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文獻電算化研究(Ⅲ)

-海洋文獻情報檢索-

Information Retrieval System(Ⅲ)

—Oceanographic Information Retrieval System—

1988.2.

韓國科學技術院
海洋研究所

提 出 文

海洋研究所長 貴下

本 報告書를 "1987年度 文獻電算化研究"의 最終報告書로 提出합니다.

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要 約 文

Ⅰ. 題 目

文獻電算化研究 (Ⅲ) -海洋文獻情報檢索-

Ⅱ. 研究開發의 重要性 및 目的

이른바 "情報化 時代"로 불리는 現代社會에 있어서 尖端科學이 創出해 내는 情報의 量은 나날이 增加되고 있는 趨勢이며, 이같은 수많은 情報속에서 個人이 필요로 하는 情報의 選擇과 入受의 어려움은 날로 가중되어 가고 있다.

따라서 本 研究所에서는 海洋情報檢索시스템을 確立함으로써 國內外 각 有關機關, 海洋學界의 研究者들이 迅速하고 正確하게 海洋文獻情報를 利用할 수 있도록 본 研究를 遂行하였다.

Ⅲ. 研究開發의 內容

가. Deep-Sea Research; Vol.33,No.11(1986.11)~Vol.34,No.9(1987.9)

나. 韓國海洋學會誌 ; Vol.22(1987)

다. 韓國水産學會誌 ; Vol.1(1968) ~Vol.13(1980),Vol.20(1987)

라. Marine Policy ; Vol.10, No.3(1986.7)~Vol.11,No.4(1987.10)

마. Acta Oceanologica Sinica ; Vol.1(1982)~Vol.6,No.3(1987.7)

바. Continental Shelf Research ; Vol.1(1982)~Vol.7,No.10(1987.10)

사. 海洋研究 (舊題 : 海洋研究所 所報) ; Vol.1(1979)~Vol.9(1987)

아. 研究文獻 (Paper) ; 700개

의 文獻들을 1)區分 (報告書, Paper, Microfilm資料), 2) 著者, 3)文獻題目, 4)書誌事項 (雜誌名, 券号, Page, 發行年度), 5)出版社, 出版地, 6)分類記號 (또는 報告書番号, Paper No.), 7)使用言語, 8)主要語 (Key Words), 9)抄録(Abstract)등의 內容으로 分析, 入力하여 이들 情報를 利用者들이 迅速, 正確하게 찾아 利用할수 있도록 하는 效率的인 情報檢索시스템을 構築하는 것이다.

Ⅳ. 研究開發의 結果

本 研究의 結果로 國內海洋科學分野의 研究者들에게 보다 迅速하고 正確한 情報를 提供할 수 있게 되었다. 그러나 충분한 情報서어비스를 提供하기에는 入力資料量이 부족한 실정이다. 따라서 事業의 持續的인 수행을 통해 海洋科學技術情報를 보다 체계적으로 蒐集. 分析함으로써 향후 海洋科學 全般에 걸친 綜合的인 데이타베이스가 構築되어야 할 것이다.

SUMMARY

I. Title

Information Retrieval System(III) - Oceanographic Information Retrieval System -

II. Objective and Significance

Rapid scientific and technological progress has been creating an enormous amount of new information, and thus it has become more difficult for individual users to choose and obtain relevant information. This study thus aims at developing an oceanographic information retrieval system which will make new and accumulated information more accessible to potential users.

III. Scope

1) Materials

a) Deep-Sea Research : Vol. 33, No. 11(1986. 11) - Vol. 34, No. 9(1987. 9)

b) Journal of the Oceanological Society of Korea : Vol. 22(1987)

c) Bulletin of the Korean Fisheries Society :
Vol. 1(1968) - Vol. 13(1980), Vol. 20(1987)

d) Marine Policy : Vol. 10, No. 3(1986. 7) - Vol. 11, No. 4(1987. 10)

e) Acta Oceanologica Sinica : Vol. 1(1982) - Vol. 6, No. 3(1987. 7)

f) Continental Shelf Research : Vol. 1(1982) - Vol. 7, No. 10(1987. 10)

g) Ocean Research : Vol. 1(1979) - Vol. 9(1987)

h) Paper : 700 articles

2) Input Data

a) Type : Report, Paper, Journal, Microfilm, etc.
b) Author
c) Title
d) Bibliography : Journal Name, Volume, Number, Page
e) Publisher, City
f) Classification Number, Report Number, Paper Number
g) Language
h) Key Words
i) Abstract

IV. Results

As a result of this study, an oceanographic information retrieval system has been developed. This system makes it easier for individual information users to choose, locate, and obtain information via simple personal computer operation. However, as the amount of data put in the system is very limited, it is necessary to continue this study to enlarge the volume of information within the system and to further improve the system. The results of this multi-year study will eventually be used for building an oceanographic data base.

일러두기

1. 構 成

Abstracted Information編과 Index 編으로 区分하였고, Abstracted Information 編은 General, Law & Economics, Physical Oceanography, Marine Meteorology, Chemical Oceanography, Marine Geology, Marine Biology & Fisheries, Ocean Technology & Engineering, Marine Pollution 으로, Index 編은 Author Index, Subject Index, Geographic Index, Taxonomic Index 로 구성하였다.

2. 排 列

가. Abstracted Information

① ② ③
87PH0007. M.S.Longuett-Higgins. 1985. ④ THE ASYMPTOTIC BEHAVIOUR OF THE COEFFICIENTS IN STOKES SERIES FOR SURFACE GRAVITY WAVES. ⑤ J.APPL.MECHANICS, ⑥ 34:269-277, ⑦ AME. SOC. MECH. ENG., N.Y. ⑧ PN-2933. ⑨ EN.

⑩ It is shown that the asymptotic behaviour of the coefficients a(n) at high order n and at large wave steepness ak is determined mainly by the limiting from of the wave crest.

① . Citation No.
② . Author
③ . Year
④ . Title
⑤ . Journal (or Book)
⑥ . Vol.(No.):Page
⑦ . Publisher, City
⑧ . Paper No.
⑨ . Language
⑩ . Abstract

나. Author Index : 著者名의 Alphabet順 排列.

다. Subject Index : Key Word의 Alphabet順 排列.

라. Geographic Index : 地名의 Alphabet順 排列.

마. Taxonomic Index : 生物學名의 Alphabet順 排列.

3. 記載事項

가. Citation No.는 分野別 일련번호임.

나. 文獻題目은 100字, Abstract는 800 字까지 入力하였고 字数 초과시 끝부분에 "+"를 표시하여 題目이나 Abstract가 끝나지 않음을 나타냈다.

다. 著 者

1). 共著인 경우 4人까지 著者名을 入力하였고 5 인 이상인 경우에는 첫著者名 다음에 "et al."을 附記하여 주었다.

2). 韓國人名은 著者名을 풀어썼고 이름사이에 "-"를 넣어 통일시켰다 ((例, Lee, Jin Hwan →Lee, Jin-Hwan)

3). 同一人의 著者名이 相異하게 표기된 경우 원본대로 入力하였다 (例, Kim, Soon-Seon, Kim, Soon-Seun).

라. 言語 : 使用된 各 言語의 略字

Chinese : CH	English : EN	French : FR	German : DE
Italian : IT	Japanese: JA	Korean : KO	Netherlands: HO
Portuguese: PT	Russian : RU	Spanish: SP	

마. PN(Paper No.) 은 研究所 圖書室에서의 整理番号임.

바. Umlaut는 무시하였음.

사. 사용된 略字는 卷頭에 "Abbreviation"欄을 두어 略字풀이를 하였다.

아. 資料의 Source가 單行本인 경우에는 Vol.No. 欄에 BK로 표시하였다.

CONTENTS

ABBREVIATION

AABW : Antarctic Bottom Water.

AAS : Atomic Absorption Spectrophotometry.

ABW : Arctic Bottom Water.

ACD : Aragonite Compensation Depth.

ACMRR (FAO) : Advisory Committee on Marine Resources Research.

ADCP : Acoustic Doppler Current Profiler.

ADE method : Alternating Direction Explicit method.

ADI method : Alternating Direction Implicit method.

AIDJEX : Arctic Ice Dynamics Joint Experiment.

ANGUS : Acoustically-Navigated Geological Undersea Surveyor.

AODW : Arctic Ocean Deep Water.

AOU : Apparent Oxygen Utilization.

APDC : Ammonium Pyrrolidinedithiocarbamate.

ARC : Agulhas Retroflection Cruise.

ARSLOE : The Atlantic Ocean Remote Sensing Land-Ocean Experiment.

ASOC : Antarctic and Southern Ocean Coalition.

ASW : Antisubmarine Warfare.

ATA : American Tunaboat Association.

ATP : Adenosine Triphosphate.

AV : Acid Value.

AVHRR : Advanced Very High Resolution Radiometer.

AWG : Aquaculture Working Group of the EEC Consultative Committee on Fisheries.

AWS : Automatic Weather Station.

AXBT : Airborne Expendable Bathythermograph.

BACS : Ballon Camera System.

BBL : Benthic Boundary Layer.

BIOMASS : Biological Investigations of Marine Antarctic Systems and Stocks.

BKD : Bacterial Kidney Disease.

BNL : Benthic (Bottom) Nepheloid Layer.

BOD : Biochemical (Biological) Oxygen Demand.

BP : Benzo [a] Pyrene.

BTS : Bottom Temperatures of the Vointer Snow Cover.

BWT : Bottom Water Temperature.

CAA : California Abalone Association.

CCAMLR : Commission for the Conservation of Antarctic Marine Living Resources.

CCCO (IOC-SCOR) : Committee on Climate Changes and the Ocean.

CCD : Calcite (Carbonate, Calcium Carbonate) Compensation Depth.

CECAF : Fishery Committee for the East Central Atlantic.

CEE : Controlled Experimental Ecosystem.

CFAS : Cooperative Fisheries Agreements.

CFC : Chlorofluorocarbon.

CFP : Common Fisheries Policy.

CHN : Carbon, Hydrogen, Nitrogen.

CINECA : Cooperative Investigation of the Northern Part of the Eastern Central Atlantic.

CMAS : Completed Mixing Activated Sludge.

CMICE : Current Meter Intercomparison Experiment.

CNES : Centre National d'Etude Spatiales.

CNP : Central North Pacific Ocean.

COC : Critical Oxygen Concentration.

COD : Chemical Oxygen Demand.

COSPAR (ICSU) : Committee on Space Research.

COV : Carbonyl Value.

CPR : Continuous Plankton Recorder.

CPT : Cone Penetration Test.

CPW : Circumpolar Water.

CS : Continental Shelf.

CSK : Cooperative Studies of the Kuroshio.

CTD : Conductivity-Temperature-Depth.

CUEA : Coastal Upwelling Ecosystems Analysis.

CW : Carapace Width.

CWP : Cold-Water Pipe.

CZCS : Coastal Zone Color Scanner.

CZM : Coastal Zone Management.

DBNA : Di-Iso-Butylnitrosoamine.

DCS : Direct Current Stripping Voltammetry.

DFG : Department of Fish and Games.

DHA : Docosahexaenoic Acid.

DMA : Dimethylamine.

DMS : Dimethylsulfide.

DNA : Deoxyribonucleic Acid.

DNI : Distance to the Nearest Island.

DO : Dissolved Oxygen.

DOC : Dissolved Organic Carbon.

DOMES : Deep Sea Mining Environmental Study.

DON : Dissolved Organic Nitrogen.

DOP : Dissolved Organic Phosphorus.

DPS : Differential Pulse Stripping Voltammetry.

DRXBT : Digital Recording Expendable Bathythermograph.

DSBM : Deep Seabed Mining.

DSDP : Deep Sea Drilling Project.

DSL : Deep Scattering Layer.

DSRV : Deep-Sea Research Vessel.

DWBC : Deep Western Boundary Current.

DWFNs : Distant Water Fishing Nations.

EAC : East Australian Current.

EASTROPAC : Eastern Tropical Pacific Ocean.

EDTA : Ethylenediaminetetraacetic Acid.

EDTC : European Diving Technology Committee.

EEC : European Economic Community.

EEG : Electroencephalograph.

EEZ : Exclusive Economic Zone.

EFJ : Extended Fisheries Jurisdiction.

EFZ : Economic Fishery Zone.

EKWC : East Korean Warm Current.

EMVP : Electro-Magnetic Velocity Profiler.

EOF : Empirical Orthogonal Function.

EPA : Eicosapentaenoic Acid.

EPR : East Pacific Rise.

EPROM : Erasable Programmable Read Only Memory.

ERR : Economic Rate of Return.

ERS : European Remote Sensing Sattellite.

ERTS : Earth Resources Technology Satellite.

ETNP : Eastern Tropical North Pacific.

ETS : Electron Transport System.

EUC : Equatorial Undercurrent.

FAMOUS : French-American Mid-Ocean Undersea Study.

FAO : Food and Agriculture Organization.

FCMA : Fishery Conservation and Management Act.

FCT : Flux Corrected Transport.

FCZ : Fishery Conservation Zone.

FDI : Foreign Direct Investment.

FDM : Finite Difference Model.

FEM : Finite Element Method.

FES : Flame Emission Spectrophotometry.

FFT : Fast Fourier Transform.

FGGE : First GARP Global Experiment.

FLEX : Fladen Ground Experiment.

FNPS : Floating Nuclear Power Plants.

FOC : Flags of Convenience.

FOCAL : Programme Francais Ocean Climat en Atlantique Equatorial.

FPC : Fish Protein Concentration.

FPD : Flame Photometric Detector.

FRP : Fiberglass Reinforced Plastic.

FRR : Financial Rate of Return.

FRT : Fast Response Thermistor.

FTB : Floating Tire Breakwater.

FUROF : Future Role and Functions.

GARP : Global Atmospheric Research Programme.

GATE : GARP Atlantic Tropical Experiment.

GDH : Glutamate Dehydrogenase.

GDS : Geographically Disadvantaged States.

GEBCO : General Bathymetric Map of the Oceans.

GEK : Geomagnetic Electrokinetograph.

GEMBASE : General Ecosystem Model of the Bristol Channel and Severn Estuary.

GEOSECS : Geochemical Ocean Sections.

GESAMP : Joint Group of Experts on the Scientific Aspects of Marine Pollution.

GFCM : General Fisheries Council for the Mediterranean.

GIPME : Global Investigation of Pollution in the Marine Environment.

GL : Glycolipid.

GLC : Gas Liquid Chromatography.

GSFC : Goddard Space Flight Center.

GSI : Gonadosomatic Index. (Global Solar Irradiation).

GTH : Gonadotrophs.

GTP : Guyed Tower Platform.

HAT : Highest Astronomical Tide.

HEBBLE : High Energy Benthic Boundary Layer Experiment.

HF : High Frequency.

HFO : Hydrous Ferric Oxide.

HMDE : Hanging Mercury Drop Electrode.

HPLC : High-Performance Liquid Chromatography.

HRIR : High Resolution Infrared Radiometer.

HSI : Hepatosomatic Index.

HTO : Hydrous Titanium Oxide.

HVR : High Velocity Region.

IATTC : Inter-American Tropical Tuna Commission.

IAVCEI : International Association of Volcanology and Chemistry of the Earths.

ICAO : International Civil Aviation Organization.

ICCAT : International Commission for the Conservation of Atlantic Tunas.

ICES : International Council for the Exploration of the Sea.

ICJ : International Court of Justice.

ICNAF : International Commission for Northwest Atlantic Fisheries.

ICNT : Informal Composite Negotiating Text.

ICSU : International Council of Scientific Unions.

IDMS : Isotope Dilution Mass Spectrometry.

IDOE : International Decade of Ocean Exploration.

IEF : Isoelectric Focusing.

IES : Inverted Echo-Sounder.

IFP : Institut Francais de Petrole.

IGOSS : Integrated Global Ocean Services System.

IGY : International Geophysical Year.

IIED : International Institute for Environment and Development.

IIOE : International Indian Ocean Expedition.

IMO : International Maritime Organization.

INL : Intermediate Nepheloid Layer.

INMARSAT : International Maritime Satellite.

IOBC : Indian Ocean Biological Centre.

IOC (UNESCO) : Intergovernmental Oceanographic Commission.

IODE : International Oceanographic Data and Information Exchange.

IOZP : Indian Ocean as a Zone of Peace.

IR : Infrared.

IRT : Infrared Radiation Thermometry.

ISA : International Seabed Authority.

ISOW : Iceland-Scotland Overflow Water.

ITCZ : Intertropical Convergence Zone.

ITU : International Telecommunication Union.

IUBS (ICSU) : International Union of Biological Sciences.

IUCN : International Union for Conservation of Nature and Natural Resources.

IUGG (ICSU) : International Union of Geodesy and Geophysics.

IUPS : International Union of Physiological Sciences.

IV : Iodine Value.

IWC : International Whaling Commission.

IWEX : Internal Wave Experiment.

JASIN : Joint Air-Sea Interaction (Experiment).

JOIDES : Joint Oceanographic Institution for Deep Earth Sampling.

JONSDAP : Joint North Sea Data Acquisition Project.

JONSWAP : Joint North Sea Wave Project.

KONOD : Korea Ocean Nodule Development.

KWCR : Kuroshio Warm Core-Ring.

KdV : Karteweg-de Vries.

LAA : Large Amorphous Aggregates.

LAAD : Last-Abundance-Appearance Datum.

LAS : Linear Alkylate Sulfonate.

LDC : Less Developed Country. (London Dumping Convention).

LED : Light Emitting Diode.

LHPO : Linoleic Acid Hydroperoxide.

LHPR : Longhurst-Hardy Plankton Recorder.

LLGDS : Land-Locked and Geographically Disadvantaged State.

LLJ : Low-Level Jets.

LLS : Land-Locked States.

LNG : Liquefied Natural Gas.

LOF : Lloyd's Standard Form of Salvage Agreement.

LORAN : Long Range Navigation.

LOSC : Law of the Sea Convention.

LPD : Light Penetration Depth.

LT : Lethal Time.

LVFS : Large Volume in situ Filtration System.

MAFF : Ministry of Agriculture, Fisheries and Food.

MAFG : Modified Anti-Interference Fluorometric Reagent.

MANOP : Manganese Nodule Program.

MARPOL : International Convention for the Prevention of Pollution from Ships.

MEAAI : Modified Essential Amino Acid Index.

MEPC : Marine Environment Protection Committee.

MET : Mode Enhancement Technique.

MFO : Mixed-Function Oxygenase.

MIAS : Marine Information and Advisory Service.

MILE : Mixed Layer Experiment.

MIZ : Marginal Ice Edge Zone.

MLD : Mixed Layer Depth.

MLT : Mixed Layer Temperature.

MOBS : Miniature Optical Backscatter Sensor.

MOCNESS : Multiple Opening/Closing Net and Environmental Sensing System.

MOD : Model Output Diagnosis.

MODE : Mid-Ocean Dynamics Experiment.

MONEX : Monsoon Experiment.

MORB : Mid-Ocean Ridge Basalt.

MSL : Mean Sea Level.

MSS : Multispectral Scanner.

MSSTS : McMurdo Sound Sediment and Tectonic Studies.

MSY : Maximum Sustainable Yield.

MULES : Mixed Upper-Layer Ecotrophic Simulation.

MW : Molecular Weight (Mediterranean Water).

N-ROSS : U.S. Navy Remote Ocean Sensing System.

NAC : Noth Atlantic Current.

NADW : North Atlantic Deep Water.

NASA : National Aeronautics and Space Administration.

NBS : National Bureau of Standard.

NEAFC : North East Atlantic Fisheries Commission.

NECC : North Equatorial Countercurrent.

NGO : Non-Governmental Organization.

NIEO : New International Economic Order.

NKCC : North Korean Cold Current.

NL : Neutral Lipid.

NMDSL : Nonmigratory Deep Sound-Scattering Layer.

NMFS : National Marine Fisheries Service.

NMR : Nuclear Magnetic Resonance.

NOAA : National Oceanic and Atmospheric Administration.

NOAMP : Nord-Ost Atlantisches Monitoring Programme.

NODC : National Oceanographic Data Center.

NORPAX : North Pacific Experiment.

NR : Nitrate Reductase.

NRM : Natural Remanent Magnetisation.

NSCAT : NASA's Scatterometer.

NSDW : Norwegian Sea Deep Water.

OBS : Ocean-Bottom Seismographs.

ODEX : Optical Dynamics Experiment.

OECD : Organization for Economic Cooperation and Development.

OPOL : Offshore Pollution Liability Agreement.

OSCR : Ocean Surface Current Radar.

OSY : Optimum Sustainable Yield.

OTEC : Ocean Thermal Energy Conversion.

OWS : Ocean Weather Ship.

PAR : Photosynthetically Available Radiation.

PBL : Planetary Boundary Layer.

PCB : Polychlorinated Biphenyl.

PDB : Paradichlorobenzene.

PDE : Partial Differential Equation.

PDR : Precision Depth Recorder.

PG : Prostaglandin.

PGA : Propylene Glycol Alginate.

PGM : Phosphoglucomutase.

PGR : Precision Graphic Recorder.

PL : Phospholipid.

PN : Particulate Nitrogen.

POC : Particulate Organic Carbon.

POLEX-SOUTH : Polar Experiment-South.

PON : Particulate Organic Nitrogen.

POV : Peroxide Value.

PPC : Phytoplankton Carbon.

PPDRI : Pepsin-Pancreatin Digest Residue Index.

PPMT : Pre-Pilot Mining Test.

PRECOM : Preparatory Commission for the International Seabed Authority and for the International Tribunal for the Law of the Sea.

PREPCOM : Preparatory Commission.

PRM : Presidential Review Memorandum.

PROBES : Processes and Resources of the Bering Sea Shelf.

PRT : Platinum Resistance Thermometer.

PSP : Paralytic Shellfish Poison.

PSS : Pacific Salinity Scale.

PUBP : Pop-Up Ocean-Bottom Seismograph.

PV : Potential Vorticity.

PVC : Polyvinyl Chloride.

PVT : Pressure-Volume-Temperature.

RBCM : Rapid Boundary Current Meter.

RCM : Recording Current Meter.

REMSMAS : Removable Screen Media-Activated Sludge.

RF : Radio Frequency.

RNA : Ribonucleic Acid.

RSA : Reciprocating States Agreement.

RSSR : Red Sea Submersible Research.

RUM : Remote Underwater Manipulator.

SACW : South Atlantic Central Water.

SADCO : South African Data Centre for Oceanography.

SALM : Single Anchor Leg Mooring.

SAMS : Surface-Actuated Multiple Samplers.

SAR : Synthetic Aperture Radar.

SBOTS : Spar Buoy Oceanographic Telemetry Systems.

SCAR (ICSU) : Scientific Committee on Antarctic Research.

SCM : Subsurface Chlorophyll Maximum.

SCOR (ICSU) : Scientific Committee on Oceanic Research.

SDS : Sodium Dodecylsulfate.

SEM : Scanning Electron Microscopy.

SEQUAL : Seasonal Equatorial Atlantic Response Program.

SGD : Submarine Groundwater Discharge.

SH : Subtropical High.

SHP : Subtropical High Pressure.

SMBA : Scottish Marine Bialogical Association.

SMC : Suspended Matter Concentration.

SMS : Seafloor Mapping System.

SOFAR : Sound Fixing and Ranging.

SOLAS : Safety of Life at Sea.

SPC : South Pacific Commission.

SPM : Suspended Particulate Matter.

SPS : South Pacific States.

SSC : Suspended Sediment Concentration.

SSCC : Sea Surface Chlorophyll Concentration.

SST : Sea Surface Temperature.

SSW : Standard Seawater.

STC : Subtropical Convergence.

STD : Salinity-Temperature-Depth.

SeaMARC : Sea Mapping and Remote Characterization.

TAC : Total Allowable Catch.

TBA : Thiobarbituric Acid.

TDD : Two-Degree Discontinuity.

TEGDM : Tetraethyleneglycole Dimethacrylate.

TEM : Transmission Electron Microscopy.

TFE : Thin Film Epoxy.

TIS : Trypsin Indigestible Substrate.

TL : Total Lipid.

TLC : Thin Layer Chromatography.

TLP : Tension Leg Platform.

TMA : Trimethylamine.

TOGA : Tropical Ocean Global Atmosphere.

TOTO : Tongue of the Ocean.

TPP : Total Particulate Phosphorus.

TSA : Training Services Agency.

TSSS : Traffic Separation Schemes.

TSV : Temperature-Salinity-Volume.

UNCLOS : United Nations Conference on the Law of the Sea.

UNCTAD : United Nations Conference on Trade and Development.

UNDP : United Nations Developing Programme.

UNEP : United Nations Environment Programme.

UNESCO : United Nations Educational, Scientific and Cultural Organization.

UOD : Ultimate Optical Density.

UOR : Undulating Oceanographic Recorder.

URSI (ICSU) : Union of Radio Science.

UTC : Underwater Training Centre.

UV : Ultraviolet.

VACM : Vector Averaging Current Meter.

VBN : Volatile Basic Nitrogen.

VERTEX : Vertical Transport and Exchange.

VLF : Very Low Frequency.

VMCM : Vector Measuring Current Meter.

VPA : Virtual Population Analyses. (Cohort Analysis).

VRM : Viscous Remanent Magnetization.

WCR : Warm-Core (Gulf Stream) Ring.

WCRP : World Climate Research Programme.

WDW : Warm Deep Water (Weddell Deep Water).

WELDAP : Welding in a Atmospheric Pressure.

WMO : World Meteorological Organization.

WNPCW : Western North Pacific Central Water.

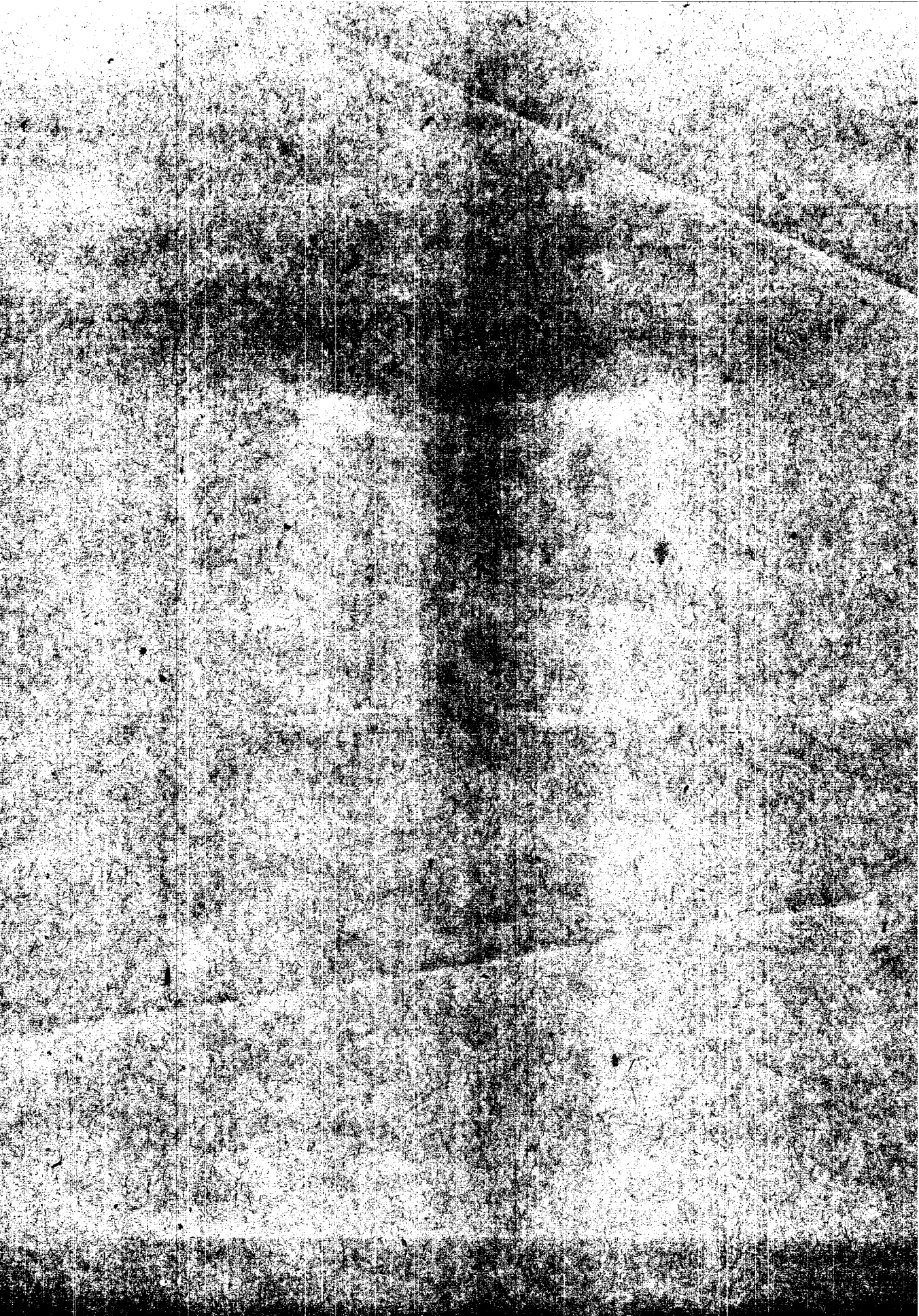
WOCE : World Ocean Circulation Experiment.

XBT : Expendable Bathythermograph.

XDP : Expendable Dissipation Profiler.

YSBCW : Yellow Sea Bottom Cold Water.

General (GN)



87GN0001. J.AIKEN, J.KELLY. 1984. A SOLID STATE SENSOR FOR MAPPING AND PROFILING STIMULATED BIOLUMINESCENCE IN THE MARINE ENVIRONMEN+. CONTINENTAL SHELF RES. 3(4):455-464. PERGAMON PRESS, OXFORD. EN.

This paper describes the design and development of a solid state sensor for the measurement, in situ, of stimulable bioluminescence of marine organisms. It can be towed inthe Undulating Oceanographic Recorder or used in vertical profiling mode from a stationary research vessel. Measurements of bioluminescence and associated environmental conditions are presented from a variety of deployments of the sensor in the Undulating Oceanographic Recorder.

87GN0002. H.TAKEOKA. 1984. FUNDAMENTAL CONCEPTS OF EXCHANGE AND TRANSPORT TIME SCALES IN A COASTAL SEA. CONTINENTAL SHELF RES. 3(3):311-326. PERGAMON PRESS, OXFORD. EN.

Concepts of age, residence time, transit time, and turn-over time are summarized which are useful for describing the exchange and transport of water or materials in a coastal sea. The age of a particle is defined as a time which has elapsed since it entered the reservoir, and the residence time is defined as a time which will be taken for a particle to reach the outlet. Time scales based on the age are simply related with those based on the residence time. It is shown that a suitable time scale for representing the exchange characteristics is the average residence time and not the turnover time, which has often been used as the exchange time scale. The average residence time in a one-dimensional channel and bay is obtained from the solutions of the advection-diffusion equation.

87GN0003. H.TAKEOKA. 1984. EXCHANGE AND TRANSPORT TIME SCALES IN THE SETO INLAND SEA. CONTINENTAL SHELF RES. 3(4):327-341. PERGAMON PRESS, OXFORD. EN.

Five typical water volumes in the Seto Inland Sea are defined, and their average residence times, remnant functions, and residence time distribution functions are obtained, mainly from results of hydraulic model experiments; the average residence times and the functions well describe characteristics of exchange and transport of materials in the sea. A representative residence time, which is the average residence time of the total water in the inland sea is about 15 months.

87GN0004. A.J.WATSON, M.I.LIDDICOAT, J.R.LEDWELL. 1987(1). PERFLUORODECALIN AND SULPHUR HEXAFLUORIDE AS PURPOSEFUL MARINE TRACERS: SOME DEPLOYMENT AND ANALYS+. DEEP-SEA RES. 34(1):19-31. PERGAMON PRESS, OXFORD. EN.

We describe a method for releasing perfluorodecalin into the sea in a manner which promotes its dissolution and dispersion, and apparatus suitable for shipboard use which analyses seawater for this substance rapidly, automatically and repeatedly. Results of a small-scale field trial in the English Channel are presented. For large-scale experiments sulphur hexafluoride may be a superior tracer to perfluorodecalin (provided that a suitable release technique can be devised), since the analysis for sulphur hexafluoride is easier and more sensitive.

87GN0005. Y.YOSHIDA. 1981. SOME ASPECTS OF THE JAPANESE ANTARCTIC RESEARCH EXPEDITION - PROGRESS OF EARTH SCIENCE PROGRAMMES-. J. GEOGR. 90(2):103-111. TOKYO GEOGR. SOC. PN-2733. JA.

In the austral summer of 1911-1912, Lieutenant Shirase organized the first Japanese Antarctic Expedition and explored the eastern part of Ross Ice Shelf and a part of Edward VII Peninsula. After that, only a few bibliographical studies were conducted by some scholars and people who are interested in polar expeditions. Japan resumed its Antarctic activity on the occasion of the International Geophysical Year in 1957-1958. Since then, multi-disciplinary scientific investigations have been continued within the framework of international cooperation. The progress of the earth science research in the Japanese Antarctic Research Expedition can be devided chronologically into four stages. In the first stage from 1957 to 1968, the research in earth science provided fundamental knowledge on +.

87GN0006. Y.YOSHIDA. 1984(3). ACTIVITIES OF THE WINTERING PARTY OF THE 22ND JAPANESE ANTARCTIC RESEARCH EXPEDITION IN 1981-1982. ANTARCTIC RECORD. (81):45-71. NAT. INST. POLAR RES., TOKYO. PN-2732. JA.

Thirty-four men of the wintering party occupied Syowa Station and Mizuho Station from February 1, 1981 to January 31, 1982, carrying out observations in many scientific disciplines, particularly laying emphasis on "Polar Experiment-south (POLEX-South)" and on "the studies of crustal structure of the Lutzow-Holm Bay region" whose programs cover the last phase of the two three-year projects. In the POLEX-South project, micro-meteorological and aerological observations were carried out in the inland plateau during the oversnow traverses, as well as micro-meteorology at Mizuho Station. Glaciological studies were also conducted at the same time. The studies of crustal structure consist of aeromagnetic survey, gravity measurement, heat flow measurement, ground-tilt measurement, and submarin+.

87GN0007. YONG-GWAN.KIM, KWANG-BAE.KOH, BONG-SEUK.HA 1987(3). WATER QUALITY OF THE ENVIRONMENTAL WATER AT CHINJU AREA. BULL. KOREAN FISH. SOC. 20(2):126-135. KOREAN FISH. SOC., PUSAN. KO.

The physical properties, coliform groups, and nutrients were investigated to evaluate the sanitary quality of the environmental water at Chinju area from May to October, 1986.

87GN0008. SANGBOK D.HAHN. 1979(1). CHALLENGER EXPEDITION AND CHALLENGER REPORTS. BULL. KORDI. 1(1):53-62. KORDI., SEOUL. KO.

The Challenger Expedition was completed in 1876

after circumnavigating the glove for over three and a half years. The Challenger Report was organized in 1876 under the direction of C.W. Thomson, and was completed under the editorship of John Murray with 50 volumes; Narrative of the Voyage 3 volumes, Physics and Chemistry 2 volumes, Deep-sea Deposits 1 volume, botany 2 volumes, Zoology 40 volumes and Summary of Scientific Results 2 volumes. It contains an unprecedented amount of information about oceans, thereby founding the science of oceanography.

87GN0009. 1982. CONSULTANCY ON ESTABLISHMENT OF A HYDRAULICS LABORATORY, KOREA OCEAN RESEARCH AND DEVELOPMENT INST+. DELFT HYDRAULICS LAB., DELFT. PN-3028. EN.

87GN0010. 1983. HYDROMETRIC AND HYDRAULICS PROJECT TECHNICAL COOPERATION WITH THE INSTITUTE OF HYDRAULIC ENGINEERI+. DELFT HYDRAULICS LAB., DELFT. PN-3027. EN.

87GN0011. R.J.BOYD. 1985. FISHERIES RESEARCH LABORATORY. ANN. REPORT ON RES. & TECHNICAL WORK. 115-121. DEPT. AGR., N. IRELAND. PN-2874. EN.

87GN0012. WON-OH.SONG, SOON-KEUN.CHANG. 1987(12). SITE SURVEY FOR THE KOREAN ANTARCTIC RESEARCH STATION. OCEAN RES. 9(1/2):65-77. KORDI., ANSAN. KO.

The Korean Government decided to establish a scientific Research Station in the Antarctic. The first Korean Antarctic Research Station is to be established on King George Island of South Shetland Islands, West Antarctica. King George Island is an ideal place for the first Korean Antarctic Research Station in terms that the Korea Ocean Research and Development Institute, the main organizer of Korean Antarctic research, could put emphasis on research fields of oceanography and environmental protection, and that logistics is easy in comparison to other remote harsh areas. A team was dispatched to make a reconnaissance survey of the site. The survey team was composed of eight persons; three scientists including authors from KORDI, four engineers from the Hyundai Engineering Co., Ltd., Seo+.

87GN0013. D.M.GRAHAM. 1984(3). FIFTEEN YEARS OF PRECISE POSITIONING. SEA TECHNOLOGY. 25(3):37-41. COMPASS PUB., ARLINGTON. PN-3007. EN.

87GN0014. R.J.BOYD. 1986. FISHERIES RESEARCH LABORATORY. ANN. REP. RES., DEV. & TECH. WORT. 115-122. DEPT. AGR., N. IRELAND. PN-3100. EN.

87GN0015. 1987(9). QUESTION OF ANTARCTICA, REPORT OF THE SECRETARY-GENERAL. U.N. GENERAL ASSEMBLY, FORTY-SECOND SESSION, AGENDA ITEM 70. V.42A(586):4-17. U.N. PN-3071. EN.

87GN0016. 1986. REPORT OF THE WORKSHOP ON THE APPLICATION OF REMOTE SENSING TECHNIQUES TO WATER RESOURCES DEVELOPM+. 28P. ESCAP. PN-2734. EN.

87GN0017. KEE-SOO.NAM. 1981(12). LITERATURE SURVEY, 1. CIRCULATION, MIXING, AND DISPERSION PHENOMENA IN ESTUARINE AREAS. BULL. KORDI. 3(2):155-172. KORDI., SEOUL. KO.

This literature survey contains research articles and reports on theories, field studies, data analyses, laboratory experiments, analytical, numerical and hydraulic model tests on physical oceanographical phenomena in rivers, estuaries, and coastal water - circulations, currents, mixing, diffusion, and dispersion, etc. - and various factors influencing them. Each article is presented by the author name(s), title, source, key words and remarks. The key words selected are those which the author believes outline the content of the article and the objectives, or results, or the logical developments of the article are given as the remarks.

87GN0018. KEE-SOO.NAM, CHANG-SHIK.KIM. 1981(4). ASSESSMENT OF PHYSICAL OCEANOGRAPHICAL STUDIES AND METHODS IN ESTUARIES AND COASTAL AREAS AROUND K+. BULL. KORDI. 3(1):53-67. KORDI., SEOUL. KO.

This bibliographical studies consists of a list of research papers and reports on physical oceanographical studies in the estuarine and coastal areas around the Korean Peninsula and a brief classification table according to the study areas and contents. This list is intended to cover most of the research papers on physical oceanographical studies done during the last decade but by no means exclusive.

87GN0019. KEE-SOO.NAM. 1982(12). LITERATURE SURVEY (2), 1. CIRCULATION, MIXING, AND DISPERSION PHENOMENA IN ESTUARINE AREAS. BULL. KORDI. 4(1/2):103-118. KORDI., SEOUL. KO.

This literature survey contains research articles and reports on theories, field studies, data analyses, laboratory experiments, analytical, numerical or hydraulic model tests on physical oceanographical phenomena in rivers, estuaries, and coastal water - circulations, currents, mixing, diffusion, and dispersion, etc. - and various factors influencing them. Each article is presented by the author name(s), title, source, key words and remarks. The key words selected are those which the author believes outline the content of the article and the objectives, or results, or the logical developments of the article are given as the remarks.

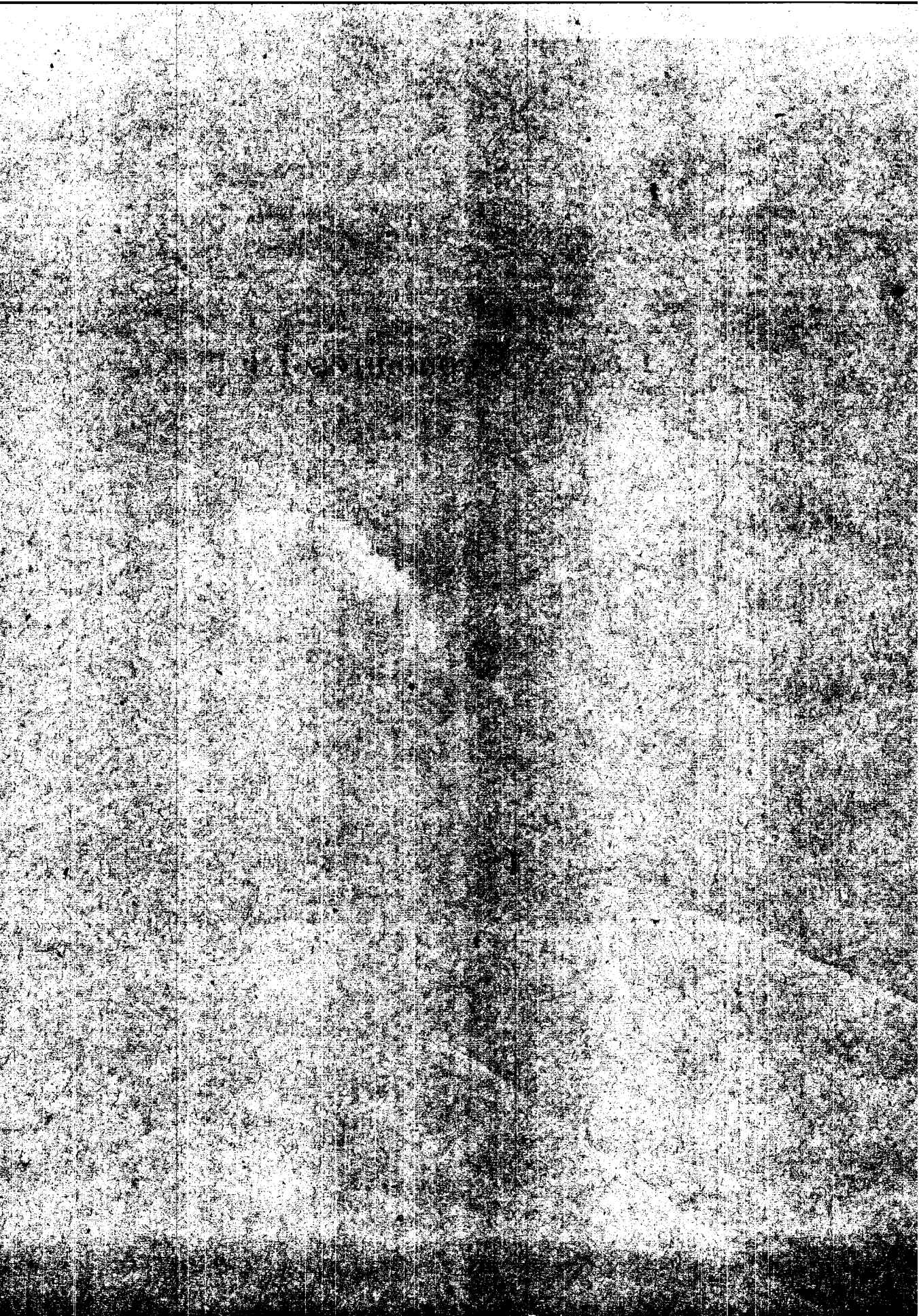
87GN0020. WON-OH.SONG. 1983(9). KORDI'S CONTRIBUTION TO KOREAN TIDAL POWER STUDIES. BULL. KORDI. 5(1):47-54. KORDI., SEOUL. KO.

This paper reviews KORDI's activities on the Korean tidal power studies from 1974 to 1981: 1) Feasibility Study of Tidal Power Plant (1974), 2) Pre-feasibility Study of Tidal Power Plant (Cheonsu Bay) (1975), 3) Pre-feasibility Study of Tidal Power Plant (Garolim Bay) (1976), 4) Pre-feasibility Study of Tidal Power

Plant (Incheon Bay) (1978), 5) Korea Tidal Power Study-1978, 6) Oceanographic Studies for Garolim Tidal Power Development (1980), and 7) Hydrographical, Meteorological, Geophysical, Sedimentological, Ecological Surveys and Tide Model Study, Feasibility Studies of Garolim Tidal Power Plant (1981). A scheme of a micro pilot tidal power plant is proposed for the next stage prior to a large scale development.

87GN0021. 1987. GOLDTHWAIT POLAR LIBRARY ACCESSIONS LIST. (40):30P. BYRD POLAR RES. CEN, COLUMBUS. PN-3038. EN.

Law & Economics(LE)



87LE0001. R.TEIWAKI. 1987(10). ACCESS AGREEMENTS IN THE SOUTH PACIFIC; KIRIBATI AND DISTANT WATER FISHING NATIONS 1979-1986. MARINE POLICY. 11(4):273-284. BUTTERWORTH SCI., GUILDFORD. EN.

This article highlights the typical problems experienced by the small island states of the south Pacific in negotiating access agreements with the major distant water fishing nations (DWFNs), notably the USA, Japan, South Korea and the USSR. The article is a post mortem of the Republic of Kiribati's experience with the DWFNs during the period from 1979 to 1986.

87LE0002. A.BERGIN. 1987(10). THE POLITICS OF PREPCOM; AUSTRALIA'S ROLE. MARINE POLICY. 11(4):299-312. BUTTERWORTH SCI., GUILDFORD. EN.

This article summarizes the general thrust of PrepCom's work and looks at how Australia has been an active participant since the first meeting. The author analyses some of the factors behind Australia's stance and discusses the policies and actions of its delegates.

87LE0003. IN-KYU.RO. 1980(8). A STUDY ON OCEAN INDUSTRIAL DEVELOPMENT POLICY FOR OFFSHORE PETROLEUM EXPLOITATION IN KOREA. BULL. KORDI. 2(1):69-76. KORDI., SEOUL. KO.

The paper attempts to suggest recommendations for the development of ocean industry for the offshore petroleum exploitation in Korea. The ocean industry is firstly defined and its industrial characteristics are elicited. Secondly, the ocean industrial activities and the market situations in the worldwide petroleum exploitation industry are briefly viewed. The oceanic inudstrial activities of Korean major companies are reviewed and the problem areas in the ocean industry are thirdly identified. Finally, the recommendations for ocean industrial policy development are suggested.

87LE0004. SUNG-GWI.KIM. 1985(12). AN ANALYSIS OF FISH PRICES BY BOX-JENKINS MODEL. OCEAN RES. 7(2):35-40. KORDI., SEOUL. KO.

Analyses of domestic fish prices by autocorrelation show that the pattern of fish prices can be classified into two categories; nonseasonal or seasonal pattern. Prices of Yellow tail, which shows typical seasonal pattern, are forecast by Box-Jenkins model. Analyses of overseas fish markets using similar methods will be useful for the management of domestic fisheries.

87LE0005. DONG-HAN.YOON. 1985(12). THE OCEAN SECTOR'S CONTRIBUTION TO GROSS NATIONAL PRODUCT: THE CASE OF KOREA. OCEAN RES. 7(2):49-57. KORDI., SEOUL. KO.

An attempt to estimate the contribution of ocean sector to the national economy of Korea was made in this paper. For the estimation, we followed the procedure proposed in Pontecarvo et al. (1980) and used the "1982 Census of Mining and Manufacturing Industries" of Korea as a major source of data. But the theoretical definition of the ocean sector could not be matched with the actual data and hence the results here are rather tentative. 1. The direct contribution of ocean sector to GNP was found to be about 5.3 percent. 2. The indirect contribution was estimated to be about 6.7 percent; the total effect, therefore, is about 12 percent. 3. The GNP elasticity of demand for ocean-related goods and services turned out to be greater than one, which implies that the ocean sector will becom+.

87LE0006. SUK-TAE.LEE. 1986(9). ECONOMIC BENEFIT OF R & D IN TYPHOON FORECASTING SYSTEM. OCEAN RES. 8(1):63-70. KORDI., ANSAN. KO.

The purpose of this paper is to estimate the benefit of R & D's in typhoon forecasting technics. For this purpose, a typhoon damage function was constructed and estimated using the historical data of typhoons which affected the Korean peninsula. The estimation result shows that one per cent improvement in forecasting accuracy reduces property damages by 5.6 per cent and personal damages by 1.5 per cent.

87LE0007. KAY-SHEK.CHO. 1982(12). ECONOMIC CONSEQUENCES OF SHIPPING CONFERENCE REGULATION. BULL. KORDI. 4(1/2):85-89. KORDI., SEOUL. EN.

A shipping conference is a kind of collective cartel of shipping lines. The conferences, by supplying most shipping services on the trade route, controlling entry or exit, making tariffs without extensive consultation with shippers, excercise monopolistic power to a considerable extent. In this study, an analysis is attempted to find the economic consequences of conference control in relation to their monopolistic power. The result shows that some measures of conference regulation such as providing substitute means of transport or establishment of a competitive merchant marine, strong organisation of shippers' councils, cargo preference or direct control of rate-making policies of the conferences will safeguard the interests of shippers and the nation as a whole. Such regulation wil+.

87LE0008. WEON-JAE.KIM. 1985(12). AN APPLICATION OF THE QUANTITATIVE MODELS TO FORECASTING THE WORLD MARKET OF BULK CARRIER. OCEAN RES. 7(2):41-47. KORDI., SEOUL. KO.

An application of the quantitative models including regression and time series model was conducted to make a persuasive prediction in the world bulk carrier market which has been suffering an excessive supply of tonnage since 1983. The first step taken for this study was to analyse the historical data of the factors involved in the market, which enabled to determine an appropriate model for the specific forecast. As a result of careful data scanning and statistical tests, a multiple linear regression model was selected to predict the cargo volume of iron ore, coal, grain, and other bulk cargo, whereas an ARIMA model seemed suitable for forecasting the scrappage and delivery tonnage of bulk carrier which have shown a cyclical pattern in their past changing behavior. According to the pr+.

87LE0009. JONG-GUK.SONG. 1985(6). LONGRUN

FORECASTING OF OCEAN-GOING CARGO VOLUME. OCEAN RES. 7(1):69-72. KORDI., SEOUL. KO.

Most of the Studies done so far fail to forecast the long term port traffic volume, which is essential for long term port development planning. This may be due to the mis-specification of the forecasting model which conventionally assumes a constant relationship between GNP and the cargo volume. This study, therefore, attempts to forecast the cargo volume of Korea by revising the model and also by combining historical data from Korea and Japan. The result seems to agree with the general hypothesis that as an economy grows the GNP elasticity of cargo traffics declines.

87LE0010. YOUNG-TAE.CHANG. 1985(6). ESTIMATION OF PROBABILITY DISTRIBUTION OF INTERARRIVAL TIME AND SERVICE TIME. OCEAN RES. 7(1):91-94. KORDI., SEOUL. KO.

This study tests if the application of queueing theory is suitable for the Korean port transportation system. The data set was taken from the port of Inchon, 1983 and mutiple-channel/single-phase model was assumed. The test method is to compare the observed probability distribution with the theoretical probability distribution. The result of a goodness-of-fit-test shows that the inter-arrival time and service time distribution are exponential and erlangian (K=2), respectively. The implication of the result is that the queueing theory can be applied to major Korean ports like Busan or Inchon, but further research such as simulation analysis including reneging cases is required for a more complete test.

87LE0011. R.L.FRIEDHEIM. 1986(12). THE U.S.-CANADA ARCTIC POLICY FORUM: IMPRESSIONS FROM THE AMERICAN CO-CHAIR. ARCTIC. 360-367. ARCTIC INST. N. AME., CALGARY. PN-2677. EN.

A U.S.-Canada Arctic Policy Forum, funded by the William H. Donner Foundation, Inc., New york, met to consider the need for U.S.-Canadian cooperation in the Arctic and some of the barriers thereto. The U.S. co-chair assessed the causes of conflict between the two countries, the need for cooperation and some of the sources of each side's conduct and indicated how the delegates - speaking in their capacities as private citizens - worked their way through the issues to the forum's conclusion. Sovereignty questions dominated the conflict issues. But each side had four types of similar internal problems in making arctic policy: 1) native vs. nonnative interests; 2) regional vs. central interests; 3) public vs. private interests; and 4) oil development vs. subsistence and commercial fishing+.

87LE0012. W.E.WESTERMEYER, V.GOYAL. 1986(12). JURISDICTION AND MANAGEMENT OF ARCTIC MARINE TRANSPORTATION. ARCTIC. 39(4):338-349. ARCTIC INST. N. AME., CALGARY. PN-2675. EN.

Although the United States and Canada have different views regarding jurisdiction over the waters surrounding arctic islands, both countries nevertheless share many concerns about marine transportation in high latitudes. Among these concerns are environmental protection, safety, impacts of development on northern peoples and third party transit of arctic waters. These common concerns suggest that there is much potential for cooperative activity and problem solving in the Arctic. Specific suggestions are made regarding possibilities for coordination of transit management activities. A range of options is presented for both the jurisdiction and management elements of a transit regime for the Arctic. It is the thesis of this article that, despite jurisdictional disagreements, the U.S. an+.

87LE0013. D.M.MCRAE. 1986(12). MANAGEMENT OF ARCTIC MARINE TRANSPORTATION: A CANADIAN PERSPECTIVE. ARCTIC. 39(4):350-359. ARCTIC INST. N. AME., CALGARY. PN-2676. EN.

Canada's interest in the management of the waters of the arctic archipelago has generally been expressed in terms of sovereignty. This term covers a range of interests including security, environmental protection and the protection of the way of life of northern communities, and resource exploitation. Three types of regimes can be proposed for the management of arctic marine transportation - a regime of free and open use with control over shipping remaining with the flag state of each vessel; a regime of shared jurisdiction under which arctic coastal states would jointly manage transportation throughout arctic waters, including the Northwest Passage; and a regime of coastal state jurisdiction, under which each coastal state would be responsible for all transportation in its adjacent w+.

87LE0014. SI-YOONG.YOO. 1985(6). A STUDY ON THE POTENTIAL ANALYSIS METHODS OF COASTAL ZONE IN KOREA. OCEAN RES. 7(1):83-89. KORDI., SEOUL. KO.

The Korean coastal zone is an important national area, which is closely related to development of resources of the sea-i.e. minerals, marine plants and animals, and ocean recreation. In view of this importance, it is necessary to establish the concept and the scope of the coastal zone, to ensure effective use, preservation and conservation and effective and efficient development of resources. To achieve these ends we must understand the coastal zone, environment in detail, which can be accomplished by systematic arrangement of the fundamental data about the coastal zone and analysis of the state of its use. In general, planning of coastal zone utilization as well as land use includes the following three steps; namely, 1) demand forecasting, 2) potential analysis such as scoring attract+.

87LE0015. D.L.VANDERZWAAG, C.LAMSON. 1986(12). OCEAN DEVELOPMENT AND MANAGEMENT IN THE ARCTIC: ISSUES IN AMERICAN AND CANADIAN RELATIONS. ARCTIC. 39(4):327-337. ARCTIC INST. N. AME., CALGARY. PN-2674. EN.

The need for Canadian-American cooperative ocean management in the Arctic stems from four factors. Transboundary ocean currents have the potential to carry marine pollutants from one country to the other.

Many living resources, such as bowhead and beluga whales, do not recognize political boundaries. Native communities depend culturally and economically on coastal resources. Technological collaboration in such areas as satellite communications and navigational aids is necessary to avoid costly duplications. Three documents - the World Conservation Strategy, the Report of the U.N. Conference on the Human Environment, and the Law of the Sea Convention - bid the United States and Canada to join hands in managing resources in a more systematic manner. At least four jurisdictional issue+.

87LE0016. DONG-WHIE.KIM, SI-YOONG.YOO, CHOON-SUN.YUN 1986(9). AN ACTIVITIES ALLOCATION MODEL USING GAME THEORY FOR COASTAL ZONE PLANNING. OCEAN RES. 8(1):71-79. KORDI., ANSAN. KO.

Coastal zone is a region where environments can be widely affected due to the movement of seawater and fresh water. Therefore if externalities between activities within a coastal zone are not fully considered in coastal zone use planning, coastal resources would not be efficiently developed from the social point of view. In order to plan an efficient utilization of coastal zones considering preservation of the environment, an activities allocation model in consideration of their interactive effects is proposed in this paper. Here, agglomeration economies are considered as a positive interactive effect, and external diseconomies are treated as a negative effect. This model is formulated by the n-person non-cooperative games and solved by computer simulation. As a case study, this model+.

87LE0017. SEOUNG-YONG.HONG. 1981(12). DEEP SEABED MINING: CURRENT ISSUES. BULL. KORDI. 3(2):141-154. KORDI., SEOUL. EN.

The characteristics, legal, economic and technological aspects of deep seabed mining which is now the major issue at the UNCLOS III are informatively examined. In the legal side, although there were contradictory disputes between the developing countries and the developed countries possessing the technology of development at the beginning, the Draft Convention-the issues of New International Economic Order were induced into-reflected recently widespread consensus on the major issues and will sooner or later be concluded politically. In the economic and industrial side, most consortia established through their governmental aids from the late 1950s have completed phase 1 of their programme and are awaiting for phase 2. In the technological side, deep seabed mining technology needs not o+.

87LE0018. JAE-CHON.PARK. 1982(12). DEEP SEABED MINING UNDER UNCERTAINTIES. BULL. KORDI. 4(1/2):91-95. KORDI., SEOUL. KO.

Political, economical and technological problems are ahead in deep seabed mining. Access to manganese nodules, therefore, should be carefully driven because of these uncertainties. Those nations who are against the law of the sea are giving rise to uncertainties in political sense, and no experience of deep seabed mining and apprehensions about future metal market are increasing them. These stem basically from two factors; our inability to predict the future and the political manipulation of new international order. The latter political risk, at the present, is more crucial for the project. But once this legal criterion is resolved, then the other risks can be quantified. A countermeasure through thorough analyses of risks should be taken before going into the exploitation of mangan+.

87LE0019. SANG-HO.YOUN. 1983(9). A STUDY ON THE INSTITUTIONAL IMPROVEMENT OF COASTAL ZONE MANAGEMENT. BULL. KORDI. 5(1):35-40. KORDI., SEOUL. KO.

The efficient utilization of space, sea water and energy resources in coastal zone should contribute a great deal in the development of the regional industries and economy. To boost technical and economic advantages in the established and new industries, it is necessary to improve the coastal zone management system through an enactment of Coastal Zone Management Act and/or establishment of a coordinating body within the existing governmental agencies. In this paper, a guideline on the long-term policy making is defined for the better utilization of the Korean coastal zone by analyzing the existing regulations, projects, methodologies and institution systems concerned.

87LE0020. SEOUNG-YONG.HONG. 1983(9). MULTI-ATTRIBUTE DECISION ANALYSIS FOR THE KOREAN DEEP SEABED MINING PROGRAM. BULL. KORDI. 5(1):41-45. KORDI., SEOUL. EN.

Options are wide open for the developing countries to participate in deep seabed mining, as the U.N. Law of the Sea convention reached the final agreement last year. Korea is one of those countries who are interested in this new ocean venture, and therefore it is time to look into a proper decision making method for an effective analysis of alternatives. In this thesis, Multi-Attribute Decision Analysis was employed to evaluate and analyze the attributes of alternatives.

87LE0021. SEOUNG-YONG.HONG, SI-YOONG.YOO. 1984(12). THE KOREAN DEEP SEABED MINING: LEGAL & ECONOMIC PERSPECTIVE. BULL. KORDI. 6(1/2):57-64. KORDI., SEOUL. KO.

Deep seabed has deposits of several useful mineral resources such as red clay, calcareous ooze, heavy metals and polymetallic sulphide nodules. Particularly, polymetallic manganese nodules containing more than 40 metals including Mn, Ni, Co and Cu are anticipated to be commercially exploited around the end of the regime under the New International Legal & Economic Order; study on possibility of economic mining technology development; forecast for the economic viability and marketability. It is observed that the successful operation of the Preparatory Commission will ensure early enforcement of Law of the Sea Treaty. The policy problem in this study is to find out the best alternative for Korea to participate in the exploitation of deep seabed resources under the newly established LOS +.

87LE0022. HAK-BONG.CHANG,

SEOUNG-YONG.HONG. 1984(12). ISSUES OF TRANSFER OF DEEP SEABED MINING TECHNOLOGY UNDER THE UN LAW OF THE SEA CONVENTION. BULL. KORDI. 6(1/2):49-55. KORDI., SEOUL. EN.

Though rules governing transfer of seabed mining technology were adopted as part of the UN Law of the Sea Convention by an absolute majority of nations in the world, some of highly developed nations who have technological and financial abilities are standing on sidelines of the Convention. If the Preparatory Commission would not produce any results acceptable to both developing and developed nations, seabed resources mining would be retarded without giving any benefits to both sides. Therefore, the controversy about deep seabed technology transfer should be settled on the basis of realism and interdependence.

87LE0023. L.A.KIMBALL. 1987. REPORT ON ANTARCTICA. 32P. INT. INST. ENVIRON. & DEV. PN-2905. EN.

87LE0024. J.A.GULLAND. 1987(10). THE MANAGEMENT OF NORTH SEA FISHERIES; LOOKING TOWARDS THE 21ST CENTURY. MARINE POLICY. 11(4):259-272. BUTTERWORTH SCI., GUILDFORD. EN.

This article looks at the complex issue of North Sea fisheries' policies. It discusses the problems of national shares, dealing first with biological issues such as the possibilities of increasing the gross value of the total catch, and second, with economic issues such as ways of increasing the net value of the fishery. Since some of the key questions cannot be answered with certainty, the last part of the article examines ways of dealing with uncertainty.

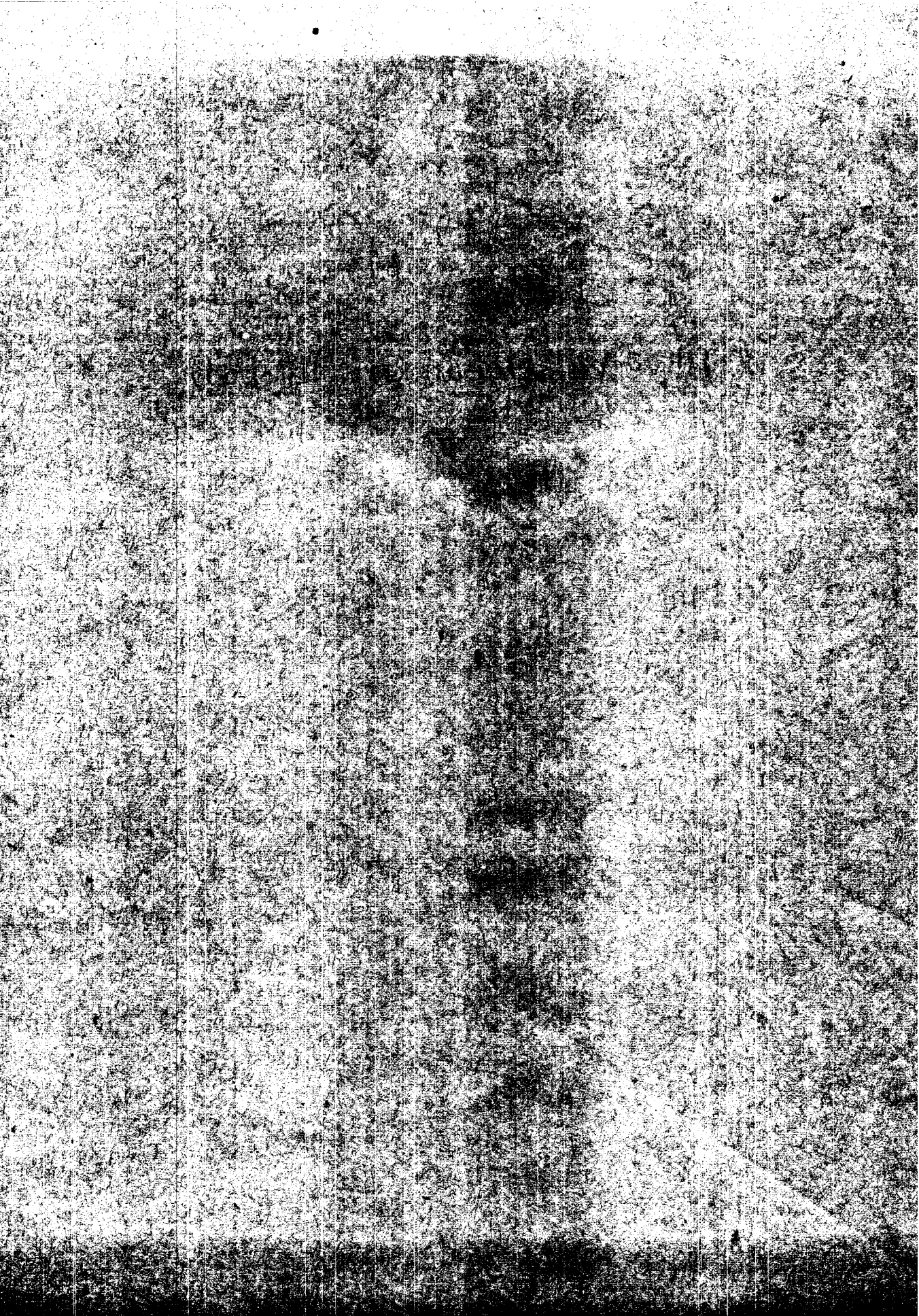
87LE0025. J.E.HARDERS. 1987(10). IN QUEST OF AN ARCTIC LEGAL REGIME; MARINE REGIONALISM - A CONCEPT OF INTERNATIONAL LAW EVALUATED. MARINE POLICY. 11(4):285-298. BUTTERWORTH SCI., GUILDFORD. EN.

This article examines the regional approach as a solution to prevent marine pollution in the Arctic Ocean, which may result from land-based sources, offshore operations, and international shipping. It is argued that both the global and unilateral approach are inadequate to protect the polar sea appropriately - for the sake of its relatively untouched environment, the coastal areas of the Arctic states, and for the culture and life style of the indigenous inhabitants. Consequently, this essay assesses the status quo of international marine pollution control as established by conventions and other instruments and leads, after an outline of present regional treaties of the various marine regions, to an application of marine regionalism to the arctic ocean.

87LE0026. A.CHAUVEL, N.BENCHECROUN, C.RAIMBAULT, J.BERGMAN. 1987. EVALUATION RAPIDE DU COUT D'UN INVESTISSEMENT: METHODE DES MODULES FONCTIONNELS. REVUE INST. FRANCAIS PETROLE. 42(4):465-480. INST. FRANCAIS PETROLE. PN-3067. FR.

The application of statistical multivariate data analysis methods to a wide range of data samples, obtained either directly from private information sources or from a sizing and detailed-estimation software, has led to the development of a new method for the quick evaluation of the cost of an investment. This method is called the Functional Module method. In the past, several so-called modular design procedures have been proposed. In the present case, however, this is the first attempt known in the field of the use of techniques such as principal-components analysis, principal factor analysis by distance table and multiple linear regression, to develop a modular structure for estimating the cost of an investment.

Physical Oceanography(PH)



87PH0001. J.D.IRISH, N.R.PETTIGREW, J.HALL. A BOTTOM-MOUNTED, DOPPLER ACOUSTIC PROFILING CURRENT METER. 11-13. PN-3006. EN.

87PH0002. JONG-SOO.HUE. 1968(12). SELF-PREPARATION OF BATHYTHERMOGRAPH SMOKED-GLASS SLIDE. BULL. KOREAN FISH. SOC. 1(2):135-137. KOREAN FISH. SOC., PUSAN. KO.

Bathythermograph (B.T.) has been commonly used to obtain a records of water temperature in the depth of 270 m from the surface. We have, however, experienced some difficulties in obtaining smoked or coated glass which is used for the bathythermograph in this region. Therefore I introduce a easy method of preparing the smoked-glass slide.

87PH0003. HO-KYUNG.JUN. 1981(4). EXPERIMENTS ON CURRENT METER MOORING IN SHALLOW WATERS: A CRITICAL REVIEW. BULL. KORDI. 3(1):43-52. KORDI., SEOUL. KO.

The Korea Ocean Research & Development Institute has been employing self-recording current meters (Aanderaa RCM-4) for acquiring serial observations of ocean current, temperature and salinity during the past three years. The mooring types of the current meters are mostly the U-type mooring. Each mooring period varied from one to two months. The detailed descriptions of these experiments are presented in this paper. Emphases are given to the improvement of mooring technique through comparisons of various results obtained in individual moorings.

87PH0004. X.Y.MIN, G.H.CHEN, F.Y.LI, C.X.YU. 1982(12). SPECIFIC GRAVITY OF SEAWATER FROM ESTUARY OF CHANGJIANG RIVER. ACTA OCEANOL. SINICA. 1(2):214-220. CHINA OCEAN PRESS, BEIJING. EN.

The specific gravity of 13 sea water samples at 25 deg. in centigrade from the estuary of the Changjiang River has been determined by the pycnometer method. The results are consistent with the values computed from chlorinity by Knudsen's tables within the experimental error of the method, and are lower on an average of about 0.02 in sigma-25 than values computed from salinity by the equation of Cox et al. (1970). The standard deviation of our measurements is estimated at +/-0.01 in sigma-25. Our work shows that the Knudsen's tables may apply to the sea water at the estuary of the Changjiang River and also provides an experimental evidence that the new oceanographic tables can be applied to the studies on the sea water of China Sea areas.

87PH0005. P.OTTONELLO, L.PAPA. 1982(8). THE USE OF EPROM MEMORIES WITH A CONVENTIONAL TIDE-WELL GAUGE TO RECORD SHORT PERIOD SEICHES. CONTINENTAL SHELF RES. 1(1):117-121. PERGAMON PRESS, OXFORD. EN.

A low cost electronic apparatus is presented, which increases considerably the useful frequency range of mechanical floating type tide-gauges. The detection and the measurement of sea level oscillations in the range of 5 to 60 min is then possible. In a preliminary application, the presence in the Gulf of Genoa of shelf oscillations, predicted by a numerical model, have been detected.

87PH0006. C.H.MAZEL. 1984(5). INSPECTION OF SURFACES BY SIDE SCAN SONAR. ROV '84. MAR. TECH. SOC., WASH. PN-3010. EN.

Side scan sonar has long been used for mapping of the horizontal sea floor. Recent tests have demonstrated that the technology shows promise for inspection of the face of vertical or sloped surfaces, including piers, breakwaters, and bridge caissons. The new applications are primarily a matter of technique and require little or no modification of standard off-the-shelf systems. This paper will provide an overview of the experience in these new areas, with a discussion of the benefits and limitations. As a result of the tests to date, side scan sonar is presently under consideration as a tool for inspection of the surface of the fiberglass reinforced plastic (FRP) OTEC cold water pipe.

87PH0007. M.S.LONGUET-HIGGINS. 1985. THE ASYMPTOTIC BEHAVIOUR OF THE COEFFICIENTS IN STOKES'S SERIES FOR SURFACE GRAVITY WAVES. J. APPL. MECHANICS. 34:269-277. AME. SOC. MECH. ENG., N.Y. PN-2933. EN.

It is shown that the asymptotic behaviour of the coefficients a(n) at high order n and at large wave steepness ak is determined mainly by the limiting form of the wave crest.

87PH0008. SANG-CHUL.HWANG, HO-KYUNG.JUN, SUK-HYUN.HAAM. 1986(12). NOTE ON THE DEEP-SEA MOORING OF CURRENT METERS IN THE EAST SEA IN 1986. OCEAN RES. 8(2):63-74. KORDI., ANSAN. KO.

Deep-sea mooring of current meters was successfully carried out 18 miles off of Mukho on the continental slope of the East sea (Japan sea). By using the "I" type mooring, current meters were secured in water depth of 850 m for 74 days from August 26 to November 7, 1986. Mooring materials and instruments used, and working procedures are described in detail. Furthermore, problems encountered during work are also discussed. The results of this experiment show that the buoy frame and by parachute, designed the Physical Oceanography Laboratory of the Korea Ocean Research and Development Institute (KORDI), and shackles and links, modified by KORDI, proved very effective for deep-sea mooring.

87PH0009. E.C.SHANG, T.F.GAO. 1987(1). SOME THEORETICAL PROBLEMS ON MODE FILTERING IN SHALLOW WATER. ACTA OCEANOL. SINICA. 6(1):55-63. CHINA OCEAN PRESS, BEIJING. EN.

Since the mode filtering is a certain sort of "space filtering", the matter of the utmost concern is the "side lobe" produced by some simplified processing in practice instead of the ideal orthogonal operation. In this paper, the following problems are discussed theoretically: (1) "side lobe" produced by using an integration in the water column instead of halfspace; (2) "side lobe" produced by using a finite discrete sampling; (3) "side

lobe" produced by a hard-clipped eigenfunction; and (4) "side lobe" produced by the inclination of the vertical array. Some analytic results and numerical examples are shown for a special case in which the sound speed profile is isovelocity in the water column. It is found that the effect of array inclination is serious and an approach of phase compensa+.

87PH0010. H.HONJI, A.KANEKO, K.KAWATATE. 1987(10). SELF-GOVERNING PROFILING SYSTEM. CONTINENTAL SHELF RES. 7(10):1257-1265. PERGAMON PRESS, OXFORD. EN.

A self-governing profiling system with a depth capability of 100 m has been developed for measuring flow velocity, temperature, salinity, and turbidity of water in the near-bottom parts of shelf seas. In the system, a moving profiler unit holding the sensors for measuring the above parameters and depth and containing a data-recording device is made to move up and down, in cycles, along a mooring line. This motion of the profiler unit is governed by a self-contained microprocessor. The system has been field-tested: examples of recorded data are presented.

87PH0011. N.DIDDEN. 1987(10). PERFORMANCE EVALUATION OF A SHIPBOARD 115-KHZ ACOUSTIC DOPPLER CURRENT PROFILER. CONTINENTAL SHELF RES. 7(10):1231-1243. PERGAMON PRESS, OXFORD. EN.

An acoustic Doppler current profiling system installed on R.V. Poseidon for continuous measurements of velocity profiles in the upper 200 m of the ocean is described. Error sources limiting the accuracy of current measurements are analysed. This includes the statistical error of frequency measurements and errors due to unsteady ship motion and transducer misalignment. A comparison of acoustically measured velocities with ship navigation relative to a radar-tracked drift buoy provides an experimental check of the velocity error. For a 1100 km track through the English Channel and the southern North Sea the ship speeds relative to the ground derived from satellite navigation and from bottom echo measurements with the acoustic profiler are compared in order to estimate the error of mea+.

87PH0012. D.ROEMMICH, B.CORNUELLE. 1987(2). DIGITIZATION AND CALIBRATION OF THE EXPENDABLE BATHYTHERMOGRAPH. DEEP-SEA RES. 34(2):299-307. PERGAMON PRESS, OXFORD. EN.

A study was undertaken of signal digitization and temperature calibration in expendable bathythermographs (XBT's) to learn how to minimize temperature errors in that system. An XBT digitizer was built into a PC-type microcomputer and used to calibrate 24 XBT probes at 5 temperature points, and later, to calibrate 72 probes at a single temperature. Twenty of the first set of probes were fastened rigidly in pairs and dropped in the ocean as a field test of the calibrations. Calibration of individual probes reduced the standard deviation of temperature calibration errors from around 0.05 Deg. in Centigrade to <0.01 Deg. in Centigrade. The calibration procedure is simple and nondestructive, so the probes can be used normally after calibration.

87PH0013. N.A.BRAY. 1987(4). SALINITY CALCULATION TECHNIQUES FOR SEPARATELY DIGITIZED FAST RESPONSE AND PLATINUM RESISTANCE CTD+. DEEP-SEA RES. 34(4):627-632. PERGAMON PRESS, OXFORD. EN.

A new algorithm for combining separately digitized fast and slow temperature signals from the Neil Brown Mark III CTD is presented. Ideally, one would like to exploit the stability of the platinum resistance thermometer (PRT) while retaining the high resolution of the fast response thermistor (FRT). Practical methods for combining the two in the past have not so'ved the problem of low frequency drift in the FRT. This drift can introduce errors as large as 0.2 Deg. in Centigrade over vertical scales comparable to the CTD cast depth. A running mean filter which is applied in the time domain to both temperature time series is introduced in this paper.

87PH0014. M.J.TUCKER. 1987(4). DIRECTIONAL WAVE DATA: THE INTERPRETATION OF THE SPREAD FACTORS. DEEP-SEA RES. 34(4):633-636. PERGAMON PRESS, OXFORD. EN.

The present standard way of interpreting the directional data from pitch-roll-heave buoys is to assume that the true angular distribution of wave energy at a particular frequency is given by model.

87PH0015. A.R.SOLOW. 1987(6). THE APPLICATION OF EIGENANALYSIS TO TIDE-GAUGE RECORDS OF RELATIVE SEA LEVEL. CONTINENTAL SHELF RES. 7(6):629-641. PERGAMON PRESS, OXFORD. EN.

Eigenanalysis has been applied in the past to analyse tide-gauge records of relative sea level. The purpose of this analysis has been to detect "coherent modes" of sea level change among the records. By applying eigenanalysis to simple models of the records, it is shown that the results can be misleading. In particular, these results can depend on differences in noise variance, noise correlation, and period of observation among the records, and not only on the information-rich component of the records. When the records have the same rate of change, differences in these factors cause eigenanalysis to attribute different rates of change to them. When the records have different positive rates of change, eigenanalysis tends to underestimate the extreme rates. For the purposes of policy+.

87PH0016. D.R.JOHNSON. 1987(8). A SURFACE CURRENT METER. CONTINENTAL SHELF RES. 7(8):975-986. PERGAMON PRESS, OXFORD. EN.

A newly developed current meter is described which has been designed to record near-surface currents of relatively high speed in an Eulerian frame. With a Weller/Davis propeller and a gimballed compass, the Rapid Boundary Current Meter (RBCM) vector averages under microprocessor control and logs into solid state memory. Its simple design, low cost and ease of use make the RBCM an attractive instrument for

surveys, for filling out arrays of more traditional instruments and for studying rapidly developing near-surface phenomena. Field experiences with the RBCM are described including comparisons with Lagrangian drifters and Eulerian current meters.

87PH0017. IN-BAE.KIM. 1970(3). FUNDAMENTAL STUDIES OF THE LOWER PART OF THE NAKTONG RIVER FOR FISHERIES EXPLOITATION, 2. TEMPERAT+. BULL. KOREAN FISH. SOC. 3(1):65-70. KOREAN FISH. SOC., PUSAN. KO.

This report is a part of the studies of the lower part of the Naktong River. The temperature and quality of the river water were investigated from May 1967 to June 1968. Except for Hadan which is a point located at the mouth of the river and much influened by sea water the average water temperature is generally below 10 Deg. in Centigrade up to the end of March, 10 to 20 Deg. in Centigrade from the beginning of April to the 1st-2nd ten days of May, and thereafter becomes above 20 Deg. in Centigrade which is adequate for the growth of warm-water fishes. The water again becomes below 20 Deg. in Centigrade at the beginning of October and becomes below 10 Deg. in Centigrade in December.

87PH0018. O.K.HUH, L.J.ROUSE JR., G.W.SMITH. 1978(3). SURFACE TEMPERATURES AND TEMPERATURE GRADIENT FEATURES OF THE U.S. GULF COAST WATERS. PROC. 11TH INT. SYMP. REMOTE SENSING OF ENVIRON. 25-29 APRIL 1977. 1609-1618. PN-2361. EN.

Satellite thermal infrared data on the Gulf of Mexico show that a seasonal cycle exists in the horizontal surface temperature structure. In the fall, the surface temperatures of both coastal and deep waters are nearly uniform. With the onset of winter, atmospheric cold fronts, which are accompanied by dry, low-temperature air & strong winds, draw heat from the sea. Penetrative convection and wind-driven mixing lower temperatures, first in the shallowest waters and then, as the winter season progresses, indeeper and deeper portions of the Gulf. A band of cooler water forming on the inner shelf expands, until a thermal front develops seaward along the shelf break between the cold shelf waters and the warmer deep waters of the Gulf.

87PH0019. K.SHUTO. 1982. A REVIEW OF SEA CONDITIONS IN THE JAPAN SEA. LA MER. 20:119-124. SOC. FRANCO-JAP. D'OCEANOGR. PN-2346. EN.

Sea conditions in the Japan Sea are briefly reviewed. Flow patterns in upper and deeper layers are described together with prevailing water masses.

87PH0020. KEE-SOO.NAM. 1982(12). A CALCULATION OF THE FLUSHING TIME OF MASAN BAY. BULL. KORDI. 4(1/2):1-10. KORDI., SEOUL. KO.

The flushing time of Masan Bay, located in the south-eastern part of the Korean Peninsula, was estimated on the basis of data from measurements of currents, water levels, echo soundings and salinities at 24 stations from July 25 to August 1, 1981. The results suggested that the fresh water fraction of the bay amounted to 8.3% of the total water volume with river runoff at 10.7 cubic meter/sec and flushing time about 139 days.

87PH0021. SANG-KYUNG.BYUN. 1983(12). WATER TRANSPORT IN THE NORTHEAST ATLANTIC OCEAN. BULL. KORDI. 5(2):1-7. KORDI., SEOUL. EN.

Based on the I.G.Y. data in summer 1958, the geostrophic current in the Northeast Atlantic Ocean and the water exchange with adjacent areas were studied. The condition of volume continuity in a closed box makes the reference level placed at the core layer of the Labrator Sea Water. This volume continuity needs the existences of the North Atlantic Current of 27000000 cubic meter/sec and of the Irminger Current in the same order of 10000000 cubic meter/sec as the Norwegian Atlantic Current.

87PH0022. A.AITSAM, ET AL. 1984. PHYSICAL AND CHEMICAL VARIABILITY OF THE BALTIC SEA: A JOINT EXPERIMENT IN THE GOTLAND BASIN. CONTINENTAL SHELF RES. 3(3):291-310. PERGAMON PRESS, OXFORD. EN.

An area of 25 x 30 nmi with a subarea of 20 x 20 nmi in the Baltic Sea Gotland Basin was surveyed for about one month by vertical CTD and fluorometric chlorophyll a casts, and by towed profiles with a chemical profiler (nutrients, CTD, O2, pH) and an undulating CTD. Autonomous current meter data were available for the same period. Five CTD surveys with a 5-mile spacing showed the existence of synoptic eddies and several other perturbations. An increased activity of the intrusive fine-structure was detected in the eddy center. The Baltic eddies are essentially non-linear, and transport water in their 'nuclei'. An internal front, separating waters with different T,S composition, was discovered in the upper layers.

87PH0023. H.TAKEOKA. 1986. THE FREQUENCY RESPONSE OF THE SETO INLAND SEA TO SEVERAL TIME-VARYING INPUTS. CONTINENTAL SHELF RES. 6(5):627-638. PERGAMON PRESS, OXFORD. EN.

The frequency response characteristics of the Seto Inland Sea to three types of input of heat or materials are investigated. The types are uniform input to the entire inland sea, input from the rivers and input from the open ocean. The frequency response functions are obtained by a Fourier transform of the remnant functions, which are a kind of impulse response function and obtained by the hydraulic model experiments. The characteristics of the frequency response functions obtained are fairly different from one another, especially that for the input from the open ocean is different from the other two. Variations of the average water temperature and average salinity of the inland sea are discussed by using these results, and contributions of the main factors to their annual variations+.

87PH0024. S.FERRARO, I.LUCA, F.MOSETTI. 1986. A RELATIONSHIP FOR MODELLING AND

FORECASTING RIVER FLOOD. BOLL. DI OCEANOL. TEORICA ED APPLICATA. 4(3):199-206. OSS. GEO. SPE., TRIESTE. PN-2872. EN.

The application of diffusion theory to flood phenomena is here discussed. An empirical relationship is presented which describes the time evolution of the flood (in local time) and forecasts the successive evolution of the phenomenon. Such forecasting is possible if a first tract of the curve h(t) is known and provides the possibility of solving a very important practical problem.

87PH0025. M.TOMCZAK. 1987(6). THE BASS STRAIT WATER CASCADE DURING SUMMER 1981-1982. CONTINENTAL SHELF RES. 7(6):561-572. PERGAMON PRESS, OXFORD. EN.

Water in Bass Strait, a shallow extension of the Australian shelf between the Great Australian Bight and the Tasman Sea, is denser than Tasman Sea surface water in winter but of comparable density in summer. Winter downflow of denser water creates high-salinity intrusions along the continental slope, which are carried northward in a narrow undercurrent at 300-400 m depth. This paper gives a detailed description of the summer situation based on cruise data from November 1981. It is found that no downflow from Bass Strait occurred during the cruise. Parcels, intrusions, and filaments of Bass Strait Water were found along the continental slope in the Tasman Sea over a large area. They are interpreted as remnants from the winter downflow. The two-fold structure of the Cascade known from+.

87PH0026. IN-BAE.KIM, MYEONG-JA.PARK. 1974(6). AN OBSERVATION OF WATER QUALITY AND RED WATER IN STILL WATER FISH PONDS. BULL. KOREAN FISH. SOC. 7(2):69-78. KOREAN FISH. SOC., PUSAN. KO.

A study on the contents of dissolved oxygen and phytoplankton in the pond water has been carried out to determine the water quality and to investigate the cause of red water in fish ponds at Pusan Fisheries College in 1972-1973.

87PH0027. CHUNG-KIL.PARK. 1978(6). CHEMICAL OCEANOGRAPHIC ASPECT OF THE COLD WATER MASS IN OFFSHORE OF THE EAST COAST OF KOREA. BULL. KOREAN FISH. SOC. 11(2):49-54. KOREAN FISH. SOC., PUSAN. KO.

The cold water mass appeared in offshore of the east coast of Korea in summer season was studied in aspect of chemical oceanography. Such a typical relationship between phosphate and dissolved oxygen as shown in the upwelling regions could not be found in the east coast except around the Kampo coast, southern part of the east coast. It is possible to isolate the North Korean Cold Water from the proper water of the Japan Sea by using sigma T-oxygen diagram. The origin of the cold water mass in offshore of the east coast of Korea in summer is not mainly due to the development of upwelling of the proper water of the Japan Sea but the southward flowing of the North Korean cold Water.

87PH0028. YOUNG-HO.SEUNG. 1980(8). A STUDY ON THE EVOLUTION OF HYDROGRAPHIC CONDITIONS IN THE MEDOC AREA. BULL. KORDI. 2(1):41-49. KORDI., SEOUL. EN.

A systematic examination was performed on the evolution of wintertime hydrographic conditions in the North Western Mediterranean of deep water formation, based on the continuously obtained long-term data. The results show that evaporation is a dominant factor to make the surface water denser. This fact is closely related to the losing the high-temperature and high-salinity character of the subsurface water. Inversely, the hydrographic structure may return to its original three-layer system mainly by advection. Aside from evaporation, vertical mixing seemed to get more significant as the surface water becomes denser.

87PH0029. T.ICHIYE. 1982. A COMMENTARY NOTE ON "TEMPERATURE AND SALINITY CHANGES IN THE TSUSHIMA CURRENT" BY R.L. KOLPACK. LA MER. 20:261-262. SOC. FRANCO-JAP. D'OCEANOGR. PN-2339. EN.

87PH0030. B.L.DU, X.J.SONG. 1982(12). SST PREDICTION FOR EAST CHINA SEA AND ADJACENT WATERS. ACTA OCEANOL. SINICA. 1(2):155-162. CHINA OCEAN PRESS, BEIJING. EN.

An empirical orthogonal function analysis has been applied to solving the forecast problem of the monthly mean sea surface temperature for the East China Sea and the adjacent waters. The data matrix of the original sea surface temperature fields can be separated into two components, i.e. the spatial and the temporal components. according to the properties of its spatial component that almost does not change with time and through the extrapolation of its temporal component, the prediction for large area sea surface temperature will be achieved. The time coefficients for temporal component are predicted by means of traverse and vertical time series method.

87PH0031. R.D.PINGREE, ET AL. 1982(8). CELTIC SEA AND ARMORICAN CURRENT STRUCTURE AND THE VERTICAL DISTRIBUTIONS OF TEMPERATURE AND CHLOR+. CONTINENTAL SHELF RES. 1(1):99-116. PERGAMON PRESS, OXFORD. EN.

Vertical sections of temperature and chlorophyll a across the slopes and shelf of the Celtic Sea in the summer show the characteristic regimes; oceanic, slope, shelf, frontal, and mixed. Increases of surface chlorophyll a are commonly observed along the shelf tidal fronts where the thermocline outcrops at the surface, and also at the shelf-break. The variations in phytoplankton biomass are most readily interpreted in terms of the effects of physical mixing processes due to wind and tide on the availability of inorganic nutrients and light energy. On the shelf, mixing processes, both due to internal waves, inertial currents, and to boundary induced turbulence caused by tidal shear associated with the sea floor, play an important role in determining the observed vertical structures. A n+.

87PH0032. A.H.TAYLOR. 1983. SPECTRAL RESPONSE OF A MODEL OF THE ENGLISH

CHANNEL AND SOUTHERN NORTH SEA HEAT BUDGETS 1961 TO 19+. CONTINENTAL SHELF RES. 2(4):331-334. PERGAMON PRESS, OXFORD. EN.

87PH0033. S.A.THORPE, A.J.HALL. 1983(4). THE CHARACTERISTICS OF BREAKING WAVES, BUBBLE CLOUDS, AND NEAR-SURFACE CURRENTS OBSERVED USING SID+. CONTINENTAL SHELF RES. 1(4):353-384. PERGAMON PRESS, OXFORD. EN.

An inverted 248 kHz two-component side-scan sonar mounted on the sea bed in a mean depth of 34 m has been used to detect the clouds of bubbles produced by breaking surface waves. The sonar has a range of about 150 m. The breaking waves appear on the sonograph records as short-lived intense echoes, and form patterns which can be explained in terms of the behaviour of groups of waves in which the highest are breaking. The bubble clouds are slightly elongated in the wave direction when they are first formed and, in winds of 5.1 m/sec, have lifetimes of up to about 5 min. Soon after a wave breaks, the horizontal motion of the fluid in which the bubbles are formed becomes similar to that of the surroundings, and the bubbles continue to be advected by the near surface currents. The rate of +.

87PH0034. H.MELLING, R.A.LAKE, D.R.TOPHAM, D.B.FISSEL 1984. OCEANIC THERMAL STRUCTURE IN THE WESTERN CANADIAN ARCTIC. CONTINENTAL SHELF RES. 3(3):233-258. PERGAMON PRESS, OXFORD. EN.

Recent hydrographic data (1981-1982) from the western Canadian Arctic Archipelago and adjacent areas of the Arctic Ocean are interpreted from the viewpoint of thermal energy transfer. Within the Archipelago, a warmer halocline than in the Arctic Ocean and a cooler Atlantic layer are identified. The warmer halocline is a consequence of the continued diffusion of heat from underlying Atlantic water without a significant downward penetration from the surface of cold seawater with salinity increased consequent to ice growth. The cooler Atlantic layer is primarily attributable to an enhanced cooling of these waters in a narrow band over the continental slope and shelf of the southern Beaufort Sea prior to their inflow into the Archipelago.

87PH0035. S.J.PRINSENBERG. 1984. FRESHWATER CONTENTS AND HEAT BUDGETS OF JAMES BAY AND HUDSON BAY. CONTINENTAL SHELF RES. 3(2):191-200. PERGAMON PRESS, OXFORD. EN.

The freshwater and heat budgets of James Bay and Hudson Bay showed that for a yearly cycle the annual ice cover and runoff are major and equal components of the freshwater budgets. James Bay has a baywide freshwater layer thickness of 6.25 m, while Hudson Bay has a 4.7 m layer;these represent summer residence times of 10 months and 4.1 years, respectively. The heat budget results indicated that the incoming surface heat flux is mainly balanced by the heat required to melt the seasonal ice cover and bring the water temperature up to the observed summer values. Thus, an assessment of hydroelectric developments in the surrounding watersheds should not only investigate the changes that will occur in the marine environment, but also in the seasonal ice cover, as they together determine the

87PH0036. Y.F.WU, M.C.LI. 1984(1). THE RELATIONSHIPS BETWEEN THE FLOOD AND DROUGHT OF THE CHANGJIANG AND HUAIHE RIVER VALLEYS AND THE+. ACTA OCEANOL. SINICA. 3(1):26-35. CHINA OCEAN PRESS, BEIJING. EN.

In order to find the relationships between the flood and drought of the Changjiang and Huaihe River valleys and Pacific SST anomalies, the synoptic analysis has been made. Two types of opposite distribution of SST departure for flood and drought years have been found. These states have set up basically preceding winter and have strengthened and persisted in summer. The time of the effect of anomalous SST on the flood and drought are different for different areas over the Pacific, the north Pacific is the earliest and the west and southeast Pacific are later. The evolution of SST anomalies with different types in every part of the Pacific has been shown. Finally, the formation of SST anomalies in Pacific has been elucidated by virtue of the surface wind anomalies which drive the ocea+.

87PH0037. F.Q.LI, Y.S.SU, Z.X.YU. 1984(10). APPLICATION OF CLUSTER ANALYSIS METHOD TO MODIFIED WATER-MASSES IN THE SHALLOW SEA. ACTA OCEANOL. SINICA. 3(4):451-461. CHINA OCEAN PRESS, BEIJING. EN.

The statistical cluster analysis method is applied to the modified water-masses in the shallow sea and a series of the experiments are carried out. A simple and convenient method for defining the quantity and boundary of water-masses and mixing zone from the hierarchicaltree is given by an improved hierarchical clustering methods. Two cluster methods of gradual examination are proposed and compared with the hierarchical clustering method.

87PH0038. JONG-HON.BONG. 1984(12). UNUSUAL HYDROLOGIC CONDITIONS OCCURRED IN THE LIGURIAN SEA OF THE NORTH-WESTERN MEDITERRANEAN SEA +. BULL. KORDI. 6(1/2):65-73. KORDI., SEOUL. KO.

The results of CTD measurement conducted from October 1981 to March 1983 in the Ligurian Sea of the North-Western Mediterranean show exceptionally high salinity in the surface layer and generally somewhat low water temperature. Moreover it is found that the intense homogenization of the water column is produced earlier than the normal case and continued for a few months in spite of the higher air temperature than the normal. The characteristics of these unusual hydrologic conditions and their causative mechanisms are presented.

87PH0039. HEUNG-JAE.LIE. 1984(12). DAILY VARIATION OF SURFACE TEMPERATURE AT COASTAL STATIONS ALONG THE EAST COAST OF KOREA. BULL. KORDI. 6(1/2):1-6. KORDI., SEOUL. KO.

Daily changes of sea surface temperature (SST)

along the east coast of Korea were studied. Daily SST data observed at Sogcho, Mukho, Pohang and Ulleungdo by Korea Hydrographic Office, and hourly data gathered by R.C.M.-4 current meters near Jugbyun by KORDI in 1980 were statistically analysed to understand temporal variation of SST. The contribution of high frequency fluctuations greater than 1 cpd to the total variance is found to be negligible, compared to that of low frequency variations. The total variance is mostly due to annual variation of SST and the spectra have a similar pattern in shape at four stations. However, annual mean SST at Sogcho is shown to be the lowest with the largest variance.

87PH0040. S.Q.ZHAO. 1984(4). AN INVESTIGATION OF FORECASTING THE CROP YIELD WITH SEA SURFACE TEMPERATURE DATA. ACTA OCEANOL. SINICA. 3(2):181-191. CHINA OCEAN PRESS, BEIJING. EN.

In the paper, the relationship between the crop yield in three different regions, the northern part of china, the northeast China and Heilongjiang Province, and the monthly mean sea surface temperature (SST) in the northwest Pacific Ocean is analysed preliminarily; the time and space distribution of the sea areas with high value correlation coefficients (HVCC) between the meteorological crop yield (MY) and the monthly mean SST is given; and crop yields in these regions are simulated by the monthly mean SST. Results obtained show that the stabler relationship between the crop yield in some large regions and the monthly mean SST is presented, so that we can forecast the crop yield in these regions using the monthly mean SST of the sea areas with HVCC.

87PH0041. P.C.ETTER, W.F.ULM, J.D.COCHRANE. 1985. THE RELATIONSHIP OF WIND STRESS TO HEAT FLUX DIVERGENCE OF TEXAS-LOUISIANA SHELF WATERS. CONTINENTAL SHELF RES. 4(5):547-552. PERGAMON PRESS, OXFORD. EN.

Monthly, multi-annual mean heat budgets are calculated for waters overlying the Texas-Louisiana shelf. Heat storage rates are calculated on the basis of a volumetric temperature-salinity census; unpublished data from Bunker are consulted to determine surface heat exchanges. Monthly heat flux divergences, calculated as residuals in the heat budget equation, show divergence of heat during the months of June and July, the upwelling season for much of the Texas-Louisiana coast, and convergence of heat during the rest of the year when winds conducive to downwelling prevail.

87PH0042. E.T.CHEN. 1985. PRELIMINARY OBSERVATIONS OF OXYGEN AND CARBON DIOXIDE OF THE WINTERTIME BERING SEA MARGINAL ICE ZO+. CONTINENTAL SHELF RES. 4(4):465-483. PERGAMON PRESS, OXFORD. EN.

Wintertime oxygen and pH profiles across the marginal ice zone of the central and southeastern Bering Sea shelf are analyzed and compared with summer data. During the winter, at water depths shllower than 75 m, the water column is homogeneous and near freezing. Between the 75- and 200-m isobaths the structure is essentially two-layered, a cool and fresh upper layer overlying a warmer, more saline bottom layer. The oxygen concentration in the surface mixed layer is higher than the summer values, but the degree of saturation is lower because of the lower temperature in winter. The oxygen degree of saturation in the bottom mixed layer on the shelf in winter are higher than in the surface water in winter and the bottom water in summer.

87PH0043. R.C.BEARDSLEY, R.LIMEBURNER, H.YU, G.A.CANNON. 1985. DISCHARGE OF THE CHANGJIANG (YANGTZE RIVER) INTO THE EAST CHINA SEA. CONTINENTAL SHELF RES. 4(1/2):57-76. PERGAMON PRESS, OXFORD. EN.

Hydrographic and current meter data collected in the East China Sea during June 1980, August 1981, and November 1981, have been used to describe the spatial and temporal structure of the Changjiang (Yangtze River) discharge over the inner and mid continental shelf off eastern China. In summer during high runoff, the freshwater discharge near the mouth of the Changjiang exhibited a bimodal distribution, with the freshest water extending in a band to the south along the coast, and a relatively shallow, low salinity plume-like structure extending offshore on average towards the northeast. Relatively warm, saline bottom water characteristic of the Taiwan Current Warm Water flowed into the Changjiang estuary along a submerged relic river valley.

87PH0044. V.MARIETTE, B.L.CANN. 1985. SIMULATION OF THE FORMATION OF USHANT THERMAL FRONT. CONTINENTAL SHELF RES. 4(6):637-660. PERGAMON PRESS, OXFORD. EN.

The formation of the Ushant thermal front off northwestern France is simulated numerically with a one-dimensional model of the vertical thermal structure of the sea. This simulation is derived from a Niiler and Kraus (1977, Modelling and prediction of the upper layers of the ocean, pp.143-172) mixed layer model in which bottom friction is introduced. The model inputs are the meteorological parameters measured at Ushant and the barotropic tidal currents computed with a numerical model (Mariette et al., 1982, Oceanologica Acta, 5, 149-159). Comparison of the model results with satellite pictures and in situ measurements shows good agreement.

87PH0045. H.J.NIEBAUER, V.ALEXANDER. 1985. OCEANOGRAPHIC FRONTAL STRUCTURE AND BIOLOGICAL PRODUCTION AT AN ICE EDGE. CONTINENTAL SHELF RES. 4(4):367-388. PERGAMON PRESS, OXFORD. EN.

Marginal ice edge zones (MIZ) are unique frontal systems with air-ice-sea interfaces. Phytoplankton blooms, which occur along the edge of the melting ice pack in spring, are strongly related to the air-ice-sea interactive processes. In spring 1982, during a cruise to the Bering Sea ice pack, hydrographic sections, including standard biological oceanographic parameters, were collected across the MIZ showing such enhanced phytoplankton bloom populations in the ice edge. In this same set of ice edge cross sections, a cold

water mass was observed at the surface in the MIZ. This water mass was subsequently overridden by warmer water forming a cold tongue structure above the pycnocline and seaward of the shelf front. We suggest that this cold tongue was transient in nature, and illustrati+.

87PH0046. E.D.BARTON. 1985. LOW-FREQUENCY VARIABILITY OF CURRENTS AND TEMPERATURE ON THE PACIFIC CONTINENTAL SHELF OFF NORTHER+. CONTINENTAL SHELF RES. 4(4):425-443. PERGAMON PRESS, OXFORD. EN.

Currents, coastal winds, coastal sea level, and coastal ocean temperatures were observed at a number of northern Baja California Pacific sites between October 1978 and October 1979. Coastal winds were weakly southward on average and fluctuated north-south throughout the year. Fluctuations were uncorrelated over alongshore separations of 200 km. Coastal winds differed considerably from the large-scale offshore wind estimate (Bakun's Index) both in strength and in variability. Temperature variation at sites along 700 km of coast showed a strong seasonal variation with the winter cool period extended by spring upwelling. Days-to-weeks scale fluctuations were similar at the five northernmost sites and correlations alongshore were significant for separations of up to 400 km. No evidence+.

87PH0047. D.L.QIU, S.L.ZHOU, C.M.LI. 1985(4). SALINITY PREDICTION AND ITS ANALYSIS FOR THE SOUTHERN HUANGHAI SEA. ACTA OCEANOL. SINICA. 4(2):180-188. CHINA OCEAN PRESS, BEIJING. EN.

Based on the prediction experiments on the salinity distribution of the southern Huanghai Sea in spring (April-June) from 1978 to 1980, two salinity-prediction methods suitable for the region are obtained. The methods are briefly introduced and the marked factors affecting salinity variation and the prediction error are analysed. Results from the prediction experiments indicate the absolute prediction error of ensemble mean as 0.43 per mille, the relative error as 25%, the deviation error as -0.16 per mille, and the stations with prediction error less than 0.5 per mille accounting for 72% of the total. There is a little difference between prediction tendency and measured data.

87PH0048. D.L.QIU, S.L.ZHOU, C.M.LI. 1985(7). APPLICATION OF CLUSTER ANALYSIS METHOD IN DETERMINING WATER-MASSES OF THE HUANGHAI SEA. ACTA OCEANOL. SINICA. 4(3):337-348. CHINA OCEAN PRESS, BEIJING. EN.

Having determined the properties of the modified water-masses in the light of the relative value and seasonal variation of temperature-salinity, we have, according to the TS-comparison method, used the stepwise cluster analysis method to determine the monthly water-masses at the surface and the bottom layers in the Huanghai Sea from 1978 to 1980. The advantages and disadvantages of the method and the relationship between the fishing grounds and the water-masses are discussed in this paper.

87PH0049. F.STRAVISI, F.CRISCIANI. 1986. ESTIMATION OF SURFACE HEAT AND BUOYANCY FLUXES IN THE GULF OF TRIESTE BY MEANS OF BULK FORMULAS. BOLL. DI OCEANOL. TEORICA ED APPLICATA. 4(1):55-61. OSS. GEO. SPE., TRIESTE. PN-2869. EN.

Surface heat and buoyancy fluxes in the Gulf of Trieste (northern Adriatic) are computed by means of bulk formulas using monthly climatic data. The total heat flux from the sea, about 20 W/square meter during spring and summer, increasing to 110 W/square meter during autumn and winter, is balanced by an annual mean meridional heat flux of 65 W/square meter. The buoyancy flux is always negative (-41 uW/cubic meter) owing to the strong influence of rivers runoff, except during January and February when small positive fluxes are observed. As a result, the northernmost part of the Adriatic Sea is a heat sink and a basin of dilution. It is only the severe winter cooling that can lead to the formation of the characteristic dense water.

87PH0050. F.STRAVISI, M.SANDRINI. 1986. THE ANNUAL CYCLE OF THE WATER TEMPERATURE AND TRANSPARENCY IN THE COASTAL WATERS OF THE LAKE GARDA. QUADERNI E.T.P. 13:35-58. PN-2868. IT

The characteristic variations of the water temperature and transparency in the surface layer of the Lake Garda through the year are described. Data refer to two station points, Torri and Garda, representing the principal and the secondary basin of the lake respectively. At each point, about thirty vertical profiles of water temperature and horizontal visibility of white and black discs, with measurements at 5 m intervals from 0 to 40 m depth, have been performed from June 1982 to November 1983, together with conventional observations of vertical water transparency by means of Secchi discs. The observed time series have been fitted by a superposition of six sinusoidal waves with a period from one year to two months, representing the typical annual cycle of the physical parameters above.

87PH0051. S.P.DINNEL, W.J.WISEMAN JR. 1986. FRESH WATER ON THE LOUISIANA AND TEXAS SHELF. CONTINENTAL SHELF RES. 6(6):765-784. PERGAMON PRESS, OXFORD. EN.

Hydrographic data collected on monthly cruises over the West Louisiana and Texas shelf from 1963 to 1965 were analyzed and the volume of fresh water on the shelf was estimated for each data set. The freshwater volume exhibits an annual cycle that is dominated by the spring flood of the Mississippi and Atchafalaya rivers. During the winter, shelf freshwater content is low, with the highest content appearing as a discontinuous band along the inner shelf. In summer an isolated high-content region is present in the center of the shelf. This high-content region dissipates and the pattern migrates toward the southeast in the late summer. By late fall the winter distribution is again present.

87PH0052. A.BADAN-DANGON, K.H.BRINK, R.L.SMITH. 1986. ON THE DYNAMICAL

STRUCTURE OF THE MIDSHELF WATER COLUMN OFF NORTHWEST AFRICA. CONTINENTAL SHELF RES. 5(6):629-644. PERGAMON PRESS, OXFORD. EN.

KUNDU showed that the upwelling system off northwest Africa is dominated by turbulent friction and suggested that over such broad and shallow continental shelves, the surface and bottom frictional boundary layers overlap in the water column. Different estimates for the thickness of the boundary layers have been proposed more recently, which take into account, amongst other things, the effects of stratification. The application of these various estimates and the direct computation of the transports within the resulting layers provide a qualitatively consistent picture of the time-dependent structure of the water column on the northwest African continental shelf, with the observed cross-shelf transports in reasonable agreement with the expected Ekman transports.

87PH0053. H.M.VAN AKEN. 1986. THE ONSET OF SEASONAL STRATIFICATION IN SHELF SEAS DUE TO DIFFERENTIAL ADVECTION IN THE PRESENCE O+. CONTINENTAL SHELF RES. 5(4):475-485. PERGAMON PRESS, OXFORD. EN.

To study the onset of seasonal stratification in a shelf sea, a descriptive model of the seasonal stratification is formulated. This model, which describes the development of the potential energy associated with the stratification, contains terms describing the mixing due to tides and wind as well as terms describing the stabilizing power of surface heat fluxes and of an estuary-like differential mass advection by the residual current. It is shown that in certain areas of the North Sea the initial onset of the seasonal stratification, as observed in the springs of 1978, 1981 and 1982, may be caused by differential advection in the presence of a strong horizontal salinity gradient. Thereafter the thermal stratification is formed, caused by a suppressed vertical heat flux in a stably sa+.

87PH0054. S.P.R.CZITROM. 1986. THE EFFECT OF RIVER DISCHARGE ON THE RESIDUAL CIRCULATION IN THE EASTERN IRISH SEA. CONTINENTAL SHELF RES. 6(3):475-485. PERGAMON PRESS, OXFORD. EN.

A method is described for measuring horizontal density gradients using data from a current meter mooring which permits the density driven component to be isolated from the observed residual currents. An estuarine-like residual circulation, towards the coast near the bottom and to the right of the offshore direction near the surface, is a result of the river discharge induced horizontal density gradients near the centre of the Eastern Irish Sea. This indicates an intermediate situation between an estuary where friction is large and the open sea where the geostrophic effect is dominant.

87PH0055. T.B.CURTIN. 1986. PHYSICAL OBSERVATIONS IN THE PLUME REGION OF THE AMAZON RIVER DURING PEAK DISCHARGE, II. WATER MAS+. CONTINENTAL SHELF RES. 6(1/2):53-71. PERGAMON PRESS, OXFORD. EN.

Based on temperature, salinity, and light transmission properties within the Amazon plume region (500 km along-shelf and 200 km across-shelf from the river mouth) during peak discharge, four water masses are defined: river Water, High Temperature Surface Water, Subsurface Ocean Water, and Bottom Boundary Layer Water. The primary frontal zone for water mass interaction is located between the 10 and 30 m isobaths, with an across-shelf scale of 80-100 km. within this frontal zone, vertical scales for water mass interleaving are 5-10 m. Seven mixing sites within the across-shelf structure are identified, and their role in the interaction process is discussed.

87PH0056. W.V.BURT, S.NESHYBA, C.L.TRUMP. 1986. RAPID ALTERNATING VERTICAL TEMPERATURE GRADIENTS IN THE EAST CHINA SEA. CONTINENTAL SHELF RES. 6(3):449-458. PERGAMON PRESS, OXFORD. EN.

Data from an array of current meters, thermistor chains, and meteorologically instrumented buoys deployed in the shallow water (depths of 97 to 115 m) of the East China Sea during AMTEX-75 (February 1985) show that the vertical temperature difference between the 20 and 70 m depths regularly alternated between about 0 Deg. in Centigrade and a maximum of 0.65 Deg. in Centigrade. The periodicity of change was predominantly that of the semidiurnal tide, 12.4 h, with some modulation at diurnal or near diurnal periodicity. An explanation is given in terms of vertical shear in the semidiurnal tidal currents coupled with the slightly higher current speeds during the offshelf phase (southeast direction) of the current ellipse.

87PH0057. L.LI, M.WIMBUSH, D.R.WATTS, T.N.LEE. 1986. VARIABILITY OF THERMAL STRUCTURE OFF GEORGIA, WINTER 1978. CONTINENTAL SHELF RES. 6(4):561-584. PERGAMON PRESS, OXFORD. EN.

Temperatures recorded over the Georgia shelf and at near-bottom locations on the slope are compared with records of thermocline elevation from inverted echo sounders on the slope and with shore wind observations, for the period January to April 1978. Both upwelling and downwelling events are observed. Upwelling events are associated with upwelling-favorable wind and/or Gulf stream frontal eddies. Strong upwellings are accompanied by risings of the thermocline over the slope, but some weaker eddies occur without noticeable thermocline disturbance. downwelling events are associated with onshore meander crests of the Gulf Stream, and sometimes with downwelling-favorable wind. The influence of downwelling does not extend seaward of the upper slope.

87PH0058. F.Q.WANG, F.Q.LI, Y.S.SU. 1986(7). ELASTIC CLASSIFICATION OF MODIFIED WATER MASS IN SHALLOW SEA. ACTA OCEANOL. SINICA. 5(3):331-339. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, the principle and steps for differentiating water masses by fuzzy cluster method are introduced, and a scalar formula based on Euclidean distance and a method for determining objectively the number of water masses by F-test are proposed.

Consequently, a method and specific steps for differentiating modified water masses in shallow sea according to fuzzy elastic classification are given. Computation of the membership degree in which each sample belongs to every water mass determines conveniently and quantitatively the cores, boundaries of water masses and mixed zones. An example for the Huanghai Sea and East China Sea is shown and compared with previous results.

87PH0059. F.Q.LI, Y.S.SU, Z.X.YU, F.Q.WANG. 1986(7). INVESTIGATION ON MAKING MEMBERSHIP FUNCTION OF WATER MASS FROM MIXING MODIFIED PROCESS. ACTA OCEANOL. SINICA. 5(3):342-354. CHINA OCEAN PRESS, BEIJING. EN.

A water mass in the sea area under investigation is defined as a fuzzy subset in the discourse universe. Possible forms of membership function of water masses in the mixing modified process are discussed with the mixing theory for conservative concentration of sea water. It may provide bases for making membership functions. Results in this paper may be extended and applied to shallow water. Examples and discussion are given in this paper.

87PH0060. HONG-RHYONG.YOO. 1986(9). REMOTELY SENSED WATER TURBIDITY PATTERN ON THE KOREAN SIDE OF THE YELLOW SEA. OCEAN RES. 8(1):49-55. KORDI., ANSAN. EN.

A study on sea surface turbidity distribution off southwest coast of Korean peninsular was carried out using Landsat Multispectral Scanner (MSS) data. For the analysis of seawater turbidity, MSS band 5 data were used. To identify the sea surface, tidal flats and solid land, all of the MSS channels were used. To obtain the turbidity values in mg/l, the field data, gathered under similar conditions as those under which the spatial data were aquired, were used. The results of the study indicate that the turbid water areas play an important role, in the sedimentary process of the adjacent coast, as trapping pockets of suspended sediments coming from the Chinese continents and from the Korean peninsula.

87PH0061. P.D.GLORIOSO. 1987. TEMPERATURE DISTRIBUTION RELATED TO SHELF-SEA FRONTS ON THE PATAGONIAN SHELF. CONTINENTAL SHELF RES. 7(1):27-34. PERGAMON PRESS, OXFORD. EN.

Hydrographic data taken from the fishery research ship Dr. Holmberg and an infrared image from the NOAA-6 satellite show the location of shelf-sea fronts over the Patagonian Shelf off the coast of Argentina. High tidal dissipation rates in this area [Simpson and Bowers (1981) Deep-Sea Research, 28, 727-738], intensified by headlands such as the Peninsula of Valdes, generate zones of enhanced vertical mixing in the near-shore waters, which lowers the sea-surface temperature. The irregular sea-surface temperature pattern suggests the transfer of some of the cold mixed water into the upper layer of stratified water farther offshore, leading to the inference of a northeastward mean flow.

87PH0062. T.DELCROIX. 1987(1). NET HEAT GAIN OF THE TROPICAL PACIFIC OCEAN COMPUTED FROM SUBSURFACE OCEAN DATA AND WIND STRESS DA+. DEEP-SEA RES. 34(1):33-43. PERGAMON PRESS, OXFORD. EN.

The heat conservation equation in the mixed layer derived by Behringer and Stommel is used to map the interseasonal and annual rates of heat gain in the tropical Pacific Ocean between 30 Deg. N and 30 Deg. S (except the 4 Deg. N - 4 Deg. S band). The interseasonal rates of heat gain are mostly determined by the rate of local heating; horizontal heat advection is also determinant between 4 Deg. and 10 Deg. in each hemisphere. The annual rate of heat gain is several times smaller than the interseasonal ones and, is mainly dominated by the effects of oceanic heat transports.

87PH0063. HYUN-CHUL.LEE, HUI-SOO.AN. 1987(12). A STUDY ON THE HEAT BUDGET IN THE SOUTH EASTERN AREA OF THE YELLOW SEA. J. OCEANOL. SOC. KOREA. 22(4):217-227. OCEANOL. SOC. KOREA, SEOUL. EN.

The heat budget of the south eastern region (33 N-36 N, 120 E-125 E) of the Yellow Sea was calculated by using the meteorological and oceanographical data. The sensible heat, the evaporation heat and the long wave back radiation have annual variation and increases toward south with strong gradient along the Cheju channel in winter, but they all show tendency to decrease toward eastern coastal area in summer. The area is roughly divided into three parts, the central part, the coastal part and the southern part, according to the characteristics of variation and distribution patterns of the exchanged heats. The amplitude of the annual variation of total heat exchange in the southern part is very large compare to those of the central and coastal part. The studied area is appeared to be hea+.

87PH0064. YONG-Q.KANG, HO-KYUN.KIM. 1987(12). RELATIONSHIPS BETWEEN THE WINTER-TIME SURFACE WATER TEMPERATURE AND THE SUMMER-TIME BOTTOM WATER T+. J. OCEANOL. SOC. KOREA. 22(4):228-235. OCEANOL. SOC. KOREA, SEOUL. EN.

Based on the hydrographic data for 19 years (1968-1984) at 65 stations in the West Sea of Korea, we investigate the relationships between the sea surface temperature (SST) in winter and the bottom water temperature (BWT) in summer. The spatially-averaged anomalies of BWT are highly correlated with those of SST during the preceding winter. However, due to advection of heat by ocean currents, the spatial pattern of BWT anomaly in summer does not closely resemble that of SST anomaly in the preceding winter.

87PH0065. SEOG-WON.CHOI, YONG-Q.KANG. 1987(3). EMPIRICAL ORTHOGONAL FUNCTION ANALYSIS OF COASTAL WATER TEMPERATURES IN THE TSUSHIMA CURRENT REGIO+. BULL. KOREAN FISH. SOC. 20(2):89-94. KOREAN FISH. SOC., PUSAN. EN.

The fluctuations of sea surface temperatures (SST) and their anomalies in the Tsushima Current region are studied by means of empirical orthogonal function (EOF) analysis of the monthly SST data for 30 years (1941-1970) at 8 coastal stations. The overall features of the seasonal variation of SST are described by the first EOF mode, which explains 97.2% of the total variance. Annual ranges of seasonal variation of SST and root-mean-square amplitudes of SST anomalies in the downstream of the Tsushima Current are larger than those in the upstream. The SST anomalies in the Tsushima Current region consist of simultaneous fluctuations, which explain 40.9% of the total variance, and "see-saw" fluctuations of which rise and fall in the upstream are opposite to those in the downstream. The la+.

87PH0066. J.D.BOYD, H.PERKINS. 1987(3). CHARACTERISTICS OF THERMOHALINE STEPS OFF THE NORTHEAST COAST OF SOUTH AMERICA, JULY 1983. DEEP-SEA RES. 34(3):337-364. PERGAMON PRESS, OXFORD. EN.

XBT and CTD measurements made in the Atlantic Ocean southeast of Barbados reveal a series of large thermohaline steps lying between the salinity maximum of the Subtropical Underwater at about 100 m and the salinity minimum of the Antarctic Intermediate Water at about 800 m. Internal structure was noted in some of the steps, as well as features resembling intrusions. The low value of the density ratio, approximately 1.5, supports the hypothesis that the steps are caused by intense salt finger activity. Estimates of vertical fluxes of heat and salt through the staircases are large enough to suggest that the process plays a major role in vertical exchange across the thermocline in this region and, consequently, a major role in determining the T-S properties of the equatorial thermocline +.

87PH0067. G.REVERDIN, M.FIEUX. 1987(4). SECTIONS IN THE WESTERN INDIAN OCEAN-VARIABILITY IN THE TEMPERATURE STRUCTURE. DEEP-SEA RES. 34(4):601-626. PERGAMON PRESS, OXFORD. EN.

The seasonal cycle of the temperature structure in the western Indian Ocean is presented along two sections monitored with XBT's. both sections cut the Great Whirl near 8 N, where variations of isotherm depths are concentrated between June and November. Between 5 N and 8 S the variability is predominantly semi-annual, whereas further south it is annual. The seasonal cycle of vertical displacements of isotherms for temperatures colder than 15 Deg. in Centigrade is similar to the cycle obtained in the core of the thermocline, with a slight lag. Variability in other parameters, such as SST, heat content or mixed layer depth, has little in common with vertical isotherm displacements. The deviations from the mean seasonal cycle are generally coherent over 5 deg. of latitude. They are sma+.

87PH0068. M.I.SCRANTON, F.L.SAYLES, M.P.BACON, P.G.BREWER. 1987(5/6). TEMPORAL CHANGES IN THE HYDROGRAPHY AND CHEMISTRY OF THE CARIACO TRENCH. DEEP-SEA RES. 34(5/6):945-963. PERGAMON PRESS, OXFORD. EN.

The Cariaco Trench has been considered a classic example of a marine anoxic basin for nearly 30 years. Although most workers assume that the chemistry of the basin is at steady-state, detailed data sets collected for hydrographic and nutrient parameters in 1973 and 1982 indicate strong temporal variations on a decadal time scale. Over this 9 year period deep-water temperature increased by 0.06 Deg. in Centigrade, salinity by 0.01 per mille, and hydrogen sulfide by 14 uM. Silica concentrations may also have increased by up to 14 uM. We can explain most of the temporal variability of these parametersin the Cariaco Trench deep waters using a time-dependent box model that includes the effects of vertical eddy diffusion and flux of the chemical species from the sediments. Deep-water temper+.

87PH0069. L.ZOCCOLOTTI, E.SALUSTI. 1987(6). OBSERVATIONS OF A VEIN OF VERY DENSE MARINE WATER IN THE SOUTHERN ADRIATIC SEA. CONTINENTAL SHELF RES. 7(6):535-551. PERGAMON PRESS, OXFORD. EN.

A bottom vein of dense water has been observed in the course of hydrological measurements carried out in three different periods-November 1980, February 1981 and June 1983-on the southern boundary of the shelf of the Adriatic Sea. The basin is renowned for cold, dense marine water generated in its northern portion by the Bora. This water flows into the Southern Adriatic Trough, where it mixes with the Levantine type water. It follows the Italian shelf break at a depth of 100-300 m, gradually deepening until it reaches S. Maria di Leuca. The resulting water flows into the Ionian Sea through the Otranto Channel (740 m deep). An early hypothesis of Pollak is that this mixed water provides the main source of the abyssal water of the eastern Mediterranean Sea.

87PH0070. YONG-Q.KANG, YEONG.GONG. 1987(6). MARKOV CHAIN PROPERTIES OF SEA SURFACE TEMPERATURE ANOMALIES AT THE SOUTHEASTERN COAST OF KOREA. J. OCEANOL. SOC. KOREA. 22(2):57-62. OCEANOL. SOC. KOREA, SEOUL. EN.

The Markov chain properties of the sea surface temperature (SST) anomalies, namely, the dependency of the monthly SST anomaly on that of the previous month, are studied based on the SST data for 28 years (1957-1984) at 5 stations in the southeastern coast of Korea. We classified the monthly SST anomalies at each station into the low, the normal and the high state, and computed transition probabilities between SST anomalies of two successive months. The standard deviation of SST anomalies at each station is used as a reference for the classification of SST anomalies into 3 states. Statistical tests show that the Markov chain properties of SST anomalies are stationary in time and homogeneous in space.

87PH0071. K.F.DRINKWATER, E.P.JONES. 1987(6). DENSITY STRATIFICATION, NUTRIENT AND

CHLOROPHYLL DISTRIBUTIONS IN THE HUDSON STRAIT REGION DURING +. CONTINENTAL SHELF RES. 7(6):599-607. PERGAMON PRESS, OXFORD. EN.

Observations of density stratification in Hudson Strait, northern Hudson Bay and southern Foxe Basin during August-September 1982, are compared to predicted regions of tidal mixing from a numerical model on the M2 tide by Griffiths, Pingree and Sinclair (1981, Deep-Sea Research, 28, 865-873). The results indicate the waters in southeastern Foxe Basin and Gabriel Strait are tidally well-mixed. At the eastern and western entrances to Hudson Strait density gradients are reduced by tidal mixing but the waters remain stratified. Surface nutrient concentrations are high within the regions of strong tidal mixing and chlorophyll data suggests increased biological productivity near these regions.

87PH0072. YONG-Q.KANG, OCK-GOO.KANG. 1987(6). ANNUAL VARIATION OF WATER TEMPERATURES IN THE UPPER 200 M OFF SOUTHEAST COAST OF KOREA. J. OCEANOL. SOC. KOREA. 22(2):71-79. OCEANOL. SOC. KOREA, SEOUL. EN.

We studied the annual variation of water temperatures in the upper 200 m off southeast coast of Korea by means of harmonic analysis of the temperatures at 10 standard depths of 51 stations. The distributions of the mean temperature in coastal zone are almost parallel to the coast, whereas those in offshore are almost zonal. With an increase of depth, the annual amplitude decreases nearly exponentially and the annual phase increases nearly linearly. The average e-folding depth for the annual amplitudes is 65 m, vertical change of the annual phase is 180 deg. per 200 m, and the vertical eddy conductivity is 4 square centimeter/sec. Annual variations of temperatures in the coastal zone of a few tens miles from the coast are considerably different from those in offshore area. The e-fold+.

87PH0073. R.K.REED. 1987(6). SALINITY CHARACTERISTICS AND FLOW OF THE ALASKA COASTAL CURRENT. CONTINENTAL SHELF RES. 7(6):573-576. PERGAMON PRESS, OXFORD. EN.

Data from three sections in the central and western regions of the alaska Coastal Current, obtained during a 10-day period in autumn 1981, are used to derive indices of salinity structure coherent with density gradients and flow. These indices showed consistent across-stream and downstream decreases which suggest removal of the freshwater signature by mixing. Baroclinic volume transport also decreased downstream, but the coastal flow still had an along-stream extent >1000 km.

87PH0074. N.D.WALKER, L.J.ROUSE JR., O.K.HUH. 1987(7). RESPONSE OF SUBTROPICAL SHALLOW-WATER ENVIRONMENTS TO COLD-AIR OUTBREAK EVENTS: SATELLITE RADIOMET+. CONTINENTAL SHELF RES. 7(7):735-757. PERGAMON PRESS, OXFORD. EN.

Cold-air outbreak induced chilling of shallow bay, bank, and shelf waters of southern Florida and the northern Bahamas was examined using satellite thermal infra-red measurements, in situ measurements, and a shallow-water heat flux model. Vast expanses of shallow waters are rapidly modified by the cold, dry continental air and high wind speeds characteristic of cold-front passages. Although water mass modifications are more rapid in shallow areas, prolonged effects are experienced in deeper shelf regions. Northerly winds accompanying the cold-air outbreak induce a net offshelf circulation, subjecting deeper regions to an inflow of chilled waters generated in shallower areas. Absence of coral reef development along preferential routes for offshelf water movement suggests that these wi+.

87PH0075. J.MA.ROBLES, S.G.MARINONE. 1987(7). SEASONAL AND INTERANNUAL THERMOHALINE VARIABILITY IN THE GUAYMAS BASIN OF THE GULF OF CALIFORNIA. CONTINENTAL SHELF RES. 7(7):715-733. PERGAMON PRESS, OXFORD. EN.

Temperature and salinity data for the years 1939-1983 are used to investigate seasonal and interannual scales of the hydrographic variability across the Guaymas Basin, which is located between 27 and 28 N in the Central Gulf of California. Winter conditions extend from December to April and summer conditions from June to October, with transition periods in May and November. Sea surface temperature increases from about 16 Deg. in Centigrade in February-March to 31 Deg. in Centigrade in August. No clear seasonal cycle in surface salinity was found. Typical values are above 35.1 per mille even in winter, and up to 35.5 per mille in November. Relatively cold and low salinity near-surface waters observed in June 1957 and in June 1982, suggest advection of California Current Water to the Gu+.

87PH0076. T.M.JOYCE. 1987(8). HYDROGRAPHIC SECTIONS ACROSS THE KUROSHIO EXTENSION AT 165 E AMD 175 W. DEEP-SEA RES. 34(8):1331-1352. PERGAMON PRESS, OXFORD. EN.

Two meridional CTD/oxygen sections were occupied across the Kuroshio extension in the autumn of both 1983 and 1984 along the longitudes of 165 E and 175 W. The western section spanned the latitudes 29 N-44 N, east of the Shatsky Rise and west of the Emperor Seamount chain. To the east of Emperor Seamounts, the meridional density gradients were substantially reduced. While the signatures of the Kuroshio and subarctic property fronts were still evident, the 175 W section was dominated by eddies with meridional scales of approximately 200 km.

87PH0077. SUN-DUCK.CHANG. 1970(10). COMPUTATION OF WIND DRIFT CURRENTS IN THE SOUTHERN WATERS OF KOREA. BULL. KOREAN FISH. SOC. 3(3):199-206. KOREAN FISH. SOC., PUSAN. EN.

By use of wind data, the wind drift currents in the southern waters of Korea were computed applying Palmen's formula. The characteristics of winds in the region were described in brief.

87PH0078. Z.F.YING, S.G.CHEN. 1984(1). NOTABLE FEATURES OF THE MIXING IN THE LINGDINGYANG BAY. ACTA OCEANOL. SINICA. 3(1):1-12. CHINA OCEAN PRESS, BEIJING. EN.

In order to understand the mixing process of saline & fresh water at the estuary of the Zhujiang River(Lingdingyang Bay), the Zhujiang River Conservancy Commission made several field observations from 1978 to 1979. The resulting data indicate that the mixing process is quite unique& complicated. Here demonstrations are made from different angles so as to show the nature of the process. On the whole, the Zhujiang Estuary can be roughly regarded as a vertical partly-mixed type with a lateral salinity gradient.

87PH0079. G.P.GASPARINI, G.M.R.MANZELLA, C.STOCCHINO 1985. LA CIRCOLAZIONE DELLE CORRENTI NEL MAR LIGURE IN RAPPORTO ALLA VARIABILITA DELLA TEMPERATURA, SALI+. 10P. IST. IDROGR. MARINA, GENOVA. PN-2531. IT.

This paper offers an analysis of the vertical and horizontal structures of the water masses in the Ligurian Sea. The intent is to better define the many eddies identified in previous studies. Also, to investigate the role that temperature, salinity and density assume on the genesis and evolution of the general circulation.

87PH0080. M.TOMCZAK JR. 1985. THE BASS STRAIT WATER CASCADE DURING WINTER 1981. CONTINENTAL SHELF RES. 4(3):255-278. PERGAMON PRESS, OXFORD. EN.

Water in Bass Strait, a shallow extension of the Australian shelf between the Great Australian Bight and the Tasman Sea, is denser than Tasman Sea surface water in winter. Relative to water of the same density, it is warmer and more saline. When it flows down the continental slope to find water of its own density, it turns left and follows the shelf edge in a narrow northward-flowing stream creating high-salinity intrusions. A detailed description of this process is given based on cruise data from June and July of 1981. Two independent sources for the Cascade are identified. Bass Strait Water, which has been identified in historical data 1200 km away from its source, could be traced over 500 km during the cruise, until it encountered the hydrographic regime controlled by the East Au+.

87PH0081. L.K.COACHMAN. 1986. CIRCULATION, WATER MASSES, AND FLUXES ON THE SOUTHEASTERN BERING SEA SHELF. CONTINENTAL SHELF RES. 5(1/2):23-108. PERGAMON PRESS, OXFORD. EN.

87PH0082. S.M.CHISWELL, D.R.WATTS, M.WIMBUSH. 1987(3). INVERTED ECHO SOUNDER OBSERVATIONS OF VARIABILITY IN THE EASTERN EQUATORIAL PACIFIC DURING THE 198+. DEEP-SEA RES. 34(3):313-327. PERGAMON PRESS, OXFORD. EN.

Meridional & zonal baroclinic variability during the 1982-83 El Nino was investigated in a about 1000-km region around the Galapagos Islands with an array of three inverted echo sounders. The resulting dynamic height time series show two principal maxima separated by several months, in good agreement with the available CTD observations of this El Nino. Strong 3.3-day peaks at two sites are not locally resonant inertia-gravity waves and instead are likely to be basin-wide third meridional mode inertia-gravity waves generated in the western or central Pacific.

87PH0083. L.K.COACHMAN. 1982(8). FLOW CONVERGENCE OVER A BROAD, FLAT CONTINENTAL SHELF. CONTINENTAL SHELF RES. 1(1):1-14. PERGAMON PRESS, OXFORD. EN.

The broad southeastern Bering Sea continental shelf contains three fronts; outer, middle, and inner. The shelf break and inner fronts appear to be analogous to similar fronts reported from other mid-latitude continental shelves; extensively studied examples are from the mid-Atlantic bight, off Nova Scotia, and around the British Isles. The middle front may have counterparts on the broad North Sea and East China Sea shelves. One-month current and temperature records from either side of the middle front, showed convergence in the layers deeper than 30 m in both the crossshelf flow field and heat flux. The convergence was about 3 cm/sec, so an average upwelling at about 0.001 cm/sec and divergence in the surface layer were required to maintain continuity. Variations in the degree of co+.

87PH0084. J.C.ANDREWS, M.J.FURNAS. 1986. SUBSURFACE INTRUSIONS OF CORAL SEA WATER INTO THE CENTRAL GREAT BARRIER REEF, I. STRUCTURES AND SH+. CONTINENTAL SHELF RES. 6(4):491-514. PERGAMON PRESS, OXFORD. EN.

Upwelling-related intrusions of Coral Sea water into the shelf sea of the central Great Barrier Reef were monitored for 6 months to establish their horizontal extent and coherence over a 350 km array of current meters and temperature sensors. A concurrent time series of cross-shelf hydrographic sections was obtained at the centre of the instrument array to map vertical structure during the progress of individual events. While intrusive activity occurs throughout the year at some level, large events are most frequently observed during summer (October to May) when bottom-trapped intrusions episodically create a thermocline on the shelf in response to relaxations or reversals of the longshore, equatorward tradewinds.

87PH0085. Y.Q.PAN, D.R.XU, J.P.XU. 1987(4). THE STRUCTURE OF FRONTS AND THEIR CAUSES IN THE COASTAL UPWELLING AREA OFF ZHEJIANG. ACTA OCEANOL. SINICA. 6(2):177-189. CHINA OCEAN PRESS, BEIJING. EN.

On the basis of the results from special investigations and relevant historical data, a description is given to the structure, mixing and shifts of the coastal upwelling front off zhejiang. It is concluded that such shifts are primarily caused by the horizontal position and strength variation of the Taiwan Warm Current, with winds playing a secondary role.

Janowitz's theory of topography-induced upwelling is applied to analyzing the formation of the Zhejiang coastal upwelling.

87PH0086. J.X.GAO, ET AL. 1984(7). STUDY ON FORAMINIFERA AND CALCIUM CARBONATE IN SEDIMENTS OF THE WESTERN MID-PACIFIC. ACTA OCEANOL. SINICA. 3(3):376-384. CHINA OCEAN PRESS, BEIJING. EN.

Two cores and ten surface sediment samples were taken in the western area of Mid-Pacific during the investigation from December 1978 to July 1979. According to the analysis of planktonic foraminifera and Calcium Carbonate in the surface samples, the investigated area is divided into three different sediment regions. The initial depth of lysocline of this area is estimated at about 3500 m and the calcium Carbonate compensation depth (CCD) is 5000 m. The water depth of the sediment core at L2016 is 2705 m and it is located above the lysocline. The sediments belong to white planktonic foraminiferal ooze. The evolution of paleoclimate is studied according to the variation of the following three parameters: the abundance value of the species indicating warm of planktonic foraminifera, the+.

87PH0087. M.ANDREE, ET AL. 1986. LIMITS ON THE VENTILATION RATE FOR THE DEEP OCEAN OVER THE LAST 12000 YEARS. CLIMATE DYNAMICS. 1:53-62. SPRINGER-VERLAG, IJMUIDEN. PN-3035. EN.

In this paper we present accelerator radiocarbon measurements on hand picked benthic and planktonic foraminifera separated from two deep sea cores raised from the South China Sea. From the benthic-planktonic age differences we are able to place limits on the extent to which the ventilation rate of the deep Pacific Ocean has changed over the last 12000 years. While much work remains to be done before any definitive answers for the global oceans can be given, these results on cores with sedimentation rates suitably high to avoid major corrections for bioturbation effects suggest that the ventilation rate of the deep Pacific Ocean has remained nearly the same throughout Holocene time. Further, there is no suggestion that the rate was slower during the period of major glacial retreat. Thes+.

87PH0088. J.C.FAUGERES, ET AL. 1986. BOTTOM CURRENT VARIATIONS ON THE FARO DRIFT (CADIZ GULF) DURING THE LATE QUATERNARY: RECORD OF MED+. BULL. SOC. GEOL. FRANCE. 2(3):423-432. SOC. GEOL. FRANCE, PARIS. PN-2913. FR.

The Faro drift located on the Algarve margin (Portugal) by a 500 to 800 m depth is built by bottom currents linked to the mediterranean outflow. Sedimentological analysis of 19 piston cores (Faegas IV cruise), showed that recent quaternary deposits are almost entirely contourite. The horizontal distribution of these facies, 3.5 kHz profiling and bottom photographs, all contribute to reconstruct the growth pattern processes of this drift: these are characterized by a northern progradation of the north flank where highest sedimentation rate are observed. The vertical distribution points out two important facts. 1) The sediments younger than 16000 B.P. (deglaciation phase and Holocene) are coarser than older sediments (Wurm p.p.); that could be linked to sea-level variations. 2) In the m+.

87PH0089. W.F.RUDDIMAN, N.J.SHACKLETON, A.MCINTYRE. 1986. NORTH ATLANTIC SEA-SURFACE TEMPERATURES FOR THE LAST 1.1 MILLION YEARS. NORTH ATLANTIC PALAEOCEANOGRAPHY, GEOL. SOC. SPECIAL PUB. (21):155-173. GEOLOGICAL SOC. PN-2550. EN.

A 1.2 Ma time series of north-east Atlantic sea-surface temperature (SST) has been assembled from the spliced record of piston core K708-7 (0.68-0 Ma) and hydraulic piston cores taken in nearby DSDP Hole 552A (1.2-0.68 Ma). A no-analogue fauna precludes making credible SST estimates in the interval 1.2-1.1 Ma, but the record above 1.1 Ma is suitable for SST estimates and related time-series analysis. The amplitude of SST variation is considerably higher in the Brunhes than in the upper Matuyama. This is due both to colder glacial SST minima after 0.85 Ma, and to increasingly warm interglacial SST maxima from 0.7 to 0.4 Ma. The dominant periodicity in the SST signal is centred near 95000 years; it increases in amplitude by a factor of four from the bottom of the record to the top, with+.

87PH0090. J.POUTIERS. 1987(2). WAS THERE ANY DEEP WATER FORMATION IN THE MEDITERRANEAN SEA BEFORE 8000 YEARS BP?. DEEP-SEA RES. 34(2):309-312. PERGAMON PRESS, OXFORD. EN.

Modeling of water exchanges between the Mediterranean and Atlantic during late Quaternary permits an understanding of the hydrologic and ecologic evolution of the Alborean Sea during this period. One is forced to conclude that deep water formation in the western Mediterranean Sea began about 8000 years BP.

87PH0091. C.BULL, C.R.CARNEIN. 1968. THE MASS BALANCE OF A COLD GLACIER: MESERVE GLACIER, SOUTH VICTORIA LAND, ANTARCTICA. ISAGE SYMP., HANOVER, USA, 3-7 SEPT. 1968. 429-440. PN-2700. EN.

The mass balance of Meserve Glacier, on the south side of Wright Valley, Antarctica, is nearly in equilibrium. During the year November 1965-November 1966, the 9.9 square kilometer glacier lost 60000000 kg of ice, equivalent of 0.61 g/square centimeter over the whole glacier. In that year the snow accumulation was less than usual; in "normal" years the balance may be slightly positive. On the 1.8 square kilometer ablation tongue of the glacier the annual loss ranges up to about 34 g/square centimeter, near the snout at 440 m elevation. Of this amount, 40 per cent occurs during the cold months from mid-February to mid-November. During the summer, a small amount of melting occurs on the 15 m-high cliffs around the glacier tongue, and around the margins of the glacier's upper surface, +.

87PH0092. G.HOLDSWORTH, C.BULL. 1968. THE FLOW LAW OF COLD ICE; INVESTIGATIONS ON MESERVE GLACIER, ANTARCTICA. ISAGE SYMP.,

HANOVER, USA, 3-7 SEPT. 1968. 204-216. PN-2699. EN.

Measurements have been made of the deformation of boreholes, of tunnels along the bed, and of horizontal circular holes cut in the walls of the tunnels, in the Meserve Glacier, Antarctica, in which the ice is at about -18 Deg. in Centigrade. At shear stresses of less than 0.5 bar the shear strain rate-shear stress relationship is best expressed as a power law with an exponent n=1.9. At shear stresses above 0.6 bar as the base of the glacier is approached, the exponent n increases to about 4.5. This preliminary analysis has been made assuming pure shear below the mid-depth of the glacier. Tunnel and core hole closure strain rates plotted versus hydrostatic pressure also indicates a significant increase in the exponent of the flow law, from 1.6 to 4.3 at a point just above the base of +.

87PH0093. J.H.MERCER. 1983. LATE CAINOZOIC GLACIAL VARIATIONS IN SOUTH AMERICA SOUTH OF THE EQUATOR. PROC. INT'L SYMP. HELD BY THE SOUTH AFRICAN SOC. FOR QUATERNARY RES. 45-58. A.A. BALKEMA, ROTTERDAM. PN-2702. EN.

Glacial variations in South America south of the equator have been radiometrically dated by both the (whole-rock) K/Ar and C14 methods. The K/Ar-dated record, derived mainly from southern Argentina, shows that glaciations on a scale comparable to those in the Pleistocene occurred near the Miocene-Pliocene transition, during the mid-Pliocene c. 3.6 m.y. BP, and repeatedly after 2 m.y. BP. Other glaciations may have occurred that have not been recognized in the geological record. During the Last Glacial Age, glaciers in southern south America, and probably also in tropical South America, were largest at a time beyond the range of C14 dating - perhaps about 73 000 years ago during marine isotopic stage 4. In Chile, two successively less extensive glaciations that peaked about 19 500 and+.

87PH0094. I.M.WHILLANS. 1987. FORCE BUDGET OF ICE SHEETS. DYNAMICS OF THE WEST ANTARCTIC ICE SHEET. 17-36. D. REIDEL PUB., DORDRECHT. PN-2701. EN.

The forces or stresses in a glacier are separated into lithostatic and resistive components. The lithostatic component is the weight of ice and gradients in it cause glacial motion as described by the driving stress. The remaining stresses oppose the motion and in assessing glacial stability it is important to determine which of the several potential resistive forces are most important. Data relating to the stresses driving and resisting the flow of the West Antarctic Ice sheet are discussed. The driving stress is readily calculated and it shows an almost exponential decrease from the inland ice, along Ice Stream B, and across the Ross Ice Shelf to the calving edge. Prior work shows that basal drag restrains inland ice and that the backstress on ice shelves originates at islands, sh+.

87PH0095. I.M.WHILLANS, J.BOLZAN, S.SHABTAIE. 1987(8). VELOCITY OF ICE STREAMS B AND C, ANTARCTICA. J. GEOPHYS. RES. 92(B9):8895-8902. AME. GEOPHYS. UNION, WASH. PN-3046. EN.

The essential difference between ice stream and inland ice and the cause of ice streaming are not known. In order to study these problems, velocities have been measured on and near ice streams B and C by repeated tracking of TRANSIT satellites. The results confirm the difference in mode of flow between fast on ice stream B and slow on the interstream ice ridges. Also as expected, ice stream C is nearly stagnant, which with other evidence of formerly fast flow confirms its recent slowing and current thickening. The drainage of ice stream B has a negative balance equivalent to thinning by 0.15 +/- 0.05 m/year over the entire catchment. The lower portion of the ice stream is thickening at about 2 m/year, but the overall behavior is thinning. This general thinning is probably partly du+.

87PH0096. DENSITY CURRENTS AND TRANSPORT PHENOMENA: ESTUARINE CIRCULATION, SALINITY INTRUSION, DISCHARGE OF +. DELFT HYDRAULICS LAB., DELFT. PN-3030. EN.

87PH0097. SUN-DUCK.CHANG. 1970(6). THE CIRCULATION IN CHINJU BAY, 2. RESULTS OF DRIFT BOTTLE EXPERIMENTS. BULL. KOREAN FISH. SOC. 3(2):137-147. KOREAN FISH. SOC., PUSAN. KO.

From November 1968 to March 1970, a series of drift bottle experiments were carried out in waters adjacent to and in Chinju Bay with the following results. Of the bottles released, 50-69 per cent were recovered. 1. The circulation of Chinju Bay is usually caused by the tidal current except during the winter season when the northwest monsoon prevails to cause a wind-drift current. 2. Sea water in the southern part of Chinju Bay flows northward at ebb tide. The ebb current east of the central submarine bank in Chinju Bay flows northeastward toward Samchonpo Channel through the eastern depression of the bank contributing to form a cyclonic eddy. The ebb current west of the bank, however, flows northward toward Noryang Channel through the western depression of the bank.

87PH0098. GI-BONG.LIM, M.FUJIMOTO. 1972(3). CIRCULATION AND WATER MASSES IN THE CONTINENTAL SHELF BREAK REGION OF THE EAST CHINA SEA. BULL. KOREAN FISH. SOC. 5(1):1-10. KOREAN FISH. SOC., PUSAN. KO.

Studies on the circulation and water masses in the continental shelf break region of the East China Sea are summarized as follows. The main stream of the Kuroshio flowing north-east near 29 N Lat 127 E Long of the East China Sea in summer is narrow in width. Moving toward east, it becomes twice as wide in Tokora Strait, Japan. In the main stream area of the Kuroshio, the surface waters in the upper layer (0-250m) are influenced by the coastal waters of China, and the counter current submerges under the surface water. Therefore, the mixing waters are found in its intermediate layer. Water mass between Amami Island and the continental shelf of the East China Sea consists of main stream water, counter current water, gyration water and mixed water with coastal waters.

87PH0099. S.SATO, T.NAGAI, H.OZASA. 1978(6).

NUMERICAL SIMULATION ON NEARSHORE CURRENT. TECH. NOTE PORT & HARBOUR RES. INST. (290):3-16. PORT & HARBOUR RES. INST. PN-2320. JA.

Nearshore current caused by wave is one of the most important factors of littoral drift and pollutant dispersion. There is a numerical simulation program of tidal currents due to alternative direction implicit method in Port and Harbour Research Institute. Two terms have been added to this program, a term of radiation stress and a term of bottom friction due to wave. Nearshore current has been able to be calculated with enough accuracy by this modification. The distribution of wave height and direction in the calculation area is necessary as input data in this program.

87PH0100. Y.TOBA, K.TOMIZAWA, Y.KURASAWA, K.HANAWA. 1982. SEASONAL AND YEAR-TO-YEAR VARIABILITY OF THE TSUSHIMA-TSUGARU WARM CURRENT SYSTEM WITH ITS POSSIBL+. LA MER. 20:41-51. SOC. FRANCO-JAP. D'OCEANOGR. PN-2343. EN.

The current transport entering the Japan Sea may be regarded as balancing with that flowing out the Sea, in a time scale longer than the seasonal. regarding the Tsushima Current and the Tsugaru Current as the main warm current system passing through the Japan Sea, the most plausible image of the variability and its-possible cause are presented, by synthesizing accumulated observational data. the average seasonal variation of the volume transport is characterized by the minimum in February through May, and the maximum in august through September.

87PH0101. T.ICHIYE. 1982. A COMMENTARY NOTE ON THE PAPER "ON THE OUTFLOW MODES OF THE TSUGARU WARM CURRENT" BY D.M.CONLON. LA MER. 20:125-128. SOC. FRANCO-JAP. D'OCEANOGR. PN-2345. EN.

CONLON (1982) proposed that there are two modes of the Tsugaru Warm Current outflowing from Tsugaru Sttait; one is the gyre mode with the outflow turning around an anticyclonic gyre during the warm season and the other is the coastal mode with the outflow moving southward along the east coast of the Japanese mainland during the cold season.

87PH0102. R.L.KOLPACK. 1982. TEMPERATURE AND SALINITY CHANGES IN THE TSUSHIMA CURRENT. LA MER. 20:199-209. SOC. FRANCO-JAP. D'OCEANOGR. PN-2344. EN.

Temperature and salinity relationships in the Japan Sea during 1968-1978 show that much of the water entering through Tsushima Strait is transported northeastward along the western margin of Japan and exits through Tsugaru Strait. A frontal zone exists in the central area where cold, low salinity water from the north contacts warm, high salinity water in the Tsushima Current. Some eddies, characterized by a high temperature and salinity core, move northward until mixing destroys their integrity within a distance of about 100-150 km. The position and character of the frontal zone appear to be controlled primarily by the strength of flow from the Kuroshio Current and secondarily by bottom topography in the Japan Sea.

87PH0103. Y.C.YUAN, K.R.HE. 1982. THE CALCULATION OF THREE-DIMENSIONAL OCEAN CURRENT BY FINITE ELEMENT METHOD. LA MER. 20:136-140. SOC. FRANCO-JAP. D'OCEANOGR. PN-2340. EN.

The present method is a development of a paper "Application of finite element method to the calculation of the Kuroshio Current in the eastern area of Taiwan". Starting from equations of motion including the pressure gradients, the Coriolis force and the friction due to the vertical eddy viscosity, we obtain a solution of the velocity components as well as the surface elevation.

87PH0104. J.NISHIZAWA, ET AL. 1982. ESTIMATION OF THE KUROSHIO MASS TRANSPORT FLOWING OUT OF THE EAST CHINA SEA TO THE NORTH PACIFIC. LA MER. 20:55-59. SOC. FRANCO-JAP. D'OCEANOGR. PN-2342. EN.

Geostrophic transport of the Kuroshio referred to 1,000 db surface is estimated at a section near the southeast end of Kyushu Island using data of more than twenty years. The section is between Cape Toi and 30 Deg. N, 133 Deg. E. The geostrophic transport varies seasonally; largest in summer and smallest in winter, with a mean value of 46500000 cubic meter/sec. Year-to-year change is also appeared. A relationship between the large Kuroshio transport and its meander is pointed out.

87PH0105. Y.C.YUAN, J.L.SU, J.S.ZHAO. 1982. A SINGLE LAYER MODEL OF THE CONTINENTAL SHELF CIRCULATION IN THE EAST CHINA SEA. LA MER. 20:131-135. SOC. FRANCO-JAP. D'OCEANOGR. PN-2341. EN.

A vertically integrated model including the baroclinic effect is proposed to study the circulation. Both winter and summer circulations for two areas in the East china Sea are computed. Numerical computations yield realistic patterns for both circulations. It is concluded that: 1) the vertically integrated model with constant density gives better results for the winter circulation than for the summer circulation when the baroclinic effect is not negligible, 2) the primary driving force of the winter circulation is a prevailing northerly wind field, and 3) the turning and spreading of the Chang Jiang outflow is due to combined effects of the wind field, topography, and baroclinicity, whereas the taiwan current seems to exert its influence mainly through changing the baroclinic field.

87PH0106. D.M.CONLON. 1982. ON THE OUTFLOW MODES OF THE TSUGARU WARM CURRENT. LA MER. 20:60-64. SOC. FRANCO-JAP. D'OCEANOGR. PN-2338. EN.

The tsugaru Warm Current displays two principal circulation modes. The first mode is characterized by the presence of a warm-core anticyclonic gyre that extends as far east as longitude 143 Deg. E (gyre mode). In the second mode, the Tsugaru Warm Current is generally confined near the Honshu coast (coastal mode). The occurrence of these modes is consistent with

the laboratory findings of WHITEHEAD and MILLER (1979), which suggests that inertial-rotational dynamics govern the Tsugaru Warm Current.

87PH0107. O.K.HUH. 1982. SATELLITE OBSERVATIONS AND THE ANNUAL CYCLE OF SURFACE CIRCULATION IN THE YELLOW SEA, EAST CHINA S+. LA MER. 20:210-222. SOC. FRANCO-JAP. D'OCEANOGR. PN-2348. EN.

Winter monsoon winds of northeast Asia force major changes in surface circulation, induce strong negative oceanic heat fluxes, and drive vertical mixing that differentiates surface temperatures along the boundaries of major water masses. The oceanic thermal fronts thus formed and their changing patterns are readily detectable by satellite through the cloud-free polar continental air of the winter monsoon winds. The Kuroshio is observed to be a strongly modulated source of warm Tsushima Current waters with a pronounced annual cycle. The Yellow Sea appears to act as a buffer, at times receiving waters that would otherwise flow through the Korea Strait and at other times supplying water to the strait.

87PH0108. M.ASTRALDI, G.M.R.MANZELLA. 1983(10). SOME OBSERVATIONS ON CURRENT MEASUREMENTS ON THE EAST LIGURIAN SHELF MEDITERRANEAN SEA. CONTINENTAL SHELF RES. 2(2/3):183-193. PERGAMON PRESS, OXFORD. EN.

Long-term (10 months) current measurements from the Ligurian continental shelf are presented. Spectral analysis of the current meter data has shown fluctuations in the alongshore current which had peaks at 15 to 20 days and which were coherent at all depths. Temperature and salinity data suggested that some oscillations may be due to the presence of topographic waves.

87PH0109. P.WIBERG, J.D.SMITH. 1983(10). A COMPARISON OF FIELD DATA AND THEORETICAL MODELS FOR WAVE-CURRENT INTERACTIONS AT THE BED ON THE +. CONTINENTAL SHELF RES. 2(2/3):147-162. PERGAMON PRESS, OXFORD. EN.

Models for the combined effect of waves and currents on the continental shelf developed by Smith and by Grant and Madsen predict near-bottom velocity profiles and values of boundary shear stress that agree reasonably well with reanalyzed data collected by Cacchione and Drake (Journal of Geophysical Research, 87, 1952-1960, 1982) using the Geoprobe system in Norton Sound, Alaska. The data set includes velocity profiles recorded during a two-day storm, sequences of which were averaged to indicate the mean flow conditions during two periods of relatively steady flow. Estimates of the reduction in vertical diffusion of momentum and mass as a result of near-bottom suspended sediment indicate that no suspended sediment stratification correction is required in this case.

87PH0110. T.F.GROSS, A.R.M.NOWELL. 1983(10). MEAN FLOW AND TURBULENCE SCALING IN A TIDAL BOUNDARY LAYER. CONTINENTAL SHELF RES. 2(2/3):109-126. PERGAMON PRESS, OXFORD. EN.

Calculations based on data from 10 triplets of orthogonally oriented ducted-impeller current meters vertically spaced near the bottom of an estuary in Puget Sound show that: (1) 10-min averaging reduces the uncertainties in the value of the various means to +/-3.6% for the velocity, +/-8.8% for the friction velocity, +/-50% for the extrapolated zero-velocity height (roughness length), and +/-40% for the Reynolds stress (95% confidence); (2) because of the magnitude of the low-frequency (tidal) variability, lengthening of the averaging period does not reduce the uncertainties; and (3) a quasi-stationary model suffices to relat ? the Reynolds stress to the mean velocity profile within the above uncertainties. Including the dynamic effects of temporal variability in the model does not p+.

87PH0111. D.A.BOOTH, D.J.ELLETT. 1983(10). THE SCOTTISH CONTINENTAL SLOPE CURRENT. CONTINENTAL SHELF RES. 2(2/3):127-146. PERGAMON PRESS, OXFORD. EN.

A four-month record from a current meter mooring on the continental slope west of Scotland displayed a steady northward current of 0.16 m/sec which appears to be associated with a core of warm light water normally observed over the shallow side of the slope. Although the tides change considerably between deep water and the continental shelf, the horizontal velocity gradients are not sufficient to explain the observed average current. One possible explanation, which displays the tendency to enhance the current over the shallow side of the slope, is a boundary current driven by a north-south pressure gradient, with pressure increasing towards the north. Such a pressure gradient could be a surface level gradient which contributes to a large term in the vorticity equation in regions with +.

87PH0112. J.R.MA. 1983(12). CERTAIN PROPERTIES AND CAUSES OF VARIATIONS OF THE SOUTH EQUATORIAL COUNTERCURRENT IN THE PACIFIC +. ACTA OCEANOL. SINICA. 2(2):167-177. CHINA OCEAN PRESS, BEIJING. EN.

Marine investigations were carried out in the western central equatorial Pacific region from 1976 to 1979 by three chinese research vessels "Xiangyanghong 05", "Xiangyanghong 09" and "Shijian" belonging to the National Bureau of Oceanography. The data of currents, surface wind, drift of the ship, temperature, salinity, and so on, were obtained during the investigations, which provides more reliable basis for further studies on the South Equatorial countercurrent in the Pacific Ocean. In this paper certain properties and causes of variations of the South Equatorial Countercurrent in the Pacific Ocean are analysed according to the above-mentioned data.

87PH0113. G.A.JACKSON, C.D.WINANT. 1983(5). EFFECT OF A KELP FOREST ON COASTAL CURRENTS. CONTINENTAL SHELF RES. 2(1):75-80. PERGAMON PRESS, OXFORD. EN.

Ocean currents supply a kelp ecosystem with nutrients, planktonic food, and larvae. We have found

that these currents in a kelp forest (Macrocystis pyrifera) are slower than currents outside. At the Pt. Loma, San Diego, California, site that we studied, current velocities were about a third of those outside. A comparison of frequency spectra shows that semi-diurnal frequencies are preferentially passed by the kelp. This effect of a kelp forest on the currents that nurture it is similar to that of a terrestrial forest on local winds.

87PH0114. T.S.HOPKINS, D.A.DIETERLE. 1983(5). AN EXTERNALLY FORCED BAROTROPIC CIRCULATION MODEL FOR THE NEW YORK BIGHT. CONTINENTAL SHELF RES. 2(1):49-73. PERGAMON PRESS, OXFORD. EN.

The sea level and the barotropic, frictional circulation response for the New York Bight are used to demonstrate the effects of external sea-level forcing, bathymetry, and variable friction. The governing equation is the steady, integrated vorticity equation and is computed by finite differencing over a curvilinear grid conforming to the 10- and 100-m isobaths and extending for 250 km alongshore. The boundary conditions are based on the hypothesis that the dynamics of the shelf are driven by the external sea-level gradient and the coastal no-flux condition; and consequently the conditions at the lateral boundaries are dependent thereon. Therefore, the external sea-level slope must be independently specified, and the lateral boundary conditions must be dependently generated.

87PH0115. D.TOLMAZIN, W.F.BOHLEN, M.FECHER. 1983(5). VARIABILITY OF CURRENTS AND HORIZONTAL EDDY COEFFICIENTS IN EASTERN LONG ISLAND SOUND. CONTINENTAL SHELF RES. 2(1):35-48. PERGAMON PRESS, OXFORD. EN.

Various circulatory mechanisms within the mesoscale range of tidal flows in Eastern Long Island Sound are investigated. Two 13-day time series of current measurements were obtained using three moorings arranged in the form of a triangle. Each mooring contains a single Aanderaa current meter located at a depth of 18 to 20 m. Statistical analysis provides evidence of residual circulation effects of topographic origin in the average flow field. The relative importance and periods of orderly residual patterns and turbulent motions are examined using kinetic energy spectra for the longitudinal and transverse components of the flow. The analyses reveal residual oscillations having nearly the same time scales for all moorings and horizontal turbulent eddies which display a diversity of tem+.

87PH0116. R.E.LEWIS. 1984. CIRCULATION AND MIXING IN ESTUARY OUTFLOWS. CONTINENTAL SHELF RES. 3(3):201-214. PERGAMON PRESS, OXFORD. EN.

The outflow of brackish waters from the Tees estuary on an ebb tide forms a plume which is initially spread by the action of gravity. Under quiescent conditions, the rate of vertical mixing of the brackish field is relatively slow and an area of low salinity may form in the surface waters as a result of the superimposition of the outflow plumes from successive tides. Averaged over a tidal period, the estuary outflow from the Tees forms a broad plume of low-salinity water which extends to seaward of the 20-m contour. The movement of the field thereafter depends on the residual coastal drift which runs either to the northwest or to the southeast with a typical speed of 0.015m/sec.

87PH0117. I.D.JAMES. 1984. A THREE-DIMENSIONAL NUMERICAL SHELF-SEA FRONT MODEL WITH VARIABLE EDDY VISCOSITY AND DIFFUSIVITY. CONTINENTAL SHELF RES. 3(1): 69-98. PERGAMON PRESS, OXFORD. EN.

A three-dimensional numerical model of circulation & eddy development in shelf-sea fronts is applied to three frontal structures, with two parameterization schemes for vertical eddy viscosity & diffusivity. The three fronts resemble those in the German Bight(a front between relatively fresh coastal water & saltier water offshore, with an interface extending from surface to bottom), the Norwegian Coastal Current(also formed by fresh coastal water but with a thermocline on one side), and the Celtic Sea (a front between water which is stratified in summer & water which is well mixed throughout the year). The two mixing assumptions, modelling the reduction of turbulence in stratified zones, are based on the Munk-Anderson scheme and the turbulent energy equation.

87PH0118. T.YAMAGATA, S.-I.UMATANI, N.MASUNAGA, T.MATSUURA. 1984. OBSERVATIONS OF AN INTRUSION OF A WARMER AND LESS SALINE WATER MASS INTO A BAY. CONTINENTAL SHELF RES. 3(4):475-488. PERGAMON PRESS, OXFORD. EN.

Detailed hydrographic observations were made in Wakasa Bay, Japan, in August 1979 as the first of a series on the topic of bay intrusions. An anomalous water tongue, evident at a depth of 50 m, was observed to move eastward into the bay at a speed of about 10 km/day. The width of the tongue was about 20 to 30 km in agreement with the Rossby internal radius of deformation. The results of current meter measurements and the observed temporal and spatial evolution of the temperature field near the front of the anomalous water tongue have suggested that ageostrophic cross-frontal motion, in balance with the along-front acceleration, may be important in our understanding of intrusion processes.

87PH0119. D.VAN FOREEST, F.A.SHILLINGTON, R.LEGECKIS 1984. LARGE SCALE, STATIONARY, FRONTAL FEATURES IN THE BENGUELA CURRENT SYSTEM. CONTINENTAL SHELF RES. 3(4):465-474. PERGAMON PRESS, OXFORD. EN.

Large scale, stationary features of the Benguela Current system have been observed on satellite infrared images. This paper attempts to establish the most likely dynamical framework required to explain the features. Although the observed features are clearly baroclinic, the wavelength of the 2.2 day period barotropic shelf wave (Buchwald and Adams, 1968, Proceedings of the Royal Society of London, A305, 235-250) fits the observed longshore spatial structure of the features well. The barotropic shelf wave model fails to explain

the baroclinic nature and the stationary aspect of the observed features. More observational and theoretical work is necessary to understand the dynamics of these features.

87PH0120. G.MANZELLA, L.PAPA, C.STOCCHINO. 1984. SU ALCUNE CARATTERISTICHE DELLE CORRENTI IN ACQUE PROFONDE. 15P. IST. IDROGR. MARINA, GENOVA. PN-2534. IT.

In this paper we analyzed current measurements carried out in the Ligurian Sea near Portofino in the period: 12-14 June 1976, at the depth of 150, 300, 500 and 600 m. Linear regression showed that there was a counterclockwise rotation of the mean velocity with depth. Hodograph ellipses have been computed and a coherence analysis between NS and EW components at different depths has been calculated. Furthermore current fluctuations and mean velocities were investigated following the Webster's method.

87PH0121. N.S.HEAPS. 1984. DEVELOPMENT OF NUMERICAL MODELS FOR THE PREDICTION OF CURRENTS. CURRENTS MEASUREMENTS OFFSHORE. BK:1-26. SOC. UNDERWATER TECH., LONDON. PN-2695. EN.

The application of numerical models to determine currents in the shelf seas surrounding the British Isles is described. Both two-dimensional depth-averaged models and three-dimensional models are considered. Problems involved in the determination of the vertical structure of current are discussed; to resolve these, a combined programme involving the measurement of current profiles and the use of three-dimensional models is suggested.

87PH0122. P.M.WOLFF, D.KONOP. 1984(9). PREDICTING WATER CIRCULATION IN DELAWARE BAY AND RIVER: NOAA'S NEW APPROACH. SEA TECHNOLOGY. 25(9):18-22. COMPASS PUB., ARLINGTON. PN-3005. EN.

87PH0123. J.M.HUTHNANCE. 1985. FLOW ACROSS REEFS OR BETWEEN ISLANDS, AND EFFECTS ON SHELF-SEA MOTIONS. CONTINENTAL SHELF RES. 4(6):709-731. PERGAMON PRESS, OXFORD. EN.

Oscillatory (e.g., tidal) flow over and around shallow reefs and islands is considered. Overall matching conditions (between sea levels and flows across the reef) are derived, to represent reef effects in models of larger regions. Analyses include various reef forms of uniform cross-section and water depth h(x), both narrow (uniform cross-reef transport) and broad(decoupled motions on either side). Simple island chains, or reefs broken by passages conducting all the flow, are also considered. Continental shelf waves, particularly near their maximum frequency, may be strongly retarded and damped by a shelf-edge reef.

87PH0124. T.A.MCCLIMANS, L.LONSETH. 1985. OSCILLATIONS OF FRONTAL CURRENTS. CONTINENTAL SHELF RES. 4(6):699-707. PERGAMON PRESS, OXFORD. EN.

The problem of interpreting Eulerian current measurements in sharp fronts with current shears much larger than the planetary vorticity is discussed for the case when there are tidal and/or inertial oscillations present. For a situation taken from the Norwegian Coastal Current, long-frontal oscillations in speed exceeded cross-frontal oscillations by a factor of about 4 as a result of the frontal shear field moving back and forth past the moored current meter. It is shown how these large amplifications can be used to estimate the cross-frontal shear. The example highlights the problem of computing energy density spectra in frontal regions.

87PH0125. A.M.DAVIES. 1985. APPLICATION OF A SIGMA COORDINATE SEA MODEL TO THE CALCULATION OF WIND-INDUCED CURRENTS. CONTINENTAL SHELF RES. 4(4):389-423. PERGAMON PRESS, OXFORD. EN.

A three-dimensional numerical sea model is formulated in terms of sigma coordinates in the vertical. The vertical grid spacing in the model is arbitrary and can be refined to give enhanced resolution in high shear regions. A method of accurately determining surface currents and indicating how fine a grid is required in the surface layer is described. The problem of determining a suitable formulation of vertical eddy viscosity to use in a model of wind-induced flow in a tidal sea is considered in detail. A formulation in which surface eddy viscosity depends upon the roughness of the sea surface and the transfer of momentum to depth by surface waves appears reasonable. Below the surface layer turbulence is related to the current at depth.

87PH0126. R.G.LUECK, T.R.OSBORN. 1985. TURBULENCE MEASUREMENTS IN A SUBMARINE CANYON. CONTINENTAL SHELF RES. 4(6):681-698. PERGAMON PRESS, OXFORD. EN.

Profiles of velocity turbulence in Monterey Canyon, made with a recently developed expendable probe, show the existence of a very turbulent bottom boundary layer. Temperature measurements indicate that the flow was up canyon at a time of low tide. The upper bound for the vertical eddy viscosity is estimated to be 0.017 square meter/sec and for the vertical eddy diffusivity is estimated to be 0.015 square meter/sec. The large vertical scale and the intensity of the observed boundary layer suggest that the flow in Monterey Canyon may be important for the renewal and circculation of water over the continental shelf in the bay area.

87PH0127. Y.T.MIAO, S.Q.YU, R.Z.QIAO. 1985(1). THE VARIATION CHARACTERISTICS OF THE KUROSHIO STRUCTURE AT THE E SECTION. ACTA OCEANOL. SINICA. 4(1):9-20. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, by making use of data from Cooperative Study of the Kurosio and Adjacent Reions (CSK) together with part of the Geomagnetic Electrokinetograph (GEK) surface current observation data, we analyse the E section in detail for the following contents: 1. The variation characteristics of time and space in the current field of the Kuroshio. 2. The current axis structures of the Kuroshio and its main

axis shift to the right with depth. Some parameter indications of the hydrographical elements are presented. 3. Comparison is made among the East of Taiwan Island, the Kuroshio in the East China Sea and the Kuroshio crossing the E section. 4. The geostrophic transports are calculated and their variations are analysed. The great difference of vertical transport distribution between+.

87PH0128. P.G.XI, S.Z.ZHANG, S.Z.FENG. 1985(10). AN INVESTIGATION ON NUMERICAL MODELING OF CIRCULATION IN THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 4(4):510-514. CHINA OCEAN PRESS, BEIJING. EN.

On the basis of the simple dynamic model of circulation developed for the East china Sea in References [1] and [2], the present paper proposes a more complete one, which is basically brought into line with Reference [3]. It is interesting to note that the computation results based on both the models mentioned above are the same in principle though different in detail. A comparison between numerical modeling and observations shows an agreement and the dynamics of circulation in the East China Sea reveals that the pattern of circulation is controlled by boundary force, water depth and thermohaline effect with the wind stress playing a minor role therein.

87PH0129. R.A.HEATH. 1986. ONE TO FOUR WEEKLY CURRENTS ON THE WEST COAST SOUTH ISLAND NEW ZEALAND CONTINENTAL SLOPE. CONTINENTAL SHELF RES. 5(6):645-664. PERGAMON PRESS, OXFORD. EN.

Current meter measurements from the west coast South Island New Zealand continental slope exhibit flows with dominant time scales of between 1 and 4 weeks as well as the expected diurnal and semidiurnal tides. The alongshore Doodson filtered daily mean flow components are marginally correlated with the alongshore wind. The onshore flow components are marginally correlated with the envelope of the square of the semidiurnal and diurnal tidal flow, which is taken as a measure of energy loss from the tide. Observations from the southern flank of the Challenger Plateau, 200 km north of the continental slope observations and further offshore, also exhibit similar long-period variatons. However, here the alongshore flow is more strongly correlated with alongshore wind than at the southern s+.

87PH0130. T.HAYASH, D.A.GREENBERG, C.J.R.GARRETT. 1986. OPEN BOUNDARY CONDITIONS FOR NUMERICAL MODELS OF SHELF SEA CIRCULATION. CONTINENTAL SHELF RES. 5(4):487-497. PERGAMON PRESS, OXFORD. EN.

The influence of cross-shelf open boundary conditions on the steady response of a wind-driven shelf sea is examined by comparing model results with the analytical solution for an infinitely long straight shelf. Boundary conditions which do permit a correctly matched solution include those which require zero along-shelf gradient of either elevation or along-shelf flow. In practical applications, neither the zero elevation nor the infinite shelf condition need be correct, and some local knowledge is necessary before specifying the boundary condition.

87PH0131. T.B.CURTIN. 1986. PHYSICAL OBSERVATIONS IN THE PLUME REGION OF THE AMAZON RIVER DURING PEAK DISCHARGE, III. CURRENTS. CONTINENTAL SHELF RES. 6(1/2):73-86. PERGAMON PRESS, OXFORD. EN.

current measurements from an array of moored current meters at 15 and 32 m water depths in the Amazon plume region at 4 Deg. N during the period of peak discharge are described. Principal variability occurred at semi-diurnal (tidal), 1-2 day (event), and week to 10 day periods. Interpretation within the context of observed hydrographic gradients and identified water masses indicates an offshore flow regime with a mean current along-shelf northwestward and an inshore flow regime with a mean current component across-shelf seaward. Surface plume mixing events and minimal tidal modulation are characteristic of the inshore regime and the upper water column offshore.

87PH0132. O.M.SMEDSTAD, J.E.WEBER. 1986. GEOSTROPHIC CURRENTS IN SHELF AREAS. CONTINENTAL SHELF RES. 6(5):655-675. PERGAMON PRESS, OXFORD. EN.

A method for obtaining geostrophic currents in a stratified ocean is discussed. It combines the use of hydrographic data and numerical modelling. For geostrophic flow in a flat-bottom stratified ocean it is shown along the lines of Gill and Clarke (1974, Deep-Sea Research, 21, 325-345) that the surface elevation is determined by the barotropic mode. Experience indicates strongly that this also is the case when the depth varies. Hence the surface elevation, or equivalently the surface velocity, can be obtained from the depth-averaged equations.

87PH0133. K.R.THOMPSON, D.T.PUGH. 1986. THE SUBTIDAL BEHAVIOUR OF THE CELTIC SEA, II. CURRENTS. CONTINENTAL SHELF RES. 5(3):321-346. PERGAMON PRESS, OXFORD. EN.

Subtidal currents observed in the Celtic Sea during spring 1978 are described in terms of empirical orthogonal functions and rotary spectra. Less than half the current variance can be related to local wind forcing. It is suggested that the remaining variance is partly due to the influence of winds acting over the adjacent Irish Sea and North Sea. There is no evidence in this limited data set of a strong coupling between the Celtic Sea and adjacent North Atlantic at subtidal frequencies. Examination of the terms in the subtidal momentum equation shows that the interior of the Celtic Sea is essentially in geostrophic balance. Close to the tidally energetic St George's Channel, both bottom friction and mean tidal advection become important.

87PH0134. G.L.MELLOR. 1986. NUMERICAL SIMULATION AND ANALYSIS OF THE MEAN COASTAL CIRCULATION OFF CALIFORNIA. CONTINENTAL SHELF RES. 6(6):689-713. PERGAMON PRESS, OXFORD. EN.

A two-dimensional numerical model is applied to a coastal ocean wherein alongshore elevation and density gradients, normally calculated by a three-dimensional model are instead supplied by climatologically averaged data for the California Current System between 25 and 40 N. Surface wind stress is also obtained from climatological data. Both surface and bottom boundary layers are resolved in the model calculations; a second moment turbulence closure submodel supplies vertical diffusivities. Near steady state solutions are possible when surface buoyancy flux is imposed at the surface.

87PH0135. T.S.HOPKINS, A.L.SWOBODA. 1986. THE NEARSHORE CIRCULATION OFF LONG ISLAND, AUGUST 1978. CONTINENTAL SHELF RES. 5(4):431-473. PERGAMON PRESS, OXFORD. EN.

The subinertial circulation within 2 to 12 km of the Long Island coast is described from a set of observations of the velocity and density fields during August 1978. The flow was characteristically to the southwest, increasing offshore and decreasing with depth. This southwest flow was driven by an externally imposed shoreward rising sea level which was modified at the coast by local wind-driven divergences and convergences. Upwelling and downwelling circulations maintained isopycnal tilts which in turn geostrophically sheared the flow. Nearly complete compensation was observed during steady periods, reducing the near-bottom flow to within about 80% of its barotropic magnitude.

87PH0136. T.YAMAMOTO, S.NISHIZAWA. 1986(11/12 SMALL-SCALE ZOOPLANKTON AGGREGATIONS AT THE FRONT OF A KUROSHIO WARM-CORE RING. DEEP-SEA RES. V.33(11/12:1729-1740. PERGAMON PRESS, OXFORD. EN.

A Longhurst-Hardy Plankton Recorder was used to study the small-scale zooplankton distribution across the front of a Kuroshio warm-core ring in June 1979. Zooplankton were strongly aggregated in the frontal region; patches of zooplankton and phytoplankton were spatially separated. A major part of the zooplankton assemblage consisted of neritic forms such as cladocerans and indicator species of the cold Oyashio water. This implies that lateral entrainment of coastal waters, which is directly influenced by the Oyashio, was an important factor in the formation of the aggregations at the Kuroshio warm-core ring front. Variation in the distribution of abundance peaks of individual zooplankton species was also observed.

87PH0137. P.J.MULHEARN, ET AL. 1986(11/12 ABYSSAL CURRENTS DURING THE FORMATION AND PASSAGE OF A WARM-CORE RING IN THE EAST AUSTRALIAN CURRE+. DEEP-SEA RES. V.33(11/12:1563-1576. PERGAMON PRESS, OXFORD. EN.

Measurements of currents and temperatures at abyssal depths in the Tasman Sea are compared with near-surface observations of the East Australian Current (EAC) System to ascertain the extent to which the deep and near-surface flows are related. The deep measurements come from three instruments which were moored at different locations on the Tasman Abyssal Plain from early December 1983 to late March 1984. They included an Anderaa current meter, recording velocity and temperature, a second temperature sensor, and an instrument which recorded fluctuations in temperature and the vertical component of the ambient electric field (from which zonal velocity is inferred). The abyssal temperature fluctuations increased in magnitude with the increase in water velocity as the front moved past, bu+.

87PH0138. A.TOMOSADA. 1986(11/12 GENERATION AND DECAY OF KUROSHIO WARM-CORE RINGS. DEEP-SEA RES. V.33(11/12:1475-1486. PERGAMON PRESS, OXFORD. EN.

Warm-core rings of the Kuroshio were tracked on monthly temperature contour maps from their generation to decay over the period of 1973-1982. Fourteen warm-core rings were found in this period, with 1-2 rings generated each year. A particularly large and warm ring was formed in 1979. According to KIMURA's results, a giant warm-core ring is generated at intervals of 6 years. When a warm-core ring drifts immediately north of the Kuroshio, it often coalesces with and separates again from the Kuroshio. The disappearance of each warm-core ring since 1973 was checked on the monthly temperature maps. Only one warm-core ring was tracked to the east of Hokkaido; two rings entered the Tsugaru Warm Current. Aside from these warm-core rings and those that coalesced with the Kuroshio, it was d+.

87PH0139. M.H.CONTE, J.K.B.BISHOP, R.H.BACKUS. 1986(11/12 NONMIGRATORY, 12-kHz, DEEP SCATTERING LAYERS OF SARGASSO SEA ORIGIN IN WARM-CORE RINGS. DEEP-SEA RES. V.33(11/12:1869-1884. PERGAMON PRESS, OXFORD. EN.

Nonmigratory, 12-kHz, deep sound-scattering layers (NMDSLs) were entrained within Sargasso Sea-Gulf Stream waters during the formation of warm-core rings 82B and 82H. At night ring water was easily distinguished from Slope Water by the presence of these well-developed features between 200 and 550 m. The distribution of NMDSLs in 82H as a function of temperature and salinity matched Sargasso Sea distributions, indicating that Sargasso Sea water was present in the center of 82H at the time of its formation. However, the distribution of NMDSLs in the center of 82B a few weeks after its formation was more consistent with the distribution found in Gulf Stream-Sargasso Sea edge water.

87PH0140. R.W.SCHMITT, R.G.LUECK, T.M.JOYCE. 1986(11/12 FINE- AND MICROSTRUCTURE AT THE EDGE OF A WARM-CORE RING. DEEP-SEA RES. V.33(11/12:1665-1689. PERGAMON PRESS, OXFORD. EN.

As part of the Warm Core Rings Experiment, a set of intensive observations of thermohaline intrusions at the outer edge of a warm ring were obtained. The observations included a CTD tow-yo, repeated microstructure profiles and continuous acoustic Doppler velocity measurements. The survey was performed relative to the drift of a drogued surface buoy. The CTD

data allowed us to map the three-dimensional structure of the intrusive features. The data indicate that the core of a cold, fresh intrusion became lighter as it extended across the front. This is contrary to the usual expectation that such intrusions should get denser under the influence of salt fingers.

87PH0141. Y.OKADA, Y.SUGIMORI. 1986(11/12 DECAY OF WARM-CORE RINGS BASED ON OBSERVATIONS OF AVAILABLE POTENTIAL ENERGY. DEEP-SEA RES. V.33(11/12:1577-1599. PERGAMON PRESS, OXFORD. EN.

Warm eddies formed north of the Kuroshio consist of a warm and high-salinity mass of kuroshio water. The energy of these eddies resides principally in the form of available potential energy, which is present in the local deformation of the density field. A warm eddy was tracked in the intermediate zone, when there was a Perturbed Area between the Kuroshio and the Oyashio Front, from July 1982 to October 1983. For variability over short-term periods, available potential energy and kinetic energy are both decreased by air-sea interaction because of a passing cyclone over the warm eddy area during the observation period. Injection of warm eddies into the perturbed Area and their subsequent decay may be important for the energy balance in the Perturbed Area and may be an important step i+.

87PH0142. T.SUGIMOTO, T.ISHIMARU, M.KOBAYASHI. 1986(11/12 CIRCULATION AND WATER EXCHANGE IN THE ANTICYCLONIC GYRE OFF SHIKOKU. DEEP-SEA RES. V.33(11/12:1641-1652. PERGAMON PRESS, OXFORD. EN.

To explain the processes that cause the subsurface chlorophyll maximum, the upwelling velocity through the seasonal thermocline in the central area of the anticyclonic gyre was estimated by the use of a heat balance model and other techniques. The upwelling velocity estimated by heat balance is about 2.0 and 3.7 m/day for a horizontal eddy diffusion coefficient of 0 and 5000000 square centimeter/sec, respectively. Compared with this value, the upwelling velocities estimated by drifting buoys or by the dynamic estimation of frictionally induced flow were unsatisfactorily larger or smaller, respectively.

87PH0143. O.B.BROWN, P.C.CORNILLON, S.R.EMMERSON, H.M.CARLE. 1986(11/12 GULF STREAM WARM RINGS: A STATISTICAL STUDY OF THEIR BEHAVIOR. DEEP-SEA RES. V.33(11/12:1459-1473. PERGAMON PRESS, OXFORD. EN.

A 10 year series of NOAA polar-orbiter satellite infrared-based determinations of Gulf Stream warm-core ring (WCR) locations, is used to derive mean loci, lifetime and size, and movement statistics in the Slope water region off the northeast United States east coast. Longer-lived rings tend to be located farther away from the climatological Gulf Stream north wall than shorter-lived rings east of 66 Deg. W. The mean loci are compared with Warm Core Ring Experiment results for 82B. We find similar changes in track corresponding to topographic variation, similar translation speed, size, decrease in size over time, etc., leading us to conclude that the kinematics observed for 82B are representative of those for a long-lived warm-core ring.

87PH0144. J.K.B.BISHOP, T.M.JOYCE. 1986(11/12 SPATIAL DISTRIBUTIONS AND VARIABILITY OF SUSPENDED PARTICULATE MATTER IN WARM-CORE RING 82B. DEEP-SEA RES. V.33(11/12:1741-1760. PERGAMON PRESS, OXFORD. EN.

SPATIAL DISTRIBUTIONS AND VARIABILITY OF SUSPENDED PARTICULAte matter (SPM) were determined optically during CTD/transmissometer surveys of warm-core ring (WCR) 82B and surrounding waters in June 1982. SPM distributions within 30 km of ring center from the surface to the depth of the 27.6 kg/cubic meter potential density surface at 800 m were different from surrounding waters. Waters within this core region of the ring had higher SPM concentrations between potential densities of 26.0 and 26.75 kg/cubic meter and had lower concentrations between 26.8 and 27.5 kg/cubic meter when compared to surrounding waters. This result suggests that processes within WCR 82B (as opposed to lateral exchange processes with surrounding waters) were most important in governing particle distributions near+.

87PH0145. M.F.FOX, D.R.KESTER. 1986(11/12 NUTRIENT DISTRIBUTIONS IN WARM-CORE RING 82-B APRIL-AUGUST. DEEP-SEA RES. V.33(11/12:1761-1772. PERGAMON PRESS, OXFORD. EN.

The chemical, physical and biological distributions of a single warm-core ring, WCR 82-B, were examined in a multidisciplinary study of the ring from March to August 1982. WCR 82-B formed in late February 1982; in April the core water of the ring was isothermal and isohaline, with a homogeneous distribution of nutrients and oxygen from the surface to a depth of 350 m. Thermal stratification occurred in early May; nutrients were depleted from the surface layer after stratifcation. In the core of the ring (radius <20 km) nitrate lost from the surface layer after stratification was regenerated in the thermostad; silicate lost from the surface water was not regenerated in the thermostad, but was regenerated in the main thermocline.

87PH0146. D.B.OLSON. 1986(11/12 LATERAL EXCHANGE WITHIN GULF STREAM WARM-CORE RING SURFACE LAYERS. DEEP-SEA RES. V.33(11/12:1691-1704. PERGAMON PRESS, OXFORD. EN.

The radial exchange of near-surface properties in Gulf Stream anticyclonic, warm-core rings is studied with the use of hydrographic and satellite data in coordination with some simple models. The importance of lateral exchange to biological properties is examined with a simple model where the ring, its surrounding frontal zone, and the far field Slope Water make up three interacting components. If the ring frontal zone is assumed to have higher "production", either due to increased vertical mixing or through active concentration of organisms tied to convergence, the core of the ring can eventually exceed the far field Slope

Water concentrations.

87PH0147. S.I.SAITOH, S.KOSAKA, J.IISAKA. 1986(11/12 SATELLITE INFRARED OBSERVATIONS OF KUROSHIO WARM-CORE RINGS AND THEIR APPLICATION TO STUDY OF PACI+. DEEP-SEA RES. V.33(11/12:1601-1615. PERGAMON PRESS, OXFORD. EN.

Satellite infrared observations of Kuroshio warm-core rings (KWCRs), made in the Tohoku area west of 150 Deg. E from February 1980 to June 1981, were used to study the effect of ring distributions on the migration routes of the epi-pelagic and migratory fish Pacific saury. Cololabis saira (Brevoort). A comparison between distribution of KWCRs and distribution of fish schools suggests that the KWCRs control southward migration routes of Pacific saury through interaction with the surrounding cold waters such as the First and Second Oyashio Intrusions. Satellite infrared monitoring of KWCRs and the surrounding cold waters have proved to be useful for the short period prediction of Pacific saury fishing ground formation.

87PH0148. H.KAWAI, S.I.SAITOH. 1986(11/12 SECONDARY FRONTS, WARM TONGUES AND WARM STREAMERS OF THE KUROSHIO EXTENSION SYSTEM. DEEP-SEA RES. V.33(11/12:1487-1507. PERGAMON PRESS, OXFORD. EN.

This paper describes the separation of the secondary Kuroshio Front, which is redefined, and compares geostrophic warm streamers, warm tongues and warm cores. Despite a large difference in their dimensions, the three structures are unified as a band of warmest water transported by a geostrophic jet stream without any countercurrent components in the band. Using satellite images, spiraling velocities of warm stremers into a warm eddy are estimated to be geostrophic for azimuthal components, but ageostrophic for radial ones. Switchover and double spiraling behaviors of warm streamers entrained into a warm eddy are shown. Roles played by secondary fronts, warm tongues and warm streamers in forming, feeding and consuming warm eddies are considered.

87PH0149. G.R.CRESSWELL, R.LEGECKIS. 1986(11/12 EDDIES OFF SOUTHEASTERN AUSTRALIA. DEEP-SEA RES. V.33(11/12:1527-1562. PERGAMON PRESS, OXFORD. EN.

Satellite infrared images and satellite drifters, together with some supporting ship data, have been used to follow complex and repidly evolving events in the East Australian Current system. The episodic extension of a geopotential ridge into the southern Tasman Sea was seen to be arrested and diverted by a substantial anticyclonic eddy. Later the ridge and the eddy partially coalesced, and this provided a pathway for the East Australian Current to travel southward and encircle the eddy. A new eddy was formed in summer when this eddy coalesced with another. The new eddy initially had two subsurface thermostads with temperatures of 18.8 and 17.0 Deg. in Centigrade, respectively, that were the result of mixing within the two component eddies the previous winter. It was kept under cont+.

87PH0150. H.KAWAMURA, K.MIZUNO, Y.TOBA. 1986(11/12 FORMATION PROCESS OF A WARM-CORE RINGS IN THE KUROSHIO-OYASHIO FRONTAL ZONE-DECEMBER 1981-OCTOBER +. DEEP-SEA RES. V.33(11/12:1617-1640. PERGAMON PRESS, OXFORD. EN.

Using AVHRR images (36 scenes) from the NOAA-6 and -7 satellites combined with some hydrographic data, a scenario is presented for the behavior of the kuroshio Extension from December 1981 to October 1982, resulting in the formation of a warm-core ring in the Tohoku Area. The behavior can be characterized by two drastic events. The first was the abrupt movement of the Kuroshio Front in December 1981, forming a bulge of the Kuroshio Water with a diameter of about 200 km. The bulge was cooled uniformly by an active air-sea interaction in winter, and became mixed with other waters. The formation process of the ring is described in detail by combining hydrographic data with the satellite data, and a hypothesis of the ring formation is given.

87PH0151. Y.NAGATA, J.YOSHIDA, H.R.SHIN. 1986(11/12 DETAILED STRUCTURE OF THE KUROSHIO FRONT AND THE ORIGIN OF THE WATER IN WARM-CORE RINGS. DEEP-SEA RES. V.33(11/12:1509-1526. PERGAMON PRESS, OXFORD. EN.

By using data with a relatively high spatial sampling rate, we show that the Kuroshio Front commonly has a double structure to the east of Honshu, Japan. distributions of temperature, salinity, thermosteric anomaly and dissolved oxygen measured in July 1983 and November 1984 indicate that the Kuroshio Front consists of three main parts: the 'temperature front' at its northern edge. the 'density front' in its southern edge and the 'inside zone' between them. The observations suggest that there is a mechanism which draws the deeper thermocline water beneath the Kuroshio into the surface layer of the frontal region. Active water exchange and mixing in the inside zone may produce a huge volume of relatively homogeneous water; this water may be regarded as the origin of the thermostad wate+.

87PH0152. D.J.TRANTER, D.J.CARPENTER, G.S.LEECH. 1986(11/12 THE COASTAL ENRICHMENT EFFECT OF THE EAST AUSTRALIAN CURRENT EDDY FIELD. DEEP-SEA RES. V.33(11/12:1705-1728. PERGAMON PRESS, OXFORD. EN.

The incidence of slope water intrusions at a coastal monitoring station near Sydney was examined in relation to movements of particular eddies and meanders of the East Australian Current (EAC) from 1979 to 1984. Intrusions occurred when an eddy or EAC meander came within 90 km of the shelf break, driving waters from the continental slope onto the shelf, enriching the coastal water column and initiating plankton blooms. However, these slope water intrusions were rare from May to July when the EAC is weak and the prevailing winds are from the west. The

mechanisms responsible for these episodic pulses of enrichment along the central coast of New South Wales appear to be analogous to those that operate in the South Atlantic Bight under the influence of the Florida Current.

87PH0153. J.R.MA, C.F.LIN, B.LI. 1986(7). DISTRIBUTION AND VARIATION OF CURRENTS, TEMPERATURE AND SALINITY IN THE EQUATORIAL WESTERN PACIFIC. ACTA OCEANOL. SINICA. 5(3):317-329. CHINA OCEAN PRESS, BEIJING. EN.

Chiefly based on the observations of surface wind, currents, temperature and salinity from the two cruises of the R/Vs Xiangyanghong 09 and shijian during the FGGE, this paper discusses the relationships between the surface currents and the wind field in the investigated area (5 N-5 S, 160-175 E) and analyzes the characteristics of the horizontal distribution of temperature and salinity and their relationships with currents.

87PH0154. T.J.SHERWIN. 1987. INERTIAL OSCILLATIONS IN THE IRISH SEA. CONTINENTAL SHELF RES. 7(2):191-211. PERGAMON PRESS, OXFORD. EN.

An inertial current with a maximum speed of about 0.20 m/sec was observed in June 1981, by a current meter 17 m below the surface of the thermally stratified waters of the western Irish Sea. The dynamics of the surface waters have been modelled using contemporary wind data recorded at the site to drive a horizontally unbounded surface slab 20 m deep with a velocity decay time of about three inertial periods (1.86 days). From thermistor chain data, inertial frequency potential energy was observed to radiate beneath the thermocline, descending at a rate of about 0.06 cm/sec. The energy available for internal mixing from the observed oscillation may have been as much as 80 J/square meter, compared with 150 J/square meter from wind-induced surface mixing.

87PH0155. D.PRANDLE. 1987. RESPONSE OF THE N.W.EUROPEAN SHELF SEA AT SUBTIDAL FREQUENCIES. CONTINENTAL SHELF RES. 7(3):267-284. PERGAMON PRESS, OXFORD. EN.

Studies involving subtidal circulation of the N.W. European Shelf seas have sometimes suggested "anomalous" flow components of unknown origin (e.g. Jefferies el al., 1982, Deep-Sea Research, 29, 713-738). The Present study aims to assess how low-frequency barotropic forcing existent in the adjoining ocean might influence shelf circulation and hence contribute to such "flow anomalies". The complex relationship indicated by this study between coastal elevation recordings and the associated oceanic gradients emphasizes the problems which may arise in using such recordings to infer long-term ocean circulation.

87PH0156. M.L.GRUNDLINGH. 1987(1). CYCLOGENESIS IN THE MOZAMBIQUE RIDGE CURRENT. DEEP-SEA RES. 34(1):89-103. PERGAMON PRESS, OXFORD. EN.

The quadrilateral 25-33 S, 35-43 E in the southwest Indian Ocean seems to have a circulaton characterized by the frequent occurrence of cyclonic eddies. Data from three hydrographic cruises, combined with the results of satellite-tracked buoys, delineated the process whereby the Mozambique Ridge Current is induced by the topography of the Mozambique Ridge to spawn eddies at 30 S, 37 E. evidence was found in 1979-1980 of two eddies existing simultaneously. The existence of occluded eddies in this area suggests a mechanism by which the subtropical contribution into the Agulhas Current may be varied or diverted.

87PH0157. Y.X.PU, X.Y.XU. 1987(1). THE KUROSHIO (ON THE PN SECTION) IN THE EAST CHINA SEA DURING 1972-1983. ACTA OCEANOL. SINICA. 6(1):37-45. CHINA OCEAN PRESS, BEIJING. EN.

The current elements of the Kuroshio in the East China Sea are analysed and discussed using the temperature-salinity and GEK data of the PN section obtained during 1972-1983. The calculations have proved (1) that the 12-year's mean volume transport of the Kuroshio at PN in the 0-800 m layer is about 20,000,000 cubic meter/sec; (2) that the mean volume transport has seasonal variations, i.e. slightly stronger in spring and summer than in the other seasons; and (3) that the period of high-volume transport thereof corresponds to the appearance of a meander of the Kuroshio south of Japan. It is also discovered that this Kuroshio meander usually appears after a sharp increase in such volume transport. Finally, the differences of the Kuroshio volume transport between the PN, E and Suao-Yona+.

87PH0158. Y.C.YUAN, Y.Q.WANG. 1987(1). THE DIAGNOSTIC CALCULATION OF EQUATORIAL FLOWS IN THE EASTERN PART OF THE WESTERN PACIFIC OCEAN. ACTA OCEANOL. SINICA. 6(1):20-28. CHINA OCEAN PRESS, BEIJING. EN.

On the basis of observational data of the eastern part of the West Pacific Ocean, a diagnostic calculation of equatorial flow for this region is performed by using the authors' model equations and computing scheme and methods. For the first cruise (January 3-March 4, 1979), the results show: (i) The primary driving force of the equatorial surface flows comes from the prevailing northeasterly wind field, with an average uniform wind speed V=6.3 m/sec. The steady westward wind produces divergent westward flows in the surface layers, causing an upwelling near the equator. The importance of the steady wind stress in the upper layer (120 m) decreases with depth and becomes insignificant at the level of z=75 m or z=100 m. (ii) The equatorial undercurrent is a strong eastward and equatorward

87PH0159. D.HAINBUCHER, T.POHLMANN, J.BACKHAUS. 1987(10). TRANSPORT OF CONSERVATIVE PASSIVE TRACERS IN THE NORTH SEA: FIRST RESULTS OF A CIRCULATION AND TRA+. CONTINENTAL SHELF RES. 7(10):1161-1179. PERGAMON PRESS, OXFORD. EN.

A simple Lagrangian transport model was applied to obtain estimates of transport routes of conservative passive tracers in the North Sea. A vertically integrated time-dependent flow field derived from the daily output

of a three-dimensional baroclinic circulation model was used in the transport model. The simulation period covers the years from 1969 to 1982. The calculations were carried out in order to get estimates of both, the low-frequency flow in the North Sea and the resulting dispersion of matter within the sea. Point sources are assumed which release tracers continuously and with a constant rate. Hence the variability of the flow field can be visualized by the temporal and spatial fate of the released tracer ensemble. The model results are displayed in three different ways +.

87PH0160. M.L.GRUNDLINGH. 1987(2). ANATOMY OF A CYCLONIC EDDY OF THE MOZAMBIQUE RIDGE CURRENT. DEEP-SEA RES. 34(2):237-251. PERGAMON PRESS, OXFORD. EN.

An eddy of the Mozambique Ridge Current was located at 30 S, 39 E during a cruise of the R.V. Meiring Naude in June 1982. The eddy had a diameter of approximately 190 km and extended to about 2000 db. The volume transport around the eddy amounted to (21-25) x 1,000,000/cubic meter/sec (relative to 1000 db), while a deeper reference level (2000 db) enhanced the transport by a factor of 2. The eddy's potential vorticity provided a control on the mass exchange between the eddy and the environment. Considerations of the potential and kinetic energy of the eddy predicted a lifetime of approximately 1-3 years.

87PH0161. YONG-HYANG.PARK, SEONG-IL.KIM. 1987(3). A NUMERICAL MODEL STUDY ON TIDE-INDUCED RESIDUAL CURRENTS AROUND CHEJUDO ISLAND. J. OCEANOL. SOC. KOREA. 22(1):9-18. OCEANOL. SOC. KOREA, SEOUL. EN.

A number of hydrographic studies and some recent current measurements around Chejudo Island suggest an existence of a clockwise residual flow in the west and north coasts of the island all the year round. on the eastern side of the island the Tsushima Current flows northward and northeastward. The contribution of tide-induced residual currents to the observed residual flow around the island was examined here through numerical solution of the two-dimensional nonlinear shallow-water equations. The calculated tide-induced residual currents show a clockwise circulation around the island. Significant residuals of 2-4 cm/sec are confined over sloping bottom topography around the island and the far-field residuals are negligibly small.

87PH0162. G.ABRAHAM, H.GERRITSEN, G.J.H.LINDIJER. 1987(3). SUBGRID TIDALLY INDUCED RESIDUAL CIRCULATIONS. CONTINENTAL SHELF RES. 7(3):285-305. PERGAMON PRESS, OXFORD. EN.

Tidally induced residual circulations are produced by tidal oscillations advecting vorticity over bottom topographic features. This paper shows that in areas with a pronounced small-scale bottom topography, tidally induced circulations of a given horizontal length scale can be significantly affected by bottom topography of a smaller length scale. It does so on the basis of a comparison of 1.5 km and 10 km grid computations of the tidal flow in the Southern Bight of the North Sea. Comparing the results of both computations, for areas with a pronounced small-scale bottom topography a significant production of vorticity at the 10 km scale was found to be induced by that part of the bottom topography which in the 10 km grid computations is of subgrid size.

87PH0163. T.S.HOPKINS, D.A.DIETERLE. 1987(3). ANALYSIS OF THE BAROCLINIC CIRCULATION OF THE NEW YORK BIGHT WITH A 3-D DIAGNOSTIC MODEL. CONTINENTAL SHELF RES. 7(3):237-265. PERGAMON PRESS, OXFORD. EN.

The baroclinic, steady circulation of the New York Bight is computed for a stratified and an unstratified situation using observed density fields as input to a three-dimensional diagnostic model. the sea le· el and associated integrated transports are computed by finite differencing of the integrated vorticity equation over a curvilinear grid conforming to the 10- and 500-m isosbaths and extending 250 km alongshore. This equation is forced by the depth-Jacobian of the baroclinic bottom pressure and the curl of the wind and bottom stresses. The wind and baroclinic pressure fields are specified as are the external and upstream boundary conditons.

87PH0164. A.L.GORDON, J.R.E.LUTJEHARMS, M.L.GRUNDLINGH. 1987(4). STRATIFICATION AND CIRCULATION AT THE AGULHAS RETROFLECTION. DEEP-SEA RES. 34(4):565-599. PERGAMON PRESS, OXFORD. EN.

The Agulhas Retroflection, as observed in late 1983, consists of the main Retroflection at 21 E with two large warm-core Agulhas rings to its west. The retroflection position is situated at the eastern-most limit of its range. The ring immediately to the west (Retroflection Eddy) is ellipitical in shape and carries 40000000 cubic meter/sec relative to the 1500 decibar (db) level; it's core properties are identical to the water enclosed by the Retroflection. These characteristics suggest that the Retroflection Eddy was formed just prior to the field work; thus the west edge of the Retroflection Eddy near 15 E marks the prior position of the main Retroflection, close to the western limit of its range. The second eddy (Cape Town Eddy), centered about 250 km southwest of Cape Town, is c+.

87PH0165. P.G.BAINES, R.C.BELL. 1987(4). THE RELATIONSHIP BETWEEN OCEAN CURRENT TRANSPORTS AND ELECTRIC POTENTIAL DIFFERENCES ACROSS THE TA+. DEEP-SEA RES. 34(4):531-546. PERGAMON PRESS, OXFORD. EN.

An attempt is made to interpret observations of electrical potential differences across the Tasman Sea in terms of ocean currents. This voltage record is significantly correlated with the (monthly averaged) mean sea level at Sydney, but not with that at other locations. A numerical model of the Robinson type for the Tasman Sea region permits the determination of the cable voltage which results from a given oceanic current pattern. Most of the observed voltage variance is probably due to East Australian Current eddies close to Sydney.

87PH0166. D.R.JOHNSON. 1987(4). NEARSHORE

SURFACE CURRENTS IN THE CHESAPEAKE BIGHT DURING SUMMER. CONTINENTAL SHELF RES. 7(4):367-378. PERGAMON PRESS, OXFORD. EN.

In this study, several different approaches are used to study coastal surface currents in an application to the dispersion of blue crab larvae from Chesapeake Bay onto the Middle Atlantic Bight. Observations from the deployment of a newly developed surface current meter (RBCM-Rapid Boundary Current Meter) are presented and compared to calculated surface currents from a simple model. In addition, using currents calculated with actual winds in this model, traces are constructed from point of encounter of larvae on the shelf back to the bay entrance. This has provided a unique Lagrangian tag for evaluating model parameters and forcing terms.

87PH0167. T.M.HAMMOND, ET AL. 1987(4). OCEAN SURFACE CURRENT RADAR (OSCR) VECTOR MEASUREMENTS ON THE INNER CONTINENTAL SHELF. CONTINENTAL SHELF RES. 7(4):411-431. PERGAMON PRESS, OXFORD. EN.

Observations of surface currents within a coastal embayment were obtained using a shore-based HF radar system, OSCR (Ocean Surface Current Radar). The study was carried out within an area of high tidal currents and complex bottom topography, located along the northern coastline of the Bristol Channel, U.K. When compared with simultaneous data obtained from conventional self-recordings current meters, the radar measurements of surface currents are to within 5-10% in speed & 10 Deg. in direction. substantial differences between the two data sets are identified, however, during short-term changes in the superimposed wind field M2 tidal current ellipses derived from the radar data are comparable with those obtained from the current meters.

87PH0168. F.E.WERNER. 1987(4). A NUMERICAL STUDY OF SECONDARY FLOWS OVER CONTINENTAL SHELF EDGES. CONTINENTAL SHELF RES. 7(4):379-409. PERGAMON PRESS, OXFORD. EN.

The circulation over the shelf edge of a homogeneous, wind-driven coastal ocean is examined. A two-dimensional finite element model in the plane perpendicular to the coast is used allowing a detailed examination of the thin horizontal and vertical frictional boundary layers characteristic to the continental shelf. After spinning-up the flow from an initial state of rest, it is found that frictional effects cause the alongshore current to develop a horizontal shear over the continental slope and shelf break, as well as a recirculation cell seaward of the break. At the shelf edge, bottom Ekman layers over the shelf and the deep ocean are disrupted and, in contrast to very gently sloping topographies, no bottom layer (in the classical Ekman sense) develops over the continental slope.

87PH0169. Z.F.FANG, Y.Z.GAO, M.DAI. 1987(4). A PROBABLE AVENUE TO EFFECT OF POLAR ICE ON NORTH PACIFIC SUBTROPICAL HIGH. ACTA OCEANOL. SINICA. 6(2):190-195. CHINA OCEAN PRESS, BEIJING. EN.

This paper is based on the data for the period from 1953 to 1977, which are the monthly averaged ice cover in the Arctic area within 160 E-110 W and north of 50 N, the areal index of the North Pacific subtropical high and the monthly averaged sea surface temperature of the North Pacific. A statistical analysis of the lag correlations between the polar ice from November to July and the sea surface temperature from January to July, and the sea surface temperature from January to July and the subtropical high lagging zero through eleven months is performed. The analysis shows that the lag correlation regions between the polar ice during spring and the sea surface temperature almost coincide with the regions of the California current and the partial north equatorial current, and the regions +.

87PH0170. YOUNG-HO.SEUNG. 1987(6). A SUMMER CIRCULATION INFERRED FROM THE DENSITY (TEMPERATURE) DISTRIBUTION IN THE EASTERN YELLOW SE+. J. OCEANOL. SOC. KOREA. 22(2):63-70. OCEANOL. SOC. KOREA, SEOUL. EN.

Existing oceanographic data indicate that tidal mixing fronts generally prevail in the Eastern Yellow Sea along the Korean coast. In the Western part, these fronts seem to be much weaker. These fronts are believed to be generated mostly by spatially different tidal mixing. The geostrophic adjustment model applied to the observed density structure gives the mixed coastal water flowing northward and the offshore waters (both surface warm and bottom cold waters) flowing southward along the Korean coast. The transport of each water amounts to about 10000 cubic meter/sec.

87PH0171. A.M.DAVIES, R.A.FLATHER. 1987(7). COMPUTING EXTREME METEOROLOGICALLY INDUCED CURRENTS, WITH APPLICATIONS TO THE NORTHWEST EUROPEAN C+. CONTINENTAL SHELF RES. 7(7):643-683. PERGAMON PRESS, OXFORD. EN.

A two-dimensional vertically integrated hydrodynamic numerical model has been used to compute 50-year extreme storm surge currents on the northwest European continental shelf. Calculations show significant spatial variability of current with meteorologically induced currents in some areas exceeding 100 cm/sec. A computationally economic method of extracting extreme wind-induced current profiles from depth-mean currents computed with the two-dimensional model is presented. This technique uses a modal decomposition through the vertical, and modal anlysis identifies mean eddy viscosity and water depth as important parameters controlling wind-induced current profiles. The dependence of the vertical transfer of the wind's momentum to depth (here parameterized by a coefficient of vertical +.

87PH0172. Z.X.DOU, C.Z.ZHANG, Y.F.ZHANG. 1987(7). A NUMERICAL COMPUTATION OF THE WIND-DRIVEN CURRENT IN THE BOHAI SEA. ACTA OCEANOL. SINICA. 6(3):344-352. CHINA OCEAN PRESS, BEIJING. EN.

On the basis of shallow water equations, a 2-dimensional model for the wind-driven current is developed in this paper to simulate the mean wind-driven circulation and sea-surface elevation fields respectively in winter and summer, and to describe the general nature of the wind-driven current in the Bohai Sea. Numerical results show that the patterns of the wind-driven circulation in Bohai are mainly the cyclonic circulation in winter and both cyclonic and anticyclonic circulations in summer. A theoretical argument based on vorticity is put up to explain the generating-mechanism of large eddies near the strait, which are considered to be the direct results of the wind stress interaction with topography gradients.

87PH0173. J.N.MOUM, T.K.CHERESKIN, M.M.PARK, L.A.REGIER. 1987(7). MONITORING GEOSTROPHIC CURRENTS AT THE EQUATOR. DEEP-SEA RES. 34(7):1149-1161. PERGAMON PRESS, OXFORD. EN.

A single intensively sampled (1 km station spacing) density section across the equator from 3 N to 3 S at 140.25 W was made in November 1984. The close station spacing allowed us to consider the effects of internal wave aliasing and to filter these out of dynamic height computations. Comparison of geostrophic currents with velocity profiles measured by an acoustic Doppler current profiler indicated that the Equatorial Undercurrent was in geostrophic balance at the time of our transect. The best estimate of velocity calculated by geostrophic methods was obtained using a 101 km running filter on the series of dynamic heights and differencing these over 102 km. Our results indicate that: (1) 100 km is an appropriate length scale for geostrophy at the equator; (2) it is important to remov+.

87PH0174. M.ARHAN. 1987(7). ON THE LARGE SCALE DYNAMICS OF THE MEDITERRANEAN OUTFLOW. DEEP-SEA RES. 34(7):1187-1208. PERGAMON PRESS, OXFORD. EN.

A careful examination of the shape of the large scale intrusion of Mediterranean Water (MW) in the North Atlantic reveals that the anomalies spread mostly westward and northward in the upper part of the intrusion, but in a west-southwestward direction at the deeper levels. Assuming that these tracer patterns are a good representation of the advective field, the horizontal velocities are expected to rotate cyclonically downward inside the MW intrusion. This sense of rotation, associated with a southward velocity component in the lower MW, can be accounted for by the existence of mid-depth upward buoyancy fluxes. A simple local model is presented to illustrate these diagnostic arguments, in which the area offshore from the Gulf of Cadiz is set in motion by wind, buoyancy fluxes, and a M+.

87PH0175. W.KRAUSS, ET AL. 1987(7). THE NORTH ATLANTIC CURRENT AND ITS ASSOCIATED EDDY FIELD SOUTHEAST OF FLEMISH CAP. DEEP-SEA RES. 34(7):1163-1185. PERGAMON PRESS, OXFORD. EN.

During August 1984 R.V. Arnold Veimer and R.V. Poseidon carried out a hydrographic survey of the North Atlantic Current southeast of Flemish Cap. Satellite-tracked drifting buoys and a Geomagnetic Electrokinetograph (GEK) provided direct current information. The data set obtained allows for a detailed description of the North Atlantic Current (NAC) between the Newfoundland continental slope & the western flank of the Mid-Atlantic Ridge. During the period of observations the NAC branched at 47 N, 41 W. From both branches a considerable part of the transport was expelled into return flows, reducing the net transport through the boundaries of the observation area to 12 Sv towards the north and 32 Sv towards the east. The buoy tracks confirm the expelling from the branches. Objective analy+.

87PH0176. S.J.PRINSENBERG, E.B.BENNETT. 1987(8). MIXING AND TRANSPORTS IN BARROW STRAIT, THE CENTRAL PART OF THE NORTHWEST PASSAGE. CONTINENTAL SHELF RES. 7(8):913-935. PERGAMON PRESS, OXFORD. EN.

Recent hydrographic and current meter data (1981-1983) from Barrow Strait, the central part of the Northwest Passage, are used to determine water mass mixing and long-term mass and heat transports. As surface water moves from the Arctic Ocean to Baffin Bay it loses heat and gains salt in the winter from the growing ice cover. Salty and warmer subsurface water is mixed into the surface layer to various degrees before entering Barrow Strait where three surface water masses of Arctic orgin can be identified.

87PH0177. W.W.SCHROEDER, S.P.DINNEL, W.J.WISEMAN JR., W.J.MERRELL JR. 1987(8). CIRCULATTION PATERNS INFERRED FROM THE MOVEMENT OF DETACHED BUOYS IN THE EASTERN GULF OF MEXICO. CONTINENTAL SHELF RES. 7(8):883-894. PERGAMON PRESS, OXFORD. EN.

The release times of five buoys, which broke free of moorings on the Alabama inner shelf, are known. The locations of subsequent sightings or recoveries of the buoys gave estimated trajectories of the buoys. These results show that the inner-shelf circulation is strongly wind-driven. When the Loop current penetrates deeply into the northeastern Gulf of Mexico, outer shelf waters are often entrained by the Loop Current.

87PH0178. T.C.ROYER, W.J.EMERY. 1987(8). CIRCULATION IN THE GULF OF ALASKA, 1981. DEEP-SEA RES. 34(8):1361-1377. PERGAMON PRESS, OXFORD. EN.

Upper layer (<1500 m) hydrographic sections in the northeast Pacific in July-August 1981 reveal a major dislocation of the subarctic gyre. Northward flow in the Gulf of Alaska east of 145 W ceased for a period of at least 1 month and probably considerably longer. Summer 1958 was the only other occasion when the gyre was observed in this position, about 700 km westward of its usual location. The causes for this circulation change are not definite but we suggest that the dislocation involves the interaction of wind stress curl (Sverdrup transport) with the bottom topography. Eastward of 155 W many seamounts are located northward of the usual axis of the zonal North Pacific

current east of 155 W. This eastward flowing current could be deflected slightly northward by the wind stress curl. +.

87PH0179. J.B.WICKHAM, A.A.BIRD, C.N.K.MOOERS. 1987(8). MEAN AND VARIABLE FLOW OVER THE CENTRAL CALIFORNIA CONTINENTAL MARGIN, 1978-1980. CONTINENTAL SHELF RES. 7(8):827-849. PERGAMON PRESS, OXFORD. EN.

Based on two years (July 1978-June 1980) of current meter array measurements and bimonthly STD/XBT transects over the continental margin off central California, the mean California Undercurrent has a jet-like core in excess of 15 cm/sec which is generally confined to the upper 300 m of the water column and to within 30 km of the coast. The variability is predominantly annual with a maximum poleward flow in May-June. Equatorward flow was surprisingly weak and infrequent in the transect studied. The alongshore flow has characteristic fluctuations of 15 cm/sec on time scales of a few days to weeks. The strongest and most coherent element of variation is the "spring transition", which had different manifestations in the two years observed, perhaps due to differences in the combination of l+.

87PH0180. W.R.CRAWFORD, P.GREISMAN. 1987(8). INVESTIGATION OF PERMANENT EDDIES IN DIXON ENTRANCE, BRITISH COLUMBIA. CONTINENTAL SHELF RES. 7(8):851-870. PERGAMON PRESS, OXFORD. EN.

A unique couplet of basin-wide baroclinic eddies was observed in Dixon Entrance. These eddies were revealed in current meter observations, drifter tracks, and contours of dynamic heights derived from hydrographic measurements. Normally, in a coastal sea strait wider than the internal Rossby radius of deformation, the outflow of brackish water is on the right, looking seaward; but in Dixon Entrance these two eddies force an outflow on the left. Several generation mechanisms for these two eddies are investigated. The diversion of the brackish water is likely due to the eddies set up by the process of tidal rectification.

87PH0181. Y.FELIKS, S.ITZIKOWITZ. 1987(9). MOVEMENT AND GEOGRAPHICAL DISTRIBUTION OF ANTICYCLONIC EDDIES IN THE EASTERN LEVANTINE BASIN. DEEP-SEA RES. 34(9):1499-1508. PERGAMON PRESS, OXFORD. EN.

Deep anticyclonic eddies in the eastern Mediterranean Basin consist of warm salty (>39.05 per mill) water. They are characterized by a downward decline of 200 m or more of 14-16 Deg. in Centigrade isotherms over a horizontal distance of 50 km. These eddies are strongly nonlinear; their radius is about 40 km and the corresponding geostrophic currents are about 20 cm/s at 350 m depth. Life-time of the eddies could be several years, and up to three or four could form annually. It is suggested that the eddies probably form along the coasts of Asia Minor and move first southwards and then eastwards.

87PH0182. K.HORIKAWA. EVALUATION OF TSUNAMI PROTECTION MEASURES. IUGG MONOGRAPH. (24):250-262. PN-2592. EN.

87PH0183. K.HORIKAWA. 1954. WAVE CHARACTERISTICS AND WAVE FORCESIN SHALLOW WATER. PROC. 1ST JAPANESE CONF. COASTAL ENG. 41-66. JAPAN SOC. CIVIL ENG., TOKYO. PN-2555. JA.

87PH0184. K.HORIKAWA. 1960(12). SOME ADDITIONAL REMARKS ON THE CHILEAN-EARTHQUAKE TSUNAMI. COASTAL ENG. JAPAN. 3:49-52. JAPAN SOC. CIVIL ENG., TOKYO. PN-2590. EN.

87PH0185. T.IWASAKI, K.HORIKAWA. 1960(12). TSUNAMI CAUSED BY CHILE EARTHQUAKE IN MAY, 1960 AND OUTLINE OF DISASTERS IN NORTHEASTERN COASTS OF+. COASTAL ENG. JAPAN. 3:33-48. JAPAN SOC. CIVIL ENG., TOKYO. PN-2591. EN.

87PH0186. M.HOM-MA, K.HORIKAWA, Y.CHAO. 1966. SHELTERING EFFECTS OF SADO ISLAND ON WIND WAVES OFF NIIGATA COAST. COASTAL ENG. JAPAN. 9:27-44. JAPAN SOC. CIVIL ENG., TOKYO. PN-2621. EN.

87PH0187. N.SUKEGAWA, H.NISHIMURA. 1971(3). SOME CONSIDERATION ON THE DAMAGE BY TSUNAMI. GENERAL REP. ON THE TOKACHI-OKI EARTHQUAKE OF 1968. 739-754. FAC. ENG., UNIV. TOKYO. PN-2572. EN.

87PH0188. H.NISHIMURA, K.HORIKAWA, Y.OZAWA, K.MIYAMOTO. 1972. ON THE FORECASTING OF TYPHOON GENERATED WAVES IN BEPPU BAY. COASTAL ENG. JAPAN. 15:1-12. JAPAN SOC. CIVIL ENG., TOKYO. PN-2638. EN.

The preceding sections were devoted to the modification and the justification of the method to forcast wind waves in a typhoon area and also to the investigation of winds and waves in the vicinity of Beppu Bay. The greatest advantage of the newly established method is that the plane distributions of waves can be obtained directly. When the method to trace waves along their direction curves is followed, more or less human selections are required in order to obtain the calculated informations covering the sea area in question and great labours in order to process the calculated data. On the contrary, the method bounded by grids allows no partial calculations and demands complicated manipulations in order to reduce calculation points when the object sea area is too large. One should sele+.

87PH0189. Y.GODA, Y.SUZUKI, K.HACHISUKA. 1977(9). THE ANALYSIS OF THE CALMNESS IN A HARBOUR WITH IRREGULAR WAVES. TECH. NOTE PORT & HARBOUR RES. INST. (271):3-53. PORT & HARBOUR RES. INST. PN-2318. JA.

Up to this time, the model test to estimate the calmness in a harbour has been carried out by using the regular waves. But problems were encountered in the

reproducibility because of the regular waves, and it was found that they would often vastly exaggerate resonance effects and regular reflection patterns, although similar effects were found in the real harbours. Then, we carried out wave disturbance tests with regular and irregular waves to compare each result. It may be concluded from these tests that irregular wave models may provide reasonably reliable results in the wave disturbance tests. And, we described concretely a procedure of a model test, following the example of Tajiri Port.

87PH0190. Y.OKUYAMA, K.TERAUCHI, Y.YOSHIDA, T.NAKATSUJI. 1978(3). COMPUTER PROGRAM OF MIRROR-IMAGE METHOD FOR WAVE DIFFRACTION WITH REFLECTION. TECH. NOTE PORT & HARBOUR RES. INST. (288):3-15. PORT & HARBOUR RES. INST. PN-2319. JA.

This technical note is the explanation and the guide of the computer program of mirror-image method for wave diffraction with reflection developed by the wave laboratory, the storm surge and tsunami laboratory and the systems laboratory. Comparing the computation and the experiment, the results of calculation are nearly equal to the measured value of the model experiment. So, this program is expected to be used in port and harbor planning.

87PH0191. T.TAKAYAMA, S.YOKOTA, T.KOCHI. 1978(9). NEW COMPUTATION PROGRAM OF SEA WAVE DIFFRACTION AND OPTIMAL DIVIDING NUMBER OF WAVE SPECTRUM. TECH. NOTE PORT & HARBOUR RES. INST. (303):3-42. PORT & HARBOUR RES. INST. PN-2322. JA.

Computing programs of the diffraction of diffracted waves and irregular wave diffraction due to the gap of breakwater have already been developed in the Port and Harbour Research Institute, and have been applied to practical problems. However, the former program is not valid for irregular waves, and the latter one is not applicable to the case where the component waves of irregular ones are reflected by a breakwater and propagate into a port. In this report, the outline of the new computation is described. Then, the new program is compared with the previous ones in the computed results, and their coincidence is confermed in comparison with their computed results which are carried out in valid cases for the previous programs.

87PH0192. T.TABATA, T.YAGYU, I.FUKUDA. 1980(12). WAVE ENERGY ON JAPANESE COAST. TECH. NOTE PORT & HARBOUR RES. INST. (364):1-19. PORT & HARBOUR RES. INST. PN-2324. JA.

This report contains the calculation of incoming wave energy around Japanese coast. Seventeen ports are selected among the major wave observation stations for calculation. Regional, seasonal, and chronological variation of the incoming wave energy are analyzed by using the wave observation data from 1975 to 1978. From the view point of the regional variation, the Pacific Ocean and Japanese Sea sides of the main island are the predominant areas.

87PH0193. M.A.DONELAN. 1980(4). SIMILARITY THEORY APPLIED TO THE FORECASTING OF WAVE HEIGHTS, PERIODS AND DIRECTIONS. PROC. CANADIAN COASTAL CONF. 1980. 47-61. PN-2680. EN.

New developments in the theory of wave-wave interaction have led to simplified methods of time dependent wave forecasting. However, these methods require the use of medium-sized computers and more time and effort than is warranted for many engineering purposes. On the other hand, standard wave forecasting relationships are based on more or less arbitrary choices of 'effective' fetch or duration and assume that wave and wind directions are coincident. Recent measurements of wave directional spectra demonstrate that wave and wind directions can be quite different even at steady-state differences of 50 degrees are not uncommon. The use of similarity theory leads to a general method for predicting wave direction at steady-state from the wind direction and fetch distribution with direction.

87PH0194. JAE-HAK.LEE, JONG-YUL.CHUNG. 1982. CONTINENTAL SHELF WAVES OFF THE EASTERN COAST OF KOREA. LA MER. 20:169-180. SOC. FRANCO-JAP. D'OCEANOGR. PN-2347. EN.

Spectral analysis has been made to investigate the effect of the atmospheric pressure on 12-hourly mean sea level at three stations off the eastern coast of korea. Our estimated barometric factor indicates that the response of sea level to atmospheric pressure fluctuations is non-barometric in most of the frequency range 0-0.5 cycles per day. In addition, the weighted barometric factor shows seasonal variation. The predicted phase speed from the nondivergent shelf wave theory, which is based on our bottom profile, i.e., exponential depth profile, well agrees with our observed values. Therefore, through this investigation, it was found that this phenomenon might be interpreted as a continental shelf wave.

87PH0195. E.H.SCHUMANN. 1983(10). LONG-PERIOD COASTAL TRAPPED WAVES OFF THE SOUTHEAST COAST OF SOUTHERN AFRICA. CONTINENTAL SHELF RES. 2(2/3):97-107. PERGAMON PRESS, OXFORD. EN.

A limited data set is used to determine whether long-period coastal trapped waves exist off the southeast coast of Southern Africa. The region has a relatively straight coastline, with regular meteorological systems propagating along it. However, it is dominated by the strongly flowing Agulhas Current, and past analyses have shown markedly different coastal regimes associated with bathymetric changes and different current characteristics. The results indicate that such trapped waves are not regular features of the coast. In the northern section the isolation of the coastal regimes is confirmed, although the apparent propagation of a baroclinic event is shown along the coast during an abnormal condition of the Agulhas Current.

87PH0196. C.T.BISHOP. 1983(2). COMPARISON OF MANUAL WAVE PREDICTION MODELS. J. WATERWAY, PORT, COASTAL & OCEAN ENG.

109(1):1-17. ASCE., N.Y. PN-2678. EN.

A comparison of three manual wave prediction models is carried out using 1972 waverider data from two deep-water locations in Lake Ontario. The Sverdrup-Munk-Bretschneider model is compared with the JONSWAP model and with the relatively new model of Donelan. Only fetch-limited, pseudo-steady-state events have been investigated. The accuracies in predicting the characteristic wave height and the period of the peak of the wave energy spectrum were found to be comparable for all three models. However, the accuracy of the Donelan model is slightly superior to that of the other two models; because the Donelan model can also predict the direction of the dominant wave energy on enclosed water bodies, where the fetch distribution is known, it could be useful for engineering applications in +.

87PH0197. S.D.LIU, S.K.LIU. 1983(6). THE NONLINEAR INTERNAL GRAVITY WAVES IN STRATIFIED FLUID. ACTA OCEANOL. SINICA. 2(1):45-51. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, starting from the equations of the nonlinear internal gravity waves in stratified fluid, using the method of the Taylor expansion nearby the equilibrium point for the nonlinear terms, we find the analytical solutions for nonlinear internal gravity waves. The linear internal gravity waves and solitary waves are its special cases. The nonlinear internal gravity waves satisfy the well-known KdV (Karteweg-de Vries) equation. The nonlinear internal gravity waves are different from linear waves in character. The former dispersive relation contains the amplitude, but the latter does not. The larger the amplitude and the wavelength the faster are waves for the nonlinear internal gravity waves. The smaller the stability of the stratification, the larger is the wavelength (or +.

87PH0198. HEUNG-JAE.LIE. 1983(9). SHELF WAVES ON THE EXPONENTIAL, LINEAR AND SINUSOIDAL BOTTOM TOPOGRAPHIES. BULL. KORDI. 5(1):1-8. KORDI., SEOUL. EN.

Dispersion relations and eigenfunctions of shelf waves are numerically investigated for the exponential, linear and sinusoidal bottom profiles. Wave properties such as dispersion curve and sea level change across shelf are found to be dependant upon the depth at the coast. The wave period and wave length, which correspond to a zero group velocity, are greatly altered by a small change in the depth at the coast. Such modification of wave properties due to the shelf slope is the most important on an exponential bottom and the least on a sinusoidal one. For a given depth at the coast the wave trapping near coast on the sinusoidal bottom and the linear one is stronger than that on the exponential bottom.

87PH0199. T.D.ALLAN. 1984. AN EYE ON OCEAN WAVES AND CURRENTS. PHYS. BULL. 35:239-241. INST. PHYSICS. PN-2698. EN.

87PH0200. K.HORIKAWA. 1984. MECHANISM OF DISASTERS CAUSED BY TSUNAMI FLOODING. NATURAL DISASTER SCI. 6(2):73-82. DIS. PREV. RES. INST., KYOTO. PN-2610. EN.

A research group was organized during the period of 1980 to 1983 under the financial support of the Ministry of Education, Science and Culture, with the aim of clarifying the mechanism of disasters caused by tsunami flooding. The selected subjects of the cooperative research were 1) to develop a method with which to predict, or evaluate in detail, tsunami magnitude and the current speed and direction of a flooding tsunami, and 2) to determine the mechanism that causes damage to houses and public facilities due to the tsunami itself as well as damage caused by floating bodies that drift on tsunami waves. In addition to the above research activities, a field survey was made on the Suruga Bay Coast by the research group members in order to apply the investigation results obtained by then +.

87PH0201. S.S.PAWKA, D.L.INMAN, R.T.GUZA. 1984. ISLAND SHELTERING OF SURFACE GRAVITY WAVES: MODEL AND EXPERIMENT. CONTINENTAL SHELF RES. 3(1): 35-53. PERGAMON PRESS, OXFORD. EN.

A field experiment is used to evaluate a numerical model of the sheltering of gravity waves by islands offshore of the Southern California region. The sheltering model considered here includes only the effects of island blocking and wave refraction over the island bathymetry. Wave frequency and directional spectra measured in the deep ocean (unsheltered region west of the islands) were used as input to the sheltering model & compared with coastal observations. An air-borne L-band synthetic aperture radar was used to image the directional properties of the waves in the deep ocean. In addition to the unsmoothed spectra, a unimodal directional spectrum model obtained from fits to the radar spectra was also employed to suppress the high noise level of this system.

87PH0202. J.H.MIDDLETON, A.CUNNINGHAM. 1984. WIND-FORCED CONTINENTAL SHELF WAVES FROM A GEOGRAPHICAL ORIGIN. CONTINENTAL SHELF RES. 3(3):215-232. PERGAMON PRESS, OXFORD. EN.

The response of a barotropic coastal ocean on a step-shaped continental shelf to a traveling sinusoidal wind stress forcing is predicted theoretically using a frictional force proportional to the alongshore current velocity. This theory is compared to a small set of observations from the northeast coast of Australia where a sudden widening of the continental shelf provides a geographical origin. The comparison is accomplished by means of frequency response functions relating alongshore wind stress with alongshore velocity. Amplitudes of the response functions are predicted to increase with alongshore distance equatorward and also to decrease with frequency at any location. These predictions are verified by the measurements. Predicted phase lags are generally less than about 30 Deg.,+.

87PH0203. F.A.SHILLINGTON. 1984. LONG PERIOD EDGE WAVES OFF SOUTHERN AFRICA. CONTINENTAL SHELF RES. 3(4):343-357.

PERGAMON PRESS, OXFORD. EN.

Long gravity wave height oscillations of up to 60 cm with periods between 12 min and 1 hour have been observed on tide gauge recordings from the southern coast of South Africa. Short period (30 min to 1 hour), small height (3 mb) air pressure pulses were recorded at stations along the same coastline. Two separate events of contrasting nature are described in detail. The simple model of SNODGRASS et al. (1962, Journal of marine Research, 20, 3-30) is used to explain the sea waves as resonant, coastally trapped, edge waves on the Agulhas Bank forced by the atmospheric pulses.

87PH0204. SEE-WHAN.KANG, CHEOL-SOO.KIM, JEI-KOOK.CHOI. 1984(12). WAVE HINDCAST WITH THE DSA-5 MODEL IN THE SEAS ADJACENT TO KOREA. BULL. KORDI. 6(1/2):37-47. KORDI., SEOUL. KO.

The DSA-5 wave model has been used to hindcast wave climates in the seas adjacent to Korea. The wave climate data during 1981-1983, observed by the KORDI and the JMA, were compared with the model calculations. Particularly, the sea-states were numerically simulated during the passages of typhoons, Cecil (1981), Agnes (1981) and Ellis (1982), and they were in a reasonably good agreement with the observations. The wave heights were consistantly underpredicted by up to - 1 m of the averaged values, and these were in the contradiction to Park et al.'s (1984) results which showed the substantial overpredictions in the comparisons of the 1977-1978 observations. To resolve the discrepancy, the wave model requires further calibrations with observations in the Korean seas.

87PH0205. M.J.TUCKER. 1985. THE IMAGING OF WAVES BY SATELLITEBORNE SYNTHETIC APERTURE RADAR: THE EFFECTS OF SEA-SURFACE MOTION. INT. J. REMOTE SENSING. 6(7):1059-1074. TAYLOR & FRANCIS, LONDON. PN-2929. EN.

The effects of sea-surface velocities in the imaging of waves by synthetic aperture radar (SAR) are considered using the 'facet' concept of the backscattering process. It is shown that if the sea wave spectrum is divided at the nominal limit of resolution of the SAR the effect of the long and short wavelength parts can be considered separately, the former being treated by numerical simulation and the latter by statistical methods. It is found that the motions due to the short wavelengths produce an azimuthal smearing which can be represented by a Gaussian low-pass filter acting on the azimuthal component of wavenumber in the image. The cut-off wavelength is typically some hundreds of metres in moderate winds. Images obtained with the SEASAT SAR frequently show such an effect.

87PH0206. G.D.CURTIS, W.M.ADAMS. 1985. NEEDS AND DEVELOPMENTS IN TSUNAMI MONITORING. SCIENCE OF TSUNAMI HAZARDS. 3(1):34-40. PN-2880. EN.

More and better data on tsunami characteristics and effects in various locations-deep-water, coastal, and inundated areas-are needed to: (1) better define zoning and structural codes in order to mitigate the hazards of tsunamis. (2) refine the definition of the evacuation areas, and (3) improve warning systems. In Hawaii, this problem is being approached in several ways-development of a deployable pressure gauge suitable for real-time field use in shallow depths offshore from terminal areas; development of a sophisticated seismic trigger system for local earthquakes; extensive photographic methods for real-time recording of a tsunami; and in situ procedures for personnel to perform post-event run-up measurements and related field observations. In this presentation, each of these approa+.

87PH0207. W.M.ADAMS, N.NAKASHIZUKA. 1985. A WORKING VOCABULARY FOR TSUNAMI STUDY. SCIENCE OF TSUNAMI HAZARDS. 3(1):45-51. PN-2879. EN.

The study of tsunamis has now progressed to such an extent that tsunamiologists need a working vocabulary. This article is an effort to aid the inductive evolution of such a vocabulary by a deductive extension. Not only are such conventional words as "run-up" given definitive definitions, but incipient jargon, such as "tsunamicity", are provided provisional definitions. Of course, some important terms, e.g., "tsunami magnitude", must be defined in each publication, either by reference to previous articles or by assignment of another unique definition. To a minor extent, incomplete translations prompt this explicit vocabularization.

87PH0208. C.S.CHEN, Z.H.QIN. 1985(10). DYNAMIC ANALYSIS OF TYPHOON SURGES ALONG THE COASTS OF ZHEJIANG AND JIANGSU PROVINCES. ACTA OCEANOL. SINICA. 4(4):515-526. CHINA OCEAN PRESS, BEIJING. EN.

Based on the numerical model shown in Ref. [1], a dynamic anlysis is given for the storm surges caused by the four typhoons on the east coast of Zhejiang and Jiangsu Provinces, in which the contributions of various dynamic factors to local surge elevation are calculated numerically, including the Coriolis force, the atmospheric pressure force, the bottom friction, the local topography and the couple nonlinear interactions between surge current and elevation as well as between surge currents themselves. Moreover, the responses of these factors to different kinds of typhoon tracks and water depths are discussed in more detail, and the effects of grid size on the computed results demonstrated.

87PH0209. G.CICCONI, I.DAGNINO, A.ALBERT. 1985(4). MEAN LENGTH OF RUNS OF SEA WAVES RECORDED IN THE GULF OF GENOA. BOLL. DI OCEANOL. TEORICA ED APPLICATA. 3(2):103-112. OSS. GEO. SPE., TRIESTE. PN-2541. EN.

This work presents the results of an investigation of the runs of the sea waves defined as a particular sequence of waves the heights of which exceed a particular level (for instance, the significant height), and of the number of waves between one exceedance of the significant height and the next. The investigation refers to routine recordings (15 minutes recording with

a three hours' interval between one recording and the next) and to continuous recordings carried out in the Gulf of Genoa between 1978 and 1982.

87PH0210. J.M.HUTHNANCE. 1986. THE SUBTIDAL BEHAVIOUR OF THE CELTIC SEA, III. A MODEL OF SHELF WAVES AND SURGES ON A WIDE SHELF. CONTINENTAL SHELF RES. 5(3):347-377. PERGAMON PRESS, OXFORD. EN.

We consider a wide (>100 km, say) straight continental shelf meeting the ocean at a steep continental slope. Trapped barotropic waves include a fast Kelvin wave, and a first mode shelf wave in the form of a slower 'coastal Kelvin wave' confined to the shelf. Responses to pressure and wind forcing of various frequencies and scales over the shelf and ocean are considered. A forced combination of fast and coastal Kelvin modes (only) appears to be sufficient representation, particularly for coastal sea level.

87PH0211. K.ABE. 1986. TSUNAMI PROPAGATION IN RIVERS OF THE JAPANESE ISLANDS. CONTINENTAL SHELF RES. 5(6):665-677. PERGAMON PRESS, OXFORD. EN.

On 26 May 1983 the rivers of the japanese Islands were invaded by a tsunami from the Sea of Japan. Water levels in five large rivers were measured and were highest midway towards the uppermost point of inundation. The level at the uppermost point was approximately the same as that at the river mouths. As a result of resonance, a standing wave develops in the rivers. The period of the invading tsunami was found to be 80 min. This continental shelf oscillation resulted in a long-wave propagation of the tsunami. The water levels showed another peak in the neighbourhood of estuarine inflows. The period of this wave was estimated to be 20 min; its formation was attributed to generation near the tsunami source.

87PH0212. Z.W.YU, Z.J.GAN, A.L.YE. 1986(10). LINEAR WAVES IN THE ROTATIONAL HOMOGENEOUS FLUID WITH UNIFORM WATER DEPTH (I),. ACTA OCEANOL. SINICA. 5(4):475-485. CHINA OCEAN PRESS, BEIJING. EN.

Linear wave equations for incompressible ideal homogeneous fluid are derived without making the assumptions of irrotation and hydrostatic pressure. The obtained equations are suitable for arbitrary bottom topography. Unified solutions of the existing waves in uniform-depth waters are found from those equations. Discussions about the above assumptions are made. Magnitude order of the error caused by the assumption of hydrostatic pressure is given.

87PH0213. Q.W.ZHANG, S.W.WANG. 1986(10). A COMPARATIVE STUDY OF 1982-1983 EL NINO EVENT. ACTA OCEANOL. SINICA. 5(4):517-521. CHINA OCEAN PRESS, BEIJING. EN.

The 1982-1983 El Nino event is examined in comparison with the other El Nino events in 1949-1983. The relationships of subtropical high to the sea surface temperature (SST) show the important influence of the water, which varied with the characters of El Nino Events.

87PH0214. KYUNGDUCK.SUH. 1987(12). NUMERICAL MODEL FOR WAVE REFRACTION/SHOALING. OCEAN RES. 9(1/2):25-28. KORDI., ANSAN. EN.

A numerical model to predict the change of wave height and direction on an irregular bottom topography is presented, which uses simple finite difference scheme and smoothing technique. The model results are compared with those of Noda (1974) on a beach with idealized periodic rip channels.

87PH0215. F.SUN. 1987(4). PROPAGATION AND TRANSFORMATION OF NON-LINEAR WAVES ON UNIFORMLY SLOPING BEACHES: (11) BREAKING OF +. ACTA OCEANOL. SINICA. 6(2):169-176. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, a systematic discussion based on the theory proposed in the preceding paper is given for such breaking characteristics on sloping beaches as breaking depths and breaker heights. Through introducing two empirical constants and considering the complicatedness of the subject studied, the final results are in good agreement with observations. Further experimental verification and theoretical study are necessary.

87PH0216. H.MITSUDERA, K.HANAWA. 1987(7). EFFECTS OF BOTTOM FRICTION ON CONTINENTAL SHELF WAVES. CONTINENTAL SHELF RES. 7(7):699-714. PERGAMON PRESS, OXFORD. EN.

The effects of bottom friction on a continental shelf wave for which s/f is O(1), where s is a wave frequency and f is the Coriolis parameter, are investigated. Rotational motions in the bottom boundary layer, which are ignored in conventional parameterizations of bottom friction having the form ru/H, are considered in this study. Here, r is a friction coefficient, H is depth and u is a velocity vector. The results are as follows: (i) The rotational motions cause a decrease in damping and a modification in frequency compared to the results obtained with ru/H; (ii) Friction in the form ru/H is only applicable if s/f << 1. Further work has examined the wavenumber dependence of these effects for linear friction using an exponential depth profile. A wind-forced model, in which the freque+.

87PH0217. CHEONG-RO.RYU, HYEON-JU.KIM. 1987(9). ON THE STOCHASTIC STABILITY CRITERIA FOR THE ANALYSIS AND SIMULATION OF OCEAN WAVES. BULL. KOREAN FISH. SOC. 20(5):457-462. KOREAN FISH. SOC., PUSAN. KO.

Stochastic stability criterias for ocean wave analysis and simulation are studied using the data simulated by the linear superposition method. To clarify the criterias, the effects of the simulation parameters on the variance of stochastic properties of ocean waves are investigated, and the stable conditions of the parameters are estimated through the comparative study on the stochastic properties of simulated waves and well-known ocean waves. The simulation parameters considered are high frequency cut-off, data length, and number and phase angle of component waves.

Statistical characteristics analysed are wave height, period and steepness, and the formation of groups of higher waves, resonance periods, steeper higher waves and extreme run-length of the run.

87PH0218. G.CHABERT D'HIERES, C.LE PROVOST. 1970(7). SPATIAL VARIATIONS OF THE MEAN SEA LEVEL IN THE ENGLISH CHANNEL. PROC. SYMP. ON COASTAL GEODESY HELD IN MUNICH ON JULY 20 TO 24, 1970. 427-437. PN-3003. EN.

We consider a homogeneous sea with a constant atmospheric pressure over it which is not disturbed by wind effects. If the tides are appreciable, the parameter to be taken into account in studying the spatial variations of the mean sea level, are the tidal currents. The results illustrate the fact the mean sea level variations increase with the strength of the tidal currents: for example at spring and at neap tides. They are also more important near the amphidromic regions. We developed a theory for this case giving the mean water level surface for a standing wave and for a KELVIN amphidromy.

87PH0219. G.CHABERT D'HIERES, C.LE PROVOST. 1976. ON THE USE OF AN HYDRAULIC MODEL TO STUDY NON LINEAR TIDAL DEFORMATIONS IN SHALLOW WATERS. APPLICA+. MEM. SOC. ROYALE SCI. LIEGE. 10:113-124. SOC. ROYALE SCI. LIEGE. PN-3000. EN.

87PH0220. YOUNG-HO.SEUNG. 1981(12). AN ESTIMATION OF ERRORS IN SEA LEVEL PREDICTION ALONG THE EAST COAST OF KOREA. BULL. KORDI. 3(2):69-74. KORDI., SEOUL. EN.

Statistical variances of sea level change along the east coast of Korea were estimated based on the year-long data. Long-period (2-30 days) component appears very important. Large part of this is the isostatic response of sea level to the atmospheric pressure variation while the effect of local wind is an order smaller. Nevertheless, the prediction error reaches up to 50% in terms of sea level change at Pohang when only tides and barometric depression are taken into account. For better prediction, the long-period sea level change should be identified in this area.

87PH0221. J.H.SIMPSON, ET AL. 1982(8). MIXING AND PHYTOPLANKTON GROWTH AROUND AN ISLAND IN A STRATIFIED SEA. CONTINENTAL SHELF RES. 1(1):15-31. PERGAMON PRESS, OXFORD. EN.

An island in a stratified region of the shelf seas creates a local increase in tidal mixing. The Influences of the enhanced mixing on both the physical structure and phytoplankton biomass distribution have been assessed in a detailed survey of the Scilly Isles region of the Celtic Sea. Marked asymmetries in the observed pattern of stratification and sea surface temperature are in accord with the h/cubic u distribution which predicts low stability regions occurring on the sides of the island. Displacement of the low stability regions relative to the h/cubic u minima is consistent with a northward mean flow. Levels of biomass and primary productivity were found to be increased by a factor about 5 over a large region (about 20 x island area) surrounding the islands with particularly inten+.

87PH0222. J.W.MURRAY, J.W.WESTON, S.STURROCK. 1983(4). SEDIMENTARY INDICATORS OF WATER MOVEMENT IN THE WESTERN APPROACHES TO THE ENGLISH CHANNEL. CONTINENTAL SHELF RES. 1(4):339-352. PERGAMON PRESS, OXFORD. EN.

The continental shelf to the southwest of the British Isles is an area of intense tidal current activity. Although most of the sediment is coarse, it still contains a small proportion of fine (<63 um) material, consisting mainly of biogenic debris. Coccoliths in particular are both common and widespread and they are found in the adjacent slope sediments. The results presented here show that coccolithophorid diversity is high in the deeper parts of Whittard Canyon, the abyssal plain, and on a small area of shelf. Diversity decreases away from the ocean towards the land. Coccoliths and coccospheres have also been recorded from surface water samples. Apart from the landward movement of oceanic water shown by the coccolithophorids, movement of material on the bottom from shelf to slope+.

87PH0223. K.P.LI, T.H.ZHOU, Z.Y.CHEN. 1983(6). A PRELIMINARY ANALYSIS OF THE VARIATION OF MONTHLY MEAN SEA LEVEL OF THE SEAS NEAR CHINA AND ITS C+. ACTA OCEANOL. SINICA. 2(1):1-11. CHINA OCEAN PRESS, BEIJING. EN.

This paper deals with the variations of the monthly mean sea level of the seas near China. The distribution charts of mean sea level in winter and in summer are given. The monthly mean sea level variations are mainly caused by monsoon, sea currents and the fluctuation of atmospheric pressure. The annual range of monthly mean sea level is 50-70 cm in the northern part of the seas near China, and 20-40 cm in the southern part. The variation period of the monthly mean sea level of the seas near China is principally annual one.

87PH0224. J.H.MIDDLETON, V.T.BUCHWALD, J.M.HUTHNANCE 1984. THE ANOMALOUS TIDES NEAR BROAD SOUND. CONTINENTAL SHELF RES. 3(4):359-381. PERGAMON PRESS, OXFORD. EN.

Observations of tidal current and height, in conjunction with theoretical mathematical models are used to investigate the propagation of the tide near Broad Sound, a narrowing estuary situated on a wide section of continental shelf toward the southern end of the Great Barrier Reef. The observations indicate that the dense offshore reefs severely inhibit tidal flow, with the result that tides flood toward Broad Sound from the north and from the south, along the main lagoon. There is a local magnification of the semi-diurnal tides within Broad Sound itself. Models of flow across reefs confirm the effectiveness of dense, shallow, and broad reefs in acting as a barrier to the tide.

87PH0225. R.D.PINGREE, D.K.GRIFFITHS, L.MADDOCK. 1984. QUARTER DIURNAL SHELF

RESONANCES AND TIDAL BED STRESS IN THE ENGLISH CHANNEL. CONTINENTAL SHELF RES. 3(3):267-289. PERGAMON PRESS, OXFORD. EN.

The mean sea level and mean bed stress due to tidal co-oscillations in the presence of quadratic friction is examined analytically and numerically. In some idealised situations under conditions of near M4 shelf resonances it is shown that phase relationships tend to exist between the M2 tidal currents and the M4 tidal currents which combine to give maximum currents in the flood or ebb direction. In the presence of quadratic friction these effects result in a mean bed stress and affect mean sea level. It is shown that these idealised responses are in part relevant to the sea level differences and sand transport paths due to tides around the British Isles.

87PH0226. YOUNG-HO.SEUNG, SANG-RYONG.LEE. 1984(12). A NUMERICAL EXPERIMENT OF TIDES IN CHINHAE BAY BY THE FINITE ELEMENT METHOD. BULL. KORDI. 6(1/2):31-36. KORDI., SEOUL. KO.

A finite element numerical experiment was performed for the tidal computation in Chinhae Bay and the results were satisfactory. In this model, the formulation of problem was simplified by neglecting the non-linear inertial term. However, a proper time integration method allowed for a reduction of computing time, retaining the unconditional stability of the system.

87PH0227. D.PRANDLE. 1985. CLASSIFICATION OF TIDAL RESPONSE IN ESTUARIES FROM CHANNEL GEOMETRY. GEOPHYS. J. ROYAL ASTRON. SOC. 80:209-221. BLACKWELL SCI. PUB., OXFORD. PN-2934. EN.

By using exponential functions to approximate channel geometry, the tidal response in an estuary can be directly classified into one of three types. The variation of tidal response with differing tidal species is examined with particular emphasis on how the appropriate linearized friction coefficient varies for each constituent. The sensitivity of an estuary to variations in this linearized friction coefficient is shown to be strongly influenced by the dimensionless estuarine length x(l).

87PH0228. P.L.WOODWORTH. 1985. ACCURACY OF EXISTING OCEAN TIDE MODELS. PROC. CONF. USE OF SATELLITE DATA IN CLIMATE MODELS, ALPBACH, AUSTRIA, BK:95-98. PN-2947. EN.

Some remarks may be appropriate at this conference concering the accuracy of present ocean tide models. The study of ocean tides is of great geophysical research interest in itself but accurate models are also required as a 'correction' to altimeter measurements of sea surface height prior to studies of other phenomena such as ocean variability or the geoid. In the long term, altimeter measurements themselves will provide the greatest improvement in tidal knowledge. The SEASAT dataset, however, was much too short to enable significant quantitative improvement to current tidal models and its study was necessarily confined to M2, the major lunar semi-diurnal tidal constituent. Future projects, such as ERS-1, therefore will have to rely in the first instance on existing models of the oc+.

87PH0229. P.L.WOODWORTH. 1985. A WORLD-WIDE SEARCH FOR THE 11-YR SOLAR CYCLE IN MEAN SEA-LEVEL RECORDS. GEOPHYS. J. ROYAL ASTRON. SOC. 80:743-755. BLACKWELL SCI. PUB., OXFORD. PN-2928. EN.

Tide gauge records from throughout the world have been examined for evidence of the 11-yr solar cycle in mean sea-level (MSL). In Europe an amplitude of 10-15 mm is observed with a phase relative to the sunspot cycle similar to that expected as a response to forcing from previously reported solar cycles in sea-level air pressure and winds. At the highest European latitudes the MSL solar cycle is in antiphase to the sunspot cycle while at mid-latitudes it changes to being approximately in phase. Elsewhere in the world there is no convincing evidence for an 11-yr component in MSL records.

87PH0230. A.M.DAVIES, J.SAUVEL, J.EVANS. 1985. COMPUTING NEAR COASTAL TIDAL DYNAMICS FROM OBSERVATIONS AND A NUMERICAL MODEL. CONTINENTAL SHELF RES. 4(3):341-366. PERGAMON PRESS, OXFORD. EN.

A two-dimensional vertically integrated model of the North Sea is used to compute the distribution of M2 and M4 tidal elevations and currents over the region. Comparison of computed and observed elevations and currents in the area shows that the model can accurately reproduce the M2 tide in the North Sea, although there are difficulties with the M4 tide particularly in the northern North Sea. The problem of computing energy dissipation in the area by substracting the energy fluxes into and out of the region is shown to be ill-conditioned in that the energy dissipation in the area is comparable to the error in the energy flux. Consequently for the sea region considered here it is not meaningful to compare this energy budget with energy dissipation due to bottom friction.

87PH0231. L.H.LARSEN, G.A.CANNON, B.H.CHOI. 1985. EAST CHINA SEA TIDE CURRENTS. CONTINENTAL SHELF RES. 4(1/2):77-103. PERGAMON PRESS, OXFORD. EN.

The East China Sea is a broad continental shelf over which there are large tides and tidal currents. During the joint China-U.S.A. Marine Sedimentation Dynamics Study, a large number of current measurements were made across the continental shelf along approximately 30 Deg. N. There is general agreement between these observations and CHOI's (1980) tidal model of the area, which supports his assumed boundary conditions and numerical procedures. The semi-diurnal tidal current near the mouth of the Changjiang transports water southward at maximum ebb and northward following maximum flood. Because the tides rotate clockwise, southward flow is followed by shoreward flow, confining the initial river plume and sediment deposition to the coastal region south of the river mouth.

87PH0232. T.F.GROSS, A.R.M.NOWELL. 1985. REPLY TO COMMENTS BY G. GUST ON 'MEAN

FLOW AND TURBULENCE SCALING IN A TIDAL BOUNDARY LAYER'. CONTINENTAL SHELF RES. 4(5):541-545. PERGAMON PRESS, OXFORD. EN.

87PH0233. J.A.CHURCH, J.C.ANDREWS, F.M.BOLAND. 1985. TIDAL CURRENTS IN THE CENTRAL GREAT BARRIER REEF. CONTINENTAL SHELF RES. 4(5):515-531. PERGAMON PRESS, OXFORD. EN.

Observations at 8 sites in the outer central Great Barrier Reef show M2, S2, K1, and O1 tidal currents flow directly off-shelf (northeast), when the corresponding tide at Townsville is at zero height and falling, with typical amplitudes of 12, 6, 3, and 2 cm/sec. On the slope (at 300 m depth), the vertically averaged long-shelf component was small. On the shelf, the eccentricity of the tidal ellipses decreases shoreward and the tidal ellipses rotate anticlockwise. The major axes of the tidal ellipses tilt left of cross-shelf, especially for the diurnal constituents. The long-shelf velocity is sensitive to the long-shelf changes in amplitude and phase of the tide heights and high quality tidal data for open boundary conditions will be required if numerical models are to model these cu+.

87PH0234. G.GUST. 1985. DISCUSSION ON 'MEAN FLOW AND TURBULENCE SCALING IN A TIDAL BOUNDARY LAYER'. CONTINENTAL SHELF RES. 4(5):533-539. PERGAMON PRESS, OXFORD. EN.

87PH0235. R.C.XIU. 1985(1). PROPAGATION OF TIDE WAVE IN A BASIN WITH VARIABLE CROSS-SECTIONAL AREA. ACTA OCEANOL. SINICA. 4(1):1-8. CHINA OCEAN PRESS, BEIJING. EN.

This paper is devoted to the study of the propagation of tide wave in a basin with variable cross-sectional area. With the W.K.B. method an analytic solution of amplitude is obtained. It is found that the motion of co-oscillating tide wave in a basin with variable cross-section is a progressive one, depending on the cross-section as well as the frictional force. The effects of friction on the motion of tide wave is discussed in detail.

87PH0236. D.E.CARTWRIGHT. 1985(1). TIDAL PREDICTION AND MODERN TIME SCALES. INT. HYDROGR. REV. 62(1):127-137. INT. HYDROGR. ORG., MONACO. PN-2942. EN.

Modern time scales introduced since about 1950 and revised formulae for the mean lunar and solar longitudes are defined and compared with the formulae of Newcomb (1895) and Brown (1919),,which still form the basis of current tide prediction practice. Changes in tidal arguments of order 0 Deg. 02 are identified, with a tendency to increase towards the 21st century. Small changes in potential amplitude and speed of some leading harmonic constituents from AD 1900 to 2000 are also noted. While all changes are small by tidal standards, it is recommended that the modern formulae be adopted by tidal authorities before discrepancies become noticeable. The modern formulae require at least an approximate correction for the difference between dynamic or Ephemeris Time and Civil or Universal Tim+.

87PH0237. G.H.FANG, J.F.YANG, X.C.ZHAO. 1985(4). A NUMERICAL MODEL FOR THE TIDES AND TIDAL CURRENTS IN THE TAIWAN STRAIT. ACTA OCEANOL. SINICA. 4(2):189-200. CHINA OCEAN PRESS, BEIJING. EN.

Semidiurnal and diurnal tidal waves in the Taiwan Strait are computed simultaneously by using finite difference method with two-dimensional nonlinear hydrodynamic equations. The agreement between the computed and observed results is considered satisfactory.

87PH0238. G.GODIN, G.GUTIERREZ. 1986. NON-LINEAR EFFECTS IN THE TIDE OF THE BAY OF FUNDY. CONTINENTAL SHELF RES. 5(3):379-402. PERGAMON PRESS, OXFORD. EN.

The inspection of 33 years of observations on the water level at St John, New Brunswick reveals that some of the semidiurnal components of the tide have abnormal amplitudes while others exhibit slow periodicities which cannot be attributed to their second order nodal modulation: this is caused by frictional effects. The modulation of M2 at St John is slightly reduced from its full oceanic range while it, in turn, controls some of the damping of S2. quadratic friction creates new semidiurnal components which may interfere with or alter some of the components of the incoming tide. Third order effects are also noticeable in the semidiurnal band.

87PH0239. C.V.STEPHENS. 1986. A THREE-DIMENSIONAL MODEL FOR TIDES AND SALINITY IN THE BRISTOL CHANNEL. CONTINENTAL SHELF RES. 6(4):531-560. PERGAMON PRESS, OXFORD. EN.

A three-dimensional hydrodynamic numerical model is applied to the simulation of tides, salinity and density currents in the Bristol Channel. The model incorporates a sigma coordinate transformation through the vertical and a grid box system throughout. A suitable formulation is chosen for vertical eddy viscosity by comparing elevations and currents from the model with observations. Two simulations of salinity are made, for February and July 1978. The resulting density current patterns for July 1978 are presented at various levels through the vertical.

87PH0240. G.GODIN. 1986. IS THE ABNORMAL RESPONSE OF THE TIDE AT THE FREQUENCY OF S2 REALLY DUE TO RADIATIONAL EFFECTS?. CONTINENTAL SHELF RES. 6(5):615-625. PERGAMON PRESS, OXFORD. EN.

The equilibrium ratios of the major solar component of the tide S2 and of the component k2, which have very close frequencies, seldom follow a linear trend when one extrapolates from that of the lunar component M2. This is due to the different damping of the resultant of S2 and K2 during their six-month interference cycle, compared to that of the other components: it gives to K2 a value larger than expected, while the reverse hold for S2. It is unlikely that radiational effects are the cause of such behaviour as is currently believed.

87PH0241. J.W.LODER, D.A.GREENBERG. 1986. PREDICTED POSITIONS OF TIDAL FRONTS IN THE GULF OF MAINE REGION. CONTINENTAL SHELF RES. 6(3):397-414. PERGAMON PRESS, OXFORD. EN.

The distribution of SIMPSON and HUNTER's tidal mixing parameter in the Gulf of Maine region, calculated from GREENBERG's numerical model of the M2 tide, is presented and used in a discussion of the summertime positions of tidal fronts and their variability. The role of wind mixing is assessed using a version of Simpson and Hunter's criterion reformulated to include a fixed fraction of the climatological wind-derived energy in the Gulf. two alternative criteria for the extent of tidally well-mixed areas, one based on a near-surface energy partition and the other on the bottom Ekman layer thickness, are also examined.

87PH0242. T.F.GROSS. 1986. MODELING TIME DEPENDENCE IN A TIDAL BOUNDARY LAYER. CONTINENTAL SHELF RES. 6(3):431-448. PERGAMON PRESS, OXFORD. EN.

Although the rate of acceleration and deceleration in a depth-limited tidal flow can be quite large, it has been found that quasi-steady logarithmic models or steady eddy diffusivities can explain the turbulent field quite well (GROSS and NOWELL, 1983; LONG, 1981). A simple, time-dependent model was devised based on kinetic energy closure (BRADSHAW et al., 1967) to simulate a depth-limited tidal boundary layer without the assumption of a time-independent eddy diffusivity.

87PH0243. G.H.FANG, J.WANG. 1986(10). AN ANALYSIS OF THE ASTROMETEOROLOGICAL CONSTITUENTS OF TIDE IN THE BOHAI SEA. ACTA OCEANOL. SINICA. 5(4):486-495. CHINA OCEAN PRESS, BEIJING. EN.

Seasonal variations in tidal harmonic constants are found to be significant in shelf seas and can be represented by adding a series of astrometeorological constituents (AMC) to the astronomical constituents (AC). The relation of AMC and corresponding AC to their resultant constituents (RC) is examined and the seasonal variation of RC is described by modulation ellipses. The values of AMC in the Bohai Sea are calculated and the major features of AMC in the Bohai Sea are analyzed. The dynamic factors which cause AMC are examined by means of numerical experiments.

87PH0244. S.L.HE, B.N.LIN. 1986(10). 2-D TIDAL FLOW BY OPERATOR-SPLITTING METHOD. ACTA OCEANOL. SINICA. 5(4):508-516. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, the method of operator splitte is applied to simulate the tidal flow in the Hangzhou Bay. different schemes of splitting have been devised and compared. Results of the study indicate that good simulation can be achieved. Besides being simpler in form, this method is flexible and allows much freedom in selecting the mode of splitting and the scheme of computation.

87PH0245. S.D.LI, D.M.CAO, G.H.FANG. 1986(10). AN ESTIMATION OF TURBULENCE STRESSES IN TIDAL CURRENTS OF HANGZHOU BAY. ACTA OCEANOL. SINICA. 5(4):496-507. CHINA OCEAN PRESS, BEIJING. EN.

Based on the momentum equations, the turbulence stresses and eddy viscosities along five sections in Hangzhou Bay are estimated by using the observed data of tidal currents and tides. The coefficient of bottom stresses obtained from the calculation is 0.00067 on the average and the vertical profiles of the amplitudes of turbulence stresses are almost linear and slight concave downwards, and the phases are deferred continuously from sea-bed. The coefficient of vertical eddy viscosity reaches its maximum at the layer below the mid-depth with a value of about 60 square centimeter/sec on the average.

87PH0246. Z.W.YU, A.L.YE, Z.Y.CHEN. 1986(4). RELATION BETWEEN DAILY MEAN SEA LEVEL AND TIDAL RANGE AND ITS PRELIMINARY DYNAMICAL EXPLANATION. ACTA OCEANOL. SINICA. 5(2):157-163. CHINA OCEAN PRESS, BEIJING. EN.

It is discovered through data analysis that both daily mean sea level (obtained by averaging 24 hourly tide heights) and daily mean tide range have oscillation component with period of 14.76 days, and that the coherence is very close to unity at this period. Besides the effect of Nyquist folding, radiation stress effect is regarded as the cause for the phenomenon.

87PH0247. F.STRAVISI, S.FERRARO. 1986(4). MONTHLY AND ANNUAL MEAN SEA LEVELS AT TRIESTE 1890-1984. BOLL. DI OCEANOL. TEORICA ED APPLICATA. 4(2):97-104. OSS. GEO. SPE., TRIESTE. PN-2871. EN.

Monthly and annual mean sea level heights from the Istituto Talassografico tide gauge station of Trieste, northern Adriatic Sea, are given for the years 1890-1984. The time series of annual mean sea levels is fitted with 26 harmonic waves plus a linear trend representing an increase of 0.132 cm/a. The mean sea level annual cycle is correlated with the corresponding precipitation cycle at Trieste.

87PH0248. M.C.G.MABIN. 1986(9). THE ROSS SEA SECTION OF THE ANTARCTIC ICE SHEET AT 18000 YR B.P.: EVIDENCE FROM HOLOCENE SEA-LEVEL+. SOUTH AFRICAN J. SCI. 82:506-508. BUR. SCI. PUB., PRETORIA. PN-3048. EN.

87PH0249. R.D.PINGREE, D.K.GRIFFITHS. 1987(10). TIDAL FRICTION FOR SEMIDIURNAL TIDES. CONTINENTAL SHELF RES. 7(10):1181-1209. PERGAMON PRESS, OXFORD. EN.

The quadratic law of bottom friction demands an increased frictional coefficient for the S2 and N2 tides with respect to a dominant M2 tidal signal. A numerical model of the semidiurnal tides in the northeast Atlantic gives an increase in friction of about 35% for the N2, S2, and K2 tides with respect to the M2 tide and this value is close to a theoretically derived estimate for the region, providing confirmation of the general widescale applicability of the quadratic friction law. Small

differences in friction also occur for the N2, S2 and K2 tides and this is attributed to the interaction of the L2 and u2 tides with the M2 tide in the presence of quadratic friction. Energy dissipation relationships, anomalous K2/S2 amplitude ratios and the role of quadratic friction on 18.6 year var+.

87PH0250. YONG-Q.KANG, SEOG-WON.CHOI. 1987(11). OBJECTIVE INTERPOLATION OF THE M2 TIDE IN THE EAST SEA. BULL. KOREAN FISH. SOC. 20(6):477-483. KOREAN FISH. SOC., PUSAN. EN.

We constructed the tidal chart of M2 tide in the East Sea (Japan Sea) by an objective method. The sea level elevations at coastal stations are specified as Dirichlet boundary conditions, and the tidal constants inside of the East Sea basin are determined by the solution of the complex partial differential equation for the sea surface elevation. We studied the influences of the bottom topography and the tidal friction on the distribution of tidal chart inside of the basin. Using the results of basin-wide tidal model, we constructed a detailed tidal chart of the M2 tide off east of Korea.

87PH0251. G.GODIN. 1987(3). DRIFT OF THE NODE OF THE SEMIDIURNAL TIDE IN NORTHUMBERLAND STRAIT. CONTINENTAL SHELF RES. 7(3):225-235. PERGAMON PRESS, OXFORD. EN.

Long series of observations on the water level inside Northumberland Strait reveal that the M2 tide varies between the winter and the summer months. This implies that the semidiurnal node, which is assumed to exist in the northern extremity of the strait, is displaced over the seasons. Sets of additional observations in the immediate vicinity of the node contain such a weakened and irregular semidiurnal signal that there is no possibility of resolving from them the components that make up the semidiurnal band. When handling and interpreting the field data, it is preferable to conceive of a zone of minimum semidiurnal activity in the northern extremity of the strait, which is displaced by ice and storms, by cycles of neap and spring tides in the Gulf of Saint lawrence and by short live+.

87PH0252. C.B.FANDRY, D.R.JACKETT. 1987(5). TIDES ON CONTINENTAL SHELVES WITH LONGSHORE TOPOGRAPHIC VARIATIONS. CONTINENTAL SHELF RES. 7(5):519-534. PERGAMON PRESS, OXFORD. EN.

In this note, present theory on the effect of continental shelves on tides is extended to include longshore variations in bottom topography. Existing formulae for the cross-shelf variation in tidal elevation and currents are corrected to include the effect of a widening or narrowing shelf. Given the coastal tide, it is shown that the offshore behaviour of tidal height and currents is strongly dependent on whether the shelf widens or narrows in the direction of increasing coastal tidal amplitude. In the absence of longshore gradients in coastal amplitude and phase, the effect of longshore bathymetric gradients is to increase the amplitude of the longshore component of tidal current. It is also shown that semidiurnal tides may be affected differently from diurnal tides, particularly in+.

87PH0253. D.K.CHEN, J.L.SU. 1987(7). CONTINENTAL SHELF WAVES ALONG THE COASTS OF CHINA. ACTA OCEANOL. SINICA. 6(3):317-334. CHINA OCEAN PRESS, BEIJING. EN.

Spectral analyses have been carried out on the time-series data from 16 tide stations and nearby weather stations along the coasts of China during the winter of 1980-1981 and the summer of 1981. After removing the wind and barometric effects, the authors found the signals of the southward moving sea-level variations at about 0.21 and 0.32 cpd along the coasts of the Huanghai Sea, East China Sea and South China Sea in winter, and only the 0.26 cpd southward moving sea-level variations along the coast of the South China Sea in summer. Using simple analytical models based on idealized bottom profiles of the China Seas, the observed phenomena can be explained as the lowest-mode continental shelf waves travelling along the coasts of China.

87PH0254. S.A.THORPE. 1985. LABORATORY OBSERVATIONS OF SECONDARY STRUCTURES IN KELVIN-HELMHOLTZ BILLOWS AND CONSEQUENCES FOR O+. GEOPHYS. & ASTROPHYS. FLUID DYNAMICS. 34:175-199. GORDON & BREACH SCI. PUB., N.Y PN-2931. EN.

Experiments have been made using shadowgraphs to examine the development of secondary structures in Kelvin-Helmholtz billows at the diffuse interface between two layers of different densities moving in shear at moderate Reynolds numbers and high Prandtl number. The onset of turbulence in billows reported in earlier work resulted from an interaction between the billows and the side walls of the apparatus. Secondary structure within the billows remote from the side walls occurs later and is, in its early stages, well organised. Regular longitudinal bands lying parallel to the mean flow develop near the vertical boundaries of the billows and extend across their widths. The initial development and scale of the spanwise bands are similar to that of the convective rolls predicted to occur in+.

87PH0255. A.GRIFFA, S.MARULLO, R.SANTOLERI, A.VIOLA. 1986. INTERNAL NONLINEAR TIDAL WAVES GENERATED AT THE STRAIT OF MESSINA. CONTINENTAL SHELF RES. 6(5):677-687. PERGAMON PRESS, OXFORD. EN.

Large amplitude internal waves were observed north and south of the Strait of Messina during two different periods. A comparison between the two sets of data is made. The behaviour of the shape of the waves is analysed from the physical parameters and two possible interpretations of these waves are given. The mechanism of formation related to the tide in the Strait is also discussed.

87PH0256. X.B.SHU, ET AL. 1986(4). VERIFICATION OF INTERNAL WAVES IN OFFSHORE AREAS BY MEANS OF CURRENT OBSERVATIONS. ACTA OCEANOL. SINICA. 5(2):165-172. CHINA OCEAN PRESS, BEIJING. EN.

Based on the shear effect of internal wave currents

in stratified fluid, the necessary condition for the possible existence of an internal wave and the sufficient condition under which there will be no internal wave are deduced starting from the continuity equation of incompressible fluid. The above two conditions are verified by the measured results from vertical current meter arraies at some observation stations in the Bohai Sea and the south Huanghai Sea. In the treatment of measured results, first of all, the tidal period components are separated from the measured currents by Fourier-analysis method, and then the internal wave currents of tidal period from the tidal period components in the light of some considerations.

87PH0257. X.B.SHU, ET AL. 1986(4). DETERMINATION OF THE DIRECTION AND VELOCITY OF INTERNAL TIDE WAVE BY MEANS OF MEASUREMENTS AT SING+. ACTA OCEANOL. SINICA. 5(2):173-182. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, the method for determining the direction and velocity of internal tide wave is proposed. The main points are as follows: starting with the continuity equation of incompressible fluid and taking the isotherm whose balance position is situated in the middle of the thermocline as the interface of two-layer ocean, one can get an equation of variations of average total current in the lower and upper layers.

87PH0258. A.J.WILLMOTT, P.D.EDWARDS. 1987(5). A NUMERICAL MODEL FOR THE GENERATION OF TIDALLY FORCED NONLINEAR INTERNAL WAVES OVER TOPOGRAPHY. CONTINENTAL SHELF RES. 7(5):457-484. PERGAMON PRESS, OXFORD. EN.

A three layer numerical model is developed to investigate tidally forced nonlinear internal wave generation over large scale one-dimensional bottom topography. Advective effects due to the barotropic tide are retained. Numerical experiments are presented which demonstrate how internal wave propagation can be arrested by the imposed tide. The model is applied to Knight Inlet on the British Columbia coast and to the edge of the Armorican Shelf in the Celtic Sea. Observations over the Celtic Sea continental slope reveal and the model confirms that the internal tidal velocity can exceed the maximum strength of the barotropic M2 tide. The presence of these velocity surges plays an important role in bottom sediment transport. The velocity field in each layer predicted by the model for th+.

87PH0259. M.ORLIC. 1987(6). OSCILLATIONS OF THE INERTIA PERIOD ON THE ADRIATIC SEA SHELF. CONTINENTAL SHELF RES. 7(6):577-598. PERGAMON PRESS, OXFORD. EN.

Wind, current and hydrographic data, taken during three summer seasons (1979, 1980 and 1983) on the Adriatic Sea shelf, have been analysed for evidence of the inertia-period oscillations. The data originated from four stations: one close to the lateral boundary, one at a typical mid-basin location, and two close to the longitudinal boundary of the Adriatic Sea. The inertia-period oscillations occurred in episodes lasting for a few days. Vertically, the oscillations displayed a simple structure: the clockwise current-vector rotations were opposed in phase across the thermocline. The partition of energy between two layers depended on the thermocline depth. Horizontally, the inertia-period currents accounted for about 10% of the total current variance at stations close to the longitudi+.

87PH0260. A.SAPIA, E.SALUSTI. 1987(7). OBSERVATION OF NONLINEAR INTERNAL SOLITARY WAVE TRAINS AT THE NORTHERN AND SOUTHERN MOUTHS OF THE +. DEEP-SEA RES. 34(7):1081-1092. PERGAMON PRESS, OXFORD. EN.

During the PRIME '82 oceanographic cruise, several large-amplitude internal wave trains were observed a few km both north and south of the Strait of Messina. Two different kinds of internal solitary waves were observed. The first was an isolated wave, with a long-lasting (about 6 min) signal; its length was about 350 m. The second consisted in sets of 3-6 waves with decreasing amplitudes. Each wave had a length of about 120 m and lasted for about 2 min, the Vaisala-Brunt period was 2-3 min. The phenomenon is discussed theoretically to determine whether its dynamics can be described by Korteweg-de Vries. Benjamin-Ono or Joseph equations.

87PH0261. M.RATTRAY JR. 1960. ON THE COASTAL GENERATION OF INTERNAL TIDES. TELLUS. 12:54-62. SWEDISH GEOPHYS. SOC. PN-2891. EN.

Differential equations, boundary, and discontinuity conditions are obtained which relate the internal tide to the surface tide in a two-layer system. Solutions of these equations give internal tides which may be large compared to the surface tide. In the coastal region these internal tides are standing waves and further offshore they attain the characteristics of progressive waves traveling seaward.

87PH0262. K.HORIKAWA, A.WATANABE. 1968. LABORATORY STUDY ON OSCILLATORY BOUNDARY LAYER FLOW. COASTAL ENG. JAPAN. 11:13-28. JAPAN SOC. CIVIL ENG., TOKYO. PN-2625. EN.

The characteristics of oscillatory boundary layer flow have been treated with keen interest during the last decade from the various aspects. Among the previous results the theoretical treatment by K. Kajiura must be the most important and fruitful on to advance in our knowledge on the present phenomena. On the other hand the senior author has had a real interest in the behaviour of sediment particles due to oscillatory fluid motion, and has conducted his systematic investigations on the sediment movement in nearshore area. The aim of this paper is to introduce some results of the recent investigations conducted at the Coastal Engineering Laboratory, University of Tokyo, with the intention of investigating the applicability of Kajiura's theory to the oscillatory flow in the vicinity of+.

87PH0263. H.NISHIMURA, K.HORIKAWA. 1973. ON THE BOUNDARY CONDITIONS AT THE BAY ENTRANCE IN THE ANALYSES OF BAY WATER OSCILLATIONS. COASTAL ENG. JAPAN. 16:29-39.

JAPAN SOC. CIVIL ENG., TOKYO. PN-2640. EN.

The purpose of present investigation is mainly to analyze the complex phenomena of bay water oscillation by using the rather simple method such as the one-dimensional analyses. In this case the establishment of boundary conditions at the bay entrance is the main difficulty to be overcome. In order to solve the stated problem the authors treat the following two cases analytically and verify their appropriateness by comparing them with laboratory data. The first case is that the wave in the open sea is coming towards the entrance of semi-infinite channel with normal incidence, and the second case is that the wave propagating through the channel is coming towards the open sea. In the treatment of the above two cases, the authors introduce a complex transmission coefficient & a complex tr+.

87PH0264. HUI-SOO.AN. 1980(8). FINITE DIFFERENCE METHOD FOR THE OCEAN WITH THE DENSITY STRATIFICATION. BULL. KORDI. 2(1):1-7. KORDI., SEOUL. EN.

The finite difference method for the study of the ocean with the density stratification is explained briefly with the boundary conditions. This difference method is used for the simulation or numerical experiment of current, upwelling and other long period ocean phenomena. the scheme is conservative for the temperature, salinity, momentum and energy.

87PH0265. YOUNG-HYANG.PARK. 1981(4). STUDY ON THE DIRECTIONAL PROPERTIES OF OCEAN WAVES USING THE SURFACE DISPLACEMENTS AND TWO COMPONE+. BULL. KORDI. 3(1):1-6. KORDI., SEOUL. EN.

By using the Fourier coefficients of surface displacements e and of corresponding horizontal velocities u and v, one can determine the mean direction of wave propagation theta 1, theta 2 and theta 3, and also the directional spread parameters n and s. Theta 1 can be determined by using the Fourier coefficients of e, u and v may give an appropriate direction of propagation. On the other hand, theta 2 and theta 3 which are obtained from two different methods but have just the same values, can be derived from the Fourier coefficients of u and v only.

87PH0266. D.PRANDLE. 1982(11). THE VERTICAL STRUCTURE OF TIDAL CURRENTS AND OTHER OSCILLATORY FLOWS. CONTINENTAL SHELF RES. 1(2):191-207. PERGAMON PRESS, OXFORD. EN.

Assuming a linearized equation of motion in the absence of stratification, the vertical structure of tidal currents is shown to be a function of two dimensionless parameters. By resolving tidal current ellipses into clockwise and anticlockwise rotating components the original theory developed for recti-linear flow can be applied to fully three-dimensional flow. In this way, many of the observed characteristics of current structure in shallow seas may be explained.

87PH0267. J.A.JOHNSON. 1982(11). A TWO TIME-SCALE MODEL OF STRATIFIED SHELF CURRENTS. CONTINENTAL SHELF RES. 1(2):143-157. PERGAMON PRESS, OXFORD. EN.

Stratification is incorporated into an unsteady model of shelf currents by splitting the dynamic response of the flow into two parts, each with its own time scale. The barotropic part of the response is independent of depth and varies rapidly on a short time scale, whereas the baroclinic part depends on depth and changes slowly with time or a long time scale. The three-dimensional model has a continental shelf sloping down from an eastern boundary to the deep ocean. The equations for the barotropic component of the pressure field contain forcing by the wind stress and feedback from the baroclinic field. An integral of the heat equation over the long time scale determines the slow changes in the temperature field and hence in the baroclinic component of the velocity distribution. The +.

87PH0268. G.S.JANOWITZ, L.J.PIETRAFESA. 1982(11). THE EFFECTS OF ALONGSHORE VARIATION IN BOTTOM TOPOGRAPHY ON A BOUNDARY CURRENT-(TOPOGRAPHICALLY IN+. CONTINENTAL SHELF RES. 1(2):123-141. PERGAMON PRESS, OXFORD. EN.

A theory which describes the constant f-plane flow of a steady inviscid baroclinic boundary current over a continental margin with a bathymetry that varies slowly in the alongshore but rapidly in the offshore directions is developed. The lowest order flow produces a variation in the vertical component of relative vorticity along the isobath as the magnitude and direction of Vh(bottom slope downstream at depth h) vary in the downstream direction. The variation of vorticity requires a vertical as well as a cross-isobath flow at first order in the Rossby number. The first order vertical velocity is computed from the vorticity equation in terms of upstream conditions and downstream variations of the bathymetry. The density, pressure, and cross-isobath flow at first order in the Rossby numb+.

87PH0269. Z.D.ZHAO, J.L.LU. 1982(12). LINEAR WAVE ACTION ON THE PILLAR WITH RECTANGULAR SECTION. ACTA OCEANOL. SINICA. 1(2):299-308. CHINA OCEAN PRESS, BEIJING. EN.

With respect to the wave forces on rectangular pillar, no theoretical solution has yet been obtained. In this paper, we found out a theoretical solution and made comparison with some experimental data to prove its coincidence.

87PH0270. Z.H.JING. 1982(6). STUDY ON CALCULATION OF OCEAN CURRENT VELOCITY. ACTA OCEANOL. SINICA. 1(1):1-9. CHINA OCEAN PRESS, BEIJING. EN.

87PH0271. G.W.HONG. 1982(6). NONLINEAR INTERACTIONS AMONG GRAVITY SURFACE WAVES. ACTA OCEANOL. SINICA. 1(1):144-154. CHINA OCEAN PRESS, BEIJING. EN.

Based on the perturbation method, a fourth order theory for nonlinear interactions among three dimensional gravity waves in water of any uniform

depth is presented in this paper. Two cases are considered: (i) wave number vectors fixed, frequencies perturbed, and (ii) wave number vectors and frequencies both fixed. According to this solution, expressions of the same order for progressive waves, short-crested waves and nonlinear interaction between wave and vertical wall are also derived.

87PH0272. Y.C.YUAN, W.Y.XU, K.R.HE. 1982(6). FINITE ELEMENT METHOD IN CALCULATION OF KUROSHIO CURRENT. ACTA OCEANOL. SINICA. 1(1):10-20. CHINA OCEAN PRESS, BEIJING. EN.

We establish the equations of finite element approximation for three-dimensional ocean current and calculate the Kuroshio current in the eastern sea area off Taiwan Province. The interpolation error of finite element approximation is given as Eq.(3.14).

87PH0273. J.F.A.SLEATH. 1982(8). FRICTION COEFFICIENTS OF RIPPLED BEDS IN OSCILLATORY FLOW. CONTINENTAL SHELF RES. 1(1):33-47. PERGAMON PRESS, OXFORD. EN.

Dissipation and friction factors have been computed for rippled beds in oscillatory flow using a finite-difference solution of the two-dimensional equation of vorticity. The computations show good agreement with available experimental results and also, at very low Reynolds numbers, with the results of a small-perturbation solution of the vorticity equation.

87PH0274. H.J.NIEBAUER. 1982(8). WIND AND MELT DRIVEN CIRCULATION IN A MARGINAL SEA ICE EDGE FRONTAL SYSTEM: A NUMERICAL MODEL. CONTINENTAL SHELF RES. 1(1):49-98. PERGAMON PRESS, OXFORD. EN.

A seasonal ice edge zone is a unique frontal system with an air-ice-sea interface. This paper is a report on the numerical results from a quasi-three dimensional, time dependent, non-linear numerical model of circulation at a continental shelf-seasonal ice edge zone. The purpose of the experiments is to model the hydrography and circulation, including upwelling, baroclinic geostrophic flow, and inertial oscillations, at the ice edge with emphasis on examining the driving forces of wind and melting ice. It is suggested that the non-linear acceleration terms and vertical density diffusion terms are negligible and that the horizontal density diffusion terms are of secondary importance within the time and space scales of the experiments. The vertical eddy viscosity terms are important in +.

87PH0275. J.WOLF. 1983. A COMPARISON OF A SEMI-IMPLICIT WITH AN EXPLICIT SCHEME IN A THREE-DIMENSIONAL HYDRODYNAMIC MODEL. CONTINENTAL SHELF RES. 2(4):215-229. PERGAMON PRESS, OXFORD. EN.

As the capacity of computers increases, the size and resolution of numerical models can be increased. A fully nonlinear three-dimensional model has been developed, using the Galerkin method in the vertical dimension, in which the gravity wave terms are treated by an alternating-direction implicit scheme, while the friction, viscous and advective terms are treated explicitly. This permits a stable solution with a longer time-step than that required in an equivalent explicit scheme, while not needing as much computational effort as a fully implicit scheme.

87PH0276. K.C.DUWE, R.R.HEWER, J.O.BACKHAUS. 1983. RESULTS OF A SEMI-IMPLICIT TWO-STEP METHOD FOR THE SIMULATION OF MARKEDLY NONLINEAR FLOW IN COASTA+. CONTINENTAL SHELF RES. 2(4):255-274. PERGAMON PRESS, OXFORD. EN.

Results of a numerical method for the simulation of nonlinear flow in coastal seas are presented. The method is based on a neutral semi-implicit scheme which is modified into a stability-enhancing two-step algorithm. By means of this method the simulation of highly nonlinear flow patterns is possible in a stable and economic way. Three examples of models of different North Sea coastal regions are discussed under certain aspects to demonstrate the reliability of the method.

87PH0277. H.H.PEECK, R.PROCTOR, C.BROCKMANN. 1983. OPERATIONAL STORM SURGE MODELS FOR THE NORTH SEA. CONTINENTAL SHELF RES. 2(4):317-329. PERGAMON PRESS, OXFORD. EN.

An evaluation study of numerical operational storm surge prediction schemes for the North Sea began in November 1981. Each scheme consists of an atmospheric and a hydrodynamical model. For the following 6 month period, scheme surge predictions, harmonic tidal predictions and observed water levels were collected at 6 h intervals. This paper gives a description of these schemes and discusses their differences. Some preliminary results of the evaluation, as assessed at a workshop at the Royal Netherlands Meteorological Institute (KNMI) in May 1981, are presented.

87PH0278. J.O.BACKHAUS. 1983. A SEMI-IMPLICIT SCHEME FOR THE SHALLOW WATER EQUATIONS FOR APPLICATION TO SHELF SEA MODELLING. CONTINENTAL SHELF RES. 2(4):P243-254. PERGAMON PRESS, OXFORD. EN.

A semi-implicit scheme for the numerical solution of the shallow water equations is proposed. The scheme is suitable for the simulation of shelf sea dynamics as is demonstrated by some examples of successful application covering a range of grid sizes typical for shelf sea models. The basic outlines of the method are presented. Some practical aspects of computation are discussed which illustrate that an explicit model can be modified easily to the semi-implicit version proposed here. Compared to explicit schemes the semi-implicit approach has two major advantages: (1) its economy (a saving of at least 50% in computing time can be achieved); (2) a closer match is obtained between the time-stepping procedure and the time scales of processes, the spatial scales of which are close to the +.

87PH0279. A.M.DAVIES. 1983. NUMERICAL MODELLING OF STRATIFIED FLOW: A SPECTRAL APPROACH. CONTINENTAL SHELF RES. 2(4):275-300. PERGAMON PRESS, OXFORD. EN.

A numerical formulation is developed to solve the three-dimensional hydrodynamic equations which describe flow in a stratified sea. Arbitrary continuous physically realistic variations of density and eddy viscosity can be included in the model, which is sufficiently flexible to be applicable to sea areas of any horizontal extent and depth. A continuous current profile from sea surface to sea bed, is computed with the model. A method for expanding computed current profiles in terms of vertical modes is proposed and the contribution of these modes to the current profiles is considered. The time variation of the wind-induced circulation of a stratified lake in response to a suddenly imposed and maintained wind stress is examined. Calculations show that the wind-driven surface current i+.

87PH0280. S.HOLTE. 1983. NUMERICAL EXPERIMENTS WITH A THREE-DIMENSIONAL MODEL OF AN ENCLOSED BASIN. CONTINENTAL SHELF RES. 2(4):301-315. PERGAMON PRESS, OXFORD. EN.

A three-dimensional numerical model, for simulating velocity and temperature variations in a basin under various forcing mechanisms, is presented. Vertical structure is analyzed using a Galerkin Method with modified Chebyshev polynomials as expansion functions. With the proper choice of these functions, the barotropic and baroclinic parts of the motion are separated naturally in the model. A time-splitting procedure is then implemented; this makes time integration very efficient. Internal seiching due to windstress is simulated in the first experiment. The geostrophic adjustment of a river flowing into a basin is then simulated. When friction and entrainment is neglected, flow adjusts to geostrophic balance over a distance about one third of the width of the basin. weak turbulence +.

87PH0281. G.FURNES. 1983. A THREE-DIMENSIONAL NUMERICAL SEA MODEL WITH EDDY VISCOSITY VARYING PIECEWISE LINEARLY IN THE VERT+. CONTINENTAL SHELF RES. 2(4):231-241. PERGAMON PRESS, OXFORD. EN.

The solution of the three-dimensional linear hydrodynamic equations which describe wind-driven flow in a homogeneous sea are solved using the eigenfunction method. The eddy viscosity is taken to vary piecewise linearly in the vertical over an arbitrary number of layers. Using this formulation the eigenfunctions are given in terms of Bessel functions. The coefficients of integration as well as the eigenvalues are determined accurately such that the boundary conditions are satisfied. Values of the eigenfunctions at any depth can then be determined very fast and to a high degree of accuracy. Current profiles at any position can hence be computed accurately. The expansion of the horizontal component of current converges very fast at all depths.

87PH0282. J.M.HUTHNANCE. 1983(1). SUB-TIDAL MOTION ON THE SCOTTISH CONTINENTAL SHELF, AUGUST-SEPTEMBER 1971. CONTINENTAL SHELF RES. 1(3):221-236. PERGAMON PRESS, OXFORD. EN.

Simultaneous 28-day records of current and bottom pressure from four positions spanning 300 km near the shelf edge, and sea level at five coastal sites, show sub-tidal variations forming a coherent but limited response to the moderate wind stress over the shelf.

87PH0283. Z.D.CAO. 1983(12). EFFECTS OF WIND ON THE WAVE ADVANCING TOWARDS SHORE. ACTA OCEANOL. SINICA. 2(2):178-189. CHINA OCEAN PRESS, BEIJING. EN.

The effects of wind on wave propagation in shallow water are approached in this paper. The equations for calculating wave elements in shallow water are derived by the law of wave refraction and the equation of wave energy flux. The numerical results calculated by the electronic computer show that under the influence of wind, the wave elements, wave direction angle and the conditions of wave breaker change greatly. consequently, the effects of wind on the water wave propagating in shallow water need to be considered in practice.

87PH0284. M.C.HUANG, R.T.HUDSPETH. 1984. STREAM FUNCTION SOLUTIONS FOR STEADY WATER WAVES. CONTINENTAL SHELF RES. 3(2):175-190. PERGAMON PRESS, OXFORD. EN.

Two stream function solutions for steady two-dimensional water waves are reviewed. By examining more closely the near-breaking wave conditions, it is shown that celerity does not increase monotonically with increasing dimensionless wave steepness. Numerical comparisons between the two algorithms indicate that the Dalrymple algorithm is more accurate for near-breaking waves and requires less computer programming effort. Numerical comparisons of the Dalrymple free surface error convergence criteria with the Chaplin significant figures convergence criteria indicate that the free surface error convergence criterion is more consistent for stream function representations.

87PH0285. Z.D.ZHAO. 1984(1). BOTTOM SHEAR STRESS UNDER WAVE ACTION. ACTA OCEANOL. SINICA. 3(1):137-142. CHINA OCEAN PRESS, BEIJING. EN.

Almost all concepts on shear stresses under wave action have been put forward on the basis of linear wave theory, thus it can not be used to evaluate the net sediment transport rate caused by wave action. Using other way to solve this problem, the author makes an advance in the idea that the non-linear effect is also considered.

87PH0286. Z.G.REN. 1984(10). CALCULATION OF WAVE-CURRENT FORCE ON ISOLATED PILE. ACTA OCEANOL. SINICA. 3(4):574-585. CHINA OCEAN PRESS, BEIJING. EN.

By means of photography the author has investigated the mechanism of wave and current motion to measure simultaneously orbital path, velocity and acceleration of water particles. this new experimental system consists of a camera, a special light source, an

intermittent exposure unit and a chemical liquid tracer. On the basis of theoretical analysis of combined effects of current and wave and the results of experiments, a model of total wave and current velocity is provided to calculate wave-current forces on a pile according to Morison's Formula. The calculated results from three different sets of wave and current data have been compared with experimental data and they are found in excellent agreement.

87PH0287. D.S.YANG. 1984(4). PRELIMINARY STUDY OF THE DYNAMICS OF THE LARGE SCALE LOW LEVEL JET. ACTA OCEANOL. SINICA. 3(2):192-204. CHINA OCEAN PRESS, BEIJING. EN.

By adopting the beta plane approximation in the neighbourhood of the equator and neglecting the nonlinear terms in the barotropic primitive equations, particular solutions are obtained under the steady condition. From these, we find that in the neighbourhood of the equator, the large scale low level jet (LLJ) is mainly determined by the inertia effect of the earth's rotaton, the depth of the equivalent fluid layer and the frictional effect of the earth's surface. By using the Green function to obtain an exact solution for the system of equations, the meridional component is obtained. However, the low level wind fields obtained by both approaches generally agree with the actuality.

87PH0288. B.Z.XU, L.F.JIN, S.Q.ZHAO. 1984(7). STUDY ON TIDAL WAVES OF THE QIANTANGJIANG RIVER. ACTA OCEANOL. SINICA. 3(3):303-312. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, the characteristic difference schemes are adopted and the proof calculation of actual measurement data of the Qiantangjiang River is made. The calculating result is in agreement with actual measurement data and conforms with the requirements of the engineering. In the end, the hydraulics model is discussed and the discussion shows that the characteristic difference schemes can be used to calculate the tidal bore (discontinuity solutions) because the schemes have a pseudo-viscous term.

87PH0289. N.S.HEAPS, J.E.JONES. 1985. A THREE-LAYERED SPECTRAL MODEL WITH APPLICATION TO WIND-INDUCED MOTION IN THE PRESENCE OF STRATIFI+. CONTINENTAL SHELF RES. 4(3):279-319. PERGAMON PRESS, OXFORD. EN.

The main features of a new three-dimensional spectral model for the motion of a stratified sea are described. The model is applied to determine wind-induced elevations and currents over an idealised shelf-edge slope during the summer season of thermal stratification. A wind stress field spanning the slope is applied in the form of a rectangular pulse through time, the direction of the stress being parallel to the shelf edge. It is shown that strong vertical motion occurs near the top of the slope in the wind region; inertial currents are excited. Outside the wind region, long-period waves trapped over the slope and propagating along it may be identified.

87PH0290. B.GALLAGHER. 1985. TESTING A CLOSURE FOR VELOCITY/PRESSURE-GRADIENT CORRELATIONS IN NONUNIFORM TURBULENT FLOW. PHYS. FLUIDS. 28(7):2083-2087. AME. INST. PHYS., N.Y. PN-2852. EN.

Certain velocity/pressure-gradient correlations arise in the Reynolds stress equation through the interaction of the turbulent velocity field with the mean strain rate field. An existing, rational closure representation for these correlations is extended here and then tested. The closure permits good agreement to be obtained between observed and computed reynolds stress components as they evolve under the influence of uniform shear and plane strain.

87PH0291. F.R.NAEF. 1985. HOW DOES ONE ESTIMATE FLOOD PEAKS IN SMALL CATCHMENTS IN SWITZERLAND WITHOUT DISCHARGE MEASUREMENT+. BEITRAGE ZUR HYDROLOGIE. 415-428. PN-2888. EN.

The aim of the described project is to develop a simple procedure for estimating floods in small catchments. After a survey of the available data and possible statements on the return period, several frequently used methods of estimating floods, from the simple flood formula to the SCS method, are examined. The analyses of data with high resolution from 5 catchments showed that the runoff coefficients of small and medium flood events exhibit a large scatter, and are not at all suited for extrapolation to large events. Therefore an investigation was started of the largest flood events in 120 catchments, for which the rainfall was reconstructed from nearby daily recordings and from streamflow recordings.

87PH0292. A.M.DAVIES. 1985. APPLICATION OF THE DUFORT-FRANKEL AND SAUL'EV METHODS WITH TIME SPLITTING TO THE FORMULATION OF A +. INT. J. NUMERICAL METHODS IN FLUIDS. 5:405-425. JOHN WILEY & SONS, CHICHESTER. PN-2939. EN.

A three dimensional hydrodynamic sea model of an arbitrary sea area is formulated using sigma co-ordinates in the vertical. The solution of the equations using finite difference grids in the horizontal and the vertical is described. Discretization of the vertical viscosity term in the hydrodynamic equations using the DuFort-Frankel and Saul'ev methods is developed. Some numerical instabilities occur with the DuFort-Frankel method which can be overcome by splitting the hydrodynamic equations into equations describing the mean flow and equations describing the deviations from it. The computational advantages of solving these equations with different time steps are discussed. The accuracy and stability of the various methods is demonstrated for wind induced flow in a simple rectangular+.

87PH0293. A.M.DAVIES. 1985(12). ON DETERMINING THE PROFILE OF STEADY WIND-INDUCED CURRENTS. APPL. MATH. MODELLING. 9:409-418. BUTTERWORTH SCI., GUILDFORD. PN-2955. EN.

A technique is developed to solve the steady-state hydrodynamic equations which describe wind-induced

currents at a point. By using the Galerkin approach, with an expansion of complex coefficients and real functions, a continuous current profile can be computed from sea surface to sea bed for arbitrary vertical variations of viscosity. The method can incorporate slip or no-slip bottom boundary conditions, and gradients of sea surface elevation. The technique is used to investigate the influence of viscosity profile, bed stress and elevation gradient on surface current magnitude and direction. Calculations suggest that viscosity profile, bed stress, and elevation gradient all affect surface current, offering some explanation for the range of surface current magnitudes and directions r+.

87PH0294. A.M.DAVIES. 1985(12). ON DETERMINING CURRENT PROFILES IN OSCILLATORY FLOWS. APPL. MATH. MODELLING. 9:419-428. BUTTERWORTH SCI., GUILDFORD. PN-2956. EN.

The time dependency of the linear three-dimensional hydrodynamic equations which describe oscillatory flow, is removed by expressing the horizontal components of current in terms of rotary components at a prescribed frequency. By this means two time independent equations (one for each rotary component) are derived, which can be readily solved using the Galerkin method, in a manner analogous to that developed by the author for steady-state wind-induced flow. The method is used to examine the influence of eddy viscosity on tidal current profiles. Two distinct flow regimes are identified. In one the water depth exceeds the thickness of the bottom stress layer, in the other, water depth is less than the thickness of this layer.

87PH0295. K.HUTTER. 1986. HYDRODYNAMIC MODELING OF LAKES. ENCYCLOPEDIA OF FLUID MECHANICS. 897-998. GULF PUB. CO., HOUSTON. PN-2887. EN.

87PH0296. G.EIDNES, T.UTNES, T.A.MCCLIMANS. 1986. WIND MIXING OF A STRATIFIED SHEAR FLOW. CONTINENTAL SHELF RES. 6(5):597-613. PERGAMON PRESS, OXFORD. EN.

The response of a shear flow to an imposed wind stress is studied both theoretically and by means of a numerical turbulence model. It is shown that for small initial gradient Richardson numbers a tail wind causes the slab velocity of the upper mixed layer to decrease. The theory is based on the assumption that during the wind-induced entrainment process the overall Richardson number will adjust to a quasi-constant value. The results imply that the common practice of estimating the total current velocity by vector addition of the original velocity and the wind-induced velocity (calculated from models based on an ocean at rest) may lead to an overestimation of the current speed.

87PH0297. N.S.HEAPS, J.E.JONES. 1986. TWO-LAYER EKMAN MODEL FOR WIND-INDUCED SHEAR FLOW NEAR THE SEA SURFACE. CONTINENTAL SHELF RES. 6(6):741-763. PERGAMON PRESS, OXFORD. EN.

A simple two-layered model for steady wind-induced shear flow near the sea surface has been formulated. Basic assumptions of Ekman's theory are retained, including horizontal uniformity, infinite depth and constant (but differing) vertical eddy viscosities in the respective layers. Employing information coming from observational data, the parameters of the model (depth of the surface layer and the two eddy viscosities) are evaluated and optimized. The results thereby obtained favour the presence of a high shear layer, about 1 m thick, immediately below the sea surface.

87PH0298. A.G.DAVIES. 1986. A NUMERICAL MODEL OF THE WAVE BOUNDARY LAYER. CONTINENTAL SHELF RES. 6(6):715-739. PERGAMON PRESS, OXFORD. EN.

A numerical model of deep, uniform, oscillatory, rough-turbulent boundary-layer flow is described. The model is based upon the governing horizontal momentum equation and a closure scheme involving the turbulent-energy equation and various turbulence-scaling laws. Finite difference solutions of these equations are obtained for a range of values of the relative roughness (A(0)/k(s)), where A(0) is the excursion amplitude of the water particles in the free-stream flow and k(s) is the equivalent bed roughness. Typical vertical profiles of horizontal velocity, turbulence energy and eddy viscosity, and time-series of the bed shear stress are presented.

87PH0299. A.M.DAVIES. 1986. APPLICATION OF A SPECTRAL MODEL TO THE CALCULATION OF WIND DRIFT CURRENTS IN AN IDEALIZED STRATIFI+. CONTINENTAL SHELF RES. 5(5):579-610. PERGAMON PRESS, OXFORD. EN.

The solution of the hydrodynamic equations describing wind drift currents in an idealized stratified sea is developed using a modal expansion in the vertical. The influence of the magnitude of wind induced surface eddy viscosity, within the surface mixed layer, and reduced eddy viscosity at depth associated with a stable pycnocline, upon wind induced current structure is examined. Calculations show that the magnitude and direction of steady state surface currents under strongly stratified conditions, are significantly influenced by mixed layer depth and pycnocline thickness. Surface eddy viscosity is also important, and in weakly stratified conditions eddy viscosity within and below the pycnocline influences surface current.

87PH0300. T.J.MCDOUGALL. 1986(11/12 OCEANIC INTRUSIONS: SOME LIMITATIONS OF THE RUDDICK AND TURNER (1979) MECHANISM. DEEP-SEA RES. V.33(11/12:1653-1664. PERGAMON PRESS, OXFORD. EN.

The RUDDICK and TURNER mechanism for double-diffusive interleaving at lateral thermoclinic fronts is examined on the S-T diagram, revealing that for the oceanographically relevant pair of properties (heat-salt rather than salt-sugar), an alternating series of diffusive and finger interfaces does not form, but rather each interface is a fingering interface. Since active oceanic intrusions do exhibit regions of diffusive stratification between the salt fingering regions, it is concluded that they must have their origins in 'smooth'

thermoclinic fronts, that is, fronts that are significantly wider than the height of an intrusion. This has direct implications for the way in which the diapycnal fluxes associated with double-diffusive interleaving are parameterized in ocean models.

87PH0301. SOK-KUH.KANG, SANG-RYONG.LEE, KYUNG-TAE.JUNG, KI-DAI.YUM. 1986(12). A STUDY OF THERMAL JET CHARACTERISTICS USING JET INTEGRAL MODEL. OCEAN RES. 8(2):29-39. KORDI., ANSAN. KO.

An unsteady jet integral model developed by Wolanski and Banner (1978) was calibrated and verified using the field data measured around the outfall site of the Kori Nuclear Power Plant (unit 1). Under the oscillating ambient flow condition, the jet integral model proved effective in investigating the major characteristics of the thermal jet. In addition, this model can be used as a tool of preliminary study and as a complementary model of a far field model.

87PH0302. D.MYRHAUG. 1987. COMPARISON OF A SIMPLE PLANETARY BOUNDARY LAYER MODEL WITH MEASUREMENT OF A TURBULENT BOUNDARY LAY+. CONTINENTAL SHELF RES. 7(2):135-148. PERGAMON PRESS, OXFORD. EN.

A simple analytical theory which describes the motion in a turbulent planetary boundary layer near a rough sea bed by using a two-layer eddy viscosity model is presented. The vertical structure of the current in the boundary layer is presented, and comparisons are made with data from McPhee and Smith (1976, Journal of Physical Oceanography, 6, 696-711) obtained from measurements of the turbulent boundary layer under drifting Arctic ice.

87PH0303. J.H.MIDDLETON, L.BODE. 1987. POINCARE WAVES OBLIQUELY INCIDENT TO A CONTINENTAL SHELF. CONTINENTAL SHELF RES. 7(2):177-190. PERGAMON PRESS, OXFORD. EN.

The causes of large amplitude or resonant tides on continental shelves are many and complex. Here we examine the role played by the angle of incidence in determining the energy losses and the magnitude and frequency of Resonant peaks for Poincare waves obliquely incident to a step-shaped, frictional continental shelf. Peak shelf/incident wave amplitude ratios are substantially reduced for obliquely incident waves compared with normally incident waves, both with and without shelf friction.

87PH0304. Y.C.ZHAO, J.P.LU. 1987(1). TWO-DIMENSIONAL WIND-DRIVEN FLOW ALONG LINEARLY SLOPING CONTINENTAL SHELF. ACTA OCEANOL. SINICA. 6(1):29-36. CHINA OCEAN PRESS, BEIJING. EN.

A solution is obtained via Green's function for steady wind-driven flows on shallow continental shelf with linearly bottom slope. Friction is parameterized in terms of constant horizontal & vertical eddy viscosities, with flow pattern illustrated.

87PH0305. S.G.H.PHILANDER, R.C.PACANOWSKI. 1987(1). NONLINEAR EFFECTS IN THE SEASONAL CYCLE OF THE TROPICAL ATLANTIC OCEAN. DEEP-SEA RES. 34(1):123-137. PERGAMON PRESS, OXFORD. EN.

Nonlinearities have a large effect on the circulation of the tropical Atlantic Ocean within a few hundred kilometers of the equator, both in the surface layers and at depth. Qualitative features of a nonlinear model that are absent from a linear model include energetic unstable waves in the western equatorial Atlantic and a westward surface jet that penetrates to considerable depths between the equator and 3 N. The largest quantitative difference between the nonlinear and linear models is the intensity of the westward surface flow at the equator. In a linear model it can be twice as fast as in a nonlinear model. In addition to the equatorial zone, nonlinearities affect the coastal zone of Africa south of the equator, where alongshore currents and zonal pressure gradients in linear an+.

87PH0306. Z.W.YU, Z.J.GAN, A.L.YE. 1987(1). LINEAR WAVES IN ROTATIONAL HOMOGENEOUS FLUID WITH UNIFORM WATER DEPTH: (II) POSSIBLE WAVES FILTERE+. ACTA OCEANOL. SINICA. 6(1):1-7. CHINA OCEAN PRESS, BEIJING. EN.

In the first part of our studies, the unified solutions of existing waves have been obtained by using the linear wave equations without making the assumptions of irrotation and hydrostatic pressure. In this paper, the second part of our studies, we shall devote to linear long wave equations without the assumption of hydrostatic pressure. All the solutions in the case of w=f are found. A set of solutions is also obtained, with a similarity to the unified solutions of the Sverdrup waves and the Poincare waves, but the corresponding waves represented by such a set have a different vertical structure of velocities. The set is not included in the solutions of linear long wave equations under the assumption of hydrostatic pressure and, therefore, is regarded as possible waves filtered out +.

87PH0307. J.R.LUYTEN, N.G.HOGG, H.M.STOMMEL. 1987(1). CLOSING THE OCEANIC CIRCULATION. DEEP-SEA RES. 34(1):55-60. PERGAMON PRESS, OXFORD. EN.

Two examples of circulation in a homogeneous ocean driven by balanced evaporation-precipitation & closed by a Fofonoff-type inertial current on the western side are given. The balances that obtain in the vorticity equation in different regions are discussed.

87PH0308. F.Y.SHAO, Z.W.YU. 1987(1). THE DISTRIBUTION OF SIGNIFICANT CREST HEIGHTS OF SEA WAVES. ACTA OCEANOL. SINICA. 6(1):46-54. CHINA OCEAN PRESS, BEIJING. EN.

Based on linear theory of sea waves, the height distribution of the intersections of wave surface with its envelope is derived. The distribution may be regarded as that of the significant crest heights under certain conditions. some properties of this distribution are discussed in analogy to maxima theory. Data are found to be in good agreement with the theoretical curve.

87PH0309. F.SUN. 1987(1). PROPAGATION AND TRANSFORMATION OF NON-LINEAR WAVES ON UNIFORMLY SLOPING BEACHES: (I) A SOLUTION FO+. ACTA OCEANOL. SINICA. 6(1):8-19. CHINA OCEAN PRESS, BEIJING. EN.

Two-dimensional non-linear hydrodynamical equations are solved by using perturbation method and treating slopping beaches as bottom boundary conditions so that a kind of solution for nonlinear progressing waves is obtained. The first order of approximation is the same potential function as used by Biesel, and the second order is calculated numerically. Based on the solution, wave characteristics before breaking, especially the wave set-down, are discussed. It turns out that for the whole course of waves propagating from deep to shallow waters the theory proposed in this paper has a wider valid range of application than others.

87PH0310. H.NISHIMURA, Y.NAKAMURA. 1987(10). A NEW METHOD OF ESTIMATING VERTICAL DIFFUSION COEFFICIENT. CONTINENTAL SHELF RES. 7(10):1245-1256. PERGAMON PRESS, OXFORD. EN.

A new method of estimating the vertical diffusion coefficient, in a coastal region is developed. This method does not require any knowledge of convection currents. The essence is to take an isopleth as a control surface. Taking mass balance for the volume bounded by the control surface and free surface, the diffusive flux through the isopleth should be equal to the net convective flux at a steady state. In a transient state where river flow rate changes, a similar approximate treatment can be possible. A rough estimation of the ratio of the horizontal and the vertical diffusions in Osaka Bay shows that most of the diffusive flux through the isopleth is vertical diffusion.

87PH0311. U.SCHAUER. 1987(10). DETERMINATION OF BOTTOM BOUNDARY LAYER PARAMETERS AT TWO SHALLOW SEA SITES USING THE PROFILE METHO+. CONTINENTAL SHELF RES. 7(10):1211-1230. PERGAMON PRESS, OXFORD. EN.

Time series of mean current profiles within 3.5 m of the bottom were obtained in two hydrographically different regions using a moored self-recording measuring device. The shear velocity, calculated by the profile method, reached maximum values of u = 6 cm/sec. Factors influencing the shape of the profile, like nonstationarity, bottom forms, and stratified suspended matter are discussed. Considering the different hydrography and morphology of the two sites it is concluded that suspended matter can account for a part of the profile deformation observed. The large roughness lengths and their relation to velocity can be explained by a modification of Prandtl's mixing length approach which is valid even for stationary unstratified flow.

87PH0312. INSIK.CHUN. 1987(12). WAVE-CURRENT INTERACTION. OCEAN RES. 9(1/2):45-50. KORDI., ANSAN. EN.

Wave-current interaction was theoretically investigated, devided into two modes, surface interaction and inner interaction. The application of the Stokes' method to the surface interaction indicated the nonlinear deviations of surface profile and water particle velocities from their raw values. For the inner interaction, the nonlinearity between waves and current was explained defining the eddy viscosity differently over the flow depth. And also three current approaches to define the eddy viscosity were examined and compared.

87PH0313. DONG-YOUNG.LEE. 1987(12). BOTTOM FRICTIONAL DISSIPATION OF IRREGULAR WAVES. OCEAN RES. 9(1/2):39-44. KORDI., ANSAN. EN.

As a wave train approaches the shore, it starts to feel the bottom and loses a portion of its energy due to bottom frictional dissipation. A method of estimation of wave energy dissipation rate has been suggested by linearizing bottom friction for irregular waves in shallow water. The bottom frictional dissipation estimated from the linearized friction method is about 1.5 times larger than that from Hasselmann and Collins' quasi-linearization method for a simple case of unidirectional wave train with no superimposed current. Utilizing this method the characteristics of bottom frictional dissipation are examined for irregular waves. The effects of current and non-Gaussian distribution of wave induced particle motion on the bottom frictional dissipation are also examined. The effects o+.

87PH0314. DONG-YOUNG.LEE. 1987(12). TRANSFORMATIONS OF WAVE NUMBER AND WAVE DIRECTION IN PLAIN COASTAL WATER. OCEAN RES. 9(1/2):35-37. KORDI., ANSAN. EN.

Wave number of the water wave varies with the propagation of a wave train in non-uniform water depth and current. The variations of the wave number and direction with the propagation of a wave train in parallel and straight bottom contours are shown to be composed of two components: one proportional to the depth gradient and the other proportional to the current gradient. The functional dependency of the relative rate of change of wave number on normalized depth gradient and current gradient and dimensionless depth and current is obtained and its characteristics are shown.

87PH0315. P.X.DING, Z.W.YU. 1987(4). PARTITION OF ENERGY FLUX OF PROGRESSIVE WAVES IN WATER OF ARBITRARY UNIFORM DEPTH. ACTA OCEANOL. SINICA. 6(2):161-168. CHINA OCEAN PRESS, BEIJING. EN.

The mean energy flux of progressive gravity waves of finite amplitude in water of arbitrary uniform depth is accurately partitioned by a relative simple method. It is comfirmed by calculation of the mean energy flux that the energy flux is chiefly due to the work done by the pressure forces of fluid. However, sometimes the energy fluxes caused by the kinetic energy and potential energy also possess fair percentage, and in the extreme case they may reach about 30% of the total energy flux. In this paper the error due to the commonly used small-amplitude theory being applied to the calculation of the energy flux is discussed in detail. In addition, the method of the energy flux partition is applicable to the

cases of both finite and infinite water depth, and it is far more simple and d+.

87PH0316. J.Y.HOLYER, T.J.JONES, M.G.PRIESTLEY, N.C.WILLIAMS. 1987(4). THE EFFECT OF VERTICAL TEMPERATURE AND SALINITY GRADIENTS ON DOUBLE-DIFFUSIVE INTERLEAVING. DEEP-SEA RES. 34(4):517-530. PERGAMON PRESS, OXFORD. EN.

Theoretical and experimental work has been carried out to understand the almost horizontal oceanic intrusions that occur at density-compensating fronts, and in particular how the layer separation and slope of the intrusions depend on the vertical concentration gradients of the two diffusing components. In the experiments salt and sugar were used as analogues of ocean temperature and salinity, respectively. Matching stable linear density distributions were set up on the two sides of a vertical barrier, with an excess of sugar on one side and salt on the other. When the barrier was removed interleaving motions formed spontaneously. A similar experiment was performed by Ruddick and Turner, but they assumed that the ensuing motion depended only on the total vertical density gradient and+.

87PH0317. T.BROWN. 1987(4). KELVIN WAVE REFLECTION AT AN OSCILLATING BOUNDARY WITH APPLICATIONS TO THE NORTH SEA. CONTINENTAL SHELF RES. 7(4):351-365. PERGAMON PRESS, OXFORD. EN.

A generalization is made to Taylor's North Sea model of Kelvin wave reflection in a closed semi-infinite channel. An oscillatory long-channel flow is introduced at the end boundary to simulate the effects of the Dover Strait or the Southern Bight. It is found that this flow makes a significant contribution to the amplitude and phase of the reflected Kelvin wave and thereby to the position of amphidromies, respectively, across and along the channel. solutions obtained are seen to describe the two amphidromies in the North Sea with closer agreement than Taylor's solution.

87PH0318. Z.W.YU, P.X.DING. 1987(7). SIMPLIFIED PROOF AND EXTENSION OF INTEGRAL PROPERTIES OF GRAVITY WAVES OF FINITE AMPLITUDE. ACTA OCEANOL. SINICA. 6(3):335-343. CHINA OCEAN PRESS, BEIJING. EN.

By means of a rather simple and direct method, this paper deduces the relations between the kinetic energy of waves and the horizontal momentum, and between different kinds of energies of waves, thus greatly simplifying the corresponding processes of deduction given by Starr and others. Furthermore, several important integral properties of two-dimensional, irrotational, periodic and permanent waves, which are generalized to the case with uniform current existing, the concept of wave excess is established, and some important integral properties of wave excess are deduced.

87PH0319. M.G.G.FOREMAN. 1987(7). AN ACCURACY ANALYSIS OF SELECTED FINITE DIFFERENCE METHODS FOR SHELF WAVES. CONTINENTAL SHELF RES. 7(7):773-803. PERGAMON PRESS, OXFORD. EN.

This paper compares the relative accuracy of five finite difference schemes for modeling barotropic shelf waves. One scheme assumes an Arakawa B lattice for the discrete variables while the other four assume an Arakawa C. Accuracy is measured by comparing numerical and analytic dispersion curves and cross-shelf amplitude profiles. The analysis is illustrated for typical depth profiles from the Australian, and Beaufort Sea shelves. Relative accuracy is found to vary with the particular shelf profile and both the cross-shelf and long-shelf resolution. The Arakawa-Lamb and Sadourny schemes are found to be slightly more accurate than the other C lattice schemes. For the Beaufort Sea profile and specific long-shelf wave-numbers, all schemes are shown to have a strong 2x(delta y) signal +.

87PH0320. D.A.SMEED. 1987(8). A LABORATORY MODEL OF BENTHIC FRONTS. DEEP-SEA RES. 34(8):1431-1459. PERGAMON PRESS, OXFORD. EN.

Experiments are described which model some features of anticyclonic eddies in the benthic boundary layer. Eddies were created in a two-layer stratified rotating fluid, by "squashing" a column of water in the centre of a tank on a rotating table. Ekman suction into the bottom boundary layer caused thinning of the lower layer in the core of the eddy. If the eddy was sufficiently strong, a "bare-spot" (i.e. a region over which the lower layer was no longer present) bounded by a front where the interface intersected the lower boundary was formed. These are similar to the "bare-spots" described by Linden and Van Heijst (1984, Journal of Fluid mechanics, 143, 69-94). Formation of a bare-spot reduced the time required for the spin-up of the upper layer.

87PH0321. J.M.HUTHNANCE. 1987(8). ALONG-SHELF EVOLUTION AND SEA LEVELS ACROSS THE CONTINENTAL SLOPE. CONTINENTAL SHELF RES. 7(8):957-974. PERGAMON PRESS, OXFORD. EN.

If wind-stress or a horizontal oceanic density gradient acts over an ocean basin with an adjacent continental shelf and slope, sea-surface slopes and currents are set up along the shelf and slope with a return flow in the ocean. The currents evolve from zero at blocked ends of the shelf and basin. Such evolution is essentially barotropic (even for baroclinic forcing) and is relevant to all flow adjustments after longshore changes of depth profile or forcing. The distance over which this evolution takes place is investigated analytically for simple geometries, and numerically for a range of shelf, slope and ocean widths, shelf/ocean depth ratios, frictional decay rates and oscillatory frequencies.

87PH0322. C.L.TANG, J.D.WOODS. 1987(9). STATISTICS OF UPPER OCEAN VARIABLES MEASURED BY DEPTH-CYCLING TOWED INSTRUMENTS. DEEP-SEA RES. 34(9):1579-1592. PERGAMON PRESS, OXFORD. EN.

Oceanographic data collected with depth-cycling towed instruments traveling along inclined sampling

tracks contain horizontal as well as vertical variations of the measured variables, and therefore cannot be treated exactly like vertical profiles in statistical analysis. In this paper, we develop a general method to estimate the measurement errors due to non-vertical sampling. In particular two statistical quantities, vertical wavenumber spectrum and probability distribution of isopycnal spacing, are considered. In an equilibrium internal wave field, non-vertical measurement has a negligible effect on the vertical wavenumber spectrum due to the very small root mean squared slope of the isopycnal surfaces relative to the slope of the sampling track.

87PH0323. N.PALDOR, P.D.KILLWORTH. 1987(9). INSTABILITIES OF A TWO-LAYER COUPLED FRONT. DEEP-SEA RES. 34(9):1525-1539. PERGAMON PRESS, OXFORD. EN.

We consider the linear instability of a two-layer fluid, whose mean state consists of a motionless lower layer and a surface layer confined between two parallel fronts. An inverted form occurs at many locations in the deep ocean, notably in the Denmark Strait overflow. Because of the vanishing surface layer depth, quasigeostrophy cannot hold, and primitive equations must be used. Two modes of long wave istability are found. The first, valid for intermediate values of the ratio of total fluid depth to surface layer depth, is analogous to a mode found for an isolated front in an otherwise similar geometry. The second mode is the extension to two layers of the mode already discovered for the same geometry but with an infinitely deep lower layer. Numerical extensions of these long wave+.

87PH0324. K.HORIKAWA. NEARSHORE CURRENT TREATMENTS AND THEIR APPLICATIONS TO ENGINEERING PROBLEMS. PROC. 4TH INT'L. CONF. PORT & OCEAN ENG. UNDER ARCTIC CONDITIONS. 84-114. PN-2602. EN.

87PH0325. K.HORIKAWA, T.SASAKI. 1972. FIELD OBSERVATIONS OF NEARSHORE CURRENT SYSTEM. COASTAL ENG. JAPAN. 15:113-125. JAPAN SOC. CIVIL ENG., TOKYO. PN-2637. EN.

The two systems based on the principle of photogrammetric surveying have been developed in order to accomplish the field observations of nearshore current system induced by waves, and were applied to the field investigations on the Shonan Coast, Kanagawa Prefecture Japan (Horikawa, Sasaki et al., 1970). The first is called as the Balloon Camera System and the second is the Synchronized Helicopter System. The main efforts were concentrated to the simultaneous observations of waves and current fields in and out the surf zone. Even though there still exist some difficulties to be overcome in applying the present systems, the validity and usefulness of these systems were demonstrated by the obtained data. In this paper are presented the details of the developed systems and a part of the a+.

87PH0326. E.WADDELL. 1973. A FIELD INVESTIGATION OF SWASH CHARACTERISTICS. COASTAL ENG. JAPAN. 16:61-71. JAPAN SOC. CIVIL ENG., TOKYO. PN-2639. EN.

In an effort to identify characteristics of swashes resulting from random waves breaking on a beach, a field investigation was conducted during which input wave and swash characteristics were continuously measured. Analysis of these data indicates that for a given subaerial beach slope, features of an uninterupted swash were uniquely determined by the height of the swash mass as it begins to move up the beach face. For the observed experimental conditions, the period of the uninterupted swashes consistently exceeded input wave periods so that collisions between successive swashes occurred. This interaction caused a shift of energy to lower frequencies across the break point. Nearshore standing waves adjacent to the beach were idcntified but the influence of these water level fluctuat+.

87PH0327. T.SASAKI, K.HORIKAWA. 1975. NEARSHORE CURRENT SYSTEM ON A GENTLY SLOPING BOTTOM. COASTAL ENG. JAPAN. 18:123-142. JAPAN SOC. CIVIL ENG., TOKYO. PN-2641. EN.

The authors found the existence of three domains on nearshore current systems by applying the surf similarity parameter (Iribarren No.) [Battjes (1974)] and the concept of infragravity waves [Suhayda (1974)]. The previous two theories [Bowen and Inman (1969), and Hino (1973)] can be applied to two of the three domains respectively, which correspond to steep and medium beaches. For the extra domain, there has been no theory, but from the analysis of field data, the authors are proposing a new hypothesis, the Infragravity Domain Hypothesis for it. From the many field observations of the velocity field taken by the BACS [Horikawa and Sasaki (1972)], several analysed results are presented.

87PH0328. T.SASAKI, K.HORIKAWA, S.HOTTA. 1976(7). NEARSHORE CURRENT ON A GENTLY SLOPING BEACH. PROC. 15TH COASTAL ENG. CONF., HONOLULU, HAWAII, JULY 11-17, 1976. 626-644. ASCE., N.Y. PN-2595. EN.

The authors developed a new field observation system called STEREOBACS by which simultaneous measurements of a spacial distribution on waves and currents in the nearshore environment can be obtained. This system was applyed on Ajigaura Beach, Japan, and several analyzed results are presented. Also field observations of infragravity low mode edge waves to support the Infragravity Domain Hypothesis on nearshore currents concerning a gently sloping beach [Sasaki (1974, 1975), Sasaki and Horikawa (1975)] are introduced.

87PH0329. M.MIZUGUCHI, K.HORIKAWA. 1976(7). PHYSICAL ASPECTS OF WAVE-INDUCED NEARSHORE CURRENT SYSTEM. PROC. 15TH COASTAL ENG. CONF., HONOLULU, HAWAII, JULY 11-17, 1976. 607-625. ASCE., N.Y. PN-2594. EN.

The wave-induced nearshore current system can be classified into two types; free type and forced type. In our laboratory experiment, we observed a kind of forced current system which is created by a periodic breaking wave height distribution caused by "cross wave".

Offshoreward currents always flow through the lower wave height region both inside and outside of a breaker line. When the surf zone was rather wide, we observed a double circulation pattern, where wave-current interaction might be important. According to our experimental results, we propose to consider that the observed current system in fields should be interpreted as the forced type current system where irregular bottom topography plays a crucial part.

87PH0330. K.MARUYAMA, K.HORIKAWA. 1977. GENERATION OF RIP CURRENTS IN A LABORATORY BASIN. COASTAL ENG. JAPAN. 20:129-145. JAPAN SOC. CIVIL ENG., TOKYO. PN-2642. EN.

A rip current observed in a nearshore area is an extremely complex phenomenon. In order to understand the generation mechanism of rip current, laboratory experiments were performed. Rip currents were observed in a model basin with a smooth wooden slope installed opposite to a wavemaker, and the velocity and wave height fields were measured simultaneously. Numerical simulations were also made and compared with the experimental data. The results, although made by neglecting nonlinear and diffusive terms, agreed well to the observed flow patterns. In this limited experiment, the dominant factor for generation of rip currents is not the edge waves. In a rectangular wave basin with a reflective wall installed opposite to the waves. In a rectangular wave basin with a reflective wall inst+.

87PH0331. M.C.LIN, K.HORIKAWA. 1978. A MODEL OF LONGSHORE DISPERSION IN THE SURF ZONE WITH ALONGSHORE CURRENT SYSTEM. COASTAL ENG. JAPAN. 21:143-155. JAPAN SOC. CIVIL ENG., TOKYO. PN-2643. EN.

A model of longshore dispersion in the surf zone is presented in this paper. This model is based on the assumptions that the surf zone can be considered as an open channel with a triangular cross section and that the lateral variation of longshore current is the primary cause of alongshore dispersion in the surf zone. The rip current effects are ignored in the present treatment. The model is compared with field and laboratory investigation data. Reasonably good agreement is found.

87PH0332. K.HORIKAWA, M.C.LIN, T.O.SASAKI. 1978. MIXING OF HEATED WATER DISCHARGED IN THE SURF ZONE. PROC. 16TH COASTAL ENG. CONF. ASCE. 2563-2583. ASCE., N.Y. PN-2598. EN.

In this paper, a description is given on the mixing processes of heated water discharged into the surf zone, based on the field investigations. In accordance with the flow characteristics observed, the flow region can be classified into three parts, namely the jet flow region, nearshore current region and coastal current region. In the jet flow region, the flow characteristics are expressed well by the two dimensional turbulent jet flow model and strongly influenced by the cuspate bottom configuration formed under the interaction between the jet flow and nearshore currents. It is realized that the dacay of plume centerline temperature is slower than the other cases owing to the influence of bottom slope, water depth and the direction of jet axis. By the dye tracer studies, in the nea+.

87PH0333. H.NISHIMURA, A.WATANABE, K.HORIKAWA. 1978. SCOURING AT THE TOE OF A SEAWALL DUE TO TSUNAMIS. PROC. 16TH COASTAL ENG. CONF. ASCE. 2540-2547. ASCE., N.Y. PN-2601. EN.

In this paper, the general features and mechanism of scouring at the toe of a seawall due to tsunami invasion are discussed based upon the results of two-dimensional experiments. The effects of the various slopes, bed material, water depth and wave conditions are separately investigated. After some consideration of the scouring mechanism, a critical condition for the occurrence of scouring is given in terms of two important parameters, namely, the rate of return flow from the land and water layer thickness in front of the seawall. These findings lend perspective towards the quantitative prediction of the total amount and pattern of scouring.

87PH0334. T.O.SASAKI, K.HORIKAWA. 1978. OBSERVATION OF NEARSHORE CURRENT AND EDGE WAVES. PROC. 16TH COASTAL ENG. CONF. ASCE. 791-809. ASCE., N.Y. PN-2603. EN.

Nodal lines normal to the shoreline of infragravity low mode edge waves in the nearshore zone were observed with eleven wave staffs simultaneously with the nearshore current spatial velocity field on a gently sloping beach. About five peaks were found in the energy spectrum and their frequencies agreed well with cut-off mode edge waves [Huntley(1976)]. Based on the above observation, conceptual models of nearshore current patterns for the infragravity domain are proposed and general current patterns for the three domains are discussed by combining the horizontal patterns of Harris (1969) and the vertical patterns of Sasaki et al. (1976).

87PH0335. M.MIZUGUCHI, K.HORIKAWA. 1978(12). EXPERIMENTAL STUDY ON LONGSHORE CURRENT VELOCITY DISTRIBUTION. BULL. FAC. SCI. & ENG., CHUO UNIV. 21:123-150. CHUO UNIV. PN-2579. EN.

87PH0336. M.C.LIN, K.HORIKAWA. 1979. A MODEL FOR LONGSHORE DISPERSION IN THE NEARSHORE CURRENT SYSTEM. COASTAL ENG. JAPAN. 22:91-103. JAPAN SOC. CIVIL ENG., TOKYO. PN-2644. EN.

Longshore dispersion in the surf zone, where nearshore currents in particular meandering currents exist, is treated theoretically in this paper. As a result of this treatment, a formula of a longshore dispersion coefficient is proposed under the assumption that the nearshore corss-section is well expressed by a right-angled triangle. The results of laboratory investigation verify that the proposed formula gives reasonably well magnitude of the longshore dispersion coefficient.

87PH0337. K.HORIKAWA, S.HARIKAI, N.C.KRAUS. 1979(6). A PHYSICAL AND NUMERICAL MODELING

OF WAVES, CURRENTS AND SEDIMENT TRANSPORT NEAR A BREAKWATER. ANN. REP. ENG. RES. INST., UNIV. TOKYO. 38:41-48. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2580. EN.

Structures sited on beaches can produce significant changes in the surrounding beach planform. This paper presents results of a physical and numerical modeling of the waves, currents and sediment movement near a breakwater. It was found that the currents associated with the structure have an appreciable effect on the sediment transport, and it is concluded that numerical models must be improved to account for the current-sediment interaction.

87PH0338. K.HORIKAWA, M.ISOBE. 1980. DYNAMIC CHARACTERISTICS IN THE NEARSHORE AREA. PROC. 17TH COASTAL ENG. CONF. MARCH 23-28, 1980, SYDNEY, AUSTRALIA. 480-498. ASCE., N.Y. PN-2646. EN.

A detailed discussion is made on the dynamic characteristics of waves and wave-induced currents in the nearshore area by using the laboratory and field investigation data collected during the last few years. The main purposes of this paper are to get the insight on the precise mechanism of the nearshore dynamic phenomena and to evaluate critically the applicability of the various assumptions commonly applied by the previous researchers.

87PH0339. SUN-DUCK.CHANG, JONG-SUB.LEE, KYEONG-HWA.HAN. 1980(12). TRANSPORT AND DIFFUSION OF POLLUTANTS IN THE COASTAL WATERS OF ONSAN INDUSTRIAL COMPLEX. BULL. KOREAN FISH. SOC. 13(4):151-162. KOREAN FISH. SOC., PUSAN. KO.

To clarify the dispersion of pollutants introduced in the coastal region, a series of current measurements, the drogue and drift bottle experiments as well as the dye diffusion experiments were carried out in Onsan Bay and in the coastal waters of Ubong-ri near Ulsan. In the southeastern coastal region of Korean peninsula, that is, in the outside of Onsan Bay, the flood tidal current flows south-south-westward, and the ebb current flows north-north-eastward at a maximum speed of 1.0-1.1 knots at spring tide. In an inlet south of Cape Ubong, an anticyclonic eddy of 1 km in diameter is usually formed during both flood and ebb flows.

87PH0340. D.PRANDLE. 1984. EFFLUENT DISPERSAL IN EUROPEAN COASTAL WATERS. 19TH COASTAL ENGIN. CONF. PROC., ASCE/SEPT. 3-7, 1984, HOUSTON, TEXAS. 3094-3108. PN-2932. EN.

The mixing of dissolved material discharged from the Windscale nuclear re-processing plant is examined. The first phase involves a numerical modelling study of large-scale long-term mixing over the entire Continental Shelf. The second phase involves a similar modelling study of near-source mixing processes over a region some 100 km square immediately adjacent to the discharge position. In this latter phase, reproduction of instantaneous peak concentrations is required. The first phase of this simulation has been successfully completed while the second phase is presently being considered. Ironically, it is shown that this second phase poses far more difficult modelling problems and hence the accuracy of simulation attained in the first phase may not be reproduced. The contrasts in t+.

87PH0341. T.IZUMIYA, K.HORIKAWA. 1984. WAVE ENERGY EQUATION APPLICABLE IN AND OUTSIDE THE SURF ZONE. COASTAL ENG. JAPAN. 27:119-137. JAPAN SOC. CIVIL ENG., TOKYO. PN-2655. EN.

A wave energy equation is developed to evaluate the energy of waves propagating over an irregular bottom. The model equation includes energy dissipation caused both by wave breaking and bottom friction. coefficients appearing in the model equation are evaluated based on laboratory experiments expressly performed for this work. The calibrated model is checked against the laboratory results for quantities such as the energy flux, wave energy, wave set-up and set-down, and the longshore current velocity. All calculations show reasonable agreements with the measurements. It is concluded that the model is applicable to complex bottom topographies and is superior to standard treatments using a Miche-type limiting wave condition.

87PH0342. J.C.J.NIHOUL, J.H.HECQ. 1984. INFLUENCE OF THE RESIDUAL CIRCULATION ON THE PHYSICO-CHEMICAL CHARACTERISTICS OF WATER MASSES AND +. CONTINENTAL SHELF RES. 3(2):167-174. PERGAMON PRESS, OXFORD. EN.

Classical models of the residual circulation in the North Sea predict a north-bound residual flow in the Southern Bight. A more refined model, taking into account the mesoscale Reynolds stress exerted in the mean on the redidual flow by the non-linear interactions of mesoscale processes (tides, storm surgres, etc.), shows on the contrary off the Belgian coast a south-bound coastal current in relation with a residual coastal gyre. Observations of the physico-chemical characteristics of coastal waters confirm the existence of the gyre. The dynamics of coastal ecosystems here are found to be determined by the gyre; successive stages of the pelagic food chain displaying a typical spatial distribution along the deflected plume of the Scheldt estuary around the gyre 'outer-lagoon'.

87PH0343. H.W.OU, L.MAAS. 1986. TIDAL-INDUCED BUOYANCY FLUX AND MEAN TRANSVERSE CIRCULATION. CONTINENTAL SHELF RES. 5(6):611-628. PERGAMON PRESS, OXFORD. EN.

A weakly nonlinear model is used to examine the mean transverse circulation (crossisobath) driven by tidal-induced buoyancy flux. The mean Eulerian flows driven by both the barotropic and baroclinic tide are presented for a semi-infinite wedge. The mean flow driven by the barotropic tide is significant only near the apex where the thickness of the frictional boundary layer is comparable to the water depth. The model predicts a mean offshore flow near the bottom while higher up in the water column the mean flow direction is less definite due to the contribution from different tidal components. The model results are consistent with

some current measurements over the Georges Bank.

87PH0344. D.G.BOWERS, J.H.SIMPSON. 1987. MEAN POSITION OF TIDAL FRONTS IN EUROPEAN-SHELF SEAS. CONTINENTAL SHELF RES. 7(1):35-44. PERGAMON PRESS, OXFORD. EN.

Different theoretical approaches to the stirring mechanism lead to the proposition that tidal fronts should lie parallel to contours of h/n-th power of u, where the exponent n varies from 3/4 to 3 according to the theory chosen. The geographical contours of the different parameters are almost parallel, which makes it difficult to distinguish between the theories by comparison with observation. In this paper, we have taken as large a data set as possible from European-shelf seas to try to determine the most appropriate mixing theory.

87PH0345. M.J.FURNAS, T.J.SMAYDA. 1987. INPUTS OF SUBTHERMOCLINE WATERS AND NITRATE ONTO THE CAMPECHE BANK. CONTINENTAL SHELF RES. 7(2):161-175. PERGAMON PRESS, OXFORD. EN.

Geostrophic tilting of isopycnal surfaces in the Yucatan Current raises the thermocline and nitrate nutricline (approximately the 22 Deg. in Centigrade surface) above the level of the shelf break along the eastern margin of the Campeche Bank. Along the northern and western margins of the bank, these features lie 20-30 m below the shelf break. Cool nitrate-rich water can move laterally from the Yucatan Current along isopycnal surfaces beneath the thermocline onto the Campeche Bank. Drogues launched on the bank moved westward, corroborating transport away from the Yucatan Current. Near-bottom water on the bank is denser than water at similar depths in the Gulf of Mexico and Campeche Gulf.

87PH0346. GAB-DONG.YOON. 1975(3). THE SEA NOISE OF THE MOVING TRAWL NET. BULL. KOREAN FISH. SOC. 8(1):1-6. KOREAN FISH. SOC., PUSAN. KO.

The sea noise of moving trawl net was recorded by an underwater tape recorder which was set wireless, and was analyzed by a sound level meter and an octave-band analyzer. The frequency distribution of sea noise of the moving otter trawl net ranged from DC to 5000 Hz, and the dominant frequency zone ranged from 500 Hz to 700 Hz, and the maximum sound pressure is about 22 dB at the otter trawl net. The main sound source of the sea noise from the moving trawl net was found to be sea noise due to the resistance of the ground rope against the sea bottom.

87PH0347. JUNG-HEE.PARK. 1977(12). UNDERWATER DISTRIBUTION OF VESSEL NOISE. BULL. KOREAN FISH. SOC. 10(4):227-235. KOREAN FISH. SOC., PUSAN. KO.

The noise pressure scattered underwater on account of the engine revolution of a pole and liner, Kwan-Ak-San (G.T. 234.96), was measured on the 28th of July, 1977. The noise pressure passed through each observation point (Nos. 1 to 5), which was established at every 10 m distance at circumference of outside hull was recorded when the vessel was cruising and drifted. In case of drifting, the revolution of engine was fixed at 600 r.p.m. and the noise was recorded at every 10 m distance apart from observation point No. 3 in both horizontal and vertical directions with 90 Deg. toward the stern-bow line. In case of cruising, the engine was kept in a full speed at 700 r.p.m. and the sounds passed through underwater in 1 m depth were also recorded while the vessel moved back and forth.

87PH0348. JUNG-HEE.PARK. 1978(9). THE PROPAGATION LOSS OF THE VESSEL NOISE ON THE SEA. BULL. KOREAN FISH. SOC. 11(3):159-163. KOREAN FISH. SOC., PUSAN. KO.

This experiment was performed on the sea of lat 33 Deg. 47 minute N, long 127 Deg. 34 minute E from August 16 through 23, 1978. When the noises of a motor siren, a for horn and the engines which are installed on the Kwan-Ak San vessel propagate, the results which were investigated on the reduction of the sound-pressures in accordance with the distance runs as follows. The reduction of the sound-pressure propagation from a motor siren (116 dB) and a fog horn (114 dB) was 82, 80 dB at the distance of 50 m from the sound-source since the sound-pressure was reduced in the way of 18, 11, 3, and 1 dB by increasing every 10 m from the sound-source. When the vessel noise was 82 dB, the sound-pressure at the point of 1,200 m it became 55 dB by reducing 22, 3 and 2 dB as the distance increases +.

87PH0349. J.CHANG, M.ABE, C.KIM, K.KIDO. 1980(12). DIRECTIVE HARMONIC WAVE DETECTING SYSTEM USING LINEAR MICROPHONE ARRAY. BULL. KOREAN FISH. SOC. 13(4):145-149. KOREAN FISH. SOC., PUSAN. KO.

Various methods have been so far proposed to find out the directions and spectra of sound waves from the sources for provisions of noise controls. The conventional methods are generally classified into three systems such as, single microphone system, moving microphone system and multi-microphone sytem, which composes a resultant super directivity by giving a appropriate delay and a weighting coefficient in the output of each microphone.

87PH0350. YONG-RHIM.YANG. 1980(9). OPTICAL PROPERTIES OF SEA WATER IN THE FISHING GROUND OF ANCHOVY. BULL. KOREAN FISH. SOC. 13(3):95-101. KOREAN FISH. SOC., PUSAN. KO.

Optical properties were studied at the fishing ground of anchovy in the southern part of Korea based on seven oceanographic stations from May to August and November. to December, 1977. Submarine daylight intensity was measured at intervals of 1 m depth in the upper 30 m layer by the underwater luxmeter (Toshiba #9). The absorption coefficient of the sea water ranged from 0.066 to 0.619 (mean 0.21) for six months. The transparency ranged from 2.6 to 16 meters (mean 8.4 m). The relationship between absorption coefficient (k) and transparency (D) was k=1.70/D. The mean water color in this area was 4.8 (3-10) in Forel scales.

87PH0351. R.H.ZHANG, ET AL. 1982(12).

MULTIPATH STRUCTURES OF SIGNAL WAVEFORMS IN SHALLOW WATER WITH THERMOCLINE. ACTA OCEANOL. SINICA. 1(2):163-174. CHINA OCEAN PRESS, BEIJING. EN.

It has been observed experimentally that the signal waveforms in shallow water with thermocline have regular multipath structures and the waveforms of received signals are strongly dependent on the depths of the source and the receiver. When both the source and the receiver are located above the thermocline, each signal received consists of a train of almost equispaced wave-packets. These observed regularities of waveforms may be used for monitoring the fluctuation of the thermocline in shallow water.

87PH0352. D.H.GUAN. 1982(6). RELATION BETWEEN SOUND FIELD AND BOTTOM-REFLECTION LOSS. ACTA OCEANOL. SINICA. 1(1):58-61. CHINA OCEAN PRESS, BEIJING. EN.

87PH0353. E.C.SHANG. 1982(6). EFFECTS OF BOUNDARY REFLECTION LOSS ON NOISE FIELD. ACTA OCEANOL. SINICA. 1(1):47-57. CHINA OCEAN PRESS, BEIJING. EN.

The effects of boundary reflection loss, scattering loss caused by the rough surface and the radiative directivity of the surface sources (parameter m) on the ambient noise field in shallow-water homogeneous layer have been discussed theoretically. It has been found that the parameter m has the stronger controlling role on the behavior of the ambient noise field than others.

87PH0354. Z.Y.ZHOU, J.C.DU, G.C.ZHAO, X.Z.ZHANG. 1984(1). VERTICAL DISTRIBUTIONS OF SOUND VELOCITY IN SEA FLOOR MEASURED IN SOUTH CHINA SEA AND HUANGHAI SEA. ACTA OCEANOL. SINICA. 3(1):13-25. CHINA OCEAN PRESS, BEIJING. EN.

This paper presents the vertical distribution of sound velocity in the first few ten meters of the sea floor measured in the South China Sea (12 stations) and the Huanghai Sea (2 stations) by reflection and refraction methods. The apparent characters of the sediment samples and the velocities estimated from the sample porosities by Anderson's empirical equation basically coincide with the measured velocity structures. A new method called "total reflected ray method" has been used to interpret the reflection data.

87PH0355. R.H.HANG, L.MENG, X.C.WANG, W.X.CHEN. 1984(10). SPECIAL FEATURE OF UNDERWATER AMBIENT NOISE IN NORTHERN HUANGHAI SEA AND ITS DEPENDENCE ON WIND SP+. ACTA OCEANOL. SINICA. 3(4):462-470. CHINA OCEAN PRESS, BEIJING. EN.

The local special feature of underwater ambient noise in the northern Huanghai sea has been investigated. The results obtained from the analysis of data measured for six days and nights have shown that the time-varying characterization of ambient noise spectrum level is remarkable and its fluctuation at every analyzed frequency band presents an equiform periodicity varying with time synchronously. The dependence of average ambient sea noise spectrum level on logarithmic wind speed within the middle range (16-30 knot) appears in "V" form.

87PH0356. B.X.ZHU. 1984(4). INFLUENCE OF SEDIMENT SOUND VELOCITY ON TIME-FREQUENCY CHARACTERISTICS OF THE SIGNAL IN THE DEEP S+. ACTA OCEANOL. SINICA. 3(2):161-171. CHINA OCEAN PRESS, BEIJING. EN.

This paper uses acoustical method to obtain the sound speed structure information of the deep sea sediment. The time-frequency characteristics of the explosive sound signals in the deep sea are analysed by using the narrow-band filters, and the bottom-reflecting path and bottom-refracting path are separated in time domain. Based on the two kinds of selected bottom models the travel-time difference between the two paths mentioned above is calculated according to the ray theory, and simple analytical formulae are obtained. The bottom model, which is more suitable for the experimental area, is identified by comparing the theoretical with experimental travel-time differences versus range.

87PH0357. S.A.THORPE, A.J.HALL, A.R.PACKWOOD, A.R.STUBBS. 1985. THE USE OF A TOWED SIDE-SCAN SONAR TO INVESTIGATE PROCESSES NEAR THE SEA SURFACE. CONTINENTAL SHELF RES. 4(5):597-607. PERGAMON PRESS, OXFORD. EN.

Side-scan sonars directed upwards from beneath the sea surface have been towed in waters off the west coast of Scotland. The sonographs show echoes from targets identified as subsurface bubble clouds produced by breaking wind-waves. In some conditions organised patterns are seen in the bubble clouds and, in particular, bubbles are accumulated in parallel rows by the effect of Langmuir circulations. The sonar is useful as a diagnostic tool to recognise and quantify these dynamical processes in the upper ocean boundary layer.

87PH0358. S.L.JIANG, E.C.SHANG. 1985(7). THE BOTTOM REFLECTION OF CONTINENTAL SHELF. ACTA OCEANOL. SINICA. 4(3):359-373. CHINA OCEAN PRESS, BEIJING. EN.

This paper analyses the seabed reflection coefficient of the "geoacoustic model" of continental terrace in shallow water, which includes two kinds of parametres: the "type parameters" and the "structure parameters". For small grazing angle, the "structure parameters" become nonsensitive in a certain band of sound frequency and the reflection coefficient is determined by the "type parameters". However, the former are sensitive for "low sound speed" sea floors. For large grazing angle, the "structure parameters" affect sound reflection character greatly.

87PH0359. J.Z.GONG. 1986(7). ATTENUATION OF SOUND WAVE IN LIQUID WITH SURFICIAL SEDIMENT OF OCEAN. ACTA OCEANOL. SINICA. 5(3):355-361. CHINA OCEAN PRESS, BEIJING. EN.

The propagation attenuation of sound wave in liquid with the surficial sediment of ocean is discussed.

Considering suspended particles in the shape of nonspheroid, we have improved the theory on sound attenuation and compared the theoretical values with the measured ones. The results indicate that the theory modified is in stricter accordance with the actual situation.

87PH0360. Y.X.LI, Y.H.YANG, Z.K.LI, Z.K.DONG. 1987(1). AN EXPERIMENTAL STUDY OF DEEP SCATTERING LAYER IN THE SOUTH CHINA SEA. ACTA OCEANOL. SINICA. 6(1):64-67. CHINA OCEAN PRESS, BEIJING. EN.

Discussed in this paper is the deep scattering layer (DSL) observed during the experiment in the South China Sea in October 1983. The authors have investigated the acoustic characteristics of the DSL, such as the volume scattering strength of the water column, the thickness of the layer and the coefficient of the backscattering. Resonant scattering, presumably caused by the swimbladder of fishes, is responsible for the bulk of observed reverberation. In addition, the size of the swimbladder forming the acoustic scatter of the DSL is also estimated.

87PH0361. YONG-RHIM.YANG. 1987(3). OPTICAL PROPERTIES OF SEA WATER IN SAGAMI BAY, JAPAN. BULL. KOREAN FISH. SOC. 20(2):119-125. KOREAN FISH. SOC., PUSAN. KO.

Optical properties of sea water were studied in the Sagami bay, Japan, based on the data obtained from six oceanographic stations in June, 1985. The rates of light penetration for eight kind of wavelenths (378, 422, 481, 513, 570, 621, 653, 677 mm) were computed with reference to the surface light intensity respectively. The mean rate of light penetration in proportion to depths were 77.93% (52.52-94.06%) in 1 m layer, 35.46% (4.00-73.64%) in 5 m layer, 18.71% (0.24-54.23%) in 10 m layer and 7.00% (0.007-27.58%) in 20 m layer. The rate of light penetration at the transparency layer with reference to the surface light intensity was shown as 13.02% (0.42-34.78%).

87PH0362. Y.SUN. 1987(4). ACOUSTIC SCATTERING MEASUREMENT OF FISH. ACTA OCEANOL. SINICA. 6(2):266-272. CHINA OCEAN PRESS, BEIJING. EN.

The method of acoustic backscattering measurement from different parts of fish using the focus array of transducer developed recently is described in this paper. The results of the measurements of several kinds of fish are given in this paper, indicating that the backscattering from fish is closely relative to the anatomy of fish. Its application in forming backscattering model of fish and that in using this model to obtain the information of fish kinds by the echoes from fish sonar are discussed.

87PH0363. D.A.SIEGEL, T.D.DICKEY. 1987(4). OBSERVATIONS OF THE VERTICAL STRUCTURE OF THE DIFFUSE ATTENUATION COEFFICIENT SPECTRUM. DEEP-SEA RES. 34(4):547-563. PERGAMON PRESS, OXFORD. EN.

Profiles of the diffuse attenuation coefficient spectrum for downwelling spectral irradiance (K (z,n)) were determined using data taken during the autumn of 1982 in the eastern North Pacific Ocean as part of the Optical Dynamics Experiment (ODEX). The near-surface K (5m,n) was consistent with Jerlov water types IA or IB and did not show any significant variations with sun altitude angle or cloud amount, supporting the notion that K (z,n) is a "quasi-inherent" optical property. Vertical profiles of K (z,n) showed significant structures with amplitudes that decrease with increasing wavelength. The observed depth-wavelength distribution may be divided into a blue-green group (400-500 nm) with a vertical structure similar to the vertical distribution of chlorophyll pigments and a green-yell+.

87PH0364. A.KANEKO. 1987(8). A NUMERICAL APPROACH TO ACOUSTIC IMAGING OF SMALL-SCALE OCEANIC FEATURES. DEEP-SEA RES. 34(8):1379-1398. PERGAMON PRESS, OXFORD. EN.

The computer simulation of an arrayed acoustic source and receiver system can image patchy structures of bubbles spread over a wide space through the reconstruction of scattering signals to each receiver. The imaging of bubble-patches has succeeded when modulated signals from bubble-patches are processed. The spatial resolutions of the acoustic system depend not only on the ping width of a sound pulse radiated from the source, but also on the time width of the modulated scattering signals and the aperture width of the arrayed receiver. Patchy structures of microscale turbulence and organisms existing in thermocline, internal waves and fronts, deep scattering layers and fish schools should be the best targets for this acoustic imaging system.

87PH0365. SEONG-RYUL.KIM, ET AL. 1987(9). DIGITAL PROCESSING AND ACOUSTIC BACKSCATTERING CHARACTERISTICS ON THE SEAFLOOR IMAGE BY SIDE SCAN +. J. OCEANOL. SOC. KOREA. 22(3):143-152. OCEANOL. SOC. KOREA, SEOUL. KO.

The digital data were obtained using Kennedy 9000 magnetic tape deck which was connected to the SMS 960 side scan sonar during the field operations. The data of three consecutive survey tracks near Seongsan-po, Cheju were used for the development of this study. The softwares were mainly written in Fortran-77 using VAX 11/780 mini-computer. The established mapping system consists of the pretreatment and the digital processing of seafloor image data. The pretreatment was necessary because the raw digital data format of the field magnetic tapes was not compatible to the VAX system. Therefore the raw data were read by the personal computer using the Assembler language and the data format was converted to IBM compatible, and next data were communicated to the VAX system. The digital pro+.

87PH0366. YEUNG-HO.PARK, ET AL. 1980(6). STUDIES ON THE UTILIZATON OF ANTARCTIC KRILL, 3. PROCESSING AND QUALITY EVALUATION OF SALTED AND F+. BULL. KOREAN FISH. SOC. 13(2):81-87. KOREAN FISH. SOC.,

PUSAN. KO.

As a part of the experiments on the utilization of krill, Euphausia superba, general composition, pH, volatile basic nitrogen, amino-N, and free individual amino acid were analyzed for investigating the processing condition and quality factors in the salted and fermented krill. The results ascertained were shown that the proper concentration of salt was 22-27% and addition of 3.9-5.9% of ethyl alcohol contributed to improve flavor and appearance of the salted and fermented krill. The amino-N of the salted and fermented krill showed a rapid increase as much as 3.2 times that of fresh krill.

87PH0367. YONG-RHIM.YANG. 1977(12). OPTICAL PROPERTIES OF SEA WATER IN THE NORTHWEST PACIFIC. BULL. KOREAN FISH. SOC. 10(4):237-241. KOREAN FISH. SOC., PUSAN. KO.

Optical properties were studied in the Northwest Pacific near Kamchatka Peninsula based on ten oceanographic stations from September 20 to 24, 1976. Submarine light intensity was measured by using a submarine illuminometer; equipped with a red filter. Light intensity in the upper 40 m depth layer was measured at 1 m depth intervals. The absorption coefficient for red color in the area ranged from 0.178 to 0.376 (mean 0.278): the Secchi-disc depth in the area ranged from 9 to 12 meters (mean 10.6 meters). The relationship between absorption coefficient (m) and transparency depth (D) was m=3.347/D.

87PH0368. YONG-RHIM.YANG. 1977(9). OPTICAL PROPERTIES OF SEA WATER IN THE JAPAN SEA. BULL. KOREAN FISH. SOC. 10(3):173-177. KOREAN FISH. SOC., PUSAN. KO.

Optical properties were studied in the Japan Sea based on the optical observations in nine oceanographic stations from September 28 to October 2, 1976. Submarine light intensity was measured by using a submarine illuminometer;equipped with a filter. In the upper 40 m depth layer light intensity was measured at 1 m depth interval. The absorption coefficient for red color in the area ranged from 0.142 to 0.323 (mean 0.232); the Secchi-disc depth in the area ranged from 15 to 23 meters (mean 19.8 meters). The relationship between absorption coefficient (m) and transparency depth (D) was m=4.93/D.

87PH0369. I.DAGNINO, G.FLOCCHINI, V.PASQUALE, V.SCIARRONE. 1985(4). SOLAR RADIATION MEASUREMENTS AT EGADI ISLANDS. BOLL. DI OCEANOL. TEORICA ED APPLICATA. 3(2):153-162. OSS. GEO. SPE., TRIESTE. PN-2539. EN.

The results of the solar radiation (0.29-2.80 u) measurements made on July 30th and 31st and August 1st during the 1983 oceanographic curise in the Egadi Island zone are illustrated. The direct and global solar radiation intensity variations are explained in the light of the synoptic situation.

87PH0370. E.G.MITCHELSON, N.J.JACOB, J.H.SIMPSON. 1986. OCEAN COLOUR ALGORITHMS FROM THE CASE 2 WATERS OF THE IRISH SEA IN COMPARISON TO ALGORITHMS FROM C+. CONTINENTAL SHELF RES. 5(3):403-415. PERGAMON PRESS, OXFORD. EN.

In situ measurements of upwelling irradiance were made using a four-channel submersible irradiance meter with similar optical characteristics to the visible channels of the Coastal Zone Color Scanner (CZCS). Concentrations of total pigments, yellow substance and total seston were sampled in parallel with the optical data. Sea-truth data were collected in the Irish Sea, which is considered to be Case 2 waters and, for comparison, in Case 1 waters off the west coast of Scotland, and off the Isles of Ushant, Brittany. Analyses showed that pigment concentration is the dominant factor affecting the colour ratios of upwelling irradiances.

87PH0371. A.MOREL. 1987(7). CHLOROPHYLL-SPECIFIC SCATTERING COEFFICIENT OF PHYTOPLANKTON. A SIMPLIFIED THEORETICAL APPROACH. DEEP-SEA RES. 34(7):1093-1105. PERGAMON PRESS, OXFORD. EN.

When studying the links between the optical properties of a water body and its phytoplankton content, it is convenient to use and necessary to study the "chlorophyll-specific" absorption and scattering coefficients for algae, respectively, a and b. While a is beginning to be well documented, little information is available on b and its possible variations from one species to another. This paper deals with the chlorophyll-specific scattering coefficient, and presents a simple theoretical treatment developed with a view to explaining the possible changes of b with the size of the algal cells and their intracellular chlorophyll concentration. In spite of its simplified character, this approach accounts for the unexpectedly large variations in b, as observed for algae grown in culture. T+.

87PH0372. JUNG-HEE.PARK. 1975(9). EFFECT OF THE SHIP NOISE ON THE INTELLIGENCE ABILITY OF MAN. BULL. KOREAN FISH. SOC. 8(3):127-132. KOREAN FISH. SOC., PUSAN. KO.

This is an experimental study that aimed to find out a possible relationships between the noise of the ship and the intelligent quotient, and the creativity of the crew member during June 5, to August 24, 1975.

87PH0373. TONG-KI.KIM. 1978(9). THE SUPERPOSED STRESS CONCENTRATION FACTOR OF THE HOLE WITH V NOTCH ON LONG INFINITE PLATE. BULL. KOREAN FISH. SOC. 11(3):165-169. KOREAN FISH. SOC., PUSAN. KO.

Given the tension on the long-infinite plate getting V notches superposed on the hold, the results may be abstracted as follows. The larger the values of r/l and u/r are, the larger grows the superposed stress concentration factor. The slope of u/r vs. alpha increases gradually, without regard to the value of outernal condition, when parameter is increased. When the angle of u/r=sine theta is varied from 5 Deg. to 60 Deg. between r/l=1/10 and r/l=1/4, the maximum stress concentration factor is about 3.8 and the minimum stress concentration factor about 1.5.

87PH0374. T.F.BAKER. 1984. TIDAL DEFORMATIONS OF THE EARTH. SCI. PROG., OXFORD. 69:197-233. BLACKWELL SCI. PUB., OXFORD. PN-2689. EN.

The recent advances in our understanding of the Earth's body tide and the deformation of the Earth due to the surface loading by the ocean tides are reviewed. Some of the instruments that are used to measure these tidal movements are described, together with the experimental accuracies that are now being achieved. Recent work on testing the latest body and ocean load tide models using tidal gravity measurements is discussed. Tidal tilt and strain measurements can be used for investigating the structure and rheology of the crust and upper mantle and some of the recent results are examined. In earthquake fault zones, time varying tidal amplitudes and phases are being used to look for changes in rheology with the build up of tectonic stress.

87PH0375. J.A.QUIBLIER. 1984(3). A NEW THREE-DIMENSIONAL MODELING TECHNIQUE FOR STUDYING POROUS MEDIA. J. COLLOID & INTERFACE SCI. 98(1):84-102. ACADEMIC PRESS, N.Y. PN-2671. EN.

A Great deal of research has been done on the relationships between the structure of porous media on the microscopic level and their overall properties. A short bibliographic survey is attempted, with special attention being paid to the use of models. the limitations of such research are outlined. A three-dimensional simulation process is proposed. On the basis of measurements of characteristics using thin sections of porous media, the aim is to simulate, through a random process, a porous medium which is at the same time geometrically realistic and fully determined (i.e., the coordinates of a point in the medium fully determine whether this point belongs to the matrix or to the pores). Simulation opens the way to further studies of the porous medium, some of which are outlined. It +.

87PH0376. R.H.BROWN. 1985. ELLIPSOIDAL GEOMETRY IN ASTEROID THERMAL MODELS: THE STANDARD RADIOMETRIC MODEL. ICARUS. 64:53-63. ACADEMIC PRESS, N.Y. PN-2842. EN.

This paper reports results of the incorporation of ellipsoidal geometry into the standard radiometric model for asteroids. For small departures from spherical shape the standard model using spherical geometry predicts fluxes in good agreement with ellipsoidal models. Large departures from spherical shape, however, can produce substantial differences in the calculated flux depending on the subsolar temperature and the wavelength of interest. The results derived here suggest that radiometric measurements of highly nonspherical, low-obliquity asteroids interpreted with spherical models result in systematically smaller diameters and higher albedos. In addition, nonspherical shape can also result in a systematic difference in the diameter of a particular asteroid derived from separate 10-+.

87PH0377. P.J.HERRING, P.HORSMAN. 1985. PHOSPHORESCENT WHEELS : FACT OR FICTION ?. THE MARINE OBSERVER. 55:194-201. H.M.S.O., LONDON. PN-2920. EN.

87PH0378. S.K.YANG, J.D.LIN, X.B.LI. 1985(4). STUDIES ON CATALYTIC WAVE OF CHROMIUM IN SEAWATER. ACTA OCEANOL. SINICA. 4(2):232-243. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, the polarographic catalytic wave of trace chromium in seawater and its mechanism are studied. It is unnecessary for natural seawater samples to be separated and preconcentrated, and the samples can be directly detected. Variable coefficient is 5%, and the relative error of recovery efficiency, 10%. The wave is a kind of hydrogen catalytic one with absorbability.

87PH0379. R.S.WANG, X.S.LIU, L.K.ZHANG. 1985(7). NUMERICAL EXPERIMENTS OF SEA ICE IN THE BOHAI SEA. ACTA OCEANOL. SINICA. 4(3):349-358. CHINA OCEAN PRESS, BEIJING. EN.

A rather complete sea ice model is given, which deals with not only thermodynamic and dynamic processes commonly used in previous models of sea ice but also a melting process of ice driven into warmer waters. A series of numerical experiments have been carried out in order to search after a mechanism of the growth and decay of sea ice in the Bohai Sea, and the principal result shows that the melting process of sea ice driven into the warmer waters must be taken into consideration when the ice condition in such a partially frozen sea as the Bohai Sea is calculated.

87PH0380. S.DAS, B.V.KOSTROV. 1987(3). ON THE NUMERICAL BOUNDARY INTEGRAL EQUATION METHOD FOR THREE-DIMENSIONAL DYNAMIC SHEAR CRACK PROBL+. J. APPL. MECHANICS. 54:99-104. AME. SOC. MECH. ENG., N.Y. PN-2097. EN.

The numerical boundary integral equation method for the solution of dynamic shear crack problems is discussed in detail, including the questions of the numerical approximation, stability, and efficiency. In particular, the necessary conditions for stability are developed. In addition to a discussion of the original algorithm proposed by Das (1980), a new version is proposed which is more efficient for some important particular cases, due to the fact that the domain of integration for the necessary convolutions is limited only to the slipping part of the crack plane instead of the entire disturbed area of the crack plane.

Marine Meteorology(ME)

87ME0001. F.STRAVISI, G.PIERI. 1984-85. UN SENSORE DI PRESSIONE DAL BAROGRAFO SPRUNG-FUESS. BOLL. DELLA SOC. ADRIATICA DI SCIENZE. 68:67-73. PN-2865. FR.

The classical Sprung-Fuess balance barograph, modified by means of low-cost solid-state circuits, is used as a precision analog output barometer. This original instrument, which succesfully works at full time, has a sufficient resolution (0.02 mbar) and accuracy (0.1 mbar) for the routine work in a scientific meteorological station.

87ME0002. SUNG-KUN.HONG. 1968(3). RELATION OF AIR TEMPERATURE AT MOKPO AREA BETWEEN EARLY SUMMER AND EARLY AUTUMN. BULL. KOREAN FISH. SOC. 1(1):55-59. KOREAN FISH. SOC., PUSAN. KO.

The relation of air temperature between early summer and early autumn from 1916 to 1966 was investigated. The data are brought by the statistical analysis for the purpose of the long range weather forecast.

87ME0003. F.STRAVISI, P.C.JAIN. 1984-85. SOME CHARACTERISTICS OF GLOBAL SOLAR IRRADIATION AND SUNSHINE AT TRIESTE. BOLL. DELLA SOC. ADRIATICA DI SCIENZE. 68:9-21. PN-2866. EN.

Monthly data of global solar irradiation (GSI) and sunshine, GSI frequency tables per month and per year and monthly average hourly GSI are presented, in a form suitable for solar energy scientists, engineers and architects. Data refer to the meteorological station of Trieste (Istituto Talassografico, CNR), in the 1972-1982 period.

87ME0004. D.H.BROMWICH. 1985. KATABATIC WIND INTERACTION WITH INEXPRESSIBLE ISLAND, TERRA NOVA BAY. ANTARCTIC J. U.S. 20(5):196-198. U.S. NAT. SCI. FOUND., WASH. PN-3047. EN.

The interaction of gale force katabatic winds with the steep topography of Inexpressible Island shows a strong seasonal dependence. In summer the airflow overides cliffs more than 300 m high, and creates a stagnation zone on the windward side of the obstacle. In winter it is inferred that the air is generally deflected around the main part of the island. Summer data usually demonstrate that measurements from the automatic weather station (AWS) sited on the southern tip of the island accurately reflect the characteristics of the upwind katabatic airflow. It is possible that the winter AWS data are less representative.

87ME0005. G.J.YANG. 1985(7). THE CHARACTERISTICS OF SPRING AND SUMMER SUBTROPICAL CIRCULATION DURING PROLONGED DROUGHTS AND FLO+. ACTA OCEANOL. SINICA. 4(3):374-381. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, using monthly mean vertical circulation maps in April and July of 1969, 1980, 1972, 1978 and 10-year mean maps of April and July, we have investigated the relationship between the subropical circulation and the persistent droughts and floods in summer in middle and lower Changjiang valleys. It is found that the subtropical high between the east of the West Pacific and the Middle Pacific in lower troposphere during spring and summer of flood years in middle and lower Changjiang valleys is stronger than that of drought years. The zonal vertical circulation of subtropical zone in the Middle Pacific has persistent characters from spring to summer during flood years.

87ME0006. P.L.WOODWORTH. 1985(9). THE INTERANNUAL CORRELATION BETWEEN SEA LEVEL AIR PRESSURE AND RAINFALL IN THE BRITISH ISLES-NORTH+. WEATHER. 40(9):285-291. ROYAL METEOROL. SOC. PN-2951. EN.

87ME0007. F.STRAVISI. 1986. A POSTERIORI CALIBRATION OF A MECHANICAL PYRANOGRAPH. SOLAR ENERGY. 36(1):21-26. PERGAMON PRESS, OXFORD. PN-2870. EN.

A method is described to homogenize a time series of hourly mean readings from the records of a Robitzsch mechanical pyranograph over a period of years. The time-dependent instrumental coefficient is represented by the product of two adimensional coefficients accounting for (i) the typical monthly error of the pyranograph at different hourly intervals of the day. (ii) the mean error of the pyranograph during each month of the year and (iii) a monthly conversion factor, slowly increasing with time, accounting for the actual irregular decay of the instrumental sensitivity. Reference hourly irradiation values are given by Kipp & Zonen pyranometers over a three-year period. The long term correction is derived with the assumption that typical monthly maximum near-noon hourly irradiations +.

87ME0008. L.Q.CHEN. 1986(10). FACTOR ANALYSIS FOR CHARACTERIZATION OF THE MARINE AEROSOL IN BERMUDA ATMOSPHERE. ACTA OCEANOL. SINICA. 5(4):522-529. CHINA OCEAN PRESS, BEIJING. EN.

Factor analysis was used to distinguish the major sources of the marine aerosol in Bermuda atmosphere. The data investigated from Bermuda were best represented by three sourses: pollution derived from North America, weathered crustal material from North Africa, and marine source from the sea spray.

87ME0009. Y.H.DING, J.ZHANG, Y.Z.LIU. 1986(7). FURTHER ANALYSES OF THE STRUCTURE OF TYPHOON NO. 7507, II. TEMPERATURE AND MOISTURE FIELDS. ACTA OCEANOL. SINICA. 5(3):363-374. CHINA OCEAN PRESS, BEIJING. EN.

This paper, the second part of further analyses of the structure of the typhoon, mainly discusses the distributions of temperature and moisture fields of typhoon No. 7507. The result has shown that the typhoon developed from the warm-core disturbance. The height of maximum warming is highest (300 to 250 hPa) during the mature stage. There is a dry layer capping the typhoon during the initial stage. Once the typhoon rapidly developed, the dry layer was destroyed. A deep saturation layer eventually occurred in the central region of the typhoon. Meanwhile, the dry air

from the China main continuously intruded into the outer region in the western and northwestern parts of the typhoon.

87ME0010. T.R.PARISH, D.H.BROMWICH. 1987(7). THE SURFACE WINDFIELD OVER THE ANTARCTIC ICE SHEETS. NATURE. V.327(6125:51-54. MACMILLAN JOURNALS. PN-3051. EN.

The intense radiative cooling of air over the ice slopes of Antarctica generates a surface wind regime that is strongly controlled by topography, and plays a key role in determining the behaviour of the atmosphere and ocean in high southern latitudes. Resultant surface winds are intimately linked to the orientation of the ice terrain and display the highest degree of persistence found on Earth. The close coupling between wind and topography allows estimation of the former if the latter is known with some precision. Here we report on time-averaged, near-surface airflow over the Antarctic continent during winter diagnosed from a recent, accurate synthesis of terrain slopes and from estimates of the lower atmospheric temperature structure. The simulated drainage pattern exhibits strong +.

87ME0011. D.H.BROMWICH. 1985. KATABATIC WIND INTERACTION WITH INEXPRESSIBLE ISLAND, TERRA NOVA BAY. ANTARCTIC J. U.S. 20(5):196-198. U.S. NAT. SCI. FOUND., WASH. PN-3092. EN.

87ME0012. J.Y.ZHOU, J.ZHANG, J.Y.WANG. 1983(12). PRELIMINARY ANALYSIS OF MID-RANGE OSCILLATION OF TROPICAL MONSOON CIRCULATION IN SUMMER, 1979. ACTA OCEANOL. SINICA. 2(2):205-212. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, the mid-range oscillation with 30-45 days of the tropical monsoon circulation during May-August 1979 was discussed. It is found that there are low and high pressure index patterns for the tropical monsoon circulation in Northern Hemisphere. In the period of low index and the transitional period from low to high index, the group genesis and development of monsoon depressions, tropical cyclones over Arabian Sea and the Bengal Bay, typhoons over the South China Sea and Western Pacific Ocean are always successively observed from west to east. In this period, the rainfall over middle-India and eastern part of China usually increases.

87ME0013. L.FEI, Z.Y.XUE, J.R.QIU. 1983(6). INFLUENCE OF COLD VORTEX OVER SUBTROPICAL HIGH LEVEL ON TYPHOON TRACKS. ACTA OCEANOL. SINICA. 2(1):22-33. CHINA OCEAN PRESS, BEIJING. EN.

In general, the westward typhoons are associated with zonal flow patterns. But if there was a high level cold vortex in the southern region of the subtropical high, the typhoon would pass through the subtropical high towards the North. In the paper, this kind of knotty typhoons track was discussed. The temperature, wind, divergence and vorticity fields in the subtropical high regions, and the structure of cold vortex were analysed. The cold vortex not only weakens the subtropical high, but also forces the typhoon to move northward.

87ME0014. D.W.WANG. 1984(1). THE NUMERICAL EXPERIMENT FOR ANOMALOUS TRACKS OF NORTHWARD TYPHOON. ACTA OCEANOL. SINICA. 3(1):36-44. CHINA OCEAN PRESS, BEIJING. EN.

By making use of a barotropic primitive equation model, a numerical experiment on the effects of the anticyclone and cut-off low vortex in the westerlies upon the anomalous tracks of northward moving typhoon is performed. The result shows that the synoptic patterns mentioned above are responsible for the bending (to the west) and accelerating of the motion of typhoon in the later stage, and that their effects vary in intensities. The anticyclone will play a predominant role when anticyclone and the cut-off low vortex coexist.

87ME0015. B.R.XU. 1984(10). THE STRUCTURE AND HEAT BUDGETS OF LARGE-SCALE DISTURBANCES OVER THE EQUATORIAL TROUGH REGION OF TH+. ACTA OCEANOL. SINICA. 3(4):477-487. CHINA OCEAN PRESS, BEIJING. EN.

The averge vertical distribution of equivalent potential temperature, horizontal divergence, relative vorticity & vertical velocity over the observation area were computed using 6-days NAVAID wind data from the R/V Shijian and R/V Xiangyanghong 09 during FGGE (the First GARP Global Experiment) and upper air sounding data of two island stations within the same period. This paper describes the large-scale structure and heat budgets in the disturbed and trade wind periods and compared them with those of the trade wind regions of the Atlantic. Some interesting results of the structure and heat budgets of large-scale disturbances over the equatorial trough region in the western Pacific are given.

87ME0016. Y.H.DING, E.R.REITER. 1985(1). LANGE-SCALE CIRCULATION CONDITIONS AFFECTING THE HURRICANE FORMATION OVER THE NORTH ATLANTIC OCEAN. ACTA OCEANOL. SINICA. 4(1):21-34. CHINA OCEAN PRESS, BEIJING. EN.

A contrasting study of the large-scale circulation features responsible for months or seasons with many hurricanes and those with few hurricanes has revealed that the frequency of hurricane formation over the North Atlantic Ocean is enhanced by the following conditions. There exists a well-developed subtropical high-pressure belt displaced to the north; a deep Icelandic low; a stronger-than-normal polar vortex with a deep polar trough dipping far southward along the eastern part of the United States; a dominant high-pressure ridge over western Canada and the United States; and a jet stream displaced northward over these regions. At 200 hPa, an anomalous anticyclonic circulation prevails over the subtropical North Atlantic. A stronger-than-normal upper easterly flow prevails. Positive+.

87ME0017. T.ZHANG, J.Y.WANG. 1985(1). CASE ANALYSIS OF SEA LEVEL CIRCULATION FOR THE ATMOSPHERE OF LOW LATITUDES IN MID-SUMMER. ACTA OCEANOL. SINICA. 4(1):35-41. CHINA OCEAN PRESS, BEIJING. EN.

In the light of the sea level synoptic charts from July to August for 1975-1978, we obtained more observed records of low latitudes by using the analysed stream and temperature-moisture field, the main characteristics of these fields in the period of multi-typhoon genesis and of typhoon interval in the mid-summer are studied. Finally, it should be pointed out that the position of the typhoon genesis and the typhoon track are generally consistent with the low temperature-moisture region of the sea surface as well as with its tendency, so that a valuable information is obtained for the forecast of the typhoon track.

87ME0018. Z.D.ZUO. 1986(4). ON INTERACTION BETWEEN MERIDIONAL AND ZONAL DISTURBANCES IN TROPICAL EASTERLY. ACTA OCEANOL. SINICA. 5(2):195-202. CHINA OCEAN PRESS, BEIJING. EN.

The distribution of wind speed in the easterly in the tropics is not uniform. In the part with large curvature, such as lines of trough and ridge, the wind speed is small, while in the part with small curvature, the wind speed is large. In this paper, these phenomena are expounded with gradient wind equation. considering the distribution of wind speed, we find the wave speed formula from linearized vorticity and divergence equation. The wave speed is equal to the sum of the Rossby wave speed and a harmonic function for x and t. Its period is about 3.5 days. And it is proved that the disturbance is barotropic instability. The results are caused by interaction between meridional and zonal disturbances.

87ME0019. Y.H.DING, J.ZHANG, Y.Z.LIU. 1986(4). FURTHER ANALYSES OF THE STRUCTURE OF TYPHOON NO. 7507; I. KINEMATICAL FIELDS. ACTA OCEANOL. SINICA. 5(2):203-213. CHINA OCEAN PRESS, BEIJING. EN.

By utilizing the denser upper-air observations from the Okinawa region and the Japanese islands during August 17-23, 1975, the structure of Typhoon 7507 formed in this area has been analysed. It has been indicated that the cyclonic tangential wind maximum occurred in the eastern sector of the typhoon and the strongest inflow occurred in the southern portion of the typhoon about 150 km away from the typhoon centre. there was a deep inflow layer below the 300 hPa level. The anticyclonic outflow was the strongest at 150 hPa and was located in the NE quadrant of the typhoon. The convergence mainly took place in the southern part of the typhoon, while the divergence occurred at the lower and middle levels in the northern sector of the typhoon. The pattern of vorticity and vertical motion+.

87ME0020. Z.H.YU, X.Z.GE. 1986(4). NUMERICAL SIMULATION OF SEASONAL MOVEMENTS OF SUBTROPICAL HIGH RIDGE LINE; II. VAPOR CONDENSATION +. ACTA OCEANOL. SINICA. 5(2):183-194. CHINA OCEAN PRESS, BEIJING. EN.

The seasonal movement and jumping of subtropical high ridge line were simulated in the previous paper by using the two-dimensional zonal average model to consider the solar radiation heating. In this paper, the simulation is made by means of the same model considering water vapor condensation heating released from the rainfall belt north of subtropical high in addition to the solar radiation heating. The basic characteristics such as the northward seasonal jumping can still be simulated, and the condensation heating in the model can make the subtropical high ridge line move to the position a little further south than that without the condensation heating. Therefore, it may be realized that the basic characteristics of seasonal movement of subtropical high depend mainly on the solar ra+.

87ME0021. Z.H.QIN, Q.Y.LIU, S.L.FENG. 1987(4). NUMERICAL EXPERIMENTS OF WINDS OVER THE NORTHERN PACIFIC OCEAN WITH NONLINEAR DIAGNOSTIC DYNAMIC M+. ACTA OCEANOL. SINICA. 6(2):196-204. CHINA OCEAN PRESS, BEIJING. EN.

By means of the proposed nonlinear diagnostic dynamic model for the planetary boundary layer (PBL) wind field, an introduction is given to the MOD method for wind prediction. Based on the MOD experiments on the surface wind field over the Northern Pacific Ocean from April to October 1985, it is concluded that the nonlinear diagnostic dynamic model used is better than the linear one.

87ME0022. Y.H.DING, Y.Z.LIU. 1987(7). A STUDY OF MOISTURE BUDGET OF A TYPHOON. ACTA OCEANOL. SINICA. 6(3):353-365. CHINA OCEAN PRESS, BEIJING. EN.

This paper deals with the study of moisture budget of the typhoon No. 7507. The results show that the mass convergence produced by divergent wind has made the maximum contribution to precipitation, especially at the lower level, accounting for about 70% of the total precipitation, and that the advection term of water vapor is very small. The vertical flux term is to transport water vapor from the lower level to the middle and upper levels, resulting in the increase of water vapor accumulation at these levels. Evaporation term also plays an important role in precipitation, accounting for about 13% of the total precipitation and 23% of the horizontal moisture convergence. The moisture of the typhoon comes mainly from its southern boundary and the secondary inflow of moisture is from its+.

87ME0023. Z.D.ZUO, Y.L.JIA, G.FU, X.L.SONG. 1987(7). THE WIND FIELD IN TROPICAL EASTERLY DISTURBANCE. ACTA OCEANOL. SINICA. 6(3):366-372. CHINA OCEAN PRESS, BEIJING. EN.

It is expounded in this paper that the wind is weak in a zone of large curvature and strong in the small one in case of large scale stream field in the tropics. The relation between the variation of stream fields and generation of cyclones in tropical disturbance are also studied based on the authors' another paper.

87ME0024. W.X.SUN, S.Z.FENG, Z.H.QIN. 1982(12). NUMERICAL STUDY ON THE BOHAI SEA WIND SURGES; THE ZEROTH-ORDER DYNAMICAL MODEL. ACTA OCEANOL. SINICA. 1(2):175-188. CHINA OCEAN PRESS, BEIJING. EN.

Based on the three-dimensional zeroth-order model of the ultra-shallow water storm surge theory proposed by Chin and Feng (1975), a numerical investigation of the Bohai Sea wind surges in made. As a preliminary numerical experiment the model wind fields are designed for computations. Computational results are compared with the principal characteristics of observations as well as with some conclusions of the classical theories on storm surges presented by P. Groen (1962) and others.

87ME0025. S.W.WANG, ET AL. 1982(12). INTERACTION BETWEEN SEA SURFACE TEMPERATURE AND ATMOSPHERIC CIRCULATION IN WINTER HALF YEAR. ACTA OCEANOL. SINICA. 1(2):189-194. CHINA OCEAN PRESS, BEIJING. EN.

87ME0026. P.M.WU, ET AL. 1982(12). NONLINEAR NUMERICAL COMPUTATIONS ON STORM SURGES OF THE TAIWAN STRAIT. ACTA OCEANOL. SINICA. 1(2):195-203. CHINA OCEAN PRESS, BEIJING. EN.

87ME0027. J.Y.WANG. 1982(6). STATISTICAL RELATIONSHIP BETWEEN THE FREQUENCY OF TYPHOON OVER NORTHWEST PACIFIC AND FIELD OF MONT+. ACTA OCEANOL. SINICA. 1(1):40-46. CHINA OCEAN PRESS, BEIJING. EN.

87ME0028. Z.H.QIN. 1982(6). ATMOSPHERE-OCEAN INTERACTION AND ITS RELATION TO OCEAN CURRENTS AND STORM SURGES. ACTA OCEANOL. SINICA. 1(1):21-39. CHINA OCEAN PRESS, BEIJING. EN.

The theory of barotropic, shallow-sea ocean currents and storm surges considered from the viewpoint of air-sea interaction is presented. A 4-layer quasi-balanced dynamical model for a simulation of the structures of both the atmospheric and the marine planetary boundary layers is obtained by an analytical approach. A simplified scheme governing the storm surges induced by a slowly travelling circular atmospheric vortex is deduced.

87ME0029. Y.T.ZHANG, Y.J.WANG. 1983(12). SIMULATION OF WIND FIELD AND THE NUMERICAL CALCULATION OF STORM SURGE OF THE BOHAL SEA. ACTA OCEANOL. SINICA. 2(2):190-204. CHINA OCEAN PRESS, BEIJING. EN.

Up to now, available method of numerical forecasting and suitable wind field model for the Bohai Sea storm surge have been few. In this paper, through the analysis of the weather situation is presented a mathematical model for the wind fields involved mainly the deformation field of a high pressure matched with a low pressure, the temperate cyclone, the cold wave and the northword typhoon. Meanwhile, numerical computations combined with the nonlinear storm surge models are made by using "ADI" method. The computed results are generally coincident with the practical observations. It has showed a success in the simulated wind field and the feasibility of using "ADI" method to forecast the Bohai Sea storm surge.

87ME0030. X.K.ZHAO, C.P.MA, R.D.LI. 1983(12). RELATIONSHIP BETWEEN THE KUROSHIO AND SST OF THE EASTERN PACIFIC, AND ITS EFFECT ON PRECIPITATION +. ACTA OCEANOL. SINICA. 2(2):213-224. CHINA OCEAN PRESS, BEIJING. EN.

This paper analyses the sea surface temperature (SST) of the eastern Pacific Ocean, the Kuroshio in the East China Sea, the subtropical high pressur: of the Pacific Ocean and the precipitation for rainy season of Qingdao. We obtain a result that if this year the eastern Pacific Equatorial Zone is a warm-water year, the Kuroshio path in the East China Sea for next year will be subject to oscillation westward. The SST of the eastern Pacific Ocean may predict precipitation for rainy season of Qingdao one year earlier than that of the Kuroshio in the East China Sea.

87ME0031. H.F.ZANG, B.Z.ZHANG. 1983(6). FORECAST OF SEA ICE REGIME. ACTA OCEANOL. SINICA. 2(1):34-44. CHINA OCEAN PRESS, BEIJING. EN.

It has been found that the sea-surface temperature and the characteristics of atmospheric circulation in the preceding months are closely related to the temperature and ice regime in winter months. This relationship is strikingly reflected over the strong ocean current regions and over the regions with quasi-permanent atmospheric center actions. It has also been shown that the influence of the ocean on the atmosphere is more pronounced over these regions. This relationship may offer a key for long-term forecasting of the sea-ice regime in winter. In addition, because there is an obvious instability, the stabilities of the correlation coefficients are analysed. In consideration of the fact that the formation of weather process changes with the variations of time scale, predictions f+.

87ME0032. P.M.WU. 1984(1). A NUMERICAL PREDICTION MODEL FOR TYPHOON SURGE ALONG THE SOUTHEAST COAST OF CHINA. ACTA OCEANOL. SINICA. 3(1):45-55. CHINA OCEAN PRESS, BEIJING. EN.

Based on the whole-current equations of typhoon surge and its definite difference equations, this paper develops a numerical prediction model for typhoon surge along the southeast coast of china by taking into account of the typhoon model of circular storm. On considering the complexities of the coast and boundaries, the development of the model was made use of a relative ideal method to deal with the boundary conditions according to the characters of the model and the boundary position of the calculation grid. The calculations fairly coincided with the field observations, that proves this numerical prediction model satisfactory.

87ME0033. A.H.OORT, Y.H.PAN. 1984(10). THE

OBSERVED EFFECTS OF TROPICAL HEATING OVER THE EAST PACIFIC ON GLOBAL CLIMATE VARIATIONS. ACTA OCEANOL. SINICA. 3(4):488-498. CHINA OCEAN PRESS, BEIJING. EN.

Based on a statistical analysis of monthly data for 1958-73, the East Equatorial Pacific centered at 130 W is considered as a key region for global climate variation. When the region is warm, the latent heat from the sea surface increases and the semipermanent systems in the global atmosphere become more active.

87ME0034. H.F.ZANG, S.W.WANG. 1984(10). EQUATORIAL EASTERN PACIFIC SST AND SUBTROPICAL HIGH. ACTA OCEANOL. SINICA. 3(4):471-476. CHINA OCEAN PRESS, BEIJING. EN.

The variations of sea surface temperature (SST) on the east Pacific and their relation to general atmospheric circulation are examined according to the data of the monthly mean SST and the 500mb level height for the period from January 1951 to December 1980.

87ME0035. Q.L.CHEN. 1984(4). THE COASTAL SWELLS OF CHINESE COAST IN WINTER. ACTA OCEANOL. SINICA. 3(2):151-160. CHINA OCEAN PRESS, BEIJING. EN.

In winter, at the coast of china, the direction of swells is generally different from that of the winds, but we could not find the generation area of these coastal swells on the weather map. In this paper, the differences between the 'coastal swells' and the other swells are studied, and we realize that the 'coastal swells' are developed from the wind waves after refraction near the shore or developed from the coastward component of the wind waves.

87ME0036. R.D.LI, X.K.ZHAO, C.C.JING. 1984(4). EFFECT OF THE KUROSHIO VARIATION ON THE SUBTROPICAL HIGH PRESSURE. ACTA OCEANOL. SINICA. 3(2):172-180. CHINA OCEAN PRESS, BEIJING. EN.

By using oceanographic data during 1955-1978, we have analysed aspects of volume transport variation of the Kuroshio for PN-line in the East China Sea, and relationships between volume transport variation of the Kuroshio and the subtropical high pressure (SHP) of the Pacific. We have found that volume transport of the Kuroshio is closely related to the long-period oscillations of the subtropical high pressure for 8-9 years and 2-3 years, respectively. The subtropical high pressure has a phase lag behind compared with volume transport of the Kuroshio. In addition, the seasonal volume transport of the Kuroshio is closely related to the subtropical high pressure, too. The results show that volume transport variation of the Kuroshio has certain influence on future variation of the subtro+.

87ME0037. L.W.TAO, X.D.WANG. 1984(7). VARIATIONS OF THE SUMMER MONSOON IN THE SOUTH CHINA SEA. ACTA OCEANOL. SINICA. 3(3):339-348. CHINA OCEAN PRESS, BEIJING. EN.

In this paper we investigated the variations of summer monsoon in the South China Sea. We found that there are two kinds of oscillations in the intensity of the monsoon, one has a period of forty days, the other, fourteen days. We also found that the oscillation of a period of forty days is caused by the alternative extension of the monsoon trough eastward in the south China Sea and the extension of the subtropical anticyclone westward in the West Pacific. It is our opinion that the summer monsoon in the West Pacific and the South China Sea is a system which is independent of the Indian monsoon and that the dividing line between these two monsoon systems is at the longitude 100 E.

87ME0038. Y.H.DING, E.R.REITER. 1984(7). LARGE-SCALE CIRCULATION CONDITIONS AFFECTING THE TYPHOON FORMATION OVER THE NORTHWEST PACIFIC. ACTA OCEANOL. SINICA. 3(3):327-338. CHINA OCEAN PRESS, BEIJING. EN.

A contrasting study of the large-scale circulation features responsible for months with many typhoons and months with few typhoons has revealed that the frequency of typhoon formation over the Northwest Pacific is related to the following conditions: Over the Northwest Pacific, a well-defined ITCZ (Intertropical Convergence Zone) extending eastward to 160 E was displaced to 20 N. At 200 mb, an extensive anomalous anticyclonic circulation prevails over the western and central Pacific.

87ME0039. P.K.TAYLOR. 1985. THE OBSERVATION OF OCEAN-SURFACE FLUXES OF HEAT, WATER AND MOMENTUM FOR CLIMATE STUDIES. ADV. SPACE RES. 5(6):225-236. PERGAMON PRESS, OXFORD. PN-2943. EN.

The potential of satellite measurements to dafine the ocean surface fluxes of heat, water and momentum is reviewed. Only surface stress and possibly rainfall can be directly estimated, latent heat flux may be available through parametrization, sensible heat flux cannot be obtained. Each of the radiative flux components may be estimated including possibly the downward longwave flux. However it is emphasised that, even for those fluxes which can be obtained, improvements in absolute accuracy of the monthly mean, area averaged values are required. Sampling by a single polar orbiting satellite is likely to be at best, marginally adequate. In most cases a pair of satellites will be needed.

87ME0040. J.CREASE. 1985. THE OCEAN AND THE WCRP. THE ROLE OF DATA IN SCIENTIFIC PROGRESS. BK:45-51. ELSEVIER SCI. PUB., AMSTERDAM. PN-2940. EN.

87ME0041. T.H.GUYMER. 1985. WINDS FOR CLIMATE RESEARCH FROM THE ERS-1 AND N-ROSS SCATTEROMETERS. PROC. CONF. USE OF SATELLITE DATA IN CLIMATE MODELS, ALPBACH, AUSTRIA, BK:157-159. PN-2944. EN.

Requirements for sea-surface winds in climate research are discussed in terms of accuracy and sampling considerations. A single satellite scatterometer is incapable of providing adequate sampling and it is envisaged that the surface wind

fields will be obtained from a combination of ERS-1, N-ROSS and in-situ data, including those of the Voluntary Observing Ships. The special requirements of the World Climate Research Programme thus have important implications for the joint calibration and validation of the scatterometers.

87ME0042. Y.ZHANG, Y.H.LI, M.I.BI. 1985(10). ABNORMALLY HEAVY RAINFALL IN THE CHANGJIANG VALLEY AND ITS CORRELATION WITH EXTRAORDINARY OCEANIC +. ACTA OCEANOL. SINICA. 4(4):535-547. CHINA OCEAN PRESS, BEIJING. EN.

The abnormally heavy precipitation occurred in the Changjiang Valley, 1983 as one of the four serious flooded events in the past sixty years was directly associated with the abnormal changes of the subtropical high of the NW Pacific. Meanwhile the abnormal changes of the S.H. were correlated with the abnormally warming of SST of the tropical East Pacific and the appearance of El nino in 1982-1983, which had attained the highest intensity in this century and were reasonably correlated with the unusual variations of Southern Oscillation, SST anomalies of the Pacific Ocean, and the anomalies of the cloudness over these areas. This has once again confirmed that there exists a teleconnection between several parts of Pacific Ocean and the atmospheric circulation. A chain reaction between the+.

87ME0043. K.P.LI. 1985(4). LOW-FREQUENCY VIBRATION SPECTRUM OF WATER LEVEL IN THE BOHAI SEA. ACTA OCEANOL. SINICA. 4(2):169-179. CHINA OCEAN PRESS, BEIJING. EN.

The low-frequency energy spectrum of the coastal water level of the bohai Sea is analyzed, the main frequencies for the peaks of the energy spectrum density being 1/5 cycle/day and 1/3 cycle/day. Also analyzed are the coherence, the variation of phase angle and the system functions among the stations. Finally, a discussion is made on the relationship between the forcing and the water level change, thus coming to a conclusion that the low-frequency change in the water level is mainly due to the energy supplied by wind stress.

87ME0044. L.S.XIE. 1985(4). DYNAMICAL ANALYSIS OF THE INFLUENCE OF KUROSHIO HEATING FIELD ON CYCLONE. ACTA OCEANOL. SINICA. 4(2):201-210. CHINA OCEAN PRESS, BEIJING. EN.

The heat transferred through sea surface and the 900 hPa, 850 hPa and 700 hPa layers during seven cyclones formed over the Kuroshio area is calculated, and the influence of heat supply of the area on cyclones development is studied. Analyses indicate that the heat so transferred has obvious influence on the cyclones over the Kuroshio in spring and winter, and that the effect of precipitation is secondary to the East China Sea cyclones, although it is generally regarded as an important factor for other ones such as those formed in the drainage areas of the Huanghe-Huaihe Rivers and the Changjiang-Huaihe Rivers.

87ME0045. S.M.XIE, M.M.YOSHINO, T.AOKI. 1985(7). LONG-RANGE CHANGES OF CORRELATION BETWEEN THE TYPHOON FREQUENCIES IN SEVEN REGIONS IN EAST ASIA AN+. ACTA OCEANOL. SINICA. 4(3):382-394. CHINA OCEAN PRESS, BEIJING. EN.

The correlation coefficients between the typhoon frequencies for the seven regions in East Asia and the monthly-mean sea surface temperature (SST) from 2 years before to 1 year after are calculated, indicating that the most significant correlation appears in the period from the summer of 2 years before to the summer of 1 year before. During this period negative correlations are located in the northwestern part of the North Pacific while the positive ones located in the southeastern part. It is also suggested that there are interannual variations of about 1, 1.5 and 2 years for the changes of the correlation intensity.

87ME0046. K.MURAKAMI, M.MORIKAWA, T.HORIE. 1985(9). NUMERICAL SIMULATIONS OF STORM SURGES BY ALTERNATING DIRECTION IMPLICIT METHOD. TECH. NOTE PORT & HARBOUR RES. INST. (529):3-35. PORT & HARBOUR RES. INST. PN-2334. JA.

The present paper describes numerical simulations of storm surges by alternating direction implicit method. In the simulations, the numerical technique, which makes the joint of coarse meshes and fine meshes, and of a two dimensional sea area and a one dimensional river area possible, is used. The open boundary can be set far from the interested area and the configuration can be drawn precisely due to the technique.

87ME0047. L.S.AUSTIN, G.E.MILLWARD. 1986. ATMOSPHERE-COASTAL OCEAN FLUXES OF PARTICULATE ARSENIC AND ANTIMONY. CONTINENTAL SHELF RES. 6(3):459-474. PERGAMON PRESS, OXFORD. EN.

Aerosol concentrations of arsenic determined on samples from the English Channel were in the range <0.05 to 11.0 ng As and from the North Atlantic <0.03 to 0.36 ng As. Antimony concentrations were in the range <0.06 to 2.7 ng Sb in the English Channel and <0.02 to 0.4 ng Sb for the North Atlantic. The bulk aerosol in each area was predominantly of marine origin, although an anthropogenic component was evident in some samples. Aerosol deposition to coastal waters may be a more important source of dissolved arsenic and antimony than the riverine input.

87ME0048. D.T.PUGH, K.R.THOMPSON. 1986. THE SUBTIDAL BEHAVIOUR OF THE CELTIC SEA, I. SEA LEVEL AND BOTTOM PRESSURES. CONTINENTAL SHELF RES. 5(3):293-319. PERGAMON PRESS, OXFORD. EN.

Interest in the subtidal behaviour of shelf seas calls for coordinated programmes of long period and shorter period intensive measurements, together with analytical and numerical representation of their responses to forcing. Analysis of more than 30 years of simultaneous sea levels and air pressures shows that at Newlyn observed levels do not follow the inverted barometer effect at any frequency. At frequencies higher

than 0.1 cpd the levels anticipate an inverted barometer response because of a lagged correlation between northward winds and low atmospheric pressures: as a result there is a pronounced change of gradient inthe energy spectrum below 0.1 cpd which is not seen in the atmospheric pressures.

87ME0049. Y.N.SHI, W.F.LU. 1986(7). A DEVELOPMENT IN THE STOCHASTIC MODEL OF AIR-SEA INTERACTION. ACTA OCEANOL. SINICA. 5(3):375-383. CHINA OCEAN PRESS, BEIJING. EN.

Having proved the stochastic model of air-sea interaction given by Mitchell (1956) to be a particular case of stochastic-dynamic model with linear air-sea feedback mechanism, this paper further develops the model. Several parameters in this model are evaluated with climatological data of the stations situated along the east coast of China, and some problems concerned are discussed.

87ME0050. M.X.CHEN. 1987(1). ON THE INFLUENCE OF SEA SURFACE TEMPERATURE UPON NW-PACIFIC SUBTROPICAL HIGH. ACTA OCEANOL. SINICA. 6(1):80-86. CHINA OCEAN PRESS, BEIJING. EN.

A correlation characteristics analysis of monthly sea surface temperature of 13 sea areas (mainly strong ocean-current areas) and 15 subtropical highs is made, and the characteristics of the time-space variation of high-correlation areas are discussed. On the basis of a preliminary analysis of the possible physical mechanism for several related phenomena, it is concluded that SST affects subtropical high through a variety of ways.

87ME0051. S.M.XIE, T.AOKI, M.M.YOSHINO. 1987(1). CHARACTERISTICS OF INTERANNUAL VARIATION OF NORTH PACIFIC SST AND ITS RELATION TO EAST ASIA CLIMAT+. ACTA OCEANOL. SINICA. 6(1):68-79. CHINA OCEAN PRESS, BEIJING. EN.

The interannual variations of the monthly sea surface temperature (SST) in the North Pacific (including Equatorial East Pacific) during 1951-1980 are analysed by means of EOF method. The findings are: (1) In the cold and warm ocean current areas, such as the North Pacific Current, the California Current and the Equatorial East Pacific areas, the convergence speeds are the fastest, while in the Kuroshio and the western part of the North Equatorial Current areas they are fast only in winter. (2) The physical features of the first 3 eigenvectors are obvious. The first eigenvector shows that the SST values are high in the south and low in the north in the latitudinal distribution of the SST field. The warm current area, i.e. the northwestern part of the North Pacific is positive and the +.

87ME0052. J.J.MORLEY, N.G.PISIAS, M.LEINEN. 1987(2). LATE PLEISTOCENE TIME SERIES OF ATMOSPHERIC AND OCEANIC VARIABLES RECORDED IN SEDIMENTS FROM THE S+. PALEOCEANOGRAPHY. 2(1):49-62. AME. GEOPHYS. UNION, WASH. PN-2895. EN.

Time series analyses of atmospheric and oceanic variables in a late Pleistocene record from the northwest Pacific show the complex relationship of the response of various segments of the climate system to changes in the earth's orbit. Most variance spectra of time series from this subarctic record contain frequency peaks with periods corresponding to at least one of the major orbital components of eccentricity, obliquity, or precession.

87ME0053. W.S.BROECKER, T.H.PENG. 1987(3). THE ROLE OF CALCIUM CARBONATE COMPENSATION IN THE GLACIAL TO INTERGLACIAL ATMOSPHERIC CARBON DIOXI+. GLOBAL BIOGEOCHEMICAL CYCLES. 1(1):15-29. AME. GEOPHYS. UNION, WASH. PN-2908. EN.

The only viable explanations put forth to date for the glacial to interglacial change in atmospheric carbon dioxide content suggested from measurements of the carbon dioxide content of gas extracted from ice cores involve changes in the ocean's nutrient cycles. Any nutrient change capable of creating the 80 uatm changes in atmosphere carbon dioxide pressure suggested by the ice core results also creates significant change in the deep ocean's carbonate ion content. Evidence from deep sea sediments suggests that these carbonate ion changes are compensated on the time scale of a few thousand years by reductions or increases in amount of calcium carbonate accumulating in deep sea sediments. This compensation process has two important consequences. First, it significantly increases the ma+.

87ME0054. 1986(9). EXECUTIVE COUNCIL WARKING GROUP ON ANTARCTIC METEOROLOGY FOURTH SESSION, FINAL REPORT. 47P. WORLD METEOROL. ORG., GENEVE. PN-2729. EN.

Chemical Oceanography(CH)

87CH0001. A.MAZZUCOTELLI, A.VIARENGO, R.FRACHE, G.MARTINO. THE DETERMINATION OF COPPER AND ZINC METALLOTHIONEINS BY GEL-PERMEATION HIGH PRESSURE LIQUID CHROM+. 90. PN-2553. EN.

87CH0002. J.R.AN, Q.ZHANG. 1982(12). AN ANALYTICAL METHOD OF ULTRA-TRACE TELLURIUM FOR SAMPLES OF SEA-AND ENVIRONMENTAL-WATER. ACTA OCEANOL. SINICA. 1(2):204-209. CHINA OCEAN PRESS, BEIJING. EN.

87CH0003. J.Y.MO, P.X.CAI, Z.ZHANG, B.S.OU. 1983(12). SEMIDIFFERENTIAL ELECTROCHEMICAL STRIPPING ANALYSIS FOR THE DETERMINATION OF TRACE HEAVY METALS IN+. ACTA OCEANOL. SINICA. 2(2):235-248. CHINA OCEAN PRESS, BEIJING. EN.

A new voltammetric technique has been described for the determination of trace Cu, Pb, Cd and Zn in seawater by semidifferential electrochemical stripping analysis, in which the semiderivative, e, of the stripping current, i, is measured as a function of electrode potential, at a rotating thin mercury film glassy carbon electrode formed in situ. The optimun conditions are reported. It is demonstrated that the technique has more merits than that of the ordinary linear sweep anodie stripping voltammetry, greatly enhances the sensitivity and resolution and shortens the time of pre-electrolysis.

87CH0004. Q.X.SHEN, Q.Z.CHEN. 1983(6). DETERMINATION OF URANIUM IN SEAWATER. ACTA OCEANOL. SINICA. 2(1):60-63. CHINA OCEAN PRESS, BEIJING. EN.

This article deals with a new method of analysing in seawater, i.e. the uranium is concentrated with an aqueous suspension of basic zinc carbonate, subsequently isolated and determined by extraction-photometric method. In concentrating uranium such factors as stirring time, amount of adsorbent used, acidity of seawater were studied and conditions suitable for analysis were found. This method is simple, accurate and good in reproducibility. It is not necessary to adjust the pH of seawater before analysis. This technique can also be applied to determination of uranium in river or lake.

87CH0005. K.C.XU, L.Q.WU, R.X.WANG. 1983(6). DIRECT DETERMINATION OF TRACE MERCURY IN SEAWATER BY DIFFERENTIAL COLD VAPOR ATOMIC ABSORPTION MET+. ACTA OCEANOL. SINICA. 2(1):52-59. CHINA OCEAN PRESS, BEIJING. EN.

A low-absorbance differential cold vapor atomic absorption method is developed for direct determination of trace mercury in seawater. The sensitivity of the method is good at 1 ng mercury per liter and precision is excellent with a relative standard deviation of 13.9% at 12 ng Hg/l level and 3.2% at 39 ng Hg/l level respectively. The method is proved to be rapid and simple, and has been applied to the analysis of mercury in seawater from Xiamen Harbor and the Central Pacific Ocean.

87CH0006. Y.A.ZHANG, Q.Z.LI, Z.W.ZENG. 1984(1). LASER-INDUCED FLUOROMETRY FOR THE RAPID DETERMINATION OF TRACE LEVELS OF URANIUM IN SEAWATER. ACTA OCEANOL. SINICA. 3(1):77-83. CHINA OCEAN PRESS, BEIJING. EN.

A laser-induced fluorometric method for the rapid determination of trace levels of uranium in seawater with the Modified Anti-interference Fluorometric Reagent for uranium (MAFG) is described. Only a sample volume of 1.5-2.5 ml is used in each determination and no pre-separation and concentration steps are required. The analysis rate is a sample per 5 min. The relative standard deviaton of ten replicate determinations on 3.44 ppb U of the natural seawater is 4.7%.

87CH0007. Y.H.LUO. 1984(10). DETERMINATION OF TRACE SILVER IN SEAWATER BY DIFFERENTIAL PULSE ANODIC STRIPPING VOLTAMMETRY METHO+. ACTA OCEANOL. SINICA. 3(4):517-526. CHINA OCEAN PRESS, BEIJING. EN.

This paper presents a new method to determine trace silver in seawater, the Differential pulse Anodic Stripping Voltammetry Method with Glassy Carbon-Gold Membrane Electrode in the Case of Laminar Flow, together with the description of its electrode structure, its principles and experimental conditions. Experimental results show that the reproducibility of glassy carbon electrode has been improved and the sensibility of determination of trace silver increased by combining the glassy carbon-gold membrane electrode with differential pulse stripping method in the case of laminar flow.

87CH0008. R.H.LU, W.F.CHEN. 1984(4). DIRECT DETERMINATION OF TRACE CADMIUM IN SEAWATER BY DERIVATIVE-VOLTAMMETRY. ACTA OCEANOL. SINICA. 3(2):221-225. CHINA OCEAN PRESS, BEIJING. EN.

An analytical method is proposed for the direct determination of Cd in seawater by differential pulse anodic stripping voltammetry and the derivative technique with a hanging mercury drop electrode. The concentration of Cd in seawater is only determined by adjusting the acidity of seawater to pH 2 and by.taking three minutes' plating time. Sensitivity of the method is about 0.0000000001 M, and accuracy of that satisfactory. Relative standard deviation is about 12% when the concentration of Cd in seawater is approximately 0.04 ppb. A good agreement was obtained by a standard curve and a standard addition technique respectively from determining Cd in the same seawater. Actual measurement time per sample is about 10 min.

87CH0009. H.Y.ZOU, S.Y.WU, J.X.CHEN. 1984(7). DETERMINATION OF ZINC 65 IN SEAWATER, MARINE ORGANISMS AND SEDIMENTS. ACTA OCEANOL. SINICA. 3(3):363-368. CHINA OCEAN PRESS, BEIJING. EN.

The methods of ion exchange-electrodeposition, ion exchange-precipitation for source-making, and for

determining Zinc 65 in marine environment have been studied in detail. The chemical and radiochemical yields are 90% for organism and sediment, and 85% for seawater. They have good repeatability with a precision of 3%. The decontamination factors for radioactive nuclides are larger than 1000. The preconcentration of seawater and the electrode position for source-making are significantly improved and can be used on thin and even source-measuring, applicable to low background beta counting.

87CH0010. Q.H.XU, J.H.HUANG, R.H.LU, M.F.HUANG. 1984(7). RESEARCH ON THE DETERMINATION OF PB, CD, CU AND ZN IN SEAWATER BY STRIPPING VOLTAMMETRY. ACTA OCEANOL. SINICA. 3(3):369-375. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, a comparison was made between the two results of determining Pb, Cd, Cu and Zn in seawater by direct current stripping voltammetry(DCS) with rotating glass carbon electrode and by differential pulse stripping voltammetry (DPS) with hanging mercury drop electrode (HMDE). It was found that DCS could be used for determining Pb, Cu, Zn in coastal waters, but it is necessary to add gallium ion to it to eliminate the interference of Cu-Zn inter-metallic compound for determining Zn. The DPS is better for determining Cd.

87CH0011. T.J.KEARNEY, F.J.SANSONE. 1985. ANALYSIS AND FORMATION MECHANISMS OF MIXED N-HALOGENATED METHYLAMINES. WATER CHLORINATION. 5:965-974. LEWIS PUB., CHELSEA. PN-2850. EN.

87CH0012. S.K.YANG, J.D.LIN. 1985(10). STUDY OF SPECIES OF DISSOLVED CHROMIUM IN SEAWATER. ACTA OCEANOL. SINICA. 4(4):564-572. CHINA OCEAN PRESS, BEIJING. EN.

A new and simple analytical procedure has been developed for the determination of the chemical species of dissolved chromium in seawater and used to monitor the water pollution in the sea area of Xiamen. The data obtained by statistical treatment coincides with the environment situation in that sea area.

87CH0013. R.H.LU. 1985(10). DIRECT AND SIMULTANEOUS DETERMINATION OF ZINC, CADMIUM, LEAD, COPPER, AND BISMUTH IN SEAWATER BY D+. ACTA OCEANOL. SINICA. 4(4):557-563. CHINA OCEAN PRESS, BEIJING. EN.

This paper suggests direct and simultaneous determinations of the reducible species of Zinc, Cadmium, Lead, Copper, and Bismuth in seawater made by the derivative-differential pulse anodic stripping voltammetry with a hung mercury drop electrode. The influence of Copper on the determination of Zinc in this experiment condition has been studied, of which both the accuracy and precision are satisfactory. The procedure of determination is so quick, simple and convenient that the background concentration of these five elements in coastal seawaters can be determined only by adjusting the acidity of seawater to pH 2.5 and by taking 10-minutes plating time. Actual measurement time of these five elements for every sample is approximately 25 min.

87CH0014. X.H.MENG, D.F.HUANG, X.SONG. 1985(10). SIMULTANEOUS DETERMINATION OF TRACES OF URANIUM AND THORIUM IN SEAWATER BY ISOTOPE DILUTION MASS S+. ACTA OCEANOL. SINICA. 4(4):573-578. CHINA OCEAN PRESS, BEIJING. EN.

The separation and simultaneous determination of the traces of U and Th in seawater by IDMS is described. The detection limits of this method are 0.0000000024 g for Th and 0.000000011 g for U. The concentrations of U and Th in seawater nearby Xiamen were measured, which are 3.20 ppb and 7 73 ppt respectively. The precisions of the method are +/-1.7% for U and +/-3.6% for Th respectively.

87CH0015. S.K.YANG, L.Y.CHEN. 1985(7). DETERMINATION OF TUNGSTEN AND MOLYBDENUM IN SEAWATER. ACTA OCEANOL. SINICA. 4(3):395-401. CHINA OCEAN PRESS, BEIJING. EN.

Tungsten and molybdenum in seawater can be sensitively and accurately determined by the polarographic catalytic wave. In a supporting electrolyte containing HCl-benzilic acid-NaCl, tungsten has a clear and stable catalytic wave. The sensitivity of the proposed method is 0.000000000005 M for W and 0.0000000006 M for Mo, respectively. This method is an extremely quick, sensitive one and is suitable for the analysis of various kinds of water.

87CH0016. B.D.ZHENG, S.Y.CAI, M.J.ZHUANG, L.S.JIANG. 1985(7). MECHANISM OF URANIUM ADSORPTION ON AMIDOXIME RESIN. ACTA OCEANOL. SINICA. 4(3):417-422. CHINA OCEAN PRESS, BEIJING. EN.

The mechanism of uranium adsorption from seawater by polyacrylamidoxime resin is investigated by means of the experiments of adsorption isotherm and adsorption rate. The uranium uptake increases with the adsorption temperature and varies with the pH of seawater. Thermochemical and kinetic calculation show that the enthalpy change and the activation energy of the uranium adsorption are 42.4 42.4 kJ/mol and 41.2 kJ/mol respectively, indicating that the uranium adsorption on the resin proceeds via a certain complex chemical reaction in which the amidoxime group in the resin chelates uranyl ions.

87CH0017. S.H.LAN, R.Z.YI. 1985(7). DIRECT DETERMINATION OF STRONTIUM IN SEAWATER BY FLAME EMISSION SPECTROPHOTOMETRY. ACTA OCEANOL. SINICA. 4(3):411-416. CHINA OCEAN PRESS, BEIJING. EN.

A procedure is suggested for direct determination of Sr in Seawater using diluted seawater sample and background emission correction by FES. The standard deviation for 8 ppm Sr is better then 2%, and the recovery of the added Sr is 97-105%.

87CH0018. S.K.YANG, S.L.ZANG. 1986(10). DETERMINATION OF RESIDUAL MALATHION IN

NATURAL WATER. ACTA OCEANOL. SINICA. 5(4):530-536. CHINA OCEAN PRESS, BEIJING. EN.

A method for determination of malathion in natural water by cathodic stripping voltammetry using mercury film electrode is suggested in this paper. This method has been applied to the determination of residual malathion in natural water (e.g. the sea, rivers, lakes, etc.). The waveheight is directly proportional to the malathion concentration within the range 0.000000005-0.0000001 mol/L. The method is simple and rapid, and the results of water sample determination is quite in accord with those of Gas Chromatograph.

87CH0019. C.H.CULBERSON, S.HUANG. 1987(5/6). AUTOMATED AMPEROMETRIC OXYGEN TITRATION. DEEP-SEA RES. 34(5/6):875-880. PERGAMON PRESS, OXFORD. EN.

The Winkler method for dissolved oxygen analysis has been automated for routine analysis using a microcomputer controlled piston buret coupled with amperometric end-point detection. The standard deviation of the method under shipboard conditions is 0.3 uM. Analysis time is 3 min per sample.

87CH0020. W.R.SIMPSON, ET AL. 1987(8). IN SITU DEEP WATER PARTICLE SAMPLER AND REAL-TIME SENSOR PACKAGE WITH DATA FROM THE MADEIRA ABYSSA+. DEEP-SEA RES. 34(8):1477-1497. PERGAMON PRESS, OXFORD. EN.

A deep water particle sampler was designed to measure physical variables in real time and collect particulate and water samples in situ with the view to furthering our understanding of biogeochemical cycles. Profiles of particulate concentration, particle size distribution (10-200 um) and temperature against depth are taken on the outward and return casts to a maximum depth of 6000 m. Particle samples are collected by large volume filtration at four depths preselected on the basis of outward cast data. For metal analyses, 1 um polycarbonate membranes are used, and glass fibre filters for organic analysis; larger particles may be collected by prefilters of any chosen mesh size. Data presented from the Madeira Abyssal Plain illustrate the function of the instrument and the results are c+.

87CH0021. CHANG-YANG.KIM, JONG-HUN.WON. 1974(9). CONCENTRATIONS OF MERCURY, CADMIUM, LEAD AND COPPER IN THE SURROUNDING SEAWATER AND IN SEAWEEDS, U+. BULL. KOREAN FISH. SOC. 7(3):169-178. KOREAN FISH. SOC., PUSAN. KO.

Concentrations of mercury, cadmium, lead and copper are determined in the surrounding seawater and in seaweeds, Undaria pinnatifida and Sargassum fulvellum, from Suyeong Bay in Busan in the spring tide and neap tide from January to April 1974.

87CH0022. J.M.EDMOND, ET AL. 1985. CHEMICAL DYNAMICS OF THE CHANGJIANG ESTUARY. CONTINENTAL SHELF RES. 4(1/2):17-36. PERGAMON PRESS, OXFORD. EN.

A reconnaissance of the chemical dynamics of the estuary and plume of the Changjiang was carried out on cruises in the summer of 1980 and the winter of 1981. In summer vigorous turbulence in the main channel of the inner estuary maintains high concentrations of suspended material in the surface layers which suppresses biological activity. Plankton blooms occur only on the inner shelf at salinities greater than about 20 ppt. In winter there is no significant photosynthetic activity over the entire mixing zone. Of the nutrients, nitrate is present in the river in very high concentrations and suffers only minor depletion in the biologically active areas. The distribution of silica is similar. Phosphate shows major release from the suspended particles and complete depletion in the plan+.

87CH0023. R.C.ALLER, ET AL. 1985. EARLY CHEMICAL DIAGENESIS, SEDIMENT-WATER SOLUTE EXCHANGE, AND STORAGE OF REACTIVE ORGANIC MATTER +. CONTINENTAL SHELF RES. 4(1/2):227-251. PERGAMON PRESS, OXFORD. EN.

A substantial proportion of the material delivered to the modern oceans is supplied by a few large rivers such as the Changjiang. Early diagenetic reactions in surficial bottom sediments determine in large part both the eventual infuence of these rivers on the sea and the nature of sedimentary deposits formed. The region off the mouth of the Changjiang exemplifies the interplay between physical, chemical, and biological factors which can produce particular spatial patterns of diagenesis and sediment-water exchange. To examine these patterns measurement of pore water solute profiles, sediment-water solute fluxes, and solute reaction rates in the upper few decimeters of sediment were made at 27 stations near the Changjiang in the East China Sea.

87CH0024. JONG-HUN.WON, HAN-SERB.YANG. 1978(9). STUDIES ON THE WATER QUALITY OF NAGDONG RIVER DOWNSTREAM FOR DRINKING WATER AND INDUSTRIAL SUPPLY +. BULL. KOREAN FISH. SOC. 11(3):129-138. KOREAN FISH. SOC., PUSAN. KO.

The contents of inorganic conservative constituents in the downstream water were determined in spring tides of every month from May 1977 to April 1978 at eight stations of Nagdong River. Samples were taken at the intervals of one or two hours from 7 a.m. to 7 p.m. at each station. The seasonal variations of contents of the chemical constituents were not large and showed nearly definite values at all the stations except station one, Kupo.

87CH0025. J.L.VALENTIN, D.L.ANDRE, S.A.JACOB. 1987. HYDROBIOLOGY IN THE CABO FRIO (BRAZIL) UPWELLING: TWO-DIMENSIONAL STRUCTURE AND VARIABILITY DURING+. CONTINENTAL SHELF RES. 7(1):77-88. PERGAMON PRESS, OXFORD. EN.

A study of the variability of hydrobiological parameters in a vertical section during a wind cycle allowed us to investigate the structure and dynamics of the upwelling ecosystem at Cabo Frio (Brazil). This coastal upwelling system is extremely sensitive to wind

changes with nutrient-rich water reaching the surface under NE winds along a coastal belt less than 5 km wide. This narrow strip is dominated by great hydrological instability. Above the continental shelf the upwelling of cold water is characterized by the inclination of the thermocline, whose vertical oscillation determines the main factors of planktonic fluctuations through the water column.

87CH0026. JONG-HUN.WON, HAN-SERB.YANG. 1978(6). SEASONAL VARIATIONS OF CHLORIDE, CALCIUM AND MAGNESIUM ION CONCENTRATIONS IN NAGDONG RIVER WATER A+. BULL. KOREAN FISH. SOC. 11(2):103-109. KOREAN FISH. SOC., PUSAN. KO.

The contents of chloride ion, calcium and magnesium in Nagdong River water were determined at Mul Geum where the intake station for Busan city water is located. Samples were taken in spring and neap tides of every month from March 1974 to March 1975. The range and mean values of the chloride ion and total hardness were 5.12-39.4 ppm, 11.9 ppm; 27.8-70.8 ppm, 49.5 ppm respectively from March 1974 to January 1975. The patterns of the variations of tide level were similar to that of water level with delay of 2.5 hours in spring tides and 3 hours in neap tides.

87CH0027. BAE-JUNG.LEE, JONG-HUN.WON. 1980(9). SEASONAL VARIATIONS OF THE CONTENTS OF INORGANIC CONSERVATIVE CONSTITUENTS OF NAGDONG RIVER WATER +. BULL. KOREAN FISH. SOC. 13(3):103-108. KOREAN FISH. SOC., PUSAN. KO.

The contents of inorganic conservative constituents in Nagdong River water were determined at Mulgeum where the intake station for Busan city water is located. Samples were taken at intervals of one hour from 7 a.m. 5to 7 p.m. at spring and neap tides of every month from January 1979 to April 1980.

87CH0028. S.Y.CAI, M.J.ZHUANG, W.Q.ZHENG. 1982(12). AHP RESIN AND ITS URANIUM ADSORPTION MECHANISM. ACTA OCEANOL. SINICA. 1(2):225-233. CHINA OCEAN PRESS, BEIJING. EN.

A number of data on the organic adsorbent applied to extract uranium from sea water have been reported, in this paper, we introduce a new organic adsorbent which has high extracting uranium capacity. The syntheses and the experimental uranium adsorption as well as its mechanism are discribed.

87CH0029. M.X.LIU, H.K.GU. 1982(12). TRACE METAL IN FISHES AND BENTHOS IN EAST CHINA SEA. ACTA OCEANOL. SINICA. 1(2):221-224. CHINA OCEAN PRESS, BEIJING. EN.

The application of inverse polarography with anti-adsorption physically coated mercury film electrode to analysis of fishes and benthos is described. The Zn, Cd, Pb, and Cu concentrations of determined marine organisms are 3-212 ug/g. 0.3-7.2 ug/g, 0.1-7.5 ug/g, and 0.06-8.8 ug/g respectively.

87CH0030. DONG-BEOM.YANG, KWANG-WOO.LEE. 1983(9). VERTICAL DISTRIBUTIONS AND DIURNAL VARIATIONS OF DISSOLVED NUTRIENTS AND CHLOROPHYLL A IN MASAN BA+. BULL. KORDI. 5(1):9-13. KORDI., SEOUL. EN.

Vertical distribution of dissolved nutrients and chlorophyll a was studied at 8 stations in Masan Bay in May, 1982. Dissolved nitrate concentrations were high in the surface waters, whereas dissolved inorganic phosphates were high in the bottom waters with low dissolved-oxygen contents. A twenty-four-hour continuous observation in May at a mid-channel station showed high concentrations of dissolved nitrates and chlorophyll a in the less saline waters of the inner Masan Bay. Dissolved nutrients and chlorophyll a contents in the surface water in September were not related to salinity or tidal variations. It was not likely that dissolved nitrates were among the limiting factors on the growth of phytoplankton in Masan Bay. In the surface waters dissolved phosphates were found in limited +.

87CH0031. W.P.COCHLAN. 1986. SEASONAL STUDY OF UPTAKE AND REGENERATION OF NITROGEN ON THE SCOTIAN SHELF. CONTINENTAL SHELF RES. 5(5):555-577. PERGAMON PRESS, OXFORD. EN.

Nitrate and ammonium uptake and regeneration rates were measured in the euphotic zone of the Scotian Shelf during three cruises (spring, summer and late winter). Nitrate, as a portion of the total nitrogen assimilated, decreased with increasing ambient Ammonium ion concentration and depth. Values integrated through the euphotic zone averaged 30% in the summer, and 27% in the spring, indicating that a large portion of phytoplankton growth was supported by 'regenerated' production Ammonium ion during those periods. In winter, growth was supported primarily by 'new' production since Nitrate ion uptake represented 67% of the total nitrogen uptake during that period.

87CH0032. T.E.WHITLEDGE, W.S.REEBURGH, J.J.WALSH. 1986. SEASONAL INORGANIC NITROGEN DISTRIBUTIONS AND DYNAMICS IN THE SOUTHEASTERN BERING SEA. CONTINENTAL SHELF RES. 5(1/2):109-132. PERGAMON PRESS, OXFORD. EN.

The annual cycle of the distribution of nitrate and ammonium concentrations in the PROBES area of the southeastern Bering Sea was highly interactive with the physical and biological processes. Nitrate concentrations were replenished over the shelf during the autumn and winter at a very uniform rate until the spring bloom commenced. In the middle shelf after nitrate concentrations were depleted in the upper mixed layer during the spring bloom, large quantities of ammonium were produced in the bottom layer. Corss-shelf diffusion, vertical diffusion, vertical mixing by storms, benthic release, and possibly nitrification interacted to supply nitrogen utilized by primary production.

87CH0033. L.A.CODISPOTI, G.E.FRIEDERICH, D.W.HOOD. 1986. VARIABILITY IN THE INORGANIC CARBON SYSTEM OVER THE

SOUTHEASTERN BERING SEA SHELF DURING SPRING 19+. CONTINENTAL SHELF RES. 5(1/2):133-160. PERGAMON PRESS, OXFORD. EN.

Inorganic carbon system measurements made over the southeast Bering Sea shelf during March to June 1980 and April to July 1981 reveal extreme temporal variability that is governed primarily by biological processes. The accumulation of organic carbon due to net community production, as estimated from changes in the inorganic carbon system, attained maximum values of about 100 gC/square meter during each experiment. although the dominant signals were of biological origin, effects of increasing insolation during spring and early summer, vertical mixing during storms, gas exchange with the atmosphere, and oscillatory currents were also evident.

87CH0034. J.J.MCCARTHY, J.L.NEVINS. 1986(11/12 UTILIZATION OF NITROGEN AND PHOSPHORUS BY PRIMARY PRODUCERS IN WARM-CORE RING 82-B FOLLOWING DEEP +. DEEP-SEA RES. V.33(11/12:1773-1788. PERGAMON PRESS, OXFORD. EN.

Rates of utilization for nitrate ion, ammonium ion, urea, and phosphate ion by primary producers and the abundances of particulate C, N, and P were determined for the euphotic zone of warm-core ring 82-B in April and early May 1982. The ring had formed in late February, and our study took place between a period of deep convection and the formation of a stable seasonal thermocline. Deep convection enriched the surface waters with nitrate ion and phosphate ion, which remained in sufficient quantities to preclude nutrient limitation of primary production during the course of the study.

87CH0035. P.M.WILLIAMS, E.R.M.DRUFFEL, K.L.SMITH JR. 1987(2). DIETARY CARBON SOURCES FOR DEEP-SEA ORGANISMS AS INFERRED FROM THEIR ORGANIC RADIOCARBON ACTIVITIE+. DEEP-SEA RES. 34(2):253-266. PERGAMON PRESS, OXFORD. EN.

A small but significant depletion of radiocarbon activity is present in surface, meso-, bathy- and abyssopelagic fishes and crustaceans collected from depth in the North Central Pacific and in the Northeast Pacific in the 1960s and 1970s compared to average values for dissolved inorganic carbon and zooplankton found in the euphotic zone during this period. These data suggest that the main source of dietary carbon for deep-sea organisms is from rapidly sinking organic detritus from the surface and from active (animal mediated) transport of living carbon.

87CH0036. W.M.BALCH, C.GARSIDE, E.H.RENGER. 1987(2). STUDIES OF NITRATE TRANSPORT BY MARINE PHYTOPLANKTON USING 36 CL-CLO(3) ION AS A TRANSPORT ANALOGU+. DEEP-SEA RES. 34(2):221-236. PERGAMON PRESS, OXFORD. EN.

Transport of a nitrate analogue 36 Cl-ClO(3) ion, was examined in phytoplankton from the Southern California Bight and Gulf of Maine. Chlorate transport (and by analogy, nitrate transport) was inhibited by ammonium concentrations exceeding 1% of the total dissolved inorganic nitrogen concentration. Chlorate transport rate was highest in water samples in which net uptake was highest and net uptake or production of ammonium approached zero. Transport of chlorate was considerably less light-dependent than the uptake of nitrate. Chlorate transport appeared to be a constitutive process no induction period).

87CH0037. J.P.CHRISTENSEN, W.M.SMETHIE JR., A.H.DEVOL. 1987(5/6). BENTHIC NUTRIENT REGENERATION AND DENITRIFICATION ON THE WASHINGTON CONTINENTAL SHELF. DEEP-SEA RES. 34(5/6):1027-1047. PERGAMON PRESS, OXFORD. EN.

Benthic nutrient regeneration on the Washington continental shelf was investigated using vertical profiles of pore-water nutrient concentrations and whole sediment sulfate reduction rates. In August, carbon oxidation rates by sulfate reduction frequently exceeded those calculated from previously reported oxygen consumption rates. Nutrient fluxes were calculated from pore-water profiles using diagenetic equations containing terms for vertical molecular diffusion, sedimentation, adsorption and macrobenthic irrigation which was estimated by modeling published radon distributions.

87CH0038. W.M.SMETHIE JR. 1987(5/6). NUTRIENT REGENERATION AND DENITRIFICATION IN LOW OXYGEN FJORDS. DEEP-SEA RES. 34(5/6):983-1006. PERGAMON PRESS, OXFORD. EN.

A plot of total combined nitrogen versus phosphate for the Jervis Inlet system (British Columbia, Canada) reveals delta N : delta P = (11.1-11.7):1 instead of 16:1, for the upper 30 m of water of the entire system & for the deep water in the main body of Jervis Inlet. In Narrows Inlet and Princess Louisa Inlet, shallow-silled fjords attached to the main body, the slope in stagnant deep water is even smaller and sometimes negative. This is caused by denitrification in the sediments. These conditions are reflected in the estimated ratio at which phytoplankton take up nitrogen and phosphorus, 12.5:1.

87CH0039. G.E.FRIEDERICH, L.A.CODISPOTI. 1987(5/6). AN ANALYSIS OF CONTINUOUS VERTICAL NUTRIENT PROFILES TAKEN DURING A COLD-ANOMALY OFF PERU. DEEP-SEA RES. 34(5/6):1049-1065. PERGAMON PRESS, OXFORD. EN.

Continuous vertical profiles of nutrient concentrations to depths of about 250 m with a vertical resolution of about 2 m help to describe and explain conditions during a cold-anomaly in the waters off Peru. The data suggest that primary production in the euphotic zone above an extraordinary shallow oxygen deficient zone was supported largely by vertical transports from a thin layer between 10 and 20 m. Calculations based on the profiles suggest that the denitrification rate in the shallow oxygen deficient feature was also supported by vertical diffusion. Both calculations are based on a vertical diffusion coefficient of 1 square centimeter/sec.

87CH0040. D.KAMYKOWSKI. 1987(7). A

PRELIMINARY BIOPHYSICAL MODEL OF THE RELATIONSHIP BETWEEN TEMPERATURE AND PLANT NUTRIENTS IN THE+. DEEP-SEA RES. 34(7):1067-1079. PERGAMON PRESS, OXFORD. EN.

A biophysical model was constructed to examine the relationship between temperature increases and plant nutrient decreases (represented by nitrate) in an upper ocean mixed layer and in underlying 2 m thick strata throughout the remainder of the euphotic zone. The formulation combines the dual effect of solar radiation on the water column heat budget and on nitrate uptake based on photosynthesis to simulate field observations of the nitrate-temperature relationship. The present model examines how the predicted nitrate-temperature relationships respond to changes in available solar radiation, the thickness of the upper mixed layer, the optical water type and the changes in biological efficiency throughout the euphotic zone. Required improvements include a more realistic treatment of inte+.

87CH0041. P.CHAPMAN, C.M.DUNCOMBE RAE, B.R.ALLANSON. 1987(8). NUTRIENTS, CHLOROPHYLL AND OXYGEN RELATIONSHIPS IN THE SURFACE LAYERS AT THE AGULHAS RETROFLECTION. DEEP-SEA RES. 34(8):1399-1416. PERGAMON PRESS, OXFORD. EN.

During the Agulhas Retroflection cruise (ARC) in November-December 1983, data were obtained on the distribution of nutrients, oxygen and chlorophyll a in the area between the south of africa and the Subtropical Convergence. Several frontal systems were observed, which were distinguished by enhanced sea surface chlorophyll a and fluorescence values. Subsurface waters could be differentiated by means of nutrient and chlorophyll concentrations; in particular, the lowest concentrations of all parameters were found in the zone between the Agulhas and Agulhas Return currents, while the Subtropical Convergence zone exhibited the highest nutrient levels.

87CH0042. KYUNG-RYUL.KIM, JUN-HAK.KI. 1987(9). STUDIES ON CHEMICAL AND BIOLOGICAL PROCESSES IN THE KEUM RIVER ESTUARY, KOREA, I. THE CYCLE OF DIS+. J. OCEANOL. SOC. KOREA. 22(3):191-206. OCEANOL. SOC. KOREA, SEOUL. KO.

Keum River discharges 6.4 billion tons of fresh water annually into the Yellow Sea. More than 60% of the total discharge is concentrated in summer, differentiating distinct low-discharge and high-discharge periods for the estuarine environment. The concentration of SPM (Suspended Particulate matter) is, in general, very high, except sometime during rainy season, and turbidity maximum is often observed, especially during spring-tides (Lee and Kim, 1987). Photosynthesis was active only during high-discharge period, despite the presence of enough nutrients throughout the year. SPM showed very low concentration during the period, suggesting that SPM is very important in controlling the productivity in the waters by reducing the efficiency of penetrating lights. Nitrification was the majo+.

87CH0043. J.Y.WEN. 1983(6). VERTICAL DISTRIBUTION OF APPARENT OXYGEN UTILIZATION IN NEARSHORE WATER OFF SOUTHERN AND CENTRAL F+. ACTA OCEANOL. SINICA. 2(1):77-83. CHINA OCEAN PRESS, BEIJING. EN.

This paper studies the vertical distribution of apparent oxygen utilization in nearshore water off Southern and Central Fujian. The characteristics of AOU vertical distribution in summer in the area under consideration are that the AOU has its low value in the upper layer and high one in the lower layer, and that negative values of surface AOU are found at half of the stations. AOU minimals at stations 1d and 1c off central Fujian come from high-rate photosynthesis of phytoplankton and the lower utilization of oxygen with the increase of temperature. The oxygen is mainly produced by photosynthesis rather than by some other processes above 10 meter water at stations 1d and 1c.

87CH0044. S.A.THORPE. 1984. THE ROLE OF BUBBLES PRODUCED BY BREAKING WAVES IN SUPER-SATURATING THE NEAR-SURFACE OCEAN MIXING L+. ANN. GEOPHYS. 2(1):53-56. CNRS, PARIS. PN-2696. EN.

Estimates of the flux of gas across the sea surface have been obtained from laboratory experiments and sonar observations of subsurface bubbles. The former appear to provide a measure of the flux through the sea surface when the contribution from breaking waves and bubbles is negligible, whilst the latter account only for the flux of Oxygen and Nitrogen transported via bubbles. Both fluxes vary with wind speed. The estimates are used to predict the levels of super-saturation of Oxygen and Nitrogen in the near-surface mixing layer of the ocean as a function of wind speed on the assumptions that a balance is achieved between gas injected by bubbles & ejected through the surface, and that other fluxes are negligible. The observed mean super-saturation level for Oxygen of about 3% could b+.

87CH0045. H.X.DIAO, C.X.JIANG, J.P.LU. 1985(1). THE MAXIMUM VALUE OF VERTICAL DISTRIBUTION OF DISSOLVED OXYGEN IN THE SOUTH CHINA SEA. ACTA OCEANOL. SINICA. 4(1):64-72. CHINA OCEAN PRESS, BEIJING. EN.

This paper indicates that there is a maximum value of vertical distribution of dissolved oxygen in the South China Sea in summer, and that this maximum value in summer derives mainly from winter. A similar reservation occurs also in temperature under the thermocline. Above and below the depth of the oxygen maximum, the oxygen content is decreased by an increase of temperature, the biological respiration and the decomposition of organic matter respectively. The oxygen maximum usually occurs above 50 meters in depth where the phytoplankton presents in small amounts. The phytoplankton is only an influentical factor for the oxygen maximum, not a decisive one.

87CH0046. H.X.DIAO. 1986(10). MECHANISM STUDY OF MINIMUM VALUE OF DISSOLVED OXYGEN IN ITS VERTICAL DISTRIBUTION IN THE PACIFIC

O+. ACTA OCEANOL. SINICA. 5(4):537-542. CHINA OCEAN PRESS, BEIJING. EN.

The formative mechanism of the minimum value of dissolved oxygen in its vertical distribution in the Pacific Ocean is systematically discussed according to distibutive characteristics of oxygen and relative parameters. The t and sigma-t thermoclines of certain intensity controlled by water temperature is an elemental cause of forming minimum value of dissolved oxygen in the Pacific Ocean, whose genesis model of minimum value is presented by the author.

87CH0047. M.FRANKIGNOULLE, A.DISTECHE. 1987. STUDY OF THE TRANSMISSION OF THE DIURNAL CARBON DIOXIDE CONCENTRATION CHANGES OBSERVED ABOVE A POS+. CONTINENTAL SHELF RES. 7(1):67-76. PERGAMON PRESS, OXFORD. EN.

A simple method is presented to calculate the carbon dioxide vertical turbulent diffusion coefficient in the upper layer above a Posidonia sea grass bed. The method relies on the measurement of the attenuation and phase shift of the diurnal carbon dioxide variation at different depths in the water column. The values of the turbulent diffusion coefficient fall in the upper range of values given in the literature for the mixed layer (about 0.01 squar meter/sec), which is consistent with the high-energy environment studied.

87CH0048. J.D.CLINE, D.P.WISEGARVER, K.KELLY-HANSEN. 1987(5/6). NITROUS OXIDE AND VERTICAL MIXING IN THE EQUATORIAL PACIFIC DURING THE 1982-1983 EL NINO. DEEP-SEA RES. 34(5/6):857-873. PERGAMON PRESS, OXFORD. EN.

Nitrous oxide concentrations in the eastern equatorial Pacific (105 W-158 W) during the later stages of the 1982-1983 El Nino were within a few percent of saturation at most stations, indicating that normal upwelling had not yet returned. The average flux of nitrous oxide into the mixed layer was 0.9 +/- 0.7 umol/square meter/day, and was largely controlled by eddy diffusion near the base of the mixed layer. Simple flux calculations indicate that in non-upwelling areas the ventilation rate of the mixed layer is relatively rapid compared to the thermocline flux divergence, hence surface concentrations of nitrous oxide will be near equilibrium. In contrast, the eastern equatorial Pacific in a normal year is characterized by strong vertical mixing and upwelling, both of which should resul+.

87CH0049. A.H.DEVOL. 1987(5/6). VERIFICATION OF FLUX MEASUREMENTS MADE WITH IN SITU BENTHIC CHAMBERS. DEEP-SEA RES. 34(5/6):1007-1026. PERGAMON PRESS, OXFORD. EN.

Exchange of solutes between the sediments and overlying water was measured in situ at two locations where the overlying waters were devoid of dissolved oxygen (Skan Bay, Alaska and the Tres Marias depression on the Mexican continental shelf). Measurements were made with a tripod capable of collecting eight sequential samples for analysis of dissolved gases and ions. The tripod also permitted tracer injection and the retrieval of sediments underlying the flux chambers. Because of the absence of oxygen, sediments from these areas did not contain benthic faunal populations, and it was possible to compare the benthic fluxes measured with the tripod with those calculated from pore water profiles. For solutes for which exchange was not limited by resistance in the diffuse sublayer, the 11 +.

87CH0050. J.J.ANDERSON, A.H.DEVOL. 1987(5/6). EXTENT AND INTENSITY OF THE ANOXIC ZONE IN BASINS AND FJORDS. DEEP-SEA RES. 34(5/6):927-944. PERGAMON PRESS, OXFORD. EN.

A model is presented that describes the extent and intensity of the anoxic zone of semi-enclosed basins. Vertical profiles of oxygen and hydrogen sulfide can be modeled by normalizing depth to the sill and bottom depths of the basin, and oxygen and sulfide to the oxygen concentration at sill depth. Profile shapes are controlled by three model parameters that express the ratio of in situ respiration to diffusion, the ratio of oxygen diffusion to advection and the ratio of sulfide production (in oxygen equivalents) to oxygen diffusion. Anoxic basins fall into three categories when compared in terms of their normalized interface depth and normalized bottom sulfide concentrations. Analysis of the three groups suggests that one group represents basins not in equilibrium. The other two group+.

87CH0051. A.POISSON, C.T.A.CHEN. 1987(7). WHY IS THERE LITTLE ANTHROPOGENIC CARBON DIOXIDE IN THE ANTARCTIC BOTTOM WATER?. DEEP-SEA RES. 34(7):1255-1275. PERGAMON PRESS, OXFORD. EN.

Late-winter and early-spring carbonate data compared with summer data confirm the notion that the Weddell Sea pack ice effectively blocks the air-sea exchange of gases. The upwelled old Weddell Deep Water (WDW) dilutes the anthropogenic carbon dioxide concentration in the winter surface water, which then mixes with the Weddell Shelf Water and more WDW to form the antarctic Bottom Water (AABW). Since the WDW probably was formed before industrialization and the winter surface water is also deficient in excess carbon dioxide we expected, and indeed found, that the AABW contains little anthropogenic carbon dioxide. The dilution of the winter surface water by the old WDW also explains why less excess carbon dioxide is found in the remnant winter water (the minimum temperature layer) than i+.

87CH0052. C.OUDOT, C.ANDRIE, Y.MONTEL. 1987(7). EVOLUTION DU CARBONE BIOXYDE OCEANIQUE ET ATMOSPHERIQUE SUR LA PERIODE 1982-1984 DANS L'ATLANTIQUE+. DEEP-SEA RES. 34(7):1107-1137. PERGAMON PRESS, OXFORD. FR.

The distributions of the carbon dioxide partial pressures in surface seawater and in atmosphere are shown and analysed in the tropical Atlantic during the period from July 1982 to August 1984 for both extremal seasons (summer and winter). The comparison between the 1983 results and the 1984 results puts in light the anomaly of the atmospheric conditions which prevailed above the equatorial Atlantic area during 1984, and

which induced anomalous hydrological features and surface oceanic circulation (Hisard et al., 1986). The variability of the oceanic carbon dioxide partial pressure seems nearer the one of salinity than the one of temperature. The leading part of the lateral advection against the vartical motion as the main mechanism responsible for high carbon dioxide partial pressure +.

87CH0053. Z.TOP, W.C.EISMON, W.B.CLARKE. 1987(7). HELIUM ISOTOPE EFFECT AND SOLUBILITY OF HELIUM AND NEON IN DISTILLED WATER AND SEAWATER. DEEP-SEA RES. 34(7):1139-1148. PERGAMON PRESS, OXFORD. EN.

Solubilities of helium and neon were determined in distilled water and seawater equilibrated with the atmosphere in the 0-20 Deg. in Centigrade temperature range. Small differences were found between the present results and those of Weiss. The isotopic fractionation of helium in solution was found to resemble closely the trend determined by Benson and Krause.

87CH0054. X.R.NING, ET AL. 1985(1). A MICRO-FLUORESCENT METHOD FOR THE DETERMINATION OF FREE AMINO ACIDS IN SEAWATER AND THE DISTRIBUT+. ACTA OCEANOL. SINICA. 4(1):121-130. CHINA OCEAN PRESS, BEIJING. EN.

O-Phthaldialdehyde is used for the determination of free amino acid in seawater by measuring the fluorescence produced by its reaction with the alpha-amino group of amino acids. This method is so sensitive that as little as 1-10 nM of amino acids and less than 1 ml of seawater may be sufficient for one test. This method is simple, rapid and accurate and alpha-amino acids contained in seawater can directly be determined without concentration and extraction. It is free from the interference of large content of inorganic salts and other nitrogenous compounds in seawater.

87CH0055. P.M.HOLLIGAN, S.M.TURNER, P.S.LISS. 1987. MEASUREMENTS OF DIMETHYL SULPHIDE IN FRONTAL REGIONS. CONTINENTAL SHELF RES. 7(2):213-224. PERGAMON PRESS, OXFORD. EN.

In June, 1984 measurements of dimethyl sulphide (DMS) were made along surface transects and on vertical profiles across the shelf break and tidal fronts to the southwest of the British isles. Surface concentrations were in the range 44-780 ng DMS-S/liter. Much of this variability is ascribed to the species composition of the phytoplankton, with localized populations of phaeocystis and, probably, coccolithophores being important sources of DMS. The implications of these results are discussed in relation to sampling strategies required to estimate the flux of volatile organic sulphur compounds from the sea to the atmosphere for shelf ecosystems.

87CH0056. J.H.MARTIN, G.A.KNAUER, D.M.KARL, W.W.BROENKOW. 1987(2). VERTEX: CARBON CYCLING IN THE NORTHEAST PACIFIC. DEEP-SEA RES. 34(2):267-285. PERGAMON PRESS, OXFORD. EN.

Particulate organic carbon fluxes were measured with free-floating particle traps at nine locations during VERTEX and related studies. Examination of these data indicated that there was relatively little spatial variability in open ocean fluxes. Data gathered during the VERTEX studies are also used for various global estimates. Open ocean primary productivities are estimated at 130 g C/square meter/year which results in a global open ocean productivity of 42 Gt/year. Organic C removal from the surface of the ocean via particulate sinking (new production) is on the order of 6 Gt/year. Fifty percent of this C is regenerated in the upper 300 m of the water column. The ratio of new production to total primary production is 0.14.

87CH0057. Q.DORTCH. 1987(5/6). THE BIOCHEMICAL COMPOSITION OF PLANKTON IN A SUBSURFACE CHLOROPHYLL MAXIMUM. DEEP-SEA RES. 34(5/6):705-712. PERGAMON PRESS, OXFORD. EN.

The biochemical composition of plankton at a station with a deep, subsurface chlorophyll maximum (SCM) below a nitrogen-depleted surface layer off the Washington coast was determined in order to answer long-standing questions about the nature and causes of SCM. The chlorophyll maximum did not correspond to a protein-biomass maximum, and chlorophyll: protein ratios indicate that only in the SCM were phytoplankton a major constituent of the total biomass. Ratios of free amino acids:protein in the particulate matter were high at all depths in the euphotic zone. From this it can be concluded that phytoplankton in the SCM are N-sufficient, since they make up 80-90% of the biomass there. Above and below the SCM, where nonphytoplankton predominate, the state of N deficiency or sufficiency of+.

87CH0058. B.B.WARD. 1987(5/6). NITROGEN TRANSFORMATIONS IN THE SOUTHERN CALIFORNIA BIGHT. DEEP-SEA RES. 34(5/6):785-805. PERGAMON PRESS, OXFORD. EN.

Oxidation and assimilation of ammonium and nitrate were measured in profiles from the surface to 1000 m at four stations in the Southern California Bight. Assimilative processes dominated the turnover of these nitrogen compounds in the nutrient depleted photic zone; however, at the bottom of the photic zone, nitrification and assimilation were equally important in the turnover of both compounds. Although ammonium oxidation was strongly inhibited by light in the surface samples, nitrification probably contributed to rapid nitrogen cycling within the photic zone. Assimilation of ammonium and nitrite, integrated over the photic zone, was about 3-fold greater than calculated regenerated production. Integrated nitrification rates below the photic zone usually exceeded new primary production+.

87CH0059. S.TSUNOGAI, S.NORIKI. 1987(5/6). ORGANIC MATTER FLUXES AND THE SITES OF OXYGEN CONSUMPTION IN DEEP WATER. DEEP-SEA RES. 34(5/6):755-767. PERGAMON PRESS, OXFORD. EN.

Sediment trap experiments at various stations in the

Pacific and Antarctic Ocean compare observed particulate organic carbon fluxes with those obtained indirectly from vertical profiles of dissolved oxygen in the Pacific deep water. The observed carbon fluxes are characterized by large spatial variation and small vertical variation. The organic carbon fluxes at the 1000 m level ranged from 2 mg C/square meter/day in the subtropical ocean to more than 100 mg C/square meter/day in the highly productive subpolar sea, and decreased by 25 +/- 10% at intervals 1000 m in depth. These results suggest that much particulate matter is transferred rapidly to the bottom of comparatively small areas of the polar, subpolar, hemipelagic and coastal seas and degraded there, and that the bottom water i+.

87CH0060. JUN-HAK.KI, KYUNG-RYUL.KIM. 1987(9). STUDIES ON CHEMICAL AND BIOLOGICAL PROCESSES IN THE KEUM RIVER ESTUARY, KOREA, II. FACTORS CONTROL+. J. OCEANOL. SOC. KOREA. 22(3):207-215. OCEANOL. SOC. KOREA, SEOUL. KO.

The Keum River Estuary was investigated two times in April and July, 1986, to study process controlling chlorophyll distribution in estuarine waters. During the surveys, distribution patterns were studied for chlorophyll-a, nutrients, pH, SPM (Suspended particulate Matter), DO (Dissolved Oxygen), temperature, salinity, etc.. During april survey (low-discharge period), sea water penetrated to Kangkyung, about 35 km upstream from the constructing weir, while in July (high-discharge period) only to 3 km upstream from the weir. In April, SPM showed very high concentrations (500 mg/l) on the average. But very low concentrations (about 10 mg/l) were observed in July due to high discharge of fresh water. Chlorophyll-a concentrations showed large variations both in time and space: much high+.

87CH0061. H.R.HUANG, X.Z.PANG. 1985(1). CHROMIUM SPECIATION IN SEAWATER OF THE BOHAI GULF. ACTA OCEANOL. SINICA. 4(1):52-63. CHINA OCEAN PRESS, BEIJING. EN.

Research of chromium speciation in the Bohai Gulf showed that content of particulate chromium in estuarine area reached more than 90%, so it is an existing dominant speciation in the Bohai Gulf. Ratio between trivalent chromium to total dissolved chromium is over 80%, whereas contents of hexavalent chromium is very low. The mean content of Cr (III) is 5.6 times higher than that of Cr (VI). Thus trivalent chromium is the prinicipal speciation of valency state of chromium in the Bohai Gulf. Under the physical and chemical condition at the eatuary transferring mechanism of chromium in seawater of Bohai Gulf is done by absorption, complexion and subsequent settlement in the sediments of tribalent chromium by suspended matter. Therefore suspended matter plays a part on the purification +.

87CH0062. R.POCKLINGTON. 1985(4). THE CONTRIBUTION OF ORGANIC MATTER BY THE ST. LAWRENCE RIVER TO THE GULF OF ST. LAWRENCE, 1981-198+. MITT. GEOL. 58:323-329. PALAONT. INST. UNIV. HAMBURG. PN-2466. EN.

Results of the third year of sampling on the St. Lawrence River at Quebec City were so at variance with those of the preceeding two years that they must be separately considered. Concentrations were significantly (>30%) higher in the months of greatest discharge. This leads to a revised annual mass transport of POC of 263000000000 g/year and of PON of 28600000000 g/year (C:N=10.7) in 1983, greater than the previous estimate for 1981-82.

87CH0063. C.A.NITTROUER, T.B.CURTIN, D.J.DEMASTER. 1986. CONCENTRATION AND FLUX OF SUSPENDED SEDIMENT ON THE AMAZON CONTINENTAL SHELF. CONTINENTAL SHELF RES. 6(1/2):151-174. PERGAMON PRESS, OXFORD. EN.

The distribution and movement of suspended sediment has been examined on the continental shelf near the mouth of the Amazon River, during peak discharge of the river. Observations included: transmissometer/CTD profiles widely distributed on the shelf, and combined with current meter profiles at two anchor stations near the river mouth; drogue deployments northwest of the river mouth; and transmissometer/current meter moorings near the northern boundary (4 N) of the study area. Suspended-sediment concentration becomes significant landward of about the 30-m isobath, where it characteristically increases exponentially toward the seabed.

87CH0064. R.FRACHE, ET AL. 1986. STUDIES ON THE PARTICULATE MATTER IN THE LIGURIAN SEA. WATER SCI. TECH. 18:314. IAWPRC. PN-2552. EN.

87CH0065. J.K.B.BISHOP, ET AL. 1986(11/12 PARTICULATE MATTER PRODUCTION AND CONSUMPTION IN DEEP MIXED LAYERS: OBSERVATIONS IN A WARM-CORE RI+. DEEP-SEA RES. V.33(11/12:1813-1841. PERGAMON PRESS, OXFORD. EN.

Particulate matter variability is described in the context of biological and physical processes in the core waters of WCR 82B between February and late June 1982. These observations demonstrate that the coupling of physical, biological and chemical processes in the upper ocean occurs on time scales as short as 10 days. They also show that particulate matter is a sensitive indicator of the balance between production and removal processes in the upper 1000 m. Our data suggest that (1) zooplankton consumption as opposed to dark respiration is the dominant loss mechanism for phytoplankton carbon mixed below the euphotic zone into deep mixed layers, and (2) the imbalance between production and removal processes in the euphotic zone at the time of stratification caused by the cessation of m+.

87CH0066. Z.F.WANG. 1986(7). BEHAVIOURS OF SUSPENDED PARTICULATE MATERIALS IN CHANGJIANG ESTUARY. ACTA OCEANOL. SINICA. 5(3):393-399. CHINA OCEAN PRESS, BEIJING. EN.

The paper deals with the distribution of suspended

particulated materials (SPM) in the Changjiang Estuary, the relation of salinity to particulated organic carbon and particulated organic nitrogen, and behaviour of SPM in mixing river-sea water. At the same time, the article shows that the SPM in Changjiang River emptying into the sea contains a large amount of organic matter. The relative concentrations of suspended particulate organic matter and living organic matter gradually increase seaward. In the estuarine environment, there is a linear relationship between log SPM and C/N ratio during the mixing of fresh water with seawater.

87CH0067. T.SAINO, A.HATTORI. 1987(5/6). GEOGRAPHICAL VARIATION OF THE WATER COLUMN DISTRIBUTION OF SUSPENDED PARTICULATE ORGANIC NITROGEN +. DEEP-SEA RES. 34(5/6):807-827. PERGAMON PRESS, OXFORD. EN.

The water column distribution of suspended particulate organic nitrogen (PON) and its natural abundance ratio of nitrogen 15: nitrogen 14 were investigated to a depth of about 4000 m at 13 stations in the North Pacific, and the South China, Philippine and bering seas. At two stations in the northern North Pacific, sediment trap experiments were also carried out. The average nitrogen 15 abundance of PON in the water column was higher in the eastern tropical and central gyre portions of the Pacific than in the western Pacific, the South China Sea, the Philippine Sea, and the Bering Sea. Year-round stratification, the influence of nitrogen 15 enriched nitrate produced during denitrification and the lack of significant nitrogen fixation in the surface layer probably caused the nitrogen 15+.

87CH0068. J.A.MOODY, B.BUTMAN, M.H.BOTHNER. 1987(6). NEAR-BOTTOM SUSPENDED MATTER CONCENTRATION ON THE CONTINENTAL SHELF DURING STORMS: ESTIMATES BASED+. CONTINENTAL SHELF RES. 7(6):609-628. PERGAMON PRESS, OXFORD. EN.

A laboratory calibration of Sea Tech and Montedoro-Whitney beam transmissometers shows a linear relation between light attenuation coefficient and suspended matter concentration (SMC) for natural sediments and for glass beads. The near-bottom concentration of suspended matter during winter storms on the U.S. East Coast Continental Shelf is estimated from light transmission measurements made 2 m above the bottom and from the size distribution of suspended material collected simultaneously in sediment traps 3 m above the bottom. The average concentrations during six storms between December 1979 and February 1980 in the Middle Atlantic Bight ranged from 2 to 4 mg/liter (maximum concentration of 7 mg/liter) and 8 to 12 mg/liter (maximum concentration of 22 mg/liter) on the south flank of G+.

87CH0069. CHANG-BOK.LEE, TAE-IN.KIM. 1987(6). FORMATION AND EVOLUTION OF TURBIDITY MAXIMUM IN THE KEUM ESTUARY, WEST COAST OF KOREA. J. OCEANOL. SOC. KOREA. 22(2):105-118. OCEANOL. SOC. KOREA, SEOUL. EN.

A series of anchor stations were occupied along the Keum Estuary during six different periods of tidal and fluvial regimes. The results clearly show that the formation and evolution of the turbidity maximum play an important role in the sedimentary processes in this environment. The turbidity maximum in the Keum Estuary is primarily related to the tidal range at the mouth and is caused by the resuspension of bottom sediments. In this estuary, the turbidity maximum is not a permanent feature and shows semidiurnal, fortnightly and seasonal variations. Repetition of deposition and resuspension of fine sediments occur in response to the variation in current velocity associated with semidiurnal tidal cycles. The core of turbidity maximum shifts landward or seaward according to the flood-+.

87CH0070. M.J.RICHARDSON. 1987(8). PARTICLE SIZE, LIGHT SCATTERING AND COMPOSITION OF SUSPENDED PARTICULATE MATTER IN THE NORTH ATLAN+. DEEP-SEA RES. 34(8):1301-1329. PERGAMON PRESS, OXFORD. EN.

Suspended particulate matter characteristics were studied on the Iceland Rise and in the western North Atlantic southeast of New York. Comparison of suspended particulate matter (SPM) and light-scattering in the Iceland Rise area suggests a second-order response due to particle size and/or composition or a nonlinear response with increasing concentration. Correlations of light scattering to SPM concentration also differ regionally. Particle size distributions are more peaked in the nepheloid layer than those in clear water. The nepheloid layer samples have a mean modal size between 3 and 9 um, interpreted as being primarily due to resuspension and advection of sediment into the region in the bottom boundary layer.

87CH0071. KUM-SHO.HWANG, JUNG-UI.HWANG. 1977(12). THE EFFECT OF PRESSURE ON THE ELECTRICAL CONDUCTIVITY OF SEA WATER (II) THE ACTIVATION ENERGY AND +. BULL. KOREAN FISH. SOC. 10(4):213-220. KOREAN FISH. SOC., PUSAN. KO.

In this study, physical and chemical properties of sea water were investigated qualitatively from the data measured by means of the conductive method as described in the previous paper.

87CH0072. CHANG-YANG.KIM, KUM-SHO.HWANG. 1977(12). THE EFFECT OF PRESSURE ON THE ELECTRICAL CONDUCTIVITY OF SEA WATER (I) THE SPECIFIC CONDUCTANCE OF+. BULL. KOREAN FISH. SOC. 10(4):205-212. KOREAN FISH. SOC., PUSAN. KO.

The properties of sea water in deep-sea are still quite poorly understood, even though those of the surface water have been sufficiently investigated. In this study, the specific conductance of sea water was measured under the circumstances: pressure of 1 to 2,000 bars and temperature 10 to 35 Deg. in Centigrade as well as over the concentration of 6.228 to 19.372 permil chloronity. The specific conductance gave the linearity with the given pressure.

87CH0073. JONG-MAN.KIM, SANG-BOK.HAHN, JONG-WHA.LEE. 1977(3). FLUORIDE CONCENTRATION IN THE COASTAL SEA WATER IN THE SOUTH-WEST OF KOREA. BULL. KOREAN FISH. SOC. 10(1):61-64. KOREAN FISH. SOC., PUSAN. KO.

Fluoride analysis using fluoride specific ion electrode has been carried out from sea water samples at 15 stations in the west coast of Korea. The concentration was varied from 0.83 to 1.00 ppm. There was a tendency that the ratio to chlorinity was increased with the depth. In general the concentration was less than that of other seas.

87CH0074. R.K.ZHANG, Y.H.LUO. 1982(6). RESEARCH ON DETERMINATON OF DISSOLVED OXYGEN IN SEAWATER. ACTA OCEANOL. SINICA. 1(1):62-70. CHINA OCEAN PRESS, BEIJING. EN.

Based on the principle of laminar flow-constant potential-chronocoulometry, this article presents a new method of determining the dissolved oxygen in seawater with considerable success. A new model of electrochemical sensor has been designed for this purpose. The sensor has the advantage of overcoming hysteresis and "outskirts effect", thus increasing its stability and prolonging its use to 1-2 years. In connection with this new method a new model SY-1 integrating microcoulometer with digital display is designed. It is a fast and accurate method, suitable for use in the laboratory on board a ship.

87CH0075. H.K.GU. 1982(6). MAXIMUM VERTICAL DISTRIBUTION OF DISSOLVED OXYGEN IN THE HUANGHAI SEA AND ITS MECHANISM. ACTA OCEANOL. SINICA. 1(1):71-76. CHINA OCEAN PRESS, BEIJING. EN.

Maximum vertical distribution of dissolved in the Huanghai Sea (Yellow Sea) and its mechanism are studied. The oxygen maximum in the summer thermoclcine is mainly conserved (derived) from winter.

87CH0076. Z.LIANG, Z.D.WANG. 1984(7). STATES OF CHLORINITY, SALINITY, ELECTRICAL CONDUCTIVITY AND ALKALINITY OF THE ZHUJIANG ESTUARY AND+. ACTA OCEANOL. SINICA. 3(3):355-362. CHINA OCEAN PRESS, BEIJING. EN.

Chlorinity, salinity, alkalinity and conductivity ratio at 15 Deg. in Centigrade have been determined for the Zhujiang (Pearl River) Estuary, and some mathematical expressions of relationships between these chemical factors have been derived. These measurements form a basis of understanding the hydrochemical states of this estuary.

87CH0077. D.C.G.MUIR, A.L.YARECHEWSKI. 1984. DEGRADATION OF METHOXYCHLOR IN SEDIMENTS UNDER VARIOUS REDOX CONDITIONS. J. ENVIRON. SCI. HEALTH. 19(3):271-295. MARCEL DEKKER, N.Y. PN-2476. EN.

The degradation of methoxychlor was studied under laboratory conditions in lake and pond sediments incubated under various redox conditions at 22.5 or 10 Deg. in Centigrade. Methoxychlor degraded rapidly in sediments with half-lives of <28 days under nitrogen aeration (Eh < -50 mv), 49 to 55 days under static aerobic conditions and 115 to 206 days in air-purged flasks (Eh 220 to 464 mv).

87CH0078. S.L.SCHIFF, R.F.ANDERSON. 1986. ALKALINITY PRODUCTION IN EPILIMNETIC SEDIMENTS: ACIDIC AND NON-ACIDIC LAKES. WATER, AIR, & SOIL POLL. 31:941-948. D. REIDEL PUB., DORDRECHT. PN-2886. EN.

Interstitial water profiles in epilimnetic sediments of lakes with varying water column alkalinities were collected to assess the origin and importance of sedimentary alkalinity in freshwater lakes. Release of calcium ion and ammonium ion, and consumption of sulphide ion are the most important contributors to alkalinity production in sediments of non-acidic lakes. In acidic lakes, iron ion and manganese ion replace calcium ion as the dominant cation contributors to alkalinity production. The sedimentary alkalinity flux is an important component of the acid neutralizing capacity of freshwater lakes. However, the presence of large alkalinity gradients in sediment porewaters does not necessarily indicate a large source of alkalinity for the lake, as a significant portion of the alkalini+.

87CH0079. JEEWON.CHANG, SAMCHUL.BAE. 1968(3). EXAMINATION OF SEAWATER ALONG THE COAST FROM PUSAN TO WULNAE. BULL. KOREAN FISH. SOC. 1(1):51-53. KOREAN FISH. SOC., PUSAN. KO.

The distribution of the radioactivity of seawater along the coast and the adjacent sea of Korea has not been reported. Therefore it is necessary to investigate this to give the basic data for reference in the field of the project applying atomic energy. A power plant of atomic energy projected by the government of R.O.K., and the Atomic Energy Agency has commenced to make general survey in geographical, meteorological and oceanographical aspects of proposed sites for it. It is a part of that survey in the field of the oceanographical investigation. The results of examination of sea water near those sites together with the fresh water of the rivers in those area are reported in this paper.

87CH0080. M.HEYRAUD, R.D.CHERRY. 1983(1). CORRELATION OF POLONIUM 210 AND LEAD 210 ENRICHMENTS IN THE SEA-SURFACE MICROLAYER WITH NEUSTON BI+. CONTINENTAL SHELF RES. 1(3):283-293. PERGAMON PRESS, OXFORD. EN.

Samples of the surface microlayer, of bulk seawater from 20-cm depth and of the neustonic organisms inhabiting the top 5 cm of the sea were collected at regular intervals over a period of 17 months at a site 3 km off Monaco and analysed for the naturally occurring radionuclides Polonium 210 and Lead 210. Enrichment of Polonium 210 in the microlayer compared with the bulk seawater was always observed, and the degree of enrichment was found to be correlated significantly with the neuston biomass per unit volume. Enrichment of Lead 210 in the microlayer was also observed, but only under the higher neuston biomass conditions.

87CH0081. P.SCHLOSSER, W.ROETHER, G.ROHARDT. 1987(3). HELIUM-3 BALANCE OF THE UPPER LAYERS OF THE NORTHWESTERN WEDDELL SEA. DEEP-SEA RES. 34(3):365-377. PERGAMON PRESS, OXFORD. EN.

Helium-3 data of the upper water column at stations in the northwestern Weddell Sea and in the Bransfield Strait are presented and discussed in relation to the hydrography. from our observations a Helium 3 balance for the winter mixed layer is proposed, which allows us to estimate the rate of entrainment of Warm Deep Water into the Winter Water to be Between 15 and 35 m/year. Of the assumptions required to obtain the WDW entrainment estimate, that of quasi-stationarity of the gas transfer across the pycnocline appears to be the most critical one, but other assumptions appear to require further study as well.

87CH0082. F.L.CAI, Y.CHEN, P.A.XU. 1987(7). THE MIGRATION PROCESS OF RADIONUCLIDES IN ARTIFICIAL MICROHABITAT. ACTA OCEANOL. SINICA. 6(3):428-433. CHINA OCEAN PRESS, BEIJING. EN.

According to the principle of photosythesis with sunlight and carbon dioxide by phytoplankton supplying food for marine organisms, while the nitrogenous compounds excreted by marine animals are transferred by bacteria into the nitrate for the use of phytoplankton, an artificial microhabitat is built to investigate comprehensively distributive relationship of Cesium 137, Cesium 134, Zinc 65, Cobalt 60, Iron 59, Manganese 54 in the parts of the microhabitat. The results show that 78% of the Cesium 134 and Cesium 137 in ion state are present in sea water, with 28% of them nearly homogenous envolved in the exchanging processes of the suspensates and organisms, and that 80% of Iron 59, Manganese 54, Zinc 65, Cobalt 60 were concentrated by solid substance, whose motion was mainly controlled b+.

87CH0083. Y.NOZAKI, M.YAMADA. 1987(8). THORIUM AND PROTACTINUM ISOTOPE DISTRIBUTIONS IN WATERS OF THE JAPAN SEA. DEEP-SEA RES. 34(8):1417-1430. PERGAMON PRESS, OXFORD. EN.

New data on the distribution of thorium and protactinum isotopes in the Japan Sea are presented based on analysis of large volume seawater samples. The isotopes thorium 230 and protactinum 231 show no systematic change in concentration with depth. Their box model residence times, based on mean concentration, are 10 years for thorium and 59 years for protactinum. In deep waters, the thorium 230 concentration becomes nearly constant which may result from rapid mixing of the water column and enhanced removal of the isotope at the sediment-water interface.

87CH0084. S.CHEN, W.Z.LIAO, X.B.HUANG, J.L.TANG. 1982(6). THE STRUCTURE OF HYDROUS TITANIUM OXIDE AND ITS PROPERTIES OF EXTRACTION OF URANIUM FROM SEAWATER. ACTA OCEANOL. SINICA. 1(1):77-81. CHINA OCEAN PRESS, BEIJING. EN.

87CH0085. F.J.SANSONE, T.J.KEARNEY. 1984. CHLORINATION KINETICS OF SURFACE AND DEEP TROPICAL SEAWATER. WATER CHLORINATION. 5:755-762. LEWIS PUB., CHELSEA. PN-2882. EN.

87CH0086. S.CHEN, ET AL. 1984(10). SOLID-LIQUID INTERFACE PROCESS OF HEAVY METAL IN THE CHANGJIANG ESTUARY; ADSORPTION THERMODYNAMIC +. ACTA OCEANOL. SINICA. 3(4):499-507. CHINA OCEAN PRESS, BEIJING. EN.

The adsorption of Pb, cu and Cd on synthetic hydrous ferric oxide (HFO) has been performed under simulated environmental conditions of the Changjiang Estuary. An improved metal ion-hydrogen ion exchange-adsorption model is proposed to explain the adsorption processes. The adsorption of these elements falls in the order: Pb>Cu>Cd and has a good coincidence with the field results obtained from the estuary. It has been concluded that the adsorption processes of Pb and Cu on HFO are mainly chemical actions, whereas static-electrical action dominates in the case of Cd.

87CH0087. G.S.ZHUANG, ET AL. 1984(10). SOLID-LIQUID INTERFACE PROCESS OF HEAVY METALS IN THE CHANGJIANG ESTUARY; KINETICS OF ADSORPTION O+. ACTA OCEANOL. SINICA. 3(4):508-516. CHINA OCEAN PRESS, BEIJING. EN.

The adsorption kinetics of Pb, Cu and Cd on hydrous ferric oxide (HFO) has been approached in the simulated environmental conditions of the Changjiang Estuary. The forward adsorption rate constants of different systems under different temperatures have been determined, and the activation energies of the adsorption for Pb and Cu evaluated (Pb=7 kcal/mol, Cu=11 kcal/mol). The results show that Pb and Cu are strongly adsorbed by HFO; the order of their adsorption rate is found to be Pb>Cu>Cd, which follows the order of their thermodynamic equilibrium constants. It has been demonstrated that the surface exchange-adsorption is the determining step of the solid-liquid interface process. The field investigation results are theoretically explained by the kinetic mechanism.

87CH0088. M.Y.SUN, Z.B.ZHANG, L.S.LIU. 1985(1). A NEW CHEMICAL MODEL OF TRACE-ELEMENTS PARTITIONED ON CLAY MINERALS IN SEAWATER. ACTA OCEANOL. SINICA. 4(1):42-51. CHINA OCEAN PRESS, BEIJING. EN.

This article studies the interactions of trace-elements in seawater with clay minerals and presents a chemical model-the main action of cation exchange in lower concentration of Pb and the main action of surface precipitation in higher concentration of Pb. Two actions are proved by the pH effect and the temperature effect of the interaction respectively. Applying Toth equation describing gas-solid adsorption to our experimental systems, we have established the isothermal formulae for liquid-solid systems. The theory curves agree with the measuring results.

87CH0089. W.T.FU, ET AL. 1986(4). ADSORPTION OF URANYL COMPLEX IONS ON HYDROUS TITANIUM OXIDE; I. CHEMICAL THERMODYNAMICAL CHARACTER+. ACTA OCEANOL. SINICA. 5(2):221-227. CHINA OCEAN PRESS, BEIJING. EN.

An account is given of the thermodynamical characteristics of the adsorption of uranyl complex ions on hydrous titanium oxide (HTO) in Sodium Chloride-Sodium Bicarbonate solution and in seawater. Determined are the adsorption isotherms and the adsorption density in various pH. The contribution of each component to the adsorption density, the adsorption free energy, the coulostatic energy and the chemisorption potential energy are estimated. The average free energy, enthalpy change, and entropy change, of the adsorption in this system are -7.33 kcal/mol, 6.30 kcal/mol and 45.7 cal/mol K respectively. It is hereof concluded that the complex chemisorption process is spontaneous and thermonegative.

87CH0090. E.M.VAN DE VRIE. MODELLING AND ESTIMATING TRANSPORT AND FATE OF HEAVY METALS IN WATER COLUMN AND SEDIMENT LAYER IN +. 273-281. DELTA INST. HYDROBIOL. RES. PN-3076. EN.

In the Delta area in the S.W. Netherlands 3 of the main European rivers enter the sea. For protection against storm floods a complex network of dikes, dams and sluices is constructed, changing estuaries in stagnant or semi-stagnant, saline, brackish or freshwater lakes. Some of the new created lakes are sedimentation areas of the rivers Rijn, Maas and Schelde. Beside suspended particles these rivers carry also a considerable amount of heavy metals partly remaining in the former estuaries. To calculate the concentrations of heavy metals in the water column and the sediment layer a compartment model 'SIMMV' is developed. Heavy metals are present in the dissolved phase and bound to particles. Transport between water and sediments takes place bounded on settling particles and in the di+.

87CH0091. JONG-HUN.WON, CHUNG-KIL.PARK, HAN-SERB.YANG. 1976(9). DISTRIBUTION OF MERCURY, CADMIUM, COPPER, LEAD AND ZINC IN SEA WATER OF ULSAN BAY. BULL. KOREAN FISH. SOC. 9(3):177-184. KOREAN FISH. SOC., PUSAN. KO.

The concentrations of mercury, cadmium, copper, lead and zinc in sea water of Ulsan Bay were determined at spring and neap tide in August 1976. The concentrations and variations of the heavy metals were higher at spring tide than that at neap tide. The heavy metal levels of Ulsan Bay except Ulsan Harbour area was not higher than those of other coastal area. Low chlorosity, low pH and high heavy metal levels except zinc were determined in Ulsan Harbour at spring tide.

87CH0092. JONG-HUN.WON, CHUNG-KIL.PARK, HAN-SERB.YANG. 1976(9). DETERMINATION OF CADMIUM, COPPER, LEAD, ZINC AND MERCURY IN SEA WATER BY ATOMIC ABSORPTION SPECTRO+. BULL. KOREAN FISH. SOC. 9(3):169-175. KOREAN FISH. SOC., PUSAN. KO.

A solvent extraction-atomic absorption spectrophotometry for determination of trace amount of cadmium, copper, lead and zinc and a flameless atomic absorption spectrophotometry for mercury in sea water were studied.

87CH0093. JONG-HUN.WON, HAN-SERB.YANG. 1978(9). STUDIES ON THE WATER QUALITY OF NAGDONG RIVER DOWNSTREAM FOR DRINKING WATER AND INDUSTRIAL SUPPLY +. BULL. KOREAN FISH. SOC. 11(3):139-146. KOREAN FISH. SOC., PUSAN. KO.

The annual variations of some heavy metal concentrations, Al, Mn, Fe, Cu, Pb, Zn, Cd, Hg were determined on the day of spring tides in every month from May 1977 to April 1978 at eight stations in the Nagdong River downstream. Samples were taken at intervals of one or two hours from 7 a.m. to 7 p.m. at each station. Annual ranges and means of concentrations of the heavy metals are as follows. In general, the contents of heavy metals except manganese and mercury were higher at the stations above station one, Kupo, though the ranges of the contents showed remarkable difference according to the sampling stations. Annual means of the concentrations of iron and manganese were exceeded already the desirable standards for industrial water and closed to the criteria of raw water for public supp+.

87CH0094. F.Y.LI, ET AL. 1983(12). ZN, PB, CU AND CD IN PHASES OF SEDIMENTS IN ZHUJIANG ESTUARY. ACTA OCEANOL. SINICA. 2(2):249-260. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, the samples of sediments collected from five sampling-stations in the river-sea water mixing zone of the Zhujiang Estuary have been determined by the sequencial extraction procedure, anodic stripping voltammetry and atomic emission spectrometry etc. The contents of the heavy metals Zn, Cu, Pb and Cd in the various phases which are dissolvable, ion-exchangeable, combined with carbonates, easily-reducible, reducible, combined with organic matters and sulfides and residue in the sediments, have been obtained.

87CH0095. H.R.HUANG, X.Z.PANG. 1983(12). CHROMIUM DISTRIBUTION AND TRANSFER IN SEAWATER OF BOHAI GULF. ACTA OCEANOL. SINICA. 2(2):261-270. CHINA OCEAN PRESS, BEIJING. EN.

The concentrations of dissolved chromium in seawater of the Bohai Gulf vary from trace to 1.6 ug/liter while those of particulate chromium from trace to 8.66 ug/liter, indicating that the concentration of chromium in seawater of nearshore and estuary in the Bohai Gulf is higher than that of offshore, and reflecting the effects of estuarine and terrestrial pollutions. Observation data indicate that there is a positive correlation between particulate chromium and COD.

87CH0096. C.H.WANG, J.X.ZHU. 1983(12). THE DIFFUSION FLUX OF AMMONIA AND CARBONIC

ACID. ACTA OCEANOL. SINICA. 2(2):225-234. CHINA OCEAN PRESS, BEIJING. EN.

Some geochemical investigations of interstitial water in surface sediments were conducted at the Changjiang Estuary and the outer shelf of the East China Sea. It is found that the changes of alkalinity, and Ammonium ion diffusion fluxes have a correlation with the actions of benthic fauna. The fluxes measured by gradient method may have a direct linear correlation with the sedimentation rate of this area.

87CH0097. M.X.LIU, W.Y.BAO, G.J.LI, H.K.GU. 1983(6). FORM DISTRIBUTION OF ZN, CD, PB, AND CU IN WATERS OF THE NORTHWEST BOHAI GULF. ACTA OCEANOL. SINICA. 2(1):64-76. CHINA OCEAN PRESS, BEIJING. EN.

The forms distribution of Zn, Cd, Pb and Cu in waters of the Northwest Bohai Gulf is investigated by inverse polarography of anti-adsorption physically coated mercury film electrode, the higher content of most forms of trace metals is in polluted estuary water, and unstable Zn and Pb are in anomalous distribution.

87CH0098. D.C.HURD. 1984. INORGANIC INTERACTIONS OF SILICA-CONTAINING MINERALS WITH SEAWATER. MARINE GEOLOGY & OCEANOGRAPHY OF ARABIAN SEA & COASTAL PAKISTAN. BK:361-368. VAN NOSTRAND REINHOLD, N.Y. PN-2854. EN.

Equations and rate constants for silica-containing minerals dissolving in 25 Deg. in Centigrade, pH 8 seawater suggested by previous workers must be corrected for the differences in suspended matter concentration (surface area of solid per unit volume of solution) and temperature between their work and that of average seawater before these equations can be applied to the problem of silica cycling in the oceans. Thus, correction relative to suspended matter concentration in average seawater reduces their rate constants by 6-7 orders of magnitude; correction for temperature, another order of magnitude; and another correction for that portion of the oceans which is undersaturated with respect to clays gives their corrected range of maximum dissolution rates as 7000000-700000000 micro-moles +.

87CH0099. C.H.WANG. 1984(1). THE DIFFUSION AND DEPOSITION OF MN AND FE AS WELL AS MN CYCLE. ACTA OCEANOL. SINICA. 3(1):56-66. CHINA OCEAN PRESS, BEIJING. EN.

The geochemical investigation in the continental shelf of the East China Sea has been made at 12 stations. Vertical profiles of the concentration of Mn and Fe in the pore water of the near shore and off shore sediments are presented, and compared with corresponding profiles of the solid compounds of Mn and Fe in the sediments. A preliminary analysis of the results has been given and according to these data, a rough model of Mn cycle is preliminarily suggested.

87CH0100. SOO-HYUNG.LEE, EUN-SOO.KIM, JAE-RYOUNG.OH, KWANG-WOO.LEE. 1984(12). HEAVY METALS IN THE SURFACE WATERS OF CHINHAE BAY DURING 1979-83. BULL. KORDI. 6(1/2):7-12. KORDI., SEOUL. EN.

The concentration of both dissolved and particulate heavy metals in the surface seawaters of Chinhae Bay was measured monthly at 11 stations during 1979-83. The total mean concentrations were 0.22, 1.7, 1.8, and 16.2 ug/l for Cd, Cu, Pb, and Zn, respectively. Within the bay, the concentrations of metals were slightly higher in Masan Inner Bay than in Chindong Bay, Masan Waterway, and Haengam Bay. In Masan Bay, the concentrations of Cd, Cu, Pb, and Zn decreased with increasing distance from the head of the bay to the Mogae Lighthouse. More than 80% of the total Cd, Cu, and Zn were in a dissolved form, whereas the rest were in the form of particulates. For Pb, however, dissolved and particulate fractions were nearly even. During 1979-83, there was no increase in the levels of heavy met+.

87CH0101. S.CHEN, W.Z.LIAO, J.Z.PAN. 1984(4). THE BEHAVIOR AND SEDIMENTATION MECHANISM OF PB, CU AND CD IN SEDIMENTARY PHASE OF THE CHANGJING ES+. ACTA OCEANOL. SINICA. 3(2):212-220. CHINA OCEAN PRESS, BEIJING. EN.

The authors have determined the distributions of Pb, Cu and Cd in surface sediment, acid-soluble fraction and interstitial water of the Changjiang Estuary and analysed the relationship between them and some environmental parameters, finding that there exists a quasi-equilibrium between the interstitial water and the sediment. The distribution of Pb or Cu in both phases is controlled mainly by the adsorption-desorption and deposition-solution processes of hydrous ferric oxide and organic matter in the sediments, whereas Cd is mainly controlled by the deposition-solution process of CdS. The sedimentation mechanism of Pb, Cu and Cd in the Changjiang Estuary is preliminarily proposed.

87CH0102. E.I.HAMILTON, H.E.STEVENS. 1985. SOME OBSERVATIONS ON THE GEOCHEMISTRY AND ISOTOPIC COMPOSITION OF URANIUM IN RELATION TO THE REPRO+. J. ENVIRON. RADIOACTIVITY. 2:23-40. ELSEVIER APPL. SCI., AMSTERDAM PN-2405. EN.

In order to determine whether or not uranium depleted in Uranium 235 and derived from the British Nuclear Fuels Ltd (BNFL) nuclear fuel reprocessing plant at Sellafield, Cumbria, UK can be detected in environmental samples, we have investigated the isotopic composition of uranium in ammonium carbonate leachates from marine and terrestrial samples from near Sellafield. Some show a depletion in Uranium 235 and the presence of Uranium 236 which unequivocally identifies the presence of uranium derived from BNFL. The Uranium 234/Uranium 238 activity ratio and total uranium content of samples are not significantly different from those of natural uranium abundances. The highest concentrations of uranium are found in anaerobic organic-rich silts and the lowest in sandy silts and coarse-graine+.

87CH0103. M.FABIANO, F.BAFFI, R.FRACHE. 1985. SEASONAL AND DEPTH VARIATIONS OF COPPER, IRON AND NICKEL IN LIGURIAN COASTAL WATERS. MARINE CHEMISTRY. 17:165-175.

ELSEVIER SCI. PUB., AMSTERDAM. PN-2530. EN.

The aim of this work is to study the seasonal variation of iron, copper and nickel in connection with those of other environmental parameters which characterize the coastal system studied; in particular, the phytoplankton biomass. Sampling was carried out from January to October with monthly periodicity, at a station 2 miles offshore of Portofino, Italy, to depths of 200 m. The results indicate that the concentrations of copper, iron and nickel in particulate matter show a marked increase compared to values reported in the literature for the open seawater of the Mediterranean. It is also possible to determine a relationship between the three metals and the seasonal and depth variations. In the particulate matter, there is a direct relationship between the phytoplankton biomass and th+.

87CH0104. F.T.MACKENZIE, W.D.BISCHOFF, V.PATERSON. 1985. BIOGEOCHEMICAL CYCLES AND TRENDS IN ESTIMATES OF INPUTS OF ANTHROPOGENIC CHEMICAL CONSTITUENTS TO +. ECO-SYSTEMS RES. CENTER, CORNELL UNIV. PUB. NO. 27. 27:1-57. CORNELL UNIV. PRESS, N.Y. PN-2853. EN.

87CH0105. J.X.HUANG, ET AL. 1985(1). GEOCHEMISTRY OF SILICON, ALUMINIUM, IRON AND CALCIUM CARBONATE IN SEDIMENTS FROM THE CENTRAL PACIF+. ACTA OCEANOL. SINICA. 4(1):73-81. CHINA OCEAN PRESS, BEIJING. EN.

In sediments of the Central Pacific, water depth is the controlling factor of the distribution of Silicon, Aluminium, Iron and Calcium Carbonate. In the shallow and subabysmal areas, Calcium Carbonate content is much greater than that in the abysmal areas where Silicon, Aluminium , and Iron contents are much lower than those in shallow and subabysmal areas. The contents of Silicon, Aluminium, and Iron increase and that of Calcium Carbonate, decrease with the variation of grain size of sediments from coarse to fine. The contents of Aluminium, Silicon, and Iron are positively related to each other and the content of Calcium Carbonate, is negatively related to that of the three elements. The evident regularities of the distribution of Silicon, Aluminium, Iron and calcium Carbonate in the+.

87CH0106. E.K.DUURSMA, J.M.BEWERS. 1985(10). APPLICATION OF PARTITION COEFFICIENTS IN MARINE GEOCHEMISTRY AND ENVIRONMENTAL ASSESSMENT. SCI. SEMINAR ON THE APPLICATION OF DISTRIB. COEFFICIENTS TO RADIOBIOL. 1-24. COMM. EUROPEAN COMMUNITIES. PN-3080. EN.

Although the majority of partition coefficients of elements and radionuclides on marine sediments are in the range of 100 to 10000000, with 10000 to 10000000 for the elements of group 3 to 7 and period 4 to 7 of the periodic system, such partition coefficients are dependant on a number of factors. These concern not only the properties of the element itself with respect to conditions of pH, redox and temperature, but also to the properties of marine particulate matter, seabed sediments and time of exposure.

87CH0107. X.G.LIAO, X.J.ZHANG. 1985(4). GEOCHEMICAL CHARACTERISTICS OF INTERSTITIAL WATER OF THE BOHAI GULF. ACTA OCEANOL. SINICA. 4(2):222-231. CHINA OCEAN PRESS, BEIJING. EN.

This paper discusses the geochemical characteristics of the interstitial water of the Bohai Gulf, where the main salt contents in 55 sedimentary layers of 13 cores (3-4 m in length) and those of bottom seawater have been determined and the exchange capacity and exchange cations of the layers analysed.

87CH0108. C.H.WANG, X.H.CHENG. 1985(4). DIFFUSION AND DEPOSITION OF IRON AND CONTROLLING FACTORS ON THE EAST CHINA SEA CONTINENTAL SHELF. ACTA OCEANOL. SINICA. 492):211-221. CHINA OCEAN PRESS, BEIJING. EN.

Research is conducted on the following questions: 1) the seasonal and spacial changes of Ferrous ion concentration in overlying water and interstitial water; 2) the profiles of Ferric ion and Ferrous ion and total Mn in solid phase of sediment; and 3) the estimation and comparison of Fe and Mn diffusion and deposition fluxes. The complex relation among the early diagenesis of iron, the grain size composition in solid phase of sediment and the factors of pH and Eh as well as dissolved oxygen are reflected by seasonal and space relation of ferrous ion change. The geochemical activity and role of iron and manganese during diagenetic processes is discussed and estimated by calculating and comparing deposition and diffusion fluxes of both the elements.

87CH0109. R.C.ALLER, J.E.MACKIN, R.T.COX JR. 1986. DIAGENESIS OF FE AND S IN AMAZON INNER SHELF MUDS: APPARENT DOMINANCE OF FE REDUCTION AND IMPLICAT+. CONTINENTAL SHELF RES. 6(1/2):263-289. PERGAMON PRESS, OXFORD. EN.

It is commonly observed that Silica reduction dominates the anaerobic decomposition of organic matter and determines redox properties in organic-rich shelf environments. Some areas of inner shelf muds near the mouth of the Amazon River are apparent exceptions to such a generalization. These deposits are sufficiently rich in organic carbon (0.6 +/- 0.1%) to support Ammonium ion production rates in the upper 0-20 cm of 0.4-6 mmol/square meter/day (average of 3.0 +/- 0.3), comparable to reactive sediments on other shelves. Anoxic conditions usually occur near the sediment-water interface, as evidenced by the absence of Nitrate ion and the presence of dissolved Mn and Fe a few centimeters below the surface.

87CH0110. W.G.BEEFTINK, J.NIEUWENHUIZE. 1986. MONITORING TRACE METAL CONTAMINATION IN SALT MARSHES OF THE WESTERSCHELDE ESTUARY. ENVIRONMENTAL MONITORING & ASSESSMENT. 7:233-248. D. REIDEL PUB., DORDRECHT. PN-3073. EN.

A survey is given of the possibilities and restrictions of (bio)monitoring trace metals in the salt marsh as

exemplified for the Scheldt estuary. The objectives for monitoring in the salt marsh are enumerated as well as the requirements they should meet. Previous studies on monitoring trace metals in the salt marsh are reviewed. Problems in monitoring trace metals in the soil subsystem are due to variations in the input of these metals, the type of estuarine circulation and the distribution of physical and chemical conditions in the salt-marsh deposits. The degree of metal enrichment and the spectrum of chemical speciation of the metals by means of a sequential extraction procedure is shortly discussed. Problems in monitoring trace metals in salt-marsh plants are discussed with res+.

87CH0111. B.A.MCKEE, D.J.DEMASTER, C.A.NITTROUER. 1986. TEMPORAL VARIABILITY IN THE PARTITIONING OF THORIUM BETWEEN DISSOLVED AND PARTICULATE PHASES ON TH+. CONTINENTAL SHELF RES. 6(1/2):87-106. PERGAMON PRESS, OXFORD. EN.

During June 1983, surface- and bottom-water samples were collected (over a 38-h period) at two anchor stations just seaward of the Amazon River mouth. samples were analyzed for dissolved and particulate Th activities. Th distribution coefficients exhibited significant temporal variability, ranging from 7,400 to 100,000 ml/g in surface waters & from 880 to 34,000 ml/g in bottom waters. Environmental parameters (e.g. salinity, suspended-sediment concentration) also exhibited a high degree of temporal variability as a result of tidal processes.

87CH0112. D.J.DEMASTER, S.A.KUEHL, C.A.NITTROUER. 1986. EFFECTS OF SUSPENDED SEDIMENTS ON GEOCHEMICAL PROCESSES NEAR THE MOUTH OF THE AMAZON RIVER: EXAMIN+. CONTINENTAL SHELF RES. 6(1/2):107-125. PERGAMON PRESS, OXFORD. EN.

The effects of suspended-sediment concentration on the biological uptake of silica and the chemical behavior of particle-reactive elements are examined for the continental shelf waters near the mouth of the Amazon River. dissolved silica and suspended-sediment concentrations measured during periods of high and low discharge indicate that uptake of dissolved silica begins where the suspended-sediment concentration falls below 10-20 mg/l. Near the mouth of the Amazon River the 10 mg/l turbidity contour and the region of initial silica uptake both occur 20-40 km farther offshore during periods of high discharge (May and June) than during periods of low discharge (October and November).

87CH0113. S.CHEN, A.Y.XU. 1986(10). GEOCHEMISTRY OF MANGANESE NODULES IN THE NOTHERN CENTRAL PACIFIC. ACTA OCEANOL. SINICA. 5(4):543-551. CHINA OCEAN PRESS, BEIJING. EN.

The contents of Mn, Fe, Cu, Co, Ni, Pb and Zn in manganese nodules and associated pelagic sediment from the Northern Central Pacific have been measured, and the correlations between the elements of the nodules and between the chemical composition and the sedimentary environments have been analyzed. It has been found that Cu, Ni and Zn are preferentially enriched in the Mn-oxide phases while Co and Pb in the Fe-oxide phases of the nodules. The elements within the same phase are positively correlated and the elements within different phases are negatively correlated. It is concluded that the elements in the Fe-oxide phase may have directly deposited from seawater while Mn-oxide phase elements are mainly derived from interstitial waters.

87CH0114. X.G.LIAO. 1986(4). GEOCHEMICAL CHARACTERISTICS OF ARSENIC IN SEDIMENTS FROM BOHAI GULF. ACTA OCEANOL. SINICA. 5(2):215-219. CHINA OCEAN PRESS, BEIJING. EN.

This paper deals with the geochemical characteristics of arsenic in sediments from bohai Gulf. The arsenic in seawater, surface sediments and cores is determined. Also measured are other physical and chemical parameters, such as Ni, Fe, C, pH and Eh in sediments. The values of As range from 0.6 to 4.5 ppb in seawater, from 10.0 to 20.9 ppm in surface sediments and from 6.8 to 22.8 ppm in cores. The contents of As from south are higher than those from north. However the As in sediments is the element not affected by pollution. The adsorption and codeposition of Ferric oxide colloid are the major form of transference of As from seawater to sediments in Bohai Gulf.

87CH0115. C.S.WONG, ET AL. 1986(7). THE EFFECT OF MINE TAILINGS ON LEVELS OF HEAVY METALS IN SEAWATER. ACTA OCEANOL. SINICA. 5(3):401-415. CHINA OCEAN PRESS, BEIJING. EN.

Changes in levels of heavy metals in seawater resulting from the addition of mine tailings were studied using plastic enclosures. Nominal concentrations of 10 mg/liter and 100 mg/liter of mine tailings from a B. C. molybdenum mine were added, and the metal levels were followed together with sedimentation rates, particle size distribution and other oceanographic and biological time-series parameters over sixteen days. No substantial elevation in levels of zinc, cadmium and copper was observed in the tailing bags compared to that in a background control bag with no addition of tailings. Lead showed a substantial increase in seawater following tailing addition and its removal apparently was with detritus settling following a plankton bloom, and inorganic settling of fine tailing particles.

87CH0116. B.Y.SUN, S.R.YU. 1986(7). A SIMPLE MODEL OF ELEMENT BALANCE IN ESTUARY. ACTA OCEANOL. SINICA. 5(3):385-392. CHINA OCEAN PRESS, BEIJING. EN.

A simple one-dimensional mathematic model is presented to discuss the balance and behavior of elements in estuary system. The results are as follows: (1) Besides chemical and biological factors, the removal of non-conservative elements is closely concerned with physical processes. (2) When the behavior and balance of non-conservative elements are studied, the mean residence time of these elements is a useful parameter, which can be obtained by combining the information from field-observation with mathematical model. (3) Based on different situations in estuary, the sensitivity

and accuracy of the analytical method used must be considered in the study of the removal of such elements.

87CH0117. R.F.ANDERSON. 1987. REDOX BEHAVIOR OF URANIUM IN AN ANOXIC MARINE BASIN. URANIUM. 3:145-164. ELSEVIER SCI. PUB., AMSTERDAM. PN-3032. EN.

The Cariaco Trench is an enclosed marine basin with restricted bottom-water circulation that causes the water column below 300 m to become anoxic. Concentrations of total U and the oxidation state of dissolved U were measured throughout the water column. There was no indication of rapid U removal at the oxygen-hydrogen sulphide interface, and bottom waters were depleted in U by only about 10% relative to open-ocean seawater. Throughout the water column uranium occurred as soluble chemically labile (reducible) U (VI). Uranium is not reduced to U (IV) by hydrogen sulphide and rapidly (within a few years) removed from the water column by chemical scavenging processes which would be the predicted behavior of U (IV) by analogy with Th (IV).

87CH0118. DONG-SOO.LEE, M.KOIDE. 1987(12). DETERMINATION OF TRACE METALS IN BIVALVE SHELL BY ATOMIC ABSORPTION SPECTROPHOTOMETRY AFTER FE-APD+. OCEAN RES. 9(1/2):1-5. KORDI., ANSAN. EN.

A simple, sensitive, and precise analytical method for the determination of trace metals in bivalve shell is described. The metals analyzed herein are cadmium, copper, lead, nickel, silver, and zinc. The method involves dissolution of shell, isolation of the sought metals by Fe-APDC coprecipitation, and subsequent determination by flame atomic absorption spectrophotometry. The analytical precision of the method ranges from 0.7% to 6.4% at natural concentration levels. The detection limits are at least several times lower than the environmental levels for all metals. Analytical results for mussel and oyster shells collected around the United States Coasts are presented.

87CH0119. Z.TOP, W.B.CLARKE, W.J.JENKINS. 1987(2). TRITIUM AND PRIMORDIAL HELIUM 3, IN THE NORTH ATLANTIC: A STUDY IN THE REGION OF CHARLIE-GIBBS FRA+. DEEP-SEA RES. 34(2):287-298. PERGAMON PRESS, OXFORD. EN.

The plume of primordial Helium 3 seen at a depth of about 3 km in the North Atlantic during the GEOSECS program in 1972 was observed again in the vicinity of the Charlie-Gibbs Fracture Zone. Most evidence suggests that the Fracture Zone is not the source of this helium, but no feasible alternative can be identified. A series of stations on a transect from 25 Deg. to 45 Deg. W at an average latitude of about 52 Deg. N shows three distinct cores of high tritium water as well as evidence of recirculated antarctic Bottom Water-Denmark Straits Water near the floor of the western extremity of the Fracture Zone.

87CH0120. E.H.DE CARLO, G.M.MCMURTRY, KEE-HYUN.KIM. 1987(3). GEOCHEMISTRY OF FERROMANGANESE CRUSTS FROM THE HAWAIIAN ARCHIPELAGO, I. NORTHERN SURVEY AREAS. DEEP-SEA RES. 34(3):441-467. PERGAMON PRESS, OXFORD. EN.

Chemical and mineralogical analyses were performed on samples of ferromanganese crusts from selected seamounts and island slopes of the Hawaiian Archipelago to determine the origin and environment of deposition of these deposits. The majority of the crusts recovered from the northern survey areas are simple mixtures of hydrogenous precipitates and detrital material, whereas the substrates reflect a wide variety of parent materials and depositional environments. Manganese and associated elements (Ni, Co, V, Pb) display decreasing concentrations with increasing water depth over the 0.8-3.2 km interval studied, whereas Fe, Si, Al and other detrital-associated elements show opposite trends.

87CH0121. Z.B.ZHANG, W.J.CAI. 1987(4). THE "ION EXCHANGE-PRECIPITATION" ISOTHERM OF HEAVY METAL PARTITIONING BETWEEN LIQUID AND SOLID IN +. ACTA OCEANOL. SINICA. 6(2):205-214. CHINA OCEAN PRESS, BEIJING. EN.

Determinded in this paper are 18 isotherms of copper ion and lead ion partitioning between liquid and solid (kaolinite, illite and montmorillonite), all proved to be "ion exchange-precipitation" isotherms. This is a new type of isotherms in marine chemistry. We have used the modified BET and Toth equations to describe them. In this paper, we proposed the third expression, i.e. de Boer-Zwikker equation. Theoretically, this method has a proper chemical model. Practically, it is simple and easy to compare with experimental data.

87CH0122. D.M.GLOVER, W.S.REEBURGH. 1987(5). RADON-222 AND RADIUM-226 IN SOUTHEASTERN BERING SEA SHELF WATERS AND SEDIMENT. CONTINENTAL SHELF RES. 7(5):433-456. PERGAMON PRESS, OXFORD. EN.

Radon-222 and Radium-226 activities were measured in the waters and sediment of the southeastern Bering Sea shelf to evaluate the use of radon as a tracer of gas exchange, water column mixing and sediment-water exchange. Cross-shelf distributions of Radon-222 and Radium-226 are presented. Gas transfer coefficients were estimated using near-surface Radon-222 deficiency measurements. A statistically significant linear relationship between averaged wind speed and transfer coefficient was found. Vertical eddy diffusivities were evaluated by applying a one-dimensional model to near-bottom excess Radon-222 distributions; these diffusivities were compared to independently determined values. The one-dimensional model applied to the near-bottom Radon-222 data was found to be inadequate and +.

87CH0123. E.WADA, M.TERAZAKI, Y.KABAYA, T.NEMOTO. 1987(5/6). NITROGEN 15 CARBON 13 ABUNDANCES IN THE ANTARCTIC OCEAN WITH EMPHASIS ON THE BIOGEOCHEMICAL STRUCT+. DEEP-SEA RES. 34(5/6):829-841. PERGAMON PRESS, OXFORD. EN.

Distributions of delta nitrogen 15 and delta carbon 13 for biogenic substances in the Antarctic Ocean were

investigated to construct a biogeochemical framework for assessing the Antarctic ecosystem.

87CH0124. F.D.KING. 1987(5/6). NITROGEN RECYCLING EFFICIENCY IN STEADY-STATE OCEANIC ENVIRONMENTS. DEEP-SEA RES. 34(5/6):843-856. PERGAMON PRESS, OXFORD. EN.

Nitrogen recycling in oceanic environments is considered on a cost to benefit basis; recycling efficiency (R) defines the ratio of total heterotrophic nitrogen regeneration to the rate of phytoplankton grazed. A simple model is derived which demonstrates that R is a function of the excretion to ingestion ratios of organisms at each trophic level as well as the length of the food chain. R is discussed in relation to ecological efficiency, and model equations are solved for relative production, regeneration and egestion for 1-5 trophic levels using an ecological efficiency characteristic of an oceanic environment. Analysis of the microbial loop on the basis of recycling efficiency indicates that marine microheterotrophs may not contribute as much to nitrogen regeneration as previously s+.

87CH0125. S.F.SUGAI. 1987(5/6). TEMPORAL CHANGES IN THE SEDIMENT GEOCHEMISTRY OF TWO SOUTHEAST ALASKAN FJORDS. DEEP-SEA RES. 34(5/6):913-925. PERGAMON PRESS, OXFORD. EN.

Monthly variations in trace metal and nutrient distributions in interstitial water were examined in Smeaton Bay and Boca de Quadra, two deep fjords where bottom water temperatures vary less than 1 Deg. in Centigrade. In Smeaton Bay, episodic sediment mixing and seasonal changes in the supply of reactive organic matter were responsible for the temporal variations observed. Mixing incidents were most frequent in the autumn and winter, leading to oxidation of the pore waters. Interstitial waters became more reducing following the spring deposition of autochthonous carbon, leading to increased concentrations of manganese ion. In contrast, in sediments from the main basin of Boca de Quadra, reducing conditions persisted throughout the year, and the seasonal availability of organic material+.

87CH0126. L.JACOBS, S.EMERSON, S.S.HUESTED. 1987(5/6). TRACE METAL GEOCHEMISTRY IN THE CARIACO TRENCH. DEEP-SEA RES. 34(5/6):965-981. PERGAMON PRESS, OXFORD. EN.

Profiles of dissolved Mn, Fe, Co, Ni, Cu and Cd were determined in the Cariaco Trench. Solubility trends are consistent with previous metal studies in anoxic fjords and landlocked seas, and serve as a model for the effects of anoxia in an oceanic regime. Class B metals (Cu and Cd) exhibit nearly quantitative removal in the anoxic water column. Transition metal concentrations (Mn, Fe, Co) initially increase across the oxygen/hydrogen sulfide interface due to the reductive dissolution of metal oxides, and then decrease at depth because of solid phase uptake. Ni profiles show no comparable response to anoxia, but contrast sharply with Ni profiles of the adjacent Venezuelan Basin. Metals which are observed or predicted to be more insoluble in anoxic water (Cu, Cd, Zn, Pb and Mo) can be +.

87CH0127. R.CARPENTER. 1987(5/6). HAS MAN ALTERED THE CYCLING OF NUTRIENTS AND ORGANIC C ON THE WASHINGTON CONTINENTAL SHELF AND SLO+. DEEP-SEA RES. 34(5/6):881-896. PERGAMON PRESS, OXFORD. EN.

Several sets of water column and sediment data from the Washington coastal zone reveal that man has not detectably increased fluxes of planktonic C to continental slope sediments in recent decades by either increasing nutrient fertilization of the waters or by overharvesting higher tropic level organisms. Washington slope sediments are not as important depocenters for storage of anthropogenic carbon dioxide as the model of Walsh et al. (1985, Deep-Sea Research, 32, 853-883) predicts for slope sediments.

87CH0128. P.W.BALLS. 1987(7). DISPERSION OF DISSOLVED TRACE METALS FROM THE IRISH SEA INTO SCOTTISH COASTAL WATERS. CONTINENTAL SHELF RES. 7(7):685-698. PERGAMON PRESS, OXFORD. EN.

An investigation has been undertaken into the dispersal of contaminants from the Irish Sea into coastal waters of Scotland via the North Channel. A total of 97 surface samples have been analysed for dissolved copper, cadmium and lead. Salinity and reactive phosphate have also been determined. Evidence is presented to suggest that copper, cadmium and reactive phosphate behave essentially conservatively on mixing into Scottish coastal waters. This behaviour is likened to the dispersal of cesium 137 from the Sellafield nuclear fuel reprocessing plant. It is suggested that this simple mechanism is inadequate to account for the lead distribution. It is proposed that this element is partly taken up by suspended particulates and sediments in the well-mixed turbid waters of the North Chann+.

87CH0129. S.CHEN, A.Y.XU, B.K.LUO. 1987(7). GEOCHEMISTRY OF ABYSSAL SEDIMENT IN THE PACIFIC OCEAN. ACTA OCEANOL. SINICA. 6(3):389-396. CHINA OCEAN PRESS, BEIJING. EN.

The contents of Fe, Mn, Cu, Co, Ni, Pb and Zn in the sediment associated with manganese nodules from the Northern Central Pacific Ocean and in their acid-soluble fractions were determined and correlations among the elements and between the trace metals and environmental parameters were discussed. It has been found that the contents of Mn, Cu and Ni in the sediment are one order of magnitude higher than those in the common sediment. As shown in the manganese nodules, they may mainly derive from seabed. The contents of all trace metals in the sediment are obviously governed by Fe-and Mn-oxides, organic matter, seawater depth, particle size and Eh. Multi-element correlation equations were developed for all trace metals. The trace metals in acid-soluble fraction of the sediment were also +.

87CH0130. J.X.LI, W.K.JOHNSON, C.S.WONG. 1987(7). RELEASE OF HEAVY METALS FROM HARBOUR'S SEDIMENT TO SEAWATER: A LABORATORY STUDY. ACTA OCEANOL. SINICA.

6(3):373-379. CHINA OCEAN PRESS, BEIJING. EN.

The release and removal behaviour of Cd, Cu, Co, Ni, Pb and Zn from the sediment of Xiamen Harbour to seawater have been studied under ultra-clean laboratory condition within 168 h. Initial rapid increases in dissolved Cu, Pb, Zn and Co were observed in the first six hours and twelve hours respectively after addition of various amounts of sediment. Then Pb and Co decreased to background values, while Zn decreased to less than the background value and Cu remained unchanged. Cd and Ni did not increase during the experiment. The results indicated that the weakly bound heavy metals were released from the sediment through desorption or exchange. Simultaneously, they might form complexes or be adsorbed in colloids or particles. The two processes existed simultaneously, changing with time+.

87CH0131. J.X.LI, Z.X.CHEN, R.G.DU, G.X.ZHANG. 1987(7). THE CONCENTRATION AND DISTRIBUTION OF TRACE METALS IN THE SURFACE WATERS OF XIAMEN HARBOR. ACTA OCEANOL. SINICA. 6(3):380-388. CHINA OCEAN PRESS, BEIJING. EN.

Dissolved, weakly and strongly bound particulates Cu, Pb, Zn, Cd, Co, Ni and Fe have been measured in the surface water sampled from eleven stations in Xiamen Harbor by clean laboratory methods and GFAAS. The average concentrations found in dissolved fractions are Cu: 0.41 +/- 0.12; Pb: 0.014 +/- 0.008; Zn: 0.084 +/- 0.043; Cd: 0.022 +/- 0.004; Co: 0.009 +/-0.004; Ni: 0.15 +/- 0.02; and Fe: 0.15 +/- 0.02 ug/kg, which make up 62%, 6%, 12%, 85%, 5%, 25% and <1% of the total metals in the surface water respectively. The results are much lower than those reported previously in the coastal waters of China. Industrial sources of trace metal contamination are likely responsible for the distribution of trace metals.

87CH0132. F.MULLER-KARGER, V.ALEXANDER. 1987(7). NITROGEN DYNAMICS IN A MARGINAL SEA-ICE ZONE. CONTINENTAL SHELF RES. 7(7):805-823. PERGAMON PRESS, OXFORD. EN.

Intense blooms of phytoplankton develop at the edge of the seasonal sea ice in the southeastern Bering Sea in spring. These blooms are closely associated with extremely strong water column density stratification due to ice melt. Here we examine the nitrogen requirements of the phytoplankton and evaluate the importance of nitrogen sources to the surface mixed layer. Ammonium and nitrate uptake rates and inorganic nitrogen concentrations within the mixed layer over a 12-day period in May 1982 showed that the amount of nutrient initially present was insufficient to satisfy the requirements of the phytoplankton.

87CH0133. W.M.BERELSON, M.R.BUCHHOLTZ, D.E.HAMMOND, P.H.SANTSCHI. 1987(7). RADON FLUXES MEASURED WITH THE MANOP BOTTOM LANDER. DEEP-SEA RES. 34(7):1209-1228. PERGAMON PRESS, OXFORD. EN.

At five Pacific Ocean sites, radon fluxes were determined from water samples collected by the MANOP Lander, from measurements of radon 222 and radium 226 concentrations in Lander-collected box core sediments, and from measurements of excess radon in the water column. In San Clemente Basin, surficial sediments are enriched in manganese and radium, due to manganese cycling near the sediment-water interface. Molecular diffusion of radon from this radium-rich surficial layer is sufficient to obscure any effect of macrofaunal irrigation on the standing crop of radon in this basin.

87CH0134. E.T.BAKER, ET AL. 1987(8). EVIDENCE FOR HIGH-TEMPERATURE HYDROTHERMAL VENTING ON THE GORDA RIDGE, NORTHEAST PACIFIC OCEAN. DEEP-SEA RES. 34(8):1461-1476. PERGAMON PRESS, OXFORD. EN.

The first water-column survey of the axial valley of the Gorda Ridge, a slow- to medium-rate spreading center within 300 km of the coast of Oregon and California, found strong evidence for ongoing hydrothermal venting. At the northern end of the ridge, anomalously high concentrations of helium-3, dissolved manganese, particulate iron, and methane confirmed the hydrothermal origin of the above-bottom plumes identifiable as maxima in light-attenuation profiles. The presence of excess radon-222 and the highly soluble hydrothermal precipitate anhydrite in the plumes require a local vent source; the precipitation of anhydrite requires fluid temperatures of at least 130 Deg. in Centigrade. Indications of hydrothermal activity elsewhere in the axial valley were inconclusive.

87CH0135. P.J.STATHAM, J.D.BURTON, W.A.MAHER. 1987(8). DISSOLVED ARSENIC IN WATERS OF THE CAPE BASIN. DEEP-SEA RES. 34(8):1353-1359. PERGAMON PRESS, OXFORD. EN.

Measurements of dissolved arsenic have been made on water samples from various depths at six stations in the Cape Basin, using hydride generation and graphite furnace atomic absorption spectrophotometry. Methylated forms of arsenic were not determined under the conditions used. Concentrations in samples from depths shallower than 110 m averaged 19.9 nmol/liter (range 17.6-22.8 nmol/liter) for all stations. The findings are consistent with the view that the major consequence of the uptake of arsenic by microorganisms is cycling between chemical forms within the euphotic zone and that the flux of arsenic into the deep ocean by transport with particles is minor, relative to the concentration of the element in the oceanic reservoir.

87CH0136. M.RHEIN, L.H.CHAN, W.ROETHER, P.SCHLOSSER. 1987(9). RADON-226 AND BARIUM IN NORTHEAST ATLANTIC DEEP WATER. DEEP-SEA RES. 34(9):1541-1564. PERGAMON PRESS, OXFORD. EN.

Radon-226 and Ba data are presented for the northeast Atlantic below 2000 m depth from a section of stations 8 S to 46 N obtained by F.S. Meteor in 1981. The precision of the Radon-226 data (+/- 1%) allows a resolution of structures in the Radon-226 distribution that is comparable to the resolution for Ba and nutrients. Linear property-property correlations in the upper parts of the depth range appear to be uniform within the observational error along the section for

Radon-226, Ba, and alkalinity, whereas the slopes of these properties versus Si increase northwards from about 10 to 0.0025 dpm Ra umol/Si. From this observation, and from studying the property distributions across the Romanche Fracture Zone, it is concluded that calcium carbonate dissolution must be an important process +.

87CH0137. H.K.GU, ET AL. 1986(4). ORIGINAL NATURAL WATER FORMED FROM ZN SATURATED WATER VAPOR. ACTA OCEANOL. SINICA. 5(2):229-234. CHINA OCEAN PRESS, BEIJING. EN.

A new concept, namely, the original natural water formed from Zn etc.-saturated water vapor, is presented according to the experimental fact that the limiting transfer concentration of trace-metal ion cycle with water evaporation equals the ion baseline of natural water.

87CH0138. CHUNG-KIL.PARK. 1975(6). STUDY ON THE CHARACTERISTIC DISTRIBUTION OF PHOSPHATE IN JINHAE BAY. BULL. KOREAN FISH. SOC. 8(2):68-72. KOREAN FISH. SOC., PUSAN. KO.

To study the effect of wastewater from the chemical fertilizer plant on water quality in Jinhae Bay, a survey was conducted from February to December in 1972. Among the various factors in this survey, distribution of phosphate was significantly high as compared with out side of the Bay. The concentration of phosphate was highest in Hengam Bay where the chemical fertilizer plant was located and it diffused to whole area of the Bay gradually. At the station 28 mean value of phosphate was above tenfold in comparison with that of 1967 when the fertilizer plant was constructed. On the other hand, in Geoje Bay, the center of oyster culture, phosphate concentration was lower than out side of the Bay.

87CH0139. CHUNG-KIL.PARK. 1975(9). EUTROPHICATION AND CHLOROPHYLL CONTENT IN THE SEAWATER OF JINHAE BAY AREA. BULL. KOREAN FISH. SOC. 8(3):121-126. KOREAN FISH. SOC., PUSAN. KO.

Chlorophyll a content in marine phytoplankton and nutrient in seawater were determined to study the influence of eutrophication of Jinhae Bay area on primary production. Samples were taken in the surface layer and bottom of 21 stations in Jinhae Bay including Masan Bay and Hengam Bay, and adjacent waters such as Geoje Bay and the estuary of Naktong River for reference during summer period in 1974.

87CH0140. JONG-HUN.WON, BAE-JEONG.LEE, MU-GYOUNG.SIM, HEON-SERK.PARK. 1979(12). EFFECT OF SUYEONG RIVER WATER ON THE WATER POLLUTION OF SUYEONG BAY. BULL. KOREAN FISH. SOC. 12(4):267-276. KOREAN FISH. SOC., PUSAN. KO.

This research was conducted to evaluate the effects of polluted Suyeong River water on the water quality of Kwangan-Ri bathing beach. The quantity of pollutant loading of Suyeong River was determined in January 1979, and the directions of tidal currents and the chemical constituents of the Suyeong Bay water were observed in May 1979. The results are as follows. Considering the tidal current, the polluted waters of Suyeong River flow off the Kwangan-Ri beach during the ebb tides, and flow into the Kwangan Ri beach during the flood tides. Consequently, the water quality of Kwangan-Ri bathing beach is not suitable for bathing.

87CH0141. HYUNG-TACK.HUH. 1979(4). POLYCHLORINATED BIPHENYLS (PCBS) AND THEIR BIOLOGICAL EFFECTS ON FISH AND OTHER AQUATIC ORGANISMS. BULL. KORDI. 1(1):47-51. KORDI., SEOUL. EN.

87CH0142. JONG-HUN.WON, BAE-JEONG.LEE. 1979(6). DISTRIBUTION OF SOME CHEMICAL POLLUTANTS IN SUYEONG BAY. BULL. KOREAN FISH. SOC. 12(2):87-94. KOREAN FISH. SOC., PUSAN. KO.

In order to study the water pollution in Suyeong Bay, Busan, some chemical constituents were determined at 25 stations in the neap tides on 9 Aug. 1977 and spring tides on 30 Aug. 1977. The water quality in Suyeong Bay was particularly shown that the concentrations of COD, iron, copper and mercury were higher than those of other coastal areas and deficiency in dissolved oxygen was observed in some parts of Suyeong Bay. In consideration of the relationship between the chlorosity and the concentrations of nutrient salts, COD and total heavy metals, water pollution of this area is considered due to the inflow of Suyeong River which was extremely polluted by sewage and industrial wastewaters.

87CH0143. KWANG-WOO.LEE. 1980(8). TRANSPORT OF POLLUTANTS IN KOREAN COSTAL WATERS. BULL. KORDI. 2(1):23-29. KORDI., SEOUL. EN.

It is necessary to protect water quality of coastal waters for maximum utilization of Korea's marine resources. However, transport of pollutants into coastal waters has been increasing at a rapid pace due to high industrialization and urbanization during the last two decades in Korea. Out of four major pathways of pollutant inputs to coastal waters (i.e. river inflow, atmospheric transport, coastal discharge through outfalls, and input from vessels and ocean dumpings), estimates are made only for river input and discharge through outfalls of nearsea industrial complexes. For future research problems, input of pollutants, mixing, dispersion, fate of pollutants, better analytical techniques and ecosystem model development are suggested. Above all, more financial support, better cooperat+.

87CH0144. KWANG-WOO.LEE, SOO-HYUNG.LEE, GI-HOON.HONG, JAE-RYOUNG.OH. 1981(12). HEAVY METALS IN COASTAL WATERS NEAR FOUR INDUSTRIAL-COMPLEX AREAS IN KOREA. BULL. KORDI. 3(2):87-96. KORDI., SEOUL. EN.

Heavy metal levels in coastal surface waters of Korea near Banweol, Yeocheon, Changweon, and Ulsan have been investigated for cadmium (Cd), copper (Cu), lead (Pb), and zinc (Zn) from 1980 to 1981. Ulsan

showed highest Cd and Pb values, while largest Cu and Zn values were shown in Changweon. In general, Cu, Pb, and Zn levels were shown to decrease gradually with increasing distance from the coast, except for Yeocheon. Partitioning behaviours of heavy metals between dissolved and particulate species were also investigated in the four coastal waters.

87CH0145. KWANG-WOO.LEE, HI-SANG.KWAK, DONG-BEOM.YANG, EUN-SOO.KIM. 1981(12). SEAWATER QUALITY NEAR FOUR INDUSTRIAL-COMPLEX AREAS IN KOREA. BULL. KORDI. 3(2):75-86. KORDI., SEOUL. EN.

As a part of the master plans for the wastewater treatments and disposals in Banweol, Ulsan, Changweon, and Yeocheon, water quality in those coastal areas of Korea was studied for a year from May, 1980. General water-quality parameters, nutrients and chlorophylls are discussed in this paper, and heavy metals will be reported in the succeeding paper. Temperatures and salinities showed relatively well-mixed water bodies in all four coastal areas. Most of the pH and DO measurements were within and above the Korean Coastal Water Quality Standards. Suspended solids contents were lowest in Ulsan, but highest in Banweol. COD results indicated that all four coastal waters were eutrophic, and some bays near Changweon and Ulsan were nearly hypereutrophic.

87CH0146. SOO-HYUNG.LEE, DONG-SOO.LEE, HI-SANG.KWAK, KWANG-WOO.LEE. 1981(4). THE INTERRELATIONSHIPS AMONG WATER QUALITY PARAMETERS IN THE HAN AND THE NAGDONG RIVERS. BULL. KORDI. 3(1):23-27. KORDI., SEOUL. EN.

In order to investigate stream characteristics including pollutant sources and distribution, water quality of the Han and the Nagdong Rivers has been surveyed during 1978 from 17 and 23 stations, respectively. For all combinations of general water quality parameters and heavy metals, simple correlation coefficients were computed. In the Han R., BOD and COD loadings affected the DO deficit, and both dissolved and particulate fractions of heavy metals. In the Nagdong R., there was no significant correlation among those parameters. Further statistical analysis including regression and factor analysis are warranted for establishment of water quality protection measures for two rivers.

87CH0147. S.CHEN, W.Z.LIAO, X.B.XU. 1982(12). A KINETIC STUDY OF THE EXTRACTION OF URANIUM FROM SEA WATER BY HYDROUS TITANIUM OXIDE-MEASUREMENT +. ACTA OCEANOL. SINICA. 1(2):210-213. CHINA OCEAN PRESS, BEIJING. EN.

87CH0148. Z.X.DOU, ET AL. 1983(6). NUMERICAL MODELLING OF POLLUTANT DISPERSION BY TIDAL CURRENT IN THE BOHAI SEA. ACTA OCEANOL. SINICA. 2(1):12-21. CHINA OCEAN PRESS, BEIJING. EN.

This paper deals with numerical modelling of organic pollutant (COD) in the Bohai Sea. One of the main purposes is intended to provide a useful numerical model for predicting the water quality in the Bohai Sea. A two-dimensional advective-dispersion equation and a set of corresponding ADI difference scheme are used. The computations were executed on the computer in a specially designed program IMEP-TD for modelling dispersion of pollutant. From the modelling results, present water quality in the Bohai Sea is, generally speaking, still fine except the areas near the estuaries and inlets where sea water is contaminated. To protect ecosystem in the Bohai Sea, the inflow load should not keep increasing rapidly.

87CH0149. R.C.SEARLE. 1984(4). GUIDELINES FOR THE SELECTION OF SITES THAT MIGHT PROVE SUITABLE FOR RADIOACTIVE WASTE DISPOSAL ON +. NUCLEAR TECHNOLOGY. 64:166-174. AME. NUCLEAR SOC. PN-2697. EN.

Guidelines have been drawn up for the selection of possible sites for high-level radioactive waste disposal in or on the seabed, which were prepared for the U.K. Department of the Environment. The first step in producing the guidelines was to identify potential failure modes for each disposal option. The guidelines were then developed on the basis of minimizing such failures. No detailed attempt has been made to rank the guidelines, since a proper evaluation of any disposal site must include an analysis of all the interdependent components of the disposal system. However, for disposal within the seabed, the main emphasis is on the geological stability and barrier properties of the disposal medium (the seabed rocks or sediments) and on the engineering feasibility. Among the more impo+.

87CH0150. Y.XIA, J.YAN. 1984(1). EXTRACTION OF URANIUM FROM SEAWATER BY AMIDOXIME RESINS. ACTA OCEANOL. SINICA. 3(1):67-76. CHINA OCEAN PRESS, BEIJING. EN.

The adsorption behaviour for uranium of four kinds of amidoxime resins: RNH, RCH, RAH and RPH in seawater has been investigated. It has been found that all these resins are capable of adsorbing rapidly uranium from U-enriched seawater with a high uranium uptake. RNH was able to adsorb uranium satisfactorily from natural seawater, and the uranium uptake of RNH with a degree of cross-linking of 3-5 mol % was above 200 ug/g-R (adsorption for 15 days). The uranium uptakes of RCH, RAH and RPH from natural seawater were much lower than the uranium uptake of RNH. The factors which caused the difference between resins RCH, RAH, RPH and resin RNH are discussed.

87CH0151. Q.H.XU, J.S.ZHENG, G.X.ZHANG. 1984(4). ON CHELATING RESINS FOR EXTRACTING URANIUM FROM SEAWATER. ACTA OCEANOL. SINICA. 3(2):205-211. CHINA OCEAN PRESS, BEIJING. EN.

A number of chelating resins have been synthesized for extracting uranium from seawater. The feasibilities of extracting uranium directly from seawater by synthesizing chelating resins have been investigated by studying three factors: (1) the chelating ability of the resins for uranyl ion; (2) the competitive complex of calcium, magnesium and other cations with uranyl ion;

(3) the competitive complex of carbonate ion with uranyl ion. It is suggested that the competitive complex of carbonate ion with uranyl ion should be the most important factor.

87CH0152. EUN-SOO.KIM. 1986(9). ECONOMICAL EXTRACTION OF DISSOLVED URANIUM FROM SEAWATER. OCEAN RES. 8(1):81-88. KORDI., ANSAN. KO.

Economical extraction of uranium from ocean water has attracted considerable attention of marine scientist over the last three decades due to relatively high uranium concentration in ocean water and the expected shortage of terrestrial uranium resource in the future. Among the countries involved in this research field, Japan is most active and just started to operate a pilot plant, of which performance results will affect on the direction of future work significantly. In this article, a brief summary of recent research and development activities of uranium recovery from ocean water is described.

87CH0153. JONG-HON.BONG. 1986(12). RELATIONSHIP BETWEEN THE FRESH WATER INPUT AND THE VOLUME TRANSPORT OF LIGURIAN CURRENT. OCEAN RES. 8(2):41-51. KORDI., ANSAN. KO.

Between 1981-1983, a systematic CTD measurement was made in the Ligurian Sea which is located near Nice, France in the northwest Mediterranean. The purpose of this measurement was to study the potential causes of the spatiotemporal variations of the Ligurian Current. In addition to these measurements, the precipitation and river discharge data along the coastline were analyzed. The result shows that the effect of the fresh water input can be a major factor affecting the spatio - temporal variations of the Ligurian Current. The flux of the Ligurian Current was found to be related to the difference in the sea level between the coastal and the offshore area of the Ligurian Sea. This difference was induced by the fresh water input from precipitation and river discharge. A barotropic effe+.

87CH0154. E.K.DUURSMA. 1986(2). MARINE CHEMISTRY OR CHEMICAL OCEANOGRAPHY. LA MER. 24(1):1-2. SOC. FRANCO-JAP. D'OCEANOGR. PN-3075. EN.

87CH0155. SEON-BONG.KIM, ET AL. 1987(1). ANTIOXIDATIVE ACTION OF MAILLARD REACTION PRODUCTS DERIVED FROM D-GLUCOSE AND GLYCINE SYSTEM. BULL. KOREAN FISH. SOC. 20(1):52-56. KOREAN FISH. SOC., PUSAN. KO.

The antioxidative activity of each molecular weight (MW) fraction of Maillard reaction products prepared from a D-glucose and glycine system, i.e., MW below 1000, between 1000 to 5000 and MW above 5000, nondialyzable melanoidins, reduced melanoidins and ozone-treated melanoidins were estimated in a linoleic acid-aqueous system. The antioxidative activity and reducing ability of Maillard reaction products increased with increasing molecular weight and color intensity.

87CH0156. JAE-HO.HA, WOO-DERCK.HAWER, DONG-HWA.SHIN. 1987(5). OPTIMUM CONDITIONS TO ESTERIFY ALGINIC ACID. BULL. KOREAN FISH. SOC. 20(3):202-207. KOREAN FISH. SOC., PUSAN. KO.

Esterifying conditions to produce propylene glycol alginate (PGA) with alginic acid and propylene oxide were determined, and physico-chemical properties of the PGA were also determined. The rate of esterification increased with the content of propylene oxide up to 4 mole. Alginic acid containing 30% of water showed maximum esterification, however, it was difficult to remove the surplus moisture in the alginic acid when it cotained the moisture above 70%. Maximum esterification was taken place when alginic acid with 44.15% of water was reacted with 4mole of propylene oxide at 70 Deg. in Centigrade.

Marine Geology(GE)

87GE0001. D.M.RUBIN, D.S.MCCULLOCH, H.R.HILL. 1983(1). SEA-FLOOR-MOUNTED ROTATING SIDE-SCAN SONAR FOR MAKING TIME-LAPSE SONOGRAPHS. CONTINENTAL SHELF RES. 1(3):295-301. PERGAMON PRESS, OXFORD. EN.

A rotating side-scan sonar system was designed to make time-lapse sonographs of a circular area of the sea floor. to construct the system, the transducers of a commercial side-scan system were mounted 2 m above the sea floor on a vertical shaft that had a rotation speed of 0.5 rpm. Records that are collected with this system offer several advantages over records that are collected with towed systems. Bottom features are presented in nearly true plan geometry, and transducer yaw, pitch, and roll are eliminated. Most importantly, repeated observations can be made from a single point, and bedform movements of <50 cm can be measured.

87GE0002. E.T.BAKER, H.B.MILBURN. 1983(4). AN INSTRUMENT SYSTEM FOR THE INVESTIGATION OF PARTICLE FLUXES. CONTINENTAL SHELF RES. 1(4):425-435. PERGAMON PRESS, OXFORD. EN.

We present the rationale, design, and use of an instrument system to measure the variability of vertical and horizontal particle fluxes. The system features a new sequentially sampling sediment trap which collects and seals 10 separate samples during a single deployment. Horizontal particle fluxes are simultaneously monitored with a beam transmissometer interfaced to a standard Aanderaa current meter. Results from a 10-week deployment of instruments at several depths in a deep fjord estuary indicate that the trapping rate increases from about 0.5 g/square mether/day at 20 m to about 150 g/square meter/day at 200 (5 m above bottom) because of frequent erosion in the deep waters. Periodic flushing of the deep water by intrusions of marine water over the seaward sill markedly enhances er+.

87GE0003. R.W.CRAWFORD, J.TOOLE, M.S.BAXTER, J.THOMSON. 1985. A COMPARISON OF THE PARTICLE TRACK AND ALPHA-SPECTROMETRIC TECHNIQUES IN EXCESS THORIUM-230 DATING+. J. ENVIRON. RADIOACTIVITY. 2:135-144. ELSEVIER APPL. SCI., AMSTERDAM PN-2930. EN.

The particle track analysis and alpha-spectrometric techniques have been applied to a comparative study of excess thorium 230 dating of three deep-sea cores from the Eastern Atlantic. Both methods yield similar sediment accumulation rates. Limitations of the alpha-track phase of the particle track detection process, arising from the non-specific determination of thorium 230 and from the mobility of some alpha-emitting daughters, suggest that details of the sedimentation record may fail to be identified. The conventional radiochemical technique, on the other hand, specifically isolates all the radionuclides of interest but at the expense of a more complex experimental procedure and a longer sample processing time. The combined particle track technique (i.e. alpha and fission track ana+.

87GE0004. J.S.M.RUSBY, R.H.EDGE, M.P.BURNHAM. 1985. THE DESIGN AND OPERATIONAL ANALYSIS OF A TRACTION WINCH SYSTEM FOR FISHING AND CORING AT 6000 METR+. UNDERWATER TECHNOLOGY. 11(3):3-13. PN-2946. EN.

This paper is concerned with the design, installation and operational performance of an electro-hydraulic traction winch system to handle warps for fishing and coring at depths down to 6000 m in the deep sea. It is in two parts, published in successive issues of this Journal. Part 1 describes the design and installation of the system in R.R.S. Discovery. Part 1 starts by discussing certain critical aspects of the design study. This includes a brief description of the computations of warp catenaries and loads necessary for the design of both warps and traction winch, and goes on to mention the particular problems of ship displacement and stability incurred by trying to fit and operate such a winch system in a mature and already 'overburdened' vessel.

87GE0005. J.S.M.RUSBY, R.H.EDGE, M.P.BURNHAM. 1985. THE DESIGN AND OPERATIONAL ANALYSIS OF A TRACTION WINCH SYSTEM FOR FISHING AND CORING AT 6000 METR+. UNDERWATER TECHNOLOGY. 11(4):15-24. PN-2945. EN.

This paper is concerned with the design, installation and operational performance of an electro-hydraulic traction winch system to handle warps for fishing and coring at depths down to 6000 m in the deep sea. It is in two parts, published in successive issues of this Journal. Part 2 the performance problems which came to light during the first year of use and the way in which these problems were overcome and performance improved. Part 2 describes certain problems which arose during the first year of operation, and the efforts made to analyse these and so improve performance. Particular emphasis is placed in Part 2 on the discovery of rapid barrel groove wear, the serious implications of this in amplifying warp string tensions between barrels, and hence the need to match the barrel gro+.

87GE0006. W.W.WAKEFIELD, A.GENIN. 1987(3). THE USE OF A CANADIAN (PERSPECTIVE) GRID IN DEEP-SEA PHOTOGRAPHY. DEEP-SEA RES. 34(3):469-478. PERGAMON PRESS, OXFORD. EN.

The construction and characteristics of a Canadian (perspective) grid as applicable for oblique deep-sea photographs are described. The implementation of such a grid throught an automated digitizing system allows fast, accurate and precise calculations of sizes and densities of animals and other objects. Changes in the camera's inclination due to "nose up" or "nose down" motion over rough topography can cause erroneous calculations of size. The magnitude of this error increases quasi-exponentially with distance of objects from the lower edge of the image and is particularly large for camera systems with a small angle of inclination. The area in a photography from which accurate counts can be taken, should be determined a posteriori for each type of object (e.g. species), based on a p+.

87GE0007. J.BUTENKO, J.D.MILLIMAN, Y.C.YE. 1985. GEOMORPHOLOGY, SHALLOW STRUCTURE, AND GEOLOGICAL HAZARDS IN THE EAST CHINA SEA. CONTINENTAL SHELF RES. 4(1/2):121-141. PERGAMON PRESS, OXFORD. EN.

The inner shelf of the East China Sea is covered with a lens of fine-grained modern sediment derived from the adjacent Changjiang; modern sediments north of the Changjiang came from the Huanghe. Rapid accumulation results in a featureless seafloor, except where escaping biogenic gases cause vents. The modern mud thins towards the mid-shelf and sediment becomes increasingly sandy and locally rippled, indicative of its relict age and present-day mixing and transport. The outer shelf, particularly south of Cheju Island, is covered with fine-grained sediment that apparently reflects modern Huanghe-derived sedimentation.

87GE0008. A.W.NIEDORODA, ET AL. 1985. OAHU OTEC PRELIMINARY DESIGN: SEA-FLOOR SURVEYS. ADV. IN UNDERWATER TECH. & OFFSHORE ENG. 3:15-27. GRAHAM & TROTMAN, LONDON. PN-2851. EN.

87GE0009. W.HAEBERLI, F.EPIFANI. 1986. MAPPING THE DISTRIBUTION OF BURIED GLACIER ICE- AN EXAMPLE FROM LAGO DELLE LOCCE, MONTE ROSA, ITAL+. ANNALS OF GLACIOLOGY. 8:78-81. INST. GLACIOLOGICAL SOC. PN-2435. EN.

Techniques for mapping the distribution of buried glacier ice are discussed and the results, from a study carried out within the framework of flood protection work in the italian alps, are presented. Bottom temperatures of the winter snow cover (BTS) primarily indicate the heat flow conditions in the underlying ground and mainly depend on the presence or absence of an ice layer beneath the surface. Determination of BTS values is therefore an inexpensive method for quickly mapping the near-surface underground ice in areas where there is 1 m or more of winter snow cover. At greater depths, and/or when more detail is required, geoelectrical resistivity soundings and seismic refraction soundings are most commonly used to investigate underground ice. A combination of the two sounding tech+.

87GE0010. R.D.FLOOD, H.J.BOKUNIEWICZ. 1986. BOTTOM MORPHOLOGY IN THE HUDSON RIVER ESTUARY AND NEW YORK HARBOR. NORTHEASTERN GEOLOGY. 8(3):130-140. PN-2546. EN.

Reconnaissance side-scan sonar records collected from New York Harbor and the lower Hudson River disclosed a wide range of bottom morphologies. Abundant natural current-produced features were observed including large areas of lineated sea floor, local fields of well developed furrows, and patches of sand waves. The riverbed was strongly lineated in the vicinity of New York City, but became progressively less lineated as one proceeds up the Hudson River. A lineated sea bed was also observed in a navigation channel leading to Raritan Bay. The lineations that occurred in muddy sediments were aligned with the major current flow direction. In one place intersecting lineation patterns were observed suggesting that more than one strong current direction has been present. Sedimentary furro+.

87GE0011. BYONG-KWON.PARK, SANG-JOON.HAN. 1987(12). SURFACE SEDIMENTS, BASIN EVOLUTION, AND SEDIMENTARY SEQUENCE OF THE YELLOW SEA. OCEAN RES. 9(1/2):51-64. KORDI., ANSAN. EN.

The Yellow Sea is a geologically unique, epicontinental (semi-closed), post-glacially submerged, shallow shelf surrounded by mainland China and the Korean Peninsula. The sea covers an area, characterized by a flat, broad and featureless sea floor with an average depth of about 55 m. The sea annually receives more than 1.6 billion tons of sediments, mostly supplied from the Huanghe and Changjiang Rivers. Sandy sediments occupy the northern part of the Yellow Sea, nearshore of the northern Bohai Bay, offshore the old Huanghe, and the central part of the South Yellow Sea. These sandy sediments seem relict sands. Silty and muddy sediments cover the sandy layer with fine-grained sediments derived from large rivers of China and Korea since the last glacial time.

87GE0012. SOON-KEUN.CHANG. 1987(6). NATURAL ENVIRONMENT AND HUMAN ACTIVITIES IN KING GEORGE ISLAND, WEST ANTARCTICA. J. KOREAN EARTH SCI. SOC. 8(1):53-71. KOREAN EARTH SCI. SOC., SEOUL. PN-2919. KO.

Natural environment and human activities in King George Island, South Shetland Islands in West Antarctica have been briefly reviewed. It is sure that human being can live a normal life in the Island, although the insufficiency in space and water resources might be a hampering factor to further human activities in the Island. It seems necessary to protect natural environment against the recent frequent visit of human beings to the Island.

87GE0013. M.KLEIN, C.FINKELSTEIN. SONAR SERENDIPITY IN LOCH NESS. PN-3009. EN.

87GE0014. K.HORIKAWA, S.HARIKAI. 1978(6). AN EXPERIMENT ON CUSP FORMATION DUE TO THE INTERACTION OF WAVES AND DISCHARGED WATER. ANN. REP. ENG. RES. INST., UNIV. TOKYO. 37:41-46. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2578. EN.

A model experiment simulating prototype conditions in the vicinity of a power plant cooling water discharge outlet was performed to investigate the interaction of the discharge and nearshore currents, and the resulting shoreline change. This interaction and its influence on the shoreline is a relatively new field of study and quantitative discussion is rare. We found several interesting results regarding cusp formation, differences in discharge conditions, and discharge/nearshore current interaction. Although similarity problems arise when modeling field conditions in the laboratory, in particular sediment similtude, such experiments are valuable and necessary engineering tools.

87GE0015. SANGBOK D.HAHN. 1979(4). ON THE COMPILATION OF TOPOGRAPHY IN THE SHALLOW SEA WITH STRONG TIDAL INFLUENCE-BOTTOM TOPOGRAPHY +. BULL. KORDI. 1(1):1-13. KORDI., SEOUL. KO.

The method of compilation on the bottom topography in the shallow sea with strong tidal influence is described in detail. The bottom topography off Chungchongnamdo area, for example, has been identified on the basis of the data obtained on R/V TAMYANG in 1972 and 1973. Positioning during the survey was facilitated by the Raydist Radiolocation System. The data on tidal reduction were obtained using the automatic tide gauge at Kunsan Harbour, upon correction with reference to the co-tidal time chart. The resulting depths were calculated in meters based on the datum level (i.e., 3.4 m below the mean sea level) at Kunsan Harbour.

87GE0016. KEUN-HO.LEE. 1979(4). SUB-BOTTOM PROFILING AND SIDE SCAN SONAR SURVEY IN THE INCHON BAY. BULL. KORDI. 1(1):39-45. KORDI., SEOUL. KO.

A sub-bottom profiling survey was carried out in some selected parts of the Inchon Bay during May, 1977. A side scan sonar survey was conducted at the northern area of Inchon harbour during August, 1977. The sub-bottom profiling survey results in: Isopach maps at the northern area of Inchon harbour and the area surrounding Modo Is. were made and profiles of bedrock distribution at some selected areas were obtained. Some suggestions were made as to the choice and the operation of the survey equipments to improve the field records in the case that distinct bedrock reflector was not identified because of the thick sediment layers and the shallow water depth. The side scan sonar survey at the northern area of Inchon harbour results in: The superficial sediments consist of gravel, sand, s+.

87GE0017. H.T.ZHAO. 1983(6). FORMATION AND DEVELOPMENT OF THE ZHUJIANG DELTA. ACTA OCEANOL. SINICA. 2(1):107-119. CHINA OCEAN PRESS, BEIJING. EN.

The fundamental conditions and basic process for the formation of the Zhujiang (Pearl River) Delta are similar to those of most of the deltas. Their localities are all in the submerged regions of the crustal structure, the shallow estuary results from transgression, the fluviatile runoff flowing into the sea and the silt discharge are large, the destructive energy of waves and the coastal current is small, silt accumulates rapidly, the depositional fabric is zonally distributed horizontally, and the corresponding sequence occurs vertically. Because the original Zhujiang Estuary stretched up to the continent about 160 km, the silt discharge of the Zhujiang River is now relatively small, as compared with the rivers famous for their deltas stretching into the sea. Therefore, the Zhujiang+.

87GE0018. R.D.FLOOD. 1987. SIDE ECHOES FROM A SINUOUS FAN CHANNEL OBSCURE THE STRUCTURE OF SUBMARINE FAN CHANNEL/LEVEE SYSTEM+. GEO-MARINE LETTERS. 7:15-22. SPRINGER-VERLAG, N.Y. PN-3034. EN.

A high-resolution bathymetric and seismic study of sinuous midfan channels on the Amazon Fan shows that some common elements of seismic profiles across the channel/levee system may be side echoes (sideswipe) from reflective, coarse channel-floor sediments which lie to the side of the ship track. This includes portions of a dipping zone of high-amplitude reflectors beneath the channel. If these strong echoes are side echoes rather than buried coarse sediments, there may be less coarse material present within the midfan channel/levee systems than predicted, and channel evolution is still poorly resolved. Side echoes may be common in other areas of complex deep-sea morphology.

87GE0019. G.S.MOUNTAIN, ET AL. 1987(6). MIDDLE TO LATE MIOCENE CANYON CUTTING ON THE NEW JERSEY CONTINENTAL SLOPE: BIOSTRATIGRAPHIC AND SE+. GEOLOGY. 15:509-512. GEOL. SOC. AME., BOULDER. PN-2998. EN.

We have identified and dated a major Miocene erosional surface (M1) on the New Jersey continental slope. This surface was penetrated at Deep Sea Drilling Project (DSDP) Site 612, which was drilled near the thalweg of a buried V-shaped canyon. Biostratigraphic data at Site 612 firmly constrain the age of strata above the buried canyon surface as Zones CN7 (=NN9) and N16 (lowermost upper Miocene); the upper Miocene surface at Site 612 lies above lowermost Oligocene strata because of coalesced unconformities. We traced the M1 erosional surface to the COST B-3 well where upper middle Miocene strata underlie it. Biostratigraphic studies of other New Jersey continental slope boreholes (ASP 14, ASP 15) suggest that elsewhere the sediments immediately below the M1 surface encompass the Globo+.

87GE0020. M.HOM-MA, K.HORIKAWA, C.SONU. 1960. A STUDY ON BEACH EROSION AT THE SHELTERED BEACHES OF KATASE AND KAMAKURA, JAPAN. COASTAL ENG. JAPAN. 3:101-122. JAPAN SOC. CIVIL ENG., TOKYO. PN-2565. EN.

87GE0021. M.HOM-MA, K.HORIKAWA, C.SONU. 1962(12). FIELD INVESTIGATION AT TOKAI, JAPAN, CONDUCED BY COMBINED PROCEDURE OF MACROSCOPIC AND MICROSCOPIC+. COASTAL ENG. JAPAN. 5:1-18. JAPAN SOC. CIVIL ENG., TOKYO. PN-2613. EN.

87GE0022. P.BRUUN. 1962(2). SEA-LEVEL RISE AS A CAUSE OF SHORE EROSION. J. WATERWAYS & HARBOUR DIV., ASCE. 88:117-130. ASCE., N.Y. PN-2656. EN.

It is an established fact that sea level is rising slowly and irregularly. Also, it seems to be true that erosion on most seashores built up of alluvial materials greatly exceeds accretion. The paper attempts to relate the two phenomena; rise of sea level and erosion.

87GE0023. M.HOM-MA, K.HORIKAWA,

M.KAGEYAMA, C.SONU. 1963. INLET CHARACTERISTICS OF RIVER SAGAMI. COASTAL ENG. JAPAN. 6:29-43. JAPAN SOC. CIVIL ENG., TOKYO. PN-2616. EN.

87GE0024. K.HORIKAWA, T.SUNAMURA. 1967. A STUDY ON EROSION OF COASTAL CLIFFS BY USING AERIAL PHOTOGRAPHS. COASTAL ENG. JAPAN. 10:67-83. JAPAN SOC. CIVIL ENG., TOKYO. PN-2623. EN.

Two areas were selected, in order to investigate erosion of coastal cliffs of the short term by using aerial photographs. At one area annual amount of sand lost from coastal cliff was estimated, and at the other the relationship between eroded distance of cliff and the strength of rocks or the frequency of wave occurrence, and the future eroded distance were examined. In studying erosion of coastal cliff, especially of a short term, aerial photographs seem to be a very useful means as compared with previous ones.

87GE0025. K.HORIKAWA, T.SUNAMURA. 1968. AN EXPERIMENTAL STUDY ON EROSION OF COASTAL CLIFFS DUE TO WAVE ACTION. COASTAL ENG. JAPAN. 11:131-147. JAPAN SOC. CIVIL ENG., TOKYO. PN-2626. EN.

87GE0026. T.SUNAMURA, K.HORIKAWA. 1969. A STUDY ON EROSION OF COASTAL CLIFFS BY USING AERIAL PHOTOGRAPHS. COASTAL ENG. JAPAN. 12:99-120. JAPAN SOC. CIVIL ENG., TOKYO. PN-2629. EN.

87GE0027. K.HORIKAWA, T.SUNAMURA. 1970. A STUDY ON EROSION OF COASTAL CLIFFS AND OF SUBMARINE BEDROCKS. COASTAL ENG. JAPAN. 13:128-139. JAPAN SOC. CIVIL ENG., TOKYO. PN-2632. EN.

The following conclusions are obtained, (1) The erosion rate of the coastal cliff in the studied area is 0.7 m/year on an average, for the long term. The cliff has receded in parallel with the present coastline. (2) The submarine bedrocks in the studied area are being eroded downward at a rate of 0.02 m/year in very shallow water; the erosion rate decreases exponentially with the increase of the water depth. (3) Artificial structures with high reflection coefficient, constructed in the shallow region made of weak submarine bedrocks involve risks of overturning themselves owing to the scour at the foot of them. (4) The amounts of material removed westward in the littoral zone out of this studied area approximate 24% of those supplied to this area due to the cliff and submarine bedrock +.

87GE0028. T.SUNAMURA, K.HORIKAWA. 1971. PREDOMINANT DIRECTION OF LITTORAL TRANSPORT ALONG KUJYUKURI BEACH, JAPAN. COASTAL ENG. JAPAN. 14:107-117. JAPAN SOC. CIVIL ENG., TOKYO. PN-2635. EN.

87GE0029. T.SUNAMURA, K.HORIKAWA. 1971. A QUANTITATIVE STUDY ON THE EFFECT OF BEACH DEPOSITS UPON CLIFF EROSION. COASTAL ENG. JAPAN. 14:97-106. JAPAN SOC. CIVIL ENG., TOKYO. PN-2634. EN.

87GE0030. T.SUNAMURA, K.HORIKAWA. 1974. TWO-DIMENSIONAL BEACH TRANSFORMATION DUE TO WAVES. PROC. 14TH COASTAL ENG. CONF., COPENHAGEN, DENMARK, JUNE 1974. 920-938. ASCE., N.Y. PN-2586. EN.

Important physical parameters controlling sandy beach transformation were clarified on the basis of the result obtained by a laboratory test. They were not only wave steepness but also beach gradient and a ratio of sand size to wave length. These parameters enabled the previously obtained laboratory beach profiles to be classified into newly-proposed three beach types. These parameters were also found to be effective in grouping the data of shoreline changes both in laboratories and in fields.

87GE0031. T.SUNAMURA, K.HORIKAWA. 1976. FIELD INVESTIGATION OF SEDIMENT TRANSPORT PATTERN IN A CLOSED SYSTEM. PROC. 15TH COASTAL ENG. CONF., HONOLULU, HAWAII, JULY 11-17, 1976. 1240-1257. ASCE., N.Y. PN-2596. EN.

87GE0032. K.HORIKAWA, T.SUNAMURA. 1977. COASTAL CHANGES IN KANTO DISTRICT, JAPAN. 4:25-35. PN-2558. JA.

87GE0033. T.SUNAMURA, K.HORIKAWA. 1977(11). SEDIMENT BUDGET IN KUJUKURI COASTAL AREA, JAPAN. COASTAL SEDIMENTS. 475-487. ASCE., N.Y. PN-2597. EN.

A closed-system sediment budget, with a time scale of 10-100 years, was studied on the Pacific coast of Japan. There are seven supply sources of beach sands in the present sedimentary compartment: two receding cliffs, three eroding beaches, and two rivers. The supplied materials which remain on a nearshore zone are transported alongshore to a central beach in the compartment and deposited there. The volume of these littoral sands provided from the cliffs and the beaches was estimated by using the historical records of topographic changes, while the sediment discharge from the rivers was evaluated by applying the existing formulas. The estimation of the deposition rate was also based on the topographic changes.

87GE0034. A.WATANABE, Y.RIHO, K.HORIKAWA. 1980. BEACH PROFILES AND ON-OFFSHORE SEDIMENT TRANSPORT. PROC. 17TH COASTAL ENG. CONF. MARCH 23-28, 1980, SYDNEY, AUSTRALIA. 1106-1121. ASCE., N.Y. PN-2645. EN.

The on-offshore sediment transport due to waves on a sloping beach is studied by analyzing the laboratory test data on two-dimensional beach deformation. The net rates of sediment transport both inside and outside the breaker zone are evaluated from beach profile changes and are related to the nondimensional bottom shear stress or the Shields parameter. The importance of the critical shear stress and of asymmetrical to-and-fro water partical motion near the bottom is pointed out.

87GE0035. N.C.KRAUS, R.S.FARINATO, K.HORIKAWA. 1981. FIELD EXPERIMENTS ON LONGSHORE SAND TRANSPORT IN THE SURF ZONE. COASTAL ENG. JAPAN. 24:171-194. JAPAN SOC. CIVIL ENG., TOKYO. PN-2647. EN.

The short term longshore sand transport rate and its on-offshore distribution were measured in multicolor fluorescent sand tracer experiments performed in energetic surf zones. Agreement is found between the measured total longshore sand transport rate and a predictive expression due to Bagnold involving the incident breaking wave height and average longshore current velocity. This agreement includes one case where the current direction was opposite to that expected from the direction of the incident waves. The existence of low frequency motion of sand tracer alongshore, into the sea bed and other time dependent transport effects were clearly demonstrated in these experiments. This included significant pulsations in tracer migration alongshore over a line crossing the surf zone. The+.

87GE0036. A.WATANABE. 1982. NUMERICAL MODELS OF NEARSHORE CURRENTS AND BEACH DEFORMATION. COASTAL ENG. JAPAN. 25:147-161. JAPAN SOC. CIVIL ENG., TOKYO. PN-2648. EN.

This paper describes numerical models for simulating waves, currents and beach deformation. The wave-current model includes wave refraction and breaking, the nonlinear effect of mean momentum convection, wave setup, and wave-current interaction. The beach deformation model employs newly proposed formulas for sediment transport rates due to waves and mean currents. Two test calculations are made to examine the applicability of the models. Though not calibrated with measurements, the models are shown capable of producing realistic nearshore current fields and beach deformations.

87GE0037. X.S.GENG, ET AL. 1983(12). EVOLUTIONARY PROCESS OF NORTHERN JIANGSU COASTAL ZONE AND A DYNAMIC EQUILIBRIUM MODEL OF NORTHERN +. ACTA OCEANOL. SINICA. 2(2):284-298. CHINA OCEAN PRESS, BEIJING. EN.

The main portion of the northern Jiangsu coastal zone is the silty plain coast. The dynamic equlibrium has been broken continuously since the Quaternary, especially in the Holocene and the historical periods. In 1855 the Huanghe River (Yellow River) changed its channel entering into sea through the Bohai Sea. In this paper we describe the evolutionary process of the northern Jiangsu coastal zone and discuss the formative conditions for the northern Jiangsu shoal. Finally, a dynamic equilibrium model for the northern Jiangsu shoal is presented.

87GE0038. D.G.AUBREY, K.O.EMERY. 1983(5). EIGENANALYSIS OF RECENT UNITED STATES SEA LEVELS. CONTINENTAL SHELF RES. 2(1):21-33. PERGAMON PRESS, OXFORD. EN.

Spatial and temporal patterns of recent sea-level rise along the United States coastline have been examined to ascertain rates of rise, and possible causes for high-frequency fluctuations in sea level. Eigenanalysis identified several distinct coastal compartments within each of which sea-level behavior is consistent. The United States east coast has three of these compartments. Spectral analysis shows a dominant time scale of six years for sea-level variability, with different coastal compartments respondidng relatively in or out of phase. No evidence for increased rates of sea-level rise over the past 10 years was found. This objective statistical technique is a valuable tool for identifying spatial and temporal sea-level trends in the United States.

87GE0039. R.SILVESTER. 1985. NATURAL HEADLAND CONTROL OF BEACHES. CONTINENTAL SHELF RES. 4(5):581-596. PERGAMON PRESS, OXFORD. EN.

When waves arrive obliquely to a coast they cause littoral drift, the fluctuations of which result in cycles of erosion and siltation. These are minimised when the resultant wave energy is normal to the beach as the longshore component of energy approaches zero. This situation occurs naturally when headlands exist and the shoreline between them is sculptured into zeta shaped bays with logarithmic spiral plan shape. Waves are then diffracted and refracted into the embayment, arriving at the beach more normally. There is a limiting erosive pattern, for the case of no further input of sediment, where the log spiral and indentation ratio reach values which are predictable. These can then be used to test the stability of that section of coast.

87GE0040. P.F.HAMILL, P.F.BALLANCE. 1985. HEAVY MINERAL RICH BEACH SANDS OF THE WAITAKERE COAST, AUCKLAND, NEW ZEALAND. NEW ZEALAND J. GEOL. & GEOPHYS. 28:503-511. D.S.I.R., WELLINGTON. PN-2668. EN.

Heavy mineral rich beach sands of the Tasman Sea coast of the Waitakere Ranges, west of Auckland City, include major minerals plagioclase, augite, titanomagnetite, and quartz, with minor ilmenite, hypersthene, hornblende, biotite, and potassium feldspar, and accessory zircon and apatite. Major sources for the sands are Taupo Volcanic Zone rhyolitic volcanics, delivered via the Waikato River, and Taranaki andesitic volcanics, via the longshore drift. Longshore trends from south to north include a slight fining, a reduction in rock fragments, an increase in heavy mineral content, and a tendency for the feldspar/quartz ratio to decline. Ilmenite is a significant component; it is derived from the Taupo Volcanic Zone (not from the Waitakere Ranges as previous authors have suggested), and i+.

87GE0041. T.SHIBAYAMA, K.HORIKAWA. 1985(5). A NUMERICAL MODEL FOR TWO-DIMENSIONAL BEACH TRANSFORMATION. PROC. JAPAN SOC. CIVIL ENG. (357):167-176. JAPAN SOC. CIVIL ENG., TOKYO. PN-2611. EN.

A simplified simulation model for predicting two-dimensional beach transformation was developed based on the recent results of research works on wave transformation, near bottom velocity and sediment transport. The wave field was calculated by the energy

flux method based on either cnoidal or linear wave theory in the offshore zone, and by Mizuguchi's energy dissipation model in the surf zone. The velocity field was calculated by the approximate method of Koyama and Iwata using the cnoidal wave profile or by linear wave theory. The sediment transport formula of Shibayama and Horikawa, which includes the effect of suspended sediment caused by vortices created in the vicinity of ripples, was used to calculate transport rates. The model was found to give reasonable results. The results+.

87GE0042. JANG-WON.CHAE, KI-DAI.YUM. 1985(6). NUMERICAL MODELLING ON THE MALLIPO BEACH CHANGES. OCEAN RES. 7(1):57-64. KORDI., SEOUL. KO.

The bathymetric changes of Mallipo beach have been investigated using the Perlin-Dean (1983) model and field data collected in the winters of 1981 and 1984. The predicted changes in the vicinity of a groin are in reasonably good agreement with the observations. It is shown that the longshore current induced by the storm waves of NW direction is a major cause of the erosion of the beach. An additional groin would enhance the accretion of sand and retain the results of yearly beach nourishment.

87GE0043. J.Y.YUAN. 1985(7). CHARACTERISTICS OF TIDAL FLATS OF THE ZHUJIANG RIVER MOUTH. ACTA OCEANOL. SINICA. 4(3):433-442. CHINA OCEAN PRESS, BEIJING. EN.

The intertidal zone of the Zhujiang River mouth tidal flat is about 570,000 mu in total, and the tidal flat of the subtidal zone (shallower than -2 m of the Huanghai Sea base level) is 560,000 mu. The two types, silty mud and argillaceous silt, are predominant in the tidal flat area, which can be divided into five types in terms of origin: 1) river mouth sand spit-subaqueous natural levee type; 2) river mouth bar type; 3) bay head type; 4) around the island type; and 5) marginal flat type. The tidal flat of the Zhujiang River mouth belongs to the depositional type and is constantly accumulating silt while extending, with an average land formation of 8,940 mu/yr in 97 years (1883-1980).

87GE0044. M.E.REN, R.S.ZHANG. 1985(7). ON TIDAL INLETS OF CHINA. ACTA OCEANOL. SINICA. 4(3):423-432. CHINA OCEAN PRESS, BEIJING. EN.

Tidal inlets should be distinguished from tidal channels which connect open sea at both ends. In China, tidal inlets may be grouped into (1) embayment-lagoon type on sandy or rocky coast, (2) estuarine inlets on the mouths of small or medium rivers which may be on mud plain coast, and (3) artificial inlets enclosed by breakwaters. Improvement of navigation channels of these inlets follows the same principle using O'Brien P-A formula. Where accurate oceanographical and littoral drift data are not available, a careful analysis of coastal morphology and sedimentology may provide a useful clue for the evaluation of the value of inlets in navigation.

87GE0045. Y.WANG, D.G.AUBREY. 1987(4). THE CHARACTERISTICS OF THE CHINA COASTLINE. CONTINENTAL SHELF RES. 7(4):329-349. PERGAMON PRESS, OXFORD. EN.

Evolution of China's coastline reflects the influence of geology, rivers, climate, typhoons, waves, tides, shelf currents, and sea-level changes. While tectonics control the broadscale appearance of the coast (either bedrock-embayed in emergent regions or plains coast in subsiding regions), rivers dominate the supply of sediment to the shore and help control erosional/accretionary trends. The Yellow River (Huang He) is the world's largest in terms of sediment supply, while the yangtze river (Chang Jiang) is the fourth largest in terms of water discharge. The size of these large rivers, combined with their instability over recent geological and historical times, accentuates their impact on coastal development in china.

87GE0046. F.ROUGERIE. 1983(12). PHYSICAL OCEANOGRAPHY.- NEW DATA ON ATOLL LAGOON INTERNAL FUNCTIONING. C.R. ACAD. SC. PARIS. (297):909-912. GAUTHIER-VILLARS, MONTREUIL. PN-2965. FR.

Long lasting physical and chemical measurements in the lagoons of two atolls of Tuamotu archipelago, French Polynesia, one closed (Takapoto) and the other one half open (Moruroa) have made possible to put forward the main features of their internal functioning: the prime part is played by ionic exchanges between lagoon and ocean trough porous coral base interstitial water. Vertical diffusion brings up continuously to the bottom of the lagoon exogenous nutrients stored in the deep ocean; primary production in open lagoons is thus sustained and can balance the biomass lost to the ocean through every falling tide.

87GE0047. F.ROUGERIE. 1985. THE NEW CALEDONIAN SOUTH-WEST LAGOON: CIRCULATION, HYDROLOGICAL SPECIFICITY AND PRODUCTIVITY. PROC. FIFTH INT. CORAL REEF CONGR., TAHITI. 6:17-22. PN-2968. EN.

According to its topographic and geomorphologic features the lagoon in the south-western part of New Caledonia can be described as a small inland sea through which transiting oceanic surface water has its physical and chemical properties deeply altered by local climatic factors such as evaporation-rainfall balance, wind systems, possible hurricane events in austral summer etc. All these considerations lead to establish the lagoon as a complex ecosystem which could ultimately enrich the ocean with plankton taxa and nutrients, mainly silica; its functioning can be simply analysed by the interaction of five elementary systems: the orographic system, the estuarine system, the coastal lagoon system, the central lagoon system and the nearby oceanic system.

87GE0048. F.ROUGERIE, B.WAUTHY. 1986. LE CONCEPT D'ENDO-UPWELLING DANS LE FONCTIONNEMENT DES ATOLLS-OASIS. OCEANOL. ACTA. 9(2):133-148. GAUTHIER-VILLARS, MONTREUIL. PN-2966. FR.

In the central desert region of the tropical ocean, atolls constitute veritable oases. The classical model of atoll functioning, based solely on horizontal exchanges

between the lagoon and oligotrophic oceanic surface water, is unable to balance nutrient budgets in a manner that accounts for the high organic production; a source of nutrients external to the ecosystem is needed, particularly for phosphorus and silica. The "geothermal endo-upwelling" concept is expounded: it comprises a vertical ascent of deep oceanic water, driven by geothermal heat flow, through the atoll's internal structure; nutrient-rich upwelled water supplies the reef-building biocenosis at the surface.

87GE0049. Z.X.ZENG, S.J.QIU. 1987(4). EVOLUTIONAL PATTERN OF THE CORAL SAND ISLANDS IN THE XISHA AREA. ACTA OCEANOL. SINICA. 6(2):235-248. CHINA OCEAN PRESS, BEIJING. EN.

Sand island or cay is the dominant type of coral reef islands in the South China Sea. This paper gives in detail the sand islands composed of loose accumulational materials on the atoll reef flats in the Xisha Islands, their types, characteristics of morphological structure and evolutional pattern and dynamics.

87GE0050. M.HOM-MA, K.HORIKAWA, R.KASHIMA. 1965. A STUDY ON SUSPENDED SEDIMENT DUE TO WAVE ACTION. COASTAL ENG. JAPAN. 8:85-103. JAPAN SOC. CIVIL ENG., TOKYO. PN-2620. EN.

87GE0051. K.HORIKAWA. 1966. REGIONAL REPORT ON COASTAL SEDIMENT STUDIES. COLLECTED PAPERS, FAC. ENG., UNIV. TOKYO. 4 DEPT. CIVIL ENG., UNIV. TOKYO. PN-2569. EN.

87GE0052. J.F.LINDSAY. 1968(12). THE DEVELOPMENT OF CLAST FABRIC IN MUDFLOWS. J. SEDIMENT. PETROL. 38(4):1242-1253. SOC. ECO. PAL. MIN., TULSA. PN-2703. EN.

Computer simulation of the motion of particles in a viscous fluid in laminar flow shows that strong long-axis fabrics may develop in mudflows in a short period of time. The rate at which the fabric develops in any one situation depends on the velocity gradient. The viscosity of the mudflow, one of the main factors controlling the velocity gradient, is increased considerably by the clasts contained in the matrix. Fabric development is cyclical and begins as a vague girdle dipping upstream. At the same time a single mode develops, centered on the girdle, and gradually increases in intensity until a maximum is reached when the plunge of the mode is horizontal. The fabric from this point degenerates in reverse order, first to a weak girdle dipping downstream, and then to a fabric similar+.

87GE0053. T.SUNAMURA, K.HORIKAWA. 1971(6). A STUDY ON THE PREVAILING DIRECTION OF LITTORAL DRIFT ALONG THE KASHIWAZAKI COAST, JAPAN. ANN. REP. ENG. RES. INST., UNIV. TOKYO. 30:21-28. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2571. EN.

The predominant directions of movement of littoral drift were inferred from the alongshore variation series of beach sediment characteristics and also from the migration of river mouth. The transport direction for a long term was based on the beach gravel properties. On the other hand, the short term direction was founded on the beach sand characteristics and the river mouth deviations; the result examined from the former and that from the latter were in fairly good agreement. The use not only of sedimentological data but also of other data which are indicative of the transport direction, as the river mouth configuration, was powerful in order to obtain more reliable informations about the direction of littoral transport.

87GE0054. T.SUNAMURA, K.HORIKAWA. 1972(6). IMPROVED METHOD FOR INFERRING THE DIRECTION OF LITTORAL DRIFT FROM GRAIN SIZE PROPERTIES OF BEACH +. ANN. REP. ENG. RES. INST., UNIV. TOKYO. 31:61-68. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2573. EN.

In order to determine reasonably the dominant direction of longshore transport, an improved method was presented. This method was based on the combination of the variation series of grain size and that of sorting coefficient, of beach sands; as the measures of the former parameter and of the latter one, the mean diameter and the friedman's standard deviation were adopted respectively.

87GE0055. T.SUNAMURA, K.HORIKAWA. 1973. A STUDY ON THE PREVAILING DIRECTION OF LITTORAL DRIFT ALONG THE KASHIWAZAKI COAST, JAPAN. ANN. REP. ENG. RES. INST., UNIV. TOKYO. 32:39-43. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2574. EN.

Spatial variation of beach sand characteristics was used to determine the dominant direction of littoral sediment transport in the vicinity of Kashiwazaki city. The results indicate that in the northern portion of the study area, a northerly transport dominated while in the southern portion, a southerly transport dominated.

87GE0056. J.N.SUHAYDA, ET AL. 1976. MARINE SEDIMENT INSTABILITY: INTERACTION OF HYDRODYNAMIC FORCES AND BOTTOM SEDIMENTS. OTC PAPER. (2426):29-33. OFFSHORE TECH. CONF. PN-2828. EN.

Simultaneous measurements of bottom oscillations and wave characteristics have been made in a study of the interaction of fine-grained sediments and surface waves. Wave staffs, pressure sensors, and an electromagnetic current meter were placed 150 ft from a bottom-emplaced accelerometer package at East Bay, Louisiana. The results of the experiments indicate that bottom motions under wave action show well-defined periodic features. Bottom oscillations on the order of 1 in. in amplitude occurred for seas having a significant wave height of about 3 ft and a period of 5 sec. The bottom appears to be undergoing an elastic wave response to bottom pressures, so that the bottom is depressed under a surface wave crest. Comparison of wave height measurements and pressure measurements indicate t+.

87GE0057. WON-OH.SONG, HEE-DO.AHN, JAE-KYUNG.OH. 1980(8). A STUDY ON MOVEMENT OF SUSPENDED SEDIMENT AT GUNSAN OUTER HARBOUR. BULL. KORDI. 2(1):15-21. KORDI., SEOUL. KO.

A series of field demonstrations of HRS Sediment Flux Meter and Settling Velocity Tube were conducted at Gunsan outer harbour. The demonstration was to check the performance of those equipment. This paper presents the results of the demonstration briefly.

87GE0058. R.G.BEA, R.P.AURORA. 1981. A SIMPLIFIED EVALUATION OF SEAFLOOR STABILITY. OTC PAPER. (3975):223-228. OFFSHORE TECH. CONF. PN-2744. EN.

A simplified method is described for evaluation of seafloor stability. The analysis is based on an elastic continuum formulation modified by a plasticity Factor. Two key elements of input into such an analysis are examined in detail: soil shear strength and wave-induced bottom pressures. For the example platform location used in this paper, conventional treatment of these two input elements leads to an evaluation that the seafloor will be unstable during criteria conditions. Platform experience during past criteria conditions in the vicinity of the example location is used to justify the conclusions.

87GE0059. K.HORIKAWA. 1981. COASTAL SEDIMENT PROCESSES. ANN. REV. FLUID MECH. 13:9-32. ANNUAL REV. INC., PALO ALTO. PN-2605. EN.

87GE0060. CHANG-BOK.LEE. 1981(12). SEASONAL HYDROLOGICAL VARIATION AND ITS INFLUENCE ON BOTTOM SEDIMENTS IN THE LOWER DORDOGNE, SOUTH+. BULL. KORDI. 3(2):107-122. KORDI., SEOUL. EN.

Seasonal migration of turbidity maximum in response to changes in river discharge determines the locus of sedimentation in the Gironde estuary system, SW of France. Migration of this turbidity maximum during low river discharge into the lower Dordogne, which comprises, together with the lower Garonne, an upper estuary in the entire estuarine system, is proved by the present study. Distribution and characteristics of the bottom and bank sediment show some variations with regard to different hydrological seasons, characterized by river discharge and up- and down-stream migration of turbidity maximum. Observed textural variations are related mainly with differences in mixing effect due to the migration of turbidity maximum and in sorting efficiency of transporting medium due to changes in+.

87GE0061. I.B.CAMPBELL, G.G.C.CLARIDGE. 1982. THE INFLUENCE OF MOISTURE ON THE DEVELOPMENT OF SOILS OF THE COLD DESERTS OF ANTARCTICA. GEODERMA. 28:221-238. ELSEVIER SCI. PUB., AMSTERDAM. PN-2719. EN.

Soils of the cold desert have many features in common with those of hot deserts. They generally have dry surface horizons, capped by a desert pavement of lag gravel, a zone of accumulation of water-soluble salts, and a permanently frozen layer beneath, which may be ice-cemented in its lower part. They are also distinguished by their very low temperatures and as a consequence of this they have very low moisture status and humidity. Soil moisture within cold desert soils is usually in the form of small ice crystals, vapour, or thin water films. The influence of broad climatic differences in Antarctica is reflected in the soils by differences in moisture supply, in terms of precipitation, and its availability, which is dependent on the length of time any given soil is, in whole or in part+.

87GE0062. K.HORIKAWA, S.HOTTA, S.KUBOTA. 1982. EXPERIMENTAL STUDY OF BLOWN SAND ON A WETTED SAND SURFACE. COASTAL ENG. JAPAN. 25:177-195. JAPAN SOC. CIVIL ENG., TOKYO. PN-2649. EN.

A literature survey of blown sand on a wetted sand surface is given and the present state of the art is briefly summarized. To fill in certain information gaps, three experiments were performed for 1) the threshold wind speed of sand grains with high water content, 2) the sand transport rate by wind on a wetted sand surface and 3) the drying process of a wetted sand surface in the field. It was found that even on a surface of high water content, sand grains begin to move when the wind speed 15 cm above the surface is greater than 15 m/s. The sand transport rate at a wind speed of 12 m/s is negligible if the water content at the surface is greater than 11%. The transport of sand with a water content of less than 11% is a close function of the evaporation from the surface, which is mainl+.

87GE0063. R.J.HALLERMEIER. 1982(11). OSCILLATORY BEDLOAD TRANSPORT: DATA REVIEW AND SIMPLE FORMULATION. CONTINENTAL SHELF RES. 1(2):159-190. PERGAMON PRESS, OXFORD. EN.

This review displays over 700 rates of sediment transport by oscillatory flow from 20 sources. Sediments include fine sands to pebbles, both of quartz and of lightweight materials, and the transport rates in water range over seven orders of magnitude. Most data are average gross (to and fro) bedload rates collinear with laboratory flow over a horizontal sediment bed, although other situations with net transport, suspended load, or oblique field waves are considered. As peak flow velocity nears twice the threshold velocity for sediment motion, bedload appears to be fully developed and the transport rate is near that given by a simple formula including flow frequency and peak velocity, and sediment size and density. At lesser peak velocities, bedload rates are markedly smaller and dist+.

87GE0064. N.TANAKA, K.NADAOKA. 1982(12). DEVELOPMENT AND APPLICATION OF A NUMERICAL MODEL FOR THE PREDICTION OF SHORELINE CHANGES. TECH. NOTE PORT & HARBOUR RES. INST. (436):3-40. PORT & HARBOUR RES. INST. PN-2332. JA.

A numerical model for practical use based on the 'one-line theory' is presented to simulate shoreline changes due to construction of coastal structures. The model contains the part to calculate wave deformation

for estimates of wave energy flux at the breaking point. The algorithm for wave deformation is based on the wave-ray method, and takes the following effects into account; i.e., wave refraction, shoaling, reflection and diffraction. As the guides for the practical application of this model, several comments are made on the required data and the determination of the parameters used in the model, with the presentation of two typical examples of the application of this model.

87GE0065. DONG-HOON.YOO, KYUNG-DUCK.SUH. 1982(12). EVALUATION OF SUSPENDED SEDIMENT TRANSPORT IN A MACROTIDAL COASTAL REGION. BULL. KORDI. 4(1/2):73-84. KORDI., SEOUL. EN.

In the coastal regions where the seasonal and tidal variations of sediment transport are both similarly significant, the tidal effect can be numeralized by correlating the maximum velocity of tidal current to the tidal range and the sediment flux to the tidal current velocity. The variations can be well evaluated by normalizing the sediment fluxes measured at different tidal conditions to those at a same reference tidal condition using the above relationships. An application of the method was made to the field data measured at Garolim Bay where extensive oceanographical survey has been conducted. The correlations are fairly good in most cases. The effects of water temperature, salinity, wind and wave on the sedimentary mechanism as well as the spatial variation of suspended sediment +.

87GE0066. K.HORIKAWA, S.HOTTA, S.KUBOTA, S.KATORI. 1983. ON THE SAND TRANSPORT RATE BY WIND ON A BEACH. COASTAL ENG. JAPAN. 26:101-120. JAPAN SOC. CIVIL ENG., TOKYO. PN-2651. EN.

The sand transport rate due to wind action was investigated in the field and in the laboratory. For the field experiment, the sand volume blown off from a beach area enclosed by large traps in the form of trenches and the sand volume accumulated in one of the trenches were compared. It was concluded from this comparison that the empirical coefficient of the Kawamura formula for the sand transport rate averaged over a section normal to the shoreline should be approximately 2.3. In order to obtain data for wind conditions corresponding to high shear velocities, an experiment in a wind tunnel was carried out. This experiment showed that the Kawamura and Bagnold formulas were valid for well-sorted sand in the range of shear velocity between 60 to 300 cm/s. However, both formulas underes+.

87GE0067. A.WATANABE. 1983. FUNDAMENTALS OF LITTORAL TRANSPORT. SEMINAR ON SEDIMENTATION PROBLEMS IN BEACHES & ESTUARIES. 1-40. PN-2608. EN.

87GE0068. E.REIMNITZ, E.W.KEMPEMA. 1983(1). HIGH RATES OF BEDLOAD TRANSPORT MEASURED FROM INFILLING RATE OF LARGE STRUDEL-SCOUR CRATERS IN THE+. CONTINENTAL SHELF RES. 1(3):237-251. PERGAMON PRESS, OXFORD. EN.

Strudel scours are craters in the sea floor as much as 25 m wide and 6 m deep, that are excavated by vertical drainage flow during the yearly spring flooding of vast reaches of shorefast ice surrounding arctic deltas; they form at a rate of about 2.5/square kilometer/year. We monitored two such craters in the Beaufort Sea and found that in relatively unprotected sites they fill in by deposition from bedload in 2 to 3 years. Net westward sediment transport results in sand layers dipping at the angle of repose westward into the strudel-scour crater, whereas the west wall of the crater remains steep to vertical. At the bottom the crater traps almost all bedload: sand, pebbles, and organic detritus. As infilling progresses, the materials are increasingly winnowed, and bypassing must occur.

87GE0069. C.E.VINCENT, R.A.YOUNG, D.J.P.SWIFT. 1983(10). SEDIMENT TRANSPORT ON THE LONG ISLAND SHOREFACE, NORTH AMERICAN ATLANTIC SHELF: ROLE OF WAVES AND +. CONTINENTAL SHELF RES. 2(2/3):163-181. PERGAMON PRESS, OXFORD. EN.

Data from a 12-day deployment of a boundary layer sensing package have been used to estimate the magnitude and directions of several components of the total sediment transport at a single site on the Long Island inner shelf where the water depth is 10 m. Two typical wave and current conditions are examined for the Long Island inner shelf and both are shown to produce bedload transport rates with onshore components. This mechanism may be important in the maintenance of coarser material on the shore face.

87GE0070. A.MALDONADO, ET AL. 1983(10). SEDIMENTATION ON THE VALENCIA CONTINENTAL SHELF: PRELIMINARY RESULTS. CONTINENTAL SHELF RES. 2(2/3):195-211. PERGAMON PRESS, OXFORD. EN.

Preliminary analysis of data collected during the course of a cooperative Spanish-United States investigation of the Valencia Shelf (western Mediterranean) reveals a storm-dominated, mud-accumulating sedimentary regime. Calcareous mud is accumulating seaward of a narrow band of shoreface sand and gravel. On the outer shelf the mud is enriched by a pelagic calcareous component. Application of a diagnostic circulation model suggests that intense, downwelling coastal flows occur during winter northeastern storms. Storm activity has induced erosional shoreface retreat during the course of the Holocene transgression and has generated by this means the basal coarse facies observed in the piston cores.

87GE0071. T.SHIBAYAMA, K.HORIKAWA. 1983(4). LABORATORY STUDY ON SEDIMENT TRANSPORT MECHANISM DUE TO WAVE ACTION. PROC. JAPAN SOC. CIVIL ENG. (296):131-141. JAPAN SOC. CIVIL ENG., TOKYO. PN-2584. EN.

87GE0072. M.L.SPAULDING, D.PAVISH. 1984. A THREE-DIMENSIONAL NUMERICAL MODEL OF PARTICULATE TRANSPORT FOR COASTAL WATERS. CONTINENTAL SHELF RES. 3(1):55-67.

PERGAMON PRESS, OXFORD. EN.

A Lagrangian marker particle in Eulerian finite difference cell solution to the three-dimensional incompressible mass transport equation was developed for predicting particulate transport in coastal and estuarine waters. Special features of the solution procedure include a finite difference grid network which translates horizontally and vertically with the mean particle motion and expands with the dispersive growth of the marker particle cloud. The cartesian vertical coordinate of the three-dimensional mass transport equation has been transformed, using instantaneous water column depth to allow adaptation to flow situations with a temporally and spatially varying bottom topography and free surface.

87GE0073. P.A.JUMARS, A.R.M.NOWELL. 1984. EFFECTS OF BENTHOS ON SEDIMENT TRANSPORT: DIFFICULTIES WITH FUNCTIONAL GROUPING. CONTINENTAL SHELF RES. 3(2):115-130. PERGAMON PRESS, OXFORD. EN.

No consistent functional grouping of organisms as stabilizers vs destabilizers, respectively decreasing of enhancing erodibility, is possible. Benthic organisms can affect erodibility in particular -and sediment transport in general- via alternation (1) of fluid momentum impinging on the bed, (2) of particle exposure to the flow, (3) of adhesion between particles, and (4) of particle momentum.18he net effects of a species or individual on erosion and deposition thresholds or on transport rates are not in general predictable from extant data. Furthermore, they depend upon the context of flow conditions, bed configuration, and community composition into which the organism is set.

87GE0074. T.L.CLARKE, D.J.P.SWIFT. 1984. THE FORMATION OF MUD PATCHES BY NON-LINEAR DIFFUSION. CONTINENTAL SHELF RES. 3(1): 1-7. PERGAMON PRESS, OXFORD. EN.

Deposits of mud on an otherwise sandy continental shelf floor commonly occur in the form of patches a few hundred meters in size. A model for the formation of these patches is proposed that is based on a resuspension mechanism that is a non-linear function of the percentage of fines in the surficial sediment. A diffusion equation governing the time evolution of the percentage fines is derived which for a certain range of fine sediment concentrations becomes unstable. Numerical solution of this equation shows that the spatial distribution of fine sediment breaks into two components in a manner qualitatively similar to observed mud patches.

87GE0075. J.M.A.DIAS, C.A.NITTROUER. 1984. CONTINENTAL SHELF SEDIMENTS OF NORTHERN PORTUGAL. CONTINENTAL SHELF RES. 3(2):147-165. PERGAMON PRESS, OXFORD. EN.

Recent research provides the first significant information about sedimentation on the continental shelf of northern Portugal. This paper presents data and interpretations obtained from textural and compositional studies of surface sediment. The shelf primarily contains sand-sized particles of lithogenic quartz (<80m water deph) and biogenic carbonate (>80m). A nearshore deposit (<30m) is actively forming from fine sand composed of immature quartz particles (subangular, hyaline) which are transported southward by prevailing waves & currents from fluvial sources in the northern part of the study area. During low stands of sea level, lithogenic sediment was carried off the shelf through submarine canyons, resulting in reduced contribution of lithogenic particles to the outer shelf region.

87GE0076. R.L.SOULSBY, A.P.SALKIELD, G.P.LE GOOD. 1984. MEASUREMENTS OF THE TURBULENCE CHARACTERISTICS OF SAND SUSPENDED BY A TIDAL CURRENT. CONTINENTAL SHELF RES. 3(4):439-454. PERGAMON PRESS, OXFORD. EN.

Measurements made with a new fast-response suspended sand sensor have for the first time enabled the turbulence characteristics of a natural sand suspension to be studied. Suspended sand concentration measurements, together with fast-response current measurements, were made 18 cm above a sandy bed under a strong tidal current. They showed a highly variable concentration field, dominated by clouds of sand which took 2 to 10s to sweep past the sensor. The concentration spectrum had peak energy at a wavelength of about 3 m, and exhibited a -5/3 power dependence at high frequencies. Damping of the turbulence intensity of the current was observed when sand was suspended.

87GE0077. K.HORIKAWA, S.HOTTA, S.KUBOTA, S.KATORI. 1984. FIELD MEASUREMENT OF BROWN SAND TRANSPORT RATE BY TRENCH TRAP. COASTAL ENG. JAPAN. 27:213-232. JAPAN SOC. CIVIL ENG., TOKYO. PN-2653. EN.

The sand transport rate due to wind action on a beach was investigated in the field. For the field experiment, the sand weight accumulated in a large trap in the form of trench and the sand weight blown off on an area downstream of the trench were measured and compared. It was concluded that the empirical coefficient of the Kawamura formula for the sand transport rate on a dry sand surface evaluated from the sand weight trapped by the trench over a section normal to the shoreline should be approximately 2.7. For a wet sand surface having about 3-4% water conent, it should be about 80% of that of a similar dry sand surface. The empirical coefficient in the Kawamura formula also varied according to the observation period. The estimated coefficient was small in an observation period whe+.

87GE0078. S.KATORI, T.SAKAKIYAMA. 1984. MEASUREMENT OF SAND TRANSPORT IN A CROSS UNIDIRECTIONAL-OSCILLATORY FLOW TANK. COASTAL ENG. JAPAN. 27:193-203. JAPAN SOC. CIVIL ENG., TOKYO. PN-2654. EN.

This paper describes a cross unidirectional-oscillatory flow tank, which has been designed and constructed to produce conditions of the wave-current coexistent flow field in a laboratory.

Experimental results are presented on the onset of sediment movement, motion of sand particles above ripples, and the rates of transport under combined action of unidirectional flow and oscillatory flow crossing each other at a right angle. The condition of the incipient motion is compared with the previous criteria in terms of the critical shields parameter. A clear correlation is shown between the rates of sand transport and the flow power defined as proportional to the product of the bottom shear stress and the mean flow velocity.

87GE0079. D.E.DRAKE, D.A.CACCHIONE. 1985. SEASONAL VARIATION IN SEDIMENT TRANSPORT ON THE RUSSIAN RIVER SHELF, CALIFORNIA. CONTINENTAL SHELF RES. 4(5):495-514. PERGAMON PRESS, OXFORD. EN.

Near-bottom currents, light transmission and scattering, and bottom pressure were measured with GEOPROBE tripods and vector-averaging current meters during June 1979 to April 1980 on the central shelf 10 km west of the Russian River, California. The instruments were located on the mid-shelf mud belt composed of bimodal sandy clayey silts contributed principally by the Russian River. Although intervals of large swell were at times superimposed on southward advective currents, the major sediment-transport events were caused by strong southerly winds that produced poleward bottom currents with a significant offshore component. The primary aspects of the distribution of modern sediments on this shelf are in good agreement with the observed poleward transport.

87GE0080. R.W.STERNBERG, L.H.LARSEN, Y.T.MIAO. 1985. TIDALLY DRIVEN SEDIMENT TRANSPORT ON THE EAST CHINA SEA CONTINENTAL SHELF. CONTINENTAL SHELF RES. 4(1/2):105-120. PERGAMON PRESS, OXFORD. EN.

Time series measurements were made from an instrumented tripod deployed on the seabed at two locations off the Changjiang on the continental shelf of the East China Sea. The first station (M3; June 1980) was positioned 150 km east of the river mouth in 39-m depth in an area of relict sand. The second station (M4;August 1981) was positioned 80 km east of the river mouth in 47-m depth over a silty-sand bottom sediment. At Sta. M4, near the river mouth, significant semidiurnal variations in suspended sediment concentrations were observed. M3 showing a net drift towards the east northeast and the relict sand deposits farther seaward on the continental shelf migrating in a northerly direction.

87GE0081. A.G.DAVIES. 1985. OBSERVATIONS OF THE STABILITY OF OSCILLATORY FLOW ABOVE THE SEABED AND OF SAND RIPPLE FORMATION. CONTINENTAL SHELF RES. 4(5):553-580. PERGAMON PRESS, OXFORD. EN.

The results of two field experiments are described, both of which were carried out at Blackpool Sands, Start Bay. In the first experiment in 1978, observations were made of the near-bed flow, and of the movement of coarse sand on the bed, beneath progressive swell waves in shallow water. In the second experiment in 1980, similar observations were made, but for a bed comprising medium to fine sand, and for a more varied range of wave periods. For the naturally rippled beds, critical conditions for the onset of vortex formation and shedding have been established, and reasonable agreement with previous laboratory results has been found. In particular, it has been shown that vortex formation occurs above the lee slopes of ripples only if the near-bed orbital excursion exceeds the ripple +.

87GE0082. J.Y.CHEN, H.F.ZHU, Y.F.DONG, J.M.SUN. 1985. DEVELOPMENT OF THE CHANGJIANG ESTUARY AND ITS SUBMERGED DELTA. CONTINENTAL SHELF RES. 4(1/2):47-56. PERGAMON PRESS, OXFORD. EN.

Since the postglacial transgression, the Changjiang estuary has undergone a progressive progradation seaward of shoals and tidal flats fringing the south bank, merging of linear sandbanks with the north bank, successive filling and narrowing of the estuarine embayment, and a resultant seaward migration of the river mouth. Knowledge of the development and evolution of the Changjiang estuary and its subaqueous delta are critical in selecting navigational channels, managing coastal resources and fisheries, as well as reclaiming coastal areas for cultivation.

87GE0083. J.D.MILLIMAN, R.C.BEARDSLEY, Z.S.YANG, R.LIMEBURNER. 1985. MODERN HUANGHE-DERIVED MUDS ON THE OUTER SHELF OF THE EAST CHINA SEA: IDENTIFICATION AND POTENTIAL+. CONTINENTAL SHELF RES. 4(1/2):175-188. PERGAMON PRESS, OXFORD. EN.

Outer shelf muds south of Cheju Island contain calcite in their clay fraction, derived from the Huanghe (Yellow River), not the Changjiang (Yangtze River). Radiometric dating suggests that at least the surface of this mud deposit is contemporaneous, although the rate of accumulation may be slow. Part of the sediment may be derived from present-day erosion of the ancient Huanghe submarine delta off Jiangsu Province. Suspended matter, light transmission, and hydrographic measurements indicate a southsoutheast transport of sediment in the East China Sea during winter, when frequent storms can resuspend sediment & force Yellow Sea water to the southeast along the Chinese coast.

87GE0084. A.D.HEATHERSHAW. 1985. SOME OBSERVATIONS OF INTERNAL WAVE CURRENT FLUCTUATIONS AT THE SHELF-EDGE AND THEIR IMPLICATIONS F+. CONTINENTAL SHELF RES. 4(4):485-493. PERGAMON PRESS, OXFORD. EN.

Observations of internal wave current fluctuations at a site on the European continental shelf are described. These have revealed current 'pulses' of regular tidal (M2) phase which may be associated with internal tides generated at the shelf-edge. Current 'pulses' have been observed with amplitudes of 30 to 40 cm/sec superimposed on peak spring tidal currents of the order 60 to 70 cm/sec. The measurements have shown that these fluctuations extended throughout the bottom

mixed layer to within at least 2 m of the sea bed where they may play an important role in modifying sediment transport rates.

87GE0085. J.D.MILLIMAN, H.T.SHEN, Z.S.YANG, R.H.MEADE 1985. TRANSPORT AND DEPOSITION OF RIVER SEDIMENT IN THE CHANGJIANG ESTUARY AND ADJACENT CONTINENTAL SHEL+. CONTINENTAL SHELF RES. 4(1/2):37-45. PERGAMON PRESS, OXFORD. EN.

Hydrographic observations, suspended-sediment measurements, and historical data indicate transport paths and sinks for sediment within the Changjiang estuary and adjacent shelf. Most of the sediment transported by the Changjiang to the ocean is carried through the North Channel of the South Branch. Sediment transport is directly related to river stage, but tidal phase (spring vs neap tides) also plays an important role. An estimated 40% of the sediment load in the river is deposited in the estuary, mostly in and seaward of the South Channel. The remaining sediment is deposited directly offshore during flood seasons, but much is resuspended and carried southward by subsequent winter storms.

87GE0086. Y.L.SHI, W.YANG, M.E.REN. 1985. HYDROLOGICAL CHARACTERISTICS OF THE CHANGJIANG AND ITS RELATION TO SEDIMENT TRANSPORTS TO THE SEA. CONTINENTAL SHELF RES. 4(1/2):5-15. PERGAMON PRESS, OXFORD. EN.

Owing to different physiographic conditions in its watershed, southern tributaries of the Changjiang flood in April to June, whereas the upper Changjiang and Hanjiang flood in July and August. Southern tributaries have greater water discharge but significantly smaller sediment loads than the northern tributaries and upper reaches of the river. Discharge-sediment concentration correlation diagrams for the lower portion of the river (Luoshan, Hankou, and Datong) show higher concentrations during falling stages of river flow. This unique situation results from the combining of the different hydrological regimes in the middle and lower Changjiang.

87GE0087. D.J.DEMASTER, ET AL. 1985. RATES OF SEDIMENT ACCUMULATION AND PARTICLE REWORKING BASED ON RADIOCHEMICAL MEASUREMENTS FROM CON+. CONTINENTAL SHELF RES. 4(1/2):143-158. PERGAMON PRESS, OXFORD. EN.

Radiochemical measurements of thorium 234, caesium 137, and lead 210 have been used to characterize rates of mixing, deposition, and accumulation on 100-day and 100-y time scales in East China Sea sediments. In the inner-shelf mud deposit near the mouth of the Changjiang (Yangtze River), thorium 234 data indicate deposition rates as rapid as 4.4 cm/month on a 100-day time scale. lead 210 data indicate that on a 100-y time scale accumulation rates are an order of magnitude slower (typically 1 to 5 cm/year) than the short-term deposition rates. Most of the sediment deposited near the mouth of the Changjiang on a 100-day time scale is transported southward along the dispersal system on a 100-y time scale, probably as a result of winter storms and a strong coastal current.

87GE0088. S.L.XIE. 1985(1). SCOURING PATTERNS IN FRONT OF VERTICAL BREAKWATERS. ACTA OCEANOL. SINICA. 4(1):153-164. CHINA OCEAN PRESS, BEIJING. EN.

There are two basic types of scouring pattern of a sand bed in front of a vertical breakwater under the action of standing waves due to the differences of the sand grain sizes and of the wave conditions. The expressions of the scouring profile, the ultimate maximum scouring depth and the development of the scouring for two scouring patterns based on the experimental data are given in the present paper. The scale laws for the sand grain size and for the scouring depth are derived, thus making it possible to apply the results from the model tests to the prototype conditions. The influence of the scouring patterns on the stability of the foundations of verical breakwaters is discussed through some typical examples in the paper.

87GE0089. L.Q.CHEN. 1985(10). LONG-DISTANCE ATMOSPHERIC TRANSPORT OF DUST FROM CHINESE DESERT TO THE NORTH PACIFIC. ACTA OCEANOL. SINICA. 4(4):527-534. CHINA OCEAN PRESS, BEIJING. EN.

The Chinese desert is one of the major sources of atmospheric mineral dust transported for a long distance to the North Pacific by the atmospheric circulation. The characteristic of the aerosol in the North Pacific is similar to that of the aerosol in North China with a considerable concentration of mineral in spring due to the large-scale dust storm occurring in North China. The study of isotope tracer indicates that the concentration of Al is significantly related to Lead 210, suggesting that the mineral aerosol in the North Pacific may originate from the desert in Northwest China by using air mass trajectory analysis. About 6000000-12000000 tons of Chinese desert mineral dust per year would be trasported to the North Pacific.

87GE0090. G.D.ZHANG, J.C.ZHU, Y.Y.WANG, H.Z.WANG. 1985(10). MODERN TIDAL CHANNELS SEDIMENTATION IN JIANGGANG, NORTH JIANGSU PROVINCE. ACTA OCEANOL. SINICA. 4(4):591-602. CHINA OCEAN PRESS, BEIJING. EN.

The Jianggang tidal flat is formed under the influence of two strong tidal currents which converge on or diverge from Jianggang. Tidal channel and creek system is rather well developed here due to the actions of scouring, transportation as well as deposition of bottom sediments by tidal currents. Tidal channels, crisscrossing the flat, are large in scale and swift in lateral migration, which plays a role of vital importance in the reworking of the tidal flat sediments. This paper evaluates the characteristics of sediments of the tidal channels and puts forward some facies criteria for the identification of these sediments and the theory of development of tidal channels by stages, thus providing a useful base for the study of its ancient counterparts.

87GE0091. DONG-YOUNG.LEE, C.P.LIN, A.J.MEHTA. 1985(12). PROPERTIES OF A

STATIONARY FINE SEDIMENT WEDGE. OCEAN RES. 7(2):31-34. KORDI., SEOUL. EN.

Properties of a stationary fine sediment wedge formed by the density current are examined for a long and narrow water body closed at one end and connected to the channel at the other. The vertical velocity profile and wedge interfacial profile are obtained analytically for a simple case and compared with limited amount of experimental information. A reasonable trend agreement is shown.

87GE0092. C.Z.LI, F.Y.ZHANG, X.C.WANG. 1985(4). PRELIMINARY STUDY ON GENETIC ENVIRONMENT OF SEDIMENTS OF THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 4(2):254-265. CHINA OCEAN PRESS, BEIJING. EN.

In order to show the relationship between the grain size model and sedimentary environment of the East China Sea, typical samples have been selected from analytical data of 1233 surface sediments, and mathematical statistic analyses of these samples have been made. Based on these analyses and combined with the compositions of the sediments and history of its formation, the authors try to divide the genetic types of the sediments of the East China Sea, with focus on the discussion of the characteristics of ancient and present hydrodynamic environments.

87GE0093. Q.C.XIE, Y.C.YE, B.W.LU. 1985(4). TOPOGRAPHY AND SEDIMENTATION OF THE EAST CHINA SEA SHELFBREAK. ACTA OCEANOL. SINICA. 4(2):276-288. CHINA OCEAN PRESS, BEIJING. EN.

The shelfbreak of the East China Sea lies in an area with a marked change in gradient between the continental shelf & the slope (west wall of Okinawa Trough), depth ranging from 132 to 162 m with an average of about 147 m, and the width ranging from 4 to 18 km. The types of the shelfbreak differ markedly from the north to the south, having an abrupt break in the south and a gradual break in the middle and the north. without permanent deposition of fine-grained material formed at the shelfbreak zone, it serves only as a temporary resting place for terrigenous sediments moving toward the Okinawa Trough through submarine canyons as important transport conduits.

87GE0094. T.B.CURTIN, R.V.LEGECKIS. 1986. PHYSICAL OBSERVATIONS IN THE PLUME REGION OF THE AMAZON RIVER DURING PEAK DISCHARGE, I. SURFACE VA+. CONTINENTAL SHELF RES. 6(1/2):31-51. PERGAMON PRESS, OXFORD. EN.

Satellite imagery in the 0.4-1.1 um band from GOES, NOAA-7 and NIMBUS-7 and shipboard measurements of suspended sediment concentration and chlorophyll are synthesized. Five main surface features are delineated in the plume region of the Amazon during peak discharge: a River Zone, Interaction Zones A, B and C, and a Nearshore Zone. The loci, temporal and spatial scales, and magnitudes of suspended sediment concentration for each zone are documented.

87GE0095. M.E.REN, Y.L.SHI. 1986. SEDIMENT DISCHARGE OF THE YELLOW RIVER (CHINA) AND ITS EFFECT ON THE SEDIMENTATION OF THE BOHAI AN+. CONTINENTAL SHELF RES. 6(6):785-810. PERGAMON PRESS, OXFORD. EN.

The Yellow River is noted for its small water discharge and huge sediment load, which amounts to about 1,100,000,000 tons every year, contributing 17% of the world's fluvial sediment discharge to the ocean. This has a profound effect on the sedimentation of the Bohai and the Yellow Sea. Changes of the outlet in the modern delta every 10 y result in frequent changes in the recession and progradation of the deltaic coastline both in space and time, and is the main reason why the Yellow River has not succeeded in building a bird-foot delta like the Mississippi. Owing to the huge sediment input from the Yellow River, the sedimentation rate of the Bohai is very high, about 0.6 m/ka, but it is unlikely that the Bohai will be filled up in a few thousand years.

87GE0096. R.NIGAM. 1986. FORAMINIFERAL ASSEMBLAGES AND THEIR USE AS INDICATORS OF SEDIMENT MOVEMENT: A STUDY IN THE SHELF R+. CONTINENTAL SHELF RES. 5(4):421-430. PERGAMON PRESS, OXFORD. EN.

Factor analysis of 60 species of foraminifers from 13 statons off Navapur, reveals three major assemblages-Ammonia annectens, Ammonia papillosus-Asterorotalia dentata and Ammobaculites persicus assemblages. These assemblages are governed by fresh water runoff and organic matter content in the sediments. A comparison of living and dead tests distribution of important assemblages indicates movement of sediment towards eastsoutheast and thus a current. The study is particularly important for predicting net sediment transport and planning and designing for offshore structures. The method adopted to decipher current-sediment transport may be useful in other areas where data on long-term movement of current or sediment transport are not available.

87GE0097. C.A.NITTROUER, D.J.DEMASTER. 1986. SEDIMENTARY PROCESSES ON THE AMAZON CONTINENTAL SHELF: PAST, PRESENT AND FUTURE RESEARCH. CONTINENTAL SHELF RES. 6(1/2):5-30. PERGAMON PRESS, OXFORD. EN.

Previous research, and particularly research since the early 1960s, has examined many aspects of the dispersal system associated with the Amazon River. This system extends a distance of about 5000 km from western South America far into the Atlantic Ocean. Amazon particulate and dissolved materials are dispersed during low stands of sea level from the Andes to the flanks of the Mid-atlantic Ridge, and during high stands of sea level from the Andes to the Caribbean Sea. the point of juncture between these two modes of dispersal is the continental shelf near the mouth of the Amazon River.

87GE0098. R.J.GIBBS, L.KONWAR. 1986. COAGULATION AND SETTLING OF AMAZON RIVER SUSPENDED SEDIMENT. CONTINENTAL SHELF RES. 6(1/2):127-149. PERGAMON PRESS, OXFORD. EN.

Sampling of the water column on the Amazon

continental shelf was conducted in June-July 1983, and shipboard measurements of the particle size distribution were accomplished utilizing techniques that permit measurement of flocs. These data indicated a volumetric concentration maximum about 100 km offshore from the Amazon River mouth, with maxima of the mean particle size in suspension in the surface waters of >100 um and in the bottom waters of >60 um. The trends of high concentration and large particle sizes parallelled the shore in a northwestern direction. The data indicated that coagulation of the sediments began at low salinities to form flocs which were then transported and settled, controlled primarily by their settling velocities and the water currents.

87GE0099. W.J.SHOWERS, D.G.ANGLE. 1986. STABLE ISOTOPIC CHARACTERIZATION OF ORGANIC CARBON ACCUMULATION ON THE AMAZON CONTINENTAL SHELF. CONTINENTAL SHELF RES. 6(1/2):227-244. PERGAMON PRESS, OXFORD. EN.

The stable carbon isotopic ratio of organic matter in the water column and sediments haas been used to examine the distribution and accumulation of organic carbon on the Amazon continental shelf. Near the river mouth, in 0.000 salinity surface waters, particulate organic carbon (POC) is isotopically light (-27.3 per mil). Isotopic values of POC in continental shelf waters north and east of the river mouth range from -19.5 to -25.7 per mil. The isotopic variations in water column POC can be related to productivity, turbidity, and water density. The isotopic character of water column POC is controlled, therefore, by the dynamic mixing and northwestward migration of riverine and marine shelf waters.

87GE0100. D.E.DRAKE, D.A.CACCHIONE. 1986. FIELD OBSERVATIONS OF BED SHEAR STRESS AND SEDIMENT RESUSPENSION ON CONTINENTAL SHELVES, ALASKA AN+. CONTINENTAL SHELF RES. 6(3):415-429. PERGAMON PRESS, OXFORD. EN.

Bed shear stress was estimated using wave and current measurements obtained with the GEOPROBE bottom-tripod system during resuspension events in Norton Sound, Alaska, and on the northern California shelf. The boundary-layer model of GRANT and MADSEN (1979, Journal of Geophysical Research, 84, 1797-1808) was used to compute the bed shear stress under conbined wave-generated and quasi-steady currents. We suspect that frequent wave stirring and observed plowing of the surface sediment by benthonic animals maintain a high water content and contribute to the ease with which these materials are resuspended.

87GE0101. YONG-AHN.PARK, SEUNG-CHAN.KIM, JIN-HYUK.CHOI. 1986. THE DISTRIBUTION AND TRANSPORTATION OF FINE-GRAINED SEDIMENTS ON THE INNER CONTINENTAL SHELF OFF T+. CONTINENTAL SHELF RES. 5(4):499-519. PERGAMON PRESS, OXFORD. EN.

A study of suspended particulate matter in the Keum estuary and the adjacent continental shelf, southeastern Yellow Sea, showed that most of the suspended matter (average amount of 27,000 tons in October 1980) is derived from the Keum River and the major dispersal directions are westward and southwestward. Associated investigations of the clay mineral and trace element of the bottom sediment in the same study area confirmed that the bulk of fine-grained sediments derived from the Keum River and its estuary probably is dispersed essentially to the southwest, but indicated that less significant amounts are dispersed to the west or northwest.

87GE0102. S.A.KUEHL, D.J.DEMASTER, C.A.NITTROUER. 1986. NATURE OF SEDIMENT ACCUMULATION ON THE AMAZON CONTINENTAL SHELF. CONTINENTAL SHELF RES. 6(1/2):209-225. PERGAMON PRESS, OXFORD. EN.

Sediment accumulation on the Brazilian continental shelf near the Amazon River is investigated using radiochemical techniques to provide a better understanding of this major dispersal system of fine-grained sediment. A sediment budget for the Amazon shelf indicates that (6.3 +/- 2.0) x 100,000,000 tons of sediment accumulate annually. Much of the remainder of Amazon River sediment about 600,000,000 tons/year probably is transported northwestward beyond the Brazilian shelf and/or is accumulating landward of the shelf as coastal accretion.

87GE0103. D.M.HANES, D.A.HUNTLEY. 1986. CONTINUOUS MEASUREMENTS OF SUSPENDED SAND CONCENTRATION IN A WAVE DOMINATED NEARSHORE ENVIRONMENT. CONTINENTAL SHELF RES. 6(4):585-596. PERGAMON PRESS, OXFORD. EN.

A miniature optical backscatter sensor (MOBS) and an electro-magnetic flowmeter were deployed seaward of the surf zone at Pte Sapin, New Brunswick during the first Canadian Coastal Sediment Study, autumn 1983. The MOBS had sensing elements at five vertical locations above the sea bed, and was sampled at 10 Hz. The suspension of sand is well correlated with the passage of individual waves and also with wave groups, with the influence of wave groups progressively more dominant at higher elevations above the bed. Suspension appears to be stronger during the onshore directed phase of the wave motion than during the offshore motion and there is evidence that initiation of suspension may be determined by fluid acceleration more than velocity. Time lags between suspension events at differen+.

87GE0104. T.YAMAMOTO, T.NAGAI, J.L.FIGUEROA. 1986. EXPERIMENTS ON WAVE-SOIL INTERACTION AND WAVE-DRIVEN SOIL TRANSPORT IN CLAY BEDS. CONTINENTAL SHELF RES. 5(4):521-540. PERGAMON PRESS, OXFORD. EN.

Wavelength and wave damping of water waves propagating over soft clay beds are measured in a soil-wave tank. Mudline motion and wave-induced mass transport in the clay beds are also measured. It is confirmed experimentally that the wave dispersion is uniquely governed by the mudline motion. Mass

transport develops in a clay bed when shear strain amplitude exceeds the limit shear strain of about 5%. The rate of wave-induced mass transport in a clay bed is found to be proportional to the rate of wave energy dissipation in the clay bed. This paper presents a complete report of the measurements and data.

87GE0105. K.HUTTER, F.SZIDAROVSZKY, S.YAKOWITZ. 1986. PLANE STEADY SHEAR FLOW OF A COHESIONLESS GRANULAR MATERIAL DOWN AN INCLINED PLANE: A MODEL FOR FL+. ACTA MECHANICA. 63:87-112. SPRINGER-VERLAG, BERLIN. PN-2889. EN.

A continuum mechanical model describing rapid shear flow of granular materials as deduced by Jenkins and Savage (1983) [11] from considerations of statistical mechanics is applied to steady plane shear flows down an inclined chute. Depending on the type and form of the physically suggested boundary conditions that are imposed at the base and the free surface, respectively, the emerging boundary value problems permit or prohibit existence of mathematical solutions. For instance, the model does not permit incorporation of an aerodynamic drag and requires special sliding boundary conditions at the base. Cause for the singular behavior is the fact that granular pressure and fluctuation energy vanish simultaneously. rectification is e.g. possible by including particle density gradients in+.

87GE0106. K.HUTTER, F.SZIDAROVSKY, S.YAKOWITZ. 1986. PLANE STEADY SHEAR FLOW OF A COHESIONLESS GRANULAR MATERIAL DOWN AN INCLINED PLANE. A MODEL FOR F+. ACTA MECHANICA. 65:239-261. SPRINGER-VERLAG, BERLIN. PN-3099. EN.

The granular flow model proposed by Jenkins and Savage and extended by us is used here to construct numerical solutions of steady chute flows thought to be typical of such flows. We briefly state the equations and boundary conditions and present numerical solutions when the following model parameters of the Senkins and Savage model are varied: (a) the coefficient of restitution of the particles under binary collision, (b) the number of particles per layer, (c) the inclination angle of the chute, and (d) the basal and free surface boundary conditions. We demonstrate that the Jenkins and Savage model may yield physically questionable results, that those of its extension differ markedly from them and are physically more reasonable in certain cases, but yield equally questionable results i+.

87GE0107. D.X.XIA, Z.X.LIU. 1986(4). FORMATION MECHANISM AND DEVELOPMENTAL CONDITIONS OF TIDAL CURRENT RIDGES. ACTA OCEANOL. SINICA. 5(2):247-255. CHINA OCEAN PRESS, BEIJING. EN.

this paper discusses mainly the formation mechanism and developmental conditions of tidal current ridges. The tidal current velocities of 1-3.5 knots and the supply of abundant loose sediments are the prerequisites for the formation of the tidal current ridges. The hydrodynamic mechanism is similar to that of straight rivers. In the trough between two ridges the tidal current moves forward in the form of two helical flows. The two flows converge and sink in the centre of the trough, and erode the trough deeply; they diverge and rise on the two sides of the trough, and accumulate the ridges. When the supply material and relief come to the dynamic equilibrium, the development of ridges keeps steady.

87GE0108. G.D.MCKENZIE, R.G.GOODWIN. 1987. DEVELOPMENT OF COLLAPSED GLACIAL TOPOGRAPHY IN THE ADAMS INLET AREA, ALASKA, U.S.A. J. GLACIOLOGY. 33(113):55-60. INT. GLACIOL. SOC., CAMBRIDGE. PN-3049. EN.

Modes of formation and rates of collapse have been determined for kame terraces and a fan delta in the Adams Inlet area, Alaska. The hummocky and trenched surface of the kame terrace develops by mass-wasting processes caused by differential melting of buried ice. The dry channels in the collapsed part of the terrace are formed by melt water during stagnant-ice bursts. Measurements over a period of 17 years indicate that terrace back-wasting averages 4.3/ma. The fan delta is forming near sea-level by streams that derive part of their load from the kame terrace. The fan delta seaward of the retreating kame terrace is undergoing partial collapse to produce kettles ringed by concentric fractures. Vegetation, now as much as 5 m below high tide, suggests a fan-delta collapse rate of a+.

87GE0109. R.LANDE, A.M.WOOD. 1987(1). SUSPENSION TIMES OF PARTICLES IN THE UPPER OCEAN. DEEP-SEA RES. 34(1):61-72. PERGAMON PRESS, OXFORD. EN.

Diffusion theory is used to derive general formulae for the expected time that a particle with a given initial depth takes to reach a greater depth, as well as the expected total time that the particle spends in each depth interval during the process. The general formulae are evaluated for a two-layer model of the upper ocean: a surface mixed layer with high turbulent diffusivity and below this a thermocline with low turbulent diffusivity. regardless of its sinking rate, a particle starting at the surface takes at most a few days to reach the thermocline, unless it is very deep. Particles with slow sinking rates are shown to make many rapid excursions back and forth between the interior of the mixed layer and the top few meters of the thermocline.

87GE0110. V.L.ASPER. 1987(1). MEASURING THE FLUX AND SINKING SPEED OF MARINE SNOW AGGREGATES. DEEP-SEA RES. 34(1):1-17. PERGAMON PRESS, OXFORD. EN.

The flux and concentration of large amorphous aggregates (marine snow) were measured using a combination camera and sediment trap deployed at 380 m (390 m water depth) in the Panama Basin in April 1985. Results at this site indicate that essentially all settling particles arrive at the sea floor as components of large aggregates, with insignificant contributions of solitary fecal pellets. The observed flux of any particle divided by its concentration gives an estimate of a model parameter which can be interpreted as particle settling speed. Particles were observed to change positions or disappear between photographs, indicating water movement which may have been associated with

the activity of grazing organisms within the sediment trap.

87GE0111. L.E.SAHL, M.A.H.MARSDEN. 1987(10). SHELF SEDIMENT DISPERSAL DURING THE DRY SEASON, PRINCESS CHARLOTTE BAY, GREAT BARRIER REEF, AUSTRA+. CONTINENTAL SHELF RES. 7(10):1139-1159. PERGAMON PRESS, OXFORD. EN.

Princess Charlotte Bay, located on the northern Great Barrier Reef, is an environment of terrigenous and carbonate deposition. The dynamics on this shelf are controlled by the Great Barrier Reef at the edge of the shelf, and the mid-shelf, shore-normal reefs. This study examines the dynamics during the dry season, with six time-series records from instrumented tripod deployments and numerous hydrographic stations.

87GE0112. K.L.SMITH JR., A.F.CARLUCCI, R.A.JAHNKE, D.B.CRAVEN. 1987(2). ORGANIC CARBON MINERALIZATION IN THE SANTA CATALINA BASIN: BENTHIC BOUNDARY LAYER METABOLISM. DEEP-SEA RES. 34(2):185-211. PERGAMON PRESS, OXFORD. EN.

Organic carbon mineralization rates in the benthic boundary layer (BBL) of the Santa Catalina Basin (1300 m depth) were estimated to identify the primary sites and organisms involved in the turnover of carbon and to compare these rates with the supply of particulate organic matter entering the system from above. Concurrent in situ measurements of macrozooplankton, epibenthic megafauna, and sediment community oxygen consumption, and bacterioplankton and total microbial (microplankton) metabolism were made on 12 dives with DSRV Alvin in November 1984. Pore water and solid phase chemistries, and sediment microbial activity were measured on samples from box cores.

87GE0113. SEE-WHAN.KANG, C.K.ZIEGLER, W.LICK. 1987(3). A NUMERICAL ANALYSIS OF SEDIMENT TRANSPORT IN AN ESTUARY. J. OCEANOL. SOC. KOREA. 22(1):25-33. OCEANOL. SOC. KOREA, SEOUL. EN.

The transport and fate of fine-grained, cohesive sediments in an estuary were investigated numerically. A numerical model of sediment entrainment, deposition, and transport has been developed by incorporating recent results of laboratory and field investigations. The time-dependent flow fields produced by river inflow and semi-diurnal tides, were calculated, and the corresponding distributions of suspended-sediment concentrations were obtained. The time-changes of sediment bed condition due to entrainment and deposition were obtained. The entrained sediments contribute initially to high sediment concentrations in the estuary basin. As the time passes, the suspended-sediment concentrations were much reduced by the seaward transport due to residual currents. The erosional and depositi+.

87GE0114. A.T.WILLIAMS. 1987(4). A NEW MODEL FOR PEBBLE BEACH TRACER DISPERSAL. ACTA OCEANOL. SINICA. 6(2):229-234. CHINA OCEAN PRESS, BEIJING. EN.

A series of eight tracer experiments were carried out over one year (1983) on a low energy, macrotidal beach in south Wales, UK. Tracer movement was monitored and 30 pebbles adjacent to coloured tracer pebbles were measured. Measurements were of the A, B, and C axes, roundness, Maximum Projection sphericity and Oblate-Prolate indices. Analysis shows that through time, the percentage rejection of these properties increased. It is theorised that the surface tracers are 'misfits' or 'rejects' which have not found their equilibrium position in the pebble facies.

87GE0115. A.D.HEATHERSHAW, A.L.NEW, P.D.EDWARDS. 1987(5). INTERNAL TIDES AND SEDIMENT TRANSPORT AT THE SHELF BREAK IN THE CELTIC SEA. CONTINENTAL SHELF RES. 7(5):485-517. PERGAMON PRESS, OXFORD. EN.

Measurements of current and temperature fluctuations at a site on the European continental shelf have revealed the presence of large M2 tidal phase current surges produced by the internal tide generated at the shelf break. These have been found to extend with little attenuation throughout the water column and to have a significant effect on the flow near the seabed. A numerical model of the internal tide has been used to investigate the surge current generation mechanism and the way in which the surges propagate across the shelf. Good agreement has been obtained between the model predictions and the observations for surges propagating onto the shelf. The model is also used to examine sediment transport at the shelf break. In particular it is shown that for realistic shelf edge topog+.

87GE0116. M.J.H.RIDGE, B.CARSON. 1987(7). SEDIMENT TRANSPORT ON THE WASHINGTON CONTINENTAL SHELF: ESTIMATES OF DISPERSAL RATES FROM MOUNT S+. CONTINENTAL SHELF RES. 7(7):759-772. PERGAMON PRESS, OXFORD. EN.

Following the 18 May, 1980 eruption of Mount St. Helens, samples from 10 stations on the Washington continental shelf were collected during cruises in October 1980, January 1981, October 1981, and January 1982, in an attempt to trace the movement of ash which was introduced to the pacific Ocean by the Columbia River. Prior to October 1980, marine ash dispersal was restricted to points west and southwest of the Columbia River mouth due to summer circulation patterns. five winter storms were probably responsible for most of the north-northwesterly transport of ash from October 1980 to October 1981. The size of this ash ranged from 7 to 22 um at distances as far as 84 km from the river mouth. Only fine ash (7-12 um) was recovered 84-125 km from the river mouth.

87GE0117. A.L.ALLDREDGE, C.C.GOTSCHALK, S.MACINTYRE. 1987(9). EVIDENCE FOR SUSTAINED RESIDENCE OF MACROCRUSTACEAN FECAL PELLETS IN SURFACE WATERS OFF SOUTHERN C+. DEEP-SEA RES. 34(9):1641-1652. PERGAMON PRESS, OXFORD. EN.

Large fecal pellets produced by macrocrustaceans,

probably euphausiids, were observed frequently in the upper 20 m of the Santa Barbara and Santa Cruz basins off southern California at abundances ranging from 500 to 98,000 pellets/cubic meter. Although sinking rates of these pellets, ranging from 18 to 170 m/day, were rapid enough to remove the pellets from surface waters within hours, up to 40% of the pellets in the field had peritrophic membranes which were partially or totally decayed. Laboratory aging studies indicate that these decomposing pellets were from 4 to 10 days old. Moreover, the daily calculated flux of pellets from surface water, based on sinking rate measurements, was many times the photosynthetic carbon production of the euphotic zone, suggesting that sustained daily+.

87GE0118. SANG-JOON.HAN. 1979(4). CLAY MINERALS IN RECENT SEDIMENTS OF THE KOREA STRAIT. BULL. KORDI. 1(1):23-37. KORDI., SEOUL. KO.

Twenty-five piston core samples from the Korea Strait and one from the Nagdong River were analyzed to estimate the relative amounts of clay minerals, and compared to these of East China Sea and Japan Sea to trace the origin of fine fraction of the bottom sediments. The bottom sediments of the study area contain, on average, 53% illite, 19% kaolinite, 16% intergrade clay, 6% chlorite and small amounts of montmorillonite, sepiolite and attapulgite. The distributions of illite, chlorite and montmorillonite may be chiefly influenced by Tsushima Warm Current from the East China Sea, and kaolinite seems to be mainly contributed by river runoff from the Korean Peninsula. Intergrade clay seems to have complex origins.

87GE0119. JAE-KYUNG.OH. 1980(8). APPLICATION OF FACTOR ANALYSIS TO GRAIN SIZE ANALYSIS IN EYRE DELTA AND ITS COMPARISON WITH THE GI+. BULL. KORDI. 2(1):63-67. KORDI., SEOUL. EN.

Factor analysis (Q and R-mode) of grain size percentages was performed on 81 samples collected on the delta and tidal channels in S-W part of Arcachon Bay (France). By the result of Q-mode analysis, four factors account for 96.2% of the initial in formation in representing primarily the following populations; F-I, 400, 500u. F-II; 250, 135u, F-III; 63u, F-IV; 160, 200u. By normalizing matrix, 3 factors which encompass 93.8% of the initial information are useful to depict each relation on the triangular diagram. R-mode analysis gives four distinct populations of sediment transport mode. Furthermore, comparison with the previous works of different depositional environments gives some result that these size limits vary with each depositional environment. For example, the particle coars+.

87GE0120. BONG-CHOOL.SUK. 1981(12). DEPOSITIONAL ENVIRONMENT OF RECENT SEDIMENT ON THE CONTINENTAL SHELF AROUND THE JEJU ISLAND. BULL. KORDI. 3(2):123-131. KORDI., SEOUL. EN.

Twenty bottom sediment samples from the continental shelf around the Jeju Island, Korea, were analyzed to study textural parameters of the sediments and heavy minerals of the sediments selected. On the basis of this investigation, two sedimentary provinces can be distinguished: One province located at the northwestern part and the other includes all study area off the Jeju Island except for the above area. The northwestern sea-bottom is covered with muddy sediments, whereas the other area with sandy sediments. As a result of the textural parameters analysis, sediments in the study area show very poorly sorted, strongly fine skewed and leptokurtic. The provenance of the sediments in this area are predominantly terrigenous but is not simple because correlations of each textural paramet+.

87GE0121. J.S.HUANG. 1982(6). SOME GEOLOGICAL FEATURES OF THE HUANGYAN ISLAND, SOUTH CHINA SEA. ACTA OCEANOL. SINICA. 1(1):94-106. CHINA OCEAN PRESS, BEIJING. EN.

87GE0122. R.L.ZOU, Y.Z.ZHU, Y.C.WANG, J.L.ZHONG. 1982(6). ANALYSIS OF BIOTIC COMPOSITION AND DISCUSSION OF "ALGAL-RIDGE" ON THE CORAL REEFS OF THE XISHA ISL+. ACTA OCEANOL. SINICA. 1(1):120-125. CHINA OCEAN PRESS, BEIJING. EN.

87GE0123. M.A.HAMPTON. 1983(1). GEOLOGY OF THE KODIAK SHELF, ALASKA: ENVIRONMENTAL CONSIDERATIONS FOR RESOURCE DEVELOPMENT. CONTINENTAL SHELF RES. 1(3):253-281. PERGAMON PRESS, OXFORD. EN.

Geologic features and processes pose several environmental concerns to resource development to the Kodiak Shelf in the Gulf of Alaska. Tectonism causes fault movement, strong seismic ground shaking, and changes in sea-floor elevation. Earthquake epicenters and structural deformation are areally concentrated, which implies areal variation in the severity of tectonic hazards. Fields of large sand waves might be sites of high-energy bed-load transport with the potential for erosion and abrasion problems. As inferred from sediment dispersal patterns, pollutants that become incorporated into bottom sediment could be concentrated and stored long-term in troughs that trend transversely across the shelf.

87GE0124. N.V.N.DURGA PRASADA RAO, A.K.A.BEHAIRY. 1984. MINERALOGICAL VARIATIONS IN THE UNCONSOLIDATED SEDIMENTS OF EL QASR REEF, NORTH OF JEDDAH, WEST CO+. CONTINENTAL SHELF RES. 3(4):489-498. PERGAMON PRESS, OXFORD. EN.

Carbonate mineralogy of El Qasr reef sediments, north of Jeddah on the west coast of Saudi Arabia, was studied by X-ray analysis. Although the mineralogical composition varies only little, there are significant differences in the proportions of aragonite & high Mg-calcite between the environments. Lagoon sediments, which contain relatively more fine-grained material, are characterized by higher aragonite concentrations than the reef flat sediments. Decreasing grain size and increasing aragonite contents towards the centre of the lagoon suggest a transport of

aragonitic mud from the shallow reef flat to the lagoon. The amount of fine fraction and occasionally the nature of the coarse fraction rather than the sand-sized skeletal material controls the aragonite concentrations in the re+.

87GE0125. H.C.PENG, Z.YU, X.MIAO, S.J.ZHUANG. 1984(1). A STUDY OF MICROTEKTITES IN THE PACIFIC OCEAN. ACTA OCEANOL. SINICA. 3(1):106-113. CHINA OCEAN PRESS, BEIJING. EN.

In 1979, we found many small colorless transparent and light yellow-green glassy spherules in the surface layer and core sediment samples taken from the west of the Central Pacific Ocean, which are considered to be microtektites. This finding is worthy of further determination of the range of strewn field and origin of tektites.

87GE0126. Y.B.LIANG, B.LU. 1984(7). ON THE EFFECT OF PHYSICO-GEOTECHNICAL CHARACTERISTICS UPON SOUND VELOCITIES OF SEA FLOOR SEDIMENTS. ACTA OCEANOL. SINICA. 3(3):313-320. CHINA OCEAN PRESS, BEIJING. EN.

This paper aims at revealing the correlation between microtexture of sediments and their acoustic presentation as well as the effect of physico-geotechnical characteristics upon sound velocities of the sea floor. Our results show that the unconfined pressing strength can be used as a supplement to the velocity calculation based on the porosity for sediments. This would improve results calculated leaving the pore structure out of consideration as the equation given by R.S. Anderson, in no respect to measuring the microtexture of pores.

87GE0127. D.C.RHOADS, ET AL. 1985. MACROBENTHOS AND SEDIMENTARY FACIES ON THE CHANGJIANG DELTA PLATFORM AND ADJACENT CONTINENTAL SHEL+. CONTINENTAL SHELF RES. 4(1/2):189-213. PERGAMON PRESS, OXFORD. EN.

The vertical distribution of macrobenthos and sedimentary structures in near-surface sediments of the East China Sea off the Changjiang has been assessed from analyses of boxcores. The geographic distribution of macrobenthos across the continental shelf reflects sediment type and sedimentation rate. In the rapidly accumulating silty-clays of the submarine delta, sparse populations of small polychaetes predominate. As sediment accumulation rate declines away from the river mouth, denser populations of more deeply burrowing polychaetes, crabs, and ophuroids occur. On the central and outer shelf, sparse populations of surface dwellers relect the sandy, mobile sediment conditions. Based on X-radiographs, five sedimentary facies are identified based on physical and biogenic sedimentary +.

87GE0128. G.H.KELLER, Y.C.YE. 1985. GEOTECHNICAL PROPERTIES OF SURFACE AND NEAR-SURFACE DEPOSITS IN THE EAST CHINA SEA. CONTINENTAL SHELF RES. 4(1/2):159-174. PERGAMON PRESS, OXFORD. EN.

Shelf deposits in the East China Sea are primarily relict sands with overlying fine-grained cohesive deposits occurring along the innermost shelf and as a more or less isolated deposit on the midshelf. Available data indicate that the midshelf mud deposit is primarily derived from the reworking of Huanghe (Yellow River) coastal deposits that were laid down at a time when the river debouched into the Yellow Sea to the north of the Changjiang. Strong bottom and near-bottom currents, as well as winter storm wave activity, are primary mechanisms resulting in both suspended sediment and bedload transport on the shelf of the East China Sea.

87GE0129. R.MANTOVAN, L.M.VITTURI, B.PAVONI, S.RABITTI. 1985. SEDIMENTS AND POLLUTION IN THE NORTHERN ADRIATIC SEA: A STATISTICAL ANALYSIS. CONTINENTAL SHELF RES. 4(3):321-340. PERGAMON PRESS, OXFORD. EN.

Data concerning grain-size distribution, mineralogy, geochemistry, and chlorinated hydrocarbon concentrations, obtained from 246 surface sediment samples collected in the Northern Adriatic Sea (Italian area), provide the basis for a multivariate statistical analysis which evaluates the influence of riverine inputs, the differences among various depositional environments and the presence of polluted zones. Cluster analysis applied to grain size has identified nine groups of lithotypes associated with the morphology and the hydrology of the basin. In the Gulf of Venice, principal component analysis on clay minerals and carbonates has permitted recognition of two main areas located north and south of the Brenta river. More subareas correspond to other lithological types.

87GE0130. E.M.CHERRY, H.C.NOLTIMIER. 1985. PALEOMAGNETISM AND HYDROTHERMAL ALTERATION: KIRKPATRICK BASALT GROUP, VICTORIA LAND. ANTARCTIC J. U.S. 20(5):32. U.S. NAT. SCI. FOUND., WASH. PN-3088. EN.

87GE0131. T.J.G.FRANCIS. 1985. RESISTIVITY MEASUREMENTS OF AN OCEAN FLOOR SULPHIDE MINERAL DEPOSIT FROM THE SUBMERSIBLE CYANA. MARINE GEOPHYS. RES. 7:419-438. D. REIDEL PUB., DORDRECHT. PN-2922. EN.

Electrical resistivity measurements of the sea bed have been made from the submersible Cyana at four locations on a seamount close to the axis of the East Pacific Rise. Two of the sites were on a major sulpiide deposit close to the top of the seamount, and the other two on pillow basalts near its base. The resistivity of the pillow-lava terrain was found to be about forty times greater than that of the sea water, in good agreement with downhole logging measurements in DSDP drill holes. The resistivity of the sulphide bottom was one to two orders of magnitude less than that of the pillow basalts. At one site the sea bed was almost twice as conductive as the overlying sea water and the deposit at this location is estimated to be about 9 m thick. Self-potentials of up to 10 mV, measure+.

87GE0132. M.A.HABAN, D.H.ELLIOT. 1985. MINERAL CHEMISTRY OF THE KIRKPATRICK BASALT, NORTHERN VICTORIA LAND.

ANTARCTIC J. U.S. 20(5):30-31. U.S. NAT. SCI. FOUND., WASH. PN-3087. EN.

87GE0133. G.FAURE, S.SUTTON. 1985. THERMOLUMINESCENCE OF SANDSTONE CLASTS OF THE ELEPHANT MORAINE. ANTARCTIC J. U.S. 20(5):12-14. U.S. NAT. SCI. FOUND., WASH. PN-3086. EN.

87GE0134. P.HUGHES, L.A.KRISSEK. 1985. MODERN SEDIMENTS OF THE TERRA NOVA BAY POLYNYA, ROSS SEA, ANTARCTICA. ANTARCTIC J. U.S. 20(5):107-108. U.S. NAT. SCI. FOUND., WASH. PN-3091. EN.

87GE0135. H.Y.ZOU, X.G.YU. 1985(7). DETERMINATION OF LEAD 210 IN MARINE SEDIMENTS AND ITS APPLICATION TO GEOCHRONOLOGY. ACTA OCEANOL. SINICA. 4(3):402-410. CHINA OCEAN PRESS, BEIJING. EN.

A method of electrodeposit-Lead Sulfate precipitation-beta counting has been developed for the determination of Lead 210 in marine sediments. The chemical yield of lead is 85-90%, coincident with radiochemical yield. The precision is 2.9%. The typical Lead 210 profiles of five cores were successfully obtained in the Changjiang Estuary and adjacent continental shelf. The sedimentation rates of the cores from five stations of G8132, G8133, G8134, G8135 and G8139 are 0.72, 0.86, 0.37, 0.33 and 0.42 cm/yr respectively.

87GE0136. J.E.MACKIN, R.C.ALLER. 1986. THE EFFECTS OF CLAY MINERAL REACTIONS ON DISSOLVED AL DISTRIBUTIONS IN SEDIMENTS AND WATERS OF THE+. CONTINENTAL SHELF RES. 6(1/2):245-262. PERGAMON PRESS, OXFORD. EN.

Reactions involving clay minerals may exert a major control on some aspects of marine water and sediment chemistry. The potential of clay mineral reactions in this regard was investigated in Amazon continental shelf muds and overlying waters using highly sensitive dissolved Al analyses. Data are restricted to low-Fe pore waters from undisturbed and incubated surface sediment at 9 stations, a surface water transect through the Amazon River plume, and water column profiles determined at coring sites. Approximately constant relations between dissolved Al, si, and Hydrogen ion in pore waters imply that aluminous authigenic clays are forming in muddy regions of the Amazon shelf.

87GE0137. R.W.FAAS. 1986. MASS-PHYSICAL AND GEOTECHNICAL ' PROPERTIES OF SURFICIAL SEDIMENTS AND DENSE NEARBED SEDIMENT SUSPEN+. CONTINENTAL SHELF RES. 6(1/2):189-208. PERGAMON PRESS, OXFORD. EN.

Mass-physical and geotechnical properties of the surficial (to 3 m) sediments on the Amazon continental shelf were analyzed from 36 short (0.5 m) and longer (3 m) cores obtained during a June-July 1983 cruise which coincided with the high discharge period of the Amazon River. Data included undrained shear strength (measured by a hand-held shear vane) and water content measurements, and were used to evaluate the state of consolidation of the uppermost 3 m of the continental shelf.

87GE0138. K.A.RODGERS, G.S.HENDERSON. 1986. THE THERMOCHEMISTRY OF SOME IRON PHOSPHATE MINERALS: VIVIANITE, METAVIVIANITE, BARACITE, LUDLAMITE+. THERMOCHIMICA ACTA. 104:1-12. ELSEVIER SCI. PUB., AMSTERDAM. PN-2995. EN.

Vivianite shows a major differential thermal response spanning 65 to 315 Deg. in Centigrade attributable to an endothermal loss of structural water combined with the oxidation of ferrous ion (which results in exothermic peak(s) being described within the endothermal record) and consequential breakdown of the original structure. Baracite also has the same basic pattern but an additional exotherm near 700 Deg. in Centigrade, possibly due to formation of high magnesium phosphate. Ludlamite shows a narrower dehydration endotherm at a higher temperature reflecting the difference in bond type between the parallel bands of octahedra in the two structures. The differences in thermal behaviour between vivianite and metavivianite are too slight to allow them to be used to detect the presence of+.

87GE0139. H.C.PENG, Q.J.ZHAO. 1986(10). STUDY ON MATERIAL COMPOSITIONS AND GROWTH ENVIRONMENT OF THE HUANGHAI GLAUCONITE. ACTA OCEANOL. SINICA. 5(4):563-571. CHINA OCEAN PRESS, BEIJING. EN.

In this paper the physical properties, chemical and mineral compositions of Huanghai glauconites are dealt with, and several factors associated with the growth of Huanghai glauconite are discussed, such as the type of bottom sediments, rate of sedimentation and the oxidation. Thus, a preliminary understanding of the growth of Huanghai glauconite is put forward.

87GE0140. H.L.HONG. 1986(10). A STUDY OF DETRITAL MINERALS IN THE SEDIMENTS FROM THE WESTERN CENTRAL PACIFIC OCEAN. ACTA OCEANOL. SINICA. 5(4):552-562. CHINA OCEAN PRESS, BEIJING. EN.

No less than 90 species of detrital minerals have been identified from the fine and very fine sand grains in the sediments from the Western Central Pacific. It is demonstrated that the volcanic minerals were originated from the eruption of oceanic tholeiitic magma since the Early Pleistocene according to the mineralogical indications and the rare-earth element distribution pattern. The mineral assemblage indicates that the detrital minerals are principally of pelagic origin. But the Melanesia Basin has more terrigenous constituents of minerals, of which, the quartz content increased generally during the interglacial periods. The area of Wallis Islands, especially of the Northern Fiji Basin has relatively typical pelagic substances and less terrigenous components. The genesis of th+.

87GE0141. KAP-SIK.JEONG, SANG-JOON.HAN, JUNG-KEUK.KANG. 1986(12). DISTRIBUTION CHARACTERISTICS OF CHEMICAL ELEMENTS IN

CORE SEDIMENTS FROM THE NORTHEASTERN EQUATORI+. OCEAN RES. 8(2):1-15. KORDI., ANSAN. EN.

The vertical distributions of total Si, Al, Fe, Mg, Ca, Na, K, Ti, P, Mn, Ba, Cu, Ni, Pb and Zn content in the sediment cores from the KONOD-1 area were determined. The contents of Mn, Fe, Al, Ni, Cu, Co, Mg, P, Na and Ti are generally low; however, Zn, Pb and Ba contents are high in the upper parts of the sediment cores. Most elements have been recycled to the overlying ambient sea water by the dissolution of metal oxides in thick oxidized sediment. Among the elements, Zn, Pb and Ba in the sediments may be involved in forming the Mn-nodules. In the deep sediments, large portions of elements seem to be associated in diagenetically-formed minerals such as Fe-smectite.

87GE0142. Y.Q.TANG, M.GONG, B.LU. 1986(4). HUMIC SUBSTANCES IN SEDIMENTS. ACTA OCEANOL. SINICA. 5(2):235-246. CHINA OCEAN PRESS, BEIJING. EN.

In this paper the chemical characteristics of humic substances (humic acid and fulvic acid) from East China Sea surficial sediment are studied through combination of chemical and physical methods. results show that humic acids have less aromatic hydrocarbon and more alkane structure. The contents of amino acids from hydrolyzate of humic substances are different. The amount of various amino acids (such as acidic, neutral or basic amino aicd) of fulvic acid is higher than that of humic acid. The distribution order of amino acid abundance in various kinds of sediments is neutral amino acid>aromatic amino acid> basic amino acid.

87GE0143. H.T.SHEN. 1986(7). A MODEL OF GENESIS OF THE RELICT SEDIMENT ON THE EAST CHINA SEA SHELF. ACTA OCEANOL. SINICA. 5(3):437-446. CHINA OCEAN PRESS, BEIJING. EN.

On the basis of the Carbon 14 dating data, lithological characters biological and chemical compositions and so on, the relict sediment of the East China Sea shelf is divided into two types of genesis-regression & transgression, with four sedimentation periods in this paper. The upper relict sediment layer is the sandy sediment of the transgressive bottom layer in Post-glacial period. Its sediment age becomes younger and younger from east to west. The direction of its age variation is in accord with the transgressive direction, showing that the sandy sediment is the product of transgression in Post-glacial period. The age of the lower relict sediment layer is over 15,000 a. BP. The main variation trend appears older in the west but younger in the east, agreeing with the regressive dire+.

87GE0144. J.PICKARD, ET AL. 1986(9). EARLY PLIOCENE MARINE SEDIMENTS IN THE VESTFOLD HILLS, EAST ANTARCTICA: IMPLICATIONS FOR COASTLINE+. SOUTH AFRICAN J. SCI. 82:520-521. BUR. SCI. PUB., PRETORIA. PN-3052. EN.

The Vestfold Hills are an ice-free oasis of low elevation on the coast of East Antarctica. The low gneissic hills rise to an elevation of 160m and are draped with a discontinuous cover of late Pleistocene and Holocene till. Holocene marine fossils are abundant in valleys with saline and hypersaline lakes. At Marine Plain in the south of the Hills, at least 8 m of diatomaceous sand is exposed in a natural scarp. The sediment contains diatoms, molluscs and foraminifera of early Pliocene age. This is the first record of late Tertiary marine fossils from Antarctica outside the Transantarctic Mountains and the Antarctic Peninsula. In this report we summarise the stratigraphy and fossils in the deposit, discuss its age, and its implications for coastline, ice sheet volume and climate of An+.

87GE0145. H.J.LEE, S.K.CHOUGH, K.S.JEONG, S.J.HAN. 1987. GEOTECHNICAL PROPERTIES OF SEDIMENT CORES FROM THE SOUTHEASTERN YELLOW SEA: EFFECTS OF DEPOSITIONA+. MARINE GEOTECHNOLOGY. 7:37-52. TAYLOR & FRANCIS, LONDON. PN-2890. EN.

Geotechnical properties of 20 scattered sediment cores from the southeastern Yellow Sea reveal that sediments contain certain common characteristics indicative of depositional processes. Silty and sandy sediments off the Taean Peninsula are largely consolidated and extensively bioturbated. Further seaward sandy sediments are consolidated in which sands are well sorted and shell fragments are scattered. In contrast, muddy sediments near the mouth of the Keum River are high in water and clay contents and low in shear strength. Water content increases with depth, but shear strength decreases. Fine sediments derived from the Keum River are restricted nearshore along the coast. Off the southwestern coast off Mokpo, sediments consist of well-sorted silty layers and laminae with various d+.

87GE0146. DAE-CHOUL.KIM, SI-TAE.SONG, BYEONG-JO.YOO. 1987(3). DEPOSITIONAL ENVIRONMENTS OF THE CONTINENTAL SHELF SEDIMENTS BETWEEN GEOJE AND NAMHAE ISLANDS. BULL. KOREAN FISH. SOC. 20(2):166-174. KOREAN FISH. SOC., PUSAN. KO.

Distribution, bathymetry and textural parameters of the bottom sediment deposited between Geoje and Namhae Islands were studied to understand the depositional environment of the area. The study area is divided into three different provinces. Except for the Gwangyang Bay and Changseon Channel, mud dominates in the western part whereas sandy mud and muddy sand prevail in the southeastern part including the eastern area of the Yogji Island. The relict sediment is located in the eastern part of the area. Generally, the Holocene sediment, located in the northern part of the area, is considered to be transported and deposited by a pelagic suspension mode. Influence of strong tidal currents results in some depressions in the vicinity of Changseon Island and the eastern part of the Yogji Is+.

87GE0147. M.C.KENNICUTT II, ET AL. 1987(3). HIGH MOLECULAR WEIGHT HYDROCARBONS IN GULF OF MEXICO CONTINENTAL SLOPE SEDIMENTS. DEEP-SEA RES. 34(3):403-424.

PERGAMON PRESS, OXFORD. EN.

Sediments on the Gulf of Mexico continental slope contain a mixture of terrigenous, petroleum and planktonic hydrocarbons. The relative amount of these three inputs varies as a function of location, water depth, and time of sampling. The hydrocarbon concentrations measured are generally lower than those previously reported for shelf and coastal gulf of Mexico sediments. The influence of land-derived material decreases from the central to the western to the eastern Gulf of Mexico. Petroleum inputs are measurable at all sites sampled. Natural seepage was considered to be a significant source of hydrocarbons to slope sediments.

87GE0148. SOON-KEUN.CHANG, R.G.DOUGLAS. 1987(3). HOLOCENE TURBIDITES OF SANTA CATALINA BASIN, CALIFORNIA CONTINENTAL BORDERLAND. J. GEOL. SOC. KOREA. 23(1):16-31. GEOL. SOC. KOREA, SEOUL. PN-2885. KO.

Sedimentological and micropaleontological analyses were carried out to identify the existence of turbidite in two piston cores from Santa Catalina Basin, California Continental Borderland.

87GE0149. YONG-AHN.PARK, KYUNG-RYUL.KIM, SOO-CHUL.PARK, SANG-YUN.BAK. 1987(3). CHARACTERISTICS OF THE BOTTOM SEDIMENTS FROM THE CONTINENTAL SHELF OF THE KOREA STRAIT AND SOME GE+. J. OCEANOL. SOC. KOREA. 22(1):43-56. OCEANOL. SOC. KOREA, SEOUL. KO.

A study on sedimentation, geochemical behavior and seismic stratigraphy of the continental shelf sediments along the Korea Strait and a part of south and southeast offshore area of the Korea peninsula was carried out. In the inner shelf floor with depth ranging up to 80 m zonal distribution patterns of mud, sandy silt, and silty sand were observed. In the outer shelf, however, coarse sandy sediments are dominant, and shells and gravels were frequently observed. These observations seem to confirm the Holocene sedimentary processes on the continental shelves off the south, south to east coasts of Korea discussed by Park (1985 and 1986) and Park and Choi (1986).

87GE0150. D.Z.PIPER, Y.KOLODNY. 1987(5/6). THE STABLE ISOTOPIC COMPOSITION OF A PHOSPHORITE DEPOSIT: DELTA CARBON 13, DELTA SULFUR 34, AND DE+. DEEP-SEA RES. 34(5/6):897-911. PERGAMON PRESS, OXFORD. EN.

The stable isotopes of carbon and sulfur in a major marine sedimentary phosphate deposit from the northwestern United States (the Phosphoria Formation of Permian age) characterize the chemical properties of the depositional environment. The delta sulfur 34 and delta carbon 13 analyses suggest deposition under conditions of variable redox from a solution the acidity of which was controlled by reaction with carbonate rocks and exchange with seawater. The delta oxygen 18 concentration of apatite indicates phosphatization in a shallow sea, during three glacial and intervening interglacial stages. These data tend to corroborate the interpretation of field studies by others, that the apatite formed on a continental shelf in an area of intense oceanic upwelling during several episodes of sea +.

87GE0151. JUNG-KEUK.KANG. 1987(9). MINERALOGY AND INTERNAL STRUCTURES OF A FERROMANGANESE CRUST FROM A SEAMOUNT, CENTRAL PACIFIC. J. OCEANOL. SOC. KOREA. 22(3):168-178. OCEANOL. SOC. KOREA, SEOUL. EN.

A study on the mineralogy and internal features have been carried out on a sample of ferromanganese crust from a Central pacific seamount. The distribution of manganese mineral vernadite in the different layers indicates typical hydrogenous origin under a continuous change of growth conditions during crustal formation. Various internal structures are discerned within the crust which may be attributed to different growth conditions. The growth structure changes and the distinct break in the formation of the crust at about 2 cm depth are assumed to be the results of Miocene to mid-Pleistocene global palaeoceanographic events.

87GE0152. SANG-JOON.HAN, KAP-SIK.JEONG, DONG-HYUK.SHIN. 1987(9). MINERALS IN THE CORE SEDIMENTS FROM THE KONOD-1 AREA; NORTHEASTERN EQUATORIAL PACIFIC. J. OCEANOL. SOC. KOREA. 22(3):119-129. OCEANOL. SOC. KOREA, SEOUL. EN.

Sediments in the cores from the KONOD-1 area consist mainly of authigenic smectite and clinoptilolite, and terrigenous minerals of illite, chlorite, kaolinite, quartz, and plagioclase. The authigenic minerals become dominant over the terrigenous minerals with increasing depth. Clinoptilolite occurs at the deeper core depth because its formation is slower than that of smectite. The vertical distribution of minerals indicates that the eolian influence, probably in the late Oligocene, diluted the abundance of smectite in near-surface sediments. This vertical distribution pattern may also have been affected by progressive dissolution of authigenic minerals in the near surface sediments.

87GE0153. JEUNG-SU.YOUN, GI-WON.GO. 1987(9). SEDIMENTOLOGICAL CHARACTERISTICS OF THE SURFACE SEDIMENTS IN THE SOUTHERN SEA OFF CHEJU ISLAND, KO+. J. OCEANOL. SOC. KOREA. 22(3):130-142. OCEANOL. SOC. KOREA, SEOUL. KO.

Sedimentological characteristics of the surface sediments in the southern sea off Cheju Island are described from analyses of bottom sediments. The sediments are subdivided into seven textural classes, namely muddy sand, slightly gravelly muddy sand, sand, clayey sand, sandy clay, sandy mud, silty sand. Sand size sediments are distributed in the southeastern part and/or around the Island, whereas sandy and muddy sediments are mainly distributed in the central and southern parts of the study area. A small portion of mud patch is located in the southwestern part of the area. X-ray diffractogram show that the minerals in clay from the southwestern mud patch are illite, chlorite, kaolinite, feldspar and calcite. The bulk of illite in the mud zone is believed to be originated from Huangh+.

87GE0154. C.X.LI, P.LI. 1983(6). THE

CHARACTERISTICS AND DISTRIBUTION OF HOLOCENE SAND BODIES IN THE CHANGJIANG DELTA AREA. ACTA OCEANOL. SINICA. 2(1):84-96. CHINA OCEAN PRESS,,BEIJING. EN.

The holocene sand bodies in Changjiang delta area may be classified genetically as river mouth sand, marine sand and river channel-filled sand, which are different in external geometry, internal characteristics, spatial distribution and contact with overlying and underlying beds. The sand bodies are distributed in two-storeyed beds in vertical sequence. The transgressive sands are overlain by regressive ones, and there is a wedge of marine clay between them.

87GE0155. C.X.LI, P.LI, L.WANG. 1984(1). POSTGLACIAL TRANSGRESSIVE-REGRESSIVE SEQUENCES IN COASTAL AND DELTAIC AREAS IN EAST CHINA SEA. ACTA OCEANOL. SINICA. 3(1):96-105. CHINA OCEAN PRESS, BEIJING. EN.

This paper mainly deals with the internal characteristics, and formation of the post-glacial transgressive-regressive sequence, as well as the distribution regularity of the sand bodies, peats and barrier-lagoon systems within post-glacial bed along the coastal and deltaic areas in Eastern China. The internal characteristics of post-glacial transgressive-regressive sequences along the coastal zones over the world are the same as those in Eastern China, and the other Quaternary marine beds are similar to post-glacial ones in Eastern China. The conclusion, therefore, obtained from the study of postglacial transgressive-regressive sequences may be useful to the study of the other marine beds.

87GE0156. Y.K.HUANG, F.XIA, G.N.CHEN. 1984(7). CONTROLLING PROCESSES OF FAULTS OVER THE ORIGIN AND DEVELOPMENT OF ZHUJIANG DELTA. ACTA OCEANOL. SINICA. 3(3):385-397. CHINA OCEAN PRESS, BEIJING. EN.

This paper discusses the origin and development of the Zhujiang Delta on the basis of the analyses of the fault systems, lithofacies, depositional thickness, ancient coastline and carbon 14 dating. We consider that the delta is a multi-faulting block, whose external form, internal structure and configuration of its ancient coastline are all strictly controlled by three active sets of the NE, NW and WE faults.

87GE0157. W.B.HARLAND. 1985. CALEDONIDE SVALBARD. THE CALEDONIDE OROGEN - SCANDINAVIA AND RELATED AREAS. BK:999-1016. JOHN WILEY & SONS, N.Y. PN-2739. EN.

The Svalbard archipelago was affected by more than one mid-Palaeozoic orogenic phase, and it is generally considered that the whole area is Caledonide. However, westernmost Svalbard may have formed from a distinct Holtedahl Geosyncline situated off North Greenland, outside the Caledonian Orogen. It exhibits thick Vendian through Silurian strata of mobile facies rich in tillites and volcanics. Its deformation could be more closely related to the Ellestmerian Orogeny. The classic Caledonian terrane (Eastern Province, i.e. Ny Friesland and Nordaustlandet) began with the Hecla Hoek Geosyncline forming over a very long time span, deformed after Llanvirn time and reaching a climax in the Ny Friesland Orogenic phase. An intermediate (Central) province formed from the Hornsundian Geosynclin+.

87GE0158. L.M.PARSON, D.G.MASSON, C.D.PELTON, A.C.GRANT. 1985. SEISMIC STRATIGRAPHY AND STRUCTUREOF THE EAST CANADIAN CONTINENTAL MARGIN BETWEEN 41 AND 52 N. CANADIAN J. EARTH SCI. 22:686-703. NAT. RES. COUN. CAN., OTTAWA. PN-2948. EN.

The seismic stratigraphy of the eastern Grand Banks continental margin is examined, and a five-fold division of the sedimentary sequence overlying basement is proposed. Oceanic basement of Cretaceous age underlies the eastern part of the study area; to the west, continental basement ranging in age from Late Precambrian to ? Jurassic underlies the Grand Banks. The sediment units, ranging in age from Early Cretaceous to Recent, have been dated by extrapolation of both commercial and DSDP drilling results from the Grand Banks and from the formerly conjugate Iberian margin. Identification of oceanic magnetic anomalies in the Newfoundland Basin agrees with the proposed age of the two oldest, Early Cretaceous units.

87GE0159. G.FAURE, K.S.TAYLOR. 1985. THE GEOLOGY AND ORIGIN OF THE ELEPHANT MORAINE ON THE EAST ANTARCTIC ICE SHEET. ANTARCTIC J. U.S. 20(5):11-12. U.S. NAT. SCI. FOUND., WASH. PN-3085. EN.

87GE0160. B.T.HUBER. 1985. THE LOCATION OF THE CRETACEOUS/TERTIARY CONTACT ON SEYMOUR ISLAND, ANTARCTIC PENINSULA. ANTARCTIC J. U.S. 20(5):46-48. U.S. NAT. SCI. FOUND., WASH. PN-3089. EN.

87GE0161. J.S.MENG, D.H.GUAN. 1985(10). ESTIMATION OF THE ATTENUATION OF SOUND IN MARINE SEDIMENTS BY NORMALLY-INCIDENT PULSES. ACTA OCEANOL. SINICA. 4(4):503-509. CHINA OCEAN PRESS, BEIJING. EN.

A method of remote sensing of attenuation coefficient of sound wave in marine sediments is proposed in this paper. Under certain conditions the echo envelope has an exponential decay EXP(-bCt). When the frequency is high enough, the exponential decay would be the dominant factor in the shape of the echo envelope. Therefore, the attenuation coefficient can be estimated from the envelope. The echo as a function of time is deduced on the basis of a small-scale layering model of marine sediments. The deduction can be regarded as a description of the mechanism of the volume-scattering of high-frequency sound in marine sediment. Experiments at sea are described, and the results are given.

87GE0162. Z.Z.YE, ET AL. 1985(10). SEDIMENTARY STRUCTURE AND FACIES MODEL OF LATE PLEISTOCENE EOLIAN BIOCALCARENITES IN SHIDAO ISLAND+. ACTA OCEANOL. SINICA. 4(4):603-614. CHINA OCEAN PRESS, BEIJING. EN.

The sequence of biocalcarenites occurred on Shidao Island, the highest one among the Xisha Archipelago, is characterized by the alternation of cross-beddings and parallel beddings, which, owing to the misinterpretation of the sedimentary structures, has caused some controversies. In conclusion, the coexistence of the three boundary surfaces and the dune and interdune deposits marks the feature of the eolian biocalcarenites. The eolian deposits started from 3200 yr BP when sea level was low and accumulated with transgression. alternation of wet and dry climate repeated several times. The history of Shidao Island might be comparable with some area in the Pacific Ocean.

87GE0163. C.R.ALEXANDER JR., C.A.NITTROUER, D.J.DEMASTER. 1986. HIGH-RESOLUTION SEISMIC STRATIGRAPHY AND ITS SEDIMENTOLOGICAL INTERPRETATION ON THE AMAZON CONTINE+. CONTINENTAL SHELF RES. 6(1/2):337-357. PERGAMON PRESS, OXFORD. EN.

Seismic profiles (3.5 kHz) from over 6000 km of shiptrack and piston cores from 26 stations were examined to evaluate the seismic-stratigraphic framework of the Amazon subaqueous delta. Acoustic reflectors in the seismic profiles were related to sedimentological and acoustic properties in piston-core sediment. Grain size in cores from the Amazon shelf correlates well with seismic velocity and saturated bulk density, and thus with changes in acoustic impedance. Acoustic reflectors on the Amazon shelf generally correspond to coarser layers in the seabed.

87GE0164. S.A.KUEHL, C.A.NITTROUER, D.J.DEMASTER. 1986. DISTRIBUTION OF SEDIMENTARY STRUCTURES IN THE ANAZON SUBAQUEOUS DELTA. CONTINENTAL SHELF RES. 6(1/2):311-336. PERGAMON PRESS, OXFORD. EN.

The nature and spatial relationships of sedimentary structures in the Amazon subaqueous delta are determined from radiographs of widely distributed sediment cores, and are contrasted with observations of sedimentary structures from other major deltas. Five distinct facies are identified in modern (accumulated within the past 100 y) Amazon sediments, including: (a) physically stratified sand, (b) interbedded mud and sand, (c) proximal-shelf sandy silt, (d) faintly laminated mud, and (e) mottled mud. In the outer topset and foreset regions of the delta, organic-rich laminae are observed in cores from several of these facies.

87GE0165. C.E.ADAMS JR., J.T.WELLS, J.M.COLEMAN. 1986. TRANSVERSE BEDFORMS ON THE AMAZON SHELF. CONTINENTAL SHELF RES. 6(1/2):175-187. PERGAMON PRESS, OXFORD. EN.

Echo-sounder profiles and side-scan sonograms reveal the presence of asymmetric bedforms on the middle Amazon shelf in water depths of 30-35 m and symmetric bedforms on the outer Amazon shelf at depths of 75-85 m. The presence of bedforms with a high degree of variability in shape, spacing, and sharpness of crests over distances of only a few kilometers suggests that sediment texture and flow processes are spatially variable. Offshore-facing lee slopes and grain size in the fine sand range (0.08-0.12 mm) suggest bed-material transport of sediment by ebbing tidal currents. Middle-shelf sands and associated bedforms apparently are a reflection of extant shelf dynamical processes.

87GE0166. D.H.ELLIOT, K.A.FOLAND. 1986. POTASSIUM-ARGON AGE DETERMINATIONS OF THE KIRKPATRICK BASALT, MESA RANGE. GEOL. INVESTIGATIONS IN NORTHERN VICTORIA LAND. BK:279-288. AME. GEOPHYS. UNION, WASH. PN-3044. EN.

New K-Ar analyses of whole-rock samples of lavas of the Kirkpatrick Basalt from the Mesa Range, north Victoria Land, give ages which range from 113 to 178 m.y. An age of 178 m.y. for the uppermost flow gives a minimum age for the lava pile and is consistent with previous estimates of the time of eruption of the lavas throughout the Transantarctic Mountains. The uppermost flow is of the high-Ti type in contrast with lower flows; thus this type of tholeiite in the Mesa Range is not appreciably younger than other Kirkpatrick Basalts. Different ages are obtained not only for rocks of the same flow but also for various size fractions of the same sample. Younger ages appear to be the result of variable argon 40 loss from poorly retentive phases, most likely in the mesostasis of the lavas.+.

87GE0167. P.J.BARRETT, D.H.ELLIOT, J.F.LINDSAY. 1986. THE BEACON SUPERGROUP (DEVONIAN-TRIASSIC) AND FERRAR GROUP (JURASSIC) IN THE BEARDMORE GLACIER ARE+. GEOLOGY OF THE CENTRAL. TRANSANTARCTIC MOUNTAINS. BK:339-428. AME. GEOPHYS. UNION, WASH. PN-3040. EN.

The beacon Supergroup and Ferrar Group in the Beardmore area comprise a platform sequence 4 km thick and ranging in age from Devonian to Jurassic. The sequence, which is now folded into a very broad syncline plunging gently to the south-southeast, rests on a surface of low relief cut in a basement of metasedimentary rocks intruded by Ordovician granite. The oldest Beacon strata are the 300 m of quartzose sandstone, the Alexandra Formation, the only formation of the Taylor Group (Devonian) in this area. The sand is well rounded, well sorted, coarse grained and locally conglomeratic. These features and the dispersed paleocurrent vectors suggest largely coastal deposition. The Victoria Group (Permian-Triassic) begins with glacial beds of the Pagoda Formation, which rest disconformably +.

87GE0168. D.H.ELLIOT, M.A.SIDERS, M.A.HABAN. 1986. JURASSIC THOLEIITES IN THE REGION OF THE UPPER RENNICK GLACIER, NORTH VICTORIA LAND. GEOL. INVESTIGATIONS IN NORTHERN VICTORIA LAND. BK:249-265. AME. GEOPHYS. UNION, WASH. PN-3042. EN.

Lavas of the Kirkpatrick Basalt form a prominent series of mesas in the upper Rennick Glacier region. The stratigraphic thickness is about 780 m, consisting of up to 40 flows ranging from less than 1 m to as much as 135 m thick. Interbeds in the sequence occur sparsely and include both fossiliferous lacustrine beds and

volcanogenic rocks. The lavas cover topography of at least 50 m. Correlative diabase sills of the Ferrar Dolerite, which intrude Beacon strata, occur near the southern end of Gair Mesa, along the plateau escarpment to the west, and to the east of Aeronaut Glacier. The structure at the southern end of Gair Mesa is a broad, shallow syncline; to the north a major fault separates the lavas from the escarpment to the west. Regionally, the lavas also form an isolated outcr+.

87GE0169. D.H.ELLIOT, M.A.HABAN, M.A.SIDERS. 1986. THE EXPOSURE HILL FORMATION, MESA RANGE. GEOL. INVESTIGATIONS IN NORTHERN VICTORIA LAND. BK:267-278. AME. GEOPHYS. UNION, WASH. PN-3041. EN.

A sequence of pyroclastic rocks crops out below the Jurassic Kirkpatrick Basalt and above the Triassic Section Peak Formation in the Mesa Range region. These rocks include breccia, lapilli tuff, tuff, and tuffaceous sandstone. Compositionally, the coarser clasts are dominated by those of basaltic composition, although megaclasts of sandstone from the Section Peak Formation are locally conspicuous. Finer clasts that form the tuffs and the matrix of breccias and lapilli tuffs include basaltic ash and pyroxene grains as well as a silicic component derived from the Section Peak Formation. Characteristics of the basaltic component suggest that hydroclastic processes operated during formation of these rocks. This sequence of pyroclastic rock represents an early phase of the tholeiitic mag+.

87GE0170. J.W.COLLINSON, D.C.PENNINGTON, N.R.KEMP. 1986. STRATIGRAPHY AND PETROLOGY OF PERMIAN AND TRIASSIC FLUVIAL DEPOSITS IN NORTHERN VICTORIA LAND, ANT+. GEOL. INVESTIGATIONS IN NORTHERN VICTORIA LAND. 211-242. AME. GEOPHYS. UNION, WASH. PN-3037. EN.

The Beacon Supergroup in northern Victoria Land is represented by three formations, an unnamed Upper Carboniferous-Lower Permian diamictite, the Takrouna Formation of Permian age, and an Upper Triassic unit, which is herein named the Section Peak Formation. The diamictite unit occurs sporadically in the Lanterman Range, the Morozumi Range, and the Neall Massif area. A maximum thickness of 350 m has been reported from the Lanterman Range, where the diamictite is demonstrably of glacial origin. No definite glacial features were observed in the diamictite at other localities. The Takrouna Formation, a predominantly sandstone unit with subsidiary noncarbonaceous and carbonaceous mudstone, occurs in the lower Rennick Glacier region in the Freyberg Mountains, Lanterman Range, Morozumi Range,+.

87GE0171. D.M.HARWOOD. 1986(9). OLDEST RECORD OF CAINOZOIC GLACIAL-MARINE SEDIMENTATION IN ANTARCTICA (31 MYR): RESULTS FROM MSSTS+. SOUTH AFRICAN J. SCI. 82:516-519. BUR. SCI. PUB., PRETORIA. PN-3050. EN.

The MSSTS-1 (McMurdo Sound Sediment and Tectonic Studies) drill-hole was drilled in 1979 to obtain information about the Cainozoic history of the East Antarctic Ice Sheet and its relationship with the development of the Transantarctic Mountains. The initial geological interpretation of this drill-core is discussed by Barrett and McKelvey. A detailed report of MSSTS-1 results is in the press and will be published as a Bulletin in the Miscellaneous Series of the New Zealand D.S.I.R., edited by P.J. Barrett.

87GE0172. J.W.COLLINSON, N.R.KEMP, J.T.EGGERT. 1987. COMPARISON OF THE TRIASSIC GONDWANA SEQUENCES IN THE TRANSANTARCTIC MOUNTAINS AND TASMANIA. GEOPHYS. MONOGRAPH. 41:51-61. AME. GEOPHYS. UNION, WASH. PN-3045. EN.

Triassic sedimentary sequences in the Transantarctic Mountains and Tasmania are both dominated by fluvial sandstones. Triassic exposures in Antarctica occur in three separate areas along the Ross Sea sector, one in the central Transantarctic Mountains and the other two in Victoria Land. In detail the Antarctic sequences and the Tasmanian sequence are different and can not be correlated lithologically, but paleocurrent vectors and the distribution of the fluvial facies and detrital constituents suggest that they could have been deposited in a single foreland basin. This foreland basin, the Nilsen-Mackay Basin, was a trough-shaped depression between the East Antarctic craton and the Gondwanian orogen.

87GE0173. SANG-JOON.HAN, HO-IL.YOON, BYONG-KWON.PARK 1987(3). NEARSHORE SEDIMENTARY ENVIRONMENTS OF THE SINYANGRI FORMATON IN CHEJU ISLAND, KOREA. J. OCEANOL. SOC. KOREA. 22(1):1-8. OCEANOL. SOC. KOREA, SEOUL. KO.

The Sinyangri Formation crops out in the vicinity of the Seongsan Peninsula, Cheju Island. Based on sedimentary structures, texture and composition, the lithologic sequence has been classified, in ascending stratigraphic order, into three lithofacies: parallel laminated sandstone facies (Facies I): conglomerate facies (Facies II); and cross stratified sandstone facies (Facies III). Wedge-to-parallel, seaward-inclined in low angle less than 10 deg. lamina-sets with alternations of coarse-and fine-grained sediments in the Facies I are the characteristic sedimentary structures in the foreshore depositional environment. grains of this facies are well sorted with good roundness compared with the other two facies, partly showing inverse graded bedding.

87GE0174. YOUNG-SOO.PARK. 1987(6). KEROGEN FACIES OF THE CRETACEOUS BLACK SHALES FROM THE ANGOLA BASIN (DSDP SITE 530), SOUTH ATLANTI+. J. OCEANOL. SOC. KOREA. 22(2):87-104. OCEANOL. SOC. KOREA, SEOUL. EN.

The middle Cretaceous stratigraphic section of Deep Sea Drilling Project (DSDP) Site 530 in the Angola Basin is characterized by cyclic interbeds of organic-carbon-rich black shales and organic-carbon-poor red and green claystones, namely the black shale sequence. A number of samples from the black shale sequence were analyzed for the types and distribution of insoluble sedimentary organic matter (kerogen) in order to give more information on the

depositional conditions of the black shales in the Angola Basin. The dominant type of kerogen in the black shale sequence at Site 530 is amorphous organic matter mainly of marine planktonic algal origin. It probably consists of remains of some unfossilized dinoflagellates. The cyclic preservation of organic-carbon-rich black shales in the An+.

87GE0175. C.Z.LIU, L.C.WU, M.CAO. 1987(7). SEDIMENTARY CHARACTERISTICS OF CHENIERS IN SOUTHERN CHANGJIANG DELTA AND THEIR ORIGIN AND AGE DETE+. ACTA OCEANOL. SINICA. 6(3):405-412. CHINA OCEAN PRESS, BEIJING. EN.

According to analyses on the texture and structure of sediment, species component and accumulative way of shells, geometry of sand body and its vertical sequence, this paper points out that the sand ridge located in the west of Shanghai is a kind of ancient chenier, and the entire broad plain of cheniers and the mud flats in between is called chenier plain. The origin of the chenier is related to the shifting of main branch channel in the Changjiang estuary and coastal changes during the historical periods. Based on carbon 14 dating data, the ages of the cheniers from west to east are 6800-6000, 5800-5500, 4200-4000 and 3200 years B. P. respectively. These cheniers of different ages illustrate the development processes of the Changjiang Delta during the Middle Holocene.

87GE0176. M.SAIDOVA. 1957. QUANTITATIVE DISTRIBUTION OF THE FORAMINIFERA IN THE OKHOTSK SEA. ACAD. SCI., USSR, REPORTS. 114(6):1302-1305. INST. OCEANOL. ACAD. SCI. USSR PN-2352. EN.

87GE0177. M.SAIDOVA. 1957. ON THE DISTRIBUTION OF FORAMINIFERA IN THE STRATA OF THE SEDIMENTS OF THE OKHOTSK SEA. ACAD. SCI., USSR, REPORTS. 115(6):1213-1216. INST. OCEANOL. ACAD. SCI. USSR PN-2349. EN.

87GE0178. M.A.BUZAS. 1965(3). FORAMINIFERA FROM LATE PLEISTOCENE CLAY NEAR WATERVILLE, MAINE. SMITHSONIAN MISCELLANEOUS COLLECTIONS. 145(8):1-30. SMITHSONIAN INST., WASH. PN-2358. EN.

87GE0179. J.LEAR. 1970(2). THE BONES ON COALSACK BLUFF A STORY OF DRIFTING CONTINENTS. SATURDAY REVIEW. SATURDAY REVIEW, INC. PN-2710. EN.

87GE0180. X.S.GENG. 1982(12). TRANSGRESSIONS AND REGRESSIONS IN THE EASTERN CHINA SINCE THE LATE PLEISTOCENE EPOCH. ACTA OCEANOL. SINICA. 1(2):234-247. CHINA OCEAN PRESS, BEIJING. EN.

The littoral plain in the eastern China and its neighbouring shallow-sea continental shelf area is the zone where the coastlines moved back and forth during the Quaternary Period. In order to get detailed information about the changes of its limits and its repeating processes, it is necessary to compare with sea level change models of the worldwide typical areas according to the paleo-littoral-line sediments and the residual geomorphological topography, as well as on the basis of sedimental sequence and chronology. Through study we have got information on glacial sea level changes and the effect of sea level changes on the eastern China.

87GE0181. X.T.ZHAO, X.S.GENG, J.W.ZHANG. 1982(12). SEA LEVEL CHANGES IN EASTERN CHINA DURING THE PAST 20,000 YEARS. ACTA OCEANOL. SINICA. 1(2):248-258. CHINA OCEAN PRESS, BEIJING. EN.

Along the coast of the eastern China and on the adjacent shelf, geomorphological, sedimentological and biological evidences, related to ancient strandline, were found, and dated by radiocarbon method. In this paper, the curve and model of sea level changes during the past 20,000 years are established.

87GE0182. SOON-KEUN.CHANG, KYUNG-SHIN.LEE. 1982(12). RECENT BENTHIC FORAMINIFERA FROM THE INTERTIDAL FLATS OF THE VICINITY OF INCHON, KOREA. BULL. KORDI. 4(1/2):63-72. KORDI., SEOUL. KO.

Micropaleontological analysis of the 98 samples collected from the intertidal flats in the vicinity of Inchon, Korea reveals the distribution, composition and related characteristics of the recent benthic foraminifers. A total of 37 species of benthonic foraminifera, among which 22 species in live, and 15 species in dead, have been identified. The live population was mainly composed of Rotaliina (Ammonia beccarii, Elphidium spp. Nonion nicobarense) with few Textulariina (Trochammina cf. japonica). In the total population including dead, however, the number of Textulariina was somewhat increased. Miliolina was also observed though in limited number. Prolific live population was observed in the area between the shoreline and the subtidal zone, concentrating mainly in the center of tid+.

87GE0183. K.F.WANG, ET AL. 1983(12). FACTOR ANALYSIS OF THE PALYNOLOGICAL ASSEMBLAGE FROM THE SEDIMENTS OF THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 2(2):271-283. CHINA OCEAN PRESS, BEIJING. EN.

Q-model factor analysis on twenty thousand grains of spores and pollen and algae from more than a hundred samples of ten column sections in the East China Sea has been made. Based on the factor loadings matrix and the factor scores matrix obtained, the palynological assemblages from the sediments of the East China Sea since late Pleistocene can be divided into eight spores and pollen zones. Zones 1-3 are dated as the Latest Pleistocene and zones 4-8 as Holocene. This paper also describes the procedure of Q-model factor analysis in detail.

87GE0184. C.H.WANG, H.W.YEH. 1984(12). THE QUATERNARY OXYGEN ISOTOPE RECORDS IN MARINE SEDIMENTS. MEMOIR GEOL. SOC. CHINA. (6):281-293. PN-2848. EN.

Oxygen isotopic analysis of marine carbonate has

contributed greatly to our knowledge of paleoclimates and has been successfully applied to the study of Cenozoic marine geology. Similar work is now being extended into the siliceous fossils and shows promising results. This review emphasizes the application of oxygen isotope study of microfossils to fields of paleoclimate and stratigraphy.

87GE0185. C.H.WANG, H.W.YEH. 1984(12). OXYGEN ISOTOPIC ANALYSIS OF MARINE DIATOMS. BULL. INST. OF EARTH SCI., ACADEMIA SINICA. 4:131-140. INST. EARTH SCI. ACAD. SINICA. PN-2846. EN.

This study has established a simple and reliable technique for analysis of the oxygen isotopic composition of marine diatoms, including a standard purification procedure and dehydration technique, that yields reproducible results. Testing of analytical procedures showed that, in addition to the water associated with marine diatoms, other contaminants, such as organic matter, iron-oxide coatings, clay and detrital minerals, are also important causes of poor analytical reproducibility. Because all contaminants have lower delta oxygen 18 values than marine diatoms, oxygen isotope values of contaminated samples are always lower than those of cleaned counterparts. Furthermore, due to the difficulty in removing clay particles trapped in porous structures of diatoms, every sample analyzed req+.

87GE0186. Y.K.HUANG, F.XIA, D.F.HUANG, H.R.LIN. 1984(4). HOLOCENE SEA LEVEL CHANGES AND CRUSTAL MOVEMENTS ALONG THE NORTHERN COASTS OF THE SOUTH CHINA SEA. ACTA OCEANOL. SINICA. 3(2):226-237. CHINA OCEAN PRESS, BEIJING. EN.

This paper discusses level changes of the sea in the last 6000 years and the recent crustal movements of the coasts of the South China Sea. There was one transgression in the middle Holocene (about 6000-3000 years ago); the sea level might not be higher than the actual one. Many terraces and coral reef platforms above the sea level can be explained by recent crustal movements. As far as the intensity of the crustal movements are concerned, the NE faults are the strongest, the NW next, and the WE are the weakest. They intersect in block-faulting, differing in seismic activity, crustal movement rate and amplitude. On the whole, they gradually become stronger from west to east in accordance with the increasing tendency of stress field. The land is tilting toward the sea, especially in+.

87GE0187. Y.S.GUO, Y.S.HAN, G.F.YANG, M.H.ZHANG. 1984(4). DISCUSSION ON THE PLEISTOCENE HIGH SEA LEVEL ABOUT THE SHANDONG PENINSULA. ACTA OCEANOL. SINICA. 3(2):238-245. CHINA OCEAN PRESS, BEIJING. EN.

It has for many years been controversial whether there was a Pleistocene high sea level on the Shandong Peninsula. Our investigations in recent years suggest that the red sandy sediments distributed around the Yuanyaodun village, Weihai County, the "Liukuang Red Bed" and the loess-like deposits near Penglai county should be terrestrial deposits, and there is still not a convincing evidence to confirm that abrasion landforms found above the 10 m elevation on the coast are of marine origin. From these, it is still not safe to say that a high sea level had occurred in the Shandong Peninsula during the Pleistocene.

87GE0188. Z.C.LIU. 1984(4). QUATERNARY SEA LEVEL CHANGES IN CHINA. ACTA OCEANOL. SINICA. 3(2):246-253. CHINA OCEAN PRESS, BEIJING. EN.

Many transgressions on the plains along the Eastern China Sea had occurred in the Quaternary. They are named Beijing, Bohai, Haixing, Huanghua, Qingxian, Baiyangdian, Haizhou Bay, Cangxi, Xianxian and Candong transgressions. Their beds of marine facies have been buried in the Hebei Province, or on the shelf of China. The greatest transgressions occurred in the Early Pleistocene, while the smallest in the Middle Pleistocene, and the transgressions in the Late Pleistocene and Holocene were larger than that in the Middle Pleistocene. In accordance with the carbon 14 dating and the paleomagnetic stratigraphy, they may be compared with the transgressions in the Late Pleistocene with the oxygen 18 stages of the core V(28-238) at Equatorial Pacific.

87GE0189. S.C.MORRIS. 1985. NON-SKELETALIZED LOWER INVERTEBRATE FOSSILS: A REVIEW. SYSTEMATICS ASSOC. SPEC. 28:343-359. PN-2737. EN.

The fossil record of those lower invertebrates lacking substantial hard skeletal parts is briefly reviewed. Much of the evidence is dependent on exceptional examples of soft-part preservation, but in a number of cases trace fossils provide additional evidence. Examples are discussed from amongst the cnidarians (especially those from the late Precambrian Ediacaran fauna), ctenophores, platyhelminths, nemerteans, nematodes, nematomorphs, rotifers, priapulids, pogonophores, echiurans, and sipunculans. The available fossil record of these groups is unlikely to revolutionize our understanding of lower invertebrate phylogeny, but it does give some indications on first appearances and the subsequent evolution of lower invertebrates, especially with respect to adaptive radiations.

87GE0190. H.YAMAMOTO, S.MIZUTANI, H.KAGAMI. 1985. MIDDLE JURASSIC RADIOLARIANS FROM BLAKE BAHAMA BASIN, WEST ATLANTIC OCEAN. BULL. NAGOYA UNIV. MUSEUM. (1):25-49. NAGOYA UNIV. MUSEUM. PN-2436. EN.

Radiolarians in a deep-sea core sample recovered from the Atlantic ocean bottom of the Blake Bahama Basin (Leg76-534A-126-1) were studied. The sample treated is the oldest part of fossiliferous sediments in the modern ocean bottom, assignable to Middle Jurassic (Callovian). These radiolarian fossils are compared with those of the Japanese Islands, and it is concluded that the Callovian part of the DSDP cores can be correlated with a succession a little above the Dictyomitrella (?) kamoensis - Pantanellium foveatum Assemblage Zone or with the upper part of the Guexella nudata

Assemblage Zone, and corresponds to a succession equivalent to an upper part of the Tricolocapsa conexa Zone to a lower part of Stylocapsa (?) spiralis Zone in Southwest Japan.

87GE0191. O.DUCASSE, C.LETE, L.ROUSSELLE. 1985. PALEONTOLOGICAL CONTRIBUTION TO A PALEOGENE CRISIS: MEDOC OSTRACOD POPULATIONS AT THE EOCENE-OLIOG+. BULL. INST. GEOL. BASSIN D'AQUITAINE. (38):141-175. UNIV. BORDEAUX I, TALENCE. PN-2915. FR.

Wet drilling (use of cores) and some 15 outercropping sections at the median part of the Medoc region yielded continuous sedimentary records at the Eocene/Oligocene boundary within shallow and unstable marine and laguno-marine environments. Successive ostracod assemblages ranging from the upper Eocene to the base of the Oligocene revealed five stratigraphic stages. Significant ostracofauna modifications appear to have occurred between the late upper Eocene (horizon 4) and the basal Oligocene (horizon 5). Populational transformations recorded in 9 polymorph species belonging to the genera Cytheretta, Hammatocythere, Pokornyella, Quadracythere, and Schuleridea were studied. Their polymorphism increases progressively throughout the upper Eocene but decreases at the base of the Oligocene+.

87GE0192. O.DUCASSE, L.ROUSSELLE. 1985. ATTEMPT OF SETTLING NORTH AQUITANIAN CONTINENTAL SHELF WITH A DEEP-SEA SPECIES; C. CONSUETA DELTEL+. BULL. SOC. GEOL. FRANCE. 1(4):597-600. SOC. GEOL. FRANCE, PARIS. PN-2911. FR.

Four Cytherella species, more or less abundant and polymorphic, are represented in bathyal environments of Aquitanian Paleogene. One of them, C. consueta Deltel, succeeds in settling the North-Aquitanian continental shelf in early Eocene. There, it constitutes few numerous populations, less polymorphic than in a deep sea environment and whose specimens are dwarf.

87GE0193. R.MANSOURI, C.BOBIER, P.CARBONEL, J.-P.TASTET. 1985. CONTRIBUTION A LA CONNAISSANCE DES SYSTEMES LAGUNAIRES EN DOMAINE MEDITERRANEEN: LES MILIEUX ACTUE+. BOLL. OCEANOL. TEORICA ED APPLICATA. 3(3):167-195. OSS. GEO. SPE., TRIESTE. PN-2916. FR.

Some lagunal environment features associated with Medjerda Dealta have been determined by analysing superficial sediments (sedimentologic parameters, mineralogy, microfauna associations, especially Ostracods). The evolution of these environments during the last millenium has been reconstituted by core studies. Thus, it is shown that in the lake of Ghar El Melh, sedimentogenesis is the result of the interaction of the accumulation of carbonates formed in situ and diluted by terrigenous or marine deposits carried by three types of vectors. The first is formed by the superficial waters draining the neighbouring Jebels and the associated products remain near the internal shoreline. The second vector corresponds to an ancient delta which is generally inactive but which is reactivated duri+.

87GE0194. K.B.PIGG, T.N.TAYLOR. 1985. ANATOMICALLY PRESERVED GLOSSOPTERIS FROM THE BEARDMORE GLACIER AREA OF ANTARCTICA. ANTARCTIC J. U.S. 20(5):8-10. U.S. NAT. SCI. FOUND., WASH. PN-3083. EN.

87GE0195. T.N.TAYLOR, E.L.SMOOT. 1985. A NEW TRIASSIC CYCAD FROM THE BEARDMORE GLACIER AREA OF ANTARCTICA. ANTARCTIC J. U.S. 20(5):5-7. U.S. NAT. SCI. FOUND., WASH. PN-3081. EN.

87GE0196. T.N.TAYLOR, E.L.SMOOT. 1985. PLANT FOSSILS FROM THE ELLSWORTH MOUNTAINS. ANTARCTIC J. U.S. 20(5):48-49. U.S. NAT. SCI. FOUND., WASH. PN-3090. EN.

87GE0197. S.M.GAO, Y.F.LI. 1985(4). SEA LEVEL FLUCTUATION ALONG THE NORTHERN COAST OF BOHAI GULF ABOUT 2000 YEARS BP. ACTA OCEANOL. SINICA. 4(2):244-253. CHINA OCEAN PRESS, BEIJING. EN.

Sea ingressions have happened twice in the Bohai Gulf since the Holocene. In the Mid-Holocene (about 6000 yrs BP) the sea reached the farthest inland and flooded the area about 4 meters ASL. Later, the seawater retrograded gradually and formed a coastal plain. It was once again submerged about 2000 BP, resulting in the submergence of large-scale cultural remains at about 2.5-3 m ASL from the Warring States to the Western Han Dynasty by marine accumulations, or the overlap of peat and clay layers of continental facies by the coastal dunes about 3000 BP.

87GE0198. PH.MOURGUIART, ET AL. 1986. LATE QUATERNARY PALAEOHYDROLOGY OF LAKE HUINAYMARCA (BOLIVIA); SCENARIOS BASED ON OSTRACODS FAUNA. HYDROBIOLOGIA. 143:191-197. DR. W. JUNK B.V. PUB., HAGUE. PN-2614. EN.

In lake Titicaca, the distribution of the modern ostracod fauna appears to be controlled by a combination of two factors: a) the equilibrium between carbonates and organic matter, b) the ionic composition of the lake water and its tributaries. Therefore, the Limnocythere-Pampacythere group generally predominates on an alkaline-carbonate lake floor. In parts of the lake receiving an NaCl input from tributaries, Cyprideis and Cyprinotus occur. These are generally absent elsewhere. The Candonopsis group is found in the deepest part of the lake. Analysis of ostracod assemblages recovered from a number of cores permitted the reconstruction of the hydrological evolution of lake Huinaymarca for the last 10000 years. This included: low water levels, variations of oxygenation related to the+.

87GE0199. HAE-KYUNG.CHEONG, EUI-HYEONG.LEE, KWANG-HO.PAIK, SOON-KEUN.CHANG. 1986. RECENT OSTRACODES FROM THE SOUTHWESTERN SLOPE OF THE ULLEUNG BASIN, EAST SEA, KOREA. J. PALEONT.

SOC. KOREA. 2:38-53. PALEONT. SOC. KOREA, SEOUL. PN-2673. EN.

Ostracodes have been examined from four cores collected from the slope of the Ulleung Basin in the East Sea (Sea of Japan). A total of 117 species belonging to 47 genera of ostracodes are identified. The dominent species are Metacytheropteron chejuense, Schizocythere kishinouyei, Eucythere sp., Krithe sawanensis and Urocythereis sp. A. Ostracode assemblages represent the mixture of warm-water and coldwater species. The fauna is composed mainly of Holocene warm temperate water species, whereas some species are diagnostic to cold water. The core 40-2 is seemed to have been deposited in the warm water environment, whereas the cores 40-1, 41-2 and SL-1 have been dominantly influenced by cold water mass. Part of ostracodes seem to be transported from the neighboring inner shelf environme+.

87GE0200. SOON-KEUN.CHANG, R.G.DOUGLAS. 1986. BIAPERTURAL CASSIDULINA FROM SANTA CATALINA BASIN, CALIFORNIA CONTINENTAL BORDERLAND. J. PALEONT. SOC. KOREA. 2:18-22. PALEONT. SOC. KOREA, SEOUL. PN-2672. EN.

An abnormal specimen of Cassidulina, having two apertures, is recorded from a piston core located in Santa Catalina Basin, California Continental Borderland.

87GE0201. O.DUCASSE, J.P.PEYPOUQUET. 1986. OSTRACODS AT THE EOCENE-OLIGOCENE BOUNDARY IN THE AQUITAINE BASIN. STRATIGRAPHY, PHYLOGENY, PALAEO+. TERMINAL EOCENE EVENTS. BK:265-273. ELSEVIER SCI. PUB., AMSTERDAM. PN-2912. EN.

Eocene/Oligocene boundary ostracods in the Aquitaine Basin may serve as good regional stratigraphic markers of the margino-littoral environment. At this time there occurred renewal of microfauna and structural readjustment within the populational settlements. Paleoenvironmental conditions were different between the upper Eocene and beginning of the lower Oligocene from the littoral to the bathyal domains.

87GE0202. Y.H.SUN, Y.C.ZHANG. 1986(10). FERN SPORES IN THE OUTER SHELF OF THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 5(4):572-583. CHINA OCEAN PRESS, BEIJING. EN.

In this paper the distributional patterns of fern spores are discussed based on 132 surface sediment samples and core samples of 48 sites taken from the outer shelf of the East China Sea and part area of the southern Huanghai SEa. In general the content of fern spore in the surficial sediments increases from west to east of the area studied. The greatest abundance occurs at the nearby long. 126 E and then progressively decreases eastwards. There is a decrease tendency in abundance of fern spores from north to south. In the cores, the abundance of fern spores decreases from the upper part to the lower part. The changes in the composition of fern spores are corresponding to their abundance. From the study of fern spores it has been shown that the sporo-pollen assemblage of the Holoc+.

87GE0203. P.CARBONEL, J.-P.COLIN, D.L.DANIELOPOL, L.LONDEIX. 1986(12). KOVALEVSKIELLA (OSTRACODA, TIMIRIASEVIINAE), GENRE A MODE DE VIE BENTHIQUE DEPUIS L'OLIGOCENE, SON+. GEOBIOS. (19):677-687. PN-2615. FR.

This paper reviews the distribution of the fossil and recent Kovalevskiella. The fossil species of this group lived in a benthic environment (fresh and oligomesohaline environments) in Europe from the Upper Oligocene to the beginning of the Quaternary. The recent Kovalevskiella species are exclusively groundwater dwellers. A lacustrine paleoenvironment in southwestern France from the Lower Miocene, where Kovalevskiella lived abundantly, is studied in detail. The study reveals the paleoecologic characteristics of the species in question. The morphology of this fossil species is compared with that of the Recent groundwater Kovalevskiella and the slow rate of the evolutionary change of the carapace shape and structure of the Kovalevskiella group is emphasized. Evolutionary-ecologic ex+.

87GE0204. J.P.PEYPOUQUET, F.GROUSSET, P.MOURGUIART. 1986(2). PALEOOCEANOGRAPHY OF THE MESOGEAN SEA BASED ON OSTRACODS OF THE NORTHERN TUNISIAN CONTINENTAL SHEL+. GEOLOGISCHE RUNDSCHAU. 75(1):159-174. GEOL. VEREINIGUNG, MENDIG. PN-2917. FR.

A new method analysis used in the study of the El Kef Section (north-western Tunisia) let to the paleooceanographic reconstruction of the Mesogean between-late Cretaceous and early Paleogene. Several changes observed are, in fact, worthy of particular mention: paleobathymetrically the area changed from an upper bathyal environment of about 400 m deep to an outer shelf domain of 100-50 m. Furthermore, the Oxygen Minimum Zone (O.M.Z.) became highly intense at (a) the Cretaceous-Tertiary transition (catastrophic event); (b) the P1-P2 boundary (intense thermic stratification); and (c) between P4 and P6 (very active paleoproductivity). In this last episode the continental shelf environment was subjected to intense upwelling responsible for the formation of a prephosphatic environment at wa+.

87GE0205. K.F.WANG, Y.L.ZHANG, H.JIANG, X.B.HAN. 1986(4). PALYNOLOGICAL ASSEMBLAGES FROM THE QUATERNARY SEDIMENTS OF THE CHANGJIANG RIVER DELTA AND THE AGE +. ACTA OCEANOL. SINICA. 5(2):257-270. CHINA OCEAN PRESS, BEIJING. EN.

Through the palynological research of Quaternary sediments in Changjiang River Delta, 14 spores and pollen zones might be distinguished, reflecting the vegetation succession and climate fluctuation of Quaternary, which conforms to the climate of the world. Zones 1-9 are thought of as pleistocene and Zones 10-14 as Holocene based on the climatic fluctuation reflected by these zones and the comparison with the climatic stage at home and abroad. The marine facies sediments of Quaternary in the Changjiang River Delta contain

abundant fossil spores and pollen and have obvious characters. Because the warm and humid climate reflected by the palynological assemblages of marine facies sediments often fittes with the transgression, the curve line of the climate fluctuation of Quaternary in the+.

87GE0206. A.C.MIX, W.F.RUDDIMAN, A.MCINTYRE. 1986(9). LATE QUATERNARY PALEOCEANOGRAPHY OF THE TROPICAL ATLANTIC, 2: THE SEASONAL CYCLE OF SEA SURFACE TE+. PALEOCEANOGRAPHY. 1(3):340-353. AME. GEOPHYS. UNION, WASH. PN-2712. EN.

Foraminiferal species abundances are used to estimate seasonal variability of late Quaternary sea surface temperatures in the tropical Atlantic Ocean. Empirical orthogonal functions analysis of 28 time series isolates two patterns (modes) of variation. The dominant mode 1 reflects seasonal temperature contrast of the South Equatorial Current region 5 Deg. in Centigrade - 6 Deg. in Centigrade higher at the glacial maximum than at present, probably indicating larger seasonal variations of the southern trade winds. Forcing for this pattern may have come from equatorward compression of glacial climate zones due to high-latitude cooling in both hemispheres and/or suppression of meridional monsoonal circulation via feedback from northern hemisphere ice cover. When compared with CLIMAP estima+.

87GE0207. Q.WANG, F.L.LI, Y.D.LI, X.L.GAO. 1987(1). DISCUSSION ON THE NAMING OF QUATERNARY TRANSGRESSIONS IN WEST-SOUTHERN COAST PLAIN OF BOHAI SEA. ACTA OCEANOL. SINICA. 6(1):104-115. CHINA OCEAN PRESS, BEIJING. EN.

Based on micropalaeontological information of over 150 drill holes, this paper discusses the problem on the naming of Quaternary Transgressions in the west-southern coast plain of Bohai Sea. We consider that palaeotide and sedimentation have a great influence on the distribution of micropalaeontological fossils. In view of the present technical level, it is necessary for transgression sequence to be established under the following conditions: full evidence of fossils; clear climate; and stable sedimentary beds. In establishing a transgression, its contents of time and phase concept must be proposed, and its biofacies, sedimentary facies and palaeoclimatology must be analysed synthetically.

87GE0208. F.L.LI. 1987(1). ON THE RELATIONSHIP BETWEEN UNDERGROUND SALT WATER AND TRANSGRESSION IN COASTAL PLAINS OF THE HUAN+. ACTA OCEANOL. SINICA. 6(1):116-123. CHINA OCEAN PRESS, BEIJING. EN.

The underground salt water in Huang-Huai-Hai-Liao (Rivers) Plains, just like an underground salt sea, is buried around the Huanghai Sea and Bohai Sea. A lot of data show that the salt water bed and marine bed were formed at the same time, i.e. the salt water was the result of transgression. At present, the concentration of the salt water is not strong and it is getting freshened under the effects of both surface and underground runoff. In view of such development, it would be possible to reconstruct paleogeography on the one hand and to change the salt water into fresh water through the dual actions of man and Nature.

87GE0209. K.G.MILLER, R.G.FAIRBANKS, G.S.MOUNTAIN. 1987(2). TERTIARY OXYGEN ISOTOPE SYNTHESIS, SEA LEVEL HISTORY, AND CONTINENTAL MARGIN EROSION. PALEOCEANOGRAPHY. 21(1):1-19. AME. GEOPHYS. UNION, WASH. PN-2897. EN.

Tertiary benthic and planktonic foraminiferal oxygen isotope records are correlated to a standard geomagnetic polarity time scale, making use of improved chronostratigraphic control and additional Oligocene isotope data. Synchronous changes in both benthic and planktonic delta oxygen 18 values which occurred in the Oligocene to Miocene (36-5.2 Ma) are interpreted, in part, to represent ice growth and decay. The inferred ice growth events correlate with erosion on passive continental margins as interpreted from seismic and chronostratigraphic records. This association is consistent with a link between Oligocene to Miocene erosional events and rapid (>15 m/m.y.) glacioeustatic lowerings of about 50 m. High benthic foraminiferal delta oxygen 18 values suggest the presence of continenta+.

87GE0210. Z.G.HUANG, ET AL. 1987(4). DEPOSITIONAL FACIES OF THE ZHUJIANG DELTA FROM FOSSIL DIATOM. ACTA OCEANOL. SINICA. 6(2):222-228. CHINA OCEAN PRESS, BEIJING. EN.

Fossil diatom groups from 85 samples of drill holes and 13 samples of the known depositional environment are analysed. The boundary of the Zhujiang Delta is discussed from the distribution of fossil diatom. The horizontal variation of Holocene sedimentary facies can be divided into four kinds of depositional environment corresponding to the delta plain subfacies and the delta front subfacies. The vertical variation of Holocene depositional facies shows twice changes of transgression from weak to vigorous.

87GE0211. K.F.WANG, H.JIANG, W.K.FENG. 1987(4). DISCOVERY OF DIATOM ASSEMBLAGES FROM DEEP-SEA BASIN IN THE SOUTH CHINA SEA AND THEIR GEOLOGICAL IM+. ACTA OCEANOL. SINICA. 6(2):215-221. CHINA OCEAN PRESS, BEIJING. EN.

Of the diatoms from sediments of the South china Sea, mainly composed of planktonic species of tropical and subtropical zones, 36 genera and 86 species are identified. Based on the changes in diatom numbers and the appearance of diatom assemblages, six diatom zones are distinguished in core V1 reflecting six phases of paleoclimate, paleo-watertemperature and paleogeography. According to the Quaternary climatic division, these zones represent hot weather and warm weather as a whole, and they are separately equal to postglacial period, the Holocene; Wurm glacial period; Riss-Wurm interglacial period; and riss glacial period,

the Late Pleistocene.

87GE0212. E.M.POKRAS. 1987(6). DIATOM RECORD OF LATE QUATERNARY CLIMATIC CHANGE IN THE EASTERN EQUATORIAL ATLANTIC AND TROPICAL A+. PALEOCEANOGRAPHY. 2(3):273-286. AME. GEOPHYS. UNION, WASH. PN-2999. EN.

Over the last 160,000 years, diatom productivity in the equatorial Atlantic has been high during glacial stages 2, 4, and 6, and moderate during parts of substages 5b and 5d (approximately 96,000 and 117,000 years B.P.). Productivity of diatoms is particularly low in substage 5e and in the middle of stage 1. Higher productivity implies more vigorous trade winds during glacial intervals, leading to stronger upwelling and enhanced lateral advection of surface waters. The influence of the Benguela Current near the equator was strongest during stage 2; a separate regime of coastal upwelling may have existed in the Gulf of Guinea at this time. Upwelling and advection may not always respond to the same forcing as sea surface temperature.

87GE0213. W.B.CHEN. 1987(7). RADIOLARIA IN CORES FROM THE OKINAWA TROUGH. ACTA OCEANOL. SINICA. 6(3):397-404. CHINA OCEAN PRESS, BEIJING. EN.

A total of 149 genus and 238 species of Radiolaria in cores from four stations in the Okinawa Trough are examined in this paper. Water depths and cores lengths at these stations are 602-1900 m and 1.7-2.4 m respectively. Based on the distributional characteristic of Radiolaria and the radiolarian temperature number, the climatic fluctuations since the last 150 000 years and the stratigraphic classification are also discussed.

87GE0214. JAHAK.KOO, YOUNGNAM.JANG, JUNGKEUK.KANG. 1980(8). MARINE TECTONICS OF KOREA. BULL. KORDI. 2(1):31-39. KORDI., SEOUL. EN.

Marine tectonic history is revealed in relation to the global plate tectonics as a basic framework for a comprehensive evaluation of georesources potential in the marine environments of Korea. The present marine domains (Yellow Sea, South Sea, East (Japan) Sea) of Korea are underlain by Precambrian to Phanerozoic stratigraphic units resulting from global tectonic evolution. Sedimentation, volcanism, plutonism and metamorphism occurred in more than five cycles related presumably to a small scale plate tectonics forming major Precambrian tectono-stratigraphic units in the proto-Korea-China segment including the loci of the present marine environments of Korea. Transgression was followed by regression with epeirogenic movements in the marine environments of the proto-Korea-China cratonic+.

87GE0215. D.S.LI. 1982(6). TECTONIC FRAMEWORKS OF THE BOHAI GULF AND COASTAL BASINS. ACTA OCEANOL. SINICA. 1(1):82-93. CHINA OCEAN PRESS, BEIJING. EN.

The Bohai Gulf and its coastal basin is an important oil and gas province of China that covers an area of 200,000 sq. km. It is a polycylic superimposed basin. Its history of development can be subdivided into four stages: (i) Late Proterozoic parageosyncline stage; (ii) Early palaeozoic cratonic stage (lower Cambrian-Middle Ordovician); (iii) Late palaeozoic intracratonic coal bearing sequences stage (Middle Carboniferous-Permian); (iv) Mesozoic and Cenozoic taphrogenic rifting and subsidence stages. Oil and gas fields are mainly distributed in the paleogene trough systems controlled by the rifting zones.

87GE0216. L.W.WANG, Q.X.LI, S.D.WU, C.S.LIN. 1984(10). ORIGIN AND EVOLUTION OF THE EAST CHINA SEA BASIN. ACTA OCEANOL. SINICA. 3(4):527-538. CHINA OCEAN PRESS, BEIJING. EN.

Based on the information and samples of sediments obtained from the geophysical and bathymetric surveys over an area about 450,000 square kilometer (scale 1/1,000,000) in the East China Sea by the National bureau of Oceanography this paper describes the influence on the margin of the East Asia Continent exerted by the interaction of the Eurasian Pacific and Indo Plates since the Indo-China Movement, especially by the formation of the Philippine Sea Plate, which were the factors controlling the development of the sea domain. The origin and evolution of the East China Sea Basin, and the geotectonic characteristics and subdivision of the East China SEa are discussed.

87GE0217. S.W.LI. 1984(7). EVOLUTIONAL PROCESS OF THE JIAOZHOU BAY VIEWED FROM CHARACTERISTICS OF SEDIMENTS. ACTA OCEANOL. SINICA. 3(3):398-408. CHINA OCEAN PRESS, BEIJING. EN.

Based on the paleogeomagnetism of the sediments derived from drilling cores in the Jiaozhou Bay and the carbon 14 dating, combined with the analyses of the paleomicrobiology, sporo-pollen, grain size and amino acid, the following results are obtained: (i) Structural fractures formed the framework for the Jiaozhou Bay. (ii) Jiaozhou Bay was a continental basin during the low sea level of the glacial period in 20000-11000 yr BP. (iii) Sea level rose again, thus forming the initial Jiaozhou Bay during the post-glacial period since 11000 yr BP. (iv) distribution of the submarine relief of the Jiaozhou Bay was finally formed due to the reconstruction of the tidal current and the fluvial hydrodynamical actions. (v) It can be estimated that the Holocene of the Jiaozhou Bay began at 11000 yr+.

87GE0218. A.GINZBURG, ET AL. 1985. THE DEEP SEISMIC STRUCTURE OF THE NORTHERN CONTINENTAL MARGIN OF THE BAY OF BISCAY. ANN. GEOPHYS. 3(4):499-510. GAUTHIER-VILLARS, MONTREUIL. PN-2962. EN.

A model of the deep crustal and upper mantle structure across the northern margin of the Bay of Biscay has been obtained from an integrated study using seismic refraction profiles, two-ship expanding spread profiles, fixed offset profiles and conventional multi-channel reflection profiles. A preliminary analysis of part of the data was published by Avedik et al. (1982). An internally consistent model of the deep structure from the shelf to the ocean-continent transition, based on ray-tracing and amplitude modelling, shows progressive thinning of the upper

continental crust from about 18 km beneath the shelf to about 2 km close to the transition zone, while the lower crust thins from about 18 km to about 4 km.

87GE0219. M.J.BICKLE, ET AL. 1985. ARCHEAN TECTONICS OF THE SHAW BATHOLITH, PILBARA BLOCK WESTERN AUSTRALIA: STRUCTURAL AND METAMORPH+. EVOLUTION OF ARCHEAN SUPRACRUSTAL SEQUENCIES. BK:325-341. GEOL. ASSO. CANADA. PN-2740. EN.

The Shaw Batholith in the 3500-Ma Pilbara granite-greenstone terrane presents some of the classic enigmas of Archean tectonics. Strongly deformed granodiorite gneisses are correlated on chemical, isotopic and structural grounds with less strained, 3500-Ma plutons intrusive into the contemporaneous greenstone sequence. Greenstone intercalations within the gneisses are thought to have been incorporated largely by thrusting and recumbent folding. Such structures have been mapped over an area of at least 65 x 35 km and disrupted the greenstone stratigraphy sufficiently to create a tectonic melange. The larger scale extent of the high-strain belt is obscured by unknown displacements on major strike-slip faults and by the difficulty of mapping early structures in rocks that were tightly fol+.

87GE0220. X.T.ZHAO, S.C.XU. 1985(1). A NEW COMPARISON BETWEEN THE RATES OF HOLOCENE TECTONIC MOVEMENT IN VARIOUS CORAL REEF DISTRIBUTIO+. ACTA OCEANOL. SINICA. 4(1):99-106. CHINA OCEAN PRESS, BEIJING. EN.

In this paper, a new method of making a quantitative comparison between the tectonic movement rates along the coastal areas is given. It is independent of any specific curve of sea level change. Meanwhile, by using the Carbon 14 data from samples of the Holocene coral reefs in China, the tectonic movement rates in the various coral reef distribution areas are calculated.

87GE0221. F.Z.BI, C.Z.ZHOU. 1985(1). ELEVATION AND SUBSIDENCE OF COASTAL ZONE OF SOUTHERN PUTIAN, FUJIAN 3600 YEARS BP. ACTA OCEANOL. SINICA. 4(1):82-91. CHINA OCEAN PRESS, BEIJING. EN.

This paper describes the elevation and subsidence of coastal zone of southern Putian 3600 years BP, having basic characteristics of large magnitude, high frequency and fast rate. Among five times of elevation and subsidence ascertained so far, the largest magnitude of the subsidence is 12.5 m, the largest magnitude of the elevation is 35.5 m, the difference of the magnitude of the elevation of beach rocks formed at the same time is 23.5 m, the average rate of the elevation and subsidence is from 5 cm to 8 cm per year. The coastal elevation and subsidence over the last scores of years are of the faulted uplift zone in the south, of the faulted depression zone in the north, the average rates of the elevation and subsidence are respectively 6 cm per year and 8 cm per year. In addition, i+.

87GE0222. L.B.HE. 1985(1). CLAY MINERALS IN THE SURFACE SEDIMENTS OF THE BOHAI SEA. ACTA OCEANOL. SINICA. 4(1):92-98. CHINA OCEAN PRESS, BEIJING. EN.

Analyses of clay mineralogy about 30 surface sediments indicate widespread occurrence of illite, kaolinite, chlorite and montmorillonite throughout the Bohai Sea. Illite is the most abundant mineral, averaging 60%, kaolinite, next to illite, is the most abundant one, averaging 18%, Chlorite and montmorillonite come second, averaging 12% and 10% respectively. The distributive patterns of clay minerals in the surface sediments are closely related to the suspended materials carried into the Bohai Sea, especially to those did by the Huanghe River, and to water dynamics in the area. Based on the distribution, the assemblages and the others of clay minerals, the Bohai Sea can be divided into two clay mineral regions, the Liaoding Gulf region and the Bohai-Laizhou Bay region.

87GE0223. X.Y.ZHANG. 1985(10). A HIGH-EFFICIENCY TANDEM PISTON AIR GUN. ACTA OCEANOL. SINICA. 4(4):641-647. CHINA OCEAN PRESS, BEIJING. EN.

The high-efficiency tandem piston air gun is a new pneumatic seismic source with simple structure, convenient operation and low cost. It can create high-energy acoustic pulse signals, and effectively attenuate bubble responses. This paper briefly introduces the air gun with 0.8 liter at a pressure of 140 kg/square centimeter. The measurement shows that the gun has reached a maximum peak-peak sound pressure up to about 11.7 bar-meters. The energy of the acoustic pulse is concentrated within 200 Hz and the main frequency corresponding to the spectrum value is about 30 Hz. Its lowest frequency is below 10 Hz.

87GE0224. H.N.ZHANG. 1985(4). ON THE RELATIONSHIP BETWEEN FAULTING AND FORMATION AS WELL AS DEVELOPMENT ON HANJIANG DELTA. ACTA OCEANOL. SINICA. 4(2):266-275. CHINA OCEAN PRESS, BEIJING. EN.

Controlled by the NE-and NW-trending faults the Hanjiang Delta formed in the Early Quaternary received deposits in the Middle Quaternary, continued to develop since the Holocene, and subsided at a velocity of 1 mm/yr. About 2000-3000 years BP the Hanjiang Delta began to uplift and became a land. Its formation and development are controlled by faulting. Early and late developments are controlled by the NE-and NW-trending fractures, respectively, indicating the rebirth and intense activity of the latter.

87GE0225. HAN-JOON.KIM, SANG-JOON.HAN, SEONG-RYUL.KIM, HAI-SOO.YOU. 1985(6). APPLICATION OF HOMOMORPHIC DECONVOLUTION TO SEISMIC DATA PROCESSING-PART. 1. OCEAN RES. 7(1):49-55. KORDI., SEOUL. KO.

A Fortran program for homomorphic deconvolution was developed using the Tribolet's algorithm and successfully applied to the separation of the reflection series from the synthetic seismogram. The use of the method for the suppression of multiples was also

studied on the basis of liftering in the complexcepstral domain. The deconvolution of the source wavelet from seismic reflection data was performed very effectively using the program and removing the positive domain contribution by multiples on the complex-cepstrum can suppress time domain multiples in number as well as amplitude.

87GE0226. S.DAS. 1986. COMPARISON OF THE RADIATED FIELDS GENERATED BY THE FRACTURE OF A CIRCULAR CRACK AND A CIRCULAR ASP+. GEOPHYS. J. ROYAL ASTRON. SOC. 85:601-615. BLACKWELL SCI. PUB., OXFORD. PN-2406. EN.

The 'far-field' velocity and acceleration pulses radiated by the fracturing of a circular crack and a circular asperity are compared to determine the differences in the fields radiated by them. The circular crack and asperity studied are of the same size and have the same average stress drop, although the distribution of the stress drop on the circular areas is different due to the inherent differences between the two problems. Since the results presented are dimensionless, they can also be used to compare the radiated field due to a crack having a given average stress drop with the radiated field due to an asperity having, say, twice this average stress drop, simply by multiplying the asperity pulses by two, and so on for the other non-dimensionalizing parameters.

87GE0227. J.R.COCHRAN. 1986. VARIATIONS IN SUBSIDENCE RATES ALONG INTERMEDIATE AND FAST SPREADING MID-OCEAN RIDGES. GEOPHYS. J. ROYAL ASTRON. SOC. 87:421-454. BLACKWELL SCI. PUB., OXFORD. PN-2711. EN.

The nature of subsidence near the ridge crest of the intermediate and fast spreading mid-ocean ridges of the Indian and Pacific Oceans is investigated using surface-ship bathymetry and magnetics profiles. The ridge can be divided into discrete sections, apparently bounded by distinct structural features such as major fracture zones, in which bathymetry plotted against crustal age forms a well-defined envelope with a width roughly the amplitude of the local bathymetry. The averaged bathymetry in all of the regions studied follows closely a square root of age subsidence curve.

87GE0228. M.P.HOCHSTEIN, ET AL. 1986. STRUCTURE OF THE HAURAKI RIFT (NEW ZEALAND). ROYAL SOC. NEW ZEALAND BULL. 24:333-348. ROYAL SOC. NEW ZEALAND. PN-2997. EN.

The Hauraki Rift is a young continental rift which extends south over 300 km from Whangarei, through the Hauraki Gulf and the Hauraki Depression, into the Taupo Volcanic Zone. The structure of the rift has been outlined by detailed land and marine geophysical surveys (seismic, gravity, and magnetic surveys). The rift consists of a set of fault-angle depressions bounded by active faults which are associated with right lateral shear; the mean strike of the active faults (and of the axis of the rift) is 339 Deg. The depressions are filled with unconsolidated Pleistocene sediments to at least 0.7 km depth; other sediments and inferred Pliocene volcanic rocks occur at the bottom of the central part (maximum thickness of infill here about 2 to 3 km). The present-day seismicity is moderate +.

87GE0229. R.D.JARRARD. 1986. CAUSES OF COMPRESSION AND EXTENSION BEHIND TRENCHES. TECTONOPHYSICS. 132:89-102. ELSEVIER SCI. PUB., AMSTERDAM. PN-2863. EN.

Three factors have hampered attempts to find the causes of compression and extension within overriding plates of subduction zones:(1) adjacent subduction zones are often similar in many subduction parameters, (2) proposed causal variables are themselves correlated, and (3) physical models are limited by uncertainties in physical quantities and complexity of the subduction process. Nevertheless, modern subduction zones provide a rich source of observations that help to distinguish among models.

87GE0230. C.H.SCHOLZ, C.A.AVILES. 1986. THE FRACTAL GEOMETRY OF FAULTS AND FAULTING. EARTHQUAKE SOURCE MECHANICS. 147-155. AME. GEOPHYS. UNION, WASH. PN-2547. EN.

The topography of natural faults and fractures has been measured over nearly the entire band: 100000 M to 0.00001 M. It is found that the surfaces are fractal or nearly fractal over this entire band but that the fractal dimension, D, is a function of spatial frequency. Both abrupt and gradual transitions in D are observed and over some scales, most notably at the high and low ends of the spectral band studied, the surfaces are smooth enough to be differentiable, i.e., they are Euclidean. From these results we can deduce that the asperity distribution on faults obeys an inverse power law and that fault roughness scales with spatial wavelength. The constants in these relationships, however, depend on D, and hence hold over only limited spatial bands.

87GE0231. S.DAS, B.V.KOSTROV. 1986. FRACTURE OF A SINGLE ASPERITY ON A FINITE FAULT: A MODEL FOR WEAK EARTHQUAKES?. EARTHQUAKE SOURCE MECHANICS. 91-96. AME. GEOPHYS. UNION, WASH. PN-2548. EN.

Dynamic rupture of a single asperity on a finite, three dimensional, stress-free fault is suggested as one possible model of low-magnitude, large moment, long duration earthquakes. Using the assumption of constant stress drop and the conventional schematic representation of the displacement spectral density, relations between seismic moments and corner frequencies of dislocation (crack) and asperity models are obtained for earthquakes of equal magnitude.

87GE0232. R.N.BROTHERS. 1986. UPPER TERTIARY AND QUATERNARY VOLCANISM AND SUBDUCTION ZONE REGRESSION, NORTH ISLAND, NEW ZEALAND. J. ROYAL SOC. NEW ZEALAND. 16(3):275-298. ROYAL SOC. NEW ZEALAND. PN-2996. EN.

Radiometric ages for Cenozoic calc-alkaline igneous rocks in the North Island indicate the presence of two contrasted areas of eruption. An older group of volcanics (27-23 Ma) is spread NW-SE along the east coast of

Northland between North Cape and Whangarei; these lavas, including garnet andesites, were generated during an isolated igneous event accompanying obduction of ophiolite massifs during the Late Oligocene. A younger group of Miocene to Holocene age (21-0 Ma) is distributed between Tokatoka-Whangarei and Egmont-Taupo Volcanic Zone across a series of NE-SW time-lines (volcanic arcs) which record a southeasterly younging direction for sequential initiation of volcanism; the erupted rocks lie along two major belts trending NW-SE (East Belt and West Belt) parallel to old basement+.

87GE0233. B.V.KOSTROV, S.DAS. 1986. ON THE ELASTIC CONTACT MODELING OF FAULTS WITH VARIABLE STIFFNESS. EARTHQUAKE SOURCE MECHANICS. 65-70. AME. GEOPHYS. UNION, WASH. PN-2549. EN.

A method for determining the slip and stress distribution along a fault with variable stiffness, which is constant outside a finite part of the fault, is presented. An integral equation is developed relating the slip on the fault to its stiffness. The fault stiffness is defined as the ratio of thickness averaged shear stress to the average fault slip. The integral equation is of Fredholm-type with logarithmic singularity, which permits easy numerical solution. To illustrate the method, some particular cases are presented. These range from the case of stress free cracks in a stiff and in a weak environment to the cases of stiff and weak gaps in a weak environment. The two former cases may be regarded as models for creeping portions of faults surrounded by slip-resistant portions, the+.

87GE0234. R.A.LIVERMORE, A.G.SMITH, F.J.VINE. 1986(7). LATE PALAEOZOIC TO EARLY MESOZOIC EVOLUTION OF PANGAEA. NATURE. V.322(6075:162-165. MACMILLAN JOURNALS. PN-2738. EN.

Several possible configurations of the Pangaea supercontinent have been suggested for the interval from late Carboniferous to early Triassic. Here we re-examine the palaeomagnetic basis for these models, emphasizing the trends of the paths of apparent polar wander for the individual components of the supercontinent rather than simply averaging poles of presumed similar age. Two of the alternatives, Pangaea B and C, may result from averaging poles of dissimilar age along common polar wander paths, giving rise to spurious tectonic displacements. The most likely model appears to be the formation, in late Devonian time, of a modified Pangaea (A2) followed by evolution to the traditional configuration (A) during the Triassic.

87GE0235. C.NICHOLSON, L.SEEBER, P.WILLIAMS, L.R.SYKES. 1986(8). SEISMIC EVIDENCE FOR CONJUGATE SLIP AND BLOCK ROTATION WITHIN THE SAN ANDREAS FAULT SYSTEM, SOUTHE+. TECTONICS. 5(4):629-648. AME. GEOPHYS. UNION, WASH. PN-2545. EN.

The pattern of seismicity in southern California indicates that much of the activity is presently occurring on secondary structures, several of which are oriented nearly orthogonal to the strikes of the major through-going faults. Slip along these secondary transverse features is predominantly left-lateral and is consistent with the reactivation of conjugate faults by the current regional stress field. Near the intersection of the San Jacinto and San Andreas faults, however, these active left-lateral faults appear to define a set of small crustal blocks, which in conjunction with both normal and reverse faulting earthquakes, suggests contemporary clockwise rotation as a result of regional right-lateral shear. Other left-lateral faults representing additional rotating block systems are+.

87GE0236. HAI-SOO.YOO, HAN-JOON.KIM. 1986(9). DETERMINATON OF INTERVAL VELOCITIES FROM MARINE SEISMIC REFLECTION DATA AND MODEL EXPERIMENT. OCEAN RES. 8(1):41-48. KORDI., ANSAN. KO.

Several methods to determine interval velocities of sea-water and sub-bottom sediment layers from seismic reflection data are discussed. The analyzing procedure of traveltime data are examined by these methods using digitized data. The results from the different methods are compared with each other and the adequacy of the analysis is also verified by a model study. In this report, a sequence of digitizing and processing of seismic reflection data is established. The sequence is proved to be applicable to shallow water seismic data within an acceptable error range.

87GE0237. W.R.BUCK. 1987. ANALYSIS OF THE COOLING OF A VARIABLE-VISCOSITY FLUID WITH APPLICATIONS TO THE EARTH. GEOPHYS. J. ROYAL ASTRON. SOC. 89:549-577. BLACKWELL SCI. PUB., OXFORD. PN-3031. EN.

Analysis shows that the convective cooling of a fluid with a temperature-dependent viscosity should exhibit simple behaviour which is consistent with geophysical data on the cooling of the oceanic lithosphere and asthenosphere. It is found that a similarity solution can describe the evolution of temperature within the stagnant high-viscosity lid which forms over an actively convecting region. The rate of thickening of the lid (or lithosphere) is directly proportional to a single parameter.

87GE0238. R.MITHAL, J.B.DIEBOLD. 1987. A METHOD OF OBTAINING A VELOCITY-DEPTH ENVELOPE FROM WIDE-ANGLE SEISMIC DATA. GEOPHYS. J. ROYAL ASTRON. SOC. 89:965-985. BLACKWELL SCI. PUB., OXFORD. PN-3033. EN.

Due to the non-uniqueness of traveltime inversion of seismic data, it is more appropriate to determine a velocity-depth(v-z) envelope, rather than just a v-z function. Several methods of obtaining a v-z envelope by extremal inversion have been proposed, all of which invert the data primarily from either x-p, or r-p, or both domains. These extremal inversion methods may be divided into two groups: linear extremal and non-linear extremal.

87GE0239. W.Y.ZHANG, K.ZHANG. 1987(1). TRANSFORMATION OF CONTINENTAL AND OCEANIC CRUSTS AND GEOTECTURE OF THE WESTERN PACIFIC MARGIN. ACTA OCEANOL.

SINICA. 6(1):94-103. CHINA OCEAN PRESS, BEIJING. EN.

Three types of crust exist in the area studied. there was an assembled continent at the end of the Hercynian-Indosinian cycle. Since the Cenozoic the area has shown a trend of tension, thinning and oceanization in varying degrees, which is manifested in the creeping and obduction of the Asian continent as well as the spreeding and subduction of West Pacific Ocean, thus bringing about the continental rifts, maginal basins and arc-thrench systems in this area. Geotectonic cycle usually begins with a tensional phase and ends with a compressional phase. When tension predominates, various rifts can be formed on the continental crust and the crust is in the trend of oceanization. When compression predominates, the rifts disappears, the crust is in the trend of continentization and, in the +.

87GE0240. R.C.LILWALL, R.E.KIRK. 1985. OCEAN-BOTTOM SEISMOGRAPH OBSERVATIONS ON THE CHARLIE-GIBBS FRACTURE ZONE. GEOPHYS. J. ROYAL ASTRON. SOC. 80:195-208. BLACKWELL SCI. PUB., OXFORD. PN-2936. EN.

Two networks of four ocean-bottom seismographs were deployed successfully in 1982 September on spreading centre sites in the region of the Charlie-Gibbs fracture zone. Activity was observed beneath both networks and hypocentres for over 100 events have been determined. The observations confirm the existence of seismic activity along a suspected short spreading centre near longitude 31.75 W linking the north and south transform valleys of the fracture zone. A relatively thick (7-9 km) seismogenic zone is seen beneath the axis which is in agreement with earlier microearthquake observations on the Mid-Atlantic Ridge.

87GE0241. D.M.CHRISTIE, J.M.SINTON. 1986. MAJOR ELEMENT CONSTRAINTS ON MELTING, DIFFERENTIATION AND MIXING OF MAGMAS FROM THE GALAPAGOS 95.9+. CONTRIB. MINERALOGY & PETROLOGY. 94:274-288. SPRINGER-VERLAG, BERLIN. PN-2864. EN.

Projections in the pseudo-quaternary system diopside-plagioclase-olivine-quartz (di-pl-ol-Q) are used in this paper as a base on which to plot additional compositional, petrologic or tectonic variables. Used in this manner, the projections provide a sensitive means of displaying and evaluating the chemical variability of mid-ocean ridge basalt (MORB) suites, such as that of the Galapagos 95.5 W propagating rift system, and allow mantle controls on the chemical variability of MORB to be distinguished from the predominant effects of shallow-level crystal fractionation and mixing. Primitive lavas from the 95.5 W region form a broadly linear array within the di-pl-ol-Q tetrahedron, parallel to the di-ol join. In terms of two recent high pressure studies of MORB petrogenesis (Stolper 1980; +.

87GE0242. D.J.FORNARI. 1986. SUBMARINE LAVA TUBES AND CHANNELS. BULL. VOLCANOL. 48:291-298. SPRINGER-VERLAG, BERLIN. PN-2713. EN.

High-resolution, side-looking sonar surveys of the East Pacific rise and seamounts in the eastern Pacific have revealed the common presence of lava tubes and channels in seafloor volcanic terrains. Tube and channel systems commonly issue from small volcanic cones or domes, are continuous for distances of 1-3 km, and are considered to be important in distributing lavas around seafloor extrusive sites and creating characteristic morphology. Eruption rate and volume are probably the most important controlling factors in determining whether tubes or channels will form. Volatile content and state, slope angle, and preeruption surface morphology are secondary factors that influence the ease with which a tube or channel may form and its direction and shape. Seafloor tubes and channels may al+.

87GE0243. R.R.B.VON FRESE, W.J.HINZE, R.OLIVIER, C.R.BENTLEY. 1987. SATELLITE MAGNETIC ANOMALIES AND CONTINENTAL RECONSTRUCTIONS. GEOPHYS. MONOGRAPH. 40:9-15. AME. GEOPHYS. UNION, WASH. PN-3043. EN.

Regional magnetic anomalies observed by NASA's magnetic satellite mission over the eastern Pacific Ocean, North and South America, the Atlantic Ocean, Europe, Africa, India, Australia, and Antarctica are adjusted to a fixed elevation of 400 km and differentially reduced to the radial pole of intensity of 60,000 nT. Having been normalized for differential inclination, declination, and intensity effects of the core field, these radially polarized anomalies in principle directly map the geometric and magnetic property variations of sources within the lithosphere. Continental satellite magnetic data show a sharp truncation and even parallelism of anomalies along the active edges of the North and South American Plates, whereas across passive plate continental margins the truncation of anomal+.

87GE0244. R.HEKINIAN, D.WALKER. 1987. DIVERSITY AND SPATIAL ZONATION OF VOLCANIC ROCKS FROM THE EAST PACIFIC RISE NEAR 21 N. CONTRIB. MINERALOGY & PETROLOGY. 96:265-280. SPRINGER-VERLAG, BERLIN. PN-3036. EN.

A substantial range of petrologic rock types has erupted on the accreting plate boundary near 21 N on the East Pacific Rise (EPR). The youngest olivine basalts erupt immediately around a segmented axial fissure system. Progressively older, more fractionated POP basalts have spread farther from the same fissure system, producing a stratigraphically-controlled zonal pattern of basalt type distribution around the eruptive fissures.

87GE0245. S.L.ZHAO, ET AL. 1983(6). PALEOMAGNETIC STUDY OF DC1 AND DC2 CORES IN THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 2(1):97-106. CHINA OCEAN PRESS, BEIJING. EN.

We got two cores from 10 miles east of Zhoushan islands about 29 m in water depth in 1979 and 1980. Dc1 core, 26 m long, can be divided into two layers; 0-19.4 m, brown-yellow, silty-clay, rich in foraminifera,

19.3-26 m, grey silt. Dc1 core, 91 m long, 7 miles south of Dc1 core. The colour for 0-16.6 m is the same as for 0-19.4 m of Dc2 core, brown silty-clay, rich in foraminifera too. The results of paleomagnetic measurements show: there are 464 specimens in Dc1 and Dc2 cores altogether; AF demagnetization often shows that 95% of all the specimens belong to normal polarity epoch, and the others are reversal ones. We consider that more stranger intensity may represent the warming period and transgression period, and vice versa. At least Dc1 and Dc2 cores provide such an evidence +.

87GE0246. R.R.B.VON FRESE, S.R.MATESKON. 1985. MODELING MAGNETIC AND GRAVITY EFFECTS OF THE TRANSANTARCTIC MOUNTAINS. ANTARCTIC J. U.S. 20(5):1-3. U.S. NAT. SCI. FOUND., WASH. PN-3039. EN.

87GE0247. E.M.CHERRY, H.C.NOLTIMIER. 1985. DATING TILL BY PALEOMAGNETISM: ALLAN HILLS, SOUTHERN VICTORIA LAND. ANTARCTIC J. U.S. 20(5):10. U.S. NAT. SCI. FOUND., WASH. PN-3084. EN.

87GE0248. Z.H.LIU, Q.L.WANG, H.Y.YUAN, D.Q.SU. 1985(10). THE BOUGUER ANOMALIES AND DEPTHS OF MOHOROVICIC DISCONTINUITY IN THE SOUTH CHINA SEA REGION. ACTA OCEANOL. SINICA. 4(4):579-590. CHINA OCEAN PRESS, BEIJING. EN.

The South China Sea is situated at the continental margin of South China. In this region, there are both continental and oceanic crusts. The values of Bouguer gravity anomalies on the continental shelf are low positive or low negative. Because the depth of the Mohorovicic discontinuity in this region is about 26-32 km below sea level, the crust belongs to the continental type. The values of Bouguer gravity anomalies in the deep-sea region are more than 250 mgal and the depth of the Moho-surface is about 10-15 km below sea level, so the crust is of oceanic type. The values of gravity anomalies and depths of the Moho-surface, obtained over the continental (and island) slope, range between those regions mentioned above, so the crust belongs to the transitional type. The continental cru+.

87GE0249. S.G.XU. 1985(7). CALCULATION AND ANALYSIS OF THE HEIGHT ANOMALY AND THE DEFLECTION OF VERTICAL IN AN OCEAN AREA. ACTA OCEANOL. SINICA. 4(3):443-452. CHINA OCEAN PRESS, BEIJING. EN.

By the analysis of a practical calculation, this paper describes, for the first time in China, the gravimetric method on the calculation of the height anomaly and the deflection of vertical in the ocean by Stokes' and Vening Meinesz's formula. There are 84 calculation points distributed uniformlic in a calculated area of 2 Deg. x 2 Deg. in the Mid-Pacific. In the course of the calculation, the gravimetric data measured by us, the 1 Deg. x 1 Deg. mean gravity data published in other countries and the 25-ordeic gravitational coefficients of GEM8 were used. The results show that the calculated areais an uplift of the geoid, with a mean height anomaly of 42 m, the maximum being 45 m and the minimum 39 m.

87GE0250. CHAN-HONG.PARK, SEONG-RYUL.KIM, SANG-JOON.HAN, JUNG-KEUK.KANG. 1986(12). INTERPRETATION OF THE MAGNETIC ANOMALIES IN THE NORTHEASTERN EQUATORIAL PACIFIC (KONOD-1 AREA). OCEAN RES. 8(2):17-27. KORDI., ANSAN. KO.

Magnetic anomalies, observed in the northeastern equatorial Pacific during the KONOD-1 cruise, were interpreted by two approaches. The first approach was to determine the depths of the magnetic basement by spectral analysis. The second approach was to speculate the overall relationship between the anomalies and the features of the seafloor. The anomaly data were converted into the frequency domain by Fourier transform. Then, the depths of the magnetic basement were determined from the slope of the power spectrum. The calculated depths of about 5500, 5800, 5700 and 5400 m from the northernmost profile to the southernmost profile are nearly equal to the depth of the acoustic basement. The greatest difference between the magnetic and acoustic basement depths was only approximately 300m.

87GE0251. WOO-YEOL.JUNG, P.D.RABINOWITZ. 1987(3). APPLICATION OF THE INDIRECT EFFECT ON REGIONAL GRAVITY FIELDS IN THE NORTH ATLANTIC OCEAN. J. OCEANOL. SOC. KOREA. 22(1):19-24. OCEANOL. SOC. KOREA, SEOUL. EN.

Gravity measurements at sea are considered to be made on the geoid. The free-air anomalies are then determined by subtracting the theoretical gravity values predicted on a reference ellipsoid from the observed values. The gravity effect due to the height difference between the geoid and reference ellipsoid and the mass between them is known as the 'indirect effect'. The result of applying the indirect effect to surface ship derived gravity anomalies in the North Atlantic Ocean demonstrates the importance of its inclusion for regional studies involving mantle processes.

87GE0252. J.E.ANDREWS. 1982. MARINE MINERAL DEPOSITS WITHIN THE 200 MILE ECONOMIC ZONES. MARINE MINING: A NEW BEGINNING. 23-30. STATE OF HAWAII. PN-2855. EN.

87GE0253. BONG-CHOOL.SUK. 1983(12). A REVIEW ON DEEP-SEA MANGANESE NODULE. BULL. KORDI. 5(2):69-80. KORDI., SEOUL. KO.

Manganese nodules occur worldwide and are restricted to areas where pelagic sediments are accumulating at rates of less than about 7 m per million years. For decades they were treated from the view point of the scientific curiosity, but now, because of their great economic value, much attention is focussed on them. In the north pacific, the greatest concentrations occur in an east-west band between about 6.5 N and 20 N where is distributed by red clay and radiolarian ooze. This zone is the most commercial area because of abundance in Mn, Ni, Cu, and Zn contents and high density relative to other areas. The origin of nodules has been proposed to be from 1)

hydrogenous, 2) hydrothermal, 3) halmyrolitic, and 4) diagenetic, and concentration mechanisms of transition metals for incorporat+.

87GE0254. D.A.J.MURRAY, W.L.LOCKHART, G.R.B.WEBSTER. 1984. ANALYSIS OF THE WATER-SOLUBLE FRACTION OF CRUDE OILS AND PETROLEUM PRODUCTS BY GAS CHROMATOGRAPHY. OIL & PETROCHEMICAL POLLUTION. 2(1):39-46. GRAHAM & TROTMAN, LONDON. PN-2477. EN.

Crude oils and petroleum products have been shown to produce qualitatively similar water soluble fractions. These were prepared from crude oils and petroleum products and were analysed using two methods of gas chromatography. A headspace technique was used to measure the more volatile hydrocarbons and a microextraction analysis was used for the less volatile fraction. The chromatograms gave the same fingerprint of aromatic hydrocarbons with some quantitative differences. Diesel and fuel oils showed extra peaks in the higher boiling point range, while gasoline gave a water soluble fraction which was richest in both the very volatile and less volatile fractions.

87GE0255. J.K.WHELAN, J.M.HUNT, J.JASPER, A.HUC. 1984. MIGRATION OF MONO-CARBON - OCTA-CARBON HYDROCARBONS IN MARINE SEDIMENTS. ORG. GEOCHEM. 6:683-694. PERGAMON PRESS, OXFORD. PN-2669. EN.

Light hydrocarbon (Mono-Carbon - Octa-Carbon) profiles are compared for three wells of varying maturities: two immature DSDP wells (Site 397 near the Canary Islands and Site 530A near the Walvis Ridge in the south-east Atlantic) and a mature well, the East Cameron well in the Texas Gulf Coast. Primary migration of Mono-Carbon and dicarbon appears to be occuring in all of the sedimentary rocks examined. Primary migration of Tri-Carbon, components becomes important only as fine-grained sedimentary rocks enter the catagenetic hydrocarbon generation zone or over short distances in more permeable sections. Lateral migration along bedding planes was more important than vertical migration in sedimentary rocks of all maturities. The lightest (methane, ethane and propane gases) hydrocarbons s+.

87GE0256. SANG-JOON.HAN, BONG-CHOOL.SUK. 1984(12). GEOLOGICAL CHARACTERISTICS OF THE DEEP-SEA MANGANESE NODULES AND THEIR ASSOCIATED SEDIMENTS IN THE+. BULL. KORDI. 6(1/2):21-29. KORDI., SEOUL. KO.

KONOD I cruise was performed by KORDI's scientists in the C-C fractures zone of the North Equatorial Pacific in order to study and develop the deep-sea manganese nodules. This paper describes the summarized results of the cruise, that is, subbottom structure, characteristic of sediments, mineralogy and geochemistry of the manganese nodules. Geophysical surveys revealed that sediment sequence is divided into Unit I, Unit IIA and Unit IIB, like the results of DSDP site 163, and its thickness tends to grow southeastward. The surface sediment consists mainly of biogenic brown siliceous ooze. Clay minerals are represented by smectite, illite, chlorite and kaolinite (in order of abundance), which show regular pattern of regional and vertical distribution. Phillipsite was detected in all the+.

87GE0257. BONG-CHOOL.SUK, SANG-JOON.HAN. 1984(12). EXPLORATION AND EXPLOITATION TECHNIQUE OF DEEP-SEA MANGANESE NODULE. BULL. KORDI. 6(1/2):75-85. KORDI., SEOUL. KO.

In the last decade it has been remarkable on increasing interest in nodule mining by many private companies and governments, and several multi-national consortia have been formed to carry out exploration, mining and processing activity of deep-sea manganese nodules. This paper describes the present technology concerned with exploration and exploitation of the nodules. Exploration method is classified into direct and indirect ones generally in the deep sea. Direct method includes nodule sampling with grab, dredge and corer, and photographing by underwater camera. Indirect method contains all the geophysical techniques, such as seismic, magnetic, gravity, sidescan survey and so on.

87GE0258. M.ARITA, ET AL. 1985(12). EXPLORATION AND EXPLOITATION OF OFFSHORE SAND IN JAPAN. CCOP TECH. BULL. 17:81-99. CCOP., BANGKOK. PN-2434. EN.

This paper reviews the recent status of offshore mining of fine aggregates in Japan, with special reference to the current aspects of exploration of sands in continental shelves and its result and some problems concerning present and future mining. future extraction of the deeper sands may be realized by means of electric driven submerged sand pump dredgers, which have recently been developed by some machinery manufacturers. The compensation of mining to fishermen is a serious problem. A better resolution to this problem is now investigated.

87GE0259. SOON-KEUN.CHANG. 1986. TERRA AUSTRALIS INCOGNITA; ANTARCTICA: ITS NATURAL ENVIRONMENT, PETROLEUM, AND MINERAL RESOURCES. J. KOREAN EARTH SCI. SOC. 7(2):117-128. KOREAN EARTH SCI. SOC., SEOUL. PN-2682. KO.

Seventy-five years have passed since the Norwegian polar explorer Roald Amundsen put the first human footprint on the south Pole in his South Pole Expedition in 1911. Natural environment, petroleum, and mineral resources of Antarctica are briefly reviewed. No petroleum or mineral deposits with economic value are discovered yet in Antarctica. However, it is thought that petroleum (and probably including minerals of Dufek stratiform gabbros) would be most promising in several decades. International stewardship of Antarctica associated with systematic investigations strengthened by modern techniques and facilities will show further possibility in other minerals.

87GE0260. S.D.LUO, W.Y.SHI, Z.CHEN, Y.P.HUANG. 1987(1). A NEW METHOD FOR SEPARATION AND DETERMINATION OF U AND TH IN DEEP-SEA MANGANESE NODULES. ACTA OCEANOL. SINICA.

6(1):87-93. CHINA OCEAN PRESS, BEIJING. EN.

A new and simple method for separation and determination of U and Th in manganese nodules has been developed. The results show that the addition of Ammonium Nitrite to the dilute Nitric Acid medium increases the selectivity of anion-exchange separation of U and Th. The simple procedure and high recoveries of the method make it valuable to the analyses of U and Th in manganese nodules.

87GE0261. MEANG-EON.PARK, DAE-CHOUL.KIM. 1987(7). TEXTURAL AND MINERALOGICAL INVESTIGATIONS ON DEEP SEA MANGANESE NODULES FROM THE EQUATORIAL PACIFI+. BULL. KOREAN FISH. SOC. 20(4):355-359. KOREAN FISH. SOC., PUSAN. EN.

Texture and mineralogy of different microlayers of deep-sea manganese nodules are investigted to reveal the environmental changes of nodules during a nodule formation. Basically a nodule can have three types (A, B and C) of microlayer. Some nodules show only one or two types of microlayer. The classification is based primarily on the texture. The suface texture of type A is coarsely porous globular microstructure whereas type B and C are intermediate to finely porous textures. The type A is characterized by its highest Mn content (30.6%) and relatively well-crystallized todorokite as well as the rapid growth rate. Smectite and biogenic silica (radiolaria) are also easily observed in the type A layer. It appears that thehydrothermal activity is one of the favorable mechanism of for+.

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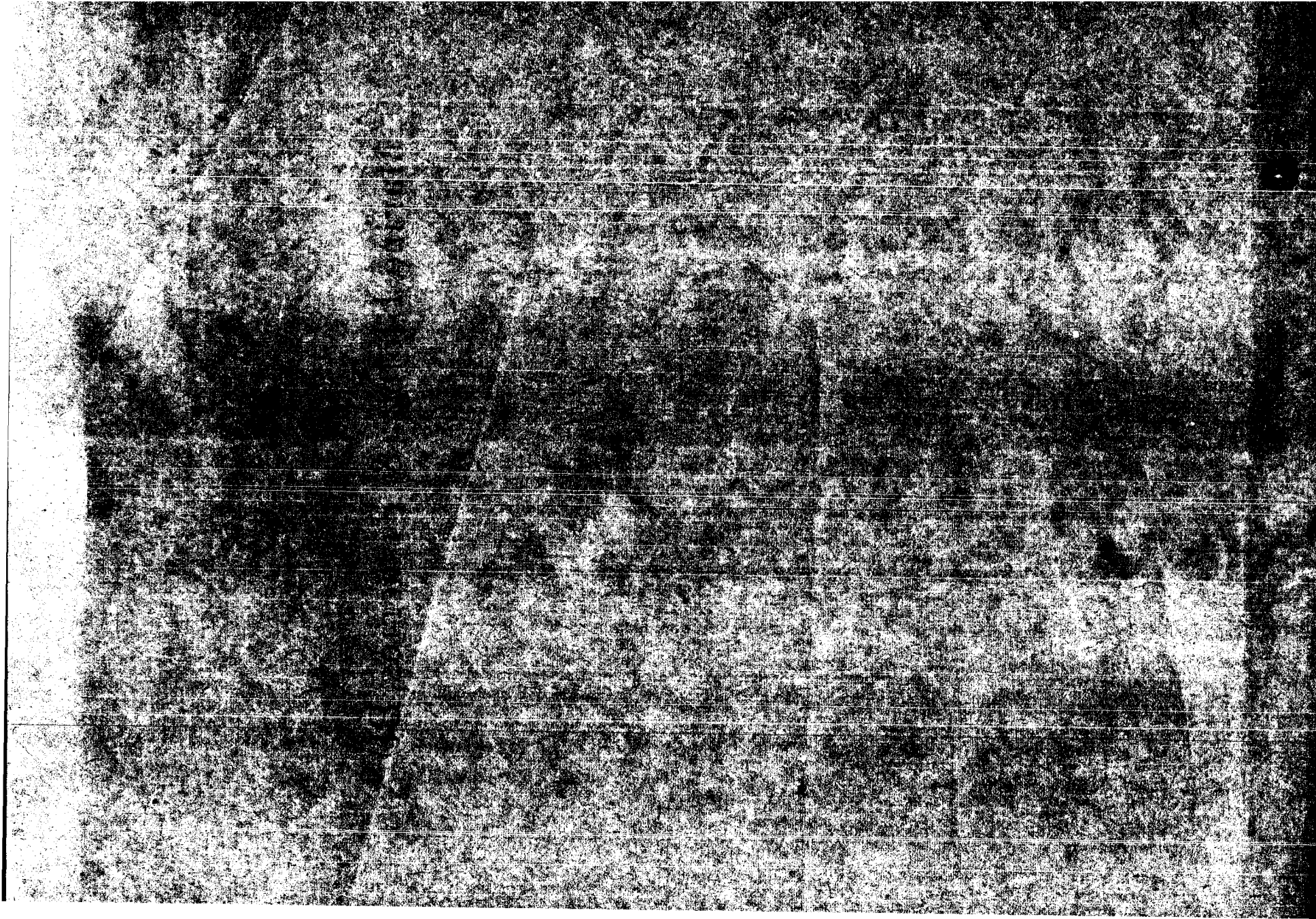

87BI0001. SEONG-JUN.KIM. 1974(9). SANITARY SURVEY OF SHELLFISH GROWING AREA ON WEST FOWL RIVER ESTUARY, MOBILE, ALABAMA. BULL. KOREAN FISH. SOC. 7(3):145-162. KOREAN FISH. SOC., PUSAN. EN.

A sanitary and bacteriological survey on the West Fowl River area of South Mobile County in the State of Alabama, U.S.A. to determine the sanitary quality of shellfish and shellfish growing waters in association with classification of shellfish growing area conducted. The bottom of the estuary is muddy and the average water depth is about 1 m at low tide. The average water temperature during the survey was 26 Deg. in Centigrade. The salinity differed from sampling station to station increasing as sampling proceeded downstream and into the bay. Average salinity ranged from 18.0 per mill at Station 1 to 28.7 per mill at Station 7.

87BI0002. DONG-SUCK.CHANG, YOUNG-MAN.KIM. 1978(3). DIFFERENCES IN VIBRIO PARAHAEMOLYTICUS DETECTION RATIO BY ANALYTICAL METHODS. BULL. KOREAN FISH. SOC. 11(1):19-24. KOREAN FISH. SOC., PUSAN. KO.

The differences in Vibrio parahaemolyticus detection ratio were compared between the isolation methods, the Most Probable Number technique and single dilution tube method. During the period from February to October in 1976, 298 samples of sea water, 112 of bottom deposit, 169 of shellfish, and 80 of fish samples collected along the south coastal area of Korea were examined to determine the detection ratio of Vibrio parahaemolyticus. It was often observed that Vibrio parahaemolyticus was detected in higher diluted samples even though negative in lower dilution.

87BI0003. C.BAKKER, T.C.PRINS, M.L.M.TACKX. 1985. INTERPRETATION OF PARTICLE SPECTRA OF ELECTRONIC COUNTERS BY MICROSCOPICAL METHODS. HYDROBIOL. BULL. 19(1):49-59. DE NIEUWE SCHOUW PRESS, ZEIST. PN-3072. EN.

1. Using monocultures or single species dominated natural phytoplankton, cell counts and volume estimations obtained by visual and electronic methods show reasonable agreement. Calibration seems possible. 2. Further examples given show that microscopical identification of the volume peaks in electronic counter spectra of natural seston is not quite simple. Phytoplankton peaks may not be detected in the Coulter spectrum. Shifts of Coulter peaks to the left side of the visual spectrum may be found when cylindrical, elongated or needle-like phytoplankton dominate the sample. 3. Both visual and electronic methods include potentially large errors. Possibly particle volume is either overestimated by the microscope and/or underestimated by the Coulter counter. In grazing studies both meth+.

87BI0004. C.BILLARD. 1985. LE COMPLEXE NUCLEOPLASTIDIAL CHEZ LES CHROMOPHYTES: STRUCTURE, FONCTION ET INTERET DANS UNE PERSPE+. ALGOLOGIE. 6(3):191-211. PN-2336. FR.

Following GIBB's studies (1979, 1981) of the chloroplast endoplasmic reticulum, some aspects of the nucleoplastidial complex, a functional association highly characteristic of the Chromophytes, will be illustrated based on examples taken from two classes well representative of the phylum, the Chrysophyceae and the Prymnesiophyceae. At this occasion, the theories of symbiogenesis proposed by phycologists today to explain evolution of nuclear envelope-chloroplast relationships in the Chromophytes will be recalled.

87BI0005. D.SPITZER, R.W.J.DIRKS. 1986. CHLOROPHYLL FLUORESCENCE EFFECTS IN THE RED PART OF REFLECTANCE SPECTRA OF NATURAL WATERS. CONTINENTAL SHELF RES. 6(3):385-395. PERGAMON PRESS, OXFORD. EN.

Solar-induced fluoresence of algal pigments can be (remotely) measured in productive water masses. Detection of the peak related to this fluorescence in the red part of the reflectance spectra can then be used for the (remote) assessment of the biomass, particularly in the waters where other optical determination methods fail. To study the chlorophyll fluorescence effects in natural waters a two-flow radiative transfer model was developed and measurements were performed in turbid coastal waters. Several phenomena, including the influence of the suspended and dissolved materials on the height and the position (shift) of the peak, and the effects of the vertical stratification of the water column, are described.

87BI0006. W.W.CROZIER. 1986. COMPARATIVE EXAMINATION OF THE SOLUBLE MUSCLE PROTEINS OF TWO SPECIES OF ANGLER-FISH (LOPHIIDAE): +. COMP. BIOCHEM. & PHYSIOL. 83B(2):371-374. PERGAMON PRESS, OXFORD. PN-2876. EN.

1. A comparative examination of sarcoplasmic proteins of the two nominal european species of angler-fish, Lophius piscatorius and L. budegassa was carried out using isoelectric focusing techniques. 2. Two protein bands differing in isoelectric point proved diagnostic for L. budegassa (pI 4.40 and pI 5.75) while a third characterized L. piscatorius (pI 4.65). 3. These species-specific protein profiles provide a method of species discrimination independent of morphological criteria. 4. Within-species heterogeneity of banding pattern suggested the presence of polymorphic gene loci of potential use in studies of population structure.

87BI0007. I.WEBSTER, J.T.ANDERSON. 1987(7). A MODEL FOR SIMULATING THE TOWING PERFORMANCE OF THE BONGO SAMPLER. DEEP-SEA RES. 34(7):1277-1291. PERGAMON PRESS, OXFORD. EN.

The bongo sampler is an obliquely towed sampling system for determining depth-averaged plankton abundances. Ideally, the bongo sampler samples each depth equally assuming a linear time-depth relationship. In practice the path followed by the sampler may be curved to some extent due to the differing towing behaviors of the net and the cable supporting it. this curvature results in the vertical rate of descent or ascent of the sampler being depth-dependent which in turn leads to the introduction of a depth-dependent sampling bias. Further sampling

bias can occur if there are depth variations in the current through which the sampler is towed. In this paper, a numerical model is developed to describe the towing performance of the bongo sampler. Simulations are presented which demonstra+.

87BI0008. WON-JAE.LEE, WI-KYUNG.CHOE, SEH-KYU.CHUN. 1970(12). STUDIES ON VIBRIO PARAHAEMOLYTICUS IN KOREAN COASTAL WATERS, 1. ON THE DISTRIBUTION OF V. PARAHAEM+. BULL. KOREAN FISH. SOC. 3(4):213-218. KOREAN FISH. SOC., PUSAN. KO.

Many investigations have been made on V. parahaemolyticus but to the author's knowledge a report on V. parahaemolyticus found in Korean coastal water has not yet been published. The authors have investigated distribution of V. parahaemolyticus in fish, shellfish, mud, crustacea, sea water and cephalopoda in order to determine the possible origins of food poisoning in Korea.

87BI0009. WON-JAE.LEE, CHEOL-WOO.AHN. 1976(12). DISTRIBUTION OF VIBRIO PARAHAEMOLYTICUS AND V. ALGINOLYTICUS IN THE COAST OF CHUNG-MU. BULL. KOREAN FISH. SOC. 9(4):233-237. KOREAN FISH. SOC., PUSAN. KO.

This study was carried out to evaluate the distribution of Vibrio parahaemolyticus and Vibrio alginolyticus in sea water, mud, oyster (Crassostrea gigas) and sea mussel (Mytilus edulis) collected from the coast of Chung-mu during the period from July 1975 to September 1976. Fifty one strains of V. parahaemolyticus and 160 strains of V. alginolyticus were isolated from 420 samples. The distribution varied by month showing the highest in July through September. The morphological, physiological and biochemical characteristics of 211 isolated strains were coincided with those of the typical V. parahaemolyticus and V. alginolyticus.

87BI0010. WON-JAE.LEE. 1977(3). STUDIES ON MARINE BACTERIA IN KOREAN COASTAL WATERS 1. ON THE DISTRIBUTION OF MARINE BACTERIA IN T+. BULL. KOREAN FISH. SOC. 10(1):31-36. KOREAN FISH. SOC., PUSAN. KO.

The monthly distribution of marine bacteria in the coastal waters of Chung-Mu was investigated from April, 1976 to March, 1977. The aim of this study was to obtain basic data for the prevention of food poisoning and for the efficient aquaculture of the area. Samples of sea water, mud, fish and shell fish were taken every month.

87BI0011. YUNG-JAE.RHO, KYUNG-HEE.LEE. 1979(6). PHENOL DERIVATIVES EFFECTS ON GLUTAMIC ACID FERMENTATION. BULL. KOREAN FISH. SOC. 12(2):95-102. KOREAN FISH. SOC., PUSAN. KO.

Brevibacterium flavum treated with phenol derivatives, guaiacol and o-vanillin has been revealed the marked increased ability in glutamic acid fermentation as 14.2 g/l in o-vanillin treated, 12.5 g/l in guaiacol treated while the 7.0 g/l in nontreated cell. The increased ability of phenol derivatives treated cells in glutamic acid fermentation was ascribed to the formation of charge-transfer complex between phenols and oxygen. The charge-transfer complex effectively supply the oxygen to the fermentation system in spite of high potential gradient in oxygen transfer formed by high cell concentration as insulator on film of air-liquid interface.

87BI0012. Z.F.CHEN. 1982(12). STUDIES ON THE CULTURE OF CHAETOCEROS MUELLERI LEMMERMAN - THE EFFECT OF SALINITY PHOSPHATE AND NI+. ACTA OCEANOL. SINICA. 1(2):282-288. CHINA OCEAN PRESS, BEIJING. EN.

Chaetoceros muelleri is a favorable food for the larvae of shellfishes and other marine animals. At a temperature of 25-30.5 Deg. in Centigrade, light intensity 1,000-1,100 lux, and pH 7.98-8.48, experiments were carried out to find the optimum salinity, phosphate, and nitrate concentration for the growth of this small diatom. The following are the results of the present investigation: (1) The optimum salinity is 25.9 per mille. (2) The suitable phosphate concentration is 19.9-139.3 ug-at/1, and the optimum concentration is 99.5 ug-at/1. (3) the suitable nitrate concentration is 1,976-7,904 ug-at/1, and the optimum concentration is 5,928 ug-at/1.

87BI0013. D.X.JIN, ET AL. 1982(6). DIATOMS FROM THE SURFACE SEDIMENTS OF THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 1(1):112-119. CHINA OCEAN PRESS, BEIJING. EN.

87BI0014. J.L.YU, Z.Y.ZHANG, Z.D.CHENG. 1983(6). DISTRIBUTION OF DIATOMS IN CONTINENTAL SHELF OF THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 2(1):147-154. CHINA OCEAN PRESS, BEIJING. EN.

From the continental shelf of the East China Sea, we have collected and recorded 157 taxa of planktonic diatoms, of which 57 are tropical species, 20 temperate species, 73 widely distributed species and 7 remain to be further investigated for their habitats. Chaetoceros peruvianus f. robusta, Chaet. setoenis, Rhizosolenia alata f. curvirostris and Triceratium campeachianum are four species recorded for the first time in China. The diatoms flora in the present region is mainly warm-water in nature and is very much similar to that in the South China Sea but differs greatly from that in the Huanghai Sea. Gosslerieia tropica and other warm-water floras are present in the waters due to the effect of the Tsushima Warm Current.

87BI0015. G.X.ZHENG, J.X.SHI, Z.Y.CHEN, X.G.HU. 1983(6). A PRELIMINARY STUDY OF THE CORRELATION BETWEEN THE BACTERIA AND THE SEDIMENTS IN THE CHANGJIANG DE+. ACTA OCEANOL. SINICA. 2(1):139-146. CHINA OCEAN PRESS, BEIJING. EN.

The isolation and enumeration of heterotrophic bacteria from 37 sediment samples of 16 stations in Changjiang Delta and adjacent continental shelf area were studied using the streaking plate method. The 722 isolates from sediment samples were identified in genus lavel. Their physiological and biochemical properties

were also examined. We obtained a preliminary correlation between bacteria and sediments.

87BI0016. M.R.LEWIS, J.J.CULLEN, T.PLATT. 1984. RELATIONSHIPS BETWEEN VERTICAL MIXING AND PHOTOADAPTATION OF PHYTOPLANKTON: SIMILARITY CRITERIA. MARINE ECOLOGY- PROG. SER. 15:141-149. INTER-RES., HALSTENBEK. PN-2467. EN.

In their natural environment, phytoplankton are exposed to fluctuations in incident irradiance due to vertical displacements in the water column induced by turbulent fluid motion. Physiological adaptation to these fluctuations results in variation in a number of measurable quantities (e.g. parameters of P-I curves, fluorescence yield, chemical composition), each of which have different time-scales of adaptation. A reaction-diffusion model is analyzed to determine the physical conditions under which a given physiological adaptation would be of ecological importance and thus may show variation in the photoadaptive variable with depth in a mixing layer.

87BI0017. W.R.BARNARD, M.O.ANDREAE, R.L.IVERSON. 1984. DIMETHYLSULFIDE AND PHAEOCYSTIS POUCHETI IN THE SOUTHEASTERN BERING SEA. CONTINENTAL SHELF RES. 3(2): 103-113. PERGAMON PRESS, OXFORD. EN.

Dimethylsulfide(DMS), a volatile excretion product of marine phytoplankton, was determined in the water column during the spring phytoplankton bloom on the southeastern Bering Sea shelf. In the same samples, a broad range of variables which characterize the biological processes in this region were measured. DMS was correlated with phytoplankton chlorophyll in the outer shelf and oceanic domains, but not in the middle shelf domain. A very strong correlation between the cell density of the haptophyte Phaeocystis poucheti & the DMS concentration in seawater was found, which suggests that this species accounts for most of the DMS present in the study region. We propose that in P. poucheti and certain other phytoplankton species the excretion of DMS is incidental to the release of acryli+.

87BI0018. H.W.DUCKLOW, S.M.HILL, W.D.GARDNER. 1985. BACTERIAL GROWTH AND THE DECOMPOSITION OF PARTICULATE ORGANIC CARBON COLLECTED IN SEDIMENTS TRAPS. CONTINENTAL SHELF RES. 4(4):445-464. PERGAMON PRESS, OXFORD. EN.

We have studied bacterial abundance and production in samples from sediment traps deployed for 1 and 100 days in several areas of the shelf and slope regions of the Middle Atlantic Bight, U.S.A. By making a series of assumptions about bacterial growth at the expense of POC in traps, we have estimated that the turnover time of organic particles collected in traps during long deployments is slow (mean 1500 +/-300 days), if only bacterial activity is considered. We conclude that even relatively old (ca. 1 year) POC in sediment traps supports high levels of active bacterial biomass, but that POC decomposition is slow, so that bacteria may not be the principal agents of POC turnover following collection.

87BI0019. A.R.D.STEBBING, M.D.BRINSLEY. 1985. THE EFFECTS OF LOAD AND STRESS INDUCED BY CADMIUM ON THE GROWTH OF A YEAST. 18TH EUROPEAN MARINE BIOL. SYMP. 577-583. JOHN WILEY & SONS, N.Y. PN-2401. EN.

Data from experiments on the growth of a marine yeast(Rhodotorula rubra) exposed to various concentrations of cadmium can be given as raw cumulative data for each concentration, or as mean specific growth rates (R) presented as concentration-response curves, which show more clearly the inhibition of growth above a threshold concentration. However, it is in some ways more informative to consider these data as R% determined at frequent intervals in time. This measure of growth, in the yeast and some other organisms, apparently indicates the output of a growth regulatory mechanism, allowing one to interpret the inhibitory threshold in concentration-response curves as the consequence of overloading the capacity of the control mechanism to counteract further inhibition.

87BI0020. R.X.CHEN, J.H.LIN. 1985(1). A NEW SPECIES OF EUCONCHOECIA FROM THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 491):131-134. CHINA OCEAN PRESS, BEIJING. EN.

The East China Sea Subbureau of National Bureau of Oceanography carried out a comprehensive investigation in the East China Sea (28-34 N, west to 127 E) from December, 1977 to November, 1978. From the planktonic ostracoda samples, we have discovered three male or female specimeans belonging to Euconchoecia, but different from five known species of the genera. Based on the observation and comparision, we identified them as a new species of Euconchoecia and named them as Euconchoecia bifurcata n. sp. to demonstrate their unique characteristic of having bifurcate front alorgan.

87BI0021. JIN-HWAN.LEE, CHANG-HWAN.CHO. 1985(12). CHECK-LIST OF MARINE PLANKTONIC ALGAE IN THE KOREAN COASTAL WATERS, II. DINOPHYCEAE. OCEAN RES. 7(2):59-68. KORDI., SEOUL. EN.

Taxonomic studies on the marine planktonic algae Dinophyceae in the coastal waters of Korea during the period from the early of 1930's to 1984 are reviewed. This is revised check-list of preliminary report (Cho 1983). A check-list of 5 orders, 19 families, 27 genera, 147 species, 14 varieties and 4 formas is presented herein, based on the system of classification by Parke and Dixon (1976).

87BI0022. A.R.LOEBLICH JR., H.TAPPAN. 1985(4). TORTOPLECTELLA, A NEW CALCAREOUS BISERIAL FORAMINIFERAL GENUS. J. FORAM. RES. 15(2):111-113. CUSH. FOUND. FORAM. RES. PN-2350. EN.

Textularia crispata Brady is redescribed and shown to be a distinctive hyaline calcareous foraminifer with oblique areal aperture, hence is made the basis of a new biserial genus tortoplectella. As it lacks an apertural

toothplate, it is placed in the new monotypic family Tortoplectellidae.

87BI0023. JIN-HWAN.LEE, CHANG-HWAN.CHO. 1985(6). CHECK-LIST OF MARINE PLANKTONIC ALGAE IN THE COASTAL WATERS OF KOREA, I. BACILLARIOPHYCEAE. OCEAN RES. 7(1):19-47. KORDI., SEOUL. EN.

A review of taxonomic studies on phytoplanktonic diatoms in the coastal waters of Korea is presented during the period from the early of 1930's to 1984. According to Simonsen's (1979) system, 538 taxa of phytoplanktonic diatoms representing 2 order, 5 suborder, 18 families, 4 subfamilies, 94 genera, 461 species, 65 varieties and 13 forma were arranged in this study. Thus phytoplankton diatom flora have been revealed for the first time.

87BI0024. Y.Y.WANG. 1985(7). DETERMINATION OF AMINO ACIDS IN COMMONLY-USED MARINE PLANKTONIC ALGAE FOODSTUFF. ACTA OCEANOL. SINICA. 4(3):471-476. CHINA OCEAN PRESS, BEIJING. EN.

This article presents an instrumental analysis of the kinds and contents of basic amino acids contained in 9 planktonic algae specimens and a comparison between the nutritive value of amino acids in the 9 planktonic algae and that of amino acids in prawn. Moreover, a comparison is made between contents of various planktonic algae amino acids essential to animals. It is concluded that such algae as N. Closterium., f. finutissima, C. Simplex var. Calcitrans, P. tricornutum, Pla. Subcordiformis and S. costatum are nutritive foodstuffs.

87BI0025. C.BILLARD, J.FRESNEL. 1986. PLANT SYSTEMATICS; RHODELLA CYANEA NOV. SP., A NEW UNICELLULAR RHODOPHYTAN ALGA. COMPTE RENDU ACADEMIE DES SCIENCES. 302:271-276. PN-2337. FR.

A new marine species of the algal genus Rhodella is described. Besides its blue-green colour, R. cyanea differs from previously known species by the radial arrangement of the cellular constituents and the peculiar features of the pyrenoid.

87BI0026. J.KOHLMEYER. 1986. TAXONOMIC STUDIES OF THE MARINE ASCOMYCOTINA. BIOLOGY OF MARINE FUNGI. BK:199-210. CAMBRIDGE UNIV. PRESS, CAMB. PN-2706. EN.

87BI0027. Z.F.CHEN. 1986(10). THE EFFECT OF FOUR HEAVY METALS ON THE GROWTH RATE AND CHLOROPHYLL CONTENT OF CHAETOCEROS MUELLERI+. ACTA OCEANOL. SINICA. 5(4):614-625. CHINA OCEAN PRESS, BEIJING. EN.

Chaetoceros muelleri Lemmermann was cultured in solution of different concentrations of Cu, Pb, Zn and Cd, and in mixtures of any two of them. After 6 days the effect of these heavy metal cations on the growth rate and chlorophyll contents of the diatom were determined and an Opton microscope was used to observe the morphology and size of the cells. The experimental results show that the effects of toxicity of these four heavy metals on Chaetoceros muelleri are: Cu>Pb>Zn>Cd>. However, the cells did not differ significantly in their morphology and size from the controled ones. In any of the mixed metals cultures, its growth rate came close to and was higher than that of the single metal culture of higher concentration.

87BI0028. M.H.JI, S.Z.PU, Y.Y.PAN, H.NIU. 1986(7). AMINO ACID CONTENT OF MARINE PHYTOPLANKTON. ACTA OCEANOL. SINICA. 5(3):457-464. CHINA OCEAN PRESS, BEIJING. EN.

Five species of marine phytoplankton, Phaeodactylum tricornutum, Chaetoceros minutissimus, Platymonas subcordiformis, Nitzschia sp. and Dunaliella sp. were analyzed for the contents of total nitrogen, free amino acid and total amino acid. Their total nitrogen content was relatively high, ranging 3.37-7.6% and the total amino acid content 15.1-36.0%, Glu, Asp, Leu, Ala, Arg, and Gly being the main components. The free amino acid content in two species, Dunaliella sp. and Nitzschia sp. ranged 0.13-0.30%, in which Arg, Ala, Glu, and Asp were predominant. The crude protein in phytoplankton is high enough to be comparable with that of higher classes of seaweed such as Porphyra and Laminaria.

87BI0029. J.M.LIN, D.X.JIN. 1987(1). FORMATION AND GERMINATION OF RESTING SPORES OF CHAETOCEROS DIDYMUS EHRENBERG (BACILLARIOPHYTA). ACTA OCEANOL. SINICA. 6(1):124-131. CHINA OCEAN PRESS, BEIJING. EN.

Resting spores are important in ecology and taxonomy of diatoms as well known to every diatomist. If Nitrate-N and Nitrite-N in the cultures drop down to 4 ug/liter, or at a relatively small amount of N, higher in number of individuals and sudden increasing of salinity the resting spores will produce after 24 h. Paired spores are present in the newborn spore-mother cells. At 20 Deg. in Centigrade and 6000 lx in a fresh medium, spores will be germinated into vegetative cells within 48 h.

87BI0030. DEUK-HEE.JIN, YANG-KI.HONG. 1987(1). TRANSFORMATION CONDITIONS AND AMPICILLIN-RESISTANT EXPRESSION OF E. COLI TS-MUTANT. BULL. KOREAN FISH. SOC. 20(1):57-62. KOREAN FISH. SOC., PUSAN. KO.

When the culture time was 2.5 hours of mid logarithemic phase, the cell concentration was 45000000 cells/ml, the optical density was equal to 0.45 at 590 nm wave length, the transformational frequencies of plasmid pPL-Lambda and pAS 1 had the highest values as 0.000002 and 0.0000015 respectively. For 9000000 competent cells in 200 ul, the transformational frequency was as high as 0.0000044 at 510 ng plasmid concentration. The competent cells treated with the mixture of calcium chloride and thymidine twice rates of transformation than those treated with calcium chloride. The ampicillin resistance of transformants was expressed in LB broth after 2 hours at 30 Deg. in Centigrade.

87BI0031. MAN.CHANG, JAE-HYUNG.SHIM,

HYUNG-TACK.HUH 05. 1987(12). NANOPLANKTON OF THE KOREAN COASTAL WATERS, I. TAXONOMICAL CONSIDERATIONS OF SOME IMPORTANT SPECIES+. OCEAN RES. 9(1/2):7-14. KORDI., ANSAN. EN.

In the present study coastal nanoplankton collected from July, 1985 to June, 1986 in the surface waters of the Chonsu Bay and adjacent waters was examined with the scanning electron microscope as well as with light microscope. A total of 36 nanoplankton species including 5 unidentified species was observed. Of the species observed, the following five species belonging to Prasinophyceae, Cryptophyceae and Prymnesiophyceae commonly occurred in the surveyed area: Pedinomonas mikron, Pyramimonas grosii, Chroomonas cf. lateralis, Chroomonas salina and Pavlova lutheri. And they are recorded as new to Korean coastal waters with systematic description of the species.

87BI0032. IN-SICK.PARK, JUNG-YOUN.PARK, KUEN-HACK.SUH, YONG-KI.HONG. 1987(3). BIODEGRADATION OF BUNKER-C OIL BY THE MIXED ENRICHMENT CULTURE OF MARINE BACTERIA. BULL. KOREAN FISH. SOC. 20(2):152-156. KOREAN FISH. SOC., PUSAN. KO.

A mixed population of marine bacteria was obtained to catalize the biodegradation of bunker-C fuel oil by means of the enrichment culture technique. Samples used for the enrichment culture were collected from sea water and sediments in the vicinity of Pusan, Chungmu, and Ulsan in Korea. As the biodegradation of bunker-C oil proceeded, the number of bacteria increased. Oil dispersion was absolutely dependent on the addition of nitrogen and phosphate sources in sea water. High and low sulfur-containing bunker-C and crude oil could be dispersed similarly. Bunker-C oil was dispersed rapidly at the pH ranging from 7.0 to 8.0 and dispersed to the amount of 7.5 g per liter of sea water medium.

87BI0033. T.M.KANA, P.M.GLIBERT. 1987(4). EFFECT OF IRRADIANCES UP TO 2000 UE/SQUARE METER/SEC ON MARINE SYNECHOCOCCUS WH7803, I. GROWTH, PI+. DEEP-SEA RES. 34(4):479-495. PERGAMON PRESS, OXFORD. EN.

We grew Synechococcus WH7803 at rates exceeding 1.4/day at irradiances from 200 to 2000 uE/square meter/sec under continuous light in nutrient replete media with no evidence of photoinhibition. Concentrations of the photosynthetic pigments phycoerythrin, phycocyanin, and chlorophyll a, were inversely related to growth irradiance. Phycoerythrin exhibited the greatest plasticity with the concentration in cells adapted to 30 uE/square meter/sec being ca. 20 times greater than that in cells adapted to 700 uE/square meter/sec. Changes in the phycoerythrin:phycocyanin ratio as well as their respective concentrations indicate that phycobilisomes underwent changes in size at irradiances which saturated or nearly saturated growth and underwent changes in number at irradiances which limited gro+.

87BI0034. C.Z.NI, ET AL. 1987(4). THE HETEROTROPHIC MICROBES IN DRY VALLEYS VICTORIA LAND AND ROSS ISLAND, ANTARCTICA. ACTA OCEANOL. SINICA. 6(2):273-280. CHINA OCEAN PRESS, BEIJING. EN.

During the expedition from Dec. 1981 to Feb. 1982, Dry Valley, Victoria and Ross Island Beach in Antarctica were visited. From ten stations samples of water, soil, snows and seawater were collected, from which heterotrophic microbes (including bacteria, yeast and fungi) were isolated and identified. Results show that there are ten genera of bacteria, nine genera of yeast and nine genera of fungi. Most of the strains grow at the temperatures of 20 deg. in centigrade and 5 deg. in centigrade, while a few grow only below 5 deg. in centigrade. More bacterial genera were isolated from the beach and nearby lakes than those from the inland Dry Valley, Indicating the relations between the strain composition and geographical location and environmental conditions of the polar zone.

87BI0035. T.M.KANA, P.M.GLIBERT. 1987(4). EFFECT OF IRRADIANCES UP TO 2000 UE/SQUARE METER/SEC ON MARINE SYNECHOCOCCUS WH7803, II. PHOTOSYNT+. DEEP-SEA RES. 34(4):497-516. PERGAMON PRESS, OXFORD. EN.

We investigated the photosynthetic behavior of Synechococcus WH7803 when grown over the irradiance range of 30-2000 uE/square meter/sec in nutrient-replete, continuous light, preadapted batch cultures. For each of 8 growth irradiances investigated, we found a unique photosynthesis vs irradiance relationship. Cell- and carbon-specific photosynthetic light harvesting efficiencies decreased 10-fold from the lowest to highest growth irradiances. Chlorophyll and phycocyanin-specific efficiencies also decreased but to a lesser extent. Phycoerythrin-specific efficiencies increased ca. 2-fold with increasing irradiances. Photosynthetic capacity approximated the in situ rate of photosynthesis only at growth irradiances which saturated growth rate.

87BI0036. R.MARTINEZ, T.T.PACKARD, D.BLASCO. 1987(5/6). LIGHT EFFECTS AND DIEL VARIATIONS OF NITRATE REDUCTASE ACTIVITY IN PHYTOPLANKTON FROM THE NORTHWES+. DEEP-SEA RES. 34(5/6):741-753. PERGAMON PRESS, OXFORD. EN.

Light kinetics and diel cycles of nitrate reductase (NR) activity were studied in the upwelling ecosystem off northwest Africa. The activity of the enzyme showed a strong response to light at low intensities but became saturated at light intensities above 15-30% of the incident light intensity. At higher irradiances, NR activity showed photoinhibition. At sea surface irradiances an average inhibition of 32% in the NR activity was observed.

87BI0037. JIN-HWAN.LEE, KWANG-IL.YOO. 1987(9). A STUDY ON THE FINE STRUCTURE OF THE MARINE DIATOMS OF KOREAN COASTAL WATER-GENUS THALASSIOSIRA 2. J. OCEANOL. SOC. KOREA. 22(3):179-190. OCEANOL. SOC. KOREA, SEOUL. EN.

A study on the fine structure of the marine diatoms has been carried out for taxonomical purpose during the periods from September 1983 to march 1987 in Korean coastal waters. Fine structure of small Thalassiosira (Bacillariophyceae) was studied by means of light microscope and scanning electron microscopy. Secondarily, six species of Thalassiosira were identified and described. Of these Thalassiosia allenii, T. binata and T. conferta were new records for Korean coastal waters. Thalassiosira aestivalis, T. allenii, T. binata, T. conferta, and T. pacifica have a valve with a single labiate process and one central and one marginal ring of strutted processes, but T. rotula has many central strutted processes close together instead of one central strutted process.

87BI0038. KANG-HO.LEE. 1968(12). THIN LAYER CHROMATOGRAPHIC SEPARATION OF LEAF XANTHOPHYLLS. BULL. KOREAN FISH. SOC. 1(2):73-79. KOREAN FISH. SOC., PUSAN. KO.

The resolving capacities of xanthophyll pigments on thin-layers of Silica Gel, Hyflo super-Cel, and Micro-Cel C with varying concentrations of acetone in petroleum ether as the developing solvent were compared. The results showed that the resolving capacity of Micro-Cel C thin-layer was superior to others and satisfactory for the separation of leaf carotenoids in clearly separated six bands; carotenes, lutein-zeaxanthin, antheraxanthin, violaxanthin, an unidentified band, and neoxanthin, when it was developed with 13% acetone-petroleum ether solution for 15 to 20 minutes in an unsaturated chamber.

87BI0039. NAM-PYO.KOH. 1969(12). FUNDAMENTAL OBSERVATIONS ON GRACILARIA CULTURE. BULL. KOREAN FISH. SOC. 2(2):134-138. KOREAN FISH. SOC., PUSAN. KO.

Experiments were carried out to asses the importance of environmental conditions upon the growth rate, length compositions seedling and spore liberation of a red alga Glacilaria verrucosa. The alga grown in water of low salinity mixed with fresh water shows better growth rate, larger length composition and excellent seedling, whereas the one vegetated in an area of tidal exposure shows a somewhat retarded growth rate and poor seedlings. The rate of growth increases from August to October and begins to diminish from December continuing to diminish through February. Therefore the spore settling time extends from May to June.

87BI0040. YEUNG-HO.PARK. 1969(6). SEASONAL VARIATION IN THE CHEMICAL COMPOSITION OF BROWN ALGAE WITH SPECIAL REFERENCE TO ALGINIC AC+. BULL. KOREAN FISH. SOC. 2(1):71-82. KOREAN FISH. SOC., PUSAN. KO.

The present investigations were carried out with the purpose of making clear the fundamental features of the seasonal variations in chemical composition of the brown algae. Three species of samples, Ecklonia cava, Sargassum sagamianum and Hizikia fusiforme have been analyzed monthly for their contents of total ash, crude protein, alginic acid, mannitol, and laminarin over a year period. Three kinds of samples were collected from the same locality, situated on the southern coast of the Che-ju Island, from September 1966 to August 1967.

87BI0041. JAE-WON.KANG. 1970(6). SPECIES OF CULTIVATED PORPHYRA IN KOREA. BULL. KOREAN FISH. SOC. 3(2):77-92. KOREAN FISH. SOC., PUSAN. KO.

Ueda, in the course of his systematic work on the lavers, Porphyra, in Japan and Korea in 1932, mentioned that most of the cultivated Porphyra belong to Porphyra tenera Kjellman. Then he, dividing the species into two forms, f. typica and f. kjellmani, put Korean cultivated Porphyra under the latter. Recently, I have become aware of the predominant occurrence of P. yezoensis Ueda in most culture-beds of Korea as in the Tokyo Bay or other places in Japan. At present, since artificial seeding for the cultivation of Porphyra with Conchocelis has been carried out and peculiar species can be cultured, a study of the species of cultivated Porphyra has become an important subject.

87BI0042. KI-WAN.LEE. 1977(9). UNRECORDED MARINE ALGAE FROM KOREA. BULL. KOREAN FISH. SOC. 10(3):171-172. KOREAN FISH. SOC., PUSAN. EN.

Two species of marine algae Collinsiella japonica (Yendo) Prinz (Chlorophyta) and Erythrotrichia japonica Tokida (Rhodophyta) were first collected in the intertidal zone of Jeju, and they are newly added to the Korean flora.

87BI0043. SOON-SEON.KIM, YEUNG-HO.PARK. 1978(6). SEASONAL VARIATION IN CARRAGEENAN CONTENT AND ITS CHEMICAL COMPOSITION OF CHONDRUS OCELLATUS. BULL. KOREAN FISH. SOC. 11(2):55-64. KOREAN FISH. SOC., PUSAN. KO.

The present investigations were carried out for the purpose of making clear the fundamental features of the seasonal variations in carrageenan content and its chemical composition. The samples, Chondrus ocellatus, were collected every month from the same locality on the coast of Haewundae from March, 1975 to February, 1976, and analyzed monthly to determine their carrageenan content, sulphate and 3,6-anhydro-D-galactose over a year period. In addition, some chemical characteristics were also tested on the fractions separated by the different concentrations of potassium chloride. In seasonal variation, the maximum carrageenan content occurred from summer through autumn, and the minimum in winter, especially in February.

87BI0044. Z.X.FANG, J.X.DAI, D.Q.CHEN. 1982(6). PARTHENOGENESIS AND THE GENETIC PROPERTIES OF PARTHENOSPOROPHYTES OF UNDARIA PINNATIFIDA. ACTA OCEANOL. SINICA. 1(1):107-110. CHINA OCEAN PRESS, BEIJING. EN.

87BI0045. W.L.LOCKHART, B.N.BILLECK, B.G.E.DE MARCH, D.C.G.MUIR. 1983. UPTAKE AND TOXICITY OF ORGANIC COMPOUNDS: STUDIES WITH AN AQUATIC MACROPHYTE (LEMNA MINOR). AQUATIC TOXICOLOGY & HAZARD

ASSESSMENT: 6TH SYMP., ASTM SIP 802. 460-468. AME. SOC. TESTING & MATERIALS. PN-2657. EN.

Aquatic macrophytes have been the subjects of relatively little research attention, either for their ability to accumulate pollutants or for their susceptibility to any toxic action of pollutants. Duckweed (Lemna minor) clones were maintained in axenic culture and were exposed to several carbon-14 labeled compounds added to the culture medium. Transfer of radioactivity from media to plants (bioconcentration) was described empirically-with regression equations incorporating exposure times and concentrations, partition coefficients, and types of water used to make the culture media. In separate experiments, the growth of cultures in terms of frond numbers was described as a function of exposure time for several concentrations of the herbicides terbutryn, ethalfluralin, and fluridone. B+.

87BI0046. R.L.STEPHENSON, F.C.TAN, K.H.MANN. 1984. STABLE CARBON ISOTOPE VARIABILITY IN MARINE MACROPHYTES AND ITS IMPLICATIONS FOR FOOD WEB STUDIES. MARINE BIOLOGY. 81:223-230. SPRINGER-VERLAG, BERLIN. PN-2472. EN.

Stable carbon isotope ratios of eelgrass Zostera marina and of kelp Laminaria longicruris showed considerable variation in time and space. The isotopic composition of Z. marina varied seasonally from a mean of -6 per mille for leaves formed in June to a mean of -10 per mille for leaves formed in February. The maximum range for individual leaves was from -5 to -11.4 per mille. Once a leaf was fully formed, its isotopic composition appeared not to change. In L. longicruris there was no clear seasonal pattern of variation, but in any given blade there was a spatial pattern of variation, with the thickened central band tending to be least negative and the margins most negative. In one blade the range was from -12 to -20 per mille. Since this range overlaps values that are found in vari+.

87BI0047. MYUNG-SOO.HAN, HI-SANG.KWAK. 1984(12). ON THE POLLEN IN THE WATER OF CHINHAE BAY, KOREA. BULL. KORDI. 6(1/2):87-88. KORDI., SEOUL. KO.

A large amount of the pollen has observed in the surface water of Chinhae Bay, Korea in the spring time of 1983. It had been diffused by wind from the pine trees around Chinhae Bay. The majority of it were identified as the pollen of Pinus thunbergii and P. densiflora.

87BI0048. P.S.RIDOUT, R.J.MORRIS. 1985. SHORT-TERM VARIATIONS IN THE PIGMENT COMPOSITION OF A SPRING PHYTOPLANKTON BLOOM FROM AN ENCLOSED +. MARINE BIOLOGY. 87:7-11. SPRINGER-VERLAG, BERLIN. PN-2949. EN.

Phytoplankton samples taken during the spring bloom in the experimental enclosed ecosystem bags at Loch Ewe, Scotland, during 1983 were analysed for carotenoids and chlorophyll compounds using high-performance liquid chromatography (HPLC). Changes in the relative proportions of these pigments were related to day-to-day changes in the composition of the bloom and the physiological state of the algae. There is clear evidence for a change in the chlorophyllide a:chlorophyll a ratio, which reached a maximum as nutrient limitation occurred. No major qualitative changes in the carotenoid components were seen during the bloom; the relative proportion, however, of some carotenoids does provide useful information on the relative abundance of certain algal types in the phytoplankton.

87BI0049. CHOON-BOK.SONG, JAE-WON.KANG. 1985(12). NOTES ON SOME UNRECORDED MARINE ALGAE IN KOREA. OCEAN RES. 7(2):1-13. KORDI., SEOUL. KO.

Four unrecorded species of marine algae are the samples collected at the several islands in the western and southern coasts of Korea from August 1984 through July 1984. They are one brown alga Sargassum giganteifolium, and three red algae Ceramium gracillimum var. byssoideum, Spyridia tenuis, and Kallymenia sessilis. It appears noteworthy that Ceramium gracillimum var. byssoideum observed during this study showed some differences in both the number of periaxial cells and nodal cortical development from those of Ceramium flaccidum, which was regarded as a synonym of C. gracillimum var. byssoideum by Womersley (1978).

87BI0050. Y.Y.WANG, ET AL. 1985(4). EFFECTS OF PHOTOPERIOD AND SALINITY ON GROWTH AND UPTAKE -OF COBALT 60 AND CESIUM 137 FOR CHLOPELLA+. ACTA OCEANOL. SINICA. 4(2):289-296. CHINA OCEAN PRESS, BEIJING. EN.

The effects of three photoperiods (24 hr illumination, 12 hrillumination + 12 hr darkness and 24 hr darkness) and three salinities (20 per mille, 30 per mille & 35 per mille) on the uptake of Cobalt 60 & Cesium 137 for Chlorella sp. and on the growth of its algae are studied. The uptake of Cobalt 60 for the algae is two orders of magnitude higher than that of Cesium 137. Of factorial effects, the effect of photoperiod is most significant either on the uptake of the radionuclides or on the growth of the algae; the effect of salinity comes next in order and that of their interaction remains with the last. The uptake of the two radionuclides increases with extended photoperiod while the uptake of Cesium 137 declines with increasing of salinity. The growth of the algae appears to be the +.

87BI0051. L.M.HUANG. 1986(4). RELATIONSHIP BETWEEN PHOTOSYNTHESIS OR RESPIRATION OF SOME SEAWEEDS AND TEMPERATURE OR SALINITY. ACTA OCEANOL. SINICA. 5(2):291-299. CHINA OCEAN PRESS, BEIJING. EN.

The effect of temperature and salinity on the photosynthetic and respiratory rates of some seaweeds are reported. The regression equations for the seaweeds and their correlograms are discussed and compared. The rates of respiration for all the studied species increase linearly with increasing temperature from 18 to 35 Deg. in Centigrade. The Optimum Salinities for photosynthesis range from 26 to 32 for two species of Gracilaria, whose respiratory rates decrease gradually

with increasing salinity.

87BI0052. P.LIN, D.H.CHEN, X.M.XIAO, W.L.DENG. 1986(4). EFFECT OF BEACH SOIL SALINITY ON CONTENTS OF CARBOHYDRATE AND NITROGENOUS COMPOUND IN MANGROVE PLA+. ACTA OCEANOL. SINICA. 5(2):285-290. CHINA OCEAN PRESS, BEIJING. EN.

This paper deals with the reaction of the contents of carbohydrate and nitrogenous compound in leaves of mangroves (Kandelia candel and Aegiceras corniculatum) to the change of seabeach soil salinity (range: 3-12) in the tidal swamp of Jiulongjiang River, Fujian Province, China. Results obtained show that: (1) contents of total sugar, starch and soluble sugar in the leaves of those mangrove plants would increase with increase in the soil salinity; (2) with increase in the soil salinity, contents of total nitrogen and soluble protein in their leaves would decrease, but fluctuate at the soil salinity more than 10.

87BI0053. EUI-IN.PAIK. 1972(12). THE POLYCHAETOUS ANNELIDS IN KOREA (I). BULL. KOREAN FISH. SOC. 5(4):128-136. KOREAN FISH. SOC., PUSAN. EN.

The materials were obtained from Busan (=Pusan), Chilcheondo in Geoje, Chungmu, Yeosu, Beolgyo, Boseong, Jangheung, Seo-gwipo of the southern coast of Korea durng the period from 1970 to 1971. As a result of the study on the animals of Nereidae, the following five species were identified, which are newly recorded to Korean fauna: Tylorrhynchus heterochaetus, Perinereis nuntia var. vallata, Perinereis nuntia var. brevicirris, Neanthes japonica, Nectoneanthes oxypoda.

87BI0054. EUI-IN.PAIK. 1973(12). SOME BENTHIC POLYCHAETOUS ANNELIDS FROM THE YELLOW SEA. BULL. KOREAN FISH. SOC. 6(3/4):123-131. KOREAN FISH. SOC., PUSAN. EN.

87BI0055. EUI-IN.PAIK. 1973(6). THE POLYCHAETOUS ANNELIDS IN KOREA (II) DESCRIPTION OF NECTONEANTHES LATIPODA, SP. NOV. BULL. KOREAN FISH. SOC. 6(1/2):81-84. KOREAN FISH. SOC., PUSAN. EN.

87BI0056. HAN-CHOON.YANG. 1974(3). SPAWNING AND LARVAL DEVELOPMENTS OF TWO SPECIES OF POLYCLAD WORMS, STYLOCHUS IJIMAI YERI & KABURAK+. BULL. KOREAN FISH. SOC. 7(1):7-14. KOREAN FISH. SOC., PUSAN. KO.

Stylochus ijimai spawns from May to October with peak spawning from July to September. P. obscurus spawns from June to October with peak spawning from July to September. S. ijimai spawns approximately 96,000-132,000 eggs by one spawning. Just after spawnings, the eggs of S. ijimai were 102 u in diameter, and those of P. obscurus were 108 u. S. ijimai and P. obscurus have simple eggs. S. ijimai develop indirectly having Gotte larvae, while P. obscurus develop directly. These two species show very similar patterns of early developments from maturation division of eggs to the gastrula stage.

87BI0057. HAN-CHOON.YANG. 1974(9). ON THE EXTERMINATION OF POLYCLADS; CALCIUM HYPOCHLORITE (CAOCL2) TREATMENT IN THE PERIOD OF HIGH W+. BULL. KOREAN FISH. SOC. 7(3):121-125. KOREAN FISH. SOC., PUSAN. KO.

Polyclads (Stylochus ijimai and Pseudostylochus obscurus) which damage oyster were treated with calcium hypochlorite to determine the TLm concentration. In this experiment the TLm and the extermination density as well as the growth of the oyster after the treatment were checked with following results. The higher the temperature and the longer the period of the treatment is, the lower the TLm is. The greater the concentration of sea water is, the higher TLm is because of the weakened action calcium hypochlorite.

87BI0058. EUI-IN.PAIK. 1975(12). TAXONOMICAL EVALUATION OF TWO VARIETIES OF PERINEREIS NUNTIA: P. NUNTIA VAR. VALLATA (GRUBE 1857) +. BULL. KOREAN FISH. SOC. 8(4):242-244. KOREAN FISH. SOC., PUSAN. EN.

Taxonomical evaluation of P. nuntia var. vallata and P. nuntia var. brevicirris Grube was checked. On the basis of the number of paragnaths and its arrangement pattern it is suggested that these two varieties are no longer valid, and they are synonym of Perinereis nuntia (Savigny, 1818).

87BI0059. EUI-IN.PAIK. 1979(12). NEW RECORDS OF THREE POLYCHAETOUS ANNELID SPECIES IN KOREA. BULL. KOREAN FISH. SOC. 12(4):277-280. KOREAN FISH. SOC., PUSAN. KO.

Examining the polychaetous annelids collected from Tongyeong Bay and Gwangyang Bay, I found three species which should be added in the list as new to the polychaetous annelid fauna of Korea. In the present study three species are reported with morphological descriptions. Consequently, a total of 128 species of polychaetous annelids has been reported (Kamita and Sato, 1941; Paik, 1972, 1973a, 1973b; Rho and Song, 1974, 1975; Paik, 1975a, 1975b, 1976; Lee, 1976; Paik 1977, 1978, 1979a, 1979b) in Korea.

87BI0060. EUI-IN.PAIK. 1979(3). NEW RECORDS OF FIVE POLYCHAETOUS ANNELIDA SPECIES IN KOREA. BULL. KOREAN FISH. SOC. 12(1):35-39. KOREAN FISH. SOC., PUSAN. KO.

Examining the polychaetous annelids collected from the Yellow Sea, Jinhae Bay, Yeocheon Bay, Jeju Do and Weolpo. I found five species which should be added in the list as new to the polychaetous annelids fauna of Korea. In the present study five species are reported morphological descriptions. Consquently, a total 125 species of polychaetous has been reported (Kamita and Sato 1941; Paik 1972, 1973a, 1973b, 1975a, 1975b, 1976, 1977, 1978, 1979; Lee 1976; Rho and Song 1974, 1975) in Korea.

87BI0061. EUI-IN.PAIK. 1979(3). BENTHIC POLYCHAETOUS ANNELIDS FROM GEOMUN-DO AND BAEG-DO ISL., KOREA. BULL. KOREAN FISH. SOC. 12(1):41-63. KOREAN FISH. SOC., PUSAN. EN.

87BI0062. EUI-IN.PAIK. 1980(3). POLYCHAETOUS ANNELIDS GROWING IN OYSTER FARMS. BULL. KOREAN FISH. SOC. 13(1):33-44. KOREAN FISH. SOC., PUSAN. EN.

87BI0063. EUI-IN.PAIK. 1980(6). NEW RECORDS OF THREE BENTHIC POLYCHAETOUS ANNELID SPECIES IN KOREA. BULL. KOREAN FISH. SOC. 13(2):89-92. KOREAN FISH. SOC., PUSAN. KO.

Examining polychaetous annelids collected from chinhae Bay in the southeastern part of Korea, I found three species which should be added in the list as new to the polychaetous annelid fauna of Korea. In the present study three species are reported with morphological descriptions. Consequently, it totals 133 species of polychaetous annelids from Korea including those previously reported.

87BI0064. D.S.M.BILLETT, B.HANSEN, Q.J.HUGGETT. 1984. PELAGIC HOLOTHUROIDEA (ECHINODERMATA) OF THE NORTHEAST ATLANTIC. PROC. 5TH INT. ECHINODERM CONF., GALWAY, 24-29 SEPT. 1984. 399-411. PN-2927. EN.

Seven species of deep-sea holothurians have been found in pelagic trawls taken in the northeast Atlantic. Four species, Benthodytes ligua, Benthodytes typica, Psychropotes depressa and Psychropotes longicauda, are present only as juvenile forms, but the other three species, Enypniastes diaphana, Peniagone diaphana and Scotothuria herringi are truly pelagic, although they may nevertheless feed at the sediment surface. The taxonomy, geographic distribution, bathymetric range and behaviour are discussed for each species. The pelagic holothurians are capable to linking abyssal regions with the bathypelagic zone and even surface waters, either by producing pelagic juveniles or by direct migration. Their density greater than 500 m above the seabed appears to be low although their distribu+.

87BI0065. P.A.TYLER, A.MUIRHEAD, J.D.GAGE, D.S.M.BILLETT. 1984. GAMETOGENIC STRATEGIES IN DEEP-SEA ECHINOIDS AND HOLOTHURIANS FROM THE N.E. ATLANTIC. PROC. 5TH INT. ECHINODERM CONF., GALWAY, 24-29 SEPT. 1984. 135-140. PN-2926. EN.

The gametogenic biology of ten echinoids and eight holothurians from deeper than 1000 m is the N.E. Atlantic have been examined. In the echinoid species Echinus affinis, E. acutus norvegicus, E. alexandri and Cidaris cidaris a maximum egg size of 110 um diameter is produced, suggestive of planktotrophic development. Samples from a time-series suggest a distinct seasonality of reproduction in Echinus affinis and from the limited evidence available we may infer a similar strategy for the other species. In the five echinothurid species examined, and in Poriocidaris purpurata an egg from 1100 um to 1500 um diameter is produced. In these species nutritive tissue is well developed. Phagocytes breakdown unspawned oocytes and may translocate the products to developing oocytes. Of the holot+.

87BI0066. R.H.EMSON, P.J.HERRING. 1984. BIOLUMINESCENCE IN DEEP AND SHALLOW WATER BRITTLESTARS. PROC. 5TH INT. ECHINODERM CONF., GALWAY, 24-29 SEPT. 1984. 656. PN-2923. EN.

87BI0067. R.L.ZOU, F.S.ZHANG, J.M.ZHOU. 1984(7). APPLICATION OF ELECTRONIC COMPUTER TECHNIQUES TO TAXONOMY OF MARINE ORGANISMS. ACTA OCEANOL. SINICA. 3(3):424-432. CHINA OCEAN PRESS, BEIJING. EN.

For the identification of milleporidae in this paper four designs are given as follows: (1) According to the morphological characters of the studied materials, the computer can present a rapid way to help in identifying specimens and to answer the species name as well as its synonyms. (2) The user can take the second design, if asking for synonyms, numbers and a check of the synonyms are shown on the Video Display of the microcomputer. (3) If you want to know the morphological characters of a certain species, you can take the third design, that is, input a valid species name and its morphological characters will be output automatically. (4) When asking for a valid or an invalid species of Millepora, you can select the fourth design, i.e. input its Latin name and the computer will answer+.

87BI0068. R.J.MORRIS, Q.BONE. 1985. HIGHLY SATURATED LIPID COMPOSITION OF CTENOPHORE CILIA: POSSIBLE INDICATION OF LOW MEMBRANE PERMEA+. LIPIDS. 20(12):933-935. AME. OIL CHEMISTS' SOC. 2937. EN.

The lipids of ciliary membranes in two species of ctenophore are found to be distinguished by phospholipids containing short chain saturated fatty acids and by saturated sterols. Such a composition is expected to result in a much lower permeability of cilia membranes to water and other ions than the general body membranes. We suggest that this is related to the large surface area of the cilia and is a requirement, on the part of the ctenophore, to control water and ionic fluxes across its surface membranes.

87BI0069. S.OHTSUKA, E.YOSHIOKA. 1985. A PRELIMINARY NOTE ON THE PELAGIC EGGS OF MARINE INVERTEBRATES. SPEC. PUB. MUKAISHIMA MAR. BIOL. STATION. 225-235. MUKAISHIMA MAR. BIOL. STATION. PN-3062..EN.

A preliminary investigation on the pelagic eggs of marine invertebrates was carried out at Mukaishima in the central part of the Inland Sea of Japan and at Shirahama on the Pacific coast in the middle Honshu, the main island of Japan. The pelagic eggs collected were identified as follows: five species of calanoid copepods - calanus sinicus, Centropages abdominalis, C. yamadai, Labidocera rotunda, and Tortanus forcipatus -, the chaetognath Sagitta crassa, rotifers Synchaeta spp., the chiton Liolophura japonica, three species of gastropods - Littorina brevicula, Nodilittorina exigua, and Peasiella roepstorffiana -, polychaetes, malacostracans, and tunicates. Some eggs were uniform, while others were variable in shapes. Eggs of Sagitta crassa were larger in winter than in summer and fall.

87BI0070. F.C.YU. 1985(4). ISOLATION OF DNA FROM SEA URCHIN SPERM NUCLEI BY HYDROXYAPATITE CHROMATOGRAPHY. ACTA OCEANOL. SINICA. 492):304-312. CHINA OCEAN PRESS, BEIJING. EN.

This article describes in detail the procedures in obtaining spermatids from living animals and in isolating sperm nuclei DNA by hydroxyapatite chromatography. The isolated DNA is free of RNAs and proteins after treatment with proteinase K, followed by chromatography on hydroxyapatite column which is eluted with stepwise-increased concentrations of potassium phosphate buffer. More than 89% of the DNA purified is found in the eluates of both 0.2 M and 0.25 M potassium phosphate buffer. The two fractions are identical in ultraviolet absorption spectrum. DNA molecules thus prepared should be useful for studying DNA structure and DNA replication by electron microscopy, since the length of the purified DNA molecules is in the range of the size of a replicating unit.

87BI0071. P.A.TYLER, A.MUIRHEAD, D.S.M.BILLETT, J.D.GAGE. 1985(5). REPRODUCTIVE BIOLOGY OF THE DEEP-SEA HOLOTHURIANS LAETMOGONE VIOLACEA AND BENTHOGONE ROSEA (ELASIP+. MARINE ECOLOGY- PROG. SER. 23:269-277. INTER-RES., HALSTENBEK. PN-2952. EN.

Specimens were examined from a number of stations (1960 to 2120 m depth) in the Porcupine Seabight and Rockall Trough, N.E. Atlantic Ocean. Both species are gonochoric and show an equal division of the sexes. The ovary of Laetmogone violacea is a compact nodose structure containing eggs up to 400 um diameter. The testis is highly digitate, with the wall of each tubule containing numerous infoldings lined with spermatogonia and spermatocytes; spermatozoa reach a maximum size of 2 um (head diameter). The ovary of Benthogone rosea consists of thin-walled nodose tubules through which the large egg of 750 um diameter can be clearly seen. The testis of B. rosea is a small digitate structure, the walls of which lack the infoldings found in L. violacea; spermatozoa have a head diameter of 5+.

87BI0072. JAE-HAC.LEE, EUI-IN.PAIK. 1986(9). POLYCHAETOUS ANNELIDS FROM THE YELLOW SEA, III. FAMILY MALDANIDAE (PART 2). OCEAN RES. 8(1):27-40. KORDI., ANSAN. KO.

Distributions and morphological characteristics of the Maldanidae in the Yellow Sea adjacent to Korea are described. Five genera and seven species belonging to two subfamilies, Euclymeninae, Maldaninae are identified during the study period. Of them, two new species (Clymenella koreana, Microclymene propecaudata) are found and four species (Clymenella koellikeri, Asychis biceps, Asychis pigmentata, Maldane cristata) are newly added to Korean fauna. Therefore the Maldanidae in Korea consists of 17 species representing 12 genera in five subfamilies.

87BI0073. JAE-HAC.LEE, EUI-IN.PAIK. 1986(9). POLYCHAETOUS ANNELIDS FROM THE YELLOW SEA, III. FAMILY MALDANIDAE (PART 1). OCEAN RES. 8(1):13-25. KORDI., ANSAN. KO.

Distributions and morphological characteristics of the Maldanidae in the Yellow Sea adjacent to Korea are described. Five genera and six species belonging to three subfamilies, Rhodininae, Lumbriclymeninae, Nicomachinae are identified during the study period. Of them, one new species (Petaloproctus macrodentatus) is found and four species (Rhodine loveni, Lumbriclymene japonica, Clymenopsis cingulata, Nicomache minor) are newly added to Korean fauna.

87BI0074. JONG-GEEL.JAE, JAE-HAC.LEE, YONG-TAE.NOH. 1987(1). TAXONOMIC STUDY ON POLYNOID POLYCHAETES IN KOREA, II. SUBFAMILY LEPIDONOTINAE. BULL. KOREAN FISH. SOC. 20(1):1-15. KOREAN FISH. SOC., PUSAN. KO.

Some scale worms collected in Korean coastal waters from 1981 to 1984 were identified with 9 species belonging to subfamily Lepidonotinae. Among them, 4 species (lepidonotus tenuisetosus, Halosydnopsis pilosa, Perolepis stylolepis and Lepidasthenia maculata) are new to Korea. Therefore, all of the lepidonotoid species in Korea are 12 species representing 7 genera. A key to the Korean species of lepidonotoid Polynoidae is provided.

87BI0075. MI-SUCK.HA, BEUNG-HO.RYU. 1987(3). PURIFICAION AND CHARACTERISTIC PROPERTIES OF DNA POLYMERASE ALPHA FROM SEA-URCHIN, HEMICENTROTUS P+. BULL. KOREAN FISH. SOC. 20(2):136-145. KOREAN FISH. SOC., PUSAN. EN.

From the sea-urchin, Hemicentrotus pulcherrismus, we have purified by four column chromatographic steps for DNA polymerase alpha activity. The molecular weight of DNA polymerase alpha was determined to be around 137,000-138,000 by Sephadex G-200 gel filtration and SDS-polyacrylamide gel electrophoresis. The purified enzyme had the optimal activity at pH 7.4.

87BI0076. B.L.WU, P.Y.QIAN. 1987(4). ULTRASTRUCTURAL CHANGES OF THE OOGENESIS IN THE POLYCHAETE CAPITELLA CAPITATA (FABRICIUS). ACTA OCEANOL. SINICA. 6(2):257-265. CHINA OCEAN PRESS, BEIJING. EN.

The ultrastructural changes of the oogenesis in Capitella capitata are described. The developing oocytes undergo obvious ultrastructural changes during the process of oogenesis, which include: the formation or differentiation of endoplasmic reticulum, Golgi complex, endocytotic pits, vesicles and the surface of the cell. The evidence demonstrates that these changes are connected with the process of yolk synthesis which occures largely within the ovary by means of autosynthesis and heterosynthesis. The results show that the Golgi complex and the endoplasmic reticulum within both the oocytes and the follicle cells are involved in the yolk synthesis and transformaton of probable yolk precursors. In summary, the similarities of oogenesis in the sibling species of Capitella suggest that t+.

87BI0077. C.M.YOUNG, J.L.CAMERON. 1987(9).

LABORATORY AND IN SITU FLOTATION RATES OF LECITHOTROPHIC EGGS FROM THE BATHYAL ECHINOID PHORMOSOMA+. DEEP-SEA RES. 34(9):1629-1639. PERGAMON PRESS, OXFORD. EN.

The large, lecithotrophic eggs of the bathyal echinothuriid echinoid Phormosoma placenta are positively buoyant both in vitro and in situ to depths of at least 608 m. Eggs attain terminal velocity in less than 5 cm. At constant salinity, flotation rate is related linearly to temperature; eggs move more slowly at lower temperatures. This effect is attributed to increased water viscosity at lower temperatures, not differential changes in egg and water density. Based on an average flotation velocity of 0.42 cm/sec, it is predicted that eggs produced at bathyal depths will reach the surface in approximately 2 days.

87BI0078. SING-WON.PARK, SUNG-HUN.LEE. 1968(3). ANALYSIS OF THE SHELL HEIGHT FREQUENCIES ON THE FRESH-WATER COCKLE, CORBICULA ELATIOR, BY MEANS OF+. BULL. KOREAN FISH. SOC. 1(1):31-43. KOREAN FISH. SOC., PUSAN. KO.

Shell height frequencies of the fresh-water cockle, Corbicula elatior, sampled in the period of 1960 to 1963, are analyzed to assess the age composition and average growth pattern. Cumulative frequencies in a sample are traced on a probability scale, and the points of inflection on a probability graph are assumed to dissect age groups.

87BI0079. CHOON-KOO.LEE, JUNG-JAE.LEE. 1968(3). THE EFFECT OF SOME FACTORS ON THE MORTALITY OF TROCHOPHORA OF OYSTER, CRASSOSTREA GIGAS. BULL. KOREAN FISH. SOC. 1(1):45-49. KOREAN FISH. SOC., PUSAN. EN.

The effect of salinities, temperature, and turbidities on the mortality of trochophora of oyster, Crassostrea gigas, was investigated at the laboratory.

87BI0080. JUNG-JAE.LEE. 1969(6). STUDIES ON THE MORTALITY OF THE YOUNG BIVALVES, MERETRIX LUSORIA, (1) BORING RATES OF DRILLS ON TH+. BULL. KOREAN FISH. SOC. 2(1):63-70. KOREAN FISH. SOC., PUSAN. KO.

This paper deals with the natural mortality of the early young bivalve, Meretrix lusoria, (less than 13mm in shell length) and the perforations bored in the bivalve by boring snails, Neverita didyma and Natica severa. The investigation was carried out in the Kunsan area and in the laboratory from May to October of 1968. The natural mortality of the field population during this period was 12.1% and among this number 38.1% were drilled by boring snails.

87BI0081. AN-YOUNG.KIM. 1971(12). ECOLOGICAL STUDIES ON THE PROPAGATION OF SAXIDOMUS PURPURATUS (SOWERBY). BULL. KOREAN FISH. SOC. 4(3/4):92-98. KOREAN FISH. SOC., PUSAN. KO.

With Saxidomus purpuratus which were sampled near Yungdo, in the harbor of Pusan during the period from September 1967 to October 1968, the author investigated the maturity against seasonal change of water temperature; and shell length, height and width against live weight, respectively, and the reciprocal correlations of shell length, height and width, as well.

87BI0082. CHOONKOO.LEE, YONG-SOON.KO, JONG-KOOK.LEE. 1972(9). A STUDY ON THE GROWTH OF THE MUSSEL, MYTILUS EDULIS, IN A SALT-FIELD RESERVOIR. BULL. KOREAN FISH. SOC. 5(3):71-75. KOREAN FISH. SOC., PUSAN. KO.

The growth of the mussel, Mytilus edulis, in a salt-field reservoir was investigated at Dangjin, Choongnam, from June to October in 1970. Temperature, salinity, specific gravity, and pH of water were 22.5-27.5 Deg. in Centigrade, 28.6-34.8 per mill, 1.019-1.024, and 7.6 respectively in the salt-field reservoir from June 20 to July 19. The shell height of the mussel group in the highest abundance increased from 200 mm (15-25 mm) on June 15 to 40 mm (20-50 mm) on September 26 in the salt-field reservoir, whereas the average shell heights of them were 19.80 mm (June 15) and 35.10 mm (Sept. 26) respectively. The daily growth of the mussel from July 10 to August 12 was 0.22 mm in shell height and highest during the experimental period.

87BI0083. SHIN-SOK.CHOI, YONG-KYOO.SONG. 1973(6). STUDIES ON THE ARTIFICIAL FERTILIZATION AND DEVELOPMENT OF CYCLINA SINENSIS. BULL. KOREAN FISH. SOC. 6(1/2):76-80. KOREAN FISH. SOC., PUSAN. KO.

Cyclina sinensis is an edible bivalve inhabiting wide tidal flats which are exposed to the air at ebb tide along the western coast of Korea. Over the period of June to September 1971, some specimens from a tidal flat near Inchon were submerged in sea water with various concentrations of ammonium hydroxide added and careful observations were made on their fertilization, early development, and metamorphosis of the larvae. The highest rate of fertilization was demonstrated by individuals treated with 1/1000 normal solution of ammonium hydroxide and their fertilized eggs followed normal development, i.e., two cell stage 1.5 hours after fertilization, blastular stage after 4 hours, and trochophore stage after 6 hours.

87BI0084. SHIN-SOC.CHOI, YONG-KYOO.SONG. 1974(3). STUDIES ON THE ARTIFICIAL FERTILIZATION AND DEVELOPMENT OF MERETRIX LUSORIA. BULL. KOREAN FISH. SOC. 7(1):1-6. KOREAN FISH. SOC., PUSAN. KO.

Meretrix lusoria is one of the most favorite edible bivalves inhabiting wide inter-tidal flats along the western coast of Korea. Over the period of July to September 1973, some specimens from a tidal flat near AnMyun Island were submerged in sea water with various concentrations of ammonium hydroxide added and careful observations were made on their fertilization, early development, and metamorphosis of the larvae.

87BI0085. SUNG-KYOO.YOO, YONG-JOO.KANG. 1974(6). STUDY ON THE MORPHOLOGICAL VARIATIONS OF MUSSEL, MYTILUS CORUSCUS GOULD. BULL. KOREAN FISH. SOC. 7(2):87-90. KOREAN FISH. SOC., PUSAN. KO.

The followings are the results of study about morphological variation of mussel, Mytilus coruscus collected respectively from Sanyang-myeon Tongyeong-goon Gyeongnam on 13th January, Yeonwhado Yokji-myeon Tongyeong-goon Gyeongnam on 15th May and down below the Yeong-do Bridge Busan on 20th August, 1964.

87BI0086. SUM.RHO, CHOON-KYU.PARK. 1975(12). STUDIES ON THE PROPAGATION OF THE ABALONES, (II) THE SPAWNING SEASON OF HALIOTIS DISCUS HANNAI INO+. BULL. KOREAN FISH. SOC. 8(4):234-241. KOREAN FISH. SOC., PUSAN. KO.

Reproductive cycle of Haliotis discus hannai Ino was studied based on the samples which were collected in Yeosu area from January, 1973 to December, 1974. Particular emphasis was paid on the seasonal variation of gonad maturity factor, coefficient of gonad maturity, fatness, and relationship of gonad weight to growth of the abalone. Seasonal fluctuation of water temperature and induction of artificial spawnings were also checked.

87BI0087. SUM.RHO. 1976(3). STUDIES ON THE PROPAGATION OF TOP SHELL-I: SPAWNING AND EARLY DEVELOPMENT OF THE TOP SHELL, TURBO +. BULL. KOREAN FISH. SOC. 9(1):43-55. KOREAN FISH. SOC., PUSAN. KO.

Fertilization and early development of turbo cornutus was studied based on the samples which were collected in Yeosu area. Particular emphasis was paid on induction of artificial spawning, fertilization rate, preembryonic development, the growth of the early larva and larval survival to various salinity.

87BI0088. PIL-AE.KANG. 1976(3). STUDIES ON THE RADULA OF KOREAN MARINE GASTROPODS. BULL. KOREAN FISH. SOC. 9(1):25-34. KOREAN FISH. SOC., PUSAN. EN.

The purpose of the present study on the radula of Korean marine gastropods is to determine the systematic position of the species by the radula features. The radula features of 9 Families based on the observation of specimens consisting of 31 species are described briefly.

87BI0089. PYUNG.CHIN, BOK-KYU.LEE. 1979(12). NITROGEN EXCRETION IN THE BIVALVE MOLLUSCS, 2. CRASSOSTREA GIGAS. BULL. KOREAN FISH. SOC. 12(4):293-296. KOREAN FISH. SOC., PUSAN. KO.

The effects of temperature and salinity on the rates of ammonia and amino nitrogen excretion, and oxygen consumption were measured for Crassostrea gigas. There was variability with temperature and salinity changes in both the rates of nitrogen excretion and the proportionality between ammonia and amino acids in the excreta, and also in the rates of oxygen consumption. Rates of nitrogen excretion and oxygen consumption were markedly decreased with increase in salinity, especially at high salinity-high temperature, whereas at low salinity-high temperature condition they were significantly increased. These changes are considered as the responses of physiological tolerances to the high temperature stress and the results of the metabolic temperature compensation at the low salinity-high te+.

87BI0090. YONG-GOE.JOH, M.HATA. 1979(9). STUDIES ON THE LIPIDS OF ABALONE (II), THE ALDEHYDE COMPOSITION OF PLASMALOGEN FROM ABALONE AND SO+. BULL. KOREAN FISH. SOC. 12(3):181-189. KOREAN FISH. SOC., PUSAN. EN.

87BI0091. JU-HA.LEE. 1980(12). GAMETOGENESIS AND REPRODUCTIVE CYCLE OF THE TOPSHELL, TURBO CORNUTUS SOLANDER. BULL. KOREAN FISH. SOC. 13(4):125-134. KOREAN FISH. SOC., PUSAN. KO.

The development of the gonads, gametogenesis and the reproductive cycle of the topshell, Turbo cornutus Solander, which is one of valuable food animals from Korean waters were studied by photomicroscopy. The materials were monthly collected from Bangeojin, Jeongjari and Dangweol, all these places being located in the south-eastern part of Korea, for one year from March 1979 to February 1980. Topshell is dioecious and oviparous. Gonad is situated on the surface of liver, which lies posteriorly. The surface of ovary and testis is covered with a fibrous membrane, membrane of connective and muscular fibers and then an outermost layer of simple-columnar epithelial cells which are composed of cuboidal and columnar mucous gland cells.

87BI0092. EE-YUNG.CHUNG. 1980(12). REPRODUCTIVE CYCLE AND BREEDING SEASON OF THE FRESHWATER CLAM, ANODONTA (SINANODONTA) WOODIANA(LEA+. BULL. KOREAN FISH. SOC. 13(4):135-144. KOREAN FISH. SOC., PUSAN. KO.

The reproductive cycle and the breeding season of the freshwater clam, Anodonta (Sinanodonta) woodiana (Lea) have been investigated by histological examination of the gonadal development under photomicroscopy. The materials were monthly collected from the Nakdong River for one year from September 1979 to August 1980.

87BI0093. JEONG-YEOL.LEE, JUNG-JAE.LEE. 1980(12). MORPHOLOGICAL CHARACTERISTICS OF THE TOPSHELL IN THE JEJU COASTAL WATERS. BULL. KOREAN FISH. SOC. 13(4):213-219. KOREAN FISH. SOC., PUSAN. KO.

Morphological characteristics of the topshell, Turbo cornutus Solander were studied on the basis of shell growth and fatness from April 1978 to October 1979. The sampled areas were coastal waters of Jeju City, Seongsanpo, Moseulpo and Seogwipo in Jeju. The average shell length of the topshell from Jeju City area was smaller than those of the other three areas, and also the spine number of the 1st row on the shell from Jeju City area was fewer than the others. Sex ratios from each areas represented about 1:1. The relationship between shell length and shell breadth showed regression line and the value of slope for the specimen from Seongsanpo was the lowest.

87BI0094. D.R.LAI, ET AL. 1983(12). THE EFFECT OF CADMIUM ON THE ACTIVITY OF ALKALINE PHOSPHATASE IN MUSSEL VIRIDIS. ACTA OCEANOL. SINICA. 2(2):330-339. CHINA OCEAN PRESS, BEIJING. EN.

The paper preliminarily discusses the effects of cadmium pollution on the alkaline phosphatase of mussel, mytilue viridid. The results show the cadmium pollution has a inhibition on the alkaline phosphatase, and the degree of inhibition rises with the increases of concerntration if cadmium in seawater. When the concentration is within the range of 1-500 ppb, the percentage of inhibited emzyme has a linear relationship with the logarithm of cadmium concentration. The results also prove that the salinity may increase the effects on cadmium on emzyme. The inhibition which may be indirect or secondary effects is reversible.

87BI0095. Y.Q.FANG, M.WANG. 1983(12). REPRODUCTIVE MECHANISM OF RUDITAPES PHILIPPINARUM; PHYSIOLOGICAL ACTION OF AMMONIUM HYDROXIDE SEAW+. ACTA OCEANOL. SINICA. 2(2):320-329. CHINA OCEAN PRESS, BEIJING. EN.

This paper expounds primarily on the physiological mechanism of the mature process and release of Ruditapes philippinarum's eggs. A natural dry condition, immersion in ammonium hydroxide seawater, and crude extracted shedding hormone, were the necessary physiological conditions and factors which make eggs reach physiological maturity, and make the female or male clam spaw and spermiate. Besides, it has been substantiated that the shedding hormone exist in the gonad of female clams. The shedding hormone may be a heat labile protein. The result may be of theoretial importance and economic value to artifical reproduction of the molluscs.

87BI0096. D.W.MCLEESE, S.RAY. 1984. UPTAKE AND EXCRETION OF CADMIUM, CDEDTA, AND ZINC BY MACOMA BALTHICA. BULL. ENVIRON. CONTAM. TOXICOL. 32:85-92. SPRINGER-VERLAG, BERLIN. PN-2464. EN.

87BI0097. A.L.MALLET, L.E.HALEY. 1984. GENERAL AND SPECIFIC COMBINING ABILITIES OF LARVAL AND JUVENILE GROWTH AND VIABILITY ESTIMATED FRO+. MARINE BIOLOGY. 81:53-59. SPRINGER-VERLAG, BERLIN. PN-2471. EN.

Diallel crosses of oysters from three geographically isolated natural populations were produced to evaluate the relative importance of genetic, maternal, and environmental effects on larval and juvenile growth and viability. Significant additive genetic effects were observed only in larval viability at Day 12 and larval shell length at Day 2. The presence of significant male and female mean square for larval viability (suggesting non-additive genetic variance) is consistent with fitness related characters. Important maternal effects were observed for the larval and juvenile shell length and viability characters. These female mean squares are probably affected by both real and spurious maternal effects and potential contributing influences are discussed. The performance of the crosse+.

87BI0098. Y.X.TAN, H.Q.SU, X.R.LI, T.H.WANG. 1984(1). ACCUMULATION OF MERCURY IN BLOOD CLAM FROM BOHAI GULF. ACTA OCEANOL. SINICA. 3(1):114-122. CHINA OCEAN PRESS, BEIJING. EN.

Accumulation rules of mercury by blood clam (Arca subcrenata Lishke) from Bohai Gulf have been studied. Mercury concentration in soft parts have been related to those in the environment level on the shore and size of animals have also been considered. Uptake ability of mercury in blood clams is high, with the concentration coefficient 1,800 Hg contents in its soft part are related to those in seawater and in sediment, the relationship may be expressed by a dual linear regression equation. The total Hg content in blood clam individual is power function of its body weight. Arca subcrenata appears to have potential as an indicator of mercury contamination in Bohai Gulf.

87BI0099. R.H.ZHU. 1984(1). COMPONENTS OF DECELLWALL ENZYMES OF THREE SEA SNAILS-CELLULASES AND PECTINASE. ACTA OCEANOL. SINICA. 3(1):123-128. CHINA OCEAN PRESS, BEIJING. EN.

Enzymic mixtures were prepared from digestive organs of the three species of sea snails. All the three mixtures can break down the cell-walls of seaweeds. The present paper reports only three of the enzymic components in these mixtures, two cellulases and one pectinase.

87BI0100. F.L.CAI, Y.CHEN, P.A.XU. 1984(7). THE METABOLISM OF COBALT 60 AND CESIUM 137 BY ARCA GRANOSA LINNUS. ACTA OCEANOL. SINICA. 3(3):433-436. CHINA OCEAN PRESS, BEIJING. EN.

The pathway by which Cobalt 60 and Cesium 137 got into Arca, and the type of uptake in animal were studied. The results showed that Cobalt 60 was taken up by gill and was transferred quickly to other organs through blood. There are more uptake pathways for Cesium 137. The uptake of Cobalt 60 by Arca was mainly active transfer and the energy comes mainly from the process of biotic oxidation. On the contrary, the uptake of Cesium 137 by Arca was mainly a passive transfer, and for most organs the exchange through body-wall was a significant factor.

87BI0101. B.L.BAYNE. 1985. RESPONSES TO ENVIRONMENTAL STRESS: TOLERANCE, RESISTANCE AND ADAPTATION. 18TH EUROPEAN MARINE BIOL. SYMP. 331-349. JOHN WILEY & SONS, N.Y. PN-2403. EN.

87BI0102. R.K.PIPE, M.N.MOORE. 1985. THE ULTRASTRUCTURAL LOCALIZATION OF LYSOSOMAL ACID HYDROLASES IN DEVELOPING OOCYTES OF THE COMMON +. HISTOCHEMICAL J. 17:939-949. CHAPMAN & HALL, LONDON. PN-2407. EN.

Azo dye techniques were used to investigate the

ultrastructural localization of lysosomal acid hydrolases in ovarian oocytes of the common marine mussel Mytilus edulis. The enzymes were arylsulphatase, Beta-glucuronidase, nonspecific esterase, N-acetyl-beta-hexosaminidase and acid phosphatase. For arylsulphatase, the azo dye technique was compared with an alternative method using nitrocatechol sulphate as the substrate and barium as the capturing ion. Activity of all the enzymes was found to be associated with the yolk granules and with pinocytotic phenomena which were observed along the basal membrane of developing oocytes. Activity was also found to be associated with resorption of atretic oocytes.

87BI0103. J.WIDDOWS. 1985. THE EFFECTS OF FLUCTUATING AND ABRUPT CHANGES IN SALINITY ON THE PERFORMANCE OF MYTILUS EDULIS. 18TH EUROPEAN MARINE BIOL. SYMP. 555-566. JOHN WILEY & SONS, N.Y. PN-2402. EN.

Mussels (Mytilus edulis L.) were exposed to sinusoidal and abrupt changes in salinity between 30 and 15 per mille and physiological responses (blood osmoconcentration, respiration, clearance rate, food absorption efficiency and scope for growth) were determined at intervals over 21 days. Adaptation to an abrupt increase in salinity was more rapid than adaptation to an abrupt decrease in salinity. Mussels subjected to a fluctuating salinity regime maintained a relatively constant rate of respiration, feeding and scope for growth between 30 and 20 per mille. Below 19 per mille there was partial valve closure, feeding ceased, respiration was reduced and scope for growth was negative. There was no acclimation to the fluctuating salinity regime over 21 days.

87BI0104. R.K.PIPE, M.N.MOORE. 1985. ULTRASTRUCTURAL CHANGES IN THE LYSOSOMAL-VACUOLAR SYSTEM IN DIGESTIVE CELLS OF MYTILUS EDULIS AS A+. MARINE BIOLOGY. 87:157-163. SPRINGER-VERLAG, BERLIN. PN-2417. EN.

The effects of increasing salinity on the ultrastructural morphology of the lysosomal-vacuolar system in digestive cells of the common mussel Mytilus edulis were investigated in order to relate structural changes to previous biochemical and cytochemical observations. After 3 h of increased salinity, from 21 to 35 per mille, the digestive cells showed an increase in numbers of heterolysosomes. There was some evidence of digestive cell breakdown, the contents forming membrane-bound bodies and being released into the tubule lumen. After 12 h of increased salinity, heterolysosomes were prevalent in the digestive cells. There was increased evidence for digestive-cell breakdown, many of the tubule lumina being packed with membrane-bound bodies. It is concluded that increasing salinity fro+.

87BI0105. A.J.S.HAWKINS. 1985. RELATIONSHIPS BETWEEN THE SYNTHESIS AND BREAKDOWN OF PROTEIN, DIETARY ABSORPTION AND TURNOVERS OF +. OECOLOGIA. 66:42-49. SPRINGER-VERLAG, N.Y. PN-2411. EN.

Seasonal and nutritionally induced changes of whole body protein metabolism have been studied in 45 to 57mm shell-length Mytilus edulis from whitsand Bay, southwest England. The subtraction of measured net protein balances from coincident rates of protein synthesis, determined in vivo by supplying N-labelled alga and monitoring the enrichment of excreted ammonia, enabled computation of protein breakdown rates. Over the range of protein absorption from zero to 0.58% of total soft tissue protein 24/hour, fractional rates of protein breakdown decreased from 0.41 to 0.03%, whereas protein synthesis and net protein balance both increased from 0.25% to 0.39% and from -0.16% to 0.36%, respectively.

87BI0106. M.L.ZUCCHI STOLFA, D.BREGANT, M.M.GIOVANNELLI. 1985. STAGNI COSTIERI DEL MEDITERRANEO: AREA DI DELTA DEL F. TAGLIAMENTO (ADRIATICO SETTENTRIONALE). 1 +. GORTANIA-ATTI MUSEO FRIUL. STORIA NAT. 6:83-104. PN-2867. IT

This work is part of a research program which aims at a new definition of transition facies. It examines a series of ponds situated in the delta region, making use of physical and chemical tests and studying the Malacofauna. In this way it is possibile to reconstruct particular situations which can be the basis for correct palaeoecological comparisons.

87BI0107. P.J.HERRING, P.N.DILLY, C.COPE. 1985. THE PHOTOPHORE MORPHOLOGY OF SELENOTEUTHIS SCINTILLANS VOSS AND OTHER LYCOTEUTHIDS (CEPHALOPODA: L+. J. ZOOL. 206:567-589. ZOOL. SOC. LONDON. PN-2935. EN.

Females and juveniles of Selenoteuthis scintillans have photophores of several structural types, distributed on the tentacles and eyeballs, and within the mantle cavity and tail. Three distinct photophore types can be recognized on the basis of their accessory structures, though their photocytes are identical. The photophores of juvenile Lampadioteuthis megaleia are similar in structure to those of Selenoteuthis but somewhat less complex. A comparison between the morphology of the photophores of lycoteuthid and enoploteuthid squids emphasizes the close similarity between the two families. At the ultrastructural level, certain photophores of both families have very characteristic microvillous blood vessels associated with the photocytes.

87BI0108. J.WIDDOWS, J.M.SHICK. 1985. PHYSIOLOGICAL RESPONSES OF MYTILUS EDULIS AND CARDIUM EDULE TO AERIAL EXPOSURE. MARINE BIOLOGY. 85:217-232. SPRINGER-VERLAG, BERLIN. PN-2415. EN.

Physiological responses of two bivalves (Mytilus edulis L. and Cardium edule L.) to intertidal conditions were studied. Specimens were collected from S.W. England in autumn/winter, 1980, and acclimatized to either intertidal or subtidal regimes before measurement of rates of heat dissipation and oxygen uptake during 5 h of air exposure, and rates of oxygen uptake rate, particle clearance, ammonia excretion, and food-absorption efficiency during 7 h of reimmersion.

Subtidal individuals were either intermittently or continuously fed in order to distinguish the effects of periodic food supply from the effects of air exposure.

87BI0109. A.J.S.HAWKINS, ET AL. 1985(1). FEEDING AND RESOURCE ALLOCATION IN THE MUSSEL MYTILUS EDULIS: EVIDENCE FOR TIME-AVERAGED OPTIMIZAT+. MARINE ECOLOGY- PROG. SER. 20:273-287. INTER-RES., HALSTENBEK. PN-2410. EN.

Although sustained predominantly by nutrients obtained directly from the environment, metabolic requirements for both gametogenesis and general maintenance in an open-shore population of the bivalve mollusc Mytilus edulis L. from southwest England were also 'subsidized' from substantial energy reserves accumulated during periods of somatic growth. Depletion of these reserves over late winter was associated with a greater sensitivity in the rate of oxidative metabolism to exogenous nutrient availability, diminished metabolic efficiencies with which absorbed ration was utilized, and an associated increase in the instantaneous maintenance requirements. Absorption rates, which were nevertheless minimal during winter, are suggested to be endogenously regulated in a manner more indicative of+.

87BI0110. D.R.DIXON, D.POLLARD. 1985(1). EMBRYO ABNORMALITIES IN THE PERIWINKLE, LITTORINA 'SAXATILIS', AS INDICATORS OF STRESS IN POLLUTED+. MARINE POLL. BULL. 16(1):29-33. PERGAMON PRESS, OXFORD. PN-2412. EN.

Brood pouches of periwinkles belonging to the Littorina 'saxatilis' species complex usually contain, in addition to the five normal stages in development, a proportion of embryos that are morphologically abnormal. The frequency of adults with a high percentage of abnormals in their brood pouches reflects to a great extent the degree of environmental stress, natural and anthropogenic, to which the adult population has been exposed. collections of this gastropod from coastal populations along the Gower coast, in south Wales, disclosed higher frequencies of abnormal embryos from sites exposed to pollutant-laden, residual water currents in Swansea Bay, than was recorded from a clean, coastal population at Rhossili, 26 km west of Swansea, where frequencies were similar to those recorded from+.

87BI0111. R.K.PIPE. 1985(7). SEASONAL CYCLES IN AND EFFECTS OF STARVATION ON EGG DEVELOPMENT IN MYTILUS EDULIS. MARINE ECOLOGY- PROG. SER. 24:121-128. INTER-RES., HALSTENBEK. PN-2408. EN.

Histological and quantitative cytochemical methods were used to investigate seasonal cycles in, and effects of starvation on, reproduction throughout the gametogenic cycle. Amount and composition of egg cytoplasm in ripe oocytes was found to be variable throughout the season. There was an overall decline in amount of egg cytoplasm as the gametogenic cycle progressed. Eggs developing early in the season had high glycogen levels but low lipid levels; protein levels remained constant from December to May but then declined. Results of experiments showed that during the first half of the gametogenic cycle starvation resulted in an increase in production of ripe oocytes. There was also an increase in volume of egg reserves on starvation but glycogen & protein levels declined. Timing of t+.

87BI0112. A.J.S.HAWKINS, B.L.BAYNE. 1985(8). SEASONAL VARIATION IN THE RELATIVE UTILIZATION OF CARBON AND NITROGEN BY THE MUSSEL MYTILUS EDULIS+. MARINE ECOLOGY- PROG. SER. 25:181-188. INTER-RES., HALSTENBEK. PN-2049. EN.

Elemental balances for carbon and nitrogen in an open-shore population of the bivalve mollusc Mytilus edulis underwent seasonal changes more characteristic of time-averaged than immediate optimization. Budgets emphasized the significance of shell and byssus towards both the carbon (8 and 44%, respectively) and nitrogen (8 and 21%, respectively) within total production, and indicated that between at least 20 and 67% of the nitrogen in faeces may be of metabolic origin.

87BI0113. A.L.SHANKS, W.G.WRIGHT. 1986. ADDING TEETH TO WAVE ACTION: THE DESTRUCTIVE EFFECTS OF WAVE-BORNE ROCKS ON INTERTIDAL ORGANISMS. OECOLOGIA. 69:420-428. SPRINGER-VERLAG, N.Y. PN-2709. EN.

Observations in rocky intertidal areas demonstrate that breaking waves 'throw' rocks and cobbles and that these missiles can damage and kill organisms. Targets in the intertidal were dented by impacts from wave-borne rocks. New dents/day in these targets was positively correlated with the daily maximum significant wave height and with new patches/day in aggregations of the barnacle Chthamalus fissus. Impact frequency was highest in the upper intertidal and varied dramatically between microhabitats on individual boulders (edges, tops and faces). These patterns were ref

87BI0114. A.L.SHANKS. 1986(6). TIDAL PERIODICITY IN THE DAILY SETTLEMENT OF INTERTIDAL BARNACLE LARVAE AND AN HYPOTHESIZED MECHAN+. BIOL. BULL. 170:429-440. MARINE BIOL. LAB., WHOI. PN-2708. EN.

At an intertidal study site in southern California the daily settlement of barnacle cyprids (probably Chthamalus spp.) was followed during the summer of 1983. Daily settlement was not significantly cross correlated with wind speed or direction but was significantly cross correlated with the maximum daily tidal range at lags of +1 to +4 days; peak settling occurred several days before the spring tide. This pattern of settlement is nearly identical to that of the megalopa of an intertidal crab, Pachygrapsus crassipes, and this suggests that, like these megalopae, cyprids may be transported onshore in slicks over tidally forced internal waves.

87BI0115. EE-YUNG.CHUNG, YOUNG-GILL.KIM, TAEK-YUIL.LEE. 1987(11). A STUDY ON SEXUAL MATURATION OF HEN CLAM MACTRA

CHINENSIS PHILIPPI. BULL. KOREAN FISH. SOC. 20(6):501-508. KOREAN FISH. SOC., PUSAN. EN.

Gonadal development, the annual reproductive cycle and the first sexual maturity of hen clam, Mactra chinensis were studied histologically. Sexuality of the species was dioecious. The gonads were irregularly arranged from the subregion of mid-intestinal gland in visceral cavity to the reticular connective tissue of the foot. The ripe eggs were about 50-60 um in diameter, and they were surrounded by gelatinous membrane. The spawning period was from May to September when the water temperature ranged 18.5-27.0 Deg. in Centigrade, with the peak in June and July. The annual reproductive cycle of Mactra chinensis could be classified into five successive stages; multiplicative, growing, mature, spent, and degenerative and resting. The monthly changes of the fatness coefficient closely cor+.

87BI0116. R.H.ZHU, S.L.CAI, H.Z.LI. 1987(4). A STUDY OF ALGINATE LYASES (I): ISOLATION, PURIFICATON AND KINETICS OF LYASES. ACTA OCEANOL. SINICA. 6(2):281-291. CHINA OCEAN PRESS, BEIJING. EN.

The crude enzyme, which was extracted from viscera of Lunella coronata coreensis (Recluz), was salted out and dialysed. Three enzymatic peaks isolated from DEAE-cellulose column chromatography were refered to as lyase I, II and III, respectively. Then these lyases underwent gel-filtration on Sephadex G-25 respectively, and three purer lyases were derived therefrom, the highest purification being 73 fold.

87BI0117. KWON-DOO.KIM. 1968(3). STUDIES ON THE PROPAGATION OF A PRAWN, PENAEUS ORIENTALIS. BULL. KOREAN FISH. SOC. 1(1):9-18. KOREAN FISH. SOC., PUSAN. KO.

A series of experiments since 1963 has been made on the artificial propagation of Penaeus orientalis for the purpose of improving breeding of the prawn.

87BI0118. SUNG-YUN.HONG. 1969(6). THE LARVAL DEVELOPMENT OF PAGURUS LANUGINOSUS DE HAAN (CRUSTACEA, ANOMURA) REARED IN THE LABORATOR+. BULL. KOREAN FISH. SOC. 2(1):1-15. KOREAN FISH. SOC., PUSAN. EN.

A study on the complete zoeal development and the glaucothoe of Pagurus lanuginosus de Haan was conducted in the laboratory.

87BI0119. CHOONG-KYU.PYEN. 1970(12). STUDIES ON THE BIOLOGY OF THE SPRING SPAWNING GROUPS OF PENAEUS JAPONICUS BATE. BULL. KOREAN FISH. SOC. 3(4):219-227. KOREAN FISH. SOC., PUSAN. KO.

The shrimp fishery for Penaeus japonicus on the Koje-Do coast commences in May and continues to October. The best catches are made twice a year, namely June and September. Modal carapace length for the female is 51-55 mm in May, 51-60 mm in June occupying about 80 percent of the total catch. There is conspicuous mode in July and 46-50 mm in August. Modal carapace length for the male is 41-45 mm in May, 46-50 mm in June, 41-45 mm in July and August. The stock of P. japonicus can be divided into two groups, namely, spring and fall groups. Among samples of P. japonicus during the period from May through August the sex ratio consisted of about 33 percent females and 67 percent males, showing wide departure from a 1:1 ratio.

87BI0120. KYUNG-SUK.CHUNG. 1970(3). BIOLOGICAL STUDIES ON THE FRESHWATER SHRIMPS OF KOREA, 1. RELATIVE GROWTH OF MACROBRACHIUM NIPPONE+. BULL. KOREAN FISH. SOC. 3(1):71-76. KOREAN FISH. SOC., PUSAN. KO.

The freshwater shrimp, Macrobrachium nipponensis is one of the largest species as well as one of the important types of food. It can be found widely in rivers and swamps from Che-ju island in the south to Chung-ju in the north. The larval development of these shrimps was studied by Yu (1966) and Chun and Yu (1967), but they didn't provide any other features. Shrimps for the present study were collected from the Nak-Dong River, near Pusan, once each month from March to December 1963.

87BI0121. CHOONG-KYU.PYEN, SUM.RHO. 1970(6). A BIOLOGICAL STUDY OF PENAEUS JAPONICUS BATE. BULL. KOREAN FISH. SOC. 3(2):93-102. KOREAN FISH. SOC., PUSAN. KO.

On the basis of the samples collected on the eastern coast of Koje-Do from May to September, 1969, studies have been made on the growth and the relationships between the carapace length and the body length, and between the carapace length and the body weight of Penaeus japonicus Bate. The mean carapace length of P. japonicus was 51 mm in May, 57 mm in June, 47 mm in July and 50 mm in September respectively. As a result of the present studies two populations of P. japonicus exist in waters around Koje-Do, namely the spring and fall spawning populations.

87BI0122. KYUNG-SUK.CHUNG. 1970(6). BIOLOGICAL STUDIES ON THE FRESH-WATER SHRIMPS IN KOREA, 2. THE ECOLOGY OF PALAEMON MODESTUS. BULL. KOREAN FISH. SOC. 3(2):110-116. KOREAN FISH. SOC., PUSAN. KO.

The fresh-water shrimp, Palaemon modestus is one of the most important types of bait for fishing and can be found abundantly in the Nak-Dong River. The larval development of Palaemon modestus in the laboratory was reported by Liu (1949), Kown and Uno (1968), but they didn't give any ecological features in the natural environments. Shrimps were collected from the Nak-Dong River near Pusan, once a month from July to December 1963 and from February to June 1969 respectively. The following is a summary of the results. They breed from April to September, mainly in July. A generation of this type of shrimps appears to be approximately one year and after breeding they die off up untill the end of October.

87BI0123. KYUNG-SUK.CHUNG. 1971(6). BIOLOGICAL STUDIES ON THE FRESH-WATER SHRIMPS IN KOREA, 3. THE FOOD AND GROWTH OF THE LARVAE OF PA+. BULL. KOREAN FISH.

SOC. 4(2):55-60. KOREAN FISH. SOC., PUSAN. KO.

There are a lot of kinds of shrimps for fishing baits, but palaemon modestus is dominant species in the Karak River. The ecology in the natural environments was reported by the author (1970) and this work is an elemental task for the larval stage in shrimp farms. Shrimps were collected from the Karak River and carried to the laboratory. Hatched larvae were reared from June 6 to June 24, 1970 for pre-experiment, and main experiment was provided from August 10 to August 24, 1970.

87BI0124. KYUNG-SUK.CHUNG. 1972(9). BIOLOGICAL STUDIES ON THE FRESH-WATER SHRIMPS IN KOREA, 4. THE ECOLOGY OF MACROBRACHIUM NIPPONENSI+. BULL. KOREAN FISH. SOC. 5(3):83-87. KOREAN FISH. SOC., PUSAN. KO.

The fresh-water shrimp, Macrobrachium nipponensis (De Haan) is one of the largest of the shrimp species and one of the most important types for protein food in fresh water fisheries. It can be found from Cheju island in the south to Chung-ju in river or swamp, in the north. The breeding of these shrimps was studied by Chun and Yu (1967) and the relative growth was reported by author (1970a), but they didn't provide other ecological features widely found in their natural environment. Shrimps were collected from the Nak Dong River, near Pusan, Korea once a month, from March to December 1963.

87BI0125. SANG-HAN.KIM. 1974(3). SOUND PRODUCTION AND BEHAVIOUR OF CRABS, PORTUNUS TRITUBERCULATUS (MIERS) (II). BULL. KOREAN FISH. SOC. 7(1):28-36. KOREAN FISH. SOC., PUSAN. KO.

For the development of acoustic fishing method, we had been researched a fundamental study which concerned on the sound production and hehaviour of crabs was conducted. For specimen crabs such as Portunus trituberculatus and Charybdis japonica were selected.

87BI0126. CHIN-SOO.KWON. 1974(6). DEVELOPMENT, GROWTH, AND RELATIONSHIP BETWEEN TEMPERATURE AND METAMORPHOSIS RATE OF THE EARLIER LA+. BULL. KOREAN FISH. SOC. 7(2):52-62. KOREAN FISH. SOC., PUSAN. KO.

The fresh water prawn, Macrobrachium rosenbergi (De Maan) is a very common species in Indo-Pacific region inhabiting both fresh and brackish waters in low land areas, and especially abundant in the lower reaches of most rivers which are influenced by seawater. It is one of the largest and commercial species of genus Macrobrachium. As a place of the researches to clear the possibilities of transplantation and propagation of this species in the Far East region the larval development, growth, optimum temperature and metamorphose rate up to first post larvae in aquarium are cleared under the conditions of salinity 6.58-7.05 per mill Cl, pH 8.0-8.2, the rate of flow 0.3 liter per minute and illumination 3000 lux. Temperature ranged from 27.5 to 28.7 Deg. in Centigrade during the period of e+.

87BI0127. CHIN-SOO.KWON. 1974(9). MORPHOLOGICAL VIEW ON BIG INDIVIDUALS APPEARED IN THE SAME AGE GROUP OF ZOEA LARVA, MACROBRACHIUM +. BULL. KOREAN FISH. SOC. 7(3):126-144. KOREAN FISH. SOC., PUSAN. KO.

Adult female prawn, Macrobrachium japonicum, which used for this work were collected at the river Simanto, Shikoku in Japan, and removed in the laboratory. For a period of rearing of zoea larvae, big individuals-individual varying bodies, comparing with standard bodies in the same aged individual group, are occasionally appeared from fifth zoea larva stage, and occurence of it be tempted to relate with the factor of trophic condition.

87BI0128. T.YAMAGUCHI, M.TANAKA. 1974(9). STUDIES ON THE ECOLOGY OF A SAND BUBBLER CRAB, SCOPIMERA GLOBOSA DE HAAN (DECAPODA, OCYPODIDAE), I. JAPAN. J. ECOL. 24(3):165-174. ECOL. SOC. JAPAN, HIROSHIMA. PN-2877. JA.

Monthly or seasonal investigations on the population of Scopimera globosa were carried out from 1971 to 1972 at two separate observation stations in Amakusa, Kyushu. The population density, the distribution of the carapace length & the appearance of megalopae and young crabs were examined at both stations, then the differences between the two populations were observed. The growth rate of the adult crabs differs much by sex during the reproductive period, the male grew more rapidly than the female. The settlement of megalopae began at the end of July & continued to the middle of October. The growth of some young crabs was so fast that they exceeded some of the adults in size within several months. The crab has no strong predator, and it seems probable that the main cause of death of Sco+.

87BI0129. K.WADA, M.TSUCHIYA. 1975(12). DISTRIBUTION OF OCYPODID CRABS IN RELATION TO TIDAL LEVEL AND THE SUBSTRATUM IN THE GAMO LAGOON. JAPAN. J. ECOL. 25(4):235-238. ECOL. SOC. JAPAN, HIROSHIMA. PN-2878. JA.

87BI0130. CHANG-HYEON.KIM. 1977(6). GAMETOGENESIS AND EARLY DEVELOPMENT OF LINUPARUS TRIGONUS (VON SIEBOLD). BULL. KOREAN FISH. SOC. 10(2):71-96. KOREAN FISH. SOC., PUSAN. KO.

Early development Linuparus trigonus (von Siebold) has been studied based on the samples collected monthly in Je-ju Island, Korea from February, 1976 to January, 1977. Gametogenesis, reproductive cycle, embryonic development were investigated by histological method, and morphological description was made on the first phyllosoma larva which reared in the laboratory. Testis is composed of two tubular duct which are symmetrical with H-shaped appearance. Outer layer of testis is of fibrous connective tissue capsule. In the lumen there is a convoluted seminiferous tubule with interstitial tissue. Ovary is a pair of symmetrical blind tubular lobes, and the midportions are connected each

other. The ovary consists of a couple of ovarian sacs partitioned by two-layered connective tissue fib+.

87BI0131. CHIN-SOO.KWON, Y.UNO, Y.OGASAWARA. 1977(6). ON THE EFFECTS OF CHLORINITIES UPON GROWTH OF EARLIER LARVAE AND POST-LARVA OF A FRESH WATER PRAWN+. BULL. KOREAN FISH. SOC. 10(2):97-114. KOREAN FISH. SOC., PUSAN. KO.

The fresh water prawn, Macrobrachium rosenbergi (de Man) is a very common species in Indo-pacific region, which inhabits both fresh and brackish water in low land area, most of rivers and especially abundant in the lower reaches which are influenced by sea water. It is one of the largest and commercial species of genus Macrobrachium, which is commonly larger than 18-24 cm in body length, from the basis of eye-stalked to the distal of telson. As a part of the researches in order to investigate the possibilities on transplantation and propagation of this species, this work dealt with the problems on the effects of chlorinities upon zoeal larvae and post-larvae.

87BI0132. S.OHTSUKA. 1984. CALANOID COPEPODS COLLECTED FROM THE NEAR-BOTTOM IN TANABE BAY ON THE PACIFIC COAST OF THE MIDDLE +. PUB. SETO MAR. BIOL. LAB. 29(4/6):359-365. SETO MAR. BIOL. LAB. PN-3061. EN.

87BI0133. T.ITO, S.OHTSUKA. 1984. CYPRIS Y FROM THE NORTH PACIFIC (CRUSTACEA: MAXILLOPODA). PUB. SETO MAR. BIOL. LAB. 29(1/3):179-186. SETO MAR. BIOL. LAB. PN-3060. EN.

A specimen of cypris y collected in Tanabe Bay off the Seto Marine Biological Laboratory on the Pacific coast of the Middle Honshu, the main island of Japan, was examined. The specimen was found in a night plankton sample hauled with a net (mesh number NXX 13 of the Japanese standard, 94 um opening) designed to collect plankton within a surface layer above a depth of 15 cm (30-IX-1983, Ohtsuka leg.). The specimen dissected was mounted onto slide glasses with Gum-chloral medium, and was examined with the phase contrast microscope. Since the preparation of the first antennae was not good, the description of the first antenna is based mainly on the observation before dissection, and some of its characteristics might be overlooked or misconceived.

87BI0134. R.J.MORRIS, E.TENTORI. 1985. THE LIPID COMPOSITION OF THE FOREGUT WALL OF CARCINUS MAENAS AND ITS RELATIONSHIP TO OBSERVED PERM+. COMP. BIOCHEM. & PHYSIOL. 82B(4):695-697. PERGAMON PRESS, OXFORD. PN-2941. EN.

1. The detailed biochemical composition of the epidermis and cuticle from the foregut in Carcinus maenus has been examined. 2. The cuticle was composed mainly of protein and chitin with a relatively small lipid component whilst the epidermis was rich in both protein and lipid. 3. The sterol fractions of both tissues were composed almost entirely of cholesterol but the component phospholipids were quite distinct. 4. The phospholipids of the epidermis were composed mainly of long chain, highly unsaturated fatty acids, whilst those of the cuticle were dominated by short-chain saturated fatty acids. 5. These compositional differences are discussed in relation to the likely permeabilities of the tissues.

87BI0135. C.J.ELLIS. 1985. CONCHOECIA MESADENIA, A NEW SPECIES OF ABYSSOPELAGIC HALOCYPRID OSTRACOD RELATED TO C. DASYOPHTHAL+. J. NATURAL HISTORY. 19:635-653. TAYLOR & FRANCIS, LONDON. PN-2924. EN.

A new species of bathypelagic planktonic ostracod is described and a comparative study made between it and the closely-related species Conchoecia dasyophthalma Muller, 1906. The new species occurs deeper in the water column than C. dasyophthalma, it is smaller and can easily be recognized by its size and the unusual position of the right asymmetrical gland.

87BI0136. D.R.JOHNSON. 1985. WIND-FORCED DISPERSION OF BLUE CRAB LARVAE IN THE MIDDLE ATLANTIC BIGHT. CONTINENTAL SHELF RES. 4(6):733-745. PERGAMON PRESS, OXFORD. EN.

Blue crab larvae are advected out of Middle Atlantic Bight estuaries immediately after spawning occurs in the estuary entrance. For the next 30 to 50 days the larvae are found offshore and mainly at the surface where they are influenced by wind-driven currents. During 1983, the megalopae encountered on the shelf had their origin in Chesapeake Bay and took, at minimum, 31 to 36 days to grow to the megalopae stage. Wind forcing dominated the inner shelf region in the summer of 1983 and the resulting dispersion of Chesapeake Bay megalopae occurred briefly in the southern sector early in the season, but toward the northern sector over most of the season. Although no firm conclusions could be drawn regarding the mechanism for return, it did not seem likely that wind advection back to the +.

87BI0137. S.OHTSUKA. 1985(12). CALANOID COPEPODS COLLECTED FROM THE NEAR-BOTTOM IN TANABE BAY ON THE PACIFIC COAST OF THE MIDDLE +. PUB. SETO MAR. BIOL. LAB. 30(4/6):287-306. SETO MAR. BIOL. LAB. PN-3064. EN.

The present paper deals with the description of two new species of Paramisophria and Metacalanus (Family Arietellidae) as the second report from my serial taxonomic works concerning the near-bottom calanoid copepods from Tanabe Bay on the Pacific coast of Honshu, Japan. With respect to the genus Metacalanus, this is the second report from Tanabe Bay since M. acutioperculum Ohtsuka, 1984 has already been described by me (Ohtsuka, 1984).

87BI0138. S.OHTSUKA. 1985(6). A NOTE ON THE FEEDING HABIT OF A CALANOID COPEPOD, PONTELLOPSIS YAMADAE MORI. PUB. SETO MAR. BIOL. LAB. 30(1/3):145-149. SETO MAR. BIOL. LAB. PN-3063. EN.

In contrast to the majority of calanoid copepods, which is planktonic, such calanoids as pontellids are neustonic (e.g., Hattori et al., 1983) and their feeding habits as well as prey-predator relationships around them can be expected to be somewhat different from those of planktonic calanoids. However, our knowledge on feeding habits of neustonic calanoids is still very poor, perhaps because of difficulty in collecting enough material. In my opinion, tedious efforts to accumulate evidences which show their feeding habits are inevitable to clarify their ecological roles in complex food webs in the marine pelagos. In the present paper, along this belief of mine, I report the feeding habit of Pontellopsis yamadae Mori (Family Pontellidae) which has become apparent from observation of an+.

87BI0139. D.GUINOT, B.R.DE FORGES. 1986. DECOUVERTE D'UNE NOUVELLE ESPECE DE SPHENOCARCINUS EN NOUVELLE-CALEDONIE, S.MAMMATUS SP.NOV. (CRUS+. INDO-MALAYAN ZOOL. 3:27-37. A.A. BALKEMA, ROTTERDAM. PN-2963. FR.

The genus Sphenocarcinus A. Milne Edwards, Known by 16 Indo-Pacific species with a rostrum which is either single (four species) or double (12 species), is widened by the discovery of a new species with a bifurcated rostrum, collected between 300-460 m, by the 'Vauban', in the north of New Caledonia, i.e. Sphenocarcinus mammatus sp.nov. Two other species of that genus, S. orbiculatus Guinot & Richer de Forges and S.stuckiae Guinot & Richer de Forges, had been previously recorded in the same area, near the island of Pines (south of New Caledonia).

87BI0140. Z.ZHENG, W.Q.CAO. 1986(4). STUDIES ON THE MARINE CLADOCERA OF CHINA; III. REPRODUCTION. ACTA OCEANOL. SINICA. 5(2):271-283. CHINA OCEAN PRESS, BEIJING. EN.

Studies are made on the reproduction of two common marine Cladocera (Penilia avirostris, Evadne tergestina) of China with emphasis on the fertility of parthenogenetic females. A positive correlation exists between the fertility and the size of the same species; but no such correlation is found between the fertility and the size of different species. The fertility is, on the whole, higher in summer and is related to the seasonal fluctuation of populaton density, both attaining their maximum period in summer; but the former appears about half a month earlier than the latter. A brief account is given of the sexual reproduction, including the respective size and the seasonal variation of sexual individuals together with a note on the sex-ratio and the characteristics of resting egg.

87BI0141. S.OHTSUKA, A.FLEMINGER, T.ONBE. 1987. A NEW SPECIES OF PONTELLA (COPEPODA: CALANOIDA) FROM THE INLAND SEA OF JAPAN WITH NOTES ON ITS FEE+. J. CRUSTACEAN BIOL. 7(3):554-571. CRUSTACEAN SOC., SAN ANTONIO. PN-3065. EN.

A new species of calanoid copepod Pontella rostraticauda (family Pontellidae) is described based on specimens collected in surface waters of the Inland Sea of Japan. Due to its neustonic character, this species may have been overlooked by previous investigators. The gut content analysis revealed that this species feeds on a wide variety of foods, including both zooplankters and phytoplankters, and can be classified as an omnivorous copepod. The new species is closely allied to P. surrecta Wilson and P. alata Scott and is distinguished from them by the shape of the female urosome and the fifth legs of both sexes. Several derived characters shared by the three species and their geographical distributions provide the basis for proposing the Pontella alata species group as a unique radia+.

87BI0142. J.Q.HUANG, Z.ZHENG. 1987(1). THE EFFECT OF SALINITY ON THE DISTRIBUTION OF COPEPODA IN THE JIULONG ESTUARY. ACTA OCEANOL. SINICA. 6(1):142-152. CHINA OCEAN PRESS, BEIJING. EN.

The effect of salinity on the distribution of copepoda in the Jiulong Estuary is studied in the present paper. The analysis of the samples collected during February 1983-January 1984 shows that the salinity of the Jiulong Estuary varies from 0.04 at Station E (head of estuary) to 31.7 at Station C (mouth of estuary). The distribution of copipoda is obviously affected by salinity. According to the relation of distribution of copepoda with salinity, the copipoda may be divided into five ecological groups, i.e. fresh-water, low-salinity estuarine, meso-salinity estuarine, neritic and oceanic groups. Their horizontal succession at the investigated region reflects the rule of salinity variation.

87BI0143. R.X.CHEN, J.H.LIN. 1987(1). SPINOECIA CRASSISPINA (NOV. SP.), A NEW SPECIES OF PLANKTONIC OSTRACODA. ACTA OCEANOL. SINICA. 6(1):153-158. CHINA OCEAN PRESS, BEIJING. EN.

87BI0144. CHANG-HYUN.KIM, IN-KWON.JANG. 1987(11). THE COMPLETE LARVAL DEVELOPMENT OF ACMAEOPLEURA PARVULA STIMPSON (BRACHYURA, GRAPSIDAE) REARED IN +. BULL. KOREAN FISH. SOC. 20(6):543-560. KOREAN FISH. SOC., PUSAN. EN.

The complete larval development of the Korean grapsid crab, Acmaeopleura parvula Stimpson, from hatching to first crab was described and illustrated. Larvae were reared in 12 different combinations of temperature and salinity, and passed through five (uncommonly six) zoeal and a megalopal stage. Best survival to first crab stage occurred in 20 Deg. in Centigrade - 31.4 per mill. Development to first crab was 22-23 days (at 25 Deg. in Centigrade), 34-37 days (at 20 Deg. in Centigrade) and 50-51 days (at 15 Deg. in Centigrade). Additional sixth zoeae were obtained only at 15 Deg. in Centigrade. Larvae of A. parvula were distinguished from the larvae of other Varuninae in the absence of lateral carapace spines and were morphologically similar to Gaetice depressus (De Haan). Other char+.

87BI0145. J.Q.HUANG, Z.Z.XU, Y.R.LI. 1987(4). A PRELIMINARY SURVEY OF DIURNAL VERTICAL MIGRATION OF PLANKTONIC CRUSTACEANS IN

THE XIAMEN HARBOUR. ACTA OCEANOL. SINICA. 6(2):292-303. CHINA OCEAN PRESS, BEIJING. EN.

The diurnal vertical migration of planktonic crustaceans may be divided into two types: Type 1, species with marked diurnal vertical migration; Type 2, species without marked diurnal vertical migration. The former may be further grouped into three patterns: Pattern 1, sinking by day and rising by night; Pattern 2, rising by dawn and evening and sinking by day and midnight; Pattern 3, rising by day and sinking by night. The latter may be further grouped into the following three patterns: Pattern 1, surface layer distribution; Pattern 2, bottom layer distribution; Pattern 3, even distribution between the surface and bottom layers. Among these patterns the two most common ones appear to be 'the sinking by day and rising by night' and the surface layer distribution. Most of the females a+.

87BI0146. C.L.MCKENNEY JR. 1987(6). OPTIMIZATION OF ENVIRONMENTAL FACTORS DURING THE LIFE CYCLE OF MYSIDOPSIS BAHIA. 6P. U.S. EPA. PN-3053. EN.

87BI0147. S.OHTSUKA, Y.FUKUURA, A.GO. 1987(7). DESCRIPTION OF A NEW SPECIES OF TORTANUS (COPEPODA: CALANOIDA) FROM KUCHINOERABU ISLAND, KYUSHU, W+. BULL. PLANKTON SOC. JAPAN. 34(1):53-63. PLANKTON SOC. JAPAN, TOKYO. PN-3059. EN.

A new species of Tortanus (Copepoda: Calanoida) collected from Kuchinoerabu Island, Kyushu, Japan, by SCUBA diving is described. This species belongs to the subgenus Atortus Sewell, 1932 which was revised by BOWMAN (1971). The diagnosis of the subgenus emended by BOWMAN (1971) should be further revised with the finding of the present new species: the female of Atortus have 2- or 3-segmented urosome. The mouthparts examination and the gut contents analysis of this new species revealed that the species was carnivorous feeding mainly on Oithona copepodids.

87BI0148. SOON-KEUN.CHANG. 1987(9). SAMPLE TREATMENT AND BASIC ANALYSIS FOR THE STUDY OF BENTHIC FORAMINIFERA. J. OCEANOL. SOC. KOREA. 22(3):153-167. OCEANOL. SOC. KOREA, SEOUL. KO.

The most usually adopted methods from the collection of samples, laboratory procedures, to basic analysis of assemblages for the quantitative study of benthic foraminifera are reviewed. Standard methods of treatment of samples with emphasis on the effective detection of contamination through routine dip of sieved into Methylene blue solution after every washing of samples are proposed to minimize differences due to individuals and for comparisons of results in future. Some basic characteristics for the quantitative analyses are also reviewed with appropriate examples. These characteristics are related to foraminiferal abundance, wall structures, condition of test conservation, diversity and related characteristics, faunal similarity between samples, and occurrence of planktonic forami+.

87BI0149. YONG-HAE.KIM, KWAN-SOH.KO. P1987(5). THE GAITING BEHAVIOUR OF THE GRASS CRAB, HEMIGRAPSUS PENICILLATUS ON THE NETTINGS. BULL. KOREAN FISH. SOC. 20(3):177-184. KOREAN FISH. SOC., PUSAN. EN.

The quantitative mechanics on the sideways walking of the crabs may provide a basic solution for entanglements of the walking legs in gillnets. The gaiting behaviour of the crabs on the flat board and the nettings 10, 16 and 23 mm in mesh size were experimented concerning about stepping positions and times in the laboratory using video set on July, 1984. It was found that the irregular movements of walking crabs in stepping positions and patterns were appeared on the nettings due to the absence of mechanical contact in spite of neural control of compensating, while on the flat surface evolved systematic leg movements.

87BI0150. M.E.DAWSON, R.J.MORRIS, A.P.M.LOCKWOOD. 1984. SOME COMBINED EFFECTS OF TEMPERATURE AND SALINITY ON WATER PERMEABILITY AND GILL LIPID COMPOSITION+. COMP. BIOCHEM. & PHYSIOL. 78A(4):792-735. PERGAMON PRESS, OXFORD. PN-2694. EN.

1. G. duebeni were adapted to two temperatures 15 and 5 Deg in Centigrade and two salinities 100% sea-water and 2% sea-water for 9-10 weeks prior to analysis of water flux and lipid composition. 2. After acclimation to 2% sea-water at 15 Deg in Centigrade for 74 days Gammarus have significantly lower water exchange rate than animals acclimated for only 4 days. 3. No significant difference in water exchange between 4-day and 67-day acclimated animals are observed at 5 Deg. in Centigrade. 4. The relative proportions of phospholipid, steroid and neutral glycerides have been determined in the gills and residual bodies. Neutral glycerides are present in the gills though at proportionally lower levels than in the bodies. 5. No consistent trends occur in the body lipid composition which ca+.

87BI0151. R.W.INGLE, A.L.RICE. 1984(5). THE JUVENILE STAGES OF EIGHT SWIMMING CRAB SPECIES (CRUSTACEA: BRACHYURA: PORTUNIDAE); A COMPARATI+. BULL. BRITISH MUSEUM NAT. HIST. 46(4):345-354. BRITISH MUSEUM NAT. HIST. PN-2691. EN.

87BI0152. S.J.ZHAO. 1984(7). APPROACH TO PREDICTION OF OUTBREAK QUANTITY AND PERIOD FOR FIRST-GENERATION ARMYWORM WITH SEA TEMP+. ACTA OCEANOL. SINICA. 3(3):349-354. CHINA OCEAN PRESS, BEIJING. EN.

So far, no literature has ever reported the prediction of plant diseases and insects outbreak by using sea surface temperature. This article aims at setting up a long-range prediction model of the outbreak quantity and period for the first-generation armyworm by using the surface water temperature of the North Pacific as predictor. Our preliminary study has yielded a desirable result, which adds a new approach of modelling in the prediction of armyworm outbreak.

87BI0153. Z.Z.XU. 1983. ECOLOGICAL STUDIES ON THE HYDROMEDUSAE IN THE SOUTH-WESTERN

TAIWAN STRAIT OF CHINA. ACTA OCEANOL. SINICA. 2(1):129-138. CHINA OCEAN PRESS, BEIJING. EN.

In the survey area, there are four maxima and two clear minima of seasonal variation in total numbers of individuals of hydromedusae a year. The change of locations in the dense center of hydromedusae shows that it moves northward from southwest in spring and summer, and it retracts from north to southwestern part of the strait in autumn and winter. The seasonal variation in number of species of hydromedusae may be divided into two types: (1) species occur throughout the year. (2) species with markedly seasonal variation. There are three dominant species in the survey area, i.e. Liriope tetraphylla, Aglaura hemistoma and Rhopalonema velatum. The former two are of oceanic eurytopic type, the last one is of oceanic steurotopic type. The hydromedusae in investigated area may be divided +.

87BI0154. 1987(8). GUIDELINES FOR USE OF LIVE AMPHIBIANS AND REPTILES IN FIELD RESEARCH. AME. SOC. ICHTHYOL. & HERPETOL PN-3094. EN.

87BI0155. GUIDELINES FOR USE OF FISHES IN FIELD RESEARCH. AME. SOC. ICHTHYOL. & HERPETOL PN-3093. EN.

87BI0156. CHAN-IL.CHUN. 1968(12). ON THE VARIATION IN THE NUMBER OF VERTEBRAE OF ANCHOVY, ENGRAULIS JAPONICUS TEMMINCK ET SCHLEGEL, +. BULL. KOREAN FISH. SOC. 1(2):97-104. KOREAN FISH. SOC., PUSAN. KO.

Some considerations were made concerning the variation in the number of vertebrae (except urostyle) of anchovies sampled from the south coast of Korea, mainly off the city of Chungmu. The some seasonal difference was evinced in the mean value of vertebrae of small sized fish only, and no other significant differences were observed such as for locality or fishing gears. It was concluded that the anchovies from the south coast of Korea might be divided into spring and summer hatching populations and that the seasonal variation in the number of vertebrae might be caused by the difference of water temperature during the spawning season.

87BI0157. SANG-CHUL.CHUNG. 1970(10). AGE AND GROWTH OF THE YELLOW CROAKER, PSEUDOSCIAENA MANCHURICA JORDAN ET THOMPSON, IN THE WESTERN +. BULL. KOREAN FISH. SOC. 3(3):154-160. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with the growth of yellow croaker by scale age reading. This study is based on material from 596 specimens caught by the Danish seine in the Yellow Sea during the period from June 1967 to April 1968. Ring marks of the scale were formed from April to July, corresponding to the spawning season of the fish reported by Bae (1960). Growth rate of each radius of the ring was approximately 0.73.

87BI0158. EUL-BAE.KIM. 1970(12). MORPHOMETRIC ANALYSIS OF PLECOGLOSSUS ALTIVELIS OF CHEJU ISLAND AND THE NAKDONG RIVER. BULL. KOREAN FISH. SOC. 3(4):228-232. KOREAN FISH. SOC., PUSAN. KO.

From the standpoint of fishery science it is an interesting matter to note that the size of Plecoglossus altivelis population on Cheju Island is smaller than that of the Nakdong River located in the southern part of Korea's mainland. Therefore the author carried out a comparative analysis to determine whether the populations differ because of racial or because of environmental conditions. The morphometric characters of the head length and the body length were used for the analysis of covariance and computed by a standard regression method of testing for the homogeneity of the populations. All samples were collected during 1968 and 1969 in the Milyang Stream of the Nakdong River and the Cheonji Stream of Cheju Island.

87BI0159. YONG-UK.KIM. 1970(12). ON THE CHARACTERISTICS OF EGGS AND LARVA OF MYLIO MACROCEPHALUS (BASILEWSKY). BULL. KOREAN FISH. SOC. 3(4):233-247. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with the results of the observations on the characteristics of the eggs being ripen by injection of synahorin and the larvae of the black porgy, Mylio macrocephalus (Basilewsky). The adult fish used in the experiments, during May 11th to June 5th, 1970, were obtained from a fish-farm of the Atsumi Fish Culture Company in Aichi Prefecture, Japan.

87BI0160. EUI-IN.PAIK. 1970(6). LENGTH-WEIGHT RELATIONSHIP OF SYNECHOGOBIUS HASTA. BULL. KOREAN FISH. SOC. 3(2):117-119. KOREAN FISH. SOC., PUSAN. KO.

A goby Synechogobius hasta (Temminck et Schlegel) was studied on the length-weight relationship, and the fish were sampled from the closed tributary and the lower part of the Naktong River, near Pusan, during the period from November of 1967 to December of 1968. The data for this study were taken from 1,050 fish. The normal relative growth was not found in fish between 20.5 cm and 27.5 cm in body length, because of the maturity of gonads and spawning.

87BI0161. IN-BAE.KIM, EUI-IN.PAIK. 1971(12). PROPAGATION OF GRASS CARP AND SILVER CARP, 1971. BULL. KOREAN FISH. SOC. 4(3/4):113-122. KOREAN FISH. SOC., PUSAN. KO.

In 1971, about 150,000 fingerlings of grass and silver carps were produced and distributed from the Fishculture Laboratory of Pusan Fisheries College. The adults were those transplanted from Japan in 1963. Findings during the process of this production are summarized as following. Brood fish must be handled with a great care during the catching, hormone injection and maturity inspection so as the fish are not injured, otherwise, the eggs would not mature perfectly. Scale fall also affects significantly. The amount of pituitary to be injected is preferable to be 2 to 3 times or more in donor's body weight to obtain good results.

87BI0162. TAE-YUNG.CHUNG, YONG-UK.KIM. 1971(12). LENGTH-WEIGHT RELATIONSHIP OF GADUS MACROCEPHALUS TILESIUS OF THE YELLOW SEA. BULL. KOREAN FISH. SOC. 4(3/4):103-104. KOREAN FISH. SOC., PUSAN. KO.

A cod, Gadus macrocephalus TILESIUS was studied on the length-weight relationship. The fish were sampled from those caught by set nets for cod in the Yellow Sea during the period from April 1964 to May 1964. The data for this study were taken from 247 fish.

87BI0163. KI-JOO.KIM. 1971(4). STUDIES ON THE FISHERY BIOLOGY OF THE PACIFIC SAURY, COLOLABIS SAIRA OF THE EAST COAST OF KOREA, 1. BULL. KOREAN FISH. SOC. 4(1):7-16. KOREAN FISH. SOC., PUSAN. KO.

This paper deals with the numbers of vertebrae, gill rakers and relative growth of the Pacific saury, Cololabis saira along the eastern coast of Korea in May, July and December 1970. About 90 percent of the total fish population possessed 64-66 vertebrae with the mean of 64.80 and the mode of 65. The number of gill rakers varied from 33 to 44 in December with the mean of 37.08. The body weight increased from July to December (from medium to large sized group) showed more than twice than that from December to the following July (from medium to large sized group). The coefficient of fatness remained constant in December, but a distinct variation was found between the medium and large sized groups in July, corresponding to the spawning season of the fish.

87BI0164. HONG-JUN.YANG. 1971(6). THE PHASE OF SCALES IN CYPRINID FISHES; A STUDY OF MORPHOLOGICAL CHARACTERISTICS OF CYPRININAE FIS+. BULL. KOREAN FISH. SOC. 4(2):66-74. KOREAN FISH. SOC., PUSAN. KO.

The general morphological characteristics of scales on the body surface in Cyprininae fishes can be summarized as follows: 1. The lentic and lotic habitats have no relation to the phase of scales. 2. The scales in the anterior body parts have transverse diameters longer than their longitudinal diameters: in the posterior body parts, the opposite holds true. 3. The scales having the largest diameters, both longitudinal and transverse, are the lateral line scales. 4. The position of the focus on each scale move posteriorly as the scale grows. In other words, the forward growth of the scales exceeds the backward. 5. The number of ridges in each scale is in proportion to longitudinal diameter.

87BI0165. YONG-UK.KIM. 1972(12). MORPHOLOGY OF UROHYAL BONES OF PLEURONECTIDAE FISHES IN KOREAN WATERS. BULL. KOREAN FISH. SOC. 5(4):121-127. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with the results of the comparative morphology on the urohyal bones on the right-eye flounders, pleuronectidae fishes in Korean waters.

87BI0166. YOUNG-SHIK.PARK, CHOON-KOO.LEE. 1972(12). EFFECTS OF COPPER AND SALT ON THE HEMOGLOBIN OF SEVERAL FRESHWATER FISHES. BULL. KOREAN FISH. SOC. 5(4):105-107. KOREAN FISH. SOC., PUSAN. KO.

The effects of copper and salt on the hemoglobin patterns of carassius carassius, ophicephalus argus, and Misgurnus anguillicaudatus were investigated by vertical starch gel electrophoresis. The number of the hemoglobin band of normal C. carassius on the anode was one, and that of O. argus was two; neither the number of the hemoglobin bands of the fishes nor the mobility of them was affected by copper or salt. The hemoglobin mobility of O. argus was faster than those of C. carassius and M. anguillicaudatus. Normal M. anguillicaudatus had two hemoglobin bands with nearly identical mobilities, one band migrating anodically and the other cathodically. When M. anguillicaudatus was exposed to copper, the mobility of band on the anode was faster than those of the other groups of control an+.

87BI0167. JAE-HYEUNG.PYEUN. 1972(6). SOME PHYSICO-CHEMICAL CHARACTERISTICS OF CARP MYOSIN B. BULL. KOREAN FISH. SOC. 5(2):57-62. KOREAN FISH. SOC., PUSAN. KO.

Natural actomyosin was extracted from the dorsal muscle of carp (Cyprinus carpio), and some physico-chemical properties were determined. The sedimentation constant of the purified skeletal muscle actomyosin was about 24.76s and the ATP sensitivity 147-176. The specific viscosity was rapidly ascended with the increase of protein concentration as other vertebrate actomyosins. ATPase activating site under the effect of pH variation was showed on the both sides of acid and base resembling with the tendency of rabbit skeletal muscle actomyosin, and found at 6.0 on the acidic side and at 9.5 on the basic side.

87BI0168. H.FUKUOKA. 1972(7). CHROMOSOMES OF THE SOCKEYE SALMON (ONCORHYNCHUS NERKA). JAPAN. J. GENETICS. 47(6):459-464. GENETICS SOC. JAPAN, MISHIMA. PN-2884. EN.

The somatic and germinal chromosomes of the sockeye salmon (Oncorhynchus nerka) from three stations in the Bering Sea are studied by the routine air-drying method. The chromosome number is 2n, 58 for eight individuals and 2n, 57 for two. Based on the arm-number is 104 in 57- and 58-cells, the variation is interpreted by a Robertsonian mechanism. There are some cells showing a deviation of chromosome numbers, such as 54, 55, 56, 59 and 60, in addition to the basic karyotype. Those chromosomal changes are not explained by a simple Robertsonian system.

87BI0169. BYOUNG-GIE.LEE, ET AL. 1973(6). A WINTERING TEST OF THE CRAWL-HELD ANCHOVY. BULL. KOREAN FISH. SOC. 6(1/2):44-48. KOREAN FISH. SOC., PUSAN. KO.

Since no medium-sized anchovies for skipjack baits are caught during the winter season in the Korean waters, the demand for the live baits in the winter season is met with crawl-stocked anchovies. Authors conducted a test on the wintering of the anchovies which were caught in the early November and acclimated for 22 days in a crawl. The wintering crawl was kept in the inlet near Chungmu City, which is

situated in the southern coast of Korea, for 4 months through December 1, 1971 to March 31, 1972.

87BI0170. EUL-BAE.KIM. 1974(12). THE INDIVIDUAL PRODUCTION RATE OF PLECOGLOSSUS ALTIVELIS IN GANGJEONG STREAM, JEJU-DO IN SUMMER. BULL. KOREAN FISH. SOC. 7(4):195-203. KOREAN FISH. SOC., PUSAN. KO.

The individual production rate of Plecoglossus altivelis was studied from the 18th of June to the 25th of September (99 days) 1973, when the fish grow best at Gangjeong Stream, Jeju Do, as one of the ways to find out the reasons why the size of P. altivelis of Jeju Island is smaller than that of other places.

87BI0171. CHAN-IL.CHUN. 1974(12). BIOLOGICAL STUDIES ON THE SAND-EEL, AMMODYTES PERSONATUS GIRARD. BULL. KOREAN FISH. SOC. 7(4):215-220. KOREAN FISH. SOC., PUSAN. KO.

The sand-eel, Ammodytes personatus is a commercially important fish abundantly found in west and east coast of Korea. Samples were collected from the Baegryeong Island (Yellow Sea), Geoje Island (southern coast) and Jumunjin (East Sea) from May 1973 to December 1974. In this paper the author dealt with some biological point of the fish, especially the relationship between total length ang body weight, and the major spawning season and sex ratio.

87BI0172. YONG-JOO.KANG. 1974(6). A STUDY ON THE RACIAL CLASSIFICATION OF ASIAN CHUM, ONCORHYNCHUS KETA (WALBAUM) BASED ON SCALE CHA+. BULL. KOREAN FISH. SOC. 7(2):91-97. KOREAN FISH. SOC., PUSAN. EN.

Two scale characters, the width and circuli counts of the first-year band, were used in a discriminant function analysis to see how effectively the two scale characters would separate geographical chum stocks from the western North Pacific. A total of 476 scale samples were taken from spawning adults which ascended to rivers of Hokkaido, Japan, in 1956, and kamchatka, the U.S.S.R., in 1957. The scale characters were examined for conformity to the statistical requirements of a discriminant function. As a result of the examinations the two characters were verified to be able to be used in a discriminant function analysis that would classify chum taken on the high seas to most probable origin.

87BI0173. YONG-UK.KIM. 1975(12). ON THE MORPHOLOGY OF LARVAL AND YOUNG STAGES OF CHASMICHTHYS DOLICHOGNATHUS HILGENDORF. BULL. KOREAN FISH. SOC. 8(4):225-233. KOREAN FISH. SOC., PUSAN. KO.

Morphological changes of early post-larval and young stages of Chasmichthys dolichognathus Hilgendorf (Family Gobiidae) have been studied based on the samples of 953 individuals collected in June 1968, July 1969 and July 1971. Particular emphasis was paid on the development of fin rays, chromatophore patterns and ventral fins. The primordial fin rays of the first dorsal fin appear in the post-larvae of around 8.0 mm in total length, and dorsal fin fully develops in the larvae of around 9.2 mm. In the early young stages of 17.0 mm in total length fin rays have completely developed.

87BI0174. YONG-UK.KIM. 1976(12). ON THE MORPHOLOGY OF LARVAL STAGES OF LOPHIUS LITULON (JORDAN). BULL. KOREAN FISH. SOC. 9(4):273-280. KOREAN FISH. SOC., PUSAN. KO.

Morphological changes of early larval stages of Lophius litulon (Jordan) are described based on 861 individuals collected at the intertidal zone at Haeundae, Busan, on the 20th of June, 1976. Particular emphasis is paid on the development of dorsal spinous rays, ventral fin rays, chromatophore patterns, alimentary canal, gills, branchiostegal rays and teeth.

87BI0175. EUL-BAE.KIM, SANG-CHUL.CHUNG. 1976(12). THE RELATIONSHIP BETWEEN TOTAL LENGTH, BODY WEIGHT AND CONDITION FACTOR OF PLECOGLOSSUS ALTIVELIS +. BULL. KOREAN FISH. SOC. 9(4):251-255. KOREAN FISH. SOC., PUSAN. KO.

Three hundred and sixty two specimens of Plecoglossus altivelis were randomly sampled from Chunji Stream in Seogwipo, Cheju-Do, during the period from 25 Aug., 1973 to 14 Feb., 1974 to investigate the relationship between total length and body weight as well as the condition factor during the spawning period.

87BI0176. IN-BAE.KIM, JAE-YOON.JO. 1976(12). THE SPAWNING OF CHANNEL CATFISH, ICTALURUS PUNCTATUS. BULL. KOREAN FISH. SOC. 9(4):261-263. KOREAN FISH. SOC., PUSAN. KO.

In 1975, a trial for channel catfish spawning was made for the first time in Korea, by stocking 11 pairs of brood fish in a 470 square meter earthen pond provided with 5 cans of 35 cm in diameter with depths of about 60 cm as spawning nests. The same trial and another pen cage method combined with pituitary injection were practiced in 1976. All these trials failed without any spawning. On the other hand 4 females and 1 male were put in a recycling water system indoor aquarium for exhibition purpose in late spring of 1976. After removing 3 females which were injured from being bitten by the male, remaining one pair of the catfish spawned successfully in July and the most eggs developed normally. The water in the recycling system showed the pH range of 7.2 to 7.4, and mean water tempe+.

87BI0177. IK-SOO.KIM. 1976(9). A STUDY OF KOREAN SPINOUS LOACHES (COBITIS TAENIA LINNE), 3. ON THE MORPHOLOGY AND DISTRIBUTION OF+. BULL. KOREAN FISH. SOC. 9(3):209-213. KOREAN FISH. SOC., PUSAN. KO.

Spinous loaches widely distributed in Korea, are of many color pattern types, but interestingly the crossband B and C-types of these loaches are collected only in the two rivers, the Yeongsan River and the Seomjin River, flowing through the south-western part of Korea. These two types have not only different color pattern, but also different geographical distribution: the B-type is found in the Yeongsan River and the C-type, in the Seomjin River. But the both types have four

common distinctive features, which easily distinguish them from other already known species of this genus: the B and C-types have the similar total length distribution, the same structure of lamina circularis and scales, and the black spots at the back of their opercula.

87BI0178. G.H.THORGAARD. 1978. SEX CHROMOSOMES IN THE SOCKEYE SALMON: A Y-AUTOSOME FUSION. CANADIAN J. GENET. CYTOL. 20:349-354. GENETICS SOC. CANADA, OTTAWA. PN-2883. EN.

Chromosomes of 21 sockeye salmon [Oncorhynchus nerka (Walbaum)] from three locations in Washington state were examined. All males had 57 chromosomes, while all females had 58 chromosomes. Both sexes had 104 chromosome arms. It appears that in males of this species the Y chromosome and an autosome have fused to form a metacentric chromosome.

87BI0179. YONG-UK.KIM. 1978(12). PECULIARITY IN SCALE CHARACTERS OF ENGRAULIDAE FISHES. BULL. KOREAN FISH. SOC. 11(4):249-256. KOREAN FISH. SOC., PUSAN. KO.

Morphological characters of the scales of Engraulidae fishes, Engraulis japonica and Thrissa kammalensis, are described with illustrative figures. The scales are primitive cycloid and quadrangular or pentagonal without concentric foci. In Engraulis japonica arrangements of the grooves are irregular, and the grooves converge from the outer margin to the central part of the scale. In Thrissa kammalensis the arrangements of the grooves are transverse in the major part of the scale except the apical part. The ridge of the apical part form a network arrangement, and parallel with the grooves. In the central part of the scales of the both species there are several fingerprint-like structures.

87BI0180. YONG-UK.KIM. 1979(12). ON THE MORPHOLOGY OF POST-LARVAL AND YOUNG STAGES OF OMOBRANCHUS ELEGANS (STEINDACHNER). BULL. KOREAN FISH. SOC. 12(4):297-303. KOREAN FISH. SOC., PUSAN. KO.

Early morphological changes of Omobranchus elegans (STEINDACHNER) (Family Blennidae) were studied based on the samples of 125 individuals collected from Changseon channel of Nam-hae in June 1978 and May 1979. Descriptions were made with particular emphasis on developmental changes of supraorbital region, fin rays, development of chromatophores and the preopercular spine.

87BI0181. YONG-RHIM.YANG. 1980(3). PHOTOTAXIS OF FILEFISH, CONGER EEL AND CRUCIAN CARP. BULL. KOREAN FISH. SOC. 13(1):1-13. KOREAN FISH. SOC., PUSAN. KO.

The purpose of the present study is to find the light intensity which induces maximum gathering rate and to observe the variation of the gathering rate both in daytime and at night by using three species of commercial fishes: filefish, Stephanolepis cirrhifer (Temminck et Schlegel), conger eel, Astroconger myriaster (Brevoort) and crucian carp, Carassius carassius (Linnaeus). The fish were acclimatized in dark condition for 40 minutes prior to the main experiment. Upon turning on the light, the number of fish in each section was counted 40 times every 30 seconds, and the gathering rates were obtain from the average number of fish in each section.

87BI0182. SUNG-BUM.HUE. 1980(8). GROWTH AND MORTALITY OF ALBACORE (T.ALALUNGA) IN THE NORTH EAST ATLANTIC MEASURED BY TAGGING DATA. BULL. KORDI. 2(1):57-61. KORDI., SEOUL. FR.

Tagging of fish is one of the most widely used techniques in gathering the biological and numerical information of the stock in the fisheries. In the albacore tuna fisheries in the north east Atlantic, many authors have studied the rates of growth and of mortality of albacore by the method of length frequency, hard part and catch statistics. In the present study we have tried at first time to obtain these rates through the tagging data. Analyses were made on the 123 recaptured albacores which represented 2.04% of the total fish (6,026) released from 1968 to 1977. The annual total mortality (0.98) appeared to be considerably lower than the rate estimated by means of the composition of the age class of the population by other authors.

87BI0183. HYUNG-TACK.HUH. 1980(8). LENGTH-WEIGHT AND BODY-SCALE RELATIONSHIPS OF THE LABORATORY GROWN YELLOW PERCH, PERCA FLAVESCENS +. BULL. KORDI. 2(1):51-56. KORDI., SEOUL. EN.

The length-weight and body-scale relationships of laboratory-grown yellow perch of age groups 0, I and II were determined and compared with those from natural waters. The mean value of growth exponent (or slope of regression, n) for the laboratory perch was greater than the cube of the length (>3.0), and greater than those of their natural counterpart with a few exceptions. The body-scale relationship was best fit by a straight line regression expressed by $L = 18.915 + 34.171\ S$ where S is scale length. The Lee's regression equation appeared to be more appropriate to the body-scale relationship of the laboratory perch than the Dahl-Lea's direct-proportion method.

87BI0184. Q.Y.ZHANG, Y.Z.ZHANG. 1983(6). STUDY ON FEEDING HABITS OF RED-FIN PARGO, PARARGYROPS EDITA, IN SOUTH FUJIAN AND TAIWAN BANK FISHI+. ACTA OCEANOL. SINICA. 2(1):120-128. CHINA OCEAN PRESS, BEIJING. EN.

The present paper is a report on the feeding habits, seasonal variations of food contents and feeding intensity, and the relationships between the digestive organs and feeding habits of Red-fin pargo, Parargyrops edita (from 39 to 178 mm in body length), collected from South Fujian and Taiwan Bank fishing ground. The result shows that Red-fin pargo is a demersal fish with wide range of food items of which are chiefly benthos and secondly nekton and plankton. Polychaeta, Ophiuroidea, Gammaridea, Pisces, Macrura, Ostracoda, Cephalopoda and Mysidacea are important food for both young and adult. The composition of food items varies with seasons. The feeding habits of the fish over 39 mm in body length do not vary with its age, but the adult

take more Pisces and Cephalopoda than the young.

87BI0185. G.R.BELL, D.A.HIGGS, G.S.TRAXLER. 1984. THE EFFECT OF DIETARY ASCORBATE, ZINC, AND MANGANESE ON THE DEVELOPMENT OF EXPERIMENTALLY INDUCED +. AQUACULTURE. 36:293-311. ELSEVIER SCI. PUB., AMSTERDAM. PN-2474. EN.

Seven groups of juvenile sockeye salmon (oncorhynchus nerka) were each reared on a different test diet to determine the influence of nutritional status on their resistance to experimentally induced bacterial kidney disease. Six test diets were formulated so that the prophylactic efficacy of two levels of vitamin C (supplied as Na L-ascorbate-2-sulfate) in combination with low levels of manganese (Mn) without zinc (Zn) and high levels of Mn with Zn supplement could be evaluated. The oregon Moist Pellet diet served as a reference standard. Mortality curves were clearly distinct and mean survival times were significantly different ($P<0.05$) for each of three dosages of R. salmoninarum inoculated, irrespective of diet. Survival time was found to be inversely related to dietary ascorbate l+.

87BI0186. A.J.NIIMI, L.LOWE-JINDE. 1984. DIFFERENTIAL BLOOD CELL RATIOS OF RAINBOW TROUT (SALMO GAIRDNERI) EXPOSED TO METHYLMERCURY AND CHL+. ARCH. ENVIRON. CONTAM. TOXICOL. 13:303-311. SPRINGER-VERLAG, BERLIN. PN-2462. EN.

The differential red and white blood cell ratios were examined in subadult rainbow trout that were exposed to low level concentrations of waterborne methylmercury and chlorobenzene. The results indicated little or no changes among the ratios even though fish were exposed for 75 to 119 days and accumulated residue levels of 3 to 12 mg/kg. Blood cell ratios were also examined in rainbow trout collected from Lake Ontario. These ratios were different from those observed in the laboratory studies, particularly among the leucocytes where the lymphocytes, thrombocytes, and granulocytes averaged 83-90, 4-14, and 2-3% among the laboratory fish; and 37, 48, and 15% in Lake Ontario fish respectively. The feasibility of using differential blood cell ratios as a physiological indicator of contami+.

87BI0187. S.P.STUBBLEFIELD, T.N.TAYLOR. 1985. FOSSIL FUNGI IN ANTARCTIC WOOD. ANTARCTIC J. U.S. 20(5):7-8. U.S. NAT. SCI. FOUND., WASH. PN-3082. EN.

87BI0188. JAE-MYUNG.YOO, JONG-MAN.KIM, HYUNG-TACK.HUH. 1985(6). A STUDY ON THE EARLY DEVELOPMENT OF MORPHOLOGY AND VERTEBRAL COLUMN OF KOREAN PAMFRET, PAMPUS ECHI+. OCEAN RES. 7(1):11-18. KORDI., SEOUL. KO.

Development of the external morphology and the vertebral column of larvae and juvenile of Korean pamfret, Pampus echinogaster were studied in relation to the standard length (SL). Specimens were collected by a Bongo net around Tokchokto, Kyonggi Bay in July and August, 1984. Notochord flexion begins at about 6.5 mm (SL) and is complete at about 7.5 mm (SL). Caudal fin anlagen appeared at about 6.2 mm (SL) while dorsal and anal fins anlagen appeared at about 7.0 mm (SL), and the formation of all fin rays were completed at about 14.3 mm (SL). At this moment, the fish entered into the young stage. With the development of the fish from the larval stage to the young stage, the middorsal longitudinal band of melanophores were gradually disappeared, while the visceral mass of the pigment we+.

87BI0189. S.X.LI, R.M.WANG, F.Y.LIU. 1985(7). STUDY ON METABOLISM OF MERCURY IN TILAPIA MOSSAMBICA. ACTA OCEANOL. SINICA. 4(3):463-470. CHINA OCEAN PRESS, BEIJING. EN.

Using Mercury Chloride as a tracer, uptake and combination of inorganic mercury in Tilapia mossambica (petres) and its transfer between different tissues of the fish were studied. The results demonstrate that gill is the main tissue uptaking mercury directly from seawater and that the mercury in gill, skin, digestive tube and fin would be transferred to the other tissues. The result of gel chromatography with Sephadex G-75 shows that most of mercury in gill filaments, liver, and digestive tube are bound in high molecules (MW-70000) and not in metallothionein, but in kidney and bile mercury binding proteins are similar to metallothionein and are accounted for up to 60% and 46% respectively.

87BI0190. W.TARNCHALANUKIT. 1986. EXPERIMENTAL HYBRIDIZATION BETWEEN CATFISHES OF THE FAMILIES CLARIIDAE AND PANGASIDAE IN THAILAND. KASETSART UNIV. FISH. BULL. (16) KASETSART UNIV., BANGKOK. PN-2551. EN.

Hybrids between the clariid species clarias macrocephalus and C. batrachus and the pangasiid species Pangasius sutchi were obtained by hormone injection of brood stock and artificial fertilization. Pure parental crosses as well as all possible hybrid combinations were obtained. Fertility, hatchability, and post-yolk absorption survival was high (66-99%) in all pure parental crosses and in all crosses between the two species of Clarias. In crosses between Clarias and Pangasius fertilization was also very hith (68-97%) but hatchability varied from 11 to 23% and post-yolk absorption survival from 0% in Pangasius sutchi(male) x Clarias batrachus(female) to about 50% in Pangasius sutchi(male) x Clarias macrocephalus(female). The longest lived hybrids of Pangasius and Clarias were those +.

87BI0191. T.X.MENG, S.M.REN. 1986(10). ON THE AGE AND GROWTH OF PSEUDOPLEURONECTES YOKOHAMAE (GUNTHER) IN THE BOHAI SEA. ACTA OCEANOL. SINICA. 5(4):593-602. CHINA OCEAN PRESS, BEIJING. EN.

The present paper deals with the age and growth of P.yokohamae, whose specimens were collected monthly from April 1982 to May 1983 by trawl in the Bohai Sea. In the study the age and growth of P. yokohamae is determined by annual ring on otolith. On the basis of

calculation of monthly changes in appearing frequency for opaque zones on the otolith edgs it is determined that the annual ring of P. yokohamae is formed in January-March every year.

87BI0192. B.M.BURR, F.J.SCHWARTZ. 1986(11). OCCURRENCE, GROWTH, AND FOOD HABITS OF THE SPOTTED HAKE, UROPHYCIS REGIA, IN THE CAPE FEAR ESTUARY+. NORTHEAST GULF SCI. 8(2):115-127. MAR. ENV. SCI. CONS. ALABAMA. PN-2707. EN.

From 1973 to 1978, 62,867 Urophycis regia were collected from the Cape Fear Estuary, North California, and the adjacent Atlantic Ocean. Most fish were young-of-the-year (25-225 mm SL), but a few age-1 individuals (230-295 mm) were present in the estuary from January to June. They moved offshore or northward when water temperatures warmed above 22 deg. in centigrade. Average monthly growth increments varied from 12 to 26 mm SL; the greatest increase in length was 92 mm from January to June 1977. Length-weight regressions for the 6-year study period were similar. Important food items were crustaceans (largely mysid shrimp and decapods) and fishes (clupeid and sciaenid larvae). The abundance of U. regia in inshore waters and the relatively large size it reaches suggests that marketing+.

87BI0193. YONG-UK.KIM, YANG-SUNG.PARK, DONG-SOO.KIM. 1987(1). DEVELOPMENT OF EGGS, LARVAE AND JUVENILES OF LOACH, MISGURNUS MIZOLEPIS GUNTHER. BULL. KOREAN FISH. SOC. 20(1):16-23. KOREAN FISH. SOC., PUSAN. KO.

The cyprinid loach, Misgurnus mizolepis Gunther, a freshwater teleost, is a member of the family Cobitidae and is known to distribute in Korea and China. This fish is considered to be an excellent food fish in Korea. This report is a description of the gross morphology of the embryos and larvae up to the development of juvenile period of life. The eggs were obtained by injecting gonadotropin and fertilized by wet method in the laboratory on July 10 in 1986. The inseminated eggs were rinsed with tap water and incubated at 25 Deg. in Centigrade. Live, freshly laid eggs were separative, demersal, adhesive, light yellow and average 1.1 mm in diameter. The hatching took place in about 24 hours after fertilization. The newly hatched larvae were average 2.7 mm in total length possessing +.

87BI0194. YONG-UK.KIM, YANG-SUNG.PARK. 1987(1). DEVELOPMENT OF EGGS LARVAL AND JUVENILES OF BLUEGILL, LEPOMIS MACROCHIRUS RAFINESQUE. BULL. KOREAN FISH. SOC. 20(1):24-32. KOREAN FISH. SOC., PUSAN. KO.

Bluegill, Lepomis macrochirus RAFINESQUE, has bred widely in the various districts of Korea since the Office of Fishery transplanted it into our country from Japan in December, 1969. The eggs of this species are adhesive and demersal. The size of the egg diameters were varied from 1.18 to 1.30 mm. Hatching took place in 40 hours after fertilization at the water temperature of 24.3 - 25.4 Deg. in Centigrade. The newly hatched larvae were 3.75 - 4.05 mm in total length possessing yolk sac, and 29-30 mytomes. Many melanophores were evenly distributed on the entire body. Ten days after hatching, the postlarvae attained 6.05 - 6.35 mm in total length. The yolk sac was completely absorbed and the width of the pectoral finfold had reached the maximum size. One month fifteen days after ha+.

87BI0195. YOUNG-DON.LEE, TAEK-YUIL.LEE. 1987(11). STUDIES ON THE REPRODUCTIVE CYCLE OF DAMSELFISH, CHROMIS NOTATUS (TEMMINCK ET SCHLEGEL). BULL. KOREAN FISH. SOC. 20(6):509-519. KOREAN FISH. SOC., PUSAN. KO.

Annual reproductive cycle of the Damselfish, Chromis notatus collected monthly at the four coastal areas around Chejudo, Korea are studied on the bases of histological observations of gonadal tissue and various quantitative variables including gonadosomatic index (GSI), fatness, egg diameter composition and the first maturity.

87BI0196. TAEK-YUIL.LEE, SUNNG-YEON.KIM. 1987(11). EXPERIMENTAL STUDIES ON THE MECHANISM OF REPRODUCTIVE CYCLE IN THE BLUEGILL, LEPOMIS MACROCHIRUS. BULL. KOREAN FISH. SOC. 20(6):489-500. KOREAN FISH. SOC., PUSAN. KO.

Annual reproductive cycle of Bluegill, Lepomis macrochirus (RAFINESQUE) were studied in the natural population. Based on these informations, reproductive mechanism of the fish including activation, degeneration and remature were examined under the controlled conditions of temperature and photoperiod. In the natural populations, gonads began to grow with the temperature increase in March and matured in June, and spawning occurred in July. With the onset of the shorter day-length and the maximum temperature condition in August, the gonads began to degenerate. Resting stage was continued during winter season.

87BI0197. IK-SOO.KIM, YONG-JOO.LEE, YONG-UK.KIM. 1987(11). A TAXONOMIC REVISION OF THE SUBFAMILY GOBIINAE (PISCES, GOBIIDAE) FROM KOREA. BULL. KOREAN FISH. SOC. 20(6):529-542. KOREAN FISH. SOC., PUSAN. KO.

Thirty three species belonging to twenty genera in the subfamily Gobiinae of Korea were reviewed and key to species and genera were provided. Among them twenty seven species captured during 1985-1987 were examined on the cephalic sensory canal systems for the taxonomic review, and classified into 4 groups based on the presence or absence of the canal and their canal pore patterns. It was confirmed that the pore patterns of preopercular and anterior ocular-scapular canal were important in the diagnosis of gobiid genera or species and in the discussion of the specialized species group.

87BI0198. SEONG-SIG.CHA, JAE-MYUNG.YOO, JONG-MAN.KIM, HYUNG-TACK.HUH. 1987(12). KEY FOR THE IDENTIFICATION OF THE ICHTHYOPLANKTON IN THE MID-EAST COASTAL WATERS OF THE YELLOW SEA. J. OCEANOL. SOC.

KOREA. 22(4):236-245. OCEANOL. SOC. KOREA, SEOUL. KO.

Ichthyoplankton were sampled with Bongo net at 13 stations from Chonsu Bay to Keum Estuary from July, 1985 to June, 1986. 19 taxa of pelagic eggs and 45 taxa of larvae were collected. The key to identify the pelagic eggs is based on the number of oil globules, the shape of the egg, the sculpture of the chorion, and the size of the egg and the oil globules. The key to the families of fish larvae is based on the morphometric characters such as the body shape, the position of the anus, the pigmentation pattern, and others.

87BI0199. H.WINDOM, D.STEIN, R.SHELDON, R.SMITH JR. 1987(2). COMPARISON OF TRACE METAL CONCENTRATIONS IN MUSCLE TISSUE OF A BENTHOPELAGIC FISH (CORYPHAENOIDES +. DEEP-SEA RES. 34(2):213-220. PERGAMON PRESS, OXFORD. EN.

Specimens of Coryphaenoides armatus, a benthopelagic fish, were collected from the North Atlantic and North Pacific for trace metal analysis. Concentrations of cadmium and lead in muscle tissue of Atlantic fish were not significantly different from those of Pacific fish. Differences in copper concentrations in the two groups may be related to size difference. Higher concentrations of nickel, cobalt, iron and manganese observed in muscle tissue from the Pacific fish may be due to differences in fish size and differences in deep water metal chemistry between the two oceans.

87BI0200. YONG-UK.KIM, YANG-SUNG.PARK, JUNG-GOO.MYOUNG. 1987(3). DEVELOPMENT OF EGGS, LARVAE AND JUVENILES OF SMOOTH LUMPSUCKER, APTOCYCLUS VENTRICOSUS)PALLAS). BULL. KOREAN FISH. SOC. 20(2):157-165. KOREAN FISH. SOC., PUSAN. KO.

On January 16, 1986, mature adults of smooth lumpsucker, Aptocyclus ventricosus (Pallas) were collected from the coastal water of Okkye, Myongju-gun, Kangwon-do, Korea. The authors carried out artificial insemination on the boat. The eggs were incubated and the larvae were reared in laboratory. During the incubation period water temperature fluctuated between 7.5 Deg. in Centigrade and 21.4 Deg. in Centigrade. The eggs of smooth lumpsucker are demersal and adhesive. The eggs diameters were varied from 2.28 to 2.36 mm. The hatching took place in ca. 725 hours after fertilization. The newly hatched larvae were 6.0-6.9 mm in total length. The features of the hatched larvae lie in the tadpole-like body from and in the well developed sucking disk, namely the ventral fins.

87BI0201. YANG-SUNG.PARK, YONG-UK.KIM. 1987(7). STUDIES ON THE LARVAE AND JUVENILES OF FLYING FISH, PROGNICHTHYS AGOO (TEMMINCK AND SCHLEGEL) (PIS+. BULL. KOREAN FISH. SOC. 20(4):308-316. KOREAN FISH. SOC., PUSAN. KO.

The flying fish, Prognichthys agoo, is widely distributed in the coastal waters of south-eastern Korea. On July 14, 1986, mature adults of flying fish were captured from U-do, Cheju-do. The eggs were stripped and fertilized by the wet method on the ship. The mature effs are demersal and adhesive with 30-40 filaments. The egg diameter varied from 1.42 to 1.58 mm. The water temperature throughout incubation ranged from 23.70 to 27.82 Deg. in Centigrade, and salinity was maintained at 30.75-33.76 permille. The hatching took place in 174 hours after fertilization. The newly hatched larvae measured 4.75-5.25 mm in total length possessing yolk sac and about 45-46 myotomes. The larvae cultured for ten days after hatching reached 11.45-12.60 mm in total length and entered the juvenile peri+.

87BI0202. S.M.HUSSAIN, J.ALI-KHAN. 1987(7). FECUNDITY OF BENTHOSEMA FIBULATUM AND BENTHOSEMA PTEROTUM FROM THE NORTHERN ARABIAN SEA. DEEP-SEA RES. 34(7):1293-1299. PERGAMON PRESS, OXFORD. EN.

present work deals with fecundity of two species of Myctophidae (lanternfish) from the Indian Ocean. B. fibulatum shows fecundity of 424-4894 in fishes of 40-99 mm (total length) and B. pterotum shows fecundity of 210-1334 in fishes of 27-48 mm (total length). No significant difference is seen in number of eggs of B. fibulatum and B. pterotum from various regions (coast of Africa, Gulf of Aden and Gulf of Oman including Pakistan waters) and also between the years 1976 and 1977 for B. pterotum.

87BI0203. YANG-SUNG.PARK, YONG-UK.KIM. 1987(9). STUDIES ON THE LARVAE AND JUVENILES OF FLYING FISH, PROGNICHTHYS AGOO (TEMMINCK ET SCHLEGEL) (PISC+. BULL. KOREAN FISH. SOC. 20(5):447-456. KOREAN FISH. SOC., PUSAN. KO.

The osteological development of the larvae and juveniles of Prognichthys agoo was examined on the laboratory-reared materials of 5.06-20.01 mm in mean total length (MTL). Cranium, vertebrae, caudal skeleton, shoulder girdle bone, pelvic girdle bone, pterygiophore and jaw bones were described in detail to examine the sequences of ossification. Ossification of the cranium took place at ca. 5.06 mm of MTL in exoccipital, basioccipital, parasphenoid. Ossification of the visceral skeleton occurred in areas where active movements of bones were required, notably in the parts for feeding and respiration.

87BI0204. M.MIYA, T.NEMOTO. 1987(9). REPRODUCTION, GROWTH AND VERTICAL DISTRIBUTION OF THE MESO- AND BATHYPELAGIC FISH CYCLOTHONE ATRAR+. DEEP-SEA RES. 34(9):1565-1577. PERGAMON PRESS, OXFORD. EN.

The life history and vertical distribution of the meso- and bathypelagic fish Cyclothone atraria (family Gonostomatidae) are described on the basis of about 9800 specimens taken during a series of 20 cruises from December 1982 to November 1985 at a station near the center of Sagami Bay, Central Japan. C. atraria does not undertake overall diel vertical migrations, being concentrated in the lower mesopelagic and bathypelagic zones below 400 m, with peak abundance at about 600 m both day and night. Spawning occurs mainly during

the summer and early autumn. C. atraria releases about 500-3000 eggs at once and may spawn several times during its life span.

87BI0205. J.CLUTTON-BROCK, G.B.CORBET, M.HILLS. 1976(4). A REVIEW OF THE FAMILY CANIDAE, WITH A CLASSIFICATION BY NUMERICAL METHODS. BULL. BRITISH MUSEUM, ZOOLOGY. 29(3):117-199. BRITISH MUSEUM NAT. HIST. PN-2362. EN.

Within the accepted classification of the Canidae it is usual to recognize three subfamilies, fourteen genera and thirty-seven species, excluding the domestic dog. Using numerical methods and a total of ninety characters an analysis has been carried out of the overall similarity between thirty-five of these species plus two breeds of domestic dog. The specimens used for this analysis are in the collections of the British Museum (Natural History). Classification above the level of species has been critically examined on phenetic characters.

87BI0206. R.WAGEMANN, R.HUNT, J.F.KLAVERKAMP. 1984. SUBCELLULAR DISTRIBUTION OF HEAVY METALS IN LIVER AND KIDNEY OF A NARWHAL WHALE (MONODON MONOCEROS+. COMP. BIOCHEM. & PHYSIOL. 78(2):301-307. PERGAMON PRESS, OXFORD. PN-2479. EN.

1. The subcellular distribution of Zn, Cd, cu and Hg in liver and kidney from a narwhal was determined by ultracentrifugation and gel filtration. 2. Most of the total mercury in the liver and kidney was bound by the cellular pollet (88 and 73%, respectively). Of the total mercury, 7 and 11% was in the form of methylmercury in the liver and kidney, respectively. 3. More than half (74%) of the total Zn and Cu in the kidney was in the cytosol and somewhat less than this was in the cytosol of the liver. 4. Almost all of the cadmium in liver and kidney (88 and 92%, respectively) was in the cytosol. 5. Cytosolic fractions from liver and kidney were evaluated for the presence of metallothionein by analysing for Zn, Cd, Hg, Cu, Fe and-SH groups, by molecular weight estimation and by u.v.abs+.

87BI0207. R.D.KENNEY, H.E.WINN. 1987. CETACEAN BIOMASS DENSITIES NEAR SUBMARINE CANYONS COMPARED TO ADJACENT SHELF/SLOPE AREAS. CONTINENTAL SHELF RES. 7(2):107-114. PERGAMON PRESS, OXFORD. EN.

Estimated cetacean biomass densities in areas of the northeastern U.S. continental shelf edge encompassing major submarine canyons were compared to those in neighboring shelf/slope areas. It was hypothesized that biomass-densities would prove to be higher in the canyon areas: however, the analysis demonstrated significantly lower total cetacean biomass in the canyon areas. When species were analyzed individually, only spotted dolphins (Stenella spp.) showed a significant difference, with higher densities near the canyons. The conyons are apparently not more important as a cetacean habitat than the shelf break region generally.

87BI0208. J.B.ZHANG. 1982(6). NOTES ON THE HYDROMEDUSAE FAUNA OF THE CHINA SEA AREAS. ACTA OCEANOL. SINICA. 1(1):126-135. CHINA OCEAN PRESS, BEIJING. EN.

87BI0209. C.Z.NI, ET AL. 1984(1). ECOLOGICAL DISTRIBUTION OF OF HYDROCARBON-DEGRADATION BACTERIA IN XIAMEN HARBOR. ACTA OCEANOL. SINICA. 3(1):129-136. CHINA OCEAN PRESS, BEIJING. EN.

The ecology of hydrocarbon-degrading bacteria were investigated during five cruises in Xiamen Harbor. The isolated strains which can degrade the petroleum belong to fifteen genera. Most strains can only degrade-one kind of hydro-carbon or petroleum. The result: showed that the population and the species-composition of hydro carbon-degrading microorganisms were positively correlated with existing level of oil pollution and with water temperature, but independent of total microbial count.

87BI0210. M.Q.ZHANG, ET AL. 1984(7). MARINE BIOLOGICAL CHORUSES OBSERVED IN XIAMEN HARBOUR. ACTA OCEANOL. SINICA. 3(3):321-326. CHINA OCEAN PRESS, BEIJING. EN.

Marine biological choruses observed in Xiamen harbour from August 1981 to October 1982 lasted for a few hours each time during the neap tide in spring, summer and autumn, in both the evening and the morning, with most energy at frequencies between 700 Hz and 1.6 kHz and spectral peaks mainly at 800 Hz, 1 kHz and 1.25 kHz. during choruses, noise spectrum levels rose up to 46 dB higher than the background noise in the sea state 0. The statistics of occurrence of the evening choruses indicate that they might be fairly widespread in and near shallow waters of the region. sources of such choruses are likely to be attributed to Johnnius belengerii and Collichthys lucidus of the family Sciaenidae.

87BI0211. J.X.MA, D.X.JIN. 1985(4). THE VERTICAL MIGRATION OF DIATOM IN LITTORAL OF XIBIAN AND XIAO'AO. ACTA OCEANOL. SINICA. 4(2):297-303. CHINA OCEAN PRESS, BEIJING. EN.

The vertical migration of diatoms in mud-flats was studied in littoral of Xibian, Longhai County and Xiao'ao, Lianjiang County, the dominant species being Gyrosigma spencerii and Hantzschia virgata respectively. Both light and tide are important factors affecting the vertical migration of diatoms. With the advent of tide, the diatom community disappears from the surface. It reappears gradually when exposed to light. In the dark, the diatoms never appear in great quantity on the surface in laboratory or in littoral. Whether in the light or in the dark, the diatoms aggregate in maximum numbers in the upper 2 mm of the sediment. But when the tide has covered the sediments for 4 hr, Hantz. virgata penetrates the mud down to a depth of 14 mm, Gy. spencerii, 12 mm.

87BI0212. I.KACZMARSKA, G.A.FRYXELL, T.P.WATKINS. 1986(11/12 EFFECT OF TWO GULF STREAM WARM-CORE RINGS ON DISTRIBUTIONAL PATTERNS OF THE DIATOM

GENUS NITZSCHIA. DEEP-SEA RES. V.33(11/12:1843-1868. PERGAMON PRESS, OXFORD. EN.

Two Gulf Stream warm-core rings (WCR) of different ages, 81-D and 82-H, were studied in early autumn of sequential years for the composition and distribution of the pennate diatom genus Nitzschia. The changes in abundance in relation to other phytoplankton indicate that the genus is not opportunistic in taking advantage of overturns in the water column. Rather it survives well in stressful situations such as the High Velocity Region or during periods of ring overwash by Slope Water, when other cell numbers are low. This study supports the concept of WCR as a flattening bowl or disc-shaped body that responds within hours to internal overturns and incorporation of Slope Water streamers.

87BI0213. F.B.GRIFFITHS, V.A.WADLEY. 1986(11/12 A SYNOPTIC COMPARISON OF FISHES AND CRUSTACEANS FROM A WARM-CORE EDDY, THE EAST AUSTRALIAN CURRENT+. DEEP-SEA RES. V.33(11/12:1907-1922. PERGAMON PRESS, OXFORD. EN.

Mesopelagic fishes and crustaceans inside a newly formed, warm-core eddy off eastern Australia were similar in composition and abundance of species to those from the more northerly Coral Sea and East Australian Current (EAC) source waters of the eddy. The crustaceans inside the eddy were a mixture of warm-water and cold-water species and were dissimilar to the crustacean fauna on either the Tasman Sea or the Coral Sea-EAC sampling sites. In contrast, of the fishes collected (all from the family Myctophidae), only warm-water or widespread species were present in the eddy. A zoogeographic transect along 155 Deg. between 16 Deg. S and 32 Deg. S showed cold-water crustaceans were present between 24 Deg. S and 32 Deg. S whereas cold-water fishes were absent.

87BI0214. JAE-HYUNG.SHIM, WON-HO.LEE. 1987(3). DISTRIBUTION OF PHYTOPLANKTON SPECIES AND ASSOCIATED ENVIRONMENTAL FACTORS IN THE SOUTHWESTERN WAT+. J. OCEANOL. SOC. KOREA. 22(1):34-42. OCEANOL. SOC. KOREA, SEOUL. EN.

Canonical correlation analysis was applied on phytoplankton species and associated physico-chemical environmental factors of the surface mixed-layer in the southwestern waters of the East Sea, Korea. water temperature was the most significant environmental factor for the distribution of phytoplankton species among the seven factors examined in spring, and salinity in autumn. The importance of these two environmental factors was discussed with the seasonal variations of the hydrographical regime.

87BI0215. A.MAUVIEL, S.K.JUNIPER, M.SIBUET. 1987(3). DISCOVERY OF AN ENTEROPNEUST ASSOCIATED WITH A MOUND-BURROWS TRACE IN THE DEEP SEA: ECOLOGICAL AND+. DEEP-SEA RES. 34(3):329-335. PERGAMON PRESS, OXFORD. EN.

An exceptional box core sample taken in the Bay of Biscay (2100 m depth) revealed an organism beneath a relatively undisturbed mound surrounded by burrows. This type of biogenic micorelief is well known in the deep sea, but, as with many other benthic faunal traces, the responsible organism has remained unidentified. The fragile fragmented animal recovered is an enteropneust and likely the builder of the sampled mound-burrows complex. We report here the dimensions of the mound and burrows and data revealing their high density in several basins of the North Atlantic, and the correlation of the abundance of biological traces on the sediment surface with isotopic evidence of bioturbation.

87BI0216. W.Z.YU, D.R.HE, Y.S.ZHENG. 1982(12). STUDIES ON THE PHOTOTACTIC BEHAVIOR OF ROUND SCAD AND CHUB MACKEREL. ACTA OCEANOL. SINICA. 1(2):275-281. CHINA OCEAN PRESS, BEIJING. EN.

The paper describes the phototactic types of fishes in the photogradient. The phototactic behaviour depends not only on the strength of illumination, but also on the wavelength of various light. Influence of moonlight was also investigated. It is found that the degree of inhibition depends on the relative intensity between background light and stimulating light and on the phototactic character of fishes. Finally, a theoretical analysis for phototactic behaviour of fishes is suggested. Basic research on the phototactic behaviour of fishes is not only significant for understanding the influence of light on fish behaviour, but also has implication for producton.

87BI0217. C.LOCKYER, R.J.MORRIS. 1985. A WILD BUT SOCIABLE DOLPHIN OFF PORTREATH, NORTH CORNWALL. J. ZOOL. 207:605-607. ZOOL. SOC. LONDON. PN-2938. EN.

87BI0218. A.SHANKS, W.G.WRIGHT, G.MALTZ. 1986. WHAT TRIGGERS THE "BAIL OUT" BEHAVIOUR IN THE LIMPET LOTTIA GIGANTEA?. MARINE BEHAV. PHYSIOL. 12:71-79. GORDON & BREACH SCI. PUB., N.Y PN-2704. EN.

Manipulating objects (small rocks, mussel shells, etc.) to which limpets are clinging will cause many spontaneously to release their hold ("bail out"). Experiments demonstrated that in the owl limpet (Lottia gigantea) bail out was only triggered by rotation of the limpet around a horizontal axis at rates of 0.13 to 1.00 rps. Limpets reattached more vigorously to a surface following a "bail out" than when they were forcibly removed from the substratum. In the field a variety of intertidal gastropods were observed to "bail out". "Bail out" appears to be an adaptive response allowing an individual to abandon a dislodged substratum for a more stable one.

87BI0219. J.KOHLMEYER, B.BEBOUT. 1986(7). ON THE OCCURRENCE OF MARINE FUNGI IN THE DIET OF LITTORINA ANGULIFERA AND OBSERVATIONS ON THE BEHA+. MARINE ECOLOGY. 7(4):333-343. PAUL PAREY SCI. PUB., BERLIN. PN-2705. EN.

The feeding and resting patterns of Littorina angulifera, the southern periwinkle, were observed in

mangrove habitats of Belize (Central America). The snails feed predominantly on the surface of prop roots of Rhizophora mangle in a narrow zone at and above the mean high water mark. This area contains large numbers of hyphae and chlamydospores of an unidentified marine fungus (Deuteromycetes) and filaments of a chlorophyte (Chlorochytrium sp.). Both organisms are ingested by snails whose digestive tracts and fecal pellets contain ground-up cork cells, trichosclereids, tracheids, calcium oxalate crystals, fungal hyphae and chlamydospores, as well as undigested cyanobacteria. Most fungal particles pass through the gut unchanged. During dry periods, L. angulifera is in a dormant state, us+.

87BI0220. D.THISTLE, G.D.F.WILSON. 1987(1). A HYDRODYNAMICALLY MODIFIED, ABYSSAL ISOPOD FAUNA. DEEP-SEA RES. 34(1):73-87. PERGAMON PRESS, OXFORD. EN.

At the High Energy Benthic Boundary Layer Experiment (HEBBLE) SITE (4820 m depth in the western North Atlantic) periods of strong currents and sediment erosion alternate with periods of weak flow and massive deposition. We investigated the impact of this atypical hydrodynamic environment on the isopod fauna by testing for a difference in composition between the HEBBLE site and a tranquil location, the Deep Ocean Mining Environmental Study (DOMES) site A (ca. 5000 m) in the equatorial Pacific. Epifaunal isopods were significantly less abundant at the HEBBLE site than at the comparison site despite significantly greater total isopod numbers at the HEBBLE site. We suggest that the hydrodynamic regime puts epifaunal isopods at risk, making them rare at the HEBBLE site.

87BI0221. SANG-TAEK.SHIN. 1976(6). APPROXIMATE ESTIMATION OF THE SURVIVAL RATE IN FISH POPULATION UTILIZING THE LENGTH COMPOSITION. BULL. KOREAN FISH. SOC. 9(2):143-150. KOREAN FISH. SOC., PUSAN. KO.

A trial has been made to find out a new method of calculating the survival rate of a fish Population utilizing the length composition data and the characteristics of the frequency curve of the length which usually is normal distribution curve. In this paper, a stochastic method is introduced and applied to calculate the survival rate of yellow croaker caught by Korean trawlers in the Yellow Sea and the East China Sea in 1971.

87BI0222. SANG-TAEK.SHIN. 1977(6). ESTIMATION OF THE SURVIVAL RATE IN FISH POPULATION FROM THE LENGTH COMPOSITION AND THE GROWTH EQUA+. BULL. KOREAN FISH. SOC. 10(2):137-143. KOREAN FISH. SOC., PUSAN. KO.

A study has been made to find out a new method of calculating the survival rate of a fish population from length composition and growth equation.

87BI0223. BONG-SUK.RYU, JONG-HWA.LEE. 1979(3). THE LIFE FORM OF PERIOPHTHALMUS CANTONENSIS IN THE GUM RIVER IN SUMMER. BULL. KOREAN FISH. SOC. 12(1):71-77. KOREAN FISH. SOC., PUSAN. KO.

An ecological survey on the crawling activity of the Periophthalmus cantonensis in the Gum River was carried out during the period from July to October 1978. The results obtained are as follows. Distribution: From Chilsanri to Osikdo. Density of population (Number/square meter): 1.5, High ebb zone: 2.6=56%, Mid ebb zone: 1.5=32%, Low ebb zone: 0.5=12%. The percentage of the fish having established territory: 86%. Mean body length of the fish having established territory: 57 mm. Mean body length of the transfering population: 2.16 mm/sec. Activity area: 10 m.

87BI0224. YONG-RHIM.YANG. 1979(6). PHOTOTAXIS OF FISH (1) - CYPRINUS CARPIO -. BULL. KOREAN FISH. SOC. 12(2):79-86. KOREAN FISH. SOC., PUSAN. KO.

The phototaxis of common carp Cyprinus carpio was studied under laboratory conditions to find out distributional pattern of the fish under light gradient and to find the light intensity which causes the maximum gathering rate. The optimum light intensities were determined. The fish tended to escape from the light source when the light intensity was stronger or weaker than a certain optimum value. The gathering rate of the fish could be divided into two types: reflex gathering rate and equilibrium gathering rate. The reflex gathering rate appeared quickly soon after lighting and gradually changed as time elapsed, while the equilibrium gathering rate was almost always constant.

87BI0225. JAE-HAC.LEE, JONG-GEEL.JAE. 1983(12). POLYCHAETOUS ANNELIDS FROM THE YELLOW SEA, I. FAMILY NEPHTYIDAE. BULL. KORDI. 5(2):19-27. KORDI., SEOUL. EN.

Distributions and taxonomic characteristics of the Nephtyidae in the Yellow Sea adjacent to Korea are described. Four genera, seven species and one subspecies are identified from samples taken during the study. One new subspecies, Micronephthys sphaerocirrata orientalis is found and three genera comprising three species, Aglaophamus sinensis, Inermonephtys inermis, Nephtys oligobranchia, are reported from Korea for the first time.

87BI0226. SOON-KIL.YI. 1983(12). STUDIES ON THE OPHIUROIDEA IN THE COASTAL WATERS OF KOREA, I. AMPHIURIDAE. BULL. KORDI. 5(2):9-17. KORDI., SEOUL. EN.

Ophiurans collected from the Yellow Sea and southern coast of Korea were identified. Eight species are found; among them, five species belonging to the family Amphiuridae, Amphiura aestuarii, Amphioplus tricoides, A. ancistrotus, A. megapomus and Amphipholis squamata are found to be unrecorded species in Korean waters.

87BI0227. J.Y.DENG, Y.D.KANG, J.S.ZHU. 1983(12). TAGGING EXPERIMENTS OF THE PENAEID SHRIMP IN THE BOHAI SEA AND HUANGHAI SEA IN AUTUMN SEASON. ACTA OCEANOL. SINICA. 2(2):308-319. CHINA OCEAN PRESS, BEIJING. EN.

There exists obvious difference in recapture rate of tagged shrimp in various sea areas and years in

autumn season, but the majority of them (98%) are recaptured in the releasing year. Although the main portion of each shrimp group in the Bohai Sea has separate distribution area, they intermingle in autumn season to search for food, thus forming a principal fishing ground located in the central Bohai Sea.

87BI0228. JAE-HAC.LEE. 1984(12). POLYCHAETOUS ANNELIDS FROM THE YELLOW SEA, II. FAMILY GLYCERIDAE. BULL. KORDI. 6(1/2):13-19. KORDI., SEOUL. EN.

The seven species of the family Glyceridae from the Yellow Sea adjacent to Korea are reviewed and their distributions are described. Of them, one new species, Glycera dentribranchia is described and three species (G. onomichiensis, G. alba, G. convoluta) are reported newly from Korea.

87BI0229. B.MORTON, M.W.YIPP, Z.G.HUANG. 1984(4). THE DISTRIBUTION AND ECOLOGICAL-BIOLOGICAL FEATURES OF CREPIDULA ONYX IN HONG KONG. ACTA OCEANOL. SINICA. 3(2):263-275. CHINA OCEAN PRESS, BEIJING. EN.

C. onyx, originally distributed in california, was found in great quantities in Victoria Harbour, Hong Kong in 1982 and was identified according to the study of its morphology and the radula teeth. Lots of the individuals of the species lived in overlapping colony, with the female at the lower, and the male in the upper while the sex-transforming individual at the middle. They attached on the shells of Perna viridis in a high density of 715 ind./square meter. studies have been carried out on its population structure, individual size, age and sex composition and on reproductive biology, such as sex transformation, change of the length of penis and fecundity.

87BI0230. SOON-KIL.YI. 1985(6). STUDIES ON THE HOLOTHUROIDEA IN THE COASTAL WATERS OF KOREA, I. SYNAPTIDAE. OCEAN RES. 7(1):1-9. KORDI., SEOUL. EN.

Three species of holothurians belonging to the family Synaptidae were identified. Among them, Labidoplax dubia and Leptosynapta inhaerens are found to be unrecorded species in Korean waters.

87BI0231. S.S.CHARMASSON, D.P.CALMET. 1987(9). DISTRIBUTION OF SCAVENGING LYSIANASSIDAE AMPHIPODS EURYTHENES GRYLLUS IN THE NORTHEAST ATLANTIC: C+. DEEP-SEA RES. 34(9):1509-1523. PERGAMON PRESS, OXFORD. EN.

Deep-sea scavenging amphipods, Eurythenes gryllus, were caught in the northeast Atlantic Ocean with baited traps attached on free-vehicle lines at different levels above the seafloor, in September 1983 and May 1984. Maximum catch rates occurred at altitudes <20 m and decreased rapidly above. The mean size of E. gryllus and the proportion of females were higher in September compared to May, indicating that we may have sampled a younger population in May. The study of color distribution versus amphipod size ranges revealed that E. gryllus become colored when maturing. Although the proportion of pigmented amphipods increased with increasing height of catch, this variation was not statistically significant.

87BI0232. G.ALBERTELLI, A.BALDUZZI, R.CATTANEO. ANALISI STRUTTURALE SU ALCUNI POPOLAMENTI BENTONICI LUNGO IL LITORALE GENOVESE. ATTI DEL 6 CONGR. ASSOC. ITALIANA OCEANOL. LIMNOL. 187-194. PN-2533. IT.

A preliminary study of the coastal zoobenthic communities nearby the town of Genoa has been carried out with 42 samplings along seven transects from the coast line to 1500 m off-shore. The Sorensen similarity index easily identified different communities. Soft bottoms are present in 27 stations; their zoobenthic communities and sediment texture have been studied with a multivariate technique. A close correspondence exists between the zoobenthic distribution and sediment texture in the large part of the studied area. Anomalous distributions of the zoobenthos in some stations are discussed in relation to local pollution phenomena and shore-line modifications due to maritime works.

87BI0233. G.ALBERTELLI, M.CATTANEO. MACROBENTHOS DEI FONDI MOLLI DEL MAR LIGURE. ATTI DEL 6 CONGR. ASSOC. ITALIANA OCEANOL. LIMNOL. 87-98. PN-2536. IT.

The results of 10 years of researches on the soft bottom macrobenthos in the Ligurian Sea are outlined. These researches, concerning the bottoms of the continental shelf and slope between 40 and 1200 m depth, provide a first faunistic, bionomic and quantitative picture of the macrobenthos in this area. The changes taking place along the bathymetric gradient in the faunistic composition, diversity, density and distribution of macrobenthonic populations are reconstructed. Moreover, in some pilot areas of the continental shelf the seasonal variations of the populations, including their biomasses, are studied.

87BI0234. M.G.CEVASCO, N.DELLA CROCE. PONTELLIDAE (COPEPODA) IN MAR LIGURE E ALTO TIRRENO. ATTI DEL 6 CONGR. ASSOC. ITALIANA OCEANOL. LIMNOL. 273-278. PN-2537. IT.

Ninety-eight hyponeustonic samples were collected during three oceanographic cruises in the Ligurian and North Tyrrhenian Seas in November 1975, March 1976 and October 1978. Salinity and temperature at surface were recorded. The present note deals with the Copepods of the family Pontellidae, tipical hyponeustonic forms. Nine species of Pontellids were found and Anomalocera patersoni, Pontella mediterranea and Labidocera wollastoni were numerically the abundant ones. The seasonal and geographic distribution in the Ligurian and North Tyrrhenian Seas as well as in the Western Mediterranean Sea, including temperature and salinity ranges at which the species have been found, were studied. The value of the dormant eggs in Pontellidae has been discussed in relation to the geographical dist+.

87BI0235. TAI-SOO.PARK. 1956(12). A STUDY ON THE QUANTITY AND COMPOSITION OF

MICROPLANKTON AT SOUTHERN SEA OF KOREA IN SUMMER, 1956. BULL. NATIONAL FISH. UNIV. PUSAN. 1(1):13-32. NATIONAL FISH. UNIV. PUSAN. PN-2970. KO.

The material for this study was collected during the period Aug. 13-28, 1956, at 59 stations distributing in the Southern Sea of Korea. The numerical abundance and quantitative and qualitative composition of Microplankton are studied upon these samples. The method of collection consisted in filtering each time just 20 l of the surface water through the Nylon cloth. The material is diluted with water about 10 times as much as it's settling volume, and 0.5 C.C. of the diluted sample is poured into a counting chamber. Counting is made under microscope usually on the whole area of the chamber.

87BI0236. TAI-SOO.PARK. 1956(12). ON THE SEASONAL CHANGE OF THE PLANKTON AT KOREAN CHANNEL. BULL. NATIONAL FISH. UNIV. PUSAN. 1(1):1-12. NATIONAL FISH. UNIV. PUSAN. PN-2969. KO.

I report on the Plankton in present investigation which was collected one time per month at each station from July 1954 to 1955. The Plankton was collected by vertical haul from the depth of 50 m at each station with Plankton net 45 cm in diameter at the mouth and 180 cm long, with coarse meshes. The volumes were measured in the laboratory by precipitating method, the sample in measuring tube being laid down untouched for 24 hours before measurement. Observing seasonal distribution of water temperature, surface temperature rises about 23 Deg. - 25 Deg. in Centigrade in summer, and begining to fall down from September, and getting minimum degree from January to March, in this case, it maintains about 14 Deg. - 15 Deg. in Centigrade.

87BI0237. M.A.BUZAS. 1968(2). FORAMINIFERA FROM THE HADLEY HARBOR COMPLEX, MASSACHUSETTS. SMITHSONIAN MISCELLANEOUS COLLECTIONS. 152(8):1-26. SMITHSONIAN INST., WASH. PN-2359. EN.

87BI0238. JUNG-SHIN.CHOE. 1969(6). SEASONAL CHANGES IN ABUNDANCE AND COMPOSITION OF DIATOMS IN THE SUYUNG BAY, PUSAN. BULL. KOREAN FISH. SOC. 2(1):16-24. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with the seasonal changes in abundance and composition of diatoms in the Suyung Bay, Pusan, Korea. This study was carried out from August 1966 through July 1967. As a result of the present study, 123 species of diatoms were identified. While the highest number of diatoms (2,554,000 cells per liter) was recorded in April of 1967, the lowest number (20,400 cells per liter) appeared in December of 1966. In general the standing stock of diatoms was high in spring and early fall and was low in late fall and winter.

87BI0239. YONG-SOOL.KIM. 1971(12). A STUDY ON THE SECULAR VARIATION OF ZOOPLANKTON BIOMASS IN THE EASTERN AREA OF THE YELLOW SEA. BULL. KOREAN FISH. SOC. 4(3/4):99-102. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with secular analysis of zooplankton biomass in the eastern area of the Yellow Sea during the last seven years from 1963-1969. The annual variation of zooplankton biomass in the research area shows increase since October 1965, the lowest point. The increasing shape is a parabola expression.

87BI0240. SANG-HO.SONG. 1971(12). PHYTOSOCIOLOGICAL STUDY OF MARINE ALGAE AT ODONG-DO. BULL. KOREAN FISH. SOC. 4(3/4):105-112. KOREAN FISH. SOC., PUSAN. KO.

The annual variation of algal vegetation at two reefs, A and B, of Odong-do, Yeosu, was observed two times each month during the period from June 1970 to May 1971, and the results obtained are as follows. The total number of the algal species occurred were 69 species, of which 12 species belong to Chlorophyceae, 17 species to Phaeophyceae and 40 species to Rhodophyceae. No significant difference was noticed in the occurrence number of algal species at the reefs observed. Most species of the algal communities in each algal belt did not show seasonal variations, but the following species showed fluctuations in cover degree: Ulva pertusa, Enteromorpha sp., Sphacelaria sp., Scytosiphon lomentaria, Colpomenia sinuosa, Sargassum thunbergii, Pterocladia tenuis, Amphiroa ephedrea, Carpopeltis+.

87BI0241. Y.NAKASONE. 1977. CRAB ZONATION IN THE YUHI RIVER, OKINAWA ISLAND. JAPAN. J. ECOL. 27:61-70. ECOL. SOC. JAPAN, HIROSHIMA. PN-2875. EN.

The vertical distribution of estuarine decapod crustaceans was investigated in the estuary of the Yuhi river, Okinawa. The zonation including land crab was classified in relation to the tide level into six main zones: 1) a cardisomine zone, 2) a sesarmine zone, 3) an ocypodine zone, 4) a macrophthalmine zone, 5) a mixed zone, 6) a Scylla zone. Factors governing these zonal arrangements are classified into two groups: the major factors related to the physiological tolerance of crabs and the factors related to the habitat preference of species. These arrangements and factors are compared with results from the mangrove swamps of Java and the Brisbane river, and discussed.

87BI0242. BYOUNG-SEO.MIN. 1977(12). DIFFERENTIATION OF SOME ENVIRONMENTAL FACTORS AND PLANKTONIC COMMUNITIES OF THE TWO AREAS DIVIDED +. BULL. KOREAN FISH. SOC. 10(4):243-258. KOREAN FISH. SOC., PUSAN. EN.

The coastal area between Youngdo and Jodo was a common coastal water not much different from other coastal waters before the construction of the breakwater between them. The breakwater between the two islands shuts off the tidal currents and divides the area into the two small isolated bays to create quite different environments. To understand the differences between them present study examined some environmental factors such as water temperature, salinity, dissolved oxygen, transparency, and major nutrients, phosphates, sillicates and nitrites and the phyto- and zooplankton. The samplings were carried out monthly from march

1976 to February 1977 at 4 stations: 2 stations in each bay.

87BI0243. JUNG-SHIN.CHOE. 1978(9). A PRELIMINARY REPORT ON THE DISTRIBUTION OF MICROPLANKTON IN TWO DIFFERENT AREAS OF THE EAST CHINA+. BULL. KOREAN FISH. SOC. 11(3):123-127. KOREAN FISH. SOC., PUSAN. KO.

Distributions of microplankton in two different regions of the East China Sea were studied based on the plankton samples collected by R.V. Umitaka Maru of Fisheries University of Tokyo, Japan in September, 1975. The abundance distribution and species composition of the two areas were interpreted with their temperature-salinity properties. The two areas are characterized by differences in the depth of thermocline, the nature of surface and bottom waters, and the abundance and species composition of microplankton.

87BI0244. HONG-JUN.YANG. 1979(3). THE CYPRINID FISH FAUNA IN THE HYEONGSAN RIVER. BULL. KOREAN FISH. SOC. 12(1):65-70. KOREAN FISH. SOC., PUSAN. KO.

The fish fauna of the Hyeongsan River was found to be as follows; 1. The study of fish fauna for this paper was achieved from May to August in 1978. 2. The collected cyprinid fishes from the Hyeongsan River are 13 species in 10 genera, i.e., Cyprinus carpio, Carassius auratus, Gnathopogon coreanus, Gnathopogon majimae, Pseudorasbora parva, Pungtungia herzi, Moroco oxycephalus, Moroco lagowskii, Tribolodon hakonensis, Zacco platypus, zacco temmincki, rhodeus ocellatus and Pseudoperilampus uyekii.

87BI0245. R.D.PINGREE, P.M.HOLLIGAN, G.T.MARDELL, R.P.HARRIS. 1982(11). VERTICAL DISTRIBUTION OF PLANKTON IN THE SKAGERRAK IN RELATION TO DOMING OF THE SEASONAL THERMOCLI+. CONTINENTAL SHELF RES. 1(2):209-219. PERGAMON PRESS, OXFORD. EN.

In the central Skagerrak between Norway and Denmark, the seasonal thermocline tends to be relatively shallow (10 to 15 m) probably due to geostrophic effects. An investigation of phytoplankton distribution in this region in late August 1981 showed the presence of an intense subsurface chlorophyll maximum (up to 30 ug Chl a/liter) at a temperature of <6 Deg. in Centigrade, dominated by coccolithophores and the dinoflagellate, Prorocentrum minimum. Data are presented on the vertical distribution of zooplankton in relation to these phytoplankton populations.

87BI0246. SOON-KIL.YI, JAE-SANG.HONG, JAE-HAC.LEE. 1982(12). A STUDY ON THE SUBTIDAL BENTHIC COMMUNITY IN ULSAN BAY, KOREA. BULL. KORDI. 4(1/2):17-26. KORDI., SEOUL. EN.

A quantitative investigation on the subtidal soft-bottom macrobenthic community in Ulsan Bay was carried out from June, 1980 to March, 1981. Of the 127 species of benthic organisms found, Polychaeta was the most dominant taxonomic group with 67 species which accounted for 88% of the total number of individuals. The number of species and individuals decreased from the inner bay toward the outer bay stations. At Station 1, a sharp drop in the number of individuals was noted from June to September, and this drop was mainly due to decrease in three dominant polychaetes, Cirratulus cirratus, Lumbrineris longifolia, and Tharyx sp.

87BI0247. KWANG-IL.YOO, JIN-HWAN.LEE. 1982(12). STUDIES ON THE PLANKTONIC DIATOMS IN THE VICINITY OF KORI NUCLEAR POWER PLANT. BULL. KORDI. 4(1/2):53-62. KORDI., SEOUL. KO.

To understand the changes of the species composition and the seasonal fluctuations of planktonic diatoms due to operation of Kori Nuclear Power Plant, a series of studies were carried out from June 1977 to December 1980. One hundred ten taxa of planktonic diatoms, representing 39 genera, 104 species, 4 varieties and 2 formas, were tentatively identified during the study. By the ecological habitat division, the neritic species comprised 61.82% of the total population, while the oceanic forms were 29.09%. The latter value was higher than that of any other southern coastal area, indicating a comparatively strong influence of open water current to the study area.

87BI0248. JAE-SANG.HONG. 1982(12). CONTRIBUTION A L'ETUDE DES PEUPLEMENTS D'UN FOND DE CONCRETIONNEMENT CORALLIGENE DANS LA REGION MA+. BULL. KORDI. 4(1/2):27-51. KORDI., SEOUL. FR.

A bionomic study of the coralligenous concretionary bottom in the northwestern Mediterranean coast was carried out in the region of Marseille, France. A total of 651 species are recognized, with bryozoans being the largest group followed by molluscs and polychaetes. Other well-represented groups were crustaceans and sponges. These five groups comprised about 84% of the total number of species in the station of Moyade. The installation of the calcareous algae, in particular of the family Corallinaceae, creates a unity of the various habitats of great structural and ecological complexity. This natural and architectural entity is represented by innumerable cavities of different size; these cavities, where the benthic biotops are greatly diversified, receive varying degrees of illuminat+.

87BI0249. Q.C.CHEN. 1982(12). A STUDY ON THE PLANKTON COMMUNITIES IN THE SOUTH HUANGHAI SEA AND THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 1(2):259-266. CHINA OCEAN PRESS, BEIJING. EN.

87BI0250. R.X.CHEN. 1982(12). THE DISTRIBUTION OF PLANKTONIC OSTRACODA ALONG THE WESTERN COAST OF TAIWAN STRAITS. ACTA OCEANOL. SINICA. 1(2):289-298. CHINA OCEAN PRESS, BEIJING. EN.

The present paper studies the seasonal change, quantitative variation and distributional patterns of planktonic Ostracoda along the western coast of the Taiwan Straits and their relationship with various environmental factors, especially those of the movement, intensification and decay and interaction of

different water systems. The total amounts of planktonic Ostracoda along the western coast of Taiwan Straits show evident seasonal variations with greater amounts in summer and autumn. The yearly maximum appeared in October and subpeaks in may and August. The quantity of the animal was lowest from january to April.

87BI0251. J.D.DUTIL, M.FORTIN. 1983. LA COMMUNAUTE DE POISSONS D'UN MARECAGE INTERTIDAL DE L'ESTUAIRE DU SAINT-LAURENT. LE NATURALISTE CANADIEN. 110:397-410. PRESSES UNIV. LAVAL, QUEBEC. PN-2480. FR.

Twelve species of fish were found in a survey of the kamouraska tidal marshes (St. Lawrence Estuary, quebec). Six species can be classified as dominant; Gasterosteus wheatlandi, Microgadus tomcod and Osmerus mordax (accounting for 86.9% of total catch), followed by Pungitius pungitius, Gasterosteus aculeatus and Liopsetta putnami. The other species are Anguilla rostrata, Alosa sapidissima, Dorosoma cepedianum, Fundulus diaphanus, Mallotus villosus et Pseudopleuronectes americanus. Mean fish density over the sampling period was 375 fish/1000 square meter or in terms of mass 946 g/1000 square meter. fish density was maximal in spring but species diversity peaked in summer. Not all the dominant species are abundant at the same time, but a general pattern emerges in which 1-year old and+.

87BI0252. DONG-YUP.KIM, HYUNG-TACK.HUH. 1983(12). SEASONAL VARIATIONS OF COPEPODS IN GAROLIM BAY. BULL. KORDI. 5(2):29-35. KORDI., SEOUL. KO.

Zooplankton community in Garolim Bay, an embayment in western coast of Korea, was dominated by Copepoda group in number of organisms as well as in species diversity throughout the study period from April 1980 to December 1981. The populations of this crustacean zooplankton in the bay appeared to be relatively poor with a range of 25-21, 476 organisms/cubic meter, showing considerable seasonal fluctuations. Among 43 species of 21 Genus identified, Paracalanus parvus and Acartia clausi occurred most widely from the entrance through middle part of the bay, while Eurytemora pacifica and Harpacticus uniremis were numerous exclusively at the inner bay during the spring and the winter months, respectively. Both the number and seasonal fluctuations of the populations increased from the bay mou+.

87BI0253. MYUNG-SOO.HAN, KWANG-IL.YOO. 1983(12). A TAXONOMICAL STUDY ON THE DINOFLAGELLATES IN JINHAE BAY, II: PERIDINIALES. BULL. KORDI. 5(2):49-67. KORDI., SEOUL. KO.

Studies on Peridiniales (Dinophyceae) in Jinhae Bay were carried out during the period from January 1980 through November 1981. As a result 25 species which representing 8 genera 4 families were identified. The morphological characteristics and distribution patterns of the Peridiniales are discussed.

87BI0254. MYUNG-SOO.HAN, KWANG-IL.YOO. 1983(12). A TAXONOMICAL STUDY ON THE DINOFLAGELLATES IN JINHAE BAY, I. ARMORED AND UNARMORED DINOFLAGELLATES. BULL. KORDI. 5(2):37-47. KORDI., SEOUL. KO.

A taxonomical study of dinoflagellates in Jinhae Bay was carried out from January, 1980 to November, 1981. It was shown that the armored dinoflagellates were the major groups among 36 species representing 16 genera identified. Of them, Dinophysis acuminata, Oxyphysis oxytoxoides, Amphidinium longum, Diplopsalis pilula, Heterocapsa triquetra, Protoperidinium achromaticum, P. bipes, P. marielebouriae, P.subinerme, Gonyaulax grindleyi, G. triacantha, G. verior, Triadinium orientale, and Spatulodinium pseudonoctiluca were identified for the first time from the Korean coastal waters. Those species found were systematically classified, and their morphological characteristics and distribution were discussed in detail. Peridiniales were discussed in Part II.

87BI0255. T.C.MALONE, T.S.HOPKINS, P.G.FALKOWSKI, T.E.WHITLEDGE. 1983(4). PRODUCTION AND TRANSPORT OF PHYTOPLANKTON BIOMASS OVER THE CONTINENTAL SHELF OF THE NEW YORK BIGHT. CONTINENTAL SHELF RES. 1(4):305-337. PERGAMON PRESS, OXFORD. EN.

Seasonal and event scale variations in the distribution and growth of phytoplankton in different hydrographic regions of the continental shelf are compared and evaluated in terms of floristic composition and the evolution of density and nutrient structure across the shelf. Annual cycles of phytoplankton biomass inshore of the 1000-m isobath are characterized by a March maximum and a July minimum. Cross-shelf biomass gradients usually increase in an offshore direction, a phenomenon that is most pronounced during march and April when biomass is high, diatoms dominate, and growh rate is light limited. This is a consequence of the combined effects of growth along the stratified side of the shelf-break front and offshore transport of biomass produced nearshore.

87BI0256. M.VECCHIONE, G.C.GRANT. 1983(4). A MULTIVARIATE ANALYSIS OF PLANKTONIC MOLLUSCAN DISTRIBUTION IN THE MIDDLE ATLANTIC BIGHT. CONTINENTAL SHELF RES. 1(4):405-424. PERGAMON PRESS, OXFORD. EN.

Faunal structure is described for the planktonic molluscs of the Middle Atlantic Bight based on two years of seasonal data from the continental shelf. Collection and taxa groups are constructed using numerical classification and reciprocal averaging ordination. Discriminant analysis is used to relate surface collection groups to physical variables, then taxa group distribution among these collection groups is analyzed by nodal fidelity analysis. The areal distribution of dominant species is presented by season, as is their surface temperature-salinity distribution.

87BI0257. L.R.POMEROY, ET AL. 1983(5). MICROBIAL DISTRIBUTION AND ABUNDANCE IN RESPONSE TO PHYSICAL AND BIOLOGICAL

PROCESSES ON THE CONTI+. CONTINENTAL SHELF RES. 2(1):1-20. PERGAMON PRESS, OXFORD. EN.

The distribution & abundance of bacteria and phytoplankton on the continental shelf of the southeastern United States were observed in relation to physical processes. Phytoplankton production was influenced by inputs of water of reduced salinity from the estuaries and by inputs of high salinity, low-temperature water from the west front of the Gulf Stream. The distribution of chlorophyll suggests that in each case production is influenced both by inputs of nutrients and by the enhanced vertical stability associated with the stratification of waters of different densities. The standing stock of bacteria on the inner shelf, 1000000/ml is little changed by the influx of water of reduced salinity.

87BI0258. D.D.SAMEOTO. 1984. VERTICAL DISTRIBUTION OF ZOOPLANKTON BIOMASS AND SPECIES IN NORTHEASTERN BAFFIN BAY RELATED TO TEM+. POLAR BIOLOGY. 2:213-224. SPRINGER-VERLAG, BERLIN. PN-2465. EN.

Vertical distributions of various species and stages of zooplankton at different times of the day were determined by stratified sampling with the BIONESS in northeastern Baffin Bay during early August. The water column was divided into an upper subarctic zone, a lower subarctic zone and a deep zone of Atlantic water. The upper subarctic zone was dominated by two species of pteropod molluscs; the lower subarctic water was dominated by the copepods, Calanus finmarchicus, C. glacialis and C. hyperboreus whose copepodite stages showed depth distributions that were different from one another, with the copepodite stage 5 and adult females generally shallower than the younger stages. All stages of all Calanus species were in the zone of primary production (10 to 50 m) while the copepods Pseu+.

87BI0259. R.W.EPPLEY, F.M.H.REID, E.STEWART. 1984. LENGTH OF PHYTOPLANKTON SPECIES PATCHES ON THE SOUTHERN CALIFORNIA SHELF. CONTINENTAL SHELF RES. 3(3):259-266. PERGAMON PRESS, OXFORD. EN.

Study of a longshore transect off Southern California suggests that the length scales (22 to 27 km) of phytoplankton species patches may be related to those of low-frequency currents. The patch boundaries were independent of shelf width but they were probably not independent of changes in chlorophyll fluorescence, temperature, and bottom topography.

87BI0260. P.R.PUGH, G.A.BOXSHALL. 1984. THE SMALL-SCALE DISTRIBUTION OF PLANKTON AT A SHELF STATION OFF THE NORTHWEST AFRICAN COAST. CONTINENTAL SHELF RES. 39(4):399-423. PERGAMON PRESS, OXFORD. EN.

The small-scale distribution of zooplankton in the euphotic zone has aroused much interest in recent years, particularly with regard to which features of the water column structure might be causing or strongly affecting such distributions. At a station on the continental shelf off Mauretania pump sampling techniques were used to investigate the relation between the vertical distribution of various zooplankton taxa and the physical, chemical, and biological structure of the water column (water depth 60 m). Attention was focused on the very precise patterns of zooplankton distribution in the region of the pycnocline and its associated massive chlorophyll a and phytoplankton biomass maximum.

87BI0261. J.D.GAGE, ET AL. 1984. ECHINODERM ZONATION IN THE ROCKALL TROUGH (NE ATLANTIC). PROC. 5TH INT. ECHINODERM CONF., GALWAY, 24-29 SEPT. 1984. 31-36. PN-2921. EN.

In deep-sea sampling undertaken by the SMBA over the past 10 years much further information has been obtained on the distribution of echinoderms in the Rockall Trough. Study of the more abundant species has defined bathymetric distributions which reflect vertical zonation in the overall distribution of the echinoderm fauna. The most clearly expressed pattern was a transition zone around 1000 m depth. A further increase in rate of first and last occurrences of species seems to occur around 2000 m for ophiuroids and holothurians. Another trend was a considerably broader bathymetric range shown by post-larval and juvenile stages compared to the adults of certain species that are thought to have indirect larval development.

87BI0262. A.J.GOODAY, P.L.COOK. 1984. AN ASSOCIATION BETWEEN KOMOKIACEAN FORAMINIFERS (PROTOZOA) AND PALUDICELLINE CTENOSTOMES (BRYOZOA)+. J. NATURAL HISTORY. 18:765-784. TAYLOR & FRANCIS, LONDON. PN-2692. EN.

87BI0263. L.F.ZHENG, P.X.WANG. 1984(1). THE FORAMINIFERAL ASSEMBLAGES IN THE SURFACE SEDIMENTS FROM THE CENTRAL PACIFIC OCEAN. ACTA OCEANOL. SINICA. 3(1):84-95. CHINA OCEAN PRESS, BEIJING. EN.

As a result of the quantitative and qualitative analyses of foraminifera from 18 surface sediment samples taken from the central pacific ocean, three assemblages of benthonic foraminifera in different water depths are preliminarily recognized, namely, (i) shelf assemblage of Amphistegina venosa (Fichtel and Moll) and Calcarina hispida Brady, inhabiting areas with water depths less than 100 m, (ii) bathyal assemblage of Globocassidulina subglobosa (Brady) and Osangularia bengalensis (Schwager), with water depths ranging from 900 to 4800 m, and (iii) abyssal assemblage of Cribrostomoides subglobosum (Sars) and Cystammina galeata (Brady), characteristic of water depths greater than 4800 m.

87BI0264. S.D.LIN, ET AL. 1984(10). AN ANALYSIS OF THE BENTHIC FAUNAL COMMUNITY STRUCTURE IN SOFT-BOTTOM INTERTIDAL ZONE ALONG NORTHER+. ACTA OCEANOL. SINICA. 3(4):539-546. CHINA OCEAN PRESS, BEIJING. EN.

Four indexes of species diversity (H), species richness (d), species evenness (J) and species dominance (D) are used in this paper to analyse the characteristics of the benthic faunal community structure in the

soft-bottom intertidal zone along the northern coast of the Hangzhou Bay. The results show a rather simple benthic faunal community structure in the survey area, with the average values of the four indexes from the five transects, namly, H=2.06, d=3.34, J=0.46 and D=0.73. Different degrees of the seasonal and regional variations have been observed from each index per transect.

87BI0265. R.L.ZOU, J.S.YE, W.Z.WANG, W.B.YUAN. 1984(7). A NUMERICAL MODEL OF PHYTOPLANKTON BIOMASS IN THE CENTRAL WATERS OF SOUTH CHINA SEA. ACTA OCEANOL. SINICA. 3(3):417-423. CHINA OCEAN PRESS, BEIJING. EN.

The present study is based on the materials collected from the middle waters of the South China Sea between 12-15 N and 111-118 E during May to July in 1978. The biomass of the phytoplankton is established to give the biomass of each Species and the environmental factors (i.e. water temperature, salinity, oxygen, silicate and phosphate contents). According to the mathematical tests and the practical experience by which a lot of species are deleted and added to the equation, the authors consider that the 4th equation as shown below is optimal one for the model of the biomass on the phytoplankton from this waters.

87BI0266. R.WILLIAMS. 1985. VERTICAL DISTRIBUTION OF CALANUS FINMARCHICUS AND C.HELGOLANDICUS IN RELATION TO THE DEVELOPMENT O+. MARINE BIOLOGY. 86:145-149. SPRINGER-VERLAG, BERLIN. PN-2416. EN.

The geographical distribution and annual mean abundance of Calanus finmarchicus (Gunnerus) and C. helgolandicus (Claus) in the nothern North Atlantic Ocean were shown in relation to the seasonal and annual fluctuations of abundance of the species in the Celtic Sea from 1960 to 1981. The two species respond differently to the development of the seasonal thermocline and halocline by taking up different vertical distributions in the water column. C. finmarchicus occurred in the colder, more saline water below the thermocline, while C. helgolandicus occurred in the warmer, less saline water above the thermocline. This behaviour is postulated as a mechanism by which these morphologically similar copepods more fully exploit the resources of their temporally and spatially heterogenous environ+.

87BI0267. I.DAGNINO, N.DELLA CROCE, N.DRAGO, V.SCIARRONE. 1985. OCCURRENCE AT SURFACE OF PASIPHAEA SIVADO (RISSO) IN THE LIGURIAN SEA. BOLL. DI OCEANOL. TEORICA ED APPLICATA. 3(1):45-49. OSS. GEO. SPE., TRIESTE. PN-2540. EN.

Pasiphaea sivado has been collected for the first time at surface, both day and night, in the Ligurian Sea. Some biological and hydrological observations about the unusual phenomenon are here reported.

87BI0268. I.R.JOINT, R.WILLIAMS. 1985. DEMANDS OF THE HERBIVORE COMMUNITY ON PHYTOPLANKTON PRODUCTION IN THE CELTIC SEA IN AUGUST. MARINE BIOLOGY. 87:297-306. SPRINGER-VERLAG, BERLIN. PN-2418. EN.

Zooplankton species diversity in the Celtic Sea in August 1982 was low; two species of copepod and two species of euphausiid accounted for 90 to 95% of the biomass sampled by a 280 um-mesh net. some 75% of the primary production was by phytoplankton smaller than 5 um. The demands of both the macrozooplankton and the microzooplankton have been examined. If it is assumed that macrozooplankton cannot efficiently graze particles smaller than 5 um, there was insufficient primary production to meet the demands of the copepods and euphausiids; however, there would have been sufficient if these animals could graze phytoplankton <5 to >1 um. ciliates were in competition with the macrozooplankton for phytoplankton and could not have been significant grazers of bacterial biomass. The majorit+.

87BI0269. G.ALBERTELLI, P.SALEMI PICONE, M.FABIANO. 1985. BILAN ENERGETIQUE D'UNE BIOCOENOSE DE SABLES FINS (NOTE PRELIMINAIRE). RAPP. COMM. INT. MER MEDIT. 29(5):209-210. PN-2554. FR.

This note deals with the energetic budget between the biocoenoses of fine well-sorted sand and the water column overlying the biocoenose itself. The study has been carried out on a station (10 m deep) located near Chiavari in the Ligurian Sea (Eastern Riviera). On this station, data about macrobenthos and meroplankton composition and environmental parameters are collected.

87BI0270. J.M.COLEBROOK. 1985. CONTINUOUS PLANKTON RECORDS: OVERWINTERING AND ANNUAL FLUCTUATIONS IN THE ABUNDANCE OF ZOOPLANKTON. MARINE BIOLOGY. 84:262-265. SPRINGER-VERLAG, BERLIN. PN-2413. EN.

A study of seasonal variations in the pattern of year-to-year changes, for 1948 to 1982, in the abundance of four zooplankton taxa (Pseudocalanus elongatus, Acartia clausi, Calanus finmarchicus and Hyperiidea) for the North Sea suggests that an element of the variations, represented at least in part by a quasi-linear downward trend, has its origins in winter & its occurrence through the year is a function of inherent persistence. A downward linear trend is the dominant pattern in the annual fluctuations in abundance of many species of zooplankton throughout the north-east Atlantic and the North Sea. It is argued that it is reasonable to extrapolate from the limited data set included in the detailed study and to assume a winter origin for the pattern wherever it occurs. Some implicati+.

87BI0271. R.WILLIAMS, N.R.COLLINS. 1985. CHAETOGNATHS AND CTENOPHORES IN THE HOLOPLANKTON OF THE BRISTOL CHANNEL. MARINE BIOLOGY. 85:97-107. SPRINGER-VERLAG, BERLIN. PN-2414. EN.

The geographical distributions, seasonal variations in numerical abundance and biomass of the predators of the holoplankton of the Bristol Channel, between November 1973 and February 1975, are described. The

predator numbers and biomass were dominated by the chaetognath Sagitta elegans Verrill. This species represented 96% of the holoplankton carnivore biomass in the outer, seaward region of the Channel and 60% in the inner region; the remainder being ctenophores.

87BI0272. J.B.ZHANG. 1985(1). DISTRIBUTION AND ABUNDANCE OF THE CTENOPHORE, PLEUROBRACHIA GLOBOSA MOSER IN THE NEARSHORE WATERS +. ACTA OCEANOL. SINICA. 4(1):113-120. CHINA OCEAN PRESS, BEIJING. EN.

The geographical distribution and seasonal abundance of Pleurobrachia globosa are analyzed on the basis of 806 samples taken from 91 stations in six sea areas along the southeast coast of China from April 1960 to January 1979. This ctenophore species is seen in small quantities without evident annual peak, while it is seen throughout the year in southern Fujian in great quantities with three peaks. The annual quantity of the animal decreased gradually from southern Fujian northward and appeared in shorter periods. The peak number of annual quantity decreased gradully as well. It is tentatively concluded that in low temperatures salinity is a limiting factor for the distribution of P. globosa while temperature takes over the control when salinities are low.

87BI0273. X.H.MAO, R.X.LI. 1985(10). DISTRIBUTION OF DINOFLAGELLATES IN THE EAST CHINA SEA. ACTA OCEANOL. SINICA. 4(4):634-640. CHINA OCEAN PRESS, BEIJING. EN.

The material discussed in this report was collected at 23 stations in the north of the continental shelf of the East China Sea from October 4 to November 5, 1977 with a Juday phytoplankton net (diameter 37 cm, No. 20 gauze) which was towed from the bottom to the surface of the sea. The Results anlayzed show that the species composition and distribution of dinoflagellates in this region bear a close relationship to the water mass and the sea currents. Based on the temperature ranges in which different species of dinoflagellates flourish, they may be divided into three groups: cold-water species, warm-temperate species and warm-water species. The number of the last group is more than 70% of the total.

87BI0274. J.X.JIANG, ET AL. 1985(10). AN ECOLOGICAL STUDY OF BENTHIC ORGANISMS IN THE NEARSHORE WATERS TO THE WEST OF TAIWAN STRAIT. ACTA OCEANOL. SINICA. 4(4):623-633. CHINA OCEAN PRESS, BEIJING. EN.

In seven cruises on benthic organisms in the nearshore waters (>50m) to the west of the Taiwan Strait in 1961-1964, altogether 189 stations of quantitative grabbing and 33 stations of qualitative trawling were made. Altogether 392 species of benthic organisms have been identified. The composition was dominated by nearshore shallow water species, with tropical and subtropical species absolutely dominant. the total average of biomass was 38.0 g/square meter and average density, 116.0 ind./square meter. The communities of benthic organisms in the area can be classified into five communities.

87BI0275. SOON-KEUN.CHANG. 1985(12). BENTHIC FORAMINIFERA IN THE SURFACE SEDIMENTS SOUTH OF BANG-O-JIN, SOUTHEAST KOREA. OCEAN RES. 7(2):23-30. KORDI., SEOUL. KO.

Micropaleontological analysis of the 11 surface sediments collected from the shallow sea south of Bang-o-jin located on the southeast coast of the Korean Peninsula reveals the distribution, composition, and related micropaleontological characteristics and implications of the benthic foraminifers. Live and total (live+dead) foraminiferal abundance, and live to total (L/T) ratios increase toward the offshore. The relationship between the total foraminiferal abundance and L/T ratio is exceptional, and this suggests that there are other factors than sedimentation, governing foraminiferal occurrences in the study area. Diversity and equitability of the total assemblage decrease toward the offshore, and the hyaline assemblages show an inverse occurrence. The large difference in diversity b+.

87BI0276. JONG-MAN.KIM, JAE-MYUNG.YOO, HYUNG-TACK.HUH, SEONG-SIG.CHA. 1985(12). DISTRIBUTION OF FISH LARVAE IN THE ULSAN BAY AND ITS ADJACENT WATERS. OCEAN RES. 7(2):15-22. KORDI., SEOUL. KO.

Seasonal distribution of fish larvae in the adjacent waters of Ulsan was studied during February, April, July and September, 1984. Twenty four species of larvae were identified. The major species found in this survey were as follows: Engraulis japonica, Omobranchus elegans, Callionymidae, Ammodytes personatus and Sebastes inermis (?). Dominant species differed from month to month; Ammodytes personatus was the most abundant fish in February with 84% of the total, and Sebastes inermis (?) and Gobiidae were in April with 47% and 28% respectively, while Engraulis japonica dominated in July (85%) and September (53%). Unknown species of Callionymidae occurred in large number in July and September. Values for species diversity index were low in February and July, and high in April and Sept+.

87BI0277. S.C.LIU, D.X.JIN, D.Z.LAN. 1985(4). DIATOMS FROM THE SURFACE SEDIMENTS OFF THE SOUTHERN HUANGHAI SEA AND EAST CHINA SEA. ACTA OCEANOL. SINICA. 4(2):313-319. CHINA OCEAN PRESS, BEIJING. EN.

Two new species (Nitzschia sinensis Liu, sp. nov. and Podosira granulata Liu, sp. nov.) and one new variety (Xanthiopyxis microspinosa var. ellipticus Liu, var. nov.) collected from the surface sediments off the southern Huanghai Sea & the East China Sea are described and a list of diatoms from the surface sediments in the survey area and some new records in China are attached.

87BI0278. M.J.FURNAS, A.W.MITCHELL. 1986. PHYTOPLANKTON DYNAMICS IN THE CENTRAL GREAT BARRIER REEF, I. SEASONAL CHANGES IN BIOMASS AND COMMU+. CONTINENTAL SHELF RES. 6(3):363-384. PERGAMON PRESS, OXFORD. EN.

Phytoplankton dynamics in the central Great Barrier Reef and the relation of these dynamics to the

seasonal upwelling of nutrient-enriched Coral Sea water onto the outer continental shelf were followed over an annual cycle. Event scale changes were sampled by frequent (2-day to 2-week) re-occupations of a cross-shelf transect during the latter half of the summer. Intrusive activity between November and April episodically injects nitrate-N enriched water into oligotrophic shelf waters. persistent mid-shelf and intermittent outer shelf mid-water phytoplankton accumulations were observed from late-January to March.

87BI0279. J.Y.ALLER, R.C.ALLER. 1986. GENERAL CHARACTERISTICS OF BENTHIC FAUNAS ON THE AMAZON INNER CONTINENTAL SHELF WITH COMPARISON TO+. CONTINENTAL SHELF RES. 6(1/2):291-310. PERGAMON PRESS, OXFORD. EN.

Major patterns of bacteria, meiofauna and macrobenthos distributions were examined from muddy sediments on the inner continental shelf near the Amazon River. The spatial distributions and functional groupings of the fauna were compared with faunal distributions on the East China Sea shelf off the Changjiang (Yangtze) River and used to assess the impact of long-term, large-scale physical processes on benthic community structure in shelf environments. Both areas are influenced by large discharges of fresh water and suspended solids, and have inner-shelf mud deposits. On the Amazon shelf, macrofauna were generally small in size or absent from highly mobile, muddy sediments on the inner shelf.

87BI0280. R.T.COONEY. 1986. THE SEASONAL OCCURRENCE OF NEOCALANUS CRISTATUS, NEOCALANUS PLUMCHRUS, AND EUCALANUS BUNGII OVER T+. CONTINENTAL SHELF RES. 5(5):541-553. PERGAMON PRESS, OXFORD. EN.

Field collections of zooplankton from the northern Gulf of Alaska demonstrate that the large oceanic copepods Neocalanus cristatus, N. plumchrus, and Eucalanus bungii are seasonal members of shelf and coastal zooplankton communities. They account for more than 25% of the net zooplankton biomass during the spring and summer months. The presence, absence, and subsequent reappearance of these copepods over the shelf is apparently related to their seasonal shifts in vertical distributions and to a persistent pattern of onshore Ekman transport. During periods when these copepods occur in the surface water of the bordering deep ocean (late autumn to summer) they are swept shoreward over the shelf.

87BI0281. P.HUTCHINGS. 1986(10). CRYPTOFAUNAL COMMUNITIES OF CORAL REEFS. ACTA OCEANOL. SINICA. 5(4):603-613. CHINA OCEAN PRESS, BEIJING. EN.

87BI0282. P.LIN, R.H.CHEN. 1986(7). STUDIES ON THE MANGROVE ECOSYSTEM OF THE JIULONGJIANG RIVER ESTUARY IN CHINA, III. ACCUMULATION AN+. ACTA OCEANOL. SINICA. 5(3):447-455. CHINA OCEAN PRESS, BEIJING. EN.

This is a paper dealing mainly with the accumulation and biological cycle of calcium and magnesium elements of the artificial 20-years old kandelia candel community in the Jiulongjiang River Estuary of Fujian province, China. The result of measurements is that the quantities of the two elements in the standing crop are kg/ha 772.91 for Ca and 526.57 for Mg. In the biological cycle of the two elements, the annual uptakes are 174.86 for Ca and 89.30 for Mg(kg/ha); the amounts of Ca and Mg returned via litter fall are estimated to be (kg/ha/a) 103.28 for Ca and 40.42 for Mg; the annual retention are (kg/ha/a) 71.58 for Ca and 48.88 for Mg, respectively. The turnover periods of Ca and Mg are 8 and 13 years, respectively.

87BI0283. MAN.CHANG, JAE-HYUNG.SHIM. 1986(9). A STUDY ON THE PHYTOPLANKTON OF THE YELLOW SEA IN SPRING, 1984. OCEAN RES. 8(1):1-11. KORDI., ANSAN. KO.

The structure and distribution of phytoplankton community with relation to environmental factors in the Korean Yellow Sea was studied in spring of 1984. A total of 125 phytoplankton taxa including 5 unidentified species was observed. The identified species consisted of 72 genera, 117 species, 1 variety and 2 formas. Weak density gradient was formed in the study area. The coastal region showed uniform vertical distribution due to strong water movement (e.g. tidal current, wave etc.), but relatively higher density than off-coastal region. Otherwise, the off-coastal region was weakly stratified that is, surface area of low density and bottom area (below 20-30m depth) of high density.

87BI0284. G.SAVIDGE, H.J.LENNON. 1987. HYDROGRAPHY AND PHYTOPLANKTON DISTRIBUTIONS IN NORTH-WEST SCOTTISH WATERS. CONTINENTAL SHELF RES. 7(1):45-66. PERGAMON PRESS, OXFORD. EN.

The main features of the relationships between the distribution of phytoplankton and the hydrography of north-west Scottish waters were determined in May and August 1983. A complex but marked salinity boundary separated coastal and oceanic shelf waters to the west of Barra Head whilst a zone of active vertical mixing associated with strong tidal currents was located immediately adjacent to the Barra Head headland. The main salinity boundary and shelf-break zone delineated marked changes in the phytoplankton taxonomic compositions and nutrient status of the bounding waters.

87BI0285. K.R.CARMAN, K.M.SHERMAN, D.THISTLE. 1987(1). EVIDENCE THAT SEDIMENT TYPE INFLUENCES THE HORIZONTAL AND VERTICAL DISTRIBUTION OF NEMATODES AT A +. DEEP-SEA RES. 34(1):45-53. PERGAMON PRESS, OXFORD. EN.

The relationship between sediment type and the nematode fauna was studied at the HEBBLE site, which is at 4820 m depth on the Scotian Rise in the northeast Atlantic. Because of the hydrodynamic regime, the fine-grained, surficial sediments (brown mud) are eroded and redeposited several times per year, so the properties of brown mud can be expected to be relatively homogeneous, regardless of depth of burial. In

those samples in which brown mud occurs from 0 to 3 cm, nematodes do not differ significantly in abundance among the three depth layers, suggesting that the usual decrease in abundance with depth in the sediment is not simply a function of proximity to the sediment surface, but relates to a change in the quality of the sediment with depth.

87BI0286. V.MARIN. 1987(1). THE OCEANOGRAPHIC STRUCTURE OF THE EASTERN SCOTIA SEA, IV. DISTRIBUTION OF COPEPOD SPECIES IN RELA+. DEEP-SEA RES. 34(1):105-121. PERGAMON PRESS, OXFORD. EN.

The boundary region where the Antarctic Circumpolar Current contacts the Weddell Sea Water represents an ecological barrier that affects the absolute abundances and developmental stage structure of the population of copepods in the area. This boundary is suggested as the southern limit of Calanus simillimus and clausocalanus laticeps. However, it does not separate two distinct communities since the order of abundance of species does not differ significantly between sides of the boundary.

87BI0287. YOUNG-MAN.KIM, IL-SHIK.SHIN, DONG-SUCK.CHANG. 1987(11). DISTRIBUTION OF VIBRIO VULNIFICUS THE COAST OF SOUTH KOREA. BULL. KOREAN FISH. SOC. 20(6):591-600. KOREAN FISH. SOC., PUSAN. KO.

To evaluate the detection rate and the density of Vibrio vulnificus by the sample, sampling area and date, 240 sea water samples and marine invertebrates were collected from coastal area of Korea including Pohang, Chungmu, Yeosu, Kunsan, Sihwa and Pusan from March to October, 1986. Eighty two strains out of 1087 strains isolated from the submitted samples were identified as V. vulnificus. Forty seven of total 240 samples were positive in V. vulnificus which were constituted by 31 out of 138 sea water samples and 16 out of 102 marine invertebrates. Detection rate of V. vulnificus among the invertebrates was high in the crab, Portunus trituberculatus and the ark shell, Anadara broughtonii samples. The samples collected at Kunsan area showed the highest in detection rate of the bacteriu+.

87BI0288. JAE-SANG.HONG. 1987(12). SUMMER OXYGEN DEFICIENCY AND BENTHIC BIOMASS IN THE CHINHAE BAY SYSTEM, KOREA. J. OCEANOL. SOC. KOREA. 22(4):246-256. OCEANOL. SOC. KOREA, SEOUL. EN.

Quantitative benthic invertebrate samples were taken in the Chinhae Bay System, Korea during September 1983 to relate benthic biomass to bottom water dissolved oxygen concentrations. Low concentrations of bottom water dissolved oxygen were found to be associated with low benthic biomass and abundance. Benthic biomass (wet weight) and animal numbers decreased logarithmically with bottom dissolved oxygen concentrations. A hypoxic bottom area extended over most of the bay, covering an area of about 266 square kilometer out of a total of 497 square kilometer. The most affected areas were limited, as a whole, to inner areas of Masan and Haeng-am Bays, Kohyonsong Bay, Wonmunpo Bay, and the Chinhae Bay Proper.

87BI0289. JAE-MYUNG.YOO, JONG-MAN.KIM, HYUNG-TACK.HUH, SEONG-SIG.CHA. 1987(12). DISTRIBUTION OF FISH LARVAE IN KYONGGI BAY. OCEAN RES. 9(1/2):15-23. KORDI., ANSAN. KO.

Fish larvae in Kyonggi Bay were surveyed during the period from February to November, 1984. Out of thirty-three taxa of fish larvae collected, twenty-eight taxa were identified to species level, two taxa to genus level, and three taxa to family level. The major species found during the study period were Gobiidae, Herklotsichthys zunasi, Engraulis japonica, Callionymidae, and Enedrias fangi. Gobiidae occupied 66.3% of the total larvae, but Engraulis japonica, whose abundances are high in the adjacent waters of Korea, occupied merely 4.9%. The majority of the fish species appearing in this area turned out to be coastal migratory species. Others were coastal sedentary species (Gobiidae, Syngnathus schlegeli, Hippocampus aterrimus, Ctenotrypauchen microcephalus, Erisphex potti), off-sho+.

87BI0290. C.J.BERG JR., C.L.VAN DOVER. 1987(3). BENTHOPELAGIC MACROZOOPLANKTON COMMUNITIES AT AND NEAR DEEP-SEA HYDROTHERMAL VENTS IN THE EASTERN +. DEEP-SEA RES. 34(3):379-401. PERGAMON PRESS, OXFORD. EN.

Benthopelagic zooplankton communities at hydrothermal vents on the East Pacific Rise and in Guaymas Basin are enriched in terms of both biomass and abundance with respect to non-vent areas, but depleted relative to biomass of surface zooplankton communities. Since much of the zooplankton community is derived from the benthic community, macrozooplankton abundance and composition differ among vent sites in accordance with the nature and extent of development of the benthic community and depend, ultimately, on the history of hydrothermal activity at each site.

87BI0291. R.J.BALDWIN, K.L.SMITH JR. 1987(3). TEMPORAL VARIATION IN THE CATCH RATE, LENGTH, COLOR AND SEX OF THE NECROPHAGOUS AMPHIPOD, EURYTHEN+. DEEP-SEA RES. 34(3):425-439. PERGAMON PRESS, OXFORD. EN.

The necrophagous lysianassid amphipod, eurythenes gryllus, was captured at altitudes up to 1800 m at 4 stations across the central North Pacific, from an oligotrophic station north of Hawaii to a eutrophic station off the California coast. This study was conducted from June 1982 to April 1984 using 54 vertical set lines, each 1800 m in length with 19 traps attached between 2 and 1800 m altitude. Catch rates were variable both within sampling periods (time on station) and within seasons. Size frequency histograms of amphipod length showed distinct instar stages, coincident for all stations and sampling periods, and with no temporal size class progression, indicating that E. gryllus had continuous recruitment.

87BI0292. KWANG-IL.YOO, SE-WHA.KIM. 1987(6). SEASONAL DISTRIBUTION OF MARINE CLADOCERANS IN CHINHAE BAY, KOREA. J. OCEANOL. SOC. KOREA. 22(2):80-86. OCEANOL. SOC. KOREA, SEOUL. EN.

Five species of marine cladocerans, Evadne nordmanni, Evadne tergestina, Podon leuckarti, Podon polyphemoides and Penilia avirostris, were found in Chinhae Bay during the years 1982-83. Incidence of E. nordmanni (March-May), P. leuckarti (April-May) in spring and of E. tergestina (June-December), E. avirostris (June-November) in summer through autumn was noticed during the present study. But P. polyphemoides appeared throughout the year except February. P. avirostris was the most abundant species, followed by P. polyphemoides and E. tergestina. Population of E. normanni and P. leuckarti was extremely poor and recorded to be less than 1,000 indiv./cubic meter. Seasonal change in size composition was noticed in E. tergestina and P. avirostris. Increase of length was recorded in P. pol+.

87BI0293. Q.H.ZHAO. 1987(7). A STUDY OF THE DISTRIBUTION OF RECENT OSTRACOD FAUNAS FROM COASTAL AREAS OF THE EAST CHINA AND YEL+. ACTA OCEANOL. SINICA. 6(3):413-420. CHINA OCEAN PRESS, BEIJING. EN.

A total of 91 species belonging to 57 genera were recovered from the coastal areas of the north East China Sea and the south Yellow Sea, of which, 42 species of 30 genera were collected alive. The biocoenoses of estuaries, supralittoral and eulittoral zones are dominated by brackish and euryhaline species, of which Albileberis sheyangensis, A. sinensis, Leptocythere ventriclivosa, Loxoconcha ocellata, Sinocytheridea latiovata and S. longa are ubiquitous; Propontocypris euryhalina, Spinileberis furuyaensis and S. pulchra are restricted to the supralittoral zone; Neomonoceratina crispata and Pontocythere littoralis are only present in the eulittoral zone. The community structure of these biocoenoses is generally marked by low species diversity (H(S) and S) and high incidence and dominance.

87BI0294. D.M.ALONGI. 1987(7). THE DISTRIBUTION AND COMPOSITION OF DEEP-SEA MICROBENTHOS IN A BATHYAL REGION OF THE WESTERN CORAL+. DEEP-SEA RES. 34(7):1245-1254. PERGAMON PRESS, OXFORD. EN.

The distribution and composition of bathyal (298-1610 m) microbenthos were examined on the Queensland continental slope, the Coral Sea Plateau and the adjacent Queensland and Townsville troughs in the western Coral Sea. Two conspicuous changes in community composition were recorded: (1) ciliates were undetected below 700 m and (2) yeasts and yeast-like cells were undetected above 1150 m. Densities of flagellates decreased, whereas amoebae densities increased significantly with water depth. Densities of living Foraminifera increased significantly from the continental slope to the adjacent troughs. Bacterial numbers ranged from (0.1-71.0) x 100,000,000 cells/g dry wt of sediment and decreased significantly with water depth.

87BI0295. M.FABIANO, T.ZUNINI SERTORIO. ASPETTI QUANTITATIVI DELLA RELAZIONE FITO-ZOOPLANCTON IN MAR LIGURE. ATTI DEL 6 CONGR. ASSOC. ITALIANA OCEANOL. LIMNOL. 305-310. PN-2538. IT.

The seasonal variation of phytoplankton (chlorophyll-a) and zooplankton (ash free dry weight) biomasses are described. Sampling was carried out fortnightly (october 1977-october 1979) at inshore and offshore stations in the Ligurian coastal waters. The phyto-zooplankton biomass ratio was calculated. The F/Z variation shows a seasonal trend with three different periods. The F/Z meaning is discussed.

87BI0296. S.ICHIMURA, Y.SAIJO. 1959(5). CHLOROPHYLL CONTENT AND PRIMARY PRODUCTION OF THE KUROSHIO OFF THE SOUTHERN MIDCOAST OF JAPAN. BOT. MAG., TOKYO. 72(851):193-202. BOT. SOC. JAPAN, TOKYO. PN-3001. EN.

The primary production in the Kuroshio off the southern midcoast of Japan was measured during the cruises in August 1957 and in May 1958. The chlorophyll amount in the sea water was high in the littoral region and it generally decreased with increasing distance from the coast. The mean value of chlorophyll content in euphotic zone showed roughly from 0.23 to 2.2 mg/cubic meter in May and 0.1 to 2.0 mg/cubic meter in August. A good linear relationship can be seen between the transparency and the mean value of chlorophyll content in the euphotic zone and this suggests that the standing crop of phytoplankton can be estimated from the depth of transparency. The definite correlation was also found between the chlorophyll content and the water temperature at least during these two months.

87BI0297. Y.ARUGA, M.MONSI. 1962(6). PRIMARY PRODUCTION IN THE NORTHWESTERN PART OF THE PACIFIC OFF HONSHU, JAPAN. J. OCEANOGR. SOC. JAPAN. 18(2):37-46. OCEANOGRA. SOC. JAPAN, TOKYO. PN-2982. EN.

The primary productivity in the northwestern Pacific was discussed on the basis of the results obtained during the summer cruise in 1961. 1) Vertical stratification of phytoplankton was clearly recognized in the Oyashio area as well as in the Kuroshio area. 2) Differentiation of photosynthetic pattern into sun and shade types, and light inhibition in photosynthesis were evidently observed, the facts being in good accordance with the results in 1960. 3) Photosynthetic rate for the surface samples from the Kuroshio, the Oyashio, and the mixed water region was at optimal light intensity 0.6-2.0, 3.5-6.0, and 2.2-4.0 mgC/chl.mg/h, respectively. 4) Daily gross production for the entire euphotic zone was estimated by the chlorophyll method.

87BI0298. M.S.DOTY, RD.E.SOERIAATMADJA, A.SOEGIARTO. 1963. OBSERVATIONS ON THE PRIMARY MARINE PRODUCTIVITY OF NORTHWESTERN INDONESIAN WATERS. MARINE RES. IN INDONESIA. (5):1-25. LEMBAGA PENELITION LAUT. PN-3004. EN.

During the fall months of 1957, a scientific cruise was completed in some of the more northwestern fishery areas of Western Indonesia on the Indonesian research vessel "Samudera". One of the principal objectives of this cruise was to determine the rates at which inorganic carbon is converted to organic material relative to the waters of the Pacific further east. The physical nature of the waters and the hydrographic results of related cruises have been reported (e.g., Soeriaatmadja, 1956a & b; Sjarif, 1959; Wyrtki, 1961) elsewhere.

87BI0299. SEH-KYU.CHUN, BU-KWAN.CHUNG, BONG-SUK.RYU. 1968(3). STUDIES ON ANISAKIS SPP. (I) ON THE INFECTION RATE OF ANISAKIS-LIKE LARVAE ISOLATED FROM VARIOUS M+. BULL. KOREAN FISH. SOC. 1(1):1-7. KOREAN FISH. SOC., PUSAN. KO.

Formerly T. Nishimura, T. Oshima and M. Otsuru studied on Anisakis-like larvae in the various marine fishes from the Japan Sea and the Pacific Ocean. In the present observation, many kinds of marine fishes from the Yellow Sea and the southern coast of Korea were studied, with the samples from the islands: Eocheng-do, Sohuksan-do, Chuja-do and Keomun-do. The authors examined 313 samples from the adjacent waters of Korea and the distribution of the Anisakis-like larvae in the fish body was found to be 9,219 larvae of Anisakis-like larvae found in the mesentery and coelomic cavity of all samples.

87BI0300. EUI-IN.PAIK. 1969(6). A STUDY ON THE FOOD OF THE GOBY, SYNECHOGOBIUS HASTA. BULL. KOREAN FISH. SOC. 2(1):48-62. KOREAN FISH. SOC., PUSAN. KO.

A goby, Synechogobius hasta (Temminck et Schlegel) was studied to investigate the food consumed and the biological change of the food organisms, and the fish were sampled from the closed tributary and the lower part of the Naktong River, near Pusan, during the period from November of 1967 to December of 1968.

87BI0301. YONG-SOOL.KIM. 1972(12). SECULAR VARIATION OF ZOOPLANKTON BIOMASS IN THE SOUTH SEA OF KOREA. BULL. KOREAN FISH. SOC. 5(4):108-114. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with secular analysis of zooplankton biomass by statistical method in the south sea of Korea during the period of nine years from 1963 through 1971. Data were taken from the Annual Report of Oceanographic Observations, Fisheries Research and Development Agency, Korea. The trend value of annual variations in the 108 month period above was calculated by method of 12 month moving average, and a period analysis was made by use of correlogram method using autocorrelation coefficients. The trend of zooplankton biomass shows periodical fluctuation for the period of 63 months with high interrelationships. The seasonal variation has been obvious with growth phase twice a year, in April and October.

87BI0302. SEH-KYU.CHUN. 1972(9). PRELIMINARY STUDIES ON THE SPOROZOAN PARASITES IN OYSTERS ON THE SOUTHERN COAST OF KOREA. BULL. KOREAN FISH. SOC. 5(3):76-82. KOREAN FISH. SOC., PUSAN. EN.

87BI0303. DAE-HAN.OUK, SEH-KYU.CHUN. 1973(12). LIFE CYCLE AND CHEMOTHERAPEUTIC CONTROL OF A FILARIAN WORM, PHILOMETROIDES CARASSII PARASITIC IN C+. BULL. KOREAN FISH. SOC. 6(3/4):112-122. KOREAN FISH. SOC., PUSAN. KO.

Philometroides carassii (ISHII, 1931) is a parasitic nematode of Carassius auratus and gold fish. Recently a large number of parasitized fishes by this nematode have been reported by fish farmers in Korea. The present investigation was aimed to find out the life cycles of the parasites and effects of chemotherapeutic medicines on the emerged larvae from the adult parasites.

87BI0304. SOO-IL.PARK, SEH-KYU.CHUN. 1974(3). HISTOPATHOLOGICAL STUDIES ON THE DISEASE CAUSED BY PATHOGENIC BACTERIA OF THE CARP. BULL. KOEAN FISH. SOC. 7(1):15-27. KOREAN FISH. SOC., PUSAN. KO.

Since the summer of the year 1972 ulcer disease of common carp, colour carp and goldfish had suddenly spread widely and caused a serious mortality at fish farms especially around Gim-hae and Yang-san, near Busan. The present study aimed to find out the causative organisms, histopathological changes and the way of treatment.

87BI0305. SOON-KIL.YI. 1975(9). STUDIES ON THE INTERTIDAL MACROFAUNA COMMUNITY AT YONG-HO BAY, BUSAN, KOREA. BULL. KOREAN FISH. SOC. 8(3):133-149. KOREAN FISH. SOC., PUSAN. EN.

A quantitative ecological investigation of the intertidal sand beach at Yong-ho Bay, located about 6 km NE of Busan Harbour was carried out from February, 1974 to February, 1975. Composition of the fauna, diversity, faunal affinity and distributions in time and space were studied. Some ecological factors influencing to the community also discussed.

87BI0306. YONG-SOOL.KIM. 1976(12). ESTIMATION OF ZOOPLANKTON PRODUCTION IN THE SOUTH SEA OF KOREA. BULL. KOREAN FISH. SOC. 9(4):245-249. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with estimation of zooplankton production in the South Sea of Korea based on the plankton data of the Annual Report of Oceanographic Observations, Fisheries Research and Development Agency, Korea during the period of seven years from 1967 through 1973.

87BI0307. SEH-KYU.CHUN. 1976(12). THE STRESS OF DRUG TREATMENT TO COMMON CARP, CYPRINUS CARPIO. BULL. KOREAN FISH. SOC. 9(4):265-271. KOREAN FISH. SOC., PUSAN. KO.

Parasitic protozoans of fish, such as Chilodonella, Costia, Trichodina, Ichthyophthirius are efectively eradicated by treating with a mixture of 50-60 ppm formalin, 0.2 ppm malachite green and 0.6 ppm dipterex in water recycling aquariums. In this case any

histopathological changes in the gill of fish were not observed. The parasites began to disappear 6 hours after treatment. Upon increased concentrations of formalin of 130 to 140 ppm, a significant change on the epithelium of gills was observed in 24-48 hours after treatment. In this case gill epithelium degenerated and necrosis of the gill lamella supporting cells follows.

87BI0308. SEH-KYU.CHUN, JONG-BACK.LEE. 1976(3). STUDIES ON THE TREMATODE LARVAE INFECTED IN THE HARD CLAM, MERETRIX LUSORIA. BULL. KOREAN FISH. SOC. 9(1):35-42. KOREAN FISH. SOC., PUSAN. KO.

Larval morphogenesis and infection rates of Cercaria pectinata Huet were investigated in regards to histological changes and mortality of the hard clam, Meretrix lusoria, in Buan located on the Western Coast of Korea. The trichocerous cercariae, Cercaria pectinata, and its sporocysts parasitize mainly in the tissues of goand, digestive gland and gills of the hard clams. One branched sporocyst grows into a great number of cylindrical sporocysts, and a heavily infected clam possesses 2,000 to 5,000 cylindrical sporocysts. Each of them produces approximately 30 to 70 germinal cells and cercariae.

87BI0309. DONG-SUCK.CHANG, YOUNG-MAN.KIM. 1978(9). ISOLATION OF VIBRIO PARAHAEMOLYTICUS IN MARINE SAMPLES COLLECTED DURING THE COLDEST MONTHS IN YONG+. BULL. KOREAN FISH. SOC. 11(3):147-153. KOREAN FISH. SOC., PUSAN. KO.

Most of the isolations of Vibrio parahaemolyticus in Korea were limited to the months of April through October, with recovery of the organism occuring predominantly during the summer months. Therefore, isolations of Vibrio parahaemolyticus were carried out to justify wintering of this organism in natural environment during the coldest months (January to February) in a year in Yongho Bay, Busan, Korea. From the results of this study it is clear that Vibrio parahaemolyticus survives in natural environment in spite of low temperature of the environment, around 0 Deg. in Centigrade. furthermore, it is considered that wintering of Vibrio parahaemolyticus has been doing in bottom deposit of estuaries and adjacent sea.

87BI0310. SEH-KYU.CHUN. 1979(12). AMOEBA INFECTION IN OYSTER (CRASSOSTREA GIGAS). BULL. KOREAN FISH. SOC. 12(4):281-285. KOREAN FISH. SOC., PUSAN. KO.

A species of enigmatic amoeba was found from the oysters cultured in Jinhae Bay and the Goje Bay in September-October 1978 and October 1979. Occurrence and the morphological characteristics of the amoeba were studied. Based on their peculiar morphological characters the enigmatic body was a species of parasitic amoeba. The amoebas were morphologically very similar to the amoeboid parasite described by Sawyer (1977). Occurrence of the oysters infected with the amoeboid ranged from zero to 13.3%. The infection rate did not show any relations to the depth of water where the oysters were suspended.

87BI0311. SUK-U.SHIN, SUNG-KOO.KANG. 1979(3). A STUDY ON PSYCHROTROPHIC COLIFORM AND BACTERIAL FLORA IN SHELLFISH. BULL. KOREAN FISH. SOC. 12(1):19-26. KOREAN FISH. SOC., PUSAN. KO.

To evaluate the sanitary conditions of four species of commercial shellfish (Crassostrea gigas, Tapes japonica, Mytilus coruscus and Anadara granosa), the psychrotrophic coliforms and the bacterial flora were monthly examined from January to December, 1978. Among the 373 coliform bacteria isolated from the samples submitted, 298 strains were identified as coliform by IMVIC test, 44 Deg. in Centigrade culture and gelatin liquefaction test. E. coli type I and K. aerogenes type I were the most predominant ones among the identified coliform as 138 strains and 71 strains respectively. The psychrotrophic coliform growing at 5 Deg. in Centigrade were 186 strains (50%) among 373 strains of isolated coliform.

87BI0312. SEH-KYU.CHUN, YOUNG-GILL.KIM. 1980(12). A TREMATODE GENUS BACCIGER PARASITIC IN BIVALVES. BULL. KOREAN FISH. SOC. 13(4):173-178. KOREAN FISH. SOC., PUSAN. KO.

Cercaria larvae of Bacciger harengulae which is parasitic to Meretrix lusoria, Tapes japonica and Solen strictus were studied in terms of their morphology and incidence of infection rate. The host bivalves were collected from Naechodo, Okgu-gun during the period from January to November in 1980. The cercaria is somewhat similar to the previously known Cercaria pectinata. It is however conformed that present cercaria belongs to Bacciger harengulae. Infection rate showed seasonal variation and host selectivity. Higher infections were observed in Solen strictus, and lower in Meretrix lusoria. Generally, the larger bivalves over 2-3 years old showed the higher infection rate.

87BI0313. SEH-KYU.CHUN. 1980(9). FUNGUS LEUCOTHRIX SP. GROWING ON THE GILLS OF CULTURED SHRIMP PENAEUS JAPONICUS. BULL. KOREAN FISH. SOC. 13(3):121-124. KOREAN FISH. SOC., PUSAN. KO.

Microscopical studies of Leucothrix sp. and its histological effect on the gill tissue of Penaeus japonicus have been made. Infection of Leucothrix sp. results in color change of the gills of the shrimp which is mainly due to the brown or black pigments of the filamentous bacteria. Higher degree of the infections makes necrosis and serious histological changes of the gill tissue and this infection affects the respiratory activity of the shrimp.

87BI0314. J.M.KIM, ET AL. 1981(4). MARINE ECOLOGICAL STUDY ON THREE BRACKISH LAKES ALONG THE EAST COAST OF KOREA. BULL. KORDI. 3(1):29-37. KORDI., SEOUL. KO.

A marine ecological study on the three brackish lakes along the east coast of Korea has been conducted during summer and fall of 1979. Three lakes, Hyang-Ho, Songji-Ho, and Yeongrang-Ho, are among nine brackish lakes scattered near the coastal region of Gangweon Province with an area of 610 ha. These are

relatively small (area; 50-100 ha) and very shallow lakes (2-7 m in depth). Hyang-ho and Songji-Ho are relatively eutrophicated and Yeongrang-Ho is heavily eutrophicated. The salinity of Hyang-Ho and Songji-ho varied from 3.3 to 19.7 per mill, while Yeongrang-Ho is less saline with 1.6-15.1 per mill. The plants and animals in the former two lakes are represented mainly by marine and brackish species and the latter dominated by freshwater species, accordingly. It appeared that three+.

87BI0315. P.M.HOLLIGAN, M.VIOLLIER, C.DUPOUY, J.AIKEN 1983(10). SATELLITE STUDIES ON THE DISTRIBUTIONS OF CHLOROPHYLL AND DINOFLAGELLATE BLOOMS IN THE WESTERN ENG+. CONTINENTAL SHELF RES. 2(2/3):81-96. PERGAMON PRESS, OXFORD. EN.

Surface phytoplankton populations, that persist for several weeks and over spatial scales >100 km, can be monitored most effectively by satellite. We show how the Coastal Zone Color Scanner provides new information about the dynamics of dinoflagellate blooms, and discuss some problems with the application of the instrument. The estimated overall accuracy for measuring total chlorophyll, C (chlorophyll a + phaeopigment), by satellite was log C +/-0.26.

87BI0316. J.A.YODER, ET AL. 1983(4). EFFECT OF UPWELLING ON PHYTOPLANKTON PRODUCTIVITY OF THE OUTER SOUTHEASTERN UNITED STATES CONTINEN+. CONTINENTAL SHELF RES. 1(4):385-404. PERGAMON PRESS, OXFORD. EN.

Gulf Stream frontal disturbances cause nutrient-rich waters to frequently upwell and intrude onto the southeastern United States continental shelf between Cape Canaveral, Florida and Cape Hatteras, North Carolina. Phytoplankton response in upwelled waters was determined with three interdisciplinary studies conducted during April 1979 and 1980, and in summer 1978. The results show that when shelf waters are not stratified, upwelling causes productive phytoplankton (diatom) blooms on the outer shelf. Phytoplankton production averages about 2 g C/square meter/day during upwelling events, and 'new' production is 50% or more of the total. When shelf waters are stratified, upwelled waters penetrate well onto the shelf as a subsurface intrusion in which phytoplankton production averages abou+.

87BI0317. S.S.BATES, T.PLATT. 1984. FLUORESCENCE INDUCTION AS A MEASURE OF PHOTOSYNTHETIC CAPACITY IN MARINE PHYTOPLANKTON: RESPONSE O+. MARINE ECOLOGY- PROG. SER. 18:67-77. INTER-RES., HALSTENBEK. PN-2473. EN.

The possibility was investigated of using in vivo chlorophyll fluorescence induction (time-scale ms) as an index of photosynthetic capacity in marine phytoplankton. Batch cultures of the diatom Thalassiosira pseudonana Hustedt (3H) and of the chlorophyte Dunaliella tertiolecta Butcher were preconditioned for 24 h at 8 different light intensities (2 to 60 W/square meter). Photosynthetic rates at light saturation and the area above the fluorescence induction curve were then determined.

87BI0318. A.W.HERMAN. 1984. VERTICAL COPEPOD AGGREGATIONS AND INTERACTIONS WITT CHLOROPHYLL AND PRODUCTION ON THE PERU SHELF. CONTINENTAL SHELF RES. 3(2):131-146. PERGAMON PRESS, OXFORD. EN.

Data consisting of high resolution profiles of in situ chlorophyll fluorescence and copepods have been measured with a towed Batfish on the Peru shelf during November 1977. The day to day vertical variability of chlorophyll fluorescence was highly conplex; however, there were indications of common features consiting of a surface chlorophyll layer about 10 to 15 m thick and a subsurface chlorophyll maximum at about 25m depth. Of the dominant copepods measured, Eucalanus inermis, Calanus shilensis, and Centropages brachiatus, the latter two were aggregated in layers at about 15 to 20 m directly within a depression located between the surface and subsurface chlorophyll layer. Primary production profiles estimated from light & chlorophyll data indicated that carbon production was generally +.

87BI0319. C.M.MORRISON, W.E.HAWKINS. 1984. COCCIDIANS IN THE LIVER AND TESTIS OF THE HERRING CLUPEA HARENGUS L. CANADIAN J. ZOOL. 62:480-493. NAT. RES. COUN. CAN., OTTAWA. PN-2478. EN.

The coccidians Goussia clupearum from liver and Eimeria sardinae from testis of herring caught in waters near Nova Scotia were studied by light and electron microscopy. Unsporulated and sporulated oocysts were the most frequently encountered stages. Oocyst walls of both species were thin and closely apposed to the host cell. At least a part of the oocyst wall appeared to serve also as the boundary of the parasitophorous vacuole. In G. clupearum, membranes lining parasitophorous vacuoles of various stages seemed to be involved in host-parasite nutrient transfer. Wall-forming bodies were found in the sporont of E. sardinae, and presumptive wall-forming bodies were found in the sporont of G. clupearum. The sporocyst wall of G. clupearum appeared to consist of two valves. The wall had +.

87BI0320. M.B.JORDAN, I.R.JOINT. 1984. STUDIES ON PHYTOPLANKTON DISTRIBUTION AND PRIMARY PRODUCTION IN THE WESTERN ENGLISH CHANNEL IN 198+. CONTINENTAL SHELF RES. 3(1):25-34. PERGAMON PRESS, OXFORD. EN.

The distribution of chlorophyll on a transect of the English Channel was measured during 1980 and 1981. In both years, high concentrations of chlorophyll a were measured in midchannel in July and August and this was due to a bloom of Gyrodinium aureolum. At a near-shore station close to Plymouth, regular measurements of water transparency and primary production were made during 1981. Values of diffuse attenuation coefficient increased in the spring with increasing chlorophyll concentration; this was followed by a period of low attenuation coefficients when

chlorophyll maxima developed on the thermocline. The attenuation coefficient was greatly increased in late summer as the result of a bloom of G. aureolum.

87BI0321. B.COTE, T.PLATT. 1984. UTILITY OF THE LIGHT-SATURATION CURVE AS AN OPERATIONAL MODEL FOR QUANTIFYING THE EFFECTS OF ENVIR+. MARINE ECOLOGY- PROG. SER. 18:57-66. INTER-RES., HALSTENBEK. PN-2470. EN.

The utility of the light-saturation curve as a tool to quantify effects of environmental conditions on the specific production rate of phytoplankton is assessed by comparing it with the more traditional approach which consists of directly relating the instantaneous rate of photosynthesis to the major factors believed to be affecting it. The internal consistency of data was tested by clculating the functional regression between measured & calculated values of the in situ production rate.

87BI0322. B.B.WARD, M.C.TALBOT, M.J.PERRY. 1984. CONTRIBUTIONS OF PHYTOPLANKTON AND NITRIFYING BACTERIA TO AMMONIUM AND NITRITE DYNAMICS IN COASTAL+. CONTINENTAL SHELF RES. 3(4):383-398. PERGAMON PRESS, OXFORD. EN.

Ammonium and nitrite dynamics in coastal waters off Washington were examined using stable nitrogen isotope methods. Assimilation rates of ammonium into particulate nitrogen exhibited maxima at shallow depths and were negligible below the photic zone. Rates of ammonium oxidation by nitrifying bacteria showed surface minima and increased with depth. Both processes showed evidence of control by light intensity: light stimulated assimilation and inhibited oxidation. Ammonium turnover was dominated by phytoplankton assimilation at shallow depths and at inshore stations, while the relative contribution of bacterial oxidation of ammonium to turnover increased with increasing depth and increasing distance from shore. Nitrite turnover due to ammonium oxidation approached 60% per day in the p+.

87BI0323. R.E.H.SMITH, T.PLATT. 1984. CARBON EXCHANGE AND CARBON 14 TRACER METHODS IN A NITROGEN-LIMITED DIATOM, THALASSIOSIRA PSEUDONAN+. MARINE ECOLOGY- PROG. SER. 16:75-87. INTER-RES., HALSTENBEK. PN-2468. EN.

A simple carbon-exchange model accounted for the kinetics of Carbon 14 uptake and release by the diatom Thalassiosira pseudonana in nitrogen-limited chemostat culture. The model treats the cells as consisting of 2 pools of carbon; an exchanging pool which carries out photosynthesis, respiration and excretion, and a synthetic pool which does not exchange, but accumulates carbon from the exchanging pool. The model fitted well to observed Carbon 14 kinetics over a 10-fold range of growth rates and was demonstrably superior to 2 alternate models which have been prevalent in the theory and application of Carbon 14 methodology in primary production studies.

87BI0324. W.K.W.LI, J.C.SMITH, T.PLATT. 1984. TEMPERATURE RESPONSE OF PHOTOSYNTHETIC CAPACITY AND CARBOXYLASE ACTIVITY IN ARCTIC MARINE PHYTOPLA+. MARINE ECOLOGY- PROG. SER. 17:237-243. INTER-RES., HALSTENBEK. PN-2469. EN.

The temperature response of photosynthetic capacity was compared to that of 3 carboxylating enzymes in Arctic marine phytoplankton. Only the activity of ribulose-1.5-bisphosphate carboxylase RuBPG consistently exhibited an apparent activation energy equivalent to that of photosynthetic capacity. This is the first indication from field samples of phytoplankton that changes in the activity of RuBPC may be closely associated with changes in photosynthetic capacity.

87BI0325. P.D.LU, ET AL. 1984(10). DISTRIBUTION OF CHLOROPHYLL-A AND ESTIMATION OF PRIMARY PRODUCTION IN THE BOHAI SEA. ACTA OCEANOL. SINICA. 3(4):559-567. CHINA OCEAN PRESS, BEIJING. EN.

In 1980 and 1981 a multi-item investigation was carried out in the Bohai Sea for four seasons. The data collected from 90 stations have been analysed and worked out. Presented in the paper are some results ont the distribution and seasonal variation of chlorophyll-a and the primary production thereof.

87BI0326. F.L.CAI, Y.CHEN, P.A.XU. 1984(4). THE TRASNFER OF CESIUM 137, COBALT 60 ALONG THE FOOD CHAIN OF PLATYMONAS BRACHIONUS AND TILAPIA. ACTA OCEANOL. SINICA. 3(2):285-289. CHINA OCEAN PRESS, BEIJING. EN.

The transfer of Cesium 137, Cobalt 60 along Platymonas sp., Brachionus plicatilis Muller and Tilapia mossambica Peters was studied by using the tracer methods of both Cesium 137 and Cobalt 60 with Ge (Li) Gamma ray detector and S-80 type multichannel-analyser for measuring the radioactivity of the sample. The experiment was carried out in four groups and the period of the experiment was fifteen days. It was found that Cobalt 60 could be transferred along seawater->Platymonas->Brachionus->Tilapia, and that Cesium 137 could only be transferred from seawater to Platymonas. Cesium 137 was not accumulated by Brachionus in any group of the experiment. Brachionus ingested Cobalt 60 mainly from Platymonas, when Cobalt 60 was ingested by tilapia; Brachionus played an important role in the tra+.

87BI0327. F.L.CAI, Y.CHEN, P.A.XU. 1984(4). A STUDY ON TRANSFER RULE OF CESIUM 137 AND COBALT 60 IN SEAWATER AND MARINE FOOD WEB. ACTA OCEANOL. SINICA. 3(2):276-284. CHINA OCEAN PRESS, BEIJING. EN.

Transfer rule of Cesium 137 and Cobalt 60 in seawater and an artificial food web which made up of Platymonas, Arca, Penaeus and Tilapia were studied. The results showed that the transfer of nuclide could be realized in a longer food chain in which seawater contained radioactivity, the transfer along food chain slone was slight, the pathway of nuclide uptaken by

organism was mainly from seawater, but the presence of the food was helpful to the transfer of the unclide, the transfer efficiency of Cobalt 60 by every member in the marine food chain was greater than that of Cesium 137.

87BI0328. M.R.ABBOTT, P.M.ZION. 1985. SATELLITE OBSERVATIONS OF PHYTOPLANKTON VARIABILITY DURING AN UPWELLING EVENT. CONTINENTAL SHELF RES. 4(6):661-680. PERGAMON PRESS, OXFORD. EN.

A sequence of satellite images of near-surface phytoplankton pigment concentrations and sea surface temperature together with concurrent surface measurements are used to study an upwelling event during the Coastal Ocean Dynamics Experiment off northern California. These data sets show a high degree of temporal and spatial variability during this episode. Recurrent patterns in this variability give insight into the dynamics of coastal upwelling and its effects on biological distributions. Simple models of coastal upwelling cannot explain the observed phenomena in the CODE region. Satellite estimates of phytoplankton growth rates were about 0.8/day near persistent upwelling centers.

87BI0329. J.A.YODER, ET AL. 1985. PHYTOPLANKTON DYNAMICS WITHIN GULF STREAM INTRUSIONS ON THE SOUTHEASTERN UNITED STATES CONTINENTAL+. CONTINENTAL SHELF RES. 4(6):611-635. PERGAMON PRESS, OXFORD. EN.

During July and August 1981 subsurface intrusion of upwelled nutrient-rich Gulf Stream water was the dominant process affecting temporal and spatial changes in phytoplankton biomass and productivity of the southeastern United States continental shelf between 29 and 32 N latitude. Intruded waters in the study area covered as much as 10 km including virtually all of the middle and outer shelf and approximately 50% of the inner shelf area. The results imply a seasonal (June to August) middle shelf production of 150 g C/square meter, about 15% higher than previous estimates of annual production on the middle shelf. Intrusions of the scale we observed in 1981 may not occur every summer. However, when such events do occur, they are by far the most important processes controlling summer phy+.

87BI0330. S.Y.SUN, Y.T.DONG. 1985. ECOLOGICAL CONTROL OF POLYCHAETE DISTRIBUTIONS IN THE CHANGJIANG ESTUARY AND ADJACENT WATERS. CONTINENTAL SHELF RES. 4(1/2):215-225. PERGAMON PRESS, OXFORD. EN.

The horizontal and vertical distributions of polychaete species, biomass, and density values in the Changjiang estuary and adjacent waters reflect primarily variable rates of sediment input and accumulation. Three areas are noted, one with relatively low biomass and density but a high percentage of polychaetes (rapid accumulation of Changjiang sediment), a second with variable but generally high biomass and density associated with lower rates of sediment accumulation, and a third with very low biomass and density as well as low percentages of polychaetes (fine sands associated with low sediment influx).

87BI0331. M.J.M.HOOTSMANS, J.E.VERMAAT. 1985. THE EFFECT OF PERIPHYTON-GRAZING BY THREE EPIFAUNAL SPECIES ON THE GROWTH OF ZOSTERA MARINA L. UND+. AQUATIC BOTANY. 22:83-88. ELSEVIER SCI. PUB., AMSTERDAM. PN-3074. EN.

The effect of grazing by 3 epifauna species Hydrobia ulvae (Pennant), Littorina littorea L., and Idotea chelipes (Pallas) on the growth of Zostera marina L. was studied after a 2-week grazing period. All species were kept separately in densities similar to those found in seagrass beds in The Netherlands. Each grazing treatment caused a significant reduction in periphyton biomass and a significant increase in macrophyte growth, compared with the control. No significant difference in growth stimulation was found between the treatments. However, a significant difference in periphyton removal occurred between Littorina and Idotea; Idotea having the largest impact on periphyton. All species differed from each other in the amount of periphyton removal, calculated per gram of grazer popula+.

87BI0332. Y.Q.FANG, Y.S.ZHANG, R.A.XU, Q.S.ZHANG. 1985(1). REPRODUCTIVE MECHANISM OF RUDITAPES PHILIPPINARUM; ISOLATION OF SHEDDING HORMONE AND DETERMINATION+. ACTA OCEANOL. SINICA. 4(1):107-112. CHINA OCEAN PRESS, BEIJING. EN.

An active substance, shedding hormone capable of inducing parent clams to spawn and spermiate, has preliminarily been isolated from the ovaries of Ruditapes philippinarum by means of ammonia sulfate precipitate of 25% concentration and Sephadex G-25 column chromatography in present study. The biological activity of the shedding hormone is above 95%. It is composed of sorts of amino acids by determination with an amino acid automatic analyzer. The experimental results indicate that the active substance is a polypeptide.

87BI0333. H.J.LAANBROEK, J.C.VERPLANKE, P.R.M.DE VISSCHER, R.DE VUYST. 1985(8). DISTRIBUTION OF PHYTO- AND BACTERIOPLANKTON GROWTH AND BIOMASS PARAMETERS, DISSOLVED INORGANIC NUT+. MARINE ECOLOGY- PROG. SER. 25:1-11. INTER-RES., HALSTENBEK. PN-3079. EN.

Distribution of phyto- and bacterioplankton growth and biomass parameters were followed during a spring bloom in the marine Oosterschelde basin, Netherlands. Several other biotic and abiotic parameters were measured. During the measuring period from 4 April until 4 June, concentrations of the dissolved nutrients silicate, ammonium, and nitrate decreased, while dissolved phosphate tended to increase. Concentrations of chlorophyll a increased with a distinct maximum in mid May during a bloom of the haptophycean Phaeocystis pouchetii. In the shallower part of the basin maxima of particulate primary production and bacterioplankton production were reached at the end of

April during a mixed bloom of diatoms of the genera Cryptomonas, Skeletonema and Thalassiosira as well as small flagellat+.

87BI0334. C.MEULSTEE, P.H.NIENHUIS, H.T.C.VAN STOKKOM. 1986. BIOMASS ASSESSMENT OF ESTUARINE MACROPHYTOBENTHOS USING AERIAL PHOTOGRAPHY. MARINE BIOLOGY. 91:331-335. SPRINGER-VERLAG, BERLIN. PN-3077. EN.

Traditional approaches for biomass assessment of estuarine macrophytes over vast areas are time consuming. A methodology for quick and accurate biomass estimation of macrophytes, growing at intertidal mudflats, has been developed and verified. Using a calculated relation between biomass and colour densities on the aerial photographs, biomass of macrophytes over a large area (ca 900 ha) could be assessed with an accuracy of about 10%. Biomass estimates could be partitioned over seagrasses, various green algae and brown algae.

87BI0335. S.BANAHAN, J.J.GOERING. 1986. THE PRODUCTION OF BIOGENIC SILICA AND ITS ACCUMULATION ON THE SOUTHEASTERN BERING SEA SHELF. CONTINENTAL SHELF RES. 5(1/2):199-213. PERGAMON PRESS, OXFORD. EN.

Silicic acid uptake rates, biogenic silica concentrations, and Lead 210 sedimentation rates were measured on the southeastern Bering Sea shelf. These rates are used to describe the distribution of biogenic silica and approximate a steady-state budget for silica on the outer shelf of the Bering Sea. specific uptake velocities in the upper 10 m range from 0.002 to 0.015/hour. No significant differences in specific uptake velocities were found between the coastal, middle, and outer domains. Average concentrations of biogenic silica were 299 and 429 mmol/square meter in the middle and coastal domains, respectively. The lower concentration in the outer shelf, 91 mmol/square meter, was a result of greater grazing stress on diatom phytoplankton in that area.

87BI0336. D.W.TOWNSEND, R.W.SPINRAD. 1986. EARLY SPRING PHYTOPLANKTON BLOOMS IN THE GULF OF MAINE. CONTINENTAL SHELF RES. 6(4):515-529. PERGAMON PRESS, OXFORD. EN.

Our observations of the distribution of early spring phytoplankton blooms (27 March to 5 April 1984) in the Gulf of Maine support previous contentions that bloom propagation begins when the depth averaged in situ solar irradiance within the upper mixed layer is about 40 ly/day. We found that prior to vernal warming and thermal stratification, the formation of an upper mixed layer in these waters appears to be determined in three ways: (1) by density stratification resulting from freshwater runoff immediately adjacent to the coast, (2) by intrusions of dense slope water and its subsequent doming to form a pyconcline in Jordan Basin, and (3) by local bathymetry.

87BI0337. S.L.SMITH, J.VIDAL. 1986. VARIATIONS IN THE DISTRIBUTION, ABUNDANCE, AND DEVELOPMENT OF COPEPODS IN THE SOUTHEASTERN BERING +. CONTINENTAL SHELF RES. 5(1/2):215-239. PERGAMON PRESS, OXFORD. EN.

When a relatively warm year (1981) in the southeastern Bering Sea is compared with a cooler year (1980), the upper layer of both the middle shelf and outer shelf warmed at a faster rate in the warmer year, but the spring bloom of phytoplankton took place at approximately the same time both years. The middle front near the 100 m isobath separated the two major communities of zooplankton both years. Offshore of the front, large calanoid copepods such as Neocalanus plumchrus, Neocalanus cristatus, Eucalanus bungii, and Metridia pacifica dominated, while inshore of that front Pseudocalanus spp., Acartia spp., and Calanus marshallae dominated.

87BI0338. R.G.KVITEK, J.S.OLIVER. 1986. SIDE-SCAN SONAR ESTIMATES OF THE UTILIZATION OF GRAY WHALE FEEDING GROUNDS ALONG VANCOUVER ISLAND,+. CONTINENTAL SHELF RES. 6(5):639-654. PERGAMON PRESS, OXFORD. EN.

Infaunal prey communities and gray whale feeding excavations were found at three sites along the west coast of Vancouver Island: Ahous Bay, Pachena Bay and Port San Juan. Side-scan sonar records indicated that whales disturbed up to 36% of the sea floor. The mean percentage of the bottom covered with feeding excavations was >17% in each of the three feeding grounds. There was a positive relationship between the biomass of ampeliscid amphipod prey and the total quantity of prey consumed by gray whales from the three feeding grounds.

87BI0339. J.J.WALSH, C.P.MCROY. 1986. ECOSYSTEM ANALYSIS IN THE SOUTHEASTERN BERING SEA. CONTINENTAL SHELF RES. 5(1/2):259-288. PERGAMON PRESS, OXFORD. EN.

during a 7-year study of the food-chain dynamics of the outer and middle shelves of the southeastern Bering Sea, numerical models were developed to test ecological hypotheses posed at the event, seasonal, and annual scales of habitat variability. Interannual variations in year class strength of Alaska pollock between warm and cold years are attributed to an order of magnitude decline in prey availability during larval drift in cold years. In cold years delayed increases in seasonal abundance of copepod nauplii, the prey of these larval fish, are attributed to low temperature effects on crustacean metabolism rather than to changes in food availability (phytoplankton). Sinking diatoms, uneaten by the zooplankton in the water column during warm or cold years, are resuspended by wind even+.

87BI0340. C.P.MCROY, ET AL. 1986. PROCESSES AND RESOURCES OF THE BERING SEA SHELF (PROBES): THE DEVELOPMENT AND ACCOMPLISHMENTS OF T+. CONTINENTAL SHELF RES. 5(1/2):5-21. PERGAMON PRESS, OXFORD. EN.

PROBES was designed as an interdisciplinary study to track the events in the pelagic ecosystem of the Bering Sea shelf that lead to high production in upper

trophic levels. The success of the project was in the development of a strong, testable hypothesis that relied on the events in the early life history of the Alaska pollock (Theragra chalcogramma) to elucidate crucial ecosystem processes. The project spanned 10 years from early conceptual stages and meetings to its final cruises and reports. Over all the field years 2727 stations were logged in the Bering Sea which involved 20 principal investigators plus 147 others as associates, students and technicians. Results are available in a series of publications and data reports.

87BI0341. D.C.GORDON JR., ET AL. 1986. ADVENTURES IN HOLISTIC ECOSYSTEM MODELLING: THE CUMBERLAND BASIN ECOSYSTEM MODEL. NETHERLANDS J. SEA RES. 20(2/3):325-335. E. J. BRILL, LEIDEN. PN-2659. EN.

A holistic ecosystem model has been developed for the Cumberland Basin, a turbid macrotidal estuary at the head of Canada's Bay of Fundy. The model was constructed as a group exercise involving several dozen scientists. Philosophy of approach and methods were patterned after the BOEDE Ems-Dollard modelling project. The model is one-dimensional, has 3 compartments and 3 boundaries, and is composed of 3 separate submodels (physical, pelagic and benthic). The 28 biological state variables cover the complete estuarine ecosystem and represent broad functional groups of organisms based on trophic relationships. Although still under development and not yet validated, the model has been verified and has reached the stage where most state variables provide reasonable output. The modelling p+.

87BI0342. R.N.SAMBROTTO, H.J.NIEBAUER, J.J.GOERING, R.L.IVERSON. 1986. RELATIONSHIPS AMONG VERTICAL MIXING, NITRATE UPTAKE, AND PHYTOPLANKTON GROWTH DURING THE SPRING BL+. CONTINENTAL SHELF RES. 5(1/2):161-198. PERGAMON PRESS, OXFORD. EN.

The temporal development of a spring diatom bloom in the southeast Bering Sea middle shelf for three consecutive ice-free years is analyzed. Physical and chemical criteria are used to divide the bloom period into prebloom, bloom, and postbloom stages. At this shelf depth, the shallowing of the mixed layer was most important in triggering bloom conditions by diminishing phytoplankton respirational losses. a nitrate advection diffusion model indicated that a cross pycnocline mixing rate of 2.1 m/day was associated with bloom conditions. Estimated convective vertical mixing rates in the upper water column were low during the period leading to nitrate exhaustion suggesting that cells remained at favorable light levels for extended periods.

87BI0343. D.C.SCHNEIDER, G.L.HUNT JR., N.M.HARRISON. 1986. MASS AND ENERGY TRANSFER TO SEABIRDS IN THE SOUTHEASTERN BERING SEA. CONTINENTAL SHELF RES. 5(1/2):241-257. PERGAMON PRESS, OXFORD. EN.

It has been hypothesized that differentiation in food web structure occurs across the Bering Sea continental shelf as a result of seasonal differentiation of water masses. We tested this idea using an apex predator, pelagic birds. Seasonal abundance of birds in central Bristol Bay was estimated from counts made while underway between hydrographic stations. Prey and body mass were determined from birds collected at sea. daily intake was estimated as an allometric function of body mass. Annual occupancy was estimated as the integral of a normal curve fit to seasonal data.

87BI0344. J.P.WU, F.A.WHITNEY, C.S.WONG. 1986(10). MEASURMENT OF PRIMARY PRODUCTION IN AN ENCLOSED WATER COLUMN. ACTA OCEANOL. SINICA. 5(4):584-592. CHINA OCEAN PRESS, BEIJING. EN.

A CEE 2.5 m by 16 m has been used to study the budget of organic production by measuring the changes in POC/N, oxygen and Carbon Dioxide, uptake through three-week period. Carbon 14 primary production measurements were conducted with 4-hours and 24-hours incubation periods, and with size fractionation. Different types and sizes of bottle effects were examined. Results showed that the oxygen method production was highest, followed by the Carbon 14 uptake method, and POC gain showed the lowest. The value of PQ should be more than 1.7. The ratio of 4-hour incubation to 24-hour incubation was 2.42 +/- 0.22, indicating that net daily production is equal to 9.7 +/- 0.9 h of illuminated growth.

87BI0345. H.DUCKLOW. 1986(11/12 BACTERIAL BIOMASS IN WARM-CORE GULF STREAM RING 81-B: MESOSCALE DISTRIBUTIONS, TEMPORAL CHANGES AN+. DEEP-SEA RES. V.33(11/12:1789-1812. PERGAMON PRESS, OXFORD. EN.

The distribution of bacterioplankton biomass and productivity in warm-core Gulf Stream ring 82-B generally corresponded to the physical and dynamical structure of the ring. These data suggest that warm-core rings are sites of enhanced variability of bacterioplankton properties in the open sea. Furthermore, the data strongly support recent work showing that frontal zones are sites of locally enhanced bacterial biomass and production. In the ring system as a whole, the euphotic zone bacterioplankton biomass and production were comparable to and occasionally greater than the biomass and production of the >64 um zooplankton, especially in the high velocity region (HVR). Bacterioplankton appear to carry out a major fraction of the heterotrophic carbon cycling in oceanic frontal regions.

87BI0346. S.H.BOYD, ET AL. 1986(11/12 BIOMASS OF THE MICRONEKTON IN GULF STREAM RING 82-B AND ENVIRONS: CHANGES WITH TIME. DEEP-SEA RES. V.33(11/12:1885-1905. PERGAMON PRESS, OXFORD. EN.

Micronekton biomass was sampled in warm-core Gulf Stream ring 82-B, the Slope Water, the Gulf Stream and the Sargasso Sea during three multi-ship cruises. There was no significant diel difference in the 0-1000 m integrated biomass for fishes or invertebrate micronekton in 24 paired day-night tows, and no evidence for diel vertical migration across the 1000 m

level. Biomass showed a consistent upward shift at night; although it varied with hydrographic regime and sampling date, median biomass depth shift for invertebrates averaged 184 and 137 m for fishes. For total micronekton, median biomass depth ranged from 550 to 750 m by day and 300 to 600 m by night. Fish biomass was always centered deeper than 250 m, while the center of invertebrate biomass rose above that level in only one of+.

87BI0347. H.J.LAANBROEK, J.C.VERPLANKE. 1986(2). TIDAL VARIATIONS IN BACTERIAL BIOMASS, PRODUCTIVITY AND OXYGEN UPTAKE RATES IN A SHALLOW CHANNEL I+. MARINE ECOLOGY- PROG. SER. 29:1-5. INTER-RES., HALSTENBEK. PN-3078. EN.

Distribution of bacterial biomass, productivity, and oxygen uptake rates were studied in a shallow tidal channel during 3 tidal cycles in spring and late summer. Maxima in concentrations of suspended particles, bacterial biomass and productivity were always observed around the turn of low tide. Numbers of attached bacteria, but not numbers of free-living bacteria, were always significantly correlated with amounts of suspended matter. In spring, the percentages of attached bacteria were correlated with the tide, whereas in late summer the percentages of attached bacteria were more uniformly distributed during the tidal cycle. A significant correlation was always observed between the numbers of attached bacteria and bacterial productivity. The numbers of free-living bacteria and bacte+.

87BI0348. E.D.TRAGANZA, D.G.REDALJE, R.W.GARWOOD. 1987. CHEMICAL FLUX, MIXED LAYER ENTRAINMENT AND PHYTOPLANKTON BLOOMS AT UPWELLING FRONTS IN THE CALIFOR+. CONTINENTAL SHELF RES. 7(1):89-105. PERGAMON PRESS, OXFORD. EN.

Atmospheric and in situ physical processes appear to generate a sustained chemical flux at the frontal boundaries of coastal upwelling systems. In this study off Pt. Sur. California, satellite images and three-dimensionally presented in situ data show the evolution of an upwelling system with a strong chemical front and a large phytoplankton bloom in a surface layer juxtaposed to the frontal boundary. From a dynamic balance of nutrient exchange processes, a lateral cross-front exchange from the upwelling system to the adjacent mixed layer is also indicated.

87BI0349. D.J.TRANTER, G.S.LEECH. 1987. FACTORS INFLUENCING THE STANDING CROP OF PHYTOPLANKTON ON THE AUSTRALIAN NORTHWEST SHELF SEAWARD O+. CONTINENTAL SHELF RES. 7(2):115-133. PERGAMON PRESS, OXFORD. EN.

An investigation was made to identify the physical factors that influence the distribution in space and time of the phytoplankton standing crop on the Australian Northwest Shelf. during the 18 months of the investigation, 8 cruises were made to the study area. On each of these, there were two oceanographic transects across the shelf, from approximately 40 m, to waters deeper than 1000 m. At various points along each transect, profiles were obtained of temperature, salinity, nitrate-N, oxygen saturaton, and in vivo chlorophyll fluorescence. Photosynthetically active radiation was monitored from dawn till sunset.

87BI0350. A.M.BARNETT, A.E.JAHN. 1987. PATTERN AND PERSISTENCE OF A NEARSHORE PLANKTONIC ECOSYSTEM OFF SOUTHERN CALIFORNIA. CONTINENTAL SHELF RES. 7(1):1-25. PERGAMON PRESS, OXFORD. EN.

Three related data sets from a baseline environmental survey on the continental shelf at San Onofre, California, consisting of: (1) zooplankton pumped from discrete depths on transects between the 8- and 30-m contours, sampled from 1976 to 1980; (2) zooplankton from oblique net hauls on a transect from 8 to 100 m sampled at 2-week intervals for 1 y, 1978-1979; and (3) vertical profiles of temperature, nutrients and plant pigments corresponding closely in time and space to the oblique net hauls, are used to describe cross-shelf zooplankton abundance patterns, community composition, and seasonal & shorter-term variations in cross-shelf zonation and their relation to variations in physical and chemical measures.

87BI0351. T.C.MALONE. 1987(1). PRIMARY PRODUCTION OF THE OCEAN WATER COLUMN AS A FUNCTION OF SURFACE LIGHT INTENSITY. DEEP-SEA RES. 34(1):139. PERGAMON PRESS, OXFORD. EN.

87BI0352. L.S.MULLINEAUX. 1987(2). ORGANISMS LIVING ON MANGANESE NODULES AND CRUSTS: DISTRIBUTION AND ABUNDANCE AT THREE NORTH PACIFI+. DEEP-SEA RES. 34(2):165-184. PERGAMON PRESS, OXFORD. EN.

A diverse and abundant assemblage of deep-sea organisms lives on the surface of manganese nodules and crusts. The organisms on nodules collected at two sites (equatorial North Pacific and central North Pacific) and on crusts collected at one site (seamount chains near the Hawaiian Islands) were identified and quantified. Eukaryotic organisms attached to a nodule can cover up to 20% of the upper surface (average coverage is about 10%). The number of hard-substrate organisms (larger than 63 um) per area of sea floor was about 10 times the faunal density of the nearby soft-substrate macrofauna (larger than 300 um) but only about a tenth of the faunal density of sediment-dwelling meiofauna (sizes between 44 and 300 um).

87BI0353. M.D.RICHARDSON, D.K.YOUNG. 1987(2). ABYSSAL BENTHOS OF THE VENEZUELA BASIN, CARIBBEAN SEA: STANDING STOCK CONSIDERATIONS. DEEP-SEA RES. 34(2):145-164. PERGAMON PRESS, OXFORD. EN.

Standing stocks of four size classes of benthic organisms were compared among three sedimentary provinces in the Venezuela Basin. Total biomass was dominated by microbiota and filter-feeding glass sponges that were abundant in both macrofaunal and megafaunal size classes. The remaining biomass was

divided among predominantly deposit-feeding meiofauna, macrofauna and megafauna. The concentration of biomass in smaller sized classes in the Venezuela Basin was in general agreement with the results of other deep-sea investigations. By contrast, biomass in shallow-water benthic assemblages is concentrated in the larger sized classes.

87BI0354. J.R.NELSON, ET AL. 1987(3). A PARTICLE FLUX STUDY IN THE SANTA MONICA-SAN PEDRO BASIN OFF LOS ANGELES: PARTICLE FLUX, PRIMARY +. CONTINENTAL SHELF RES. 7(3):307-328. PERGAMON PRESS, OXFORD. EN.

In May 1983, two short-term (2.5 day) deployments of sediment traps at 100, 300, and 500 m measured the sinking flux of mass (as dry weight), particulate organic carbon and carbonate carbon in the nearshore basins off Los Angeles. The flux of organic carbon at 100 m depth was about 15% of the mass flux and about 5% of the rate of primary production measured in the surface waters. At 500 m the flux of organic carbon had decreased to about half that at 100 m. Characteristics of the trap collections indicated a large biogenic contribution. In the second deployment, much of this appeared to be the fecal material of the pelagic red crab, Pleuroncodes.

87BI0355. JAE-HAC.LEE. 1987(5). DISTRIBUTIONAL PATTERN OF POLYCHAETES IN THE BENTHIC COMMUNITY OF THE YELLOW SEA. BULL. KOREAN FISH. SOC. 20(3):224-229. KOREAN FISH. SOC., PUSAN. KO.

The ecological studies of the benthic polychaetes of the Yellow Sea were carried out for five years from August 1982. The emphasis of the research were placed on clarification of the distributional pattern and characteristic species of environmental factors on the plychaete community. A total of 6 benthic communities have been recognized from the dominant benthic fauna found. In each benthic communities, dominant and characteristic polychaete species were clarified according to their ecological types. In general, as echinoderms such as Ophiura kinbergi, Amphioplus megapomus, and Luidia quinaria are distributed widely and found in high density, their influence on the distribution of most polychaetes is clearly shown.

87BI0356. KWANG-IL.YOO, JOON-BAEK.LEE. 1987(5). ON THE TROPHIC CORRELATION BETWEEN TINTINNIDS AND DINOFLAGELLATES IN MASAN BAY, KOREA. BULL. KOREAN FISH. SOC. 20(3):230-236. KOREAN FISH. SOC., PUSAN. EN.

The correlation between tintinnid and dinoflagellate by means of seasonal variation of standing crops was investigated at two selected stations in Masan Bay, well-known as a red tide zone in southern coastal waters of Korea, during the period from January 1981 to December 1982. The interspecific food selection by size and morphology between tintinnid including favella and dinoflagellate is recognized and it is considered to be an important factor influencing on the prey-predator relationship in lower trophic level in the surveyed area.

87BI0357. S.W.JEFFREY, G.M.HALLEGRAEFF. 1987(5/6). PHYTOPLANKTON PIGMENTS, SPECIES AND LIGHT CLIMATE IN A COMPLEX WARM-CORE EDDY OF THE EAST AUSTRALI+. DEEP-SEA RES. 34(5/6):649-673. PERGAMON PRESS, OXFORD. EN.

The complex warm-core eddy system Mario, documented by Cresswell and Legeckis (1986, Deep-Sea Research, 33, 1527-1562) from July 1980 to February 1982, was examined for phytoplankton species and pigments in autumn (April-May) 1981. During this period phytoplankton biomass (60-80 mg Chl a/square meter) was higher at the eddy centre and western margin than at other stations inside and outside the eddy (20-40 mg Chl a/square meter). Nanoplankton plus picoplankton accounted for 60-70% of the chlorophyll at the eddy centre and western margin, and as much as 90% at some of the non-enriched stations. Light-penetration profiles (400-750 nm) distinguished eddy water with its increased phytoplankton biomass from tropical Coral Sea water from which the eddy was derived. Thin-layer chromatograph+.

87BI0358. G.SHAFFER. 1987(5/6). REDFIELD RATIOS, PRIMARY PRODUCTION, AND ORGANIC CARBON BURIAL IN THE BALTIC SEA. DEEP-SEA RES. 34(5/6):769-784. PERGAMON PRESS, OXFORD. EN.

The biogeochemical cycling of oxygen, phosphorus and carbon in the Baltic Sea is investigated using a natural coordinate conservation method. The mean Redfield ratio of oxygen consumption to phosphate production due to organic decomposition is found to be 159 +/- 6 in the Baltic proper deep water. Utilizing the C:N ratio for particulate matter in the deep water, a "best" set of Redfield ratios is found to be 159:130:14.4:1 for oxygen:C:N:P. Present net community production in the Baltic proper appears to be about 50 +/- 7g C/square meter/year as calculated from oxygen consumption rates and transport rates of "new" phosphorous into the euphotic zone.

87BI0359. K.BANSE. 1987(5/6). SEASONALITY OF PHYTOPLANKTON CHLOROPHYLL IN THE CENTRAL AND NORTHERN ARABIAN SEA. DEEP-SEA RES. 34(5/6):713-723. PERGAMON PRESS, OXFORD. EN.

Marked seasonality of ship-observed chlorophyll concentrations in the upper layers of the central and northern parts of the Arabian Sea is established for three hydrographically defined offshore areas. A peak related to the southwest (summer) monsoon occurs, either with or without a northeast (winter) monsoon-related peak. Both appear to depend on the establishment of a deep mixed layer and the concomitant nutrient supply, but at any station the relation between pigment content and mixed-layer depth or nitrate concentration is usually obscure.

87BI0360. J.J.WALSH, D.A.DIETERLE, W.E.ESAIAS. 1987(5/6). SATELLITE DETECTION OF PHYTOPLANKTON EXPORT FROM THE MID-ATLANTIC BIGHT DURING THE 1979 SPRING BLO+. DEEP-SEA RES. 34(5/6):675-703. PERGAMON

PRESS, OXFORD. EN.

Analysis of CZCS imagery confirms shipboard and in situ moored fluorometer observations of resuspension of near-bottom chlorophyll within surface waters (1-10 m) by northwesterly wind events in the mid-Atlantic Bight. As much as 8 - 16 ug Chl/liter are found during these wind events from March to May, with a seasonal increase of algal biomass until onset of stratification of the water column. Rapid sinking or downwelling apparently occurs after subsequent wind events, however, such that the predominant surface chlorophyll pattern is about 0.5 - 1.5 ug/liter over the continental shelf during most of the spring bloom. Perhaps half of the chlorophyll increase observed by satellite during a wind resuspension event represents in situ production during that 4-5 day interval, with the remai+.

87BI0361. U.STEFANSSON, T.THORDARDOTTIR, J.OLAFSSON. 1987(5/6). COMPARISON OF SEASONAL OXYGEN CYCLES AND PRIMARY PRODUCTION IN THE FAXAFLOI REGION, SOUTHWEST ICEL+. DEEP-SEA RES. 34(5/6):725-739. PERGAMON PRESS, OXFORD. EN.

Seasonal oxygen and primary production cycles in the Faxafloi region, southwest Iceland, are described and discussed. Productivity data obtained by Carbon 14 measurements are used to estimate the photosynthetic production of oxygen within the mixed layer, and this is compared with the apparent oxygen evasion. The total estimated production within this layer and the total apparent oxygen flux into the atmosphere give similar results when integrated over the entire period with positive evasion rates. For any given time, however, the two rates may be quite different. during the initial phase of plant production, the rate of formation of oxygen generally exceeds the evasion rate, whereas the opposite applies later on in the growing season.

87BI0362. F.P.CHAVEZ, R.T.BARBER. 1987(7). AN ESTIMATE OF NEW PRODUCTION IN THE EQUATORIAL PACIFIC. DEEP-SEA RES. 34(7):1229-1243. PERGAMON PRESS, OXFORD. EN.

Two estimates of new production in the equatorial Pacific are presented and the similarity between the physically based estimate and an estimate based on measurements of primary productivity is emphasized. The new production calculated by both methods is on the order of 1 gigaton C/year, an order of magnitude greater than previous estimates for this region. The new estimates suggest that equatorial Pacific circulation supports a significant proportion (18-56%) of the global new production calculated by Eppley and Peterson (1979, nature, 282, 677-680).

87BI0363. JAE-KU.RHEE, YOUNG-KI.PAIK, HO-IL.LEE, HONG-HYUN.YANG. 1987(7). DEFENCE MECHANISM OF JAVA TILAPIA, TILAPIA MOSSAMBICA, TO CLONORCHIS SINENSIS. BULL. KOREAN FISH. SOC. 20(4):317-327. KOREAN FISH. SOC., PUSAN. KO.

As a series of studies on the suitability as a second intermediate host of Clonorchis sinensis, artificial infection experiments were applied to Tilapia mossambica. And then, in order to elucidate the defence mechanism of the fish to Clonorchis, clonorchicidal substance in the epidermal mucus of the fish was isolated by silica gel column and thin layer chromatography and analyzed for its chemical structure by UV, IR and NMR-spectroscopy. According to the results of the present studies it seemed that this species can not serve as a proper intermediate host of Clonorchis sinensis, and that defence mechanism to the fluke seems to be correlated with linoleic acid in the epidermal mucus of this species.

87BI0364. P.C.FIEDLER, H.J.BERNARD. 1987(8). TUNA AGGREGATION AND FEEDING NEAR FRONTS OBSERVED IN SATELLITE IMAGERY. CONTINENTAL SHELF RES. 7(8):871-881. PERGAMON PRESS, OXFORD. EN.

Stomach contents of albacore (Thunnus alalunga) and skipjack (Katsuwonus pelamis) caught off California in August 1983 showed they were feeding on juvenile northern anchovy (Engraulis mordax), other fishes, and planktonic crustaceans. The distribution and diet of these predators were related to mesoscale frontal features visible in satellite sea surface temperature and phytoplankton pigment imagery. Albacore were caught in the vicinity of a filament of cold, pigment-rich surface water that varied with the intensity of coastal upwelling on time scales of several days. Skipjack were caught in warm water in the Southern California Bight, north of their normal range due to El Nino warming.

87BI0365. A.M.SPRINGER, ET AL. 1987(8). THE PARADOX OF PELAGIC FOOD WEBS IN THE NORTHERN BERING SEA, I. SEABIRD FOOD HABITS. CONTINENTAL SHELF RES. 7(8):895-911. PERGAMON PRESS, OXFORD. EN.

Two distinct environmental settings in the Bering Strait region of the northern Bering Sea lead to characteristic pathways of energy flow through primarily pelagic food webs to avian consumers. In Norton Sound, a large, shallow embayment on the northeastern coast, the physical environment is dominated by the discharge of the Yukon River & by a large seasonal temperature signal. Seabirds breeding at Bluff, the largest colony in Norton Sound, number in the order of 50,000 and require 1,200,000 g C/day. Two piscivorous species constitute the bulk of all seabirds there & are supported by a pelagic food web typical of the coastal zone of the Bering and Chukchi seas. This food web also is present around St. Lawrence Island, on the northwestern shelf, and is important to at least one species o+.

87BI0366. R.B.HEYWOOD, J.PRIDDLE. 1987(8). RETENTION OF PHYTOPLANKTON BY AN EDDY. CONTINENTAL SHELF RES. 7(8):937-955. PERGAMON PRESS, OXFORD. EN.

A patch of high phytoplankton biomass, approximately 1,000,000,000 square meter in area, remained apparently stationary off King George Island, South Shetland Islands, over a period of at least 11 days. The patch was centred on an eddy at the apex of a tight meander formed by water passing round the eastern end of King George Island and being turned back immediately by the strong northeastern flow of

water within the Bransfield Strait. Chlorophyll a biomass approached 1 g/square meter and was concentrated within the top 50-75 m of water.

87BI0367. T.L.HAYWARD. 1987(9). THE NUTRIENT DISTRIBUTION AND PRIMARY PRODUCTION IN THE CENTRAL NORTH PACIFIC. DEEP-SEA RES. 34(9):1593-1627. PERGAMON PRESS, OXFORD. EN.

The relation between horizontal and vertical nutrient distributions and biological pattern in the North Pacific central gyre suggests that new primary production is strongly nutrient limited and that the nutrient supply rate is a major determinant of biological pattern. However, no consistent relation between the nutrient distribution and biological pattern is evident on any spatial or temporal scale. Along- and cross-isopycnal nutrient fluxes to the euphotic zone, estimated from nutrient gradients and eddy diffusivities predicted from microstructure and tracer distributions, are roughly equivalent, but both are a small fraction of the nutrient requirement.

87BI0368. YONG-KAE.CHO, CHOON-KWON.KIM. 1971(6). ACCUMULATION OF HEAVY METAL IN SHELLFISH, 1. ON THE COPPER CONTENT IN GREEN OYSTERS. BULL. KOREAN FISH. SOC. 4(2):61-65. KOREAN FISH. SOC., PUSAN. KO.

It is well known that shellfish absorb and accumulate heavy metals in the water environment. When the concentration of the heavy metals in the water is above guideline, we find abnormal accumulation of them in the body of shellfish. This study on green oysters is an instance showing the relationship between the abnormal accumulation of heavy metal and industrial wastewaters containing it. This paper deals with the copper-contents in the meat of oysters which were collected in Changhang Bay and Daechun area, the latter being not supposed to be influenced by the water of the Kum River during the period from October 1970 to February 1971.

87BI0369. WON-JAE.LEE, WI-KYUNG.CHOE. 1973(6). VIBRIO PARAHAEMOLYTICUS IN KOREAN COASTAL WATERS, 3. THE DISTRIBUTION OF VIBRIO FLORA IN THE PUBLI+. BULL. KOREAN FISH. SOC. 6(1/2):20-26. KOREAN FISH. SOC., PUSAN. KO.

Authors have investigated the monthly distribution of Vibrio flora in sea water, mud, fish and shellfish in the public beaches at the suburbs of Busan in order to determine the possible origins of food poisoning.

87BI0370. JONG-HUN.WON. 1973(6). THE CONCENTRATIONS OF MERCURY, CADMIUM, LEAD AND COPPER IN FISH AND SHELLFISH OF KOREA. BULL. KOREAN FISH. SOC. 6(1/2):1-19. KOREAN FISH. SOC., PUSAN. KO.

Heavy metal concentrations have been determined in fishes and shellfishes sampled from October 1971 to April 1972 in Korea. In general, fish viscera, shellfish muscle and crustacean exoskeleton contained high concentrations of the metals. With regard to the regional variations of the metals, samples of the west coast of Korea contained relatively high concentrations of mercury, copper, cadmium and lead, but those of the south coast contained high levels of cadmium and lead. In particular, the concentrations of copper in the samples of the west coast were almost twice as much those of the other coasts.

87BI0371. EUNG-HO.LEE, BYEONG-HO.RYU, SYNG-TACK.YANG 1975(6). SUITABILITY OF SHELLFISH FOR PROCESSING, 2. SEASONAL CHANGES IN HEAVY METAL CONTENT OF BABY CLAM. BULL. KOREAN FISH. SOC. 8(2):85-89. KOREAN FISH. SOC., PUSAN. KO.

Heavy metal content have been determined in baby clams from March 1973 to April 1974 in Depori, Samchunpo, Korea. Monthly changes of mercury, lead, copper and cadmium in the samples were irregular but as a whole, the content of mercury, lead, copper and cadmium were relatively high in summer season. The content of total mercury, lead, copper and cadmium in the samples ranged from 0.003 to 0.038 ppm, 0.096 to 0.921 ppm, 0.023 to 0.139 ppm and 0.009 to 0.038 ppm respectively. In the consideration of heavy metal content, it was concluded that baby clams in Depori, Samchunpo, Korea is suitable for processing materials.

87BI0372. H.W.KLEMMER. 1976. MERCURY CONTENT OF BIOTA IN COASTAL WATERS IN HAWAII. BULL. ENVIRON. CONTAM. TOXICOL. 15(4):454-457. SPRINGER-VERLAG, N.Y. PN-2977. EN.

A survey of mercury and pesticide residue content of biota collected from four coastal areas of Hawaii was undertaken as part of a multi-disciplinary project in Quality of Coastal Waters (LAU 1972, 1973) supported by the Sea Grant Program of the University of Hawaii. Information collected from this survey is presented for evidence of biological concentration of mercury and of any influence of agricultural or urban waste discharges on mercury concentrations in coastal biota.

87BI0373. D.J.H.PHILLIPS. 1976. THE COMMON MUSSEL MYTILUS EDULIS AS AN INDICATOR OF POLLUTION BY ZINC, CADMIUM, LEAD AND COPPER. 1. MARINE BIOLOGY. 38:59-69. SPRINGER-VERLAG, BERLIN. PN-2992. EN.

The net uptake of zinc, cadmium, lead and copper by the common mussel Mytilus edulis (L.) exposed to different conditions was investigated with a view to using this species as an indicator of contamination of the marine environment by these metals. The variables studied were season, position of the mussel in the water column, water salinity, water temperature, and the simultaneous presence of all four metals. Each of these 5 variables affected the net uptake of some or all of the metals studied under some conditions.

87BI0374. G.E.ZAROOGIAN, S.CHEER. 1976(6). ACCUMULATION OF CADMIUM BY THE AMERICAN OYSTER, CRASSOSTREA VIRGINICA. NATURE. 261:408-410. MACMILLAN JOURNALS. PN-2991. EN.

87BI0375. D.A.WRIGHT. 1977. THE EFFECT OF CALCIUM ON CADMIUM UPTAKE BY THE SHORE

CRAB CARCINUS MAENAS. J. EXP. BIOL. 67:163-173. CAMBRIDGE UNIV. PRESS, CAMB. PN-2984. EN.

The accumulation of cadmium by the shore crab Carcinus maenas (L.) is to some extent dependent upon the calcium concentration of the external medium. This effect is apparently independent of the overall salinity of the external medium and may at least partially explain previous reports of a 'salinity effect'. Haemolymph cadmium has a highly significant inverse relationship with the external calcium concentration. This effect is less obvious with other tissues, although the whole body cadmium has a significant inverse correlation with the external calcium concentration. Both the haemolymph and gill show a significant inverse relationship between tissue cadmium and calcium.

87BI0376. R.GILLESPIE, T.REISINE, E.J.MASSARO. 1977. CADMIUM UPTAKE BY THE CRAYFISH, ORCONECTES PROPINQUUS PROPINQUUS (GIRARD). ENVIRON. RES. 13:364-368. ACADEMIC PRESS, N.Y. PN-2979. EN.

Orconectes propinquus was exposed to 10, 100, and 1000 ppb cadmium chloride containing 0.09 u Ci/liter cadmium chloride for 1.5, 4.5, 10.5, 22.5, 46.5, 94.5, and 190.5 hours. At 10 ppb, total Cd uptakes between 1.5 and 94.5 hours were not significantly different. By 190.5 hours, the organisms had accumulated a mean concentration of 18.4 ppm Cd, which was significantly higher than the concentrations accumulated at earlier times. At 100 ppb, Cd uptake at 1.5 hours was significantly less ($P < 0.05$) than that at 22.5-190.5 hours and uptake at 4.5 hours was significantly less than that at 94.5 and 190.5 hours. Also, uptake at 10.5 hours was significantly less than that at 190.5 hours.

87BI0377. A.P.GRIMANIS, D.ZAFIROPOULOS, M.VASSILAKI-GRIMANI. 1978. TRACE ELEMENTS IN THE FLESH AND LIVER OF TWO FISH SPECIES FROM POLLUTED AND UNPOLLUTED AREAS OF TH+. ENVIRON. SCI. & TECHNOL. 12(6):723-726. AME. CHEMICAL SOC., WASH. PN-2988. EN.

Ten trace elements (As, Cd, Co, Cu, Fe, Hg, Rb, Sb, Se, and Zn) were determined by neutron activation analysis in the flesh and liver of the two edible fishes Sargus annularis and Gobius niger caught from polluted and unpolluted areas of the Aegean Sea. Increased levels of arsenic were found in the flesh of Sargus annularis from the polluted areas studied. Arsenic levels were also increased in the flesh and liver of Gobius niger from the Athens sewage outfall area. Elevated concentrations of mercury were found in the flesh of Sargus annularis and in the flesh and liver of Gobius niger from a sea area close to Mytelene Harbor in the island of Lesvos. No significant differences were found for all the other elements determined. Elevated levels of arsenic and mercury found in these two +.

87BI0378. J.H.BEATTIE, D.PASCOE. 1978. CADMIUM UPTAKE BY RAINBOW TROUT, SALMO GAIRDNERI EGGS AND ALEVINS. J. FISH. BIOL. 13:631-637. ACADEMIC PRESS (LONDON). PN-2985. EN.

The uptake of cadmium by eggs and alevins of rainbow trout from water concentrations of between 0.01 and 50.0 mg Cd/l was investigated. The cadmium content of eggs and alevins increased with time and with exposure concentration. Lower cadmium levels were detected in alevins than in eggs. Most of the cadmium (98%) in the eggs was found to be associated with the egg membrane or chorion. This explains the considerable reduction in cadmium concentration observed in alevins after hatching. Alevins hatching from eggs which had been exposed to cadmium survived longer in cadmium than alevins not exposed as eggs. This suggests that the pretreatment of eggs with cadmium serves some protective function. Behavioural and pathological signs of cadmium poisoning such as erratic swimming and blood c+.

87BI0379. K.B.FENNIKOH, H.I.HIRSHFIELD, T.J.KNEIP. 1978. CADMIUM TOXICITY IN PLANKTONIC ORGANISMS OF A FRESHWATER FOOD WEB. ENVIRON. RES. 15:357-367. ACADEMIC PRESS, N.Y. PN-2981. EN.

The effects of cadmium chloride on populaton growth of two species of green algae were determined in 168-hour bioassays, and six additional freshwater species were studied using 96-hour LC50 measurements. Intercomparisons of these two test series show that limits generated by a 100-fold reduction of the 96-hour LC50 values would protect planktonic species from the observable effects on life span, growth, or reproduction. The limits generated by these laboratory studies are in the range of concentrations observed in a field study of a contaminated estuarine cove. However, field exposures vary with the tide, and the hardness of the laboratory water is considerably lower than that of the water in the cove. These factors probably account for the absence of observable effects on planktonic+.

87BI0380. R.E.REHWOLDT, W.MASTRIANNI, E.KELLEY, J.STALL. 1978. HISTORICAL AND CURRENT HEAVY METAL RESIDUES IN HUDSON RIVER FISH. BULL. ENVIRON. CONTAM. TOXICOL. 19:335-339. SPRINGER-VERLAG, N.Y. PN-2976. EN.

87BI0381. G.A.CHAPMAN. 1978. TOXICITIES OF CADMIUM, COPPER, AND ZINC TO FOUR JUVENILE STAGES OF CHINOOK SALMON AND STEELHEAD. TRANS. AME. FISH. SOC. 107(6):841-847. AME. FISH. SOC., LAWRENCE. PN-2973. EN.

Continuous-flow toxicity tests were conducted to determine the relative tolerances of newly hatched alevins, swim-up alevins, parr, and smolts of chinook salmon (Oncorhynchus tshawytscha) and steelhead (Salmo gairdneri) to cadmium, copper, and zinc. Newly hatched alevins were much more tolerant to cadmium and, to a lesser extent, to zinc than were later juvenile forms. However, the later progression from swim-up alevin, through parr, to smolt was accompanied by a slight increase in metal tolerance. The 96-h LC50 values for all four life stages ranged from 1.0 to >27 ug Cd/liter, 17 to 38 ug Cu/liter, and 93 to 815 ug Zn/liter. Steelhead were consistently more sensitive to these

metals than were chinook salmon. When a sensitive life stage for acute toxicity tests with metals is sought+.

87BI0382. K.KREMLING, J.PIUZE, K.VON BROCKEL, C.S.WONG. 1978. STUDIES ON THE PATHWAYS AND EFFECTS OF CADMIUM IN CONTROLLED ECOSYSTEM ENCLOSURES. MARINE BIOLOGY. 48:1-10. SPRINGER-VERLAG, BERLIN. PN-2990. EN.

Two experiments were performed during 1975 and 1976, in which cadmium was added to seawater and its plankton enclosed in plastic containers moored in Saanich Inlet (Vancouver Island, Canada), as part of the CEPEX project. In both experiments, two enclosures (Ca. 68 cubic meter each) were used; one was spiked with about 1.3 ug/l cadmium while the other served as a control, to assess the fate of the added metal and its effect on marine phytoplankton. In both experiments, the pattern of biological events was found to be very similar for the cadmium-treated bag and for the control. Furthermore, there were no marked differences in the phytoplankton species composition, thus indicating that at this concentration level cadmium did not affect the ecosystem. The rate of removal of cadmium by b+.

87BI0383. R.V.ANDERSON, J.E.BROWER. 1978. PATTERNS OF TRACE METAL ACCUMULATION IN CRAYFISH POPULATIONS. BULL. ENVIRON. CONTAM. TOXICOL. 20:120-127. SPRINGER-VERLAG, N.Y. PN-2987. EN.

The study of the occurrence and effects of heavy metals in aquatic systems has increased and an excellent review was presented by LELAND et al. (1974). Our study investigated concentrations of Cd, Cu, Pb, and Zn in three populations of the crayfish, Orconectes virilis (Hagen). Two of the populations were collected at the same location but at sampling sites with different inputs of the trace metals. The third population was from a site on the same river but where metal input was low. These sites allowed an evaluation of the effects of different sublethal environmental concentrations on accumulation and concentration of the metals in crayfish. Various tissue concentrations from crayfish at the high input site were also examined to determine if particular body parts were sites of accumu+.

87BI0384. J.G.EATON, J.M.MCKIM, G.W.HOLCOMBE. 1978. METAL TOXICITY TO EMBRYOS AND LARVAE OF SEVEN FRESHWATER FISH SPECIES, I. CADMIUM. BULL. ENVIRON. CONTAM. TOXICOL. 19:95-103. SPRINGER-VERLAG, N.Y. PN-2986. EN.

The embryos and larvae of seven freshwater fish were exposed to low concentrations of cadmium in soft water. All species were killed or their growth retarded by concentrations ranging from about 4 to 12 ug Cd/liter. The larvae were consistently more sensitive than the embryos. The agreement between these results and those from life-cycle chronic toxicity studies indicates that embryo and larval exposures will give reliable estimates of the chronic toxicity of cadmium to additional fish species. A 60-day exposure period appears to be appropriate for determining larval sensitivity to cadmium.

87BI0385. G.A.CHAPMAN, D.G.STEVENS. 1978. ACUTELY LETHAL LEVELS OF CADMIUM, COPPER, AND ZINC TO ADULT MALE COHO SALMON AND STEELHEAD. TRANS. AME. FISH. SOC. 107(6):837-840. AME. FISH. SOC., LAWRENCE. PN-2983. EN.

Flow-through acute toxicity tests of cadmium, copper, and zinc were conducted with adult male coho salmon (Oncorhynchus kisutch) and adult male steelhead (Salmo gairdneri). The 96-h LC50 values for copper were 46 and 57 ug/liter, and for zinc were 905 and 1,755 ug/liter, for coho salmon and steelhead, respectively. Mortality induced by cadmium was slow in onset, but 50% mortality occurred after more than a week at 3.7 ug/liter for coho salmon and 5.2 ug/liter for steelhead. Hardness and alkalinity of the water supply were higher during the toxicity tests with steelhead, complicating direct comparisons between the two species.

87BI0386. J.M.MANSON, E.J.O'FLAHERTY. 1978. EFFECTS OF CADMIUM ON SALAMANDER SURVIVAL AND LIMB REGENERATION. ENVIRON. RES. 16:62-29. ACADEMIC PRESS, N.Y. PN-2974. EN.

87BI0387. J.SARKKA, M.L.HATTULA, J.JANATUINEN, J.PAASIVIRTA. 1978. CHLORINATED HYDROCARBONS AND MERCURY IN AQUATIC VASCULAR PLANTS OF LAKE PAIJANNE, FINLAND. BULL. ENVIRON. CONTAM. TOXICOL. 20:361-368. SPRINGER-VERLAG, N.Y. PN-2972. EN.

This paper is a part of a study of the chlorinated hydrocarbons and mercury residues in the food webs of Lake Paijanne. The purpose was to search differences in the residue levels between the regions, years (1972-1974), species and trophic levels. Mercury has been discharged into the lake near to stat. 1 and 2 till year 1968 as slimicides of the wood-processing industry. PCB and DDT have not been used in particularly great amounts in the drainage area flowing into this lake. The total use of PCB in Finland was in 1969 about 240 tons (RAUTAPAA 1972) and of DDT from 1953 to 1971 229 tons (MARKKULA 1972) and the use of DDT has been nearly totally prohibited since 1971.

87BI0388. B.R.MURPHY, G.J.ATCHISON, A.W.MCINTOSH. 1978. CADMIUM AND ZINC CONTENT OF FISH FROM AN INDUSTRIALLY CONTAMINATED LAKE. J. FISH. BIOL. 13:327-335. ACADEMIC PRESS (LONDON). PN-2980. EN.

Eleven species of fish from an industrially-contaminated lake were analysed for whole body cadmium and zinc content by atomic absorption spectrophotometry. Cadmium and zinc content of fish were species related, and most species accumulated these trace metals to levels significantly higher than background. Maximum concentrations detected were 13.60 ug Cd/g (dry wt) in a bluegill and 820 ug Zn/g in a redear sunfish. Cadmium content was much more variable than zinc content. Distributions of concentrations of both cadmium and zinc in fish were

lognormal, and concentrations of both metals tended to decrease in higher trophic levels. Zinc concentrations significantly decreased as total length increased in three species.

87BI0389. J.M.MCKIM, J.G.EATON, G.W.HOLCOMBE. 1978. METAL TOXICITY TO EMBRYOS AND LARVAE OF EIGHT SPECIES OF FRESHWATER FISH II: COPPER. BULL. ENVIRON. CONTAM. TOXICOL. 19:608-616. SPRINGER-VERLAG, N.Y. PN-2971. EN.

Fish larvae and early juveniles of all species tested (brook trout, rainbow trout, brown trout, lake trout, northern pike, white sucker, herring, and smallmouth bass) were more sensitive to copper than the embryos. Embryo survival was affected only at the higher concentrations tested, for all species except the rainbow trout. The concentrations of copper that caused significant effects on the larval standing crop were similar for all species (31.7-43.5 ug Cu/l) except the northern pike, which seemed to be considerably more resistant (104.1 ug Cu/l). Copper concentrations shown to have no significant effects on the early developmental stages of these species are considered close estimates of the copper concentrations that would have no measurable adverse effects during a complete life +.

87BI0390. T.KARIYA, H.HAGA, Y.HAGA, Y.KAWASAKI. 1978. STUDIES ON THE POST-MORTEM IDENTIFICATION OF THE POLLUTANT IN FISH KILLED BY WATER POLLUTION-XIII,+. BULL. JAPAN. SOC. SCI. FISH. 44(10):1065-1072. JAPAN. SOC. SCI. FISH., TOKYO. PN-2975. JA.

The toxicity of several cadmic solutions to fishes and cadmium content in fish bodies killed with these solutions were investigated in this study. Cadmium concentration was higher in kidneys and hepatopancreas among the various organs of fishes killed with Cd; it was higher in hepatopancreas than in kidneys for the feeding group and vice versa for the non-feeding group.

87BI0391. S.K.BANERJEE, S.G.DASTIDAR, P.K.MUKHOPADHYAY, R.V.DEHADRAI. 1978(12). TOXICITY OF CADMIUM: A COMPARATIVE STUDY IN THE AIR-BREATHING FISH, CLARIAS BATRACHUS (LINN.) & IN+. INDIAN J. EXP. BIOL. 16:1274-1277. COUNCIL SCI. & IND. RES. PN-2993. EN.

Air-breathing fishes are more resistant towards the toxicity of Cadmium than the non-air-breathing fishes as to their duration of survival and growth in the metal polluted environment. They respond differently under sub-acute levels of Cd exposure so far as the activities of their gill lysosomal enzymes and membrane bound ATPase are concerned. Alteration in the levels of serum glucose, liver glycogen and glucose-6-phosphatase indicate that carbobydrate metabolism in the fishes is impaired under the above mentioned experimental conditions. Accumulation of cadmium in the various tissues is also found to be different in these two species when kept in an environment containing 50 ppm of Cd for 4 weeks.

87BI0392. SEH-KYU.CHUN. 1978(12). THE EFFECTS OF TRICHLORFON ON CARP FINGERLINGS. BULL. KOREAN FISH. SOC. 11(4):239-241. KOREAN FISH. SOC., PUSAN. KO.

A study was made to measure mortality and scoliosis of the fingerlings of common carp (Cyprinus carpio) which has been exposed to various concentrations of trichlorfon. Trichlorfon increased mortality of the fingerlings and it caused severe scoliosis. When exposed to 40 ppm trichlorfon for 120 hrs, 100% mortality was observed. Scoliosis was observed when the fingerlings have been exposed 25 to 40 ppm trichlorfon.

87BI0393. CHANG-HWAN.CHO, YONG-SOO.KIM. 1978(12). ENVIRONMENT IN THE OYSTER FARM AREA - SUPERFICIAL MUD CHARACTERISTICS NEAR CHUNGMU -. BULL. KOREAN FISH. SOC. 11(4):243-247. KOREAN FISH. SOC., PUSAN. KO.

COD and sulphide contents in the superficial mud in three oyster farms, one near Gajo-do in Chinhae Bay, the second near Eup-do in Koseong Bay and the third near Eogu in Keoje Bay, around the Chungmu area have been monthly determined for seven months from May through November in 1978. Bottom water was also checked for chlorophyll-a, dissolved oxygen, COD and sulphide. In general, large amounts of COD and sulphide in the superficial mud were found in the summer season.

87BI0394. TAEK-YUIL.LEE, YOUNG-WON.SON. 1978(6). BIOASSAY STUDY OF EARLY DEVELOPMENT OF MACTRA CHINENSIS PHILIPPI FOR THE WATER QUALITY EVALUATION +. BULL. KOREAN FISH. SOC. 11(2):115-121. KOREAN FISH. SOC., PUSAN. KO.

Early developmental stages of Mactra chinensis were bioassayied to determine the water quality of the coastal waters of Busan. The water samples were obtained at 12 stations from July 12 to July 17, 1977. Water quality evaluation was made in terms of the rates of normal development to abnormal development in three indicatory states, i.e. fertilization membrane formation, morula and trochophore larvae.

87BI0395. CHANG-HWAN.CHO. 1978(6). ON THE GONYAULAX RED TIDE IN JINHAE BAY. BULL. KOREAN FISH. SOC. 11(2):111-114. KOREAN FISH. SOC., PUSAN. KO.

The red tide that occurred in Jinhae Bay in the middle of July, 1977 was caused by the microscopic dinoflagellate, Gonyaulax sp., which is very similar to G. catenella. The cell is round, dorsoventrally flat and transdiameter is about 40 u. Many cells are chained. Dark brown, band and streak-like patches were formed in the surface water. A great deal of jelly fishes, Chrysaora quinquecirrha and Aurelia aurita, appeared in the red tide area and its surrounding waters.

87BI0396. J.R.JENNINGS, P.S.RAINBOW. 1979. STUDIES ON THE UPTAKE OF CADMIUM BY THE CRAB CARCINUS MAENAS IN THE LABORATORY. I. ACCUMULATION FR+. MARINE BIOLOGY. 50:131-139. SPRINGER-VERLAG, BERLIN. PN-2989.

EN.

The crab carcinus maenas (L.) was exposed to radioactively labelled cadmium dissolved in seawater at concentrations of 0.1, 1 and 10 ppm, the latter concentration being toxic to the crabs (50% mortality after 12.3 days). Net accumulation of cadmium from solution was proportional to the level and time period of cadmium exposure. Total absorbed cadmium levels reached 0.0043 and 0.0412 mg Cd/g dry weight after 40 days exposure to 0.1 and 1 ppm Cd, respectively, and 0.1115 mg Cd/g dry weight after 12.3 days average exposure to 10 ppm Cd. The highest tissue concentration was found in the midgut gland, reaching 0.786 mg Cd/g dry weight after 12.3 days average exposure to 10 ppm Cd. The midgut gland only contained about 10% of the total cadmium absorbed from solution, while the exoskeleton +.

87BI0397. E.M.B.SORENSEN, R.E.HENRY, R.RAMIREZ-MITCHELL. 1979. ARSENIC ACCUMULATION, TISSUE DISTRIBUTION AND CYTOTOXICITY IN TELEOSTS FOLLOWING INDIRECT AQUEOUS +. BULL. ENVIRON. CONTAM. TOXICOL. 21:162-169. SPRINGER-VERLAG, N.Y. PN-2978. EN.

87BI0398. CHANG-HWAN.CHO. 1979(3). MASS MORTALITYS OF OYSTER DUE TO RED TIDE IN JINHAE BAY IN 1978. BULL. KOREAN FISH. SOC. 12(1):27-33. KOREAN FISH. SOC., PUSAN. KO.

In early August 1978, a huge red tide occurred off Chilcheon Is., at the mouth of Jinhae Bay. It expanded rapidly into the central part and then soon covered all the bay except the innermost part of the bay. After staying for a week it disappeared, and thereafter several small scale red tides partially occurred and disappeared until the end of August. It differed from the red tides hitherto recorded from this bay in respect of the dominant plankter, the geographical extent and the severe damaging effect to local oyster resources. During the red tide period, nevertheless, no oyster damage was found.

87BI0399. JONG-MAN.KIM. 1979(4). THE TOXICITY OF MERCURY AND CADMIUM ON TWO FRESHWATER FISHES, CARP AND LOACH. BULL. KORDI. 1(1):15-21. KORDI., SEOUL. KO.

Acute toxic effects of mercury and cadmium on carp (Cyprinus carpio) and loach (Misgurnus anguillicaudatus) were investigated using a continuous-flow bioassay. The 96-hr LC50 values of mercury for the carp and the loach were 0.1 and 0.15 ppm, respectively. The toxicity of cadmium to carp was much greater than to loach with the 96-hr LC50 for carp (0.64 ppm) being less than one-sixth of that of the loach (3.9 ppm). Mercury concentrations in the dead carp during the tests were 1.3-4.1 ppm in muscle, 7.1-9.2 ppm in the liver, and 100-410 ppm in the gill, while those of cadmium were 0.6-2.8 ppm, 5.1-10.3 ppm, and 10.8-48.0 ppm, respectively. These amounts were up to 20-4,100 times greater than mercury contents found in the carp from control aquaria and 6-480 times for the cadmium. The resu+.

87BI0400. JOO-SUCK.PARK, HAK-GYOON.KIM. 1979(6). BIOASSAYS ON MARINE ORGANISMS II, ACUTE TOXICITY TEST OF MERCURY, COPPER AND CADMIUM TO CLAM, MERE+. BULL. KOREAN FISH. SOC. 12(2):113-117. KOREAN FISH. SOC., PUSAN. EN.

The short-term acute toxicities of mercury, cadmium and copper for the clam, Meretrix lusoria were determined from 28 June to 15 July, 1978. In the test with mercury and copper, the rate of mucus excretion increased gradually at a higher concentration. But the clams did not excrete mucus in the solutions of cadmium and natural sea water. The rate of mucus excretion in mercury was 42.9%, and that in copper was 14.3% in a test solution of 1 mg/l mercury was more toxic than copper.

87BI0401. JOO-SUCK.PARK, HAK-GYOON.KIM. 1979(6). BIOASSAYS ON MARINE ORGANISMS III. ACUTE TOXICITY TEST OF MERCURY, COPPER CADMIUM AND TO YELLOWTAI+. BULL. KOREAN FISH. SOC. 12(2):119-123. KOREAN FISH. SOC., PUSAN. EN.

The acute toxicity test of mercury, cadmium and copper to yellowtail, Seriola quinqueradiata, and to rock-bream, Oplegnathus fasciatus, were conducted by static bioassays from 18 July to 27 October, 1978. In the tests, the least sensitive heavy metals were cadmium to rock bream and copper to yellowtail. The test species were most sensitive to mercury among all the chemicals used. The 24hr-LC 50 value for the yellowtail was 0.11 mg/l for mercury, 0.82 mg/l for cadmium and 1.03 mg/l for copper. While the 48hr-LC 50 value for the rock bream was 1.40 mg/l for mercury and 1.73 mg/l for copper.

87BI0402. UNG-JUN.HAN, YEONG-HO.HAN. 1979(9). STUDIES ON THE MATHEMATICAL KINETICS FOR THE REMOVABLE MOVING SCREEN MEDLA-ACTIVATED SLUDGE PROCES+. BULL. KOREAN FISH. SOC. 12(3):175-179. KOREAN FISH. SOC., PUSAN. KO.

One of the major problems in the activated sludge system has been difficulty in separating the microbial solids from the treated effluent and in returning them to the aeration tank. Another problem has been the digestion of the excess activated sludge. In contrast, it has not been difficult to separate the microbial solids from the treated effluent from the biological fixed-film systems (RBC process, Trickling Filter, FAST process). These systems have also featured less sludge production. The object of the present study is to evaluate the sludge accumulation rate and effluent quality prediction in the REMSMAS process designed in the dynamic hydraulic structure.

87BI0403. UNG-JUN.HAN, YEONG-HO.HAN. 1979(9). STUDIES ON THE MATHEMATICAL KINETICS FOR THE REMOVABLE MOVING SCREEN MEDIA-ACTIVATED SLUDGE PROCES+. BULL. KOREAN FISH. SOC. 12(3):167-173. KOREAN FISH. SOC., PUSAN. KO.

It is preented the removable moving screen media-activated sludge (REMSMAS) process by using

the biological fixed-film systems. The substrate removal kinetic difference between the aeration-only completed mixing activated sludge (CMAS) process and REMSMAS process were observed. The substrate removal kinetics were developed based on the attached and suspended microbial growths. The units of the aeration-only CMAS process were continuously operated with the normal detention time of 4.5, 6, 9.5 and 12 hours studies after steady-state condition and the operating of the REMSMAS units conducted with the normal detention time of 6 and 12 hours studies in nonsteady-state condition.

87BI0404. R.F.LEE, S.C.SINGER, D.S.PAGE. 1981. RESPONSES OF CYTOCHROME P-450 SYSTEMS IN MARINE CRAB AND POLYCHAETES TO ORGANIC POLLUTANTS. AQUATIC TOXICOLOGY. 1:355-365. ELSEVIER/NORTH-HOLLAND. PN-2475. EN.

A number of field and laboratory studies were carried out to determine responses of the cytochrome P-450 dependent mixed-function oxygenase systems in crabs (Callinectes sapidus, sesarma cinerum and Uca pugilator) and polychaetes (Nereis virens) to organic pollutants. Mixed function oxygenase (benzo[a]pyrene hydroxylase) activity and cytochrome p-450 content generally increased in polychaetes and crabs after exposure to oil, benzo[a]pyrene or polychlorinated biphenyls. A consistent response to foreign organic compounds were changes in the binding to cytochrome p-450 reflected in the apparent binding constant.

87BI0405. JIN-HWAN.LEE, MYUNG-SOO.HAN, HYUNG-TACK.HUH. 1981(12). STUDIES ON THE CAUSATIVE ORGANISMS OF RED TIDE IN THE JINHAE BAY. BULL. KORDI. 3(2):97-105. KORDI., SEOUL. KO.

A 5-year study program has been launched in August 1979 to look into the red tide outbreaks. Data reported here are the results of the first year's investigation. Studies conducted from August 1979 to September 1980 at 12 stations in the Jinhae Bay have shown that the phytoplankton blooms of the more than 100000-1000000 cell/l persisted in the area throughout the year. The phytoplankton communities were composed of 85 taxa of Chrysophyta, 18 Dinophyta, and 1 Euglenophyta. The red-tide of this Bay was caused mainly by 3 diatom and 6 dinoflagellate species throughout the year with major outbreaks being occurred in May through September. A diatom Skeletonema costatum was the most outstanding species in all sampling periods with a maximum population being reached up to 10000000 cells/l +.

87BI0406. JIN-HWAN.LEE, HYUNG-TACK.HUH. 1983(9). A STUDY ON THE PHYTOPLANKTON AND RED-TIDE IN DEUKRYANG BAY. BULL. KORDI. 5(1):21-26. KORDI., SEOUL. KO.

Phytoplankton community in Deukryang Bay, southern coast of Korea, has been studied bimonthly from August 1980 through June 1981. Sixty-seven species representing 30 genera, 62 species, 2 varieties, 1 forma and 2 unidentified species were recorded. Two distinct blooms (red-tides), one in August and the other in December, were observed during the study period. The August red-tide was caused by a dinoflagellate, Ceratium furca, while one in December was attributable to the blooms of a diatom, Skeletonema costatum. Red-tide by Ceratium furca appears to be unprecedented record in Korea waters. It can be assumed that the red-tide in August was caused by high concentration of nutrients brought in by surface runoff and by a vertical mixing in August, and unusually high water temperature i+.

87BI0407. DONG-BEOM.YANG, EUN-SOO.KIM, KWANG-WOO.LEE 1983(9). SEAWATER QUALITY AND RED TIDES IN JINHAE BAY IN 1979-1982. BULL. KORDI. 5(1):15-20. KORDI., SEOUL. EN.

Serious red-tide outbreaks occur often in Jinhae Bay and thus appropriate monitoring systems are needed. This paper summarizes oceanographical characteristics of red tides in Jinhae Bay during a four-year period. During red tides, high temperature, low salinity, high chemical oxygen demand and low transparency were observed. Both dissolved inorganic nitrogen and phosphates were high in Masan Bay but low and possibly limiting in Jindong Bay. The chlorophyll a contents were rather high in Masan Bay during red tides but quite low in Jindong Bay during periods of non-red tides. Stepwise multiple regression analysis showed that during red-tide blooms salinity, dissolved silica and water temperature were the most dominant variables for the total standing crop which was mainly diatoms. Duri+.

87BI0408. U.BORGMANN, K.M.RALPH. 1984. COPPER COMPLEXATION AND TOXICITY TO FRESHWATER ZOOPLANKTON. ARCH. ENVIRON. CONTAM. TOXICOL. 13:403-409. SPRINGER-VERLAG, BERLIN. PN-2463. EN.

The effect of copper on the growth rate of cyclopoid copepods and survival of rotifers was determined in natural water with and without addition of the complexing agent tris. Free copper concentrations were estimated, both by cupric ion electrode and from the bioassay data, making use of the known complexing ability of Tris and the increase in total copper tolerated after Tris addition. Growth rates of copepods were directly related to free copper concentrations indicating that the copper-Tris complex was not toxic to these animals. Rotifer survival was similar at equivalent free copper concentrations in water with and without 1 mmole/L Tris, but addition of 3 mmole/L Tris resulted in slightly lower free copper at equivalently toxic total copper concentrations. Free copper concentrat+.

87BI0409. P.S.RIDOUT. 1985. CONCENTRATIONS OF MN, FE, CU, ZN AND CD IN THE MESOPELAGIC DECAPOD SYSTELLASPIS DEBILIS FROM THE E+. MARINE BIOLOGY. 87:285-288. SPRINGER-VERLAG, BERLIN. PN-2950. EN.

Specimens of the oceanic decapod Systellaspis debilis were collected from six sites in the East Atlantic Ocean between 1970 and 1984, and were analysed for Mn, Fe, Cu, Zn and Cd. The data confirm that there are small but significant differences in mean metal concentrations from some sites which showed no obvious pattern in relation to geographic location of the samples. As a

result, ranges of site means are quoted as "baseline" levels for each metal (ug/g dry wt): 2.3 to 2.9 ug Mn/g, 31.2 to 77.8 ug Fe/g, 25.9 to 83.4 ug Cu/g, 41.9 to 92.9 ug Zn/g, 11.1 to 31.8 ug Cd/g. The concentration of cadmium in S. debilis from all sites was raised relative to cadmium concentrations reported for coastal decapods, perhaps as a result of dietary enrichment. Metal accumulation may provide useful in+.

87BI0410. C.Z.NI, ET AL. 1985(10). A STUDY ON MICROBIAL DEGRADATION FOR OIL POLLUTANTS IN MARINE ENVIRONMENT. ACTA OCEANOL. SINICA. 4(4):615-622. CHINA OCEAN PRESS, BEIJING. EN.

This paper presents the degradation of 10 strains of hydrocarbon-degrading bacteria isolated from Xiamen harbor for 8 kinds of hydrocarbon and their mixed hydrocarbons incubated for 7 days at 25 Deg. in Centigrade. The results indicate that the degradation rates of different genera of bacteria, which are measured with gas chromatography, are different for 8 hydrocarbons, thus showing the differences among genera; that the degradation rates of most strains for alkaline hydrocarbons are higher than those for aromatic hydrocarbons; that the mixed strains favour the degradation for mixed hydrocarbons; and that the concentration of hydrocarbon is an important factor affecting degradation rates.

87BI0411. R.B.CLARK, S.L.ZHANG. 1985(7). PROBLEMS OF ASSESSING MARINE POLLUTION. ACTA OCEANOL. SINICA. 4(3):453-462. CHINA OCEAN PRESS, BEIJING. EN.

The sea receives an enormous variety of wastes from direct discharges or, indirectly, from rivers or by rain or precipitation from the atmosphere. In some areas, toxic wastes accumulate in sufficient quantity to create a threat to human health or to damage fisheries or other natural resources. It is necessary to be able to measure the effects of pollution in the sea. This paper is concerned with the problems of assessing the impact of marine pollution on biological systems.

87BI0412. P.C.LIONG, K.RAJENDRAN. 1986. ON THE TOXICITY OF AMMONIA TO COCKLE. FISH. BULL. (46) DEPT. FISH., MIN. AGR., MALAY. PN-3107. EN.

The toxicity of ammonia to cockle was measured using ammonia solution and ammonium chloride as sources of toxicant. Ammonia solution proved to be much more toxic compared to ammonium chloride. The difference in toxicity however could be explained by the higher pH of the test solutions when ammonia solution was used as the toxicant. If only the toxic fraction, the unionized ammonia, was considered, there was no significant difference in the toxicity of the two chemicals. The toxic level was found to be well above values usually encountered in the coastal waters. It follows that the concentration of ammonia is unlikely to be a limiting factor in cockle culture in the coastal environment.

87BI0413. S.DEVI. 1986. HEAVY METAL LEVELS IN SOME MALAYSIAN SHELLFISH. FISH. BULL. (44) DEPT. FISH., MIN. AGR., MALAY. PN-3105. EN.

Trace metals (copper, cadmium, lead, mercury and zinc) in four major bivalve species marketed in Malaysia were determined. They are the clam (Paphia undulata), the cockle (Anadara granosa), the green mussel (Perna viridis) and the rock oyster (Crassostrea cucullata). Cockle samples were taken from various locations in Penang, Perak and Selangor, while the other bivalve samples were taken from one location only. Data indicate no major threat to public health from levels of trace metals recorded in the bivalves, thereby suggesting that the coastal aquaculture industry in the country need not face any problems from trace metals under the existing circumstances.

87BI0414. T.R.PARSONS, ET AL. 1986(7). THE EFFECT OF MINE TAILINGS ON THE PRODUCTION OF PLANKTON. ACTA OCEANOL. SINICA. 5(3):417-423. CHINA OCEAN PRESS, BEIJING. EN.

Mine tailings at levels of ca 30 and 300 ppm were added to two plankton communities contained in 60 ton Controlled Experimental Ecosystems (CEE); a third CEE was used as a control. The mine tailings caused (1) a delay in the primary productivity and chlorophyll a maxima; (2) a shift in the size spectrum of primary producers towards autotrophic flagellates compared with diatoms in the control; (3) a suppression of heterotrophic microflagellates; and (4) an increased production of zooplankton compared with the control. zooplankton were observed to have consumed tailings but no changes were observed in the structure of the zooplankton community as a result of tailings additions.

87BI0415. T.R.PARSONS, T.A.KESSLER, G.G.LI. 1986(7). AN ECOSYSTEM MODEL ANALYSIS OF THE EFFECT OF MINE TAILINGS ON THE EUPHOTIC ZONE OF A PELAGIC ECOSY+. ACTA OCEANOL. SINICA. 5(3):425-436. CHINA OCEAN PRESS, BEIJING. EN.

A computer analysis was performed on experimental results obtained when mine tailings were added to seawater. The Mixed Upper-layer Ecotrophic Simulation (MULES) model was tested by changing the extinction coefficient and the abundance of heterotrophic zooflagellates. Increasing the extinction coefficient resulted in a delay of phytoplankton growth, an increase in zooplankton standing stock and better growth of autotrophic flagellates compared with diatoms. Zooflagellates in the ecosystem influence the growth of zooplankton; secondary production by zooplankton was markedly depressed at low levels of zooflagellates. These results are believed to be of general significance for the diagnosis of suspended sediment effects on planktonic ecosystems.

87BI0416. JIN-HWAN.LEE, HI-SANG.KWAK. 1986(9). A STUDY ON THE GYMNODINIUM NAGASAKIENSE RED-TIDE IN JINHAE BAY OF KOREA. KOREAN J. ECOL. 9(3):149-160. ECOL. SOC. KOREA, SEOUL. PN-2681. EN.

Relationship between the causative organisms of red-tide and environmental factors had been ecologically dealt with. The surveys were conducted at seven

stations in Jinhae Bay from July to September 1981. The red-tide was mainly caused by two dinoflagellate taxa throughout major outbreaks occurred in July through September. Leading species of red-tide were Gymnodinium nagasakiense belong to be major species and Prorocentrum micans, P. minimum, P. triestinum as minor species.

87BI0417. JOONG-KYUN.JEON, ET AL. 1987(12). STUDIES ON THE TOXIC SUBSTANCE OF MUSSEL MYTILUS SP. J. OCEANOL. SOC. KOREA. 22(4):271-278. OCEANOL. SOC. KOREA, SEOUL. KO.

Attempts were made to elucidate the responsible toxin in mussel Mytilus sp. which caused a food poisoning incident in March 1986 in Pusan, Korea. Two persons were dead and 15 persons intoxicated in the incident. The mid-gut glands of the mussel collected were extracted with dichloromethane, filtered through a Diaflo ultrafiltration membrane, and then purified by chromatography on Bio-Gel P-2 and Bio-Rex 70. The toxic fractions obtained were analysed by electrophoresis, TLC and ion-pairing reversed phase HPLC analyses. The results showed that the fractions contained GTX(1-4) as the major component, along with neoSTX, PX(1,2) as the minor. It was concluded from these results that the causative mussel toxin of the above food poisoning was PSP.

87BI0418. C.Z.NI, ET AL. 1987(4). A STUDY ON MICROBIAL DEGRADATION OF OIL POLLUTANTS IN THE MARINE ENVIRONMENT: DEGRADATION OF CRUDE+. ACTA OCEANOL. SINICA. 6(2):249-256. CHINA OCEAN PRESS, BEIJING. EN.

Monthly collected water samples from two different stations in the Xiamen Harbor in one whole year were analysed for crude oil and diesel oil degradation by nature microbe flora. the results indicate that the difference between degradation rates of the two stations is related to the material type, temperature, oil degradation bacteria counts of the environment and season. The degradation velocity of diesel and crude oil in seawater is influenced by microbial degradation time. The calculated degradation velocity of crude oil and diesel oil by natural microbe flora in Xiamen Harbor sea areas based on the measured degradation rates were 0.02-0.19 g/day/square meter and 0.004-0.61 g/day/square meter respectively. This provides, to a certain extent, a scientific basis for preliminary eval+.

87BI0419. C.S.WANG, W.P.YIN. 1987(7). ACCUMULATION OF HEAVY METALS IN ARCA GRANOSA. ACTA OCEANOL. SINICA. 6(3):421-427. CHINA OCEAN PRESS, BEIJING. EN.

This paper explores the accumulations and distributions of Cd, Pb and Cu in clam Arca granosa through determining their contents in blood and soft parts. The results show an order of concentration factors for these metals therein as: Cd>Cu>Pb>; the values of concentration factors and the patterns of distribution are similar for Cu and Pb but different from Cd. Concentration factors in blood can reflect the enrichement abilities of soft parts. Exposure experiments have indicated that the Pb level in blood is controlled by Pb concentrations in surrounding seawater, changing with time, that the Pb concentration causing poisoning in the seawater is 1-100 ug/l, and that the Pb content in blood and soft parts of Arca granosa increases with that of Pb increasing in seawater. There exist relat+.

87BI0420. SOON-KIL.YI, PYUNG.CHIN. 1987(9). EFFECTS OF COOLING WATER SYSTEM OF A POWER PLANT ON MARINE ORGANISMS I. EFFECTS ON PRIMARY PRODUCT+. BULL. KOREAN FISH. SOC. 20(5):381-390. KOREAN FISH. SOC., PUSAN. KO.

To evaluate the effects of the cooling water system on the primary production of marine phytoplankton, a series of experiments were made at the cooling water system of Samchonpo Power Plant from May 1985 to May 1986. Mechanical and physiological perturbations of the entrained process are the most detrimental to the primary production of marine phytoplankton. Nevertheless the primary production is increased by the heated water within the upper limit of temperature tolerance of the phytoplankton. The cooling water system, on the average, reduces the gross production and net production by 4.6 to 12.1 and 8.4 to 11.9 mgC/cubic meter/hour, respectively.

87BI0421. SOON-KIL.YI. 1987(9). EFFECTS OF COOLING WATER SYSTEM OF A POWER PLANT ON MARINE ORGANISMS II. EFFECTS ON BENTHIC ORGANI+. BULL. KOREAN FISH. SOC. 20(5):391-407. KOREAN FISH. SOC., PUSAN. KO.

To understand the effects of the cooling water system of the power plant on the succession of sessile zoobenthos, a series of experiments were carried out at the cooling water system of Samchonpo Power Plant from May 1985 to May 1986. The lowest species diversity of the zoobenthos was observed at the discharge canal. This is probably caused by both increased velocity and temperature of circulating water. It is also noticeable that species composition of the zoobenthos, to a certain degree, was affected due to the impingement of meroplankton during the entrainment process.

87BI0422. B.C.PARKER, R.V.HOWARD. 1977. THE FIRST ENVIRONMENTAL IMPACT MONITORING AND ASSESSMENT IN ANTARCTICA. THE DRY VALLEY DRILLING P+. BIOL. CONSERVATION. 12:163-177. APPL. SCI. PUB., BARKING. PN-2720. EN.

We describe here the development of an environmental impact assessment matrix, adapted from Leopold et al. (1971), to estimate probable impact of a major geological drilling project in Antarctica. Our matrix includes five recovery time intervals and impact probability. Methods for environmental impact monitoring have emphasised microbiology of air & soil in this unusual region of sparse native soil and water microbial communities, such that preaudits, audits and postaudits could be used to monitor impact and recovery. Data obtained have enabled revision and improvement of prediction for our impact matrices.

87BI0423. Z.G.HUANG, R.X.CAI, Y.Y.XU. 1982(12).

ON THE DISTRIBUTIONAL CHARACTERISTICS OF FOULING ORGANISMS IN DONGSHAN BAY. ACTA OCEANOL. SINICA. 1(2):267-274. CHINA OCEAN PRESS, BEIJING. EN.

87BI0424. J.D.CHRISTENSEN, A.H.DEVOL, W.M.SMETHIE JR 1984. BIOLOGICAL ENHANCEMENT OF SOLUTE EXCHANGE BETWEEN SEDIMENTS AND BOTTOM WATER ON THE WASHINGTON CON+. CONTINENTAL SHELF RES. 3(1): 9-23. PERGAMON PRESS, OXFORD. EN.

Solute exchange between the interstitial waters & overlying waters on the Washington continental shelf was investigated based on measurements of the pore-water sulfate distribution & sulfate reduction rates as well as through models describing the distribution of sulfate in anaerobic pore waters. The depth-integrated sulfate reduction rate greatly exceeded the influx of sulfate attributable to molecular diffusion & sediment accumulation acting on the measured vertical sulfate gradients, and indicated that additional transport mechanisms must have been operating. Sediment mixing was probably not the primary mechanism since high eddy diffusivities would be required to depths of 30 cm to maintain the observed sulfate distribution. Irrigation of bottom water through animal burrows was the mo+.

87BI0425. L.X.ZHANG, Z.G.HUANG, C.Y.LI, C.X.ZHENG. 1984(10). AN ECOLOGICAL STUDY OF FOULING ORGANISMS IN XISHA ISLANDS. ACTA OCEANOL. SINICA. 3(4):547-558. CHINA OCEAN PRESS, BEIJING. EN.

Monthly and seasonal panel experiments were carried out in the Yongxing Island from September 1979 to August 1981. Altogether 119 species of fouling organisms are collected, of which, Hydroides elegans, Serpula vermicularis, Scrupocellaria longispinosa, Amathia distans, Enteromorpha spp. and Ostrea spp. are dominant species. Fouling of organisms may occur all the year round with evident seasonal variations. Species succession in the process of community formation is very evident and the climax has arrived after two years. Great variation exists between fouling organisms in different years and at different stations.

87BI0426. C.X.ZHENG, ET AL. 1984(4). A PRELIMINARY STUDY ON THE FOULING AND BORING ORGANISMS IN LANGYA BAY. ACTA OCEANOL. SINICA. 3(2):254-262. CHINA OCEAN PRESS, BEIJING. EN.

In order to study the fouling and boring organisms the wooden and plastic panels were exposed along the fixed pierside for monthly, quarterly and yearly intervals during the period of Sept. 1979 to Aug. 1980 at Langya Bay, Hainan Island, South China Sea. A greater emphasis was laid on the following subjects; the species, the season of attachment and the relative abundance. A comparison was made of the ecological features of the fouling organisms of this bay with those of thirty bays or harbours along the coast of China.

87BI0427. Y.S.LIN, Z.Y.LIANG. 1984(7). STUDY OF MARINE MICROFOULING ORGANISMS; SOME CHARACTERISTICS OF THE MICROFOULING TO FIVE MATERIAL +. ACTA OCEANOL. SINICA. 3(3):437-440. CHINA OCEAN PRESS, BEIJING. EN.

In the last few years, scanning electron microscope (SEM) has been widely used to observe and study community structure and succession of the microfouling organisms on various solid surfaces immersed in the sea, polysaccharide components of bacterial slime layer, two-tier microfouling layer structure, metal corrosion products in the attached process and characteristics of attached microorganisms on the coating surfaces. The SEM observations indicated that substrate components exposed to natural seawater are one of the important factors affecting microbial adhesion. The present paper examined the influences of several metal materials, from which ship is usually made on microbial adhesion during the exposure to seawater by the SEM and discussed the material selecting problems from the an+.

87BI0428. JOONG-KYUN.JEON. 1986(12). NATURAL TOXINS OF MARINE ORGANISMS. OCEAN RES. 8(2):53-61. KORDI., ANSAN. KO.

In recent years, research activities on toxins or bioactive substances of marine organisms have been rapidly increasing in the United States, USSR, and other countries. These research on marine toxins may result in the development of new biochemical, chemical, and food resources. Since marine toxins contain anticarcinogenic, antibiotic, psychopharmacological and numerous other types of biological properties, useful drugs may develop from them. These new developments may, in the future, provide the resources to prevent deaths, and to contribute to the welfare of mankind. A brief summary of marine toxin research, divided into oral and parenteral poisons, is given.

87BI0429. JAE-HYUNG.SHIM, MOON-SUB.JURNG. 1987(12). DEVELOPMENT AND SUCCESSION OF MARINE FOULING ORGANISMS ON ARTIFICIAL SUBSTRATA. J. OCEANOL. SOC. KOREA. 22(4):257-270. OCEANOL. SOC. KOREA, SEOUL. EN.

Fouling communities developing in Jinhae Harbor and Masan Bay were studied by slide and panel immersion test during the period from Dec., 1982 to Nov., 1983. The total viable count of bacteria was estimated more than 17000 CFU/square centimeter after 15 days of immersion and 46 taxa of benthic diatoms were classified in micro-community. Progressional change of fouling communities was clearly shown and dominant diatom species are Licmophora flavellata, Navicula grevillei, and Nitzschia closterium. Major macrofouling organisms are Mytilus edulis, Balanus amphitrite amphitrite, Hydroides ezoensis, and Celleporina sp. Wet weight production of macrofouling organisms exceeds 500 g/100 square centimeter after 5 months of immersion.

87BI0430. D.A.CACCHIONE, D.E.DRAKE, M.E.FIELD, G.B.TATE. 1987(6). SEA-FLOOR GOUGES CAUSED BY MIGRATING GRAY WHALES OFF NORTHERN CALIFORNIA. CONTINENTAL SHELF RES. 7(6):553-560. PERGAMON PRESS, OXFORD. EN.

Side-scan sonar records collected during March and

April 1981 and 1982 off northern California contain elongate depressions whose sizes & shapes are similar to sea-floor gouges made by feeding gray whales (Eschrichtius robustus) in the northern Bering Sea and in shallow embayments off British columbia. The discovery of the whale gouges in the sonar records was unexpected, and supports some of the previous speculation that gray whales feed opportunistically during migration. Although seemingly minor in amount, the total amount of bottom sediment removed from the central and northern California continental shelf by gray whale activities year after year represents macroscale biologically induced erosion and could have significant geological implications in shelf erosion and depositional sc+.

87BI0431. KWAN-SOH.KO. 1968(12). COMPARISON OF INDICATING NET SHAPING. BULL. KOREAN FISH. SOC. 1(2):129-133. KOREAN FISH. SOC., PUSAN. KO.

The writer reviewed the cutting method of webbing practiced in major countries. Cutting rhythm (Bar cutting to Point Cutting) should be chosen to approach as straight as possible, therefore the knot cuttings or the side cuttings should be 1, if possile. According to calculation, an arbitrary solution to a mixed cutting was undertaken, while another cutting method, of calculation 5 and 6, was taken by a prepared table. In no case, it was consequently possible to use an unmixed cutting rhythm. sometimes, the cutting calculated from approximate value differs from desired result, but this difference should not be taken too significant in practice.

87BI0432. CHA-DOL.KIM. 1969(12). THE INFLUENCE OF CATCH VOLUME ON TRAWLER WARP TENSION. BULL. KOREAN FISH. SOC. 2(2):173-178. KOREAN FISH. SOC., PUSAN. KO.

Few reports have been written regarding the measurement of stern trawler warp tension under conditions of a full catch. This report compares the tension imposed on the warps at the time the boat begins to tow the net and the tension at the time the cod end is filled with a large quantity of fish. The structure of the otter boards and trawl net used for the experiment was the same types as used by Koyama, Sakurai, and Sumikawa. The warp tension was measured with a load cell tension meter. This meter continuously records the tension on a pen oscillograph. The net towing speed was measured with the CM-1A type current meter, Toho Dentan Co. Ltd., Japan.

87BI0433. SING-WON.PARK. 1969(12). AN ECOLOGICAL STUDY OF TUNA LONG LINE CATCH DISTRIBUTION OBTAINED BY EXPERIMENTAL FISHING OPERATIO+. BULL. KOREAN FISH. SOC. 2(2):161-172. KOREAN FISH. SOC., PUSAN. KO.

Ten experimental tuna long line fishing operations were performed with the long lines A and B, in combination casting orders of BA and AB. The long line B differs from A in its additional main line length per basket and its greater depth of submersion. The BA casting order results in an AB hauling order, so that the long line B is casted at an earlier time of a day and fishes for a longer period than A line. The author emphasizes that certain variations of the hooking rates in relation to the line casting time were caused by an inadequate fishing depth as well as by the fish preference for a particular feeding time. When the part of the line casted in pre-dawn hours and hauled in the pre-sunset hours show a significantly lower hooking rate than other parts of the line, then it is con+.

87BI0434. BYOUNG-GEE.LEE, YONG-RIM.YANG, YOUNG-TAE.SU, BOO-IL.SON. 1971(12). STUDY ON THE ANCHOVY BOAT SEINE, 1. ON THE HYDRODYNAMIC RESISTANCE AND PERFORMANCE OF THE CONVENTI+. BULL. KOREAN FISH. SOC. 4(3/4):79-91. KOREAN FISH. SOC., PUSAN. KO.

A boat seine has been used as a major fishing gear for catching anchovy (Engraulis japonica) in the southern coastal waters of Korea since 1920s. The original seine was operated by two rowing boats as the haul seine. The rowing boats were, in recent, replaced by powered boats. The net size was enlarged by more than three times the original net as they began to be operated in the deeper waters of approximately sixty meters. However, there are many problems in the efficiency of the fishing gear to be improved. The authors studied on the hydrodynamic resistance and performance of the boat seine net of the 1/10 scale model in tow.

87BI0435. KWAN-SOH.KO, SANG-HAN.KIM. 1971(4). COMMON SHRIMP BEHAVIOUR TO PHYSICAL STIMULI AND THE FISHING GEAR DESIGN (II). BULL. KOREAN FISH. SOC. 4(1):1-6. KOREAN FISH. SOC., PUSAN. KO.

In order to study the catching efficiency of shrimp trawl equipped with electrodes around the net mouth and stimulant devices attached to the ground rope, an experimental operation was carried out at Oma-Island Shrimp Farm from October 3rd to November 5th, 1970. The behaviour response of the common shrimp, Penaeus japonicus Bate to moving nets and electric stimulant devices were reported in the preceding papers based on the water tank experiments (Ko and Kim, 1970). Through comparative fishing tests the rate of catching efficiency during daylight time was confirmed to be from 89 to 96 per cent of the night catch efficiency, and with 30 V. 1.5 A. electric power was sufficient for practical sea operation.

87BI0436. KWAN-SOH.KO, SANG-HAN.KIM, GAB-DONG.YOON. 1972(12). ELECTRICAL FISHING METHOD OF PENAEUS JAPONICUS BATE. BULL. KOREAN FISH. SOC. 5(4):115-120. KOREAN FISH. SOC., PUSAN. KO.

The data presented in this paper, on the body and Jumping voltage of Penaeus japonicus Bate, are part of a current study on shrimp behaviour in order to improve fishing efficiency of the fishing gear. The experiments concerning electrical stimuli was mostly carried out at the Marine Laboratory of Busan Fisheries College in 1972.

87BI0437. DONG-SIK.KIM. 1972(3). SELECTIVITY OF DRIFT NET FOR SPANISH MACKEREL SCOMBEROMORUS NIPHONIUS. BULL. KOREAN FISH. SOC. 5(1):11-16. KOREAN FISH. SOC., PUSAN. KO.

During the period from 1966 to 1968, total catches of Spanish mackerel averaged 6,000 to 7,000 M/T per annual in Korea, and approximately 70 per cent of this amount was captured by drift nets. In an effort to improve the efficiency of drift nets, some experiments were conducted in 1969 to investigate the selectivity of material and mesh size. Seven different mesh sizes (80, 85, 95, 100, 105, 110 and 115 mm) of both multi-and mono-filament netting were used, and the following results were obtained.

87BI0438. SING-WON.PARK, ET AL. 1972(6). PRELIMINARY TEST ON THE CREEL HOLDING OF THE ANCHOVY, ENGRAULIS JAPONICA. BULL. KOREAN FISH. SOC. 5(2):63-67. KOREAN FISH. SOC., PUSAN. KO.

Preliminary creel-holding test of live anchovies which are to be used as bait for the skipjack fishery, was conducted on the fish caught by set net and lift net. They were held in the creels constructed with bamboo frame and minnow netting, during the period of Oct. 24-Nov. 28 in 1972. It was found that the survival rate of the creel-held anchovies varied by the size of fish, the towed distance and speed of fish-carrying creel in which the fish were accomodated after catch.

87BI0439. JUNG-HEUI.PARK. 1972(6). A STUDY ON THE AIR SCREEN IN WATER, 1. EXPERIMENTS ON THE AIR SCREEN EFFECTS FOR DRIVING AND INTER+. BULL. KOREAN FISH. SOC. 5(2):50-56. KOREAN FISH. SOC., PUSAN. KO.

This study has been carried out to observe the driving and the intercepting effects of air screen on some sea-water fishes; Chrysophrys major, Mylio macrocephalus, Fugu pardalis. The fish holding ability to obtain effective air screen was ranged as following when the air pressure was 0.160 kg/suquar centimeter and the hole diameter was 0.3 mm on the 12.6 mm pipe, depending upon the intervals of the holes on the pipe: The shortest distance which could hold fish between two screens was 59.4 cm when the holes were perforated at every 40 cm; 33.5 cm when at every 30 cm; 28,75 cm when at every 10 cm; and 27.25 cm when at every 5 cm. Thus, no significant change was observed when the holes were perforated more densely than 30 cm intervals. Therefore the hole intervals should be 30cm in desig+.

87BI0440. SING-WON.PARK. 1975(12). THE DIFFERENCE OF THE TUNA LONGLINE CATCH BY RETRIEVING METHOD. BULL. KOREAN FISH. SOC. 8(4):197-201. KOREAN FISH. SOC., PUSAN. EN.

87BI0441. DAI-AN.KIM. 1976(12). STUDIES ON STRENGTH OF NETTING (3) JOINT STRENGTH OF TWISTED-JOINTED NETTING. BULL. KOREAN FISH. SOC. 9(4):293-298. KOREAN FISH. SOC., PUSAN. EN.

The decrease in strength of netting twines at the twisted joint is regarded to be due mainly to the frictional force between plied yarns, but the rate of decresae is within 5% in filament twines and 5 to 10% in spun twines. The variation of the twisted joint strength with the angle between the two adjacent bars draws a parabola having the minimum value at the angle of 90 Deg.. The minimum value was revealed as about 93% of the strength at the angle of 0 Deg. in wet spun twines, but regarded to be negligibly small in filament twines. The knot strength is about 30 +/- 5% of the twisted joint strength.

87BI0442. TAE-JOON.SHON, JEONG-SIG.BAG, DOO-OK.SOH. 1977(9). STUDIES ON THE SHAPE OF FISH REEFS AND THE THRONGING OF FISH SCHOOLS. BULL. KOREAN FISH. SOC. 10(3):179-187. KOREAN FISH. SOC., PUSAN. KO.

This study intended to investigate the shape of the artificial fish reefs settled in the waters of Seogwipo, and the thronging of fish schools into them.

87BI0443. DAI-AN.KIM. 1978(3). PROPERTIES IN STRENGTH OF RASCHEL NETTING. BULL. KOREAN FISH. SOC. 11(1):39-48. KOREAN FISH. SOC., PUSAN. EN.

1) The decrease in strength of Raschel twines at Raschel joints is regarded to be due mainly to the frictional force between yarns and the unbalanced tensile distribution by the deformation of the joints. The rate of the decrease is about 13% in lengthwise pull and 22 to 26% in breadthwise pull. 2) The 3-course joint is less in deformation and stronger than the 2-course joint in all cases of pulls.

87BI0444. KWAN-SOH.KO, YONG-HAE.KIM. 1979(12). MODEL EXPERIMENT OF STOW NET. BULL. KOREAN FISH. SOC. 12(4):201-207. KOREAN FISH. SOC., PUSAN. KO.

The stow net now used in the Yellow Sea, are traditional bag net with the opening held by a lighter upper and a weighted lower beams standing against the current. Such bag net anchored at the bottom are known in many countries, particularly in the estuaries of large rivers, but more rarely in sea fisheries, because they are too much affected by the weather, moreover a permanent strong current is necessary. Some scientists intended to improve this fishing gear, using the shearing devices instead of a lighter upper .and a weighted lower beams in order to widen mouth of the stow net however they are unsuccessful.

87BI0445. GAB-DONG.YOON. 1979(12). UNDERWATER NOISE GENERATED BY FISHING GEAR - STERN TRAWL NET -. BULL. KOREAN FISH. SOC. 12(4):217-224. KOREAN FISH. SOC., PUSAN. KO.

The main purpose of the present study is to measure the sound spectra of the underwater noises generated by moving trawl net. An underwater recording system was designed to detect underwater noise generated by moving trawl net. The acoustic analysis was made by a heterodyne analyzer (B & K 2010) and level recorder (B & K 2307). The noises generated by the trawl net are appreciably higher (about 10 dB) than the background

noise in the presence of the fishing vessel. The frequency distribution of underwater noise was DC-6,300 Hz and predominant frequency range was 100-200 Hz, and maximum sound pressure level was 137 dB.

87BI0446. DAI-AN.KIM. 1979(3). ON THE SIMILARITY LAW FOR FISHING NETS. BULL. KOREAN FISH. SOC. 12(1):1-6. KOREAN FISH. SOC., PUSAN. EN.

87BI0447. JUNG-HEE.PARK. 1979(9). DISTRIBUTION OF VESSEL NOISES IN THE SAE-BA-DA. BULL. KOREAN FISH. SOC. 12(3):125-130. KOREAN FISH. SOC., PUSAN. KO.

In this paper, the noise pressure propagated in the air on account of the engine revolution of a stern trawler, Sae-Ba-Da (G.T. 2275.71) was measured at the check points No. 1 through No. 43 when the vessel was cruising, towing nets, and drifting.

87BI0448. R.Z.ZHANG. 1984(7). DISTRIBUTION AND SPAWNING SEASONS OF THREE SPECIES OF TUNAS LARVAE IN THE SOUTH CHINA SEA. ACTA OCEANOL. SINICA. 3(3):409-416. CHINA OCEAN PRESS, BEIJING. EN.

The present investigation is based on the collection of the eggs & larvae in the past several years during March, 1964 to February 1965, January to October 1973, January 1975 to May 1976, and January 1978 to February 1979 respectively from the South China Sea. The planktonic larvae of Katsuwonus pelamis, thunnus albacores and Auxis thazard were examined for the occurrence and distribution in those waters. According to the occurrence of these larvae, one will be able to conjecture their activity area and spawning season of the adult species in the South China Sea. The main spawning season of the three species is from April to August in those years.

87BI0449. R.P.BRIGGS. 1986. A GENERAL REVIEW OF MESH SELECTION FOR NEPHROPS NORVEGICUS (L.). FISH. RES. 4:59-73. ELSEVIER SCI. PUB., AMSTERDAM. PN-2873. EN.

The techniques used in Nephrops mesh selection studies are described and recent literature on the subject is reviewed. It would appear that Nephrops selection has a shallow ogive, giving a wide selection range. The various factors affecting selection are discussed and the importance of studying whole trawl selection is emphasised. Various gear designs are described, and it is concluded that Nephrops fishing ideally requires a gear that steepens the selection ogive, releases undersized whitefish, and remains economically viable.

87BI0450. C.P.EAN. 1987. THE SMALL PURSE SEINE FISHERY OF KAMPUNG GAJAH, PENANG AND TANJUNG PIANDANG, PERAK. FISH. BULL. (48) DEPT. FISH., MIN. AGR., MALAY. PN-3108. EN.

The small purse seine fishery at Kampung Gajah, Butterworth, Penang and Tanjung Piandang, Perak is an important fishery directed mainly at the mullets or ikan kedera, Valamugil cunnesius. This species is seasonal and is caught mainly during the months of July to December. This gear was shown to be more efficient than the "jaring kedera", a drift net which is also specific for catching mullets. Trash, which forms an important component of the landings by the small purse seines, is made up of genuine trash species of the genera Thryssa, Secutor, Leiognathus, Setipinna, Ambassis and Opisthopterus. The major commercial food fish encountered in the trash is Johnius. The small purse seine is operated throughout the year in the shallow coastal waters between Penang in the north and Kuala Sep+.

87BI0451. YONG-HAE.KIM, KWAN-SOH.KO. 1987(11). THE SHEARING CHARACTERISTICS OF THE MODEL OTTER BOARDS WITH THE FLAP. BULL. KOREAN FISH. SOC. 20(6):484-488. KOREAN FISH. SOC., PUSAN. KO.

The model experiments were performed in the circular water tank on the simple cambered and the super-V otter boards attached with the slotted fowler flap at the trailing edge in order to develop more efficient shearing characteristics. The dimension of the model otter boards was varied slightly in the flap chord ratio 0.20-0.22 and in the area 432-426 square centimeter in accordance with the flap angle 30-50 Deg.

87BI0452. BYOUNG-GEE.LEE, KWAN-SOH.KO, YONG-HAE.KIM, KYOUNG-HYUN.PARK. 1987(3). A MODEL EXPERIMENT ON THE HYDRODYNAMIC CHARACTERISTICS OF THE SIMPLE CAMBER AND THE SUPER-V OTTER +. BULL. KOREAN FISH. SOC. 20(2):114-118. KOREAN FISH. SOC., PUSAN. KO.

The authors carried out a model experiment to examine the hydrodynamic characteristics of the simple camber and the super-V otter board. The experiment had been done in a circular flow tank in the speed range of 0.1-1.2 m/sec. As a result, it is examined that in the simple camber otter board the most effective angle of attack is about 25 Deg., the shearing coefficient 1.47 and the drag coefficient 0.42, while in the super-V otter board they are about 20 Deg., 1.40 and 0.40 respectively, so that the simple camber otter board performs a little better efficiency than the super-V otter board.

87BI0453. KWAN-SOH.KO, GAB-DONG.YOON, CHUN-WOO.LEE. 1987(3). AUTOMATION OF LONGLINE; AUTOMATION OF THE ALASKA POLLACK LONGLINE. BULL. KOREAN FISH. SOC. 20(2):106-113. KOREAN FISH. SOC., PUSAN. KO.

The Alaska pollack longline operations, which consist of baiting, shooting, hauling and arrangement of hooks, are dependant on manual labour up to the present. The automation aginst this traditional way is necessary to eliminate the manual operations and to reduce crew. We have developed a prototype longline system suitable for Alaska pollack longline gear, which is composed of an automatic baiting machine, an automatic line hauler, a hook cleaner and storage rails. The automatic baiting machine driven by hydraulic power is precise baiting method controlled sequentially, and the automatic line hauler is to haul up the mainline

by means of hydraulic power and at the same time to split every hook and to carry it onto storage rail automatically.

87BI0454. KWAN-SOH.KO, BYEONG-GUK.KWON. 1987(3). IMPROVEMENT OF SEA EEL POTS. BULL. KOREAN FISH. SOC. 20(2):95-105. KOREAN FISH. SOC., PUSAN. KO.

Traditional sea eel pots can be divided into two groups such as bamboo and plastic pots, however they are nearly same in a shape with one entrance and fishing efficiency, except their materials. Very few yet have been studied on their catching methods or catching mechanisms at the view point of behavior. Accordingly, we have designed tubular pots in order to fill up faults of traditional fishing gear construction and behaviors of sea eel. The suitable tubular pot was decided by comparative experiments in the water tank and the fishing efficiency was compared through the field experiments.

87BI0455. DAE-AN.KIM, KWAN-SOH.KO. 1987(7). FISHING MECHANISM OF POTS AND THEIR MODIFICATION, 1. BEHAVIOR OF CONGER EEL, ASTROCONGER MYRIASTER+. BULL. KOREAN FISH. SOC. 20(4):341-347. KOREAN FISH. SOC., PUSAN. KO.

The behavior of conger eel, Astroconger myriaster (Brevoort), to the bamboo and plastic pots with baits was investigated alternately in two experimental water tanks. One of the pots being dropped on the tank bottom, the eels touched it to obtain the bait probably by their sense of smell, and increased rapidly in the number of touch to show a maximum within 30 minutes. But the touch was made mainly to the pot wall at which the bait was located and quite accidentally to the pot mouth. The eels touched the pot mouth retreated frequently without attempting to enter the pot and their entering was very hampered by the bamboo funnel constituting the pot mouth. However, a entering, if made, encouraged other touches and the touches ascribed other enterings. But, if 30 minutes elapsed, the num+.

87BI0456. DAE-AN.KIM, KWAN-SOH.KO. 1987(7). FISHING MECHANISM OF POTS AND THEIR MODIFICATION, 2. BEHAVIOR OF CRAB, CHARYBDIS JAPONICA, TO NET +. BULL. KOREAN FISH. SOC. 20(4):348-354. KOREAN FISH. SOC., PUSAN. KO.

The behavior of crab, Charybdis japorica A. Milne EDWARDS, to the net pots with baits was investigated alternately in the experimental tanks. One of the pots being dropped on the tank bottom, the crabs touched it to obtain the bait probably reacted by their senses of smell and sight, and increased gradually in the number of touch to show a maximum within 30 min. The crabs, if touched circular pots, were guided more easily to the pot entrances than the case of touching square ones, but the guidance from the vicinity of the entrances into the pots was easier in the square. When the crabs entered the pots, they always showed a sharp precaution. However, most of enterings were made mainly within 30 minutes and easier in pots with lower entrances. If 30 min. elapsed, the entering was lit+.

87BI0457. T.MIYAUTI. 1967(12). STUDIES ON THE EFFECT OF SHELL CLEANING IN PEARL CULTURE-II. THE INFLUENCE OF FOULING ORGANISMS UP+. JAPAN. J. ECOL. 17(6):227-229. ECOL. SOC. JAPAN, HIROSHIMA. PN-2735. JA.

In a preceding paper, it was reported that the activity of shell movement and the amount of feces in the Japanese pearl oysters, Pteria (Pinctada) martensii (DUNKER) were lowered by the presence of fouling organisms. This study has been carried out on the harmful influence of fouling organisms upon the regeneration of shell margin and the byssus secretion of the bivalve with a view to making clear whether shell cleaning is effective for increasing the growth of the bivalve and the quality of pearls.

87BI0458. CHOONKOO.LEE, NAM-KEE.CHANG, JUNG-JAE.LEE. 1968(12). AN ATTEMPT TO IMPROVE TIDELANDS FOR MARINE BIVALVES, (1) SOIL TEXTURES AND CHEMICAL PROPERTIES OF +. BULL. KOREAN FISH. SOC. 1(2):115-119. KOREAN FISH. SOC., PUSAN. EN.

The basic investigations on soil textures, water holding capacity, pH, exchangeable calcium, and organic matter contents in four species bed were conducted in order to improve the natural flat for the bivalve beds. It was statistically significant that there were differences in the soil textures among all beds of four species, D. japonica, C. sinensis, M. veneriformis, and T. philippinarum.

87BI0459. WON-KI.PARK. 1968(12). A STUDY ON THE FOOD EFFECT OF NON-EDIBLE MARINE ALGAE (PART 1: TEST ON THE FOOD VALUE FOR CHICKEN). BULL. KOREAN FISH. SOC. 1(2):121-127. KOREAN FISH. SOC., PUSAN. KO.

This research has been dealt with the nutritional component analysis of two kinds of non-edible marine algae, Sargassum horneri (Turner) C. Ag. and Zostera marina Linne which grow abundantly around the southern coast of Korea. These marine algae were mixed in several kinds of samples rates with the combined feed for poultry sold in the market. These were given to 35 chicken in seven test divisions respectively. We have experimented with 35 chicken grown up for two weeks after hatchout. The combined food for poultry obtained from the market was set up as control divisions.

87BI0460. KYU-JUNG.CHOE, NAM-PYO.KOH. 1968(12). AN OBSERVATION ON THE ROCK METHOD OYSTER CULTURE. BULL. KOREAN FISH. SOC. 1(2):105-113. KOREAN FISH. SOC., PUSAN. KO.

The following experiments were carried out at rock method oyster field at Uduri, Dolsan-myon, Yeocheon-gun, Jeon-nam, Korea, in 1966. In this experiment, the settling rate of oyster at each exposure level and their growth rate were checked.

87BI0461. T.MIYAUTI. 1968(2). STUDIES ON THE EFFECT OF SHELL CLEANING IN PEARL

CULTURE-III. THE INFLUENCE OF FOULING ORGANISMS U+. JAPAN. J. ECOL. 18(1):40-43. ECOL. SOC. JAPAN, HIROSHIMA. PN-2736. JA.

In the preceding papers, it was reported that the activity of shell movement, the amount of feces, the shell regeneration and the byssus secretion in the Japanese pearl oysters, Pteria (Pinctada) martensii (DUNKER) were decreased by the presence of fouling organisms. In order to clarify whether the work of shell cleaning is effective for increasing the growth of the bivalve and the quality of the pearl, the harmful influence of the presence of fouling organisms upon the oxygen consumption of the Japanese pearl oysters was studied in the present paper. Fouled pearl oysters were reared in three pearl farms in Sasebo Bay and their oxygen consumption before and after shell cleaning was measured. The apparatus employed was similar to Hall's experimental apparatus using the running water syst+.

87BI0462. NAM-PYO.KOH, CHONG-HONG.PARK. 1968(3). AN EXPERIMENT ON THE CULTURE OF LAVER, PORPHYRA TENERA, ON THE "SAE-OL-BAL' (TRIPLE-KNOTTED BLIND)+. BULL. KOREAN FISH. SOC. 1(1):19-30. KOREAN FISH. SOC., PUSAN. KO.

An experiment on the culture of laver, Porphyra tenera, was carried out from September 26, 1965 to February 12, 1966 at a laver farm on the coast of Gae-do, Hwacheong-myeon, Yeocheon-gun, Jeonranam-do, using "Sae-ol-bal" (triple-knotted blind) laver bed.

87BI0463. CHOONKOO.LEE, NAM-KEE.CHANG. 1969(12). AN ATTEMPT TO IMPROVE TIDELANDS FOR MARINE BIVALVES, (2) THE PHYSICAL AND CHEMICAL COMPOSITIONS OF+. BULL. KOREAN FISH. SOC. 2(2):155-160. KOREAN FISH. SOC., PUSAN. KO.

The soil textures and chemical compositions of Tapes philippinarum beds were investigated in order to estimate the grade of the habitat soil of T. philippinarum for the improvement of natural tidal flats. The coefficients of correlation between the percentages of debris, coarse sand, fine sand, silt, and clay of the habitat soil, and the population density of T. philippinarum were 0.78, 0.73, -0.42, -0.68, and -0.51 respectively. And the optimum levels of same were above 13.5%, above 23.0% below 41.5%, below 10.0%, and below 6.8% respectively.

87BI0464. CHOONKOO.LEE, NAM-KEE.CHANG, SHIN-SOK.CHOI 1969(6). STUDIES ON ENVIRONMENTAL FACTORS IN MARINE BIVALVE CULTURE. BULL. KOREAN FISH. SOC. 2(1):33-40. KOREAN FISH. SOC., PUSAN. KO.

Physicochemical properties of sea water and soil of Korean tidal flats densely populated with species of Mactra veneriformis, Cyclina sinensis, Meretrix lusoria, and Tapes philippinarum, were investigated in order to find out the index of environmental factors in marine bivalve culture. The turbidity varied with the change in concentrations of organic matter, silicate, and the exchangeable copper in sea water. All of these concentrations in Inchon, Kunsan, and Hansando were higher than those in Yusoo. In the 5 areas investigated the lowest were ditected at Kangnung. The minerals and organic matter content in sea water did not vary significantly among the different bivalve beds. And it was presumed that the soil texture was one of the most important environmental factors for the dens+.

87BI0465. CHOONG-KYU.PYEN. 1969(6). REARING OF THE LARVAL PRAWN, PENAEUS JAPONICUS BATE. BULL. KOREAN FISH. SOC. 2(1):87-91. KOREAN FISH. SOC., PUSAN. KO.

Experiments on the rearing of larvae of the prawn, Penaeus japonicus Bate, have been conducted by using a large tank A (3.4 x 1.9 x 1.0 m) and two small tanks B and C (1.45 x 0.85 x 1.0 m).

87BI0466. WON-KI.PARK. 1970(10). A STUDY ON THE FEED EFFECT OF NON-EDIBLE MARINE ALGAE, PART 2. TEST OF NUTRIENT VALUE FOR PULLET. BULL. KOREAN FISH. SOC. 3(3):172-176. KOREAN FISH. SOC., PUSAN. KO.

This research dealt with the nutrient value of the seaweed, Sargassum horneri (Turner) C. Ag. which showed the highest nutrient value in the previous experiment (park 1968). Its objective was to find the most effective mixing ratio of ordinary chicken feed used for pullet.

87BI0467. SANG.CHOE. 1970(10). STUDIES ON FEEDING AND GROWTH OF THE ORIENTAL BROWN SHRIMP, PENAEUS JAPONICUS BATE. BULL. KOREAN FISH. SOC. 3(3):161-171. KOREAN FISH. SOC., PUSAN. EN.

The higher the temperature of the sea water, and the smaller the size of the oriental brown shrimp, the higher the feeding rate of the shrimp will be as long as the temperature ranges from 19 Deg. to 30 Deg. in Centigrade, and each shrimp weighs from 1.6 to 14.9 grams. The average daily feeding rate is between 18 to 44 percent. The nighttime feeding rate is always higher than the daytime feeding rate. However, the daytime feeding rate can be raised to from 22 to 37 percent of the daily feeding rate in the non-sediment, dark or direct-sunshine-shielded conditions. Growth can thus be accelerated to that extent under such conditions.

87BI0468. CHOONG-KYU.PYEN. 1970(10). STUDIES ON THE PROPAGATION OF ABALONE. BULL. KOREAN FISH. SOC. 3(3):177-185. KOREAN FISH. SOC., PUSAN. KO.

The spawning of the abalone, Haliotis discus hannai, was induced in October 1969 by air exposition for about 30 minutes. At temperatures of from 14.0 to 18.8 Deg. in Centigrade, the youngest trochophore stage was reached within 22 hours after the egg was laid. The trochophore was transformed into the veliger stage within 34 hours after fertilization. For 7-9 days after oviposition the veliger floated in sea water and then settled to the bottom. The peristomal shell was secreted along the outer lip of the aperture of the larval shell, and the first respiratory pore appears at about 110 days after fertilization. The shell attained a length of 0.40 mm in 15 days. 1.39 mm in 49 days, 2.14 mm in 110

days, 5.20 mm in 170 days and 10.00 mm in 228 days respectively.

87BI0469. CHOONG-KYU.PYEN. 1970(10). PROPAGATION OF THE BLUE CRAB, PORTUNUS TRITUBERCULATUS (MIERS). BULL. KOREAN FISH. SOC. 3(3):187-197. KOREAN FISH. SOC., PUSAN. KO.

The author succeeded in rearing the young blue crab from the first stage of zoea to the true crab shape, and during this time he observed their growth and metamorphosis. The relationships between the number of eggs carried by female crabs (E) and the carapace width (C) and body weight (W) are shown as follows: E= 27.9049C - 281.8155, E= 0.5682 W - 116.4606. There are five zoeal stages and a megalopa in the complete larval development of the blue crab. Water temperature in rearing aquaria ranged from 21.4 to 25.2 Deg. in Centigrade. The duration of each zoeal stage was two days on the average. After the fifth moulting, the zoea becomes megalopa and 5 to 6 days later the megalopa moults and develops into the first stage of adult crab shape.

87BI0470. SUNG-KYOO.YOO. 1970(3). THE GROWTH OF FOOD ORGANISMS FOR THE MASS PRODUCTION OF MOLLUSCAN SEEDLINGS, 1. PHAEODACTYLUM, PLA+. BULL. KOREAN FISH. SOC. 3(1):1-6. KOREAN FISH. SOC., PUSAN. KO.

A series of experiments have been made on the mass culture of Phaeodactylum tricornutum, Platymonas sp. and Chlorella sp. in the laboratory. The shortest lag phase was found in the culture of Ph. tricornutum followed by Platymonas sp. and Chlorella sp. As compared to the aeration culture, the stagnant culture, in general, showed long duration of the lag phase, short period of the exponential phase and extremely small daily increment.

87BI0471. SEH-KYU.CHUN. 1970(3). STUDIES ON THE OYSTER DISEASES, 1. PATHOGENETIC INVESTIGATION. BULL. KOREAN FISH. SOC. 3(1):7-18. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with mortality and pathogenetic investigation of the oysters Crassostrea gigas cultured by the coventional bamboo and hanging method in Kimhae and Koje-Do in 1969.

87BI0472. IN-BAE.KIM. 1970(3). AN EXPERIMENT TO INDUCE SPAWNING OF CHINESE CARPS BY PITUITARY INJECTION. BULL. KOREAN FISH. SOC. 3(1):19-26. KOREAN FISH. SOC., PUSAN. KO.

During the summer of 1969, a series of experiments on the spawning and development of the eggs of grass carp and silver carp was performed with the following results, but the complete development of eggs was not accomplished: 1. The season of maturity for both species is estimated to be from the end of June to the beginning of August. 2. Pituitary glands for the use of inducing maturation should be obtained before the maturation season of its donor. 3. Silver carp as small as 40 cm in body length (48 cm in total length) with an age of 6 years were found to have reached maturity, and the number of eggs in the ovaries were from about 23 to 26 thousand for those with body lengths of 40-44.5 cm.

87BI0473. CHOONG-KYU.PYEN, SUM.RHO. 1970(3). BREEDING OF THE PUFFER FUGU RUBRIPES. BULL. KOREAN FISH. SOC. 3(1):52-64. KOREAN FISH. SOC., PUSAN. KO.

Fingerlings hatched from the eggs of the puffer, Fugu rubripes, which were spawned on May 21, 1969, and were cultivated. The results of their growth during 150 days, until October 25th, are studied.

87BI0474. JONG-RAK.CHUNG, HI-SANG.KWAK. 1970(6). GROWTH OF SOUTH AND WEST COAST PACIFIC OYSTER SPATS (CRASSOSTREA GIGAS) AFTER CROSS-TRANSPLANTATIO+. BULL. KOREAN FISH. SOC. 3(2):129-136. KOREAN FISH. SOC., PUSAN. KO.

As an attempt to determine if the morphological differences between the southern and western oysters are due simply to the local ecological factors or are based on their fundamental genetic nature, oyster seeds produced in 1968 at Tong-Young, Ye-Chun, and Ko-Hung on the south coast and at Kan-Wol-Do on the west coast were cross-transplanted during May of 1969 to compare their growth. The spats were placed in plastic baskets which permitted free water flow through and the baskets hung from a wooden rack located at a tidal zone of less than 1 hour exposure at a depth chosen to keep the baskets submerged in water at all times. Twice a month the growth of the spats were measured along with the air and water temperature and salinity.

87BI0475. SUNG-KYOO.YOO, KI-JU.KIM, CHONG-KU.LEE. 1970(6). BIOLOGICAL STUDIES ON THE PROPAGATION OF IMPORTANT BIVALVES, 4. GROWTH OF THE MUSSEL, MYTILUS EDUL+. BULL. KOREAN FISH. SOC. 3(2):103-109. KOREAN FISH. SOC., PUSAN. KO.

The results of this work concerning the growth of the mussel, Mytilus edulis cultured by the hanging method in Koje Bay are as follows: The major spawning time is confined to the period from March to April. The average length of the mussel life was about eighteen months. The mussels growing on the hanging line for arrestation undergo seasonal vicissitudes, and the mussels which fall off, mass into countless numbers during the period from August to October and finally disappear completely in November.

87BI0476. KI-CHUL.CHOI, YONG-KYOO.SONG. 1971(6). ECOLOGICAL STUDIES ON THE PENAEUS ORIENTALIS KISHINOUE CULTURED IN A POND FILLED WITH SEA WATER, 1. BULL. KOREAN FISH. SOC. 4(2):47-54. KOREAN FISH. SOC., PUSAN. EN.

The difference in growth rate of P. orientalis cultured on muddy bottom region and sandy bottom region in a pond filled with sea water were studied. For the investigation of the growth rate, the body length and the body weight were determined. Five individuals from each experimental region were sampled in random. The samples were collected at ten-day intervals. The survival rate, the predator of P.

orientalis, and the water conditions during the experimental period were also determined.

87BI0477. YONG-KYOO.SONG, CHOONKOO.LEE, SHIN-SOK.CHOI. 1971(6). EFFECTS OF FEEDING AND BOTTOM CONDITIONS ON THE CARAPACE GROWTH OF PENAEUS ORIENTALIS. BULL. KOREAN FISH. SOC. 4(2):43-46. KOREAN FISH. SOC., PUSAN. EN.

The effects of different conditions of the feedings in connection with the bottom stata on the growth rate of Penaeus orientalis have been investigated. The relationships between the days (D) after hatching and the carapace lengths (L) of P. orientalis are represented. The growth rate of the carapace length of P. orientalis in the region of muddy bottom is higher than that of the carapace in the sandy bottom whether the prawns are fed or not.

87BI0478. T.UYENO. 1972(11). CHROMOSOMES OF OFFSPRING RESULTING FROM CROSSING COHO SALMON AND BROOK TROUT. JAPAN. J. ICHTHYOL. 19(3):166-171. ICHTHYOL. SOC. JAPAN., TOKYO. PN-2903. EN.

Chromosome numbers of the hybrids between Oncorhynchus kisutch (2n=60) and Salvelinus fontinalis (2n=84) were 2n=60 in the cross female O. kisutch x male S. fontinalis and 2n=72 in the reciprocal cross. The karyotype of offspring from the former cross was identical with that of the female parent, but the karyotype of offspring from the reciprocal cross was intermediate of karyotypes of both parents. The karyotype of S. fontinalis looked as most primitive among karyotypes of salmonid fishes ever reported. The evolution of the salmonid karyotype is also briefly discussed.

87BI0479. GYUNG-MAN.BAE. 1972(3). STUDY ON THE SPAT COLLECTION OF OYSTER, 3. SPAT FALL AND EXPOSURE TIME. BULL. KOREAN FISH. SOC. 5(1):23-28. KOREAN FISH. SOC., PUSAN. KO.

The results were obtained from the experiment on the oyster spatfall, Crassostrea gigas by means of the rack method in Yongho Bay, on the southern coast of Korea, from June to August in 1962 and 1963.

87BI0480. GYUNG-MAN.BAE, PYUNG-ARM.BAE. 1972(3). GROWTH OF TRANSPLANTED PORTUGAL AND OLYMPIA OYSTERS IN THE KOREAN COASTAL WATERS. BULL. KOREAN FISH. SOC. 5(1):17-22. KOREAN FISH. SOC., PUSAN. KO.

This results concerning the growth of transplanting of the oyster seed, Crassostrea angulata and Ostrea lurida, which were transplanted from Japan by air, and cultivated by the raft suspended method at the coast of Yeongoo-Ri, Koje-Goon, located on the southern coast of Korea from January to December 1970.

87BI0481. IN-BAE.KIM. 1972(6). MASS PRODUCTION OF ROTIFERS FOR THE CULTURE OF FISH AND SOME SHRIMP LARVAE. BULL. KOREAN FISH. SOC. 5(2):45-49. KOREAN FISH. SOC., PUSAN. KO.

This paper deals with a series of experiments in rotifer culture and its usage for the food of tiny fish fry.

87BI0482. JAE-WON.KANG. 1972(6). DISEASES OF THE CULTIVATED PORPHYRA AT CULTURE BEDS WITH SPECIAL REFERENCE TO THE EFFECTS OF FERTI+. BULL. KOREAN FISH. SOC. 5(2):39-44. KOREAN FISH. SOC., PUSAN. KO.

Considerable damages of the cultivated Porphyra by Porphyra diseases were reported from the Porphyra culture bed along the coast of Yongwon-ri, Changwon, Kyungnam during the years of 1969 and 1970. The present study deals with the effects of fertilizer plant effluents on the Porphyra diseases.

87BI0483. SUNG-KYOO.YOO, MYUNG-SUK.YOO. 1973(6). BIOLOGICAL STUDIES ON OYSTER CULTURE (II) MORPHOLOGICAL CHARACTERISTICS OF THE OYSTER, CRASSOSTREA+. BULL. KOREAN FISH. SOC. 6(1/2):65-75. KOREAN FISH. SOC., PUSAN. KO.

Morphological variations of the Korean Oyster, Crassostrea gigas, were studied on the basis of the oyster samples collected from seven ecologically different areas in May and October of 1972 respectively. The sampling areas were Daecheon and Buan in the west coast, Namseong, Chamyeon, Imyeong and Chubong in the south coast and Pohang in the east coast. The everage sizes of the oysters of the west coast were smaller than those of the south coast as well as those of the east coast. The oysters of the east were largest in size. The oysters from subtidal habitats (Chubong and Pohang) had elongated shells and those from intertidal habitats (Buan, Namseong, Imyeong and Chamyeon) had stanted shells. The samples from subtidal habitats showed size variations depending on cultural methods app+.

87BI0484. YONG-GEUN.KIM. 1974(12). THE UTILIZATION OF DIETARY PROTEIN BY YOUNG RAINBOW TROUT. BULL. KOREAN FISH. SOC. 7(4):209-214. KOREAN FISH. SOC., PUSAN. KO.

The utilization dietary protein in young rainbow trout was investigated when feeded with the diets of controlled levels of casein and lipids for 12 days. Body weight gain was in proportion to the protein content in diet up to 40%, and the maximum was obtained with 40.4% of crude protein. On the other hand, the accumulated protein in body also showed almost maximum value around 40% of protein level in the diet and the change of accumulated protein showed a little with more protein level.

87BI0485. IN-BAE.KIM, MYEONG-JA.PARK. 1974(12). EFFECT OF SOME PESTICIDES TO THE ABILITY OF THE FILTERATION AT EEL CULTURE USING RECIRCULATING FIL+. BULL. KOREAN FISH. SOC. 7(4):187-194. KOREAN FISH. SOC., PUSAN. KO.

When rearing fish at recirculating filter systems, some pesticides are often used for controling various fish diseases. In this case, the pesticides are usually applied after stopping the filteration, from a view point of affecting the filtering ability of oxidation and

decomposition by killing the decomposing bacteria in the filter system. Therefore, a great inconvenience is usually met. The authors carried out a series of experiments, and the influence of 3 kinds of treatments of pesticides, formalin 33 ppm + malachite green 0.15 ppm, dipterex 0.25 ppm, and furanace 0.1 ppm, to the filtering ability expressed as the consumption rate of dissolved oxygen and depletion of ammonia-nitrogen during the passing time through the filter layer was investigated.

87BI0486. IN-BAE.KIM, JAE-YOON.JO. 1974(12). REARING OF THE EARLY STAGE OF THE EEL ANGUILLA JAPONICA. BULL. KOREAN FISH. SOC. 7(4):179-186. KOREAN FISH. SOC., PUSAN. KO.

The followings are some results obtained from a series of experiments for the culture of eels from the elver stage in the laboratory from April 1973 to June 1974.

87BI0487. MYUNG-SUK.YOO, SUNG-KYOO.YOO. 1974(6). SPAT COLLECTION AND THE GROWTH OF ANADARA BROUGHTONI SCHRENCK. BULL. KOREAN FISH. SOC. 7(2):79-86. KOREAN FISH. SOC., PUSAN. KO.

The results from the experiment of natural collection and growth of arkshell (Anadara broughtoni SCHRENCK) spat, which was collected at Seok-gok Bay located at Chang-weon-gun, Korea, and grown in the littoral zone of Sa-gok-ri, Geo-je-gun, Korea, beginning from August 1, 1973 to April 8, 1974 are studied.

87BI0488. SEONG-JUN.KIM. 1974(6). A STUDY ON THE SANITARY QUALITY OF PACIFIC OYSTERS, CRASSOSTREA GIGAS AND GROWING WATERS IN BURLEY+. BULL. KOREAN FISH. SOC. 7(2):41-51. KOREAN FISH. SOC., PUSAN. EN.

A study of the sanitary quality of Pacific oysters (Crassostrea gigas) and growing waters associated with raft culture in Burley Lagoon, Washington was conducted.

87BI0489. IN-BAE.KIM, JAE-YOON.JO. 1975(12). COMPARISON OF THE GROWTH RATES OF THREE STRAINS OF COMMON CARP, CYPRINUS CARPIO. BULL. KOREAN FISH. SOC. 8(4):222-224. KOREAN FISH. SOC., PUSAN. KO.

Three strains of common carp, i.e., Israeli carp, red-and-white, and golden strains, were stocked in the same pond, and their growth rates were compared.

87BI0490. JONG-HUN.WON, NAM-PYO.GO. 1975(6). WATER QUALITY OF THE CULTURE BEDS OF HARD CLAM AND ADJACENT SEA OF THE YEOSU REFINERY OF HONAM OIL+. BULL. KOREAN FISH. SOC. 8(2):73-84. KOREAN FISH. SOC., PUSAN. KO.

The present study was conducted to evaluate the effects of oil spill from the wastewater of Yeosu Refinery on water quality of hard clam culture beds in Taein-Ri, Kwang Yang Bay. Wastewater and oil spill may reach to the culture beds in 6-8 hours by tidal current movement. Water quality is nearly normal as unpolluted sea water except the concentration of n-hexane extractive chemicals which shows higher than unpolluted sea water in period of September to October in 1973. It may be caused by wastewater of Yeosu Refinery.

87BI0491. DU-BYUNG.LIM, CHANG-HWAN.CHO, WOO-SUP.KWON 1975(6). ON THE OCEANOGRAPHIC CONDITIONS OF OYSTER FARMING AREA NEAR CHUNGMU. BULL. KOREAN FISH. SOC. 8(2):61-67. KOREAN FISH. SOC., PUSAN. KO.

Oceanographic conditions of the coastal water around Chungmu, one of the most important oyster farming areas in Korea, were studied from May to November in 1974 to find out the environmental influence to oyster farming. Six localities, Goseong Bay, Jaran Bay, off Saryangdo, Hansilpo, Tong-yeong Bay and Juklimpo were selected for monthly oceanographic observation and biological sampling. Flood current running westward brings saline water from the south-east and ebb current brings the low salinity water of Jinju Bay into this area. The growth of oyster was good in Juklimpo, Tong-yeong Bay and Goseong Bay and worst in Hansilpo. The highest mortality was observed 82% in the waters off Saryangdo.

87BI0492. IN-BAE.KIM, JAE-YOON.JO, JAE-YOUNG.CHOI. 1975(9). REARING EXPERIMENT OF COMMON CARP IN BRACKISH WATER. BULL. KOREAN FISH. SOC. 8(3):181-184. KOREAN FISH. SOC., PUSAN. KO.

A series of experiments on the tolerance and growth of common carp, about 10 cm long in body length, in brackish water containing salinities of 2 to 20 ppt, were carried out in indoor aquariums. All fish well survived in waters containing salinities up to 12 ppt, when transfered directly from fresh water, and fairly well survived at 15 ppt, when acclimated at lower salinities before putting them into higher salinities. The temperature during the experiments was subjected to the room temperature ranging from 14 Deg. to 27 Deg. in Centigrade. The food efficiency and growth rate were good both for alive Tubifex and pelletized dry feed at salinities from 2 to 8 ppt, but at 12 ppt the result was very poor for alive Tubifex while, for pellet feed, food efficiency was very good though growth+.

87BI0493. SHIN-SOC.CHOI. 1975(9). COMPARATIVE STUDIES ON THE EARLY EMBRYONIC DEVELOPMENT AND GROWTH OF MERETRIX LUSORIA AND CYCLINA +. BULL. KOREAN FISH. SOC. 8(3):185-195. KOREAN FISH. SOC., PUSAN. KO.

The comparative studies Were conducted with respect to the artificial spawning early embryonic development, metamorphosis and growth of two species Meretrix lusoria and Cyclina sinensis collected from Inchon, Anmyon island and Buan areas from 1969 to 1974. The highest rate of artificial spawning of M. lusoria, which treated with a dilute ammonium hydroxide (4/100-5/100N) - seawater solutions, was 25.0 - 33.3%, whereas in C. sinensis the rate of spawning was lower than that of M, lusoria under the similar experimental conditions (12.5 - 19.0%). However, the rate of artificial spawning of C. sinensis increased 40%

by repeated thermal stimulation.

87BI0494. SUNG-KYOO.YOO, CHANG-HWAN.CHO, MYUNG-SUK.YOO. 1976(12). ON THE SEEDLING TIME OF THE MANGROVE OYSTER, CRASSOSTREA RHIZOPHORAE, IN THE LAGOON OF COCINETA IN+. BULL. KOREAN FISH. SOC. 9(4):281-285. KOREAN FISH. SOC., PUSAN. EN.

An investigation on the breeding time of the Mangrove oyster, Crassostrea rhizophorae, in the lagoon of Cocineta which is located in the northwestern part of Venezuela was carried out from February through May in 1976. Surface water temperature was high, over 25 Deg. in Centigrade and specific gravity was around 1.0258. Transparency to water depth varied between 29 and 80%. The range of water content of the oysters increased from February through May. However, the averge monthly range of water content varied only slightly from 80.67 to 82.25%. From the numbers of matured planktonic larvae together with total numbers of planktonic larvae found, we may assume that the best seedling period is from late April through early May. We may also assume that the best area is around stations 4+.

87BI0495. IN-BAE.KIM. 1976(12). AN EXPERIMENT ON THE FEEDING OF LOW ANIMAL PROTEIN FEED TO CARP. BULL. KOREAN FISH. SOC. 9(4):257-259. KOREAN FISH. SOC., PUSAN. KO.

An experiment on the growth of common carp by feeding low (animal) protein feed when stocked at a relatively low rate of density was conducted in 1976 at the fish pond of the National Fisheries University of Busan.

87BI0496. YONGSOOL.KIM, CHANGHWAN.CHO. 1976(3). TECHNICAL STUDY ON THE ARTIFICIAL PRECOCIOUS BREEDING OF ABALONE, HALIOTIS DISCUS HANNAI INO. BULL. KOREAN FISH. SOC. 9(1):61-68. KOREAN FISH. SOC., PUSAN. KO.

For the artificial precocious breeding of abalone effects of changes in environmental parameters, water temperature and light period, on the induction of spawning have been studied. Subtidal specimens of Haliotis discus hannai were collected irregularly for 6 times from April to June 1975 in Chungmu Bay near Jukdo Island, the southern coast of Korea. One hundred and fifty specimens were reared in 4 aquarium tanks in the laboratory and in a creel submerged in the sea during the period of 60 days from april 24 to June 23, 1975. The all groups kept in the four tanks and a creel showed very high spawning rates (70-100%), compared to those inhabited the natural environment at sea until right before the spawning time (0-50%, average 16.4%).

87BI0497. SUN-DUCK.CHANG, PYUNG.CHIN, BYUNG-OUN.SUNG 1976(3). EFFECT OF SILT AND SALINITY ON THE MORTALITY OF MERETRIX LUSORIA (RODING). BULL. KOREAN FISH. SOC. 9(1):69-73. KOREAN FISH. SOC., PUSAN. KO.

Mortality of clam, Meretrix lusoria was measured during the experimental cultures in different sediments compositions and in different salinities of sea water. Consequently, it may be stated that the mortality results mainly from the deposition of silt and clay, although the survival rate of Meretrix lusoria depends also on water temperature, salinity, dissolved oxygen, body size and other factors.

87BI0498. NAM-PYO.GO, CHEOL-HYEON.SON. 1976(3). STUDIES ON LABORATORY CULTURE OF FREE-LIVING CONCHOCELIS OF PORPHYRA AND METHODS OF MONOSPORE LIBE+. BULL. KOREAN FISH. SOC. 9(1):56-60. KOREAN FISH. SOC., PUSAN. KO.

In order to find effective seed collection method from cultivated Porphyra, benthic diatom elimination, culturing conditions of Conchocelis, liberation of conchospores and treatment of the fronds tc obtain monospores have been studied.

87BI0499. IN-BAE.KIM, JAE-YOON.JO. 1977(12). REARING EXPERIMENT OF COMMON CARP IN SMALL AQUARIUM. BULL. KOREAN FISH. SOC. 10(4):275-279. KOREAN FISH. SOC., PUSAN. KO.

During the experimental rearing period of common carp in a small simple recirculating aquarium combined with frequent exchanges of water and cleanings, some observations were made on the conditions of fish growing which was directly and instantly affected by the cleaning frequency of strainer, changing rate of water, division and frequency of feed supply, prohibition of excess feeding and the amount of dissolved oxygen.

87BI0500. IN-BAE.KIM, JAE-YOON.JO. 1977(12). AN EXPERIMENT ON THE REARING OF RAINBOW TROUT IN THE INDOOR AQUARIUM IN BUSAN. BULL. KOREAN FISH. SOC. 10(4):267-273. KOREAN FISH. SOC., PUSAN. KO.

Rainbow trout were reared in a small indoor aquarium which was equipped with a simple recirculating biofilter combined with a small amount of inflowing water for 199 days from April 25 to November 10, 1977 in Busan where very hot summer air temperature is encountered, and results obtained were promissing.

87BI0501. CHANG-HWAN.CHO, YONG-SOOL.KIM. 1977(12). MICROENVIRONMENT IN OYSTER FARM AREA, 1. ON THE EUTROPHICATION AND RAFT DENSITY IN GEOJE BAY. BULL. KOREAN FISH. SOC. 10(4):259-265. KOREAN FISH. SOC., PUSAN. KO.

After a great mortality owing to abnormal oceanographical condition and fungal disease in 1973 hanging cultch lines per raft has been reduced to 450 from 558, and oyster production per raft has also been decreased. It seems to be the result of dense culture of oysters and its resulting accumulation of waste materials on the sea bottom in the farm area. The present study was carried out to investigate the effect of rearing density and the degree of eutrophication in Geoje Bay for 6 months from June through November in 1977.

87BI0502. CHOONG-KYU.PYEN. 1977(3). LE RAPPORT SUR LA CONDITION ET L'ENVIRONMENT DE L'AQUICULTURE D'HUITRES

AU MAROC. BULL. KOREAN FISH. SOC. 10(1):53-60. KOREAN FISH. SOC., PUSAN. FR.

87BI0503. IN-BAE.KIM, YONG-UK.KIM, JAE-YOON.JO. 1977(6). REARING OF THE EEL ANGUILLA JAPONICA IN RECIRCULATING AQUARIUMS. BULL. KOREAN FISH. SOC. 10(2):115-124. KOREAN FISH. SOC., PUSAN. KO.

From august 1976 to May 1977, a series of rearing experiments of eels weighing over 5 grams were carried out utilizing indoor recirculating aquariums and the results are summarized as following: 1. The eels were instantly acclimatized in the aquarium when alive Tubifex was fed as food, resulting in the food coefficient of around 5, and the daily growth rate of 2% or so. 2. When mackerel flesh was used in combination with flour dough or commercial powdered feed, the food coefficients were 4 to 5 and daily growth rates were between 1 and 2%. 3. The eels of 12.4-14.7 g in average weight which had not shown any growth when fed processed feed, grew normally when they were fed alternately with alive-Tubifex and processed feed with the results of 4.3-6.0 in food coefficient and 1.4-2.3% in da+.

87BI0504. M.E.CHRISTIANSEN, J.D.COSTLOW JR, R.J.MONROE. 1978. EFFECTS OF THE INSECT GROWTH REGULATOR DIMILIN (TH 6040) ON LARVAL DEVELOPMENT OF TWO ESTUARINE CR+. MARINE BIOLOGY. 50:29-36. SPRINGER-VERLAG, BERLIN. PN-2896. EN.

Effects of Dimilin (TH 6040), an insect growth regulator which interferes with the formation of the insect cuticle, were studied on the larval development of Rhithropanopeus harrisii (Gould) and Sesarma reticulatum (Say) (Crustacea: Brachyura). When larvae were exposed to 0.5 (R. harrisii only), 1, 3, 5, 7, and 10 ppb Dimilin from hatching to the first crab stage, survival in both species decreased in relation to increased concentrations of Dimilin. Survival of R. harrisii larvae was significantly lower at 1 ppb and higher levels compared with control experiments, and in S. reticulatum a significant decrease in survival began at the 3 ppb level. At 10 ppb Dimilin, no larvae survived to the megalopa stage in either of the two species. The results indicate that early stage larvae of R. +.

87BI0505. SUN-DUCK.CHANG, PYUNG.CHIN. 1978(12). EFFECTS OF SUSPENDED SILT AND CLAY ON THE MORTALITY OF SOME SPECIES OF BIVALVES. BULL. KOREAN FISH. SOC. 11(4):227-231. KOREAN FISH. SOC., PUSAN. KO.

Effects of suspended silt and clay on the survival of the rearing bivalves, Meretrix lusoria, Cyclina sinensis and Mactra veneriformis were studied. During sixty-five days of experimental cultures in different concentrations of suspended silt and clay and in different time of immersions, mortalities of the bivalves were checked every day, and the rates of shell movement and oxygen consumption were measured. In general, the higher the concentration of silt and clay and the longer the immersion time, the earlier the occurence, and the higher the rate of the mortalities of the experimental bivalves.

87BI0506. IN-BAE.KIM, JAE-YOON.JO. 1978(12). REARING OF RAINBOW TROUT TO COMMERCIAL SIZE IN A INDOOR AQUARIUM. BULL. KOREAN FISH. SOC. 11(4):233-238. KOREAN FISH. SOC., PUSAN. KO.

Rainbow trout were reared in a stainless steel aquarium from Nov. 11, 1977 to June 12, 1978, and the following resutls were obtained. The result of whole period for 212 days was 56.5 kg in gross increment, and based on this result, when 1 l/min full day inflowing water available, the net production will become 28.25 kg. So, if a 5,000 kg production is planned, 180 l/min or about 10.8 cubic meter/hr of inflowing water will be required, and the production in value will become 15 million won at local price at the expense of about 5.3 million won. From the result of this experiment, rainbow trout is feasible for commercial production in Korea with relatively small amount of well water and simplified water recirculation system.

87BI0507. KYUNG-HEE.LEE, KEUN-TAI.LEE. 1978(12). EFFECTS OF PHENOL DERIVATIVES ON BACTERIAL GROWTH. BULL. KOREAN FISH. SOC. 11(4):213-217. KOREAN FISH. SOC., PUSAN. KO.

Henri-Michaelis-Menten model for predicting the behavior of culture of Brevibacterium flavum under carbon limiting condition has been evaluated on a chemostat growing in the presence of the phenol derivatives: guaiacol, o-vanillin and vanillin. It is found that Henri-Michaelis-Menten model could be applicable to the evaluation of the growth rate of cells in the phenol derivatives. The marked enhancing abilities of the cells treated by the phenol derivatives during fermentation were ascribed to the formation of charge-transfer complex between the phenol-derivatives and oxygen which supplies oxygen effectively to the fermentation system.

87BI0508. SOO-IL.PARK. 1978(3). NUTRITIONAL LIVER DISEASE OF CULTURED YELLOWTAIL, SERIOLA QUINQUERADIATA, CAUSED BY FEED DEFICIENC+. BULL. KOREAN FISH. SOC. 11(1):1-4. KOREAN FISH. SOC., PUSAN. KO.

When frozen sand eel Ammodytes personatus which had been stored for a long time, was given to yellowtail for 70 to 80 days, some mortality of the rearing fish began to appear. The liver of the diseased fish showed some yellowish brown discoloration & histopathological study revealed that fatty degeneration of the liver cells was obvious, and this degeneration was especially heavy around bile-duct. The cell nuclei showed atrophy.

87BI0509. SOO-IL.PARK. 1978(3). NUMERICAL CHANGES OF THE COLIFORM BACTERIA IN A RECIRCULATING AQUARIUM. BULL. KOREAN FISH. SOC. 11(1):5-8. KOREAN FISH. SOC., PUSAN. KO.

Numerical changes of coliform bacteria in a recirculating aquarium were measured as fouling indicator. The contamination of the filter bed was mainly due to the food given to fishes, the fecal materials and the additional supply of water polluted already. Abun lance of the bacteria in the aquarium was

controlled by the physiochemical factors of water quality. Of these factors, pH was the main factor. Under the water temperature 20 Deg. in Centigrade, if pH was controlled at lower than 5-6, the bacteria did not flourish seriously. Under the water temperature over 30 Deg. in Centigrade, the bacterial growth was markedly decreased regardless of the pH value, and the bacterial flora seemed to be active in growth under temperature condition lower than 30 Deg. in Centigrade.

87BI0510. CHANG-HWAN.CHO, J.A.FRIAS. 1979(12). OYSTER SETTING IN THE RESTINGA LAGOON IN VENEZUELA. BULL. KOREAN FISH. SOC. 12(4):287-292. KOREAN FISH. SOC., PUSAN. KO.

87BI0511. IN-BAE.KIM. 1980(12). PILOT SCALE FISH PRODUCTION IN WATER RECYCLING SYSTEM. BULL. KOREAN FISH. SOC. 13(4):195-206. KOREAN FISH. SOC., PUSAN. KO.

Fish were grown in a water recycling rearing system consisting of a filter system, of which the area is about 30 square meter and the volume of filter gravels is about 15 cubic meter, 6 rearing and 2 supplementary tanks about 7 square meter of surface area each. Based on an analysis of results of the above mentioned main experiment and the other miscellaneous fish grown in the remaining tanks, it was considered to be feasible to implement a commercial production in this system by improving parts of the system and adding a number of the units. A special problem seems to be an adoption of more effective aeration device when fish loading increases.

87BI0512. YONG-SOOL.KIM. 1980(12). EFFICIENCY OF ENERGY TRANSFER BY A POPULATION OF THE FARMED PACIFIC OYSTER, CRASSOSTREA GIGAS IN G+. BULL. KOREAN FISH. SOC. 13(4):179-193. KOREAN FISH. SOC., PUSAN. KO.

The efficiency of energy transfer by a population of the farmed pacific oyster, Crassostrea gigas was studied during culture period of 10 months July 1979-April 1980, in Geoje-Hansan Bay near Chungmu City. The net efficiency of energy transfer from assimilation to meat production (yield/assimilation) of a farm population of the oyster was estimated to be 28% during culture period July 1979-April 1980. The gross efficiency of energy transfer from ingestion to meat production (yield/food filtered) is probably between 11% and 20%.

87BI0513. CHANG-HWAN.CHO. 1980(6). FARMING DENSITY OF OYSTER IN HANSAN-GEOJE BAY. BULL. KOREAN FISH. SOC. 13(2):45-56. KOREAN FISH. SOC., PUSAN. KO.

Farming density of oyster cultured in Hansan-Geoje Bay was studied to obtain the optimal farming density based on the biosedimentation analysis and the annual yield data from 1970 to 1979. Farming density of oyster extrapolated by means of pollution grade of sediment is significantly correlated to COD and phaeophytin content of the bottom mud of the bay. Pollution grade is linearly related to the number of oyster clusters suspended in the unit area. Optimal farming density was 0.12 string/square meter in case of raft culture, and it was 0.25 string/square meter in case of long-line culture.

87BI0514. YOUNG-GILL.KIM. 1980(6). ECOLOGICAL STUDY ON THE TRANSPLANTATION OF SEA SQUIRT, HALOCYNTHIA RORETZI (V. DRASCHE) TO GOGUNSA+. BULL. KOREAN FISH. SOC. 13(2):57-64. KOREAN FISH. SOC., PUSAN. KO.

Seed tunicates of Halocynthia roretzi (V. DRASCHE) which were artificially settled in Chungmu area were transplanted to Seonyudo and Eochungdo to know the feasibility of the tunicate culturing in the western coast of Korea. From April 1978 to march 1979, the growth of the transplanted tunicate in the two area was compared and analyzed in reference to the ecological factors.

87BI0515. X.E.BAI. 1983(12). ACTION OF BOTTOM SOIL ON PENAEID SHRIMP CULTURE. ACTA OCEANOL. SINICA. 2(2):299-307. CHINA OCEAN PRESS, BEIJING. EN.

The present paper is based on the results of experiments on the adsorption of sulfide of bottom soil, which were carried out in 1979-1981, and gives special emphasis on the problem of the occurrence of the harm caused by hydrogen sulfide to the shrimps cultured in the high-production earthen pond. The scientific basis of prevention and control of the harm caused by hydrogen sulfide occurring in the pond and a simple effective measure for high, stable production of penaeid shrimp culture are proposed accordingly.

87BI0516. D.R.JOHNSON, B.S.HESTER, J.R.MCCONAUGHA. 1984. STUDIES OF A WIND MECHANISM INFLUENCING THE RECRUITMENT OF BLUE CRABS IN THE MIDDLE ATLANTIC BIGHT. CONTINENTAL SHELF RES. 3(4):425-437. PERGAMON PRESS, OXFORD. EN.

This report forms part of an on-going effort to understand the large yearly variations in blue crab harvest of Chesapeake Bay. Recent sampling programs have indicated that the larvae are transported out of the bay immediately after being spawned, and spend their first month offshore at the sea surface. Although it is well established that a mid and outer shelf southward flow occurs during all seasons in the Middle Atlantic Bight, very little is known of the nearshore currents. This study constitutes an effort to determine if the characteristically light, but northward, wind stress during the critical summer months is sufficient to drive northward counter flow at the surface and, hence, to reduce the chances that the larvae are being advected south & lost from the area of Chesapeake Bay.

87BI0517. Z.F.CHEN. 1984(10). STUDIES ON THE CULTURE OF CHAETOCEROS MUELLERI LEMMERMAN; THE EFFECT OF SEA SOIL EXTRACT AND VARIO+. ACTA OCEANOL. SINICA. 3(4):568-573. CHINA OCEAN PRESS, BEIJING. EN.

This paper shows that the use of sea soil extract instead of vitamin and biotin to culture chaet. muelleri is possible. The effect of the different nitrogen sources on Chaetoceros muelleri was studied in order to suggest a more simple and better fertilizer for the mass culture of this species.

87BI0518. SUNG-GWI.KIM, HYUN-YEONG.KIM. 1985(6). THE IMPACT ON THE BUSINESS PERFORMANCE OF THE FOUR UNCERTAINTY FACTORS IN AQUACULTURE OF YELLOW TA+. OCEAN RES. 7(1):73-82. KORDI., SEOUL. KO.

In a business analysis under uncertainty conditions, the variable factors which have an impact upon the management performance must be identified. The analysis must then investigate the effects of varying the different factors. This is especially true in the aquaculture of Yellow Tail, where the variations in fodder cost, survival rate, conversion ratio and market price are so wide that they must be systematically considered in a business analysis. In this report, the appropriate ranges for the factors which can lead to stable profitability has been determined. These factors can be controlled by the manager, which will exclude some uncertainty from the project. In conclusion, managers must cooperate each other more intensively for the development of aquaculture technology and the es+.

87BI0519. P.S.CHOO. 1986. OBSERVATIONS ON THE USE OF SOME NON-ALGAL FEEDS IN THE CULTURE OF PROTOZOEAE LARVAE OF PENAEID PRA+. FISH. BULL. (42) DEPT. FISH., MIN. AGR., MALAY. PN-3103. EN.

Three types of non-algal feeds-activated dry bakers' yeast, boiled chicken egg-yolk and a single-cell protein (SCP) were fed to the protozoeae larvae of the penaeid prawn, Penaeus merguiensis and P. monodon. The larvae fed actively and also showed good survival on the yeast and the egg-yolk, but not on the SCP. Bakers' yeast was found to be more convenient to use and easier to prepare than chicken egg-yolk, and the optimal feeding rate for P. merguiensis fed on bakers' yeast was worked out. A feeding rate of 0.1 mg bakers' yeast/larva/day for protozoeae I, 0.2 mg/larva/day for protozoeae II, and 0.2 mg/larva/day combined with frozen Artemia nauplii at 1/ml of culture volume for protozoeae III larvae was considered optimal for the larvae of P. merguiensis.

87BI0520. R.B.HASSAN, T.T.LOON. 1986. OBSERVATIONS ON ACID RUNOFF AND IRON IN BRACKISHWATER FISHPONDS. PROBLEMS AND IMPLICATIONS. FISH. BULL. (43) DEPT. FISH., MIN. AGR., MALAY. PN-3104. EN.

In the management of brackishwater fishponds, high acidity (low pH) and high Fe content of pond water were among the serious problems encountered. hydrogen ion and ferrous ion are transported into the pond water by runoff. Hydrogen ion resulted in low pH and also destroyed the bicarbonate alkalinity. High Fe content is toxic to fish/prawn. Frequent water exchange, drying and tilling, are some of the measures recommended to minimize the problems of acidity and Fe.

87BI0521. S.PATHMASOTHY, L.T.JIN. 1987. COMPARATIVE STUDY OF THE GROWTH RATE AND CARCASS COMPOSITION OF THE STRIPED CATFISH, PANGASIUS SUT+. FISH. BULL. (50) DEPT. FISH., MIN. AGR., MALAY. PN-3110. EN.

The growth rate of Pangasius sutchi which are given chicken viscera shows a 414% increase in body weight which are not distinguishable ($P < 0.05$) compare to those that are being fed with 32% crude protein and 7.4% fat pellet with a 431% increase in body weight. However the growth rate of fish which are given 24% curde protein pellet are much lower showing that Pangasius sutchi need a high crude protein content in their food. Fishes which are given chicken viscera contain high fat in their muscle and mesentric compared to those that are given pellet. This fish as a whole have a tendency to accumulate fat in it's body.

87BI0522. P.S.CHOO. 1987. THE EFFECT OF ETHYLENEDIAMINE TETRAACETIC ACID DISODIUM SALT ON THE SPAWNING AND HATCHING OF PENAE+. FISH. BULL. (49) DEPT. FISH., MIN. AGR., MALAY. PN-3109. EN.

The addition of 5 mg/l ethylenediamine tetraacetic acid disodium salt to the sea water in the hatchery of the Fisheries Research Institute at Glugor, Penang during the period Dec. 1984 - Aug. 1985 brought about significant improvement to the water quality thus resulting in higher number of penaeid prawn (Penaeus monodon and Penaeus merguiensis) eggs spawned and in the hatching of the eggs which was not possible in earlier trials when no ethylenediamine tetraacetic acid disodium salt was added. However, the culture of the larvae of Penaeus monodon and Penaeus merguiensis was still possible in the sea water where no ethylenediamine tetraacetic acid disodium salt was added.

87BI0523. IN-BAE.KIM, PYONG-KIH.KIM, YOUNG-OK.CHEE. 1987(11). THE AMMONIA REMOVAL CAPACITY OF A FEW KINDS OF FILTER MEDIA IN A WATER REUSE AQUACULTURE SYSTEM. BULL. KOREAN FISH. SOC. 20(6):561-568. KOREAN FISH. SOC., PUSAN. EN.

The purpose of this study was to find out the removal capacity of harmful ammonia by different filter media in the submerged biological filters in a given space of chamber. Four materials, pile cloth, corrugated skylight roofing plate, embossed plastic plate, and gravel, were used as the experimental filter media. Each filter medium was placed in two aquariums, each aquarium measuring 90 cm x 60 cm x 60 cm (depth).

87BI0524. JAE-SANG.HONG, ET AL. 1987(5). OCEANOGRAPHIC CONDITIONS IN RELATION TO LAVER PRODUCTION IN KWANGYANG BAY, KOREA. BULL. KOREAN FISH. SOC. 20(3):237-247. KOREAN FISH. SOC., PUSAN. KO.

The present study deals with the physico-chemical and meteorological conditions in Porphyra-cultivation ground to determine the relationship between laver production and its environmental factors in kwangyang Bay from January to April in 1986. As a result, major environmental factors which are thought to have a great influence upon the poor harvest during the cultivation period are as follows; 1)the excessive rainfall in the beginning of cultivation period, 2) the accumulation of suspended matters on the thallus of laver, 3) the decrease of current velocity and the

stagnation of the water in the cultivation ground.

87BI0525. CHOON-BOK.SONG, JAE-SANG.HONG, JAE-WON.KANG. 1987(7). A STUDY ON SOME FACTORS AFFECTING THE POOR HARVEST OF LAVER IN KWANGYANG BAY, 1986. BULL. KOREAN FISH. SOC. 20(4):328-340. KOREAN FISH. SOC., PUSAN. KO.

In order to clarify major reasons of a poor harvest, the Porphyra-cultivation ground was investigated in Kwangyang Bay in terms of the laver production per unit area, diseases, and fouling organisms from January to April in 1986. In conclusion, the poor harvest of laver in 1986 may result from such following problems as the decrease in vertical attachment range of laver and fouling problems as the decrease in vertical attachment range of laver and fouling organisms at "Soppal" cultivation ground, prevalence of certain diseases, changes in environmental conditions, arrangement and maintenance of facilities for laver cultivation.

87BI0526. A.TALIB, C.MAHYAM. THE SQUID & CUTTLEFISH RESOURCES IN PENINSULAR MALAYSIA. FISH. BULL. (45) DEPT. FISH., MIN. AGR., MALAY. PN-3106. EN.

Squids and cuttlefish fishery is one of the most important fishery in Peninsular Malaysia. The information on the species, biological aspects, the resource and the rate of exploitation is not well known. In this paper, attempts is being made to study the resource and the rate of exploitation by using the available ten-years commercial landing data and the survey data taken from K.K. "JENAHAK". The MSY values of Squids and Cuttlefish for West Coast of Peninsular Malaysia using Schaefer and Fox Models are 11570 M. Tons and 1096 M. Tons respectively. While for the East Coast, the MSY values of Squids and Cuttlefish using Schaefer's Model are 4300 M. Tons or 3600 M. Tons of fox Model is used, instead.

87BI0527. IN-BAE.KIM. 1969(6). FUNDAMENTAL STUDIES OF THE LOWER PART OF THE NAKTONG RIVER FOR FISHERIES EXPLOITATION, (1) THE CAT+. BULL. KOREAN FISH. SOC. 2(1):25-32. KOREAN FISH. SOC., PUSAN. KO.

The estimated annual catch of river fishes in the lower part of the Naktong River was derived from the questionnaire, as a part of the fundamental investigation which was carried out for the development of fisheries in that region during the period of May 1967, to June 1968. The annual catch of the region was estimated to be about 500 tons, excluding the mussel Corbicula elatior. Prussian carp Carassius carassius was the largest in amount followed by common carp Cyprinus carpio, and then goby Synechogobius hasta, Japanese eel Anguilla japonica, mullet Mugil cephalus, ect. and in that order.

87BI0528. KI-JOO.KIM. 1970(10). STUDIES ON THE INTERSPECIFIC RELATIONS BETWEEN COMMON MACKEREL AND HORSE MACKEREL, 1. ANALYSIS OF +. BULL. KOREAN FISH. SOC. 3(3):149-153. KOREAN FISH. SOC., PUSAN. KO.

The present study deals with dynamical relationships between variations of common mackerel and horse mackerel catches in the waters adjacent to Korea for the years 1926 to 1969. The materials used here were obtained from Fishery Statistics published by the Bureau of Fisheries and the Fisheries Research and Development Agency of Korea. As to variations of catch, the two species have alternating cycle trends occurring every ten years. With regard to the long period trend of catch, there is no correlation between annual variations of the species caught. Dynamical relationships between the two species showed a somewhat different pattern of catch as they transferred from one stage to another of the secular variations.

87BI0529. JEE-WON.CHANG, DOO-OK.SU. 1970(3). STATISTICAL PREDICTION OF THE ANNUAL CATCHES OF ANCHOVY, ENGRAULIS JAPONICA, IN KOREA BY MEANS OF +. BULL. KOREAN FISH. SOC. 3(1):45-51. KOREAN FISH. SOC., PUSAN. KO.

By means of past data, taken from the annual catches of anchovy landings in Korea, from the year 1926 to 1967, as reported in the Annual Statistical Reports of Fisheries, the future annual catches from the year 1968 to 1973 were predicted by statistical extrapolation.

87BI0530. KI-JOO.KIM. 1973(6). STUDIES ON THE FISHERY BIOLOGY OF THE PACIFIC SAURY, COLOLABIS SAIRA OF THE EAST COAST OF KOREA, 3. BULL. KOREAN FISH. SOC. 6(1/2):58-64. KOREAN FISH. SOC., PUSAN. KO.

Changes in stock size of the Pacific saury, Cololabis saira, were studied on the basis of fishery statistics compiled from 1964 to 1972 and body size composition of the fish collected from 1968 to 1972. During the period from 1964 to 1972 there was a direct correlation between the stocks of fall (september-february of the following year) and spring (March-August) season. The sizes of stocks in both seasons showed a three-year cyclic change, and the mode of stock in the fall always preceeded one year that in the spring. Exceedingly high fishing effort was observed in the spring as well as the fall of 1967. But very low fishing effort was noticed in the spring of 1969.

87BI0531. KI-JOO.KIM. 1973(6). STUDIES ON THE FISHERY BIOLOGY OF THE PACIFIC SAURY, COLOLABIS SAIRA OF THE EAST COAST OF KOREA, 2. BULL. KOREAN FISH. SOC. 6(1/2):49-57. KOREAN FISH. SOC., PUSAN. KO.

Based on the fork length data of 1968 and on the fishery statistical data of 1968, 1970 and 1971, a research was made on the migration of the Pacific saury in the waters off the eastern coast of Korea. Northward migration is brought out in order of size, i.e., the smaller move northward earlier than the larger do, and the order is reverse in the case of southward migration. The moving pattern of the distribution centroid is assumed to be related with the abundance of each group to a considerable extent.

87BI0532. BONG-SEUK.HA. 1974(12). STUDIES ON

THE MUSCLES OF MARINE ANIMALS (I) CONTENTS OF INORGANIC SUBSTANCES IN THE MUSCLES OF FI+. BULL. KOREAN FISH. SOC. 7(4):229-233. KOREAN FISH. SOC., PUSAN. KO.

The author studied on the inorganic substances in the muscles of Branchiostegus joponicus japonicus, Chromis notatus, Haliotis gigantea mataka, obtaining the following results. It is noticeable that the concentration of Cu, P, Fe, Ca, and Na in the muscles of Branchiostegus japonicus japonicus (demersal fish), Chromis notatus (pelagic fish) and Haliotis gigantea mataka (shell fish) are quite different in the three species.

87BI0533. KYU-JUNG.CHOE. 1974(12). THE RESOURCES OF THE ARK-SHELL, ANADARA BROUGHTONII IN DEUK RYANG BAY. BULL. KOREAN FISH. SOC. 7(4):204-208. KOREAN FISH. SOC., PUSAN. KO.

The standing crop of the ark-shell, Anadara broughtonii was investigated in the fishing ground near Seodang-Ri, Hoecheon-Myeon, Boseong Gun, Chulla-Nam Do, from the 10 to 17, January 1974, as a preliminary study for the resource investigaton of the species. 1. The resources of the ark-shell was estimated to be about 3.4-8.3 M/T, the individual number being about 11,000-37,000 in the area, 112 ha covered for the investigation. 2. Of the landed ark-shell by fishing, 93% of them were over 3 years old.

87BI0534. SANG-TAEK.SHIN. 1975(3). STOCK ASSESSMENT OF YELLOW CROAKER IN THE YELLOW SEA AND EAST CHINA SEA. BULL. KOREAN FISH. SOC. 8(1):11-19. KOREAN FISH. SOC., PUSAN. KO.

Yellow croaker, Pseudosciaena manchurica Jordan et Thompson, in the Yellow Sea and the East China Sea are subjected to be caught by trawl nets, stow nets and gill nets throughout the year. Monthly indices of population size are calculated. Mathematic models (I) were used in order to determine catchability coefficient, natural mortality, fishing mortality, recruiting coefficient of the fishing ground and dispersion coefficient from the fishing ground.

87BI0535. TAE-JUN.SHON. 1975(3). ON THE CATCH OF GILL NET IN THE JEJU ISLAND - COMPARISON OF MACKEREL CATCH IN MONOFILAMENT AND MUL+. BULL. KOREAN FISH. SOC. 8(1):7-10. KOREAN FISH. SOC., PUSAN. KO.

The catches of mackerel by monofilament and multifilament net were compared by means of x-square and t-test method. In order to improve the netting twine of drift nets, 6 sheets 5 different mesh and nylon-monofilament netting twines (B x 2, C, D, F,) and 2 sheets nylon-multifilament (A x 2) which are using near the Jeju Island in contemporary days were used for the experiment. These gill nets were connected in order of A, B, C, A, B, E, F and operated by fishing boat Taeann Ho near sea of Jeju Island from May 1974 to August 1974.

87BI0536. KEE-JU.KIM. 1975(6). APPROXIMATE ESTIMATION OF RECRUITMENT IN FISH POPULATION UTILIZING STOCK DENSITY AND CATCH. BULL. KOREAN FISH. SOC. 8(2):47-60. KOREAN FISH. SOC., PUSAN. KO.

For the calculation of population parameter and estimation of recruitment of a fish population, an application of multiple regression method was used with some statistical inferences. Then, the differences between the calculated values and the true parameters were discussed. In addition, this method criticized by applying it to the statistical data of a population of bigeye tuna, Thunnus obesus of the Indian Ocean. The method was also applied to the available data of a population of Pacific saury, Cololabis saira, to estimate its recruitments.

87BI0537. MOON-HA.BAIK. 1977(3). FISHES COLLECTED IN THE FISHING GROUND OF CHROMIS NOTATUS ALONG THE COAST OF SEOGWIPO IN JEJU-DO. BULL. KOREAN FISH. SOC. 10(1):49-52. KOREAN FISH. SOC., PUSAN. KO.

The author has collected as many as 35 species belonging to 25 genera in 18 families by trap net in the fishing ground of Chromis notatus along Seogwipo coast in Jeju-do. Among 35 species included are 6 species of Labridae, 4 species of Scorpaenidae, 3 species of Pomacentridae, and 3 species of Monacanthidae. In regard to the amount of catch, more than 90% are Chromis notatus which are mainly caught within the depth of 15-25 m, and the rest are largely Apogon semilineatus and those belonging to Labridae. Some ornamental fishes, subtropical fishes and some rare species are also collected.

87BI0538. WOO-IL.CHOO. 1977(3). A REVIEW OF SOME ASPECTS OF THE YELLOWFIN TUNA FISHERY IN THE ATLANTIC OCEAN. BULL. KOREAN FISH. SOC. 10(1):37-47. KOREAN FISH. SOC., PUSAN. KO.

Korea started the Atlantic tuna fishery from 1964 by means of longline, then added bait-boats in 1972. Both fisheries have given the top priority to catch yellowfin tuna (Thunnus albacares). The paper reviews available catch, effort and biological data, estimates some population parameters in order to understand the status of the Atlantic yellowfin tuna as a whole.

87BI0539. R.D.LI. 1985(10). THE RELATIONSHIP BETWEEN SHRIMP RESOURCES IN THE HUANGHAI AND BOHAI SEAS AND SEA SURFACE TEMPERATU+. ACTA OCEANOL. SINICA. 4(4):548-556. CHINA OCEAN PRESS, BEIJING. EN.

In this paper the relationship between the variation of shrimp resources (which is sensitive to the sea temperature of the Huanghai and Bohai Seas) and the equatorial sea surface temperature is analysed, the results obtained showing high correlation between the two. Therefore, a new approach to studying long-term variational law of fishery resources and forecasting method is made through large-scale air-sea interaction.

87BI0540. SUNG-CHUL.CHUNG. 1985(6). TECHNICAL PROGRESS, FISHERY RESOURCE DEPLETION AND THE INPUT ELASTICITY OF

FISH HARVEST: THE CASE +. OCEAN RES. 7(1):65-68. KORDI., SEOUL. KO.

The conventional harvest production function is revised and estimated in this study in order to test the widely-held hypothesis that the retarded growth of fish harvest in the coastal and adjacent seas is largely attributable to the depletion of fishery resources. The result of the empirical test has shown that the input (fishing vessels in tonnage) elasticity of fish harvest has been declining over time with continuous increase in fishing vessels in terms of tonnage and efficiency. Even though the test has been carried out with very limited data under restrictive assumptions, the ever decreasing input elasticity of harvest implies that the fish stock in the coastal and adjacent seas has been overexploited.

87BI0541. A.C.GAMBANG. 1986. DEMERSAL FISH RESOURCES IN MALAYSIAN WATERS; EIGHTH TRAWL SURVEY OFF THE COAST OF SARAWAK (20TH AP+. FISH. BULL. (37) DEPT. FISH., MIN. AGR., MALAY. PN-3102. EN.

A Demersal Fish Resource Survey was carried out to monitor the demersal resources off the Sarawak Coast between 10-60 metres depth during the month of April and June, 1982. Results showed that the overall catch rate was 171 kg/hr, where commercial fish had 80 kg/hr and trash fish had 91 kg/hr. Trash occupied more than half of the catch (53 percent). The three groups, rajiformes, Tachysuridae, and the mullets remained the most abundant group. A total of 17,420 square kilometer trawlable area was recorded where limitations were due to the presence of hard corals, hard grounds, pipe and cable lines and LNG area. Within this trawlable ground, productive ground covered 2,405 square kilometer. The present survey showed that the total standing stock for the trawlable area was 48,957 tons.

87BI0542. A.C.GAMBANG. 1986. DEMERSAL FISH RESOURCES IN MALAYSIAN WATERS; SEVENTH TRAWL SURVEY OFF THE COAST OF SARAWAK (16TH M+. FISH. BULL. (36):1-41. DEPT. FISH., MIN. AGR., MALAY. PN-3101. EN.

The present survey was carried out to monitor the demersal fish resources, and trawlable grounds along the coast of Sarawak waters. Highest catch rate was toward deeper water. Catch rate of commercial fish increased towards deeper water, while trash fish increased towards shallow water. High catch rate was recorded in a mixture of mud and sand areas and those of coral areas especially for commercial fish. In the catch composition, there were changes in groups occupying the ten most abundant group. Previously abundant groups were decreasing in abundance and noticable was the increase in abundance of less commercially important group like the leiognathids.

87BI0543. A.B.BEJIE. 1986. THIRD PRAWN RESOURCE SURVEY ALONG THE COAST OF SARAWAK (11TH MARCH-13TH JUNE, 1982). BULETIN PERIKANAN. (32) MIN. AGR., MALAYSIA. PN-2994. EN.

This report describes an annual prawn resource survey -a third in the series- for 1982 carried out at Sarawak coastal waters. The survey was confined to waters between 6 and 33 metres in depth. Information on prawn distribution, species composition, total catch, catch rates, male-female ratio and species abundance was obtained. A total of 82 trawling stations distributed along the coast were covered with a total yield of 10,686.3 kg. giving the following break-downs: (1) prawn catch amounted to 327.16 kg. (3.1%); (2) commercial food fish 3,660.44 kg. (34.2%); and (3) trash fish 6,698.7 kg. (62.7%).

87BI0544. Q.S.TANG. 1987(1). ESTIMATION OF FISHING MORTALITY AND ABUNDANCE OF PACIFIC HERRING IN THE HUANGHAI SEA BY COHORT ANA+. ACTA OCEANOL. S'NICA. 6(1):132-141. CHINA OCEAN PRESS, BEIJING. EN.

In this paper Cohort Analysis (VPA) with the data on catch in number by age and year is used to estimate independently fishing mortality, abundance and actual number of spawning stock of the Pacific herring in the Huanghai Sea. The results show that catch rate of the fishery is very high, and that the fishing mortality of the dominant age group aged 2-4 was 0.37-2.97 during the years 1971-1984. The size of year class has been decreased since 1982 although the variability for this species in the Huanghai Sea is frequent. This results in reducing the recruitment of the fishery, the abundance and the actual number of spawning stock. Therefore, an urgent management measure should be considered. The magnitude of several sources of errors in Cohort Analysis (VPA) are examined, and the pre+.

87BI0545. KYU-DAE.CHO, ET AL. 1987(7). RELATIONSHIP BETWEEN THE CATCHES OF TUNA AND OCEANOGRAPHIC CONDITIONS IN THE SOUTH-EAST PACIFIC. BULL. KOREAN FISH. SOC. 29(4):360-369. KOREAN FISH. SOC., PUSAN. KO.

The relationship between the catches of tuna and hydrographic conditions in South-East Pacific region (latitude 5 N-12 S, longitude 145 W-115 W) was investigated by using the catch data of tuna and digital Bathythermograph (DBT) data from December 9, 1980 to April 2, 1981. The results are as follows: The study area were located in South Eguatorial Current regions including equatorial upwelling regions in 5 N to 12 S. The horizontal mean temperature at the depth of 10 m on the first quarter months in the study area was about 25 Deg. in Centigrade and the salinity of those fishing areas ranged from 34.8 to 35.0 per mille. Yellowfin funa and bigeye tuna were mainly caught in SW vertical temperature profile type, which the depth of thermocline ranged from 100 m to 300 m, and temperature di+.

87BI0546. JAE-HYEUNG.PYEUN, EUNG-HO.LEE. 1968(12). MICROSCOPIC OBSERVATIONS OF FAT TRANSLOCATION IN THE TISSUE OF YELLOW CORVENIA DURING SALTING AND +. BULL. KOREAN FISH. SOC. 1(2):63-71. KOREAN FISH. SOC., PUSAN. KO.

Salted and dried yellow corvenia (Pseudosciaena manchurica), so called "Gul-bi", is one of nation-widely consuming fish foods. It is suitable for a long term

preservation and its produce is also a great deal on sea food processing in this country. The texture of "Gul-bi", however, have often appeared to be a delicate factor for the quality of the product. The loss or dislocation of fat in the tissue of the fish resulted by salting and drying is believed to profoundly relate to the texture of product. In this paper, the tissue of yellow corvenia and movement of fat were microscopically observed before salting, immediately after salting, and after drying and the results observed in the tissues dry salted, brine salted, and brine salted with the addition of BHA were compared.

87BI0547. DONG-KUN.PARK, SANG-KWAN.LEE, JAE-BYUNG.LEE. 1968(12). A STUDY ON THE RAW MATERIAL OF FISH PASTE USING SHARK MEATS. BULL. KOREAN FISH. SOC. 1(2):87-96. KOREAN FISH. SOC., PUSAN. KO.

As the raw material of fish paste, the experiment on shark meats was conducted from July to December 1967 at the Fisheries Research and Development Agency, Pusan, Korea.

87BI0548. CHANG-YANG.KIM, HYUN-KI.LEE. 1968(12). THE MICROBIOLOGICAL ASSAY OF TRYPTOPHAN IN RED PORGY, PAGROSOMUS MAJOR. BULL. KOREAN FISH. SOC. 1(2):81-86. KOREAN FISH. SOC., PUSAN. KO.

A porgy was divided into eight parts. After drying at low temperature and pulberizing it, the sample was hydrolyzed by barium hydroxide at 120 Deg. in Centigrade, under the pressure of 1 kg/square centimeter for 8 hours. Tryptophan was determined by means of microbiological assay, using Lactobacillus arabinosus 17-5.

87BI0549. SUNG-KYOO.YOO. 1969(12). THE FOOD AND GROWTH OF THE LARVAE OF THE ARK SHELL ANADARA BROUGHTONI SCHRENCK. BULL. KOREAN FISH. SOC. 2(2):147-154. KOREAN FISH. SOC., PUSAN. KO.

The larvae of the ark shell Anadara broughtoni (Schrenck) were grown at room temperature (approximately 20.4 Deg. in Centigrade), and fed laboratory-cultured Cyclotella nana. The egg of the ark shell produced in the laboratory measured about 54.9 u in diameter. The embryos gradually developed into larvae up to 110.8 u shell length, 83.9 u shell height and with shell breadth of 58.2 u even in the absence of the algal food. Beyond this size, however, the growth of the larvae was considerably retarded. The larvae showed better growth rate when they were fed the algal food two days after spawning, i.e., early straight-hinge stage.

87BI0550. KANG-HO.LEE. 1969(12). PIGMENT STABILITY OF LAVERS PORPHYRA TENERA KJELLMAN DURING PROCESSING AND STORAGE. BULL. KOREAN FISH. SOC. 2(2):105-133. KOREAN FISH. SOC., PUSAN. EN.

The stability of three major pigments in lavers, namely chlorophylls, carotenoids, and phycobilins, during processing and storage was studied. The results of the pigment retention in fresh lavers during storage at low temperatures, of heat stability during heat treatment, and of the pigment loss during storage are summarized.

87BI0551. SEH-KYU.CHUN, SEONG-JUN.KIM, DONG-SUCK.CHANG. 1969(12). THE SHELLFISH POISON IN TAPES PHILIPPINARUM LISCHKE. BULL. KOREAN FISH. SOC. 2(2):139-146. KOREAN FISH. SOC., PUSAN. KO.

Incidents of poisoning caused by edible marine bivalve, Tapes philippinarum in Kojedo, Korea were reported in March 1968 and 1969. The results of the present investigation revealed that the incidents were caused by hemorrhagic diathesis and liver injuries, as those caused by acute yellow atrophic liver.

87BI0552. JONG-RAK.CHUNG, A.M.DOLLAR. 1969(12). POSTMORTEM CHANGES OF STERILE FISH MUSCLE INOCULATED WITH A PROTEOLYTIC PSEUDOMONAS SP. BULL. KOREAN FISH. SOC. 2(2):93-104. KOREAN FISH. SOC., PUSAN. EN.

87BI0553. JONG-RAK.CHUNG. 1969(6). STORAGE CHARACTERISTICS OF IRRADIATED PACIFIC OYSTERS, CRASSOSTREA GIGAS. BULL. KOREAN FISH. SOC. 2(1):41-46. KOREAN FISH. SOC., PUSAN. EN.

87BI0554. YEUNG-HO.PARK. 1969(6). SEASONAL VARIATION OF TOTAL NITROGEN CONTENT IN THE SEAWEED, GELIDIUM AMANSII LAMOUROUX. BULL. KOREAN FISH. SOC. 2(1):83-86. KOREAN FISH. SOC., PUSAN. KO.

The present investigations were made with the purpose of elucidating the seasonal variation in total nitrogen content of Gelidium amansii. Monthly samples were collected from the sea near Pusan, from August 1957 to June 1959. The results obtained have been summarized as follows: The maximum total nitrogen content of Gelidium amansii was observed during the months of January and February, and the minimum content was observed in June and July. Thus the total nitrogen content of Gelidium amansii exhibited a considerable periodic change throughout the year. The recommended harvest time of Gelidium amansii with regard to total nitrogen content, is from May to October, but on the other hand the proper harvest time is from May to June, with respect to the season of spore-formation and its p+.

87BI0555. BONG-SUK.HA. 1970(12). ENZYME ACTIVITY AND ACIDITY IN VINEGAR PICKLING OF ANCHOVY. BULL. KOREAN FISH. SOC. 3(4):207-212. KOREAN FISH. SOC., PUSAN. KO.

The following results are obtained by experiment on the variation of enzyme activity during pickling anchovy (Engraulis japonicus) in vinegar. 1. Protease activity increased during brine-salting. It decreased for a short time by the addition of acetic acid and gradually changed at an invariable ratio during pickling. 2. Lipase activity decreased during brine salting but increased temporarily by the addition of vinegar, after this no fixed tendency could be observed during pickling

whereas acid value abviously increased. 3. VBN (Volatile basic nitrogen) and NaCl content quickly increased during brine salting. During pickling VBN increased slowly while NaCl content scarcely varied.

87BI0556. EUNG-HO.LEE, JAE-HYEUNG.PYEUN, JONG-WHA.HUR. 1970(3). STUDIES ON THE SHELLFISH PROCESSING, 1. PURIFICATION OF THE SURF CLAM MACTRA SULCATARIA REEVE FOR +. BULL. KOREAN FISH. SOC. 3(1):27-32. KOREAN FISH. SOC., PUSAN. KO.

A study on the purification of the surf clam Mactra Sulcataria REEVE for the remove of sand and fecal piles was conducted in the laboratory. The sand was mostly distributed around the inhalent and exhalent siphon, mantle and gill, and were also distributed in the digestive tract including the mid-gut gland. The sand particles in the digestive tract were extremely small and their sizes were about 180 x 10 u to 550 x 200 u. It could be seen that there was little, if any, difference in the rate of sand removal when either the hanging purification method was used or the method of laying the surf clams in thick or thin layers on the bottom of the experimental vessel was used.

87BI0557. WOO-HYUN.CHOI. 1970(3). STUDIES ON THE VARIATION IN CHEMICAL CONSTITUENTS OF THE SEA MUSSEL, MYTILUS EDULIS. BULL. KOREAN FISH. SOC. 3(1):38-44. KOREAN FISH. SOC., PUSAN. KO.

This paper deals with the proximate composition of the cultured sea mussel (Mytilus edulis) which are distributed along the whole coastline of Korea, particularly abundant in the southern coast. Studies on seasonal variation in chemical constituents of the mussel at Northern Bay of Choongmu were carried out from March to December 1968.

87BI0558. EUNG-HO.LEE, JONG-WHA.HUR. 1970(3). STUDIES ON THE SHELLFISH PROCESSING, 2. EFFECT OF DEHYDRATION METHOD, EDTA OR BHA TREATMENT ON THE+. BULL. KOREAN FISH. SOC. 3(1):33-37. KOREAN FISH. SOC., PUSAN. KO.

The effect of the dehydration method and EDTA or BHA treatment upon the pigment degradation and water re-absorption of the dehydrated meat of the surf clam Mactra sulcataria REEVE was studied. Sun drying produced a greater decrease in pigment content as compared to that produced by hot-air dehydration. The hot-air dehydrated product which was treated with BHA showed little pigment loss in comparison with the pigment of the fresh surf clam meat. The BHA treatment upon the dehydrated surf clam products had an outstanding effect on the pigment retention and the EDTA treated one had a weak effect on it. The hot-air dehydrated products more rapidly re-absorbed water than the sun dried one. It could be seen that there was litlle difference among the rate of rehydration of the BHA or EDTA tr+.

87BI0559. SANG-AE.KIM, KANG-HO.LEE, DONG-KUN.PARK. 1970(6). PIGMENT STABILIZATION OF FRESH UNDARIA PINNATIFIDA WHEN TREATED WITH ASHES. BULL. KOREAN FISH. SOC. 3(2):120-128. KOREAN FISH. SOC., PUSAN. KO.

In this study, changes in chlorophyll and carotenoid pigment in fresh and ash treated Undaria pinnatifida were determined by column chromatography. And pigment stabilizing effects of ashes were discussed.

87BI0560. JONG-WHA.HUR, EUNG-HO.LEE. 1971(4). STUDIES ON THE SHELLFISH PROCESSING, 6. EFFECT OF ANTIOXIDANTS OR EDTA TREATMENT ON THE QUALITY OF+. BULL. KOREAN FISH. SOC. 4(1):22-30. KOREAN FISH. SOC., PUSAN. KO.

Sea mussel Mytilus edulis, world-widely distributed, is a sort of popular food in Korea. The demands of high quality and mass production are not being satisfied since it is usually sun dried. A rapid dehydration and the treatment of food additives to improve the quality of the product seems to be required. In this paper, the effect of antioxidants and EDTA treatment was studied when sea mussel was pressed and hot-air dehydrated for 10 hours at 45 to 52 Deg. in Centigrade under the air flow rate of 3 meter per second.

87BI0561. EUNG-HO.LEE, YEUNG-HO.PARK. 1971(4). DEGRADATION OF ACID SOLUBLE NUCLEOTIDES AND THEIR RELATED COMPOUNDS IN SEA FOODS DURING PROCESSING+. BULL. KOREAN FISH. SOC. 4(1):31-41. KOREAN FISH. SOC., PUSAN. KO.

The present study was directed to define the degradation pattern of the nucleotides and their related compounds in the muscle of anchovy during drying. Three kinds of samples, fresh, sun dried and boiled-and-dried anchovy, were prepared and the contents of nucleotides and related compounds of samples were determined by ion exchange chromatography.

87BI0562. EUNG-HO.LEE, ET AL. 1971(4). STUDIES ON THE SHELLFISH PROCESSING, 5. EFFECT OF EDTA AND BHA IN COLOR PRESERVATION OF CANNED SUR+. BULL. KOREAN FISH. SOC. V,4(1):17-21. KOREAN FISH. SOC., PUSAN. KO.

The effect of EDTA or BHA pretreatment upon the color preservation of canned surf clam meat during canning and storage was studied. The EDTA treatment of surf clam meat appeared effective on color preservation during processing. After three month storage, the samples showed little color change comparing with those right after processing. After one year storage, EDTA or BHA treated samples showed better color preservation as compared with control.

87BI0563. JAE-HYEUNG.PYEUN. 1972(3). PARAMYOSIN OF THE ABALONE, NOTOHALIOTIS DISCUS. BULL. KOREAN FISH. SOC. 5(1):29-38. KOREAN FISH. SOC., PUSAN. KO.

The protein composition of abalone muscle was estimated with the following result: on a series of samples analyzed, water-soluble protein, 19-22%; salt-soluble protein, 27-39%; alkali-soluble protein, 20-26%; and stroma 20-28%; respectively. It was demonstrated by ultracentrifugal analysis that

approximately 65% of the salt-soluble protein is accounted for by paramyosin, 30% by actomyosin, and 5% by myosin, respectively.

87BI0564. CHANG-YANG.KIM. 1972(9). STUDIES ON THE CONTENTS OF MERCURY, CADMIUM, LEAD, AND COPPER IN EDIBLE SEAWEEDS IN KOREA. BULL. KOREAN FISH. SOC. 5(3):88-96. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with the contents of heavy metals such as mercury, cadmium, lead and copper in 17 species of edible seaweeds collected from Jumunjin, Pohang, Pusan, Chungmu, Yeosu and Wando areas.

87BI0565. BYUNG-SOON.KIM, EUNG-HO.LEE. 1972(9). PROCESSING OF STEAMED FISH CAKE FROM CARP MEAT. BULL. KOREAN FISH. SOC. 5(3):97-103. KOREAN FISH. SOC., PUSAN. KO.

In this paper, the effects of some additives to the quality of fish cake such as salt, polyphosphate, and starch were tested. Besides, that of washing and alterative heating procedure were also discussed. From the result of quality test by measuring jelly strength and sensory evaluation the product was quite palatable to common, and the addition of salt and starch as 3 and 5 to 15 percent respectively, resulted in the best jelly strength of the product, it was markedly enforced when a small amount of polyphosphate (0.3 %) was added.

87BI0566. DAE-JIN.SONG. 1973(12). STUDIES ON FREEZING OF ABALONE, (1) EFFECTS OF FREEZING RATE ON THE QUALITY OF FROZEN ABALONE. BULL. KOREAN FISH. SOC. 6(3/4):101-111. KOREAN FISH. SOC., PUSAN. KO.

To study the effect of freezing rate on the quality of frozen abalone (Haliotis gigantea, GMELIN) liquid nitrogen spray freezing, air blast freezing, semi-air blast freezing, and still air freezing were carried out. The rheological change, protein denaturation, and free water content of frozen and thawed abalone were examined at the period of 0, 1, 2, and 3 month during cold storage at -20 Deg. in Centigrade.

87BI0567. DONG-SUCK.CHANG, WI-KYUNG.CHOE. 1973(12). BACTERIOLOGICAL STUDIES ON MARKET SEA FOODS, 2. SANITARY INDICATIVE BACTERIA IN SLICES OF RAW FISH. BULL. KOREAN FISH. SOC. 6(3/4):92-96. KOREAN FISH. SOC., PUSAN. KO.

This examination was carried out to evaluate the sanitary quality of slices of raw fish being served in the restaurants. Twenty five kinds of slices of raw fish collected from various restaurants in Busan Korea were examined during the period from March to May in 1971. As the evaluation factors of sanitary quality, the contents of sanitary indicative bacteria such as coliform group, fecal coliform, fecal streptococci and anterococci and plate counts were determined.

87BI0568. HO-YEON.CHOI, MU-NAM.KIM, KANG-HO.LEE. 1973(12). NON-ENZYMATIC BROWNING REACTIONS IN DRIED SQUID STORED AT DIFFERENT WATER ACTIVITIES. BULL. KOREAN FISH. SOC. 6(3/4):97-100. KOREAN FISH. SOC., PUSAN. KO.

In the previous work (Kim et al, 1973), the quality of sun-dried Alaska pollack, Theragra chalchogramma, was discussed in the aspect of non-enzymatic discoloration as a function of relative humidity during storage at room temperature (20 Deg. in Centigrade). In this paper, sun-dried squid, Ommastrephes sloani pacificus was investigated at the same aspect mentioned above. Fresh squid from the whole sale market was dressed, filleted, dried for 48 hours in the open air and finally stored in the humidistat chamber. Lipid oxidation and development of non-enzymatic browning were tested by the same methods described in the previous paper.

87BI0569. DONG-SUCK.CHANG, WI-KYUNG.CHOE. 1973(12). BACTERIOLOGICAL STUDIES ON MARKET SEA FOODS, 1. SANITARY INDICATIVE BACTERIA IN SUNDRIED SEA FOODS. BULL. KOREAN FISH. SOC. 6(3/4):87-91. KOREAN FISH. SOC., PUSAN. KO.

This study was conducted to evaluate the sanitary quality of sun dried sea foods being distributed in the markets located in Busan city. Twenty one kinds of sun dried sea foods, 9 kinds of fish and shellfish, 5 kinds of mollusca and 7 kinds of seaweed were examined during the period from September to December in 1970. For the evaluation of sanitary contents of sanitary indicative bacteria such as coliform group, fecal coliform, fecal streptococci and enterococci, and plate counts were determined.

87BI0570. KANG-HO.LEE, HO-YEON.CHOI. 1973(6). WATER ACTIVITY AND PIGMENT DEGRADATION IN DRIED LAVERS STORED AT ROOM TEMPERATURE. BULL. KOREAN FISH. SOC. 6(1/2):27-36. KOREAN FISH. SOC., PUSAN. KO.

The effect of water activity on degradation of pigments in dried lavers, Porphyra tenera Kjellm was examined when stored at room temperature for fifty days. Chlorophyll pigment was extracted with methanol-petroleum ether mixture solvent (2:1 v/v), partitioned in ether, and analysed spectrophotometrically at 662 nm as chlorophyll a. The degradation products of chlorophyll were isolated on sugar-starch column (85:15 w/w) with n-propanol-petroleum ether solution (1:200 v/v) as a developing solvent. The rate of pigment loss in heat treated samples at 60 and 100 Deg. in Centigrade for 2 hours prior to storage somewhat decreased, particularly at higher moisture levels although the final pigment retention was not much stabilized.

87BI0571. SEONG-BIN.HAN, JONG-HO.LEE, KANG-HO.LEE. 1973(6). NON-ENZYMATIC BROWNING REACTIONS IN DRIED ANCHOVY WHEN STORED AT DIFFERENT WATER ACTIVITIES. BULL. KOREAN FISH. SOC. 6(1/2):37-43. KOREAN FISH. SOC., PUSAN. KO.

In this paper, non-enzymatic browning reactions as a factor of self stability of boiled and dried anchovy were studied to discuss the effect of water activity to the discoloring reaction and the preservative moisture content. The development of rancidity of the fish meat

was also mentioned since the fish is fatty and the lipid oxidation is a functional deteriorative reaction.

87BI0572. JONG-RAK.CHUNG. 1974(12). MICROBIOLOGICAL AND CHEMICAL CHANGES IN THE PACIFIC OYSTERS, CRASSOSTREA GIGAS EXPOSED TO GAMMA RA+. BULL. KOREAN FISH. SOC. 7(4):221-228. KOREAN FISH. SOC., PUSAN. EN.

87BI0573. HOON-I.KANG, JEUNG-KEUN.KIM, SOO-HYEUN.KIM, JAE-HYEUNG.PYEUN. 1974(3). EVALUATION IN THE UTILITY OF THE BY-PRODUCTS OF OYSTER PROCESSING (I) SEASONAL VARIATION IN CHEMIC+. BULL. KOREAN FISH. SOC. 7(1):37-40. KOREAN FISH. SOC., PUSAN. KO.

The chemical constituents of the cooked-released fluid of oyster, Crassostrea gigas which was collected in the harvesting season (Sept., 1973 to Apr., 1974), were analyzed periodically to evaluate the potential utility in the view point of food and nutrition.

87BI0574. JONG-HO.LEE, SUNG-BIN.HAN, KANG-HO.LEE. 1974(6). THE RELATION BETWEEN QUALITY AND CONTENT OF ZINC AND MAGNESIUM IN DRIED LAVER, PORPHYRA TENERA KJE+. BULL. KOREAN FISH. SOC. 7(2):63-68. KOREAN FISH. SOC., PUSAN. KO.

The growth of sea weeds is greatly affected by the environmental conditions of ambient water. Especially nutrient salts in sea water function as a major factor to the growth of lavers, so that the content of inorganic substances in lavers could be a criterion for quality evaluation of lavers. In this experiment, the relation between the quality and the content of Zinc and Magnesium which are not only physiologically active and closely related with pigments such as chlorophyll and phycobilins but also important in quantity is discussed if such a measurement to be an index for quality evaluation.

87BI0575. JONG-GAP.LEE, WI-KYUNG.CHOE. 1974(9). STUDIES ON THE VARIATION OF MICROFLORA DURING THE FERMENTATION OF ANCHOVY, ENGRAULIS JAPONICA. BULL. KOREAN FISH. SOC. 7(3):105-114. KOREAN FISH. SOC., PUSAN. KO.

Identification and change of microflora during the fermentation of anchovy Engraulis japonica, under the halophilic circumstance were investigated. The change of salinity and pH in meat and juice which decide the environment for microorganism and decomposition of nitrogenous compound which functions as a nutrient source were also discussed by measuring the content of total-N, amino-N, nonprotein-N, TMA and VBN.

87BI0576. BYEONG-HO.RYU, JONG-CHUL.LEE, EUNG-HO.LEE. 1974(9). CHANGES OF DIMETHYLAMINE (DMA) CONTENT IN FISH MUSCLE DURING HEAT PROCESSING. BULL. KOREAN FISH. SOC. 7(3):115-120. KOREAN FISH. SOC., PUSAN. KO.

Secondary amines are known as one of the precursors of nitrosamines which are potent carcinogenic compounds of man and animals. Nitrosamines are formed when both secondary amines and nitrite are present. The nitrites are occurred naturally in vegetables, fruits and many others, and frequently used in fish product as a color fixative or a preservative. In this paper, to know the formation of nitrosamines in fish meat, the changes of dimethylamine (DMA) content during the heat treatment such as drying, roasting and fish cake processing are discussed.

87BI0577. YEUNG-HO.PARK, HWA-SOOL.PARK, EUNG-HO.LEE. 1974(9). DEGRADATION OF NUCLEOTIDES IN THE MUSCLE OF SEA MUSSEL DURING DRYING. BULL. KOREAN FISH. SOC. 7(3):163-168. KOREAN FISH. SOC., PUSAN. KO.

The present paper deals with the degradation of nucleotides in the muscle of sea mussel, Mytilus edulis, during drying. Three kinds of samples, raw, hot-air dried, and steamed-and-hot air dried were prepared and the contents of nucleotides were determined by ion exchange chromatography on columns of Dowex 1, X8.

87BI0578. BYEONG-HO.LEE, JONG-GAP.LEE, HO-YEON.CHOE. 1975(12). QUALITY CHANGES IN SHUCKED SEA MUSSEL MYTILUS EDULIS. BULL. KOREAN FISH. SOC. 8(4):208-212. KOREAN FISH. SOC., PUSAN. KO.

The study was conducted to determine the optimum conditions for keeping quality of shucked sea mussel, Mytilus edulis, during marketing under commercial handling. As quality factors, water holding capacity, pH, VBN and TMA content were measured. Water holding capacity was obviously affected by salt content of the sea mussel meat. Water was released at the salinity above 2.8% and absorbed below the value. In case of distilled water added instead salt solution, 23.3% weight was gained. Absorbing or releasing water of sea mussel meat was also influenced by temperature showing either water gain or loss was greater at 5 Deg. in Centigrade than 25 Deg. in Centigrade. Osmotic equilibrium by salt between meat and liquor was held within 4 hours.

87BI0579. PYL-HEYN.SIN, JONG-WHA.HUR, BONG-SEOG.HA. 1975(12). INHIBITION OF OXIDATION IN DRIED YELLOW SEA BREAM BRANCHIOSTEGUS JAPONICUS JAPONICUS (HOUTTUYN). BULL. KOREAN FISH. SOC. 8(4):213-216. KOREAN FISH. SOC., PUSAN. KO.

Yellow sea bream contains comparatively larger amount of fat among white muscle fishes, so that rancidity might easily occur during drying and storage. For the purpose of the protection of rancidity, the effect of some antioxidants was studied when yellow sea bream was sun-dried after dipping in the solutions and packed in PVC film (0.3 mm x 12 cm x 30 cm) for storage at room temperature. The inhibitory effect of additives was in order of Tenox-II, BHA, sustane and NDGA, while EDTA, potassium sorbate, CTC and alpha-naphthylamine were ineffective. The results suggest that the treatment of 0.1% Tenox-II solution and packing in PVC film is better condition to improve the quality of product and during drying and storage.

87BI0580. CHEOL-WOO.AHN, YUN-HI.HWANG. 1975(12). STUDIES ON SANITARY QUALITY OF JARHI-DOM CHROMIS NOTATUS. BULL. KOREAN FISH. SOC. 8(4):217-221. KOREAN FISH. SOC., PUSAN. KO.

This study was carried out to evaluate the sanitary quality of Jarhi-dom, Chromis notatus, and its products, during the period from May to October, 1975. And bacterial density of the sea water in the estuary of Sogwipo was compared. The number of general bacteria and coliform group in the sea water appeared lower than that of other areas. Both jarhimuchim-hoe and Jarhimul-hoe showed higher bacterial densities than the fresh fish when caught and sold in the market although Jarhimuchim-hoe showed slightly higher density than Jarhimul-hoe.

87BI0581. EUNG-HO.LEE, JAE-HYEUNG.PYEUN, SOO-HYEUN.KIM, SEUNG-YONG.CHUNG. 1975(3). SUITABILITY OF SHELLFISHES FOR PROCESSING, 1. SUITABILITY OF BABY CLAM FOR PROCESSING. BULL. KOREAN FISH. SOC. 8(1):20-30. KOREAN FISH. SOC., PUSAN. KO.

It is matter of fact that processing technology must affects the quality and yield of final product, and these also depend on the selection of raw material directly or indirectly. So that the estimation of the preprocessing condition of shellfish is of great importance for distributors and processors. This study was attempted to establish the basic data for evaluating the processing suitability of baby clam, which is one of the five important shellfishes for domestic use and export.

87BI0582. YEUNG-JOO.KANG, YEUNG-HO.PARK. 1975(3). EFFECTS OF CONDENSED PHOSPHATES ON THE DENATURATION OF ALASKA POLLACK MUSCLE DURING REFREEZING AND+. BULL. KOREAN FISH. SOC. 8(1):37-45. KOREAN FISH. SOC., PUSAN. KO.

The present study was conducted to evaluate the effects of condensed phosphates on the refreezing damage of Alaska pollack muscle. The fillets were dipped in such solution as 5 and 10% sodium polyphosphate, 1 and 5% mixture of sodium polyphosphate & sodium pyrophosphate (1:1, w/w) for 1 and 5 minutes, respectively, before refreezing. And fillets were frozen at 27 Deg. in Centigrade - 28 Deg. in Centigrade and stored for 15 days at from -18 Deg. in Centigrade to -20 Deg. in Centigrade. The degree of denaturation was estimated by determining amounts of drip released, content of total solids, nitrogen, and DNA in the drip and cooking-weight-loss. Phosphorus absorbed in the muscle was also determined. Treatment, at higher the concentration and longer the dipping time, resulted in the lo+.

87BI0583. BONG-SEUK.HA. 1975(3). COLOR FIXING EFFECT OF TANNIC ACID IN LAVER. BULL. KOREAN FISH. SOC. V,8(1):31-36. KOREAN FISH. SOC., PUSAN. KO.

A combination of two specifically different pigments, phycoerythrine & chlorophyll, gives the laver shining black color. This shining black color is the dominant factor in deciding the quality of the dried product of laver (dried laver). Therefore, this experiment was carried out to know the effect of tannic acid as a pigment fixing agent. Raw laver, Porphyra spp., was treated with tannic acid solutions to prevent dissolution of biliproteins especially phycoerythrine in to the fresh water. This danger is mostly revealed when the chopped and shredded lavers are suspended in fresh water before the laver sheets are finally made. The influence of mechanical damage with different diameters of chopper plate on dissolution of the pigment was also mentioned.

87BI0584. WI-KYUNG.CHOE, ET AL. 1975(6). FACTORS INVOLVED IN THAWING OF FROZEN ALASKA POLLACK AND REFREEZING OF THE FILLET. BULL. KOREAN FISH. SOC. 8(2):107-117. KOREAN FISH. SOC., PUSAN. KO.

Alaska pollack caught in the Northern Pacific Ocean and frozen aboard vessel are shipped to the plant and processed into frozen fillets. In the present paper quality changes during thawing, refreezing and storage at -20 Deg. in Centigrade are discussed. Natural, running-water, vacuum and steam thawing were employed as thawing methods. And contact plate, air blast, immersion in dry ice-alcohol solution freezing and storage at -5 Deg. in Centigrade were applied to refreeze the thawed fillets. As quality factors content of drip released, salt-extractable protein, VBN, DNA in the drip and pH were determined. In addition, bacteriological tests were also carried out along with the whole process.

87BI0585. JEUNG-KEUN.KIM. 1975(6). EVALUATION IN THE UTILITY OF THE BY-PRODUCTS OF OYSTER PROCESSING (II) COOKING CONDITION FOR SHELL+. BULL. KOREAN FISH. SOC. 8(2):101-106. KOREAN FISH. SOC., PUSAN. KO.

Following the previous report (Kang et al, 1974), the conditions of cooking for shelling process of oyster were discussed, and the content of nitrogenous compounds in the cooked-released fluid of oyster by different cooking conditions has been investigated. The heating condition of 110 Deg. in Centigrade and 15 minutes was adequate for effective shelling and the condition of meat content in cooking of oyster. The contents of total nitrogen, protein nitrogen, nonprotein nitrogen and amino-nitrogen were seemed to be increased with heating time, and the tendency was to be more exact in the cooking condition of 110 Deg. in Centigrade.

87BI0586. EUNG-HO.LEE, ET AL. 1975(6). SUITABILITY OF SHELLFISHES FOR PROCESSING, 3. SUITABILITY OF PACIFIC OYSTER FOR PROCESSING. BULL. KOREAN FISH. SOC. 8(2):90-100. KOREAN FISH. SOC., PUSAN. KO.

The estimation of the pre-processing condition of oyster is of great importance for distributors and processors. This study was attempted to establish the basic data for evaluating the processing suitability of oyster, which is the most important shellfish for domestic use and export. The data were analysed by measuring the condition index, chemical composition

and heavy metal content of oysters. In order to eliminate the manual work that has to be done on a tightly closed oyster shell and avoid shrinkage in the oyster meat which is attendant on the steaming process, chemical means to open oyster were examined. Finding the method of pretreatment of polyphosphate for frozen oysters were attempted to improve the product quality.

87BI0587. DONG-SUCK.CHANG, WI-KYUNG.CHOE, KWON-OK.CHO. 1975(9). BACTERIOLOGICAL STUDIES ON MARKET SEA FOODS, 3. SANITARY INDICATIVE BACTERIA IN FROZEN SEA FOODS. BULL. KOREAN FISH. SOC. 8(3):157-165. KOREAN FISH. SOC., PUSAN. KO.

This experiment was carried out to evaluate the sanitary quality of commercially frozen sea foods. One hundred and sixteen samples in six different items from several refrigeration plant in Busan city were examined from March to December in 1974. In addition, the changes in bacterial density through the process from thawing, round or semifilleted frozea Alaska pollack to the finishing as frozen fillet blocks were observed.

87BI0588. SUN-NAM.CHOE. 1975(9). HISTOCHEMICAL OBSERVATION OF CANNED FISH BALL COLLECTED FROM THE LOCAL MARKET OF KOREA. BULL. KOREAN FISH. SOC. 8(3):166-170. KOREAN FISH. SOC., PUSAN. KO.

Six kinds of canned processed fish-balls were collected from the local market of Korea in April, 1975 and frozen section was prepared with the fish-balls at -25 Deg. in Centigrade, coincidently stained with PAS, sudan III, carbol-thionine & light green for histochemical observation on evaluation of materials and quality of the porducts. The results based on morphological analysis were summarized as follows. Protein contents were showed the lowest level, ranging about 2.7-9.0%, while carbohydrate was contained from 58.1% to 75.2% of the highest degree.

87BI0589. SEUNG-YONG.CHUNG, ET AL. 1975(9). DEGRADATION OF NUCLEOTIDES AND THEIR RELATED COMPOUNDS IN GAE-BUL, URECHIS UNICINCTUS, DURING SUN +. BULL. KOREAN FISH. SOC. 8(3):171-176. KOREAN FISH. SOC., PUSAN. KO.

Gae-bul, Urechis unicinctus, fresh or sun-dried has been esteemed as one of the most tasty sea foods in Korea. In this paper, the degradation of nucleotides and their related compounds in Gae-bul during sun drying was studied. The nucleotides and their related compounds were extracted with cold perchloric acid and their amounts were determined by anion exchange column chromatography.

87BI0590. EUNG-HO.LEE, ET AL. 1975(9). FREE AMINO ACID CONTENT IN THE EXRACT OF MIDEUDUCK, STYELA CLAVA. BULL. KOREAN FISH. SOC. 8(3):177-180. KOREAN FISH. SOC., PUSAN. KO.

"Mideuduck", Styela clava, has been esteemed as one of the most tasty sea foods in the south coast of Korea. The free amino acids in Mideuduck were analysed by amino acid auto-analyser. In Mideuduck extract, taurine, proline, glutamic acid, glycine, alanine and serine were abundant, holding 32.8%, 17.6%, 11.9%, 11.2%, 8.9%, 7.1% respectively of total amino acid content and followed by threonine, lysine, methionine in order. While valine, leucine, phenylalanine, isoleucine and histidine were poor and aspartic acid, arginine and tyrosine were trace in content.

87BI0591. DAE-JIN.SONG, PYL-HYUN.SHIN, JONG-WHA.HUR. 1976(12). HISTOLOGICAL STUDY ON THE INHIBITION OF OXIDATION IN DRIED YELLOW SEA BREAM, BRANCHIOSTAGUS JAPONI+. BULL. KOREAN FISH. SOC. 9(4):239-244. KOREAN FISH. SOC., PUSAN. KO.

The present study was conducted to evaluate inhibition effect of oxidation and discoloration in yellow sea bream, treated with some antioxidants, dried and stored for one month. The effect was observed microscopically from the aspects of distribution and movement of fat, and changes of muscular system. On the initial stage of drying, a part of hypodermic fat was penetrated into intermuscular tissue passing through connective tissue and myocommata, but the rest part was exuded to the out side of surface. The tissues from which the hypodermic fat was removed seemed to be hardened with the gathering of adjacent muscle fibers.

87BI0592. JAE-HYEUNG.PYEUN, BO-YOUNG.JEONG, KUM-SHO.HWANG. 1976(12). FORMATION OF DIMETHYLAMINE IN THE COURSE OF ANCHOVY FERMENTATION WITH SALT. BULL. KOREAN FISH. SOC. 9(4):223-231. KOREAN FISH. SOC., PUSAN. KO.

Dimethylamine (DMA) is known as an origin compound of dimethylnitrosamine which is responsible for carcinogenesis. It has been also reported that relatively large amount of DMA is distributed in fish muscle, particularly in salted and fermented fish. In this experiment, the degradation products of protein and trimethylaminoxide by the temperature conditions of 17 Deg. in Centigrade and 27 Deg. in Centigrade in the course of anchovy fermentation with 22% of salt were analysed, and the formation of DMA was discussed.

87BI0593. SUNG-KOO.KANG, WOO-JUN.KIM, TAE-JUNG.KANG. 1976(3). STUDY ON PROCESSING AND UTILIZATION OF CULTURED UNDARIA PINNATIFIDA, 1. EFFECT OF HEAT TREATMENT O+. BULL. KOREAN FISH. SOC. 9(1):19-24. KOREAN FISH. SOC., PUSAN. KO.

To examine the storage effect of the dry cured cultured undaria pinnatifida, its components were researched according to different places and periods of production and in heat treatment of it, how the different time, temperature and salt concentration can effect on its storage was researched.

87BI0594. SEUNG-YONG.CHUNG, EUNG-HO.LEE. 1976(6). THE TASTE COMPOUNDS OF FERMENTED ACETES CHINENSIS. BULL. KOREAN FISH. SOC. 9(2):79-110. KOREAN FISH. SOC., PUSAN. KO.

In Korea fermented fish and shellfish have traditionally been favored and consumed as seasonings

or further processed for fish sauce. Three major items in production quantity among more than thirty kinds which are presently available in the market are fermented anchovy, oyster and small shrimp. They are usually used as a seasoning mixture of Kimchi in order to provide a distinctive flavor. Fermented small shrimp, Acetes chinensis is most widely and largely used and occupies an important position in food industry of this country. But no study on its taste compounds has been reported. This study was attempted to establish the basic data for evaluating taste compounds of fermented small shrimp.

87BI0595. JONG-RAK.CHUNG, SU-ILL.KIM, MIN-CHUL.LEE. 1976(6). IRRADIATION PRESERVATION OF KOREAN FISH, I. RADURIZATION OF CROAKER, YELLOW CORVENIA AND ROUNDNOSE+. BULL. KOREAN FISH. SOC. 9(2):129-142. KOREAN FISH. SOC., PUSAN. EN.

87BI0596. KANG-HO.LEE, WI-KYUNG.CHOE, JAE-HYEUNG.PYEUN, MU-NAM.KIM. 1976(6). DISCOLORATION OF CANNED BOILED OYSTER. BULL. KOREAN FISH. SOC. 9(2):111-119. KOREAN FISH. SOC., PUSAN. KO.

Discoloration of canned boiled oyster namely greening, yellowing and browning often occur separately or associatively in the storage of the product. Greening is mainly caused by the appearance of chlorophyll and its derivatives on the surface around the digestive diverticula of the oyster and yellowing by dispersion of carotenoid. Browning reactions by sugar amino condensation or enzymatic action, tyrosinase, also cause an undesirable color development. In this paper, the stability and the changes in distributional or partitional ratio of chlorophyll and carotenoid pigment of meat vs viscera in raw and canned oyster during six month storage in order to measure the dispersion rate of both pigments between meat and viscera, and to evaluate the feasibility of discoloration of oyster meat.

87BI0597. JONG-RAK.CHUNG, IN-SOO.KIM. 1976(6). POSTMORTEM DEGRADATION OF FISH MUSCLE PROTEINS. BULL. KOREAN FISH. SOC. 9(2):120-128. KOREAN FISH. SOC., PUSAN. EN.

Two experiments were conducted to study the nature of protein degradation in fish muscle postmortem, first one with English sole (Paraphyrus vetulus) followed by another with rockfish (Sebastodes spp.).

87BI0598. YEUNG-HO.PARK, JAE-HYEUNG.PYEUN, HOO-KYU.OH, YEUNG-JOO.KANG. 1976(9). UTILIZATION OF UNEXPLOITED ALGAE FOR FOOD OR OTHER INDUSTRIAL USES, I. CHEMICAL COMPOSITION OF UNE+. BULL. KOREAN FISH. SOC. 9(3):155-162. KOREAN FISH. SOC., PUSAN. KO.

Forty one samples from thirty three species of algae (19 from 15 species of Rhodophyceae, 18 from 14 species of Phaeophyceae, 3 from 3 species of Chlorophyceae, and 1 of marine Phanerogams) collected from several locations on the east, west and south coast of Korea, were analyzed for their contents of crude protein, fat, cellulose, ash, nitrogen free extract, amino nitrogen, and total amino acids. For the examination of extractability of algal protein with water, 4 species of algae, Sargassum thunberggi, Grateloupia filicina, Phyllospadix japonica, and Sargassum confusum, were analyzed. And the effect of some precipitation treatments for isolation of algal protein was also tested.

87BI0599. YEUNG-HO.PARK, JAE-HYEUNG.PYEUN, HOO-KYU.OH.YEUNG-JOO.KANG. 1976(9). UTILIZATION OF UNEXPLOITED ALGAE FOR FOOD OR OTHER INDUSTRIAL USES, II. CARRAGEENAN CONTENT AND IT+. BULL. KOREAN FISH. SOC. 9(3):163-168. KOREAN FISH. SOC., PUSAN. KO.

Three species of Rhodophyceae namely Chondrus ocellatus, Grateloupia filicina and Gigartina tenella were collected from the coast of Haeundae, Busan, on June 23, 1975. And analyzed with respect to the content of carrageenan and such chemical characteristics as the content of sulphate and 3, 6-anhydrogalactose, the solubility in potassium chloride solution. In addition, the same chemical properties were tested on the fractions separated by the different concentration of potassium chloride.

87BI0600. BONG-SEUK.HA, TAE-MYOUNG.JEONG, MIN-SUK.YANG. 1976(9). STUDIES ON THE LIPID OF AQUATIC ANIMAL (PART 1) FATTY ACIDS AND STEROLS IN THE MUSCLE OF EEL. BULL. KOREAN FISH. SOC. 9(3):203-208. KOREAN FISH. SOC., PUSAN. KO.

The composition of fatty acids and sterols in the muscle lipid of eel, Anguilla japonicus Temminck & Schlegel was investigated quantitatively by using gas liquid chromatography (GLC) and the sterols separated from unsaponifiable matter by thin-layer chromatography were identified by GLC, infrared spectroscopy, nuclear magnetic resonance and GLC-mass spectrometry respectively.

87BI0601. YONG-GOE.JOH, YONG-KEUN.KIM. 1976(9). THE ORIGIN OF MOLLUSCS STEROL (1) THE STEROL COMPOSITION OF BIVALVES AND SNAILS. BULL. KOREAN FISH. SOC. 9(3):185-193. KOREAN FISH. SOC., PUSAN. EN.

The sterol compositions of the Pelecypoda, M. sulcataria, S. sachalinensis, and the Gastropoda, H. discus hannai Ino, T. cornutus were investigated.

87BI0602. YONG-GOE.JOH, M.HATA. 1976(9). STUDIES ON THE LIPIDS OF "BUGBANGJOHGAE" SPISULA SACHALINENSIS. BULL. KOREAN FISH. SOC. 9(3):195-202. KOREAN FISH. SOC., PUSAN. EN.

The present investigation was performed to find the lipid composition of the total lipids, the fatty acid components of the neutral lipids and the phospholipids, and the composition of sterols, from Spisula sachalinensis.

87BI0603. KANG-HO.LEE, HONG-SOO.RYU, SOON-IM.WOO. 1977(12). STUDIES ON THE EXTRACTION OF SEA WEED PROTEINS, 2. EXTRACTION OF NACL AND ALCOHOL SOLUBLE

PROTEINS. BULL. KOREAN FISH. SOC. 10(4):189-197. KOREAN FISH. SOC., PUSAN. KO.

In present study, the effects of various factors including the solvent concentration, extraction time and temperature, the ratio of sample vs extraction solvent, (w/v) and pH upon the extractability of the NaCl and alcohol soluble proteins of marine algae were investigated. Eight species of fresh algae, the major ones in consumption as food, namely Porphyra suborbiculata, Undaria pinnatifida, Hizikia fusiforme, Sargassum fulvellum, Enteromorpha linza, Sargassum kjellmanianum, codium coarctatum, and Ulva pertusa were used for the extraction of NaCl soluble protein and dried materials of four species, Porphyra suborbiculata, Undaria pinnatifida, Enteromorpha linza and Sargassum fulvellum were used for the extraction of alcohol soluble protein.

87BI0604. DAE-JIN.SONG, JONG-WHA.HUR, YEUNG-JOO.KANG 1977(12). STUDIES ON FREEZING OF YELLOW SEA BREAM, 1. EFFECTS OF FREEZING AND STORING TEMPERATURE AND CHEMIC+. BULL. KOREAN FISH. SOC. 10(4):221-226. KOREAN FISH. SOC., PUSAN. KO.

The quality changes of yellow sea bream, Branchiostegus japonicus japonicus, during frozen storage were mentioned from the view point of commercial value. The experiments were conducted to find out the effective storing method by varying the storage temperatures (-5 Deg. in Centigrade, -35 Deg. in Centigrade) and pretreatment with chemicals. The samples were stored for 6 months at -5 Deg. in Centigrade and -35 Deg. in Centigrade after dipping in the chemical solutions and packing with polyethylens film. The extractibility of salt soluble protein of sample stored at -35 Deg. in Centigrade was higher than that of samples stored at - 5 Deg. in Centigrade, while the chemical treatments were not so much effective.

87BI0605. BONG-SEUK.HA. 1977(12). STUDIES ON THE LIPID OF AQUATIC PRODUCTS (PART 2) A COMPARATIVE STUDY ON FATTY ACID COMPOSITION OF+. BULL. KOREAN FISH. SOC. 10(4):199-204. KOREAN FISH. SOC., PUSAN. KO.

The patterns of fatty acid composition of lipid extracted from eight species of edible marine benthic algae; i.e. two species of green, five of brown and one of red algae, were investigated quantitatively by using gas liquid chromatography. The total lipid contents in average of the algae were 1.51% in the green algae, 2.81% in brown algae and 1.02% in red algae respectively.

87BI0606. SUK-U.SHIN, WOO-JUN.KIM, SUNG-KOO.KANG. 1977(3). A STUDY ON DISTRIBUTION OF PSYCHROTROPHIC COLIFORMS AND GENERAL MICROFLORA OF FROZEN FISH FOR EXPO+. BULL. KOREAN FISH. SOC. 10(1):23-29. KOREAN FISH. SOC., PUSAN. KO.

Three kinds of samples, Trachpenalus curiviostris, Astroconger myriaster and Cantherines modestus which were pre-treated in a processing plant were frozen at -40 Deg. in Centigrade in a contact freezer and stored for 32 days. The numbers of general bacterium, coliforms and E. coli were measured at 8 day intervals during frozen storage and the isolated strains was classified.

87BI0607. EUNG-HO.LEE, JIN-WHAN.HA, WOO-DEOCK.HEO. 1977(3). CONDITIONS FOR ALASKA POLLACK AND FILE FISH SKIN GLUE PROCESSING AND THE QUALITY OF PRODUCT. BULL. KOREAN FISH. SOC. 10(1):1-9. KOREAN FISH. SOC., PUSAN. KO.

The purpose of this study is to complish a method of fish glue making with residual products such as fish head and skin discarded from sea food processing. Using the skins of Alaska pollack and file fish from fillet packers, the optimum conditions of skin glue pr ɔcessing were investigated and physical and chemical properties of the product were also determined.

87BI0608. KANG-HO.LEE, JIN-HO.CHOI. 1977(3). INHIBITION OF BROWNING REACTIONS OCCURRING IN THE STORAGE OF DRIED OYSTER, 1. INHIBITORS AND TREAT+. BULL. KOREAN FISH. SOC. 10(1):11-15. KOREAN FISH. SOC., PUSAN. KO.

Brownish discoloration develops very rapidly in the storage of dried oyster. This undesirable browning is mainly caused by the series of reactions of sugar-amino condensation, enzymatic oxidation of tyrosine and/or the oxidative rancidity of lipids in the tissue of oyster. Sulfites are commonly used as inhibitors for Maillard type browning reactions in agricultural products. The inhibitory effect of sulfite treatment on canned oysters was also confirmed in some investigations. The results suggested that sulfites not only work on blocking the amadori rearrangement but also on the reduction of free tyrosine which retards the progress of enzymatic oxidation of tyrosine by tyrosinase.

87BI0609. JIN-HO.CHOI, KANG-HO.LEE, MU-NAM.KIM. 1977(3). INHIBITION OF BROWNING REACTIONS OCCURRING IN THE STORAGE OF DRIED OYSTER, 2. INHIBITORY EFFECT OF+. BULL. KOREAN FISH. SOC. 10(1):17-22. KOREAN FISH. SOC., PUSAN. KO.

In the present paper, the effect of sodium sulfite treatment on the inhibition of browning reactions occurring in the storage of dried oyster was tested and the supplementary effect of antioxidants added was also mentioned. Dried oysters treated with sodium sulfite solutions as described in the previous paper (Lee and Choi, 1977) were stored in the bottles with silica gel bags at room temperature with or without the application of antioxidants. The ethanol solution of an antioxidant mixture (BHA, BHT, plus synergists) was sprayed on the surface of cooked oyster before drying.

87BI0610. JAE-HYEUNG.PYEUN, YEONG-HO.PARK, KANG-HO.LEE. 1977(6). FACTORS INVOLVED IN THE QUALITY RETENTION OF CULTURED UNDARIA PINNATIFIDA. BULL. KOREAN FISH. SOC. 10(2):125-135. KOREAN FISH. SOC., PUSAN. KO.

Recently, culture of Undaria pinnatifida, one of the representative esculent sea weed, has been prevailing in

the east and south coasts of Korea and reached the mass culture stage. In this study, compositional quality factors for food were studied and the contributory effects of blanching and pigment fixatives in the quality retention of cultured Undaria pinnatifida are discussed. When the place and time of harvesting were the same, cultured Undaria pinnatifida showed scarce difference in the chemical composition comparing to the naturally grown Undaria pinnatifida, but cultured Undaria pinnatifida showed a considerable difference depending upon the cultured places.

87BI0611. YONG-GOE.JOH, M.HATA. 1977(9). THE STEROL COMPONENTS OF UNDARIA PINNATIFIDA AND THE INCORPORATION OF CARBON 14-1-ACETATE INTO THE+. BULL. KOREAN FISH. SOC. 10(3):163-170. KOREAN FISH. SOC., PUSAN. EN.

The present study was carried out to know the sterol components of U. pinnatifida and their incorporation abilities of carbon 14-1-acetate injected into it.

87BI0612. BONG-HO.HAN. 1977(9). THERMAL RESISTANCE OF BACTERIAL SPORES TO DRY HEAT. BULL. KOREAN FISH. SOC. 10(3):145-149. KOREAN FISH. SOC., PUSAN. KO.

Thermal resistance of dried bacterial spores against dry heat was determined. Spore suspensions of Bacillus subtilis var. niger ATCC 9372, Bacillus stearothermophilus Oxoid Code BR 23 and Clostridium sporogenes ATCC 19404 were located on aluminium strips, dried in electric oven under vacuum at room temperature for 10 minutes.

87BI0613. HONG-SOO.RYU, KANG-HO.LEE. 1977(9). STUDIES ON THE EXTRACTION OF SEAWEED PROTEINS, 1. EXTRACTION OF WATER SOLUBLE PROTEINS. BULL. KOREAN FISH. SOC. 10(3):151-162. KOREAN FISH. SOC., PUSAN. KO.

Distribution of marine algae is diverse in Korea and the resource of edible algae is abundant marking 239,037 tons of yearly production in 1976. They have been known as a protein source and used as a supplement in Korean diet. It is necessary to estimate the potentiality and properties of usable algal proteins especially as food resources and studies of extraction and separation of the proteins, therefore, are basically required for this purpose. In this study, the influence of various factors including the sample treatment, extraction time and temperature, sample vs extraction solvent ratio and pH upon the extractability of the water soluble protein was determined. And the effect of precipitation treatment for isolation of the algal protein from the extracts was also tested.

87BI0614. BONG-SEUK.HA. 1978(12). STUDIES ON THE LIPID OF AQUATIC PRODUCTS (PART 3) FATTY ACID COMPOSITION THE LIPID IN DRIED PURPLE+. BULL. KOREAN FISH. SOC. 11(4):219-225. KOREAN FISH. SOC., PUSAN. KO.

Several samples of the dried purple laver grown and processed at the major laver producing districts, i.e. Mokpo, Wando, Hadong and Jangrim, along the southern coast of Korea were quantitatively investigated to determine composing patterns of the fatty acids by gas-liquid chromatography. The total lipid contents in dried purple laver of Hadong were 1.8% being the highest value. Upon analyzing fatty acid composition, some differences were observed in their quantitative distribution at different growing places.

87BI0615. EUNG-HO.LEE, C.KOIZUMI, J.NONAKA. 1978(12). VOLATILE CONSTITUENTS OF COOKED SQUID. BULL. KOREAN FISH. SOC. 11(4):183-188. KOREAN FISH. SOC., PUSAN. KO.

In this study, gas chromatographic analysis was carried out on volatile constituents of cooked squid for the object of obtaining information on the characteristic flavor of the cooked squid meat.

87BI0616. EUNG-HO.LEE, ET AL. 1978(12). CONDITIONS FOR CONGER EEL AND HAGFISH SKIN GLUE PROCESSING AND THE QUALITY OF PRODUCT. BULL. KOREAN FISH. SOC. 11(4):189-195. KOREAN FISH. SOC., PUSAN. KO.

Using the skins of conger eel, Astroconger myriaster, and hagfish, Eptatretus burgeri, from fillet manufactory, the optimum conditions of skin glue processing were investigated and physical and chemical properties of the product were also determined. The yields of conger eel and hagfish skin to the total body weight were 10.6% and 11.4%, respectively. The optimum processing conditions for conger eel skin glue were the extraction of skins which were previously limed with 0.3% calcium hydroxide solution for one hour, in water at pH 5.5 and 60 Deg. in Centigrade for four hours. The additional water was six times sample weight.

87BI0617. KEUN-TAI.LEE, KYUNG-HEE.LEE. 1978(12). THE KINETIC STUDIES OF GLUCONIC ACID FERMENTATION (PART 1) EFFECT OF PHENOL AND CATECHOL DERIVATIV+. BULL. KOREAN FISH. SOC. 11(4):205-211. KOREAN FISH. SOC., PUSAN. KO.

The effect of phenol derivatives (guaiacol, vanillin, o-vanillin, eugenol) and catechol derivatives (pyrogallol, resorcinol) to enhance the volumetric oxygen transfer coefficient, in the aerobic fermentation was studied. Guaiacol, vanillin, o-vanillin, pyrogallol and resorcinol revealed to enchance the volumetric oxygen transfer coefficient, and eugenol had no such ability. The enhancement of the oxygen transfer ability is probably due to the formation of the charge transfer complex by the derivatives and oxygen molecules.

87BI0618. SOO-HYUN.KIM. 1978(12). PROCESSING OF STEAMED FISH JELLY PRODUCT FROM HAGFISH. BULL. KOREAN FISH. SOC. 11(4):197-203. KOREAN FISH. SOC., PUSAN. KO.

In this study, the effects of some additives to the quality of fish jelly product such as salt tripolyphosphate and starch were examined. Besides, that of washing and stepwise heating procedure were also discussed. From the result of quality test by measuring jelly strength and sensory evaluation the product was quite palatable to common, and the addition of 3 percent of salt and 5 percent of starch

KOREAN FISH. SOC. 11(3):155-158. KOREAN FISH. SOC., PUSAN. KO.

Loach, Misgurnus anguillicaudatus, has been esteemed as one of the most tasty fresh water fishes in Korea. The free amino acids in loach meat were analysed by the amino acid autoanalyser. In loach extract, glycine, histidine, lysine and threonine were abundant, holding 23.6%, 21.1%, 13.4%, and 8.5% of total free amino acid contents respectively and followed by serine, alanine, gulutamic acid, methionine, valine, proline, leucine and isoleucine in order. While tyrosine, aspartic acid, and phenylalanine were poor and arginine was trace in content.

87BI0627. CHEOL-WOO.AHN, SU-AN.CHOI, YEUNG-HO.PARK. 1979(12). CHANGES IN CONTENTS OF AMINES IN THE DARK-FLESHED FISH MEAT DURING PROCESSING AND STORAGE, (1) FOR+. BULL. KOREAN FISH. SOC. 12(4):245-253. KOREAN FISH. SOC., PUSAN. KO.

Trimethylamine and dimethylamine contents of salted, hot-air dried, sun dried and boiled-dried samples of three commercial fishes, common mackerel, gizzard-shad and sardine, were analyzed and quantitatively compared at two different temperature conditions. Trimethylamine contents of sun dried samples were relatively higher than in the other samples, while those of boiled-dried small sardine was comparatively lower than those of the others. Dimethylamine content of sun dried samples were higher than those of the other samples, whereas those of boiled-dried small sardine and salted common mackerel were comparatively lower than those of the other samples.

87BI0628. JIN-HWAN.HA, EUNG-HO.LEE. 1979(12). FREE AMINO ACID CONTENT IN THE EXTRACT OF CORAL DAMSELFISH, CHROMIS NOTATUS. BULL. KOREAN FISH. SOC. 12(4):241-243. KOREAN FISH. SOC., PUSAN. KO.

Coral damselfish (demoiselle), Chromis notatus, has been one of the most tasty sea foods in Jeju-Do, Korea. The free amino acids in the extracts of Chromis notatus were analysed by amino acid autoanalyser. In the extracts, taurine, lysine, glycine and alanine were abundant, holding 30.3%, 22.7%, 16.0%, 11.5% of total amino acid content, respectively and followed threonine, glutamic acid and serine, in order. While methionine, histidine, leucine, isoleucine, valine were poor and aspartic acid and proline were trace in content.

87BI0629. EUNG-HO.LEE, SE-KWON.KIM, DUCK-JAE.CHO, BONG-HO.HAN. 1979(12). PROCESSING OF KRILL SOLUBLE AND ITS AMINO ACID COMPOSITION. BULL. KOREAN FISH. SOC. 12(4):235-240. KOREAN FISH. SOC., PUSAN. KO.

A study on the amino acid composition of raw frozen krill, and krill solubles manufactured in forms of paste and powder has been carried out. Among the amino acids in raw frozen krill, glutamic acid, lysine, and aspartic acid showed high values in quantity and then followed leucine, alanine, arginine, glycine and proline. The quantity of histidine was very small and that of cystine was only in trace. The krill solubles in forms of paste and powder prepared by autolysis and hydrolysis with pronasep revealed almost the same patterns in amino acid composition as in raw frozen krill.

87BI0630. DONG-SUCK.CHANG, YOUNG-MAN.KIM, YOUNG-GOAN.KIM. 1979(12). BACTERIOLOGICAL STUDY ON CULTURED VEGETABLES. BULL. KOREAN FISH. SOC. 12(4):261-266. KOREAN FISH. SOC., PUSAN. KO.

This experiment was carried out to evaluate the sanitary quality of cultured vegetables and to check the removing rate of bacteria by treating methods such as washing with tap water or commercial detergent, or blanching. Removing rate of bacterial density of vegetables by washing three times with tap water was about 70% in fruit vegetables, about 20% in leaf vegetables but it was about 80% in leaf vegetables by washing with a commercial detergent. Survival rate of viable cell count of leaf vegetables was less than 0.1% after blanching for one minutes in boiling tap water.

87BI0631. SOON-IM.WOO, HONG-SOO.RYU, KANG-HO.LEE. 1979(12). STUDIES ON THE EXTRACTION OF SEAWEED PROTEINS, 4. PRECIPITATION CONDITIONS AND NUTRITIONAL EVALUAT+. BULL. KOREAN FISH. SOC. 12(4):225-234. KOREAN FISH. SOC., PUSAN. KO.

For the effective utilization of diverse and abundant resource of seaweeds in Korea as a food protein supplement, extraction conditions of water, salt, and alkali soluble proteins were investigated in previous work (Ryu and Lee, 1977: Lee et al., 1977: Lee et al., 1978). The present study as a part of the serial work was thus aimed to find the conditions of isolation and purification of extracted proteins, and to evaluate the nutritional quality of the isolated seaweed proteins in terms of amino acid composition, chemical score, protein score, modified essential amino acid index (MEAAI), and in vitro digestibility presented as pepsin-pancreatin digest residue index (PPDRI).

87BI0632. JIN-HO.CHOI, CHANG-YANG.KIM. 1979(12). DEPURATION OF LIVE OYSTERS BY CONTROLLING TEMPERATURE, PH AND FREE CHLORINE CONTENT. BULL. KOREAN FISH. SOC. 12(4):255-259. KOREAN FISH. SOC., PUSAN. KO.

Depuration of extraneous substances such as bottom deposit, feces and coliforms from live oyster has been studied. Coliform accumulation of bottom cultured oysters was much higher than that of raft or long line cultured oysters. When the depuration tank designed in this study was adopted, the depuration rate could be diminished to about 50% within one hour treatment. The most effective conditions of the tank water for depurating live oysters were 22 Deg. in Centigrade in temperature, 8.80 in pH and below about 2 ppm of residual chlorine concentration.

87BI0633. WOO-JUN.KIM, KUI-SHIK.KIM. 1979(3). SUITABILITY OF CYNTHIA RORETZI DRASCHE FOR PROCESSING. BULL. KOREAN FISH. SOC. 12(1):7-11. KOREAN FISH. SOC., PUSAN. KO.

This study was attempted to establish the basic data for evaluating the processing suitability of Cynthia

resulted in the best jelly strength. It was markedly enforced when 0.3 percent of tripolyphosphate was added.

87BI0619. CHANG-YANG.KIM. 1978(3). STUDIES ON SECONDARY AMINE IN FOODS (I) CONTENTS OF DIMETHYLAMINE IN FISH MUSCLE. BULL. KOREAN FISH. SOC. 11(1):9-12. KOREAN FISH. SOC., PUSAN. KO.

Contents of dimethylamine (DMA) in fresh fish muscle were analyzed by gaschromatography. DMA contents were in Pseudosciaena manchuria 10.367 mg%, in Theragra chalcogramma 19.133 mg%, in Sardinops melanosticta 22.833 mg%, and in Scomber japonicus 26.300 mg% respectively. Individual amines could not be separated with such a low content.

87BI0620. EUNG-HO.LEE, ET AL. 1978(3). STUDIES ON THE PROCESSING AND UTILIZATION OF SARDINE PROTEIN CONCENTRATE. BULL. KOREAN FISH. SOC. 11(1):25-37. KOREAN FISH. SOC., PUSAN. KO.

Since 1976 the catches of sardine increased rapidly in Korea. However due to the poor facilities of preservation, most sardine landed was used only for fish meal as feeds. The aims of this study are to investigate the processing of sardine as a protein concentrate and to solve related problems under our particular circumstances. Using the ethyl alcohol and isopropyl alcohol, the storage effect for further processing, the optimum processing conditions of sardine protein concentrate and amino acid composition of the product were determined. The utilization of sardine protein concentrate as a supplement of bread and noodles was also studied.

87BI0621. CHEOL-WOO.AHN, YEUNG-HO.PARK. 1978(3). CHANGES IN CONTENTS OF FORMALDEHYDE AND AMINES IN ALASKA POLLACK MUSCLE DURING DRYING. BULL. KOREAN FISH. SOC. 11(1):13-18. KOREAN FISH. SOC., PUSAN. KO.

The present study was conducted to elucidate the pattern in changes of trimethylamine oxide and related compounds in the muscle of Alaska pollack during drying, especially referred to formaldehyde and dimethylamine. Three kinds of dried samples of Alaska pollack, sun dried, hot-air dried, and salted-sun dried, were prepared and analyzed for their contents of trimethylamine oxide, trimethylamine, dimethylamine, and formaldehyde.

87BI0622. YONG-GOE.JOH. 1978(6). THE STEROL COMPOSITION OF STYELA CLAVA. BULL. KOREAN FISH. SOC. 11(2):97-101. KOREAN FISH. SOC., PUSAN. EN.

Marine invertebrates contain very complex and interesting sterol mixtures. With an advent of refined technique as gas chromatography, and more recently the combined use of GLC and mass spectrometry, many new sterols were separated from them and identified. Styela clava is a well-known tunicate (Urochorda), one of major natural enemies to oyster, and showing strong reproducibility, although the meat is very popular with the inhabitants in the south coast of Korea. The present study was carried out to examine the sterol composition of Styela clava prior to research on the sterol metabolism and steroid hormones in the tunicates.

87BI0623. BYEONG-HO.RYU, EUNG-HO.LEE. 1978(6). THE TASTE COMPOUNDS OF BROILED DRIED SEA MUSSELS. BULL. KOREAN FISH. SOC. 11(2):65-83. KOREAN FISH. SOC., PUSAN. KO.

This study was attempted to evaluate the taste of broiled-dried sea mussel which is a traditional dried sea food in Korea. The contents of such compounds as free amino acids, nucleotides and their related compounds, TMAO, betaine, and nonvolatile organic acids were analysed. From the results of analysis of nucleotides, the contents of AMP and ADP in broiled-dried Mytilus coruscus and Mytilus edulis appeared higher than other nucleotides and tended to increase slightly after cooking, drying, and storage which might be due to both their stability and the addition of degradation of nucleic acids during cooking.

87BI0624. KANG-HO.LEE, SOON-IM.WOO, HONG-SOO.RYU. 1978(6). STUDIES ON THE EXTRACTION OF SEA WEED PROTEINS, 3. EXTRACTION OF SODIUM HYDROXIDE SOLUBLE PROTEINS. BULL. KOREAN FISH. SOC. 11(2):85-90. KOREAN FISH. SOC., PUSAN. KO.

In present study, the effect of various factors including the solvent concentration, extraction time, extraction temperature and the ratio of sample vs extraction solvent(w/v) upon the extractability of the NaOH soluble proteins of marine algae were investigated. Seven species of sun-dried algae, the major ones in consumption as food, namely Porphyra suborbiculata, Undaria pinnatifida (natural and cultivated), Sargassum fulvellum, Sargassum kjellmanianum, Ulva pertusa, Enteromorpha linza and Codium coarctatum were used for the extraction of the NaOH soluble protein. The frozen and macerated samples were prepared by the same method described in previous paper (Lee, 1977).

87BI0625. DAE-JIN.SONG. 1978(6). STUDIES ON FREEZING OF THE ABALONE, 2. HISTOLOGICAL CHANGES BY FREEZING. BULL. KOREAN FISH. SOC. 11(2):91-95. KOREAN FISH. SOC., PUSAN. KO.

Histological changes of the abalone muscle occurring in the process of freezing as well as thawing were investigated, and its results were compared to the histological structure of fresh muscle. The muscles of the abalone were mainly composed of smooth muscle fibres, and its morphologcial structures is similar to those of the top shell. Mechanical damgage of the muscle fibres caused by freezing were not observed while a number of small ice crystals were found between the muscle fibres. The damage by thawing was not much remarkable compare to the destruction of muscle fibres of fish.

87BI0626. SYNG-TAEK.YANG, YOO-SHIK.PARK, EUNG-HO.LEE 1978(9). FREE AMINO ACID CONTENT IN THE EXTRACT OF LOACH, MISGURNUS ANGUILLICAUDATUS. BULL.

roretzi which is one of the most tasty sea foods in Korea. The results are as follows. The moisture content was increased from November to January. From this period to March, moisture was decreased and increased again from April. Protein content was high from August to November and lipid content was relatively high from June to February. From March to may the content of glycogen was 7.3 to 7.5 percent. From this period to February glycogen was decreased rapidly. By the results of condition index and chemical composition of Cynthia roretzi, the suitable harvest season as raw materials for processing seems to be from March to June.

87BI0634. EUNG-HO.LEE, SE-KWON.KIM. 1979(6). CONDITIONS FOR PROCESSING OF MEATY TEXTURED FISH PROTEIN CONCENTRATE FROM ALASKA POLLACK AND MACKE+. BULL. KOREAN FISH. SOC. 12(2):103-111. KOREAN FISH. SOC., PUSAN. KO.

For the effective utilization of the coastal fish resources in Korea, an investigation on the optimum processing conditions and the quality of a textured fish protein concentrate similar to the texture of animal meat has been carried out with the fish meat of Alaska pollack and mackerel. A noodle shaped product was prepared with the fish meat paste after the adjustment of pH and salt content. The product was soaked in 96% ethyl alcohol to produce textured fish protein concentrate and then dried. The processing conditions were estimated with the rehydration capacity of the textured fish protein concentrate (FPC). The quality of the final product was evaluated with chemical composition, sensory test and texture measurement.

87BI0635. BONG-HO.HAN, KEUN-SUK.KIM, DUCK-JAE.CHO. 1979(9). PROCESSING OF SOY CURD POWDER WITH SOYBEAN AND KRILL. BULL. KOREAN FISH. SOC. 12(3):137-141. KOREAN FISH. SOC., PUSAN. KO.

A study on the processing of soy curd powder with soybean milk and krill autolysate has been carried out to prolong the self life and to improve the taste and colour of soy curd. The soy curd was manufactured by coagulation of the soybean milk prepared from soybean through a series of processes of soaking, grinding, heating at 100 Deg. in Centigrade for 5 minutes and filtration. Ten hours was reasonable as the soaking time of the soybean for the high yield of soybean milk. The use of 3% glucono-d-lactone to the weight of the raw soybean showed the best coagulation of the soybean milk at 90 Deg. in Centigrade in relation to the yield and content of crude protein of the soy curd.

87BI0636. DAE-JIN.SONG, YEUNG-JOO.KANG. 1979(9). STUDIES ON THE FREEZING OF YELLOW SEA BREAM, 2. HISTOLOGICAL CHANGES BY FREEZING. BULL. KOREAN FISH. SOC. 12(3):131-136. KOREAN FISH. SOC., PUSAN. KO.

Histological changes of yellow sea bream, Branchiostegus japonicus japonicus, were observed under microscope during freezing storage for 6 months at -5 Deg. in Centigrade and -35 Deg. in Centigrade, and the results were compared with the muscle structure of fresh muscle. The freezing storage of yellow sea bream at -5 Deg. in Centigrade showed more changes in muscle structure than that stored at -35 Deg. in Centigrade. In the view point of the changes of the muscle structure, the yellow sea bream can be stored up to 1 month at -5 Deg. in Centigrade and 3 months at -35 Deg. in Centigrade. The freezing of yellow sea bream at -5 Deg. in Centigrade showed higher extracellular freezing than that at -35 Deg. in Centigrade.

87BI0637. CHANG-YANG.KIM, ET AL. 1979(9). PROCESSING OF LIQUEFIED SARDINE PROTEIN CONCENTRATE BY ENZYMIC METHOD AND ITS UTILIZATION. BULL. KOREAN FISH. SOC. 12(3):143-153. KOREAN FISH. SOC., PUSAN. KO.

A study on the processing of liquefied fish protein with a long self life and good solubility has been carried out for the effective utilization of sardine. The whole sardine was chopped, homogenized with same amount of water and then hydrolyzed by the addition of commercial proteolytic enzyme. The hydrolysate was centrifuged and the supernatant was decolorized with active carbon, desodorized by azeotropic distillation with toluene, xylene and cyclohexane. The liquefied sardine protein was then concentrated by rotary vacuum evaporator with the addition of starch.

87BI0638. YEUNG-HO.PARK, ET AL. 1979(9). STUDIES ON THE UTILIZATION OF ANTARCTIC KRILL, 1. COMPOSITIONAL CHARACTERISTICS OF FRESH FROZEN AN+. BULL. KOREAN FISH. SOC. 12(3):191-200. KOREAN FISH. SOC., PUSAN. KO.

For the use of antarctic krill as a food protein source its compositional characteristics were investigated as the first part of the work that includes other subjects such as processing of krill-paste, concentrates, and fermented or seasoned product. In general composition of fresh frozen and preboiled frozen krill on board, the contents of crude fat and free smino nitrogen were higher in the former than in the latter which contained a high amount of ash. VBN was rather high as much as 37.6 and 26.4 mg% in both fresh frozen and preboiled krill. The pH of krill homogenates was 7.1 to 7.2 in both cases. Such a low pH might be attributed to a long term storage and temperature fluctuations during frequent transshipping.

87BI0639. KEUN-TAI.LEE, BONG-HO.HAN. 1979(9). KINETIC STUDIES OF LACTIC ACID FERMENTATION (PART 1) EFFECT OF MECHANICAL AGITATION ON FERMENTATIO+. BULL. KOREAN FISH. SOC. 12(3):155-160. KOREAN FISH. SOC., PUSAN. KO.

Mechanical agitation in fermentation process enhances the fermentation activity of microbes by means of oxygen supply and frequent collision with substrate. However, the fermentation activity of microaerophilic bacteria is inhibited by the excess oxygen resulted from the mechanical agitation. On this account, a strain of Lactobacillus bulgaricus was cultured to know the inhibition effect of the mechanical agitation and determine the optimum conditions for the process of lactic acid fermentation.

87BI0640. KEUN-TAI.LEE, MYEONG-SOOK.LEE, BONG-HO.HAN 1979(9). KINETIC STUDIES OF LACTIC ACID FERMENTATION (PART 2) INFLUENCE OF TEMPERATURE ON FERMENTATION. BULL. KOREAN FISH. SOC. 12(3):161-166. KOREAN FISH. SOC., PUSAN. KO.

To know the influence of temperature on the fermentation process, a strain of Lactobacillus bulgaricus was experimentally cultured under three different temperature conditions of 39 Deg. in Centigrade, 42 Deg. in Centigrade and 45 Deg. in Centigrade at pH 5.8 and mechanical agitation of 500 rpm. During 20 hour's fermentation, the microbial growth attained the maximum concentration under the conditions mentioned above. However, the culturing conditions resulted different outcomes in terms of maximum concentration of the microbes and the residual concentration of substrate. Among the three temperature conditions, the fermentation at 45 Deg. in Centigrade was most effective and the maximum specific growth rate was 0.58/hr. Activation energy deduced from the Arrhenius equation was 9,220 c+.

87BI0641. MYEONG-SOOK.LEE, DONG-SUCK.CHANG. 1980(12). DISTRIBUTION AND PHYSIOLOGICAL CHARACTERISTICS OF BACILLUS CEREUS IN RICE AND RICE PRODUCTS. BULL. KOREAN FISH. SOC. 13(4):163-171. KOREAN FISH. SOC., PUSAN. KO.

Recently, Bacillus cereus has been identified as one of food poisoning bacteria especially in products of cereal foods in foreign countries. Therefore, the quantitative distribution of Bacillus cereus in market foods, its physiological characteristics, growth rate by temperature and heat resistance of its spore were examined. Thirty two samples of cooked rice, 20 samples of kimbab (cooked rice rolled with laver), 23 samples of rice cake, 13 samples of rice and 13 samples of barley were collected from restaurants and food stores in Busan, Korea during the period from May to November in 1980.

87BI0642. JIN-HWAN.HA, EUNG-HO.LEE. 1980(3). CHANGES IN FREE AMINO ACIDS OF YELLOW SEA BREAM BRANCHIOSTEGUS JAPONICUS JAPONICUS DURING DEHYDRAT+. BULL. KOREAN FISH. SOC. 13(1):27-31. KOREAN FISH. SOC., PUSAN. KO.

Yellow sea bream, Branchiostegus japonicus japonicus, has been one of the widely consumed food fish in Jeju-Do, Korea. This study was attempted to establish the basic data for evaluating changes of taste compounds of the yellow sea bream during dehydration. The free amino acids were analysed by amino acid autoanalyser. The free amino acid composition of the raw yellow sea bream, abundant amino acids were lysine, alanine, threonine and arginine and then taurine, serine, proline, glycine, glutamic acid, leucine in order. Such amino acids as valine, methionine, tyrosine, isoleucine, phenylalanine were poor in content.

87BI0643. YEUNG-HO.PARK, DONG-SOO.KIM, SOON-SEUN.KIM, SEUN-BONG.KIM. 1980(3). CHANGES IN HISTAMINE CONTENT IN THE MUSCLE OF DARK-FLESHED FISHES DURING STORAGE AND PROCESSING, I. BULL. KOREAN FISH. SOC. 13(1):15-22. KOREAN FISH. SOC., PUSAN. KO.

It has been well known that histamine is presumably the causative material of an outbreak of allergy-like food poisoning from eating of the meat of dark-fleshed fishes. The present paper was conducted to elucidate the changes in histamine content in the muscle of the dark-fleshed fishes, such as, common mackerel, Scomber japonicus, gizzard-shad, Konosirus punctatus and small sardine, Sardinops melanosticta, under different condition of storage and process. In general, the formation of histamine was markedly different depending upon the kind of fish and the storage temperature. According to the each products, the higher value observed in the sample of sun dried, and those of salted and hot-air dried were similar and boiled-dried of small sardine was observed the lower value.

87BI0644. EUNG-HO.LEE, WOO-JUN.KIM, SE-KWON.KIM, DUCK-JAE.CHO. 1980(3). SUITABILITY OF SHELLFISHES FOR PROCESSING, 4. SUITABILITY OF MUSSEL FOR PROCESSING. BULL. KOREAN FISH. SOC. 13(1):23-26. KOREAN FISH. SOC., PUSAN. KO.

This study was attempted to establish the basic data for evaluating the processing suitability of the mussel, Mytilus edulis, cultured by hanging method in Yeosu Bay, Korea. Seasonal variations in condition index and chemical composition of the mussel were carried out from March 1978 to February 1979. By the results of condition index and chemical composition of the mussel, the suitable harvest season as raw materials for processing is determined to be from December to April next year and from July to August.

87BI0645. YEUNG-HO.PARK, ET AL. 1980(6). STUDIES ON THE UTILIZATION OF ANTARCTIC KRILL, 2. PROCESSING OF PASTE FOOD, PROTEIN CONCENTRATE, S+. BULL. KOREAN FISH. SOC. 13(2):65-80. KOREAN FISH. SOC., PUSAN. KO.

Processing conditions of the krill products such as paste food, krill protein concentrate, seasoned dried krill, powdered seasoning, meat ball, and snack have been examined and the quality was evaluated chemically and organoleptically. In the processing of paste food, krill juice was yielded 71% and krill scrap 29%. The yields of paste and broth from the krill juice showed 53% and 43%, respectively. In amino acid composition of the krill paste, proline, glutamic acid, aspartic acid, lysine, and leucine were abundant, while histidine, methionine, tyrosine, serine and threonine were poor.

87BI0646. SYNG-TAEK.YANG, EUNG-HO.LEE. 1980(9). TASTE COMPOUNDS OF FRESH-WATER FISHES, 2. ORGANIC BASES IN THE MUSCLE OF WILD COMMON CARP. BULL. KOREAN FISH. SOC. 13(3):109-113. KOREAN FISH. SOC., PUSAN. KO.

Organic bases in the dorsal meat of wild common carp, Cyprinus carpio, were analyzed as a part of the studies on the taste compounds of fresh-water fishes.

The male and female meat showed no significant differences in contents of total creatinine, betaine, TMA and TMAO. The most abundant basic compound was total creatinine (ca. 400mg%). The amount of betaine was poor (ca. 66.5 mg%) and TMA and TMAO were trace in content (below 1 mg%).

87BI0647. SYNG-TAEK.YANG, EUNG-HO.LEE. 1980(9). TASTE COMPOUNDS OF FRESH-WATER FISHES, 3. TASTE COMPOUNDS OF KOREAN SNAKEHEAD MEAT. BULL. KOREAN FISH. SOC. 13(3):115-119. KOREAN FISH. SOC., PUSAN. KO.

Snakehead, Channa argus, is one of the most palatable fresh-water fishes in Korea; however, relatively little is known about the characteristics of taste. The present study was undertaken to analyze the proximate composition as well as the taste compounds of dorsal muscle of Korean snakehead.

87BI0648. SUNG-KYOO.YOO, KYUNG-YANG.PARK. 1981(12). BIOLOGICAL STUDIES ON OYSTER CULTURE (III) OYSTER GROWTH COMPARISON BETWEEN 4 FARMS IN HANSAN - GE+. BULL. KOREAN FISH. SOC. 13(4):207-212. KOREAN FISH. SOC., PUSAN. KO.

Growth rates of oysters at four oyster farms in Hansan-Geoje Bay, near Chungmu, southern Korea, and density-dependent relative shell growth were investigated from November 1979 to May 1980 with the following results: The best grown oysters at Sorang showed relatively slow growth in meat weight until February 1980, and then showed rapid growth upto May. At Hwado and Songdo they grew fast from December 1979 to February 1980, and from April to May 1980. Those at Chubong gradually increased growth rate from December 1979, and in April and May they showed rapid growth but still being smaller than the others.

87BI0649. KANG-HO.LEE, ET AL. 1987(1). LIPID OXIDATIVE BROWNING IN DRIED FISH MEAT, 1. OXIDATION OF FISH OIL AND BROWNING. BULL. KOREAN FISH. SOC. 20(1):33-40. KOREAN FISH. SOC., PUSAN. KO.

This paper aims to study the browning reactions of lipid originated carbonyl compounds with nitrogenous compounds in dried fishes, flounder, mackerel, shrimp, hair tail fish, and whale. When those fishes were dried and stored, the PoV and CoV were high in the mackerel and the hair tail fish, whereas low in the flounder, the shrimp, and the whale. The browning was developed more rapidly in the lipid soluble fraction than in the water soluble fraction of each sample, and the loss of available lysine and polyenoic acids were accompanied.

87BI0650. EUNG-HO.LEE, ET AL. 1987(1). PREPARATION OF POWDERED SMOKED-DRIED MACKEREL SOUP AND ITS TASTE COMPOUNDS. BULL. KOREAN FISH. SOC. 20(1):41-51. KOREAN FISH. SOC., PUSAN. KO.

This study was carried out to prepare powdered smoked-dried mackerel which can be used as a soup base, and to examine storage stability and the taste compounds of products. Raw mackerel are filleted, boiled for 10 minutes and pressed to remove lipids, and then soaked in extract solution of skipjack meat. Judging from the results of taste and sensory evaluation, it is concluded that the powdered smoked-dried mackerel can be used as natural flavoring substance in preparing soups and broth.

87BI0651. KANG-HO.LEE, ET AL. 1987(1). LIPID OXIDATIVE BROWNING IN DRIED FISH MEAT, 3. BROWNING REACTIONS IN FISH OIL-LYSINE SYSTEM AND P+. BULL. KOREAN FISH. SOC. 20(1):79-87. KOREAN FISH. SOC., PUSAN. KO.

This study was carried out in order to investigate the browning reactions of fish oil-amino acid model system and the properties of browning products. In the water soluble fraction of the browning products obtained from the fish meat or the lysine added fish oil, some antioxidation activity was detected. But in the liposoluble fraction which covers most of the browning reactions in the fish meat, little antioxidation activity was detected. And all of the browning products provided in this experiment showed very low reducing activity.

87BI0652. KANG-HO.LEE, ET AL. 1987(1). LIPID OXIDATIVE BROWNING IN DRIED FISH MEAT, 2. BROWNING DUE TO THE OXIDATION OF PHOSPHOLIPID. BULL. KOREAN FISH. SOC. 20(1):63-68. KOREAN FISH. SOC., PUSAN. KO.

The results of previous paper (Lee et al, 1987), indicated that the role of polyunsaturated carbonyls from the polar lipid seemed more important than those of the nonpolar lipid in the browning reaction. In this study, the role of phospholipid in lipid oxidative browning reaction was investigated. In fatty acid composition of hair tail fish, neutral lipid and glycolipid contained the higher percent of saturated and monoenic acids while phospholipid contained more of polyenoic acids. When this fish was dried and stored, polyunsaturated fatty acids of phospholipid and glycolipid more rapidly decreased than that of neutral lipid. The browning was developed more rapidly in phospholipid than in glycolipid and neutral lipid.

87BI0653. SEON-BONG.KIM, ET AL. 1987(11). THE DNA DAMAGE BY LINOLEIC ACID HYDROPEROXIDE. BULL. KOREAN FISH. SOC. 20(6):569-572. KOREAN FISH. SOC., PUSAN. KO.

The DNA damage by linoleic acid hydroperoxide (LHPO) was investigated in a DNA-LHPO system at 37 Deg. in Centigrade to elucidate the DNA damage mechanism by lipid peroxidation products. LHPO showed a great DNA damage with the increase of its concentrations. DNA was completely damaged in a LHPO-DNA (weight ratio, 2:3) system after incubation for 2 days. The degree of DNA damage by LHPO was greater than that of linoleic acid. In the quantitative analysis of DNA damage, the decreasing ratio of DNA content was 60% in 844 ug LHPO system incubated for 1 day compared to the control solution marked 30%. There were no participation of active oxygens on the DNA damage by LHPO.

87BI0654. JIN-HWAN.HA, ET AL. 1987(11). A STUDY ON THE THERMAL TREATMENT CONDITIONS OF

RETORT POUCHED FRIED FISH MEAT PASTE, 1. INFLUENCE +. BULL. KOREAN FISH. SOC. 20(6):573-581. KOREAN FISH. SOC., PUSAN. KO.

The fish meat paste products are rapidly growing in its production. However, the recent prohibition of AF-2 gives a lot of difficulties in the marketing of fish meat paste products manufactured by the conventional procedures. The present study aims to obtain the optimal conditions for retaining the quality of the fish meat paste products with long shelf-life on the market. The fried fish meat paste was sealed in the retort pouches and sterilized under the conditions which the Fo value designated to 6. The effects of the sterilization temperature and the diameter of the products on the quality factors such as jelly strength, water holding capacity, texture and in vitro protein digestibility were investigated.

87BI0655. SE-KWON.KIM, EUNG-HO.LEE. 1987(11). SYNTHESIS AND FUNCTIONAL PROPERTIES OF PLASTEIN FROM THE ENZYMATIC HYDROLYSATES OF FILEFISH PROTEI+. BULL. KOREAN FISH. SOC. 20(6):582-590. KOREAN FISH. SOC., PUSAN. KO.

Plasteins were synthesized from a peptic filefish protein hydrolysate by papain, pepsin, alpha-chymotrypsin and protease (from Streptomyces griceus) under the optimum conditions of previous paper. L-glutamic acid diethylester and L-leucine ethylester were incorporated into plastein during the plastein reaction by papain. The structural changes of freeze-dried filefish meat, peptic hydrolysate, FPC and plasteins were observed by Scanning Electron Microscopy (SEM). The functional properties of plasteins also were measured.

87BI0656. KANG-HO.LEE, SEUNG-HO.SONG, IN-HAK.JEONG. 1987(11). QUALITY CHANGES OF DRIED LAVERS DURING PROCESSING AND STORAGE, 2. QUALITY STABILITY OF ROASTED LAV+. BULL. KOREAN FISH. SOC. 20(6):520-528. KOREAN FISH. SOC., PUSAN. KO.

Quality stability of roasted lavers during heat treatment and storage was investigated measuring the changes in pigments including chlorophyll a, carotenoids and biliproteins, fatty acids and free amino acids as the major quality factors. In roasting of dried lavers, carotenoids were found to be more stable than chlorophyll a, and biliproteins were most heat labile. The overall heat stability of the pigments depended upon heating time and temperature. Chlorophyll a and carotenoids were retained more than 90% in the cases of roasting for 90 min. at 60 Deg. in Centigrade; 60 min. at 80 Deg. in Centigrade; 10 min. at 100 Deg. in Centigrade; or 5 min. at 150 Deg. in Centigrade while biliproteins remained about 70%. The lipids of dried lavers including polyunsaturated fatty acids appeared+.

87BI0657. KANG-HO.LEE, IN-HAK.JEONG, IN-CHUL.KIM, YEONG-OK.KIM. 1987(3). STABILITY OF POLYUNSATURATED FATTY ACIDS IN STORAGE OF SARDINE OIL EXTRACTED WITH BHA ADDED SOLVEN+. BULL. KOREAN FISH. SOC. 20(2):146-151. KOREAN FISH. SOC., PUSAN. KO.

The storage stability of sardine oil and the effect of BHA on the oxidation of fatty acids especially, highly unsatureted fatty acids like EPA and DHA were investigated. The sardine oil was extracted from round sardine, with chloroform-methanol(2:1 v/v) solvent with/without addition of BHA, and then stored at 30 Deg. in Centigrade. The deterioration of oil was examined periodically by measuring acid value(AV), peroxide value(POV), carbonyl value(COV), and oxygen absorption. The changes in fatty acid composition during the storage was determined by GLC analysis to elucidate the oxidative stability of individual fatty acid.

87BI0658. YEONG-OK.SONG, DEUK-MOON.CHO, JAE-HYEUNG.PYEUN. 1987(5). DETERMINATION OF RIBOFLAVIN CONTENT IN FISHES. BULL. KOREAN FISH. SOC. 20(3):219-223. KOREAN FISH. SOC., PUSAN. KO.

A slightly modified method of Rashid and Potts(1980) to determine riboflavin in milk in which lead acetate was used as a precipitant was employed in the present study to test applicability to determine that of fish as well. The lead acetate method was found to be sensitive, simple, inexpensive and rapid compared to the modified A.O.A.C. method by Gordon et al. (1979). But higher riboflavin values were obtained in this study than those reported so far. The riboflavin contents of 9 white fleshed fishes were in the range of 0.29-0.48 mg per 100 g fresh sample.

87BI0659. DONG-SOO.KIM, YOUNG-DONG.KIM, YOUNG-CHUL.LEE, YOUNG-MYOUNG.KIM. 1987(5). EFFECTS OF ALASKA POLLACK MEAT PASTE ON THE QUALITY OF INSTANT NOODLE. BULL. KOREAN FISH. SOC. 20(3):208-212. KOREAN FISH. SOC., PUSAN. KO.

In order to enrich the nutritional value of instant noodle and diverse utilization of Alaska pollack meat paste (AMP), several quality parameters of instant noodle mixed with AMP as enrichment of protein were investigated. Protein and amino acid contents of instant noodle were increaesd to 4.7% and 4, 006.1 mg% by incremental level up to 30% of AMP. Hardness, cooking weight and volume of noodle were also increased by the increments of AMP added, but tensile strength and soup turbidity were decreased. Sensory scores in flavor, color and soup taste of instant noodle mixed with AMP were revealed higher than that of without AMP, but texture scores were decreased with the increase of the AMP over 20%.

87BI0660. JIN-HOON.KANG, ET AL. 1987(5). THE DNA DAMAGE BY FISH OIL PEROXIDATION PRODUCTS, 1. DNA DAMAGE BY THE PEROXIDATION PRODUCTS OF TO+. BULL. KOREAN FISH. SOC. 20(3):213-218. KOREAN FISH. SOC., PUSAN. KO.

The DNA damage mechanism by fish oil peroxidation was investigated through the model system of a DNA-mackerel lipid at 37 Deg. in Centigrade. Mackerel lipid peroxidation products induced a great DNA damage with the increment of its concentration, and such DNA damage in all systems examined occurred below 100 millieg/kg in POV

(peroxide value). From the results of the addition of several active oxygen scavengers to the DNA-lipid systems, singlet oxygen and superoxide anion greatly affected to the increase of POV and to the DNA damage by mackerel lipid peroxidation, respectively. It indicates that there was a close relationship between the effects of active oxygens in the mackerel lipid peroxidation and its DNA damage mechanism.

87BI0661. YOUNG-JE.CHO. 1987(5). BIOCHEMICAL ACTIVITY OF MICROORGANISM STORED BY THE METHOD OF PARTIAL FREEZING. BULL. KOREAN FISH. SOC. 20(3):185-190. KOREAN FISH. SOC., PUSAN. KO.

In order to study the preservation effect of -3 Deg. in Centigrade partial freezing method, the growth and biochemical activity of microorganisms and the changes of K-value in mackerel press juice were investigated at 0 Deg. in Centigrade, -3 Deg. in Centigrade supercooling (liquid phase) and -3 Deg. in Centigrade freezing (solid phase). The results obtained in this paper were follows: 1) The growth and biochemical activity of microorganisms were reduced at -3 Deg. in Centigrade supercooling than 0 Deg. in Centigrade in spite of the small variation in temperature. 2) There were no growth and biochemical activity of microorganisms at -3 Deg. in Centigrade freezing (solid phase). 3) The difference in the K-value between -3 Deg. in Centigrade supercooling and -3 Deg. in Centigrade freezi+.

87BI0662. EUNG-HO.LEE, ET AL. 1987(5). PROCESSING CONDITIONS AND QUALITY STABILITY OF FROZEN SEASONED SARDINE MEAT DURING FROZEN STORAGE. BULL. KOREAN FISH. SOC. 20(3):191-201. KOREAN FISH. SOC., PUSAN. KO.

Seasoned sardine meat was prepared to extend the use of sardine for human consumption, and processing conditions and storage stability of frozen seasoned sardine meat were studied during storage at -20 Deg. in Centigrade. Judging from the results of chemical experiments and sensory evaluation, the products can be preserved in a good quality for 120 days during frozen storage.

87BI0663. JIN-HOON.KANG, ET AL. 1987(7). THE DNA DAMAGE OF FISH OIL PEROXIDATION PRODUCTS, 2. DNA DAMAGE BY THE PEROXIDATION PRODUCTS OF PO+. BULL. KOREAN FISH. SOC. 20(4):300-307. KOREAN FISH. SOC., PUSAN. KO.

The present study was investigated on the DNA damage by the peroxidation of polar and non-polar lipid fractionated from mackerel lipid to elucidate the DNA damage mechanism by fish oil peroxidation. The degree of DNA damage by polar lipid peroxidation became greater with the increase of its concentration, and such DNA damage was induced below 100 millieq./kg in POV for 4 days incubation.

87BI0664. DONG-SUCK.CHANG, IL-SHIK.SHIN, JAE-HYEUNG.PYEUN, YEUNG-HO.PARK. 1987(7). A STUDY ON PARALYTIC SHELLFISH POISON OF SEA MUSSEL, MYTILUS EDULIS; FOOD POISONING ACCIDENT IN GA+. BULL. KOREAN FISH. SOC. 20(4):293-299. KOREAN FISH. SOC., PUSAN. KO.

At various times and places all over the world men have become ill and some have died after eating shellfish that were intoxicated with paralytic shellfish poison (PSP) caused by Protogonyaulax spp. In late March, 1986, two persons were dead by ingesting wild sea mussels, Mytilus edulis, grown at bottom of an anchored waste ship to be dismantled at Gamchun Bay, Pusan, Korea. The samples were collected from the bottom of the ship during April 1 - April 8 of the year to find the cause of the food poisoning accident. The toxicity was estimated by bioassay with ICR male mouse, while the toxins were extracted and characterized. The toxins were extracted with acidified 80% ethanol. The extract was defatted three times with dichloromethane, treated with activated charcoal, and then purified +.

87BI0665. SE-KWON.KIM, EUNG-HO.LEE. 1987(7). SYNTHESIS AND FUNCTIONAL PROPERTIES OF PLASTEINS FROM THE ENZYMATIC HYDROLYSATES OF FILEFISH PROTE+. BULL. KOREAN FISH. SOC. 20(4):282-292. KOREAN FISH. SOC., PUSAN. KO.

In order to exploit a new type of food source, enzamatically modified hydrolysates and the plasteins synthesized from the filefish (Navodon modestus) protein hydrolysates by plastein reaction were investigated. The optimum conditions for enzymatic hydrolysis of filefish muscle and synthesis of plasteins using papain, pepsin, alpha-chymotrypsin and protease (from Streptomyces griceus) were determined. The optimum temperature and pH for the hydrolysis of filefish muscle by papain, pepsin, alpha-chy-motrypsin and protease were 50 Deg. in Centigrade, 40 Deg. in Centigrade, 55 Deg. in Centigrade and 50 Deg. in Cengigrade; and 6, 2, 7 and 8, respectively. Those for incubation time and enzyme concentration were 4hr, 0.5% for papain & protease, 24hrs 1.0% for pepsin & alpha-chymotrypsin. The+.

87BI0666. BYEONG-JIN.YOU, KANG-HO.LEE, JONG-HO.LEE. 1987(7). ANTIOXIDANT ACTIVITY OF AMINO ACID-XYLOSE BROWNING REACTION PRODUCTS, 3. ISOLATION OF ANTIOXYGENIC+. BULL. KOREAN FISH. SOC. 20(4):273-281. KOREAN FISH. SOC., PUSAN. KO.

In this work the antioxidant effects of browning reaction products prepared by xylose-tryptophan reaction system were discussed. The antioxygenic brown pigments were separated by solvent extraction, and column chromatography and isolated by gel filteration. The functional groups of the brown pigments which had antioxidant activity were examined. By elucidation of IR spectra, the pigment fractions which showed a strong antioxidant activity were bearing the indole group. It is suggested that the antioxidant function of the brown pigment is due to hydroxy and amino group. A higher activity of the brown pigment fraction E might be attributed to carboxylic acid or carboxylic ester compounds.

87BI0667. R.H.ZHU, H.X.SHI, R.G.LIU. 1987(7). A STUDY OF ALGINATE LYASES, II. THEIR EFFECTS ON SUBSTRATE. ACTA OCEANOL. SINICA. 6(3):434-443. CHINA OCEAN PRESS, BEIJING. EN.

Two acid partial hydrolysis methods are used in preparing three substrates, i.e. short-chain polymannuronide (SM), short-chain polyguluronide (SG) and short-chain polymannuronide-polyguluronide (SMG). Using viscosity reduction method, it is demonstrated that lyase I is an exolyase while lyase II and lyase III are endolyases. Somogyi-Nelson method is used for determining the reducibility of lyase-decomposed substrates, indicating that the three lyases acted strongly on algin, SM and SMG, but slightly on SG. UV absorption method is used for determining absorption spectrum of products, indicating that all the three lyases are polymannuronide lyases.

87BI0668. SE-KWON.KIM, EUNG-HO.LEE. 1987(9). SYNTHESIS AND FUNCTIONAL PROPERTIES OF PLASTEIN FROM THE ENZYMATIC HYDROLYSATES OF FILEFISH PROTEI+. BULL. KOREAN FISH. SOC. 20(5):431-440. KOREAN FISH. SOC., PUSAN. KO.

In order to develop a new type of food source for the effective utilization of fish protein, plastein reaction was applied to improve the functional properties of filefish protein. Plasteins were synthesized from a peptic filefish protein hydrolysate by papain, pepsin, alpha-chymotrypsin and protease (from Streptomyces griceus) under the optimum conditions of previous paper. Also, L-glutamic acid diethylester and L-leucine ethylester were incorporated into plastein during the plastein reaction by papain. And, General composition, yield, molecular weight, amino acid composition, color and IR spectrum of plasteins were measured.

87BI0669. SEON-BONG.KIM, JIN-HOON.KANG, YEUNG-HO.PARK. 1987(9). DNA DAMAGES OF LIPID OXIDATION PRODUCTS AND ITS INHIBITION MECHANISM. BULL. KOREAN FISH. SOC. 20(5):419-430. KOREAN FISH. SOC., PUSAN. KO.

The damage of plasmid DNA by lipid peroxidation and its inhibition were investigated through the model system of DNA and linoleic acid at 37 deg. in centigrade. The degree of DNA damage increased in proportion of the increase of concentration and peroxidation of linoleic acid. DNA damage induced from linoleic acid peroxidation was greatly inhibited by the addition of active oxygen scavengers, especially, singlet oxygen scavenger and superoxide anion scavenger in reaction system. These active oxygens, such as superoxide anion and hydrogen peroxide were rapidly generated in the early stage of peroxidation and also scavenged by the addition of superoxide dismutase and catalase, respectively.

87BI0670. KWANG-SOO.OH, EUNG-HO.LEE, MYUNG-CHAN.KIM, KANG-HEE.LEE. 1987(9). ANTIOXIDATIVE ACTIVITIES OF SKIPJACK MEAT EXTRACT. BULL. KOREAN FISH. SOC. 20(5):441-446. KOREAN FISH. SOC., PUSAN. KO.

To develop cheaper and safer natural antioxidative substance instead of synthesized ones the extract of skipjack meat was examined for the antioxidative effects and factors. Amino-N of skipjack meat extract was 15.3 mg/100 g, and the extract apparently showed inhibitory effect on the oxidation of methyl linoleate. Antioxidative activity of extract revealed a tendancy to reduce slightly in proportion to hydrolyzing. When extract was dialyzed in distilled water, the outer fraction had a strong inhibitory effect on the oxidation of methyl linoleate, while the inner fraction showed no effect.

87BI0671. DONG-SOO.KIM, ET AL. 1987(9). DEGRADATION OF CARCINOGENIC NITROSAMINE FORMATION FACTOR BY NATURAL FOOD COMPONENTS, 1. NITRITE-SC+. BULL. KOREAN FISH. SOC. 20(5):463-468. KOREAN FISH. SOC., PUSAN. KO.

The present paper was investigated to elucidate the nitrite-scavenging ability of vegetable extracts. Vegetable extracts possessed the scavenging ability of nitrite. By fractionation of vegetable extracts, nitrite-scavenging ability of garlic (Allium sativum for. Pekinense), chinese pepper (Zanthexylum schinifolium), onion (Allium cepa), welsh onion (Allium fistulosum) and ginger (Zingiber officinale) extracts were effective in the water-soluble fraction, but carrot (Daucus carota uar. sativa) in the methanol-soluble fraction. Nitrite-scavenging ability of vegetable extracts was also pH-dependent, highest at pH 1.2 and lowest at pH 6.0. Particularly, nitrite-scavenging abilities of water-soluble fractions obtained from garlic and chinese pepper were similar to that of L-ascorbic acid+.

87BI0672. KANG-HO.LEE, SEUNG-HO.SONG, IN-HAK.JEONG. 1987(9). QUALITY CHANGES OF DRIED LAVERS DURING PROCESSING AND STORAGE 1. QUALITY EVALUATION OF DIFFERENT G+. BULL. KOREAN FISH. SOC. 20(5):408-418. KOREAN FISH. SOC., PUSAN. KO.

The quality of different grades of dried lavers obtained from three culture areas was evaluated and its changes during the storage at different levels of water activity were measured. Not much differences in general chemical composition between the locality was detected except some in the content of lipid and pigments. But the quality grades of dried lavers were mainly depended upon the content of protein and pigments including chlorophyll a, carotenoids, and biliproteins although there was little differences in amino acid composition of the proteins, and glutamic acid, aspartic acid and alanine were high in general. The lipid of dried lavers was composed of a high level of polyunsaturated fatty acids, particularly, of eicosapentaenoic acid which amounted to as much as a half of the to+.

87BI0673. SEON-BONG.KIM, ET AL. 1987(9). DEGRADATION OF CARCINOGENIC NITROSAMINE FORMATION FACTOR BY NATURAL FOOD COMPONENTS, 2. NITRITE-SC+. BULL. KOREAN FISH. SOC. 20(5):469-475. KOREAN FISH. SOC., PUSAN. KO.

The preser t paper was investigated to elucidate the

nitrite-scavenging ability of seaweed extracts. Seaweed extracts possessed the scavenging ability of nitrite. By fractionation of seaweed extracts, nitrite-scavenging ability of laver (Porphyra tenera), sea lettuce (Enteromorpha compresa) extracts were effective in the water-soluble fraction, but sea mustard (Undaria pinnatifida), sea staghorn (Codium fragile) extracts in the methanol-soluble fraction. Nitrite scavenging ability of seaweed extracts was also pH-dependent, highest at pH 1.2 and lowest at pH 6.0. Particularly, nitrite-scavenging abilities of water-soluble fractions obtained from laver and sea lettuce were similar to that of L-ascorbic acid at pH 1.2.

87BI0674. N.DELLA CROCE. OCEANOGRAFIA BIOLOGICA DEL MAR LIGURE E ALTO TIRRENO. ATTI DEL 6 CONGR. ASSOC. ITALIANA OCEANOL. LIMNOL. 9-22. PN-2535. IT.

The Author briefly points out general concepts about Marine Biology, Ecology and Experimental Biology in relation to Biological Oceanology. Biological Oceanology identifies itself with the integrative processes which lead to study the Ocean as a biological system. In this Country, the study of the marine ecosystem from the biological point of view appears composite but rather disarticulate; moreover reviews dealing with this research field are regularly presented at international meetings (International Commission for the Scientific Exploration of the Mediterranean Sea) as well as, now and then, at national ones (Italian Society for Marine Biology).

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87TE0001. T.OKUBO, ET AL. 1971. SEISMIC SURVEY FOR CIVIL ENGINEERING BY HANDY-SEISMOGRAPH. ENGINEERING GEOLOGY. 12(2):83-103. PN-3013. JA.

Recently in the civil engineering field, the survey using Handy-Seismograph is getting to popularize connecting with actual works. There are 10 or more kinds of Handy-Seismograph apparatus which have already developed at in and out of Japan. It is a special merit that these any apparatus can be operated by only a few person (one-three), and are more simple, small size and light weight type as compared with the normal one. The survey by such handy type is named "Shallow Refraction Method" and as the name, it makes to better economy for near surface investigation. And so, it will be a new type of survey technique which holds extensive utilizing sphere, looking at the points of its simplification, movability, original measurement system and so on. Moreover, it will play a part in bring+.

87TE0002. T.IMAI, M.YOSHIMURA. 1972(6). THE RELATION OF MECHANICAL PROPERTIES OF SOILS TO P- AND S- WAVE VELOCITIES. GEOPHYS. EXPLOR. 25(6):15-22. SOC. EXPLOR. GEOPHYS. JAPAN. PN-3011. JA.

In recent years, as a method of soil investigation, the measurement of velocities of elastic waves (P- and S-waves) of soils has been important in technological purposes. We have developed a P- and S- wave velocity logging method for this purpose since a few years. Thus we have much experiences in measurement of P- and S-wave velocities. From the lot of data, we derived some interesting facts. In this paper, we discuss the relation of some index values in Soil Mechanics to P- and S-wave velocities, particularly the relation between the N-Value and S- wave velocity. Furthermore, we discuss the difference between dynanic and static Young's moduli. The S wave velocity is a very important information in estimating the mechanical characteristics of soils in Civil Engineering.

87TE0003. M.MULCAHY. 1983(3). DEL NORTE POSITIONING SYSTEM WIDELY USED IN ALASKAN OFFSHORE. SEA TECHNOLOGY. 24(3):16-17. COMPASS PUB., ARLINGTON. PN-3008. EN.

87TE0004. A.D.BANASZEK. 1985(6). PROCEDURES AND PROBLEMS ASSOCIATED WITH THE CALIBRATION AND USE OF PRESSURE SENSORS FOR SEA LEVEL +. OCEAN DATA CONF. - EVALUATION, COMPARISON & CALIBRATION OF OCEAN INSTR 38P. PN-2960. EN.

Calibration of pressure sensors used in sea level measurement systems can be defined as the processes required to accurately convert the pressure sensor output to sea level relative to a known datum. These processes include relating the sensor output to pressure and then relating pressure to sea level. This paper describes the procedures necessary to convert the sensor output to pressure, the importance of other parameters required to convert pressure to sea level in practical systems, and the results and accuracies presently obtainable.

87TE0005. R.SPENCER, J.M.VASSIE. 1985(6). COMPARISON OF SEA-LEVEL MEASUREMENTS OBTAINED FROM DEEP PRESSURE SENSORS. OCEAN DATA CONF. - EVALUATION, COMPARISON & CALIBRATION OF OCEAN INSTR 25P. PN-2959. EN.

The object of this paper is to assess and quantify the performance of high pressure sensors for oceanographic use by demonstrating the results from several long term deployments especially where there were several sensors or different instruments at the same location. Although the institute of Oceanographic sciences (I.O.S.) has been involved in taking bottom pressure records in the deep ocean for over 10 years from more than 50 pelagic stations, this discussion will concentrate mainly on recent work carried out using the Mark IV bottom pressure recorder.

87TE0006. P.G.COLLAR, D.ECCLES, M.J.HOWARTH, N.W.MILLARD. 1985(6). AN INTERCOMPARISON OF HF RADAR OBSERVATIONS OF SURFACE CURRENTS WITH MOORED CURRENT METER DATA AND+. OCEAN DATA CONF. - EVALUATION, COMPARISON & CALIBRATION OF OCEAN INSTR 24P. PN-2961. EN.

87TE0007. M.J.TUCKER. 1985(6). EVALUATION AND COMPARISON OF INSTRUMENTS. OCEAN DATA CONF. - EVALUATION, COMPARISON & CALIBRATION OF OCEAN INSTR 20P. PN-2957. EN.

87TE0008. M.HOM-MA, K.HORIKAWA. COASTAL PROTECTION WORKS AND RELATED PROBLEMS IN JAPAN. PROC. 7TH CONF. COASTAL ENG. 904-930. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2588. EN.

87TE0009. M.E.PARKER, J.B.HERBICH. DRAG AND INERTIA COEFFICIENTS FOR PARTIALLY-BURIED OFFSHORE PIPELINES. OTC PAPER. (3072):217-224. OFFSHORE TECH. CONF. PN-2835. EN.

This model study was designed to simulate more accurately the actual design conditions for most offshore pipelines. The data were analyzed by two approaches: (1) presentation of results in terms of a dimensionless force that can be used to give a prototype force estimation without requiring the calculation of the wave kinematics, and (2) presentation of drag, lift, and inertia coefficients that can be used in the Morison equation in combination with Stokes' third-order wave theory. All results have been presented in a dimensionless form. Assuming that the laws of hydraulic modeling are followed and that there are no scale effects, these results can be used for determining the wave-induced forces on a partially buried pipeline.

87TE0010. M.HOM-MA, K.HORIKAWA. 1165. EXPERIMENTAL STUDY ON TOTAL WAVE FORCE AGAINST SEA WALL. COASTAL ENG. JAPAN. 8:119-129. JAPAN SOC. CIVIL ENG., TOKYO. PN-2618. EN.

87TE0011. T.SHIMANO, M.HOM-MA, K.HORIKAWA,

T.SAKOU. 1957. FUNCTIONS OF GROINS - FUNDAMENTAL STUDY ON BEACH SEDIMENT AFFECTED BY GROINS (1). PROC. 4TH CONF. COASTAL ENG. 111-121. PN-2564. EN.

87TE0012. K.HORIKAWA, C.SONU. 1958. AN EXPERIMENTAL STUDY ON THE EFFECT OF COASTAL GROINS. COASTAL ENG. JAPAN. 1:59-74. JAPAN SOC. CIVIL ENG., TOKYO. PN-2562. EN.

87TE0013. T.SHIMANO, M.HOM-MA, K.HORIKAWA. 1958. EFFECT OF A JETTY ON NEARSHORE CURRENTS -MODEL EXPERIMENT-. COASTAL ENG. JAPAN. 1:45-58. JAPAN SOC. CIVIL ENG., TOKYO. PN-2563. EN.

87TE0014. M.HOM-MA, T.SAKOU. 1959. AN EXPERIMENTAL STUDY OF THE SUBMERGED BREAKWATER. COASTAL ENG. JAPAN. 2:103-109. JAPAN SOC. CIVIL ENG., TOKYO. PN-2566. EN.

87TE0015. M.HOM-MA, K.HORIKAWA. 1961. A STUDY ON SUBMERGED BREAKWATERS. COASTAL ENG. JAPAN. 4:85-102. JAPAN SOC. CIVIL ENG., TOKYO. PN-2612. EN.

87TE0016. M.HOM-MA, K.HORIKAWA. 1962(12). EXPERIMENTAL STUDIES ON THE COOLING WATER INTAKE SYSTEM FOR THE ATOMIC POWER PLANT AT TOKAI, JAPAN. COASTAL ENG. JAPAN. 5:19-41. JAPAN SOC. CIVIL ENG., TOKYO. PN-2613. EN.

87TE0017. Y.INAI, A.SEYAMA, T.TOGASHI. 1962(12). DESIGN AND EXECUTION OF A SUBMARINE COOLING WATER INTAKE SYSTEM FOR THE ATOMIC POWER PLANT, TOKAI,+. COASTAL ENG. JAPAN. 5:43-68. JAPAN SOC. CIVIL ENG., TOKYO. PN-2613. EN.

87TE0018. M.HOM-MA, K.HORIKAWA, H.MOCHIZUKI. 1964. AN EXPERIMENTAL STUDY ON FLOATING BREAKWATERS. COASTAL ENG. JAPAN. 7:85-94. JAPAN SOC. CIVIL ENG., TOKYO. PN-2617. EN.

87TE0019. C.G.LANGNER. 1969. THE ARTICULATED STINGER: A NEW TOOL FOR LAYING OFFSHORE PIPELINES. OTC PAPER. (1073):37-42. OFFSHORE TECH. CONF. PN-2799. EN.

A new form of pipe support structure, or stinger, has been designed for laying pipelines offshore from a pipe-laying barge. The new stinger consists of 4 to 12 segments, each about 50 feet in length. Each stinger segment is adjustably buoyant and contains rollers for supporting the pipe. The stinger segments are connected in series by special hinge joints which provide a limited degree of vertical, lateral, and torsional flexibility. Vertical flexibility increases the water depth capability, and lateral flexibility increases the weather capability of the stinger.

87TE0020. C.G.LANGNER. 1969. THE ARTICULATED STINGER: A NEW TOOL FOR LAYING OFFSHORE PIPELINES. OTC PAPER. (1073):37-42. OFFSHORE TECH. CONF. PN-2778. EN.

A new form of pipe support structure, or stinger, has been designed for laying pipelines offshore from a pipe-laying barge. The new stinger consists of 4 to 12 segments, each about 50 feet in length. Each stinger segment is adjustably buoyant and contains rollers for supporting the pipe. The stinger segments are connected in series by special hinge joints which provide a limited degree of vertical, lateral, and torsional flexibility. Vertical flexibility increases the water depth capability, and lateral flexibility increases the weather capability of the stinger.

87TE0021. J.T.POWERS, L.D.FINN. 1969. STRESS ANALYSIS OF OFFSHORE PIPELINES DUI.ING INSTALLATION. OTC PAPER. (1071):9-20. OFFSHORE TECH. CONF. PN-2780. EN.

A finite-beam-element, initial-value analysis procedure determines stresses in a subsea pipeline suspended between the ocean floor and a laybarge or stinger. The basic theory, its advantages over other theories, and a comparison of results with the results of analytical procedures based on other theories are included. The finite-element theory is applicable over a wide range of marine pipelaying problems, and compares favorably with other accepted theories in the ranges of their applicability.

87TE0022. J.O.JIRSA, J.C.WILHOIT JR., M.AGUIRRE, N.C.MOGBO. 1969. EFFECT OF CONCRETE COATING ON THE RIGIDITY OF 12 3/4-IN. LINE PIPE. OTC PAPER. (1074):47-51. OFFSHORE TECH. CONF. PN-2777. EN.

87TE0023. W.V.BREWER, D.A.DIXON. 1969. INFLUENCE OF LAY BARGE MOTIONS ON A DEEP WATER PIPELINE LAID UNDER TENSION. OTC PAPER. (1072):23-31. OFFSHORE TECH. CONF. PN-2779. EN.

Tensioning is a prime requirement for laying deep-water pipelines. Of the several new or improved pipe laying methods which have been proposed, or even utilized, all require tensioning of the pipeline to minimize stress in the critical area. In these methods the use of a stinger is optional. In the present work the authors have employed the same mathematical technique to study the sensitivity of a tensioned pipeline to lay barge motions, i.e., surge, heave and pitch. Two general trends emerge from the results, which are presented both in the form of graphs for several sizes of pipeline and for water depths up to 1,000 ft, and in the form of dimensionless charts. Surge, and to a lesser degree heave, is influential in shallow or intermediate water depths. Pitch becomes a critical par+.

87TE0024. P.M.AAGAARD, R.G.DEAN. 1969. WAVE FORCES: DATA ANALYSIS AND ENGINEERING CALCULATION METHOD. OTC PAPER. (1008):95-102. OFFSHORE TECH. CONF. PN-2793. EN.

This paper presents a method for calculating ocean wave forces on offshore drilling structures. The method

is based upon data from two full-scale wave force measurement installations in the ocean and a mathematical model representing hydrodynamic forces on submerged bodies in unsteady flow (Morison, et al., 1950) and the kinematic flow field of highly non-linear waves (Dean, 1950). The method is considered applicable to a broad range of wave conditions commonly encountered in offshore structure design. Several comparisons show that the method represents measured forces satisfactorily for engineering design.

87TE0025. B.OVUNC, H.MALLAREDDY. 1970. STRESS ANALYSIS OF OFFSHORE PIPELINES. OTC PAPER. (1222):727-731. OFFSHORE TECH. CONF. PN-2776. EN.

The intent of this presentation is to describe an iterative method for determining the stresses and the three-dimensional nonlinear configuration of subsea pipeline suspended between the ocean floor and a lay barge with or without stinger. If a stinger is used, it may be considered as composed by elements of desired length, rigidly or semi-rigidly connected or hinged to each other. The final shape of the pipeline can be improved and the stresses at the critical area can be minimized by applying a sufficient amount of tension from the barge to the pipeline.

87TE0026. S.W.SMALL. 1970. THE SUBMARINE PIPELINE AS A STRUCTURE. OTC PAPER. (1223):735-742. OFFSHORE TECH. CONF. PN-2798. EN.

In the past, design of submarine pipelines has not taken full cognizance of the fact that such pipelines are structures and should be designed as structures. The submarine pipeline is, in fact, an extremely complex structure. It is much more complex than many larger and more impressive surface structures. Structural design considerations both during and after construction are discussed. The submarine pipeline is seen to function as a continuous beam, a beam on elastic foundation, a tension member, a compression member, a pressure pipe, an externally-loaded conduit, and a suspension element. The system of loads on a submarine pipeline include gravitational, environmental, constuctional and operational loads.

87TE0027. J.R.WILKINS. 1970. OFFSHORE PIPELINE STRESS ANALYSIS. OTC PAPER. (1227):11-17. OFFSHORE TECH. CONF. PN-2775. EN.

This paper presents a method for analyzing the stresses induced in a submarine pipeline during installation. The analysis procedure utilizes finite difference equations and load-deflection curves to form a mathematical model of the pipeline-stinger-laybarge system from the deck of the barge to the sea floor. Example problems of both possible future deep-water pipelines and contemporary problems are given. A description of field tests involving 1 inch and 2 and 1/2 inch nominal pipe under varying tension and the results of a comparison of theoretical deflection with the test deflections are given. The basic equation for this analysis method and their derivations are given.

87TE0028. B.J.HARRIS, W.A.MORGAN, F.X.STUART. 1971. CONTROL SIMULATION STUDY OF A DYNAMICALLY POSITIONED PIPELAY BARGE SYSTEM FOR DEEPWATER OPERATION. OTC PAPER. (1506):883-892. OFFSHORE TECH. CONF. PN-2768. EN.

Extension of offshore pipe laying capabilities to water depths of 1500 feet or more is dependent upon the development of methods of controlling the pipelay barge at these depths. Dynamic positioning through regulation of propulsion units is one method of control currently being considered. A simulation study was performed on a hybrid computer to investigate this technique, using direct digital control of the variables (pipe tension, pipe lateral load and barge position). In the study it was possible not only to evaluate the behavior of the system but ultimately to develop a successful scheme for controlling it.

87TE0029. R.BLUMBERG, C.OSBORN, S.A.TAHER. 1971. ANALYSIS OF OCEAN ENGINEERING PROBLEMS IN OFFSHORE PIPELINING. OTC PAPER. (1356):297-303. OFFSHORE TECH. CONF. PN-2772. EN.

Ocean engineering problems discussed were developed from theoretical studies and engineering field monitoring of pipelaying operations in the Gulf of Mexico by American Science & Engineering company engineers. Pipeline monitoring was performed for a variety of lay barge-stinger combinations used by three major pipeline contractors in laying pipelines ranging up to 36 inches in diameter in water depths out to 320 feet. Total value of these pipelines is well in excess of $100 million. Ocean engineering problems riviewed include an analysis of the fourth order nonlinear differential equations which govern pipe bending stresses during laying operations and calculation of devit lifting schedules so that the submerged pipe may be safely raised for tie-ins and riser connections.

87TE0030. J.C.WILHOIT JR., J.E.MERWIN. 1971. THE EFFECT OF AXIAL TENSION ON MOMENT CARRYING CAPACITY OF LINE PIPE STRESSED BEYOND THE ELASTIC L+. OTC PAPER. (1355):293-296. OFFSHORE TECH. CONF. PN-2773. EN.

87TE0031. M.S.PRIEST. 1971. WAVE FORCES ON EXPOSED PIPELINES ON THE OCEAN BED. OTC PAPER. (1383):549-550. OFFSHORE TECH. CONF. PN-2770. EN.

As a step toward making reliance upon questionable coefficients unnecessary, the author offers an analysis of experimental data reported by two European laboratories. Physical quantities pertinent to the problem are arranged in dimensionless parameters, and the functional relations between parameters determined. These relations enable direct evaluation of the maximum horizontal and vertical components of wave force per unit length of pipeline from known pertinent quantities, for shallow water wave conditions.

87TE0032. P.BRANDO, G.SEBASTIANI. 1971. DETERMINATION OF SEALINES ELASTIC CURVES AND STRESSES TO BE EXPECTED DURING

LAYING OPERATIONS. OTC PAPER. (1354):279-285. OFFSHORE TECH. CONF. PN-2774. EN.

The article describes a finite elements calculation procedure to determine sealines elastic curves and stresses expected during laying operations both in presence and in absence of barge applied tension. The present method overcomes the difficulties encountered by other authors in determining complete curves which tend asymptotically to the stiffened catenary contour when deep water high tension and sealines with low specific gravity are to be considered. This method can also be used for small tension cases in shallow waters where the stiffened catenary formula would provide very high values for the maximum bending moment near the sea bottom.

87TE0033. B.OVUNC, H.MALLAREDDY. 1971. STRESS ANALYSIS OF OFFSHORE PIPELINES UNDER DYNAMIC LOADS. OTC PAPER. (1361):349-354. OFFSHORE TECH. CONF. PN-2769. EN.

The intent of this presentation is to describe a method for determining the natural frequencies, modal shapes and the stresses induced by dynamic loads applied to subsea pipelines suspended between the ocean floor and the lay barge or stinger. The pipe may be uniform or non-uniform cross section composed of several elements either hinged or semirigidly connected or rigidly connected. The analysis of offshore pipelines under static loads was obtained by the stiffness matrix method using an iterative procedure. The pipeline is assumed to be composed by finite elements and the static loads on the elements were transfered to the joint. The deformed configuration of the pipeline was determined.

87TE0034. S.W.SMALL, R.D.TAMBURELLO, P.J.PIASECKYI. 1971. SUBMARINE PIPELINE SUPPORT BY MARINE SEDIMENTS. OTC PAPER. (1357):309-315. OFFSHORE TECH. CONF. PN-2771. EN.

This paper deals with the submarine pipeline installed on the bottom. It summarizes the state of the art in submarine pipeline foundation design as extracted from publications available to the practicing engineer. In particular, it covers the quantitative evaluation of initial settlement. Various methods of analysis, using accepted theories of soil mechanics, are compared and evaluated. Practical problems with which the practicing engineer is faced are identified and discussed. These include the major problems associated with soils sampling, soils analysis and development of an analytical approach. A pragmatic approach to evaluating initial settlement of a pipeline is developed. Areas in which research and development might be of most immediate benefit are suggested.

87TE0035. T.SUNAMURA, K.HORIKAWA. 1972. A STUDY USING AERIAL PHOTOGRAPHS OF THE EFFECT OF PROTECTIVE STRUCTURES ON COASTAL CLIFF EROSION. COASTAL ENG. JAPAN. 15:105-111. JAPAN SOC. CIVIL ENG., TOKYO. PN-2636. EN.

87TE0036. J.DE JONG, R.J.BROWN. 1973. DEVELOPMENT AND UTILIZATION OF A DEEPWATER PIPELINE CONNECTOR. OTC PAPER. (1835):149-155. OFFSHORE TECH. CONF. PN-2767. EN.

This paper describes how one-atmosphere chambers might be utilized for making deepwater pipeline connections and, as well, provide the means whereby valves, controls, etc., can be encapsulated and readily serviced subsea. A new connector device is described. It makes use of the high seawater pressure available at depth for pulling one pipe end into close proximity with another and through a port located within a subsea one-atmosphere connector chamber. Control of the entire operation and final joining of the two pipe ends by means of conventional welding is accomplished within the manned chamber. Anticipated utilization of the connector includes deepwater pipeline constrction and repair connections. Modified connector chambers can be used for line tie-ins and riser connections.

87TE0037. G.C.DALEY. 1974. PHYSICAL INTERPRETATIONS OF THE INSTABILITIES ENCOUNTERED IN THE DEFLECTION EQUATIONS OF THE UNCON+. OTC PAPER. (1933):19-22. OFFSHORE TECH. CONF. PN-2766. EN.

For a pipeline of constant rigidity, horizontal tension, and submerged weight per unit length, there is a maximum value that the maximum sag-bend moment attains as the distance from the free end to the sea floor increases. This paper presents the results of a parametric study analyzing a pipeline displaced from the sea floor to some pipeline construction configuration. The pipeline is modeled as a continuous beam having constant submerged weight per unit length and a constant flexural rigidity throughout the length of the beam. The beam is taken as being under a constant horizontal tension or force with one end supported vertically by the sea floor. The governing differential equations are solved in terms of dimensionless combinations of the three characteristic variables - the subme+.

87TE0038. G.CLAUSS, C.KRUPPA. 1974. MODEL TESTING TECHNIQUES IN OFFSHORE PIPELINING. OTC PAPER. (1937):47-52. OFFSHORE TECH. CONF. PN-2765. EN.

If offshore pipelaying operations are to be simulated at model scale complete geometric similarity can not be maintained. Model pipe cross section dimensions and material have rather to be chosen in a way quite different from full scale conditions, in order to fulfill the relevant scaling laws. Using large deflection beam theory the latter are derived from first principles, allowing for gravity and elastic forces in addition to inertia forces. Recommendations for selecting model pipe material, geometry and possible liquid content are made.

87TE0039. K.HORIKAWA. 1974(10). COASTAL ENGINEERING PROBLEMS IN CONSTRUCTION OF HARBOURS. INT'L SYMP. ENG. PROBLEMS IN CREATING COASTAL INDUSTRIAL SITES, OCT. 1 1-29. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2575.

EN.

87TE0040. R.SERPAS, J.C.WILHOIT JR., J.E.MERWIN. 1975. THE EFFECTS OF YIELDING ON SUSPENDED PIPELINES UNDER TENSION USING A TRILINEAR MOMENT VS CURVATURE+. OTC PAPER. (2274):303-309. OFFSHORE TECH. CONF. PN-2762. EN.

This paper reports the effects of horizontal tension and angle of lift off from a support stinger on a suspended pipeline which is allowed to yield if the curvature becomes large enough. The effect of yielding over a support stinger, which results in a residual moment at the lift-off point, is also investigated. The technique developed for the solution of the suspended pipe problem employs a numerical procedure using Taylor series and a trilinear approximation to the moment vs curvature diagram for the pipe. A 16-in.-diameter pipe is used in the computations and the results are presented graphically. It is concluded that allowing the pipe to yield either in the suspended portion or over a support stinger does not significantly affect the depth attainable and horizontal tension can be +.

87TE0041. T.G.JOHNS, R.E.MESLOH, R.WINEGARDNER, J.E.SORENSON. 1975. INELASTIC BUCKLING OF PIPELINES UNDER COMBINED LOADS. OTC PAPER. (2209):635-641. OFFSHORE TECH. CONF. PN-2763. EN.

Investigation of the buckling characteristics of offshore pipelines produced solutions to nonlinear equilibrium and compatibility equations that demonstrate the pre- and postbuckling configurations of pipelines under combined loads. In general, this study enhances our understanding and insight into the nature of pre- and postbuckling behavior of pipelines having low diameter-to-thickness (D/t) ratios - i.e., in the range from 20 to 100.

87TE0042. J.G.BOUWKAMP. 1975. BUCKLING AND POST-BUCKLING STRENGTH OF CIRCULAR TUBULAR SECTIONS. OTC PAPER. (2204):583-588. OFFSHORE TECH. CONF. PN-2764. EN.

Results of axial load tests carried out on (8 5/8 in. x 0.219 in.) seamless and (12 3/4 in. x 0.250 in.) electric-weld Grade B line-pipes with slenderness ratios between 40 and 120 agreed reasonably well with predicted load values (using the tangent-modulus expression). Axial deformations prior to buckling were non-linear. Local plastic buckling caused a drastic reduction of the post buckling strength. Results indicate that an offshore tower under lateral loads can deform under ultimate conditions significantly more than a linear elastic analysis would indicate, thus increasing the earthquake resistance.

87TE0043. L.B.SERPAS, S.W.SMALL. 1975. ITERACTIVE PROCESS FOR SELECTION OF A DESIGN FOR DEEP WATER SUBMARINE PIPELINES. OTC PAPER. (2278):328-331. OFFSHORE TECH. CONF. PN-2761. EN.

A presentation of logics forming an iterative process entering into the planning and selection of a design for a deep-water submarine pipeline system. Shows the need to consider simultaneously various seemingly unrelated criteria, which in practice affect the design of the pipeline system. The overall view given could be profitably applied to a project early in the planning. The main purpose is that of identification and discussion of all of the many factors that enter into the selection of a design which leads to confidence in the feasibility of construction, the survival of the pipeline, and the reliability of the system to fulfill its financial commitments.

87TE0044. R.A.GRACE, S.A.NICINSKI. 1976. WAVE FORCE COEFFICIENTS FROM PIPELINE RESEARCH IN THE OCEAN. OTC PAPER. (2676):681-690. OFFSHORE TECH. CONF. PN-2759. EN.

The first year of a two-year research program called pipeline Survival under Ocean Wave Attack has been completed. A test pipe rig was designed, fabricated and placed in the ocean. This rig featured a 17-1/2-foot-long section of 16-inch-diameter steel pipe supported by, and 3 inches above, a base composed of steel channels and T beams. The base was 16 by 8 feet in plan and 4-1/2 inches deep. Stability of the whole arrangement on the sea floor was increased by using concrete slab inserts with the base and by filling the end parts of the pipe with steel chain. A 39-1/2-inch-long test section, towards the center of the pipe and supported by two steel rods on which strain gages had been placed, was used as the force sensor. One rod gave horizontal forces, the other vertical ones.

87TE0045. J.H.NATH, T.YAMAMOTO, J.C.WRIGHT. 1976. WAVE FORCES ON PIPES NEAR THE OCEAN BOTTOM. OTC PAPER. (2496):741-743. OFFSHORE TECH. CONF. PN-2760. EN.

Where wake effects are negligible, potential flow calculations predict well the lift and added mass forces acting on pipelines near the ocean floor when subjected to time dependent flows. Wake effects have a significant influence on the flow conditions and measured frequencies of vortex shedding can predict the drag force acting on the cylinder. The Strouhal number is a function of the gap below the cylinder. The added mass coefficient is much larger when the cylinder is near the boundary than when it is a free stream.

87TE0046. R.MATTEELLI, F.ANDREUZZI, F.TADDEI. 1976. SEA-LINE LAYING IN DEEP WATERS. OTC PAPER. (2677):695-703. OFFSHORE TECH. CONF. PN-2758. EN.

The laying of sea lines, by means of a lay barge, in deep waters, requires an accurate theoretical forecast of the bending stresses in the suspended span. In order to maintain the stress between a maximum allowable value, it is necessary to know the traction to be maintained applied to the sea line by the tensioner. In the mathematical model of the laying in deep waters neither the large deformations nor the large displacements can be neglected. Therefore, the equilibrium configuration is the solution of a nonlinear integrodifferential equation with idoneous boundary conditions. The resolutive technique of this equation

has involved a reformulation of the problem, namely, finally the solution of a nonlinear integral equations system. The presence of currents involves a deflection of+.

87TE0047. T.G.JOHNS, R.E.MESLOH, J.E.SORENSON. 1976. PROPAGATING BUCKLE ARRESTORS FOR OFFSHORE PIPELINES. OTC PAPER. (2680):721-724. OFFSHORE TECH. CONF. PN-2756. EN.

When an underwater pipeline is buckled in the presence of sufficient external pressure, a propagating buckle is initiated, and the buckle front will propagate along the pipeline until a region of much less external pressure is reached. This paper describes the results of experimental research on methods of arresting the advancement of a propagating buckle along the pipeline. The arresting capacities of three types of buckle arrestors conceived during this program, free-ring, welded-ring, and heavy-walled section arrestors, are described in detail. Results of propagating pressure experiments are also presented.

87TE0048. K.KAWASE, K.SEKITA, M.TANIYAMA. 1976. A PROCEDURE FOR REGULATING DEEP-SEA PIPELINE LAYING OPERATIONS IN ADVERSE SEA STATES. OTC PAPER. (2678):709-713. OFFSHORE TECH. CONF. PN-2757. EN.

In order to help establish procedures for the design and installation of deep-sea pipelines by the lay-barge method, the dynamic behavior characteristics of the stinger and the pipeline being laid were theoretically analyzed, and their survival conditions were determined with prevailing sea conditions and lay-barge motions taken into account. Further, these theoretically determined dynamic behavior characteristics were proved to be true by both laboratory model tests and field measurements taken at an offshore installation site. These data were used to propose a procedure for regulating deep-sea pipeline-laying operations in adverse sea states.

87TE0049. T.G.JOHNS, M.A.TAMM. 1977. LOCAL BUCKLING OF CYLINDRICAL COLUMNS UNDER COMBINED LOADS. OTC PAPER. (2952):573-578. OFFSHORE TECH. CONF. PN-2753. EN.

Buckling of cylindrical columns in offshore platforms has long been of great concern to the industry. In this work is presented an analytical formulation of inelastic buckling of cylindrical members under combined external pressure and axial load. Development of the basic equations is presented in detail as is the results of an analytical parametric study of the effects of design variables D/t, length, yield stress, material work harden-ability. The results were found to closely reproduce experimental laboratory results published in the literature.

87TE0050. K.KARAL. 1977. LATERAL STABILITY OF SUBMARINE PIPELINES. OTC PAPER. (2967):71-75. OFFSHORE TECH. CONF. PN-2796. EN.

The upper bound approach of the theory of perfect plasticity has been applied to develop a method for geotechnical stability analysis of unburied submarine pipelines. The coefficient of lateral resistance of the soil and the corresponding displacements of the pipe depend on seven geometrical, loading and material parameters. Compared to the coefficients based on Coulomb friction, the coefficients obtained by the present method are, in general, higher for pipes on sand and lower for pipes on clay.

87TE0051. K.SEKITA, M.TANIYAMA, K.NISHIMURA. 1977. THE ESTIMATION OF LAY BARGE OPERATING RATES BY MODEL TESTING. OTC PAPER. (2913):285-287. OFFSHORE TECH. CONF. PN-2754. EN.

Great numbers of submarine pipelines for the transportation of petroleum, gas, and water have been recently constructed worldwide, and many others now are being constructed or planned. Most submarine pipelines are laid by the lay-barge method. But adverse deep-sea conditions cause excessive dynamic stresses to occur in pipe being laid, making it difficult to ensure safe and reliable pipeline installation. To analyze the dynamic behavior characteristics of the lay barge, the stinger, and the pipe being laid under unfavorable deep-sea conditions, we conducted model tests using a 1/60th scale lay-barge model and irregular waves with sites assumed to be Southeast Asian offshore areas in depths of 75 m.

87TE0052. K.R.DEMARS, V.A.NACCI, W.D.WANG. 1977. PIPELINE FAILURE: A NEED FOR IMPROVED ANALYSES AND SITE SURVEYS. OTC PAPER. (2966):63-68. OFFSHORE TECH. CONF. PN-2752. EN.

Pipeline failure data for the Gulf of Mexico are analyzed. Over 125 failures are considered with information primarily from government sources. Data show that failures have increased significantly from 7 in 1969 to over 40 in 1975. Pipeline failures are divided into four categories for analyses purposes including: (1) corrosion and normal wear, (21 abrasion and fatigue, (3) construction-related mishaps, and (4) sediment movement. Sediment instabilities may be directly or indirectly related to three of the four failure categories. The data show a need for detailed site surveys and stability analyses to improve pipeline performance. Additional improvements will come from the use of pipeline corridors in heavily developed areas but detailed feasibility studies will be needed prior to+.

87TE0053. T.MIYAKE, S.KURATA, T.HORI, K.SEKITA. 1977. AN INTEGRATED PROCESS COMPUTER CONTROL SYSTEM FOR LAY BARGE OPERATIONS. OTC PAPER. (2912):277-279. OFFSHORE TECH. CONF. PN-2755. EN.

The most important requirement in lay barge operations is that pipe be laid rapidly without damage. This makes it necessary to effectively organize all information and efficiently present it to the barge operator both in easy-to-understand form and on a real-time basis. Moreover, it is not easy to maneuver a lay barge by operating a number of winches, because loads can be allocated to the winches in an almost infinite number of combinations, making it impossible for the barge operator to effect correct load allocations on a real-time basis while maintaining static and

dynamic balances between the barge/stinger and the sea bed.

87TE0054. R.SLETTEN, S.FJELD, B.ROLAND. 1977. IN-SERVICE INSPECTION OF NORTH SEA STRUCTURES. OTC PAPER. (2980):181-189. OFFSHORE TECH. CONF. PN-2795. EN.

87TE0055. T.HORIE, K.MURAKAMI, Y.KANEYAMA. 1978(3). NUMERICAL SIMULATION ON TIDAL CURRENT AND CONTAMINATED WATER DISPERSION IN THE OFF-TOKUSHIMA COAST. TECH. NOTE PORT & HARBOUR RES. INST. (309):3-46. PORT & HARBOUR RES. INST. PN-2323. JA.

This note describes the numerical simulation of the effect on tidal current and substance dispersion in the coast of Tokushima due to several proposed reclamation projects; they are the runway extension of Tokushima airport to the sea, a new reclamation in the off-Okinosu area near the mouth of Yoshino River, another reclamation in the off-Kaneiso area near Komatsujima City, etc. Tidal computation is carried out by two ways which are the case of wide area divided into 400 meter meshed and the case of narrow area divided into 200 meter meshed, because the extension area of the airport is too small to calculate with the wide area computation.

87TE0056. S.YAMAMOTO, T.SHIOZAWA. 1978(9). OPTIMUM DESIGN OF COMPOSITE BREAKWATER. TECH. NOTE PORT & HARBOUR RES. INST. (301):3-12. PORT & HARBOUR RES. INST. PN-2321. JA.

In this paper non-L.P. optimizing technique was applied to the most economic design of composite breakwater and the computer program was developed. We have ever decided the economic sectional form from experiences or trials at preliminary design but using this program we can obtain the most economic mound hight and caisson width in about 10 seconds and so. This program contains several assumptions in equations and numerical calculation but we think this program become useful for investigation of the cost if those assumptions are improved for the future.

87TE0057. J.BRAKEL, H.W.REINHARDT, L.J.OOSTLANDER. 1979. CONCENTRATED LOADINGON A THICK WALLED CONCRETE CYLLINDER. PROC. INT. SYMP. OFFSHORE STRUCTURE HELD AT COPPE, FEDERAL UNIV. RIO D 171-187. PN-2881. EN.

87TE0058. S.BIANCHI, S.CAO, V.OLIVERI. 1980. NEW SOLUTIONS AND IMPROVEMENTS TO PIPELAYING DEVELOPED DURING CONSTRUCTION OF VERY DEEP WATER SEAL+. OTC PAPER. (3739):35-42. OFFSHORE TECH. CONF. PN-2750. EN.

This paper describes the main problems, at times unexpected, faced during the Messina crossing project, completed successfully in 1979 using for the first time the new generation semisubmersible pipelayer SAIPEM CASTORO SEI, whose features are mentioned in OTC 1979 paper 3502. Three 20 in. Lines have been laid from Favazzina on the Italian mainland to Mortelle, Sicily. This is part of a gasline system - under construction - from Algeria through Tunisia, across the Mediterranean to Sicily then to the Italian mainland northward to Bologna for a total of about 2,500 km. Problems faced and solutions adopted contribute to feasibility of future projects in deep waters.

87TE0059. C.G.LANGNER, H.M.WILKINSON. 1980. INSTALLATION OF THE COGNAC 12-INCH PIPELINE. OTC PAPER. (3740):45-49. OFFSHORE TECH. CONF. PN-2749. EN.

The Cognac Pipeline, installed in May 1979, is believed to be the deepest operating oil pipeline in the world, reaching a maximum depth of 1020 feet. Furthermore, the pipeline connection to the Cognac platform is believed to be the largest diameter and deepest J-tube riser installed to date. This paper describes the design and construction of this 27.5 mile long 12.75-inch diameter pipeline from Mississippi Canyon Block 194 in the gulf of Mexico to Shell's production facilities on the Southwest Pass of the Mississippi River Delta. The pipeline was laid using a conventional centerslot laybarge (McDermott's LB29) and a conventional five-segment articulated stinger. The only special laybarge equipment dictated by the extreme water depth was the mooring system, which consisted of twelve +.

87TE0060. H.W.O'DONNELL. 1980. OVERCOMING OBSTACLES IN LANDING PIPELINES. OTC PAPER. (3786):431-433. OFFSHORE TECH. CONF. PN-2790. EN.

Pipelines constructed from offshore areas often encounter physical barriers or obstacles as they come ashore. Obstacles encountered may be in the form of difficulties to construct through a heavy surf or unstable areas, environmental or recreational restrictions, construction difficulties from steep bluffs, or manmade developments such as roads, railroads or canals. Directional controlled horizontal drilling has been successfully used to install over 60 crossings of rivers and streams. These crossings have been installed under waterways up to 75 feet deep and 2,200 feet wide. It is a well-proven method for installing marine pipeline crossings with a maximum of security and a minimum of environmental damage. Use of this method to bring pipelines onshore in areas where obstacles make the+.

87TE0061. A.LOEKEN. 1980. THE "CREEP" ON THE EKOFISK-EMDEN 36" GAS PIPELINE. OTC PAPER. (3783):393-396. OFFSHORE TECH. CONF. PN-2745. EN.

After start-up of the 36" Ekofisk-emden gas pipeline, the bottom part of the riser at Ekofisk started to move towards the jacket. The movement resulted in the need to develop a permanent solution to the problem. This was performed by a piled anchor with one pile on each side of the pipeline. These piles are connected to the pipeline by two links attached to a mechanical clamp around the pipeline. The installation of this anchor was performed in October/November 1979. The pipeline has a somastic corrosion coating and a concrete weight

coating. The cover over the line is up to 6-10 ft and the operating temperature 70-110 Deg. F. Working pressures have mostly varied between 1200 psig and 1700 psig. The movement of the pipeline end is most likely due to a slow reduction in friction +.

87TE0062. S.ANAND, S.L.AGARWAL. 1980. FIELD AND LABORATORY STUDIES FOR EVALUATING SUBMARINE PIPELINE FRICTIONAL RESISTANCE. OTC PAPER. (3781):371-375. OFFSHORE TECH. CONF. PN-2746. EN.

For short pipelines installed between the shore and an offshore terminal or shore connections of long distance sea-lines or submarine effluent outfalls, the general method of installation is by pulling, usually in a trench, with the aid of a winch. To determine the winch capacity for pulling the pipeline and to check the lateral stability of the submarine pipeline, the frictional resistance between the pipe and the soil is required to be known for the longitudinal and lateral directions respectively. For this purpose tests were carried out under controlled conditions for different diameter pipes for model and prototype studies, for sandy and silty soils, both for longitudinal and lateral directions of pull. These tests were subsequently checked, during the actual installation of a sub+.

87TE0063. D.A.KNOLL, J.B.HERBICH. 1980. WAVE AND CURRENT FORCES ON A SUBMERGED OFFSHORE PIPELINE. OTC PAPER. (3762):227-230. OFFSHORE TECH. CONF. PN-2791. EN.

An investigation was conducted at Texas A&M University regarding the interaction of waves and currents, and their relationship to the forces on submerged pipelines. A model pipeline in a wave-current test facility was used to obtain experimental drag force values which were compared to values predicted by the Morison equation. The major input parameters required by this equation were the water particle kinematics of velocity and acceleration and the coefficients of drag and inertia. The horizontal velocity fields of the combined wave-current condition and the coefficient of drag were investigated specifically due to the drag-dominated condition caused by the small cylinder in a wave field of relatively long wave lengths. Each of the parameters was investigated individually in order to+.

87TE0064. C.G.LANGNER, H.M.WILKINSON. 1980. INSTALLATION OF THE COGNAC 12-INCH PIPELINE. OTC PAPER. (3740):45-49. OFFSHORE TECH. CONF. PN-2792. EN.

The Cognac Pipeline, installed in May 1979, is believed to be the deepest operating oil pipeline in the world, reaching a maximum depth of 1020 feet. furthermore, the pipeline connection to the Cognac platform is believed to be the largest diameter & deepest J-tube riser installed to date. This paper describes the design and construction of this 27.5 mile long 12.75-inch diameter pipeline from Mississippi canyon Block 194 in the Gulf of Mexico to Shell's production facilities on the Southwest Pass of the Mississippi River Delta. The pipeline was laid using a conventional centerslot laybarge and a conventional five-segment articulated stinger. The only special laybarge equipment dictated by the extreme water depth was the mooring system, which consisted of twelve 20 ton anchors with at+.

87TE0065. J.STRATING. 1981. A SURVEY OF PIPELINES IN THE NORTH SEA INCIDENTS DURING INSTALLATION, TESTING AND OPERATION. OTC PAPER. (4069):25-32. OFFSHORE TECH. CONF. PN-2785. EN.

A survey of incidents with pipelines in the North Sea has been carried out as a part of the comprehensive Netherlands Marine Technological Research program (MATS) sponsored by the Ministery of Economic Affairs. Nine operators and four government agencies in the Netherlands, Great Britain, Norway and Denmark were interviewed with regard to their experience with submarine pipelines. The operators were asked to supply information about incidents which occurred with their pipelines during installation, testing and operation. The government representatives explained the safety philosophy and technical requirements adopted by their respective offices. The paper discusses the main findings of the authorities on pipeline trenching (or burial), requirements. Subjects discussed are anchor hoo+.

87TE0066. B.DE SIVRY, B.G.SUDREAU, M.JEGOUSSE. 1981. NEW WELDING CONCEPT FOR PIPELINES: ELECTRON BEAM WELDING. OTC PAPER. (4101):299-304. OFFSHORE TECH. CONF. PN-2784. EN.

Large diameter pipelines can be laid in deep and ultra deep sea conditions using the J-curve Method with a dynamically positioned vessel and very fast single pass welding technique: the Electron Beam welding. Developments under study since 3 years at TOTAL-CFP have shown successively: Theoretical study of J-curve Laying, Feasability study of electron beam welding, Full scale tests of the major elements of the assembly. New full scale prototype has been built and a J-curve simulation has been done. This paper relates succesively: Feasability study introducing the different technological choices ..., Tests of the major elements, Final study of the prototype, Construction and assembly of the full scale prototype, Simulation J Laying with the real movements of the Laying Vessel (roll and +.

87TE0067. B.G.SUDREAU, B.DE SIVRY, O.R.ANSELME, C.BONNET. 1981. ELECTRON BEAM WELDABILITY FOR DEEP SEA PIPELINES. OTC PAPER. (4102):311-316. OFFSHORE TECH. CONF. PN-2783. EN.

Total has undertaken the development of electron beam welding procedures in order to adapt this high performance welding technique to offshore pipelines. fifteen hundred Weld runs in the horizontal-vertical position have been made up to now in order to obtain welds, corresponding to the specifications of API and according to an acceptance procedure with a view to certifying the process for pipeline welding. For that purpose we studied the influence of all the parameters (power, focusing current, welding speed, vibration) able to modify the morphology, the soundness, the fitting

and alignment tolerances, and the mechanical properties of the melted zone.

87TE0068. J.-L.MIGLIARESE, D.BONARIA, M.BAYLOT, G.HERVE. 1981. AUTOMATIC DEEP WATER PIPELINE REPAIR SYSTEM. OTC PAPER. (4029):195-198. OFFSHORE TECH. CONF. PN-2786. EN.

Deepsea pipeline repair is very expensive because of the operating costs, production loss and investments involved. A versatile system that can be put into operation very rapidly is thus required for dealing with emergencies. After the WELDAP project (welding in a atmospheric pressure) proved a success, TOTAL-CFP and ELF-AQUITAINE began in 1978 to develop a modular end preparation system for deep water pipeline repair. Operations are automated and remote-controlled through an umbilical from a dynamically positioned drillship. For this system five interchangeable tools have been developed. These tools must be used in conjunction with an adapted H-frame and are designed to remove the concrete and bitumen coating, make the final cut, clean inside and grind down the longitudinal weld be+.

87TE0069. H.MUESCH, J.LANGER, C.F.DUEREN, H.LUEGGER. 1981. FLASH BUTT WELDING FOR LARGE DIAMETER PIPES. OTC PAPER. (4103):327-331. OFFSHORE TECH. CONF. PN-2782. EN.

For economic reasons, large-diameter pipes with wall thicknesses of up to 40 mm are most suitable for J-method deep-water pipelaying. The welding process chosen is a modified flash butt welding process with inductive preheating. The suitability of this process was proven by means of a prototype machine designed for welding X 60 pipes of 30" diameter and 40 mm wall thickness. Numerous tests were carried out in order to optimize the welding parameters and to analyse the various influencing factors. The results have shown that the modified flash butt welding process incorporating a process of inductive normalizing the weld region produces high quality welds which fully meet the requirements of offshore pipelining. A condition is, however, that only pipes with a high degree of purity are+.

87TE0070. N.W.ROELOFSEN, J.J.DIKKER. 1981. PIPELINE TRENCHING FIRTH OF FORTH. OTC PAPER. (3984):301-303. OFFSHORE TECH. CONF. PN-2787. EN.

The gas produced by the Northern fields in the North Sea comes on shore at St. Fergus, Scotland. To link the terminal in St. Fergus to the national grid at Bishop auckland, Durham, British Gas Corporation planned a 42 inch onshore pipeline along the coast. Two river estuaries had to be crossed: The river Tay and the river Forth. The latter is the widest, at the crossing location the rivermouth is 18 kilometers wide. The waterdepth reaches 60 meters. With the coast-line only 10 kilometers to the east this area is exposed to the North Sea tide currents and waves.

87TE0071. N.W.ROELOFSEN, J.J.DIKKER. 1981. PIPELINE TRENCHING FIRTH OF FORTH. OTC PAPER. (3984):301-303. OFFSHORE TECH. CONF. PN-2742. EN.

The gas produced by the Northern fields in the North Sea comes on shore at St. Fergus, Scotland. To link the terminal in St. Fergus to the national grid at Bishop Auckland, Durham, British Gas Corporation planned a 42 inch onshore pipeline along the coast. Two river estuaries had to be crossed: The river Tay and the river Forth. The latter is the widest, at the corssing location the rivermouth is 18 kilometers wide. The waterdepth reaches 60 meters. With the coastline only 10 kilometers to the east this area is exposed to the North Sea tide currents and waves.

87TE0072. R.J.DE KOK. 1981. MARINE PIPELINE INSPECTION USING A TRACKING TECHNIQUE. OTC PAPER. (4058):449-452. OFFSHORE TECH. CONF. PN-2822. EN.

The pipeline tracking technique offers a considerable gain in efficiency in comparison with the currently used pipeline surveying technique. The new technique enables the survey vessel to move more or less parallel to the pipeline, instead of crossing time and again at right angles. The tracking technique employes a standard subbottom profiler together with two detectors, suspended from paravanes on each side of the ship. A colour-television system provides the helmsman with readily intelligible reflection information, which enables him to keep track of the pipeline.

87TE0073. V.D.TELLA, G.MINACH, P.VIELMO. 1981. A NEW OPERATING CABLE AND PIPE BURYING SYSTEM. OTC PAPER. (3983):283-286. OFFSHORE TECH. CONF. PN-2788. EN.

The use of pipes or cables laid on seabottom calls for the adoption of means to guarantee protection against possible damage caused by dragging anchors, trawler nets and the action of currents on free spans. The preferred protection method, most commonly used, is the burying of the cable or pipe in a trench of proper size dug along the line route: at present, for the most important cable and pipe laying projects, the national authorities prescribe a line burying for the whole route. To give a reliable solution to this construction problem, Tecnomare, on the basis of the design and construction experience gained during a previous project TM 102, has designed, built and tested a new system for the burying of underwater cables and pipes, named TM 402, which is now at an operating stage.

87TE0074. P.G.BERGAN, E.MOLLESTAD. 1981. IMPACT-RESPONSE BEHAVIOUR OF OFFSHORE PIPELINES. OTC PAPER. (4065):9-12. OFFSHORE TECH. CONF. PN-2823. EN.

A method for analyzing the dynamic behaviour of marine pipelines subjected to impact loads or sudden forced movements is outlined. Inertia forces (also from hydrodynamic mass), hydrodynamic drag forces as well as friction and lift effects for a pipe at the sea bottom are accounted for. An extensive nonlinear formulation is used for the pipe itself; it includes large displacements and elasto-plastic material behaviour. Aspects of the numerical formulation of the problem and the solution

of the nonlinear dynamic equations are discussed. The examples show computed dynamic response for pipelines lying on the sea floor and for a pipe section freely submerged in water when subjected to various force and displacement histories.

87TE0075. M.A.SOUZA, A.C.WALKER. 1981. VIBRATION CHARACTERISTICS OF BUCKLED CYLINDERS. PROC. 3RD INT'L. SYMP. OFFSHORE ENG. 382-394. PN-2836. EN.

87TE0076. J.J.JENSEN. 1981. IMPACT STRENGTH OF CONCRETE COATING ON PIPELINES. PROC. 3RD INT'L. SYMP. OFFSHORE ENG. 52-73. PN-2837. EN.

87TE0077. J.A.P.ARANHA, J.DE LIMA, J.J.CRUZ, V.C.F.IELO. 1981. A METHOD TO SOLVE THE PROBLEM OF ABANDON/RECOVERY OPERATION OF A PIPELINE. PROC. 3RD INT'L. SYMP. OFFSHORE ENG. 189-222. PN-2839. EN.

87TE0078. M.H.HIRATA, L.HSU, F.M.FARIAS. 1981. ON THE DESIGN AND DYNAMICAL ANALYSIS OF A RISER. PROC. 3RD INT'L. SYMP. OFFSHORE ENG. 414-435. PN-2841. EN.

87TE0079. A.J.FERRANTE, ET AL. 1981. ON THE USE OF MORISON EQUATION FOR STEEL JACKET STRUCTURES. PROC. 3RD INT'L. SYMP. OFFSHORE ENG. 290-300. PN-2840. EN.

87TE0080. HEE-DO.AHN. 1981(12). PRESENT AND FUTURE VIEWS OF COASTAL AND OFFSHORE STRUCTURES. BULL. KORDI. 3(2):133-140. KORDI., SEOUL. KO.

During the last decade there has been world wide interest both in ocean exploitation and in nearshore development. The interest is being extended from a water depth of 10 to 20 m to a depth 300 m or more, and construction works are accomplished by applying highly advanced engineering technology. Hence a great deal of investigations and technological development are necessary for the planning, designing and execution of these structures.

87TE0081. T.TAKAYAMA. 1981(3). WAVE DIFFRACTION AND WAVE HEIGHT DISTRIBUTION INSIDE A HARBOUR. TECH. NOTE PORT & HARBOUR RES. INST. (367):3-140. PORT & HARBOUR RES. INST. PN-2353. JA.

In constructing a new harbor, expanding or modifying the existing port facilities, one of the great concerns for port engineers is to secure calm water inside it, among other problems. The calmness in water condition inside a harbor may be influenced by waves, winds, currents and other factors, the waves intruding through its entrance being the most influential one. Though wave height generally decreases through diffraction in the presence of breakwaters at the entrance, the degree of the decrease is sometimes contrary to our expectation due mainly to the wave height amplification by reflection from seawalls or quays in a harbor. Therefore, a computing method with due consideration on wave reflection is necessary in estimating wave height inside it.

87TE0082. J.SAITOH. 1981(6). APPLICATION OF MULTIVAARIATE ANALYSIS TO PORT PLANNING. TECH. NOTE PORT & HARBOUR RES. INST. (382):3-50. PORT & HARBOUR RES. INST. PN-2328. JA.

In port planning, planners usually collect a large quantity of and various kinds of data to make a good port plan or to have a good judgement in port constructions. These data consist of sets of measurement on a number of individuals or objects, such that the sample data may be quantity of cargo and service level of some transportation drawn randomly. And then the statistical treatment may be made on a collection of measurements, such as quantity of cargo and service level. In doing such work, multivariate analysis is the most effective statistical treatment. Each technique of the multivariate analysis is introduced that has been developing in the fields of economics, psychology and sociology.

87TE0083. T.YAGYU. 1981(6). STUDY ON INFLUENTIAL DESIGN CONDITIONS FOR DESIGN OF PORT AND HARBOUR FACILITIES. TECH. NOTE PORT & HARBOUR RES. INST. (381):3-23. PORT & HARBOUR RES. INST. PN-2327. JA.

In design of port and harbour facilities, a lot of design conditions affect the design. Therefore, in order to make an optimum design, it is very effective to concentrate the efforts of developing technique and advancing precision concerning design conditions on the most influential elements. The most influential design conditions are identified by knowing the grade of influence of each design condition on the design. In this report, the influential design conditions are analyzed by using the method of design of experiment for typical port and harbour facilities such as composite breakwater, gravity type (Caisson) quaywall and sheet pile type wuaywall. The outcomes of the study are as follows.

87TE0084. K.SHIBATA, T.YAGYU, T.MURATA. 1981(6). DESIGN METHOD OF STEPPED FACE SEAWALL. TECH. NOTE PORT & HARBOUR RES. INST. (380):3-13. PORT & HARBOUR RES. INST. PN-2326. JA.

Shore protection facilities are constructed to secure the life, the property of man and the land from natural disaster. Recently, there are some criticism that those facilities are apt to prevent man from using coast easily. To avoid these problems, stepped face seawall have been constructed recently. The functions of this kind of seawall are not only to prevent disaster, but also to be used for sea bathing, walking on sea side and fishing. To improve the design method, we investigated the design methods on existing facilities in 1980, and the results were reported on technical note of the Port and Harbour Research Institute, No. 346. Herein, we have examined the result in details. And the recommendation on the design method of stepped face seawall is proposed in this report.

87TE0085. S.K.CHAKRABARTI, R.E.FRAMPTON. 1982. REVIEW OF RISER ANALYSIS TECHNIQUES. APPL. OCEAN RES. 4(2):73-90. COMP. MECH. PUB., ASHURST. PN-2801. EN.

A state-of-the art review of the riser analysis is presented. The papers starting with the Mohole project in early 1950 to the present day covering the analysis of a riser are discussed. It is shown how the earlier static analysis of the problem is superceded by a more advanced dynamic analysis with the advent of the modern computer. Several controversial areas in the analysis, e.g., the non-linear drag terms, the effective tension in the system, the buoyant weight of the riser and contents, the non-linearity due to large deformations, etc., are reviewed and the deficiencies of many works in these areas are pointed out. A detailed derivation of the horizontal equation of motion of the riser and interpretation of the various terms in the equations have been provided.

87TE0086. R.M.BRUSCHI, A.CONTER, R.MATTEELLI, A.MAZZOLI. 1982. DEEP-WATER PIPELINES: STRESS FORECASTING AND INTERVENTION PHILOSOPHY BEFORE, DURING, AND AFTER LAY+. OTC PAPER. (4235):63-69. OFFSHORE TECH. CONF. PN-2821. EN.

The growth in the demand for energy over the last ten years, has made it necessary to extend offshore hydrocarbon exploration to areas of deep water, often in hostile environmental conditions. For this reason, offshore technology is becoming increasingly sophisticated in order to provide satisfactory solutions to the new engineering and cost problems. Advances have been made in the development of design techniques for deep waters pipelines, and significant improvements have been achieved. Much has been said on the topic of installation techniques 1, 2, 3, 4, and on their importance in terms of the feasibility of an underwater crossing. This paper briefly examines the techniques used in the identification of the work required on the laying corridors, and on the assumed pipeline equil+.

87TE0087. R.G.BEA, R.P.AURORA. 1982. DESIGN OF PIPELINES IN MUDSLIDE AREAS. OTC PAPER. (4411):401-409. OFFSHORE TECH. CONF. PN-2819. EN.

A design strategy is presented for routing and configuring pipelines in mudslide areas. This strategy is illustrated with a case study of a pipeline in the Mississippi River Delta. The case study focuses on the geotechnical aspects of pipeline settlement, flotation, and analysis of mudslide forces and stresses.

87TE0088. R.M.BRUSCHI, G.BURESTI, A.CASTOLDI, E.MIGLIAVACCA. 1982. VORTEX SHEDDING OSCILLATIONS FOR SUBMARINE PIPELINES: COMPARISON BETWEEN FULL-SCALE EXPERIMENTS AN+. OTC PAPER. (4232):21-29. OFFSHORE TECH. CONF. PN-2781. EN.

The results of two experimental investigations, which were carried out in order to obtain information on the amplitude of vortex-excited oscillations of submarine pipelines, are analyzed. The first research, performed in a wind tunnel, concerned the measurement of the lift and drag forces acting on a model cylinder, in the proximity of a plane simulating the sea bottom. In the second research, a full-scale pipeline span was placed in a test field, where tidal currents were known to closely reproduce the design conditions. The response of the pipeline was recorded for different types of surface roughness, and the effectiveness of some devices aimed at reducing the vortex excited response were also checked.

87TE0089. M.B.BRYNDUM, R.S.COLQUHOUN, A.VERWEY. 1982. DYNAMIC LAY STRESSES FOR PIPELINES. OTC PAPER. (4267):469-473. OFFSHORE TECH. CONF. PN-2820. EN.

The modelling system Dynamic Seapipe is capable of simulating a wide range of physical pipeline systems and can thereby serve as a tool for dynamic structural analysis of different pipelaying techniques and operations. The basic equations describing the dynamic equilibrium of a pipestring subjected to various external forces are presented, together with the procedure for solving the resulting ten independent partial differential equations. The dynamic analyses of three different pipelaying situations, two from the North Sea in shallow water and one from the Mediterranean in greater water depth, are referred to.

87TE0090. T.K.DATTA. 1982. ABANDONMENT AND RECOVERY SOLUTION OF SUBMARINE PIPELINES. APPL. OCEAN RES. 4(4):247-252. COMP. MECH. PUB., ASHURST. PN-2800. EN.

Abandonment and recovery operation of submarine pipelines require a set of design data which enable this operation to be carried out without overstressing the pipeline. In this paper an analytical/graphical approach is presented for arriving at a solution which meets the above requirement. For the purpose of analysing the pipeline the finite difference method is adopted while the cable length attached to the pipeline is analysed by employing a line integration technique. The analysis is carried out under static forces which also include the effect of current velocity. The results of the analysis of the pipeline are composed into a set of graphical plots from which the initial conditions required for the analysis of the cable length are furnished. Using the above approach the design +.

87TE0091. S.IWASAKI, T.UCHIDA, M.FUKUI, S.TOYAMA. 1982(12). AUTOMATIC DESIGN OF CURTAIN WALL TYPE BREAKWATER. TECH. NOTE PORT & HARBOUR RES. INST. (435):3-46. PORT & HARBOUR RES. INST. PN-2331. JA.

This report presents the system and the design method of the automatic design system for curtain wall type breakwater. Using this system, we are able to design curtain wall type breakwater. This system has two functions as follows: (1) To calculate stresses of piles, bearing capacities of piles, deflections of superstructures and the costs required for the structures. (2) To calculate the dimension of piles which minimize the costs of structures being given allowable stresses and deformations.

87TE0092. M.FUKUI, T.UCHIDA. 1982(3). OPTIMUM DESIGN OF PORT AND HARBOUR STRUCTURES; CONVERGENCE AND VARIABLES ETC. IN THE OPTIMUM DESIG+. TECH. NOTE PORT & HARBOUR RES. INST. (406):3-48. PORT & HARBOUR RES. INST. PN-2329. JA.

We studied effect of initial values, penalty function and constants for convergent criterion in the computer program of optimum design of composite breakwater which we developed previously. And we studied process of convergence in the optimum design method by the computer program. As a result of the investigation, the usefullness of optimum design method by the computer program is clarified. Furthermore, we studied about the method how to take the constants and variables in the optimum design program for port and harbour structures effectively.

87TE0093. D.H.QIU. 1982(6). MAXIMUM TOTAL WAVE FORCES ON PILE GROUPS. ACTA OCEANOL. SINICA. 1(1):136-143. CHINA OCEAN PRESS, BEIJING. EN.

By using the concept of the joint probability distribution of independent stochastic variables, this paper gives an analysis of the maximum total wave forces on pile groups due to irregular wave action on the basis of Ref. [1]. Methods for calculating the maximum total wave forces on pile groups considering both the wave energy spectrum and the directional wave spectrum are also given in this paper. Special computer programs MAXTOTWAF-PGZ-1 and MAXTOTWAF-PGZ-2 are developed for the purpose of calculation.

87TE0094. T.UCHIDA, S.IWASAKI, M.FUKUI. 1982(9). AUTOMATIC DESIGN SYSTEM FOR CANTILEVER SHEET PILE BREAKWATER AND QUAYWALL. TECH. NOTE PORT & HARBOUR RES. INST. (428):3-29. PORT & HARBOUR RES. INST. PN-2330. JA.

This report presents the system and the design method of the automatic design system for cantilever sheet pile breakwater and quaywall. Using this system, we are able to design cantilever sheet pile breakwater and quaywall on the sand soil ground. This system has two functions as follows: (1) Examine a stability of structure for a given section. (2) Minimize the required amount of steels for the design of structures being given allowable stresses and deformations.

87TE0095. J.L.MAURICIO PORRAZ, M.T.CZERNIAK. 1983. APPLICATIONS OF IN-SITU FILLED CONTAINERS FOR ARCTIC STRUCTURES. COASTAL STRUCTURES '83. BK:601-609. ASCE., N.Y. PN-2727. EN.

Among the many concerns in the development of artificial islands, causeways, and other structures needed for arctic offshore activities is the ease and speed of construction during a short open-water season, specially in view of a shortage of certain construction materials and the high cost and difficulty of their importation. Sand bags have been widely used in the arctic for short service life applications and in less exposed to wave and ice attack, and for the larger service life required for production facilities, the limitations of sand bag protection become more pronounced. Structures can be built or protected by in-situ filled containers which can be deployed empty and inflated in place. There are several advantages to this approach that are particularly suited to arctic applic+.

87TE0096. N.MIMURA, T.SHIMIZU, K.HORIKAWA. 1983. LABORATORY STUDY ON THE INFLUENCE OF DETACHED BREAKWATER ON COASTAL CHANGE. COASTAL STRUCTURES '83. BK:740-752. ASCE., N.Y. PN-2609. EN.

A laboratory experiment was performed to study the influence of a detached breakwater on the neighboring beach. The experiment was divided into two cases, one for a natural beach and the other for a detached breakwater. Relevant quantities related to the wave and current fields, sand transport, and bottom topography were measured as accurately as possible. The two cases were compared to understand the influence of the breakwater on the waves, nearshore current, sediment transport, and topographic change.

87TE0097. R.A.EIMMERMAN, A.H.MOUSSELLI, M.B.YATES, J.D.MCNORGAN. 1983. DESIGN AND CONSTRUCTION OF THE HONDO SOUR GAS PIPELINE. OTC PAPER. (4452):75-81. OFFSHORE TECH. CONF. PN-2818. EN.

This 6.9 mile long subsea pipeline is designed to deliver 60 MMSCFD of sour natural gas from Exxon's "Hondo A" platform, which stands in 850' of water in the Santa Barbara Channel, to an onshore gas processing plant in Las Flores Canyon, 20 miles west of Santa Barbara, California. This 12" pipeline is the deepest water line from a platform to shore off the U.S. west Coast and is believed to be the third deepest line ever installed from a platform to shore. This paper covers details of the final pipeline design and also describes the installation of the offshore portion of the pipeline.

87TE0098. C.T.BISHOP, B.DEYOUNG, V.W.HARMS, N.W.ROSS. 1983. GUIDELINES FOR THE EFFECTIVE USE OF FLOATING TIRE BREAKWATERS. INFORMATION BULLETIN. (197):3-19. CORNELL UNIV., ITHACA. PN-2679. EN.

87TE0099. K.HORIKAWA, N.SHUTO. 1983. TSUNAMI DISASTERS AND PROTECTION MEASURES IN JAPAN. TSUNAMIS - THEIR SCI. & ENG. BK:9-22. TERRA SCIENTIFIC PUB., TOKYO. PN-2607. EN.

This paper is composed of three parts. The first part describes actual tsunami disasters caused directly by tsunamis, and also the secondary damage indirectly attributable to tsunami attacks. In order to demonstrate a typical example of disaster criteria, the subject of boat damage was investigated in relation to tsunami cresting height above mean sea level. The second part is devoted to the evaluation of the recurrence period of disasterous tsunamis based on several approaches. These approaches are principally divided into two categories, the first on the bases of tsunami magnitude records and the second on tsunamigenic earthquake records. As a

result of this treatment, it is concluded that the possible occurrence frequencies of the 1896 Sanriku tsunami, the 1933 Sanriku tsunami, an+.

87TE0100. A.J.GRASS, P.W.J.RAVEN, R.J.STUART, J.A.BRAY. 1983. THE INFLUENCE OF BOUNDARY LAYER VELOCITY GRADIENTS AND BED PROXIMITY ON VORTEX SHEDDING FROM FREE +. OTC PAPER. (4455):103-108. OFFSHORE TECH. CONF. PN-2814. EN.

The paper summarises the results of a laboratory study of the separate & combined effects of bed proximity & large velocity gradients on the frequency of vortex shedding from pipeline spans immersed in the thick boundary layers of tidal currents. Tests have been carried out using a rigid model pipeline cylinder in a water channel flow at subcritical Reynolds numbers. The measurements show that in the case of both sheared & uniform approach flows, with and without velocity gradients respectively, the Strouhal number defining the vortex shedding frequency progressively increases as the gap between the pipe base and the bed is reduced below two pipe diameters. The maximum increase in vortex shedding Strouhal number, recorded close to the bed in an approach flow with large velocity gradient+.

87TE0101. M.B.BRYNDUM, V.JACOBSEN, L.P.BRAND. 1983. HYDRODYNAMIC FORCES FROM WAVE AND CURRENT LOADS ON MARINE PIPELINES. OTC PAPER. (4454):95-100. OFFSHORE TECH. CONF. PN-2816. EN.

The weight coating requirements for assuring the on-bottom stability of several pipelines in the Arabian Gulf have been determined through an integrated design procedure including mathematical modelling for determining extreme wave conditions, field measurements of currents & physical model testing to establish the magnitude of the hydrodynamic forces. The paper describes in detail the hydrodynamic model testing. By using the carriage technique, scales varying from 1:1 to 1:4 have been obtained in the laboratory. Further by applying directly measured wave induced bottom velocities from a given sea state the design conditions have been reproduced correctly in the laboratory reducing scaling errors to a minimum. Thereby the uncertainties arising from the application of data from tests+.

87TE0102. G.L.ARCHER, A.J.ADAMS. 1983. THE BEHAVIOR OF CONCRETE OVER THIN FILM EPOXY COATINGS ON OFFSHORE PIPELINES. OTC PAPER. (4453):85-89. OFFSHORE TECH. CONF. PN-2817. EN.

Problems have been experienced on lay-barges with the slippage of concrete weight coating when applied over TFE coatings. Tests were carried out on 42 inch concrete coated pipe samples, incorporating three different slip prevention methods, to determine the shear strength between the concrete and the pipe. Analyses were carried out to determine the resulting increase in the flexural stiffness of the pipe string adveloped by the concrete due to the varying shear strengths produced. It was found that the use of a rough band, consisting of flint chippings embedded in a layer of liquid epoxy on top of the TFE, was the optimum method. The advantages of this technique are that it is simple, cheap and only need be applied to a small area of the pipe so that the increase in stiffness can be c+.

87TE0103. C.P.ELLINAS, W.J.SUPPLE. 1983. BUCKLING DESIGN OF RING-STIFFENED CYLINDERS. OTC PAPER. (4472):253-259. OFFSHORE TECH. CONF. PN-2829. EN.

The paper reports on a study carried out by J.P. Kenny & Partners on behalf of the U.K. Department of Energy to update the Guidance Notes relating to the Buckling of Offshore Steel Structures. Ring-stiffened cylinders formed one of five categories of structural elements investigated by the authors in the course of the study. The paper presents comprehensive collections of test results gathered from all available sources worldwide relevant to the buckling of unstiffened and ring-stiffened cylinders under axial pressure and combined loadings. The collated results are compared with the corresponding predictions from various Code Recommendations. All forms of collapse, such as inter-ring shell buckling, general instability and ring-stiffener failure are considered. Conclusions are drawn+.

87TE0104. N.N.PANICKER, I.R.YANCEY. 1983. DEEPWATER PRODUCTION RISER. OTC PAPER. (4512):9-15. OFFSHORE TECH. CONF. PN-2813. EN.

A deepwater production riser design developed by Mobil Research and Development Corporation is presented. The riser consists of a lower rigid section terminated about 200 feet below the sea surface with a tensioning buoy assembly and a flexible upper section made of a bundle of flexible pipes. It is designed to be compliant to waves, currents and vessel motions and applicable to both mild and severe environments. Design, analysis, testing, and installation method are discussed.

87TE0105. A.WATANABE, K.HORIKAWA. 1983(3). REVIEW OF COASTAL STABILIZATION WORKS IN JAPAN. INT. CONF. COASTAL & PORT ENG. IN DEV. COUNTRIES, COLOMBO, MAR. 20-26, 186-200. PN-2606. EN.

Coastal stability practices executed in Japan over the past several decades are reviewed. Their histories are briefly described, followed by some typical examples of beach erosion problems together with the related coastal protection works and their successful or unsuccessful outcomes. After a comprehensive description of the causes of beach erosion, a comparison is made of the characteristics of various erosion control measures.

87TE0106. K.SHIBATA, H.UEDA, K.OHORI. 1983(6). STUDY ON THE DIMENSIONS OF EMBANKMENT AND SEAWALL. TECH. NOTE PORT & HARBOUR RES. INST. (448):3-418. PORT & HARBOUR RES. INST. PN-2333. JA.

Design conditions, design sections and other essential dimensions of 489 embankments and seawalls have been studied based on the data gathered through

questionnaires. Dominant relations among the dimensions of these facilities are also analyzed.

87TE0107. T.SAITOH. 1984. CONSTRUCTION OF MUTSU OGAWARA SINGLE ANCHOR LEG MOORING (SALM) BUOY BERTH AND SUBMARINE PIPELINE. CIVIL ENG. JAPAN. 27-36. JAPAN SOC. CIVIL ENG., TOKYO. PN-2794. EN.

87TE0108. V.JACOBSEN, M.B.BRYNDUM, J.FREDSOE. 1984. DETERMINATION OF FLOW KINEMATICS CLOSE TO MARINE PIPELINES AND THEIR USE IN STABILITY CALCULATIONS. OTC PAPER. (4833):481-487. OFFSHORE TECH. CONF. PN-2810. EN.

Most of the expressions describing the hydrodynamic forces on marine pipelines are based on free stream kinematics (undisturbed flow) and it is expected that these formulae will fail when oscillatory flow fields are considered. The presence of the pipe will locally change the flow field. A wake is formed in each half period and is then washed over the pipe in the following half period giving rise to relatively high local flow velocities, which differs significantly from the flow generated by the free stream. Through measurements of the flow velocities in the vicinity of the pipe the effect of the wake has been quantified. Furthermore, a hydrodynamic description of the flow field around a cylinder resting on a plane boundary exposed to a regular oscillating flow field is developed.

87TE0109. A.WATANABE, T.HARA, K.HORIKAWA. 1984. STUDY ON BREAKING CONDITION FOR COMPOUND WAVE TRAINS. COASTAL ENG. JAPAN. 27:71-82. JAPAN SOC. CIVIL ENG., TOKYO. PN-2652. EN.

New breaker indices expressed in terms of the ratio of the orbital velocity at a wave crest to the phase velocity are presented. Their applicability to the breaking of compound cross-waves on a sloping bed is confirmed with experimental data. An application method of the breaking criteria is described for numerical computations of the nearshore wave field where more than one wave train is involved. It is shown that locations of the breaking point behind a detached breakwater predicted by this method agree well with those observed in a laboratory experiment.

87TE0110. E.C.SMETAK, J.LOMBARDI, H.J.ROUSSEL, T.C.WOZNIAK. 1984. JACKET, DECK, AND PIPELINE INSTALLATION - LENA GUYED TOWER. OTC PAPER. (4683):319-323. OFFSHORE TECH. CONF. PN-2843. EN.

The installation of Exxon's Lena guyed tower set two new offshore records when the longest one-piece jacket was positioned on the seafloor and eight main piles were driven to 560 feet. The overall installation of the guyed tower jacket, decks, and pipelines required a variety of offshore installation procedures and extensive project planning. To minimize the potential for damage to the tower's guying system, an unconventional derrick barge mooring system was deployed at the installation site. A special pile latch assembly was developed to assist in installing six torsion piles. Installing 58 conductor strings required efficient handling of over 800 pieces of conductor pipe. following deck installation, two pipelines were installed through 1000-foot J-tubes using the direct pull meth+.

87TE0111. J.T.CONNOLLY, P.G.WYBRO. 1984. RISER ANALYSIS METHODS: COMPARISON WITH MEASURED FIELD DATA. OTC PAPER. (4735):217-220. OFFSHORE TECH. CONF. PN-2811. EN.

Predictions of riser responses using three time domain riser analysis methods were compared to full scale data. The transfer function, significant wave and random wave methods were used to predict response in the wave active zone and lower portion of an instrumented production riser. Simultaneous measurements of vessel motion, wave height, and riser stresses & rotations were obtained from the Dorada instrumented production riser system, located in the Spanish Mediterranean. Hydrodynamic interactive effects of the vessel hull on the fluid flow field around the riser have been approximately accounted for. Fluid flow was found to be altered by as much as 40 percent when considering fluid/vessel interaction.

87TE0112. P.A.FRIEZE, S.CHO, D.FAULKNER. 1984. STRENGTH OF RING-STIFFENED CYLINDERS UNDER COMBINED LOADS. OTC PAPER. (4714):39-46. OFFSHORE TECH. CONF. PN-2844. EN.

In the first part of the paper, the background, model parameters, model fabrication, test rig and instrumentation relating to combined axial compression and radial pressure tests on eighteen stress-relieved three bay ring stiffened cylinders is described. Four different geometries were involved and the results in terms of axial and hoop stresses at the collapse limit state are presented non-dimensionalised with respect to the corresponding static tensile yield stresses. Interaction curves for the four geometries are presented. The second part of the paper is concerned with deriving a strength formulation for ring stiffened cylinders subjected to axial loading and radial pressure. The basic formulation approaches a linear interaction for slender cylinders when the axial load is compre+.

87TE0113. C.H.HULSBERGEN. 1984. STIMULATED SELF-BURIAL OF SUBMARINE PIPELINES. OTC PAPER. (4667):171-175. OFFSHORE TECH. CONF. PN-2812. EN.

Under certain conditions submarine pipelines bury themselves down to two diameters below the original sea bed. A field example is presented, and an analysis is given of the possible mechanisms involved. Seeking a wider application of this phenomenon, a stimulated self-burial method is introduced, using fins attached to the pipe. Tentative laboratory tests show promising results.

87TE0114. H.T.AKTEN, S.LUND, D.M.MILLER. 1985. ON THE DESIGN AND CONSTRUCTION OF STATPIPE PIPELINE SYSTEM. OTC PAPER. (4922):247-255. OFFSHORE TECH. CONF. PN-2809. EN.

During the past two years, the laying and testing of

approximately 842 kms of submarine pipelines in the North Sea was successfully completed which involved twice crossing of the 300 m deep Norwegian Trench for the first time in its history. The longest and deepest project yet undertaken in the hostile waters of the North Sea was expectedly highly demanding with regard to engineering and construction planning preparations. All project specifications, contractors' operation procedures and manuals were diligently prepared, reviewed and implemented in a consolidated team approach. Extensive studies and field/laboratory tests were carried out on the performance of numerous materials considered for use in the project, particularly that of field joint materials and coating systems to verify+.

87TE0115. P.W.J.RAVEN, R.J.STUART, J.A.BRAY, P.S.LITTLEJOHNS. 1985. FULL-SCALE DYNAMIC TESTING OF SUBMARINE PIPELINE SPANS. OTC PAPER. (5005):395-400. OFFSHORE TECH. CONF. PN-2805. EN.

As part of a wider program of development to establish an improved basis for submarine pipeline span assessment, full scale testing was performed on 50 m and 40 m lengths of spanning 20-inch pipe in the strongly tidal Severn Estuary (UK). The spans have been tested over a range of incident velocities to promote responses including cross flow lock-in conditions. The tests were performed with smooth and replicated concrete roughness surfaces and a range of gaps between pipe and bed. Measurements of current, vortex shedding behaviour and span motions have been recorded and evaluated. The work has established a significant benchmark for the prediction of thresholds for the onset of adverse span response in relation to local current conditions. The full scale testing extends existing kno+.

87TE0116. F.G.NIELSEN, K.HERFJORD. 1985. THE IMPORTANCE OF NONLINEAR WAVE FORCES TO FATIGUE OF DEEPWATER STRUCTURES. OTC PAPER. (4952):493-498. OFFSHORE TECH. CONF. PN-2807. EN.

A large diameter, vertical cylinder is considered. Non-linear wave forces occur due to variation in wetted surface on the cylinder and the velocity square term in the Bernoulli equation. These effects cause forces at the sum and difference frequencies in a wave spectrum. For a structure with natural period of about 4 seconds, these second order forces make a significant contribution to the excitation force at resonance. Using a typical transfer function between wave force and hot spot stress, it is shown that the second order forces have an important effect on the estimated fatigue life of the structure.

87TE0117. R.J.BROWN, A.C.PALMER. 1985. SUBMARINE PIPELINE TRENCHING BY MULTIPASS PLOUGHS. OTC PAPER. (4925):283-288. OFFSHORE TECH. CONF. PN-2808. EN.

A major development program for large ploughs to trench submarine pipelines began in 1975, and has led to the construction of 13 ploughs, which have been used in many parts of the world. Deep trenches are best cut in a sequence of separate passes. The paper describes the development of the first multi-pass plough, used to trench the Gullfaks pipeline in 1984, and the application of the concept to Arctic pipelines, which may require trenches more than 4 m deep.

87TE0118. R.B.GAMBLE, D.G.JAMMAL, M.J.K.CRAIG. 1985. DEEPWATER PIPELINES: EAST BREAK AREA, OFFSHORE TEXAS. OTC PAPER. (4924):273-280. OFFSHORE TECH. CONF. PN-2834. EN.

Union Oil Company of California recently installed 27 miles of deepwater pipelines in the East Breaks Area, Offshore, Texas. The 6", 8" and 10" pipelines were laid in water depths of 200-1000 ft. These lines are a combination of rigid and flexible pipe and will transport crude oil and natural gas. This paper provides an overview of the project with discussion on the feasibility study, engineering and design, installation and support equipment, and the procedures implemented.

87TE0119. Y.N.ZHAO. 1985(1). THE EQUAL PROBABILISTIC COMBINATION BETWEEN SEA STATE AND RESPONSE OF STRUCTURE. ACTA OCEANOL. SINICA. 4(1):143-152. CHINA OCEAN PRESS, BEIJING. EN.

Combination of a fixed design wave height with various wave periods may exert quite different wave loads on ocean structure. The response of structure induced by mild sea state may be larger than that by severe sea state because the frequency of the spectral peak for mild sea state is near to the natural frequency of structure. Thus it is necessary to investigate the worst combination between wave height and period, and also the critical combination between sea state and response for any design criteria. This paper presents a new combinative mode of wave height and period for equal return period. The selections of original design wave height and the critical combination of sea state with response for equal probability are also discussed.

87TE0120. C.Z.GONG, G.H.DAI. 1985(4). MATHEMATICAL MODEL FOR WAVE DIFFRACTION OF GAP BREAKWATER. ACTA OCEANOL. SINICA. 4(2):320-331. CHINA OCEAN PRESS, BEIJING. EN.

By combining the singularity distributions method in mathematical-physical equation with the phenomenon of water surface oscillation, two kinds of wave diffraction model of gap breakwater are recommended for preliminary port planning and designing.

87TE0121. J.S.JIANG, G.S.LAO, P.X.HU. 1985(7). PREDICTION OF MOTION OF SEMI-SUBMERSIBLE DRILLING PLATFORM IN WAVES. ACTA OCEANOL. SINICA. 4(3):477-489. CHINA OCEAN PRESS, BEIJING. EN.

Starting from potential theory, this paper presents a new procedure for computing the hydrodynamic forces and six-degrees-of-freedom motion for a semi-submersible platform at an arbitrary heading in waves by using strip theory and linearized viscous damping hypothesis, taking the effects of the free surface and the interaction between main hulls into

account. The differential equations of motion for the floating platform are formulated in a new way and the associated computer programs are developed. Comparisons between the theoretical computing results and the full-scale and model-scale experiments show that the present method gives more accurate results than those by previous methods.

87TE0122. D.H.QIU, D.T.ZHU. 1986(4). WAVE FORCE ON PIER GROUP. ACTA OCEANOL. SINICA. 5(2):301-312. CHINA OCEAN PRESS, BEIJING. EN.

In the case of pier-group structures in offshore engineering construction, the calculation of wave forces on piers is quite complicated due to the wave scattering effect on the piers in group. In this paper, the diffraction problem of two piers with unequal diameters is studied and formulas for calculating wave forces on piers are given on the basis of MacCamy-Fuchs linear wave diffraction theory with a strict consideration on the phase difference between the piers in a pier-group.

87TE0123. Y.N.ZHAO. 1986(6). THE WORST DESIGN WAVE FOR THE EQUAL RETURN PERIOD. ACTA OCEANOL. SINICA. 2(1):155-164. CHINA OCEAN PRESS, BEIJING. EN.

The wave period will strongly affect the wave load, and the prevailing method of marine structure design, as adopted nowadays, will not obtain the requisite maximum wave load on structure. This paper presents a new method to determine the design wave that is conditioned by the principle of equal return period by selecting a set of the worst wave height and period which would produce the maximum wave load as a design wave. In this way, not only the given design criterion keeps constant but also the design load in the worst case can be obtained.

87TE0124. 1987. STATEMENT OF RESEARCH NEEDS IN OFFSHORE FOUNDATION DESIGN. UNDERWATER TECHNOLOGY. 13(2):6-13. PN-3055. EN.

A review has been made of the current and future research requirements relating to the design of the foundations of offshore structures. In this context the term 'research' is used widely to cover position papers, literature reviews and the establishment of data bases as well as the performance of field tests, laboratory experiments and analytical studies. Topics are classified according to priority; alpha being essential and urgent, beta being essential, gamma being necessary in the longer term. A number of prerequisites are identified if research results are to be quickly applied by industry.

87TE0125. P.W.PENNEY. 1987. OFFSHORE VEHICLE DESIGN: THE CONSEQUENCES OF OPERATING IN ICE. UNDERWATER TECHNOLOGY. 13(2):15-27. PN-3057. EN.

This paper reviews the problems likely to be encountered by ships and semi-submersibles if called upon to work in ice-covered or ice-infested waters. Operations recently undertaken in the Beaufort Sea are considered, though with the prospective renewal of the Antarctic Treaty in 1991 other locations and opportunities should not be overlooked. The effects upon stability, structure, propulsion and the design of the bow are examined as well as the measures required to protect the working man and the polar environment.

87TE0126. W.D.LOTH, A.C.PALMER. 1987. A HYBRID DRILLING SYSTEM FOR DEEP WATER IN THE ARCTIC. UNDERWATER TECHNOLOGY. 13(2):3-6. PN-3054. EN.

There is an established technology of offshore drilling and production in Arctic areas where the water is shallow or the ice is landfast. Promising areas for exploration have deep water and constantly-moving ice, and there the existing techniques are not applicable. One alternative approach is to set the whole system on the sea bed, and to supply it by submarines: that is technically feasible, but would demand an extensive development, which the economics are unlikely to justify. The paper puts forward a less radical 'hybrid' scheme: the drilling system is on the bottom, but it receives power, control, supplies and maintenance from an icebreaking surface ship, through a flexible riser-umbilical.

87TE0127. S.J.ARCHER. 1987. MODELLING THE OFFSHORE ENVIRONMENT. UNDERWATER TECHNOLOGY. 13(2):28-32. PN-3058. EN.

87TE0128. Y.L.CAO, S.G.ZHANG, G.N.HE. 1987(4). PSEUDO-STATIC ANALYSIS FOR DYNAMIC DEFORMATION BEHAVIOR OF OFFSHORE GRAVITY PLATFORM FOUNDATIONS. ACTA OCEANOL. SINICA. 6(2):304-310. CHINA OCEAN PRESS, BEIJING. EN.

Based on the analysis of cyclic triaxial test for the South-Sea sand, a comprehensive normalized model of soil stress-strain relationship is presented herein, which includes effects of not only initial stress states but also loading cycles. Consequently, a pseudo-static procedure to analyse the deformation behavior of foundations is suggested. Example of calculations shows that the suggested procedure is convenient in application.

87TE0129. CHEONG-RO.RYU, JONG-IN.KIM. 1987(7). WAVE REFLECTION CONTROL FUNCTIONS OF MOUNDS FOR A FOUNDATION OF BREAKWATERS. BULL. KOREAN FISH. SOC. 20(4):370-378. KOREAN FISH. SOC., PUSAN. KO.

Wave reflection control functions of mound for the foundation of composite and perforated breakwaters were investigated through the theoretical considerations. The theory developed is based on a simple summation of components of reflected waves. The applicability of the theory is assured by the comparative studies of the theoretical calculation and experimental data on the sea surface elevation in front of a breakwater. It is found that the reflection is mainly controlled by depth and width of the mound. In the design of composite type perforated breakwaters, the width of perforated part of the upright section can be decreased to less than half of the conventional design width for the same reflection by using the reflection control function of mound part and the reflection can be redu+.

87TE0130. DAI-AN.KIM. 1976(3). STUDIES ON STRENGTH OF NETTING (1) THE DECREASE IN STRENGTH OF NETTING TWINES BY KNOTTING. BULL. KOREAN FISH. SOC. 9(1):1-7. KOREAN FISH. SOC., PUSAN. EN.

The decrease in strength of netting twines at the knot may be regarded to be due mainly to the frictional force acting on the tip of the knot.

87TE0131. YOO-BUM.LEE. 1976(3). A STUDY ON THE INFLUENCE THAT THE COMPRESSION RATIO AFFECT THE EFFICIENCY OF 4 CYCLE DIESEL ENGINE+. BULL. KOREAN FISH. SOC. 9(1):74-78. KOREAN FISH. SOC., PUSAN. KO.

In this paper, the author experimented, by using the C.F.R. engine, how the functions of engine is changed when the compression ratio is raised. As the result of test, the best compression ratio is disernable in proportion to each fuel, and acknowledges that if the higher compression ratio were to exist other than the above one, efficiency of heat gets rather lower, and that the maximum output of engine decreases. And the best compression ratio changed according to supply calorie per each hour, and this change is more remarkable in the fuel of low cetane number. Consequently, the best compression ratio cannot be regardless of output in the fuel of low cetane number.

87TE0132. DAI-AN.KIM. 1976(3). STUDIES ON STRENGTH OF NETTING (2) THE KNOT STRENGTH OF KNOTTED NETTING WITH MESHES OPENED. BULL. KOREAN FISH. SOC. 9(1):13-18. KOREAN FISH. SOC., PUSAN. KO.

87TE0133. KWEOUN-OCK.CHO, HOO-KYU.OH. 1977(3). THE CHARACTERISTIC OF A TWO STAGE AMMONIA RECIPROCATING COMPRESSOR. BULL. KOREAN FISH. SOC. 10(1):65-69. KOREAN FISH. SOC., PUSAN. KO.

The characteristics of two stage compressor which is constituted of two separated reciprocating compressors was tested measuring the volumetric efficiency of each compressor at suction of both high and low pressure side using orifice type flowmeters. The volumetric efficiency of low pressure side compressor was lower than that of the high side when they were operating under the same compression ratio. And it tended to reduce obviously by lowering evaporating temperature resulting in a markable reduction of refrigerating capacity at the same time.

87TE0134. S.SUZUKI, Y.SHIRASAKI. 1981. LOCATION FINDING OF OFFSHORE SUBMARINE CABLES. OTC PAPER. (3986):319-323. OFFSHORE TECH. CONF. PN-2743. EN.

The theoretical basis for the search principle of submarine cables by magnetic techniques is explained. The magnetic search technique using the proton magnetometer is introduced as a highly accurate search method applicable to the detection of cable locations and fault points. The development of the search system hardware and the procedure of search operation are described. The successful results of the application of finding unarmored coaxial cables buried to a depth of about 70 to 90 cm into the seabed at a sea depth of about 70 m and armored cables laid at some 50 m sea depth are discussed with actual data. Furthermore, the results of simulation in the automatic detection of cables by analyzing actual magnetic field data using pattern recognition techniques are described.

87TE0135. YOUNG-HO.SEUNG, HO-KYUNG.JUN. 1981(4). PERFORMANCE TEST OF A LABORATORY-MADE CURRENT PROFILER IN SHALLOW WATER. BULL. KORDI. 3(1):39-42. KORDI., SEOUL. EN.

A simple method for the use of a current profiler introduced by duing and Johnson (1972) to measure vertical profiles of horizontal current was field tested. The tests showed that this instrument can be useful not only in the open ocean but in shallow water as well. Attention should be given to the fact that the compass of Aanderaa current meter should not be in reversed state when the profiler falls freely. The problem which arises especially in the shallow water may be from the casual errors in current speed due to the wave-induced ship motion transferred to the instrument through the wire. A special device, such as the universal joint, may reduce this type of errors when fitted to the junction of hull and roller-compartment.

87TE0136. H.R.SORHEIM, S.GREGERSEN, N.A.JENSSEN. 1983. DYNAMIC POSITIONING IN SINGLE-POINT MOORINGS. OTC PAPER. (4606):221-226. OFFSHORE TECH. CONF. PN-2833. EN.

This paper deals with the concept of and a system for complete control of the slowly varying bow motion of a bow-moored ship using dynamic positioning. System performance is shown by simulated case studies with an offshore loading tanker. Significant improvements of motion behaviour and mooring force performance are demonstrated. A complete positioning system is presently running successfully onboard a 125000 dwt tanker in the North Sea. Some preliminary results are shown.

87TE0137. H.S.J.ROE, E.DARLINGTON. 1985. A NEW ACOUSTIC CONTROL SYSTEM FOR DEEP PELAGIC TRAWLING CLOSE TO THE SEA BED. UNDERWATER TECHNOLOGY. 11(4):2-6. PN-2954. EN.

The design and operation of a new acoustic system for determining and controlling the height of a trawl above the sea bed is described. A specially designed transducer is integrated with the Institute of Oceanographic Sciences' acoustically telemetering net monitor. Using this system nets can be controlled and operated to within 10 m of the deep ocean floor in water depths of over 5000 m.

87TE0138. O.EGELAND, L.P.SOLLI. 1980. SOME APPROACHES TO THE COMPARISON OF RISER ANALYSIS METHODS AGAINST FULL-SCALE DATA. OTC PAPER. (3778):355-359. OFFSHORE TECH. CONF. PN-2747. EN.

Various methods of calculating riser response as applied in six computer programs are considered for

comparison against a set of full-scale data. The computer programs investigated employ either linearized, frequency domain solution, or time integration techniques with varying degrees of non-linearities included and for either regular waves or irregular sea. The methods to be used for the comparison with measured data are discussed in connection with test runs with the computer programs. It is recommended that the comparison is made in terms of linearized transfer functions and other parameters relevant to spectral analysis.

87TE0139. T.SUNAMURA, K.HORIKAWA. 1978. VISIBLE-REGION PHOTOGRAPHIC REMOTE SENSING OF NEARSHORE WATERS. PROC. 16TH COASTAL ENG. CONF. ASCE. 1439-1453. ASCE., N.Y. PN-2599. EN.

By use of a synchronized camera system, multiband black-and-white photographs and conventional color photographs were taken respectively with the purposes of testing filters available for shallow-water photographic bathymetry, and of checking the availability of low-cost process imagery for the study of coastal processes. Kodak Wratten filters 29, 58, and 90 were employed for the multiband photography. A Wratten 90 filter provided the best correlation between water depth and the photographic density. The low-cost imagery, obtained in a laboratory from the color photographs by applying ordinary filters without using any expensive image processing devices, proved to be useful.

87TE0140. J.G.BLACKINTON, D.M.HUSSONG, J.G.KOSALOS. 1983. FIRST RESULTS FROM A COMBINATION SIDE-SCAN SONAR AND SEAFLOOR MAPPING SYSTEM (SEA MARC II). OTC PAPER. (4478):307-311. OFFSHORE TECH. CONF. PN-2815. EN.

SeaMARC II (Sea Mapping and Remote Characterization) is both a conventional side-scan sonar and a bathymetric mapping system. It is a 12kHz, long-range, shallow-towed, high-speed system that produces an ocean floor image up to 10km wide. (By contrast SeaMARC I is a 30kHz deep towed, slow-speed side-scan only system). Bathymetry is determined by measuring 4000 times each second the magnitude and arrival angle of narrow band acoustic energy returned from each side of ship's track. Off-line processing of this series of vectors produces a seafloor bathymetric map along the track with a width 3.4 times the water depth. A 10 knot tow capability allows more than 4000 square kilometers to be surveyed each day.

87TE0141. A.R.HIBBS, W.S.WILSON. 1983(10). SATELLITES MAP THE OCEANS. IEEE SPECTRUM. 46-53. IEEE., N.Y. PN-2664. EN.

87TE0142. S.TANAKA, T.SUGIMURA, T.NISHIMURA, Y.HATAKEYAMA. 1983(5). ACCURACY OF DIRECT MEASUREMENT OF MEAN SURFACE WATER VELOCITY OF THE KUROSHIO USING MULTI-TEMPORAL+. 17TH INT. SYMP. REMOTE SENSING OF ENVIRON. 933-943. PN-2354. EN.

This paper discusses a method of directly measuring the mean surface velocity of the Kuroshio Current using multi-temporal NOAA-6/AVHRR imageries and investigating the accuracy of the measurements. The data from Channel 4 of the NOAA-6/AVHRR show the water temperature of the sea's surface; some special features such as a vortex, the so called "Sea Mark", can be clearly recognized along the line formed by the meeting of different water masses. The NOAA-6 imageries can be observed about every 12 hours; two successive imageries can give us the drifting distance during that period. If distance is divided by time, the result is corresponding water velocity. The accuracy of current velocity measurement was found to be 0.05 knots in standard deviation. The velocity distribution map of the +.

87TE0143. O.B.BROWN, R.E.CHENEY. 1983(6). ADVANCES IN SATELLITE OCEANOGRAPHY. REV. GEOPHYS. & SPACE PHYS. 21(5):1216-1230. AME. GEOPHYS. UNION, WASH. PN-2662. EN.

Progress has been made in the past four years by U.S. scientists in the development and application of active and passive satellite remote sensing techniques to the study of oceanic processes. This report summarizes technical advances and recent applications. Major advances have been made in developing and applying quantitative measurements from active and passive satellite based sensor systems launched in the late 1970's and that proven methodologies now exist to observe sea surface temperature, ocean elevation, ocean color, surface wind stress and waves, and to locate free drifting buoy data collection platforms. Many of the advances in technique and application have occurred using sensors which were experimental, i.e., not part of an operational satellite observing system. conseque+.

87TE0144. T.D.ALLAN, T.H.GUYMER. 1984. SEASAT MEASUREMENTS OF WIND AND WAVES ON SELECTED PASSES OVER JASIN. INT. J. REMOTE SENSING. 5(2):379-408. TAYLOR & FRANCIS, LONDON. PN-2693. EN.

SEASAT's ability to measure surface wind and wave fields over the area of the Joint Air-Sea Interaction experiment (JASIN) by means of its radar altimeter, microwave radiometer, scatterometer and synthetic aperture radar (SAR) has been analysed over some eight passes selected to provide a variety of surface conditions from light winds (4 m/s) to moderately strong winds (16-20 m/s). Comparisons were made not only with observations from research vessels and buoys but also between one SEASAT sensor and another. It is concluded that a description as accurate as surface observations but with considerably better resolution was achieved. The most difficult performance to assess was that of SAR. Although regular swell patterns were revealed on five of the passes examined it is still not clea+.

87TE0145. A.WADSWORTH, P.PIAU. 1985(5). OPERATIONAL REMOTE SENSING OF OIL SLICKS AT SEA BY MICROWAVE RADIOMETRY. PROC. EARSEL/ESA SYMP. "EUROPEAN REMOTE SENSING OPPORTUNITIES", STRASB 127-129.

PN-2670. EN.

Thanks to various research works conducted in different countries, microwave radiometry has proven its ability to help in fighting against hydrocarbon pollution at sea, in quantizing thickness and volume of the spills, and can now been considered as a mature tool. To help in defining the next generation of operational instruments, we should think in terms of systems on one hand, and integrate the region of interest, type of hydrocarbon, conditions of operations of the equipment on the other. After a survey of the work already conducted by IFP, the present paper tries to define the solutions that seem interesting for oil thickness and volume estimating in the case of the seas around France. The technical solutions and the integration into an operational system are being considered. Op+.

87TE0146. W.F.TOWNSEND, J.L.FELLOUS. 1986. TOPEX/POSEIDON: AN INTERNATONAL SATELLITE OCEANOGRAPHY MISSION. 37TH CONGR. INT. ASTRONAUT. FED., INSBRUCK, AUSTRIA, OCT. 4-11, 1986. PERGAMON PRESS, OXFORD. PN-2665. EN.

Broadly speaking, the goal of the Ocean Topography Experiment (TOPEX/POSEIDON) is to utilize satellite radar altimetry to provide global ocean topography measurements with sufficient accuracy and precision to significantly enhance our understanding of the general circulation of the global oceans. Such information is needed to better understand how the atmosphere drives the circulation of the oceans, how the oceans in turn influence the atmosphere and, ultimately, the role of the oceans in climate change. Current plans call for the U.S. National Aeronautics and Space Administration (NASA) and the French Centre National d'Etudes Spatiales (CNES) to collaborate on TOPEX/POSEIDON in order to more fully exploit the scientific value of the data. Earliest launch of TOPEX/POSEIDON would be in+.

87TE0147. W.BOUR, L.LOUBERSAC, P.RUAL. 1986(12). THEMATIC MAPPING OF REEFS BY PROCESSING OF SIMULATED SPOT SATELLITE DATA: APPLICATION TO THE TROCH+. MARINE ECOLOGY- PROG. SER. 34:243-249. INTER-RES., HALSTENBEK. PN-2967. EN.

Exploitation of trochus Trochus niloticus is important for Pacific islanders. Because trochus environments in New Caledonia are very extensive and access is difficult, synoptic methods of estimation are called for. High resolution remote sensing appears to be a particularly suitable method. Simulation of images to be obtained from the French SPOT satellite was carried out in New Caledonia in December 1983. This paper deals with the method used to process the digital high resolution images that will be produced by SPOT. Results are presented as thematic maps of the main reef environment types, with their respective surface areas.

87TE0148. JUNG-HEE.PARK, SANG-HAN.KIM. 1975(12). THE STUDY ON THE NOISE IN THE VESSEL. BULL. KOREAN FISH. SOC. 8(4):202-207. KOREAN FISH. SOC., PUSAN. KO.

During the term of June, 7 to August 11, the noises in the main engine room in terms of the r.p.m. of the Pung-Yang Ho (4,500 H.P.), the Chuk-Yang Ho (3,800 H.P.), the Dong-Bang Ho (3,000 H.P.), the Oh-Dae San Ho (2,600 H.P.), the Kwan-Ak-San Ho (1,000 H.P.) and the Back-Kyung Ho (850 H.P.) were measured with the use of sound level meter, which has measuring range 37-140 dB.

87TE0149. SOO-GIL.AHN. 1975(9). STUDY ON HEAT RELEASE RATE BY COMBUSTION IN DIESEL ENGINE. BULL. KOREAN FISH. SOC. 8(3):150-156. KOREAN FISH. SOC., PUSAN. KO.

This paper dealt itself with the relation of the heat release rate with crank angle in combustion process by adjusting the injection time, injection amount and engine speed of diesel engine. The result of test were obtained by analyzing indicator diagram of KUBOTA 2LKE diesel engine, where the indicator was used Textronix oscilloscope. Efficiency of engine was increased at the time of earlier injection time under the constant injection amount, and engine speed, but the pressure increasing was observed higher than the efficiency increasing.

87TE0150. JANG-GWEON.GO. 1976(12). STUDIES ON THE STABILITY QUALITIES TRAWLER. BULL. KOREAN FISH. SOC. 9(4):287-292. KOREAN FISH. SOC., PUSAN. KO.

The author studied the stability qualities of stern trawlers in the North Pacific Ocean according to Kato's simple judging method. The author selected 1,000 gross tonnage of A and B types, and calculated each characteristics for various conditions under 5 different free-board and 5 different KG. Finally, authour obtained some data of stability factors for the two types, and pointed out the zone of safety and danger between stability factor, GM and GZ max.

87TE0151. JUNG-HEE.PARK. 1976(9). THE STUDY ON THE NOISE IN THE VESSEL -EFFECT OF THE NOISE CONTROL BY THE NOISE ARRESTING ROOMS-. BULL. KOREAN FISH. SOC. 9(3):215-221. KOREAN FISH. SOC., PUSAN. KO.

In this study, Noise arresting effect of the noise control room from the transmission of surrounding noise was tested when the packing noise control rooms were sat up in the test room in which the prerecorded noise from an engine room was reradiated at the same level as the original pressure.

87TE0152. H.J.MIGLIORE, P.PALO. 1979. ANALYSIS OF BARGE MOTION USING STRIP AND THREE DIMENSIONAL THEORIES. OTC PAPER. (3558):1765-1769. OFFSHORE TECH. CONF. PN-2751. EN.

Strip theory is commonly used to analyze ship response to wave excitation for slender and shallow draft vessels. The two-dimensional nature of strip theory can introduce problems in analyzing barges, which have relatively low length-to-beam ratios and large draft. As part of recent OTEC work, three-dimensional response theory has been developed into a computer model that can be applied to both

slender and barge-like objects. The objectives of this study were to: (1) utilize both of these theories to analyze, in a systematic manner, box-like shapes for various drafts, periods of excitation and length-to-beam ratios (L/B), and (2) compare results as calculated from each theory. These results were for head-on seas only.

87TE0153. KI-YUN.KIM. 1979(12). MANOEUVRABILITIES OF THE M.S. "SAEBADA". BULL. KOREAN FISH. SOC. 12(4):209-215. KOREAN FISH. SOC., PUSAN. KO.

The manoeuvrabilities of a ship are decided by the values of her manoeuvring indices. The manoeuvring indices consist of two kinds: indices K and T. The former decides a ship's turning ability and the latter, the length of time delay to a steady turning motion after her rudder has finished the turn of an ordered angle. In this paper, the author figured out the values of the manoeuvring indices of the m.s. "SAEBADA" (GT: 2,275.7 ton), the training ship of the National Fisheries University of Busan through her Z test and analyzed these values and the other data which were obtained from her Z test to study her manoeuvrabilities.

87TE0154. A.WATANABE, K.HORIKAWA. 1980(8). RESPONSE OF A MOORED BUOY TO IRREGULAR WAVE FORCES. 3RD INT'L. SYMP. STOCHASTIC HYDRAULICS, AUG. 5-7, 1980. 1-12. PN-2604. EN.

The response of a moored buoy to both regular and irregular waves is investigated on the basis of the diffraction theory and experimental results. Only a circular cylindrical buoy moored by linear springs is treated. The diffraction theory on the buoy motion previously proposed by the authors is briefly described and is compared with the regular wave experiments to demonstrate the importance of nonlinear drag force components. Characteristics of buoy response to irregular waves are then discussed by applying the spectral analysis and the probability method to experimental data. The proposed theory is shown to be applicable for predicting the buoy motion in irregular waves.

87TE0155. HO-KYUNG.JUN, SUK-HYUN.HAAM. 1982(12). A MODIFIED RADIO BUOY. BULL. KORDI. 4(1/2):97-102. KORDI., SEOUL. KO.

A radio buoy was designed to study water movements, and tested through field experiments. This paper describes the details of this buoy as well as the field experiments. The buoy consists of three parts: antenna with electronic parts, housing and battery pack. The radio frequency (RF) used is 27 MHz which is the same RF as the KORDI's directional finder (ADFS-210). The average RF power transmitted is about 130mW. The bearing of the buoy is determined as the crossing point of the two buoy signals received at two fixed directional finder stations. The field experiments of this buoy were conducted twice, once in August and once in December in 1982 at the Kampo area of the Kyung-Sang Bukdo. The results of the experiment, however, were not so successful as expected due to lack of enou+.

87TE0156. B.J.NATVIG, M.BERTA. 1983. COMPREHENSIVE DYNAMIC ANALYSIS OF OFFSHORE LOADING CONCEPTS. OTC PAPER. (4499):477-484. OFFSHORE TECH. CONF. PN-2831. EN.

A computer based method for comprehensive analysis of Offshore Loading concepts is discussed. The method differs from much of the previous published work in that all of the following effects are accounted for: Non-linear time domain analysis in irregular seas. The frequency dependent added mass and potential damping are tackled by convolution integrals. Still water damping, wave damping and current damping have been included in accordance with advice given from NSMB, Wageningen. Two tankers, connected by a non-linear hawser, may be moored in tande.n. The moored tanker is modelled using all 6 degrees of freedom. Slowly varying wave drift and non-constant wind forces wrt. the instantaneous ship headings are included. Non-linear inertia forces, as they appear in the ship manoeuvering e+.

87TE0157. L.J.WEVERS, M.VLAMING, J.VERDONCK. 1985. WAVE AND MOTION MEASUREMENTS ON BOARD THE SEMISUBMERSIBLE PIPELAYING BARGE LB-200. OTC PAPER. (5028):57-61. OFFSHORE TECH. CONF. PN-2803. EN.

For a barge laying pipe under rough weatherconditions at sea, pitch, roll, heave, surge, sway and yaw are important phenomena to be known and monitored. It is of vital importance that the static and dynamic stresses in the pipe are kept within prescribed limits. The static bending stress in the pipe at the upper bend, on the stinger, and at the lower bend, near the sea bottom touch point, are highly dependent on the deformation of the pipe. The horizontal tension of the barge mooring lines will effect the static pipe deflection. However pipe deflection does not depend only upon static forces. Dynamic forces caused by dynamic barge motions add an important part to the sttesses in upper and lower pipe bends. Too much stress will cause pipe buckling in the bends and results in much del+.

87TE0158. E.G.PITT, R.W.PASCALL, J.VAN HETEREN. 1985(6). A COMPARISON OF THE MEASUREMENTS MADE BY TWO PITCH-ROLL BUOYS DURING THE NURWEC PROJECT. OCEAN DATA CONF. - EVALUATION, COMPARISON & CALIBRATION OF OCEAN INSTR 24P. PN-2958. EN.

87TE0159. D.M.ZHAO, ET AL. 1984(10). OBSERVATION OF HUMAN EEG AND TREMOR DURING SIMULATED HELIUM-OXYGEN SATURATION DIVING AT A DEPTH OF+. ACTA OCEANOL. SINICA. 3(4):586-595. CHINA OCEAN PRESS, BEIJING. EN.

EEG and tremor of three divers are recorded during simulated helium-oxygen saturation diving at a depth of 302 m. The results are as follows: 1. During the exposure to Helium-Oxygen, a decrease in alpha rhythm and increase in activity of theta and wave appear in subjects' EEGs and sometimes characteristics with sleep stage I are shown in individual EEG. 2. During the exposure to Helium-Oxygen, the increase in the

amplitude of postural tremor in 4-8 Hz and 8-13 Hz is recorded and the increase of the amplitude of 8-13 Hz is more noticeable. 3. During the exposure to Helium-Oxygen, all the divers suffered from fatigue, poor sleep and memory failure. These symptoms accorded with the records of the subjects' EEG and tremor.

87TE0160. H.D.ZHANG, H.X.WANG, J.H.GONG. 1984(4). PHYSIOLOGICAL FUNCTION AND DECOMPRESSION DURING LONG-TERM NITROGEN-OXYGEN SATURATION DIVING. ACTA OCEANOL. SINICA. 3(2):290-299. CHINA OCEAN PRESS, BEIJING. EN.

The present study aims: at (1) examining the effect of prolonged exposure to high pressure on physiological functions: (2) observing performance capacity and adaptive process of the organism, and (3) evaluating the validity of saturation decompression. The results obtained from 7 subjects show that they had good adaptive capacity and could undertake moderate work load. The uniform saturation decompression scheme used and no-decompression air excursion depth-time limit were proved to be safe. Up to now, only a few experiments of long-term exposure to 4.65 ATA nitrox atmosphere have been reported throughout the world, so the data accumulated have its reference value.

87TE0161. D.M.ZHAO, ET AL. 1984(7). CHANGES ON EEG DURING SIMULATED SATURATION DIVING. ACTA OCEANOL. SINICA. 3(3):441-449. CHINA OCEAN PRESS, BEIJING. EN.

During nitrogen-oxygen simulated saturation at a depth of 36.5 m the frequency, amplitude and index of alpha waves decreased and the activities of beta and theta wave increased on the EEGs at rest. After the pressure was decompressed to normal, they could recover to the predive level. During the air excursion diving at depths of 60 and 70 m, the parameters of EEG approximated to those of nitrogen-oxygen exposure. But at that time of the air excursion diving at a depth of 75 m they appeared the maximum. This showed that the changes related to the nitrogen partial pressure. There was an increase in slow waves during the simulated nitrogen-oxygen saturation.

87TE0162. B.S.CHEN. 1985(1). DECOMPRESSION FROM NITROGEN-OXYGEN SATURATION DIVING. ACTA OCEANOL. SINICA. 4(1):135-142. CHINA OCEAN PRESS, BEIJING. EN.

Nine experiments were carried out on 39 healthy male adults for a total of 54 decompressions from nitrogen-oxygen saturation diving at the depths of 20-50 m. Excess supersaturation pressures of nitrogen dissolved in 1200 min tissue were calculated at all depths in decompression. In Exp. VIII when chamber pressure was decompressed from 50 m to 35 m, a slight decompression sickness occurred, while pressure decrease in 1200 minutes reached 7.05 m. Based on the above-mentioned analysis and calculation, the stage decompression schedules of nitrogen-oxygen saturation exposure at 36.5 m were revised.

87TE0163. W.THORNILEY. 1987. THE EFFECTS OF NOISE IN THE DIVING ENVIRONMENT. UNDERWATER TECHNOLOGY. 13(2):14. PN-3056. EN.

87TE0164. Y.CHEN, F.L.CAI, M.H.QIU, P.A.XU. 1987(7). THE BEHAVIOUR OF ZINC 65 IN ARTIFICIAL MARINE MICROHABITAT. ACTA OCEANOL. SINICA. 6(3):444-451. CHINA OCEAN PRESS, BEIJING. EN.

The concentration of Zn under artificial conditions in suspended matter, sediment, algae, and excretion as well as its distribution in the organs of fish (Tilapia mossambia), prawn (Penaeus penicillatus), clam (Arca granosa), clam (Cyclina sinensis) are studied. The results show a high concentration factor of suspended matter, with a dynamic equilibrium of concentration by lagea arrived after two days. The concentration factor of Zn in the intestines of fish, prawn, clam and gills of clam are very high, and their excretive rate is rapid. It shows that the intestines and gills are critical organs of Zn concentration. The content of Zn in nucleic acid is highest, and is higher in RNA than in DNA, while that in organic acid is lowest.

87TE0165. D.M.ZHAO, ET AL. 1987(7). CHANGES ON EEG DURING SIMULATED NITROGEN-OXYGEN SATURATION DIVING. ACTA OCEANOL. SINICA. 6(3):452-460. CHINA OCEAN PRESS, BEINING. EN.

During nitrogen-oxygen simulated saturation at a depth of 36.5 m the frequency, amplitude and index of alpha waves decreased and the activities of beta and theta wave increased on the EEGs at rest. After the pressure was decompressed to normal, they could recover to the predive level. During the air excursion diving at depths of 60 and 70 m, the parameters of EEG approximated to those of nitrogen-oxygen exposure. But at that time of the air excursion diving at a depth of 75 m they appeared the maximum. This showed that the changes related to the nitrogen partial pressure. There was an increase in slow waves during the simulated nitrogen-oxygen saturation. The activities of slow wave decreased on the EEGs in case of hyperventilation. The photic stimulation to the eyes caused the s+.

87TE0166. M.HOM-MA, K.HORIKAWA. WAVE FORCES AGAINST SEA WALL. PROC. 9TH CONF. COASTAL ENG. 490-503. JAPAN SOC. CIVIL ENG., TOKYO. PN-2593. EN.

87TE0167. A MATHEMATICAL MODEL FOR WATER QUALITY CALCULATIONS IN RIVER SYSTEMS UNDER STEADY STATE CONDITIONS. DELFT HYDRAULICS LAB., DELFT. PN-3029. EN.

87TE0168. DELFT WATER QUALITY MODEL FOR 1-, 2- AND 3-DIMENSIONAL SYSTEMS. DELFT HYDRAULICS LAB., DELFT. PN-3025. EN.

87TE0169. ENVIRONMENTAL HYDRAULICS: SURFACE WATER POLLUTION CONTROL, WATER QUALITY PLANNING, ECOSYSTEM RESEA+. DELFT HYDRAULICS LAB., DELFT. PN-3026. EN.

87TE0170. THE TWO-DIMENSIONAL DEPTH

AVERAGED MATHEMATICAL MODEL WAQUA. 1-7. DELFT HYDRAULICS LAB., DELFT. PN-3021. EN.

87TE0171. K.HORIKAWA. 1960(1). SECONDARY WAVE CREST FORMATION. PROC. JAPAN SOC. CIVIL ENG. (66):50-58. JAPAN SOC. CIVIL ENG., TOKYO. PN-2589. EN.

The critical condition for the formation of secondary wave crests in shallow water has been studied using a wave channel 3 ft. deep by 1 ft. wide by 60 ft. long. In the preliminary experiment a horizontal model reef with a vertical drop at its seaward end was installed in order to extend the results of Mason and Keulegan. In later tests this model reef was taken out and the experiment was conducted for a horizontal bottom extending over the entire length of wave channel. The theoretical criterion introduced by Miche was found to be a fairly reliable index.

87TE0172. M.HOM-MA, K.HORIKAWA, S.KOMORI. 1966. RESPONSE CHARACTERISTICS OF UNDERWATER WAVE GAUGE. COASTAL ENG. JAPAN. 9:45-54. JAPAN SOC. CIVIL ENG., TOKYO. PN-2619. EN.

The paper concerns the characteristics of the correction factor which is introduced into the relationship between the water surface elevation of progressive waves and its corresponding fluctuation of underwater wave pressure. As a result of extensive investigations conducted both in laboratory and field, it is verified that the correction factor is well expressed by a certain function of relative water depth. By using an empirical formula proposed in this paper the power spectrum of surface elevation and its significant wave height off the Ohita Coast are estimated from the record of underwater pressure fluctuation. The estimated values, generally speaking, have a satisfactory agreement with the actual ones determined from the records of surface water elevation.

87TE0173. K.HORIKAWA, C.-T.KUO. 1966. A STUDY ON WAVE TRANSFORMATION INSIDE SURF ZONE. COASTAL ENG. JAPAN. 9:69-81. JAPAN SOC. CIVIL ENG., TOKYO. PN-2622. EN.

The wave transformation inside surf zone is treated analytically in this paper under the several appropriate assumptions. The theoretical curves computed numerically have a consistant agreement with the experimental data in the case of wave transformation on a horizontal bottom. On the other hand, in the case of wave transformation on a uniformly sloping beach, the analytical treatment seems to be inadequate to clarify the actual phenomena. Besides them the numerous data on wave height attenuation and others are presented in the graphical forms.

87TE0174. K.HORIKAWA, A.WATANABE. 1967. A STUDY ON SAND MOVEMENT DUE TO WAVE ACTION. COASTAL ENG. JAPAN. 10:39-57. JAPAN SOC. CIVIL ENG., TOKYO. PN-2624. EN.

87TE0175. K.HORIKAWA, H.NISHIMURA. 1968. CHARACTERISTIC OSCILLATION IN A BASIN WITH A BRANCH. COASTAL ENG. JAPAN. 11:59-68. JAPAN SOC. CIVIL ENG., TOKYO. PN-2627. EN.

87TE0176. K.HORIKAWA, N.SHUTO, H.NISHIMURA. 1969. CHARACTERISTIC OSCILLATION OF WATER IN AN L-SHAPED BAY. COASTAL ENG. JAPAN. 12:47-56. JAPAN SOC. CIVIL ENG., TOKYO. PN-2628. EN.

87TE0177. K.HORIKAWA, H.NISHIMURA. 1970. ON THE FUNCTION OF TSUNAMI BREAKWATERS. COASTAL ENG. JAPAN. 13:103-112. JAPAN SOC. CIVIL ENG., TOKYO. PN-2630. EN.

87TE0178. K.HORIKAWA, A.WATANABE. 1970. TURBULENCE AND SEDIMENT CONCENTRATION DUE TO WAVE. COASTAL ENG. JAPAN. 13:15-24. JAPAN SOC. CIVIL ENG., TOKYO. PN-2631. EN.

A new electrolytic turbulence transducer has been developed in order to measure the turbulent velocity fluctuation superposed on the oscillatory flow velocity. The aim of the present paper is firstly to describe the outline of this transducer and secondly to introduce some of the experimental results. The main items of the results are, 1) the vertical distribution of turbulence intensity averaged over one wave cycle, where the turbulence is induced by ripples which appear on the movable bed of wave flume, and 2) the correlation between the turbulence intensity and the characteristics of sediment particles at the same level such as their fall velocity and sediment concentration.

87TE0179. H.NISHIMURA, K.HORIKAWA, N.SHUTO. 1971. ON THE FUNCTION OF TSUNAMI BREAKWATERS. (REPORT NO. 2). COASTAL ENG. JAPAN. 14:63-72. JAPAN SOC. CIVIL ENG., TOKYO. PN-2633. EN.

As stated in Introduction of this paper, there are three difficult points exist in the one-dimensional treatment of bay water oscillations. The boundary conditions at the bay entrance have been mainly investigated in this paper, but they are closely related to each other and cannot be discussed separately. The actual motions of water particles are not one-dimensional at all and are much complicated in the vicinity of bay entrance. The suitable boundary conditions to be taken were examined by using the measured amplitudes and phases of stationary waves in the whole region, instead of the direct measurements of flow rate or water levels at the entrance. Further experimental data are needed in order to solve this problem more strictly and to connect the present results to the correction for+.

87TE0180. A.E.STRONG, R.J.DERYCKE, H.STUMPF. 1972. SATELLITE DETECTION OF UPWELLING AND COLD WATER EDDIES. PROC. 8TH INT. SYMP. REMOTE SENSING OF ENVIRON. 2-6 OCT. 1972. 1069-1081. ENVIRON. RES. INST. MICHIGAN. PN-2357. EN.

Two interesting cold water features have been witnessed by NOAA environmental satellites during the past year. (1) a sequence of 1 to 5 satellite images unveiled upwelling features off the Mexican Pacific Coast during February 1971. During the summer of

1972 a well developed "Tehuantepecer" was observed through ATS-3 sunglint information to be the driving force for this upwelling. (2) Cold eddies have been tracked for several years off Cape Hatteras as they move southwestward in the Sargasso Sea toward Cape Kennedy, Florida. Not only can they be monitored by the satellite's infrared sensors but at times cooler surface waters suppress cloud cover to reveal their location.

87TE0181. A.WATANABE, K.HORIKAWA. 1974. BREAKING WAVE FORCES ON A LARGE DIAMETER CELL. PROC. 14TH COASTAL ENG. CONF., COPENHAGEN, DENMARK, JUNE 1974. 1741-1760. ASCE., N.Y. PN-2585. EN.

Experiments have been carried out by using non-breaking waves and breaking waves to investigate the wave forces on a vertical circular cell located in the shallow water. Based on the experimental data, the drag coefficient and the inertia coefficient of a circular cylinder and the curling factor of breaking waves are estimated, and the computation methods of wave forces are examined. As a result, it is shown that the phase lag of inertia forces behind the accelerations of water particles should be considered for the estimation of the drag coefficient as well as the inertia coefficient. In addition the previous formula of the maximum breaking wave forces acting on a cell or a pile is revised by introducing the effects of the above-mentioned phase lag and another phase difference, both +.

87TE0182. R.KING. 1974. VORTEX EXCITED STRUCTURAL OSCILLATIONS OF A CIRCULAR CYLINDER IN STEADY CURRENTS. OTC PAPER. (1948):143-149. OFFSHORE TECH. CONF. PN-2797. EN.

This paper is applicable to offshore structures in locations where significant steady currents are encountered (e.g. the N. Sea). It emphasises the importance of considering excitation of fundamental and higher normal modes of structural oscillations in the flow direction, as these can be excited in velocities one quarter those required for cross-flow excitation. The use of free surface hydroelastic models is justified by quantitative correlation with full scale test results.

87TE0183. K.HORIKAWA, M.MIZUGUCHI, O.KITAZAWA. 1976(6). HYDRODYNAMIC FORCE ON A CIRCULAR CYLINDER IN A WAVE-CURRENT FIELD. ANN. REP. ENG. RES. INST., UNIV. TOKYO. 35:33-43. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2576. EN.

The evaluation of hydrodynamic forces on maritime structures which are located in a wave-current field, has been interested very recently in connection with the national project on the construction of bridges crossing over the Seto Inland Sea. The paper reported herein is the result of the preliminary study on the above subject. That is to say, the assumption of the interaction between waves and current being negligibly small is applied in the present treatment in order to avoid the complexity of analysis and experimental procedures. Therefore the results reported in this paper are at any rate the first approximation to the present problem, but its important aspects are included.

87TE0184. K.HORIKAWA, T.SASAKI, H.SAKURAMOTO. 1977. MATHEMATICAL AND LABORATORY MODELS OF SHORELINE CHANGES DUE TO DREDGED HOLES. J. FAC. ENG., UNIV. TOKYO. 34(1):49-57. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2577. EN.

Effects on shoreline shape due to exploitation of submarine deposits of sand and shingle were investigated using mathematical and laboratory models. The mathematical model was applied for an idealized sandy beach by using hindcasted waves, typical of those on the coast of Japan facing the Pacific Ocean. The experiment in a wave basin was conducted to examine the mathematical model, and the results proved its usefulness in predicting shoreline changes qualitatively. The quantitative discrepancies between the theoretical and experimental results are discussed in this paper.

87TE0185. H.NISHIMURA, M.ISOBE, K.HORIKAWA. 1977. HIGHER ORDER SOLUTIONS OF THE STOKES AND THE CNOIDAL WAVES. J. FAC. ENG., UNIV. TOKYO. 34(2):268-293. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2582. EN.

In this paper, the Stokes and the cnoidal wave theories are rediscussed comparatively by showing the way to derive the solutions in very similar manners, where the both theories are originated from exactly the same system of equations and boundary conditions. It is, however, very hard to develop these theories to higher order approximations as far as the traditional methods proposed by Skjelbreia and by Laitone are followed. In order to derive the solutions of arbitrary orders more systematically, the authors succeeded in establishing recurrence formulae for the wave solutions. Thus it becomes possible to use a computer successfully to calculate extremely high order solutions. Finally, as an application of these advanced theories, the limiting conditions for the convergence of each s+.

87TE0186. K.HORIKAWA, M.MIZUGUCHI, O.KITAZAWA, M.NAKAI. 1977(6). HYDRODYNAMIC FORCES ON A CIRCULAR CYLINDER IN A WAVE-CURRENT FIELD (REPORT NO. 2). ANN. REP. ENG. RES. INST., UNIV. TOKYO. 36:37-47. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2581. EN.

In order to determine precisely the hydrodynamic forces acting on a circular cylinder in a wave-current field, the authors devoted their main efforts to clarify the characteristic features of the interested field. As a first step, the theoretical treatment was made and its results were tested by comparing with the experimental data. Based on the above results, the analysis was made to determine the hydrodynamic forces on a circular cylinder, and adaptability of the method presented in the previous report was confirmed theoretically and experimentally.

87TE0187. H.NISHIMURA, M.ISOBE. 1978. ON THE VALIDITIES OF FINITE AMPLITUDE WAVE THEORIES. INT. CONF. WATER RESOURCES ENG. BANGKOK, THAILAND, 10-13 JAN., 1978. 363-373. PN-2587. EN.

This paper deals with the theories of conservative surface waves and their validities. A general theory for such waves is developed including both the Stokes and the cnoidal wave theories. The discussion will give an overall view of these traditional theories which are of great importance in the field of coastal engineering as well as wave hydrodynamics. As another application of these advanced solutions, the theoretical validities of the low order solutions, which are often used for engineering purposes, are examined in this paper through the evaluation of their relative errors.

87TE0188. A.WATANABE, P.THIMAKORN, A.D.GUPTA. 1978. CONCENTRATION OF SUSPENDED CLAY IN PERIODIC FLOW. PROC. 16TH COASTAL ENG. CONF. ASCE. 1918-1931. ASCE., N.Y. PN-2600. EN.

A diffusion model of clay-water flow is formulated to determine the time dependent concentration distribution of suspended clay in a two dimensional periodic flow. Taking into account the entrainment rate of the clay particle from the bed, the integrated diffusion equation to yield a solution of the time-variation of the clay concentration in the vicinity of the channel bed is derived. In addition the original diffusion equation is solved by means of the finite element method. An experiment was conducted in a recirculating two dimensional channel where sinusoidal current variation was generated upon the clay-water mixture. Results obtained from the experiment are compared with those derived from the model.

87TE0189. T.SARPKAYA, M.CINAR. 1980. HYDRODYNAMIC INTERFERENCE OF TWO CYLINDERS IN HARMONIC FLOW. OTC PAPER. (3775):333-337. OFFSHORE TECH. CONF. PN-2748. EN.

The lift, drag, and inertia coefficients have been determined experimentally for two cylinders at various positions subjected to harmonically oscillating flow. The cylinders were placed at 0 Deg., 30 Deg., 60 Deg., and 90 Deg. to the flow direction in separate series of tests. The spacing between the cylinder centers was varied from 1.5 diameters to 3.5 diameters. The results are presented in terms of the relative spacing, Keulegan-Carpenter number, and the flow direction.

87TE0190. K.HORIKAWA, M.ISOBE, M.SHIOZAKI. 1980(6). LABORATORY INVESTIGATIONS ON THE WAVE AND CURRENT SYSTEM INDUCED BY COASTAL STRUCTURES. ANN. REP. ENG. RES. INST., UNIV. TOKYO. 39:41-46. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2583. EN.

A preliminary investigation was carried out in a wave basin with the purpose of collecting accurate data which can be used to verify the adaptability of the numerical model expected to be developed in the near future. The experiments were made under the various conditions of waves and the alignment of coastal structures. Based on the detailed data of wave profiles and velocity field, the distributions of the wave height, the mean water level, and the radiation stress components were diagramatically shown. By using the above results, the mechanism of the nearshore current generation was discussed.

87TE0191. BYUNG-HO.CHOI. 1980(8). TIDE AND SURGE MODELING AT KORDI. BULL. KORDI. 2(1):85-87. KORDI., SEOUL. EN.

87TE0192. JANG-WON.CHAE. 1980(8). ESTIMATION OF DESIGN WAVE HEIGHT. BULL. KORDI. 2(1):9-14. KORDI., SEOUL. EN.

Design wave height at South Uist, U.K. was estimated from two years wave data, using both marginal probability density function and asymptotic distributions. For the distribution of individual wave heights Battjes method (1972) was modified in terms of wave period and steepness. The extreme wav : height can be reasonably estimated with averaged wave period over the observation period and upper limit value of wave steepness from scatter plot of Hs vs Tz. Three asymptotic distributions with various plotting position rules were applied to all the three hourly values of Hs and Hmax. Weibull distribution with Gumbel's plotting rule was well fitted. Grouping of high waves did not significantly affect the return period of extrapolated extreme wave height mainly due to the shortness of observa+.

87TE0193. N.STARSMORE. 1981. CONSISTANT DRAG AND ADDED MASS COEFFICIENTS FROM FULL-SCALE DATA. OTC PAPER. (3990):357-361. OFFSHORE TECH. CONF. PN-2741. EN.

A major problem with full-scale wave force experiments has been the derivation of Drag and Added Mass coefficients from the resulting data. Typically, derivations based on short samples of data (wave-by-wave procedures) show wide scatter and recourse is usually made to averaging data over several wave cycles. In the present paper, an examination of established laboratory results shows that conventional Drag and Added mass coefficients are very sensitive to the time delay between the Force and the Velocity, and this sensitivity leads to the scatter found in the full-scale data.

87TE0194. 1981. HONG KONG REPLACEMENT AIRPORT STUDY: WATER QUALITY MODELLING. DELFT HYDRAULICS LAB., DELFT. PN-3024. EN.

87TE0195. T.TAKAYAMA. 1981(3). WAVE DIFFRACTIAN AND WAVE HEIGHT DISTRIBUTION INSIDE A HARBOR. TECH. NOTE PORT & HARBOUR RES. INST. (367):1-140. PORT & HARBOUR RES. INST. PN-2353. JA.

In constructing a new harbor, expanding or modifying the existing port facilities, one of the great concerns for port engineers is to secure calm water inside it, among other problems. The calmness in water condition inside a harbor may be influenced by waves, winds, currents and other factors, the waves intruding through its entrance being the most influential one. Though wave height generally decreases through diffraction in the presence of breakwaters at the entrance, the degree of the decrease is sometimes contrary to our expectation due mainly to the wave height amplification by reflection from seawalls or

quays in a harbor. Therefore, a computing method with due consideration on wave reflection is necessary in estimating wave height inside it. However, no suitable approaches ha+.

87TE0196. BYUNG-HO.CHOI. 1981(4). A TIDE AND SURGE COMPUTATION FOR KYONGGI BAY. BULL. KORDI. 3(1):13-21. KORDI., SEOUL. EN.

A two-dimensional numerical model was established to compute the M2 tide and steady uniform wind effects on water levels in Kyonggi Bay in the west coast of Korea. The computed M2 tidal distribution agrees well with those known from observation lying within bounds +/- 10 cm in amplitude and +/- 5 Deg. in phase relative to the observed results. Experiments have been performed with the model to investigate the response of the bay to steady uniform wind stress fields suddenly created over the area. Some of preliminary results are presented and discussed.

87TE0197. KYUNG-TAE.JUNG. 1981(4). RESPONSE ANALYSIS OF SHALLOW WATER TIDES AT INCHEON. BULL. KORDI. 3(1):7-11. KORDI., SEOUL. KO.

A nine-year series of tidal data from Incheon, a reference tidal station of Korea, was analyzed by response method in an attempt to deduce the physical understanding of time varying patterns. It is found that substantial amount of non-orthogonal energies deduced from high order interactions between major harmonic components exist throughout the diurnal and semi-diurnal tidal bands. These phenomena are discussed in view of non-linear interactions and radiational effects.

87TE0198. N.E.HUANG. 1982. SURVEY OF REMOTE SENSING TECHNIQUES FOR WAVE MEASUREMENT. 38-79. WALLOPS FLIGHT CENTER, NASA. PN-2356. EN.

87TE0199. G.G.HARTNUP, ET AL. 1982. HYDRODYNAMIC TESTS ON MARINE RISERS. OTC PAPER. (4319):223-227. OFFSHORE TECH. CONF. PN-2826. EN.

This paper presents experimental techniques & resultant data from an ongoing programme of large scale laboratory tests on marine risers in waves. The experiments are being carried out in the No.3 tank of the National Maritime Institute in England which has a water depth of 25 ft (7.6 m). The range of models used represent full size risers of between 500-2000 ft (150-600 m) supported by semisubmersible or tension leg platforms. The measurements made include the wave elevation, surface platform motions, riser top and bottom end tensions and a large number of displacements and bending stresses along the riser length in long crested regular and irregular waves.

87TE0200. T.SARPKAYA, T.S.RAINES, D.O.TRYTTEN. 1982. WAVE FORCES ON INCLINED SMOOTH AND ROUGH CIRCULAR CYLINDERS. OTC PAPER. (4227):731-733. OFFSHORE TECH. CONF. PN-2825. EN.

The forces acting on yawed smooth & rough circular cylinders in a sinusoidally oscillating planar flow have been investigated experimentally and the force transfer coefficients have been evaluated. The results have shown that the so-called "independence principle" does not hold true over the range of Reynolds numbers and Keulegan-Carpenter numbers entered by the investigation. It has further been shown that the Morison equation predicts the measured force with the same degree of accuracy as that for the normal cylinder provided that the force coefficients appropriate to each yaw angle, Reynolds number, and Keulegan-Carpenter number are used.

87TE0201. 1982. MORPHOLOGICAL IMPACT OF PROPOSED REPLACEMENT AIRPORT AT CHEK LAP KOK, HONG KONG. DELFT HYDRAULICS LAB., DELFT. PN-3023. EN.

87TE0202. JANG-WON.CHAE, KWANG-SOO.LEE, WON-OH.SONG. 1982(12). SPECTRAL CHARACTERISTICS OF WIND-GENERATED WAVES AT MANLIPO, KOREA. BULL. KORDI. 4(1/2):11-16. KORDI., SEOUL. EN.

Wave measurements were made with a waverider buoy off Manlipo beach. The spectral analysis of typical 45-hours wave records shows that the wave spectra generated by northwesterly winds are well fitted by JONSWAP spectrum rather than pierson-Moskowitz spectrum. The slopes of the spectra are generally in good agreement with that (-5) of the Phillips' equilibrium range, but distortion of the slopes appears in reasonably well developed spectra.

87TE0203. M.KATO, T.ABE, M.TAMIYA, T.KUMAKIRI. 1983. DRAG FORCES ON OSCILLATING CYLINDERS IN A UNIFORM FLOW. OTC PAPER. (4591):95-99. OFFSHORE TECH. CONF. PN-2832. EN.

This paper describes the drag coefficients of cylinders oscillated in both in-line and transverse directions to a uniform flow. The drag coefficients have been obtained experimentally over a wide range of oscillating frequencies, amplitude and flow velocities for the cylinders of various diameters under simulated practical offshore conditions.

87TE0204. J.K.VANDIVER. 1983. DRAG COEFFICIENTS OF LONG FLEXIBLE CYLINDERS. OTC PAPER. (4490):405-410. OFFSHORE TECH. CONF. PN-2830. EN.

In the summer of 1981 a field experiment was conducted investigating the vibration response of long flexible cylinders to vortex shedding in a steady, uniform current. Two basic cylinder types were tested, both 75 feet in length. One cylinder was a cable 1.25 inches in diameter with seven pairs of internal biaxial accelerometers. The second cylinder was a steel pipe, 1.631 inches in diameter, carrying the cable inside. Drag force, current speed, tension, and biaxial acceleration at seven locations were measured. Drag coefficients in excess of 3.0 were measured for both the pipe and the cable under lockin conditions.

87TE0205. T.SARPKAYA, C.BAKMIS, M.A.STORM.

1984. HYDRODYNAMIC FORCES FROM COMBINED WAVE AND CURRENT FLOW ON SMOOTH AND ROUGH CIRCULAR CYLINDERS AT +. OTC PAPER. (4830):455-460. OFFSHORE TECH. CONF. PN-2845. EN.

Experiments were conducted with two smooth and two sand-roughened cylinders in a harmonically oscillating flow with current to determine the drag and inertia coefficients and to examine the effect of current-induced wake biasing on the modified Morison equation. The various flow parameters such as the relative current velocity, Reynolds number, and the Keulegan-Carpenter number were varied systematically and the in-line force measured simultaneously. The principal results, equally valid for smooth and rough cylinders, are as follows: the drag coefficient decreases with increasing relative current for a given Reynolds number and Keulegan-Carpenter number; the effect of wake biasing on the drag and inertia coefficients is most pronounced in the drag/inertia dominated regime; and the two+.

87TE0206. J.WOLFRAM, A.THEOPHANATOS. 1985. THE EFFECTS OF MARINE FOULING ON THE FLUID LOADING OF CYLINDERS: SOME EXPERIMENTAL RESULTS. OTC PAPER. (4954):517-521. OFFSHORE TECH. CONF. PN-2806. EN.

This paper describes laboratory based experiments to determine drag and inertia coefficients for cylinders covered with marine fouling. Real, rather than imitation fouling has been used in all cases. Various types of hard and soft fouling and long flapping seaweeds have been investigated. The experimental approach, which is new, is also described. The results indicate that marine fouling may cause a greater increase in fluid loading than is generally assumed.

87TE0207. A.BOKAIAN, F.GEOOLA. 1985. HYDRODYNAMIC FORCES ON A PAIR OF CYLINDERS. OTC PAPER. (5007):413-416. OFFSHORE TECH. CONF. PN-2804. EN.

Measurements are presented of forces on a pair of identical parallel circular cylinders with a smooth surface under a steady uniform flow. The drag coefficient of the cylinders was found to be a continuous function of the cylinders' spacing. With increasing the streamwise separation, whereas the transverse extent of the force field on the downstream cylinder indicated an increase, that on the upstream one showed a decrease. In the near wake, the lift forces attained peak values while the drag forces remained lower than the single cylinder value. The forces on the upstream body differed from those on an isolated body only if the two cylinders were as close as two diameters. Mutual interference effects were observed to be most significant at small separations.

87TE0208. C.LUSETTI. 1985. EVIDENZA DELLA MAREA POLARE NEL PORTO DI GENOVA - CONSIDERAZIONI. 11P. IST. IDROGR. MARINA, GENOVA. PN-2532. IT.

The aim of this work is to study the Pole Tide characteristics in the harbour of Genoa. The procedure is a preliminary spectral analysis followed by a filtering, to estimate the noise, performed by means of a technique illustrated by Currie (1981). Both spectral analysis and filtering are based on the Maximum Entropy Method. Finally a spectral analysis is performed on the filtered series. The results are a period of 14.6 months and an amplitude of about 1.5 cm.

87TE0209. R.Y.EDWARDS JR. 1985. HYDRODYNAMIC FORCES ON VESSELS STATIONED IN A CURRENT. OTC PAPER. (5032):99-101. OFFSHORE TECH. CONF. PN-2802. EN.

Two sets of model tests were conducted at the facilities of the Offshore Technology Corporation (OTC) to determine the hydrodynamic forces and moments exerted on ships stationed in a current. The first set of tests which were executed in 1981, involved a large drill ship in deep water. The tests were conducted in a conventional towing basin. A wide range of current speeds and yaw angles was investigated. A Reynold's Number based upon ship breadth of 500000 was achieved at large yaw angles. In 1983, the development of a unique current generating system in the OTC Wave and Current Basin was completed.

87TE0210. P.J.HUANG, B.L.ZHAO. 1985(7). PROBABILITY CHARACTERISTICS OF WAVE AND WAVE PRESSURES IN FRONT OF VERTICAL BREAKWATER. ACTA OCEANOL. SINICA. 4(3):490-501. CHINA OCEAN PRESS, BEIJING. EN.

The distribution of wave height in front of a vertical breakwater, the range of wave pressure fluctuation at different subsurface levels, and the wave periods have shown that they are practically invariable with depth and can be determined theoretically. The distribution of crest and trough of total pressures is the same as that of wave height. As far as different subsurface levels are concerned, the spectral constitution of wave pressure field and the regularity of attenuation of spectral components are analyzed at the vertical breakwater, and a new expression describing the equilibrium range of wave pressure spectrum obtained.

87TE0211. A.J.SCHLEISS. 1986(5). DESIGN OF PERVIOUS PRESSURE TUNNELS. INT. WATER POWER & DAM CONSTRUCTION. ELECTRICAL-ELECTRONIC PRESS. PN-2893. EN.

This article presents the summarized results of a study carried out by the author on the design of pervious pressure tunnels taking into account seepage forces and secondary permeability in lining and rock. The applicability of the traditional "pressure tunnel statics", which assume lining and rock as impervious, is discussed. New design criteria for pervious pressure tunnels are recommended.

87TE0212. Z.G.REN, J.HE. 1986(7). WAVE-CURRENT FORCE COEFFICIENTS FOR ISOLATED PILE. ACTA OCEANOL. SINICA. 5(3):465-473. CHINA OCEAN PRESS, BEIJING. EN.

Based on the linear wave theory and model experiment results, the wave-current force coefficients for isolated pile are investigated, using Morison's

formula to calculate the wave-current force. A formula is presented for determining the relative coefficients of the drag, in which the feature value of the wave-current field is proposed and used as an important parameter. According to the maximum wave-current force measured in the experiment, the coefficients of the drag force and inertia force are determined by statistical method of two-variable regression so that both of them are fitted in optimum.

87TE0213. D.L.VISCHER. 1986(9). ROCKFALL-INDUCED WAVES IN RESERVOIRS. INT. WATER POWER & DAM CONSTRUCTION. ELECTRICAL-ELECTRONIC PRESS. PN-2894. EN.

The shores of man-made reservoirs can be seriously damaged by rockfall-induced water waves. The same situation can, of course, occur in natural lakes, fjords and estuaries. Such rockfalls are described in this article, and treated as a special case of the more general phenomenon of shore instability. The hydrodynamic effects of these rockfalls have been investigated in a number of two-dimensional and three-dimensional model tests.

87TE0214. HYO-SEOB.KIM, SANG-RHYONG.LEE, KI-DAI.YUM, WON-OH.SONG. 1986(9). A NUMERICAL EXPERIMENT OF TIDAL CURRENT IN THE NARROW CHANNELS WITH ABRUPT SECTIONAL CHANGES. OCEAN RES. 8(1):57-62. KORDI., ANSAN. KO.

A numerical model was set up to simulate the tidal environment in the southwest coast of Korea having many narrow channels. The model used two-dimensional finite difference schemes in general, but also adopted one-dimensional scheme for the narrow Uldolmok and Mokpogu Channels. A lumped parameter was used to treat the energy loss due to the abrupt sectional change of those channels. The computed water levels for M2 tide were in good agreement with field measurements in the channels in terms of tidal range and phase. It is also shown that the general trend of tidal regime in the southwest coast of Korea can be reasonably produced by the present model.

87TE0215. Y.C.LI, F.R.ZHANG. 1987(7). WAVE-CURRENT FORCE ON VERTICAL PILE. ACTA OCEANOL. SINICA. 6(3):461-471. CHINA OCEAN PRESS, BEIJING. EN.

The drag and the inertia coefficients of wave-current force on vertical pile are well related to the redefined Keulegan-Carpenter number by the test data of the authors. The relation could be also used for irregular wave-current force to calculate in time domain. A simplified method for the calculation of cumulative probabilistic distribution of peak value of irregular wave-current force is also recommended in this paper. These methods were justified by the model test of the authors.

87TE0216. HUI-SOO.AN. 1980(8). A PROSPECT OF POWER GENERATION BY THE USE OF TEMPERATURE DIFFERENCE IN THE THERMALLY STRATIFIED OC+. BULL. KORDI. 2(1):77-83. KORDI., SEOUL. KO.

The future prospect on the power generation by the use of the temperature differnece in the thermally stratified ocean and the change of oceanic environments resulting from the discharge of cold water were reviewed and analyzed. The subtropical warm Tsushima current (branched from the Kuroshio current) flows on the surface layer along the east coast of Korean Peninsula. The cold water mass of below 1 Deg. in Centigrade is known to be located beneath the depth of 200-300 m in the Japan Sea. The temperature difference between the surface and below layers, is greater than 20 C for nearly 4 months during the summer. When an ocean thermal power plant is in operation, the cold and dense water mass discharged from such plant will have an impact on the hydrographical and biological environmen+.

87TE0217. K.MURAKAMI. 1981(3). THE HARMONIC ANALYSIS OF TIDES AND TIDAL CURRENTS BY LEAST SQUARE METHOD AND ITS ACCURACY. TECH. NOTE PORT & HARBOUR RES. INST. (369):1-38. PORT & HARBOUR RES. INST. PN-2325. JA.

This paper describes the investigation on the accuracy of the harmonic analysis of tides and tidal currents by least square method. Over a short period, the method may be unable to separate correctly two harmonics that are close in frequency. After the calculation, however, these harmonics can be separated correctly using the assumption of the equilibrium theory of tide. Tidal waves, which are synthesized with harmonic constants of Yokohama Port by computer, are separated to several harmonic constants by least square method. The differences between input harmonic constants and output results are estimated. Furthermore, estimate of the error due to atmospheric pressure fluctuation or data missing is investigated with several calculation tests.

87TE0218. P.J.HUANG, K.Q.YANG, C.W.LU, L.C.LIU. 1983(12). A STUDY OF THE WAVE FORCE UPON A VERTICAL BREAKWATER. ACTA OCEANOL. SINICA. 2(2):340-348. CHINA OCEAN PRESS, BEIJING. EN.

Field measurement of waves and wave pressure in a given harbour were carried out in the years 1973 and 1977 and then the statistical analysis was made. Based on this analysis and the linear wave theory some problems concerning the total pressure spectrum and the total pressure crest value and trough value are discussed, and the method of calculating these quantities is given.

87TE0219. SANG-JOON.HAN. 1983(9). SEDIMENTOLOGIC CONDITIONS IN THE TIDAL POWER PLANT AREAS OF GAROLIM BAY, KOREA AND LA RANCE, FRANC+. BULL. KORDI. 5(1):27-34. KORDI., SEOUL. KO.

The sedimentological conditions of two tidal power plant sites, Garolim Bay and La Rance, were studied and compared each other to predict qualitatively sedimentological changes after construction and operation of the tidal power plant at Garolim Bay. In the La Rance estuary, the 13 years' operation of the

first tidal power plant in the world has a small effect on sedimentological aspects owing to small sediment supply from open sea. In Garolim Bay, however, rather larger sedimentological changes than in the La Rance estuary may be occurred for much supply of the suspended sediment from the outside of the bay. Therefore, a plan to counter siltation should be considered and the best solution could be obtained by the sedimentological small scale model experiements.

87TE0220. C.GARRETT. 1984. TIDES AND TIDAL POWER IN THE BAY OF FUNDY. ENDEAVOUR, NEW SERIES. 8(2):58-63. PERGAMON PRESS, OXFORD. PN-3002. EN.

The Bay of Fundy in Eastern Canada has the highest tides in the world, with a range from low tide to high tide that can exceed 15 m in Minas Basin at the head of the Bay. Interest in harnessing these tides for the generation of electricity has raised challenging questions about the environmental impact of a tidal power development, and stimulated basic research which has elucidated the role of the tides in the general oceanography of the region.

87TE0221. WON-OH.SONG. 1987(12). REASSESSMENT OF GAROLIM TIDAL POWER PROJECT. OCEAN RES. 9(1/2):29-33. KORDI., ANSAN. EN.

Garolim bay is one of the most prominent tidal power sites in Korea. A feasibility study for the tidal power development was made by Sogreah in 1981. The paper describes the results of reassessment of the project conducted by KORDI in 1986. The objectives of the study are to review and update the 1981 study report in the light of 1986 knowledge and outlook. The study has only confirmed the technical feasibility of the project with existing technology. Economic feasibility, however, has not been justified due to high stipulated discount rate.

87TE0222. K.HORIKAWA. 1959(9). PRESENT STATE OF COASTAL ENGINEERING IN JAPAN. J. WATERWAYS & HARBORS DIV., ASCE. 41-59. ASCE., N.Y. PN-2567. EN.

Japanese engineers are striving successfully to improve the status of coastal engineering in Japan. A complete bibliography of Japanese publications on this subject is presented.

87TE0223. K.HORIKAWA. 1961(12). TSUNAMI PHENOMENA IN THE LIGHT OF ENGINEERING VIEW POINT. REP. CHILEAN TSUNAMI. 136-150. DEPT. CIVIL ENG., UNIV. TOKYO. PN-2568. EN.

87TE0224. K.HORIKAWA. 1966. PRESENT STATUS OF COASTAL ENGINEERING RESEARCH. COLLECTED PAPERS, FAC. ENG., UNIV. TOKYO. 4 DEPT. CIVIL ENG., UNIV. TOKYO. PN-2570. EN.

87TE0225. SUK-HO.KIM. 1974(12). ELECTRO-CHEMICAL ASPECTS OF STRESS CORROSION OF MILD STEELS (I). BULL. KOREAN FISH. SOC. 7(4):234-237. KOREAN FISH. SOC., PUSAN. KO.

Electro-chemical aspects of stress corrosion on the mild steels when immersed in the 5% sulphuric acid solution and charged with 100 mV and 100 mA were discussed. The main results of the experiment are follows. 1. The weight loss by corrosion was concerned with the applied stress, and the larger the applied stress, the greater the weight loss. 2. Reduction of corrosion stress was a factor of inverse proportion to the applied stress. 3. corrosion began at first on the parts of impurities concentrated and the grain boundaries, and gradually developed and spreaded out. 4. The materials of unsteady structure deformed of space lattice by the high stress or work-hardening showed less reduction of corrosion stress.

87TE0226. TONG-KI.KIM. 1976(3). STUDIES ON THE MECHANICAL PROPERTIES OF THE CURING GUM IN THE PREVENTION OF VIBRATION. BULL. KOREAN FISH. SOC. 9(1):8-12. KOREAN FISH. SOC., PUSAN. KO.

The major subjects of this experiment are to evaluate the mechanical properties of the curing gum for prevention of vibration and to study for related problems. In the prevention of vibration by the curing gum, the results are as follows. When the value of forced frequency over natural frequency is less than root 2, it may well be used that the value (1%-2%, 4%-5%) of damping coefficient over critical damping coefficient of the curing gum is large. When the value of forced frequency over natural frequency is larger than root 2, it may well be used that the value (2.5%-3.5%) of the curing gum is low. If the larger value of logarithmic decrement may be used, the low curing gum is preferred. The conductive range of sulphur contents of the curing gum is 2.5%-3.5% in the light of phase an+.

87TE0227. DUK-HONG.MOON. 1978(9). INFLUENCES OF THE SUCTION AIR IN DIRECT INJECTION DIESEL ENGINE ON THE EFFICIENCY. BULL. KOREAN FISH. SOC. 11(3):171-175. KOREAN FISH. SOC., PUSAN. KO.

With the direct injection diesel engine, the author carried out experiment by oscilloscope indicator, to investigate the effects of suction period, on the engine performance as varing the load under same fuel injection.

87TE0228. GYU-HEON.KIM. 1978(9). SHAPE AND STRESS CONCENTRATION FACTOR OF CONNECTING ROD SMALL END. BULL. KOREAN FISH. SOC. 11(3):177-182. KOREAN FISH. SOC., PUSAN. KO.

The aim of this study is to affirm what the relation between s'/r and a1, a2 during the transformation of s/r is, where s' is the thickness of lateral sides of the small end, r, outer circle radius, a1, stress concentration factor on periphery of inner circle, a2, stress concentration factor on periphery of outer circle and s, thickness of top and bottom sides of small end. The author carried out a photoelastic experimentation and two-dimension similitude small ends were utilized as the specimens.

87TE0229. HOO-KYU.OH, KWEOUN-OK.CHO.

1979(3). A STUDY ON THE VOLUMETRIC EFFICIENCY OF HIGH SPEED MULTI-CYLINDER AND ROTARY COMPRESSOR. BULL. KOREAN FISH. SOC. 12(1):13-18. KOREAN FISH. SOC., PUSAN. KO.

Volumetric efficiency is a determining factor for the measurement of compressor capacity, but it is practically hard to take an accurate measurement of capacity characteritics so that most of users trust the data of makers catalogue. We often realized the discrepancy in their data with actual capacity. This study was attempted to establish the basic data of capacity characteristics of compressor by measuring volumetric efficiency of high speed multi-cylinder compressor and rotary compressor. The volumetric efficiency was calculated based on the quantity of the flow of ammonia vapor and pressure difference in suction state of orifice plate and compressor.

87TE0230. Y.GOTO, T.MIURA. 1980. BENDING PROPERTIES OF REINFORCED CONCRETE BEAMS AND LAPPED SPLICE STRENGTHS OF REINFORCING BARS AT+. TECHNOLOGY REPORTS, TOHOKU UNIV. 45(1):19-40. TOHOKU UNIV. PN-2718. EN.

Flexural strengths of reinforced concrete beams and ductility when subjected to bending, or the lapped splice strengths of reinforcing bars used in reinforced concrete members will change greatly when temperature is lowered. Therefore, their properties are investigated by varying temperatures between normal temperature and -150 Deg. in Centigrade. As a result, it is found that in design of reinforced concrete members to be used at low temperatures, it will be risky at times to think in the same way as in cases of using them at normal temperature, and it is realized that it is necessary to give special considerations to the temperature used and the moist condition of concrete.

87TE0231. R.G.BEA, P.AURORA. 1981. SIMPLIFIED EVALUATION OF SEAFLOOR. OTC PAPER. (3975):223-227. OFFSHORE TECH. CONF. PN-2789. EN.

A simplified method is described for evaluation of seafloor stability. The analysis is based on an elastic continuum formulation modified by a Plasticity Factor. Two key elements of input into such an analysis are examined in detail: soil shear strength & wave-induced bottom pressures. For the example platform location used in this paper, conventional treatment of these two input elements leads to an evaluation that the seafloor will be unstable during criteria conditions. However, when perceptive evaluations are made of drilling, sampling, and testing factors that act to lower measured shear strength, and when recognition is given to the wave attenuating effects of bottom motions, then the evaluation leads to the conclusion that the seafloor will be stable. Platform experience during +.

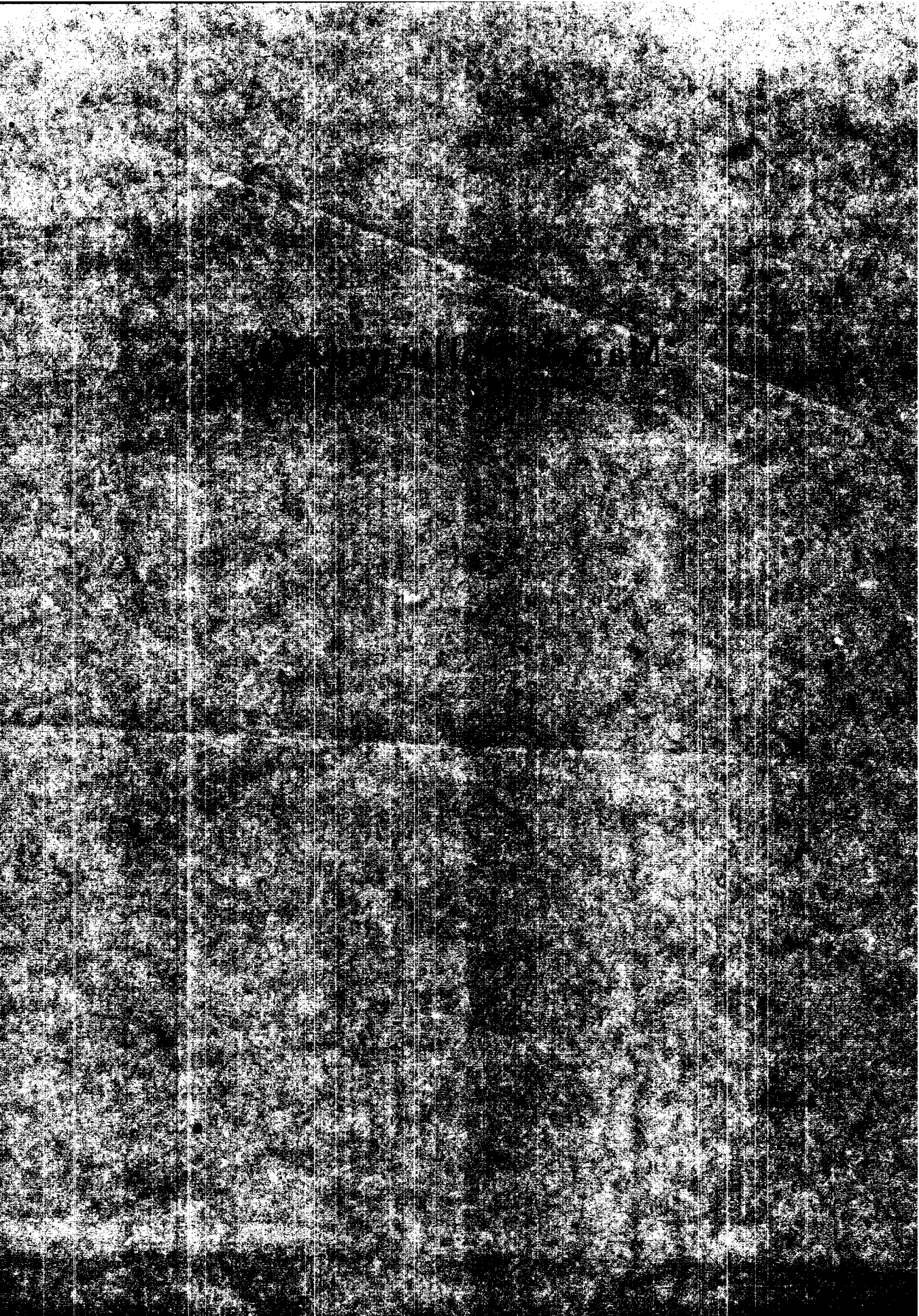
87TE0232. A.M.FISH. 1983. COMPARISON OF U.S.S.R. CODES AND U.S. ARMY MANUAL FOR DESIGN OF FOUNDATIONS ON PERMAFROST. COLD REGIONS SCI. & TECH. 8:3-24. ELSEVIER SCI. PUB., AMSTERDAM. PN-2722. EN.

A comparative study was made of design criteria and analytical methods for footings and pile foundations on permafrost employed in U.S.S.R. Design Code SNiP II-18-76 (1977) and U.S. Army Cold Regions Research and Engineering Laboratory Special Report 80-34 developed in the early 1970s by the U.S. Army Corps of Engineers and published in 1980. The absence of adequate constitutive equations for frozen soils and of rigorous solutions of the boundary problems has made it necessary to incorporate (explicitly or implicitly) various safety factors in the foundation analyses. From the review it is concluded that the principal difference between these practices is in the assessment and application of appropriate values of safety factors, which leads to a substantial discrepancy in the dimensions +.

87TE0233. B.LADANYI. 1985(6). USE OF THE CONE PENETRATION TEST FOR THE DESIGN OF PILES IN PERMAFROST. J. ENERGY RESOURCES TECHNOLOGY. 107:34-38. AME. SOC. MECH. ENG., N.Y. PN-2721. EN.

Experience gained in recent years in performing cone penetration tests in frozen soils, both in the field and in cold room, leads to the conclusion that certain frozen soil properties needed in foundation design can be successfully determined by that test, provided suitable high-capacity, rate-controlled, cone-driving equipment is available. In addition, as shown in this paper, due to its similarity with the driven pile, the tests can be used directly for pile design in frozen soils through a scaling method which takes into account the effects of size, strain rate and temperature. The paper proposes such a design method for piles under axial load, and discusses the possibility of using the CPT data also in connection with the design of laterally loaded piles.

Marine Pollution(PO)



87PO0001. C.PAPUCCI, C.D.JENNINGS, O.LAVARELLO. 1986. A MODIFIED BOX CORER AND EXTRUDER FOR MARINE POLLUTION STUDIES. CONTINENTAL SHELF RES. 6(5):671-675. PERGAMON PRESS, OXFORD. EN.

Plans are presented for a box corer and extruder suitable for use in marine pollution studies where large, undisturbed samples are required. The corer has been modified to minimise disturbance of the sample during collection and a segmented core liner has been introduced to facilitate sectioning the core. Data are presented which indicate the effective operation of the sampling system.

87PO0002. SUK-MO.LEE. 1987(1). EVALUATION OF THE SELF-PURIFICATION CAPACITY IN THE SOUTHERN WATERS OF THE EAST SEA IN SUMMER. BULL. KOREAN FISH. SOC. 20(1):69-78. KOREAN FISH. SOC., PUSAN. KO.

Human wastes are rich in organic matter and therefore affect the dissolved oxygen when they are discharged into the sea. The breakdown of this organic matter liberates nutrients. The purpose of this study is to evaluate the self-purification capacity in the southern waters of the East Sea during the three cruises in June, July and August, 1986. Streeter and Phelps' model has been used in this study. Factors in this model, deoxygenation constant and reaeration coefficient, have been determined by applying oxygen consumption method and a closed system model.

87PO0003. J.F.PAYNE, A.RAHIMTULA. A PERSPECTIVE ON POTENTIAL ENVIRONMENTAL PROBLEMS ASSOCIATED WITH CHLORINE USAGE. HEALTH OF THE NORTHWEST ATLANTIC. BK:94-108. ENVIRON. CANADA, & DEPT. FISH. PN-2658. EN.

87PO0004. S.C.REED, J.R.BOUZOUN, W.T.TOBIASSON. 1985. WATER SUPPLY AND WASTE DISPOSAL ON PERMANENT SNOWFIELDS. CANADIAN J. CIVIL ENG. 12:344-350. NAT. RES. COUN. CAN., OTTAWA. PN-2725. EN.

The snow and glacial ice on permanent snowfields must serve as both the water source and the receptacle for wastes for any human habitation. In addition, the snow also serves as the support media for any structural foundations and hence the thermal aspects of water supply and waste disposal can be critical. Most activity has occurred on the ice caps of Greenland and Antarctica and has ranged from small transient field parties to large permanent facilities in continuous use for over 25 years. Novel procedures to insure the reliable production of good quality water are described as well as the recommended criteria for water quantity depending on the size and duration of the activity. The various methods of wastewater disposal that have been used at temporary camps and permanent station+.

87PO0005. J.A.NOVITSKY, D.M.KARL. 1985(12). INFLUENCE OF DEEP OCEAN SEWAGE OUTFALLS ON THE MICROBIAL ACTIVITY OF THE SURROUNDING SEDIMENT. APPL. & ENVIRON. MICROBIOL. 50(6):1464-1473. AME. SOC. MICROBIOL., WASH. PN-2849. EN.

The microbial activity near two deep ocean sewage outfalls off the coast of the island of Oahu, Hawaii, was characterized. Water samples and sediment samples to a depth of 4.5 cm were analyzed from an area of approximately 45000 square meter surrounding the outfalls. Although the effluent water at both sites exhibited heterotrophic activity that was 2 orders of magnitude greater than water from a control site, ambient water samples taken within 1 m of the discharge ports exhibited activity only twice that of the control water. The heterotrophic activity of the outfall sediment was only elevated above that of the control site for surface samples collected within 10 m of the outfall. Likewise, the rates of microbial nucleic acid synthesis and carbon production in the sediment were only +.

87PO0006. E.F.COSTA. 1987(1). PERU AND THE LAW OF THE SEA CONVENTION. MARINE POLICY. 11(1):45-57. BUTTERWORTH SCI., GUILDFORD. EN.

This work aims to give a global view of the Maritime Dominion of Peru and of the position which Peru must adopt regarding the Law of the Sea Convention within an international framework. The article outlines some aspects of the Convention and then considers the nature and range of Peru's Maritime Dominion within the 200-mile limit. The Convention is related to Peru's national and international interests. The author maintains that Peru's permanent interests in all aspects of marine affairs are better protected under the Law of the Sea Convention, and recommends that Peru should adhere to the Convention.

87PO0007. D.J.DOULMAN. 1987(1). LICENSING DISTANT-WATER TUNA FLEETS IN PAPUA NEW GUINEA. MARINE POLICY. 11(1):16-28. BUTTERWORTH SCI., GUILDFORD. EN.

This article considers the licensing of distant-water tuna fleets in Papua New Guinea. Revenue from licences has risen since 1980, although administration and surveillance costs are burdensome.

87PO0008. N.T.A.HU. 1987(4). THE SINO-ARGENTINE 'SQUID WAR' OF 1986: ITS IMPLICATIONS FOR FISHERIES POLICY MAKING. MARINE POLICY. 11(2):133-142. BUTTERWQRTH SCI., GUILDFORD. EN.

By examining a recent international fishery incident, this paper offers a new look at fisheries policy making. Marine natural resources within 200-mile EEZs can be deemed a symbol of national sovereignty and jurisdiction by coastal states. For distant-water fisheries states, fisheries policy making links and interacts with other realms of national policy making, ie foreign policy, naval policy, international trading policy, and marine-legal policy.

87PO0009. E.FRANCKX. 1987(4). NEW SOVIET FISHERY REGULATIONS CONCERNING THE EEZ: AN APPRAISAL. MARINE POLICY. 11(2):125-132. BUTTERWORTH SCI., GUILDFORD. EN.

When the USSR enacted municipal legislation

concerning its economic zone in 1984, it did so as primus inter pares after the adoption of the United Nations Law of the Sea Convention. Almost two years later, the fishery provisions of that edict were elaborated by subordinate legislation. Although there are many points of reference with the corresponding provisions of the 1982 Convention, omissions and ambiguities on certain crucial issues have to be noted, especially as far as anadromous species are concerned.

87PO0010. J.CABLE. 1987(4). CLOSING THE BRITISH SEAS. MARINE POLICY. 11(2):90-96. BUTTERWORTH SCI., GUILDFORD. EN.

For nearly three centuries British maritime policy reflected Britain's changing priorities and helped to shape and alter the law of the sea. Today Britain seems stuck in a laissez-faire attitude no longer suited to her needs, while other states transform law and policy to suit themselves. The weaker Britain's economic position becomes, the greater will be her need of a more nationalist policy, particularly with regard to maritime affairs. In the present political climate these are heretical ideas, but there should be a contingency plan for a change of course, as one may soon be required.

87PO0011. T.L.MCDORMAN, P.TASNEEYANOND. 1987(7). INCREASING PROBLEMS FOR THAILAND'S FISHERIES: MALAYSIA'S NEW FISHERIES LAW. MARINE POLICY. 11(3):205-216. BUTTERWORTH SCI., GUILDFORD. EN.

This article examines the direct implications for Thailand of the Malaysian fisheries Act of 1985. It looks at the possibilities open to Thailand in dealing with its neighbours, all of whom are intensifying control over their 200-mile zones to the detriment of Thai distant-water fishing interests. Access to surplus resources and joint ventures are considered.

87PO0012. K.RAMAKRISHNA, R.E.BOWEN, J.H.ARCHER. 1987(1). OUTER LIMITS OF CONTINENTAL SHELF; A LEGAL ANALYSIS OF CHILEAN AND ECUADORIAN ISLAND CLAIMS AND US+. MARINE POLICY. 11(1):58-68. BUTTERWORTH SCI., GUILDFORD. EN.

This article highlights the legal and geomorphological difficulties in interpreting Article 76 of the United Nations Convention on the Law of the Sea (UNCLOS), as it pertains to the delimitation of outer limits of continental shelf of islands, in light of recent Chilean and Ecuadorian claims and the US responses. It concludes that both Ecuador and Chile have put forward claims cognizable under UNCLOS and that the treaty provisions characterizing jurisdiction 'on submarine ridges' will continue to give rise to conflicting claims.

87PO0013. J.M.BEWERS, C.J.R.GARRETT. 1987(4). ANALYSIS OF THE ISSUES RELATED TO SEA DUMPING OF RADIOACTIVE WASTES. MARINE POLICY. 11(2):105-124. BUTTERWORTH SCI., GUILDFORD. EN.

This article summarizes the history of low-level radioactive waste dumping in the ocean and its regulation through the London Dumping Convention. The oceanographic and radiological bases of risk assessment are described and recent evaluations of the consequences of sea dumping summarized. After an analysis of issues that have been the subject of recent debate it is concluded that further development of regulations is not impeded by scientific uncertainty, but requires political decisions which involve economic and social considerations.

87PO0014. G.C.KASOULIDES. 1987(7). VESSELS IN DISTRESS: 'SAFE HAVENS' FOR CRIPPLED TANKERS. MARINE POLICY. 11(3):184-195. BUTTERWORTH SCI., GUILDFORD. EN.

The recent rise in marine pollution incidents has jeopardized the traditional right of access to ports in cases of distress. Although numerous maritime conventions contain provision to this effect, the nature of the right remains controversial. The existing infrastructure, however, on the international and regional level might facilitate the adoption of a pragmatic approach and the designation of 'safe havens' to prevent pollution and permit the salvage of crippled vessels.

87PO0015. P.W.BIRNIE. 1987(7). PIRACY: PAST, PRESENT AND FUTURE. MARINE POLICY. 11(3):163-183. BUTTERWORTH SCI., GUILDFORD. EN.

After a brief historical overview, the author examines the definition of piracy. There are problems with this as definition differs under municipal and international law, and the latter gives rise to two interpretations. Attempts at codifications are described, from the activities of the League of Nations, through the Harvard Research Draft of 1932 to the Geneva Convention on the High Seas in 1958 and the 1982 Law of the Sea Convention. Examples are given of types of piracy, including the seizing of yachts, violence against boat people and political piracy. Possible legal responses to piracy are discussed.

87PO0016. OIL SPILL CONTROL. DELFT HYDRAULICS LAB., DELFT. PN-3022. EN.

87PO0017. B.E.MARTI. 1987(4). CARGO-SHARING THROUGH A POLICY OF BILATERALISM: EFFECTS ON US CONTAINERIZED FOREIGN TRADE. MARINE POLICY. 11(2):97-104. BUTTERWORTH SCI., GUILDFORD. EN.

This article examines historical data to study the latent effects of protectionism, especially in the form of cargo-sharing under a scenario of bilateralism. Movements of containerized foreign trade are considered.

87PO0018. N.MIMURA, K.HORIKAWA. 1982. DIFFUSION CHARACTERISTICS OF LARGE SCALE HEATED DISCHARGE IN THE COASTAL REGION. COASTAL ENG. JAPAN. 25:211-225. JAPAN SOC. CIVIL ENG., TOKYO. PN-2650. EN.

The amount of heated water discharged from conventional and nuclear power stations to the coastal area has increased enormously, as more and more large scale power stations are built on the coast. The authors

carried out field investigations on the Okuma Coast in Fukushima Prefecture in order to investigate the diffusion process of such large scale heated water. The characteristics of the current field and water temperature distribution in the warm water body produced by the heated discharge were determined. The scale of the warm water patch and the manner of water temperature decrease were investigated for five different power stations located on the Okuma Coast and along Wakasa Bay. Relationship between the diffusion characteristics and environmental factors are discussed.

87PO0019. E.I.HAMILTON. 1985(4). THE DISPOSAL OF RADIOACTIVE WASTES INTO THE MARINE ENVIRONMENT: THE PRESENCE OF HOT PARTICLES CONT+. MINERALOGICAL MAGAZINE. 49:177-194. MINERALOGICAL SOC., LONDON. PN-2404. EN.

Radioactive particulate matter (identified as hot particles) is present in the effluent discharged by the British Nuclear Fuels Ltd (BNFL) uranium reprocessing plant at Sellafield, Cumbria, UK. There is very little information on the abundance or chemical and physical forms of solid matter in the effluent; even less is known of the significance of particulate debris in relation to the uptake of radionuclides for non-occupationally exposed people as a result of transfer along marine foodchains. Some observations on the occurrence and abundance of hot particles in the vicinity of Sellafield are reported, with special reference to those that contain transuranic radionuclides (Pu, Am, Cm). Some of the uncertainties are discussed in an evaluation of the significance of hot particles, albei+.

87PO0020. R.L.MAZANY, L.G.BARRETT, R.A.APOSTLE. 1987(1). MARKET SEGMENTATION; NOVA SCOTIA FISH PROCESSING AND THE US MARKET. MARINE POLICY. 11(1):29-44. BUTTERWORTH SCI., GUILDFORD. EN.

This paper outines some findings from our recent fisheries research which bears on the structure of fish processing in Nova Scotia and on some of the main marketing linkages into the USA. We propose that scale distinctions among different types of processing operations in Nova Scotia have important implications for an understanding of Canadian marketing practices and American attitudes toward Canadian fish products.

87PO0021. J.A.GULLAND. 1987(7). THE IMPACT OF SEALS ON FISHERIES. MARINE POLICY. 11(3):196-204. BUTTERWORTH SCI., GUILDFORD. EN.

Although some species of seals have become extinct, others are increasing in number. Seals may have an adverse effect on fisheries in terms of damage to fishing gear, the spread of parasites to commercial fish species, and competition with man for fish. The potential benefits of seal culling are assessed.

87PO0022. S.JENTOFT, K.H.MIKALSEN. 1987(7). GOVERNMENT SUBSIDIES IN NORWEGIAN FISHERIES: REGIONAL DEVELOPMENT OR POLITICAL FAVOURITISM?. MARINE POLICY. 11(3):217-228. BUTTERWORTH SCI., GUILDFORD. EN.

The article addresses the question of the role of government in Norwegian fisheries-with special emphasis on the system of state subsidies. The creation and subsequent development of this system is discussed initially - with special attention to goals and organizational structure. The programme of state subsidies is then evaluated in terms of economic efficiency, regional distribution and its impact on different groups within the industry. Two important conclusions emerge: first, there is a considerable discrepancy between intentions and results - between goals and effects. The system does not contribute to economic efficiency, and it is not geared to the special needs of 'marginal' regions - in spite of the fact that it has come to be justified on exactly those grounds. Second, this +.

87PO0023. E.DALE, J.OWENS, A.STENSETH. 1987(7). TILLING THE SEA: PROSPECTS FOR NORWEGIAN AQUACULTURE. MARINE POLICY. 11(3):229-239. BUTTERWORTH SCI., GUILDFORD. EN.

This article describes the current state of Norwegian aquaculture and assesses its potential for the future. The most important species is salmon, with some cultivation of trout, mussels and oysters. Possible new species are cod, flatfish, lobster and crayfish. Europe is the largest market, and greatest market growth is expected in the USA and Japan. For the future, it is recommended that transport and distribution be improved, and that more emphasis be given to education and research. Pollution and disease are seen as potential problems. It is suggested that if Norway puts into effect a comprehensive plan for aquaculture, it may become a leading aquaculture nation by 2000.

87PO0024. C.LAMSON. 1987(1). ARCTIC SHIPPING, MARINE SAFETY AND ENVIRONMENTAL PROTECTION. MARINE POLICY. 11(1):3-15. BUTTERWORTH SCI., GUILDFORD. EN.

The United Nations law of the Sea treaty attempts to enumerate obligations to protect and preserve the marine environment, including icecovered areas. Other international conventions address the need to enhance navigational safety and prevent vesselsource pollution. This article reviews the operational record of arctic shipping activities, primarily in Canadian and US waters, and raises questions about the adequacy of present legal and administrative frameworks to fulfil commitments to protect the arctic marine environment and assure the safety of arctic seafarers.

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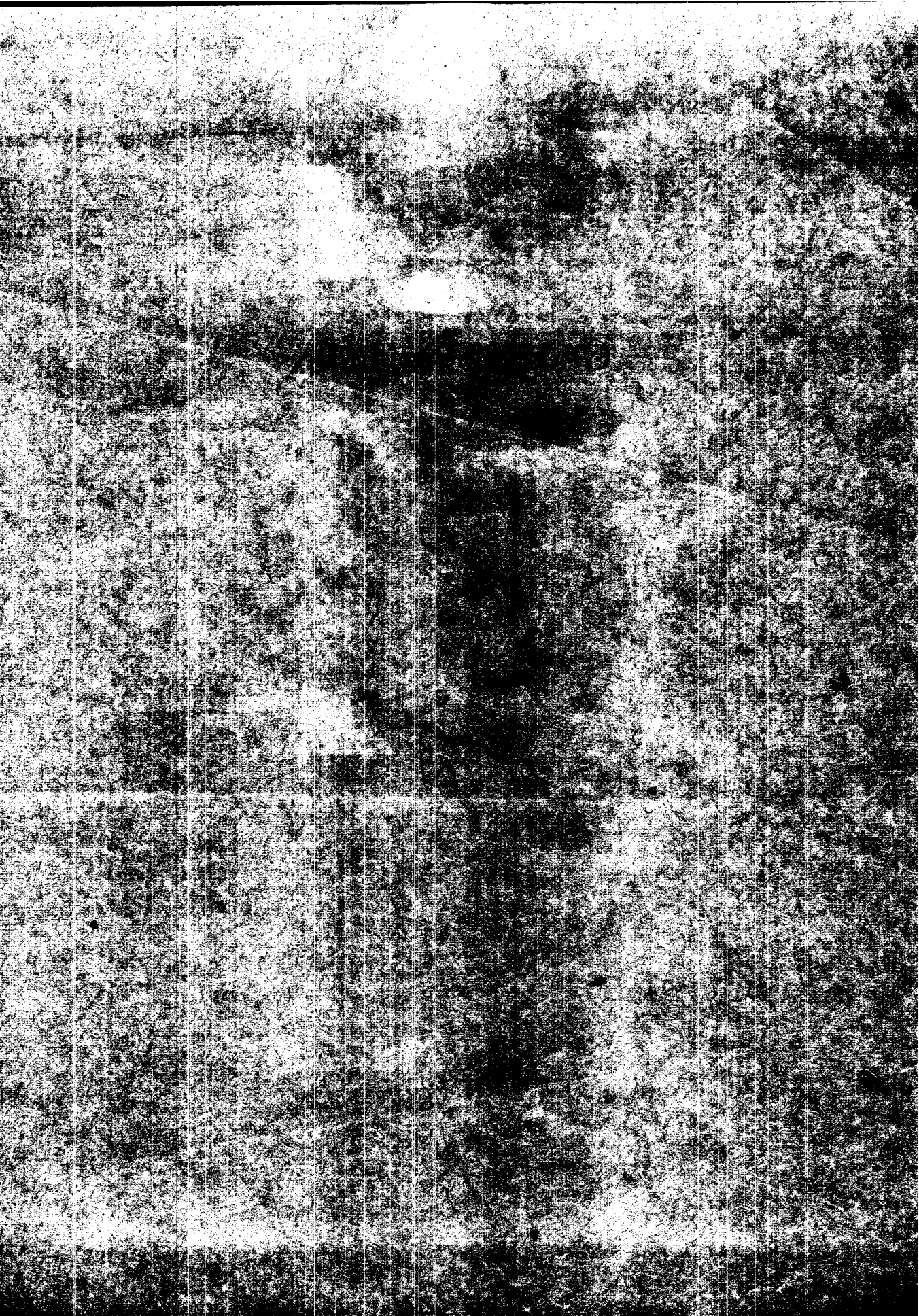

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