IDOE

# INTERNATIONAL DECADE OF OCEAN EXPLORATION

## PROGRESS REPORT VOLUME 8: APRIL 1978 to OCT. 1978

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# INTERNATIONAL DECADE OF OCEAN EXPLORATION



## PROGRESS REPORT VOLUME 8
## April 1978 to October 1979

Prepared by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data and Information Service, under contract to the National Science Foundation, Section for International Decade of Ocean Exploration



June 1981

**Nations in IDOE**

Australia
Canada
Chile
Colombia
Denmark
Ecuador
France
Germany, Fed. Rep. of
India
Indonesia
Japan
Korea, Republic of
Malaysia
Mexico
Netherlands
New Zealand
Norway
Papua New Guinea
Peru
Philippines
Singapore
South Afrida
Spain
Thailand
United Kingdom
United States
USSR

# PREFACE

The International Decade of Ocean Exploration (IDOE) is a long-term, international, cooperative program to improve the use of the ocean and its resources for the benefit of mankind.

On March 8, 1968, the President of the United States proposed "an historic and unprecedented adventure—an International Decade of Ocean Exploration for the 1970's." In December 1968, the United Nations General Assembly endorsed "the concept of an international decade of ocean exploration to be undertaken within the framework of a long-term programme of research and exploration. . . ."

In late 1969, the Vice President of the United States, in his capacity as Chairman of the National Council on Marine Resources and Engineering Development, assigned responsibility for planning, managing, and funding the U.S. program to the National Science Foundation (NSF), and set forth the following goals:

- Preserve the ocean environment by accelerating scientific observations of the natural state of the ocean and its interactions with the coastal margin—to provide a basis for (a) assessing and predicting man-induced and natural modifications of the character of the oceans, (b) identifying damaging or irreversible effects of waste disposal at sea, and (c) comprehending the interaction of various levels of marine life to permit steps to prevent depletion or extinction of valuable species as a result of man's activities;

- Improve environmental forecasting to help reduce hazards to life and property and permit more efficient use of marine resources—by improving physical and mathematical models of the ocean and atmosphere to provide the basis for increased accuracy, timeliness, and geographic precision of environmental forecasts;

- Expand seabed assessment activities to permit better management—domestically and internationally—of marine mineral exploration and exploitation by acquiring needed knowledge of seabed topography, structure, physical and dynamic properties, and resource potential, and to assist industry in planning more detailed investigations;

- Develop an ocean monitoring system to facilitate prediction of oceanographic and atmospheric conditions—through design and development of oceanographic data buoys and other remote sensing platforms;

- Improve worldwide data exchange through modernizing and standardizing national and international marine data collection, processing, and distribution; and

- Accelerate Decade planning to increase opportunities for international sharing of responsibilities and costs for ocean exploration, and to assure better use of limited exploration capabilities.

Shortly after receiving the Vice-President's charge, the National Science Foundation set up the Office for the International Decade of Ocean Exploration (now International Decade of Ocean Exploration Section) and began to define the U.S. program. In the first year of IDOE's existence, three areas were chosen for priority attention: (1) environmental quality, (2) environmental forecasting, and (3) seabed assessment. In 1971, living resources was added as a fourth program area.

A key goal of IDOE has been to make sure that data from all projects will be available to future users. In pursuit of this objective, the IDOE Office of NSF contracted with the Environmental Data Service (now Environmental Data and Information Service) of the National Oceanic and Atmospheric Administration to manage the scientific data for IDOE. The agreement included publishing a series of progress reports.

M. Grant Gross, Director
Ocean Sciences Division

## INTRODUCTION

This report, the eighth in a series, provides the scientific community and other interested persons with data inventories and lists of scientific reports derived from U.S. IDOE projects. Detailed program descriptions and accomplishments will appear in a separate publication, a 10-year summary of IDOE. The text here is arranged according to the program areas established for IDOE. Subprograms are given under appropriate programs.

Appendix A contains the Report of Observations/Samples Collected by Oceanographic Programs (ROSCOP), a summary of reported observations received during the period covered by this Report. All IDOE grant holders must submit ROSCOP reporting forms to NOAA Environmental Data and Information Service's National Oceanographic Data Center (NODC) upon completion of a data collection activity. The ROSCOP summaries in Appendix A follow the same program sequence as the text.

Two charts follow the appendices. The first shows ocean areas for which data and ROSCOP summaries have been received by NOAA's Environmental Data and Information Service (EDIS) during the period covered by this report. The second shows ocean areas for which data have been received by EDIS from January 1970 to October 1979. Each numbered area is about 1,100 by 1,100 km (600 by 600 n.mi.) and, although entirely shaded, may contain only one reported observation.

EDIS has either the data or papers described in this report in one of its center archives or can assist in obtaining them. Queries may be addressed to any of the following EDIS centers:

National Oceanographic Data Center (NODC)
National Oceanic and Atmospheric Administration
Washington, DC 20235
Tel: (202) 634-7234
IDOE Project Leader: M. Jackson

Marine Geology and Geophysics Branch
National Geophysical and Solar-Terrestrial Data Center (NGSDC)
National Oceanic and Atmospheric Administration
Boulder, CO 80303
Tel: (303) 497-6338
IDOE Project Leader: J.B. Grant

Environmental Science Information Center (ESIC)
National Oceanic and Atmospheric Administration
Rockville, MD 20852
Tel: (301) 443-8137
IDOE Project Leader: R. R. Freeman

National Climatic Center (NCC)
National Oceanic and Atmospheric Administration
Federal Building
Asheville, NC 28801
Tel: (704) 258-2850, ext. 766
IDOE Project Leader: R. Quayle

General inquiries about IDOE programs should be addressed to:

Division of Ocean Sciences
National Science Foundation
Washington, D.C. 20550
Tel: (202) 357-9639

CONTENTS

# Environmental Quality Program

This program was designed to provide information on the quality of the marine environment and to assess and predict man's impact on the oceans through research on geochemical processes and marine pollution. The program consisted of four major investigations: Geochemical Ocean Sections Study (GEOSECS) made detailed measurements of physical and chemical characteristics of ocean waters along Arctic to Antarctic transects; Pollutant Transfer Program investigated mechanisms and pathways by which pollutants are transported to and within the oceans; Biological Effects Program assessed the impact of selected pollutants on marine organisms; and Controlled Ecosystem Pollution Experiment (CEPEX) provided information on the effects of pollutants on pelagic marine communities contained in large plastic enclosures.

## Geochemical Ocean Sections Study (GEOSECS)

GEOSECS is an international cooperative program involving geochemists from 14 U.S. universities. Investigators from Belgium, Canada, France, Federal Republic of Germany, India, Japan, and the United Kingdom also participated in GEOSECS or carried out similar programs coordinated by the United States. The U.S. program involved the occupation of 121 oceanographic stations in the Atlantic and 147 stations in the Pacific. A similar study was conducted in the Indian Ocean to complete a baseline survey of the world oceans and confirm large-scale and small-scale mixing patterns found in the Atlantic and Pacific. Stations were occupied along the western side of the Indian Ocean, and the remaining stations were completed in April 1978. At each station, 15 chemical measurements were made aboard ship; an additional 20 were obtained from samples analyzed in laboratories at 12 major universities.

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## Pollutant Transfer Program (PTP)

Processes that transport pollutants from land sources to the oceans and accumulate pollutants in discrete parts of the marine environment were investigated. Objectives of the studies were to: (1) identify important pathways and mechanisms, (2) evaluate major environmental factors that influence transfer processes, and (3) develop principles governing the transfer of pollutants. Attention was focused on several major ocean interfaces: air-sea, sediment-sea, river-sea, and particulate-sea.

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## Biological Effects Program (BEP)

The objectives of this program were to determine the effects of various types and levels of pollutants on the life history stages and physiological processes of a wide range of species. The major emphasis in the final year of the Biological Effects Program (BEP) was to find biological indicator species that could be used as an early warning of pollutant-induced perturbations in the open ocean. This focus evolved from the initial studies that began in 1973. At that time, several investigators initiated laboratory experiments to evaluate sublethal, low-level effects of trace metals, petroleum, chlorinated hydrocarbons, and phthalates on the growth, behavior, and biochemical processes of several classes of marine organisms.

### Biological Effects Bibliography

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## Controlled Ecosystem Pollution Experiment (CEPEX)

CEPEX was an international, cooperative, field research project designed to test the effects of chemical (pollutants) and physical variables on the structure of pelagic marine communities and the interactions between the various organisms. For this purpose large plastic enclosures (1,300 $m^3$ volume) were filled so that replicate intact water columns and their included populations were captured. Each enclosure was manipulated according to a specific experimental design, and the same populations were re-visited for up to 90 days to determine shifts in population structure. The field site was located in Saanich Inlet, Vancouver Island, British Columbia.

### CEPEX Bibliography

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# Environmental Forecasting Program

The Environmental Forecasting Program focused on projects designed to explain the large-scale, long-term behavior of the ocean and the ocean's influence on weather and climate. Experiments and studies included: Joint U.S.-U.S.S.R. Mid-Ocean Dynamics Experiment (POLYMODE); North Pacific Experiment (NORPAX); International Southern Ocean Studies (ISOS); and Climate: Long-range Investigation, Mapping,and Prediction study (CLIMAP).

## Joint U.S.-U.S.S.R. Mid-Ocean Dynamics Experiment (POLYMODE)

The purpose of POLYMODE was to establish the dynamics and statistics of mesoscale motions in the ocean, their energy source, and their role in the general circulation of the ocean. POLYMODE was based on: 1) U.S.S.R. Polygon project—a continuing series of experiments investigating mesoscale phenomena in the Atlantic and Pacific Oceans and in the Arabian Sea, and 2) Mid-Ocean Dynamics Experiment (MODE-I) of the united States and the United Kingdom. A Joint U.S.-U.S.S.R. POLYMODE Organizing Committee, established under the Agreement between the Governments of the United States and the U.S.S.R. on Cooperation in Studies of the World Ocean, directed the POLYMODE experiment. The UNESCO/Intergovernmental Oceanographic Commission's Scientific Committee on Oceanographic Research (SCOR) Working Group 34 invited other countries to participate in POLYMODE.

### POLYMODE Data

POLYMODE data received during the period of this report are available from NODC as follows:

**NODC Accession No.:** 79-00206
**Organization:** Woods Hole Oceanographic Institution
**Investigator:** William Metcalf (WHOI)
**Grant No.:** OCE77-01026
**Project:** POLYMODE
**Data:** XBT data taken from 50 cruises between 6/16/76-9/30/78. Data submitted on NODC-compatible magnetic tape.

**NODC Accession No.:** 79-00243
**Organization:** Massachusetts Institute of Technology
**Investigator:** Carl Wunsch (MIT)
**Grant No.:** OCE75-03998 A02
**Project:** POLYMODE II - 3
**Data:** Temperature and pressure data from buoys, obtained between 10/6/76 - 7/5/77. Data submitted on magnetic tape.

**NODC Accession No.:** 79-00244
**Organization:** Massachusetts Institute of Technology
**Investigator:** Carl Wunsch (MIT)
**Grant No.:** OCE75-03998 A02
**Project:** POLYMODE III - 1
**Data:** Temperature and pressure data from buoys, obtained between 5/77 - 5/78. Data submitted on tape.

**NODC Accession No.:** 79-00297
**Organization:** Woods Hole Oceanographic Institution
**Investigator:** W.G. Metcalf (WHOI)
**Grant No.:** OCE77-01026
**Project:** POLYMODE
**Data:** XBTs taken aboard the *Iselin, Gyre, Atlantis-II, Oceanus,* between 4/2 - 7/16/78. Data submitted on NODC-compatible magnetic tape.

### POLYMODE Bibliography


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MODE GROUP
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1977. V. Lee and C. Wunsch (editors). Atlas of the Mid-Ocean dynamics experiment (MODE-1). Mass. Inst. Technology, Cambridge, MA, 274p (MODE).

POLYMODE XBT GROUP.
1978. POLYMODE XBT survey by the Soviet research Vessel *Victor Bugaev,* 10-21 July 1977. XBT Technical Rpt. 78-1, 78-1, 9p. Woods Hole Oceanographic Inst., Woods Hole, Mass.

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POLYMODE XBT GROUP.
1978. POLYMODE XBT survey by the Soviet Research Vessel *Victor Bugaev,* 28 July - 16 August 1977. XBT Tech. Rep #78-3, POLYMODE XBT Group, Woods Hole Oceanographic Institution, 11p.

POLYMODE XBT GROUP.
1978. Combined POLYMODE XBT surveys by the Soviet Research Ships *Akademik Vernadsky, Petr Lebedev, Sergey Vavilov,* and *Akademic Krilov,* 7 August - 9 September 1977. XBT Tech. Rep. #78-4, POLYMODE XBT Group, Woods Hole Oceanographic Institution, 16p.

POLYMODE XBT GROUP.
1978. POLYMODE XBT surveys by the Soviet Research Vessels *Akademic Krilov* and *Akademic Kurchatov,* 18 August - 11 September 1977. XBT Tech. Rep. #78-5, POLYMODE XBT Group, Woods Hole Oceanographic Institution, 14p.

POLYMODE XBT GROUP.
1978. POLYMODE XBT survey by the Soviet Research Vessel *Akademic Kurchatov*, 15 - 18 September 1977. XBT Tech. Rep. #78-6, POLYMODE XBT Group, Woods Hole Oceanographic Institution, 7p.

POLYMODE XBT GROUP.
1978. POLYMODE XBT surveys by the Soviet Research Vessels *Akademic Krilov* and *Akademic Vernadsky*, 22 September - 16 October 1977. XBT Tech. Rpt. #78-7, POLYMODE XBT Group, Woods Hole Oceanographic Institution, 22p.

POLYMODE XBT GROUP.
1978. POLYMODE XBT survey by the Soviet Research Vessel *Vityaz*, 29 October - 11 November 1977. XBT Teeh. Rpt. #78-8, POLYMODE XBT Group, Woods Hole Oceanographic Institution, 8p.

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1978. POLYMODE XBT surveys by the Soviet Research Vessel *Mikhail Lomonosov* and *Vityaz*, 11-26 November 1977. XBT Tech. Rpt. #78-9, 12p.

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1978. POLYMODE XBT surveys by the Soviet Researeh Vessels *Vityaz* and *Mikhail Lomonosov*, 25 December 1977 - 7 January 1978. XBT Technical Report #78-11, 12p. POLYMODE XBT Group, Woods Hole Oceanographic Institution.

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POLYMODE XBT GROUP.
1978. POLYMODE XBT survey by the American Research Vessel *Gyre*, 22 January - 5 February 1978. XBT Technical Report #78-13, 10p. POLYMODE XBT Group, Woods Hole Oceanographic Institution.

POLYMODE XBT GROUP.
1978. POLYMODE XBT survey by the American Research Vessel *Gyre*, and the Soviet Research Vessel *Akademik Vernadsky*, 15 February - 3 March 1978. XBT Tech. Report #78-14 16p. POLYMODE XBT Group, Woods Hole Oceanographic Institution.

POLYMODE XBT GROUP.
1979. POLYMODE XBT survey by the Soviet Research Vessel *Moldavia*, 22 February - 12 March 1978. XBT Tech. Report #79-1, POLYMODE XBT Group, Woods Hole Oceanographic Institution.

POLYMODE XBT GROUP.
1979. POLYMODE XBT survey by the Soviet Research Vessel *Akademik Kurchatov*, 12-18 March 1978. XBT Tech. Report #79-2, POLYMODE XBT Group, Woods Hole Oceanographic Institution.

POLYMODE XBT GROUP.
1979. POLYMODE surveys by the Soviet Research Vessels *Moldavia* and *Akademik Kurchatov*, 25 March - 8 April 1978. XBT Technical Report #79-3, 11p. POLYMODE XBT Group, Woods Hole Oceanographic Institution.

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POLYMODE XBT GROUP.
1979. POLYMODE XBT survey by the Soviet Research Vessel *Akademik Kurchatov*, 27 August - 3 September 1978. XBT Technical Report #79-14, 10p. POLYMODE XBT Group, Woods Hole Oceanographic Institution.

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## North Pacific Experiment (NORPAX)

The long-term objective of NORPAX was to understand fluctuations in the upper layers of the North Pacific Ocean and their relation to the overlying and adjoining atmosphere. These fluctuations have time scales of months to years and a space scale in excess of 1,000 km. Achievement of this goal should lead to improved prediction of weather and climate for the northeast Pacific Ocean and North America. NORPAX worked to attain its long-range objective through analysis of historical data, experiments to identify and understand important processes, monitoring of low-frequency fluctuations, and integration of observations with theoretical and numerical studies.

### NORPAX Data

NORPAX data received during the period of this report are available from NODC as follows:

**NODC Accession No.:** 78-00604
**Organization:** University of Alaska (Institute of Marine Science)
**Investigator:** T. Royer (U of A)
**Grant No.:** OCE76-80046
**Project:** NORPAX - POLEX — 1
**Data:** 50 XBTs taken aboard the *Moana Wave*, 10/20 - 11/4/76. Data submitted on NODC-compatible magnetic tape.

**NODC Accession No.:** 78-00629
**Organization:** Scripps Institution of Oceanography
**Investigator:** R. A. Knox (SIO)
**Grant No.:** OCE76-80041
**Project:** NORPAX - POLEX
**Data:** 165 STDs taken aboard the *T. Washington*, 1/21/74 - 2/17/74. Data submitted on NODC-compatible magnetic tape.

**NODC Accession No.:** 78-0703
**Organization:** University of Hawaii
**Investigator:** Klaus Wyrtki (U of H)
**Grant No.:** IDO75-06468
**Project:** NORPAX/EL NINO WATCH
**Data:** 184 CTDs taken aboard the *Moana Wave*, 2/11 - 5/27/75. Data submitted on NODC-compatible magnetic tape.

**NODC Accession No.:** 78-00705
**Organization:** Scripps Institution of Oceanography
**Investigator:** G. McNally (SIO)
**Grant No.:** OCE78-22308
**Project:** NORPAX/ADS
**Data:** *T. G. Thompson*, Lagrangian currents, N. S. components and acceleration from 6 drifters, 10/75.

**NODC Accession No.:** 78-00718
**Organization:** University of Hawaii
**Investigator:** Klaus Wyrtki (U of H)
**Grant No.:** OCE76-23173
**Project:** NORPAX
**Data:** Sea level, every 15 minutes at 25 Pacific Island stations.

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## International Southern Ocean Studies (ISOS)

The program improved our understanding of circulation in the southern ocean.

Global atmospheric and oceanic circulation is of particular interest in the southern ocean, because of the strong and variable air-sea exchanges that drive the Antarctic Circumpolar Current System and result in the formation of Antarctic bottom water and intermediate water. Understanding this oceanic-atmospheric circulation is one of the building blocks in a comprehensive theory of global climate dynamics.

### ISOS DATA

ISOS data are available from NODC as follows:

**NODC Accession No.:** 78-00194
**Organization:** Texas A&M University
**Investigator:** W. Emery (TAMU)
**Grant No.:** OCE76-81371
**Project:** ISOS/FDRAKE 77
**Data:** 575 XBTs taken aboard the *Yelcho, Burton Island, Hero, Northwind, Nella Dan, Thalla Dan,* and *Zubov,* 11/76 - 3/77. Data submitted on NODC compatible magnetic tape.

**NODC Accession No.:** 78-00333
**Organization:** Woods Hole Oceanographic Institution
**Investigator:** Terry Joyce (WHOI)
**Grant No.:** OCE75-14056
**Project:** ISOS - FDRAKE 76
**Data:** 69 CTDs taken aboard the *T. G. Thompson,* 3/10 - 4/6/76. Data submitted on punched cards.

**NODC Accession No.:** 78-00683
**Organization:** Oregon State University
**Investigator:** R. D. Pillsbury (OSU)
**Grant No.:** OCE74-12558
**Project:** ISOS/FDRAKE 76
**Data:** Currents and tides (buoys), 2/16/76 - 1/23/77. 57,330 sets of current measurements in the Drake Passage. Data submitted on NODC compatible magnetic tape.

**NODC Accession No.:** 79-00135
**Organization:** Texas A&M University
**Investigator:** W. D. Nowlin, Jr. (TAMU)
**Grant No.:** OCE74-12032 AO1
**Project:** ISOS/FDRAKE 77
**Data:** 105 XBTs taken aboard the *Melville* in the Drake Passage between 1/14 - 2/10/77. Data submitted on NODC compatible magnetic tape.

**NODC Accession No.:** 79-00147
**Organization:** University of Washington
**Investigator:** Richard Wearn, Jr. (U of W)
**Grant No.:** OCE76-24597
**Project:** ISOS/FDRAKE 75
**Data:** STD and station data taken aboard the *Ara Islas Orcadas* between 1/10 - 3/3/75. Data submitted on NODC compatible magnetic tape.

**NODC Accession No.:** 79-00298
**Organization:** Texas A&M University
**Investigator:** W. D. Nowlin (TAMU)
**Grant No.:** OCE76-80410 AO1
**Project:** ISOS/FDRAKE 79
**Data:** 180 XBTs taken aboard the *Yelcho* and 142 XBTs taken aboard the *Melville*. This data was taken in January and February of 1979. Data submitted on NODC compatible magnetic tape.

**NODC Accession No.:** 79-00299
**Organization:** Oregon State University
**Investigator:** R. D. Pillsbury (OSU)
**Grant No.:** OCE76-80066
**Project:** ISOS FDRAKE 77 and FDRAKE 78
**Data:** Current data taken between 2/1/77 and 6/78. Data submitted on NODC compatible magnetic tape.

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## Climate: Long-Range Investigation, Mapping, and Prediction (CLIMAP) Study

CLIMAP research was designed to describe and explain the major changes in global climate that have occurred in the past million years. These changes involve transitions between two partly stable states of global climate—ice ages and temperate (interglacial) periods. The fundamental objective was to improve our understanding of the causes of long-term climatic change. Previous CLIMAP work firmly established a concept suggested by earlier workers, that variation in the Earth-Sun orbital geometry is the pacemaker of long-term climatic change. Much of recent CLIMAP work was directed toward studies of the interaction of the various parts of the global climate system. Ocean sediment cores are multichannel recorders of changes in the ocean circulation, variation in the size of ice sheets, and changes in terrestrial climate. Knowledge of how these parts of the global system have interacted in the past provides insight into some of the causal relationships that will determine the climate of the future. These long-range trends are the fundamental, large-amplitude rhythms that underlie the higher frequency and smaller scale variations of recent centuries.

### CLIMAP Data

CLIMAP data received during the period of this report are available from NGSDC as follows:

**NGSDC Accession No.:** 17010024
**Organization:** Oregon state University
**Investigator:** J. Theide (OSU)
**Grant No.:** OCE 75-22133
**Project:** CLIMAP
**Data:** 1500 n.mi. bathymetry on microfilm

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# Seabed Assessment Program

This program funded basic research that focused on the geological processes along continental margins, midocean ridges, and deep-sea basins. In the last decade, Earth scientists began to recognize the subtle relationship between the movements of the Earth's crust and the active processes in the world's oceans and their bearing on the origin and development of hydrocarbon and metallic ore deposits.

The projects supported by Seabed Assessment are broadly grouped as Continental Margin Studies, Plate Tectonics and Metallogenesis, and the Manganese Nodule Program.

## Continental Margin Studies

The continental margin was studied to better understand the rifting of continental land masses and the effects of the rifting on the margins. Continental margins are broadly divided between passive (pull-apart) and active (compressive) types. The margins around the Atlantic are almost all passive; those around the Pacific are active. At the beginning of the decade, knowledge of the origin and structure of margins was poorly known and very uneven.

### Continental Margin Data

Continental Margin data received during the period of this report are available from NGSDC as follows:

**NGSDC Accession No.:** 10020005
**Organization:** University of Texas at Galveston
**Investigator:** J. Watkins (U. of Texas)
**Grant No.:** OCE 74-02923
**Project:** Continental Margin Studies
**Data:** 2,500 bathymetric and 5,200 magnetic observations on magnetic tape.

### Continental Margin Bibliography


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Rabinowitz, P. D.
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## Plate Tectonics and Metallogenesis Studies

A fuller understanding of the origin and development of ore deposits is needed to guide the search for new reserves of minerals vital to industrial civilization. One of the significant implications of plate tectonic theory is that active processes along plate margins relate in subtle ways to the formation both of economic metal deposits and hydrocarbon accumulation. The subject is a complex, multifaceted one that includes both sea floor- and mountain-building processes. The circum-Pacific belt, characterized by active subduction zones, parallels to varying degrees some of the world's major metallogenic provinces. At one end of the system, hydrothermal processes along the spreading centers of the ocean floor show evidence of metal concentrations, and at the other end in the mountain belts, suites of rocks in the zones of metal accumulation suggest deep marine origin. Following the paths of the metals from the source to the mine is a major scientific problem in Earth science that the Seabed Assessment Program supported in part through several projects.

### Plate Tectonics and Metallogenesis Studies Data

Plate Tectonics and Metallogenesis Studies data received during the period of this report are available from NGSDC as follows:

**NGSDC Accession No:** 07080003
**Organization:** Oregon State University
**Investigator:** L. Kulm (OSU)
**Grant No:** OCE 76-05903
**Project:** Plate Tectonics
**Data:** 3,800 n.mi. of bathymetric and seismic data on microfilm.

**NGSDC Accession No:** 08015012
**Organization:** Hawaii Institute of Geophysics
**Investigator:** G. Woollard (HIG)
**Grant No:** GX-28674
**Project:** Plate Tectonics
**Data:** Mineralogy, geochemistry, and geochronology of 18 core samples in published data report.

**NGSDC Accession No:** 08995007
**Organization:** Hawaii Institute of Geophysics
**Investigator:** G. Woollard (HIG)
**Grant No:** GS-28674
**Project:** Plate Tectonics
**Data:** Geochemical analyses of 10 core samples in published data report.

### Plate Tectonics and Metallogenesis Studies Bibliography

Bonatti, E.
1978. Vertical tectonism in oceanic fracture zones. Earth and Plan. Sci. Lett. 37:369-379.

## Nazca Plate Study

The Nazca Lithospheric Plate lies adjacent to the event edge of the great metallogenesis province of the Andes. This area was the subject of major field programs from 1972-75 by Oregon State University and the Hawaii Institute of Geophysics in cooperation with scientists from Chile, Columbia, Peru, and Ecuador. The results were synthesized into comprehensive models of the Nazca Plate that served as site surveys for subsequent drilling on Offshore Drilling Project (OSDP) Leg 34 by the *Glomar Challenger*. Three holes were drilled through the sedimentary sequence into basement rocks, one in the Bauer Basin (metalliferous sediments) and two on the seawater side of the Peru-Chile Trench.

### Nazca Plate Study Bibliography

Blakely, R. J.
1976. An age-dependent, two-layer model for marine magnetic anomalies. *In*: The geophysics of the Pacific Ocean basin and its margin. Geophysical Monograph 19, Amer, Geophys. Un., p. 227-235.

## Studies in East Asia Tectonics and Resources (SEATAR)

An international group of scientists performed a large-scale, comprehensive investigation of the interplay between the regional tectonics and the occurrences of metals and hydrocarbons in East Asia. This project was based on recommendations of a workshop held in Bangkok in 1973.

### SEATAR Data

SEATAR data received during the period of this report are available from NGSDC as follows:

**NGSDC Accession No:** 15040072
**Organization:** Cornell University
**Investigator:** D. Karig (Cornell)
**Grant No:** OCE 77-24045
**Project:** SEATAR
**Data:** 1200 km of seismics on microfilm

### SEATAR Bibliography

Cardwell, R. K., and B. L. Isacks.
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## Manganese Nodule Program (MANOP)

IDOE-sponsored studies of deep-sea manganese nodules changed focus in 1977 with the initiation of MANOP (the new Manganese Nodule Program). Its predecessor programs successively compiled unpublished data on distribution and composition of nodules, and surveyed and sampled a number of small areas within the band of copper- and nickel-rich nodules south and east of Hawaii. MANOP concentrated on the paths and mechanisms that carry economically important elements, such as copper and nickel, to the sea floor and lead to their incorporation in the nodules.

### MANOP Data

MANOP data received during the period of this report are available from NGSDC as follows:

**NGSDC Accession No:** 08025001
**Organization:** Hawaii Institute of Geophysics
**Investigator:** J. Andrews (HIG)
**Grant No:** GX-34659
**Project:** MANOPS
**Data:** Sample descriptions and manganese nodule geochemistry from 4 core and 48 grab samples in published data report.

**NGSDC Accession No:** 08025002
**Organization:** Hawaii Institute of Geophysics
**Investigator:** S. Margolis (HIG)
**Grant No:** OCE 76-03969
**Project:** MANOPS
**Data:** Sample descriptions, geochemistry, and manganese nodule analyses from 6 core and 31 grab dredge samples in published data report.

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# Living Resources Program

The goal of this program was to provide scientific knowledge for improved management and use of the ocean's living resources. Emphasis was on interdisciplinary studies of the mechanisms that produce and sustain marine life. The program included the Coastal Upwelling Ecosystems Analysis (CUEA) and Seagrass Ecosystem Study (SES) projects.

## Coastal Upwelling Ecosystems Analysis (CUEA)

The long-term goal of the CUEA program was to understand coastal upwelling ecosystems well enough to predict their response to changes far enough in advance to be useful to mankind. This goal, when achieved, provides the basis for protecting the long-term productivity of fisheries in these ecosystems.

### CUEA Data

CUEA data received during the period of this report are available from NODC as follows:

**NODC Accession No:** 78-00803
**Organization:** Oregon State University
**Investigator:** J. Huyer and R. L. Smith (OSU)
**Grant No:** OCE 76-00594
**Project:** CUEA (JASON - 1976)
**Data:** 144 CTDs taken aboard the *Eastward*, 7/23 - 8/16/76. Data submitted on NODC compatible magnetic tape.

**NODC Accession No:** 79-00205
**Organization:** University of Delaware
**Investigator:** C. N. K. Mooers (U of D)
**Grant No:** OCE 77-28354
**Project:** CUEA - JOINT II
**Data:** 194 CTDs taken aboard the *Columbus Iselin*, 3/15 - 3/31/77. Data submitted on NODC compatible magnetic tape.

**NODC Accession No:** 79-00209
**Organization:** Oregon State University
**Investigator:** Jane Huyer (OSU)
**Grant No:** OCE 76-00594
**Project:** CUEA - JOINT II (MAM 77)
**Data:** 453 CTDs taken aboard the *Melville* (3 4 - 5 22 77) and *Columbus Iselin* (4 5 - 5 19 77). Data submitted on NODC compatible magnetic tape.

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## Seagrass Ecosystem Study (SES)

The Seagrass Ecosystem Study (SES) began in 1974 as a team research project to study benthic marine plant systems, particularly the dynamic processes by which seagrass ecosystems are maintained and how they contribute to the seas.

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# Appendix A—ROSCOP Summaries

In the following ROSCOP (Report of Observations/Samples Collected by Oceanographic Programs) summaries,[1] all institutions or activities are U.S. participants in IDOE, and all projects are part of the Declared National Program (DNP) for Marine Data Exchange. This appendix includes all IDOE-related ROSCOPs received by NOAA's Environmental Data and Information Service from April 1978 to October 1979. The reported ROSCOPs bring the IDOE 1970 to 1979 total to 600. Information is presented in the following order:

**Line 1:** Name of vessel or platform used to collect the data, name of institution operating the vessel or platform,[2] ship cruise number.

**Line 2:** Inclusive dates of the cruise or platform deployment; general ocean area of cruise; and 10° Marsden square(s) where observations and samples were collected, as shown by charts following appendices.

**Line 3:** NODC Reference Number. (Reference to this number when requesting ROSCOPs facilitates retrieval of the information.)

**Line 4:** Name of principal investigator or chief scientist on the cruise, his affiliate institution,[3] and the identifying number of the NSF grant that supports the principal investigator.

**Line 5:** Name of the IDOE project for which the cruise data and collections were made.

[1]See Introduction.

[2]Certain cooperative data collection efforts were performed on vessels other than those of the grant holder's parent institution.

[3]Certain inventory forms were submitted by institutions other than those of the grant holders.

A listing of parameters by discipline and the number of stations, observations, samples, or miles of record follow line 5. Where continuous sampling or observing has been made, the number of miles is used rather than discrete values.

## LIST OF ABBREVIATIONS

### Institution of IDOE Grant Holder

| | |
|---|---|
| **MIT** | Massachusetts Institute of Technology |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **OSU** | Oregon State University |
| **RSMAS** | Rosenstiel School of Marine and Atmospheric Sciences, University of Miami |
| **SIO** | Scripps Institution of Oceanography |
| **TAMU** | Texas A&M University |
| **URI** | University of Rhode Island |
| **U Wash.** | University of Washington |
| **WHOI** | Woods Hole Oceanographic Institution |

**Organizations providing support:**

| | |
|---|---|
| **NSF** | National Science Foundation |
| **OCE** | Ocean Sciences Division |

## Environmental Quality Program

### Geochemical Ocean Sections Study (GEOSECS)

1. R/V *Melville* (SIO) cruise INDOMED Leg 3
2. December 4 - December 11, 1977
3. NODC Reference No. R392764
4. R. T. Williams (SIO)
5. **Program:** GEOSECS

**Geology/Geophysics** - Bathymetry 1,700 n.mi.; magnetism - 900 n.mi.;
**Biology** - Zooplankton - 2
**Physical/Chemical Oceanography** - ocean stations-2; STD/CTD -2; oxygen, phosphates, nitrates, nitrites, silicates, alkalinity and chlorinity-2 each.

1. R/V *Melville* (SIO) cruise INDOMED Leg 4
2. December 16, 1977 - January 23, 1978
3. NODC Reference No. R392765
4. H. Craig (SIO)
5. **Program:** GEOSECS

**Geology**/Geophysics - Bathymetry 4,500 n.mi.; magnetism - 3,800 n.mi.
**Meteorology** - Ice observations-22
**Biology** - Zooplankton - 17
**Physical/Chemical Oceanography** - surface temperatures - 4,500; ocean stations - 22; STD/CTD-21; phosphates, nitrates, nitrites, silicates, alkalinities - 21 each; oxygen, chlorinity, trace elements, isotopes, and dissolved gases - 22 each.

1. R/V *Melville* cruise INDOMED Leg 5
2. January 28 - February 25, 1978
3. NODC Reference No. R392766
4. R. F. Weiss (SIO)
5. **Program:** GEOSECS

**Geology/Geophysics** - Bathymetry - 5,100 n.mi.; magnetism - 4,800 n.mi.
**Physical/Chemical Oceanography** - surface temperatures - 5,100; ocean stations - 9, STD/CTD - 9; oxygen, phosphates, nitrates, nitrites, silicates, alkalinity, chlorinity, trace elements isotopes, and dissolved gases - 9 each.
**Biology** - Zooplankton - 9.

1. R/V *Melville* cruise INDOMED Leg 6
2. March 7 - March 31, 1978
3. NODC Reference No. R392767
4. W. Broecker (SIO)
5. **Program**: GEOSECS

**Geology/Geophysics** - Bathymetry - 3,700 n.mi.; magnetism - 3,500 n.mi.
**Biology** - Zooplankton - 11
**Physical/Chemical Oceanography** - surface temperatures - 3,700; ocean stations - 11, STD/CTD - 11; oxygen, phosphates, nitrates, nitrites, silicates, alkalinity, chlorinity, trace elements, radioactivity, isotopes, and dissolved gases - 11 each.

1. R/V *Melville* cruise INDOMED Leg 7
2. April 4 - April 24, 1978
3. NODC Reference No. R392768
4. D. Spencer (SIO)
5. **Program:** GEOSECS

**Geology/Geophysics** - Bathymetry - 3,200 n.mi.; magnetism - 3,100 n.mi.
**Biology** - Zooplankton - 8
**Physical/Chemical Oceanography** - surface temperatures - 3,200; ocean stations - 8; STD/CTD - 8; oxygen, phosphates, nitrates, nitrites, silicates, alkalinity, chlorinity, trace elements, radioactivity, isotopes, and dissolved gases - 8 each.

### Biological Effects Program (BEP)

1. R/V *Oceanus* (WHOI) cruise 43
2. April 11 - April 18, 1978, NW Atlantic 3. NODC Reference No. R393247
4. J. J. Stegeman (WHOI), Grant: NSF/OCE76-84415 and OCE77-24517.
5. **Program:** Biological Effects

**Physical/Chemical Oceanography:** XBTs - 15
**Biology:** Pelagic fishes - 22, vitamin concentrations - 36, hydrocarbon concentrations - 58, lipid concentrations - 36, radionuclides fish tissues and swim bladder tissues - 68.

## Environmental Forecasting Program

### Joint U.S.-U.S.S.R. Mid-Ocean Dynamics Experiment (POLYMODE)

1. R/V *Endeavor* cruise EN-013
2. September 24 - October 9, 1977
3. NODC Reference No. R392706
4. T. Rossby (URI), Grants: OCE76-11726 and OCE75-18931
5. **Program:** POLYMODE

**Dynamics** — Sofar floats - 2
**Physical/Chemical Oceanography** — STD/CTD - 10, XBTs - 223

1. R/V *Oceanus* (WHOI) cruise 42
2. April 1 - April 7, 1978
3. NODC Reference No. R392941
4. T. Sanford (WHOI), Grant No. OCE76-24605
5. **Program:** POLYMODE

**Physical/Chemical Oceanography:** XBTs - 4

1. R/V *Endeavor* (URI) cruise EN20
2. April 3 - April 26, 1978
3. NODC Reference No. R392944
4. H. Sigurdsson (URI), R. S. J. Sparks (URI), Grant No. OCE77-25789
5. **Program:** POLYMODE

**Geology/Geophysics** - Dredge - 2; Soft bottom core - 45; Bottom photography - 3;
Seismic reflection - 2,400
**Physical/Chemical Oceanography** — XBTs - 45
**Biology** — Bacterial and pelagic microorganisms - 4

1. R/V *Bartlett* (WHOI)
2. April 15 - April 21, 1978
3. NODC Reference No. R392862
4. J. McWilliams (WHOI)
5. **Program:** POLYMODE

**Physical/Chemical Oceanography:** XBTs - 102

1. R/V *Atlantis II* (WHOI) cruise 100 leg 1
2. April 21 - May 12, 1978
3. NODC Reference No. R392697
4. K. Bradley (WHOI), G. Volkmann (WHOI), R. Millard (WHOI), W. Dunkel (WHOI), and R. Payne (WHOI)
5. **Program:** POLYMODE

**Physical/Chemical Oceanography** — ocean stations - 34, STD/CTD - 34, XBTs - 147, surface temperatures - 147, oxygens - 34, silicates - 34
**Geology**/Geophysics — bathymetry - 500 n.mi.
**Dynamics** — current meters for 365 days

1. R/V *Endeavor* cruise EN-021
2. May 6 - May 26, 1978
3. NODC Reference No. R392945
4. T. H. Rossby (URI) and J. F. Price (URI), Grant No. OCE76-11726
5. **Program:** POLYMODE

**Dynamics:** Sofar floats - 30
**Physical/Chemical Oceanography** — XBTs - 400

1. R/V *Atlantis II* (WHOI) cruise 100 - Leg 2
2. May 16 - June 4, 1978
3. NODC Reference No. R393245
4. G. H. Tupper (WHOI), C. Wunsch (MIT), N. Fofonoff (WHOI), W. Schmitz (WHOI), and P. Richardson (WHOI)- Grant No. OCE77-19403
5. **Program:** POLYMODE

**Physical/Chemical Oceanography** — STD/CTD - 15, XBTs - 276
**Geology/Geophysics** — bathymetry - 4,000 n.mi.
**Dynamics** — current meters - 10 for 360 days, drifters - 2

1. R/V *Gilliss* (RSMAS) cruise GS7801, 7802
2. May 16 - June 28, 1978
3. NODC Reference No. R393112
4. J. V. Leer (RSMAS) Henry Perkins (RSMAS)
5. **Program:** POLYMODE

**Physical/Chemical Oceanography** — ocean stations - 114; STD/CTD - 114; XBTs - 250

1. R/V *Columbus Iselin* (RSMAS) cruise CI7805
2. May 18 - July 18, 1978
3. NODC Reference No. R392849
4. B. Taft (U Wash.)
5. **Program:** POLYMODE

**Physical/Chemical Oceanography** — STD/CTD - 271, XBTs- 350, oxygen - 271

1. R/V *Oceanus* (WHOI) cruise 47
2. June 3 - June 23, 1978
3. NODC Reference No. R392942
4. T. Sanford (WHOI), Grant No. OCE76-24605
5. **Program:** POLYMODE

**Physical/Chemical Oceanography:** STD/CTD - 50, XBTs - 137

1. R/V *Oceanus* (WHOI) 52 Leg 1
2. September 26 - October 24, 1978
3. NODC Reference No. R393201
4. W. Jenkins (WHOI), S. McDowell (URI) and T. Joyce (WHOI), Grant No. OCE77-2045 and OCE76-11726
5. **Program:** POLYMODE

**Physical/Chemical Oceanography:** ocean stations - 27, STD/CTD - 40, XBTs - 120

1. R/V *Endeavor* (URI)
2. October 20 - November 20, 1978
3. NODC Reference No. R393416
4. T. H. Rossby and J. F. Price (URI), Grant No. OCE76-11726
5. **Program:** POLYMODE

**Dynamics** — Sofar floats - 30

**Physical/Chemical Oceanography** — XBTs - 80, isotopes - 5

**North Pacific Experiment (NORPAX)**

1. *Chevron California,* cruise 295
2. January 6 - January 13, 1978
3. NODC Reference No. R395748
4. D. McLain (NOAA)
5. Program: NORPAX

**Physical/Chemical Oceanography** — 43 XBTs

1. *Hawaiian Queen,* cruise 217
2. January 7 - January 12, 1978
3. NODC Reference No. R395749
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 35 XBTs

1. *Chevron California,* cruise 282
2. January 26 - January 31, 1978
3. NODC Reference No. R395750
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 26 XBTs

1. *Hawaiian Queen,* cruise 218
2. January 26 - January 31, 1978
3. NODC Reference No. R395751
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 32 XBTs

1. *Chevron California,* cruise 296
2. February 2 - February 7, 1978
3. NODC Reference No. R395768
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 4 XBTs

1. *Hawaiian Queen,* cruise 219
2. February 9 - February 14, 1978
3. NODC Reference No. R395752
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 34 XBTs

1. *Hawaiian Queen,* cruise 220
2. February 23 - February 28, 1978
3. NODC Reference No. R395753
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 32 XBTs

1. *Chevron California,* cruise 297
2. March 2 - March 7, 1978
3. NODC Reference No. R395769
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 6 XBTs

1. *Chevron California*
2. March 13 - March 18, 1978
3. NODC Reference No. R395754
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 31 XBTs

1. *Hawaiian Queen,* cruise 221
2. March 16 - March 22, 1978
3. NODC Reference No. R395755
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 35 XBTs

1. *Hawaiian Queen,* cruise 223
2. April 6 - April 12, 1978
3. NODC Reference No. R395756

4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 35 XBTs

1. *Chevron California,* cruise 298
2. April 10 - April 15, 1978
3. NODC Reference No. R395770
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 10 XBTs

1. *Chevron California,* cruise 298
2. April 21 - April 26, 1978
3. NODC Reference No. R395757
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 30 XBTs

1. *Hawaiian Queen,* cruise 224
2. April 28 - May 3, 1978
3. NODC Reference No. R395758
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 38 XBTs

1. *Chevron California,* cruise 297
2. May 6 - May 11, 1978
3. NODC Reference No. R395759
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 32 XBTs

1. *Chevron California,* cruise 299
2. May 8 - May 12, 1978
3. NODC Reference No. R395771
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 6 XBTs

1. *Chevron California,* cruise 299
2. May 21 - May 27, 1978
3. NODC Reference No. R395760
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 33 XBTs

1. *Hawaiian Queen,* cruise 227
2. June 3 - June 9, 1978
3. NODC Reference No. R395761
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 34 XBTs

1. *W. B. Cobb,* cruise 222
2. July 1 - July 6, 1978
3. NODC Reference No. R395763
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 23 XBTs

1. *Hawaiian Queen,* cruise 228
2. July 1 - July 7, 1978
3. NODC Reference No. R395762
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 37 XBTs

1. *W. B. Cobb,* cruise 223
2. July 11 - July 15, 1978
3. NODC Reference No. R395747
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 15 XBTs

1. *Chevron California,* cruise 302
2. July 22 - July 27, 1978
3. NODC Reference No. R395764
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 29 XBTs

1. *Hawaiian Queen,* cruise 229
2. July 28 - August 2, 1978
3. NODC Reference No. R395765
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 35 XBTs

1. *Hawaiian Queen,* cruise 230
2. August 5 - August 10, 1978
3. NODC Reference No. R395766
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 32 XBTs

1. *Chevron Mississippi,* cruise 286
2. August 22 - August 27, 1978
3. NODC Reference No. R395767
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 29 XBTs

1. *Hawaiian Queen,* cruise 231
2. September 11 - September 16, 1978
3. NODC Reference No. R395710
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 33 XBTs

1. *Chevron Mississippi,* cruise 289
2. September 15, September 20, 1978
3. NODC Reference No. R395712
4. D. McLain (NOAA)
5. **Program:** NORPAX
**Physical/Chemical Oceanography** — 29 XBTs

1. *Chevron California,* cruise 304
2. September 24 - September 29, 1978
3. NODC Reference No. R395709
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 33 XBTs

1. *Hawaiian Queen,* cruise 232
2. October 9 - October 15, 1978
3. NODC Reference No. R395711
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 34 XBTs

1. *Chevron California,* cruise 305
2. October 21 - October 26, 1978
3. NODC Reference No. R395713
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 32 XBTs

1. *Hawaiian Queen,* cruise 233
2. November 5 - November 9, 1978
3. NODC Reference No. R395714
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 25 XBTs

1. *Chevron California,* cruise 306
2. November 11 - November 16, 1978
3. NODC Reference No. R395715
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 31 XBTs

1. *Mauna Lei,* cruise 234
2. December 9 - December 15, 1978
3. NODC Reference No. R395716
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 34 XBTs

1. *Hawaiian Queen,* cruise 235
2. January 6 - January 11, 1979
3. NODC Reference No. R395717
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 31 XBTs

1. *Chevron California,* cruise 324
2. January 6 - January 11, 1979
3. NODC Reference No. R395718
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 33 XBTs

1. *Chevron California,* cruise 308
2. January 23 - January 24, 1979
3. NODC Reference No. R395719
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 6 XBTs

1. *Chevron California,* cruise 326
2. January 30 - February 4, 1979
3. NODC Reference No. R395720
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 37 XBTs

1. *Chevron California,* cruise 309
2. March 3 - March 8, 1979
3. NODC Reference No. R395722
4. D. McLain (NOAA)
5. **Program:** NORPAX

**Physical/Chemical Oceanography** — 31 XBTs

1. *Hawaiian Queen,* cruise 236
2. February 4 - February 9, 1979
3. NODC Reference No. R395721
4. D. McLain (NOAA)
5. **Program:** NORPAX

Physical/Chemical Oceanography — 34 XBTs

### International Southern Ocean Studies (ISOS)

1. R/V *Knorr* (WHOI) 73 legs 9 and 10
2. September 18 - November 5, 1978, South of New Zealand
3. NODC Reference No. R393197
4. M. McCartney (WHOI) and W. Jenkins (WHOI) Grant No. OCE77-22885 and OCE77-22877
5. **Program:** ISOS

**Physical/Chemical Oceanography** — ocean stations - 115, STD/CTD - 120, XBTs - 605, Isotopes - 7

1. R/V *Knorr* (WHOI) - 73 leg 11
2. November 12 - December 9, 1978, SW Pacific and Antarctic
3. NODC Reference No. R393198
4. H. Bryden (WHOI) and T. Joyce (WHOI), Grant No. OCE77-02287
5. **Program:** ISOS

**Physical/Chemical Oceanography**: ocean station - 1, CTDs - 79, XBTs - 200, oxygen 79

1. R/V *Melville* (TAMU) Drake 79
2. January 11, 1979 - February 6, 1979, Drake Passage
3. NODC Reference No. R393282
4. W. D. Nowlin, Jr. (TAMU), R. D. Pillsbury (OSU)
5. **Program:** ISOS/FDRAKE 79

**Geology/Geophysics:** Bathymetry 2,000 n.mi.,
**Dynamics:** 1 current meter for 10 months, bottom pressure - 3
**Physical/Chemical Oceanography:** temperatures - 150, salinities 100, oxygen - 37, ocean stations - 37, STD/CTD - 8, XBTx - 150

### Seabed Assessment Program

#### Plate Tectonics and Metallogenesis Studies

1. R V *Thomas Washington*
2. September 20 - December 10, 1978
3. NODC Reference No. R393522
4. J. H. Filloux (SIO)
5. Program:SEATAR

Geology Geophysics — Magnetotellurics-2

#### Manganese Nodule Program (MANOP)

1. R V *Wecoma* (OSU) cruise, WELOC-78 Legs 1 and 2
2. February 23 - March 2, 1978
3. NODC Reference No. R392654
4. J. Dymond (OSU)
5. Program:MANOP

Geology Geophysics — nine soft bottom core
Pollution — three suspended solids

1. R V *Wecoma* (OSU) cruise WELOC-78 Legs 5 and 6
2. April 13 - April 23, 1978
3. NODC Reference No. R392739
4. J. Dymond (OSU)
5. Program:MANOP

Pollution — suspended solids - 1

1. R V *Wecoma* (OSU) cruise W7903A
2. March 20 - March 24, 1979
3. NODC Reference No. R393357
4. R. F. Weiss (SIO)
5. Program:MANOP

# Living Resources Program

#### Coastal Upwelling Ecosystems Analysis (CUEA)

1. R/V *Cayuse* (OSU) cruise C7803A
2. March 8 - March 10, 1978
3. NODC Reference No. R392529
4. R. Smith (OSU), A. J. Huyer (OSU)
5. **Program:** Poleward undercurrent/CUEA

**Dynamics**: one current meter for 1365 days

1. R/V *Cayuse* (OSU) cruise C7802C
2. February 24 - February 28, 1978
3. NODC Reference No. R392650
4. B. Hickey (U. Wash.)
5. **Program:** Poleward undercurrent/CUEA

**Physical/Chemical Oceanography:** STD/CTD - 45

1. R/V *Cayuse* cruise C7804C
2. April 24 - April 30, 1978
3. NODC Reference No. R392950
4. B. Hickey (U. Wash.)
5. **Program:Dynamics**: six current meters for 70 days

1. R/V *Cayuse*, cruise C7805B
2. May 6 - May 8, 1978
3. NODC Reference No. R392951
4. B. Hickey (U. Wash.)
5. **Program:** Poleward undercurrent/CUEA

**Dynamics:** one current meter for 120 days

1. R/V *Wecoma* (OSU) cruise W7805A
2. May 9 - May 24, 1978
3. NODC Reference No. R392745
4. R. Smith (OSU), L. Gordon (OSU), J. Huyer (OSU)
5. **Program:** Poleward undercurrent/CUEA

**Physical/Chemical Oceanography** - STD/CTD - 89, oxygens - 470, phosphates - 250, nitrates - 250, nitrites - 250, silicates - 250, alkalinities - 250, pH - 250
**Dynamics** — four current meters

1. R/V *Wecoma* (OSU) cruise W7807B
2. July 24 - July 26, 1978
3. NODC Reference No. R392860
4. R. Smith (OSU), A. Huyer (OSU)
5. **Program:** Poleward undercurrent/CUEA

**Physical/Chemical Oceanography** — STD/CTD - 18, one current meter

1. R/V *Wecoma* (OSU) cruise W7809A
2. September 10 - September 19, 1978
3. NODC Reference No. R392943
4. A. Huyer (OSU), R. Smith (OSU), and L. Gordon (OSU) Grant No. OCE77-07932
5. **Program:** Poleward undercurrent/CUEA

**Physical/Chemical Oceanography** — STD/CTD - 82, oxygen - 33, pH - 33
**Biology** — ATP/ADP/AMP Concentrations - 33

#### Seagrass Ecosystem Study (SES)

1. Satellite
2. May 18 - October 20, 1978
3. NODC Reference No. R393519
4. K. J. Savastano
5. **Program:** SEAGRASS

**Geology/Geophysics** — Bottom photography
**Biology** — Attached plants and algae

# Appendix B—IDOE Films

NSF has arranged for the preparation of several films describing the work of IDOE-funded oceanographers. These 16-mm sound and color motion pictures are available from the organizations indicated.

**The Alchemist Sea** (5 minutes)-For nearly 200 million years, the Earth's surface has been broken up into massive plates that shift and move—often beneath the sea floor. Scientists, collecting core samples from the sea floor, are discovering that there is a relationship between plate motion and the distribution of ore deposits. Their research can help guide our search for metals on the sea floor as well as on continents. (CCL)

**Boundary of Creation** (27 minutes)-This film describes the efforts of U.S. and French scientists in Project FAMOUS to understand the ever-changing geology of our Earth, particularly the midocean ridges off the Azores. The picture features the probes of the submersible ALVIN in the ocean depths and also portrays research in Hawaii and Iceland. (NFL)

**Changing Climes** (5 minutes)-Are the unusual weather patterns and severe crop losses of recent years just passing phenomena? Or is the Earth sliding into a downward side of a long-term temperature cycle. Scientists are detecting evidence of such long-term cycles and are raising some early warnings. (CCL)

**Cycle in the Sea** (4 minutes)-Thanks to the motions of wind, water, and the Earth itself, life in the oceans continuously renews itself. Here is an important story of the balance in the world's ecosystems and the study of this balance off the coast of Oregon. (RHR) (AEF) (KFP)

**Desert in the Deep?** (5 minutes)-That the ocean floor is no desert is beginning to be realized. But the varieties of life forms, from simple organisms to sharks measuring four feet between the eyes, were unsuspected until scientists went to sea with cameras able to explore the very deepest reaches of the ocean. (RHR) (AEF) (KFP)

**Elements of Mystery** (25 minutes)-The film monitors the progress of a team of scientists aboard the research ship *Melville* as they gather data on chemical composition and determine locations of manganese nodules in the Pacific. The joint research effort, with several universities participating, is attempting to increase understanding of how manganese nodules are formed, as well as their economic potential as an international resource. (MTP)

**The Turbulent Ocean** (60 minutes)-A documentary film about the planning and execution of one of the largest deep-sea expeditions in twentieth century oceanographic research. Over 75 scientists and technicians from 18 national and international universities and oceanographic institutions set forth in a coordinated, cooperative effort to find and measure eddies, strange and not yet understood motions beneath the surface of the sea. (CFI)

**Well of Life** (27 minutes)-The twin dramas of the ocean's life cycles and the scientific probing of its mysteries are combined in this story of ocean upwelling. Coastal upwelling is the still little-understood process by which the ocean continuously renews its resources, through the motions of wind, water, and the Earth itself. This film deals with the efforts of scientists to uncover the driving forces of upwelling and to learn how it influences and is influenced by weather, climate, and other ocean-linked phenomena. The setting is off the Oregon coast. (English, French, German, Spanish, and Russian versions.) (ACL)

**Where is the Weather Born?** (5 minutes)-Weather and climate, it has been said, began in the oceans. A group of scientists have been studying the northern Pacific in the effort to identify the oceanic processes relating to weather conditions over the continents. NORPAX, the North Pacific Experiment, is an effort to understand the interrelationships, for instance, between sea-surface temperatures and long-term weather (or short-term climate). This research could lead not only to improved understanding, but to prediction of climate as well. (CCL)

**Pastures in the Sea** (5 minutes)-Food chains in the sea, like food chains on land, depend on plants to use the Sun's energy to convert chemical nutrients into food. To understand, and perhaps better use, the resources of the sea, we have to understand its interlocking life cycles. Science is looking at the beginning of the sea's food chain; this film looks at the science. (RHR) (AEF) (KFP)

**Rivers of the Sea** (52 minutes)-A sea-going expedition leaves Tahiti to gain a better understanding of the oceans and their chemistry—knowledge that is vital in preventing ocean pollution, improving commercial fishing, and understanding climatic conditions. It joins scientists working at sea and in land-based laboratories in California, New York, and Miami. This expedition is one of the largest and most concentrated oceanographic surveys since the voyage of the *Challenger* 100 years ago. (RHR)

**Science and the Salmon Fishery** (6 minutes)-Commercial fishermen have learned by guess and by gosh where to catch fish, but they often do not know why the fish are where they are. A scientific experiment off the Oregon coast has turned up explanations and, with the coopera-

tion of the cho salmon fishermen, has developed a system of fishery predictions with pay offs. (AEF) (KFP) (RHR)

**Test Tubes in the Sea** (5 minutes)-Can our oceans continue to absorb the urban wastes, oils, and chemicals we discharge into them — or is there a point of no return? An international team of scientists and engineers is trying to find out by measuring pollutants in the sea. Their efforts are giving us a major tool that will help us understand how these contaminants affect the ocean food chain and an indication of how far we can go in continuing to pollute the sea. (AEF) (KFP) (RHR)

## DISTRIBUTORS

(ACL)

Alpha Cine Labs
1001 Lenora Street
Seattle, Washington 98121

(Films are for purchase only)

(AEF)

American Educational Films
Box 5001
132 Lasky Drive
Beverly Hills, California 90212

(Films are for rent or purchase)

(CFI)

Centre Films, Inc.
1103 N. El Centro Avenue
Hollywood, California 90038

(Films are for rent or purchase)

(CCL)

Cineffects Color Laboratory
115 West 45th Street
New York, New York 10036

(Films are for purchase only)

(KFP)

King Features Productions
Educational Film Division
235 East 45th Street
New York, New York 10017

(Films are for purchase only)

(MTP)

Modern Talking Pictures Service
2323 Hyde Park Road
New Hyde Park, New York 11040

(Films are for free loan)

(NFL)

NOAA Film Library
12227 Wilkins Avenue
Rockville, Maryland 20852

(Films are for free loan)

(RHR)

RHR Filmedia, Inc.
1212 Avenue of the Americas
New York, New York 10036

(Films are for free loan)

# Appendix C—Reports and Workshops Sponsored by IDOE

The Caribbean: Geology, Geophysics and Resources. A report on the IDOE workshop on Geology and Geophysics of the Caribbean Region and its Resources held in Kingston, Jamaica, 1975. The report, edited by John Weaver, University of Puerto Rico, includes a geologictectonic map compiled by J. E. Case and T. L. Holcombe, which extends from 54° E to 93° E and from 5° N to 24° N. Individual articles include: Geologic Framework of the Caribbean Region (J. E. Case), Bathymetry and Sediments (T. L. Holcombe), Seismicity (J. F. Tomblin), Mineral Resources (P. W. Guild and D. P. Cox). Copies can be obtained by writing: 1) Dr. John D. Weaver, Institute of Caribbean Science, University of Puerto Rico, Mayaguez, P. R.; or 2) Seabed Assessment Program, IDOE, Div. Ocn. Sci., 1800 G Street NW., Washington, D.C. 20550.

The Continuing Quest (large-scale science for the future). Report of a study conducted under the auspices of the Ocean Sciences Board of the National Research Council. August 1978, National Academy of Sciences.

Federal Agency Support For Marine-Related Social Science Research. A Report prepared by the ad hoc Subcommittee for the Interagency Committee on Marine Science and Engineering, December 1976.

Geology, Geophysics and Resources of the Caribbean. Report of the IDOE Workshop on Geology and Marine Geophysics of the Caribbean Region and its Resources, Kingston, Jamaica, 1975.

Minerals from Mantle to Mine, a 7-page article reprinted from MOSAIC May June 1977, describes the Seabed Assessment Program's Studies in East Asia Tectonics and Resources (SEATAR) project. Copies available free from the NSF Div. Ocn. Sci. Office.

Meyers, H., M. S. Loughridge, and J. B. Grant. 1978. Proceedings of Marine Geological Data Management Workshop. May 22-24, 1978. Boulder, Colo.

Ocean Research in the 1980's. Recommendations from a series of workshops on promising opportunities in large-scale oceanographic research. August 1977, Center for Ocean Management Studies, University of Rhode Island, Kingston, R. I.

Report of the Workshop on Biological Oceanography for Post 1980 IDOE Planning. April 20-22, 1977. Center for Ocean Management Studies, University of Rhode Island.

Report of the Workshop on Chemical Oceanography for Post 1980 IDOE Planning. June 1-3, 1977. Center for Ocean Management Studies, University of Rhode Island.

Report of the Workshop on Geochemical and Geophysical Oceanography for Post 1980 IDOE Planning. June 15-17, 1977. Center for Ocean Management Studies, Unviersity of Rhode Island.

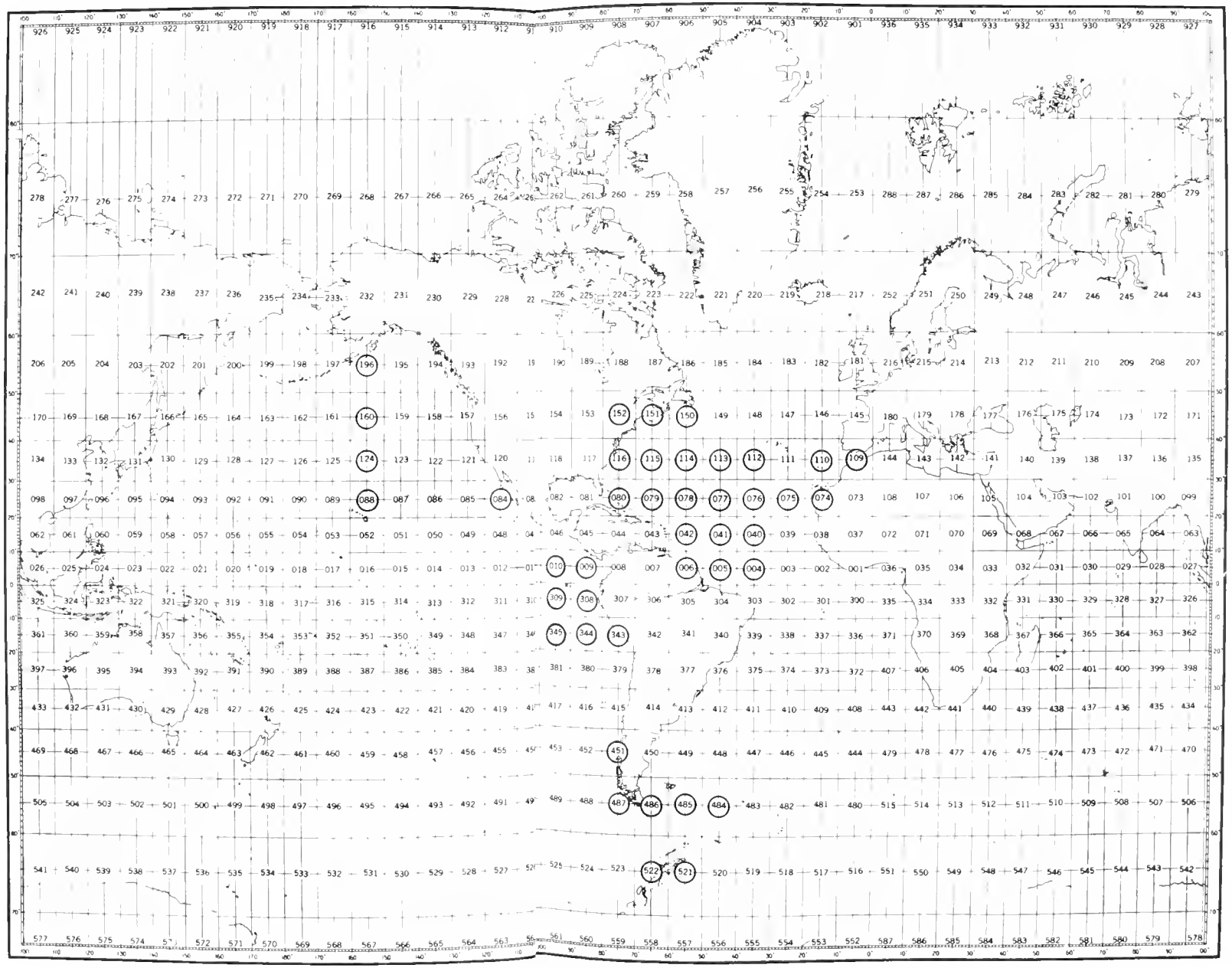
Report of the Workshop on Physical Oceanography for Post 1980 IDOE Planning. March 21-23, 1977. Center for Ocean Management Studies, University of Rhode Island.

River Interaction with the Ocean (RIO), Report on the RIO Workshop, June 1979, Ronald J. Gibbs, Coordinator.

Shelf Sediment Dynamics. A national overview (June 1977). Report of a workshop held in Vail, Colo., November 2-6, 1976.

Transient Tracers in the Ocean. A Report to the International Decade of Ocean Exploration, National Science Foundation, of a Design Workshop held at Lamont-Doherty Geological Observatory, Palisades, N. Y., February 10-12, 1977.

Weibe, P. H., D. Spencer, P. Richardson, and G. D. Grice (Steering Committee). 1977. Oceanographic study of warm core Gulf Stream rings and the northwest Atlantic Slope water region: a prospectus for multidisciplinary research. Proceedings, Interdisciplinary Workshop or Gulf Stream Anticyclonic Eddies (warm core rings), May 16-20, 1977. Woods Hole Oceanogr. Inst., Woods Hole, Mass. 246p.



**IDOE material received:**
**ROSCOP Forms**
**○Data**

Chart of 10° by 10° geographic areas (Marsden Squares) within which were collected data and information reported in this publication and received by NOAA's Environmental Data and Information Service during the period April 1978 to October 1979 Note Data and ROSCOP forms are seldom received at the same time

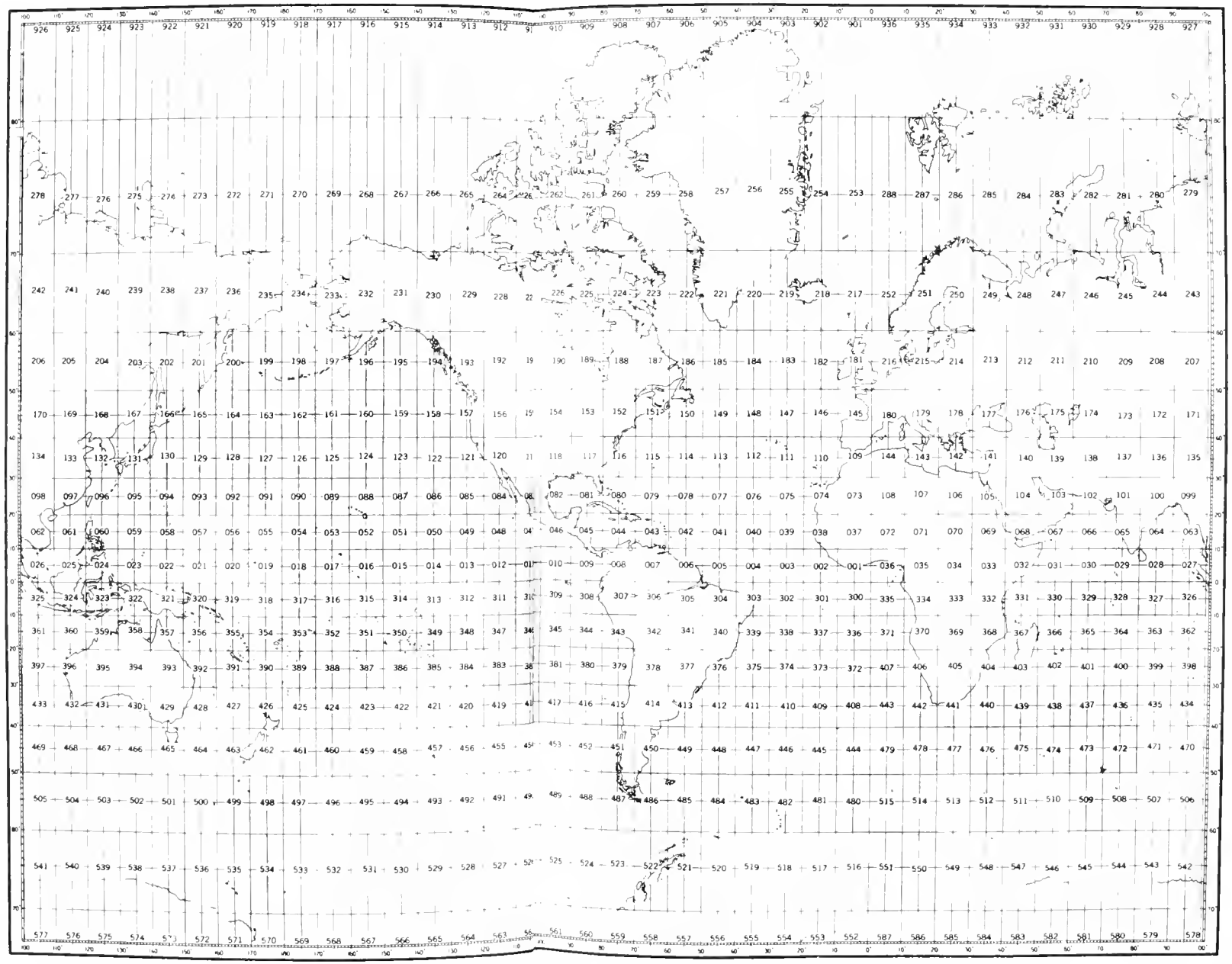


Chart of 10° by 10° geographic areas (Marsden Squares) within which were collected data received by NOAA's Environmental Data and Information Service during the period January 1970 to October 1979 (shaded squares) resulting from IOOE-sponsored research



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