## FRONTISPIECE

Summary of Japan Trench transect stratigraphy, Part 1: Shallower terrace and inner trench wall sites, 438, 439, and 435. (Note: See the frontispiece in Part 2 for the deeper sites, 440, 441, 434, and 436.) Interpretation of the seismic profiles and stratigraphic columns uses the following color code: Brown — basaltic basement oceanic crust; green — Cretaceous sediments; light blue — Paleogene sediments; light red — Neogene sediments; yellow — Quaternary sediments; uncolored areas are not interpreted.

The photographs of the cores are described for each site in order of increasing depth downsection.

Site 438

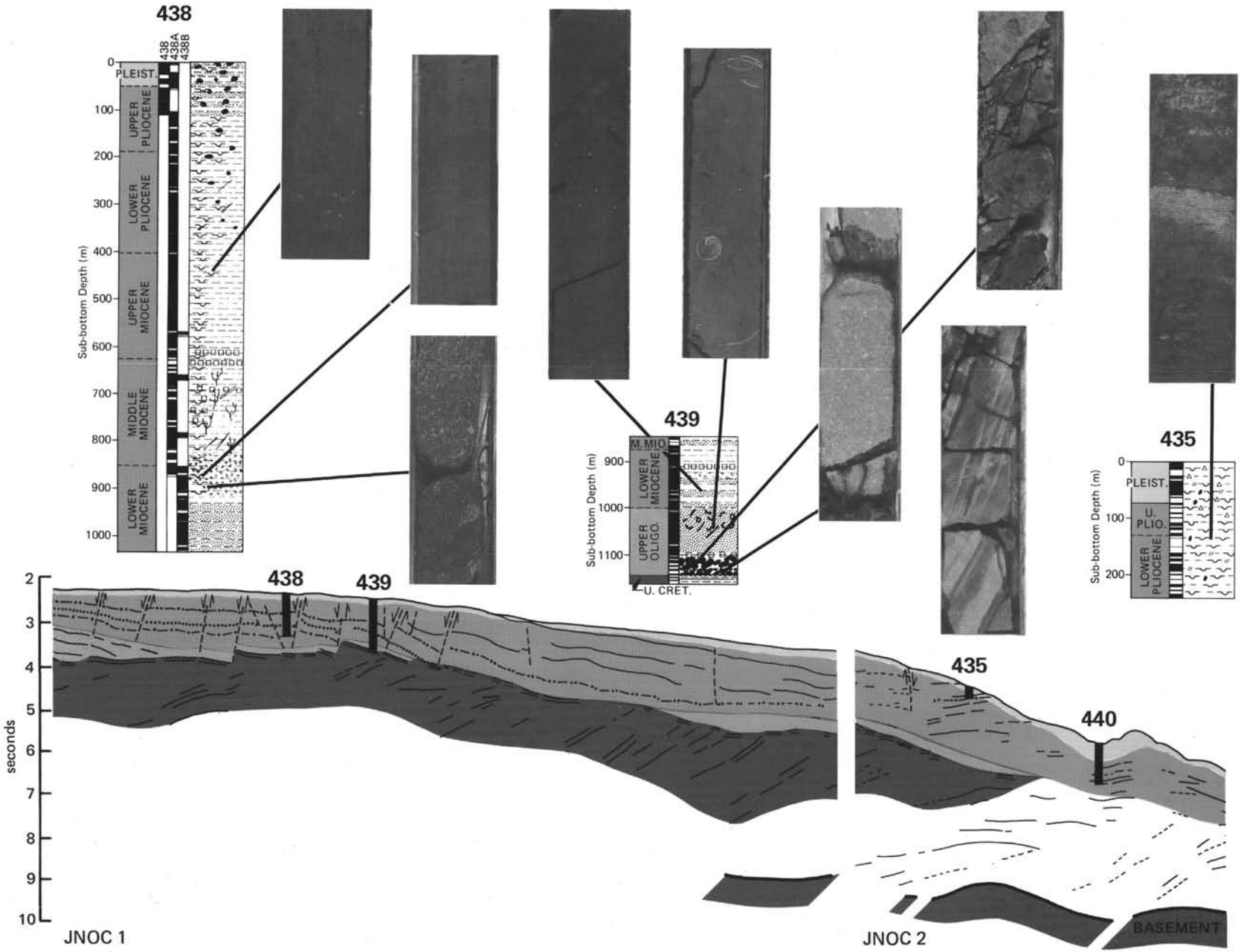
1) Interval 438A-39-1, 55–75 cm: upper Miocene medium gray (5Y 5/1) intensely but subtly mottled clayey calcareous diatomite; typical appearance of most undeformed Neogene muddy sediment in Leg 56, 57 sites.
2) Interval 438B-4-1, 35–55 cm: middle Miocene grayish olive green mottled diatomaceous claystone showing high-angle reverse fault with approx. 1 cm displacement and veins at about 34 cm.
3) Interval 438B-9-3, 10–30 cm: lower Miocene olive gray (5Y 4/2) vitric silty sandy claystone; moderately mottled. Contains coarser fragments of volcanic material.

Site 439

1) Interval 439-18-2, 25–55 cm: lower Miocene dark olive gray graded sandstone and silty claystone; note sharp scoured basal contact with underlying mudstone. Upper part of sequence is faulted and contains 1 to 2 cm shale clasts (lithology similar to Cretaceous dark shales recovered at base of hole) and abundant wood chips.
2) Interval 439-26-6, 89–114 cm: upper Oligocene massive medium gray coarse-grained siltstone and fine-grained sandstone containing articulated pelecypods and gastropods.
3) Interval 439-34-1, 35–57 cm: upper Oligocene nonmarine conglomerate–breccia unit containing angular clasts of fine-grained predominantly dacitic volcanic rock and dark shale set in dark greenish gray (5G 3/1) clay matrix.
4) Interval 439-36-1, 15–40 cm: portion of porphyritic dacite boulder in upper Oligocene nonmarine conglomerate.
5) Interval 439-38-1, 90–115 cm: Upper Cretaceous thin bedded convolute–laminated quartzose siltstone in dark shale matrix which occurs below a pronounced unconformity.

Site 435

Interval 435A-3-4, 25–50 cm: lower Pliocene graded volcanic ash layer about 5 cm thick. Note that the lower part of the ash bed contains pyrite (darkened portion).


438
438
438A
438B
PLEIST.
UPPER PLIOCENE
LOWER PLIOCENE
UPPER MIOCENE
MIDDLE MIOCENE
LOWER MIOCENE
Sub-bottom Depth (m)
0
100
200
300
400
500
600
700
800
900
1000
439
M. MIO.
LOWER MIOCENE
UPPER OLIGO.
U. CRET.
Sub-bottom Depth (m)
900
1000
1100
435
PLEIST.
U. PLIO.
LOWER PLIOCENE
Sub-bottom Depth (m)
0
100
200
438
439
435
440
seconds
2
3
4
5
6
7
8
9
10
JNOC 1
JNOC 2
BASEMENT

## FRONTISPIECE

Summary of Japan Trench transect stratigraphy, Part 2: Deeper inner wall sites, 440, 441, and 434, and Site 436 from the outer swell. (Note: See the frontispiece in Part 1 for the shallower sites, 438, 439, and 435.) Interpretation of the seismic profiles and stratigraphic columns uses the following color code: Brown — basaltic basement oceanic crust; green — Cretaceous sediments; light olive — Paleogene sediments; light red — Neogene sediments; yellow — Quaternary sediments; uncolored areas are not interpreted.

The photographs of the cores are described for each site in order of increasing depth.

Site 440

1) Interval 440B-43-3, 40–85 cm: lower Pliocene slumped olive gray diatomaceous claystone. Upper part of sequence overturned. Note discordant contact at 52 cm and stretched mottles of light colored ash in mudstone above. Core of slump folds occurs at about 67 cm.
2) Interval 440B-55-5, 82–115 cm: lower Pliocene grayish olive claystone showing healed fractures with open partings parallel to the fracture trend.

Site 441

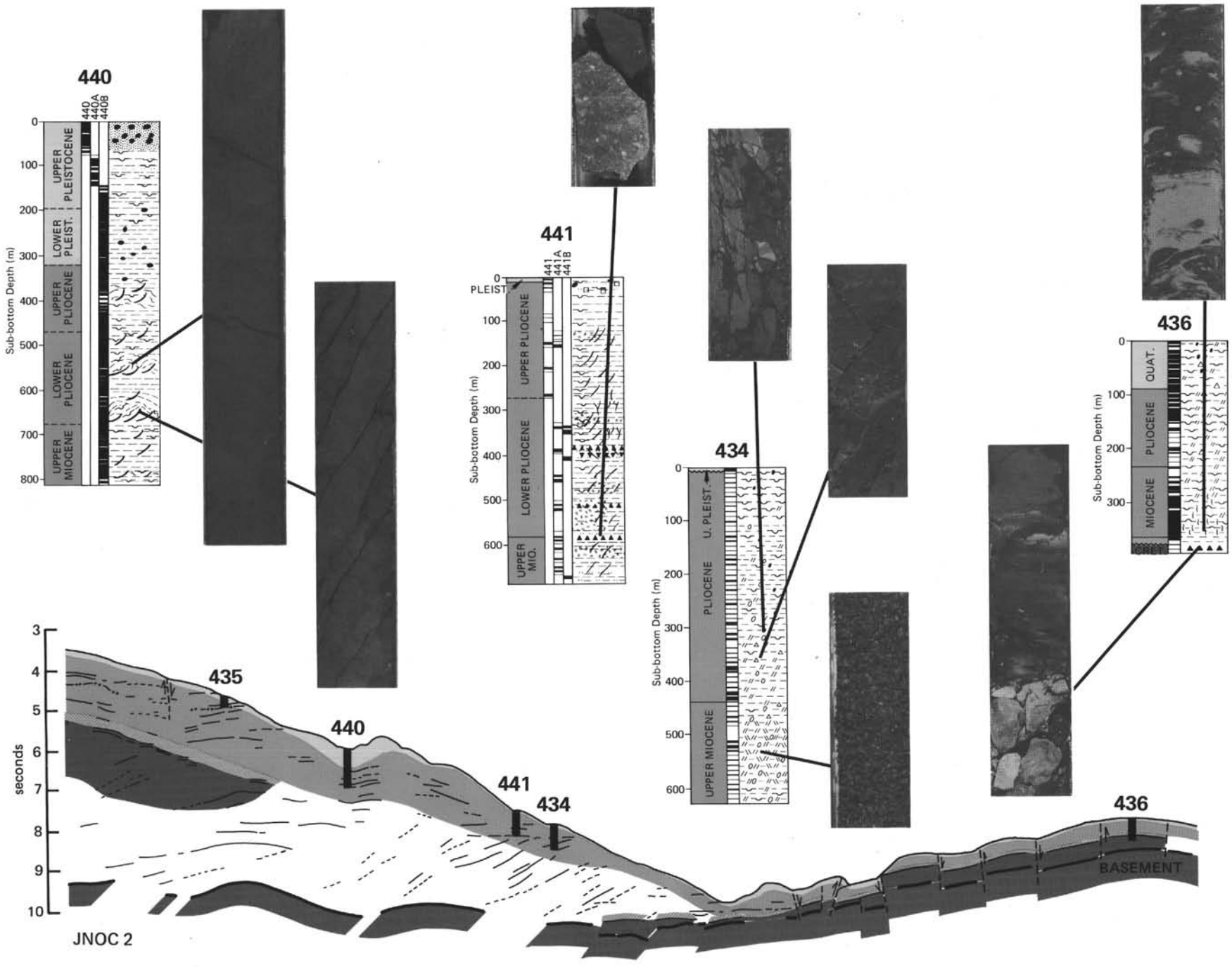
Interval 441A-11-1, 57–72 cm: upper Miocene resedimented breccia with crude stratification indicating 35° to 40° dip. Clasts are angular and consist of claystone, yellow gray calcareous marlstone, olive gray claystone, glauconitic claystone, silty claystone, and white tuff. Many clasts were lithified prior to resedimentation, and some were soft and sutured during compaction.

Site 434

1) Interval 434-7-1, 20–40 cm: lower Pliocene grayish olive green diatomaceous claystone showing open hackly fracturing typical of sediment recovered at Sites 441 and 434.
2) Interval 434B-9-2, 90–117 cm: lower Pliocene vitric diatomaceous silty clay with layer of yellowish gray marlstone exhibiting progressive offset along a series of healed microfaults.
3) Interval 434B-26-2, 89–109 cm: upper Miocene drilling breccia of tuffite. Typical of much of our recovery at Sites 434 and 441.

Site 436

1) Interval 436-39-4, 75–100 cm: lower Miocene interbedded brownish black manganiferous pelagic clay and vitric radiolarian claystone (light-colored) in transition from condensed Cretaceous–Paleogene pelagic sequence to Neogene hemipelagic muds.
2) Interval 436-41-1, 10–40 cm: unfossiliferous clay overlying Upper Cretaceous chert.


440
440
440A
440B
UPPER PLEISTOCENE
LOWER PLEIST.
UPPER PLIOCENE
LOWER PLIOCENE
UPPER MIOCENE
Sub-bottom Depth (m)
0
100
200
300
400
500
600
700
800
441
441
441A
441B
PLEIST
UPPER PLIOCENE
LOWER PLIOCENE
UPPER MIO.
Sub-bottom Depth (m)
434
U. PLEIST.
PLIOCENE
UPPER MIOCENE
Sub-bottom Depth (m)
436
QUAT.
PLIOCENE
MIOCENE
Sub-bottom Depth (m)
seconds
3
4
5
6
7
8
9
10
435
440
441
434
436
BASEMENT
JNOC 2

# Initial Reports of the Deep Sea Drilling Project

A Project Planned by and Carried Out with the Advice of the
JOINT OCEANOGRAPHIC INSTITUTIONS FOR DEEP EARTH SAMPLING (JOIDES)

## VOLUME LVI, LVII, PART 1

covering Legs 56 and 57 of the cruises of the Drilling Vessel *Glomar Challenger*
Yokohama, Japan to Yokohama, Japan

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Thompson, P. R., and Whelan, J. K., 1980. Fecal pellets at Deep Sea Drilling Project Site 436. *In* Scientific Party, *Initial Reports of the Deep Sea Drilling Project*, 56, 57, Pt. 2: Washington (U.S. Govt. Printing Office), 921-936.

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# Foreword

For the three and one-half years between 1872 and 1876, the H.M.S. CHALLENGER—after which D/V GLOMAR CHALLENGER is named—undertook the world's first major oceanographic expedition. It is fitting that our century should have its counterpart to that famous ship a century ago whose voyages helped establish oceanography as a science. It is equally fitting that GLOMAR CHALLENGER should be plying the same waters one century later seeking answers to new questions concerning the history of our planet and the life it supports. The fundamental advancement of our knowledge of the earth will lead to enhanced capabilities to understand its processes and to use its natural resources intelligently.

The Deep Sea Drilling Project is being undertaken within the context of the National Science Foundation's Ocean Sediment Coring Program. The Foundation is funding the project by means of a contract with the University of California, and the Scripps Institution of Oceanography is responsible for its management. The University has, in turn, subcontracted with Global Marine Incorporated for the services of the drilling ship, GLOMAR CHALLENGER.

Scientific planning is conducted under the auspices of the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES). The JOIDES consortium has convened advisory panels for that purpose, consisting of a large number of distinguished scientists from the academic institutions, Government agencies, and private industry of many countries. Altogether, the project has involved the active interest and participation of many of the world's best scientists and technologists.

The first ocean coring operations for the Deep Sea Drilling Project began on August 11, 1968. During the ensuing years of drilling operations in the Atlantic, Pacific, and Indian Oceans, the Gulf of Mexico, Caribbean Sea, and Mediterranean Sea, and Antarctic waters, the scientific objectives that had been set forth were successfully accomplished. Primarily, the age of the ocean basins and their processes of development were determined. Emphasis was placed on broad reconnaissance and on testing the involvement of the mid-oceanic rise systems in the development of the ocean basins.

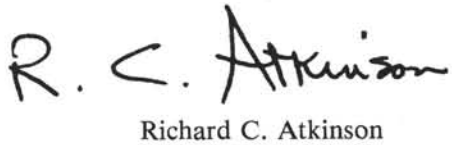
From these concepts come major interpretations of the results of the drilling as they bear on patterns of sedimentation and physical and chemical characteristics of the ancient oceans.

As a result of the success of the Deep Sea Drilling Project, the National Science Foundation extended its contract with the University of California to encompass an additional 36 months of drilling, allowing GLOMAR CHALLENGER to continue operations throughout the oceans of the world in exploring the deep ocean floors for a period presently extending one full decade. Scientific interest will involve major effort in drilling deeply into the oceanic crustal igneous rocks to study the processes and mechanisms leading to the formation of the oceanic crust.

These reports contain the results of initial studies of the recovered core material and the associated geophysical information. The contribution to knowledge has been exceedingly large and future studies of the core material over many years will contribute much more.

The importance of the work of the Deep Sea Drilling Project and D/V GLOMAR CHALLENGER is internationally recognized. In response to this recognition, a number of nations are providing partial support. Effective January 1974, the USSR and the Federal Republic of Germany entered into agreements with the United States for participation and support. Similar arrangements were agreed to by Japan in July 1975, the United Kingdom in September 1975, and France in January 1976.

All people, in their lives, activities, and industry, should benefit greatly from the project —from the technological advances that are being made and through the information being obtained on natural resources.



Richard C. Atkinson
*Director*

Washington, D.C.
October 1976

# Preface

Recognizing the need in the oceanographic community for scientific planning of a program to obtain deep sedimentary cores from the ocean bottoms, four of the major oceanographic institutions that had strong interests and programs in the fields of marine geology and geophysics, formed in May 1964, the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES). This group, Lamont-Doherty Geological Observatory; Rosenstiel School of Marine and Atmospheric Science, University of Miami; the Scripps Institution of Oceanography, University of California at San Diego; and the Woods Hole Oceanographic Institution, expressed an interest in undertaking scientific planning and guidance of the sedimentary drilling program. It was the purpose of this group to foster programs to investigate the sediments and rocks beneath the deep oceans by drilling and coring. The membership of this original group was later enlarged in 1968 when the University of Washington became a member, and again in 1975 when University of Hawaii Institute of Geophysics, the Oregon State University School of Oceanography, the University of Rhode Island Graduate School of Oceanography, and Texas A&M University Department of Oceanography became members. In accordance with international agreements, institutions of participating nations became members of JOIDES. Thus, during 1974 to 1976, the Bundesanstalt für Geowissenschaften und Rohstoffe of the Federal Republic of Germany, the Centre National pour l'Exploitation des Océans of France, the National Environmental Research Council of the United Kingdom, the University of Tokyo of Japan, and Academy of Sciences of the USSR became JOIDES members.

Through discussions sponsored by the JOIDES organization, with support from the National Science Foundation, Columbia University's Lamont-Doherty Geological Observatory operated a drilling program in the summer of 1965, on the Blake Plateau region off Jacksonville, Florida.

With this success in hand, planning began for a more extensive deep sea effort. This resulted in the award of a contract by the National Science Foundation to the Scripps Institution of Oceanography, University of California at San Diego for an eighteen-month drilling program in the Atlantic and Pacific Oceans, termed the Deep Sea Drilling Project (DSDP). Operations at sea began in August 1968, using the now-famous drilling vessel, the *Glomar Challenger.*

The goal of the Deep Sea Drilling Project is to gather scientific information that will help determine the age and processes of development of the ocean basins. The primary strategy is to drill deep holes into the ocean floor, relying largely on technology developed by the petroleum industry.

Through the efforts of the principal organizations and of the panel members which were drawn from a large cross section of leading earth scientists and associates, a scientific program was developed.

Cores recovered from deep beneath the ocean floor provide reference material for a multitude of studies in fields such as biostratigraphy, physical stratigraphy, and paleomagnetism, that afford a new scope for studies of the physical and chemical aspects of sediment provenance, transportation, deposition, and diagenesis. In-hole measurements, as feasible, provide petrophysical data to permit inference of lithology of intervals from which no cores were recovered.

A report, describing the core materials and information obtained both at sea and in laboratories on shore, is published after the completion of each cruise. These reports are a cooperative effort of the scientists participating in the cruise and are intended primarily to be a compilation of results which, it is hoped, will be the starting point for many future new and exciting research programs. Preliminary interpretations of the data and observations taken at sea, are also included.

Core materials and data collected on each cruise will be made available to qualified scientists through the Curator of the Deep Sea Drilling Project, following a Sample Distribution Policy (p. xxi) approved by the National Science Foundation.

The advent of *Glomar Challenger,* with its deep-water drilling ability, is exceedingly timely. It has come when geophysical investigation of the oceans has matured through 20 to 30 years of vigorous growth to the point where we have some knowledge about much of the formerly unknown oceanic areas of our planet. About one million miles of traverses had been made which tell us much about the global pattern of gravity, magnetic and thermal anomalies, and about the composition, thickness, and stratigraphy of the sedimentary cover of the deep-sea and continental margin. The coverage with such data has enabled the site selection panels to pick choice locations for drilling. The knowledge gained from each hole can be extended into the surrounding area. Detailed geophysical surveys were made for most of the selected locations prior to drilling.

The earth sciences have recently matured from an empirical status to one in which substantial theories and hypotheses about major tectonic processes are flourishing. Theories about the origin of magnetic fields and magnetic reversals, about ocean floor spreading and continental drift, and about the thermal history of our planet, have led to specific predictions that could be tested best by an enlightened program of sampling of deep-sea and continental margin sediments and underlying rocks.

In October 1975, the International Phase of Ocean Drilling (IPOD) began. This international interest, and the true participation of both the scientists and governments of a number of nations, is elegant testimony of the importance of the work being done by the Deep Sea Drilling Project.

The members of JOIDES and DSDP and the scientists from all interested organizations and nations who have served on the various advisory panels are proud to have been of service and believe that the information and core materials that have been obtained will be of value to students of earth sciences and all humanity for many years to come.

# Deep Sea Drilling Project

**MEMBER ORGANIZATIONS OF THE JOINT OCEANOGRAPHIC INSTITUTIONS FOR DEEP EARTH SAMPLING (JOIDES):***

Bundesanstalt für Geowissenschaften und Rohstoffe, Federal Republic of Germany

University of California at San Diego, Scripps Institution of Oceanography

Centre National pour l'Exploitation des Océans, Paris

Columbia University, Lamont-Doherty Geological Observatory

University of Hawaii, Hawaii Institute of Geophysics

University of Miami, Rosenstiel School of Marine and Atmospheric Science

Natural Environment Research Council, London

Oregon State University, School of Oceanography

University of Rhode Island, Graduate School of Oceanography

Texas A&M University, Department of Oceanography

University of Tokyo, Ocean Research Institute

USSR Academy of Sciences

University of Washington, Department of Oceanography

Woods Hole Oceanographic Institution

*Includes member organizations during time of the cruise.

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University of California at San Diego
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# Deep Sea Drilling Project
# SAMPLE DISTRIBUTION POLICY*

Distribution of Deep Sea Drilling samples for investigation will be undertaken in order to (1) provide supplementary data to support GLOMAR CHALLENGER scientists in achieving the scientific objectives of their particular cruise, and in addition to serve as a mechanism for contributions to the *Initial Reports;* (2) provide individual investigators with materials that are stored with samples for reference and comparison purposes.

The National Science Foundation has established a Sample Distribution Panel to advise on the distribution of core materials. This panel is chosen in accordance with usual Foundation practices, in a manner that will assure advice in the various disciplines leading to a complete and adequate study of the cores and their contents. Funding for the proposed research must be secured separately by the investigator. It cannot be provided through the Deep Sea Drilling Project.

The Deep Sea Drilling Project's Curator is responsible for distributing the samples and controlling their quality, as well as preserving and conserving core material. He also is responsible for maintaining a record of all samples that have been distributed, shipboard and subsequent, indicating the recipient, and the nature of the proposed investigation. This information is made available to all investigators of DSDP materials as well as other interested researchers on request.

The distribution of samples is made directly from one of the two existing repositories, Lamont-Doherty Geological Observatory and Scripps Institution of Oceanography, by the Curator or his designated representative.

1. *Distribution of Samples for Research Leading to Contributions to Initial Reports*

Any investigator who wishes to contribute a paper to a given volume of the *Initial Reports* may write to the Chief Scientist, Deep Sea Drilling Project (A-031) Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A., requesting samples from a forthcoming cruise. Requests for a specific cruise should be received by the Chief Scientists two months in advance of the departure of the cruise in order to allow time for the review and consideration of all requests and to establish a suitable shipboard sampling program. The request should include a statement of the nature of the study proposed, size and approximate number of samples required to complete the study, and any particular sampling technique or equipment that might be required. The requests will be reviewed by the Chief Scientist of the Project and the cruise co-chief scientists; approval will be given in accordance with the scientific requirements of the cruise as determined by the appropriate JODIES Advisory Panel(s). If approved, the requested samples will be taken, either by the shipboard party if the workload permits, or by the curatorial staff shortly following the return of the cores to the repository. Proposals must be of a scope to ensure that samples can be processed and a contribution completed in time for publication in the *Initial Reports.* Except for rare, specific instances involving ephermeral properties, sampling will not exceed one-quarter of the volume of core recovered, with no interval being depleted and one-half of all core being retained as an archive. Shipboard sampling shall not exceed approximately 100 igneous samples per investigator; in all cases co-chief scientists are requested to keep sampling to a minimum.

The co-chief scientists may elect to have special studies of selected core samples made by other investigators. In this event the names of these investigators and complete listings of all materials loaned or distributed must be forwarded, if possible, prior to the cruise or, as soon as possible following the cruise, to the Chief Scientist through the DSDP Staff Science Representative for that particular cruise. In such cases, all requirements of the Sample Distribution Policy shall also apply.

If a dispute arises or if a decision cannot be reached in the manner prescribed, the NSF Sample Distribution Panel will conduct the final arbitration.

Any publication of results other than in the *Initial Reports* within twelve (12) months of the completion of the cruise must be approved and authored by the whole shipboard party and, where appropriate, shore-based investigators. After twelve months, individual investigators may submit related papers for open publication provided they have submitted their contributions to the *Initial Reports.* Investigations not completed in time for inclusion in the *Initial Reports* for a specific cruise may not be published in other journals until final publication of that *Initial Report* for which it was intended. Notice of submission to other journals and a copy of the article should be sent to the DSDP Chief Science Editor.

*Revised October 1976

2. *Distribution of Samples for Research leading to Publication other than in Initial Reports*

A. Researchers intending to request samples for studies beyond the scope of the *Initial Reports* should first obtain sample request forms from the Curator, Deep Sea Drilling Project (A-031), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A. On the forms the researcher is requested to specify the quantities and intervals of the core required, make a clear statement of the proposed research, state time required to complete and submit results for publication, specify the status of funding and the availability of equipment and space foreseen for the research.

In order to ensure that all requests for highly desirable but limited samples can be considered, approval of requests and distribution of samples will not be made prior to 2 months after publication of the Initial Core Descriptions (I.C.D.). ICD's are required to be published within 10 months following each cruise. The only exceptions to this policy will be for specific instances involving ephemeral properties. Requests for samples can be based on the Initial Core Descriptions, copies of which are on file at various institutions throughout the world. Copies of original core logs and data are kept on open file at DSDP and at the Repository at Lamont-Doherty Geological Observatory, Palisades, New York. Requests for samples from researchers in industrial laboratories will be handled in the same manner as those from academic organizations, with the same obligation to publish results promptly.

B. (1) The DSDP Curator is authorized to distribute samples to 50ml per meter of core. Requests for volumes of material in excess of this amount will be referred to the NSF Sample Distribution Panel for review and approval. Experience has shown that most investigations can be accomplished with 10ml sized samples or less. All investigators are encouraged to be as judicious as possible with regard to sample size and, especially, frequency within any given core interval. The Curator will not automatically distribute any parts of the cores which appear to be in particularly high demand; requests for such parts will be referred to the Sample Distribution Panel for review. Requests for samples from thin layers or important stratigraphic boundaries will also require Panel review.

(2) If investigators wish to study certain properties which may deteriorate prior to the normal availability of the samples, they may request that the normal waiting period not apply. All such requests must be reviewed by the curators and approved by the NSF Sample Distribution Panel.

C. Samples will not be provided prior to assurance that funding for sample studies either exists or is not needed. However, neither formal approval of sample requests nor distribution of samples will be made until the appropriate time (Item A). If a sample request is dependent, either wholly or in part, on proposed funding, the Curator is prepared to provide to the organization to whom the funding proposal has been submitted any information on the availability (or potential availability) of samples that it may request.

D. Investigators receiving samples are responsible for:

(1) publishing significant results; however contributions shall not be submitted for publication prior to 12 months following the termination of the appropriate leg;

(2) acknowledging, in publications, that samples were supplied through the assistance of the U.S. National Science Foundation and others as appropriate;

(3) submitting five (5) copies (for distribution to the Curator's file, the DSDP Repositories, the GLOMAR CHALLENGER's Library, and the National Science Foundation) of all reprints of published results to the Curator, Deep Sea Drilling Project (A-031), Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093, U.S.A.;

(4) returning, in good condition, the remainders of samples after termination of research, if requested by the Curator.

E. Cores are made available at repositories for investigators to examine and to specify exact samples in such instances as may be necessary for the scientific purposes of the sampling, subject to the limitations of B (1 and 2) and D, above, with specific permission of the Curator or his delegate.

F. Shipboard-produced smear slides of sediments and thin sections of indurated sediments, igneous and metamorphic rocks, will be returned to the appropriate repository at the end of each cruise or at the publication of the *Initial Reports* for that cruise. These smear slides and thin sections will form a reference collection of the cores stored at each repository and may be viewed at the respective repositories as an aid in the selection of core samples.

3. *Reference Centers*

As a separate and special category, samples will be distributed for the purpose of establishing up to five reference centers where paleontologic materials will be available for reference and comparison purposes. The first of these reference centers has been approved at Basel, Switzerland.

# Data Distribution Policy

Data gathered on board D/V *Glomar Challenger* and in DSDP shore laboratories are available to all researchers 12 months after the completion of each cruise. The files are part of a coordinated computer database, fully searchable and coordinated to other files. Data sets representing a variety of geologic environments can be arranged for researchers who may wish to manipulate the database directly.

Most data requests are filled free of charge, except if they are unusually large or complex and direct costs exceed $50.

When data are used for publication, the National Science Foundation must be acknowledged and DSDP provided with five reprints for inclusion in the DSDP index of publications and investigations. Requests for data should be submitted to:

Data Manager, Deep Sea Drilling Project
Scripps Institution of Oceanography (A-031)
University of California, San Diego
La Jolla, California 92093

Telephone: (714) 452-3526
Cable Address: SIOCEAN

I. The database includes files generally available both in digital form on magnetic tape and as microfilm copies of the original observation forms.

A. Geophysical data include underway bathymetry, magnetics, and sub-bottom profiles; bathymetry data exist both as 12-kHz and 3.5-kHz records. Underway data are processed by DSDP and the Geological Data Center at Scripps Institution of Oceanography (SIO). Seismic records are available in microfilm and photographic prints.

B. Physical property data obtained on board *Glomar Challenger* include:
   - Analytical water content, porosity, and density
   - Density and porosity by Gamma Ray Attenuation Porosity Evaluator (GRAPE)
   - Acoustic velocity by Hamilton Frame Method
   - Thermal conductivity
   - Heat flow (*in situ*)
   - Natural gamma radiation (discontinued after Leg 19)
   - Well logs

C. Sediment data obtained on board ship and from core samples in DSDP shore laboratories include:
   - Core photographs
   - Visual core descriptions
   - Smear slide descriptions
   - X-ray diffraction
   - X-ray fluorescence
   - Total carbon, organic carbon, and carbonate determinations
   - Grain-size determinations (sand, silt, clay)
   - Interstitial water chemistry
   - Gas chromatography

D. Igneous rock data include:
   - Core photographs
   - Visual core descriptions
   - Rock chemistry
   - Paleomagnetics
   - Thin-section descriptions

E. Paleontologic data include fossil names, abundance, preservation, and age of sample and are available, for selected sites, for Ter-

tiary and Mesozoic taxa. Range charts can be generated from the database, using the line printer. A glossary of fossil names is available on microfiche or magnetic tape.

F. Ancillary files include:
   Site positions
   Sub-bottom depths of cores
   Master Guide File (a searchable core data summary file)

II. Additional publications, aids to research, are periodically updated and distributed to libraries. Single copies, at no charge, are distributed on microfiche at 48X magnification, except for the Data Datas (see below), which are at 24X. They include:

A. Guides to DSDP Core Materials, a series of printed summaries containing maxima, minima, and typical values for selected observations. Guides are available for each of the major ocean basins and for Phases I, II, and III of the drilling program. The source data summary file is also available.

B. Index to Initial Reports and Subsequent Publications and Investigations is a comprehensive key word index to chapters of the *Initial Reports,* and to papers and investigations in progress which cite DSDP samples or data. The Index and its annotated bibliography serve to inform researchers of other investigators working on similar projects. Each paper is assigned key words for field of study, material, geographic area, and geologic age. A complete citation, including the assigned key words, is printed in the bibliography. Key words are permuted to form a comprehensive cross-index to the author reference list.

C. Data Data, a series of informal memoranda providing a quick reference to accessible data, is available on microfiche. Also available is a site position map to assist researchers in large-area studies. (Site positions are plotted on a bathymetry map compiled by the SIO Geologic Data Center.)

D. Data Retrieval and Application Computer Programs to perform data management and retrieval functions and a set of programs designed to provide special graphic displays of data are available; they may be of limited use because of differences in computer hardware. All current programs are written in ALGOL for a Burroughs 7800 computer system. Software inquiries may be addressed to the Data Manager.

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