PROCEEDINGS OF THE OCEAN DRILLING PROGRAM

VOLUME 130

SCIENTIFIC RESULTS

ONTONG JAVA PLATEAU

Covering Leg 130 of the cruises of the Drilling Vessel *JOIDES Resolution*,
Apra Harbor, Guam, to Apra Harbor, Guam, Sites 803–807,
18 January–26 March 1990

Wolfgang H. Berger, Loren W. Kroenke, Thomas R. Janecek,
Jan Backman, Franck Bassinot, Richard M. Corfield, Margaret Lois Delaney,
Rick Hagen, Eystein Jansen, Lawrence A. Krissek, Carina Lange,
Robert Mark Leckie, Ida Lykke Lind, Mitchell W. Lyle, John J. Mahoney,
Janice C. Marsters, Larry Mayer, David C. Mosher, Robert Musgrave,
Michael L. Prentice, Johanna M. Resig, Heike Schmidt, Rainer Stax, Michael Storey,
Kozo Takahashi, Toshiaki Takayama, John A. Tarduno,
Roy H. Wilkens, Guoping Wu
Shipboard Scientists

Thomas R. Janecek
Shipboard Staff Scientist

Prepared by the
OCEAN DRILLING PROGRAM
TEXAS A&M UNIVERSITY

Eva M. Maddox
Volume Editor

in cooperation with the
NATIONAL SCIENCE FOUNDATION
and
JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

This publication was prepared by the Ocean Drilling Program, Texas A&M University, as an account of work performed under the international Ocean Drilling Program, which is managed by Joint Oceanographic Institutions, Inc., under contract with the National Science Foundation. Funding for the program was provided by the following agencies at the time of this cruise:

Academy of Sciences, Russia

Canada/Australia Consortium for the Ocean Drilling Program, Department of Energy, Mines and Resources (Canada) and Department of Primary Industries and Energy (Australia)

Deutsche Forschungsgemeinschaft (Federal Republic of Germany)

European Science Foundation Consortium for the Ocean Drilling Program (Belgium, Denmark, Finland, Iceland, Italy, Greece, The Netherlands, Norway, Spain, Sweden, Switzerland, and Turkey)

Institut Français de Recherche pour l'Exploitation de la Mer (France)

National Science Foundation (United States)

Natural Environment Research Council (United Kingdom)

University of Tokyo, Ocean Research Institute (Japan)

Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation, the participating agencies, Joint Oceanographic Institutions, Inc., Texas A&M University, or Texas A&M Research Foundation.

It is recommended that reference to the whole or to part of this volume be made in one of the following forms, as appropriate:

Berger, W.H., Kroenke, L.W., Mayer, L.A., et al., 1993. *Proc. ODP, Sci. Results,* 130: College Station, TX (Ocean Drilling Program).

Fornaciari, E., Backman, J., and Rio, D., 1993. Quantitative distribution patterns of selected lower to middle Miocene calcareous nannofossils from the Ontong Java Plateau. *In* Berger, W.H., Kroenke, L.W., Mayer, L.A., et al., *Proc. ODP, Sci. Results,* 130: College Station, TX (Ocean Drilling Program), 245–256.

Effective Publication Dates of ODP *Proceedings*

According to the International Code of Zoological Nomenclature, the date of publication of a work and of a contained name or statement affecting nomenclature is the date on which the publication was mailed to subscribers, placed on sale, or when the whole edition is distributed free of charge, mailed to institutions and individuals to whom free copies are distributed. The mailing date, *not the printed date,* is the correct one.

The mailing dates of recent *Proceedings of the Ocean Drilling Program* are as follows:

Volume 139 (*Initial Reports*): August 1992
Volume 140 (*Initial Reports*): September 1992
Volume 141 (*Initial Reports*): December 1992
Volume 126 (*Scientific Results*): August 1992
Volume 127/128 (*Scientific Results*): September 1992
Volume 129 (*Scientific Results*): December 1992

Distribution

Copies of this publication may be obtained from Publications Distribution Center, Ocean Drilling Program, 1000 Discovery Drive, College Station, Texas 77845-9547. Orders for copies will require advance payment. See current ODP publication list for price and availability of this publication.

Printed April 1993

ISSN 0884-5891
Library of Congress 87-642-462

Printed in U.S.A. by Edwards Brothers Incorporated

The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences–Permanence of Paper for Printed Library Materials, ANSI Z39.48-1984∞ ™

Foreword

By the National Science Foundation

The Ocean Drilling Program (ODP) is a major component of the National Science Foundation's continuing commitment to the study of the geologic processes that have shaped our planet and modified its environment. The scientific problems being addressed range from the geologic history and structure of continental margins to the processes responsible for the formation and alteration of the ocean's crust. In a time of enhanced public and scientific interest in problems of global change, ODP provides critical data on changes in ocean circulation, chemistry, and biologic productivity and their relation to changes in atmospheric circulation and glacial conditions. The Ocean Drilling Program has a unique role in addressing these problems, since it is the only facility for continuously sampling the geologic record of the ocean basins, which cover 70% of our planet.

The ODP is the successor to the Deep Sea Drilling Project (DSDP), which was a global reconnaissance of the ocean basins. DSDP began operations in 1968 at Scripps Institution of Oceanography, using a 400-foot drillship, the *Glomar Challenger*. DSDP was supported initially by only the National Science Foundation, with extensive involvement of international scientists who were invited to participate on drilling cruises. As this international interest continued to grow in the early 1970's, formal participation in the project was offered to the international geoscience community. In 1975, five nations (France, the Federal Republic of Germany, Japan, the United Kingdom, and the Soviet Union) accepted this commitment to joint planning and conduct of the project, as well as to financial support for operations. This International Phase of Ocean Drilling (IPOD) continued to 1983. Although the *Challenger* had reached the limits of her capabilities, the remarkable scientific success of the DSDP and the new questions it had generated demanded a continuing capability for drilling in the oceans.

The Ocean Drilling Program was organized, international participation was coordinated, a new drillship (the *JOIDES Resolution*) was contracted and outfitted, and her first cruise sailed in early 1985, within 18 months of the retirement of the *Challenger*. This is a remarkable accomplishment that reflects the efforts and excellence of the Joint Oceanographic Institutions, Inc. (prime contractor for ODP), Texas A&M University (science and ship operator), Lamont-Doherty Geological Observatory (logging operator), and the international science community in organizing and planning the new program. It was argued in planning for the ODP that a larger drillship was required to provide space for the increasing U.S. and international demand for shipboard participation, improved and expanded laboratory capabilities, and improvements in coring and logging systems. A larger and better equipped vessel would also provide better stability and working conditions in high-latitude regions of the oceans. The success of the *JOIDES Resolution* has proven the wisdom of these early arguments.

ODP now has operated in all oceans except the ice-covered Arctic. We have drilled above the Arctic circle and within sight of the Antarctic continent. Over 1000 scientists from 25 nations have participated in the initial ODP cruises. The larger scientific parties have allowed an increased emphasis on student participation and training aboard ship. The state-of-the-art laboratories support rapid and complete initial analyses of samples that provide both scientific results and guide subsequent shore-based studies. Nearly 1000 additional scientists have used these data and requested samples from the program's core and data archives for continuing study. The geochemical and geophysical logging capability is unsurpassed in either academia or industry and has provided remarkable new data with which to study the Earth. New experiments to measure and monitor geologic processes have been deployed in ODP boreholes.

The international commitment to ocean drilling has increased in the ODP. In addition to our five partners in IPOD—France, the Federal Republic of Germany, Japan, the Soviet Union, and the United Kingdom—two consortia have joined ODP: Canada-Australia and the European Science Foundation (representing Belgium, Denmark, Finland, Greece, Iceland, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and Turkey). The 20 countries of the ODP represent the community of nations that have a global interest in the geosciences and oceanography. This global scientific participation has assured the program's scientific

excellence by focusing and integrating the combined scientific knowledge and capabilities of the program's 20 nations. It has allowed problems of a global nature to be addressed by providing databases and background studies which are openly shared for planning and interpreting drilling results. It has eased problems of access to territorial waters, allowing comparative studies to be done among oceans. Finally, the international sharing of program costs has allowed this important and large program to proceed without detrimental impact to the research budgets of any one nation.

The Ocean Drilling Program, like its predecessor, DSDP, serves as a model for planning, conducting, and financing research to address problems of global importance. The National Science Foundation is proud to have a leading role in this unique international program, and we look forward to its continuing success.

Walter E. Massey
Director
National Science Foundation

Washington, D.C.

Foreword

By Joint Oceanographic Institutions, Inc.

This volume presents scientific and engineering results from the Ocean Drilling Program (ODP). The papers presented here address the scientific and technical goals of the program, which include providing a global description of geological and geophysical structures including passive and active margins and sediment history, and studying in detail areas of major geophysical activity such as mid-ocean ridges and the associated hydrothermal circulations.

The Ocean Drilling Program, an international activity, operates a specially equipped deep-sea drilling ship, the *JOIDES Resolution* (Sedco/BP 471), which contains state-of-the-art laboratories, equipment, and computers. The ship is 471 feet (144 meters) long, is 70 feet (21 meters) wide, and has a displacement of 18,600 short tons. Her derrick towers 211 feet (64 meters) above the waterline, and a computer-controlled dynamic-positioning system stabilizes the ship over a specific location while drilling in water depths up to 27,000 feet (8230 meters). The drilling system collects cores from beneath the seafloor with a derrick and drawworks that can handle 30,000 feet (9144 meters) of drill pipe. More than 12,000 square feet (1115 square meters) of space distributed throughout the ship is devoted to scientific laboratories and equipment. The ship sails with a scientific and technical crew of 51 and a ship's crew (including the drill crew) of 62. The size and ice-strengthening of the ship allow drilling in high seas and ice-infested areas as well as permitting a large group of multidisciplinary scientists to interact as part of the scientific party.

Logging, or measurements in the drilled holes, is an important part of the program. ODP provides a full suite of geochemical and geophysical measurements for every hole deeper than 1300 feet (400 meters). For each such hole, there are lowerings of basic oil-industry tools: nuclear, sonic, and electrical. In addition, a borehole televiewer is available for imaging the wall of the hole, a 12-channel logging tool provides accurate velocity and elastic property measurements as well as sonic waveforms for spectral analysis of energy propagation near the wall of the hole, and a vertical seismic profiler can record reflectors from below the total depth of the hole.

The management of the Ocean Drilling Program involves a partnership of scientists and governments. International oversight and coordination are provided by the ODP Council, a governmental consultative body of the partner countries, which is chaired by a representative from the United States National Science Foundation. The ODP Council periodically reviews the general progress of the program and discusses financial plans and other management issues. Overall scientific and management guidance is provided to the operators of the program by representatives from the group of institutions involved in the program, called the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES).

The Executive Committee (EXCOM), made up of the administrative heads of the JOIDES institutions, provides general oversight for ODP. The Planning Committee (PCOM), with its advisory structure, is made up of working scientists and provides scientific advice and detailed planning. PCOM has a network of panels and working groups that screen drilling proposals, evaluate instrumentation and measurement techniques, and assess geophysical-survey data and other safety and siting information. PCOM uses the recommendations of the panels and committees to select drilling targets, to specify the location and major scientific objectives of each two-month drilling segment or leg, and to provide the science operator with nominations for co-chief scientists.

Joint Oceanographic Institutions, Inc. (JOI), a nonprofit consortium of U.S. oceanographic institutions, serves as the National Science Foundation's prime contractor for ODP. JOI is responsible for seeing that the scientific objectives, plans, and recommendations of the JOIDES committees are translated into scientific operations consistent with scientific advice and budgetary constraints. JOI subcontracts the operations of the program to two universities: Texas A&M University and Lamont-Doherty Geological Observatory of Columbia University. JOI is also responsible for managing the U.S. contribution to ODP.

Texas A&M University (TAMU) serves as science operator for ODP. In this capacity, TAMU is responsible for planning the specific ship operations, actual drilling schedules, and final scientific rosters, which are developed in close cooperation with PCOM and the relevant

panels. The science operator also ensures that adequate scientific analyses are performed on the cores by maintaining the shipboard scientific laboratories and computers and by providing logistical and technical support for shipboard scientific teams. Onshore, TAMU manages scientific activities after each leg, is curator for the cores, distributes samples, and coordinates the editing and publication of scientific results.

Lamont-Doherty Geological Observatory (LDGO) of Columbia University is responsible for the program's logging operation, including processing the data and providing assistance to scientists for data analysis. The ODP Data Bank, a repository for geophysical data, is also managed by LDGO.

Core samples from ODP and the previous Deep Sea Drilling Project are stored for future investigation at three sites: ODP Pacific and Indian Ocean cores at TAMU, ODP and DSDP Atlantic and Antarctic cores at LDGO, and DSDP Pacific and Indian Ocean cores at the Scripps Institution of Oceanography.

Scientific achievements of ODP include new information on early seafloor spreading and how continents separate and the margins evolve. The oldest Pacific crust has been drilled and sampled. We have new insights into glacial cycles and the fluctuations of ocean currents throughout geological time. Many of the scientific goals can be met only with new technology; thus the program has focused on engineering as well as science. To date, ODP engineers have demonstrated the capability to drill on bare rock at mid-ocean-ridge sites and have developed techniques for drilling in high-temperature and corrosive regions typical of hydrothermal vent areas. A new diamond coring system promises better core recovery in difficult areas.

In addition, ODP is cooperating closely with other geological and geophysical programs; for example, in 1991 the first hole was drilled by ODP for emplacement of a seismometer near Hawaii for the Ocean Seismic Network. JOI is pleased to have been able to play a facilitating role in the Ocean Drilling Program and its cooperative activities, and we are looking forward to many new results to come.

D. James Baker
President
Joint Oceanographic Institutions, Inc.

Washington, D.C.

Preface

The *Scientific Results* volumes of the *Proceedings of the Ocean Drilling Program* contain specialty papers presenting the results of up to one and one-half years of research in various aspects of scientific ocean drilling. I acknowledge with thanks the authors of the papers published in this volume, who thereby have enabled future investigators to gain ready access to the results of their research.

Each of the papers submitted to a *Scientific Results* volume undergoes rigorous peer review by at least two specialists in the author's research field. A paper typically goes through one or more revision cycles before being accepted for publication. Our goal is to maintain a peer-review system comparable to those of the most highly regarded journals in the geological sciences.

The Editorial Review Board for a *Scientific Results* volume is responsible for obtaining peer reviews of papers submitted to the volume. This board usually is made up of the two co-chief scientists for the cruise, the ODP staff scientist for the cruise, and one external specialist who is familiar with the geology of the area investigated. In addition, the ODP staff editor assigned to the volume helps with any manuscripts that require special attention, such as those by authors who need assistance with English expression.

Scientific Results volumes may also contain short reports consisting of good data that are not ready for final interpretation. Papers in this category are segregated in a section in the back of the volume called Data Reports. Although no interpretation is permitted, these papers ordinarily contain a section on methodology or procedures. Data Report papers are read carefully by at least one specialist to make sure they are well organized, comprehensive, and discuss the techniques thoroughly.

In acknowledgment of the contributions made by this volume's Editorial Review Board, names of the individual Board members are listed on the title page. Reviewers of manuscripts for this volume, whose efforts are so essential to the success of the publication, are listed in the front portion of the book, without attribution to a particular manuscript.

On behalf of the Ocean Drilling Program, I extend sincere appreciation to members of the Editorial Review Boards and to the reviewers for giving so generously of their time and efforts in ensuring that only papers of high scientific quality are published in the *Proceedings*.

Philip D. Rabinowitz
Director
Ocean Drilling Program
Texas A&M University

College Station, Texas

REVIEWERS FOR THIS VOLUME

Gary Acton
Sabine E. Apitz
Marie-Pierre Aubry
James A. Austin, Jr.
Richard T. Bachman
Paul A. Baker
Enriqueta Barrera
John A. Barron
Luc Beaufort
Wolfgang H. Berger
William A. Berggren
Anne Boersma
Timothy J. Bralower
James F. Bristow
David Bukry
Lloyd H. Burckle
William H. Busch
Steven C. Clemens
Patrick J. Coleman
Keith A.W. Crook
Steven L. D'Hondt
Kathleen A. Dadey
Walter E. Dean
Geoffrey Eglinton
John W. Farrell
John V. Firth
James V. Gardner
Stefan Gartner
Joris Gieskes
Timothy Herbert
David Hodell
Peter R. Holler
Brian T. Huber
Lynn Ingram
Eystein Jansen
Richard D. Jarrard
Thomas C. Johnson
Robert Karlin
Lloyd D. Keigwin
Gerta Keller
Dennis Kent
John L. LaBrecque
Michael T. Ledbetter
Homa J. Lee
Paul Loubere
Hanspeter P. Luterbacher
Murli H. Manghnani
Chris Metzler
Philip A. Meyer
Kenneth G. Miller
Sarah E. Mock
Gregory Mountain
Clive R. Neal
Erick Nygaard
Richard K. Olsson
Larry C. Peterson
Richard Poore
Isabella Premoli Silva
Christina Ravelo
Maureen Raymo
David K. Rea
Johanna Resig
William F. Ruddiman
William W. Sager
Annika Sanfilippo
Andrew Saunders
Nicholas J. Shackleton
William J. Showers
William V. Sliter
Niall Slowey
Laura B. Stokking
Lowell D. Stott
Jürgen Thurow
Jane S. Tribble
Wuchang Wei
James D. Wright
James Zachos

Publisher's Note: Current policy requires that artwork published in *Scientific Results* volumes of the *Proceedings of the Ocean Drilling Program* be furnished by authors in final camera-ready form.

OCEAN DRILLING PROGRAM

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

University of California at San Diego, Scripps Institution of Oceanography

Columbia University, Lamont-Doherty Geological Observatory

University of Hawaii, School of Ocean and Earth Science and Technology

University of Miami, Rosenstiel School of Marine and Atmospheric Science

Oregon State University, College of Oceanography

University of Rhode Island, Graduate School of Oceanography

Texas A&M University, College of Geosciences and Maritime Studies

University of Texas at Austin, Institute for Geophysics

University of Washington, College of Ocean and Fishery Sciences

Woods Hole Oceanographic Institution

Canada/Australia Consortium for the Ocean Drilling Program, Department of Energy, Mines and Resources (Canada) and Department of Primary Industries and Energy (Australia)

European Science Foundation Consortium for Ocean Drilling, Belgium, Denmark, Finland, Iceland, Italy, Greece, The Netherlands, Norway, Spain, Sweden, Switzerland, and Turkey

Federal Republic of Germany, Bundesanstalt für Geowissenschaften und Rohstoffe

France, Institut Français de Recherche pour l'Exploitation de la Mer

Japan, University of Tokyo, Ocean Research Institute

Russia, Academy of Sciences

United Kingdom, Natural Environment Research Council

PRIME CONTRACTOR

Joint Oceanographic Institutions, Inc.
Washington, D.C.

Thomas E. Pyle
Director, Ocean Drilling Programs

OPERATING INSTITUTION

College of Geosciences and Maritime Studies
Texas A&M University
College Station, Texas

Robert A. Duce
Dean

OCEAN DRILLING PROGRAM

Philip D. Rabinowitz
Director

Timothy J.G. Francis
Deputy Director

Richard G. McPherson
Administrator

Jack G. Baldauf, Manager
Science Operations

Barry W. Harding, Manager
Engineering and Drilling Operations

Russell B. Merrill, Curator and Manager
Science Services

Robert E. Olivas, Manager
Technical and Logistics Support

LOGGING OPERATOR

Borehole Research Group
Lamont-Doherty Geological Observatory
Columbia University
Palisades, New York

Roger N. Anderson, Head

PARTICIPANTS ABOARD *JOIDES RESOLUTION* FOR LEG 130*

Wolfgang H. Berger
Co-Chief Scientist
Fachbereich Geowissenschaften
Universität Bremen
Postfach 330440
D-2800 Bremen 33
Federal Republic of Germany

Loren W. Kroenke
Co-Chief Scientist
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822

Thomas R. Janecek
ODP Staff Scientist/Sedimentologist
Ocean Drilling Program
Texas A&M University
1000 Discovery Drive
College Station, Texas 77845-9547

Jan Backman
Paleontologist (nannofossils)
Department of Geology
University of Stockholm
S-10691 Stockholm
Sweden

Franck Bassinot
Physical Properties Specialist
Département de Géologie Dynamique
Université Pierre et Marie Curie
4 place Jussieu
75252 Paris Cedex 05
France

Richard M. Corfield
Paleontologist (foraminifers)
Department of Earth Sciences
University of Oxford
Parks Road
Oxford OX1 3PR
United Kingdom

Margaret Lois Delaney
Inorganic Geochemist
Institute of Marine Sciences
University of California, Santa Cruz
Santa Cruz, California 95064

Rick Hagen
Geophysicist
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822

Eystein Jansen
Sedimentologist
Department of Geology
University of Bergen
Allegaten 41
N-5007 Bergen
Norway

Lawrence A. Krissek
Sedimentologist
Department of Geology and Mineralogy
Ohio State University
125 South Oval Mall
Columbus, Ohio 43210-1298

Carina Lange
Paleontologist (diatoms)
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, California 92093-0215

Robert Mark Leckie
Paleontologist (foraminifers)
Department of Geology and Geography
University of Massachusetts
Amherst, Massachusetts 01003

Ida Lykke Lind
Sedimentologist
Instituttet for Teknisk Geologi
DTH, Bygning 204
DK2800 Lyngby
Denmark

Mitchell W. Lyle
LDGO Logging Scientist
Borehole Research Group
Lamont-Doherty Geological Observatory
Columbia University
Palisades, New York 10964

John J. Mahoney
Igneous Petrologist
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822

Janice C. Marsters
Physical Properties Specialist
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822

Larry Mayer
Logging Scientist
Department of Oceanography
Dalhousie University
Halifax, Nova Scotia B3H 4J1
Canada

*Addresses at time of cruise.

David C. Mosher
Sedimentologist
Department of Oceanography
Dalhousie University
Halifax, Nova Scotia B3H 4J1
Canada

Robert Musgrave
Paleomagnetist
Geology Department
University of Tasmania
G.P.O. Box 252C
Hobart, Tasmania 7001
Australia

Michael L. Prentice
Sedimentologist
Department of Geological Sciences
University of Maine
Orono, Maine 04469

Johanna M. Resig
Paleontologist (foraminifers)
Department of Geology and Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822

Heike Schmidt
Sedimentologist
Fachbereich Geowissenschaften
Universität Bremen
Postfach 330440
D-2800 Bremen 33
Federal Republic of Germany

Rainer Stax
Organic Geochemist
Institut für Geowissenschaften und Lithosphärenforschung
Universität Giessen
Senckenbergstrasse 3
D-6300 Giessen
Federal Republic of Germany

Michael Storey
Igneous Petrologist
Department of Geology
University of Keele
Keele, Staffordshire ST5 5BG
United Kingdom

Kozo Takahashi
Paleontologist (radiolarians)
Department of Geology and Geophysics
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

Toshiaki Takayama
Paleontologist (nannofossils)
Department of Geology
College of Liberal Arts
Kanazawa University
1-1 Marunouchi
Kanazawa 920
Japan

John A. Tarduno
Paleomagnetist
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, California 92093-0215

Roy H. Wilkens
Physical Properties Specialist/Logging Scientist
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822

Guoping Wu
Sedimentologist
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, California 92093-0215

SEDCO OFFICIALS

Captain Edwin G. Oonk
Master of the Drilling Vessel
Overseas Drilling Ltd.
707 Texas Avenue South
Suite 103D
College Station, Texas 77840-1917

Kenneth D. Horne
Drilling Superintendent
Overseas Drilling Ltd.
707 Texas Avenue South
Suite 103D
College Station, Texas 77840-1917

ODP ENGINEERING AND OPERATIONS PERSONNEL

Eugene Pollard	Drilling Superintendent
Mark Robinson	Engineer

ODP TECHNICAL AND LOGISTICS PERSONNEL

Wendy J. Autio	Marine Technician/Paleomagnetics Laboratory
Stacey Cervantes	Photographer
David Cunningham	Marine Technician/Core Laboratory
Mary Ann Cusimano	Chemistry Technician
Kenneth du Vall	Marine Technician/Marine Geophysics Laboratory
John R. Eastlund	Computer System Manager
Ted ("Gus") Gustafson	Marine Technician/Marine Geophysics Laboratory
Burney Hamlin	Laboratory Officer
Michiko Hitchcox	Yeoperson
Matt Mefferd	Assistant Laboratory Officer
Peggy Myre	Curatorial Representative
Carie Rivers	Marine Technician/Core Laboratory
Mark C. Simpson	Chemistry Technician
Donald Sims	X-ray Technician
William Stevens	Electronics Technician
Mark Watson	Electronics Technician
Barry Weber	Electronics Technician
Charles Williamson	Marine Technician/Shipping/Storekeeper

Ocean Drilling Program Publications Staff

Publications Supervisor
William D. Rose

Chief Editors
Lona Haskins Dearmont
Norman J. Stewart

Editors
Eva M. Maddox
Jennifer A. Marin
Sondra K. Stewart
William R. Winkler

Bibliographer
Nancy K. McQuistion (part-time)

Chief Production Editor
Jennifer Pattison Hall

Production Editors
Jill K. Butler (this volume)
Jaime A. Gracia

Senior Publications Coordinator
Janalisa Braziel Soltis

Publications Coordinator
Gudelia ("Gigi") Delgado

Publications Distribution Specialist
Fabiola Muñoz Byrne

Hole Summary Coordinator
Laura Hammond Young

Data Entry/Copier Operator
Amy Hernandez

Senior Photographer
John W. Beck

Photographer
Barry C. Cochran

Chief Illustrator
Deborah L. Partain

Illustrators
Melany R. Borsack
Michelle Cady
Michelle Curtis
Linda C. De Leon
Garnet D. Gaither

Production Assistants
Mary Elizabeth Betz
Carrie R. Castillón

VOLUME 130—TABLE OF CONTENTS

SECTION 1: BASEMENT/STRUCTURAL/SEISMIC STUDIES

SECTION 2: BIOSTRATIGRAPHY

SECTION 3: ISOTOPE STRATIGRAPHY

SECTION 4: SEDIMENTOLOGY AND PRESERVATION STUDIES

Back-Pocket Foldout

Chapter 3:

Figure 2. Single-channel seismic reflection profile extending from the top of the Ontong Java Plateau.

Chapter 10:

Table 1. Graphic distribution of planktonic foraminifers of Hole 806C (uppermost Oligocene) and Hole 806B (basal Miocene through Pleistocene).

Leg 129 *Data Report:*

Table 1. Range chart of selected nannofossil species from Hole 802A.

CD-ROM Data
(in back pocket)

Chapter 43:

A Plate Tectonic Reconstruction of the Southwest Pacific, 100–0 Ma. The reconstruction is contained in two readable/executable files on the CD-ROM that can be run on any IBM PC compatible that has a VGA monitor attached. They are FORWARD.EXE and BACKWARD.EXE, which will run the reconstructions forward and backward in time, respectively. The files either may be executed directly from your CD-ROM drive or may be copied to and run from your PC hard drive, providing you have sufficient disk space available. To run one of the files from your hard drive, roughly 9 megabytes of disk space must be available; to run both files, about 18 megabytes must be available.

Volume Indexes:

Machine-readable versions of both the Subject and Taxonomic indexes to ODP Volumes 129 and 130 are included on the CD-ROM. A README file gives instructions for their use.