



**VOLUME 207**  
**SCIENTIFIC**  
**RESULTS**

**DEMERARA RISE:  
EQUATORIAL  
CRETACEOUS AND  
PALEOGENE  
PALEOCEANOGRAPHIC  
TRANSECT,  
WESTERN ATLANTIC  
SITES 1257-1261**

**PROCEEDINGS OF THE  
OCEAN DRILLING PROGRAM**

Prepared by the  
OCEAN DRILLING PROGRAM,  
TEXAS A&M UNIVERSITY,  
in cooperation with the  
NATIONAL SCIENCE FOUNDATION  
and JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

# PROCEEDINGS OF THE OCEAN DRILLING PROGRAM

Volume 207

Scientific Results

Demerara Rise: Equatorial Cretaceous and Paleogene  
Paleoceanographic Transect, Western Atlantic

Covering Leg 207 of the cruises of the Drilling Vessel *JOIDES Resolution*  
Bridgetown, Barbados, to Rio de Janeiro, Brazil

Sites 1257–1261

11 January–6 March 2003

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Reference to the whole or to part of this volume should be made as follows:

**Volume citation:**

Mosher, D.C., Erbacher, J., and Malone, M.J. (Eds.), 2007. *Proc. ODP, Sci. Results, 207*: College Station, TX (Ocean Drilling Program). doi:10.2973/odp.proc.sr.207.2007

**Chapter citation:**

Mosher, D.C., Erbacher, J., and Malone, M.J., 2007. Leg 207 synthesis: extreme warmth, organic-rich sediments, and an active deep biosphere, Cretaceous–Paleogene paleoceanographic depth transect at Demerara Rise, western tropical Atlantic. In Mosher, D.C., Erbacher, J., and Malone, M.J. (Eds.), *Proc. ODP, Sci. Results, 207*: College Station, TX (Ocean Drilling Program), 1–26. doi:10.2973/odp.proc.sr.207.101.2007

**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 printing date*, is the correct one.

The printing date of this volume: June 2007

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

Volume 208 (*Initial Reports*): May 2004

Volume 209 (*Initial Reports*): June 2004

Volume 210 (*Initial Reports*): October 2004

Volume 193 (*Scientific Results*): March 2007

Volume 202 (*Scientific Results*): May 2007

Volume 208 (*Scientific Results*): May 2007

Copies of this publication may be obtained from Publications Distribution Center, Integrated Ocean Drilling Program, Texas A&M University, 1000 Discovery Drive, College Station TX 77845-9547, USA. See the ODP publication list at [www-odp.tamu.edu/publications](http://www-odp.tamu.edu/publications) or contact IODP for prices and ordering information. Orders for copies require advance payment.

**ISSN**

Book: 0884-5891; CD-ROM: 1096-2514; World Wide Web: 1096-7451

Library of Congress 87-642-462

## PUBLISHER'S NOTES

This volume also appears on the World Wide Web. Any scientific corrections, revisions, or additions will be noted in the chapter (see "Chapter Notes") at [www-odp.tamu.edu/publications](http://www-odp.tamu.edu/publications).

This publication was prepared by the Integrated 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:

Australia/Canada/Chinese Taipei/Korea Consortium for Ocean Drilling, Department of Primary Industries and Energy (Australia), Natural Resources Canada, National Taiwan University in Taipei, and Korean Institute for Geology, Mining and Minerals

Deutsche Forschungsgemeinschaft (Federal Republic of Germany)

European Science Foundation Consortium for Ocean Drilling (Belgium, Denmark, Finland, Iceland, Ireland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland)

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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.

Current policy requires that all figures published in *Scientific Results* volumes of the *Proceedings of the Ocean Drilling Program* be provided by the authors.

Abbreviations for names of organizations and publications in ODP reference lists follow the style given in *Chemical Abstracts Service Source Index* (published by American Chemical Society).

The map at the front of this volume was produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.R. Smith ([gmt.soest.hawaii.edu](http://gmt.soest.hawaii.edu)). A site map showing the drilling locations for this leg and maps showing the drilling locations of all Ocean Drilling Program (ODP) and Deep Sea Drilling Project (DSDP) drilling sites are available on the volume CD-ROM in PDF format.

Cover photograph (interval 207-1258B-53R-1, 8–28 cm) shows a Cretaceous black shale with concentrations of preserved fish debris and phosphoritic nodules (coproliths). The photograph was taken by ODP Photographer Cindi Prince.

# FOREWORD

## BY JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

This volume presents scientific and engineering results from the Ocean Drilling Program (ODP). These results address the scientific and technical goals of the program, which are focused on the study of the dynamics of Earth's interior and environment, the evolution of oceanic crust, the fluctuations of climate, and the study of the Earth's deep biosphere.

Although ODP ended operations in 2003, science results from ODP's expeditions on the *JOIDES Resolution* continue to emerge. The results represent the contributions of scientists and research institutions from 22 ODP member countries. International oversight and coordination of the program was provided by the ODP Council, which was made up of representatives from the member countries. Scientific and management guidance was provided by representatives from the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES).

Joint Oceanographic Institutions, Inc. (JOI), a nonprofit consortium of 29 U.S. oceanographic institutions, serves as the National Science Foundation's prime contractor for ODP. JOI implemented scientific objectives, plans, and recommendations of the JOIDES committees through subcontracts to Texas A&M University (TAMU) for science operations and to Lamont-Doherty Earth Observatory (LDEO) of Columbia University for geochemical and geophysical well-logging services.

JOI, TAMU, and LDEO worked together successfully for many years to manage the Ocean Drilling Program. We look forward to many exciting discoveries and continued international collaboration on the Integrated Ocean Drilling Program as we further our scientific mission.

Steven R. Bohlen

President of the Joint Oceanographic Institutions and Executive Director of the Ocean Drilling Programs  
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# PREFACE

## THE VOYAGES OF DISCOVERY

The *Scientific Results* volumes of the *Proceedings of the Ocean Drilling Program* are about Earth and her oceans.

These volumes contain contributions to a better understanding of the history of our planet through time. This exploration of Earth's past is based on scientific analyses of layers of strata sampled by the *JOIDES Resolution* at key locations throughout the global ocean. These volumes are a tribute to the scientific exploration carried out by the men and women who contributed to these voyages of discovery. Like the pioneering exploration and research of Captain Cook aboard the first *Resolution*, these volumes are a credit to the human spirit, which sees no boundaries.

The papers in this volume are published in a new online format that will be archived on CD-ROM. The *Proceedings* contents are available to students, scientists, and the public throughout the world. Volumes, once housed in the libraries of the member nations of the Ocean Drilling Program (ODP), are now published on the Internet for a worldwide audience and are also available in CD-ROM format. This electronic publication enables future investigators to gain easier access to the results of ocean drilling research. I acknowledge and thank the authors for their contributions and willingness to participate in this new venture in our successful transition to electronic publications.

Each *Scientific Results* volume has an Editorial Review Board that 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 investigated area. ODP staff coordinate the peer-review process and also edit and produce each paper.

Each *Scientific Results* volume contains one leg synthesis paper and other peer-reviewed papers that present the results of extensive research in various aspects of scientific ocean drilling related to each leg. Each paper submitted to a *Scientific Results* volume undergoes rigorous peer review by at least two specialists in the author's research field. Volumes may also contain short reports of useful data. These Data Reports do not include interpretation of results and are peer-reviewed by at least one specialist. We seek to maintain a peer-review system comparable to those of the most highly regarded journals in the geological sciences.

To acknowledge the contributions made by this volume's Editorial Review Board, the Board members are designated Editors of the volume. Reviewers of manuscripts for this volume, whose efforts are so essential to the success of the publication, are listed without attribution to any particular manuscript.

On behalf of ODP and now the Integrated Ocean Drilling Program, the successor to ODP, I extend sincere appreciation to the members of the Editorial Review Board and to the reviewers for generously contributing their time and effort. This process ensures that only papers of high scientific quality are published in the *Scientific Results* volumes.

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European Science Foundation Consortium for Ocean Drilling (Belgium, Denmark, Finland, Iceland, Ireland, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland)

\*At time of completion of ODP cruises in September 2003. See [Publisher's Notes](#), p. 4, for list of funding agencies at time of cruise.



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# CD-ROM CONTENTS: SYNTHESIS AND CHAPTERS

## SYNTHESIS

1. **Leg 207 Synthesis: Extreme Warmth, Organic-Rich Sediments, and an Active Deep Biosphere: Cretaceous–Paleogene Paleoceanographic Depth Transect at Demerara Rise, Western Tropical Atlantic**

D. Mosher, J. Erbacher, and M. Malone  
doi:10.2973/odp.proc.sr.207.101.2007

## CHAPTERS

### SEDIMENTOLOGY AND STRATIGRAPHY

2. **Sediment Composition and Cyclicity in the Mid-Cretaceous at Demerara Rise, ODP Leg 207**

Alexandra J. Nederbragt, Jürgen Thurow, and Richard Pearce  
doi:10.2973/odp.proc.sr.207.103.2007

3. **Campanian through Eocene Magnetostratigraphy of Sites 1257–1261, ODP Leg 207, Demerara Rise (Western Equatorial Atlantic)**

Yusuke Suganuma and James G. Ogg  
doi:10.2973/odp.proc.sr.207.102.2006

4. **Data Report: Silicoflagellates Recovered from Ocean Drilling Program Leg 207 Sites 1257 and 1258**

Christopher P. Power and Kevin McCartney  
doi:10.2973/odp.proc.sr.207.111.2007

5. **Data Report: Survey of Diatoms in Ocean Drilling Program Leg 207 Sites 1257 and 1258, Demerara Rise, Western Atlantic**

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doi:10.2973/odp.proc.sr.207.115.2007



## GEOCHEMISTRY AND BIOMARKERS

**6. Data Report: Stable Isotope Ratios of Foraminifers from ODP Leg 207 Sites 1257, 1258, and 1260 and a Cleaning Procedure for Foraminifers in Organic-Rich Shales**

Karen L. Bice and Richard D. Norris  
doi:10.2973/odp.proc.sr.207.104.2005

**7. Data Report: Stable Isotopic Ratios in Bulk Carbonate from Upper Campanian and Maastrichtian Samples (Demerara Rise, Western Tropical North Atlantic)**

Kenneth G. MacLeod  
doi:10.2973/odp.proc.sr.207.110.2006

**8. Inorganic Geochemical Characterization of Lithologic Units Recovered during ODP Leg 207 (Demerara Rise)**

Almut Hetzel, Hans-Jürgen Brumsack, Bernhard Schnetger, and Michael E. Böttcher  
doi:10.2973/odp.proc.sr.207.107.2006

**9. Sulfur-Iron-Carbon Geochemistry in Sediments of the Demerara Rise**

Michael E. Böttcher, Almut Hetzel, Hans-Jürgen Brumsack, and Andrea Schipper  
doi:10.2973/odp.proc.sr.207.108.2006

**10. Data Report: Iron Isotope Geochemistry of Mid-Cretaceous Organic-Rich Sediments at Demerara Rise (ODP Leg 207)**

Robin E. Clayton, Alexandra J. Nederbragt, Dmitry Malinovsky, Per Andersson, and Jürgen Thurow  
doi:10.2973/odp.proc.sr.207.109.2007

**11. Data Report: Organic Carbon, Total Nitrogen, Carbonate Carbon, and Carbonate Oxygen Isotopic Compositions of Albian to Santonian Black Shales from Sites 1257–1261 on the Demerara Rise**

Philip A. Meyers and Stefano M. Bernasconi  
doi:10.2973/odp.proc.sr.207.106.2006

## MICROBIOLOGY

**12. Data Report: Intact Membrane Lipids as Indicators of Subsurface Life in Cretaceous and Paleogene Sediments from Sites 1257 and 1258**

Helen F. Fredricks and Kai-Uwe Hinrichs  
doi:10.2973/odp.proc.sr.207.112.2007

**13. Data Report: Microbiological AODC and CARD-FISH Analysis of Black Shale Samples from the Demerara Rise, ODP Leg 207**

Axel Schippers and Lev N. Neretin  
doi:10.2973/odp.proc.sr.207.105.2006

## PHYSICAL PROPERTIES, LOGGING, AND MULTICHANNEL SEISMICS

### 14. Data Report: Log-Adjusted Depth Scales for Cretaceous Black Shale Deposits from Demerara Rise

Matt O'Regan

doi:10.2973/odp.proc.sr.207.113.2007

### 15. Compressibility, Permeability, and Stress History of Sediments from Demerara Rise

Matt O'Regan and Kate Moran

doi:10.2973/odp.proc.sr.207.114.2007

## CD-ROM CONTENTS: DRILLING LOCATION MAPS

A site map showing the drilling locations for this leg and maps showing the drilling locations of all Ocean Drilling Program (ODP) and Deep Sea Drilling Project (DSDP) drilling sites are available in PDF format.

[ODP Leg 207 Site Map](#)

[ODP Map](#) (Legs 100–210)

[DSDP Map](#) (Legs 1–96)

## CD-ROM CONTENTS: INDEX TO LEG 207 *INITIAL REPORTS AND SCIENTIFIC RESULTS VOLUMES*

The index covers both the *Initial Reports* and *Scientific Results* portions of Volume 207 of the *Proceedings of the Ocean Drilling Program*. The index contains a subject and taxonomic index.

[Index to Leg 207](#)

## CD-ROM CONTENTS: COMPILED ELECTRONIC INDEX

The Compiled Electronic Index of the *Proceedings of the Ocean Drilling Program* contains the indexes of Volumes 101–205, 207, and 208. The indexes are contained in the directory titled ODPINDEX and are named ###NDX.PDF (### = the leg number). These indexes can be searched individually or collectively. For information on using the Acrobat search function, see the Help function in Adobe Reader.

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