Volume 209
Scientific Results
Drilling Mantle Peridotite along the Mid-Atlantic Ridge from 14° to 16°N Sites 1268–1275

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 209
Scientific Results
Drilling Mantle Peridotite along the Mid-Atlantic Ridge from 14° to 16°N

Covering Leg 209 of the cruises of the Drilling Vessel JOIDES Resolution
Rio de Janeiro, Brazil, to St. George, Bermuda
Sites 1268–1275
6 May–6 July 2003

SHIPBOARD SCIENTISTS
Peter B. Kelemen, Eiichi Kikawa, D. Jay Miller,
Natsue Abe, Wolfgang Bach, Richard L. Carlson, John F. Casey, Lynne M. Chambers, Michael Cheadle,
Anna Cipriani, Henry J.B. Dick, Ulrich Faul, Miguel Garces, Carlos Garrido, Jeffrey S. Gee, Marguerite M. Godard,
David W. Graham, Dale W. Griffin, Jason Harvey, Benoit Ildefonse, Gerardo J. Iturrino, Jennifer Josef,
William P. Meurer, Holger Paulick, Martin Rosner, Timothy Schroeder, Monique Seyler, Eiichi Takazawa

SHIPBOARD STAFF SCIENTIST
D. Jay Miller

EDITORIAL REVIEW BOARD
Peter B. Kelemen, Eiichi Kikawa, D. Jay Miller
Reference to the whole or to part of this volume should be made as follows:

**Volume citation:**

**Chapter citation:**

**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: September 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 206 (*Scientific Results*): July 2007
- Volume 207 (*Scientific Results*): June 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
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.

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)
- Institut National des Sciences de l’Univers–Centre National de la Recherche Scientifique (INSU-CNRS) (France)
- Marine High-Technology Bureau of the State Science and Technology Commission of the People’s Republic of China
- 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.

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). 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.

The cover photograph is of dunite with a light green-gray groundmass hosting abundant transgranular black serpentine-magnetite veins oriented mainly parallel to the long axis of the core (interval 209-1271A-1R-1, 68–83 cm). Photograph 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
Washington, D.C.
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.

Paul J. Fox
Director, Science Services, TAMU
Integrated Ocean Drilling Program
Texas A&M University
College Station, Texas
REVIEWERS FOR THIS VOLUME

Chiara Boschi  B. Ronald Frost  Sue Welch
Tim Ferdelman  Cin-Ty Lee
OCEAN DRILLING PROGRAM*

National Science Foundation
4201 Wilson Boulevard
Arlington VA 22230, USA
Tel: (703) 306-1581; Fax: (703) 306-0390
Web site: www.nsf.gov

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

Columbia University, Lamont-Doherty Earth Observatory
Florida State University
Oregon State University, College of Oceanic and Atmospheric Sciences
Pennsylvania State University, College of Earth and Mineral Sciences
Rutgers, The State University of New Jersey, Institute of Marine and Coastal Sciences and Faculty of Arts and Sciences
Stanford University, School of Earth Sciences
Texas A&M University, College of Geosciences
University of California at San Diego, Scripps Institution of Oceanography
University of California, Santa Cruz
University of Florida
University of Hawaii, School of Ocean and Earth Science and Technology
University of Miami, Rosenstiel School of Marine and Atmospheric Science

University of Michigan, College of Literature, Science, and the Arts
University of Rhode Island, Graduate School of Oceanography
University of South Florida, College of Marine Science
University of Texas at Austin, Institute for Geophysics
University of Washington, College of Ocean and Fishery Sciences
Woods Hole Oceanographic Institution
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
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.
Federal Republic of Germany, Bundesanstalt für Geowissenschaften und Rohstoffe
France, Institut National des Sciences de l’Univers–Centre National de la Recherche Scientifique (INSU-CNRS)
Japan, University of Tokyo, Ocean Research Institute
People’s Republic of China, Marine High-Technology Bureau of the State Science and Technology Commission of the People’s Republic of China
United Kingdom, Natural Environment Research Council

ODP PROGRAM MANAGER
Joint Oceanographic Institutions, Inc.
1201 New York Avenue, NW, Suite 400
Washington DC 20005, USA
Tel: (202) 232-3900; Fax: (202) 462-8754
E-mail: info@joiscience.org
Web site: www.joiscience.org

ODP LOGGING SERVICES OPERATOR
Borehole Research Group
Lamont-Doherty Earth Observatory of Columbia University
PO Box 1000, 61 Route 9W
Palisades NY 10964, USA
Tel: (845) 365-8341; Fax: (845) 365-3182
E-mail: borehole@ldeo.columbia.edu
Web site: www.ldeo.columbia.edu/BRG/ODP

ODP SCIENCE OPERATOR
Integrated Ocean Drilling Program
Texas A&M University
1000 Discovery Drive
College Station TX 77845-9547, USA
Tel: (979) 845-2673; Fax: (979) 845-4857
E-mail: information@iodp.tamu.edu
Web site: iodp.tamu.edu

ODP SITE SURVEY DATA BANK
Lamont-Doherty Earth Observatory of Columbia University
PO Box 1000, 61 Route 9W
Palisades NY 10964, USA
Tel: (845) 365-8542; Fax: (845) 365-8159
E-mail: odp@ldeo.columbia.edu
Web site: ssdb.iodp.org
LEG 209 PARTICIPANTS*

SHIPBOARD SCIENTIFIC PARTY

Peter B. Kelemen  
Co-Chief Scientist  
Department of Geology and Geophysics  
Woods Hole Oceanographic Institution  
Woods Hole MA 02543  
USA  
peterk@whoi.edu

Eiichi Kikawa  
Co-Chief Scientist  
OD21 Program  
Japan Agency for Marine Science and Technology  
2-15 Natsushima-cho  
Yokosuka 237-0061  
Japan  
kikawa@jamstec.go.jp

D. Jay Miller  
Staff Scientist  
Ocean Drilling Program  
Texas A&M University  
1000 Discovery Drive  
College Station TX 77845-9547  
USA  
Present address (25 November 2003):  
Integrated Ocean Drilling Program  
Texas A&M University  
1000 Discovery Drive  
College Station TX 77845-9547  
USA  
miller@iodp.tamu.edu

Natsue Abe  
Petrologist  
Deep Sea Research Department  
Japan Agency for Marine Science and Technology  
2-15 Natsushima-cho  
Yokosuka 237-0061  
Japan  
abenatsu@jamstec.go.jp

Wolfgang Bach  
Petrologist  
Marine Chemistry and Geochemistry  
Woods Hole Oceanographic Institution  
360 Woods Hole Road  
MS 8  
Woods Hole MA 02543  
USA  
wbach@whoi.edu

Richard L. Carlson  
Physical Properties Specialist  
Department of Geology and Geophysics  
Texas A&M University  
College Station TX 77843-3115  
USA  
carlson@geo.tamu.edu

*Addresses at time of cruise, except where updated by the leg participants before publication.
John F. Casey  
Petrologist  
Department of Geosciences  
University of Houston  
4800 Calhoun Road  
Science and Research Building 1  
Houston TX 77204-5503  
USA  
jfcasey@uh.edu

Lynne M. Chambers  
Petrologist  
NERC Isotope Geosciences Laboratory  
British Geological Survey  
Kingsley Dunham Centre, Keyworth  
Nottingham  
Nottinghamshire NG12 5GG  
United Kingdom  
lmch@bgs.ac.uk

Michael Cheadle  
Petrologist  
Department of Geology and Geophysics  
University of Wyoming  
Laramie WY 82071  
USA  
cheadle@uwyo.edu

Anna Cipriani  
Petrologist  
Lamont-Doherty Earth Observatory of Columbia University  
PO Box 1000, 61 Route 9W  
Palisades NY 10964  
USA  
anka@ldeo.columbia.edu

Henry J.B. Dick  
Petrologist  
Department of Geology and Geophysics  
Woods Hole Oceanographic Institution  
MS 8, McLean Laboratory  
Woods Hole MA 02543  
USA  
hdick@whoi.edu

Ulrich Faul  
Petrologist  
Research School of Earth Sciences  
The Australian National University  
Canberra ACT 0200  
Australia  
uli.faul@anu.edu.au

Miguel Garces  
Paleomagnetist  
Stratigraphy, Paleontology, and Marine Geosciences  
Universitat de Barcelona  
Campus de Pedralbes  
08028 Barcelona  
Spain  
mgarces@ub.edu

Carlos J. Garrido  
Petrologist  
Departamento de Mineralogía y Petrología  
Universidad de Granada  
Facultad de Ciencias, Fuentenuva s/n  
18002-Granada  
Spain  
carlosg@ugr.es

Jeffrey S. Gee  
Paleomagnetist  
Scripps Institution of Oceanography  
University of California, San Diego  
Geosciences Research Division - 0220  
La Jolla CA 92093-0220  
USA  
jsgee@ucsd.edu
Marguerite M. Godard
Petrologist
Laboratoire de Tectonophysique
Université Montpellier II
Case Courrier 49
Place Eugène Bataillon
34095 Montpellier Cedex 5
France
margot@dstu.univ-montp2.fr

David W. Graham
Petrologist
College of Oceanic and Atmospheric Sciences
Oregon State University
104 Ocean Administration Building
Corvallis OR 97331-5503
USA
dgraham@coas.oregonstate.edu

Dale W. Griffin
Microbiologist
Coastal and Marine Division
United States Geological Survey
600 4th Street South
St. Petersburg FL 33701
USA
dgriffin@usgs.gov

Jason Harvey
Petrologist
Department of Earth Sciences
The Open University
Walton Hall
Milton Keynes MK7 6AA
United Kingdom
j.harvey@open.ac.uk

Benoit Ildefonse
Physical Properties Specialist
Laboratoire de Tectonophysique
ISTEEM
Université Montpellier 2, CC49
34095 Montpellier Cedex 5
France
benoit@dstu.univ-montp2.fr

Gerardo J. Iturrino
Logging Staff Scientist
Borehole Research Group
Lamont-Doherty Earth Observatory of Columbia University
PO Box 1000, 61 Route 9W
Palisades NY 10964
USA
iturrino@ldeo.columbia.edu

Jennifer Josef
Microbiologist
Marine Geology
Oregon State University
104 COAS Administration Building
Corvallis OR 97333
USA
jjosef@coas.oregonstate.edu

William P. Meurer
Petrologist
Department of Geosciences
University of Houston
312 Science and Research Building 1
Houston TX 77204-5007
USA
wpmeurer@mail.uh.edu
Holger Paulick  
Petrologist  
Mineralogisch-petrologisches Institut  
Universität Bonn  
Poppelsdorfer Schloss  
53115 Bonn  
Germany  
holger.paulick@uni-bonn.de

Martin Rosner  
Petrologist  
Department of Inorganic and Isotope Geochemistry  
GeoForschungsZentrum Potsdam  
Telegrafenberg B122  
14473 Potsdam  
Germany  
rosner@gfz-potsdam.de

Timothy Schroeder  
Petrologist  
Department of Geology and Geophysics  
University of Wyoming  
PO Box 3006  
Laramie WY 82071  
USA  
Present address (15 August 2003):  
Department of Environmental Earth Science  
Eastern Connecticut State University  
83 Windham Street  
Willimantic CT 06226  
USA  
schroeder@easternct.edu

Monique Seyler  
Petrologist  
Laboratoire de Geosciences Marine  
Institut de Physique du Globe de Paris  
4 Place Jussieu  
75252 Paris Cedex 05  
France  
seyler@ipgp.jussieu.fr

Eiichi Takazawa  
Petrologist  
Department of Geology, Faculty of Science  
Niigata University  
2-8050  
Ikarashi, Niigata 950-2181  
Japan  
takazawa@geo.sc.niigata-u.ac.jp

TRANSOCEAN OFFICIALS

Tom Hardy  
Master of the Drilling Vessel  
Overseas Drilling Ltd.  
707 Texas Avenue South, Suite 213D  
College Station TX 77840-1917  
USA

Wayne Malone  
Drilling Superintendent  
Overseas Drilling Ltd.  
707 Texas Avenue South, Suite 213D  
College Station TX 77840-1917  
USA
ODP SHIPBOARD PERSONNEL AND TECHNICAL REPRESENTATIVES

Lisa Brandt  
Marine Laboratory Specialist (Chemistry)

Lisa Crowder  
Marine Laboratory Specialist  
(Underway Geophysics)

Roy Davis  
Laboratory Officer

Randy Gjesvold  
Marine Electronics Specialist

Dennis Graham  
Marine Laboratory Specialist (Chemistry)

Ted Gustafson  
Marine Laboratory Specialist  
(Downhole Tools/Thin Sections)

Margaret Hastedt  
Marine Computer Specialist

Scott Herman  
Marine Laboratory Specialist (Paleomagnetism)

Michiko Hitchcox  
Marine Laboratory Specialist (Yeoperson)

Eric Jackson  
Marine Laboratory Specialist (X-Ray)

Michael Meiring  
Marine Electronics Specialist

Erik Moortgat  
Marine Computer Specialist

Stefan Mrozewski  
Logging-while-Drilling Engineer (Anadrill)

Robert Olivas  
Marine Laboratory Specialist (Core)

Chieh Peng  
Assistant Laboratory Officer/Storekeeper

Cyndi Prince  
Marine Laboratory Specialist (Photographer)

Mads Radsted  
Marine Laboratory Specialist  
(Physical Properties)

Michael Storms  
Operations Manager

Kerry Swain  
Schlumberger Logging Engineer

Paula Weiss  
Marine Laboratory Specialist (Curation)
## Publication Services Staff*

<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karen Benson</td>
<td>Production Specialist II</td>
</tr>
<tr>
<td>Jami Castillo</td>
<td>Editor</td>
</tr>
<tr>
<td>Mary Chapman</td>
<td>Production Specialist I</td>
</tr>
<tr>
<td>Gudelia (“Gigi”) Delgado</td>
<td>Senior Publications Coordinator</td>
</tr>
<tr>
<td>Patrick H. Edwards</td>
<td>Production Specialist III</td>
</tr>
<tr>
<td>Jaime A. Gracia</td>
<td>Supervisor of Production</td>
</tr>
<tr>
<td>Lauren Gracia</td>
<td>Student Assistant</td>
</tr>
<tr>
<td>Cassandra Harashe</td>
<td>Student Assistant</td>
</tr>
<tr>
<td>Jenni Hesse</td>
<td>Editor</td>
</tr>
<tr>
<td>Shana C. Lewis</td>
<td>Editor</td>
</tr>
<tr>
<td>Ginny Lowe</td>
<td>Reports Coordinator</td>
</tr>
<tr>
<td>Nancy H. Luedke</td>
<td>Graphics Specialist II</td>
</tr>
<tr>
<td>Amy McWilliams</td>
<td>Editor</td>
</tr>
<tr>
<td>Angeline T. Miller</td>
<td>Manager of Publication Services</td>
</tr>
<tr>
<td>Linda Orsi</td>
<td>Graphics Specialist II</td>
</tr>
<tr>
<td>Deborah L. Partain</td>
<td>Supervisor of Graphics</td>
</tr>
<tr>
<td>Lorri L. Peters</td>
<td>Supervisor of Editing</td>
</tr>
<tr>
<td>M. Kathleen Phillips</td>
<td>Publications Specialist</td>
</tr>
<tr>
<td>Jennifer Pattison Rumford</td>
<td>Electronic Publications Specialist</td>
</tr>
<tr>
<td>Kenneth Sherar</td>
<td>Production Specialist II</td>
</tr>
<tr>
<td>Ann Yeager</td>
<td>Distribution Specialist</td>
</tr>
</tbody>
</table>

*At time of publication.
CD-ROM CONTENTS: SUMMARY AND CHAPTERS

SUMMARY

1. **Leg 209 Summary: Processes in a 20-km-Thick Conductive Boundary Layer beneath the Mid-Atlantic Ridge, 14°–16°N**
   Peter B. Kelemen, Eiichi Kikawa, D. Jay Miller, and Shipboard Scientific Party
   doi:10.2973/odp.proc.sr.209.001.2007

CHAPTERS

PETROLOGY

2. **Data Report: Microprobe Analyses of Primary Phases (Olivine, Pyroxene, and Spinel) and Alteration Products (Serpentine, Iowaitite, Talc, Magnetite, and Sulfides) in Holes 1268A, 1272A, and 1274A**
   M. Moll, H. Paulick, G. Suhr, and W. Bach
   doi:10.2973/odp.proc.sr.209.003.2007

3. **Sulfide Mineralization at Site 1268, Mid-Atlantic Ridge, Ocean Drilling Program Leg 209**
   D. Jay Miller
   doi:10.2973/odp.proc.sr.209.004.2007

4. **Hybridization of Dunite and Gabbroic Materials in Hole 1271B from Mid-Atlantic Ridge 15°N: Implications for Melt Flow and Reaction in the Upper Mantle**
   Eiichi Takazawa, Natsue Abe, Monique Seyler, and William P. Meurer
   doi:10.2973/odp.proc.sr.209.005.2007

MICROBIOLOGY

5. **Peridotite Dissolution Rates in Microbial Enrichment Cultures**
   Jennifer A. Josef, Martin R. Fisk, and Stephen Giovannoni
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.

OPD Leg 209 Site Map
OPD Map (Legs 100–210)
DSDP Map (Legs 1–96)

CD-ROM CONTENTS: INDEX TO LEG 209 Initial Reports and Scientific Results Volumes

The index covers both the Initial Reports and Scientific Results portions of Volume 209 of the Proceedings of the Ocean Drilling Program. The index contains a subject and taxonomic index.

Index to Leg 209

CD-ROM CONTENTS: COMPILED ELECTRONIC INDEX

The Compiled Electronic Index of the Proceedings of the Ocean Drilling Program contains the indexes of Volumes 101–209. 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.
| **209SR.PDF**  
(Preliminary pages and table of contents) |
| --- |
| **README.TXT**  
(ASCII information about the volume CD-ROM) |
| **ACROREAD**  
(Acrobat Reader installation software and instructions for different platforms) |
| **MAPS**  
(Drilling location maps) |
| **VOLUME**  
(Leg 209 Scientific Results volume) |
| **ODPINDEX**  
(Compiled Electronic Index of the Proceedings of the Ocean Drilling Program) |

### MAC_OS
- README.TXT

### UNIX
- 209_MAP.PDF (Leg 209 site map)
- ODPMAP.PDF (ODP map, Legs 100 through 210)
- DSDPMAP.PDF (DSDP map, Legs 1 through 96)

### WINDOWS
- SUMMARY.PDF (Chapter 1: Leg 209 Summary: Processes beneath the Mid-Atlantic Ridge)
- 003.PDF (Chapter 2: Data Report: Microprobe Analyses)
- 004.PDF (Chapter 3: Sulfide Mineralization)
- 005.PDF (Chapter 4: Hybridization of Dunite and Gabbros)
- 002.PDF (Chapter 5: Periodotite Dissolution Rates in Cultures)

### OVERSIZE
- 209NDX.PDF (Leg 209 Proceedings volume index)
- 101NDX.PDF through 209NDX.PDF (Index files)

- 002.PDF (Chapter 2 files)

- 209NDX.PDF (Leg 209 Proceedings volume index)