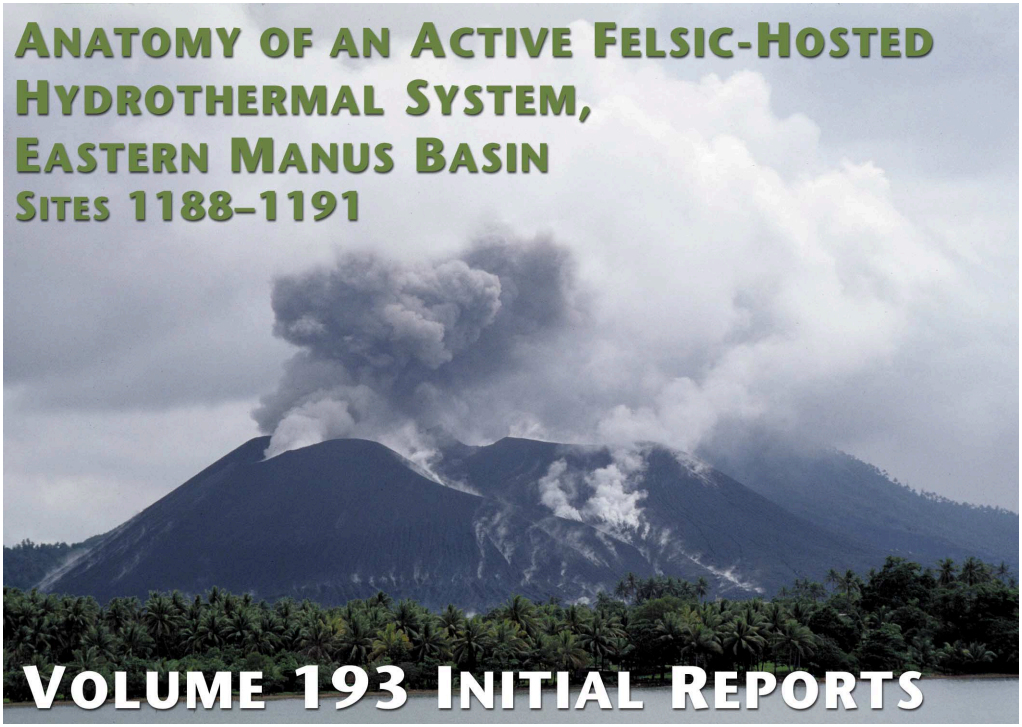
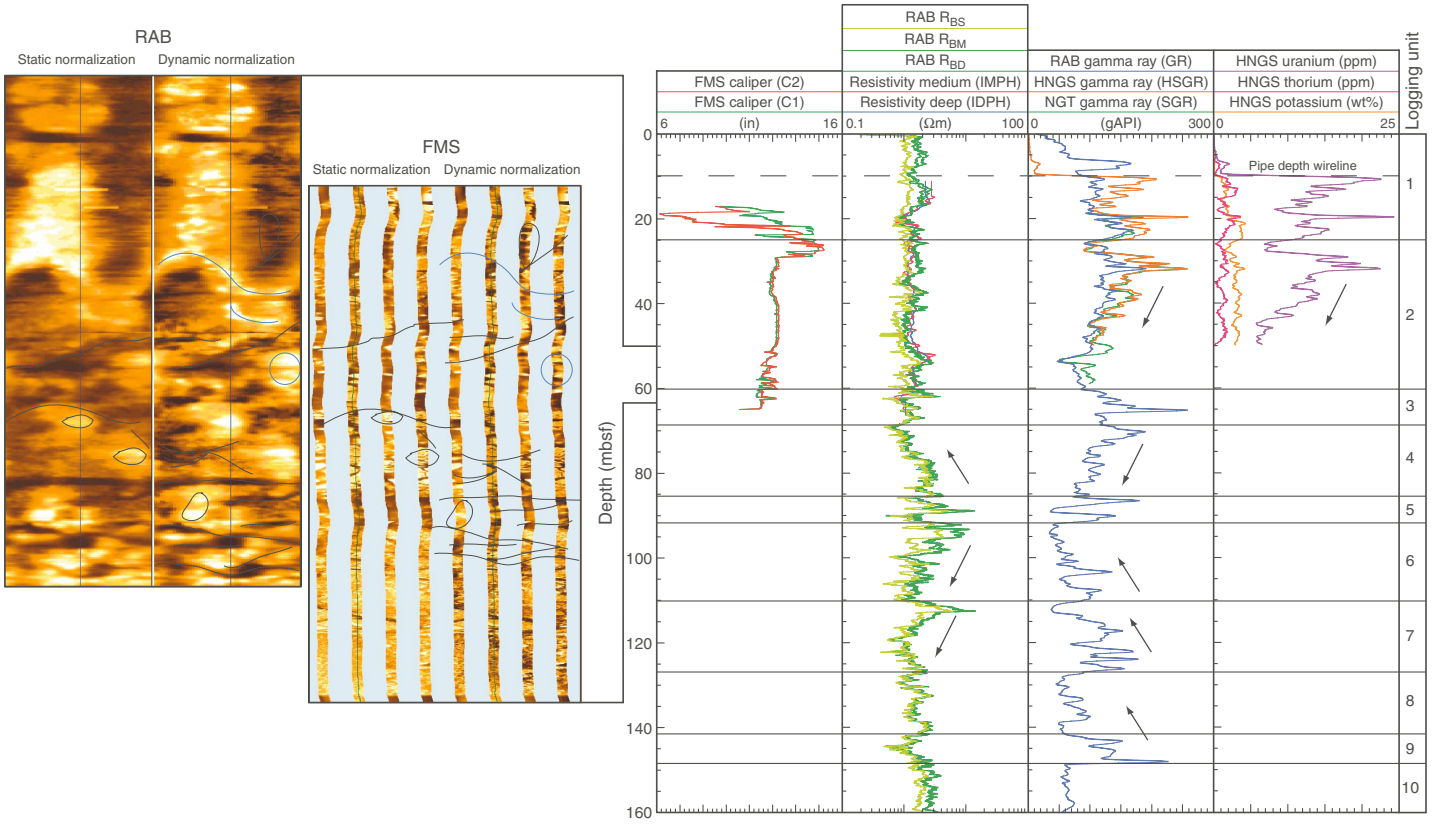


Proceedings of the Ocean Drilling Program

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



Frontispiece. (Caption shown on next page.)

Frontispiece (continued). (**Figure shown on previous page.**)

A comparison between logging-while-drilling (LWD) resistivity-at-the-bit (RAB) and wireline log data from the first Ocean Drilling Program deployment of the RAB tool. The measurements obtained in Hole 1189C provide electrical images of the borehole wall (on left) and log curves of electrical resistivity and natural radioactivity (on right). The LWD data (images, deep-, medium-, and shallow-button resistivity curves, and gamma-ray profile) show fracture patterns, alteration trends (denoted by arrows), and high gamma-ray values that may be indicative of hydrothermal fluid flow along fractures. The wireline logging data were collected only in the upper 65 m because of a hole obstruction, emphasizing the value of obtaining LWD data before deterioration of borehole conditions. The Formation MicroScanner (FMS) calipers show the size of the borehole in the upper sections after LWD operations were completed. The wireline spectral gamma-ray data show the correlation between high gamma-ray values (RAB and wireline) and high uranium concentrations (wireline). The RAB data also show a rapid increase in gamma-ray values from the seafloor to ~6 m below seafloor (mbsf) that is not present in the wireline logs (because of the location of the drill pipe at 10 mbsf) or in the core data and most likely corresponds to the presence of hydrothermal deposits. Fracture patterns correlate well between the full 360° coverage RAB and the higher-resolution (<20% borehole coverage) FMS oriented images. In addition, because of relatively low core recovery, the LWD logs provide the only continuous record of the lithostratigraphic sequences drilled in the Manus Basin. R_{BS} = shallow resistivity, R_{BM} = medium resistivity, R_{BD} = deep resistivity, IMPH = medium induction phasor-processed resistivity, IDPH = deep induction phasor-processed resistivity, HNGS = hostile-environment natural gamma-ray sonde, HSGR = total spectral gamma ray, NGT = natural gamma-ray tool, SGR = standard gamma ray.

Proceedings of the Ocean Drilling Program

Volume 193
Initial Reports
Anatomy of an Active Felsic-Hosted Hydrothermal System, Eastern Manus Basin

Covering Leg 193 of the cruises of the Drilling Vessel *JOIDES Resolution*
Apra Harbor, Guam, to Townsville, Australia
Sites 1188–1191
7 November 2000–3 January 2001

SHIPBOARD SCIENTISTS
Raymond A. Binns, Fernando J.A.S. Barriga, D. Jay Miller, Ryuji Asada, Wolfgang Bach, Anne C.M. Bartetzko, Liane G. Benning, Terje Bjerkgård, Lizet Brokner Christiansen, Erika R. Elswick, Robert Findlay, Gerardo J. Iturrino, Hiroyuki Kimura, John B. Kulange, Klas S. Lackschewitz, Sang-Mook Lee, Andrew Masta, Holger Paulick, Álvaro M. Pinto, Stephen Roberts, Steven D. Scott, David A. Vanko, Ian Warden, Christopher J. Yeats

SHIPBOARD STAFF SCIENTIST
D. Jay Miller

VOLUME EDITORS
John M. Scroggs, Mary Chapman

VOLUME GRAPHIC DESIGNER
Jennie L. Lamb

VOLUME PRODUCTION EDITOR
Kenneth R. Sherar

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

Print citation for Chapter 1:
Shipboard Scientific Party, 2002. Leg 193 summary. *In* Binns, R.A., Barriga, F.J.A.S., Miller, D.J., et al., *Proc. ODP, Init. Repts.,* 193: College Station TX (Ocean Drilling Program), 1–84.

CD-ROM volume citation:
Binns, R.A., Barriga, F.J.A.S., Miller, D.J., et al., 2002. *Proc. ODP, Init. Repts.,* 193 [CD-ROM]. Available from: Ocean Drilling Program, Texas A&M University, College Station TX 77845-9547, USA.

CD-ROM chapter citation:
Shipboard Scientific Party, 2002. Site 1188. *In* Binns, R.A., Barriga, F.J.A.S., Miller, D.J., et al., *Proc. ODP, Init. Repts.,* 193, 1–305 [CD-ROM]. Available from: Ocean Drilling Program, Texas A&M University, College Station TX 77845-9547, USA.

This volume also appears on the World Wide Web. See **www-odp.tamu.edu/publications** for Web citation formats.

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: January 2002

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

Volume 189 (*Initial Reports*): May 2001
Volume 190 (*Initial Reports*): July 2001
Volume 191 (*Initial Reports*): September 2001
Volume 172 (*Scientific Results*): September 2001
Volume 173 (*Scientific Results*): August 2001
Volume 174B (*Scientific Results*): July 2001

Copies of this publication may be obtained from Publications Distribution Center, 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** or contact ODP for prices and ordering information. Orders for copies require advance payment.

ISSN
Book: 0884-5883; CD-ROM: 1096-2522; World Wide Web: 1096-2158
Library of Congress 87-642-462

Publisher's Notes

This volume also appears on the World Wide Web. Any 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 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.

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 bulk of the shipboard-collected data from this leg is available on the World Wide Web and is accessible at **www-odp.tamu.edu/database**. If you cannot access this site or need additional data, please contact the ODP Data Librarian, Ocean Drilling Program, Texas A&M University, College Station TX 77845-9547, USA (e-mail: **database@odpemail.tamu.edu**).

Supplemental data on the volume CD-ROM were provided by the authors and may not conform to ODP publication formats.

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. These maps were produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith (**gmt.soest.hawaii.edu**).

Cover photograph by ODP Photographer John Beck is of the *JOIDES Resolution* sailing past the erupting Tavurvur volcano while entering the harbor of Rabaul, Papua New Guinea. The focus of Leg 193 was another nearby volcano, Pual Ridge in the Manus Basin.

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, and the fluctuations of climate. In addition, study of the Earth's deep biosphere is an emergent research objective.

ODP, an international partnership of scientists and research institutions from 22 countries, operates the drillship *JOIDES Resolution*. This state-of-the-art research vessel contains eight levels of laboratories and other scientific facilities required for carrying out the program's objectives.

The management of ODP involves a partnership of scientists and governments. International oversight and coordination are provided by the ODP Council, which is made up of representatives from the member countries. Overall scientific and management guidance is provided by representatives from the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES).

Joint Oceanographic Institutions, Inc. (JOI), a nonprofit consortium of 15 U.S. oceanographic institutions, serves as the National Science Foundation's prime contractor for ODP. JOI implements scientific objectives, plans, and recommendations of the JOIDES committees through major 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 have worked together successfully for many years to manage the Ocean Drilling Program. We look forward to many exciting discoveries and continued international collaboration as we further our scientific mission, especially the planning for the future of ocean drilling beyond 2003.

Steven R. Bohlen
President of the Joint Oceanographic Institutions and Executive Director of the Ocean Drilling Programs
Washington, D.C.

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

Oregon State University, College of Oceanic and Atmospheric 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 Texas at Austin, Institute for Geophysics

University of Washington, College of Ocean and Fishery Sciences

Woods Hole Oceanographic Institution

*At time of publication. See **Publisher's Notes,** p. 7, for list of funding agencies at time of cruise. For an up-to-date list of current member organizations and office contact information, see the ODP Web site: **www.oceandrilling.org.**

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)

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

Ocean Drilling Program (ODP)

Web site: **www.oceandrilling.org**

ODP Science Advisory Structure (JOIDES)

JOIDES Office
University of Miami—RSMAS
4600 Rickenbacker Causeway
Miami FL 33149, USA
Tel: (305) 361-4668; Fax: (305) 361-4632
E-mail: **joides@rsmas.miami.edu**
Web site: **joides.rsmas.miami.edu**

ODP Program Manager

Joint Oceanographic Institutions, Inc.
1755 Massachusetts Avenue, NW, Suite 700
Washington DC 20036-2102, USA
Tel: (202) 232-3900; Fax: (202) 462-8754
E-mail: **joi@joiscience.org**
Web site: **www.joiscience.org**

ODP Science Operator

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: **odp@odpemail.tamu.edu**
Web site: **www-odp.tamu.edu**

ODP Logging Services Operator

Borehole Research Group
Lamont-Doherty Earth Observatory
Columbia University
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 Site Survey Data Bank

Lamont-Doherty Earth Observatory
Columbia University
Route 9W
Palisades NY 10964, USA
Tel: (845) 365-8542; Fax: (845) 365-8159
E-mail: **odp@ldeo.columbia.edu**
Web site: **www.ldeo.columbia.edu/databank**

Leg 193 Participants*

Shipboard Scientific Party

Raymond A. Binns
Co-Chief Scientist
CSIRO
Division of Exploration and Mining
PO Box 136
North Ryde NSW 1670
Australia
r.binns@syd.dem.csiro.au

Fernando J.A.S. Barriga
Co-Chief Scientist
Departamento de Geologia
Universidade de Lisboa
Edificio C2, Piso 5
Campo Grande
1749-016 Lisboa
Portugal
f.barriga@fc.ul.pt

D. Jay Miller
Staff Scientist
Ocean Drilling Program
Texas A&M University
1000 Discovery Drive
College Station TX 77845-9547
USA
miller@odpemail.tamu.edu

Ryuji Asada
Microbiologist
Department of Earth Sciences
Kanazawa University
Kakuma, Kanazawa
Ishikawa Prefecture 920-1192
Japan
rasada@kenroku.kanazawa-u.ac.jp

*Addresses at time of cruise, except where updated by the leg participants before publication.

Wolfgang Bach
Petrologist
Department of Marine Chemistry and Geochemistry
Woods Hole Oceanographic Institution
360 Woods Hole Road, Mail Stop #8
Woods Hole MA 02543
USA
wbach@whoi.edu

Anne C.M. Bartetzko
Logging Staff Scientist
Angewandte Geophysik
RWTH Aachen
Lochnerstrasse 4-20
52056 Aachen
Germany
A.Bartetzko@geophysik.rwth-aachen.de

Liane G. Benning
Geochemist
School of Earth Sciences
University of Leeds
Leeds LS2 9JT
United Kingdom
liane@earth.leeds.ac.uk

Terje Bjerkgård
Petrologist/Structural Geologist
Mineral Resources Division
Geological Survey of Norway
Leiv Eirikssons Vei 39
N-7491 Trondheim
Norway
terje.bjerkgard@ngu.no

Lizet Brokner Christiansen
Physical Properties Specialist
Department of Earth and Planetary Sciences
Johns Hopkins University
3400 North Charles Street
Baltimore MD 21218
USA
lizet@jhu.edu

Erika R. Elswick
Geochemist
Department of Geological Sciences
Indiana University
1001 East 10th Street
Bloomington IN 47405
USA
eelswick@indiana.edu

Robert Findlay
Science Observer/Structural Geologist
Geological Survey of Papua New Guinea
Department of Mining
Private Bag
Port Moresby National Capital District
Port Moresby
Papua New Guinea
director@daltron.com.pg

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

Hiroyuki Kimura
Microbiologist
Graduate School of Biosphere Sciences
Hiroshima University
1-4-4 Kagamiyama
Higashi-Hiroshima, Hiroshima 739-8528
Japan
hirok@hiroshima-u.ac.jp

John B. Kulange
Science Observer/Sulfide Petrologist
Geology Department
University of Papua New Guinea
PO Box 414, University
N.C.D.
Papua New Guinea
kulange@yahoo.com

Klas S. Lackschewitz
Sedimentologist
Fachbereich Geowissenschaften
Universität Bremen
Postfach 330440
28334 Bremen
Germany
klacksch@uni-bremen.de

Sang-Mook Lee
Paleomagnetist
Deep-Sea Research Center
Korea Ocean Research and Development Institute
Ansan PO Box 29
Seoul 425-600
Korea
smlee@kordi.re.kr

Andrew Masta
Science Observer/Microbiologist
Division of Biochemistry and Molecular Biology
School of Medicine and Health Sciences
University of Papua New Guinea
PO Box 5623
Boroko
Papua New Guinea
mastaany@upng.ac.pg

Holger Paulick
Petrologist
Institut für Mineralogie
Technische Universität Bergakademie Freiberg
Lehrstuhl für Lagerstättenlehre
Brennhausgasse 14
09599 Freiberg
Germany
holger.paulick@mineral.tu-freiberg.de

Álvaro M. Pinto
Sulfide Petrologist
Departamento de Geologia
Universidade de Lisboa
Edificio C2, Piso 5
Campo Grande
1749-016 Lisboa
Portugal
alvaro-pinto@clix.pt or
alvaro.pinto@somimcor.pt

Stephen Roberts
Sulfide Petrologist
School of Ocean and Earth Sciences
University of Southampton
Southampton SO14 3ZH
United Kingdom
sr1@mail.soc.soton.ac.uk

Steven D. Scott
Sulfide Petrologist
Department of Geology
University of Toronto
22 Russell Street
Toronto ON M5S 3B1
Canada
scottsd@geology.utoronto.ca

David A. Vanko
Igneous Petrologist
Department of Geology
Georgia State University
24 Peachtree Center Avenue
Atlanta GA 30303
USA
dvanko@gsu.edu

Ian Warden
Science Observer/Sulfide Petrologist
Nautilus Minerals Corporation
397 Liverpool Street
Darlinghurst NSW 2010
Australia
rosswarden@ozemail.com.au

Christopher J. Yeats
Sulfide Petrologist
CSIRO
Division of Exploration and Mining
PO Box 136
North Ryde NSW 1670
Australia
chris.yeats@dem.csiro.au

Transocean Sedco Forex 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

Observers

Teruyuki Koyama
Japan Drilling Co., Ltd.

Ian Warden
Nautalis Minerals Corporation

Shipboard Personnel and Technical Representatives

John W. Beck
Marine Laboratory Specialist (Photography)

Christopher Bodley
Information Services Representative

Melissa Boyd
Marine Laboratory Specialist (Core)

John Davis
Marine Computer Specialist

Charles Endris
Marine Laboratory Specialist (Paleomagnetism)

Randy Gjesvold
Marine Electronics Specialist

Dennis Graham
Marine Laboratory Specialist (Chemistry)

Gus Gustafson
Marine Laboratory Specialist
(Downhole Tools/Thin Section)

Burney Hamlin
Laboratory Officer

Michiko Hitchcox
Marine Laboratory Specialist (Yeoperson)

G. Leon Holloway
Development Engineer

Jessica Huckemeyer
Marine Laboratory Specialist (Curation)

Maniko Kamei
Marine Laboratory Specialist (X-Ray)

Jurie Kotze
Marine Electronics Specialist

Anastasia Ledwon
Marine Laboratory Specialist
(Physical Properties)

Robert Olivas
Marine Laboratory Specialist (X-Ray)

Chieh Peng
Marine Laboratory Specialist
(Chemistry/Storekeeping)

Patrick Riley
Marine Laboratory Specialist
(Microbiology/Core)

Michael A. Storms
Operations Manager

Anthony Strahan
Anadrill Engineer

Toshikatsu Sugawara
Marine Laboratory Specialist (Core)

Kerry Swain
Schlumberger Logging Engineer

Yusuke Yano
Industry Observer

Taras Olijnyk
SDS Digger Tools Engineer
(7 November–14 December 2000)

Rick Goebel
SDS Digger Tools Engineer
(14 December 2000–3 January 2001)

ODP Publications Staff*

Karen Benson
Production Editor

Mary Chapman
Editor

Gudelia ("Gigi") Delgado
Senior Publications Coordinator

Patrick H. Edwards
Production Editor

Edward W. Flax
Student Assistant

Jaime A. Gracia
Senior Production Editor

Mendy A. Harrison
Assistant Editor

Ann Klaus
Publication Services Manager

Kathryn M. Kozelsky
Graphic Designer

Jennie L. Lamb
Graphic Designer

Nancy H. Luedke
Graphic Designer

Krista L. May
Editor

Amy McLeod
Student Assistant

Angeline T. Miller
Senior Editor

Mary Elizabeth Mitchell
Publications Coordinator Assistant

Heather M. Nevill
Editor

Deborah L. Partain
Senior Graphic Designer

Lorri L. Peters
Editor

Katerina E. Petronotis
WWW Administrator

M. Kathleen Phillips
Publications Specialist

Jennifer Pattison Rumford
Electronic Publications Specialist

Kenneth Sherar
Production Editor

Ann Yeager
Distribution Specialist

*At time of publication.

Acknowledgments

The Ocean Drilling Program (ODP) Leg 193 Science Party wishes to thank the numerous people and institutions that contributed to this exceptionally successful scientific expedition. We are particularly grateful to the crew of the *JOIDES Resolution,* under the supervision of Captain Tom Hardy and Drilling Superintendent Wayne Malone. The ODP science technicians, led by Burney Hamlin, were outstanding and indefatigable in their tasks of curating core, operating laboratories and services, and helping us in every way possible. We were extremely impressed with the degree of involvement shown by everyone aboard the *JOIDES Resolution* in ensuring the ultimate achievement of the Leg 193 scientific objectives.

The operations were carefully planned and conducted under the guidance of Operations Manager Mike Storms. This was no easy task during Leg 193—we anticipated numerous technical challenges and overcame them through the effort, will, and initiative shown by engineers and crew from ODP, Transocean Sedco Forex, Schlumberger, Anadrill, and SDS Digger Tools.

We are also most grateful to the JOIDES organization, to ODP management at Texas A&M University, and to the administrative, academic, and research institutions from the many countries involved that provided the financial and logistical means to prepare and complete this venture and that conducted the prior scientific work on which our leg was founded. We thank the government of Papua New Guinea for approving Leg 193 drilling in the country's territorial waters. Finally, we acknowledge the skills and patience of the ODP Publication Services personnel, whose services were invaluable in presenting our initial results in this volume.

CD-ROM Contents: Chapters

CD-ROM Contents: Core Descriptions

Visual core descriptions (VCDs); thin-section data tables; igneous, alteration, sulfide, and structural logs; structural descriptions; digital core images; and photomicrograph logs and photomicrographs are included in this section. To reduce download times, core description data are separated into two PDF files for both Site 1188 and Site 1189. In addition to split-core images, selected whole-core images are presented for Site 1188 and selected digital close-up images are presented for Sites 1188 and 1189. The photomicrograph log (**PHOTOLOG.PDF**) can be found in the PHOTOMIC directory.

Site 1188

Visual Core Descriptions · **Thin Sections** · **Igneous Log** · **Alteration Log** · **Sulfide Log** · **Structural Log** · **Structural Geology Descriptions**

Site 1189

Visual Core Descriptions · **Thin Sections** · **Igneous Log** · **Alteration Log** · **Sulfide Log** · **Structural Log** · **Structural Geology Descriptions**

Site 1190

Visual Core Descriptions · **Thin Sections** · **Igneous Log** · **Alteration Log**

Site 1191

Visual Core Descriptions · **Thin Sections** · **Igneous Log** · **Alteration Log** · **Structural Log** · **Structural Geology Descriptions**

CD-ROM Contents: Supplementary Material

This CD-ROM contains author-prepared supplementary material that was prepared during Leg 193 but not cited in the *Initial Reports* volume. Supplementary material files must be viewed with appropriate software and are located in the SUPP_MAT directory. A complete listing of the files follows.

Alteration Logs

These Excel 97/98 spreadsheet files contain the alteration logs for Sites 1188, 1189, 1190, and 1191.

ALT_LOGS
- **1188_ALT**
  - **1188AALT.XLS**
  - **1188BALT.XLS**
  - **1188FALT.XLS**
- **1189_ALT**
  - **1189AALT.XLS**
  - **1189BALT.XLS**
- **1190_ALT**
  - **1190AALT.XLS**
  - **1190BALT.XLS**
  - **1190CALT.XLS**
- **1191_ALT**
  - **1191AALT.XLS**

Igneous Logs

These Excel 97/98 spreadsheet files contain the igneous logs for Sites 1188, 1189, 1190, and 1191.

IGN_LOGS
- **1188_IGN**
  - **1188AIGN.XLS**
  - **1188FIGN.XLS**
- **1189_IGN**
  - **1189AIGN.XLS**
  - **1189BIGN.XLS**
- **1190_IGN**
  - **1190AIGN.XLS**
  - **1190BIGN.XLS**
  - **1190CIGN.XLS**
- **1191_IGN**
  - **1191AIGN.XLS**

Structural Logs

These Excel 97/98 spreadsheet files contain the structural logs for Sites 1188, 1189, and 1191.

STR_LOGS
- **1188_STR**
  - **1188ASTR.XLS**
  - **1188BSTR.XLS**
  - **1188FSTR.XLS**
- **1189_STR**
  - **1189ASTR.XLS**
  - **1189BSTR.XLS**
- **1191_STR**
  - **1191ASTR.XLS**

Sulfide Logs

These Excel 97/98 spreadsheet files contain the sulfide logs for Sites 1188 and 1189.

SUL_LOGS
- **1188_SUL**
  - **1188ASUL.XLS**
- **1189_SUL**
  - **1189ASUL.XLS**
  - **1189BSUL.XLS**

PIMA Data

The PIMA data files are in ASCII format and contain files for Sites 1188, 1189, and 1191.

PIMADATA
- **1188PIMA**
  - **1188A00A.TXT through 1188A00C.TXT**
  - **1188A001.TXT through 1188A126.TXT**
  - **1188B002.TXT**
  - **1188B005.TXT**
  - **1188F001.TXT through 1188F014.TXT**
  - **1188F016.TXT through 1188F252.TXT**
- **1189PIMA**
  - **1189A001.TXT through 1189A061.TXT**
  - **1189A063.TXT**
- **1191PIMA**
  - **1191A001.TXT through 1191A017.TXT**
- **PIMALOG.TXT**
- **README.TXT**

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 193 Site Map

ODP Map (Legs 100–193)

DSDP Map (Legs 1–96)

Related CD-ROM Material

Downhole Logging and Core Data

A second CD-ROM is included with this volume. The "Log and Core Data" CD contains Leg 193 depth-shifted and processed downhole logging data and shipboard core logging data (moisture and density, magnetic susceptibility, and natural gamma radiation). The downhole logging data are provided by the Borehole Research Group at the Lamont-Doherty Earth Observatory, Wireline Logging Operator for ODP.

Most of the logging and core data included on this CD are available on the World Wide Web at **www.ldeo.columbia.edu/BRG/ODP.** If you cannot access this site or want to order the CD, please contact the ODP Logging Services Operator at the Lamont-Doherty Earth Observatory, Columbia University, Route 9W, Palisades NY 10964, USA; Tel: (845) 365-8341; Fax: (845) 365-3182; E-mail: **borehole@ldeo.columbia.edu.**

The majority of the core data on the CD are available on the Web at **www-odp.tamu.edu/database.** If you cannot access the ODP database or need additional data, please contact: ODP Data Librarian, Ocean Drilling Program, Texas A&M University, 1000 Discovery Drive, College Station TX 77845-9547, USA; Tel: (979) 845-8495; Fax: (979) 458-1617; E-mail: **database@odpemail.tamu.edu.**

Compiled Electronic Index

The Compiled Electronic Index of the *Proceedings of the Ocean Drilling Program* included on the volume CD-ROM contains individual indexes of Volumes 101–173 and 174B. 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.

CD-ROM Directory Structure

- **193IR.PDF** (Preliminary pages and table of contents)
- **README.PDF** (Information about the volume CD-ROM)
- **README.TXT** (Information about the volume CD-ROM in ASCII format)
- **ACROREAD** (Acrobat Reader 4.0.5 installation software and instructions for different platforms)
  - **MAC**
  - **WINDOWS**
  - **UNIX**
  - **README.TXT**
- **MAPS** (Drilling location maps)
  - **193_MAP.PDF** (Leg 193 site map)
  - **ODPMAP.PDF** (ODP map, Legs 100 through 193)
  - **DSDPMAP.PDF** (DSDP map, Legs 1 through 96)
- **VOLUME** (Leg 193 *Initial Reports* volume)
  - **CHAPTERS** (Volume chapters)
    - **IR193_01.PDF** (Leg 193 Summary)
    - **IR193_02.PDF** (Explanatory Notes)
    - **IR193_03.PDF** (Site 1188)
    - **IR193_04.PDF** (Site 1189)
    - **IR193_05.PDF** (Site 1190)
    - **IR193_06.PDF** (Site 1191)
  - **CORES** (Visual core descriptions; thin-section data tables; igneous, alteration, sulfide, and structural logs; structural descriptions; digital core images; photomicrographs; and photomicrograph log)
    - **1COR1188.PDF** (Site 1188, Part 1)
    - **2COR1188.PDF** (Site 1188, Part 2)
    - **1COR1189.PDF** (Site 1189, Part 1)
    - **2COR1189.PDF** (Site 1189, Part 2)
    - **COR_1190.PDF** (Site 1190)
    - **COR_1191.PDF** (Site 1191)
    - **IMAGES** (PDF files of core images)
    - **PHOTOMIC** (PDF files of photomicrographs)
  - **INDEX.PDX** (Acrobat file used to enable Acrobat Search of the Leg 193 *Initial Reports*)
- **SUPP_MAT** (Supplementary material)
  - **ALT_LOGS** (Alteration logs in Microsoft Excel 97/98 format)
    - **1188_ALT** (Site 1188 data)
    - **1189_ALT** (Site 1189 data)
    - **1190_ALT** (Site 1190 data)
    - **1191_ALT** (Site 1191 data)
  - **IGN_LOGS** (Igneous logs in Microsoft Excel 97/98 format)
    - **1188_IGN** (Site 1188 data)
    - **1189_IGN** (Site 1189 data)
    - **1190_IGN** (Site 1190 data)
    - **1191_IGN** (Site 1191 data)
  - **STR_LOGS** (Structural logs in Microsoft Excel 97/98 format)
    - **1188_STR** (Site 1188 data)
    - **1189_STR** (Site 1189 data)
    - **1191_STR** (Site 1191 data)
  - **SUL_LOGS** (Sulfide logs in Microsoft Excel 97/98 format)
    - **1188_SUL** (Site 1188 data)
    - **1189_SUL** (Site 1189 data)

(Continued on next page)

CD-ROM Directory Structure (continued)