

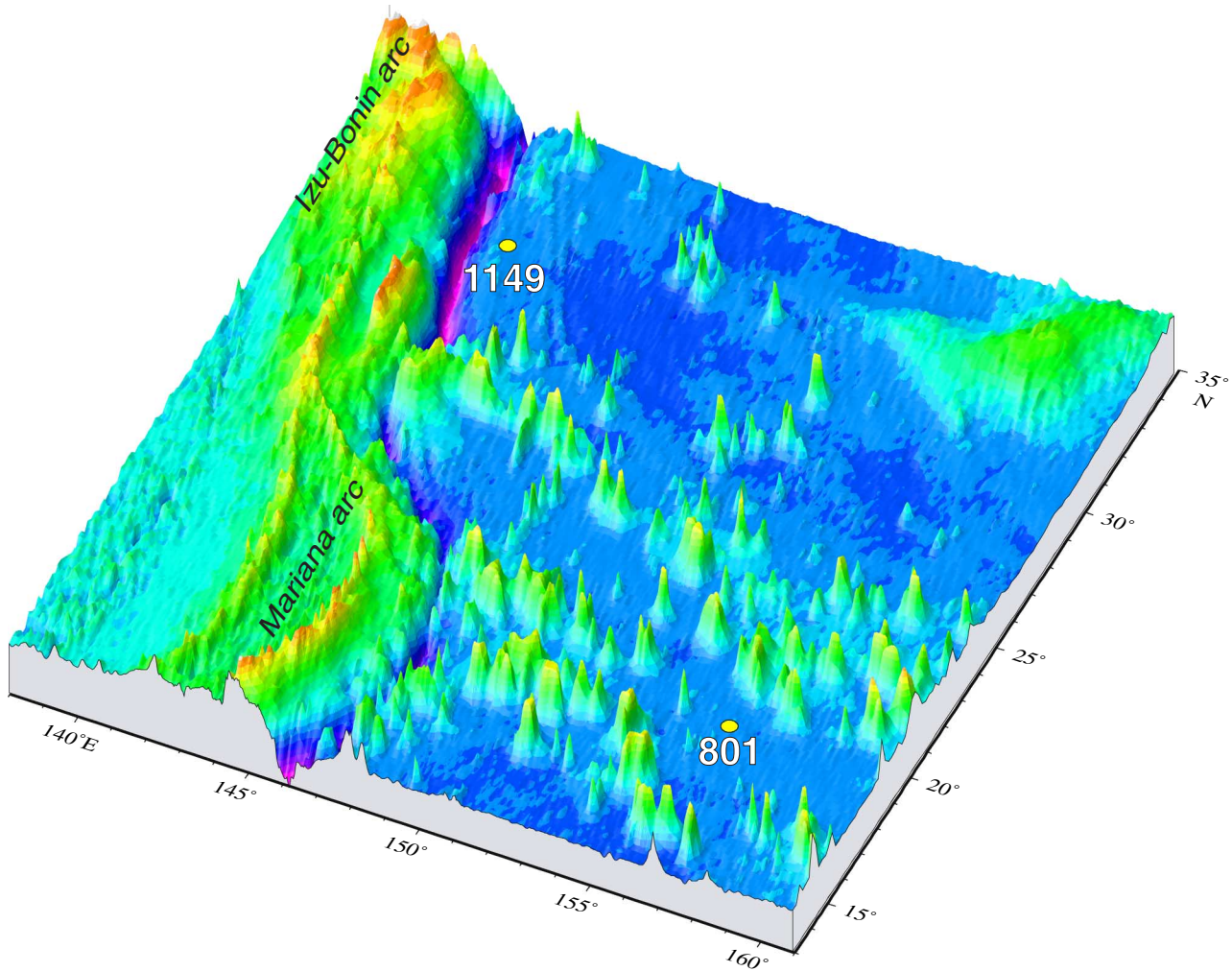


VOLUME 185
INITIAL REPORTS

SITES 801 AND 1149
IZU-MARIANA MARGIN

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. Bathymetric map of Leg 185 study area showing proximity of site locations to the Izu-Bonin and Mariana arc systems.

PROCEEDINGS OF THE OCEAN DRILLING PROGRAM

Volume 185

Initial Reports

Izu-Mariana Margin

Covering Leg 185 of the cruises of the Drilling Vessel *JOIDES Resolution*

Hong Kong, People's Republic of China, to Yokohama, Japan

Sites 801 and 1149

12 April–14 June 1999

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

Printed booklet citation for Chapter 1:

Shipboard Scientific Party, 2000. Leg 185 summary: inputs to the Izu-Mariana subduction system. *In* Plank, T., Ludden, J.N., Escutia, C., et al., *Proc. ODP, Init. Repts.*, 185: College Station TX (Ocean Drilling Program), 1–63.

CD-ROM volume citation:

Plank, T., Ludden, J.N., Escutia, C., et al., 2000. *Proc. ODP, Init. Repts.*, 185 [CD-ROM]. Available from: Ocean Drilling Program, Texas A&M University, College Station TX 77845-9547, USA.

CD-ROM chapter citation:

Shipboard Scientific Party, 2000. Site 801. *In* Plank, T., Ludden, J.N., Escutia, C., et al., *Proc. ODP, Init. Repts.*, 185, 1–222 [CD-ROM]. Available from: Ocean Drilling Program, Texas A&M University, College Station TX 77845-9547, USA.

WWW volume citation:

Plank, T., Ludden, J.N., Escutia, C., et al., 2000. *Proc. ODP, Init. Repts.*, 185 [Online]. Available from World Wide Web: <http://www-odp.tamu.edu/publications/185_IR/185ir.htm>. [Cited YYYY-MM-DD]

WWW PDF chapter citation:

Shipboard Scientific Party, 2000. Site 801. *In* Plank, T., Ludden, J.N., Escutia, C., et al., *Proc. ODP, Init. Repts.*, 185, 1–222 [Online]. Available from World Wide Web: <http://www-odp.tamu.edu/publications/185_IR/VOLUME/CHAPTERS/IR185_03.PDF>. [Cited YYYY-MM-DD]

WWW HTML chapter citation:

Shipboard Scientific Party, 2000. Site 801. *In* Plank, T., Ludden, J.N., Escutia, C., et al., *Proc. ODP, Init. Repts.*, 185 [Online]. Available from World Wide Web: <http://www-odp.tamu.edu/publications/185_IR/chap_03/chap_03.htm>. [Cited YYYY-MM-DD]

ISSN

Printed booklet: 0884-5883; CD-ROM volume: 1096-2522; World Wide Web volume: 1096-2158
Library of Congress 87-642-462

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 2000

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

Volume 182 (*Initial Reports*): February 2000

Volume 183 (*Initial Reports*): March 2000

Volume 184 (*Initial Reports*): April 2000

Volume 164 (*Scientific Results*): January 2000

Volume 165 (*Scientific Results*): February 2000

Volume 166 (*Scientific Results*): May 2000

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.

PUBLISHER'S NOTES

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, 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 in PDF format.

Beginning with *Initial Reports* Volume 176 and *Scientific Results* Volume 169, all *Proceedings* volumes will be published on CD-ROM and the World Wide Web at www-odp.tamu.edu/publications.

Initial Reports

Book: ISSN 0884-5883

CD-ROM: ISSN 1096-2522

WWW: ISSN 1096-2158

Scientific Results

Book: ISSN 0884-5891

CD-ROM: ISSN 1096-2514

WWW: ISSN 1096-7451

Site map was produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith (imina.soest.hawaii.edu/gmt/). Cover photograph is from Leg 185, the derrick of the *JOIDES Resolution* at dawn by ODP Photographer Roy Davis.

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.

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 seven 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 eleven 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 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.

James D. Watkins
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*At time of publication. See [Publisher's Notes](#), p. 6, 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.

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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)

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ACKNOWLEDGMENTS

Drilling the seafloor to study subduction requires a leap of faith. It takes a firm belief in the plate tectonic cycle to commit to spending two months drilling deep crust in the western Pacific in order to learn something about mantle processes and arc volcanism hundreds of kilometers away. It was not easy to argue the case for drilling to the JOIDES panels over more than ten years when various versions of the “geochemical reference site” proposals were evaluated. Nonetheless, early comparisons to the function of milk-producing farm animals gave way to serious consideration of the recycling of crustal material at subduction zones. This change in thinking came about slowly, after geophysical and geochemical evidence pointed to the lack of accretionary prisms at some margins and the presence of rare cosmogenic isotopes and other chemical tracers of recycled crust in some volcanic arcs. We acknowledge all of the scientists and members of the JOIDES panels who argued in favor of using ocean drilling to study the Subduction Factory.

We thank several people for contributions to the proposals that led to Leg 185: Charlie Langmuir and Jim Natland for the original geochemical reference site idea; Jim Gill for resuscitating the idea; Sherm Bloomer for early guidance through the JOIDES review process; John Diebold for help in accessing seismic profiles; and the other proponents on the proposals who did not participate in the cruise: Tim Elliott, Bob Stern, Julie Morris, and Peter Floyd. Thanks to the members of the Biosphere PPG and others who played a critical role in developing the successful microbiology effort during Leg 185.

Drilling predominantly basalt and chert in almost 6000 m of water is a challenging proposition. The drilling operation during Leg 185, however, exceeded our best expectations. This was entirely due to the experience and dedication of the Sedco engineers, technicians, and drillers, under Drilling Superintendent Scott Pederson, and the ODP operations under Operations Manager Glen Foss. The ODP technicians, supervised by Laboratory Officer Burney Hamlin, were professional and very capable

in their handling, processing, and analyzing the core material. We thank Captain Tom Ribbens and the entire ship's crew for ensuring the success of Leg 185.

Finally, we thank all the ODP staff at Texas A&M University for their help in preparing for the cruise and arranging port-call activities, for their support during the cruise, and for their diligence in publishing the postcruise reports.

CD-ROM CONTENTS: CHAPTERS

1. Leg 185 Summary: Inputs to the Izu-Mariana Subduction System
2. Explanatory Notes
3. Site 801
4. Site 1149

CD-ROM CONTENTS: CORE DESCRIPTIONS

Visual core descriptions (VCDs), smear-slide data tables, thin sections, alteration logs, vein logs, and digital images are included in this section. VCDs, smear-slide data tables, thin sections, alteration logs, and vein logs are combined into one PDF file for each site. ASCII versions of the smear-slide data tables, alteration logs, and vein logs are also available (see "[ASCII Tables](#)").

Site 801

[Visual Core Descriptions](#) · [Thin Sections](#) · [Alteration Logs](#) · [Vein Logs](#)

Site 1149

[Visual Core Descriptions](#) · [Smear Slides](#) · [Thin Sections](#) · [Alteration Logs](#) · [Vein Logs](#)

CD-ROM CONTENTS: ASCII TABLES

This CD-ROM contains ASCII versions of some of the **data tables** presented in the volume chapters and all of the **smear-slide data tables**, **alteration logs**, and **vein logs** presented in the Core Descriptions section. A complete listing of the ASCII data tables can be found on the next three pages.

You can access these data directly from the PDF files. Depending on your computer platform, the following information applies.

PC COMPUTERS

By default, clicking on a filename with a .TXT extension will launch the Notepad application. You can configure your computer's operating system so that files on this CD with .TXT extensions automatically open in other software, such as Microsoft Excel. Follow these steps from the pull-down menu: Windows 95 and NT operating systems: View > Options > File Types; and Windows 98 systems: View > Folder Options > File Types.

MAC COMPUTERS

All table files with .TXT extensions will automatically open into Excel. If you do not have Excel installed on your computer, you may view these files through other spreadsheet or text-editor programs. Open the application of your choice, select File > Open, and open the ASCII file.

UNIX COMPUTERS

You can open files with .TXT extensions in any text editor or spreadsheet program, but not directly from PDF files.

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Chapter 4

Smear-Slide Data Tables
Alteration Logs

Vein Logs

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- Table T17.** Average wet bulk density, porosity, and velocity of each lithologic unit and each lithology, calculated from discrete sample measurements.
- Table T18.** Compressional wave velocity measured on split cores and discrete samples.
- Table T19.** Thermal conductivity values, Holes 1149A, 1149B, 1149C, and 1149D.
- Table T20.** Shear strength, Hole 1149A.
- Table T21.** List of samples taken for microbiological analysis, Site 1149.
- Table T22.** Results of perfluorocarbon tracer tests, Site 1149.

Table T23. Sediment samples used for fluorescent microsphere tests.

Smear-Slide Data Tables

Site 1149 smear-slide table.

Alteration Logs

Alteration log for Hole 801C.

Alteration log for Hole 1149B.

Alteration log for Hole 1149C.

Alteration log for Hole 1149D.

Vein Logs

Vein log for Hole 801C.

Vein logs for Holes 1149B, 1149C, and 1149D.

CD-ROM CONTENTS: TECHNICAL NOTE

This CD-ROM includes a reprint of *ODP Technical Note 28*, "Methods for Quantifying Potential Microbial Contamination during Deep Ocean Coring," by D.C. Smith, A.J. Spivack, M.R. Fisk, S.A. Haveman, H. Staudigel, and the Leg 185 Shipboard Scientific Party.

Technical Note 28 presents details of two tracer methods used to quantify the amount of contamination that potentially may be introduced into the recovered core material during coring. The tracer experiments involve the delivery of both chemical and particulate tracers during drilling and their quantification in the ODP cores.

CD-ROM CONTENTS: SUPPLEMENTARY MATERIALS

These are supplementary data files presented in Adobe Acrobat PDF files and Microsoft Excel version 97/98 spreadsheets and are located in the SUPP_MAT directory.

COM_SAMP

This directory contains a summary of the communal and composite samples in a spreadsheet format and core-image plates in PDF format.

801_COM

This directory contains the communal sample table and core images for Site 801.

801_COMM.XLS: Summary of community samples with rock descriptions and type of alteration for Site 801 cores.

PLATES

Digital images of core intervals from Site 801 from which communal samples were taken as described in 801_COMM.XLS.

801_P01.PDF: Images of selected intervals from Cores 185-801B-37R through 41R.

801_P02.PDF: Images of selected intervals from Cores 185-801C-49M through 52M.

801_P03.PDF: Images of selected intervals from Cores 185-801B-41R through 43R.

801_P04.PDF: Images of selected intervals from Cores 185-801B-43R through 801C-1R.

801_P05.PDF: Images of selected intervals from Cores 185-801C-1R through 2R.

- 801_P06.PDF:** Images of selected intervals from Core 185-801C-4R.
801_P07.PDF: Images of selected intervals from Core 185-801C-5R.
801_P08.PDF: Images of selected intervals from Cores 185-801C-5R through 6R.
801_P09.PDF: Images of selected intervals from Cores 185-801C-6R through 7R.
801_P10.PDF: Images of selected intervals from Cores 185-801C-8R through 10R.
801_P11.PDF: Images of selected intervals from Cores 185-801C-11R through 12R.
801_P12.PDF: Images of selected intervals from Core 185-801C-12R.
801_P13.PDF: Images of selected intervals from Cores 185-801C-14R through 16R.
801_P14.PDF: Images of selected intervals from Cores 185-801C-16R through 21R.
801_P15.PDF: Images of selected intervals from Cores 185-801C-21R through 28R.
801_P16.PDF: Images of selected intervals from Cores 185-801C-28R through 34R.
801_P17.PDF: Images of selected intervals from Cores 185-801C-34R through 38R.
801_P18.PDF: Images of selected intervals from Cores 185-801C-39R through 46R.

1149_COM

This directory contains the communal sample table and core images for Site 1149.

1149COMM.XLS: Summary of community samples with rock descriptions and type of alteration for Site 1149 cores.

PLATES

Digital images of core intervals from Site 1149 from which communal samples were taken as described in 1149COMM.XLS.

- 1149B_B.PDF:** Images of selected basement intervals from Cores 185-1149B-30R through 32R.
- 1149B_S.PDF:** Images of selected basement intervals from Core 185-1149B-29R.
- 1149C_SB.PDF:** Images of selected basement intervals from Cores 185-1149C-8R through 11R.
- 1149D_B1.PDF:** Images of selected basement intervals from Cores 185-1149D-5R through 8R.
- 1149D_B2.PDF:** Images of selected basement intervals from Cores 185-1149D-8R through 11R.
- 1149D_B3.PDF:** Images of selected basement intervals from Cores 185-1149D-11R through 16R.
- 1149D_B4.PDF:** Images of selected basement intervals from Cores 185-1149D-17R through 19R.

IGN_MIN

This directory contains igneous mineralogy description logs for Sites 801 and 1149 presented in an Excel spreadsheet format.

801_MIN.XLS: Igneous mineralogy description log for Hole 801C.

1149_MIN.XLS: Igneous mineralogy description log for Hole 1149D.

CD-ROM CONTENTS: DRILLING LOCATIONS 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 185 Site Map

ODP Map (Legs 100–185)

DSDP Map (Legs 1–96)

RELATED LEG DATA

DOWNHOLE LOGGING AND CORE DATA

A second CD-ROM was produced in conjunction with this leg. The Log and Core Data CD contains Leg 185 depth-shifted and processed logging data and ODP core data (shipboard gamma-ray attenuation bulk density, natural gamma radiation, magnetic susceptibility, *P*-wave velocity, and moisture and density). The logging data are provided by the Borehole Research Group at the Lamont-Doherty Earth Observatory (LDEO), ODP Logging Services Operator for ODP.

The majority of the logging data included on the 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: ODP Logging Services Operator, Lamont-Doherty Earth Observatory, PO Box 1000, Route 9W, Palisades NY 10964, USA; Tel: (914) 365-8672; Fax: (914) 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.

CD-ROM DIRECTORY STRUCTURE

185IR.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 installation software and instructions for different platforms)	4.0	MAC
		WINDOWS
		UNIX
	README.TXT	
MAPS (Drilling locations maps)	185_MAP.PDF (Leg 185 site map)	
	ODPMAP.PDF (ODP map, Legs 100 through 185)	
	DSDPMAP.PDF (DSDP map, Legs 1 through 96)	
VOLUME (Leg 185 <i>Initial Reports</i> volume)	CHAPTERS (Volume chapters)	IR185_01.PDF (Leg 185 Summary)
		IR185_02.PDF (Explanatory Notes)
		IR185_03.PDF (Site 801)
		IR185_04.PDF (Site 1149)
	CORES (Visual core descriptions, smear-slide data tables, thin-section tables, alteration logs, vein logs, and digital core images)	COR_801.PDF (Site 801)
		COR_1149.PDF (Site 1149)
		IMAGES (PDF files of core images)
	TABLES (Tables in ASCII format of coring summaries, igneous core descriptions, volcanic glass, primary mineralogy, XRF analyses, vein types, index properties, <i>P</i> -wave velocities, thermal conductivity, water chemistry, microbiological analyses, smear slides, alteration logs, and vein logs)	IR185_03 (Site 801 files)
		IR185_04 (Site 1149 files)
		S_SLIDES (Smear slides for Site 1149)
ALT_LOG (Alteration logs for Sites 801 and 1149)		
VEIN_LOG (Vein logs for Sites 801 and 1149)		
README.TXT		
	INDEX.PDX (Acrobat file used to enable Acrobat Search of the Leg 185 <i>Initial Reports</i>)	
TECHNOTE (ODP Technical Note 28)	TNOTE_28.PDF (Methods for Quantifying Potential Microbial Contamination during Deep Ocean Coring)	
	README.TXT	
SUPP_MAT (Supplementary materials)	COM_SAMP (Summary tables of communal and composite samples in Microsoft Excel 97/98 format and digital images of selected core samples in PDF format)	801_COM (Table and core images for Site 801)
		1149_COM (Table and core images for Site 1149)
	IGN_MIN (Igneous mineralogy descriptions in Microsoft Excel 97/98 format)	801_MIN.XLS (Site 801)
		1149_MIN.XLS (Site 1149)
	README.TXT	
ODPINDEX (Compiled Electronic Index of the <i>Proceedings of the Ocean Drilling Program</i>)	101NDX.PDF through 169SNDX.PDF (Index files)	
	NDX.PDX (Adobe Acrobat file used to enable Acrobat Search of the Compiled Electronic Index)	