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## The Tasmanian Gateway: Cenozoic Climatic and Oceanographic Development

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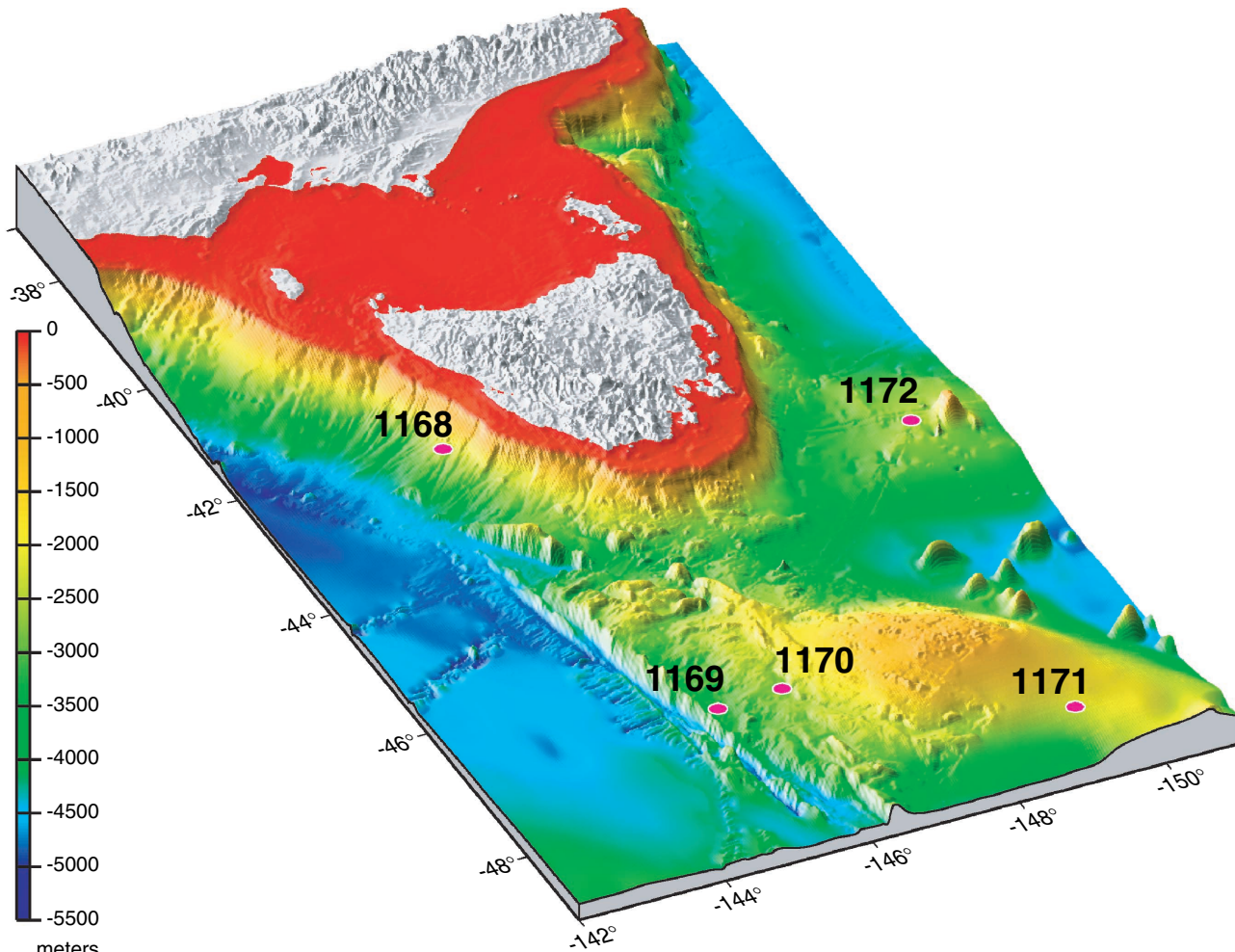
The cover image shows a close-up, high-angle view of a ship's hull, likely a research vessel, as it moves through the water. The hull is dark, and the water is a deep blue. A person is visible on the deck, and the ship's rigging is visible. The text is overlaid on the image.

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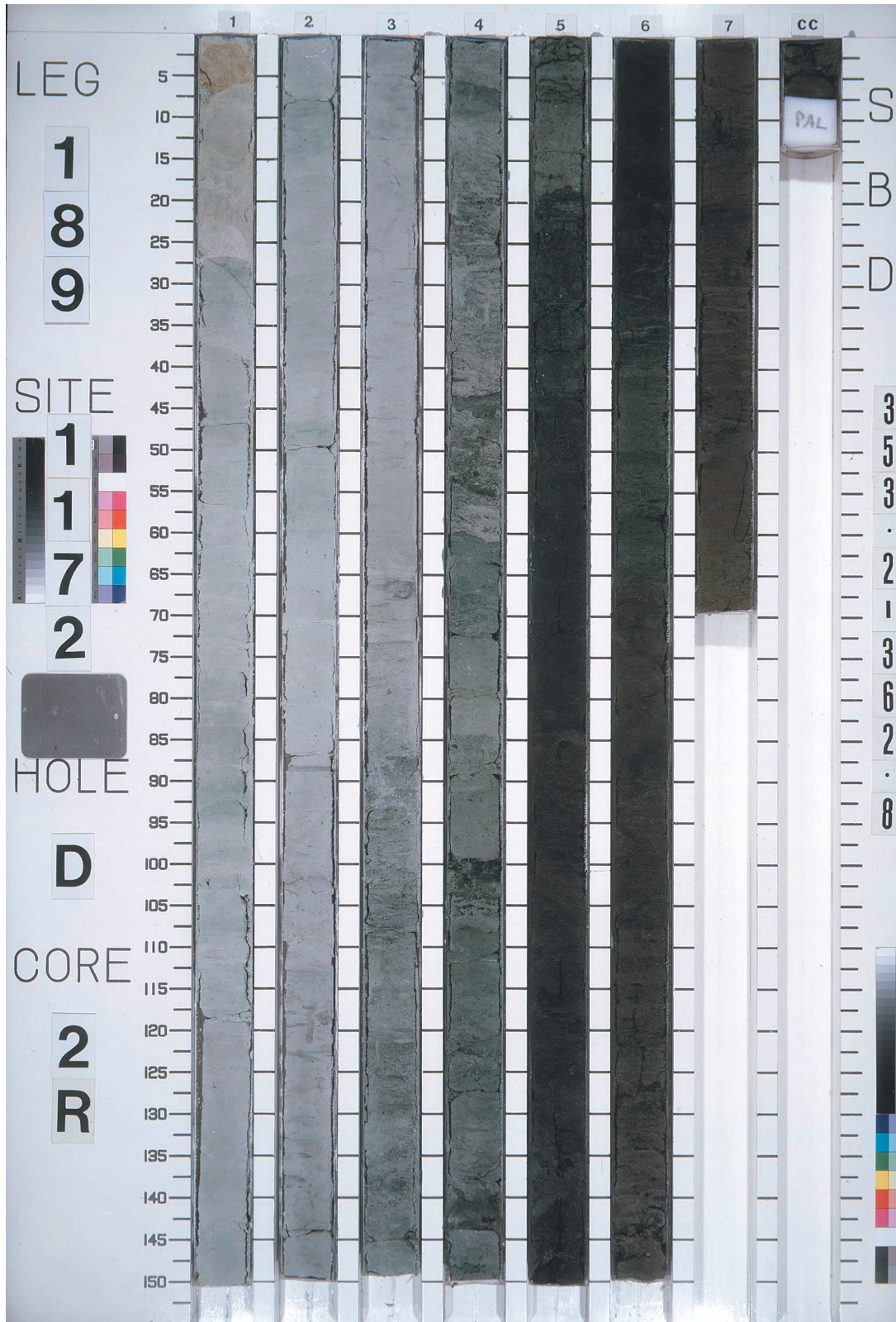
**THE TASMANIAN GATEWAY:  
CENOZOIC CLIMATIC AND  
OCEANOGRAPHIC  
DEVELOPMENT  
SITES 1168–1172**

**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 1.** Relief map showing the setting of all sites drilled during Leg 189. Site 1168 is on the segmented and canyoned western Tasmania margin, Site 1172 is on the isolated east Tasman Plateau, and the other sites are on the South Tasman Rise. Strike-slip motion along the western margin of Tasmania (north northwest-south southeast) is shown by one major fault scarp formed >43 Ma. Similar motion along the western margin of the South Tasman Rise and within the rise (north-south) is shown by several fault scarps formed 43–33 Ma.



**Frontispiece 2.** Leg 189 core across the Eocene/Oligocene boundary on the East Tasman Plateau, showing gray late Eocene mudstones, green latest Eocene glauconitic siltstones, and white early Oligocene chinks. This core summarizes the profound changes that occurred as the Tasmanian Gateway opened.

# PROCEEDINGS OF THE OCEAN DRILLING PROGRAM

Volume 189

Initial Reports

The Tasmanian Gateway: Cenozoic Climatic and  
Oceanographic Development

Covering Leg 189 of the cruises of the Drilling Vessel *JOIDES Resolution*  
Hobart, Tasmania, to Sydney, Australia  
Sites 1168–1172  
11 March–6 May 2000

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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](http://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](mailto:database@odpemail.tamu.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 this CD-ROM in PDF format. These maps were produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith ([imina.soest.hawaii.edu/gmt/](http://imina.soest.hawaii.edu/gmt/)).

Cover photograph is of the *JOIDES Resolution* in Hobart, Tasmania, by ODP Photographer John Beck.

# 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 14 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.

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\*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](http://www.oceandrilling.org).

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## CD-ROM CONTENTS: CHAPTERS

1. Leg 189 Summary
2. Explanatory Notes
3. Site 1168
4. Site 1169
5. Site 1170
6. Site 1171
7. Site 1172

## CD-ROM CONTENTS: APPENDIX

Appendix: Magnetic Experiments

# CD-ROM CONTENTS: CORE DESCRIPTIONS

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

## Site 1168

[Visual Core Descriptions · Smear Slides](#)

## Site 1169

[Visual Core Descriptions · Smear Slides](#)

## Site 1170

[Visual Core Descriptions · Smear Slides](#)

## Site 1171

[Visual Core Descriptions · Smear Slides](#)

## Site 1172

[Visual Core Descriptions · Smear Slides](#)

# CD-ROM CONTENTS: ASCII TABLES

This CD-ROM contains ASCII versions of biostratigraphic **data tables** presented in the volume chapters and **smear-slide data tables** presented under “Core Descriptions.” A complete listing of the ASCII data tables can be found on the next two 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.

**Chapter 3**  
**Chapter 4**

**Chapter 5**  
**Chapter 6**

**Chapter 7**  
**Smear-slide data tables**

**Chapter 3, Site 1168**

**Table T12.** Reliable biostratigraphic events identified, Site 1168.

**Chapter 4, Site 1169**

**Table T7.** Combined bioevents used for the age model, Site 1169A.

**Chapter 5, Site 1170**

**Table T13.** Biostratigraphic events, Site 1170.

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**Table T13.** Biostratigraphic events identified, Site 1171.

**Chapter 7, Site 1172**

**Table T11.** Selected dinocyst datums, Holes 1172A and 1172D.

**Smear-Slide Data Tables**

**Hole 1168A** smear-slide table.

**Hole 1168B** smear-slide table.

**Hole 1168C** smear-slide table.

**Site 1169** smear-slide table.

**Site 1170** smear-slide table.

**Hole 1171A** smear-slide table.

**Hole 1171B** smear-slide table.

**Hole 1171C** smear-slide table.

**Hole 1171D** smear-slide table.

**Hole 1172A** smear-slide table.

**Hole 1172B** smear-slide table.

**Hole 1172C** smear-slide table.

**Hole 1172D** smear-slide table.

# 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 189 Site Map**

**ODP Map** (Legs 100–189)

**DSDP Map** (Legs 1–96)

## RELATED LEG DATA

### DOWNHOLE LOGGING AND CORE DATA

A second CD-ROM is included with this volume. The “Log and Core Data” CD contains Leg 189 depth-shifted and processed downhole logging data and shipboard core logging data (gamma-ray attenuation bulk density, natural gamma radiation, magnetic susceptibility, color reflectance, and moisture and density). The downhole logging data are provided by the Borehole Research Group at the Lamont-Doherty Earth Observatory, Wireline Logging 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](http://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, Route 9W, Palisades NY 10964, USA; Tel: (845) 365-8341; Fax: (845) 365-3182; E-mail: [borehole@ldeo.columbia.edu](mailto:borehole@ldeo.columbia.edu).

The majority of the core data on the CD are available on the Web at [www-odp.tamu.edu/database](http://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](mailto:database@odpemail.tamu.edu).

## COMPILED ELECTRONIC INDEX

The Compiled Electronic Index of the *Proceedings of the Ocean Drilling Program* included on the *Initial Reports* CD-ROM contains individual indexes of Volumes 101–171B. 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

<b>189IR.PDF</b> (Preliminary pages and table of contents)		
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<b>README.TXT</b> (Information about the volume CD-ROM in ASCII format)		
<b>ACROREAD</b> (Acrobat Reader 4.0.5 installation software and instructions for different platforms)	<b>MAC</b>	
	<b>WINDOWS</b>	
	<b>UNIX</b>	
	<b>README.TXT</b>	
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		<b>IR189_03.PDF</b> (Site 1168)
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		<b>IR189_05.PDF</b> (Site 1170)
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	<b>APPENDIX</b> (Volume appendix)	<b>MAG_EXP.PDF</b> (Magnetic Experiments)
	<b>CORES</b> (Visual core descriptions, smear-slide data tables, and digital core images)	<b>COR_1168.PDF</b> (Site 1168)
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		<b>COR_1170.PDF</b> (Site 1170)
		<b>COR_1171.PDF</b> (Site 1171)
		<b>COR_1172.PDF</b> (Site 1172)
		<b>IMAGES</b> (PDF files of core images)
	<b>TABLES</b> (Selected tables in ASCII format of biostratigraphic event and smear-slide data)	<b>IR189_03</b> (Site 1168 files)
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	<b>ODPINDEX</b> (Compiled Electronic Index of the <i>Proceedings of the Ocean Drilling Program</i> )	<b>101NDX.PDF through 171BNDX.PDF</b> (Index files)
<b>NDX.PDX</b> (Acrobat file used to enable Acrobat Search of the Compiled Electronic Index)		