



**PROCEEDINGS OF THE
INTEGRATED OCEAN
DRILLING PROGRAM
VOLUME 311 EXPEDITION REPORTS
CASCADIA MARGIN GAS HYDRATES**

Expedition 311 of the riserless drilling platform
Balboa, Panama, to Victoria, British Columbia (Canada)
Sites U1325–U1329
28 August–28 October 2005

Volume authorship

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and the Expedition 311 Scientists

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Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the participating agencies, Integrated Ocean Drilling Program Management International, Inc. (IODP-MI), or the Integrated Ocean Drilling Program Implementing Organizations.

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

The bulk of the shipboard-collected core data from this expedition is accessible from Integrated Ocean Drilling Program U.S. Implementing Organization (IODP-USIO) Science Services, Texas A&M University (TAMU), at iodp.tamu.edu/database/index.html. If you cannot access this site or need additional data, please contact: Data Librarian, Integrated 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@iodp.tamu.edu

A complete set of the logging data collected by ODP-USIO Science Services, Lamont-Doherty Earth Observatory (LDEO), is available at iodp.ldeo.columbia.edu/DATA/IODP. If you have problems downloading the data, wish to receive additional logging data, or have questions regarding the data, please contact: Database Administrator, Borehole Research Group, Lamont-Doherty Earth Observatory of Columbia University, PO Box 1000, 61 Route 9W, Palisades NY 10964, USA. Tel: (845) 365-8343; Fax: (845) 365-3182; E-mail: logdb@ldeo.columbia.edu

Supplemental data were provided by the authors and may not conform to IODP publication formats.

Some close-up core photographs have been tonally enhanced to better illustrate particular features of interest.

Cover photograph is of a Bullseye vent gas hydrate sample (311-U1328B-6X-CC; 21.06 mbsf) taken after storage in liquid N₂. Photograph by Laura Stern of the U.S. Geological Survey, Menlo Park, California.

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Foreword

By Integrated Ocean Drilling Program Management International, Inc.

The Integrated Ocean Drilling Program (IODP) is the most ambitious ocean exploration and drilling program ever undertaken. With multiple platforms and multiple partners, our research spans the globe and truly represents international collaboration and diplomacy among scientists and nations interested in attaining scientific goals.

The *Proceedings* present the scientific and engineering results of IODP drilling projects, each an important component of an international program designed to better understand Earth, its environmental changes and processes, the deep biosphere, and climate change.

The collective effort required to conduct each IODP expedition is colossal. Beginning with scientists who submit ocean drilling research proposals, there are others who evaluate, rank, and prioritize proposals. Scientists also schedule the science operations, select science party members from scores of international scientists qualified to participate, plan platform operations, ready the drillship, and choose borehole locations. There are onboard logistics to manage and critical communications to coordinate among various academic institutions, governments, and national science organizations. And the resulting data must be managed and made accessible to scientists, particularly those who will prepare future proposals. Every aspect of planning an IODP expedition takes a village—or several. There are many participants and many more stakeholders.

Ocean-drilling achievements, however complex, help us understand extraordinary linkages and interpret relationships as they exist in various parts of the Earth system. Achievements in two legacy drilling programs (the Ocean Drilling Program and Deep Sea Drilling Program) have validated the scientific concepts behind plate tectonics, contributed to the understanding of ocean circulation changes, and extended our knowledge of long- and short-term climate change—scientific information at the foundation of our current drilling program.

IODP drilling platform operations are conducted by three Implementing Organizations (IOs). Riserless platform operations are conducted by the JOI Alliance, comprising the Joint Oceanographic Institutions, Inc., Texas A&M University through the Texas A&M Research Foundation, and Lamont-Doherty Earth Observatory of Columbia University. Riser platform operations are conducted by the Japan Agency for Marine-Earth Science and Technology through Japan's Center for Deep Earth Exploration in cooperation with the Center for Advanced Marine Core Research at Kochi University. Mission-specific platform operations are conducted by the European Consortium for Ocean Research Drilling, Science Operator, comprising the British Geological Survey, Bremen University, and the European Petrophysics Consortium. The European IO currently represents the ocean-drilling efforts of 16 nations in Europe, plus Canada. At the start of this drilling project, IODP involved 20 nations.

The discoveries discovered in this volume build upon layers of knowledge and science developed over roughly the last fifty years. Expedition *Proceedings* are published by IODP Management International for IODP under the sponsorship of the U.S. National Science Foundation (NSF), Japan's Ministry of Culture, Education, Sports, Science and Technology, and other IODP members. The material is based upon research supported under Contract OCE-0432224 from NSF.

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*At time of expedition.



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Web site: www.jamstec.go.jp/chikyu/eng/index.html

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Expedition 311 Scientists

Data report: testing and deployment of the APCT-3 tool to determine in situ temperatures while piston coring

M. Heesemann et al.

Gas hydrate on the northern Cascadia margin: regional geophysics and structural framework

M. Riedel et al.

Data report: seismic structure beneath the north Cascadia drilling transect of IODP Expedition 311

M. Sherwath et al.

Core descriptions

Visual core descriptions (VCDs), smear slide data tables, and core and composite infrared digital images are included in this section. VCDs and smear slide data tables are combined into one PDF file for each site. There are also thin sections for three sites.

Site U1325

Composite infrared images · Visual core descriptions · Smear slides

Site U1326

Composite infrared images · Visual core descriptions · Smear slides

Site U1327

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Site U1328

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Site U1329

Composite infrared images · Visual core descriptions · Smear slides · Thin sections



Expedition research results

Data reports

Titles are available in [HTML](#) pending completion of the volume.

Syntheses

Titles are available in [HTML](#) pending completion of the volume.

Supplementary material

Calibration, response, and temperature data for the third-generation advanced piston corer temperature tool are presented in WinTemp ASCII and .LOG formats. See [README.TXT](#) in the SUPP_MAT directory for a full listing of directories and files, or see the [Directory structure](#) for the names of the main subdirectories.

Drilling location maps

A site map showing the drilling locations for this expedition and maps showing the drilling locations of all Integrated Ocean Drilling Program (IODP), Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP) drilling sites are available in PDF format. These maps were produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith (gmt.soest.hawaii.edu).

[IODP Expedition 311 site map](#)

[IODP map](#) (Expeditions 301–312)

[ODP map](#) (Legs 100–210)

[DSDP map](#) (Legs 1–96)



Expedition-related bibliography

IODP publications

Scientific Prospectus

Collett, T.S., Riedel, M., Malone, M.J., and the Expedition 311 Project Team, 2005. Cascadia margin hydrates. *IODP Sci. Prosp.*, 311. doi:10.2204/iodp.sp.311.2005

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Preliminary Report

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Scientific Drilling Journal

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Proceedings volume

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