



PROCEEDINGS OF THE INTEGRATED OCEAN DRILLING PROGRAM

VOLUME 336 EXPEDITION REPORTS

MID-ATLANTIC RIDGE MICROBIOLOGY: INITIATION OF LONG-TERM COUPLED MICROBIOLOGICAL, GEOCHEMICAL, AND HYDROLOGICAL EXPERIMENTATION WITHIN THE SEAFLOOR AT NORTH POND, WESTERN FLANK OF THE MID-ATLANTIC RIDGE

Expedition 336 of the riserless drilling platform
Bridgetown, Barbados, to Ponta Delgada, Azores (Portugal)
Sites 395 and U1382–U1384
16 September–16 November 2011

Volume authorship

Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists

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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).

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A complete set of the logging data collected by IODP-USIO Science Services, Lamont-Doherty Earth Observatory (LDEO), is available at brg.ldeo.columbia.edu/logdb/. 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 core photographs have been tonally enhanced to better illustrate particular features of interest. High-resolution images are available upon request.

Cover photograph shows a double rainbow viewed from aboard the *JOIDES Resolution*. Photograph by Bill Crawford.

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Foreword

By Integrated Ocean Drilling Program Management International, Inc.

The Integrated Ocean Drilling Program (IODP) is now in the latter half of its decadal program (2003–2013). As envisioned in the Initial Science Plan (ISP), IODP expeditions take advantage of three scientific ocean drilling platforms that enable us to cover unprecedented areas of wide oceans, from ice-covered shallow water to full ocean depths. Drilling miles of depth below seafloor, now part of IODP capabilities, is the major advance from the program predecessors, the Deep Sea Drilling Project and the Ocean Drilling Program. The living Earth is a dynamic system that is continuously evolving. IODP seeks to understand this complex and unique system through scientific ocean drilling, sampling, and experimenting in deep holes, along with advancement of related scientific disciplines. IODP is an international collaboration among scientists and nations with keen aspirations to attain the scientific goals of the ISP. IODP currently includes participating members from 26 nations.

The *Proceedings* present the scientific and engineering results of IODP drilling projects, each designed to better understand the past, present, and future of the Earth system.

IODP expeditions begin with scientists who submit research drilling proposals to test new and innovative ideas, then the proposals progress to international scientific advisors (Science Advisory Structure) who nurture, 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. The science party, collectively and individually, conducts science on board and on shore. The co-chief scientists on each expedition are responsible for synthesizing the scientific results as hallmark of expedition.

Ocean-drilling achievements help us to understand and interpret phenomena in various parts of the Earth system. Achievements in the two legacy drilling programs 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. IODP is truly an expansion and extension of the scientific research conducted by the legacy programs, engaging in cutting-edge research concerning topics of global importance.

IODP drilling platform operations are conducted by three Implementing Organizations (IOs). Riserless platform operations are conducted by the U.S. Implementing Organization (USIO), comprising the Consortium for Ocean Leadership, 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 (ECORD) Science Operator (ESO), comprising the British Geological Survey, the University of Bremen, and the European Petrophysics Consortium. The European IO currently represents the ocean-drilling efforts of 16 nations in Europe, plus Canada.

The discoveries presented 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 Education, Culture, 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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Florida State University, USA

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University of Miami, USA

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University of Tasmania/IMS, Australia

University of Texas at Austin, USA

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

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Dale W. Griffin

Core descriptions

Visual core descriptions (VCDs), smear slide data tables, thin sections, and core images are included in this section. VCDs, smear slides, and thin sections are combined into PDF files for each site. The entire set of core images in PDF is available in the IMAGES directory.

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Expedition research results

Data reports

Titles are available in [HTML](#).

Syntheses

Titles are available in [HTML](#).

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 336 site map](#)

[IODP map](#) (Expeditions 301–336)

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Expedition-related bibliography

IODP publications

Scientific Prospectus

Edwards, K.J., Bach, W., and Klaus, A., 2010. Mid-Atlantic Ridge flank microbiology: initiation of long-term coupled microbiological, geochemical, and hydrological experimentation within the seafloor at North Pond, western flank of the Mid-Atlantic Ridge. *IODP Sci. Prosp.*, 336. doi:10.2204/iodp.sp.336.2010

Preliminary Report

Expedition 336 Scientists, 2012. Mid-Atlantic Ridge microbiology: initiation of long-term coupled microbiological, geochemical, and hydrological experimentation within the seafloor at North Pond, western flank of the Mid-Atlantic Ridge. *IODP Prel. Rept.*, 336. doi:10.2204/iodp.pr.336.2012

*Scientific Drilling journal**

Pending

Proceedings volume

Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, 2012. *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.2012

Expedition 336 Scientists, 2012. Expedition 336 summary. In Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.101.2012

Expedition 336 Scientists, 2012. Methods. In Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.102.2012

Expedition 336 Scientists, 2012. Site 395. In Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.103.2012

Expedition 336 Scientists, 2012. Site U1382. In Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.104.2012

Expedition 336 Scientists, 2012. Site U1383. In Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.105.2012

Expedition 336 Scientists, 2012. Sediment and basement contact coring. In Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.106.2012

Schmidt-Schierhorn, F., Kaul, N., Stephan, S., and Villinger, H., 2012. Geophysical site survey results from North Pond (Mid-Atlantic Ridge). In Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.107.2012

Edwards, K.J., Wheat, C.G., Orcutt, B.N., Hulme, S., Becker, K., Jannasch, H., Haddad, A., Pettigrew, T., Rhinehart, W., Grigar, K., Bach, W., Kirkwood, W., and Klaus, A., 2012. Design and deployment of borehole observatories and experiments during IODP Expedition 336, Mid-Atlantic Ridge flank at North Pond. In Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). doi:10.2204/iodp.proc.336.109.2012

*The [Expedition-related bibliography](#) is continually updated online. Please send updates to PubCrd@iodp.tamu.edu.

Orcutt, B.N., Barco, R.A., Joye, S.B., and Edwards, K.J., 2012. Summary of carbon, nitrogen, and iron leaching characteristics and fluorescence properties of materials considered for seafloor observatory assembly. *In* Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.336.108.2012](https://doi.org/10.2204/iodp.proc.336.108.2012)

Griffin, D.W., 2012. Long-range transatlantic transport of microorganisms in clouds of African desert dust: a study of atmospheric microbiology, chemistry, and the influence of desert dust on surface water microbial ecology aboard the R/V *JOIDES Resolution*, IODP Expedition 336, 16 September–16 November 2011. *In* Edwards, K.J., Bach, W., Klaus, A., and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.336.110.2012](https://doi.org/10.2204/iodp.proc.336.110.2012)



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	ODPMAP.PDF (ODP map, Legs 100–210)
	DSDPMAP.PDF (DSDP map, Legs 1–96)

*Directory structure reflects the Expedition Reports content and volume material produced on the ISO disc image.

