



PROCEEDINGS OF THE INTEGRATED OCEAN DRILLING PROGRAM

VOLUME 334 EXPEDITION REPORTS COSTA RICA SEISMOGENESIS PROJECT, PROGRAM A STAGE 1 (CRISP-A1)

Expedition 334 of the riserless drilling platform
from and to Puntarenas, Costa Rica
Sites U1378–U1381
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Expedition 334 Scientists

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Examples of how to cite this volume or part of this volume are available at publications.iodp.org/proceedings/334/334bib.htm.

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 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

Some core photographs have been tonally enhanced to better illustrate particular features of interest. High-resolution images are available upon request.

Cover photograph shows *JOIDES Resolution's* bow. Photograph by Kohtaro Ujiie.

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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 24 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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University of Texas at Austin, USA

University of Tokyo, Japan

University of Washington, USA

Woods Hole Oceanographic Institution, USA

*At time of expedition.



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IODP Japanese Implementing Organization: Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

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Expedition 334 Scientists

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

See “[Syntheses](#)” in the Expedition-related bibliography.

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 334 site map](#)

[IODP map](#) (Expeditions 301–334)

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[DSDP map](#) (Legs 1–96)



Expedition-related bibliography

IODP publications

Scientific Prospectus

Vannucchi, P., Ujiie, K., and Gamage, K., 2010. Costa Rica Seismogenesis Project (CRISP): sampling and quantifying input to the seismogenic zone and fluid output. *IODP Sci. Prosp.*, 334. [doi:10.2204/iodp.sp.334.2010](https://doi.org/10.2204/iodp.sp.334.2010)

Preliminary Report

Expedition 334 Scientists, 2011. Costa Rica Seismogenesis Project (CRISP): sampling and quantifying input to the seismogenic zone and fluid output. *IODP Prel. Rept.*, 334. [doi:10.2204/iodp.pr.334.2011](https://doi.org/10.2204/iodp.pr.334.2011)

*Scientific Drilling journal**

Pending.

Proceedings volume

Vannucchi, P., Ujiie, K., Stroncik, N., Malinverno, A., and the Expedition 334 Scientists, 2012. *Proc. IODP*, 334: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.334.2012](https://doi.org/10.2204/iodp.proc.334.2012)

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Expedition 334 Scientists, 2012. Site U1380. *In* Vannucchi, P., Ujiie, K., Stroncik, N., Malinverno, A., and the Expedition 334 Scientists, *Proc. IODP*, 334: Tokyo (Integrated Ocean Drilling Program Management International, Inc.). [doi:10.2204/iodp.proc.334.105.2012](https://doi.org/10.2204/iodp.proc.334.105.2012)

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Syntheses*

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Directory structure*

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