



**PROCEEDINGS OF THE  
INTEGRATED OCEAN  
DRILLING PROGRAM  
VOLUME 319 EXPEDITION REPORTS  
NANTROSEIZE STAGE 2: NANTROSEIZE  
RISER/RISERLESS OBSERVATORY**

Expedition 319 of the riser drilling platform  
Shingu, Japan, to Yokkaichi, Japan  
Sites C0009–C0011  
5 May–31 August 2009

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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).

The bulk of the shipboard-collected core data from this expedition is accessible at [sio7.jamstec.go.jp/](http://sio7.jamstec.go.jp/).

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. High-resolution images are available upon request.

Cover photograph shows the riser blow-out preventer on the rig floor of the D/V *Chikyu*. Photo © JAMSTEC.

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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 United States 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, 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.

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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### Core descriptions

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

#### Site C0009

[Visual core descriptions](#) · [Smear slides](#) · [Thin sections](#)

## Expedition research results

### Data reports

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

### Syntheses

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



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## Supplementary material

Supplementary material includes cuttings-core-log-sesimic integration data in Microsoft Excel format, downhole measurements data in Excel and PDF, geochemistry data in Excel, lithology data in Excel and PDF, logging data in Adobe Illustrator format, operations data in PDF, and structural geology data in Excel. 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/](http://gmt.soest.hawaii.edu/)).

[IODP Expedition 319 site map](#)

[IODP map](#) (Expeditions 301–312, 314–316, and 319)

[ODP map](#) (Legs 100–210)

[DSDP map](#) (Legs 1–96)



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# Expedition-related bibliography

## IODP publications

### *Scientific Prospectus*

Araki, E., Byrne, T., McNeill, L., Saffer, D., Eguchi, N., Takahashi, K., and Toczko, S., 2009. NanTroSEIZE Stage 2: NanTroSEIZE riser/riserless observatory. *IODP Sci. Prosp.*, 319. [doi:10.2204/iodp.sp.319.2009](https://doi.org/10.2204/iodp.sp.319.2009)

### *Preliminary Report*

Saffer, D., McNeill, L., Araki, E., Byrne, T., Eguchi, N., Toczko, S., Takahashi, K., and the Expedition 319 Scientists, 2009. NanTroSEIZE Stage 2: NanTroSEIZE riser/riserless observatory. *IODP Prel. Rept.*, 319. [doi:10.2204/iodp.pr.319.2009](https://doi.org/10.2204/iodp.pr.319.2009)

### *Scientific Drilling journal\**

Pending

### *Proceedings volume*

Saffer, D., McNeill, L., Byrne, T., Araki, E., Toczko, S., Eguchi, N., Takahashi, K., and the Expedition 319 Scientists, 2010. *Proc. IODP, 319: Tokyo (Integrated Ocean Drilling Program Management International, Inc.)*. [doi:10.2204/iodp.proc.319.2010](https://doi.org/10.2204/iodp.proc.319.2010)

Expedition 319 Scientists, 2010. Expedition 319 summary. *In* Saffer, D., McNeill, L., Byrne, T., Araki, E., Toczko, S., Eguchi, N., Takahashi, K., and the Expedition 319 Scientists, *Proc. IODP, 319: Tokyo (Integrated Ocean Drilling Program Management International, Inc.)*. [doi:10.2204/iodp.proc.319.101.2010](https://doi.org/10.2204/iodp.proc.319.101.2010)

Expedition 319 Scientists, 2010. Methods. *In* Saffer, D., McNeill, L., Byrne, T., Araki, E., Toczko, S., Eguchi, N., Takahashi, K., and the Expedition 319 Scientists, *Proc. IODP, 319: Tokyo (Integrated Ocean Drilling Program Management International, Inc.)*. [doi:10.2204/iodp.proc.319.102.2010](https://doi.org/10.2204/iodp.proc.319.102.2010)

Expedition 319 Scientists, 2010. Site C0009. *In* Saffer, D., McNeill, L., Byrne, T., Araki, E., Toczko, S., Eguchi, N., Takahashi, K., and the Expedition 319 Scientists, *Proc. IODP, 319: Tokyo (Integrated Ocean Drilling Program Management International, Inc.)*. [doi:10.2204/iodp.proc.319.103.2010](https://doi.org/10.2204/iodp.proc.319.103.2010)

Expedition 319 Scientists, 2010. Site C0010. *In* Saffer, D., McNeill, L., Byrne, T., Araki, E., Toczko, S., Eguchi, N., Takahashi, K., and the Expedition 319 Scientists, *Proc. IODP, 319: Tokyo (Integrated Ocean Drilling Program Management International, Inc.)*. [doi:10.2204/iodp.proc.319.104.2010](https://doi.org/10.2204/iodp.proc.319.104.2010)

Expedition 319 Scientists, 2010. Site C0011. *In* Saffer, D., McNeill, L., Byrne, T., Araki, E., Toczko, S., Eguchi, N., Takahashi, K., and the Expedition 319 Scientists, *Proc. IODP, 319: Tokyo (Integrated Ocean Drilling Program Management International, Inc.)*. [doi:10.2204/iodp.proc.319.105.2010](https://doi.org/10.2204/iodp.proc.319.105.2010)

Expedition 319 Scientists, 2010. Appendix: NanTroSEIZE acronyms. *In* Saffer, D., McNeill, L., Byrne, T., Araki, E., Toczko, S., Eguchi, N., Takahashi, K., and the Expedition 319 Scientists, *Proc. IODP, 319: Tokyo (Integrated Ocean Drilling Program Management International, Inc.)*. [doi:10.2204/iodp.proc.319.app.2010](https://doi.org/10.2204/iodp.proc.319.app.2010)



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## Syntheses\*

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## Journals/Books\*

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



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