

# Proceedings of the International Ocean Discovery Program

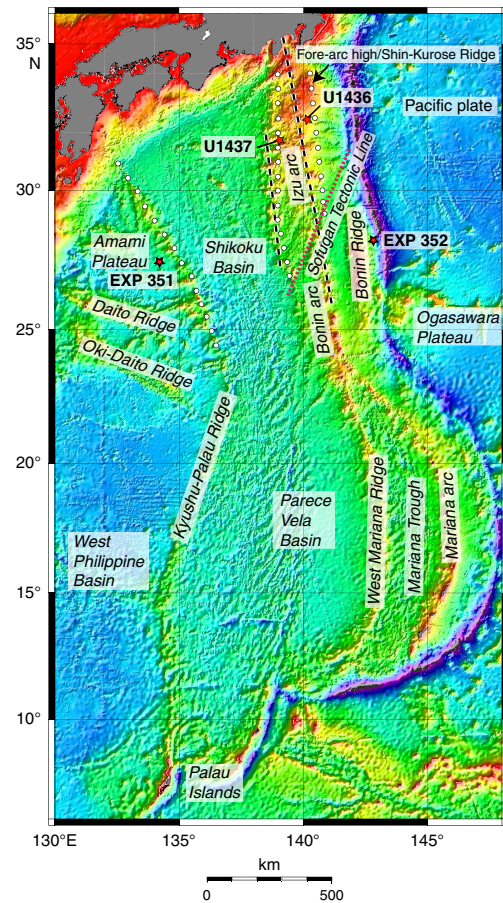
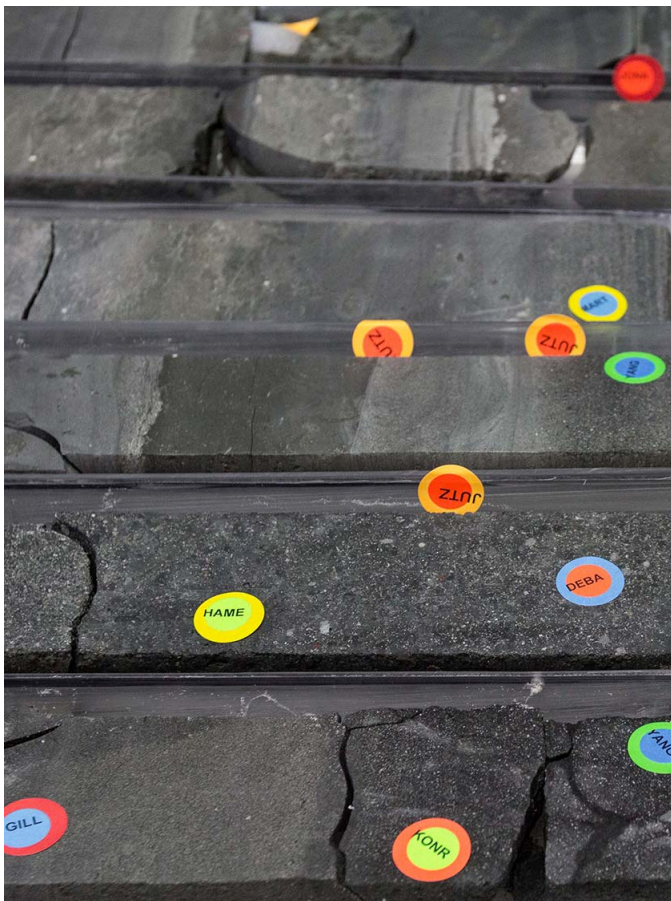
## Volume 350

### Izu-Bonin-Mariana Rear Arc

Expedition 350 of the riserless drilling platform  
 Keelung, Taiwan, to Yokohama, Japan  
 Sites U1436 and U1437  
 30 March–30 May 2014

#### Volume authorship

Tamura, Y., Busby, C.J., Blum, P., and the Expedition 350 Scientists



## Publisher's notes

Funding for the program was provided by the following agencies at the time of this expedition:

National Science Foundation (NSF), United States  
Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan  
European Consortium for Ocean Research Drilling (ECORD)  
Ministry of Science and Technology (MOST), People's Republic of China  
Korea Institute of Geoscience and Mineral Resources (KIGAM)  
Australian Research Council (ARC) and GNS Science (New Zealand), Australian/New Zealand Consortium (ANZIC)  
Ministry of Earth Sciences (MoES) India  
Coordination for Improvement of Higher Education Personnel, Brazil (CAPES)

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, IODP Management International, Inc., Consortium for Ocean Leadership, Lamont-Doherty Earth Observatory of Columbia University, Texas A&M University, or Texas A&M Research Foundation.

The bulk of the shipboard-collected core data from this expedition is accessible from the International Ocean Discovery Program (IODP) *JOIDES Resolution* Science Operator, Texas A&M University (TAMU), at [iodp.tamu.edu/database/index.html](http://iodp.tamu.edu/database/index.html). If you cannot access this site or need additional data, please contact: Data Librarian, International Ocean Discovery Program *JOIDES Resolution* Science Operator, Texas A&M University, 1000 Discovery Drive, College Station TX 77845-9547, USA. Tel: (979) 845-8495; Fax: (979) 458-1617; Email: [database@iodp.tamu.edu](mailto: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](http://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; Email: [logdb@ldeo.columbia.edu](mailto: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 example of split cores recovered during Expedition 350 and made of volcanoclastic deposits that were laid out across the shipboard laboratories every few days for a summary inspection and sampling. Color labels with requester codes mark locations where technical staff was about to cut the individual samples for postcruise research. Photo credit: IODP.

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Y. Tamura et al.

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#### [Site U1437](#)

Y. Tamura et al.

### Core descriptions

Visual core descriptions (VCDs), smear slide data, thin section data, 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.

#### [Site U1436](#)

Visual core descriptions · Smear slides · Thin sections

#### [Site U1437](#)

Visual core descriptions · Smear slides · Thin sections

### Supplementary material

Supplementary material for this volume includes DESC workbooks and biostratigraphic range charts in Excel format. See [README.TXT](#) for a full listing of directories and files.

## 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 International Ocean Discovery Program (IODP), produced using QGIS ([www.qgis.org](http://www.qgis.org)), Integrated Ocean Drilling Program, Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP), produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith ([gmt.soest.hawaii.edu](http://gmt.soest.hawaii.edu)), are available in PDF.

#### [IODP Expedition 350 site map](#)

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## Foreword

The International Ocean Discovery Program (IODP) represents a renewal and strategic refocusing of what has been widely hailed as one of the most successful and ambitious international scientific programs in the world. Based solidly on the 45-year scientific legacy of the Deep Sea Drilling Project, Ocean Drilling Program, and Integrated Ocean Drilling Program, the new IODP Science Plan (*Illuminating Earth's Past, Present, and Future*) defines 4 main themes and 13 challenges for the next decade of scientific ocean drilling that are both of fundamental importance in understanding how Earth works and of high relevance to society as Earth changes. The new IODP represents an extraordinary level of international collaboration in utilizing scientific ocean drilling to understand climate and ocean change, the deep biosphere and evolution of ecosystems, connections between Earth's deep processes and surface impacts, and geological processes and hazards on human scales.

The *Proceedings of the International Ocean Discovery Program* presents the scientific and engineering results of IODP drilling projects on an expedition basis. As in the preceding Integrated Ocean Drilling Program, expeditions in the new IODP will be conducted by three implementing organizations, each providing a different drilling platform. These are the U.S. Implementing Organization (USIO; through September 2014) and the *JOIDES Resolution* Science Operator (JRSO; as of October 2014), providing the research vessel *JOIDES Resolution* for riserless drilling operations; JAMSTEC's Center for Deep Earth Exploration (CDEX), providing the drillship *Chikyu* for riser and occasional riserless operations; and the European Consortium for Ocean Research Drilling (ECORD) Science Operator (ESO), providing mission-specific platforms (MSPs) for expeditions that extend the IODP operational range where neither drillship is suitable. Scheduling decisions for each of the platforms are made separately by three independent Facility Boards, each of which includes scientists, operators, and platform funding partners: the *JOIDES Resolution* Facility Board (JRFB), *Chikyu* IODP Board (CIB), and ECORD Facility Board (EFB). At the beginning of the new IODP, the three Facility Boards agreed to utilize Publication Services at the USIO and now the JRSO for production of all expedition *Proceedings* volumes and reports.

The new IODP differs from prior legacy programs in that it has no central management authority nor commingled funding for program-wide activities. Yet the new IODP retains a key integrative structural element: evaluation of all proposals for drilling expeditions by a single advisory structure composed of scientists representing all international program partners. International scientists may submit drilling proposals to the Science Support Office; the proposals are then evaluated by the Science Evaluation Panel in the context of the new Science Plan.

The new IODP also has a second internationally integrative level for high-level discussion (but no executive authority): the IODP Forum. The Forum is defined as the custodian of the Science Plan and is charged with assessing program-wide progress toward achieving the Science Plan. As of the Forum's first annual meeting (May 2014), IODP involves 27 international financial partners, including the United States, Japan, an Australia/New Zealand consortium (ANZIC), Brazil, China, India, South Korea, and the 19 members of ECORD (Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, and the United Kingdom). The enhanced membership in the new IODP represents a remarkable level of international collaboration that remains one of the greatest strengths of scientific ocean drilling.

Keir Becker  
Inaugural Chair of the IODP Forum

## International Ocean Discovery Program implementing organizations

### IODP European Implementing Organization: European Consortium for Ocean Research Drilling, Science Operator (ESO)

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# Expedition-related bibliography\*

## IODP publications

### Scientific Prospectus

Tamura, Y., Busby, C., and Blum, P., 2013. Izu-Bonin-Mariana Rear Arc: the missing half of the subduction factory. *International Ocean Discovery Program Scientific Prospectus*, 350. <http://dx.doi.org/10.2204/iodp.sp.350.2013>

### Preliminary Report

Expedition 350 Scientists, 2014. Izu-Bonin-Mariana rear arc: the missing half of the subduction factory. *International Ocean Discovery Program Preliminary Report*, 350. <http://dx.doi.org/10.14379/iodp.pr.350.2014>

### Proceedings volume

Tamura, Y., Busby, C.J., Blum, P., and the Expedition 350 Scientists, 2015. *Proceedings of the International Ocean Discovery Program, Expedition 350: Izu-Bonin-Mariana Rear Arc*: College Station, TX (International Ocean Discovery Program). <http://dx.doi.org/10.14379/iodp.proc.350.2015>

Tamura, Y., Busby, C.J., Blum, P., Guèrin, G., Andrews, G.D.M., Barker, A.K., Berger, J.L.R., Bongioiolo, E.M., Bordiga, M., DeBari, S.M., Gill, J.B., Hamelin, C., Jia, J., John, E.H., Jonas, A.-S., Jutzeler, M., Kars, M.A.C., Kita, Z.A., Konrad, K., Mahony, S.H., Martini, M., Miyazaki, T., Musgrave, R.J., Nascimento, D.B., Nichols, A.R.L., Ribeiro, J.M., Sato, T., Schindlbeck, J.C., Schmitt, A.K., Straub, S.M., Vautravers, M.J., and Yang, Y., 2015. Expedition 350 summary. *In* Tamura, Y., Busby, C.J., Blum, P., and the Expedition 350 Scientists, *Proceedings of the International Ocean Discovery Program, Expedition 350: Izu-Bonin-Mariana Rear Arc*: College Station, TX (International Ocean Discovery Program). <http://dx.doi.org/10.14379/iodp.proc.350.101.2015>

Tamura, Y., Busby, C.J., Blum, P., Guèrin, G., Andrews, G.D.M., Barker, A.K., Berger, J.L.R., Bongioiolo, E.M., Bordiga, M., DeBari, S.M., Gill, J.B., Hamelin, C., Jia, J., John, E.H., Jonas, A.-S., Jutzeler, M., Kars, M.A.C.,

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