Proceedings of the International Ocean Discovery Program

Volume 362

Sumatra Subduction Zone

Expedition 362 of the riserless drilling platform
Colombo, Sri Lanka, to Singapore
Sites U1480–U1481
6 August–6 October 2016

Volume authorship
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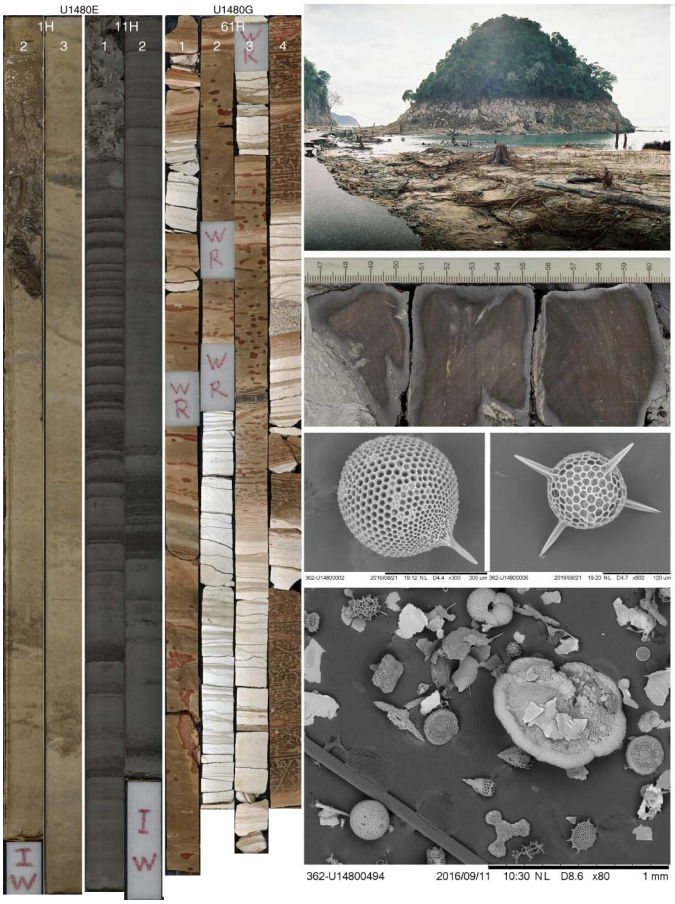

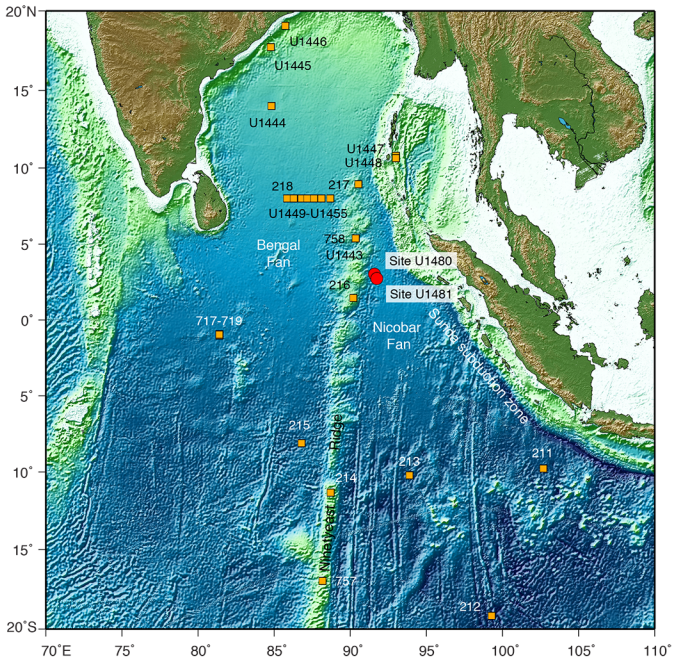

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Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the participating agencies, TAMU, or Texas A&M Research Foundation.

The bulk of the shipboard-collected core data from this expedition is accessible at **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**.

A complete set of the logging data collected during the expedition is available at **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**.

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 (left) core section images (left; Sections 326-U1480E-1H-2, 1H-3, 11H-1, and 11H-2 and 362-U1480G-61R-1 through 61R-4). Top right image is of devastation in Aceh, Sumatra, following the 2004 Sumatra-Andaman earthquake and tsunami. The elevation of the tsunami tree-stripped zone on the island is 30 m above sea level. Middle right image is a close-up of a large wood fragment in Section 362-U1480G-11R-3. Bottom right images are SEM images of radiolarians and other microfossils in Cores 362-U1480B-1H and 362-U1480H-1H. Photo credits: tsunami photo used with permission of Jose C. Borrero (USC Tsunami Research Center/Coast Marine Consulting and Research (top right); all other images were collected by the Expedition 362 scientists and are public access.

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Chapters

Core descriptions

Visual core descriptions (VCDs) are presented in PDF files for each site. Smear slides and/or thin sections are presented in PDF and/or CSV files for each site and/or hole (CSV files are available in the CORES directory). The entire set of core images in PDF is available in the IMAGES directory.

Site U1480
Visual core descriptions · Smear slides · **Thin sections**

Site U1481
Visual core descriptions · **Smear slides**

Supplementary material

Supplementary material for the Volume 362 expedition reports includes DESClogik workbooks in Microsoft Excel; amorphous silica extraction procedures and data in Microsoft Word, Microsoft Excel, and PDF; WRMSL magnetic susceptibility calibration error and MAD sample drying technique information in Microsoft Word and Microsoft Excel; images of sediment ripples, smear slide description sheets, and XRD data in PDF, Microsoft Excel, JPG, and EVA formats; and structural and drilling data and calculations in Microsoft Excel and PDF. A full list of directories can be found in SUPP_MAT in the volume zip folder or on the **Supplementary material for Volume 362 expedition reports** web page.

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

IODP Expedition 362 site map
IODP map (Expeditions 349–357, 359–362, 364, and 365)
Integrated Ocean Drilling Program map (Expeditions 301–348)
ODP map (Legs 100–210)
DSDP map (Legs 1–96)

Dedication

This volume is dedicated to the more than 250,000 people who lost their lives during the 2004 Sumatra-Andaman earthquake and tsunami and to the people of Indonesia and the surrounding Indian Ocean affected by this event.

Acknowledgments

The members of the Expedition 362 science party would like to sincerely thank all of the personnel aboard the R/V *JOIDES Resolution* for their skill, hard work, and professionalism. We specifically acknowledge the Technical Support Staff on board for their superb attitude and dedication throughout the expedition. The operational success of the expedition was in large part due to the expertise and devotion of the drilling crew and operations team. All IODP staff are gratefully acknowledged for their support and hard work before, during, and after the expedition. A large number of scientists working in the region since the 2004 earthquake are thanked for their long-term input to the proposed project and for site survey data to aid development of the project. Funding organizations in Germany, France, United Kingdom, USA, Indonesia, Japan, and Singapore are acknowledged for enabling the major data collection effort on the subduction zone margin. Specific site survey data for the expedition were acquired by the Federal Institute for Geosciences and Natural Resources (BGR; Germany) as part of the SeaCause program, with data jointly owned by German and Indonesian institutions and by the National Center for Scientific Research (CNRS; France) and Western Geco/Institut du Physique du Globe Paris (IPGP).

Foreword

The International Ocean Discovery Program (IODP) represents the latest incarnation of almost five decades of scientific ocean drilling excellence and is generally accepted as the most successful international collaboration in the history of the Earth sciences. IODP builds seamlessly on the accomplishments of previous phases: the Deep Sea Drilling Project, Ocean Drilling Program, and Integrated Ocean Drilling Program. The 2013–2023 IODP Science Plan (*Illuminating Earth's Past, Present, and Future*) defines four themes and thirteen challenges for this decade of scientific ocean drilling that are both of fundamental importance in understanding how the Earth works and of significant relevance to society as the Earth changes, at least in part in response to anthropogenic forcing. This phase of IODP represents a renewed level of international collaboration in bringing diverse drilling platforms and strategies to increasing our understanding of climate and ocean change, the deep biosphere and evolution of ecosystems, connections between Earth's deep processes and surface manifestations, and geologically induced hazards on human timeframes.

The *Proceedings of the International Ocean Discovery Program* presents the scientific and engineering results of IODP drilling projects, expedition by expedition. As in the preceding Integrated Ocean Drilling Program, expeditions in the new IODP are conducted by three implementing organizations, each providing a different drilling capability. These are the US Implementing Organization (USIO; through September 2014) and the *JOIDES Resolution* Science Operator (JRSO; as of October 2014), providing the leased commercial 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, for example, in polar environments and in shallow waters. Scheduling decisions for each capability are made 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 scientific ocean drilling programs in that it has neither a central management organization nor commingled funding for program-wide activities. Yet this phase of IODP retains a fundamental integrative structural element: a "bottom-up" 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; all submitted proposals are then evaluated by a Science Evaluation Panel in the context of the Science Plan.

The new IODP also has a second internationally integrative level for high-level discussion and consensus-building: the IODP Forum. The Forum is charged with assessing program-wide progress toward achieving the Science Plan. At present, IODP involves 26 international financial partners, including the United States, Japan, an Australia/New Zealand consortium (ANZIC), Brazil, China, India, South Korea, and the eighteen members of ECORD (Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, and the United Kingdom). This enhanced membership in the new IODP represents a remarkable level of international collaboration that remains one of the greatest ongoing strengths of scientific ocean drilling.

James A. Austin Jr.
Chair, IODP Forum

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Expedition-related bibliography*

IODP publications

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Preliminary Report

Dugan, B., McNeill, L., Petronotis, K., and the Expedition 362 Scientists, 2017. *Expedition 362 Preliminary Report: Sumatra Subduction Zone.* International Ocean Discovery Program. **https://doi.org/10.14379/iodp.pr.362.2017**

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Expedition reports

McNeill, L.C., Dugan, B., Petronotis, K.E., Backman, J., Bourlange, S., Chemale, F., Chen, W., Colson, T.A., Frederik, M.C.G., Guèrin, G., Hamahashi, M., Henstock, T., House, B.M., Hüpers, A., Jeppson, T.N., Kachovich, S., Kenigsberg, A.R., Kuranaga, M., Kutterolf, S., Milliken, K.L., Mitchison, F.L., Mukoyoshi, H., Nair, N., Owari, S., Pickering, K.T., Pouderoux, H.F.A., Yehua, S., Song, I., Torres, M.E., Vannucchi, P., Vrolijk, P.J., Yang, T., and Zhao, X., 2017. Expedition 362 summary. *In* McNeill, L.C., Dugan, B., Petronotis, K.E., and the Expedition 362 Scientists, *Sumatra Subduction Zone.* Proceedings of the International Ocean Discovery Program, 362: College Station, TX (International Ocean Discovery Program). **https://doi.org/10.14379/iodp.proc.362.101.2017**

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Supplementary material

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