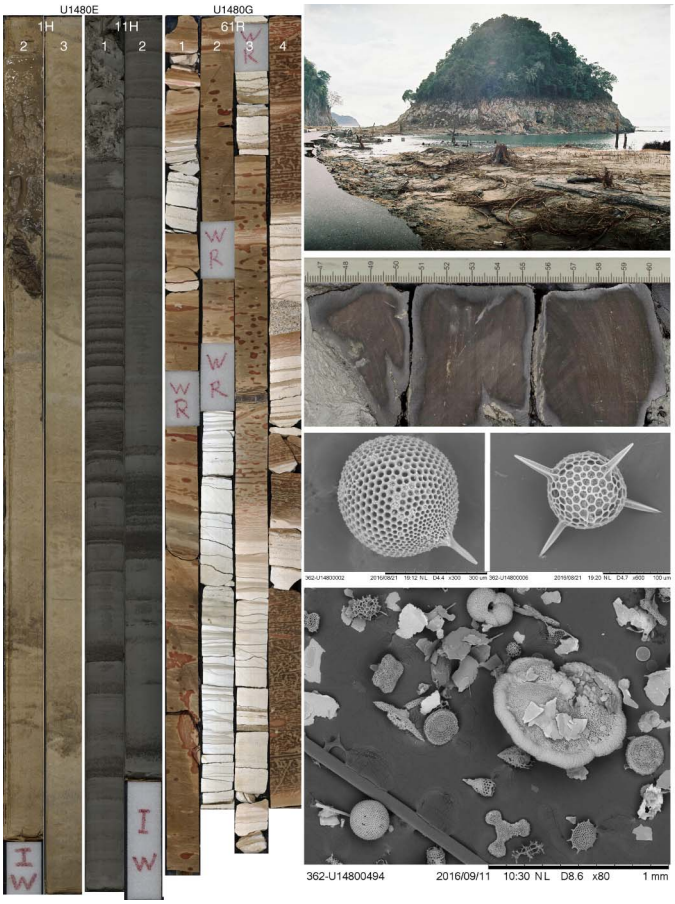
Proceedings of the International Ocean Discovery Program

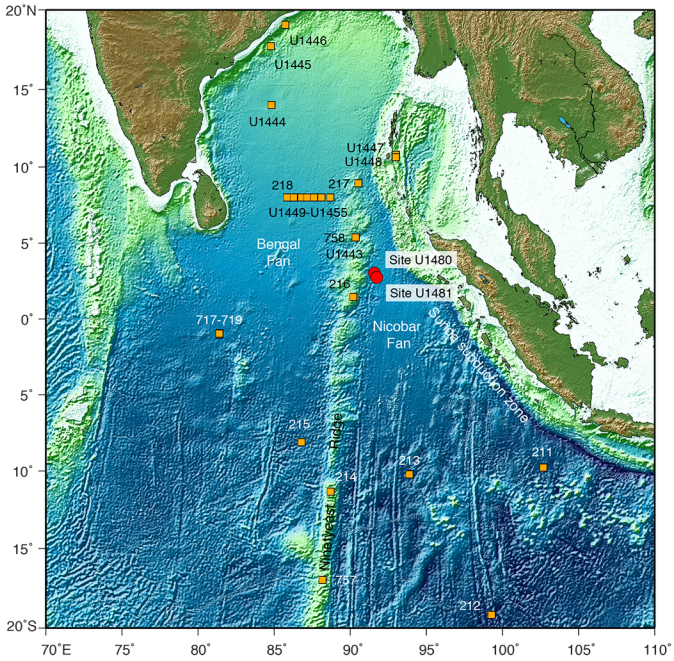
Volume 362

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
McNeill, L.C., Dugan, B., Petronotis, K.E., and the Expedition 362 Scientists





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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

International Ocean Discovery Program

JOIDES Resolution Science Operator

Website: **http://iodp.tamu.edu**

IODP JRSO
International Ocean Discovery Program
Texas A&M University
1000 Discovery Drive
College Station TX 77845-9547
USA
Tel: (979) 845-2673; Fax: (979) 845-4857
Email: **information@iodp.tamu.edu**

IODP JRSO Curation and Laboratories
IODP Gulf Coast Repository (GCR)
Texas A&M University
1000 Discovery Drive
College Station TX 77845-9547
USA
Tel: (979) 845-8490; Fax: (979) 845-1303
Email: **rumford@iodp.tamu.edu**

European Consortium for Ocean Research Drilling, Science Operator (ESO)

Website: **http://www.ecord.org**

IODP ESO Coordinator: Science, Logistics, and Operations
British Geological Survey
The Lyell Centre
Research Avenue South
Edinburgh EH14 4AP
United Kingdom
Tel: (44) 131-667-1000; Fax: (44) 131-668-4140
Email: **eso@bgs.ac.uk**

IODP ESO Curation and Laboratories
IODP Bremen Core Repository (BCR)
Center for Marine Environmental Sciences (MARUM)
University of Bremen
Leobener Strasse
28359 Bremen
Germany
Tel: (49) 421-218-65560; Fax: (49) 421-218-98-65560
Email: **bcr@marum.de**

IODP ESO Petrophysics
European Petrophysics Consortium
Department of Geology
University of Leicester
Leicester LE1 7RH
United Kingdom
Tel: (44) 116-252-3611; Fax: (44) 116-252-3918
Email: **sjd27@leicester.ac.uk**

Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Website: **http://www.jamstec.go.jp/chikyu/e**

IODP Japan Science Operator
Center for Deep Earth Exploration (CDEX)
Japan Agency for Marine-Earth Science and Technology
Yokohama Institute for Earth Sciences
3175-25 Showa-machi
Kanazawa-ku, Yokohama
Kanagawa 236-0001
Japan
Tel: (81) 45-778-5643; Fax: (81) 45-778-5704
Email: **cdex@jamstec.go.jp**

IODP Japan Curation and Laboratories
IODP Kochi Institute for Core Sample Research (KCC)
Japan Agency for Marine-Earth Science and Technology
200 Monobe Otsu
3175-25 Showa-machi
Nankoku City, Kochi 783-8502
Japan
Tel: (81) 88-864-6705; Fax: (81) 88-878-2192
Email: **kcc.contact@jamstec.go.jp**

Expedition 362 participants*

Expedition 362 scientists

Lisa C. McNeill
Co-Chief Scientist
Ocean and Earth Science
National Oceanography Centre Southampton
University of Southampton
Southampton S014 3ZH
United Kingdom
lcmn@noc.soton.ac.uk

Brandon Dugan
Co-Chief Scientist
Department of Geophysics
Colorado School of Mines
Golden CO 80401
USA
dugan@mines.edu

Katerina E. Petronotis
Expedition Project Manager/Staff Scientist
International Ocean Discovery Program
Texas A&M University
1000 Discovery Drive
College Station TX 77845
USA
petronotis@iodp.tamu.edu

Jan Backman
Paleontologist (nannofossils)
Department of Geological Sciences
Stockholm University
SE-106 91 Stockholm
Sweden
backman@geo.su.se

Sylvain Bourlange
Physical Properties Specialist
Laboratoire GeoRessources
CNRS-Université de Lorraine-CREGU
Ecole Nationale Supérieure de Géologie
Rue du Doyen Marcel Roubault
TSA 70605
54518 Vandoeuvre-lès-Nancy
France
sylvain.bourlange@univ-lorraine.fr

Farid Chemale, Jr.
Sedimentologist
Programa de Pós-Graduação em Geologia
Universidade do Vale do Rio dos Sinos
93.022-000 São Leopoldo - RS Brasil
Brazil
faridcj@unisinos.br

Wenhuang Chen
Paleontologist (foraminifers)
Key Laboratory of Marginal Sea Geology
Guangzhou Institute of Geochemistry
Chinese Academy of Sciences
511 Kehua Street, Tianhe District
Guangzhou 510640
China
chenwenhuang@gig.ac.cn

Tobias A. Colson
Physical Properties Specialist
School of Earth Sciences
University of Western Australia
35 Stirling Highway
Crawley 6009
Australia
tobias.colson@research.uwa.edu.au

Marina C.G. Frederik
Physical Properties Specialist
Center for Regional Resources Development Technology (PTPSW-TPSA)
Agency for the Assessment and Application of Technology (BPPT)
Building 820, Earth System Technology (Geostech)
Kawasan Puspitek Serpong
South Tangerang, Banten
Indonesia 15314
marina.frederik@bppt.go.id

Gilles Guèrin
Downhole Measurements Specialist
Lamont-Doherty Earth Observatory
Columbia University
Borehole Research Group, 61 Route 9W
Palisades NY 10964
USA
guerin@ldeo.columbia.edu

Mari Hamahashi
Structural Geologist
Geophysics Research Group
Institute of Geology and Geoinformation
Geological Survey of Japan (AIST)
AIST Tsukuba Central 7
1-1-1 Higashi
Tsukuba Ibaraki 305-8567
Japan

Present address (1 February 2017):
Earth Observatory of Singapore (EOS)
Nanyang Technological University
50 Nanyang Avenue
Singapore 639798
mhamahashi@ntu.edu.sg

*Addresses at time of expedition, except where updated by participants.

Timothy Henstock
Core-Log-Seismic Integration/Geophysics Specialist
Ocean and Earth Science
National Oceanography Centre Southampton
University of Southampton
Southampton SO14 3ZH
United Kingdom
then@noc.soton.ac.uk

Brian M. House
Organic Geochemist
Scripps Institution of Oceanography
University of California, San Diego
Vaughan Hall 434
8675 Discovery Way
La Jolla CA 92037
USA
bhouse@ucsd.edu

Andre Hüpers
Inorganic Geochemist
MARUM-Center for Marine Environmental Sciences
University of Bremen
PO Box 330 440
D-28334 Bremen
Germany
ahuepers@uni-bremen.de

Tamara N. Jeppson
Physical Properties Specialist
Department of Geology and Geophysics
University of Wisconsin-Madison
1215 West Dayton Street
Madison WI 53706
USA
tnjeppson@wisc.edu

Sarah Kachovich
Paleontologist (radiolarians)
Department of Geography Planning and Environmental Management
Level 4, Building 35
The University of Queensland
Brisbane QLD 4027
Australia
s.kachovich@uq.edu.au

Abby R. Kenigsberg
Structural Geologist
Department of Geosciences
Pennsylvania State University
503 Deike Building
University Park PA 16802
USA
arkenigsberg@gmail.com

Mebae Kuranaga
Physical Properties Specialist
Yamaguchi University
Graduate School of Science and Engineering
1677-1 Yoshida
Yamaguchi City 753-8512
Japan
may.hazime@gmail.com

Steffen Kutterolf
Sedimentologist
GEOMAR, Helmholtz Center for Ocean Research Kiel
Wischhofstrasse 1-3
24148 Kiel
Germany
skutterolf@geomar.de

Kitty L. Milliken
Sedimentologist
Bureau of Economic Geology
1 University Station, Box X
Austin TX 78713
USA
kitty.milliken@beg.utexas.edu

Freya L. Mitchison
Paleontologist (diatoms)
School of Earth and Ocean Sciences
Cardiff University
Park Place
Cardiff CF10 3XQ
United Kingdom
mitchisonF@cardiff.ac.uk

Hideki Mukoyoshi
Sedimentologist
Shimane University
Department of Geoscience
1060 Nishikawatsu-cho, Matsue
Shimane 690-8504
Japan
mukoyoshi@riko.shimane-u.ac.jp

Nisha Nair
Physical Properties Specialist
CLCS/Marine Geophysical Division
National Centre for Antarctic and Ocean Research
Earth System Science Organization
Ministry of Earth Sciences, Government of India
Headland Sada, Vasco-da-Gama
Goa 403804
India
nisha1711nair@gmail.com
nishanair@ncaor.gov.in

Satoko Owari
Inorganic Geochemist
Chiba University
Department of Earth Sciences
1-33 Yayoi-cho, Inage-ku
Chiba City 263-8522
Japan
owari.stk@chiba-u.jp

Kevin T. Pickering
Sedimentologist
Earth Sciences
University College London (UCL)
London WC1E 6BT
United Kingdom
kt.pickering@ucl.ac.uk

Hugo F.A. Pouderoux
Sedimentologist
CNRS
UMR6118 Geosciences Rennes
University de Rennes I
Campus de Beaulieu
35042 Rennes Cedex
France
h.pouderoux@gmail.com

Yehua Shan
Structural Geologist
Key Laboratory of Marginal Sea Geology
Chinese Academy of Sciences
511 Kehua Street, Tianhe District
Guangzhou 510640
China
shanyh@gig.ac.cn

Insun Song
Physical Properties Specialist
Geologic Environmental Division
Korea Institute of Geoscience & Mineral (KIGAM)
124 Gwahak-ro
Yuseong-gu
Daejeon 34132
Republic of Korea
isong@kigam.re.kr

Marta E. Torres
Inorganic Geochemist
College of Earth, Ocean and Atmospheric Sciences
Oregon State University
104 CEOAS Administration Building
Corvallis OR 97331-5503
USA
mtorres@coas.oregonstate.edu

Paola Vannucchi
Structural Geologist
Royal Holloway and Bedford New College
Royal Holloway University of London
Queens Building
Egham TW20 0EX
United Kingdom
Paola.Vannucchi@rhul.ac.uk

Peter J. Vrolijk
Structural Geologist
New Mexico Tech
801 Leroy Place
Socorro NM 87801
USA
dimeguru@gmail.com

Tao Yang
Paleomagnetist
Institute of Geophysics
China Earthquake Administration
5 Minzu Daxue Nanlu, Hiadian District
Beijing 100081
China

Present address (April 2017):
Institute of Geophysics and Geomatics
China University of Geosciences
388 Lumo Road
Wuhan 430074
China
yangtao@cug.edu.cn

Xixi Zhao
Paleomagnetist
Department of Earth and Planetary Sciences
University of California, Santa Cruz
1156 High Street
Santa Cruz CA 95064
USA
xzhao@ucsc.edu

Present address (January 2017):
State Key Laboratory of Marine Geology
Tongji University
1239 Siping Road
Shanghai 200092
China
xzhao@tongji.edu.cn

Education and outreach

Naomi Barshi
Education/Outreach Officer
2317 Mattison Lane
Santa Cruz CA 95062
USA
naomibarshi@gmail.com

Agnes Pointu
Education/Outreach Officer
Lycée Louis de Broglie
1 avenue Jean Béranger
78160 Marly-le-Roi
France
agnes.pointu@gmail.com

Operational and technical staff

Siem Offshore AS officials

Steve Bradley
Master of the Drilling Vessel

Wayne Malone
Offshore Installation Manager

JRSO shipboard personnel and technical representatives

Timothy Blaisdell
Applications Developer

Susan Boehm
Thin Section Laboratory

Lisa Brandt
Chemistry Laboratory

Timothy Bronk
Assistant Laboratory Officer

Lisa Crowder
Assistant Laboratory Officer

Aaron de Loach
Core Laboratory

Keith Dupuis
Underway Geophysics Laboratory

Dean Ferrell
Engineer

Timothy Fulton
Senior Imaging Specialist

Clayton Furman
Logging Engineer

Randy Gjesvold
Marine Instrumentation Specialist

Sandra Herrmann
Physical Properties Laboratory

Michael Hodge
Marine Computer Specialist

Minh Nhut Huynh
Marine Computer Specialist

Nicolette Lawler
X-Ray Laboratory

Brittany Martinez
Curatorial Specialist

Aaron Mechler
Chemistry Laboratory

Mike Meiring
Engineer

Stephen Midgley
Operations Superintendent

William Mills
Laboratory Officer

Algie Morgan
Applications Developer

Beth Novak
Paleomagnetism Laboratory

Garrick Van Rensburg
Marine Instrumentation Specialist

Jean Wulfson
Publications Specialist

IODP Publication Services staff*

Douglas Cummings
Graphics Specialist II

Gudelia ("Gigi") Delgado
Publications Coordinator

Ekanta Desai
Graphics Specialist II

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Distribution Specialist

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Expedition-related bibliography*

IODP publications

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Preliminary Report

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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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