

Proceedings of the International Ocean Discovery Program

Volume 366

Mariana Convergent Margin and South Chamorro Seamount

Expedition 366 of the riserless drilling platform

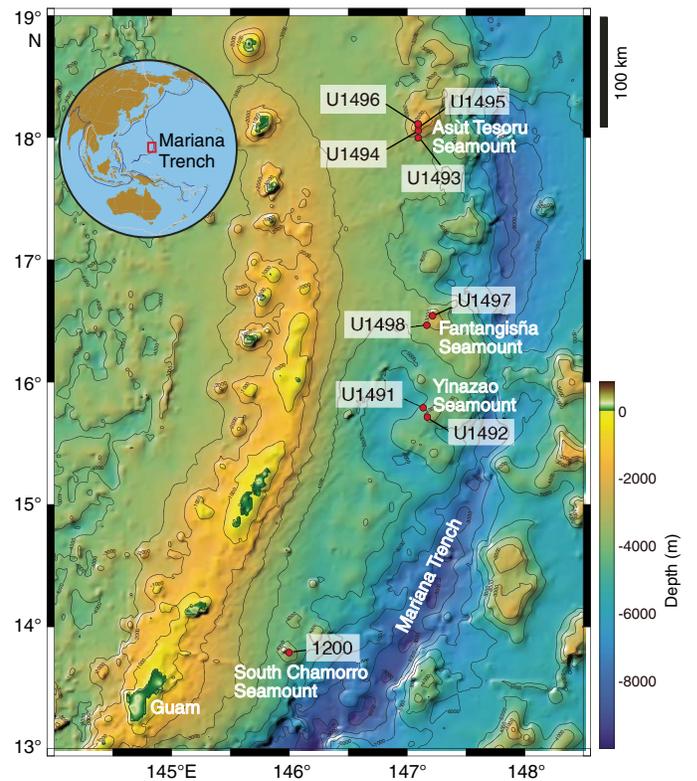
Guam to Hong Kong

Sites 1200 and U1491–U1498

8 December 2016–7 February 2017

Volume authorship

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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://mlp.ldeo.columbia.edu/logdb/scientific_ocean_drilling. 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.

JRSO expedition photos are the property of IODP and are public access.

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

Cover photograph shows serpentinite muds that have experienced a range of oxidation-reduction conditions and striking color variations (Sections 366-U1492A-1H-1 through 1H-4). This core was recovered from the summit of Yinazao Seamount. Photo credit: Geoff Wheat and IODP JRSO.

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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.

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Supplementary material

Supplementary material for the Volume 366 expedition reports includes a list of intervals removed from whole-round sections and DESClogik workbooks in Microsoft Excel format. A full list of directories can be found in SUPP_MAT in the volume zip folder or on the [Supplementary material for Volume 366 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 366 site map](#)

[IODP map](#) (Expeditions 349–357, 359–366, and 370)

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Dedication



The scientific ocean drilling community lost a generous, thoughtful friend on 5 May 2017 when Mike Storms lost a battle from complications arising from myelodysplastic syndrome.

Mike sailed on 48 scientific drilling expeditions (9 Deep Sea Drilling Project legs, 26 Ocean Drilling Program legs, 9 Integrated Ocean Drilling Program expeditions, and 4 International Ocean Discovery Program expeditions), spanning 47 years of service. He began his career working for the scientific community as a marine technician (an engineering aide) at the Deep Sea Drilling Project in 1970 and rose to the position of Supervisor of Operations Support at the International Ocean Discovery Program.

Mike's last expedition, serving as Operations Superintendent, was Expedition 366, Mariana Convergent Margin and South Chamorro Seamount, which ended in Hong Kong on 7 February 2017. For 2 months we had the pleasure to live and work with Mike. We enjoyed listening to stories of Mike's new life in Washington at his favorite table in the galley or watching and cheering one of the many college and professional football teams during the bowl season, joking about the daily revision in the operational plan, and relaxing on the sofa while engaging in discussion of the latest political mess.

Expedition 366 was a challenging expedition for all, with many complications that required multiple late-night/early-morning wake up calls. Mike would lament about the hours he spent in bed watching RigWatch, wondering what was going to happen (crater?) next. Through it all he helped guide us, providing clear plans and options without which we would have been truly lost. His patient, professional advice and guidance allowed us to succeed, despite the challenges of the drilling operations, leaving three new legacy boreholes that will be used by the international community for decades to come.

Mike was like family, more than a shipmate. He helped us ring in a new year and a new chapter in the discovery of the world's deepest subduction zone. He will be missed.

Acknowledgments

This research used samples and data provided by the International Ocean Discovery Program (IODP). We thank all of the personnel aboard the R/V *JOIDES Resolution* during Expedition 366 for their skill and dedication. Particular thanks go to the Technical Support staff for the quality and timeliness of their work. We greatly appreciate the qualified advice from the entire drilling crew and their efforts to core the very challenging serpentinite mudflows and to emplace casing in three sites for seafloor observatory use. The success of the expedition was also enabled by the help of the Environmental Protection and Safety Panel, which allowed us to readjust our drilling strategies even during the expedition. We thank Drs. Adrian Oakley, Brian Taylor, Gregory Moore, and Andrew Goodliffe for the acquisition and interpretation of multichannel seismic data provided for preparation for this expedition. The editorial staff at the IODP *JOIDES Resolution* Science Operator at Texas A&M University is thanked for support with publication of this document. We thank Emilia Salgueiro, Marine Geology and Georesources, Instituto Português do Mar e da Atmosfera, Portugal, and José-Abel Flores, University of Salamanca, Spain, for description of fossils in Section 366-U1491C-2H-CC, 1–7 cm.

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.

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IODP publications

Scientific Prospectus

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Preliminary Report

Fryer, P., Wheat, G., Williams, T., and the Expedition 366 Scientists, 2017. *Expedition 366 Preliminary Report: Mariana Convergent Margin and South Chamorro Seamount*. International Ocean Discovery Program. <http://dx.doi.org/10.14379/iodp.pr.366.2017>

Proceedings volume

Fryer, P., Wheat, C.G., Williams, T., and the Expedition 366 Scientists, 2018. *Mariana Convergent Margin and South Chamorro Seamount*. Proceedings of the International Ocean Discovery Program, 366: College Station, TX (International Ocean Discovery Program). <https://doi.org/10.14379/iodp.proc.366.2018>

Expedition reports

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Fryer, P., Wheat, C.G., Williams, T., Albers, E., Bekins, B., Debret, B.P.R., Deng, J., Dong, Y., Eickenbusch, P., Frery, E.A., Ichiyama, Y., Johnson, K., Johnston, R.M., Kevorkian, R.T., Kurz, W., Magalhaes, V., Mantovanelli, S.S., Menapace, W., Menzies, C.D., Michibayashi, K., Moyer, C.L., Mullan, K.K., Park, J.-W., Price, R.E., Ryan, J.G., Shervais, J.W., Sissmann, O.J., Suzuki, S., Takai, K., Walter, B., and Zhang, R., 2018. Sites U1493, U1494, and U1495. In Fryer, P., Wheat, C.G., Williams, T., and the Expedition 366 Scientists, *Mariana Convergent Margin and South Chamorro Seamount*. Proceedings of the International Ocean Discovery Program, 366: College Station, TX (International Ocean Discovery Program).

<https://doi.org/10.14379/iodp.proc.366.106.2018>

Fryer, P., Wheat, C.G., Williams, T., Albers, E., Bekins, B., Debret, B.P.R., Deng, J., Dong, Y., Eickenbusch, P., Frery, E.A., Ichiyama, Y., Johnson, K., Johnston, R.M., Kevorkian, R.T., Kurz, W., Magalhaes, V., Mantovanelli, S.S., Menapace, W., Menzies, C.D., Michibayashi, K., Moyer, C.L., Mullan, K.K., Park, J.-W., Price, R.E., Ryan, J.G., Shervais, J.W., Sissmann, O.J., Suzuki, S., Takai, K., Walter, B., and Zhang, R., 2018. Site U1496. In Fryer, P., Wheat, C.G., Williams, T., and the Expedition 366 Scientists, *Mariana Convergent Margin and South Chamorro Seamount*. Proceedings of the International Ocean Discovery Program, 366: College Station, TX (International Ocean Discovery Program).

<https://doi.org/10.14379/iodp.proc.366.107.2018>

Fryer, P., Wheat, C.G., Williams, T., Albers, E., Bekins, B., Debret, B.P.R., Deng, J., Dong, Y., Eickenbusch, P., Frery, E.A., Ichiyama, Y., Johnson, K., Johnston, R.M., Kevorkian, R.T., Kurz, W., Magalhaes, V., Mantovanelli, S.S., Menapace, W., Menzies, C.D., Michibayashi, K., Moyer, C.L., Mullan, K.K., Park, J.-W., Price, R.E., Ryan, J.G., Shervais, J.W., Sissmann, O.J., Suzuki, S., Takai, K., Walter, B., and Zhang, R., 2018. Site U1497. In Fryer, P., Wheat, C.G., Williams, T., and the Expedition 366 Scientists, *Mariana Convergent Margin and South Chamorro Seamount*. Proceedings of the International Ocean Discovery Program, 366: College Station, TX (International Ocean Discovery Program).

<https://doi.org/10.14379/iodp.proc.366.108.2018>

Fryer, P., Wheat, C.G., Williams, T., Albers, E., Bekins, B., Debret, B.P.R., Deng, J., Dong, Y., Eickenbusch, P., Frery, E.A., Ichiyama, Y., Johnson, K., Johnston, R.M., Kevorkian, R.T., Kurz, W., Magalhaes, V., Mantovanelli, S.S., Menapace, W., Menzies, C.D., Michibayashi, K., Moyer, C.L., Mullan, K.K., Park, J.-W., Price, R.E., Ryan, J.G., Shervais, J.W., Sissmann, O.J., Suzuki, S., Takai, K., Walter, B., and Zhang, R., 2018. Site U1498. In Fryer, P., Wheat, C.G., Williams, T., and the Expedition 366 Scientists, *Mariana Convergent Margin and South Chamorro Seamount*. Proceedings of the International Ocean Discovery Program, 366: College Station, TX (International Ocean Discovery Program).

<https://doi.org/10.14379/iodp.proc.366.109.2018>

*The Expedition-related bibliography is continually updated online (<http://publications.iodp.org/proceedings/366/366title.html#bib>). Please send updates to PubCrd@iodp.tamu.edu.

Johnston, R.M., Ryan, J.G., and the Expedition 366 Scientists, 2018. pXRF and ICP-AES characterization of shipboard rocks and sediments: protocols and strategies. In Fryer, P., Wheat, C.G., Williams, T., and the Expedition 366 Scientists, *Mariana Convergent Margin and South Chamorro Seamount*. Proceedings of the International Ocean Discovery Program, 366: College Station, TX (International Ocean Discovery Program).
<https://doi.org/10.14379/iodp.proc.366.110.2018>

Supplementary material

Fryer, P., Wheat, C.G., Williams, T., and the Expedition 366 Scientists, 2018. Supplementary material,
<https://doi.org/10.14379/iodp.proc.366supp.2018>. Supplement to Fryer, P., Wheat, C.G., Williams, T., and the Expedition 366 Scientists, *Mariana Convergent Margin and South Chamorro Seamount*. Proceedings of the International Ocean Discovery Program, 366: College Station, TX (International Ocean Discovery Program).
<https://doi.org/10.14379/iodp.proc.366.2018>