Proceedings of the International Ocean Discovery Program

Volume 372A

Creeping Gas Hydrate Slides

Expedition 372A of the R/V *JOIDES Resolution*
Fremantle, Australia, to Lyttleton, New Zealand
Site U1517
26 November 2017–4 January 2018

Volume authorship
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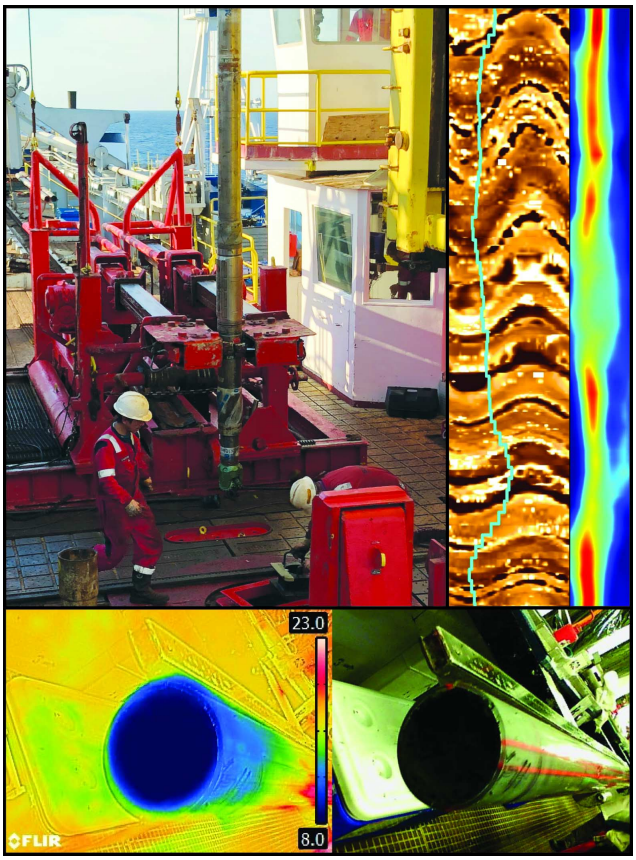

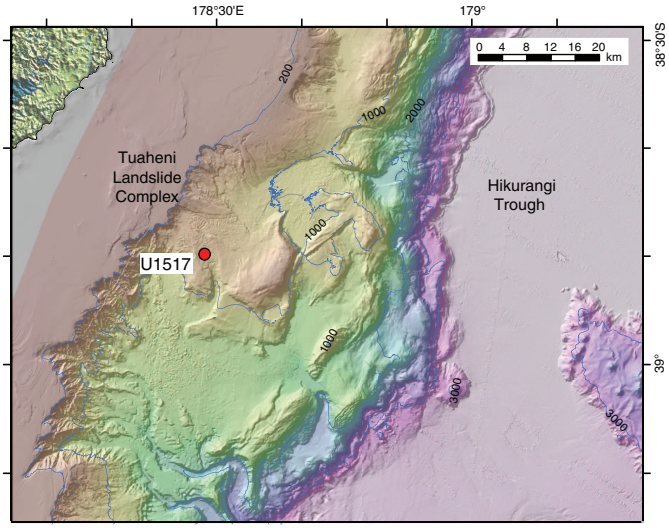

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Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the participating agencies, TAMU, or Texas A&M Research Foundation.

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://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 photographs show (top left) rig floor crew preparing logging-while-drilling tools for deployment, (top right) resistivity bit image and coherence velocity, and (bottom) gas hydrate identified using infrared imaging. Photo credit: David McNamara and IODP JRSO.

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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 U1517
Visual core descriptions · **Smear slides**

Supplementary material

Supplementary material for the Volume 372A expedition reports includes DESClogik workbooks and downhole temperature dual pressure probe data 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 372A 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 372A site map
IODP map (Expeditions 349–357, 359–372, and 381)
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Acknowledgments

We are very grateful to the entire teams of International Ocean Discover Program (IODP) Expeditions 372 and 375 for the smooth coordination between various Expedition 372 objectives. This *Proceedings* volume summarizes results from Expedition 372 Site U1517 concerning the role of gas hydrates in slow deformation at the Tuaheni Landslide Complex. Expedition 372 also included logging while drilling in preparation for Expedition 375. We acknowledge the important role of the *JOIDES Resolution* Facility Board in supporting and coordinating the complex operations of Expedition 372.

We would like to thank staff and crew aboard the R/V *JOIDES Resolution* for their skills, enthusiasm, and professionalism, which were pivotal for successful operations. We also acknowledge the significant efforts in coordinating and planning by many IODP staff leading up to the expedition, most notably, Leah LeVay, Katerina Petronotis, and Kevin Grigar. We wish to acknowledge support of the temperature dual pressure probe (T2P) by the Jackson School of Geosciences at the University of Texas (USA) and the UT GeoFluids Consortium, in particular Peter Polito. We are grateful for the enthusiasm of Schlumberger's shipboard logging team, David Pedulla, Liam Warda, and Lachlan Douglass, in logging the unusually shallow, by industry standards, Expedition 372 targets. We wish to thank the captains, crews, and scientists of the R/V *Tangaroa* Voyages TAN1114 and TAN1404 and R/V *Sonne* Voyage SO-247, which collected most of the site survey data.

IODP drilling at the Tuaheni Landslide Complex was the culmination of a number of research initiatives. We particularly acknowledge Joshu Mountjoy for leading studies into deformation of this landslide system for more than a decade. Selection of Site U1517 was underpinned by numerous seismic imaging and multibeam bathymetric expeditions led by scientists from New Zealand and Germany. We gratefully acknowledge Gareth Crutchley's processing of our 3-D P-Cable site survey data set and Joshu Mountjoy, Phil Barnes, Stuart Henrys, Sebastian Krastel, Stephanie Koch, Anke Dannowski, Andreia Plaza-Faverola, Steve Wilcox, John Mitchell, and Susi Woelz for their various contributions to seismic and bathymetric acquisition, processing, and interpretations of the data sets that were critical for drill site characterization and safety evaluation. Remotely operated Meeresboden-Bohrgerät 200 (MeBo) drilling during *Sonne* Voyage SO-247 led by Katrin Huhn and Nina Kukowski greatly facilitated site selection. We thank the Australia-New Zealand IODP Consortium for organizing the IODP Southwest Pacific Ocean Workshop in 2012, which was crucial for proposal development. We are grateful to Stuart Henrys and Mitch Malone for their immense efforts in tackling environmental protection regulations and obtaining the necessary clearances for research in New Zealand waters.

We wish to thank the funding agencies that supported acquisition and analysis of site survey and other relevant data. Crown Minerals (now New Zealand Petroleum and Minerals) commissioned the O5CM seismic survey. Land Information New Zealand's Ocean Survey 20/20 program supported *Tangaroa* Voyage TAN1114. *Tangaroa* Voyage TAN1404 was supported by National Institute of Water & Atmospheric Research internal funds, GNS Science internal funds, and German Science Foundation projects (KR2222/18; Bl 404/7-1). Funding sources for *Sonne* Voyage SO-247 included the German Ministry of Education and Research (03G0247A; 03G0247B) and the United States National Science Foundation (NSF) (OCE-1557519). Key funding for data analysis was provided by the New Zealand Marsden Fund (14-NIW-008) and the Ministry of Business, Innovation, and Employment (C05X0908). The NSF supported initial development of the T2P (OCE-0351085).

Finally, we wish to sincerely thank IODP, including all its Program Member Offices, for their continued support of scientific ocean drilling.

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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Chair, IODP Forum

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Scientific Prospectus

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Preliminary Report

Pecher, I.A., Barnes, P.M., LeVay, L.J., and the Expedition 372 Scientists, 2018. *Expedition 372 Preliminary Report: Creeping Gas Hydrate Slides and Hikurangi LWD.* International Ocean Discovery Program. **https://doi.org/10.14379/iodp.pr.372.2018**

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Expedition reports

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Supplementary material

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