

Proceedings of the International Ocean Discovery Program

Volume 355

Arabian Sea Monsoon

Expedition 355 of the riserless drilling platform

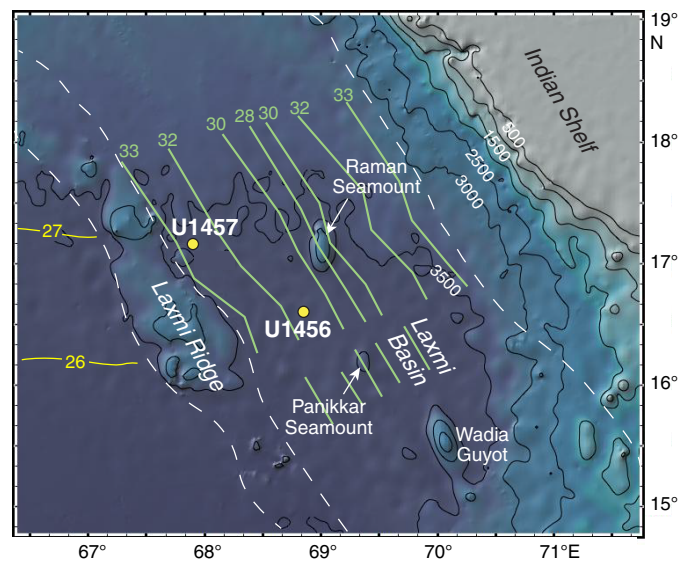
Colombo, Sri Lanka, to Mumbai, India

Sites U1456–U1457

31 March–31 May 2015

Volume authorship

Pandey, D.K., Clift, P.D., Kulhanek, D.K., and the Expedition 355 Scientists



Publisher's notes

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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 debris flow conglomerate comprising matrix-supported clasts of shallow water limestones floating in a carbonate-clay matrix. Steeply dipping laminated limestone and clay-rich limestone are likely a large raft of shallow-water sediment within the large mass transport deposit that was emplaced throughout Laxmi Basin prior to ~10.8 Ma following large scale collapse of the western Indian continental margin. Photograph from Section 355-U1456E-9R-4. Photo credit: IODP JRSO. JRSO expedition photos are the property of IODP and are in the public domain.

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[Site U1457](#)

D.K. Pandey et al.

Core descriptions

Visual core descriptions (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 U1456](#)

Visual core descriptions · Smear slides · Thin sections

[Site U1457](#)

Visual core descriptions · Smear slides · Thin sections

Supplementary material

Supplementary material for the Volume 355 expedition reports includes DESClogik workbooks in Microsoft Excel. A full list of directories can be found in SUPP_MAT in the volume zip folder or on the [Supplementary material for Volume 355 expedition reports](#) web page.

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 355 for their skill and dedication. Particular thanks go to the technical support staff for the quality and timeliness of their work. The Publications staff at the IODP *JOIDES Resolution* Science Operator at TAMU are thanked for help with publication of this document. We thank the Science Evaluation Panel and the Environmental Protection and Safety Evaluation Panel for their professional advice in bringing the proposal to a successful completion. Partial financial support provided by the Ministry of Earth Sciences, India (IODP-India), towards this expedition is gratefully acknowledged.

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 (<http://www.qgis.org>), and 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 355 site map](#)

[IODP map](#) (Expeditions 349–355)

[Integrated Ocean Drilling Program map](#) (Expeditions 301–348)

[ODP map](#) (Legs 100–210)

[DSDP map](#) (Legs 1–96)

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

Scientific Prospectus

Pandey, D.K., Clift, P.D., and Kulhanek, D.K., 2014. *Expedition 355 Scientific Prospectus: Arabian Sea Monsoon*. International Ocean Discovery Program. <http://dx.doi.org/10.14379/iodp.sp.355.2014>

Preliminary Report

Pandey, D.K., Clift, P.D., Kulhanek, D.K., Andò, S., Bendle, J.A.P., Bratenkov, S., Griffith, E.M., Gurumurthy, G.P., Hahn, A., Iwai, M., Khim, B.-K., Kumar, A., Kumar, A.G., Liddy, H.M., Lu, H., Lyle, M.W., Mishra, R., Radhakrishna, T., Routledge, C.M., Saraswat, R., Saxena, R., Scardia, G., Sharma, G.K., Singh, A.D., Steinke, S., Suzuki, K., Tauxe, L., Tiwari, M., Xu, Z., and Yu, Z., 2015. *Expedition 355 Preliminary Report: Arabian Sea Monsoon*. International Ocean Discovery Program. <http://dx.doi.org/10.14379/iodp.pr.355.2015>

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Expedition reports

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Sharma, G.K., Singh, A.D., Steinke, S., Suzuki, K., Tauxe, L., Tiwari, M., Xu, Z., and Yu, Z., 2016. Expedition 355 methods. In Pandey, D.K., Clift, P.D., Kulhanek, D.K., and the Expedition 355 Scientists, *Arabian Sea Monsoon*. Proceedings of the International Ocean Discovery Program, 355: College Station, TX (International Ocean Discovery Program). <http://dx.doi.org/10.14379/iodp.proc.355.102.2016>

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Supplementary material

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