

Proceedings of the International Ocean Discovery Program

Volume 354

Bengal Fan

Expedition 354 of the riserless drilling platform

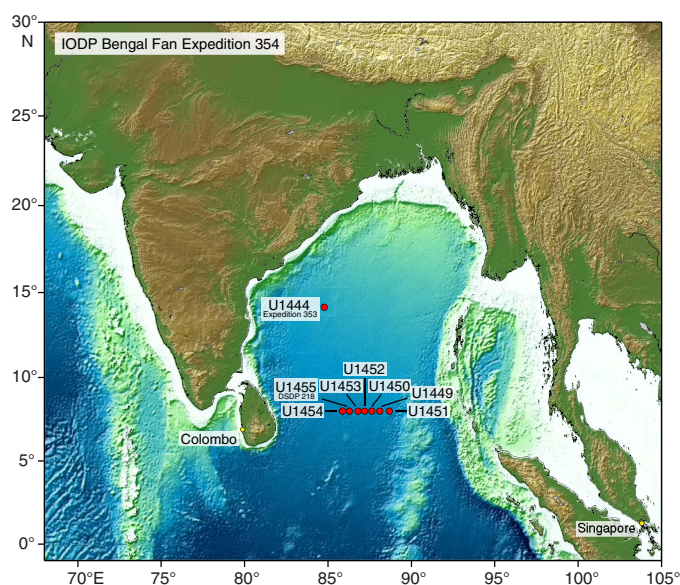
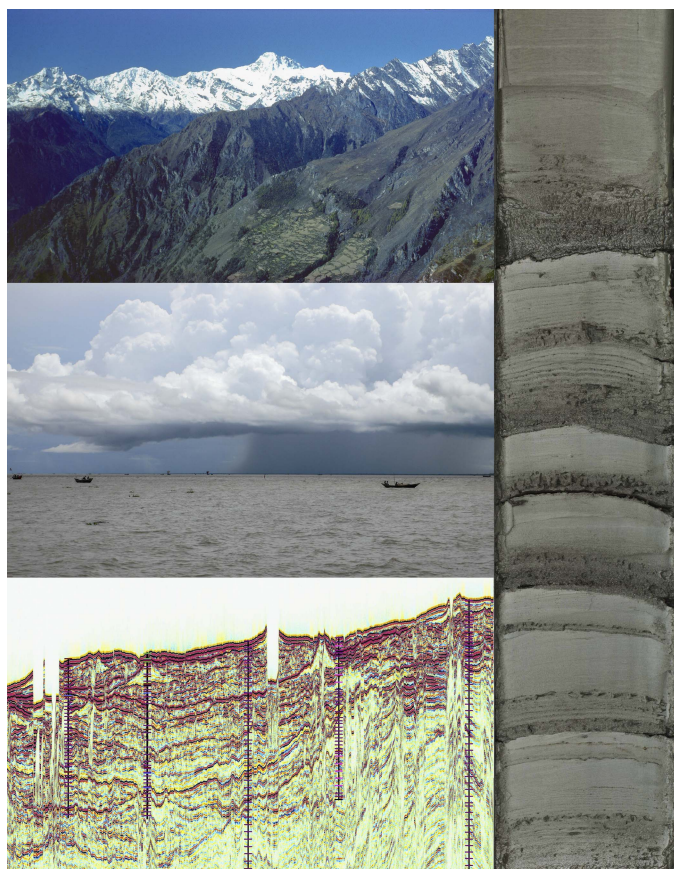
Singapore to Colombo, Sri Lanka

Sites U1449–U1455

29 January–31 March 2015

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://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 “from source to sink.” Top left: High Himalayan range under the Himal Chuli peak in Central Nepal showing glaciers and deep incision of the valleys that generate the erosion flux of sediments of Himalaya rivers. Middle left: Lower Meghna River, which conveys about one billion tons of sediment per year from the Ganga and Brahmaputra Rivers to the Bengal Fan across the Bangladesh delta during the monsoon season. Bottom left: seismic cross section of Bengal Fan at 8°N drilled during Expedition 354 showing channel levee structures and fan deposition. Right: turbidite succession from a levee drilled during Expedition 354. Photo credit: Christian France-Lanord (top left and middle left), Volkhard Spiess and Tilmann Schwenk (bottom left), and IODP JRSO (right; Section 354-U1452B-5H-1). JRSO expedition photos are the property of IODP and are in the public domain.

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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.

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Supplementary material

Supplementary material for the Volume 354 expedition reports includes larger versions of some figures in PDF and DESC 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 354 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), produced using QGIS (<http://www.qgis.org>), and Integrated Ocean Drilling Program, Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP), 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 354 site map](#)

[IODP map](#) (Expeditions 349–354)

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

[ODP map](#) (Legs 100–210)

[DSDP map](#) (Legs 1–96)

Acknowledgments

On behalf of the Expedition 354 science party, Christian France-Lanord and Volkard Spiess want to express their particular gratitude to Peter Molnar, Herman Kudrass, and Joe Curray for their contributions at various stages of this project. Expedition 354 would certainly not have been possible without their special input during the long-lasting construction of this project and their outstanding scientific contributions to the understanding of the Himalaya, Bengal Fan, and Indian monsoon.

Several expeditions to collect and analyze marine geophysical data and geologic samples have supported this project and have been funded through the German Ministry of Education and Science (BMBF) as cooperative work between Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), Hannover, and Bremen University, namely Cruises SO 93/1 to /3 in 1993, Project and Cruise SO 125-Bengalseis (BMBF Grant 03G0125A), and Project and Cruise SO 188-BengalSeaLevel (BMBF Grant 03G0188A). The seismic data interpretation and drilling proposal preparation was further supported by DFG (Deutsche Forschungsgemeinschaft) Grant Sp296/14.

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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Scientific Prospectus

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Preliminary Report

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Expedition reports

France-Lanord, C., Spiess, V., Klaus, A., Schwenk, T., Adhikari, R.R., Adhikari, S.K., Bahk, J.-J., Baxter, A.T., Cruz, J.W., Das, S.K., Dekens, P., Duleba, W., Fox, L.R., Galy, A., Galy, V., Ge, J., Gleason, J.D., Gyawali, B.R., Huyghe, P., Jia, G., Lantzsich, H., Manoj, M.C., Martos Martin, Y., Meynadier, L., Najman, Y.M.R., Nakajima, A., Ponton, C., Reilly, B.T., Rogers, K.G., Savian, J.F., Selkin, P.A., Weber, M.E., Williams, T., and Yoshida, K., 2016. Expedition 354 summary. In France-Lanord, C., Spiess, V., Klaus, A., Schwenk, T., and the Expedition 354 Scientists, *Bengal Fan*. Proceedings of the International Ocean Discovery Program, 354: College Station, TX (International Ocean Discovery Program).

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Supplementary material

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