



**PROCEEDINGS OF THE
INTEGRATED OCEAN
DRILLING PROGRAM
VOLUME 347 EXPEDITION REPORTS
BALTIC SEA PALEOENVIRONMENT**

Expedition 347 of the mission-specific drilling platform
from and to Kiel, Germany
Sites M0059–M0067
12 September–1 November 2013

Volume authorship

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Expedition 347 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, IODP Management International, Inc., or the Integrated Ocean Drilling Program Implementing Organization.

Abbreviations for names of organizations and publications in IODP reference lists follow the style given in *Chemical Abstracts Service Source Index* (published by American Chemical Society).

IODP mission-specific platform data are downloadable from iodp.wdc-mare.org/. Downhole wireline data are archived at brg.ldeo.columbia.edu/logdb/. If you cannot access this site or need additional data, please contact:

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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 the Geoquip GMTR120 drill rig. Photograph by Carol Cotterill.

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Foreword

By Integrated Ocean Drilling Program Management International, Inc.

The Integrated Ocean Drilling Program (IODP) concluded its decadal program (2003–2013) in September 2013. As envisioned in the Initial Science Plan (ISP), IODP expeditions utilized three scientific ocean drilling platforms to cover unprecedented areas of wide oceans, from ice-covered shallow water to full ocean depths. The major advance from the program predecessors, the Deep Sea Drilling Project and the Ocean Drilling Program, was the ability to drill miles of depth below seafloor. The living Earth is a dynamic system that is continuously evolving. Among its aims, IODP sought to understand this complex and unique system through scientific ocean drilling, sampling, and experimenting in deep holes, along with advancement of related scientific disciplines. IODP has been an international collaboration among scientists and nations with keen aspirations to attain the scientific goals of the ISP. By the program's end, IODP included participating members from 26 nations.

The *Proceedings* present the scientific and engineering results of IODP drilling projects, each designed to better understand the past, present, and future of the Earth system.

Each IODP expedition started with scientists who submitted research drilling proposals to test new and innovative ideas. These proposals then progressed to international scientific advisors (Science Advisory Structure) who nurtured, evaluated, ranked, and prioritized proposals. Scientists scheduled the science operations, selected science party members from scores of international scientists qualified to participate, planned platform operations, readied the drillship, and chose borehole locations. The science party, collectively and individually, conducted science on board and on shore. The co-chief scientists of each expedition have been responsible for synthesizing the scientific results and will continue in this role as IODP postcruise research results become available.

Ocean-drilling achievements help us to understand and interpret phenomena in various parts of the Earth system. Achievements in the two legacy drilling programs have validated the scientific concepts behind plate tectonics, contributed to the understanding of ocean circulation changes, and extended our knowledge of long- and short-term climate change. IODP has expanded and extended the scientific research conducted by the legacy programs, engaging in cutting-edge research concerning topics of global importance.

Three Implementing Organizations (IOs) conducted IODP drilling platform operations. Riserless platform operations have been conducted by the U.S. Implementing Organization (USIO), comprising the Consortium for Ocean Leadership, Inc., Texas A&M University through the Texas A&M Research Foundation, and Lamont-Doherty Earth Observatory of Columbia University. Riser platform operations have been conducted by the Japan Agency for Marine-Earth Science and Technology through Japan's Center for Deep Earth Exploration in cooperation with the Center for Advanced Marine Core Research at Kochi University. Mission-specific platform operations have been conducted by the European Consortium for Ocean Research Drilling (ECORD) Science Operator (ESO), comprising the British Geological Survey, the University of Bremen, and the European Petrophysics Consortium. The European IO represented the ocean-drilling efforts of 16 nations in Europe, plus Canada.

The discoveries presented in this volume build upon layers of knowledge and science developed over roughly the last fifty years. Through September 2013, expedition *Proceedings* were published by IODP Management International for IODP under the sponsorship of the U.S. National Science Foundation (NSF), Japan's Ministry of Education, Culture, Sports, Science and Technology, and other IODP members. The material is based upon research supported under Contract OCE-0432224 from NSF.

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Florida State University, USA

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Institut Universitaire Européen de la Mer (IUEM),
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University of Tasmania/IMS, Australia

University of Texas at Austin, USA

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*At time of expedition.

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Core descriptions

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Expedition research results

Data reports

Titles are available in [HTML](#).

Syntheses

Titles are available in [HTML](#).

Supplementary material

Supplementary material for this volume includes biostratigraphy data in Excel format and figures as JPGs and TIFFs, geochemistry data in Excel format, hand-drawn visual core descriptions as PDFs, lithostratigraphy data in Excel format, palynology data in Excel format, slab core scans in JPG format, and smear slide scans as PDFs. See [README.TXT](#) in the SUPP_MAT directory for a full listing of directories and files.

Drilling location maps

A site map showing the drilling locations for this expedition and maps showing the drilling locations of all Integrated Ocean Drilling Program (IODP), Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP) drilling sites are available in PDF format. These maps were produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith (gmt.soest.hawaii.edu/).

[IODP Expedition 347 site map](#)

[IODP map](#) (Expeditions 301–347)

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[DSDP map](#) (Legs 1–96)

Expedition-related bibliography*

IODP publications

Scientific Prospectus

Andrén, T., Jørgensen, B.B., and Cotterill, C., 2012. Baltic Sea Basin Paleoenvironment: paleoenvironmental evolution of the Baltic Sea Basin through the last glacial cycle. *IODP Sci. Prosp.*, 347. doi:10.2204/iodp.sp.347.2012

Preliminary Report

Expedition 347 Scientists, 2014. Baltic Sea Basin Paleoenvironment: paleoenvironmental evolution of the Baltic Sea Basin through the last glacial cycle. *IODP Prel. Rept.*, 347. doi:10.2204/iodp.pr.347.2014

Proceedings volume

Andrén, T., Jørgensen, B.B., and Cotterill, C., and the Expedition 347 Scientists, 2015. Proc. IODP, 347: College Station, TX (Integrated Ocean Drilling Program). doi:10.2204/iodp.proc.347.2015

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