

Proceedings of the International Ocean Discovery Program

Volume 403

Eastern Fram Strait Paleo-Archive

Expedition 403 of the R/V *JOIDES Resolution*
from and to Amsterdam, Netherlands
Sites U1618–U1624
4 June–2 August 2024

Volume authorship

Lucchi, R.G., St. John, K.E.K., Ronge, T.A., and the Expedition 403 Scientists



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The bulk of the shipboard-collected core data from this expedition is accessible at <https://zenodo.org/communities/iodp> (see list of [available data sets](#)). 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 (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 (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 photo shows the *JOIDES Resolution* off Prins Karls Forland, Svalbard. Photo credit: Chris Lyons, Sling-shot Pictures, and IODP.

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Core descriptions

Visual core descriptions (VCDs) are presented in PDF files for each site. Thin sections, smear slides, and/or tabular core description information for each site or hole are presented in tab-separated value (TSV) format or PDF 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 403 expedition reports includes core composite photos with X-ray images in Microsoft PowerPoint format and PDF. A full list of directories can be found in SUPP_MAT in the volume zip folder or on the [Supplementary material for Volume 403 expedition reports](#) web page.

Expedition research results

Data reports

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 (<https://www.generic-mapping-tools.org>), are available in PDF.

[IODP Expedition 403 site map](#)

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Dedication

We dedicate this publication to and thank everyone at sea and on shore who made IODP “the most successful and productive global geoscience collaboration” (<https://doi.org/10.1038/d41586-023-00690-1>).

In memoriam

We also dedicate this volume in memoriam of Maria Bianca Cita (Italy, 1924–2024), geologist, micropaleontologist, and stratigrapher. She was the first non-US scientist and one of the first two women to participate in a Deep Sea Drilling Project (DSDP) expedition (Leg 2, 1968). Her contribution to marine geosciences and inspiration for future generations will last forever.



Acknowledgments

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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 an intense 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 current IODP phase 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 Institute for Marine-Earth Exploration and Engineering (MarE3), 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 current 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 current 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 current IODP also has an international integrative level for high-level discussion and global consensus-building: the IODP Forum. The Forum is not only charged with assessing program-wide progress toward achieving the current Science Plan, but also with overseeing approaches toward a new bright future of scientific ocean drilling post 2023. At present, IODP involves 22 international funding agencies, including those from the United States, Japan, an Australia/New Zealand consortium (ANZIC), China, India, South Korea, and the 15 members of ECORD (Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom). The IODP membership represents an unparalleled level of international scientific collaboration; one of the greatest and ongoing strengths of scientific ocean drilling.

Henk Brinkhuis
Chair, IODP Forum

International Ocean Discovery Program

JOIDES Resolution Science Operator

Website: <http://iodp.tamu.edu>

IODP JRSO

International Ocean Discovery Program
Texas A&M University
1000 Discovery Drive
College Station TX 77845-9547
USA
Tel: (979) 845-2673; Fax: (979) 845-4857
Email: information@iodp.tamu.edu

IODP JRSO Curation and Laboratories

IODP Gulf Coast Repository (GCR)
Texas A&M University
1000 Discovery Drive
College Station TX 77845-9547
USA
Tel: (979) 845-8490; Fax: (979) 845-1303
Email: curator@iodp.tamu.edu

European Consortium for Ocean Research Drilling, Science Operator (ESO)

Website: <http://www.ecord.org>

IODP ESO Coordinator: Science, Logistics, and Operations

British Geological Survey
The Lyell Centre
Research Avenue South
Edinburgh EH14 4AP
United Kingdom
Tel: (44) 131-667-1000; Fax: (44) 131-668-4140
Email: eso@bgs.ac.uk

IODP ESO Curation and Laboratories

IODP Bremen Core Repository (BCR)
Center for Marine Environmental Sciences (MARUM)
University of Bremen
Leobener Strasse
28359 Bremen
Germany
Tel: (49) 421-218-65560; Fax: (49) 421-218-98-65560
Email: bcr@marum.de

IODP ESO Petrophysics

European Petrophysics Consortium
Department of Geology
University of Leicester
Leicester LE1 7RH
United Kingdom
Tel: (44) 116-252-3611; Fax: (44) 116-252-3918
Email: sjd27@leicester.ac.uk

Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Website: <http://www.jamstec.go.jp/chikyu/e>

IODP Japan Science Operator

Institute for Marine-Earth Exploration and Engineering (MarE3)
Japan Agency for Marine-Earth Science and Technology
Yokohama Institute for Earth Sciences
3175-25 Showa-machi
Kanazawa-ku, Yokohama
Kanagawa 236-0001
Japan
Tel: (81) 45-778-5643; Fax: (81) 45-778-5704
Email: mare3-exp@jamstec.go.jp

IODP Japan Curation and Laboratories

IODP Kochi Institute for Core Sample Research (KCC)
Japan Agency for Marine-Earth Science and Technology
200 Monobe Otsu
3175-25 Showa-machi
Nankoku City, Kochi 783-8502
Japan
Tel: (81) 88-864-6705; Fax: (81) 88-878-2192
Email: kcc.contact@jamstec.go.jp

Expedition 403 participants*

Expedition 403 scientists

Renata G. Lucchi

Co-Chief Scientist

Division of Geophysics

Istituto Nazionale di Oceanografia e di Geofisica Sperimentale-
OGS

Italy

rglucchi@ogs.it

Kristen E.K. St. John

Co-Chief Scientist

Department of Geology and Environmental Science

James Madison University

USA

stjohnke@jmu.edu

Thomas A. Ronge

Expedition Project Manager/Staff Scientist

International Ocean Discovery Program

Texas A&M University

USA

ronge@iodp.tamu.edu

Maria A. Barcena

Micropaleontologist (diatoms)

Geology Department

University of Salamanca

Spain

mbarcena@usal.es

Stijn De Schepper

Micropaleontologist (dinocysts)

NORCE Norwegian Research Centre AS

Norway

stde@norceresearch.no

Lucinda C. Duxbury

Microbiologist/Geochemist

Institute for Marine and Antarctic Studies

Australia

lucinda.duxbury@utas.edu.au

A. Catalina Gebhardt

Sedimentologist

Department of Geosciences

Alfred Wegener Institute

Helmholtz Center for Polar and Marine Research

Germany

catalina.gebhardt@awi.de

Alba Gonzalez-Lanchas

Micropaleontologist (nannofossils)

Department of Earth Sciences

University of Oxford

United Kingdom

alba.gonzalez-lanchas@earth.ox.ac.uk

Gryphen Goss

Sedimentologist

Department of Earth and Planetary Sciences

Yale University

USA

gryphen.goss@yale.edu

Nicole M. Greco

Sedimentologist

Department of Geological Sciences

University of Florida

USA

Present affiliation (15 November 2024):

National Center for Ecological Analysis and Synthesis

University of California Santa Barbara

USA

greco@nceas.ucsb.edu

Jens Gruetznier

Physical Properties Specialist/Stratigraphic Correlator

Department of Geosciences

Alfred Wegener Institute

Helmholtz Center for Polar and Marine Research

Germany

jens.gruetznier@awi.de

Lauren Haygood†

Inorganic Geochemist

Boone Pickens School of Geology

Oklahoma State University

USA

lauren.haygood@okstate.edu

Katrine Husum

Observer/Micropaleontologist (foraminifera)

Norwegian Polar Institute

Norway

katrine.husum@npolar.no

Mutsumi Iizuka

Organic Geochemist

The National Institute of Advanced Industrial Science and

Technology (AIST)

Marine Geology Research Group

Japan

m.iizuka@aist.go.jp

Aruggoda K. Isuri U. Kapuge

Sedimentologist

Department of Earth Sciences

University of Delaware

USA

kapuge@udel.edu

*Affiliations at time of expedition, except where updated by participants.

†Shore-based participant.

Adriane R. Lam
Sedimentologist
Earth Sciences
Binghamton University
USA
alam@binghamton.edu

Olga Libman-Roshal
Physical Properties Specialist
Earth and Environmental Studies
Montclair State University
USA
libmanroshao1@montclair.edu

Yanguang Liu
Inorganic Geochemist
First Institute of Oceanography
Kay Laboratory of Marine Geology and Metallogeny
China
yanguangliu@fio.org.cn

Lindsey Rose Monito
Physical Properties Specialist
Department of Geological Sciences
University of Florida
USA
monitol@ufl.edu

Brendan Thomas Reilly
Paleomagnetist
Lamont-Doherty Earth Observatory
Columbia University
USA
breilly@ldeo.columbia.edu

Observers

Paul Ruzycki
Ice Navigator
Martech Polar Consulting Ltd.
Canada
paul.ruzycki@gmail.com

Outreach

Chris Lyons
Videographer
Slingshot Pictures LLC
chrislyons.create@gmail.com

Tim Lyons
Videographer
Slingshot Pictures LLC
studio@lyonswork.com

Yair Rosenthal
Physical Properties Specialist/Stratigraphic Correlator
Institute of Marine and Coastal Sciences
Rutgers, The State University of New Jersey
USA
rosenthal@marine.rutgers.edu

Yuhi Sakai
Downhole Tools/Physical Properties Specialist
Department of Urban Management
Kyoto University
Japan
sakai.yuhi.68c@st.kyoto-u.ac.jp

Adukkam Veedu Sijinkumar
Sedimentologist
Department of Geology
Central University of Kerala
India
sijingeo@gmail.com

Yusuke Suganuma
Sedimentologist
National Institute of Polar Research
Division for Advanced Research Promotion
Japan
suganuma.yusuke@nipr.ac.jp

Yi Zhong
Paleomagnetist
Department of Ocean Science and Technology
Southern University of Science and Technology
China
zhongy@sustech.edu.cn

Victor Gronmyr
Ice Navigator
Martech Polar Consulting Ltd.
Canada
gronmyrv@gmail.com

Khyber Jones
Videographer
Slingshot Pictures LLC
khyberjones@gmail.com

Operational and technical staff

SEA1 Offshore AS officials

Jake Robinson
Master of the Drilling Vessel

Glenn Barrett
Drilling Supervisor

JRSO shipboard personnel and technical representatives

Alejandro Avila-Santis
Marine Laboratory Specialist

Timothy Blaisdell
Applications Developer

Fabricio Ferreira
Marine Laboratory Specialist

Clay Furman
Schlumberger Engineer

Randy Gjesvold
Marine Instrumentation Specialist

Kevin Grigar
Operations Superintendent

James Kowalski
Curatorial Specialist

Aiden Leetz
Marine Laboratory Specialist

Tiffany Liao
Marine Laboratory Specialist

Chang Liu
Marine Laboratory Specialist

Nick Logan
Marine Computer Specialist

Dan Marone
Assistant Laboratory Officer

Aaron Mechler
Marine Laboratory Specialist

Kerry Mullins
Marine Computer Specialist

Beth Novak
Assistant Laboratory Officer

Chieh Peng
Laboratory Officer

Michael Rivera
Marine Laboratory Specialist

Daniel Rudback
Marine Laboratory Specialist

Alyssa Stephens
Publications Specialist

Brittany Stockmaster
Marine Laboratory Specialist

Garrick van Rensburg
Marine Instrumentation Specialist

Max Witek
Marine Laboratory Specialist

Jesse Yeon
Marine Laboratory Specialist

James Zhao
Applications Developer

IODP Publication Services staff*

Molly Blaisdell
Production Editor II

Douglas Cummings
Graphics Specialist III

Keith Dupuis
Graphics Specialist III

Anthony Eason
Graphics Specialist II

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Amy McWilliams
Supervisor of Editing

Julie Myers
Production Editor IV

Lorri Peters
Manager of Publication Services

Alyssa Stephens
Supervisor of Graphics

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IODP publications

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Preliminary Report

Lucchi, R.G., St. John, K.E.K., Ronge, T.A., and the Expedition 403 Scientists, 2024. Expedition 403 Preliminary Report: Eastern Fram Strait Paleo-Archive. International Ocean Discovery Program. <https://doi.org/10.14379/iodp.pr.403.2024>

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Lucchi, R.G., St. John, K.E.K., Ronge, T.A., and the Expedition 403 Scientists, 2026. Eastern Fram Strait Paleo-Archive. Proceedings of the International Ocean Discovery Program, 403: College Station, TX (International Ocean Discovery Program). <https://doi.org/10.14379/iodp.proc.403.2026>

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- St. John, K.E.K., Lucchi, R.G., Ronge, T.A., Barcena, M.A., De Schepper, S., Duxbury, L.C., Gebhardt, A.C., Gonzalez-Lanchas, A., Goss, G., Greco, N.M., Gruetzner, J., Haygood, L., Husum, K., Iizuka, M., Kapuge, A.K.I.U., Lam, A.R., Libman-Roshal, O., Liu, Y., Monito, L.R., Reilly, B.T., Rosenthal, Y., Sakai, Y., Sijinkumar, A.V., Suganuma, Y., and Zhong, Y., 2026. Expedition 403 summary. In Lucchi, R.G., St. John, K.E.K., Ronge, T.A., and the Expedition 403 Scientists, Eastern Fram Strait Paleo-Archive. Proceedings of the International Ocean Discovery Program, 403: College Station, TX (International Ocean Discovery Program). <https://doi.org/10.14379/iodp.proc.403.101.2026>
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- Lucchi, R.G., St. John, K.E.K., Ronge, T.A., Barcena, M.A., De Schepper, S., Duxbury, L.C., Gebhardt, A.C., Gonzalez-Lanchas, A., Goss, G., Greco, N.M., Gruetzner, J., Haygood, L., Husum, K., Iizuka, M., Kapuge, A.K.I.U., Lam, A.R., Libman-Roshal, O., Liu, Y., Monito, L.R., Reilly, B.T., Rosenthal, Y., Sakai, Y., Sijinkumar, A.V., Suganuma, Y., and Zhong, Y., 2026. Site U1624. In Lucchi, R.G., St. John, K.E.K., Ronge, T.A., and the Expedition 403 Scientists, Eastern Fram Strait Paleo-Archive. Proceedings of the International Ocean Discovery Program, 403: College Station, TX (International Ocean Discovery Program). <https://doi.org/10.14379/iodp.proc.403.107.2026>

*The Expedition-related bibliography is continually updated online (<http://publications.iodp.org/proceedings/403/403title.html#bib>). Please send updates to PubCrd@iodp.tamu.edu.

Supplementary material

Lucchi, R.G., St. John, K.E.K., Ronge, T.A., and the Expedition 403 Scientists, 2026. Supplementary material, <https://doi.org/10.14379/iodp.proc.403supp.2026>. In Lucchi, R.G., St. John, K.E.K., Ronge, T.A., and the Expedition 403 Scientists, Eastern Fram Strait Paleo-Archive. Proceedings of the International Ocean Discovery Program, 403: College Station, TX (International Ocean Discovery Program).

Site map

