European Consortium for Ocean Research Drilling

ANNUAL REPORT 2023

From 2003 to 2013, the European Consortium for Ocean Research drilling (ECORD) was part of the Integrated Ocean Drilling Program (IODP-1 2003-2013), which became the International Ocean Discovery Program in October 2013.

ECORD coordinated the European contribution to the programme through the mission-specific platform (MSP) concept, which allowed the ocean research community to work in technically challenging conditions where the US drillship *JOIDES Resolution* and the Japanese drilling vessel *Chikyu* are unable to operate. The development of the MSP concept has therefore added a new dimension to ocean drilling.

The ECORD Science Operator (ESO) consortium has successfully managed five MSP expeditions for IODP-1 to the Arctic (2004), Tahiti (2005), New Jersey (2009), the Great Barrier Reef (2010), and the Baltic Sea (2013). ECORD's scientific and operational accomplishments have been prolific and of high quality, and are recognised by our global partners as a crucial contribution to the largest marine geosciences programme in the world.

The International Ocean Discovery Program (IODP-2), which started on 1 October 2013, builds on this legacy and addresses global challenges facing current and future generations with new research approaches, expanded scientific communities and continued development of its unique collaborative model.

ECORD funds and implements MSP operations for IODP as an independent platform provider, with the aim to carry out high-profile expeditions and to maintain the implementation of one expedition per year if funding allows for the duration of the 2013-2023 programme. MSPs might include specifically outfitted polar vessels, jack-up rigs, geotechnical vessels, seabed-drilling systems, long-piston coring, anchored barges and others, as determined by scientific priorities and operational efficiency. From 2015 to 2021, ESO has successfully managed fourexpeditions to the Atlantis Massif, the Chicxulub Impact Crater, the Rift of Corinth and the Japan Trench Paleoseismology.

ECORD makes financial contributions to the US National Science Foundation (NSF) and to the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) for support and access to the *JOIDES Resolution* and the *Chikyu* respectively. Members of ECORD can therefore take part in all IODP expeditions that address research topics such as climate and ocean change, biodiversity, sub-seafloor life, origin of life, natural hazards on human time scales, as well as the internal structure and dynamics of our Planet.

Front cover: Operations during IODP Expedition 389. Credits: M. Parker, ECORD/IODP.

Published by the ECORD Managing Agency (EMA) - June 2024.
Layout and design: Malgo Bednarz (EMA Outreach Officer).
www.ecord.org

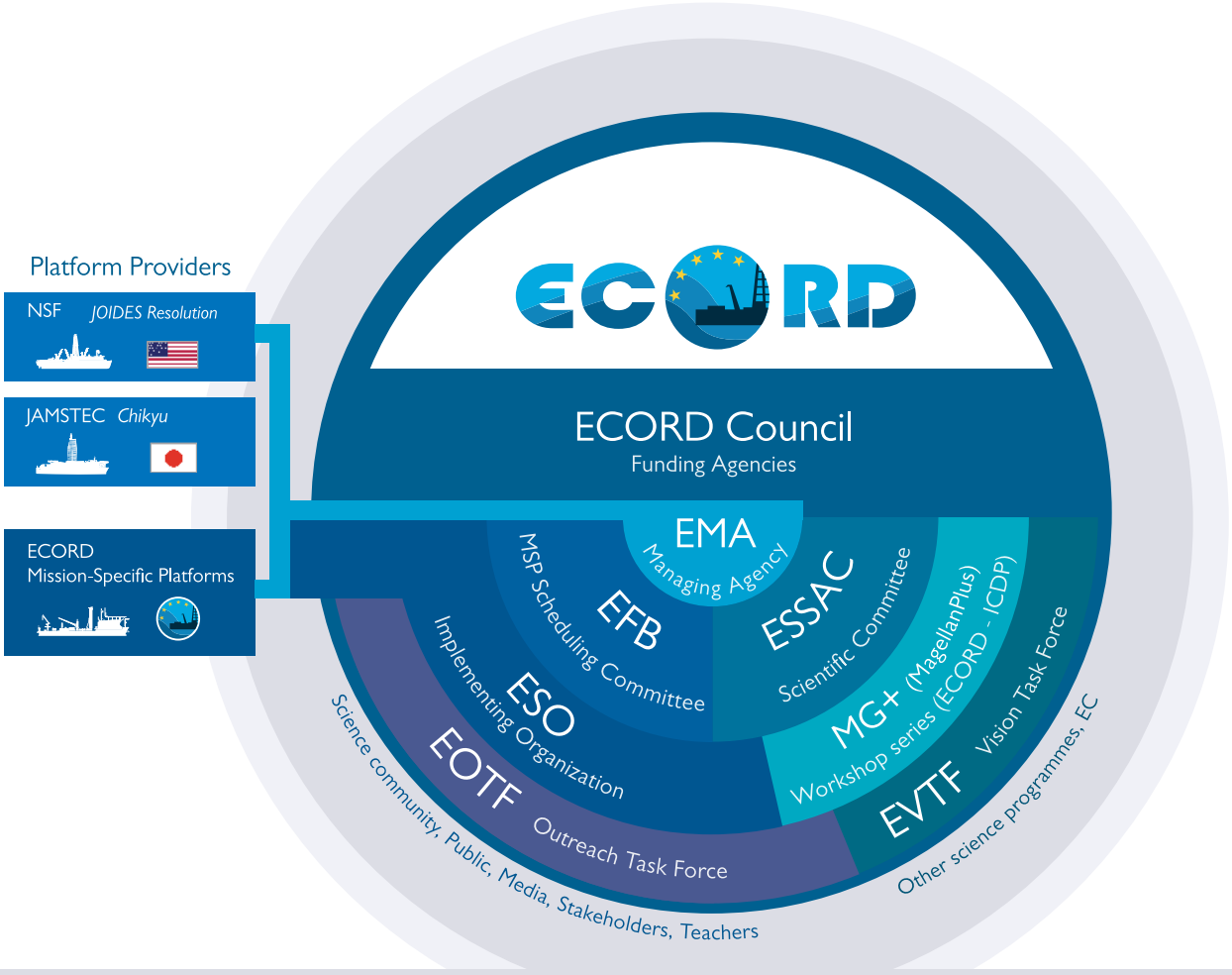
European Consortium for Ocean Research Drilling

ECORD Annual Report 2023

1 January 2023 - 31 December 2023

Table of Contents

ECORD entities



2023 ECORD Member Countries

Austria	1	Österreichische Akademie der Wissenschaften (ÖAW)
Canada	2	Canadian Consortium for Ocean Drilling (CCOD)
Denmark	3	Danish Agency for Science and Higher Education
Finland	4	Suomen Akatemia
France	5	Centre National de la Recherche Scientifique (CNRS)
Germany	6	Deutsche Forschungsgemeinschaft (DFG)
Ireland	7	The Geological Survey of Ireland (GSI)
Italy	8	Consiglio Nazionale delle Ricerche (CNR)
Netherlands	9	Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)
Norway	10	Forskningsradet
Portugal	11	Fundação para a Ciência e a Tecnologia (FCT)
Spain	12	Ministerio de Ciencia, Innovación (MCIN)
Sweden	13	Vetenskapsradet (VR)
Switzerland	14	Fonds National Suisse (FNS)
United Kingdom	15	United Kingdom Research and Innovation (UKRI)

European Consortium for Ocean Research Drilling

As defined in the ECORD Memorandum of Understanding, ECORD includes **five entities** (ECORD Council, ECORD Managing Agency - EMA, ECORD Facility Board - EFB, ECORD Science Operator - ESO, ECORD Science Support and Advisory Committee - ESSAC), **two task forces** (ECORD Vision Task Force - EVTF and ECORD Outreach Task Force - EOTF) and **a workshop programme** (MagellanPlus Workshop Series Programme).

www.ecord.org *ema@cerege.fr* @ECORD_IODP ECORD_IODP ECORD IODP

ECORD Council

www.ecord.org/about-ecord/management-structure/council/

The **ECORD Council** is the funding entity for ECORD and provides oversight for all ECORD activities.

Chair	**France Lagroix** (France; 1 January to 31 December 2023)
Outgoing Vice-Chair	**Guido Lüniger** (Germany; 1 January to 30 June 2023)
Incoming Vice-Chair	**Annalisa Iadanza** (Italy; 1 July to 31 December 2023)

Council Core Group	**Michael Webb** (UK) **France Lagroix** (France) **Guido Lüniger** (Germany) **Bernard Westerop** (The Netherlands) **Annalisa Iadanza** (Italy)

France Lagroix
ECORD Council Chair 2023

France Lagroix is a CNRS Research Director and the Solid Earth Science Delegate of CNRS's Institut National des Science de l'Univers (INSU) appointed as the alternate French delegate of the ECORD Council. France Lagroix is a trained geologist and geophysicist who obtained a doctoral degree in rock magnetism from the University of Minnesota and is currently affiliated to the Institut de Physique du Globe de Paris since 2004.

EMA (ECORD Managing Agency)

www.ecord.org/about-ecord/management-structure/ema/

Director	**Gilbert Camoin** (CEREGE, France)
Assistant Director	**Nadine Hallmann** (CEREGE, France)
Outreach Officer	**Malgo Bednarz** (CEREGE, France)
Administrator	**Patricia Rieu** (CEREGE, France)

EMA is the management body of ECORD. EMA is in charge of the management of the ECORD budget and the contracts with the ECORD partners, the representation of ECORD in all IODP entities and the link between these entities and the ECORD members.

Gilbert Camoin
EMA Director

Gilbert Camoin, PhD, DSc, is a senior research scientist at the CNRS (Centre National de la Recherche Scientifique) and works currently at the CEREGE (Centre Européen de Recherche et d'Enseignement de Géosciences de l'Environnement) in Aix-en-Provence, France. His major research activities are mainly focused on the records of sea-level, environmental and climatic changes by coral reefs and other carbonate systems. He has authored more than 150 peer-reviewed papers and supervised 11 PhD students and eight post-docs.
Gilbert sailed on ODP Leg 144 and several other cruises, was then lead PI of Proposal 519 (Tahiti and Great Barrier Reef drilling) and Co-chief Scientist on IODP Expedition 310. He served as Chair of the ODP/IODP-1 Environment Science Steering Evaluation Panel (2001-2005), Chair of the ECORD Science Support and Advisory Committee - ESSAC - (2007-2009), Member of the IODP-1 Science Planning Committee (2007-2010), and Member of the IODP-2 Science Plan Writing Committee (2010-2011). He was appointed as Director of the ECORD Managing Agency in January 2012.

ESSAC (ECORD Science Support and Advisory Committee)

www.ecord.org/about-ecord/management-structure/essac/

Chair	**Angelo Camerlenghi** (OGS Trieste, Italy)
Vice-Chair	**Antony Morris** (Plymouth University, UK)
Science Coordinator	**Hanno Kinkel** (OGS Trieste, Italy)

ESSAC is the ECORD science committee and is responsible for the scientific planning and coordination of ECORD's contribution to IODP. ESSAC aims at maximising the scientific and technological contribution of ECORD to IODP, as well as promoting appropriate representation of the ECORD scientific community in the IODP Science Advisory Structure.

Angelo Camerlenghi
ESSAC Chair

Angelo Camerlenghi, PhD, is a senior research scientist at the National Institute of Oceanography and Applied Geophysics – OGS based in Trieste, Italy. His research is in the field of geological oceanography, addressing ocean margins evolution, fluid flow and gas hydrates, and recently the Mediterranean salt giant. He has led several international projects and research cruises worldwide and is author of 136 scientific publications listed in Scopus.
Angelo sailed on ODP Leg 117 (Indian Ocean) as technician while a MS student at Texas A&M University, on ODP Leg 146 (Cascadia Margin) as sedimentologist, and on ODP Leg 178 (Sea-Level Change and Glacial History, Antarctic Peninsula) as co-chief scientist. He was the lead proponent of the Eastern Mediterranean drilling (ODP Leg 160) and is now leading the IODP Multiple Platform Drilling Proposal Uncovering a Salt Giant. He served as member of the Site Survey Panel (1992-95), Italian Delegate in ESSAC (2004-2005) and member of the Steering Committee of the IODP-IMI Workshop on Geohazards, Portland, Oregon in 2007. He is ESSAC Chair since January 1st 2022.

ESO (ECORD Science Operator)

www.ecord.org/about-ecord/management-structure/eso/

ESO is the implementing organisation of ECORD and is tasked with planning and delivering mission-specific platform (MSP) expeditions for the International Ocean Discovery Program (IODP). ESO is a consortium of three European scientific institutions: the British Geological Survey (BGS); the MARUM – Center for Marine Environmental Sciences, University of Bremen, Germany; and the European Petrophysics Consortium (EPC). Each partner contributes specific expertise to ESO, allowing the consortium to build tailored expeditions to suit the requirements of proposals selected for implementation by the ECORD Facility Board. BGS coordinates proposal scoping, expedition planning and project management, contracting of drilling services and vessels, operational oversight, and project permitting. MARUM manages the curation services and scientific facilities required by MSPs, provides data management services, and coordinates the implementation of the Onshore Science Party, hosted at the IODP Bremen Core Repository and laboratories of the University of Bremen. EPC comprises two European universities: University of Leicester (UK, lead partner) and University of Montpellier (France). The consortium provides operational, technical and high-level scientific support for MSP expeditions. EPC is part of the International Scientific Logging Consortium which provides staff for IODP non-riser expeditions.

David McInroy
ESO Science Manager

David McInroy is Team Leader for Ocean Geoscience at the British Geological Survey in Edinburgh, UK, and is tasked with progressing deep sea geoscientific research within the BGS Marine Geoscience Directorate. David is a geologist and geophysicist with a research background in the evolution and hydrocarbon prospectivity of the UK's Atlantic Margin, and has participated in geophysical data acquisition cruises on the UK's continental shelf. From 2003-2010, David was Expedition Project Manager for IODP Expeditions 302, 310 and 313, and since 2010 has held the role of ESO Science Manager.

British Geological Survey (BGS), UK	
Science Manager / Outreach Manager	**David McInroy**
Operations Manager	**Graham Tulloch**
Operations Support	**Grant Affleck**
Expedition Project Managers	**Jeremy Everest** **Hannah Grant** **Margaret Stewart**
Data Manager	**Mary Mowat**
IT Support	**Alan Douglas**
MARUM, Germany	
Curation and Laboratory Manager	**Ursula Röhl**
Assistant Laboratory Manager	**Patrizia Geprägs**
Curatorial Scientists	**Holger Kuhlmann** **Alex Wülbers** **Nina Rohlfs**
Media Relations	**Ulrike Prange**
Data Manager	**Vera Bender**
Geochemists	**Luzie Schnieders**
Petrophysics Techs	**Vera Lukies**
Bioinformatician	**Oliver Blaszczyk**
University of Leicester, UK	
EPC Manager	**Sarah Davies**
EPC Project Manager	**Simon Draper**
Petrophysics Staff Scientists	**Tim van Peer** **Marisa Rydzy** **Andrew McIntyre**
University of Montpellier, Fravnce	
Petrophysics Staff Scientist	**Johanna Lofi** **Erwan Le Ber** **Philippe Pezard** **Laurent Brun**

EFB (ECORD Facility Board)

www.ecord.org/about-ecord/management-structure/efb/

EFB is the key planning forum for MSP expeditions and is responsible for scheduling drilling proposals and for advising on the long-term planning of ECORD's activities and functions, through operational and management oversight of MSP expeditions. EFB is composed of a Science Board, the ECORD Vision Task Force (EVTF) and partners' representatives (NSF and MEXT).

Chair
Alexandra Turchyn
(University of Cambridgel, UK)

Members of the Science Board
Gabriele Uenzelmann-Neben
(AWI, Germany)
Michele Rebesco
(OGS, Italy)
Beth Christensen
(Rowan University, USA)
Yasuhiro Yamada
(Kyushu University, Japan)
Jody Webster
(University of Sydney, Australia)

Sasha Turchyn
ECORD Facility Board Chair

Sasha Turchyn is a Professor of Geochemistry in the Department of Earth Sciences at the University of Cambridge, in Cambridge, England. At its broadest level her research focuses on the processes that bring carbon to and from the surface in the carbon cycle. This includes studies of biogeochemistry and geomicrobiology of marine sedimentary environments, studies of hydrothermal circulation and its role in the carbon cycle, volcanic carbon and sulfur fluxes, and paleoceanographic studies to understand how these processes change over time. After university, Sasha worked as a field engineer in the oil industry on offshore platforms in the North Sea before returning to get her PhD. She has built her career using legacy assets including core samples and porefluid samples, as well as leveraging existing data acquired through DSDP/ODP/IODP with numerical models. Sasha has published over 120 papers and was awarded the Berner Lecture (EAG), the Dansgaard Award (AGU) and the Pilkington Prize for teaching excellence (Cambridge). Sasha joined the EFB science board in January 2020 and was appointed chair in January 2023.

EVTF (ECORD Vision Task Force)

The **EVTF** is the ECORD strategic entity in charge of developing a long-term scientific and funding strategy, and monitoring the ECORD progress toward the completion of the IODP Science Plan.
The EVTF is composed of the ECORD Council Core Group, including the ECORD Council Chair and Vice-Chair, the ESSAC Chair, the EMA Director and Assistant Director and the ESO Science Manager.

EOTF (ECORD Outreach Task Force)

The **EOTF** coordinates ECORD communication tasks, such as outreach/public information and educational activities related to IODP in ECORD countries. The EOTF is composed of the EMA Outreach Officer (Chair) and Assistant Director, the ESO Outreach and Media Relations Managers and the ESSAC Science Coordinator. The EMA Director and the ESSAC Chair act as observers.

MG+ (MagellanPlus Workshop Series)

www.ecord.org/science/magellanplus/

The **MagellanPlus Workshop Series Programme** is designed to support ECORD scientists in developing new and innovative science proposals to meet the challenges of the IODP Science Plan and the 2050 Science Framework. This programme is co-funded by ECORD and the International Continental Scientific Drilling Program (ICDP).

ECORD and IODP meetings and conferences

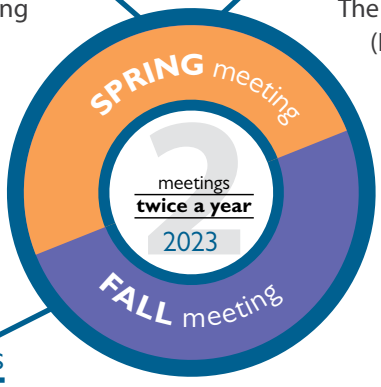
The table on the next page summarizes the ECORD and IODP meetings that have been held in 2023, as well as the two major conferences (EGU in Vienna and AGU in San Francisco) where IODP-related sessions and booths have been organized.

ECORD Council meetings

The **ECORD Council** meets twice a year: a spring meeting involving the members of the ECORD Council and of the EVTF, and a fall meeting jointly with ESSAC involving representatives of all ECORD entities as well as representatives from other ECORD entities, IODP partners (funding agencies, operators and science committees), IODP liaisons and collaborating science programmes

EOTF meetings

The **ECORD Outreach Task Force** (EOTF) meets twice a year, in February/March and in fall. Outreach liaisons from the US Science Support Program, JAMSTEC (Japan) and ICDP usually attend the EOTF fall meeting.



ESSAC meetings

ESSAC meets twice a year: a spring meeting involving ESSAC Delegates and EMA and ESO representatives, and a fall meeting jointly with the ECORD Council.

EFB meeting

The **ECORD Facility Board** (EFB) meets once a year. Liaisons from ECORD entities and representatives from IODP partners (funding agencies, operators and science committees) attend the EFB meetings.

ECORD representatives at IODP meetings

ECORD representatives act as members and/or liaisons to meetings of IODP entities:

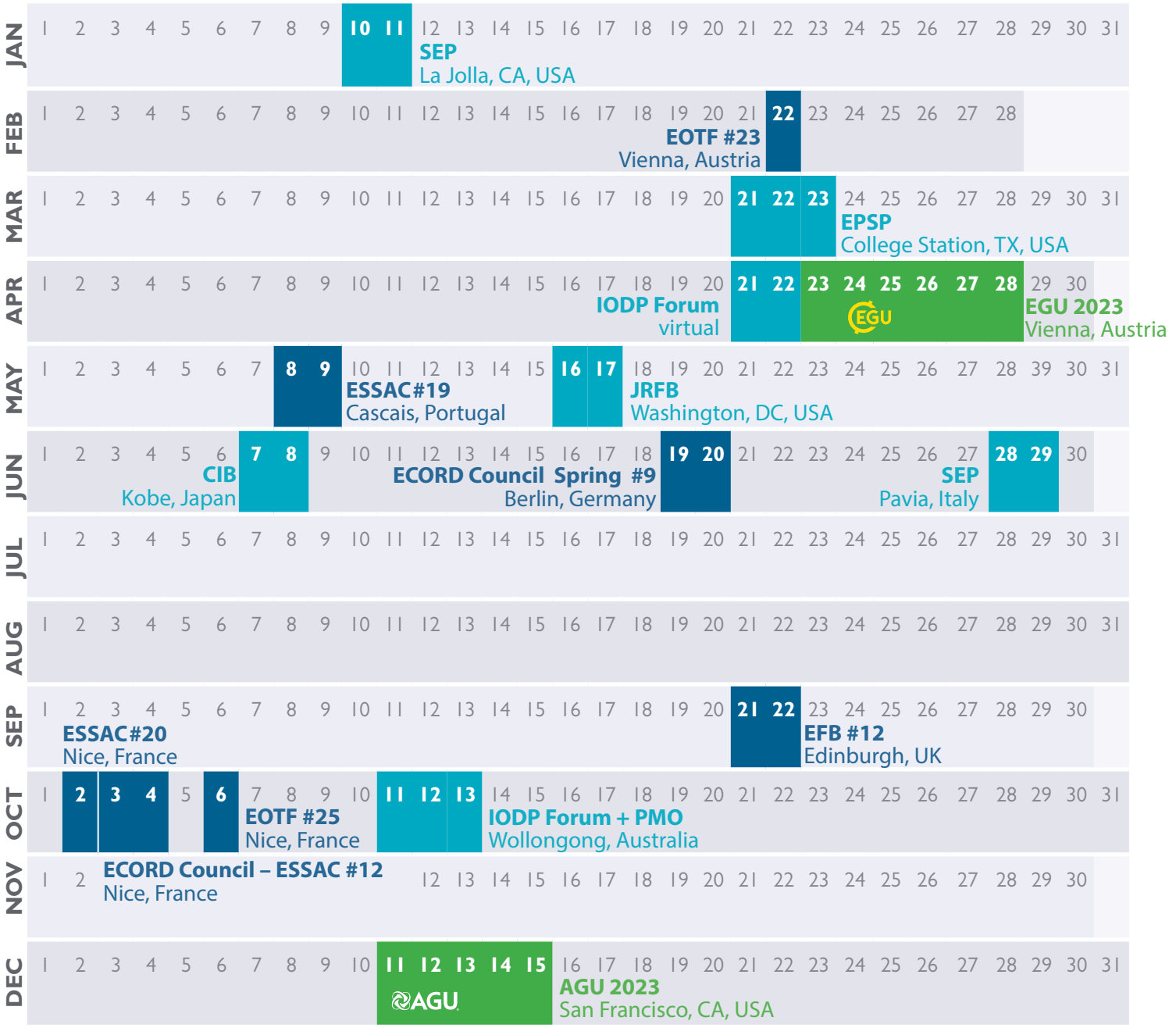
- the *JOIDES Resolution* Facility Board (JRFB),
- the *Chikyu* IODP Board (CIB),
- the Science Evaluation Panel (SEP),
- the Environmental Protection and Safety Panel (EPSP),
- the IODP Forum.

See 10. ECORD representatives on IODP panels, *page xx*.

www.ecord.org/contact-ecord/ *ema@cerege.fr*

Mobilising the *MMA Valour* before IODP Expedition 389.
Credits: J. Everest, ECORD/IODP.

ECORD / IODP meetings and conferences **2023** calendar



ECORD meetings | IODP meetings | International conferences

Figure summarizing the ECORD and IODP meetings that have been held in 2023, as well as the two major conferences (EGU and AGU) where IODP-related scientific sessions and booths have been organised.

Acronyms:
AGU - American Geophysical Union, CIB - *Chikyu* IODP Board, EFB - ECORD Facility Board, EGU - European Geosciences Union, EOTF - ECORD Outreach Task Force, EPSP - Environmental Protection and Safety Panel, JRFB - *JOIDES Resolution* Facility Board, SEP - Science Evaluation Panel.

http://www.ecord.org/events-calendar/

ECORD European Consortium for Ocean Research Drilling

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

1. FY2023 highlights

Celebrating "The Hundredth Site M100" milestone of Mission Specific Platform (MSP) Expeditions during IODP Expedition 389. Three members of ESO sailing on Expedition 389 were also present for Site M0001 on Expedition 302 (ACEX). From left to right: Alex Wuelbers (MARUM), Graham Tulloch (BGS) and Luzie Schnieders (MARUM). Credits: M. Rydzy, ECORD/IODP.

1. FY2023 highlights

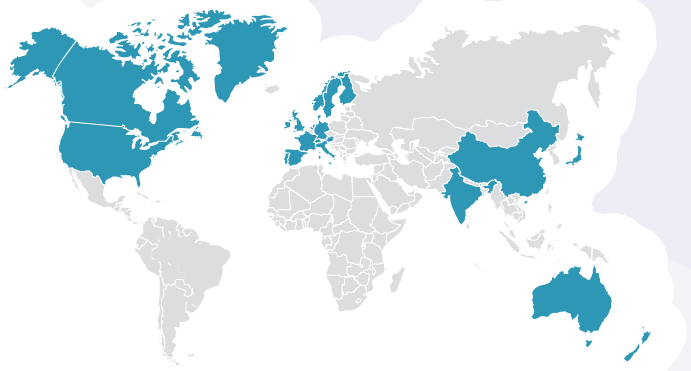
New ECORD logo
After 20 years in operation, ECORD decided to refresh its logo (image on the right).
The new logo was presented to the community during the 20th Anniversary celebration of ECORD at the Natural History Museum in Vienna in April 2023 (see page *114*).

ECORD
European Consortium for Ocean Research Drilling

On 25 April 2023, ECORD has celebrated its 20th anniversary at the occasion of the General Assembly of the European Geosciences Union that was held in Vienna. Since its creation in 2003, ECORD has developed a unique European distributed research infrastructure that connects research facilities at multiple sites across Europe and Canada that are engaged in multidisciplinary aspects of subsurface scientific research and have a longstanding culture of cooperation on science, technology, and education. ECORD's contributions to IODP science have been remarkable during the Integrated Ocean Drilling Program (2003-2013) and the International Ocean Discovery Program (2013-2024), especially including a leading role in the submission of drilling proposals concerning all IODP capabilities, the active participation to all IODP expeditions and the implementation of successful Mission-Specific Platform (MSP) expeditions using diverse drilling and coring facilities.

ECORD combines research, education and innovation, and offers a unique portfolio of science and educational activities, world-class capabilities, state-of-the-art technology, and remarkable knowledge-based resources. This portfolio has been significantly enriched since the start of the International Ocean Discovery Program to better serve the European and Canadian Earth and environmental science communities.

Bottom: IODP member countries, as of December 2023.
Right: 15 ECORD member countries, as of December 2023.
www.ecord.org/about-ecord/about-us
(maps credit: *http://histgeo.ac-aix-marseille.fr*).



This 2023 Annual Report demonstrates that the ECORD science community is very healthy, especially through its leading role in the submission of drilling proposals, its massive and sustained participation to IODP expeditions and in the publication and promotion of cutting-edge results related to the successive ocean drilling programmes.

In 2023 ECORD has also played a pivotal role in future scientific ocean drilling with the preparation of the International Ocean Drilling Programme (IODP^3) that ECORD has built with its Japanese partners for the international scientific community.

ECORD membership

An addendum to the 2019-2023 ECORD MoU has been signed by all current ECORD members between October 2023 and March 2024 to extend ECORD's participation through the last year of the Ocean Discovery Program. Over the past few years, former ECORD members, Israel, Iceland, Belgium, and Poland, as well as Greece and, more recently, Brazil have expressed interest in joining the current 15 ECORD members in the future. These promising contacts will be reactivated in 2024 while preparing the launching of IODP^3.

Mobilisation before the offshore phase of the IODP Expedition 389, *MMA Valour*. Credits: M. Parker, ECORD/IODP.

ECORD budget

ECORD is currently funded exclusively by its 15 members. In FY23, the total ECORD contributions amounted to $14.62M (below), showing a decrease of about $2.2M compared to the FY22 budget due to a reduced UK contribution to compensate its increased contribution in 2019 and 2020.

In general, the ECORD budget has decreased of $2.1M since 2014, due to a decrease in member contributions (France and the United Kingdom) and strong fluctuations in exchange rates between the US Dollar and the national currency contributions of five ECORD countries (France, UK, Denmark, Spain, and Ireland).

The ECORD running costs were very stable in 2023, amounting to 3.676 M$. With a slightly decreasing budget during the second phase of the programme, more than 90% of the ECORD budget has been dedicated to the funding of IODP expeditions.

The contributions to the ECORD budget are unevenly distributed between its members, ranging from $5.6M to $80K (*see Section 9 – 'ECORD budget' on page 126*). In 2023, the three major ECORD contributors, DFG/Germany ($5.6M), CNRS/France ($3.636M), and UKRI ($1.1M) have provided 71.6% of the total ECORD budget. The contributions of other ECORD members range from $80K to $1.1M.

The ECORD budget shows a positive balance of $11.799M at the end of 2023 and this sum will be carried forward to the ECORD FY24 budget.

Meeting onboard *MMA Valour* during IODP Expedition 389. Credits: M. Parker, ECORD/IODP.

Mission-specific platform (MSP) expeditions
are ECORD's landmark since 2004.

ECORD is one of the three IODP Platform Providers since 2013.

Expedition 386: Japan Trench Paleoseismology

In 2023, IODP Expedition 386: Japan Trench Palaeoseismology (Co-chief Scientists: Michael Strasser, ECORD-Austria and Ken Ikehara, Japan) entered its post-expedition phase after the Personal Sampling Party (PSP) which was conducted in November-December 2022 onboard the D/V Chikyu.

More on page 37

Expedition 389: Hawaiian Drowned Reefs

The offshore phase of IODP Expedition 389: Hawaiian Drowned Reefs (Co-chief Scientists: J. Webster, ANZIC and A. C. Ravelo, USA) was implemented from 31 August through 2 November 2023 with the MMA Valour, equipped with the Benthic Portable Remotely Operated Drill (PROD5). This expedition aims at generating a record of sea-level change and associated climate variability during several controversial and poorly understood periods over the last 500 kyrs. The expedition recovered a total of 426 m of core from 35 holes across 15 sites of drowned reef terraces around Hawaii, with an average recovery of 66%. The Onshore Science Party of this expedition has been held in February 2024..

More on page 38

Expedition 406: New England Shelf Hydrogeology

The ECORD Science Operator (ESO) has continued planning for IODP Expedition 406: New England Shelf Hydrogeology (Co-chief Scientists: Brandon Dugan, USA and Karen Johannesson, USA) throughout 2023. The objectives of this expedition are to determine the origin and volume of offshore freshwater in the subseafloor of the New England Shelf that will lead to a better understanding of this hydrogeological phenomenon worldwide. This expedition initially scheduled in May-August 2024 was postponed due to a lack of availability of suitable coring system/platform in the advertised time window. In early 2024, the ECORD Facility Board has decided to re-schedule this expedition, which should benefit from an NSF co-funding in 2025 following a proposition from EMA.

More on page 42

The future IODP^3 expedition schedule

The future IODP^3 expedition schedule will partly rely on the MSP proposals that currently reside at the ECORD Facility Board (EFB), at the Chikyu IODP Board (CIB) and at the Science Evaluation Panel (SEP), including Land-to-Sea Transects to be conducted in conjunction with ICDP. In addition, new MSP proposals are expected to be submitted to IODP^3 as a result of the 16 MagellanPlus workshops that have been organized since 2021 and which mostly focused on MSP concept. The scientific objectives of the active MSP proposals and of the MagellanPlus workshops focused on MSP drilling are quite diverse in terms of science topics, drilling and coring systems and geographical areas, thus demonstrating the prominent role that the MSP concept will play in the future to fulfill the scientific objectives of the 2050 Science Framework (*https://www.ecord.org/science/magellanplus/*).

Operations onboard *MMA Valour* during IODP Expedition 389. Credits: E. Le Ber, ECORD/IODP.

ECORD partnership: *JOIDES Resolution* and *Chikyu* expeditions

ECORD's partnership with NSF and JAMSTEC is based on Memoranda of Understanding (MoU) that allow ECORD scientists to participate to expeditions implemented by the *JOIDES Resolution* (JR) and *Chikyu* (*http://www.iodp.org/expeditions*).

The International Ocean Discovery Program has now entered its last year as it will end on 30 September 2024 instead of 30 September 2023 as initially planned. This additional year has therefore needed the extension of all Memoranda of Understanding (MoU) and contracts concerning ECORD and its partners.

JOIDES Resolution expeditions

Four expeditions have been implemented by the JR in 2023 in the Northern Atlantic and the Mediterranean (see table next page, map on page *20*, and Section 4 - Participating in 2023 JR expeditions on page *60*). A total of 36 ECORD scientists from eight ECORD members were invited to participate, including five Co-chief Scientists. Three out of these four expeditions (expeditions 398, 399 and 400) were supported by proposals led by ECORD scientists.

1. **Expedition 398: Hellenic Arc Volcanic Field** (Co-chief Scientists: T. Druitt, ECORD-France; S. Kutterolf, ECORD-Germany) has focused on island arc volcanism and associated hazards through the investigation of processes that drive such volcanism and how the volcanoes interact with their marine surroundings. The Christiana-Santorini-Kolumbo volcanic field on the Hellenic volcanic arc is a unique system for addressing these questions.

2. **Expedition 399: Building Blocks of Life, Atlantis Massif** (Co-chief Scientists: A. McCaig, ECORD-UK; S. Lang, USA) has collected new cores from the Atlantis Massif (30°N; Mid-Atlantic Ridge), an oceanic core complex that has been investigated by four previous expeditions, which transformed our understanding of tectonic and magmatic processes at slow- and ultraslow-spreading ridges. In this area, the exposure of deep mantle rocks leads to serpentinization, with major consequences for the properties of the oceanic lithosphere, heat exchange between the ocean and crust, geochemical cycles, and microbial activity.

3. **Expedition 395: Reykjanes Mantle Convection and Climate** (Co-chief Scientists: R. Parnell-Turner, USA; A. Briais, ECORD-France) has investigated the intersection between the Mid-Atlantic Ridge and Iceland hotspot, which provides a natural laboratory where the composition and dynamics of Earth's upper mantle can be observed. The formation of V-shaped ridges (VSRs), temporal changes in ocean circulation and connections with plume activity as well as the evolution of chemistry of hydrothermal fluids were the main objectives of this expedition.

4. **Expedition 400: NW Greenland Glaciated Margin** (Co-chief Scientists: P. Knutz, ECORD-Denmark; A. Jennings, USA) has focused on the long-term history and variability of the Greenland Ice Sheet to better understand glacial instability thresholds, identified as major climate system tipping points, and how the cryosphere will respond to anthropogenic greenhouse gas emissions.

Four JR expeditions based on proposals led by an ECORD scientist were initially scheduled for U.S. FY2024, i.e. the last year of the current programme:

1. **Expedition 401: Mediterranean-Atlantic Gateway Exchange** (Co-chief Scientists: R. Flecker, ECORD-UK; E. Ducassou, ECORD-France) consists of the offshore part of the first Land-to-Sea Transect (L2S) implemented by IODP and aims at investigating Miocene Mediterranean–Atlantic Gateway Exchange (IMMAGE) to recover a complete record of Atlantic–Mediterranean exchange from its Late Miocene inception to its current configuration.

2. **Expedition 402: Tyrrhenian Continent-Ocean Transition** (Co-chief Scientists: N. Zitellini, ECORD-Italy; A. Malinverno, USA) aims at testing continent-ocean transition (COT) formation models by drilling.

3. **Expedition 403: Eastern Fram Strait Paleo-archive** (Co-chief Scientists: R. Giulia Lucchi, ECORD-Italy; K. St. John, USA) has the objective to investigate the area around Svalbard, which is very sensitive to climatic variability and can be considered as a "sentinel of climate change."

4. **Expedition 404: Arctic-Atlantic Gateway Paleoclimate** (Co-chief Scientists: W. Geissler, ECORD-Germany; J. Brigham-Grette, USA) aimed at evaluating the role played by the Arctic-Atlantic Gateway roles in changing the global climate through their influence on oceanic circulation, heat transport and ice sheet development during the Cenozoic.

This expedition, which was initially scheduled in September and October 2024, has been cancelled due to the demobilization of the JR. EMA has initiated discussions with NSF regarding a potential re-scheduling of this expedition with substantial additional ECORD funding, but for a variety of reasons along with several other internal considerations at JRSO and TAMU, adding Expedition 404 back to the schedule at this late date was not feasible.

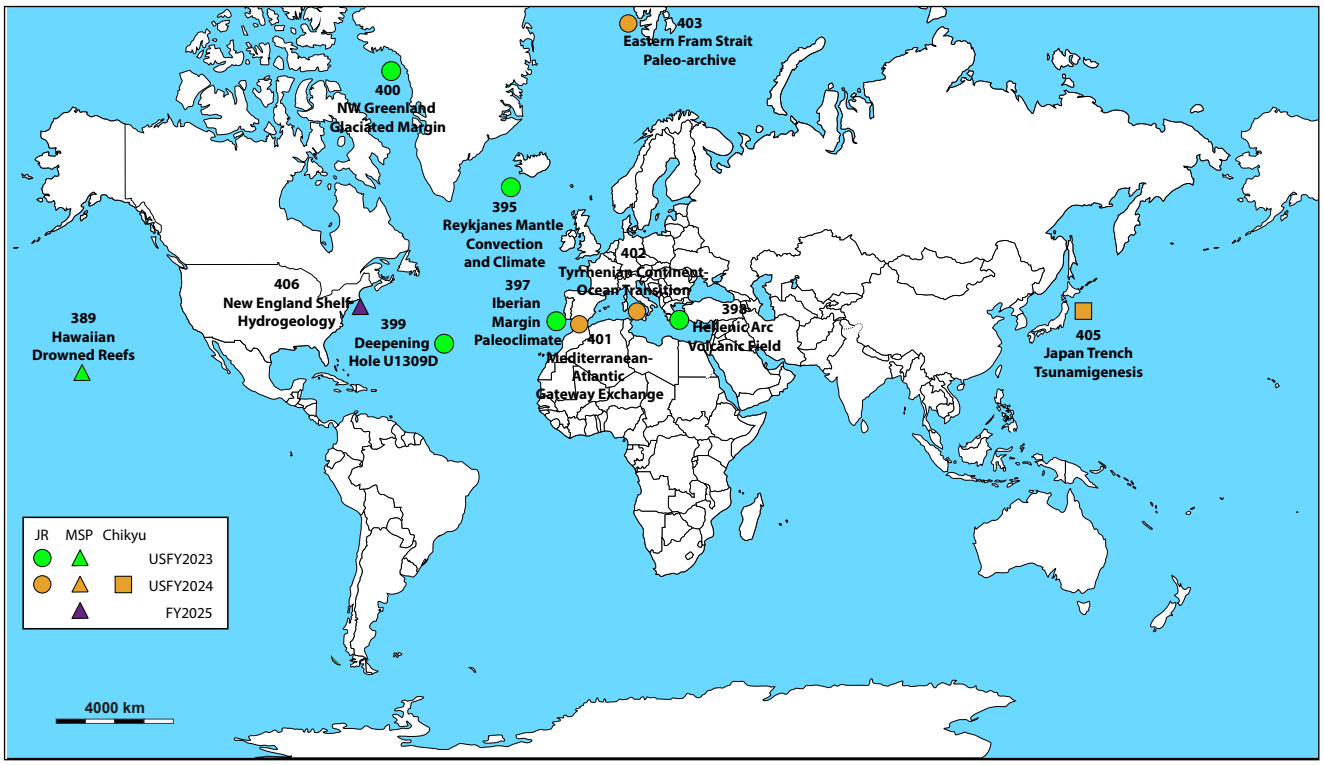
Chikyu expedition

Chikyu will implement IODP Expedition 405: 'Japan Trench Tsunamigenesis – JTRACK', which will be the last expedition of the International Ocean Discovery Program, from 12 September to 7 December 2024 (Co-chief Scientists: Suishi Kodara, Japan, Marianne Conin, ECORD-France, Christine Regalla, USA, Patrick Fulton, USA, Kohtaro Ujiie, Japan and Jamie Kirkpatrick, ECORD-Canada). This expedition aims at exploring what controls shallow slip during great earthquakes and will be focused on drilling into the Japan Trench subduction zone. The second transect of this expedition will access the fault zone in the region of large, shallow slip observed during the 2011 Tohoku-oki earthquake.

2023 - 2024 *JOIDES Resolution and Chikyu* expeditions

Expedition name	#	Dates	Ports	Oper.
Hellenic Arc Volcanic Field	398	Dec. 11, 2022 – Feb. 10, 2023	Tarragona / Heraklion	JRSO
Building Blocks of Life, Atlantis Massif	399	April 12 – June 12, 2023	Ponta Delgada / Ponta Delgada	JRSO
Reykjanes Mantle Convection and Climate	395	June 12 – Aug. 12, 2023	Ponta Delgada / St. Johns	JRSO
NW Greenland Glaciated Margin	400	Aug. 12 – Oct. 12, 2023	St. Johns / St. Johns	JRSO
Mediterranean-Atlantic Gateway Exchange	401	Dec. 10, 2023 – Feb. 9, 2024	Amsterdam / Napoli	JRSO
Tyrrhenian Continent-Ocean Transition	402	Feb. 9 – Apr. 8, 2024	Napoli / Napoli	JRSO
Eastern Fram Strait Paleo-archive	403	June 4 – Aug. 2, 2024	Reykjavik / Reykjavik	JRSO
Japan Trench Tsunamigenesis	405	Sept. 12 – Dec. 7, 2024	TBD	MarE3

2023 and 2024 IODP expeditions



A silhouette on *JOIDES Resolution* deck at sunset, IODP Expedition 401. Credits: Patty Standring, IODP.

IODP expeditions 2023 calendar

2022 DEC

11

JR **Exp. 398:**
Hellenic Arc Volcanic Field

2023 JAN

2023 FEB

10

2023 MAR

2023 APR

12

JR **Exp. 399:**
Building Blocks of Life, Atlantis Massif

2023 MAY

2023 JUN

12

JR **Exp. 395:**
Reykjanes Mantle Convection and Climate

2023 JUL

2023 AUG

12

JR **Exp. 400:**
NW Greenland Glaciated Margin

2023 SEP

2023 OCT

13

2023 NOV

2023 DEC

10

JR **Exp. 401:**
Mediterranean-Atlantic Gateway Exchange

2024 JAN

2024 FEB

9

Anticipating next IODP expeditions

New IODP Proposals

Six new drilling proposals have been submitted to IODP in 2023. Only 20 new proposals have been submitted to IODP since October 2020, as a consequence of the pandemic and the recent JRFB and CIB decisions to not accept new JR and Chikyu proposals.

Active IODP Proposals

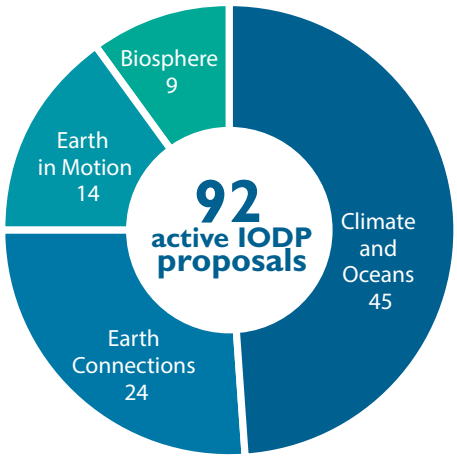
There are currently 92 active IODP proposals in the archives of the Science Support Office (as of 22 February 2024). Their distribution across the Science Plan themes demonstrates a good to very good proposal pressure in all objectives of the Science Plan (see figure below) and rather constant ratios between the two leading themes - Climate and Ocean (49%) and Earth Connections (26%) - and the Earth and Motion (15%), and Biosphere (10%) themes.

The geographical distribution of active proposals (see figure below) demonstrates global interest of the scientific community and fairly constant ratios between the different oceans, with a sustained interest for the Atlantic Ocean and the Mediterranean (38 out of 92 active proposals) that has been encouraged by the FY22 through FY24 JR track.

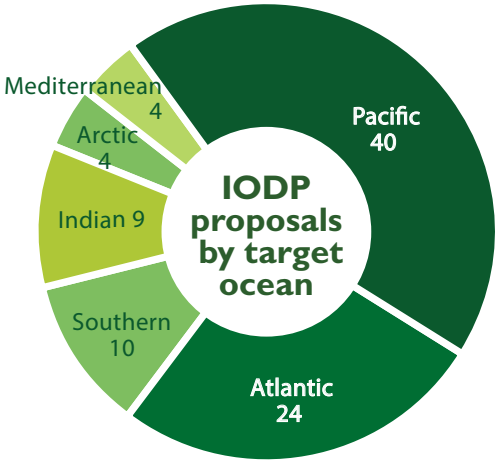
Fifty-six active proposals are residing at the appropriate Facility Boards ready to be selected for drilling (36 at the JRFB, ten at the CIB and eight at the EFB). Thirty-six active proposals are residing at the Science Evaluation Panel. These numbers are constant over the few last years.

Sixty-one proposals (66% of all proposals) concern aim at using the JR – slightly decreasing -, while the number of proposals concerning the other platforms increased in 2023: 13 MSP and *Chikyu* proposals (14% of all proposals for each platform type); five active proposals concern the use of multiple platforms. It is expected that before the end of IODP, JR proposals will be transferred to the EFB to be potentially implemented by IODP[3], following the procedure established by the chairs of the IODP Facility Boards. Recently, four proposals that were at the *JOIDES Resolution* Facility Board (JRFB) requested to be transferred to the EFB to be considered for implementation by IODP[3].

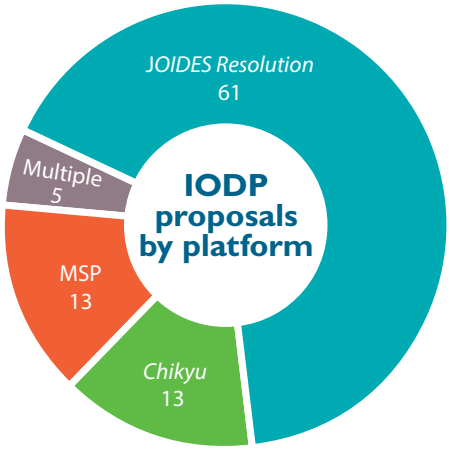
The organization of several MagellanPlus workshops focused on MSP drilling over the last two years should lead to the submission of a significant number of MSP proposals in the near future, thus forming the basis of the International Ocean Drilling Programme (IODP[3]).



Distribution of active proposals (n = 92) by IODP Science Plan themes
(Data provided by the IODP Science Support Office as of 22 February 2024)



Distribution of active proposals (n = 92) by target ocean
(Data provided by the IODP Science Support Office as of 22 February 2024)

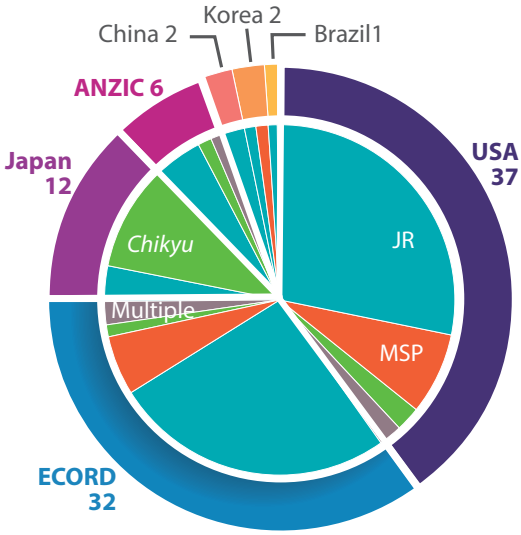


Distribution of IODP active proposals by platforms (n = 92).
Multiple proposals consist of combined *Chikyu* and JR drilling.
(Data provided by the IODP Science Support Office as of 22 February 2024)

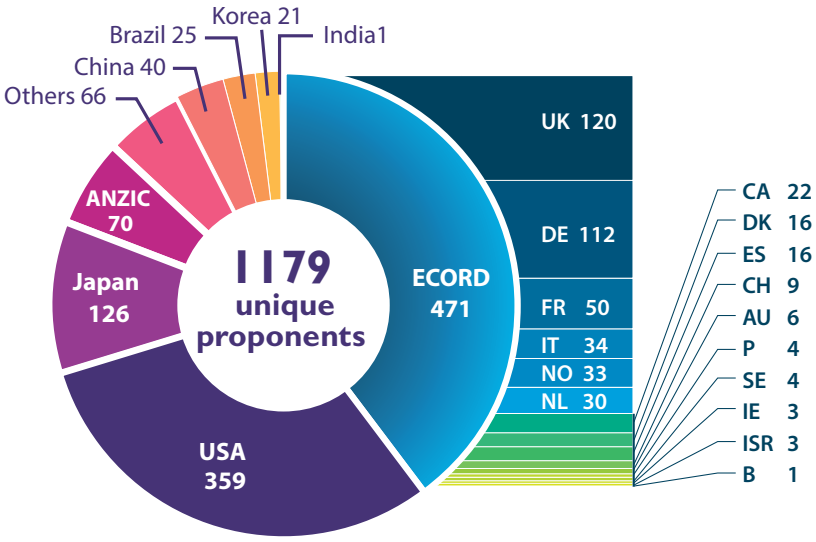
The figure on the right illustrates the distribution of IODP active proposals by platforms and IODP members. Most of the MSP proposals are currently handled by US and ECORD communities.

Proponents

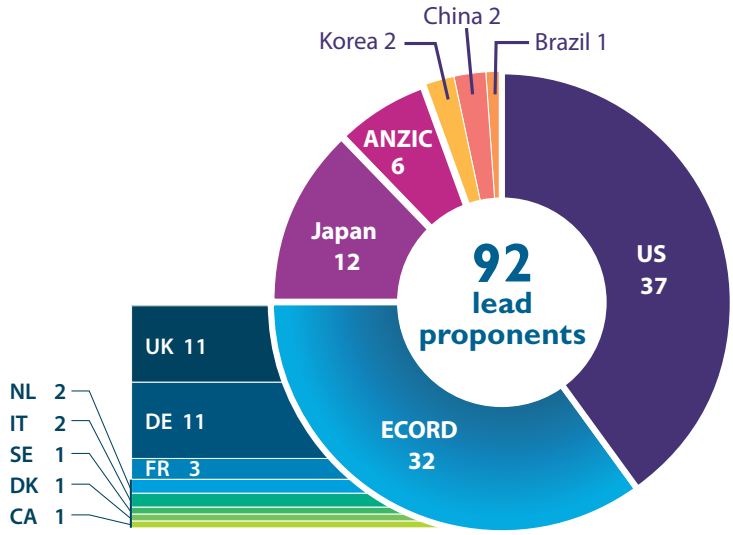
Since the start of the International Ocean Discovery Program, ECORD's contribution to IODP science is prominent, including the submission of drilling proposals that concern all IODP capabilities. ECORD has a leading role in proposal submission the current programme with percentages of unique proponents constantly above 37% since the start of IODP. Currently, 471 ECORD scientists out of 1179 are proponents of active IODP proposals (i.e. 39.9%), including 32 lead proponents (see figures below). UK and Germany dominate the ECORD participation, respectively with 120 and 112 unique proponents out of 471 (25.4% and 23.8%), each including 11 lead proponents out of 32 (34.4% each). The ECORD unique and lead proponents belong to 14 and 7 ECORD members, respectively. Two past ECORD members, Belgium, and Israel, have been integrated in the current statistics.



Distribution of IODP active proposals by platforms and IODP members (n = 92).
(Data provided by the IODP Science Support Office as of 22 February 2024)



Distribution of active proposals (n = 92) by proponents' member affiliation (ECORD members are detailed).
Data provided by the IODP Science Support Office as of 22 February 2024



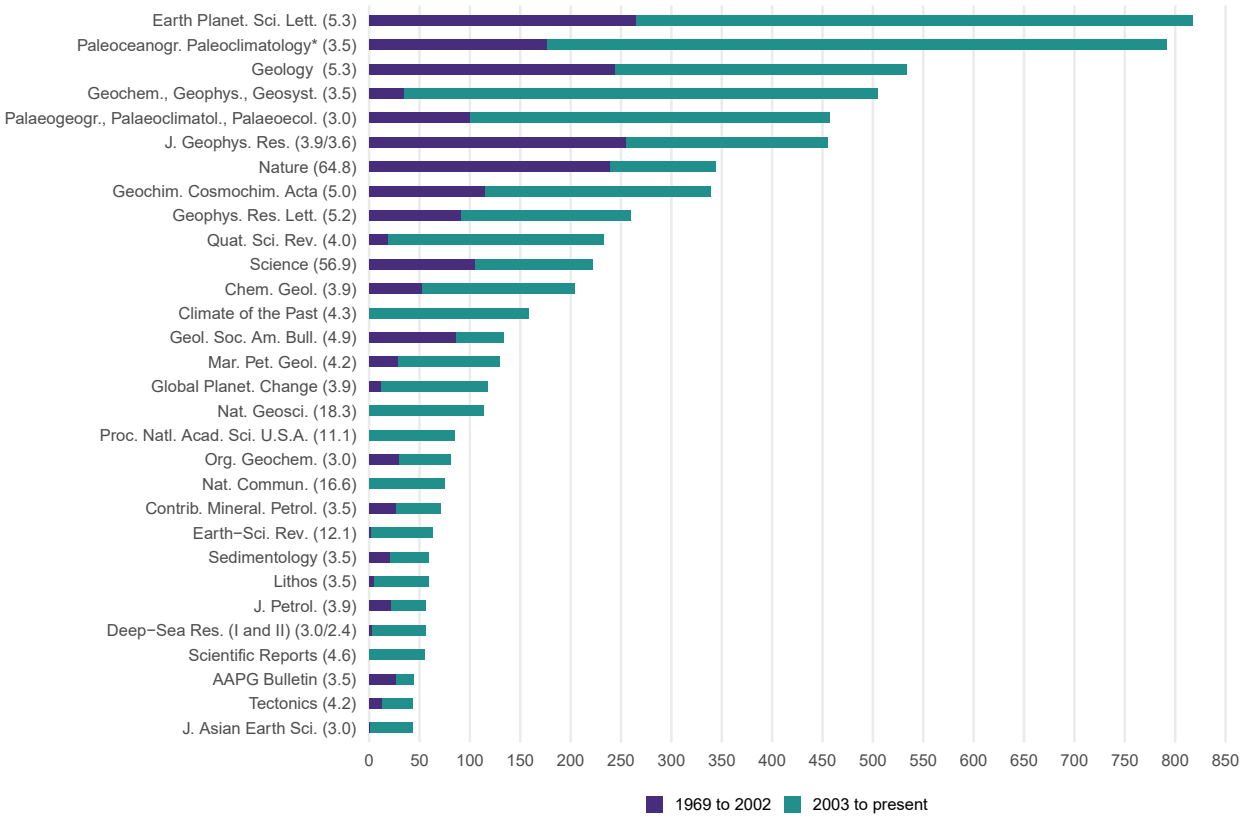
Distribution of active proposals (n = 92) by lead proponents' member affiliation (ECORD members are detailed).
Data provided by the IODP Science Support Office as of 22 February 2024

Promoting IODP science

The Scientific Ocean Drilling Bibliographic Database and Publication Impact Report (*http://iodp.tamu.edu/publications/AGI_studies/2023_Pub_Impact.pdf*), which is published annually, monitors the valorization of scientific achievements of successive ocean drilling programmes through publications related to successive ocean drilling programmes from 1969 through June 2023. A total of 6,605 research papers out of 13,809 Program-related papers that have been published in non-Program publications (~48% of the serial publications in the database) were published in 30 highly ranked peer-reviewed journals, based on the Clarivate Analytics 2022 journal impact factor (See figure below and table next page).

This demonstrates the impact of the ocean drilling science and the attractivity exerted by the scientific ocean drilling programmes on the science community. It must be reminded here that scientists were encouraged to publish post-cruise research results in English language peer-reviewed journals rather than the Program Proceedings volumes since 1996 only.

The figure below includes the highly ranked journals that have published a total of 40 or more research papers related to DSDP and ODP (1969–2002) and IODP (2003–present). Journal impact factors are shown in parentheses. The table next page presents the data behind this graph.



Highly ranked peer-reviewed serials publishing Program-related expedition research results (1969–2023).
* =includes Paleoceanography papers (name changed in 2018).

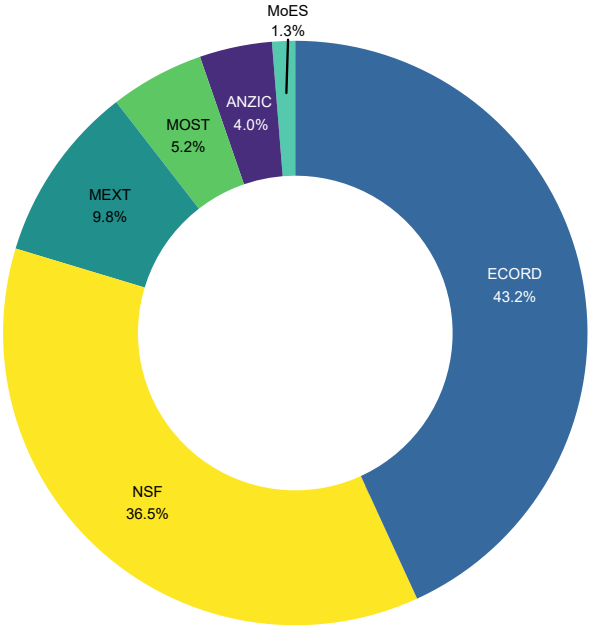
Journal	Journal Impact Factor (2022)	Number of Program-related papers published		
		1969–2002	2003–2023	Total
Nature	64.8	239	105	344
Science	56.9	105	117	222
Nature Geoscience	18.3	0	114	114
Nature Communications	16.6	0	75	75
Earth-Science Reviews	12.1	2	61	63
Proceedings of the National Academy of Sciences of the U.S.A.	11.1	0	85	85
Earth and Planetary Science Letters	5.3	265	552	817
Geology	5.3	244	289	533
Geophysical Research Letters	5.2	92	168	260
Geochimica et Cosmochimica Acta	5.0	115	224	339
Geological Society of America Bulletin	4.9	87	47	134
Scientific Reports	4.6	0	55	55
Climate of the Past	4.3	0	158	158
Marine and Petroleum Geology	4.2	29	101	130
Tectonics	4.2	13	30	43
Quaternary Science Reviews	4.0	19	214	233
Journal of Geophysical Research (Solid Earth, Oceans)	3.9/3.6	255	200	455
Chemical Geology	3.9	53	151	204
Global and Planetary Change	3.9	12	106	118
Journal of Petrology	3.9	22	34	56
Paleoceanography and Paleoclimatology*	3.5	177	615	792
Geochemistry, Geophysics, Geosystems	3.5	35	470	505
Contributions to Mineralogy and Petrology	3.5	27	44	71
Lithos	3.5	5	54	59
Sedimentology	3.5	21	38	59
AAPG Bulletin	3.5	27	17	44
Palaeogeography, Palaeoclimatology, Palaeoecology	3.0	100	357	457
Organic Geochemistry	3.0	30	51	81
Deep-Sea Research (Parts I and II)	3.0/2.4	3	53	56
Journal of Asian Earth Sciences	3.0	1	42	43

Highly ranked peer-reviewed serials publishing Program-related expedition research results (1969–2023).
* = includes Paleoceanography papers (name changed in 2018).

As every year, the 2023 Scientific Ocean Drilling Bibliographic Database and Publication Impact Report reflects the outstanding intellectual contribution of the ECORD scientists to IODP science. With 14,761 out of 34,204 serial contributions (43.2% of total publications) related to the successive ocean drilling programmes, the ECORD science community demonstrates its leading role in the international geoscience landscape (see table below).

Member country or consortia	First authors of serials	Serial contributions by country	Serial contributions by author	Total contributions
Australia/New Zealand Consortium	434	742	938	1,372
Australia	262	492	595	857
New Zealand	172	250	343	515
China	786	682	995	1,781
ECORD	**5,171**	**7,402**	**9,590**	**14,761**
Austria	30	92	97	127
Canada	386	498	595	981
Denmark	80	143	158	238
Finland	11	17	20	31
France	735	1,047	1,476	2,211
Germany	1,262	1,647	2,165	3,427
Ireland	7	39	42	49
Italy	362	489	636	998
Netherlands	280	384	419	699
Norway	162	253	288	450
Portugal	21	78	93	114
Spain	214	375	474	688
Sweden	125	187	205	330
Switzerland	187	308	333	520
United Kingdom	1,309	1,845	2,589	3,898
India	233	166	204	437
Japan	894	1,176	2,470	3,364
United States	4,564	4,204	7,925	12,489
Total papers:	**12,082**			**34,204**

Serial publication for peer-reviewed serials showing counts by first author, contributing country, contributing authors, and total contributions by all authors from current IODP member countries (1969–2023).
Theses and dissertations are underreported to AGI and are not fully represented.



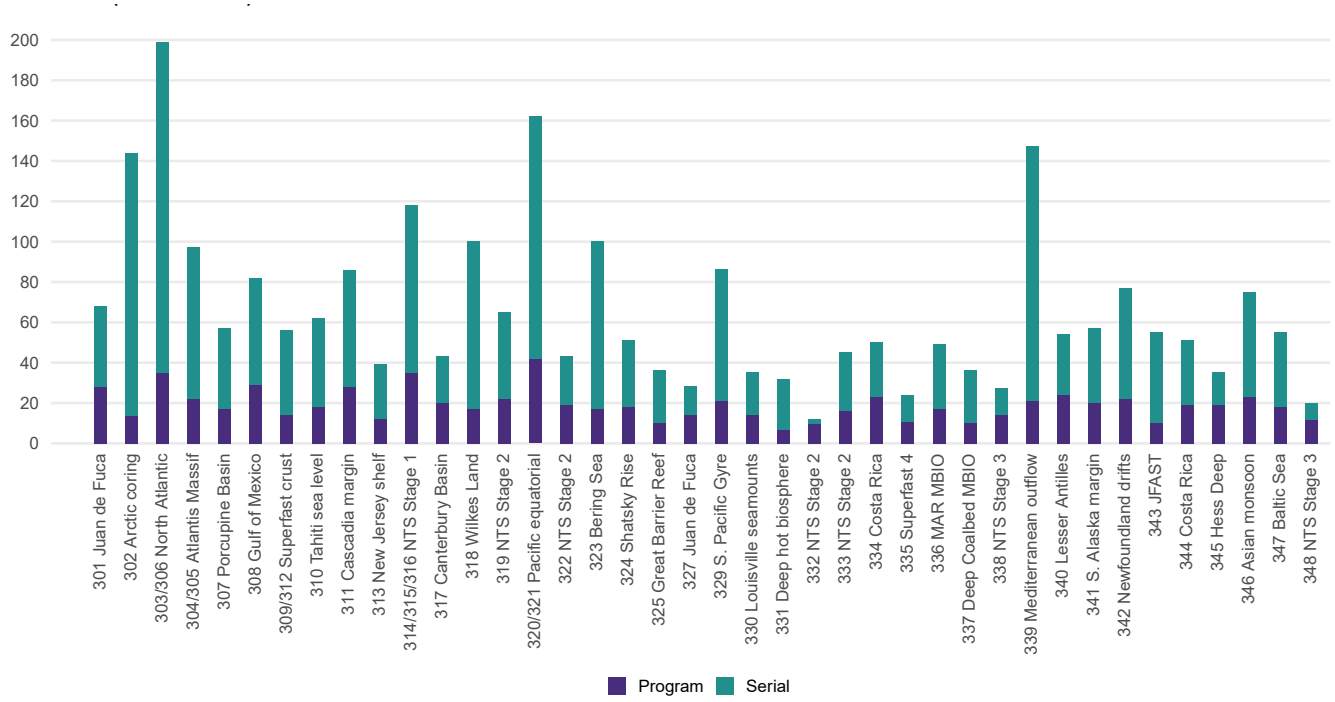
Total serial contributions by all authors from current IODP funding entities (1969–2023).

IODP member country or consortium	Serials	Misc.
Australia/New Zealand Consortium	434	574
China	786	199
ECORD	5,171	5,739
India	233	92
Japan	894	950
United States	4,564	7,557
Totals:	**12,082**	**15,111**

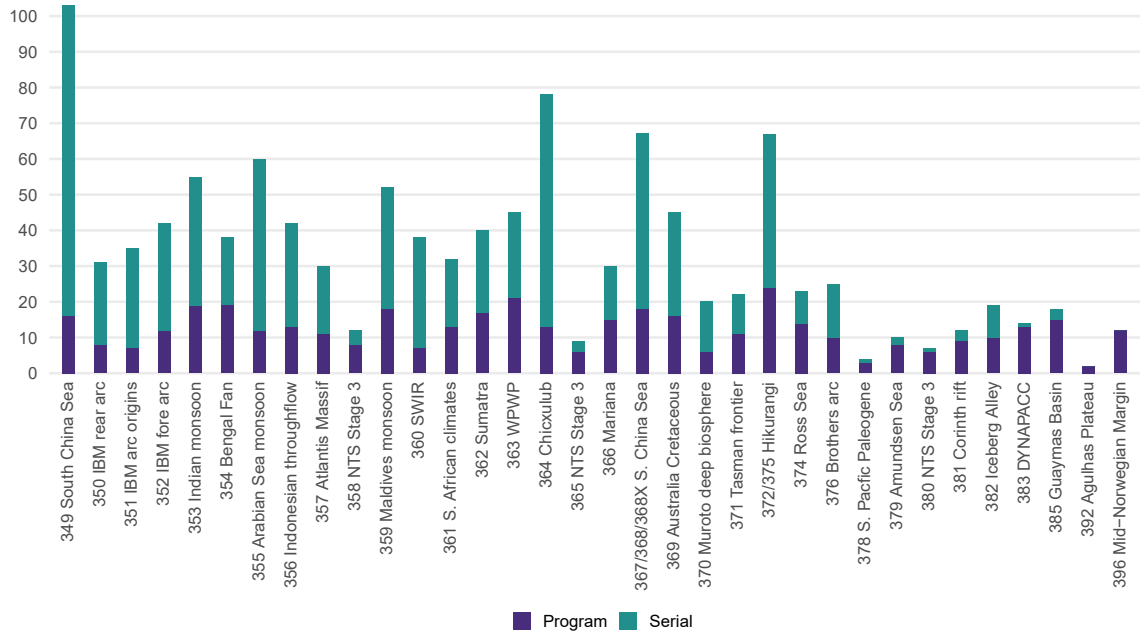
First-authored non-Program publications by type and current funding consortium (1969–2023).IODP funding entities (1969–2023).

Records in the Scientific Ocean Drilling Bibliographic Database as of June 2023, by affiliation country of all authors.

MSP expeditions, which are implemented only since 2004 and represent less than 10% of the number of IODP expeditions, have generated a significant proportion of the peer-reviewed scientific publications arising from the Integrated Ocean Drilling Program and the International Ocean Discovery Program (see figures below).

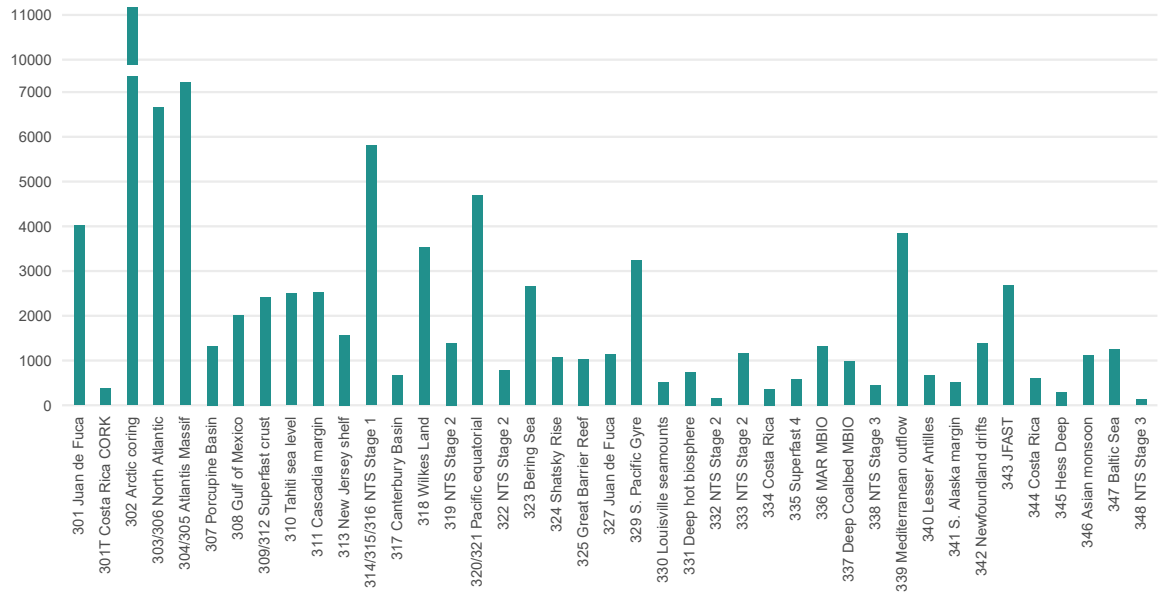


Number of Program and serial publication records for Integrated Ocean Drilling Program Expeditions 301–348 (2003–2023). MSP expeditions are expeditions 302, 310, 313, 325 and 347.
Note: MSP expeditions 310 and 325 should be combined as they are based on the same proposal (#519)

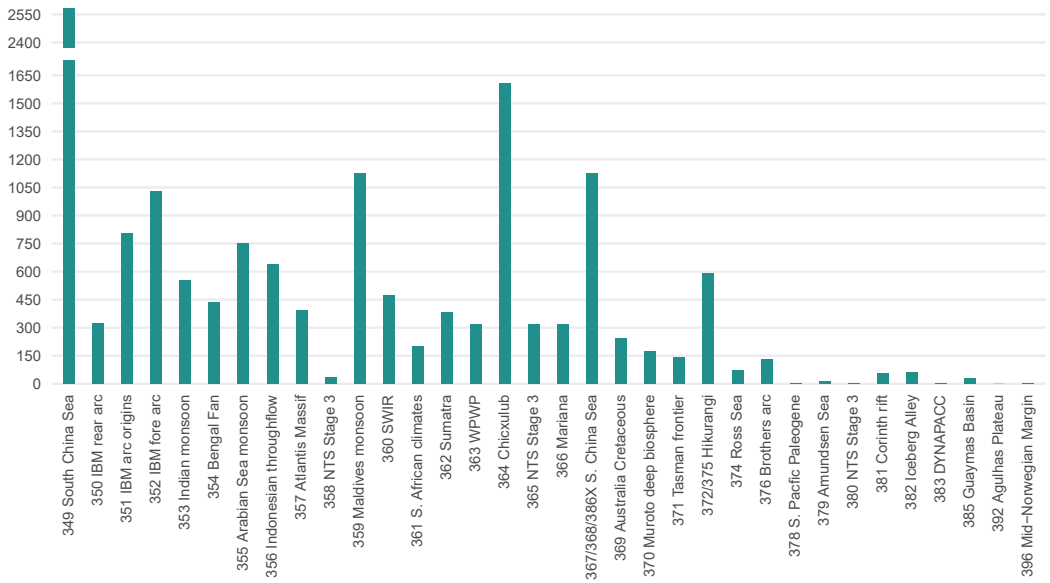


Number of Program and serial publication records for IODP Expeditions 349–372, 374–376, 378–383, 385, 392, and 396 (2014–2023). MSP expeditions are expeditions 357, 364 and 381.

The 2023 Scientific Ocean Drilling Bibliographic Database and Publication Impact Report collected citation data through Google Scholar in July 2023. Program publications and non-Program serial publications containing research results from IODP expeditions have been cited in other research articles more than 101,400 times between 2003 and 2023. Expedition-related science continues to be cited in other research for many years after publication. The two figures below include available citation counts for Expeditions 301–372, 374–376, 378–383, 385, 392, and 396.



Number of times Program or non-Program serial publications from Integrated Ocean Drilling Program expeditions were cited by other research articles (2003–2023). Note the y-axis scale break.
MSP expeditions are expeditions 302, 310, 313, 325 and 347.
Note: MSP expeditions 310 and 325 should be combined as they are based on the same proposal (#519)



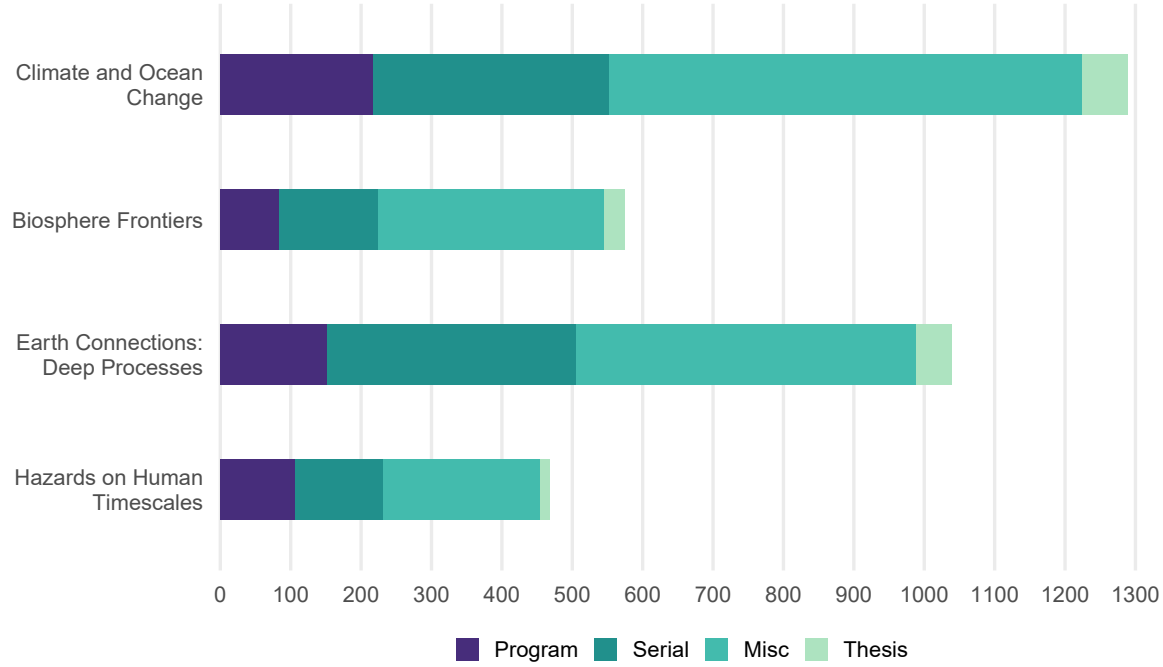
Number of times Program or non-Program serial publications from International Ocean Discovery Program expeditions were cited by other research articles (2014–2023). Note the y-axis scale break.
MSP expeditions are expeditions 357, 364 and 381.

The list of the most-cited IODP expedition–related papers as of June 2023 illustrates the high-impact and high-quality science achieved by MSP expeditions (see table below).

Article	Expedition	Citations (*N*)	Altmetric score
Kallmeyer, J., Pockalny, R., Adhikari, R.R., Smith, D.C., and D'Hondt, S., 2012. Global distribution of microbial abundance and biomass in subseafloor sediment. Proceedings of the National Academy of Sciences of the United States of America, 109(40):16213–16216. https://doi.org/10.1073/pnas.1203849109	IODP 343	904	
Grimes, C.B., John, B.E., Kelemen, P.B., Mazdab, F.K., Wooden, J.L., Cheadle, M.J., Hanghøj, K., and Schwartz, J.J., 2007. Trace element chemistry of zircons from oceanic crust: a method for distinguishing detrital zircon provenance. Geology, 35(7):643–646. https://doi.org/10.1130/G23603A.1	IODP 304/305; ODP 209	795	
Sluijs, A., Schouten, S., Pagani, M., Woltering, M., Brinkhuis, H., Sinninghe Damsté, J.S., Dickens, G.R., et al., 2006. Subtropical Arctic Ocean temperatures during the Palaeocene/ Eocene Thermal Maximum. Nature, 441(7093):610–613. https://doi.org/10.1038/nature04668	IODP 302	777	
Westerhold , T., Marwan, N., Drury, A.J., Liebrand, D., Agnini, C., Anagnostou, E., Barnet, J.S.K., et al., 2020. An astronomically dated record of Earth's climate and its predictability over the last 66 million years. Science, 369:1383–1387. https://doi.org/10.1126/science.aba6853	IODP 320/321; ODP 154, 199, 207, 208	740	
Rebesco, M., Hernández-Molina, F.J., Van Rooij, D., and Wåhlin, A., 2014. Contourites and associated sediments controlled by deep-water circulation processes: State-of-the-art and future considerations. Marine Geology, 352:111–154. https://doi.org/10.1016/j.margeo.2014.03.011	IODP 339	708	
Lipp, J.S., Morono, Y., Inagaki, F., and Hinrichs, K.-U., 2008. Significant contribution of Archaea to extant biomass in marine subsurface sediments. Nature, 454(7207):991–994. https://doi.org/10.1038/nature07174	IODP 301, 311; ODP 201, 204, 207	640	
Moran, K., Backman, J., Brinkhuis, H., Clemens, S.C., Cronin, T., Dickens, G.R., Eynaud, F., et al., 2006. The Cenozoic palaeoenvironment of the Arctic Ocean. Nature, 441(7093):601–605. https://doi.org/10.1038/nature04800	IODP 302	636	
Deschamps, P., Durand, N., Bard, E., Hamelin, B., Camoin, G., Thomas, A.L., Henderson, G.M., Okuno, J., and Yokoyama, Y., 2012. Ice-sheet collapse and sea-level rise at the Bølling warming 14,600 years ago. Nature, 483(7391):559–564. https://doi.org/10.1038/nature10902	IODP 310	561	
Li, C.-F., Xu, X., Lin, J., Sun, Z., Zhu, J., Yao, Y., Zhao, X., et al., 2014. Ages and magnetic structures of the South China Sea constrained by deep tow magnetic surveys and IODP Expedition 349. Geochemistry, Geophysics, Geosystems, 15(12):4958-4983. https://doi.org/10.1002/2014GC005567	IODP 349	526	
Grimes, C.B., Wooden, J.L., Cheadle, M.J., and John, B.E., 2015. "Fingerprinting" tectono-magmatic provenance using trace elements in igneous zircon. Contributions to Mineralogy and Petrology, 170(5–6). https://doi.org/10.1007/s00410-015-1199-3	ODP 176, 179, 209; IODP 304/305	493	

Top cited Program-related serials as of June 2023 with corresponding Altmetric scores from 29 August 2023. Click on the graphic to view the live Altmetric data.

The figure below displays all publication records related to IODP (Expeditions 349–372, 374–376, and 379–383) and sorted by the themes and challenges of the current IODP Science Plan (Illuminating Earth's Past, Present, and Future: The Science Plan for the International Ocean Discovery Program 2013–2023). Science plan themes are tied to the primary objectives of each expedition.



International Ocean Discovery Program publication records (all types) by IODP Science Plan theme (2013–2023).

Managing knowledge-based resources

IODP and ECORD implement a sustainable sample and data curation management plan of data conservation and provision to the science community.

Hundreds of kilometres of core, other types of samples (fluids, biota) and data have been acquired and stored in three core repositories (Gulf Coast Repository, College Station, USA; Kochi Core Center, Kochi, Japan; Bremen Core Repository – BCR, Bremen, Germany) where they are made accessible to the international community for post-moratorium studies.

The BCR hosts all the cores recovered from the Atlantic and Arctic oceans as well as the Mediterranean, Baltic and Black Seas since the beginning of scientific ocean drilling programmes. The collection at the BCR currently holds more than 182 km of cores acquired during 102 expeditions. 8,086 sample requests were related to cores now stored at BCR (DSDP/ODP/IODP; since 1969) and 1,920,000 samples were taken from these cores, involving several thousands of individual scientists since 1994. In 2023, a total of 39,285 samples were taken at the BCR for 369 requests (of which 93 were submitted by scientists based in ECORD-countries).

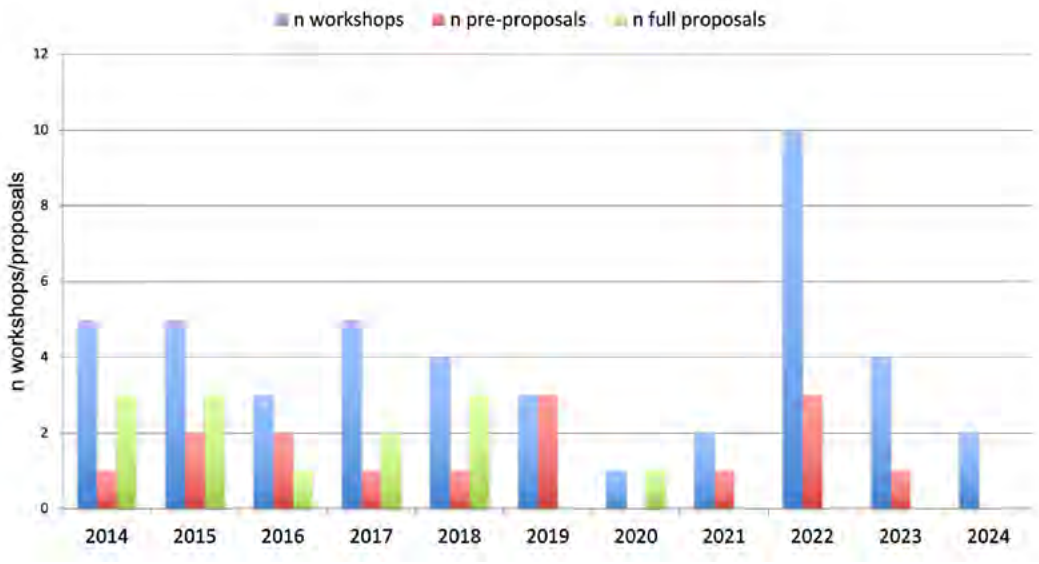
All cores collected during expeditions that will be implemented by the JR in the Atlantic Ocean and neighbouring seas from 2021 through 2024 will be stored at BCR before the end of the current programme. Over the last months, ECORD has negotiated an MoU with NSF for the period from 1 October 2023 to 30 September 2029 regarding the storage and archiving of NSF-owned cores recovered from previous and current ocean drilling programmes at the BCR.

ECORD has developed and maintained several databases to make available to the science community all the necessary information to the development of drilling proposals and to allow the scientists to get access to the data collected during the drilling expeditions and keep track of ECORD activities in IODP (see Section 6 – Archiving IODP cores: the Bremen Core Repository - on page xx). In particular, over 1.92 million of samples that were taken on cores that are stored at the BCR are entered into a database, the 'BCR DIS Internet Interface', that is accessible to the general public for post-moratorium samples.

MagellanPlus Workshop Series Programme

The leading role of ECORD scientists in the submission of IODP proposals partly relies on the success of the ECORD-ICDP MagellanPlus Workshop Series Programme (*http://www.ecord.org/science/magellanplus/*; see Section 7: Engaging the community on pge xx), which provides a substantial support to ECORD scientists to develop innovative drilling proposals concerning diverse scientific topics addressed by facilities provided by the three IODP platform providers and/or the ICDP infrastructure.

Since 2014, 44 MagellanPlus workshops have been organized (on average 4 workshops per year), involving 1,687 scientists (23% of early-career scientists on average) from 45 countries (15 ECORD, 7 IODP partners and 23 non-IODP countries). Twenty-eight IODP drilling proposals were submitted (see figure below).



Distribution of MagellanPlus workshops and related proposals since 2014

ECORD educational activities

Training the next generation of scientists from ECORD members and promoting IODP science in ECORD and non-ECORD countries are major goals for ECORD.

The outstanding portfolio of science and educational activities that ECORD has gradually developed over the last years with high demand from scientists, students and early-career scientists (see Section 7: Engaging the community on page *94*).

The ECORD Summer Schools (*https://www.ecord.org/education/summer-schools/*), initiated in 2007, are well-established and are attended annually by many Master's and PhD students as well as postdoctoral research fellows from ECORD member countries and beyond.

Three ECORD Summer schools were sponsored by ECORD in 2023:

1. the 15th ECORD Bremen Summer School on "From Greenhouse to Icehouse - The Cenozoic Arctic Ocean and (global) climate history"was held at MARUM, University of Bremen, Germany on 4-15 September 2023;
2. the 18th ECORD Urbino Summer School in Paleoclimatology (USSP) was held in Urbino, Italy on 6-23 July 2023;
3. the 7th ECORD Summer School on "Downhole Logging for IODP Science" has been organized by the ECORD Petrophysics Consortium (EPC) at the University of Leicester, UK, on 22-28 July 2023.

In addition, ECORD has provided financial support to the INA (International Nannoplankton Association) Summer School on Evolution and Taxonomy (INASSET) that was held at the University of Parma, Italy.

After a break of two years due to the pandemic, the ECORD Training Course: 'The Shipboard Simulation Experience' that was held at MARUM on 13-17 March 2023 has offered a basic training focusing on the IODP core flow procedures and offshore expeditions to 30 participants.

The aim of ECORD Research Grants (*http://www.ecord.org/education/research-grant/*), also initiated in 2007, is to foster participation of early-career scientists in ocean drilling research and encourage them to develop their own projects and collaborate with other research groups outside their home institutions. In 2023, awarded 17 grants to students from ten different ECORD member countries to allow them to conduct innovative research on core material and data related to past DSDP / ODP / IODP expeditions.

Communicating

Promoting activities and accomplishments of IODP to various audiences, including scientists, classrooms and the general public, is a major goal of ECORD through its Outreach Task Force (EOTF).

The EOTF constantly updates and creates communication and educational material (core replicas, leaflets, videos, brochures, etc.) that are distributed across the ECORD members for exhibitions and exhibition booths, as well as through the MagellanPlus workshops and ECORD Training Course and Summer Schools (see Section 8: 'Communicating on page *112*).

In addition, since 2019, the EOTF has developed exhibition material (ECORD Sphere, core replicas, 3D models etc.) for permanent and temporary exhibitions in museums and aquariums, thus ushering a new communication environment for ECORD. Two permanent exhibitions including ECORD material have opened in 2023: 'The Earth – A dynamic planet' at the Natural History Museum in Vienna, Austria and the 'Grotte Cosquer' at the Cosquer Méditerranée Museum in Marseille, France.

News promoting ECORD and MSP expeditions frequently appear on national and international Internet portals, TV stations and newspapers.

The International Ocean Discovery Program has now entered its last year as it will end on 30 September 2024 instead of 30 September 2023 as initially planned. This additional year has therefore needed the extension of all Memoranda of Understanding (MoU) and contracts concerning ECORD and its partners, NSF and JAMSTEC.

The end of IODP will represent a major change in the organization of international activities related to scientific ocean drilling. After decades of unified international programs, from DSDP to the current IODP, post-2024 scientific ocean drilling initiatives will see a transition from a single international program operated by independent platform providers to independent programs, whose internal organization and mutual collaboration still need to be defined.

ECORD and Japan, who have advocated for the continuation of a single international programme, intend to continue providing scientific ocean drilling opportunities post-2024 to the international scientific community, based on their well-established infrastructures, competitiveness in the international research landscape and maximum scientific return from investment.

Over the last months, all ECORD entities have been heavily involved in the planning of the International Ocean Drilling Programme - IODP³ (IODP-cubed), which will start on 1 January 2025, immediately after the end of IODP. The documents that will support both the Agreement between ECORD and JAMSTEC and the organization of the whole programme and its partnership have been finalized after two retreats of the IODP³ Planning Group in March 2023 in San Francisco, USA and in September 2023 in Edinburgh, UK, followed by several virtual meetings until February 2024.

IODP³

IODP³ investigations will be based on research proposals that address the objectives of the 2050 Science Framework, or other outstanding new research ideas.

IODP³ will implement and fund two types of expeditions:

1. Offshore expeditions following an expanded Mission Specific Platform (MSP) concept, regardless of the technology and/or the drilling/coring needs.
2. Scientific Projects using Ocean Drilling ARChives (SPARCs) that are international and multidisciplinary projects that have objectives originating from or that are based on ocean drilling archives.

The objectives and the functioning of IODP³ are described in Camoin, Eguchi et al. (Sci. Dril., 33, 89–92, 2024; *https://doi.org/10.5194/sd-33-89-2024*). ANZIC and India already sent letters of interest to become IODP³ Associate Members; Brazil started discussions with ECORD and JAMSTEC regarding their potential participation to IODP³. To ensure stability during the transition between the two programmes, the ECORD Council has decided to extend the current terms of the different ECORD entities and their Chairs/Directors through 2025: the ECORD Managing Agency (hosted by the Centre National de la Recherche Scientifique – CNRS), the ECORD Science Operator (hosted by the British Geological Survey – BGS - in Edinburgh), the ECORD Science Support and Advisory Committee (hosted by the National Institute of Oceanography and Experimental Geophysics – OGS - in Trieste) and the Bremen Core Repository (hosted by the MARUM at the University of Bremen). The ECORD Council has observed that the current ECORD entities are fit for purpose and are working very well and that no significant changes in the management and functioning of these entities are currently requested.

The launching of the new scientific ocean drilling programmes will also require continuity of core and data legacies, in order to maintain one of the key basic principles of the successive international scientific ocean drilling programmes. It is the intention of all current IODP members to preserve the core distribution amongst the three repositories (BCR, Gulf Coast Repository – GCR – and the Kochi Core Center – KCC –) to maintain the continuity of core and data legacies and to ensure the continued availability of this material to all legitimate scientific users after the end of IODP.

Over the last months, ECORD and JAMSTEC have negotiated MoUs with NSF for the period from 1 October 2023 to 30 September 2029 regarding the storage and archiving of NSF-owned cores recovered from previous ocean drilling programmes at the BCR and at the KCC. The BCR hosts all cores recovered since the beginning of scientific ocean drilling from the Atlantic and Arctic oceans as well as the Mediterranean, Baltic, and Black Seas, i.e. to date more than 182 km of cores acquired during 102 expeditions. The KCC hosts all cores recovered since the beginning of scientific ocean drilling from the Western Pacific and Indian Oceans, corresponding to a total length of more than 140 km of cores. The US-owned cores will continue to be stored, archived, and sampled at the BCR at no cost to NSF and remain available for scholarly studies, e.g. investigations on legacy material (cores and data), sampling, and education, to all global scientists following guidelines approved by the JOIDES Resolution Facility Board.

Based on the well-established operation of the ECORD and JAMSTEC infrastructures, their successful implementation, their competitiveness in the international research landscape and a maximum return from investment, a bright future is promised to the international communities and ECORD and Japan in their intentions to play a prominent role in post-2024 scientific ocean drilling.

Gilbert Camoin
ECORD Managing Agency Director

Related websites

http://www.ecord.org
http://www.iodp.org

2. Operating and articipating in mission-specific platform (MSP) expeditions

ECORD Science Operator (ESO) activities in 2023 focussed on three MSP expeditions: Expedition 386 Japan Trench Paleoseismology, Expedition 389 Hawaiian Drowned Reefs, and Expedition 406 New England Shelf Hydrogeology.

IODP Expedition 386 has reached its post-expedition phase, and ESO activities this year concentrated on the finalisation and dissemination of data and reports from the offshore, Onshore Science Party (OSP) and Personal Sampling Party (PSP) phases. The offshore phase of IODP Expedition 389 was implemented in September and October, and successfully recovered 426 m of core from the drowned reef terraces around Hawaii. Finally, planning continued with the anticipation of implementing IODP Expedition 406 in spring or summer 2024.

View from *MMA Valour* during IODP Expedition 389. Credits: M. Parker, ECORD/IODP.

IODP Expedition 386

Japan Trench Paleoseismology

Offshore phase (2021)

Co-chief Scientists
Michael Strasser
(University of Innsbruck, Austria)
Ken Ikehara
(Geological Survey of Japan, AIST)

Expedition website *www.ecord.org/expedition386*

IODP Expedition 386 was jointly implemented by ESO and the Institute for Marine-Earth Exploration and Engineering (MarE3) within the Japan Agency for Marine-Earth Science and Technology (JAMSTEC).

At the beginning of 2023, the ESO team focussed on the management of activities after the Personal Sampling Party (PSP) in November-December 2022, when the Science Party met on the D/V *Chikyu* to take samples for post-expedition research, make final standard core measurements (shear vane and penetrometer), and make revisions to the Expedition Reports. During this time, the ESO-Bremen team continued to handle sample requests for X-ray diffraction and pore water samples, document sample residues and update these in the Drilling Information System (DIS), and package samples and ship them to the Kochi Core Center. QC/QA of the OSP data also continued in Bremen, including the update and archive of the X-ray diffraction data. The Bremen data managers continued their remote support for the PSP by finalizing the entry of samples into the DIS. Additionally, the data management team made minor corrections of DIS entries, and prepared IODP Expedition 386 data for long-term archiving by the PANGAEA Data Publisher.

The written materials for the Preliminary and Expedition Reports were reviewed by the ESO team and submitted to IODP Publication Services at Texas A&M University. The 1st Post-expedition Meeting (editorial) was held in College Station between 15 and 21 April, hosted by the IODP Publication Services and supported by ESO team members.

Throughout 2023, the Preliminary Report was held under embargo to allow early publication of Chu et al. (2023) in Nature Communications. The embargoed Preliminary Report was eventually published on 11 September (Ikehara et al., 2023).

The Science Party and their collaborators are now conducting their own post-expedition research. The majority of papers from this expedition are expected to be submitted to peer-reviewed journals before July 2025, and will be listed in the expedition-related bibliography in due course.

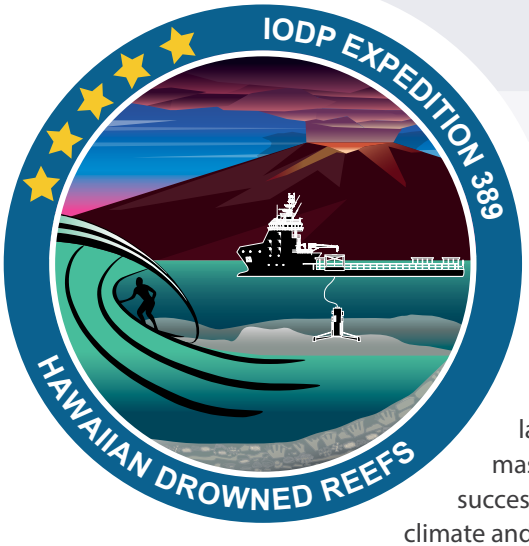
Chu, M., Bao, R., Strasser, M., Ikehara, K., Everest, J., Maeda, L., Hochmuth, K., Xu, L., McNichol, A., Bellanova, P., Rasbury, T., Kölling, M., Riedinger, N., Johnson, J., Luo, M., März, C., Straub, S., Jitsuno, K., Brunet, M., Cai, Z., Cattaneo, A., Hsiung, K., Ishizawa, T., Itaki, T., Kanamatsu, T., Keep, M., Kioka, A., McHugh, C., Micallef, A., Pandey, D., Proust, J. N., Satoguchi, Y., Sawyer, D., Seibert, C., Silver, M., Virtasalo, J., Wang, Y., Wu, T. W., Zellers, S., 2023. Earthquake-enhanced dissolved carbon cycles in ultra-deep ocean sediments. Nature Communications. *https://doi.org/10.1038/s41467-023-41116-w*.

Ikehara, K., Strasser, M., Everest, J., Maeda, L., Hochmuth, K., and the Expedition 386 Scientists, 2023. Expedition 386 Preliminary Report: Japan Trench Paleoseismology. International Ocean Discovery Program. *https://doi.org/10.14379/iodp.pr.386.2023*

IODP Expedition 389

Hawaiian Drowned Reefs

Offshore phase (2023)



Co-chief Scientists: **Jody Webster** (University of Sydney, Australia); **Christina Ravelo** (University of California, USA)

Expedition website: *www.ecord.org/expedition389*

Exp. 389 Scientific objectives

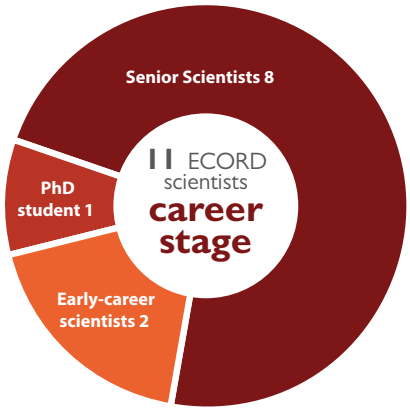
Surrounding the island of Hawai'i are a series of twelve fossil coral reefs that formed as the reef communities successively grew and were drowned by rising sea-levels and/or the near constant subsidence of the crust around the ever-growing volcanic archipelago of Hawai'i. When combined with Hawai'i's location away from the influence of any of the large Quaternary ice-sheets, or strong boundary ocean currents that can mask the sea-level and palaeoclimate signals, this location represents a unique succession of expended reef sequences, key for the recovery of high-resolution climate and reef response records.

Covering important time periods in the Earth's climate history, the information contained in these natural fossil reef archives will help scientists reconstruct sea-level change at a much higher resolution than previously possible at a stable far-field site. It will also enable them to investigate the links between global sea-level change and global climate change, and therefore the mechanisms that control abrupt climate change.

These records of natural climate change on a range of scales, from seasonal and decadal signals to the much longer term millennial scale changes, will also provide a framework for evaluating the effects of climate change originating from human activity.

The scientific team cored in 15 locations, to a depth of about 70 m below the seafloor, with the aim to address questions on four main themes:

- To reconstruct sea-level change in the central Pacific over the last 500,000 years.
- To reconstruct the variability in climate over the last 500,000 years, as recorded in the fossil corals, and better understand the differences in response between a seasonal – inter-annual variation in climate against what represents a more permanent shift in sea surface temperature, rainfall and storm tracks.
- To understand how coral reef systems respond both geologically and biologically to rapid changes in sea-level and climate – for example can reefs turn on and off when they reach certain limits, and how do they recover from disturbances in the system.
- To explain the subsidence and volcanic history of Hawai'i.



Distribution of ECORD scientists in IODP Expedition 389 by career stage (n = 11)

Distribution of ECORD scientists in IODP Expedition 389 by country (n = 11)

At the end of 2022, a Call for Tender for vessel and drilling services for this expedition was published and supplier bids received and assessed by the ESO Operations team. On 9 January 2023, ESO successfully identified a supplier that met the technical specification and budgetary constraints. Commercial arrangements were taken forward with the supplier in Q1 and Q2, and a contract was signed on 30 May with Benthic, a brand in the geo-services segment of Acteon Data and Robotics.

Benthic supplied their 5th generation Portable Remotely Operated Drill (PROD5) system, carried on the multipurpose vessel MMA *Valour* (see photo below). Planning discussions between ESO and Benthic commenced in Q1, covering detailed aspects of operations including deck planning, container fastening, vessel logistics, and schedule.

ESO continued science, facilities and logistics planning, including preparations for standard and other measurements for the offshore and OSP phases, container setups and certificates, US visa applications, making equipment/consumables lists, checking and maintaining equipment, and placing orders where needed. The Bremen team continued to evaluate sample requests for offshore and onshore requirements. Various ESO team members contributed to the production of the Scientific Prospectus, H&S documentation, and logistics for the expedition's first mobilisation in Singapore.

ESO-EPC staff evaluated hyperspectral analysis options, accessed data results and investigated possibilities to obtain and analyse suitable test samples. ESO-EPC met with prospective suppliers of hyperspectral systems and provided coral samples to test on their systems to evaluate data quality and equipment feasibility.

Additionally, ESO-EPC staff worked on the permit to use the MSCL radioactive source during the expedition. They met with Geotek's consultant for Radioactive Material training and to arrange the practical aspects of the source permits. ESO-EPC was also arranging a leak test, which was completed on 28 June.

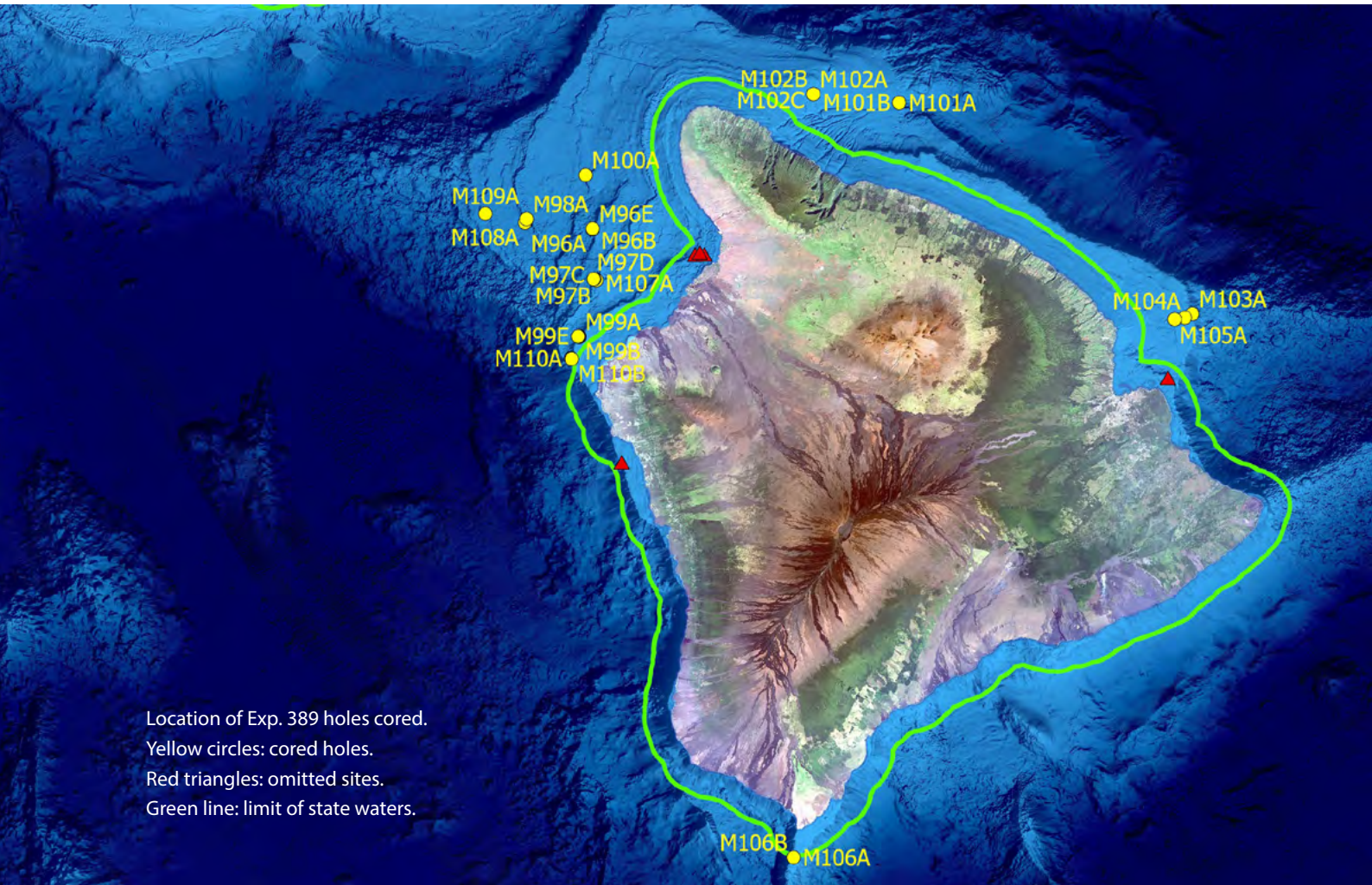
Benthic Portable Remotely Operated Drill (PROD5) being recovered to deck after a coring dive.
Credits: E. Le Ber, ECORD/IODP.

Outreach preparations were made for the expedition in liaison with the ECORD Outreach Task Force (EOTF), including updates to the expedition flyer and communication plan. Several zoom meetings were held with the Co-chief Scientists, prospective Onboard Outreach Officers, USSSP and ANZIC, and possibilities for educational ship to shore activities with the US Geological Survey were assessed. ESO outreach staff travelled to Hawaii to organise a Media Event at the mobilisation port. First mobilisation for the expedition took place in Singapore between 24 and 31 July, attended by various ESO team members from all partners. The mains tasks were to install the ESO laboratory containers on the vessel, check and test the equipment, and make the necessary cable runs. Second mobilisation took place in Kapolei, near Honolulu, between 23 and 31 August, attended by various ESO team members. The main tasks were to finalise the expedition set up, conduct final equipment testing, finalise the IT network, make final detailed plans with the Benthic drilling team and ship crew, and introduce the Science Party to the vessel. ESO staff also deployed the new database system mDIS (mobile Drilling Information System) on this expedition.

The expedition set sail on 31 Aug; please consult the daily and weekly reports (*https://www.ecord.org/expedition389/expedition-389-reports/*) for information on expedition progress, and also the expedition blog (with ESO staff contributions) for further background explanations (*https://expedition389.wordpress.com/*).
ESO-EPC staff organised a ship-to-shore event attended by undergraduate students, technicians, and staff from the School of Geography, Geology and the Environment (SGGE), University of Leicester. The event focussed on life on the ship and the science that takes place onboard.

A mid-expedition port call took place between 27 and 29 September to refuel and resupply, and the opportunity was taken to ship the first consignment of cores back to the UK for X-ray CT scanning at the BGS Core Scanning Facility near Nottingham. Additionally, 19 samples were shipped to Science Party member laboratories for 'quick turnaround' geochronological C14 (three samples) and U/Th (16 samples) analyses.

On 13 October, the Hawai'i Board of Land and Natural Resources denied permission to enter state waters for the purpose of scientific coring, due to insufficient community engagement. The expedition therefore focussed on sites in federal waters beyond the three nautical mile limit (see figure below).



Location of Exp. 389 holes cored.
Yellow circles: cored holes.
Red triangles: omitted sites.
Green line: limit of state waters.

After 63 days at sea, the offshore phase of the expedition ended on 2 November at Kapolei, near Honolulu, followed by a 4-day demobilisation when ESO staff dismantled and packed away the cores and equipment.

The expedition recovered a total of 426 m of core from 35 holes across 15 sites, with an average recovery of 66%. See table below for a summary of the holes completed.

In the latter parts of 2023, the ESO team continued planning for the OSP including making hotel reservations, placing catering orders, arranging local transport and logistics, laboratory maintenance and upgrades, staff planning, and equipment and consumables refitting.

Hole	Proposal site	Latitude	Longitude	Water depth (m)	Hole depth (mbsf)	Core recovery (m)
M96A	KAW-06A	20.03638781	-156.0657199	740.8	1.78	1.62
M96B	KAW-06A	20.03643922	-156.0656652	739.1	0.99	0
M96C	KAW-06A	20.03642284	-156.0656884	739.9	1.74	0.45
M96D	KAW-06A	20.03684314	-156.0656096	736.8	7.4	2.24
M96E	KAW-06A	20.03697955	-156.065609	738.2	6.7	0
M96F	KAW-06A	20.03695973	-156.0655957	738.2	12.24	4.76
M97A	KAW-04B	19.94213676	-156.0628529	414.2	35.05	26.42
M97B	KAW-04B	19.942109	-156.062876	414.6	59.35	23.17
M97C	KAW-04B	19.94252535	-156.0636549	417.6	36.16	28.04
M97D	KAW-04B	19.94269911	-156.0634772	424	23.69	19.22
M98A	MAH-01A	20.055425	-156.1897348	1100.1	19.1	8.42
M99A	KAW-02C	19.83442301	-156.0912882	131.9	6.44	4.29
M99B	KAW-02C	19.83434176	-156.091199	131.9	6.4	4.35
M99C	KAW-02C	19.83434793	-156.0912606	131.9	38.31	25.5
M99D	KAW-02C	19.83441074	-156.091324	131.7	27.71	0
M99E	KAW-02C	19.83524005	-156.0924407	144.6	31.62	18
M99F	KAW-02C	19.83533802	-156.0923038	145.6	13.45	6.75
M99G	KAW-02C	19.83529511	-156.0924674	146.3	68.62	18.93
M100A	KAW-07A	20.13760642	-156.0791074	998	12.43	9.73
M101A	KOH-02A	20.27367705	-155.4899026	931.9	18.09	12.34
M101B	KOH-02A	20.2738323	-155.489799	932	45.15	26.44
M102A	KOH-01A	20.28998249	-155.6508677	412.8	25.14	11.08
M102B	KOH-01A	20.28994913	-155.6509482	415.4	4.7	0
M102C	KOH-01A	20.28987123	-155.6510088	415.9	73.44	42.32
M103A	HIL-05A	19.87701015	-154.9396091	404.5	45.61	14.31
M104A	HIL-04A	19.87031057	-154.9539999	347	46.39	42.99
M105A	HIL-03A	19.86749352	-154.9727191	339.5	26.08	7.63
M106A	KAL-01A	18.85667931	-155.6883303	148.6	7.43	1.47
M106B	KAL-01A	18.85677182	-155.688265	147.9	16.14	2.98
M107A	KAW-04C	19.94018483	-156.0581779	403.8	13.44	12.72
M108A	MAH-02B	20.04836361	-156.1927453	1178.4	1.97	1.95
M108B	MAH-02B	20.04834551	-156.192127	1177.2	30.7	16.35
M109A	MAH-04A	20.06516911	-156.2669381	1241.8	4.62	4.21
M110A	KAW-03C	19.79323136	-156.1057844	156.9	18.7	14.18
M110B	KAW-03C	19.7925084	-156.1047558	144.8	17.22	12.9
				Total	**804**	**425.76**

Table: Summary of IODP Expedition 389 holes completed. Note: hole depth includes intervals deliberately washed (no coring attempted).

IODP Expedition 406

Postponed

New England Shelf Hydrogeology

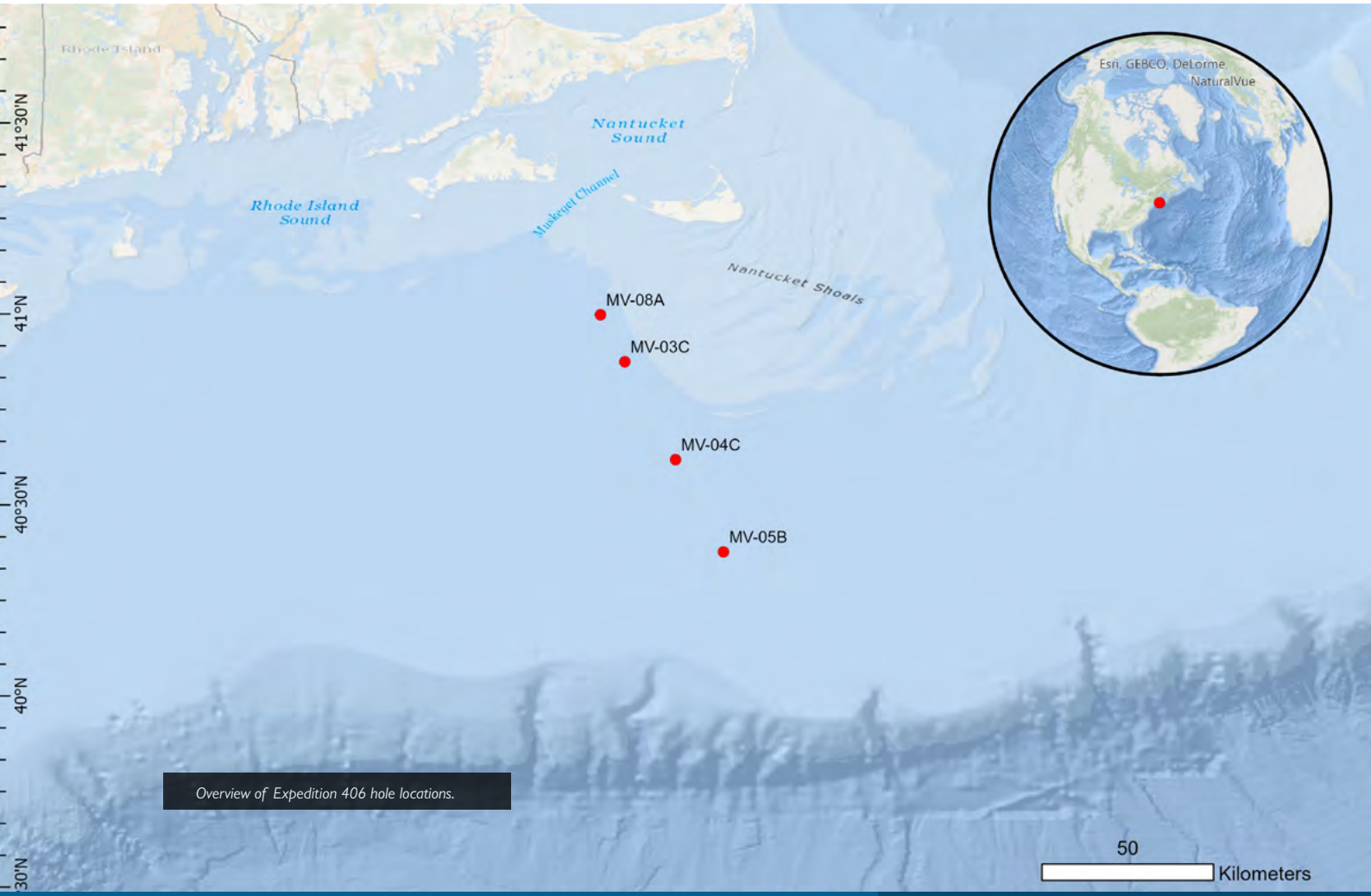
Co-chief Scientists	**Brandon Dugan** (Colorado School of Mines, USA) **Karen Johannesson** (University of Boston, MA, USA)
Expedition website	*www.ecord.org/expedition406*

ESO continued planning for IODP Expedition 406: New England Shelf Hydrogeology throughout 2023. Brandon Dugan (Colorado School of Mines) was invited as Co-chief Scientist on 17 February and Karen Johannesson (University of Boston, MA) invited on 19 May.

On 23 February, ESO staff met with Brandon Dugan and representatives from the NOAA National Marine Fisheries Service to discuss permitting requirements.

The Call for Scientists was opened between 6 June and 15 Aug, with an online information webinar held on 27 June. Science Party nominations were received from the Program Member Offices from 9 October, and ESO met with the Co-chief Scientists on 1 November to select the Science Party members.

Following a market consultation exercise in September, a Request for Proposals was issued by ESO in October and November. In early December the call closed with no bids submitted. Early feedback indicated a lack of availability of platforms in the advertised time window (May-August 2024). The expedition was cancelled for 2024, and its future is now subject to a decision by the ECORD Facility Board and ECORD Council in early 2025.



Overview of Expedition 406 hole locations.

ESO facility, service and general activities

Throughout 2023, ESO representatives participated in various standing programme meetings required for the smooth functioning of IODP and ECORD, including the ECORD Facility Board, ECORD Council, ECORD Vision Task Force, ECORD Science Support & Advisory Committee, ECORD Outreach Task Force, Chikyu IODP Board, IODP Science Evaluation Panel, and IODP Forum. Additionally, ESO staff attended ECORD-Japan IODP[3] planning meetings throughout the year, as well as various working groups set up to address the challenges of transitioning to new post-2024 ocean drilling programmes.

To support the development of future proposals that may utilise MSP, the following workshops were attended by ESO staff in advisory roles:

- MagellanPlus workshop "Cenostore: Cenozoic palaeo-climate of NW Europe and implications for subsurface CO2 containment", 11-13 January, Belfast, UK.
- The ECORD/J-DESC online "Workshop on the Future of Scientific Ocean Drilling", 17, 19 and 26 January.
- The "Ocean Drilling and British-Irish Ice Sheet (BIIS) Long Term History" online workshop, 28 March.
- The ANZIC Future D.E.E.P. Regional Planning Workshop, 3-4 April, Hobart, Australia.
- An MSP proposal workshop at the Deepwater Circulation Research Conference, 26 May, Edinburgh, UK.
- MagellanPlus workshop "MANTLE-L2S: Accessing the Circus-Iberian mantle archive of Wilson Cycle processes through Land-to-Sea drilling", 3-6 July, Plymouth, UK.
- MagellanPlus workshop "MSP drilling the SE-Asian Sunda Shelf: Plio-Pleistocene climate, sea level, carbon storage and continental weathering on the largest low latitude shelf system", 9-11 October, Edinburgh, UK.

Throughout 2023, the ESO partners maintained their laboratory and refrigerated containers, and the equipment they contain. On 21 March, ESO-Bremen routinely maintained all microscopes in preparation for Expedition 389, and new label printers have been in operation in the BCR labs since 8 March. On 5 December, ESO staff visited the JOIDES Resolution (JR) to view its facilities and explore the possibility of occasionally hiring the JR as an MSP in the future.

Certification activities continued, including a visit to the ESO-EPC team at the University of Leicester by the UK's Environmental Agency to inspect radioactive sources and associated paperwork.

ESO staff underwent all necessary training in support of offshore activities, including Personal Survival Training, Basic Offshore Safety Induction And Emergency Training (BOSIET), and First Aid training. Additionally, ESO-EPC staff arranged the renewal of their radioactive handling training, revised the Radioactivity Safety Local Rules in preparation for the EPC summer school and future expedition, and attended a two-day MSCL training course at Geotek on 22-23 June.

Data Management

Throughout 2023, the ESO-Bremen team continued work towards the new database system mDIS (mobile Drilling Information System) and finalized a new mDIS instance for IODP Expedition 389. The team participated in several meetings with ICDP colleagues and a software company to develop mDIS BCR specifications (expedition and curation versions). Additionally, the team continued their maintenance of the ESO cloud system, including a major version update of the Nextcloud software on 2 February, and implementation of additional daily backup routine to separate physical storage.

The ESO data managers also continued preparations for the long-term archiving of IODP Expedition 386 data in PANGAEA. This involved minor corrections of DIS entries, and QC/QA OSP data.

3. Anticipating future mission-specific platform expeditions

Jody Webster (Co-chief Scientist, University of Sydney, Australia) takes a closer look at a freshly recovered core onboard *MMA Valour* during IODP Expedition 389.
Credits: M. Parker, ECORD/IODP.

3. Anticipating future mission-specific platform expeditions

Related websites:
www.ecord.org/about-ecord/management-structure/efb
www.iodp.org/active-proposals
www.iodp.org/facility-boards#SEP

This year, with the end of the programme the Chair of the ECORD Facility Board (EFB) worked alongside the Chairs of the *Chikyu* IODP Board (CIB) and the *JOIDES Resolution* Facility Board (JRFB) to establish a procedure so that proposals at other facility boards could be transferred to the EFB to be run as mission-specific platform (MSP) expeditions in the International Ocean Drilling Programme - IODP[3]. This procedure includes the submission of an addendum to the Science Evaluation Panel (SEP) for review, in which proponents describe the alignment of their scientific objectives with the 2050 Science Framework and define three implementation plans after exchanges with the ECORD Science Operator (ESO). Four proposals that were at the JRFB awaiting scheduling requested to be transferred to the EFB to be considered for implementation by IODP[3].

There was no drilling proposal to schedule at the annual EFB meeting, which was held in Edinburgh, UK, in September 2023, as the final expedition of the current programme - New England Shelf Hydrogeology - was already scheduled for April-June 2024. Unfortunately, this expedition had to be rescheduled for spring 2025. The annual EFB meeting therefore reviewed the proposals at the EFB, those requesting transfer from the JRFB to the EFB and proposals currently at SEP and designed as MSP expeditions.

Valuable lessons from IODP Expedition 386: Japan Trench Paleoseismology about the future of remote participation in IODP[3] have been discussed. Expedition 386 was drilled during the pandemic in spring 2021, when the majority of the science party members were unable to participate due to travel restrictions at the time. This situation provided an unexpected opportunity to explore how to build a Science Party with those who cannot always take the time to be part of the ship board science party. As scientific ocean research drilling moves forward, such inclusive approaches are going to be essential to insure that we are able to support a wide range of scientists who wish to participate in ocean research drilling. Some of the key takeaways were:

- Onshore Science Party members should commit to shifts as if they were offshore, and it may be worth putting them in hotel rooms, so it is not something they are trying to do 'on the side' while doing their normal jobs too.
- Communication is essential – both among the Science Party members as well as from the ship to the shore.
- There is a benefit to expanding the Science Party so more people can get involved even if you are limited with the numbers you can have on the ship itself.

MSP proposals at the ECORD Facility Board

Five MSP proposals currently reside at the EFB (table below), including three expeditions that were postponed over the last five years (i.e., expeditions 373 in 2018, 377 in 2018 and 2022, and 406 in 2023), and four proposals that have been transferred from the JRFB to the EFB.

- 637-Ful2: New England Shelf Hydrogeology (IODP Expedition 406)
- 708-Full2: Arctic Ocean Paleoceanography (IODP Expedition 377)
- 730-Full2: Sabine Bank Sea Level
- 813-Full: Antarctic Cenozoic Paleoclimate (IODP Expedition 373)
- 864-Full2: Equatorial Atlantic Gateway
- 971-Full2: Kane Megamullion Deep Drilling
- 979-Full2: Arctic Atlantic Gateway Paleoclimate (IODP Expedition 404)
- 1004-APL2: Nadir K-Pg Impact Crater

Proposals at the ECORD Facility Board

Proposal	Type	Short Title	Lead Proponent	Country	Status
637	Full2	New England Shelf Hydrogeology	Dugan	USA	Exp. 406, postponed
708	Full2	Central Arctic Paleoceanography (ArcOP)	Stein	ECORD - Germany	Exp. 377, postponed
730	Full2	Sabine Bank Sea Level	Taylor	USA	
813	Full	Antarctic Cenozoic Paleoclimate	Williams	USA	Exp. 373, postponed
864	Full2	Equatorial Atlantic Gateway	Jones	ECORD - UK	transferred from JRFB
971	Full2	Kane Megamullion Deep Drilling	Sanfilippo	ECORD - Italy	transferred from JRFB
979	Full2	Arctic Atlantic Gateway Paleoclimate	Geissler	ECORD - Germany	Exp. 404, transferred from JRFB
1004	APL2	Nadir K-Pg Impact Crater	Nicholson	ECORD - UK	transferred from JRFB

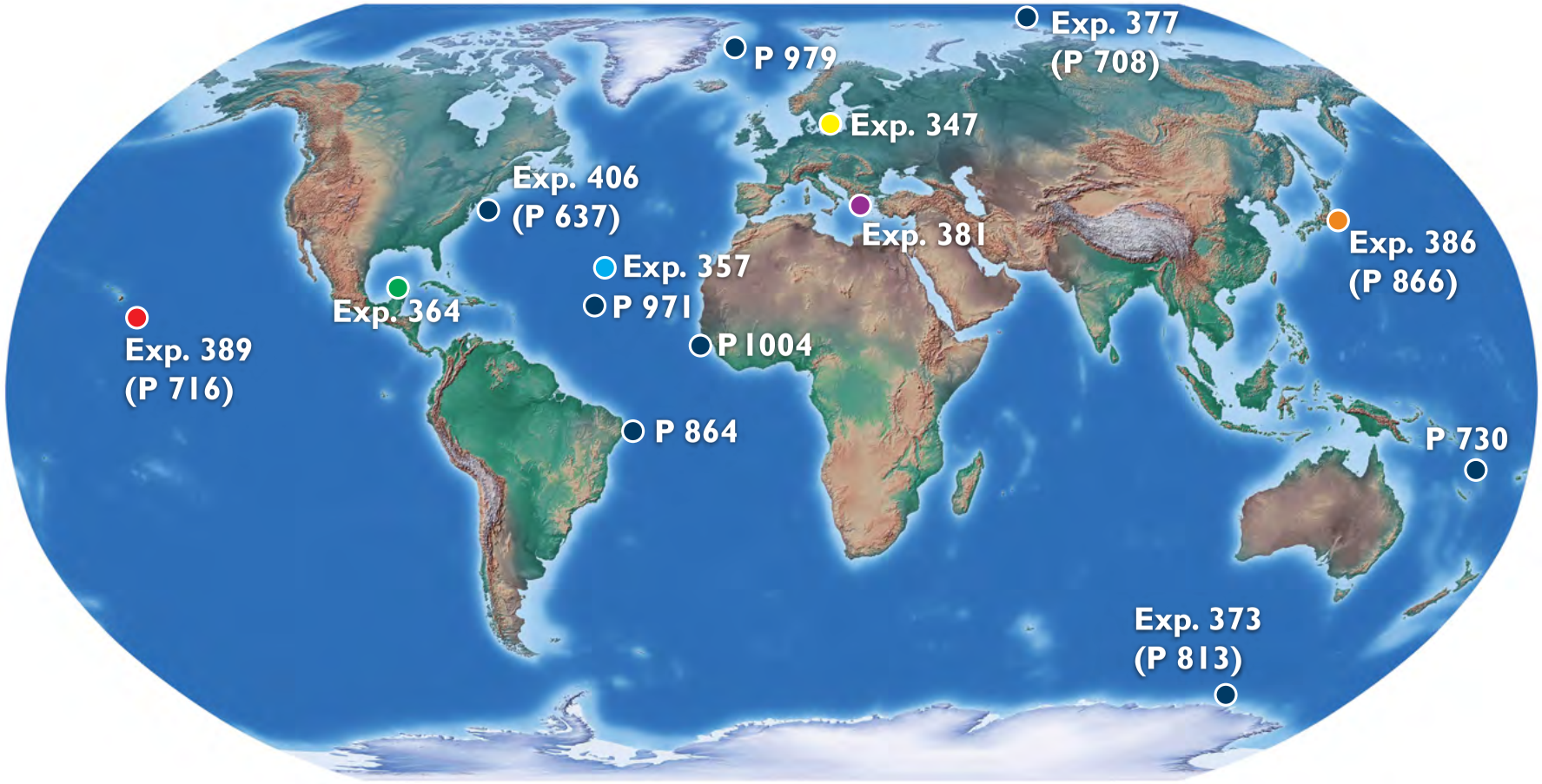
Related websites

http://www.ecord.org/about-ecord/management-structure/efb/

http://www.iodp.org/active-proposals

http://www.iodp.org/facility-boards#SEP

Mission-specific platform expeditions and proposals at the EFB



IODP Expedition 406

Postponed

New England Shelf Hydrogeology

Co-chief Scientists **Brandon Dugan** (Colorado School of Mines, USA)
Karen Johannesson (University of Boston, MA, USA)

Expedition website *www.ecord.org/expedition406*

Exp. 406 Scientific objectives

In many coastal settings around the world the distribution of freshwater within continental shelf sediments is far out of equilibrium with modern sea level conditions. One of the most remarkable examples of this can be found on the Atlantic continental shelf off New England where groundwater within shallow Pliocene-Pleistocene sand units over 100 km offshore Long Island are remarkably fresh (~ 3000 mg/l salinity). On Nantucket Island to the North, a 514 meter-deep borehole penetrating the entire Cretaceous–Tertiary sedimentary package showed considerable vertical variations in salinity with extremely fresh (< 1000 mg/l) waters in sand aquifers, higher salinity levels (between 30–70% seawater) in thick clays/silts and intermediate to low salinities in thin confining units, attesting to marked disequilibrium conditions because diffusion tends to eliminate such patterns. Pore fluids within Pleistocene to Upper Cretaceous sands beneath Nantucket Island were also found to be modestly over-pressured by about 4 m above the local water table.

It is hypothesized that the rapid incursion of freshwater on the continental shelf in New England could have been caused by one or more of the following mechanisms: (1) Meteoric recharge during Pleistocene sea-level low-stands including vertical infiltration of freshwater associated with local flow cells that may have developed on the continental shelf during sea level low stands; (2) Sub-ice-sheet recharge during the last glacial maximum; (3) Recharge from pro-glacial lakes. It is further hypothesized that the overpressures could be due to either: (1) Pleistocene sediment loading; or (2) fluid-density differences associated with the emplacement of a thick fresh water lens overlying saltwater (analogous to excess pressures observed in gas legs of petroleum reservoirs). These different recharge mechanisms can be distinguished using environmental isotope and noble gas data.

This work will extend our understanding of the current and past states of fluid composition, pressure and temperature in continental shelf environments. It will help better constrain rates, directions, and mechanisms of groundwater flow and chemical fluxes in continental shelf environments. It will contribute to developing new tools for measuring freshwater resources in marine environments. The apparent transient nature of continental shelf salinity patterns could have important implications for microbial processes and long-term fluxes of carbon and nitrogen and other nutrients to the global ocean.

Exp. 406 Operations

See Section 2: Operating and participating in mission-specific platform expeditions on page *42*.

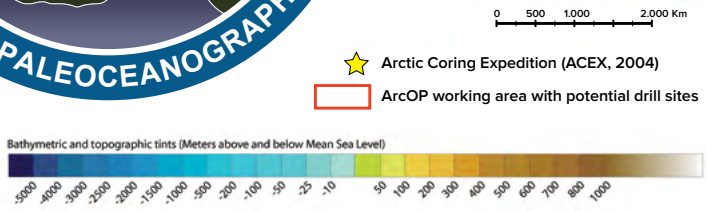
IODP Expedition 377

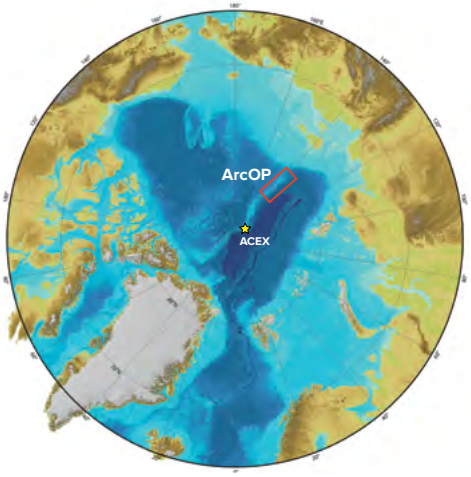
Postponed

Arctic Ocean Paleoceanography (ArcOP)

Co-chief Scientists: **Ruediger Stein** (Alfred Wegener Institute, ECORD-Germany)
Kristen St. John (James Madison University, USA)

Expedition website: *www.ecord.org/expedition377*





Exp. 377 Scientific objectives

Prior to 2004, the geological sampling in the Arctic Ocean was mainly restricted to near-surface Quaternary sediments. Thus, the long-term Pre-Quaternary geological history is still poorly known. With the successful completion of the Arctic Coring Expedition - ACEX (IODP Expedition 302) in 2004, a new era in Arctic research has begun. Employing a novel multi-vessel approach, the first MSP expedition of IODP has proven that drilling in permanently ice-covered regions is possible.

During ACEX, 428 meters of Quaternary, Neogene, Paleogene and Campanian sediment on Lomonosov Ridge were penetrated, providing new unique insights into the Cenozoic Arctic paleoceoceanographic and climatic history. While highly successful, the ACEX record also has three important limitations. Based on the original age model, the ACEX sequence contains a large hiatus spanning the time interval from late Eocene to middle Miocene, i.e., 44.4 to 18.2 Ma. This is a critical time interval, as it spans the time when prominent changes in global climate took place during the transition from the early Cenozoic Greenhouse world to the late Cenozoic Icehouse world. Furthermore, generally poor recovery during ACEX prevented detailed and continuous reconstruction of Cenozoic climate history. Finally, a higher-resolution reconstruction of Arctic rapid climate change during Neogene to Pleistocene times, could not be reached during ACEX in 2004. A return to the Lomonosov Ridge for a second MSP - type drilling campaign within IODP might fill these major gaps in our knowledge on Arctic Ocean paleoenvironmental history through Cenozoic times and its relationship to the global climate history.

Overall goal of the proposed drilling campaign is the recovery of a complete stratigraphic sedimentary record on the southern Lomonosov Ridge to meet our highest priority paleoceanographic objective, the continuous long-term Cenozoic climate history of the central Arctic Ocean. Furthermore, sedimentation rates two to four times higher than those of ACEX permit higher-resolution studies of Arctic climate change in the Pleistocene and Neogene. As demonstrated in the proposal, this goal can be achieved by careful site selection, appropriate drilling technology, and applying multi-proxy approaches to paleoceanographic, paleoclimatic, and age-model reconstructions.

IODP Proposal 730-Full2

EFB waiting room

Sabine Bank Sea Level

Lead Proponent: **Frederick Taylor** (University of Texas, USA)

P 730 Scientific objectives

Western Pacific Warm Pool (WPWP) coral records of Quaternary climate and sea level continue underachieving their potential due to scarcity of samples. Pre-LGM corals are even rarer than post-LGM with virtually no records prior to ~15 ka; only MIS 3 sea level peaks are dated by corals, while low stands remain poorly defined. Some issues that fossil corals from Vanuatu would illuminate include pre-Holocene WPWP climate variability, including the El Niño-Southern Oscillation (ENSO) and decadal-scale variability, annual cycle sensitivity to insolation, and the response of the South Pacific Convergence Zone (SPCZ) to changes in background conditions and concrete paleosea level evidence. Dated corals from SB and BG would provide unprecedented constraints on the trajectory and rates of convergence and subsidence of a tectonic plate back into the mantle. Because of their geochemical character, corals are perhaps the most precisely datable natural material that records interannual, decadal, and century-scale SST and SSS variability via ^{18}O, Sr/Ca, and, possibly, other proxies at sub-annual resolution. Drilling rapidly subsiding reefs at Sabine Bank and Bougainville Guyot is a new strategy offering many advantages. Both reefs have ridden eastward over the New Hebrides trench outer rise (NHTOR) at mean rates of ~85 mm/yr and are descending into the trench. Bougainville Guyot was drilled at 1066 m depth at ODP Site 831 with extremely poor core recovery. However, an incredibly well preserved ~350 ka *Porites* sp. coral from ~ 240 mbsf produced one of the only credible pre-MIS 5e coral records. This example illustrates how rapid subsidence can facilitate coral preservation. Sabine Bank's surface lies at 5 - 35 m depths and MCS profiles indicate up to 500 m of carbonate subdivided into four major units overlying a faulted basement. SB drilling would produce at least a post LGM record, and possibly much more. The western ends of SB and BG are ~100 ka younger in their stratigraphic evolution than the western ends. This enables a strategy of drilling younger strata at the western edges of SB and BG and progressively older strata toward the trench to compensate for the limitations of the Marum Mebo 200 Drill which presently has a 70 mbsf capacity, but is being improved to drill to 200 mbsf.

IODP Expedition 373

Postponed

Antarctic Cenozoic Paleoclimate

Co-chief Scientists **Trevor Williams** (Texas A&M University, USA)
Carlota Escutia (University of Granada, ECORD-Spain)

Expedition website *www.ecord.org/expedition373*

Exp. 373 Scientific objectives

Along the George V and Adélie Land (GVAL) shelf of Antarctica, shallowly-buried strata contain a record of Antarctica's climate and ice history from the lush forests of the Eocene greenhouse to the dynamic ice sheet margins of the Neogene. Over these times, Antarctica and the Southern Ocean have played a central role in controlling sea level, deep-water formation, ocean circulation, and exchange of carbon dioxide with the atmosphere. Yet currently there are very few direct records of Antarctic climate and ice conditions from close to the continent. On the GVAL shelf, short piston cores and dredges have recovered Cretaceous and Eocene sediment at the seabed. In 2010, IODP Expedition 318 recovered earliest Oligocene and early Pliocene subglacial and proglacial diamicts, providing direct records of ice advances across the shelf at these times, and confirming that target sediments are accessible at shallow burial depths. However, challenging ice and drilling conditions from the *JOIDES Resolution* resulted in poor core recovery and abandoning sites before the stratigraphic targets were reached. Here, it is proposed to use the MeBo sea bed drill for improved core recovery and easier access to the shelf. It is proposed to drill two stratigraphic transects of shallow (~80 m) holes to investigate Antarctica's role in icehouse and greenhouse climates, and the transitions between the two.

To investigate Oligocene to Pliocene ice sheet dynamics, strata above and below regional erosional and downlap surfaces are targeted to date and characterize major episodes of ice sheet advance and retreat. These direct records of ice extent on the shelf can be set in the context of Southern Ocean records of temperature, ice-rafted debris (IRD) and latitudinal fluctuations of the opal belt, and hence ice behavior can be related to paleoclimate conditions. The ice and climate history of the GVAL margin can provide warm-world scenarios to help understand ice sheet instability in analogous future warm climates.

In the Cretaceous and Eocene greenhouse target intervals: temperature and vegetation records will provide high-latitude constraints on pole-equator temperature gradients and their evolution; the proximity of the sites to the coastal lowlands will enable us to assess the hypothesized role of thawing permafrost in Eocene hyperthermal events; and late Eocene cooling and possible pre-cursor glaciations can also be documented by drilling.

Exp. 373 Operations

Expedition 373: Antarctic Cenozoic Paleoclimate was postponed until further notice in 2018, after a tender exercise demonstrated no vessel availability for the 2019/20 or 2020/21 Antarctic summer seasons.

In early 2020, ESO continued to liaise with the Australian Antarctic Division regarding a planned visit to the icebreaker *Nuyina* before it was delivered to Australia, either in the dockyard in Romania, or at a European port before, during or after Arctic sea trials. We learned from an AAD contact that the ship build was delayed due to the COVID-19 crisis (the shipyard had many positive Covid-19 cases). Ultimately, and due to COVID-19 restrictions, we were unable to visit the ship as planned, and we will arrange a visit when restrictions allow. We also considered the feasibility of using the icebreaker *Laura Bassi* (formerly the *RRS Ernest Shackleton*, now operated by the Italian Istituto Nazionale di Oceanografia e di Geofisica Sperimentale).

IODP Proposal 864-Full2

EFB waiting room

Equatorial Atlantic Gateway

Lead Proponent: **Tom Dunkley Jones** (University of Birmingham, ECORD-UK)

P 864 Scientific objectives

This proposal seeks to answer first order questions about the tectonic, climatic and biotic evolution of the Equatorial Atlantic Gateway (EAG). It is proposed to target sequences of Late Cretaceous and Cenozoic sediments offshore NE Brazil, just south of the theorized final opening point of the EAG. These sequences are accessible to conventional non-riser drilling in the vicinity of the Pernambuco Plateau, part of the northeastern Brazilian continental shelf. This region was chosen to satisfy two key constraints that other regions in Equatorial Brazil could not meet: first, Aptian-Albian aged sediments, that record the main phases of the South Atlantic marine incursion, are present at depths shallow enough to be recovered by non-riser drilling; second, Late Cretaceous and Paleogene sediments preserved on the Pernambuco Plateau, are close enough to the continental margin, and at shallow enough paleo water depths (<2000 m) to provide well-preserved organic biomarkers and calcareous microfossils for multi-proxy studies of greenhouse climate states. New records in this region will allow us to address major questions within four key themes: A) The early rift history of the Equatorial Atlantic; B) Biogeochemistry of the restricted Equatorial Atlantic; C) The long-term paleoceanography of the Equatorial Atlantic Gateway; and, D) the limits of tropical climates and ecosystems under conditions of extreme warmth. Tackling these major questions with new drilling in the EAG region will advance our understanding of the long-term interactions between tectonics, oceanography, ocean biogeochemistry and climate, and the functioning of tropical ecosystems and climate during intervals of extreme warmth.

IODP Proposal 971-Full2

EFB waiting room

Equatorial Atlantic Gateway

Lead Proponent: **Alessio Sanfilippo** (University of Pavia, ECORD-Italy)

P 971 Scientific objectives

This proposal concerns the drilling of two 500-m deep holes on the long-lived detachment fault footwall at the Kane Megamullion, an oceanic core complex (OCC) located at 23°N on the Mid Atlantic Ridge (MAR). The site of the first hole, KNA-01A, is on peridotite, which based on seismic structure and geologic reconnaissance represents exhumed mantle directly exposed on the seafloor. The second site, KNC-01A, is on talc-serpentine schist, which is believed to mask a 264 km2 gabbro body close to the same lithospheric flow line.

There are 4 principal objectives:

1. Test the seismic and geologic interpretations of the Kane OCC sub-surface structure.
2. Test the variability of crustal architecture with decreasing melt flux in 3D.
3. Examine hydrothermal alteration processes in lower crustal and mantle lithologies as a function of depth and temperature.
4. Explore heterotrophic and chemolithoautotrophic lifestyles in the lower oceanic crust and upper mantle at the Kane OCC.

IODP Expedition 404

EFB waiting room

Arctic Atlantic Gateway Paleoclimate

Lead Proponent: **Wolfram Geissler** (Alfred Wegener Institute, ECORD-Germany)

Exp. 404 Scientific objectives

Today's polar cryosphere reflects a climate state that developed during a stepwise global cooling during the Cenozoic greenhouse-to-icehouse climate transition. Polar ocean gateways such as the Drake Passage in the Southern Hemisphere and the Arctic-Atlantic Gateway (AAG) in the Northern Hemisphere played pivotal roles in changing the global climate through their influence on oceanic circulation, heat transport and ice sheet development. The Arctic Ocean was isolated from the global oceanic thermohaline circulation system during most of its geological history. This gradually changed when Greenland and Svalbard began to move apart from each other, initiating the opening of the AAG through the Fram Strait. Although this gateway is known to be important in Earth's past and modern climate, little is known about its Cenozoic development. Indeed, the opening history and AAG's consecutive widening and deepening must have had a strong impact on circulation and water mass exchange between the Arctic Ocean and the North Atlantic.

As a first order approximation, the timing of Fram Strait opening can be inferred from geophysical and stratigraphic records as well as modelling studies which form the basis of the hypotheses to be tested with this proposal. Climate and tectonic modelling studies suggest that a certain width and depth of the Fram Strait are required to allow the bi-directional exchange of water masses of Atlantic and Arctic origin through the AAG. To test these models, direct geological evidence from ocean drilling sediment records from three primary sites between 73°N and 78°N are needed to constrain the age of the opening, widening, and deepening of this deep-water Arctic-North Atlantic Oceans connection.

These sites will provide unprecedented sedimentary records from the Eocene/Oligocene through the Miocene that will unveil (1) the history of shallow-water exchange between the Arctic Ocean and the North Atlantic and its impact on the global cryosphere evolution, and (2) the development of the AAG to a deep-water connection and its influence on global climate changes. By filling the current time gap of ~20 million years in the AAG region with new, well-dated borehole material, we will address these large uncertainties and gaps in the paleoclimate record.

IODP Proposal 1004-APL2

EFB waiting room

Nadir K-Pg Impact Crater

Lead Proponent: **Uisdean Nicholson** (Heriot-Watt University, ECORD-UK)

P 931 Scientific objectives

The hypervelocity impact of large asteroids and comets represent an important geological hazard and can cause major perturbations of Earth's climate and biological systems. Seismic sections across the 8.5-km wide Nadir structure offshore Guinea, West Africa, show numerous characteristics consistent with a complex impact crater. The feature is relatively shallow, at only ~300-400 m below the seafloor, and uniquely accessible by riserless drilling. Leveraging planned IODP Expeditions in the Central Atlantic, nine days of drilling are required to test the hypothesis that this structure was caused by a marine-target impact of Late Cretaceous to Early Paleogene age. Drilling will allow to test conceptual and numerical models of crater formation based on seismic data. The proponents also seek to determine the age of the impact lithologies and therefore determine the age of the crater. This will allow to test the hypothesis that the Nadir structure could be an impact that was coeval with the Chicxulub impact event in Mexico (or part of an impact cluster. If the crater pre-dates or corresponds with the K-Pg boundary, then the selected sites will provide a high-resolution archive including K-Pg impact ejecta and the Paleogene recovery of life following the K-Pg mass extinction. It will also provide an important low-latitude record of early Cenozoic oceanographic and climatic conditions, likely including the Paleocene-Eocene Thermal Maximum (PETM) and Eocene hyperthermal events.

MSP proposals at SEP

Ten MSP proposals have been handled by SEP in 2023 and could potentially involve diverse drilling/coring technologies:

- Proposal 796-ADP: Nice Amphibious Drilling (Lead Proponent: Achim Kopf, ECORD-Germany);
- Proposal 931-Pre: East Antarctic Ice Sheet Evolution (Lead Proponent: Amelia Shevenell, USA);
- Proposal 1003-Pre2: N. Cava Volcanic Ash (Lead Proponent: Ann Dunlea, USA);
- Proposal 1005-Full: Sunda Sea Level and Weathering (Lead Proponent: Peter Clift, USA);
- Proposal 1006-Pre: Mediterranean-Black Sea Gateway (Lead Proponent: Wout Krijgsman, ECORD-Netherlands);
- Proposal 1007-Full: Sunda Shelf Carbon Cycling (Lead Proponent: Zhifei Liu, China);
- Proposal 1008-Pre2: Belize Barrier Reef Postglacial Sea Level (Lead Proponent: Eberhard Gischler, ECORD-Germany);
- Proposal 1009-Pre: Tracing Monsoon, Ocean currents and diagenetic carbon Redistribution in the Timor Sea (Lead proponent: Uwe Balthasar, ECORD-UK);
- Proposal 1011-Pre: Northeast Greenland Glaciated Margin (Lead proponent: Lara Perez, ECORD-Denmark);
- Proposal 1012-Pre: Late Cenozoic Glaciers, Landscapes, Climates, and Ecosystems of the North Sea (GLACE-NS). Lead proponent: Andrew Newton, ECORD-UK.

MSP proposals at SEP

Proposal	Type	Short Title	PI	Country	Staus
796	ADP	NADIR: Nice Amphibious Drilling	Kopf	ECORD - Germany	Revise
931	Pre	East Antarctic Ice Sheet Evolution	Shevenell	USA	Develop to Full
1003	Pre2	N. CAVA Volcanic Ash	Dunlea	USA	Revise
1005	Full	Sunda Shelf Sea Level and Weathering	Clift	USA	Revise
1006	Pre	Mediterranean-Black Sea Gateway	Krijgsman	ECORD - Netherlands	Revise
1007	Full	Sunda Shelf Carbon Cycling	Liu	China	Revise
1008	Pre2	Belize Barrier Reef Postglacial Sea Level	Gischler	ECORD -Germany	Revise
1009	Pre	Tracing Monsoon, Ocean currents and diagenetic carbon Redistribution in the Timor Sea	Balthasar	ECORD - UK	Declined
1011	Pre	Northeast Greenland Glaciated Margin	Perez	ECORD - Denmark	Declined
1012	Pre	Late Cenozoic Glaciers, Landscapes, Climates, and Ecosystems of the North Sea	Newton	ECORD - UK	Revise to Full

IODP Proposal 796-ADP

SEP waiting room

Nice Amphibious Drilling

Lead Proponent: **Achim Kopf** (MARUM, ECORD-Germany)

P 796 Scientific objectives

Submarine landslides, followed by tsunamis, represent a major geohazard and an exciting research target given the wealth of trigger mechanisms and their dynamic interaction. The Ligurian margin, western Mediterranean, is known for its steep topography with numerous landslide scars, however, the cause of these landslides is incompletely understood. Given the geodynamic situation adjacent to the western Alps (with seismicity ranging up to M>6) and the large discharge of water and sediment through the Var River, the lithological variability (coarse sand and conglomerate interbedded with sensitive clay) and different hydrological regimes (coupled to precipitation and seasonal melt-water discharge), as well as the profound human impact on the coast (e.g. collapsed landfill area and construction site in 1979, followed by a tsunami in the Gulf of Antibes), the French portion of the Riviera is an area where various triggers can be studied in a locally confined region.

The fact that the margin comprises permeable delta deposits that underwent transgression calls for an amphibious approach that addresses both the onshore portion of a charged aquifer as well the area into which the fluids are funneled, thus causing elevated pressure in the shallow submarine slope. It is proposed to drill two onshore and four offshore holes at the Ligurian margin to characterize the strata of the Plio-Quaternary Var aquifer, and the marine metastable slope E and W of the 1979 collapse structure and its redeposited material downslope. The target depth at each site will provide reconnaissance data to portions already sampled (onshore groundwater wells, offshore gravity/piston coring) and also characterization of the underlying strata down to the Pliocene puddingstones. Since mission-specific amphibious drilling and borehole instrumentation is proposed, drill cores and downhole-logging information will identify mechanically weak vs. strong layers, hydraulically active horizons, and zones of overpressure owing to groundwater-charging or rapid vertical loading in the Var delta deposits. The related hypotheses may be tested by drilling, and will be comprehensively answered by long-term monitoring of the physical parameters affecting slope failure. Offshore, borehole observatory installation is effortless given water depths of <50 m and will include multi-parameter instruments.

This proposal is designed to unambiguously test multiple-triggers for landslides at the French Riviera, and although locally restricted, the complexity of the area makes this margin a primary site for time- and cost-efficient operations at a glacially affected margin in the NEAM region.

IODP Proposal 931-Pre

SEP waiting room

East Antarctic Ice Sheet Evolution

Lead Proponent: **Amelia Shevenell** (University of South Florida, USA)

P 931 Scientific objectives

The aim is to recover Late Cretaceous to late Quaternary strata from the Sabrina Coast shelf, offshore of the Aurora Basin, East Antarctica. The Aurora Basin extends from the Gamburtsev Mountains to the coast, is one of East Antarctica's largest marine-based catchments, and contains 3-5 meters of sea-level equivalent ice. Models indicate that Antarctica's ice sheets may have nucleated in the Gamburtsev Mountains, reached the Sabrina Coast before continental-scale ice sheets formed, and has remained relatively sensitive to climate perturbations through the Cenozoic. The proposed drilling program will provide key constraints on the: 1) existence of warm high southern latitude climates during the late Mesozoic and early Cenozoic, and 2) evolution of the East Antarctic Ice Sheet in the Aurora Basin from the Paleogene to the last deglaciation. A broad range of datable open marine, glaciomarine, and subglacial sediments are accessible by shallow (150-300 m) drilling, as imaged by high-resolution seismic data and confirmed by piston cores collected during site survey cruise NBP14-02. This accessible archive of past Antarctic climate and ice sheet history will provide data to improve ice sheet and climate model boundary conditions and outputs. This type of data-model integration is required to better understand the response of Antarctica's ice sheets to continued anthropogenic warming.

IODP Proposal 1003-Pre2

SEP waiting room

N. CAVA Volcanic Ash

Lead Proponent: **Ann Dunlea** (Woods Hole Oceanographic Institution, USA)

P 1003 Scientific objectives

Forecasting volcanic hazards is essential for protecting society, but the drivers and rhythms of eruptions are not well understood and limit predictive models. Alteration of volcanogenic material in marine sediment has been shown to play an important role in carbon cycling with consequences that may impact climate, but the extent of these interactions is far from clear. To move forward we need to understand the feedback mechanisms and relationships of volcanic ash with deep earth processes, the biosphere, and climate.

This project proposes to test four hypotheses:

1a. The rhythms of volcanic activity from the Southern Mexico and Northern Central American volcanic arcs are correlated with glacial-interglacial cycles and/or tectonic events.

1b. Changes in the composition of volcanogenic material deposited over time reflect the evolution of the volcanic arc and reflect changes in sediment composition being subducted to the arc.

2a. The presence of reactive silicates in volcanogenic material plays a major role in the carbon and silica cycles that determine whether CO2 is released from or sequestered in the sediment.

2b. Microbial abundance, composition, and activity are controlled by the presence of volcanogenic material and its degree of alteration and/or diagenesis.

To test these hypotheses, it is proposed to:

A. construct ~750kyr to 7.5Myr records of the frequency, magnitude, and composition of the volcanic ash (layers and dispersed) in the marine sediments offshore of Southern Mexico and Northern Central America; and

B. constrain the effects of subseafloor post-depositional alteration of volcanogenic material on carbon cycling pathways and the subseafloor biosphere.

Completion of these objectives requires drilling 20 sites along the margin of Southern Mexico and the Northern Central American Volcanic Arc where a prolific amount of volcanic ash is buried in the seafloor. Utilizing modern drilling techniques, novel analytical approaches to characterize sediment and pore water, and state of the art biosphere sampling and analyses, the project will generate research opportunities beyond what can be achieved with the marine sediment drilled on earlier DSDP/ ODP/ IODP expeditions. The resulting research will reveal the role of volcanic ash in deep sea carbon preservation and the biosphere and decipher the relationship and strength of external factors modulating volcanic hazards, thereby helping improve predictions of future explosive volcanic hazards.

IODP Proposal 1005-Full

SEP waiting room

Sunda Sea Level and Weathering

Lead Proponent: **Peter Clift** (Louisiana State University, USA)

P 1005 Scientific objectives

The low-latitude tropics are affected by repeated emergence and submergence of some of the world's largest continental shelves. Initial studies suggest that enhanced chemical weathering and growth of rainforests during times of exposure have a significant effect on global atmospheric CO_2 levels. Unlike their high latitude equivalents, tropical shelves appear to have played a key role on regulating global climate since the Pliocene, but this is presently poorly understood because previous drilling has largely been on the continental slopes making measuring the weathering state of the exposed shelf difficult. The Sunda Shelf in SE Asia is the largest tropical shelf worldwide well-suited for comprehensive, high-resolution studies designed to reconstruct major geomorphic changes on a "Maritime Continent" and to assess associated interactions with global climate. Coupled with regional seismic data drilling will permit a weathering and CO_2 consumption budget to be reconstructed. Moreover, the Sunda Shelf has been the site of extensive methane-emitting wetlands during sea-level highstands that are eroded during regressions and that may further amplify climatic cycles. The sedimentary sequences will be used to evaluate the contribution of the glacial exposure of this major tropical shelf functioning as an enormous CO_2 and methane sink/source and as a second set of "Lungs of the Earth".

IODP Proposal 1006-Pre

SEP waiting room

Mediterranean-Black Sea Gateway Exchange

Lead Proponent: **Wout Krijgsman** (University of Utrecht, ECORD-The Netherlands)

P 1006 Scientific objectives

BlackGate aims to address fundamental questions concerning the dynamic evolution of the Mediterranean-Black Sea (MBS) gateway and its paleoenvironmental consequences. The importance of Mediterranean connectivity has been recognised, and several accepted IODP projects (IMMAGE, DEMISE) are currently directed at a better understanding of the Miocene gateway systems that led to the rise and demise of the Mediterranean Messinian Salinity Crisis, the youngest and largest salt giant in Earth history, and its consequences for global climate change. The missing link for a comprehensive understanding is the poor constraints on the hydrological fluxes through the Mediterranean-Black Sea gateway, derived from a huge catchment that at times drained much of Europe and Asia. This gateway also drives the Pliocene-Quaternary circulation patterns in the Black Sea and governs its status as the world's largest example of marine anoxia. The exchange history of the MBS gateway is poorly constrained because continuous Pliocene-Quaternary deposits are not exposed on land adjacent to the Black Sea or North Aegean. Gateway exchange is controlled by climatic (glacio-eustatic driven sea level fluctuations) and tectonic processes in the catchment (linking the Black and Caspian seas) as well as tectonic propagation of the North Anatolian Fault zone in the gateway area itself. Changes in MBS connectivity trigger dramatic paleoenvironmental and biotic turnovers. Drilling a Messinian to Recent transect in the Aegean, Marmara and Black seas will recover high-amplitude records of continent-scale hydrological changes during glacial-interglacial cycles, marine and fresh water fluxes, biological turnover events, patterns and processes of anoxia, chemical perturbations and carbon cycling, growth and propagation of the NAF, existence of land-bridges for Africa/Asia-Europe mammal migration and presence/ absence of water exchange during the Messinian salt giant. It is proposed to use a MSP to drill three sites, one on the Turkish margin of the Black Sea (Arkhangelsky Ridge 400 mbsf), one on the southern margin of the Sea of Marmara (North Imrali Basin 750 mbsf) and one in the Aegean (North Aegean Trough 650 mbsf). All sites target Quaternary oxic-anoxic marl-sapropel cycles. Pliocene lacustrine sediments and mixed marine-brackish Miocene sediments will be recovered from the Black Sea and Aegean. MSP drilling is required because *JOIDES Resolution* cannot pass under the Bosporus bridges.

IODP Proposal 1007-Full

SEP waiting room

Evolution of the Pliocene-Pleistocene Tropical Sunda Shelf

Lead Proponent: **Zhifei Liu** (Tongji University, China)

P 1007 Scientific objectives

The Sunda Shelf provides particularly well-suited conditions for comprehensive high-resolution studies to reconstruct major geomorphic changes on the Maritime Continent and to assess associated interactions with the global climate. As the largest tropical shelf in the world, the Sunda Shelf was completely exposed during sea-level lowstand periods, allowing the development of large paleo-drainage systems and widespread rainforests and marine vegetations. Here we propose a Mission Specific Platform-based drilling project on the Sunda Shelf in the southern South China Sea to drill ten sites throughout four major sedimentary basins along two largest paleo-river systems to retrieve sedimentary sequences deposited since 5 Ma. Sampling the paleo-river systems to determine their age and sedimentary environment will allow to reconstruct the eustatic sea-level fluctuations and the development of major drainage systems. This will help us understand the erosional response to tectonic activity occurred in drainage hinterlands of SE Asia and the flux of weathering products on the shelf. The Sunda Shelf and adjacent land regions were covered by rainforests and marine vegetations during sea-level lowstand periods, comparable with those in modern Amazon and Congo systems in term of environmental impact and carbon storage. The retrieved sedimentary sequences will be used to evaluate the contribution of the glacial exposure of this major tropical shelf region functioning as an enormous CO_2 sink and carbon sequestration.

The science mission of this drilling campaign is to test the hypothesis that the emergence of the low-latitude Maritime Continent with associated chemical weathering of basaltic silicates and carbon sequestration efficiency of marine vegetation is a driver for the Pliocene-Pleistocene global climate change.

IODP Proposal 1008-Pre2

SEP waiting room

Belize Barrier Reef Postglacial Sea Level

Lead Proponent: **Eberhard Gischler** (University of Frankfurt/Main, ECORD-Germany)

P 1008 Scientific objectives

In contrast to the Indo-Pacific, where postglacial sedimentary successions of coral reefs including relative sea-level data were obtained from outcrops and coring, e.g., in Vanuatu as well as in Tahiti and the Great Barrier Reef (IODP drilling), there is only one such record in the Atlantic (Barbados, eastern Caribbean). The Barbados core data are extremely valuable, however, there are also limitations and challenges. The cores were not rigorously investigated with regard to sedimentology, paleoecology, and taphonomy, and there are apparent differences to more recent, IODP-based data, e.g., the evidence of meltwater pulse (MWP) 1B, the timing and height of sea level during the last glacial maximum (LGM), the apparent lack of microbialites, as well as mismatches with Holocene sea-level curves. Therefore, it is planned to obtain glacial-postglacial reef sections by coring in the western Caribbean, which would provide valuable comparisons with the existing eastern Caribbean (Barbados) and the Indo-Pacific records. The barrier and atoll reef system offshore Belize is the largest modern tropical reef complex in the Atlantic Ocean, and well-suited for this purpose. It also represents a mixed carbonate-siliciclastic sedimentary system. Late Quaternary reefs were deposited largely during sea-level highstands, like those of the Holocene and marine isotope stage 5, which are well-studied, unlike the reef deposits from lower highstands and lowstands of sea level. The latter deposits, including those from the last postglacial, can be recovered by drilling in fore-reef areas of the 250 km-long barrier reef of Belize. Based on a recent site survey, which obtained highly resolved bathymetric and shallow seismic data from the area, and based on discussions during an international workshop, three drill areas have been identified. These include two transects of four drillholes each, oriented perpendicular to the modern reef crest. Drillholes will be situated on linear ridges running along the fore-reef slope. One of these transects will be located off Carrie Bow Cay where shallow coring in the fore-reef area has been performed by previous studies. A third transect of four drillholes will be located on a southward shoaling ridge, running more or less parallel to the modern reef crest south of the mouth of English Cay Channel. In addition to these 12 drillholes, one site is planned in deep water east of the barrier reef and one on the delta of the English Cay Channel in order to obtain off-reef reference records with both limited and strong siliciclastic input, respectively.

IODP Proposal 1012-Pre

SEP waiting room

Late Cenozoic Glaciers, Landscapes, Climates, and Ecosystems of the North Sea

Lead Proponent: **Andrew Newton** (Queen's University Belfast, ECORD-UK)

P 1012 Scientific objectives

The intensification of glacial-interglacial cycles at the onset of the Pleistocene (~2.6 Ma) was a critical tipping-point in Earth's climate history. The increased severity of cold conditions triggered the development of continental-scale ice sheets, whose timing and extents are recorded in the North Sea Basin (NSB). Unlike the onshore record, the NSB preserves an almost complete record of glacial erosion and deposition from European ice sheets and Europe's large river systems. This has resulted in a 1.2-km-thick Pleistocene record of climatic and environmental change. Relatively little is known about global ice sheet fluctuations, except for estimates on ice volume with poor spatio-temporal control. There is evidence that Pleistocene ice sheet feedback loops affected the evolution of the global climate system through complex ocean-atmosphere-cryosphere linkages. Thus, the Pleistocene sequence preserved in the North Sea is a significant, and arguably unique, palaeo-climate archive capturing such linkages. While the NSB is covered by extensive seismic and borehole data, the late Pliocene- Pleistocene interval lacks samples providing geological control on existing interpretations. In this pre-proposal, we outline the merits of a NSB drilling expedition to unravel how glaciers, landscapes, climate, and ecosystems evolved and interacted through the late Pliocene and Pleistocene. The drilling campaign would contribute knowledge on natural climate variability and vulnerability, analogues of past warmer climates, tipping points, and rates of change. The mid-latitude location will allow for linkages between low- and high-latitude records, and the potential feedbacks and teleconnections of northwest European climate with other parts of the climate system – e.g., the influence of European Ice Sheets on the position of North Atlantic storm tracks. A particular focus on ecosystem evolution will reveal climate- and biology-related feedbacks, resilience, recovery, and carbon cycle dynamics. The results from a successful drilling campaign tie into IODP Strategic Objectives 3-5 and Flagship Initiative 1 (ground-truthing future climate change). It will contribute to better calibration of numerical Earth- system models, knowledge on climate sensitivity and variability, and a wider appreciation of feedbacks between different parts of the Earth-system. The ability to cover such a wide range of themes, at a scale that captures changes from across northwest Europe, can only be achieved through continuous coring of the uniquely-complete late Pliocene-Pleistocene NSB succession. The fact that such insight can be generated from a modest amount of drilling emphasises why the Plio- Pleistocene NSB should be considered a high-value target for the IODP.

4. Participating in 2023 IODP expeditions

The *JOIDES Resolution's* derrick as viewed from the helideck., IODP Expedition 398.
Credit: Thomas Ronge, IODP JRSO.

4. Participating in 2023 IODP expeditions

IODP expeditions

www.iodp.org/expeditions

IODP expeditions provide ECORD scientists with an excellent opportunity to participate in international multidisciplinary ocean drilling projects and to have priority access to unique samples and data.

In 2023, **four expeditions** were implemented on the *JOIDES Resolution* (JR).

A total of 36 ECORD scientists from eight ECORD member countries were invited to participate including **five Co-chief Scientists**.

Exp. 398 | Exp. 399 | Exp. 395 | Exp. 400

Participation of ECORD scientists

JOIDES Resolution
Science Operator

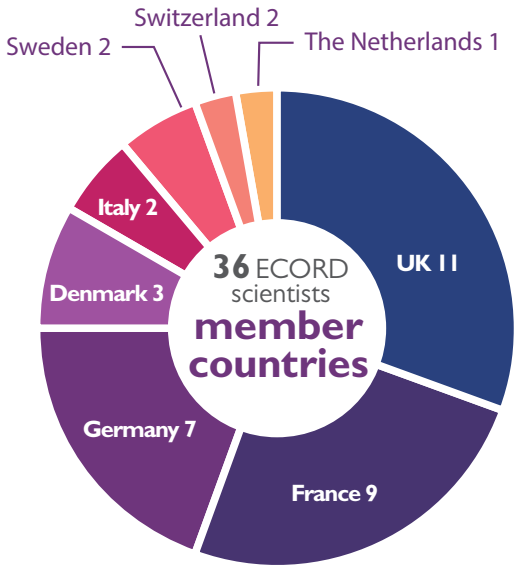
In 2023, ECORD, as a contributing member of the *JOIDES Resolution* Consortium, was entitled to an average of seven scientists on every IODP expedition onboard the drill ship *JOIDES Resolution* (JR).

Scientists are chosen following an open call for applications and a competitive selection process. After a nomination proposal by ESSAC, staffing discussions are held with the implementing organisations, the appointed Co-chief Scientists and the IODP member countries/consortia.

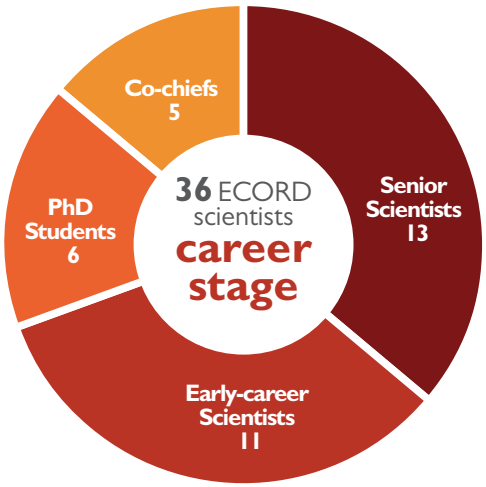
Participation of ECORD scientists is proportional to the financial contributions of the ECORD member countries to the ECORD budget following a quota system. Selection of ECORD members of shipboard Science Parties is, therefore, based on both scientific merit and a time-averaged country quota. However, country quotas do not apply when a specific expertise is requested through a Special Call, or if the expedition occurs in territorial waters of an ECORD member country. In both cases, scientists from ECORD member countries can also sail following special calls or sail as observers.

Four *JOIDES Resolution* expeditions took place in 2023 with full shipboard science parties.

In total, 36 ECORD scientists were selected in 2023, including five Co-chief Scientists and five scientists staffed in response to Special Calls.



Distribution of ECORD scientists in 2023 JR expeditions by country (n = 36)



Distribution of ECORD scientists in 2023 JR expeditions by career stage (n = 36)

2023 *JOIDES Resolution* expeditions

Expedition name	#	Dates	Ports	Oper.
Hellenic Arc Volcanic Field	398	Dec. 11, 2022 – Feb. 10, 2023	Tarragona / Heraklion	JRSO
Building Blocks of Life, Atlantis Massif	399	April 12 – June 12, 2023	Ponta Delgada / Ponta Delgada	JRSO
Reykjanes Mantle Convection and Climate	395	June 12 – Aug. 12, 2023	Ponta Delgada / St. Johns	JRSO
NW Greenland Glaciated Margin	400	Aug. 12 – Oct. 12, 2023	St. Johns / St. Johns	JRSO

An aerial view of the *JOIDES Resolution* in Santorini's caldera, IODP Expedition 398. Credits: Thomas Ronge, IODP JRSO

IODP Expedition 398

JOIDES Resolution Science Operator

11 Dec. 2022 – 10 Feb. 2023

Hellenic Arc Volcanic Field

https://joidesresolution.org/expedition/hellenic-arc-volcanic-field/

Exp. 398 Principal goals

The understanding of island arc volcanism and associated hazards requires study of the processes that drive such volcanism and how the volcanoes interact with their marine surroundings.

What are the links and feedback between crustal tectonics, volcanic activity, and magma genesis? What are the dynamics and impacts of submarine explosive volcanism and caldera-forming eruptions? How do calderas collapse during explosive eruptions and then recover to enter new magmatic cycles? What are the reactions of marine ecosystems to volcanic eruptions?

The Christiana-Santorini-Kolumbo (CSK) volcanic field on the Hellenic volcanic arc is a unique system for addressing these questions. It consists of three large volcanic centers (Christiana, Santorini, and Kolumbo), and a line of small submarine cones, founded on thinned continental crust in a 100 km long rift zone that cuts across the island arc. The marine rift basins around the CSK field, as well as the Santorini caldera, contain volcano-sedimentary fills up to several hundreds of meters thick, providing rich archives of CSK volcanic products, tectonic evolution, magma genesis and paleoenvironments accessible only by deep drilling backed up by seismic interpretations. Four primary drilling sites were defined in the rift's basins and two additional primary sites inside the Santorini caldera.

The expedition science had five main objectives, each with a leading testable hypothesis, and two secondary objectives. Deep ocean drilling in this area had multiple aims: 1) to identify, characterize, and interpret depositional packages visible on seismic images, 2) chemically correlate primary volcaniclastic layers in the rift fills with their source volcanoes, 3) fill in the many gaps in the onshore volcanic records, 4) provide a tight chronostratigraphic framework for rift tectonic and sedimentary histories, and 5) sample deep subsurface microbial life.

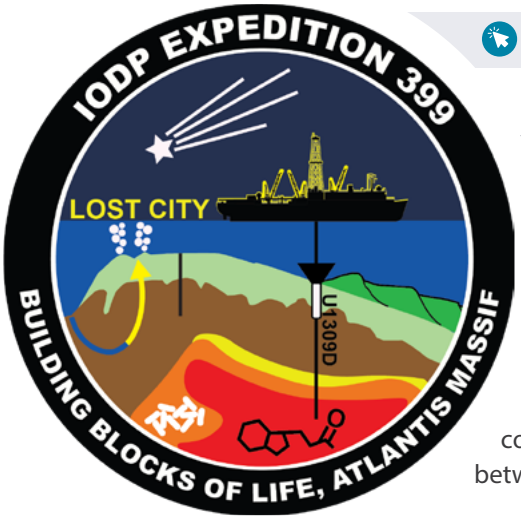
Steffen Kutterolf (Co-chief Scientist, GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany) watches the sunset from the helideck onboard *JOIDES Resolution* during IODP Expedition 389.
Credits: Erick Bravo, IODP JRSO

IODP Expedition 399

JOIDES Resolution Science Operator

12 April – 12 June 2023

Building Blocks of Life, Atlantis Massif



https://joidesresolution.org/expedition/the-lost-city-hydrothermal-field/

Exp. 399 Principal goals

IODP Expedition 399 has collected new cores from the Atlantis Massif (30°N; Mid-Atlantic Ridge), an oceanic core complex that has transformed our understanding of tectonic and magmatic processes at slow- and ultraslow-spreading ridges.

The exposure of deep mantle rocks leads to serpentinization, with major consequences for the properties of the oceanic lithosphere, heat exchange between the ocean and crust, geochemical cycles, and microbial activity.

The Lost City hydrothermal field (LCHF) is situated on its southern wall and vents warm (40°–95°C) alkaline fluids rich in hydrogen, methane, and abiotic organic molecules. The Atlantis Massif was the site of four previous expeditions implemented by the JR and a mission specific platform (MSP) during the Integrated Ocean Drilling Program (Expeditions 304, 305, and 340T) and the current IODP (Expedition 357), as well as numerous dredging and submersible expeditions. The deepest IODP hole in young (<2 My) oceanic lithosphere, Hole U1309D, was drilled 5 km north of the LCHF and reached 1415 meters below seafloor (mbsf) through a primitive series of gabbroic rock. In contrast, during IODP Expedition 357 a series of shallow (<16.4 mbsf) holes were drilled along the south wall of the massif, one within 0.4 km of the LCHF where serpentinized peridotites were recovered. The hydrologic regime differs between the two locations, with a low permeability conductive regime in Hole U1309D and a high likelihood of deep permeability along the southern wall.

IODP Expedition 399 has targeted both locations to collect new data on ancient processes during deformation and alteration of detachment fault rocks. Recovered rocks and fluids will provide new insights into ongoing water-rock interactions, abiotic organic synthesis reactions, and the extent and diversity of life in the subseafloor in an actively serpentinizing system. The objective was to deepen Hole U1309D to 2060 mbsf, where temperatures were expected to be ~220°C. The lithology was predicted to transition with depth from primarily gabbroic to more ultramafic material. Predicted temperatures were well above the known limits of life, so detectable hydrogen, methane, and organic molecules can be readily attributed to abiotic processes. A new ~200 m hole was planned to be drilled on the southern ridge close to IODP Expedition 357 Site M0069, where both deformed and undeformed serpentinites were recovered. IODP Expedition 399 aimed at recovering a complete section through the detachment fault zone and at sampling material that reflects the subseafloor biological, geochemical, and alteration processes that occur along the LCHF circulation pathway. The collection of borehole fluids from both holes was planned using both the Kuster Flow Through Sampler tool and the new Multi-Temperature Fluid Sampler tool. Wireline logging aimed at providing information on downhole density and resistivity, image structural features, and document fracture orientations. Finally, the operations included the installation of a reentry system at proposed Site AMDH-02A, and Hole U1309D to be left open for future deep drilling, fluid sampling, and potentially borehole observatories.

Johannes Lissenberg (Igneous Petrologist, Cardiff University, UK) takes a close look at a core piece with a loupe, IODP Expedition 399.
Credits: Erick Bravo, IODP JRSO

IODP Expedition 395

JOIDES Resolution Science Operator

12 June – 12 Aug. 2023

Reykjanes Mantle Convection and Climate

https://joidesresolution.org/expedition/reykjanes-mantle-convection-and-climate-2/

Exp. 395 Principal goals

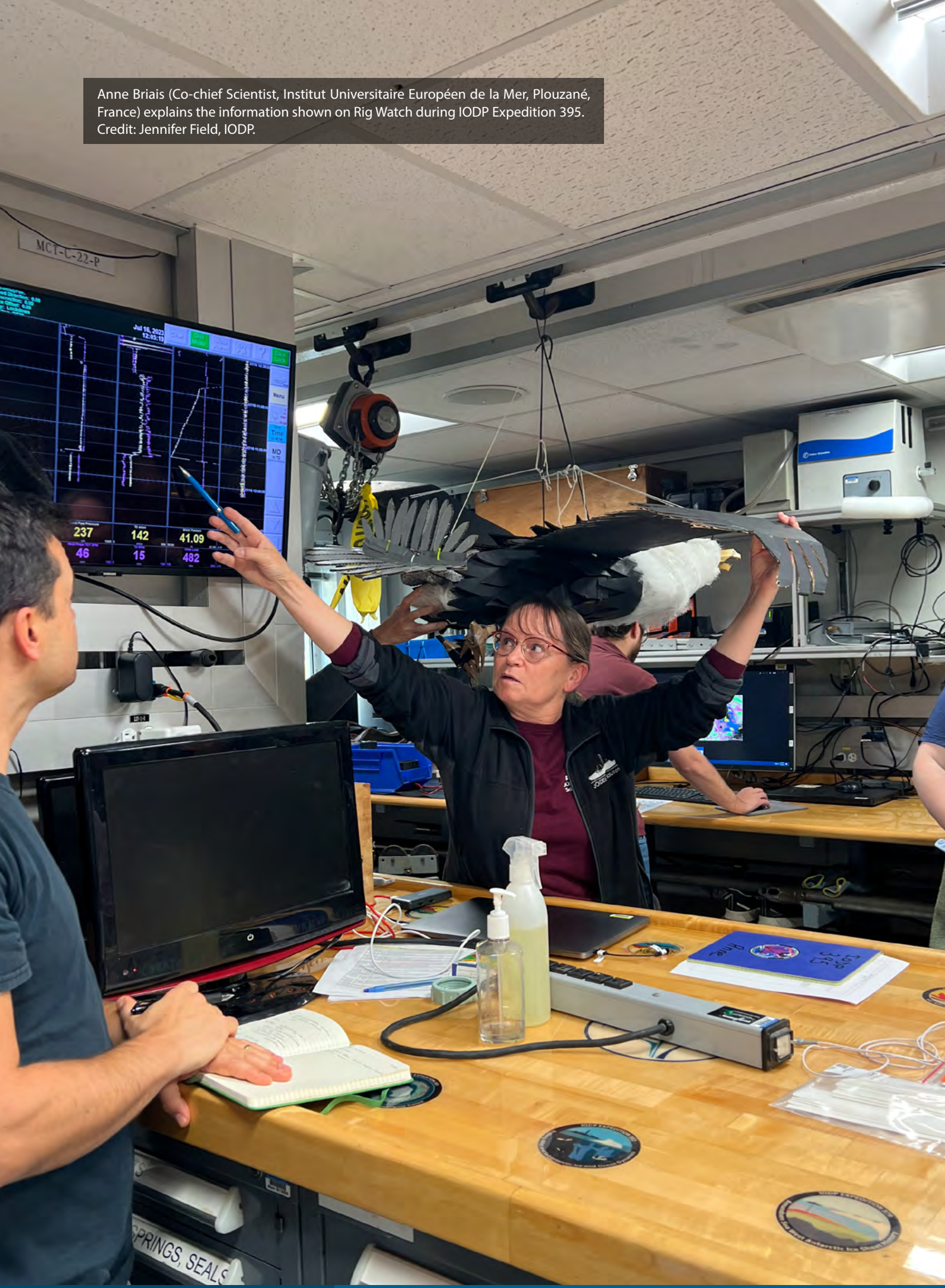
The intersection between the Mid-Atlantic Ridge and Iceland hotspot provides a natural laboratory where the composition and dynamics of Earth's upper mantle can be observed. Plume-ridge interaction drives variations in the melting regime, which result in a range of crustal types, including a series of V-shaped ridges (VSRs) and V-shaped troughs (VSTs) south of Iceland.

. Time-dependent mantle upwelling beneath Iceland dynamically supports regional bathymetry and leads to changes in the height of oceanic gateways, which in turn control the flow of deep water on geologic timescales.

IODP Expedition 395 had three objectives:

1. to test contrasting hypotheses for the formation of VSRs,
2. to understand temporal changes in ocean circulation and explore connections with plume activity, and
3. to reconstruct the evolving chemistry of hydrothermal fluids with increasing crustal age and varying sediment thickness and crustal architecture.

It was planned to recover basaltic samples from crust that is blanketed by thick sediments and is thus inaccessible when using dredging. Major, trace, and isotope geochemistry of basalts will allow us to observe spatial and temporal variations in mantle melting processes. The hypothesis that the Iceland plume thermally pulses on two timescales (5–10 and ~30 Ma), leading to fundamental changes in crustal architecture will be tested against alternative hypotheses involving propagating rifts and buoyant mantle upwelling. Millennial-scale paleoclimate records are contained in rapidly accumulated sediments of contourite drifts in this region. The accumulation rate of these sediments is a proxy for current strength, which is moderated by dynamic support of oceanic gateways such as the Greenland-Scotland Ridge. These sediments also provide constraints for climatic events including Pliocene warmth, the onset of Northern Hemisphere glaciation, and abrupt Late Pleistocene climate change. This combined approach will explore relationships between deep Earth processes, ocean circulation, and climate. The objectives will be addressed by recovering sedimentary and basaltic cores, and a penetration of ~130 m into igneous basement at five sites east of Reykjanes Ridge was an objective of the expedition. Four sites intersect VSR/VST pairs, one of which coincides with Björn drift. A fifth site is located over 32.4 My old oceanic crust that is devoid of V-shaped features. This site was chosen because it intersects Oligocene–Miocene sediments of Gardar drift. Recovered sediments and basalts will provide a major advance in our understanding of mantle dynamics and the linked nature of Earth's interior, oceans, and climate.



Anne Briais (Co-chief Scientist, Institut Universitaire Européen de la Mer, Plouzané, France) explains the information shown on Rig Watch during IODP Expedition 395. Credit: Jennifer Field, IODP.

IODP Expedition 400

JOIDES Resolution Science Operator

12 Aug. – 12 Oct. 2023

NW Greenland Glaciated Margin

https://joidesresolution.org/expedition/nw-greenland-glaciated-margin/

Exp. 395 Principal goals

Elucidating the long-term history of the Greenland Ice Sheet (GrIS) is essential for understanding glacial instability thresholds, identified as major climate system tipping points, and how the cryosphere will respond to anthropogenic greenhouse gas emissions.

To address current knowledge gaps in the evolution and variability of the GrIS and its role in Earth's climate system, the objective of IODP Expedition 400 was to obtain cores from seven sites across the northwest Greenland margin into Baffin Bay where thick Cenozoic sedimentary successions can be directly linked to the evolution of the northern GrIS (NGrIS).

The strategy of drilling along this transect was to retrieve a composite stratigraphic succession representing the Late Cenozoic era from the Oligocene/Early Miocene to Holocene. The proposed sites specifically targeted high–accumulation rate deposits associated with contourite drifts and potential interglacial deposits within a trough mouth fan system densely covered by seismic data. The participants seek to test if the NGrIS underwent near-complete deglaciations in the Pleistocene and to assess the ice sheet's response to changes in orbital cyclicities through the mid-Pleistocene transition. The paleoclimate records that have been obtained may provide chronology on the NGrIS expansion and unravel potential linkages between marine heat transport through Baffin Bay and high Arctic warmth during the Pliocene. A deep coring site (980 mbsf) targeting a Miocene and Oligocene strata succession will examine possible linkages between changes in atmospheric CO_2 and climate-ecosystem conditions in Greenland. The overall aim is to investigate the full range of forcings and feedback—oceanic, atmospheric, orbital, and tectonic—that influence the GrIS over a range of timescales, as well as conditions prevailing at the time of glacial inception and deglacial to interglacial periods. The data and results gathered from Expedition 400 will effectively constrain predictive models addressing the GrIS response to global warming and its impending effects on global sea levels.

Paul Knutz (Co-chief Scientist, Geological Survey of Denmark and Greenland, Denmark) gives a thumbs-up to a drill bit onboard *JOIDES Resolution* during IODP Expedition 400. Credits: Philip Staudigel, IODP.

5. Selected 2023 IODP publications from ECORD scientists

254 publications

1. Abell, J. T., Winckler, G., Pullen, A., Kinsley, C. W., Kapp, P. A., Middleton, J. L., et al. (2023). Evaluating the Drivers of Quaternary Dust Fluxes to the Western North Pacific: East Asian Dustiness and Northern Hemisphere Gustiness. Paleoceanography and Paleoclimatology, 38(9), e2022PA004571. https://doi.org/10.1029/2022PA004571

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9. Argenio, C., Flores, J. A., Fuertes, M. A., Balestra, B., & Amore, F. O. (2023). Coccolithophore paleoproductivity since the Last Glacial Maximum in the Atlantic Ocean: Relationship with calcification and preservation variability. Quaternary International, 643, 34–45. https://doi.org/10.1016/j.quaint.2022.10.010

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11. Auer, G., Bialik, O. M., Antoulas, M.-E., Vogt-Vincent, N., & Piller, W. E. (2023). Biotic response of plankton communities to Middle to Late Miocene monsoon wind and nutrient flux changes in the Oman margin upwelling zone. Climate of the Past, 19(11), 2313–2340. https://doi.org/10.5194/cp-19-2313-2023

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Testing samples onboard *MMA Valour* during IODP Expedition 389. Credits: M. Parker, ECORD/IODP.

Freshly recovered core sections onboard *MMA Valour* during Expedition 389: fossilized reef deposits after they have been placed in plastic core liners. The different colors and textures represent various corals, algae, and microbialites from the fossil reef. . Credit: M. Parker, ECORD/IODP.

6. Archiving IODP cores: the IODP Bremen Core Repository

Freshly recovered cores onboard *MMA Valour* during IODP Expedition 389. Credits: M. Parker, ECORD/IODP.

IODP Bremen Core Repository (BCR)

www.marum.de/en/Research/IODP-Bremen-Core-Repository.html

The Bremen Core Repository (BCR) at the MARUM, University of Bremen, Germany, is one of the three IODP core repositories. The other two are the Gulf Cost Repository (GCR) located at Texas A&M University in College Station (USA) and the Kochi Core Center (KCC) in Kochi (Japan). In accord with IODP convention and practice, the BCR hosts all the cores recovered since the beginning of scientific ocean drilling from the Atlantic and Arctic Oceans as well as the Mediterranean, Baltic and Black Seas. The BCR is also responsible for organizing and hosting the Onshore Science Parties of and providing mobile laboratories and scientific expertise for mission-specific platform expeditions (MSPs).

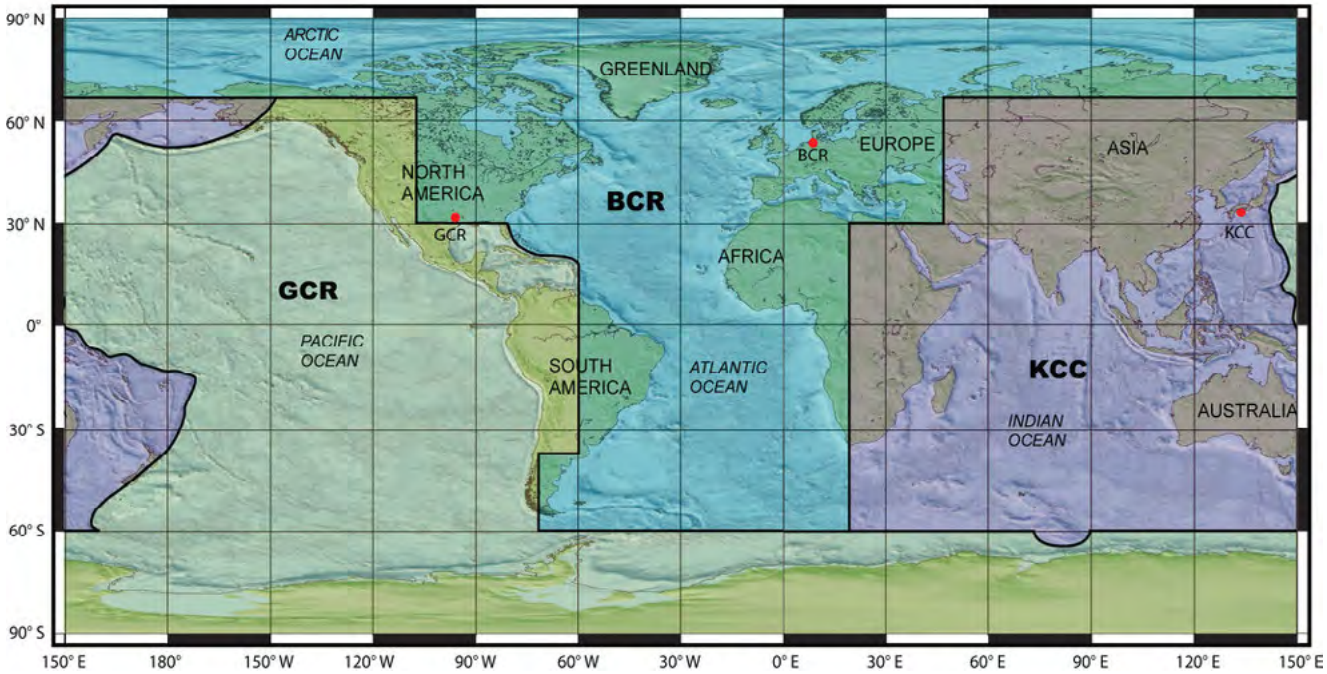
BCR was founded in 1994 and moved to the MARUM building on the University of Bremen campus in 2005. During the DSDP/ODP Core Redistribution project (2006-2008) the collection grew from 75 km to 140 km of cores, currently the collection holds more than **182 km of cores** acquired during **102 expeditions**.

marum
Center for Marine Environmental Sciences
University of Bremen

Universität Bremen

ECORD
European Consortium for Ocean Research Drilling

IODP
INTERNATIONAL OCEAN DISCOVERY PROGRAM



Geographic Assignment of Core Samples to Repositories.
Adapted from Firth, JV, Gupta, LP and Röhl, U (2009) New focus on the Tales of the Earth - Legacy Cores Redistribution Project Completed. Scientific Drilling, 7. 31-33. doi:10.2204/iodp.sd.7.03.2009. [Map Mar 15, 2016].
Retrieved from *http://www.marum.de/en/Cores_at_BCR.html*

Samples and requests at BCR

BCR statistics

A total of **39,285 samples were taken** at the BCR for **369 requests** (of which 93 were submitted by scientists based in ECORD member countries).

All BCR samples **(over 1,92 million samples**/more than **8,086 sample requests**, including samples taken earlier at the ECR for legacy cores that are now at BCR) are entered into a database, the BCR DIS Internet Interface, that is accessible to the general public for post-moratorium samples (web interface for curatorial data *http://dis.iodp.pangaea.de/BCRDIS/*).

Repository and sample statistics

	Expeditions	Amount of core (km)
	102	182
	Sample Requests (from ECORD countries)	**Samples taken**
Bremen Core Repository FY23	283 (141)	103,786 (41,749)
Bremen Core Repository (since opening in 1994)	5,826	1,244,911
From all cores stored at BCR	8,163	1,922,296

Data management at BCR

Database: the BCR DIS Internet Interface

Since 11 May 2023, the new mobile Drilling Information System (mDIS) is **in full operation for all core sampling at BCR**. Significant progress has been achieved also in the day to day running operation of this new database for BCR. We are in close contact with the developers and other users of the mDIS for further improvements of the mDIS.

IODP Expedition 389: Hawaiian Drowned Reefs was the first expedition that benefited during the offshore phase from the features of this new database. The mDIS has also be used during the Onshore Science Party that was held in February 2024 at BCR.

SEDIS: The Scientific Earth Drilling Information Service

The Scientific Earth Drilling Information Service – SEDIS (http://sedis.iodp.org/) is continued in IODP and being maintained.

View at the back deck of the MMA Valour during IODP Expedition 389.
Credits: ECORD/IODP.

MSP Expeditions at BCR

IODP Expedition 386: Japan Trench Paleoseismology

All incoming sample request and related scientist´s information have been entered into the Drilling Information system (DIS). We participated at the Expedition 386 Expedition review in Edinburgh, UK, on 20 September 2023.

IODP Expedition 389: Hawaiian Drowned Reefs

BCR staff equipped and shipped the freshly maintained laboratory containers to the port of mobilization in Singapore, also attended the mobilization phase 1 in Singapore in late July as well as mobilization phase 2 in late August in Kapolei. Furthermore, BCR staff sailed on IODP Expedition 389 from 31 August to 31 October. The Onshore Science Party for this expedition has been prepared in late 2023.

Cores from *JOIDES Resolution* expeditions for the BCR

IODP Expeditions 390/393/390C/395E: South Atlantic Transect

The working halves core sections from IODP Expeditions 390/393/390C/395E: South Atlantic Transect are at the BCR since 2022. We closely collaborated with the GCR on planning the respective Sampling Party (SP) held from 16 to 20 January in Bremen. By the end of the SP, a total of about 17,487 samples was taken.

Acquiring pictures during the Sampling Party for IODP Expeditions 390/393 for a photo story in a local newspaper.
Credit: MARUM, ECORD, IODP.

IODP Expedition 397: Iberian Margin Paleoclimate

For IODP Expedition 397: Iberian Margin Paleoclimate we also closely collaborated with the GCR on the sample plan for the respective Sampling Party that was held between 5 and 16 June 2023 in Bremen. A total of about 48,372 samples was taken.

IODP Expedition 398: Hellenic Arc Volcanic Field

For IODP Expedition 398: Hellenic Arc Volcanic Field, we also closely collaborated with the GCR on the sample plan for the respective Sampling Party (SP) that was held between 24 and 28 July 2023 in Bremen. A total of about 11,998 samples was taken.

Participants of IODP Expedition 397's Sampling Party at BCR/MARUM. Credits: MARUM and IODP.

Participants of IODP Expedition 398's Sampling Party at BCR/MARUM. Credits: MARUM and IODP.

BCR received the 16.58 km of core from the following expeditions in 2023:

- 3.20 km of working-half cores from IODP Expedition 398: Hellenic Arc Volcanic Field;
- 3.84 km of archive-half cores from IODP Expeditions 390, 390C, 393, 395E: South Atlantic Transect;
- 6.28 km of working-half cores from IODP Expeditions 395, 395C: Reykjanes Mantle Convection and Climate, and IODP Expedition 384: Engineering Testing;
- 2.30 km of working-half cores from IODP Expedition 400: NW Greenland Glaciated Margin;
- 0.95 km of archive-half cores from IODP Expedition 391: Walvis Ridge Hotspot.

The BCR Manager attended the ECORD – Japan Webinar (January), the IODP Forum meeting (April in Vienna, Austria, online), the ESO in-person meeting (May, Edinburgh, UK), monthly ESO Meetings (online), the ECORD Council Spring Meeting (June, Berlin, Germany), the IODP Expedition 406 Co-chiefs meeting (November, online), the LEAPs Planning meeting (July, online), the German IODP/ICDP Meeting (August, Hanover, Germany), the ECORD Facility Board (EFB) meeting (September, Edinburgh, UK), the IODP Forum meeting (October, Wollongong, Australia), the ESSAC and ECORD Council Meetings (October, Nice, France), the ECORD Vision Task Force (EVTF) meetings (November and December, online), and the AGU Fall Meeting (December, San Francisco, USA).

Visitors at the BCR

The location of the BCR on the University of Bremen campus has proven to be very convenient for many visitors, ranging from walk-in scientific visitors, the general public, school classes (including skype conferences to geo show "unterirdisch" in Köln and Hanover in conjunction with IODP/ICDP and at the occasion of the German IODP/ICDP Meeting at the University of Hanover), and visiting students' groups from other universities in Germany and Europe and official delegations visiting the University of Bremen. In June 2023, an Open Campus was held at the University of Bremen, where also tours to the BCR were given.

In 2023, amongst others, the BCR was visited by:

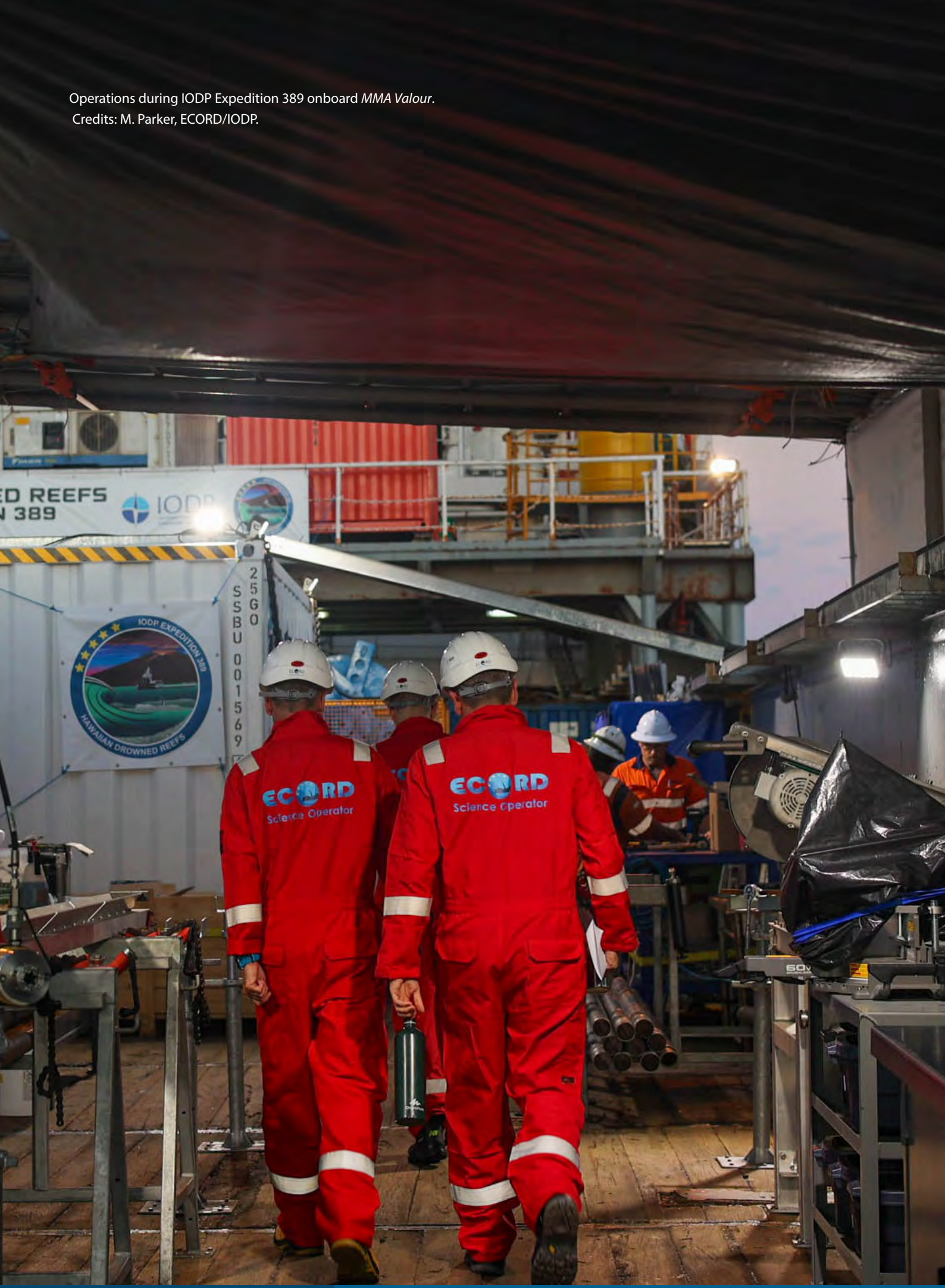
- 75 participants of the GeoGenetics workshop held at MARUM
- 30 participants of the 83rd Annual Meeting of the German Geophysical Society (DGG) held at the University of Bremen
- 12 students from the Colorado School of Mines
- 25 students from the International Research Training Group ArcTrain "Processes and impacts of climate change in the North Atlantic Ocean and the Canadian Arctic"
- 15 participants of the annual study conference of the German Mathematical Society
- 20 new geosciences master's students from the University of Bremen
- 18 students from the Interdisciplinary Centre for Science and Technology Studies (IZWT) at the University Wuppertal, Germany
- 25 members of the Rotary Club Bremen
- 18 new scientific apprentices at the University of Bremen
- 20 participants of a Summer School on "Machine Learning and its Applications" held at the University of Bremen
- 15 students from the University of the North, Barranquilla, Colombia
- 10 scientists participating in a proposal writing workshop for SVALCLIME: "Deep-time Arctic climate archives: High-resolution coring of Svalbard's sedimentary record" initiated by IODP Expedition 396 Co-chief scientist S. Planke
- 10 participants of the annual meeting of the Network Science Communication
- the new director H. Dolman from the Royal Netherlands Institute for Sea Research
- ANZIC Director Ron Hackney
- A. Lehmann Managing Director of Deutsche Allianz Meeresforschung (DAM)
- Stefan Müller (Head of Department) and Zage Kaculevski (Head of Unit) from the Federal Ministry of Education and Research (BMBF)
- J. Günther Rector of the University of Bremen
- Jim McManus, OCE Division Director, Kevin T. Johnson, Program Director Marine Geology and Geophysics, James F. Allan, Program Director Ocean Drilling Program at the National Science Foundation (NSF)
- Guido Lüniger, Program Director Geosciences at the German Research Foundation (DFG)
- the rectors of the Universities of Oldenburg and Bremen, R. Bruder (Oldenburg) and J. Günther (Bremen)
- 15 participants in the discussion for further development of the German Strategy for Sustainability, including Parliamentary State Secretary Dr. Bettina Hoffman and S. Ryglewski (member of the German parliament).

Training students

Equally important for informing and educating the general public of our goals and scientific and technical achievements are the frequent visits by media representatives (television, radio and print). For example, a journalist and a photographer from a local newspaper with over-regional impact (Weser Kurier) collected material for a photo reportage during the Sampling Party for IODP Expeditions 390/393; a film team was interviewing IODP Expedition 398 scientists for a TV show of the French/German TV channel ARTE, science journalist T. Ulanowski, and photo journalist J. R. Heinicke.

This year the BCR provided again core material for numerous course studies run by various instructors. The BCR is also an ideal place to train students, with the opportunity to work on real cores and have access to laboratory facilities. In the past year both formats, the ECORD Training Course in March 2023 and the 15th ECORD Summer School that was dedicated to the topic of "From Greenhouse to Icehouse - The Cenozoic Arctic Ocean and (global) climate history" could equally pick up again with the summer school being held in September 2023 (see also Section 7: Engaging the community on page *94*).

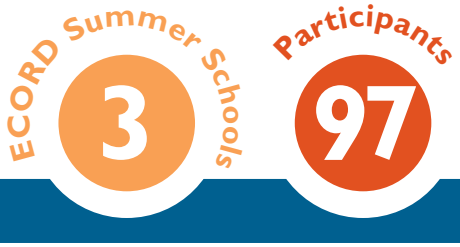
Operations during IODP Expedition 389 onboard *MMA Valour*.
Credits: M. Parker, ECORD/IODP.



7. Engaging the community

ECORD Summer School: Downhole Logging for IODP Science, 2023: Sarah Davies (EPC, University of Leicester, UK) shows the participants of the Summer School how to read from lithology visible in some cores at the BGS. Credits: E. Le Ber, EPC/ECORD.

7. Engaging the Community



7.1 Training young scientists

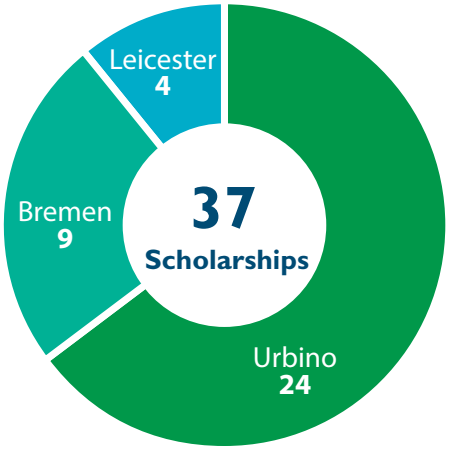
A major goal of ECORD is to train the next generation of scientists from member countries and promote IODP-motivated science.

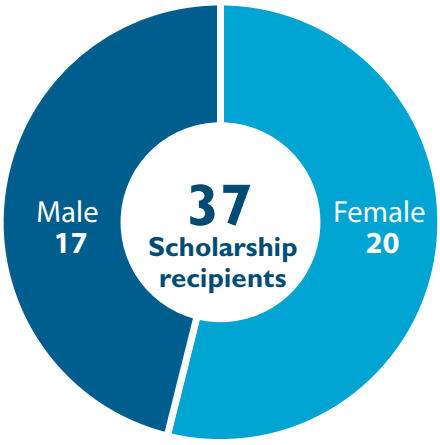
The **ECORD Summer Schools**, initiated in 2007, are well-established and are attended annually by many Masters and PhD students as well as postdoctoral research fellows from ECORD member countries and beyond. Three ECORD Summer Schools were supported by ECORD in 2023 (Urbino, Leicester, Bremen)

ESSAC supported 37 students with ECORD Scholarships to participate in the ECORD Summer Schools.

An additional Summer School in Parma (Italy), that focussed on Mesozoic Nannofossil Biostratigraphy (INASSET) was provided with financial support.

Furthermore, after a break during the pandemic, the MARUM (Bremen) continued the provide the well established ECORD Training Course: The Shipboard Simulation Experience again in 2023.





Distribution of ECORD Scholarships (n = 37) in 2023:
Left: by recipients' country,
Top right: by Summer School,
Bottom right: by gender.

ECORD 18th Urbino Summer School in Paleoclimatology (USSP)

Urbino, Italy, 6-22 July 2023

49 participants

http://www.urbinossp.it

To promote the integration of field data and modelling results in the next generation of paleoclimatologists, the USSP Consortium and teacher pool organized the 18th annual Urbino Summer School in Paleoclimatology. USSP brought together 49 graduate students from many nations who were instructed and mentored by 20 world experts in palaeontology, palaeoceanography, palaeoclimatology, and geochemistry.

The USSP 2023 provided a student-centred programme comprised of:

- integrated topical lectures by internationally recognized scientists;
- exercises, investigations, and presentations based on authentic field data and modelling results;
- parallel sessions providing groups of participants with a more focused coverage of selected topics within palaeoclimatology;
- a regional field excursion to classic Cretaceous and Cenozoic sections, and \
- intensive discussions of specific palaeoclimate topics in small student working groups facilitated by dedicated instructors.

The school also included discussions on the future of the IODP[3] community and careers, and opportunities with the ECORD programme presented by Hanno Kinkel.

The USSP programme structure included a first segment centered on themes related to palaeoclimate archives and stratigraphy. This provided students with tools to conduct group investigations that included practical exercises following lectures in which attendees were tasked to brainstorm and evaluate the Eocene-Oligocene Transition as well as the Miocene Climatic Optimum, and to determine which of these intervals provides a better analogue for future projections of climate change. In addition, two evening sessions with open discussions were centered around philosophical issues, addressing the science-policy interface, diversity and inclusion, science communication, and study design.

Urbino Summer School in Paleoclimatology. Credit: USSP 2023

7th ECORD Summer School on Downhole Logging for IODP Science

Leicester, UK, 22-28 July 2023

26 participants

https://le.ac.uk/iodp/summer-schools/

Hosted by the European Petrophysics Consortium (EPC) and in its seventh year, the ECORD Summer School on Downhole Logging for IODP Science was finally held in person at the University of Leicester. 26 participants from all over the world came together and were taught by an international group of instructors, including general talks about IODP, various platforms and drilling techniques as well as examples from onshore downhole logging (International Scientific Continental Drilling Program - ICDP - project in Oman).

The participants also received dedicated training in an industrial software package to visualise, interpret and analyse downhole logging data. Mike Lovell (University of Leicester) presented on the basic principles of petrophysics with some interesting analogues from building sandcastles to various aspects of cooking.

The students had the opportunity to visit the British Geological Survey (BGS), including a tour around the core store, the largest core facility in the UK. In addition, a demonstration of the core scanning facilities (CT scan), which have been used for IODP Expedition 389: Hawaiian Drowned Reefs has been organized.

During a mini conference, the participants got a chance to present their current or upcoming research projects. The broad range of research topics was incredible to see and demonstrates the significance of scientific (ocean) drilling in the tackling major questions within the Earth Sciences. Feedback was very positive and is being evaluated in preparation for a potential 2024 summer school.

EPC
EUROPEAN PETROPHYSICS CONSORTIUM

Participants and organisers of the 2023 ECORD Summer School: Downhole Logging for IODP Science. Credits: Colin G Brooks Photography, ECORD

ECORD 15th Bremen Summer School

on "From Greenhouse to Icehouse - The Cenozoic Arctic Ocean and (global) climate history"

MARUM, University of Bremen, Germany, 4 -15 September 2023

https://www.marum.de/en/education-career/ECORD-training/ECORD-Summer-Schools/2023.html

22 participants

MARUM, University of Bremen hosted and ran the ECORD Summer School "From Greenhouse to Icehouse - The Cenozoic Arctic Ocean and (global) climate history" with 22 participants from 12 different nations. Several presentations related to IODP and the "Virtual Drillship Experience" at the Bremen Core Repository (BCR) labs were given. BCR and ESO Bremen teams play a key role in the organization of ECORD Bremen Summer Schools. Ursula Röhl was one of the organizers and presented IODP and ECORD structure and objectives, as well as state-of-the-art IODP-style shipboard simulation exercises. A presentation on IODP core curation, the tour through the BCR´s facilities, and the practicals on "Shipboard techniques for physical properties" were given by Holger Kuhlmann. Marisa Rydzy from EPC also contributed to the summer school by presenting and including interactive exercises on downhole logging. The students enjoyed practical exercises on IODP shipboard methodologies as well as lectures and interactive discussions on the main IODP scientific themes provided by several renowned researchers, highlighting the significance of the Arctic Ocean in the Earth's climate system.

Two ship-to-shore live events, one from the MMA *Valour* for IODP Expedition 389: Hawaiian Drowned Reefs and a second from the *JOIDES Resolution* for IODP Expedition 400: NW Greenland Glaciated Margin were organized to both educate and entertain the summer school´s participants. IODP veteran and Arctic Ocean expert Rudy Stein (University of Bremen) had put together an outstanding scientific programme around the overarching theme of this year´s summer school.

For the detailed programme see *https://www.marum.de/en/education-career/ECORD-training/ECORD-Summer-Schools/2023.html*.

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University of Bremen

Rudy Stein and participants of the ECORD Summer School 2023 "From Greenhouse to Icehouse – The Cenozoic Arctic Ocean and (global) climate history" at BCR/MARUM. Crredits: V. Diekamp, MARUM, ECORD.

Some quotes from participants who attended the ECORD Summer School 2023 in Bremen:

"It was an amazing experience and thanks so much for the effort you put in to organize it! It was also great to give participants an opportunity to present their research, practice their presentation skills and for us to learn more about our peers."

"It was really great and I learnt so much. It felt like I was involved in a proper scientific community for two weeks and I enjoyed meeting everyone. I now have much greater understanding in my feels of research as a whole and in particular the operation of IODP."

"I did not expect to have so many researchers from different field working on a similar (big) topic beforehand. Now I'm overwhelmed by the content of knowledge, since I did not know about the Arctic tectonic / climate history."

"Meeting other ECRs passionate about Earth Sciences, networking, meeting with professionals in the field to expand network was all great. Learning about the IODP program and all the roles of shipboard scientists too."

Summer School on on Evolution and Taxonomy (INASSET)

Parma, Italy, 25 June - 1 July 2023

20 participants

https://ina.tmsoc.org/meetings/summerschool2023/inasset2023.html

This year the INA (International Nannoplankton Association) Summer School on Evolution and Taxonomy (INASSET) was held at the University of Parma, Italy.

ECORD for the first time has provided financial support, as biostratigraphy was and is an essential tool in scientific ocean drilling. ECORD is grateful to INA for organising such a high-quality training. This year's course dealt with Mesozoic Nannofossils and 20 participants from all around the world participated. Invited lecturers covered a wide range of topics from palaeoceanography and biostratigraphy, statistical treatment of data, sample preparation to scientific ocean drilling. The practical exercises and extensive microscopy sessions were rounded up by a one-day field trip to the Northern Apennines.

Participants ot the INA Summer School on Evolution and Taxonomy (INASSET 2023) in Parma, Italy. Credits: G. Villa, E. Matioli, INASSET

ECORD Training Course: The Shipboard Simulation Experience

MARUM, University of Bremen, Germany, 13-17 March 2023

30 participants

https://www.marum.de/en/education-career/ECORD-training/ECORD-Training-Course-2023.html

marum
Center for Marine Environmental Sciences
University of Bremen

The BCR is an ideal place to train students, with the opportunity to work on real cores and have access to laboratory facilities. The MARUM, University of Bremen hosted the training course again after a two-year break due to the pandemic.

Taking advantage of this setting, the new ECORD Training Course provided a "Shipboard Simulation Experience" for scientists from academia and industry. The one-week course offered a basic training focusing on the IODP core flow procedures, preparing the parti-cipants for participating in an offshore drilling expedition, and instilling them with an appreciation for high standards in all kinds of coring projects. IODP-style lab exercises will form the foundation of the ECORD Training Course following the pattern of the unique "Virtual Ship" approach developed for the Bremen ECORD Summer Schools. In total, 30 participants, of those 18 from ECORD member countries, participated in the course.

Participants and lecturers (above) of and scenes (below) at the ECORD Training Course 2023 at MARUM. Credits: MARUM, ECORD/IODP.

7.2 Sponsoring research for young scientists

ECORD Research Grants

17 GRANTS awarded

ECORD supports outstanding early-career scientists through the sponsorship of merit-based **awards for research** using core materials and data from previous DSDP/ODP/IODP expeditions

The aim is to foster participation of early-career scientists in ocean drilling research and encourage them to develop their own projects and collaborate with other research groups outside their home institutions.

In 2023, ESSAC opened a later call for ECORD Research Grants addressed to early-career scientists to allow them to conduct innovative research related to the International Ocean Discovery Program. The award can be up to €3,000 for research that will be carried out in cooperation with host institutions/laboratories abroad in order involve mobility to promote new collaborations, network building among early-career researchers and/or the acquisition of new scientific expertise. The ECORD Research Grants will cover travel and lab expenses or other approved costs related to the study. In 2023, ECORD awarded 17 grants with a total of €48.600 to students from ten different ECORD member countries. .

Distribution of ECORD Grants (n = 17) in 2023 by recipients' home country.

ECORD Research Grants awarded in 2023

Name		Project	Host Institution	Awarded (€)
Agterhuis, Tobias	NED	South Atlantic deep water mass structure across the onset of the Early Eocene Climatic Optimum from neodymium isotopes	Lausanne University	3000
Amadori, Chiara	ITA	Investigating the effects of a novel analytical method on Moisture and Density estimates: porosity correction of basement rocks from the South Atlantic Transect (X390-393)	MARUM, Bremen	3000
Filippi, Giulia	ITA	Understanding the planktic foraminiferal morozovellids permanent decline at the Early Eocene Climatic Optimum, ~53-49 Ma (ODP Site 1209-1210 and ODP 762)	Bristol University	3000
Freitas, Mafalda	PRT	Unravelling the t emperature d ependent m echanisms of natural c arbon s equestration: nsights from authigenic carbonate precipitation in marine serpentinite mud volcanoes	Utrecht University	3000
Jamson, Katie	CND	Which group is producing the most carbonate, and is that always the case through time?	Binghampton University, New York	3000
Jebasinski, Lena	GER	Ocean circulation in the South Pacific Ocean and its effect on Antarctic ice sheet stability during Marine Isotope Stage 11 and Termination V compared to the Holocene	University of Delaware	3000
Molina, Giulia S.	PRT	Improving the interpretation of benthic foraminifera paleoenvironmental changes in the Gulf of Cadiz during Early to Middle Pleistocene transition: New insights from trace element and eNd data	Universitat de Barcelona	3000
Pascoal Duarte, Debora	UK	Reconstructing the evolution of the Equatorial Atlantic Gateway and the Nadir Crater Impact: Insights from DSDP and ODP sediment cores	GEOMAR Kiel	3000
Peral, Marion	FRA	DOMINO: Drivers Of the Mid-PleIstoceNe GlaciatiOns	Vrije Universiteit Brussel	3000
Preine, Jonas	GER	Core-log-seismic integration and physical property analysis of the Christiana-Santorini-Kolumbo volcanic field to unravel its volcano-tectonic evolution	Woods Hole Institute	1600
Pwavodi, Joshua	FRA	Re-assessing hydro-mechanical properties of rocks in Nankai ubduction zone using laboratory and machine learning models.	University of Lausanne	3000
López-Quirós, Adrián	ESP	SUBmarine Green cLAY: Did tectonics cause the present Antarctic glaciation?	Natural History Museum of London	3000
Toyos Simón, María	GER	A novel approach to estimate long-term mass accumulation rates corrected for syndepositional redistribution in marine sediments	Lamont-Doherty Earth Observatory	3000
Torricella, Fiorenza	ITA	Palaeoceanographic reconstruction during MIS 7 and MIS 9 - PAGESS	University of Colgate	3000
Turton, Nikita	IRE	PETM	University of Burgundy	3000
Zhao, Xiaoxiao	GER	Climate change impacts on ocean nitrogen cycling during the aleo c ene Eocene Thermal Maximum	Max-Planck-Institute for Chemistry Mainz	2000
Zorzi, Corralie	FRA	Underlying the forcing of intense Indian summer droughts: a model-data perspective (acronym: DROUGHT)	University of Québec in Montréal	3000

7.3 ECORD Distinguished Lecturer Programme

The ECORD Distinguished Lecturer Programme (DLP) is designed to bring scientific discoveries of IODP to the geosciences community in ECORD and non-ECORD countries, through lectures covering each of the four main themes of the IODP Science Plan 2013-2023.

ECORD Distinguished Lecturer Programme

6 lecturers

In 2023, a call for applications for the Distinguished Lecturer Programme has been issued and nine applications from six ECORD member countries have been received. Six lecturers have been nominated for the period starting on 1 January 2024 and represent a broad spectrum of IODP science:

1. **Cédric M. John** (Queen Mary University London, UK): "Drilling Down the Data: A Deep Learning Dive into IODP Cores"
2. **Laura De Santis** (National Institute of Oceanography and Applied Geophysics OGS Trieste, Italy): "Ice sheet and ocean interaction, paleoclimate and paleoceanographic record during past glacials and interglacials"
3. **Thomas Westerhold** (MARUM, University of Bremen, Germany): "The starring role of Scientific Ocean Drilling to discover the changing states of Earth's Climate during the past 66 million years"
4. **Sverre Planke** (University of Oslo, Norway): "Drilling volcanic rifted margins to understand large igneous provinces and associated global warming"
5. **Jenny A. Gales** (University of Plymouth, UK): "Deciphering Antarctic continental slope processes: new insights through ocean drilling"
6. **Rosalind M. Coggon** (University of Southampton, UK): "The IODP South Atlantic transect: Low-temperature Ridge Flank Contributions to Global Biogeochemical Cycles and Archives of Changing Global Conditions"

The selected lecturers will be funded to travel to research centres and universities that will apply to host their lectures.
https://www.ecord.org/education/dlp/

DLP Speakers 2024

Cédric M. John
Queen Mary University London, UK

Laura De Santis
Laura De Santis OGS Trieste, Italy

Sverre Planke
University of Oslo, Norway

Thomas Westerhold
MARUM University Bremen Germany

Jenny A. Gales
University of Plymouth, UK

Rosalind M. Coggon
University of Southampton, UK

7.4 MagellanPlus Workshop Series Programme

4 workshops

The ECORD/ICDP MagellanPlus Workshop Series Programme is designed to support European and Canadian scientists to develop new and innovative science proposals that follow the major themes of the 2050 Science Framework and the ICDP Science Plan.

MAGELLAN PLUS WORKSHOP SERIES

ECORD European Consortium for Ocean Research Drilling

icdp INTERNATIONAL CONTINENTAL SCIENTIFIC DRILLING PROGRAM

The MagellanPlus Workshop Series Programme funds workshops and/or travel grants that are expected to lead to or foster high-quality and innovative scientific drilling proposals for submission to IODP and ICDP.

Two calls for workshop proposals were issued in 2023 for the organisation of workshops in late 2023 or in 2024.

At the 15 January deadline, three proposals were received and two proposals were funded. At the 15 May deadline, no proposal was received.

Participants of the MagellanPlus Workshop: CenoStore. Credit: ECORD/IODP

Four **MagellanPlus workshops** have been organized in 2023

MagellanPlus: **CenoStore Workshop**

Late Cenozoic palaeoclimate of NW Europe and implications for subsurface CO_2 containment

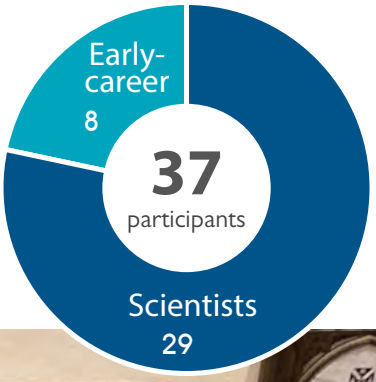
Belfast, UK, and online, 10-13 January 2023

Convenors: Andrew Newton (Queen's University Belfast, ECORD-UK), Mads Huuse (University of Manchester, ECORD-UK), Heather Stewart (BGS, ECORD-UK), Margaret Stewart (BGS, ECORD-UK), Ian Kane (University of Manchester, ECORD-UK), Georgina Heldreich (University of Manchester, ECORD-UK), Freek Busschers (TNO, ECORD-Netherlands)

CenoStore aims to recover the highest resolution late Pliocene-Middle Pleistocene record from the North Sea to understand the impact of global climate and oceanic processes on depositional and ecosystem evolution. The workshop brought together stakeholders from North Sea states (and globally) to provide geological expertise and allow greater integration across maritime borders.

During the workshop, hypotheses were refined and optimum drill sites and operational approach were discussed to achieve scientific aims in order to prepare a North Sea mission specific platform (MSP) drilling proposal.

The proponents submitted Proposal 1012-Pre: Late Cenozoic Glaciers, Landscapes, Climates, and Ecosystems of the North Sea (GLACE-NS) with Andrew Newton as Lead Proponent.



Participants of the MagellanPlus Workshop: CenoStore. Credit: ECORD/IODP

MagellanPlus: **MAREXKUS Workshop**

MAntle Remelting and hydrothermal chemical Exchange at Knipovich Ultraslow Spreading ridge

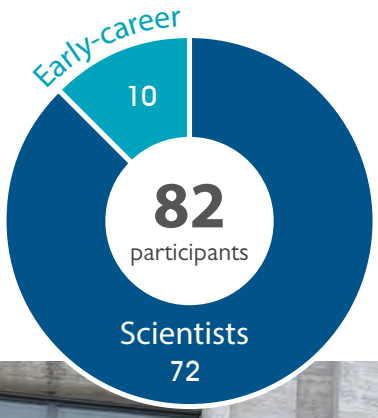
Rome, Italy, and online, 1-3 March 2023

Convenors Alessio Sanfilippo (University of Pavia, ECORD-Italy), Marco Cuffaro (National Research Council, ECORD-Italy), Johan Lissenberg (Cardiff University, ECORD-UK), Valentin Basch (National Research Council, ECORD-Italy), Alessia Conti (National Research Council, ECORD-Italy), Eleonora Ficini (National Research Council, ECORD-Italy), Lorenzo Petracchini (National Research Council, ECORD-Italy)

The oceanic lithosphere is the fundamental zone for thermal and mass exchange between Earth's deep interior and its surface. Knipovich Ridge provides a unique opportunity to study the interplay between mantle alteration, volcanism and sedimentation and establish its effects on element exchange. The aim of the workshop was to develop an MSP-type scientific drilling proposal targeting the oceanic mantle, lower crust and overlying sediments at Knipovich.

Several scientific topics have been defined:

1. defining the role of prior mantle depletion in the formation of oceanic lithosphere;
2. understanding relationships between spreading asymmetry and mantle melting;
3. exploring mechanisms of tectonic exposure of basement rocks at ultraslow spreading ridges;
4. defining the extent of chemical exchange between peridotites, sediments and seawater,
5. exploring the impact of mantle serpentinization and hydrothermalism on microbial activity,
6. defining the interplay between mantle-seawater exchange and the evolution of the sedimentary cover.



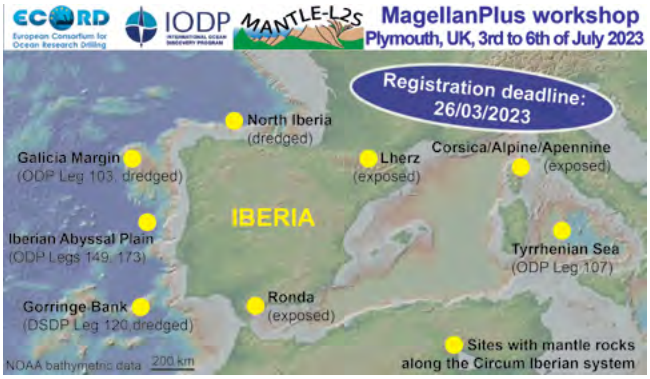
Participants of the MagellanPlus Workshop: MAREXKUS. Credit: ECORD/IODP

MagellanPlus: **MANTLE-L2S Workshop**

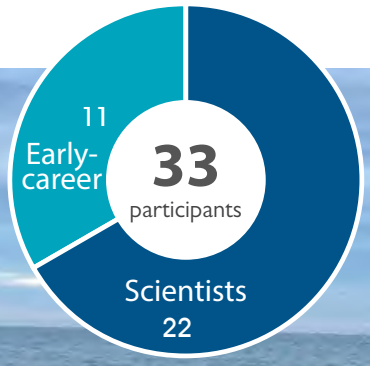
Accessing the Circum-Iberian mantle archive of Wilson Cycle processes through Land-to-Sea drilling

Plymouth, UK, and online, 3-6 July 2023

Convenors Andy Parsons (University of Plymouth, ECORD-UK), Julien Collot (Geological Survey of New Caledonia), Marguerite Godard (CNRS Géosciences Montpellier, ECORD-France), James Hepworth (University of Plymouth, ECORD-UK), Gael Lymer (University College Dublin, ECORD-Ireland), Gianreto Manatschal (University of Strasbourg, ECORD-France), Antony Morris (University of Plymouth, ECORD-UK), Esther Schwarzenbach (Freie Universität Berlin, ECORD-Germany), Arianna Secchiari (Università di Parma, ECORD-Italy)



MANTLE-L2S will seed new proposals for the investigation of mantle rocks and their interactions with Earth systems and cycles during the Wilson Cycle. Special focus has been given to the circum-Iberian system as a natural laboratory for cross-disciplinary, land-to-sea (L2S) MSP investigations of mantle rocks at different stages of the Wilson Cycle. Thanks to the hard work and contributions of all attendees, MANTLE-L2S has achieved its central aim of creating a proposal plan for a new MSP-based IODP pre-proposal. Whilst a number of potential targets were discussed, there was an overwhelming consensus that the Gorringe Bank serpentinite seamount, offshore SW Portugal, should be the target for our pre-proposal. This seamount first exhumed during opening of the Atlantic but is currently in a state of compression. It is located in a region of complex and societally important seismic activity and has also be interpreted as a site of subduction initiation. As such Gorringe bank offers a unique opportunity to investigate mantle rocks in the middle part of the Wilson cycle during which, passive margins transform to active margins. Work is currently underway to write up the plans developed during MANTLE-L2S into MSP pre-proposal.



Participants of the MagellanPlus Workshop: MANTLE-L2S. Credit: ECORD/IODP

MagellanPlus: **Sunda Shelf Workshop**

Drilling the SE-Asian Sunda Shelf: Plio-Pleistocene climate, sea level, carbon storage and continental weathering on the largest low latitude shelf system

Edinburgh, UK, and online, 9-11 October 2023

Convenors: Thomas Wagner (Heriot-Watt University, ECORD-UK), Peter Clift (University College London, ECORD-UK)

The Sunda Shelf in Southeast Asia has long been identified as a strategic and high-quality target region for scientific drilling using MSP techniques. Two strong proposals have been developed in the past (IODP 1005 and IODP 1007) providing an opportunity to build synergies and develop conceptual ideas for a land-to-sea perspective for the Sunda Shelf region within the framework of the new IODP³. The workshop was organised around two main topics: the advancement of IODP 1005 and the development of new conceptual ideas for a land-to-sea drilling perspective. Representatives of the ICDP research community joined the workshop and supported a vibrant discussion about Land-to-Sea perspective. Moving forward, IODP China invited for a sister workshop in Shanghai on 8 and9 November 2023, focusing the discussion on IODP 1007 with a participation of 45 experts mainly from SE Asian countries. The enthusiasm from the workshop continues, with active writing teams supporting the revision of IODP 1005 and intense communication between ICDP and IODP communities about new joined goals. As a follow on to the Edinburgh workshop, Thomas Wagner has planned to hold two 1-day discussion meetings in March 2024, jointly invited by colleagues from GRID in Bandung, Indonesia, and the Nanyang Technological University in Singapore. We all anticipated that these national meetings will further catalyse the development of a full-scale scientific drilling initiative for the wider Sunda Shelf region.

Participants of the MagellanPlus Workshop: Sunda Shelf. Credit: ECORD/IODP

So far, two **MagellanPlus workshops** are planned for **2024**

MagellanPlus: **21st Century Drilling Workshop**

Building Capacity in the Digital Domain on scientific ocean drilling legacy material

Bremen, Germany, 8-12 April 2024

Convenors: Anna Joy Drury (Imperial College London, ECORD-UK, and MARUM, University of Bremen, ECORD-Germany), Beth Christensen (Rowan University, USA), Gerald Auer (University of Graz, ECORD-Austria), Thomas Westerhold (MARUM, University of Bremen, ECORD-Germany), Ursula Röhl (MARUM, University of Bremen, ECORD-Germany)

The objective of this workshop is to propose testing the creation of new records (core descriptions, geochemistry) from digital core. The digital setup will occur as hackathons prior to two in-person MagellanPlus workshops, where tests will be conducted on physical cores in IODP core repositories, e.g., BCR. It will be directly linked to workshops at the GCR and KCC. Follow-up online syntheses of all workshops will develop best practices for virtual "drilling" of legacy materials.

Despite the readily available databases much of the legacy material is not suitable for modern, high- resolution analysis; challenges include metadata and data in different forms and databases. In addition, a variety of cores, notably some capturing critical events, are seriously depleted (including their archive halves) or lack the more modern suite of scientific ocean drilling standard measurements. At times, these issues strongly compromise the ability to generate new high-resolution records from legacy material. The digital re-creation of core (virtual or V-core) would enable continued study on these depleted cores, and creation of new datasets from them would facilitate virtual "drilling". The workshop series will pioneer and test new methods for the use of V-core while addressing a novel scientific question: What are the oceanographic and sedimentological controls on the timing and distribution of ice rafted debris (IRD) in the Miocene Southern Ocean?

MagellanPlus: **The Garvellachs Workshop**

Drilling the Tonian to Cryogenian boundary in the Inner Hebrides, Scotland

London, UK, 14-16 July 2024

Convenors: Graham Shields (University College London, ECORD-UK), Elias Rugen (University College London, ECORD-UK)

The late Tonian and early Cryogenian strata of the Inner Hebrides in Scotland offer a unique window into 'Snowball Earth' dynamics with ramifications for the geological timescale. The aim is to gather together a diverse group of scientists at different career stages and establish the foundations of a new proposal for a drilling project around the Garvellach islands, Inner Hebrides, Scotland. Operational and logistical strategies for scientific drilling as well as collaborative science goals and likely outcomes of a future MSP/ICDP drilling proposal will be discussed. Scientific goals include to recover the highest resolution record of the late Tonian to interrogate Earth's descent into the global 'Sturtian' glaciation, and to progress towards defining the unratified basal Cryogenian Global Stratotype Section and Point (GSSP).

MagellanPlus workshops: **Travel Grants 2023**

9 Travel Grants

4 Workshops

In addition to workshop funding, the MagellanPlus Workshop Series Programme supports the participation of ECORD and ICDP scientists in international IODP and ICDP workshops held in other countries.

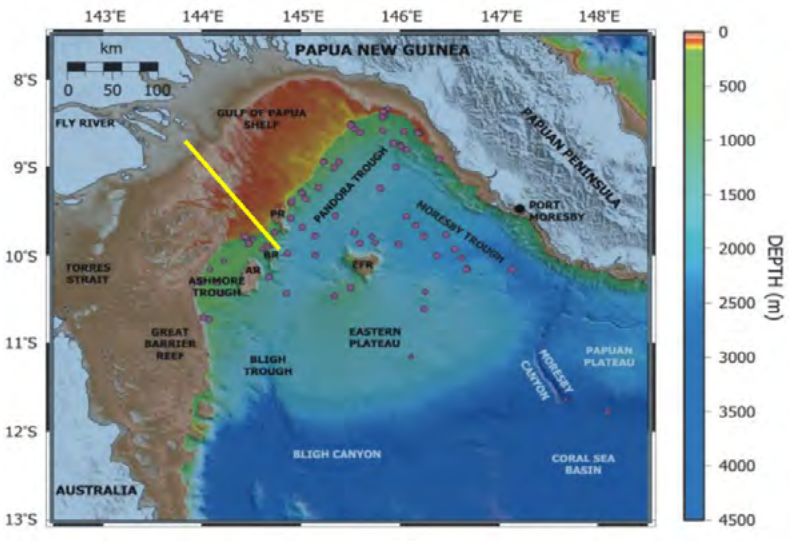
Travel support will not exceed 1,500 € per scientist and 5,000 € per workshop.

In 2023, ECORD supported nine scientists to attend four different workshops.

Development of Scientific Drilling Proposals in the Gulf of Papua
University of Arizona, USA, 14-17 March 2023

Convenor: Yair Rosenthal (USA)

The goal of this workshop was to develop drilling proposals in this region that address key science questions in addition to planning and logistical requirements. The unique structure of the Gulf of Papua and its alternating lithologies provide variable depositional environments that can be used to address questions of broad relevance to the IODP community including: Neogene history of the Indo Pacific Warm Pool climate; reconstruction of the weathering and erosional history of Papua New Guinea and implications to climate change; source-to-sink sedimentation processes; evolution of carbonate reefs and sea-level as far back as the Oligocene.



ECORD supported three French scientists to attend this USSSP workshop.

IODP Expedition 401: Mediterranean-Atlantic Gateway Exchange
University of Bristol, UK, 11-13 July 2023

Co-chief Scientists: Rachel Flecker (ECORD-UK) and Emmanuelle Ducassou (ECORD-France)

The Investigating Miocene Mediterranean-Atlantic Gateway Exchange (IMMAGE) drilling proposal is designed to recover a complete record of Atlantic-Mediterranean exchange from its Late Miocene inception to its current configuration. This will be achieved by coring Miocene offshore sediments and borehole logging at three sites on either side of the Gibraltar Strait during IODP Expedition 401 and from the two precursor connections now exposed on land in southern Spain and northern Morocco with ICDP.

ECORD supported one Norwegian scientist to attend the pre-cruise workshop.

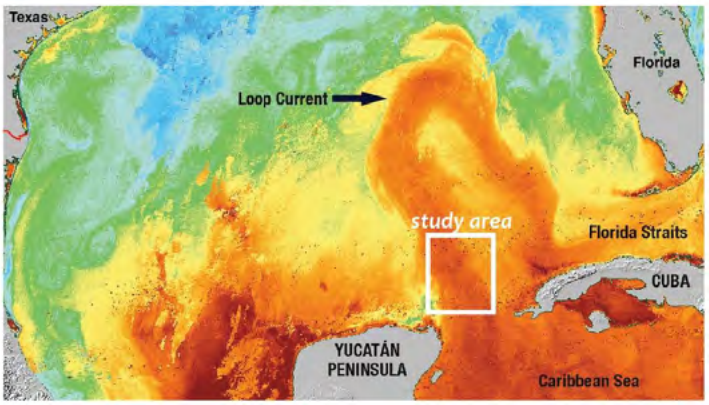
Developing Strategies for the Scientific Investigation of Sediment Drifts on Campeche Bank, Gulf of Mexico

Mexico City, 16-18 August 2023

Convenor Christopher Lowery (USA)

This workshop was focused on developing strategies to drill contourite sediment drifts on the eastern Campeche Bank in the southeastern Gulf of Mexico. These contourites record the development and history of the Loop Current, and overlie early Cenozoic and Cretaceous pelagic sediments, including the K/Pg boundary deposit, and Early Cretaceous platform carbonates.

ECORD supported two scientists from Portugal and the UK to attend this USSSP workshop.



Repository Core Re-Discovery Program (ReCOrD) pilot

Kochi Core Center, Japan, 27 August - 5 September 2023

International PI Gerald Auer (University of Graz, ECORD-Austria)

The aim of this workshop was to understand sedimentary changes due to large-scale changes in surface and intermediate water circulation patterns during the Middle to Late Miocene. Key Ocean Drilling Project (ODP) sites in the wider Indian Ocean have been re-investigated, and novel non-destructive core analysis methods combined with classical core description have been used.

ECORD supported three scientists from the UK, Austria and Germany to attend this workshop, which has been funded and organized by J-DESC and KCC.

ReCoRD
KCC-J-DESC Repository Core Re-Discovery Program

More info

A more complete overview of all MagellanPlus workshops, reports and summaries can be found at:

www.ecord.org/science/magellanplus

8. Communicating

Outreach teams of ECORD and ICDP at the Celebration of the Opening Day of the permanent exhibition "The Earth – a dynamic Planet" at the NHM, Vienna, 21 February 2023. From left to right, top: U. Heidbach (ICDP), H. Kinkel (ESSAC), U. Prange (ESO), N. Hallmann (EMA), D. McInroy (ESO), M. Bednarz (EMA), A. Camerlenghi (ESSAC); bottom: Thomas Wiersberg (ICDP) and Gilbert Camoin (EMA).
Credit: U. Heidbach, ICDP.

8. Communicating

Promoting IODP activities and accomplishments to large, often non-scientific, audiences is a major and ongoing goal of the ECORD Outreach Task Force (EOTF).

During the last few years, the EOTF extended the scope of its work toward securing ECORD presence at permanent and short-term exhibitions in national museums in Europe. In 2023, ECORD contributed to a permanent exhibition: the long-planned exhibition "The Earth - a dynamic Planet" at the Natural History Museum in Vienna, Austria, which is visited by 800 000 visitors per year on average (see page *120*).

Within ECORD, responsibilities for outreach activities are distributed between the ECORD Managing Agency - EMA (coordination, publications and web), the ECORD Science Operator - ESO (mission-specific platform - MSP - expeditions and media) and the ECORD Science Support & Advisory Committee - ESSAC (education), and are coordinated by the EOTF.

ECORD Outreach Task Force

More info

www.ecord.org/outreach

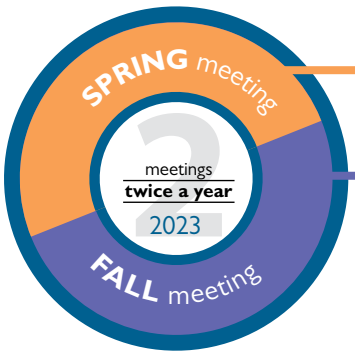
www.ecord.org/resources

ECORD Outreach Task Force meetings

ECORD Outreach Task Force meetings are attended by ECORD and ICDP outreach teams to enhance cooperation between ECORD and ICDP. Outreach teams representing other IODP entities are frequently invited to join EOTF meetings.

The EOTF met twice during 2023:

EOTF spring meeting #23 in Vienna, Austria, on 22 February, and EOTF fall meeting #23 in Nice, France; on 6 October.



EOTF spring meeting #23
22 February 2023, Vienna, Austria

EOTF fall meeting #24
6 October 2023, Nice, France

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20th Anniversary of ECORD

celebrated on 25 April 2023, NHM, Vienna, Austria

On 25 April 2023, ECORD celebrated its 20th Anniversary at the Natural History Museum in Vienna, Austria, during the ECORD-ICDP Town Hall Meeting (*https://www.ecord.org/about-ecord/about-us/20th-anniversary-of-ecord/*). The event was well attended and the ECORD community had a chance to hear presentations from John Ludden, Catherine Mével and Gilbert Camoin. During the meeting John Ludden and Catherine Mével received the 11th and 12th ECORD Awards in recognition of their outstanding contributions to ECORD and IODP (photo below).

On the occasion of the 20th Anniversary, ECORD introduced its new, refreshed logo (see top image) and produced a special issue of the ECORD Newsletter (*issue #38*), which contains articles about ECORD creation, and its 20 years of history.

To extend the widespread promotion of ECORD and its two decades of successful activities, the EOTF produced and distributed several hundreds of T-shirts with a logo that was designed specifically for the celebration of the 20th Anniversary (image on the right).

Read more: *https://www.ecord.org/about-ecord/about-us/20th-anniversary-of-ecord/*
Photo gallery: *https://www.ecord.org/resources/gallery/photos/ecord-iodp-events/20th-anniversary-of-ecord-2023/*

Gilbert Camoin and the recipients of the ECORD Award: Catherine Mével and John Ludden during 20th Anniversary of ECORD celebrated in NHM Vienna, April 2023. Credit: M. Bednarz, ECORD/IODP.

ECORD Sphere in Natural History Museum Vienna, Deck 50, February-April 2023.
Credit: M. Bednarz, ECORD/IODP.

8.1 Communicating with scientists

Promoting IODP/ECORD at conferences, exhibitions and workshops

Under the umbrella "Scientific Drilling" the EOTF promotes both the ocean and continental drilling programmes IODP and ICDP at the EGU (European Geosciences Union, Europe) and AGU (American Geophysical Union, USA). Both meetings are attended by thousands of scientists from all over the world.

EGU 2023 23-28 April 2023, Vienna, Austria

www.egu23.eu *>18 000 scientists from 107 countries*

The EGU 2023 General Assembly was held from 23 to 28 April 2023 where a joint ECORD/IODP-ICDP booth was organized by the ECORD and ICDP outreach teams. The booth was equipped with the ECORD Sphere and we had a chance to enjoy conversations with a lot of visitors interested in scientific drilling. The ECORD booth in the conference's exhibition was a busy and popular meeting point. A joint ECORD-ICDP Town Hall Meeting was held on 25 April at the Natural History Museum Vienna, during which ECORD celebrated its 20th Anniversary (see page xx), and ICDP announced its celebration of 25+ years of scientific drilling that was celebrated three months later in July 2023. In addition, ECORD presented plans for the International Ocean Drilling Programme - IODP[3], which will be launched on 1 January 2025 (see page xx).

The joint IODP-ICDP session "Achievements and perspectives in scientific ocean and continental drilling" (ITS2.2/SSP1.2) was held on 27 April.

AGU 2023 11-15 December 2023, San Francisco, USA

https://www.agu.org/fall-meeting-2023

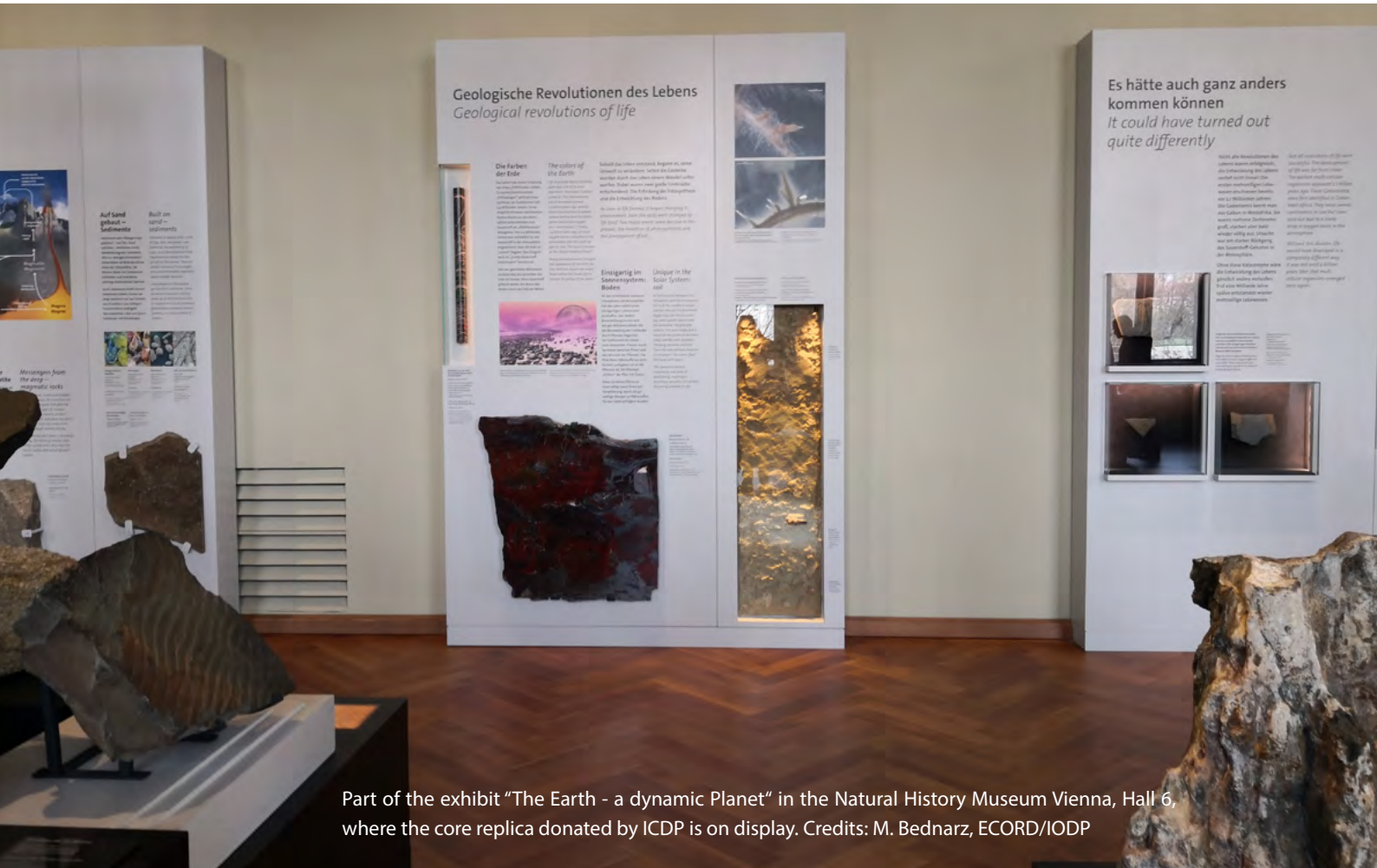
EOTF's close collaboration with our US and Japanese IODP partners and the ICDP outreach staff made it possible for us to be present at the AGU 2021 fall meeting. It was held in a hybrid mode with sessions in person as well as virtual events. The EOTF, similarly to the outreach teams of JAMSTEC/MarE3 and IODP China, decided not to participate physically in the AGU 2021, but to focus on virtual means to promote ECORD during this conference. To connect with AGU participants both ECORD and ICDP offered a chat online every day in the afternoon.

AGU23
San Francisco, CA & Online Everywhere
11-15 December 2023

Other meetings and conferences in 2023

In addition to the EGU and AGU, ECORD was present at other conferences and meetings including:

- INQUA 2023 (13-20 July 2023, Rome, Italy),
- the annual joint SIMP, SGI, SOGEI, AIV Congress "The Geoscience paradigm: Resources, Risks and future perspectives" (19-21 September 2023, Potenza, Italy), and
- IODP-France Scientific Days (29-30 November 2023, Paris, France).



Part of the exhibit "The Earth - a dynamic Planet" in the Natural History Museum Vienna, Hall 6, where the core replica donated by ICDP is on display. Credits: M. Bednarz, ECORD/IODP

8.2 Communicating with the general public

IODP expeditions

IODP Expedition 386: Japan Trench Paleoseismology

www.ecord.org/expedition386

At the end of the moratorium phase, the Science Party published a final press release and report, flanked by social media activities.

IODP Expedition 389: Hawai'ian Drowned Reefs

www.ecord.org/expedition386

This mission-specific platform expedition was implemented in August 2023 and kicked off with media relations such as an international media release and a media event. In the run-up to the event, Marley Parker was selected as Onboard Outreach Officer, a specialist who gave everyone a glimpse of the ship in blogs and video shorts offshore and onshore.

Towards the end of the year the onshore has been prepared where all science party members will meet at the IODP Bremen Core Repository to split, describe and analyze the cores in early 2024.

Expedition 389 blog: *https://expedition389.wordpress.com/*

IODP Expedition 401: Mediterranean-Atlantic Gateway Exchange

https://iodp.tamu.edu/scienceops/expeditions/mediterranean_atlantic_gateway_exchange.html

This *JOIDES Resolution* expedition started in December 2023 and corresponds to the offshore part of the first Land-2-Sea project being jointly undertaken by IODP and ICDP (IMMAGE project, *https://www.immageland2sea.ac.uk/*). The EOTF has been cooperating with USSSP and the University of Bristol concerning outreach activities for the offshore and onshore part of the IMMAGE project, respectively. The EOTF also planned a short-term exhibition related to this project on the occasion of the JR being present in the Atlantic close to the Portuguese coast. The exhibit was focused on Expedition 401, and took place at the Algarve Living Science Center in Faro, Portugal, from December 2023 to February 2024 (see page xx). Official inauguration of the exhibition took place on 29 December with a ship-to-shore call.

IODP Expedition 406: New England Shelf Hydrogeology

www.ecord.org/expedition406

In preparation for this expedition, scientific partners as well as public relations partners were contacted and all associated press activities were prepared. Unfortunately, this MSP expedition had to be postponed and is now planned to be implemented in 2025.

Part of the exhibit "The Earth - a dynamic Planet" in the Natural History Museum Vienna, Hall 6, where the four core replicas donated by ECORD are at display, Credits: NHM Vienna.

ECORD at museums and exhibitions

The EOTF has been working towards ECORD's presence at permanent and short-term exhibitions in museums all around Europe. This includes fabrication and donation (or long-term loans) of materials for museums and research institutions as well as loans of the ECORD Sphere for dedicated exhibitions.

Permanent exhibitions

The presence of ECORD in permanent exhibitions is a priority for the EOTF as it secures a perpetual, widespread and stable source of information for the general public about scientific ocean drilling and the role of our consortium in this global research initiative. Since 2022, ECORD is proud to have its presence at two permanent exhibitions, including one that was officially opened in February 2023. A third permanent exhibit where ECORD will be present is planned to be officially opened at the German Maritime Museum (DSM), Bremerhaven, Germany, in summer 2024. During 2023, the EOTF has been actively working on providing suitable materials to the DSM with which ECORD has an excellent record of cooperation regarding a past short-term exhibit.

As of 2023, exhibits that promote ECORD are:

Cosquer Méditerranée museum, Marseille, France:
La Grotte Cosquer, since 2022

https://www.grotte-cosquer.com

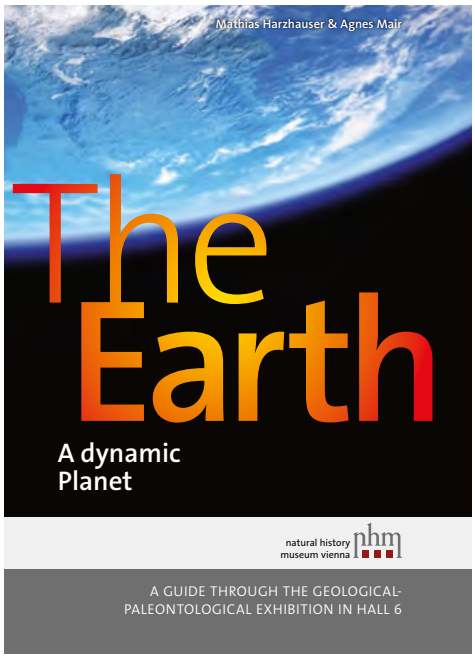
Natural History Museum Vienna, Austria:
"The Earth – A Dynamic Planet", since 2023

https://www.nhm-wien.ac.at/en/exhibitions/permanent_exhibitions/mezzanine_level/hall_6-9_earth_history

ECORD and ICDP at the Natural History Museum Vienna (NHM)

Permanent exhibition since February 2023 , Vienna, Austria

The planning for this exhibition started in 2020, but was postponed due to the COVID-19 pandemic, and the opening of the exhibition, originally planned for 2021, was postponed to February 2023.



Since 21 February 2023, ECORD and ICDP are eventually present at the National History Museum in Vienna. ECORD and ICDP representatives were invited for the Opening Day Celebration, during which Gilbert Camoin (ECORD) and Thomas Wiersberg (ICDP) gave talks about scientific drilling to about three hundred international guests at this official, high-profile event (photo next page).
The permanent exhibition in the Geology section Hall 6: "The Earth – a dynamic Planet" at the NHM Vienna presents five core replicas donated by ECORD and ICDP with corresponding information and video materials. The four core replicas donated by ECORD are: PETM, Tahiti and two from the Chicxulub Impact Crater. ICDP donated a core replica from the Great Oxidation Event (ICDP project FAR-DEEP).

Photo gallery: Exhibition opening day:
https://www.ecord.org/resources/gallery/photos/ecord-iodp-events/ecord-nhm-exhibition-opening-day/

Photo gallery: ECORD materials at the NHM exhibition:
https://www.ecord.org/resources/gallery/ecord-at-exhibitions/ecord-in-nhm-vienna/

Official webpage of the exhibition:
https://www.nhm-wien.ac.at/en/exhibitions/permanent_exhibitions/mezzanine_level/hall_6-9_earth_history

Gilbert Camoin (ECORD) and Thomas Wiersberg (ICDP) (in the middle) during the Celebration of the Opening Day of the permanent exhibition "The Earth – a dynamic Planet" at the NHM, Vienna, 21 February 2023 . Credit: U. Heidbach, ICDP.

Long- and short-term exhibitions

ECORD at the Algarve Living Science Center

Temporary exhibition, December 2023 - February 2024, Faro, Portugal

Exhibition: "Expediton 401 | Salty secrets of the Mediterranean: a story to be revealed"

In early December 2023, an exhibition at the Algarve Living Science Center, Faro, Portugal, took place at the start of IODP Expedition 401: Mediterranean-Atlantic Gateway Exchange, which was the offshoret part of the Land-2-Sea IMMAGE project. This exhibition aimed at promoting scientific drilling to the general public. It has been jointly prepared by the EOTF, ESSAC and ECORD Council representatives from Portugal, outreach teams of ICDP and USSSP, as well as scientists involved in the IMMAGE project.

The exhibition was a multidisciplinary initiative and a variety of materials as well as the ECORD Sphere were on display. After the exhibition in Faro the ECORD Sphere will continue travelling to Naples, Italy, for an exhibit in February 2024.

Photo gallery: *https://www.ecord.org/resources/gallery/ecord-at-exhibitions/ecord-at-algarve-living-science-center/*

View at the temporary exhibition at the Algarve Living Science Center, Faro, Portugal. Credits: Algarve Living Science Center

8.3 ECORD outreach resources

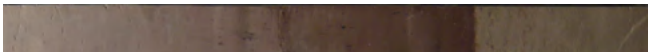
Core replicas

www.ecord.org/resources/core-replicas

Replicas of drilling cores from ODP/IODP legs and expeditions are valuable tools to introduce ODP/IODP science and to raise awareness about scientific ocean drilling to the public.

Seven replicas of ODP and IODP drilled cores are available for classroom activities and display at temporary exhibitions, museums, and conferences in Europe.

The EOTF arranged the production of an additional set of core replicas that will be located at the European Petrophysics Consortium (EPC) in Leicester, UK, and available for loans in 2024.



How to loan a core replica?

To order a loan, contact **Malgo Bednarz** at *bednarz@cerege.fr* with inquiry about the availability of any particular core replica.

ECORD shares the core replicas free of charge, on a temporary basis to sscientists, educators and exhibitors under the conditions described in the loan document.

Models for exhibitions

Several realistic (1:1 scale) models of two species of corals were fabricated to date. These models complement the core replica from IODP Expedition 310: Tahiti Sea Level. Two of the models were donated to the NHM Vienna and DSM for permanent exhibits.

A new core replica from MSP IODP Expedition 310: Tahiti Sea Level and two realistic models of specimens of corals indentified in cores from the same expedition (left: *Porites lobata*; right: *Pocillopora eydouxi*).

ECORD Sphere

The ECORD Sphere presents ECORD and its MSP concept on an interactive spherical display, which is being loaned to museums and science centers across Europe and showcased at meetings and conferences.

All four IODP science topics are presented as well as IODP/ECORD drilling vessels, selected ECORD/IODP expeditions covering diverse scientific topics and the three IODP core repositories. It also illustrates selected scientific data of ocean acidity, sea-level rise, draining the ocean and tectonic plates.

The ECORD Sphere was displayed at the Natural History Museum Vienna from February to April 2023 and at the ECORD booth at the EGU 2023. Afterwards it traveled to Bremen, Germany, where it was exhibited at the House of Science (Haus der Wissenschaft) as part of the interactive exhibition "3,688 meters below sea level" between 20 July to 21 October 2023. The exhibition was conceived by MARUM – Center for Marine Environmental Sciences at the University of Bremen where the IODP Bremen Core Repository is also located. Then, the ECORD Sphere was on display in the MARUM entrance hall in November and early December 2023.

The globe was then exhibited at the GeoBerlin conference in Berlin, Germany, from 3 to 7 September 2023 before traveling to Portugal. Here, it was integrated in an exhibition at the Algarve Living Science Center in Faro on the occasion of the JR leaving the port for IODP expedition 401 (see page 122).

The next planned stop for the ECORD Sphere will be the Paleontology Museum in Naples, Italy, for an exhibit related to IODP Expedition 402: Tyrrhenian Continent–Ocean Transition when the JR will be at the port of Naples. In April 2024, the ECORD Sphere will be transported to Vienna for the EGU 2024 and then to the University of Utrecht, The Netherlands, to be displayed at the University Museum.

Left: Ulrike Prange and Jana Nitsch assembling the ECORD Sphere system. Right: Thomas Westerhold and Holger Kuhlmann are trying out its capability. Credits: U. Röhl, MARUM

ECORD Sphere webpage: *https://www.ecord.org/resources/ecord-sphere/*

9. FY23 and FY24 budgets

Positive balance of USD **11,8 M** at the end of 2023

About **95%** of the ECORD budget for direct operational costs

View from onboard of *MMA Valour* during IODP Expedition 389.
Credits: E. Le Ber, ECORD/IODP.

9. FY23 and FY24 budgets

FY23 ECORD budget

ECORD is currently funded exclusively by its 15 member countries.

In FY23, the total ECORD contributions amounted to $14.62M (below), showing a decrease of about $2.2M compared to the FY22 budget due to a reduced UK contribution to compensate its increased contribution in 2019 and 2020. Since 2014, the ECORD budget decrease is of $2.1M, due to a decrease in member contributions (France and the United Kingdom) and strong fluctuations in exchange rates between the US Dollar and the national currency contributions of five ECORD countries (France, UK, Denmark, Spain and Ireland).

The ECORD budget Is seen as a minimum budget due to the opportunity for members to make direct cash and/or in-kind contributions (IKC) that allow them to increase their contributions to ECORD on an expedition by expedition basis.

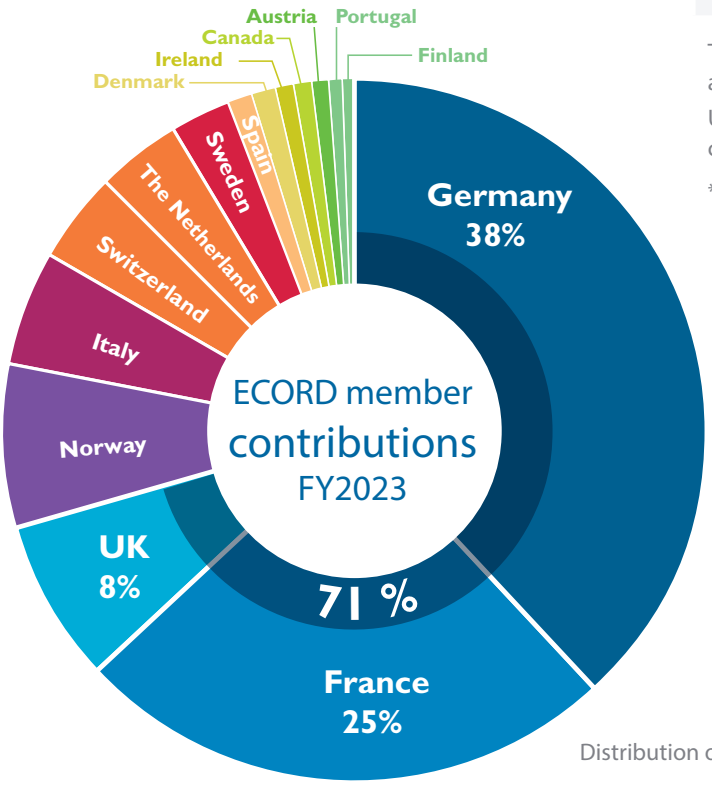
The contributions to the ECORD budget are unevenly distributed between the member countries, ranging from $5.6M to $80K (below). Based on their contributions, each ECORD member country receives a participation quota for all IODP expeditions. However, the participation of ECORD member countries to the ECORD educational programme (page X) is not based on financial contributions.

ECORD contributions FY23 (USD)	
DFG (Germany)	5,600,000
CNRS (France) *	3,636,000
UKRI (United Kingdom) *	1,110,000
Forskningsradet (Norway)	1,100,000
CNR (Italy)	750,000
FNS (Switzerland)	600,000
NWO (The Netherlands)	600,000
VR (Sweden)	400,000
MCIN (Spain) *	167,000
DAFSHE (Denmark) *	150,000
GSI (Ireland) *	120,000
CCOD (Canada)	115,000
ÖAW (Austria)	100,000
FCT (Portugal)	90,000
Academy of Finland	80,000
TOTAL	**14,618,000**

The amount in dollars is based on exchange rates (when applicable) at the time of the payment by the relevant partner.

UK contribution reduced in compensation of increased contributions in 2019 and 2020.

* Countries paying their contribution in their own currency



Distribution of ECORD member contributions for FY2023

The three major ECORD contributors, Germany ($5.6M), France ($3.636M) and the United Kingdom ($1.11M) provide 71% of the total ECORD budget.

The contributions of other member countries range from $80K to $1.1M.

The table below summarises the ECORD budget for FY23.

The ECORD non-operational costs were stable, amounting to approximately 5% of the member country contributions, leaving 95% of the ECORD budget for direct and indirect operational costs.

The ECORD budget shows a positive balance of $11,799,347 at the end of 2023 and this sum will be carried forward to the ECORD FY24 budget.

ECORD **FY2023** Budget (in USD)

	FY23 Income (USD)	FY23 Expenses (USD)
FY22 balance	27,475,321	
FY23 contributions	14,618,000	
ECORD-NSF MoU		7,000,000
ESO		2,218,705
JAMSTEC-X386 PSP*		685,556
ESO X-389**		17,113,972
AMS Rosmoport X-377***		1,700,000
EMA		313,075
MagellanPlus		111,600
IODP Chairs Support		200,800
ESSAC		371,260
BCR		395,607
Outreach basic		65,399
Project Manager L2S****		118,000
TOTAL	42,093,321	30,293,974
FY23 balance	**11,799,347**	

* Costs for Personal Sampling Party of IODP Expedition 386: Japan Trench Paleoseismology

** Costs for the implementation of the offshore operations concerning IODP Expedition 389: Hawaiian Drowned Reefs

*** Maximum reimbursement to Arctic Marine Solution (AMS) for the Russian icebreaker contracted for the implementation of IODP Expedition 377: Arctic Ocean Paleoceanography (ArcOP)

**** Project Manager's 18-month salary for the implementation of the Land-to-Sea Transect IMMAGE

Benthic Portable Remotely Operated Drill (PROD5) used for coring during IODP Expedition 389.
Credits: E. Le Ber, ECORD/IODP.

FY24 ECORD budget

The expected total contributions for FY24 from the 15 contributing ECORD member countries is about $15.62M (see table below).

ECORD contributions FY22 (USD)	
DFG (Germany)	5,600,000
CNRS (France) *	3,167,000
UKRI (United Kingdom) *	3,177,979
CNR (Italy)	1,000,000
FNS (Switzerland)	600,000
NWO (The Netherlands)	600,000
VR (Sweden)	400,000
Forskningsradet (Norway)	282,780
MCIN (Spain) *	158,300
DAFSHE (Denmark) *	143,290
CCOD (Canada)	115,000
GSI (Ireland) *	105,540
ÖAW (Austria)	100,000
FCT (Portugal)	90,000
Academy of Finland	80,000
TOTAL	**15,619,889**

The amount in US dollars will be based on exchange rates (when applicable) at the time of the payment by the relevant partner.
* Countries paying their contribution in their own currency

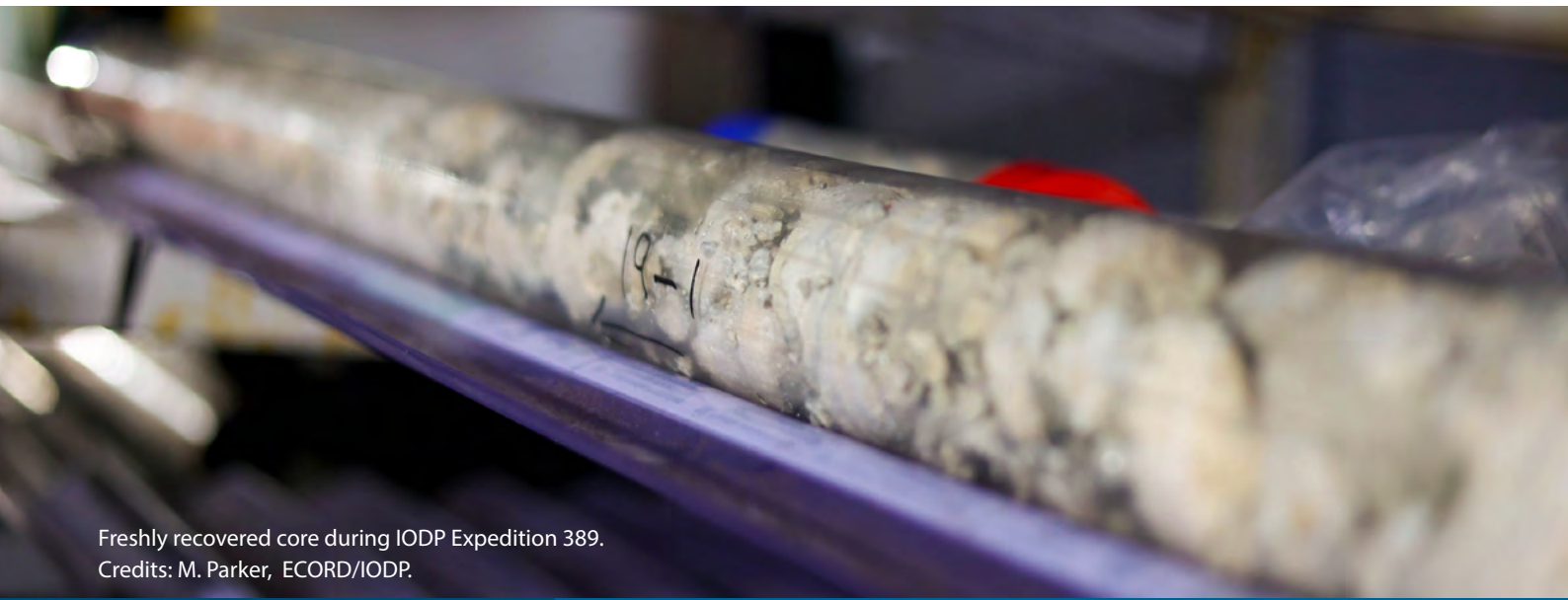
Freshly recovered cores during IODP Expedition 389.
Credits: M. Parker, ECORD/IODP.

The table below summarises the expected ECORD budget for FY24.

ECORD **FY2024** Budget (in USD)

	FY24 Income (USD)	FY24 Expenses (USD)
FY23 balance	11,632,347	
FY24 contributions	15,619,889	
ECORD-NSF MoU		3,500,000
ECORD-JAMSTEC MoU		1,000,000
ESO fixed costs		2,073,754
ESO X389 OSP		722,389
EMA		313,075
MagellanPlus		86,800
IODP Chairs Support		208,048
ESSAC		371,260
EFB Chair Support		8,000
BCR		511,044
Outreach basic		79,329
IODP³ Science Office		474,241
TOTAL	**27,252,236**	**9,347,940**
Expected FY24 balance	**17,904,296**	

The amounts in USD are subject to exchange rate fluctuations.



Freshly recovered core during IODP Expedition 389.
Credits: M. Parker, ECORD/IODP.

ECORD Managing Agency

The table below summarises the EMA budget for FY23 and FY24, as approved by the ECORD Council in June 2023.

EMA budget for FY23 and FY24					
	FY23		FY24		Variance
	€	USD	€	USD	€
Salaries					
Outreach Officer	71.400	88.536	71.400	88.536	0
Compensation for the Director	50.000	62.000	50.000	62.000	0
Travels and meetings					
Travels EMA CEREGE	50.000	62.000	50.000	62.000	0
Invited speakers to ECORD meetings	3.000	3.720	3.000	3.720	0
Organisation ECORD Meetings	20.000	24.800	20.000	24.800	0
Organisation SEP June Meeting	10.000	12.400	10.000	12.400	0
MagellanPlus	90.000	111.600	70.000	86.800	20,000 (-)
Consumables / Office costs	6.000	7.440	6.000	7.440	0
Overheads CEREGE	42.080	52.179	42.080	52.179	0
GRAND TOTAL	**342.480**	**424.675**	**322.480**	**399.875**	**20,000 (-)**

Exchange rate used in FY23 and FY24 budgets: 1€ = $1.24

ECORD Science Support and Advisory Committee (ESSAC)

The table below summarises the ESSAC budget for FY23 and FY24 as approved by the ECORD Council in June 2023.

ESSAC budget for FY23 and FY24					
	FY23		FY24		Variance
	€	USD	€	USD	€
Salaries					
Science Coordinator (Grade 8/43)	69.000	85.560	69.000	85.560	0
Compensation for the Chair	50.000	62.000	50.000	62.000	0
Compensation for the Vice-Chair	5.000	6.200	5.000	6.200	0
Travels and subsistence					
Science Coordinator	8.387	10.400	8.387	10.400	0
Chair	22.016	27.300	22.016	27.300	0
Office Costs	6.452	8.000	6.452	8.000	0
Meetings					
ESSAC Spring meeting	3.226	4.000	3.226	4.000	0
ESSAC Fall meeting	3.226	4.000	3.226	4.000	0
Travel support invited speakers	3.468	4.300	3.468	4.300	0
Travel Support ESSAC Liaison to SEP and other meetings	3.468	4.300	3.468	4.300	0
Conference Travel Support or non-ECORD countries	4.597	5.700	4.597	5.700	0
Education and Outreach					
ECORD DLP Support	14.919	18.500	14.919	18.500	0
ECORD Summer Schools	38.065	47.200	38.065	47.200	0
ECORD Training Course	6.452	8.000	6.452	8.000	0
ECORD Scholarships	15.000	18.600	15.000	18.600	0
ECORD Research Grants	30.000	37.200	30.000	37.200	0
ECORD-Japan scientific meetings	16.129	20.000	16.129	20.000	0
TOTAL	**299.405**	**371.260**	**299.405**	**371.260**	**0**

Exchange rate used in FY21 and FY22 budgets: 1€ = $1.24

ECORD Science Operator

The table below summarises the expenditure breakdown of ESO for FY23 in US dollars.

ESO budget for FY23									
	2023 Annual Program Plan Budget				2023 Expenditure				2023 variance
	BGS	MARUM	EPC	Total	BGS	MARUM	EPC	Total	
Management and administration	330,661	215,480	488,300	1,034,441	295,674	215,480	488,300	999,454	34,987
Salary	256,661	157,480	438,300	852,441	263,970	157,480	438,300	859,750	-7,309
Travel	50,000	26,000	26,000	102,000	28,096	26,000	26,000	80,096	21,904
Supplies	7,000	7,000	7,000	21,000	0	7,000	7,000	14,000	7,000
Shipping	0	0	0	0	99	0	0	99	-99
Communication	2,000	0	0	2,000	2,025	0	0	2,025	-25
Equipment	5,000	15,000	7,000	27,000	1,484	15,000	8,500	24,984	2,016
Other	10,000	10,000	10,000	30,000	0	10,000	8,500	18,500	11,500
Technical, Engineering and Science Support	16,773,570	546,971	424,955	17,745,496	15,052,449	546,971	424,955	16,024,375	1,721,121
Personnel	644,570	225,971	316,955	1,187,496	768,944	225,971	316,955	1,311,870	-124,374
Travel	52,000	44,000	36,000	132,000	221,522	44,000	36,000	301,522	-169,522
Supplies	0	79,000	0	79,000	0	79,000	0	79,000	0
Shipping	60,000	165,000	20,000	245,000	65,116	165,000	20,000	250,116	-5,116
Communication	4,000	0	0	4,000	3,289	0	0	3,289	711
Contractual Services	0	0	40,000	40,000	0	0	40,000	40,000	0
Equipment	3,000	3,000	2,000	8,000	54,005	3,000	2,000	59,005	-51,005
Other	16,010,000	30,000	10,000	16,050,000	13,939,573	30,000	10,000	13,979,573	2,070,427
Core Curation	0	94,763	0	94,763	0	94,763	0	94,763	0
Personnel	0	78,263	0	78,263	0	78,263	0	78,263	0
Travel	0	6,000	0	6,000	0	6,000	0	6,000	0
Supplies	0	3,500	0	3,500	0	3,500	0	3,500	0
Shipping	0	7,000	0	7,000	0	7,000	0	7,000	0
Data Management	75,463	185,691	36,250	297,404	90,832	185,691	36,250	312,773	-15,369
Salary	41,463	112,691	36,250	190,404	30,272	112,691	36,250	179,213	11,191
Travel	8,000	8,000	0	16,000	0	8,000	0	8,000	8,000
Supplies	6,000	0	0	6,000	0	0	0	0	6,000
Coms.	0	0	0	0	37,175	0	0	37,175	-37,175
Contractual	0	50,000	0	50,000	0	50,000	0	50,000	0
Equipment	20,000	15,000	0	35,000	23,385	15,000	0	38,385	-3,385
Outreach	79,531	55,666	25,375	160,572	36,688	55,666	25,375	117,728	42,844
Salary	34,390	47,666	25,375	107,431	0	47,666	25,375	73,041	34,390
Travel	8,000	8,000	0	16,000	0	8,000	0	8,000	8,000
Supplies	8,000	0	0	8,000	30,573	0	0	30,573	-22,573
Equipment	29,141	0	0	29,141	6,115	0	0	6,115	23,026
Equipment	29,141	0	0	29,141	341	0	0	341	28,800
Other	0	0	0	0	31,382	0	0	31,382	-31,382
Grand Total	17,259,225	1,098,571	974,880	19,332,676	15,475,642	1,098,571	974,880	17,549,093	1,783,583

Bremen Core Repository (BCR)

The table below summarises the BCR budget for FY23 and FY24 as approved by the ECORD Council in June 2023.

BCR budget for FY23 and FY24					
	FY23		FY24		Variance
	€	USD	€	USD	€
Salaries and Fringes (1,6 FTE)	256.780	318.407	294.224	364.838	37,444 (+)
Student workers	11.508	14.270	32.200	39.928	20,692 (+)
Travels	2.100	2.604	1.680	2.083	420 (-)
Supplies	14.350	17.794	28.700	35.588	14,350 (+)
Shipping	21.700	26.908	35.700	44.268	14,000 (+)
Curation database updates	6.300	7.812	13.328	16.527	7,028 (+)
SEDIS 24/7 maintenance/ upgrades (0,08 FTE)	6.300	7.812	6.300	7.812	0
Total	**319.038**	**395.607**	**412.132**	**511.044**	**93,094 (+)**

Exchange rate used in FY23 and FY24 budgets: 1€ = $1.24

Science Party members and ESO staff gathered at Barbers Point Harbor, Kapolei, to depart on Expedition 389. Credit: M. Parker, ECORD/IODP

ECORD Outreach Task Force (EOTF)

The table below summarises the EOTF budget for FY23 and FY24 as approved by the ECORD Council in June 2023.

ECORD Outreach budget for FY23 and FY24					
	FY23		FY24		Variance
	€	USD	€	USD	USD
Basic outreach activities					
Annual Report	1.248	1.548	2.000	2.480	932 (+)
ECORD Newsletters	3.387	4.200	4.500	5.580	1,380 (+)
Managing core replicas	4.630	5.741	8.378	10.389	4,648 (+)
EGU and AGU booths	16.411	20.350	16.411	20.350	0
ECORD website (maintenance and development)	1.371	1.700	1.371	1.700	0
Travels	10.484	13.000	10.484	13.000	0
Shipping	4.000	4.960	4.000	4.960	0
Goodies	6.411	7.950	10.000	12.400	4,450 (+)
Office costs	2.863	3.550	2.863	3.550	0
Pre- and post-cruise flyers	968	1.200	968	1.200	0
Expedition logos, stickers and posters	968	1.200	3.000	3.720	2,520 (+)
Expedition logos and stickers	968	1.200	968	1.200	0
TOTAL	**52.741**	**65.399**	**63.975**	**79.329**	**13,930 (+)**

Exchange rate used in FY23 and FY24 budgets: 1€ = $1.24

Marisa Rydzy (ESO, EPC) gives a smile to the camera while working onboard *MMA Valour* during IODP Expedition 389.
Credits: M. Parker, ECORD/IODP

10. ECORD representatives on IODP panels

10. ECORD representatives on IODP panels

The **International Ocean Discovery Program (IODP)** is composed of three platform providers (NSF-USA for *JOIDES Resolution*, MEXT/JAMSTEC - Japan for *Chikyu* and ECORD for mission-specific platforms - MSPs), three Facility Boards, two IODP advisory panels, a Science Support Office and the IODP Forum. The ECORD participation in IODP entities in 2023 is listed below.

JOIDES Resolution Facility Board - **JRFB**

http://www.iodp.org/facility-boards#JRFB

The *JOIDES Resolution* Facility Board - JRFB is the planning forum for expeditions using the *JOIDES Resolution*.

ECORD Members of the JRFB
Gilbert Camoin (France)
Steffen Kutterolf (Germany)

Chikyu IODP Board - **CIB**

https://www.jamstec.go.jp/cib/

The *Chikyu* IODP Board - CIB is the planning forum for expeditions using *Chikyu*.

ECORD Members of the CIB
Gilbert Camoin (France)
Achim Kopf (Germany)

ECORD Facility Board - **EFB**

https://www.ecord.org/about-ecord/management-structure/efb/

ECORD Facility Board is the planning forum for expeditions using mission-specific platforms.

ECORD Members of the EFB
Science Board:
Alexandra Turchyn **(Chair)** (UK)
Gabriele Uenzelmann-Neben (Vice-Chair) (Germany)
Michele Rebesco (Italy)
ECORD Vision Task Force members:
France Lagroix (France)
Guido Lüniger (Germany)
Annalisa Iadanza (Italy)
Mike Webb (UK)
Gilbert Camoin (France)
Bernard Westerop (The Netherlands)
Dave McInroy (UK)
Angelo Camerlenghi (Italy)
Ursula Röhl (Germany)

Science Evaluation Panel - **SEP**

http://www.iodp.org/program-organization/science-evaluation-panel

Science Evaluation Panel (SEP) is a JRFB advisory panel that evaluates the scientific objectives and relevance of proposed expeditions using all IODP platforms.

SEP ECORD Members

Science
Christoph Beier (Finland)
Clara Bolton (France)
Anne Briais (France)
Gerald Dickens (Ireland)
Michelle Harris (UK)
Matt Ikari (Germany)
Eryn McClymont (UK)
Tim Reston (UK) **(Co-Chair)**
Alessio Sanfilippo (Italy)
Mike Weber (Germany)

Site:
Laura de Santis (Italy)
Maria Filomena Loreto (Italy)
Jonas Preine (Germany)
Nick Schofield (UK)

Environmental Protection and Safety Panel - **EPSP**

www.iodp.org/program-organization/environmental-protection-and-safety-panel

The Environmental Protection and Safety Panel (EPSP) is a JRFB advisory panel that evaluates the environmental protection and safety of proposed expeditions using all IODP platforms.

EPSP ECORD Members

Martin Hovland (Norway)
Philippe Lapointe (France)
Toby Harrold (Spain)
Dieter Strack (Germany)

IODP Forum

http://www.iodp.org/iodp-forum

The IODP Forum is the custodian of the Science Plan and is a venue for exchanging ideas and views on the scientific progress of the Program. The Forum also provides advice to IODP Facility Boards on Platform Provider activity.
Many ECORD representatives from all ECORD entities have attended the two meetings of the IODP Forum held in Vienna, Austria on 22 and 23 April 2023 and in Wollongong, Australia on 11 and 12 October 2023.

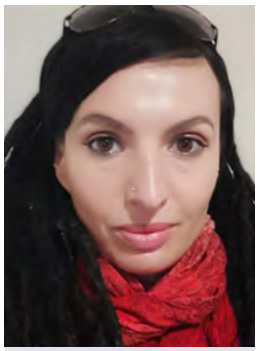
IODP Forum Chair

Henk Brinkhuis (The Netherlands)

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

ECORD European Consortium for Ocean Research Drilling

Contributors



Malgo Bednarz
EMA Outreach Officer

Gilbert Camoin
EMA Director

Angelo Camerlenghi
ESSAC Chair

Sarah Davies
EPC Manager

Jez Everest
ESO Expedition Project Manager

Nadine Hallmann
EMA Assistant Director

Lucas Lourens
MagellanPlus Chair

David McInroy
ESO Science Manager

Hanno Kinkel
ESSAC Science Coordinator

Ulrike Prange
ESO Media Relations

Ursula Röhl
ESO Curation and Lab Manager

Alexandra V. Turchyn
EFB Chair

A sample of the alkalic basalt found in the core during IODP Expedition 389.
Credit: M. Parker, ECORD/IODP

Ab List of acronyms

ABS: American Bureau of Shipping

ACC: Antarctic Circumpolar Current

ACEX: Arctic Coring Expedition

AAD: Australian Antarctic Division

ADP: Amphibious Drilling Proposal

AGU: American Geophysical Union

AIS: Antarctic Ice Sheet

AIST: National Institute of Advanced Industrial Science and Technology

ANZIC: Australian and New Zealand IODP Consortium

APL: Ancillary Project Letter

ArcOP: Arctic Ocean Paleoceanography, IODP Expedition 377

AWI: Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research, Bremerhaven

BCR: Bremen Core Repository

BGR: Bundesanstalt für Geowissenschaften und Rohstoffe - Federal Institute for Geosciences and Natural Resources, Hannover

BGS: British Geological Survey

CCOD: Canadian Consortium for Ocean Drilling

CEREGE: Centre Européen de Recherche et d'Enseignement des Géosciences de l'Environnement - Centre for Research and Education in Environmental Geosciences, Aix-en-Provence

CIB: *Chikyu* IODP Board

CNR: Consiglio Nazionale delle Ricerche - National Research Council of Italy

CNRS: Centre National de la Recherche Scientifique - National Center for Scientific Research, France

CRISP: Costa Rica Seismogenesis Project

CT: Computed Tomography

DAFSHE: Danish Agency for Science and Higher Education

DFG: Deutsche Forschungsgemeinschaft - German Research Foundation

DIS: Drilling Information System

DLP: Distinguished Lecturer Programme

DSDP: Deep Sea Drilling Project

EC: European Commission

ECORD: European Consortium for Ocean Research Drilling

EFRAM-ARC: Eastern Fram Strait Paleo Archive

EFB: ECORD Facility Board

EGU: European Geosciences Union

EMA: ECORD Managing Agency

EOTF: ECORD Outreach Task Force

EPC: European Petrophysics Consortium

EPGFZ: Enriquillo-Plaintain Garden Fault zone

EPSP: Environmental Protection and Safety Panel

ESO: ECORD Science Operator

ESSAC: ECORD Science Support and Advisory Committee

ETH: Eidgenössische Technische Hochschule - Swiss Federal Institute of Technology, Zurich

EVTF: ECORD Vision Task Force

ExB: Executive Boardin IODP^3

FCT: Fundação para a Ciência e a Tecnologia - Foundation for Science and Technology, Portugal

FNS: Fonds National Suisse de la Recherche Scientifique - Swiss National Science Foundation, SNSF

FY: Fiscal Year

GCR: Gulf Coast Repository

GEOMAR: Helmholtz Centre for Ocean Research Kiel

GFZ: Deutsches GeoForschungsZentrum - German Research Centre for Geosciences, Potsdam

GPC: Giant Piston Coring

GSI: The Geological Survey of Ireland

IBM: Izu-Bonin-Mariana

ICDP: International Continental Scientific Drilling Program

Ifremer: Institut Français de Recherche pour l'Exploitation de la Mer – French Research Institute for Exloitation of the Sea

IGSN: International Geo Sample Number

IKC: In-Kind Contribution

INSU: Institut National des Sciences de l'Univers - National Institute of Sciences of the Universe, France

IODP: Integrated Ocean Drilling Program (2003-2013) & International Ocean Discovery Program (2013-2024)

IODP^3: IODP-cubed; International Ocean Drilling Programme to be started on 1 January 2025

ISOLAT: Integrated Southern Ocean Latitudinal Transects

JAMSTEC: Japan Agency for Marine-Earth Science and Technology

J-DESC: Japan Drilling Earth Science Consortium

JOIDES: Joint Oceanographic Institutions for Deep Earth Sampling

JR: *JOIDES Resolution*

JRFB: *JOIDES Resolution* Facility Board

JRSO: *JOIDES Resolution* Science Operator

KAUST: King Abdullah University of Science and Technology

KCC: Kochi Core Center

K-Pg: Cretaceous–Paleogene

LSCE: Laboratoire des Sciences du Climat et de l'Environnement - Laboratory for Sciences of Climate and Environment, Gif-sur-Yvette

LWD: Logging While Drilling

MarE3: Marine-Earth Exploration and Engineering Division

MARUM: Center for Marine Environmental Sciences, University of Bremen

mbsf: metres below sea floor

mDIS: mobile Drilling Information System

MDP: Multi-phase Drilling Project

MeBo: Meeresboden-Bohrgerät - seafloor drill

MG+: MagellanPlus Workshop Series Programme

MINECO: Ministerio de Economía y Competitividad - Ministry of Economy and Competitiveness, Spain

MoU: Memorandum of Understanding

MPI: Max Planck Institute

MPT: Mid-Pleistocene Transition

MSCL: Multi-Sensor Core Logger

MSP: Mission-Specific Platform

NADIR: Nice Amphibious Drilling In-situ Monitoring and Risk Analysis

NanTroSEIZE: Nankai Trough Seismogenic Zone Experiment

NOC: National Oceanography Centre, Southampton

NSF: National Science Foundation

NWO: Nederlandse Organisatie voor Wetenschappelijk Onderzoek - Netherlands Organisation for Scientific Research

ÖAW: Östereichische Akademie der Wissenschaften - Austrian Academy of Sciences

OCT: Ocean-Continent Transition

ODP: Ocean Drilling Program

OGS: National Institute of Oceanography and Applied Geophysics

OSP: Onshore Science Party

PIN: Prior Information Notice

PMO: Program Member Office

PROCEED: Expanding Frontiers of Scientific Ocean Drilling

RD2: Rockdrill2

SEA: Safety and Environment Advisory Group in IODP^3

SEDIS: Scientific Earth Drilling Information Service

SFWG: Science Framework Working Group

SEP: Science Evaluation Panel

UKRI: United Kingdom Research and Innovation

USSP: Urbino Summer School in Paleoclimatology

USSSP: U.S. Science Support Program

Marisa Rydzy (ESO, EPC) gives a smile to the camera while working onboard *MMA Valour* during IODP Expedition 389.
Credits: M. Parker, ECORD/IODP

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2023 ECORD Member Countries

Austria	1	Österreichische Akademie der Wissenschaften (ÖAW)
Canada	2	Canadian Consortium for Ocean Drilling (CCOD)
Denmark	3	Danish Agency for Science and Higher Education
Finland	4	Suomen Akatemia
France	5	Centre National de la Recherche Scientifique (CNRS)
Germany	6	Deutsche Forschungsgemeinschaft (DFG)
Ireland	7	The Geological Survey of Ireland (GSI)
Italy	8	Consiglio Nazionale delle Ricerche (CNR)
Netherlands	9	Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)
Norway	10	Forskningsradet
Portugal	11	Fundação para a Ciência e a Tecnologia (FCT)
Spain	12	Ministerio de Ciencia, Innovación (MCIN)
Sweden	13	Vetenskapsradet (VR)
Switzerland	14	Fonds National Suisse (FNS)
United Kingdom	15	United Kingdom Research and Innovation (UKRI)

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