ECORD

EUROPEAN CONSORTIUM FOR
OCEAN RESEARCH DRILLING

ANNUAL REPORT 2022

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 four expeditions 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: *D/V Chikyu* docked in Shimizu, Japan, during Personal Sampling Party for Expedition 386.
Credits: P. Bellanova, ECORD/IODP/JAMSTEC.

Published by the ECORD Managing Agency (EMA) - April 2023.
Layout and design: Malgo Bednarz (EMA Outreach Officer).
www.ecord.org

ECORD
EUROPEAN CONSORTIUM FOR OCEAN RESEARCH DRILLING

ECORD Annual Report 2022

1 January 2022 - 31 December 2022

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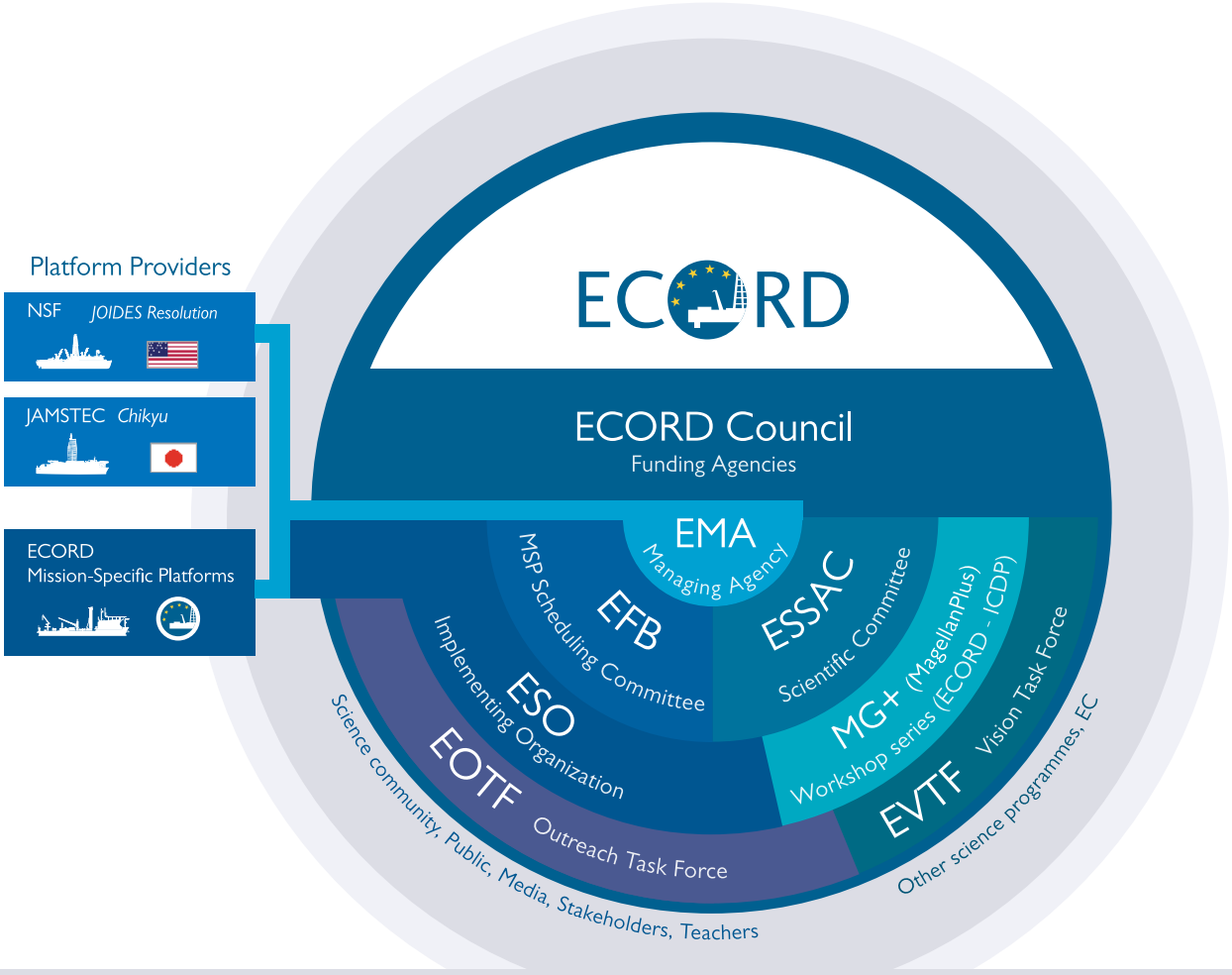
ECORD entities



2022 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) (diagram on previous page).

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	**Guido Lüniger** (Germany; 1 January to 31 December 2022)
Outgoing Vice-Chair	**Michael Webb** (UK; 1 January to 30 June 2022)
Incoming Vice-Chair	**Stéphane Guillot** (France; 1 July to 31 December 2022)

Council Core Group	**Michael Webb** (UK) **Stéphane Guillot** (France) **Guido Lüniger** (Germany) **Bernard Westerop** (The Netherlands) **Markus Engelhardt** (Norway)

Guido Lüniger

ECORD Council Chair 2022

Guido Lüniger is the Programme Director for geology at the German Research Foundation (DFG). Among other duties, he oversees the DFG contribution to international scientific drilling programmes, such as ECORD/IODP and ICDP and is the appointed German delegate of the ECORD Council. Guido has a background in geology and obtained a doctoral degree in organic geochemistry at the University of Cologne. Before joining DFG, he worked at the University of Zurich.

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)

ECORD Managing Agency

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 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 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)

ECORD ESSAC

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	**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**
Media Relations / Outreach Manager	**Ulrike Prange**
Data Manager	**Vera Bender**
Geochemists	**Luzie Schnieders** **Martin Kölling**
Petrophysics Techs	**Vera Lukies** **Thomas Westerhold**
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, France	
Petrophysics Staff Scientist	**Johanna Lofi** **Erwan Le Ber**

D/V *Chikyu* during Personal Sampling Party for IODP Expedition 386. Credits: P.Bellanova, ECORD/IODP/JAMSTEC.

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 **Gabriele (Gabi) Uenzelmann-Neben**
(AWI, Germany)

Members of the Science Board
Michele Rebesco
(OGS, Italy)
Alexandra Turchyn
(Cambridge University, UK)
Beth Christensen
(Rowan University, USA)
Yasuhiro Yamada
(Kyushu University, Japan)
FengPing Wang
(Shanghai JiaoTong University, China)

Gabriele Uenzelmann-Neben
ECORD Facility Board Chair

Gabriele Uenzelmann-Neben is senior scientist at the Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research (AWI) in Bremerhaven, Germany. As a Geophysicist, her research interests include continental margins, geophysics of the polar regions, sediment transport processes, glaciomarine sedimentation, reconstruction of sedimentary environments, climate and oceanic circulation using the high-resolution seismic imaging of sedimentary structures, large igneous provinces LIPs (formation and impact on climate and circulation) and seismic reflection data. Gabi participated in more than 20 cruises as team leader and eight as chief scientist, and has published more than 80 peer-reviewed papers. She was member of the IODP Site Evaluation Panel (2010-2015) and she was ECORD Distinguished Lecturer from 2014 to 2016. Gabi was appointed as EFB Chair in January 2019.

EVTF (ECORD Vision Task Force)

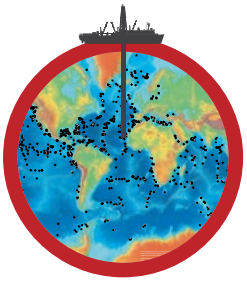
The **EVTF** is the ECORD strategic entity in charge of developing a long-term scientific and funding strategy, and monitoring the ECORD progress toward the completion of the IODP Science Plan.
The EVTF is composed of the ECORD Council Core Group, including the ECORD Council Chair and Vice-Chair, the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

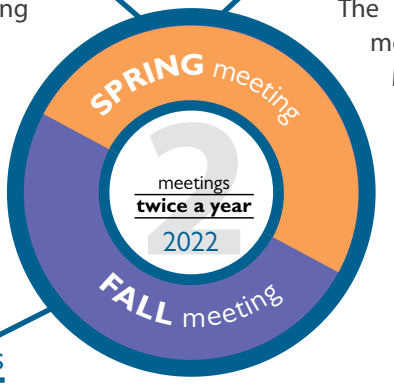
The table on the next page summarizes the ECORD and IODP meetings that have been held in 2022, as well as the two major conferences (EGU in Vienna and AGU in Chicago) where IODP-related sessions and booths have been organized.

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** meets twice a year, in February/March and in fall. Outreach liaisons from the U.S. 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

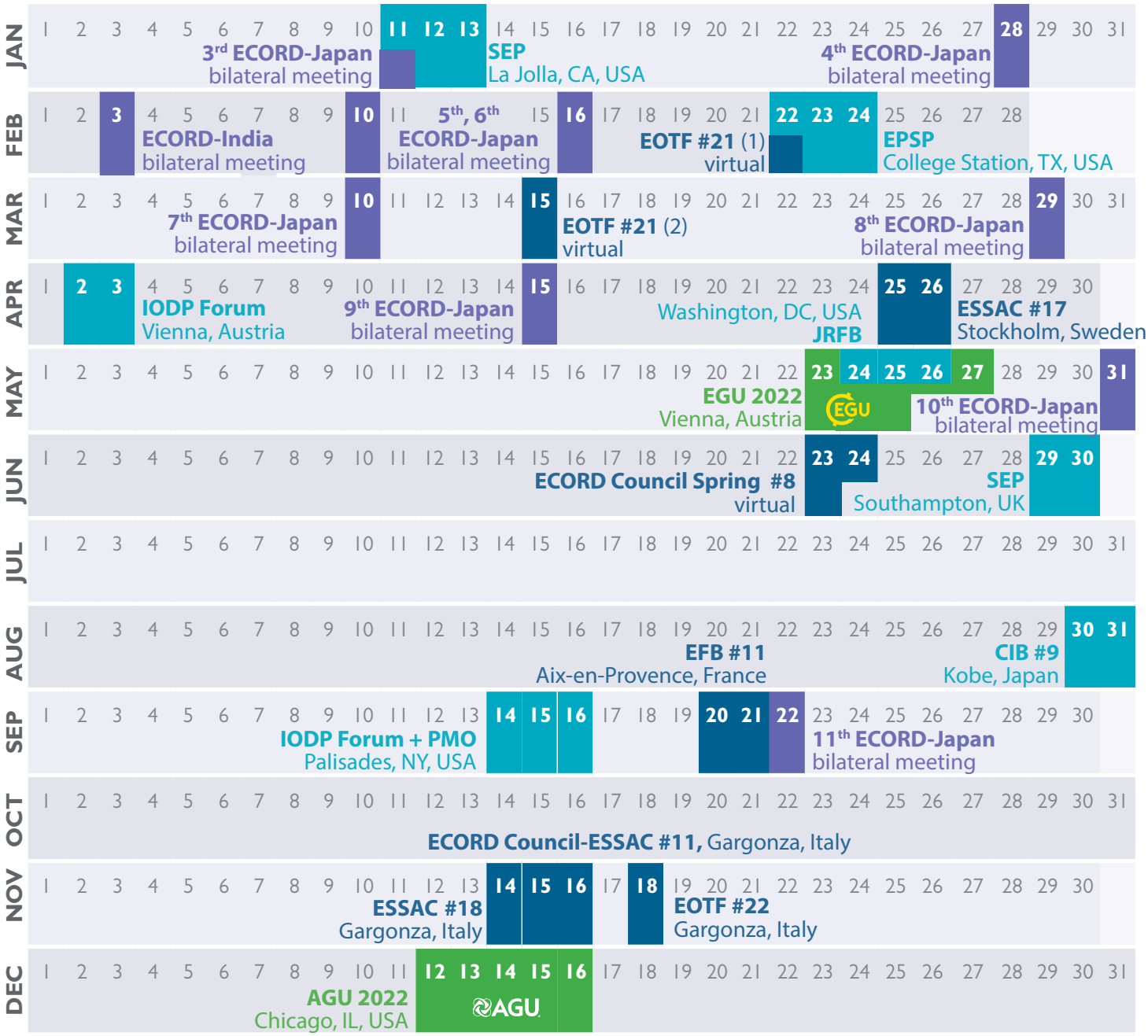
ECORD representatives act as members and/or liaisons to meetings of IODP entities:

- 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 138*

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

ECORD / IODP meetings and conferences **2022** calendar



ECORD meetings | IODP meetings | bilateral meetings (virtual) | International conferences

Figure summarizing the ECORD and IODP meetings that have been held in 2022, 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/

I. FY2022 highlights

Onboard D/V *Chikyu* during Onshore Science Party for IODP Expedition 386. Credits: L. Maeda, ECORD/IODP/JAMSTEC

1. FY2022 highlights

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 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.

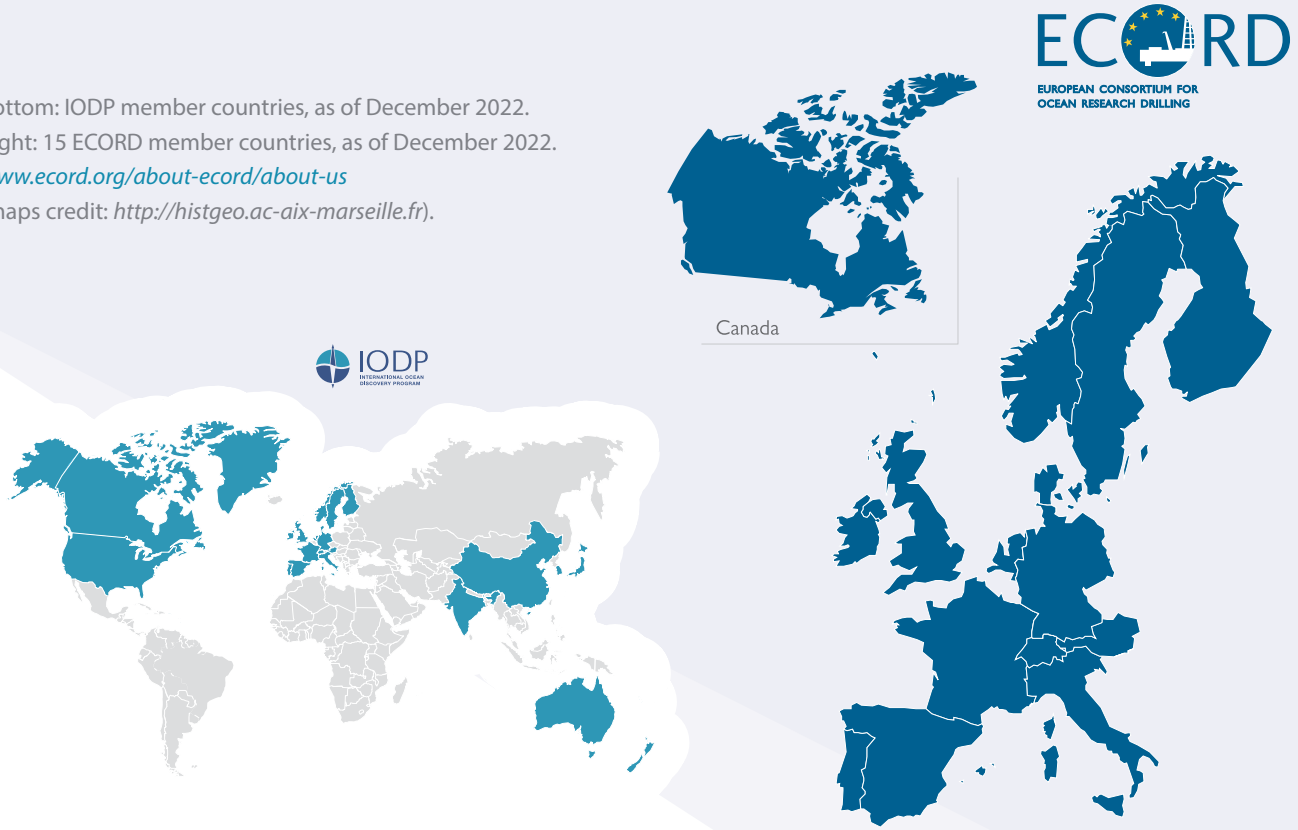
This 2022 Annual Report demonstrates that the ECORD science community is very healthy, especially through its leading role in the submission of drilling proposals, its massive and sustained participation to IODP expeditions and in the publication and promotion of cutting-edge results related to the successive ocean drilling programmes.

ECORD membership

Over the last months, regular exchanges between the Spanish Ministry of Science and Innovation (MCIN), EMA and the CNRS Legal Department have led to the redaction of an Agreement to allow MCIN to become an ECORD Member and pay past and future contributions to ECORD.

Over the past three years, former ECORD members, Israel, Iceland, Belgium and Poland, as well as Greece have formerly expressed interest in joining the current 15 ECORD members in the future. However, the promising contacts established have been interrupted by the COVID-19 pandemic and are now in process to be reactivated.

Bottom: IODP member countries, as of December 2022.
Right: 15 ECORD member countries, as of December 2022.
www.ecord.org/about-ecord/about-us
(maps credit: *http://histgeo.ac-aix-marseille.fr*).



ECORD 2022 budget

ECORD is currently funded exclusively by its 15 members. In FY22, the total ECORD budget amounted to $16.84M, showing a decrease of about $582K compared to the FY21 budget (*see Section 9 – 'ECORD budget', page 126*). 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 running costs were very stable in 2022, amounting to less than 10% of the members' contributions. With an expected stable budget during the second phase of the programme, more than 90% of which being dedicated to the funding of IODP expeditions.

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) to participate to the funding of MSP expeditions in exchange of extra science party positions. So far, several MSP expeditions have benefitted from IKCs.

The contributions to the ECORD budget are unevenly distributed between its members, ranging from $5.6M to $80K (*see Section 9 – 'ECORD budget', page 126*). The three major ECORD contributors, DFG/Germany ($5.6M), UKRI ($3.386M) and CNRS/France ($3.147M) provide 72% 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 $26.85M at the end of 2022 and this sum has been carried forward to the ECORD FY23 budget.

Mission-specific platform expeditions

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

The offshore and onshore phases of IODP Expedition 386: Japan Trench Paleoseismology (Co-chief Scientists: M. Strasser, ECORD-Austria and Ken Ikehara, Japan) have been successfully implemented despite to many restrictions related to the COVID-19 pandemic. A Personal Sampling Party (PSP) has been held from 15 November through 6 December 2022 and provided the opportunity to the Science Party members to meet on *Chikyu* and take samples for their post-expedition research (*read more on page 35*). Besides its operational and scientific successes, this expedition has demonstrated that a collaborative approach involving different IODP Platform Providers (ECORD Science Operator - ESO - and the Institute for Marine-Earth Exploration and Engineering - MarE3 - within JAMSTEC in the case of IODP Expedition 386) and the provision of in-kind contributions (IKC) represent a model for future scientific ocean drilling expeditions implemented in an MSP mode.

More on page 35

Expedition 377: Central Arctic Paleoceanography (ArcOP)

Since 2020, ESO and EMA have collaborated with the Swedish Polar Research Secretariat (SPRS) to set up operational, funding and communication plans related to the implementation of IODP Expedition 377: Central Arctic Paleoceanography (ArcOP; Co-chief Scientists: R. Stein, ECORD-Germany and K. St. John, USA) that was recommended for scheduling by the ECORD Facility Board (EFB) in March 2019. This expedition has been seen as a first-priority expedition for ECORD by the EFB and has benefitted from IKCs provided by SPRS and the Federal Institute for Geosciences and Natural Resources (BGR) in Hannover, Germany.

In early April, the ECORD Council has decided to postpone the implementation of this expedition, initially scheduled in August and September 2022, by two to three years based on the uncertainty of offshore operational safety given the current geopolitical situation in this region. However, the prolongation of the crisis in Ukraine led to a cancellation of the expedition and the EFB removed the expedition's "ready for scheduling" status as it was not possible to predict when a new opportunity for ArcOP would become appropriate. The ECORD Council has mandated the CNRS and EMA to carry out negotiations with SPRS, with the assistance of ESO, in order to settle this termination amicably. A final agreement has been found between the parties and has been approved by the ECORD Council.

More on page 38

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) is now planned for five to eight weeks in between end August and 31 October 2023. Dates of the Onshore Science Party are anticipated to be in early 2024. 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 kyr. In July, the ECORD Council has approved an increase of $3.5M of the overall budget as a consequence of increased operational costs related to the current economic situation.

More on page 40

Expedition 406: New England Shelf Hydrogeology

At its last meeting that was held on 20 and 21 September, 2022 in Aix-en-Provence (France), the EFB has recommended the implementation of an expedition based on Proposal 637: New England Shelf Hydrogeology (Lead Proponent: B. Dugan, USA) in 2024.

At its last meeting that was held on 15 and 16 November, 2022 in Gargonza (Italy), the ECORD Council has approved the scheduling of this expedition, which will be IODP Expedition 406.

More on page 41

The post-2024 MSP expedition schedule

The post-2024 MSP expedition schedule will rely both on the 12 MSP proposals that currently reside at the EFB and at the Science Evaluation Panel (SEP), including Land-to-Sea Transects to be conducted in conjunction with ICDP, and the MSP proposals that will arise from the 11 MagellanPlus workshops that have been organized since 2021 or planned for the coming year (*see Section 7.3 – 'MagellanPlus Workshop Series Programme' on page 100*). 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/*).

To further increase operational flexibility of MSP expeditions and to offer more opportunities to the science community, ECORD has defined new options to the proponents through the definition of various implementation plans, including a Basic Plan that will correspond to the minimum requirements for expedition success, and variable operational times that are shorter than the standard two-month expedition. This might serve as a model for the implementation of drilling expeditions in the future.

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*).

JOIDES Resolution expeditions

In 2022, the JR has implemented five expeditions (four in USFY 2022) in the Southern Atlantic *(see table on the next page and Section 4 - 'Participating in 2022 IODP expeditions' on page 62)*.

A total of 50 ECORD scientists from 11 ECORD members were invited to participate, including seven Co-chief Scientists. Four out of these five expeditions (expeditions 390, 392, 393 and 397) were supported by proposals led by ECORD scientists.

JOIDES Resolution Science Operator

1. **Expedition 391: Walvis Ridge Hotspot** (Co-chief Scientists: W. Sager, USA; K. Hoernle, ECORD-Germany), whose scientific objectives were to investigate records of plate motions, as well as mantle geodynamics, magma flux, and mantle source compositions along the Tristan-Gough-Walvis Ridge hotspot track. This hotspot extends from the active volcanic islands of Tristan da Cunha and Gough through a province of guyots and then along Walvis Ridge to the Etendeka flood basalt province, and displays a tight linear age progression in which ages increase from the islands to the flood basalts (covering ~135 My).

2. **Expedition 392: Agulhas Plateau Cretaceous Climate** (Co-chief Scientists: G. Uenzelmann-Neben, ECORD-Germany; Steven Bohaty, ECORD-Germany), aiming at:

- determining the nature and origin of the Agulhas Plateau;
- significantly advance the understanding of how Cretaceous temperatures, ocean circulation, and sedimentation patterns evolved as CO_2 levels rose and fell and the breakup of Gondwana progressed;
- (documenting long-term paleoceanographic variability through the Late Cretaceous and Paleogene; and
- investigating geochemical interactions between igneous rocks, sediments, and pore waters through the life cycle of a large igneous province (LIP).

3 and 4. **Expedition 390 and 393: South Atlantic Transects 1 and 2** (Co-chief Scientists: R. Coggon, ECORD-UK; J. Sylvan, USA for Expedition 390 and D. Teagle, ECORD-UK; J. Reece, USA for Expedition 393. The objectives of these expeditions were to: 1) recovering complete sedimentary sections and the upper 100–350 m of the underlying oceanic crust along a slow/intermediate spreading rate Mid-Atlantic Ridge crustal flow line at ~31°S, 2) investigating the history of the low-temperature hydrothermal interactions between the aging ocean crust and the evolving South Atlantic Ocean, 3) refining global biomass estimates and examining microbial ecosystems' responses to variable conditions in a low-energy gyre and aging ocean crust, and 4) reconstructing the history of the deep western boundary current and deepwater formation in the Atlantic basins to test hypotheses regarding the role of evolving thermohaline circulation patterns in climate change and the effects of tectonic gateways and climate on ocean acidification.

5. **Expedition 397: Iberian Margin Paleoclimate** (Co-chief Scientists: F. Abrantes, ECORD-Portugal; D. Hodell, ECORD-UK), aiming at documenting past variability of all major subsurface water masses of the eastern North Atlantic to reconstruct the North Atlantic climate at high temporal resolution for the entire Quaternary and Pliocene. Records consist of rapidly accumulating sediments along a depth transect is designed to complement those sites drilled during Expedition 339 (560–1073 mbsl) where sediment was recovered at intermediate water depth under the influence of Mediterranean Outflow Water (MOW).

In addition to IODP Expedition 397: Iberian Margin Paleoclimate, the U.S. FY23 will include four expeditions (*see table on the next page*)

1. **IODP Expedition 398:** Hellenic Arc Volcanic Field (Co-chief Scientists: T. Druitt, ECORD-France; S. Kutterolf, ECORD-Germany);
2. **IODP Expedition 399:** Building Blocks of Life, Atlantis Massif (Co-chief Scientists: A. McCaig, ECORD-UK; S. Lang, USA);
3. **IODP Expedition 395:** Reykjanes Mantle Convection and Climate (Co-chief Scientists: R. Parnell-Turner, USA; A. Briais, ECORD-France);
4. **IODP Expedition 400:** NW Greenland Glaciated Margin (Co-chief Scientists: P. Knutz, ECORD-Denmark; A. Jennings, USA).

Three out of these four expeditions (expeditions 398, 399 and 400) are supported by proposals led by ECORD scientists.

At its last meeting that was held in a hybrid form (Washington, DC and remotely) on 24 - 26 May 2022, the *JOIDES Resolution* Facility Board (JRFB) has scheduled four expeditions of low cost and minimal risk for U.S. FY2024 (*see table below*) pending availability of funding for four expeditions:

1. **IODP Expedition 401:** Mediterranean-Atlantic Gateway Exchange (Co-chief Scientists: R. Flecker, ECORD-UK; E. Ducassou, ECORD-France);
2. **IODP Expedition 402:** Tyrrhenian Continent-Ocean Transition (Co-chief Scientists: N. Zitellini, ECORD-Italy; A. Malinverno, USA);
3. **IODP Expedition 403:** Eastern Fram Strait Paleo-archive (Co-chief Scientists: R. Giulia Lucchi, ECORD-Italy; K. St. John, USA);
4. **IODP Expedition 404:** Arctic-Atlantic Gateway Paleoclimate (Co-chief Scientists: W. Geissler, ECORD-Germany; J. Brigham-Grette, USA).

All proposals supporting these expeditions are led by an ECORD scientist.

IODP Expedition 401 consists of the offshore part of the first Land-to-Sea transect (IMMAGE) to be implemented jointly with the International Continental Scientific Drilling Program (ICDP).

Since its 2021 meeting, the *JOIDES Resolution* Facility Board (JRFB) decided that no new proposals that require the JR to address the Science Plan will be accepted, with the exception of proposals reviewed by the SEP that were deactivated, but encouraged to re-apply.

The JRFB also considered the future of the 'orphan' sites that correspond to unimplemented sites on the board for later completion in exceptional circumstances (e.g., mechanical failures of the JR).

2022 *JOIDES Resolution* expeditions

Expedition name	#	Dates	Ports
Walvis Ridge Hotspot	391	Dec. 6, 2021 – Feb. 5, 2022	Cape Town / Cape Town
Agulhas Plateau Cretaceous Climate	392	Feb. 5 – Apr. 7, 2022	Cape Town / Cape Town
South Atlantic Transect 1	390	Apr. 7 – June 7, 2022	Cape Town / Cape Town
South Atlantic Transect 2	393	Jun. 7 – Aug. 7, 2022	Cape Town / Cape Town
Iberian Margin Paleoclimate	397	Oct. 11 – Dec. 11, 2022	Lisbon / Tarragona

Chikyu expedition

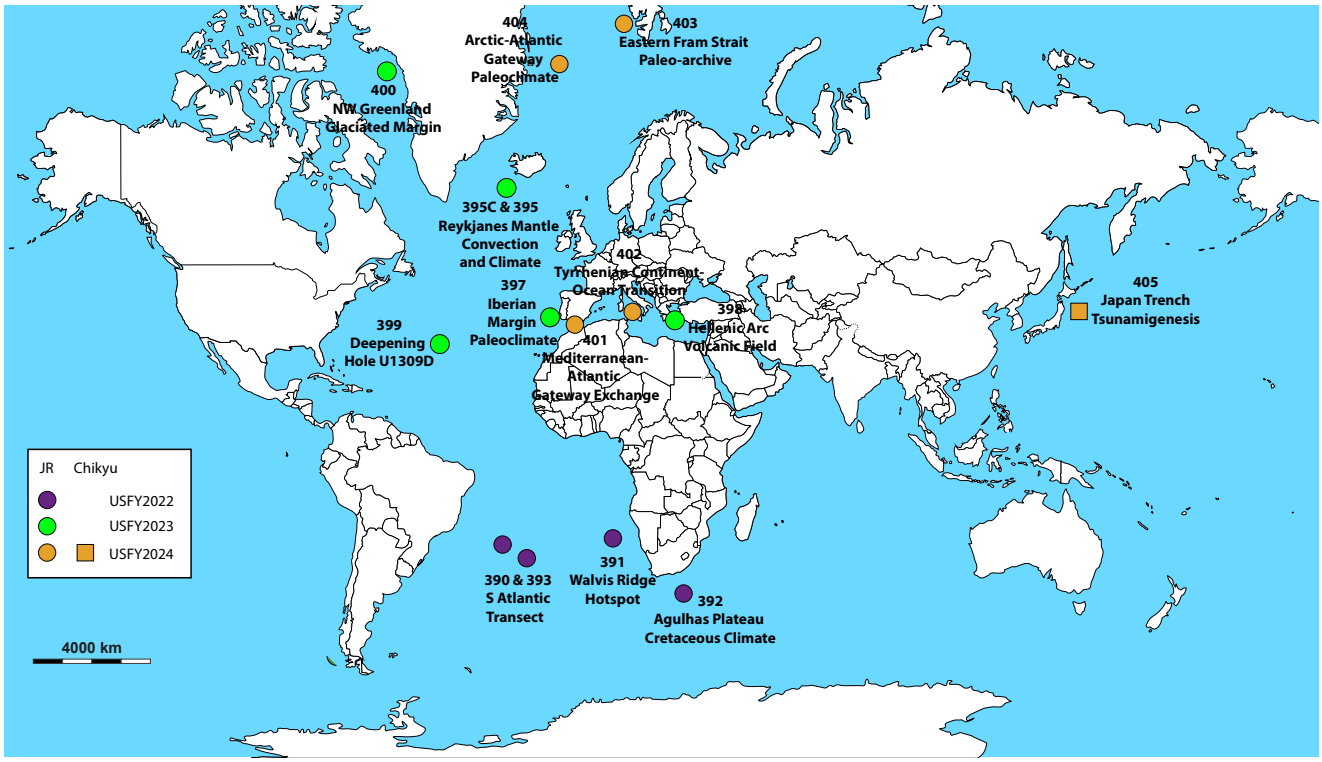
Following its last meetings that were held in Kobe (Japan) and remotely on 30-31 August and 18 October 2022, the *Chikyu* IODP Board (CIB) has decided to schedule IODP Expedition 405: Japan Trench Tsunamigenesis in mid 2024, based on Proposal 835: Tracking Tsunamigenic Slips Across and Along the Japan Trench - JTRACK (Lead proponent: S. Kodaira, Japan).

Since its 2021 meeting, the *Chikyu* IODP Board (CIB) has recognized that the currently accepted but unimplemented/unscheduled deep-riser drilling projects using *Chikyu* will not be completed during the current phase of IODP. In addition, the CIB has decided that no new *Chikyu* proposals will be accepted in the current phase of the programme. Only riserless drilling proposals currently at SEP will be considered for possible implementation.

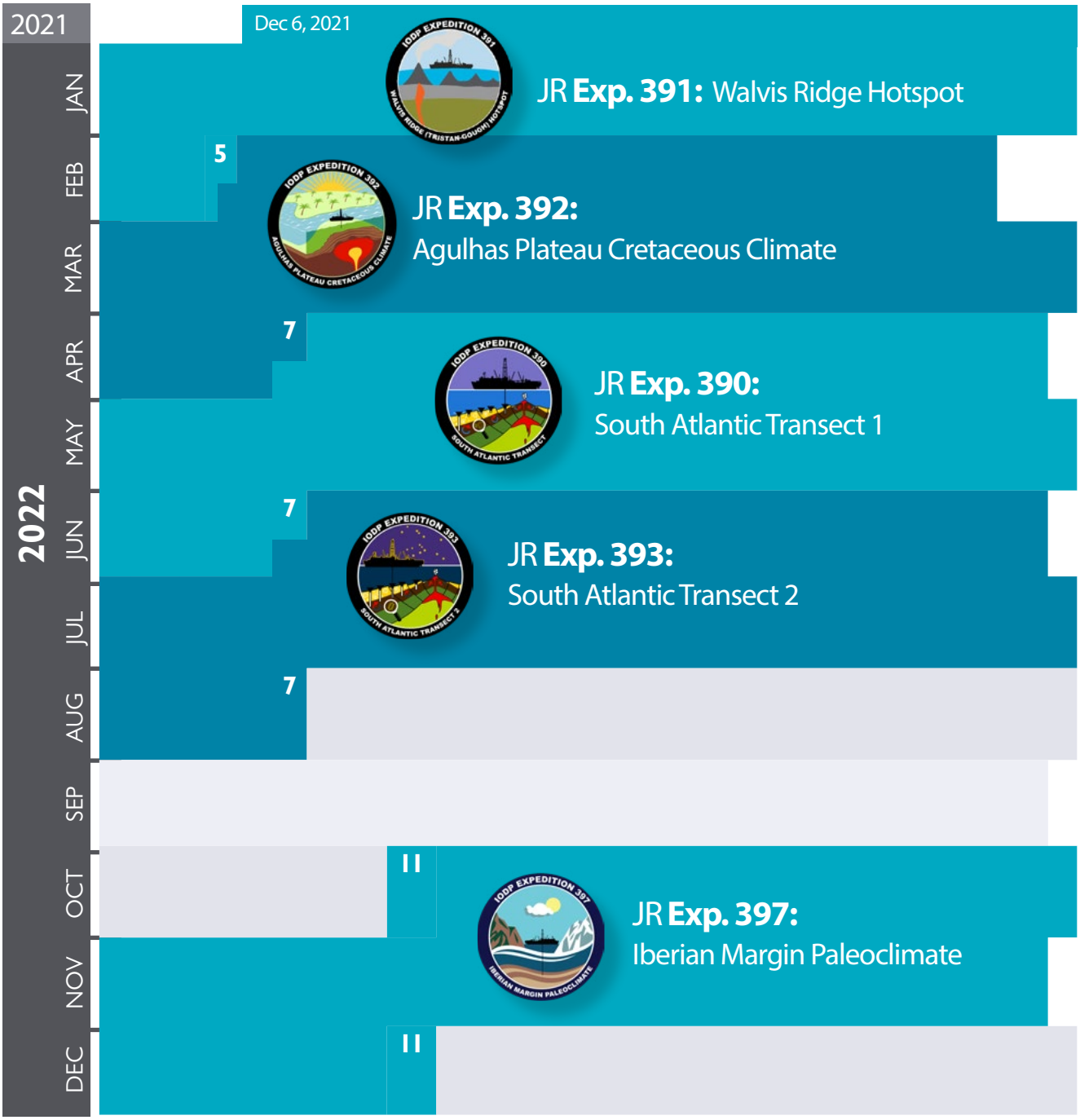
2023-2024 *JOIDES Resolution* and *Chikyu* expeditions

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
Arctic-Atlantic Gateway Paleoclimate	404	Aug. 2 - Sept. 30, 2024	Reykjavik / Reykjavik	JRSO
Japan Trench Tsunamigenesis	405	TBD (~mid-2024)	TBD	MarE3

JOIDES Resolution and *Chikyu* 2022-2024 expeditions



IODP expeditions 2022 calendar



Anticipating next IODP expeditions

New IODP Proposals

Only three new IODP proposals have been submitted in 2022. This is the lowest number of new proposals in a year since the start of the current Program, probably as a consequence of JRFB and CIB decisions regarding the acceptance of new JR and *Chikyu* proposals.

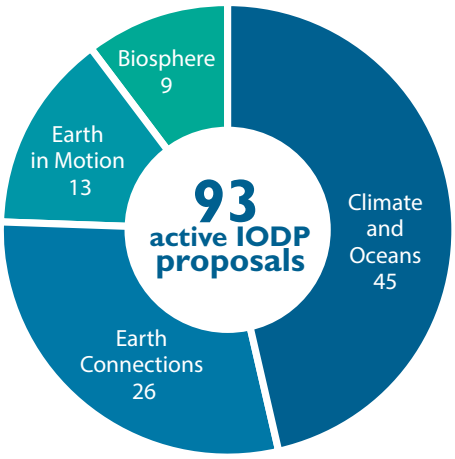
Active IODP Proposals

There are currently 93 active IODP proposals in the archives of the Science Support Office (as of 7 February, 2023). 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 (48%) and Earth Connections (28%) - and the Earth and Motion (14%), and Biosphere (10%) themes.

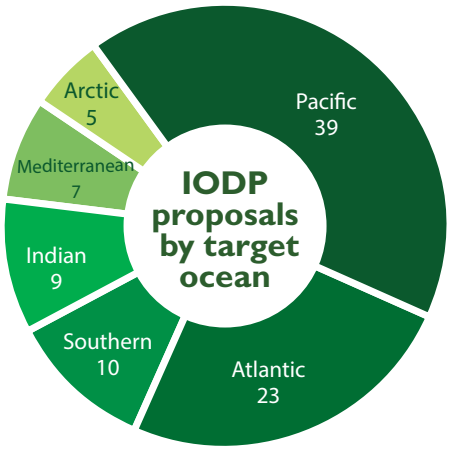
The geographical distribution of active proposals (see figure below) demonstrates global interest of the scientific community and fairly constant ratios between the different oceans, with a sustained interest for the Atlantic Ocean and the Mediterranean that has been encouraged by the FY22 through FY24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

Fifty-eight active proposals are residing at the appropriate Facility Boards ready to be selected for drilling (43 at the JRFB, eight at the CIB and five at the EFB). Thirty-five active proposals are residing at the Science Evaluation Panel.

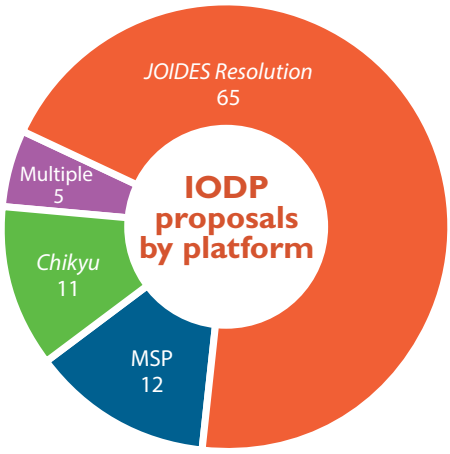
Sixty-five proposals (70% of all proposals) concern aim at using the JR, while the number of proposals concerning the other platforms remained fairly constant since several years: 12 MSP proposals (13% of all proposals) and 11 *Chikyu* proposals (about 12% of all proposals); five active proposals concern the use of multiple platforms. However, the organization and the planning of many MagellanPlus workshops focused on MSP drilling indicate that the number of MSP proposals should sharply increase in the near future and should form the basis of post-2024 ECORD-Japan scientific drilling programme.



Distribution of active proposals (n = 93) by IODP Science Plan themes (Data provided by the IODP Science Support Office as of 7 February 2023)



Distribution of active proposals (n = 93) by target ocean (Data provided by the IODP Science Support Office as of 7 February 2023)

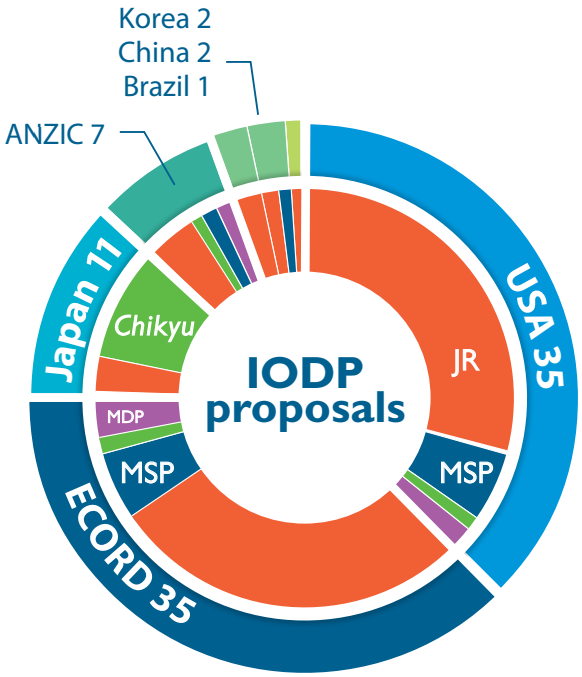


Distribution of IODP active proposals by platforms (n = 93). Multiple proposals consist of combined *Chikyu* and JR drilling. (Data provided by the IODP Science Support Office as of 7 February 2023)

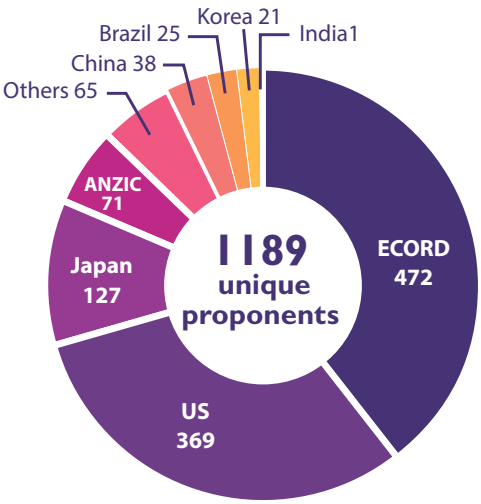
Proponents

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.

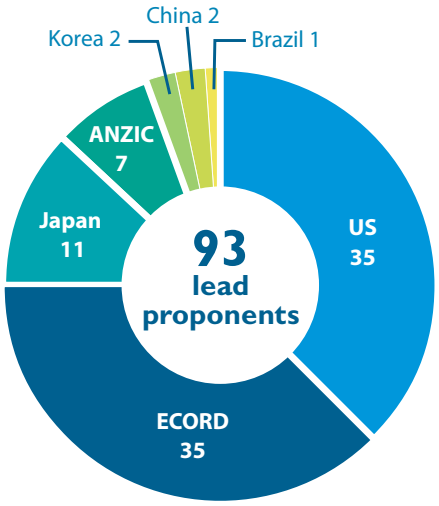
Since the start of the International Ocean Discovery Program, ECORD's contribution to IODP science is prominent, including the submission of drilling proposals that concern all IODP capabilities. ECORD has a leading role in proposal submission the current programme with percentages of unique proponents constantly above 37% since the start of IODP. Currently, 472 ECORD scientists out of 1189 are proponents of active IODP proposals (i.e. 39.7%), including 35 lead proponents (see figures below).



Distribution of IODP active proposals by platforms and IODP members (n = 93).
(Data provided by the IODP Science Support Office as of 7 February 2023)



Distribution of active proposals (n = 93) by proponents' member affiliation
(Data provided by the IODP Science Support Office as of 7 February 2023)

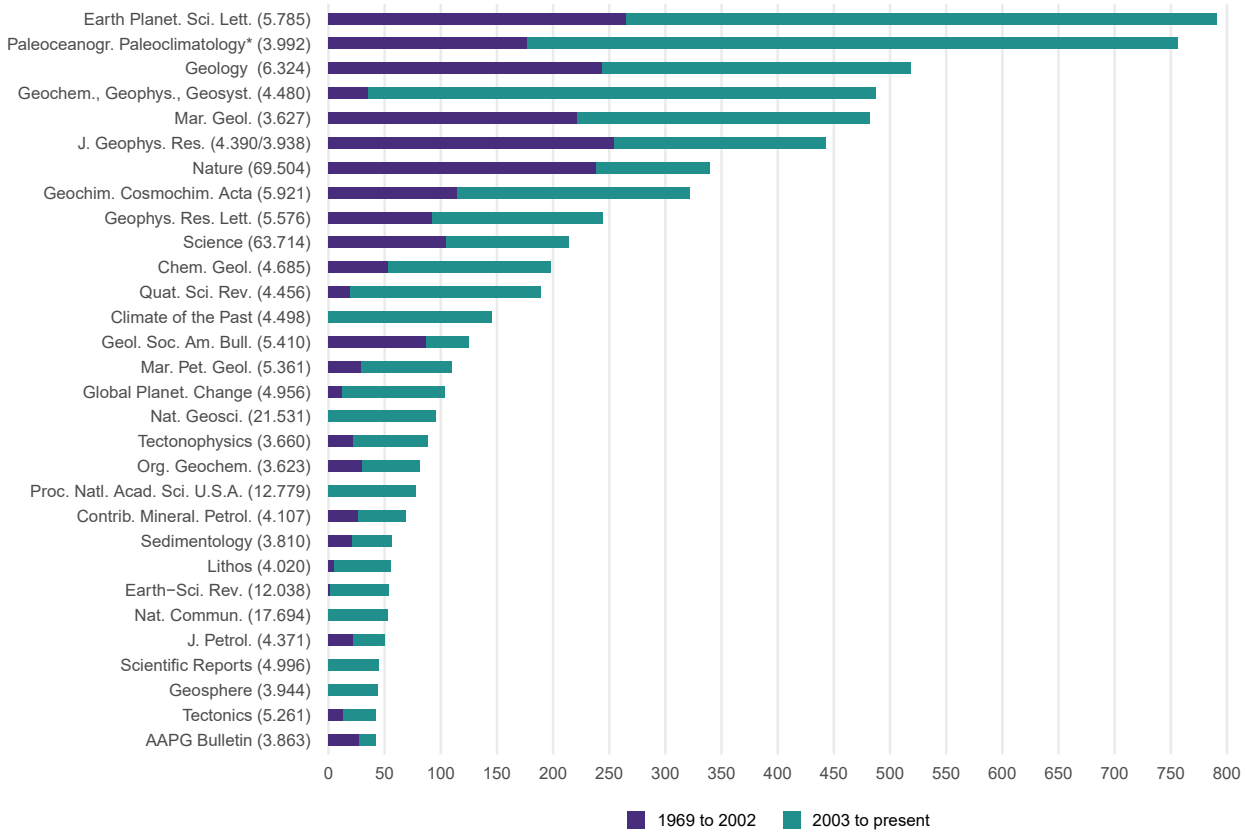


Distribution of active proposals (n = 93) by lead proponents' member affiliation
(Data provided by the IODP Science Support Office as of 7 February 2023)

The Scientific Ocean Drilling Bibliographic Database and Publication Impact Report (*http://iodp.tamu.edu/publications/AGI_studies/2022_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 2022.

A total of 6,321 research papers out of 13,081 Program-related papers that have been published in non-Program publications (~48.3% of the serial publications in the database) were published in 30 highly ranked peer-reviewed journals, based on the Clarivate Analytics 2020 journal impact factor *(see figure below and table on the 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.



Highly ranked peer-reviewed serials publishing Program-related expedition research results (1969–2022). The number next to the journal name is the Impact Factor 2021.

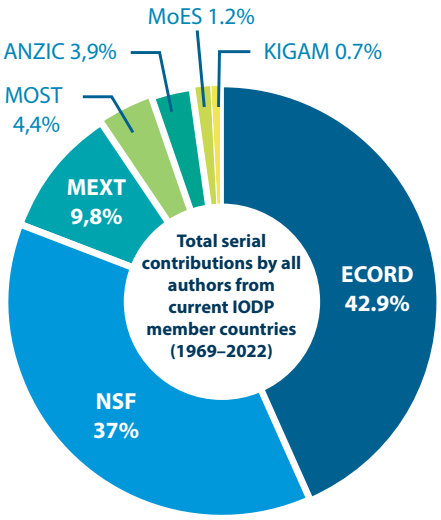
* = includes Paleoceanography papers (name changed in 2018).

Journal	Journal Impact Factor (2021)	Number of Program-related papers published		
		1969–2002	2003–2022	Total
Nature	69.504	238	101	339
Science	63.714	105	109	214
Nature Geoscience	21.531	0	96	96
Nature Communications	17.694	0	53	53
Proceedings of the National Academy of Sciences of the U.S.A.	12.779	0	78	78
Earth-Science Reviews	12.038	2	52	54
Geology	6.324	244	275	519
Geochimica et Cosmochimica Acta	5.921	115	207	322
Earth and Planetary Science Letters	5.785	265	526	791
Geophysical Research Letters	5.576	92	152	244
Geological Society of America Bulletin	5.410	87	38	125
Marine and Petroleum Geology	5.361	29	81	110
Tectonics	5.261	13	29	42
Scientific Reports	4.996	0	45	45
Global and Planetary Change	4.956	12	91	103
Chemical Geology	4.685	53	145	198
Climate of the Past	4.498	0	146	146
Geochemistry, Geophysics, Geosystems	4.480	35	452	487
Quaternary Science Reviews	4.456	19	170	189
Journal of Geophysical Research (Solid Earth, Oceans)	4.390/3.938	255	188	443
Journal of Petrology	4.371	22	28	50
Contributions to Mineralogy and Petrology	4.107	27	42	69
Lithos	4.020	5	50	55
Paleoceanography and Paleoclimatology*	3.992	177	579	756
Geosphere	3.944	0	44	44
AAPG Bulletin	3.863	27	15	42
Sedimentology	3.810	21	35	56
Tectonophysics	3.660	22	66	88
Marine Geology	3.627	222	260	482
Organic Geochemistry	3.623	30	51	81

Table illustrating 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 (1969–2022).

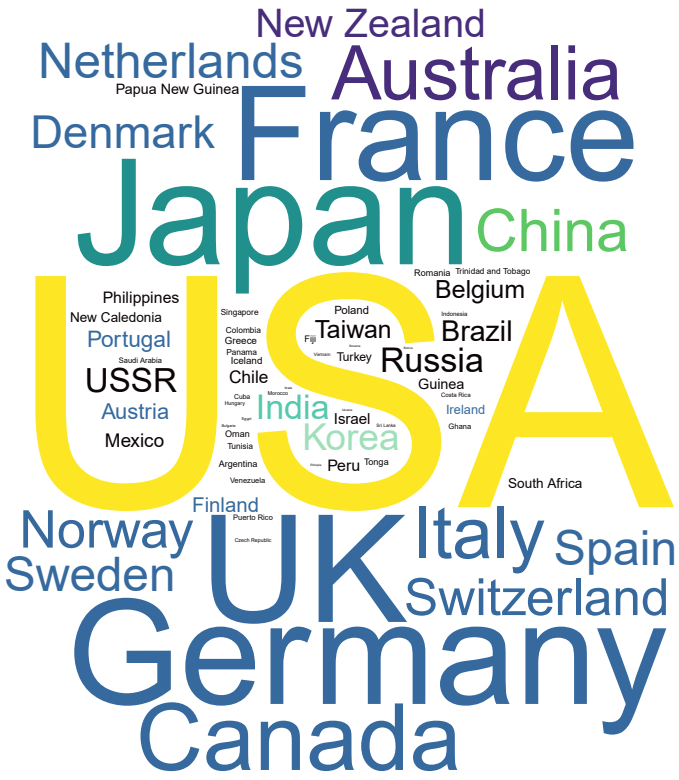
As every year, the 2022 Scientific Ocean Drilling Bibliographic Database and Publication Impact Report reflects the outstanding intellectual contribution of the ECORD scientists to IODP science.

With 13,768 out of 32,077 serial contributions (about 42.9% 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	396	669	848	1,244
Australia	237	447	545	782
New Zealand	159	222	303	462
China	634	550	774	1,408
ECORD	**4,911**	**6,845**	**8,857**	**13,768**
Austria	26	79	84	110
Canada	366	472	565	931
Denmark	70	136	151	221
Finland	11	17	20	31
France	704	962	1,356	2,060
Germany	1,192	1,526	2,007	3,199
Ireland	6	33	35	41
Italy	333	448	590	923
Netherlands	270	359	393	663
Norway	158	238	273	431
Portugal	19	65	77	96
Spain	198	328	414	612
Sweden	120	178	192	312
Switzerland	175	278	301	476
United Kingdom	1,263	1,726	2,399	3,662
India	209	146	181	390
Japan	839	1,089	2,318	3,157
Republic of Korea	75	135	153	228
United States	4,429	4,004	7,453	11,882
Total papers:	**11,493**			**32,077**

Table illustrating 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 (1969–2022).
Theses and dissertations are underreported to AGI and are not fully represented.

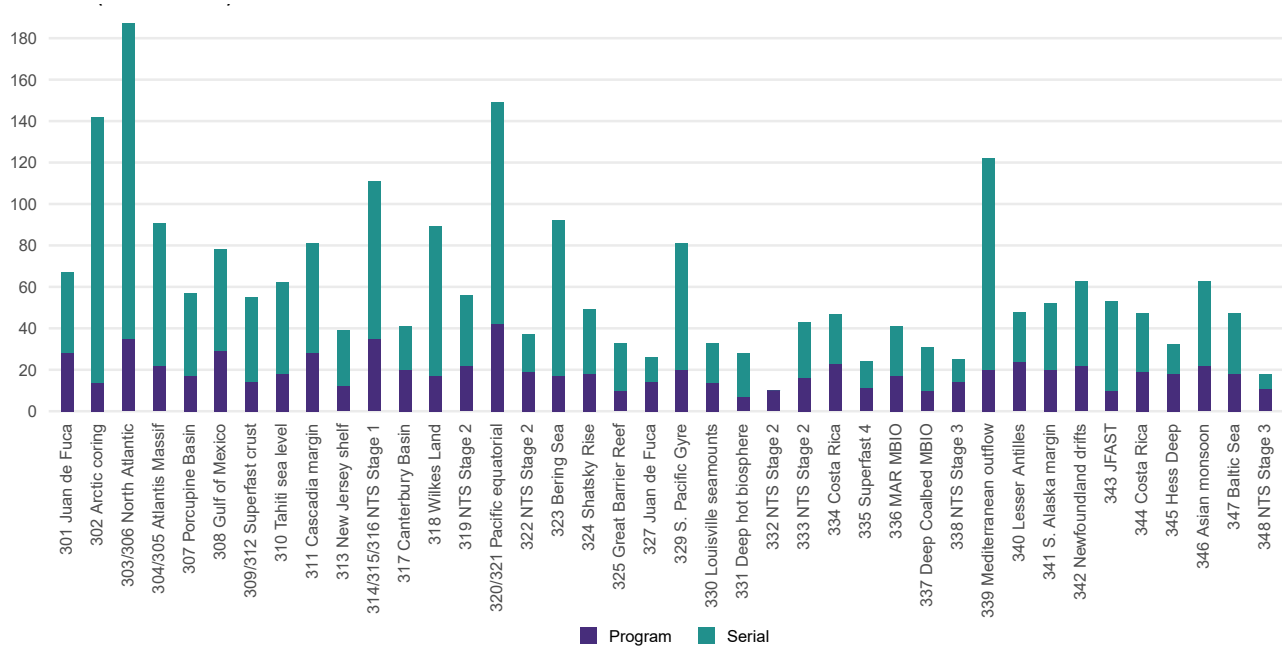


Records in the Scientific Ocean Drilling Bibliographic Database as of June 2022 by affiliation country of all authors.

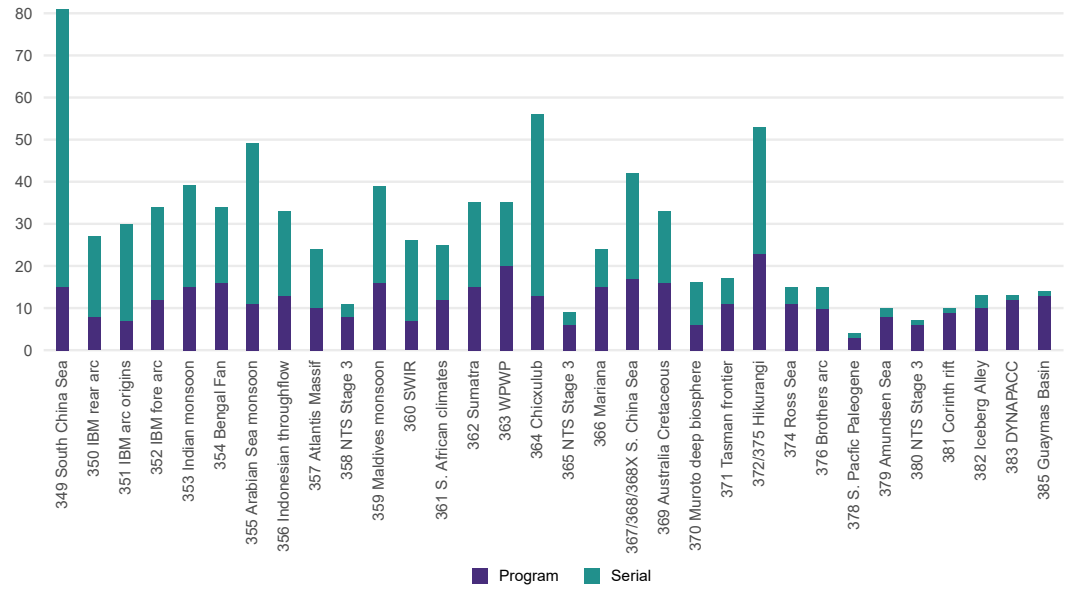
IODP member country or consortium	Serials	Misc.	Theses and dissertations
Australia/New Zealand Consortium	396	551	19
China	634	193	3
ECORD	**4,911**	**5,571**	**254**
India	209	89	7
Japan	839	933	1
Republic of Korea	75	82	1
United States	4,429	7,408	784
Totals:	**11,493**	**14,827**	**1,069**

Table illustrating first-authored non-Program publications by type and current funding consortium (1969–2022).

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*).

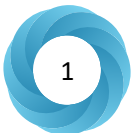
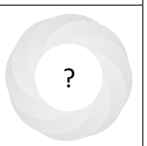


Number of Program and serial publication records for Integrated Ocean Drilling Program Expeditions 301–348 (2003–2022).
MSP expeditions are expeditions 302, 310, 313, 325 and 347.
MSP expeditions 310 and 325 should be combined as they are based on the same proposal (#519)



Number of Program and serial publication records for IODP Expeditions 349–372, 374–376, and 379–383 (2003–2022).
MSP expeditions are expeditions 357, 364 and 381.

The list of the most-cited IODP expedition–related papers as of June 2022 illustrates the high-impact and high-quality science achieved by MSP expeditions (*see table below*).

Article	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**	836	
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**	780	
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**	686	
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**	625	
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**	615	
Jakobbson, M., Macnab, R., Mayer, L., Anderson, R., Edwards, M., Hatzky, J., Schenke, H.W., and Johnson, P., 2008. An improved bathymetric portrayal of the Arctic Ocean: Implications for ocean modeling and geological, geophysical and oceanographic analyses. Geophysical Research Letters, 35(7):L07602. **https://doi.org/10.1029/2008GL033520**	544	
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**	516	
Pagani, M., Pedentchouk, N., Huber, M., Sluijs, A., Schouten, S., Brinkhuis, H., Sinninghe Damsté, J.S., Dickens, G.R., and Expedition 302 Scientists, 2006. Arctic hydrology during global warming at the Palaeocene/Eocene Thermal Maximum. Nature, 443(7103):671–675. **https://doi.org/10.1038/nature05043**	462	
Frost, B.R., and Beard, J.S., 2007. On silica activity and serpentinization. Journal of Petrology, 48(7):1351–1368. **https://doi.org/10.1093/petrology/egm021**	439	
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**	432	

Top cited Program-related serials as of June 2022 with corresponding Altmetric scores from 23 August 2022.

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.

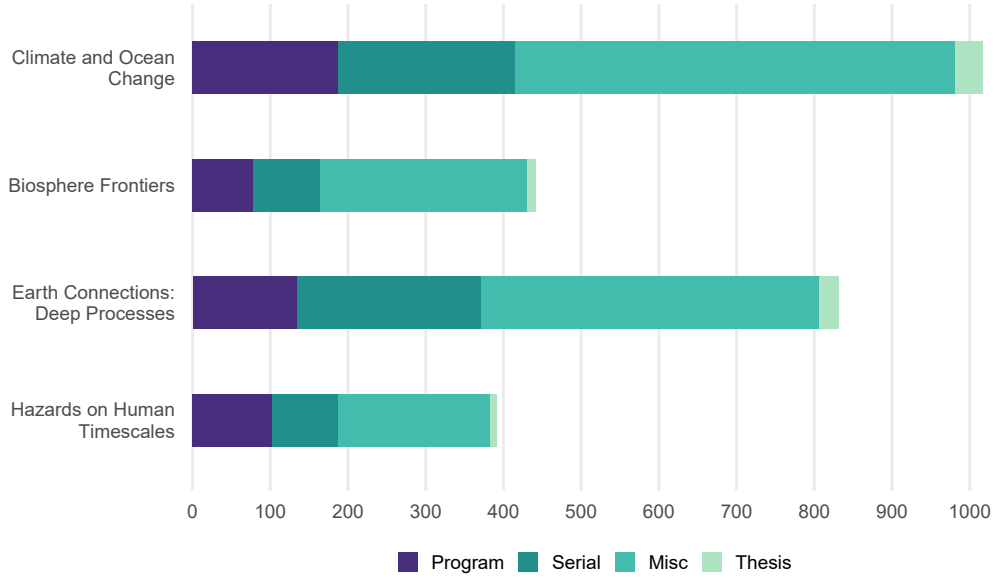


Figure illustrating the International Ocean Discovery Program publication records (all types) by IODP Science Plan theme (2013–2022).

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.

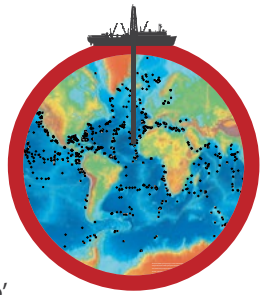
Hundreds of kilometres of core, other types of samples (fluids, biota) and data have been acquired and stored in three core repositories (Gulf Coast Repository, College Station, USA; Kochi Core Center, Kochi, Japan; Bremen Core Repository – BCR, Bremen, Germany) where they are made accessible to the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

The BCR hosts all the cores recovered since the beginning of scientific ocean drilling from the Atlantic and Arctic oceans as well as the Mediterranean, Baltic and Black Seas. The collection at the BCR currently holds more than 170 km of cores acquired during 98 expeditions. 7,881 sample requests were related to cores now stored at BCR (DSDP/ODP/IODP; since 1969) and 1,820,000 samples were taken from these core, involving 5,522 individual scientists since 1994. In 2022, a total of 32,364 samples were taken at the BCR for 204 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 from 2021 through 2024 will be stored at BCR before the end of the current programme.

ECORD has developed and maintained several databases in order 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 86*). In particular, over 1.78 million 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 page 100*), which provides a substantial support to ECORD scientists to develop innovative drilling proposals concerning diverse scientific topics addressed by the three IODP platforms and/or the ICDP infrastructure. Since 2014, 41 MagellanPlus workshops have been organized (on average four workshops per year), involving about 1,500 scientists (23% of early-career scientists on average), and 26 IODP drilling proposals were submitted (*see figure below*).

The MagellanPlus Programme has been heavily impacted by the COVID-19 pandemic and this programme could restart in late 2021 with the organization of two workshops: 'Black Sea – Mediterranean Gateway Exchange' (22-24 September 2021, Frankfurt, Germany) and 'Mechanisms of rifting of large continental blocks – a case study at the Baltic Sea' (1-3 December 2021, Helsinki, Finland). All workshops that were initially scheduled in 2020 and 2021 have been held in 2022.

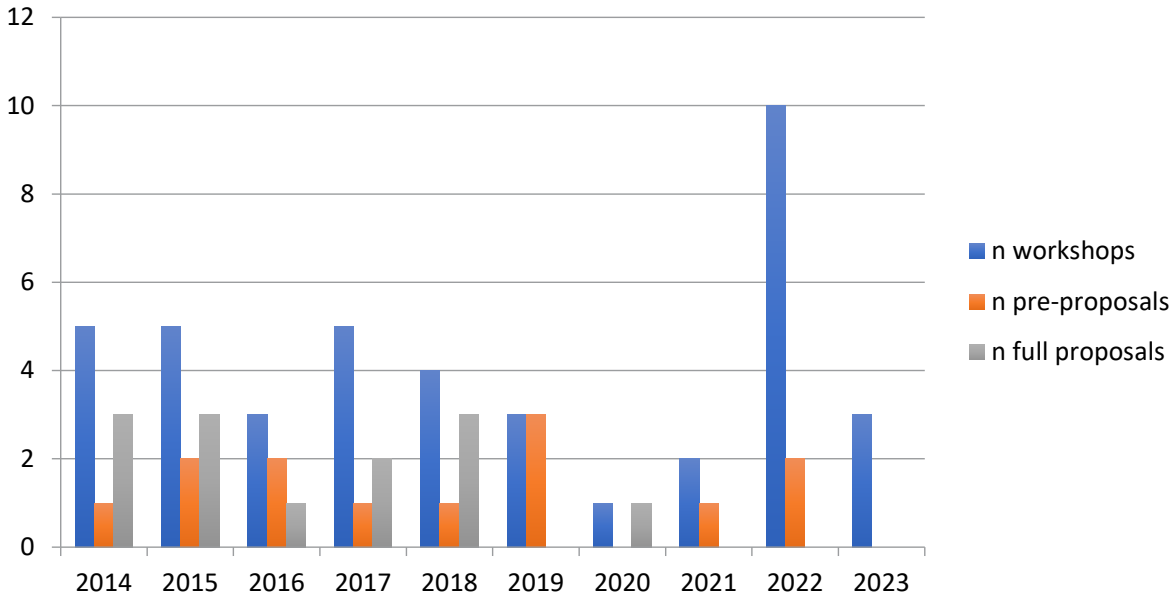


Figure illustrating the MagellanPlus workshops and related proposals since 2014.

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 7. Engaging the community, *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 Masters and PhD students as well as postdoctoral research fellows from ECORD member countries and beyond. Two ECORD Summer schools were sponsored by ECORD in 2022:

- the 14th ECORD Bremen Summer School on "Sea Level, climate variability and coral reefs" was held at MARUM, University of Bremen, Germany on 5-16 September 2022,
- the 17th ECORD Urbino Summer School in Paleoclimatology (USSP) which was held in Urbino, Italy on 8-20 July. ESSAC supported 20 students with ECORD Scholarships to participate in the ECORD Summer Schools.

The 6th ECORD Summer School on "Downhole Logging for IODP Science" has been organized virtually and hosted by the ECORD Petrophysics Consortium (EPC) at the University of Leicester, UK, on 4-8 July 2022.

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 2022, ESSAC opened a later call for ECORD Research Grants addressed to early-career scientists 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 8. 'Communicating' on page 110*).

In addition, since 2019, the EOTF has developed exhibition material for temporary exhibitions in museums and aquariums, thus ushering a new communication environment for ECORD. New resources that have been produced in 2022 include new core replicas and 3D coral models. In addition, the ECORD Sphere has entered its final development phase and has been tested by the EOTF before being displayed for the first time in June 2022 in Trieste. All these new resources have supported the long-term exhibition 'Die Erde – Ein dynamischer planet' – 'The Earth – A dynamic Planet') at the Natural History Museum in Vienna, Austria.

News promoting ECORD and MSP expeditions frequently appear on national and international Internet portals, TV stations and newspapers. In parallel, the EOTF has prepared the communication plan and promotional material concerning the IODP Expedition 389: Hawaiian Downed Reefs, that will be implemented by ECORD in August-October 2023.

2013 - 2024

The end of the International Ocean Discovery Program

is now scheduled on 30 September 2024,
as decided by all current IODP partners

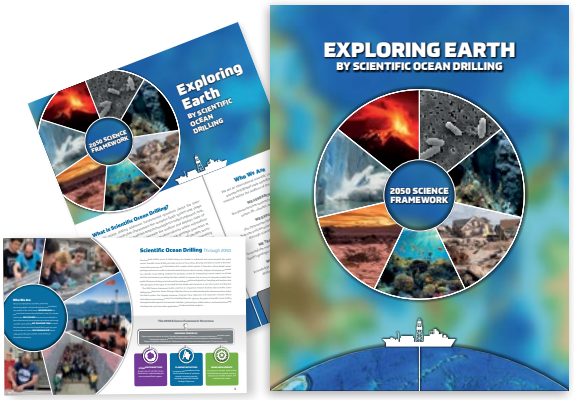
This decision has several implications for ECORD, including the extension of the 2019-2023 ECORD MoU through 2024 and of the MoUs linking ECORD and its partners (NSF and JAMSTEC). In addition, the current term of the ECORD Managing Agency (hosted by the Centre National de la Recherche Scientifique - 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, University of Bremen, Germany) will be extended through 2024.

While entering the final phase of the current programme, it is of utmost importance to notice that the last two years of the programme will continue to be very active with the implementation of 11 drilling expeditions by all platform providers. Full capabilities will be especially developed in 2024, the last year of IODP, thus demonstrating the readiness of current IODP partners to face the challenge represented by the next phase of international cooperation in scientific ocean drilling.

The end of the International Ocean Discovery Program 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 and collaborative programs, whose internal organization and mutual collaboration still need to be defined.

To prepare this sharp transition, ECORD has first elaborated its plans internally, especially through the instrumental role of the ECORD Vision Task Force and via continuous exchanges between all ECORD entities. ECORD has then interacted with its current IODP partners through our regular communication channels and via bilateral meetings. A major outcome of these bilateral meetings was the decision by ECORD and Japan to build a combined post-2024 programme based on the 2050 Science Framework (*http://www.iodp.org/2050-science-framework*), which represents a new and innovative approach for conducting science using offshore drilling platforms.



ECORD-Japan post-2024 programme

In 2022, ECORD and Japan have shaped their post-2024 plans based on:

1. a commitment to the 'philosophy' of the successive scientific ocean drilling programs;
2. the legacy of their respective achievements, success and innovations since 2004; and
3. the need to adopt an innovative approach tailored to meet the needs of the post-2024 international landscape.

ECORD and Japan agreed to implement jointly drilling and coring Mission-Specific Platform (MSP) expeditions that will play a prominent role in achieving the goals of the 2050 Science Framework.

The MSP concept that has been initiated by ECORD since 2004 and developed during the current programme involves operational and funding flexibility, variable operational times compared to the standard two-month expedition, as well as tailored programmatic procedures concerning proposals and science parties. ECORD and Japan intend to further develop the MSP concept by diversifying drilling and coring technologies, including riserless drilling, giant piston coring and even riser drilling, and applying them to all geological environments, as determined by scientific priorities, operational efficiency and better value for funding.

Architecture of the ECORD-Japan programme

The broad architecture of the ECORD-Japan programme has been elaborated by working groups and then presented at IODP meetings (Facility Boards and IODP Forum). ECORD and Japan have decided to keep their identity and most of their current bodies. In addition, three joint entities are currently considered: an 'Advisory Operational Committee', which will be the MSP expedition scheduling entity and two Task Forces, including a Vision Task Force - in charge of developing a long-term scientific and funding strategy and monitoring the progress toward the completion of the 2050 Science Framework – and a Communication Task Force, in charge of the coordination of outreach tasks.

ECORD and Japan anticipate that this programme will begin immediately after the conclusion of the current IODP. International governmental and non-governmental entities will be invited to participate as Associate Members for non-platform providers providing cash or in-kind contributions, including temporary (e.g., project-based) membership, or as Partners for regular platform providers through exchanges of berths on expeditions and other services. Communication plans to inform ocean drilling science communities about the rapidly evolving situation of the post-2024 plans have been set up in 2022 and will develop further in 2023. They involve formal presentations and open exchanges during international and national conferences, workshops, webinars, usual channels (websites, newsletters, social media networks), as well as open discussion/online forum to collect community feedback.

There are still many uncertainties regarding the post-2024 scientific ocean drilling landscape, including the availability of drilling platforms to conduct post-2024 scientific drilling related the 2050 Science Framework. NSF has considered the potential use of the JR in a non IODP-style context beyond 2024. In 2022, ECORD has

sent a letter of interest to NSF in which several items were listed as part of a cost-benefit analysis before any decision can be taken. NSF has also considered a possible demobilization of the JR in 2025 will be considered if a viable business model cannot be defined. A final decision from NSF concerning the JR is expected within the first months of 2023. In parallel, NSF initiated also the process to acquire a new globally ranging non-riser scientific drillship in the next decade. China has presented thorough post-2024 plans, including its intention to become a new platform provider and implement an expedition per year on an MSP mode using different vessels with distinctive capabilities to address various scientific objectives of the 2050 Science Framework. During their bilateral meetings, ECORD and China have expressed interest in collaborating in the frame of a post-2024 scientific ocean drilling initiative, including a direct co-operation for the first MSP expeditions.

ECORD and Japan have invited potential future scientific ocean drilling programmes to share overarching resources, such as proposal and data management (the main responsibility of the current Science Support Office – SSO) and the proposal review process (the remit of the current Science Evaluation Panel – SEP - and Environmental Protection and Safety Panel - EPSP -) under the auspices of an 'Alliance'.

ECORD and Japan intend to foster active collaboration with other programs and initiatives with similar scientific objectives, and implement joint expeditions, regardless of the technology and/or the drilling/coring needs. It is anticipated that drilling expeditions operated on an MSP mode, especially in shallow-environments, will be of pivotal importance to implement Land-to-Sea Transects (L2S) with the International Scientific Continental Drilling Program (ICDP).

The development of post-2024 initiatives 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. In 2022, all current IODP partners hosting an IODP Core Repository expressed a strong will to preserve core and sample collections and to ensure the continued availability of this material to all legitimate scientific users after the end of IODP. The related agreements among current IODP partners have been drafted and will be formalized to ensure the continuity of legacy activities throughout the transition between IODP and future scientific ocean drilling initiatives. This is of prime importance especially for the Bremen Core Repository - BCR - and the Kochi Core Center - 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 170 km of cores acquired during 98 expeditions before the implementation of a number of JR expeditions in these regions before the end of the current program. 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 provision of a new IODP Core Repository by China in a new phase of scientific ocean drilling would require coordination and agreements between the proposed new core repository and the current IODP core repositories.

There are still many challenges to tackle and many issues to be solved to delineate the final architecture of the ECORD-Japan programme and of a potential 'Alliance' of collaborative programmes. However, based on the well-established operation of the ECORD and JAMSTEC infrastructures, their successful implementation, their competitiveness in the international research landscape and maximum return from investment, a bright future is promised to 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*
- *https://www.jamstec.go.jp/j/*
- *http://www.iodp.org*

2. Operating and participating in mission-specific platform expeditions

Onboard D/V *Chikyu* during Personal Sampling Pary for IODP Expedition 386. Credit: P.Bellanova, ECORD/IODP/JAMSTEC.

2. Operating and participating in mission-specific platform expeditions

ECORD Science Operator (ESO) activities in 2022 were less disrupted by the COVID-19 pandemic than previous years, as restrictions were gradually lifted, and normal business slowly resumed.

The hybrid Onshore Science Party (OSP) for Expedition 386: Japan Trench Paleoseismology was successfully completed in February and March, and the associated Personal Sampling Party (PSP) successfully completed in November.

In February, Russia invaded Ukraine and caused major global political and economic disruption. Uncertainties over safety issues regarding the implementation of the IODP Expedition 377 led its full cancellation in April.

In parallel to the delivery of the IODP expeditions 386 and 377 activities, further scoping and planning for the IODP Expedition 389: Hawaiian Drowned Reefs and IODP Expedition 406: New England Hydrogeology continued.

IODP Expedition 386

COMPLETED (2022)

Japan Trench Paleoseismology

Co-chief Scientists	**Michael Strasser** (University of Innsbruck, Austria) **Ken Ikehara** (Geological Survey of Japan, AIST)
Vessels	***Kaimei*** - Offshore phase ***Chikyu*** - Onshore phase
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). Despite the expedition being drawn out throughout 2021 and 2022 due to COVID-19, there continued to be a strong desire within both ESO and MarE3 for collaboration, and we successfully worked together to deliver the hybrid OSP and associated PSP for the expedition.

Expedition Planning and Implementation

Throughout January and early February 2022, ESO and MarE3 met frequently to develop the hybrid OSP model which would allow certain key science activities to take place and provide the Science Party with data and samples to progress their post-expedition research.

Weekly meetings continued between ESO and MarE3, and both operators held regular meetings with the Co-chief Scientists to keep them abreast of developments. ESO partners continued to review revised sample requests, plan lab layouts and OSP core-flows, devise various procedures (curatorial, geochemistry, visual core description, biostratigraphy, physical properties), produce consumable lists, and sample planning (pore water and core sampling).

The Onshore Science Party was implemented from 14 February to 15 March in hybrid mode. Due to COVID-19 entry restrictions into Japan at the time, only the eight Science Party members based in Japan could physically attend the OSP, and were supported by MarE3 staff and additional technicians and students. The science- and operator-staffed '*Chikyu* Team' focussed on core splitting, core imaging, core description, initial geochemistry, palaeomagnetic measurements and sampling for other IODP analyses. The remaining 24 Science Party members remotely attended the OSP from their institutions and homes around the world, and contributed to data entry, data review and reporting. Running an OSP in this way was extremely challenging, not least because of the wide range of time zones involved when working with an international Science Party.

The MarE3 team coordinated the daily operations onboard *Chikyu*, while the ESO team took responsibility for the overall OSP management, coordination, data management, and communication. Daily Zoom meetings were held between ESO and MarE3, and also between the operators and the Science Party. Although the *Chikyu* was docked in the

Port of Shimizu, the ship was still a free-standing facility and MarE3 arranged mobile data connections to enable efficient communication between ship and shore. ESO also utilised an online collaboration workspace for the Science Party, which was very successful. We intend to use such a system for all future MSP expeditions. The ESO Bremen team provided the MARUM IODP Cloud system as the expedition's live data management tool.

Since the expedition's work force was distributed around the world, ESO and MarE3 devised a plan where certain samples were periodically shipped to ESO laboratories at the universities of Bremen and Leicester, and also the home laboratories of Science Party members in certain cases. This allowed a near-normal MSP analytical plan to be carried out, but with a lag in data production due to shipping times. ESO-Bremen managed incoming sample shipments from MarE3, and either prepared them for processing and analysis at MARUM (anions, sulphide, XRD), or forwarded them to ESO-Leicester (P-wave).

Although a shipping lag was anticipated, shipping times were greater than expected due to ongoing problems in the global shipping system. The science and operator teams also found that working remotely across different time zones was slower than hoped, and we quickly realised that we needed to adapt the hybrid OSP model to allow for a more 'extended OSP' throughout the year. Thus, the intense *Chikyu* phase was coined 'OSP Phase 1', where the team completed the core splitting and all associated *Chikyu* activities. This phase was then followed by OSP Phase 2 (from March to November 2022). Remote OSP measurements conducted by ESO were completed in the early part of Phase 2, and the data uploaded for the Science Party. Report writing was also a major Phase 2 activity, and ESO staff assisted the Science Party when required.

During Phase 1, the ESO-Bremen team elaborated the complex loan agreement for borrowing a defined set of expedition U-channels to the University of Innsbruck, which was issued and signed in March. In Phase 2, a further amendment to this loan agreement was issued in June. Similarly, the team progressed a loan agreement on 19 May for borrowing a defined set of expedition U-channels to the Research Institute of Geology and Geoinformation, Geological Survey of Japan, National Institute of Advances Industrial Science and Technology (AIST).

The ESO team's main focus in the second half of the year was the preparation and implementation of the Personal Sampling Party (PSP, 15 November – 6 December), or Phase 3, where the Science Party met on the *Chikyu* to take samples for their post-expedition research. Leading up to the PSP, fortnightly planning meetings between the operators continued, with various ESO staff members working with MarE3 colleagues on sample planning, sampling workflows, sample data management, measurements and analyses, consumables lists, and logistics.

Eight ESO staff members attended the PSP in person: J. Everest (EPM), H. Grant (EPM support/training), M. Stewart (EPM support/training), M. Mowat (data management). P. Geprägs (core curation/sampling/facilities), A. Wülbers (core curation/sampling/facilities), M. Rydzy (petrophysics), and E. Le Ber (petrophysics). Supporting them remotely from their home institutes were several ESO staff members: U. Prange (outreach), V. Bender (data management), L. Schneiders (geochemistry), G. Tulloch (operations), and the ESO Management Team.

The team were finally granted their long-awaited opportunity to work directly with MarE3 colleagues, to coordinate and oversee the extensive sampling of the giant piston cores for post-expedition research. In parallel, final standard core measurements (shear vane and penetrometer) were taken, and also further additions and revisions made to the expedition reports.

The written materials for the Preliminary and Expedition Reports are now submitted to IODP Publication Services at Texas A&M University, USA. Planning is now underway for the 1st Post-expedition Meeting (Editorial) to be held in College Station in March 2023. The start of the moratorium has been set as 30 November 2022, which is the day the majority of scientists left the PSP.

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

Personal Samplig Party onboard D/V *Chikyu* during IODP Expedition 386. Credits: M. Mowat, ECORD/IODP/JAMSTEC.

IODP Expedition 377

Cancelled

Arctic Ocean Paleoceanography (ArcOP)

Co-chief Scientists	**Ruediger Stein** (Alfred Wegener Institute, Germany) **Kristen St. John** (James Madison University, USA)
Expedition website	*www.ecord.org/expedition377*

ESO continued planning activities with the Swedish Polar Research Secretariat (SPRS), Arctic Marine Solutions (AMS) and Geoquip Marine, despite growing uncertainty and speculation about the impacts of the war in Ukraine on the viability of the expedition. ESO and AMS staff visited the drillship *Dina Polaris* in Providence, USA, on 4 February during a crew change period. The *Dina Polaris* was investigating ground conditions for offshore windfarm installations offshore eastern US, after which she headed back to Europe for further work before beginning the ArcOP contract.

ESO, SPRS, AMS and Geoquip Marine met in person in St Gallen, Switzerland, 24-25 March 2022 to discuss operational planning in detail. This was the first time all four operational partners met in person since the ArcOP project was initiated, and it was a great opportunity to meet new colleagues and cement many operational aspects that were under discussion online for many weeks: general expedition planning and timing, ice management, positioning, station keeping, coring, rig operations, coring equipment, science logistics, deck plan, installation plan, crewing, medevac plan, personnel certification and risk analysis.

On 4 April, ECORD Council agreed to postpone ArcOP for two to three years due to uncertainties regarding safety issues with the implementation of the expedition. ECORD Council asked SPRS, AMS and ESO to review the operational plans with the aim of implementing the ArcOP science objectives according to a new time-plan that addresses the safety concerns.

ESO engaged with SPRS, AMS and Geoquip during the second half of 2022 to understand the implications of the postponement, and the possible future options. The first step of this process was to identify and fairly settle the costs incurred by the contracted partners. ESO's role was to advise CNRS and SPRS on the equipment cost claims of the contractors.

The ArcOP operational partners and ECORD attempted to identify future scenarios under which ArcOP could be implemented. Despite best efforts, it was unfortunately not possible to maintain the contractual relationships for an indefinite period of time. This was against the backdrop of a prolongation of the crisis in Ukraine, and it was not possible to predict when a new opportunity for ArcOP would become appropriate. In September, ESO disbanded the ArcOP Science Party and the EFB removed the expedition's "ready for scheduling" status. The longer-term outlook for the proposal will be addressed by the science evaluation and/or scheduling functions of the program(s) that will replace IODP post-2024. If ArcOP can be re-scheduled in the future, a new Call for Scientists will be issued.

ECORD EUROPEAN CONSORTIUM FOR OCEAN RESEARCH DRILLING
IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM
SWEDISH POLAR RESEARCH SECRETARIAT POLARFORSKNINGSSEKRETARIATET
arctic marine solutions

D/V *Chikyu* docked in Shimizu, Japan, during Personal Sampling Party for Expedition 386. Credits: P. Bellanova, ECORD/IODP/JAMSTEC.

IODP Expedition 389

Scheduled for 2023

Hawaiian Drowned Reefs

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

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

Planning and preparations for IODP Expedition 389: Hawaiian Drowned Reefs continued throughout 2022 after the ECORD Facility Board recommended its re-scheduling at their September 2021 meeting.

ESO resumed planning for this expedition, including fresh scoping of academic and commercial seafloor drills and discussions with potential drilling contractors.

Between 3 February and 17 March, ESO ran a Prior Information Notice for drilling and vessel services, to inform the market of the imminent opportunity and to solicit feedback from interested suppliers. A full tender call for drilling and vessel services was issued by ESO-BGS between 14 April and 1 June. In early June, ESO completed the technical review of supplier bids which revealed a promising, technically compliant bid. The price schedules from the suppliers were revealed shortly thereafter, which unfortunately showed that the technically compliant bid was over budget.

On 30 June, ESO submitted a new 2023 budget request to the EFB and ECORD Council, which was approved on 19 July, and ESO moved forward with a new tender call.

In July, the ESO operations team were informed that, due to the higher estimated value of the drilling contract, a new set of procurement rules would be applied according to UK Government policy (under which the BGS conducts all procurement). A greater degree of independent scrutiny would be applied, and specific approval from the UK Cabinet Office would be required. This process required additional time and preparation, which meant the new Call for Tender was issued later than planned. The ESO Operations Team were called to two meetings of the UK Cabinet Office in September and October, and final approval to proceed was given on 27 October 2022. While this extra approval step delayed the new call for tender, it also provided a second layer of independent scrutiny of the procurement being attempted by ESO. Although delayed, the tender timeline remained consistent with an offshore operation in September-October 2023.

A new Call for Tender for vessel and drilling services was published on 11 November, with supplier bids received on 12 December. The ESO Operations team at the BGS assessed the bids in December and early January, and on 9 January 2023 successfully identified a supplier that meets the technical specification and the budgetary constraints. Commercial arrangements will be taken forward with the supplier in January 2023, and a contract award is anticipated in February or March 2023.

The Call for Scientists was opened on 1 August 2022, and was followed by an information webinar on 9 September 2022. The Call was closed on 23 September 2022.

On 27 October 2022, the ESO team met the Co-chief Scientists in Edinburgh for a face-to-face planning meeting. The meeting was designed to update the Co-chiefs and ESO staff on all expedition planning, and to select a Science Party from the shortlisted nominations received from the Program Member Offices. A Science Party was selected and, after approval from the PMOs, formal invites were issued in December 2022.

ESO has continued permitting work for this expedition, and ESO has been liaising with the Co-chiefs on staffing matters.

ESO are exploring the possibility of adding a demonstration site in deep water/hard rock in the vicinity of Hawaii, using the chosen seafloor drill system. This is in response to concerns expressed by community members interested in scientific targets in deep water/hard rock that SFD technology may not serve them well. After further investigation, ESO will present a proposal and budget for a deep test site to ECORD Council and EFB for discussion.

Offshore dates are anticipated to be 5-8 weeks between end August and 31 October 2023. The OSP is likely to be early 2024.

IODP Expedition 406

Scheduled for 2024

New England Shelf Hydrogeology

Proposal (PDF) https://docs.iodp.org/Proposal_Cover_Sheets/637-Full2_Person_cover.pdf

Lead Proponent: **Brandon Dugan** (Rice University, USA)

Following the recommended scheduling of Expedition 406: New England Hydrogeology by the EFB in September 2022, ESO convened a planning meeting with the proponents on 27 November 2022. The meeting was a first step towards constructing a specification for the required vessel, drilling and water sampling services.

ESO anticipates contracting a geotechnical vessel to deploy marine wireline coring, or a liftboat to deploy mining-style wireline coring (a similar approach to that used for IODP Expedition 313: New Jersey Shallow Shelf). The requirement to sample significant volumes of formation water adds a new technical dimension for ESO, however it is anticipated that this facility can be accommodated on MSPs.

Personal Samplig Party onboard D/V *Chikyu* during IODP Expedition 386. Credits: M. Mowat, ECORD/IODP/JAMSTEC.

Completed MSP Expedition Support

E. Le Ber returned to Chicxulub texture classification research, using self-organizing maps to compare results from other semi-supervised algorithms (e.g., KMeans).

ESO facility, service and general activities

For MSP proposals under investigation for potential implementation, ESO-Bremen staff continued to scope QA/QC procedures for analytical equipment and instrumentation. This involves incorporating QA/QC documentation into offshore laboratory routines, and continuously improving the online tutorials for both the Offshore Phase and the Onshore Science Party available on the web. Part of the work was to migrate all information on numerous webpages to the new MARUM webpages.

Other ongoing work continued, such as sampling for shore-based requests, laboratory and equipment upkeep and certification, and updating of the EPC Logging Protocol. Although ArcOP was postponed, EPC staff at Montpellier continued monitoring contracts for the purchase and design of containers, and purchases of logging tools and winches (received in August). These items were intended to be deployed on ArcOP, but were also purchased to serve future MSP expeditions. Additionally, EPC continued working with colleagues from School of Engineering on the design for new tri-axial P-wave system.

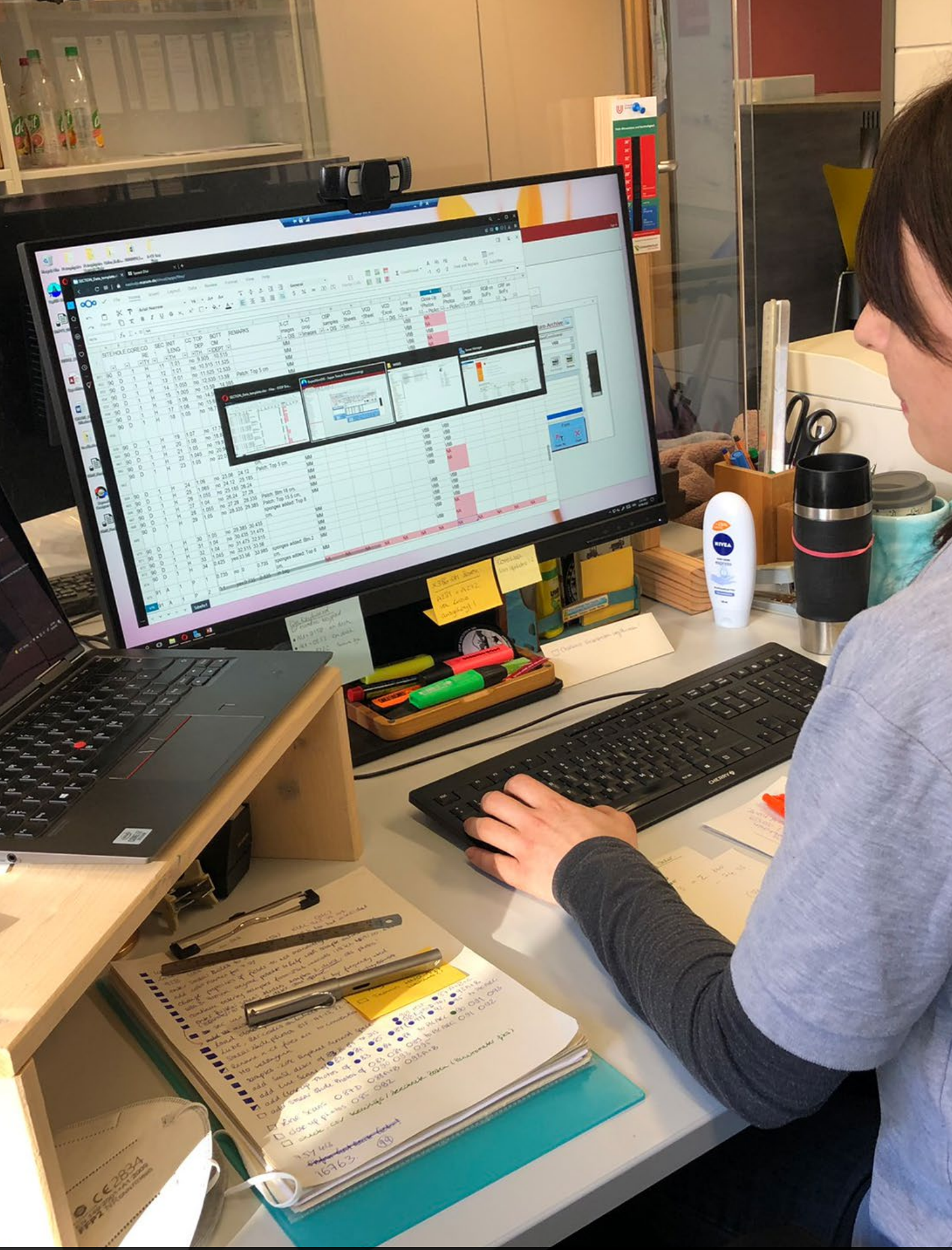
Data Management

ESO-Bremen continues to work towards the new database system, mDIS, working with colleagues from the German Research Centre for Geosciences (GFZ) and/or programmers of the involved IT company. ESO-Bremen staff attended multiple virtual meetings and workshops throughout 2022 as part of this process, and an order was placed to obtain our ESO-specific version of the mDIS. The Bremen team are now deploying the Curation version of the mDIS, with a view to deploying the Expedition version later in 2023.

Training

Staff training continued throughout 2022, to develop staff skills and to meet regulatory requirements. For example:

- M. Rydzy (ESO-EPC) received training on Sitecore in order to assist in design of websites for University of Leicester;
- The newest ESO team members (M. Rydzy, H. Grant and M. Stewart) participated in IODP Expedition 391 Walvis Ridge Sampling Party at MARUM at the University of Bremen (13-16 June), providing an opportunity to train in IODP sampling protocol and networking with other ESO partners, the JRSO and the Science Party;
- EPC staff at Montpellier received BOISET training in Marseille on 26 – 28 April;
- P. Geprägs attended a sea survival training course at Rely on Nutec in Bremerhaven on 29 June;
- L. Schnieders (Bremen) attended a routine mandatory first aid update training and participated in a mandatory fire protection update training.



Managing Expedition 386 OSP data in Bremen. Credit: U. Röhl, ECORD/IODP/JAMSTEC.

3. Anticipating future mission-specific platform expeditions

D/V *Chikyu* docked in Shimizu, Japan, during Personal Sampling Party for Expedition 386.
Credits: P. Bellanova, ECORD/IODP/JAMSTEC.

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

SCHEDULED EXPEDITIONS

The personal sampling party of IODP Expedition 386: Japan Trench Paleoseismology has taken place in late 2022, and preparations of the offshore phase of International Ocean Discovery Program (IODP) Expedition 389: Hawaiian Drowned Reefs in 2023 are well underway.

At its last meeting that was held on 20 and 21 September 2022 in Aix-en-Provence, France, the ECORD Facility Board (EFB) has decided to recommend the scheduling of an IODP Expedition based on proposal 637: New England Shelf Hydrogeology. This expedition targets scientific objectives, which so far have not yet been addressed by scientific ocean drilling and will thus venture into new scientific dimensions.

As IODP concludes, the EFB remains committed to the continuation of mission-specific platform (MSP) expeditions in a post-2024 scientific ocean drilling programme. Our goal is to see a smooth transition to the next programme without any gap in drilling. To that end, the EFB intends to transfer all active MSP proposals – both at the EFB and at the Science Evaluation Panel (SEP) – to a new scientific ocean drilling programme. The proponents have been advised that an addendum will be needed to emphasize the link of their proposals' objectives to the 2050 Scientific Framework *(https://iodp.org/2050-science-framework)*.

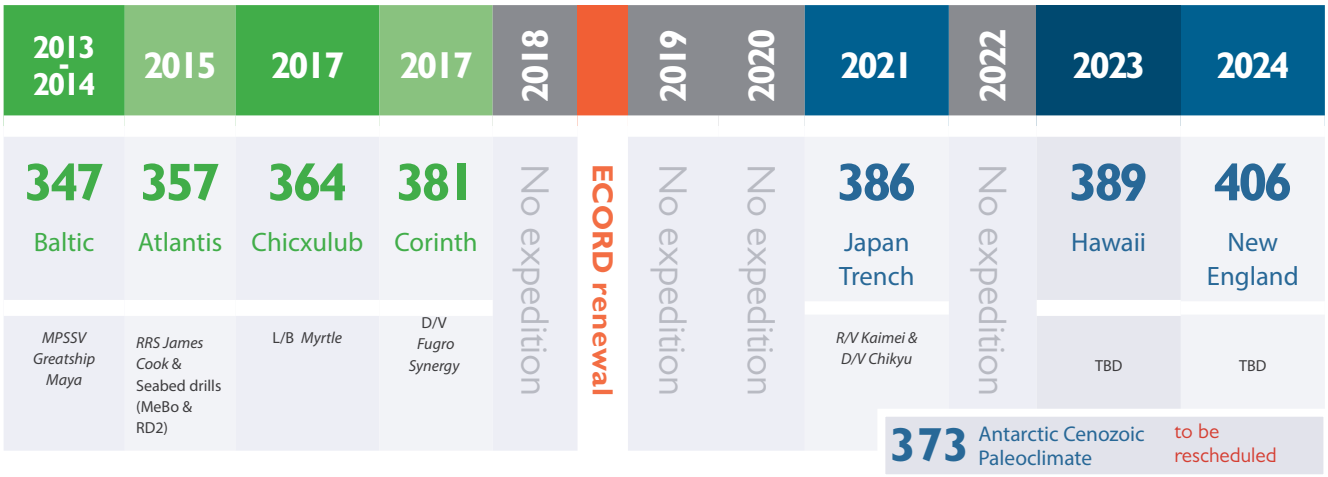
Currently active MSP drilling proposals and MSP proposals that will arise from MagellanPlus workshops and from individual submissions in the next two years may form the basis of a post-2024 scientific ocean drilling programme. MSP expeditions are expected to play a prominent role in the achievement of Strategic Objectives defined in the 2050 Science Framework.

Active MSP proposals

The number of active MSP proposals in the IODP system is fairly constant and presently includes 12 proposals concerning various science topics and geographical areas that reside both at the EFB and at SEP. A higher MSP proposal pressure including different science themes and involving various potential drilling/coring systems in diverse environments is expected within the next two years based on recent and planned MagellanPlus workshops. These proposals may therefore provide additional scientific, operational and funding opportunities in the near future.

Since the start of IODP, MSP expeditions have no longer been restricted to enclosed or ice-covered sea areas and shallow-water drilling environments. ECORD intends to develop the MSP concept by diversifying drilling and coring technologies, including riserless drilling, and applying them to all drilling environments, as determined by scientific priorities, operational efficiency and better value for money.

Scheduling of MSP expeditions for the two coming years (2023-2024)



347 - Expedition 347: Baltic Sea Paleoenvironment
357 - Expedition 357: Atlantis Massif Serpentinization and Life
364 - Expedition 364: Chicxulub K-Pg Impact Crater
381 - Expedition 381: Corinth Active Rift Development
386 - Expedition 386: Japan Trench Paleoseismology
389 - Expedition 389: Hawaiian Drowned Reefs
406 - Expedition 406: New England Shelf Hydrogeology
373 - Expedition 373: Antarctic Cenozoic Paleoclimate

MSP proposals at the ECORD Facility Board

Five MSP proposals currently reside at the EFB (see *table below*), including the three expeditions that were postponed over the last four years (i.e., expeditions 373 in 2018, 377 in 2018 and 2022, and 389 in 2019).

Two proposals concern scheduled expeditions:

- 716 'Hawaiian Drowned Reefs' (IODP Expedition 389), scheduled for 2023;
- 637 'New England Shelf Hydrogeology' (IODP Expedition 406), scheduled for 2024.

Three proposals are currently in the EFB holding bin:

- 708 'Arctic Ocean Paleoceanography' (IODP Expedition 377);
- 730 'Sabine Bank Sea Level'; this proposal has been taken over by a new Lead Proponent;
- 813 'Antarctic Ocean Paleoclimate' (IODP Expedition 373).

Proposals at the ECORD Facility Board

Proposal	Type	Short Title	Lead Proponent	Ocean	Status
637	Full2	New England Shelf Hydrogeology	Dugan (USA)	Atlantic	Exp. 406, scheduled for 2024
708	Full2	Central Arctic Paleoceanography (ArcOP)	Stein (ECORD-Germany)	Arctic	Exp. 377, postponed
716	Full2	Hawaiian Drowned Reefs	Webster (ANZIC)	Pacific	Exp. 389, scheduled for 2023
730	Full2	Sabine Bank Sea Level	Taylor (USA)	Pacific	EFB
813	Full	Antarctic Cenozoic Paleoclimate	Williams (USA)	Southern Ocean	Exp. 373, postponed

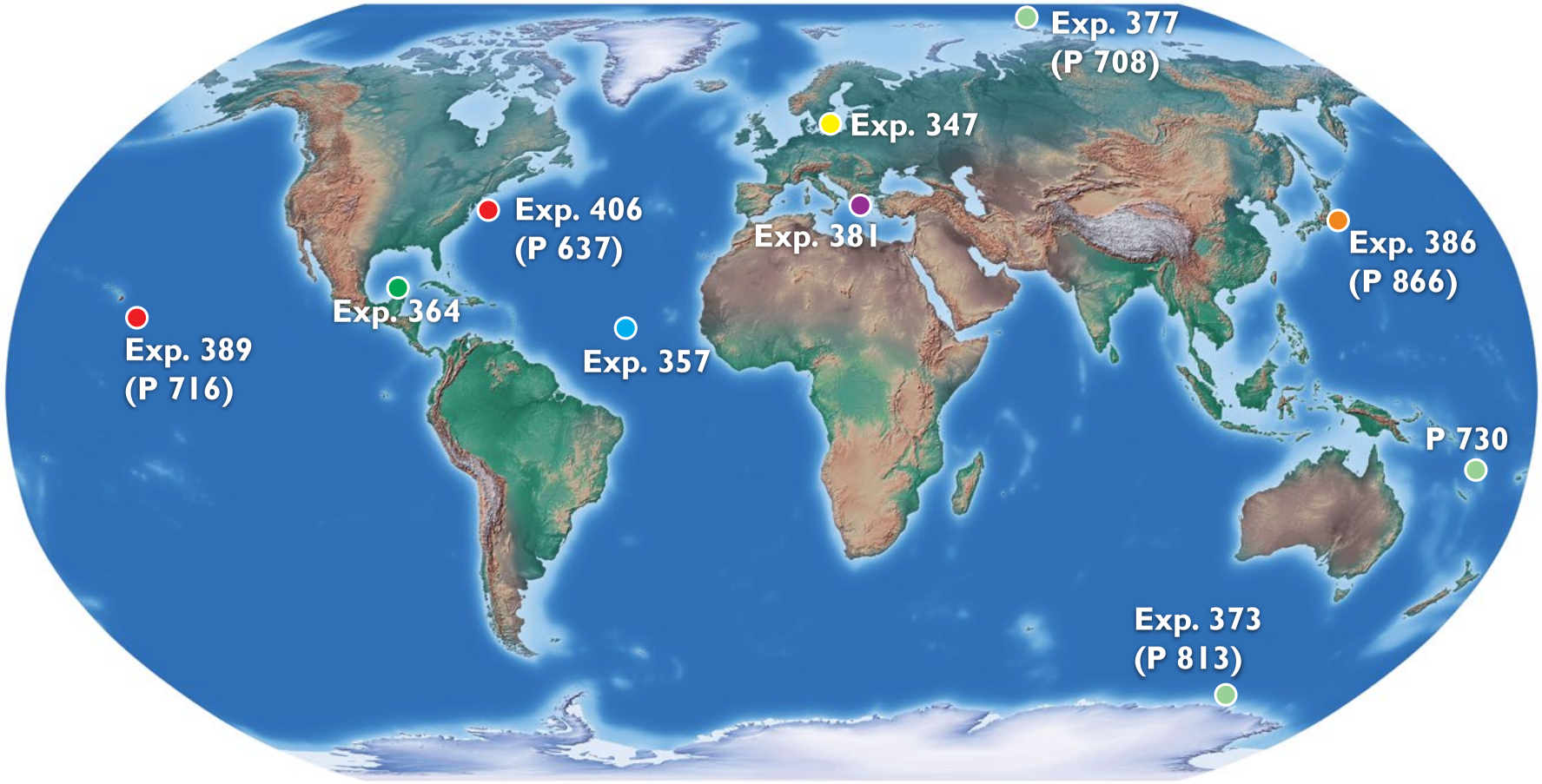
ESO staff continually review the operational options and costs of proposals residing at EFB, a summary of which is given in table on the right.

Proposal	Title	Lead Proponent	Status
P730-Full2	Sabine Bank	Partin	No recent ESO activity. Proposal requires a new lead PI to take responsibility.
P813-Full	Antarctic Cenozoic Paleoclimate	Williams	No recent ESO activity, except informal exchanges with the proponents.

Related websites

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

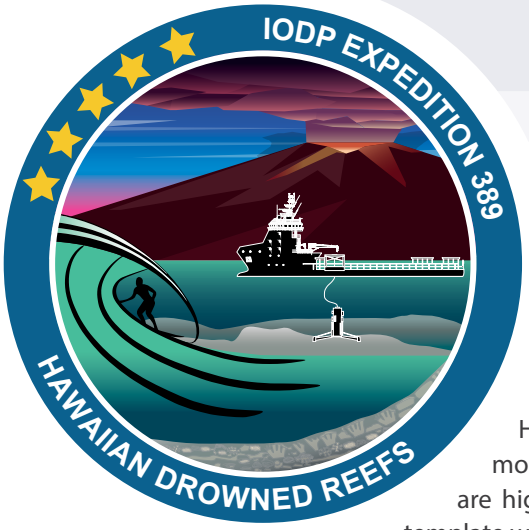
Mission-specific platform expeditions and proposals at the EFB



IODP Expedition 389

Scheduled for 2023

Hawaiian Drowned Reefs



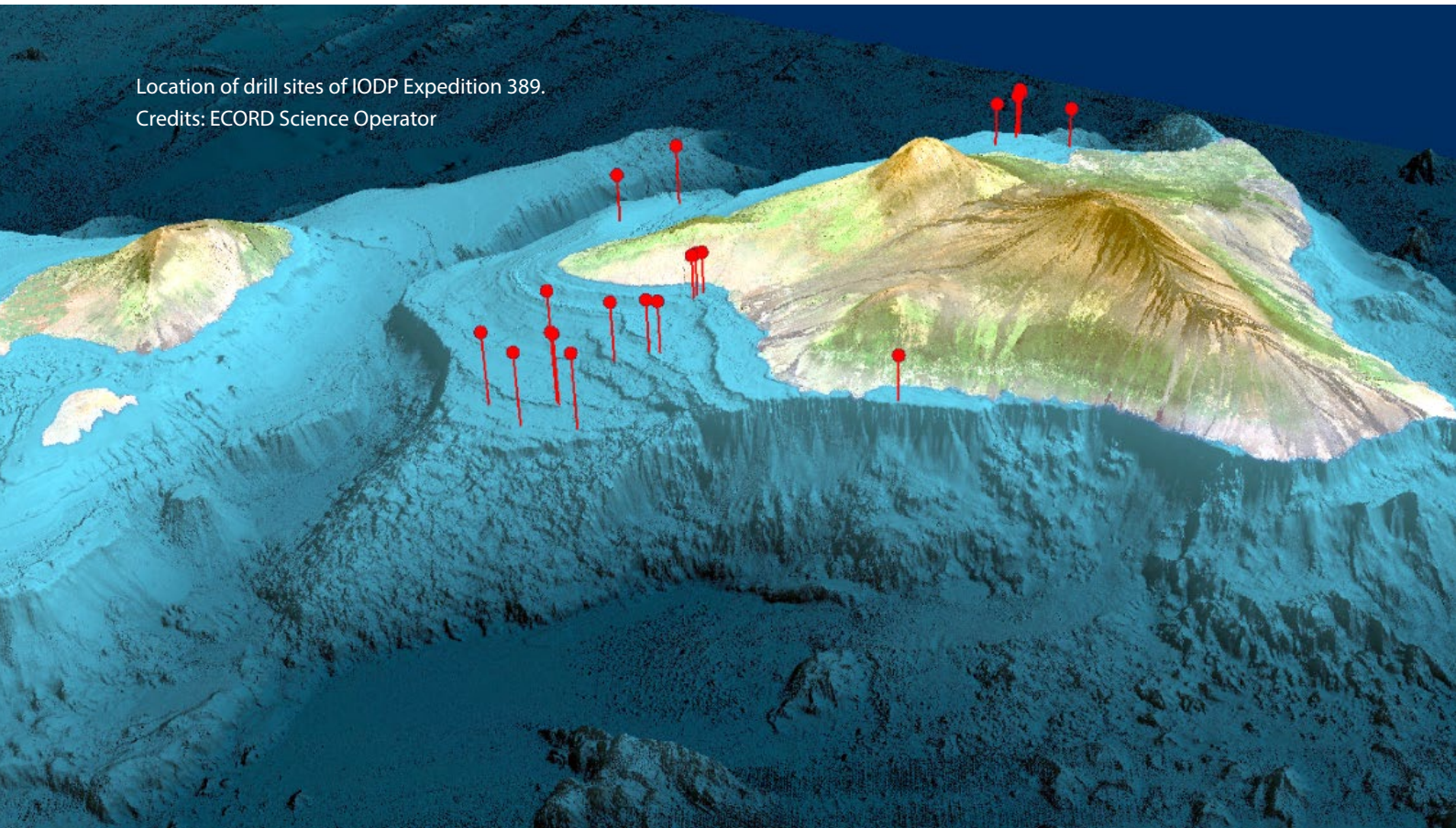
Co-chief Scientists **Jody Webster** (University of Sydney, Australia)
Christina Ravelo (University of California, USA)

Expedition website *www.ecord.org/expedition389*

Exp. 389 Scientific objectives

Our understanding of the links and mechanisms that control eustatic sea-level and global climate changes has been significantly hampered by a lack of appropriate fossil coral records over the last 500 kyr - particularly into and out of the glacial periods. It is proposed to address this problem directly by drilling a unique succession of drowned coral reefs around Hawaii now at -134 to -1155 m. Abundant observational and numerical modeling data indicate that the internal stratigraphy and tops of these reefs are highly sensitive to sea-level and climate changes, thereby providing a firm template with which to conduct these operations.

As a direct result of Hawaii's rapid (2.5-2.6/kyr) but nearly constant subsidence, a thick (100-200 m) expanded sequence of shallow coral reef dominated facies is preserved within the reefs. These reefs span important periods in Earth climate history, either not available or highly condensed on stable (Great Barrier Reef, Tahiti) and uplifted margins (Papua New Guinea, Barbados) due to a lack of accommodation space and/or unfavorable shelf morphology. Specifically, these data show that the reefs grew (for ~90-100 kyrs, albeit episodically) into, during and out of the majority of the last five to six glacial cycles. Therefore, scientific drilling through these reefs will generate a new record of sea-level and associated climate variability during several controversial and poorly understood periods over the last 500 kyr.



Location of drill sites of IODP Expedition 389.
Credits: ECORD Science Operator

The project has four major objectives.

First, to constrain the timing, rate, and amplitude of sea-level variability over the last 500 kyr allowing a definitive test of Milankovitch climate theory and an assessment of controversial abrupt sea level events (meltwater pulses) that occur on suborbital frequencies associated with events occurring in the extra-tropics (i.e., Dansgaard/Oeschger ice core temperature Events, and related Heinrich ice rafted debris Events in N. Atlantic sediment cores).

Second, to investigate processes that determine changes in mean climate and high-frequency (seasonal-interannual) climate variability using high-resolution coral proxy data from times with different climate forcing boundary conditions (e.g., ice sheet size, pCO2, solar forcing) over the last 500 kyr.

Third, to determine the response of coral reef systems to abrupt sea-level and climate changes, test sedimentary models of reef evolution as well as ecologic theories of coral reef resilience and to establish the role of microbial communities in reef building.

And fourth, to refine the variation through space and time of the subsidence of Hawaii and contribute to understanding the volcanic evolution of the island.

Exp. 389 Operations

See 2. Operating and participating in mission-specific platform expeditions on *page 40*.

Corals of Tahiti, photo taken during IODP Expedition 310.
Credit: G. Camoin, ECORD/IODP

IODP Expedition 406

Scheduled for 2024

New England Shelf Hydrogeology

Co-chief Scientists **TBD**

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 2. Operating and participating in mission-specific platform expeditions on *page 41*.

Operations onboard R/V *Kaimei* during offshore phase of IODP Expedition 386. Credits: N. Okutsu, ECORD/IODP/JAMSTEC

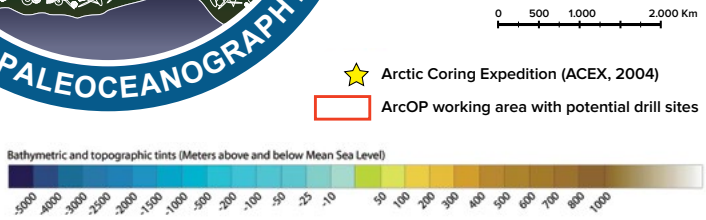
IODP Expedition 377

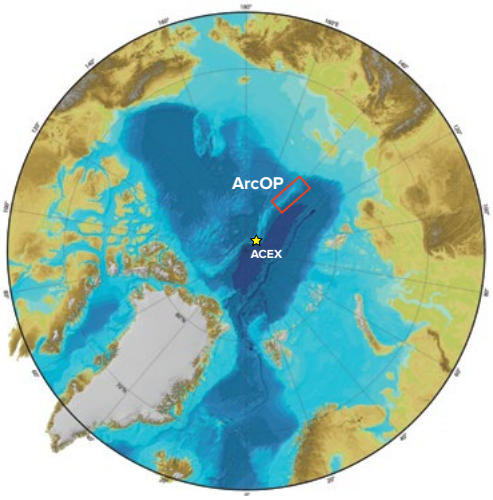
Cancelled

Arctic Ocean Paleoceanography (ArcOP)

Co-chief Scientists: **Ruediger Stein** (Alfred Wegener Institute, 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.

Exp. 377 Operations

See 2. Operating and participating in mission-specific platform expeditions on *page 38*.

ECORD EUROPEAN CONSORTIUM FOR OCEAN RESEARCH DRILLING
IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM
SWEDISH POLAR RESEARCH SECRETARIAT POLARFORSKNINGSSEKRETARIATET
arctic marine solutions

Ice on site during IODP Expedition 302 ACEX. Credits: ECORD/IODP.

IODP Expedition 373

Postponed

Antarctic Cenozoic Paleoclimate

Co-chief Scientists **Trevor Williams** (Texas A&M University, USA)
Carlota Escutia (University of Granada, 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 Australian Antarctic Division (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 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.

Splitted cores during PSP for IODP Expedition 386 onboard *Chikyu*. Credits: M. Mowat, ECORD/IODP/JAMSTEC.

MSP proposals at the Science Evaluation Panel

Nine MSP proposals have been handled by SEP in 2022 and could potentially involve diverse drilling/coring technologies:

- Proposal 796 ADP: Nice Amphibious Drilling Ligurian Landslide (Lead Proponent: Achim Kopf, ECORD-Germany) that will need to be re-structured into the new Land-2-Sea format;
- Proposal 931-Pre: East Antarctic Ice Sheet Evolution (Lead Proponent: Amelia Shevenell, USA), which could involve seabed-drilling;
- Proposal 995-Full: Canterbury Bight Offshore Freshened Groundwater (Lead Proponent: Aaron Micallef, ECORD-Germany)
- Proposal 1003-Pre2: N. Cava Volcanic Ash (Lead Proponent: Ann Dunlea, USA), which is supported by long piston coring;
- Proposal 1005-Full: Sunda shelf and weathering (Lead Proponent: Peter Clift, USA), which may involve an MSP collaboration with China;
- Proposal 1006-Pre: Mediterranean-Black sea Gateway (Lead Proponent: Wout Krijgsman, ECORD-Netherlands), for which the MSP drilling facility still need to be defined;
- Proposal 1007-Full: Evolution of the Pliocene Pleistocene Tropical Sunda Shelf (Lead Proponent: Zhifei Liu, China), which also may involve an MSP collaboration with China;
- Proposal 1008-Pre: Postglacial Atlantic sea-level reconstruction through drilling the Belize Barrier Reef (Lead Proponent: Eberhard Gischler, ECORD-Germany), for which the MSP drilling facility still need to be defined;
- Proposal 1009-Pre: Tracing Monsoon, Ocean currents and diagenetic carbon Redistribution in the Timor Sea (Lead proponent Uwe Balthasar, ECORD-UK) that has been deactivated by SEP at its January 2023 meeting.

The EFB has contacted all Lead Proponents to request to link the scientific objectives of their proposals to the 2050 Science Framework (*https://iodp.org/2050-science-framework*), in order to enable a smooth transfer of their proposal to a future programme based on the MSP concept.

MSP proposals at SEP

Proposal	Type	Short Title	PI	Country	Status
796	ADP	NADIR: Nice Amphibious Drilling	Kopf	ECORD (Germany)	Revise
931	Pre	East Antarctic Ice Sheet Evolution	Shevenell	USA	Develop to Full
995	Full	Canterbury Bight Offshore Freshened Groundwater	Micallef	ECORD (Germany)	Declined
1003	Pre2	N. CAVA Volcanic Ash	Dunlea	USA	Revise
1005	Full	Sunda Sea Level and Weathering	Clift	USA	Revise
1006	Pre	Mediterranean-Black Sea Gateway Exchange	Krijgsman	ECORD (The Netherlands)	Revise
1007	Full	Evolution of the Pliocene-Pleistocene Tropical Sundo Shelf (SE Asia)	Liu	China	Revise
1008	Pre	Postglacial Atlantic sea-level reconstruction through drilling the Belize Barrier Reef	Gischler	ECORD (Germany)	Revise
1009	Pre	Tracing Monsoon, Ocean currents and diagenetic carbon Redistribution in the Timor Sea	Balthasar	ECORD (UK)	Declined

ESO staff continually review the operational options and costs of proposals residing at SEP, a summary of which is given in the table on the next page.

Proposal	Title	Lead Proponent	Status
P796-ADP	NADIR: Nice Amphibious Drilling	Kopf	No recent ESO activity.
P931-Pre	East Antarctic Ice Sheet Evolution	Shevenell	No recent ESO activity.
P1003-Pre2	Northern Central American Volcanic Arc (CAVA) Volcanic Ash	Dunlea	No recent activity. Zoom meeting with proponents in August 2021, follow up e-mail exchanges in September 2021.
P1005-Full	Sunda Shelf Sea Level	Clift	E-mail exchanges with proponents in January 2022.
P1006-Pre	Mediterranean-Black Sea Gateway Exchange	Krijgsman	ESO attended the MagellanPlus Workshop BlackGate in September 2021. No other recent ESO activity.
P1007-Full	Sunda Shelf Carbon Cycling	Liu	ESO attended the 3rd International Workshop on the Sunda Shelf Drilling in March 2022.
P1008-Pre	Belize Barrier Reef Postglacial Sea-level	Gischler	ESO feedback was given at SEP in January 2023, through the watchdog role.
P1009-Pre	Timor Sea Paleoenvironment	Balthasar	ESO attended the MagellanPlus Workshop TIMOR in May 2022. ESO feedback was given at SEP in January 2023, through the watchdog role.

IODP Proposal 796-ADP

SEP waiting room

Nice Amphibious Drilling

Lead Proponent: **Achim Kopf** (MARUM, 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 995-Full

Deactivated by SEP

Canterbury Bight Offshore Freshened Groundwater

Lead Proponent: **Aaron Micallef** ((GEOMAR Helmholtz Centre for Ocean Research, Germany)

P 995 Scientific objectives

Offshore freshened groundwater (OFG) is groundwater stored in sub-seafloor sediments and rocks with a total dissolved solid concentration below that of seawater. The large majority of OFG has been emplaced by meteoric recharge and is located in siliciclastic, rifted, non-glaciated margins, within 50 km of the coast and down to a water depth of 75 m. The OFG system hosted in the Canterbury Bight, which is located offshore of the South Island of New Zealand, shares these characteristics and is well constrained by geophysical data and numerical models.

We are proposing a hydrogeology-focused drilling campaign that targets two primary sites along a 28 km shore-normal transect in the Canterbury Bight. We plan in-situ measurements and pumping tests to: (i) determine hydrogeological and petrophysical properties of the aquifer, physical and chemical characteristics of the OFG, as well as the variation of boundary conditions over geological time-scales; (ii) sample groundwater for geochemical (e.g., geochemical tracers, environmental isotopes, gas and nutrient analyses) and microbiological (e.g., gene-based analyses, microbial rate experiments, cell enumeration, radiocarbon analysis of RNA) analyses. We also plan to install SCIMPI observatories to corroborate and calibrate estimates and measurements of pressure, temperature and salinity, to monitor their variability over at least nine years, and to estimate hydrologic properties at the borehole scale.

Data from the proposed drilling campaign will allow us to address fundamental knowledge gaps related to OFG characteristics, controls and emplacement dynamics, and the role that it plays in global biogeochemical cycles, by: (i) reducing uncertainty in estimations of OFG distribution and dimensions from geophysical data and mathematical models, (ii) estimating the residence times of OFG, (iii) reconstructing the environmental conditions prevailing during recharge, (iv) constraining rates and mechanisms of freshening/salinisation, (v) quantifying biogeochemical cycles and fluxes, and (vi) characterising the abundance, activity, distribution and controls of microbial communities. The project outcomes will improve the: (i) understanding of key elements, controlling factors and evolution of groundwater systems at the continental margin scale, (ii) mapping and volumetric estimations of OFG systems, with direct implications for global water budgets and management of coastal groundwater resources; (iii) understanding of biogeochemical cycling in shelf environments and the development of hydrological and reactive-transport models; (iv) global models of total cellular life and their response to environmental change.

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, 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** (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-Pre

SEP waiting room

Postglacial Atlantic Sea-Level Reconstruction through Drilling the Belize Barrier Reef

Lead Proponent: **Eberhard Gischler** (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 1009-Pre

Deactivated by SEP

Tracing Monsoon, Ocean Currents and Diagenetic Carbon Redistribution in the Timor Sea

Lead Proponent: **Uwe Balthasar** (ECORD-UK)

P 1009 Scientific objectives

The Timor Sea, via the Indonesian Throughflow (ITF), connects the warm waters of the Pacific Ocean with those of the Indian Ocean. It is dynamically linked to the Leeuwin Current which transports low-salinity, nutrient-deficient ITF waters poleward to subtropical latitudes along the western coast of Australia. Furthermore, the Timor Sea is strongly affected by the Australian Monsoon. We expect that the sedimentary records from the proposed sites will provide crucial insights into the variability and interconnectedness of the ITF, Leeuwin Current and the Australian Monsoon over the past 2 million years. In addition to these palaeoceanographic and palaeoclimatic questions, the location along the northern margin of the Sahul Shelf carbonate platform provides the opportunity for the first holistic study of early carbonate diagenesis that integrates in situ data on sedimentology, palaeontology, geochemistry, and microbiology in order to decipher diagenetic processes that have been enigmatic until now. Carbonate sediments undergo significant changes during early burial as they pass through a sequence of distinct geochemical zones that are controlled by the microbial oxidation of organic matter within the uppermost meters to 10s of meters of the sediment column. During this critical early diagenesis some of the more soluble forms of CaCO3 (mainly aragonite) dissolve, while low-Mg calcite which is stable in such environments, precipitates as cement, thus mineralogically stabilising the sediment without much compaction. The relationship between dissolution, precipitation, geochemical zones and microbial activity remains unknown and has never been studied in an integrated in situ approach.

Understanding these relationships has significant implications for the palaeoenvironmental interpretation of geological shallow marine limestone deposits, and for the role of early carbonate diagenesis in the organic and inorganic carbon cycle.

4. Participating in 2022 IODP expeditions

JOIDES Resolution during IODP Expedition 374. Credits: IODP JRSO.

4. Participating in 2022 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 2022, **five expeditions** were implemented on the *JOIDES Resolution* (JR).

A total of 50 ECORD scientists from 11 ECORD member countries were invited to participate including **seven Co-chief Scientists**.

Exp. 390 | Exp. 391 | Exp. 392 | Exp. 393 | Exp. 397

Participation of ECORD scientists

In 2022, ECORD, as a contributing member of the *JOIDES Resolution* (JR) Consortium, was entitled to an average of seven scientists on every expedition onboard the drill ship *JOIDES Resolution*.

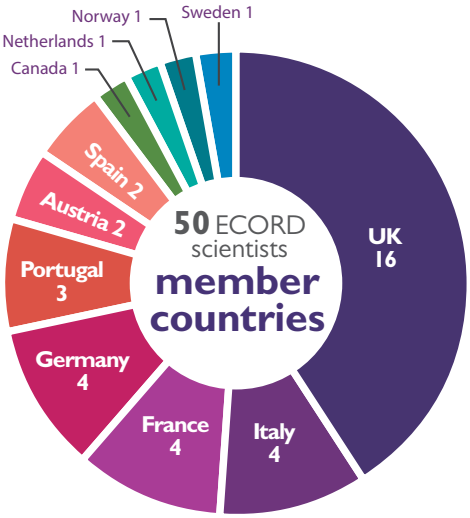
Scientists are chosen following an open call for applications and a competitive selection process. After a nomination proposal by ESSAC, staffing discussions are held with the implementing organisations, the appointed Co-chief Scientists and the IODP member countries/ consortia.

Participation of ECORD scientists is proportional to the financial contributions of the ECORD members 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 member quota. However, member 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 members can also sail following special calls or sail as observers.

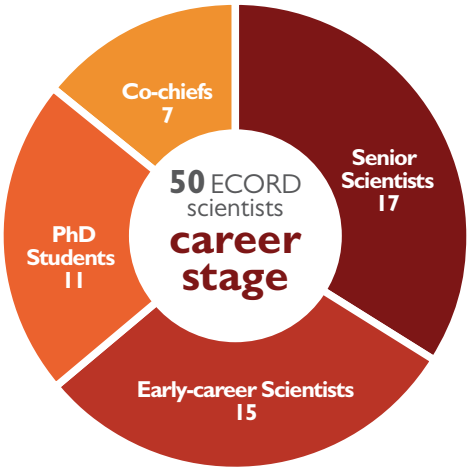
JOIDES Resolution Science Operator

Despite the still ongoing global COVID-19 pandemic, five *JOIDES Resolution* expeditions were implemented in 2022 (four during the US 2022 fiscal year), resuming with a full shipboard science parties. This was enabled by a very strict COVID-19 protocol, which required extensive quarantine and testing before boarding the drillship. Likewise the postponement of expeditions in the previous years led to substantial restaffing and issuing of special calls.

In total, 50 ECORD scientists were selected in 2022, including seven Co-chief Scientists and twenty scientists staffed in response to Special Calls.



Distribution of ECORD scientists in 2022 IODP expeditions by country (n = 50)



ECORD participants in 2022 IODP expeditions by career stage (n = 50).

JOIDES Resolution during IODP Expedition 353. Credits: W. Crawford, IODP JRSO

IODP Expedition 391

JOIDES Resolution Science Operator

6 December 2021 – 5 February 2022

Walvis Ridge Hotspot

Co-chief Scientist
Kaj Hoernle
(GEOMAR Kiel, Germany)

Participating Scientists
David Buchs (Cardiff University,UK)
Claire Carvallo (Sorbonne Université, France)
Yuhao Dai (Lund University, Sweden)
Giacomo Dalla Valle (Institute for Marine Sciences, Italy)
Arianna V. Del Gaudio (University of Graz, Austria)
Stephan Homrighausen (GEOMAR Kiel, Germany)
Ethan Petrou (University of Oxford, UK)
Simone Pujatti (University of Calgary, Canada)
Mike Widdowson (University of Hull, UK)

http://iodp.tamu.edu/scienceops/expeditions/walvis_ridge_hotspot.html

Exp. 391 Scientific Goals

Hotspot tracks (quasilinear chains of seamounts, ridges, and other volcanic structures) provide important records of plate motions, as well as mantle geodynamics, magma flux, and mantle source compositions. The Tristan-Gough-Walvis Ridge (TGW) hotspot track, extending from the active volcanic islands of Tristan da Cunha and Gough through a province of guyots and then along Walvis Ridge to the Etendeka flood basalt province, forms one of the most prominent and complex global hotspot tracks. The TGW hotspot track displays a tight linear age progression in which ages increase from the islands to the flood basalts (covering ~135 My). Unlike Pacific tracks, which are simple chains of seamounts that are often compared to chains of pearls, the TGW track is alternately a steep-sided narrow ridge, an oceanic plateau, subparallel linear ridges and chains of seamounts, and areas of what appear to be randomly dispersed seamounts. The track displays isotopic zonation over the last ~70 My. The zonation appears near the middle of the track just before it splits into two to three chains of ridge- and guyot-type seamounts. The older ridge is also overprinted with age-progressive late-stage volcanism, which was emplaced ~30–40 My after the initial eruptions and has a distinct isotopic composition. The plan for Expedition 391 was to drill at six sites, three along Walvis Ridge and three in the seamount (guyot) province, to gather igneous rocks to better understand the formation of track edifices, the temporal and geochemical evolution of the hotspot, and the variation in paleolatitudes at which the volcanic edifices formed.

After a delay of 18 days to address a shipboard outbreak of the coronavirus disease 2019 (COVID-19) virus, Expedition 391 proceeded to drill at four of the proposed sites: three sites on the eastern Walvis Ridge around Valdivia Bank, an ocean plateau within the ridge, and one site on the lower flank of a guyot in the Center track, a ridge located between the Tristan subtrack (which extends from the end of Walvis Ridge to the island of Tristan da Cunha) and the Gough subtrack (which extends from Walvis Ridge to the island of Gough). One hole was drilled at Site U1575, located on a low portion of the northeastern Walvis Ridge north of Valdivia Bank. At this location, 209.9 m of sediments and 122.4 m of igneous basement were cored. The latter comprised 10 submarine lava units consisting of pillow, lobate, sheet, and massive lava flows, the thickest of which was ~21 m. Most lavas are tholeiitic, but some alkalic basalts were recovered. A portion of the igneous succession consists of low-Ti basalts, which are unusual because they appear in the Etendeka flood basalts but have not been previously found on Walvis Ridge. Two holes were drilled at Site U1576 on the west flank of Valdivia Bank. The first hole was terminated because a bit jammed shortly after penetrating igneous basement. Hole U1576A recovered a remarkable ~380 m thick sedimentary section consisting mostly of chalk covering a nearly complete sequence from Paleocene to Late Cretaceous (Campanian). These sediments display short and long cyclic color changes that imply astronomically forced and longer term paleoenvironmental changes. The igneous basement yielded 11 submarine lava units ranging from pillows to massive flows, which have compositions varying from tholeiitic basalt to basaltic andesite, the first occurrence of this composition recovered from the TGW track. These units are separated by seven sedimentary chalk units that range in thickness from 0.1 to 11.6 m, implying a long-term interplay of sedimentation and lava eruptions. Coring

at Site U1577, on the extreme eastern flank of Valdivia Bank, penetrated a 154 m thick sedimentary section, the bottom ~108 m of which is Maastrichtian–Campanian (possibly Santonian) chalk with vitric tephra layers. Igneous basement coring progressed only 39.1 m below the sediment-basalt contact, recovering three massive submarine tholeiite basalt lava flows that are 4.1, 15.5, and >19.1 m thick, respectively. Paleomagnetic data from Sites U1577 and U1576 indicate that their volcanic basements formed just before the end of the Cretaceous Normal Superchron and during Chron 33r, shortly afterward, respectively. Biostratigraphic and paleomagnetic data suggest an east–west age progression across Valdivia Bank, becoming younger westward. Site U1578, located on a Center track guyot, provided a long and varied igneous section. After coring through 184.3 m of pelagic carbonate sediments mainly consisting of Eocene and Paleocene chalk, Hole U1578A cored 302.1 m of igneous basement. Basement lavas are largely pillows but are interspersed with sheet and massive flows. Lava compositions are mostly alkalic basalts with some hawaiite. Several intervals contain abundant olivine, and some of the pillow stacks consist of basalt with remarkably high Ti content. The igneous sequence is interrupted by 10 sedimentary interbeds consisting of chalk and volcaniclastics and ranging in thickness from 0.46 to 10.19 m. Paleomagnetic data display a change in basement magnetic polarity ~100 m above the base of the hole. Combining magnetic stratigraphy with biostratigraphic data, the igneous section is inferred to span >1 My. Abundant glass from pillow lava margins was recovered at Sites U1575, U1576, and U1578.

Although the igneous penetration was only two-thirds of the planned amount, drilling during Expedition 391 obtained samples that clearly will lead to a deeper understanding of the evolution of the Tristan-Gough hotspot and its track. Relatively fresh basalts with good recovery will provide ample samples for geochemical, geochronologic, and paleomagnetic studies. Good recovery of Late Cretaceous and early Cenozoic chalk successions provides samples for paleoenvironmental study.

After funnel deployment, the VIT (vibration-isolated television) camera frame is positioned for lowering into the water to verify the funnel position on the seafloor. *JOIDES Resolution* during IODP Expedition 391. Credit: S. Herrmann, IODP JRSO.

IODP Expedition 392

JOIDES Resolution Science Operator

5 February – 7 April 2022

Agulhas Plateau Cretaceous Climate

Co-chief Scientists
Gabriele Uenzelmann-Neben (AWI- Bremerhaven, Germany)
Steven Bohaty (Heidelberg University, Germany)

Participating Scientists
Odysseas Archontikis (University of Oxford, UK)
Sietske Batenburg (University of Barcelona, Spain)
Peter Bijl (Utrecht University, The Netherlands)
Edoardo Dallanave (MARUM Bremen, Germany)
Jörg Geldmacher (GEOMAR Kiel, Germany)
Jens Herrle (Goethe-University Frankfurt, Germany)
Denise K. Kulhanek (Kiel University, Germany)
Alexander Minakov (University of Oslo, Norway)
Thomas Wagner (Heriot-Watt University, UK)
Thomas Westerhold (MARUM Bremen, Germany)

http://iodp.tamu.edu/scienceops/expeditions/agulhas_plateau_climate.html

Exp. 392 Scientific goals

During IODP Expedition 392, three sites were drilled on the Agulhas Plateau and one site was drilled in the Transkei Basin in the Southwest Indian Ocean. This region was positioned at paleolatitudes of ~53°- 61°S during the Late Cretaceous (van Hinsbergen et al., 2015) (100–66 Ma) and within the new and evolving gateway between the South Atlantic, Southern Ocean, and southern Indian Ocean basins. Recovery of basement rocks and sedimentary sequences from the Agulhas Plateau sites and a thick sedimentary sequence in the Transkei Basin provides a wealth of new data to:

1. determine the nature and origin of the Agulhas Plateau;
2. significantly advance the understanding of how Cretaceous temperatures, ocean circulation, and sedimentation patterns evolved as CO_2 levels rose and fell and the breakup of Gondwana progressed;
3. document long-term paleoceanographic variability through the Late Cretaceous and Paleogene; and
4. investigate geochemical interactions between igneous rocks, sediments, and pore waters through the life cycle of a large igneous province (LIP).

Importantly, postcruise analysis of Expedition 392 drill cores will allow testing of competing hypotheses concerning Agulhas Plateau LIP formation and the role of deep ocean circulation changes through southern gateways in controlling Late Cretaceous–early Paleogene climate evolution.

IODP Expedition 390

JOIDES Resolution Science Operator

7 April – 7 June 2022

South Atlantic Transect I

Co-chief Scientists
Rosalind Coggon (University of Southampton, UK)

Participating Scientists
Jaume Dinarès-Turell (National Institute of Geophysics and Vulcanology, Italy)
Walter Kurz (University Graz, Austria)
Elliot Carter (University of Manchester, UK)
Claire Routledge, (Kiel University, Germany)
Leonardo Tamborrino (MARUM Bremen, Germany)
Andrew McIntyre (University of Leicester, UK)
Lewis Grant (University of Southampton, UK)

IODP Expedition 393

JOIDES Resolution Science Operator

7 June – 7 August 2022

South Atlantic Transect II

Co-chief Scientists
Damon Teagle (University of Southampton, UK)

Participating Scientists
Elmar Albers (University of Bremen, Germany)
Chiara Amadori (University of Pavia, Italy)
Thomas Belgrano (University of Southampton, UK)
Aled Evans (University of Southampton, UK)
Michelle Harris (University of Plymouth, UK)
Marcin Latas (University College London, UK)
Paul Moal-Darrigade (Université de Bordeaux, France)
Claudio Robustelli Test (University of Torino, Italy)
Alina Shchepetkina (University of Lisbon, Portugal)

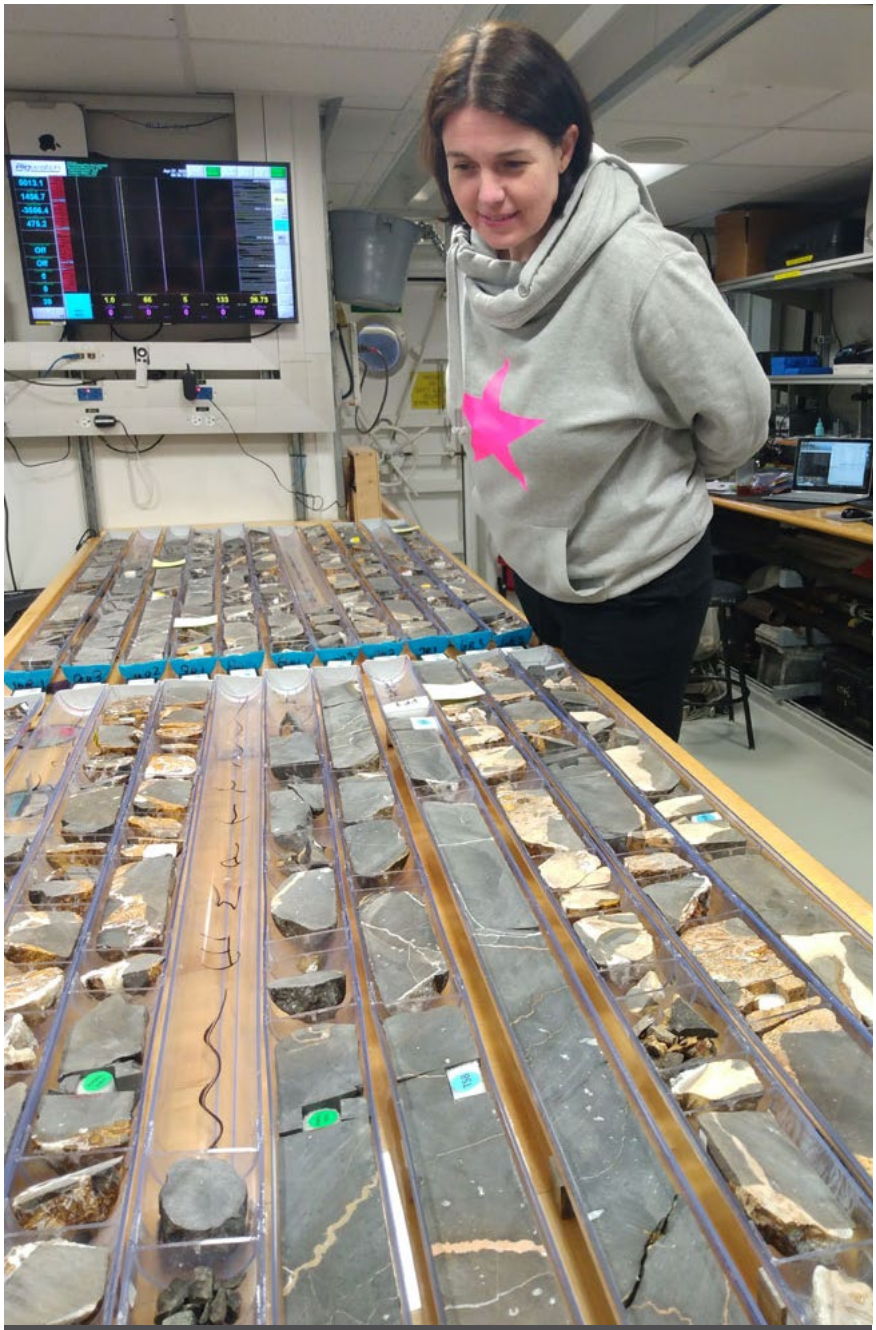
http://iodp.tamu.edu/scienceops/expeditions/south_atlantic_transect.html

Exp. 390 and 393 Scientific goals

The South Atlantic Transect (SAT) is a multidisciplinary scientific ocean drilling project that comprises four IODP expeditions: engineering Expeditions 390C and 395E as well as Expeditions 390 and 393. Altogether, the expeditions aim to recover complete sedimentary sections and the upper 100–350 m of the underlying oceanic crust along a slow/intermediate spreading rate Mid-Atlantic Ridge crustal flow line at ~31°S. The sediments along this transect were originally spot cored more than 50 years ago during Deep Sea Drilling Project Leg 3 (December 1968–January 1969) to help verify the theories of seafloor spreading and plate tectonics. Given dramatic advances in drilling technology and analytical capabilities since Leg 3, many high-priority scientific objectives can be addressed by revisiting the transect. The SAT expeditions target six primary sites on 7, 15, 31, 49, and 61 Ma ocean crust, which fill critical gaps in our sampling of intact in situ ocean crust with regards to crustal age, spreading rate, and sediment

thickness. Drilling these sites is required to investigate the history of the low-temperature hydrothermal interactions between the aging ocean crust and the evolving South Atlantic Ocean and quantify past hydrothermal contributions to global biogeochemical cycles. Samples from the transect of the previously unexplored sediment- and basalt-hosted deep biosphere beneath the South Atlantic Gyre are essential to refining global biomass estimates and examining microbial ecosystems' responses to variable conditions in a low-energy gyre and aging ocean crust. The transect is located near World Ocean Circulation Experiment Line A10, providing access to records of carbonate chemistry and deepwater mass properties across the western South Atlantic through key Cenozoic intervals of elevated atmospheric CO_2 and rapid climate change. Reconstruction of the history of the deep western boundary current and deepwater formation in the Atlantic basins will yield crucial data to test hypotheses regarding the role of evolving thermohaline circulation patterns in climate change and the effects of tectonic gateways and climate on ocean acidification.

Engineering Expeditions 390C and 395E cored a single hole through the sediment/basement interface with the advanced piston corer/extended core barrel system at five of the six primary proposed SAT sites and installed a reentry system with casing either into basement or within 10 m of basement at each of those five sites. Expedition 390 (7 April–7 June 2022) conducted operations at three of the SAT sites, recovering 700 m of core (77% recovery) over 30.3 days of on-site operations. Sediment coring, basement drilling, and logging were conducted at two sites on 61 Ma crust, and sediment coring was completed at the 7 Ma crust site. At Site U1557 on 61 Ma crust, the drill bit was deposited on the seafloor prior to downhole logging, leaving Hole U1557D available for future deepening and to establish a legacy borehole for basement hydrothermal and microbiological experiments. Expedition 390 scientists additionally described, and analyzed data from, 792 m of core collected during Expeditions 390C and 395E. Expedition 393 plans to operate at four sites, conducting basement drilling and downhole logging at the 7 Ma site, in addition to sediment coring, basement drilling, and logging at the sites intermediate in age.



Co-chief Scientist Roz Coggon (University of Southampton, UK) gazes over the sections taken for a sampling party onboard *JOIDES Resolution* during IODP Expedition 390 I. Credit: A. Stephens, IODP JRSO.

IODP Expedition 397

JOIDES Resolution Science Operator

11 October – 11 December 2022

IODP Expedition 397: Iberian Margin Paleoclimate

Co-chief Scientists	Fatima Abrantes (Institute of the Sea and Atmosphere, Portugal) David Hodell (University of Cambridge, UK)
Participating Scientists	José-Abel Flores (University of Salamanca, Spain) Emilia Salgueiro (Institute of the Sea and Atmosphere, Portugal) Chuang Xuan (University of Southampton, UK) Hannah Louise Brooks (RWTH Aachen University, Germany) Stefanie Kaboth-Bahr (University of Potsdam, Germany) Jasmin Mirjam Link (Heidelberg University, Germany) Marion Peral (Université de Bordeaux, France) Louise Dauchy-Tric (Institut de Physique du Globe de Paris, France)

http://iodp.tamu.edu/scienceops/expeditions/iberian_margin_paleoclimate.html

Exp. 397 Scientific goals

The Iberian margin is a well-known source of rapidly accumulating sediment that contains a high-fidelity record of millennial climate variability (MCV) for the late Pleistocene. The late Sir Nicholas (Nick) Shackleton demonstrated that piston cores from the region can be correlated precisely to polar ice cores in both hemispheres. Moreover, the narrow continental shelf off Portugal results in the rapid delivery of terrestrial material to the deep-sea environment, thereby permitting correlation of marine and ice core records to European terrestrial sequences. Few places exist in the world where such detailed marine-ice-terrestrial linkages are possible. The continuity, high sedimentation rates, and fidelity of climate signals preserved in Iberian margin sediments make this region a prime target for ocean drilling.

During IODP Expedition 339 (Mediterranean Outflow), one of the sites proposed here was drilled to a total depth of 155.9 meters below seafloor in multiple holes. At Site U1385 (the "Shackleton site") a complete record of hemipelagic sedimentation was recovered for the last 1.45 My corresponding to Marine Isotope Stage 47 with sedimentation rates of 10–20 cm/ky. Preliminary results from Site U1385 demonstrate the great promise of the Iberian margin to yield long records of millennial-scale climate change and land–sea comparisons.

IODP Expedition 397 will extend this remarkable sediment archive through the Pliocene and expand the depth range of available sites by drilling additional sequences in water depths from 1304 to 4686 meters below sea level (mbsl). This depth transect is designed to complement those sites drilled during Expedition 339 (560–1073 mbsl) where sediment was recovered at intermediate water depth under the influence of Mediterranean Outflow Water (MOW). Together, the sites recovered during Expeditions 339 and 397 will constitute a complete depth transect with which to study past variability of all the major subsurface water masses of the eastern North Atlantic. Because most of the mass, thermal inertia, and carbon in the ocean-atmosphere system is contained in the deep ocean, well-placed depth transects in each of the major ocean basins are needed to understand the underlying mechanisms of glacial–interglacial cycles and MCV. We have identified four primary sites (SHACK-4C, SHACK-10B, SHACK-11B, and SHACK-14A) at which multiple holes will be drilled to ensure complete recovery of the stratigraphic sections at each site, ranging in age from the latest Miocene to Holocene. Building on the success of Site U1385 and given the seminal importance of the Iberian margin for paleoclimatology and marine-ice-terrestrial correlations, the cores recovered during Expedition 397 will provide present and future generations of paleoceanographers with the raw material needed to reconstruct the North Atlantic climate at high temporal resolution for the entire Quaternary and Pliocene.

5. Selected 2022 IODP publications from ECORD scientists

256 publications

1. Abbott, A. N., Löhr, S. C., Payne, A., Kumar, H., & Du, J. (2022). Widespread lithogenic control of marine authigenic neodymium isotope records? Implications for paleoceanographic reconstructions. Geochimica et Cosmochimica Acta, 319, 318–336. https://doi.org/10.1016/j.gca.2021.11.021

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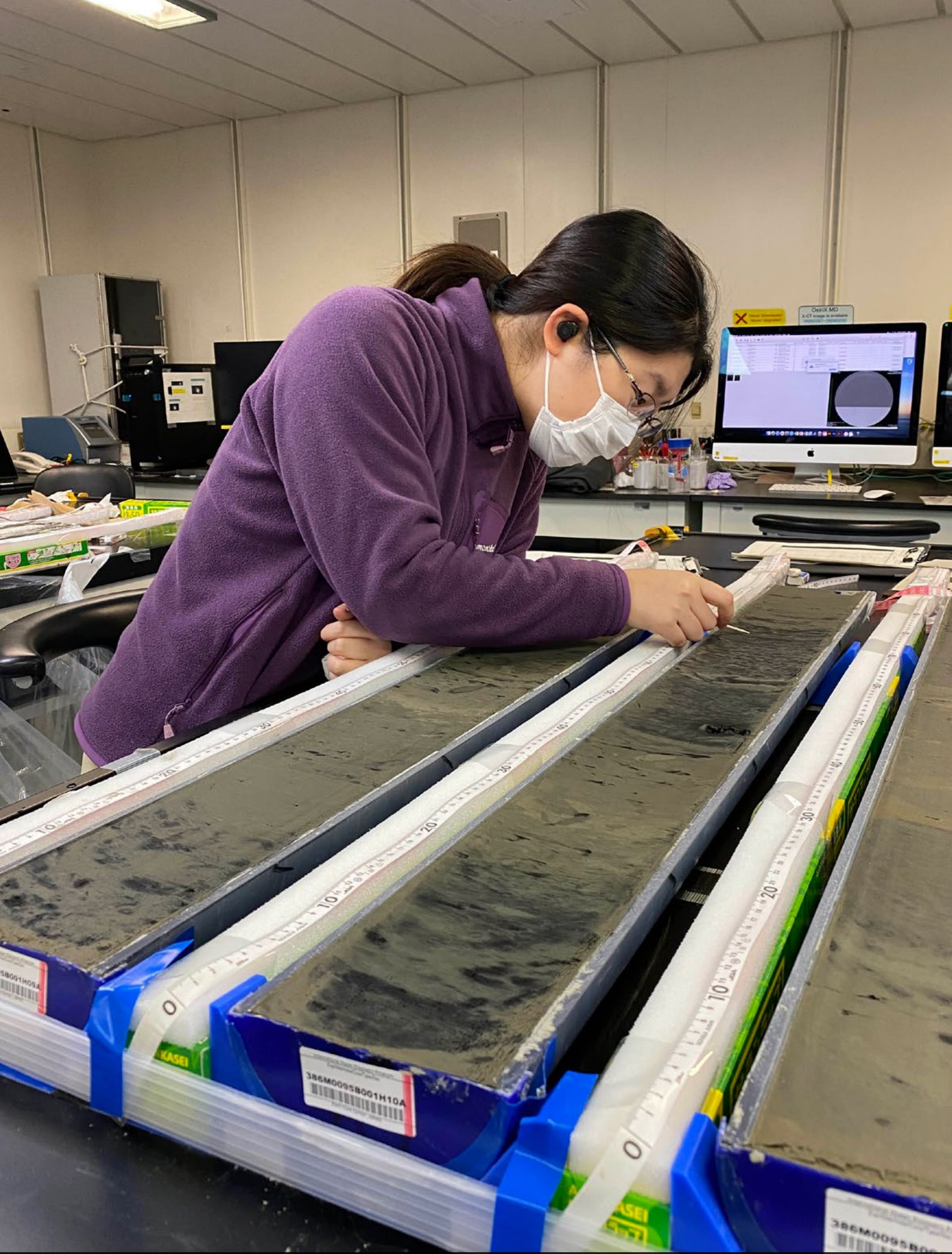


Sampling cores during the OSP for IODP Expedition 386 onboard *Chikyu*. Credits: N. Okutsu, ECORD/IODP/JAMSTEC.

6. Archiving IODP cores: the IODP Bremen Core Repository

Sediment samples taken during the Onshore Science Party for IODP Expedition 386 onboard D/V *Chikyu* in Japan were delivered to Bremen Core Repository in Germany. The samples were safely packed and refrigerated in polystyrene boxes. Credit: U. Röhl, ECORD/IODP/JAMSTEC.

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 (OSP) of and providing mobile laboratories and scientific expertise for Mission Specific Expeditions (MSPs).

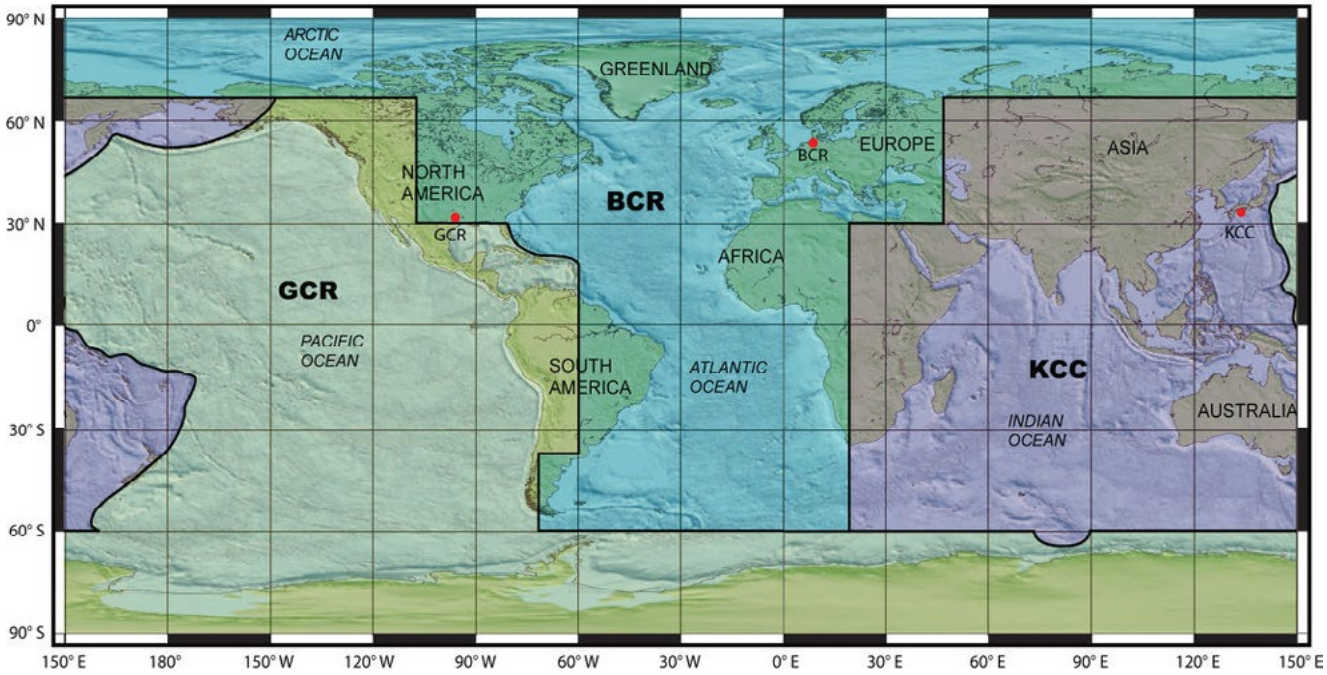
BCR was founded in 1994 and moved to the MARUM building on the University of Bremen campus in 2005. During the DSDP/ODP Core Redistribution project (2006-2008) the collection grew from 75 km to 140 km of cores, currently the collection holds more than 170 km of cores acquired during 98 expeditions.

Universität Bremen ECORD IODP

Effects of the Corona pandemic on BCR operation

BCR was far less affected by the pandemic in 2022, and any temporary backlogs could be dealt with in a timely manner and there was no sample request stack by the end of the year. IODP sample requests were accepted throughout the year, but the completion and shipment of requested samples was slightly delayed in some cases.

Also, not all requesters' institutions were able to accept shipments and therefore the BCR refrained from shipping these samples during some intervals contributing to a temporary batch of non-completed sample requests.



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, requests, and data management at BCR

BCR statistics

A total of 32,364 samples were taken at the BCR for 204 requests (of which 93 were submitted by scientists based in ECORD-countries).

All BCR samples (over 1.82 million samples/more than 7,881 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)
	97	170
	Sample Requests (from ECORD countries)	**Samples taken**
Bremen Core Repository FY22	203 (104)	32,364 (18,194)
Bremen Core Repository (since opening in 1994)	5,5431	1,141,084
From all cores stored at BCR	7881	1,818,510

Database: the BCR DIS Internet Interface

We still maintain the status quo of the currently running CurationDIS (legacy version) at the BCR. Since 2019, we closely follow the developments of the next generation of database, the "mobile Drilling Information System" (mDIS, initiated by the ICDP) in close collaboration with the ICDP at the German Research Centre for Geosciences (GFZ) in Potsdam, the developments for an AWI SAMS (SAmple Management System) also based on the ICDP mDIS, as well as the exchange group sample management (break-out group "mDIS") as part of the University of Bremen Research Alliance (UBRA). Orders have been placed for programming features for our new mDIS database. A full version of the new mDIS database is housed on the MARUM server system for final test and implementation. It is anticipated that the full version of our mDIS will be in operation in the repository early in 2023.

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.

After the dried sample material that arrived to BCR from Japan has been grinded, it was filled into glass vials. Splits of these master samples were analyzed in different laboratories. Credit: U. Röhl, ECORD/IODP.

Ion Chromatograph was used to measure the sets of samples that arrived at Bremen Core Repository from IODP Expedition 386 OSP that took place onboard D/V *Chikyu*, Japan. Credit: U. Prange, ECORD/IODP.

MSP Expeditions at BCR

IODP Expedition 386: Japan Trench Paleoseismology

Support was provided through the discussion of core-flow, core handling, and lab layout planning for the OSP that was held from 14 February to 15 March 2022. The OSP onboard *Chikyu* successfully processed all the expedition´s cores. Sample shipments for analyses at MARUM have been received and a portion was forwarded to EPC at Leicester University. BCR staff supported sample preparation for shipboard analyses carried out at MARUM (e.g., XRD). All incoming sample request and related scientists' information have been entered into the Drilling Information system (DIS). Afterward planning and preparations have been carried out for the Personal Sample Party (PSP) that was held onboard *Chikyu* (13 - 30 November 2022). Two staff members completed the ESO Team on board the *Chikyu*. Data Management was handled remotely at MARUM

IODP Expedition 377: Arctic Ocean Paleoceanography (ArcOP)

The suite of laboratory containers underwent maintenance to be ready for implementation of the offshore phase of IODP Expedition 377 in summer 2022. All incoming science party members' sample requests and metadata were integrated into the DIS; however, the expedition was then postponed in April 2022.

IODP Expedition 389: Hawaiian Drowned Reefs

BCR staff attended the IODP Expedition 389 Webinar held online in September 2022. The suite of laboratory containers underwent maintenance to be ready for implementation of the offshore phase of the expedition in summer 2022. Science party members' sample requests started to be submitted at the end of the year.

Data from the samples' measurements are processed, quality-checked, and evaluated by the geochemistry lab at BCR and then interpreted by the geochemists among the science party of the IODP Expedition 386. Credit: U. Röhl, ECORD/IODP.

Cores from *JOIDES Resolution* expeditions for the BCR

IODP Expedition 396: Mid-Norwegian Continental Margin Magmatism

The working halves core sections from IODP Expedition 396: Mid-Norwegian Continental Margin Magmatism, are at the BCR since October 2021. We closely collaborated with the GCR on planning the respective Sampling Party held from 21 to 28 April 2022 in Bremen. By the end of the Sampling Party, **a total of about 13,598 samples** was taken.

IODP Expedition 396 Sampling Party group picture. Credit: Carlos A. Zarikian, IODP.

IODP Expedition 391: Walvis Ridge Hot Spot

For IODP Expedition 391: Walvis Ridge Hot Spot, we also closely collaborated with the GCR on the sample plan for the respective Sampling Party that was held between 13 and 17 June 2022 in Bremen. **A total of about 2,041 samples** was taken.

Will Sager (IODP Expedition 391 Co-chief scientist), T. Höfig (IODP Expedition Project Manager), and H. Grant (EPM for MSPs, BGS, Edinburgh) jointly identifying sample locations. Credit: U. Röhl, IODP and MARUM.

Cores received by BCR in 2022 from other IODP expeditions

In 2022, the BCR received 11.51 km of cores from the following expeditions:

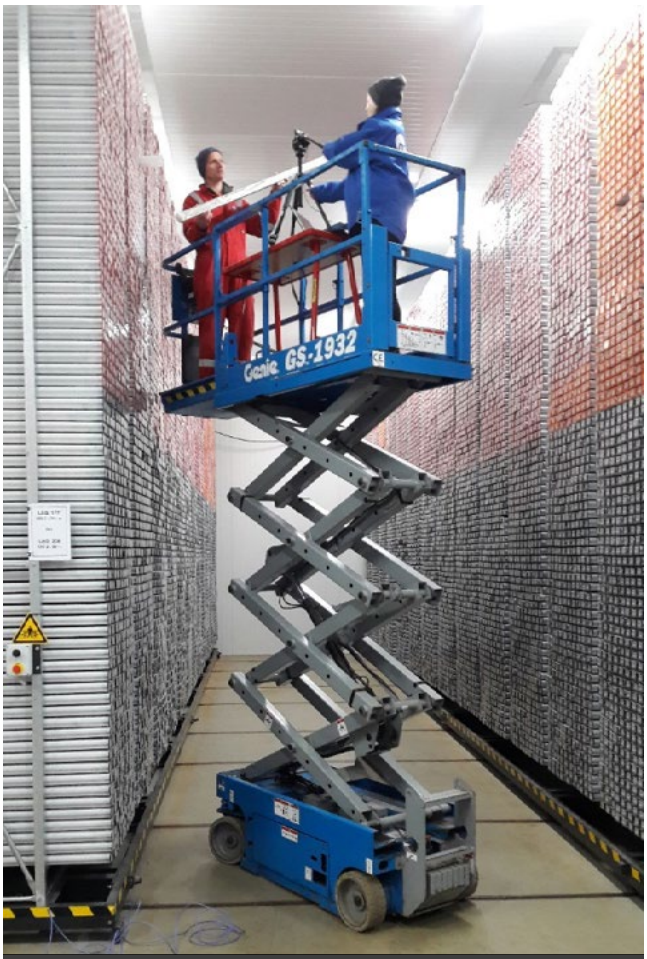
1. IODP Expedition 384: Engineering testing (July to Sept 2020) - 0.23 km;
2. IODP Expedition 390C: South Atlantic Transect Reentry Installations (October - December 2020) - 0.86 km;
3. IODP Expedition 395E: Complete South Atlantic Transect Reentry Installations (April - June 2021) - 0.18 km;
4. IODP Expedition 395C: Reykjanes Mantle Convection & Climate: Crustal Objectives (June - August 2021) - 2.44 km;
5. IODP Expeditions 390 and 393: South Atlantic Transect I+II (April - August 2022), and 397T - 1.7 km;
6. IODP Expedition 397: Iberian Margin Paleoclimate (October - December 2022) - 6.1 km.

Visitors at the BCR

The location of the BCR on the University of Bremen campus has proven to be very convenient for a wide variety of visitors, including summer school and conference participants, young scientists and students, university visitors, TV teams, radio stations, journalists, photographers, artists, VIPs, IODP meeting participants, industry visitors, schoolchildren, teachers, future expedition participants, museum representatives, individual scientists, and sampling party participants. Each visit presents an opportunity for ESO-Bremen staff to promote the work and opportunities of IODP to diverse audiences.

In 2022, the BCR welcomed many visitors, ranging from walk-in scientific visitors, the general public, school classes (including skype conferences to geo show "unterirdisch" in Berlin at the occasion of the German IODP/ICDP Meeting in Potsdam), and visiting students' groups from other universities in Germany and Europe and official delegations visiting the University of Bremen.

Since the Corona measures have been eased, it was possible to welcome visitors in the labs and reefer again, of course applying all necessary hygiene measures.



Live broadcast to the GeoShow "Unterirdisch" held at Urania Society, Berlin, with J. Nitsch and H. Kuhlmann. Courtesy MARUM and IODP.

In 2022, amongst others, the BCR was visited by:

- Maria-Helga Gudmundsdottir in charge of a core collection at the Icelandic Institute of Natural History to learn about core repository procedures and operation,
- Dr. Michaela Muylkens from the Bremen Government Agency of Science and Ports,
- students from "Marine Robotics" at Jacobs University in Bremen,
- K. Ververaki from the University of Crete, Greece and M. Kanakidou, Excellence Chair of the University of Bremen,
- S. Berka, Executive Director, International Engineering Program, University of Rhode Island, USA,
- a delegation from the Korea Institute of Geoscience and Mineral Resources (KIGAM),
- participants of the 15th International Coral Reef Symposium held in Bremen, HRH Prince Albert II. of Monaco visited MARUM and BCR at the occasion of the opening of the 15th International Coral Reef Symposium (*see photo on the next page*),
- participants of the 12th International Conference on Climatic and Biotic Events of the Paleogene (CBEP12) held in Bremen,
- Otmar Wiestler, president of the Helmholtz Association,
- participants of the "Ocean Floor Symposium" organized by the Cluster of Excellence "The Ocean Floor - Earth's Uncharted Interface" at MARUM,
- participants of the Conference "Wissenswerte" held in Bremen for science journalists,
- participants of the Annual Meeting of The Micropaleontological Society (TMS) held at MARUM,
- James F. Allan, Program Director Ocean Drilling Program,
- Kevin T. Johnson, Program Director Marine Geology and Geophysics, at the National Science Foundation (NSF), and
- Guido Lüniger, Program Director Geosciences at the German Research Foundation (DFG).

Visits by media representatives

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 French TV team carried out footage and interviews, a team from University of Bremen's Communication and Marketing carried out filming for their campaign "You know why", and a Danish TV team accompanied by EXC University of Bremen Excellence Chair E. Willerslev from the Centre for GeoGenetics, University of Copenhagen, Denmark, did some filming.

HRH Prince Albert II. of Monaco discussing climate archives with M. Kucera. Credit: V. Diekamp, MARUM and IODP.

Training students

This year, the BCR provided core material again 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 the ECORD Summer School program could pick up again and as a result the postponed 14th ECORD Summer School that was dedicated to the topic of "Sea level, climate variability, and coral reefs" was held in September 2022 (*See 7.1 Training young scientists on page 95*).

Smear slide analysis during the ECORD Summer School 2022. Credit: U. Röhl, MARUM and IODP.

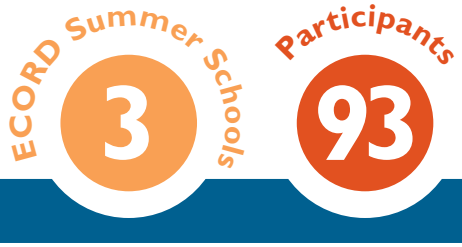
Related website

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

7. Engaging the community

Participants of the night shift of the Personal Sampling Party for IODP Expedition 386 onboard D/V *Chikyu*.
Credit: P. Bellanova, ECORD/IODP/JAMSTEC.

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. Two ECORD Summer schools were sponsored by ECORD in 2022. The 2022 ECORD Summer School: Downhole Logging for IODP Science was held online.

ESSAC supported 20 students with ECORD Scholarships to participate in the ECORD Summer Schools.

In addition to the three Summer Schools organised by ECORD (*see pages 96 - 98*), eight between early-careers researchers and students received an ECORD scholarship to attend the summer school GLAcial Sedimentation School (GLASS): Interpreting past climate using Antarctic and Greenland sediment cores 2022, Oregon State University Marine and Geology Repository (OSU-MGR), Corvallis, OR, USA, 23–27 May 2022.

Distribution of ECORD Scholarships in 2022 by recipients' country (n = 20)

ECORD 14th Bremen Summer School

on "Sea Level, climate variability and coral reefs"

MARUM, University of Bremen, Germany, 5-16 September 2022

30 participants

https://www.marum.de/en/education-career/ECORD-training/ECORD-Summer-Schools/2022.html

Thirty participants from 12 different nations took part in the 14th ECORD Bremen Summer School held at MARUM, University of Bremen (Germany).

Group picture ECORD Summer School 2022 in Bremen.
Credit: U. Prange, MARUM/IODP

Several presentations related to IODP and the "Virtual Drillship Experience" at the Bremen Core Repository (BCR) labs were given. Ursula Röhl was one of the organizers and presented IODP and ECORD structure and objectives, as well as the "Virtual Drillship Experience". 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.

BCR and ESO Bremen teams play a key role in the organisation of ECORD Bremen Summer Schools. Practical exercises on IODP shipboard methodologies as well as lectures and interactive discussions on the main IODP scientific themes compose the programme of these summer schools. Marisa Rydzy from the ECORD Petrophysics Consortium (EPC) also contributed to the summer school by presenting and including interactive exercises on downhole logging. For the detailed programme see *https://www.marum.de/en/education-career/ECORD-training/ECORD-Summer-Schools/2022.html*.

Visual core description with David de Vleeschouwer (University of Münster).
Credit: U. Röhl, MARUM/IODP

Center for Marine Environmental Sciences
University of Bremen

Holger Kuhlmann giving a presentation to the participants of the 14th ECORD Bremen Summer School held at MARUM, University of Bremen.
Credit: U. Röhl, MARUM/IODP

ECORD 17th Urbino Summer School in Paleoclimatology (USSP)

Urbino, Italy, 8-20 July 2022

47 participants

http://www.urbinossp.it

To promote the integration of field data and modeling results in the next generation of paleoclimatologists, the USSP Consortium and teacher pool organized the 17th annual Urbino Summer School in Paleoclimatology, which was attended by 47 graduate students from many nations.

The USSP 2022 provided a student-centred programme comprised of:

- integrated topical lectures by 20 experts in palaeontology, palaeoceanography, palaeoclimatology, and geochemistry;
- exercises, investigations, and presentations based on authentic field data and modeling results;
- parallel sessions providing groups of participants with a more focused coverage of selected topics;
- a regional field excursion to classical Cretaceous and Cenozoic sections, and
- intensive discussions of specific topics in small student working groups facilitated by dedicated instructors.

The school also included discussions on opportunities offered by ECORD following presentations by Hanno Kinkel and Angelo Camerlenghi.

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 the comparison of oceanic sequences with the local succession counterparts. In addition, USSP 2022 included a one-day workshop (17 July 2022) where instructors gave informal presentations on their latest field and modeling results, providing students with an excellent opportunity to learn about ongoing cutting-edge research and the scientific progress made in the field.

Poster Session at Urbino Summer School 2022.
Credit: U. Amarathunga, ECORD/IODP

Group picture Urbino Summer School 2022.
Credit: H. Kinkel, ECORD/IODP

6th ECORD Summer School on Downhole Logging for IODP Science

Virtual, hosted by EPC at University of Leicester, UK, 4-8 July 2022

15 participants

https://le.ac.uk/iodp/summer-schools/2022

Hosted by the University of Leicester and in its sixth year, the ECORD Summer School on Downhole Logging for IODP Science was once more organised online and attended by 15 early-career scientists representing 12 nationalities. This new format enabled a continuity in knowledge transfer while international travels and in-person meetings were still limited.

This summer school introduces the interpretation and applications of downhole logs and physical property data, primarily from IODP. It explores the relevance and unique insights of these data for a range of fields, including palaeoclimatology, sedimentology, hydrogeology, and broader geological and ecological processes such as sediment provenance and water column productivity.

The ECORD Summer School on Downhole Logging for IODP Science is open to applicants from all career stages and geoscience backgrounds. However, the course is tailored for:

- those who are early in their career and/or would like to introduce and make use of more physical properties data in their research;
- those who would like to get more involved in IODP in some capacity, either through accessing and using data or sailing on an IODP expedition.

Introductory sessions on petrophysics, the study of the physical (and chemical) properties of rocks and their interactions with fluids, are the main focuses of the summer school. These core principles are then used for insight into broader marine geoscience questions. Practical exercises and presentations provide experience for interpreting log data and integrating them with other datasets based on real world applications.

The summer school aims at providing experience in data quality assessment and basic processing, scientific log interpretation, synthetic seismogram construction, stratigraphic correlation using downhole log data, as well as insights into offshore logging planning and operations.

The 5-day summer school encompassed 30 hours of CPD-accredited training in petrophysics. The school offered synchronous as well as asynchronous online sessions to facilitate participation from a wide range of time zones every day. The school included a mixture of interactive lectures, workshops and exercises exploring different aspects of scientific downhole logging within IODP and beyond.

In 2023, the ECORD Summer School on Downhole Logging for IODP Science is expected to be held in person.

EPC
EUROPEAN PETROPHYSICS CONSORTIUM

Participants and organizers of the 2022 ECORD Summer School: Downhole Logging for IODP Science.
Screen shot kindly provided by Australian particiant Emily Conn.

7.2 Sponsoring research for young scientists

ECORD Research Grants

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.

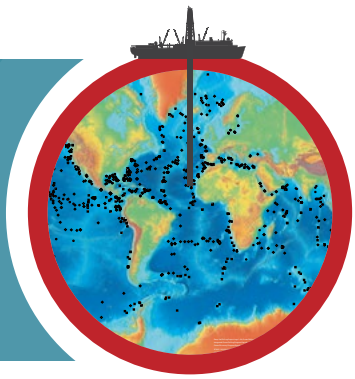
The aim is to foster participation of early-career scientists in ocean drilling research and encourage them to develop their own projects and collaborate with other research groups outside their home institutions.

In 2022, 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 abroad in order to promote mobility and network building among early-career researchers.

One of the science meetings during the Personal Sampling Party for IODP Expedition 386 onboard D/V *Chikyu*.
Credit: E. Le Ber, ECORD/IODP/JAMSTEC.

7.3 MagellanPlus Workshop Series Programme

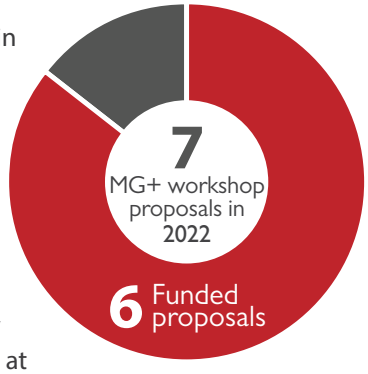
The ECORD/ICDP MagellanPlus Workshop Series Programme is designed to support European and Canadian scientists to **develop new and innovative science proposals that follow the major themes of the IODP and ICDP Science Plans and the 2050 Science Framework.**



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 2022 for the organisation of workshops in late 2022 or in 2023.

At the 15 January deadline, three proposals were received and all proposals were funded. At the 15 May deadline, four proposals were received and three proposals were funded.



In 2022, seven regular and three exploratory workshops have been organised. The latter aim at generating MSP drilling proposals, either as stand-alone projects or as part of land-to-sea transects that integrate marine and continental coring. Scientific themes of these topical workshops must be aligned with the Strategic Objectives defined in the 2050 Science Framework.

At the start of the Personal Sampling Party for IODP Expedition 386. Credit: L. Maeda, ECORD/IODP/JAMSTEC.

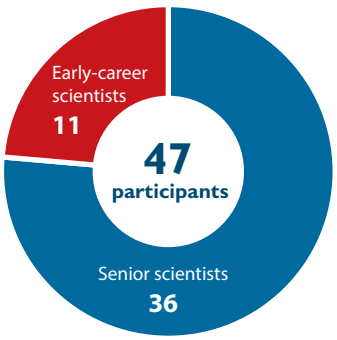
Seven **regular MagellanPlus workshops** have been organized in 2022

MagellanPlus: **TIMOR Workshop**
TracIng Monsoon, Ocean currents and diagenetic carbon Redistribution
Vienna, Austria, 19-22 May 2022

Convenors Uwe Balthasar (University of Plymouth, UK), Jennifer Biddle (University of Delaware, USA), Clara Bolton (CEREGE, France), Hal Bradbury (University of Cambridge, UK), David De Vleeschouwer (University of Münster, Germany), Ann Holbourn (University of Kiel, Germany), Wolfgang Kuhnt (University of Kiel, Germany), Axel Munnecke (University of Erlangen, Germany), Theresa Nohl (University of Erlangen, Germany), Kirstie Wright (Heriot-Watt University, UK), Martin Zuschin (University of Vienna, Austria)

The aim of the TIMOR workshop was to develop an IODP mission-specific platform (MSP) proposal to study two separate but complementary topics in a single expedition:

- the early diagenetic redistribution of carbon via the microbially driven oxidation of organic carbon, the dissolution of aragonite and the precipitation of calcite, and
- the palaeoclimatic and palaeoceanographic impacts of Quaternary Monsoon and Indonesian Throughflow variability in the Timor Sea.



Participants of the MagellanPlus: TIMOR Workshop

MagellanPlus: **Belize Workshop** | IODP drilling off the Belize Barrier Reef (Central America) to reconstruct postglacial environmental changes

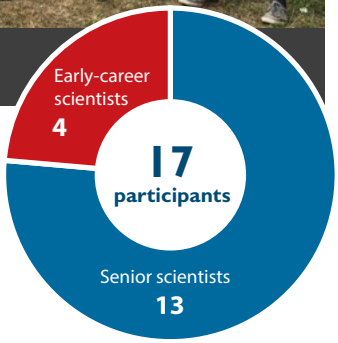
Frankfurt/Main, Germany, 8-10 July 2022

Convenors: Eberhard Gischler (University of Frankfurt, Germany), Flavio Anselmetti (University of Bern, Switzerland), Stefano Fabbri (University of Bern, Switzerland)

The aim was to develop an IODP pre-proposal to drill in the deep forereef of the Belize Barrier Reef, western Caribbean Sea. Four tentative objectives were suggested and have been discussed at the workshop:

1. quantification of postglacial reef composition and architecture as response to sea-level and climate change,
2. elaboration of a reef-derived Atlantic postglacial sea-level curve from the western Caribbean,
3. extraction of environmental data on temperature and carbonate saturation during the post-glacial period, and
4. detailing Pleistocene reef initiation and paleoecology.

Belize Workshop participants.

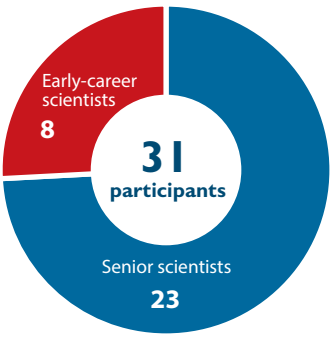


MagellanPlus: **SCYLLA Workshop** | Serpentinite diapirs in the Calabrian Subduction sYstem return Lower plate mantLe from EArth's oldest ocean

Bologna, Italy, 21-23 September 2022

Convenors: Luca Gasperini (ISMAR, Italy), Alina Polonia (ISMAR, Italy)

The aim of the SCYLLA workshop was to discuss the rationale to submit an IODP proposal to drill and core underplated serpentinite diapirs in the Calabrian Arc subduction system (central Mediterranean Sea) derived directly from the oldest in situ ocean in the world. It tackled fundamental questions on the structure and nature of subducting slabs and their implications for material recycling, mantle evolution and seismogenesis in subduction zones. This workshop aimed to involve a broad scientific community, ranging from sedimentologists, geophysicists, geochemists, volcanologists, and seismologists to microbiologists.

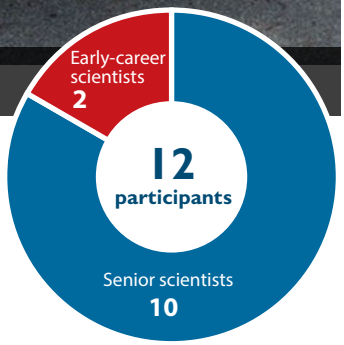


MagellanPlus: **COSNICA Workshop** | The life cycle of a microplate at a convergent margins
Graz, Austria, 27-30 September 2022

Convenors: Walter Kurz (University of Graz, Austria), Steffen Kutterolf (GEOMAR, Germany), Jennifer Brandstätter (University of Graz, Austria), Paola Vannucchi (University of Florence, Italy)

The overarching workshop objective was to integrate several drilling projects offshore Nicaragua and Costa Rica under a general umbrella theme, and to develop and brainstorm two IODP-Pre-Proposals targeting the Cocos Plate and the Nicaraguan fore-arc region. The first objective was the result of unsolved questions arising from two CRISP expeditions (Expeditions 334 and 344) and the second objective has a potential amphibian component associated to the ICDP workshop proposal that has been held in March 2020 in Nicaragua to drill the terrestrial part of the Nicaragua depression. These two drilling targets will additionally complement a third proposed project at the Nicaraguan section of the incoming Cocos Plate where bend faults will be targeted and where a successful Magellan workshop was held in 2016 in London.

COSNICA Workshop participants.



MagellanPlus: **VoCS** | The coupling of volcanic, climatic and sedimentary processes across the lifetime of arc-volcanic systems
Lecco, Italy, 12-14 October 2022

Convenors: Andrea Di Capua (CNR IGAG of Milan, Italy), Sebastian Watt (University of Birmingham, UK)

The aim was to develop an IODP/ICDP proposal investigating feedbacks between climatic and volcanic processes in glaciated regions. Understanding the tempo and magnitude of these feedbacks requires high-resolution reconstructions of volcanic, climatic and sedimentary processes. Drilling can meet this challenge: the authors proposed a novel strategy sampling proximal sequences to target long and detailed records of individual volcanoes, to advance our understanding of how surface processes modulate volcanism.

MagellanPlus: **SVALCLIME Workshop** | Deep-time Arctic climate archives: High-resolution coring of Svalbard's sedimentary record

Longyearbyen, Norway, 18-21 October 2022

Convenors Kim Senger (UNIS, Norway), Aleksandra Smyrak-Sikora (UNIS, Norway), Sverre Planke (University of Oslo, Norway), Morgan Jones (University of Oslo, Norway), Denise Kulhanek (University of Kiel, Germany), Valentin Zuchuat (RWTH Aachen, Germany)

The near-complete sedimentary succession preserved in high-arctic Svalbard archipelago provides a record of major global environmental changes during the Phanerozoic. The aim of the workshop was to develop one ICDP proposal, SVALCLIME, for systematic high-resolution drilling onshore Svalbard. The SVALCLIME project aims to drill five to ten shallow (<250 m depth) stratigraphic boreholes over 2-3 field seasons. The new cores will be integrated with the existing core material and key outcrop sections to generate an Arctic deep-time paleoclimate archive.

MagellanPlus: **NorthGreen Workshop** | Northeast Greenland: Unlocking records from sea to land

Copenhagen, Denmark, 21-23 November 2022

Convenors Lara F. Pérez (Geological Survey of Denmark and Greenland, Denmark), Paul C. Knutz (Geological Survey of Denmark and Greenland, Denmark), John Hopper (Geological Survey of Denmark and Greenland, Denmark), Marit-Solveig Seidenkrantz (Aarhus University, Denmark), Matt O'Regan (Stockholm University, Sweden)

The aim of the workshop was to develop MSP proposals with focus on Northeast Greenland margins and the surrounding Arctic Ocean. The sensitivity of the northern Greenland Ice Sheet to polar amplification, and year-round sea ice conditions make this region one of the most critical locations on the planet for understanding the effects of global warming. Moreover, with its oceanward connection to the Fram Strait, the Northeast Greenland margin presents a natural laboratory for understanding ice-ocean-tectonic interactions in a gateway pivotal for Earth's climate.

NorthGreen Workshop participants.

MagellanPlus: **Oceanic Life Cycle of Tectonic Plates Workshop** | Investigating the Oceanic Life Cycle of Tectonic Plates with Mission-Specific Scientific Drilling

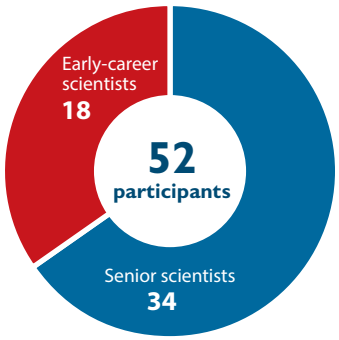
Plymouth, UK, 4-5 April 2022

Convenors: Michelle Harris (University of Plymouth, UK), Thomas Belgrano (University of Southampton, UK), Lydéric France (University of Lorraine, France), Jürgen Koepke (University of Hannover, Germany), Johan Lissenberg (Cardiff University, UK), Alessio Sanfilippo (University of Pavia, Italy), Esther Schwarzenbach (Free University of Berlin, Germany)

The primary goal is to seed Mission Specific Platform (MSP) drilling and MagellanPlus Workshop proposals that address IODP Strategic Objective 2: Oceanic Life Cycle of Tectonic Plates. This will be achieved by bringing together an international group of scientists working on different aspects of the Solid Earth cycle, including (but not limited to):

1. the creation, alteration, and subduction of oceanic lithosphere;
2. rifted margins;
3. seamounts.

The workshop will serve to identify those science questions where MSP drilling is required to advance our current understanding, as well as synergies within the Solid Earth scientific drilling community.



Oceanic Life Cycle of Tectonic Plates Workshop participants.

MagellanPlus: **Natural Hazards Workshop** | Mission-specific platform approaches to assessing natural hazards that impact society

Lisbon, Portugal, 7-9 July 2022

Convenors Hugh Daigle (University of Texas, USA), João C. Duarte (University of Lisbon, Portugal), Åke Fagereng (Cardiff University, UK), Raphaël Paris (University of Clermont Auvergne, France), Patricia Persaud (Louisiana State University, USA)

This exploratory workshop gathered representatives from a range of Earth Science disciplines to focus on three topics of natural hazards that impact society:

- hazards on active margins,
- hazards on passive margins,
- tropical cyclones in the geologic record.

The scope was intentionally broad to explore the range of potential hazards projects that can be supported by the 2050 Science Framework. The workshop had the following goals:

- outline questions in natural hazards that can be addressed with MSP drilling,
- identify field locations to examine those problems,
- develop three pre-proposals for MSP drilling.

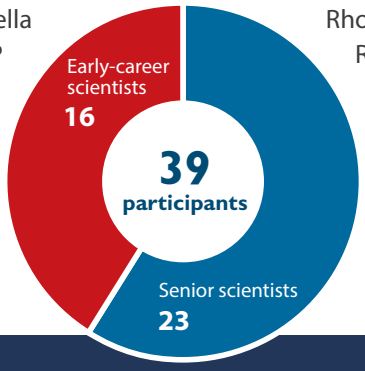
Natural Hazards Workshop participants.

MagellanPlus: **IO:DIP Workshop** | Delving Into the Past
Graz, Austria, 27-30 September 2022

Convenors Gerald Auer (University of Graz, Austria), Sietske J. Batenburg (University of Barcelona, Spain), David De Vleeschouwer (MARUM, Germany), Anna Joy Drury (University College London, UK)

The IO:DIP Workshop aimed to bring together experienced researchers with early-career scientists who have a scientific interest in developing new drilling strategies in the Indian Ocean. IO:DIP had the objective to discuss, advance, and integrate mutually-beneficial drilling proposals for the Indian Ocean. IO:DIP intended to develop a framework of overarching and interconnected research goals, gathered under the umbrella of International Ocean Drilling. Thus, IO:DIP facilitated the synchronization of future Indian Ocean proposals to realize a more cost-effective implementation of large-scale scientific objectives.

The workshop further advanced ideas developed during other recent Indian Ocean workshops (e.g., the 2020 Chapman Conference "On the Evolution of the Monsoon, Biosphere and Mountain Building in Cenozoic Asia"; the 2018 SPADE Workshop in Goa; the 2017 workshop "Land-Ocean Interactions Across the Indian Ocean: Toward Regional Integration of Recent Drilling Results" in Rhode Island; and the 2017 "Australasian IODP Regional Planning Workshop" in Sydney), with the express aim to strengthen existing (pre-)proposals and by developing a set of mutually beneficial drilling objectives.



IO:DIP Workshop participants.

So far, three regular MagellanPlus workshops are planned for 2023:

MagellanPlus: **CenoStore Workshop** | Cenozoic palaeo-climate of NW Europe and implications for subsurface CO_2 containment

Belfast, UK, 11-13 January 2023

Convenors: Andrew Newton (Queen's University Belfast, UK), Mads Huuse (University of Manchester, UK), Heather Stewart (BGS, UK), Margaret Stewart (BGS, UK), Ian Kane (University of Manchester, UK), Georgina Heldreich (University of Manchester, UK), Freek Busschers (TNO, 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 full IODP (MSP) North Sea drilling proposal.

MagellanPlus: **MAREXKUS Workshop** | MAntle Remelting and hydrothermal chemical Exchange at Knipovich Ultraslow Spreading ridge

Rome, Italy, 1-3 March 2023

Convenors: Alessio Sanfilippo (University of Pavia, Italy), Valentin Basch (National Research Council, Italy), Marco Cuffaro (National Research Council, Italy), Johan C. Lissenberg (Cardiff University, UK)

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 is to develop an MSP-type scientific drilling proposal targeting the oceanic mantle, lower crust and overlying sediments at Knipovich.

MagellanPlus: **MANTLE-L2S Workshop** | Accessing the Circum-Iberian mantle archive of Wilson Cycle processes through Land-to-Sea drilling

Plymouth, UK, 3-6 July 2023

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

ESO staff continually review the operational options and costs of potential future MSP proposals that could be developed after MagellanPlus workshops, a summary of which is given below.

Proposal/Activity	Title	Status	Latest ESO activity
Proposal(s) in development	MG+ Workshop "Investigating the Oceanic Life Cycle of Tectonic Plates with Mission-Specific Scientific Drilling".	Proposal(s) in development	ESO attended the workshop on 4-5 April.
Proposal(s) in development	MG+ Workshop "Mission-Specific Platform Approaches to Assessing Natural Hazards that Impact Society".	Proposals in development	ESO attended the workshop in Lisbon, 7-9 July.
Proposal(s) in development	MG+ Workshop "IO:DIP – Indian Ocean: Delving Into the Past".	Proposals in development	ESO attended the workshop in Graz, 27-30 Sep.
Proposal(s) in development	MG+ Workshop "Northeast Greenland (NorthGreen): Unlocking records from sea to land".	Proposals in development	ESO attended the workshop in Copenhagen, 21-23 Nov.

More info

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

www.ecord.org/science/magellanplus

8. Communicating

ECORD Sphere on display during ECORD Council-ESSAC meeting in Gargonza, Italy, November 2022.
Credits: M. Bednarz, ECORD/IODP.

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).

Within ECORD, responsibilities for outreach activities are distributed between EMA (coordination, publications and web), ESO (MSP expeditions and media) and ESSAC (education), and are coordinated by the ECORD Outreach Task Force (EOTF).

More info

www.ecord.org/outreach

www.ecord.org/resources

ECORD Outreach Task Force

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 2022: EOTF spring meeting #21 (virtual) on 22 February (I) and 15 March (II), and EOTF fall meeting #22 on 18 November in Gargonza, Italy.

EOTF spring meeting #21
22 February and 15 March 2022, virtual

EOTF fall meeting #22
18 November 2022, Gargonza, Italy

The Spring meeting in 2022 was divided into two parts, with one dedicated solely to discuss the ideas and prepare communication actions for Expedition 377: Arctic Ocean Paleoceanography (ArcOP).

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8.1 Communicating with scientists

Promoting IODP/ECORD at conferences, exhibitions and workshops

The EOTF promotes IODP and ICDP under the umbrella of **"Scientific Drilling"** at the EGU (European Geosciences Union, Europe) and AGU (American Geophysical Union, USA), which are meetings attended by thousands of scientists from all over the world every year.

Ocean Sciences Meeting 2022 Honolulu, Hawaii and virtual, 27 February - 4 March 2022

https://www.aslo.org/osm2022/

At the virtual Ocean Science Meeting 2022 EOTF had a vivid exchange and discussion in the Scientific drilling outreach session. The EOTF participated with a presentation on Mission-Specific Platform Expeditions as a means of reaching new science frontiers.

An oral presentation was submitted to the IODP Session (DS05): Time travel, legacy and Frontiers: Scientific Ocean Drilling connects the past, present and future workings of our planet. The talk focused on the MSP concept, ArcOP as one of the most challenging expeditions, and challenges in outreach.

EGU 2022 Vienna, Austria, and virtual, 23–27 May 2022

www.egu2022.eu *>7 000 scientists from 89 countries (and 7,002 virtual attendees from 116 countries)*

After two years without physical EGU meetings due to the COVID-19 crisis, the EOTF and ICDP organized a joint booth at the EGU 2022, as well as a joint hybrid Town Hall meeting. Due to the health and safety restictions related to COVID-19 pandemic, the exhibit hall was in 2022 located in a separate part of the building, with no direct access to the scientific sessions. Additionally the number of visitors allowed at the booth at the same time was restricted. This resulted in less than usuall visitors at the booth.

The IODP-ICDP Session "Achievements and perspectives in scientific ocean and continental drilling" (SSP1.2) was held on 24 May.

The ICDP-IODP/ECORD Town Hall Meeting has been organized on 24 May, 18:00 CEST as pure online event (zoom) and focus on news from both programs with plenty of time for discussion

ECORD/IODP/ICDP booth at EGU 2022 in Vienna, Austria. Credits: H. Kinkel, ECORD/IODP.

AGU 2022 Chicago, USA, 12-16 December 2022

https://www.agu.org/Fall-Meeting-2021

After a long pandemic break ECORD was able to be present at the AGU 2022 Fall Meeting again. We used this opportunity to pick up the EOTF's close collaboration with our US and Japanese IODP partners and the ICDP outreach in person.

A joint IODP-ECORD/ICDP booth was organized during the AGU Fall Meeting in Chicago. Outreach teams of ECORD and ICDP worked together with USSSP and MarE3-JAMSTEC partners in order to plan a merged space in the exhibit hall during the AGU 2022 (*see photo below*).

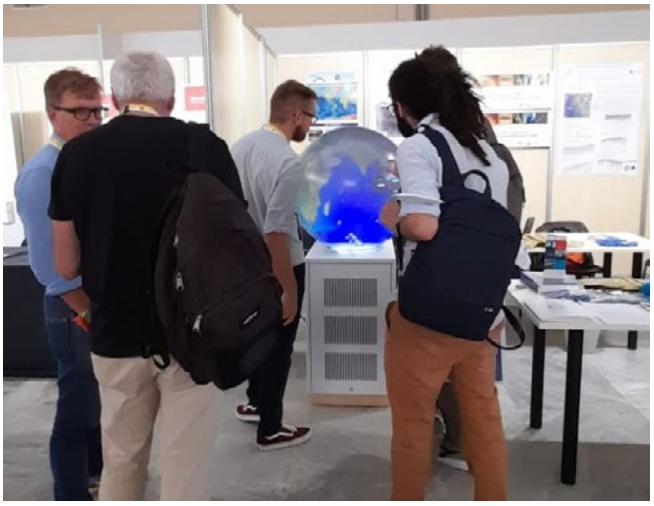
ESSAC (Angelo Camerlenghi, Hanno Kinkel) and ICDP (Thomas Wiersberg) at AGU 2022 in Chicago, USA. Credits: ECORD/IODP.

IODP/ECORD/ICDP booth at AGU 2022 in Chicago, USA. Credits: H. Kinkel, ECORD/IODP.

SGI-SIMP Congress "Geosciences for a sustainable future" Turin, Italy, 19-21 September 2022

https://www.socgeol.it/N4696/congresso-sgi-simp-2022-geosciences-for-a-sustainable-future.html

As a platinum sponsor of the congress, IODP-Italy displayed an ECORD/IODP-Italy exhibition booth at the annual congress of the Italian Geological Society (SGI). The Joint SGI-SIMP Congress "Geosciences for a sustainable future" took place in Turin in 19-21 September 2022. EOTF and ESSAC assisted with providing core replicas, 3D models of corals and the ECORD Sphere for the exhibit at this geo-scientific event. After the SGI-SIMP Congress the ECORD Sphere was presented as part of the OGS booth to the general public during **Trieste Next Science Festival**, Trieste (22-24 September 2022).



ECORD/IODP-Italy exhibition booth at the Joint SGI-SIMP Congress "Geosciences for a sustainable future", 19-21 September 2022, Turin, Italy. Top-left: Visitors at the booth looking at the ECORD Sphere. Right: ECORD Sphere and IODP-Italy giveaways. Bottom: photo of the booth staff; Jonathan Ford, Annalisa Iadanza and Hanno Kinkel. Credits: IODP-Italy

Association of French Sedimentologists (ASF) annual meeting

Brest, France, 28-30 Septembre 2022

https://asf-brest-2022.sciencesconf.org/

The Association of French Sedimentologists (ASF) organized its annual meeting in Brest in September 2022. IODP-France displayed an ECORD booth which enjoyed a great attendance. EOTF assisted with providing core replicas and promotional materials for the exhibit at this geo-scientific event.

This event was an excellent opportunity to confirm the great popularity of the programme, especially among the young generation, fascinated by the core replicas and enthusiastic about the perspective to sail.

Discussion around a core replica during ASF meeting, Brest, September 2022. Anne Briais shows to a visitor the "fireball layer" at the K/Pg boundary drilled during ODP Leg 171B. Credit: G. Ceuleneer.

8.2 Outreach for IODP expeditions

IODP Expedition 377: Arctic Ocean Paleoceanography (ArcOP)

https://www.ecord.org/expedition377

The MSP Arctic Ocean Paleoceanography (ArcOP) was supposed to be a unique scientific opportunity - and was also to be accompanied accordingly with outreach measures. Various activities were planned together with our international partners from the Swedish Polar Research Secretariat and Arctic Marine Solutions as well as with the designated Onboard Outreach Officer and the TV documentary team.

This expedition has been cancelled due to safety reasons related to the geopolitical situation since early 2022 (*see more on page 38*).

IODP Expedition 386: Japan Trench Paleoseismology

www.ecord.org/expedition386

After a successful offshore phase in 2021, scientist gathered virtually for the first hybrid and thus challenging onshore phase. With travel restrictions still valid, eight Japan based Science Party members were working onboard the D/V *Chikyu*, supported by staff from the Institute for Marine-Earth Exploration and Engineering (MarE3, JAMSTEC). All other science party members as well as ESO staff in Bremen, Edinburgh and Leicester participated online. For this – again highly unusual – onshore science phase the expedition blogsite was re-activated (*https://expedition386.wordpress.com/*). Activities were also shared on social media (Twitter, Facebook, Instagram).

In December the personal sampling party (PSP) followed, and finally all participating scientists were able to meet for the first time onboard D/V *Chikyu*, following a very strict hygiene protocol for safety reasons. The personal sampling party is not usually part of the EOTFs responsibility, but with this unusual expedition – also being organized for the first time by two Platform Providers – we were happy to follow up, again via blogposts and social media.

The Expedition was featured in NatGeo Kids and BBC News.

https://expedition386.wordpress.com/

IODP Expedition 389: Hawaiian Drowned Reefs

https://www.ecord.org/expedition389

The Mission-specific platform expedition for 2023 will be IODP Expedition 389: Hawaiian Drowned Reefs. Parallel to operations EOTF has been preparing outreach activities, such as updating the communication plan and identifying a potential candidate as onboard outreach officer.

Additionally we are liaising with colleagues from ANZIC and USSSP and reconnecting with hindsight to pre-pandemic cooperation.

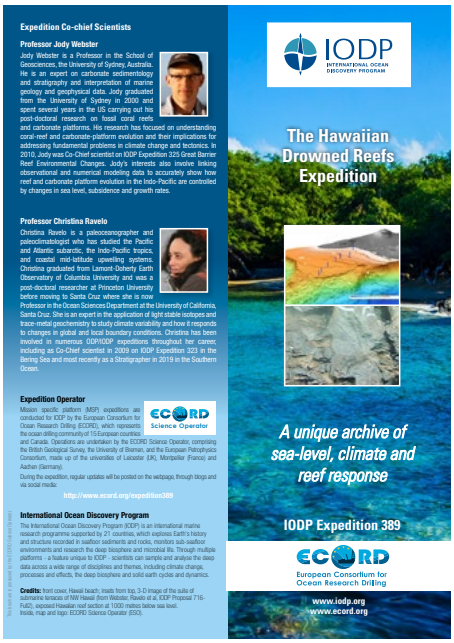


Photo-reporting during Onshore Science Party of IODP Expedition 386 onboard *Chikyu*. Credits: L. Maeda, ECORD/IODP/JAMSTEC.

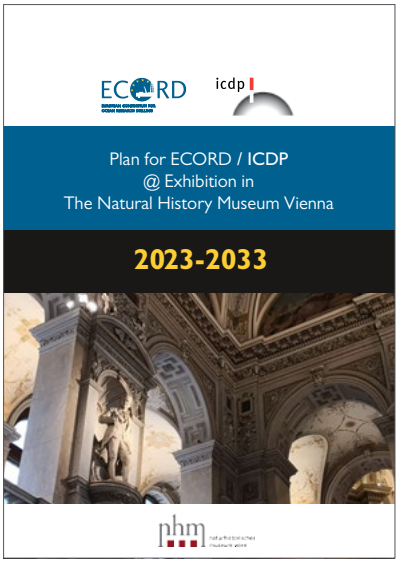
8.3 ECORD at museums and exhibitions

Permanent/long-term exhibitions

Since late 2020, the EOTF has been working towards ECORD presence at permanent exhibitions in museums 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.

Natural History Museum Vienna: "The Earth – A Dynamic Planet" (Vienna, Austria, 2023 - 2033)

The EOTF has been working with the Natural History Museum (NHM) Vienna to promote scientific drilling on the occasion of the newly planned, long-term (>10 years) exhibition at the NHM Vienna. The NHM Vienna exhibition will concentrate on geology with the focus on climate and major changes in the atmosphere and biosphere. The EOTF organized fabrication of several core replicas and other models for the exhibition, such as 1:1 models of corals associated with the core replica from Expedition 310: Tahiti Sea Level (*see Section 8.4 - 'Communicating - ECORD outreach resources' on page 122*).



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

The EOTF invited the ICDP outreach team for this initiative and joint planning for participation in the permanent exhibition at the NHM Vienna is still in place. This joint ECORD-ICDP project will deliver a section in the exhibition where scientific drilling will be promoted and explained. ECORD and ICDP will donate various materials to the NHM Vienna. Video footages and other digital resources are also being prepared. Representatives of ECORD and ICDP will participate in the discussion planned for the opening day of the exhibition. The opening ceremony (by invitation-only) will gather international experts from the field of Earth sciences, architects and artists, as well as polititians to celebrate the "The Earth - A Dynamic Planet" exhibition.

nhm naturhistorisches museum wien
natural history museum vienna

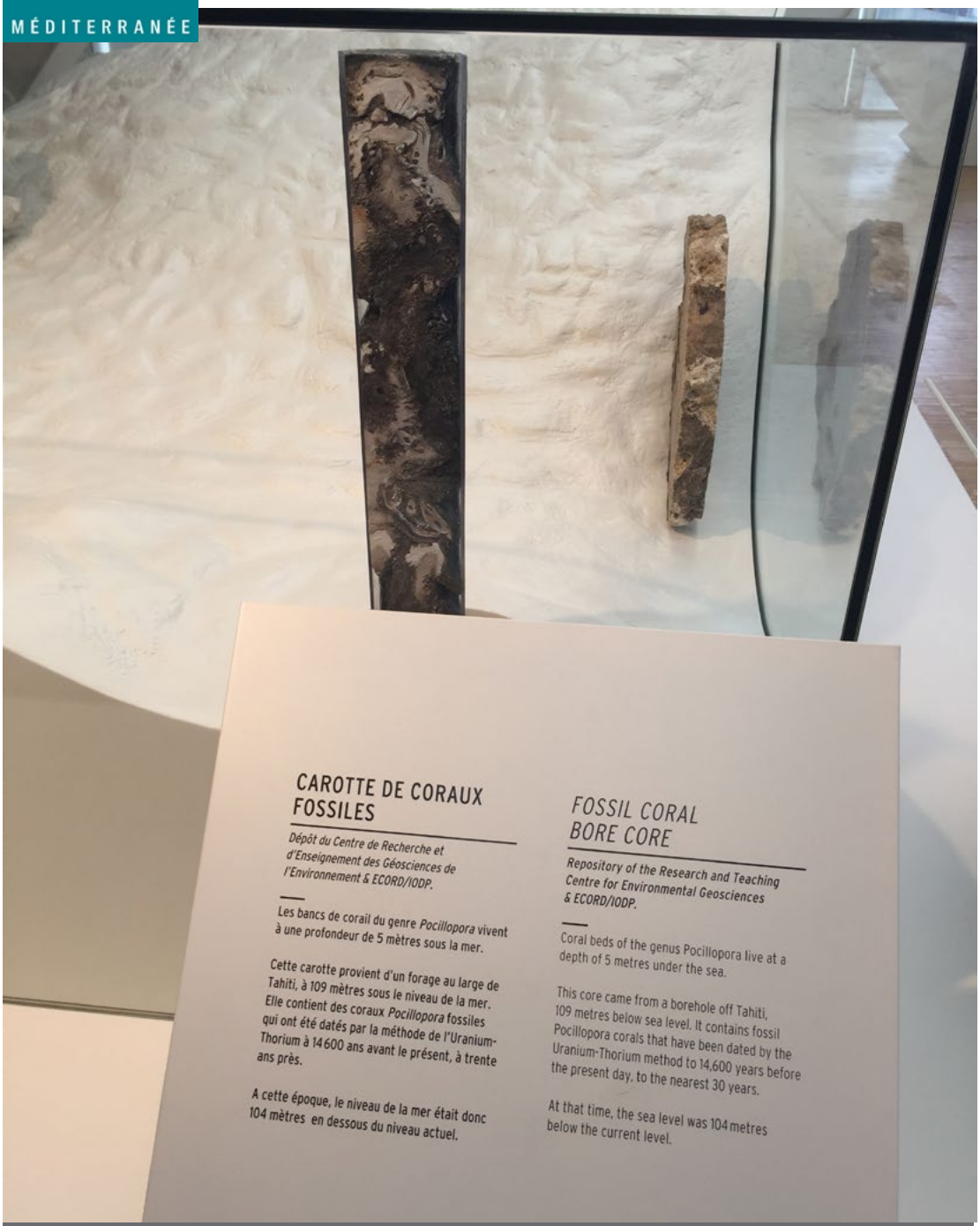
Natural History Museum Vienna. Credit: Lapping, Pixabay.

Cosquer Méditerranée museum: *La Grotte Cosquer*
Marseille, France, 2022-permenent

https://www.grotte-cosquer.com

A core replica related to IODP Expedition 310: Tahiti Sea Level is now displayed at the newly opened museum Cosquer Méditerranée (harbour of Marseille, France).

The museum shares information about the Cosquer cave that was visited by Upper Paleolithic humans during the glacial maximum (from 25000 to 19000 years before the present), when the coastline was more than ten kilometres from the seaside than it is today. The Tahiti core replica illustrates how the high-resolution dating based on corals identified in the cores help in reconstructing postglacial sea-level rise (from 19000 to 6000 years) and the following closure of the entrance to the Cosquer cave.



Core replica from the IODP MSP Expedition 310: Tahiti Sea Level at the exhibition in the Cosquer Méditerranée museum, Marseille, France. Credit: E. Bard, CEREGE/CNRS.

German Maritime Museum (DSM): *"CHANGE NOW - Ships change the world"*

Bremerhaven, Germany, 4 February - 31 July 2022

https://www.dsm.museum/en/press-area/change-now-ships-change-the-world

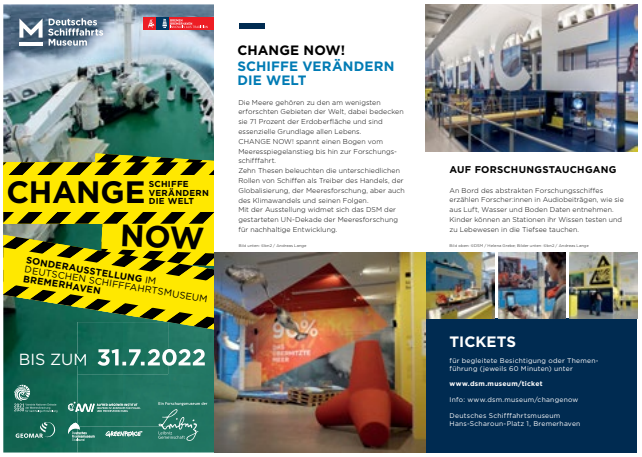
Deutsches Schifffahrts Museum

The EOTF worked with the German Maritime Museum (DSM) and provided materials and information related to IODP Expedition 302: ACEX.

The EOTF arranged a loan of the ACEX core replica and provided the museum with photographs from the expedition. Science related information was provided by Jan Backman who was Principal Investigator on the ACEX expedition, and Rudy Stein, Expedition 377 Co-chief Scientist.

The ACEX core replica was displayed in the section of "Ocean research" in the area focused on "Science". This section presented the history of ships in the light of ocean science. The core replica and the information related to the expedition were located in the immediate proximity to the model of the *Glomar Challenger* (*see photo on the next page*).

The exhibition lasted five months and is now available to be visited through a virtual tour, where the user can explore all the areas of the former physical form of the exhibition using Internet connection: *https://www.dsm.museum/en/exhibition/virtual-tour-of-change-now-and-into-the-ice*



Core replica of a section from the IODP MSP Expedition 302: ACEX displayed at the exhibition "CHANGE NOW - Ships change the world". Credits: German Maritime Museum (DSM).

Permanent exhibition focused on laboratory settings

Planned start: second half of 2023

https://www.dsm.museum/en/

Deutsches Schifffahrts Museum

The EOTF is now cooperating with the German Maritime Museum (DSM) on planning the ECORD input into the newly planned permanent exhibition focused on labolatory settings related to ocean research. ECORD will provide the museum with materlias (including donation of a core replica and model of coral *Pocillopora*) and science related info.

A core replica from IODP Expedition 310: Tahiti Sea Level and a realistic models of a coral indentified in the section (*Pocillopora eydouxi*) which will be donated to DSM for the permanent exhibit focused on labolatory settings.

Core replica of a section from the IODP Expedition 302: ACEX displayed next to the model of *Glomar Challenger* at the exhibition "CHANGE NOW - Ships change the world". Credits: German Maritime Museum (DSM).

8.4 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 ocean drilling to the public.

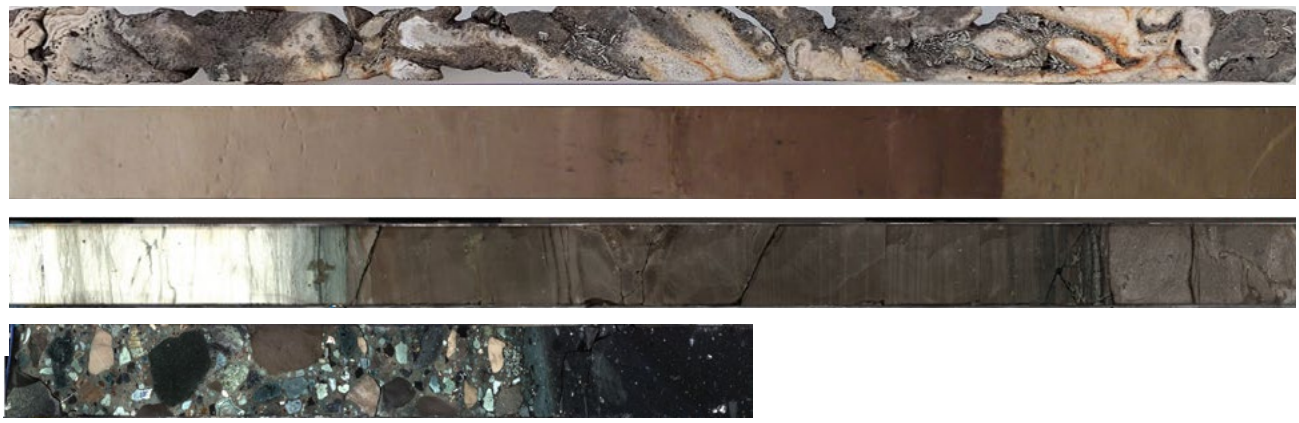
Seven replicas of ODP and IODP drilled cores are available for classroom activities and display at temporary exhibitions and conferences in Europe and Canada.

The EOTF ordered fabrication of several new core replicas some of which will be donated to muesums.

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.



Core replicas donated to NHM Vienna for long-term exhibition "The Earth - A Dynamic Planet".
Sections from top: Core 310-M0024A-10R-1, Hole 1262C - Core 5H, Section 4, Core 364-M0077A-040R-01, Core 364-M0077A-081R-002.

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 will be donated to the NHM Vienna for the permanent exhibit.

Realistic models of specimens of corals indentified in cores from MSP IODP Expedition 310: Tahiti Sea Level (Left: *Porites lobata*; right: *Pocillopora eydouxi*).

ECORD core replicas and coral models displayed at the ECORD/IODP-Italy exhibition booth at the Joint SGI-SIMP Congress "Geosciences for a sustainable future", 19-21 September 2022, Turin, Italy. Credits: IODP-Italy.

ECORD Sphere

The ECORD Spheree presents ECORD and its MSP concept on an interactive spherical display, which is to be loaned to museums and aquariums across Europe and showcased at meetings and conferences.

The ECORD Sphere is targeted at the general public. The scientific content focuses on an introduction to the four IODP science themes, IODP/ECORD drilling vessels, selected IODP/ECORD expeditions covering all IODP themes and the three IODP core repositories. It also illustrates and/or animates selected scientific data of ocean acidity, sea-level rise, draining the oceans and tectonic plates.

ECORD Sphere has been completed in 2021 and then the project entered the stage of testing by the EOTF. After the testing was completed, the Sphere was made available for temporary exhibitions, conferences and ECORD meetings.

ECORD Sphere was displayed in Italy at the SGI-SIMP Joint Congress: Geosciences for a sustainable future in Turin on 19-21 September 2022. Subsequently it was presented to the general public during the Trieste Next Science Festival on 22-24 September 2022 (*read more on page 114*). During these events the ECORD Sphere was presented to several thousand of people and proved its role as an exceptional way to convey the mission of scientific ocean drilling and ECORD.

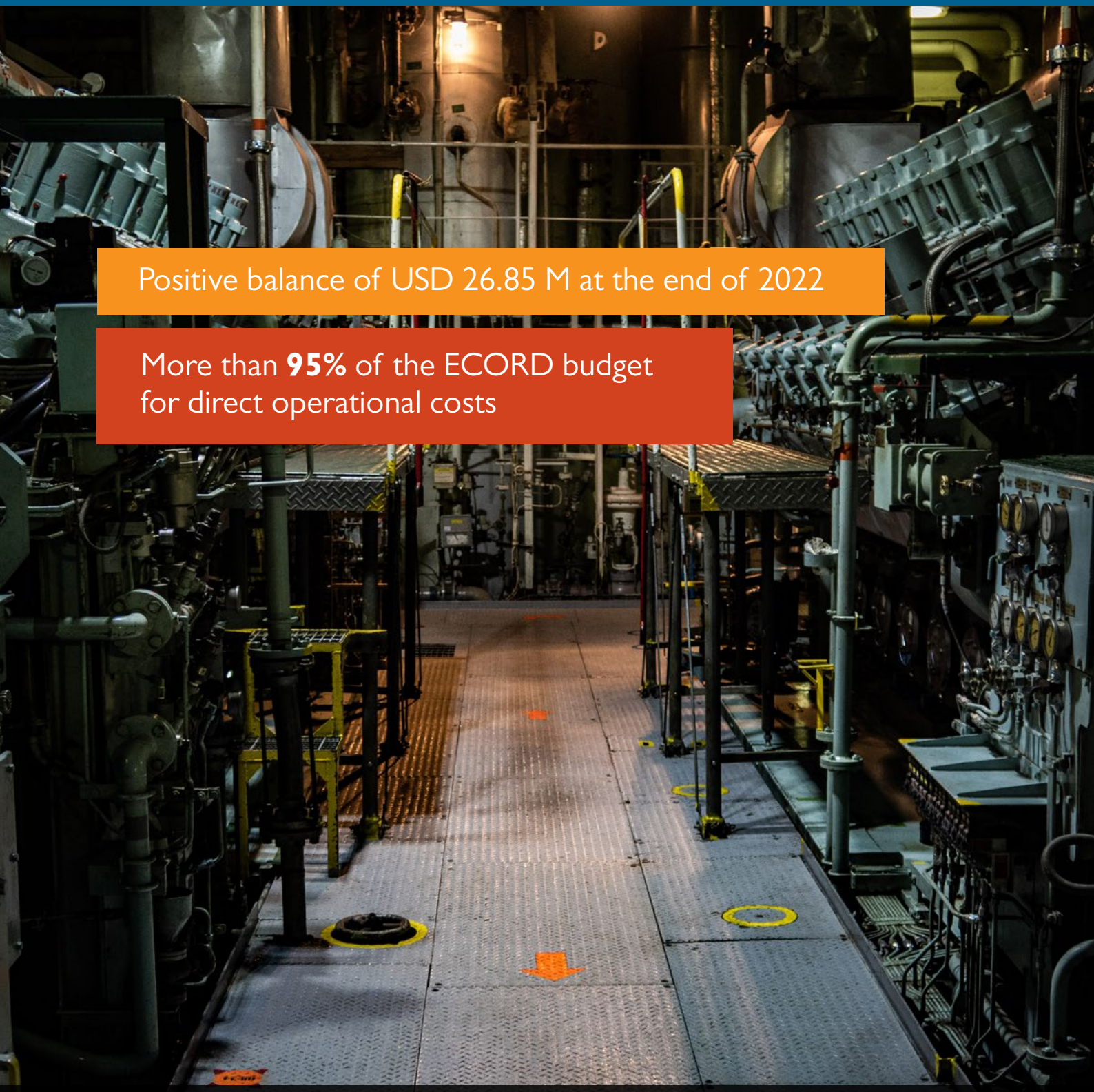
In November 2022, the ECORD Sphere was presented to the members of the ECORD community during the Council-ESSAC meeting that took place in Gargonza, Italy.

Equipment to aid safe transportation of the Sphere was bought prior supplying the Sphere to the exhibitions. The EOTF is currently working on updates to the content of the ECORD Sphere as well as on planning for its future travels to meetings and exhibitions. The later will include presentation of the ECORD Sphere in the NHM Vienna in February-April 2023, EGU 2023 in late April, INQUA 2023 in Rome, Italy in July 2023, and Geoberlin in Germany in September 2023.

ECORD Sphere during Trieste Next Science Festival, Trieste, Italy, 22-24 September 2022. Credits: ECORD/IODP.

ECORD Sphere on display during the ECORD Council-ESSAC meeting in Gargonza, Italy, November 2022.
Credits: M. Bednarz, ECORD/IODP.

9. FY22 and FY23 budgets



Positive balance of USD 26.85 M at the end of 2022

More than **95%** of the ECORD budget for direct operational costs

Inside the D/V *Chikyu* vessel during Pesronal Sampling Party for IODP Expedition 386. Credits: P. Bellanova, ECORD/IODP/JAMSTEC.

9. FY22 and FY23 budgets

FY22 ECORD budget

ECORD is currently funded exclusively by its 15 member countries.

In FY22, the total ECORD budget amounted to $16.84M (below), showing a decrease of about $582K compared to the FY21 budget. 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).

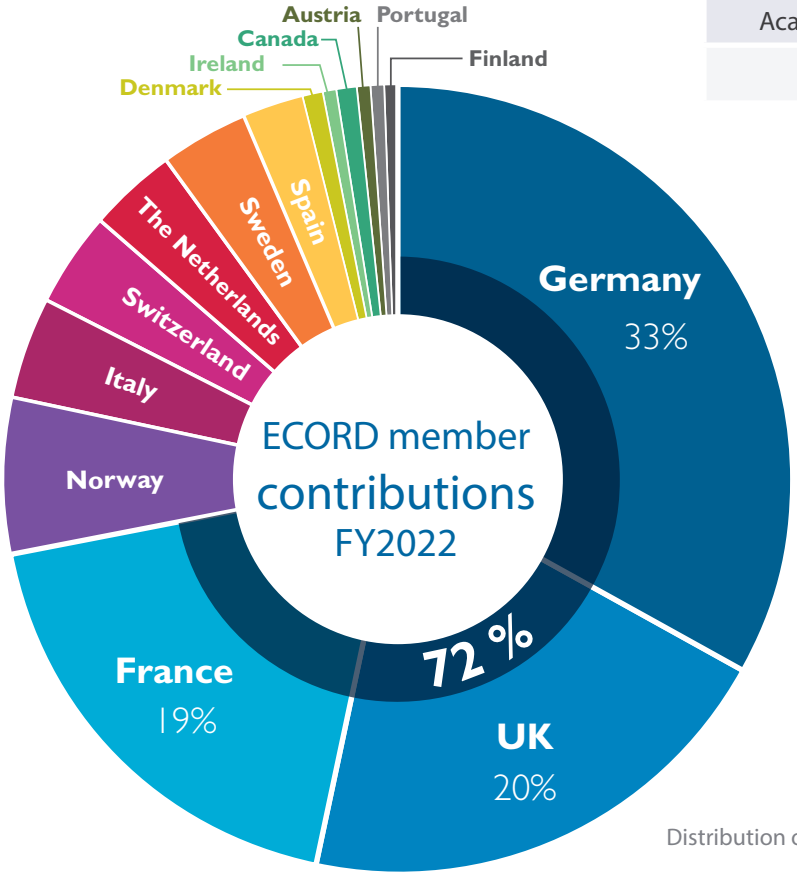
The ECORD budget is seen as a minimum budget due to the opportunity for members to make direct cash and/or in-kind contributions (IKC) that allow them to increase their contributions to ECORD on an expedition by expedition basis.

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 xx) is not based on financial contributions.

ECORD contributions FY22 (USD)	
DFG (Germany)	5,600,000
UKRI (United Kingdom) *	3,386,240
CNRS (France) *	3,146,685
Forskningsradet (Norway)	1,100,000
CNR (Italy)	700.000
FNS (Switzerland)	600.000
NWO (The Netherlands)	600.000
VR (Sweden)	400.000
MCIN (Spain) *	660.000
DAFSHE (Denmark) *	145.368
GSI (Ireland) *	120.000
CCOD (Canada)	115.000
ÖAW (Austria)	100.000
FCT (Portugal)	91.256
Academy of Finland	80.000
TOTAL	**16,844,549**

ECORD member country contributions for FY22 (USD). The amount in dollars is based on exchange rates (when applicable) at the time of the payment by the relevant partner.

* Countries paying their contribution in their own currency



Distribution of ECORD member contributions for FY2022

The three major ECORD contributors, Germany ($5.6M), the United Kingdom ($3.386M) and France ($3.147M) and provide 72% 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 FY22.

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 $26,849,254 at the end of 2022 and this sum will be carried forward to the ECORD FY23 budget.

ECORD **FY2022** Budget (in USD)

	FY22 Income (USD)	FY22 Expenses (USD)
FY21 balance	22,766,957	
FY22 contributions	16,844,549	
ECORD-NSF MoU		7,240,000
ESO		2,070,253
AMS X377 *		738.131
SPRS X377 **		257.927
BGR X377 ***		550.000
OSP-PSP X386 ******		685.556
EMA		196.296
MagellanPlus		136.400
IODP Chairs Support		242.000
ESSAC		190.720
BCR		343,419
Outreach basic		46.550
Outreach TV		35.000
Outreach Officer		30.000
TOTAL	39,611,506	12,762,252
FY22 balance	**26,849,254**	

* Reimbursement of Arctic Marine Solution costs related to the cancellation of Expedition 377

** Reimbursement of the Swedish Polar Research Secretariat costs related to the cancellation of Expedition 377

*** Reimbursement of the in-kind contribution provided by the Bundesanstalt für Geowissenschaften und Rohstoffe (Federal Institute for Geosciences and Natural Resources), Hanover, Germany, for the implementation of Expedition 377

**** Costs for Onshore Science Party and Personal Sampling Party

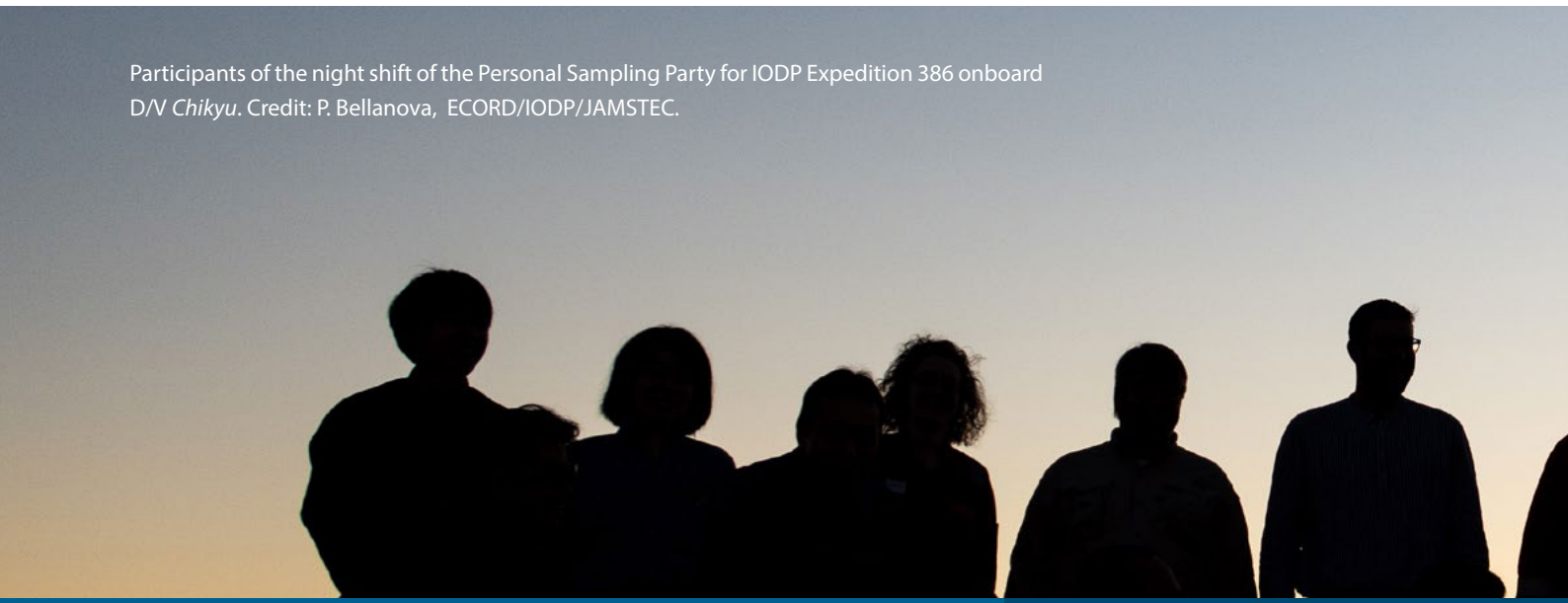
The ESO team was very happy to finally visit D/V *Chikyu* in person an the occasion of Personal Sampling Party for IODP Expedition 386. Credits: M. Rydzy, ECORD/IODP/JAMSTEC.

FY23 ECORD budget

The expected total contributions for FY23 from the 15 contributing ECORD member countries is about $14.97M (see table below).

ECORD contributions FY23 (USD)	
DFG (Germany)	5,600,000
CNRS (France) *	3,360,000 €
UKRI (United Kingdom) *	900,000 £
Forskningsradet (Norway)	1,100,000
MCIN (Spain) *	150.000 €
CNR (Italy)	750.000
FNS (Switzerland)	600.000
NWO (The Netherlands)	600.000
VR (Sweden)	400.000
DAFSHE (Denmark) *	1,000,000 DKR
GSI (Ireland) *	100.000 €
CCOD (Canada)	115.000
ÖAW (Austria)	100.000
FCT (Portugal)	90.000
Academy of Finland	80.000
TOTAL	**14,370,000**

The amount in US dollars will be 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



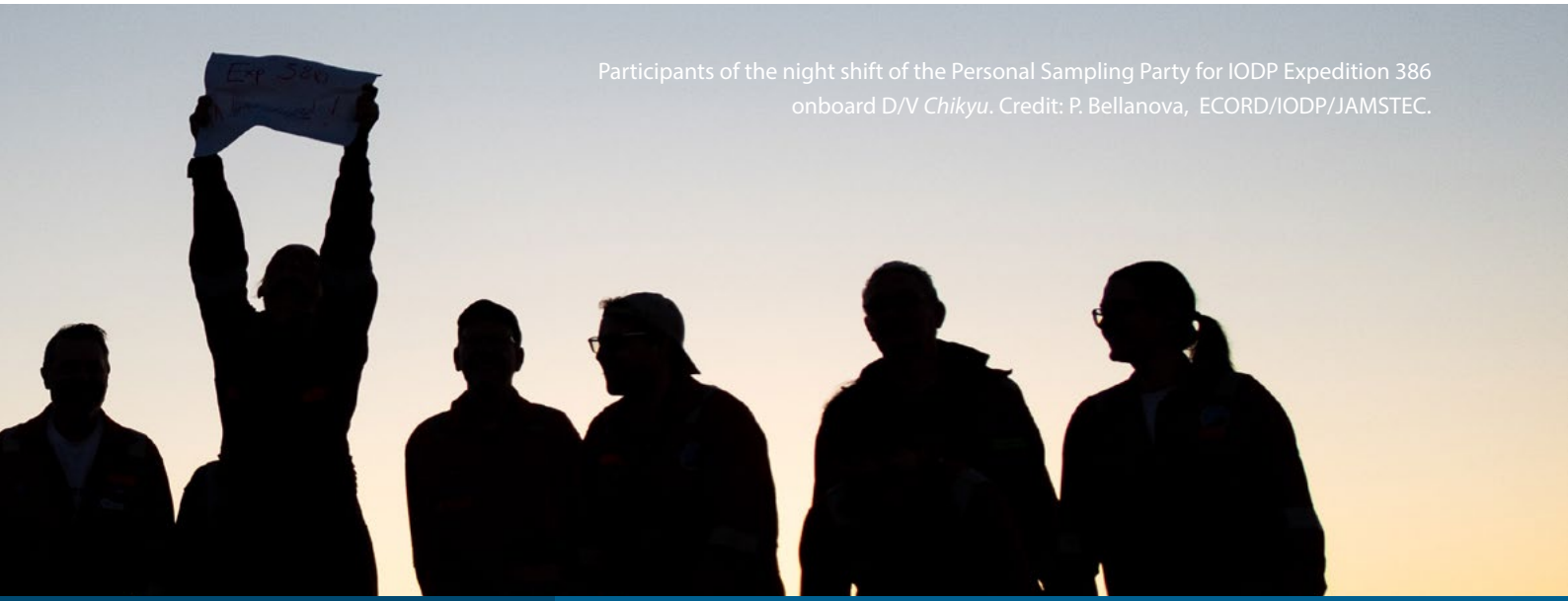
Participants of the night shift of the Personal Sampling Party for IODP Expedition 386 onboard D/V *Chikyu*. Credit: P. Bellanova, ECORD/IODP/JAMSTEC.

The table below summarises the expected ECORD budget for FY23.

ECORD **FY2023** Budget (in USD)

	FY23 Income (USD)	FY23 Expenses (USD)
FY22 balance	26,849,254	
FY23 contributions	14,370,000	
ECORD-NSF MoU		7,000,000
ESO		2,218,705
ESO X389		TBD
AMS Rosmorport X377 *		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	**41,219,254**	**TBD**

The amounts in USD are subject to exchange rate fluctuations.
* Maximum reimbursement to Arctic Marine Solution for the Russian icebreaker contracted for the implementation of Expedition 377
** Project Manager's 18-month salary for the implementation of the land-to-sea transect IMMAGE



Participants of the night shift of the Personal Sampling Party for IODP Expedition 386 onboard D/V *Chikyu*. Credit: P. Bellanova, ECORD/IODP/JAMSTEC.

Budget of ECORD Entities

ECORD Managing Agency

The table below summarises the EMA budget for FY22 and FY23, as approved by the ECORD Council in June 2022.

EMA budget for FY22 and FY23					
	FY22		FY23		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 *	10.000	12.400	20.000	24.800	10,000 (+)
Organisation SEP June Meeting	10.000	12.400	10.000	12.400	0
MagellanPlus	110.000	136.400	90.000	111.600	20,000 (-)
Consumables / Office costs	6.000	7.440	6.000	7.440	0
Overheads CEREGE	25.000	31.000	42.080	52.179	17,080 (+)
Savings 2020-2021 **	70.000	86.800	0	0	
GRAND TOTAL	**265.400**	**329.096**	**342.480**	**424.675**	**77,080 (+)**

Exchange rate used in FY22 and FY23 budgets: 1€ = $1.24
* Increase related to the organisation of hybrid sessions
** Savings of $86,800 related to the COVID-19 pandemic

ECORD Science Support and Advisory Committee (ESSAC)

The table below summarises the ESSAC budget for FY22 and FY23 as approved by the ECORD Council in June 2022.

ESSAC budget for FY22 and FY23					
	FY22		FY23		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	2.984	3.700	3.226	4.000	242 (+)
ESSAC Fall meeting	2.984	3.700	3.226	4.000	242 (+)
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 *	30.000	37.200	38.065	47.200	8,065 (+)
ECORD Training Course	6.500	8.060	6.452	8.000	48 (-)
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 **	n/a	n/a	16.129	20.000	16,129 (+)
TOTAL	**274.775**	**340.720**	**299.405**	**371.260**	**24,630 (+)**

Exchange rate used in FY22 and FY23 budgets: 1€ = $1.24
* Consideration of a new Summer School
** Travel support for ECORD and Japanese scientists

ECORD Science Operator

The table below summarises the expenditure breakdown of ESO for FY22 in US dollars.

ESO budget for FY22									
	2022 Annual Program Plan Budget				2022 Expenditure				2022 variance
	BGS	MARUM	EPC	Total	BGS	MARUM	EPC	Total	
Management and administration	**117,179**	**170,345**	**306,294**	**593,818**	**64,498**	**170,345**	**306,294**	**541,136**	**52,682**
Salary	87,099	138,607	273,805	499,511	64,304	138,607	273,805	476,716	22,795
Travel	15,040	11,693	11,970	38,702	193	11,693	11,970	23,856	14,847
Supplies	4,387	5,846	5,985	16,218	0	5,846	5,985	11,831	4,387
Shipping	0	0	0	0	0	0	0	0	0
Coms.	1,253	0	0	1,253	0	0	0	0	1,253
Equipment	3,133	5,846	5,985	14,965	0	5,846	5,985	11,831	3,133
Other	6,267	8,352	8,550	23,168	0	8,352	8,550	16,902	6,267
Technical, Engineering and Science Support	**253,787**	**269,401**	**489,857**	**1,013,046**	**141,309**	**269,401**	**489,857**	**900,567**	**112,479**
Personnel	219,321	179,198	311,168	709,687	141,187	179,198	311,168	631,553	78,135
Travel	20,053	23,386	17,099	60,538	122	23,386	17,099	40,607	19,931
Supplies	0	39,255	0	39,255	0	39,255	0	39,255	0
Shipping	6,267	4,176	1,710	12,153	0	4,176	1,710	5,886	6,267
Communication	0	0	0	0	0	0	0	0	0
Contractual Services	0	0	149,620	149,620	0	0	149,620	149,620	0
Equipment	1,880	2,506	1,710	6,096	0	2,506	1,710	4,216	1,880
Other	6,267	20,880	8,550	35,697	0	20,880	8,550	29,430	6,267
Core Curation	**0**	**77,802**	**0**	**77,802**	**0**	**77,802**	**0**	**77,802**	**0**
Personnel	0	66,945	0	66,945	0	66,945	0	66,945	0
Travel	0	5,011	0	5,011	0	5,011	0	5,011	0
Supplies	0	1,670	0	1,670	0	1,670	0	1,670	0
Shipping	0	4,176	0	4,176	0	4,176	0	4,176	0
Data Management	**48,480**	**190,500**	**27,894**	**266,873**	**0**	**190,500**	**27,894**	**218,393**	**48,480**
Salary	27,173	91,946	27,894	147,012	0	91,946	27,894	119,839	27,173
Travel	5,013	6,682	0	11,695	0	6,682	0	6,682	5,013
Supplies	3,760	0	0	3,760	0	0	0	0	3,760
Coms.	0	0	0	0	0	0	0	0	0
Contractual	0	83,521	0	83,521	0	83,521	0	83,521	0
Equipment	12,533	8,352	0	20,885	0	8,352	0	8,352	12,533
Outreach	**45,027**	**45,793**	**27,894**	**118,714**	**0**	**45,793**	**27,894**	**73,687**	**45,027**
Salary	16,739	39,112	27,894	83,744	0	39,112	27,894	67,005	16,739
Travel	5,013	6,682	0	11,695	0	6,682	0	6,682	5,013
Supplies	5,013	0	0	5,013	0	0	0	0	5,013
Equipment	18,261	0	0	18,261	0	0	0	0	18,261
Grand Total	464,474	753,841	851,938	2,070,253	205,806	753,841	851,938	1,811,585	258,668

Bremen Core Repository (BCR)

The table below summarises the BCR budget for FY22 and FY23 as approved by the ECORD Council in June 2022.

BCR budget for FY22 and FY23					
	FY22		FY23		Variance
	€	USD	€	USD	€
Salaries and Fringes (1,6 FTE)	249.301	309.133	256.780	318.407	7,479 (+)
Student workers	5.600	6.944	11.508	14.270	5,908 (+)
Travels	0	0	2.100	2.604	2,100 (+)
Supplies	2.450	3.038	14.350	17.794	11,900 (+)
Shipping	6.300	7.812	21.700	26.908	15,400 (+)
Curation database updates	7.000	8.680	6.300	7.812	700 (-)
SEDIS 24/7 maintenance/ upgrades (0,08 FTE)	6.300	7.812	6.300	7.812	0
Total	**276.951**	**343.419**	**319.038**	**395.607**	**42,087 (+)**

Exchange rate used in FY22 and FY23 budgets: 1€ = $1.24

Recipients of the ECORD Awards (on the left: Gabriele Uenzelmann-Neben, and on the right: Ursula Röhl), Council-ESSAC meeting in Gargonza, Italy, November 2022. In the middle: Gibert Camoin, Director of ECORD. Credits: N. Hallmann, ECORD/IODP.

ECORD Outreach Task Force (EOTF)

The table below summarises the EOTF budget for FY22 and FY23 as approved by the ECORD Council in June 2022.

ECORD Outreach budget for FY22 and FY23					
	FY22		FY23		Variance
	€	USD	€	USD	USD
Core outreach activities					
Annual Report	3.589	4.450	1.248	1.548	2,902 (-)
ECORD Newsletters	3.387	4.200	3.387	4.200	0
Managing core replicas	8.871	11.000	4.630	5.741	5,259 (-)
Models	4.032	5.000	n/a	n/a	5,000 (-)
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	2.379	2.950	4.000	4.960	2,010 (+)
Goodies	6.411	7.950	6.411	7.950	0
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 and stickers	968	1.200	968	1.200	0
TOTAL basic outreach activities	**61.734**	**76.550**	**52.741**	**65.399**	**11,151 (-)**
IODP Expedition 377 outreach					
Production of a TV documentary	28.226	35.000			
Onboard Outreach Officer	24.194	30.000			
Savings 2020-2021	**24.194**	**30.000**			
TOTAL	**89.960**	**111.550**	**52.741**	**65.399**	

Exchange rate used in FY22 and FY23 budgets: 1€ = $1.24

ECORD team taking photos during Personal Sampling Party onboard D/V *Chikyu*, IODP Expedition 386.
Credits: P. Bellanova, ECORD/IODP/JAMSTEC.

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 the IODP entities in 2022 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)

Environmental Protection and Safety Panel - **EPSP**

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

Environmental Protection and Safety Panel (EPSP) 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 INTERNATIONAL OCEAN DISCOVERY PROGRAM

ECORD EUROPEAN CONSORTIUM FOR OCEAN RESEARCH DRILLING

Science Evaluation Panel - **SEP**

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

Science Evaluation Panel (SEP) evaluates the scientific objectives and relevance of proposed expeditions using all IODP platforms.

SEP ECORD Members
Science
Thorsten Bauersachs (Germany)
Christoph Beier (Finland)
Clara Bolton (France)
Anne Briais (France)
Karsten Gohl (Germany)
Matt Ikari (Germany)
Julie Prytulak (UK)
Alessio Sanfilippo (Italy)
Paola Vannucchi (Italy)
Antje Voelker (Portugal)
Mike Weber (Germany)
Site
Silvia Ceramicola (Italy)
Christian Hübscher (Germany)
Maria Filomena Loreto (Italy)
Uisdean Nicholson (UK)
Tim Reston (UK; **Co-Chair**)
Nick Schofield (UK)
Tilmann Schwenk (Germany)

IODP Forum

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

The IODP Forum represents the overarching umbrella of the programme and provides advice to IODP Facility Boards on platform provider activity.

IODP Forum Chair
Henk Brinkhuis (The Netherlands)
ECORD attendees at the IODP Forum in Vienna, Austria on 7-8 April 2022 (hybrid)
Andre Bornemann (Germany)
Henk Brinkhuis (The Netherlands)
Angelo Camerlenghi (Italy)
Gilbert Camoin (France)
Markus Engelhardt (Norway)
Stéphane Guillot (France)
Nadine Hallmann (France)
Hanno Kinkel (Italy)
France Lagroix (France)
Guido Lueniger (Germany)
Dave McInroy (UK)
Antony Morris (UK)
Bernhard Plunger (Austria)
Tim Reston (UK)
Ulla Röhl (Germany)
Sasha Turchyn (UK)
Gabriele Uenzelmann-Neben (Germany)
Michael Webb (UK)
Bernard Westerop (The Netherlands)
ECORD attendees at the IODP Forum in Palisades, NY, on 14-15 September 2022 (hybrid)
Malgo Bednarz (France)
Andre Bornemann (Germany)
Henk Brinkhuis (The Netherlands)
Angelo Camerlenghi (Italy)
Gilbert Camoin (France)
Nadine Hallmann (France)
Hanno Kinkel (Italy)
France Lagroix (France)
Guido Lueniger (Germany)
Antony Morris (UK)
Dave McInroy (UK)
Tim Reston (UK)
Ulla Röhl (Germany)
Gabriele Uenzelmann-Neben (Germany)
Michael Webb (UK)
Bernard Westerop (The Netherlands)

Contributors

Malgo Bednarz
EMA Outreach Officer

Gilbert Camoin
EMA Director

Angelo Camerlenghi
ESSAC Chair

Sarah Davies
EPC 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

Gabi Uenzelmann-Neben
EFB Chair

View from D/V *Chikyu* during Personal Sampling Party, IODP Expedition 386.
Credits: J. Everest, ECORD/IODP/JAMSTEC.

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

CDW: Circumpolar Deep Water

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

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 (2013-2023)

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

OFSZ: Oriente-Septentrional Fault zone

OSP: Onshore Science Party

PIN: Prior Information Notice

PMO: Program Member Office

PROCEED: Expanding Frontiers of Scientific Ocean Drilling

QA/QC: Quality Assurance/Quality Control

RD2: Rockdrill2

SEDIS: Scientific Earth Drilling Information Service

SFWG: Science Framework Working Group

SEP: Science Evaluation Panel

SPRS: Swedish Polar Research Secretariat

UKRI: United Kingdom Research and Innovation

USSP: Urbino Summer School in Paleoclimatology

USSSP: U.S. Science Support Program

VR: Vetenskapsrådet - Swedish Research Council

WAIS: West Antarctic Ice Sheet

XRF: X-Ray Fluorescence

Sampling core onboard D/V *Chikyu* during Personal Sampling Party for IODP Expedition 386. Credits: P. Bellanova, ECORD/IODP/JAMSTEC.

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2022 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)

ECORD
EUROPEAN CONSORTIUM FOR OCEAN RESEARCH DRILLING

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