ECORD

EUROPEAN CONSORTIUM FOR
OCEAN RESEARCH DRILLING

ANNUAL REPORT 2018

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 2018, ESO has successfully managed three expeditions to the Atlantis Massif, the Chicxulub Impact Crater and the Rift of Corinth.

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: Platform at night, *Fugro Synergy* during Expedition 381 Corinth Active Rift Development (photo ECORD/IODP).

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http://www.ecord.org

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ECORD
EUROPEAN CONSORTIUM FOR OCEAN RESEARCH DRILLING

ECORD Annual Report 2018

1 January 2018 - 31 December 2018

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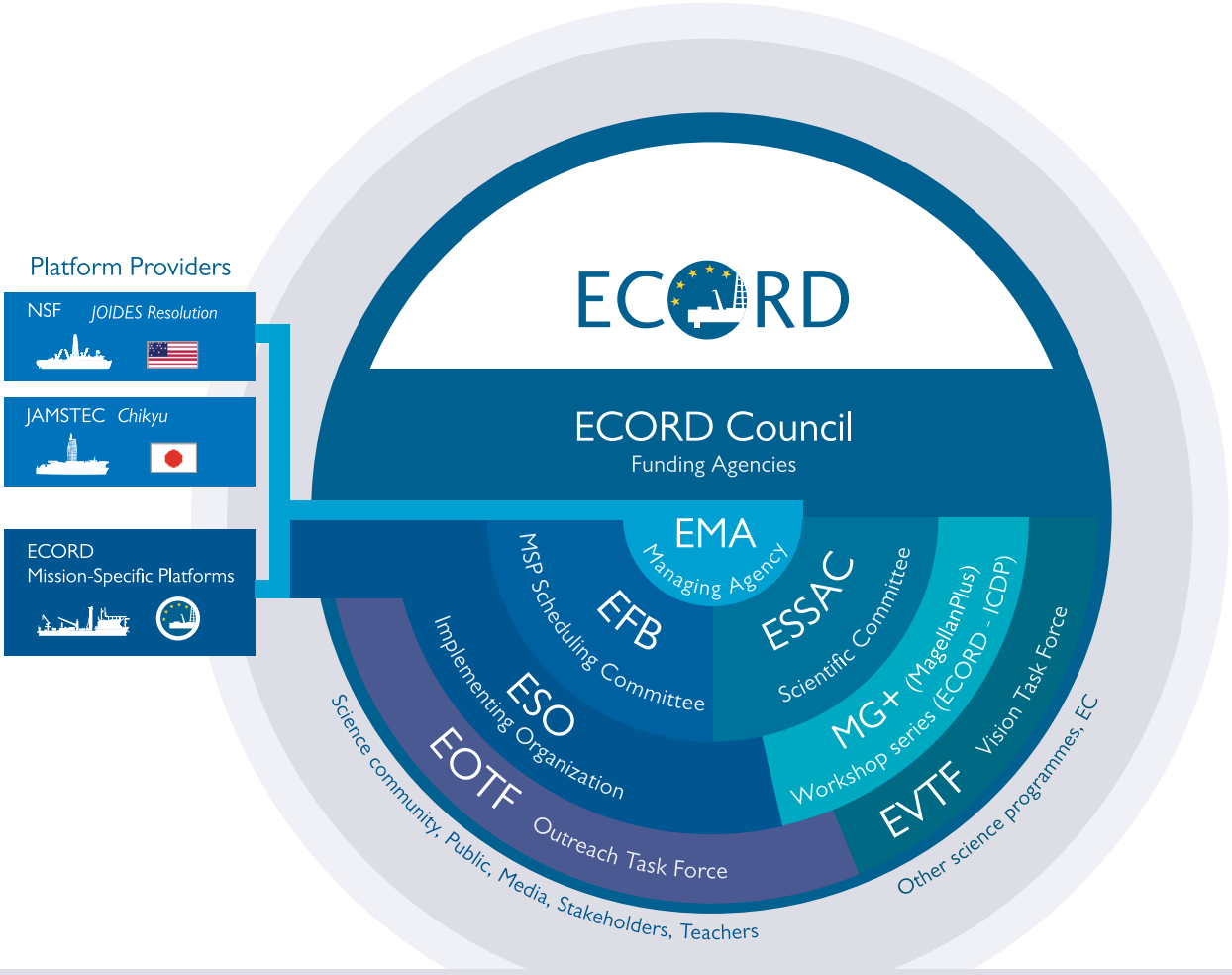

FY2018 ECORD Member Countries

Austria	1	Österreichische Akademie der Wissenschaften (ÖAW)
Canada	2	The University of British Columbia (UBC)
Denmark	3	Uddannelses- og Forskningsministeriet
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 Economía y Empresa
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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ECORD IODP

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ECORD_IODP

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

ECORD Council

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

Chair	**Guido Lüniger** (Germany; 1 January to 31 December 2018)
Outgoing Vice-Chair	**Michael Webb** (UK; 1 January to 30 June 2018)
Incoming Vice-Chair	**Eric Humler** (France; 1 July to 31 December 2018)
Council Core Group	**Bernard Westerop** (The Netherlands) **Eric Humler** (France) **Guido Lüniger** (Germany) **Marco Sacchi** (Italy) **Michael Webb** (UK)

Guido Lüniger
ECORD Council Chair 2018

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.

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

EMA (ECORD Managing Agency)

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

Director	**Gilbert Camoin** (CEREGE, France)
Assistant Director	**Nadine Hallmann** (CEREGE, France)
Outreach Coordinator	**Patricia Maruéjol** (University of Lorraine, France)
Administrator	**Patricia Rieu** (CEREGE, France)

The EMA is the management entity of ECORD and represents ECORD in all IODP entities. EMA is the fund holder for the consortium in IODP and provides oversight of the ECORD Science Operator (ESO) and the ECORD Science Support and Advisory Committee (ESSAC).

Gilbert Camoin
EMA Director

PhD, DSc, is a senior research scientist at the CNRS. (Centre National de la Recherche Scientifique) and currently works at the CEREGE (Centre Européen de Recherche et d'Enseignement de Géosciences de l'Environnement) Institute 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 125 peer-reviewed papers and supervised 11 PhD students and 8 post-docs. He was appointed as Director of the ECORD Managing Agency in January 2012 and served previously 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).

ESSAC (ECORD Science Support and Advisory Committee)

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

Chair	**Antony Morris** (Plymouth University, UK)
Outgoing Vice-Chair	**Jan Behrmann** (GEOMAR, Germany) 1 January to 31 August 2018
Science Coordinator	**Hanno Kinkel** (Plymouth University, UK)

The **ESSAC (Science Support and Advisory Committee)** is the ECORD science committee and is responsible for the scientific planning and coordination of ECORD's contribution to IODP.

Antony Morris
ESSAC Chair

Antony Morris is professor of Geophysics and Geodynamics at the School of Geography, Earth and Environmental Sciences at the University of Plymouth. He uses geophysical magnetic methods to investigate fundamental crustal processes. The main focus of his research has been the magnetic analysis of samples of oceanic lithosphere recovered from the world's oceans by the International Ocean Discovery Program and innovative investigations of major ophiolites (slices of oceanic lithosphere that have been emplaced tectonically on to land). He has sailed five times on the *JOIDES Resolution* (IODP Expeditions 304/305, 335, 345, 351, 360) and once on the *RRS James Cook* (part of the UK research fleet, cruise JC21 for IODP Proposal #551). He was appointed as ESSAC Chair in January 2018.

EFB (ECORD Facility Board)

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

Chair	**Gilles Lericolais** (Ifremer, France)
Vice-Chair	**Gabriele Uenzelmann-Neben** (AWI, Germany)
Members of the Science Board	**Gretchen Früh-Green** (ETH Zurich, Switzerland) **Stephen Gallagher** (University of Melbourne, Australia) **Fumio Inagaki** (JAMSTEC, Japan) **Ellen Thomas** (Yale University, USA)

The **ECORD Facility Board (EFB)** is the 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. The EFB is composed of the ECORD Vision Task Force (EVTF) and a Science Board.

Gilles Lericolais
ECORD Facility Board Chair

Dr. Gilles Lericolais has been a marine geologist/geophysicist at Ifremer since 1984. He has been Chief scientist on more than 10 scientific cruises in different seas and oceans. He has led and coordinated various science projects such as the 5th FP ASSEMBLAGE project and the 6th FP HERMES Project dealing with the Black Sea sedimentary systems, the HYPOX FP7 project, EUROMARINE+ and DANCERS. He has been head of the Laboratory of Sedimentary Environments of Ifremer from 2006 to 2011; he has been in charge of the Ifremer project « Margins and Sedimentary systems » and of the GOLO (Exxon-Mobil, Total, Ifremer). He has authored/co-authored 58 refereed publications. He is Vice-Chair of the European Marine Board, member of EurOcean and an alternate member of the Management Board and member of the Executive Committee of the JPI Oceans. He is one of the French representatives of the National board for the IOC of the UNESCO. In 2011, he was appointed as Director of the European and International Affairs of Ifremer. After being Vice Chair and then Chair of the IODP Site Survey Panel from 2008 to 2013, he has been nominated Chair of the ECORD Facility Board for 2016 to 2018.

EOTF (ECORD Outreach Task Force)

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

EVTF (ECORD Vision Task Force)

The **EVTF (ECORD Vision Task Force)** is the ECORD strategic entity in charge of developing a long-term scientific and funding strategy, and monitoring ECORD's progress towards achieving the objectives of the IODP Science Plan. The EVTF is composed of the Council Chair and Vice-Chair, the Council Core Group, ESSAC Chair, the EMA Director and Assistant Director, the ESO Chair and Science Manager, and Outreach Manager and the ECORD-ILP Chair.

ESO (ECORD Science Operator)

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

Robert Gatliff
ESO Chair

Robert Gatliff is the Director for Energy and Marine Geoscience at the British Geological Survey and Chair of the ECORD Science Operator. His expertise is based on basin analysis and seismic interpretation of the United Kingdom and he has led geophysics and drilling expeditions on the NE Atlantic Margin.

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.

ECORD Science Operator

The **ESO (ECORD Science Operator)** 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. The 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 OSP, hosted at the IODP Bremen Core Repository and laboratories of the University of Bremen. EPC comprises two universities: the University of Leicester (UK, lead partner) and CNRS Montpellier (France). The consortium provides operational, technical and high-level scientific support for MSP expeditions. EPC also has links into a larger international logging community that includes personnel at Lamont-Doherty Earth Observatory (USA) and the University of Tokyo (Japan).

Chair	**Robert Gatliff** (BGS, UK) until March 2018
Science Manager	**David McInroy** (BGS, UK)
Operations Manager	**Dave Smith** (BGS, UK)
Expedition Project Managers	**Gareth Carter** (BGS, UK) **Sophie Green** (BGS, UK) **Jeremy Everest** (BGS, UK)
EPC Managers	**Sarah Davies** (University of Leicester, UK) **Sally Morgan** (University of Leicester, UK) until July 2018
Petrophysics Staff Scientists	**Johanna Lofi** (University of Montpellier, France) **Erwan Le Ber** (University of Leicester, UK) **Jenny Inwood** (University of Leicester, UK) until January 2018
Curation and Laboratory Manager	**Ursula Röhl** (MARUM, Germany)
BCR Superintendent	**Holger Kuhlmann** (MARUM, Germany)
Assistant Laboratory Manager	**Patrizia Geprägs** (MARUM, Germany)
Data Managers	**Vera Bender** (MARUM, Germany) **Mary Mowat** (BGS, UK)
Outreach Manager	**Carol Cotterill** (BGS, UK)
Media Relations	**Ulrike Prange** (MARUM, Germany)

MG+ (MagellanPlus Workshop Series)

http://www.ecord.org/science/magellanplus/

MG+ is designed to support ECORD scientists in developing new and innovative science proposals to meet the IODP Science Plan challenges. This programme is co-funded by ECORD and the International Continental Scientific Drilling Program (ICDP).

ECORD and IODP meetings and conferences

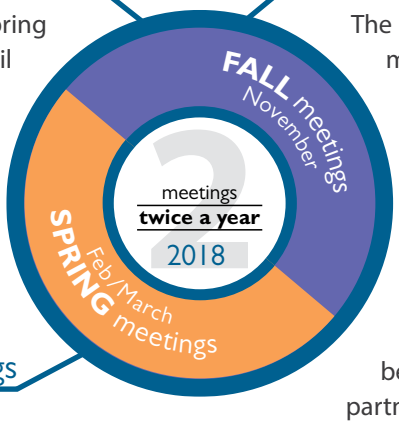
ECORD Council meetings

The ECORD Council meets twice a year with a spring meeting (Berlin, Germany) involving the Council and the members of the ECORD Vision Task Force, and a joint fall meeting with ESSAC (The Hague, Netherlands in 2018) involving representatives of all ECORD entities as well as representatives from our IODP partners (funding agencies, operators and science committees) and collaborating science programmes.

EOTF meetings

The ECORD Outreach Task Force (EOTF) meets twice a year, in February/March and in November (in 2018 Bremen, Germany and The Hague, Netherlands, respectively).

Outreach colleagues from the US Science Support Program, CDEX/JAMSTEC (Japan) and ICDP attended the EOTF fall meeting in order to enhance coordination between ECORD, ICDP and IODP partners.



ESSAC meetings

The ESSAC meets twice a year with a spring meeting (Toulouse, France in 2018) involving the ESSAC Delegates and EMA and ESO representatives. The ESSAC fall meeting 2018 (The Hague, Netherlands) was organised jointly with the ECORD Council.

EFB meeting

The ECORD Facility Board (EFB) **meets once a year** (Venice, Italy in 2018) and involves its members (Science Board and ECORD Vision Task Force), as well as representatives from our IODP partners (funding agencies, operators and science committees).

ECORD representatives on IODP meetings

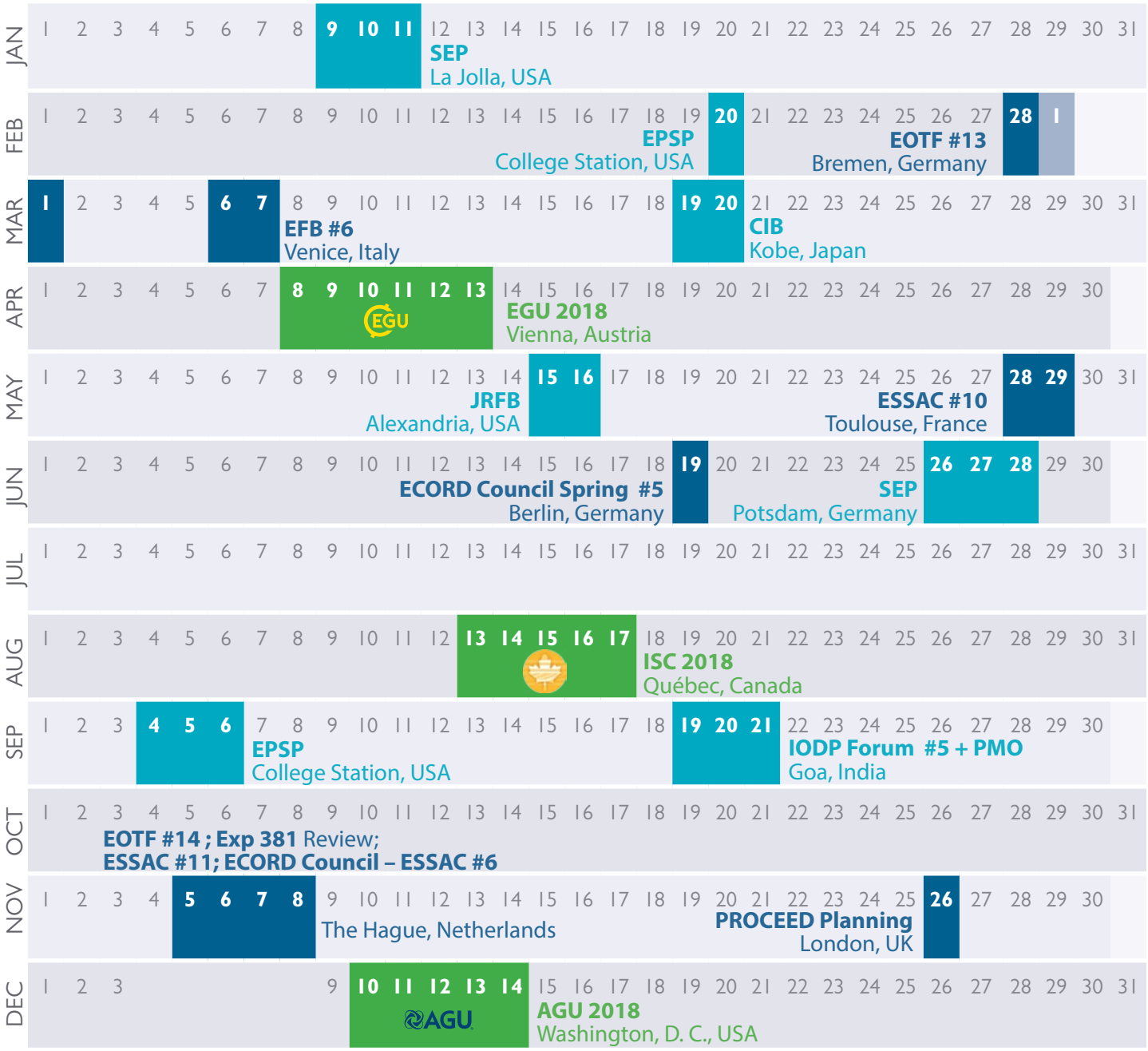
ECORD sends representatives to meetings of:

- 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 participation in IODP panels, page 78.

EGU 2018 in Vienna, Austria. IODP - ICDP team (photo ECORD/IODP).

ECORD / IODP meetings and conferences 2018 calendar



ECORD meetings | IODP meetings | International conferences

Figure summarizing the ECORD and IODP meetings that have been held in 2018, as well as the three major conferences (EGU in Vienna, ISC in Québec and AGU in Washington) where IODP-related scientific sessions and booths have been organised.

Acronyms:
AGU - American Geophysical Union, CIB - *Chikyu* IODP Board, EGU - European Geosciences Union, EOTF - ECORD Outreach Task Force, EPSP - Environmental Protection and Safety Panel, ISC - International Sedimentological Conference, JRFB - *JOIDES Resolution* Facility Board, PROCEED - Expanding Frontiers of Scientific Ocean Drilling, SEP - Science Evaluation Panel.

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

1. FY2018 Highlights

Core description during Onshore Science Party for Expedition 381 Corinth Active Rift Development.
(photo V. Diekamp, ECORD/IODP).

1. FY2018 highlights

Since its creation in 2003, ECORD has developed as a unique European distributed research infrastructure that connects research facilities at multiple sites across Europe and Canada. The ECORD research facilities are engaged in the multidisciplinary aspects of the sub-surface scientific research and have a longstanding culture of cooperation on Science, Technology and Education.

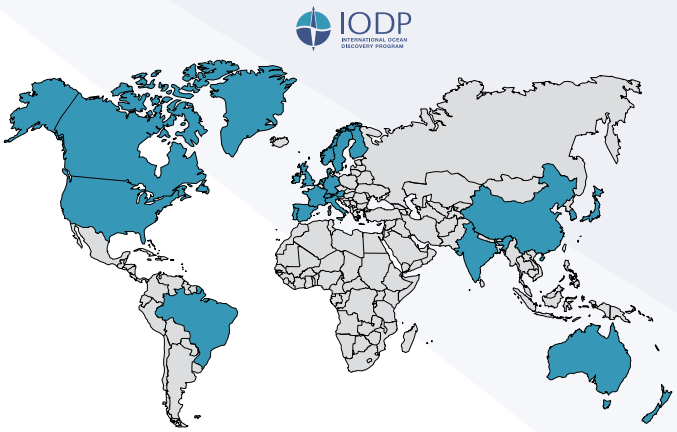
ECORD combines research, education and innovation and offers a unique portfolio of science and educational activities, world-class capabilities, state-of-the-art technology and remarkable knowledge-based resources to the European and Canadian Earth and Environmental science community.

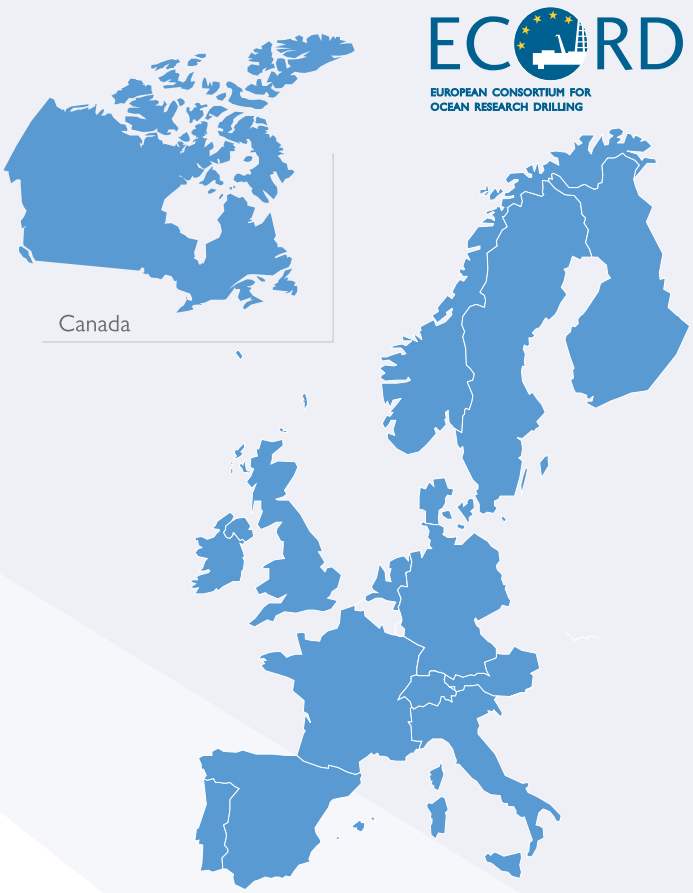
After the successful completion of the offshore phase of Expedition 381 Corinth Active Rift Development in late 2017, the onshore science party has been organised in Bremen, Germany in early 2018. In parallel, ECORD has ensured all the tasks related to its status of IODP Platform Provider, including the maintenance of sustainable sample and data curation Facilities at the Bremen Core Repository and the promotion of ECORD and IODP activities and accomplishments to large audiences.

The outstanding intellectual contribution of the ECORD scientists to IODP is reflected by the involvement of 494 scientists in active IODP proposals, the participation of 42 ECORD scientists on five IODP expeditions and their leading role in the the valorisation of cutting-edge results related to the successive ocean drilling programmes. The portfolio of science and educational activities that ECORD has developed over the last years has been very effective in 2018 with the ECORD-ICDP MagellanPlus Workshop Series Programme, which supports scientists to develop innovative drilling proposals, the training of more than 130 students and early-career scientists in ECORD Summer Schools and Training Course, as well as the funding of ECORD Research Grants to conduct research on core materials and/or data related to successive scientific ocean drilling programmes.

ECORD in the second phase of IODP (2019-2023)

ECORD is now entering the second phase (2019-2023) of current IODP with the renewed commitment of the current fifteen ECORD member countries following the very positive evaluation of ECORD's structure, activities and scientific achievements by an ECORD External Evaluation Committee (EEC) in June 2017. This transition also includes the finalisation of an updated version of the ECORD Memorandum of Understanding (MoU) and the revision of the MoU between ECORD and the US National Science Foundation (NSF), while the MoU linking ECORD and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) will remain active as the MoU signed in 2013 by the two partners covers the whole duration of IODP.





Left: IODP member countries, as of December 2018.
Right: 15 ECORD member countries, as of December 2018.
http://www.ecord.org/about-ecord/about-us
(maps credit: http://histgeo.ac-aix-marseille.fr).

ECORD budget

ECORD is currently funded exclusively by its 15 member countries. In FY18, the total ECORD budget amounted to 17.154M USD, showing therefore a decrease of about 400K USD compared to the FY17 budget, due to a lower contribution from France and to unfavorable exchange rates between the US Dollar and the British Pound (see 9. FY18 and FY19 budgets).

The ECORD running costs were very stable in 2018. With an expected stable budget during the second phase of the programme, more than 95% of which being dedicated to the funding of IODP expeditions, ECORD is now in capacity to build concrete plans for 2019-2023.

The ECORD annual budget must be seen as a minimum budget as there are opportunities for IODP member and non-member countries to provide external co-funding and/or in-iind contributions (IKC) for the implementation of MSP expeditions in exchange of extra science party positions. IKC correspond to direct operational facilities and services that ESO would normally pay for.

The ECORD budget showed a positive balance of 15.79M USD at the end of 2018 and this sum has been carried forward to the ECORD FY19 budget.

Mission-specific platform expeditions

ECORD Science Operator

Mission-specific platform expeditions are an ECORD's landmark since 2004. ECORD is one of the three IODP Platform Providers since 2013.

No MSP expedition has been implemented in 2018. Based on the two potential scheduling scenarios for MSP expeditions that have been considered by the ECORD Facility Board (EFB) for FY19 and 20, the Expedition 389 Hawaiian Drowned Reefs' (Proposal 716; Lead Proponent: J. Webster, Australia) has been provisionally scheduled in Autumn 2019 as the fourth full expedition implemented by ECORD for IODP, after Expedition 357 Atlantis Massif Serpentinization and Life (2015), Expedition 364 Chicxulub Impact Crater (2016) and Expedition 381 Corinth Corinth Active Rift Development. However, since the preferred bidder pulled out of negotiations for business reasons at a late planning stage, the Hawaii Expedition has been postponed and will be rescheduled at the next meeting of the ECORD Facility Board.

At its last meeting that was held in The Hague (The Netherlands) on 7 and 8 November 2018, the ECORD Council has endorsed the scheduling of three additional MSP expeditions before the end of IODP: Expedition 386 based on Proposal 866 Japan Trench Paleoseismology (Lead proponent: M. Strasser, ECORD- Austria) to be implemented in FY20 in collaboration with CDEX-JAMSTEC, Expedition, Expedition 377 Central Arctic Paleoceanography (ArcOP) (Co-chief Scientists: R. Stein, ECORD-Germany and K. St. John, USA) in FY21 and Expedition 373 Antarctic Cenozoic Paleoclimate.

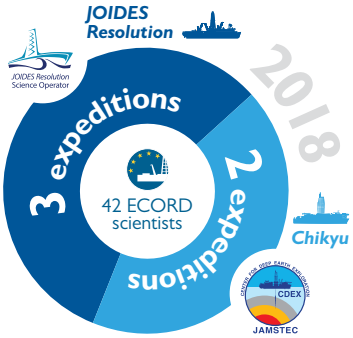
Council considered that it was not possible to schedule an MSP expedition based on proposal #887-CPP2 Gulf of Mexico Methane Hydrate (Lead proponent: P. Flemings, USA), based on the new information received from ESO and on the EFB priorities supported by the ECORD Council.

Submission of new proposals will be required to support post 2023 MSP scientific ocean drilling. In-kind contributions (IKC) and/or external co-funding from IODP and/or non-IODP members may become a key component in the financial model for future MSP expeditions in the current or any future programme.

The operational review of Expedition 381 Corinth Active Rift Development (Co-chief Scientists: L. McNeil, ECORD-UK and Donna Shillington, USA) was held on 6 November 2018 in The Hague, The Netherlands. The operational review committee has concluded that Expedition 381 was extremely successful with the completion of almost all drilling and coring objectives and the recovery of a total of 1645 m of core from three sites over a 1905 m cored interval (86% recovery). The operational review committee has expressed congratulations to the Co-chief Scientists, and all 381 scientists, as well to the operator ESO and proposed six main recommendations to improve forthcoming MSP expeditions. The scientific community can expect high-impact papers from Expedition 381, proposing scenarios of timing and spatial complexity of rift-fault system development, but also on the evolution of the drainage system in the first 1–2 My of the Corinth rift history, linked to the rift control.

Early morning view from the platform, Exp 381 (photo ECORD/IODP).

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



IODP expeditions (*http://www.iodp.org/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. ECORD, as a contributing member of the JR consortium and participant in the programme, is entitled to an average of eight scientistson every JR expedition and a minimum of four scientists on every expedition, with the exception of expeditions based on Complementary Project Proposal (CPP) for which a reduced contingent of berths is available for ECORD scientists.

JOIDES Resolution expeditions

Twenty four ECORD scientists, including one Co-chief Scientist and more than 50% of early-career scientists, were invited to participate in three expeditions that were implemented in 2018 by the *JOIDES Resolution* (See 4. Participating in 2018 *JOIDES Resolution* and *Chikyu* expeditions):

1. **Expedition 374: 'Ross Sea West Antarctic Ice Sheet History'** (4 January – 8 March 2018) aimed at unravelling the West Antarctic Ice Sheet (WAIS) evolution through the Neogene and Quaternary;

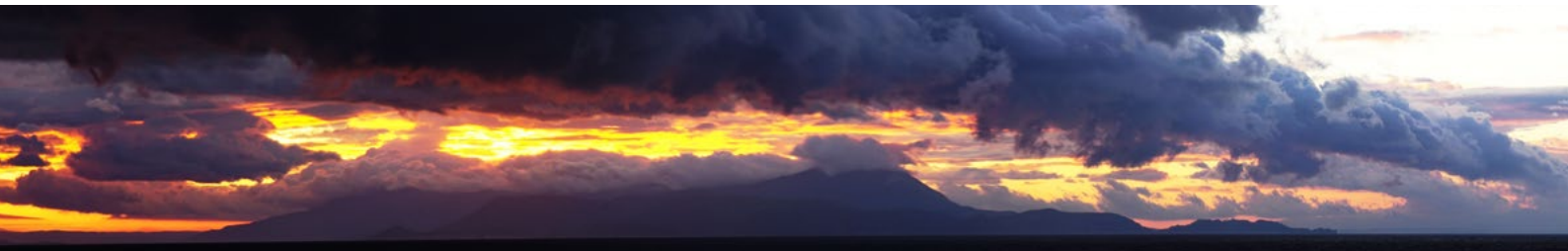
2. **Expedition 375: 'Hikurangi Subduction Margin'** (8 March – 5 May 2018) to investigate the processes and in situ conditions that underlie subduction zone Slow slip events (SSEs) at the northern Hikurangi Trough;

3. **Expedition 376: 'Brothers Arc Flux'** (5 May – 5 July 2018) to investigate the fundamental, interrelated processes governing sub-seafloor hydrothermal activity at Brothers volcano, southern Kermadec Arc.

The JR Facility Board (JRFB) has scheduled five JR expeditions in the Pacific and Southern Ocean before the end of 2019 (see table below).

2019 expeditions in the Pacific and Southern Ocean

Expedition name	#	Dates	Ports
Amundsen Sea West Antarctic Ice Sheet History	379	18 Jan -20 Mar 2019	Punta Arenas / Punta Arenas
Iceberg Alley Paleoceanogr. / S. Falkland Slope Drift	382	20 Mar - 20 May 019	Punta Arenas / Punta Arenas
Dynamics of Pacific Antarctic Circumpolar Current	383	20 May - 20 July 2019	Punta Arenas / Punta Arenas
Panama Basin Crustal Archit. (504B) and Restoring Hole 896A	385T	18 Aug - 16 Sept 2019	Antofagasta / San Diego
Guaymas Basin Tectonics and Biosphere	385	16 Sept - 16 Nov 2019	San Diego / San Diego



Early morning view from the platform, Exp 381 (photo ECORD/IODP).

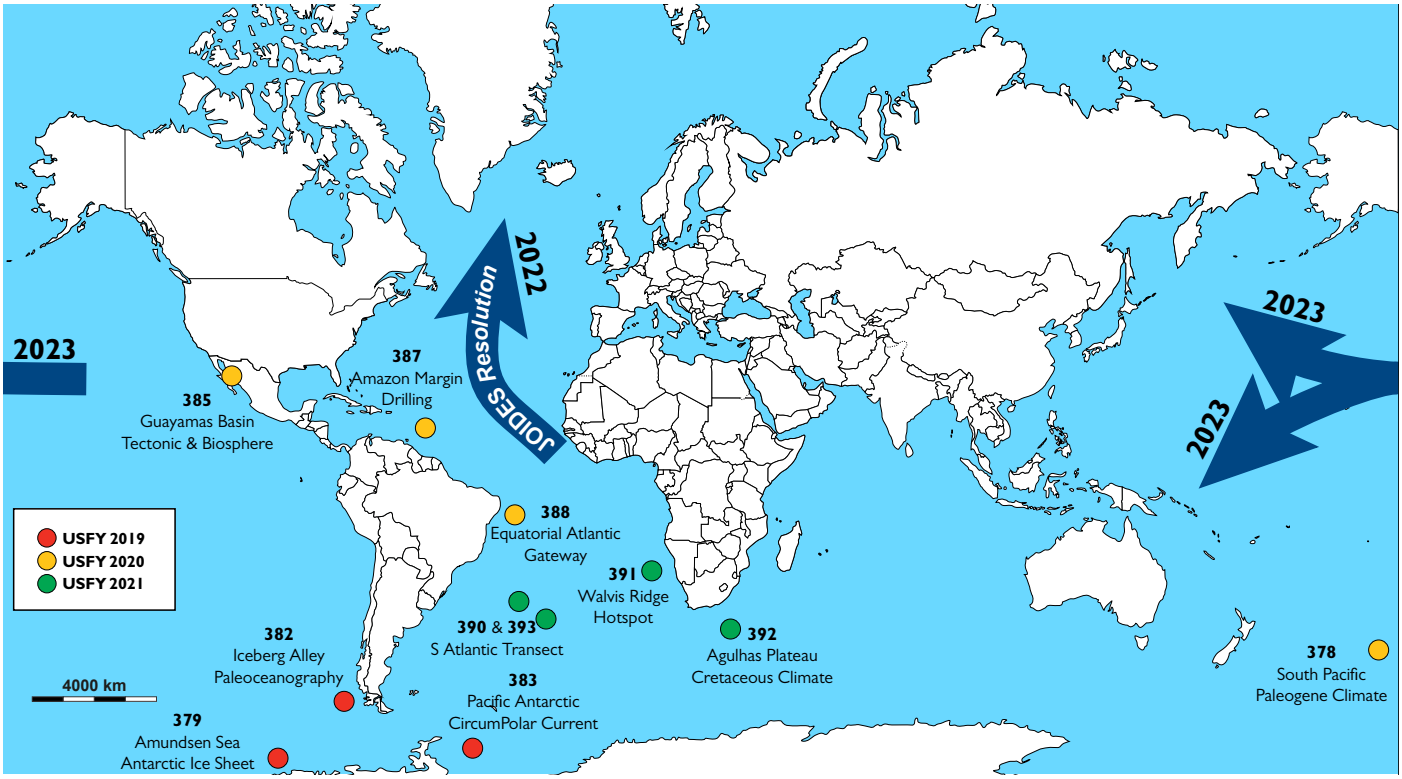
The JRFB has also sheduled the first expeditions in the Southern Atlantic in spring 2020 (see table below) after the implementation of Expedition 378 'South Pacific Paleogene' which was initially scheduled in late 2018 and postponed due to significant damages to the JR in the dry dock at Subic Bay Philippines in summer 2018. Four out of the seven scheduled expeditions in FY20 and 21 are based on proposals led by ECORD scientists. It seems likely that only four expeditions will be implemented every year from FY20 onwards due to the aging of the ship.

2020-2021 JR expeditions

Expedition name	#	Dates	Ports
South Pacific Paleogene Climate	378	3 Jan - 4 Mar 2020	Fiji / Papeete
(*JOIDES Resolution* Engineering Testing)	384	4 Mar - 26 Apr 2020	Papeete / Barbados
Amazon Margin	387	26 Apr - 26 June 2020	Barbados / Recife
Equatorial Atlantic Gateway	388	26 June - 26 Aug 2020	Recife / Recife
South Atlantic Transect, Expedition #1	390	5 Oct - 5 Dec 2020	Rio de Janeiro / Cape Town
Walvis Ridge Hotspot	391	5 Dec 2020 - 4 Feb 2021	Cape Town / Cape Town
Agulhas Plateau Cretaceous Climate	392	4 Feb - 6 Apr 2021	Cape Town / Cape Town
South Atlantic Transect, Expedition #2	393	6 Apr - 6 June 2021	Cape Town / Rio de Janeiro

The JRFB has reaffirmed that, based on current and anticipated proposal pressure, the JR will operate in the general area of the Equatorial and North Atlantic, Gulf of Mexico, Mediterranean, Caribbean, and the Arctic in FY21 and FY22. The four MagellanPlus workshops that have been held in 2018 (*www.ecord.org/science/magellanplus*) to develop JR drilling proposals concerning diverse scientific topics in this area demonstrates the pivotal role that the ECORD science community will play in this endeavour. The JR is expected to complete its global circumnavigation in the Indo-Pacific region near the end of the programme, in FY23 (see map below).

2019-2021 *JOIDES Resolution* IODP expeditions and planned *JOIDES Resolution* ship track



JOIDES Resolution expeditions

Eighteen ECORD scientists, including one Co-chief Scientist were invited to participate in two expeditions that were implemented in 2018 by the *Chikyu* (See 4. Participating in 2018 *JOIDES Resolution* and *Chikyu* expeditions):

1. **Expedition 380: NanTroSEIZE Stage 3 – 'Frontal Thrust Long-Term Borehole Monitoring System'** (12 January – 7 February 2018) to deploy a long-term borehole monitoring system (LTBMS) in Hole C0006G in the overriding plate at the toe of the Nankai accretionary prism.

2. **Expedition 358: 'NanTroSEIZE - Plate Boundary Deep Riser 4'** (7 October 2018 – 21 March 2019) aims at deepening riser hole C0002F/N/P from 3000 mbsf to the primary megathrust fault target at ~5200 mbsf, using logging-while-drilling (LWD), downhole measurements, and drill cuttings analysis extensively, in addition to limited coring intervals. This expedition therefore materializes the culmination of ten years of drilling efforts to reach the plate interface fault system at seismogenic / slow slip depths. The NanTroSEIZE programme has started in 2007 and its completion will have required 12 expeditions involving more than 200 scientists from 15 countries.

The *Chikyu* IODP Board (CIB) will prioritise future riser drilling projects (CRISP #537, IBM #698, and Hikurangi #781) at its 2019 meeting, after the completion of the last NanTroSEIZE expedition. In parallel, the CIB has encouraged new *Chikyu* riser-based projects for consideration along with current active proposals for future implementation.

Anticipating next IODP expeditions

New IODP Proposals

Sixteen new IODP proposals have been submitted in 2018, showing a slight decrease compared to 2017 (16 vs 20). However, this still demonstrates a strong scientific demand and a sustained involvement of the scientific community in IODP science.

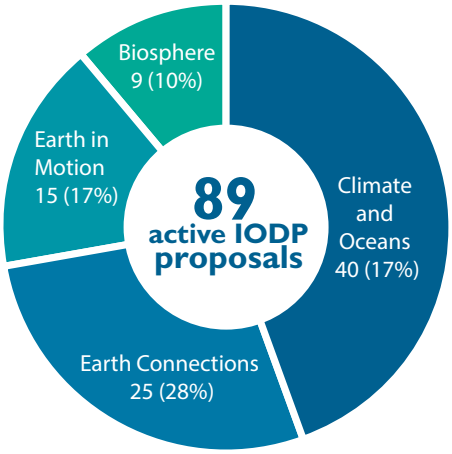
Active IODP Proposals

There are currently 89 active IODP proposals in the archives of the Science Support Office (as of 30 January, 2019). Their distribution across the Science Plan themes demonstrates a good to very good proposal pressure in all objectives of the Science Plan (see figure on top) and rather constant ratios between the themes: 45% of the proposals are in the Climate and Oceans Theme, whilst the other proposals are in the Earth Connections (28%), Earth and Motion (17%), and Biosphere (10%) themes.

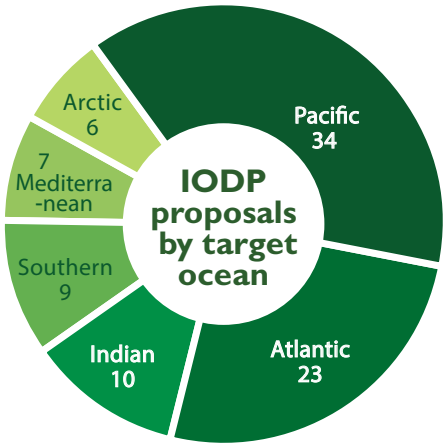
Regarding the geographical distribution of active proposals (see figure on the right), the number of drilling proposals in the Atlantic and the Mediterranean is fairly constant compared to 2017 (23 vs 26 and seven vs six respectively), thus reflecting the proposal pressure that will drive the planned 2020-2022 JR track.

The distribution of the 89 active IODP proposals across the various IODP platforms is rather constant compared to 2017. There are 61 JR proposals (68.5%), 12 *Chikyu* proposals (13.5%), 10 MSP proposals (11.2%; see 3. Anticipating next MSP expeditions, page 26), and six multiple proposals (6.7%) involving the JR and the *Chikyu* (see figure to the lower right). Forty four of these proposals are residing at the appropriate Facility Boards ready to be selected for drilling (29 for the JRFB, seven at the *Chikyu* IODP Board and six at the EFB).

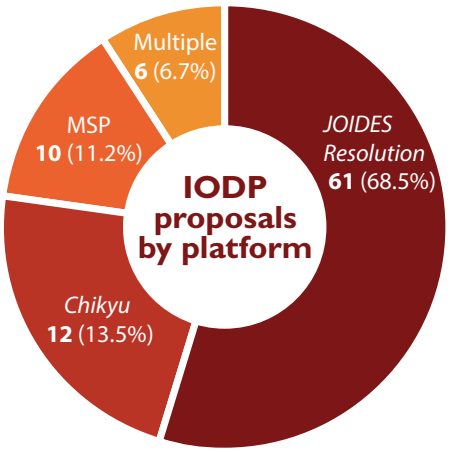
The ten active MSP proposals that are residing at the EFB and the Science Evaluation Panel (SEP) form the basis of the operational plan that has been defined for the second phase of the current programme (See 3. Anticipating next MSP expeditions, page 26). The objectives of the MSP proposals are quite diverse in terms of science topics (climate and sea-level change, geohazards, hydrogeology, deep biosphere), drilling systems (drill ships, jack-up rigs, seafloor drills, long piston coring) and geographical areas (Atlantic, Pacific, Arctic and Southern oceans, Mediterranean Sea, Japan Sea), thus demonstrating the great opportunities provided by the MSP concept to IODP. These proposals include an Amphibious Drilling Proposal (796-ADP NADIR Nice Amphibious Drilling) whose Scientific objectives can only be accomplished by combining land and shallow-water drilling, this exemplifies the necessary closer collaboration between ICDP and IODP, especially through ECORD given that most ADPs will likely involve MSP operations.



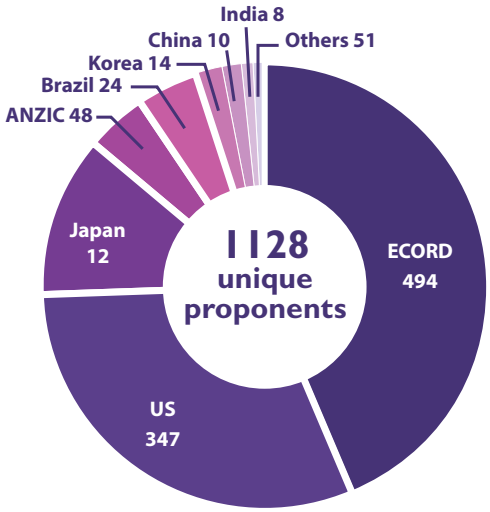
Distribution of active proposals by IODP Science Plan themes (n = 89) (as of 30 January 2019).



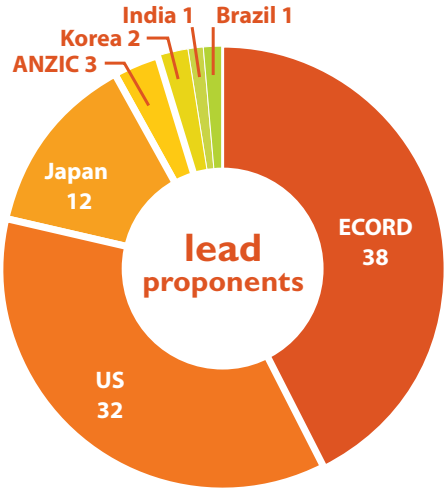
Distribution of active proposals by target ocean (n = 89) (as of 30 January 2019).



Distribution of IODP proposals by platforms (n = 89). Multiple proposals consist of combined *Chikyu* and JR drilling (Data provided by the IODP Science Support Office as of Feb 2018). (as of 30 January 2019).



Distribution of active proposals by proponents' member affiliation (as of 30 January 2019).



Distribution of active proposals by lead proponents' member affiliation (as of 30 January 2019).

Four of the six proposals residing at SEP, including a Multi-phase Drilling Proposal (863-MDP ISOLAT Southern Ocean Paleoclimate) involving long piston-coring technology, did not get any action from their proponents since several years and could be deactivated soon. A higher MSP proposal pressure including different science themes and involving various potential drilling/coring systems in diverse environments will be necessary to provide additional scientific, operational and funding opportunities in the near future and to ensure a future to the MSP concept in a new programme that could be developed beyond 2023.

ECORD proponents

ECORD is providing a huge contribution to the scientific efforts within IODP. ECORD has a leading role in proposal submission in IODP since 2014 with percentages of unique proponents constantly above 37%. Currently, 494 ECORD scientists out of 1128 unique proponents (*i.e.* 43.8%), including 38 lead proponents, are proponents of active IODP proposals (see figures to the left). The wealth of ECORD-led active IODP proposals partly relies on the success of the ECORD-ICDP MagellanPlus Workshop Series Programme (See 7. Engaging the community, page 58), which provides a substantial support to ECORD scientists to develop inovative drilling proposals concerning diverse scientific topics addressed by the three IODP platforms and/or the ICDP infrastructure.

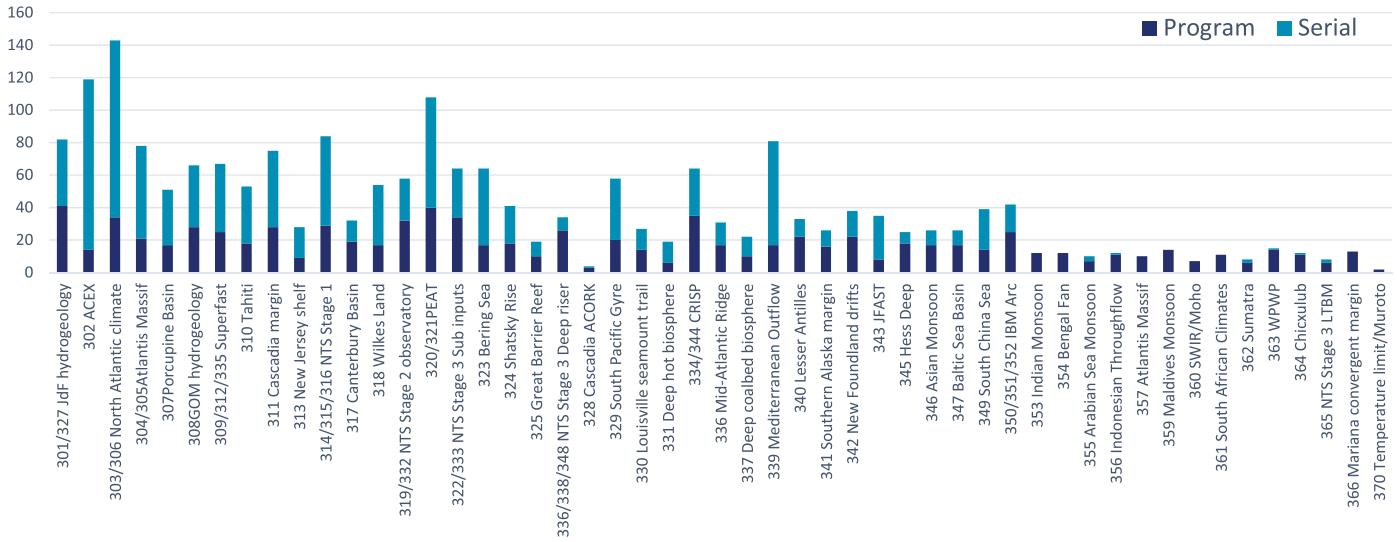
MSP *Fugro Synergy*, Gulf of Corinth, Exp. 381 (photo J. Everest, ECORD/IODP).

Valorizing IODP science

The outstanding intellectual contribution of the ECORD scientists to IODP is also reflected by the valorisation of cutting-edge results (See 6. Selected 2018 IODP publications from ECORD scientists, page 42). With 10,764 out of more than 25,000 serial contributions reported in the Scientific Ocean Drilling Bibliographic Database (*http://iodp.tamu.edu/publications/AGI_studies/AGI_study_2018.pdf*) and related to the successive ocean drilling programmes from 1969 through June 2018 (Deep Sea Drilling Project, the Ocean Drilling Program, the Integrated Ocean Drilling Program, and the International Ocean Discovery Program), the ECORD science community demonstrates its leading role in the international geoscience landscape (see table below). These numbers also testify the attractivity exerted by the scientific ocean drilling programmes on the geoscience community.

Member country or consortia	First authors of serials	Serial contributions by country	Serial contributions by author	Total contributions
Australia/New Zealand Consortium	310	453	558	868
Australia	180	300	347	527
New Zealand	130	153	211	341
Brazil	23	30	32	55
China	420	326	427	847
ECORD	4,073	5,239	6,691	**10,764**
Austria	15	38	39	54
Canada	322	409	489	811
Denmark	52	103	115	167
Finland	8	10	11	19
France	608	773	1,078	1,686
Germany	994	1,156	1,502	2,496
Ireland	5	22	24	29
Italy	278	345	453	731
Netherlands	222	259	278	500
Norway	140	187	217	357
Portugal	15	41	51	66
Spain	142	234	290	432
Sweden	104	134	139	243
Switzerland	133	198	214	347
United Kingdom	1,035	1,330	1,791	2,826
India	173	95	106	279
Japan	696	817	1,829	2,525
Republic of Korea	50	81	93	143
United States	3,923	3,253	5,942	9,865
Total papers:	**9,668**			**25,346**

Table illustrating serial publication authorship by first author, contributing country, contributing authors, and total contributions (1969–2018)



Publication records for Expeditions 301–370 (2003–2018) as of June 2018. MSP expeditions are Expeditions 302, 310, 313, 325, 347, 357 and 364. MSP expeditions 310 and 325 should be combined as they are based on the same proposal (#519)

The number of programme (Expedition Reports, post-expedition research data reports, and Scientific Drilling papers) and non-programme serial publications for all completed Integrated Ocean Drilling Program and IODP expeditions at the end of June 2018 (Expeditions 301–368; see figure on next page) demonstrates that the MSP expeditions, which represent less than 10% of all IODP expeditions, have generated a significant proportion of the peer-reviewed scientific publications arising from the programme.

Furthermore, the list of the most-cited IODP expedition–related papers as of July 2018 illustrates the high-impact and high-quality science achieved by MSP expeditions (see tables on previous and this page). However, the figure and the table on this page do not yet include the high scientific return expected from the most recent MSP Expeditions 357, 364 and 381, which will further enhance the combined scientific output of MSP expeditions.

Article	Leg or expedition	Cited by (N)
Sluijs, A., Schouten, S., Pagani, M., Woltering, M., Brinkhuis, H., Sinninghe Damsté, J.S., Dickens, G.R., Huber, M., Reichart, G.-J., Stein, R., Matthiessen, J., Lourens, L.J., Pedentchouk, N.,	IODP 302	550
Inagaki, F., Nunoura, T., Nakagawa, S., Teske, A., Lever, M., Lau- er, A., Suzuki, M., Takai, K., Delwiche, M., Colwell, F.S., Nealson, K.H., Horikoshi, K., D'Hondt, S., and Jørgensen, B.B., 2006. Bio- geographical distribution and diversity of microbes in methane hydrate-bearing deep marine sediments on the Pacific Ocean margin. Proceedings of the National Academy of Sciences of the United States of America, 103(8):2815–2820. http://dx.doi. org/10.1073/pnas.0511033103	ODP 201, 204	549
Moran, K., Backman, J., Brinkhuis, H., Clemens, S.C., Cronin, T., Dickens, G.R., Eynaud, F., Gattacceca, J., Jakobsson, M., Jordan, R.W., Kaminski, M., King, J., Koc, N., Krylov, A., Martinez, N., Matthiessen, J., McInroy, D., Moore, T.C., Onodera, J., O'Regan, M., Pälike, H., Rea, B., Rio, D., Sakamoto, T., Smith, D.C., Stein, R., St. John, K., Suto, I., Suzuki, N., Takahashi, K., Watanabe, M., Yamamoto, M., Farrell, J., Frank, M., Kubik, P., Jokat, W., and Kristoffersen, Y., 2006. The Cenozoic palaeoenvironment of the Arctic Ocean. Nature, 441(7093):601–605. http://dx.doi. org/10.1038/nature04800	IODP 302	513
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. http://dx. doi.org/10.1038/nature07174	ODP 201, 204, 207; IODP 301, 311	475
Scher, H.D., and Martin, E.E., 2006. Timing and climatic consequences of the opening of Drake Passage. Science, 312(5772):428–430. https:// doi.org/10.1126/science.1120044	ODP Site 1090 and others	447
Kallmeyer, J., Pockalny, R., Adhikari, R.R., Smith, D.C., and D'Hondt, S., 2012. Global distribution of microbial abun- dance and biomass in subseafloor sediment. Proceedings of the National Academy of Sciences of the United States of America, 109(40):16213–16216. https://doi. org/10.1073/ pnas.1203849109	IODP 323 with ODP 204, 204, 207, and IODP 301, 311, 336	411
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	IODP 302	326
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. http:// dx.doi.org/10.1038/nature10902	IODP 310	313
Moore, G.F., Bangs, N.L., Taira, A., Kuramoto, S., Pangborn, E., and Tobin, H.J., 2007. Three-dimensional splay fault geometry and implications for tsunami generation. Science, 318(5853):1128–1131. http://dx.doi.org/ 10.1126/sci- ence.1147195	IODP 314/315/316	308
Frost, B.R., and Beard, J.S., 2007. On silica activity and ser- pentinization. Journal of Petrology, 48(7):1351–1368. http:// dx.doi.org/10.1093/ petrology/egm021	IODP 304/305	276
	Total cited by:	**4,168**

Top ten cited IODP expedition–related papers as of July 2018.
Most of them are in the top journals by impact factor. MSP expeditions are Expeditions 302 and 310.

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.

The BCR currently contains 155.35 km of deep-sea cores from 89 expeditions. All BCR samples (over 1.69 million samples/ more than 7077 sample requests/over 4742 individual scientists, 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/*).

In 2018, a total of 41,925 samples were taken at the BCR for 258 requests (of which 156 were submitted by ECORD scientists; see 6. Archiving IODP cores: the Bremen Core Repository). ECORD has developed 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.

Engaging the community

The portfolio of science and educational activities that ECORD has developed over the last years has been very effective in 2018 with high demand from scientists, students, early-career scientists and members from education (See 7. Engaging the community, page 58).

The continuous funding of the **ECORD-ICDP MagellanPlus Workshop Series Programme** expresses the strong ECORD's support to its scientists to develop innovative drilling proposals concerning diverse scientific topics for any of the three IODP platforms and the ICDP infrastructure (*http://www.ecord.org/science/magellanplus/*) .

Four workshops have been funded or co-funded by ECORD in 2018:

- 'Fjord sediment archives in the northeastern North Atlantic', 7-8 April 2018, Vienna, Austria.
- 'The North Atlantic Igneous Province continental break-up magmatism and impacts on global warming during the Paleogene', 29-30 May, 2018, Kiel, Germany.
- 'Temporal evolution of Arctic gas hydrate and methane seepage systems', 4-5 June 2018, Tromsø, Norway.
- 'Greenland Ice Sheet evolution revealed by drilling a transect on the Baffin Bay – West Greenland Margin', 12-14 September 2018, Copenhagen, Denmark.
- An additional workhop will be held in early 2019: 'New Caledonia Peridotite Amphibious Drilling Project', 22-24 January 2019, Montpellier, France.

The promotion of IODP scientific achievements to a large audience within universities and institutes has been actively conducted by four 2018-2019 ECORD Distinguished Lecturers (*http://www.ecord.org/education/dlp/*): Rebecca Bell (UK), Marguerite Godard (France), Verena Heuer (Germany) and Luc Beaufort (France).

A major goal of ECORD is to train the next generation of scientists from ECORD member countries. The portfolio of educational activities that ECORD has built over the last years included funding or co-funding of three Summer Schools and a Training Course and has involved more than 130 students and early-career scientists. Seventeen ECORD scholarships were provided to support outstanding students to attend the ECORD Summer schools and Training Course.

Three ECORD Summer Schools were sponsored by ECORD in 2018 (http://www.ecord.org/education/summer-schools/): the 15th Urbino Summer School in Paleoclimatology on Past Global Change Reconstruction and Modelling Techniques (11-27 July 2018; Urbino, Italy), the 12th ECORD Bremen Summer School (3-14 September 2018; Bremen, Germany) focused on Sub-seafloor Fluid Transport and Gas Hydrate Dynamics and the 3rd ECORD Petrophysics Summer School (30 June - 2 July 2018; Leicester, UK).

The fourth ECORD Training Course (*http://www.ecord.org/education/summer-schools/*) has been held at the IODP Bremen Core Repository at MARUM, Bremen, on 23-27 April 2018. This one-week course, with a focus on the IODP core-flow procedures, was tailored to prepare the participants for sailing on an offshore drill ship expedition, and to instill in them an appreciation of the high standards required in all kinds of coring projects.

Seven ECORD Research Grants (*http://www.ecord.org/education/research-grant/*) were awarded to PhD students and early-career scientists to conduct research on core material and data related to past or upcoming DSDP/ODP/IODP expeditions.

Through its participation to the **Teachers at Sea programme** initiated by Ocean Leadership (*http://www.ecord.org/education/teachers-at-sea/*), an ECORD Education Officer sailed on the *JOIDES Resolution* Expedition 374 Ross Sea West Antarctic Ice Sheet History.

The **ECORD School of Rock** aims at supporting educational activities of teachers interested in IODP science via a workshop with lectures given by scientists and practical hands-on sessions developed and tested by scientists and educators who sailed on IODP expeditions. The 2018 ECORD School of Rock was held in Pavia, Italy on 24 - 27 July 2018.

Communicating

Promoting activities and accomplishments of IODP to various audiences, including scientists, classrooms and the general public, is a major goal of ECORD. ECORD constantly update and create communication and educational materials that are distributed across the ECORD member countries.

In 2018, the ECORD outreach team has promoted the IODP and ICDP programmes under the umbrella of 'Scientific Drilling' at major international (EGU, AGU) and national science conferences with the organization of joint ECORD-ICDP booths and a Townhall meeting at the EGU in Vienna which hosted almost 15,000 attendees.

On 5 March in Bremen, the ECORD Outreach team has organised a media day during the Onshore Science Party of Expedition 381 Corinth Active Rift Development.

At its last meeting that was held in The Hague, The Netherlands, on 7-8 November 2018, the ECORD Council has accepted the EOTF proposition to increase significantly the outreach budget in order to be able to organise temporary exhibitions in museums and aquariums. This positive move will certainly usher a new communication environment for ECORD.

Forward look

While still working on their mid-term (*i.e.* 2019-2023) renewal, most IODP member countries and consortia - including ECORD - are already planning efforts designed to consider the future of scientific ocean drilling beyond 2023. The challenges to build a successor to the current programme will be enormous since such a programme might have to fit to a totally different operational, financial and programmatic model from that of its predecessors. This endeavor will require the full mobilisation and involvement of all stakeholders to ensure the building of a programme in which suitable technological facilities will meet the scientific needs of the community.

Based on the building phases of the current IODP (2013-2023), the planning of a scientific ocean drilling programme beyond 2023 will start in 2019 with several initiatives taken at the national or consortia levels. These multiple planning efforts to continue scientific ocean drilling beyond 2023 will eventually require coordination to outline a Science Plan or to reconsider the current one, and to assess the technologies and the envisioned mix of drilling platform capabilities needed to reach its full potential.

As part of these planning efforts, the workshop entitled **'PROCEED' ('Expanding Frontiers of Scientific Ocean Drilling')** by ECORD at the Austrian Academy of Sciences, Vienna, Austria, on 6-7 April 2019 has a unique opportunity to initiate the momentum that is needed to maintain scientific ocean drilling research in the next decade. This workshop aims at initiating concepts and defining new goals for a future international scientific ocean **drilling programme to be developed beyond 2023**. Special emphasis will be on new science frontiers and technological developments in a multiple drilling platform approach.

Based on the well-established operation of the ECORD infrastructure, its successful implementation, its competitiveness in the international research landscape and maximum return from the investment, ECORD sees its future with confidence, 50 years after the first scientific ocean drilling operations by the *Glomar Challenger* in the Gulf of Mexico (DSDP Leg 1).

Gilbert Camoin
ECORD Managing Agency Director

Related websites

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

2. Operating and participating in mission-specific platform expeditions

On board *Fugro Synergy* during Expedition 381 Corinth Active Rift Development (photo ECORD/IODP).

Onshore Science Party (Exp 381)

In 2018, the ECORD Science Operator (ESO) implemented the Onshore Science Party (OSP) for Expedition 381: Corinth Active Rift Development, the eighth mission specific platform (MSP) expedition of IODP. The OSP took place from 31 January to 28 February and followed the offshore phase of the expedition which was successfully implemented from 22 October to 18 December 2017. At the OSP, ESO staff and the Science Party worked to analyse the first deep cores ever taken from beneath the Gulf of Corinth.

ESO support for past MSP expeditions

ESO support for past MSP expeditions continued throughout the year. In October 2017, the moratorium ended for Expedition 364: Chicxulub: Drilling the K-Pg Impact Crater. The IODP Proceedings were published online on 30 December 2017 (*http://publications.iodp.org/proceedings/364/364title.html*), and all shipboard data were made publicly available after export from the ExpeditionDIS and ESO Science Server to **PANGAEA** (*www.pangaea.de*). The Science Party and collaborators of Expedition 364 are continuing their post-expedition research, with the majority of papers from this expedition expected to be submitted to peer-reviewed journals by June 2019. ESO staff supported the 2nd Post-Expedition Meeting that was held in Merida, Mexico, 5-8 June 2018, which provided an opportunity for the Expedition Scientists to meet and discuss their latest results and to coordinate their publication strategies for 2018 and 2019.

IODP Expedition 381

Onshore Science Party (OSP)

Corinth Active Rift Development

Co-chief Scientists	**Lisa McNeill** (University of Southampton, UK) **Donna Shillington** (Lamont-Doherty Earth Observatory, USA)
Expedition Project Manager	**Gareth Carter** (ESO, BGS, UK)
Petrophysics Staff Scientist	**Erwan Le Ber** (EPC, University of Leicester, UK)
IODP sites	M0078, M0079, M0080
Expedition website	*http://www.ecord.org/expedition381/*

Exp 381 Scientific objectives

Expedition 381: Corinth Active Rift Development provides the opportunity to achieve unprecedented precision of timing and spatial complexity of rift-fault system development and rift-controlled drainage system evolution in the first 1–2 My of rift history.

Through integration of the core and downhole logging measurements with an extensive offshore seismic dataset and onshore outcrop data, the Science Party anticipate being able to determine how faults evolve, how strain is distributed, and how the landscape responds within the first few million years in a non-volcanic continental rift, as modulated by Quaternary changes in sea level and climate.
Three sites were carefully selected to sample the recent syn-rift sequence (IODP Sites M0078 to M0080).

Two primary themes are addressed by drilling at these sites:

1st The fault and rift evolution (including fault growth, strain localisation, and rift propagation) and deformation rates will be examined. The spatial scales and relative timing can already be determined using the offshore seismic data, and dating of the new cores will better constrain the timing, provide temporal correlation to the onshore data, and the ability to quantify strain rates.

2nd The new expedition data will define lithologies, depositional systems and paleoenvironment (including catchment paleoclimate), basin paleobathymetry, and relative sea level. By integrating this data with seismic data, onshore stratigraphy, and catchment data, the relative roles and feedbacks between tectonics, climate, and eustasy in sediment flux and basin evolution can be investigated.

Exp 381 Onshore Science Party

The offshore phase of the expedition successfully concluded on 18 December 2017, after spending 58 days at sea and collecting almost 1,645 m of core. After shipping the cores to the IODP Bremen Core Repository over the Christmas period, they arrived in Bremen on 3 January 2018 and were unloaded and safely stored in the BCR reefer.

Splitting a core. Exp 381, OSP (photo V. Diekamp, ECORD/IODP).

OSP preparations

January 2018

Final OSP preparations were made, including analytical planning, preparation and set-up of workflows for the various work stations (geochemistry, paleomagnetism, visual core description, sampling, colour and linescan track systems, mineralogy/XRD, TC/TOC Leco, palynology including the HF laboratory, microscopes for biostratigraphy and lithostratigraphy) as well as equipment tests, final purchasing of consumables/equipment (e.g. vacuum sealer), and health and safety documentation compilation.

4-week pre-OSP programme

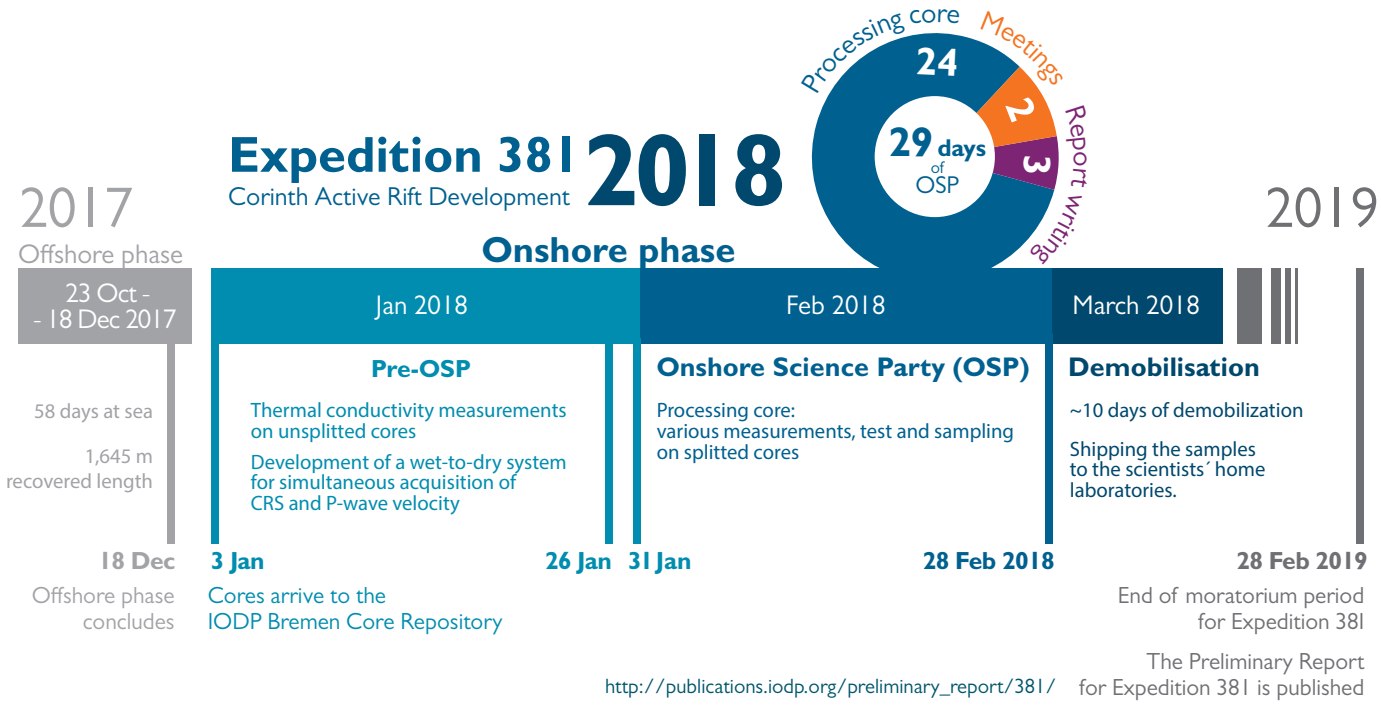
3 - 27 January 2018

In parallel, a 4-week pre-OSP programme of work, in which thermal conductivity measurements were acquired, took place at the BCR between 3 and 26 January. During this pre-OSP phase, ESO-EPC staff worked with Bremen colleagues to develop a wet-to-dry system for the multi-sensor core logger (MSCL) to enable simultaneous acquisition of colour reflectance spectrophotometry (CRS) and P-wave velocity measurements on split cores during the OSP (historically it has only been CRS that is acquired on the MSCL during the OSP).

The OSP in Bremen

31 January - 28 February 2018

The OSP took place from 31 January to 28 February at the IODP Bremen Core Repository and the MARUM, University of Bremen, Germany, with further analytical laboratories accessed through the university's Department of Geosciences. The total duration of the Onshore Science Party was 29 days (2 days introduction/meetings, 24 days processing core, 3 days report writing). After the OSP the ESO Bremen team worked for about 10 days on the demobilisation of all labs, offices, and work stations as well as shipping all the samples taken at the OSP to the scientists´ home laboratories.



Exp 381 QA/QC for MSP expeditions

ESO Bremen and EPC continued to implement QA/QC for MSP expeditions throughout the year. Various work packages related to this topic which encompass overall policies and procedures for QA/QC were completed. These documents will be stored in the database and together with all expedition data made publicly available at the end of the moratorium.

Exp 381 Preliminary OSP observations

Preliminary OSP observations of the core revealed thinly bedded and laminated mud with thin interbeds of fine sand including organic matter. Lithologies and micropalaeontological assemblages were highly variable, indicating a complex palaeoenvironmental history with multiple changes between marine and lacustrine conditions in the Gulf of Corinth. Discrete and distinctive sandy turbidite layers were identified, which the Science Party suspect were deposited during lowstand periods when the gulf was isolated from the marine environment. The deeper part of the section drilled at Site M0079 shows more complexity and heterogeneity than the equivalent section sampled at Site M0078, which may be a consequence of the expansion and completeness of the section at M0079.

At Site M0080, intervals of marine and non-marine deposition were identified, including gravels, pebbly muds/sands, siltstone, and at the base of the hole, coarse conglomerate was recovered. Microfossils were observed in some of the deepest cores, some of which will be able to provide important age constraints on the oldest sediments recovered.

Exp 381 Moratorium period

28 February 2019

Since the end of the OSP, the Science Party and their collaborators have continued their post-expedition research. The moratorium period for Expedition 381 ended on 28 February 2019, and the IODP Proceedings volume is published and data released online via the Pangaea portal.

Exp 381 Peer-reviewed papers

2020

The majority of peer-reviewed papers from this expedition are expected to be submitted to journals before October 2020. Several papers are already in preparation or in press, including an early results paper submitted to Nature Scientific Reports entitled "High-resolution record reveals climate-driven environmental and sedimentary changes in an active rift".

The IODP Preliminary Report has been under embargo to allow these early results to be published.

Preliminary report published in Feb 2019:
http://publications.iodp.org/preliminary_report/381/

Exp 381 Post-expedition Meetings

Early preparations were made with the Co-chief Scientists for the Expedition 381 2nd Post-expedition Meeting, to be held in Greece in either fall 2019 or spring 2020. At this meeting, the Science Party will present the first results from their individual post-expedition research projects, and will coordinate their publication strategies.

Drilling and coring objectives achieved with a total of
1645 m of cores recovered
from three sites over a
1905 m cored interval

The Operational Review Committee meeting concerning this expedition was organised in The Hague on 6 November 2018 prior to the ECORD Council-ESSAC annual meeting.

Even if the Operational Review Committee considered that it was too early to evaluate the scientific outcome of Expedition 381, its members assessed the operational and scientific achievements, and therefore evaluated the general success of the expedition. The members of the Operational Review Committee agreed that Expedition 381 was very successful, as the drilling and coring objectives were almost completely achieved with a total of 1645 m of cores recovered from three sites over a 1905 m cored interval.

This success was noteworthy, despite some challenges including short leading time frame, permit issues in Greek territorial waters, short time between the offshore and onshore phases and problems of timing to access logging data. The collection of XRF data for the first time on an MSP expedition at the onshore science party was another significant achievement.

3. Anticipating future mission-specific platform expeditions

Fugro Synergy during Expedition 381 Corinth Active Rift Development (photo R. Gawthrope, ECORD/IODP).

3. Anticipating future mission-specific platform expeditions

In June 2018, the *JOIDES Resolution* Facility Board forwarded the Proposal P887 Gulf of Mexico Gas Hydrates (Expedition 386) to the EFB, as the *JOIDES Resolution* cannot implement such an expedition due to the strengthening of regulations in the Gulf of Mexico (GOM) following the "New Horizon" disaster. The EFB met virtually to evaluate the possibility of implementing Expedition 386 as an MSP, which could have been the first Complimentary Project Proposal (CPP) for ECORD. However, since the significant cost of this expedition for ECORD would have precluded the implementation of one of the two polar expeditions before the end of the program. The EFB has recommended the implementation of both Expedition 377 'Arctic Ocean Paleoceanography (ArcOP)' as a first-priority expedition (EFB Consensus 18-03-05) and Expedition 373 'Antarctic Cenozoic Paleoclimate' before the end of the current programme, most probably in 2023. The ECORD Council has therefore considered that it was not possible to implement the Expedition 386 'Gulf of Mexico Methane Hydrate' as an MSP expedition before 2021 as requested by the proponents.

SCHEDULED EXPEDITIONS

IODP Expedition 386

Scheduled for 2020

Japan Trench Paleoseismology

Co-chief Scientists **TBD**

Expedition website *http://www.ecord.org/expedition386/*

Exp 386 Scientific objectives

Short historical and even shorter instrumental records limit our perspective of earthquake maximum magnitude and recurrence, and thus are inadequate to fully characterize Earth's complex and multi-scale seismic behaviour and its consequences. Examining prehistoric events preserved in the geological record is essential to reconstruct the long-term history of earthquakes and to deliver observational data that help to reduce epistemic uncertainties in seismic hazard assessment for long return periods. "Submarine paleoseismology" is a promising approach to investigate deposits from the deep sea, where earthquakes leave traces preserved in the stratigraphic succession. However, at present we lack comprehensive data sets and long-term records that allow for conclusive distinctions between quality and completeness of the paleoseismic archives.

Motivated by the mission to fill the gap in long-term records of giant (Mw9-class) earthquakes, J-TRACK Paleoseismology aims at testing and developing submarine paleoseismology in the Japan Trench (JT).

Exp 386 Operations

This proposal aims to use multiple shallow Giant Piston Coring (GPC) to test and develop submarine paleoseismology in the Japan Trench. Eighteen primary sites are proposed with 40 mbsf giant piston coring at each site, with water depths ranging from 7250 to 8030 m.

Scoping for this proposal continued in 2018, and a new planning phase was initiated after the proposal was scheduled by the ECORD Facility Board for implementation in 2020. ESO and CDEX colleagues met to consider if this expedition can be jointly implemented by the two operators, with a research vessel provided as an IKC from Japan.

The *Kaimei* has been proposed as a potential vessel that could be contributed as an IKC, and CDEX colleagues will investigate if they can apply for *Kaimei* ship time on ESO's behalf. The *Kaimei* underwent sea trials in 2018 which will continue into 2019. The trials include testing of the *Kaimei*'s Giant Piston Coring (GPC) system (40m length, weight 6 tons).

The provision of the *Chikyu* as the location for the Onshore Science Party is also possible, with many elements possibly provided as an IKC.

Discussions started in 2018 between ESO and CDEX will continue in the first quarter of 2019, and will lead to an implementation strategy for a joint ESO-CDEX expedition using the *Kaimei* and possibly the *Chikyu* (OSP location).

IODP Expedition 377

Scheduled for 2021

Arctic Ocean Paleoceanography (ArcOP)

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

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

Exp 377 Scientific objectives

The overall goal of this proposal is the recovery of a complete stratigraphic sedimentary record on the southern Lomonosov Ridge to reconstruct the continuous long-term Cenozoic climate history of the central Arctic Ocean at high resolution, with a special focus on the Neogene and the Pleistocene. Key objectives are related to the reconstruction of the history of circum-Arctic ice-sheets, sea-ice cover, Siberian river discharge, as well as deepwater circulation and ventilation and their significance within the global climate system.

Exp 377 Operations

At the beginning of 2018, ESO continued planning for Expedition 377 for potential implementation in August to September 2019, as directed by the ECORD Facility Board. ESO made continued efforts to seek In-Kind Contributions (IKC), that would enable the expedition to be implemented within the allocated budget.

By March 2018, ESO concluded that an IKC in the form of a completely free nuclear icebreaker and other contributions were unlikely, and in any event vessel availability meant Expedition 377 could not be undertaken in 2019. To enable this expedition to be implemented, ESO suggested that the primary icebreaker must be secured by a fully-funded contract, and the ice and fleet management to be subcontracted in its entirety.

In November 2018, the ECORD Council agreed to increase the budget allocation for Expedition 377, and scheduled the expedition for late summer 2021.

IODP Expedition 373

Scheduled for 2023

Antarctic Cenozoic Paleoclimate

Co-chief Scientists	**Trevor Williams** (Texas A&M University, USA) **Carlota Escutia** (University of Granada, Spain)
Expedition website	*http://www.ecord.org/expedition373/*

Exp 373 Scientific objectives

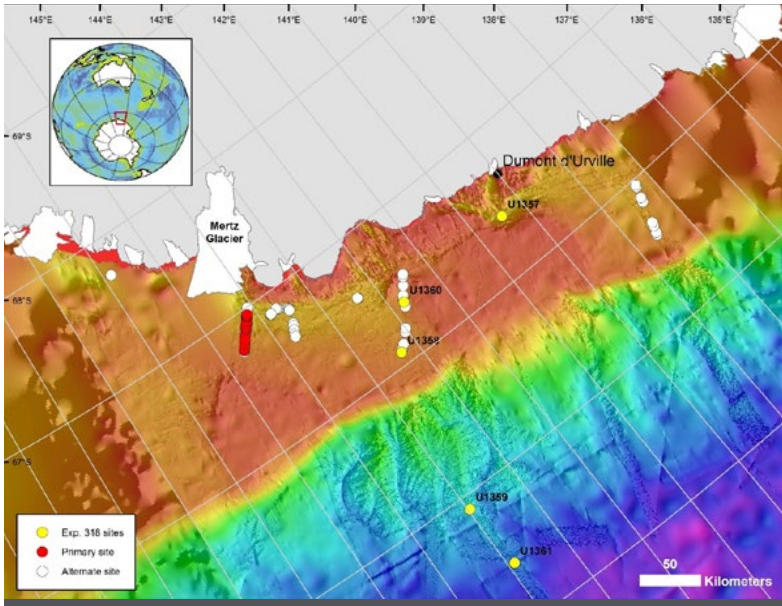
The aim of this expedition, based on Proposal 813, is to drill the shallowly-buried strata along the George V and Adélie Land shelf of East Antarctica (page 28) to obtain a record of Antarctica's climate and ice history from the Eocene (greenhouse) to the Neogene (icehouse).

Exp 373 Operations

In March, the ECORD Facility Boarded scheduled the implementation of Expedition 373 in the 2019/21 Antarctic summer season. Acknowledging the risks associated with securing an appropriate ice-capable vessel for the deployment of seafloor drilling technology, the ECORD Facility Board also approved the scheduling of Expedition 389: Hawaiian Drowned Reefs as a back-up for the 2019 MSP expedition.

In May, ESO issued a world-wide invitation to tender for an icebreaking platform and drilling services, which specifically encouraged submission of seafloor drilling equipment (although geotechnical vessel-based options were not ruled out by the call wording). A full tender evaluation was undertaken by ESO in June, which found that there were no compliant vessel options within the allocated budget to implement this proposal in either the 2019/20 or 2020/21 Antarctic summer seasons.

Alternative options were investigated by ESO, including a promising option to apply for ship time on the new Australian research vessel RSV *Nuyina*, ideally as an IKC, although co-funded and fully-funded options could be available. The vessel is due to be commissioned for the 2020/21 season, however early advice suggests that a very robust ship time proposal would be required, and access to the ship would not be immediate due to the priority of other science programs in Australia.



Exp 373 sitemap (ECORD/IODP)

As a consequence of zero availability of affordable vessels for a 2019/20 or 2020/21 operation, ESO reverted to the ECORD Facility Board consensus instructing ESO to implement Expedition 389: Hawaiian Drowned Reefs as the alternative expedition for 2019. Expedition 373 will remain as a future expedition option for ECORD, and ESO will continue scoping platform opportunities that may allow its implementation in 2023.

IODP Expedition 389

To be rescheduled

Hawaiian Drowned Reefs

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

Exp 389 Scientific objectives

The overall goal of the drilling campaign is to sample a unique succession of drowned coral reefs around Hawaii now at -134 to -1155 m below sea level. As a direct result of Hawaii's rapid 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 unfavourable shelf morphology. Specifically, these data show that the reefs grew into, during and out of the majority of the last five to six glacial cycles. 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.

Exp 389 Operations

As a consequence of zero availability of affordable vessels for Expedition 373 in 2019/20 or 2020/21, ESO reverted to the ECORD Facility Board consensus instructing ESO to implement Expedition 389: Hawaiian Drowned Reefs as the alternative expedition for September-October 2019.

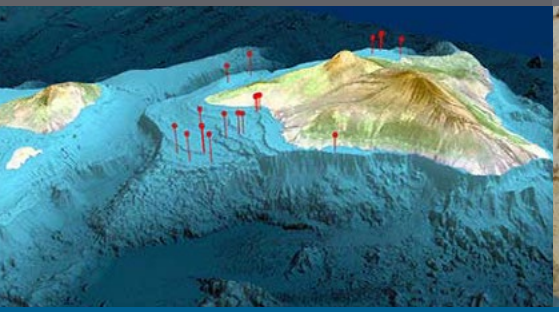
In August, ESO issued a call to tender for platform and drilling services for X389. The tender called for both a vessel and a suitable drilling system, and specifically encouraged submission of seafloor drilling equipment. The bids were evaluated in October, and at the end of 2018 ESO were engaged in ongoing discussions with potential drilling contractors.

Permitting work continued, and in May ESO staff visited Hawaii to attend permitting meetings with the Department for Land and Natural Resources and the US Army Corps of Engineers, the state and federal entities that oversee permitting for marine research activities.

The Call for Scientists was open from 1 October to 23 November, and a webinar was held on 31 October. An introductory video conference was held with the Co-chief Scientists on 7 Dec. Preparation of permitting paperwork continued and is ready for submission.

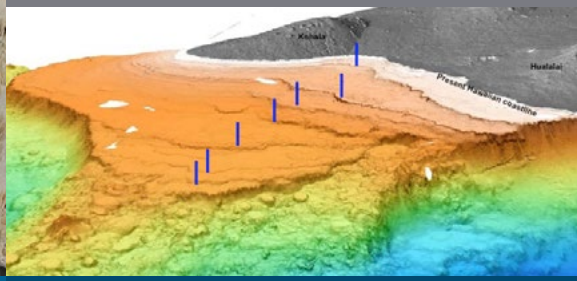
In December, the preferred bidder pulled out of negotiations citing business reasons. An alternative, not wholly compliant bidder was immediately engaged. Discussions with the alternative bidder led to the conclusion that, at this time, X389 would carry significant technical risk. These risks were presented to ECORD Council and EFB in February, to inform a 'go/no-go' decision. The ECORD Council has taken the decision to postpone Expedition 389 that will be rescheduled at the next meeting of the ECORD Facility Board that will be held in Bremen on 21-22 March, 2019. The work invested earlier will be applicable when rescheduling becomes effective.

Location of the drillsites of IODP Expedition 389 (photo ECORD/IODP)



Coral from a drowned reef NW of Hawaii main island (photo J. Webster)

3-D image of the suite of submarine terraces of NW Hawaii (from Webster, Ravelo et al, IODP Proposal 716-Full2)

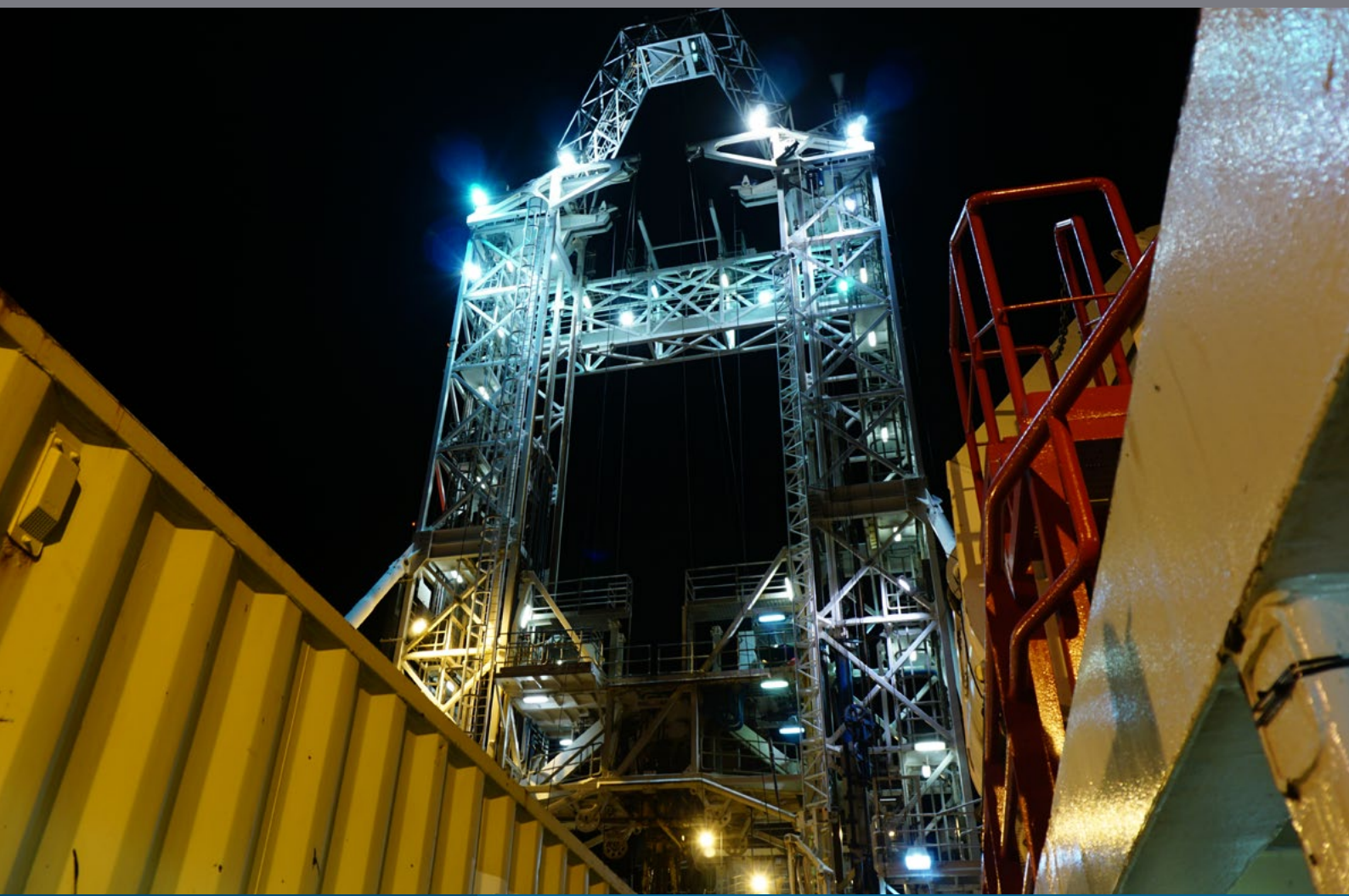


Scheduling of MSP expeditions for the five coming years (2019-2023)

2013 2014	2015	2017	2017	2018		2019	2020	2021	2022	2023
347 Baltic	**357** Atlantis	**364** Chicxulub	**381** Corinth	No expedition	ECORD renewal	No expedition	**386** Japan Trench	**377** ArcOp	No expedition	**373** Antarctic
Drillship *Greatship Maya*	RRS *James Cook* & Seabed drills (*MeBo* & *RD2*)	Liftboat *Myrtle*	Drillship *Fugro Synergy*				*Kamei* & (TBC)	Drillship		Comm. seafloor drill & vessel

389 Hawaiian Drowned Reefs — to be rescheduled

MSP *Fugro Synergy* at night, Gulf of Corinth, Exp. 381 (photo R. Gawthorpe, ECORD/IODP).



MSP proposals at the ECORD Facility Board and the Science Evaluation Panel

Proposals at EFB

Proposal	Type	Short Title	PI	Country	Stage
637	Full2	New England Shelf Hydrogeology	Person	USA	EFB
730	Full2	Sabine Bank Sea Level	Taylor	USA	EFB

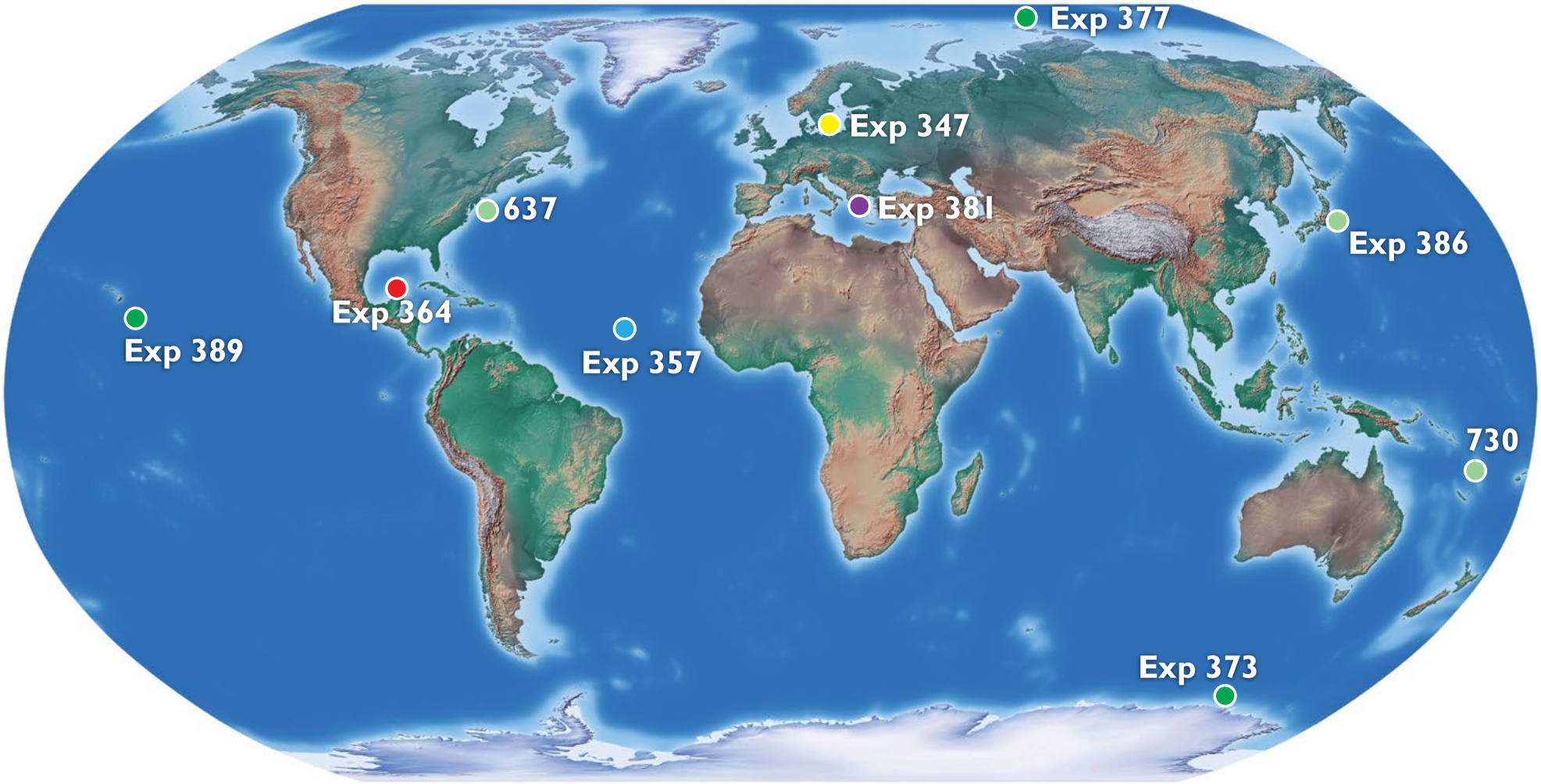
Proposals at SEP in January 2018

Proposal	Type	Short Title	PI	Country
796	ADP	NADIR: Nice Amphibious Drilling	Kopf	ECORD: Germany
863	MDP	ISOLAT Southern Ocean Paleoclimate	Peterson	USA
915	Pre	North Atlantic Fjord Sediment Archives	Giraudeau	ECORD: France
931	Full2	East Antarctic Ice Sheet Evolution	Shevenell	USA

ADP: Amphibious Drilling Proposal, MDP: Multi-phase Drilling Project,.

Core description: Spyros Sergiou taking a smear slide, OSP for Exp. 381, MARUM, Bremen (photo V. Diekamp, ECORD/IODP).

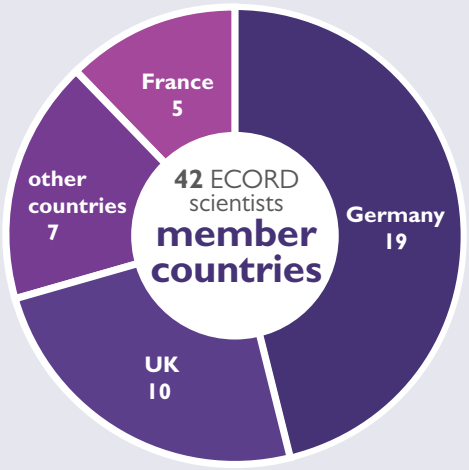
Mission-specific platform expeditions and proposals at the EFB



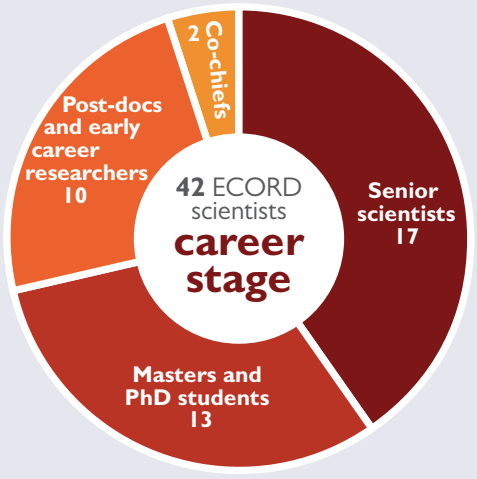
- 2014 MSP Expedition
- 2015 MSP Expedition
- 2016 MSP Expedition
- 2017 MSP Expedition
- Scheduled MSP proposals as of December 2018
- MSP proposals in the EFB waiting room

4. Participating in 2018 *JOIDES Resolution* and *Chikyu* expeditions

A drone-captured image of the starboard bow of the *JOIDES Resolution*. Exp 369 Australia Cretaceious Climate and Tectonics. (Credit: Gabriel Tagliaro/IODP).



Distribution of ECORD Scientists according to member countries (n = 42 including two Co-chief Scientists and nine special calls)



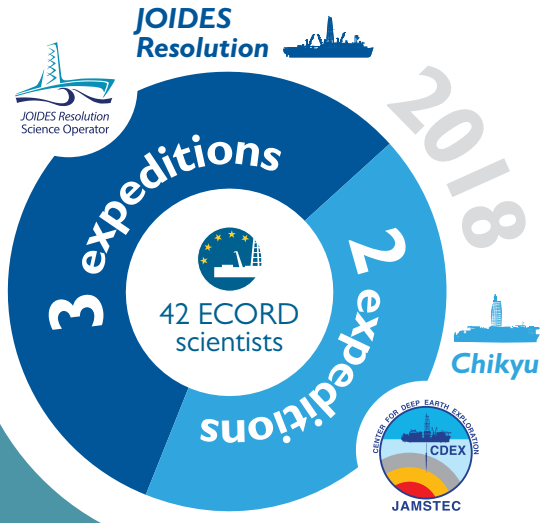
Distribution of ECORD Scientists according to career stage (n = 42 including two Co-chief Scientists and nine special calls).

4. Participating in 2018 *JOIDES Resolution* and *Chikyu* expeditions

IODP expeditions

http://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. ECORD, as a contributing member of IODP, is entitled to an average of eight scientists on every expedition.



In FY18, three expeditions were implemented on the *JOIDES Resolution* (JR) and two on the *Chikyu*.

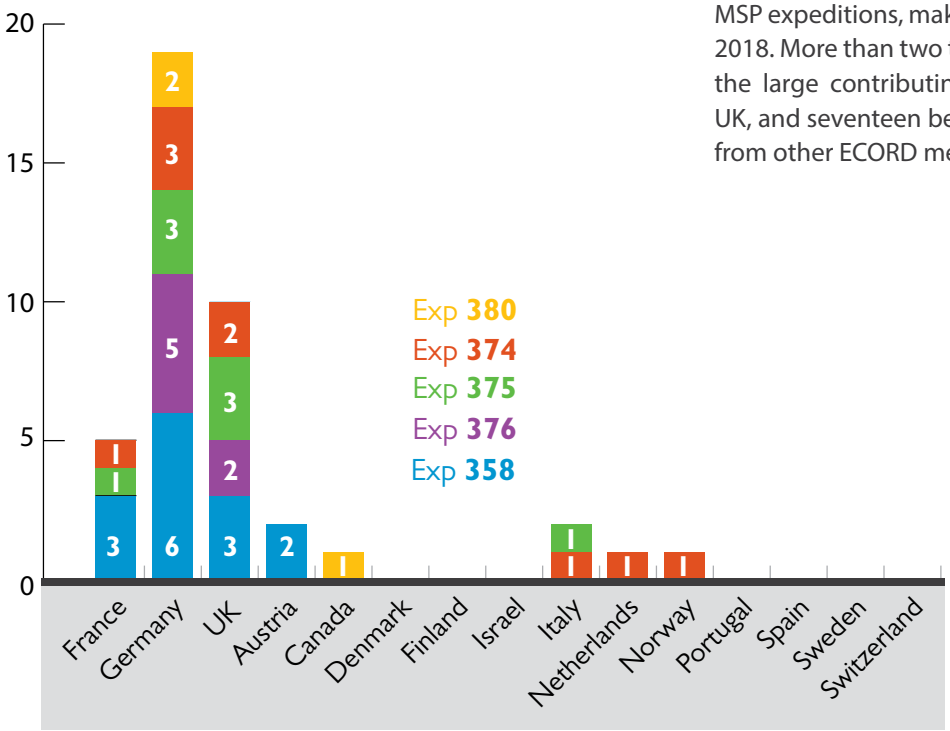
A total of **42 ECORD scientists** from ten ECORD member countries were invited to participate and sailed, including **two Co-chief Scientists**, one from Italy and one from Germany.

Participation of ECORD scientists

Scientists are chosen following an open call for applications and a competitive selection process. After a nomination proposal by ESSAC, 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 financial contributions of the member countries following a quota system. Selection of the Science Party is, therefore, based on both scientific merit and a time-averaged country quota. However, country quotas do not apply when a specific expertise is requested through a special call, or if the expedition occurs in territorial waters of an ECORD member country. In these cases, scientists from ECORD member countries can also sail following special calls or sail as observers.

Nine of the 42 invited scientists participated following special calls. Thirteen PhD and Master students and ten Post-docs or early-career scientists had the opportunity to participate in MSP expeditions, making up 54% of the ECORD participants in 2018. More than two thirds of the ECORD scientists came from the large contributing countries, France, Germany and the UK, and seventeen berths were allocated to scientists coming from other ECORD member countries.



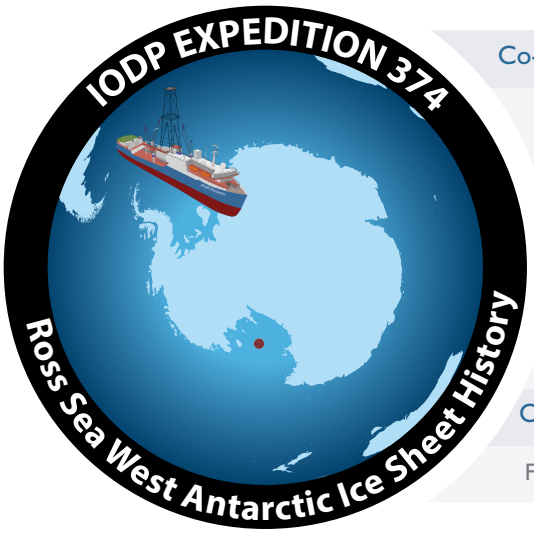
Distribution of ECORD Scientists according to member countries and Expedition (n = 42 including two Co-chief Scientists and nine special calls)

IODP Expedition 374

JOIDES Resolution Science Operator

4 January – 8 March 2018

Ross Sea West Antarctic Ice Sheet History



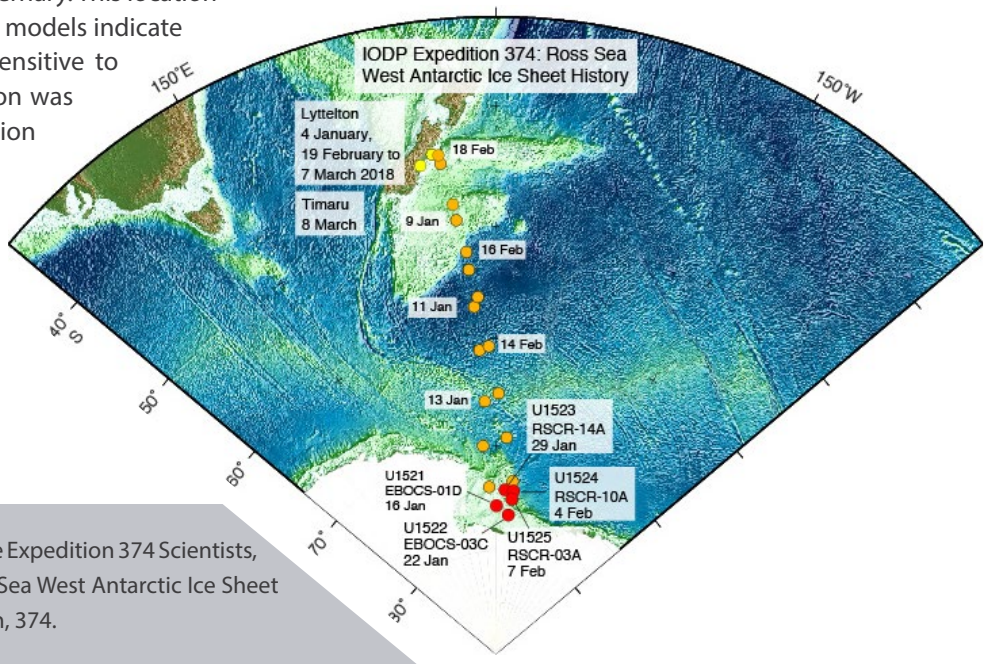
Co-chief Scientists	Laura di Santis (OGS, Trieste, Italy)
Participating Scientists	Jan Sverre Laberg (University of Tromsø, Norway) Tina van der Flierdt (Imperial College London, UK) Francesca Sangiorgio (University of Utrecht, The Netherlands) Oliver Esper (AWI, Bremerhaven, Germany) Juliane Müller (AWI, Bremerhaven, Germany) Oscar Romero (MARUM, Bremen, Germany) Jenny Gales (Plymouth University, UK) Francois Benny (University of Lille, France)
Outreach Officer	Agnès Pointu (France)

Further reading: *http://publications.iodp.org/preliminary_report/374/index.html*

The West Antarctic Ice Sheet (WAIS) is currently retreating due to shifting wind-driven oceanic currents that transport warm waters toward the ice margin, resulting in ice shelf thinning and accelerated mass loss of the WAIS. Previous results from drilling on Antarctica's continental margins show significant variability in marine-based ice sheet extent during the late Neogene and Quaternary. Numerical models indicate a fundamental role for oceanic heat in controlling this variability over at least the past 20 My. Although evidence for past ice sheet variability has been collected in marginal settings, sedimentologic sequences from the outer continental shelf are required to evaluate the extent of past ice sheet variability and the associated oceanic forcings and feedbacks. International Ocean Discovery Program Expedition 374 drilled a latitudinal and depth transect of five drill sites from the outer continental shelf to rise in the eastern Ross Sea to resolve the relationship between climatic and oceanic change and WAIS evolution through the Neogene and Quaternary. This location was selected because numerical ice sheet models indicate that this sector of Antarctica is highly sensitive to changes in ocean heat flux. The expedition was designed for optimal data-model integration and to enable an improved understanding of the sensitivity of Antarctic Ice Sheet (AIS) mass balance during warmer-than-present climates (e.g., the Pleistocene "super interglacials," the mid-Pliocene, and the late early to middle Miocene).

Exp 374 Principal goals

- Evaluate the contribution of West Antarctica to far-field ice volume and sea level estimates;
- Reconstruct ice-proximal atmospheric and oceanic temperatures to identify past polar amplification and assess its forcings and feedbacks;
- Assess the role of oceanic forcing (e.g., sea level and temperature) on AIS stability/instability;
- Identify the sensitivity of the AIS to Earth's orbital configuration under a variety of climate boundary conditions; and
- Reconstruct eastern Ross Sea paleobathymetry to examine relationships between seafloor geometry, ice sheet stability/instability, and global climate.



McKay, R.M., De Santis, L., Kulhanek, D.K., and the Expedition 374 Scientists, 2018. Expedition 374 Preliminary Report: Ross Sea West Antarctic Ice Sheet History. International Ocean Discovery Program, 374. *https://doi.org/10.14379/iodp.pr.374.2018*

IODP Expedition 375

Hikurangi Subduction Margin

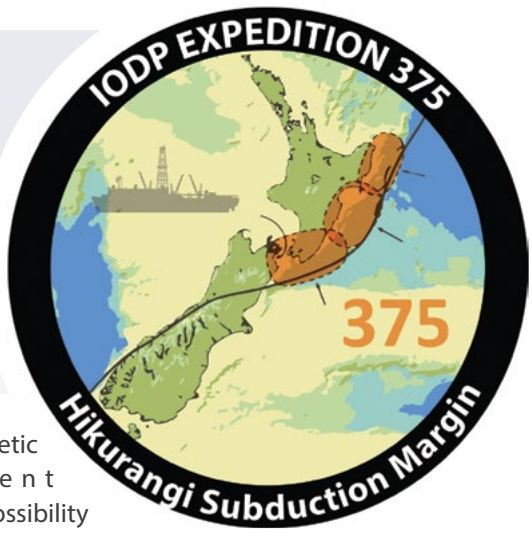
JOIDES Resolution Science Operator

8 March – 5 May 2018

Participating Scientists

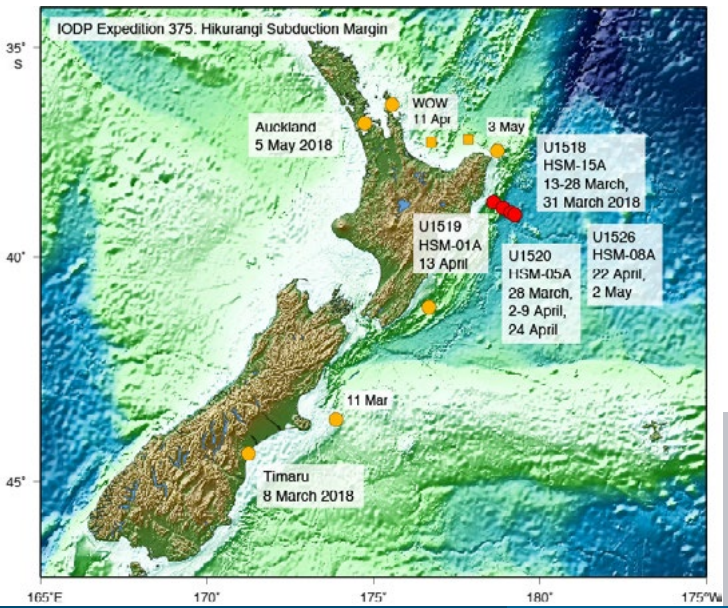
Steffen Kutterolf (GEOMAR, Kiel, Germany)
Francesca Meneghini (University of Pisa, UK)
Ake Fakereng (Cardiff University, The Netherlands)
Rebecca Bell (NOC Southampton, UK)
Andre Huepers (MARUM, Bremen, Germany)
Matt Ikari (MARUM, Bremen , Germany)
Pierre Malie (University of Montpellier, France)
Adam Woodhouse (University of Leeds, UK)

Further reading: *http://publications.iodp.org/preliminary_report/375/index.html*



Slow slip events (SSEs) at the northern Hikurangi subduction margin, New Zealand, are among the best-documented shallow SSEs on Earth. International Ocean Discovery Program Expedition 375 was undertaken to investigate the processes and in situ conditions that underlie subduction zone SSEs at the northern Hikurangi Trough by: (1) coring at four sites, including an active fault near the deformation front, the upper plate above the high-slip SSE source region, and the incoming sedimentary succession in the Hikurangi Trough and atop the Tūranganui Knoll Seamount; and (2) installing borehole observatories in an active thrust near the deformation front and in the upper plate overlying the slow slip source region. Logging-while-drilling (LWD) data for this project were acquired as part of Expedition 372 (26 November 2017–4 January 2018; see the Expedition 372 Preliminary Report for further details on the LWD acquisition program).

Northern Hikurangi subduction margin SSEs recur every 1–2 years and thus provide an ideal opportunity to monitor deformation and associated changes in chemical and physical properties throughout the slow slip cycle. Sampling of material from the sedimentary section and oceanic basement of the subducting plate reveals the rock properties, composition, lithology, and structural character of material that is transported downdip into the SSE source region. A recent seafloor geodetic experiment raises the possibility that SSEs at northern Hikurangi may propagate all the way to the trench, indicating that the shallow thrust fault zone targeted during Expedition 375 may also lie in the SSE rupture area. Hence, sampling at this location provides insights into the composition, physical properties, and architecture of a shallow fault that may host slow slip.



Exp 375 Principal goals

Expedition 375 (together with the Hikurangi subduction LWD component of Expedition 372) was designed to address three fundamental Scientific objectives:

- characterize the state and composition of the incoming plate and shallow plate boundary fault near the trench, which comprise the protolith and initial conditions for fault zone rock at greater depth and which may itself host shallow slow slip;
- characterize material properties, thermal regime, and stress conditions in the upper plate above the core of the SSE source region; and
- install observatories at an active thrust near the deformation front and in the upper plate above the SSE source to measure temporal variations in deformation, temperature, and fluid flow. The observatories will monitor volumetric strain (via pore pressure as a proxy) and the evolution of physical, hydrological, and chemical properties throughout the SSE cycle. Together, the coring, logging, and observatory data will test a suite of hypotheses about the fundamental mechanics and behavior of SSEs and their relationship to great earthquakes along the subduction interface.

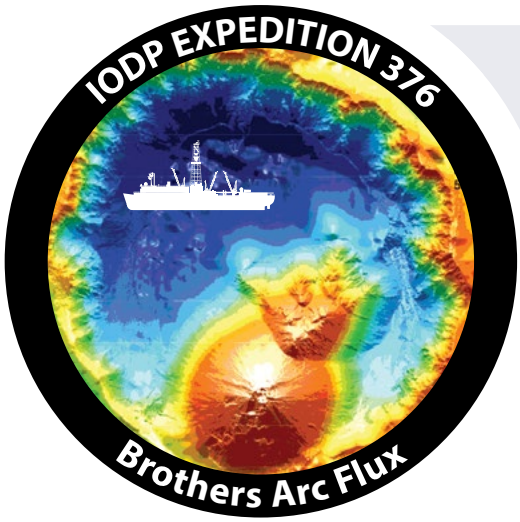
Saffer, D.M., Wallace, L.M., Petronotis, K., and the Expedition 375 Scientists, 2018. Expedition 375 Preliminary Report: Hikurangi Subduction Margin Coring and Observatories. International Ocean Discovery Program. *https://doi.org/10.14379/iodp.pr.375.2018*

IODP Expedition 376

JOIDES Resolution Science Operator

5 May – 5 July 2018

Brothers Arc Flux



Participating Scientists

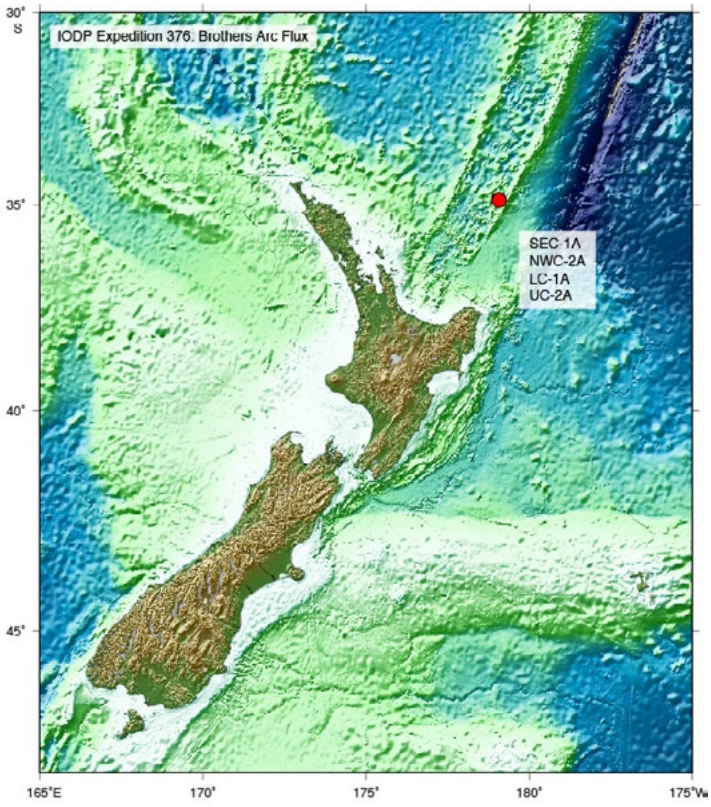
Stephen Roberts (NOC Southampton, UK)
Philipp Brandl (GEOMAR, Kiel, Germany)
John Jamieson (Memorial University, Canada)
Karen Strehlow (GEOMAR, Kiel, Germany)
Lucy Schlicht (University of Bremen, Germany)
Andrew J. Martin (Cardiff University, UK)
Anna Kutovaya (RWTH Aachen University, Germany)

Further reading: *http://iodp.tamu.edu/scienceops/expeditions/brothers_arc_flux.html*

Expedition 376 investigated the fundamental, interrelated processes governing subseafloor hydrothermal activity at Brothers volcano, southern Kermadec arc (IODP proposal 818-Full2). The primary objectives were to: (1) characterize the subsurface, magma-derived volatile phase for testing models predicting the existence of either a single-phase gas or a two-phase brine-vapor; (2) explore the distribution of base and precious metals and metalloids at depth as well as the reactions that have taken place during their precipitation along fluid migration pathways to the seafloor; (3) quantify the mechanisms and extent of fluid-rock interaction, and what this implies for the mass flux of metals and metalloids to the ocean as well as the role of magma-derived carbon and sulfur species in acting as agents for those fluxes; and (4) assess the diversity, extent, and metabolic pathways of microbial life in an extreme, acidic, and metal-toxic (sub)volcanic environment.

Exp 376 Principal goals

The ultimate scientific goal of Expedition 376 is to discover the key processes that distinguish submarine arc-hosted hydrothermal systems from those linked to spreading centers, which results from the flux of magmatic fluid commonly being much higher in volcanic arcs. As a consequence of their shallow water depths and high volatile contents, the magmatic-hydrothermal arc signature gives rise to different fluid compositions and thus mineralization compared to submarine extensional settings. This likely also has consequences for the associated biota. Additionally, given the very acidic fluids and high metal concentrations, submarine arc hydrothermal systems are thought to be important analogs to porphyry copper, epithermal gold, and various volcanic rock-hosted massive sulfide deposits mined on land.



Drilling at Brothers volcano will provide essential information for understanding the formation of those mineral deposits and will also reconstruct the volcanic stratigraphy of this arc volcano.

Operations focussed on discharge zones of geochemically distinct fluids in and around the caldera of Brothers volcano by drilling and logging to 100s of m. The drill sites show variable impact of magmatic volatiles, which will enable the expedition to directly study the implications of magma degassing for the transport of metals to the seafloor and how this affects the functioning of microbial life.

IODP Expedition 380

12 January – 7 February 2018

NanTroSEIZE Stage 3: Frontal Thrust Long-Term Borehole Monitoring System

Participating Scientists: Alex Roesner (MARUM, Bremen, Germany); Burhan Senyener (MARUM, Bremen, Germany)

Further reading:
http://www.jamstec.go.jp//e/nantroseize/expedition_380.html

NanTroSEIZE
Exploring Japan's Earthquake Zone

Exp 380 Principal goals

The multi-expedition Integrated Ocean Drilling Program/ International Ocean Discovery Program (IODP) Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) was designed to investigate fault mechanics and seismogenesis along subduction megathrusts through direct sampling, in situ measurements, and long-term monitoring in conjunction with allied laboratory and numerical modeling studies. Overall NanTroSEIZE Scientific objectives include characterizing the nature of fault slip and strain accumulation, fault and wall rock composition, fault architecture, and state variables throughout the active plate boundary system.

Expedition 380 was the twelfth NanTroSEIZE expedition since 2007 (refer to Kopf et al. (2017) for a comprehensive summary of objectives, operations, and results during the first 11 expeditions).

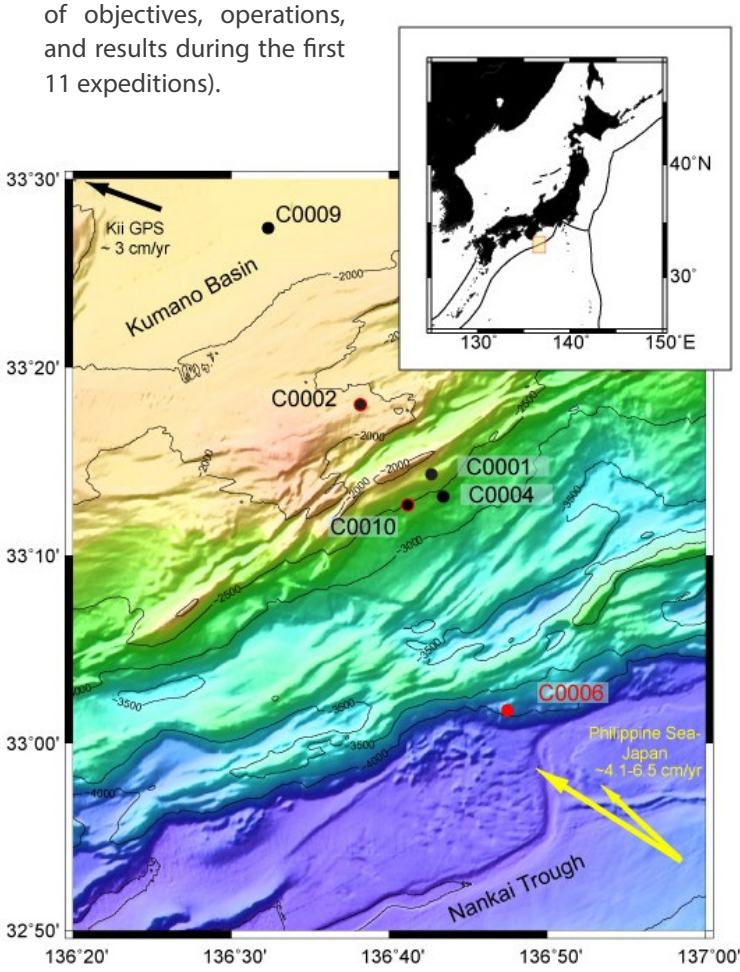


Image credits IODP/JAMSTEC

Expedition 380 focused on one primary objective: riserless deployment of a long-term borehole monitoring system (LTBMS) in Hole C0006G in the overriding plate at the toe of the Nankai accretionary prism.

The LTBMS installed in Hole C0006G incorporates multi-level pore pressure sensing and a volumetric strain meter, tilt meter, geophone, broadband seismometer, accelerometer, and thermistor string. Similar previous LTBMS installations were completed further upslope at IODP Sites C0002 and C0010. The ~35 km trench-normal transect of three LTBMS installations will provide monitoring within and above regions of contrasting behavior in the megasplay fault and the plate boundary as a whole, including a site above the updip edge of the locked zone (Site C0002), a shallow site in the megasplay fault zone and its footwall (Site C0010), and a site at the tip of the accretionary prism (the Expedition 380 installation at Site C0006). In combination, this suite of observatories has the potential to capture stress and deformation spanning a wide range of timescales (e.g., seismic and microseismic activity, slow slip, and interseismic strain accumulation) across the transect from near-trench to the seismogenic zone.

Expedition 380 achieved its primary scientific and operational goal with successful installation of the LTBMS to a total depth of 457 m below seafloor in Hole C0006G. The installation was conducted in considerably less time than budgeted, partly because the Kuroshio Current had shifted away from the NanTroSEIZE area after 10 y of seriously affecting D/V NanTroSEIZE operations. After Expedition 380, the LTBMS was to be connected to the Dense Oceanfloor Network System for Earthquakes and Tsunamis in March 2018 using the remotely operated vehicle Hyper-Dolphin from the Japan Agency for Marine-Earth Science and Technology R/V *Shinsei Maru*.

Kinoshita, M., Becker, K., Toczko, S., and the Expedition 380 Scientists, 2018. Expedition 380 Preliminary Report: NanTroSEIZE Stage 3: Frontal Thrust Long-Term Borehole Monitoring System (LTBMS). International Ocean Discovery Program. http://dx.doi.org/10.14379/iodp.pr.380.2018

IODP Expedition 358

7 October 2018 – 21 March 2019

NanTroSEIZE: Plate Boundary Deep Riser 4

Exploring Japan's Earthquake Zone

Co-chief Scientists	Matt Ikari (MARUM, Bremen, Germany)
Participating Scientists	Marianne Conin (University of Lorraine, France) Mai-Linh Doan (University of Grenoble-Alpes, France) Anja Schleicher (GFZ, Potsdam, Germany) Daniel Faulkner (University of Liverpool, UK) Achim Kopf (MARUM, Bremen, Germany) Michael Strasser (University of Innsbruck, Austria) John Bedford (University of Liverpool, UK) Wi-Lei Hong (Geological Survey, Tromsø, Norway) Jade Ditilleul (University of Lorraine, France) Pauline Cornard (University College London, UK) Dominik Jäger (University of Innsbruck, Austria) Junli Zhang (MARUM, Bremen, Germany) Katja Stanislowski (MARUM, Bremen, Germany)

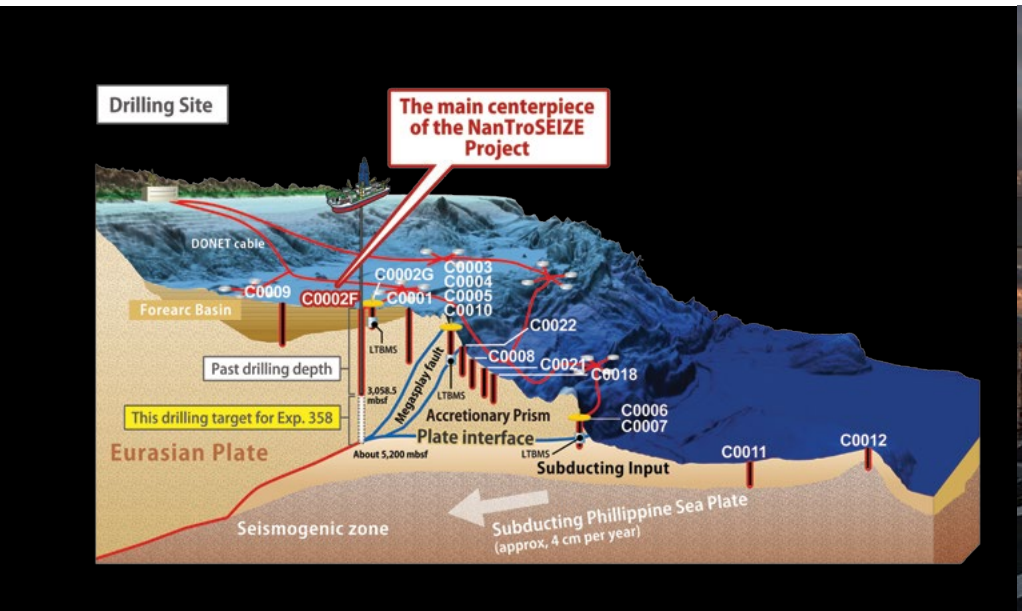
Further reading: *http://www.jamstec.go.jp//e/nantroseize/expedition_358.html*

IODP Expedition 358 "NanTroSEIZE Plate Boundary Deep Riser 4" began on 7 October 2018.

Exp 358 Principal goals

The main expedition goal is to deepen riser hole C0002F/N/P from 3000 mbsf to the primary megathrust fault target at ~5200 mbsf, using logging-while-drilling (LWD), downhole measurements, and extensive drill cuttings analysis, in addition to limited coring intervals. This expedition will be the culmination of 10 years of IODP NanTroSEIZE deep drilling efforts to reach the plate interface fault system at seismogenic/slow slip depths.

IODP Site C0002 is the deep center-piece of the NanTroSEIZE Project, intended to access the plate interface fault system at a location where it is believed to be capable of seismogenic locking and slipping, and to have slipped coseismically in the 1944 Tonankai earthquake. This drilling target also is in close proximity to the location where a cluster of very low frequency seismic events and the first tectonic tremor recorded in any accretionary prism setting has been found, all suggesting fault processes related to the up-dip limit of megathrust seismogenic mechanics are active here.

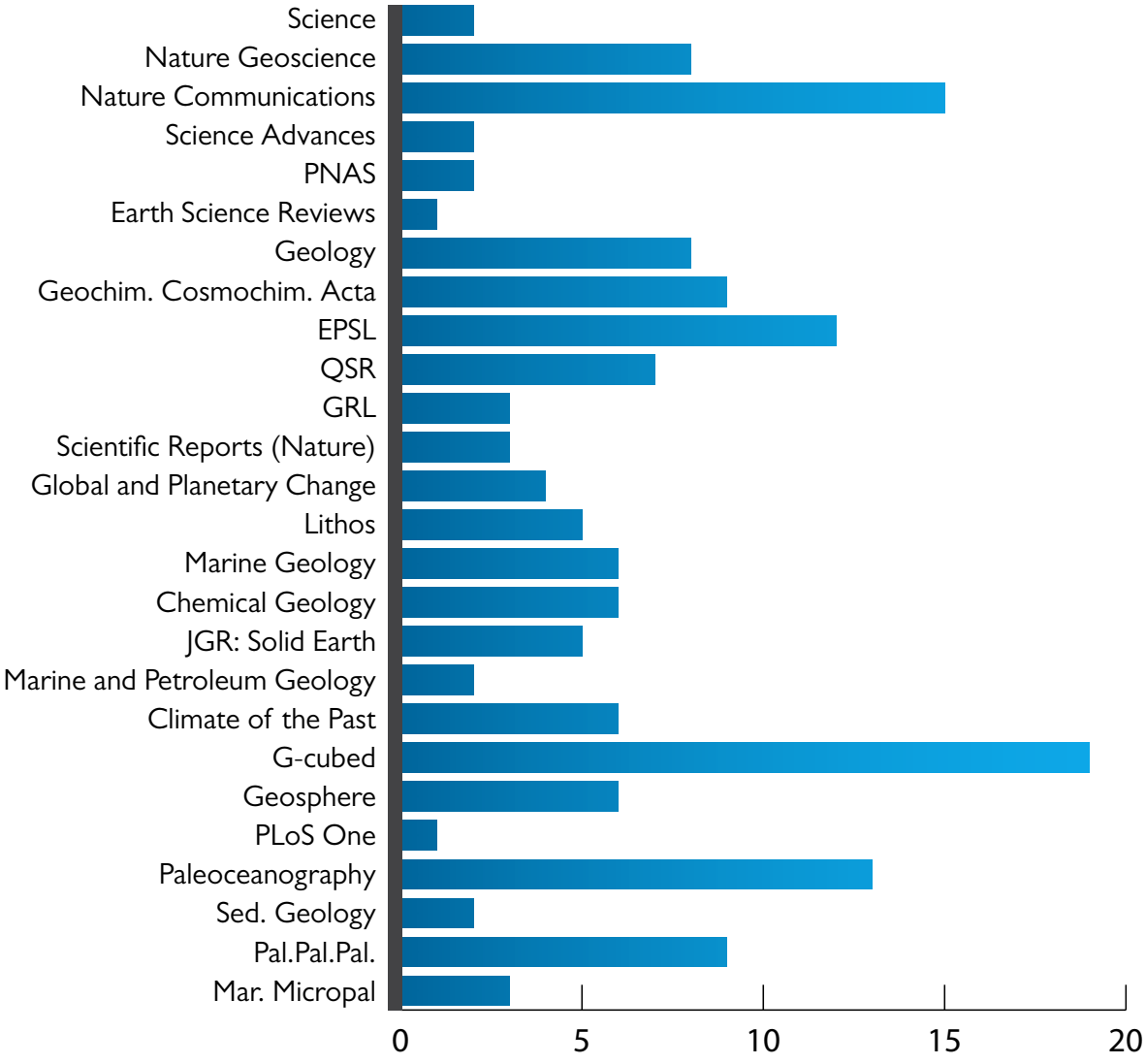


Credits for both images IODP/JAMSTEC

Amazing sunset from the helideck, Exp 358

Kostas Panagiotopoulos examining micropalaeontological sample at the Bremen Core Repository, MARUM, Germany. OSP for Exp 381 (photo V. Diekamp, ECORD/IODP).

5. Selected 2018 IODP publications from ECORD scientists



Publications involving authors from ECORD member countries in highly rated peer-reviewed serials publishing programme-related expedition research results.

5. Selected 2018 IODP publications from ECORD scientists

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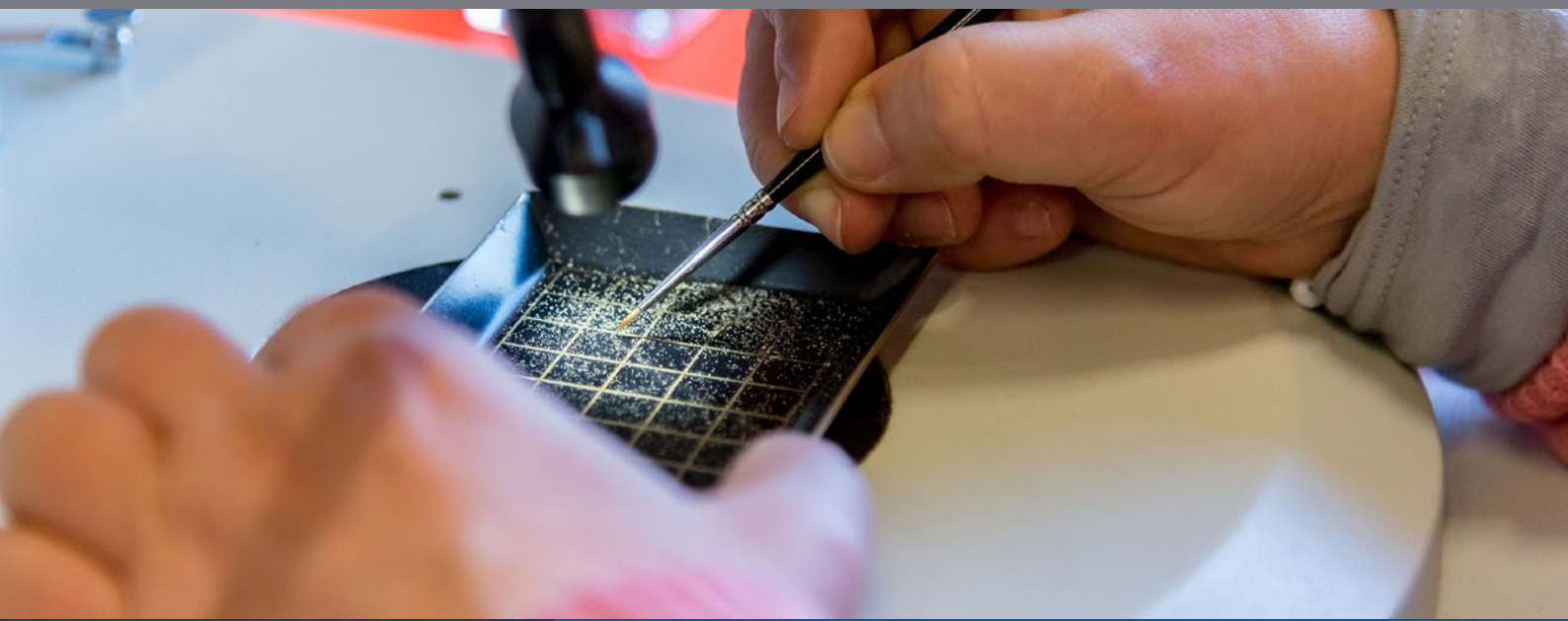
OSP for Expedition 381, MARUM, Germany. Maria Geraga examining micropalaeontological sample (photo V. Diekamp, ECORD/IODP)



6. Archiving IODP cores: the IODP Bremen Core Repository

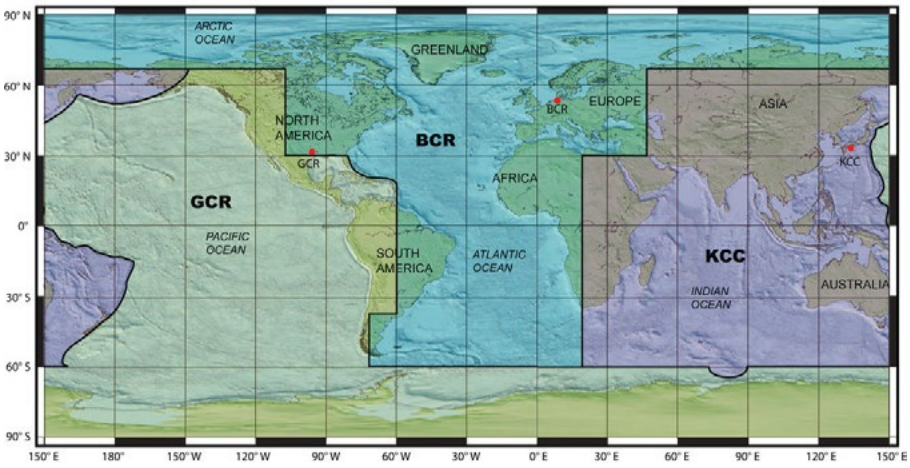
Bremen Core Repository.
(photo N. Hallmann ECORD/IODP)

IODP Bremen Core Repository (BCR)

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

The Bremen Core Repository (BCR) at the MARUM, University of Bremen, Germany, is **one of the three IODP core repositories**. The other two are the Gulf Cost Repository (GCR) located at Texas A&M University in College Station (USA) and the Kochi Core Center (KCC) in Kochi (Japan).

In accord with IODP convention and practice, the BCR hosts all the cores recovered since the beginning of scientific ocean drilling from the Atlantic and Arctic Oceans as well as the Mediterranean, Baltic and Black Seas. The BCR is also responsible for organizing and hosting the Onshore Science Parties of and providing mobile laboratories and scientific expertise for mission-specific platform expeditions (MSPs).



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

Samples and requests at BCR

The BCR presently (Dec 2018) contains 155.35 km of deep-sea cores from 89 expeditions. A total of 41,925 samples were taken at the BCR for 258 requests (of which 156 were submitted by ECORD-country scientists) during FY2018.

Database: the BCR DIS Internet Interface

All BCR samples (over 1.69 million samples/more than 7077 sample requests/over 4742 individual scientists, incl. 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/).

The CurationDIS (6.3) is currently in operation at the BCR and working smoothly. Migration of IODP Exp. 364 data from the ExpeditionDIS to the CurationDIS has been completed. Further, International Geo Sample Numbers (IGSNs) of all Exp. 364 cores, sections and samples have been registered and published. The workflow between BCR Data Management and PANGAEA for post-moratorium data publication and IGSN registration has been optimized.

Repository and sample statistics	
Expeditions	**Amount of core (km)**
89	155.35

Bremen Core Repository FY18	
Sample Requests (from ECORD countries)	**Samples taken**
258 (156)	41,925

SEDIS: The Scientific Earth Drilling Information Service

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

Bremen Core Repository (photo N. Hallmann ECORD/IODP).

MSP expeditions at BCR

Expedition 381, Corinth Active Rift Development

The Expedition 381, Corinth Active Rift Development, Onshore Science Party (OSP) was conducted between 31 January – 28 February, 2018. The facilities comprised several labs, the large marine technology hall, the main corridor in front of the IODP laboratories and a number of offices and analytical laboratories. The offices were used by the scientists and ESO staff for report writing and compilation, and general planning.

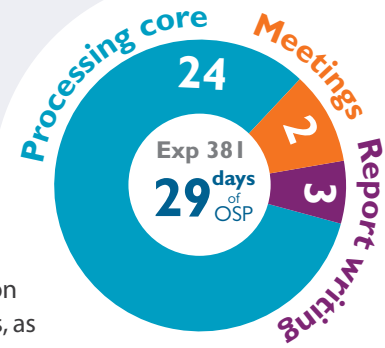
Sample Allocation Committee (SAC) discussions (attended by Co-chief Scientists, EPMs and IODP Curator, observed by the BCR Superintendent) and other planning discussions involving other ESO staff started two days before the start of the OSP. Days 1 and 2 of the OSP was used for meetings, presentation of offshore results, review of core processing and post-cruise science (including sample requests), and inspection of and training at the facilities. All took place at the MARUM.

For efficiency and similar to all other MSP expeditions, the 32 scientists and ESO personnel worked in two overlapping shifts (Shift A: 07:30 to 18:15, Shift B: 11:45 to 22:30) and 7 days/week.

Exp. 381 Co-chief scientists Lisa McNeill (left) and Donna Shillington at MARUM (photo V. Diekamp, MARUM)

Exp. 381 sampling for paleomagnetic analysis in the BCR labs (photo V. Diekamp, MARUM)

The total duration of the Onshore Science Party was 29 days:
2 days introduction/meetings, 24 days processing core, 3 days report writing.



At the sampling table during the Exp. 381 Onshore Science Party (OSP) in the BCR labs (photo U. Röhl, ECORD/IODP).

This OSP officially concluded on 28 February 2018. Nevertheless, as several moratorium sample requests were not completed by the end of the OSP, these have been dealt with by BCR staff and by some visiting Exp. 381 science party members during the year.

Extensive XRF core scanning of numerous archive half sections for Exp. 381 shipboard measurements has started and carried out by some Exp. 381 science party members and will be completed early in 2019.

MSP expeditions at BCR (continued)

Expedition 364 Chicxulub K/Pg Impact

All materials from IODP Exp. 364 Chicxulub K/Pg Impact Crater were carefully shrink-wrapped, packed (photo on the right), and shipped to Gulf Coast Repository in May 2018, where they did arrive on June 8, 2018.

Shrink-wrapping of Exp. 364 cores at MARUM (photo U. Röhl, ECORD, IODP)

BCR representatives on meetings

The BCR Manager attended:

- **EFB meeting** in Venice (March),
- **German IODP Meeting** in Bochum (March),
- **ESO Meeting** in Edinburgh (May), and
- **ECORD Council Meeting** in Berlin (June),
- **EFB** video conference (September),
- Exp. 381 Corinth Active Rift Development Review, and
- **ESSAC and ECORD Council Meetings** in The Hague (November).

The BCR Manager hosted the **IODP Curatorial Meeting 2018** (September, photo below)

Exp. 364 cores in the BCR reefer awaiting their shipment to the GCR (photo U. Röhl, ECORD/IODP).

Staff members from all three IODP core repositories (BCR, GCR, and KCC) touring the BCR reefer at the occasion of the IODP Curatorial Meeting 2018 held at MARUM (photo U. Röhl, ECORD/IODP).

Visitors at BCR

Scientists, students and general public

The location of the BCR on the University of Bremen campus has proven to be very convenient for many visitors, ranging from walk-in scientific visitors, the general public, school classes (incl. skype conferences to geo show "unterirdisch" in Bochum, as well as on the occasion of 200 year anniversary of Bonn University for the show "Greenhouse – Icehouse. The Climate Show" in Bonn), and visiting students groups from other universities in Germany and Europe and official delegations visiting the University of Bremen.

In 2018, amongst others, the BCR was visited by:

- T. Orzol and J. Ksionsek from the Klaus Tschira Foundation,
- Michael Lutzeyer, owner of the Grootbos Foundation, Cape Town, S-Africa,
- a delegation from Taiwan participating in the 8th Taiwanese-German Joint Symposium held at MARUM,
- high school students from Lyzeum Mariupol (Ukraine),
- German School in Hurlingham,
- Instituto Cultural Roca Buenos Aires (Argentina), and
- SMAN 1 PURI, Mojokerto (East-Java, Indonesia),
- B. Blöchlinger from the Werner Siemens Foundation,
- Prof. Ben Artzi and a delegation from the University of Haifa, Israel, guided by G. Spahnke from the Bremen State Senate´s Chancellery, and Prof. Charlotte Yates, provost and vice-president of Guelph University, Canada.

Materials for courses and trainings

This year the BCR provided core material for numerous course studies run by various instructors. These were usually visits to the BCR by classes. These courses included core description and visual illustration of geoscientific concepts. The BCR is also an ideal place to train students, with the opportunity to work on real cores and have access to laboratory facilities. The **ECORD Summer Schools** program, presenting a new theme each year that relates to the IODP science plans, has been organised annually since 2007. In 2018, the **12th ECORD Summer School** was dedicated to the topic of "Sub-seafloor fluid transport and gas hydrate dynamics" (see section 7, page 59). The **ECORD Training Course 2018** was held for the fourth time in April (see section 7, page 60).

Representatives of the television, radio and print media

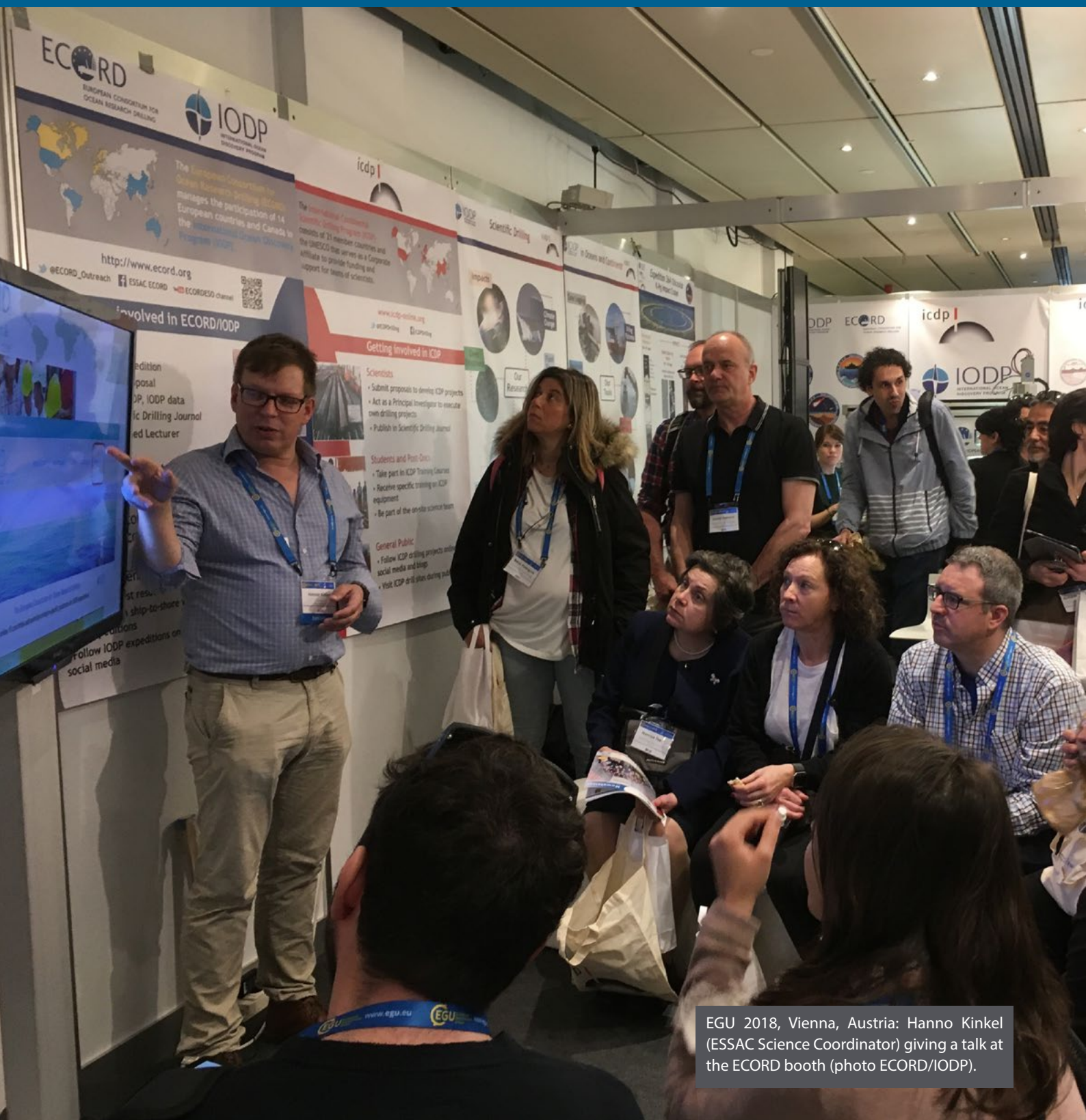
Equally important for informing and educating the general public of our goals and scientific and technical achievements are the frequent visits by representatives of the television, radio and print media. E.g., a production company working for the **Dutch public broadcaster NTR** carried out some filming (see below) and interview with IODP Exp. 302 participant Prof. Henk Brinkhuis, Director of the Royal Netherlands Institute for Sea Research (NIOZ), for a documentary regarding the discovery of Azolla fern in the Eocene Arctic Ocean (broadcasted on Oct 3, 2018; *https://www.npostart.nl/VPWON_1292624*) or undergraduate student Joel Lander from the **blogging team of the University of Bremen** (*https://blogs.uni-bremen.de/eule/2018/05/15/steine-die-die-welt-bedeuten/*).

Henk Brinkhuis and Diederik Jekel, presenter (photo H. Brinkhuis, NIOZ).

Scenes from the filming in the BCR reefer. (photo H. Brinkhuis, NIOZ).

Robert L. Gawthorpe examining freshly splitted cores at the Bremen Core Repository, MARUM, Germany. OSP for Exp 381. (photo V. Diekamp, ECORD/IODP).

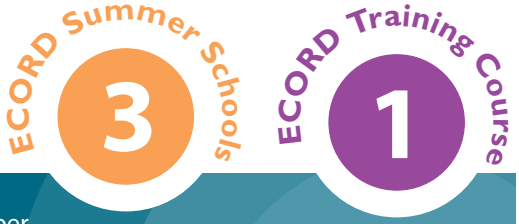
7. Engaging the community



EGU 2018, Vienna, Austria: Hanno Kinkel (ESSAC Science Coordinator) giving a talk at the ECORD booth (photo ECORD/IODP).

7. Engaging the Community

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 Master and PhD students as well as postdoctoral research fellows from ECORD member countries and beyond.

136 students

Three ECORD Summer Schools and one ECORD Training Course were sponsored by ECORD in 2018.

3rd Petrophysics Summer School
Leicester, UK, 30 June-2 July, 2018

21 students

https://www2.le.ac.uk/departments/geology/research/gbrg/projects/iodp/petrophysics-summer-school-2018

The **European Petrophysics Consortium (EPC)** organised for the third time the ECORD Petrophysics Summer School, which is focused on the application of downhole logging and core physical properties data to scientific questions, with case studies from various IODP expeditions. It consisted of lectures, discussion groups, and practical exercises on the different elements and data types used in petrophysical analyses. A total of 16 lecturers and tutors from five different countries provided the programme, with a broad mix from academia, IODP operators, and industry.

Throughout the course, speakers from academia (University of Leicester, Imperial College London, Lamont-Doherty Earth Observatory and University of Montpellier) and industry (BP, Schlumberger and Total E&P UK) were invited to speak on their respective expertise, including – but not limited to - evaluation of hydrocarbon volumes, statistics and modelling, and core-log-seismic integration. As in previous years, talks and lectures were broken up by a field trip and practical sessions, including for the first time a session focussed on sample-based physical property data acquisition.

Practical sessions largely involved software training in **Techlog**, the Schlumberger well logging package. Two full days of training were incorporated into the summer school schedule, teaching the fundamentals of this software through the use of the IODP training dataset generated from data recovered during **IODP Expedition 346: Asian Monsoon**. More advanced sessions were undertaken toward the end of the second Techlog day where participants learned about hierarchal cluster analysis, acoustic log processing and borehole image processing.

Excursions to **Reeves Wireline Technologies** and to the core store at the National Geoscience Data Centre of the British Geological Survey focused on downhole logging activities, including the development, testing, calibration and deployment of logging tools. In addition, practical exercises included demonstrations of physical property data acquisition using multi-sensor core loggers. Integration of core physical property data and their use to calibrate in situ measurements were also key components of the summer school. Attendees presented their own research during poster sessions where research networks were developed and their future aims discussed.

Twenty-one students from ten different nationalities participated in the summer school.

15th Urbino Summer School in Paleoclimatology
Urbino, Italy, 11-27 July 2018

60 students

http://www.urbinossp.it/

The Urbino Summer School in Paleoclimatology (USSP) is organised annually by an international consortium of scientists and is hosted by the Faculty of Sciences and Technology at the University of Urbino, Italy. The school is open to students from ECORD member countries, the USA and other countries and is designed to provide training in many different areas of paleoclimatology, including biogeochemical cycling and palaeoceanography, continental systems, and aspects of deep time climate modeling. The course consisted of a student-centered programme of: (1) integrated topical lectures by 25 internationally-recognized scientists; (2) student-centered data-rich exercises, investigations, and

presentations on field data and modelling results; (3) parallel sessions providing groups of participants with a more focused coverage of selected topics within palaeoclimatology; (4) a regional field excursion to classic Cretaceous and Cenozoic sections; and (5) intensive discussions of specific palaeoclimate topics in small student working groups facilitated by dedicated instructors. The summer school brought together 60 students from ten ECORD member countries (Canada, Finland, France, Germany, Israel, Italy, Netherlands, Sweden, Switzerland and the UK) and five non-ECORD member countries (Australia, New Zealand, Poland, Singapore and the USA).

12th ECORD Bremen Summer School on "Sub-seafloor Fluid Transport and Gas Hydrate Dynamics"
Bremen, Germany, 3-14 September 2018

https://www.marum.de/en/education-career/ECORD-training/ECORD-Summer-Schools/ECORD-Summer-School-2018.html

24 students

The **Bremen ECORD Summer Schools** use the facilities at MARUM and its International Graduate School for Marine Sciences GLOMAR, as well as the Bremen Core Repository, who jointly offer unique training possibilities by providing laboratory and seminar rooms. These summer schools take especially advantage of the «virtual ship» facilities associated with the core repository.

The 2018 topic concerned seawater circulations through systems of faults, fractures, and other permeable conduits in magmatic and sedimentary rocks, as well as the subsequent redistribution of heat and solution by advection. Fluids seeping through the ocean crust in various continental margin settings transport hydrocarbons and concentrate them at migration barriers forming natural gas hydrates within the gas hydrate stability zone. Scientific ocean drilling has contributed to an amazing turn-around in the perception of marine gas hydrates. From avoiding gas hydrates, due to safety issues in the past, the programme is now considering them as drilling targets. Research on natural methane hydrates in seafloor settings and its dynamics during climate changes is a topic of worldwide interest.
This school has attracted 24 PhD students and early post-docs from several European countries, the USA and Australia.

Tour to the BCR reefer during the ECORD Summer School 2018 "Sub seafloor fluid transport and gas hydrate dynamics" (photo U. Röhl, ECORD/IODP).

Scene during the ECORD Training Course 2018 (photo V. Diekamp, ECORD/IODP).

ECORD Training Course 2018 "The Virtual Drillship Experience"
MARUM, University of Bremen, Germany, 23 – 27 April 2018

https://www.marum.de/Ausbildung-Karriere/ECORD-training/ECORD-Training-Courses.html

31 students

The ECORD Training Course 2018 was held for the fourth time with 31 participants from fourteen different countries, including non-ECORD IODP member countries. This one-week course, with a focus on the IODP core-flow procedures, was tailored to prepare the participants for sailing on an offshore drillship expedition, and to instill in them an appreciation of the high standards required in all kinds of coring projects.

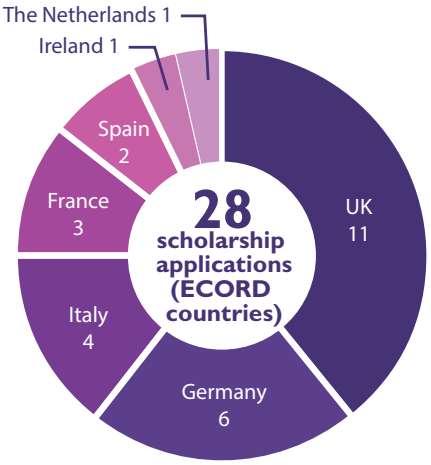
In addition to the lab exercises, the last day also included a session dedicated to IODP proposal writing.

Sponsoring research for young scientists

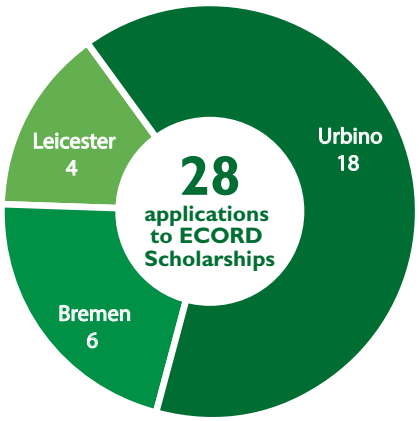
ECORD Scholarships

ECORD Scholarships provide support to outstanding students to attend the ECORD-sponsored summer schools.
Twenty eight applications were received in 2018.

- **The Petrophysics Summer School** (Leicester, UK) received four applications for ECORD scholarships from two ECORD member countries, of which three were awarded. In addition, ten travel awards by USSSP to US-based scientists were given to participants.
- **The Urbino Summer School in Paleoclimatology** received a total of 18 applications from six ECORD member countries. Nine students from four ECORD member countries were granted.
- Six applications from four ECORD countries concerned the **ECORD Bremen Summer School**. Three students from two ECORD member countries were granted.



Distribution of applications to ECORD Scholarships (n = 28) not including six applications from non – ECORD countries.



Distribution of applications to ECORD Scholarships (n = 28) not including 6 applications from non – ECORD countries.

	Name	Gender	Country
ECORD Scholarships Urbino Summer School 2018			
1200 € each	Swaantje Brzelinski	F	GER
	Frieda Hoem	F	NED
	Lorna Kerans	F	UK
	Andrew Mair	M	UK
	Elisabeth Robinson	F	UK
	Martina Vannaci	F	GER
	Shuzhuang Wu	M	GER
	Rim Zrida	F	GER
	Anta-Clarisse Sarr	F	FRA
ECORD Scholarships Leicester Summer School 2018			
800 € each	Aurea Vanessa Caetano	F	UK
	Oswaldo Mantilla	M	UK
	Khurram Shazad	M	GER
ECORD Scholarships Bremen Summer School 2018			
600 € each	Claudio Argentino	M	ITA
	Giuseppe Amendola	M	ITA
	Allan Audsley	M	UK

ECORD Research Grants

ECORD supports outstanding early-career scientists by sponsoring merit-based awards for research that is directed toward Scientific objectives of past or up-coming DSDP / ODP / IODP expeditions (core material and data). The aim is to foster participation of young scientists in ocean drilling research and encourage them to develop their own projects and collaborate with other research groups outside of their home institutions. Twelve applications from five ECORD member countries were submitted in 2018 from PhD students and post-doctoral researchers, and seven grants were awarded (3 UK, 2 Italy, 1 France, and 1 Denmark).

Awardees ECORD Research Grants 2018

Country	Name	Institution
UK	Katrina Nilsson-Kerr	The Open University
ITA	Pietro Bazzicalupo	Università degli Studi di Bari
FRA	Antoine Triantafyllou	University of Nantes
DEN	Johannes Monkenbusch	University of Copenhagen
UK	Zeinab Smillie	Heriot-Watt University
UK	Max Casson	University of Manchester
ITA	Ornella Quivelli	University of Bari

Distribution of applications to ECORD Research Grants (n = 12).

Education/Outreach Officers

"Teachers at Sea" programme

As part of the "Teachers at Sea" programme, initiated by Ocean Leadership and sponsored by the USA, teachers from ECORD countries have the opportunity to participate onboard the *JOIDES Resolution* as Education/Outreach Officers during IODP expeditions – *http://joidesresolution.org/node/453*.

The primary objectives of this education programme are to:

- Provide educators with opportunities to sail on a ocean-going marine research vessel, working along-side scientists and using state of the art scientific approaches to address problems of global interest and obtain first-hand knowledge of the results of the expeditions
- Translate scientific results into useful teaching resources, such as classroom curriculum materials
- Disseminate education resources into classroom settings and motivate other teachers to use IODP science and materials in their curriculum.

Following a special call for applications in 2016, ESSAC nominated **Agnès Pointu** to participate in Expedition 374 Ross Sea West Antarctic Ice Sheet History. The participation was supported by IODP-France.

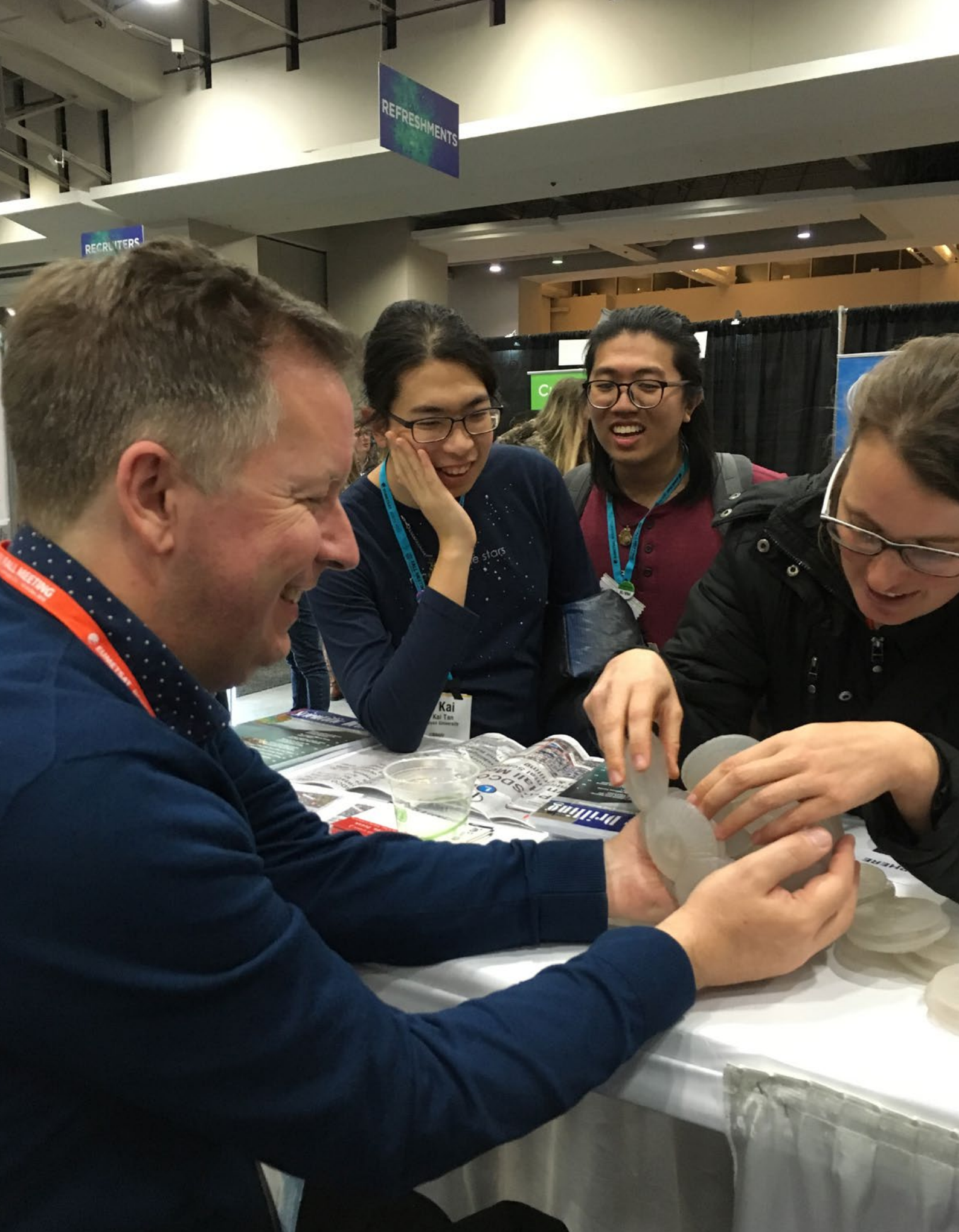
Virtual drill ship tour

A virtual drill ship tour was produced during the expedition, as well as blogs and teaching material (*https://www.youtube.com/watch?v=ivjgB8JSoTM*).

ECORD School of Rock

ECORD School of Rock supports educational activities of teachers interested in IODP science via a workshop with lectures given by scientists and practical hands-on sessions developed and tested by scientists and educators who sailed on IODP expeditions. The main part of the funding of every ECORD School of Rock has to be provided by the national educational organisation/ministry of the hosting country. The national IODP offices provide additional funding, and support may also be requested from ECORD.

The 2018 ECORD School of Rock was held in Pavia, Italy on 24 - 27 July 2018.



Tony Morris (ESSAC Chair) helps young scientists in building a model of microfossil from 3D-printed elements at the ECORD booth, AGU 2018, Washington D.C., USA (photo ECORD/IODP).

8. Communicating

ECORD, IODP and ICDP team at the booth at the AGU 2018, Washington D.C., USA (photo ECORD/IODP).

8. Communicating

Promoting the activities and accomplishments of the IODP to large, often non-scientific, audiences is a major and ongoing goal.

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).

http://www.ecord.org/outreach/

http://www.ecord.org/resources/

ECORD Outreach Task Force meetings

The EOTF met twice during 2018. The first meeting was held in Bremen (Germany) in February. The second meeting was held in The Hague (The Netherlands), in November, and hosted by NWO just before the ECORD Council-ESSAC meeting. Outreach colleagues from the US Science Support Program and CDEX/JAMSTEC (Japan) attended the fall meeting to enhance cooperation between ECORD and IODP partners.

Communicating with scientists

Promoting IODP/ECORD at conferences

During the year, ECORD outreach staff continued to promote both the IODP and ICDP programmes under the umbrella of "Scientific Drilling" at science conferences.

In coordination with our colleagues in the USA and Japan, and with the ICDP outreach staff, a joint IODP-ICDP booth was organised at the AGU Fall Meeting 2018 in December in Washington (USA).

With almost 15,000 participants, the main event for ECORD is the European Geosciences Union (EGU) Conference in Vienna (Austria) in April, at which ECORD and the ICDP jointly sponsored a booth and organised a Townhall meeting. ICDP logging scanner demonstrations, videos and lunch talks attracted many visitors to the booth and programme information and subscriptions were accessed via online tools. For the first time an ECORD/IODP Outreach session was organised at the EGU General Assembly meeting and included an important contribution from ECORD teachers who sailed on IODP expeditions and from our IODP colleagues. The success of these joint events will lead to similar collaborations in 2019 at the EGU as well as at the AGU.

This year ECORD and ICDP also organised a booth at the International Sedimentological Congress in Québec, Canada.

The EOTF also supported member countries, Italy and Switzerland, with organising successful exhibition booths at science conferences held in Catania and Bern.

ECORD information was also widely distributed through the ECORD-ICDP MagellanPlus Workshop Series (page 20) and ECORD Training Course and Summer Schools (page 59-60).

ECORD Newsletter and leaflets

The **ECORD Newsletter** is published twice yearly to coincide with the EGU and AGU conferences (spring and fall of each year). The newsletter provides the main published source of general ECORD information, and includes reports on recent outreach and education activities.

Leaflets explaining the programme objectives and the latest information resulting from seven completed MSP expeditions are included in an ECORD folder, which is continuously updated.

Media activities

Media activities were conducted by the ESO outreach staff as it is important to let everyone know what ECORD is doing and give detailed information on the science of every mission-specific platform expedition, especially in the region where drilling occurs.

Media Day: Expedition 381, 5th March 2018, Bremen, Germany

A media day for Expedition 381 Corinth Active Rift Development was organised on 5 March in Bremen during the Onshore Science Party (top and bottom photo).

A media release was issued to communicate the first outcomes of the expedition to the journalists and media offices of institution of the Science Party - *http://www.ecord.org/outreach/press-releases/*. The event received global interest from several countries and was especially reported in the US, Switzerland and Germany.

Media day during OSP for Expedition 381, MARUM, Bremen, Germany (photo V. Diekamp ECORD/IODP).

Communicating with the general public

In preparation of Expedition 389 Hawaiian Drowned Reefs, promotional materials, a logo, leaflet, banner and expedition web page, were designed to create the individual identity of the expedition.

YouTube ECORD_IODP

A number of videos were produced during Expedition 381 and posted on the ECORD YouTube channel.

The ECORD photo gallery was revised with many additional pictures featuring recent MSP expeditions and ECORD summer schools - *http://www.ecord.org/resources/gallery/ecord-tv/*

Media day during OSP for Exp 381. Co-chief scientist Donna Shillington is being interviewed. MARUM, Bremen, Germany (photo V. Diekamp ECORD/IODP)

Outreach events

A number of public outreach events, workshops and courses organised by ECORD/IODP scientists in Canada, United Kingdom, Italy and France, received a support from ECORD. ECORD sponsored a workshop for teachers, the **ECORD School of Rock 2018**, organised by Italian scientists along with IODP Italia, in Pavia, in July.

Core Replicas

http://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. In 2018, core replicas were provided to support open days in science centres, scientific exhibitions and festivals, university courses in the United Kingdom, France and Italy. The first batch of series of core replicas from Expedition 364 Chicxulub Impact Crater is now delivered by Paula Weiss (*https://www.facebook.com/Core-Replicas-by-Paula-Weiss-836591733027195/*).

Outreach officers

After **Agnès Pointu** (France), who sailed as Education Officer on IODP Expedition 374 to the Ross Sea, **Vivien Cumming** (UK) was selected to sail as Outreach Officer on Expedition 379 Amundsen Sea W Antarctic Ice Sheet History in early 2019 to produce TV documentaries. Educational and outreach resources created by ECORD Education and Outreach Officers are posted on the website on *http://www.ecord.org/outreach/*

Outreach resources

Following discussions initiated in 2017, the EOTF has created new resources, brochures, video and tools to broaden outreach activities and resources to the general public in 2019.

Online presence of ECORD

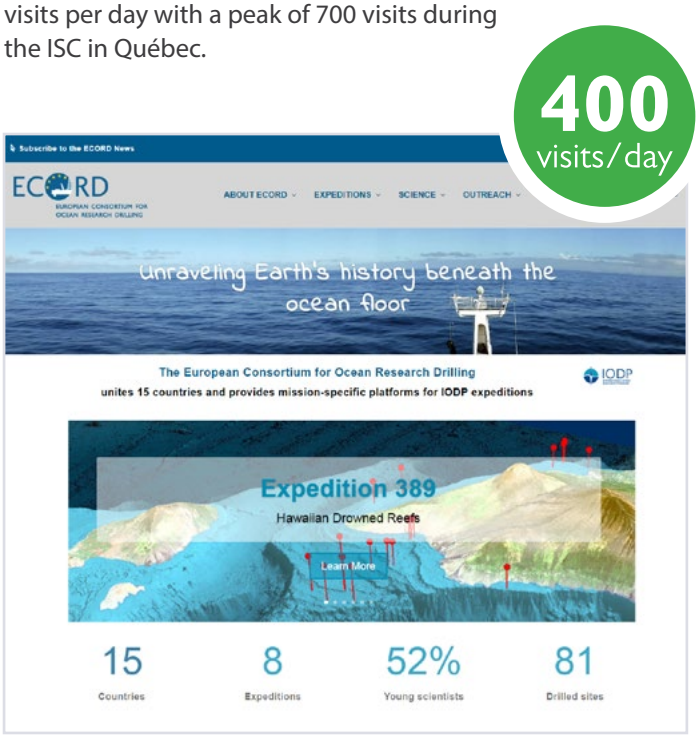
ECORD website

http://www.ecord.org

With the ability of the website to distribute online news and the ECORD web app used at conferences, more than 1159 subscribers joined the ECORD mailing list.

Thirty-four ECORD news were distributed to the ECORD mailing list (representing about 0.65/week), as well as 25 ECORD news were posted on the ECORD homepage.

Since July 2018, the ECORD website had an average of 400 visits per day with a peak of 700 visits during the ISC in Québec.



The website is now compliant with the new EU GDPR and a new monitoring system of our web statistics was implemented to better protect the privacy of our visitors - *http://www.ecord.org/privacy*.

ECORD on social media

To increase our visibility, the ECORD, ESO and ESSAC social media were merged into a single "ECORD-IODP" access. It includes @ECORD_IODP - 1590 followers via Twitter, ECORD IODP, 1033 friends via Facebook, and ECORD_IODP channel on YouTube). Information posted on our social networks not only helps guiding users to specific ECORD webpages but also encourages return visits to the website. Conveying information to the science community and the wider public is especially useful during major ECORD/IODP events, like MSP expeditions.

ECORD Information Database

http://ecordbase.ecord.org/

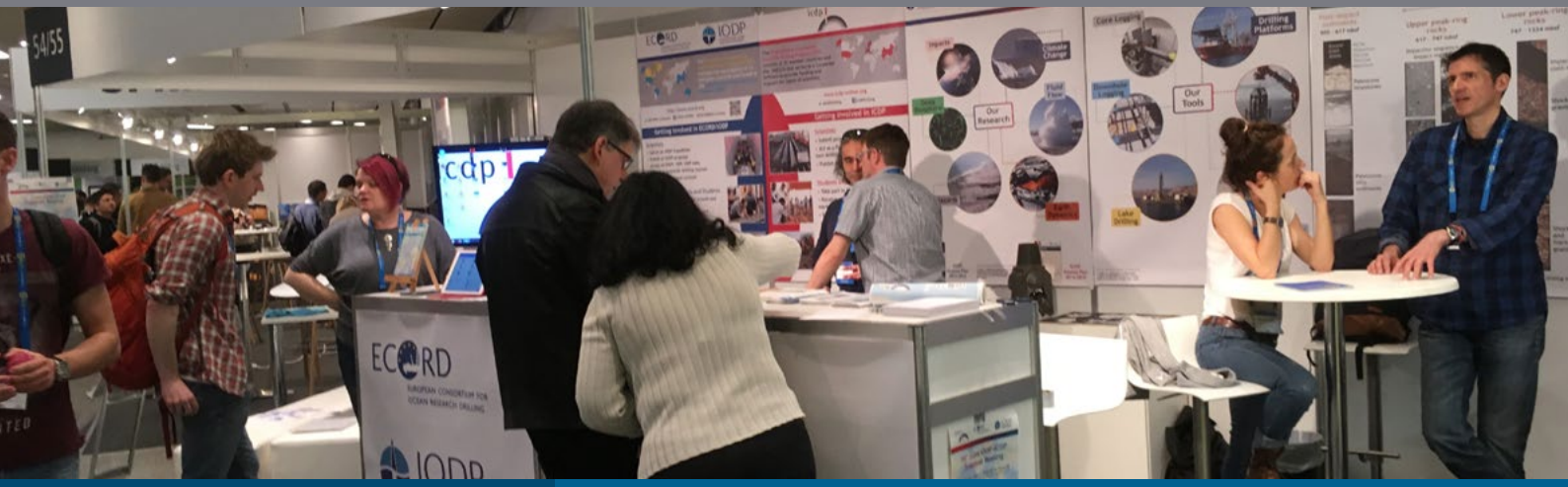
The renewal of the ECORD Information database has been outlined by the EOTF and will start in February 2019.

More info

http://www.ecord.org/outreach/

http://www.ecord.org/resources/

ECORD booth at EGU 2018 in Vienna, Austria (photo ECORD/IODP).



9. FY18 and FY19 budgets

Positive balance of **15.8M USD** at the end of 2018

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

Annual budget of **> 7M USD** to implement MSP expeditions

Archive-half cores during examination by scientists, OSP for Exp. 381, MARUM, Bremen (photo V. Diekamp, ECORD/IODP).

FY18 ECORD budget

ECORD is currently funded exclusively by its 15 member countries.

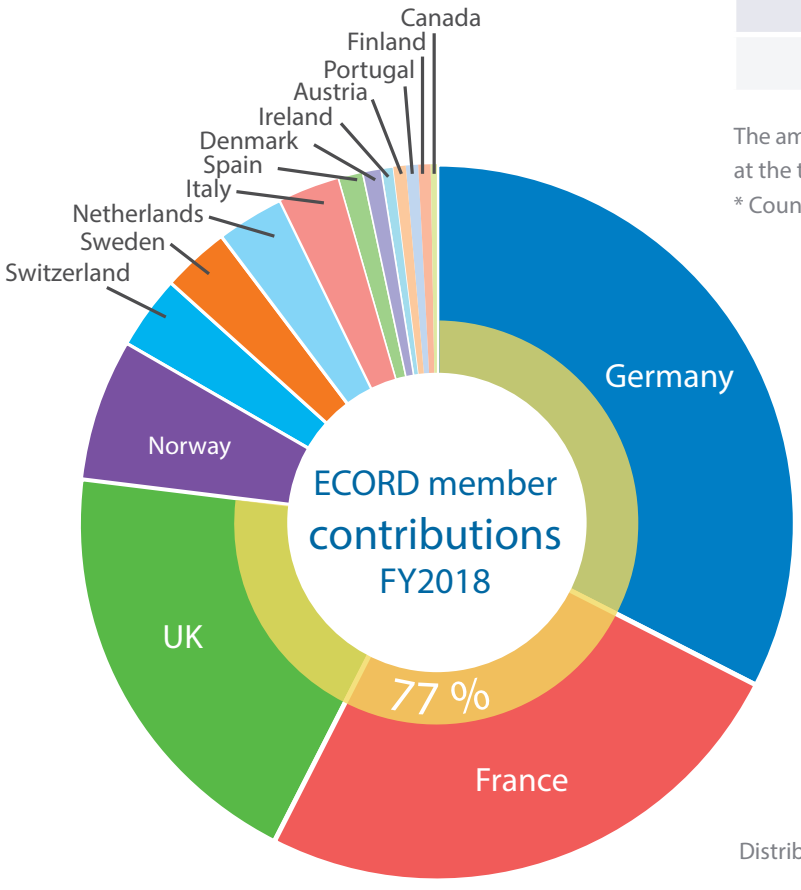
In FY18, the total ECORD budget amounted to 17.19M USD (below), showing a decrease of about 400K USD compared to the FY17 budget. Since 2014, the ECORD budget decrease is of 1.78M USD, mainly due to strong fluctuations in exchange rates between the US Dollar and the national currency contributions of five ECORD countries (France, UK, Denmark, Ireland and Spain).

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 ad-hoc/expedition by expedition basis.

The contributions to the ECORD budget are unevenly distributed between the member countries, ranging from 5.6M USD to 30K USD (right). 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 61) is standard and not based on levels of financial contribution.

ECORD contributions FY18 (USD)	
Austria	100,000
Canada	30,000
Denmark *	152,000
Finland	80,000
France *	4,302,000
Germany	5,600,000
Ireland *	114,000
Italy	500,000
Netherlands	500,000
Norway	1,100,000
Portugal	90,000
Spain *	168,000
Sweden	528,000
Switzerland	600,000
UK *	3,330,000
TOTAL	**17,194,000**

The amount in USD is based on the exchange rate (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 FY2018

The three major ECORD contributors, Germany (5.6M USD), France (4.302M USD) and UK (3.330M USD), provide 77% of the total ECORD budget.

The contributions of other member countries range from 30K USD to 1.1M USD. Canada kept a minimum contribution in 2018 whilst identifying new funding sources.

The table below summarises the ECORD budget for FY18. The expenses are given for comparison.

The ECORD running costs are very stable, amounting to appoximately 5% of the member country contributions, leaving 95% of the ECORD budget for direct operational costs.

The ECORD budget shows a positive balance of $15,79M at the end of 2018 and this sum will be carried forward to the ECORD FY19 budget.

ECORD FY **2018** Budget (in USD)

	FY18 Income (USD)	FY18 Expenses (USD)
FY17 balance	9,529,808	
FY18 contributions	17,194,000	
ECORD-NSF MoU		7,000,000
ECORD-JAMSTEC MoU		0 *
ESO		2,811,526
EMA		300,560
MagellanPlus		124,000
ECORD Outreach		66,400
ESSAC		294,158
BCR		332,094
TOTAL	26,720,808	10,928,433
FY18 balance	**15,792,091**	

Exchange rate: 1 € = 1.19 $

The amounts in USD are subject to exchange rate fluctuations.

* Payment delayed to 2019

FY19 ECORD budget

The expected total contributions for FY19 from the 15 ECORD member countries is about $17,127,000 (see table below).

ECORD contributions FY19 (USD)	
Austria	100,000
Canada	7,000
Denmark *	152,000
Finland	80,000
France *	4,258,000
Germany	5,600,000
Ireland *	114,000
Italy	500,000
Netherlands	500,000
Norway	1,100,000
Portugal	90,000
Spain *	168,000
Sweden	528,000
Switzerland	600,000
UK *	3,330,000
TOTAL	**17,127,000**

The amount in USD is based on the exchange rate (when applicable) at the time of the payment by the relevant partner.
* countries paying their contribution in their own currency.

ECORD FY **2019** Budget (in USD)

	FY19 Income (USD)	FY19 Expenses (USD)
FY18 balance	15,792,091	
FY19 contributions	17,127,000	
ECORD-NSF MoU		7,000,000
ECORD-JAMSTEC MoU		3,000,000 *
ESO		2,000,000 **
EMA		356,700
MagellanPlus		81,326
IODP Chairs Support		144,000
IODP publ. Support		15,000
ESSAC		315,606
BCR		353,109
Outreach basic		66,400
Outreach exhibitions		50,000
Outreach stakeholders		11,200
Outreach expeditions		30,000
ECORD database		18,000
TOTAL	**32,919,091**	**12,088,232 ** **
Expected FY19 balance	**20,830,859 ** **	

* Payments 2017 - 2019; ** ESO 2019 budget to be confirmed. The amounts in USD are subject to exchange rate fluctuations.

ECORD Managing Agency

The table below summarises the EMA budget for FY18 and FY19, as approved by the ECORD Council in December 2018. Most of the expenses remain stable with the exception of a slight increase in salaries (+ 13.9%), a higher budget of $11.8K to cover the organisation of the ECORD meetings and an increased budget for the organisation of MagellanPlus workshops. The budget to cover the organisation of the ECORD Evaluation Committee (only in FY17), the Expedition Operational Review Committee (ORC) meetings and the SEP June meeting decreased by about $10K. Overall, the EMA FY18 budget anticipates an increase of 12.5% compared to FY17.

EMA budget for FY18 and FY19

	FY18		FY19		Variance
	€	USD	€	USD	€
Salaries					
Assistant Director	68,000	80,300	68,000	78,880	0
Outreach Officer	N/A	N/A	68,000	78,880	68,000 (+)
Outreach Coordinator	47,000	55,500	26,000	30,160	21,000 (-)
Compensation for the Director	50,000	59,000	50,000	58,000	0
Travels and meetings					
Travels EMA CEREGE	50,000	59,000	50,000	58,000	0
Travels EEC (8) & ORC (2)	2,000	2,400	N/A	N/A	2,000 (-)
Invited speakers to ECORD meetings	N/A	N/A	3,000	3,480	3,000 (+)
ECORD Meetings	10,000	11,800	10,000	11,600	0
SEP June Meeting	5,000	5,900	10,000	11,600	5,000 (+)
MagellanPlus	100,000	118,000	70,000	81,326	30,000 (-)
Consumables	2,500	3,000	2,500	2,900	0
Overheads	20,000	23,800	20,000	23,200	0
TOTAL	**354,500**	**417,300**	**377,500**	**438,026**	**23,000 (+)**

ECORD Science Support and Advisory Committee (ESSAC)

The table below summarises the ESSAC budget for FY18 and FY19 as approved by the ECORD Council in June 2018.

ESSAC budget for FY18 and FY19					
	FY18		FY19		Variance
	€	USD	€	USD	€
Salaries					
Science Coordinator	68,369	80,578	68,921	85,462	0,042 (-)
Compensation for the Chair	50,000	59,000	50,000	62,000	0
Compensation for the Vice-Chair	0	0	5,000	6,200	5,000 (+)
Travels and subsistence					
Science Coordinator	6,000	7,080	7,500	9,300	1,500 (+)
Chair	15,000	17,700	19,000	23,560	2,000 (+)
Office Costs	6,000	7,080	6,100	7,564	0,100 (+)
Meetings					
ESSAC Spring meeting	2,500	2,950	2,600	3,224	0,100 (+)
ESSAC Fall meeting	2,500	2,950	2,600	3,224	0,100 (+)
Invited speakers to meetings	3,000	3,540	3,100	3,844	0,100 (+)
Travel Support ESSAC Liaison to SEP	3,000	3,540	3,100	3,844	0,100 (+)
Conference Travel Support	4,000	4,720	4,100	5,084	0,100 (+)
Education and Outreach					
ECORD DLP Support	12,000	14,160	13,000	16,120	1,000 (+)
ECORD Summer School Support	30,000	35,400	30,000	37,200	0
ECORD Training Course	6,500	7,670	6,500	8,060	0
ECORD Summer School Student Support	15,000	17,700	15,000	18,600	0
ECORD Research Grants	18,000	21,240	18,000	22,320	0
Teachers at Sea, Travel Support	7,500	8,850	0	0	7,500 (-)
TOTAL	**249,686**	**294,629**	**254,521**	**315,606**	**4,835 (+)**

ECORD Science Operator

The table below summarises the expenditure breakdown of ESO for FY18 in US dollars. The table below summarises the ESO budget for FY18.

ESO budget for FY18 and FY19									
	2018 Annual Program Plan Budget				2018 Expenditure				2018 variance
	BGS	MARUM	EPC	Total	BGS	MARUM	EPC	Total	
Management and administration	223,130	161,299	304,874	689,303	152,414	161,299	304,874	618,587	70,716
Personnel	153,130	115,299	244,874	513,303	137,435	115,299	244,874	497,608	15,695
Travel	50,000	26,000	40,000	116,000	9,568	26,000	40,000	75,568	40,432
Supplies	5,000	5,000	5,000	15,000	0	5,000	5,000	10,000	5,000
Communication	0	0	0	0	1,752	0	0	1,752	-1,752
Equipment	5,000	5,000	5,000	15,000	498	5,000	5,000	10,498	4,502
Other	10,000	10,000	10,000	30,000	3,161	10,000	10,000	23,161	6,839
Technical, Engineering and Science Support	427,383	676,723	392,978	1,497,084	487,242	676,723	392,978	1,556,943	-59,859
Personnel	380,383	242,123	309,978	932,484	298,924	242,123	309,978	851,025	81,459
Travel	44,000	40,000	36,000	120,000	37,566	40,000	36,000	113,566	6,434
Supplies	0	356,600	0	356,600	0	356,600	0	356,600	0
Shipping	0	20,000	20,000	40,000	356	20,000	20,000	40,356	-356
Communication	0	0	0	0	4	0	0	4	-4
Contractual Services	0	0	25,000	25,000	0	0	25,000	25,000	0
Equipment	3,000	3,000	2,000	8,000	139,744	3,000	2,000	144,744	-136,744
Other	0	15,000	0	15,000	10,648	15,000	0	25,648	-10,648
Core Curation	0	81,371	0	81,371	0	81,371	0	81,371	0
Personnel	0	68,371	0	68,371	0	68,371	0	68,371	0
Travel	0	6,000	0	6,000	0	6,000	0	6,000	0
Supplies	0	2,000	0	2,000	0	2,000	0	2,000	0
Shipping	0	5,000	0	5,000	0	5,000	0	5,000	0
Data Management	121,294	97,421	41,434	260,149	18,548	97,421	41,434	157,403	102,746
Personnel	12,294	79,421	41,434	133,149	9,075	79,421	41,434	129,930	3,219
Travel	8,000	8,000	0	16,000	0	8,000	0	8,000	8,000
Supplies	6,000	0	0	6,000	0	0	0	0	6,000
Communication	0	0	0	0	546	0	0	546	-546
Contractual Services	75,000	0	0	75,000	0	0	0	0	75,000
Equipment	20,000	10,000	0	30,000	8,927	10,000	0	18,927	11,073
Publications	150,000	0	0	150,000	144,136	0	0	144,136	5,864
Contractual Services	150,000	0	0	150,000	144,136	0	0	144,136	5,864
Outreach	87,781	28,575	17,264	133,620	75,127	28,575	17,264	120,966	12,654
Personnel	71,781	20,575	17,264	109,620	60,301	20,575	17,264	98,140	11,480
Travel	8,000	8,000	0	16,000	14,299	8,000	0	22,299	-6,299
Supplies	8,000	0	0	8,000	0	0	0	0	8,000
Shipping	0	0	0	0	496	0	0	496	-496
Communication	0	0	0	0	31	0	0	31	-31
Grand Total	1,009,588	1,045,389	756,550	2,811,527	877,467	1,045,389	756,550	2,679,406	132,121

Bremen Core Repository (BCR)

The table below summarises the BCR budget for FY18 and FY19 as approved by the ECORD Council in June 2018.

BCR budget for FY18 and FY19					
	FY18		FY19		Variance
	€	USD	€	USD	€
Salaries and Fringes 1.6 FTE	165,025	194,730	239,344	277,639	74,319 (+)
Student Workers	8,200	9,676	9,892	15,827	1,692 (+)
Travel	1,800	2,124	2,585	2,999	785 (+)
Supplies	2,000	2,360	19,891	23,074	17,891 (+)
Shipping	11,500	13,570	10,772	12,495	728 (-)
Curation DIS updates	3,000	3,540	4,309	4,998	1,309 (+)
SEDIS web portal maintenance and service 24/7 (incl. 0.08 FTE)	9,500	11,210	12,208	14,161	2,708 (+)
Indirect Costs	80,410	94,844	0	0	80,410 (-)
Total	**281,435**	**332,093**	**299,001**	**351,193**	**17,566 (+)**

ECORD Outreach Task Force (EOTF)

The table below summarises the EOTF budget for FY18 and FY19 as approved by the ECORD Council in June and November 2018.

EOTF budget for FY18 and FY19				
	FY18		FY19	
	€	USD	€	USD
Core outreach activities				
ECORD Publications	11,300	13,364	7,457	8,650
Core replicas			5,043	5,850
EGU and AGU booths	20,000	23,600	17,543	20,350
ECORD website			1,465	1,700
Travels	11,000	12,980	14,267	16,550
Shipping	4,000	4,720	2,543	2,950
Goodies			6,853	7,950
Miscellaneous	7,000	8,260	N/A	N/A
Donators and Stakeholders				
Image video	0	0	5,862	6,800
Image brochure	0	0	3,793	4,400
Expeditions				
Expedition flyers			1,030	1,200
Expedition logos and stickers			1,030	1,200
Outreach Officer	0	0	25,862	30,000
Temporary Exhibitions				
Spherical Display System	0	0	43,103	50,000
ECORD Information Database				
Overheads	3,000	3,540	0	0
TOTAL	**56,300**	**66,464**	**135,862**	**157,600**

Drillship *DP Hunter* seen from helicopter (photo G. Camoin, ECORD/IODP).

10. ECORD participation in IODP panels

Leah Nolan operating core line scanner during OSP for Exp 381, at MARUM, Bremen (photo ECORD/IODP).

10. ECORD participation in IODP panels

The International Ocean Discovery Program (IODP) is composed of three platform providers (NSF for *JOIDES Resolution* , CDEX/JAMSTEC for *Chikyu* and ECORD for MSPs), three Facility Boards, two IODP advisory panels, a Science Support Office and the IODP Forum. The ECORD participation in the IODP entities in 2018 is listed below.

JOIDES Resolution Facility Board - JR**FB**

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)
Wolfgang Bach (Germany)
Steve Bohaty (UK)

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)
Benoît Ildefonse (France)

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
James A. Austin Jr. (USA)

ECORD attendees at the IODP Forum 2018 in Goa, India
Gilbert Camoin (France),
Nadine Hallmann (France)
Guido Lüniger (Germany)
David McInroy (UK)
Antony Morris (UK)
Werner Piller (Austria)

Science Evaluation Panel - **SEP**

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

IODP advisory panel: Science Evaluation Panel (SEP) evaluates the Scientific objectives and relevance of proposed expeditions using all IODP platforms.

SEP ECORD Members
Maria Angela Bassetti (France)
Rebecca Bell (UK)
Calvin Campbell (Canada)
Adélie Delacour (France)
Louis Géli (France)
Marguerite Godard (France)
Marc-André Gutscher (France)
David Iacopini (UK)
Samuel Jaccard (Switzerland)
Jens Kallmeyer (Germany)
Andrew MacCaig (UK)
Kevin Pickering (UK)
Jenny Pike (UK)
Werner Piller (Austria)
Michelle Rebesco (Italy)
Michael Riedel (Germany)
Kazuyo Tachikawa (France)
Heinrich Villinger (Germany)

Environmental Protection and Safety Panel - **EPSP**

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

IODP advisory 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)
David Long (UK)
Dieter Strack (Germany)

Contributors

Malgo Bednarz
EMA Outreach Officer

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EMA Director

Carol Cotterill
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Sarah Davies
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Nadine Hallmann
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Hanno Kinkel
ESSAC Science Coordinator

Gilles Lericolais
EFB Chair

Lucas Lourens
MagellanPlus Chair

Patricia Maruéjol
EMA Outreach Coordinator

David McInroy
ESO Science Manager

Antony Morris
ESSAC Chair

Ulrike Prange
ESO Media Relations

Ursula Röhl
ESO Curation and Lab Manager

David Smith
ESO Operations Manager

Core description, OSP for Exp. 381, MARUM, Bremen (photo V. Diekamp, ECORD/IODP).

Ab List of acronyms

ADP: Amphibious Drilling Proposal
AGU: American Geophysical Union
ANZIC: Australia-New Zealand IODP Consortium
ArcOP: Arctic Ocean Paleoceanography
AWI: Alfred-Wegener-Institute
BCR: Bremen Core Repository
BGS: British Geological Survey
CDEX: Center for Deep Earth Exploration
CEREGE: Centre Européen de Recherche et d'Enseignement des Géosciences de l'Environnement
CIB: *Chikyu* IODP Board
CNR: Consiglio Nazionale delle Ricerche
CNRS: Centre National de la Recherche Scientifique
CPP: Complementary Project Proposal
CRISP: Costa Rica Seismogenesis Project
CRS: Colour Reflectance Spectrophotometry
DFG: Deutsche Forschungsgemeinschaft
DIS: Drilling Information System
DLP: Distinguished Lecturer Programme
DSDP: Deep Sea Drilling Project
EOTF: ECORD Outreach Task Force
EVTF: ECORD Vision Task Force
EC: European Commission
ECORD: European Consortium for Ocean Research Drilling
EEC: External Evaluation Committee
EFB: ECORD Facility Board
EGU: European Geosciences Union
EMA: ECORD Managing Agency
EPM: Expedition Project Manager
EPC: European Petrophysics Consortium
EPSP: Environmental Protection and Safety Panel
ESO: ECORD Science Operator
ESSAC: ECORD Science Support and Advisory Committee
ETH: Eidgenössische Technische Hochschule
FCT: Fundação para a Ciência e a Tecnologia
FNS: Fonds National Suisse
FTE: Full Time Equivalent
FP: Framework Programme
FY: Fiscal Year
GCR: Gulf Coast Repository
GEOMAR: Helmholtz Centre for Ocean Research Kiel
GLOMAR: Bremen International Graduate School for Marine Sciences
GFZ: Deutsches GeoForschungsZentrum
GDPR: General Data Protection Regulation
GOM: Gulf of Mexico
GPC: Giant Piston Coring
GSI: The Geological Survey of Ireland
HF: Hydrofluoric acid
IBM: Izu-Bonin-Mariana
ICDP: International Continental Scientific Drilling Program
Ifremer: French Research Institute for Exploitation of the Sea
IGSN: International Geo Sample Number
IKC: In-Kind Contribution
ILP: Industry Liaison Panel
IOC: Intergovernmental Oceanographic Commission
IODP: Integrated Ocean Drilling Program (2003-2013) & International Ocean Discovery Program (2013-2023)
ISC: International Sedimentological Conference
ISOLAT: Integrated Southern Ocean Latitudinal Transects
JAMSTEC: Japan Agency for Marine-Earth Science and Technology
JOIDES: Joint Oceanographic Institutions for Deep Earth Sampling
JPI-Oceans: Joint Programming Initiative Healthy and Productive Seas and Oceans
JR: *JOIDES Resolution*
JRFB: *JOIDES Resolution* Facility Board
K-Pg: Cretaceous–Paleogene
KCC: Kochi Core Center
LTBMS: Long-Term Borehole Monitoring System
LWD: Logging While Drilling
MARUM: Center for Marine Environmental Sciences, University of Bremen
mbsf: metres below sea floor
MDP: Multi-phase Drilling Project
MeBo: Meeresboden-Bohrgerät
MG+: MagellanPlus Workshop Series Programme
MoU: Memorandum of Understanding
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
NIOZ: Koninklijk Nederlands Instituut voor Onderzoek der Zee
NOC: National Oceanography Centre, Southampton
NSF: National Science Foundation
NWO: Nederlandse Organisatie voor Wetenschappelijk Onderzoek
ÖAW: Österreichische Akademie der Wissenschaften
ODP: Ocean Drilling Program
OGS: Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
ORC: Operational Review Committee
OSP: Onshore Science Party
ÖAW: Österreichische Akademie der Wissenschaften
PI: Principal Investigator
PROCEED: Expanding Frontiers of Scientific Ocean Drilling
QA/QC: Quality Assurance/Quality Control
RD2: Rockdrill2
SAC: Sample Allocation Committee
SEDIS: Scientific Earth Drilling Information Service
SEP: Science Evaluation Panel
SSE: Slow Slip Events
T**C/TOC:** Total Carbon/Total Organic Carbon
UBC: The University of British Columbia
UKRI: United Kingdom Research and Innovation
UNESCO: United Nations Educational, Scientific and Cultural Organization
USSP: Urbino Summer School in Paleoclimatology
USSSP: U.S. Science Support Program
VR: Vetenskapsradet
WAIS: West Antarctic Ice Sheet
XRF: X-Ray Fluorescence

Mary Ford during core description, OSP for Exp. 381, MARUM, Bremen (photo V. Diekamp, ECORD/IODP).

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