

ECORD and scientific ocean drilling beyond 2024



IODP Expedition 386: Japan Trench Paleoseismology
IODP Expedition 377: Arctic Ocean Palaeoceanography (ArcOP)
IODP Expedition 389: Hawaiian Drowned Reefs

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The International Ocean Discovery Program (**IODP**) - www.iodp.org - is an international research programme dedicated to advancing the scientific understanding of the Earth through drilling, coring, and monitoring the sub-seafloor. The European Consortium for Ocean Research Drilling (**ECORD**) - www.ecord.org - supports the participation of European and Canadian scientific communities in IODP and provides funding for the implementation of mission-specific platform expeditions. ECORD is funded by 15 countries (*see back page*).

IODP is funded by the US National Science Foundation (NSF), Japan's Ministry of Education, Culture, Sports, Science, and Technology (MEXT); ECORD; the Australian-New Zealand IODP Consortium (ANZIC); India's Ministry of Earth Sciences; China's Ministry of Science and Technology; the Korea Institute of Geoscience and Mineral Resources (KIGAM); and Brazil's Ministry of Education (CAPES).

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Cover photo: Operations onboard R/V *Kaimei* during IODP Expedition 386: Japan Trench Paleoseismology. Credits: K. Ikehara, ECORD/IODP/JAMSTEC



Gilbert Camoin



Nadine Hallmann





Mike Webb


The COVID-19 pandemic that the World has faced over the last two years has strongly affected the activities of our programme with the postponement of many expeditions, workshops, conferences and educational activities. However, all IODP and ECORD meetings have been held remotely and, since a few months, in a hybrid form, thus maintaining the programme active during this difficult period. In addition to


its basic functioning, ECORD has implemented a Mission-Specific Platform (MSP) expedition in 2021 and planned another one for 2022. ECORD has also initiated special calls for workshops focused on MSP proposals and developed new resources aiming at improving ECORD science communication.


ECORD membership


 Before the COVID-19 pandemic, the ECORD Managing Agency (EMA) has been very active in providing information to former ECORD members, including Israel, Iceland, Belgium and Poland. Israel and Iceland have formerly expressed interest in joining the current 15 ECORD members in the future.








 Following the ECORD-IODP Day that was organized on 3 October 2019 in Athens, Greece, the promising contacts with the Greek science community and authorities have been interrupted by the COVID-19 pandemic and are now in process to be reactivated. In addition, contacts have been established with Croatia, Russia and, more recently, the United Arab Emirates during the COVID-19 pandemic.









 At its last meeting that was held in a hybrid form (Granada, Spain and remotely) on 20 and 21 October 2021, the ECORD Council has decided to lift restrictions regarding Spanish scientists applying for ECORD berths to sail on IODP expeditions (see [ECORD Newsletter #34](#)), in light of recent developments demonstrating that Spain should sign soon the 2019-2023 ECORD MoU and proceed with the payment of its related contributions to ECORD.

continued →



Roz Coggon

Awarded **2021 Asahiko Taira International Scientific Ocean Drilling Research Prize**

Dr Rosalind Coggon, a Royal Society University Research Fellow (University of Southampton's School of Ocean and Earth Science), a Co-editor of the 2050 Science Framework, and the recipient of 6th ECORD Award, has been awarded the prestigious international prize in recognition for her outstanding transdisciplinary research accomplishment in ocean drilling from the American Geophysical Union (AGU).

Read more:

<https://www.southampton.ac.uk/oes/news/2021/10/06-rosalind-coggon-awarded-from-the-american-geophysical-union.page>

Incoming ECORD members



Marisa Rydzy

Research Associate
EPC
University of Leicester
(since August 2021)

Marisa Rydzy joined the IODP group as Research Associate in August after working as petrophysicist in the petroleum industry for nearly eight years. In 2014, she graduated with a PhD from Colorado School of Mines where she studied the effect of hydrate formation on the elastic properties of unconsolidated sediments. Her research interests include gas hydrates and rock-fluid interactions. In her free time, Marisa enjoys outdoor activities such as hiking, camping, and snowshoeing, as well as reading, yoga, and the theatre.

Mission-specific platform expeditions

The delivery of a world-class portfolio of MSP expeditions has been ECORD's primary objective since 2004 and, since 2013, ECORD became one of the three IODP Platform Providers, along with the NSF and JAMSTEC.



Offshore: Apr-Jun 2021, OSP: Feb 2022, TBC

IODP Expedition 386: Japan Trench Paleoseismology

IODP Expedition 386: Japan Trench Paleoseismology (Co-chief Scientists: M. Strasser, ECORD-Austria and Ken Ikehara, Japan) has been the first IODP expedition implemented since January 2020. The offshore phase conducted with the Japan Agency for Marine-Earth Science and Technology (JAMSTEC)-operated research vessel *Kaimei* in spring 2021 (13 April - 1 June 2021) has been very successful. The onshore phase on board *Chikyu* docked in Shimizu that was originally planned on 6 October 2021, has been postponed to 14 February - 15 March, 2022 (*see page 16*). However, these new dates may be reconsidered again, based on global travel restrictions that may still apply in early 2022. Besides its operational success, this expedition has demonstrated that a collaborative approach involving different IODP Platform Providers (ECORD Science Operator - ESO - and the Institute for Marine-Earth Exploration and Engineering - MarE3 - within JAMSTEC in the case of IODP Expedition 386) and the provision of in-kind contributions (IKC) represent a model for future scientific ocean drilling expeditions implemented in an MSP mode.



Planned for Sept-Oct 2023

IODP Expedition 389: Hawaiian Drowned Reefs

At its last meeting that was held in Trieste, Italy, the EFB has recommended the scheduling of IODP Expedition 389: Hawaiian Drowned Reefs (Co-chief Scientists: J. Webster, ANZIC and A. C. Ravelo, USA), which aims at generating a record of sea-level change and associated climate variability during several controversial and poorly understood periods over the last 500 kyr. The scheduling of this expedition has been approved by the ECORD Council at its last meeting and its implementation is now planned for September-October 2023 (*see page 19*).



Offshore: Aug-Sept 2022

IODP Expedition 377: Central Arctic Paleooceanography (ArcOP)

Over the last months, ESO and EMA have collaborated with the Swedish Polar Research Secretariat (SPRS) to prepare IODP Expedition 377: Central Arctic Paleooceanography (ArcOP; Co-chief Scientists: R. Stein, ECORD-Germany, and K. St. John, USA) in August and September 2022, including operational, funding and communication planning (*see page 18*).

This expedition, which has been considered as a first-priority expedition for ECORD by the ECORD Facility Board (EFB), aims at reconstructing the long-term Cenozoic climate history of the central Arctic Ocean. It will benefit from IKCs provided by SPRS and the Federal Institute for Geosciences and Natural Resources (BGR) in Hannover, Germany.

Based on budget predictions, another MSP expedition could be planned for 2024, provided that the current programme is extended through 2024.

Such an expedition should be based on one of the MSP proposals currently residing at the EFB and will be defined at the next EFB meeting that will be held in Aix-en-Provence, France, on 20 and 21 September 2022 (*see Scheduling of MSP expeditions on page 13*).

The four MSP proposals that currently reside at the Science Evaluation Panel (SEP) and the MSP drilling proposals that will arise from MagellanPlus workshops that are planned in the next two years (*see page 24-27*), may form the basis of the expedition schedule for a post-2024 MSP-only drilling programme. The success of the last MagellanPlus specific call for workshop proposals with scientific themes aligned with the Strategic Objectives defined in the 2050 Science Framework (<https://www.ecord.org/science/magellanplus/>) demonstrates the prominent role that MSP expeditions will play in the future.

More info <https://www.ecord.org/expeditions/msp/2013-2023>.

ECORD partnership: JOIDES Resolution and Chikyū expeditions since spring 2021

ECORD's partnership with NSF and JAMSTEC is based on Memoranda of Understanding (MoU) that allow ECORD scientists to participate to expeditions implemented by the *JOIDES Resolution* (JR) and *Chikyū*.

At its last meeting that was held remotely on 13-14 July 2021, the *Chikyū* IODP Board (CIB) has recognized that the currently accepted but unimplemented/unscheduled deep-riser drilling projects using *Chikyū* will not be completed during the current phase of IODP. In addition, the CIB has decided that no new *Chikyū* proposals will be accepted in the current phase of the programme. Only riserless proposals currently at SEP will be considered for possible implementation in the 2024/2025 operation window(s) that will include a total of three months for IODP expeditions.

IODP Expedition 395C: Reykjanes Mantle Convection and Climate (6 June - 6 August 2021) has been the first expedition implemented by the JR after the most critical phase of the COVID-19 pandemic that started soon after the implementation of IODP Expedition 378: South Pacific Paleogene Climate (3 January - 6 February 2020). The JR has just completed Expedition 396: Mid-Norwegian Continental Margin Magmatism (6 August - 6 October 2021) with a reduced science party, before she implements a series of four expeditions in the Southern Atlantic from December 2021 to August 2022, IODP Expedition 391: Walvis Ridge Hotspot, IODP Expedition 392: Agulhas Plateau Cretaceous Climate, and IODP Expeditions 390 and 393: South Atlantic Transects 1 and 2 (*see map and table on page 7*).

Three expeditions that were initially scheduled in 2020 have been postponed, IODP Expedition 387: Amazon Continental Margin,

IODP Expedition 388: Equatorial Atlantic Gateway and IODP Expedition 394: Rio Grande Cone Methane and Carbon Cycling due to a lack of permission to drill in Brazilian waters.

At its last meeting that was held in a hybrid form (San Diego, CA and remotely) on 23 - 25 June 2021, the *JOIDES Resolution* Facility Board (JRFB) has confirmed that no new proposals that require the JR to address the Science Plan will be accepted, with the exception of proposals reviewed by the SEP in 2020 that were deactivated, but encouraged to re-apply.

The JRFB also considered the future of the 'orphan' sites that correspond to unimplemented sites on the board for later completion in exceptional circumstances (e.g., mechanical failures of the JR). The JRFB decided that 12 orphan sites from five expeditions will require submission of revised versions that follow the guidelines for proposals addressing the 2050 Science Framework before being reviewed for potential future implementations.

The U.S. FY2023 JR scheduling includes five expeditions from October 2022 through September 2023 (*see map and table on page 7*), IODP Expedition 397: Iberian Margin Paleoclimate, IODP Expedition 398: Hellenic Arc Volcanic Field, IODP Expedition 399: Deepening Hole U1309D, IODP Expedition 395: Reykjanes Mantle Convection and Climate and IODP Expedition 400: NW Greenland Glaciated Margin. Four out of the five proposals supporting these expeditions are led by an ECORD scientist.

Finally, the JRFB has recommended that, in light of the proposal pressure in the Atlantic Ocean, the JR will stay in the Atlantic Ocean with the possibility of eastern Pacific Ocean drilling through the end of the current programme.

In memory of Jörn Thiede

Former Director of the Alfred Wegener Institute and GEOMAR, Prof. Dr Jörn Thiede, passed away in July 2021 at the age of 80.

He will be remembered by the IODP community for his impressive achievements in geosciences, especially in scientific ocean drilling.

Read more:

<https://www.geomar.de/en/news/article/trauer-um-joern-thiede>

<https://www.awi.de/en/about-us/service/press/single-view/default-f1e3b94e1c-1.html>





U.S. FY2024 (1 October 2023 - 30 September 2024) has been considered as an ‘option’ year in Memoranda underlying the JR Consortium to extend the current term (30 September 2023) of the International Ocean Discovery Program. In light of reduced operations and lost opportunities during the COVID-19 outbreak, NSF has decided that unspent funds in U.S. FY2020 and U.S. FY2021 due to reduced operations will be applied to U.S. FY2024 operations.



ECORD has continuously contributed to the JR Consortium throughout the pandemic. At its last meeting that was held in a hybrid form (Granada, Spain and remotely), the ECORD Council has decided to extend the 2019-2023 ECORD-NSF MoU through 2024, as such an option is clearly indicated in this agreement. The ECORD Council has approved EMA’s proposition to contribute to the JR Consortium in order to help NSF to consider additional expeditions in U.S. FY2024. The ECORD Council also supported the extension of the 2019-2023 ECORD MoU through 2024, provided that the expected contributions from ECORD funding agencies are available for that year.

In addition, the ECORD Council has decided to extend the terms of the ECORD Managing Agency (Centre National de la Recherche Scientifique – CNRS), the ECORD Science Operator (British Geological Survey – BGS - in Edinburgh), the ECORD Science Support and Advisory Committee (National Institute of Oceanography and Experimental Geophysics - OGS - in Trieste) and the Bremen Core Repository (BCR) through 2024.



Over the last months, ECORD has been actively involved in the planning of post-2024 international scientific ocean drilling initiative(s) based on the 2050 Science Framework and in which ECORD intends to play a prominent role (*see page 10*).



ECORD intends to play a prominent role in post-2024 international scientific ocean drilling initiative(s)

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Director of the ECORD Managing Agency

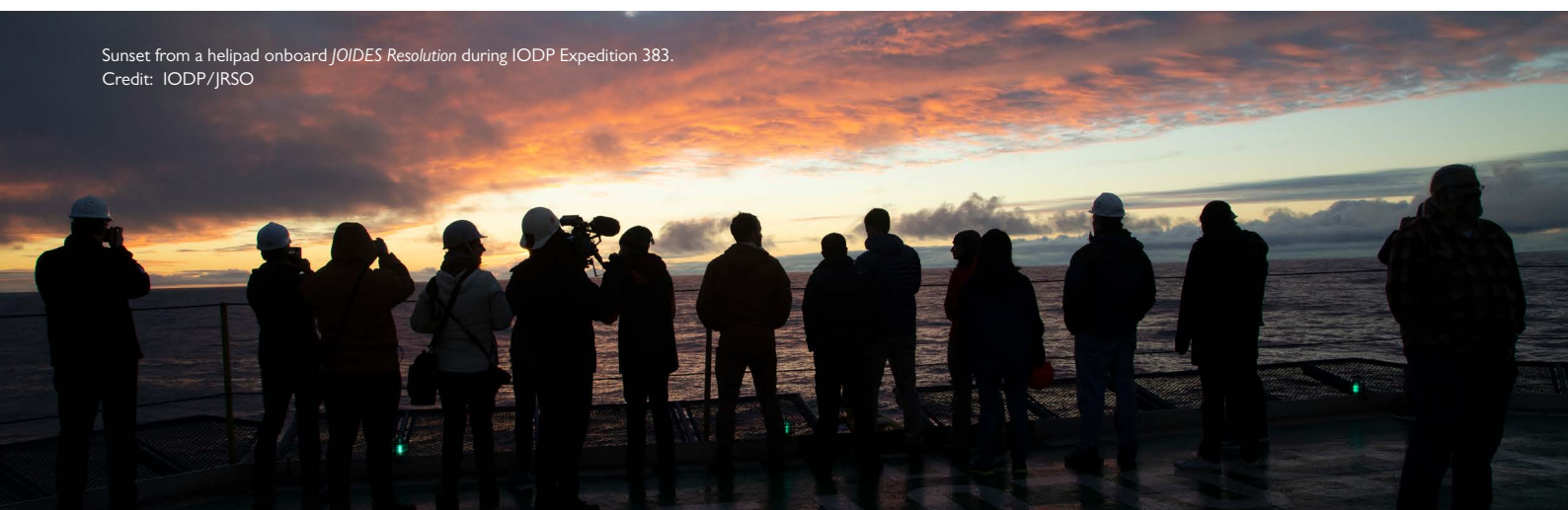
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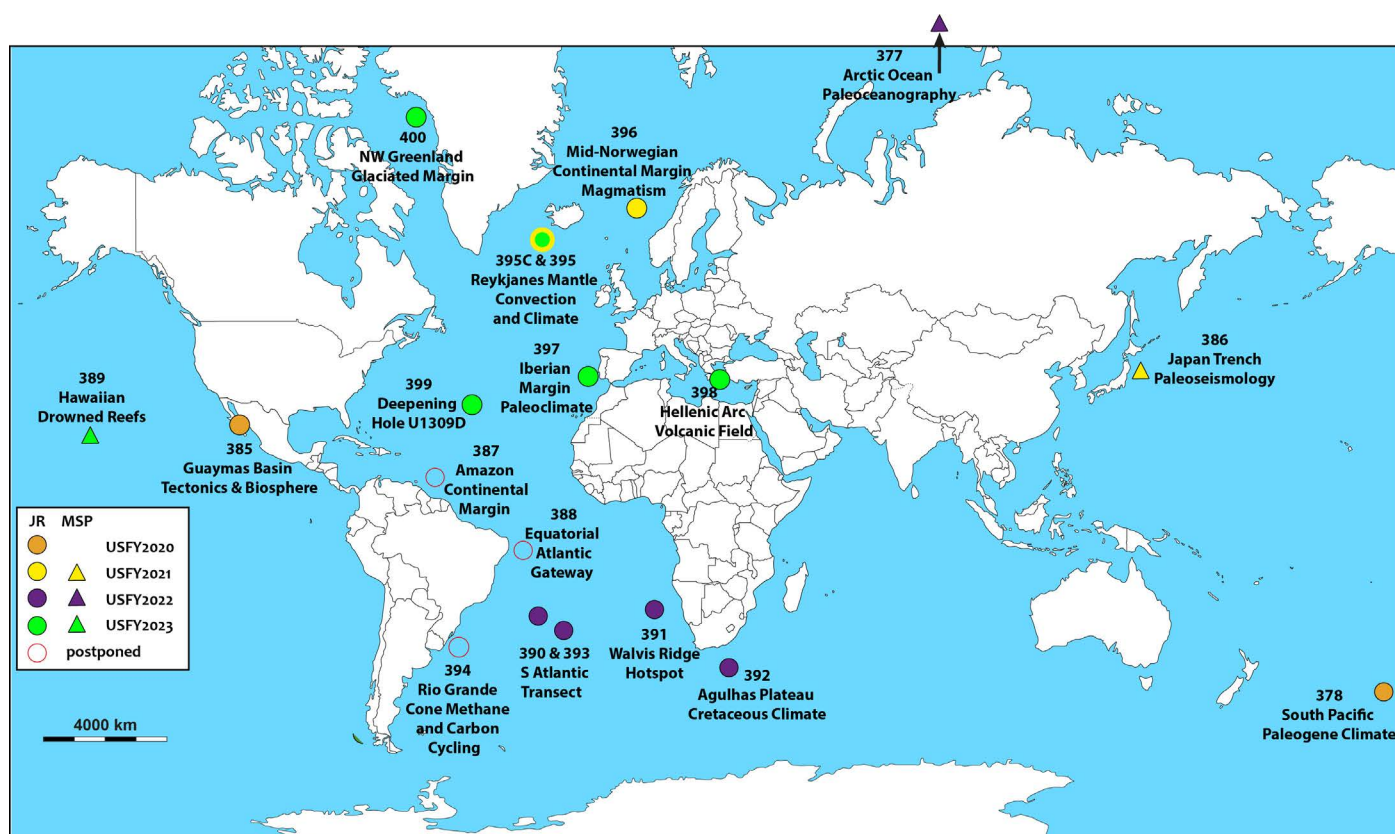


More info: <https://www.ecord.org>

Sunset from a helipad onboard JOIDES Resolution during IODP Expedition 383.
Credit: IODP/JRSO



IODP Expeditions 2020-2023



Expedition Name	#	Dates	Ports	Operator
Walvis Ridge Hotspot	391	Dec. 6, 2021 – Feb. 5, 2022	Cape Town / Cape Town	JRSO
Agulhas Plateau Cretaceous Climate	392	Feb. 5 – Apr. 7, 2022	Cape Town / Cape Town	JRSO
South Atlantic Transect 1	390	Apr. 7 – June 7, 2022	Cape Town / Montevideo	JRSO
South Atlantic Transect 2	393	Jun. 7 – Aug. 7, 2022	Montevideo / Montevideo	JRSO
Arctic Ocean Paleooceanography	377	Aug. – Sep. 2022	TBD	ESO
Iberian Margin Paleoclimate	397	Oct. 6 – Dec. 6, 2022	Lisbon / Tarragona	JRSO
Hellenic Arc Volcanic Field	398	Dec. 6, 2022 – Feb. 5, 2023	Tarragona / Heraklion	JRSO
Deepening Hole U1309D	399	April 7 – June 7, 2023	Ponta Delgada / Ponta Delgada	JRSO
Reykjanes Mantle Convection and Climate	395	June 7 – Aug. 7, 2023	Ponta Delgada / St. Johns	JRSO
NW Greenland Glaciated Margin	400	Aug. 7 – Oct. 7, 2023	St. Johns / St. Johns	JRSO
Hawaiian Drowned Reefs	389	Sep. - Oct., 2023	TBD	ESO
Amazon Continental Margin	387	postponed	TBD	JRSO
Equatorial Atlantic Gateway	388	postponed	TBD	JRSO
Rio Grande Cone Methane and Carbon Cycling	394	postponed	TBD	JRSO

ECORD Awards in recognition of outstanding contribution to ECORD

12 October 2021

Dick Kroon

received the 7th ECORD Award on the occasion of the IODP Forum meeting

Scientific Ocean Drilling is fun – each borehole is unique, and scientific results are often surprising and novel! My involvement with SOD stretches over > 30 years including six *JOIDES Resolution* expeditions, two as Co-chief Scientist, recovering paleoceanographic-climate records from the Pleistocene to the Cretaceous. I will never forget when the stunning cores containing the Paleocene-Eocene Thermal Maximum and the Cretaceous–Paleogene boundary intervals were recovered during the Legs 208 and 171B, respectively. The dramatic improvement in recovery of such sediments over the years is testament to the skills of the IODP engineers and operators. Completion of stable isotope climate records with astronomical timescales from the Pleistocene to the Cretaceous has required careful planning by many scientists, drilling sequences containing fresh carbonate shells and with high temporal resolution, plus onshore research in numerous stable isotope labs. Hence it took several decades for these comprehensive stable isotope curves to be completed, and it is such a highlight for me to see these now being used in future climate debates.

I got involved with shallow water drilling even before ECORD developed the Mission Specific Platform concept! Using a simple jack-up rig, an international group drilled several sites in the Great Barrier Reef and discovered that the reef stack was late Pleistocene in age, astonishingly young. This drilling opened my eyes to the importance of shallow water drilling. ECORD took the plunge and developed the mission specific concept shortly after. The idea to drill in environments where other platforms cannot operate, such as in the Arctic and the Chicxulub crater, was a milestone in SOD and has led to important scientific discoveries reported in highly cited papers in top journals.

The five years I spent co-leading the Science Evaluation Panel was one of my greatest pleasures. Of course, SEP could not function without the Support Office and I would like to give them the greatest compliments for handling the proposal submission system so well. For the last three years I served as Chair of the IODP Forum, another extraordinary experience! It was amazing to see the new Science Framework being developed in such a short time... the involvement of early career researchers from diverse backgrounds in producing the Framework shows that the SOD community is alive and kicking. The Forum has now initiated discussions on post-

2024 SOD and it warms my heart that all current platform providers and funding agencies are working intensely on planning the future of ocean drilling within an international context, hopefully in a more sustainable manner aided by improved budgets. ECORD will play a key role in this, building on a solid foundation for sustainable MSP drilling presented at the last Forum. This includes broadening the MSP concept, further collaboration between platform providers, in-kind contributions, new funding routes, and improved collaboration with ICDP. The future looks bright therefore, and I conclude by saying ‘may many exciting MSP expeditions be drilled in the future under the flag of the Science Framework’!

Thank you for nominating me for the ECORD Award.



Dick Kroon in the Arabian Sea with JR in the background, ODP Leg 117. Credit: IODP

ECORD Awards in recognition of outstanding contribution to ECORD

20 October 2021

Antony Morris

received the 8th ECORD Award

on the occasion of the ECORD Council-ESSAC Meeting #10

I am delighted to receive this ECORD Award, which I would like to accept on behalf of all current and past members of ESSAC in recognition of their hard work and commitment in ensuring the scientific success of ECORD over many years. It has been a great privilege and honour to have represented ESSAC and the broader ECORD science community as the Chair of ESSAC over the last four years. This has also allowed me to work closely with our amazing partners within IODP, particularly during the planning, development and writing of the new 2050 Science Framework and more recently during ongoing discussions about the design and implementation of a successor to the current IODP program that should ensure the long-term future of scientific ocean drilling.

My own IODP journey began in 2004 when I sailed for the first time on the *JOIDES Resolution* during IODP Expedition 304/305 to Atlantis Massif on the Mid-Atlantic Ridge. I had been working on ocean crustal research for many years prior to that, but exclusively in small teams working on geodynamic

problems in Tethyan ophiolites. My first IODP expedition opened my eyes to a new way of working involving close and intensive collaboration with scientists from around the world to achieve a common aim. I think I learnt more about my own science of paleomagnetism during that first expedition than during any previous project I was involved in, and (having gained my sea-legs) I became a convert to scientific ocean drilling by the time we returned to shore in the Azores. I have since had the privilege of being selected for four other IODP expeditions with oceanic crustal objectives, sailing in the Pacific and Indian Oceans and the Philippine Sea and working alongside many talented Earth scientists from whom I have learnt so much. It's been a particular joy to have been able to spend time at sea with so many early career researchers who have never failed to impress with their passion and enthusiasm for science and their in-depth knowledge. I would also like to pay tribute to the technical, drilling, catering, hospitality and ships crews on the JR for the immense contributions they make to IODP, and for making each of my own experiences onboard so memorable and delightful. I'm particularly grateful to them for making my three Christmases at sea such happy times... despite being away from family and loved ones, the "IODP family" always manages to celebrate in style during the festive period!

In accepting this award, I would like to thank Gilbert Camoin and Nadine Hallmann at EMA and Hanno Kinkel (the ESSAC Science Coordinator par excellence) for their constant support during my extended tenure as ESSAC Chair, and Leanne Armand, Carl Brenner, Nobu Eguchi, Jorijntje Henderiks, Dick Kroon, Dave McInroy, Lisa McNeill, Clive Neal, Damon Teagle, Mike Webb and all my other IODP colleagues for many enjoyable discussions over the years.



Tony Morris receiving the ECORD Award during the Council-ESSAC meeting #10 in Granada, Spain, on 20 October 2021. Credit: ECORD.



ECORD and scientific ocean drilling beyond 2024



Gilbert Camoin



Over the last months, ECORD has been actively involved in the planning of post-2024 international scientific ocean drilling initiative(s).

ECORD is currently shaping its post-2024 plans building on:

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

Our emerging plans are being defined and sharpened internally, especially through the instrumental role of the ECORD Vision Task Force and via continuous exchanges between all ECORD entities. ECORD has also exchanged views on the future with its current partners through our regular channels of communications and via bilateral meetings despite the impact of the COVID-19 pandemic on our ability to hold in-person discussions. Further bilateral meetings and direct discussions with partners are planned and will be of pivotal importance in coming weeks and months.

The broad outlines of ECORD’s intentions for post-2024 scientific ocean drilling have already been presented during IODP meetings (Facility Boards and Forum meetings), culminating in the recent IODP Forum and Inter-Governmental meetings that were held in a hybrid form in Rome, Italy, on 11-13 October 2021.

The 2050 Science Framework (<http://www.iodp.org/2050-science-framework>), which represents a new and innovative approach for conducting science using offshore drilling platforms, must be the foundation of such future initiatives. Based on the well-established operation of the ECORD infrastructure, its successful implementation, its competitiveness in the international research landscape and maximum return from investment, ECORD intends to continue to play a prominent role in post-2024 scientific ocean drilling.



A prominent role for Mission-Specific Platforms (MSP)

Mission-Specific Platform (MSP) expeditions will play a prominent role in achieving the goals of the 2050 Science Framework.



Diversification of drilling and coring technologies

ECORD intends to further develop the MSP concept by diversifying drilling and coring technologies, including riserless drilling, and applying them to all geological environments, as determined by scientific priorities, operational efficiency and better value for money.



Active collaboration with other platform providers

ECORD intends to foster active collaboration with other platform providers, as well as other programmes and initiatives with similar scientific objectives, and implement joint expeditions in “MSP-mode”, regardless of the technology and/or the drilling/coring needs.

Any development of post-2024 international scientific ocean drilling initiatives will require current and new platform providers to confirm their participation and work together on a sustainable implementation model, including use of available facilities, core and data legacy agreements and general coordination of independent programmes.

There are still uncertainties regarding the availability of drilling platforms to conduct post-2024 scientific drilling related to the 2050 Science Framework.

Post-2024 plans of the U.S. National Science Foundation (NSF)



The U.S. National Science Foundation (NSF) has delineated post-2024 plans on two time scales, including

1. the potential use of the *JOIDES Resolution* (JR) from 2024 through 2028, and
2. the potential provision of a state-of-the-art, globally ranging non-riser scientific drillship in the next decade.

NSF has considered the potential use of the JR in a non IODP-style context beyond 2024. A sharp increase in JR Consortium partners' contributions is expected to further explore that option. At its 2021 Autumn meeting, the ECORD Council has expressed interest in obtaining details about operational costs associated with the post-2024 use of the JR. This information will be essential for a cost-benefit analysis before any decision can be taken. A possible demobilization of the JR in 2025 will be considered if a viable business model cannot be defined.

The process of acquiring a new globally ranging non-riser scientific drillship in the next decade would include four major steps that would take a decade:

1. Science Mission Requirements (SMR) to define desirable vessel characteristics based on the identification of critical environmental, drilling and onboard lab requirements;
2. a Conceptual Design based on SMRs, but without any guarantee of acquisition;
3. a lease vs. build/buy decision and acquisition;
4. the development of a U.S.-drilling programme based on SMRs, conceptual design and new partnerships.



Post-2024 plans of JAMSTEC



JAMSTEC considers the potential use of *Chikyu* beyond 2024 to implement riserless drilling expeditions in the Western Pacific and Indian oceans. In addition, JAMSTEC considers the use of other vessels to be operated on an MSP mode and using alternative coring tools, such as Giant Piston Coring (GPC) and Boring Machine System (BMS).

During their bilateral meetings, ECORD and JAMSTEC have expressed interest in collaborating to implement jointly MSP expeditions in a post-2024 scientific ocean drilling initiative.



Post-2024 plans of IODP China



China has presented thorough post-2024 plans, including its intention to become a new platform provider and implement one expedition per year on an MSP mode using different vessels with distinctive capabilities to address various scientific objectives of the 2050 Science Framework.

During their bilateral meetings, ECORD and China have expressed interest in collaborating in the frame of a post-2024 scientific ocean drilling initiative, including a direct co-operation for the first MSP expeditions.



continued →

During offshore phase of IODP Expedition 381.
Credit: P. Robert, ECORD/IODP



The end of IODP II: 30 September 2024



The end of the International Ocean Discovery Program, now planned on 30 September 2024, will represent a major change in the organization of international activities related to scientific ocean drilling.

The development of post-2024 scientific ocean drilling initiatives will be characterized by a transition from a single international programme operating with independent platform providers to some form of 'alliance' of independent and collaborative programmes, whose internal organization and mutual collaboration still need to be defined.

There are still many challenges to tackle and many issues to be solved within the next months through bilateral and other in-person and virtual meetings.

Extraordinary IODP Forum meeting (2-3 April, Vienna 2022)

The IODP Forum extraordinary meeting that will be held during the weekend preceding the EGU in Vienna, Austria (2-3 April 2022), will certainly represent a major step in progress towards making concrete plans for the future of scientific ocean drilling.

Major issues concerning future initiatives include (among others):

- systems for proposal and data management (currently the main responsibility of the Science Support Office);
- the scientific and safety evaluation of drilling proposals (currently the remit of the Science Evaluation Panel and the Environment Protection and Safety Panel, respectively); and
- the scheduling of drilling expeditions (currently the main task of Facility Boards within IODP).

IODP Legacy

IODP proposal database

NSF has already decided to not financially support the IODP proposal database after the end of the current IODP.

IODP website

In parallel, NSF has not decided how long it will financially support a legacy IODP website.

IODP core and data legacies

The development of post-2024 initiatives will also require continuity of core and data legacies, in order to maintain one of the key basic principles of the successive international scientific ocean drilling programmes.

During the last IODP Forum meeting, all current IODP partners hosting an IODP Core Repository expressed a strong will to preserve core and sample collections and to ensure the continued availability of this material to all legitimate scientific users after the end of IODP. The related agreements among current IODP partners will have to be formalized to ensure the continuity of legacy activities throughout the transition between IODP and future scientific ocean drilling initiatives.

The provision of a new IODP Core Repository by China in a new phase of scientific ocean drilling would require coordination and agreements between the proposed new core repository and the current IODP core repositories.

Informing ocean drilling science communities

Communication plans to inform ocean drilling science communities about the rapidly evolving situation of the post-2024 plans have been set up and will develop further in the next months (see page 35). A first ECORD Community Webinar will be organized in January 2022 and others will follow to update

the science community on a regular basis. In addition, our usual channels (websites, newsletters, social media networks) and an open discussion/online forum will be used to collect community feedback... **stay tuned !**

Gilbert Camoin

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Director of the ECORD Managing Agency



and the ECORD Vision Task Force:

A. Morris (ESSAC Chair), A. Camerlenghi (ESSAC Vice-Chair), G. Uenzelmann-Neben (EFB Chair), D. McInroy (ESO Manager), M. Webb, G. Lueniger, F. Lagroix/S. Guillot, B. Westerop, M. Engelhardt (ECORD Council)



Gabriele Uenzelmann-Neben

Scheduling of MSP expeditions



The preparations for the onshore phase of Expedition 386: Japan Trench Paleoseismology and the offshore phase of Expedition 377: Arctic Ocean Paleooceanography are well underway.

The EFB will discuss the scheduling for 2024, the last year of the current programme, at its next meeting that will be held in Aix-en-Provence in September/October 2022.

Meanwhile, the ECORD Facility Board has met to discuss which expedition shall be implemented in 2023. The decision has been made to go for **Expedition 389: Hawaiian Drowned Reefs**.



This expedition was already scheduled to be drilled in 2019, but then had to be postponed for logistical reasons. Preparations at that stage had progressed quite far, and the EFB assumes it should be easy to resume planning of this expedition.

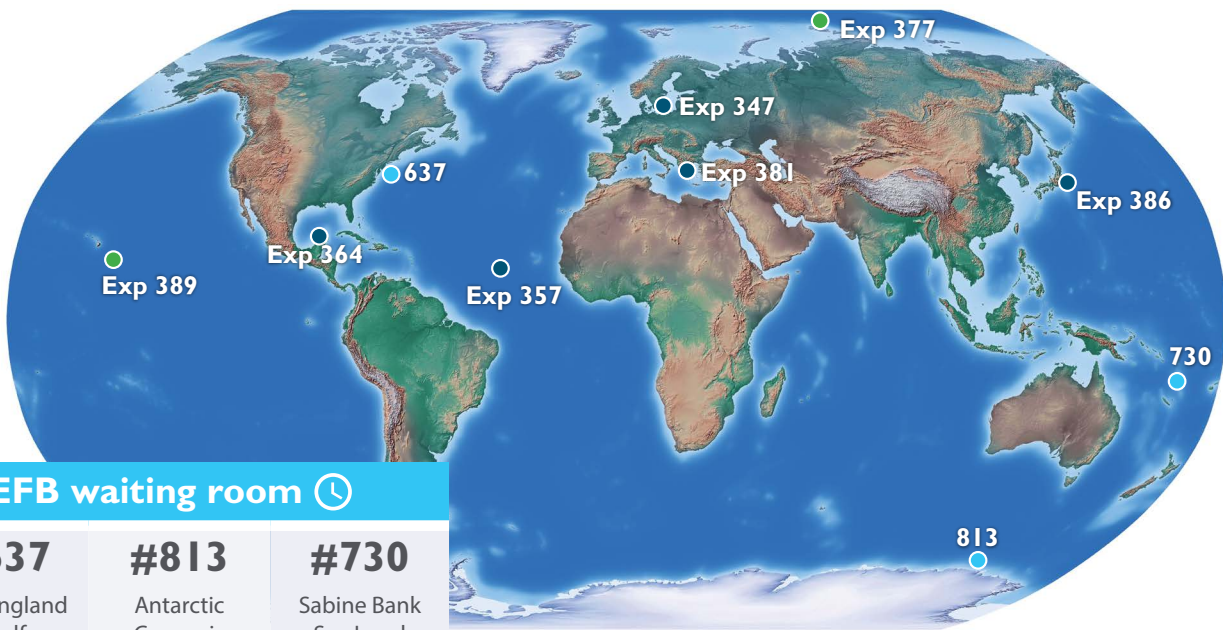
As IODP concludes, the EFB remains committed to the continuation of mission-specific platform expeditions in a post-2024 scientific ocean drilling programme. Our goal is to see a smooth transition to the next programme without a gap in drilling. To that end, the EFB intends to transfer all MSP proposals active – both at the EFB and at SEP – to the new programme.

Gabriele Uenzelmann-Neben
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 Chair of the ECORD Facility Board



MSP 2020-2023 operational plan

2013 - 2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
347 Baltic Sea Paleoenvironment	357 Atlantis Massif Serpentinization and Life	364 Chicxulub K-Pg Impact Crater	381 Corinth Active Rift Development	No expedition	No expedition	No expedition	386 Japan Trench Paleoseismology	377 Arctic Ocean Paleooceanography	389 Hawaiian Drowned Reefs
Drillship <i>Greatship Maya</i>	RRS <i>James Cook</i> & Seabed drills (<i>MeBo</i> & <i>RD2</i>)	Liftboat <i>Myrtle</i>	Drillship <i>Fugro Synergy</i>	ECORD renewal			<i>Kaimei</i> & <i>Chikyu</i>	<i>Dina Polaris</i> & <i>Victor Chernomyrdin</i>	TBD



EFB waiting room

#637 New England Shelf Hydrogeology	#813 Antarctic Cenozoic Paleoclimate	#730 Sabine Bank Sea Level
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● Completed MSP expeditions ● Scheduled MSP expeditions
 ● MSP proposals in the EFB waiting room

Letter from the IODP Forum Chair



Henk Brinkhuis

Dear ECORD & IODP community!

It is my distinct pleasure and honor to have been selected as your next, and fourth IODP Forum Chair, attempting to follow in the footsteps of Keir Becker, Jamie Austin and Dick Kroon.

Following a decade of managing the NIOZ Royal Netherlands Institute of Sea Research I thought it would be good to return to my first love, being a marine geologist, marine palynologist, and paleoceanographer: to scientific ocean drilling - IODP in all its shapes and forms. Better still, seizing the opportunity, I was very (very!) fortunate to be selected as an onboard palynologist on the first 'infra-COVID', and very successful IODP Expedition 396: Mid-Norwegian Continental Margin Magmatism – from which I just returned (8 October). Frankly – it was ab-so-lutely awesome to be 'one of the grunts' again, working together with the rest of the magnificent Science

Party of Expedition 396, learning the trade all over again while re-igniting my research interests - Phanerozoic global change, extreme climate transitions, and related biostratigraphy, evolution, paleoecology, and biogeochemistry of phytoplankton and dinoflagellates, in particular.



Henk Brinkhuis and Joost Frieling (palynologist, Oxford University) on board JOIDES Resolution during IODP Expedition 396. Credits: Reed Scherer, IODP.



Group photo of the team on JOIDES Resolution during IODP Expedition 396. Credits: Sandra Herrmann, IODP.

IODP duty called immediately, though – when the IODP Forum gathered in person, and virtually, in Rome, 10-11 October. FYI - The IODP Forum is a venue for exchanging ideas and views on the scientific progress of the International Ocean Discovery Program. The Forum is the custodian of the IODP Science Plan and provides advice to the IODP Facility Boards on progress towards its fulfillment. There, Dick Kroon skillfully chaired his 'last' meeting – and was presented the 7th ECORD award (*see page 8*) by Gilbert Camoin for outstanding service to the organization – well earned indeed! A tough act to follow. For me, it was a rapid on-the-job-training, and I am looking forward to generating positive contributions, working with you all, both to the end of the IODP programme, and beyond. In Rome, forces gathering successfully pushed to a consensus to expand the current, IODP programme to include FY2024, which is mighty positive news – also as it will compensate for the loss of operations due to COVID-19. This great news was further confirmed by the very recent ECORD Council-ESSAC meeting in Granada on 21-22 October.

Other news, first from the US side, includes that the JRFB received and accepted the JRFB Working Group on Science Framework Proposals report (now posted at iodp.org), and recommended approval of the JRFB and SSO programme plans. While it now looks like the JR will stay in the Atlantic and possibly get to the eastern Pacific by the end of IODP in FY24, do note that no new proposals that require the JR to address the (existing) Science Plan

will be accepted at this point. Great news is that NSF/OCE requested “that USSSP assist NSF on behalf of the U.S. scientific community in determining Science Mission Requirements (SMRs) for a new drillship that would serve a new U.S.-led science program”.

Also at the IODP Forum meeting in Rome, the other IODP parties have expressed keen interest to continue to support international scientific drilling post-2024 – and discussions are now intensifying about how, to what extent, in which format, governance, and corresponding budget requirements. The Forum also warmly received the ECORD report outlining plans involving continuation of the MSP concept post-2024, as presented by Gilbert Camoin. The Forum agreed that an MSP-only phase guided by the 2050 Science Framework may fill a non-riser drilling gap due to the potential decommission of the *JOIDES Resolution* in 2025. The cornerstone for that future has been laid down in the shape of the 2050 Science Framework (<https://www.iodp.org/2050-science-framework>) as prepared by the international community, with a.o. ECORD’s Rosalind Coggon at the helm. Not only the recipient of an ECORD Award, she was also awarded the Taira Prize (*see page 3*)! Many congrats to her indeed!

I have no doubt that through its versatile MSP programme ECORD will continue to make strong scientific contributions to the current, and any post-2024 scientific ocean drilling efforts. For now, key is to explore how we

can create the most effective configuration addressing all needs voiced in the 2050 Science Framework with the global international community. Besides innovative drilling, this also includes securing the ocean drilling legacy in various ways, including e.g., high quality archiving, and maintenance of databases.

It is good to see ECORD moving forward in various ways, including the organization of successful MagellanPlus workshops directed towards new and innovative MSP proposals including cooperation with ICDP. We do need your input and participation to secure a future programme – and there will be two occasions for MagellanPlus coming up: January 2022 and May 2022! (*see page 26*).

Hence, no doubt 2022 will be an exciting and positive year. Likely culminating with Expedition 377: ArcOP – next summer. This is as you know one of the most challenging expeditions ECORD will implement – and staffing has almost been completed. The World’s eyes will very much be on the results of this expedition; may the wind be in their back!



Henk Brinkhuis - henk.brinkhuis@nioz.nl
IODP Forum Chair
Utrecht University
Ocean Systems Research Department, Royal NIOZ, NL



JOIDES Resolution during IODP Expedition 396. Credits: Peter Betlem, IODP.



David McInroy



Sarah Davies



Ursula Röhl



Jez Everest

Implementation of MSP expeditions

Expedition 386: Japan Trench Paleoseismology



Offshore phase - completed

The offshore phase of Expedition 386 was successfully completed between 13 April - 1 June 2021 using giant piston coring (GPC) deployed from the R/V *Kaimei*, after several months of delay due to COVID-19.

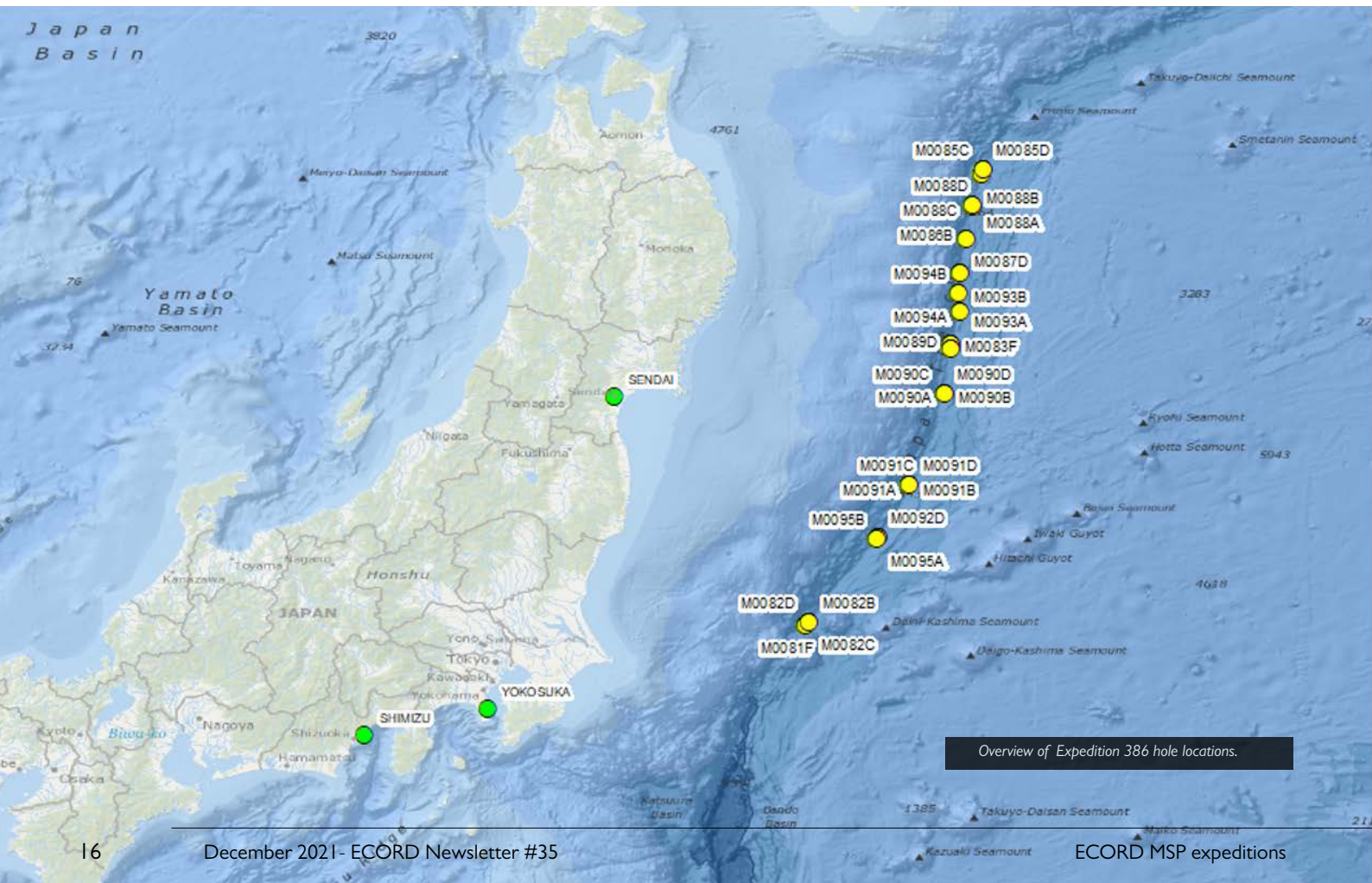
At the start of 2021, the outlook for the offshore phase bleak due to restrictions on foreign nationals entering Japan.

In response, the two expedition operators, ESO and MarE3, agreed with the ECORD Facility Board that the offshore phase of the expedition could be implemented wholly by Japan-based participants from the Science Party and MarE3.

The expedition offshore phase was adjusted so that only one Co-chief Scientist (Ken Ikehara) would sail, and the offshore science team would be reduced from eight members to four. MarE3 extended their staffing provision by supplying an extra curator and extra technicians from Marine Works Japan.

Co-chief Scientists:	Michael Strasser Ken Ikehara
Offshore dates:	13 April - 1 June 2021 on board R/V <i>Kaimei</i> from/to Yokosuka
Onshore Science Party dates:	14 February - 15 March 2022 on board D/V <i>Chikyu</i> docked in Shimizu

Sites	15
Holes	58
Cores	58
Expedition days	50
Deepest water depth (record)	8023 mbsl
Deepest sub-sea level sample (record)	8060.74 mbsl
Meters cored	933.5
Meters of core recovered	832.57
Recovery	89%



Overview of Expedition 386 hole locations.

ESO staff remotely supported the offshore team both pre-offshore and offshore to fulfil all IODP requirements. ESO staff created project-specific tutorials and guidelines for curation, sampling, multi-sensor core logging, hydroacoustic data acquisition, and data management. During the offshore phase, ESO staff helped to assist with these procedures remotely via daily video conferences with the MarE3-led team on the R/V *Kaimei*.

The offshore phase set sail on 13 April 2021. Please see the daily and weekly reports at <https://www.ecord.org/expedition386/expedition-386-reports/> for full details of the offshore phase.

Fifteen out of the nineteen planned sites were cored (see map on previous page), in water depths of about 7.5 to 8 km, with a total of 29 giant piston cores recovered, each with an associated smaller trigger core. A total of 832.57 m of core was recovered at average core recovery of 89%.

In addition to coring, 90 new multibeam and sub-bottom profile survey lines were acquired during transit and waiting-on-daylight for GPC operations. This data, which is part of the official expedition dataset, characterises the basin architecture along the whole of the Japan Trench. For all the primary trench basins, the Science Party now have sub-bottom profiles at very high spatial resolution, which will allow the study of the depositional basins in “near 3D”.



The coring operations set two new IODP records:

- the deepest water site ever cored (8023 mbsl)
- the deepest sub-sea level sample ever recovered (8060.74 mbsl)

The expedition was a great operational success, despite some very poor weather. In particular, the captain of the R/V *Kaimei* reflected that he does not recall the weather being so poor in that part of the season. In addition to the poor weather, the Kuroshio Current remained obstinately strong and flowed right across some, and adjacent to most, of the planned expedition sites. Due to the challenging environmental conditions, 50% of expedition time was spent operating, with 17% spent in transit. The time spent on

GPC operations was maximised by overnight transits to each site, and by careful observation and forecasting of sea surface current and weather conditions.

All planned cores were retrieved from the 1st and 2nd priority sites, and only two 3rd priority sites around 38°N could not be cored due to strong currents. At all 1st and 2nd priority sites (and also at three 3rd priority sites), 20 m and 40 m GPC cores were recovered. Average recovery was > 90% at 1st priority sites and between 84-93% at 2nd priority sites. The Co-chief Scientists estimate that >75% of scientific objectives can be addressed with these cores alone.

The additional coring at eight of the 3rd and 4th priority sites at least once with at least a 30 m GPC should guarantee enough sampling material to fully investigate spatial (and temporal) variability of event-deposits.

Throughout the offshore phase, daily video meetings were held between ESO staff onshore in Europe, the MarE3 onshore and offshore teams, and the Co-chief Scientists. The meetings allowed the two operators and the Science Party to report on expedition progress, seek advice and support for offshore activities, and agree offshore strategies to mitigate the impacts of the poor weather and strong currents.

Data was regularly transferred from the ship and checked by ESO staff onshore, with any issues quickly reported back. ESO

staff provided remote support and data quality control, including the daily transfer of curatorial data into the ESO database system (the Expedition 386 Drilling Information System, or ExpeditionDIS-386). After the offshore phase was completed, ESO staff

from all partners finalised all offshore curatorial data, the offshore science data folder, and conducted checks for data consistency and completeness before release to the Science Party.

The outreach programme was very successful, with live broadcasts from the R/V *Kaimei* to EGU, and a post-cruise presentation to the JPGU. Science Party members gave live talks from the R/V *Kaimei* and Q&A sessions to Japanese Universities and high schools.

Preparations for the onshore phase

After the competition of the offshore phase, and over the summer, the anticipated and hoped-for relaxation of travel restrictions into Japan did not materialise, and on 2 August the decision was taken postpone the Onshore Science Party to 14 February - 15 March 2022.

All expedition offshore data is now available to the Science Party, including all X-CT scan data and sub-bottom profiler data. ESO staff have continued to check data before it is released to the Science Party. The Co-chief Scientists continue to coordinate the Science Party to review the offshore and X-CT data, to identify layers of interest and duplicate intervals to inform the sampling strategy at the OSP.

Early shipping of samples for post-expedition work is underway. ESO initiated and completed a pre-OSP early sample shipping plan (for selected scientist's Interstitial Water samples). These

samples are usually shipped after the OSP, however the Sample Allocation Committee agreed to release some samples that are more likely to be impacted by the growing time delay between coring and analysis.

ESO and MarE3 have also agreed for MarE3 to start some measurements pre-OSP that would normally be done at the OSP. These measurements are more likely to be impacted by the growing time delay between coring and analysis. Headspace gas analysis has begun, and will be shortly followed by sulphide analysis. This work is being done by Marine Works Japan technicians, under the supervision of MarE3. Similar to the offshore phase, ESO staff will check and QC the data if it is produced, before release to the Science Party.

Expedition 386 webpage: <https://www.ecord.org/expedition386/>

Expedition 377: Arctic Ocean Paleooceanography (ArcOP)



Planning summary

The overall goal of this expedition is to recover of a complete stratigraphic sedimentary record on the southern Lomonosov Ridge to study the continuous, long-term Cenozoic climate history of the central Arctic Ocean. Higher-resolution studies of Arctic climate change in the Pleistocene and Neogene will be possible because the chosen location experienced sedimentation rates two to four times higher than successions sampled at Expedition 302 (ACEX) sites.

Post-contract planning for this expedition has continued since the beginning of 2021, with representatives from ESO, the Swedish Polar Research Secretariat (SPRS) and Arctic Marine Solutions (AMS) continuing to meet weekly.

On 20 May, the ArcOP operational partners (ESO, SPRS, AMS and the drilling contractor, Geoquip Marine) met for an ArcOP Operations Symposium to progress the operational planning that started in the pre-contract phase, and to give the opportunity for all the ArcOP partners to understand their role, their contribution, and the expectations of all parties involved.

The Call for Scientists was opened on 16 March, with a closing date of 14 May. The PMOs sent their shortlisted nominations to ESO by 25 June, and ESO and the Co-chief Scientists met on 19 August to select a provisional Science Party. Our selections were ratified by the PMOs by 30 August, and the Science Party sent provisional invites on 3 September.

All 36 invited scientists (incl. Co-chief Scientists) have accepted their pre-invites, and the full Science Party will be published after final acceptances are made.



Co-chief Scientists:	Ruediger Stein Kristen St. John
Offshore dates:	Aug - Sep 2022 on board <i>Dina Polaris</i> , ports to be confirmed
Onshore Science Party dates:	to be confirmed
All dates are provisional	

A Special Call for a Paleogene radiolarian specialist closed on 30 September, and we anticipate issuing an invite for that position very soon.

All ESO staff contributed to the production of the Expedition 377 Scientific Prospectus (http://publications.iodp.org/scientific_prospectus/377/), which was published on 26 August.

In the final quarter of 2020, a series of meetings and discussions between ECORD, ESO, SPRS and potential suppliers of ice management, vessel and drilling services culminated in an offer from SPRS to ECORD to provide vessel and ice management services for the expedition. At the ECORD Council meeting in December 2020, ESO provided a fresh review and risk assessment of the new technical offer for the expedition fleet. The decision was taken to proceed with the expedition in August-September 2022. We are now moving forward with detailed planning with the expedition partners and Co-chief Scientists, and a new Call for Scientists has been issued in March 2021 (<https://www.ecord.org/open-calls-for-scientists-iodp-expedition-377/>).

Expedition 377 webpage: <https://www.ecord.org/expedition377/>

Expedition 377 Scientific Prospectus: http://publications.iodp.org/scientific_prospectus/377/



Panorama of Tahiti taken from the DP Hunter during IODP Expedition 310.
Credits: ECORD/ IODP

Expedition 389: Hawaiian Drowned Reefs



Summary and restart of planning for 2023

Planning for IODP Expedition 389: Hawaiian Drowned Reefs has been on hold since March 2019, when the ECORD Facility Board removed Expedition 398 from the mission-specific platform schedule after the preferred contractor for the expedition drilling services formally withdrew their bid in late 2018 for business reasons.

At their September 2021 meeting, the ECORD Facility Board recommended the re-scheduling of Expedition 389 for 2023, either in April-May or most likely in September-October to avoid whale migration seasons.



Co-chief Scientists:	Jody Webster Christina Ravelo
Offshore dates:	Sep - Oct 2023 TBD
Onshore Science Party dates:	TBD

ESO have restarted planning for this expedition, and we anticipate issuing a new call for drilling services in early 2022. In parallel, ESO will work with the Co-chief Scientists to issue a new Call for Scientists, also anticipated in early 2022, via IODP-related channels.

Expedition 389 webpage: <https://www.ecord.org/expedition389/>

Expedition 389 science article: "Unlocking the history of sea-level, climate change and reef responses over the last 500,000 years"
(see page 20)

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Panorama of Tahiti taken from the DP Hunter during IODP Expedition 310.
Credits: ECORD/IODP.



IODP Expedition 389: Hawaiian Drowned Reefs

Unlocking the history of sea-level, climate change and reef responses over the last 500,000 years

J. M. Webster¹, A. C. Ravelo², J. C. Braga³, D. A. Clague⁴ and 716-Full2 proponents

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⁴Monterey Bay Aquarium Research Institute, Moss Landing, CA, USA, clague@mbari.org

The ECORD Faculty Board met in Trieste, Italy on 29-30 September and confirmed that *IODP Expedition 389: Hawaiian Drowned Reefs* will now be rescheduled for 2023 (TBC).

Surrounding the island of Hawai'i are a series of twelve fossil coral reefs that formed as the reef communities successively grew and were drowned by rising sea-levels and/or the near constant subsidence of the crust around the ever-growing volcanic archipelago of Hawaii. Covering important time periods in the Earth's climate history, the information contained in these natural fossil reef archives will help IODP scientists reconstruct sea-level change at higher resolution than previously possible at stable far-field sites. It will also enable them to investigate the links between global sea-level change and global climate change, and therefore the mechanisms that control abrupt climate change. These records of natural climate changes occurring from seasonal and decadal to the much longer-term millennial time scales, will also provide an interpretative framework for understanding the effects of climate change originating from human activity.

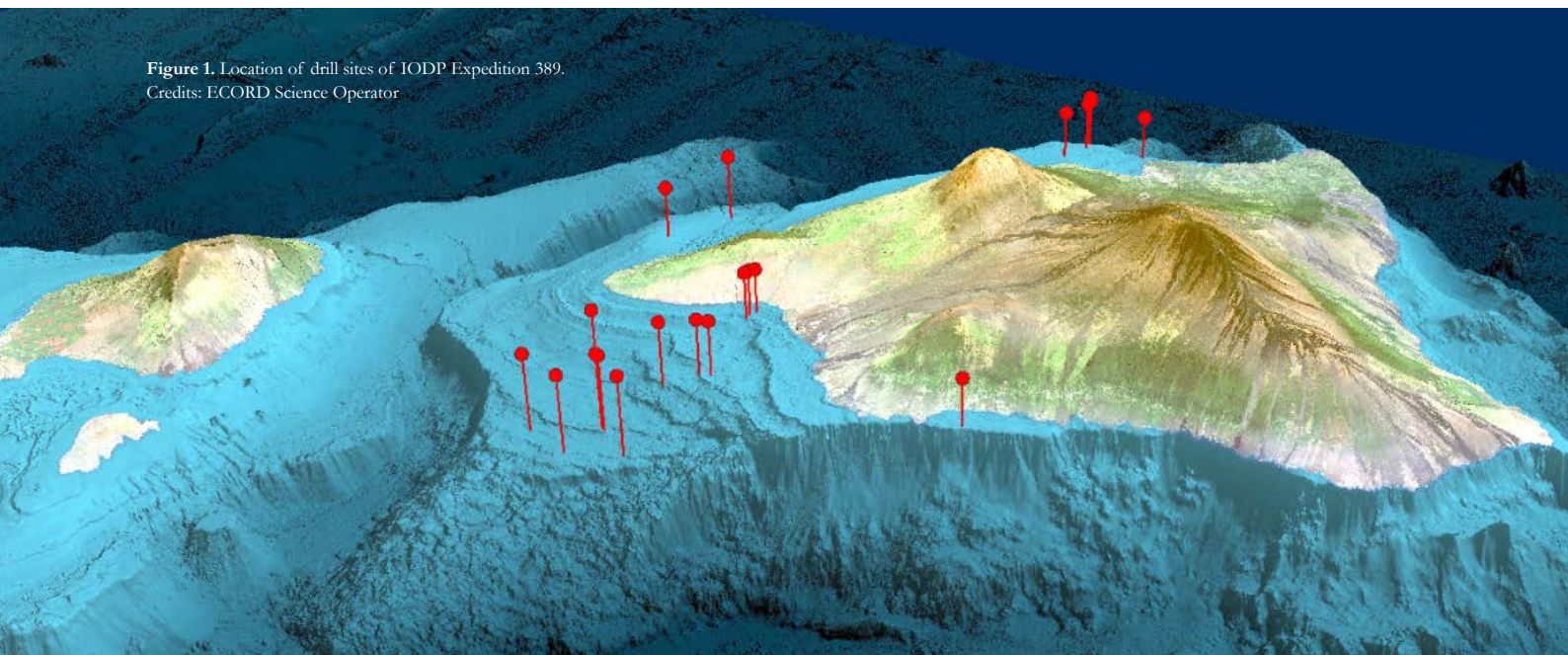
Expedition 389 will core in up to eleven locations (Fig 1), to a depth of 150 m below the seafloor, with the aim to address scientific questions across four main themes to: (1) reconstruct sea-level change in the central Pacific over the last 500,000 years; (2) characterize climate variability over the last 500,000 years, as recorded in the fossil corals, to better understand long-term shifts in the background state of sea surface temperature, rainfall and storm tracks and the state dependence of seasonal - inter-annual variability; (3) understand how coral reef systems respond both geologically and biologically to rapid changes in sea-level and climate – for example can reefs turn on and off when they

reach certain environmental limits, and how do they recover from disturbances in the system; and (4) better explain the subsidence and volcanic history of Hawai'i. In this article we briefly highlight relevant advances in some of these themes and crucial knowledge gaps that will be addressed by Expedition 389 drilling.

Constraining sea level-changes in the central Pacific over the last 500 kyr.

Significant advances have been made in reconstructing sea-level changes over the past 500 kyrs using continuous deep-sediment archives. However, fossil coral reefs continue to

Figure 1. Location of drill sites of IODP Expedition 389.
Credits: ECORD Science Operator



offer more precise temporal resolution than achievable from deep-sea sediment reconstructions and may also provide more accurate constraints on the vertical position of past sea level (Woodroffe and Webster, 2014). There have been several recent reviews of the global fossil coral sea level data (e.g., Fig. 2). Despite significant progress in understanding sea level variability, ice sheet dynamics and global isostatic adjustment (GIA) over the last 150 ka – particular during MIS 5e and the last deglaciation (Barbados, Expedition 310 Tahiti, Expedition 325 GBR), crucial questions remain in part due to the lack of appropriate absolute coral sea-level data. Figure 2A-C highlights: (1) the bias towards high sea-level events (i.e. highstands); (2) the lack of temporal coverage earlier than 150 ka – particularly during interstadial/stadial and lowstand sea levels; and (3) a major bias towards either co-seismically uplifted sites and/or relatively stable sites with condensed reef sections. Expedition 389 will provide the most comprehensive and absolute record of sea levels during the different interglacial, interstadial/stadial, glacial maxima, and deglacial intervals over the last 500 kyrs, including the abrupt meltwater pulse events (MWP's) (Fig. 2) which are proving difficult and controversial to resolve. For example, recent work off the western coast of Hawai'i confirms that the H1d reef terrace (-150 m) drowned ~14.75 ka, coeval with the deglacial MWP-1A timing derived from the Expedition 310 Tahiti reef record but not Barbados at 14.1 ka (Fig. 3). New sea level data are vital to better calibrate and tune dynamical models that simulate ice sheet mass loss and predict the rate and amplitude of future global sea rise.

Reconstruct paleoclimate variability for the last 500 kyr and establish the relationship between the mean climate state and seasonal-interannual variability.

Determining paleoclimate conditions in the open ocean subtropical Pacific remains a high priority for testing climate theory and for validating the ability of fully coupled IPCC-class climate models to hindcast the regional expression of global climate change. This has profound implications for predicting storm distribution, frequency and intensity, and therefore for water resource management and geohazard prevention. Recent work shows that numerical simulations of the amplitude of North Pacific storm tracks is model-dependent because of model-to-model differences in grid spacing and in the ability to calculate accurate temperature gradients; paleoclimate studies can thus provide a test bed to evaluate individual and ensemble model behaviour. Studies focused on MIS 5 predict that, at Hawai'i, there should have been changes in the mean and seasonality of sea surface temperature (SST) due to changes in Greenland ice sheet size and greenhouse gas concentrations and in storminess and winter precipitation. Modelling results of the last glacial maximum

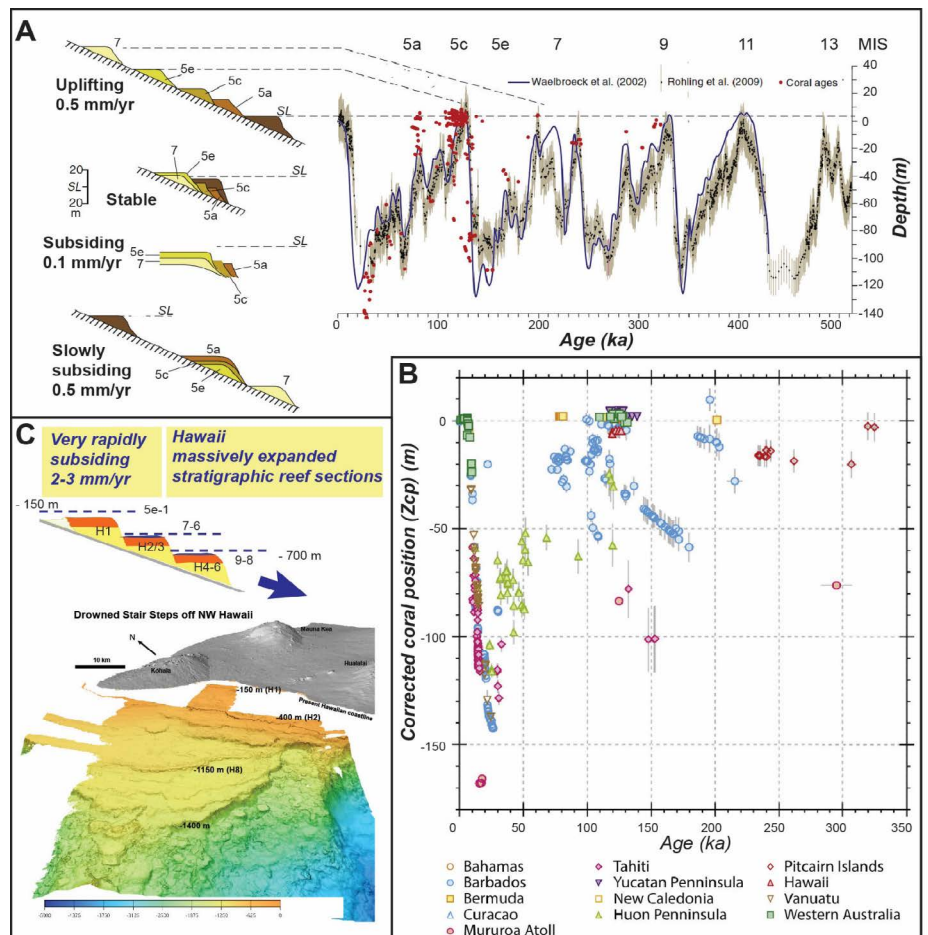


Figure 2. (A) Review of the response of coral reefs to sea level changes (after Woodroffe and Webster, 2014 and see for original sea level data sources). Reconstructions of sea level over the past 500 ka based on continuous records, compiled from the Red Sea, and the coral-calibrated deep-sea benthic $\delta^{18}O$ records. The distribution of the most reliably dated corals (coral that have been U-series dated and have $\delta^{234}U$ values within the range 137–157‰) are shown for those samples >25 ka. (B) Reconstructed relative sea levels for fossil corals, without GIA correction, from both near and far-field locations that pass an initial screening ($\delta^{234}U$ initial, calcite 2% and ^{232}Th concentration 2 ppb) with their respective uncertainties intervals (95%) based on a recent synthesis by Hibbert et al., (2016). Note both reviews clearly highlight lack temporal coverage back past ~150 ka – particularly during interstadial/stadial and lowstand sea levels, and the major bias towards either co-seismically tectonic uplifted sites and/or relatively stable sites with condensed reef sections. (C) Schematic showing the drowned reef terraces and greatly expanded reef sections (see (A) for comparison) in Hawai'i due to the relationship between reef growth, sea level oscillations and very rapid subsidence. 3D multibeam image, see the current coastline, showing the series submerged reefs to drilled by Exp. 389, formed over the last 500 ka, deepest at 1400 m below present sea level (after Webster et al., 2009).

(LGM) predict that Hawaiian coral records should reflect a southward shift in storm tracks, a precipitation anomaly, and SST responses to changes in ice albedo and greenhouse gas forcing. In addition, model simulations of Heinrich 1, interstadial and stadial events, and the LGM, suggests that although extratropical teleconnections to ENSO variability could have changed under different boundary conditions in many locations, Hawai'i is one of the few regions where interannual variability is consistently coupled to tropical ENSO variability. In all, existing modelling studies provide a firm theoretical framework for interpreting the mean, seasonal, and interannual variability that can be derived from the fossil corals targeted by Expedition 389.

With respect to data-based paleoclimate studies, the open-ocean subtropical Pacific remains one of the most important regions for which there is almost no data to compare to other regional data or to models due to the lack of appropriate geological samples. Relevant advancements in data-based paleoclimate work are sparse, but include evidence from a Mauna Kea ice core for a strong atmospheric temperature response to millennial-scale climate changes, from a sub-tropical west Pacific sediment core

for significant changes in SST since the LGM related to Asian monsoon dynamics, and from MIS 7 corals for changes in seasonal and interannual variability. In addition, there have been a number of tropical ENSO reconstructions that can be compared to Hawaiian coral records to test ideas regarding the nature of extratropical teleconnections.

Recent advancements in coral geochemistry have provided a better handle on the complexities of metal and isotope uptake and therefore will enhance the ability of Hawaiian fossil corals to provide robust paleoceanographic reconstructions. For example, there is a better understanding of which coral species are best suited for palaeoclimate reconstruction. Additionally, the boron geochemistry of coral skeletons offers a potential method to reconstruct the dissolved inorganic carbon (DIC) chemistry of the coral calcification fluid from which the skeleton precipitates and reconstruct past DIC e.g. seawater pH. Coral nitrogen and phosphorous isotopes are also increasingly being used as novel proxies for reconstructing nutrient input and upwelling. Finally, although Sr/Ca measurements in some species of corals are not thought to provide reliable SST data, there are promising

new proxies like Li/Mg and Sr-U that can provide robust SST estimates.

Geologic and biologic responses of coral reef systems to abrupt sea-level and climate changes.

Considerable progress has been made in understanding the role of coral reef systems as valuable archives of past sea-level and environmental changes, and how reefs were impacted by these changes (Camoïn and Webster, 2015; Woodroffe and Webster, 2014). However, important questions still remain about: (1) what processes control high-resolution spatio-temporal variations in reef architecture and composition – particularly in response to millennial-scale sea-level and climate changes; (2) what causes reefs to “turn-on” or “turn-off” (i.e. drowning) and what are their climatic and ecologic thresholds; and (3) how reef communities reassemble following disturbances on interglacial/glacial vs. millennial times scales. There is an urgent need for further research, not only to decipher processes driving past sea-level and climate change and its geographical variability, but also to better understand how coral reefs might respond in the context of future global climate changes (Camoïn and Webster, 2015). The combination of Hawaii’s unique geological setting (rapid subsidence, expanded stratigraphic sections, sensitivity to drowning, contrasting local environmental conditions), recent advances in dating techniques (diagenetic vetting – hyperspectral imaging and micro-scale carbonate mineral mapping, U/Th isotope systematics, Laser-Ablation ICP-MS), the novel use of reef assemblages, proxies (endolithic borers) and statistical tools to better constrain reef accretion, palaeowater depth estimates, and sophisticated 3D numerical reef modelling, make the prospect of Expedition 389 all the more exciting.

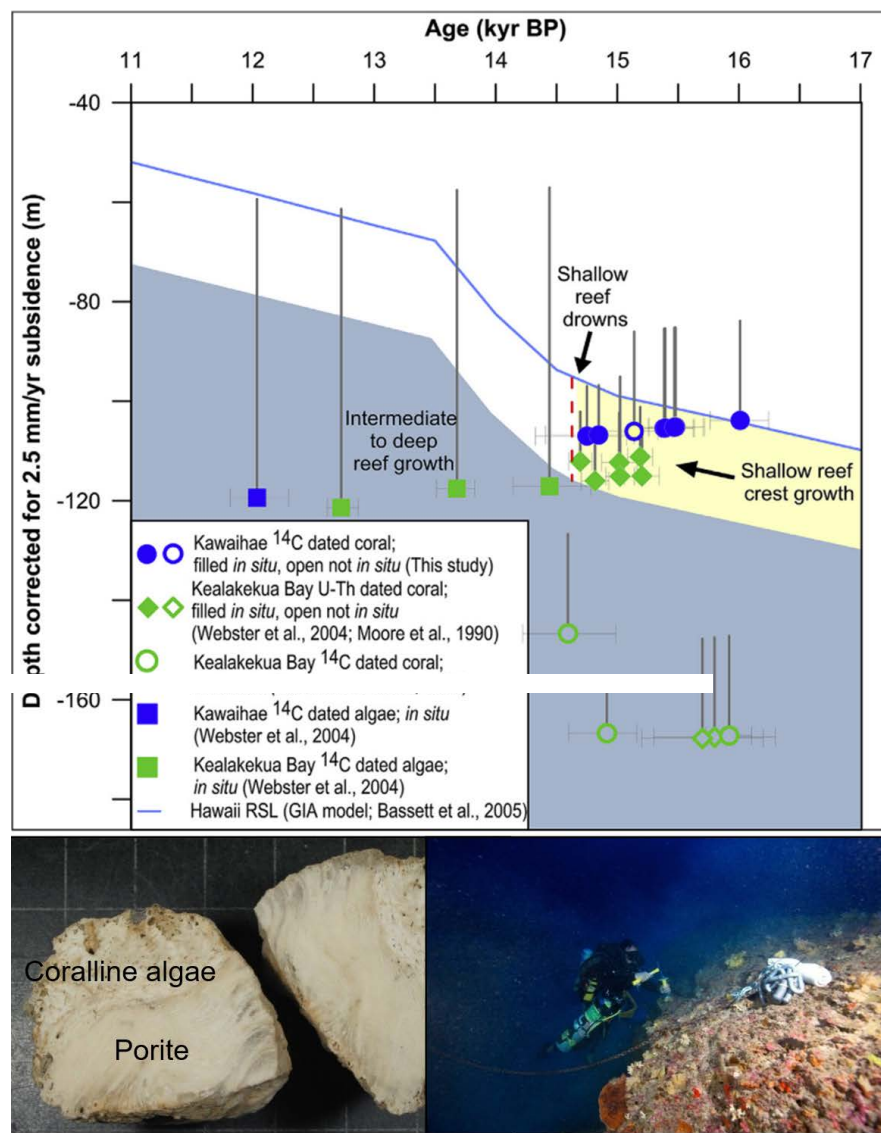


Figure 3. Summary of chronologic data from Kawaihae (blue symbols) and Kealakekua Bay (green symbols) including the new radiocarbon dated corals, published ages from Kealakekua Bay. Vertical error bars represent paleowater depth of the coral or algae samples, and horizontal errors denote 2σ age range. The transition from shallow (yellow) to deep (blue) facies growth is shown with shading (top panel). Deep diver photographs of sample recovery on H1d and examples of shallow water reef crest facies characterised by Porites samples with associated encrusting coralline algae (CAR) and vermetid gastropods (after Sanborn et al., 2017 and see for other data sources).

Expedition 389 is also concerned with elucidating the nature of living and ancient microbial communities in the reefs and their role in reef building. Microbial activity led to the precipitation of significant amounts of carbonate (microbialite) in cavities formed by primary reef builders (corals and encrusters, like coralline red algae, vermetids, and bryozoans), as shown by Expedition 310 (Tahiti), and also coevally on the seafloor by the Expedition 325 (GBR) cores. The microbial carbonate is locally the major component of the Tahiti reef, and some stratigraphic intervals of the GBR reef, contributing significantly to framework development and preservation. Biomarkers in fossil microbialite from Tahiti, GBR and other deglacial reefs indicate a key role of sulfate reducing bacteria in calcite precipitation. Analysis of global microbialite development in reef structures during the LGM-deglaciation suggests a strong correlation between microbial carbonate precipitation and carbonate saturation state of shallow ocean waters but this must be tested through previous glacial/interglacial cycles. Finally, the energy dynamics and role of

different microorganisms within carbonate-precipitating microbial mats remains to be solved.

Reef foundations, subsidence and volcanic history Hawai'i.

Over several decades, researchers have used the surface ages and depths of the various drowned shorelines around Hawai'i to determine the rate of subsidence of the island. These empirical data, along with recent numerical modelling studies, are consistent with constant subsidence over time periods of hundreds of thousands of years. Over a million-year timeframe, however, the island does not subside uniformly because the center of mass of the active volcanoes is slowly but systematically shifting towards the southeast as older volcanoes stop growing and new volcanoes form. Overall, the evolutionary history of Hawaiian volcanoes remains surprisingly poorly known; although the sequence of eruptive stages is well documented, their timeframe is not. Expedition 389 will obtain well-dated volcanic samples from the base of each hole to: (1) refine the variation through space and time of the subsidence of Hawai'i, and; (2) contribute to understanding the volcanic evolution of the island.

The promise of Expedition 389, seabed rock drills and expedition planning.

The implementation of Expedition 389 around the rapidly subsiding island of Hawai'i has the potential to unlock a unique and largely unexploited archive of sea-level and climate changes. The scientific potential of Expedition 389 is supported by a wealth of bathymetric, submersible, ROV observations, sedimentary and radiometric data collected over the last 30 years by many workers (Fig. 3). The drilling platform to be used on Expedition 389 is yet to be finalised, however, there have been significant advances in the seabed rock drill technology used for research and commercial applications (i.e. MeBo 200 – MARUM; RD2 – BGS; PROD1-3 – Benthic; Seafloor drill – Fugro, and the new BMS50M (Benthic Multi-coring System – JOGMEC). Most recently, as a “proof of concept” that seabed rock drills can recover high quality cores from challenging reef lithologies such as heterogeneous reef frameworks and cavities, e.g. friable grainstones, and coralline algal facies, our group investigated a unique suite of cores that were collected by the PROD drilling system as part of a geotechnical survey in ~80 m water (~30 m penetration, ~80% recoveries) on the North West Shelf of Australia (Fig. 4). On the basis of economic cost, environmental/cultural sensitivities, seabed depths, penetration depths and the need for high quality reef cores, the preferred platform for Expedition 389 is a seabed rock drill deployed from a ship.

In summary, Expedition 389 is well positioned to directly address several key Strategic Objectives and Flagship Initiatives in the 2050 Science Framework: Exploring Earth by Scientific Ocean Drilling by investigating the mechanisms that control rapid sea level and climate change as well as the relationship between changes in mean climate state and high frequency (seasonal-decadal) climate variability. As ECORD Science Operator now moves forward with expedition planning, finalizing the ship and drill system logistics, and environmental permitting please stay tuned for the call to join the Expedition 389 Scientific Party and be part of this exciting new phase of IODP coral reef drilling.

Acknowledgments.

We acknowledge the other proponents on the original proposal IODP proposal #716-Full2 (Drowned corals reefs around Hawai'i: a unique archive of sea-level, climate change, and reef response over the last 500 kyr).



Fig. 4. Representative core images showing the high quality core recovery in a range of very challenging fossil reef lithologies using a sea bed rock drill (Webster et al., In Press 10/09/21). These MIS 3 to 4 reef cores were recovered from the North West Shelf of Australian using the seabed drilling system PROD in ~80 m water.

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Nadine Hallmann



Lucas Lourens

MagellanPlus: **BlackGate Workshop** (22-24 September 2021, Frankfurt, Germany)

Black Sea–Mediterranean Gateway

The MagellanPlus workshop “Black Sea-Mediterranean gateway exchange: BlackGate” was hosted by the Senckenberg Biodiversity & Climate Research Centre in Frankfurt, Germany.



The aim of the workshop was to frame scientific objectives and to select suitable drilling sites to MSP-drill a transect to recover the Messinian to Recent (~7 Myr) sedimentary sequences in the Northern Aegean, Marmara and Black seas. In order to achieve this, the workshop brought together 30 scientists in attendance (plus seven participating online) from twelve different countries, and from multiple disciplines, ranging from geology, paleontology, biogeochemistry and reflection seismics, including 11 early-career scientists.

The exchange history of the Black Sea-Mediterranean gateway is poorly constrained because continuous Pliocene-Quaternary deposits are not exposed on land adjacent to the Black Sea or northern Aegean. Gateway exchange is controlled by climatic and tectonic processes and changes in Black Sea-Mediterranean connectivity trigger dramatic paleoenvironmental and biotic turnovers. Drilling a Messinian to Recent transect in the Aegean, Marmara and Black seas will recover high-amplitude records of continent-scale hydrological changes during glacial-interglacial cycles and allow us to reconstruct marine and fresh water fluxes, biological turnover events, patterns and processes controlling anoxia, chemical perturbations and carbon cycling, growth and propagation of the North Anatolian Fault Zone, the timing of land-bridges for Africa/Asia-Europe mammal migration and presence/absence of water exchange during the Messinian salt giant.

Black-Gate was so successful that we submitted a preliminary proposal for the IODP 1 October 2021 deadline with the following three themes:

- Generation of high-resolution integrated continental-scale climate, sea surface temperature, salinity, anoxia and thermohaline circulations records
- Impact of Black Sea-Aegean gateway connectivity on biogeochemical processes and subseafloor microbial communities,
- Reconstruction of the detrital provenance and tectonic history of the gateway basins and the surrounding mountains.

To achieve the scientific goals, we propose to use an MSP to drill three sites, one on the Turkish margin of the Black Sea, one on the southern margin of the Sea of Marmara and one in the northern Aegean. All sites target Quaternary oxic-anoxic marl-sapropel cycles. Pliocene lacustrine sediments and mixed marine-brackish Miocene sediments will be recovered from the Black Sea and Aegean.

<https://www.uu.nl/en/events/blackgate-magellan-plus-workshop>



Participants of the BlackGate workshop in the garden of the Senckenberg Biodiversity & Climate Research Centre

30 **Scientists**
11 **Early-career**

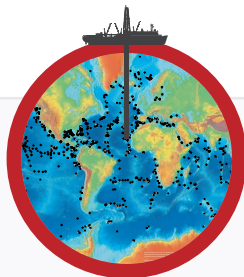
12 **Countries**

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More on MagellanPlus Workshop Series Programme: <https://www.ecord.org/science/magellanplus/>



Upcoming MagellanPlus Workshops

REGULAR WORKSHOPS

Mechanisms of rifting of large continental blocks - a case study at the Baltic Sea

(1-3 December 2021, Helsinki, Finland)

Contact: Pietari Skyttä (pimisk@utu.fi)

TIMOR: Tracing Monsoon, Ocean currents and diagenetic carbon Redistribution

(31 March-2 April 2022, Vienna, Austria)

Contact: Uwe Balthasar (uwe.balthasar@plymouth.ac.uk) More info: <https://www.plymouth.ac.uk/whats-on/timor>

IO:DIP – Indian Ocean: Delving Into the Past (10-13 April 2022, Graz, Austria)

The life cycle of a microplate at a convergent margin. More info: <http://indian-ocean.uni-graz.at>

SCYLLA Workshop (spring 2022, Bologna, Italy)

Serpentinite diapirs in the Calabrian subduction system return lower plate mantle from Earth's oldest ocean.

Contacts: Luca Gasperini (luca.gasperini@ismar.cnr.it) and Alina Polonia (alina.polonia@ismar.cnr.it)

Belize Barrier Reef Workshop (8-10 July 2022, Frankfurt/Main, Germany)

IODP-drilling off of the Belize Barrier Reef (Central America) to reconstruct postglacial environmental changes.

Contacts: Eberhard Gischler (gischler@em.uni-frankfurt.de); Stefano Fabbri (stefano.fabbri@geo.unibe.ch); Flavio Anselmetti (Flavio.anselmetti@geo.unibe.ch)

COSNICA Workshop (September 2022, Graz, Austria)

The life cycle of a microplate at a convergent margin. More info: <http://cosnica.uni-graz.at>

EXPLORATORY WORKSHOPS

Investigating the Oceanic Life Cycle of Tectonic Plates with Mission-Specific Scientific Drilling (1-2 April 2022, Vienna, Austria)

Contact: Michelle Harris (michelle.harris@plymouth.ac.uk)

Mission-specific platform approaches to assessing natural hazards that impact society (8-10 July 2022, Lisbon, Portugal)

Contact: Hugh Daigle (daigle@austin.utexas.edu)

More info: <https://www.ecord.org/science/magellanplus/>

ECORD/ICDP MagellanPlus Workshop Series Programme **CALL FOR PROPOSALS**

The ECORD/ICDP MagellanPlus Workshop Series Programme aims **to foster the development of new IODP/ICDP drilling projects**, and invites scientists from ECORD/ICDP member countries to propose workshops for the elaboration of compelling drilling proposals.

Scientific Ocean Drilling is entering a transitional phase from the 2013-2023 Science Plan to the 2050 Science Framework (www.iodp.org/2050-science-framework), which represents a new and innovative approach for conducting science using offshore drilling platforms.

A prominent role for **Mission-Specific Platforms (MSP)** is anticipated to achieve the goals of the 2050 Science Framework.

MagellanPlus welcomes proposals for topical workshops aimed at generating **MSP drilling proposals**, either as **stand-alone projects** or as part of **land-to-sea transects** that integrate marine and continental coring. The submission of MSP drilling proposals that consider the possibility of in-kind contributions is encouraged. Scientific themes must be aligned with the **Strategic Objectives** defined in the **2050 Science Framework**, i.e.:

- Earth's Climate System;
- Feedbacks in the Earth System;
- Tipping Points in Earth's History;
- Global Cycles of Energy and Matter;
- Natural Hazards Impacting Society;
- The Oceanic Life Cycle of Tectonic Plates;
- Habitability and Life on Earth (e.g., deep biosphere).

Workshops may be either focused on specific scientific ideas and targets or be designed to explore a range of potential ideas related to the Strategic Objectives listed above. Proposals that would use the *JOIDES Resolution* will not be taken into consideration as the JOIDES Resolution Facility Board has recently decided to no longer accept new proposals/pre-proposals for this platform.

MagellanPlus workshops are normally expected to take place in ECORD/ICDP member countries, but exceptions can be made when justified. Workshops that combine virtual and face-to-face sessions, in order to both reduce our carbon footprint and allow for wider participation in workshops, can be considered.

continued →

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

Deadline
for applications:
**15 January
2022**

ECORD/ICDP MagellanPlus Workshop Series Programme **CALL FOR PROPOSALS**

The contribution of the MagellanPlus Workshop Series
will not exceed 15,000 € per workshop.

Proponents are encouraged to seek co-funding from other sources. Workshops will be held no later than 12 months after approval by the MagellanPlus Science Steering Committee.

Proposals must include:

1. a short summary (max. 500 characters) stating the purpose of the proposed workshop and its expected impact;
2. a full description (max. 2 pages) of the proposed workshop outlining the goals, rationale, expected outcome, involvement of early-career researchers, number of participants and location;
3. a workshop programme;
4. a list of keynote speakers;
5. a flyer of the workshop;
6. a full budget for the workshop;
7. a CV (max. 1 page) plus a list of international, peer-reviewed publications for the last five years, of main applicant.

Proposals must be submitted by email as a single, combined pdf document to magellan.plus@uu.nl and to ema@cerege.fr

The deadline for applications: **15 January 2022**

For further information, please contact MagellanPlus via magellan.plus@uu.nl

ECORD remains committed to a vigorous policy of broad participation and inclusion, and to providing a safe, productive, and welcoming environment for all programme participants and staff.

Download the call in PDF at: <https://www.ecord.org/?ddownload=15562>

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



Antony Morris

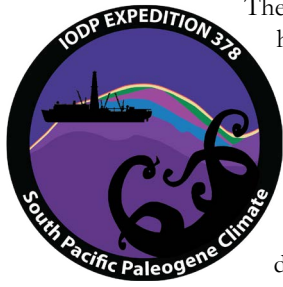


Hanno Kinkel

Implementation and staffing

JR Expeditions

The past two years have been very challenging for IODP expeditions, but there have been three expeditions since 2020.



The last expedition before the pandemic hit was Expedition 378: South Pacific Paleogene Climate. Besides Ulla Röhl as Co-chief Scientist, six ECORD scientist sailed on this expedition, and this was the first time that ECORD sailed only female scientists on an expedition. Despite technical difficulties leading to revised drilling operations, Expedition 378 recovered the first continuously cored, multiple-hole Paleogene sedimentary section from the southern Campbell Plateau at Site U1553.



From August till October this year IODP returned to almost normal operations with Expedition 396: Mid-Norwegian Continental Margin Magmatism setting sail with a limited offshore science party. ECORD has two Co-chief Scientists Christian Berndt and Sverre Planke and nine scientists participating in this expedition.

MSP Expeditions



IODP Expedition 386: Japan Trench Paleoseismology finished its offshore phase from April to June this year. Due to travel restrictions none of the ten ECORD scientists, three ECORD Expedition Project Managers, nor the ECORD Co-chief Scientist Michi Strasser were

able to participate in this phase, but we are very grateful for all the efforts of our Japanese colleagues in making the offshore phase a huge success, setting two new depth records for scientific ocean drilling. We are looking forward for the Onshore Science Party, which will hopefully take part onboard the *D/V Chikyu* next spring (*see page 16*).

The postponement and reorganizations of expeditions required some restaffing, but we hope that we are slowly getting back to our normal operational mode and staffing for upcoming expeditions is already complete or in process until 2023 (*see table on page 7*)

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ECORD
Science Support &
Advisory Committee

<https://www.ecord.org/about-ecord/management-structure/essac/>

Working on the freshly obtained core onboard R/V Kaimai during IODP Expedition 368.
Credits: N. Okutsu, ECORD/IODP/JAMSTEC.



Letter from the *JOIDES Resolution* Facility Board Chair



Larry Krissek

3 November 2021

Dear IODP Community,

As I write this letter, my spirits are buoyed – as I hope yours are -- by the news of the recently completed and hugely successful Expedition 396: Mid-Norwegian Continental Margin Magmatism aboard the *JOIDES Resolution*. We should all be grateful to Siem, the ship's crew, the JRSO, and the scientific and technical shipboard parties for their contributions to this success, and we can hope that Expedition 396 is a harbinger of a return to a more “normal” pattern of JR operations. At the same time, however, we extend our heartfelt condolences to the family, friends, and shipmates of the Entier crewman who died after contracting COVID-19 while traveling to the port-call at the start of Expedition 396; his tragic loss is a reminder that steps to ensure the safety of all associated with scientific ocean drilling remain of utmost importance.

I appreciate this opportunity to provide an update on recent activities of the JRFB, which affect both:

1. plans for JR operations through the end of IODP in 2024, and
2. first steps toward developing potential guidelines and procedures for addressing the 2050 Science Framework (SF).

I'll begin, however, by mentioning recent personnel changes on the JRFB:

1. **Clive Neal** has completed his term as JRFB Chair, so he rotates off the JRFB with our deepest thanks and best wishes for the future. As of 1 October, I have begun my term as JRFB Chair; I look forward to working with all of you to ensure productive operations of the JR during the next three years, and to set the stage for success in future scientific ocean drilling;
2. **Steve Bohaty** (University of Southampton) also has completed his term on the JRFB, so we thank him for his dedicated and insightful service; and
3. **Steffen Kutterolf** (GEOMAR) and **Amelia Shevenell** (University of South Florida) have joined the JRFB as new science members, so we look forward to working with them during the next three years.

Clive's letter in the *June 2021 ECORD Newsletter* summarized activities arising from an off-cycle virtual JRFB meeting in November 2020 – especially

1. the creation of a Working Group (WG) to consider requirements and review processes for proposals that would use a potential U.S. globally ranging, non-riser drilling platform to address the SF (see *Consensus Statement 2* of the November 2020 JRFB meeting), and
2. the distribution of a “Request For Information” (RFI) to the international community to provide input about new proposal ideas to address the 2050 Science Framework (see *Consensus Statement 4* of the November 2020 JRFB meeting).

Products of these two efforts were considered by the JRFB at its hybrid meeting in June 2021, as summarized below. The minutes, consensus statements and action items from that meeting are available at <http://www.iodp.org/jrfb-minutes?limit=20&limitstart=0>, and the final report of the Working Group on Science Framework Proposal Requirements and Assessments can be accessed at <http://www.iodp.org/docs/meetings/1124-jrfb-wg-sfp-final-report/file>.

The report of the Science Framework Proposal WG was accepted by the JRFB at its June 2021 meeting. The WG recommendations were directed specifically toward proposals to use a potential new U.S. non-riser drilling platform, but could be adopted by other platform providers in future scientific ocean drilling. Those recommendations include:

1. continuing to implement a single, unified proposal and site characterization review system, while incorporating considerations of cost categories, success criteria, and risk mitigation early in the review process. Proponents will benefit from interacting early and often with the platform operator when incorporating these considerations; and
2. a community-driven workshop should be held for each Flagship Initiative to define the goals and strategies needed to address that Flagship Initiative. A proposal that addresses a Flagship Initiative would then be expected to explain how it meets the workshop-defined goals and strategies for that Flagship Initiative.

I would like to thank JRFB member Ken Miller (WG Chair) and all members of this WG for their efforts. To build on their efforts, the JRFB moved to formulate a new WG to develop possible draft guidelines for proposals that will address the SF (see Consensus Statement 13). Thanks are owed to Ken Miller, Lisa McNeil, and Charna Meth, who have agreed to serve on the new WG.

The JRFB reviewed a summary of the RFI responses, which now number 81. Responses can still be submitted through a link at <http://www.iodp.org/proposals/call-for-proposals>. The strongly international nature of scientific ocean drilling is highlighted by the authors and authoring teams of those responses, with ECORD scientists involved in 33 responses, Japanese scientists involved in 31 responses, U.S. scientists involved in 41 responses, and scientists from other IODP partners (ANZIC, India, China and South Korea) involved in a smaller number of responses. Geographically, the Pacific was the area of most interest by a factor of three, probably because little drilling has taken place in the eastern and central Pacific for a number of years. A non-riser drilling platform was mentioned five times more frequently than any other platform. Strategic Objectives and Flagship Initiatives related to climate change, Earth's climate system and its feedbacks were mentioned 1.5 to 2 times more frequently than the other SOs and FIs, which were mentioned at relatively similar frequencies. The information provided by the RFIs will serve as a starting point as the U.S. community works to define and prioritize the likely Science Mission Requirements of a potential new U.S.-supplied non-riser drilling vessel.

In other business at its June 2021 meeting, the JRFB:

1. recommended a JR operations schedule for FY 2023 (October 2022 through September 2023) with five expeditions – Iberian Margin Climate, Hellenic Arc, Deepening Hole U1309D, Reykjanes Mantle Convection and Climate, and NW Greenland Glaciated Margin. (The call for applications to sail on the first two expeditions recently closed);
2. approved a Consensus Statement emphasizing the need to maintain the availability of data bases presently at the Science Support Office and elsewhere beyond 2024;
3. approved a Consensus Statement supporting efforts to extend JR operations beyond 2024; and
4. approved an Action item to formulate a WG to explore the scope and requirements for developing Virtual Expeditions. Through the latter three actions, the JRFB is working to support the future of scientific ocean drilling, whatever its form.

In closing, it is hugely encouraging to see plans in-place for the upcoming return to more “normal” JR operations. Here's hoping that our biggest concerns soon are “waiting on weather”, “rate of penetration”, and implementing the Science Framework, rather than COVID mutations and vaccination rates. Stay safe and healthy, and I look forward to meeting you in 3D soon.

Best wishes,
Larry Krissek

Larry Krissek - krissek.1@osu.edu
Chair of the JOIDES Resolution Facility Board





Antony Morris



Hanno Kinkel

ECORD Grants 2021

ECORD Research Grants 2021

10
GRANTS
awarded

This year ESSAC opened a later call for ECORD Research Grants addressed to early-career scientists to allow them to conduct innovative research related to the International Ocean Discovery Program.

In 2021, the Training and Outreach Subcommittee selected ten proposals for funding (table below) and awarded each up to €3,000 for research that will be carried out in cooperation with host institutions abroad in order to promote mobility and network building among early-career researchers.

ECORD Research Grants awarded in 2021

Name		Project	Host Institution	Awarded (€)
Valentin Basch	ITA	Isotopic heterogeneity and melt aggregation in the lower oceanic crust (IODP Site U1415, Hess Deep, East Pacific Rise)	Louisiana State University, USA	3000
Francesca Battaglia	ITA	Morphobathymetric and seismostratigraphic analysis to map acoustic and sedimentary facies correlated with IODP site U1357, Adèlie Basin, Antarctica	University of Granada, ESP	3000
Morgane Brunet	FRA	Surficial sediment remobilization of the Tuaheni Landslide Complex, New Zealand: Insights from U1517B and U1517C cores correlation	Université du Québec, CAN	2690
Carlotta Ferrando	ITA	Amphibole-rich diabase dikes in the slow-spreading oceanic crust (Atlantis Bank, 57°E, Southwest Indian Ridge): where is the water coming from?	CRPG - CNRS, Nancy, FRA	3000
Tzu-Hao Hunag	SWE	Decoding Marine Silicate Weathering through disentangling silicon phases of sediment	University Tartu, EST	3000
Laurin Kolb	GER	Vegetation reconstruction of SE African hominid environments during the Plio-Pleistocene based on $\delta^{13}C_{wax}$ analyses from IODP Site U1478	University of Notre Dame, USA	3000
Jing Lyu	GER	Neodymium isotopes as a tracer of when Tasman Leakage reached the Broken Ridge (Indian Ocean)	University of Barcelona, ESP	3000
Toshiki Nagakura	GER	Selective addition of substrates for microorganisms living in Guaymas Basin analyzed with NanoSIMS	JAMSTEC, JAP	2300
Samanta Trotta	ITA	Biomarker-derived paleoclimate evidence for the Lower Pleistocene (MIS 48-MIS 41) at IODP Site U1387, Gulf of Cadiz	IPMA Lisbon, PRT	2500
Arne Ulfers	GER	Orbital forcing in the eastern central Atlantic (ODP Leg108 - Site 663) and connections to the African continent during the Pleistocene using XRF-scanning data	MARUM, GER	2900

Antony Morris - *ESSAC Chair*

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Angelo Camerlenghi - *incoming ESSAC Chair*
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ECORD Summer Schools 2021

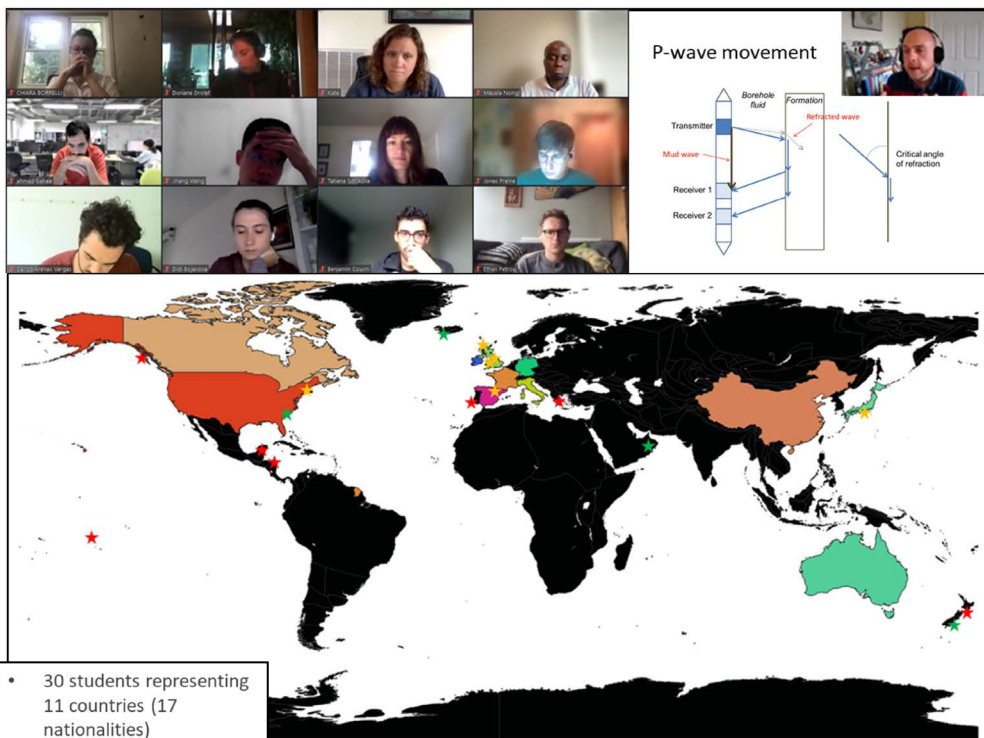
5th ECORD Summer School: Downhole-Logging for IODP Science (13-17 September 2021)



After a one-year hiatus due to the COVID-19 pandemic, the 5th ECORD Summer School: Downhole-Logging for IODP Science (previously the Petrophysics Summer School) took place via Zoom on 13-17 September 2021. The event was organised by the European Petrophysics Consortium (EPC) and hosted by the University of Leicester.

way!) presented by Angela Slagle and Gilles Guerin from Lamont-Doherty Earth Observatory in the US. Peter Finch from the University College of London taught the basic principles of Petrophysics which the students had to promptly apply in fun and challenging, (but not too challenging) log-analysis exercises. In the following days, students listened to exciting accounts of operations and scientific outcomes for past IODP and ICDP

expeditions, for example on the Japanese drilling vessel *Chikyu* (Yoshinori Sanada, Japan Agency for Marine-Earth Science and Technology), for mission specific platforms (Dave McInroy, British Geological Survey), and while drilling and logging the Semail Ophiolite in Oman (Dr. Philippe Pezard, Geosciences Montpellier, CNRS, Montpellier University, Montpellier). In between lectures and exercises, Leicester's own Emeritus Professor Mike Lovell educated and entertained the group by highlighting ways of finding useful analogues for rock-fluid interactions in the kitchen (you read that right) - while also answering life's central question of how much salt is the right amount for boiling pasta (if you want to know the answer, apply for next year's summer school!). Finally, students showcased their newly acquired



- 30 students representing 11 countries (17 nationalities)
- ★ Presenters from Columbia University, BGS, MarE3/JAMSTEC, Imperial College London, University of Montpellier
- ★ Exercises covered 3 IODP drilling locations
- ★ Individual group projects covered 6 IODP campaigns worldwide

Twenty-eight early-career researchers from around the globe, representing 17 nationalities from as many different time zones, joined the EPC Team and a group of distinguished guest lecturers online for a week full of insightful presentations and practical exercises.

petrophysics skills during a series of exercises and a final group project using data from one of six selected IODP expeditions. The results of the group projects were presented on the last day and organizers, lecturers, and tutors alike were awed by the students' efforts and the quality of the presentations.

The week started with a whistle-stop tour through the history of IODP (for example, did you know that Nature Magazine called IODP "the most successful international research collaboration ever"?), as well as the ins and outs of scientific offshore drilling operations (including how to handle drill pipe collars the acrobatic

According to exit polls, the summer school was very well received by the participants overall. Many voiced their regret that they were not able to join in person and emphasized that Zoom could not replace face-to-face classes – never mind talking core porosity over beer and curry in beautiful Leicestershire. Hopefully, the 2022 ECORD Summer School will return to being an in-person learning event. Fingers crossed!



Simon Draper - sd227@leicester.ac.uk
EPC Project Manager, University of Leicester



EOTF News and Activities



Malgo Bednarz



Ulrike Prange



David McInroy



Hanno Kinkel



Nadine Hallmann



Jez Everest

Throughout the difficult pandemic time, starting early 2020, the majority of meetings and conferences as well as exhibitions, where the EOTF usually promotes ECORD mission and activities, have been either cancelled, rescheduled or have taken place virtually. Restrictions that were put in place in multiple countries caused uncertainty resulting in limited number of participants, and therefore, presented a minor opportunity for ECORD outreach activities. The EOTF, similarly to the outreach teams of JAMSTEC/MarE3 and IODP China, decided not to participate physically in the AGU 2021 (13-17 December), but to focus on virtual means to promote ECORD during this conference ([see page 39](#)).

The EOTF started preparing for EGU 2022 (3-8 April) where we plan to have a joint ECORD-ICDP virtual booth ([see page 39](#)).

EOTF members are using the pandemic time to develop new ideas and materials for the future, as well as to explore new ways of promoting ECORD.

2021 has been a year of intense outreach work focused on Expedition 386 and especially on Expedition 377 ([see page 37](#)).

Projects

Permanent/long-term exhibitions

Since late 2020, the EOTF has been working towards ECORD presence at permanent exhibitions in museums around Europe. This includes fabrication and donation (or long-term loans) of materials for museums and research institutions as well as loans of the ECORD Puffersphere for dedicated exhibitions.

Exhibition in the Natural History Museum Vienna

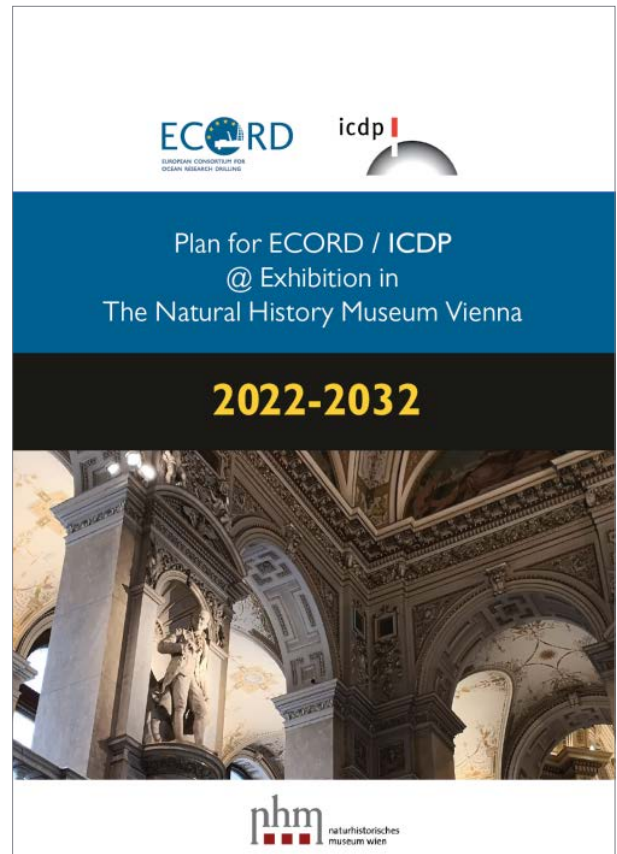


The EOTF is working with the Natural History Museum (NHM) Vienna to promote scientific drilling on the occasion of the newly planned, long-term (>10 years) exhibition at the NHM Vienna. The NHM Vienna exhibition will concentrate on geology with the focus on climate and major changes in the atmosphere and biosphere. The EOTF organized fabrication of core replicas and other models for the exhibition. The planning that started in 2020 was postponed due to COVID-19 pandemic, and the opening of the exhibition, originally planned for 2021 is now postponed to 2022.

The EOTF invited the ICDP outreach team for this initiative and joint planning for participation in the permanent exhibition at the NHM Vienna is still in place. This joint ECORD-ICDP project will deliver a section in the exhibition where scientific drilling will be promoted and explained. ECORD and ICDP will donate various materials to the NHM Vienna. Video footages and other digital resources are also being considered.

It is planned that representatives of ECORD and ICDP will give talks on the opening day of the exhibition.

A detailed plan in cooperation with the exhibition architects from the NHM Vienna is planned to be delivered in the first half of 2022.



ECORD Puffersphere



The ECORD Puffersphere presents ECORD and its MSP concept on an interactive spherical display, which is to be loaned to museums and aquariums across Europe and showcased at meetings and conferences. The ECORD Puffersphere is targeted at the general public. The scientific content focuses on an introduction to the four IODP science themes, IODP/ ECORD drilling vessels, selected IODP/ ECORD expeditions covering all IODP themes and the three IODP core

repositories. It also illustrates and/or animates selected scientific data of ocean acidity, sea-level rise, draining the oceans and tectonic plates.

The EOTF is working on planning for future travels of the sphere and the logistics related to shipping and insurance.

ECORD digital sphere

Based on the content of the physical ECORD Puffersphere, the EOTF started working on the digital version that will be available through a web browser. ECORD digital sphere will be available in different versions, and one of them will reflect the content of the physical display.

More info about the Puffersphere display: <https://pufferfishdisplays.com/displays/>

ECORD Communication on post-2024

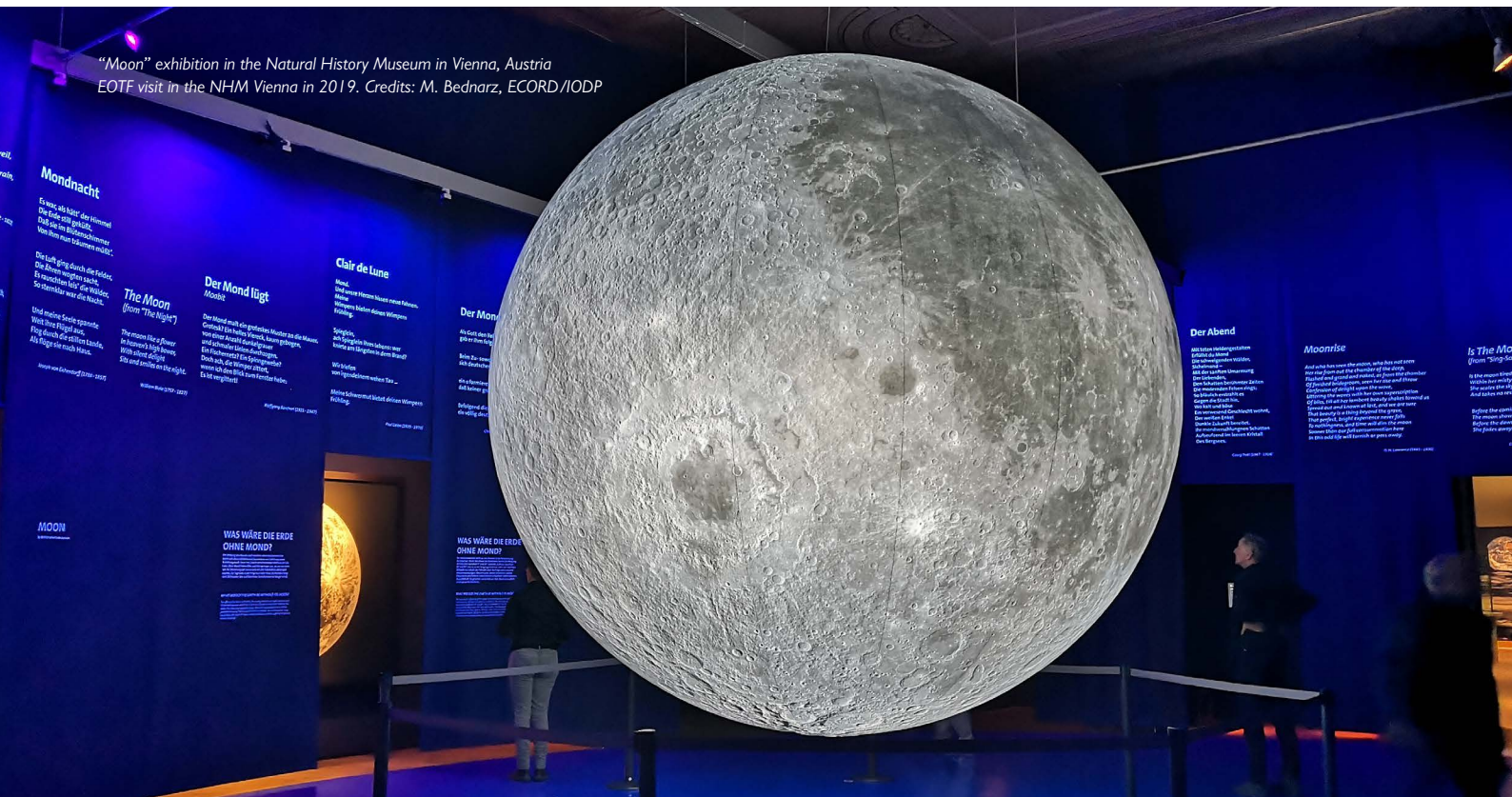
On 23 November 2021, representatives of EFB, ESSAC, EMA, IODP Forum, and EOTF met to discuss the communication on post-2024. The goal of this virtual meeting was to develop ideas on how to inform the science community about the progress with

future plans for scientific ocean drilling. The outcome of this meeting was then further discussed by the EOTF members on 24 November during the EOTF fall meeting.

The means of communications to be employed in order to keep the science community informed include:

- ECORD Headline (December, before Christmas);
- news item on the ECORD website (early January);
- Questions & Answers sessions: (January and late March/early April);
- webinars following each Questions & Answers session (January and late March/early April);
- new issue of the Scientific Drilling journal (to be published January-February);
- discussion at the Town Hall meeting during the EGU in April 2022.

Stay tuned!



"Moon" exhibition in the Natural History Museum in Vienna, Austria
EOTF visit in the NHM Vienna in 2019. Credits: M. Bednarz, ECORD/IODP

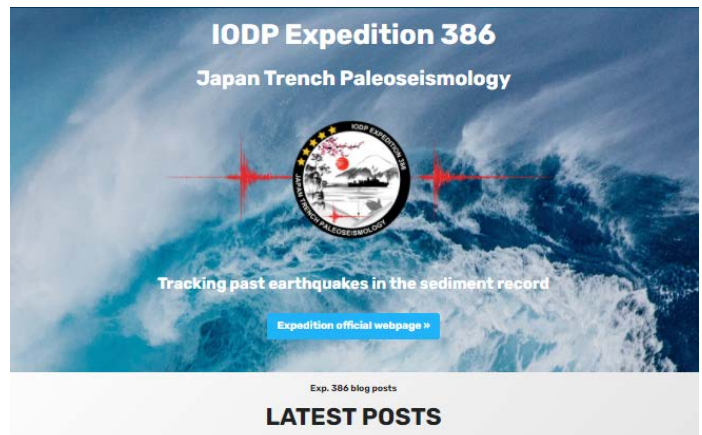
Outreach activities related to MSP Expeditions

Outreach for Expedition 386: Japan Trench Paleoseismology

With the completed offshore phase of Expedition 386, the EOTF together with the outreach team of JAMSTEC/MarE3 started planning for the outreach actions focused on the Onshore Science Party that will take place from 14 February to 15 March 2022 on board *Chikyu* docked in Shimizu.



As agreed on the second day of the EOTF fall meeting #20 (24 November), JAMSTEC/MarE3 will control outreach actions during the onshore phase of the expedition. Owing to the COVID-19 restrictions, no media will be allowed onboard, therefore, the EOTF and JAMSTEC/MarE3 are only preparing for digital/virtual outreach actions. Overall, outreach during the OSP of Expedition 386 is planned to be digital, streamlined, focused on social media, high-quality video materials and photography as well as blog posting.

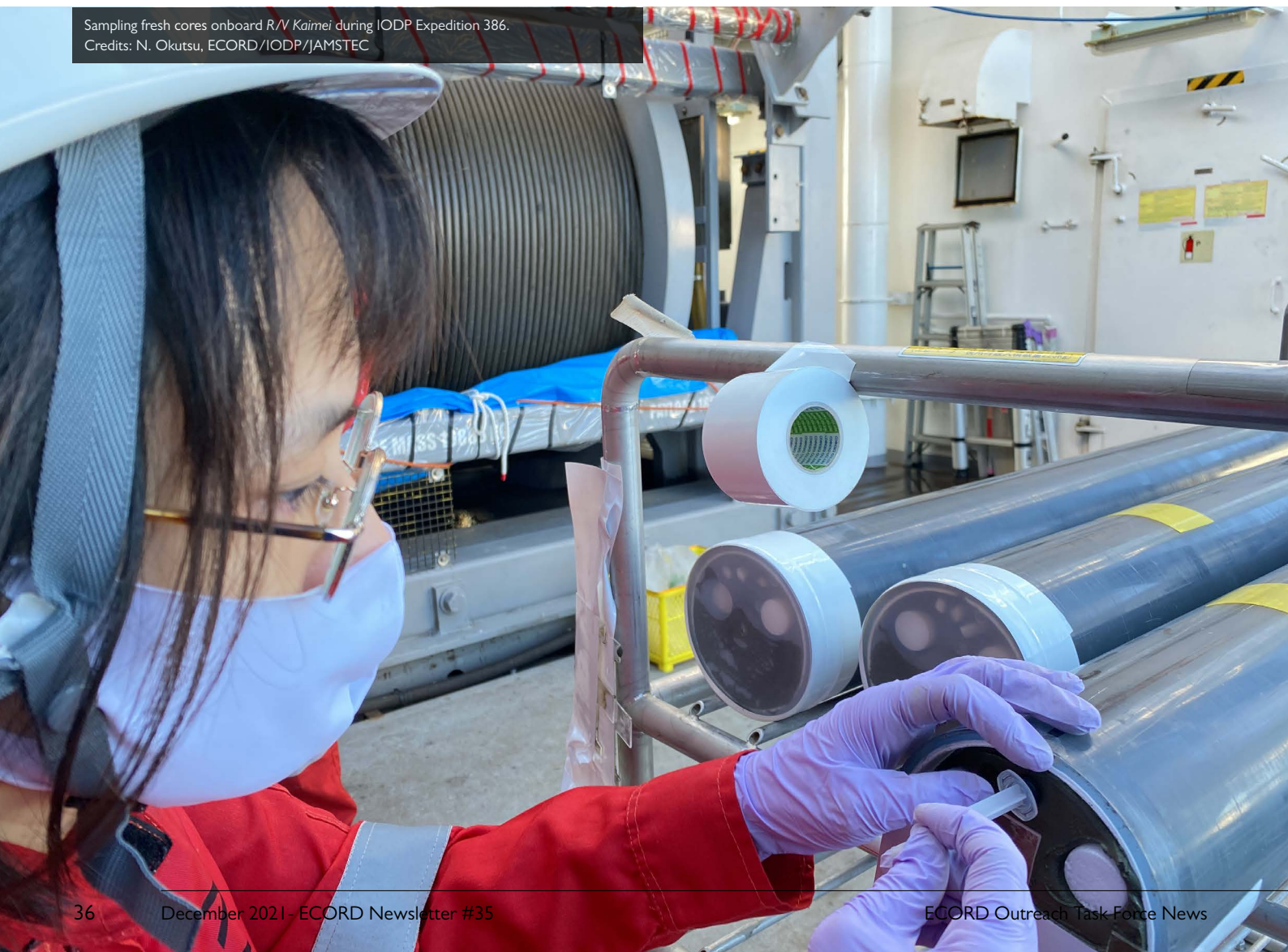


The outreach team is working on content about Expedition 386 for both, the ECORD Puffersphere and the digital ECORD sphere.

Expedition 386 blog: <https://expedition386.wordpress.com/>

Expedition 386 webpage: <https://www.ecord.org/expedition386/>

Sampling fresh cores onboard R/V *Kaimei* during IODP Expedition 386.
Credits: N. Okutsu, ECORD/IODP/JAMSTEC



Outreach for Expedition 377: Arctic Ocean Paleoceanography (ArcOP)

Planning for outreach actions related to ArcOP restarted in early 2021 after the announcement of the implementation of this expedition following the collaboration with the Swedish Polar Research Secretariat (SPRS) and AMS (Arctic Marine Solutions). Since the beginning of 2021, EOTF members and Co-chief Scientists meet frequently with representatives from SPRS and AMS in order to further promote the expedition and to plan for future actions, especially considering the offshore phase.



During the first day of the EOTF fall meeting #20 (16 November), the EOTF and Co-chief Scientists discussed future plans and delineated outreach objectives and actions to be undertaken for this challenging expedition.

The EOTF finalized two ArcOP dedicated documents focusing on:

1. a general explanation of the ArcOP objectives and operations (“ArcOP Universal document”, developed with the Co-chief Scientists, SPRS and AMS), for internal and external use;
2. “Introduction to outreach plans and actions” (developed with the Co-chief Scientists), for dissemination to Science Party members and onboard staff.

Documentary about Expedition 377 and ECORD

The process of appointing a producer of the documentary was completed in the first half of 2021 and included two-stage interviews with four selected professional, award-winning film production companies. EOTF members selected a French company - Galaxie Group, which presented the most attractive offer within the agreed budget and which fulfils all the requirements and objectives delineated for the documentary by the EOTF. Galaxie Group has already an experience in producing documentary films about IODP Expeditions (Expedition 310) and has a global distribution network, which will assure worldwide broadcasting of the final movie. Galaxie has already started working on the documentary with assistance from the EOTF and Co-chief Scientists as well as in cooperation with SPRS and AMS. The “Introduction to outreach plans and actions” document was shared with selected Science Party members and external scientists together with an invitation to participate in the pre-expedition interviews (completed in November).

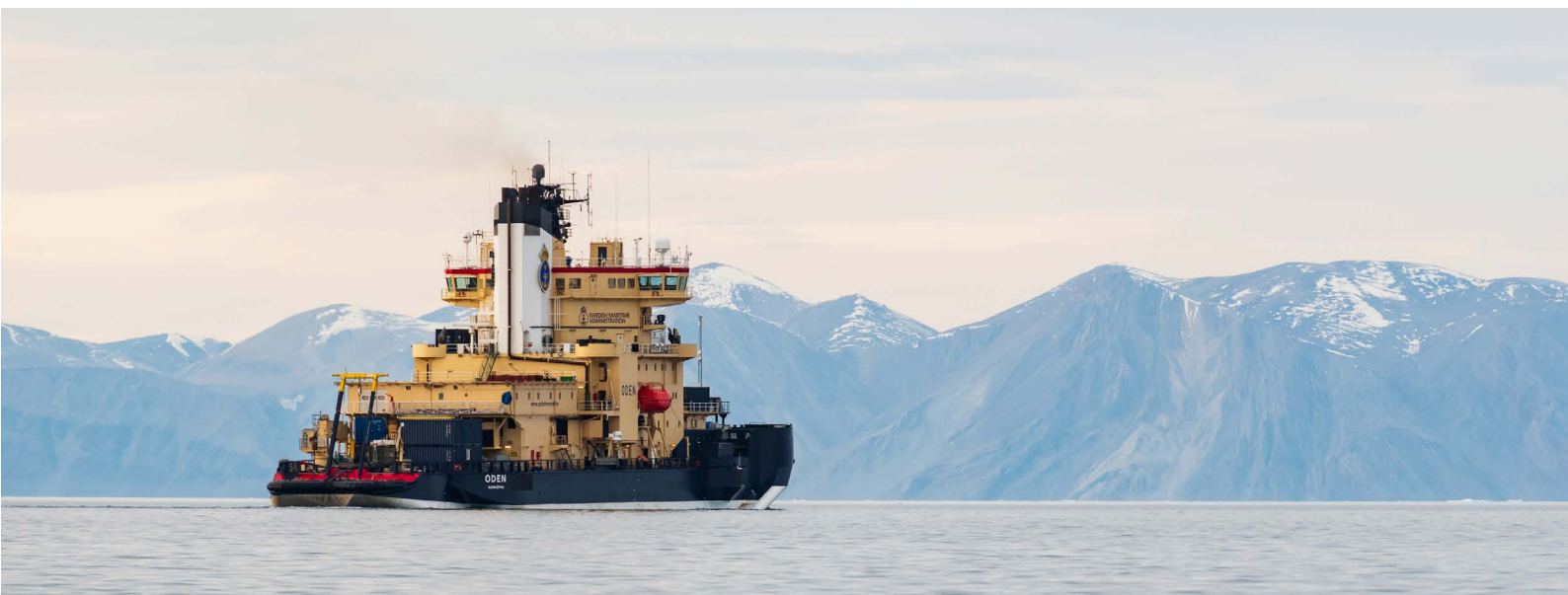
ArcOP Onboard Outreach Officer

The EOTF selected a Science Communication Specialist as ArcOP Onboard Outreach Officer who will be responsible for ECORD outreach actions and activities during the offshore and onshore stages of the expedition. A call released on 28 April 2021 (<https://www.ecord.org/call-for-science-communication-specialists-arcop/>) attracted a number of high-quality applicants and the EOTF shortlisted the six most competitive candidates. The EOTF selected a professional science communicator who has years of experience in communication in science and a history of cooperation with globally known TV stations, scientific organisations and who is highly skilled in leading social media campaigns.

The EOTF is already working with the future ArcOP Onboard Outreach Officer in order to prepare for a successful outreach campaign that will start next year.



Expedition 377 blog: <https://expedition377arcop.wordpress.com/>
Expedition 377 webpage: <https://www.ecord.org/expedition377/>



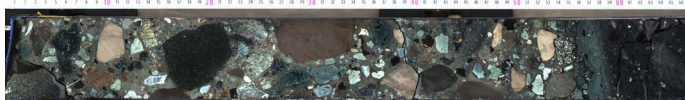
Icebreaker *Oden* that will be used during IODP Expedition 377: ArcOP in 2022. Credit: Lars. Lehnert, SPRS

Resources

Core replicas

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

The EOTF ordered fabrication of eight new core replicas from among which, four will be donated to the NHM Vienna (*see page 34*).



More info: <https://www.ecord.org/resources/core-replicas>

Models for exhibitions

Four realistic (1:1 scale) models of two species of corals were fabricated. These models will accompany the new core replica from Expedition 310: Tahiti Sea Level (<https://www.ecord.org/resources/core-replicas/core-replica-tahiti-sea-level-iodp-expedition-310/>). Two of the models will be donated to the NHM Vienna for the permanent exhibition (*see page 34*).



Realistic models of specimens of corals identified in cores from Exp. 310. Left: *Porites lobata*; right: *Pocillopora eydouxi*. Produced by Kamyk.pl.

ECORD publications, brochures and flyers

The digital version of the ECORD Newsletter #34 was published in June 2021 and is available for download on the ECORD website (<https://www.ecord.org/?download=15207>).

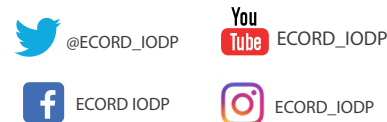
The ECORD Annual Report 2021 will be released in early 2022.



ECORD Annual Reports: <https://www.ecord.org/resources/reports/activities/>
ECORD Newsletters: <https://www.ecord.org/resources/ecord-newsletter/>
ECORD brochures and flyers: <https://www.ecord.org/resources/brochures/>

ECORD online

The EOTF keeps working on the active presence of ECORD in the Internet through social media (Facebook, Twitter, Instagram and Youtube – see back page) and through ECORD website improvements and additional applications.



Hosting, server-side maintenance and website management

During the general EOTF meeting #20 (24 November) that followed the meeting on ECORD Communication on post-2024 (see page x), the EOTF agreed that substantial improvements need to be performed in regards to the hosting provider and domain name management.

It has been decided to improve the cyberinfrastructure to ensure that ECORD can accommodate changes and additions to its digital space that will most likely follow post-2024, and may include migration of IODP legacy (website and data base) that are currently supported by NSF. The EOTF is planning for the improvements to take place in 2022.

How to loan a core replica?

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

ECORD shares the core replicas on a temporary basis with scientists and teachers under the conditions described in the loan document, with special attention to core replica preservation and treatment (core replica may not be visually or physically altered in any way). Core replicas are loaned free of charge with the ordering university/research institution covering the shipment of core replicas back to EMA.

ECORD at conferences, events and meetings

EOTF meetings

EOTF #20 fall meeting (16 and 23 November 2021, virtual)

The EOTF #20 fall meeting was held on two days, 16 November – ArcOP-focused day, and 23 November – general meeting.

The spring EOTF meeting is planned to take place on 22 February 2022 (virtual) and a day between 3-8 April 2022 on the occasion of the EGU in Vienna.

AGU 2021 (13-17 December, New Orleans, USA)

Following the continuing restrictions related to COVID-19, the EOTF together with JAMSTEC and IODP China decided not to physically participate in the AGU Fall Meeting 2021. The EOTF cooperates with USSSP who kindly offered to help with the promotion of ECORD while at the AGU 2021 booth in New Orleans. The EOTF and ICDP sent promotional materials to USSSP representatives, and planned for a virtual presence at the AGU. Information about the virtual ECORD presence at the AGU 2021 will be conveyed through a brochure (see the image) that contains links to:

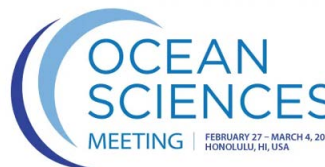


■ Dedicated subpage on ECORD website
www.ecord.org/ecord-icdp-at-agu-2021

■ Links to daily half-hour Zoom sessions of the AGU meeting (13-17 December) at 9:15-9:45 (16:15-16:45 CET).
<https://us02web.zoom.us/j/89482610361?pwd=MnF2alFYcUpKa2l6STVVem51bEZjZjZz09>

Ocean Sciences Meeting 2022 (27 February - 4 March 2022, Honolulu, virtual)

In late September, the EOTF submitted an abstract to the OSM 2022. An oral presentation is planned during IODP Session (DS05): Time travel, legacy and Frontiers: Scientific Ocean Drilling connects the past, present and future workings of our planet. The talk will focus on the MSP concept, ArcOP as one of the most challenging expeditions, and challenges in outreach. The EOTF is waiting for the approval of the submitted abstract.



EGU 2022 (3-8 April 2022, Vienna, Austria)

After two years without physical EGU meetings due to the COVID-19 crisis, the EOTF is planning a joined ECORD-ICDP booth at the EGU 2022 as well as a joined Town Hall meeting. The initial plans for the booth include organisation of Lunch & Learn sessions that were very successful during the EGU 2019. The EOTF is arranging the display of the ECORD Puffersphere at the EGU 2022 booth.



EGU 2022 Call for abstracts

SSP1.2: Achievements and perspectives in scientific ocean and continental drilling

<https://meetingorganizer.copernicus.org/EGU22/session/43244>

Deadline: 12 January 2022, 13:00 CET

Just prior to the EGU, ECORD will organise an extraordinary IODP Forum meeting in Vienna, Austria, on 2-3 April 2022.

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Assistant Director of the ECORD Managing Agency

Hanno Kinkel - hanno.kinkel@plymouth.ac.uk,
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ECORD Science Operator Outreach Manager

Jez Everest - jder@bgs.ac.uk,
ECORD Science Operator



Calendar of meetings, workshops and conferences in 2021 and 2022

2021		
<p>1-3 December MagellanPlus Workshop: Mechanisms of rifting of large continental blocks Helsinki, Finland</p>	<p>13-17 December AGU 2021 New Orleans, LA, USA</p>	
2022		
<p>11-13 January SEP La Jolla, CA, USA</p>	<p>Spring MagellanPlus Workshop: SCYLLA Bologna, Italy</p>	<p>September MagellanPlus Workshop: COSNICA Graz, Austria</p>
<p>22-24 February EPSP College Station, TX, USA</p>	<p>May ESSAC Spring Meeting #17 Stockholm, Sweden</p>	<p>20-21 September ECORD Facility Board Meeting #11 Aix-en-Provence, France</p>
<p>22 February and April TBD ECORD Outreach TF Meeting #21 Virtual and Vienna, Austria</p>	<p>24-26 May JR Facility Board Washington, DC, USA</p>	<p>18 November ECORD Outreach TF Meeting #22 TBD</p>
<p>31 March-2 April MagellanPlus Workshop: TIMOR Vienna, Austria</p>	<p>23-24 June ECORD Council Spring Meeting #8 Virtual</p>	<p>14 November ESSAC Fall Meeting #18 Italy</p>
<p>1-2 April MagellanPlus Workshop: Oceanic Life Cycle of Tectonic Plates Vienna, Austria</p>	<p>8-10 July MagellanPlus Workshop: Belize Barrier Reef Frankfurt/Main, Germany</p>	<p>15-16 November ECORD Council-ESSAC Meeting #11 Italy</p>
<p>2-3 April IODP Forum Vienna, Austria</p>	<p>8-10 July MagellanPlus Workshop: Natural Hazards Lisbon, Portugal</p>	<p>12-16 December AGU 2022 Chicago, IL, USA</p> 
<p>3-8 April EGU 2021 Vienna, Austria</p> 	<p>Summer SEP TBD</p>	
<p>10-13 April MagellanPlus Workshop: IO:DIP Graz, Austria</p>	<p>Summer Chikyu IODP Board TBD</p>	

Check for updates: <https://www.ecord.org/calendar/>




Working on a freshly obtained core onboard R/V Kaimei during IODP Expedition 386.
Credits: N. Okutsu, ECORD/IODP/JAMSTEC

Last day on R/V Kaimei during IODP Expedition 386.
Credit: K. Ikehara, ECORD/IODP/JAMSTEC

ICDP Drilling Activities Summer/Fall 2021

Although the Corona pandemic is still around and certainly will be around for longer, many ICDP-funded projects either have already kicked off or will do so soon. In recent months, two ICDP projects have drilled boreholes in Switzerland/Germany respectively Italy.


Drilling Overdeepened Alpine Valleys (DOVE)



Drilling Overdeepened Alpine Valleys (DOVE) investigates formerly-glaciated areas, now characterized by deeply incised structures filled by Quaternary deposits. These buried troughs and valleys were formed by glacial overdeepening, likely caused by pressurized subglacial meltwater below warm-based glaciers. The overall goal is to determine age and extent of past glaciations and how and at which rate glacial erosion affects mountain ranges and their foreland by scientific

drilling in Switzerland (Basadingen) and Germany (Tannwald). Drilling at the Basadingen site in Northern Switzerland finally drilled at a sequence of diamicts at a depth of 143 meters that likely represents the bottom of the overdeepened basin. Drilling at Tannwald includes three boreholes approx. 160 m deep, two of which - designed for geophysical investigations with no core recovery - were completed by end of June, while the third borehole at the Tannwald site retrieve continuous core with excellent recovery.

STAR (A Strainmeter Array Along the Alto Tiberina Fault System, Central Italy)



STAR (A Strainmeter Array Along the Alto Tiberina Fault System, Central Italy) drills boreholes in Gubbio (Central Italy), a location famous for geoscientist worldwide because the Iridium anomaly that marks the Cretaceous-Paleogene boundary was identified and described here for the first time. Current ICDP drilling at Gubbio addresses another big unknown: the low-angle fault paradoxon. Gubbio sits on top of the Alto Tiberina Fault (ATF), where rock layers with only a slight inclination lie on top of each other, so mainly creeping

behaviour and only low earthquake activity of the ATF would be expected. Nevertheless, the opposite is observed at times: Gubbio was hit by an Mw 5.6 earthquake in 1984. This contradictory behaviour is sometimes referred to as the “low angle normal fault paradox “. Within the framework of the ICDP funded project STAR meanwhile two of a total of six 80 to 160 meter deep boreholes have been drilled and instrumented with strainmeters, seismometers and fiberoptics. The boreholes do not reach down into the fault itself, but will provide relevant data from the zone above - over a period of many years



STAR drilling at Gubbio, Central Italy.
Credits: T. Wiersberg, ICDP

ICDP Core Replica

IODP/ECORD and ICDP have been invited to deliver input for an exhibition at the Natural History Museum in Vienna, Austria. For this purpose, ICDP designed a replica of a 2.3 Ga old drill core from the ICDP project FAR-DEEP. FAR-DEEP drill cores date back to the early Palaeoproterozoic (2.0-2.5 Ga before present), the time of the formation of the modern Earth system, when the atmosphere began to evolve and accumulate oxygen. The replica original consists of siltstone with layers of oxidized iron, called “Red Beds” or BIF (“Banded Iron Formation”), which document the great oxidation event.



FAR-DEEP drill core replica. Credits: U. Heidbach, ICDP

AGU Fall Meeting and EGU General Assembly

On the **EGU 2021 General Assembly**, the virtual joint IODP-ICDP-SSP2.9 session “Achievements and perspectives in scientific ocean and continental drilling” was very well attended (over 100 participants), as was the ICDP-IODP Town Hall Meeting that followed. Five webinars organized by IODP/ECORD and ICDP were also well received, with 25-40 participants attending each. For the **EGU 2022 General Assembly**, the call for abstracts is already open with abstract submission deadline on 12 January 2022, 13:00 CET (<https://meetingorganizer.copernicus.org/EGU22/session/43244>).

Albeit ICDP will not be physically present at the upcoming **AGU 2021 Fall Meeting**, we will be available via Zoom each day from 9:15-9:45 CST (Meeting ID: 846 7459 9441, Passcode: 602726). The joint ICDP-CSD Facility Town Hall meeting will be held on Monday, December 13. Details will be announced shortly via ICDP social media. Stay tuned for updates!



SCIENTIFIC DRILLING | Volume 29 | April 2021

A new issue of the IODP-ICDP programme journal SCIENTIFIC DRILLING was published in Spring 2021.

The volume (Vol. 29) contains one Science Report, one Progress Report, one Workshop Report and three Technical Developments. The Workshop Report “Exploring Deep Oceanic Crust of Hawai’i” discusses the preparation of an IODP proposal to drill a 2.5 km-deep hole into oceanic crust on the North Arch off Hawai’i as a pilot hole for exploration of the oceanic crust-mantle transition (MoHo, here we come). The Technical Development contributions describe new geophysical memory-logging tools for highly unstable and inclined scientific exploration drilling, methods to minimize microbial contamination from drilling lubricants into subsurface rock cores and new methods for pressure core sub-coring and pore-scale micro-CT scans. Furthermore, two papers from this volume report on paleoclimate archives from southern mid-latitudes in Brazil (Science Report) and New Zealand (Progress Report). SCIENTIFIC DRILLING is an Open Access journal with no publication costs for authors. We kindly invite the scientific drilling community to consider publication in SCIENTIFIC DRILLING.

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Helmholtz Centre Potsdam, GFZ
Section 4.2: Geomechanics and Scientific Drilling

More information about ICDP: <https://www.icdp-online.org>



Portugal

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Fatima Abrantes, the ECORD Council member for Portugal, was nominated as Co-chief Scientist of IODP Expedition 397: Iberian Margin Paleoclimate that will drill into Pleistocene to late Miocene sediments on the SW Portuguese margin in October-December 2022. She is the first Portuguese Co-chief Scientist after the start of “IODP” in 2003 and the second overall since Portugal joined ODP in 1998. The American Geophysical Union (AGU) recently also honored Fatima Abrantes with one of the prestigious Ambassador Awards. The Portuguese IODP community congratulates her to both achievements.

IODP played a role in various outreach activities. In early April 2021, Helder Pereira, the high school teacher who sailed as outreach officer on IODP Expedition 339, contributed the Zoom talk “Breve introdução à perfuração do fundo do oceano para fins científicos” [Brief Introduction to Deep Ocean Drilling for Scientific Purposes] to the ‘VIII Semana do Núcleo de Estudantes de Biologia da Associação Académica da Universidade do Algarve (NEBUA-AAUALG)’ (‘8th Week of the Biology Students’ Nucleus of the Academic Association of the University of the Algarve).



Scientific outcomes, in particular the climatic variations seen in the sea-surface temperature record of IODP Site U1385 (SW Portuguese margin), were presented in several activities this fall starting with the European Researchers’ Night at the end of September. Teresa Rodrigues, who generated the temperature record, also used it in presentations at the FIC.A and the Seminar on “Research in State Laboratories and Building a Safe and More Resilient Society” on 25 October 2021. The FIC.A - Festival Internacional de Ciência de Oeiras (International Science Festival in Oeiras) aimed to bring the worlds of science and technology closer to school students from pre-school, 1st cycle, 2nd cycle, 3rd cycle and secondary school level. To engage the curiosity of the school students, Teresa Rodrigues used her IODP results to explain to the students “Pode o aquecimento global levar a períodos de frio extremo?” (Can global warming lead to extreme cold spells?)

Antje Voelker - antje.voelker@ipma.pt
ECORD Council member, ESSAC Delegate



Teresa Rodrigues (left photo, credits: IPMA) explaining the link between global warming and the possibility of cold spells caused by melting of glacial ice sheets as reflected in the temperature record of IODP Site U1385 (shown in right photo) to a captive audience of school students during the FIC.A (right photo).

The IODP research community in Austria is continuing its efforts in (1) working with data sets obtained during the April-to-June-2021 offshore phase of IODP Expedition 386: Japan Trench Paleoseismology and preparing its onshore science party in early 2022 (Michi Strasser, Co-chief Scientist); (2) preparing two Magellan Plus workshops in Graz, that were postponed to April and September 2022 (IO:DIP - Indian Ocean: Delving into the Past and COSNICA – The life cycle of a microplate at a convergent margin, hosted by Gerald Auer and Walter Kurz, respectively); and (3) getting ready for sailing IODP Expedition 391 - Walvis Ridge Hotspot in December 2021 (Arianna Del Gaudio). We are also happy that Water Kurz was recently invited to sail IODP Expedition 390: South Atlantic Transect in 2022.



Furthermore, we note growing interest from Austrian early-career scientists in the programme, which is resulting in an increasing number of Austrian applications to sail, also in 2021.



Towards preparing and securing continued Austrian membership in ECORD, we – together with our colleagues from ICDP and the Austrian Academy of Sciences (ÖAW) – are organizing an ÖAW-IODP/ICDP Symposium on 9 December 2021, with Roz Coggon and Marco Bohnhoff introducing the new 2050 Science Framework and ICDP Science Plans, respectively, and we Austrian scientists presenting our scientific-drilling related research highlights, program involvements and future research perspectives to the broader public and representatives of the federal ministry for education, science and research (BMBWF). Just after the symposium we will have a workshop to prepare community input for the next negotiation phases in 2022/2023 between the ÖAW and BMBWF, for continued membership in the post-2023 scientific ocean drilling programme.

Michael Strasser - michael.strasser@uibk.ac.at
ESSAC Delegate

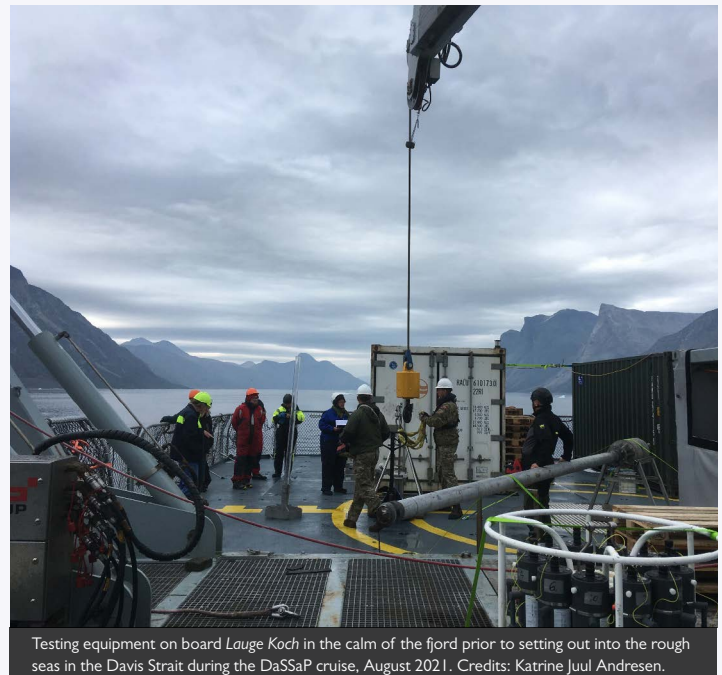
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ESSAC Alternate

Bernhard Plunger - bernhard.plunger@oem.ac.at
ECORD Council Delegate



Denmark is very pleased that the mission proposal 909 (CENICE) to study the Cenozoic paleoclimate history of Baffin Bay and northwest Greenland has been scheduled for 2023 (Expedition 400). Prof. Paul Knutz from the Geological Survey of Denmark and Greenland (GEUS) and Anne Jennings (INSTAAR, U. Colorado in Boulder, USA) have been selected as Co-chief Scientists. Preparations, including pre-expedition meetings and scientific staffing, will commence in 2022.

From 13 to 18 August a short cruise, the Davis Strait Site Survey and Paleoceanography (DaSSaP), was carried out with the patrol vessel Lauge Koch (LAKO) of the Danish Royal Navy with the purpose of obtaining shallow site survey data in support of Proposal 962 (Stoner et al.). This mission has been approved by the JRFB but not scheduled yet. The site survey cruise was planned for 2020, but had to be postponed due to COVID-19. Despite the few days of cruise time and less-than-optimal weather, the cruise succeeded in reaching its target and collected subbottom profiler and multibeam data as well as several sediment cores. Cruise leader: Senior scientists Tove Nielsen (GEUS), co-lead: Prof. Marit-Solveig Seidenkrantz (Aarhus University).



Testing equipment on board Lauge Koch in the calm of the fjord prior to setting out into the rough seas in the Davis Strait during the DaSSaP cruise, August 2021. Credits: Katrine Juul Andersen.

Marit-Solveig Seidenkrantz - mss@geo.au.dk
ESSAC Delegate

Paul Knutz - pkn@geus.dk
ESSAC Alternate

The Irish community was delighted that Weimu Xu (UCD/iCrag) was able to participate in Expedition 396: Mid-Norwegian Continental Margin Magmatism as part of the reduced science party hosted on the JR. Weimu thoroughly enjoyed the opportunity to work onboard during such a successful expedition and eagerly awaits future onshore sampling in Bremen. Her post-cruise research will apply paleobotanical and geochemical tools and analysis, with the aim to constrain North Atlantic Igneous Province volcanic activity and associated carbon degassing and changing atmospheric pCO_2 , and potential links to climatic warming, enhanced hydrological cycling and changing global weathering rates.

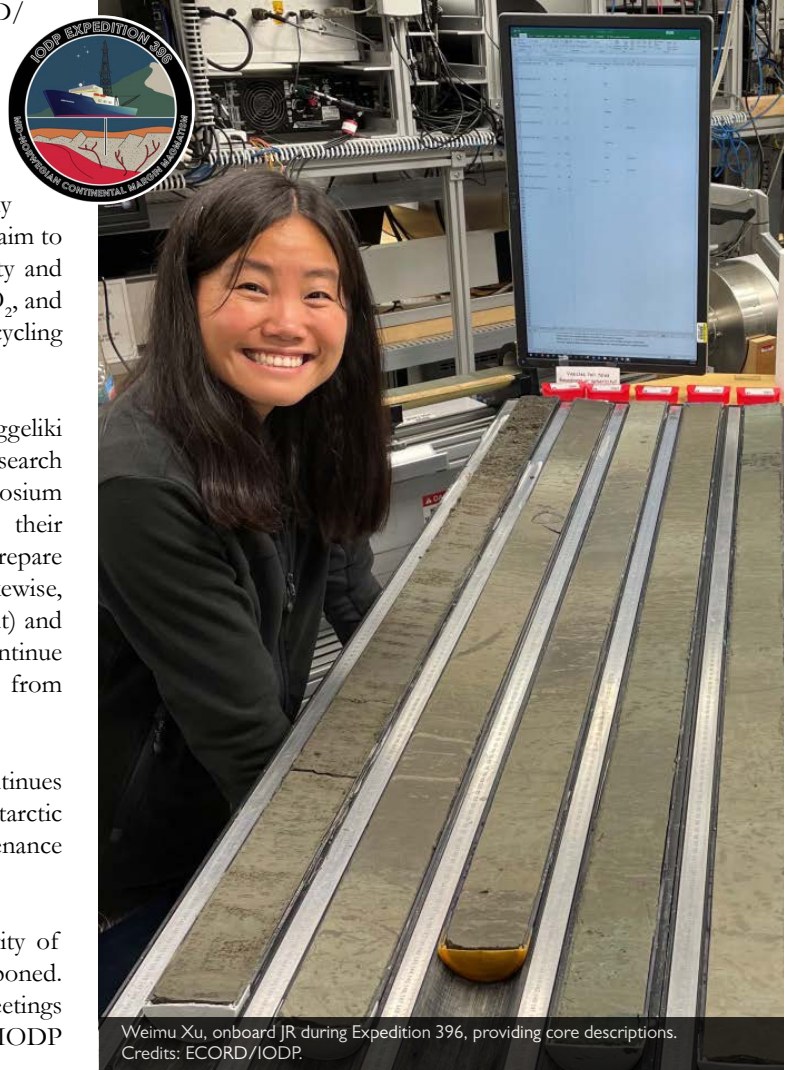
Ben Couvin (UCD postgraduate student) and Aggeliki Georgiopolou (expedition participant) presented their research on Expedition 372 at the recent '9th International Symposium on Subaqueous Mass Movements and their Consequences' – and continue to prepare material for additional publications. Likewise, David McNamara (expedition participant) and his student, Effat Behboudi (UCD), continue efforts for future publications arising from Expedition 372.

Roland Neofitu (UCD, 2020 ECORD Research Grant) continues his research on the mid-Miocene dynamics of the Antarctic ice-sheet, through the application of sedimentary provenance techniques on ice-rafted debris.

Due to the persisting presence of COVID-19, the majority of geoscience meetings within Ireland remain virtual or postponed. We look forward to the future return of in-person meetings and additional opportunities to promote ECORD & IODP participation to our scientists.

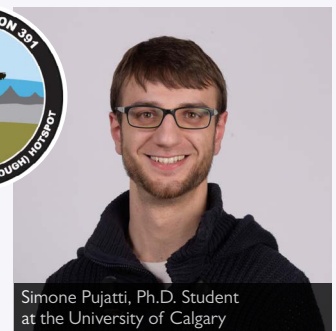
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ECORD Council Delegate



Weimu Xu, onboard JR during Expedition 396, providing core descriptions.
Credits: ECORD/IODP.

Simone Pujatti, a Ph.D. Student at the University of Calgary will participate as a Physical Properties Specialist on the upcoming Expedition 391: Walvis Ridge Hotspot (8 Dec. 2021 - 7 Feb. 2022). Simone is working in Dr. Ben Tutolo's Reactive Transport Research Laboratory (<https://ucalgary.ca/reactive-transport/research/>). Simone is interested in water-rock interactions during hydrothermal alteration of oceanic lithosphere, and, specifically, quantifying variations in porosity, permeability, mineralogy, and geochemistry, with a particular focus on the bulk redox state of iron in mafic and ultramafic rocks.



Simone Pujatti, Ph.D. Student at the University of Calgary

John William Jamieson - jjamieson@mun.ca
Chair of the Canadian Consortium for Ocean Drilling

Early-career scientists - IODP-Italy Postdoctoral Fellowships

The evaluation process of the “CNR IODP-Italy call for 2-year long Postdoctoral Fellowships” (2021 ed.) has been timely completed. Two early-career scientists have been awarded to conduct the following projects on IODP data and samples: (1) Isotopic heterogeneity and melt aggregation at the oceanic crust-mantle transition (ODP Site 895 and IODP Site U1415, Hess Deep, East Pacific Rise) (Valentin Basch, IGG-CNR (Pavia); (2) Origin and fate of refractory and ultra-refractory domains in the oceanic mantle: new constraints from the Iberia-Newfoundland, Hess Deep and IBM drilled peridotites (Arianna Secchiari, University of Parma).

Four Italian early-career scientists (two PhD students and two Postdoctoral researchers) have also successfully applied for the annual call for ECORD research grants.



Scientific participation to the programme - highlights

Giacomo Dalla Valle (CNR ISMAR) will sail soon as a Sedimentologist on IODP Expedition 391: Walvis Ridge Hotspot.



Jaume Dinarès-Turell (INGV) will participate as a Paleomagnetist on IODP Expedition 390: South Atlantic Transect.

In the frame of the active Italian involvement in drilling proposals, the Magellan Plus Workshop “Serpentinite diapirs in the Calabrian subduction system return lower plate mantle from Earth’s oldest ocean” will be organized by Luca Gasperini and Alina Polonia next Spring in Bologna (CNR-ISMAR).

Dissemination and outreach in 2021

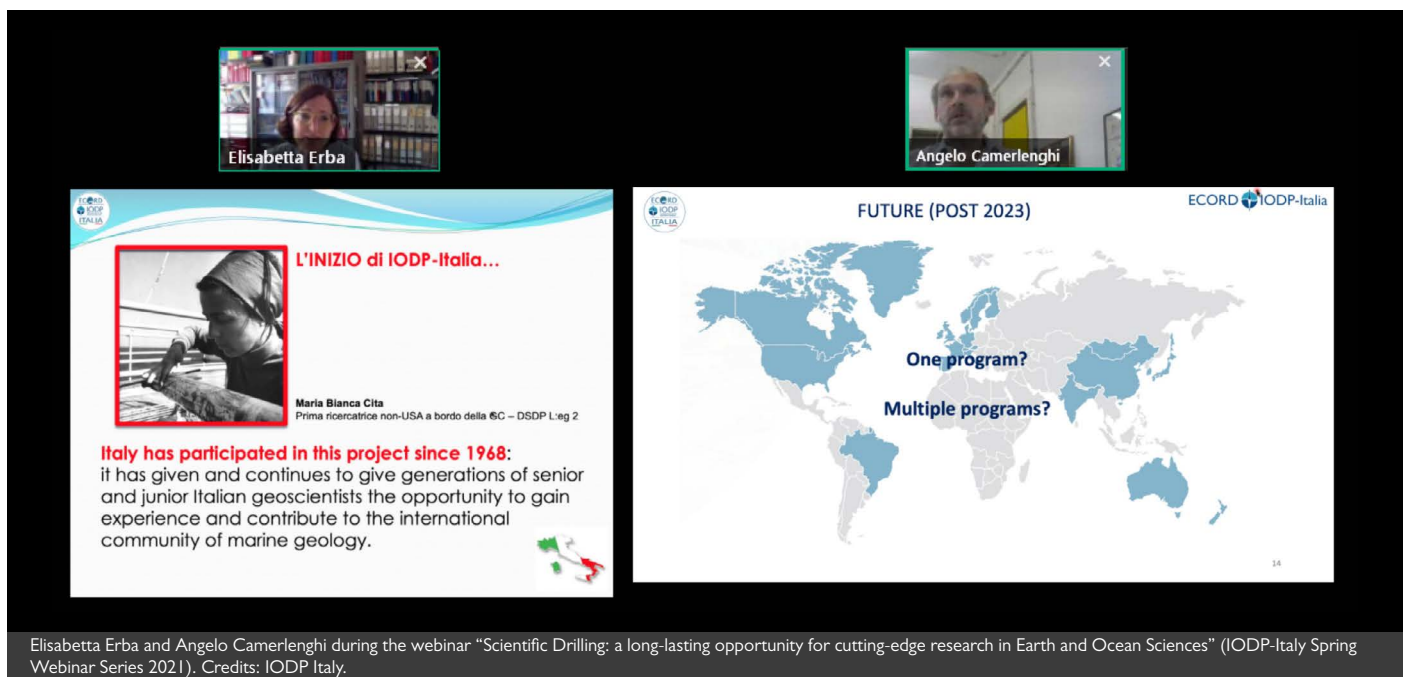
IODP-Italy Spring Webinar Series 2021 International Scientific Drilling through IODP and ICDP

IODP-Italy Spring Webinar Series 2021. A joint ocean and continental drilling live event “International Scientific Drilling through IODP and ICDP” was promoted by IODP-Italy last spring (March-June 2021). Qualified experts in scientific drilling successfully conducted six seminars (four on IODP and two on ICDP), spanning from scientific presentations to sessions regarding the opportunities to get involved and the status of the Italian participation to the international drilling programmes. IODP-Italy Spring webinar series 2021 achieved 344 live connections (~ 50 % young researchers and PhD students). The contents are available on the IODP-Italy website (<http://www.iodp-italia.cnr.it>, section Events / IODP-Italy) and as a playlist on YouTube (<https://bit.ly/3GW11Gy>).

IODP-Italy at the 90th SGI conference. On the occasion of the 90th congress of the Italian Geological Society “Geology without borders” (Trieste, 14-16 September 2021; ~ 500 attendees), IODP-Italy set up a virtual exhibition booth to illustrate its role and activities among the national geoscience community. In addition, Chiara Boschi gave a presentation on IODP-Italy on behalf of the “CNR Committee for ECORD-IODP and ICDP”.

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ECORD Council Delegate
(CNR) IODP-Italy Scientific Secretariat and the national IODP-Italia Committee

IODP-Italy: www.iodp-italia.cnr.it



Elisabetta Erba and Angelo Camerlenghi during the webinar “Scientific Drilling: a long-lasting opportunity for cutting-edge research in Earth and Ocean Sciences” (IODP-Italy Spring Webinar Series 2021). Credits: IODP Italy.

The Finnish IODP community is looking forward to the Magellan Workshop “Mechanisms of rifting of large continental blocks – Baltic Sea case study” to be held in Helsinki-Espoo 1-3 December 2021. Key questions to be discussed at the workshop include (1) changes in the periodicity and plate-tectonic framework of rifting from Archaean to present, (2) climate and weathering processes in the Mesoproterozoic, and (3) geological controls over the reactivation of rift-faults. The programme includes sauna, of course! All interested are very welcome to participate (contact pimisk@utu.fi).

Raisa Alatarvas has continued her PhD project at the University of Oulu, using materials from the Expedition 347: Baltic Sea Paleoenvironment. Participants of the Expedition 347, Outi Hyttinen and Aarno Kotilainen, have continued publishing results from the expedition.



Joonas Virtasalo has been invited to the OSP of Expedition: 386 Japan Trench Paleoseismology.

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ESSAC Alternate

UK IODP Annual Meeting 2020

The sight of a science party, albeit reduced, back onboard the *D/V JOIDES Resolution* as part of Expedition 396: Mid-Norwegian Continental Margin Magmatism was a welcome sight for all. Representing the UK community onboard was Joost Frieling (University of Oxford), sailing as a Micropaleontologist. Despite COVID-related disruption to the posted IODP schedule, engineering works (Expedition 390C and 395E) in preparation for the South Atlantic Transect (Expedition 390 and 393) were recently undertaken by the *JOIDES Resolution*, with several re-entry cones installed that are ready and awaiting the arrival of the COVID-delayed expeditions. This work was overseen by Expedition 390 and 393 Co-chiefs Rosalind Coggon and Damon Teagle (both University of Southampton).

Recently, Dave Hodell (University of Cambridge) has been selected to Co-chief the upcoming Expedition 397: Iberian Margin Paleoclimate. In addition, Andrew McCaig (University of Leeds) has also been selected to Co-chief the upcoming Expedition 399: Building Blocks of Life, Atlantis Massif. The UK is well represented with five of the eight forthcoming IODP Expeditions selecting a UK-based Co-chief Scientist.



Royal Society University Research Fellow, Dr Rosalind Coggon (University of Southampton) has been awarded the prestigious Asahiko Taira International Scientific Ocean Drilling Research Prize by the American Geophysical Union (AGU, [see page 3](#)). Roz Coggon is the 7th recipient of this prize since its inception in 2015, and only the second woman to have received it. AGU awarded the prize to Roz Coggon in recognition of her “outstanding

achievements and contributions by pushing the frontiers of our science forward” and praised for “embodying AGU’s shared vision of a thriving, sustainable, and equitable future for all powered by discovery, innovation, and action and doing this with integrity, respect, diversity, and collaboration while creating deep engagement in education and outreach”. Additionally, Roz Coggon has been awarded the 6th ECORD award, in recognition of her outstanding and enormous contribution to the new 2050 Science Framework.

Professor Tony Morris (University of Plymouth), Chair of ESSAC, also recently received an ECORD award for his outstanding and long serving contributions to both ECORD and IODP ([see page 9](#)).



A NERC/UKRI Research Council geophysical site survey investigation for scientific ocean drilling grant (worth up to £1,650,000) is now open. The data generated from the investigation should aid the scientific community develop future ocean drilling expeditions. Proposals that seek international collaboration and co-funding that will maximise synergies with relevant international projects and programmes are strongly encouraged. The closing date is the 14th of December 16:00 UK Time.

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Science highlight

One of the IODP-NL science highlights in 2021 was Jeroen van der Lubbe and colleagues Nature publication on “Indo-Pacific Walker circulation drove Pleistocene African aridification”. The study presents results from Expedition 361: South African Climates where Jeroen participated as shipboard scientist. It provides an important framework for the link between climate change and early human evolution.



the Partnership for Observation of Global Ocean (POGO). He was also the Director of the NIOZ Royal Netherlands Institute of Sea Research for ten years. Earlier this year Henk participated also in Expedition 396: Mid-Norwegian Margin Magmatism and Paleoclimate Implications. Even though the conditions were difficult due to the pandemic situation, the expedition turned out as a great success and with exciting new sedimentary archives of the Paleocene-Eocene Thermal maximum.



Dutch representatives in IODP

Henk Brinkhuis started his term as **IODP Forum Chair** for the term 1 October 2021 – 30 September 2024

Henk Brinkhuis is the Chair of Marine Palynology and Paleoecology at Utrecht University (read more in the Letter from IODP Chair on [page 14](#)). Dr. Brinkhuis is a marine geologist, marine palynologist, and paleoceanographer. He has led and participated in four scientific ocean drilling expeditions and served previously Netherlands IODP the ECORD Science Support and Advisory Committee (ESSAC), the IODP Science Steering and Evaluation Panel (co-chair), and the Executive Committee of

Upcoming meeting

The Dutch scientific ocean drilling community will come together again



during the NAC 2022 conference on 10-11 March 2022. The NAC conference brings together all the research fields within the Earth and Environmental Sciences in the Netherlands and will host **session dedicated to IODP related research**.

IODP-NL will also organise a workshop during the conference to inform the community about upcoming changes in the programme and brainstorm about future possibilities.



Henk Brinkhuis, day shift scientists and JRSO technicians welcome the golden hour onboard *JOIDES Resolution* during IODP Expedition 396.
Credits: Carlos Alvarez Zarikian, IODP JRSO.

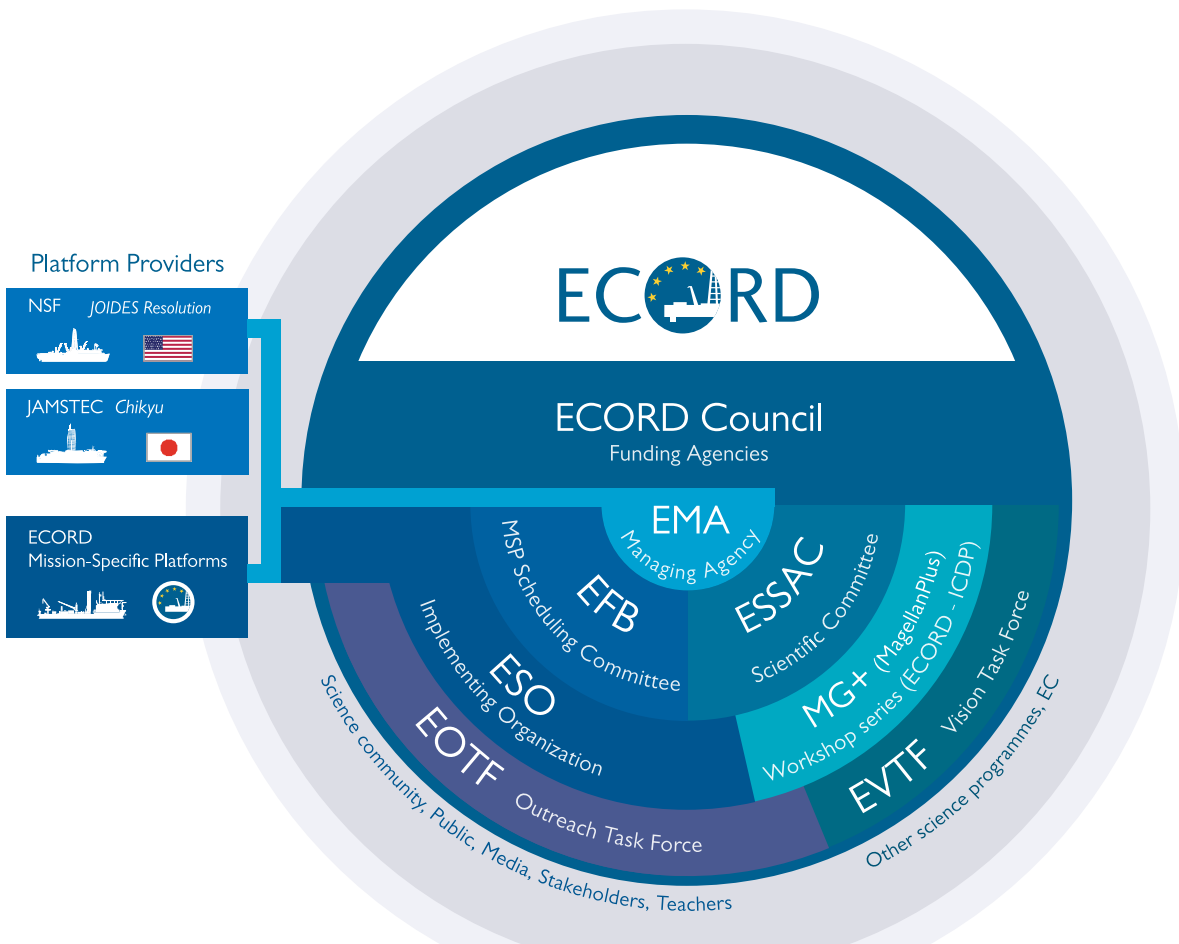
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ESSAC Delegate

IODP-NL webpage: <https://www.iodp.nl/>

ACEX: Arctic Coring Expedition	IODP: Integrated Ocean Drilling Program (2003-2013) & International Ocean Discovery Program (2013-2023)
AGU: American Geophysical Union	JAMSTEC: Japan Agency for Marine Earth Science and Technology
AMS: Arctic Marine Solutions	J-DESC : Japan Drilling Earth Science Consortium
ANZIC: Australian and New Zealand IODP Consortium	JOIDES: Joint Oceanographic Institutions for Deep Earth Sampling
ArcOP: Arctic Ocean Paleoceanography, IODP Expedition 377	JpGU: Japan Geoscience Union
BCR: Bremen Core Repository	JR: <i>JOIDES Resolution</i>
BGR: Bundesanstalt für Geowissenschaften und Rohstoffe - Federal Institute for Geosciences and Natural Resources	JRFB: JOIDES Resolution Facility Board
BGS: British Geological Survey	JRSO: JOIDES Resolution Science Operator
BMS: Boring Machine System	MarE3: Institute for Marine-Earth Exploration and Engineering
CCOD: Canadian Consortium for Ocean Drilling	MARUM: Zentrum für Marine Umweltwissenschaften der Universität Bremen - Center for Marine Environmental Sciences, University of Bremen
CIB: Chikyu IODP Board	mbsf: metres below seafloor
CNR: Consiglio Nazionale delle Ricerche – National Research Council, Italy	mbsl: metres below sea level
CNRS: Centre National de la Recherche Scientifique - National Center for Scientific Research, France	MCIN: Ministry for Science and Innovation, Spain
DAFSHE: Danish Agency for Science and Higher Education	MeBo: Meeresboden-Bohrgerät - seafloor drill
DFG: Deutsche Forschungsgemeinschaft - German Research Foundation	MEXT: Ministry of Education, Culture, Sports, Science & Technology, Japan
ECORD: European Consortium for Ocean Research Drilling	MoU: Memorandum of Understanding
EFB: ECORD Facility Board	MSP: Mission-specific platform
EGU: European Geosciences Union	NHM: Natural History Museum
EMA: ECORD Managing Agency	NSF: National Science Foundation, USA
EOTF: ECORD Outreach Task Force	NWO: Nederlandse Organisatie voor Wetenschappelijk Onderzoek - Netherlands Organisation for Scientific Research
EPC: European Petrophysics Consortium	ÖAW: Österreichische Akademie der Wissenschaften - Austrian Academy of Sciences
EPSP: Environmental Protection and Safety Panel	ODP: Ocean Drilling Program
ESO: ECORD Science Operator	OSP: Onshore Science Party
ESSAC: ECORD Science Support and Advisory Committee	PI: Principal Investigator
EVTF: ECORD Vision Task Force	PMO: Program Member Office
FB: Facility Board	SEP: Science Evaluation Panel
FCT: Fundação para a Ciência e a Tecnologia - National Funding Agency for Science and Technology	SMR: Science Mission Requirements
FNS: Fonds National Suisse de la Recherche Scientifique - Swiss National Science Foundation	SPRS: Swedish Polar Research Secretariat
FY: Fiscal Year	SSO: Science Support Office
GPC: Giant Piston Corer	UKRI: UK Research and Innovation
GSI: Geological Survey of Ireland	USSSP: U.S. Science Support Program
IBM: Izu Bonin Mariana	VR: Vetenskapsrådet - Swedish Research Council
ICDP: International Continental Scientific Drilling Program	
IKC: In-kind contribution	



Onboard R/V *Kaimei* during IODP Expedition 386.
Credits: N. Okutsu, ECORD/IODP/JAMSTEC



ECORD Member Countries




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


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