

ECORD Teachers' Workshop



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Reports of MagellanPlus Workshops
Outcomes of the Mediterranean Outflow Expedition
ICDP Training Course 2014*

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The International Ocean Discovery Program (IODP) is an international research programme dedicated to advancing scientific understanding of the Earth through drilling, coring, and monitoring the sub-seafloor. The European Consortium for Ocean Research Drilling (ECORD) supports the participation of European, Canadian and Israeli scientific communities in IODP and provides funding for the implementation of mission-specific platform expeditions. ECORD is funded by Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Israel, The Netherlands, Norway, Poland, Portugal, Sweden, Switzerland and The United Kingdom.

IODP is supported by the US National Science Foundation (NSF); Japan's Ministry of Education, Culture, Sports, Science, and Technology (MEXT); the European Consortium for Ocean Research Drilling (ECORD); the Australia-New Zealand IODP Consortium (ANZIC); India's Ministry of Earth Sciences; the People's Republic of China (Ministry of Science and Technology); the Korea Institute of Geoscience and Mineral Resources (KIGAM); and Brazil's Ministry of Education (CAPES).

For more information, visit www.iodp.org.

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Cover: French science teachers took part in the first ECORD Teachers' Workshop "Understanding Earth with Ocean Cores" in Valbonne Sophia Antipolis, France (credit J.L. Bérenguer). Photo right: Sunrise over the Philippine Sea during Expedition 351 Izu Bonin Mariana Arc Origins (photo Mohammed Aljadhali & IODP).





Gilbert Camoin

An Overview of ECORD Activities



Guido Lüniger

Even if no mission-specific platform expedition will be implemented in 2014, this year will paradoxically appear as extremely active for ECORD on all aspects of its endeavours: science, operations, management, collaboration and outreach and education.

ECORD membership

ECORD will include 18 countries until the end of 2014 when Iceland will withdraw its participation in the Consortium. The ECORD Council has decided to remove Spain - hopefully temporarily - from our list of ECORD members and, accordingly, ESSAC will not consider further applications from Spanish scientists to sail on IODP expeditions. However, the ECORD Council has encouraged Spain to send observers to the ECORD Council and ESSAC meetings to maintain contact with the hope that Spain will be back in ECORD soon.

All other member countries have confirmed their participation in ECORD for a minimum of five years for most, and a minimum of three years for four countries (Canada, Denmark, Israel, Switzerland). Commitment of all ECORD funding agencies beyond FY2018 will be based on an external evaluation of ECORD's achievements and performance after only three and a half years of the International Ocean Discovery Program.

ECORD's exchanges with Russia have been fruitful over recent months. ECORD has offered the status of "Accessing Member" to Russia, allowing young Russian scientists to take part in the ECORD educational programme and Russian representatives to attend ECORD meetings as observers. This temporary status will allow our Russian colleagues to try to form a consortium of institutions potentially interested in joining ECORD, and to further develop discussions with the governmental entities to raise a significant yearly contribution to ECORD.

Preliminary contacts have been established with the Czech Republic,

Turkey and Luxembourg for a possible future expansion of the Consortium.

ECORD activities in drilling expeditions

More than 80% of the ECORD annual budget, which is currently USD 18.7M, concern direct operational costs for IODP expeditions. ECORD's co-funding of the *JOIDES Resolution* and the *Chikyu* amounts to USD 8M (*i.e.* 42.7% of the ECORD budget) and forms the basis of two distinct Memoranda of Understanding (MoU) with the NSF and JAMSTEC, including a combination of significant co-funding along with berth exchanges to provide access to these platforms for ECORD scientists and access to MSP expeditions for scientists from our partner countries.

The annual ECORD budget should be considered as a minimum budget, since in-kind contributions as well as external co-funding from any ECORD or IODP member country will be included as additional funding sources to deliver an average of one MSP expedition a year for IODP. The ECORD Facility Board (*page 5*) has recently determined a 5-year plan for the MSP expeditions by adjusting the numbers of low-, medium-, and high-cost expeditions. Expedition 357 Atlantis Massif Seafloor Processes: Serpentinization and Life should be the next MSP expedition and will be implemented in October-December 2015 (*pages 6-7*). The expeditions Chicxulub Impact Crater (#364) (*pages 7-8*) and Antarctic Cenozoic Paleoclimate are tentatively scheduled in FY2016 and FY2017. A drilling expedition in the Arctic could be implemented in FY2018, therefore completing the MSP operational plans for the first five years of the International Ocean Discovery Program.

After three expeditions dedicated to the Izu Bonin Mariana area (#350, #351 and #352), the *JOIDES Resolution* will implement a series of expeditions in the Indian Ocean in FY2015 and 2016 - <http://www.iodp.org/expeditions> - before following a path from the western and southwestern Pacific, through the

Southern Ocean, and into the Atlantic Ocean to start drilling there in FY2018.

There are still uncertainties regarding the next *Chikyu* expeditions as the scheduling of riserless expeditions in Japanese Fiscal Year (JFY) 2014 and 2015 is still pending, while riser drilling expeditions could be potentially planned in JFY2016 and 2017.

ECORD activities related to the European Commission (EC)

The past months have been marked by the completion and submission of the Distributed European Drilling Infrastructure (DEDI) proposal in the frame of the EC Horizon 2020 (H2020-INFRAIA-2014-2015) (*page 8*) and built on two pre-proposals that were submitted in October 2012: Distributed European Infrastructure for Subseafloor Sampling and Monitoring (DEISM) by ECORD and Distributed European Drilling Infrastructure (DEDI) by the Deep-Sea and Sub-Seafloor Frontiers Initiative (DS3F).

The prime objective of the DEDI proposal is to further enhance the scientific investigation of the solid Earth beneath the surface by providing support for transnational access to cutting-edge technologies and proven scientific services to the European earth science community. DEDI is also designed to foster and improve European collaboration between DEDI partners, research groups and industry in the development and sharing of new, innovative technologies for specialist sub-surface sampling, measurements, downhole logging and long-term monitoring. Among the eleven partners from four ECORD countries (France, Germany, Iceland, UK), five of them are directly involved in ECORD through ESO and EMA (BGS - coordinator, MARUM, University of Leicester, CNRS Montpellier and CEREGE). The links with ICDP and the European Multidisciplinary Seafloor Observatory (EMSO) will be made through the GFZ-Potsdam and the IFREMER respectively. The Iceland Geosurvey (ISOR) and three SMEs are the other partners in the proposal.

ECORD is also involved in the "Earth Science Europe" initiative, which aims to establish an Earth Science Forum or Board to represent the whole Earth Science community, recognised by the EC. After the second meeting held on 2-3 April 2014 in Paris (France), which brought together ERC fellows and representatives of science programmes, national institutes and industry, a brochure has been published and is available online - <http://www.bgs.ac.uk/earthScienceEurope/downloads/EarthScienceEuropeBrochure.pdf>. A final meeting will be organised soon to define a roadmap.

In parallel, ECORD will soon restart discussions related to exploring new ways of organising its management and funding, e.g. possibly as a European Research Infrastructure Consortium (ERIC).

ECORD collaborative activities

Collaborations between IODP/ECORD and other science programmes have made significant progress over the last months. The first proposal prepared by the IMPRESS/IMAGES community was submitted on 1 April 2014 and concerns a multiphase project (863-MDP: ISOLAT, lead proponent: L. Peterson)

requiring mission-specific coring platforms to investigate the Southern Ocean paleoclimate and Past Antarctic Circumpolar current variability.

Following a recommendation from the IODP Forum, which was endorsed by the ICDP Assembly of Governors, a joint IODP/ICDP group has been formed to discuss ways to encourage submission of proposals that combine IODP and ICDP capabilities ("amphibious proposals"), and to clarify procedures for their coordinated reviews. ECORD and the ICDP Assembly of Governors have agreed to assign a specific annual budget of € 20,000 to workshop proposals aimed at initiating such amphibious drilling proposals in the frame of the MagellanPlus Workshop Series Programme, which is co-funded by ECORD and ICDP - <http://www.ecord.org/magellanplus.html>

ECORD outreach & educational activities

ECORD is at the cutting edge of education through a full array of activities, which are now potentially open to its IODP partners: the MagellanPlus Workshop Series Programme, the ECORD Distinguished Lecturer Programme, and activities aimed at training the next

generation of scientists: the ECORD Summer Schools, the ECORD Scholarships, as well as the ECORD Research Grants <http://www.essac.ecord.org/index.php?mod=education>.

ECORD has increased its presence in science conferences (EGU, AGU, International Sedimentological Congress, Goldschmidt Conference) where its activities are now more integrated with ICDP under a joint "Scientific Drilling" banner ([page 9](#)).

As we enter the second year of the International Ocean Discovery Program, it is satisfying to observe that ECORD has completed its mutation through its efficient new architecture to face new challenges, but also to benefit from new opportunities, offered by the programme. ECORD has already achieved most of its objectives regarding collaboration with the EC and the other science programmes, and now plays an even more active role in IODP scientific, technological and educational activities.

Gilbert Camoin, Director of the ECORD Managing Agency - camoin@cerege.fr - and Guido Lüniger, Chair of the ECORD Council - guido.lueniger@dfg.de

**New
Asahiko Taira
International
Scientific Ocean
Drilling
Research Prize**

Presented by AGU and the Japan Geoscience Union, this new Union prize will be given to an early career/early mid-career scientist in recognition of outstanding transdisciplinary research accomplishment in ocean drilling.

This prize has been made possible by the generous support of the Integrated Ocean Drilling Program Management International. It will be given annually with a cash award of \$18,000, and an invitation to present a lecture during the annual meeting.

Nominations open 15 January 2015
For more information visit
honors.agu.org
AGU

The **Asahiko Taira International Scientific Ocean Drilling Research Prize** is a new award that will be given to scientists within 15 years after their Ph.D. in recognition of their outstanding transdisciplinary research accomplishment in ocean drilling.

This new prize, given in honour of Asahiko Taira* (JAMSTEC), was made possible through a generous donation from the Integrated Ocean Drilling Program Management International (IODP-MI), which was decided during the last meeting of the IODP Board of Governors held in December 2013 in San Francisco.

The prize will be presented annually in an alternating cycle: first at the AGU's 2015 Fall Meeting in San Francisco and at the Japan Geoscience Union's Meeting the following year. The winner will receive USD 18,000 and the opportunity to present a lecture at the meeting where the award is presented.

<http://honors.agu.org/medals-awards/the-asahiko-taira-international-scientific-ocean-drilling-research-prize>

* *Asahiko Taira, for whom the prize is named, has an extensive background of more than 40 years in geological research. His areas of focus include tectonics, paleoceanography, and ocean drilling science. He obtained his Ph.D. from the University of Texas at Dallas, and then taught for several years as a Professor at Kochi University and the University of Tokyo.*



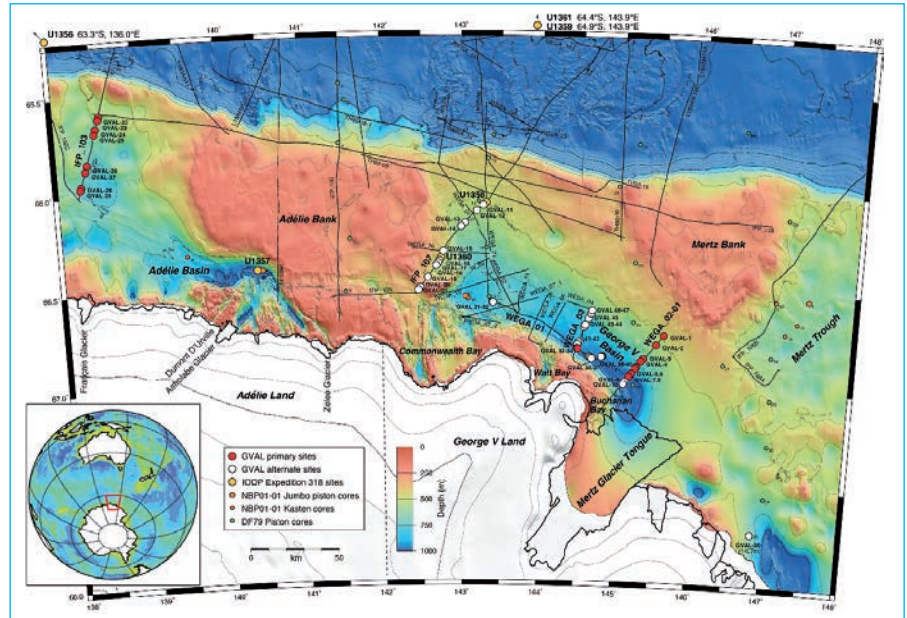
Karsten Gobl

News from the ECORD Facility Board

At the ECORD Facility Board's (EFB) Annual meeting in March in Bremen, the EFB produced a five-year strategy for scheduling MSP expeditions through to 2018. It was agreed to schedule the Atlantis Massif (Proposal #758) expedition in 2015 ([page 6](#)) and an Arctic expedition in 2018; however scheduling decisions for relatively low-cost expeditions in fiscal years 2016 and 2017 still had to be made.

After the Science Evaluation Panel (SEP) meeting in June, an email exchange between the EFB members discussed further scheduling and decisions were made by electronic voting ([table below](#)). A consensus was reached to schedule an expedition to drill the **Chicxulub Impact Crater** (Proposal #548) in 2016 ([pages 7-8](#)). In response to the EFB's main concern during the March meeting with regard to the high costs of a two-hole expedition, the Proposal #548 proponents had submitted an Addendum with a one-hole scenario only. The SEP discussed this Addendum and agreed that most of the scientific objectives could be met with a single borehole following which they put their recommendation to the EFB to schedule an expedition but with an extended penetration depth to 1,500 m. In order to keep the costs within the low-cost category, the EFB recommended to the ECORD Council that a limit should be placed on the expedition costs for ECORD.

The EFB also reached a consensus for an expedition to drill the East Antarctic Shelf (Proposal #813 Antarctic Cenozoic Paleoclimate, [above](#)) in 2017 using a



Proposal #813-Full Antarctic Cenozoic Paleoclimate (Williams et al.): Transects of primary and alternate sites along existing seismic lines with a total of 18 primary and 29 alternate sites up to 80 m penetration (353-1407 m WD).

seabed-drilling system such as RockDrill 2 or MeBo ([page 7](#)) on a research icebreaker. The Proposal #813 proponents had also submitted an Addendum in which they presented new site-survey data and modifications to the drilling strategy accordingly. The ECORD Science Operator is currently scoping and negotiating with operators to implement both expeditions.

According to the IODP reporting and review procedures, the EFB is in charge of coordinating the review meetings for MSP expeditions, which are to be held about six months after the expedition Onshore Science Party. The review meeting for Expedition 347 Baltic Sea

Paleoenvironment will take place on 18 November 2014 at CEREGE in Aix-en-Provence, France.

The EFB will hold its next annual meeting on 25-26 March 2015, also in Aix en Provence. Two EFB Science Board members, Marta Torres and Antonio Cattaneo, will rotate off after 2015. Beginning in 2016, the Science Board will have 6 members. A call for applications to serve on the ECORD Facility Board from 2016 to 2018 is now open until 5 December 2014 ([page 27](#)).

Karsten Gobl, Chair of the ECORD Facility Board - karsten.gobl@awi.de <http://www.ecord.org/ecord-fb.html>

Scheduled MSP proposals (as of June 2014)

#	Short title	Lead Proponent	Year	Area
758	Atlantis Massif Seafloor Processes	G. Früh-Green	2015	N Atlantic
548	Chicxulub: Drilling the K-T Impact Crater	J. Morgan	2016	G. of Mexico
813	Antarctic Cenozoic Paleoclimate	T. Williams	2017	George V Land shelf
	<i>Arctic proposal to be selected</i>		2018	

IODP Proposals are posted on <http://www.iodp.org/active-proposals>.



David McInroy



Sarah Davies

ECORD Science Operator News



Ursula Röhl



Dave Smith

In the previous ECORD Newsletter (#22), we reported on the initial results and successes of IODP Expedition 347 Baltic Sea Paleoenvironment, which was concluded by the expedition's Onshore Science Party in January and February 2014 at the University of Bremen. The Expedition 347 Preliminary Report is available online at http://publications.iodp.org/preliminary_report/347, with the Proceedings of the IODP Vol. 347 expected to be published in February 2015. ESO partners are finalising the QA/QC for expedition procedures and data. The science team is continuing with post-expedition research that is expected to lead to a series of high impact papers in peer-reviewed journals in the next two years.

With the successful completion of Expedition 347, ESO is now preparing for its next two exciting and contrasting expeditions: IODP Expedition 357 Atlantis Massif Serpentinisation and Life (*below*) and IODP Expedition 364 Chicxulub Impact Crater (*pages 7-8*).

IODP Expedition 357 Atlantis Massif Seafloor Processes: Serpentinization and Life

Co-chief Scientists: Gretchen Früh-Green (ETH Zurich, Switzerland) and Beth Orcutt (Bigelow Laboratory for Ocean Sciences, USA)

Scheduled to begin in October 2015, Expedition 357 promises to be an exceptional and exciting IODP expedition. This will be the sixth IODP Mission-Specific Platform (MSP) expedition, and the first MSP expedition aimed at coring hard rock.



RRS James Cook, the NERC-operated research vessel to be used as the Expedition 357 MSP.

The target is the Atlantis Massif oceanic core complex (30°N, Mid-Atlantic Ridge, *Figure 1*), a dome-like area of oceanic crust where variably serpentinised mafic and ultra-mafic lithologies are exposed on the seafloor by detachment faulting. Twelve shallow boreholes are planned to be drilled over the Atlantis Massif, each between 50-80 metres below seafloor (mbsf). The cores will characterise the tectono-magmatic processes that formed these heterogeneous lithologies and exposed them at the seabed, and to examine hydrothermal activity associated with detachment faulting. The expedition will collect cores to explore the extent and activity of the deep biosphere, and how abiotic and biotic processes change with ageing of the lithosphere and with variation in rock type. The role of serpentinisation in driving hydrothermal systems, sustaining microbiological communities, and sequestering carbon in ultramafic rocks will also be investigated.

This will be the first IODP expedition to use alternative coring apparatus from a non-traditional IODP platform. As an in-kind contribution to ECORD, the UK's Natural Environment Research Council (NERC) is providing free access to the *Royal Research Ship (RRS) James Cook* (*photo above*), a dynamically positioned research vessel. This vessel is 89.2 m in length, has an average operating speed of 11 knots, and contains a number of built-in science laboratories, which will be utilised in addition to the series of containerised laboratories normally used by ESO for MSP expeditions.

In another departure from the traditional view of IODP expeditions, coring and downhole logging will be conducted using seafloor drills. These seafloor drills have several advantages over larger deck-based drill rigs; importantly they can recover higher quality core with better core recovery when starting holes on hard rock. Being decoupled from the research ship on an umbilical, these seafloor drills avoid drill-string heave, which can cause large weight-on-bit fluctuations that cause crushing

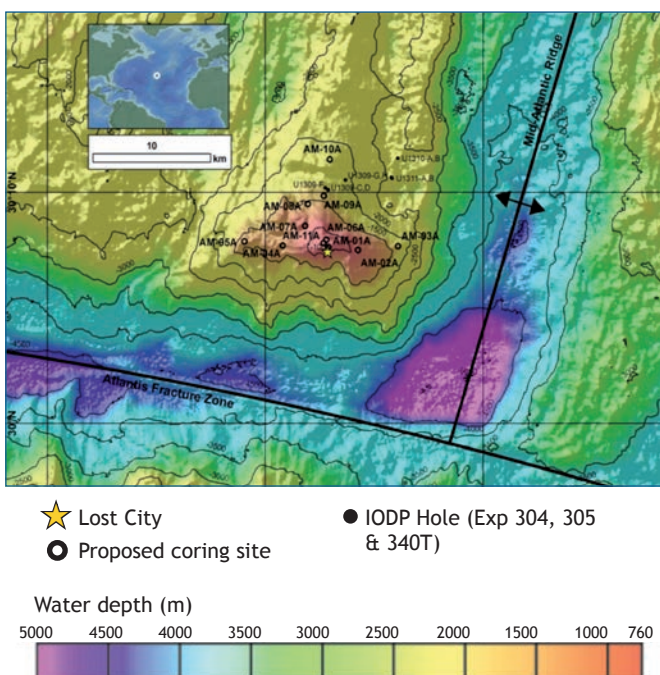
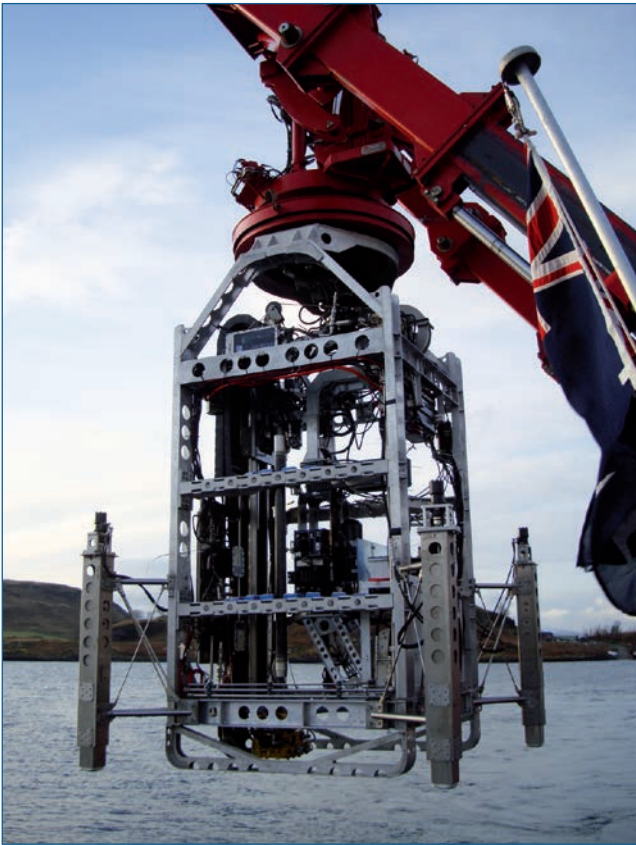


Figure 1. Location of IODP Expedition 357 proposed sites.



Deployment of the BGS RD2 (credit D. Smith, BGS).



Deployment of the MARUM MeBo (credit MARUM).

and fracturing. The seafloor drills also have smaller core diameter and, when combined with diamond bits and an absence of heave, perform better when recovering core from fractured igneous lithologies, which can be problematic for larger coring systems. The seafloor coring system requires less flushing, as the bits, drill pipes and casing are much smaller, allowing more sensitive control over the drilling parameters that are applied to the formation, such as the weight on bit. Two seafloor drills will be carried: the BGS seafloor RockDrill 2 (RD2, *photo above left*) and the MARUM Meeresboden-Bohrgerät (MeBo, *photo above right*). The RD2's maximum penetration is 50 mbsf and the MeBo's maximum penetration is 80 mbsf.

The RD2 and MeBo seafloor drills are evolving systems that are under constant development by technical teams at the BGS and MARUM. To meet the scientific demands of IODP expeditions, new capabilities need to be added to these systems, in particular downhole logging and the ability to plug and instrument boreholes. Expedition 357 is serving as a catalyst for new seafloor drill developments, and in the coming months ESO will continue with plans to develop new dual induction resistivity and magnetic susceptibility downhole logging tools, and a new drill-string plug and borehole packer system for integrated borehole fluid sampling by ROV in the future. These new developments will be deployed on Expedition 357 to enhance the expedition's scientific return.

The call for scientists to participate in this expedition is expected to open between November 2014 and January 2015. If interested, please consult <http://www.iodp.org/apply-to-sail>, or look out for

call news from your local IODP Program Member or National Office.

IODP Expedition 364 Chicxulub Impact Crater

Co-chief Scientists: Joanna Morgan (Imperial College London, UK) and Sean Gulick (University of Texas Institute for Geophysics, USA)

IODP Expedition 364 Chicxulub Impact Crater will see a return to deep drilling to investigate a cataclysmic impact event and its role in the K-Pg mass extinction. Scheduled for Spring 2016, the seventh IODP MSP expedition is expected to capture the imagination of the wider public and the interest of the scientific community.

The target is a single drill site 25 km offshore the State of Yucatán, Gulf of Mexico, positioned above the now buried, but well-preserved, Chicxulub impact crater (*Figure 2, page 8*). The crater is the result of a large terrestrial impact event, which produced a global ejecta layer, and has been directly linked to the K-Pg mass-extinction. Chicxulub is the only known terrestrial impact structure with an unequivocal topographic, but now buried, "peak ring". Peak rings on other planetary bodies are rings of hills that protrude through the crater floor within large impact basins, and there is no consensual agreement on either their formational mechanism or the nature of the rocks that form them. Coring into the impact crater itself will not only reveal the nature, lithology and physical state of the Chicxulub peak ring, but should also reveal how rocks are weakened during large impacts so that they collapse into flat, wide craters, and what caused the environmental changes that led to mass extinction.

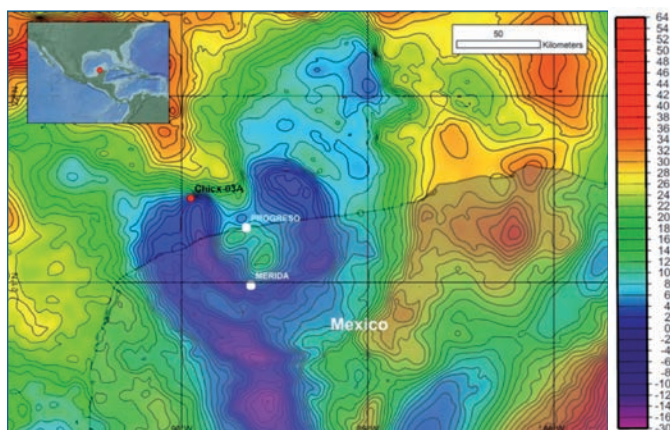


Figure 2. Location of IODP Expedition 364 proposed site, shown on map of free-air gravity (colour bar in mGal).

In only 17 m water depth, this MSP expedition will require the use of a lift boat or jack-up rig, similar to that used for Expedition 313 New Jersey Shallow Shelf in 2009. The expedition aims to drill a single hole to a minimum of 1,200 mbsf, taking core samples from 550 mbsf to total depth. It may be possible to increase the total depth to 1,500 mbsf, which will depend on the platform and coring apparatus contracted by ESO, and will be decided in advance.

At the time of writing, ESO is preparing to start the contracting exercise for the drilling services and platform, and will seek drilling options for both 1,200 mbsf and 1,500 mbsf scenarios. This expedition will be conducted inside Mexican territorial waters, and ESO is seeking to involve the Sistema de Investigación, Innovación y Desarrollo Tecnológico del Estado de Yucatán (SIIDETEY), a recently-formed scientific research consortium of the Mexican state of Yucatán, and the National Autonomous University of Mexico (UNAM) as project partners.

The call for scientists for this expedition is expected to open in Spring 2015. If interested please consult <http://www.iodp.org/apply-to-sail>, or look out for call news from your local IODP Program Member or National Office.

EC H2020 Proposal - Integrating and Opening Research Infrastructures of European Interest

A consortium of research institutes and SMEs, including four ESO partners (BGS, MARUM, University of Leicester and CNRS Montpellier) have submitted a proposal for € 5M funding over 3 years to the European Union's Horizon 2020 Research and Innovation Program. By coupling research and innovation, Horizon 2020 puts emphasis on excellent science, industrial leadership and tackling societal challenges. The goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation.

The specific call topic targeted by our consortium is "Integrating and Opening Research Infrastructures of European Interest", specifically addressing the domain "Research infrastructures for ocean drilling". The call asks for the development of a unique EU component for scientific research drilling that integrates

and links with IODP, ICDP, EMSO and other Research Infrastructures and earth science programmes, and additionally fosters involvement with industry in joint research projects.

We have proposed the **Distributed European Drilling Infrastructure (DEDI)** with the specific objective to further enhance the scientific investigation of the solid Earth beneath the surface by providing support for transnational access to cutting edge technologies and proven scientific services to the European earth science community. DEDI is also designed to foster and improve European collaboration between the infrastructure partners, research groups and industry in the development and sharing of new, innovative technologies for specialist sub-surface sampling, measurements, downhole logging and long-term monitoring. DEDI will stimulate the development of new instruments that could not be economically developed by a single institute, for example to sample in extreme environments including glaciers/ice, solid gas hydrates and high-temperature geological formations. Specific objectives of DEDI are to:

1. Foster synergies and pool resources in scientific drilling and monitoring by setting up a website, common mechanisms and policies for access, and all other technical requirements for transnational use;
2. Develop a sustainable sample and data curation management plan for all future projects where DEDI will be involved;
3. Improve existing technologies and complement those with innovative new tools and services to ensure the wide acceptance and versatile use of the Research Infrastructure (RI); it will prepare the way for a larger offer of access activities in the near future;
4. Bring continental and ocean drilling communities closer together and collaborate with their counterparts in ESFRI (*e.g.* EPOS, EMSO, etc.) in order to enhance the attractiveness of the drilling infrastructure to any scientist in Europe;
5. Establish effective knowledge exchange and engagement with industry partners for DEDI and its users;
6. Demonstrate the efficient use of DEDI by setting up a first amphibious research project along a vulnerable continental margin in the Western Mediterranean Sea. At this EMSO site, ICDP, IODP and EMSO will closely collaborate;
7. Establish a business plan for a sustainable DEDI within the European landscape of research infrastructures.

Nine Work Packages have been proposed by the DEDI consortium, to cover all management, networking, transnational access and joint research activities required to deliver the above objectives. The DEDI proposal is currently under assessment with other proposals in this call topic, with notification expected in early 2015.

David McInroy, ESO Science Manager, Sarah Davies, EPC Manager, Ursula Röhl, ESO Curation and Laboratory Manager and Dave Smith, ESO Operations Manager
<http://www.eso.ecord.org>
<http://www.ecord.org/contact.html#eso>



Albert Gerdes



Alan Stevenson

ECORD Outreach & Education News and Activities



Patricia Maruéjol



Julia Gutiérrez-Pastor

News from the Outreach team

Since April 2014, the ECORD Outreach & Education Task Force (ECORD OETF) have organised outreach activities at EGU 2014 and at the International Sedimentological Congress in Geneva (ISC 2014) in collaboration with ICDP, produced and distributed ECORD/IODP resources (printed and educational materials), supported the MagellanPlus Workshops and national initiatives, and opened education calls. The team met in Zurich, Switzerland, on 3-4 September 2014 to coordinate the programme's outreach and education activities for the rest of 2014 and early 2015. To enhance coordination between ECORD, IODP partners and ICDP, Matthew Wright, Communications Manager at the Consortium for Ocean Leadership/USIO, Thomas Wiersberg, Outreach & Education Manager at ICDP, and Melanie Leng (Member of the ICDP Executive Committee) attended the meeting and Sharon Katz-Cooper (Education Assistant Director at the Consortium for Ocean Leadership) and Tamano Omata (Outreach Manager at CDEX-JAMSTEC) joined the meeting via online connections. This was Milena Borissova's (EMA Assistant Director) final ECORD OETF meeting and the team would like to thank Milena for her contribution to the work of the OETF during the last three years and to wish her well for the future.

- **EGU 2014** - <http://www.ecord.org/pi/egu14.html> - 27 April to 2 May, Vienna (Austria). Joint ECORD/IODP-ICDP exhibit booth (#55-56-57) (*above*) and Townhall Meeting. A media conference "Looking into the past to predict future climate: new results from the IODP Baltic Expedition" in coordination with the EGU press team.
- **ISC 2014** - <http://www.sedimentologists.org/meetings/isc> - 18 to 22 August 2014, Geneva (Switzerland). Joint ECORD/IODP-ICDP exhibit booth (#12) in conjunction with IODP and ICDP science sessions.
- ECORD sponsored a students' programme entitled "Jumping on the Employment Express" on 9 June at the **Goldschmidt 2014 Conference**, (Sacramento, USA) - <http://goldschmidt.info/2014/studentEvents>
- Information and support (materials, core replicas, etc.) were provided to several events organised in ECORD and IODP member countries:
 - ♦ IODP-ICDP Germany, mid March, Erlangen (*page 25*)
 - ♦ 2nd Post-cruise Meeting of Expedition 339 Mediterranean Outflow, early June, Tarifa, Spain (*pages 18-19*)
 - ♦ IODP Australia at the Australian Earth Convention, early July - <http://iodp.org.au>
 - ♦ Urbino Summer School 2014, July (*page 11*)



- ♦ Bremen Summer School 2014, September (*page 12*)
- ♦ IODP-Italia at the Italian Geological Society meeting, mid September, Milan (*page 26*)
- ♦ Researchers' Night the University of Haifa, Israel, late September (*page 25*)
- ♦ IODP-Canada at the Geological Society of America meeting (GSA 2014), in Vancouver, mid October (*page 26*)
- ♦ IODP-France at the Earth Sciences Meeting (RST 2014), in Pau, late October
- ♦ IODP booths organised by CDEX/JAMSTEC at the Japan Geosciences Union Meeting (JpGU), in Yokohama, Japan in April/May and the Asia Oceania Geosciences Society (AOGS) meeting in Sapporo, Japan in July/August.

Upcoming events and activities

The ECORD OETF will continue to promote both the IODP and ICDP programmes under the umbrella of "Scientific Drilling" at science conferences and supporting national IODP educational initiatives. To enhance further collaboration IODP and ICDP outreach colleagues are invited to take part in each September meeting of the ECORD OETF.

ECORD and ICDP will organise a joint exhibition booth (#2412) at AGU 2014, 15-19 December in San Francisco, USA.

This will be the first time that the programmes will be jointly represented at AGU. We will also take part in the joint IODP-ICDP Townhall Meeting. ECORD and ICDP will continue their collaboration at EGU 2015, 12-17 April, in Vienna (booth and Townhall Meeting).

The ECORD OETF has been tasked to produce a new IODP brochure. Discussions started in September in Zurich and a draft will be presented at the next IODP Forum in 2015 in Canberra, Australia.

Education

Markus Fingerle (German science teacher) and Diane Hanano (IODP-Canada Science Coordinator) have been invited to sail as Education Officers during Expeditions 353 and 354 respectively (*pages 13 & 14*). Jean-Luc Bérenguer reported on the ECORD-IODP workshop for teachers held in France last April (*page 10*) at the joint ESSAC/ECORD Council Meeting in Zurich in October. ECORD recognised this successful educational experience as a major contribution to the education and outreach objectives of the programme and supported that it should be shared and developed across all ECORD countries.

ECORD Outreach team: Albert Gerdes and Alan Stevenson, ESO, Julia Gutiérrez-Pastor, ESSAC and Patricia Maruéjol, EMA - <http://www.ecord.org/pi/contacts.html>

"Understanding Earth with Ocean Cores" a Teachers' Workshop in France

Between 9 and 11 April, 40 teachers attended the IODP-France Educational Workshop entitled "Understanding Earth with Ocean Cores" (*below*). The workshop was held at the International School in Valbonne Sophia Antipolis where the organiser, Jean-Luc Bérenguer, is an Earth Science teacher.



The programme was spread over two and a half days. During the first morning we had two presentations: "Exploring the Oceans Crust" by Benoît Ildefonse (Géosciences Montpellier, *above*) and "The Ophiolite Model" by Georges Ceuleneer (GET Toulouse). These were complemented by two hard rock workshops, which used samples from Expedition 345 Hess Deep in which both the speakers, Jean-Luc and Susan Gebbels (UK) had participated. The evening's entertainment was a star-gazing session at the school's observatory where we had magnificent views of Mars, the Moon's craters, and the Galilean moons of Venus.

On the second day, the conference venue moved to Géoazur, a geological laboratory

close to the school. Three speakers, Sébastien Migeon (Géoazur), Maria Angela Bassetti (CEFREM, Perpignan) and Gilbert Camoin (CEREGE, Aix en Provence) gave a series of lectures, "Using sediments to record the active margins of the continents", "An overview of Expedition 346" and "How corals can be used to record changes in sea-level rise" respectively. These talks linked in with the afternoon's practical sessions, which looked at foraminifera and sediments from around Egypt and the River Nile.

We were fortunate during the final day to have a live broadcast with Lesley Allen (UK) Education Officer and Julien Berger (GET Toulouse) onboard the *JOIDES Resolution* during Expedition 350 Izu-Bonin-Mariana Rear Arc. Jean-Luc, Susan and Helder Pereira (Portugal) (*from left to right on photo above right*) then shared their experiences about what it was like to be an Education Officer onboard the *JR*. They provided information to the delegates about the "School of Rock" programme and gave a demonstration about how to search for education resources on the *JR*'s and Ocean Leadership websites.

In December 2013 Jean-Luc and Susan travelled to take part in the filming of the "Educator at Sea" video. The video was released in April 2014 at The National Science Teachers Association conference in Boston, USA. It was a first for France at the workshop, as unfortunately we were not able to screen it at Cannes! The video was funded by the NSF and produced by

Dan Brinkhuis (Science Media NL) and is available online at <https://www.youtube.com/watch?v=PJTmfh7IWW0>



The feedback from the workshop was very positive. All the teachers felt that they had learnt a great deal and would be able to use the information in their lessons to the benefit of their students. Steps are now being taken to build on the success of this first conference, which promoted ECORD's Outreach and Education Programme. The organisers are discussing whether to run a similar workshop in a different country or to have a travelling road show that can visit several destinations.

Thanks to the International School Valbonne and Géoazur for their wonderful hospitality.

Jean-Luc Bérenguer, Science Teacher, International High School in Valbonne Sophia Antipolis (France), Teacher at Sea (IODP 345) and School of Rock (2009)
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Reports of ECORD Summer Schools

11th Urbino Summer School in Paleoclimatology 9-25 July 2014, Urbino, Italy

This year for the 11th time the Urbino Summer School in Paleoclimatology (USSP) was organised in this small but beautiful town of the Marche region in Italy. Urbino is perfectly chosen - it is a UNESCO World Heritage Site with a wonderful renaissance architecture.

I decided to apply for the USSP after consulting with former USSP participants in the Alfred Wegener Institute, Bremerhaven and Institute of Geological Sciences of the Polish Academy of Sciences (where I work on my project). I was able to participate in the USSP thanks to being awarded an ECORD scholarship.

The summer school lasted for 17 days so was more than two weeks of intense study of the fascinating subject of paleoclimatology. As usual the school covered a broad range of topics, starting with orbital forcing of the climate, through geochemistry and climate proxies, finishing on a deeper

analysis of selected climate transitions and periods, climate modeling and future climate changes. We also participated in a field trip where we could see the K-Pg boundary in Gubbio (*below*). During the trip we were divided into groups that had to collect data, which were later used during the classes.

From the posters presented during the summer school we could learn about ongoing research of other USSP participants. The posters were easily accessible to everybody during the breaks between the lectures.

During the USSP, besides listening to the highest quality lectures given by world-class scientists, we could talk with all researchers. For us - young scientists at the beginning of our research career, this was just as valuable as the lectures - the opportunity to talk about our work in front of our posters with experienced scientists.

One day we participated in the Cioppino conference about 30 minutes ride from Urbino. During the conference we listened to shorter talks focused on more recent results of the lecturers' research. The day ended with a dinner of Italian food and a party!

From my point of view, it was important to meet more than 60 Ph.D. students from all around the world who work in the same field as me and participated in the USSP. It was of great importance to share views on paleoclimate research (although not only this topic). It is very likely that I will meet many of the students in future and it is very important to have colleagues from different countries in different renowned institutes.

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<http://www.urbinosp.it>



ECORD Bremen Summer School

Subseafloor Biosphere: Current Advances and Future Challenges

22 September - 2 October 2014, Bremen, Germany

The MARUM Center for Marine Environmental Sciences in Bremen was the host of the 8th ECORD Summer School, focusing on the geomicrobiology of the deep biosphere. In the course of two weeks 22 Master-, Ph.D.-students, Post docs and scientists renowned in the fields of microbiology and geology discussed and presented the latest advances in research and methodological techniques.

The participants came from 14 countries from the Americas, Europe and Asia, which gave the event an international touch and contributed to lively debates and discussions on various scientific topics, as well as social and cultural issues.

The first week featured an intense and exciting schedule of talks held by the lecturers dealing with diversity, distribution and limits of microbial life, geochemical processes within seafloor sediments and the oceanic crust. To complement these topics the researchers reported on case studies involving the IODP, presenting results from various drilling expeditions that offered insights into scientific questions and the structure of this international programme. In addition, each participant gave a short presentation on their current area of research, which enabled a vivid exchange of information and ideas that often extended to the coffee breaks. The first week was rounded off by a field trip to the first German oil museum in Wietze, a small town in Lower Saxony. The museum conveyed an extensive and current perspective on oil and gas production, including a historic view on oil production in Germany at the beginning of the 20th century.

As the first week concentrated on theory, the second week of the summer school had a strong focus on practical and laboratory work (*above*). We were introduced to



first-hand shipboard methodology applied during IODP expeditions. These methods, presented under the concept of the "Virtual Ship", included cultivation techniques, characterisation of microbial activity, drill-core description and core scanning, and downhole logging. The scientists provided insights on how to cultivate microbes, highlighting the difficulties imposed by anaerobic, nutrient-poor conditions. The next course was carried out at the MPI for microbiology, where we extracted DNA from a contaminated sediment core and subsequently amplified the DNA using PCR to identify the various strains of bacteria and archaea living within the core. In the last course, we attempted the quantification of microbial communities via cell counting under the microscope. In the last two days we were introduced to the first onboard procedures conducted on a sediment core after its immediate retrieval. We characterised the physical core properties using a multi-sensor core logger, performed sedimentological core descriptions using smear slides, and extracted pore water for chemical analyses. The practical part of the summer school offered a great and colourful mixture of biological and geological methodologies, encouraging

us to conduct necessary procedures on future IODP expeditions.

During the last day we were challenged to write our very own scientific proposal for a seagoing expedition, a great experience, which demanded teamwork and creativity. We were also informed on options for active participation in the IODP. To summarise, the ECORD Summer School 2014 was a great experience, a chance to meet and exchange ideas with students and lecturers, and an opportunity to understand how to take part in future IODP cruises.

We would like to thank all of the people involved including Dierk Hebbeln, Verena Heuer, Ursula Röhl and Jutta Bülten. We are grateful to all the lecturers who came from all over the world to share their knowledge with us. We acknowledge the technicians and staff at MARUM and all the participating students for making this year's ECORD Summer School such a memorable one.

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Gretchen Früh-Green

News from



Julia Gutiérrez Pastor

The first year of the International Ocean Discovery Program "Exploring the Earth under the Sea" has come to an end, and ESSAC is continuing its efforts with education and outreach activities and staffing of expedition participants and panel members.

In 2014 a total of 29 ECORD scientists (including 6 from special calls) and 1 Co-chief sailed on *JOIDES Resolution (JR)* expeditions: Expedition 349 South China Sea (a Complementary Project Proposal: CPP) and three Izu Bonin Mariana (IBM) expeditions (Exp. 350 IBM Rear Arc, Exp. 351 IBM Arc Origins and Exp. 352 IBM Forearc). For future IODP Expeditions in 2015, the *JR* Science Operator has completed the selection process for ECORD scientists to participate in Expedition 353 Indian Monsoon Rainfall (with 9 ECORD scientists), Expedition 354 Bengal Fan (with 8 ECORD scientists) and Expedition 355 Arabian Sea Monsoon (CPP, with 5 ECORD scientists). These expeditions will include three ECORD Co-chief Scientists. We have also completed the application process for Expedition 356 Indonesian Throughflow, and staffing is underway. We are pleased to see that many students and early-career scientists have the opportunity to participate in *JR* expeditions and make up more than 50% of the ECORD participants in 2014 and 2015.

The *JR* Facility Board also selected four expeditions for 2016 and one for 2017. The application and nomination process for three of these expeditions is in progress: Exp. 359 Maldives Monsoon; Exp. 360 Indian Ridge Moho; and Exp. 361 Southern African Climates. Staffing is expected to start early 2015. More

information about the scientific objectives and dates of all expeditions can be found on the IODP website at <http://www.iodp.org/expeditions> and in the table below.

In the IODP advisory panels (*table page 15*), ECORD has 9 members (including Dick Kroon as SEP Chair) in the science sub-group and 5 members in the site survey sub-group of the Science Evaluation Panel (SEP), which is responsible for evaluation of all IODP proposals. ESSAC has recently selected Serge Berné (France) as a new member on SEP (site-survey sub-group) and Dave Long (UK) on the Environmental Protection and Safety Panel (EPSP) to replace members rotating off these panels. We are also currently in the process of selecting 4 new members for the science sub-group of SEP to replace members rotating off in 2015. We would like to take this opportunity to thank Adélie Delacour, Nabil Sultan, Michael Strasser and Stuart Robinson for their efforts and dedication as SEP members during the past three years.

The ESSAC Office has issued two new calls this Autumn: one for two new members to the ECORD Facility Board to replace members from ECORD and the US who are rotating off the board at the end of 2015; and a call for the ESSAC Chair 2016-2018, who will serve as Vice-chair in 2015 and take over the ESSAC Office at the beginning of 2016 (*page 27*).

The **ECORD/ICDP MagellanPlus Workshop Series Programme** continues to be a success and is designed to support ECORD member scientists in developing new and innovative

IODP Expedition Drilling Schedule

Expedition	Exp #	Drillship	Dates	Co-chief Scientists
Indian Monsoon Rainfall	353	JR	29 Nov 2014 - 29 Jan 2015	S. Clemens - W. Kuhnt
Bengal Fan	354	JR	29 Jan - 31 March 2015	C. France-Lanord - V. Spiess
Arabian Sea Monsoon	355	JR	31 March - 31 May 2015	D. Pandey - P. Clift
Indonesian Throughflow	356	JR	31 July - 30 Sept 2015	S. Gallagher - C. Fulthorpe
Maldives Monsoon	359	JR	30 Sept - 30 Nov 2015	C. Betzler - G. Eberti
Atlantis Massif Seafloor Processes	357	MSP	Oct - Dec 2015 (tbc)	G. Früh-Green - B. Orcutt
Indian Ridge Moho	360	JR	30 Nov 2015 - 30 Jan 2016	H. Dick - C. MacLeod
South African Climates	361	JR	30 Jan - 31 March 2016	I. Hall - S. Hemming
Chicxulub Impact Crater	364	MSP	Spring 2016	J. Morgan - S. Gulick
Sumatra Seismogenic Zone	362	JR	31 July - 30 Sept 2016	L. McNeill - tbd
Western Pacific Warm Pool	363	JR	30 Sept - 30 Nov 2016	tbd
Antarctic Cenozoic Paleoclimate	tbd	MSP	tbd	tbd



JR: *JOIDES Resolution*, MSP: *mission-specific platform* - <http://www.iodp.org/expeditions>. ECORD Co-chief Scientists are marked in blue. The photo shows the gangway of the *JR* lifted for departure of Expedition 352 (credit Tim Fulton, IODP/TAMU).

science proposals for submission to IODP and ICDP. There were six MagellanPlus workshops covering a variety of themes that took place in 2014 (*pages 20-22*) and currently three workshops are planned for 2015 - <http://www.ecord.org/magellanplus.html>.

We have started a new phase of the **ECORD Distinguished Lecturer Programme (DLP)** with five new lectures (*right*) that cover the major themes defined in the IODP Science Plan: Christian France-Lanord and Gabriele Uenzelmann-Neben for "Climate and Ocean Change", Jens Kallmeyer for "Biosphere Frontier", Paola Vannucchi, for "Earth in Motion" and Antony Morris for "Earth Connections". The DLP will run for the next two years and we are looking forward to hearing about the lectures - <http://www.essac.ecord.org/index.php?mod=education&page=dlp>

Once again young scientists had the opportunity to participate in two **ECORD Summer Schools** related to marine science research and ocean drilling in 2014:

- The ECORD-Urbino Summer School in Paleoclimatology (USSP) on Past Global Change Reconstruction and Modelling Techniques. University of Urbino, Italy, 9 to 25 July 2014 - <http://www.urbinosp.it>. Seventy-one students from 16 countries attended the Summer School (*page 11*),
- ECORD Bremen Summer School - Subseafloor Biosphere: Current Advances and Future Challenges. MARUM, University of Bremen, Germany, 22 September to 2 October 2014 - http://www.marum.de/en/ECORD_Summer_School_2014.html. Twenty-nine students from 15 countries participated in this Summer School (*page 12*).

As in past years, ESSAC provided **ECORD Scholarships** to young scientists to attend one of these summer schools. ESSAC received 57 scholarship applications for the USSP and 13 applications for the ECORD Bremen Summer School. Fourteen students were awarded scholarships to attend the USSP and 4 students received scholarships to attend the ECORD Bremen Summer School. Furthermore, the ESSAC Office received four applications to host new ECORD-sponsored Summer Schools in 2015.

In addition, we received ten applications from seven ECORD countries for the **ECORD Research Grants** to support outstanding young scientists in IODP-related research. Three Ph.D. students and two Post-doctoral researchers were chosen to receive awards.

As part of the **"Teachers at Sea" programme**, an initiative of the Consortium for Ocean Leadership, ESSAC offered the unique opportunity for teachers and educators of ECORD countries to sail on one of the three Izu Bonin IODP Expeditions. Two ECORD teachers were selected. Lesley Allen (UK) sailed on IODP Exp. 350 (Rear Arc). Markus Fingerle (Germany) had to postpone his participation and will sail on Exp. 353 Indian Monsoon Rainfall. In addition, Diane Hanano (Canada) has just been selected to sail on in Exp. 354 Bengal Fan. We are looking forward to hearing about their experiences.

Further ESSAC-related activities included the EGU 2014 General Assembly Meeting (28 April - 2 May 2014), where we held a special session **"EuroForum 2014: Major achievements and future perspectives in scientific ocean and continental drilling"**. We were pleased to host an Arne Richter Award for Outstanding Young Scientists Lecture given by Peter Bijl, which was highly attended. As has now become a tradition at the EGU Meeting, more information about the new programme and possibilities to get involved was available at the IODP/ECORD-ICDP

Scientific Drilling booth in the exhibit hall and at the IODP-ICDP Town Hall Meeting (*page 9*). For the EGU 2015 General Assembly Meeting (12-17 April 2015), we are organising a session entitled "Achievements and perspectives in scientific ocean and continental drilling" (co-organised SSP3.3.1/BG6.5/CL5.13/GMPV7.3), which will be part of the new Programme Subgroup SSP3.3 - Ocean and continental drilling (*below*).

In summary, ESSAC remains active in science support and outreach activities and in shaping the future of ocean research. We are pleased to take part in this phase of scientific ocean drilling and look forward to seeing exciting workshops, new science proposals and active participation by the science community. The ESSAC Office greatly appreciates the active involvement of the ESSAC delegates and alternates in the numerous ranking and selection processes related to expeditions, panel membership, and education and outreach activities. We would also like to thank the ECORD Council and the scientific community for their support, active involvement and input, all of which continue to contribute to the success of ESSAC as the science advisory body of ECORD.

*Gretchen Früh-Green, ESSAC Chair, and Julia Gutiérrez-Pastor, ESSAC Science Coordinator - essac.office@erdw.ethz.ch
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ECORD invites you to Host a Lecture

The European Consortium for Ocean Research Drilling (ECORD) is sponsoring an initiative for a lecture series to be given by leading scientists involved with the International Ocean Discovery Program (IODP).

Christian France-Lanord
Centre de Recherches Paléogéologiques et Géochimiques CNRS, Nancy, France

Gabriele Uenzelmann-Neben
Johann-Wagner-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany

Jens Kallmeyer
GFZ German Research Centre for Geosciences, Helmholtz Centre Potsdam, Germany

Paola Vannucchi
Earth Sciences Department, Royal Holloway, University of London, Surrey, UK

Antony Morris
School of Geography, Earth and Environmental Sciences, Plymouth University, UK

Applications to host a Distinguished Lecturer will be accepted from any college, university or non-profit organisation in all European countries, Israel and Canada.

CLIMATE AND OCEAN CHANGE
Himalaya: from mountains to drilling in the Bengal fan

Reconstructing palaeo-circulation: Reading sediment drifts with the aid of IODP information

BIOSPHERE FRONTIERS
What controls abundance and activity of microbial life in subsurface sediments? New insights from scientific drilling.

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Achievements and perspectives in scientific ocean and continental drilling SSP3.3.1/BG6.5/CL5.13/GMPV7.3

Convenor: G.Früh-Green - Co-Convenors: A. Foubert, T. Wiersberg and M. Ziegler

Submission deadline for abstracts: Wednesday 7 January 2015

<http://meetingorganizer.copernicus.org/EGU2015/session/17396>

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

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<http://www.essac.ecord.org/index.php?mod=about>

Report of ECORD Research Grants

High-pressure melting relations of Juan de Fuca sediments and basalts and their effects on the Northern Cascade volcanic chemistry

Marina Martindale*

This project, funded by ECORD and PCIGR aims to help define the 'subduction input' of the northern Cascade Arc during generation of primary magmas. The northern segment of the Cascade Arc, the Garibaldi Volcanic Belt (GVB), hosts some of the youngest and hottest subducting crust globally (*Syracuse et al., 2010*), along with the termination of the subducting slab at the Nootka Fault (*Figure 1*). The unique tectonic and thermal setting of the GVB may give rise to an unusual melting regime that will be addressed via high-pressure melting experiments for natural subducting oceanic basalt and overlying sediments from the Juan de Fuca Plate.

The sediment comprises terrigenous turbidites eroded primarily from juvenile Canadian Cordillera terranes (*Carpentier et al., 2014*).

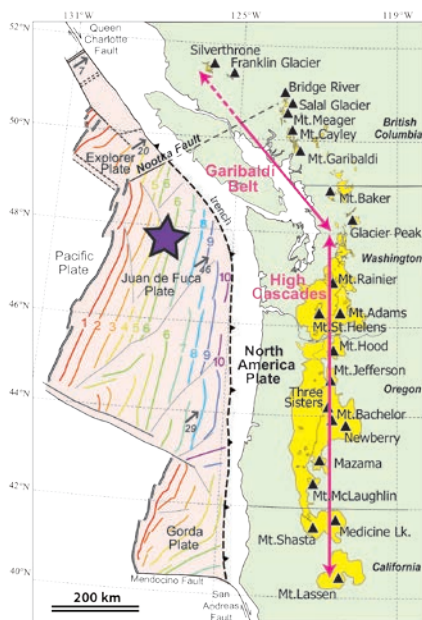


Figure 1. Map of the Cascade Arc, modified from Mullen and Weis, (2013). Purple star = ODP drilling site (ODP-168-1027) sediment and oceanic crust sample location (Davis et al., 1997). The sediment comprises terrigenous turbidites eroded primarily from juvenile Canadian Cordillera terranes (Carpentier et al., 2014).

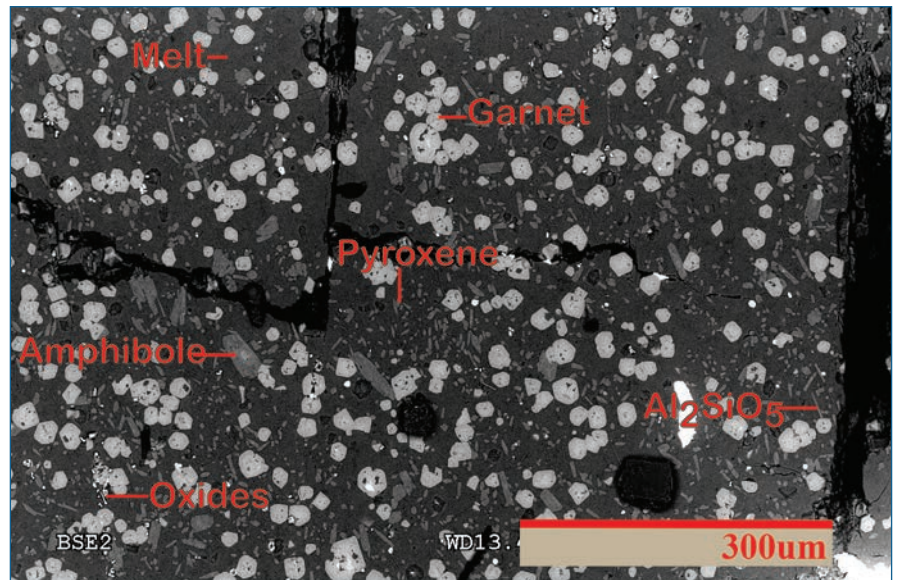


Figure 2. Sediment melt product showing significant melt as well as garnet, pyroxene, amphibole, an Al_2SiO_5 phase and oxides; 3GPa, 900°C.

Phase relations of natural sediments from the Juan de Fuca basin were investigated experimentally at 2.5-3.5GPa, 750-1100°C and Juan de Fuca Plate basalt was investigated at 2.5-3GPa and 800-1000°C (*Figure 2*). To reflect the 'hot' nature of the arc, no additional water was added to the samples. At 3GPa the vapour-saturated solidus for the east Pacific terrigenous sediment is higher (800-850°C) than in phengite-bearing pelitic marine sediments (700-750°C) at 3 GPa (*e.g. Hermann and Spandler, 2008; Skora and Blundy, 2010*). A higher solidus temperature (825-850°C at 3GPa) is also seen in oceanic island basalt-type volcanoclastic sediments of the west Pacific (*Martindale et al., 2013*). Variations in sediment melting behaviours may help explain differences in arc lava chemistry between arcs.

Acknowledgements

Melting experiments were conducted at the School of Earth Sciences, University of Bristol, UK. SEM, EMPA and LA-ICP-MS major and trace-element analyses are being conducted at PCIGR, University of British Columbia, Canada.

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Outcomes of IODP Expedition 339

Palaeoceanographic, stratigraphic and sedimentary significance of the Mediterranean Outflow Water and its conceptual implications

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and IODP Expedition 339 Scientists

Integrated Ocean Drilling Program (IODP) Expedition 339 drilled 5 sites in the Gulf of Cadiz and 2 off the west Iberian margin (*Figure 1*) aboard the *JOIDES Resolution* (17 November 2011 to 17 January 2012, http://iodp.tamu.edu/scienceops/expeditions/mediterranean_outflow.html). The Gulf of Cadiz was targeted for scientific drilling as a key location for the investigation of Mediterranean Outflow Water (MOW) through the Gibraltar Gateway and its influence on global circulation and climate. It is also a prime area for understanding the effects of tectonic activity on evolution of the Gibraltar Gateway and on margin sedimentation. This contribution highlights some of the major results and future plans of the successful science outcomes of Expedition 339. These results combine geophysical and drill-core data to determine the sequence of events that established a significant MOW contribution to North Atlantic thermohaline circulation dynamics, and how these dynamics relate to Neogene and Quaternary climatic and tectonic events.

Deposits from late Miocene to present: seismic records and drill core interpretation

Major regional discontinuities appear as high-amplitude seismic reflections within late Miocene to present-day sediments (*Figure 2*). These discontinuities provide a record of MOW circulation relative to coeval tectonic and environmental events. In seismic records, Pliocene deposits appear as sheeted drifts, overlying a weakly reflecting Miocene unit that progrades downslope. The late Pliocene to Lower Quaternary section records significant synsedimentary deformation associated with two discontinuities that define a major truncation surface. Quaternary deposits are distinguished by high amplitude seismic reflections and show clear upslope progradation.

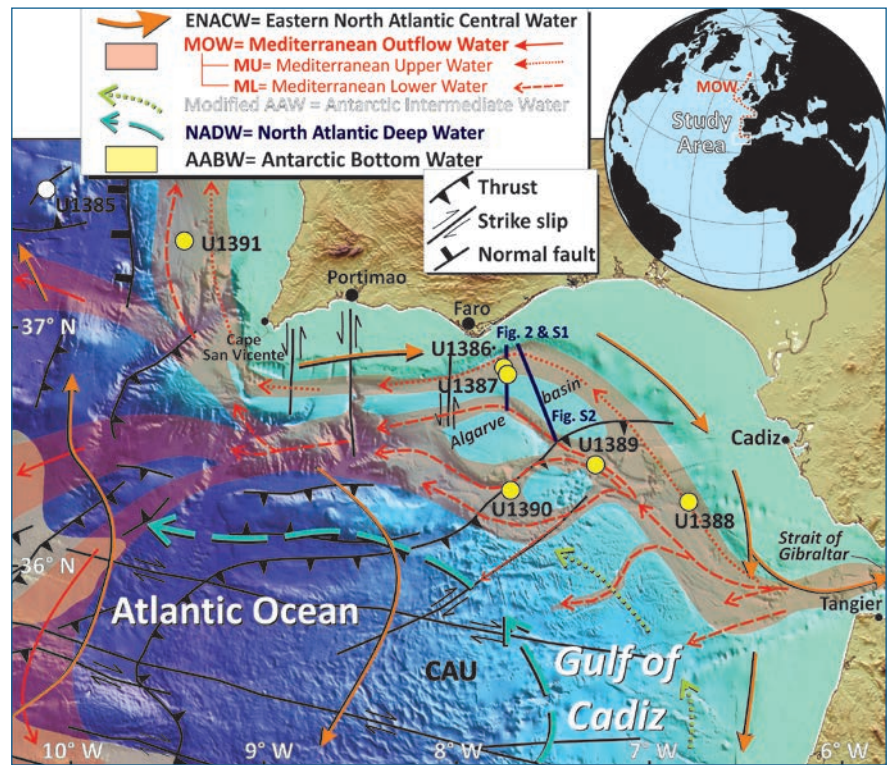


Figure 1. Regional water masses, major tectonic features and Gulf of Cadiz CDS site locations sampled during IODP Expedition 339 (from Hernández-Molina et al., 2014).

Of the 5.5 km of core recovered during Expedition 339, at least 4.5 km belongs to a Contourite Depositional System (Stow et al., 2013; Hernández-Molina et al., 2013). The predominant sedimentary facies in the late Miocene to present-day sedimentary record include pelagites, hemipelagites, contourites, turbidites, debrites and slump deposits (*Figure 3*). Contourites constitute up to 95% of Quaternary deposits, and ~50% of the recovered Pliocene succession. This facies includes sand-rich, silt-rich and mud-rich contourites, deposited at moderate (20–30 cm/ky) to very high (>100 cm/ky) sediment accumulation rates. Dolomitic mudstone and dolostones are rare, but also occur in drill-core material. The recovered contourites are remarkably uniform in composition and textural attributes. Muddy and silty contourite deposits exhibit intense continuous bioturbation and an absence

of primary sedimentary structures (Stow et al., 2013; Dorador et al., 2014). They are particularly characterised by bi-gradational sequences from inverse to normal grading with a number of partial sequence types (*Figure 3*).

The chronostratigraphy and absolute ages of depositional hiatuses and stratigraphic boundaries derive from shipboard bio- and magnetostratigraphic analyses of core samples. Two depositional hiatuses (*Figure 2*), evident at 3.2–3.0 Ma and 2.4–2.1 Ma, indicate that MOW did not significantly circulate into the North Atlantic until the late Pliocene and early Pleistocene. A later event, occurring at 0.9–0.7 Ma, suggests the existence of an additional Pleistocene phase of MOW intensification (Hernández-Molina et al., 2014). Also, recent results reveal abrupt, millennial scale variations of MOW strength during Greenland Stadials (GS)

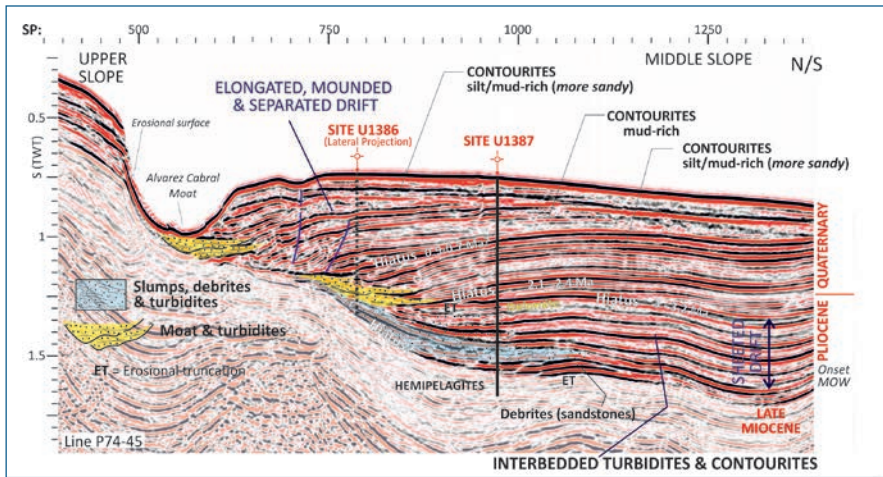


Figure 2. Seismic profile showing the major sedimentary stacking pattern, from the Pliocene sheeted drift to the Quaternary elongate and mounded drift, based on the correlation between Sites U1386 and U1387 and the multichannel seismic reflection line P74-45. The hiatuses and main type of contourite drifts are indicated (data courtesy of REPSOL). Profile location shown in Figure 1 (from Hernández-Molina et al., 2014).

contourite facies model are required, for example, to the detail of the sand-silt contributions and the role of sediment supply. An enormous quantity and extensive distribution of contourite sands (Figure 3), and bottom-current-modified turbidite sands, are reported (Stow et al., 2013; Hernández-Molina et al., 2013). Additionally, remarkable interactions between contourite and turbidite processes have been reported that are completely new and different from the current facies models. Therefore, the results and future detailed work carried out by Expedition 339 scientists will be very significant for the future use of contourite systems in palaeoceanographic studies. In addition, the drilled sandy contourites are completely different deep-water sands than the turbidite sands that are currently dominant as deep-water oil and gas plays, and these new findings could herald a paradigm shift in exploration targets in deep-water settings (Stow et al., 2013; Hernández-Molina et al., 2013).

and Interstadials (GI) with strong MOW during GS and glacial terminations and a complex behavior during Heinrich Stadials (Bahr et al., 2014).

Final considerations, current situation and future plans

The Gulf of Cadiz is the world's premier contourite laboratory and thus presented an ideal testing ground for the contourite

paradigm. The preliminary results are in agreement with ideas about more variety of facies sequences for bottom current deposits than are presently represented in the most commonly accepted contourite facies model. Moreover, this illustrates that there is an enormous spatial and temporal facies change in the same Contourite Depositional System. Therefore, modifications to the

Scientific results were presented at the IODP Expedition 339 2nd Post-cruise Meeting organised for shipboard and shore-based scientists in Tarifa (Cádiz),

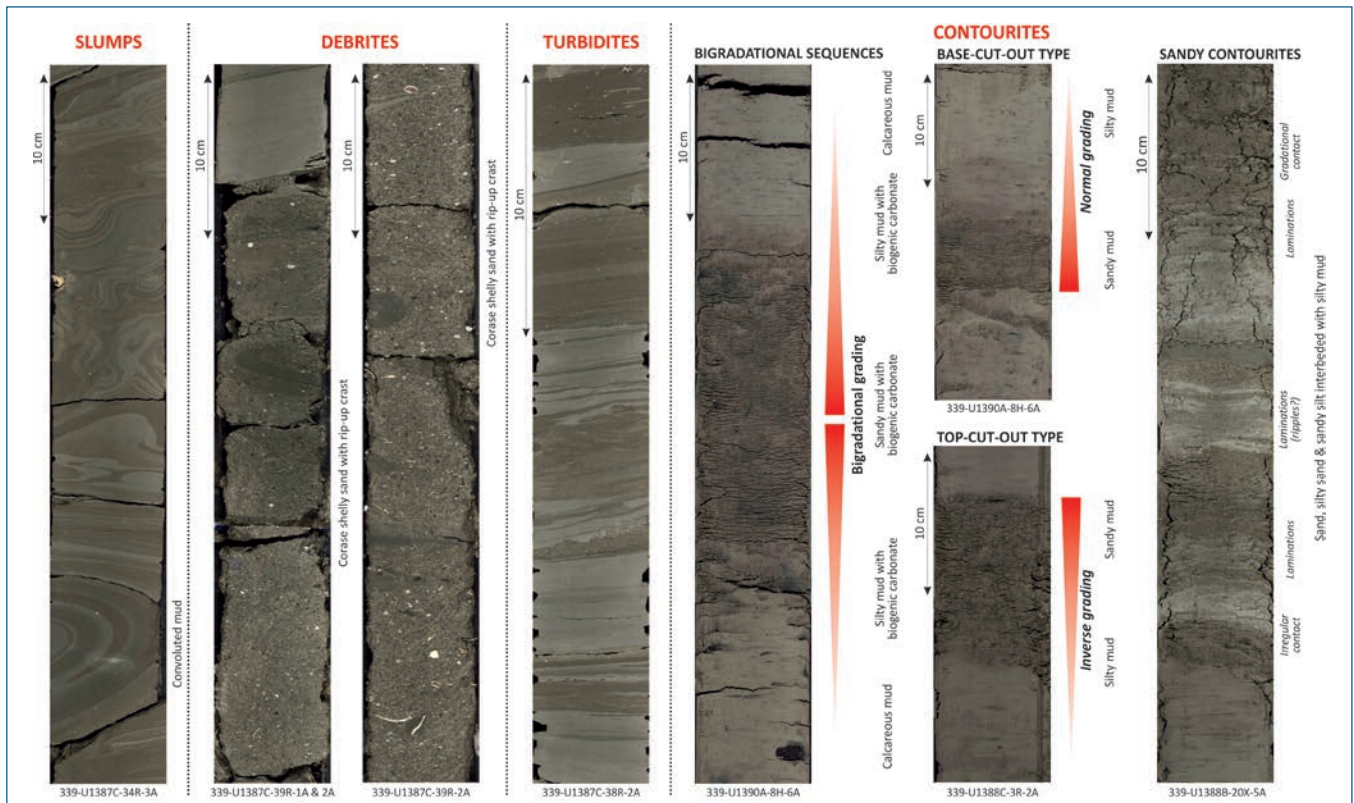


Figure 3. Examples of the main sedimentary facies for Pliocene and Quaternary sections sampled during IODP Expedition 339 (from Hernández-Molina et al., 2014).

Spain, from 1 to 6 June 2014. Sixty-seven researchers from 13 countries participated in the meeting. These results will be published in a Virtual Special Issue (VSI) of over 50 manuscripts in the Elsevier journals Global and Planetary Changes and Marine Geology in 2015. Overarching expedition results were also presented at the International conference "Deep-water Circulation: Processes and Products" in Ghent, Belgium (*page 23*). A collaboration with the MEDGATE Network for reconstructing Mediterranean-Atlantic exchange - <http://www.eu-medgate.net> - is also organising a RCMNS interim colloquium during 5-8 May 2015, in Rabat, Morocco - <http://www.mediterraneanatlanticgateways.net>.

Acknowledgements

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Calendar of Workshops and Conferences

<p>2014</p> <p>15 - 17 September MagellanPlus Workshop N Atlantic Drilling for Climate Dynamics Heidelberg, Germany www.ecord.org/magellanplus.html</p> <p>19 - 22 October GSA 2014 Vancouver, BC, Canada community.geosociety.org/gsa2014</p> <p>27 - 31 October 24th RST Pau, France rst2014-pau.sciencesconf.org/</p> <p>15 - 19 December AGU Fall Meeting San Francisco, CA, USA fallmeeting.agu.org/2014/</p> <p>-----</p>	<p>2015</p> <p>2 - 4 February MagellanPlus Workshop South Atlantic Drilling Newcastle, UK www.ecord.org/magellanplus.html</p> <p>12 - 17 April EGU General Assembly 2015 Vienna, Austria egu2015.eu</p> <p>3 - 7 May AGU-GAC-MAC-CGU Montréal, QC, Canada ja.agu.org/2015</p> <p>5 - 8 May MagellanPlus Workshop IMAGE Project Rabat, Morocco www.ecord.org/magellanplus.html</p>	<p>24 - 28 May JPGU 2015 Chiba, Japan www.jpgu.org/meeting_e</p> <p>31 May - 3 June AAPG 2015 Denver, CO, USA ace.aapg.org/2015</p> <p>10 - 12 June MagellanPlus Workshop Mantle, Water and Life Lyon, France www.ecord.org/magellanplus.html</p> <p>2 - 7 August AOGS 2015 Singapore http://www.asiaoceania.org</p> <p>27 July - 2 August XIX INQUA 2015 Nagoya, Japan inqua2015.jp</p>	<p>16 - 21 August Goldschmidt 2015 Prague, Czech Republic goldschmidt.info/2015/</p> <p>29 Sept - 2 Oct 3P Arctic Stavanger, Norway www.3parctic.com</p> <p>14 - 18 December AGU Fall Meeting San Francisco, CA, USA meetings.agu.org</p> <p>-----</p> <p>2016</p> <p>26 July - 1 June Goldschmidt 2016 Yokohama, Japan goldschmidt.info/2016.org</p> <p>27 Aug - 4 Sept 35th IGC Cape Town, South Africa www.35igc.org/</p>
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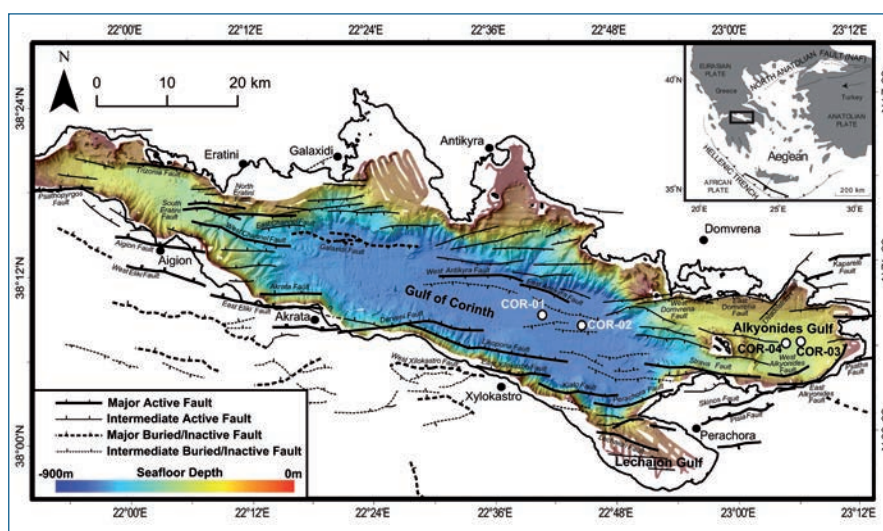
Reports of Workshops

:: IODP Drilling within the Corinth Continental Rift, Greece MagellanPlus Workshop - 11-14 February 2014, Athens (Greece)

Convenors: L. McNeill, C. Nixon, D. Sakellariou, H. Kranis, R. Gawthorpe, M. Ford, D. Christodoulou, G. Ferentinos and M. Sachpazi

How rifting initiates and evolves to continental breakup and ocean basin formation is a major unanswered Solid Earth-Plate Tectonic question: continental rifting is the first stage of this process. Important insights have been derived from numerical models and from observations at mature, magma-poor passive margins where activity has ceased, but early syn-rift stratigraphy is often difficult to image and sample due to deep burial and tectonic overprinting. The Corinth Rift, Central Greece (*right*), presents an ideal laboratory for the study of continental rifting: it is young and highly active; has a near-complete syn-rift stratigraphic sequence; and has a unique existing geophysical dataset to resolve, at very high temporal and spatial resolution, how faults initiate and link, how strain is distributed over time, and how the landscape responds during the first few million years of continental rifting. The entire interconnected rift system can be resolved and examined on a range of timescales and the Corinth rift lacks magmatism, reducing the number of variables contributing to rift morphology and stratigraphic fill. An international collaborative project, launched in 2011, has integrated all marine geophysical datasets to generate a high-resolution, high-precision fault network and stratigraphic framework of the modern rift axis combined with an equivalent onshore framework. The missing piece of the jigsaw for the Corinth Rift tectonic framework is offshore drilling at key locations to provide a chronology for the entire offshore basin, and incidentally creating a high resolution Quaternary paleoclimatic and paleoenvironmental record.

To support preparation of a proposal to the IODP, a workshop was held on 11-14 February 2014, in Athens, Greece. The workshop was financially supported by the ECORD/ICDP MagellanPlus Workshop Series Programme, the Natural



Fault map of the Corinth Rift system, Greece showing proposed IODP drillsites.

Environment Research Council (UK), and the Hellenic Centre for Marine Research (Greece). 36 participants from six countries, including students and early-career researchers, attended a two-day meeting followed by a one-day field trip to the rift zone and one-day of proposal preparation by a subset of participants. Presentations included keynotes on key global rift questions and modeling techniques of rift processes, and on current knowledge of Corinth Rift chronostratigraphy, fault-basin evolution, sediment flux history and modeling potential, seismology, deep crustal structure and the potential application of drilling to regional hazard assessment. The latest results of the marine data integration project were discussed, alongside regional complementary research projects. A session was devoted to discussion of ocean drilling core analysis techniques to establish a high fidelity chronological and environmental record. An ESO representative provided critical information on mission-specific platform methodologies and constraints for drilling in this environment. Workshop discussions generated the following

primary scientific objectives and potential drill site locations (*above*) framed around the temporal and spatial resolution of processes that could be generated from the Corinth Rift, probably unparalleled worldwide:

- constrain the distribution of tectonic strain in time and space and growth history of a rift-scale normal fault network;
- determine the evolution of a rift-controlled drainage system in time and space including the relative contributions of tectonics and climate;
- establish the timescale of rift segment initiation and maintenance.

The meeting was extremely productive with strong endorsement of the Corinth Rift system as a key target to address global rift problems. As a result of the workshop, a proposal was submitted to IODP on 1 October 2014 for drilling within the Corinth Rift system.

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:: Advancing Sub-Surface Biosphere and Paleoclimate Research MagellanPlus Workshop - 21- 23 August 2014, Seoul (South Korea)

Convenors: H. J. Mills, J. de Leeuw, K. U. Hinrichs, F. Inagaki and J. Kallmeyer

The workshop took place in Seoul, South Korea, on 21-23 August 2014, directly before the International Society for Microbial Ecology (ISME) meeting. 28 junior and senior scientists with experience in the geomicrobiological components of the IODP, ICDP, Deep Carbon Observatory (DCO) and IMPRESS (the successor of IMAGES) programmes participated in this workshop (right). The idea for this workshop was developed during the Chikyuu+10 Workshop in April 2013 but has roots in many meetings and discussions over the last several years. The idea to have a community discussion on standard protocols for microbiological drilling, sample handling and long-term sample storage developed and broadened rapidly with the interest and support of ICDP and DCO.



Participants from ECORD member countries: S. Crowe, UBC, Canada; B. Engelen, Carl von Ossietzky Univ., Germany; K.U. Hinrichs, U. Roehl, Univ. of Bremen, Germany; J. Kallmeyer, GFZ-Potsdam, Germany; J. de Leeuw, NIOZ, The Netherlands; K. Lloyd, B.B. Jørgensen, A. Torti, Aarhus Univ. Denmark; D. Smith, ESO-BGS, UK; **USA:** J. Fang, Hawaii Pacific Univ.; T. Kieft, New Mexico Tech; H. Mills, Univ. Houston Clear Lake; M. Wilkins, Ohio State Univ.; **Japan:** T.Y. Hori, AIST; F. Inagaki, J. Kurado, Y. Morono, X. Nan, JAMSTEC; Y. Kubo, CDEX-JAMSTEC; Y. Suzuki, Univ. Tokyo; **China:** J. Chen, Univ. Hongkong; F. P. Wang, Shanghai Jiao Tong Univ.; **South Korea:** J.W Kim, Yonsei Univ.; J.H. Lee, Hanyang University; J. W Lee, KIOST; **Taiwan:** M.T. Chan, National Ocean Univ. Taiwan.

The overall aim of our workshop was to develop shared sampling and long-term storage strategies partly based on already existing white and scientific papers and to implement these strategies through standardised protocols for all drilling platforms, *i.e.* "traditional drilling" with the *JOIDES Resolution*, *Chikyuu* and *MSP/ICDP* platforms. A decision was made during the workshop planning to expand the goal for standardisation to much less expensive seabed drilling and long piston core operations from additional research vessels.

Initial workshop discussions were mainly dedicated to providing background information on the current state of deep life components and organic proxy-based paleoclimatology within long-term scientific plans for IODP, ICDP, DCO and IMPRESS. In addition, presentations on sub-surface microbiology and organic proxy-based paleoclimatology highlighted the benefits of conducting geomicrobiological and paleoclimate research by acquiring high quality microbiological samples, even when the expedition may focus on other scientific disciplines. At the end of the first day and the start of day two, virtually all participants gave short 10-15 minute talks to present their research activities with an

emphasis on the key aspects of pre-drilling, drilling, onboard sample handling, in-repository sample handling and long-term storage. Therefore, to help develop and implement a feasible set of standardised protocols, the workshop participants first suggested a three level approach to improve the expectation of biological research for upcoming expeditions. Where possible, we took into account the diversity of drilling operations, *i.e.* "traditional drilling", seabed drilling and long-piston coring. The levels suggested are as follows:

Level 1 - expeditions with little to no geomicrobiological component

Expectation: microbiologist onboard, low frequency core sampling, no onboard contamination checks. Proposals listed at this level will not receive support from the biosphere community to improve their rank when evaluated.

Level 2 - expeditions with a modest geomicrobiological component

Expectation: microbiologist onboard, more frequent core sampling onboard, onboard contamination checks, limited geochemistry. Proposals listed at this level will receive some support from the biosphere community to improve their rank when evaluated.

Level 3 - expeditions with a significant geomicrobiological component

Expectation: microbiologist(s) onboard, frequent core sampling, full onboard contamination checks, onboard cell counting, extended geochemistry, onboard CAS freezing facilities. Proposals listed at this level will receive full support from the biosphere community to improve their rank when evaluated.

We concluded that the recommendations and protocols defined by the three sub-groups provide the opportunity to write a full handbook for microbiological and organic proxy-based paleoclimate drilling, sample processing and long-term storage. Once completed, the handbook should be tested onboard to determine feasibility. Additional protocols and procedures specific for different ocean and terrestrial drilling platforms, as well as within the repositories, will be included.

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Additional funding was provided by ICDP, DCO, JAMSTEC and J-DESC.

:: Accelerating Neoproterozoic Research through Scientific Drilling MagellanPlus Workshop - 17-19 March 2014, Nottingham (UK)

Convenors: D. J. Condon, P. Boggani, D. Fike, G. P. Halverson, S. Kasemann, A. Knoll, F. A. Macdonald, A. R. Prave and M. Zhu

An ICDP and ECORD sponsored Workshop, in March 2014, was held with 49 participants from 14 countries, to consider the utility of scientific drilling to accelerate research of the Neoproterozoic (1.00 to 0.54 Ga) to earliest Cambrian (541 to ~520 Ma) rock record. The Neoproterozoic time slab challenges us with a hierarchy of questions, from the broadly profound, such as 'why did complex, macroscopic life evolve on this planet some 600 million years ago?' (*right*), and 'how likely is it that other Earth-like planets may have experienced the same?', to the more detailed, such as 'how do different but broadly coeval stratigraphic sections that contain distinctly different proxy records really relate to one another?'

Unlike most other MagellanPlus workshop topics, this one was not centred on a single site or collection of sites in one area. The need for global coverage is that the questions being asked are ultimately about global Earth system change and addressing such questions requires the integration of numerous local/regional datasets in order to advance understanding of global-scale Earth system change. When and where applied, scientific

drilling for Neoproterozoic research has been instrumental in providing access to rock sections that do not outcrop (*e.g.*, South Oman Salt basin) and in obtaining material that is not contaminated through surface processes (*e.g.* weathering) such that primary proxy record (isotopes, biomarkers, magnetic) can be reliably extracted and studied. The aim is to greatly increase the number of such records, therefore a number of high priority sites were identified and discussions were held regarding establishing operating and management mechanisms for undertaking an integrated global drilling programme, constructing open-access data and sample archiving, and coordinating approaches to multi-national funding. In addition to the specific drilling projects, issues relating to developing and sustaining an overarching initiative were also discussed.

The workshop was a success insofar that it initiated discussion and progress towards the development of a scientific drilling research initiative charged with accelerating Neoproterozoic research and identified key locations to focus on for initial drilling efforts. It was agreed that a programme of scientific continental



Ediacran fossils dated at ~565 Ma, some of the oldest macroscopic fossils known and which pre-date the Cambrian explosion by some 35 million years.

drilling for the Neoproterozoic must match in spirit and scope that of the IODP and its key role in advancing understanding of the co-evolution of Cenozoic climate and life. Such a programme will involve multiple drilling projects funded by different sources (*e.g.* ICDP plus industry, NASA, national research foundations) and engage with as wide a spectrum of the Earth science community as possible. Such an undertaking will engage the Earth science community for decades.

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ICDP Training Course Drilling into Active Fault Zones

The annual ICDP Training Course took place from 6 to 10 October 2014 at the Franz Josef Glacier (New Zealand) close to the parallel-running ICDP Deep Fault Drilling Project (DFDP) that started drilling on 29 August to sample and monitor the Alpine Fault at depth.

33 graduate students, Ph.D. students, early-career scientists and senior scientists involved in current or upcoming scientific drilling projects attended the training course. The lecturers touched upon relevant aspects of scientific drilling in active fault zones, including drilling engineering, rock and fluid samples and sampling strategies, pre-site studies,



(photo courtesy ICDP)

downhole logging, permanent downhole monitoring, and data management. Practical exercises and a one-day visit to the DFDP drill site helped deepen the acquired expertise (*above*).

The training course was very well received by the participants from New Zealand, USA, UK, Canada, Finland, India, China, Italy, South Korea, the Netherlands, Switzerland, Spain and Germany, including a representative from ESO. More information on the training course and other ICDP training activities can be found on the ICDP website at <http://www.icdp-online.org/support/training/annual-training-course>

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News from ECORD Member Countries

Belgium

From 10 to 12 September 2014, the **2nd Deep-Water Circulation Congress** was organised in Ghent (Belgium) under the theme "Contourite Log-book", with the intention to increase our ability to unveil and extract the temporal and lateral variability of palaeoceanographic processes from contourite depositional systems using geophysical profiling and sediment coring, such as during IODP Expedition 339 (*pages 17-19*).

Key questions were addressed in the four

main sessions: **(1)** The influence of contourite sedimentation on slope stability, **(2)** The coupling between oceanographic processes and contourite sedimentation, **(3)** Contourite processes and deep-water ecosystems, and **(4)** Advances in diagnostic criteria of contourite systems.

During the congress, six exciting keynote lectures were given, as well as 35 oral and 28 poster presentations, many of which were presented by some of the 20 Ph.D. students and early-career scientists, out of a total of 95 official conference registrations. These



presentations were the collaborative effort of 266 international scientists.

Thanks to the additional financial support, travel grants were provided to a significant number of international participants, and 17 students from four geology, or geology-related, master courses in

Belgium (Ghent, Leuven, Liège and Brussels) were invited to attend the conference, fuelling their inspiration for their further academic collaboration.

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France

By participating in the recent **IODP Expedition 349 South China Sea Tectonics**, a fabulous opportunity was offered to Anne Briais (GET, Toulouse) (*right*) to test the hypotheses she advanced during her thesis 25 years ago. In particular, some scientists have suggested very different ages for the formation of the South China Sea sub-basins, whereas the model proposed by Anne suggested a single mid-ocean ridge.

The main objective of Expedition 349 was therefore to better understand the complex East Asian tectonics, and more specifically to test these various hypotheses by obtaining ages of the basaltic basement, now buried under thick sediments. This was successfully achieved during the



drilling expedition in two sites close to the relict spreading axis. A drilling

site just north of the continent-ocean boundary also provided the age of the continental breakup. According to the preliminary results, the age model proposed by Anne Briais during her thesis seems to be confirmed. The originality of this approach lies in the capacity to reach the ocean crust beneath the sediments, allowing dating of the seafloor, calibration of the magnetic anomaly models, and probable validation of the model Anne and colleagues advanced so many years ago. Once again the critical role of drilling to complete scientific studies has been proved!

Georges Ceuleneer, ESSAC Delegate and President of IODP-France, and Stéphanie Cuvén, IODP-France Science Coordinator
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United Kingdom



(credit Amy West & IODP)

UK-IODP Knowledge Exchange Programme. Sally Morgan has been appointed as the NERC-funded

UK-IODP Directed Knowledge Exchange Fellow and will be based in the Department of Geology at the University of Leicester, where she was recently appointed as a Research Fellow. Sally has worked within industry and has a long-standing relationship with IODP, first sailing as a UK scientist in 2005
<http://www2.le.ac.uk/departments/geology/research/gbrg/iodp/staff>.

Brazilian Equatorial Margin Workshop (February 2014). UK-IODP provided partial support for attendance of: Kirsty Edgar (Cardiff), Alex Dickson (Oxford), and Tom Dunkley-Jones (Birmingham), Stephen Bohaty (Southampton), Jessica Whiteside (Southampton), and Tom Wagner (Newcastle).

2014 - UK-IODP conference. A one day conference is to take place on 5 November at the Royal Geographical Society in London. The meeting covers all the themes of the IODP, with over 80 participants, 12 talks and 35 poster presentations.

2015 UK-IODP Student Conference. As per past agreement, the next student conference will be

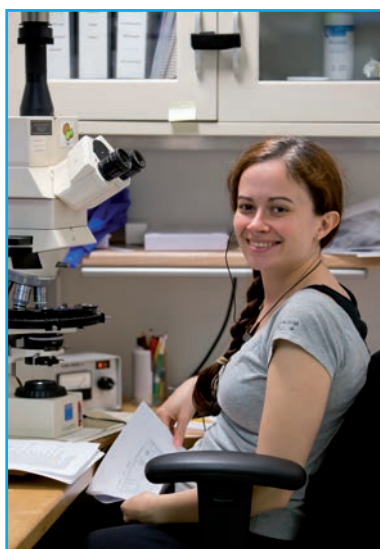
held -summer 2015, three years after the inaugural meeting.

IODP Expeditions. 9 UK participants have been supported on expeditions in 2014 (Exp 350 to 352) and a further five UK scientists will sail on upcoming expeditions (Exp 353 to 355). Lesley Allen, science teacher at Truro College took part in Expedition 350 Izu Bonin Mariana Rear Arc as an Education Officer (blogs posted on <http://joidesresolution.org/blog>).

Sean Burke, UK-IODP - Science Coordinator, and Bridget Wade, ESSAC Delegate
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Sweden

The latter half of 2014 has been an exceptionally busy period for Swedish-based participants in IODP and ECORD. It has included participants from Uppsala University in **Expedition 350 Izu-Bonin-Mariana Rear Arc** (Abigail Barker and Manuela Bordiga), and Milos Bartol (Uppsala University) will participate in **Expedition 353 Indian Monsoon Rainfall**, which is scheduled to start in November. Manuela (*right*, pictured onboard the *JOIDES Resolution*) writes that she enjoyed "... the opportunity to be part of and contribute to an important scientific research programme" and "the good interaction between people with different backgrounds and skills, and the friendly and supporting relationships with the technical staff and crew". Abigail was similarly enthusiastic about her experience and "had a fantastic experience working as



(credit Tim Fulton, IODP/TAMU)

part of a multinational team onboard the *JOIDES Resolution*."

Following on from their participation in the Onshore Science Party earlier in the year, the first results obtained by Swedish ECORD scientists involved in **Expedition 347 Baltic Sea Paleoenvironment**

(Co-Chief Thomas Andr en and Elinor Andr en from S dert rn University and Ian Snowball from Lund/Uppsala Universities) were presented in a session dedicated to the expedition at 'BALTIC-2014', the 12th Colloquium on Baltic Sea Marine Geology, which was held in Warnem nde, Germany from 8-12 September. In addition, Nadine Quintana Krupinski who participated in Expedition 347 through the US Science Support Program moved to Sweden to work as a post-doctoral researcher at Lund University and continues her studies of Baltic Sea foraminifera.

Information about Swedish participation in IODP and ICDP activities can be obtained via the **Swedish Scientific Drilling Program** - www.ssdp.se.

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Germany

This year's joint **IODP-ICDP meeting** was hosted by the University of Erlangen (17 to 19 March). Almost 200 scientists attended the conference, which covered a broad range of topics related to scientific drilling from paleoclimate over deep biosphere to seismogenic zones. The highlight of the meeting was a public event for school children. The two-hour science-show was named "unterirdisch" (German for sub-surface) and aimed at introducing school children to geology and specifically to scientific drilling in the oceans and on the continents. In order to achieve this, the popular German TV moderator Johannes Büchs was engaged to foster interactions between geoscientists and the children through recurring quizzes, simple experiments and live video conference circuits with both the *JOIDES Resolution*



Jan Behrmann (Geomar, Kiel), left, and TV moderator Johannes Büchs, right, during the science show (photo courtesy of C. Beier, University of Erlangen).

and the Bremen Core Repository. In total more than 500 pupils attended the event in addition to the regular conference attendants. The show was also recorded by a TV team and is still available to view at <http://www.video.uni-erlangen.de/clip/id/3709>.

A similar event is planned for the joint IODP-ICDP meeting in Bonn next year.

*André Bornemann, IODP-Koordinationsbüro
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Israel

During recent months, Israel has been very active in relation to ocean drilling and public outreach. On 18 September, the Ministry of Science, Technology and Space of the State of Israel, in joint cooperation with the European Commission, organised a **Researchers' Night** event in all the high academic and research institutions of Israel. The national event, marked this year under the "Marine Science" category, was a large success with thousands of parents and children visiting Israeli academic institutes.

As part of this event, a replica of the K/Pg boundary core (ODP Leg 171B) was presented at the University of Haifa to school pupils and university students. The core replica was temporarily donated for this purpose by ECORD and was the centre of attraction in a booth specially prepared for this event. The K/Pg boundary core was supplemented by other cores retrieved at different depths offshore



Israel, which served as active explanations to the participants about the main purposes of scientific ocean drilling and the different methodologies used during coring expeditions.

Moreover, as part of the Researchers' Night event at the University of Haifa, a live broadcast connection was made with the *JOIDES Resolution* during Expedition 352 Izu Bonin Mariana Forearc. The event

was attended (from right to left on photo above) by Mr. Amos Shapira, president of the University of Haifa, Mr. Jacob Perry, Minister of Science Technology and Space of the State of Israel, and Prof. Zvi Ben-Avraham, Head of the Mediterranean Sea Research Center of Israel and Israeli Delegate to the ECORD Council.

*Nicolas Waldmann, ESSAC Delegate
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Canada

IODP-Canada was pleased to provide **summer school scholarships** to Diksha Bista (Dalhousie University) and Katherine Schmidt (University of Toronto). Both MSc students attended the 2014 Urbino Summer School in Paleoclimatology (*page 11*), which "built up a clear and complex picture of the climate system" and "provided a perfect platform to share ideas and knowledge."

ECORD Research Grant recipient Marina Martindale (University of

British Columbia) recently carried out melting experiments at the University of Bristol on sediment and basalt from ODP Leg 168 Juan de Fuca Ridge (*page 16*). The data add a new dimension to her Ph.D. research and will aid in the modelling of subduction input and primary magma generation at the northern Cascade Arc.

IODP-Canada had a successful booth at the **Geological Society of America 2014** Annual Meeting (19-22 October) <http://community.geosociety.org/gsa2014>.



Diane Hanano (CCOD Scientific Coordinator) was selected to sail as an **Education Officer** on IODP Expedition 354 Bengal Fan (*page 13*) from 29 January to 31 March 2015.

Diane Hanano, CCOD Scientific Coordinator
coordinator@mail.iodpcanada.ca
<http://www.iodpcanada.ca>

Italy

IODP-Italia organised an exhibition booth (*right*) at the joint congress of the **Italian Geological Society and the Italian Society of Mineralogy and Petrography** - <http://www.geoscienze2014.it> - at the University of Milan, 10-12 September 2014. Over ca. 800 earth scientists from Italy and all over the world attended the conference including a large number of students and young scientists. Emanuele Fontana and Cinzia Bottini (*right*) worked in the booth presenting past and future ECORD/IODP activities to specialists, teachers and students attending the conference. There were many visitors attracted to the booth by the informative materials, the three core replicas as well as by movies and documentaries. The visitors were provided with newsletters, reports and leaflets with information about the ECORD programme and website. A large number of visitors joined the



mailing list and also participated in a draw to win a copy of the book by Christine Laverne "*Drill me a painting*", which describes her experiences during DSDP, ODP and IODP.

The congress was a great success and ECORD's activities were also promoted during the session

"S1-Holes in the Bottom of the Sea: Discoveries and Challenges in Marine Geology" and many specialists who have been on expeditions shared their experiences at the ECORD booth.

Cinzia Bottini, Università degli Studi di Milano, Italy
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Finland

Finnish participants of IODP Expedition 347 Baltic Sea Paleoenvironment (Outi Hyttinen and Aarno Kotilainen) have continued their work on expedition material, and also participated (Aarno Kotilainen) in the Post-Cruise Editorial Meeting at College Station, TX (*right*).

"Climate - ice sheet - sea interactions - evolution of the Baltic Sea Basin over the past 60,000 years - CISU" is a new joint research project funded by the Academy of Finland and the Russian Foundation for Basic Research. The CISU project is coordinated by the Geological Survey of Finland in partnership with Helsinki University



Participants of the IODP Expedition 347 Baltic Sea Paleoenvironment Post-Cruise Editorial Meeting at College Station, Texas, USA, June 2014.

and the A.P. Karpinsky Russian Geological Research Institute (VSEGEI). The project is based on the IODP Expedition 347 material and new sediment core material from the eastern Gulf of Finland.

IODP Expedition 347 and its first results were presented during the **12th Colloquium on Baltic Sea Marine Geology**, IOW,

Warnemuende, Germany, 8 to 12 September 2014. The Colloquium included a special session on "Baltic Sea paleoenvironments: Baltic IODP".

Aarno Kotilainen, ESSAC Delegate - aarno.kotilainen@gtk.fi - and Anna Kalliomäki, ECORD Council Delegate

ECORD Calls



Call for Applications
to serve on the **ECORD Facility Board** of IODP
from 2016 to 2018
Deadline: 5 December 2014

The ECORD Facility Board (EFB) is the key forum for planning mission-specific platforms expeditions operated by ECORD. As an IODP Platform Provider, ECORD uses a Facility Board to make or inform decisions on the effective use of its drilling facility in fulfilling the objectives of the science plan - <http://www.iodp.org/Science-Plan-for-2013-2023>.


We are specifically seeking three new ECORD Facility Board members: one from an ECORD member country, one from a US associated member country (Australia, New Zealand, Brazil, China, South Korea and India) and one from Japan.

The EFB meets once a year and the new EFB members are expected to served for three years, starting on 1 January 2016.

More information on <http://www.essac.ecord.org>

Applications should be sent to the ESSAC Office.

Contacts:
ESSAC Office - Gretchen Früh-Green: essac.office@erdw.ethz.ch
EFB - Karsten Gohl (Chair): karsten.gohl@awi.de
ECORD - Gilbert Camoin: camoin@cerege.fr



Call for Applications
to serve as **ESSAC Chair**
from 1 January 2016 to 31 December 2017
Deadline: 9 January 2015

ESSAC is the science committee of ECORD as part of the International Discovery Program (IODP).

Role: the selected ESSAC Chair shall oversee and coordinate all ESSAC science, education and outreach activities. The ESSAC Chair is responsible for running the ESSAC Office. The Chair represents ESSAC in each ECORD entity and at the IODP Forum.

Terms/conditions:The ESSAC Chair rotates every two years, and with him/her the location of the ESSAC Office. The selected ESSAC Chair shall serve as Vice-Chair for 2 years, one year prior to his/her term in 2015 and one year after his/her term in 2018. The ESSAC office shall be funded from the ECORD budget and the budget shall be sufficient to support a Science Coordinator with a scientific background, the full cost of maintaining an office and compensation for the Chair.

More information on <http://www.essac.ecord.org>

Applications should be sent to the ESSAC Office.

Contact:
Gretchen Früh-Green (Chair): essac.office@erdw.ethz.ch

Canada



Iceland



Israel



ECORD Contacts

ECORD Council (as of 1st July 2014)

Chair: Guido Lüniger - guido.lueniger@dfg.de

Vice-Chair: Michel Diament - michel.diament@cnrs-dir.fr

ESSAC - ECORD Science Support and Advisory Committee (as of 1st January 2014)

Chair: Gretchen Früh-Green - frueh-green@erdw.ethz.ch

ESSAC Office: essac.office@erdw.ethz.ch

EMA - ECORD Managing Agency

Director: Gilbert Camoin - camoin@cerege.fr

EMA Office: ema@cerege.fr

ESO - ECORD Science Operator

Chair: Robert Gatliff - rwga@bgs.ac.uk

Science Manager: David McInroy - dbm@bgs.ac.uk

Operations Manager: Dave Smith - djsm@bgs.ac.uk

<http://www.ecord.org>



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