

ESO to start Baltic Sea Paleoenvironment Expedition



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Michael Webb

Message from the Council Chair

As we enter the final few months of the Integrated Ocean Drilling Program, it is pleasing to report that agreements have now finally been reached with NSF and MEXT that should provide a strong basis for future partnership working under the new International Ocean Discovery Program. As was highlighted in the recent ECORD statement to the community, these agreements have the potential to provide ECORD scientists with access to significantly more berths under the new IODP programme, which is a very positive outcome. It is also pleasing to see that early indications are that ECORD's budget is likely to be renewed with a modest overall reduction, which, given the very difficult financial situation, is a major achievement and reflects the very positive findings of various national reviews of IODP and the ECORD review.

In discussions at ECORD Council it has been recognised for some time that the resourcing of the ECORD business plan for the next 10-years will present new challenges, not least because if ECORD is to support the numbers of the expensive mission-specific platform (MSP) expeditions (*e.g.* in the Arctic) that it hopes to then it needs to secure additional funding. In light of this, ECORD has already started the important work that needs to be done to fully explore additional funding opportunities. As part of this, a number of meetings are planned in the near future, for example, with the newly formed ECORD Industry Liaison Panel and with potential Russian partners. ECORD is also exploring with its existing partners the potential for additional funding and in-

kind contributions (*e.g.* 'free' or reduced cost ship-time for MSP expeditions) to be provided on a project basis.

Looking to the future, it is very impressive to see that, as of November 2012, of the 88 proposals in the IODP system, 25 are led by ECORD proponents and 15 are for future MSP expeditions. This clearly provides further evidence of the strong international leadership that is coming from the ECORD science community and that the success of the MSP concept should continue in the new IODP programme. The ECORD science community is also going to be very well represented on the new Science Advisory Structure with the same numbers as in the current phase.

The last MSP expedition to the Baltic is about to head off in late June (*pages 5-6 and 10*). With this expedition ECORD will have met its plan to deliver 5 MSPs under the current programme and ECORD hopes this final MSP will be as successful as the previous ones.

Finally, I would like to thank Anne de Vernal for her time and dedication as ECORD Council Chair, and more recently as outgoing ECORD Vice-chair, and to welcome Guido Lüniger as the incoming ECORD Vice-chair.

Michael Webb, ECORD Council Chair, from October 1, 2012 to September 30, 2013
<http://www.ecord.org/c/council.php>

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Gilbert Camoin

ECORD Managing Agency: The launch of a new IODP



Milena Borissova

Over the last months, EMA has concentrated its activities towards preparing the few last steps to achieve ECORD's transition into the new, groundbreaking International Ocean Discovery Program (*below*), which will be launched on October 1, 2013.

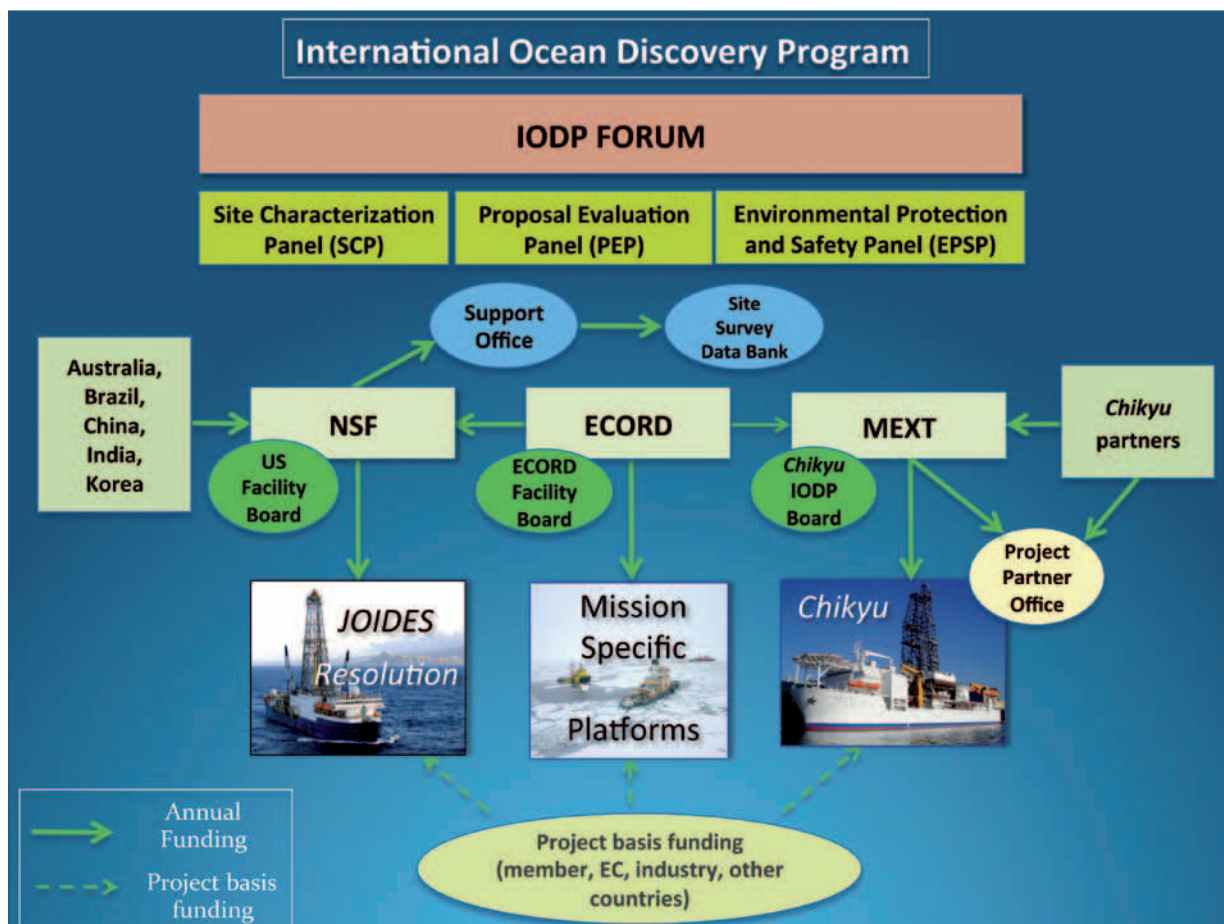
ECORD Membership and Objectives

All current ECORD member countries have expressed interest in participating in the International Ocean Discovery Program. The ECORD Memorandum of Understanding (MoU), on which ECORD's functioning and development will be based for the next ten years, has been approved by the ECORD Council in November 2012 and sent to all ECORD national funding agencies for signature in February 2013. Over the next months, the 18 current ECORD member countries will have to decide on their respective level of participation within the new programme. A major objective for ECORD will be to deliver an average of **one mission-specific platform (MSP) expedition a year** in the new programme by adjusting the numbers of low, medium and high-cost expeditions, and creating new opportunities through external co-funding and in-kind contributions.

Following recommendations of the **ECORD Vision Task Force**, ECORD has initiated discussions with countries and institutes to expand the Consortium. Israel is expected to join ECORD at the start of the new programme. Russian representatives will attend the next meeting of the ECORD Council and a visit of an ECORD delegation to Russia is scheduled in June 2013. Preliminary contacts have been established with Turkey, Luxembourg, Estonia and Lithuania.

ECORD's agreements with NSF and MEXT-JAMSTEC

ECORD is in the process of finalising the new MoUs with its partners, the USA and their associate members, and Japan. These MoUs will include a combination of significant co-funding along with berth exchanges to provide access to the **JOIDES Resolution (JR)** and the **Chikyu** for ECORD scientists and, in reciprocity, access to MSP expeditions for scientists from our partner countries. A signed letter was sent to the ECORD science community in February 2013 to summarise the main outcomes of the ECORD negotiations with NSF and MEXT/JAMSTEC, and on the agreements that will apply from the start of the new IODP - http://www.ecord.org/Letter_to_ECORD_Science_Community.pdf.



ECORD and NSF have agreed that the NSF will receive annually \$7m from ECORD along with 13 berths for US and JR Members and Associate Members scientists on each MSP expedition, in exchange for which ECORD receives 8 berths on all JR expeditions. ECORD will also consider providing additional funds on a project basis when funding allows.

ECORD intends to fund *Chikyu* operations on an annual basis with a minimum contribution of 1\$m plus 4 berths on each MSP expedition for Japanese scientists, in exchange for berths on *Chikyu*. The annual ECORD contribution will be adapted to the level of involvement of ECORD scientists in riser drilling proposals and *Chikyu* expeditions. In addition, ECORD will also consider funding *Chikyu's* operations in European/Canadian waters on a project basis.

Based on the projected berths on all platforms, and the significant number of additional berths provided to ECORD Co-chief Scientists that will not count towards the berth quotas, a significant increase can be expected in the overall numbers of ECORD berths in the new programme to somewhere between 500 and 600 (*i.e.* a 25-50% increase on the current programme).

The launch of the new ECORD structure

The new ECORD structure - <http://www.ecord.org/about/structure.html> - has been established and the new ECORD entities have started to exercise their functions. Among these new entities, the **ECORD Facility Board** - the planning forum for MSP expeditions - has been the first IODP Facility Board to meet on March 7-8, in Edinburgh, UK. The **ECORD Industry Liaison Panel** - the ECORD link between academia and industry - will meet for the first time on May 2-3, in Geneva, Switzerland.

The first workshops of the **MagellanPlus Workshop Series Programme** - <http://www.essac.ecord.org/index.php?mod=workshop&page=call-workshop>, now funded both by ECORD and ICDP to help ECORD scientists to develop innovative drilling proposals, were held in October and November 2012 (*pages 15-16*). Four IODP-related and one ICDP-related workshops will be funded in 2013.

ECORD and the EC

Working towards the establishment of a European Infrastructure to better co-ordinate various European Universities or Institutes that operate and/or develop tools that investigate the sub-seafloor will be amongst ECORD's main goals in the near



future. The **DEISM (Distributed European Infrastructure for Subseafloor Sampling and Monitoring)** proposal submitted in October 2012 to the European Commission in response to a Public Consultation on Research Infrastructures is the first step of ECORD's efforts to develop such a network designed to increase and optimise trans-national access to cutting-edge technologies and scientific services to the European science community.

While the **ECORD FY12 Annual Report** (*above*) has been delivered mid-March, ECORD welcomes its current and new partners to take a leading part in the programme's new phase and towards the reshaping of ocean science and technological innovation.

Gilbert Camoin, EMA Director and Milena Borrisova, EMA Assistant Director
<http://www.ecord.org/ema.html>



David McInroy

IODP Expedition 347: Baltic Sea Paleoenvironment

This summer, ESO will implement its 5th mission-specific platform (MSP) Expedition on behalf of the IODP in the Baltic Sea. Mobilisation is expected to take place in the UK in early June, when ESO's seven containerised laboratories and offices, and two refrigerated core containers, will be installed on the deck of the chosen platform. After mobilisation, the platform is expected to transit to Copenhagen, Denmark, to pick up the Science Party. **IODP Expedition 347: Baltic Sea Paleoenvironment** is therefore expected to officially start at Copenhagen in June, and will visit up to seven sites in the southern, central and northern Baltic Sea. The expedition will last for up to 60 days, before returning to a European port for demobilisation. The Science Party will gather at the Bremen Core Repository, Germany, to complete the scientific analyses on the cores a couple of months after the offshore phase.

The expedition platform will be the *Greatship Manisha*, a multi-purpose supply and support vessel owned by the Greatship Group, and the sister ship of the *Greatship Maya* used for IODP Expedition 325: Great Barrier Reef Environmental Changes. The drilling contractor is Island Drilling Singapore Pte. Ltd., who have partnered with Geoquip Marine to provide the drilling rig and drilling services. The drill rig, recently installed on the *Greatship Manisha* for another commercial client, is Geoquip Marine's GMTR 120 Geotechnical and Coring Rig (*top right*). The British Geological Survey will supply their Marine Wireline Coring System (*bottom right*), the same set of coring tools that was used for IODP Expedition 302: Arctic Coring.



Thomas Andrén



Bo Barker Jørgensen

The expedition is being led by Co-chief Scientists **Thomas Andrén** of the School of Life Sciences, Södertörn University, Sweden, and **Bo Barker Jørgensen** of the Center for Geomicrobiology, Department of Bioscience, Aarhus University, Denmark. The Science Party has been selected, with members listed on the IODP Expedition 347 webpage - <http://www.eso.ecord.org/expeditions/347/347.php>. The Co-chief Scientists will lead a team of 31 scientists from twelve countries including the ECORD members Sweden, Denmark, Germany, UK, Poland, France, Finland and The Netherlands.

Planning for the offshore operation has taken place over the past several months. A pre-cruise meeting was held in Edinburgh on September 24, 2012, and a microbiology planning meeting was convened by the Co-chief Scientists at the University of Aarhus, Denmark, on February

27-28, 2012. The meeting was attended by Science Party microbiologists and ESO representatives, who met to plan the activities and sampling methods to be undertaken offshore with regard to the microbiology analyses. This expedition will be the first MSP to utilise ESO's new dedicated microbiology



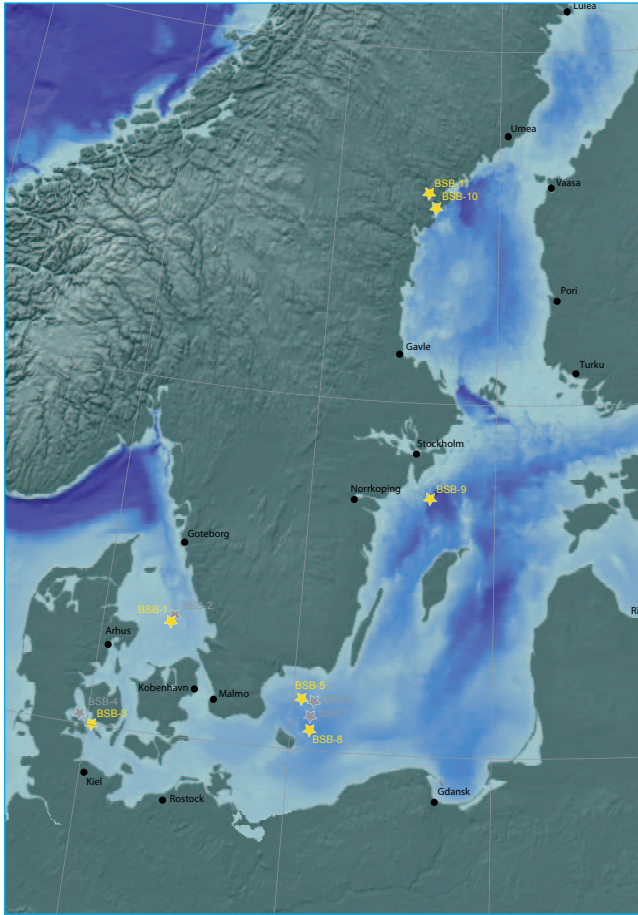
The Greatship Manisha (photo Geoquip Marine, courtesy of Island Drilling Singapore Pte.Ltd).

laboratory container configured by the IODP team at the MARUM, University of Bremen, as well as the petrophysics laboratory container updated by the EPC team at the University of Leicester, now also including an additional fast track multi-sensor core logger.



Examples of drill and core bits from the BGS Marine Wireline Coring System, to allow for effective coring in any formation encountered.

The seven coring sites within the Baltic Sea (*page 6*) are in water depths of 23-451 m. The expedition's science objectives were described in an article in *ECORD Newsletter #19 - October 2012*. The expedition aims to recover sediment cores from the last interglacial-glacial cycle in different settings in six sub-basins of the Baltic Sea: the gateway of the Baltic Sea



Drillsite map of Expedition 347: Baltic Sea Paleoenvironment.

Basin (Anholt), a sub-basin in the southwesternmost part of the Baltic Sea Basin (Little Belt), two sub-basins in the south (Bornholm Basin and Hanö Bay), one deep sub-basin in the central Baltic (Landsort Deep), and finally the sub-basin in the north (the Ångermanälven River estuary). These six areas are expected to contain a set of sediment sequences covering the last *ca.* 140,000 years, with paleoenvironmental information on a semi-continental scale. The position of the Baltic Sea Basin in the heartland of a recurrently waning and waxing ice sheet, the Scandinavian Ice Sheet, has resulted in a complex development. The area has been affected by repeated glaciations of different

magnitude, and has sensitively responded to sea-level and gateway threshold changes, with large shifts in sedimentation patterns and high sedimentation rates. The basin's position also makes it a unique link between Eurasian and NW European terrestrial records. The sediments of this largest European intra-continental basin therefore form a rare archive of climate evolution over the last glacial cycle. As well as providing an excellent opportunity to reconstruct climatic variability, the large variability in salinity, climate, sedimentation patterns and oxygenation that the Baltic Sea Basin has undergone during the last glacial cycle makes it optimal for new research on the deep biosphere, its evolution, and biogeochemical processes.

Reports from the ESO and science teams aboard the *Greatship Manisha* will be posted on the expedition page on the ESO website at <http://www.eso.ecord.org/expeditions/347/347.php>. The website includes information about the expedition and the people involved in the project.

Preparing for an IODP Expedition to core the Chicxulub Impact Crater, offshore Mexico

IODP Proposal #548, Chicxulub Impact Crater, was highly ranked by the Science Advisory Structure of the Integrated Ocean Drilling Program. The proposal was similarly identified as an important scheduling target in the new International Ocean Discovery Program by the ECORD Facility Board, the new executive body for MSP expeditions. Preparations are underway to contract a hazard site survey in spring 2013 across the proposed drill sites, to allow for the safe positioning of a lift boat or jack-up rig required to work in the shallow water depths of 17m. ESO has contracted the University of Texas Institute for Geophysics (UTIG) to conduct the survey work, which will involve both geophysical and geotechnical surveying. The University of Texas has partnered with Seafloor Geotec, LLC to acquire ship-based cone penetrometer (CPT) data at each site. Additionally, the Universidad Nacional Autonoma Mexico (UNAM) will provide their research vessel *Justo Sierra* for the survey. The survey data will be held by ESO on behalf of ECORD. The drilling phase of this proposal is planned to be implemented in late 2014 or early 2015 (*page 10*).

David McInroy, ESO Science Manager
<http://www.eso.ecord.org>

Information and reports of MSP Expeditions can be found at:

<http://www.eso.ecord.org/expeditions/pubs.php>

Data from MSP expeditions are available at:

<http://iodp.wdc-mare.org/>

News from the Bremen Core Repository



Ursula Röhl

The IODP Bremen Core Repository (BCR) houses one of the three growing IODP collections, along with the Gulf Coast Repository (GCR) located at the Texas A&M University in College Station (USA) and the Kochi Core Center (KCC) in Kochi (Japan). The BCR hosts all cores recovered since the beginning of scientific ocean drilling from the Atlantic and Arctic Oceans as well as the Mediterranean and Black Seas, a highly valuable scientific treasure both within and beyond Europe's borders. The BCR also organises and hosts the Onshore Science Parties (OSP) of mission-specific platform (MSP) expeditions, as well as the offshore curation and analysis during all MSP expeditions operated by ESO.



(photo MARUM)

The BCR has a very modern refrigerated storage area - supplementary racks were added recently to provide additional capacity for about 40 km of IODP cores - with a movable rack system and state-of-the-art and high-capacity laboratory and office space. A cumulative length of about 11 km of new cores from two IODP expeditions, Expedition 339: Mediterranean Outflow, and Expedition 342: Paleogene Newfoundland Sediment Drifts (*above*) arrived at the BCR during 2012. The BCR currently (spring 2013) holds almost 152 km of deep-sea cores from 86 expeditions available to be studied, sampled, and analysed in detail by national, regional, and international researchers and science teams.



(photo Carlos Zarikian & IODP).

The repository is an important contact point for scientists from all over the world: an average of around 200 scientists visit the BCR annually. As many as 50,000 samples per year are taken by guests and by the repository staff. Two IODP Sampling Parties were held at the BCR recently; for Expedition 339: Mediterranean Outflow from June 9 to 17, 2012 (*bottom left*), and for Expedition 342: Paleogene Newfoundland Sediment Drifts from February 25 to March 3, 2013. These two Sampling Parties were attended by a total of about 90 participants (expedition scientists as well as shore-based participants) from up to 13 different countries and a total of about 70,000 samples were taken.

The BCR is also an ideal place to train students. The 2012 DEBI-RCN meeting - <http://www.darkenergybiosphere.org/RCN/meetings/2012.html> - was held at the MARUM, University of Bremen, with a visit to the BCR to show rock samples of "Ocean Crust Processes and Consequences for Life" and a training workshop. In 2012, the ECORD Bremen Summer School was dedicated to "Submarine Landslides, Earthquakes and Tsunamis" (*below*) and the ECORD Bremen Summer School 2013 will be



photo Volker Diekamp, MARUM)

on "Deep-Sea Sediments: From Stratigraphy to Age Models" - http://www.marum.de/en/ECORD_Summer_School_2013.html. Through these efforts, many young emerging scientists have been made aware of the potential of IODP cores to inspire their research. Equally important for informing and educating the public of ECORD and IODP's scientific and technical achievements are the frequent events attended by representatives of the television, radio and print media.

Ursula Röhl, ESO Curation and Laboratory Manager
http://www.marum.de/en/IODP_Bremen_Core_Repository.html



Albert Gerdes



Alan Stevenson

ECORD Outreach and Education News and Activities



Patricia Maruéjol



Julia Gutiérrez Pastor

News from the Outreach team

The ECORD Outreach Team has been busy supporting IODP activities at the AGU 2012 Fall meeting, producing new ECORD publications and a video, opening education calls and preparing ECORD/IODP activities at EGU 2013. The team held the ECORD Outreach and Education Task Force meeting in Salamanca, Spain, on February 19-20 2013, to develop plans for activities that will take place during the spring and summer of 2013. ECORD/IODP at EGU 2013 and the renewal of IODP kept the team very busy with the release of many ECORD publications and documents (ECORD MoU 2013-2023, ECORD Annual Report 2012, this issue of the Newsletter) as well as the preparation of outreach activities for the upcoming MSP expedition to the Baltic Sea ([pages 5-6](#)) and new resources and online information.

- **EGU 2013:** An important outreach issue is the presentation of ECORD/IODP at EGU 2013. This year we continue our fruitful co-operation with the ICDP outreach team to present ocean and continental research drilling to the science community - <http://www.ecord.org/pi/egu13.html>.
- **"Looking for Life":** ECORD co-funded a video filmed by Luc Riolon and Rachel Seddoh that explains the scientific outcomes of Expedition 337: Shimokita Coalbed conducted onboard the *Chikyu*. A short version will be shown at EGU 2013 during the IODP-ICDP Townhall meeting.
- **ECORD website:** the transition into the new IODP 2013-2023 requires the contents of ECORD websites to be updated to

give information about the new ECORD entities, MagellanPlus Workshop Series Programme, etc.

Upcoming Events and Activities

Members of the team will be involved in upcoming activities:

- EGU 2013, April 7-12, 2013;
- Goldschmidt 2013: ECORD is organising a booth at the conference held in Florence on August 25-30, 2013 to promote IODP to geochemists;
- 3P Arctic 2013: ECORD is organising a booth in co-ordination with the ECORD Industry Liaison Panel.

ECORD Education

ECORD teachers, Jean-Luc Bérenguer and Susan Gebbels, were invited to sail on Expedition 345: Hess Deep Plutonic Crust as Education Officers ([see report below](#)). The ODP/IODP core replicas will be shown at several venues: the University of Salamanca, Utrecht University Museum, the Urbino Summer School 2013 and the GAC-MAC conference in Winnipeg, Alberta.

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

Get connected with ECORD:



http://twitter.com/ECORD_outreach



<http://www.ecord.org/RSS/ecord-rss.php>

ECORD Teachers at Sea

IODP Expedition 345: Drilling in the Hess Deep Rift

On December 12, 2012, the *JOIDES Resolution (JR)* left Costa Rica on a new mission to drill into the lowest oceanic crust during IODP expedition 345. The drillsite was the Hess Deep Rift in the Pacific Ocean, close to the Galapagos Islands and near the triple junction of three tectonic plates (Cocos, Nazca and Pacific). It was also a human adventure, the scientific party was a diverse mixture of geologists from several countries in Europe and Canada, the USA, Japan and Australia. During the 8-week cruise we worked together to understand the secrets of the gabbros cored from 5,000m beneath the seabed. Jean-Luc Bérenguer, science teacher at the International School of Vallbonne and in charge of the Education team in Géoazur

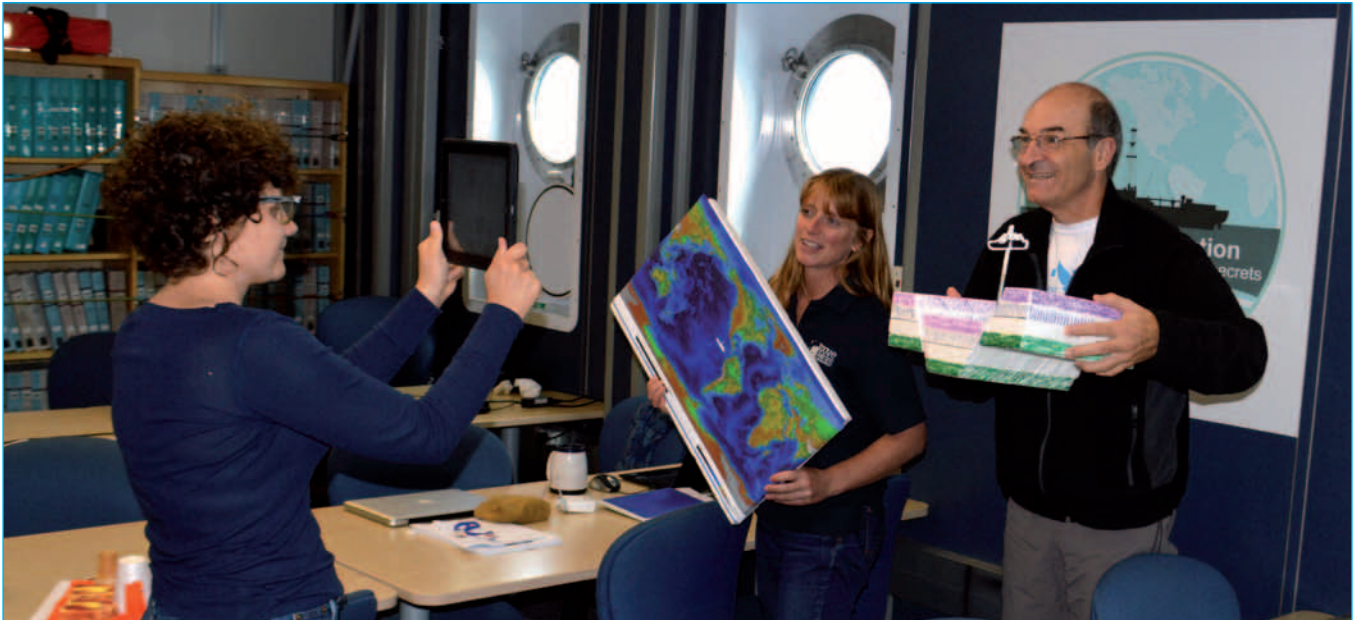
(France) and Susan Gebbels, a Research Associate at Newcastle University (UK), were on board as Educator Officers.

"It was just awesome to be able to broadcast with scientists directly from the middle of the Pacific Ocean!"

The major part of the day was spent broadcasting ([page 9](#)) to schools, universities and other groups of young people. During the expedition we organised 93 broadcasts to almost 4,000 young people in 16 countries - an IODP record! Each broadcast was adapted to suit the age and interests of the audience. A guided tour was delivered in one of several languages explaining the objectives of the expedition. Some of the

main points of interest in the tour were the thrusters, the lifeboats and the drill floor. The broadcast ended in the core lab where the students could see the cores that had just been drilled and the equipment, such as those found in the PaleoMag corner, on the Physical Properties bench or in the Microscope Lab. Each broadcast ended with the opportunity for the students to ask questions to one of the scientists. Some of the questions included:

- What was the most impressive thing that happened to you during your work?
- How long does it take to drill 100 m?
- How many years have you been doing your work?
- Did you see any dolphins (or sharks, whales, or polar bears)?



From left to right, Nicole Kurtz, Susan Gebbels and Jean-Luc Béranguer organise a broadcast onboard the JOIDES Resolution (© IODP/TAMU).

- What do you do when there's a storm?
- Can you show us a troctolite?
- Are you going to drill to the Moho?

New expedition-related hands-on activities for the classroom

At the same time, we have developed geoscience workpackages and activities for the classroom. These have been posted on the Deep Earth Academy's JOIDES Resolution website - joidesresolution.org and www.ac-nice.fr/svt/hdc. These activities allow the students to undertake practical work on enigmas that explore some topics related to the Hess Deep, for example:

- Animals of the deep (a look at which animals can be found along the length of the pipestrings, *right*);
- Marine snow (what are the sediments composed of?);
- How magnetic are the rocks? (magnetic susceptibility in the gabbros);
- Minerals (thin sections and crystal composition of olivine gabbros).

Ship-to-shore links

Throughout the duration of the expedition we worked closely with several primary schools in the UK and France. The teachers in these schools chose to use the expedition as the basis for a cross-curricula topic incorporating: science, artwork, writing, poetry, numbers, and speaking and listening skills. Other schools sent their mascots on-board the JR with the Education Officers, for example Rosie the puppet. These helped to

facilitate the children's learning through the actions of a familiar character. Each week an aspect of the science or life on board was photographed and emailed to the students. We received positive feedback about all our initiatives from students and teachers, which seemed to be effective ways of bring geosciences into the classroom. However, we feel that



it is necessary to go farther to optimise the education and outreach work done on board by post-expedition projects.

Post-cruise projects

- We hope to be able to maintain the new links when we are back to school.

We will attend several poster sessions and talks already planned at several workshops and conferences: EGU 2013 in Vienna, Austria (April 7-12, 2013), UK Science Week (March 2013) and the EMSEA conference in Plymouth, UK (September 3-5, 2013).

- We are also organising a European-scale high-school project to study some cuttings from the Hess Deep Expedition, which have not been studied before. The project will be a great opportunity for the students to be involved in a science project and to learn more about marine geosciences.

In conclusion, the experience of this expedition as Educator Officers lead us to the following conclusions:

- It remains essential to maintain a strong relationship between scientists and teachers through a better mutual understanding of each other's work.
- There is no comparable experience for a geoscience teacher to work as an Education Officer on board the JR.
- We must also strengthen the link between 'Science and Society', especially as it involves many themes such as geosciences, climate change and natural hazards.

Education gives more value to the science !

Susan Gebbels - Susan.gebbels@ncl.ac.uk
 Jean-Luc Béranguer - Beranguer@unice.fr
 JR Website: <http://joidesresolution.org>



Carlota Escutia Dotti

News from



Julia Gutiérrez Pastor

The International Ocean Discovery Program “*Exploring the Earth under the Sea*” will start on October 1, 2013 and many ongoing activities within ESSAC include managing the transition to the new programme framework (*pages 3-4*). As we look forward to the year ahead, **IODP expeditions** will take place on all three platforms. ESSAC has issued calls for the *JOIDES Resolution* Expedition 349: South China Sea, with a deadline for applications on April 1, 2013, and the three Izu Bonin Mariana (IBM) Expeditions 350, 351 and 352, IBM rear arc, IBM arc origins and IBM forearc respectively, expected to investigate the genesis of continental crust in the Izu-Bonin-Mariana convergent margin. The deadline for applications for the IBM expeditions is May 1, 2013. In addition, ESSAC has issued a call for *Chikyu* Expedition 348: NanTroSEIZE Plate Boundary Deep Riser-3 with a deadline of April 9, 2013. The selection of ECORD scientists for MSP Expedition 347: Baltic Sea Paleoenvironment has been completed, with two ECORD Co-chief Scientists, Thomas Andrén and Bo Barker Jørgensen (*pages 5-6*); ECORD scientists for Expedition 346: Asian Monsoon have also been selected. More information about the scientific objectives and precise dates of all these expeditions can be found in the table *below* and on the IODP website at <http://www.iodp.org/expeditions>.

At the heart of the **Science Advisory Structure (SAS)**, is the Proposal Evaluation Panel (PEP), which in the new programme will conduct business in much the same way it does now. The Site Characterization Panel (SCP) and Environmental Protection and Safety Panel (EPSP) will provide critical support to the PEP review process. ESSAC issued a call for nominations for ECORD members in the PEP to replace Maryline Moulin from Portugal. The deadline for applications was February 25, 2013 and ESSAC is now in the process of reviewing these applications.

The second phase of the **ECORD Distinguished Lecturer Programme (DLP)** is now running with three ECORD Distinguished Lecturers who will present the exciting ocean drilling discoveries on three main scientific themes of the IODP Science Plan (2013-2023):

- Claude Hillaire-Marcel, Université du Québec à Montréal, Canada “The Arctic Ocean in the Cenozoic climate system”;
- Benoît Ildefonse, Université Montpellier, France “Mantle, ocean crust and seawater, what's next in scientific ocean drilling?”;
- Roger Urgeles, Institut de Ciéncies del Mar, Barcelona, Spain “Submarine landslides and derived tsunamis, new challenges for the IODP”.

This phase of the DLP will be active until June 2014. A first call for institutions to host the lecturers is now closed, but ESSAC continues to welcome applications - <http://www.essac.ecord.org/index.php?mod=education&page=dlp>

Within the ECORD educational programmes, the **ECORD Summer Schools** in 2013 are:

- The Urbino Summer School in Paleoclimatology: Past Global Change Reconstruction and Modeling Techniques, University of Urbino, Italy, July 10-30 - www.uniurb.it/ussp.
- ECORD Summer School on "Deep-Sea Sediments: From Stratigraphy to Age Models", University of Bremen, Germany, September 9-20 - www.marum.de/en/ECORD_Summer_Schools.html.

Furthermore, the ESSAC Office has issued a new call to host ECORD-sponsored Summer Schools in 2014. The deadline for applications is May 15, 2013.

A call for **ECORD Scholarships** has been issued to attend the two ECORD Summer Schools in 2013. The deadline for

IODP Expedition Drilling Schedule

Expedition	Exp #	Drillship	Dates	Co-chief Scientists
Hess Deep Plutonic Crust	345	JR	Dec.11, 2012 - Feb. 12, 2013	K. Gillis - J. Snow
SCIMPI	341S	JR	May 25-29, 2013	I. Kulin - M. Riedel
S Alaska Tectonics Climate and Sedimentation	341	JR	May 29 - July 29, 2013	J. Jaeger - S. Gulick
Baltic Sea Paleoenvironment	347	MSP	Late June to late Aug. 2013	B.B. Jørgensen-T. Andrén
Asian Monsoon	346	MJR	July 29 - Sept 28, 2013	R. Tada - R. Murray
NanTroSEIZE Plate Boundary Deep Riser	348	Chikyu	August 15 - January 2014	M. Kinoshita - H. J. Tobin
South China Sea	349	JR	Jan. 28 - March 30, 2014	C. F. Li - J. Lin
Izu Bonin Mariana: Rear Arc	350	JR	March 30 - May 30, 2014	tbd
Izu Bonin Mariana: Arc Origins	351	JR	May 30 - July 30, 2014	tbd
Izu Bonin Mariana: Forearc	352	JR	July 30 - Sept. 29, 2014	tbd
Chicxulub Impact Crater	tbd	MSP	late 2014 - early 2015	tba



JR: *JOIDES Resolution*, MSP: *mission-specific platform*. Sailing dates may change slightly - <http://www.iodp.org/expeditions>. ECORD Co-chief Scientists are marked in blue. The first core of Expedition 345: Hess Deep Plutonic Crust (photo B. Ildefonse & IODP/TAMU).

applications was March 10, 2013. Up to 15 young scientists from ECORD countries or European non-ECORD countries will be sponsored by ECORD to attend one of these summer schools - <http://www.essac.ecord.org/index.php?mod=education&page=scholarships>

A call for applications for **ECORD Research Grants** was issued with a deadline of April 15, 2013. These are merit-based awards for outstanding graduate students to conduct research related to IODP and consist of small and short-term grants, which should cover travel and lab expenses. A report on work carried out with the support of an ECORD Research Grant by Christian Zeeden is posted on [page 13](#).

In addition, ESSAC was involved in the selection of two ECORD scientists, Sue Mahoney (UK) and Sidonie Révillon (France), to participate in the Short Course on Shipboard Sedimentology of the U.S. Science Support Program, which aimed to improve skills for integrating sedimentology data with physical properties, biostratigraphy and geochemistry data. ESSAC was also involved in the selection of two **ECORD teachers**, Susan Gebbels and Jean-Luc Bérenguer, to participate in the 'Teacher at Sea Program', an initiative of the Consortium for Ocean Leadership. This programme provides teachers with an opportunity to participate in sea-going research experiences aboard the *JOIDES Resolution*, and translating scientific results into useful teaching resources ([pages 8-9](#)).

The **ECORD/ICDP MagellanPlus Workshop Series Programme** continues to support European and Canadian scientists in developing new and innovative science proposals for submission to IODP and ICDP - <http://www.essac.ecord.org/index.php?mod=workshop&page=call-workshop>. Two workshops are scheduled for the spring 2013:

- Deep-sea Record of Mediterranean Messinian Events (DREAM), May, 5-8, 2013, Brisighella (Ravenna), Italy;
- Exploring the Cretaceous Greenhouse through Scientific Drilling, April, 15-17, 2013, London, UK.

In addition, ECORD scientists are involved in the JAMSTEC and IODP-MI Chikyu +10 planning workshop (March 21-23, 2013) to engage the international community in discussions about future expeditions and long-range operations.

ESSAC has been involved in numerous activities regarding the new structure of the **International Ocean Discovery Program (IODP)**. Among them, ESSAC has been involved in the selection of the five leading members of the international scientific community that form the core of the **ECORD Facility Board** - <http://www.ecord.org/ecord-fb.html> - with an accomplished ECORD scientist, Karsten Gohl (AWI, Germany), serving as Chair, and Antonio Cattaneo (Ifremer, France), Dominique Weis (University of British Columbia, Canada), Marta Torres (Oregon State University, USA) and Gerald R. Dickens (Rice University, USA) as members. The ECORD Facility Board will oversee mission-specific platform operations including scheduling expeditions, approving programme long-term plans, monitoring the advisory panels to ensure efficient and effective review of drilling proposals, and developing and monitoring policies for data collection, publications and core curation.

ESSAC was also charged with defining its Terms of Reference for the new programme and electing **Gretchen Früh-Green** (ETH-Zurich and ESSAC Delegate) as the next ESSAC Chair through an open call.

In summary, whether you are new to the programme or a senior ocean drilling scientist, this is an exciting time for IODP. At the EGU Meeting (April 7-12, 2013), you can visit the IODP-ECORD/ICDP booth (#52-53-54) in the exhibit hall and attend the IODP-ICDP Townhall Meeting (April 9, 2013) for more information about the new programme and possibilities to get involved. We hope to see you there!

I am confident that ESSAC has extended its activities and is now, in addition to its supporting mandate, playing a true science advisory role to better serve the ECORD community. This would not have been possible without the dedication and hard work of the Science Co-ordinator, Julia Gutiérrez Pastor, the active involvement of the ESSAC Delegates and the ECORD Council, with input from the scientific community. The Gdansk meeting (June 3-5, 2013) will be the last for the ESSAC Office in Granada before its rotation. Best wishes and good luck to Gretchen Früh-Green who will take over as the new ESSAC Chair running the office in Zurich!

Carlota Escutia Dotti, ESSAC Chair, and Julia Gutiérrez Pastor, ESSAC Science Co-ordinator, <http://www.essac.ecord.org>

IODP-ICDP session at EGU 2013, Vienna (Austria)

"Major achievements and perspectives in scientific ocean and continental drilling"

Convenor: Carlota Escutia

Co-Convenors: Ursula Röhl, Ulrich Harms, Thomas Wiersberg and Rüdiger Stein

Talks: Friday April 12, 15:30-17:00/ Room Y8

Posters: Friday April 12, 17:30-19:00/ Yellow Posters

Link: <http://meetingorganizer.copernicus.org/EGU2013/session/11622>

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Workshop and Conference Announcements

- :: MagellanPlus Workshop Series <http://www.essac.ecord.org/index.php?mod=workshop&page=call-workshop>
- :: ECORD DLP 2012-2014 <http://www.essac.ecord.org/index.php?mod=education&page=dlp>
- :: EGU 2013, April 7-12, 2013, Vienna, Austria <http://www.egu2013.eu>
- :: IODP Workshop: Chikyu +10, April 21-23, 2013, Tokyo, Japan <http://www.jamstec.go.jp/chikyu+10/index.html>
- :: OTC 2013, May 6-9, 2013, Houston, USA <http://www.otcnet.org/2013/>
- :: JpGU 2013, May 19-24, 2013, Makuari Messe, Japan http://www.jpgu.org/meeting_e/index.htm
- :: Goldschmidt 2013, August 25-30, 2013, Florence, Italy <http://www.goldschmidt.info/2013>
- :: 3P Arctic 2013, October 15-18, 2013, Stavanger, Norway <http://www.3parctic.com>
- :: AGU 2013 Fall Meeting, December 9-13, 2013, San Francisco, USA <http://fallmeeting.agu.org/2013/>

Report of ECORD Research Grants

Studying phase relations of orbital forcing and terrestrial (ice) response in the Miocene

Christian Zeeden, Lucas Lourens & Frits Hilgen (Utrecht University, The Netherlands)

The aim of this study is to gain a better understanding of the terrestrial (ice sheet) response to orbital forcing in the Miocene. From the precession phase of oxygen isotope data it will become clear whether northern- or southern-hemisphere ice sheets dominate the variation in oxygen isotope data. To be able to constrain phase lags for both obliquity and precession, we intend to investigate the time interval between ca. 9 and 10 Ma, as this time period has a relatively high obliquity influence (during a 2.4 Myr eccentricity minimum, when the influence of precession is relatively weak (see the orbital solution by Laskar et al., 2004).

Results show that Miocene benthic isotope data are influenced by precession and obliquity, especially in the older part (~9.7-10 Ma).

Cross-spectral analysis shows that benthic oxygen isotope data lag the magnetic susceptibility signal by 19 ± 10 degrees in the obliquity band, corresponding to -2 ± 1 kyr. This is in range with younger phase determinations by Tiedemann & Franz, 1997 for offsets of the obliquity phase between their tuning target and the oxygen isotope values, though care has to be taken for such a comparison due to a tuning to a different orbital solution.

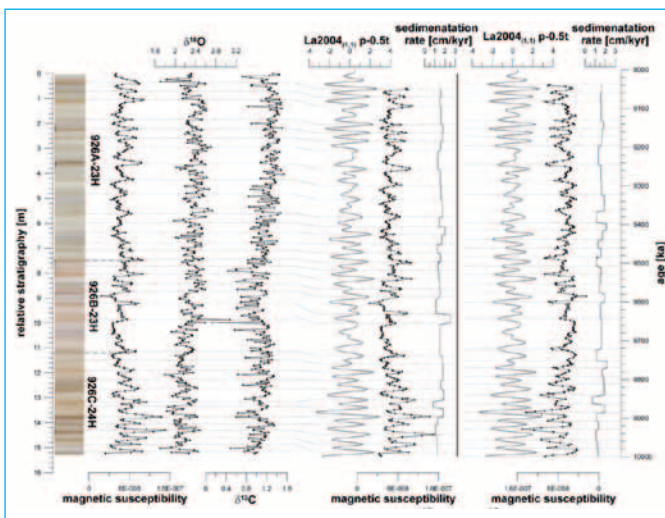
Data and preliminary interpretations were presented at the EGU 2012 meeting and a manuscript is in progress.

Acknowledgements - This project was facilitated by an ECORD Grant received in 2011. Ann Holbourn and Wolfgang Kuhnt provided essential training in recognising and preparing samples for measurement. Walter Hale and Alex Wülbers (BCR) are thanked for core handling and hands-on support during sampling.

This is a contribution made within the GTSnext project (www.gtsnext.eu). The research leading to these results has received funding from the [European Community's] Seventh Framework Programme [FP7/2007-2013] under grant agreement n° [215458].

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Core photograph (left), magnetic susceptibility, $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ data of samples from ODP Site 926. Two tuning options of this record to p-0.5t minima- and maxima are shown on the right, including resulting ages.

For the study of oxygen isotopes from benthic foraminifera 385 samples were taken in cores of the ODP Leg 154 at the Bremen Core Repository. Magnetic susceptibility, colour, $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ data (both of benthic foraminifera) were generated (*above*).

Full reports of ECORD Research Grants:
<http://www.essac.ecord.org/index.php?mod=education&page=grants>

MagellanPlus Workshop Reports

:: Records of Geohazards and Monsoonal Changes in the Northern Bay of Bengal - Preparation of an IODP Drilling Proposal - October 8-10, 2012, Bremen, Germany Convenors: Volkhard Spiess, Hermann Kudrass and Tilmann Schwenck (MARUM, University of Bremen)

The first meeting of the new MagellanPlus Workshop Series Programme was held at MARUM Research Center on Marine Environmental Sciences from October 8 to 10. The meeting brought together 22 specialists from Bangladesh, China, Denmark, France, Germany, Spain, Switzerland, UK and United States (*below*) to discuss and prepare an ambitious drilling project in the Bay of Bengal of the Indian Ocean.

The Indian Ocean monsoon system dominates the climate and seasonality of Southeast Asia, and will become a major target for IODP drilling initiatives in upcoming years. The central Bay of Bengal and the Indian continent and Andaman Island margins are highly ranked drilling areas, but for the understanding of the monsoon system more drilling initiatives are required in focus regions. While active drilling proposals exist in the Japan Sea or in the northern Arabian Sea, which is currently not accessible, the Bay of Bengal remains a key region to access sediments and signals from the Himalayas and the Tibetan Plateau. Research during the last two decades has provided sufficient evidence and data to fully support a new drilling proposal and fill a crucial gap in the IODP drilling strategy for the monsoon system. The initiative was strongly supported by an IODP workshop in Goa in October 2011,

where strategic ideas for Indian Ocean drilling were discussed.

The Southeast Asian monsoon governs the seasonal heat and humidity transfer from sea to land, and precipitation drives huge sediment loads into the Bay of Bengal by the Ganges and Brahmaputra rivers. The rapidly accumulating sediments on shelf, slope and in a shelf canyon contain a high-resolution record of Anthropocene, Holocene and late Pleistocene paleoclimatic changes and cyclonic episodes. The sediments have also recorded subsidence, sea-level changes and subduction-related earthquakes. The multidisciplinary workshop aimed to develop and optimise an IODP drilling proposal.

The 3-day workshop programme was organised in three parts to lead to a concept for a drilling proposal, and to establish a strong group of proponents with broad expertise, willing to write a full drilling proposal during the upcoming 6 months.

The workshop started with overview presentations on four main themes: exhumation and Asian monsoon, erosion and river sediments, structural growth and earthquakes, and delta processes and source-to-sink aspects, followed by an introduction into the regional seismic database and sedimentation processes on delta, shelf, a major shelf canyon and the continental

slope. Each participant presented general and specific ideas, which could be realised as part of a drilling project.

After mutual information, work concentrated in the second part on developing scientific objectives and testable hypotheses in break-out groups on four themes: monsoon signals/paleoceanography, delta development/tectonics, canyon evolution/sea level and terrestrial processes/signals. The more practically oriented third part of the meeting promoted break-out group discussions on drilling strategies, proxies and the selection of potential drillsites.

In the course of the workshop and during longer breaks and joint evening activities, we developed the general view that a lot of mature ideas and approaches were put on the table that could be incorporated into a drilling proposal, which we intend to prepare before the drillship is going to the Indian Ocean. We decided to use the window of opportunity supposedly coming up after 2014 to drill in this important oceanic basin, which was for a long time under-represented in drilling activities.

<http://www.essac.ecord.org/index.php?mod=workshop&page=call-workshop>

The workshop was funded by ECORD; ICDP and IODP



:: Drilling an active hydrothermal system associated with a submarine intraoceanic arc volcano - November 15-17, 2012, Lisbon, Portugal

Convenors: Wolfgang Bach (MARUM, University of Bremen), Cornel de Ronde (GNS, New Zealand), Susan Humphris (Woods Hole Oceanographic Institution, USA), Jun-ichiro Ishibashi (Kyushu University, Japan) and Fernando Barriga (University of Lisbon)

Hydrothermal processes associated with intraoceanic arcs play a major role in the exchange budgets of the global oceans and seafloor crust. Investigations of the distribution of sub-seafloor mineralisation and alteration styles are critical in further assessing the potential of intraoceanic arc hydrothermal systems as a tectonic environment for seafloor resources and a supplier of important metals and nutrients to the oceans. Seafloor hydrothermal systems along intraoceanic arcs are also some of the most hostile environments for life, owing to the extraordinary high concentrations of toxic metals and metalloids in very acidic (and gas-rich) fluids. Drilling into an intraoceanic arc volcano with diverse hydrothermal vents would provide critical new insights into (1) the mechanisms and extent of fluid-rock interaction and consequences for mass transfer of S and C species, and some metals and metalloids, into the oceans, (2) the distribution of metals and associated formation of mineral deposits in the sub-seafloor, and (3) the diversity and extent of microbial life in a hostile volcanic environment.

The purpose of the MagellanPlus Workshop was to bring together an international group of geologists, petrologists, geochemists, geophysicists and microbiologists to discuss and plan an IODP proposal to drill into a hydrothermal system hosted by the submarine Brothers volcano of the Kermadec intraoceanic arc. The group included specialists in volcanic processes, fluid geochemistry, fluid-rock interaction, ore deposit formation, petrology and geochemistry, geophysical exploration, and microbiology of extremophiles. Scientists who have played lead roles in past hydrothermal drilling expeditions were on hand to guide those with less IODP drilling experience and to impart their wisdom gained from previous drilling of seafloor hydrothermal systems.

The meeting was co-funded by ECORD, ICDP and IODP-MI and took place between November 15 and 17 in a building of the Faculty of Sciences, University of Lisbon. A field trip on November 14 to the Neves Corvo mine, one of two large operating mines in Portugal and the western-most extension of the Iberian Pyrite Belt, was attended by most of the 25 workshop participants (*above*). Lectures in the mornings of days 1 and 2 of the workshop covered various topics, including the global distribution and significance of arc hydrothermal systems, geochemical and microbiological processes within active submarine volcanoes, lessons from past scientific drilling in hydrothermal systems, and the geology and geophysics of Brothers volcano and its hydrothermal systems. In several discussion sessions the present state of knowledge about arc hydrothermal systems and the outstanding science questions that can best be addressed by drilling were defined. The drilling and logging strategies and anticipated technical difficulties with drilling Brothers volcano were also discussed.

It was concluded that within the extreme change in forcing parameters of subduction along the Tonga-Kermadec Trench, Brothers provides the possibility for examining specific structural/magmatic/volcanic co-evolution patterns. A question



central to hydrothermal deposit research over the past several decades, is the role of leaching of metals by circulating external waters, relative to metal input from degassing magmatic fluids. The question of how much metal transport is due to magmatic-degassing flux versus water-rock dominated hydrothermal circulation can be investigated at Brothers volcano as it is host to hydrothermal systems derived by both these mechanisms. Sub-seafloor hydrological patterns at volcanoes like Brothers are closely related to caldera and cone formation. Thus, drilling will aid in our understanding of how volcano architecture influences the distribution of large-scale permeability.

Deep, non-riser drilling will provide access to critical zones dominated by magma degassing and high-temperature hydrothermal circulation. The desired drill cores should contain valuable information on the influence of magmatic degassing on metal transport and allow us to distinguish between two principal sources: (1) directly from the magma and (2) via acid-promoted dissolution or leaching of rock. The cores will also help in the examination of the upflow zones away from areas of shallow entrainment of seawater.

The drilling technology currently available on the *JOIDES Resolution*, has a poor record of achieving high core recovery for the 10 m immediately below the seafloor. Any *JR*-style drilling expedition should hence be complemented by seabed drillrig sampling, which will provide core from shallow intervals most useful for microbiological studies.

Full reports of the MagellanPlus Workshop Series:

<http://www.essac.ecord.org/index.php?mod=workshop&page=call-workshop>

Highlights of IODP Proposal #758

Serpentinization and life: Biogeochemical and tectono-magmatic processes in young mafic and ultramafic seafloor

Gretchen Früh-Green¹

Proposal 758 addresses two important discoveries in mid-ocean ridge research: long-lived detachment faulting as a distinct mode of seafloor spreading, leading to emplacement of ultramafic and gabbroic rocks as major components of oceanic core complexes at slow-spreading ridges (*e.g.*, Smith et al., 2006) (*Figure 1*); and off-axis serpentinization and circulation of low temperature,

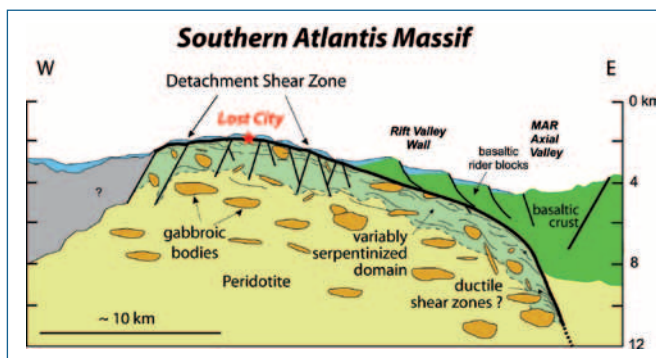


Figure 1: Conceptual cross-section of heterogeneous lithosphere exposed by detachment faulting at the southern wall of the Atlantis Massif; showing the LCHF and extent of serpentinization (light green shaded region) (modified from Boschi et al., 2006).

alkaline fluids that promote carbonate precipitation, exemplified by the Lost City hydrothermal field (LCHF; Kelley et al., 2005). Serpentinization is a fundamental process that occurs in many tectonic settings - on Earth and perhaps on Mars and other extraterrestrial bodies - where aqueous fluids react with olivine-rich mantle and/or gabbroic rocks. Serpentinization alters dry, dense, mechanically strong rocks into low-density, rheologically-weak, highly magnetic rocks and results in the uptake or release of many components, such as H₂O, Mg, Ca, Si, Cl, Li, B, C and S. Serpentinization also leads to reduced fluids with high concentrations of abiotically-produced H₂, CH₄, C₂, alkanes and formate that are important for microbial activity on and within the seafloor (*e.g.*, McCollum, 2007; Proskurowski et al., 2008; Lang et al., 2010). Despite the potential of these fluids to sustain a deep hydrogen-based biosphere, the nature and distribution of microbial communities in ultramafic subsurface environments are poorly known.

Using a seabed rock drill for the first time on an MSP expedition, a series of shallow (50-100m) holes will be cored across the Atlantis Massif (30°N, Mid-Atlantic Ridge), where detachment faulting exposes young mafic and ultramafic rocks on the seafloor (*Figure 2*). Drilling will focus on: (1) exploring the nature and extent of a subsurface biosphere in rocks of varying lithology and age; (2) understanding the role of serpentinization in driving hydrothermal activity, in sustaining microbiological communities, and in the sequestration of carbon in ultramafic rocks; and (3) characterising tectono-magmatic processes that lead to lithospheric

heterogeneities and variations in hydrothermal activity. Drilling a spreading-parallel, E-W profile at varying distances from the LCHF will evaluate how microbial communities evolve with variations in hydrothermal activity, age of emplacement on the seafloor and variations in rock type. Drilling an axis-parallel, N-S profile will investigate how faulting and lithospheric heterogeneities influence hydrothermal circulation and the nature of the deep biosphere when the dominant rock type changes from ultramafic to gabbroic. This profile will also assess the role of the differing rheologies of gabbros and serpentinized ultramafic rocks in localising detachment faults.

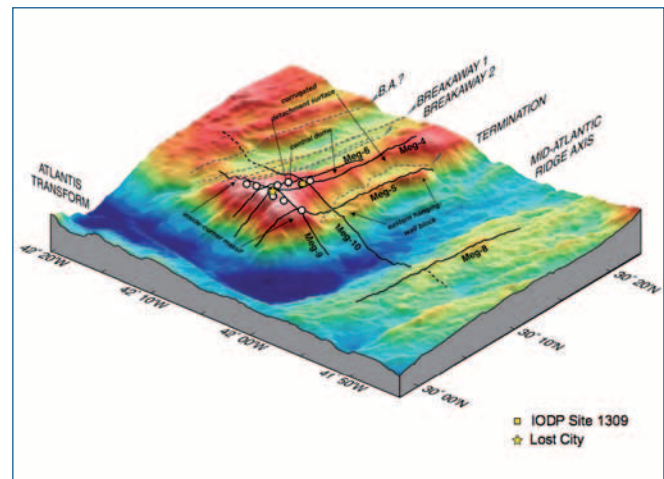


Figure 2: Three-dimensional representation of the Atlantis Massif with locations of proposed drillsites relative to seismic reflection profiles, the LCHF and IODP Site 1309 (modified from Canales et al., 2004). Serpentinites are the dominant rock type along the southern wall (target by the E-W transect of proposed holes), whereas gabbroic rocks make up the central dome (target of the N-S transect).

IODP Proposal #758 Proponents: G. Früh-Green, M. Andreani, J. Baross, S. Bernasconi, C. Boschi, W. Brazelton, M. Cannat, M. Cheadle, A. Delacour, J. Escartin, M. Godard, P. Gouze, N. Holm, M. Ivarsson, B. John, D. Kelley, S. Lang, M. Lilley, C. MacLeod, A. McCaig, B. Menez, A. Morris, M. Schrenk and R. Searle

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Report of an ECORD Distinguished Lecturer 2010-2012



Benthic archaea - the unseen majority with importance to the global carbon cycle revealed by IODP drilling

Kai-Uwe Hinrichs¹

Between Fall 2010 and Spring 2012, the ECORD Distinguished Lecturer Programme (DLP) took me to nine institutions in Canada, Denmark, France, Germany, Israel, Norway and the United States, at which I presented the lecture “Benthic archaea - the unseen majority with importance to the global carbon cycle revealed by IODP drilling”. At three of these institutions, the University of Michigan, the University of Georgia, Athens, and the University of Jena, my lectures were part of the regular departmental lecture series and fully sponsored by the host institutions so that these were only informally part of my DLP tour. My initial plan was to follow the advice of two of my DLP predecessors, Peter Clift and Achim Kopf, who both managed to organise amazingly efficient tours during which they gave five lectures in a week, but both the geographically scattered hosting institutions as well as my tight time schedule in the past two years precluded me from following their example.

I very much enjoyed the cultural and academic diversity I encountered during my DLP visits. I view the programme as an effective way to disseminate the excitement and fantastic opportunities within scientific ocean drilling to a broader academic community and, in my case probably even more relevant, to be an ambassador of a rather exotic ECORD/IODP Deep-Biosphere community. My presentation focused on the study of lipid signals resulting from sub-seafloor life. Specifically, I discussed the state-of-the-art technology and approaches in quantifying the extent, composition, and metabolic function of sub-seafloor microbial communities. Depending on whether my host department had a geological or a biogeochemical focus, I sought to adapt the content to the audience. Given that my lecture’s content was off the mainstream of geological sciences, it was at times challenging to select the “right” dose of specialised information - an iterative process that I much enjoyed.

With the exception of the universities in Oldenburg and Aarhus, all other stations of my DLP tour were first-time visits. The University of Tromsø in Norway, where Jürgen Mienert hosted my visit in late September 2011, was the northernmost place I’ve ever been to. While we had an unusual warm late summer in Bremen and elsewhere in Europe, the rough fall weather in Tromsø gave me a glimpse of how an Arctic winter might look like there. Similarly, it was a welcome contrast to escape gloomy and foggy Bremen in late November 2011 to picturesque Mediterranean Perpignan in southern France, where I met a vibrant marine sciences community and my hosts Serge Berné and Maria-Angela Bassetti. Among the very memorable journeys was also my first-ever visit to Israel in March 2012 as member of an ECORD delegation that also included my DLP fellow Dominique Weis. Our host Nicolas Waldmann at the University of Haifa had organised a wonderful meeting attended by several senior representatives of the Israeli marine science community in order to develop momentum to join the international ocean drilling community via an affiliation

with ECORD. Dominique’s and my lecture were part of the programme and these stimulated very interesting discussions with students and faculty members. Nicolas then organised a wonderful day trip to the historic centre of Jerusalem (*below*), certainly one of the highlights of my DLP tour. In the midst of a very impressive sightseeing tour, during which Nicolas proved himself to be a fantastic (and formerly professional) tour guide, I even had the opportunity to meet with two of my colleagues from Ben Gurion University, Beer Sheva, and Hebrew University, Jerusalem.

The DLP programme is an important part of the outreach activities of ECORD; I very much enjoyed being part of it and I hope that the programme will help in raising awareness of the unique research opportunities of scientific ocean drilling in Europe and, ultimately, in increasing our community.



Tea time: ECORD delegation interrupts the sightseeing tour led by Dr. Nicolas Waldmann, University of Haifa (centre background with blue sweater) with a tea break in the Old City of Jerusalem. Front from left to right: Carlota Escutia Dotti, DL Kai-Uwe Hinrichs, Alon Amrani (Hebrew University), DL Dominique Weis; behind Carlota to the left is Robert Gatliff from BGS.

Hosting institutions in chronological order (designates formal DLP lectures):*

- University of Michigan, USA (hosted by Phil Meyers); October 29, 2010*
- *University of Oldenburg, Germany (hosted by Heribert Cypionka); December 1, 2010*
- *University of Aarhus, Denmark; June 14, 2011 (hosted by Beth Orcutt)*
- *University of Tromsø, Norway; September 30, 2011 (hosted by Jürgen Mienert)*
- *University of Perpignan, France; November 18, 2011 (hosted by Serge Berné)*
- *University of Toronto, Canada, Feb 6, 2012 (hosted by Barbara Sherwood Lollar)*
- University of Georgia, Athens, USA, Feb 10, 2012 (hosted by Samantha Joye)*
- *University of Haifa, Israel, March 27, 2012 (hosted by Nicolas Waldmann)*
- University of Jena, Germany, May 8, 2012 (hosted by Kirsten Küsel)*

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A Letter from Denmark

Funding structure

As a country surrounded by water and with a long naval history, Denmark has a continued interest in marine science and has been a member of ECORD since it was founded. The Danish membership of ECORD and participation in IODP has until the end of 2012 been funded by the The Danish Council for Independent Research, Natural Sciences (FNU). As of January 2013 the funding organisation is the Division of Research Infrastructure, Ministry of Science, Innovation and Higher Education.

Danes at Sea

Within the current IODP programme nine Danish researchers have participated in eight expeditions encompassing a wide range of research topics aimed at both geoscience and microbiology. Additionally at least two Danish scientists are expected to participate in upcoming expeditions. Platforms for these expeditions include the *JOIDES Resolution (JR)*, the *Chikyu* as well as mission-specific platforms (MSPs).

Geoscience

Estela Vazquez Esmerode from Copenhagen University, joined Exp. 303 in 2004 as a sedimentologist, while Morten Bjerager, Copenhagen University, participated in Exp. 307 in 2005, also as a sedimentologist. More recently, Christian Bjerrum, Copenhagen University, took part in Exp. 313 in 2009 as a Petrophysicist/Physical properties scientist. As Expedition 313 was carried out using an MSP, cores were opened and analysed during the 5-week Onshore Science Party in Bremen, Germany. The primary purpose was to obtain cores of Miocene sequences across a transect of seismic clinothems, also known as 'sea slugs'. The unprecedented continuous cores help improve our understanding of Miocene sea-level variability, timing and their significance in the global carbon cycle through burial of carbon during coastal migration. Furthermore, the high-resolution deposits allowed the study of Miocene climate, and especially the Miocene Climate Optimum, and the global cooling leading to the beginning of northern hemisphere glaciations. Between scientific expeditions, both the *JOIDES Resolution* and the *Chikyu* are at times leased to the private sector, and in 2012 Paul Knutz and Henrik Nøhr-Hansen



"Core on deck!" on the *JR*, Expedition 323 (photo N. Risgaard-Petersen & IODP).

from the Geological Survey of Denmark and Greenland (GEUS) sailed on one such expedition funded by industry.

Microbiology

The Danish Center for Geomicrobiology headed by Bo Barker Jørgensen focuses on sub-seafloor microbial life and biogeochemistry and has been closely associated with the IODP with onboard participation in six drilling expeditions over four years. From this Center, Nils Risgaard-Petersen joined Exp. 323 in 2009, while Britta Gribsholt sailed on Exp. 329 in 2010, where she analysed the very deep oxygen penetration to the ocean crust. Beth Orcutt sailed on both Exp. 327 in 2010 and Exp. 336 in 2011, where she took part in the CORK experiments on long-term microbial



Microbiology sampling on the *Chikyu* in Expedition 337 off Shimokita (photo C. Glombitza, JAMSTEC/IODP).

growth and activity. On the *Chikyu* Exp. 337 (2012), Hans Røy joined in the Kumano Sea while Mark Lever and Clemens Glombitza participated in the expedition, "Deep Coalbed Biosphere off Shimokita", that set a record for scientific drilling to 2.466 mbsf.

The Baltic Sea Paleoenvironment Expedition

In the summer of 2013 the ECORD Science Operator will be in charge of Exp. 347 in the Baltic Sea with the Swedish geologist, Thomas Andrén, and Bo Barker Jørgensen as Co-chiefs (pages 5-6). The drilling vessel on this MSP expedition will be the *Greatship Manisha*. The expedition will combine paleoceanographic studies of the glacial-interglacial climate history from the past 140,000 years with studies of the deep biosphere in relation to the dramatic shifts of past environmental conditions in the Baltic Sea area. It will be the largest expedition ever to take place in Danish waters.

International committees, workshops and training

In March 2009, the Magellan workshop "Paleoenvironmental Evolution of the Baltic Sea through the Last Glacial Cycle" was held in Copenhagen and was very important for preparing the final proposal for Exp. 347. The workshop was among others organised by Jørn Bo Jensen and Bo Barker Jørgensen and a number of Danish scientist participants. Danish scientists have also been active in the IODP panels, most recently Holger Lykke-Andersen was a member of the SSP (Site Survey Panel) from 1995-1998 (ODP) and 2007-2009 (IODP). In 2012 Christina Sheldon from Geoscience, Aarhus University, took part in the ECORD Summer School "Impact of Cryosphere Dynamics from Land to Ocean" in Montréal, Canada with a scholarship from ECORD. For more information please visit <http://www.iodpcanada.ca/outreach/summer-schools>.

Bo Barker Jørgensen (Centre for Geomicrobiology, Aarhus University), Anders Kjær (Ministry of Science, Innovation and Higher Education), Paul Knutz (ESSAC alternate; GEUS), and Marit-Solveig Seidenkrantz (Council and ESSAC delegate, MagellanPlus Steering Committee member; Centre for Past Climate Studies, Aarhus University)

A Letter from Sweden

Historically, Sweden is a seafaring nation and has a passion for maritime exploration that originates from the establishment of Viking trade routes. Today, Sweden is a multi-cultural society that invests heavily in education and science, with the aim to increase public government spending on research and development to 1.5% of its GDP (-3.5% if the private sector is included). It should, therefore, be no surprise that IODP and Swedish science have benefitted from this high level of funding since Sweden joined ECORD in 2003. The Swedish Research Council (VR) has contributed approximately 4.3 million USD to IODP and provided the *ODEN* icebreaker for the very first mission specific platform (MSP) expedition, 302: Arctic Coring (ACEX) in 2004.

Scientific Leadership in IODP

It is notable that of the five MSP expeditions organised during IODP, Swedish scientists have played major roles in the organisation of two of them. Jan Backman (Stockholm) was Co-chief Scientist of the ACEX expedition and Thomas Andrén (Södertörn) is Co-chief of Expedition 347: Baltic Sea Paleoenvironment, which will take place in the summer of this year (2013). In addition to the obligatory delegates that represent national interests on ESSAC and the ECORD Council, Sweden has been well represented on other panels that are part of the IODP management system. For example, Maria Ask (Luleå) served on the Engineering Development Panel and was Vice-chair in 2009. Jan Backman was a member of the Scientific Steering and Evaluation Panel (2005-2007). Eve Arnold (Stockholm), who was the ESSAC delegate between 2003 and 2008, has served for several years on the IODP-MI Education and Outreach Task Force.

Sailing scientists and broadening the base

Sweden's level of contributions entitled it to a quota of twelve scientific berths (valid in October 2012) and by the end of 2013 at least eleven scientists will have sailed on IODP expeditions, or attended Onshore Science Parties at the Bremen Core Repository. In addition to the two aforementioned Co-chiefs the scientists are: Claudia Agnini (Stockholm, Exp.

342: Paleogene Newfoundland Sediment Drifts), Elinor Andrén (Södertörn, Exp. 347: Baltic Sea Paleoenvironment), Jan Backman (Stockholm, Exp. 321: Pacific Equatorial Age Transect/Juan de Fuca), Lillemor Claesson (Stockholm, Exp. 316: NanTroSEIZE Shallow Megasplay and Frontal Thrusts - Stage 1), Marion Dumont (Exp. 301: Juan de Fuca Hydrogeology), Tommy Edeskär (Luleå, Exp. 308: Gulf of Mexico Hydrogeology), Martin Jakobsson (Stockholm, Exp. 302: Arctic Coring Expedition), Andreas Nilsson (Lund, Exp. 313: New Jersey Shelf) and Ian Snowball (Uppsala/Lund, also Exp. 347). In addition, Maria Ask (Luleå) served as a shore-based scientist on Exp. 322: NanTroSEIZE Subduction Inputs - Stage 2, and Helen Coxall (Stockholm), who was one of the proponents of Exp. 342, has just taken part in the Onshore Sampling Party.

At the beginning of IODP, interest in scientific ocean drilling in Sweden was primarily, although not exclusively, concentrated in Stockholm as a result of Prof. Jan Backman's dedication to the use of geology to elucidate the oceans role in climate change. The list of sailing scientists shows that Sweden has successfully spread the opportunities afforded by IODP to other centres of Earth Science and last, but not least, Eve Arnold and Helen Coxall regularly take students to the Bremen Core Repository to see the 'real deal'.

On the horizon

Three chosen Swedish ECORD scientists are eagerly waiting for the commencement of Expedition 347: Baltic Sea Paleoenvironment (T. Andrén as Co-chief Scientist, E. Andrén as a paleontologist and I. Snowball as geophysicist/paleomagnetist). As a relatively young

ecosystem, which suffers from multiple stressors imposed by human activity, the information stored in the stratigraphy of the Baltic Sea is of interest to all aspects of Earth science. Further ahead, Swedish participation in the International Ocean Discovery Program (IODP 2013-2023) is now secure following a successful application to the VR in 2012, which was led by Jan Backman.

Continued membership of ECORD will provide outstanding research opportunities for the next generation of Swedish Earth scientists, who are involved in proposals in the pipeline. To ensure that these opportunities are taken, a group of established scientist from different centres (Ian Snowball & Chris Juhlin-Uppsala, Maria Ask-Luleå, Jan Backman-Stockholm and Vivi Vajda-Lund) have formed a secretariat for the 'Swedish Scientific Drilling Program', which will



On the top of the world: Members of the technical crew, Exp 302: Arctic Coring (photo Kate Moran © ECORD/IODP).

form an interface between individual scientists and larger organizations involved in scientific drilling, such as IODP and ICDP, and ensure the efficient use of infrastructure relevant to them (such as drill-rigs, core-scanners and long core magnetometers). This secretariat is managed by the Department of Earth Sciences-Geophysics, Uppsala University.

Ian Snowball (ESSAC delegate), Eve Arnold (ESSAC alternate) and Dan Holtstam (ECORD Council member 2005-2012)

News from ECORD Member countries

Belgium

The Belgian IODP community has successfully prolonged its participation in IODP for the upcoming three years, within the framework of the International Coordination Action "COCARDE II", funded by the FWO Flanders, and supported by IOC-UNESCO.

Additionally, the team of Belgian delegates has changed, both for the ECORD Council and for ESSAC. Although **Prof. Dr. Jean-Pierre Henriet** remains active as effective delegate for the ECORD Council, his new alternate will be **Prof. Dr. David Van Rooij**, who will also be the effective delegate for ESSAC.



Katrien Heirman onboard Chikyū during Exp 338 (© JAMSTEC/IODP)

The ESSAC alternate will be **Dr. Kenneth Mertens**. All three delegates are affiliated to Ghent University, with research expertise in geophysics, sedimentology and palaeoceanography. Within these years, the delegates have strong ambitions to better consolidate

the Belgian IODP (and ICDP) community and to secure more long-term funding. The start of this new delegation was also coincidental with the participation of the first Belgian scientist onboard the *Chikyū*. **Dr. Katrien Heirman** (Ghent University) participated from November 25, 2012 to January 13, 2013 on IODP Expedition 338: "NanTroSEIZE" Stage 3 (Leg 2) as a shipboard sedimentologist.

David Van Rooij, ESSAC Delegate, Jean Pierre Henriet, Council Delegate, and Kenneth Mertens, ESSAC Alternate

Canada

Kathryn Gillis (University of Victoria) recently sailed as Co-chief Scientist on Expedition 345: Hess Deep Plutonic Crust (December 2012 - February 2013). This was the second drilling programme at the Hess Deep Rift to study crustal accretion processes at the fast-spreading East Pacific Rise (EPR). The expedition took advantage of well-surveyed crustal exposures to recover the first cores of young, primitive plutonic rocks that comprise the lowermost ocean crust.

Guillaume St-Onge (Université du Québec à Rimouski) is gearing up to sail on Expedition 341: Southern Alaska Margin (May - July 2013) as a Physical Properties Specialist/Stratigraphic Correlator.

IODP-Canada is pleased to support two educators - **Jane Londero**, high-school math and science teacher (Whitehorse, YT) and **Sarah Thornton**, Senior Laboratory



Kathryn Gillis observes the arrival of a core on the drill floor during Expedition 345 (photo William Crawford, IODP/TAMU).

Instructor (University of Victoria) - to participate in the 'School of Rock 2013: Exploring Ocean Cores and the Geology of the Pacific Northwest' onboard the *JOIDES Resolution* in Victoria, BC, April 1-9.

IODP-Canada continues to promote scientific ocean drilling via conference participation, port-call activities and student grants, including five for the upcoming 2013 ECORD Summer Schools.

ESSAC Delegate **Dominique Weis (University of British Columbia)** was recently selected as one of five scientists to serve on the ECORD Facility Board, the key planning forum for mission-specific platform expeditions.

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Finland

Expedition 347: Baltic Sea Paleoenvironment. There is great interest in the upcoming Baltic Sea Paleoenvironment Expedition in the Finnish geoscience and microbiology communities. Several scientists applied for ECORD berths on the expedition. The community is very pleased that **Outi Hyttinen** (University of Helsinki) and **Aarno Kotilainen** (Geological Survey of Finland) have been invited to participate in the offshore and onshore science parties of the expedition taking place this year. Outi Hyttinen will be acting as a stratigraphic correlator and Aarno Kotilainen as a physical properties specialist/stratigraphic correlator. Aarno is also one of the co-proponents of the expedition.

Expedition 347 has been successfully presented by **Joonas Virtasalo** to a wider geoscience community in the bi-

annual Lithosphere Symposium held at the Geological Survey of Finland, Espoo in early November 2012. The meeting had a special theme focusing on “Scientific Drilling Projects in Fennoscandia”, where currently active IODP-ICDP proposals were discussed and advertised. More than 70 researchers and students attended the Symposium.

In March 2013, the new International Ocean Discovery Program (IODP) was presented and advertised to doctoral and post-graduate students at the annual Geological Colloquium and

workshop arranged by the Finnish Doctoral Program in Geology, this time at the University of Oulu.

Kari Strand, ESSAC Delegate, and Annakaisa Korja, ESSAC Alternate
<http://iodpfinland.oulu.fi/>



IODP-related poster presented by Ekaterina Kaparulina (right) and Heather Tessier at the Geological Colloquium in Oulu March 2013.

United Kingdom

The UK has approximately 700 students and scientists engaged in IODP-related research. Over the past year, 16 UK scientists have participated in eight expeditions, two serving as Co-chief Scientists.
<http://www.bgs.ac.uk/iodp/newsletters.html>

IODP 2013-2023. While the final structure of the international programme is taking shape, the UK-IODP domestic research programme (the largest of its kind in the UK) is also going through a renewal process. All signs are positive that the programme will continue to enable UK scientists to take advantage of the opportunities provided by IODP *e.g.* post-cruise funding, site-survey grant rounds, hosting and attending IODP-related meetings/workshops. In September, UK-IODP hosted two

conferences. The three-day, 2012 UK-IODP Student and Early-Career Scientists Workshop was the first of its kind in the UK, and was a great success for the 50 participants. The 2012 UK-IODP General Conference was a day of excellent talks covering the diversity of research conducted within IODP, including a poster session, and discussions about the future of the international and domestic programmes.
<http://www.bgs.ac.uk/iodp/meetings.html>

UK-IODP new faces. We have several new UK scientists in the ESSAC and IODP Science Advisory Structure (SAS). Current members are: **Bridget Wade** (Univ. of Leeds) at ESSAC; **Dick Kroon** (Univ. of Edinburgh), Chair of the PEP; **Stuart Robinson** (UCL) and **Lisa McNeil** (Univ. of Southampton) at PEP; **Paul Wilson** (NOCS) at SIPCom; **Mads Huuse** (Univ. of Manchester) at SCP;



Paul Wilson, Expedition 342 Co-chief Scientist (photo P. Lippert & IODP).

Cedric John (Imperial College) at STP, and **Bramley Murton** (NOCS) at STP.

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Norway

Old ODP core tells about high-latitude climate in a globally warmer world. New studies of the old ODP Site 642 from Leg 104 have been initiated to determine characteristics of the Nordic Seas water column, and how it varied, during the globally warmer Pliocene (5.3-2.6 million years ago). Through a new Norwegian Research Council (NRC) funded project, 'Ocean Control on high-latitude Climate Sensitivity - a Pliocene case study (OCCP)', a fully integrated multi-proxy and model study of the role of the Nordic Seas in controlling high northern latitude Pliocene climate



will be carried out and the most important forcing(s) will be identified. The project will be led by **Dr. Bjørg Risebrobakken** at Uni Research

AS and Bjerknes Centre for Climate Research. According to preliminary results, the Nordic Seas were not

as warm during the Pliocene as previously proposed, and the pattern of ocean circulation was very different from modern conditions. The Nordic Seas, and especially the Vøring Plateau, are critical areas for understanding Arctic amplification mechanisms, and there is a crucial need for new IODP cores from this area to resolve future scientific challenges.

Expedition 345 to the tectonic window of Hess Deep in the eastern Pacific ~ 1000 km west of the Galapagos Islands started on December 12, 2012 in Puntarenas (Costa Rica) and ended on February 12, 2013 in Balboa (Panama). The *R/V JOIDES Resolution* therefore returned to the lower Hess Deep oceanic crust almost exactly 20 years after the highly successful ODP Leg 147. In this tectonic window the deepest layers of a fast-spreading oceanic crust are outcropping. The drilling was carried out in ~4850 m water depth under quite challenging borehole conditions. We recovered primitive plutonic lithologies from these deep layers to determine



Christmas season onboard the JOIDES Resolution during Expedition 345 (photo Romain Meyer & IODP).

intrinsic processes of how magma is transported and crystallises within the Earth's deep oceanic crust. Preliminary onboard observations indicate that the mineralogical and petrologic evolution of these igneous rocks is unprecedented for ocean-floor geology studies.

Helga (Kikki) Kleiven, ESSAC Delegate, Romain Meyer, University of Bergen, and Katrine Husum (ESSAC Alternate)

The Netherlands

The Netherlands continue active participation in ECORD as part of IODP 2013-2023. The Dutch science community is strongly involved in IODP and ECORD. To ensure active participation in the new programme, IODP-NL has produced a White Paper summarising and highlighting the most remarkable scientific achievements from the period 2003-2013 and providing an outline of the plans and ambition for the new programme. The White Paper was forwarded to the NWO Council for Earth and Life Sciences (ALW) with the strong recommendation for continuing the financial support

of IODP through continued Dutch membership in ECORD.

In its December meeting, the Council discussed this proposal and agreed to prolong the involvement of The Netherlands in ECORD past 2013. In view of the high scientific and organisational standards of IODP/ECORD and the impressive scientific achievements of the Dutch science community, the Council not only extended the membership, but also increased the yearly contribution to ECORD by 25%. This will provide Dutch scientists with even greater opportunities to engage in IODP/ECORD activities in the new programme!



IODP-NL website: <http://www.iodp.nl/>

IODP-NL on facebook: <https://www.facebook.com/Iodp.nl?ref=hl>

Josef Stuefers, NWO program manager and ECORD Council Delegate
<http://www.nwo.nl/en/research-and-results/programmes/Integrated+Ocean+Drilling+Program>

Switzerland

New Venture in Swiss Participation within IODP post 2013.

In anticipation of renewal of ECORD membership, the Swiss scientific community held a workshop “New Venture in Swiss Participation within IODP post 2013” in Murten in June 2012. This workshop brought together keynote speakers from the IODP community as well as professors, senior and junior scientists, and students from all Swiss universities, to define a science and strategy plan for future Swiss participation in IODP. The outcome of this workshop provided the basis for a detailed research plan presented to the Swiss National Science Foundation (SNSF) in October 2012. Future Swiss membership in IODP through ECORD brings a new focus on microbiology and will promote interdisciplinary research and

new collaborations among the Swiss geoscience and biogeoscience communities. We are pleased to announce that SNSF has granted funding for continued membership in IODP and ICDP for 2014-2016.

Joint IODP-ICDP portal.

To foster cooperation between the marine (IODP) and the continental (ICDP) scientific drilling communities, a joint platform including a common web-entry point was defined: <http://www.swissdrilling.ch>. A steering committee of 12 members from eight Swiss universities has been set up to co-ordinate IODP-ICDP activities and to organise an annual joint conference to discuss drilling-related science.

Swiss participation in IODP.

Two Swiss scientists took part in recent IODP expeditions: Michael Strasser, currently SNSF professor at the ETH Zurich, sailed

as the first Swiss IODP Co-chief Scientist onboard *Chikyū* under challenging sea conditions during Exp. 338: Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) (above), which was aimed at accessing the deep interior of the active accretionary wedge by riser drilling. Maria I. Sandoval Gutierrez (PhD student at the University of Lausanne) participated as a radiolarian specialist on Exp. 344, which continued the Costa Rica Seismogenesis Project (CRISP-A2) to investigate processes that control nucleation and seismic rupture of large earthquakes at erosional subduction zones. The current Swiss members in ECORD and IODP committees and panels are: Michael



Renowned oceanographer Walter Munk (left) visits Exp. 338 Co-chief Scientists M. Strasser (right) and B. Dugan on the *Chikyū*.

Strasser (ETH Zurich) at PEP (Co-chair) and OTF - Andrea Moscariello (Univ. of Geneva), Chair of the ECORD Industry Liaison Panel; Stefano Bernasconi (ETH Zurich) at the MagellanPlus Steering Committee; Gretchen Früh-Green (ETH Zurich) at ESSAC and Martina Kern-Lütschg (SNSF) at the ECORD Council.

Gretchen Früh-Green, ESSAC Delegate and Vice-chair

Recent publications that include ECORD authors

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