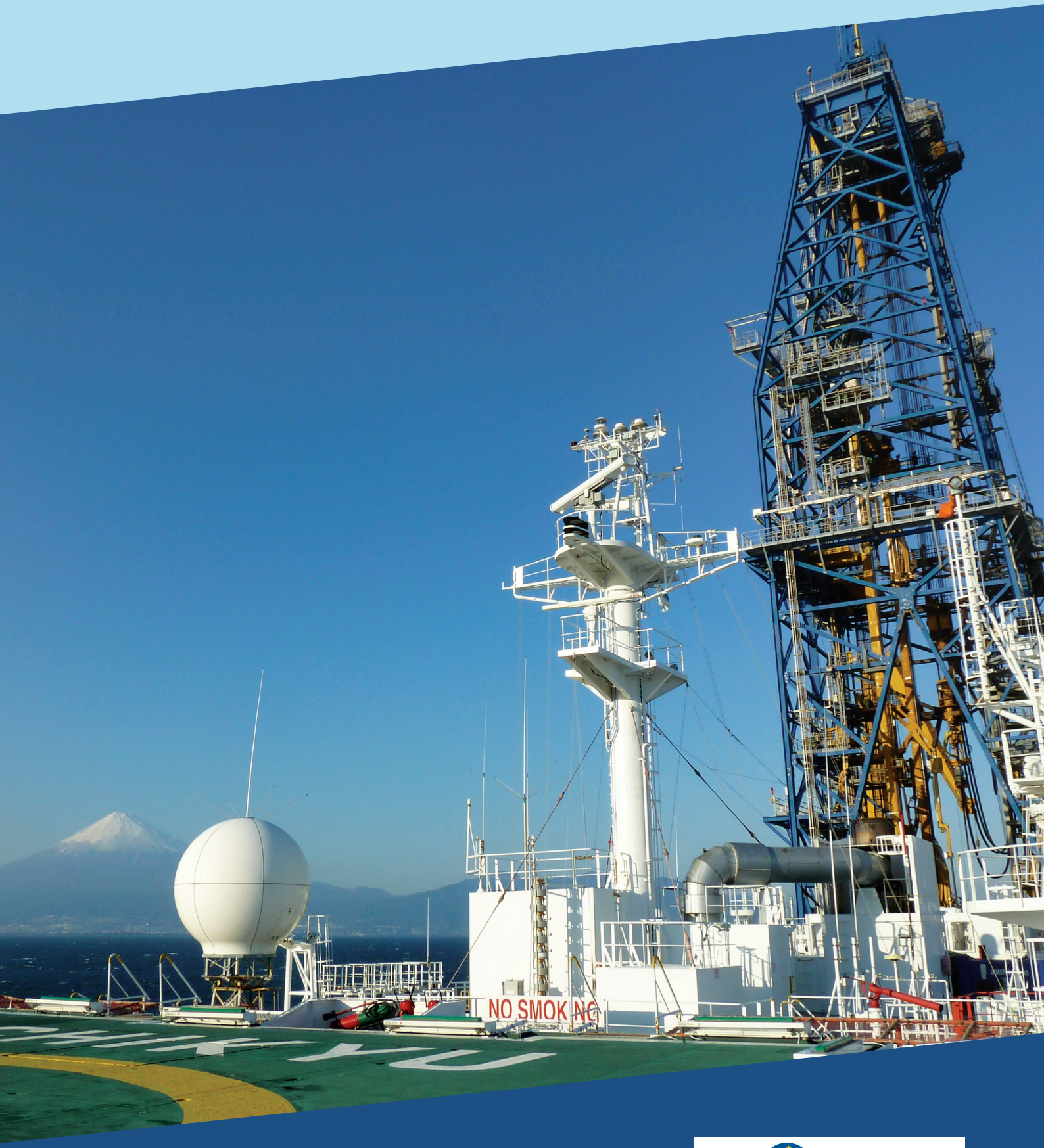
IODP
INTEGRATED OCEAN DRILLING PROGRAM

UK newsletter 37

August 2012



NATURAL ENVIRONMENT RESEARCH COUNCIL

ECORD
European Consortium for Ocean Research Drilling

Recent UK based IODP Expedition Participants

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Stephen Bowden Aberdeen Exp 337
David Limmer Aberdeen Exp 337
Guy Harrington Birmingham Exp 337
Dorrik Stow (co-chief) Heriot-Watt University Exp 339
David Hodell Cambridge Exp 339
Martin Palmer NOCS Exp 340
Peter Talling NOCS Exp 340
Deborah Wall-Palmer Plymouth Exp 340
Ian Bailey NOCS Exp 341
Erin McClymont Durham Exp 341
Paul Wilson (co-chief) NOCS Exp 342
Philip Sexton Open University Exp 342
Diederik Liebrand NOCS Exp 342
Paul Bown UCL Exp 342
Becky Cook NOCS Exp 343

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Cover: Mt. Fuji from the Helicopter deck of the Chikyu; Exp 343 – JFAST. © Louise Anderson, University of Leicester.

Editor: Dayton Dove, British Geological Survey, Edinburgh, EH9 3LA
Graphic design: Jean-marc Ryckebusch

Foreword

Dayton Dove (UKIODP Science Programme Coordinator).

Over the past year, 16 UK scientists have participated in eight IODP expeditions, two serving as co-chief scientist (see opposite table).

In this edition, David Hodell of Cambridge presents two articles on the recent Exp. 339 – Mediterranean Outflow: An account of the 'ancillary program' of coring the southwestern Iberian margin which was originally proposed by the late Sir Nicholas Shackleton; A description of a technological advancement in measuring oxygen and hydrogen isotopes of pore- waters, allowing for near real-time measurement offshore. There is also an excellent article from Sally Morgan, Jenny Inwood, and Louise Anderson of the European Petrophysical Consortium (EPC) at University of Leiceister, who having been offshore with IODP more than any other UK scientists, describe their experiences as scientific staff over multiple expeditions on each of the three IODP platforms. There is also a brief update on the renewal of both the international (IODP) and domestic (UKIODP) programmes.

At about the time this newsletter is published, we will be hosting the 2012 UKIODP Student Conference, immediately followed by the 2012 UKIODP General Conference. For the Student Conference, approximately 45 students and early-career researchers will participate in a 2–3 day event of talks and workshop exercises. Students will present their research, and senior scientists from the UKIODP community will be on hand to describe the history of ocean research drilling, advise on how researchers can best interact with the programme, and mentor break-out groups. The General Conference is a one day event of talks, posters, and discussion covering the diverse IODP-related research conducted within the UK. The overarching objective of the conference is to recognize the achievements from the last ten years of IODP, and to look forward to the next ten.

This year has seen the departure of Sasha Leigh, NERC's programme manager of UKIODP. There is no doubt she will be missed as not only had she worked with the UK-IODP for eight years, she had also sailed on IODP as a student, giving her an excellent knowledge of the history and workings of the programme. In Sasha's absence, Jessica Batchelor has taken over this role. Jessica is also well suited to take up the role as she has spent the last four years as a NERC programme officer and manager. Jessica's background is marine biology, but we're quickly getting her up to speed on the science of IODP, and the world of acronyms that accompany it.

The last year has seen a fairly large rotation of UK representatives serving IODP's Science Advisory Structure (SAS). Paul Wilson (NOCS) was elected to the Science Implementation and Planning Committee (SIPCom). Dick Kroon of University of Edinburgh was elected to chair the Proposal Evaluation Panel (PEP), and Bridget Wade (Leeds) will be the new UK representative to ESSAC. Other new members are: Stuart Robinson-UCL (PEP); Lisa McNeil- Southampton (PEP-Replacing Dave Hodell in Nov 2012); Cedric John-Imperial (Technology Panel); Mads Huuse-Manchester (Site Characterization Panel).

Updates on the renewal of both the international and domestic programmes are also included. The structure of the new International Ocean Discovery Program (IODP) is shaping up nicely for Europe, and UK scientists. While the management of the programme will change significantly, the feel of the programme for scientists will be largely the same. The NERC directed UK-IODP program will likely remain largely unchanged, however there will be key changes to how grant funding is allocated in the next phase.

Drilling the "Shackleton Site" (U1385) on the Iberian Margin during IODP Expedition 339

17 November 2011–17 January 2012

David Hodell (University of Cambridge)

Before Nick Shackleton's untimely death in 2006, he was very keen on the idea of using the *JOIDES Resolution* to drill the southwestern Iberian Margin (Fig. 1). His research on piston cores had demonstrated the uniqueness of the sediment record on this margin for correlating marine climate records to the polar ice cores and European terrestrial sequences (Shackleton et al., 2000, 2004). Few places exist in the world where such detailed and unambiguous marine-ice-terrestrial correlations are possible. Nick demonstrated that the surface oxygen isotopic record could be correlated precisely to temperature variations (i.e., $\delta^{18}O$) in Greenland ice cores (Fig. 2). By comparison, the benthic $\delta^{18}O$ signal in the same cores resembles the temperature record from Antarctica. Moreover, the narrow continental shelf and proximity of the Tagus River results in the rapid delivery of terrestrial material, including pollen, to the deep-sea environment, thereby permitting direct correlation to European terrestrial sequences.

To fulfill Nick's wishes, a UK-led effort was launched to obtain a deep record by submitting an IODP Ancillary Program Letter (APL 763) requesting four days of ship time to drill four holes at one of the "Shackleton sites" to 150 mbsf. The APL was approved and scheduled as part of IODP Expedition 339 (Mediterranean Outflow).

Expedition 339 sailed from Ponta Delgada (Azores) at 0800 h UTC on 22 November 2011 and the Shackleton site was the first site on the schedule. After a 741 nmi steam, we arrived at Site U1385 at 0400 h UTC, on 25 November 2011. Five holes were cored at Site U1385 using the advanced piston corer (APC) system to a maximum depth of ~155.9 mbsf. A total of 67 cores were recovered representing 621.8 m of sediment with a nominal recovery of 103.2% (>100% due to post-recovery core expansion).

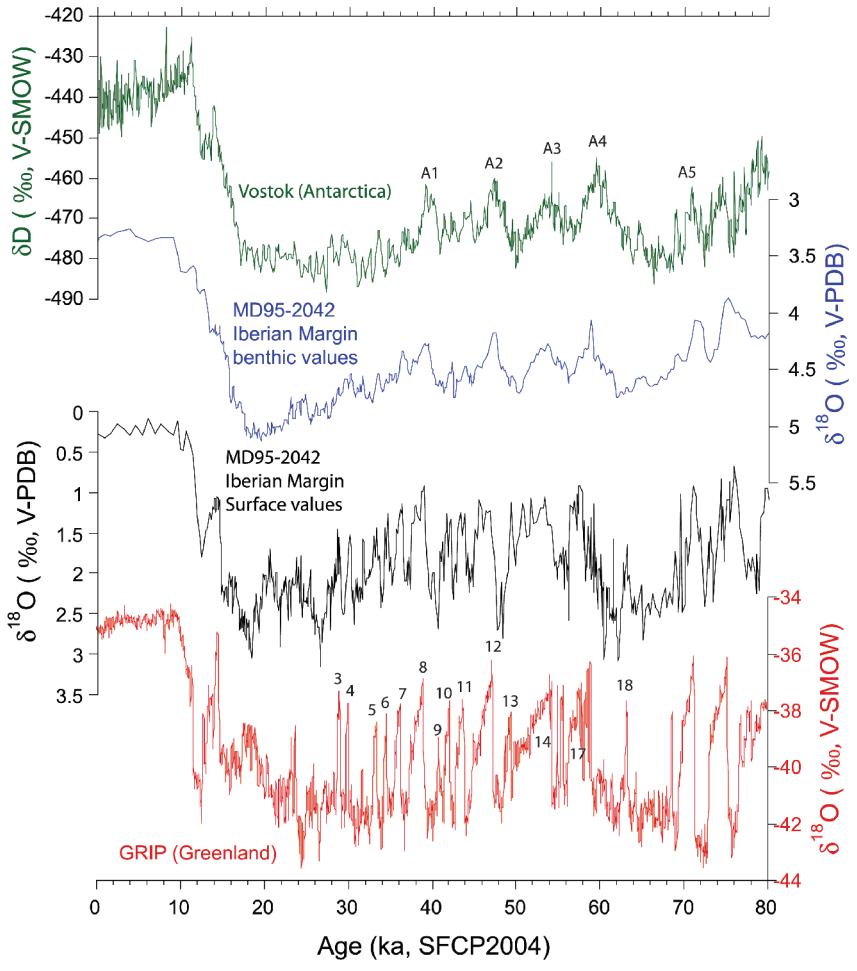
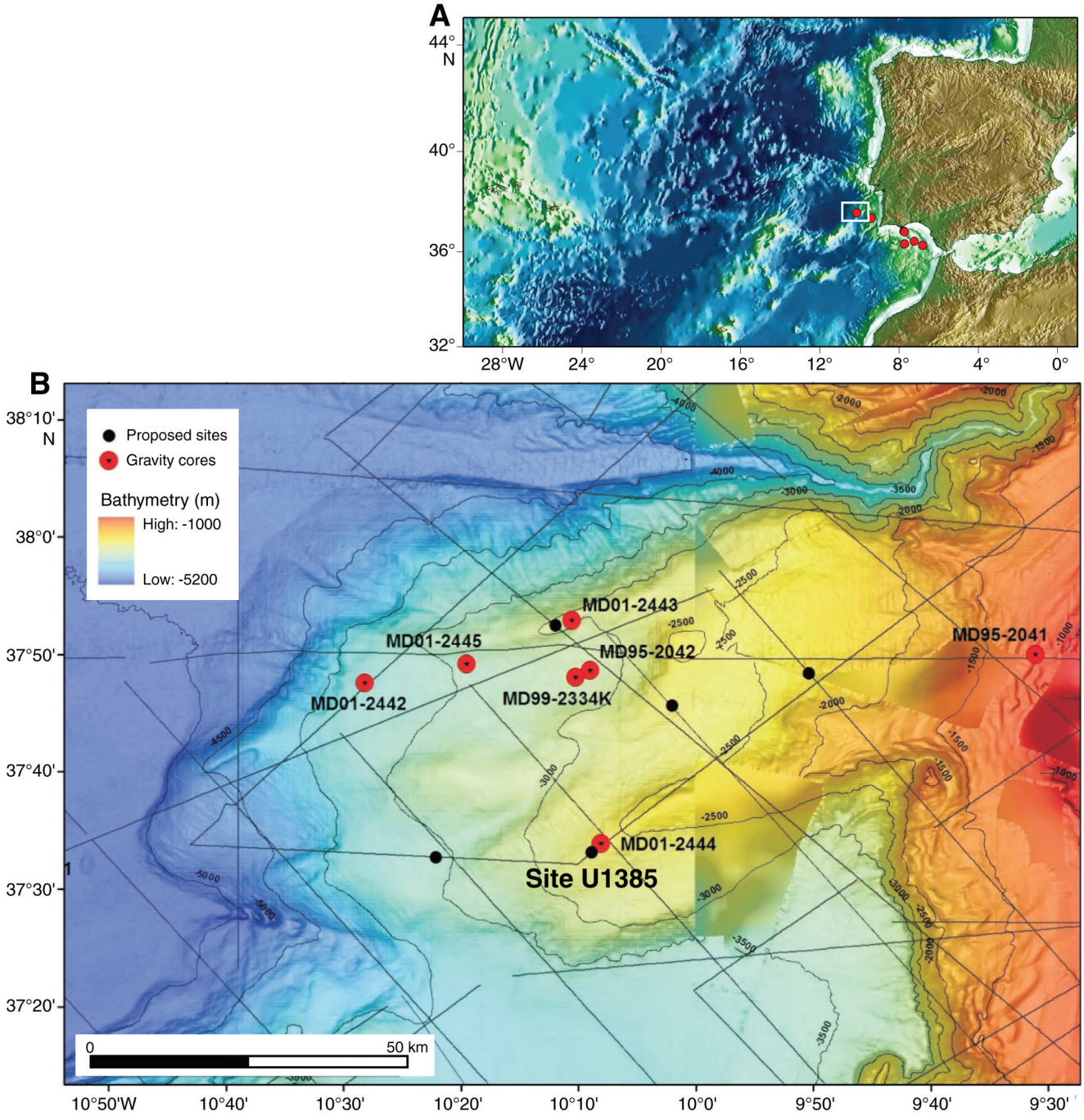


Figure 2. Correlation of $\delta^{18}O$ record of Greenland ice core (red) to $\delta^{18}O$ of Globigerina bulloides (black) in Core MD95-2042 (Shackleton et al., 2000). Resulting correlation of Vostok δD (green) and benthic $\delta^{18}O$ of Core MD95-2042 (blue) is based on methane synchronization. VPDB = Vienna Peedee belemnite, VSMOW = Vienna standard mean ocean water.

Figure 1.
Maps of (A) West Iberian margin showing (B) detailed bathymetry and locations of Marion Dufresne (MD) piston cores and IODP Site U1385 (37°34.285'N, 10°7.562'W) relative to seismic lines in the drilling area.



Split cores from all holes were analyzed post-cruise by core scanning X-ray fluorescence (XRF) at Cambridge and the Royal Netherlands Institute for Sea Research (NIOZ) to obtain semi-quantitative element data at 1-cm spatial resolution (Fig. 3). These data permit accurate hole-to-hole correlation and construction of a verifiably complete spliced stratigraphic section, containing no notable gaps or disturbed intervals to 166.5 mcd. Correlation of variations in Natural Gamma Radiation (NGR) to the oxygen isotope stack suggests Site U1385 contains a continuous record from the Holocene to 1.42 Ma (Marine Isotope Stage 46) with average sedimentation rates of ~ 10 cm kyr-1 (Fig. 4). We were permitted to sample the core working halves of Holes U1385D and E at Cambridge and took 16,512 samples at 1-cm spacing from the Holes D&E composite section.

Our short-term goal is to produce a low-resolution (20-cm) benthic oxygen isotope record to test the preliminary stage designations (Fig. 4) and provide Expedition 339 scientists with an oxygen isotope stratigraphy. Very strong precession power in elemental XRF and colour reflectance signals promises to be a powerful tool for developing an orbitally-tuned chronology. The Site U1385 record will serve as a marine reference section of Pleistocene climate variability, and will significantly improve the precision with which marine climate records can be correlated to polar ice cores and European terrestrial sequences.

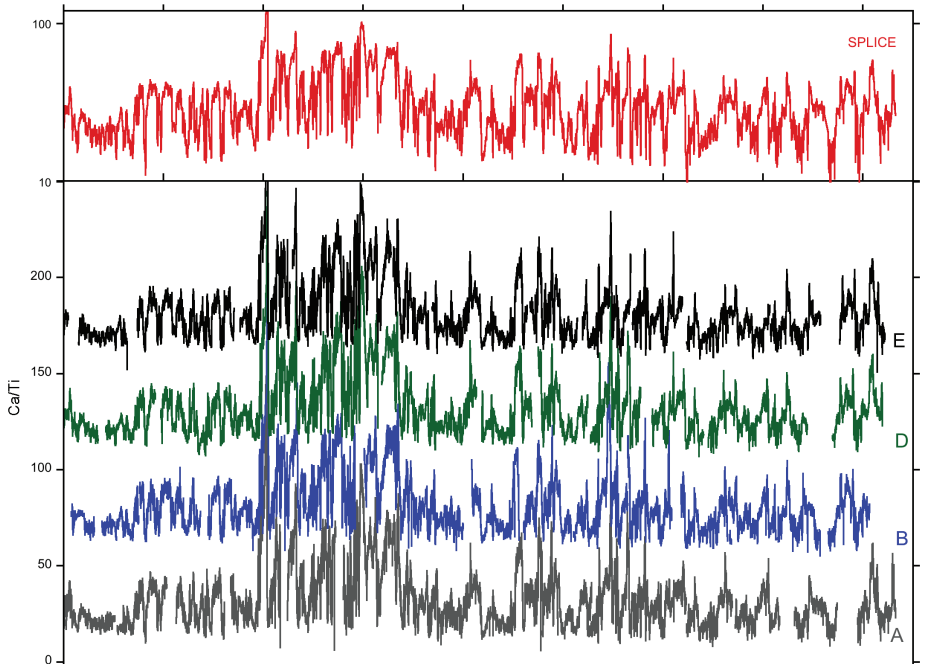


Figure 3.
Ca/Ti measured by scanning XRF in Holes A, B, D, and E from Site U1385. The spliced Ca/Ti record (log scale) shown in top panel is comprised of segments from Holes A, B, D, and E. Ca/Ti is a proxy for weight %CaCO3 content and reflects the relative proportion of biogenic carbonate and detrital sediment. Data collected postcruise using Avaatech XRF scanners at University of Cambridge and NIOZ.

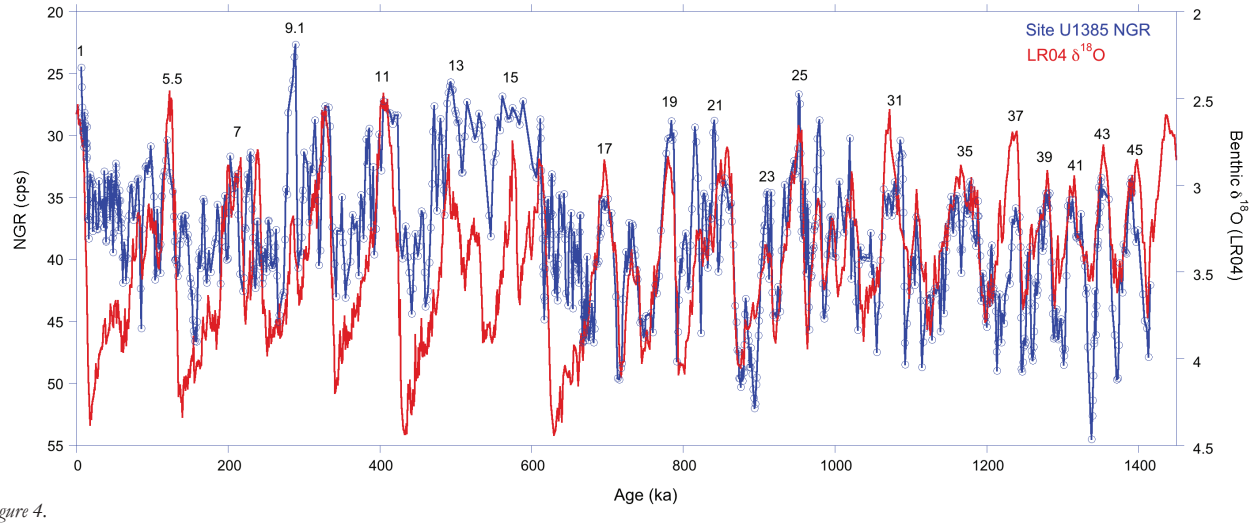


Figure 4.
Preliminary identification of marine isotope stages at Site U1385. Ages for the last 420 ka are well constrained by chronologies of piston cores MD01-2444 and -2443. Prior to 420 ka, age assignments are based on correlation of Natural Gamma Radiation (NGR) to the LR04 benthic $\delta^{18}O$ stack (Lisiecki et al., 2005).

Specific objectives to be accomplished by postcruise research include:

- Deriving a marine sediment proxy record for the Greenland Ice Core beyond the oldest ice (~125 ka) that can be compared to the synthetic Greenland record produced by inversion of the EPICA ice core isotope record (Barker et al., 2011);
- Documenting the nature of millennial-scale climate variability for older glacial cycles of the Quaternary, including changes in surface and deepwater circulation during the "100 k.y. world," Mid-Pleistocene Transition (MPT), and "41 k.y. world";
- Determining interhemispheric phase relationships (leads/lags) by comparing the timing of proxy variables that monitor surface (Greenland) and deepwater (Antarctic) components of the climate system, thereby overcoming problems of age determination on millennial and submillennial timescales;
- Studying how changes in orbital forcing and glacial boundary conditions affect the character of suborbital-scale climate variability and, in turn, how millennial-scale variability interacts with orbital geometry to produce the observed glacial–interglacial patterns of climate change;
- Reconstructing the history of changing local dominance of northern-sourced versus southernsourced deep water on orbital and suborbital timescales during the Quaternary;
- The Shackleton site (U1385) has certainly lived up to Nick's expectations, but four days of drilling only permitted us to obtain the upper 150 m of sediment at one site. We have submitted a UK-led Full Proposal (771) to IODP for a complete 56-day expedition to the Iberian Margin. Drilling additional sites will allow us to both extend the record beyond the base of Site U1384 (1.4 Ma) and recover a full depth transect of sites spanning a range of subsurface water masses. A site survey cruise sponsored by UK-IODP will occur next year to acquire the multi-channel seismic lines needed to select the best drill sites to meet the drilling objectives.

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Scientific Results from Recent Expeditions

Expedition 339: Interstitial Water Isotope Measurements

17 November 2011–17 January 2012

David Hodell (University of Cambridge)

This research was a joint effort and collaboration between David Hodell and Madeline Miller (California Institute of Technology) who sailed as Inorganic Geochemists on Expedition 339.

Shipboard measurement of interstitial (pore) waters aboard the *JOIDES Resolution* and its predecessor the *Glomar Challenger* have become increasing more sophisticated through the history of DSDP, OPD, and IODP. However, oxygen and hydrogen isotopic measurements of pore water samples have been limited to post-cruise shore-based activities because isotope ratios mass spectrometers are very sensitive to ship motion. New laser-based spectroscopic methods for water isotope measurement now offer the possibility of making water isotope measurements aboard ship in near real time.

During Expedition 339 (Figure 1), oxygen and hydrogen isotopes measurements of interstitial water were made for the first time aboard the *JOIDES Resolution* by cavity ringdown laser spectroscopy (CRDS). CRDS is a time-based measurement system that uses a laser to quantify spectral absorption lines unique to $H_2{}^{16}O$, $H_2{}^{18}O$, and $HD^{16}O$ in an optical cavity (Gupta et al., 2009). The equipment consisted of an L1102-*i* Picarro water isotope that measures $\delta^{18}O$, δD, and total H_2O concentration simultaneously (Figure 2). The bench-top instrument is field deployable, shock and vibration resistant, and is perfectly suited for a shipboard environment. With support from UK-IODP, the Picarro instrument was shipped from Cambidge to the *JOIDES Resolution* via College Station and installed in a few hours during the port call in Ponta Delgada.

Figure 1.
Site locations drilled during IODP Expedition 339 (Mediterranean Outflow).

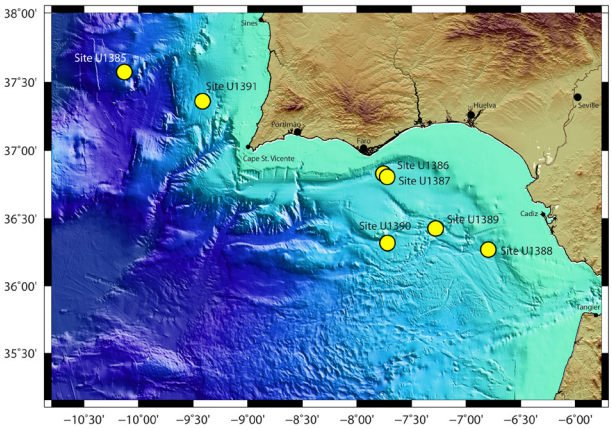
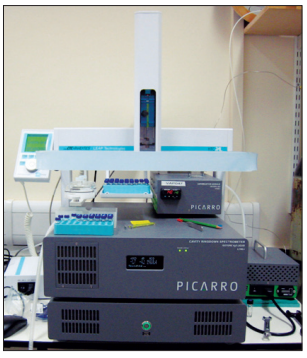


Figure 2.
The Picarro L1102-I instrument used to measure oxygen and hydrogen isotopes of interstitial waters during IODP Expedition 339.



	Chloride	$\delta^{18}O$	δD
Glacial ocean signal	+	+	+
Brine input	+	+	+
Gas hydrate dissociation/ formation	-/+	+/-	-/+
Evaporite dissolution	+	0	0
Biogenic opal recrystallization	-	+	0
Ash particle alteration (low/ high temp.)	+	+/-	+
Meteoric water input	-	-	-
Clay membrane ion filtration	-	-	-
Clay mineral diagenesis/ authigenesis	-/+	+/-	-/+

Table 1.
Processes that modify the chloride, $\delta^{18}O$ and δD of sediment pore waters. (modified after Kastner et al., 1991, and Dählmann and de Lange, 2003)

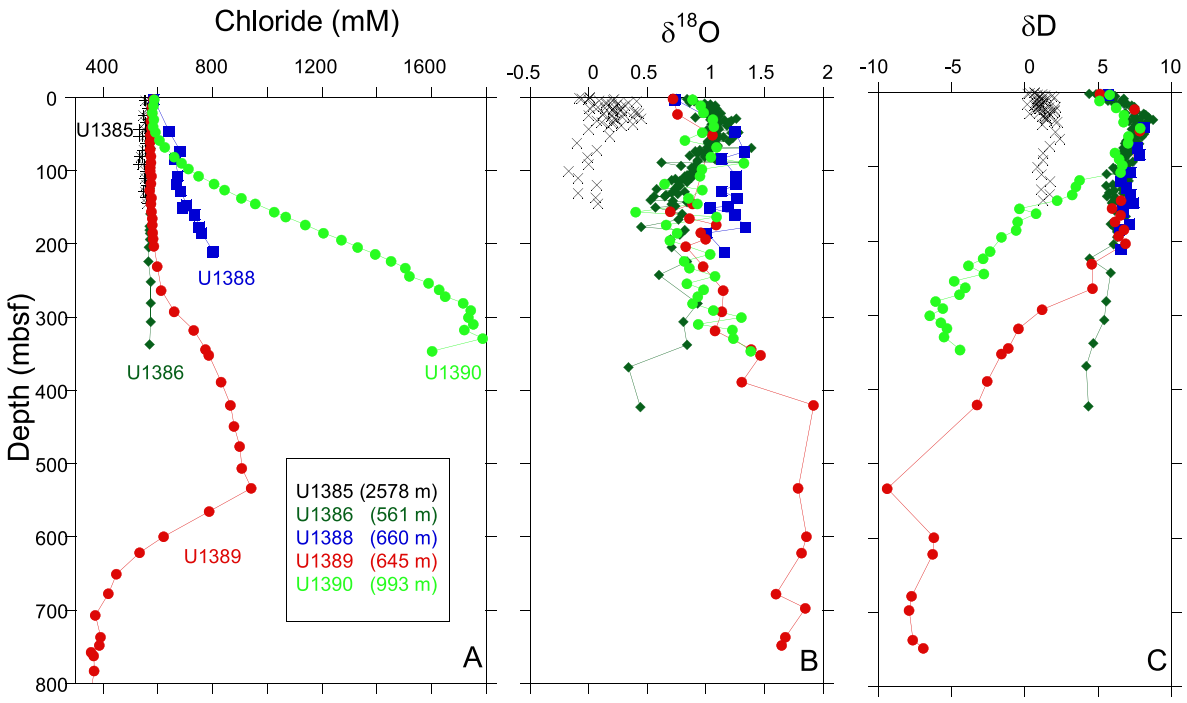
Only a small volume of water is needed (~100 µl) as each analysis consists of 2µl of water drawn into a syringe and injected nine times into the vaporizer of the instrument. During Expedition 339, we analysed ~200 pore water samples with bracketing standards to correct for drift. Precision for liquid water using the Picarro L1102-I with autosampler injection is <0.1 for $\delta^{18}O$ and <0.5 for δD, which is comparable to traditional methods using an isotope ratio mass spectrometer. When combined with chloride measurements, the water isotopic data provide valuable information about the processes responsible for altering interstitial water chemistry (Table 1).

Interstitial fluids were collected at 6 sites during Expedition 339 both by traditional squeezing using a hydraulic press and using Rhizon samplers (Rhizosphere Research Products) (Figure 3). Rhizons consist of a hydrophilic porous polymer tube that is inserted through holes drilled through the core liner (Seeberg-Elverfeldt et al., 2005). Syringes are attached to each Rhizon sampler via a Luer-lock, pulled to generate vacuum, and held open with wooden spacers (Figure 3).

The interstitial fluids collected during Expedition 339 display widely varying concentrations of elements and isotope ratios, and differ significantly from those of the overlying seawater. Chloride concentrations range from a low of 371 mM near the bottom of Site U1389 to a maximum of 1745 mM near the bottom of Site U1390 (Figure 4A).

Figure 3.
Rhizon sampling during IODP Expedition 339.

Figure 4.
Chloride, $\delta^{18}O$, and δD of interstitial waters measured during IODP Expedition 339.



Pore waters at Site U1385, located in 2578 m of water, have the lowest sediment-water interface values of $\delta^{18}O$, δD and chloride, reflecting Northeast Atlantic Deep Water (Figure 4). All other sites have significantly higher sediment-water interface values, which reflects the fact that they are bathed in Mediterranean Outflow Water (MOW) that has been enriched in ^{18}O and D by evaporation.

The negative correlation between $\delta^{18}O$ and δD in the deep sections of Sites U1389 and U1390 in the Gulf of Cadiz is a telltale indicator of clay mineral dehydration reactions (Figure 4; Kastner et al., 1991). Clay mineral dehydration occurs at great depth (several km) and begins at temperatures exceeding ~60°C (Kastner et al., 1991). The transition of smectite to illite, in particular, has been identified as an important process for fluid formation in deeply buried sediment of the Gulf of Cadiz (Hensen et al., 2007). However, given the geothermal gradients measured during Expedition 339 were always less than 40 °C km^{-1}, none of the holes penetrated deep enough to directly intersect the zone of clay mineral transformation. The fluids must have a deeper, high temperature origin and migrate toward the surface along deep-penetrating faults during times of episodic tectonic activity. Along the transport pathway, fluids interact with surrounding sediments through dissolution and diagenetic reactions. For example, the high-chloride, low-δD water at Sites U1389 and U1390 likely resulted from the dissolution of Triassic-Jurassic chloride salts, also located well below the depths of maximum penetration of the sites, by undersaturated waters produced in part by clay mineral dehydration at depth.

Prior to Expedition 339, the pore water chemistry from the Gulf of Cadiz was known mainly through the sampling of fluids from the sea floor or shallow subsurface. Fluids from mud volcanoes have provided a window into sediment-water reactions occurring at depth (Pinheiro et al., 2003; Hensen et al., 2007; Scholz et al., 2009). During Expedition 339, interstitial waters were recovered to a maximum depth of 750 mbsf at Site U1389. These pore water samples bridge the gap between observations made at or near the seafloor and subsurface water-rock interactions occurring at great depth.

The interstitial water chemistry of Expedition 339 sites is complex, reflecting a large number of diagenetic and metamorphic processes that are occurring in an accretionary prism setting on a convergent margin that may be undergoing active subduction (Gutscher et al., 2002). Postcruise research will apply other element and isotope systems to elucidate the diagenetic reactions that have modified fluid composition at Expedition 339 sites.

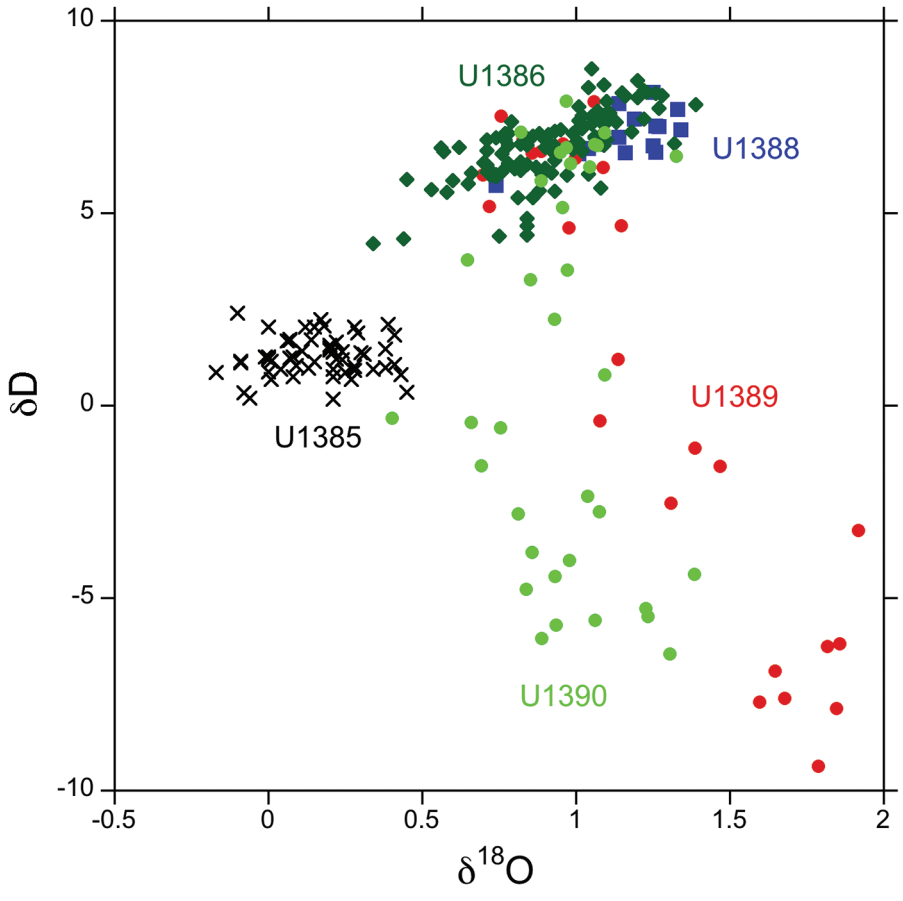


Figure 5.
$\delta^{18}O$ versus δD of pore waters. Note the negative correlations for Sites U1389 and U1390 that is indicative of clay mineral dehydration reactions.

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IODP Logging/Petrophysics Staff Scientist Perspective

An expedition in the life of a Petrophysics/Logging Staff Scientist

Sally Morgan, Jenny Inwood and Louise Anderson (European Petrophysics Consortium, University of Leicester)

As IODP Research Associates at the University of Leicester, we provide scientific and technical expertise in downhole logging and core petrophysical measurements to the international scientific community within the integrated Ocean Drilling Program. Downhole logging generates data that can link measurements on core to regional geophysical surveys providing an essential means to understand physical properties at all scales. These data provide a continuous record that enables *in situ* formation characterisation. This becomes especially important in the event of incomplete core recovery. These key data, generated on all IODP expeditions, are used to help address the scientific objectives of each expedition. The integration of petrophysical measurements with other datasets also provides a powerful tool that benefits the investigation of varied research questions.

Selected downhole measurements	Example of application on an IODP expedition
Spectral gamma ray (K, U and Th) [Figure 1]	Core-log integration Hole-to-hole correlation Inferring lithologies
Magnetic susceptibility [Figure 2]	Inferring lithologies Cyclicity studies
Sonic and density measurements, Vertical Seismic Profile (VSP)	Ties borehole measurements into interpretations of seismic data through generation of synthetic seismograms.
Resistivity/conductivity	Commonly used to define lithologic units, including fining-up trends. Used to calculate porosity and estimate various properties of formations.
Image logs (optical and acoustic, Mission Specific Platform expeditions) [Figure 3]	Accurate core-log integration, assessment of in situ structural features and analysis of depositional environments. Evaluation of formation porosity and core recovery.
Image logs (resistivity, JOIDES Resolution expeditions)	As above. Analysis of formation dips in comparison with matching structures in the core can enable reorientation of the core.
Specialist tools deployed as the expedition science requires ('Third Party')	e.g. Deep Exploration Biosphere Investigative tool (DEBI-t) microbiology tool on Exp 336 deployed to assess bioload on borehole wall. e.g. Goettingen Borehole Magnetometer (GBM) on Exp 330 deployed to aid in the recognition of temporally distinct flow units in the core.

Petrophysics Staff Scientists on IODP Mission Specific Expeditions

Individual IODP expeditions have different requirements and the life cycle of an expedition varies, but the Petrophysics Staff Scientist (PSS) is involved in every stage. This includes the pre-expedition planning through to the offshore and on to the onshore phases of the expedition, including the editorial and post-expedition science meetings and post-expedition research [Figure 4].

The nature of the role and the proportion of our time allocated to tasks vary and are partly dependent on the platform. For Mission Specific Platform (MSP) expeditions we manage the downhole logging and core petrophysics/physical properties program, whereas on the riserless platform, the JOIDES Resolution (JR), our principal responsibility is coordinating the downhole measurements program (as the Logging Staff Scientist - LSS).

IODP Petrophysics operations, onshore and offshore, are a team endeavour and close co-operation with our logging colleagues in Montpellier, Aachen and LDEO, and our ESO (British Geological Survey, Edinburgh and MARUM, Bremen) and United States Implementing Organisation (USIO – TAMU, College Station) collaborators, is key to successful expeditions, on MSPs or the JR. We need to be able to deal with and manage any number of new situations and expedition-specific issues. A continuous challenge is to find the correct balance between ensuring seamless efficient operations whilst maximising the scientific output and ensuring high quality data are generated and made available to the Science Party. These data are also archived and are accessible to future generations of scientists seeking to use this legacy.

During the offshore phase of an expedition it is our job to liaise with the logging engineers, drill crew, Operations Superintendent and the Staff Scientist and co-chiefs to ensure a safe and efficient logging operation that will contribute to the scientific objectives. We also own and maintain a range of equipment including Geotek Multi-Sensor Core Logger (MSCL) systems. The MSCL-S (measures gamma density, P-wave velocity, non-contact resistivity and magnetic susceptibility) is containerised and is mobilised for offshore MSP expeditions. The MSCL-XYZ (measures natural gamma radiation) is mobilised to Bremen for measurements on whole-cores prior to the MSP Onshore Science Party (OSP). MSP expeditions require all scientists to attend an OSP, held in Bremen, during which the full suite of IODP measurements, analyses and report writing is completed. At the OSP, the PSS leads the physical properties analyses working with the Science Party and ESO personnel.

Expedition-related research

The involvement in cutting-edge science and collaboration with other members of the international Science Party, with the aim of publishing research that utilises the petrophysics data, are highlights of the PSS/LSS role. Between us we have very diverse research backgrounds in paleomagnetism, structural geology, oceanic hydrothermal systems, ophiolites, and life in extreme environments. This broad base allows us to fit easily into Expedition Science Parties and helps forge interdisciplinary post-expedition research collaborations. For example, Petrophysics Staff Scientists Jenny Inwood (Leicester) and Johanna Lofi (Montpellier) have submitted co-authored papers based on the expedition data from the New Jersey Shallow Shelf (Expedition 313) for the deadline in August 2012. Here some of the findings are summarised.

The New Jersey shallow shelf is an ideal location to study impact of late Cenozoic sea level change on the evolution of shelf depositional systems due to a combination of rapid depositional rates, tectonic stability and a well-preserved fossil record. Expedition 313 obtained continuous cores and downhole logging measurements through Oligocene-Recent siliciclastic sequences at three sites. Downhole logging measurements included continuous through-pipe spectral gamma ray measurements of the entire formation, with open hole magnetic susceptibility, sonic velocity, conductivity and acoustic image logs acquired in key sections of the targeted Miocene clinoforms.

The downhole-logging data were used to evaluate the formation characteristics. Multivariate statistical analysis (Iterative Non-hierarchical Cluster Analysis) of spectral gamma ray logs provides an objective assessment of subtle and major petrophysical changes within the succession. The statistical units output can be compared to the depositional sequences observed in recovered cores. By incorporating a statistical analysis using additional parameters that respond to the degree of lithification, porosity and pore fluid salinity as well as lithology the most significant changes between the formations were also evaluated and the confidence of ties to the seismic sections improved.

Earlier this year (March-April 2012), the Lesser Antilles Volcanism and Landslides Expedition 340 drilled volcanic landslide deposits and volcaniclastic sediments off the islands of Montserrat and Martinique in the Lesser Antilles Arc (see the 340 report in this edition of UK-IODP magazine, Figure 5). During Expedition 340 4 holes were successfully logged generating a variety of data including spectral and natural gamma ray, density, resistivity, magnetic susceptibility, sonic velocity and resistivity images. A vertical seismic profile (VSP) experiment was conducted in one hole allowing the observations in the hole, recorded as a function of depth, to be tied to the seismic surveys, recorded as a function of time.

Still within the expedition moratorium period, plans for collaborative research on the data acquired are underway. Research on the data will involve the generation of synthetic seismograms (allowing the boreholes to be linked with the available regional seismic lines) and detailed analysis of structures in the resistivity image logs (to potentially identify the palaeoflow of past landslides). Sally Morgan and Angela Slagle plan to present the petrophysics results from Expedition 340 at the American Geophysical Union, Fall Meeting this year at a Lesser Antilles Arc dedicated session (V042).

Future Activities

The remainder of 2012 will see us involved with diverse IODP commitments including educational outreach (summer schools: ECORD Summer School, Bremen and GEOCEAN Summer School, Brest), post-expedition meetings (for expeditions 330, 336 and 340) and IODP Panel Meetings (Site Characterization Panel and Science Technology Panel). Then, in 2013, the Program will be dominated by the planning and execution of the offshore and onshore phases of IODP MSP Expedition 347 (Baltic Sea Palaeoenvironment).

The Universities of Leicester (UK-lead), Montpellier (France) and RWTH Aachen (Germany) together comprise the European Petrophysics Consortium (EPC). The consortium was launched in 2003 to provide a European focus for logging within the Integrated Ocean Drilling Program (IODP).

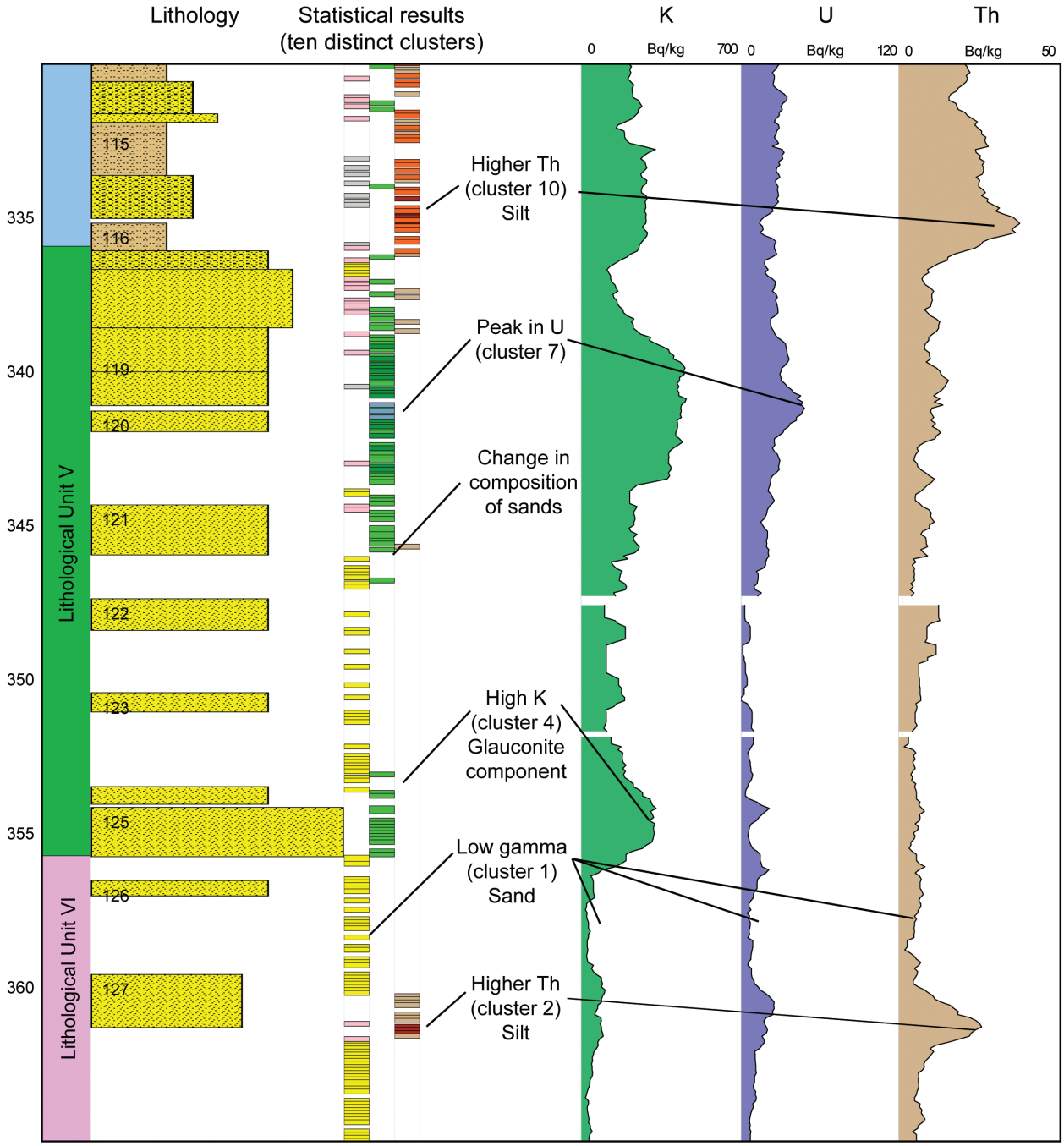
As part of its role, EPC provides Petrophysics Staff Scientists (PSS) to IODP Mission Specific Platform (MSP) expeditions run by the ECORD Science Operator (ESO) that is itself comprised of a consortium of scientific institutions (the British Geological Survey, University of Bremen and EPC).

As part of a wider Logging Consortium, lead by Lamont Doherty Earth Observatory (LDEO) members of EPC also sail as Logging Staff Scientists (LSS) on USIO expeditions onboard the JOIDES Resolution.

IODP Research Associates typically spend two months a year on offshore operations and, for MSP expeditions, additional time in Bremen for onshore operations. Since 2005, they have participated in ten expeditions and used logging data to engage in diverse geological research; including coral reef response to sea-level change (310 and 325), controls on siliciclastic shallow marine sedimentation (313), palaeoclimate records in carbonate oozes (321), the evolution of seamounts (330), microbiology and the ocean crust (336) and volcanism and landslides (340).

EPC is not formally involved with the Japanese Chikyu-led operations but Louise Anderson participated as a NERC-funded science party member in the Japan Trench Fast Drilling Project (343) onboard the Chikyu.

Figure 1:
Example of the excellent correlation between lithology and spectral gamma ray logs from New Jersey Expedition 313. This enables assessment of lithology in intervals of poorer core recovery. A statistical analysis of the spectral gamma ray data returns characteristic clusters for different lithological units and has proved a powerful tool in defining key stratigraphic surfaces (Inwood et al., in review*).*



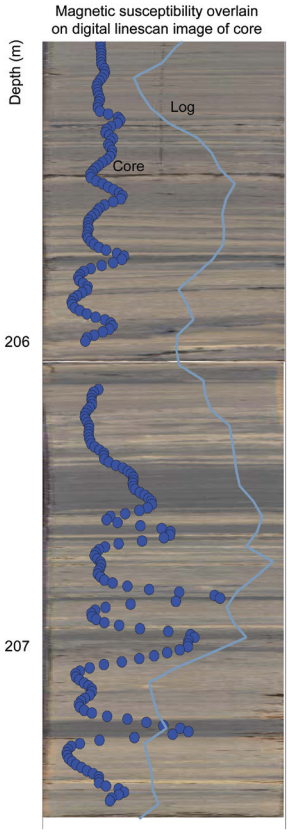


Figure 2.
Magnetic susceptibility core measurements at a cm-scale from New Jersey Expedition 313 highlight darker and lighter banding. The logging measurements, which integrate over a larger interval show similar broad trends.

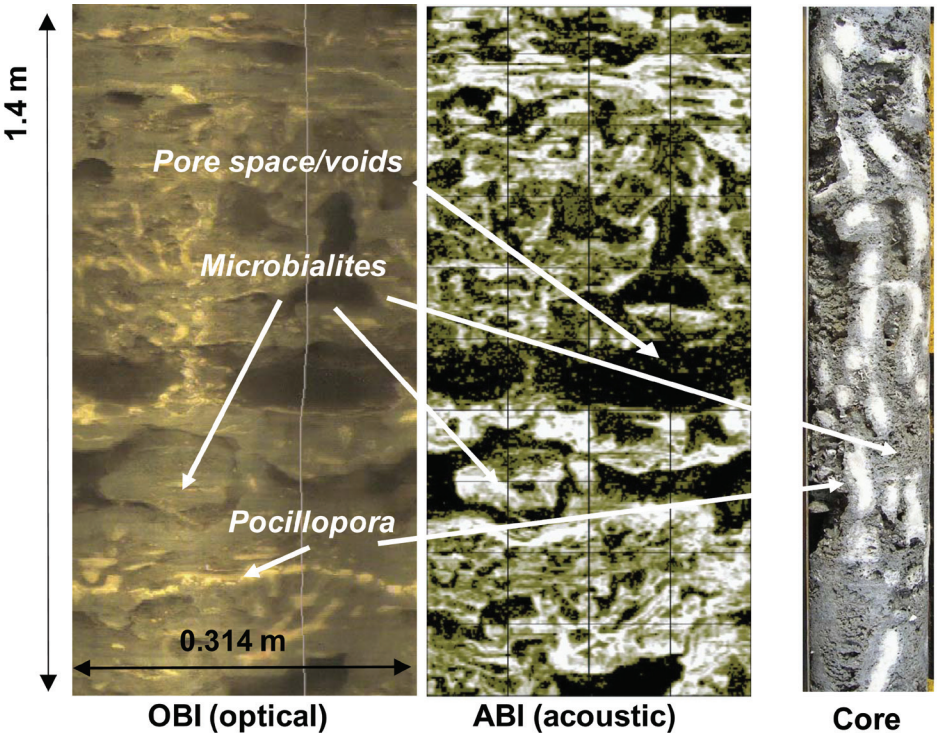


Figure 3.
In the Tahiti Sea Level Expedition (310) optical and acoustic images were fundamental for recognising macroporosity in the reef systems. The recognition of voids and their location downhole enabled corals to be placed in depth more accurately, important for sea level reconstruction, and provided estimates for true core recovery (image logs showed that ~30% more core was actually recovered compared with what was originally calculated using conventional methods, Inwood et al., 2008).

Figure 4.
IODP MSP Expedition timeline.

Some notes on the lifetime of an IODP Mission Specific Platform (MSP) Expedition from the viewpoint of a Petrophysics Staff Scientist (PSS): New Jersey Shallow Shelf Expedition 313

(starred boxes show the phases scientists are most involved in)

Pre-expedition planning

2006

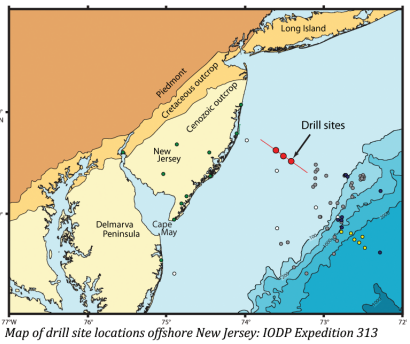
Pre-expedition planning (Jenny becomes involved as PSS)
Liaised with expedition proponents to design a logging program appropriate for the scientific goals. Investigated logging tools and contractors. Logging timing estimates.

2007

Pre-expedition planning (Johanna named as second PSS)
Established offshore and onshore core petrophysical requirements and timings. Trained other scientists and EPC petrophsyicists on equipment as required. Attended planning meetings. Acquired permits for petrophsyical equipment.

2008

Planning meetings (Leicester, Montpellier, Edinburgh, Bremen)
Finalised logging program. Attended planning meetings and discussions as platform and operators were confirmed. Detailed planning with Montpellier (logging contractors).



Map of drill site locations offshore New Jersey: IODP Expedition 313

Offshore and Onshore Science Party (OSP) of expedition

2009 Jan - Mar

Three months to go (Leicester)
Prepared to sail. Shipped petrophysical and logging equipment. Contacted scientists with MSCL protocols and health and safety information.

2009 Apr

Mobilisation (Atlantic City)
Sally's contract at Leicester begins. Set up the petrophysics container, prepared MSCL calibration pieces. Bought last minute supplies (coffee machine, dog bed to sit on, suncream). Attended press conferences. Met the drilling crew and L/B Kayd staff.

2009 30th Apr to 17th Jul

Offshore Phase: 3 months, 3 drill sites (New Jersey)
Acquired logging measurements (images, conductivity, magnetic susceptibility, sonic velocity, spectral gamma ray etc). VSP measurements acquired. MSCL measurements on all recovered core (velocity, magnetic susceptibility, resistivity and density). Jenny and Johanna rotate as PSS. EPC MSCL operators also rotate (Sally, Annick and Frank). Demobilisation of petrophysics container and shipment of logging equipment.


L?B Kayd taken on first crossover between Jenny and Johanna (J. Inwood)

2009 Aug

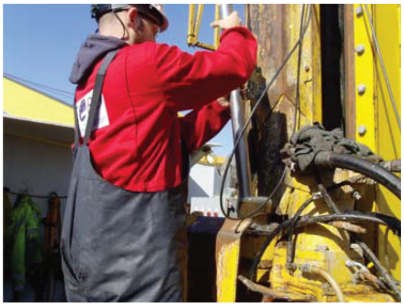
Data QAQC and planning for the OSP (Leicester)
Processed and QAQC'd offshore logging and petrophysical data. Planned the OSP petrophsyical requirements, logistics and staffing.

2009 Sep - Oct

Pre-OSP measurements (Bremen)
Natural gamma ray and thermal conductivity measurements began well in advance of the OSP, set up by Jenny and Sally. Sally led this phase with Jenny, Johanna, Louise, Annick and Leicester and Aachen technicians also involved.

2009 6th Nov to 6th Dec

OSP with entire Science party (Bremen)
Jenny, Johanna responsible for the full duration as PSSs with Sally involved as Petrophysics Lab Manager. Acquisition of petrophysical measurements and writing the logging and physical properties sections of the Proceedings and Preliminary Report. Presented offshore logging results. Trained physical properties scientists on equipment (digital linescanning, colour reflectance, moisture and density, and discete Vp). On completion of the OSP, demobilised petrophysical equipment, archived data and transfer to Leicester.


Montpellier logging engineer Simon Barry, first day of logging (J. Inwood)

2009 Dec

First presentations at AGU (San Francisco)
Presented first expedition results, including the co-chief scientists' summary and a summary of the logging results. Time for Jenny and Johanna to discuss future research.


NGR during pre-OSP in the MARUM core reefer in Bremen (U. Roehl)

Post expedition activities

2010 Jun

First post-expedition meeting: editorial (College Station)
Selected scientists (including Jenny and Johanna) edited the Expedition Proceedings over a six day period.

2010 Jul

Expedition operational review (Edinburgh)
Attended by invited external experts, co-chief scientists and operational staff, including Jenny. Addressed concerns raised and responded to queries as requested.

2010 Dec

Special joint AGU session: Exps 313 & 317 (San Francisco)
New Jersey (313) and Canterbury Basin (317) sailed in the same year and have complementary research objectives. Jenny and Johanna's research presented.

2011 Aug

Second post-expedition meeting: research progress (Utah)
An opportunity to present current expedition-related research, be updated on the research of other Science Party members and collaborators, and discuss existing and future collaborations. Attended by Johanna (also presenting on behalf of Jenny).

2012 4th Aug

Publication submission deadline
End of the Petrophysics Staff Scientists' official involvement in Expedition 313, although research continues. First papers already submitted, including Inwood. Lofi et al. 2012. Many more papers to be included in a special Expedition 313 themed issue of Geosphere.


313 Post-Expedition research meeting in Utah (J. Lofi)

Figure 5.
A) Left to right: Bong Gabalana (Floorman: Siem Offshore), Nicky Ursua (Floorman: Siem Offshore) and Kerry Swain (Logging Engineer: Schlumberger) during logging operations. B) Montserrat in the background.

References

Individual Expedition Proceedings can be found at www.iodp.org

Inwood, J, Brewer, T S, Braaksma, H and Pezard, P. 2008. Integration of core, logging and drilling data in modern reef carbonates to improve core location and recovery estimates (IODP Expedition 310), *Journal of the Geological Society of London,* 165, pp585-596.

Inwood, J, Lofi, J, Davies, SJ, Basile, C, Bjerrum, C, Mountain, G, Proust, J-N, Otsuka, H, Valppu, H. (in review). Statistical classification of log response as an indicator of facies variation during changes in sea level: IODP Expedition 313, *Submitted to G-cubed,* 2012.

UKIODP News

Dayton Dove (BGS)

Get Involved

Would you like to hear more about research opportunities with IODP? From announcements to join IODP expeditions, to meeting announcements, to funding opportunities, the UK-IODP Announcements bimonthly email is the first point of contact for UK scientists participating in the programme. Email the Science Coordinator ukiodp@bgs.ac.uk to have your name added to the mailing list.

IODP Renewal

The current phases of the Integrated Ocean Drilling Programme (IODP) and NERC's directed UK-IODP research programme are being renewed for 2013.

International programme renewal

The new International Ocean Discovery Programme (IODP) will begin in 2013. While the new programme will be based on the new Science Plan www.iodp.org/science-plan-for-2013-2023, the organizational structure will have significant changes. Negotiations between the three primary implementing organizations (IO's) and other stakeholders are ongoing, so it is impossible to pre-determine the final structure of the programme. However, the various management agencies, through IWG+ www.iodp.org/international-working-group-plus, have developed a framework for the new IODP http://iodp.org/doc_download/3485-new-iodp-framework-17-august-2012. Rather than try to thoroughly describe this document, I recommend that you read it. I will point out a couple key changes:

1. More authority will be devolved to platform providers (MEXT, ECORD, NSF), (i.e., workshop proposals, data management, core curation, publications, engineering and technology development, and education and outreach). The central management will be drastically scaled back (no more IODP-MI); There will be an 'IODP Forum', which will be the "custodian of the Science Plan and a venue for exchanging ideas and views on the scientific progress of the program".

2. The management of the programme is due to change significantly, but the feel of the programme for participating scientists should not change dramatically. Scientists from nations who "support platform(s) towards IODP Science Plan goals" will continue to have access to the JOIDES Resolution, the Chikyu, and MSP expeditions.

3. There is a new Science Advisory Structure www.iodp.org/sas-science-advisory-structure which is already active, and we have been busy populating the new panels with UK scientists (see below table). The key scientific panel within the new advisory structure is the Proposal Advisory Panel (PEP), and the chair of this panel is UK-based (Dick Kroon-Edinburgh).

Timeline for Renewal:

www.nerc.ac.uk/research/programmes/ukiodp/events/timetable.asp

*Mike Bickle and Heiko Palike wrote excellent articles in the UK-IODP Newsletter (v.36) last year describing the new science programme in detail, and how researches can become involved as proponents www.bgs.ac.uk/iodp/newsletters.html.

Domestic programme renewal

In 2010, a substantial effort was made to gather and compile evidence of the success of NERC's, directed UK-IODP programme. The outcome of the programme review was very positive as seen in the review panel's executive summary document: www.nerc.ac.uk/research/programmes/ukiodp/events/documents/ukiodp-review-summary.pdf. Based on the recommendations of the review panel, along with input from the UK-IODP management and Science Advisory Panel, Tim Jickells-UEA (NERC's Earth System Science Theme Leader) has prepared a UK-IODP Theme Action plan to present to NERC's Science & Innovation Strategy Board (SISB) in October, 2012. Tim Jickells will soon be stepping down as theme leader, at which point Harry Elderfield of Cambridge University will step in as custodian of the UK-IODP TAP. He will receive SISB's recommendations, revise the document with further feedback from the community, and resubmit to SISB in March of 2013. Following SISB's final recommendation, Council will make a decision on programme funding .

The current Theme Action Plan does not recommend wholesale changes to the programme, and we anticipate that the programme will 'look' largely the same as it does currently. For example, it is recommended that NERC continues to support staff-time and travel and subsistence for offshore participants, and to fund site-survey grant rounds. There are however likely to be two, key changes:

1. It is likely that there will no longer be dedicated UK-IODP grant rounds i.e. no more ring-fenced grant rounds specifically for IODP related research. Applicants will be directed to the standard NERC funding streams e.g. Responsive Mode.

2. There will be increased post-cruise funding, and this will be extended to all offshore expedition participants, post-grads through to professors. While the full details of this are not yet finalized, this post-cruise funding should allow scientists, from post-grads to professors, to capitalise immediately on their expedition participation.

UKIODP News

UKIDP Student workshop

9-11th Sept, 2012 - Chicheley Hall Conference Centre

Over 40 students, and seven senior scientists will participate in the conference. The purpose of this interactive workshop is to bring together a diverse group of students and early career scientists to explore new, multidisciplinary approaches to studying the Earth's systems through scientific ocean drilling. Student talks will be discussed in the context of the four themes outlined in the new IODP science plan, and there will be talks by senior scientists describing the history of scientific ocean drilling, as well as how best to become involved in the programme. A workshop exercise will have participants creating, and then presenting a mock IODP proposal. We have a fantastic list of participants and senior scientists (see table), so the conference should be a great success. The majority of the participants will be joining us as well at the following day's UK-IODP General Conference.

Students and Early-Career Researchers

Gilad Antler University of Cambridge
Tracy Aze Cardiff University
Marcus Badger University of Bristol
Peter Bloxsom Cardiff University
Mark Bourne University of Oxford
Adele Cameron The Open University
Thomas Chalk NOCS
Carys COOK Imperial College London
Becky Cook University of Southampton
Anna Joy Drury Imperial College London
Wenjiao Du University of Bristol
Kirsty Edgar Cardiff University
Aurora Elmore Durham University
Samantha Engwell University of Bristo
Matthew Falder Cambridge Dept Earth Sciences
Linhao Fang University of Oxford
Lyndsey Fox University of Leeds
Marise Gorton University of Bradford
Will Gray University College London
Laetitia Gunton University of Southam
Michelle Harris University of Southampton, National Oceanography Centre
Edward Inglis University of Southampton
Eleanor John Cardiff University
Wendy Kordesch National Oceanography Centre
Sue Mahony University of Bristol
Chiara Marieni University of Southampton
Annette McGrath University of Leicester
Cherry Newsam University College London
Joseph Nicholl University of Cambridge
Ross Parnell-Turner University of Cambridge
Benjamin Petrick Newcastle University
Katy Prentice Imperial College London
Victoria Rennie University of Cambridge
Jennifer Rutter University of Southampton
Oliver Shorttle University of Cambridge
Christopher Smith-Duque University of Southampton
Sindia Sosdian Cardiff University
David Wilson University of Cambridge
Xinyuan Zheng University of Oxford

Senior Scientists-mentors

Damon Teagle National Oceanography Centre
Mike Bickle University of Cambridge
Heiko Palike National Oceanography Centre
Sasha Turchyn University of Cambridge
Joe Cann University of Leeds
John Maclennan University of Cambridge
Peter Clift Louisiana State University
Sally Morgan Leicester University

Organisers

Dayton Dove British Geological Survey
Sophie Green British Geological Survey
Jessica Batchelor NERC

UKIODP News

General UKIODP Conference

12th Sept; Wadham Hall, Oxford University

This event is aimed at the UK IODP science community and is an opportunity to highlight important scientific achievements from the current IODP phase - looking back over ten years of international collaborative research - and to look forward to the new International Ocean Discovery Programme, 2013-2023. The conference will cover a range of scientific themes relating to the new IODP Science Plan. There will be approximately 90 scientists in attendance.

Programme

09:15-09:55	Registration
09:55-10:00	Introduction
10:00-10:15	Talk: Professor Paul Wilson, University of Southampton *'IODP Exp. 342 Newfoundland Sediment Drifts: Scientific rationale and initial drilling results'*
10:15-11:00	Talk: Professor Gideon Henderson, University of Oxford *'Sea-level changes of the Pleistocene and the mechanisms of climate change'*
11:00-11:45	Talk: Dr Sasha Turchyn, University of Cambridge *'The Microbial Deep Biosphere: Insights from the geochemistry of pore fluids and sediments'*
11:45-12:00	Coffee
12:00-12:45	Talk: Dr Matt O'Regan, University of Stockholm *'Arctic Drilling in the new phase of IODP - Opportunities, challenges and emerging proposals'*
12:45-13:00	Talk: Dr Rob Larter, British Antarctic Survey *'Antarctic and Southern Ocean drilling in the new phase of IODP'*
13:00–14:00	Lunch
14:00-14:15	Talk: Professor David Hodell, University of Cambridge *'Significance of the "Shackleton Site" (IODP Site U1385) on the Iberian Margin for Global Stratigraphy and Climate Change Research'*
14:15–15:00	Talk: Professor Godfrey Fitton, University of Edinburgh *'Testing the mantle plume hypothesis through ocean drilling'*
15:00-15:15	Talk: Professor Julian Pearce, Cardiff University *'Understanding Subduction Initiation and Ophiolite Formation through Forearc Drilling'*
15:15-15:30	Coffee
15:30-16:15	Talk: Dr Dan Faulkner, University of Liverpool *'The strength of faults through the seismic cycle'*
16:15–16:30	Talk: Professor Martin Palmer, National Oceanography Centre, Southampton *'Update for IODP leg 340 to the Lesser Antilles'*
16:30-16:45	UKIODP update
16:45-18:00	Posters & Wine

UKIODP News

UKIDP Student workshop

9–11th Sept, 2012 - Chicheley Hall Conference Centre

Grants

There were no dedicated small or standard UK-IODP grant rounds in the last year. There will not be any further grant rounds through to 2013, and as stated above, UK-IODP will likely no longer receive funding for dedicated IODP-research grant rounds.

Site Survey Grants

Awarded Site-Survey Grants		
PI	Institute	Title
David Hodell	Cambridge	IODP Survey of the "Shackleton sites" on the Southwest Iberian Margin
Robert Larter	BAS	Depositional patterns and records in sediment drifts off the Antarctic Peninsula and West Antarctica
Lisa McNeill	NOCS	Corinth Virtual Site Survey: Integrating Geophysical Data for Syn-rift Stratigraphy, Fault and Basin Evolution and Advancing IODP Proposed Drilling

Rapid response grants

Recently awarded grants:

C. Johan Lissenberg (Cardiff University) – Exp. 335. Melt migration through a mid-ocean ridge magma chamber: (I) ODP Hole 1256D, Pacific

Martin Palmer (NOCS)-Exp. 340 – A 4.3 million year record of arc volcanism in the Northern Lesser Antilles: Constraints from IODP Hole U1396

UK panel members

SAS Panel	Member	Replacements
SIPCom (Science Implementation and Policy Committee)	Paul Wilson (NOCS)	
PEP (Proposal Evaluation Panel)	Dick Kroon (Chair; Edinburgh), David Hoddell (Cambridge), Stuart Robinson (UCL)	Lisa McNeil (NOCS) to replace D. Hodell
TP (Technology Panel)	Cedric John (Imperial)	
EPSP (Environmental Protection and Safety Panel)	Bramley Murton (NOC)	
SCP (Site Characterization Panel)	Mads Huuse (Manchester	
ESSAC	Bridget Wade (Leeds)	Backup: Anthony Morris (Plymouth)

UK-IODP Grant Guidance

Available Awards

Strategic grants

To support UK membership in the international Integrated Ocean Drilling Program (IODP), NERC runs a UK research programme to enable UK scientists to:

1. participate in and obtain material from drilling expeditions,
2. ensure that IODP carries out the best and highest priority science, and
3. capitalise on the results of IODP drilling and UK technologies, allowing them to benefit from technological advances in deep sea drilling.

The current phase of NERC's UK-IODP science support started in September 2008 and runs until 2013. Part of the funding for the programme is directed toward supporting research grants with the objective of taking forward IODP-related research in the UK.

***There will be no more strategic grant rounds prior to end of current programme, 2013.**

Rapid response grants

IODP rapid response awards support a limited number of small-scale, short research activities specifically related to IODP Leg objectives. They are typically awarded to help with sample processing costs or small equipment purchases. Please note that applications for Rapid Response Grants will now need to be costed under FEC requirements. The maximum amount, to include all FEC costings is now £2,750 for Rapid Response Grants (*Meaning that UKIODP will pay max of £2200, the other £500 to be recovered from the University).

Proposals (no more than two pages long) should clearly state the aims, deliverables and the case for support. Where relevant, the proposal should be supported by a statement from an IODP Leg co-chief or chief scientist. For students, this may be replaced by, or combined with, a statement from an appropriate member of the departmental academic staff.

Rapid Response proposals will be reviewed by members of the UK IODP Committee and awards will be limited by the funds available for this scheme. Although there is no closing date, applications should be submitted by e-mail to the science coordinator ukiodp@bgs.ac.uk as early as possible.

Expedition and post-cruise funding

From 1 April 2010, any PhD students or Post-Doctorates sailing on IODP expeditions and receiving FEC for their participation will be required to submit a post-cruise grant application not longer than 2 months following their return from the expedition.

An outline of this potential work must be included in the FEC application (see below) although UKIODP appreciate this is just an indication and not a commitment to the work plan.

Participation in an IODP expedition does not guarantee post-cruise funding.

FULL ECONOMIC COSTING GUIDANCE FOR EXPEDITION PARTICIPANTS

Under full economic costing, all IODP expedition participants from the UK are eligible to apply to NERC for funding to cover their time on board ship. As with research grants, awards will be made at 80% FEC.

The different categories of expedition participant and eligible costs are listed below:

Co-chief

- Directly Incurred costs:
    - Staff Time (for offshore and onshore co-chief activities)
    - Travel and Subsistence (for expedition, sampling parties and post-cruise meetings)

- Directly Allocated costs:
    - Estates Costs (only for time spent onshore)

- Indirect costs:
    - Only for time spent onshore

Expedition participant (sailing)

- Directly Incurred costs:
    - Staff Time (for offshore only)
    - Travel and Subsistence (for expedition, sampling parties and post-cruise meetings)

- Directly Allocated costs:
    - Estates Costs - not eligible

- Indirect costs - not eligible

Expedition participant student (sailing)

- No costs eligible
- Expedition, sampling party and post-cruise meeting Travel and Subsistence costs should be claimed via the UKIODP Science Coordinator ukiodp@bgs.ac.uk

Applications for FEC must be submitted via the Research Councils' Joint electronic-Submission system (Je-S) at least 1 month ahead of the expedition start date. The 'scheme' should be completed as 'Directed FEC' and the 'call' as 'IODP'.

See the Je-S website for information on the Je-S process (. Further information, including details on Full Economic Costing, is also available in the NERC Research Grants Handbook for Full Economic Cost Grants. Potential applicants are reminded that they and their institution must be registered with Je-S, in order to submit applications.

Standard NERC rules for institutional and investigator eligibility apply to all components of the call. For example, submissions must be made via UK universities or NERC-recognised bodies.

Application submission requirements

Expedition participants claiming FEC must submit their proposal in a Small Grant format through the Je-S system. Previous Track Record must not exceed 2 sides of A4 and the Description of the Proposed Research must not exceed 2 sides of A4 (including all necessary tables, references and figures). The Justification of Resources should be completed as a separate item. Up to an additional 2 sides of A4 may be used for this purpose. A CV of the expedition participant is required, (up to 2 sides A4 for each CV).

Applications we would expect to see submitted to NERC via the Je-S system would contain the following documents:

- Application Form.
- Attachments including:
- Case for Support incorporating the Previous Track Record (up to 2 sides A4) and Description of Proposed Research (up to 2 sides A4).*NB: This is one attachment in the Je-S system.
- Justification of Resources (up to 2 sides A4).
- CVs for Principal Investigator named in the proposal (up to 2 sides A4).
- Impact Plan (up to 2 sides A4).

* If participating as Co-chief the case for support should include more detail and we therefore require up to 4 sides A4.

Applicants can use their original application to sail as a basis for this submission although specific information is required on their own contribution to the cruise. Impact plans are required and should include the wider significance of the work completed on the expedition.

Guidance for submission of final reports for FEC applications

Je-S will prompt a final report to be submitted following the end date of the FEC award. This final report should be submitted in the requested format, using 'Not Applicable' in sections where necessary. The Summary section should be completed in up to 4,000 characters, including information on cruise reports, core recovery data, any preliminary microbiology/core chronology and any information that was taken onboard (eg logging, geophysical, etc data). Some information on the PI's plans for follow-up work should also be included. Links to relevant cruise reports, cruise diary updates, etc should also be included.

Advice on application and administrative arrangements is available from the Programme Administrator, lucpew@nerc.ac.uk or the Programme Manager jetc@nerc.ac.uk.

Any queries regarding the Je-S system and submission of applications should be directed to the dedicated Je-S Helpdesk.

POST-CRUISE SUPPORT FOR POST-DOCTORAL AND POST-GRADUATE RESEARCH ASSISTANTS

The new guidance below will be applied to grants submitted on or after 1 June 2011.

This scheme provides additional support for Post-Doctoral Research Assistants (PDRAs) and Post-Graduate Research Assistants (PGRAs) who sail with the Integrated Ocean Drilling Program (IODP) on behalf of the UK. The scheme aims to ensure that more PDRAs and PGRAs can complete up to 6 months post-cruise research. The application procedure is separate from the main UKIODP strategic grant rounds and has specific conditions.

Specific conditions for post-cruise support applications

- As with applications to any other NERC grant scheme, applications must be led by a Principal Investigator from an eligible UK institution. The PDRA or PGRA should be named as the Recognised Researcher for the application. All eligibility criteria are the same as for all other NERC directed programme grant applications.
- Applications must be on behalf of a PDRA or PGRA who has been accepted as (not simply applied to become) a UK shipboard participant on a forthcoming IODP expedition.
- The application must cover a discrete body of work based only on material collected during an IODP cruise. It must not be a continuation of any other unrelated project funded by NERC or other organisations.
- Candidates should notify the UK IODP Science Co-ordinator, Dayton Dove and the NERC UK IODP Programme Administrator, Amy Vitale, that they intend to submit a post-cruise application before sailing. Applicants will need to give a brief description of the post-cruise work that they intend to perform, and submit their proposal in Small Grant format via the Research Councils' Joint electronic-Submission system (Je-S). See the 'Full Economic Costing guidance for expedition participant' page for more details.
- On return to port, the candidate should notify the NERC UK IODP Programme Administrator, Amy Vitale, that the necessary samples have been obtained, otherwise funding will not be made available.
- You must apply not longer than 2 months following the return from the expedition (if you think you have exceptional circumstances, please contact UK IODP Science Co-ordinator, ukiodp@bgs.ac.uk.
- Both PDRA and PGRA applications will be peer reviewed and the final decision will be made by members of the UK IODP Committee. Awards will be limited by the funds available for this scheme.
- At least one first-authored peer-reviewed publication should result from the work.
- All other conditions and eligibility requirements are the same as for other NERC funding and can be found on the forms and handbooks section of this website.

Special criteria for PDRA applications

- Applications for Post Cruise Grants will now need to be costed under FEC requirements. The maximum amounts (at 100%), to include all Directly Incurred and Directly Allocated costs is now £25k to cover up to 6 months of post-cruise research (maximum funding limits will be adjusted for periods under 6 months on a pro rata basis). Extra time will be allowed only if another funding source is procured.

- To be eligible for this funding, a PDRA must hold a recognised PhD. Doctoral students can apply if they are close to submitting their thesis, or have submitted at the time of sailing, but funds will not be released until the student has successfully defended their thesis.

Special criteria for PGRA applications

- Applications for Post Cruise Grants will now need to be costed under FEC requirements. The maximum amounts (at 100%), to include all Directly Incurred and Directly Allocated costs is now £21k to cover up to 6 months of post-cruise research (maximum funding limits will be adjusted for periods under 6 months on a pro rata basis). Extra time will be allowed only if another funding source is procured. This applies to applicants taking a PhD break.

- To be eligible for this funding, a PGRA must be at least 18 months into their PhD before taking up the award.

Full financial guidance is available from the NERC website:
www.nerc.ac.uk/research/programmes/ukiodp/grants/postcruise.asp

Please direct initial queries to programme administrator lucpew@nerc.ac.uk or the Science Coordinator ukiodp@bgs.ac.uk.

Useful Websites

Integrated Ocean Drilling Programme (UK)
www.ukiodp.bgs.ac.uk
www.nerc.ac.uk/research/programmes/ukiodp/

ECORD Sites

European Consortium for Ocean Research Drilling (ECORD)
www.ecord.org

ECORD Science Support Advisory Committee
www.essac.ecord.org

IODP Central Sites

IODP Management International Inc.
www.iodp.org

Initial Science Plan for IODP
www.iodp.org/isp

JAMSTEC
www.jamstec.go.jp/chikyu/eng/index.html

IODP Science Advisory Structure
www.iodp.org/sas

IODP Implementing Organisations

Centre for Deep Earth Exploration (CDEX)
www.jamstec.go.jp/chikyu/eng/index.html

ECORD Science Operator
www.eso.ecord.org

JOI-Alliance US Implementing Organisation
www.iodp-usio.org

IODP National Offices

Finland http://iodpfinland.oulu.fi/
France www.iodp-france.org/
Germany www.iodp.de/
Italy www2.ogs.trieste.it/iodp/
Netherlands www.iodp.nl/
Portugal http://e-geo.ineti.pt/ecord/
Spain http://carpe.usal.es/~iodp/
Switzerland www.swissiodp.ethz.ch

IODP China www.iodp-china.org/chs/
IODP Korea www.kodp.re.kr
ODP Australia www.odp.usyd.edu.au

IODP Related Sites

European Science Foundation (ESF) www.esf.org
Japan Drilling Earth Consortium (J-DESC) www.j-desc.org/
International Continental Scientific Drilling Program (ICDP)
www.icdp-online.org/contenido/icdp/front_content.php
Lamont Doherty Earth Observatory - www.ldeo.columbia.edu
MEXT Ministry of Education, Culture, Sports, Science and Technology www.mext.go.jp/english/
National Science Foundation www.nsf.gov
Natural Environment Research Council www.nerc.ac.uk
USSSP U.S. Science Support Program www.usssp-iodp.org

ODP Legacy Sites

Joint Oceanographic Institutions for Deep Earth Sampling -
www.ifm-geomar.de
Consortium for Ocean Leadershio www.oceanleadership.org/
ODP Wireline Logging Services -
www.ldeo.columbia.edu/BRG/ODP/
Science Operator Texas A&M University (TAMU) -
www-odp.tamu.edu/index.html

Mid-Ocean Ridge Links

InterRidge Office www.interridge.org
NOAA Vents Programme www.pmel.noaa.gov/vents
DeRIDGE www.deridge.de

Margins Links

HERMES (hotspot ecosystem research on the margins of European seas) www.eu-hermes.net/
US Margins Programme www.nsf-margins.org/

NERC Marine Programmes

Joint Climate Research Programme -
www.nerc.ac.uk/research/programmes/jointclimate/
Oceans 2025 -
www.nerc.ac.uk/research/programmes/oceans2025/
RAPID www.nerc.ac.uk/research/programmes/rapid/
Technology Proof of Concept -
www.nerc.ac.uk/research/programmes/technologypoc/

Completed NERC Marine Programmes

Autosub Under Ice (AUI) Programme -
www.nerc.ac.uk/research/programmes/autosubunderice/
COAPEC (Coupled Ocean-Atmosphere Processes and European Climate) -
www.nerc.ac.uk/research/programmes/coapec/
Ocean Margins LINK Programme -
www.nerc.ac.uk/research/programmes/oceanmargins/
Surface-Ocean/Lower-Atmosphere Study (SOLAS) -
www.nerc.ac.uk/research/programmes/solas/

Acronym List

www.iodp.org/acronyms/

BCR	Bremen Core Repository
BoG	Board of Governors
CDEX	Center for Deep Earth Exploration
CDP	Complex Drilling Projects
DSDP	Deep Sea Drilling Project
ECORD	European Consortium for Ocean Drilling Research
EDP (old)	Engineering Development Panel (SAS)
EMA	ECORD Management Agency
EPC	European Petrophysical Consortium
EPSP	Environmental Protection and Safety Panel (SAS)
ESO	ECORD Science Operator
ESSAC	ECORD Science Support and Advisory Committee
ETF (old)	Engineering Task Force
GCR	Gulf Coast Repository
ICDP	International Continental Scientific Drilling Program
IIS-PPG	Industry-IODP Science Program Planning Group
ILP	Industry Liaison Panel (ECORD)
IO(s)	Implementing Organization(s)
IODP	Integrated Ocean Drilling Program
IODP-MI	Integrated Ocean Drilling Program-Management International
ISP	Initial Science Plan
J-DESC	Japan Drilling Earth Science Consortium
JOI	Joint Oceanographic Institutions, Inc.
KCC	Kochi Core Center Repository
LUBR	Leicester University Borehole Group
MEXT	Ministry of Education, Culture, Sports, Science, and Technology (Japan)
MOST	Ministry of Science and Technology (People's Rep. of China)
MSP	Mission Specific Platform
NanTroSEIZE	Nankai Trough Seismogenic Zone Experiment
NERC	Natural Environment Research Council (UK)
NSF	National Science Foundation (USA)
ODP	Ocean Drilling Program
OTF	Operations Task Force (SAS)
PEP	Proposal Evaluation Panel (SAS)
PI	Primary Investigator
POC	Platform Operations Costs
SAS	Science Advisory Structure
SASEC (old)	Science Advisory Executive Committee (SAS)
SIPCom	Science Implementation and Planning Committee (SAS)
SOC	Science Operating Costs
SCP	Site Characterization Panel (SAS)
SPC (old)	Science Planning Committee (SAS)
SSEP (old)	Science Steering and Evaluation Panel (SAS)
SSP (old)	Site Survey Panel (SAS)
STP (old)	Scientific Technology Panel (SAS)
TAP (old)	Technology Advice Panel
TP	Technology Panel (SAS)
USAC	United States Advisory Committee for Scientific Ocean Drilling
USIO	United States Implementing Organization
USSAC	United States Science Advisory Committee
USSSP	United States Science Support Program

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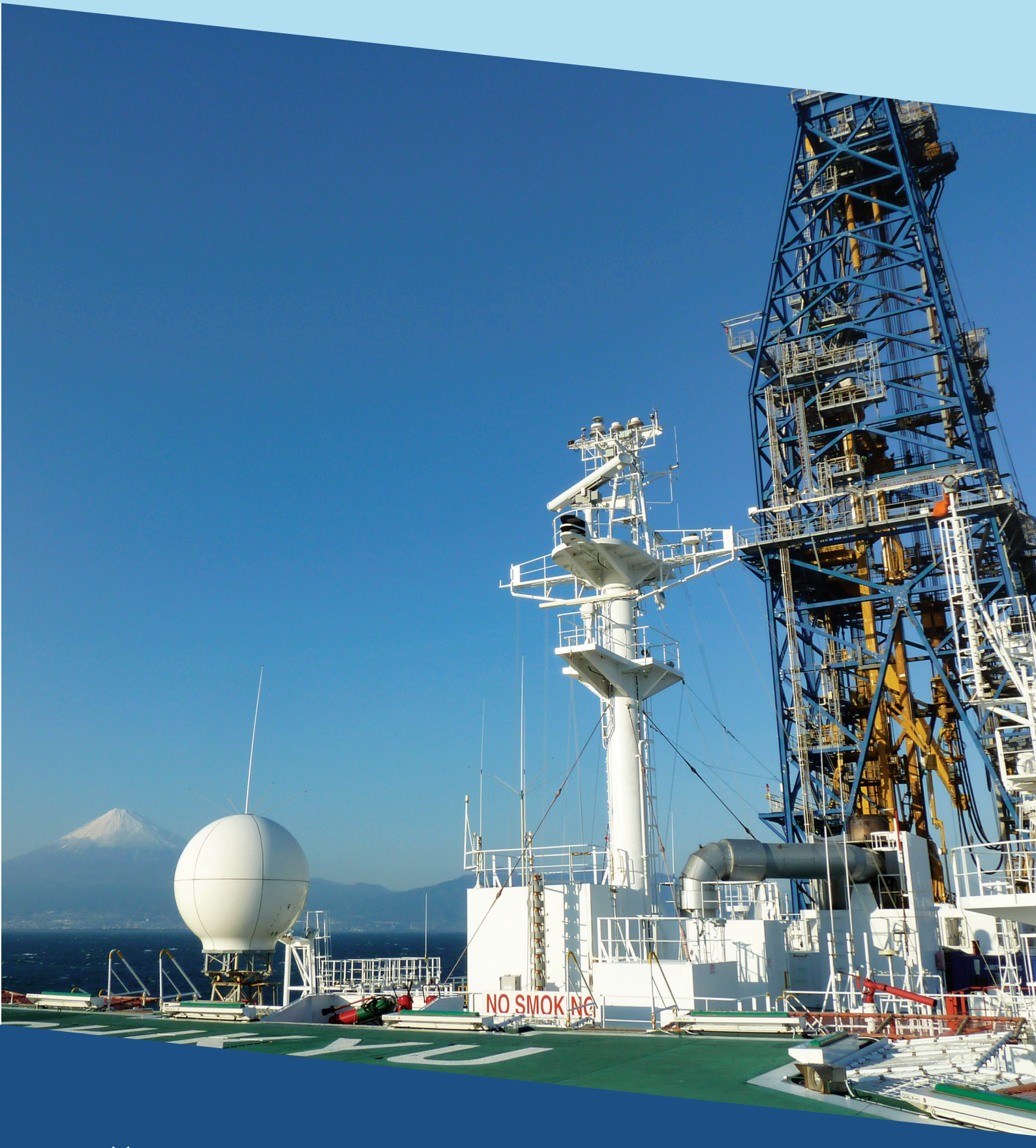
IODP
INTEGRATED OCEAN DRILLING PROGRAM



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