

# INTEGRATED OCEAN DRILLING PROGRAM MANAGEMENT INTERNATIONAL



1 October 2010 – 30 September 2011

Annual Report

Contract No. NSF OCE 0432224

Submitted by IODP Management International, Inc.

to

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## TABLE OF CONTENTS

MANAGEMENT AND ADMINISTRATION .....	4
TECHNICAL, ENGINEERING AND SCIENCE SUPPORT.....	8
ENGINEERING DEVELOPMENT .....	21
CORE CURATION.....	22
DATA MANAGEMENT.....	24
PUBLICATIONS.....	26
OUTREACH.....	29
IODP-MI ANNUAL REPORT DISTRIBUTION LIST.....	31
APPENDIX 1.....	31

## MANAGEMENT AND ADMINISTRATION

### CONTRACTUAL ACTIVITIES – OCE 0432224

#### **NSF-CMO Prime Contract**

NSF issued 5 contract modifications during FY2011:

- #42 approved the revised FY11 APP budget of \$20,093,457 and provided \$5 million of incremental funds
- #43 approved the FY10 carry forward request and increased the FY11 APP budget to \$20,784,892
- #44 provided \$4 million incremental funding
- #45 revised the FY11 APP budget to \$17,852,950
- #46 approved the FY12 APP budget at \$19,683,338

### PRINCIPAL SUBCONTRACTOR ACTIVITIES

#### ***Ippan Shadan Hojin* IODP-MI (ISHI)**

In FY10 IODP-MI executed subcontract IODP-MI-10-03 with *Ippan Shadan Hojin* IODP-MI (ISHI) to replace AESTO and establish and support the IODP-MI Tokyo office and the FY10-FY13 APPs.

Subcontract modification #3 reduced the prior approved FY 2010 subcontract budget by \$348,500 from \$1,090,137 to \$741,637. \$348,500 was de-obligated from the final FY 2010 subcontract budget.

Modification #4 reduced the FY11 subcontract budget to \$2,336,577.

Modification #5 added the vice president as a signatory.

Modification #6 reduced the FY11 subcontract budget to \$2.22 million.

#### **Bremen University**

Subcontractor provides core repository services for IODP at the Bremen Core Repository. During the reporting period, the parties executed 3 modifications:

- #9 approved the FY 2011 subcontract budget at the level authorized in the FY 2011 IODP Annual Program Plan (\$338,779) for continued core repository services
- #10 approved the subcontractor's FY 2010 unobligated carry forward request of \$15,000 and de-obligated the subcontractor's FY 2010 unobligated budget amount of \$49,826
- #11 approved the FY12 APP budget at \$348,259

#### **Japan Agency for Marine–Earth Science and Technology (JAMSTEC)**

JAMSTEC serves IODP as the Japanese Implementing Organization (IO). Riser-equipped drilling capability, by way of the vessel *Chikyu*, is supplied by CDEX, part of JAMSTEC.

CDEX also provides administrative services to the Kochi University Center for Advanced Marine Core Research (CMCR) repository. During the reporting period, the parties executed 3 subcontract modifications:

- #13 authorized the FY 2011 SOC subcontract budget and work scope at the level of \$10,375,859 in accordance with the FY 2011 IODP Annual Program Plan (October 25, 2010 version) as approved by the Lead Agencies
- #14 de-obligated the subcontractor's FY10 unobligated budget amount of \$19,980
- #15 reduced the FY11 subcontract budget to \$7.44 million

#### **Consortium for Ocean Leadership (COL)**

COL serves IODP as the USIO. During the reporting period, the parties executed 9 subcontract modifications:

- Modification #29 approved the FY11 APP subcontract budget of \$4,078,906 and provided \$1 million of incremental funds
- Modification #30 provided incremental funding of \$1,050,000 for the approved FY 2011 SOC subcontract budget
- Modification #31 reprogrammed \$48,242 from IODP-MI's FY11 engineering development budget to the USIO's FY11 SOC budget to cover the scope and budget for the Multi-Function Telemetry Module for the SCIMPI system
- Modification #32 provided incremental funding of \$48,242 for the approved FY 2011 SOC subcontract budget
- Modification #33 approved the subcontractor's FY10 carry forward request and increased the FY11 subcontract budget to \$4,152,148
- Modification #34 provided \$1 million incremental funding for the FY 2011 subcontract budget
- Modification #35 provided incremental funding of \$1,053,906 for the FY11 subcontract budget
- Modification #36 fully funded the FY11 APP subcontract budget
- Modification #37 approved the FY12 APP budget at \$4.196 million

#### **University of California, San Diego (UCSD)**

The Scripps Institution of Oceanography at UCSD is the subcontractor providing the services to receive and archive scientific ocean drilling-related electronic and digital data in support of the Site Survey Data Bank (SSDB). The IODP-MI Tokyo office oversees the technical work of the subcontractor and provides support and quality control of previously archived samples and data from the Deep Sea Drilling Project and the Ocean Drilling Program.

During the reporting period, the parties executed 2 subcontract modifications:

- Modification #14 approved the subcontractor's FY 2011 Annual Program Plan subcontract budget of \$270,000 for the continued operation and maintenance of the SSDB
- Modification #15 approved the subcontractor's FY10 carry forward request and increased the FY11 subcontract budget to \$279,978

## FINANCE REPORT

The annual financial report is attached (see Appendix 1).

Total FY11 APP contract funds:	\$17,852,950	This reflects all modifications made during the fiscal year.
Funds obligated from FY10	\$ 1,582,192	
Total funds expended:	\$ 16,187,682	
Total funds committed:	\$ 1,431,189	
Variance:	\$ 1,816,271	

## PERSONNEL STATUS

IODP-MI office consolidation was completed in early 2010. Program Services are now provided from the Tokyo office, while finance and administrative support are provided from Washington, DC.

The following positions are filled from the Washington, DC office of IODP-MI as of September 30, 2011: Director of Finance and Administration, Program Liaison Assistant, and Staff Accountant.

The following positions are filled under subcontractor employment in the Tokyo office as of September 30, 2011: President & CEO, Vice President, Operations Manager, Data and Publications Manager, Outreach and Communications Manager, Office Manager, Associate Science Manager, Associate Information Technology Manager, Operations Coordinator, Contract Officer, Publications Coordinator, SAS Coordinator, temporary Program Assistant, and one part time IT support staff.

## SUPPORT FOR SCIENCE PLANNING AND ADVISORY STRUCTURE

The Science Planning team works with the chairs of SASEC and SPC on the broader issues of science planning and review of science achievements. In FY11 the chairs of SASEC and SPC were supported by the IODP-MI science managers in the following fields: meeting agendas, preparation of meeting agenda books, editing of material produced during the meetings, and meeting minutes.

IODP-MI also provided coordination of all other SAS meetings including confirmation and distribution of meeting rosters and logistics, support at meetings for panel chairs and panelists, and updates of the IODP web site with all SAS related information. For SPC, SSEP and SSP, IODP-MI edited proposal reviews, secured external reviewers and edited their external reviews, prepared and distributed proposal packages in advance of meetings.

IODP-MI reviewed the proposals (6 workshop proposals and 26 drilling proposals in FY11) for completeness and adherence to IODP guidelines, and corresponded with the proponents. IODP-MI also oversaw data submission to SSDB to assist the proponents in uploading site survey data, and to examine the total data volume for a SCP meeting.

IODP-MI has supported Science Planning Writing Committee (SPWC) in terms of writing and publishing a new Initial Science Plan since the first quarter of FY10. After the successful last meeting in Lansdowne, VA, USA on October 6-10, 2010, IODP-MI finalized the science plan by transforming the committee's conclusion and public comments into the print version.

IODP-MI administered the establishment of the new SAS structure in the following fields: nomination of chairs of SIPCOM and PEP, advising those chairs of the new structure, drafting the new Terms of Reference and policies, compiling the new member's information submitted by PMOs, distributing the new SAS-related information and documents to the new SAS members and IODP community.

Attended SAS meetings in FY2011 are as follows:

Date	Meeting	Meeting Place	Attendees
November 2010	#15 SSEP	Portland, Oregon, USA	Yamamoto, H.Kawamura
January 2011	#11 SASEC	Miami, Florida, USA	Yamamoto, Larsen, Y.Kawamura
February 2011	#14 SSP	Kanagawa, Japan	Yamamoto
February 2011	#12 STP	Auckland, New Zealand	Yamamoto, Y.Kawamura, Collier
February 2011	#12 EDP	Grenoble, France	Y. Kawamura, Kagaya
March 2011	#17 SPC	Edinburgh, UK	Yamamoto, Larsen, Kagaya
June 2011	#12 EPSP	Edinburgh, UK	Kagaya
June 2011	#12 SASEC	Amsterdam, The Netherlands	Yamamoto, Larsen, Suyehiro, Johnson
July 2011	#13 STP	Web-Conference	Johnson, Y. Kawamura, Collier, Kim
August 2011	#15 SSP	St. Petersburg, Florida, USA	Yamamoto
August 2011	#16 SPC	Sendai, Miyagi, Japan	Yamamoto, Y. Kawamura, Johnson, Kagaya, Suyehiro, Larsen

Attended Science planning meeting in FY 2011 is as follows

Date	Meeting	Meeting Place	Attendees
October 2010	The 3 <sup>rd</sup> SPWC	Lansdowne, Virginia, USA	Larsen

## TECHNICAL, ENGINEERING AND SCIENCE SUPPORT

### IODP-MI

#### Platform Scheduling

Throughout the first quarter, IODP-MI worked closely with the OTF, the SAS, the IOs and the PMT to adjust operational schedules to accommodate the changing readiness and availability dates for the *JOIDES Resolution*, *Chikyu* and future *MSP* expedition planning. To arrive at the final schedule, the OTF worked very effectively and efficiently through email communications; a report summarizing the discussions and decisions made is available at <http://www.iodp.org/otf/>.

Total three Operations Task Force were met in FY11; 1) Edinburgh, Scotland, March 26th, 2011 in association with the SPC meeting. 2) Edinburgh, Scotland, June 10th - 11th 2011. These meetings focused on scheduling options for *Chikyu*, *JOIDES Resolution*, and *MSPs* for FY2012 through FY2013.

The full meeting report showing all possible scheduling options is available online at [www.iodp.org/otf/](http://www.iodp.org/otf/).

#### Project Scoping

Total two NanTroSEIZE Project Management Team Meetings (PMT), one new PMT meeting for FY12 *Chikyu* expedition proposal 787-RRD Japan Trench Fast Drilling Project and four new PMT meetings for FY13 and beyond *MSP* expeditions 1) proposal 548-Full 3 Chicxulub K-T Impact Crater, 2) proposal 716-Full 2 Hawaiian Drowned Reefs, 3) proposal 672-Full 3 Baltic Sea Basin Paleoenvironment and 4) proposal 758-Full 2 Atlantis Massif Seafloor Processes were held during FY11 to address uncertainties and changes in budget and operational constraint issues

NanTroSEIZE PMT Meeting #19 was held during AGU in San Francisco, CA on December 18, 2010. The meeting focuses on the effects of change the *Chikyu* operation schedule plan for late FY10 to FY13 and discussed how to maximize scientific achievement on this new schedule.

NanTroSEIZE PMT Meeting #20 was held in JAMSTEC Tokyo Office, Tokyo, Japan on August 18-19, 2011. The meeting focused on planning of Exp.338 in 2012 and beyond includes CDEX operation plan proposals and discussed several concerns for detailed plan and schedule/time estimation.

Chicxulub Project Management Team Meeting #1 was held October 12, 2010, Edinburgh, Scotland. Main points of discussion at meeting were scientific background of IODP Proposal 548 and potential operational scenario for a Chicxulub *MSP* Expedition.

Hawaii Project Management Team Meeting #1 was held November 15, 2010, Edinburgh, Scotland. Main points of discussion at meeting were platform capability requirement on the expedition (*MSP* or *JOIDES Resolution*) and addressing site location, environment, weather and permitting issues.

Baltic Sea PMT Meeting #1 was held June 28, 2011 Edinburgh, Scotland. Main points of discussion at meeting were scientific background of IODP Proposal 672, potential

operational scenario with coring and logging strategy and technical feasibility for a Baltic Sea Expedition.

Atlantis Massif PMT Meeting #1 was held June 29, 2011 Edinburgh, Scotland. Main points of discussion at meeting were scientific background of IODP Proposal 758 and potential operational scenario with coring and logging strategy, technical feasibility of using seabed drilling system for an Atlantis Massif Expedition.

Those PMT meeting reports are available at: <http://www.iodp.org/project-scoping-groups/>.

#### Expedition Operational Assessment

Following five IODP-MI Operations Review Task Force meetings met on FY11 to review the operational aspects of these expeditions.

- 1) Expeditions 317 Canterbury Basin  
January 6 – 7, 2011  
USIO, College Station, TX, USA
- 2) Expeditions 318 Wilkes Land  
March 8 – 9, 2011  
LDEO, New York, NY, USA
- 3) Expeditions 325 Great Barrier Reef Environmental Changes  
July 18 – 19, 2011  
BGS, Edinburgh, Scotland
- 4) Expeditions 332/333 NanTroSEIZE Stage 2  
August 18 – 19, 2011  
JAMSTEC, Tokyo, Japan
- 5) Expeditions 329 South Pacific Gyre Subseafloor Life  
August 30 – 31, 2011  
LDEO, New York, NY, USA

The review concentrated on “lessons learned” from the expedition with an emphasis on “what should be done differently in the future.” The committee review was based upon confidential reports submitted by the IO and by the Expedition co-chief scientists.

Each meeting began with a detailed oral presentation by the co-chief scientists. This included a summary of the scientific findings, as well as a series of positive and negative issues that arose before, during and after the two cruises. The IO staff scientists next gave oral presentations regarding the results of the expeditions from the operator perspective. These covered coring operations, achievements, planning and implementation. Following these oral presentations, the Task Force examined the issues identified in the oral reports and in written reports submitted by scientists. The Task Force then developed summaries and recommendations for action by the IO and other IODP entities. The full report of the each expedition Operations Review Task Force is available online at: <http://www.iodp.org/ortf/>.

#### **CDEX**

Three IODP Expeditions were successfully conducted: IODP Expedition 331 “DEEP HOT BIOSPHERE”, IODP Expedition 332 “Riserless Observatory”, and IODP Expedition 333

“Subduction Input 2 and Heat Flow”. The first was *Chikyu*'s first experience drilling into an active hydrothermal vent system, and the latter two expeditions extended and expanded on previous NanTroSEIZE drilling programs. IODP Expedition 332 was especially important, marking the first deployment of a permanent CORK-type observatory, and the first long-term data set recovered from a temporary observatory system. IODP Expedition 333 also drilled the first Ancillary Project Letter, “NanTroSLIDE”, examining and coring mass transport deposits (MTDs) along the seaward side of the accretionary wedge.

IODP Expedition 337 “Shimokita Coalbed Biosphere” was unavoidably postponed as a direct result of the 11 March 2011 the Great East Japan Earthquake, in which *Chikyu* sustained some limited damage.

#### Expedition 331: DEEP HOT BIOSPHERE

This expedition aimed to examine and elucidate the Iheya North hydrothermal system seafloor microbial ecosystem, and the physical and chemical environmental parameters of the hydrothermal vent system. Five sites were drilled during Expedition 331: the active hydrothermal vent site and sulfide-sulfate mound at North Big Chimney (NBC) (Site C0016); three sites east of NBC at distances of ~100, 450, and 1550 m from the active vents (Sites C0013, C0014, and C0017, respectively); and one hillside site ~600 m northwest of the active vents representing a potential migration path for hydrothermal fluids (Site C0015). Our maximum penetration was 151 meters below seafloor (mbsf) at recharge Site C0017. Heavy, triangular, gimbaled guide bases were deployed at three holes, one each at Sites C0013, C0014, and C0016, for re-entry, casing, and capping, including

Analyses of interstitial water and headspace gas yielded complex patterns with depth and laterally at most sites over distances of only a few meters. Documented processes include formation of brines and vapor-rich fluids by phase separation and segregation, uptake of Mg and Na by alteration minerals in exchange for Ca, leaching of K at high temperature and uptake at low temperature, anhydrite precipitation, microbial oxidation of organic matter and anaerobic oxidation of methane utilizing sulfate, microbial methanogenesis, abrupt changes in composition with depth that result from sealing by relatively impermeable cap rock, and generation of hydrogen at depth, apparently by hydrothermal rather than microbial processes.

Shipboard analyses have not yet confirmed the presence of an active deep hot biosphere. Cell abundances are much lower than those found in previous Ocean Drilling Program/IODP sites on continental margins, and attempts at culturing were generally unsuccessful. CDEX found ample evidence for microbial activity supported by sedimentary organic matter, but only in sediments within the upper 10–30 mbsf where temperatures were relatively low. At Site C0014, the recharge site, a community of Fe-oxidizers was found that were subsequently successfully cultured.

#### Expedition 332: NanTroSEIZE Stage 2: Riserless Observatory

The IODP Expedition 332 “Riserless Observatory” was a 48-day expedition (25 October to 11 December 2010), targeting the shallow portion of C0002 for installation of the first permanent observatory in the NanTroSEIZE project. Nine scientists (including Co-Chiefs and EPM), from the USA, Japan, and Germany with an observer from Petrobras, participated in IODP Expedition 332, following up, and expanded on, initial observatory operations begun during IODP Expedition 319 in 2009.

The complexity of this expedition mainly comprised engineering work, including (1) retrieval of a temporary observatory instrument (i.e. SmartPlug) installed during Expedition 319 at

IODP Site C0010, which penetrates the shallow “megaseal” fault in the midforearc; (2) deployment of an upgraded temporary observatory (i.e. GeniusPlug) at Site C0010; and (3) installation of a permanent observatory at IODP Site C0002 in the outer Kumano Basin, at the location of planned future deep riser drilling.

SmartPlug/GeniusPlug recovery and deployment operations at Site C0010 were quite successful, proving the viability and effectiveness of the SmartPlug modular observatory program. Times series data recovered from the SmartPlug include seafloor and formation pressure as well as four independent temperature records from the fault zone and the overlying seafloor reference. Tentative analysis of the data proves the effective seal of the bridge plug; dampened pressure amplitudes in the tight, slightly overpressured formation; and identification of prominent earthquake and tsunami events in the 15 month record (23 August 2009–7 November 2010). The SmartPlug was replaced with a GeniusPlug, an extension of the now-proven SmartPlug design, having a 30 cm extension chamber containing an OsmoSampler for collecting fluids for geochemical analysis and a flow-through osmotic colonization system for microbiological study.

A new hole was drilled at Site C0002 with logging while drilling (LWD) and cased for deployment of a long-term borehole monitoring system (LTBMS). The LTBMS is comprised of a CORK assembly with a hydrogeological unit measuring pressure at four depth levels as well as a broadband seismometer, volumetric strainmeter, tiltmeter, geophones, and a thermister string. The key goals include pore pressure monitoring in the upper accretionary prism, a series of measurements in the homogeneous sediments (strain, tilt, seismicity, and pressure) in the transition zone, and emperature and pressure monitoring in the overlying Kumano Basin sediments. The lower portion of the assembly is isolated from the overlying ocean by a swellable packer. Part of the instrument string below was cemented to couple the strainmeter and seismometer to the formation/casing. Future plans include connecting the LTBMS to the DONET underwater cable network, for real-time monitoring.

#### Expedition 333: NanTroSEIZE Stage 2 Subduction Input 2 and Heat Flow; NanTroSLIDE APL

The IODP Expedition 333, was a 30-day expedition (12 December 2010 – 10 January 2011), targeting subduction inputs and heat flow in the incoming subducting plate as a continuation of Expedition 322. Drilling and coring of subduction inputs and collecting heat flow measurements help elucidate the geophysical properties driving large subduction earthquakes at the margin of the Philippine Sea Plate which slides beneath the Eurasian Plate. In addition, as part of the Ancillary Project Letter (APL), mass transport deposits (MTD) on the outer slope of the accretionary prism were drilled, cored, and temperature measurements collected at Site C0018 to study the relationships between earthquake occurrence and submarine landslides.

The Expedition 333 started with APL operations, drilling and coring six layers of submarine landslide deposits at Site C0018 (water depth: 3084.35 meters) to 314.2 mbsf. The hole penetrated a thick MTD layer (62 meters thick) near the bottom of the borehole; immediately above and below which were discovered deposits of volcanic ash typical of those found around Japan. Age analysis of the upper ash layer indicates that the landslide producing this thick sedimentation layer likely occurred around one million years ago.

Drilling, coring, and temperature measurements were performed at Sites C0011 and C0012 in order to expand and elaborate on samples and data collected (especially for samples of basaltic basement and heat flow) during IODP Expedition 322.

Drilling and coring of sediments at Site C0011 (water depth: 4050.5 m) and Site C0012 (water depth: 3510.5 m) reached down to a depth of 380 mbsf at C0011 and 180 mbsf. In addition, coring continued underlying basaltic basement at C0012 to a depth of 630.5 mbsf. Stable and continuous drilling conditions allowed for the good recovery of cores, permitting stratigraphic sequence analyses. High-resolution formation temperature measurements were made at all sites with APCT3 during piston coring, the results of which revealed a higher heat flow at C0012 than that at C0011, providing valuable clues to understanding fluid circulation at input sites.

#### Future Expedition Planning

Planning for several FY12 IODP Expeditions began during FY11, specifically preparations for a Rapid-Response Drilling Project, IODP Expedition 343, and the Japan Trench Fast Drilling Project. This is an extremely technically challenging operation, proposing to drill into the Tohoku fault on the seaward slope near the Japan Trench. This will involve drilling in approximately 7,000 meters of water, with a planned penetration of approximately 1,000 meters below sea floor (mbsf). Two observatory installations are planned, in conjunction with LWD drilling and coring of the fault zone. Residual temperature signals from the earthquake event are one of the main targets of this expedition.

The CDEX Engineering group is helping the expedition proponents with the planning and purchasing of some observatory components, as well as heading some investigation of other component desirability and appropriateness. Specific sections include a spectra-line for the MTL string, and deployment strategies. CORK and wellhead designs are also within CDEX's responsibility.

An external review panel of deep-sea drilling experts is reviewing the operational plans prepared by CDEX for this expedition, and CDEX has been in close consultation with other industry-level consulting firms regarding the viability of drilling in such deep water.

### **ESO**

#### Expedition 313: New Jersey Shallow Shelf

The Expedition Report was published online on 4 Dec 2010. Results from Expedition 313 were reported at the 2010 AGU Fall Meeting, at Special Session 'Sea Level, Near-Surface Currents, and the Stratigraphic Record: Recent Results'.

The Expedition 313 2nd Post-expedition Meeting took place from August 15 – 18, 2011, at the University of Utah, Salt Lake City, USA. The Science Party gathered to discuss their results to date and to coordinate their publication approach. In addition, the Science Party participated in a field trip to view classic outcrops of the Blackhawk Wave-Dominated Coastal System (Book Cliffs) and the Ferron Sandstone Deltaic System.

A series of collaborative peer-reviewed papers from the Science Party are expected to be published before August 2012.

#### Expedition 325: Great Barrier Reef Environmental Changes

The IODP Expedition 325 moratorium ended on 16 July with the online publication of the Proceedings of the Integrated Ocean Drilling Program, Expeditions 325, Great Barrier Reef Environmental Changes at <http://publications.iodp.org/proceedings/325/325title.htm>. Expedition 325 was reported at the 2010 AGU Fall Meeting at Special Session 'Sea Level, Near-Surface Currents, and the Stratigraphic Record: Recent Results'.

The 1st Post-Expedition Meeting (editorial) took place at College Station, Texas, from 7-11 December, attended by C. Cotteril (BGS) and S. Morgan (EPC, Univ. of Leicester).

The Expedition 325 Operational Review Task Force (ORTF) took place at the Edinburgh offices of the British Geological Survey on 18 & 19 July 2011. All reports by the Operations Review Task Force concerning *MSP* Expeditions can be found on IODP-MI's website at <http://www.iodp.org/ortf/>.

The Expedition 325 2nd Post-expedition Meeting will take place from July 3 – 7, 2012, at Heron Island, Queensland, Australia. A special session has been co-organised with scientists associated with Expedition 310 (Tahiti) for the 12th International Coral Reef Symposium (9 – 13 July, Cairns, Australia).

#### Expedition 347: Baltic Sea Paleoenvironment

ESO staff held a Project Management Team Meeting with Thomas Andrén and Bo Baker Jörgensen, proponents (and now Co-chief Scientists) of the Baltic Sea Paleoenvironment proposal, on 28 June at the British Geological Survey in Edinburgh. Representatives from all ESO partners were in attendance.

The Baltic Expedition has been designated IODP Expedition 347. ESO is continuing to scope potential drilling methodologies and platforms for this proposal, and has been working with the proponents to accommodate the requirements of the proposed science program. ESO aim to issue a notice of interest in the OJEU for a platform and coring services for the Baltic Expedition at the end of February 2012.

#### Proposal 548: Chicxulub Impact Crater

ESO staff held a Project Management Team Meeting with Joanna Morgan and Sean Gulick, proponents (and now Co-chief Scientists) of the Chicxulub Impact Crater proposal, on 12 October at the British Geological Survey in Edinburgh. Representatives from all ESO partners were in attendance.

ESO have enlisted the help of Chicxulub co-proponent Jaime Urrutia Fucugauchi to make initial contact with appropriate Government authorities and to explore permitting channels. Fucugauchi has been able to meet officers from the National Institute of Ecology (INE), the National Council on Science and Technology (CONACYT), the Ministry of Environmental and Natural Resources (SEMARNAT), the Federal Attorney for Environmental Protection (PROFEPA) and the Yucatan Government. The Yucatan Government have indicated to Fucugauchi that they fully support the drilling proposal.

ESO submitted a letter of project approval, co-signed by the IODP-MI President, the EMA Director and ESO Chair, to the directors of the Mexican National Council on Science and Technology (CONACYT), and the Mexican Ministry of Environmental and Natural Resources (SEMARNAT). The letter explained:

- that project approval has been given by IODP-MI and ECORD;
- that the project will be funded (ECORD, IODP Lead Agencies, and possibly ICDP);
- that the project will be implemented by ESO;
- our plan to formally collaborate with UNAM - the National Autonomous University of Mexico;
- that up to two Mexican scientists will join the Science Party;

- our plan to take the cores back to BCR and then ultimately store them at the GCR;

Following submission of this letter, ESO have been asked to formally proceed with permit applications for the hazard site survey and the drilling operation, which are in hand. ESO is continuing to solicit potential contractors for the hazard site survey and drilling work, and will start the tendering process once further information is obtained. ESO aim to commission the hazard site survey for 2013, providing funding is forthcoming for an *MSP* program in the new IODP. ESO aim to implement the drilling operation in 2014.

S. Davies and S. Morgan (EPC, University of Leicester) attended a meeting at Weatherford on 10 January 2011 to discuss multi-toolstring and alternative options for conveyance.

Joanna Morgan and Sean Gulick submitted an ICDP proposal in February 2011, applying for up to US\$1.45M to co-fund this proposal. Their application has since been put on hold by ICDP until a schedule for the expedition is confirmed.

#### Proposal 758: Atlantis Massif Seafloor Processes

ESO staff held a Project Management Team Meeting with Gretchen Früh-Green and Christopher MacLeod, proponents of the Atlantis Massif Seafloor Processes proposal, on 29 June at the British Geological Survey in Edinburgh. Representatives from all ESO partners were in attendance. The meeting was particularly valuable with regard to the proposal's requirement of using a seabed drill, specifically the lithologies likely to be encountered by a seabed drill, site selection and safe positioning of a seabed drill, sampling for the high-priority microbiology program and downhole measurement requirements and what might be achievable with a seabed drill.

A full and up-to-date copy of the site survey database associated with this proposal has been assembled on the servers at the BGS.

BGS Marine Operations staff are continuing to evaluate all available seabed drill options, including the evolving BGS and MeBo (MARUM) seabed drills for this proposal. On 27-29 July, D. Smith attended a demonstration of the Gregg seabed drill off Vancouver, Canada.

#### Proposal 716: Hawaii Drowned Reefs

ESO staff held a Project Management Team Meeting with Jody Webster and David Clague, proponents of the Hawaii Drowned Reef proposal, on 15 November at the British Geological Survey in Edinburgh. Representatives from all ESO partners were in attendance.

ESO submitted a project brief to the State of Hawaii Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands (OCCL) on 7 December. ESO has since received an official response from the OCCL directing ESO to submit a Conservation District Use Application for sites located within 3 miles of the coast. An Environmental Assessment will also need to be filed with this application. Additionally, ESO received an official response from the US Army Corps of Engineers directing ESO to apply for a Department of the Army (DA) permit for the other sites.

ESO has been investigating operational scenarios for the drilling of the Hawaii Drowned Reef proposal. Currently four operational scenarios exist, each with their own advantages and disadvantages:

1. Build a drill ship *MSP* with an API string and motorized core barrel (MCB) capability (expensive, duplicates JR coring capability).
2. Use the JR with its API string and Motor Driven Core Barrel (MDCB) or other compatible MCB (logging issue: JR cannot log top 90 m of open hole).
3. Use a seabed drill operating from a local research vessel. This option has readiness issues as current seabed drill technology does not provide the penetration required by the Hawaii proposal, or the core diameter and logging capability required by IODP. Further development is required before seabed drills are ready to be used for this proposal, and other proposals requiring shallow, multiple holes.
4. A mixture of options 2 and 3.

ESO is continuing to scope all available seabed drills, including the evolving BGS and MeBo (MARUM) seabed drills, for potential use in this, and future, proposals.

#### Proposal 581: Late Pleistocene Corallgal Banks

Lead proponent Andre Droxler independently approached Fugro to enquire whether they could conduct the coring required to complete the Late Pleistocene Corallgal Banks proposal. ESO received an offer from Fugro of 24 hours of geotechnical ship time for \$75k to conduct a coring test on the corallgal mounds of Southern and Baker Banks in the Gulf of Mexico. ECORD have since approved the use of funds for this test.

The objective is to use Fugro's geotechnical vessel R/V Seaprobe 1 to deploy a single coring tool, the QDTech Alien Corebarrel (developed by Marshall Pardey and used during Expedition 313) to test its suitability for coring uncemented corallgal reef material. This would be regarded as a technical test with no Science Party and no minimum measurements will be made.

ESO are currently in discussion with Fugro regarding details and the contract, with the current opportunity window running from mid-March to May 2012. A permit for the work has already granted by the Bureau of Ocean Energy Management, Regulation and Enforcement. If recovery is reasonable, as decided by IODP curators on board, the cores will be split (either at the GCR or the BCR), the archive half kept by ESO and the working half given to the proponents to provide ESO with lithological and disturbance information.

#### Scoping for future Arctic expeditions

As part of ECORD's initiative to explore potential collaboration with industry in Arctic scientific drilling, ESO attended two industry conferences:

- AAPG Polar Petroleum Potential (3P) Exhibition and Conference, 30 Aug – 2 Sep, Halifax, Canada. ESO staff attended an IODP-MI-sponsored booth to promote the IODP program to industry. D. McInroy gave a talk entitled The First Deep Coring in the Central Arctic Ocean: The Drilling of the Lomonosov Ridge by the IODP.
- D. McInroy gave the same talk at the Finding Petroleum: Exploring the Arctic conference, Geological Society, London, 11 Oct.

#### Other

ESO is continuing to implement QA/QC within *MSP* operations as asked by IODP-MI. Various work packages related to this topic which encompass overall policies and procedures for QA/QC are either in progress or already completed. The Exp. 325 QA/QC report was finalized (STP Consensus Statement 1003-03: Modification of QA/QC Reporting Procedures) and was forwarded to STP on Jan 15. This is a significant piece of ongoing work,

which involves adding metadata of past expeditions into the database or alternatively linking metadata with analytical data in database. For *MSP* proposals ESO is currently investigating for potential implementation. ESO is also scoping analytical equipment and instrumentation including QA/QC procedures.

## **USIO**

The U.S. Implementing Organization (USIO) completed four full expeditions and began a fifth expedition during FY11. Over the course of these expeditions, the USIO transited one of the farthest distances ever traveled for a scientific ocean drilling expedition, drilled in metamorphic rock as hard as any formation ever encountered, collected sediments and basalts from the only known erosional end-member of convergent margins within reach of scientific drilling, and recovered a significant collection of basement rock for microbiology research.

### Expedition 329: South Pacific Gyre Subseafloor Life

From 9 October to 13 December 2010, an international team of IODP scientists explored one of the largest, most remote, and least explored areas of the world's oceans, gathering data that offer a glimpse into one of the most fascinating ocean phenomenon yet to be studied.

The South Pacific Gyre covers 10% of the Earth's total surface area and has been called Earth's largest oceanic desert because of the harsh and remote conditions. Energy production of tiny plants and microbes is lower here than in any other region of the world's ocean. Samples taken from the seafloor in this gyre have the lowest cell concentrations ever found in the seafloor, and organic oxidation occurs at rates thousands of times below the net respiration rates seen at other sites in the Pacific Ocean. Organic carbon content—critical for sustaining life—decreases so rapidly with depth in this area that it drops below detectable levels just a few meters below the seafloor, yet those few meters host microbial processes that are estimated to be tens of millions of years old. Scientists believe the harsh environment of this region may have driven the evolution of “extremophiles”—tiny, unique life forms that are able to live in areas without sunlight or organic matter and at extremely slow metabolic rates, possibly even living on hydrogen generated by natural radioactivity.

The center of the South Pacific Gyre is farther away from any continental landmass than the center of any other oceanic gyre, and the 6,655 nmi covered during the Expedition 329 represents one of the farthest distances traveled for an expedition in scientific ocean drilling history. The surface water is the clearest salt water in the world and the sedimentary cover in the gyre spans more than 100 million years of seafloor age. A range of instruments that are seldom used during IODP expeditions were employed during the Expedition 329, including oxygen microelectrodes and optodes, flow cytometric cell counting, radiotracer facilities, and hydrogen analysis. Samples recovered during the expedition will lead to key advances in the understanding of fundamental aspects of subsea floor life, metabolic activities, and biomass in this very low activity sedimentary ecosystem, and also of geological processes, including the factors that control hydrothermal circulation and chemical alteration in the ocean crust, models of regional tectonic history, geodynamo models, and models of glacial–interglacial ocean-climate change.

### Expedition 330: Louisville Seamount Trail

In December 2010, the Expedition 330 research team embarked on an expedition to drill into the summits of five guyots in the extinct volcanic chain called the Louisville Seamount Trail. Because scientists have long regarded hotspots as being fixed in relation to moving tectonic plates, submarine volcanic trails have been used to indicate the direction and speed at which

tectonic plates move. However, recent ocean drilling of the Hawaiian-Emperor Seamounts has indicated that hotspots are not as stationary as once thought. Comparing results from the Louisville Seamount Trail and the Hawaiian-Emperor Seamount Chain may give clues as to whether the Louisville hotspot moved at the same time and in the same direction as the Hawaiian hotspot, or in a different direction, or not at all. Scientists anticipate the results from Expedition 330 data will help to address this fundamental question of geodynamics—whether hotspots are fixed relative to one another and can truly provide a global reference frame for geodynamic reconstructions.

The Louisville Seamount Trail is a 4,300 km long volcanic chain built over the past 80 million years as the Pacific plate moved over a hotspot; it was once an archipelago of volcanic islands, but Expedition 330 drilling revealed evidence that it was at or above the surface of the ocean for only a short time. Because of its age and size, the Louisville Seamount Chain is regarded as the South Pacific counterpart of the Hawaiian-Emperor Seamount Chain. Drilling during ODP Leg 197 in the Emperor Seamounts confirmed ~15° southward motion of the Hawaiian hotspot prior to 47 Ma, calling into question whether the Pacific hotspots constitute a fixed frame of reference. If the Hawaii and Louisville hotspots moved in concert, they might constitute a slowly moving reference frame in the Pacific. Alternatively, these hotspots may have moved independently, as suggested by geodynamic models of mantle flow patterns that reproduce the observed latitudinal motion for the Hawaiian hotspot but predict essentially no latitudinal shift for the Louisville hotspot. These end-member models can be only distinguished through drilling of the Louisville Seamount Trail.

Core recovery during the Expedition 330 was outstanding, with an average of 72.4%. At Site U1374 on Rigel Guyot, a total of 522 meters was drilled, with a record-breaking 88% of basement recovery. Nearly all the Expedition 330 core material is characterized by low alteration, providing samples of mostly well-preserved basalt containing, for example, pristine olivine crystals with melt inclusions, fresh volcanic glass, various micro and macrofossils, and, in one case, mantle xenoliths and xenocrysts. The volcanic rocks collected are well suited for all planned post-expedition geochemical studies, including a range of isotope measurements, high-precision age determination, and detailed paleomagnetic investigations. In addition, the combined the Expedition 329 and 330 recovered sample material comprises the largest collection of basement rock ever collected for microbiology research during 40 years of scientific ocean drilling.

#### Expedition 334: Costa Rica Seismogenesis Project

The Expedition 334, the Costa Rica Seismogenesis Project (CRISP), was a 4-week expedition to the eastern Pacific Ocean off shore Osa Peninsula, Costa Rica, where the Cocos Ridge is subducting beneath the Caribbean plate. This expedition was designed to explore the processes that control nucleation and seismic rupture of large earthquakes at erosional subduction zones, where nearly 80% of earthquakes greater than magnitude 8 occur across the globe. CRISP involved the only known erosional end-member of convergent margins within reach of scientific drilling. Complementing other deep-fault drilling (SAFOD and Nankai Trough Seismogenic Zone Experiment), the Expedition 334 investigated the seismogenic processes common to most faults and those unique to erosional margins. With a relatively thin sediment cover, fast convergence rate, abundant seismicity, subduction erosion, and change in subducting plate relief along strike, CRISP sites offered excellent opportunities to learn more about the causes of earthquake nucleation and rupture propagation. CRISP was also the first research endeavor to drill into the sediments and basalts of Cocos Ridge, which is the trace of the Galapagos hotspot on the Cocos plate. Nearly 1,500 meters (almost 1 mile) of sediment cores were collected during the expedition,

revealing detailed records of some 2 million years of tectonic activity along a seismic plate boundary.

The basement was successfully drilled at one (upslope) of the three slope sites, where both cores and logging-while-drilling (LWD) logs penetrated below the slope sediment and upper plate basement interface. It remains unclear if drilling entered a transition zone with clasts of basement (e.g., an erosional surface) or the basement itself; however, further analysis should answer this question. Preliminary results of biostratigraphic ages obtained from the slope sites indicate high sediment accumulation rates in the terrestrially sourced slope sequence. Detailed research of sedimentary facies and benthic foraminifer fauna in slope sediments are keys to estimate the mass removal associated with basal erosion and the thickness of the subduction channel.

Present-day in situ stress orientation was estimated from borehole breakouts at sites in the middle and upper slopes. Borehole breakouts, which form when there are differences in the principal horizontal stresses, were identified from LWD images of borehole radius and density. In addition, types, orientations, and kinematics of faults were determined from cores. Stress at the middle slope site is compressional, whereas that at the upper slope site is extensional. This marked change in stress state occurs within ~12 km along the CRISP transect in the northwestern flank of the Cocos Ridge and may correspond to a change from compression (middle slope) to extension (upper slope), marking the onset of subduction erosion. Approximately 170 tephra layers with ages ranging from middle Miocene to the present were retrieved from all cored holes at the four different sites. Post-expedition analyses of the tephra will answer questions about the evolution of the magmatic arc, including the deactivation of the volcanoes located on the present day location of the Tamanca Cordillera.

#### Expedition 335: Superfast Spreading Rate Crust 4

The *JOIDES Resolution* returned to ODP Hole 1256D in April 2011 for the fourth drilling expedition of the Superfast Spreading Crust campaign. Crust formed at fast-spreading ridges accounts for 50% of the ocean floor and about 30% of the Earth's surface. Superfast spreading crust is thinner than elsewhere, making it possible to reach the lower portions of the ocean crust without having to drill as deep. The objective of Expedition 335 was to advance Hole 1256D several hundred meters through the dikegabbro transition into the cumulate gabbros that comprise the lower crust. Cores from in situ cumulate gabbros would allow major advancement in our understanding of how a significant proportion of the Earth's crust formed, by testing hypotheses about magmatic accretion of the lower ocean crust.

Operations in Hole 1256D were challenging, requiring eight reentries before coring could resume, and a total of 24 reentries made with a record of more than 150 miles of pipe trip during the expedition. The granoblastic basalt zone drilled during Expedition 335 contained metamorphic rock as hard as any formation ever encountered during ocean drilling, sometimes tougher than the most resilient of hard-formation drilling and coring bits. A remarkable suite of heattempered basalts was recovered that provide a detailed picture of the rarely seen boundary between magma and seawater. In addition, hole-cleaning operations recovered granoblastic and minor gabbroic rocks as large as 3.5 kg that preserve a complex history of recrystallization, hydrothermal alteration, and small scale intrusions that could not have been observed on a core scale. Hole 1256D, one of the deepest hard rock penetration sites of scientific ocean drilling, was left stabilized, cleared to its full depth, and primed for further deepening during the next return.

### Expedition 336: Mid-Atlantic Ridge Microbiology

The Expedition 336, which began in September 2011, will examine the microbiology of a sediment pond and the underlying young, cold, and hydrologically active flank of the Mid-Atlantic Ridge. Planned drilling operations at three sites include sediment/basalt coring, basement logging, and installation of three long-term subseafloor observatories, with the objectives of investigating the nature of microbial communities in young ridge flanks and their role in crustal weathering, as well as the origin of deep-seated microbial communities.

During the first 2 weeks of the expedition, the *JOIDES Resolution* returned to DSDP Hole 395A and retrieved the CORK observatory that was installed in 1997 during ODP Leg 174B. Once the CORK was on board, the internal string was pulled out, pressure and temperature data were downloaded, thermistors were cut out of the string, and sections of the string were sampled for microbiologic analyses. Hole 395A was then logged to 600 mbsf with a new in situ tool for detecting microbial life in ocean floor boreholes—the Deep Exploration Biosphere Investigative tool (DEBI-t).

The new Hole 395A lateral CORK (L-CORK), a modified design to fit DSDP reentry hardware, failed during installation at the seafloor. The CORK head broke off from the rest of the CORK, which remained in the hole. The CORK head and running tool were retrieved and inspected to determine the cause of the failure, and video evidence and instrumentation data were collected for further review to determine what alterations can be made to increase chances of success in subsequent installations and to identify potential future actions in Hole 395A.

### Expedition Planning

Pre-expedition planning meetings were held in College Station, Texas, for the FY12 Expeditions 339 (Mediterranean Outflow), 340 (Lesser Antilles Volcanism and Landslides), and 342 (Newfoundland Sediment Drifts) and the FY13 Expedition 341 (Southern Alaska Margin Tectonics, Climate, and Sedimentation). After a series of planning and engineering design meetings, the Cascadia Margin expedition was removed from the FY12 schedule in response to budgetary and timeline issues. The Expedition 340 was approved to replace the Cascadia Margin expedition, and Ancillary Project Letter (APL) 779 was added as stand-alone operation Expedition 340T (Atlantis Massif Oceanic Core Complex). The pre-expedition meeting for the Expedition 340T was conducted via conference call. The Expedition 342 was added to the FY12 USIO expedition schedule in June 2011, and planning efforts at the end of the year focused on refining schedule details and tentative port selections.

Science staffing was completed this year for the FY11 Expeditions 334 (CRISP), 335 (Superfast Spreading Rate Crust 4), and 336 (Mid-Atlantic Ridge Microbiology) and the FY12 Expeditions 339, 340T, 340, and 341. The USIO coordinated science staffing to fulfill specialized needs and made shipboard berths available to accommodate education and outreach efforts. Clearance applications were submitted to the U.S. State Department for operations in the Exclusive Economic Zone (EEZ) waters of Spain and Portugal during the Expedition 339 and for operations in the EEZ of Montserrat, Guadeloupe, Dominica, and Martinique during the Expedition 340. Environmental evaluations for use of air guns during the Expedition 339 check shot surveys and seismic sources to conduct a check shot survey during the Expedition 334 were submitted to the National Science Foundation, and development of the environmental evaluation reports for the Expeditions 340 and 340T was initiated.

A communications model for future engineering work was established through biweekly teleconferences between the USIO project team, proponents, and engineers who worked together to finalize design requirements for the L-CORKs that would be deployed during the Expedition 336. The USIO also managed logistically challenging shipping requirements and specialized outfitting in port to accommodate microbiological and chemical requirements for the Expedition 329 (South Pacific Gyre Subseafloor Life), to deploy logging-while-drilling tools for the Expedition 334 (CRISP), and to transfer 45 shipments of hardware and equipment to Curaçao in preparation for the Expedition 336.

#### Engineering and tool development and support

*Large-diameter pipe handling infrastructure:* Contracts were finalized during FY11 for the design and fabrication of infrastructure for safely and efficiently handling large-diameter (6-5/8 inch) pipe on board the *JOIDES Resolution*. Representatives from the USIO and subcontractors met on board the *JOIDES Resolution* to evaluate the rig floor layout and equipment needed for the design of the new system. Several options for new elevator designs including side- and center-latch styles for use with both conventional IODP pipe and 6-5/8 inch pipe will be considered before final selection.

*Magnetic susceptibility sonde rebuild:* The USIO continued construction of two new magnetic susceptibility sonde (MSS)-B tools to replace the MSS-A. New susceptibility coil configurations were manufactured and tested, low- and high-resolution sensors were completed, and field testing of the MSS-B was scheduled to take place during Expedition 340.

*Multifunctional telemetry module:* The USIO's Multifunction Telemetry Module (MFTM), which was designed to transmit third-party tool downhole data back to the surface in real time, was deployed successfully with the DEBI-t during Expedition 336 to measure biomass on the borehole wall and borehole temperature. The DEBI-t was developed by scientists and engineers from the University of Southern California, the National Aeronautic and Space Administration Jet Propulsion Laboratory at the California Institute of Technology, and Photon Systems, Inc. Future deployments of the MFTM are planned in combination with other devices, including the Simple Cabled Instrument for Measuring In Situ Parameters (SCIMPI) and the Motion Decoupled Hydraulic Delivery System (MDHDS).

The SCIMPI is a collaborative effort between the USIO, University of Rhode Island, Woods Hole Oceanographic Institute, and Transcend Engineering & Technology, LLC, to develop a borehole observatory sensor system to capture in situ physical and hydrogeological properties data over long time periods. The MFTM will be used to communicate between the surface and the downhole SCIMPI system prior to long-term deployment. Testing of the SCIMPI system began in FY11 and will continue through FY12.

The MDHDS project is a collaborative development between the USIO, the University of Texas at Austin, Massachusetts Institute of Technology, and Mohr Engineering, wherein the MFTM will allow real-time monitoring of formation temperatures and pressures while the MDHDS penetrometer is decoupled from the motion of the drill string. At-sea deployment of the MDHDS MFTM is scheduled to take place during Expedition 342.

*Drilling sensor sub:* A three-phase project began in FY11 to finalize the development of the drilling sensor sub tool designed to measure drilling and coring parameters near the bit during operations, save the data in onboard memory, and wirelessly transmit the data to the

retrievable memory module, which is recovered with the core and downloaded on the surface. Diagnostic tests and tool calibration were scheduled for early FY12.

*Multisensor magnetometer module:* The USIO continued development of a third-party borehole magnetometer tool that will provide borehole and tool orientation data, continuous downhole records of formation magnetization surrounding the borehole, and measurements of the borehole field on three axes, allowing calculation of the full formation magnetization vector: inclination, declination, and total field intensity. The multisensor magnetometer tool will be capable of working in both strongly magnetized hard rock formations and in sediments with weaker magnetizations. Bench testing and test deployments are scheduled during FY12, with first expedition deployment targeted for early FY13.

## ENGINEERING DEVELOPMENT

### Offshore Technology Conference

Through personal interface, booth visuals, brochures, and other handouts, the IODP Engineering Development initiative was successfully promoted at the Offshore Technology Conference (OTC) held in Houston, Texas, May 2-5, 2011.

### IODP-MI Managed Projects (Third-Party)

*Motion Decoupled Hydraulic Delivery System (MDHDS):* System design and fabrication is proceeding by Mohr Engineering and Lamont Doherty Earth Observatory (LDEO). Full bench test of MDHDS, T2P, MFTM were conducted on January 2011. MDHDS team had several conference calls and discussed major concerns related to the modification of fishing neck, pulleys and stoppers which they indicated from January test results. Then the team made decisions to change length of fishing neck and placement of upper/lower stoppers on tool.

On June OTF meeting, USIO reported there is an option to have MDHDS at-sea testing at ODP Site 1073 in New Jersey on way transit to Newfoundland Sediment Drifts expedition and after non-IODP. This option will take 0.6 day transit and 2-3 days operations.

The team conducted a field tests with Full-System (combined with MFTM, ERS and T2P) at Schlumberger's testing hole in Sugarland on September 2011. There were several failures at the test and the team found some issues relating to MDHDS hydraulic releasing mechanism, backup method to retrieve MDHDS in case of emergency. The team reported that MDHDS is not sufficiently refined to justify a sea trial with this test result and need considerable bench testing and another integrated deployment. Next bench test for hydraulic releasing mechanism is scheduled on early to mid-December 2011. Due of delay on MDHDS sea trial, IODP-MI modified the contract (a one-year extension without additional-cost) to University of Texas.

*Simple Cabled Instruments for Measuring Properties InSitu (SCIMPI):* System designing and fabrication has completed in FY11 and waiting for sea trial on *JOIDES Resolution*.

SCIMPI has deployed in sea and tested full set of tools from R/V Endeavor on March 2011. Communications problems between the data logger and measurement modules below 150 meters immersion depth during the test were definitively traced to a defect in the wet-matable cable connector design. Cable manufacturer (Seacon Banter) remanufactured wet connect cable sections. Also, the team assembled entire SCIMPI array plus spares in June in the configuration detailed in the APL and deployed all in Narragansett Bay adjacent to the Bay Campus of URI on June. Communication and readings from all sensors in this wet test were

as anticipated and successful on eight of ten modules. One module systematically over-reported resistivity values and has been sent back to Transcendev for confirmation of the sensor calibration. A second module intermittently reported an error code used to indicate when it is in air (a nonconductive medium), the cause of which is being investigated.

OTF meeting on June discussed sea trial for SCIMPI on *JOIDES Resolution* in FY2013, possibly prior to Exp.341 S. SCIMPI team is planning to schedule a bench test at LDEO on or near November 2011 with Full-System (combined with MFTM, ERS and Schlumberger Cable) if possible. Then SCIMPI will be placed in long-term storage in URI until sea trial by *JOIDES Resolution*.

*Wireline Hydraulic Testing and Borehole Imaging Tool for Stress Measurements:* This new Engineering Development Proposal was reviewed on EDP #11 July 2010 and second reviewed on EDP #12 meeting on February 2011. This Wireline hydraulic testing and borehole imaging tool composed downhole pumping system, packers and sensors for fracture imaging and stress measurements. EDP recommended IODP-MI to do feasibility study on this project before full funding. Project proponent team started feasibility study under IODP-MI contract from April, 2011 and establish technical advisory group call "DRST International Technical Committee" for conduct feasibility study with several external reviewers. The first meeting of the committee was held on July in Tokyo, Japan to discuss detail of studies and system designing and fabrication planning. After the committee meeting, proponent team submitted project feasibility study report and draft proposal for system designing and fabrication to IODP-MI in September, and the report was reviewed by EDP. EDP provided positively consensus to IODP-MI which endorsed the project to move forward to next step. IODP-MI is now waiting proponent team to submit their final proposal includes SOW.

## CORE CURATION

### **Bremen Core Repository**

Bremen Core Repository (BCR) experienced another busy year, with the major activities including regular sampling for scientists' requests and adapting data from legacy cores, samples and sample requests into the DIS database system. The period was also characterized by numerous outreach activities and several prominent visitors. A total of 18,968 samples were taken at the BCR for 181 requests during this fiscal year (Table 1). We have processed a substantial number of sample requests for DSDP and older ODP cores (redistribution cores), and the total number of samples taken is still significant compared to the average over past years, especially considering the fact that there were no large sampling or science parties held during this fiscal year.

The new MARUM II building, which contains a 425 m<sup>2</sup> core reefer, opened in the spring of 2011. All non-IODP cores (University of Bremen Geosciences Department (GeoB) piston and gravity cores) are being moved out of the existing BCR reefer in the MARUM building to the new reefer, resulting in a greater capacity for us (for a total of about 270 km of IODP-format cores).

No new cores arrived at the BCR during this fiscal year. However, the cores from the IODP Expedition 325 "Great Barrier Reef Environmental Changes", because they were drilled in

the western Pacific, were shipped to the Kochi Core Center at the end of the moratorium year (in Aug-Sept 2011).

#### DSDP/ODP Core Redistribution Project

Although the actual transportation of cores for the core redistribution project was completed during FY09, the arrival of DSDP cores in Bremen brought with them a number of additional tasks. These have all been completed except for the ongoing project of correcting the deficiencies in the existing JANUS corelog database – that is, the basic core and section length data for a large portion of the DSDP core collection has numerous mistakes that need to be corrected by looking at all of the core photos and entering the correct section numbers and lengths into a table. BCR is still employing student workers to carry out this relatively long-term project, and so far 30 DSDP Legs have been completed and the tables for these legs have been sent to the database group at TAMU for review and update of the JANUS database. When this project is complete, the corrected values will also be uploaded into the DIS database to assure accuracy of the depth calculations for all of our sampling. Completion of this task is the only remaining work to be done for the core redistribution project. Student workers are continuing the project of updating the Janus Database corelog for inputting the correct section lengths of older DSDP legs.

#### **CDEX**

In FY11, there was an increase in the number of sample requesters who visited KCC to collect core samples for their research work. These visitors came from Australia, China, Japan, and the USA. About 2560 core sections recovered during the Expeditions 331 and 333 were safely stored in KCC, and the number of RMS (Routine Microbiological Sample) increased to 174.

#### Sample Requests

There were 66 sample requests for IODP Legacy cores received and processed; 56 of these requests were completed, while the rest were in various stages of processing. There were 17 requests received for IODP cores, and the first RMS sample request was received. After evaluating the request, sub-sampling of the requested RMS was conducted without thawing, and the sub-samples were shipped in frozen condition to the requesters. Two core sections from the IODP Expedition 322 sediment/basalt boundary were sent to the Nagoya City Science Museum for a special exhibition with the Earth Science theme. Sample requests are being regularly received from the researchers all over the world.

#### Chikyu onboard curation

Curation services were provided during IODP Expeditions 332 and 333. Four data requests for the former and 61 sample/data requests for the latter were received and summarized into Pre-Cruise Sampling Plan (PCSP). In addition, 44 sample/data requests were received for IODP Expedition 337, which was postponed due to mega-earthquake/tsunami that hit Japan just before the expedition. A total of 771 core sections from IODP Expedition 331, and 1790 core sections and 44 RMS from IODP Expedition 333 were received and stored in KCC. This brought the number of RMSs being curated in KCC to 174. A summary of these RMSs is available through the KCC website ([www.kochi-core.jp/rms/](http://www.kochi-core.jp/rms/)). The RMS and cuttings curation procedures were prepared in detail and submitted to the STP for review and approval of the same.

#### Sampling party

A sampling party for basement cores recovered during IODP Expedition 333 was organized in KCC. Five science party members, including EPM, conducted reexamination of certain

sections to verify the onboard VCD for these cores, and took 235 samples for 11 requests received during the expedition.

### Miscellaneous

Since the moratorium period of IODP Expedition 325 has passed, the cores collected during this expedition need to be transferred from BCR to KCC in October, 2011. Database, storage space and logistics- related preparations were completed for receiving this shipment of about 850 D-tubes from the BCR. Some of the Expedition 331 cores were collected by using aluminum core liners. However, highly corrosive nature of sediment began corroding the liner. Therefore, the Expedition 331 SAC recommended replacement of aluminum liners by plastic liners. This task of replacing liners of 136 core sections was successfully completed despite high H<sub>2</sub>S gas concentration in some of the sections. After holding two sampling parties, shrink-wrapping of the Expedition 323 cores was conducted over a period of about one year along with other curatorial activities.

Shrink-wrapping of all core sections (ca. 9140, Working and Archive Halves) was completed. To examine changes in core quality during prolonged storage of cores in relatively high temperature (20°C, air-conditioned room) conditions, an experiment has been started by using non-IODP core sections. A set of measurements is performed periodically and data will be summarized in ca. three years time. A new workstation has been set up in the KCC sampling room in order to increase efficiency of core sampling tasks. The workstation stores all tools required for sampling tasks, including a PC and label printer, all easily accessible from the sampler.

### **USIO**

The USIO provides services in support of IODP core sampling and curation of the core collection archived at the Gulf Coast Repository (GCR). During FY11, the USIO also established a new protocol for working with legacy cores and materials and worked with a thirdparty programmer to design a new database to replace the Sample Materials Curation System. The new Sample/Data Request System was completed, evaluated, and scheduled for release in early FY12. Several core legacy documentation projects continued throughout the year, including scanning of DSDP and ODP paper sample request files and thin section archive samples for accessibility via the database. The USIO also collected digital images of all working half sections that were pulled for sampling during the year and posted highresolution images on the web to show the extent of working half sampling to date.

## **DATA MANAGEMENT**

IODP-MI data management services in FY11 included a number of successful activities to provide access to IODP data, to re-new the public-facing data systems of IODP, and to prepare and plan for the transition to post-2013 IODP. IODP-MI manages the program-wide data systems, including Scientific Earth Drilling Information Service (SEDIS), Site Survey Database (SSDB), Proposal Database (PDB), Sample Materials Curation System (SMCS), Central Registry LDAP, the drilled sites database and map resources, and other systems. Among these, SEDIS, PDB, SMCS and the drilled sites map database received development effort to upgrade the systems. In FY11, IODP-MI also laid out plans for permanent archive of IODP data resources in order to engage Funding Agencies, IOs and other stakeholders. IODP-MI will continue permanent archive planning implementation in FY12 and FY13.

The SEDIS phase III RFP resulted in 3 contracts in order to utilize the unique specialties of each of the vendors selected. Completion of borehole logging web services was completed by LDEO in FY11, establishing vocabularies for all downhole measurement terminology, creating XML wrappers for the log files from all IOs, and creating ASCII resource end-points for the binary data files produced by logging instruments. The ASCII resource end-points for the logging web services allows researchers utilize logging data without the need for proprietary software for the binary (i.e., .dat or .hex) log files.

As part of the SEDIS III contract vocabulary and ontology for all core measurements data parameters was also developed in FY11. These vocabularies will be implemented within SEDIS to improve searches and queries by translating database parameter names into more common terms (e.g., GRA is define as a measurement of bulk density) and relating the terms used across the IOs' different databases. These vocabularies are also published separately to be used by any earth science data system programmed to incorporate IODP vocabularies. This contract, completed by INSTAAR, also produced XML wrappers for core photos, allowing the core photos to be served web services to service-enabled applications (e.g., CoreWall).

The third SEDIS III contract was extended until March 2012 in order to utilize deliverables from the other contracts. However, MARUM was able to deliver a beta version of the SEDIS Data Warehouse parameter query tool. This tool works by making all of the parameters from the data sets returned by a SEDIS search query-able in a Data Warehouse interface. The result is a single data set that contains all data matching the query criteria. Additional work on this contracted, to be completed by March 2012, includes implementing the vocabularies developed by LDEO and INSTAAR to improve the search functionality and query parameters for SEDIS.

SEDIS usage continued to increase in FY11. SEDIS was registered as a component in the Global Earth Observation System of Systems (GEOSS), an international inter-disciplinary data system. The SEDIS catalog currently consists of ~90,000 metadata records and ~26,000 publications metadata records. SEDIS applications will serve as a basis for IODP long term data and publications archives.

The SSDB contract with Scripps Institute of Oceanography (SIO) is in effect for FY11-13. SIO continued operation and maintenance of the SSDB. Issues such as management of time-consuming uploads, the portable SSDB-in-a-box for meeting support, and education of Site Survey Panel member on SSDB functionality are covered in the FY11-13 service agreement. The SSDB-in-a-box is maintained by IODP-MI and is synced to the production SSDB before each SSP/SCP meeting in order to provide a more efficient local copy of the SSDB data under review by the panel.

The Proposal Database was operated and maintained by IODP-MI during FY11. The upgrade to an enhanced Proposal Database system to support the new drilling proposal process, science themes, and drilling proposals for post-2013 scientific ocean drilling was mostly completed in FY11, with public launch for the April 2012 proposal submission period.

The SMCS system continues to be hosted by IODP-TAMU, with major re-engineering completed during FY11. The Sample Request Management system (SDRM) is faster and more user friendly and provides increased functionality for IOs, core repositories and sample allocation committees. The re-engineered SDRM accommodates spreadsheet import and export for ease of desktop data entry and sample request review processes. The SDRM

version 2 was completed by COL and will be launched in FY12 after thorough testing in FY11. IODP-MI also developed a framework for an upgraded Central Inventory (CI) of IODP sample materials in FY11. The framework is designed to allow synchronization with repository inventory systems and to improve the search interface for end users looking for IODP materials from any of the repositories. The updated CI will be completed, integrated with SDRM v2 and launched in FY12.

IODP-MI coordinated a meeting of the IODP Data Management Coordination group in FY11. This group includes technical representatives from all IOs and applications developers from the IODP scientific community (e.g., GeoMapApp, DBSeaBed, etc.). The meetings was used to coordinate plans and actions for SEDIS, SMCS and other Program-wide data systems. The meeting also served as a forum for discussion of long-term archiving of IODP data, publication and program documents.

Other data management activities conducted during FY11 included operation and maintenance of the OGC web services for mapping SEDIS metadata, regular updating of the IODP Google Earth database, hosting and maintenance of the IODP Central Registry LDAP system, development of the Taxonomic Names List database, and internal office IT resource operations and maintenance. Development of the IODP document repository system was started as the archive for IODP program documents (e.g., APPs, Annual Reports, SAS meeting summaries, etc.). The IODP document repository will be federated with the ODP document repository hosted by ODP so that the IODP and ODP documents repositories are cross- searchable.

## **PUBLICATIONS**

IODP-MI is responsible for production of the journal *Scientific Drilling* published in cooperation with ICDP, and has overall responsibility for publishing of IODP Scientific Prospectuses, Preliminary Reports, Proceedings Volumes and Technical Reports. IODP-MI works closely with the USIO-TAMU Publications Services Group, the IOs, and the co-Chief Scientists to produce program publications in a timely and professional manner. IODP-MI handles matters of publications policies in coordination with IOs and IODP Curators. Publications activities in FY11 included:

- 1) Publication of the program journal *Scientific Drilling*,
- 2) Oversight and coordination of program reports and proceedings,
- 3) Review and updating of publication policies and procedures, and
- 4) Planning and preparation permanent and accessible archive of IODP Publications

In FY11, IODP-MI published two volumes of the journal *Scientific Drilling*, Volumes 11 and 12, in March and September, respectively. Highlights of *Scientific Drilling* in FY11 include Science Reports from the Bering Sea, Wilkes Land, the Great Barrier Reef, and SAFOD. In FY11, *Scientific Drilling* also contained reports on drilling at Lake El'gygytyn, Dead Sea drilling, drilling 3.5-billion year old rocks at Berberton, South Africa, workshop reports related to mantle drilling, and a very timely report about 20-years of ice drilling at Lake Vostok in Antarctica.

Program publications published during FY11 include the following:

### **IODP Program Publications and Reports**

### IODP Proceedings Volumes

- Volume 313 of the Proceedings of the Integrated Ocean Drilling Program, Expedition 313, New Jersey Shallow Shelf
- Volume 324 of the Proceedings of the Integrated Ocean Drilling Program, Expedition 324, Shatsky Rise Formation
- Volume 322 of the Proceedings of the Integrated Ocean Drilling Program, Expedition 322, NanTroSEIZE Stage 2: Subduction Input
- Volume 319 of the Proceedings of the Integrated Ocean Drilling Program, Expedition 319, NanTroSEIZE Stage 2: Riser/Riserless Observatory 1
- Volume 317 of The Proceedings of the Integrated Ocean Drilling Program, Expedition 317, Canterbury Basin Sea Level
- Volume 323 of The Proceedings of the Integrated Ocean Drilling Program, Expeditions 323, Bering Sea Paleooceanography
- Volume 318 of The Proceedings of the Integrated Ocean Drilling Program, Expedition 318, Wilkes Land Glacial History
- Volume 331 of The Proceedings of the Integrated Ocean Drilling Program, Expedition 331, Deep Hot Biosphere
- Volume 327 of The Proceedings of the Integrated Ocean Drilling Program, Expedition 327, Juan de Fuca Ridge-Flank Hydrogeology
- Volume 325 of The Proceedings of the Integrated Ocean Drilling Program, Expedition 325, Great Barrier Reef Environmental Change

### Expedition Preliminary Reports

- Expedition 331 Preliminary Report, Deep Hot Biosphere
- Expedition 328 Cascadia subduction zone ACORK observatory
- Expedition 327 Preliminary Report, Juan de Fuca Ridge-Flank Hydrogeology
- Expedition 325 Preliminary Report, Great Barrier Reef Environmental Changes
- Expedition 326 Preliminary Report, NanTroSEIZE Stage 3: Plate Boundary Deep Riser: Top Hole Engineering
- Expedition 332 Preliminary Report, NanTroSEIZE Stage 2: Riserless Observatory
- Expedition 330 Preliminary Report, Louisville Seamount Trail
- Expedition 333 Preliminary Report, NanTroSEIZE Stage 2: Subduction Inputs 2 and Heat Flow
- Expedition 334 Preliminary Report, Costa Rica Seismogenesis Project (CRISP)
- Expedition 335 Preliminary Report, Superfast Spreading Rate Crust
- Expedition 329 Preliminary Report, South Pacific Gyre Subseafloor Life

### Scientific Prospectuses

- Expedition 337 Scientific Prospectus, Deep coalbed biosphere off Shimokita
- Expedition 333 Scientific Prospectus, NanTroSEIZE Stage 2: subduction inputs 2 and heat flow
- Expedition 335 Scientific Prospectus, Superfast Spreading Rate Crust 4
- Expedition 336 Scientific Prospectus, Mid-Atlantic Ridge Microbiology
- Expedition 332 Scientific Prospectus, NanTroSEIZE Stage 2: riserless observatory
- Expedition 331 Scientific Prospectus, Deep Hot Biosphere
- Expedition 339 Scientific Prospectus, Mediterranean Outflow
- Expedition 340 Scientific Prospectus, Lesser Antilles Volcanism and Landslides
- Expedition 341 Scientific Prospectus, Southern Alaska Margin

- Expedition 340T Scientific Prospectus, Atlantis Massif Oceanic Core Complex

#### Other Reports and Publications

- The Science Plan for the International Ocean Discovery Program 2013 – 2020
  - *Illuminating Earth's Past, Present and Future*
  - *Illuminating Earth's Past, Present and Future* short brochure
- Rapid Response Drilling for Tohoku Earthquake Detailed Planning Group report published and made available online at IODP.org

Up-to-date publications information, including links to all FY11 IODP publications can be found here: <http://www.iodp.org/scientific-publications/>

The bi-annual journal *Scientific Drilling* published jointly with the International Continental Scientific Drilling Program (ICDP) had print runs of approximately 5000 copies per volume. It was distributed to subscribers and at international scientific conferences such as AGU, EGU JpGU, AOGS, Goldschmidt and OTC. An electronic version of the journal is available for download from the website of both IODP and ICDP. In addition to unique, single subscribers, a large number of printed copies are sent as bulk subscriptions to IODP related institutions (e.g., Program Member Offices) for a most cost effective distribution. IODP-MI developed CrossRef Cited-by-linking services to IODP published reports and Proceedings in FY11 and is working with USIO-TAMU to test the initial submissions. The cited-by-linking services have been implemented for *Scientific Drilling* and changes at CrossRef made it available to IODP reports and Proceedings.

IODP-MI coordinated multiple meetings with IODP-TAMU Publications Services Group during FY11. The close communication and coordination with IODP-TAMU Publications group has been helpful in dealing with a number of publication extension requests, in responding to delays in some Scientific Prospectuses and Preliminary Reports, in planning for Cited-by-linking implementation and in reviewing and updating IODP Publications Policy.

IODP-MI began review of the electronic format of IODP publications in FY10, at the request of IODP-TAMU. This issue was presented to SAS for discussion in FY11 and will be followed up with additional SAS input in FY12. Under review is the cost/benefit of both HTML and PDF versions of IODP publications. No changes for these electronic publications formats are planned for FY11, but recommendations will be prepared for the post-2013 scientific ocean drilling program.

IODP-MI coordinated a review and updating of IODP Depth Scale Terminology in FY10. An IODP Task Force was convened to develop a version 2 of the IODP Depth Scale Terminology Document and to develop Guidelines for Use of the IODP Depth Scales Terminology in IODP Publications and Reports. The updated depth scale terminologies and guidelines for use in publications were released for community review and comment, and were reviewed and approved by SAS in FY11. The Depth Scale Terminologies v.2 and publications guidelines are now being implement by Expedition Science Parties and in IODP publications.

## OUTREACH

IODP-MI Outreach and Communications activities in FY11 included media relations, video production, new IODP website development and current site updates, graphic and publication development with reaching the target audiences; the science community, Lead Agencies, IOs and PMOs, educators and students, the general public and very importantly, the media.

IODP-MI outreach planned and coordinated 2 press conferences. The web-streamed press conference on New Science Plan achieved results in producing a slot in BBC radio program,. The conference was later covered such as by European newspapers, on line media and blogs. IODP press conference held at EGU resulted in numerous articles in scientific publications and international media including BBC News and Eos.

IODP-MI outreach issued several press releases and tracked the success of IODP news coverage. The news stories were placed in notable media, both on printed and online outlets with covering each expedition. Significant scientific findings of the program and highlights of FY11 were also released.

Re-engineering of content management system (CMS) to update the backend of the IODP.org website was re-scheduled for completion in FY12. This project enables to reduce administrative cost, increase efficiency of daily updating and creating much more user friendly website. The goal of this project is IODP.org website will be applied as website for the 2013 Program.

IODP-MI outreach continued updating and maintaining of the iodp website. The contents were enriched with videos, news coverage, expedition information and calendar listings. IODP-MI Outreach and Communications manager handled inquiries via website from scientists, educators, students, the industries, the general public and the media aiming to assist in increasing their understanding about the program wide.

IODP-MI outreach developed 2 videos during FY11 including INVEST and “ECORD- Exploring the Earth under the Sea”. They were presented at IODP exhibitions at internal national conferences and available on IODP and IOs websites.

IODP-MI outreach planned and implemented exhibition participation at international scientific conferences and Town Hall Meetings. AGU Town Hall Meeting attracted over 260 participants. Program agenda included updates by representatives from Lead Agencies and presentation by 4 young scientists with expertise in scientific themes in NSP.

Details and other FY11 IODP-MI outreach and communications activities included:

### Media Relations

- IODP-MI outreach handled media inquiries and coordinated interviews by major international media such as Nature, BBC, Eos, and national and on line media. “50 years of scientific ocean drilling” (Nature) was one of highlighted outcomes.
- IODP-MI outreach issued press releases on expeditions and program activities as follows:
  - Scientists Study Earthquake Triggers in Pacific Ocean

- Heavy Metal Meets Hard Rock: Battling through the Ocean Crust's Hardest Rocks
  - Scientists Set Course for Next Decade of Scientific Ocean
  - Presentation of 2013-2023 Science Plan Webcast
  - Significant Role of Oceans in Onset of Ancient Global Cooling
  - Ancient Undersea Volcanoes Yield Clues to Earth Dynamics
- IODP-MI supported IOs media relations and TV program development including IODP DEEP HOT BIOSPHERE expedition and mechanize of earthquakes

#### Outreach to Scientists

- IODP-MI outreach organized IODP booths as well as a joint booth with ICDP at the international conferences including AGU, EGU, OTC, JPGU, AOGS, Goldschmidt and 3P Arctic
- IODP-MI outreach produced and submitted advertisements to *Eos* for publication on Call for Proposals, Call for Applications, Call for Workshops and IODP Town Hall Meeting at AGU Fall Meeting

#### Community Coordination

- Outreach Task Force Meeting in September in Tokyo was coordinated, set an agenda and acted as a chair by IODP-MI Outreach and Communications Manager
- IODP-MI outreach coordinated with communications and outreach specialists at IOs and developed informational materials for the science community, the media and the public
- IODP-MI outreach supported IOs and PMOs on media inquiries, expedition-related activities, educational and training programs for teachers and young scientists, and general public activities.
- Outreach supported IODP workshops and scientific conferences such as GAC-MAC 2011 and IUGG

#### Design and Publications

- IODP-16 page brochures, flyer on New Program, IODP 2011 calendars, incentive goods were developed and distributed at the international conferences and to the science community, Lead Agencies, IOs, PMOs, media and the public. The publications were edited and reprinted a few times in FY11 to reflect program updates.
- 4 posters about engineering development and technical achievements were developed under cooperation with IOs. They were presented at IODP booth in OTC to attract the industry and increase understanding about the program
- Flyer on SEDIS was developed and JR and Chikyu fact sheets were updated and reprinted for exhibition distribution

## **IODP-MI ANNUAL REPORT DISTRIBUTION LIST**

D. Conover, NSF	I. Ridley, NSF
J. Allan, NSF	M. Rouse, NSF
T. Janecek, NSF	R. Batiza, NSF

## **Appendix 1**

Financial report

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# INTEGRATED OCEAN DRILLING PROGRAM MANAGEMENT INTERNATIONAL



## Appendix 1

1 October 2010 – 30 September 2011

Annual Report

Contract No. NSF OCE 0432224

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**IODP-MI Statement for the Quarter Ended September 30, 2011**

**NSF CONTRACT SUMMARY**

Major Cost Category	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
<b>Management &amp; Administration</b>	\$ 5,671,375.00	\$ 1,537,748.00	\$ 4,923,480.00	\$ 87,615.00	\$ -	\$ 660,280.00
<b>Technical, Engineering &amp; Science Support</b>	\$ 5,492,732.00	\$ 471,871.00	\$ 4,496,575.00	\$ 535,368.00	\$ -	\$ 460,789.00
<b>Engineering Development</b>	\$ 1,009,131.00	\$ 374,036.00	\$ 796,438.00	\$ 220,993.00	\$ -	\$ (8,300.00)
<b>Core Curation</b>	\$ 1,458,621.00	\$ 304,744.43	\$ 1,229,515.16	\$ 78,526.00	\$ -	\$ 150,579.84
<b>Data Management</b>	\$ 2,990,470.00	\$ 709,752.00	\$ 2,291,582.00	\$ 255,091.00	\$ -	\$ 443,797.00
<b>Publications</b>	\$ 1,687,028.00	\$ 379,507.00	\$ 1,520,319.00	\$ 30,728.00	\$ -	\$ 135,981.00
<b>Logging</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Outreach</b>	\$ 1,125,785.00	\$ 262,820.00	\$ 929,773.00	\$ 222,868.00	\$ -	\$ (26,856.00)
<b>NSF Contract Total</b>	\$ 19,435,142.00	\$ 4,040,478.43	\$ 16,187,682.16	\$ 1,431,189.00	\$ -	\$ 1,816,270.84

**Note: The FY11 NSF Contract Operating Budget includes revised FY11 APP (\$17,852,950) plus FY10 obligated carryforward (\$1,582,192).**

**IODP-MI Statement for the Quarter Ended September 30, 2011**

IODP-MI DC	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
Management & Administration	\$ 2,444,042	\$ 860,948	\$ 2,294,840	\$ 8,625	\$ -	\$ 140,577
Technical, Engineering & Science Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Engineering Development	\$ 839,006	\$ 353,739	\$ 721,675	\$ 123,247		\$ (5,916)
Core Curation	\$ -			\$ -	\$ -	\$ -
Data Management	\$ 413,627	\$ 167,389	\$ 220,877	\$ 117,725		\$ 75,025
Publications	\$ 8,100	\$ 30	\$ 1,884	\$ -	\$ -	\$ 6,216
Logging	\$ -			\$ -	\$ -	\$ -
Outreach	\$ 239,500	\$ 67,273	\$ 198,695	\$ 147,029	\$ -	\$ (106,224)
<b>Total</b>	\$ 3,944,275	\$ 1,449,379	\$ 3,437,971	\$ 396,626	\$ -	\$ 109,678

**IODP-MI Statement for the Quarter Ended September 30, 2011**

IODP-MI Japan	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
<b>Management &amp; Administration</b>	\$ 1,325,343.00	\$ 274,554.00	\$ 1,088,611.00	\$ -	\$ -	\$ 236,732.00
<b>Technical, Engineering &amp; Science Support</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Engineering Development</b>		\$ 2,385.00	\$ 2,385.00			\$ (2,385.00)
<b>Core Curation</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Data Management</b>	\$ 186,615.00	\$ 50,914.00	\$ 131,113.00	\$ -	\$ -	\$ 55,502.00
<b>Publications</b>	\$ 235,948.00	\$ 59,804.00	\$ 196,674.00	\$ -	\$ -	\$ 39,274.00
<b>Logging</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Outreach</b>	\$ 474,671.00	\$ 70,852.00	\$ 383,768.00	\$ -	\$ -	\$ 90,903.00
<b>Total</b>	\$ 2,222,577.00	\$ 458,509.00	\$ 1,802,551.00	\$ -	\$ -	\$ 420,026.00

**IODP-MI Statement for the Quarter Ended September 30, 2011**

COL	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
Management & Administration	\$ 1,120,535.00	\$ 255,523.00	\$ 950,662.00	\$ 66,773.00	\$ -	\$ 103,100.00
Technical, Engineering & Science Support	\$ 287,694.00	\$ 102,560.00	\$ 262,748.00	\$ 9,685.00	\$ -	\$ 15,261.00
Engineering Development	\$ 170,125.00	\$ 17,912.00	\$ 72,378.00	\$ 97,746.00	\$ -	\$ 1.00
Core Curation	\$ 419,997.00	\$ 85,313.00	\$ 331,103.00	\$ 72,032.00	\$ -	\$ 16,862.00
Data Management	\$ 1,056,242.00	\$ 253,280.00	\$ 905,860.00	\$ 124,751.00	\$ -	\$ 25,631.00
Publications	\$ 1,442,980.00	\$ 319,673.00	\$ 1,321,761.00	\$ 30,728.00	\$ -	\$ 90,491.00
Logging	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outreach	\$ 71,977.00	\$ 15,059.00	\$ 36,159.00	\$ -	\$ -	\$ 35,818.00
<b>Total</b>	\$ 4,569,550.00	\$ 1,049,320.00	\$ 3,880,671.00	\$ 401,715.00	\$ -	\$ 287,164.00

**IODP-MI Statement for the Quarter Ended September 30, 2011**

CDEX	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
<b>Management &amp; Administration</b>	\$ 781,455.00	\$ 146,723.00	\$ 589,367.00	\$ 12,217.00		\$ 179,871.00
<b>Technical, Engineering &amp; Science Support</b>	\$ 5,205,038.00	\$ 369,311.00	\$ 4,233,827.00	\$ 525,683.00		\$ 445,528.00
<b>Engineering Development</b>	\$ -	\$ -	\$ -	\$ -		
<b>Core Curation</b>	\$ 684,845.00	\$ 118,845.00	\$ 587,891.00	\$ 6,494.00		\$ 90,460.00
<b>Data Management</b>	\$ 1,054,008.00	\$ 173,711.00	\$ 767,072.00	\$ -		\$ 286,936.00
<b>Publications</b>	\$ -	\$ -	\$ -	\$ -		\$ -
<b>Logging</b>	\$ -	\$ -	\$ -	\$ -		\$ -
<b>Outreach</b>	\$ 339,637.00	\$ 109,636.00	\$ 311,151.00	\$ 75,839.00		\$ (47,353.00)
<b>Total</b>	\$ 8,064,983.00	\$ 918,226.00	\$ 6,489,308.00	\$ 620,233.00	\$ -	\$ 955,442.00

**IODP-MI Statement for the Quarter Ended September 30, 2011**

Bremen	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
Management & Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Technical, Engineering & Science Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Engineering Development						
Core Curation	\$ 353,779.00	\$ 100,586.43	\$ 310,521.16	\$ -		\$ 43,257.84
Data Management				\$ -	\$ -	\$ -
Publications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Logging	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outreach	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>	\$ 353,779.00	\$ 100,586.43	\$ 310,521.16	\$ -	\$ -	\$ 43,257.84

**IODP-MI Statement for the Quarter Ended September 30, 2011**

UCSD/Scripps	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
Management & Administration	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Technical, Engineering & Science Support	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Engineering Development						
Core Curation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Data Management	\$ 279,978.00	\$ 64,458.00	\$ 266,660.00	\$ 12,615.00		\$ 703.00
Publications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Logging	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outreach	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>	\$ 279,978.00	\$ 64,458.00	\$ 266,660.00	\$ 12,615.00	\$ -	\$ 703.00

**IODP SOC Activity for the Quarter Ended September 30, 2011**

**IODP SOC SUMMARY**

Major Cost Category	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
Management & Administration	\$ 6,537,889.00	\$ 1,811,335.20	\$ 5,595,798.22	\$ 287,040.00	\$ -	\$ 655,050.78
Technical, Engineering & Science Support	\$ 6,512,663.00	\$ 591,482.68	\$ 4,940,494.32	\$ 1,086,993.00	\$ -	\$ 485,175.68
Engineering Development	\$ 1,009,131.00	\$ 374,036.00	\$ 796,438.00	\$ 220,993.00	\$ -	\$ (8,300.00)
Core Curation	\$ 1,537,032.00	\$ 343,944.43	\$ 1,288,315.16	\$ 98,137.00	\$ -	\$ 150,579.84
Data Management	\$ 3,388,455.00	\$ 779,300.03	\$ 2,452,192.22	\$ 449,341.00	\$ -	\$ 486,921.78
Publications	\$ 1,687,028.00	\$ 379,507.00	\$ 1,520,319.00	\$ 30,728.00	\$ -	\$ 135,981.00
Logging	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outreach	\$ 1,286,985.00	\$ 314,858.78	\$ 1,031,122.12	\$ 238,068.00	\$ -	\$ 17,794.88
<b>IODP SOC Total</b>	<b>\$ 21,959,183.00</b>	<b>\$ 4,594,464.12</b>	<b>\$ 17,624,679.04</b>	<b>\$ 2,411,300.00</b>	<b>\$ -</b>	<b>\$ 1,923,203.96</b>

**Note: The IODP SOC Summary includes IODP-MI's NSF Contract plus the ESO SOC activity. ESO's SOC activity is reported for information purposes only. ESO's FY11 APP Budget is funded directly through EMA.**

**IODP SOC Activity for the Quarter Ended September 30, 2011**

ESO	Operating Budget FY 2011	Expenditure		Committed	Projected	Variance
		QTD	YTD			
Management & Administration	\$ 866,514.00	\$ 273,587.20	\$ 672,318.22	\$ 199,425.00		\$ (5,229.22)
Technical, Engineering & Science Support	\$ 1,019,931.00	\$ 119,611.68	\$ 443,919.32	\$ 551,625.00		\$ 24,386.68
Engineering Development	\$ -	\$ -		\$ -	\$ -	
Core Curation	\$ 78,411.00	\$ 39,200.00	\$ 58,800.00	\$ 19,611.00		\$ -
Data Management	\$ 397,985.00	\$ 69,548.03	\$ 160,610.22	\$ 194,250.00		\$ 43,124.78
Publications	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Logging	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Outreach	\$ 161,200.00	\$ 52,038.78	\$ 101,349.12	\$ 15,200.00		\$ 44,650.88
<b>Total</b>	\$ 2,524,041.00	\$ 553,985.69	\$ 1,436,996.88	\$ 980,111.00	\$ -	\$ 106,933.12

Note: ESO's SOC activity is reported for information purposes only. ESO's FY11 APP Budget is funded directly through EMA.