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Annual Program Plan 2013

Integrated Ocean Drilling Program



IODP

INTEGRATED OCEAN
DRILLING PROGRAM

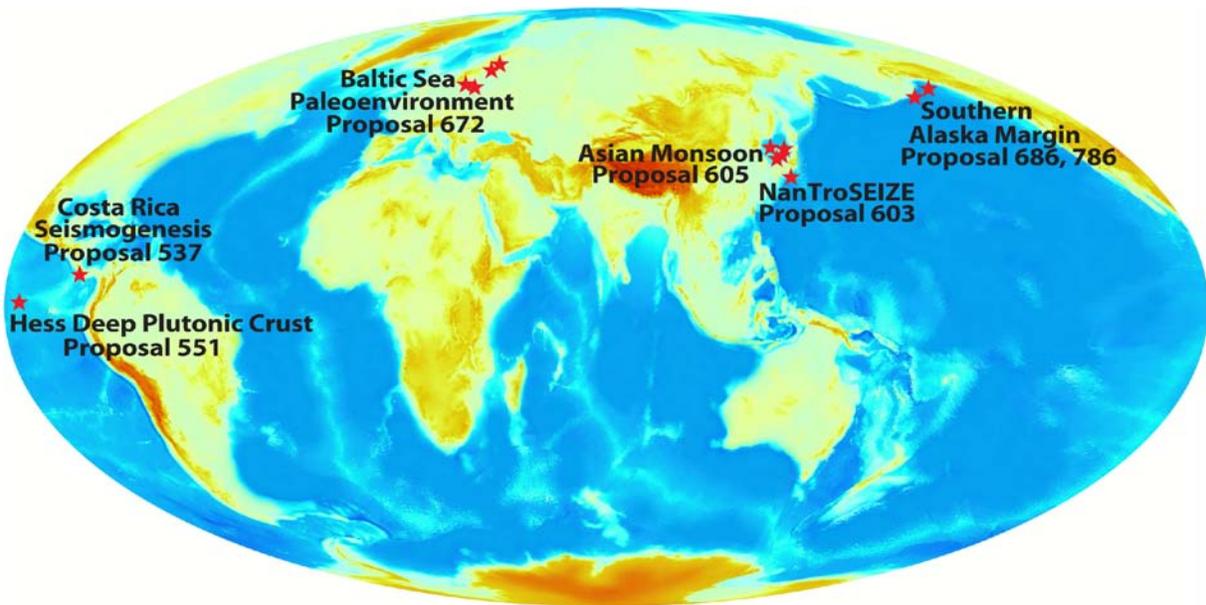


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1 Introduction

The Integrated Ocean Drilling Program (IODP) is a ten-year international partnership to explore Earth's history, structure, chemistry, and dynamics as recorded in ocean sediments and the uppermost oceanic lithosphere. The IODP advances understanding of Earth's environmental conditions and climate history, plate tectonic processes, Earth's crustal structure and composition, life in the ancient oceans, and a vast contemporary seafloor biosphere. Through expeditions carried out on multiple drilling platforms, IODP retrieves sediment and rock samples (cores), provides shipboard and shore-based facilities to study samples, obtains valuable downhole geophysical and geochemical measurements (logging/petrophysics), provides opportunities for special experiments (such as seafloor and subseafloor observatories) to determine and monitor *in-situ* conditions beneath the seafloor. IODP coordinates the solicitation and review of drilling proposals in accordance with the priorities established in the IODP Science Plan *Earth Oceans, and Life*, manages physical samples and meta-data from IODP expeditions, produces publications of expedition outcomes, and conducts outreach activities to disseminate the program's major scientific findings.

IODP is funded by Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the U.S. National Science Foundation (NSF) as Lead Agencies; by the European Consortium for Ocean Research Drilling (ECORD); the People's Republic of China Ministry of Science and Technology (MOST); Korea Institute of Geoscience and Mineral Resources of the Republic of Korea (KIGAM); the Ministry of Earth Sciences of India (MoES), and the Australia-New Zealand IODP Consortium (ANZIC). The program is established by Memoranda of Understanding among these entities and is governed by an IODP Council composed of their representatives. Integrated program management is provided by a central management organization, IODP Management International (IODP-MI), a non-profit corporation registered in Delaware, USA, through contract OCE-0432224 with the U.S. National Science Foundation's Directorate of Geosciences, Division of Ocean Sciences (NSF/GEO/OCE).

This Annual Program Plan (APP) for Fiscal Year 2013 (FY2013) presented by IODP-MI lays out the work plan (tasks) and budget proposed for the final year of the 10-year contract. Facing both the end of the ten-year agreement for IODP and the desire to continue geoscience research with ocean drilling platforms beyond FY2013, the Lead Agencies are in discussion on how a future program might operate. Traditionally, IODP-MI has presented the Annual Program Plan (APP) in seven Work Breakdown Elements (WBE): Management and Administration; Technical, Engineering, and Science Support; Engineering Development; Core Curation; Data Management; Publications; and Outreach. This WBE structure is maintained in this final year plan, during which expeditions on multiple drilling platforms will be carried out. Additionally, a transition strategy is included in relevant WBEs to indicate how continuing tasks in that area will be handed over to other entities beginning October 1, 2013.

The FY2012 expedition summary is described in Section 12 of this APP. Seven scientific expeditions carried out on all three platforms are planned during FY2013. *JOIDES Resolution* (JR) will conduct four scientific expeditions and one instrument test deployment, estimated at 30 weeks of operation. As

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explained in Appendix B, the JR expeditions address the science themes of seismogenesis (Expedition 344: Costa Rica Seismogenesis Project 2), magmatic accretion and ridge hydrothermal processes (Expedition 345: Hess Deep Plutonic Crust), and glacial erosion and its effects on a continental margin (Expedition 341: Southern Alaska Margin Tectonics, Climate, and Sedimentation), and tectonically induced environmental changes (Expedition 346: Asian Monsoon). The Simple Cabled Instrument for Measuring Parameters in Situ (SCIMPI) will be test-deployed in the Cascadia Margin. As discussed in Appendix C, *Chikyu* will continue the study of the Nankai Trough Seismogenic Zone with Expedition 338, the second expedition of NanTroSEIZE Stage 3, which will sample and log the interior of the accretionary prism beneath the Kumano forearc basin, and Expedition 348, which will aim to penetrate the mega-splay fault (extending into FY2014). *Chikyu* expeditions will operate for an estimated 19 weeks during FY2013. A mission-specific platform will carry out Expedition 347, Baltic Sea Paleoenvironment, which will study climate and sea level dynamics since Marine Isotopic Stage (MIS) 5 as inferred from sedimentary record in the Baltic Sea Basin.

2 Budget Summary

In response to written fiscal guidance provided by the Lead Agencies dated 16 May 2012, this Program Plan budget identifies a total program cost of \$167,452,732 for FY2013 (see Tables APP-1, APP-2 and APP-3). Of this cost, 11% is Science Operation Costs (SOCs) and the remaining 89% is Platform Operation Costs (POCs). SOCs and POCs are originally defined in Annex I of the MOU between the Lead Agencies, NSF and MEXT. Following guidance from the Lead Agencies in recent program years, the Operational SOC of USIO as defined by NSF in October 2007 and was effective for FY08-10 is categorized as POC to simplify budgetary accounting and provide budget clarity consistent with contractual funding. Table APP-4 is the summary of IODP-MI Contract Budget for FY2013. It is noted that the Lead Agency guidance for FY2013 requested a budget for IODP integrative activities that is only 75% of the equivalent FY2012 budget. Therefore, this APP proposes strict screening and prioritization on activities with a view to enable effective, seamless transition to the next phase.

	IODP-MI	IODP-MI Operators & Subcontractors				Total
		USIO	CDEX	ESO	Bremen	
SOCs	3,677,159	2,991,353	6,999,475	3,744,229	305,147	\$17,717,363
POCs	-	67,242,567	76,928,125	5,564,677	-	\$149,735,369
Total	\$3,677,159	\$70,233,920	\$83,927,600	\$9,308,906	\$305,147	\$167,452,732

Table APP- 1: Summary IODP Budget for FY2013

Description	IODP-MI	USIO	CDEX	ESO	Bremen	Total
Management and Administration	2,834,705	541,691	759,583	730,787	-	\$ 4,866,766
Technical, Engineering and Science Support	-	-	5,495,866	2,452,758	-	\$ 7,948,624
Engineering Development	-	-	-	-	-	\$ -
Core Curation	-	388,738	387,900	73,535	305,147	\$ 1,155,320
Data Management	526,592	771,059	356,127	367,649	-	\$ 2,021,427
Publications	114,426	1,289,865	-	-	-	\$ 1,404,291
Outreach	201,436	-	-	119,500	-	\$ 320,936
Total	\$ 3,677,159	\$ 2,991,353	\$ 6,999,475	\$ 3,744,229	\$ 305,147	\$ 17,717,363

Table APP- 2: SOC Budget Summary for FY2013

Description	IODP-MI	USIO	CDEX	ESO	Bremen	Total
Management and Administration	-	3,954,364	885,092	235,470	-	\$ 5,074,926
Technical, Engineering and Science Support	-	60,545,996	76,028,032	5,329,208	-	\$ 141,903,236
Engineering Development	-	99,750	-	-	-	\$ 99,750
Core Curation	-	133,937	15,000	-	-	\$ 148,937
Data Management	-	2,423,680	-	-	-	\$ 2,423,680
Publications	-	84,840	-	-	-	\$ 84,840
Outreach	-	-	-	-	-	\$ -
Total	\$ -	\$ 67,242,567	\$ 76,928,125	\$ 5,564,677	\$ -	\$ 149,735,369

Table APP- 3: POC Budget Summary for FY2013

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Description	IODP-MI	USIO	CDEX	Bremen	Total
Management and Administration	2,834,705	541,691	759,583	-	\$ 4,135,979
Technical, Engineering and Science Support	-	-	5,495,866	-	\$ 5,495,866
Engineering Development	-	-	-	-	\$ -
Core Curation	-	388,738	387,900	305,147	\$ 1,081,785
Data Management	526,592	771,059	356,127	-	\$ 1,653,778
Publications	114,426	1,289,865	-	-	\$ 1,404,291
Outreach	201,436	-	-	-	\$ 201,436
Total	\$ 3,677,159	\$ 2,991,353	\$ 6,999,475	\$ 305,147	\$ 13,973,134

Table APP- 4: IODP-MI Contract Budget Summary for FY2013

IODP-MI's budget is \$3,677,159 (100% SOC), representing a decrease of 36% from FY2012. This includes the costs for providing necessary integration, coordination, and central management functions for the integrated program. IODP-MI maintains two offices in Japan and the USA. The Tokyo Office, located on the Etchujima campus of Tokyo University of Marine Science and Technology (TUMSAT), houses the headquarters function combining the science planning and operations management. A Japanese corporation *Ippan Shadan Hojin* (General Corporation) IODP-MI, hereinafter referred to as ISHI, provides the legal framework for business operations in Japan. The Washington DC Office provides the accounting and contracting functions of IODP-MI. In FY2013, the IODP-MI budget includes costs in Management and Administration (M&A), Data Management, Publications, and Outreach IODP-MI activities are described in detail in **Appendix A**.

The **USIO** budget is \$70,233,920 (4% SOC; 96% POC). The USIO SOC budget is \$2,991,353, representing a decrease of 29% from FY2012, including costs for Management and Administration (M&A), Core Curation, Data Management, and Publications. The details of the USIO activities are described in **Appendix B**.

The **CDEX** budget is \$83,927,600 (8% SOC; 92% POC). The CDEX SOC budget is \$6,999,475 representing a decrease of 30% from FY2012, including costs for Management and Administration (M&A), Technical, Engineering and Science Support (TESS), Core Curation, and Data Management. The details of the CDEX activities are described in **Appendix C**.

The **ESO** budget is directly funded through **EMA**. The ESO budget is \$9,308,906(40% SOC, 60% POC). The ESO SOC of \$3,744,229 includes support for Expedition 347 as well as associated costs for Management and Administration (M&A), Technical, Engineering and Science Support (TESS), Core Curation, Data Management, and Outreach. The details of the ESO activities are described in **Appendix D**.

The University of Bremen Core Repository budget is \$305,147 (100% SOC), representing a decrease of 12% from FY2012. These funds are primarily for personnel and operating costs associated with IODP/ODP core sampling and core archiving operations separated from ESO Core Curation budget. The details of the BCR activities are described in **Appendix E**.

3 Program Structure

The program’s organizational structure is summarized in [Figure APP-1](#). In addition to the IODP members that comprise the governing IODP Council, the IODP operations are based on three structural elements: the Central Management Organization, IODP Management International; the three Implementing Organizations; and the Science Advisory Structure (SAS), comprising scientists, engineers, and technologists designated by IODP member organizations.

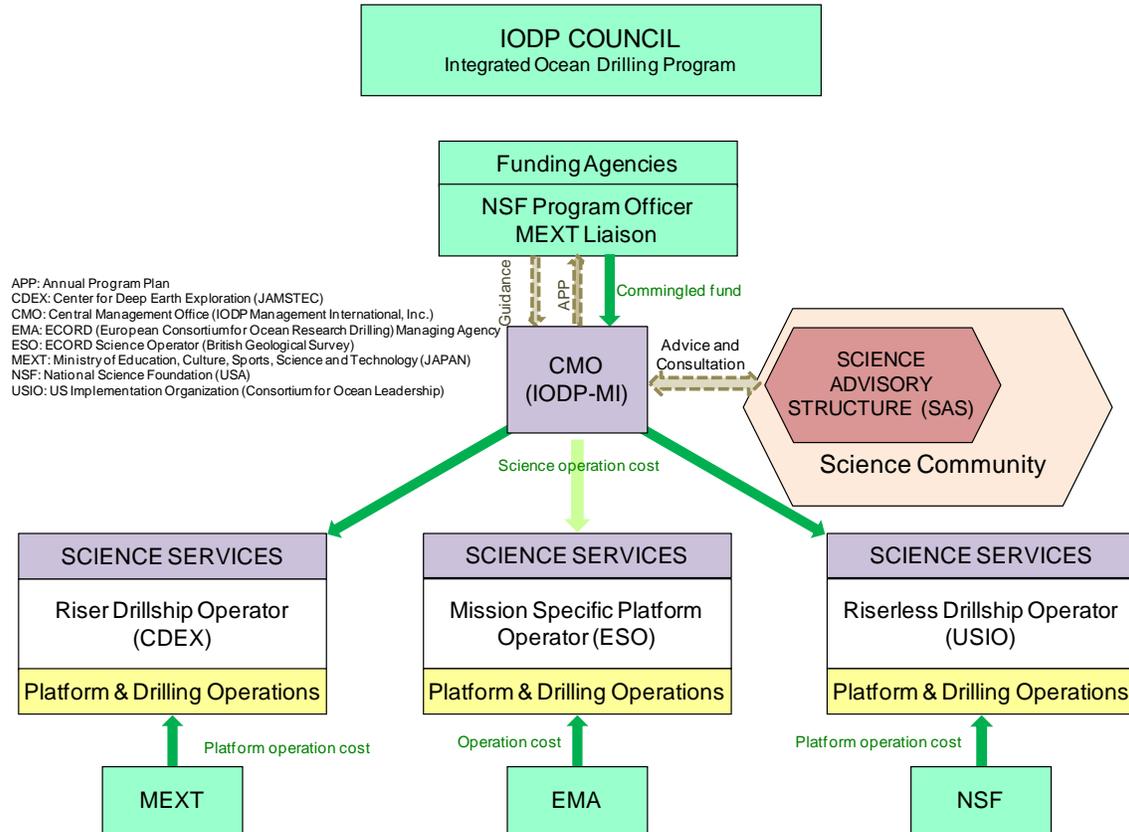


Figure APP-1: IODP Program Management Structure

According to the principles upon which the program was founded, program costs are defined as either Science Operating Costs (SOCs) or Program Operating Costs (POCs). Funds for Science Operations Costs (SOCs) are collected from IODP members by the US NSF and provided through contract to IODP-MI, which in turn distributes them to the Implementing Organizations and other subcontractors according to the budgets outlined in the APP. Platform Operations Costs (POCs), which represent far larger costs, are supplied directly to the IOs from the funding agencies of the countries or consortia responsible for the IODP drilling platforms. (In a deviation from earlier program years, the actual flow of funds for SOC vessel costs (as opposed to integrative activities) to the US Implementing Organization is now directly from the US NSF, but the USIO’s SOC operation activities remain under the management umbrella of IODP-MI. Similarly, SOC for ESO is provided directly through EMA.)

The IODP Council is the forum in which the sponsoring financial partners (IODP members) fund and guide the program. Currently, IODP members are: the U.S.A. represented by the National Science Foundation (NSF); Japan, as represented by the Ministry of Education, Culture, Sports, Science, and

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Technology (MEXT); the European Consortium for Ocean Drilling (ECORD) as represented by the ECORD Management Agency (EMA); the People's Republic of China as represented by the Ministry of Science and Technology (MOST); the Korea Institute of Geoscience and Mineral Resources (KIGAM); India as represented by the Ministry of Earth Sciences of India (MoES); and the Australia-New Zealand IODP Consortium (ANZIC). The NSF and MEXT are designated as Lead Agencies; EMA is a Contributing Member; and MOST, KIGAM, MoES, and ANZIC are Associate Members.

While not an integral part of this annual program plan and budget, each IODP member has a national office or program that coordinates the participation of their nationally affiliated scientists in the IODP. These are referred to as the Program Member Offices (for example, USSSP in the US and J-DESC in Japan). Among other responsibilities, the PMOs nominate members of the Science Advisory Structure, expedition chief scientists, and science party members and financially support them to attend meetings and work on expeditions. IODP-MI maintains a liaison function with the PMOs.

3.1 IODP Management International

A Central Management Office (CMO) for IODP was established at the beginning of the the program to develop and manage IODP science operations, implementation plans, and outreach activities on a yearly basis. The central management functions are provided by IODP Management International through its 10-year contract with NSF. In this role, IODP-MI supports the deliberations of the Science Advisory Structure (SAS), receives advice and recommendations from SAS on scientific priorities and plans, manages the proposal submission and review process, requests responsive plans from the IOs, and works with IOs and the SAS to produce an integrated Annual Program Plan (APP) detailing the annual work plan and budget. Once the APP is approved and funded, IODP-MI is responsible for its successful implementation, coordinating all science operations and managing any deviations resulting from drilling conditions, fiscal changes, or other developments, providing all integrated program functions, and complying with all contractual terms and conditions. A more comprehensive description of the duties of IODP-MI is contained in Appendix A.

The Annual Program Plan is expected to be consistent with budget guidance provided to IODP-MI by the Lead Agencies. IODP-MI submits the program's Annual Program Plan to the Science Implementation and Policy Committee (SIPCOM) of the SAS and a committee of IODP-MI Board of Governors (BoG) for review and approval prior to consideration by the IODP-MI BoG and submission to the Lead Agencies. The NSF is responsible for contractual approval of the Annual Program Plan (APP) in consultation with MEXT. Any significant changes in the approved Annual Program Plan (for example, a change in the schedule or scope of a drilling expedition) are to be considered and approved by IODP-MI and the Lead Agencies prior to implementation, in consultation with the SAS and the IOs.

3.2 Implementing Organizations (IOs)

Scientific expeditions are accomplished on three distinct drilling platforms funded by IODP members USA, Japan, and ECORD and operated by Implementing Organizations (IOs). These platforms and Implementing Organizations are:

- *JOIDES Resolution*, operated by the US Implementing Organization (USIO)

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- *Chikyu*, operated by JAMSTEC's Center for Deep Earth Exploration (CDEX)
- Mission-specific platforms (MSP), operated by the ECORD Science Operator (ESO).

Conventional (riserless) drilling capability is supplied by the NSF through a contract to the USIO, which consists of Consortium for Ocean Leadership as the prime contractor and overall manager; Texas A&M University (TAMU), the subcontractor that operates the *JOIDES Resolution* and provides associated services and functions such as expedition staffing, logistics, program-specific engineering development and operations, shipboard laboratories, curation, and distribution of core samples and data; and Lamont-Doherty Earth Observatory (LDEO) of Columbia University, responsible for shipboard geophysical and geochemical logging services, and the acquisition, processing and interpretation of logging measurements. Details of the USIO and its operational plans for FY2013 are presented in **Appendix B**.

Riser-equipped drilling capability, by way of the deep sea drilling vessel *Chikyu*, is supplied by the Center for Deep Earth Exploration, CDEX, which is an organizational unit within the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). CDEX also operates the Kochi Core Center Repository (KCC). More information regarding CDEX and its operational plans for FY2013 are presented in **Appendix C**.

Mission-specific platform (MSP) drilling, sampling, and logging capability is supplied by the ESO (see Appendix D), a consortium led by the British Geological Survey (BGS), which conducts MSP operations and program-specific engineering development; the European Petrophysics Consortium (EPC) which provides logging services, and the University of Bremen which provides repository services for MSP samples and cores. The ESO has a contractual arrangement with the EMA, affiliated with the Centre Nationale de la Recherche Scientifique (CNRS) based in Paris. Details of ESO and its operational plans for FY2013 are presented in **Appendix D**. ESO will utilize Bremen curatorial personnel and services during actual MSP operations. These ESO funds are separate from the normal IODP core archive and sampling operations proposed by Bremen in the Annual Program Plan (See **Appendix E**).

3.3 Science Advisory Structure (SAS)

The IODP Science Advisory Structure consists of scientists, engineers, and technologists designated by IODP Program Member Offices (PMO). The SAS provides long-term guidance on the scientific planning of the IODP and recommends annual programs based on proposals from the international science community. The SAS in 2013 consists of the Science Implementation and Policy Committee (SIPCOM), the Proposal Evaluation Panel (PEP), the Environmental Protection and Safety Panel (EPSP), the Site Characterization Panel (SCP), and the Scientific Technology Panel (STP) and in total comprises approximately one hundred scientists representing the international geoscience community in IODP member countries. SAS members contribute on a voluntary basis except for the Chairpersons of SIPCOM and PEP who are compensated from the IODP-MI contract. Terms of Reference define the membership, mandates, meeting schedules of the SAS committees and panels.

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SIPCOM is hosted and supported in its work by IODP-MI. The SIPCOM in conjunction with the IODP-MI Operations Task Force (OTF) determines drilling schedules, and provides scientific oversight and long-term planning to the program including approval of regional and thematic workshops for which program funds are requested. An important responsibility of the PEP is to conduct the scientific review all drilling proposals and related workshop proposals, and to forward with detailed review comments those proposals that are deemed most competitive and ready to implement to the program's Operations Task Force (OTF) and SIPCOM to consider their implementation. In carrying out proposal review, PEP considers the advice from the SAS support panels EPSP, SCP, and STP.

4 FY2013 Expedition Operations

Seven expeditions involving three drilling platforms are proposed in FY2013. Section 12 of this document summaries expedition activity in FY2012.

4.1 Expedition Schedule

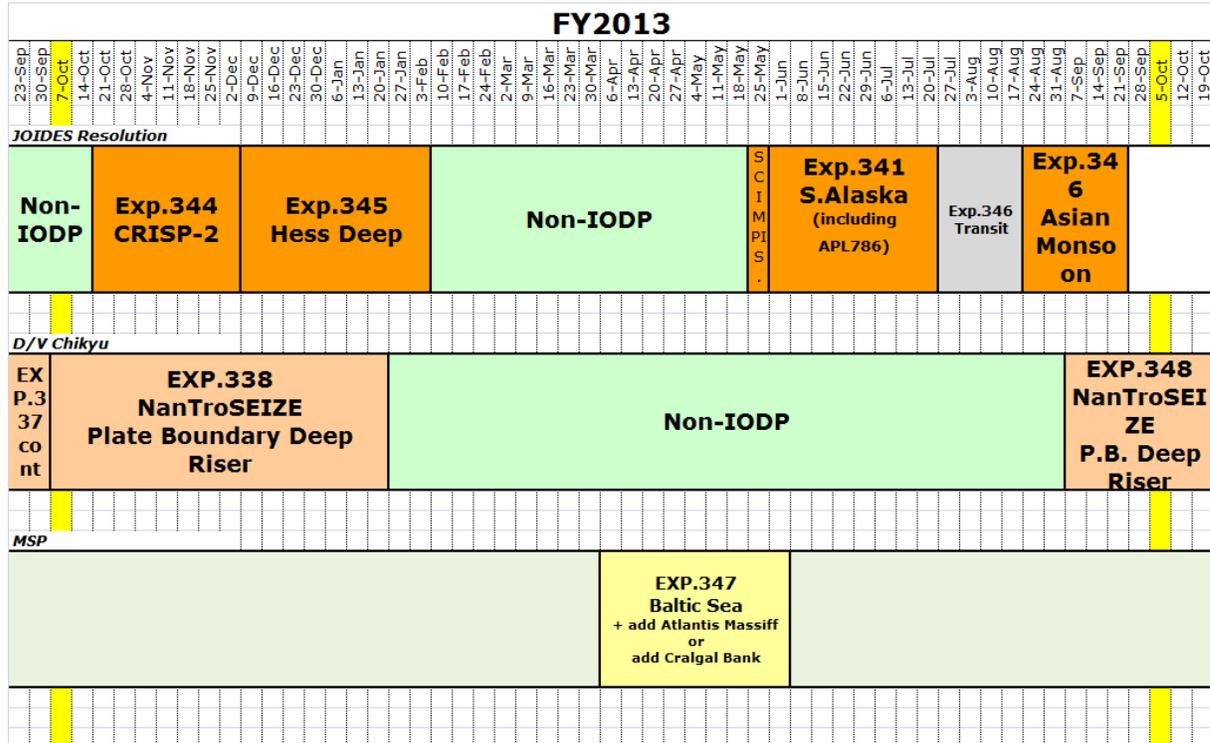


Figure APP- 2: Operation Schedule for FY2013.

USIO

The USIO plans to conduct 4 FY2013 expeditions and a SCIMPI (Simple Cabled Instrument for Measuring Parameters In-situ) engineering development sea trial with the *JOIDES Resolution* during more than eight months of operation (including transit). The FY2013 program will begin with the Costa Rica Seismogenesis Project 2 expedition, followed by the Hess Deep Plutonic Crust expedition. The *JOIDES Resolution* will then enter a non-IODP period (Feb-May, 2013) before conducting SCIMPI sea trial and Southern Alaska Margin Tectonics, Climate, and Sedimentation expedition. After a transit (22 days), the Asian Monsoon expedition will take place from August to September 2013. Completion of the Asian Monsoon expedition will leave the *JOIDES Resolution* strategically positioned in the western Pacific for anticipated post-2013 work in this region.

CDEX

CDEX *Chikyu* will conduct deep riser operations as part of the Complex Drilling Project NanTroSEIZE. The first expedition (105 days) plans to reach the record-breaking 3,600m depth from the seafloor for scientific ocean drilling and the second expedition starting from September and extending into FY2014 will aim to penetrate the splay fault zone and reach about 5,200m depth. Although the

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current IODP officially ends at the end of FY2013, CDEX will commit to achieving the 5,200m depth target of splay fault penetration with the present project management scheme into FY2014/15.

IODP-MI suggests that CDEX should reconsider the NanTroSEIZE ultimate goal (to drill to 7,000mbsf and reach to plate boundary) as part of new Chikyu program/JAMSTEC midterm plan.

ESO

ESO plans to conduct Baltic Sea Paleoenvironment expedition with a mission-specific platform over approximately 2 months of platform operation. A one-day coring test on the Coralgal Banks in the Northwest Gulf of Mexico may take place if not completed in FY2012.

4.2 USIO Operations

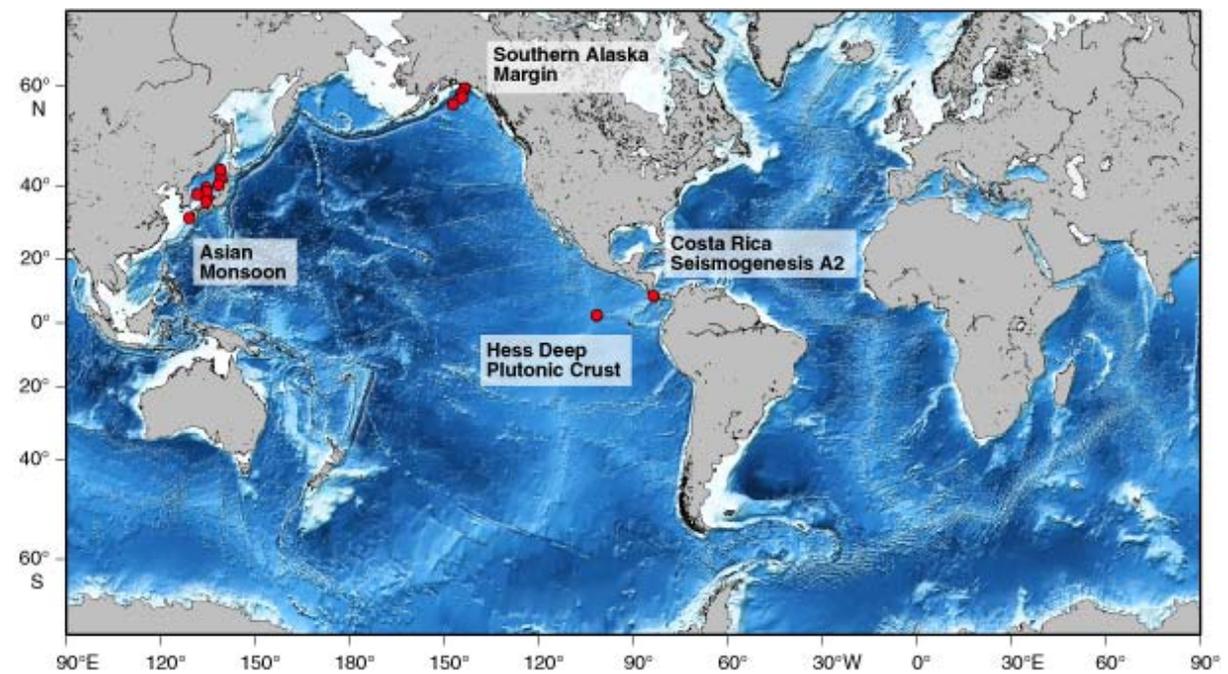


Figure APP-3: IODP-USIO FY13 drill sites.

4.2.1 Costa Rica Seismogenesis Project 2

4.2.1.1 Proposed Operations

The Costa Rica Seismogenesis Project (CRISP) 2 is designed to elucidate the processes that control nucleation and seismic rupture of large earthquakes at erosional subduction zones. CRISP is located at the only known seismogenic zone at an erosional convergent margin within reach of scientific drilling, where a low sediment supply, fast convergence rate, abundant seismicity, subduction erosion, and a change in subducting plate relief along strike offer excellent opportunities to better understand earthquake nucleation and rupture propagation. This project complements other deep fault drilling (San Andreas Fault Observatory at Depth and Nankai Trough Seismogenic Zone Experiment) and investigates the first-order seismogenic processes common to most faults and those unique to erosional margins. This expedition follows the operations conducted during Expedition 334 (CRISP 1) and will focus on constraining the boundary conditions of lithology, fluid flow, and thermal structure that trigger unstable slip in the seismogenic zone along a drilling transect at two slope sites. These slope sites may also serve as pilot holes for potential future proposed riser drilling to reach the aseismic/seismic plate boundary.

4.2.1.2 Logistics

Operations require an estimated 49 days (2 in port, 3 in transit to and from the first/last sites, and 44 in operations).

4.2.1.3 Core Storage

Cores will be stored at the Gulf Core Repository.

4.2.2 Hess Deep Plutonic Crust

4.2.2.1 Proposed Operations

Hess Deep Plutonic Crust will be the second offset drilling program at the Hess Deep Rift to study crustal accretion processes at the fast-spreading East Pacific Rise. The expedition will take advantage of well-surveyed crustal exposures to recover the first cores of young, primitive plutonic rocks that comprise the lowermost ocean crust. The principal objective for drilling at Hess Deep is to test competing hypotheses of magmatic accretion and hydrothermal processes at fast-spreading mid-ocean ridges. These hypotheses make predictions that can only be tested with drill core, including the presence or absence of modally layered gabbro, presence or absence of systematic variations in mineral and bulk rock compositions, and extent and nature of hydrothermal alteration and deformation. The highest priority for drilling at the Hess Deep Rift will be to sample one or more 100 to ≥ 250 m long sections of primitive gabbroic rocks. Three primary drill sites have been identified; however, if coring proceeds well in the first or second of these sites, it will be continued as long as possible in order to obtain the longest possible continuous sample. The alternate site is located near Ocean Drilling Program (ODP) Site 894, where shallow-level gabbros are exposed. This plan differs slightly from Proposal 551, as there is no alternate site in upper mantle peridotite. Drilling, coring, and logging operations may be

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challenging during the Hess Deep expedition because of water depths >4,800 m, a thin sediment cover, and, potentially, unstable basement formations.

4.2.2.2 Logistics

Operations are estimated to take 61 days (5 in port, 11 in transit, and 45 in operations).

4.2.2.3 Core Storage

Cores will be stored at the Gulf Core Repository.

4.2.3 Southern Alaska Margin Tectonics, Climate, and Sedimentation

4.2.3.1 Proposed Operations

Southern Alaska Margin Tectonics, Climate and Sedimentation will drill a cross-margin transect to investigate the northeast Pacific continental margin sedimentary record formed during orogenesis amid a time of significant global climatic deterioration in the Pliocene-Pleistocene, which led to the development of the most aggressive erosion agent on the planet: a temperate glacial system. This expedition will use sedimentary provenance and paleoclimatic, glacial-marine, and structural sedimentary indicators tied to a multicomponent chronology to generate detailed records of changes in the locus and magnitude of glacial erosion, degree of tectonic shortening, and sediment and freshwater delivery to the coastal ocean; their impact on oceanographic conditions in the Gulf of Alaska; and the resulting continental margin stratigraphic record on the interaction of these processes.

4.2.3.2 Logistics

Operations are estimated at 61 days (3 days in port, 8 days in transit, and 50 in operations).

4.2.3.3 Core Storage

Cores will be stored at the Gulf Core Repository.

4.2.4 Asian Monsoon

4.2.4.1 Proposed Operations

Asian Monsoon will drill two latitudinal transects in the Japan Sea to monitor behaviors of the westerly jet and winter monsoon and will drill at the northern part of the East China Sea to monitor the Yangtze River discharge history that should reflect variations in summer monsoon intensity. The southern transect will be used to reconstruct the behavior of the subpolar front and examine its relationship with the westerly jet and sea level changes. The northern transect will be used to identify ice-rafted debris events and reconstruct temporal variation in its southern limit as winter monsoon proxies. The proposed drilling is designed to (1) specify the onset timing of orbital and millennial-scale variability of East Asian monsoon and westerly jet and reconstruct their evolution process and spatial variation patterns and (2) reconstruct orbital and millennial-scale paleoceanographic changes in the Japan Sea during the last 5 m.y. to clarify the linkage between the paleoceanographic changes in the Japan Sea and the variability of East Asian monsoon and/or sea level changes. Comparison of the results with the uplift history of the Himalayan and Tibetan Plateaus will enable us to test the idea that

topographic evolution of the plateaus was responsible for creation of bimodality in westerly jet circulation that caused amplification of millennial-scale variability of Asian monsoon.

4.2.4.2 Logistics

Operations are estimated at 39 days (1 in port, 2 in transit, and 36 in operations).

4.2.4.3 Core Storage

Cores will be stored at the Kochi Core Center.

4.3 CDEX Operations

In FY2013, Chikyu plans to operate for deep riser drillings of the NanTroSEIZE project.

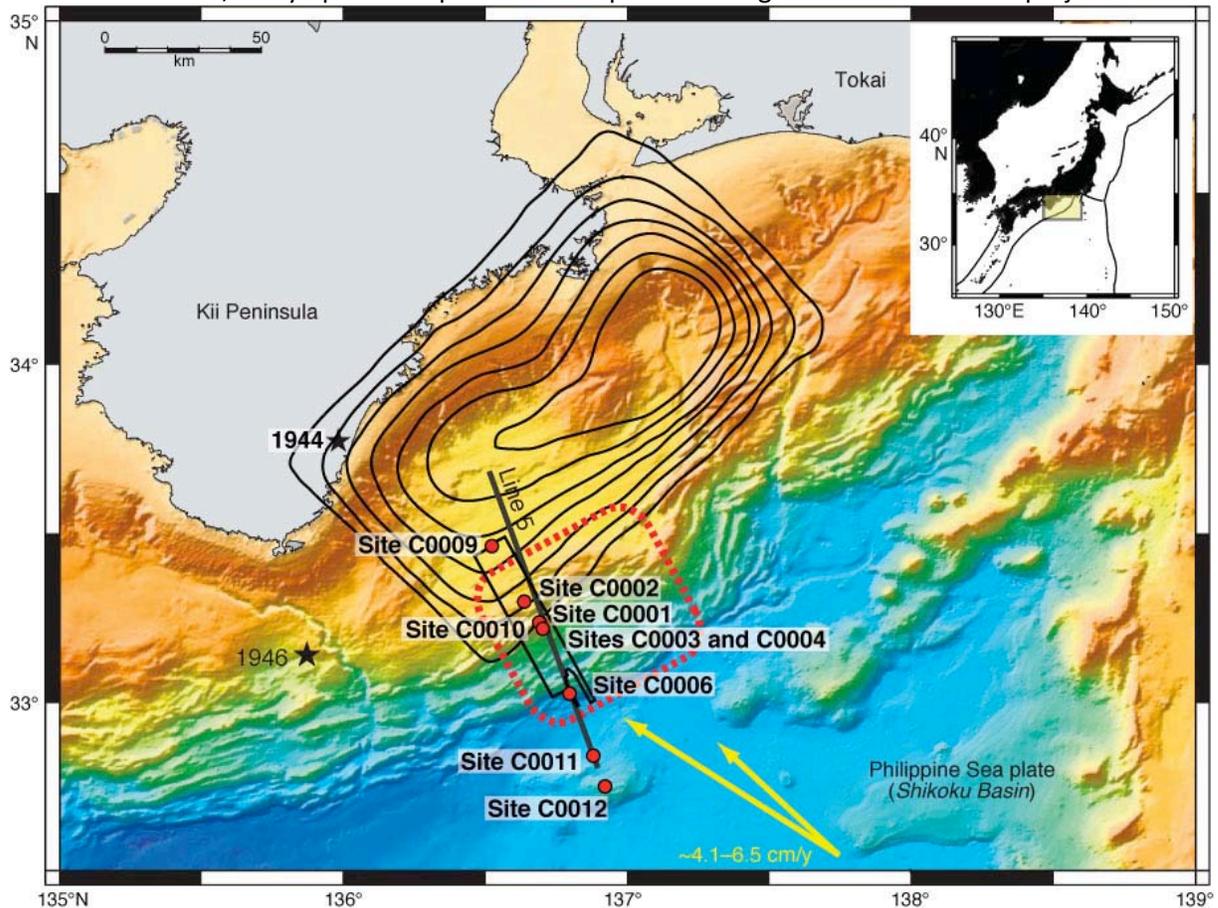


Figure APP-4: IODP-CDEX Fy13 NanTroSEIZE Site Map. C0002 is the drill site for the Stage 3 drilling.

4.3.1 NanTroSEIZE Deep Riser Plate Boundary 3600 m TD

4.3.1.1 Proposed Operations

Site C0002 is the centerpiece of the NanTroSEIZE project, intended to eventually access the plate interface fault system at a location where it is believed to be capable of seismogenic locking and slip and to have slipped coseismically in the 1944 Tonankai earthquake ([Fig. APP-4](#)). The operations during this phase aim to reach a point above the “megaspay fault” zone with LWD, spot core at the part of the hole, and set 13-3/8” casing. The interval from 856

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mbsf to target depth (proposed to be 3600 mbsf) will be drilled with continuous LWD resistivity, gamma radiation, and annulus fluid pressure data. During this riser drilling, mud return will allow for comprehensive analysis of drill cuttings and mud gas, as was performed at Site C0009. Coring (100 m total) is also planned to sample the inner wedge but is restricted to one interval from 2300 to 2400 mbsf.

4.3.1.2 Logistics

Operation days are estimated to be 105 days (transit and port call 5 days, drilling 100 days). EPMs (Expedition Project Manager/Staff Scientist) are assigned and 4 Co-Chief scientists were selected. The shipboard science party is envisioned to include about 14 scientists onboard at a time and rotating every about 1.5 months, embarkation and disembarkation will be made by helicopter from Minami-Ise.

4.3.1.3 Core Storage

Cores will be stored at Kochi Core Center.

4.3.2 NanTroSEIZE Deep Riser Plate Boundary 5200m TD

The main aim is to penetrate the “megaspaly fault” to understand its role in tsunami generation and seismogenic strain partitioning.

4.3.2.1 Proposed Operations

The operations will target the reflector known as the “megaspaly fault”. The megaspaly fault reflector lies at an estimated depth of 5000 – 5200 mbsf. This expedition will be aimed for continuous deepening of C0002F to the mega-splay fault with LWD/MWD from the final depth of Expedition 338 (3,600 mbsf; 13-3/8” casing set point). The primary scientific objective of this expedition is to sample “mega-splay fault” which estimated to exist around 5,200 mbsf based on the seismic reflection data. 11-3/4” casing is expected to set at 4,700 mbsf and extensive wire-line logging through this interval and about 200 m coring is planned at the end of this interval. Below this casing set point, continuous LWD/MWD operation to 5,000 mbsf and coring from 5,000 – 5,200 mbsf plus intensive wire-line logging is also planned.

4.3.2.2 Logistics

Operation days are estimated to be 30 days (transit 2 days, drilling 28 days) within FY2013. The plan is to continue on through January 2014 (about 4 months extension). Detailed logistics discussions are still underway among the NanTroSEIZE Project Management Team. At least one EPM (Expedition Project Manager/Staff Scientist) is assigned and 4 Co-Chief scientists will be selected. The shipboard science party is envisioned to include about 14 scientists onboard at a time and rotating every about 2 months, embarkation and disembarkation will be made by helicopter from Minami-Ise.

4.3.2.3 Core Storage

Cores will be stored at Kochi Core Center.

4.4 ESO Operations

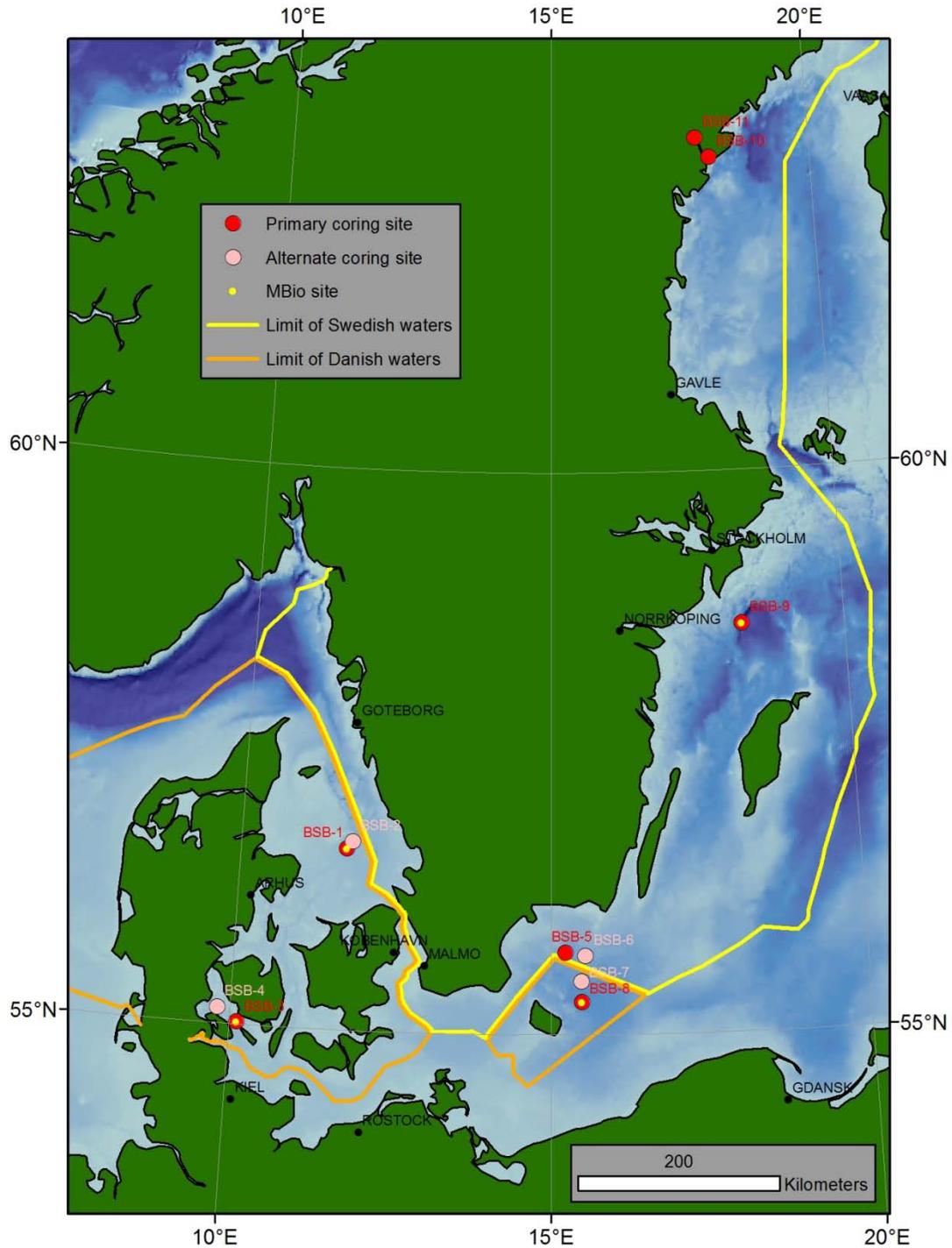


Figure APP-5: IODP-ESO FY13 drill site in the Baltic Sea.

4.4.1 Baltic Sea Paleoenvironment

The Expedition plans to obtain records of climate evolution over the last glacial cycle (last ca. 140,000 years) from the largest European intra-continental basin and their relation to the deep biosphere.

4.4.1.1 *Proposed Operations*

A prospectus, including a measurements plan to be agreed by the Scientific Technology Panel (STP), will be produced with the Co-chief Scientists. Final approval of the sites by the Environmental Protection and Safety Panel (EPSP) is still required. The proposed sites are shown in the location map (above), however until final approval is received from the EPSP all site positions are subject to change. Permitting will begin with the appropriate authorities (Swedish Coast Guard, Swedish Ministry of Enterprise, Energy and Communications, and the Danish Ministry of Climate and Energy) once a preferred contractor is established.

4.4.1.2 *Environment and Safety*

As is the case for all MSP Expeditions, high standards of environmental protection will be maintained. An Environmental Impact Assessment will be required to apply for a research permit from the Swedish and Danish authorities, and will be prepared in due course.

4.4.1.3 *Logistics*

Operations are estimated at 50 days (3 in transit, and 47 in operations) plus days from the ports of departure and arrival to and from the first and the last site, respectively.

4.4.1.4 *Core Storage*

Cores will be stored at the Bremen Core Repository.

5 Management and Administration

5.1 Goals

The goal of Management and Administration of various IODP-related entities, including IODP-MI, IOs, SAS, and Program Offices is to plan and coordinate with other IODP-related entities; support the Science Advisory Structure and manage the proposal review system; oversee, review, and report on IODP activities, assure compliance with program procedures and policies, assure compliance with contractual regulations, and manage human, financial, and physical resources to ensure that program goals and deliverables are met.

5.2 Summary of FY2012 Accomplishments

Formulated FY2013 Annual Program Plan for approval by the Lead Agencies. FY2012 APP was revised and approved by the Lead Agencies on December 21, 2011. This revision included SOC enhancement to augment the science activity for Exp 343: J-FAST and POC reduction due to the Chikyu schedule shift. A further revision was made in January 2012 reflecting the ECORD Council decision on the change in the POC budget of ECORD Science Operator. All the other requisite reports have been submitted in timely manner.

Transition to the new SAS framework is proving to be smooth and efficient. For the IODP science community, three workshops will have been partially supported by IODP-MI within FY2012; “Unlocking the opening processes of the South China Sea”, “Coordinated Scientific Drilling in the Canadian Beaufort Sea”, and “Observatories in Scientific Ocean Drilling.”

IODP-MI was reorganized to operate with 13 staff members. The position of Vice President was vacated as the incumbent VP retired. Deputy to President is hired to conduct tasks and fulfill responsibilities at appropriate level.

5.3 Deliverables in FY2013

Compliance with the Annual Program Plan – The Annual Program Plan (APP) is the central document in IODP, which describes all the planned activities and costs in Science and Platform Operations. Managers at both IODP-MI and the IOs are required to assure the implementation of the work plan and budget as laid out in the APP.

Quarterly and Annual Reports – IODP-MI and the IOs develop quarterly and annual reports, including financial reports and projections.

Reporting and Liaison (for the IOs) – IO managers provide reporting and liaison functions with and between IODP-related entities, the Science Advisory Structure, Program Member Offices and other national organizations, and participate in program task forces, coordination groups, expedition-related project management teams, working groups, etc to ensure program integration.

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Coordination and Representation (for IODP-MI) – IODP-MI is responsible that coordination is working with and between IOs, the SAS entities, Program Member Offices, institutional leaders and other community representatives, funding agencies, other scientific programs, and institutions in potential new IODP member countries, subcontractors.

Contract monitoring – All management entities are responsible for ensuring that subcontracted services for IODP-related activities are provided in compliance with contract requirements.

Transition to post-2013 Framework – Additionally in FY2013, all program entities must manage the end of the ten-year contract and handover responsibilities to the (in some cases, to-be-determined) entities that are to be involved in the new framework. This is particularly important for IODP-MI, which will conclude its contractual relationship with the NSF during a close-out period following the contract end date of September 30, 2013.

5.4 Transition Strategy

Management entities that will continue post-2013 will develop program plans for the next financial period in response to guidance provided by their respective funding agencies. Proposal submission and meetings of the Science Advisory Structure will be scheduled with a view toward continuity as elaborated in the new framework being worked out by IODP members. Contracts and subawards currently held by IODP-MI will be phased out or transitioned to new entities.

5.5 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	Total
Salary and Fringes	1,382,126	296,986	367,064	489,787	-	\$ 2,535,963
Travel	281,500	19,204	130,000	186,000	-	\$ 616,704
Supplies	23,750	2,525	20,000	15,000	-	\$ 61,275
Shipping	14,000	1,171	-	-	-	\$ 15,171
Communication	37,500	6,990	8,000	-	-	\$ 52,490
Contractual Services	113,750	-	77,000	-	-	\$ 190,750
Equipment	2,000	50	-	15,000	-	\$ 17,050
Other Direct Costs	530,650	4,985	-	25,000	-	\$ 560,635
Total Direct Costs	2,385,276	331,911	602,064	730,787	-	\$ 4,050,038
<i>Modified Direct Costs (If applicable)</i>	<i>1,165,100</i>	<i>68,515</i>	<i>525,064</i>	<i>-</i>	<i>-</i>	
Consumption tax (5%)	55,509	-	-	-	-	\$ 55,509
Indirect Costs/Administrative Fee	393,920	209,780	157,519	-	-	\$ 761,219
Total	\$ 2,834,705	\$ 541,691	\$ 759,583	\$ 730,787	\$ -	\$ 4,866,766

Table APP- 5-1: Management and Administration Total Budget Summary for FY2013.

Expense Category	IODP-MI	USIO	CDEX	Bremen	Total
Salary and Fringes	1,382,126	296,986	367,064	-	\$ 2,046,176
Travel	281,500	19,204	130,000	-	\$ 430,704
Supplies	23,750	2,525	20,000	-	\$ 46,275
Shipping	14,000	1,171	-	-	\$ 15,171
Communication	37,500	6,990	8,000	-	\$ 52,490
Contractual Services	113,750	-	77,000	-	\$ 190,750
Equipment	2,000	50	-	-	\$ 2,050
Other Direct Costs	530,650	4,985	-	-	\$ 535,635
Total Direct Costs	2,385,276	331,911	602,064	-	\$ 3,319,251
<i>Modified Direct Costs (If applicable)</i>	<i>1,165,100</i>	<i>68,515</i>	<i>525,064</i>	<i>-</i>	
Consumption tax (5%)	55,509	-	-	-	\$ 55,509
Indirect Costs/Administrative Fee	393,920	209,780	157,519	-	\$ 761,219
Total	\$ 2,834,705	\$ 541,691	\$ 759,583	\$ -	\$ 4,135,979

Table APP- 5-2: Management and Administration Contract Budget for FY2013

5.6 Justification

5.6.1 IODP-MI

Budget reflects less frequency of meetings and less FTEs (Appendix A)

Salaries and Fringes – Salaries and fringe benefits rate for IODP-MI and ISHI M&A staff.

Travel – Includes all domestic and foreign travel for the IODP-MI and ISHI M&A staff, and non-IODP-MI travelers such as the SIPCOM and PEP chairs and participants in OTF and ORTF meetings.

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Supplies – Office supplies and expendables.

Shipping – Includes costs for regular postage, overnight deliveries and bulk mailings.

Communication – includes inter-office (Tokyo-DC) communication charges.

Contractual Services – Include CPA accounting services for the DC office and an IT/website support contract for the Tokyo office.

Other Direct Costs –

DC Office- Includes support of the PEP and SIPCOM Chairs, honoraria for Panel Chairs and compensation for Specialty Coordinators. Includes support of workshops and Scoping Groups. Covers general audit, legal and administration service fees and corporate licenses and insurance, DC office and equipment rental, printing, software, repairs, relocation, recruiting and Bank Fees and association dues.

Tokyo Office - includes Tokyo office rental and equipment lease. Covers general audit, legal and administration fees, corporate licenses and insurance, and bank transfer fees. As required by the laws of Japan, the 5 % consumption tax is applied.

5.6.2 USIO

Salaries and Fringes – Salaries, fringes, and sea pay, including an anticipated cost-of-living allowance and estimated fringe benefits rate.

Travel – Transportation, per diem, lodging, and other associated costs.

Supplies – General office supplies and expendables and operational supplies.

Shipping – Postage, express mail, courier services and freight.

Communication – Telephone and fax charges.

Contractual Services – None budgeted.

Other Direct Costs – Costs not covered in other categories:

Training – None budgeted.

Business Conferences – Incidental expense associated with meetings hosted by the USIO.

Insurance – Annual insurance premium.

Services – Expert assistance.

TAMU Computing Services – Use of TAMU's financial and management information System (FAMIS).

Equipment Rental – Rental of equipment when it is more economical to rent than purchase.

Furniture – Office furniture.

Recruiting –None budgeted.

Maintenance and Repair – Equipment agreements and equipment repairs.

Library – None budgeted.

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Indirect Costs—Administrative and financial costs associated with operating the Program. The specific equations used to calculate these costs vary by institution (For details, see 5.3 of Appendix B).

5.6.3 CDEX

Salaries and Fringes - Salaries and fringes for staff in CDEX.

Travel – Transportation, per diem, accommodation and other associated cost for all foreign and domestic travel including international meetings (IODP related meetings), domestic meetings, travel to shore base, travel to Helibase, travel to subcontractor site.

Supplies - General office supplies.

Communication - Telephone charges, Mobile phone charges, fax charges and postage.

Contractual Service – Part time worker and computer and software rental.

5.6.4 ESO (funded directly through EMA)

Salaries and Fringes – Portion of salaries at standard institution rates, including overheads.

Travel –Transportation, per diem and accommodation for all tasks, including ESO internal meetings, IOs meetings, ECORD Council meetings, ESSAC meetings, meetings of other IODP bodies including panels and committees, IODP-MI task forces, operational reviews and a range of appropriate scientific conferences (including conference fees) and workshops.

Supplies – General office supplies.

Equipment – Miscellaneous items, upgrades, etc.

Other Direct Costs –Training for all partners.

6 Technical, Engineering, and Science Support (TESS)

6.1 Goals

Goals for this Work Breakdown Element (WBE) primarily relate to the Implementing Organizations and include managing, coordinating, and performing the activities and providing the services, materials, platforms, and ship- and shore-based laboratories necessary to support IODP expeditions.

6.2 Summary of FY12 Accomplishments

Conducted six expeditions; Exp. 336: Mid-Atlantic Ridge Microbiology, Exp. 339: Mediterranean Outflow, Exp. 340: Lesser Antilles Volcanism and Landslides including APL: Atlantis Massif Oceanic Core Complex & Exp.342: Paleogene Newfoundland Sediment Drifts including MDHDS engineering development sea trial by USIO, and Exp. 343: Japan Trench Fast Drilling Project & Exp. 337: Deep Coalbed Biosphere off Shimokita by CDEX. All expeditions were completed without any incident and achieved most of scientific targets. Total 8,255 m of core had been recovered from the bottom of sea (excluding yet uncompleted Exp 337 and 342).

6.3 Deliverables for FY2013

Generic deliverables for this Work Breakdown Element listed below are applicable to the specific IO expedition operations described in **Section 4** of the main text of this report, as well as in **Appendices B** (USIO), **C** (CDEX), and **D** (ESO).

- Expedition Planning and Implementation: Provide scientific and operational planning and execution for each scheduled expedition, including provision of a drilling platform. Conduct long-range operational planning for out-year expeditions.
- Reporting: Provide expedition-related reports and content for expedition publications (e.g., *Scientific Prospectus*, *Preliminary Report*, etc.). Act as a liaison to Science Advisory Structure (SAS) and other panels and task forces as appropriate.
- Expedition Staffing: Provide selection and support for scientific staffing and Co-Chief Scientist selection for each scheduled expedition. Provide support for shipboard and shorebased technical personnel and activities.
- Logistical Support: Provide for expedition and Shore-Based activities including procurement, shipping, and inventory of equipment and supplies.
- Analytical Systems: Provide and maintain shipboard and shore-based analytical facilities and associated quality control/quality assurance protocols. Ensure effective capture and transfer of expedition data to database systems.
- Logging: Provide for the delivery of logging services including back-off/severing services where needed.
- Engineering Support: Provide engineering support for maintaining and developing shipboard and shore-based drilling, coring, logging, and downhole systems including third-party developments.
- Applications Development: Provide maintenance and support for custom software

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- Applications for the capture and shipboard management of operational, sampling, and analytical information.
- Legacy Documentation.

6.4 Transition Strategy

Because this Work Breakdown Element (WBE) primarily relate to the Implementing Organizations, no specific transition strategy will be applied.

6.5 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	Total
Salary and Fringes	-	-	1,632,844	1,114,060	-	\$ 2,746,904
Travel	-	-	-	135,000	-	\$ 135,000
Supplies	-	-	150,000	639,699	-	\$ 789,699
Shipping	-	-	200,000	14,000	-	\$ 214,000
Communication	-	-	-	-	-	\$ -
Contractual Services	-	-	2,918,170	25,000	-	\$ 2,943,170
Equipment	-	-	-	510,000	-	\$ 510,000
Other Direct Costs	-	-	-	15,000	-	\$ 15,000
Total Direct Costs	-	-	4,901,013	2,452,758	-	\$ 7,353,771
<i>Modified Direct Costs (If applicable)</i>	-	-	1,982,844	-	-	
Indirect Costs/Administrative Fee	-	-	594,853	-	-	\$ 594,853
Total	\$ -	\$ -	\$ 5,495,866	\$ 2,452,758	\$ -	\$ 7,948,624

Table APP- 6-1: Technical, Engineering, and Science Support Total Budget for FY2013.

Expense Category	IODP-MI	USIO	CDEX	Bremen	Total
Salary and Fringes	-	-	1,632,844	-	\$ 1,632,844
Travel	-	-	-	-	\$ -
Supplies	-	-	150,000	-	\$ 150,000
Shipping	-	-	200,000	-	\$ 200,000
Communication	-	-	-	-	\$ -
Contractual Services	-	-	2,918,170	-	\$ 2,918,170
Equipment	-	-	-	-	\$ -
Other Direct Costs	-	-	-	-	\$ -
Total Direct Costs	-	-	4,901,013	-	\$ 4,901,013
<i>Modified Direct Costs (If applicable)</i>	-	-	1,982,844	-	
Indirect Costs/Administrative Fee	-	-	594,853	-	\$ 594,853
Total	\$ -	\$ -	\$ 5,495,866	\$ -	\$ 5,495,866

Table APP- 6-2: Technical, Engineering, and Science Support Contract Budget for FY2013.

6.6 Justification

6.6.1 IODP-MI

None. While IODP-MI monitors expedition-related science operations costs of the Implementing Organizations, it does not assign budget resources to this WBE.

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6.6.2 USIO

None budgeted under SOC (all under POC).

6.6.3 CDEX

Salaries and Fringes -Salaries and fringes for staff in CDEX (See FTE allocation table).

Supplies - Consumables for onboard lab equipment and stationeries.

Shipping – Shipping of core samples to scientist including deep-freezing core.

Contractual Services

1) Lab Technical Services: Annual contract for Lab Technical Services. The contractor provides 24 hours on-board lab technical services during expeditions as well as preparation works, equipment maintenance and procurement of lab consumables throughout the year. SOC covers personnel cost for lab technicians for IODP period and minimum onboard laboratory maintenance (4 Lab technicians) during non-IODP period.

- Lab technicians	(SOC – USD 1,921,170 /POC – USD 1,650,808)
- Travel Expense for Lab Technicians	(SOC – None budgeted /POC – USD 750,000)
- Lab consumables	(SOC– None budgeted /POC – USD 375,000)
- Overhead	(SOC– None budgeted /POC – USD 941,065)
(Total)	(SOC– USD 1,921,170 /POC – USD 3,716,873)

2) Logistic Support: Transportation cost for science party (including Publication Assistants and APCT/DVTP engineers from TAMU) between hotel to Minami-Ise Heliport, hotel to Shingu shore base and their baggage transportation from Minami-Ise Heliport to Shingu base if necessary.

(SOC – USD 50,000 / POC – None Budgeted)

3) V-SAT: V-SAT communication during expedition. The bandwidth has been upgraded from 512 kbps to 768 kbps to provide better communication services together with network accelerator.

(SOC – USD 70,000 / POC – USD 70,000)

4) Equipment Maintenance: Annual maintenance for *Chikyu* Lab measurement instrument including the X-CT scanner’s annual maintenance contract, required by Japanese law.

(SOC – USD 150,000 / POC – USD 150,000)

5) Wireline Logging or LWD: Contract for wire line logging for Exp.338.

Expedition 338 (SOC – USD 695,000 / POC – USD3,805,000)

Other Direct Cost: (SOC – None Budgeted / POC USD 67,262,039)

1) Chikyu Operation and Management Contract: includes crewing, travel, fuel and lubricants, Equipment and supplies (Casing, Wellhead, Bit, Core bit, Packer, Coring equipment, drill pipe, Riser fairing, Drill collar, HWDP, Crossover sub, Stabilizer, Fishing tool, Mud, Cement and other drilling equipment and consumables), port call, subcontractor services for drilling (Mud Engineering service, Waste mud treatment service, Well head service, Cementing service, Casing Running Service, ROV service, Conductor Jetting service, Weather service, etc.), DP equipped supply boat service, watch boat service, helicopter service, shore-base cost, Helibase cost, other logistics cost,

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normal repair and maintenance, insurance for subcontractor equipment, training for crew, overhead.

- 2) **Other direct cost:** includes heavy breakdown, insurance (all risks-Hull and Machinery Insurance, P&I insurance and other insurances).

6.6.4 ESO

Salaries and Fringes – Portions of salaries at standard institution rates, including overheads for planning of future MSP Expeditions.

POC – Most BGS costs are split 50/50 between POCs and SOC, except for non-scientific work, which is fully allocated to POCs.

SOC – All Bremen and EPC costs.

Travel – Scoping, planning and preparation will require a variety of meetings among ESO staff, with co-chiefs and scientists, scoping groups (including Project Management Team meetings), discussion with actual or potential contractors, for contractual issues and staff exchanges.

SOC – All Bremen and EPC travel, 50% of BGS offshore operations.

BGS 4 non-Europe journeys @\$3,500. 4 Europe journeys @\$2,000.

Bremen 3 non-Europe journeys @\$3,500. 6 Europe journeys @\$2,000.

EPC 6 non-Europe journeys @\$3,500. 6 Europe journeys @\$2,000.

Supplies– Advance purchase of lab and office consumables for offshore curation and sampling (power water chemistry, gas chemistry, microbiology, sedimentology and paleontology).

Contractual services – Cost of MSCL (-S and -XYZ) servicing and maintenance. This includes software and electronic updates and spare parts as required and covers costs for license fees and safety testing for the MSCL source. Logging equipment servicing and maintenance is also covered.

Equipment

SOC – Logging-related computer hardware is required continue compatibility with logging tools. Funds for a Geotek MSCL XCT are requested. This X-ray core imaging system collects linear digital X-ray images on whole core. For rock cores, as opposed to soft sediment cores, where core can shift within the liner when rotated, Geotek recommend their option where the X-ray source and detector rotate, rather the rotating the core. This then allows CT data to be collected. Users can visualise and record three-dimensional structures within the cores and rotational images can be used for computed tomographic (CT) reconstructions. For three of the four proposed expeditions in particular (Chixculub, Hawaii Drowned Reefs and Atlantis Massif Seafloor Processes) X-ray CT imaging would provide vital quantitative data and information about core quality, orientation of fractures, and in the case of Hawaiian Drowned Reefs, coral orientation, that could inform core-splitting, sampling strategies and further analyses ahead of the Onshore Science Party. Funds are requested for FY12 because there is a long lead in time for the Geotek MSCL XCT to be ordered and built in time for an expedition in FY13.

Other Direct Cost

SOC – Bremen University laboratory upkeep and certification. This includes regular checks, certification, and if needed, spare parts for all exhaust air from labs and especially lab hoods, gas line pipes, electric lines, water pipes, cleaning and performance checks of sediment traps in lab sinks, waste water tests for unauthorized chemicals, lack of oxygen monitoring in labs, checks

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for X-ray equipment (XRF, XRD labs), overall laboratory equipment performance tests and certificates (e.g, chemical lab), balances calibration service, certified element standards, certified sediment standards, software updates, licence fees, etc., for IODP labs, proportionate for labs at Bremen University (e.g. used for Onshore Science Parties) and mobile lab containers sent to MSP expeditions.

SOC - EPC – funds requested to cover the fees and costs associated with gaining permits to import register and use the MSCL source on offshore expeditions in any given territory/territorial waters. These costs would be incurred in FY12 in readiness for an expedition in FY13. This figure is based on expenditure on licences and permits for the source during the Great Barrier Reef expedition in FY10.

7 Engineering Development

7.1 Goals

Historically IODP-MI has overseen specific engineering development projects to enhance the platform performance and science capability of the program. Projects are chosen for inclusion in the annual program plans in consultation with the Science Advisory Structure and/or Implementing Organizations. An example of past engineering development projects is LTBMS (Long Term Bore hole Monitoring System) by CDEX.

No new engineering developments are proposed in FY13. Tasks in this area are limited to finishing up projects that are ongoing from previous program years or closing out unsuccessful projects. No budget is requested in this Work Breakdown Element.

7.2 Summary of FY12 Accomplishments

IODP-MI has completed the MDHDS (Motion Decoupled Hydraulic Delivery System) project, which deploys penetrating down-hole temperature and pressure measurement tools. The equipment has been fully tested and is now a IODP certified tool.

The SCIMPI (Simple Cabled Instrument for measuring Parameters In-situ) project had completed all fabrication and producing documents.

Associated with above MDHDS and SCIMPI development, IODP-MI conducted and completed a common deployment system (ERS: electric releasing/fishing system). And the system had been modified up to version 2.1, which improved for the operability and simplified the maintenance.

7.3 Deliverables for FY2013

In collaboration with NEPTUNE-Canada, a sea trial for the SCIPMI package will be conducted aboard the *JOIDES Resolution* near the Cascadia Margin region to complete the engineering development.

7.4 Transition Strategy

IODP-MI will transfer completed/certified technologies (LTBMS, MDHDS, ERS and SCIMPI) to the IOs and other appropriate organizations for future program use.

7.5 Budget

No budget for ED is requested in FY13.

8 Core Curation

8.1 Goals

This Work Breakdown Element provides services in support of IODP core sampling and curation of the core collection archive. IODP supports operations at three core repositories: the Gulf Coast Repository (GCR) operated by the USIO, the Kochi Core Center Repository (KCC) operated by CDEX, and the Bremen Core Repository operated by Bremen University (**Table APP-1**).

Repository	Institution	Geographic Location
GCR	Texas A&M University	Pacific Ocean (east of western trench boundaries); Caribbean Sea and Gulf of Mexico; Southern Ocean (>60°S, except Kerguelen Plateau)
BCR	University of Bremen	Atlantic Ocean, Mediterranean Sea, Arctic Ocean (north of Bering Strait)
KCC	Kochi University	Western Pacific Ocean (west of trench boundaries); Indian Ocean, Kerguelen Plateau; Bering Sea

Table APP8-1: Core Distribution Scheme for IODP.

8.2 Summary of FY12 Accomplishments

Three core repositories provided regular services based on the primary deliverables. Total 532 (Fiscal YTD) sample request had been received among three, and each repository conducted core school for young/new researchers as well as science party members.

8.3 Deliverables in FY2013

The primary deliverables for the repositories during FY2013 are:

- Policy and Procedures: Work with other IOs, the Science Advisory Committee (SAS), and the IODP central management office (IODP - MI) to implement a policy for IODP core curation. Work closely with staff to coordinate, standardize, and document curatorial procedures for IODP cores and samples.
- Sample and Curation Strategies: Plan sample and Curation strategies for specific expeditions identified in Section 4 of this Annual Program Plan and review all shipboard and moratorium-related requests in coordination with the other members of the Sample Allocation Committee (SAC) for each expedition.
- Sample Requests: Respond to post-moratorium sample requests from the scientific community.
- Core Sampling: Provide curator specialist on board the drillship to supervise core sampling during ship operations.
- Core Curation: Conduct all responsibilities associated with curation of core collections and provide services in support of core sampling, analysis, and education.

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- Use of Core Collection: Promote the outreach use of the core collection in collaboration with Implementing Organization (IO) and IODP-MI education/outreach personnel by providing materials for display at meetings or museums, as well as conducting tours and supporting other program outreach activities.
- Meetings: Host and/or participate an annual IODP curatorial staff meeting. Act as IO liaison for meetings with the other IOs, IODP-MI, and the SAS, as appropriate.

8.4 Transition Strategy

A transition strategy will be articulated to minimize disruption to sample access and maintain continuity in service to users as responsibilities become clear with the resolution of the new framework.

8.5 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	Total
Salary and Fringes	-	280,925	247,231	60,535	190,812	\$ 779,503
Travel	-	46,125	-	6,000	3,300	\$ 55,425
Supplies	-	26,250	10,000	2,000	5,850	\$ 44,100
Shipping	-	18,750	20,000	5,000	18,000	\$ 61,750
Communication	-	2,625	-	-	-	\$ 2,625
Contractual Services	-	-	27,500	-	-	\$ 27,500
Equipment	-	-	-	-	-	\$ -
Other Direct Costs	-	14,063	-	-	-	\$ 14,063
Total Direct Costs	-	388,738	304,731	73,535	217,962	\$ 984,966
<i>Modified Direct Costs (If applicable)</i>	-	-	277,231	-	-	
Indirect Costs/Administrative Fee	-	-	83,169	-	87,185	\$ 170,354
Total	\$ -	\$ 388,738	\$ 387,900	\$ 73,535	\$ 305,146	\$ 1,155,320

Table APP- 8-2: Core Curation Total Budget for FY2013.

Expense Category	IODP-MI	USIO	CDEX	Bremen	Total
Salary and Fringes	-	280,925	247,231	190,812	\$ 718,968
Travel	-	46,125	-	3,300	\$ 49,425
Supplies	-	26,250	10,000	5,850	\$ 42,100
Shipping	-	18,750	20,000	18,000	\$ 56,750
Communication	-	2,625	-	-	\$ 2,625
Contractual Services	-	-	27,500	-	\$ 27,500
Equipment	-	-	-	-	\$ -
Other Direct Costs	-	14,063	-	-	\$ 14,063
Total Direct Costs	-	388,738	304,731	217,962	\$ 911,431
<i>Modified Direct Costs (If applicable)</i>	-	-	277,231	-	
Indirect Costs/Administrative Fee	-	-	83,169	87,185	\$ 170,354
Total	\$ -	\$ 388,738	\$ 387,900	\$ 305,146	\$ 1,081,785

Table APP- 8-3: Core Curation Contract Budget for FY2013.

8.6 Justification

8.6.1 IODP-MI

No budget.

8.6.2 USIO

Salaries and Fringes—Salaries, fringes, and sea pay, including an anticipated cost-of-living allowance and estimated fringe benefits rate.

SOC/POC—Salaries, fringes, and sea pay for staff supporting the USIO (see Appendix B, USIO FTE Allocation Tables).

Travel—Transportation, per diem, lodging, and other associated costs.

SOC/POC—Travel to IODP meetings and workshops, IO meetings, and USIO meetings (including an annual IODP Curators meeting); professional conferences; and travel costs for USIO staff who will sail on FY13 expeditions.

Supplies—Office and operational supplies.

SOC/POC—General office supplies and printer supplies; general safety, cleaning, and laboratory supplies; specialized supplies for sampling and curatorial tasks; crates and shipping boxes.

Shipping—Postage, express mail, and freight.

SOC/POC—Postage for regular correspondence, regular-sized sample shipments to scientists, and costs for special shipments of deep-frozen microbiological samples, U-channels, or whole core sections for X-ray fluorescence scanning.

Communication—Telephone and fax charges.

SOC/POC—Standard telephone line, long distance, cellular phone, and fax charges.

Contractual Services—None budgeted.

Equipment—None budgeted.

Other Direct Costs—Costs not covered in other categories.

Training—Registration, transportation, per diem, and lodging expenses related to professional training.

SOC/POC—Registration and travel costs for professional training courses and meetings (TAMU).

Business Conferences—Incidental expenses associated with meetings hosted by the USIO.

SOC/POC—Expenses for sample parties and groups of scientists, educators, or others visiting the GCR.

Services—Expert assistance.

SOC/POC—Annual physical examinations for seagoing personnel, Graduate Assistant Research tuition and fees, and facilities repair.

Maintenance and Repair—Maintenance agreements and equipment repairs.

SOC/POC—Repairs and maintenance for deep freezers; laboratory, repository, and office equipment; and shrink-wrap and bagging machinery.

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8.6.3 CDEX

Salaries and fringes: Salaries and fringes for staff in KCC (See Appendix C, FTE allocation table).

Travel: None budgeted

Supplies: General office supplies, general laboratory supplies and curatorial tasks.

Shipping: Courier and postage for sample shipping, containers and other associated cost for shipping, u-channels.

Communication: Telephone charges, Mobile phone charges, fax charges and postage.

Contractual Services:

1) Industrial waste disposal: Disposal cost for industrial waste designated by the local government. Most core storage-materials and materials used for core transport are in this category.

(SOC – USD 10,000 / POC – None budgeted)

2) Core management system maintenance: Annual maintenance cost for the core storage management software being used at KCC. (SOC – USD 15,000 / POC - USD 15,000)

3) Rental: Annual rental cost of one forklift used at KCC to move IODP cores from yard to storage and computer for IODP curation staff. (SOC – USD 20,000 / POC – None budgeted)

4) Brochures, DVD: KCC's own outreach materials to introduce core data archived in KCC and how to submit sample requests. (SOC – USD 7,500 / POC – None budgeted)

8.6.4 ESO

Salaries and fringes

SOC – Portions of salaries at standard institution rates, including overheads.

(See organizational chart and position and percent effort table in the "Introduction" section). The services provided by the University of Bremen are in general not limited to the individuals listed in the Table "FTE Allocation for all WBEs", but may be covered in part by support scientists, technicians and students, so that the percentages shown for specified individuals are in some cases higher than anticipated.

Travel

SOC – This category is an estimated projection for travel to meetings related to IODP curatorial topics. It may include visits to the Gulf Coast and Kochi Repositories for technical and training exchange, as well as cooperative work. Bremen 2 non-Europe journeys @ \$3,500

Supply

SOC – The bulk of this category is for materials related to sampling needs. This includes plastic scoops and tubes, u-channels, Pmag cubes, Styrofoam plugs, sample bags, shipping boxes, labels and ink bands for the printers; tape for the d-tubes and for packing, etc. The amount is loosely based on past needs for MSP core sampling, but future sampling activity levels are difficult to assess. We can only assume that sampling levels will increase as the size of our collection increases.

Shipping

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SOC – These costs are primarily for courier shipping of samples (incl. u-channels, and archive core halves for non-destructive measurements requests) worldwide to the requesting investigators. As with the *Supplies* category, the amount depends on the amount of sampling activity, which certainly will continue to increase with the size of our collection.

8.6.5 Bremen

Salary and Fringes

SOC - This category is the equivalent of 1.6 FTE positions, and is used to cover 80% of the salaries of W. Hale and A. Wülbers. Due to a standard 4 per cent annual salary increase for FY12 and notification of a 6.5 per cent annual salary increase for FY13, based on our (80%) FY11 salary expenditure of \$174,080.69, prorated for 2 years to 2013, we have added \$16,731.08 to this category.

Travel

SOC - This category is an estimated projection for travel to meetings related to IODP curatorial topics. It may include visits to the Gulf Coast and Kochi Repositories for technical and training exchange, as well as cooperative work.

Supplies

SOC - The bulk of this category is for materials related to sampling needs. This includes plastic scoops and tubes, u-channels, Pmag cubes, Styrofoam plugs, sample bags, shipping boxes, labels and ink bands for the printers; tape for the d-tubes and for packing, etc. The amount is loosely based on past needs, but future sampling activity levels are difficult to assess. We can only assume that sampling levels will increase as the size of our collection increases.

Shipping

SOC - These costs are primarily for courier shipping of samples worldwide to the requesting investigators. As with the *Supplies* category, the amount depends on the amount of sampling IODP Annual Program Plan 2013, which certainly will continue to increase with the size of our collection. In FY13 we are dealing with cores from three recent JR expeditions in the Atlantic, two of which will have associated high-volume sample parties. Although the sample party for Exp. 339 will be held in FY12, an estimated 70,000 samples to be taken will significantly deplete our stocks of supplies going into FY13. In addition, the growing importance of microbiological investigations to the program will likely also have an impact on these costs, because shipping samples in a frozen state is more expensive by an order of magnitude. It is impossible to predict how many of these kinds of shipments will be required, and therefore what the costs will be, even for the near future. Furthermore, the increasing use of non-destructive scanning instruments by many institutes to analyze DSDP/ODP/IODP archive-half core material is creating an uncertain situation with regard to shipping large volumes of core sections around the world, with costs running into the thousands of dollars per shipment. Therefore, we would like to have at least \$18,000.00 for this category, and hope that this amount is not exceeded.

Indirect costs

This is a flat-rate cost for university and institute administration costs and materials of 40%, based on the high-maintenance nature of this contract and extraordinary size of the operation.

9 Data Management

9.1 Goals

The goals of data management include: management of data supporting IODP activities, management of expedition and post-expedition data, management of sample and data requests and core repository inventory tracking, ensuring long-term archiving of IODP data and information, management of the drilling proposal application database, management of the Site Survey Data Bank, and increasing access to IODP data.

9.2 Summary of FY2012 Accomplishments

Several long-term data management projects were completed during FY2012 in support of IODP and post-2013 scientific ocean drilling activities. Among the data management projects completed in FY2012 was the upgrade of the Proposal Database (PDB v. 2.0) to a modern, web-forms based system. The Sample Materials Request system (known as SDRM) was similarly upgraded from an out-dated code base to a maintainable and scalable system suitable for the remainder of IODP and the post-2013 drilling program. The Scientific Earth Drilling Information System (SEDIS) was completed in FY2012 with the launch of parameter query functionality and other enhancements. SEDIS now enables users to search all IODP/ODP/DSDP data sets for specific parameters and produce an aggregated data set matching query criteria. The Taxonomic Names List was also completed and delivered to IOs during FY2012, a major step forward in the effort to standardize IODP vocabularies. The Site Survey Data Bank (SSDB) was operated throughout FY2012, maintaining consistency in the proposal and expedition planning process through IODP and into the transition phase to post-2013 IODP.

Another set of accomplishments in FY2012 relates to the establishment of the foundation for IODP data and publications archives. The IODP data and publications archives will be established in the USA, Japan, and Europe, leveraging the resources of World Data System (WDS) facilities to host permanent archives of IODP and legacy data and publications. The framework and code bases needed to deploy these archives from the SEDIS catalogues were established in FY2012. Furthermore, the framework for a central archive of IODP informational documents (e.g., Annual Program Plans, Annual Reports, SAS meeting documents, etc.) was established in FY2012. The IODP document repository will be federated with the ODP/DSDP document repositories to allow cross-searching of IODP and legacy program document archives.

9.3 Deliverables in FY2013

The IOs are responsible for capturing and storing all drilling-related data generated during shipboard operations and on-shore sampling parties. Each IO uses its own specific protocols and databases for this. In FY2013, each IO is responsible for providing access to metadata describing data stored in their respective databases as well as access to data resources (core measurements data, borehole logging data and core photographs and digital images), for providing access to data for caching of core

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measurement, borehole logging and digital images data, and for providing curatorial data for central inventory and sample request data management systems.

The Scientific Drilling Information Service (SEDIS) provides central access to the distributed IO databases (see **Figure APP-6**) by harvesting metadata from each IO and by integrating the distributed data systems using a web services approach. In FY2013, SEDIS will cache IO data resources and present data from the distributed data systems in an integrated portal for discovery, retrieval and querying. SEDIS serves as the “one-stop” access point for accessing IO data, post-expedition data and SSDB holdings, supporting service-oriented software applications access and query access to the source data systems to facilitate visualization and analysis of IODP data. FY2013 deliverables for SEDIS include hosting and maintenance of the system, as well as promotion of the SEDIS services within the IODP community and via international data networks (i.e., GEOSS).

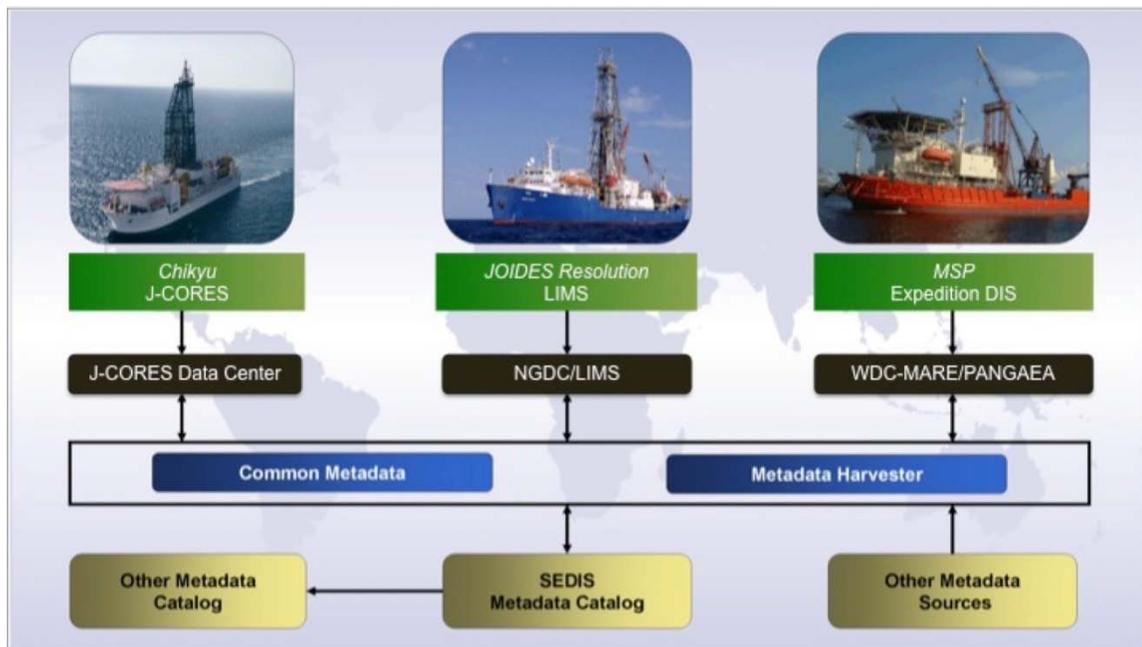


Figure APP-6: Expedition data management by IOs and IODP-MI data systems.

Sample requests and related core repository data will be handled by the Sample Materials Curation Management System (SMCS), which, together with the Central Inventory (CI), comprise the Sample Materials Request System (SDRM). The launch of SDRM v.2 and the Central Inventory as integrated systems was completed in early FY2012. During FY2013, SMCS components will be operated and maintained.

The Site Survey Databank (SSDB) remains an integral IODP IT (Information Technology) system in support of proposed drill site characterization, and is used by the Site Characterization Panel (SCP), Environmental Protection and Safety Panel (EPSP) and several other SAS panels, Task Forces and IOs working groups. The SSDB is hosted by the Scripps Institution of Oceanography at University of California San Diego. The SSDB site information packages are online resources used by SAS panel

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meetings and cited in IODP Scientific Prospectuses. In FY2013, the SSDB will have 2 submission deadlines in support of panel meetings. SSDB will continue to be managed for year-round support with special support in place during submission deadlines and panel review periods.

As of the third quarter of FY2012, the Proposal Database version 2 (PDB v2) is used for submission of drilling and workshop proposals. The PDB v2 improves the administrative functionality for reviewing and managing the IODP proposal process, including versioning and revisions of proposals, tracking proposals' status through the IODP SAS processes, and increasing the integration of proposals coversheet information with the SEDIS data inventory. In FY2013, the PDB v2 will be operated and maintained for drilling proposal processes and workshop proposal submissions.

Relatively minor data management and IT deliverables in FY2013 include operation and maintenance of the IODP Central Registry LDAP (Lightweight Directory Access Protocol) system, maintenance of the IODP drilled holes KML database, maintenance of the Taxonomic Names Lists (TNLs), and hosting, administration and maintenance of IODP servers and IT resources. IODP-MI and the IOs will also monitor and protect critical network, servers, and computer resources to ensure safe, reliable operation and security for IODP data and IT resources as per the cyber security plan developed in 2011.

A major data management deliverable in FY2013 will be deployment of permanent accessible archives of IODP data and information. There will be three permanent archives of IODP data, with one located in the USA, one located in Japan, and one located at a European scientific data center. The archives and processes for loading IODP data will follow standards-compliant, open-access protocols. Much of the work to establish the archives is happening in FY12, e.g., negotiations with World Data Systems and developing a framework for building the archives. The actual export of data sets and metadata will occur in FY13, as the mechanisms envisioned in the new framework are established to handle data that comes out of moratorium in FY14. The permanent archives will be fully operationalized in FY2013, with mechanisms established for loading FY2013 expedition data to the archives in subsequent fiscal years. The IODP document repository will also be completed in FY2013 and will be linked to ODP/DSDP document repositories for archival purposes.

Further details of IO data management activities are included in **Appendices B, C, and D**.

9.3.1 Management of Expedition Data

IOs are responsible for maintaining and managing databases supporting expedition data during moratorium. IODP-MI operates and maintains data management and harvesting systems for storage and archiving of expedition and post-expedition data, including core and sample tracking.

- a. **Management of data access systems:** CDEX uses J-CORES for shipboard data collection and the J-CORES Public Data Center for caching of versioned post-moratorium data in SEDIS. USIO uses LIMS for shipboard data collection and archives post-moratorium data at the National Geophysical Data Center (NGDC). SEDIS caches post-moratorium USIO data from both the JANUS and LIMS systems via the NGDC archives. ESO uses the DIS system for collection of data during expedition and the WDC-PANGAEA for access to data sets and web services via SEDIS.
- b. **Acquisition of core and logging data:** Each IO is responsible for capturing the scientific data that will be collected during the scheduled expeditions for FY2013 and arranging for storage of

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the data in a database so it is accessible to the expedition participants and to the scientific communities via SEDIS. IODP-MI maintains the SEDIS system with ISO-compliant metadata and OGC standards-compliant web services.

9.3.2 Management of Program-wide Data and Data Systems

IODP-MI provides program-wide data systems in support of four major program activities: Site Characterization, Drilling Proposals, Sample Materials Requests, and Data Access.

IODP data systems that are available to and used by the entire IODP and wider scientific community are managed by IODP-MI. These systems include the Site Survey Databank (SSDB), Proposal Database (PDB), Sample Material Curation System (SMCS), Scientific Earth Drilling Information System (SEDIS), and other systems. These data systems are generally hosted on IODP-MI servers, and are operated and maintained by IODP-MI data management staff or under contract with IODP-MI. The Program-wide data systems provide mission-critical capabilities for site survey review, drilling proposal submission, sample request management, and data access.

The Site Survey Databank (SSDB) is utilized for pre-expedition submission and review of site characterization information, as environmental protection and safety planning. The SSDB is used mainly by drilling proponents and the SCP and EPSP SAS panels.

The Proposal Database (PDB) is utilized to submit drilling proposals and workshop proposals. The PDB is used mainly by proponents and the PEP SAS panel.

The Sample Material Curation System is utilized to receive sample requests and track core repository holdings. It is mainly used by sample requestors and IODP Core Repository curatorial staff.

The Scientific Earth Drilling Information System (SEDIS) is utilized to access metadata, data and publications from all IOs in a single site. It is used by international researchers seeking post-moratorium data and publications with associated metadata.

The IODP expeditions mapping database is operated by IODP-MI using the Open Geospatial Consortium (OGC) data standard KML (formerly Keyhole Markup Language) to deliver data in formats useable by Google Earth, Google Map and other GIS (Geographic Information Systems) applications. The IODP.org website utilizes the IODP-MI expedition mapping database KML for the "Expedition Explorer," a dynamic mapping interface for visualizing IODP/ODP/DSDP site locations. The KML data is also available for download and use in desktop GIS applications.

- a. **SSDB:** The Site Survey Databank will be operated year-round in FY2013 for submission of site characterization and site survey data. SSDB operation, hosting and maintenance costs are included in the FY2013 budget. IODP-MI will request a 1-year proposal from UCSD to operate the SSDB in FY2014 in order to provide the post-FY2013 organizations with time to assess the future operation and maintenance strategy for the SSDB while maintaining continuity of services.
- b. **PDB:** The Proposal Database version 2 (PDB v2) will be used for submission of drilling proposal in FY2013. The PDB v2 includes online forms for completion of necessary drilling proposal information, a database for storage of information and proposal versions, and scripts for

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converting inputted data to the IODP drilling proposal document format. PDB operation, hosting and maintenance costs are included in the FY2013 budget. The PDB v2 will be migrated to a hosted server environment during FY2013 to ensure continuity of services for the 1 October 2013 proposal submission deadline, which presumably will be handled by an entity other than IODP-MI.

- c. **SMCS:** The Sample Materials Request System (SDRM) version 2 is an upgraded system for tracking user requests for materials in all IODP repositories. The system works in coordination with each repositories' in-house sample management system. The Central Inventory is the master system that links the repositories sample management systems to a Program-wide inventory of IODP sample materials. SMCS hosting, maintenance and administration fees are included in FY2013 budget. IODP-MI and Consortium for Ocean Leadership will coordinate on hosting of SMCS to ensure continuity of operation in post-FY2013 phase.
- d. **SEDIS:** The Scientific Earth Drilling Information System is the program-wide data access system. SEDIS harvests metadata from each of the IOs and Program-wide data systems and provides a searchable interface for discovery of IODP data. SEDIS hosting, maintenance and administration fees are included in FY2013 budget.
- e. **Metadata access from each IO:** Each IO is responsible for providing metadata describing the datasets they have in their own databases. IODP-MI is responsible for providing metadata from SSDB and PDB. These metadata will continue to be regularly harvested by SEDIS to provide central access to the program data by the scientific community.
- f. **IODP Data Archive:** IODP will deliver 3 data archives hosted at World Data System (WDS) World Data Centers in the USA, Japan and Europe. The code and implementation process for populating archives from SEDIS catalogues developed in FY2012 will be used to generate file-based and metadata referenced archives in FY2013. The FY2013 budget will include funding for loading of IODP archives which will continue to accept IODP data through FY2013 expedition moratorium expiration.
- g. **Transition support services:** IODP-MI will provide applications, source code, documentation, IT infrastructure resources and knowledge transfer and training to appropriate entities in the post-FY2013 scientific ocean drilling program. The FY2013 budget includes funding for the establishment of hosted servers, migration of websites, databases and applications, shipping of IT resources, and travel for knowledge transfer and training.

9.4 Transition Strategy

FY2013 data management deliverables will also include many tasks related to transition from IODP-MI to a Support Office (as yet unidentified and without fully defined responsibilities). During FY2013, IODP-MI will coordinate closely with IOs on transition planning and will undertake numerous tasks to ensure smooth transition from IODP-MI to the new structures established to support scientific ocean drilling. Among the transition deliverables during FY2013 will be, documenting all IODP data systems and providing documentation to appropriate parties, migrating mission critical websites, databases and applications to hosted servers and transferring leases for those servers to appropriate parties, transferring all needed IODP-MI IT infrastructure components (e.g., servers, networking equipment,

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etc.) to appropriate parties, and performing knowledge transfer and training as appropriate to transfer of responsibilities to post-FY2013 organizations.

9.5 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	Total
Salary and Fringes	109,038	509,236	235,482	131,249	-	\$ 985,005
Travel	20,800	40,955	-	42,000	-	\$ 103,755
Supplies	-	15,460	-	6,000	-	\$ 21,460
Shipping	5,000	1,135	-	-	-	\$ 6,135
Communication	-	6,815	-	-	-	\$ 6,815
Contractual Services	354,000	-	50,000	75,000	-	\$ 479,000
Equipment	-	55,477	-	113,400	-	\$ 168,877
Other Direct Costs	-	89,379	-	-	-	\$ 89,379
Total Direct Costs	488,838	718,457	285,482	367,649	-	\$ 1,860,426
Consumption Tax (5%)	5,702	-	-	-	-	\$ 5,702
<i>Modified Direct Costs (If applicable)</i>	-	99,250	235,482	-	-	
Indirect Costs/Administrative Fee	32,052	52,602	70,645	-	-	\$ 155,299
Total	\$ 526,592	\$ 771,059	\$ 356,127	\$ 367,649	\$ -	\$ 2,021,427

Table APP- 9-1: Data Management Total Budget for FY2013

Expense Category	IODP-MI	USIO	CDEX	Bremen	Total
Salary and Fringes	109,038	509,236	235,482	-	\$ 853,756
Travel	20,800	40,955	-	-	\$ 61,755
Supplies	-	15,460	-	-	\$ 15,460
Shipping	5,000	1,135	-	-	\$ 6,135
Communication	-	6,815	-	-	\$ 6,815
Contractual Services	354,000	-	50,000	-	\$ 404,000
Equipment	-	55,477	-	-	\$ 55,477
Other Direct Costs	-	89,379	-	-	\$ 89,379
Total Direct Costs	488,838	718,457	285,482	-	\$ 1,492,777
Consumption Tax (5%)	5,702	-	-	-	\$ 5,702
<i>Modified Direct Costs (If applicable)</i>	-	99,250	235,482	-	
Indirect Costs/Administrative Fee	32,052	52,602	70,645	-	\$ 155,299
Total	\$ 526,592	\$ 771,059	\$ 356,127	\$ -	\$ 1,653,778

Table APP- 9-2: Data Management Contract Budget for FY2013

9.6 Justification

9.6.1 IODP-MI

Salaries and Fringes — Include salaries and fringe benefits rate for IODP-MI staff.

Travel — Travel cost for staff attending data management coordination and task force meetings, visits to vendors and travel for knowledge transfer and training related to transition to post-FY2013 program operations.

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Contractual Services – The Data Management budget for FY2013 will be mainly used for the operation and maintenance of SSDB, SMCS, PDB, SEDIS and other Program-wide data systems managed by IODP-MI.

9.6.2 USIO

Salaries and Fringes—Salaries, fringes, and sea pay, including an anticipated cost-of-living allowance and estimated fringe benefits rate. SOC/POC—Salaries and fringes for staff supporting the USIO (see Section 3.2. USIO FTE Allocation Tables).

Travel—Transportation, per diem, lodging, and other associated costs. SOC—Travel to IODP meetings and travel costs for USIO staff who will work at port calls and sail on FY13 expeditions and transit. Also includes LDEO travel to professional training courses and meetings. POC—Travel costs for USIO staff who will work at port calls and sail on FY13 expeditions and transit. Also includes LDEO travel to professional training courses and meetings.

Supplies—Office and operational supplies. SOC—General office supplies and electronic media and other computer supplies with an acquisition cost of less than \$1,000 (for TAMU) and \$5,000 (for LDEO), including printers, laptops, tablet computers, and monitors (LDEO); printer and copier supplies; paper; expendables and small hardware necessary for continued operation and maintenance of IT resources; digital photographic supplies (e.g., drum scanner supplies, CDs, DVDs, and tapes) for processing images on shore; and software for all shore-based elements at LDEO. POC—General office supplies and electronic media and other computer supplies with an acquisition cost of less than \$1,000 (for TAMU) and \$5,000 (for LDEO), including printers, laptops, tablet computers, and monitors (LDEO). Other data management supplies may be purchased in support of USIO deliverables using cost avoidances gained during the fiscal year.

Shipping—Postage, express mail, and freight. SOC—Postage for regular correspondence and small packages, data and photo requests, and other shipping needs. POC—Postage for regular correspondence and small packages.

Communication—Telephone and fax charges. SOC/POC—Standard telephone line, long distance, cellular phone, and fax charges.

Contractual Services—None budgeted.

Equipment—Procurement, upgrading, or fabrication of equipment with an acquisition cost of more than \$5,000, plus those items as defined by Ocean Leadership, Columbia University, or TAMRF policy. SOC/POC—Computer and network equipment to replace aged network models, workstations, and plotters, and new workstations for new staff.

Other Direct Costs—Costs not covered in other categories.

Training—Registration, transportation, per diem, and lodging expenses related to professional training. POC—Registration and associated travel costs for professional training courses and meetings (TAMU). Registration for professional training courses and meetings (LDEO).

Business Conferences—Incidental expenses associated with meetings hosted by the USIO. SOC/POC—Expenses for refreshments provided for various business meetings and catering services occasionally required for on-site training and professional consultant services.

Software—Software purchases and upgrades. SOC/POC—Software subscriptions, volume licensing agreements, and concurrent usage software agreements used in support of continuing activities and systems maintenance for the entire enterprise (TAMU).

Services—Expert assistance. SOC—Rental for storage of paper prime data, annual physical

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examinations for seagoing personnel, TAMU Physical Plant services, IT expert assistance services, copier services, external copying and printing services, safe deposit box rentals, and back-up services. POC—Annual physical examinations for seagoing personnel, TAMU Physical Plant services, IT expert assistance services, safe deposit boxes, and copier services.

Maintenance and Repair—Maintenance agreements and equipment repairs. SOC/POC—Departmental copier maintenance agreements, various maintenance contracts and repairs for IT computer hardware and software, and noncontracted maintenance on imaging equipment such as cameras.

Library—Books, journals, and other resources. POC—Books, professional publications, and documentation materials required for reference.

Indirect Costs—Administrative and financial costs associated with operating the Program. SOC/POC— For LDEO, indirect costs at 53% are assessed on all charges except permanent equipment. In addition, subcontracts are charged indirect costs on the first \$25,000 of each contract. The indirect costs for subcontracts established prior to FY13 have already been paid, so these subcontracts are not subject to indirect cost during FY13. MTDCs are the total direct costs minus these exceptions.

9.6.1 CDEX

Salaries and fringes—Salaries and fringes for staff in CDEX. (See FTE allocation table)

Contractual Services—SOC—Annual maintenance costs for IODP specific software (GeoFrame, GeoLog, SeizEarth, etc.) and computer on Chikyu and on Land (Wireline/Log data storage/computers, etc.)

9.6.2 ESO

Salaries and fringes—Portions of salaries at standard institution rates, including overheads. POC—None budgeted. SOC—All costs.

Travel— ESO database group meetings, Data Management Coordination Group meetings, data management liaison and travel to offshore expedition. POC—None budgeted. SOC— All travel.

Supplies—POC—None budgeted. SOC—Computer consumables.

Contractual services—POC—None budgeted. SOC—Offshore DIS support and developments; continuous upgrading is planned in line with IODP-MI requirements, including VCD development.

Equipment—POC—None budgeted. SOC—ESO computer infrastructure upgrade and maintenance, and Bremen computer infrastructure upgrade and maintenance. A major computer upgrade exercise is planned ahead of IODP Expedition 347. BSCW licence for communication and data transfer.

10 Publications

10.1 Goals

The goals of IODP Publications are editing, production, and distribution of IODP scientific drilling expedition plans, initial reports and scientific results and program activities.

As shown in Figure APP-7, IODP publications have four categories, defined as follows:

The Report Series (Scientific Prospectus, Preliminary Reports, and Technical Notes); the Publications Series (IODP *Proceedings*, Expedition Reports, Expedition Research Results, Supplementary Materials, Drilling Location Maps, Expedition-related Bibliographies, Index); the Program's journal, *Scientific Drilling*, published jointly with the ICDP; and the open literature. The function of IODP publications are:

- Documentation of IO specific technology and data (Technical Notes);
- Proper scientific documentation of all drilling expeditions (Scientific Prospectus);
- Rapid documentation and publications of major findings (Preliminary Reports);
- Wide community distribution of IODP science achievements and program activities (*Scientific Drilling*) in a journal format with peer-review for Science Reports;
- Extensive legacy documentation of all expedition results (Expedition Reports of the *Proceedings*); and
- Peer-reviewed publication of post-expedition research results (open literature and data

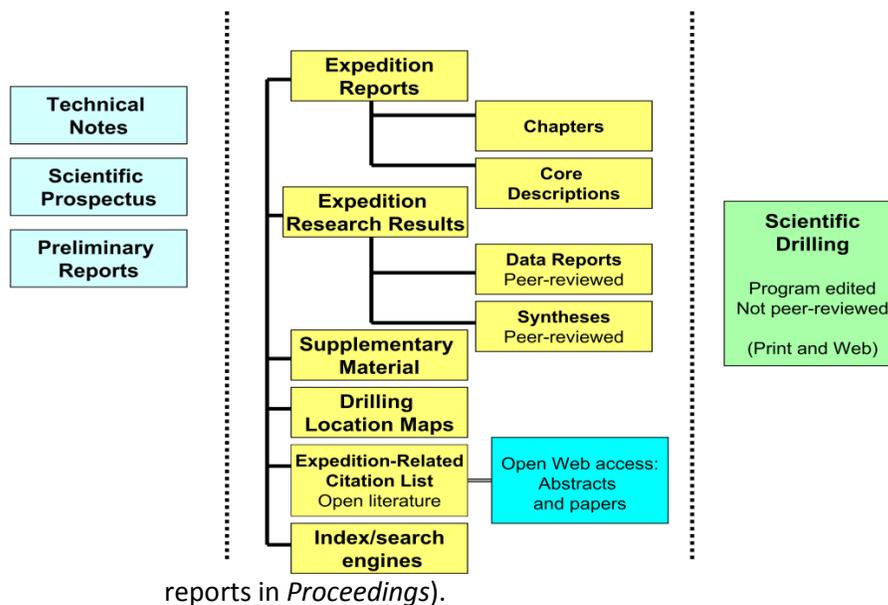


Figure APP-7: Publications produced within the program.

10.2 Summary of FY12 Accomplishments

IODP publication deliverables in FY2012 (at the time of this draft) include 15 Scientific Prospectuses or Scientific Prospectus Addendums, 5 Preliminary Reports, 8 Proceedings Volumes and 2 issues of *Scientific Drilling Journal*.

Cross-Ref Cited-by-linking services were also implemented by IODP-MI for all IODP publications in FY2012. Digital Object Identifier (DOI) registration now includes DOIs of all cited works in order to better track the impact of IODP-related publications. As noted in Deliverables (below), the process of re-submitting DOI metadata for previous IODP publications including citation DOIs will be on-going process.

The Ocean Drilling Citation Database was maintained by the American Geological Institute (AGI) GeoRef division throughout FY2012 under contract with IODP-MI.

10.3 Deliverables in FY2013

Publications: The planned publications in FY2013 are projected to reduce by about 20% in their numbers from FY12:

- Approximately 6 Scientific Prospectuses for FY 2012/2013 expeditions;
- Approximately 10 Preliminary Reports;
- Approximately 7 Proceedings of the IODP volumes covering expedition reports;
- Approximately 5 Proceedings volumes covering expeditions research content;
- One issue of the journal *Scientific Drilling*;
- Publications specialist support for approximately 8 expeditions (4 USIO, 3 CDEX, 1 ESO);
- Recording publication citations and post-expedition research submissions;

IODP-MI oversees all publication activities and is the program publisher. The production of Scientific Prospectuses, Preliminary Reports and Proceedings Volumes are managed under contract with IOs, with publication services mainly taking place at USIO-TAMU. IODP-MI reviews and edits all IODP publications.

Scientific Prospectuses, Preliminary Reports and the *Proceedings* are required for every expedition; thematically related expeditions conducted within a short period of time may be considered one single project for which an integrated set of Proceedings is produced. A Scientific Prospectus is due six months pre-expedition. A Preliminary Report is due two months post-expedition and a Proceedings Volume is due 12 months post-expedition. Each IO is contractually responsible for the production of the Technical Notes, as needed.

In FY2013 the final editing and production of all IODP Reports and Proceedings is provided by the USIO in order to secure cross-platform consistency in format and appearance. CDEX and ESO will deliver the edited draft material, including all necessary content and scientific editing. Tracking of IODP scientific publications in the open literature for inclusion in the Proceedings Volumes in FY2013 is provided by IODP-MI and IOs, based on an IODP-MI contract for generating the necessary data.

Technical Notes, Scientific Prospectus, Preliminary Reports and Proceedings Volumes are all published electronically on the Web in html and PDF formats. Volumes of electronic Proceedings are

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also available on DVD. The latter is supplied to funding agencies, libraries, expedition members, and also used for scientific outreach.

IODP-MI, with support from ICDP, produces the journal *Scientific Drilling*, including solicitation of articles, editing, production and distribution of the journal. Each IODP Expedition results in a peer-reviewed Science Report published in *Scientific Drilling*. *Scientific Drilling* is delivered in both print and electronic format on the Web. Printed copies (c. 4900) are distributed by IODP-MI to funding agencies, member institutions, libraries, the PMOs, the IODP scientific community, and to ICDP (for further distribution). The database of Scientific Drilling subscribers is regularly checked for inactive addresses and the subscriptions are updated accordingly. As of FY2012, there are approximately 2,500 individual subscribers receiving the *Scientific Drilling* journal, in addition to the issues distributed at international scientific conferences, at IODP Member Institutions, through the PMOs and by other means. Funding for one issue of *Scientific Drilling* is included in FY2013 budget.

IODP-MI collects and submits DOIs for cited works in *Scientific Drilling* and will continue to do so through FY13. IODP-MI developed and maintains the system used to register DOIs, including the Cited-by-linking DOI registrations of cited works in IODP publications. The task of collecting and submitting the DOIs for cited works from Reports Series and Publication Series is handled by the USIO. There is a significant backlog of IODP publications for which DOIs of cited works will be submitted; this effort will not be completed by end of FY13. The DOI registration system currently managed by IODP-MI will be provided to the appropriate entities at the end of FY13. It is not yet known whether IOs or Support Office would manage the DOI registration system post-FY13. Administration of the DOI registration system does require routine programming because CrossRef updates the schema for DOI submission and the changes are often not backwards compatible, requiring the DOI registration application to be re-programmed to comply with the updated DOI schema.

During FY2013, IODP-MI will deploy a permanent archive of IODP publications and related metadata. The FY2013 budget includes funds to populate the permanent archives of IODP publications. The permanent archives will be fully operational by the end of FY2013, with mechanisms established for loading FY2012-2013 Expedition publications to the archives in subsequent fiscal years.

10.4 Transition Strategy

During FY2013, IODP-MI will provide services and support in order to ensure smooth transition of IODP-MI publication tasks and responsibilities to the post-FY2013 Support Office and other appropriate entities. These services and support will include documentation of IODP IT systems, migration of code, website, applications and databases to hosted servers, transfer of raw data files of IODP publications for use of templates for future IODP publications, and knowledge transfer and training.

The raw data files, procedures manual, subscriber database, distribution list, and knowledge transfer and training for production of *Scientific Drilling* journal will be provided to the post-FY2013 Support office during FY2013. The raw files will be suitable to serve as a template for future issues of *Scientific Drilling*. The subscriber database will ensure continuity for subscribers of the journal.

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The AGI GeoRef contract will be transferred to the Support Office or other appropriate entity at the conclusion of the FY2013 contract period. Knowledge transfer will be provided to the receiving entity to ensure that IODP-related publications continue to be catalogued and metadata for such publications is made available for reporting and for related publications data systems.

The CrossRef DOI registration website, application, database and documentation will be migrated to hosted servers and provided to the post-FY2013 Support Office or other appropriate entity. This application will allow DOIs for IODP publications to continue to be submitted using the current process. This application is also used for CrossRef Cited-by-linking submissions. Knowledge transfer and training will be provided to the hosting entity for the CrossRef DOI registration system.

10.5 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	Total
Salary and Fringes	73,680	1,198,390	-	-	-	\$ 1,272,070
Travel	4,000	40,400	-	-	-	\$ 44,400
Supplies	-	30,150	-	-	-	\$ 30,150
Shipping	5,200	3,400	-	-	-	\$ 8,600
Communication	-	8,000	-	-	-	\$ 8,000
Contractual Services	25,000	-	-	-	-	\$ 25,000
Equipment	-	-	-	-	-	\$ -
Other Direct Costs	-	9,525	-	-	-	\$ 9,525
Total Direct Costs	107,880	1,289,865	-	-	-	\$ 1,397,745
Consumption Tax (5%)	5,194	-	-	-	-	\$ 5,194
<i>Modified Direct Costs (If applicable)</i>	-	-	-	-	-	-
Indirect Costs/Administrative Fee	1,352	-	-	-	-	\$ 1,352
Total	\$ 114,426	\$ 1,289,865	\$ -	\$ -	\$ -	\$ 1,404,291

Table APP- 10: Publication Budget for FY2013 (Total and Contract Budgets are identical)

10.6 Justification

10.6.1 IODP-MI

Salaries and Fringes — Include salary and fringe benefits rate for IODP-MI staff.

Travel – Travel costs for staff providing publications support.

Shipping – Shipping cost for *Scientific Drilling*.

Contractual Services – Services for publishing *Scientific Drilling* (IODP contribution - excluding ICDP support).

10.6.2 USIO

Salaries and Fringes—Salaries, fringes, and sea pay, including an anticipated cost-of-living allowance and estimated fringe benefits rate. SOC/POC—Salaries and fringes for staff supporting the USIO (see Section 3.2. USIO FTE Allocation Tables) and for USIO staff providing Publications Assistant support for CDEX expeditions, as required, and at an ESO onshore Science Party meeting.

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Travel—Transportation, per diem, lodging, and other associated costs. SOC—Travel costs for IO and USIO meetings and professional conferences; for USIO staff to provide Publications Assistant support for CDEX IODP expeditions, as required, and to attend an ESO onshore Science Party meeting, for nonsailing USIO staff to work at port calls, and to bring off-site USIO staff to participate in on-site meetings. POC—Travel costs for USIO staff who will sail on FY13 and initial FY14 expeditions.

Supplies—Office and operational supplies. SOC—General office supplies. POC—None budgeted.

Shipping—Postage, express mail, and freight. SOC—Postage and shipping for regular correspondence and IODP scientific reports. POC—None budgeted.

Communication—Telephone and fax charges. SOC—Standard telephone line, long distance, and fax charges. POC—None budgeted.

Other Direct Costs—Costs not covered in other categories.

Business Conferences—Incidental expenses associated with meetings hosted by the USIO. SOC—Meal expenses related to hosting meetings. POC—None budgeted.

Services—Expert assistance. SOC—Payments to IODP Editorial Review Board members, annual physical examinations for seagoing personnel, and printing of annual report. POC—None budgeted.

Equipment Rental—Rental of equipment when it is more economical to rent than to purchase. SOC—Water cooler rental. POC—None budgeted.

Maintenance and Repair—Maintenance agreements and equipment repairs. SOC—Copier repairs and copier and forklift maintenance agreement. POC—None budgeted.

10.6.3 CDEX

None budgeted.

10.6.4 ESO

Salaries and fringes—Portions of salaries at standard institution rates, including overheads. POC—None budgeted. SOC—All costs.

Travel—Attend outreach meetings associated with the Baltic Paleoenvironment (offshore and onshore) expedition, and for forthcoming expeditions (Chixculub, Hawaii Drowned Reefs, and Atlantis Massif Seafloor Processes) as appropriate. Attend conferences (EGU, AGU) and other E&O activities. POC—None budgeted. SOC—All costs.

Supplies—POC—None budgeted. SOC—Printing brochures for expeditions, support of booths, materials etc.

11 Outreach

11.1 Goals

IODP outreach aims to promote the program and scientific expeditions by highlighting program activities and achievements to various focus groups: the scientific community, Funding Agencies, program partners, educators/students, the general public, and the media. IODP outreach activities take various forms including media relations, web communication and production of rich set of multimedia materials, active presence at scientific conferences and organization of Town Hall Meetings and media conferences, and development and dissemination of educational materials. IODP-MI is responsible for coordination of these international outreach activities conducted in cooperation with outreach task force members, including the IOs and PMOs.

11.2 Summary of FY12 Accomplishments

Continuous efforts to oversee the integrated program's outreach activities and to send positive messages of the program to the society brought targeted deliverables in FY 2012.

- IODP outreach maintained and established contacts with media networks to reach international and major national press. News of IODP activities appeared in high-profile media and journals such as the BBC, Public Broadcasting Service, and quality journals such as *Nature*, *Science*, and *EOS* as well as worldwide online media. Many appearances resulted from strategically timed press releases, at media events and handling of daily media inquiries.
- IODP outreach actively participated at international scientific and technological conferences; AGU, EGU, OTC, JPGU, Goldschmidt and IGC. Outreach contributed to expand the IODP and non IODP communities Booth activities, press conferences and Town Hall Meetings were planned and implemented at these meetings to provide program updates and publicize expedition results. 350 people participated at the AGU Town Hall Meeting in 2012, up 35% from 2011, and the EGU Town Hall Meeting welcomed 225 participants.
- IODP outreach developed informational and multimedia materials in print and on line formats. These were effectively distributed and assisted to increase awareness of the whole program. A new program website was launched to provide information with easy access and reduce administration costs. The 16-page program brochure was updated and distributed to potential member countries. Community newsletters and expedition-specific web portal pages managed by the IOs contributed to maintaining awareness in IODP member countries and attract new members towards the program.

11.3 Deliverables in FY2013

In FY2013, IODP outreach will continue to make efforts to increase visibility of the integrated program, to promote expedition highlights, achievements, and platform accomplishments working closely with members of outreach task force and national entities such as the PMOs. There are no SOC budgets requested by USIO and CDEX. The IODP-MI budget request mainly focuses on electronic means of outreach.

- Media relations: IODP outreach will continue to develop and maintain professional relationships with the media, handle inquiries in a swift and effective manner, and monitor

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news coverage. To encourage the media to take stories directly from IODP press releases, outreach will continue to ensure that quality press releases are developed and issued on time.

- Multimedia communications: IODP outreach will continue to use multimedia communications including website and social net services to communicate program updates and disseminate positive images of the program.
- The outreach task force will not meet physically in FTY2013 due to budget constraints. Regular communication and coordination between task force members will be conducted via electronic methods.
- IODP outreach will continue to maintain an inventory of printed materials and act on opportunities to distribute these materials (e.g. at scientific conferences and media events). When appropriate, PDF format can be more effectively used to reduce cost.
- Active presence at international scientific conferences will continue in FY2013, with priority on the Fall Meeting (December 2012) of the American Geophysical Union, the European Geosciences Union (April 2013), and the Japan Geophysical Union (May 2013) if budget allows. Press conferences can be held at these meetings to report on expeditions, scientific results, and general program activities. A Town Hall event will be held at Fall AGU (December 2012); other Town Hall events will be considered if budget allows.
- Educational activities will be continued by national efforts as possible within available national resources. Organizing port calls and developing educational materials in traditional and innovative formats including printed and web portal will be carried out if possible within budget.

11.4 Budget

Expense Category	IODP-MI	USIO	CDEX	ESO	Bremen	Total
Salary and Fringes	120,300	-	-	77,500	-	\$ 197,800
Travel	7,800	-	-	30,000	-	\$ 37,800
Supplies	-	-	-	12,000	-	\$ 12,000
Shipping	15,000	-	-	-	-	\$ 15,000
Communication	-	-	-	-	-	\$ -
Contractual Services	35,000	-	-	-	-	\$ 35,000
Equipment	-	-	-	-	-	\$ -
Other Direct Costs	2,000	-	-	-	-	\$ 2,000
Total Direct Costs	180,100	-	-	119,500	-	\$ 299,600
Consumption Tax (5%)	6,865	-	-	-	-	\$ 6,865
<i>Modified Direct Costs (If applicable)</i>	-	-	-	-	-	
Indirect Costs/Administrative Fee	14,471	-	-	-	-	\$ 14,471
Total	\$ 201,436	\$ -	\$ -	\$ 119,500	\$ -	\$ 320,936

Table APP- 11-1: Outreach Budget for FY2013.

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Expense Category	IODP-MI	USIO	CDEX	Bremen	Total
Salary and Fringes	120,300	-	-		\$ 120,300
Travel	7,800	-	-		\$ 7,800
Supplies	-	-	-		\$ -
Shipping	15,000	-	-		\$ 15,000
Communication	-	-	-		\$ -
Contractual Services	35,000	-	-		\$ 35,000
Equipment	-	-	-		\$ -
Other Direct Costs	2,000	-	-		\$ 2,000
Total Direct Costs	180,100	-	-		\$ 180,100
Consumption Tax (5%)	6,865	-	-		\$ 6,865
<i>Modified Direct Costs (If applicable)</i>	-	-	-	-	-
Indirect Costs/Administrative Fee	14,471	-	-	-	\$ 14,471
Total	\$ 201,436	\$ -	\$ -	\$ -	\$ 201,436

Table APP- 11-2: Outreach Contract Budget for FY2013.

11.5 Justification

11.5.1 IODP-MI

Salaries and Fringes – Salary and fringe benefits for 1.0 FTE

Travel – Two person-trips for the December 2012 AGU meeting and coordination with other entities for the program transition.

Shipping – Shipping program informational materials to program partners and promotional events.

Contractual Services – The iodp.org web site hosting, maintenance, news monitoring and information services, limited graphic services.

Other Direct Costs – Limited printing, EOS advertizing, and miscellaneous costs.

11.5.2 USIO

No SOC budget is included for FY2013.

11.5.3 CDEX

No SOC budget is included for FY2013.

11.5.4 ESO

Salaries and Fringes – **Portions** of salaries at standard institution rates, including overheads. No POC budgeted, SOC all costs

Travel – Attend outreach meetings associated with the Baltic Paleoenvironment (offshore and on shore) expedition, and for forthcoming expeditions (Chixculub, Hawaii Drowned Reefs, and Atlantis Massif Seafloor Processes) as appropriate. Attend conference (EGU, AGU) and other E&O activities. No POC budgeted, SOC all costs (BGS 6 journeys@ \$3,000, Bremen 4 journeys@\$3,000)

Supplies – No POC budgeted, SOC printing brochures for expeditions, support of booths and materials

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Shipping, Communication, Contractual services, Equipment and Other Direct Costs – None budgeted

12 Scientific Operation Summary (FY11Q3-FY12Q2)

12.1 Relation to IODP Science Plan

The IODP Science Plan *Earth, Oceans, and Life* contains three major themes and eight initiatives. IODP strives to address these themes and initiatives. From June 2011 to May 2012, IODP completed five expeditions (including 340-in-transit) addressing all three major themes and four initiatives. During these expeditions, shipboard scientific parties consisted of 137 scientists from 18 countries supported by 6 expedition project managers and 11 logging staff scientists.

12.1.1 Theme 1: The Deep Biosphere and Subsurface Ocean

- Expedition 336 Mid-Atlantic Ridge Microbiology (Initiative: Deep Biosphere)

12.1.2 Theme 2 Environmental Change, Processes, and Effects

- Expedition 339 Mediterranean Outflow (Initiative: Rapid Climate Change)

12.1.3 Theme 3 Solid Earth Cycles and Geodynamics

- Expedition 335 Superfast Spreading Rate Crust 4 (Initiative: 21st Century Mohole)
- Expedition 340T Atlantic Massif Oceanic Core Complex
- Expedition 340 Lesser Antilles Volcanism and Landslides
- Expedition 343 J-FAST (Initiative: Seismogenic Zone)

12.2 Expedition-specific Scientific Highlights

Work toward expedition-specific objectives can continue after the end date of an expedition through shore-based analysis, integration among disciplines, and comparison of results from other expeditions. Therefore, the most significant outcomes of an expedition sometimes emerge well after the active phase is concluded. Nonetheless, early indications of expedition success can be identified. The following are summarized from shipboard scientific party reports:

12.2.1 Expedition 336 Mid-Atlantic Ridge Microbiology (395A, U1382, U1383)

- The site in the North Pond region of the Atlantic Ocean (22°45'N, 46°05'W) in 4414–4483 m water depth is characterized by vigorous circulation of seawater in permeable 8 Ma basaltic basement underlying a <300 m thick sedimentary pile. The combined microbiobiogeochemical-hydrological experiments were successfully carried out to meet the primary objective of understanding how the seawater circulation affects microbial and geochemical processes in the uppermost basement.
- Deep Exploration Biosphere Investigative tool (DEBI-t) was used for the first time for detecting in situ microbial life in ocean floor boreholes.
- Initiated subseafloor observatory science at a young mid-ocean-ridge flank setting.
- Hole U1382B: 189 m long CORK observatory is installed for pressure monitoring, microbiological sampling and fluid sampling in uppermost basaltic crust.
- Hole U1383C: A multilevel CORK observatory is installed for monitoring pressure and temperature, dissolved oxygen, and fluid sampling.

12.2.2 Expedition 339 Mediterranean Outflow (U1385 – U1391)

- Coring off the Iberian Margin focused on the significance of Mediterranean Outflow Water (MOW) in paleoceanography, climate and sea level changes.
- Cores obtained from U1385 serve as a marine reference section of Pleistocene climate variability, and will significantly improve the precision with which marine climate records can be correlated to polar ice cores and terrestrial sequences.
- Cores obtained provide latest Miocene to Holocene sedimentary succession in different sites with clear records of MOW influence on the North Atlantic Ocean through Gibraltar Gateway. Evidence shows enhanced MOW influence through the Quaternary.
- Wax and wane of drift sediments include decimetric-scale cycles characterized by relative abundance and thickness of silty contourites.

12.2.3 Expedition 335 Superfast Spreading Rate Crust 4 (1256D)

- This Expedition marked the fourth attempt to deepen the Hole 1256D to understand the nature of the ocean crust formed at a fast spreading rate.
- The previously drilled bottom depth of 1507 mbsf was deepened to 1521.6mbsf and obtained a few cores, cobbles, rubbles and cuttings.
- A new finding is evidence of intrusive, structural, and textural relationships, along with overprinting and crosscutting hydrothermal alteration and metamorphic paragenetic sequences.
- Another indication is the high extent of metamorphic recrystallization shown by the granoblastic basalt likely originating from the lowermost reaches of Hole 1256D.

12.2.4 Expedition 340T Atlantic Massif Oceanic Core Complex (U1309D, U1392)

- This short Expedition obtained new geophysical downhole measurement data (logging and vertical seismic profiling) to enable core-log-seismic integration over different spatial scales to attribute the observed seismic reflectivity to altered olivine-rich troctolite cored beneath the dormal core of Atlantic Massif west of the Mid-Atlantic Ridge at 30°N.
- Obtained the first *in situ* velocity measurements of gabbros typical of oceanic lower crust, with V_p reaching values $>7\text{km/s}$.
- The results including temperature measurements suggest that percolation of seawater along the fault zone is still active.

12.2.5 Expedition 340 Lesser Antilles Volcanism and Landslides (U1393 – U1401)

- Cores to understand the magmatic evolution and eruptive history of the Lesser Antilles arc in space and time and to identify evidence of volcanic hazards including volcanic debris avalanches were obtained.
- Cores with tephra records will enable reconstruction of the Monserrat volcanism history as far back as 4.5Ma.
- The eruptional and depositional history of Martinique will date back to $\sim 350\text{ ka}$.

12.2.6 Expedition 343 J-FAST (Japan Trench Fast Drilling Project: C0019)

- Succeeded in drilling in nearly 7 km water depth at the Japan Trench area where the 2011 March 11 M9 earthquake occurred and caused huge tsunami and penetrated the subducting plate boundary marking a world depth record in scientific ocean drilling.
- Logging data and core samples were obtained to seismologically and geologically characterize the M9 earthquake faulting at its shallowest dip end.

12.3 Major Peer-Reviewed Publications in FY2011-2012 (as of May 2012)

(Note, expedition numbers are added after the reference)

- McCaig, A. M., Harris, M. (2012), Hydrothermal circulation and the dike-gabbro transition in the detachment mode of slow seafloor spreading, *Geology*, 40(4), 367-370. [*Expeditions 304/305*]
- Deschamps, P., Durand, N., et al. (2012), Ice-sheet collapse and sea-level rise at the Bolling warming 14,600 years ago, *Nature*, 483(7391), 559-564. [*Expedition 310*]
- Channell, J.E.T., Hodell, D.A., et al. (2012), A 750-kyr detrital-layer stratigraphy for the North Atlantic (IODP Sites U1302-U1303, Orphan Knoll, Labrador Sea), *Earth and Planetary Science Letters*, 317-318, 218-230. [*Expeditions 303/306*]
- Naafs, B.D.A., Hefter, J., et al. (2012), Strengthening of North American dust sources during the late Pliocene (2.7 Ma), *Earth and Planetary Science Letters*, 317-318, 8-19. [*Expeditions 303/306*]
- Ikari, M.J., Strasser, M., et al. (2011), Submarine landslide potential near the megasplay fault at the Nankai subduction zone, *Earth and Planetary Science Letters*, 312(3-4), 453-462. [*Expedition 315/316*]
- Passchier, S. (2011), Ancient Antarctic fjords, *Nature*, 474(7349), 46-47. [*Expedition 318*]
- Marz, C., Vogt, C., et al. (2011), Variable Eocene-Miocene sedimentation processes and bottom water redox conditions in the central Arctic Ocean (IODP Expedition 302), *Earth and Planetary Science Letters*, 310(3-4), 526-537. [*Expedition 302*]
- Slagle, A. L., Goldberg, D.S. (2011), Evaluation of ocean crustal Sites 1256 and 504 for long-term CO₂ sequestration, *Geophysical Research Letters*, 38(16). [*Expedition 309/312*]
- Blackman, D. K., Ildefonse, B., et al. (2011), Drilling constraints on lithospheric accretion and evolution at Atlantis Massif, Mid-Atlantic Ridge 30 degrees N, *Journal of Geophysical Research*, 116(B7). [*Expeditions 304/305*]
- Alonso-Garcia, M., Sierro, Francisco, J., et al. (2011), Arctic front shifts in the subpolar North Atlantic during the mid-Pleistocene (800-400 ka) and their implications for ocean circulation, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 311(3-4), 268-280. [*Expeditions 303/306*]
- Yamazaki, T. (2011), Paleoposition of the intertropical convergence zone in the eastern Pacific inferred from glacial-interglacial changes in terrigenous and biogenic magnetic mineral fractions, *Geology*, 40(2), 151-154. [*Expeditions 320/321*]
- Minakov, A. N., Podladchikov, Y.Y. (2011), Tectonic subsidence of the Lomonosov Ridge, *Geology*, 40(2), 99-102. [*Expedition 302*]
- De Schepper, S., Fischer, E. I., et al. (2011), Deciphering the palaeoecology of late Pliocene and early Pleistocene dinoflagellate cysts, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 309(1-2), 17-32. [*Expeditions 303/306*]
- Romero, O. E., Swann, G. E. A., et al. (2011), A highly productive subarctic Atlantic during the last interglacial and the role of diatoms, *Geology*, 39(11), 1015-1018. [*Expeditions 303/306*]

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- Alt, J. C., Shanks, W.C. (2011), Microbial sulfate reduction and the sulfur budget for a complete section of altered oceanic basalts, IODP Hole 1256D (eastern Pacific), *Earth and Planetary Science Letters*, 310(1-2), 73-83. [Expedition 309/312]
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