参考資料３

FY05 Program Plan for the Integrated Ocean Drilling Program (IODP)

June 28, 2004

Approved by

Science Planning and Policy Oversight Committee

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Kensaku Tamaki

and

Executive Committee of the Integrated Ocean Drilling Program (IODP) International Inc, Board of Governors

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Hisatake Okada

A) PREFACE

This document represents the Program Plan for the second operational year of the Integrated Ocean Drilling Program (IODP). The Plan contains the scientific rationale for non-riser vessel (*JOIDES Resolution*) operations, spanning from October 2004 to May 2005, and for the second Mission-Specific Platform (MSP) program during the summer of 2005, an expedition to offshore Tahiti to study the last deglacial sea-level rise in the South Pacific. The Program Plan also provides details of the ongoing outfitting of the Japanese riser vessel *Chikyu*, and a description of the preparation (e.g., engineering and hazards site surveys) for the inauguration of riser-based scientific operations in FY07.

The science presented in this Program Plan is the combined product of three ranking exercises by the IODP Science Advisory Structure (SAS). In August 2002, the five extant MSP programs were ranked by the interim Planning Committee of IODP at the request of the International Working Group (IWG). A second (global) ranking of all programs by the Science Planning Committee (SPC) occurred later in September 2003. At the March 2004 SPC meeting, the Tahiti component of the Last Glacial Sea Level Rise program was put forth to the IODP-MI Operations Committee (OPCOM) as an MSP operation to be conducted in FY05. The introduction of the Tahiti Sea Level Program is the most substantial addition to the FY05 Program Plan (over the provisional FY05 schedule set forth in the FY04 Program Plan). Minor modifications were made to the JOIDES Resolution schedule by OPCOM.

DOCUMENT STRUCTURE

The **Executive Summary** contains three sections: the first provides an overview of the IODP and explains its structure, entities and functions. The second section provides a description of the scientific operations and associated activities for the FY05 field programs, along with activities in support of *Chikyu* operations currently scheduled for FY2006. The third section provides summary budget information.

The **Program Plan** contains five major sections. The first outlines the organizational framework and entities of IODP, describes the management and operational structure of IODP, and explains how the SAS provides advice and guidance to the program. The second section describes the planning process leading to the development of the FY05 operational schedule. The third section is a description of the scientific and operational FY05 expeditions. The fourth section summarizes the overall budget for FY05 (detailed budgets from the IOs are presented in the appendices). The fifth section summarizes the management and administration details and detailed budgets of the Central Management Office, IODP-MI.

Appendix A provides specific budgets for support of the Sapporo Office of IODP-Management International, Inc, submitted by AESTO.

Appendix B provides specific activities and detailed budgets for non-riser vessel operations, submitted by the JOI Alliance (JOI, Inc., TAMU, LDEO-Columbia).

Appendix C provides specific activities and budgets in support of continued outfitting of the riser vessel *Chikyu* and long-range planning in preparation for international science operations by that vessel, submitted by the Center for Deep Earth Exploration (CDEX).

Appendix D provides specific activities and detailed budgets for the Tahiti Sea Level drilling program and advance planning for future MSP projects, submitted by the ECORD Science Operator (BGS, the European Petrophysics Consortium [Universities of Aachen, Leicester, GFZ/ICDP – Potsdam, Montpelier], University of Bremen).

Appendix E provides specific activities and budgets for the operation of the IODP repository at the University of Bremen

B) FY05 PROGRAM PLAN -- EXECUTIVE SUMMARY

ORGANIZATIONAL FRAMEWORK

The Integrated Ocean Drilling Program (IODP) is an international partnership of scientists and research institutions organized to explore Earth's history and structure as recorded in the ocean basins. IODP will provide sediment and rock samples (cores), shipboard (i.e., platform-based) and shore-based facilities to study these samples, downhole geophysical and geochemical measurements (logging/petrophysics), and opportunities for special experiments (i.e., seafloor and sub-seafloor observatories) to determine *in situ* conditions beneath the seafloor. IODP studies will lead to a better understanding of plate tectonic processes, Earth's crustal structure and composition, environmental conditions and life in ancient oceans, and climate change.

IODP is sponsored by Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the U.S. National Science Foundation (NSF) as lead agencies and by the European Consortium for Ocean Research Drilling (ECORD). China has also recently joined IODP. The lead Agencies (NSF and MEXT) are currently in discussion with other potential IODP members The IODP Council, representing all IODP members, provides a forum for consultation among the NSF, MEXT, EMA (Executive arm of ECORD), and other IODP member funding agencies.

IODP operation is based on three components:

The Central Management Office (CMO). IODP-MI has received a 10-year contract from the lead agencies to run the CMO.

The Implementing Organizations (IOs). There are three IOs:

- JOI Alliance, which is responsible for the non riser ship, the JOIDES *Resolution*
- Center for Deep Earth Exploration (CDEX) , which is responsible for the Riser ship, *Chikyu*, and
- ECORD Science Operator (ESO), which is responsible for Mission Specific Platforms (MSPs)

The Science Advisory structure. The IODP Science Advisory Structure (SAS) is composed of scientists, engineers and technologists designated by IODP member organizations, such as national or consortia organizations

The funds provided by the funding agencies are in two categories: Platform Operation Costs (POC)s, and Science Operation Costs (SOC)s. The POCs are provided directly by NSF to JOI Alliance for the operation of the JOIDES *Resolution*, by MEXT to CDEX for the operation of *Chikyu*, and by EMA to ESO for operation of MSPs. The SOC funds from the funding agencies are comingled and are provided to IODP-MI. These funds are used for Management and Administration at IODP-MI Washington and Sapporo offices, and through subcontracts are provided by IODP-MI to the IOs and to third parties for various shipboard and shorebased science service costs. The relationships between the three components described above are summarized in **Figure ES-1**.

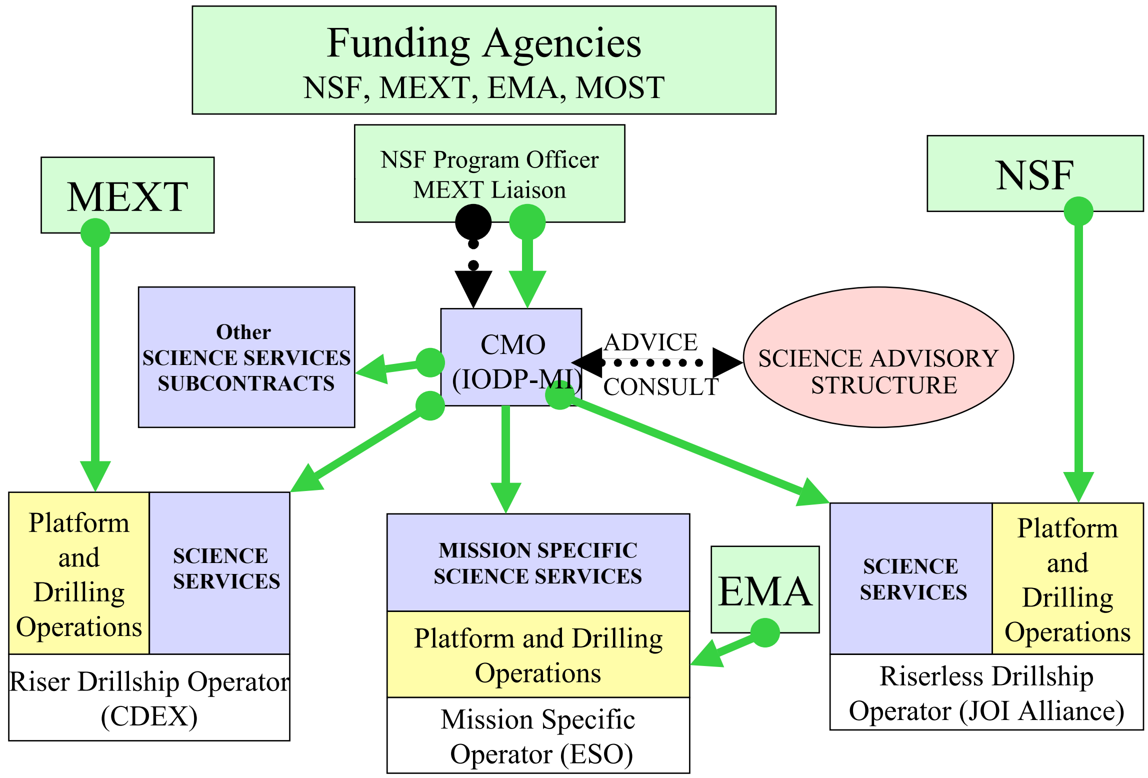


Figure ES-1: *IODP program management structure. SOCs represent "Science Operation Costs", while POCs represent "Platform Operation Costs", as defined in IODP principles and since modified by the Lead Agencies. The funding agencies consist of NSF and MEXT (as the Lead Agencies), EMA as a contributing member, and MOST (China) as an Associate Member. Solid arrows indicate flow of funds. Dotted arrows indicate flow of advice.*

IODP-MI – The Central Management Organization

The wiring diagram for IODP-MI Management and administration for the Washington office and the Sapporo office (which is operated through a subcontract to AESTO) is given in **Figure ES-2**. Besides the President (Manik Talwani), there are three key personnel: Vice President for Science Operations (Thomas Janecek), who as chairman of OPCOM puts together the annual operational plan in conjunction with the IOs and the SAS, Vice President for Planning (Hans Christian Larsen) who has a major liaison function with the SAS and also supervises the SAS support office, located in Sapporo in addition to Data Management and Publication responsibilities there, and Senior Advisor to the President (Yoichiro Otsuka) who has a liaison function with the funding agencies. A Financial and Administrative Officer, a Contracts Officer, and a Director of Communications constitute the remaining Senior personnel.

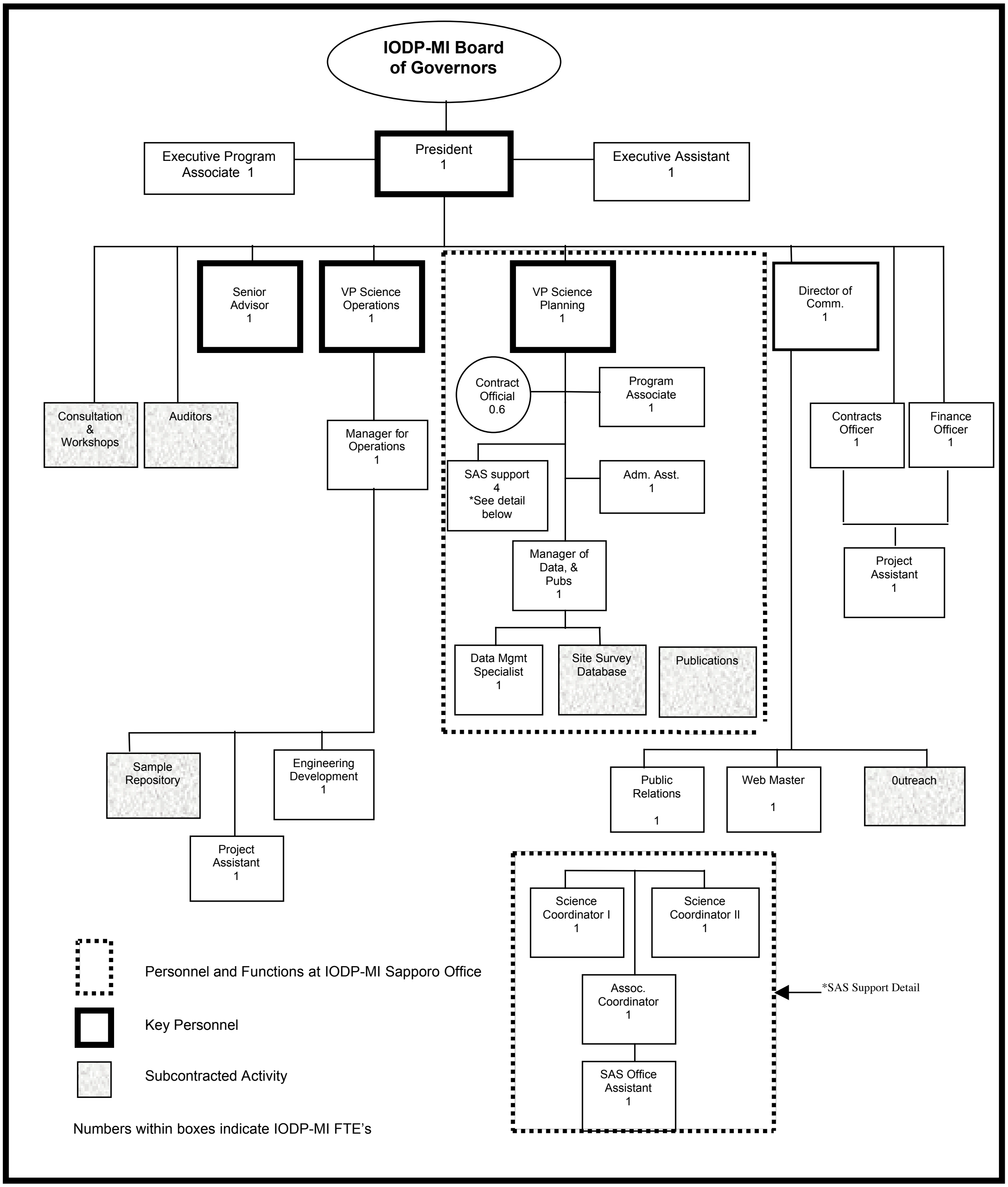


Figure ES-2 *Organization of IODP Management International, Inc. Three positions (Manager of Operation, the Executive Program Associate and Public Relations officer) will be hired halfway through FY05. Two positions (Engineering Development and a Project Assistant) will not be hired until FY06.*

Implementing Organizations

IODP is the first scientific ocean drilling program to have more than one Implementing Organization (i.e., drilling operator). Riserless drilling capability will be supplied in FY05 by the JOI Alliance, a partnership of JOI, Inc., Texas A&M University (operation of the riserless drillship, the *JOIDES Resolution* in the first phase of IODP, and associated activities of expedition staffing, logistics, program-specific engineering development and operations, shipboard laboratories, curation and distribution of core samples and data) and Lamont-Doherty Earth Observatory of Columbia University (geophysical and geochemical logging services, involving acquisition, processing and interpretation of logging measurements). The ECORD Science Operator (ESO) will supply MSPs drilling and logging capabilities. The ESO is a consortium led by the British Geological Survey (MSP operations and program-specific engineering development), the European Petrophysics Consortium (logging services) and the University of Bremen (repository services). Riser drilling capability using the vessel *Chikyu* will be supplied by the Center for Deep Earth Exploration (CDEX) starting in FY07.

Science Advisory Structure

The IODP Science Advisory Structure (SAS) provides long-term guidance on the scientific planning of the IODP, and recommends annual science and engineering plans based on proposals from the international science community. The SAS consists of the Science Planning and Policy Oversight Committee (SPPOC), the Science Planning Committee (SPC), as well as several advisory panels (**see Figure ES-3)** containing hundreds of scientists from the international geoscience community in IODP member countries and consortia.

The SPPOC (Kensaku Tamaki, chairman) heads the SAS, and is considered the "Executive Authority" and is composed of representatives from scientific organizations in the IODP member countries. SPPOC is a committee of IODP-MI. The SPPOC, as its name implies, provides scientific oversight of IODP. An important responsibility of the SPC (Mike Coffin, chairman; Keir Becker, vice chairman) is to prioritize the recommendations for the drilling sites. It considers recommendations from the various SAS panels and is the focus of scientific planning for IODP.

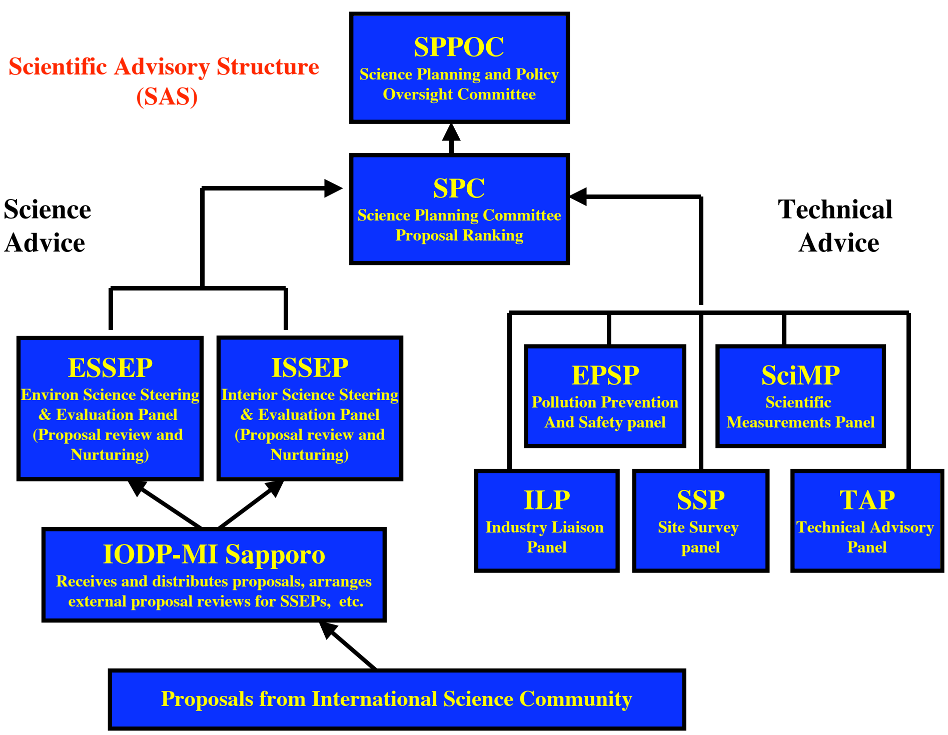


Figure ES-3*: IODP Science Advisory Structure (SAS).*

A principal responsibility of IODP-MI is to construct an annual program plan. In doing so its OPCOM committee plays a very important part (**Figure ES-4**). OPCOM receives prioritized drilling recommendations from SPC, and in discussions with the IOs and SPC constructs an operational plan. The operational plan is sent to SPC for review and comment and, if necessary, modifications are made**.** IODP-MI then uses it to construct an annual Program Plan after receiving budgetary guidance from the lead agencies. The Program Plan includes proposals for subcontracts from the IOs and other third parties and is submitted to SPPOC and then to the IODP-MI Board of Governors for approval, and finally to NSF which administers the contract on behalf of the funding agencies.

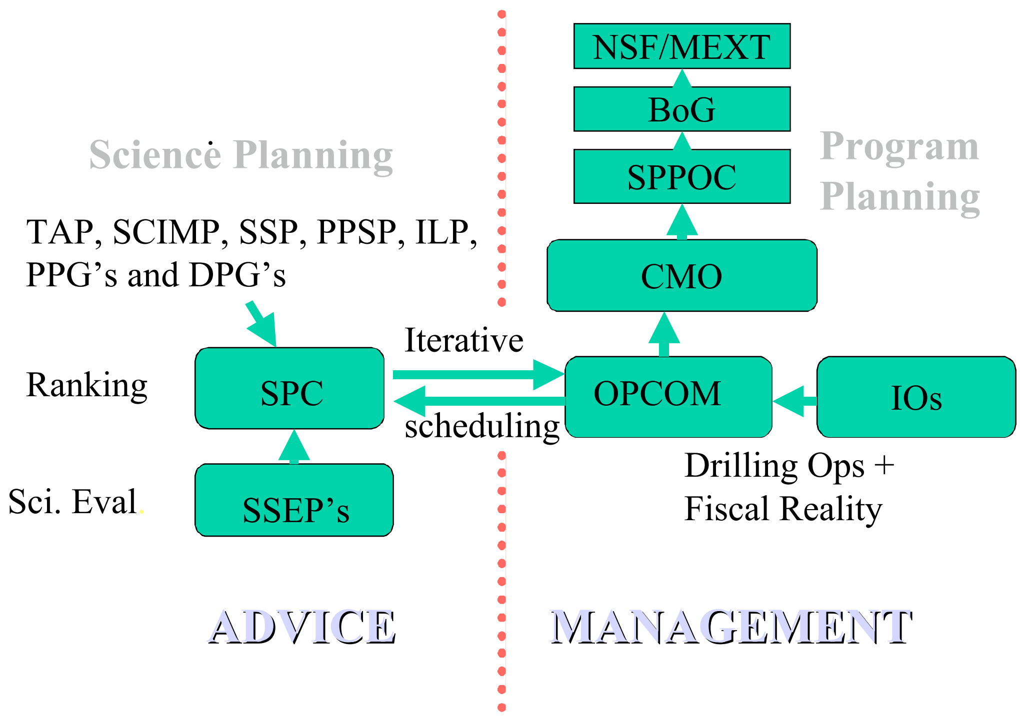


Figure ES-4 *The flow of scientific advice from the science and technical communities to the IODP management structure occurs via advisory panels and committees. Scientific planning for the IODP is provided by a Science Advisory Structure (SAS) which is led by the Science Planning Committee. IODP-Management International is the Central Management Organization (CMO) that will translate the scientific priorities of ocean drilling community into program plans to carry out the scientific operations of IODP. It will do so based on advice from the international IODP Science Advisory Structure (SAS), and in consultation with vessel operators (referred to as "Implementing Organizations," IOs).*

FY05 EXPEDITION DESCRIPTIONS

Figure PP-05 *FY05 Expedition Locations*

Specific details concerning science operations for FY05 are presented in the Program Plan (Section 6 of the document). Here we provide a brief summary of the operations.

	Cruise	**Port (Origin)**	**Dates**	**Total Days (Port/Sea)**	**Days at Sea (Transit/Op[4])**
303	North Atlantic Climate 1	St. John's Newfld	22 Sept – 14 Nov	53 (5/48)	5/43
304	Oceanic Core Complex 1	Ponta Delgada	14 Nov – 5 Jan '05	52 (5/47)	7/40
305	Oceanic Core Complex 2	Ponta Delgada	5 Jan – 27 Feb	53 (5/48)	7/41
306	North Atlantic Climate 2	Ponta Delgada	27 Feb – 22 Apr	54 (5/49)	4/45
307	Tahiti		Spring/ Summer-05		
	JR Transit	Reykjavik	22 Apr – 10 May	18 (3/15)	15/0
	JR Demobilization	Galveston	10 May – 1 Jun	22 (22/0)	0/0

Table ES-1. *Operational schedule for the Riserless and MSP platforms in FY05*

JOI Alliance Riserless Operations
The FY05 Program consists of the completion of one science program initiated at the end of FY04 and three complete science programs, all in the North Atlantic Oean (See **Figure ES-5** for expedition locations and the detailed Budget Section in the JOI Alliance appendix for expedition costs).

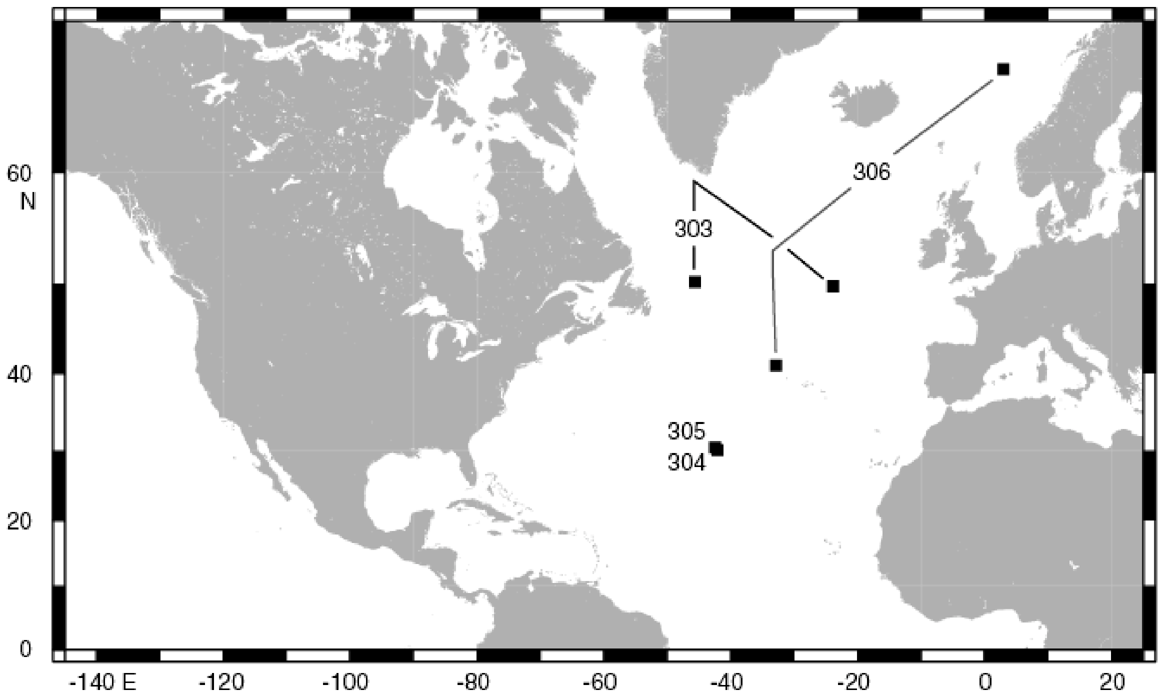


Figure ES-5. IODP Riserless FY05 expedition map.

<u>IODP Expeditions 303 and 306: North Atlantic Climate 1 and 2</u>

The objective of these two expeditions is to establish for the Late Neogene to Quaternary the intercalibration of geomagnetic paleointensity, isotope stratigraphy, and regional environmental stratigraphies to develop a millennial-scale stratigraphic template for the North Atlantic. Other objectives are (1) to better understand the relative phasing of atmospheric, cryospheric, and oceanic changes that are central to understanding the mechanisms of global climate change on orbital or millennial timescales, (2) to improve our knowledge of the temporal and spatial behavior of the geomagnetic field through high-resolution records of directional secular variation and geomagnetic paleointensity, and (3) to provide fundamental constraints for numerical models of the geodynamo. These goals will be accomplished by advanced piston corer (APC) coring nine primary sites with the objective of acquiring complete sedimentary sections appropriate for high-resolution studies. This is a two-expedition program with five sites to be occupied during IODP Expedition 303 and the remaining four sites cored during IODP Expedition 306. In addition, at the last Expedition 306 site we will investigate the feasibility of reconstructing bottom-water temperature histories at the decadal to centennial timescale by making high-precision temperature-depth measurements at a location in the

Norwegian-Greenland Sea with the proposed installation of a Cork and instrument string near ODP Site 642.

Proposed Operations

With the exception of the aforementioned final site of Expedition 306, from an operational standpoint these will be routine sediment coring expeditions. Each site will consist of multiple APC-cored holes to assure recovery of the complete sediment section. APC coring, employing the drillover technique, will extend to ~300 m below seafloor (mbsf). One site will be logged with the triple combination (triple combo) and Formation MicroScanner (FMS)/Sonic tool strings. For the Norwegian-Greenland Sea site, the proposed operation is to jet in a reentry cone and deploy a thermistor string and Cork.

<u>IODP Expeditions 304 and 305: Core Complex 1 and 2</u>

This two-expedition program is aimed at documenting the conditions under which oceanic core complexes (OCCs) develop. These large shallow seafloor features appear to be related to rifting and accretion at slow-spreading mid-ocean ridges. However, currently available data are inadequate to characterize the magmatic/tectonic/metamorphic history so that we can better understand the mechanisms of uplift and emplacement of OCCs. Two sites will be drilled:

1. Deep penetration site (est. >700 m) on the Central Dome of Atlantis Massif (Site AMFW-01A) to sample the detachment fault zone and the alteration front and drill into unaltered mantle (core and logging analyses planned).
2. Shallower penetration site (est. 400–500 m) through the hanging wall (Site AMHW-01A) to sample rock just above the detachment, the shallowest part of the unexposed fault, and through the fault zone (core and logging analyses planned).

Proposed Operations

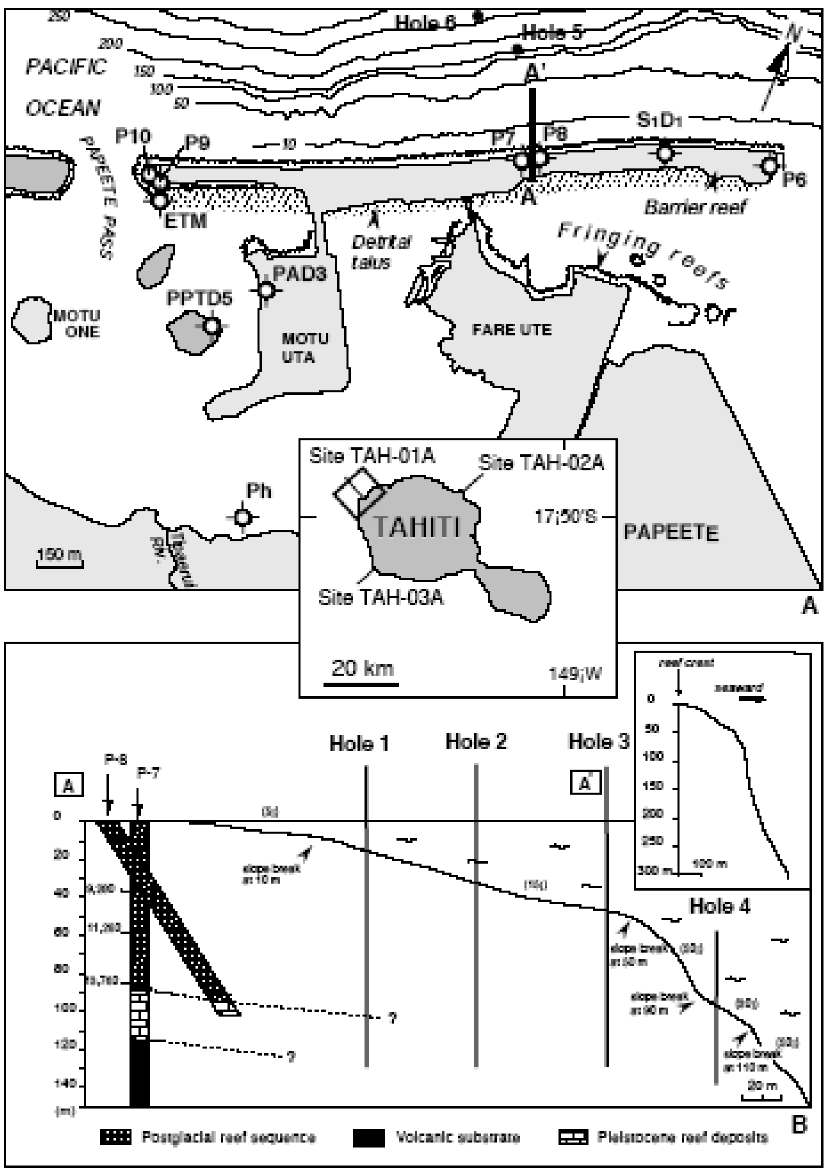
Both sites will require casing to maximize the chances of achieving deep penetration. The first casing string (13-$^3/_8$ in) will be set to ~20 mbsf using the Hard Rock Reentry System (HRRS) Hammer Drill-in Casing system. Each site will then be rotary core barrel (RCB) cored to ~130 mbsf and opened using a bicentered bit or underreamer, allowing a second (10-3/4 in) casing string to be set. Each hole will then be RCB cored to maximum depth and logged. During IODP Expedition 304, both sites will be established with the HRRS Hammer Drill reentry cone/casing system and drilled to casing depth. The supplemental 10_-in casing strings will be set (as required). Remaining time will be devoted to drilling and coring the hanging wall hole to the maximum depth possible in the available time. IODP Expedition 305 will be devoted to deepening the hole at the footwall site to the maximum depth possible. Plans call for a limited trial (~50 m) of the advanced diamond core barrel (ADCB) coring system during Expedition 304 to further evaluate the potential of this system to achieve improved hard rock core recovery and quality over the conventional RCB system. Three days have been added to the Expedition 304 schedule for the ADCB evaluation. If successful, the ADCB may be used further during Expedition 305.

ESO Mission Specific Platform Operations

Late Deglacial Sea Level History—Expedition 307

The history of sea-level and sea surface temperature variation associated with the last deglaciation is of prime interest to understand the dynamics of large ice sheets and their effects on Earth's isostasy. So far, the only sea-level record that encompasses the whole deglaciation is based on offshore drilling of Barbados coral reefs which overlie an active subduction zone, implying that the apparent sea-level record may be biased by tectonic movements. The main objective of this expedition is to establish the course of the last deglacial sea level rise and to identify short-term paleoclimatic/paleoceanographic changes that are thought to have punctuated the transitional period between present-day climatic conditions following the Last Glacial Maximum. The reef setting of Tahiti (French Polynesia) is ideal for this type of study because it is in a tectonically inactive area far away from glaciated regions (**Figure ES-6**).

Figure ES-6 –*Location of sites to be drilled on Expedition 307*



Science Description
The main objective of this Expedition is to drill to a series of boreholes along a number of transects in order to:

1. Reconstruct the deglaciation curve for the period 20,000 to 10,000 yrs BP in order to establish the minimum sea-level during the Last Glacial Maximum (LGM), to test predictions based on different ice and rheological models, and to assess the validity, the timing and amplitude of meltwater pulses which are thought to have disturbed the general thermohaline oceanic circulation and, hence, global climate.

2. Identify and to establish patterns of short-term paleoclimatic changes that are thought to have punctuated the transitional period between present-day climatic conditions following the LGM. It is proposed to quantify the variations of sea surface temperatures based on high-resolution isotopic and trace element analyses on massive coral colonies. When possible, we will try to identify specific climatic phenomena such as El Nino-Southern Oscillation in the time frame prior to 10,000 yrs BP and try to get a better knowledge of the global variation and relative timing of post-glacial climate change in the southern and northern hemisphere.

3. Analyse the impact of sea-level changes on reef growth, geometry and biological makeup, especially during reef drowning events; this approach will help improving the modeling of reef development and the morphological and sedimentological evolution of the foreslopes (highstand vs lowstand processes).

Operational Plans
For Tahiti, the requirement is for a dynamically positioned drilling vessel. Two possibilities, both types equipped with a drilling rig and associated equipment, are:

- A vessel with sufficient accommodation, space and facilities to allow all required scientific work to be carried out at sea.

- A relatively small geotechnical-survey vessel suitable for drilling but with insufficient accommodation and facilities to permit full on-board working. In this case core will be transferred to shore for completion of core logging and curation. This will require the use of a local boat for daily visits to the ship for the transfer of cores to the onshore facility; such facilities are known to be available in Papete.

BUDGETS

This Program Plan budget identifies a total program cost of $64,192 K for FY05 (see **Table ES-2**), to meet the high-priority needs identified by the SAS. Of this cost, 34% is considered to be Science Operation Costs (SOCs) and the remaining 66% is Platform Operation Costs (POCs). These costs are distributed among the three IOs (JOI Alliance, CDEX, and ESO), IODP-MI, AESTO and the University of Bremen.

IODP-MI's budget is $3035 K (**Table ES-2).** The cost of several activities and services, such as databases, core repositories, support for the SAS office and the site survey data will be supported under subcontracts to AESTO, the IOs or others.

The JOI Alliance budget of $39,239K for FY05 includes support for three full expeditions in FY05 (North Atlantic Climate 2, and Core Complex 1 and 2) and partial costs for North Atlantic Climate 1 expedition (which straddles FY04 and FY05). Of the Alliances total budget (see **Table ES-2**), 67% are POCs and 33% are SOCs

The ESO budget of $6,754 K (24% SOC/ 76% POC) is primarily in support of the Tahiti expedition. Other funds are in support of long-term planning, education and outreach, and data management and administration.

The CDEX budget is $12,695 K (86% POC). These funds are to support engineering site surveys, administration and operations personnel, education and outreach, project scoping, data management and engineering development (long-term well-head monitoring).

The University of Bremen Core Repository budget is $241K. These funds are primarily for personnel and operating costs (consumables, supplies, telecommunications, etc) for normal IODP/ODP core-sampling and core archive operations.

Table ES-2. *IODP Summary Budgets for FY05*

Entity	Specifics	SOCs	POCs	Total ($K)
IODP-MI		**3,035**	**0**	**3,035**
AESTO		**1,188**	**0**	**1,188**
JOI-Alliance				
	JOI	660	692	1,352
	TAMU	8,483	24,313	32,796
	LDEO	3,672	1,419	5,091
	TOTAL	**12,815**	**26,424**	**39,239**
ESO		**1,758**	**4,996**	**6,754**
CDEX		**1,659**	**11,036**	**12,695**
BREMEN		**241**	**0**	**241**
TBD		**1,040**	**0**	**1,040**
Grand Total		**21,736**	**42,456**	**64,192**

Budget Process – Science Operation Costs

Detailed budgets for Science Operation Costs were submitted to IODP-MI from the IOs, AESTO and the University of Bremen. The total amount of proposed SOCs was approximately $26,000 K. The Lead Agencies gave IODP-MI budget guidance for a target figure of $20,000 K for Science Operation Costs. IODP-MI assessed the scientific priorities of FY05 and developed SOC budgets to reach this target figure (**Table ES-3**)

Table ES-3 *Science Operation Costs (SOCs) based upon the Lead Agency budget guidance.*

	IODP-MI Core Activities		IODP-MI Subcontracts					
	IODP-MI	AESTO	JOI-A	CDEX	ESO	Brem	TBD	Total
Manage & Admin.	**3,035**							**3,035**
Edu, Out, Pubs			**1,054**	**188**	**66**		**370**	**1,678**
Education & Outreach			100	96	56		340	592
Publications@			954	92	10		30	1,086
Sci. Advisory Stru.^		**1,188**						**1,188**
Engineering Dev.				**1,028**	**20**		**250**	**1,298**
Data & Samples			**3,197**	**156**	**178**	**241**		**3,772**
Data			2,361	156	165			2,682
Curation			836		13	241		1,090
Site Surv Data Bnk+							**420**	**420**
Sci. Oper Costs			**8,564**	**287**	**1,494**			**10,345**
Manag. & Admin. **			1,941		0			1,941
Other*			6,623	287	1,494			8,404
Total	**3,035**	**1,188**	**12,815**	**1659**	**1,758**	**241**	**1,040**	**21,736**

Footnotes

*Other** for JA, includes science services, logging services, and platform services
for CDEX, includes project scoping costs (personnel and travel)
for EMA, includes sec. A-4.1 (sci. liaison, maintenance, and planning) & B-4 (SOCs) from ESO

*Manag. & Admin. ** * for JA, as per FY05 SOC M&A submission
for EMA, consists of EMA's SOC budget

*Sci. Advisory Stru.^* AESTO subcontract from IODP-MI

Publications@ JOI-A budget includes cost to produce, print, and distribute the ESO ACEX expd. report.

TBD To Be Determined -- funds administered by IODP-MI (outsourced to IOs or others)

C) FY05 IODP PROGRAM PLAN

The science and operational plan for IODP FY05 was finalized by OPCOM based on input from the Science Advisory Structure, from the Implementing Organizations and the University of Bremen.

The management and administration will be carried out through this contract in the Washington office and the Science Advisory Structure through a subcontract to AESTO at the Sapporo office. Other tasks will be carried out by the Implementing Organizations and by the University of Bremen. There are still other tasks for which we will issue RFP's and the budgets for these are stated in the TBD (to be determined) column in the summary budget.

The detailed proposals from the subcontractors are provided in the appendices.

IODP ORGANIZATIONAL FRAMEWORK AND ENTITIES

Organizational Framework

According to the principles upon which the Integrated Ocean Drilling Program (IODP) has been founded, the "Science Operation Costs" (SOCs) of the IODP will be supplied to the not-for-profit corporation IODP Management International, Inc. (IODP-MI), which provides the Central Management Organization (CMO) functionality for the Program (see **Figure PP-1**). In turn, IODP-MI will distribute SOCs to Implementing Organizations (IOs, drilling operators) and to other subcontractors according to the budgets outlined in this and subsequent IODP annual Program Plans. SOC funds will be collected from IODP members, commingled by the U.S. National Science Foundation (NSF), and provided through contract to IODP-MI (see **Figure PP-1**). Currently, the U.S. NSF, Japan, as represented by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the European Consortium for Ocean Research Drilling (ECORD), as represented by the European Management Agency (EMA) and the Republic of China, as represented by the Ministry of Science and Technology (MOST) are IODP members. The U.S. NSF and Japan's MEXT are designated as Lead Agencies, the EMA is a Contributing Member and the Republic of China's MOST is an Associate Member.

The Lead Agencies have established an IODP Council that: a) provides governmental oversight for all IODP activities, b) assures effective planning, management and operation of the IODP and c) encourages and promotes broad international participation in the IODP. The Council members are representatives from each country or entity contributing support to the IODP. The Chair of the Council is from one the Lead Agencies and is to alternate between them on a yearly basis. The Council meets once per year with the agenda and site for all meetings decided through mutual understanding. The responsibility for meeting arrangements is to reside with the Chair. The Chair is responsible for developing the meeting agenda, in consultation with the other Lead Agency. Meetings of the Council may be open to participation by others through mutual confirmation of the Agencies. The Council is expected to serve as a consultative body reviewing financial, managerial and other matters involving the overall support of the IODP. A formal agenda is prepared for each meeting and written records are to be kept. Guests include representatives from the CMO (IODP-MI), IOs, and Science Advisory Structure (SAS).

As detailed in **Figure PP-1**, "Platform Operating Costs" (POCs) are supplied directly from individual funding agencies of the countries or consortia operating IODP drilling assets: from NSF to the JOI Alliance (JOI, Inc., Texas A&M University, Lamont-Doherty Earth Observatory of Columbia University) for operation of the non-riser vessel (JOIDES *Resolution* in the first phase of IODP), from MEXT to the Center for Deep Earth Exploration (CDEX) for continued outfitting of the riser ship *Chikyu* and all preparation activities in support of international operations expected to start in FY2007, and from ECORD to the ECORD Science Operator (ESO) for Mission-Specific Platform (MSP) operations.

The technical management relationship consists of the following components: a) overall central management tasks and responsibilities for science operations by IODP-MI, with offices in Washington, D.C. and Sapporo, Japan; b) science advice is provided by the SAS, supported by a planning office at IODP-MI, Sapporo; and 3) multiple IOs, as listed in the previous paragraph – JOI Alliance, ESO and CDEX.

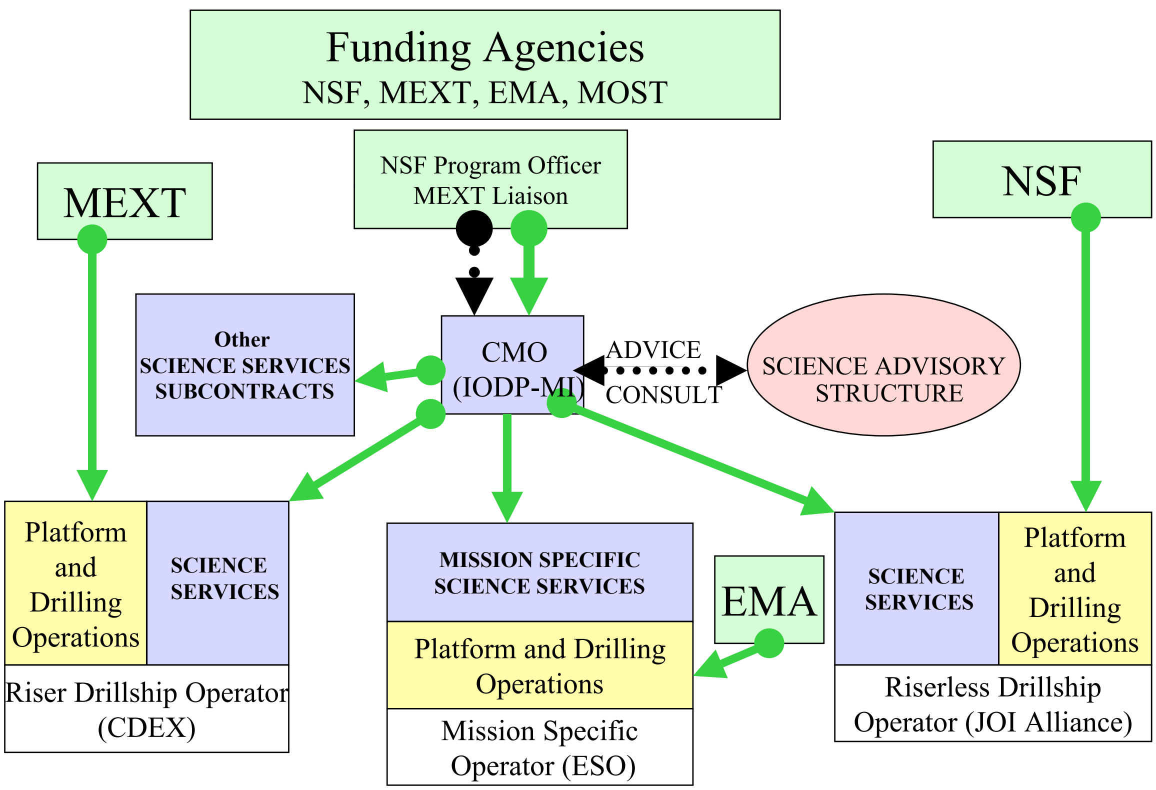


Figure PP-1: *IODP program management structure. SOCs represent "Science Operation Costs", while POCs represent "Platform Operation Costs", as defined in IODP principles and since modified by the Agencies. SOCs and POCs are detailed in accompanying budgets, both in the Program Plan and in Appendices A-E. The funding agencies consist of NSF and MEXT (as the Lead Agencies), EMA as a contributing member, and MOST (Republic of China) as an Associate Member. Solid arrows indicate flow of funds. Dotted arrows indicate flow of advice.*

Program Manager
A Central Management Organization (CMO) has been established with the concurrence of MEXT and NSF to develop and manage science operations and implementation plans for the IODP. The CMO is provided by IODP Management International, Inc. through a ten-year contract with NSF. The CMO: a) receives advice and recommendations on scientific priorities and plans from the SAS, b) requests plans that are responsive to this advice from IOs, and c) works with IOs and the SAS to produce an integrated annual IODP Program Plan (**Figure PP-2**).

IODP-MI submits the annual IODP Program Plan to the Science Planning and Policy Oversight Committee (SPPOC), the executive authority of the SAS and an IODP-MI committee, for review and approval prior to consideration by the IODP-MI Board of Governors (BoG) and the Lead Agencies. The NSF has responsibility to approve contractually the annual IODP Program Plan, in consultation with MEXT. After approval by the Agencies, significant changes in the annual IODP Program Plan are to be considered and approved by IODP-MI and the Lead Agencies prior to implementation, in consultation with the SPPOC and the IOs, as appropriate.

The Annual Plan is to be consistent with budget guidance provided to IODP-MI by the Lead Agencies. The annual Plan includes a presentation of total program costs, which include both SOCs and POCs. IODP-MI will manage SOC funds provided under contract with the NSF. The NSF is expected to administer the contract with due consideration to the interests of MEXT. POCs will be provided directly to the IOs from the Lead Agencies and EMA (**Figure PP-1**)

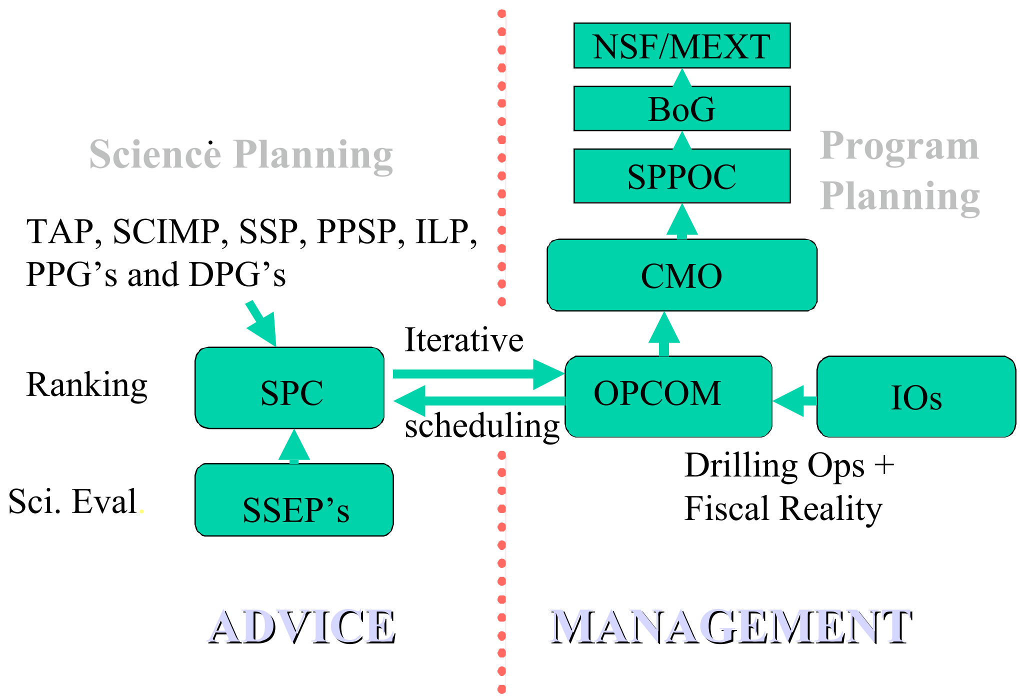


Figure PP-2. The flow of scientific advice from the science and technical communities to the IODP management structure occurs via advisory panels and committees. Scientific planning for the IODP is provided by a Science Advisory Structure (SAS) which is led by the Science Planning Committee. IODP-Management International is the Central Management Organization (CMO) that will translate the scientific priorities of ocean drilling community into program plans to carry out the scientific operations of IODP. It will do so based on advice from the international IODP Science Advisory Structure (SAS), and in consultation with vessel operators (referred to as "Implementing Organizations," IOs).

We present a organizational wiring diagram of for IODP-MI (**Figure PP-3**). IODP-MI provides contractual, management and fiscal links for science operations between NSF and the various operational and advisory components of IODP. IODP-MI has two offices, one in Washington, D.C., USA, and another in Sapporo, Japan.

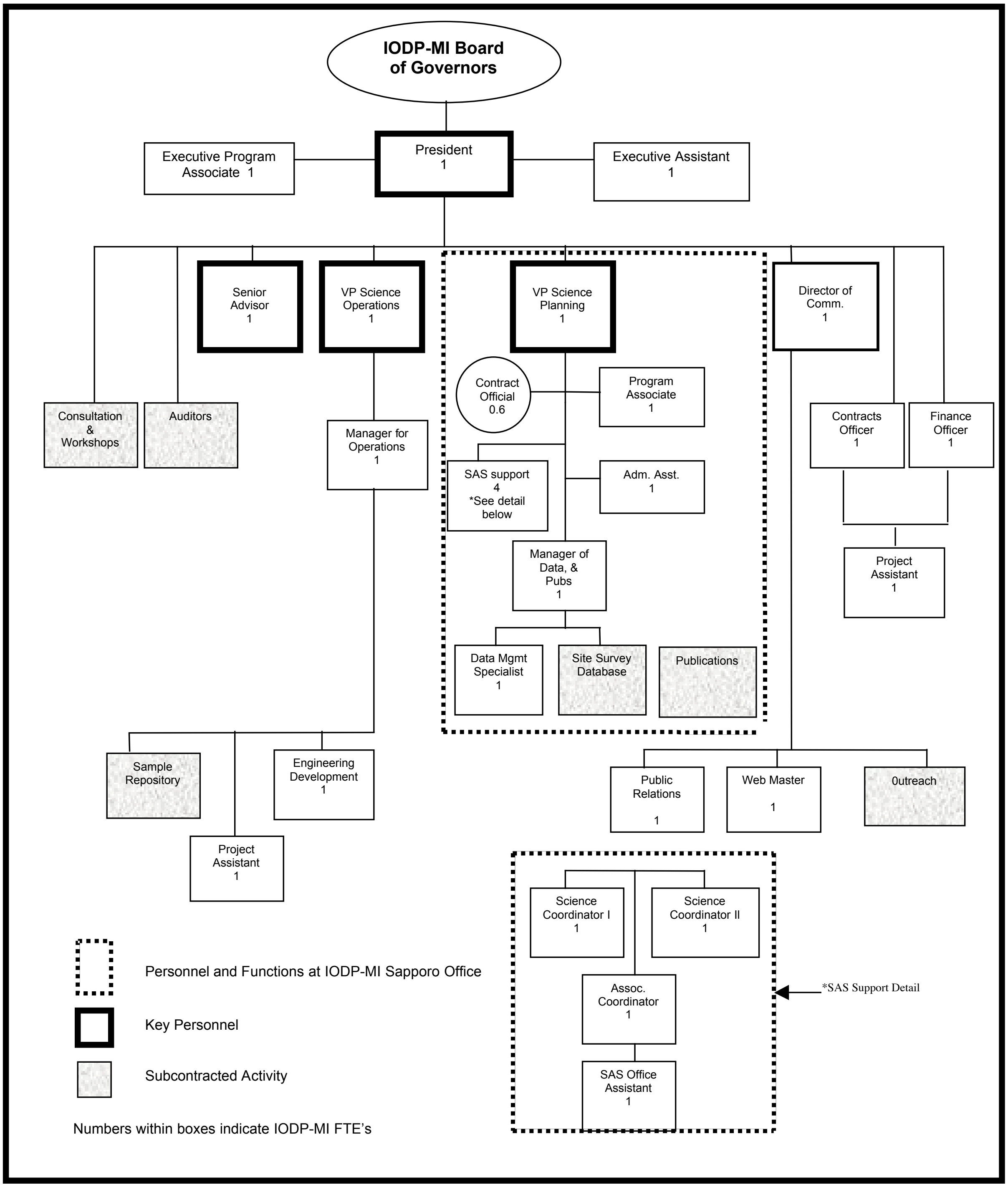


Figure PP-3 *Organization of IODP Management International, Inc***.** *Three positions (Manager of Operations, the Executive Program Associate, and Public Relations Officer) will be hired halfway through FY05. Two positions (Engineering Development and a Project Assistant) will not be hired until FY06.*

Science Advisory Structure

The IODP Science Advisory Structure (SAS) is composed of scientists, engineers and technologists designated by IODP member organizations, such as national or consortia organizations. The SAS provides long-term guidance on the scientific planning of the IODP, and recommends annual science and engineering plans based on proposals from the international science community. The initial scientific objectives of IODP are listed in the IODP Initial Science Plan (ISP) (www.iodp.org/isp.html). Through SAS-sponsored activities, these objectives are pursued, reaffirmed and modified as appropriate by the SAS, and by other international scientists, engineers and technologists engaged in ocean drilling. The SAS consists of several advisory committees, panels and groups (see **Figure PP-4**) containing hundreds of scientists from the international geoscience community in IODP member countries and consortia. The SAS provides planning and program advice and guidance to IODP-MI with regard to scientific goals and objectives, facilities, scientific personnel and operating procedures. In turn, IODP-MI provides support for SAS planning in the form of SOCs.

The Science Planning Committee (SPC) Chair, Vice Chair and the SAS planning office coordinate the SAS. The SAS office (part of IODP-MI, Sapporo) provides support for many aspects of the SAS, including the SPC and the Science Planning and Policy Oversight Committee (SPPOC). The Chair of the SPC receives financial and administrative support through the SAS office. The SPC Chair rotates every two years. The current Chair is Mike Coffin of the Ocean Research Institute (ORI) of the University of Tokyo. The Vice-Chair is Keir Becker of the Rosenstiel School of Marine Science at the University of Miami. The Chair of SPPOC is Kensaku Tamaki of the University of Tokyo. SPC and SPPOC Chairs are expected to rotate, on a 2-year basis, initially between institutions in Japan and the USA.

The SPPOC (a committee of IODP-MI) heads the SAS, is considered the “Executive Authority” and is composed of representatives from scientific organizations in the IODP member countries that have a major interest in the study of the sea floor. The SPPOC formulates scientific and policy recommendations with respect to IODP planning and operations.

The SAS may establish panels and/or committees as needed to address its responsibilities, including panels on platforms and on science operations. The Lead Agency countries are entitled to equal representation on all SAS panels. (seven members each). ECORD is entitled to have three voting members and one non-voting observer on each SAS panel and committee.

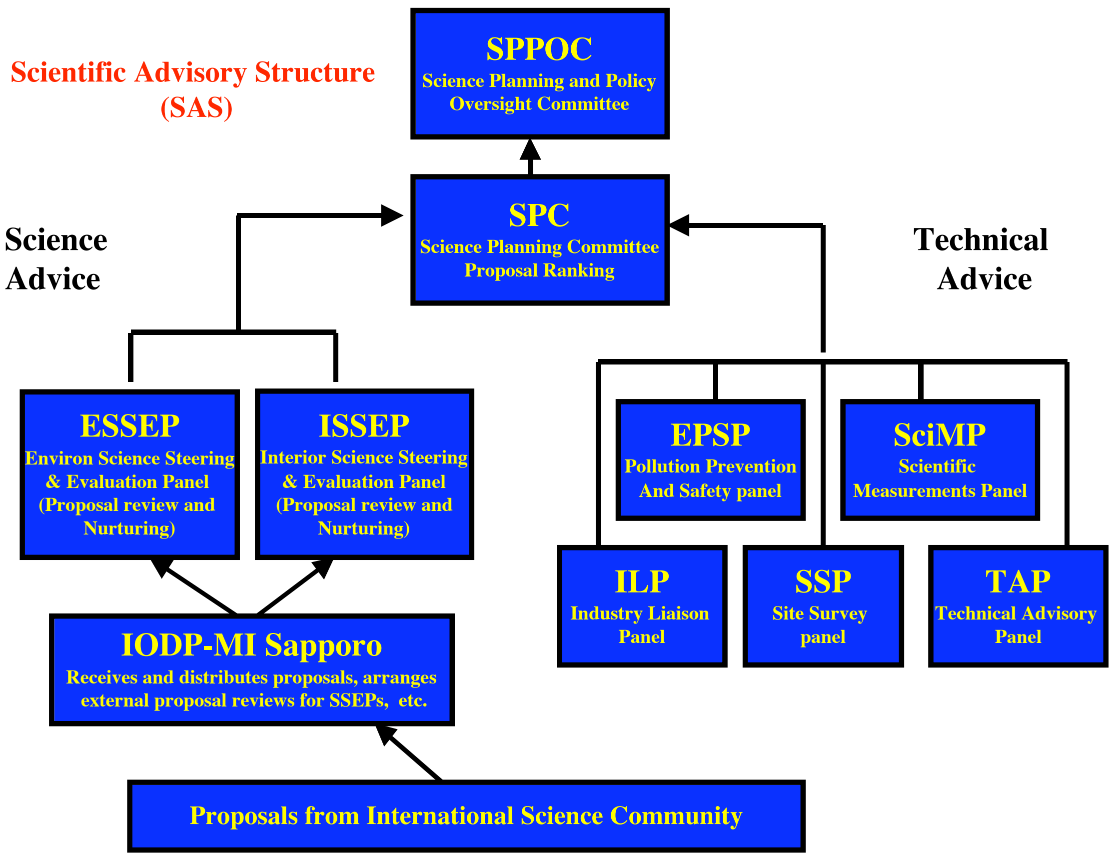


Figure PP-4*: IODP Science Advisory Structure (SAS). Technical and scientific advisory panels liaise as necessary).*

Implementing Organizations

IODP is the first international scientific ocean-drilling program to have more than one Implementing Organization (IO, drilling operator). The IOs receive SOCs from NSF by way of IODP-MI, and POCs directly from their national or consortia funding agencies (see **Figure PP-1**).

Non-riser drilling capability will be supplied by the NSF through a contract to the JOI Alliance (see Appendix A), consisting of JOI, Inc. (prime contractor and overall management), Texas A&M University (subcontractor that operates a non-riser drillship, 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 of Columbia University (geophysical and geochemical logging services aboard the non-riser vessel, involving acquisition, processing and interpretation of logging measurements). In phase one of the U.S. IO operations (extending to at least May 2005), the JOI Alliance will provide the *JOIDES Resolution* as the non-riser vessel. Five non-riser expeditions are planned between June 2004 and April 2005. A vessel, still to be determined, will be refitted and provided by the Alliance as the phase two non-riser platform. (Details of the JOI Alliance and its operational plans for FY05 are presented in the Appendix B)

Riser drilling capability by way of the vessel *Chikyu* will be supplied by CDEX and will begin in FY07. CDEX is part of the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). CDEX will also administrate the Kochi University Center for Advanced Marine Core Research (CMCR) repository. This repository will house samples and cores from the *Chikyu* and other platforms. The exact geographic distribution of cores is under discussion by the Science Advisory System and should be finalized by the start of FY05. (Details on CDEX and its plans for FY05 are presented in Appendix C).

MSP drilling, sampling and logging capability will be supplied by the ESO, a consortium led by the British Geological Survey (BGS; which will conduct MSP operations and program-specific engineering development), the European Petrophysics Consortium (logging services) and the University of Bremen (repository services for MSP samples and cores). 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 Program Plan). The ESO will have a contractual arrangement with the ECORD Management Agency (EMA), affiliated with the CNRS, based in Paris. The ESO will conduct a coring expedition to the high Arctic in August and September of 2004 and are planning for a second MSP Operation near Tahiti in FY05 (Details of ESO and its operational plans for FY05 are presented in Appendix D.)

Site Survey Data Bank

During the Ocean Drilling Program (ODP), the Site Survey Data Bank prepared safety packages for pre-expedition review of designated sites, and supplied each shipboard scientific party with the geophysical data necessary to conduct scheduled drilling expeditions properly. The Data Bank also assisted scientists interested in developing IODP proposals by providing information with respect to scientific problems of interest to the scientific ocean drilling community. In FY2004, Data Bank services to IODP were provided by the same Data Bank that has provided such services to the ocean drilling community since 1985. This Data Bank, located at the Lamont-Doherty Earth Observatory (LDEO), will service IODP through January 2005 with an extension of the ODP contract between The JOI Alliance and LDEO (Funds for the continuation of the SSDB through January 2005 are not included in this Program Plan). After January 2005, the SSDB function will be awarded by IODP-MI to an operator via a competitive bidding process. IODP-MI will establish a task force to define the task of the new SSDB, assist IODP-MI personnel in developing and Request for Proposals (RFP), and to evaluate the responses to the RFP.

FY05 OPERATIONAL PROGRAM DEVELOPMENT

The FY05 operational program was developed (in conjunction with the FY04 plan) at the first SPC meeting in September 2003. Minor changes to the riserless schedule were incorporated following the March 2004 SPC and the April 2004 OPCOM meeting. One MSP expedition was added to the program for FY05

The Operational Program Development for FY05 is divided into two parts including (1) a summary of September 2003 SPC/OPCOM ranking and scheduling (derived from the FY04 Program Plan and (2) modifications and additions to the program based upon the March 2004 SPC and April 2004 OPCOM meetings.

Summary of the program development from September 2003 SPC meeting.

Presentation of proposals

The prospectus for the first SPC meeting in September 2003 consisted of 17 externally reviewed drilling proposals, including 5 that required MSPs and one that involved some riser drilling. The committee organized the proposals for review into three groups (as follows), corresponding to the three main themes of the IODP Initial Science Plan (ISP):

I. Deep Biosphere and Subseafloor Ocean

545-Full3	Juan de Fuca Ridge Flank Hydrogeology	
547-Full4	Oceanic Subsurface Biosphere	
553-Full2	Cascadia Margin Hydrates	
557-Full2	Storegga Slide Gas Hydrates	
573-Full2	Porcupine Basin Carbonate Mounds	
584-Full2	TAG II Hydrothermal	
589-Full3	Gulf of Mexico Overpressures	

II. Environmental Change, Processes and Effects

482-Full3	Wilkes Land Margin	
519-Full2	South Pacific Sea Level	MSP
533-Full3	Central Arctic Paleoceanography	MSP
543-Full2	Norwegian Margin Bottom Water	
548-Full2	Chicxulub K-T Impact Crater	MSP
564-Full	New Jersey Shallow Shelf	MSP
572-Full3	N. Atlantic Neogene–Quaternary Climate	
581-Full2	Late Pleistocene Coralgal Banks	MSP
595-Full3	Indus Fan and Murray Ridge	Riser (partial)

III. Solid Earth Cycles and Geodynamics

512-Full3	Atlantis Oceanic Core Complex

Before outlining and discussing the procedure for reviewing and ranking proposals, the SPC decided to forward Proposal 533-Full3 directly to the Operations Committee (OPCOM) without further review because of its history of favorable reviews, top ranking, advanced operational planning, and because IODP-MI considered the program to be in the implementation phase..

Global ranking of proposals

The SPC conducted the ranking through a closed vote. Each member submitted a signed ballot, assigning the numerical rank of 1 through 16 to the full set of proposals. The iSAS Office staff collected the ballots and tabulated the results, as shown below:

Rank	Proposal #	Short Title	Mean	St dev
1	519-Full2	South Pacific Sea Level	4.43	2.56
2	512-Full3	Atlantis Oceanic Core Complex	4.57	3.16
3	545-Full3	Juan de Fuca Ridge Flank Hydrogeology	4.64	3.88
4	564-Full	New Jersey Shelf	5.21	3.81
5	589-Full3	Gulf of Mexico Overpressures	6.21	5.22
6	553-Full2	Cascadia Margin Hydrates	8.14	4.00
7	572-Full3	N. Atlantic Neogene–Quaternary Climate	8.64	3.67
8	482-Full3	Wilkes Land Margin	8.79	4.59
9	543-Full2	Norwegian Margin Bottom Water	9.14	3.96
10	547-Full4	Oceanic Subsurface Biosphere	9.50	3.25
11	595-Full3	Indus Fan and Murray Ridge	9.57	3.13
12	584-Full2	TAG II Hydrothermal	10.21	3.14
13(t)	557-Full2	Storegga Slide Gas Hydrates	11.14	3.48
13(t)	581-Full2	Late Pleistocene Coralgal Banks	11.14	3.98
15	548-Full2	Chicxulub K-T Impact Crater	11.57	5.77
16	573-Full2	Porcupine Basin Carbonate Mounds	13.07	3.67

The SPC examined the global ranking results and debated which proposals to forward to OPCOM and finally decided to forward the top 12 ranked proposals in two tiers for possible scheduling.

Development of scheduling options

After hearing a report on the advanced status of operational planning for the Arctic drilling project, the OPCOM recommended including it in the FY2004 operations schedule for MSP programs.

OPCOM Consensus 03-09-1: The OPCOM recommends Proposal 533-Full3 Central Arctic Paleoceanography to the SPC for inclusion in the FY2004 operations schedule to institute the necessary steps for program implementation. Its final implementation is contingent upon ECORD participation.

An effort to maximize the scientific return and safety, while minimizing the overall costs and transit times, resulted in the OPCOM recommending three potential scheduling scenarios shown below. The OPCOM expressed a clear preference for the last scenario, because it includes four of the six highest-ranked proposals for the non-riser vessel, it completes three of them, and it involves the lowest estimated costs.

OPCOM Consensus 03-09-2: The OPCOM recommends the following three scenarios to the SPC for consideration as possible drilling schedules for FY2004 and FY2005, with preference given to Scenario 10:

Exp.	Scenario 8	Scenario 9	Scenario 10
1	545-Full3 (Pt. 1)	545-Full3	545-Full3 (Pt. 1)
2	572-Full3 (Pt. 1)	572-Full3 (Pt. 1)	572-Full3 (Pt. 1)
3	584-Full2	584-Full2	512-Full3 (Pt. 1)
4	512-Full3 (Pt. 1)	512-Full3 (Pt. 1)	512-Full3 (Pt. 2)
5	512-Full3 (Pt. 2)	572-Full3 (Pt. 2) + 543-Full2	572-Full3 (Pt. 2) + 543-Full2
6	589-Full3 or 543-Full2	-----	-----
Cost:	$6.2-7.0M	$5.6M	$4.6M
Transit:	42 days	52 days	52 days

Review of scheduling options and vote on final schedule

The SPC accepted the OPCOM recommendation on including Proposal 533-Full3 in the operations schedule for FY2004,

SPC Motion 03-09-32: The SPC recommends including Proposal 533-Full3 Central Arctic Paleoceanography in the MSP operations schedule for FY2004, pending ECORD participation in the IODP.

The SPC then reviewed the three scheduling scenarios proposed by OPCOM for operating the non-riser drilling vessel in FY2004 and provisionally in FY2005. After identifying the non-A-CORK component of Proposal 553-Full2, Cascadia Margin Hydrates, as an acceptable alternate for 545-Full3, pt. 1, the SPC voted to approve the expedition schedule as follows.

SPC Motion 03-09-34: The SPC approves the following expedition schedule for the non-riser vessel during June 2004 through May 2005:

1.	545-Full3	Juan de Fuca Ridge Flank Hydrogeology (Part I)
2.	572-Full3	N. Atlantic Neogene-Quaternary Climate (Part I)
3.	512-Full3	Atlantis Oceanic Core Complex (Part I)
4.	512-Full3	Atlantis Oceanic Core Complex (Part II)
5a.	572-Full3	N. Atlantic Neogene-Quaternary Climate (Part II)
5b.	543-Full2	Norwegian Margin Bottom Water

The SPC also identifies the non-A-CORK component of Proposal 553-Full2 Cascadia Margin Hydrates as an alternate first expedition in case any significant delays arise in the logistical planning for Proposal 545-Full3.

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Highly ranked but unscheduled proposals

Several of the other highly ranked but unscheduled proposals at the September 2003 SPC meeting received various measures of commitment, as stated in the following motions and consensus.

SPC Motion 03-09-37: The SPC forwards Proposals 519-Full2, South Pacific Sea Level, 564-Full, New Jersey Shelf, and 589-Full3, Gulf of Mexico Overpressures, to the OPCOM for consideration at the next OPCOM scheduling meeting without re-ranking

FY04 and Provisional FY05 Schedule

Table PP-1 presents the operational schedule for FY04 and the provisional FY05 schedule resulting from the September 2003 SPC and OPCOM meetings

Table PP-1: *IODP Operational Schedule, FY04 (and provisional FY05)*

Exp. #	Expedition	Port (origin)	Dates[1,2]	Total Days (Port[1]/Sea)	Days at Sea (Transit/Ops[3])
1/300	Juan de Fuca	Astoria	[4]21 June – 29 Aug.	69 (6/63)	11/52
MSP-1	Lomonosov Ridge	Stavanger	~1 Aug. - ~15 Sept.	TBD	~35 (in ice)
	JR transit	Acapulco	29 Aug. – 13 Sept.	15 (1/4)	14/0
2/301	North Atlantic 1	Bermuda	13 Sept. – 30 Oct.	47 (2/45)	14/31
3/302	CORE 1	Ponta Delgada	30 Oct. – 18 Dec.	49 (4/45)	8/37
4/303	CORE 2	Ponta Delgada	18 Dec. – 10 Feb. '05	54 (5/49)	8/41
5/304	N. Atl 2 & Norweg.	Ponta Delgada	10 Feb. – 5 April	54 (5/49)	15/34
	JR transit[5]	Reykjavik	5 April – 23 April	18 (3/15)	15/0

Revisions/additions to the FY05 Program

Modifications to the provisional FY05 riserless operational plan (shown in **Table PP-1**; above) were made following the March 2004 SPC meeting and the April 2004 OPCOM meeting. One additional MSP program was added to the schedule (Tahiti) and minor changes were made in the USIO riserless platform schedule

Mission Specific Platform Operations

In September 2003, ESO were mandated by SPC to prepare plans to carry out two proposals that were at that time ranked as No. 1 and No. 4 respectively:

No.1 - Tahiti and the Great Barrier Reef (GBR), #519-Rev 1
No.4 - New Jersey Margin, #564

Subsequently, at the March 2004 SPC meeting a consensus was reached that the FY05 program should be confined to the Tahiti drilling only.

SPC Consensus 04-03-13: The SPC recommends that the OPCOM split Proposal 519 South Pacific Sea Level into two MSP expeditions. The Tahiti component should be considered for scheduling in FY05.

OPCOM accepted this consensus and recommended that ESO begin preparations for drilling the Tahiti South Pacific Sea Level program in FY05.

JOI Alliance Riserless Platform Operations

OPCOM recommended only minor changes to the provisional FY05 USIO riserless platform operations. No new expeditions have been scheduled. The current 365-day program had about eight additional days of unallocated time and OPCOM considered several options to utilize that unallocated time.

OPCOM discussed and approved changes in operations for the North Atlantic expeditions including the drilling of alternate sites for the originally proposed IRM sites, the drilling of a new hole for the Norwegian Bottom Water Proposal 543-Full2 (North Atlantic 2 expedition), the incorporation of contingency time into North Atlantic Operations and tests of the Advanced Diamond Core Barrel during the Core Complex expeditions.

North Atlantic Expeditions

•IRM Sites:
OPCOM was informed by the JOI Alliance that Transocean required a support vessel for operations at the IRM sites. OPCOM discussed the implications of the cost of a vessel to drill these sites (estimated to be greater than $330K) vs. the loss of science if alternate sites were drilled (e.g., information on latitudinal changes, water-mass migration, and deep water end member for the N. Atlantic). The science at the IRM sites is a high priority of the proposal but the cost implications at this stage are an overriding factor. OPCOM elected to move forward with replacing the IRM site with alternate sites. However, OCPOM also decided to keep the IRM sites under its purview to allow for the possibility of incorporating these sites into a future (riserless phase 2) program when a ship with increased operational capabilities may be available.

•Weather Program---contingency time*:*
The concept of including weather contingency time in North Atlantic Climate 1 schedule (and in expeditions in general) was discussed by OPCOM. The USIO estimated that the expedition could have 10-15% downtime resulting from weather. Given this, OPCOM agreed that some flexibility (3-4 day contingency) was important to incorporate into planning for this expedition. OPCOM, however, stressed that this concept needs to be discussed on a case-by-case basis for non-riser expeditions.

•Norwegian Bottom Water site:
OPCOM discussed the following consensus item from SPC

SPC Consensus 04-03-23: The SPC was briefed about discussions with the JOI Alliance regarding drilling a new hole for achieving the objectives described in Proposal 543-Full2. The proposal indicated that Hole 642E would be suitable, and in many ways ideal, for the proposed experiments. We are concerned that drilling a new hole will require additional time and funds, and we request that the lead proponent prepare a proposal addendum that justifies additional ship time and program costs if these are required to achieve the primary project objectives. The addendum should be submitted in time for consideration at the OPCOM meeting on 15-16 April 2004. Otherwise, the proponent and the JOI Alliance should determine the best approach to accomplish the proposed science within the currently allocated ship time and budgets.

The proponent did submit a proposal addendum and OPCOM spent considerable time discussing the scientific merit outlined in both the original proposal and the addendum as well as the time and costs associated with the new hole. OPCOM deemed the scientific merit for a new hole was justified and approved the new strategy with the understanding that the original program would be used as a backup strategy.

Core Complex Expeditions

•Advanced Diamond Core Barrel:
The JOI Alliance discussed the possibility of using the Advanced Diamond Core Barrel (ADCB) on the Core Complex expeditions. The purpose of the test would be to run a head-to-head comparison with the RCB in the same hard-rock formations. There would be minimal impact on the science as the ADCB would be deployed in the bottom of the hole after RCB coring operations ceased. ADCB operations would need approximately two days. OPCOM supported the concept of incorporating the use of the ADCB into the Core Complex program. They felt (1) that this type of test was very appropriate given the lithologies and the science program, and (2) that it was important in IODP for IOs to provide this type of engineering development and testing time when possible. In addition, if the ADCB operations were successful, it could be used at other times during the expedition

Final FY05 Operational Schedule

The revised FY05 schedule developed by OPCOM and the USIO, which incorporates the changes described above, is as follows:

Table PP-2: *IODP Operational Schedule, FY05*

	Cruise	Port (Origin)	Dates	Total Days (Port/Sea)	Days at Sea (Transit/Op[4])
303	North Atlantic Climate 1	St. John's Newfld	22 Sept – 14 Nov	53 (5/48)	5/43
304	Oceanic Core Complex 1	Ponta Delgada	14 Nov – 5 Jan '05	52 (5/47)	7/40
305	Oceanic Core Complex 2	Ponta Delgada	5 Jan – 27 Feb	53 (5/48)	7/41
306	North Atlantic Climate 2	Ponta Delgada	27 Feb – 22 Apr	54 (5/49)	4/45
307	Tahiti		Spring/ Summer-05		
	JR Transit	Reykjavik	22 Apr – 10 May	18 (3/15)	15/0
	JR Demobilization	Galveston	10 May – 1 Jun	22 (22/0)	0/0

FY05 EXPEDITION DESCRIPTIONS

Figure PP-05 *FY05 Expedition Locations*

Expeditions 303 and 306 North Atlantic Climate

Expeditions 303 + 306	**North Atlantic Neogene-Quaternary Environments**
Proposal	**572-Full3**
Title	**Ice-sheet–ocean–atmosphere interactions on millennial time scales during the late Neogene–Quaternary using a paleointensity-assisted chronology for the N. Atlantic**
Proponents	**James E. T. Channell, Joseph S. Stoner, Gerard C. Bond, David A. Hodell and Ellen E. Martin**

Expedition 306	**Norwegian Margin Bottom Water**
Proposal	**543-Full2**
Title	**Installation of a CORK in Hole 642E to document and monitor bottom-water temperature variations through time**
Proponents	**Robert N. Harris**

Figure PP-06. *Primary sites for the North Atlantic Expeditions*

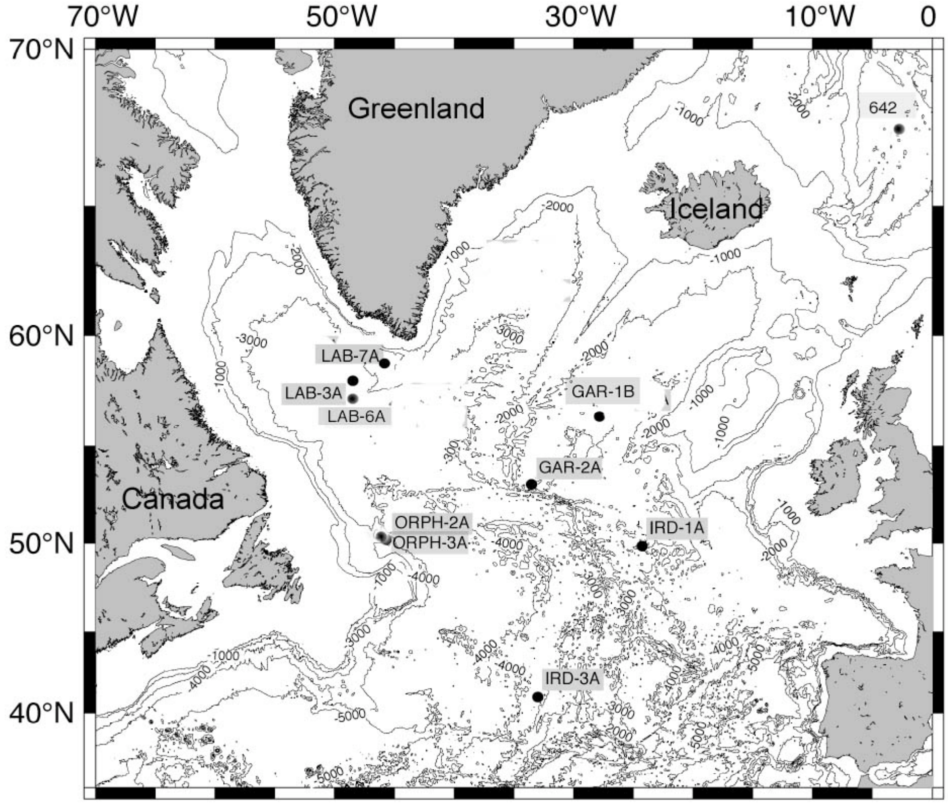

Table PP-3 Primary Sites for North Atlantic Climate 1 Expedition

Site No.	Location (Lat/Long)	Water Depth (mbsf)	Operations Description (mbsf)
ORPH-3A	50° 09.98' N	3591	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	45° 38.27' W		Logging with Triple Combo and FMS-sonic
LAB-7A	58° 14.23' N	2273	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	46° 38.59' W		
LAB-3A	58° 02.17' N	3350	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	48° 27.57' W		
LAB-6A	57° 28.51' N	3485	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	48° 31.842' W		
IRD-1A	49° 52.667' N	3884	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	24° 14.287' W		

Table PP-4. *North Atlantic Climate 1 Alternate sites (note that all NAC II sites will be alternate NAC I sites to allow maximum weather contingency)*

IRD-3A	41° 0.068' N	3426	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	32° 57.438' W		
ORPH-2A	50° 12.40' N	3539	3XAPC to 200 mbsf. Drill over stuck core barrels
(Canada)	45° 41.22' W		
GAR-2A	53° 03.400' N	3024	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	33° 31.780' W		
GAR-1B	56° 21.882' N	2820	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	27° 53.310' W		
IRD-4A	42° 50.205' N	3542	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	23° 5.252' W		
LAB-8A	58° 28.75' N	2703	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	46° 27.34' W		
LAB-8B	58° 33.22' N	2556	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	46° 18.04' W		
LAB-8C	58° 29.7737' N	2618	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	46° 25.2140' W		Pending EPSP approval

Table PP-5 *North Atlantic Climate 2 Primary Sites*

Site No.	**Location (Lat/Long)**	**Water Depth**	**Operations Description**
IRD-3A	41° 0.068' N	3426	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	32° 57.438' W		
ORPH-2A	50° 12.40' N	3539	3XAPC to 200 mbsf. Drill over stuck core barrels
(Canada)	45° 41.22' W		
GAR-2A	53° 03.400' N	3024	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	33° 31.780' W		
GAR-1B	56° 21.882' N	2820	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	27° 53.310' W		
Site 642	67° 13.20' N	1288	Install reentry cone with 120 m 10 3/4" casing and thermistor probe.
(Norway)	02° 55.80' W		

Table PP-6. *North Atlantic Climate 2 Alternate sites (note that all NAC I sites will be alternate NAC II sites to allow maximum weather contingency)*

ORPH-3A	50° 09.98' N	3591	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	45° 38.27' W		
LAB-7A	58° 14.23' N	2273	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	46° 38.59' W		
LAB-3A	58° 02.17' N	3350	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	48° 27.57' W		
LAB-6A	57° 28.51' N	3485	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	48° 31.842' W		
IRD-1A	49° 52.667' N	3884	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	24° 14.287' W		
IRD-4A	42° 50.205' N	3542	3XAPC to 300 mbsf. Drill over stuck core barrels
(International)	23° 5.252' W		
LAB-8A	58° 28.75' N	2703	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	46° 27.34' W		
LAB-8B	58° 33.22' N	2556	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	46° 18.04' W		
LAB-8C	58° 29.7737' N	2618	3XAPC to 300 mbsf. Drill over stuck core barrels
(Denmark)	46° 25.2140' W		Pending EPSP approval

Science Description

(Note: This science program will be undertaken in two parts, as expeditions 303 and 306.)

The objective of these two expeditions is to establish for the Late Neogene to Quaternary the intercalibration of geomagnetic paleointensity, isotope stratigraphy, and regional environmental stratigraphies to develop a millennial-scale stratigraphic template for the North Atlantic. Other objectives are (1) to better understand the relative phasing of atmospheric, cryospheric, and oceanic changes that are central to understanding the mechanisms of global climate change on orbital or millennial timescales, (2) to improve our knowledge of the temporal and spatial behavior of the geomagnetic field through high-resolution records of directional secular variation and geomagnetic paleointensity, and (3) to provide fundamental constraints for numerical models of the geodynamo. These goals will be accomplished by APC coring nine primary sites with the objective of acquiring complete sedimentary sections appropriate for high-resolution studies. This is a two-expedition program with five sites to be occupied during Expedition 303 and the remaining four sites cored during Expedition 306. In addition, at the last Expedition 306 site we will investigate the feasibility of reconstructing bottom-water temperature histories at the decadal to centennial timescale by making high-precision temperature-depth measurements at a location in the Norwegian-Greenland Sea with the proposed installation of a Cork and instrument string near ODP Site 642.

Proposed Operations

With the exception of the aforementioned final site of Expedition 306, from an operational standpoint these will be routine sediment coring expeditions. Each site will consist of multiple APC-cored holes to assure recovery of the complete sediment section. APC coring, employing the drillover technique, will extend to ~300 m below seafloor (mbsf). One site will be logged with the triple-combination tool and Formation MicroScanner/sonic tool strings. For the Norwegian- Greenland Sea site, the proposed operation is to jet in a reentry cone and deploy a thermistor string and Cork.

Experiments

The emphasis of these two expeditions will be on sediment core recovery and analyses. No downhole experiments are planned. Heavy use of the core imaging system, a magnetometer, and multisensor track systems can be expected. No downhole experiments are anticipated for the Norwegian Greenland Sea Cork site.

Environment and Safety

There is a high risk of losing operating time because of severe weather and ice conditions. The optimum weather window for drilling these sites is July through September. Scheduling these expeditions in the September–November and February–April time frame increases the risk of operational downtime (to about 10%) attributable to weather. To minimze risks to the safety personnel and equipment, the JOI Alliance has arranged for daily site-specific forecasts from a weather service experienced in North Atlantic conditions and a dedicated local weather observer will sail. Three additional operating days have been added to Expedition 301 to accommodated operating time lost because of weather. There is a low risk encountering poor hole conditions.

Logistics

Operations for Expedition 303 will require and estimated 53 days (5 in port, 5 in transit, and 43 on site). Note that this expedition straddles the FY04/F05 program years. Operations for Expedition 306 require and estimated 54 days (5 in port, 4 in transit, and 45 on site).

Logging

Expedition 303: North Atlantic Climate 1

During Expedition 303, the standard geophysical tool string for density, porosity, resistivity and gamma ray information and the Formation MicroScanner (FMS)/sonic tool string for high-resolution resistivity logs and images and sonic velocity data will be deployed. The scientific objectives that could be addressed using logging data include 1) providing reference depths for composite core depth scales, (2) recognition of ice-rafted debris, (3) recognition of ash, clay and organic layers, and (4) characterization of millennial scale cyclostratigraphy.

The prime target for logging will be the Orphan Knoll site. This is the first deep drilling investigation of the sediments on the flanks of Orphan Knoll, and the collection of downhole log data will be instrumental in fully characterizing the site. Logging at Orphan Knoll will allow the assessment of potential problems with core expansion and contraction. Total logging time for a hole at Orphan Knoll is estimated at approximately 18 hours.

Expedition 306: North Atlantic Climate 2

The current plan is to drill four sites, namely GAR1A, GAR2A, ORPH2A, and IRD3A, that will be complementary to Expedition 303 (North Atlantic 1) and to log a minimum of two sites with the triple combo tool string and added high-resolution MGT (given suitable sediment characteristics), the FMS/sonic tool string, and the WST check shot tool. Logging operations at any of the sites to be cored during Expedition 306 will take approximately 30 hours (20 for standard logging and 10 for WST checkshots). If core recovery/core quality is poor at any of the other sites, the further use of downhole logging should be considered in order to accomplish the scientific objectives of the expedition.

The second part of Expedition 306 will consist of the installation of a Cork near ODP Hole 642E, located on the Voring Plateau. This Cork installation will be used to document and reconstruct bottom-water temperature (BWT) variations through time on the decadal to centennial scale by measuring thermal anomalies in the sediment pile. The area near Hole 642E, originally drilled during ODP Leg 104, is ideal for this study because it is in a climatically sensitive region with an established 50-yr time series of bottom-water temperature measurements in ~278 m of Neogene and Quaternary pelagic and hemipelagic sediments overlying a series of basalts and interbedded Eocene sediments. The full suite of standard logging tools will be available for use as needed during this second part of the expedition. Log data may be useful in determining the initial thermal regime of the hole, as well as providing data on hole condition and characterizing the formation surrounding the Cork.

Expeditions 304 and 305: Core Complex 1 and 2

Expeditions 3/304 + 4/305	**Atlantis Oceanic Core Complex**
Proposal	**512-Full3**
Title	**Oceanic core complex formation: Deformation, alteration, and accessible mantle peridotite**
Proponents	**Donna Blackman, John Collins, Javier Escartin, G. Früh-Green, Kevin Johnson, Chris MacLeod, Monique Seyler**

Figure PP-7. *Primary sites for the Core Complex expeditions*

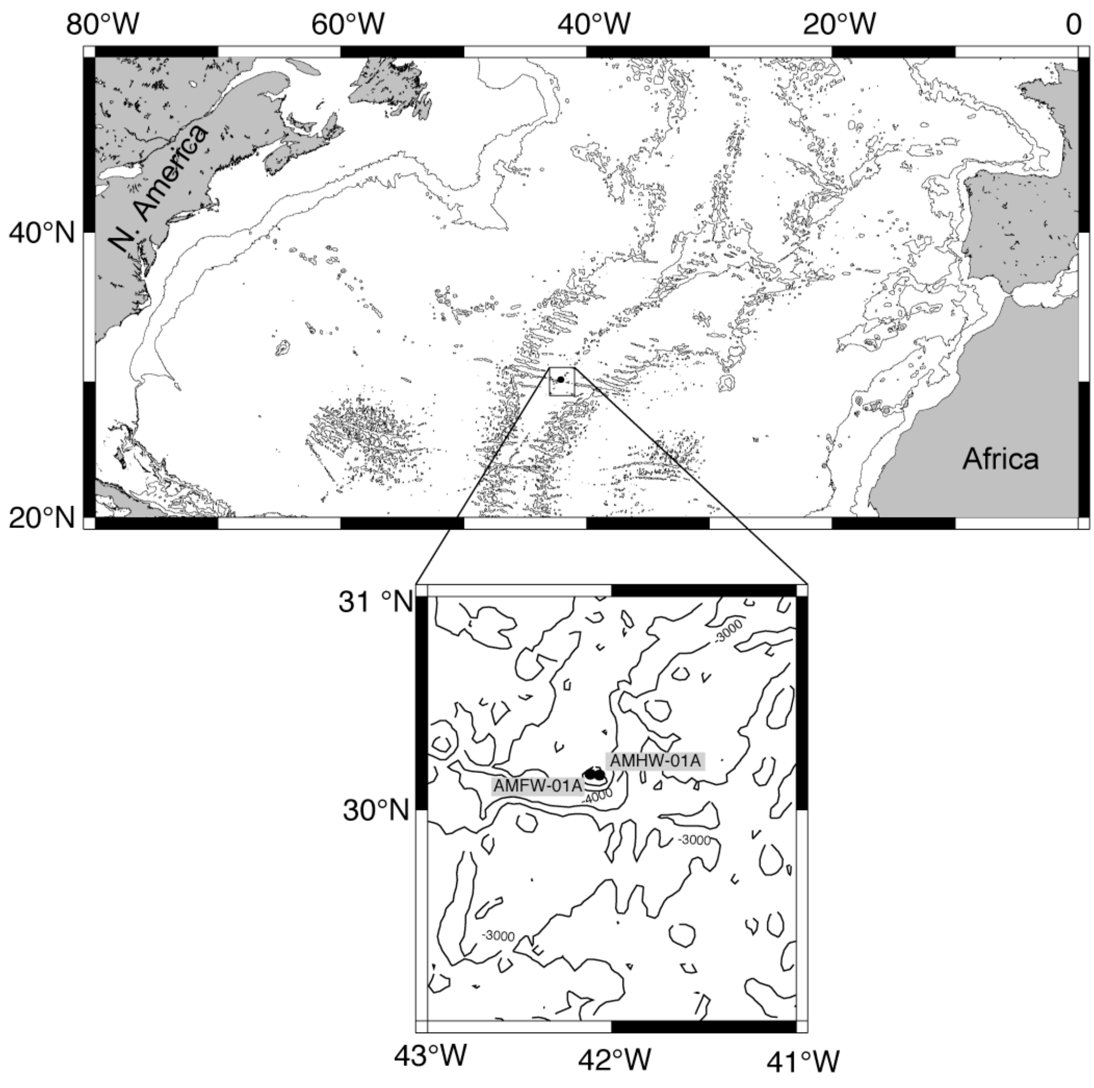

Table PP-7 *Oceanic Core Complex 1 Primary operations*

Site	Location (lat/long)	Water depth	Operations Description (mbsf)
AMFW-01A (footwall - peridotite)	30.17000°N 42.12333°W	1630	Hole A: Bare rock spud, RCB 1/2 cores 0–130 mbsf Hole B: HRRS hammer drill-in 22 m 13-3/8 inch casing Underream to ~130 m, Run ~120 m 10-3/4" casing Set retainer, cement 10-3/4 inch casing
AMHW-01A (hanging wall - basalt)	30.19166°N 42.06500°W	2580	Hole A: HRRS hammer drill-in 22 m 13-3/8 inch casing RCB 1/2 cores 22 to 70 mbsf, ADCB 70 to 130 mbsf Underream to ~130 m, Run ~120 m 10-3/4" casing Set retainer, cement 10-3/4 inch casing RCB 1/2 cores 130 to 500 mbsf Log: triple combo, FMS/sonic, mag., UBI

Table PP-8 *Alternate Operations For Core Complex 1*

<u>If first footwall pilot hole fails (not peridotite/gabbro or bad hole conditions), attempt another pilot hole</u>			
Footwall (peridotite)	~30.17°N ~42.12°W	~1630	Bare rock spud, RCB 1/2 cores 0–130 mbsf Log: triple combo, FMS/sonic, mag., UBI
			Subtotal = 4.7 days
<u>If first footwall pilot hole OK but HRRS fails, attempt 2nd HRRS installation and core (leave time for HW site)</u>			
Footwall (peridotite)	~30.17°N ~42.12°W	~1630	HRRS hammer drill-in 22 m 13-3/8 inch casing Underream to ~130 m, Run ~120 m 10-3/4" casing Set retainer, cement 10-3/4 inch casing
			Subtotal = 7.6 days
<u>If first footwall pilot hole and HRRS OK, but first HW HRRS fails (no time for 2nd HW HRRS): Deepen FW hole as time permits</u>			
Footwall (peridotite)	~30.17°N ~42.12°W	~1630	RCB 1/2 cores 130 to1060 mbsf Log: triple combo, FMS/sonic, mag., UBI, VSP
			Subtotal = 36.9 days
<u>Transect of shallow MDCB core holes in FW</u>			
Footwall (peridotite)	~30.17°N ~42.12°W	~1630	Trip in/out with XCB/MDCB BHA MDCB core two holes 0 to ~9.0 mbsf average
			Subtotal = 1.3 days
<u>Bare rock spud and RCB 1/2 core to bit destruction in FW</u>			
Footwall (peridotite)	~30.17°N ~42.12°W	~1630	RCB 1/2 cores to bit destruction 0 to ~150 mbsf Drop bit, Log: triple combo, FMS/sonic, mag., UBI
			Subtotal = 5.5 days
Footwall (peridotite)	~30.17°N ~42.12°W	~1630	RCB 1/2 cores 0 to ~26 mbsf
			Subtotal = 1.6 days

Table PP-9 *Oceanic Core Complex 2 Primary Operations.*

Site	Location (lat/long)	Water depth (mbrf)	Operations Description
AMFW-01A (footwall - peridotite)	30.17000°N 42.12333°W	1630	Hole A: HRRS Hammer Drill-In 22 m 13-3/8 in. casing RCB 1/2 cores ~22 to 70 m, ADCB 70-130 m Underream to ~130 m, Run ~120 m 10-3/4" casing Run Retainer, Cement 10-3/4" casing (0.9 d) RCB 1/2 cores 130 to 1100 m Log: Triple Combo, FMS/Sonic, Mag., UBI, VSP Hole B: RCB 1/2 cores 0 to ~26 m

Table PP-10 *ALTERNATE SITES for Core Complex 2*

AMFW-01A	~30.17°N ~42.12°W	1630	HRRS Hammer Drill-In 22 m 13-3/8 in. casing RCB 1/2 cores ~26 to 130 m Underream to ~130 m, Run ~120 m 10-3/4" casing Run ~120 m 10-3/4" casing w/ MM & UnderReamer Run Retainer, Cement 10-3/4" casing RCB 1/2 cores 130 to 610 m Drop Bit, Log: Triple Combo, FMS/Sonic, Mag., UBI VSP **Hole Subtotal = 30 days**
AMHW-01A	~30.19166°N '~42.06500°W	2580	RCB to bit destruction 'Hole Subtotal = 3.0 days
AMFW-01A	~30.17000°N ~42.12333°W	1630	MDCB core 8 hole transect 0 to 4.5 m **Hole Subtotal = 1.8 days**
AMHW-01A	~30.19166°N ~42.06500°W	2580	RAB to bit destruction **Hole Subtotal = 3.0 days**

Science Description

The principal objective of Expeditions 304 and 305 is to determine the conditions under which oceanic core complexes (OCCs) develop. Formation of these large, shallow seafloor features appears to be a common manifestation of plate rifting and accretion at slow spreading ridges.

The Atlantis Massif, located at the eastern intersection of the Mid-Atlantic Ridge and Atlantis transform fault, has several key features that make this site an ideal target for OCC drilling. The hanging wall is in contact with the footwall of the detachment surface, which is believed to be dominated by variably serpentinized peridotite at the surface that may grade into fresh peridotite over drillable distances. The objectives of these expeditions are to (1) characterize variation in rock type, structure, and alteration with depth at an ultramafic OCC, including the nature and deformation history of the detachment fault and (2) obtain core of essentially fresh, in situ peridotite to document composition, microstructure, evidence for melt production/migration and relationships between deformation/melt and syntectonic alteration.

To achieve these goals, two expeditions are proposed and two sites will be drilled:

- Deep drill (>700 m) on the Central Dome of Atlantis Massif (Site AMFW-01A) to sample the detachment fault zone and the alteration front and drill into unaltered mantle (core and logging analyses planned).
- Deep drill (400–500 m) through the basaltic hanging wall (Site AMHW-01A) to sample rock just above the detachment, the shallowest part of the unexposed fault, and through the fault zone (core and logging analyses planned).

Operations

Both sites will require casing to maximize the chances of achieving deep penetration. The first casing string (13-3/8 in) will be set to ~20 mbsf using the HRRS Hammer Drill-in Casing system. Each site will then be RCB cored to ~130 mbsf and opened using a bicentered bit or underrreamer allowing a second (10.75”) casing string to be set. Each hole will then be RCB cored to maximumdepth and logged. During Expedition 304, both sites will be established with the HRRS Hammer Drill reentry cone/casing system and drilled to casing depth. The supplemental 10_-in casing strings will be set (as required). Remaining time will be devoted to drilling and coring the hanging wto the maximum depth possible in the available time. Expedition 305 will be devoted to deepening the hole at the footwall site to the maximum depth possible. Plans call for a limited trial (~50the Advanced Diamond Core Barrel (ADCB) coring system during Expedition 304 to further evaluate the potential of this system to acheieve the improved hard rock core recovery and quality over the conventional RCB system. Three day have been added to the Expedition 304 schedule for the ADCB evaluation. If successful, the ADCB may be used further during Expedition 305.

Experiments

A borehole vertical seismic profile (VSP) experiment has been proposed at the footwall site. All other operations during these two expeditions will focus on maximizing recovery and increasing depth of penetration.

Environment and Safety

The principal risks to the program are the difficulty of starting a hole in bare rock and the possibility the possibility of encountering unstable hole conditions. The difficulty of starting a hole on bare rock will be mitigated through use of the HRRS Hammer Drill-in Casing system. Experience has shown that in hard rock drilling the upper part of the hole is most prone to instability; hence, we will be prepared to case the upper 120 m of each hole. Below that depth we expect to encounter competent rock that will provide stable conditions and allow deep penetration, although it is possible that the shallowest (hanging wall) site will exhibit unstable hole conditions throughout the section. Sufficient supplieas and hardware will be carried to allow a third hole to be started in the event that one of the primary holes is lost through instability.

Weather conditions should not be a limiting factor, even though this expedition is scheduled for late fall 2004.

Procedures will be adopted to minimize risk to marine mammals from the proposed seismic experiments, including posting observers while experiments are in progress to record the presence and proximity of marine mammals, gradually increasing the amplitude of the sound sources to allow animals time to move away, and suspending operations if animals approach within 800 yards.

Logistics

Operations for Expedition 304 require an estimated 52 days (5 in port, 7 in transit, and 40 on site). For Expedition 305, operations require an estimated 53 days (5 in port, 7 in transit, and 41 onsite).

Logging

Downhole logging will provide in situ information on the geophysical structure of the drilled formation. Whereas core recovery is often biased and incomplete in basement, downhole logging data are continuous and therefore provide information over intervals of low recovery. The downhole logging program is designed for logging the hanging wall and footwall holes using the triple combination (triple combo) tool string, FMS/sonic tool string, and Well Seismic Tool (WST). In addition, the Ultrasonic Borehole Imager (UBI) will also be available for Expedition 305 operations. In addition, the deployment of a third-party magnetometer (i.e., Bundesanstalt für Geowissenschaften und Rohstoffe [BGR]—German Geological Survey) is under investigation.

Table PP-11 *Logging Operations for Core Complex Sites*

Site	WaterDepth (mbsl)	Sediment Thickness (m)	Basement Thickness (m)	Logging Operations
AMFW-01A	1630	1	> 700	Triple Combo, FMS/sonic, UBI, WST3
AMHW-01A	2550	1-2	400-500	Triple Combo, FMS/sonic

Expedition 307: Deglacial Sea Level Rise in South Pacific; Tahiti

Expedition 307	**Tahiti**
Proposal	**519-Full2**
Title	**The Last Deglacial Sea-Level rise in the South Pacific: Offshore Drilling in Tahiti (French Polynesia) and on the Australian Great Barrier Reef**
Proponents	**G.F. Camoin, E. Bard, B Hamelin, P Pezard, P.J. Davies, W.C. Dullo**

Figure PP-8 *Proposed location of sites for Tahiti drilling*

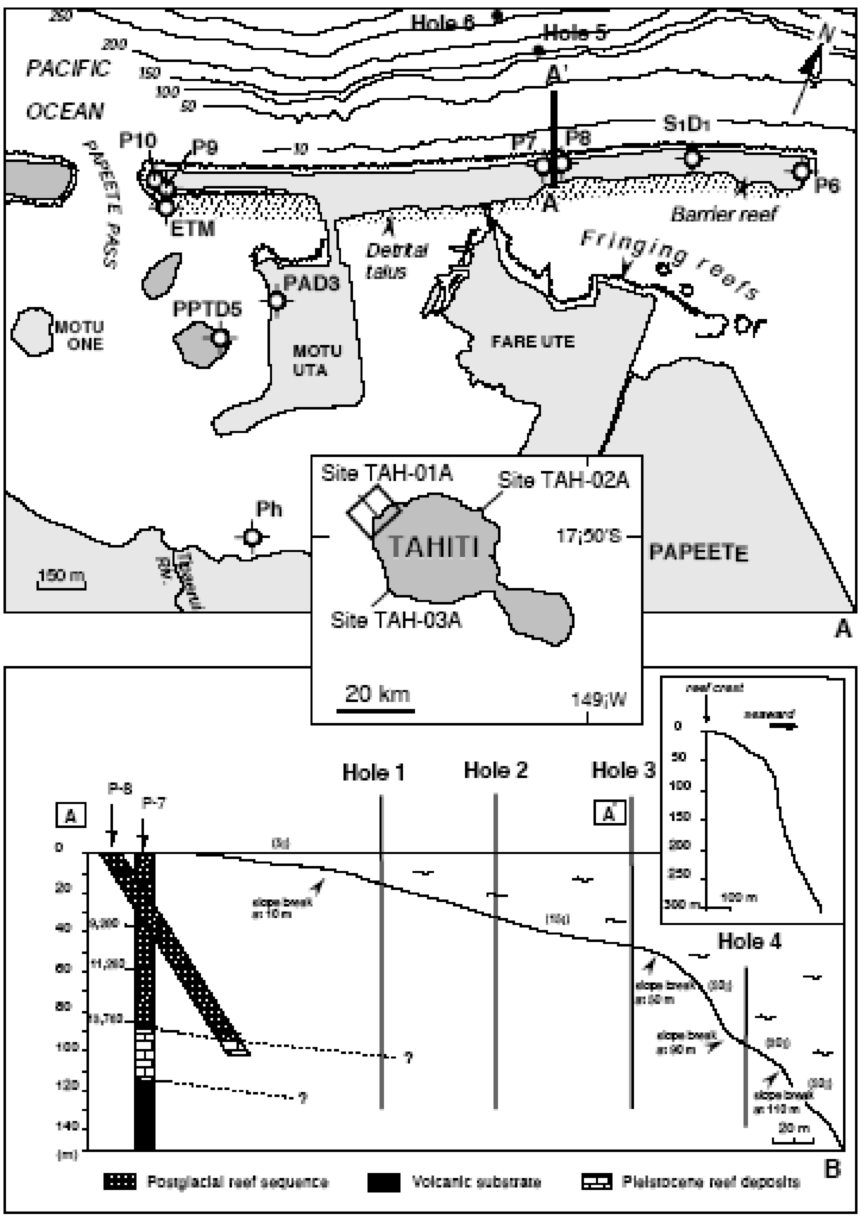

Table PP_12- *Proposed sies for Tahiti expedition*

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
TAH-01A	17.31S –149.35E	20/300	50/100	10	440	6 holes (transect) -Recovery of Holocene and Pleistocene depositional reef sequences. Volcanic basement.
TAH-02A	17.35S –149.20E	20/300	50/100	10	440	6 holes (transect) –Recovery of Holocene and Pleistocene depositional reef sequences. Volcanic basement.
TAH-03A	17.45S –149.35E	20/300	50/100	10	440	6 holes (transect) -Recovery of Holocene and Pleistocene depositional reef sequences. Volcanic basement.
RIB-01A	15.30S–145.40E	25/250	30/100	10	330	5 holes (transect) - Recovery of Holocene and Pleistocene depositional reef sequences. Limestone basement.
HYD-01A	18.40S - 147.40E	40/250	50/100	10	400	6 holes (transect) - Recovery of Holocene and Pleistocene depositional reef sequences. Limestone basement
Alternate site BOW-01	16.50S –145.50E	25/250	30/100	10	330	6 holes (transect) Recovery of of Holocene and Pleistocene depositional reef sequences. Limestone basement

Science Description

The main objective of this Expedition is to drill to a series of boreholes along a number of transects in order to:

1. Reconstruct the deglaciation curve for the period 20,000 to 10,000 yrs BP in order to establish the minimum sea-level during the Last Glacial Maximum (LGM), to test predictions based on different ice and rheological models, and to assess the validity, the timing and amplitude of meltwater pulses which are thought to have disturbed the general thermohaline oceanic circulation and, hence, global climate.

2. Identify and to establish patterns of short-term paleoclimatic changes that are thought to have punctuated the transitional period between present-day climatic conditions following the LGM. It is proposed to quantify the variations of sea surface temperatures based on high-resolution isotopic and trace element analyses on massive coral colonies. When possible, we will try to identify specific climatic phenomena such as El Nino-Southern Oscillation in the time frame prior to 10,000

yrs BP and try to get a better knowledge of the global variation and relative timing of post-glacial climate change in the southern and northern hemisphere.

3. Analyse the impact of sea-level changes on reef growth, geometry and biological makeup, especially during reef drowning events; this approach will help improving the modeling of reef development and the morphological and sedimentological evolution of the foreslopes (highstand vs lowstand processes).

Operational Plans

For Tahiti, the requirement is for a dynamically positioned drilling vessel. Two possibilities, both types equipped with a drilling rig and associated equipment, are:

- A vessel with sufficient accommodation, space and facilities to allow all required scientific work to be carried out at sea.
- A relatively small geotechnical-survey vessel suitable for drilling but with insufficient accommodation and facilities to permit full on-board working. In this case core will be transferred to shore for completion of core logging and curation. This will require the use of a local boat for daily visits to the ship for the transfer of cores to the onshore facility; such facilities are known to be available in Papeete.

It is proposed to use a ‘piggy-back’ mining-type wireline coring system with a conductor to seabed. This will allow minimum cuttings due to the small kerf on the bit, a smooth hole profile due to bit type and the best chance of obtaining high quality and high recovery of core. This type of equipment has been used extensively in other coral reef situations world-wide and has a good track record. For offshore use the drillstring is protected by the conductor pipe to seabed. This serves both to avoid excessive string bending and provide a conduit to the vessel for any cuttings.which come to surface.

If a sufficiently large drilling vessel is used for this Expedition, it will be possible to carry out all necessary preliminary scientific work (e.g. for drilling decisions, safety and ephemeral properties) onboard the drillship. After due consideration, it has been decided that there will be no splitting of the cores at sea, as it will be more efficient to carry out the majority of the scientific analysis during an onshore party at Bremen. Therefore there would be only limited scientific analysis carried out onboard, and only a limited number of scientists would be required to sail. It is currently planned that core will be cut on board into 1.5 m lengths and curated. The core catcher sample will be split and a visual description recorded. At present there is no indication of requirements for microbiology, but this can be incorporated into the prospectus.

The drilling transects are never more than 40 km from the island’s capital Papeete, and the closest is immediately offshore. We are advised that there is plenty of space at a research centre at the local University, and it would be possible to set up an onshore base at Papeete where it would be possible to carry out limited analytical work should the drillship facilities deem this necessary. However this activity would not in any way replace the proposed work at the Offshore Party in Bremen, and would be classed as an offshore operation.

Environment and Safety

Meteorological information suggests that the most favorable weather window is in the period from May to October. It is presently proposed that the expedition begins in May/June 2005 if the chosen drilling vessel is available at that time. However, the information also indicates that there are seldom strong winds, so that there can be considerable flexibility in timing from a weather point of view. Swell is predominantly from the north-east, but is likely to be only occasionally problematic.

All operations in the coral-reef environments must be carried out to the highest standards both for the health and safety of all personnel involved and for the protection of this fragile environment. The proposed IODP statement on the conduct of operations with due regard to the Environment shall form the baseline for any requirements in any area of work.

The ESO will operate to its own set of guidelines that will follow established NERC/BGS Health and Safety Policy. These will be in addition to the guidelines produced by OPCOM for reef drilling in general, and will be integrated with the IODP Health and Safety Policy and the specific vessel ISM requirements. In the event of all encompassing policies having different standards, the highest practicable will be used.

At sites in water depths of less than 50 m, an ROV will be deployed prior to drillstring deployment in order to observe the seabed and to avoid spudding into live coral heads.

Logistics

The estimated time for Expedition 307 is yet to be determined. The expedition will most likely take place in May/June 2005.

Logging

Considering the anticipated shallow depth and small diameter of many holes, short slimline tool strings are required.

The following is a generic list of minimum and additional tools, based on formation properties and not on 'operator'-based trademark names:

Minimum measurements

1. Natural gamma (total counts and spectral) – for log-log and core-log correlation (total counts), clay typing, mineralogy and red algae detection from uranium and dissolution horizons identification (spectral).

2. Porosity (cannot utilise a radioactive source) – for physical properties, core-log correlation, quality control, lithology.

3. Electrical resistivity (shallow-deep measurement) for physical properties, core-log correlation, quality control, lithology and pore-fluid identification.

4. Sonic measurements – for physical properties, core-log correlation, borehole-seismic integration, quality control.

Additional requested measurements

1. High-resolution borehole wall imaging at cm- to mm-scale (either electrical, acoustic or optical) – for core-log correlation, detailed reefal stratigraphic analyses from direct identification of coral types (with optical images), hole size (with acoustic images), mesoscale porosity identification, oriented sedimentological and structural information.

2. Hydrochemical borehole fluid analysis (with the simultaneous measurement of borehole pressure, fluid temperature, pH and electrical conductivity) allowing the identification of fluid circulation within the reef, an essential aspect for the primary scientific objective of the expedition, the complete reconstruction of the sea-level curve.

3. Check-shots – direct measurement of seismic travel time for core/borehole-surface seismic integration.

Due to environmental concerns in this shallow-water reef environment, the use of chemical nuclear sources is prohibited. As such, density and porosity logging tools that require standard Am-Be (for neutrons) and Ce (for gamma rays) sources cannot be used.

The proponents borehole geophysics plan expresses the need to have a full programme in at least two holes per transect, and possibly three. Besides the standard suite of tools (1-4) the deployment of two speciality tools, pending available funds, is requested. One is an optically imaging tool and the other is fitted with hydrochemical sensors to measure simultaneously *p*, *T*, *Cw*, *pH*. The holes will be drilled with seawater providing an ideal environment for the mm-scale optical imaging.

FY05 BUDGET OVERVIEW

This Program Plan budget identifies a total program cost of $64,192 K for FY05 (see **Table PP-13**), to meet the high-priority needs identified by the SAS. Of this cost, 34% is considered to be Science Operation Costs (SOCs) and the remaining 66% is Platform Operation Costs (POCs). These costs are distributed among the three IOs, IODP-MI, AESTO and the University of Bremen.

Table PP-13. *IODP Summary Budgets for FY05*

Entity	Specifics	SOCs	POCs	Total ($K)
IODP-MI		**3,035**	**0**	**3,035**
AESTO		**1,188**	**0**	**1,188**
JOI-Alliance				
	JOI	660	692	1,352
	TAMU	8,483	24,313	32,796
	LDEO	3,672	1,419	5,091
	TOTAL	**12,815**	**26,424**	**39,239**
ESO		**1,758**	**4,996**	**6,754**
CDEX		**1,659**	**11,036**	**12,695**
BREMEN		**241**	**0**	**241**
TBD		**1,040**	**0**	**1,040**
Grand Total		**21,736**	**42,456**	**64,192**

IODP-MI's budget is $3035 K (**Table PP-13).** The cost of several activities and services, such as databases, core repositories, support for the SAS and SAO offices, as well as for a site survey data bank are supported (or will be supported) under subcontracts to AESTO, the IOs, or others.

The AESTO budget of $1,188 K is for support of the Sapporo IODP-MI Office. This office coordinates the SAS and its committee meetings and assists with the other activities managed by the Vice President for Science Planning including oversight of data management, Site Service Data Bank and publication activities.

The JOI Alliance budget of $39, 239K for FY05 includes support for three full expeditions in FY05 (North Atlantic Climate 2, and Core Complex 1 and 2), and partial costs for North Atlantic Climate 1 expedition (which straddles the FY04 and FY05). Of the Alliance's total budget (see **Table PP-13**), 67% are POCs and 33% are SOCs

The ESO budget of $6,754 K (24% SOC/ 76% POC) is primarily in support of the Tahiti expedition. Other funds are in support of long-term planning, education and outreach, and data management support and administration.

The CDEX budget is $12,695 K (86% POC). Funds are to support engineering site surveys, administration and operations personnel, education and outreach, publications, project scoping, data management and engineering development (long-term well monitoring).

The University of Bremen Core Repository budget is $241K (100% SOC). These funds are primarily for personnel and operating costs (consumables, supplies, telecommunications, etc) associated with normal IODP/ODP core sampling and core archiving operations. Funds for curatorial support for MSP operations are identified in the ESO budget.

Budget Process

Detailed budgets for Science Operation Costs were submitted to IODP-MI from the IOs, AESTO and the University of Bremen. The total amount of proposed SOCs was approximately $26,000 K. The Lead Agencies gave IODP-MI budget guidance for a target figure of $20,000 K for Science Operation Costs. IODP-MI assessed the scientific priorities of FY05 and developed budgets to reach this target figure (**Table PP-14; Below**). **Table PP-14** provide details of SOC expenditures for all entities, including IODP-MI, AESTO, JOI Allliance, EMA, CDEX, the University of Bremen as well as funds that will be distributed by IODP-MI via RFPs.

Table PP-14 *Science Operation Costs (SOCs) based upon Lead Agency budget guidance*

	IODP-MI Core Activities			IODP-MI Subcontracts					
	IODP-MI	**AESTO**		**JOI-A**	**CDEX**	**ESO**	**Brem**	**TBD**	**Total**
Manage & Admin.	**3,035**								**3,035**
Edu, Out, Pubs				**1,054**	**188**	**66**		**370**	**1678**
Education & Outreach				100	96	56		340	592
Publications@				954	92	10		30	1,086
Sci. Advisory Stru.^		**1,188**							**1,188**
Engineering Dev. #					**1,028**	**20**		**250**	**1,298**
Data & Samples				**3,197**	**156**	**178**	**241**		**3,772**
Data				2,361	156	165			2,682
Curation				836		13	241		1,090
Site Surv Data Bnk+								**420**	**420**
Sci. Oper Costs				**8,564**	**287**	**1,494**			**10,345**
Manag. & Admin. **				1,941		0			1,941
Other*				6,623	287	1,494			8,404
Total	**3,035**	**1,188**		**12,815**	**1,659**	**1,758**	**241**	**1,040**	**21,736**

Footnotes

*Other** — for JA, includes science services, logging services, and platform services
for CDEX, includes project scoping costs (personnel and travel)
for EMA, includes sec. A-4.1 (sci. liaison, maintenance, and planning) & B-4 (SOCs) from ESO

*Manag. & Admin. ** * — for JA, as per FY05 SOC M&A submission
for EMA, consists of EMA's SOC budget

*Sci. Advisory Stru.^* — AESTO subcontract from IODP-MI

Publications@ — JOI-A budget includes cost to produce, print, and distribute the ESO ACEX expd. report.

TBD — To Be Determined -- funds administered by IODP-MI (outsourced to IOs or others)

BUDGET DETAILS FOR CONTRACTOR (IODP-MI)

IODP Management and Administration

Offices and Their Locations

IODP-MI has established two offices. The primary *IODP-MI Office* is located in the U.S. in the Washington, D.C., area, and it will serve as the headquarters and corporate office. The *Sapporo IODP-MI Office*, headed by the IODP-MI Vice President for Science Planning, is located in Sapporo, Japan.

Personnel and Their Duties

The key personnel will consist of the President, the Vice President for Science Operations, the Vice President for Science Planning, and the Senior Advisor to the President.

The IODP-MI President is responsible for all IODP-MI employees. He directly oversees the two IODP-MI Vice Presidents (VPs), the Senior Advisor to the President, and the Director of Communications, as well as the Finance and Administrative Officer and the Contracts Officer. The President is the Chief Executive Officer of IODP-MI and will be responsible for the operation of the CMO office. In this capacity, he will construct the IODP Annual Program Plan, obtain approvals from the IODP-MI Board of Governors and negotiate the contract for its implementation with NSF (on behalf of NSF/MEXT). He will be ultimately responsible for the execution of the Annual Program Plan and within the Program Plan he will, jointly with the relevant Vice President, be responsible for the various subcontracts to be awarded. While the Vice Presidents will be responsible for timely budgetary and programmatic monitoring of the work done under the subcontracts, the President will be ultimately responsible for all the work done under the contract with NSF.

The VP for Science Operations is responsible for oversight of IODP field operations and planning. The VP for Science Operations will work closely with the IOs to develop implementation strategies to achieve the science objectives of IODP. Since core sample repositories will be subcontracted, their oversight and overall management is one of the responsibilities of the VP for Science Operations. He will also serve as Chair of the Operations Committee (OPCOM), an IODP-MI committee. A Manager of Operations will be hired during the latter half of FY05. He/she will work closely with the VP for Science Operations in all aspects of responsibility related to the IOs.

The VP for Science Planning represents the main interface between the international scientific community and IODP. Key responsibilities are to provide the management interface to the SAS by supporting and coordinating the SAS and its activities and to oversee the production of the key products of IODP - data, publications, and education. He serves as an advisor to the Science Planning Committee (SPC) Chair and to the SPPOC Chair. He will directly oversee the subcontract for the Site Survey Data Bank.

The Sapporo IODP-MI Office will be subcontracted to Japan's Advanced Earth Science and Technology Organization (AESTO) under a sole source arrangement. The VP for Science Planning will oversee this subcontract. In addition to the SAS functions, AESTO personnel, under the supervision of the VP for Science Planning, will plan for data management as well as publication subcontracts.

The principal role of the Senior Advisor to the President will be to advise the President with regard to liaison with MEXT, NSF and other IODP-MI funding agencies. We believe that continuous and thoughtful liaison is of vital importance and therefore it needs to be handled at a very high level within IODP-MI.

The Director of Communications will head the Education/Outreach effort at IODP-MI and will also be responsible for coordinating the Education/Outreach at the IOs and at the national organization involved in IODP-MI. His/her task will include developing and monitoring the principal IODP website, arranging IODP outreach events such as maintaining booths at scientific meetings and arranging town hall meetings. He/she will also be responsible for media contacts and press releases and for publishing IODP brochures and informational letters. The Director of Communications will supervise a Web Designer and a Public Relations Assistant. The latter will be hired during the latter half of FY05.

Other personnel will include a Finance and Administrative Officer, a Contracts Officer, an Executive Program Associate (hired in the latter half of FY05), an Executive Assistant and a Project Assistant.

The total numbers of F.T.E.s in the Washington office, including the Vice President of Science Planning in Sapporo, will be 15 when fully staffed **(see Figure PP-3**). Three positions (Manager of Operations, the Executive Program Associate, and Public Relations) will be hired halfway through FY05. Two positions (Engineering Development and a Project Assistant) will not be hired until FY06. Thus at the beginning of FY05 the total number of F.T.E.s in the Washington office, including the Vice President of Science Planning in Sapporo, will be 10; by the end of FY05 the number will be 13.

<u>Outreach and Education activities of IODP-MI and IOs</u>

The coordination of Outreach and Education activities presents a challenge because these activities are ongoing not only at the IOs but also by the national organizations and committees. The IODP-MI Education and Outreach Task force has prescribed the following actions:

- Proactively ensure that these individual program based efforts including web based and press-related, are clearly contributions to an integrated IODP-wide effort

- Coordinate and promote integrated planning, execution, and evaluation of Outreach
- Facilitate international science lectures on the occasion of various SAS meetings
- Facilitate international media relations
- Advance education by engaging the international community
- Foster language and cultural awareness
- Develop procedures and protocols for Education and Outreach

Specifically, IODP-MI will outsource the following activities via subcontracts.

- Create program Identity and Materials
- Compile and maintain common content resources
- Develop and produce broader scientific information
- Develop Master Schedule for relevant IODP activities

It is clear that all these tasks will require intensive coordination between IODP-MI and the IOs

Publications

For FY05, the major portion of the publication budget is for JOI Alliance to publish the initial reports. CDEX will publish some technical manuals. ESO will prepare its initial reports through the science editing stage; the final production and publication will be handed over to JOI Alliance. Decisions on publications will be made by the IODP-MI Sapporo office. IODP-MI will subcontract the printing of the IODP newsletters. Policies and guidelines for publication will be developed with the support and advice of the Task force on Publications.

Task Forces and Advisory Groups.

Several IODP activities will be funded via subcontracts to IOs or other entities. These activities include (1) Education and Outreach, (2) Publications, (3) Engineering development, and the (4) Site Survey Databank. IODP-MI will establish task forces to provide guidance and advice and assist in the preparation and evaluation of RFPs for these subcontracts. The TBD (To Be Determined) column of **Table PP-14** lists the funds proposed for these subcontracts.

In addition to the task forces that will provide advice and guidance on specific technical issues, IODP-MI will establish two additional advisory groups. The first advisory group will provide a yearly performance evaluation of IODP-MI. The second advisory group will assist IODP in expanding its role with other geoscience initiatives.

<u>Cost Elements (**Table PP-15**)</u>

Equipment and Supplies

- Equipment – Computers, laptops and printers are needed for new staff as they are hired and repairs and maintenance costs of existing equipment. The server system maintenance and on-going monitoring will be needed throughout the year. A LCD projector will be needed for meetings and presentations.

- Supplies --- Office supplies are based on reaching full staffing during the year and the need for letterhead, envelopes and business cards.

Travel

- Travel includes all domestic and foreign travel for the IODP-MI staff, two AESTO staff, the SPC Chair, four task forces and two advisory and oversight groups.

Other

- Space and Furniture – This represents our estimate of rent for the full year and additional furniture needs to complete our space. Office machine rentals include a copier, printer and postage machine.

- Relocation and recruiting is based on the hiring assumptions noted in the personnel section.

- Postage, telephone are based on reaching full staffing during the year

- Administrative consultants include legal fees and auditors.

- Honoraria for Panel Chairpersons -- Panel Chairperson are very important to IODP. They arrange meetings, run the meetings, and take the minutes and distribute them. In the U.S., all scientists must account for their time away from their may (funded) duties. IODP advisory duties take the chairs away from their main duties, so they need to be compensated. We must treat all panel chairs equally, so all panel chairs will receive compensation, regardless of nationality. Co-chairs will split the $5000. This plan for Chairperson compensation has been unanimously approved by the IODP Board of Governors.

- Scientific/technical advisors and consultants (for task forces, evaluation, advisory boards)

Table PP-15. *Management and Administrative costs for IODP-MI (FY05)*

Item	Specific	sub total	Total
Personnel			
	Key Personnel	998,084	
	Managers and Officers	512,816	
	Technical & Administrative	311,300	
	Total		**1,822,200**
Equipment and Supplies			**99,000**
Travel			**508,800**
Other			**605,000**
	Space and furniture **Insurance** **Relocation and Recruiting** **Association dues and subscriptions** **Bank Charges** **Network Operations** **Telephone Services** **Video Conferencing** **Meeting expenses** **Admin. Consultants** **Honorarium—Panel Chairs** **Scientific/Technical advisors/consultants**		
FYO5 Total Budget			**$3,035,000**

D) APPENDICES – BUDGET DETAILS FOR SUBCONTRACTORS

The attached appendices provide budget details for the IODP-MI subcontractors.

APPENDIX A: **AESTO**
APPENDIX B: **JOI ALLIANCE**
APPENDIX C: **CDEX**
APPENDIX D: **ESO**
APPENDIX E: **UNIVERSITY OF BREMEN**