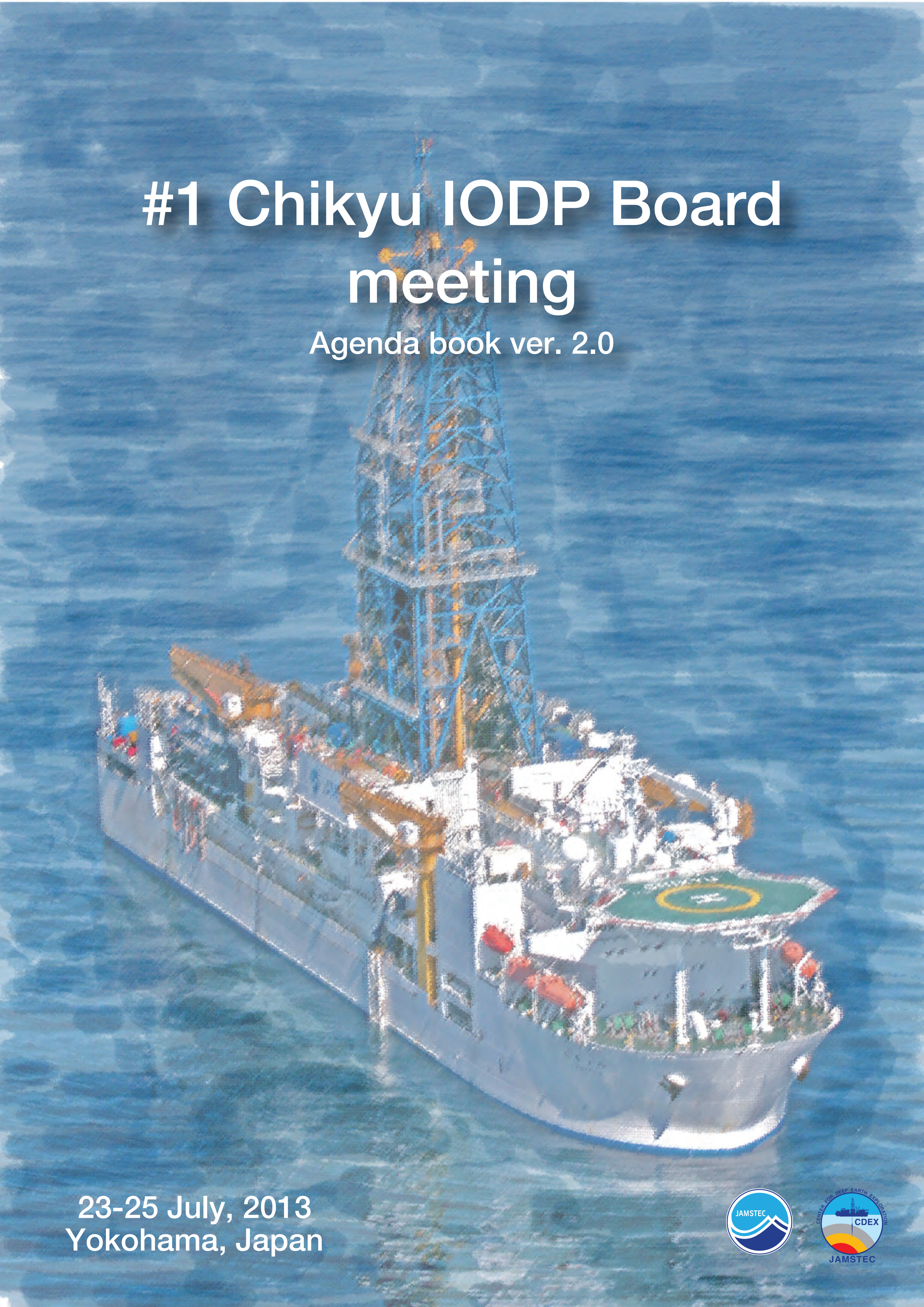


#1 Chikyu IODP Board meeting

Agenda book ver. 2.0

23-25 July, 2013
Yokohama, Japan

Agenda Item 1

Welcome and Introductions

- Call to order and self-introductions
- Welcome and meeting logistics

    Meeting Logistics

    Meeting Roster

Chikyu IODP Board #1 Meeting Logistics

23 – 25 July 2013
Miyoshi Memoriam Auditorium,
JAMSTEC Yokohama Institute for Earth Sciences (YES)
Yokohama, JAPAN

MEETING DATES & TIMES:

23 July (Tue.)	09:00 - 17:00	CIB Meeting	Miyoshi Memoriam Auditorium, JAMSTEC YES
24 July (Wed.)	09:00 - 17:00	CIB Meeting	Miyoshi Memoriam Auditorium, JAMSTEC YES
25 July (Thu.)	09:00 - 15:00	CIB Meeting	Miyoshi Memoriam Auditorium, JAMSTEC YES

MEETING LOCATION:
Miyoshi Memorial Auditorium (Conference Bldg, 2F)
Yokohama Institute for Earth Sciences (YES),
Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
Access: http://www.jamstec.go.jp/e/about/access/yokohama.html

SOCIAL EVENT: *Details to be announced.

23 July, 17:30 – 20:00, Reception at the Guest House, JAMSTEC YES

RECOMMENDED HOTEL AND MAKING LODGING RESERVATIONS

(Important Deadline Information):
We have a block of rooms at the **Yokohama Bay Sheraton Hotel & Towers** at a rate of 13,400 JPY per night for a single room, including taxes BUT without breakfast.

Please send your hotel reservation form via email (cib-info@jamstec.go.jp) to the CDEX office, **no later than 28 June 2013**. The email subject should contain the keywords "(your name) #1 CIB hotel booking".

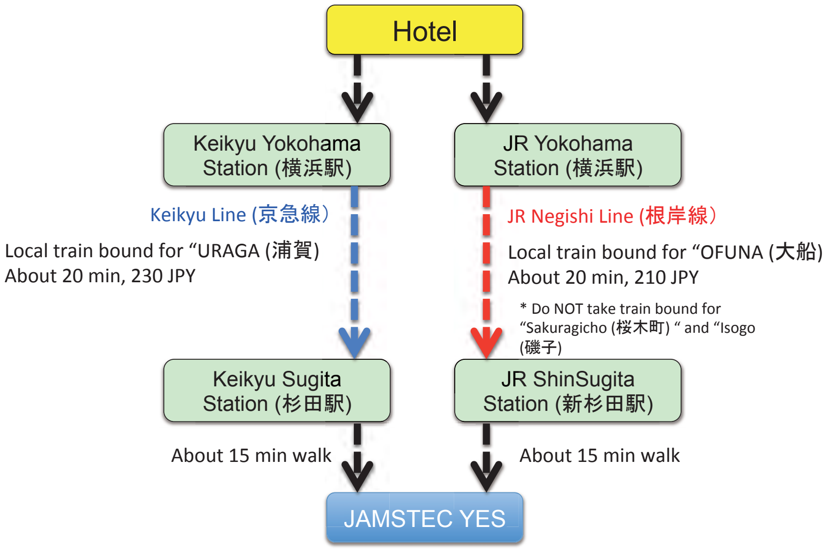
Yokohama Bay Sheraton Hotel & Towers
1-3-23 Kitasaiwai, Nishi-ku, Yokohama
220-8501 JAPAN
Tel: 81-45-411-1111
http://www.starwoodhotels.com/sheraton/

If you prefer a different hotel, please let us know as soon as possible: cib-info@jamstec.go.jp

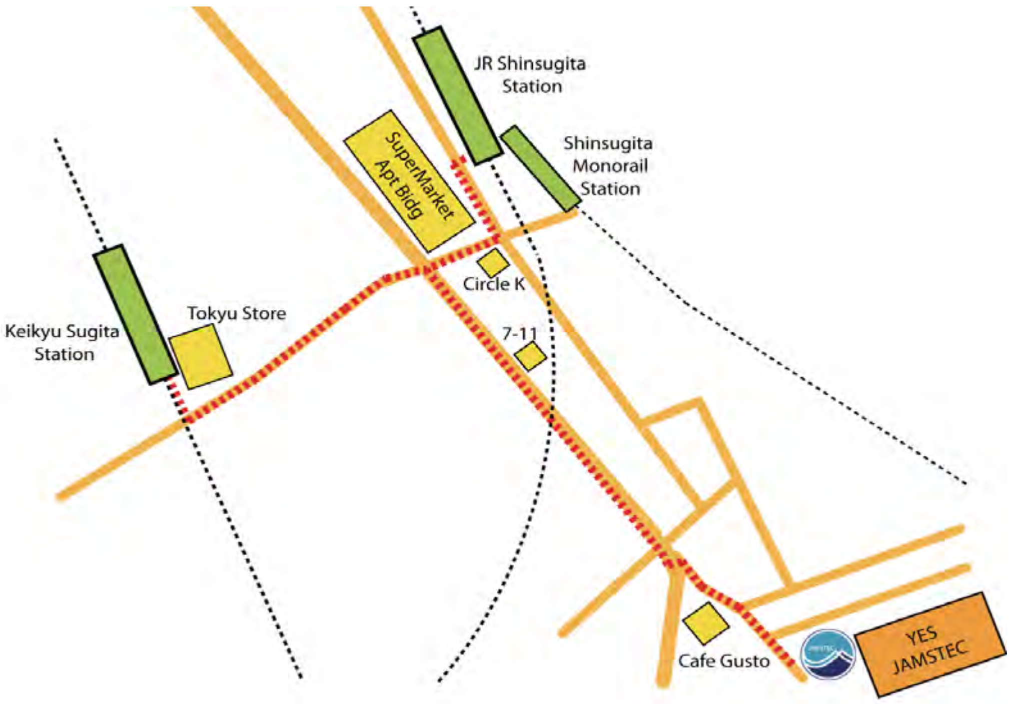
MEETING HOST:
Shomei Kobayashi
Deputy Director
Center for Deep Earth Exploration (CDEX)/JAMSTEC
TEL: +81-45-778-5665
E-mail: cib-info@jamstec.go.jp

TRANSPORTATION:

Participants will need to organize their own transport to and from the meeting location, JAMSTEC YES.



LOCATION MAP: JAMSTEC/YES



REFERENCE INFORMATION:
Participants will need to organize their own transport from the airport to the hotel and back.

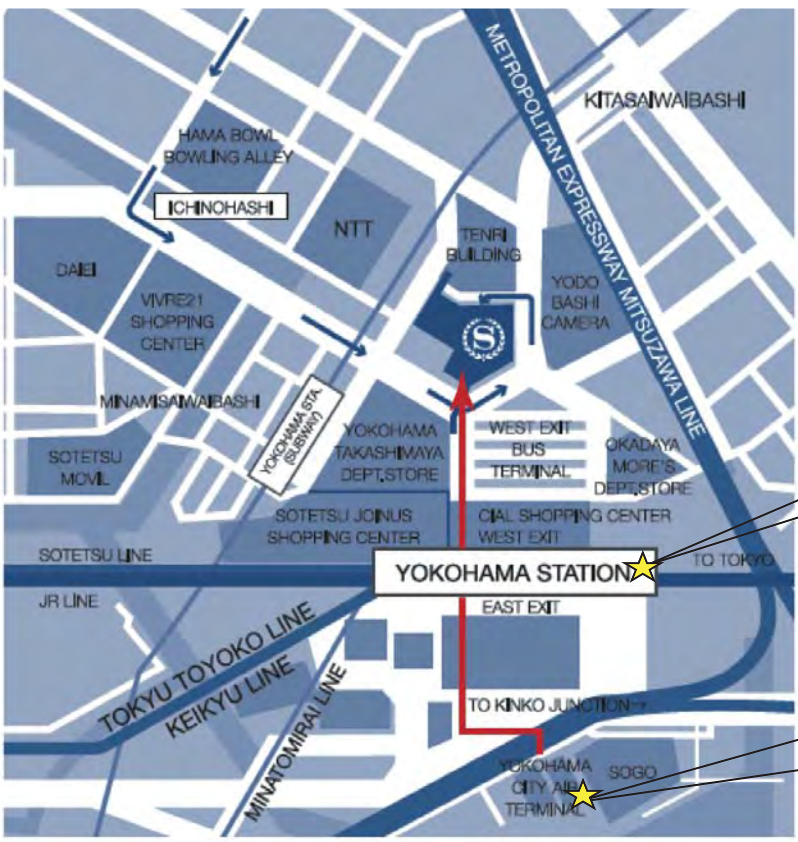
Narita Airport to Yokohama Station:

- Express Train (to Yokohama Station): Narita Express: ca. 95 min, 4,180 JPY
- Limousine Bus (to Yokohama City Air Terminal: YCAT): ca. 90 min, 3,500 JPY

The Sheraton Hotel is located just across the street from the west exit of Yokohama Station (see reference map below).

- Narita International Airport: http://www.narita-airport.jp/en/
  - o Narita Express (NEX) Timetable: http://www.jreast.co.jp/e/nex/index.html
    - ▪ Tickets for the NEX are available from ticket machines on floor B1 at both Terminals 1 & 2.
  - o Limousine Bus Timetable: http://www.limousinebus.co.jp/en/platform_searches/index/2/23
    - ▪ Buses from Narita to Yokohama Station leave from the arrival level on the first floor. Buy a ticket inside the terminal at the Arrival Lobby ticket counters before proceeding to the bus stop.

Yokohama Station to the Hotel



[Yokohama Station]

If you take train (NEX) from Narita Airport, you will arrive here.

[Yokohama City Air Terminal]

If you take limousine bus from Narita Airport, you will arrive here.

#1 *Chikyu* IODP Board meeting Roster

Name	Institution
Members	
Wataru Azuma	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Gilbert Camoin*	European Managing Agency (EMA), CEREGE, France
Hodaka Kawahata	The University of Tokyo, Japan
Gaku Kimura	CIB Chair - The University of Tokyo, Japan
Yuzuru Kimura	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Casey Moore	University of California, Santa Cruz, USA
Kenneth Nealson	University of Southern California, USA
Yoshiyuki Tatsumi	Kobe University, Japan
Heinrich Villinger	University of Bremen, Germany
Liaisons	
Keir Becker	IODP Forum chair - University of Miami, USA
David Divins	US Implementing Organization (USIO) - Consortium for Ocean Leadership, USA
Robert Gatliff	European Science Operator (ESO), British Geological Survey, UK
Holly Given	IODP-Management International, Inc./IODP Support Office, USA
Karsten Gohl*	ECORD Facility Board Chair - Alfred Wegener Institute, Germany
Susan Humphris	JR Facility Board Chair - Woods Hole Oceanographic Institution, USA
Masa Kinoshita	Kochi Core Center (KCC), Japan
Dick Kroon	PEP chair - The University of Edinburgh, UK
Gilles Lericolais	SCP Chair - Institut français de recherche pour l'exploitation de la mer (IFREMER), France
Observers	
Naokazu Ahagon	Kochi Core Center (KCC), Japan
Jamie Allan	National Science Foundation, USA
Yoshito Ando	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Rodey Batiza*	National Science Foundation, USA
Nobu Eguchi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Lallan Gupta	Kochi Core Center (KCC), Japan
Stuart Henrys	GNS Science, New Zealand
Shinji Hida	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Hitoshi Hotta	JAMSTEC, Japan
Yuichi Inoue	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Akira Ishiwatari	Japan Drilling Earth Science Consortium (J-DESC) - Tohoku University, Japan
Thomas Janecek	National Science Foundation, USA
Gil Young Kim*	K-IODP, Korea Institute of Geoscience and Mineral Resources (KIGAM)
Shomei Kobayashi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Nori Kyo	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Young Joo Lee*	Korea Institute of Geoscience and Mineral Resources (KIGAM)
Kuo-Fong Ma*	National Central University, Taiwan
Shigemi Matsuda	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Ryo Matsumoto	Meiji University, Japan
Sidney L. M. Mello	IODP-Capes/Brazil Office, Universidade Federal Fluminense, Brazil
Shin'ichi Mizumoto	JAMSTEC, Japan
Toshiaki Mizuno	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Kyaw Moe	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Shigemi Naganawa	The University of Tokyo, Japan
Yoko Okamoto	Marine Works Japan, Ltd.
Dhananjai K Pandey*	IODP-India, National Centre for Antarctic & Ocean Research
Kentaro Saeki	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Ikuo Sawada	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Jeff Schuffert	US Science Support Program (USSSP), Consortium for Ocean Leadership, USA
Toshikatsu Sugawara	Marine Works Japan, Ltd.
Kazuhiro Sugiyama	Marine Works Japan, Ltd.
Kiyoshi Suyehiro	IODP-Management International Inc., Japan
Asahiko Taira	President of JAMSTEC, Japan
Sean Toczko	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Shouting Tuo	IODP-China Office, Tongji University, China
Udrekh*	Agency for The Assessment and Application of Technology, Indonesia
Michiko Yamamoto	IODP-Management International Inc., Japan
Masaoki Yamao	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Chris Yeats	Australian/New Zealand IODP Consortium, Australian Resources Research Centre, CSIRO, Australia

* - unable to attend

Other CDEX Attendees

Akiko Fuse
Shinya Goto
Kiyoshi Hatakeyama
Yoshihisa Kawamura
Hiroyuki Kikuta
Shin'ichi Kuramoto
Tamano Omata
Tomokazu Saruhashi
Keita Umetsu
Yasuo Yamada

Agenda Item 2

Approval of Agenda

Draft Agenda

Chikyu IODP Board #1 meeting
23-25 July 2013

Miyoshi Memoriam Auditorium
JAMSTEC Yokohama Institute for Earth Sciences (YES)

Draft Agenda ver.1.6

Day-1		**Tuesday, 23 July 2013**
0900-0920	**1. Welcome and Introductions**	(Hotta/Kobayashi)
0920-0930	**2. Approval of Agenda**	(Chair - Kimura)
0930-0945	**3. Framework of the new IODP**	(Kimura/Azuma)
0945-1000	**4. Chikyu membership**	(Azuma)
	COFFEE BREAK	
1030-1130	**5. Chikyu IODP Board Terms of Reference**	(Chair - Kimura)
	Approval (or Confirm)	
	Science member's rotation and chair selection process	
	CIB conflict of interest policy	
	Interactions with ECORD and JR FBs	
1130-1200	**6. JR Advisory Panels overview**	
	PEP	(Kroon)
	SCP	(Lericolais)
	EPSP	(Humphris)
	LUNCH	
1330-1500	**7. Roadmap for Chikyu Expeditions**	(Chair - Kimura)
	Expedition scheduling process	(Eguchi)
	Proposal evaluation process	
	Project Coordination Team (PCT)	
	Proposal Advisory Team (PAT)	
	Proposal workshop	
	JR Advisory Panels usage	
	PEP	
	SCP	
	Riser ad-hoc PEP	
	Chikyu safety review	(Matsuda)
	Chikyu Safety Review Committee	
	EPSP	
	Engineering development	(Kyo)
	Chikyu Technical Advisory Team (TAT)	
	COFFEE BREAK	
1530-1630	**8. Summary of Chikyu IODP Operations to date**	

	Chikyu's Capability	(Saruhashi)
	IODP Expeditions Summary	(Eguchi)
	Lessons Learned	
1630-1700	**9. Chikyu Budgetary Overview**	(Azuma)
	Summary of Previous Expeditions	
	Budgetary Guidance of JFY2014	
1700-1730	**10. Outline of Ship Schedule for JFY2014 and 2015**	(Eguchi)
	NanTroSEIZE Planning Update	
1800-	**Reception**	

Day-2 **Wednesday, 24 July 2013**

0900-1000	**11. Chikyu +10 Workshop report**	(Kuramoto)
	COFFEE BREAK	
1030-1200	**12. Proposals Overview**	
	Support Office activities	(Given)
	Proposals ready for scheduling	(Kroon/ Lericolais)
	Proposal at PEP	
	LUNCH	
1330-1430	**13. Long-term Planning**	(Chair - Kimura)
	Post NanTroSEIZE Riser Expeditions	
	Chikyu Riserless Expeditions	
	COFFEE BREAK	
1530-1630	**14. Toward project advancement**	(Chair - Kimura)
	PCT Establishment	
	WS planning	
	TAT Discussion Items	
1630-1700	**15. International collaboration**	(Chair - Kimura)
	Cooperation with ECORD and JR FBs	
	Chikyu new member recruitment	

Day-3 **Thursday, 25 July 2013**

0900-1000	**16. Chikyu Facility Procedures, Guidelines and Policies**	(Chair - Kimura)
	Environmental Protection and Safety Policy	
	Sample, Data and Obligation Policy	
	Proposal Confidentiality Policy	
	Staffing Procedures	
	Proposal Submission Guidelines	
	Onboard Measurements Guidelines	
	Third Party Tool Guidelines	
	Site Survey Data Requirements	
	Second Post Expedition Meeting	

COFFEE BREAK

1030-1100 **17. Core Curation** (Kinoshita)
KCC Core Curation Process
Collaboration with Bremen and TAMU

1100-1130 **18. Data Management** (Eguchi)

LUNCH

1300-1330 **19. Publication** (Eguchi)

1330-1400 **20. Outreach Program** (Omata)

1400-1430 **21. Review of Consensus Statements and Action Items**

1430-1445 **22. Next CIB meeting**

1445-1500 **23. Any Other Business**

Agenda Item 3

Framework of the new IODP

Framework Document

Ver: 17 Aug 2012

Over the past two years, the Integrated Ocean Drilling Program's (IODP) 25 international partners, the platform operators, and the scientific leadership of the Science Advisory Structure have come together to consider the IODP experience and design a management structure and business model for future operations that retains both the multi-platform capabilities and transformative science goals outlined in the new science plan "*Illuminating Earth's Past, Present, and Future: The International Ocean Discovery Program Science Plan for 2013-2023*" while addressing constraints facing the main financial sponsors. The framework presented here will be used as a guiding document by the Platform Providers (MEXT, ECORD, NSF) to develop more specific Memoranda of Understanding with their international partners for the new International Ocean Discovery Program.

Framework for International Ocean Discovery Program

IODP Program Management

1. The Science Plan "Illuminating Earth's Past, Present and Future" is the guiding scientific document for the new IODP.
2. A Support Office, funded through contributions to the U.S. Facility Board to support *JOIDES Resolution* operations, is intended to have the following tasks (dependent upon outcome of the solicitation process): support of the Science Advisory Structure (SAS) and associated meeting logistical support, support of IODP Forum, oversight of Site Survey Data Bank, maintenance of the IODP website, and publication of the journal 'Scientific Drilling'. The Support Office will handle drilling proposals for the *JOIDES Resolution, Chikyu, and* MSPs and may be utilized upon request by other platform providers.
3. Most other functions of the current Central Management Organization not included in Item #2 will be transferred to the Platform Providers and/or program partners (i.e., workshop proposals, data management, core curation, publications, engineering and technology development, and education and outreach).
4. A Project Partnership Office (PPO), which will be financially supported by MEXT/JAMSTEC, will be established to develop funding and collaborative partnerships for large-scale IODP initiatives utilizing *Chikyu* and conduct other relevant tasks. This PPO would also be available for use by other Platforms Providers to assist them in developing large-scale collaborations. The PPO will also provide support for riser proposals in SAS evaluation/nurturing process (mentioned in Item 21).
5. The IODP Forum is the custodian of the Science Plan and a venue for exchanging ideas and views on the scientific progress of the program. The Forum will also provide advice to IODP Facility Boards on Platform Provider activity. The IODP Forum is independent from the Science Advisory Structure and the Platform Provider Facility Boards. Members will include active community scientists, and representatives from funding agencies (to any platform), implementing organizations, and program member offices. The IODP Forum will also have liaisons from others interested in the IODP program (e.g., other large science programs, potential new members, etc.). The chair of the IODP Forum will be a well-recognized scientist who will be the face of the program and will discuss with the respective Facility Boards the

progress of the program toward completion of the Science Plan. The Chair of the IODP Forum will be in post by October 1, 2013.

Platform Provider Program Management

6. Individual Platform Providers contribute to IODP by fulfilling objectives identified in the Science Plan.
7. NSF will operate the *JOIDES Resolution* as an independent Platform Provider. ECORD will operate MSPs as an independent Platform Provider. MEXT/JAMSTEC will operate *Chikyu* as an independent Platform Provider.
8. Each Platform Provider will have its own Facility Board (FB) that will be responsible for the effective delivery of the Facility's contribution to the IODP Science Plan with the available resources.
9. The U.S. Facility Board will consist of (1) representatives from funding agencies contributing to *JOIDES Resolution* operations, (2) active leading members of the international scientific community, and (3) representatives from the *JOIDES Resolution* operator. The Chair of the US FB will be a well-recognized active scientist from the ocean drilling community. NSF will act in a coordinating role for the FB to facilitate meeting logistics. The U.S. FB will have liaisons from all major entities in the program. The US Facility Board will (1) schedule proposals for drilling based upon science priorities and optimal geographic distribution, (2) advise on long-term planning, (3) approve the Annual Facility Program Plan and (4) fund the Support Office.
10. The ECORD Facility Board will include leading scientists, representatives from the ECORD Science Operator, the Director of the ECORD Managing Agency, and representatives from ECORD/IODP funding agencies. The Board will be organized by EMA, with an ECORD scientist as Chair. The ECORD Facility Board will have liaisons from all major entities in the program. The ECORD Facility Board will primarily (1) schedule proposals for drilling based upon science priorities, optimal geographic distribution and costs, (2) assess the Annual ECORD plan and (3) advise on long-term planning.
11. The Chikyu IODP Board (CIB) will consist of (1) representatives from entities contributing to *Chikyu* operations, (2) leading members of the international scientific community, and (3) representatives from MEXT/JAMSTEC/CDEX. The CIB Chair will be selected from well-recognized scientists of the ocean drilling community. The CIB will have liaisons from all major entities in the program. The CIB will (1) advise on long-term *Chikyu* project planning, (2) schedule proposals for drilling based upon science priorities, engineering feasibilities and optimal geographic distribution, (3) approve the Annual Facility Program Plan, and (4) advise on activities of an entity to function as a Project Partnership Office (PPO).
12. The current curation and geographical distribution of cores will continue into the new program, with the goal to maintain a uniform sampling policy among all the IODP repositories. NSF/USIO intends to support all cores from the *JOIDES Resolution/Glomar Challenger* and MSPs located at the Gulf Coast Repository. In reciprocity, ECORD intends to support all cores from the *JOIDES Resolution/Glomar Challenger* and MSPs located at the Bremen Core Repository. JAMSTEC intends to support Chikyu cores wherever they are stored. NSF/USIO and ECORD intend to support the cores from the *JOIDES Resolution/Glomar Challenger* and from MSPs located at the Kochi Core Center, respectively. The repository

heads will select members of the community to act as a Curatorial Advisory Board, which will act as an appeals board for issues associated with sample distribution and assist in reviewing and approving requests to sample permanent archives.

13. Data collection and archiving for each platform will be the responsibility of the Platform Provider.
14. Publications including shipboard reports, the Scientific Prospectus, Preliminary Reports, and Proceedings volumes will be the responsibility of the Platform Provider. The Program encourages the Platform Providers to maintain common publication formats.

Program Exchange

15. Nations supporting platform(s) towards IODP Science Plan goals may have berths on *JOIDES Resolution*, *Chikyu*, MSP expeditions and other platforms through an exchange program agreed upon bilaterally between individual Platform Providers.
16. Lead proponents selected as Co-chief scientists, based upon programmatic or project need, will not count toward national or consortia quotas. This provision will be revisited yearly for the *JOIDES Resolution* and on a project-by-project basis for *Chikyu* to ensure that the science party size and/or member berthing quotas on either platform are not unduly affected should members increase their yearly contribution level to either the *JOIDES Resolution* or *Chikyu* partnerships or new members join either partnership.

Science Advisory Structure

17. The Proposal Evaluation Panel (PEP) is the key scientific panel that integrates the program and ensures scientific excellence in accordance with the Science Plan of IODP. Riserless/MSP proposals will be received and evaluated by the PEP twice/year. Riser proposals will be received by PEP in response to specific proposal calls. An ad hoc PEP breakout group, distinct from the four thematic breakout groups (with additional scientific and operational expertise supplied to PEP as required), will meet for evaluation of these riser proposals.
18. The Science Advisory Structure will also include the Environmental Protection and Safety Panel (EPSP) and the Site Characterization Panel (SCP).
19. The US FB will oversee the Proposal Evaluation Panel, the Environmental Protection and Safety Panel and the Site Characterization Panel. The current Terms of Reference will provide the basis for the Terms of Reference for these panels in the post-2013 program. The PEP, SCP and EPSP representatives will be staffed by the Program Member Offices using a to-be-determined quota system based primarily upon national/consortia contributions to the operations of the *JOIDES Resolution,* but overall programmatic contributions and scientific needs will also be taken into consideration.
20. The Implementing Organizations may establish and staff their own Technical Development Panels and Scientific Technical Panels to address the unique technical/analytical needs of

each platform. The Implementing Organizations are encouraged to exchange ideas and ensure best practices.

21. The Support Office identified in Item 2 will receive proposals for all platforms. Proposals will be forwarded to the Science Advisory Structure Panels, the Project Partnership Office identified in Item 4 (for the case of riser proposals), and to the Implementing Organizations for review of science and logistical support requirements.

JOIDES Resolution Planning and Project Architecture and Financial Contribution

22. Member contributions will be used to offset costs associated with operating the *JOIDES Resolution* and Support Office activities.
23. *JOIDES Resolution* members will include any entity providing at least $3.0M USD/annum towards operation of the *JOIDES Resolution* and Support Office activities. This contribution provides representation on all SAS panels and two berths/expedition on the *JOIDES Resolution*.
24. Associate Members will include any entity that provides contributions of at least $1M USD/annum for the operation of the *JOIDES Resolution* and Support Office activities. Levels of representation on SAS panels and berths on the *JOIDES Resolution* will be scaled accordingly.
25. Participants wishing to make a contribution of less than $1M USD/annum may join via a consortium.
26. Participation levels for members and associate members on the *JOIDES Resolution* and SAS panels will be defined in the Annex to the Memorandum of Understanding (MoU) for each partner. Additional berths will be offered to Platform Providers through an exchange mechanism.
27. Co-funded projects will require a flexible approach to staffing.

ECORD MSP Planning and Project Architecture and Financial Contributions

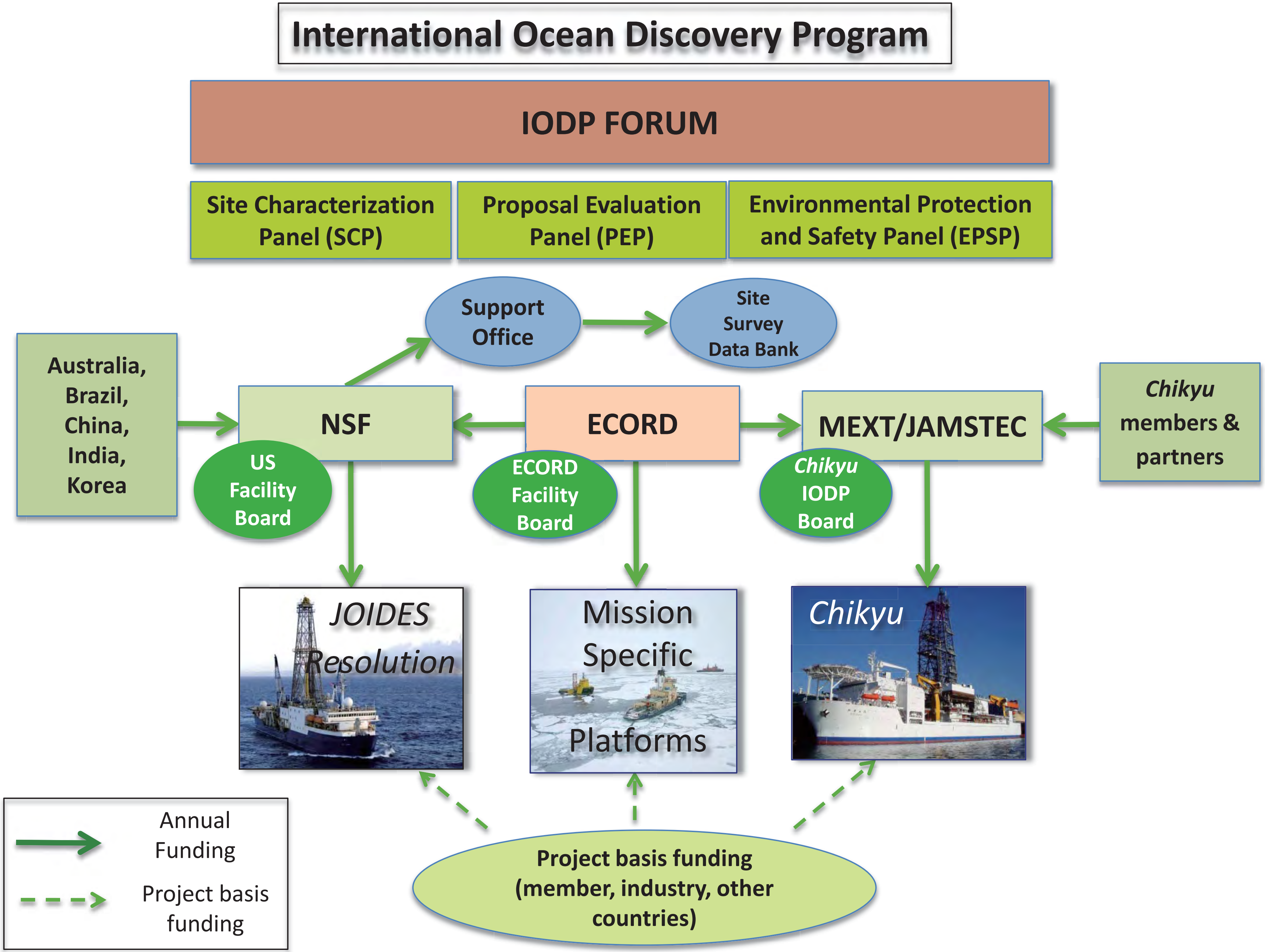
28. ECORD will be responsible for funding and implementing Mission Specific Platform operations. In addition to its own funding, ECORD will encourage and help proponents to seek additional funding sources on a project basis, with the aim of offering more opportunities. Possible additional funding may come, *inter alia*, from the European Commission, partnership with industry, and specific funding at the national level.
29. ECORD will sign a Memorandum of Understanding with NSF that includes access to the *JOIDES Resolution* for ECORD scientists and in reciprocity access to MSPs for US scientists and scientists from *JOIDES Resolution* Members and Associate Members. Participation levels are to be defined in the Annex to the MoU signed between ECORD and the NSF. Additional places may be offered through an exchange mechanism. Monitoring of the exchanged berths will be the responsibility of the PMOs, in coordination with the IOs.
30. Access to MSPs will be offered to Japanese and *Chikyu* partner scientists through an exchange mechanism between berths on MSPs and *Chikyu*. Participation levels are to be defined in an Agreement document signed between ECORD and MEXT/JAMSTEC.
31. Co-funded projects will require a flexible approach to staffing.

Chikyu Planning and Project Architecture and Financial Contributions

32. The major portion of *Chikyu*'s operational time will continue to be allocated for scientific drilling. With flexible scheduling and dynamic geographical movement, she will conduct large riser projects, as well as ancillary shorter-term riserless projects of various scientific themes.
33. Large-scale project proposals for *Chikyu* will be formulated and nurtured from an early stage through workshops (scoping/project formulation) attended by SAS representatives, Implementing Organizations, and potential partners among others in addition to community scientists and engineers.
34. Operation costs of *Chikyu* will be supported through a newly formed *Chikyu partnership body (to be named)* and the *Chikyu* project teams/consortia.
35. Countries, research institutions, private organizations, universities or any other entities/consortia interested in *Chikyu* science activities are invited to join the *Chikyu partnership body. Chikyu* partnership members will need to pay a minimum participation fee of Japanese Yen 25,000,000*/annum, which will provide one berth on each *Chikyu* IODP expedition, as well as capacity-building opportunities at Kochi Core Center. Other benefits such as more berths on *Chikyu*, options for choosing berths on the other two platforms (*JOIDES Resolution*/MSP), and CIB representation may be obtainable, subject to availability, with multiple units of participation [Details to be defined and formulated in separate Memorandums]. (*equivalent to USD 312.5 K based on the exchanged rate: 1 USD=80 Yen)
36. Countries, research institutions, private organizations, universities, foundations or any other entities/consortia interested in supporting *Chikyu* science activities are encouraged to join the relevant *Chikyu* project team/consortium. Benefits of project partners will be determined through bilateral negotiations with each project team, based on levels of their contributions [Details to be defined in the Memorandums]. For large-scale initiatives, an international consortium may be formed in order to maximize financial, intellectual and engineering resources.

Transition

1. The Integrated Ocean Drilling Program Science Advisory Structure, with its current panels and representation quotas, will be used to evaluate and prioritize proposals through September 30, 2013. SIPCOM will cease to exist after September 30, 2013.
2. IODP Council will continue as the program authority through September 30, 2013. After that date, IODP Council will be disbanded.
3. IWG+ will stay in existence until the operational framework of the new program is fully implemented.
4. Facility Boards will be initiated prior to the start of the new program and may need to work closely with SIPCOM during the period of overlap.


International Ocean Discovery Program
IODP FORUM
Site Characterization Panel (SCP)
Proposal Evaluation Panel (PEP)
Environmental Protection and Safety Panel (EPSP)
Support Office
Site Survey Data Bank
Australia, Brazil, China, India, Korea
NSF
ECORD
MEXT/JAMSTEC
Chikyu members & partners
US Facility Board
ECORD Facility Board
Chikyu IODP Board
JOIDES Resolution
Mission Specific Platforms
Chikyu
Annual Funding
Project basis funding
Project basis funding (member, industry, other countries)

Agenda Item 4

Chikyu membership

Chikyu Membership Category

Chikyu membership category

1. *Chikyu* Regular Member

-Definition: *Chikyu* Regular Member is one who will provide regular funds for *Chikyu* operations for multiple consecutive years and receive benefits in return.

-Applicable parties: Countries, research organizations, universities and/or their consortia

-Dues: One (1) M USD/year (minimum level)

-Benefits: 1) One (1) berth/each *Chikyu* expedition per a contribution of one (1) M USD
2) Member status of the CIB

2. *Chikyu* Project Member

-Definition: *Chikyu* Project Member is one who will provide funds for *Chikyu* operation of a particular project of interest and receive benefits in return.

-Applicable parties: Countries, research organizations, universities, foundations, private organizations, and/or their consortia

-Dues: Typically more than ten(10) M USD/project*

-Benefits: 1) Member status of the CIB and the PCT (Project Coordination Team) for the *Chikyu* expedition
2) Berths of the *Chikyu* expedition if requested**

*) In addition to monetary contribution, in-kind contribution may also be accepted.

**) Obtainable berths will be determined based on contribution level through negotiations with JAMSTEC.

3. *Chikyu* Partnership Member

-Definition: *Chikyu* Partnership member is one who will provide modest funds for *Chikyu* operations for multiple consecutive years and receive benefits in return. This membership is for new or smaller partners to help them enhance their capabilities in earth sciences.

-Applicable parties: Countries, research organizations, universities and/or their consortia

-Dues: Three hundred(300) K USD/year (fixed amount)

-Benefits: 1) Opportunity to board one *Chikyu* expedition per year subject to Co-chief agreement and space availability
2) Prioritized opportunity to attend training courses conducted at Kochi Core Center (KCC)
3) Opportunity to utilize selected research equipment at KCC by paying a nominal fee
4) Observer status of the CIB

Agenda Item 5

Chikyu IODP Board Terms of Reference

- Approval (or Confirm)
  - Draft Terms of Reference of the *Chikyu* IODP Board
- Science member's rotation and chair selection process
  - CIB membership
  - CIB members selecting process
- CIB Conflict of Interest policy
  - *Chikyu* IODP Board Conflict-of-Interest Policy (Draft ver. 0.2)
  - JOIDES Resolution Facility Conflict-of-Interest Policy
  - IODP Conflict-of-Interest Policy
- Interaction with ECORD and JR FBs
  - ECORD FB ToR/Member List
  - JR FB ToR/Member List

Draft Terms of Reference of the *Chikyu* IODP Board (CIB)

Mandate

The *Chikyu* IODP Board (CIB) will discuss and/or review the matters described below concerning the planning and the operations of *Chikyu* IODP expeditions and relevant programs, and provide suitable recommendations for JAMSTEC and other relevant parties.

1. Annual *Chikyu* IODP Implementation Plans for the following Japanese fiscal year.
2. Long-term *Chikyu* IODP Implementation Strategies for the following 4-5 years.
3. Data management, core curation, publications, capacity building, outreach programs, and other related activities.
4. The establishment of full-proposal formation workshops.
5. Other related issues when a need arises.

Membership

The CIB will consist of the CIB Members, the Liaisons, and the Observers.

<u>CIB Members</u>

- Six leading scientists (three scientists from Japanese organizations and three from foreign organizations)
- *Chikyu* Regular Members
- *Chikyu* Project Members
- Director/IODP, MEXT
- Director of the Center for Deep Earth Exploration (CDEX) of JAMSTEC

<u>Liaisons</u>

- IODP Forum Chair
- PEP Chair
- Support Office (SO)
- USIO
- ESO
- Kochi Core Center (KCC)

Observers

- NSF
- *Chikyu* Partnership Members
- Program Member Offices
- Others as appointed by JAMSTEC

Secretariat

- CDEX of JAMSTEC

Chair and scientific members

The Chair will be selected among leading Japanese scientists. The Chair will attend meetings of the IODP Forum and other relevant international scientific conferences (The transportation and accommodation cost will be borne by JAMSTEC.)

The Chair shall serve for two years. The other five scientific members shall serve for three years.

Decisions

The CIB will make decisions by common consent of the CIB Members present. In the case the CIB Members present fail to reach consensus, the Chair can make a final decision.

Meetings

The CIB will convene at least once a year. JAMSTEC will bear the transportation and accommodation cost for six CIB Scientific Members, including the Chair, to attend CIB meetings.

Membership

CIB members	Liaisons	Observers
Six leading scientists *Chikyu* Regular Members *Chikyu* Project Members Director/IODP, MEXT CDEX Director	IODP Forum Chair PEP Chair Project Partnership Office(PPO) Support Office(SO) USIO ESO Kochi Core Center(KCC) ECORD FB Chair JR FB Chair EPSP Chair SCP Chair	NSF *Chikyu* Partnership Members Program Member Offices J-DESC USSSP ESSAC Other PMOs Others

Six leading scientists

Gaku Kimura(Chair)	Yoshiyuki Tatsumi	Hodaka Kawahata
The University of Tokyo, Japan	Kobe university, Japan	The University of Tokyo, Japan
2 year-term	2 year-term	3 year-term
		
Kenneth H. Nealson	**J. Casey Moore**	**Heinrich Villinger**
University of Southern California, USA	University of California, Santa Cruz, USA	University of Bremen, Germany
2 year-term	3 year-term	3 year-term
		

CIB Nominations Committee Report
-CIB members selecting process-

JAMSTEC set up the CIB (Chikyu IODP Board) Nominations Committee as an ad-hoc committee for the selection of CIB science members in early January, 2013. CIB Nominations Committee approved the application form to call for nominations for six active leading members from the international scientific community.

<CIB Nominations Committee Members>

Chair:

Dr. Mitsuhiro Toriumi (Research Director, IFREE/JAMSTEC)

Members:

Dr. Wataru Azuma (Director-General, CDEX/JAMSTEC)
Dr. Akira Ishiwatari (Professor, Tohoku University)
Dr. Hiroshi Kitazato (Research Director, BioGeos/JAMSTEC)
Dr. Shinichi Mizumoto (Research Coordinator, Planning Department/JAMSTEC)
Dr. Yujiro Ogawa (Professor Emeritus, University of Tsukuba)

<Timeline>

18 Jan., 2013	CIB Nominations Committee finalized the call for nominations document
18 Jan.-22 Mar., 2013	Call for nominations to CIB science members
27 Mar., 2013	CIB Nominations Committee meeting at JAMSTEC Tokyo office, and selected potential members.
28 Mar., 2013	Invitation letters to CIB science members were sent out to the selected applicants

<CIB Nominations Committee Meeting >

Date: 27 March, 2013

Venue: JAMSTEC Tokyo office

Brief note:

-CIB Nominations Committee selected six leading scientists including the chair from 14 applicants from international scientific community taking into account field of expertise balance, national/consortia balance, and conflict of interest on existing proposals in IODP.

-To ensure the continuity of memory of meeting, the committee decided to invite 2 scientists as two-year term members just for this time (the term of members is normally 3 years and that of the chair is 2 years).

-The committee endorsed the terms of reference for the Chikyu IODP Board and agreed that late July would be the best time to hold the inaugural CIB meeting.

Chikyu IODP Board Conflict-of-Interest Policy
Draft ver. 0.2

The objective of the conflict-of-interest (COI) policy for the *Chikyu* IODP Board (CIB) within the International Ocean Discovery Program (IODP) is to minimize both real and perceived conflicts of interest while maintaining the fullest possible involvement of knowledgeable scientists and other individuals in providing scientific and technical advice to the CIB. The CIB will operate under a comprehensive, effective, and, to the maximum extent possible, flexible COI policy.

Definition:

A conflict of interest is a situation in which the interests (e.g., personal, familial, professional, financial, or commercial) of a CIB member, or designated alternate, involved in project designation and expedition scheduling, or in IODP-related financial or commercial enterprises, have a real or perceived impact, either positive or negative, in the view and recommendations of the Board.

Implementation:

Conflicts of interest are unavoidable. Potential conflicts should be identified as early as possible prior to meetings, with sufficient time to allow the Chair of the CIB to work with JAMSTEC and the appropriate national and consortia offices to identify alternates with suitable scientific and technical expertise for conflicted members.

If any CIB member, alternate, or any other attendee of a board meeting, has any direct interest that might be affected by, or might reasonably be perceived to be affected by, any action under consideration, that member or attendee is required to make a public declaration of the existence of such COI to the chair.

The Chair will make a determination regarding whether the circumstances actually constitute a COI and will take appropriate action, including whether or not the conflicted party should recuse themselves from the discussion, and for how long.

All declared or proposed possible COIs, and the relevant actions taken, will be recorded in the minutes of the meeting at which the COI was considered.

JOIDES Resolution Facility Conflict-of-Interest Policy

(Draft, May 2013)

The objective of the conflict-of-interest (COI) policy for the *JOIDES Resolution* Facility (JRF) within the International Ocean Discovery Program (IODP) is to minimize both real and perceived conflicts of interest while maintaining the fullest possible involvement of knowledgeable scientists and other individuals in providing scientific and technical advice to the program. The JRF will operate under a comprehensive, effective, and, to the maximum extent possible, flexible COI policy for its Board (JRFB) and advisory panels.

Definition:
A conflict of interest is a situation in which the interests (e.g., personal, familial, professional, or commercial) of a JRFB or advisory panel member or designated alternate involved in proposal nurturing, evaluation, ranking, or scheduling, or in IODP-related financial or commercial enterprises, have a real or perceived impact, either positive or negative, on the recommendations or decisions of a panel or the Board.

Principles:
The COI policy is based on the following principles:

- An individual can be a member of only one standing advisory panel or the JRFB.
- No representative of NSF or the U.S. Implementing Organization (IO) and its subcontractors can serve as a member on an advisory panel, but may serve on the JRFB.
- All potential conflicts of interest (e.g. proponent on proposal, IODP-related commercial or financial enterprise) will be declared at the start of every meeting, or at an otherwise appropriate time during the meeting. The Chair will make a determination regarding whether the circumstances constitute a conflict of interest and take the appropriate action (discussed below).
- The JRFB, which is responsible for the advisory panels, will monitor compliance with this policy by receiving a brief annual report from panel chairs on how conflicts were dealt with in their respective meetings.

Implementation:
Conflicts of interest are unavoidable. Potential conflicts should be identified as early as possible prior to a meeting in sufficient time to allow the Chair of the advisory panel to work with the JRFB and the various national and consortia offices to identify alternates with suitable scientific and technical expertise for conflicted members.

If any JRFB or advisory panel member, alternate, or any other attendee of a panel or board meeting, has any direct interest that might be affected by, or might reasonably be perceived to be affected by, any action under consideration, that member or attendee is required to make a public declaration of the existence of such interest to the chair.

The chair will make a determination regarding whether the circumstances constitute a conflict of interest. All declared or proposed possible conflicts of interest, and the actions taken, will be recorded in the minutes of the meeting at which the interest was considered, and the annual conflict of interest report prepared for the JRFB.

JRFB or advisory panel members, or other attendees, who are determined by the chair to have a conflict of interest with respect to an IODP or IODP-related proposal will not be present during any part of a meeting when that proposal is nurtured, evaluated, ranked, or scheduled. However, a conflicted JRFB or advisory panel member may participate in general discussions regarding proposals (e.g. how proposals address long-range objectives) in order to provide a full range of expertise to the decision-making process.

JRFB or advisory panel members who are in conflict of interest because of IODP-related financial or commercial enterprises will not be present during discussions relevant to those financial or commercial enterprises.

EPSP Modification:
The nature of the EPSP review process requires a modification to the *JOIDES Resolution* Facility Conflict of Interest policy.

The EPSP provides independent advice to the appropriate platform provider with regard to safety and environmental issues that may be associated with general and specific geologic circumstances of proposed drill sites. The EPSP also provides advice on appropriate drilling technologies for avoidance of drilling hazards and protecting the environment. This requires that a representative proponent attend the EPSP meeting, make a presentation, and engage in discussions with EPSP.

Panel members will declare any conflict of interest at the start of the panel's safety review. Panel members, proponents, and others with a conflict of interest or apparent conflict of interest are encouraged to participate in the discussion of the individual sites. When determining the fate of an individual drilling location, EPSP panel members with a conflict are excluded from voting.

IODP Conflict-of-Interest Policy

(Approved by the SPPOC, July 2004)

A. INTRODUCTION

General statement:

The objective of the conflict-of-interest (COI) policy for the Science Advisory Structure (SAS) of the Integrated Ocean Drilling Program (IODP) is to minimize both real and perceived conflicts of interest while maintaining the fullest possible involvement of knowledgeable scientists in providing scientific and technical advice to the program. The IODP SAS needs a comprehensive, effective, and, to the maximum extent possible, flexible COI policy that takes into account the differing international structures and histories of the funding agencies, other governmental agencies, implementing organizations, research organizations, and universities of its participating members. The statement presented in Appendix A builds upon the efforts of the predecessor scientific ocean drilling programs to determine and manage conflicts of interest within the SAS.

Definition:

A conflict of interest is a situation in which the interests (for example: personal, familial, professional or commercial) of an IODP SAS member or designated alternate involved in proposal nurturing, evaluation, ranking, scheduling, or assessment processes, or in IODP-related financial or commercial enterprises, have a real or perceived impact, either positive or negative, on the results of the nurturing, evaluation, ranking, scheduling or assessment processes, or related contractual work. Conflict of interest depends on the situation, not the character or actions of the individual.

Principles:

The COI policy is based on the following principles:

- An individual scientist can be a regular member of only one standing SAS committee or panel.
- Any representative of IODP Management International, Inc. (IODP-MI), IODP lead funding agencies, implementing organizations (IOs), and their subcontractors cannot serve as a member on standing SAS committees and panels, other than the IODP-MI Board of Governors members who also serve as Science Planning and Policy Oversight Committee (SPPOC) members.
- All potential conflicts of interest will be declared at the start of every meeting, or at an otherwise appropriate time during the meeting.
- Committee and panel members or other meeting attendees determined as having a conflict of interest regarding an IODP or IODP-related proposal should not be present when the relevant proposal is evaluated, considered for ranking, ranked, considered for scheduling, or scheduled. Proponents may be present for the general discussion of proposals (e.g., how proposals address long-range objectives).
- Committee and panel members or other meeting attendees determined as having a conflict of interest regarding IODP-related financial or commercial enterprises should not be present during discussions relevant to such financial or commercial enterprises.

B. COI POLICY

The issues of conflict of interest have three foci: an understanding of who may serve on panels; procedures and safeguards with regard to proposal nurturing, evaluation, ranking, scheduling, and assessment processes; and procedures and safeguards with regard to IODP-related financial or commercial enterprises. The goal of the COI policy is to maintain the fullest involvement possible by knowledgeable scientists from across the spectrum of IODP members in providing scientific advice to the SAS, IODP-MI, and the IOs. Managing conflict of interest effectively and efficiently within the IODP SAS will enable achievement of this goal. The SPPOC will receive a brief annual report from SAS committee and panel chairs noting how conflicts were dealt with in their respective meetings.

In regard to panel service, no employee of the IODP-MI, IODP funding agencies, IOs, or their subcontractors may serve as a member of a standing SAS committee or panel. (The exception to this is the IODP-MI board members who also serve on the SPPOC.) Such persons, however, may be proponents of IODP proposals (for example staff scientists).

SAS activities fall into two primary categories, a nurturing, evaluation, and technical advice component (SAS panels); and an evaluation, ranking, scheduling, and assessment part (SAS committees). Accordingly, the COI policy may allow for involvement of proponents in informative roles at appropriate panels and in general discussions, but not in any evaluations of their respective proposals leading directly to and including competitive proposal rankings and scheduling decisions.

In regard to SAS panels, the specific issues concern the participation of panel members and other meeting attendees who are proponents of active proposals. Panel members and other attendees who are proponents of active proposals are to be excluded from discussions of the specific proposal/s on which they are proponents. They may participate in the discussion of all other proposals, including serving as watchdogs. These panel members may participate in nurturing and evaluating all other proposals, with these members declaring their potential conflicts and the chair/s keeping a record of these conflicts. The chair/s should clearly announce and document all potential conflicts of interest and resulting recusals, including in the minutes. In a similar fashion, panel members who have a financial or commercial interest in tools, programs, etc, by means of their employment will be regarded as having a conflict of interest. The IODP-MI Sapporo Office retains any paper ballots from the grouping exercise to document adherence to the COI policy.

In regard to the Science Planning Committee (SPC), a committee member or any other attendee who is a proponent on a proposal being considered for ranking or scheduling may not be present for the specific discussions of proposals leading to ranking, the ranking process itself, determination of which proposals to forward to the Operations Committee (OPCOM), or the scheduling process. Further, these conflicted members may not serve as watchdogs on other proposals. It is the responsibility of the committee chair to define when these specific discussions begin.

In regard to OPCOM, an SPC committee member who is a proponent on a proposal included in the group of proposals residing with or forwarded to OPCOM may not participate as an OPCOM member but is eligible to be called upon for advice as needed.

In regard to the SPPOC, a committee member or any other attendee who is a proponent on a proposal included in the annual program plan may not be present for the presentation, discussion, or approval of that annual program plan.

Conflicts of interest are unavoidable. Potential conflicts should be identified as early as possible, and the various national and consortia offices should identify alternates with suitable scientific and technical expertise for conflicted members. This will require due diligence by the IODP-MI Vice-President for Science Planning and Deliverables and the IODP SAS chairs to make such requests in advance of meetings. Sufficient time must be given for the national and consortia offices to nominate alternates, if standing alternates have not been identified in advance, and for the alternates to be fully informed of relevant business in time to be prepared for meetings. Whether or not alternates are appointed for conflicted members, quorum rules as specified in the SAS terms of reference for that committee or panel will apply.

Appendix A. SAS Conflict-of-Interest Statement

I. Declarations of Conflicts of Interest by SAS Members

If any SAS panel or committee member, alternate, or any other attendee of a panel or committee meeting, has any direct interest that might be affected by, or might reasonably be perceived to be affected by, any action under consideration by the panel or committee, that member or attendee is required to make a public declaration of the existence of such interest to the chair. The possible existence of such interest may also be proposed to the chair by a member or attendee other than the member having the interest.

All declared or proposed possible conflicts of interest, and the actions taken, will be recorded in the minutes of the meeting at which the interest was considered and the annual conflict of interest report prepared for the SPPOC. With respect to any such declared interest or proposed possible interest, the chair will make an initial determination regarding whether the circumstances constitute a conflict of interest. In determining whether the circumstances constitute a conflict of interest, the chair may, at his or her discretion, consult with other members of the panel or committee. The chair's decision will be subject to review in accordance with Robert's Rules of Order.

II. Policies for Conflicted SAS Members or Other Attendees

a) Panel or committee members, or other attendees, who are determined by the chair to have a conflict of interest with respect to a drilling proposal will not be present during any part of a panel or committee meeting when that proposal is nurtured, evaluated, ranked, scheduled, or assessed. However, a conflicted panel or committee member may participate in general discussions that do not lead directly to voting, regarding proposals in general, including discussion of his or her own proposal. Such members must restrict their comments and discussion to the scientific objectives of proposals being discussed and shall not make comparisons with their own proposals.

b) Panel or committee members who are in conflict of interest because of IODP-related financial or commercial enterprises will not be present during any part of a panel or committee meeting during discussions relevant to those financial or commercial enterprises.

c) SPC members or alternates determined as having a conflict of interest will not be present during deliberations leading directly to a vote and will not vote with respect to the inclusion in, or exclusion from, the upcoming recommended science plan of a proposal affected by such conflict of interest.

d) SPPOC members or alternates who are proponents on proposals included in the annual program plan will not be present for the presentation, discussion, or approval of that annual program plan.

e) During panel or committee discussions that do not lead directly to a vote or that do not involve competitive ranking of proposals (e.g., discussion of long-term platform plans by the SPC or evaluation of proposals by the panels), all members may participate in general discussions in order to provide a full range of expertise to the decision-making process. A member having a proposal under active consideration by the SSEPs or the SPC that may form part of the long-term platform plans will not be present during final deliberations and voting related to those long-term plans.

f) Panel or committee members or other attendees who are determined to have a conflict of interest will not be present during deliberations leading directly to a vote and will not vote with respect to any other matters affected by such conflict of interest.

MEMORANDUM OF UNDERSTANDING
of
European and Other Funding Organisations
on
Membership and Operation of ECORD
in the
International Ocean Discovery Program (IODP)

Annex H: ECORD Facility Board (E-FB)

- **Purpose**

The ECORD Facility Board (E-FB) will be the key planning forum for the Mission-Specific Platform (MSP) expeditions by providing operational and management oversight of those expeditions, approving the expedition section of the Annual ECORD Plan and advising on the long-term planning.

- **Mandate**

The main tasks of the E-FB will be to:

o Determine the operations schedule for MSP expeditions to implement high-priority science proposals forwarded to the E-FB by the Proposal Evaluation Panel (PEP), based upon science priorities, optimal geographic distribution and costs;

o Approve the expedition section of the Annual ECORD Plan, which will include the following elements associated with the Mission-Specific Platform operations: operations schedule, data management, publications, core curation, and engineering and scientific technical development;

o Advise on long-term planning of MSP expeditions.

- **Membership**

The ECORD Facility Board will include the members of the **ECORD Executive Bureau** (E-EB; *see Annex G)*, a formal representative of each IODP partner and a **Science Board** defined below.

o **Science Board**

The Science Board will consist of five leading scientists from any country funding IODP. They will be nominated by the E-EB and their nominations will be approved by the ECORD Council, based on the recommendations provided by the ECORD Science Support and Advisory Committee (ESSAC) following an open nomination process. The Science Board members will be selected to serve on the E-FB on 3-year staggered rotations.

Chair

The Chair of the E-FB will be an ECORD scientist selected for his/her scientific and managerial leadership. The Chair is expected to attend meetings of the PEP, IODP Forum and selected international scientific conferences.

The Chair shall serve two years and will be nominated by the E-EB and his/her nomination is approved by the ECORD Council.

The Chair will be provided with logistical support through EMA.

- **Meetings**

The meetings of the E-FB will be organised by EMA.

The E-FB will convene once annually to execute its mandate, but additional meetings may be organised as appropriate.

The E-FB will commence no later than the beginning of calendar year 2013.

The E-FB will have liaisons from all major entities of IODP including:

- The Chair of the IODP Forum or his/her nominated representative;
- The Chair of the PEP or his/her nominated representative;
- The Chair of the IODP Support Office;
- The Chair of the SCP or his/her nominated representative;
- Representatives from other Platform Providers.

Observers will normally include representatives from Program Member Offices (PMO), additional representatives from Funding Agencies and/or Platform Providers. Guests who may contribute to the E-FB activities will be invited as appropriate.

All potential conflicts of interest will be declared at the start of every meeting, or at an otherwise appropriate time during the meeting.

Members of the E-FB or other meeting attendees determined as having a conflict of interest regarding an MSP-related proposal should not be present when the relevant proposal is evaluated, considered for ranking, ranked, considered for scheduling, or scheduled.

- **Decisions**

The E-FB will usually reach decision by general consent, *i.e.* when a motion is not likely to be opposed. Reasonable effort will be made to attain a general consent. If a motion fails to be approved by general consent, the Chair of the E-FB can decide either to defer further action, or to ask for a standard vote involving only the Science Board members. A motion will be accepted if approved by the majority of the votes cast at the meeting. Voting will be normally done by 'show of hands'.

ECORD Facility Board #1

March 7th and 8th, 2013

British Geological Survey, Edinburgh, UK

Roster

MEMBERS	*NAME*	*EMAIL*
ECORD ExecBureau		
ECORD Council	Michael Webb	mweb@nerc.ac.uk
ECORD Council	Anne de Vernal	devernal.anne@uqam.ca
ECORD Council	Michel Diament *	michel.diament@cnrs-dir.fr
ECORD Council	Guido Lüniger	guido.lueniger@dfg.de
ECORD Council	Josef Stuefer *	j.stuefer@nwo.nl
EMA	Gilbert Camoin	gcamoin@cerege.fr
ESSAC	Carlota Escutia Dotti	cescutia@ugr.es
ESO	Robert Gatliff	rwga@bgs.ac.uk
Science Board		
	Karsten Gohl (Chair)	Karsten.Gohl@awi.de
	Antonio Cattaneo	Antonio.Cattaneo@ifremer.fr
	Gerald Dickens	jerry@rice.edu
	Marta Torres *	marta.torres1@gmail.com
	Dominique Weis	dweis@eos.ubc.ca
Funding agencies		
NSF	Tom Janecek	tjanecek@nsf.gov
MEXT	Shingo Shibata	shibata@mext.go.jp
KIGAM	*	
IODP India	*	
IODP China	*	
ANZIC	*	
CAPES (Brazil)	Sidney Luis De Matos Mello	sidney@igeo.uff.br
LIAISONS		
IODP Forum	Keir Becker	kbecker@rsmas.miami.edu
PEP	Dirk Kroon	dkroon@staffmail.ed.ac.uk
SIPCom	Jan de Leeuw	Jan.de.Leeuw@nioz.nl
SCP	Gilles Lericolais	gilles.lericolais@ifremer.fr
CDEX	Nobuhisa Eguchi	neguchi@jamstec.go.jp
USIO	David Divins	ddivins@oceanleadership.org
OBSERVERS/GUESTS		
ESO	Alan Stevenson	agst@bgs.ac.uk
ESO	David McInroy	dbm@bgs.ac.uk
ESO	Sarah Davies	sjd27@leicester.ac.uk
ESO	Ursula Roehl	uroehl@marum.de
ESO	David Smith	djsm@bgs.ac.uk
EMA	Milena Borissova	borissova@cerege.fr
USSSP	Jeff Schuffert	jSchuffert@oceanleadership.org
NSF	Rodey Batiza	rbatiza@nsf.gov
J-DESC	Yasuhiro Yamada	yamada@earth.kumst.kyoto-u.ac.jp
J-DESC	Keita Umtesu	umetsu@jamstec.go.jp
USIO	Mitch Malone	malone@iodp.tamu.edu
IODP-MI	Yoshi Kawamura	ykawamura@iodp.org

* Apologies

Version: 3 October, 2012

JOIDES Resolution Facility Board Terms of Reference

General Purpose

The *JOIDES Resolution* Facility Board provides operational and management oversight of the *JOIDES Resolution* as part of the International Ocean Discovery Program (IODP).

Mandate

1. Determine the operations schedule for the *JOIDES Resolution* to implement the high priority science proposals forwarded to the board by the Proposal Evaluation Panel (PEP):
    a. Develop and approve an annual operations schedule for the *JOIDES Resolution* approximately 18 months prior to the start of each fiscal year.
    b. Develop and approve a long-term (3-4 year) regional track for the *JOIDES Resolution* that maximizes scientific return and minimizes transits.
2. Approve the annual facility program plan for the *JOIDES Resolution:*
    a. Discuss and approve the annual facility program plan (generated by the U.S. operator) that includes at minimum the following elements associated with the *JOIDES Resolution* operations: annual operations schedule, data management, publications, core curation, and engineering and scientific technical development.
3. Approve the Support Office annual program plan:
    a. Discuss and approve the Support Office annual program plan (generated by the Support Office personnel) that includes at minimum the following elements: logistical support for the *JOIDES Resolution* Facility Board, the IODP Forum, and the program's advisory panels, oversight of the proposal review process, management of the Site Survey Data Bank, and support of the IODP website.
4. Oversight of the facility's advisory panels:
    a. Monitor functionality of the PEP and its service panels with respect to the efficient and effective review of drilling proposals for the *JOIDES Resolution* and the advice provided to the PEP and the U.S. operator by the service panels regarding safety/environmental/technical issues.
    b. Monitor representation on panels to ensure membership quotas are properly maintained.
5. Develop and monitor policies for data collection, pre- and post-cruise publications, and core curation associated with the *JOIDES Resolution*.

Membership

Each *JOIDES Resolution* partner will have one formal representative to the board. Five senior leading scientists from the IODP community will serve on the board. The U.S. Operator will have one formal representative on the board.

Liaisons to the board will include the PEP Chair, the IODP Forum Chair, the head of the Support Office, and one representative from each of the other platform operators.

Observers to the board can include Program Member Office representatives, additional representatives from *JOIDES Resolution* partners and the platform operators, and representatives from funding agencies not contributing financially to *JOIDES Resolution* operations.

Chair:
The chair of the *JOIDES Resolution* Facility Board will be a U.S. scientist selected for his/her scientific and managerial leadership. The chair will be one of the five scientific representatives on the board. The chair is expected to attend meetings of the Proposal Evaluation Panel, the IODP Forum, and select international scientific conferences. The chair will be provided with appropriate salary and logistical support through the United States Science Support Program. The chair shall serve for two years in this role.

Scientific Representation:
Four senior leading scientists (in addition to the chair) will be selected to serve on the *JOIDES Resolution* Facility Board on 3-year staggered rotations.

Selection Process:
The chair and the four scientific representatives shall be recommended to the *JOIDES Resolution* Facility Board by the U.S. Science Support Program following an open nomination process.

Decisions
The *JOIDES Resolution* Facility Board will reach decisions through consensus of the members present. In the event that consensus cannot be reached, the US National Science Foundation will provide the U.S. operator and Support Office with the requisite guidance.

Meetings
The *JOIDES Resolution* Facility Board will commence no later than the beginning of calendar year 2013 in order to plan operations for FY2014. It will convene at least once annually to execute its mandate.

JOIDES Resolution Facility Board Meeting 1303
Roster

Members	
Jamie Allan	National Science Foundation, USA
Gilbert Camoin	European Management Agency (EMA), CEREGE-CNRS, France
Manoel Cardosa	Coordenação de Aperfeiçoamento de Pessoal de Nivel (CAPES), Brazil
Chris Yeats	ANZIC, Australian Resources Research Centre, CSIRO, Australia
Gil Young Kim	Korea Institute of Geoscience and Mineral Resources (KIGAM), Korea
David Divins	USIO– Consortium for Ocean Leadership, USA
Gabe Fillipelli	Indiana University, Purdue University Indiana, USA
Susan Humphris	Woods Hole Oceanographic Institution, USA
Akira Ishiwatari	Tohuku University, Japan
Rick Murray	Boston University, USA
Heiko Palike	University of Bremen, Germany
Liaisons	
Dick Kroon	PEP Chair - The University of Edinburgh, UK
Barry Katz	EPSP Chair - Chevron Corporation, Houston, TX, USA
Dave Mallinson	SCP Vice Chair - East Carolina University, USA
Keir Becker	IODP Forum Chair - University of Miami, USA
Bob Gatliff	European Science Operator, British Geological Survey, UK
Wataru Azuma	Center for Deep Earth Exploration, JAMSTEC, Japan
Observers	
Rodey Batiza	National Science Foundation, USA
Tom Janecek	National Science Foundation, USA
Jim Beard	National Science Foundation, USA
Leonard Pace	National Science Foundation, USA
Shingo Shibata	MEXT, Japan
Mizuno Toshiaki	MEXT, Japan
Guido Lueniger	ECORD Council, Deutsche Forschungsgemeinschaft, Germany
Emidio Cantidio	Coordenação de Aperfeiçoamento de Pessoal de Nivel (CAPES), Brazil
Nobu Eguchi	Center for Deep Earth Exploration, JAMSTEC, Japan
Mitch Malone	USIO, Texas A&M University
Brad Clement	USIO, Texas A&M University
David Goldberg	USIO, Lamont Doherty Earth Observatory
Holly Given	IODP-Management International, Inc., USA
Yoshi Kawamura	IODP-Management International, Inc., Japan
Jeff Schuffert	USSSP, Consortium for Ocean Leadership, USA
Charna Meth	USSSP, Consortium for Ocean Leadership, USA
Anthony Koppers	USAC, Oregon State University, USA
Shouting Tuo	IODP-China Office, Tongji University, China
Carlota Escutia	ESSAC, Instituto Andaluz de Ciencias de la Tierra, Spain

Agenda Item 6

JR Advisory Panels overview

Terms of References : PEP, SCP, EPSP

IODP SCP drill site characterisation data guiding statement and rationale

Terms of Reference for
JOIDES Resolution Facility Advisory Panels

Draft – May 2013

Panel staffing is shown in Appendix A.

Proposal Evaluation Panel

General Purpose

The Proposal Evaluation Panel (PEP) reports to the *JOIDES Resolution* Facility Board (JRFB) and is responsible for evaluation of all proposals in the context of the themes and initiatives of the IODP Science Plan. PEP is responsible for selection of the best and most relevant proposals for forwarding to the JRFB or other Facility Board using the JRF advisory panels for development of annual and long-range schedules. PEP also advises JRFB on any shortcomings of the proposal pool with respect to themes and challenges of the Science Plan and makes suggestions for stimulating proposal pressure in those areas.

Mandate

The primary responsibility of the PEP is to evaluate all the proposals submitted to IODP. The internal organization of the PEP to conduct proposal evaluations is flexible and will be determined by the chair according to the needs of each meeting.

Specifically, the PEP is responsible for:

- evaluation of pre-proposals, identification of pre-proposals for development into full proposals, and rejection of those proposal unlikely to succeed.
- evaluation of full proposals and identification of those needing revision and those to be sent for external review. Those proposals sent for external review will also be sent for simultaneous review by the Site Characterization Panel (SCP), and to the U.S. platform provider (or other appropriate platform provider) for operator feasibility analyses.
- selection of the best proposals for forwarding to JRFB or other Facility Board using the JRF advisory panels for development of annual and long-term platform schedules. Each forwarded proposal will be accompanied by a summary of key discussion points and justification for the rating assigned by PEP, as well as a summary of external reviews. SCP comments and reviews will be collated together with the PEP documentation by the Support Office to form a complete proposal package for the JRFB or other appropriate Facility Board.

  Full proposals that PEP identifies as among the scientifically most compelling but needing further site characterization or technological development based on SCP review are placed in a "holding bin." When the site characterization or technological needs are determined by the PEP and SCP chairs and and OTF to be satisfied, such proposals will be released and included within the pool considered in developing annual and long-range science plans.
- advising the JRFB (or other Facility Board using the JRF advisory panels) of any shortcomings in the proposal pool in terms of advancing the Science Plan objectives and making recommendations for addressing them.

Decisions

The PEP will normally reach decisions by consensus. A quorum will consist of at least two-thirds of the panel members. In cases for which a consensus is not possible, decisions will be reached by a simple majority of all members present and eligible to vote. In such cases, voting records will be reported in the panel minutes.

Conflict of Interest

PEP will follow the *JOIDES Resolution* Facility Conflict of Interest policy. Actual or perceived conflicts of interest will be declared at the start of each meeting and resolved by the chair, and treatment thereof will be recorded in the meeting minutes. Proponents will not participate in any discussion of their proposal.

Meetings

Robert's Rules of Order will govern all meetings. The PEP will convene biannually, generally six to eight weeks after biannual proposal deadlines, and additional electronic meetings may be held as appropriate. This will allow for feedback to proponents within three months of the proposal deadlines. The SCP will meet in conjunction with, or overlapping, PEP and select SCP members will provide direct input to the proposal evaluation process as needed. The Support Office will produce draft minutes of PEP plenary sessions including detailed voting results, for approval by PEP within one month following the meeting.

Membership

PEP membership is large and must strive to assure sufficient breadth of expertise across all areas of the Science Plan. The PEP chair will work with the JRFB and PMOs to maintain balance of expertise and to ensure regular rotation of membership. PEP members shall normally serve for terms of three years. Candidates for PEP membership are recommended by the PMOs. The JRFB makes the final selection based on the PMO recommendations and other considerations.
When appropriate, non-voting specialists may be invited to PEP meetings on an ad hoc basis to assist with evaluation of proposals.

Chair

The Chair will be nominated by members of PEP and approved by the JRFB for a term of three years. The role requires substantial dedicated time, and the chair should be provided with appropriate salary and logistical support by the appropriate PMO.

Liaisons

The PEP chair or alternate will be the liaison to the JRFB and SCP. Liaisons from the SCPand EPSP will attend PEP meetings to assist in evaluation of practical aspects of drilling proposals. Representatives from the implementing organizations may also attend PEP meetings for assessments of technological requirements for proposals under evaluation. Liaisons from other international geoscience initiatives should be encouraged to attend PEP meetings as appropriate for the proposal pool.

Environmental Protection and Safety Panel (EPSP)

General Purpose

The Environmental Protection and Safety Panel (EPSP) provides independent advice to the *JOIDES Resolution* Facility Board (JRFB) and the U.S. implementing organization (IO) (and others as requested) with regard to safety and environmental issues that may be associated with general and specific geologic circumstances of proposed drill sites. The EPSP also provides advice on appropriate drilling technologies for avoidance of drilling hazards and protecting the environment. The panel reports directly to the JRFB.

Mandate

The EPSP reviews all prospective drilling by the *JOIDES Resolution* (and by other platforms as requested) and advises on safety requirements and appropriate technology needed to meet these requirements. All drilling operations involve safety and environmental issues. The principal geologic safety and a significant environmental hazard in ocean drilling is the possible release of substantial quantities of high-pressure fluids and volatiles including hydrocarbons from subsurface reservoir strata. Careful planning and appropriate site surveys reduce or eliminate the risk of hydrocarbon release. IODP proposal proponents are initially responsible for carefully assessment of proposed drill sites in terms of safety and environmental protection. The EPSP independently examines and reviews each proposed site, including site survey data and operational plans, to determine if and how drilling operations can be conducted to maximize safety and minimize environmental impact.

Decisions

The panel will recommend among the following options:

- site approval as proposed
- amendment of a proposed site with respect to location and/or depth of penetration
- a specific drilling order for an expedition
- a specific drilling program (including the nature of the monitoring program)
- acquisition of additional data to complete the safety review
- denial of approval.

Approval will be based on the judgment of the EPSP that a proposed site can be safely drilled in light of the available technology, information, and planning. Recommendations of the panel will be based on consensus or voting, as decided on a case-by-case basis. Votes will be decided by a majority of all members present and eligible to vote. A quorum consists of at least two-thirds of the voting members. Voting records will be kept and reported in the meeting minutes.

Conflict of Interest

The nature of the EPSP review process requires a modification to the JOIDES Resolution Facility Conflict of Interest policy. Panel members will declare any conflict of interest at the start of the panel’s safety review. Panel members, proponents, and others with a conflict of interest or apparent conflict of interest are encouraged to participate in the discussion of the individual sites. When determining the fate of an individual drilling location, EPSP panel members with a conflict are excluded from voting.

Meetings

The EPSP will convene at least once annually, and additional electronic reviews may be held as appropriate. EPSP will provide the Support Office with minutes of the meetings, including detailed voting results, within one month following the meeting.

Membership

Members of the EPSP will be specialists who can provide expert advice on maximizing safety and minimizing environmental impact associated with drilling of proposed sites, including sites in hydrocarbon prone and biologically sensitive areas. Members of the EPSP are primarily selected on the basis of this specific expertise. Candidates for EPSP membership are recommended by the PMOs with the JRFB making the final selection based on the PMO recommendations and other considerations. EPSP members are initially appointed for a three-year term renewable at the discretion of the EPSP chair, the JRFB, and the relevant national/consortia program.

Chair

The Chair will be nominated by members of EPSP and approved by the JRFB for a term of three years. This term is renewable at the discretion of the JRFB.

Liaisons

The EPSP chair or alternate will be liaison to the JRFB, PEP, Site Characterization Panel (SCP). Representatives from the implementing organizations (IOs) may also attend EPSP meetings as appropriate.

Site Characterization Panel

(Draft – May 2013)

General Purpose

The Site Characterization Panel (SCP) provides advice to the PEP and the *JOIDES Resolution* Facility Board as to whether the site characterization data package enables effective achievement of the scientific objectives of the proposal. The SCP also provides feedback to the drilling proponents on the degree of completeness of the drill site characterization data package, and on its assessment of whether the scientific objectives of each drill site can be effectively achieved on the basis of the proposal and data package.

Mandate

1. Review site survey data packages submitted by proponents to the IODP Site Survey Data Bank.
2. Verify data quality and identify data gaps for each proposal's site survey data package.
3. Provide early guidance to proponents and the PEP regarding necessary site characterization data.
4. Make recommendations regarding the degree of completeness of each drill site characterization data package to the proponents and the PEP.
5. Advise the PEP, on the basis of the proposal and data package, whether the site characterization package enables effective achievement of the scientific objectives of the proposal.
6. Examine and encourage opportunities for use of new site survey technologies.
7. Foster cooperation and coordination for site survey data acquisition.

Classification Decisions

The site characterization completeness for each proposed drill site will be classified by general consensus of the SCP members. Revision of site classifications will be by consensus of the SCP at a meeting or by e-mail. Site classifications will be recorded in the meeting minutes. The SCP site classification does not include safety considerations.

Conflict of Interest

SCP will follow the *JOIDES Resolution* Facility Conflict of Interest policy. Actual or perceived conflicts of interest will be declared at the start of each meeting and resolved by the chair, and treatment thereof will be recorded in the meeting minutes. Proponents will not participate in any discussion of their proposal.

Meetings

Robert's Rules of Order will govern all meetings. The SCP will convene biannually in association, but not necessarily concurrently, with PEP meetings, and additional electronic meetings may be held as appropriate. SCP will provide the Support Office with minutes of the meetings, including detailed voting results, within one month following the meeting.

Membership

SCP members normally serve for terms of three years. Candidates for SCP membership are recommended by the PMOs. The JRFB makes the final selection based on the PMO recommendations and other considerations.

Chair
The Chair will be nominated by members of SCP and approved by the JRFB for a term of three years.

Liaisons

The SCP Chair or alternate will be liaison to the JRFB and PEP. A liaison from the EPSP will attend each SCP meeting. Representatives from the implementing organizations (IOs) may also attend the meetings as appropriate.

Appendix A. Staffing of Advisory Panels

Country	**PEP**	**SCP**	**EPSP**	**Total**
US	14	7	7	28
ECORD	9	4 + (1)	4 + (1)	17 + (1)
Brazil	2	2	2	6
ANZIC	1	1	1	3
India	1	(1)	(1)	2
China	1	(1)	(1)	2
Korea	1	(1)	(1)	2
Japan	6	1	-	7
TOTAL	**35**	**15-19****	**14-18****	**68**

(1) Representation on either SCP or EPSP but not both

** Panel size will depend on which panel (SCP or EPSP) is selected by countries with $1.0M subscription rates.

IODP SCP drill site characterisation data guiding statement and rationale

The method and rationale for data evaluation are outlined as follows. The proponents choose sites, which according to their knowledge and existing data will allow answering of questions, testing of hypotheses, and achieving of objectives presented in their proposal. The Site Characterisation Panel (SCP) reviews all data in the Site Survey Data Bank (SSDB), advises the proponents on the adequacy of the drill site characterisation package, and provides an assessment of whether or not the scientific objectives of each drill site can be effectively achieved on the basis of the proposal and data package.

The rationale for this review is to ensure that IODP expeditions will have a high probablility of success and that ship time, researcher time, and funds are not wasted by drilling in the wrong location or to the wrong depth, or recovering sediments or rocks that will not achieve the objectives of the proposal. This is the guiding statement for SCP reviews, and represents the standard to which the site survey data package is held. Actual data requirements are based on meeting this standard, and are at the discretion of the SCP. The fundamental responsibility of proponents with respect to demonstrating the feasibility of the science is to demonstrate via their data that the proposed target is adequately imaged and there are no structural complications. It is recommended that every proposal include a proponent who has the ability to manipulate and interpret geophysical data and prepare figures and statements regarding the adequacy of the data.

For example, high resolution palaeoceanographic objectives require a sedimentary column that is nearly complete and not disturbed by erosional unconformities, faults, or mass transport deposits. Thus, to ensure success, the data provided to SCP must be of sufficient resolution and continuity (i.e., a 2d SCS or MCS grid) to develop a regional image of the target and the structural configuration of the target area in order to avoid structural complications (faults, mass transport deposits, unconformities, etc.). For some targets, which are very small (e.g. gas seeps) or deep (e.g. crustal slip planes) only a 3d grid of MCS data (or 3d seismic volume) provide a detailed image. For deeper targets seismic refraction data as well as gravity and magnetic data may be needed to provide necessary information on the structural configuration.

Bathymetric data are needed to characterise the seafloor surface. Surface samples and side scan/back scatter data as well as 3.5 kHz, Parasound, Topas, or other high-frequency subbottom profiler data may be needed to characterise the shallow environment and thus provide valuable information about the shallow subsurface which are vital for drilling operations (what materials are being spudded) and for scientific purposes as related to high-resolution studies (paleoclimate reconstructions), geohazard studies (slumps, slides, fluid flow, etc), or shallow crustal objectives.

Seismic velocities are always needed to a) convert the seismic data from two-way travel time into depth, and b) characterise changes in lithology, e.g. gas, volcanic, crystalline basement.

In order to correctly evaluate the data submitted to the SSDB, SCP needs as much information about acquisition and processing parameters as possible (i.e., metadata). Coordinates unequivocally identifying the location of the data as well as unambiguous seismic trace numbers (either shot point SP or Common Datum Point CDP) are needed to correctly locate and evaluate the proposed drill site.

Definitions and Idealized Survey and Data Parameters

- High resolution Multi-Channel Seismic (MCS) (theoretically allows a resolution of layers > 6 m thickness)
    - optimum sampling rate (SR)= 1 ms (max 2ms)
    - shot interval ≤ 25 m
    - streamer offset ≥ 1200 m
    - fold~ 50
    - CDP interval ≤ 25 m
    - source frequency content up to 150 Hz
    - true amplitude preservation
- 2d grid MCS: line spacing max 10 km
- 3d grid MCS: a dense 2d grid, line spacing should be determined case-by-case, 1 km in general
- Cross lines: seismic lines crossing each other at roughly 90°, need to extend at least 10 km beyond the proposed site.
- Single channel seismic (SCS) data will be considered on a case by case basis, e.g. if the proposed sites are located in ice covered areas where one cannot always collect MCS data, or if target depths are very shallow (<100 m subsurface). The determining factor is whether or not the data adequately image the targets.
- 3D seismic volume, which was acquired to fill a box-shaped area, sorted into "bin", migrated with 3D-migration technique, will be required on a case by case basis, e.g.. very small target, deep target with very complicated structure which should be properly imaged only in 3D seismic volume

General Data Guidelines

- **Digital seismic data** (SCS or MCS depending on objectives and targets) in SEGY format with the following header information to allow proper evaluation
    - Trace sequential number bytes 1-4
    - Shot point number bytes 17-20
    - Common datum point (CDP) number bytes 21-24
    - Coordinate units bytes 89-90
    - Scalar to be applied to coordinates bytes 71-72
    - Navigation with the coordinate units and scalar defined above
        - MCS data should contain CDP location bytes 181-184 and 185-188
        - SCS data should contain source location bytes 73-76 and 77-80
    - Record length bytes 115-116
    - Sample rate bytes 117-118
    - If the header location does not follow the SEGY standard as mentioned above, proponents must provide the table describing the location of the headers.
- Detailed information on acquisition and processing parameters

  <u>Acquisition</u>
    - Type and frequency content of seismic source
    - Streamer length and channel interval
    - Sample rate, record length, filters applied during recording
    - Shot interval, CDP interval, fold

  <u>Processing</u>
    - Processing sequence including information on filters and gain applied (at what stage, type filter flanks, type of gain)
    - Static corrections?
    - Deconvolution?

    - Multiple suppression?
    - Stacking, type and parameters
    - Migration, type and parameters
    - Depth conversion or depth migration (for depth section)?
- **Figures** (jpg, pdf, tif, gif) of seismic lines (interpreted and un-interpreted) with clearly annotated SP or CDP (the same as in digital files), scale, orientation and information on filters and/or gains applied. Interpreted lines should include the location, with proposed penetration depth, of proposed sites.
- **Swath bathymetric data** as image files (jpg, pdf, tif, gif) as well as ASCII xyz-files or net-cdf grids with information on cell size
- **Navigational data** as ASCII xyz-files with either SP or CDP number, which directly relates to the same parameter in the digital seismic data, seismic figures and location maps
- **Location maps** annotated with lat/lon for each site with bathymetry across the proposed site and available seismic lines with annotated SP or CDP numbers (same as digital seismic data, seismic figures and navigational data)
- If available, information from nearby wells or cores.

Examples of Needed Data (arranged according to broad objectives).

<u>Ocean and Climate Change (e.g. 318 Wilkes Land, 339 Mediterranean outflow, 342 Paleogene Newfoundland Sediment drifts) or</u>
<u>Biosphere Frontiers (e.g. 331 Deep Hot Biosphere, 336 Mid Atlantic Ridge Flank, 337 Deep Shimokita Coalbed)</u>

- High resolution MCS (or SCS where target depth is <100mbsf).
- Depending on target, 2d or 3d (lateral high resolution or very deep) grid of MCS
- Sites ideally located on or near crossing lines (this depends upon demonstrated regional continuity of reflections and EPSP considerations).
- Acoustic backscatter data (side-scan or multibeam) to characterise the seafloor
- High resolution bathymetry
- Seismic velocities appropriate to demonstrate the local velocity fields
- For very shallow target, 3.5 kHz, Parasound, Topas or other subbottom profiling data both as figures and SEGY similar to MCS data to characterise shallow subbottom structures and determine the thickness of sediment cover.
- Surface samples to provide information on surface sedimentary composition and structure (e.g. gas seeps, fluid flow) as figures and tables for shallow targets and expected gas seeps of fluid flow; add locations to base maps
- .
- Video/photography if drilling into a hard irregular outcrop (e.g. a reef, or basalt outcrop)

<u>Earth Connections (e.g. 331 Deep Hot Biosphere, 340T Atlantis Massif)</u>
- Middle resolution MCS (SR= 2ms, shot interval 25-50 m, CDP interval 25-50 m, fold 50-100)
- 2d grid, 3d grid MCS or 3D seismic volume for fluid and volatile flow (on a case-by-case basis).
- Sites ideally located on or near crossing lines
- Acoustic backscatter data (side-scan or multibeam) to characterise seafloor

- Refraction seismic data and structural model for deeper target where the MCS section with interpretation cannot properly image.
- Seismic velocities, both reflection (appropriate to demonstrate the local velocity fields) and refraction
- Surface information providing the surface sedimentary composition and/or structure, e.g. surface samples, video/photography” for these. Sub-bottom and/or backscatter may be also included.
- High resolution magnetic and gravity data as well annotated maps and ASCII xyz-files

<u>Earth in Motion (e.g. 340 Lesser Antilles Volcanism and Landslides, 343 Japan Trench Fast Earthquake Drilling Project JFAST)</u>

- High or middle resolution MCS, depending on target
- 2d grid MCS, or 3d grid MCS or 3D seismic volume depending on target (e.g. gas hydrates, fluid flow, deeper complicated structure)
- Sites ideally located on or near crossing lines
- Refraction data and structural model to accurately image deeper targets (e.g. fault zones, slip planes)
- High resolution gravity and magnetic data for deeper targets
- Acoustic backscatter data (side-scan or multibeam) to characterise seafloor in case of e.g. fluid flow or landslides

Agenda Item 7

Roadmap for Chikyu Expeditions

- Expedition scheduling process
- Proposal evaluation process
- Project Coordination Team (PCT)
    - Chikyu IODP Board Project Coordination Team (PCT) General Terms of Reference -Draft ver. 0.6
- Proposal Advisory Team (PAT)
    - Chikyu IODP Board Proposal Advisory Team (PAT) General Terms of Reference -Draft ver. 0.2
- Proposal workshop
    - Workshop Funding Guidelines -Draft ver. 0.3
- JR Advisory Panels usage
    - PEP
    - SCP
- Riser ad-hoc PEP
- Chikyu safety review
    - Chikyu Safety Review Committee
        - Structure to review the drilling program and operations of Chikyu
    - EPSP
- Engineering development
    - CDEX Technical Advisory Team (TAT)
        - TAT Terms of Reference -Draft ver. 1.0

Chikyu IODP Board Project Coordination Team
General Terms of Reference
Draft ver. 0.6

1. Overview

D/V *Chikyu* project implementation, especially for riser projects, requires several years from preparation to execution. This is because of the complexities inherent in complex drilling operation logistics and planning as well as multi-stage and multi-year strategies to tackle the scientific objectives. The principle investigators and the co-chief scientists (in the implementation stage) need to work closely with the implementation organization (IO) once a proposal becomes a project; this collaboration between the IO and scientists is the key factor for project success. The *Chikyu* IODP Board (CIB) Project Coordination Team (PCT) is the venue where the IO and scientists work together for the success of each scientific drilling project.

2. General Purpose

The PCT creates a feasible drilling project once proposals have been accepted. Normally, the PCT will be established once the CIB designates a proposal to a project. The PCT shall define operational constraints and maximize the scientific target of a project within those constraints, and shall provide reasonable advice to the Director General of CDEX. Each PCT might have slightly different terms of references because each drilling project may have different specific aspects. Coordination with the Technical Advisory Team (TAT) is also highly recommended, in terms of managing the technological and engineering aspects of a project.

3. Mandate

The PCT shall make recommendations and offer advice to the CIB and Director General of CDEX pursuant to the following principles:

- Development of designated drilling project(s) based on IODP drilling proposal(s) recommended by the CIB.
- Identify operational constraints and, if possible, determine mitigation plans.
- Review assigned projects to identify expedition-specific scientific targets, efficiently and effectively coordinate expedition development, establish agreement on scientific/technological contingency options.

- Coordination between each expedition among the assigned project to maximize scientific outcome and maintain the agreed-upon scientific standards.
- Co-chiefs selection and the science party staffing of each expedition, to maximize the scientific outcome of the project and to satisfy *Chikyu* IODP membership agreements.
- Coordinate onboard scientific measurements among the designated project.
- Identify and assign responsibility for expedition-specific technological development requirements.

4. Membership

The PCT membership shall consist of CDEX representatives, principle investigators, and external scientists and engineers as needed. The number of core members shall be five to eight.

5. Meeting

Hold a physical meeting once a year, basically in conjunction with other international meetings (e.g., AGU). In addition to the physical meeting, telephone-based (e.g. Skype) conferences are encouraged on an as-needed basis.

Chikyu IODP Board Proposal Advisory Team
General Terms of Reference
Draft ver. 0.2

1. Overview

D/V *Chikyu* project implementation, especially for riser projects, takes several years from preparation to execution. This is because of the complexities inherent in complex drilling operation logistics and planning as well as multi-stage and multi-year strategies to tackle the scientific objectives. The principle investigators need to work closely with the implementation organization (IO) when developing full drilling proposals. Collaboration and cooperation between the IO and scientists is the key factor for project success. The *Chikyu* IODP Board (CIB) Proposal Advisory Team (PAT) is the venue where the IO and scientists work together to develop full drilling proposals via the proposal development workshop structure.

2. General Purpose

PAT assists the development of operationally feasible full proposals, once a pre-proposal has been submitted to the program, and has been accepted and endorsed by the CIB, and has received JAMSTEC workshop funding. Normally, the PAT will be established once the CIB designates a workshop to develop a full proposal. The PAT shall manage a balance between the scientific targets and operational constraints and shall provide reasonable advice to the proponent group for developing a full drilling proposal. Managing the technological and engineering aspects of a proposal should be coordinated with the Technical Advisory Team (TAT).

3. Mandate

The PAT shall make recommendations and offer advice to the proponent group and to the Director General of CDEX pursuant to the following principles:

- Coordinate the proposal development workshop.
- Initiate logistical support for the proposal development workshop.
- Provide technical and operational advice to proponents in the proposal development workshop* on developing an IODP drilling Full Proposal.

Chikyu IODP Full Proposal Development Workshop
Funding Guidelines
Draft ver. 0.3

1. Overview

JAMSTEC offers funding opportunities for holding workshops proposed for the purpose of developing D/V *Chikyu*-driven IODP full proposals. Each workshop provides an opportunity for the initial proponent group to expand the number of proposal-related scientists and to strengthen the scientific merits of the proposal. Additionally, direct interaction with the implementing organization (IO) helps proponents to develop a feasible drilling proposal.

2. General purpose

The workshop will discuss and solidify the scientific objectives and develop a first-rate IODP full drilling proposal. Expanding the proponent group's scientific expertise will ideally maximize the scientific goals of the proposal.

3. Workshop funding scheme

- The proponent group will submit to IODP a pre-proposal prior to applying for workshop funding, and must receive a "develop full proposal" evaluation from the JRF Proposal Evaluation Panel (PEP).
- The proponent group should submit the workshop proposal, together with the pre-proposal and the PEP evaluation, to CDEX (deadline TBD).
- The CIB will discuss and evaluate all workshop proposals at its annual meeting based on the scientific merits and uniqueness of each relative to the IODP New Science Plan and the *Chikyu* +10 workshop report.
- Based on the CIB prioritization, JAMSTEC will decide a level of funding for each workshop proposal.
- In some cases, the CIB will select a proposal and for its further development encourage JAMSTEC to fund a workshop (e.g. site survey).

4. Workshop implementation

The CIB will assign a Proposal Advisory Team (PAT) once the decision has been made to forward a workshop funding recommendation to JAMSTEC.

The PAT shall then organize the workshop based on its funding level.

5. Funding recipient's responsibilities

Funding recipients are required to submit a brief WS report (format TBD) to JAMSTEC within 60 days and a detailed WS report within 120 days after the closing of the WS, respectively.

Chikyu Safety Review Committee

(Structure to review the drilling program and operations of *Chikyu*)

Shigemi Matsuda
CDEX-HSE

#1 CIB Meeting @YES
21-23 July 2013

Chikyu Safety Review Committee

(Dec. 2004 ～now)

Mandate : to make verification and advice on the following subjects

1) Drilling program and operations
2) Drilling hazard and environment
3) Major accident and Countermeasures
4) HSE-MS validity

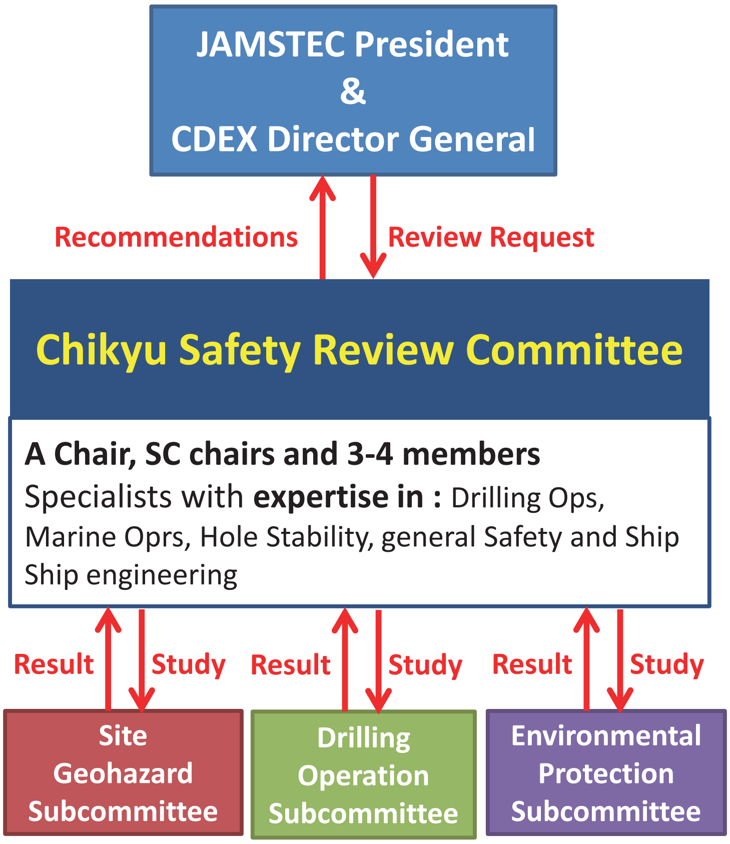
Subcommittee : The committee is allowed to form subcommittee to study or examine any specialized subject or issue if required

Subcommittee in the past

- Environmental Assessment SC to protect marine life and its habitat around the sites of Exp331 (Okinawa)
- Drilllpipe Strength Evaluation SC to drill the holes at ultra deep water in Exp343 (JFAST)

Chikyu Safety Review Committee

(future)



Subcommittee

1) Site Geohazard SC (Riser)
2) Drilling Operation SC (Riser/Riserless)
3) Env. Protection SC if required (Riser/Riserless)

Additional Mandate to be considered although the original mandate will remain same

- After the riser full proposal is designated as a project, Site Geohazard SC shall study the safety package prepared by the proponent and the PCT
- One the conceptual drilling program is made by CDEX, Drilling Operation SC shall study the program and make necessary verification and advice on it
- After the project moves onto implementation stage, Chikyu Safety Review Committee shall evaluate the detailed drilling program made by CDEX

Schedule

- The shallow geohazard evaluation of riserless drill sites for *Chikyu* shall be done by EPSP, which can be started anytime.
- The current structure of Chikyu Safety Review Committee (掘削安全委員会) will remain till the end of JPFY 2013 to review expedition 348 for NanTroSEIZE to be carried out in 2013
- The future structure should be introduced in JPFY 2014 to start reviewing the possible project designated by CIB

CDEX Technical Advisory Team
Terms of Reference
Draft Ver. 1.0

1. Overview

The CDEX Technical Advisory Team (TAT, tentative name) will serve the science oriented riser and riserless drilling projects of *Chikyu*, which mainly include the International Ocean Discovery Program (IODP), by expanding the utilization of technical expertise from external sources to partner with CDEX staff. The TAT will be instrumental in providing input to the CDEX from the science and technical communities. The TAT will help the CDEX to achieve more attractive science through attainable technology in both new developments and equipment maintenance and upgrades while working within the financial constraints of CDEX. The knowledge sharing among Implementation Organizers (IOs) will also be expected for efficient operations and developments as functioned in the previous IODP Engineering Development Panel (EDP) and Science Technology Panel (STP)

2. General Purpose

Assists CDEX to achieve the scientific goals of the projects through new or improved technology and engineering practices.

Provides advice to CDEX to achieve the long term engineering developments related to a) sampling/logging/coring, b) drilling/vessel infrastructure, c) borehole infrastructure, and to furnish advice about scientific measurement, equipment, procedures and shipboard equipment usage and needs as well as borehole and observatory measurements.

3. Mandate

The advisory team shall review each scientific drilling project and advice to the CDEX. Identify potential engineering/operational difficulties/challenges with appropriate/reasonable mitigation plan. The advisory team shall also review potential future scientific projects that is raised at the “Chikyu +10 workshop” and shall facilitate the delivery of new and innovative solutions.

The advisory team shall review and advice to CDEX long range engineering development plan, including coring/sampling methods, high T and high P logging tools, drilling/vessel infrastructures and borehole infrastructures. In addition, the advisory team shall review laboratory facility and scientific measurements made onboard, and adjust the current IODP cross-platform measurement, sampling, and data policies, which are the most essential elements for maintaining high scientific standards.

4. Membership

The advisory team member shall be selected from the following disciplines with minimum term of two years. The advisory team chair and member should be selected by CDEX Director General base on the recommendations from CDEX stakeholders.

- Drilling and completions
- Coring
- Logging and dowhnole measurements
- Long term borehole observatory
- Deep-water Riser technologies and well control
- Shipboard lab equipment and measurements
- Management, project coordination and Pioneering technologies applicable to *Chikyu*

CDEX Technology Development Manager will act as the secretariat for the advisory team.

As meeting guests, outside specialists may invite to a meeting as requested by the secretariat and the chair with CDEX director general's approval.

The advisory team members and other attendees should follow the conflict of interest policy (see appendix) with respect to contents in the meeting

5. Meetings

The advisory team chair and the secretariat shall decide meeting agenda and appropriate member to be participated to the meeting based on the agenda. Normally a meeting takes place annually and the participants would be about six to eight members from the advisory team membership, based on their expertise necessary for each meeting agenda.

6. Liaisons

Representatives from the funding agencies and implementing organizations shall also attend meetings as liaisons.

Agenda Item 8

Summary of Chikyu IODP Operations to date

- Chikyu's capability
    - D/V Chikyu brochure
    - Technical Development for Chikyu
- IODP Expeditions Summary
    - Chikyu Expedition Key Results
    - Chikyu IODP Borehole Data
- Lessons Learned
    - ORTF reports

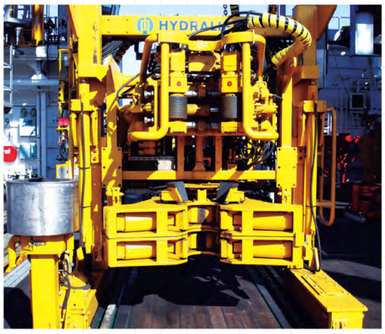
JAMSTEC
CDEX

Deep Sea Drilling Vessel
CHIKYU

DEEP SEA DRILLING VESSEL CHIKYU

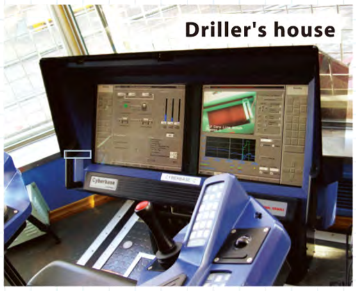
1 Automated Drilling Equipment

Hydraracker
Handle the pipes on the drill floor



Iron Roughneck
Make-up and Break-out the pipes

Power swivel
Rotate the drill pipe



Automated Drilling Equipment : Remote control from driller's house
Operate drilling equipment using control joystick

2 Mud circulation system

Circulate mud depending on borehole condition

Mud pumps
Circulate drilling fluid down the drill strings

← Remove drill ↓ cuttings from the drilling fluid

↑ **Mud cleaner**

Shale shaker →

Mud mixing area

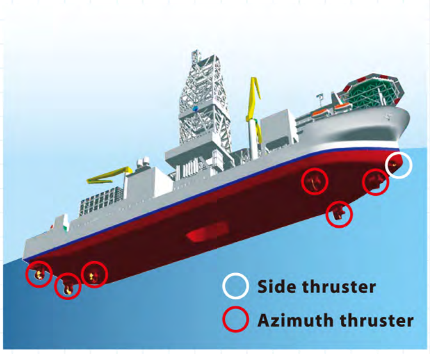
3 Mud disposal system

Drill Drain Thickening System
Thicken the drill drain

Big Bag Filling System
Fill stabilized sludge in big bag

4 Dynamic Positioning System

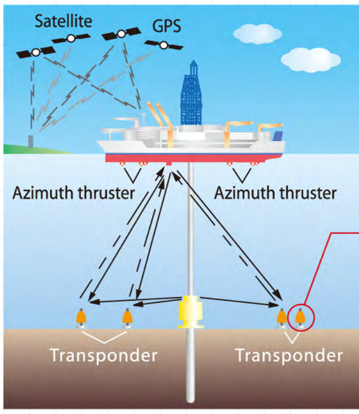
Maintain a constant position against wind and current movement



VVVF(Variable Voltage, Variable Frequency)controller
Control any thruster torque and rotation

Side thruster
2,550kW

Azimuth thruster
360° rotatable
4,200kW×6



Transponder

5 Research Laboratory

X-ray CT Scanner
High-resolution X-ray CT (Computed Tomography) enables to visualize features of the interior of the core

XRF Core Logger
The XRF Core Logger is a non-destructive device, that measures the major chemical components of the core samples

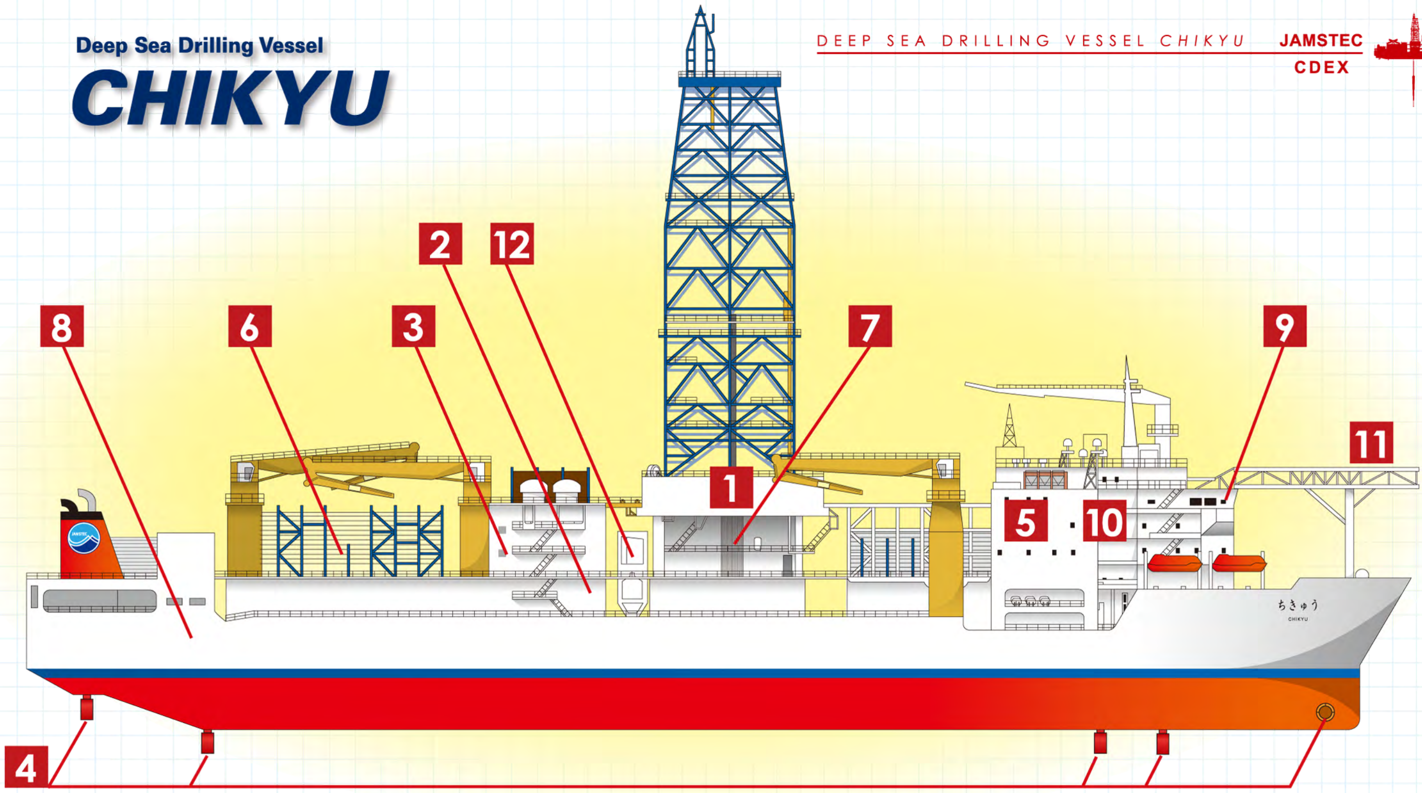
Microbiology Lab.
The laboratory contains equipment for uncontaminated sampling such as anaerobic glove box and facilities for incubating and storage (< -80° C)

More information: CHIKYU HAKKEN Web **http://www.jamstec.go.jp/chikyu/**

Deep Sea Drilling Vessel

CHIKYU

DEEP SEA DRILLING VESSEL *CHIKYU* JAMSTEC CDEX



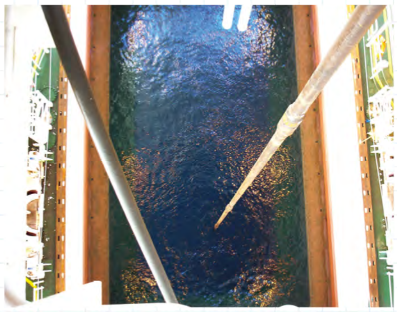
6 Riser pipe / Drill pipe

Riser pipes

Drill pipes

7 Riser tensioner / Moonpool

Riser tensioner



Moonpool

8 Engine room/High voltage panel room

ADD engine

High voltage panel

	Type	Engine output	Generator output
Main generator×6	12ADD30V	5,270kW	5,000kW
Auxiliary generator×2	6ADD30V	2,640kW	2,500kW

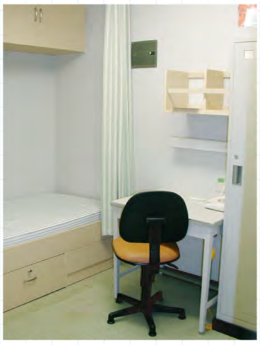
9 Bridge

Wheel house

DPS control panel

Thruster operating panel

10 Living quarter

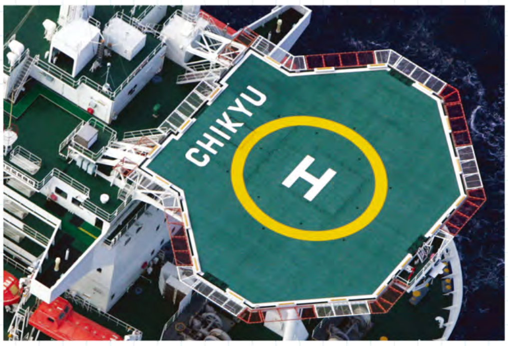


Cabin

Mess room

Conference room

11 Helicopter deck



It is possible for large size helicopter (30 passengers) to land

12 BOP

Blow-Out Preventer (BOP)

Deep Sea Drilling Vessel *CHIKYU* Specifitions

Class	NK (Nippon Kaiji Kyokai)
Navigation area	Ocean going area (Worldwide)
Length	210m
Breadth	38m
Depth	16.2m
Height (From sea level)	121m
Height (From ship bottom)	130m
Draft	9.2m
Gross Tonnage	56,752tons
Max cruising speed	12knots
Propulsion system	Diesel electric propulsion
Complement	200 people
Range	Approx. 14,800 nautical miles (Full load condition, 10knots)

Propeller	Azimuth thruster 4,200kW (5,710PS) x6 Side thruster 2,550kW (3,470PS) x1
Power generator	5,000kWx6, 2,500kWx2
DPS	NK DPS-B
Drilling system	Riser drilling system
Max water depth	2,500m
Length of drill string	10,000m
Ship equipment	Helicopter deck etc.

Keel-laying ceremony	April 25th, 2001
Launching ceremony	January 18th, 2002
Delivery ceremony	July 29th, 2005

The Center for Deep Earth Exploration
Japan Agency for Marine-Earth Science and Technology
3173-25 Showa-machi, Kanazawa-ku, Yokohama, 236-0001 JAPAN
TEL +81-45-778-5647 FAX +81-45-778-5704
Web http://www.jamstec.go.jp/chikyu/
E-mail cdex@jamstec.go.jp

2010.6

Technical Development for Chikyu

CDEX
Chikyu IODP Board #1 meeting
23-25 July 2013

Developing New Technology for Chikyu

- Ultra-deep water riser drilling system
- Turbine driven coring system (TDCS)
- Hybrid pressure core sampler (Hybrid PCS)
- Small diameter rotary core barrel(SD-RCB)
- Gel-core system
- Long term borehole monitoring system (LTBMS)
- Under water TV-ROV(Remotely operated vehicle)

Ultra-deep water riser drilling system

Developing New Technology for Chikyu

Objective:

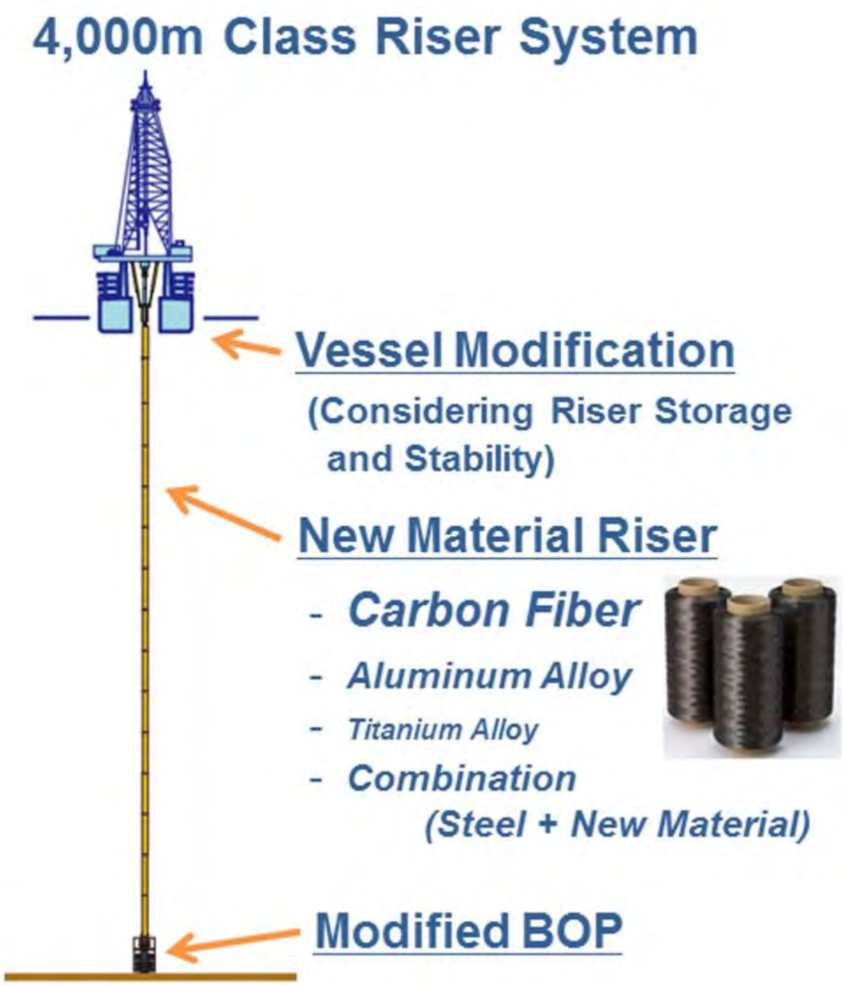
- Drill in a water of 4,000m and coring 7000mbsf
- High margin of safety in both ordinary and emergency operation

Characteristics of CFRP:

	Comparison to Steel material
Weight	Less than quarter
Strength	7 times (high strength light weight)
Elasticity	7 times (high dumping efficient)
Fatigue strength	Much higher

Development schedule:

- Demonstrate CFRP Riser & Riser system of a semi full-scale within the span of a half decade



Turbine driven coring system(TDCS)

Developing New Technology for Chikyu

Objective:

- Enhance core quality and recovery in hard rock formations
- Use mud as drilling fluid to drive turbine
- Wire line retrievable

SPEC:

- Maximum speed: >900rpm
- Weight-on-bit : <10kN
- Core length:4.5m
- Core size：60mm

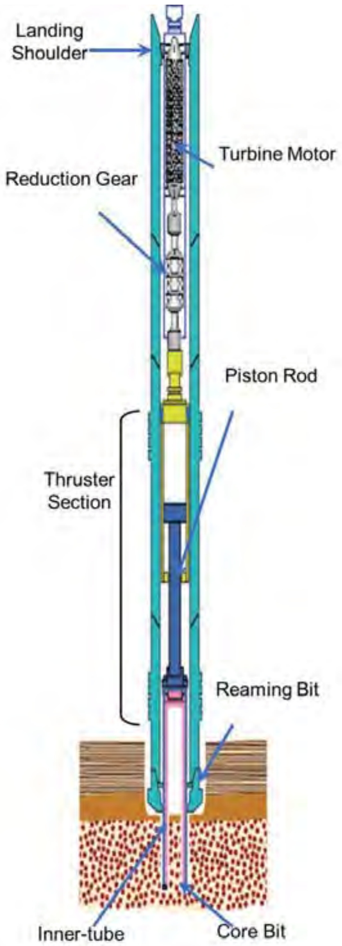
Development schedule:

(~2012)

- Strengthening of reduction gear
- Onshore coring test of TDCS
- Performance test of core bit

(2013)

- Manufacturing TDCS prototype
- Engineering test (NanTro SEIZE)



Hybrid pressure core sampler(Hybrid PCS)

Developing New Technology for Chikyu

Objective:

- Obtain pressurized core sample
- Wire line retrievable and conveyable to “GEOTEK Pressure Core Analysis and Transfer System(PCATS)” under pressurized condition

SPEC:

- Core length:3.5m
- Core size：51mm
- Max pressure:5,000psi(34.5 Mpa)

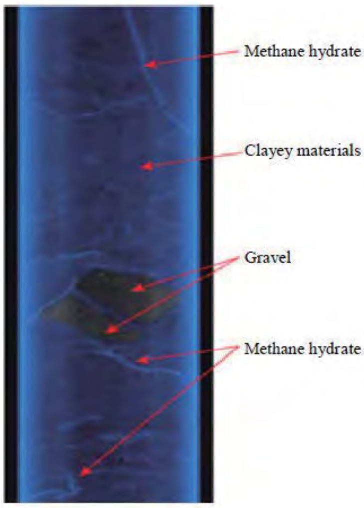
Development schedule:

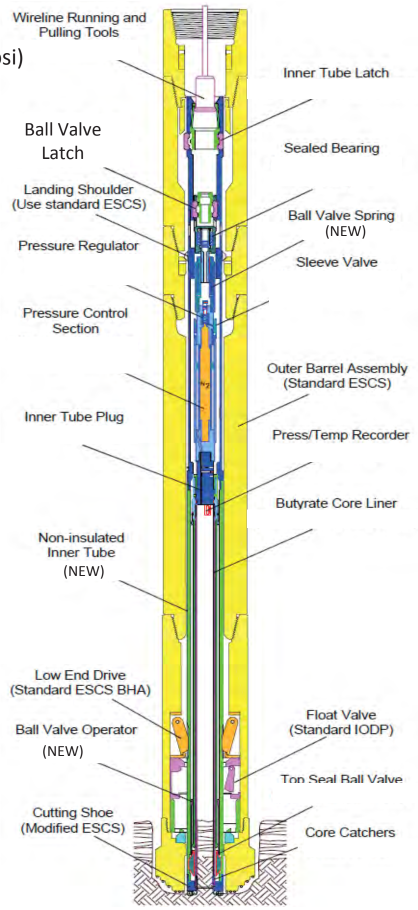
(2012)

- Demonstration ocean drilling of engineering prototype in Kumano (Mud volcano)

Nankai Trough – Kumanonada 5th Mud volcano

X-ray CT Image: pressurized core sample (3000 psi)





Small diameter rotary core barrel (SD-RCB)

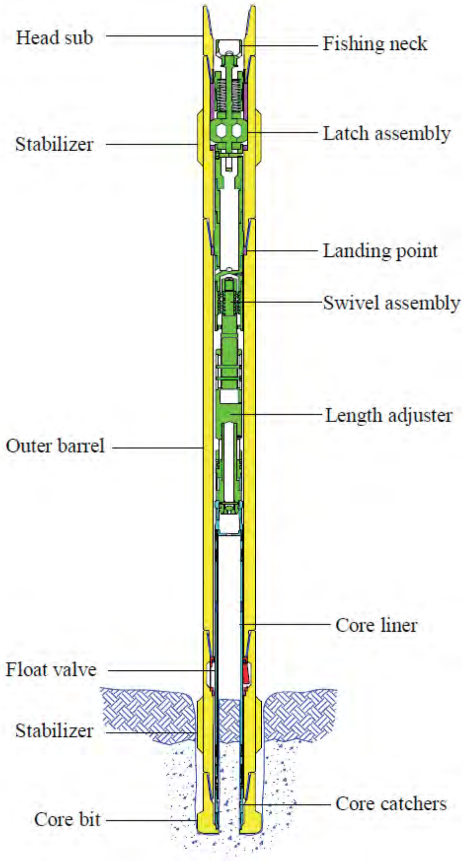
Developing New Technology for Chikyu

Objective:
- Improved core recovery/quality
- Low fluid invasion of core
- Improved hole stability

SPEC:
- 8-1/2” hole (bit) size
- 7” collar (outer barrel) size.
- Two 8-1/2” blade stabilizers (Top, near bit)
- Core length (9.5m)
- Core size (2.75 in.= 70mm)
- Center bit available to drill out
- Applicable on Chikyu drill pipe min. ID (4-1/8” = 104.8mm)

Development schedule:
(~2010)
- Test and verification of experimental prototype

(2013~)
- Demonstration of engineering prototype(Nankai)

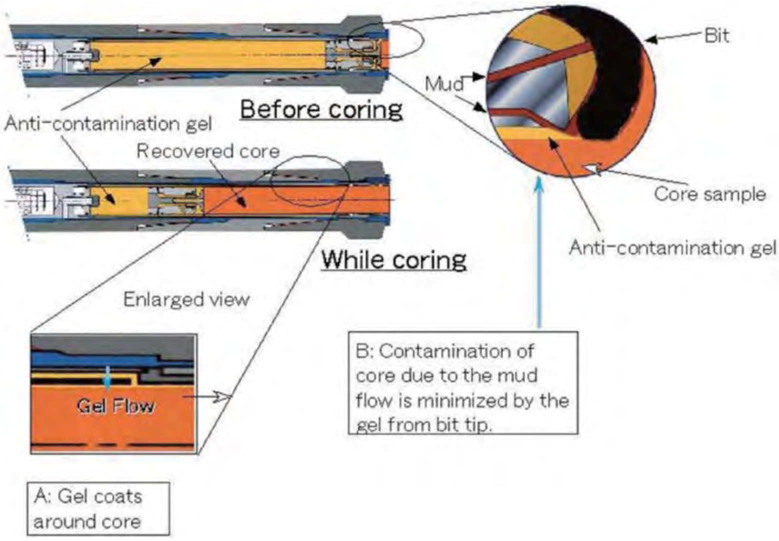


Gel-core system

Developing New Technology for Chikyu

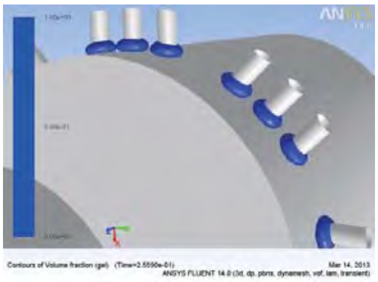
Objective:
- Obtain microorganism sample in extreme environment
- Reduce contamination of sampled core less than 1%
- Wire line retrievable

Test condition:
- Viscosity: 1000cs/3000cs
- Speed: 5/10/15(cm/min)
- Design pressure:20Mpa(external)



Development schedule:
(~2010)
- Verification of components (incl. inflow prevention unit)
- Gel flow analysis by CFD
- Shop trial of experimental prototype

(2013~)
- Confirm scientific requirement



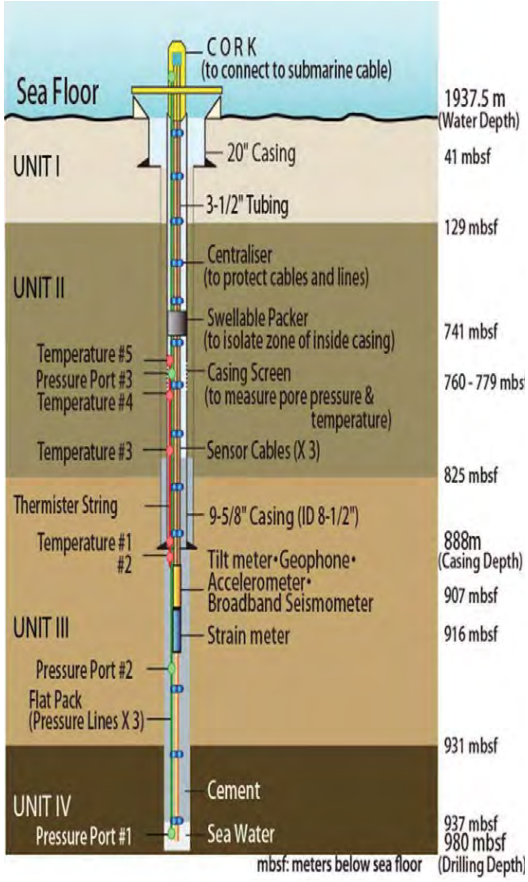
Long term borehole monitoring system(LTBMS)

Developing New Technology for Chikyu

Operation schedule:
(~2012)
- C2 Riser-less LTBMS (NanTro)
- Japan Trench Fast Earthquake Drilling

(2013～)
- C10 Riser-less LTBMS (NanTro)
- C6/C7 Riser-less LTBMS (NanTro)
- C2 Riser LTBMS
- Mud volcano LTBMS（Kumano）

High temperature / long life (125° C / 5 years), low power consumption (for multi sensor)



Under water TV-ROV(Remotely operated vehicle)

Developing New Technology for Chikyu

Objective:
- Launch from UWTV (Station) in a water of 7,000m
- Wide mobile range
- Real time video transmission and high imaging ability

SPEC:
(Station)
- Size(mm):L941×W920×H1970
- Weight(kg):200 (in air) ,150 (in water)
- Equipment: Camera×2ea,
  Cable cutter, Docking system,
  LED Light, Gyro

(Vehicle)
- Size(mm):L600×W365×H325
- Cable length: 30m
- Weight(kg): 40 (in air) ,0(in water)
- Equipment: V.Thruster×2ea,
  Thruster×3ea, Camera, LED Light, Gyro

Development schedule:
(~2013)
- Tank test

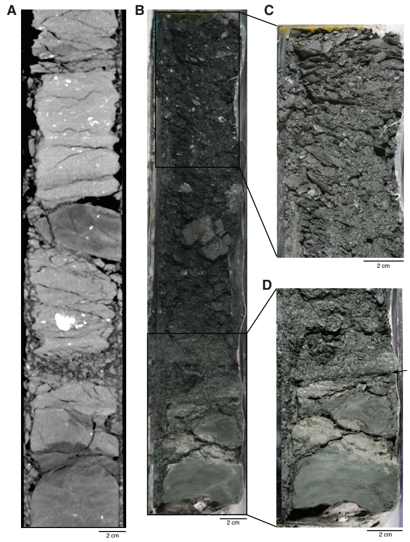
(2014~)
- Sea trial & implementation

Chikyu Expedition Key Results

_2007_

Exp 314, 315 and 316 (NanTroSEIZE Stage 1)

Lithology, structure, and recent activity of megasplay fault and associated thrust sheet (Sites C0001, C0004, and C0008)



- The splay fault clearly thrusts the hanging wall prism over younger slope sediments in the footwall; however, the youngest slope sediments that cover the fault appear not to be cut by the fault.
- The splay fault is active as a blind thrust, in which the tip of the fault has not propagated to the surface but remains buried.
- The shallowest cover sediments above the hanging wall wedge are composed of repeated mass transport complexes associated with repeated slope collapses and rip-up debris generation
- Two steps of age reversal are tentatively recognized across the splay fault zone; this evidence suggests that fault-bounded lithologic Unit III at Site C0004 is a sliverlike unit coming up from a much deeper setting.

Age of cover sequence and uplifted accretionary prism units

- The megasplay thrust sheet contains internal structural imbrication and has incorporated material progressively as it advanced
- This landward progression of successively older dates marking the uplift and surface exposure of Shikoku Basin sediments is consistent with progressive growth of the accretionary prism through late Miocene to Quaternary time.
- The onset of splay fault uplift of a pronounced outer arc high and/or capture of a significant turbidite sediment source for the basin was abrupt in the early Pleistocene.

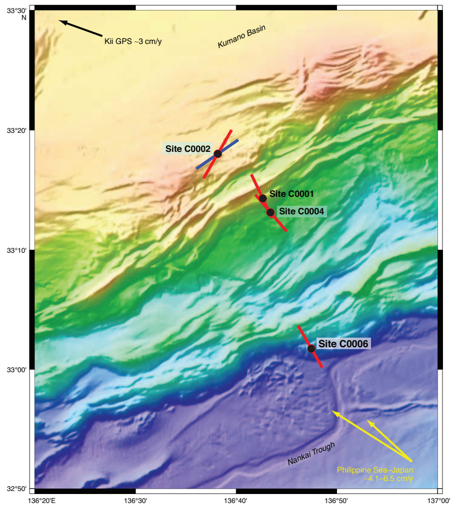
Indicators of stress regime – Borehole breakouts and present-day stress orientations

- Breakout orientations at Sites C0001, C0004, and C0006 all indicate northwest–southeast azimuths of the maximum horizontal principal stress.

Indicators of stress regime – Paleostress from core-based structural data

– Fault analyses from that site show the following time evolution of the stress field:

1. First phase of northwest–southeast shortening by thrust faulting and possibly strike-slip faulting,
2. Second phase of northeast–southwest extension by normal faulting, and
3. Third phase of north–south extension by normal faulting consistent with the main normal faults seen in the 3-D seismic lines. This last phase correlates with the borehole breakout observations.



Thermal regime

– Good linear gradients indicative of predominantly conductive heat flow were found at all sites, with the exception of some depths at Site C0006.

– The extremely low heat flow observed at frontal thrust Sites C0006 and C0007 might be related to stratigraphic or structural fluid pathways developed in this region, perhaps facilitating circulation of seawater down into the thrust sheet

Gas hydrates and bottom-simulating reflector

– The logging data indicate that the BSR is a response to both a small velocity high from hydrate cement in the hydrate stability zone and a more significant velocity low caused by the presence of uncemented sediments and/or free gas below the stability field.

2009

Exp 319 (NanTroSEIZE Stage 2)

Geomechanics: structures and stress state

– The results from resistivity imaging (breakouts and DITF) and direct stress measurement (MDT and LOT) at Site C0009 indicate either a normal or strike-slip faulting regime in which SH_{max} is oriented northwest–southeast at Site C0009

Forearc basin development and correlation with Site C0002: depositional and tectonic environment

– Unconformity UC2 exhibits more than 1000 m of relief between Sites C0009 and C0002 and marks a hiatus of approximately equal age and duration at both sites (~5.6–3.8 Ma)

– These strata record infilling of the Kumano Basin and the progressive landward (northwestward) migration of the depocenter, likely caused by underplating and/or slip on the megasplay with resulting uplift of the seaward edge of the basin.

Architecture and along-strike variation of the megasplay fault

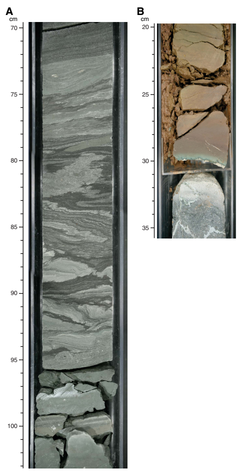
– The character and physical properties of the megasplay fault system vary markedly along strike

Exp 322 (NanTroSEIZE Stage 2)

– Recovery of basal pelagic deposits in contact with pillow basalt constitutes a major achievement at Site C0012.

– Although relief on the bathymetric high may have been enhanced by inversion at some point in the late Miocene or Pliocene, the basement clearly modulated sedimentation rates throughout the history of the Shikoku Basin.

– In essence, that site represents the presubduction geochemical reference site for the Nankai subduction zone, with pore fluids unaffected by the effects of focused flow and diagenesis associated with rapid burial beneath the trench wedge and frontal accretionary prism.



2010

Exp 326 (NanTroSEIZE Stage 3)

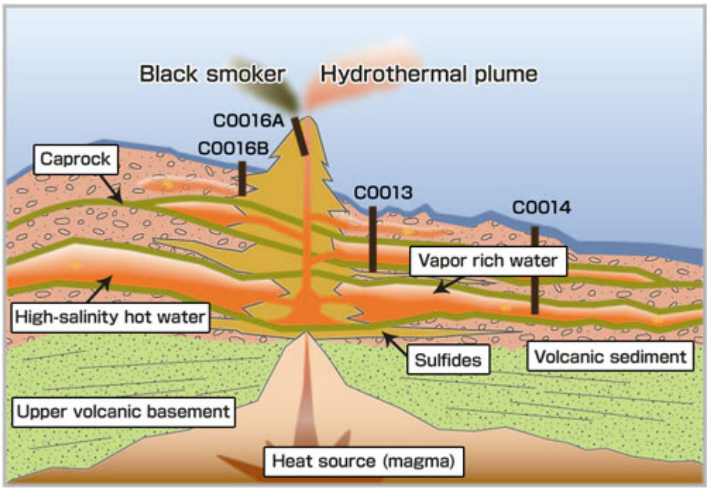
– The limited objectives of Expedition 326 were eventually completely met, albeit with setbacks and a necessary, though little-precedented, extension of the duration of the expedition.

Exp 331 (Deep Hot Biosphere)

Artificial hydrothermal vents created

– Four artificial hydrothermal vents were created by our drilling operations, in Holes C0013E, C0014G, C0016A, and C0016B, in which hydrothermal fluid formerly trapped in the sub-seafloor ascended up the hole and exited into the ocean.

– These newly created hydrothermal vents will serve as windows into the sub-seafloor and any associated microbial communities entrained into them in post-drilling, long-term monitoring studies of fluid composition and flow and of in situ microbial colonization



Subseafloor hydrothermal alteration, fluid flow, and reservoirs within the defined hydrogeologic structure

– The hydrological regime at Iheya North Knoll is characterized by large-scale hydrothermal alteration, deposition, and fluid migration within permeable rocks and sediments hosted by the Iheya North Knoll volcanic complex

Stratification of hydrothermal fluid by subseafloor phase separation and segregation

– Expedition 331 provides tentative evidence of subseafloor stratification of hydrothermal fluids that have phase separated.

Is a subvent biosphere present?

- So far, the shipboard analyses and experiments have provided little evidence for the existence of a hot subvent biosphere beneath the Iheya North hydrothermal field, though cultivation from a colder, diffusely venting site and a site of lateral recharge provided evidence for a subvent iron-oxidizing microbial community.

Actively forming Kuroko deposit in the subseafloor environment of the Iheya North field

- The first time this type of massive sulfide, which closely resembles the Kuroko black ore, has been recovered from an active deep-sea hydrothermal system.

Exp 332 (NanTroSEIZE Stage 2)

- The data collected from the recovered SmartPlug proved to be complete time series data over >15 months and validates the concept of cheap, durable, replaceable CORK-like observatories.

Exp 333 (NanTroSEIZE Stage 2)

- A major change of physical properties is found at ~250 mbsf at Site C0011 and has tentatively been identified between 70 and 90 mbsf at Site C0012. This transition appears as a lithologically determined feature enhanced by diagenesis.
- Heat flow measured during Expedition 333 is 90 mW/m^2 at Site C0011 and 140 mW/m^2 at Site C0012, respectively ~20% lower and 30% higher than the heat flow expected from conductive cooling of a 20 Ma lithosphere.
- Submarine slope destabilization does not occur systematically during subduction earthquakes.

2012

Exp 343 (Japan Trench Fast Drilling Project)

- The overall structure at the drill site consists of a prism of faulted and folded clayey to silty mudstones above, and in fault contact (at ~820 mbsf) with, a largely undeformed, relatively thin sequence of hemipelagic and pelagic sediments that were deposited on top of the incoming Pacific plate.
- Faults and bedding are variable in dip magnitude, but faults and bedding at all depths in the prism

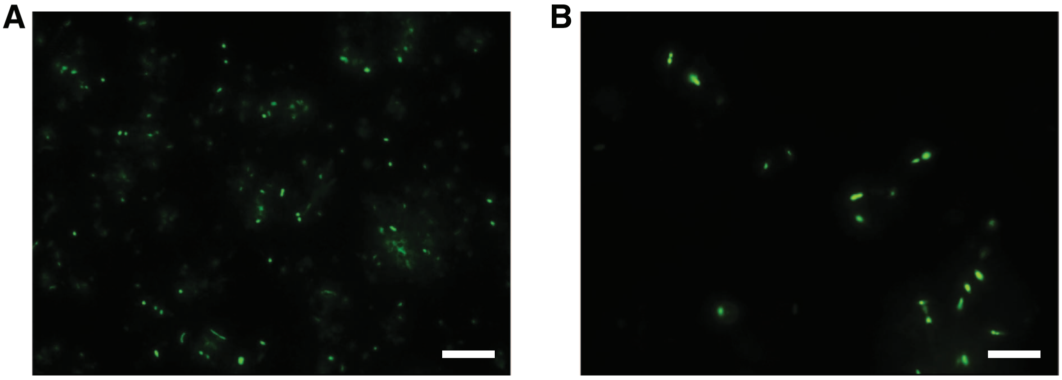
show a preferred northeast strike direction reflecting horizontal contraction and local extension (at shallower depths) approximately parallel to the plate convergence direction.

- Borehole breakouts are evident in image logs from the LWD hole and indicate several different in situ stress domains along the borehole.
- Fault slip during the 2011 event and other past earthquakes likely occurred on the plate boundary décollement.
- Successful recovery of ~1 m of highly sheared clay and neighboring sediments from the plate boundary décollement provide plenty of material for mechanical and physical properties testing, as well as for geochemical, mineralogical, and microstructural analyses.
- An observatory consisting of 55 temperature sensors and autonomous data loggers was successfully installed across the two fault targets.
- 

Exp 337 (Deep Coalbed Biosphere off Shimokita)

Preliminary evidence for deep subseafloor microbial activity associated with coalbeds

- Evidence for microbially mediated methanogenesis is found in our gas compositional data. In particular, C1/C2 ratios analyzed during mud-gas monitoring are generally in the range suggesting biological methanogenesis as the major source of methane.
- The coalbed at ~2 km sub-seafloor depth is probably not directly responsible for the presence of methane hydrates found in shallower layers at this site; instead, it resembles a slow-paced bioreactor with sustained activity on geologic timescales as previously proposed for other organic-rich deeply buried layers



–

Preliminary assessment of the sedimentation history at Site C0020

– >700 m of intertidal and wetland sequences were deposited from late Oligocene/early Miocene through early/middle Miocene.
– Our findings suggest that this sedimentary basin had been continuously subsiding in order to generate the accommodation space during this period without an abrupt faulting event and that the rate of basin subsidence had been in balance with the sedimentary input.

Accomplishments and future perspectives

– The bottom depth of Hole C0020A is 2466 mbsf, extending the previous maximum penetration depth in scientific ocean drilling by 355 m.
– The cored materials provide unprecedented opportunity to address fundamental scientific questions pertaining to the interactions between a deep coalbed hydrocarbon system and subseafloor life.
– New shipboard facilities on the Chikyu such as the mud-gas monitoring laboratory and the radioisotope laboratory were successfully implemented and strongly contributed to the mission achievement of Expedition 337.
– The core recovery through riser drilling was remarkably high (75.3% in average), often close to 100% (12 out of 32 spot cores were >90% recovery), even at great burial depths of 2000 mbsf and deeper.
– This expedition also provided a testbed for the use of riser drilling technology to address geobiological and biogeochemical objectives and was therefore a crucial step toward the next phase of deep scientific ocean drilling.

Exp 338 (NanTroSEIZE Stage 3)

– LWD data, mud-gas analyses, and cuttings samples in Hole C0002F provided constraints on the lithologic and structural features, physical properties, and geochemistry of the previously unaccessed deeper part of the Nankai accretionary prism.

- Riserless coring in Holes C0002H, C0002J, C0002K, and C0002L provided core samples
    1. across the gas hydrate zone including the BSR of the Kumano Basin, which was not cored during Expedition 315,
    2. across the preliminary unconformity boundary between the Kumano Basin sediment and the underlying accretionary prism sediment, and
    3. in the uppermost accretionary prism, which allowed constraints on the lithologic and structural features, physical properties, and fluid and gas chemistries of sediment in those intervals.

Chikyu IODP Borehole Data

Exp	Drilled Site Name	Hole	Lat	Long	Water Depth (mbsl)	Drilling Type	Total Depth (m)	Drilled interval (m) Top	Drilled interval (m) Bottom	Cored Interval (m)	Core recovered (m)	% core recovery	Number of cores	Drilling Comment
	C0001	A	33º 14.2945' N	136º 42.7139' E	2199.5	Pilot	1000.0	0.0	1000.0	--	--	--	--	MWD-GR-APWD
		B	33º 14.3135' N	136º 42.7252' E	2188.9	Coring	30.6	0.0	30.6	30.6	30.6	100.0	1	HPCS - geotech core
		C	33º 14.3345' N	136º 42.7014' E	2198	LWD	77.5	0.0	77.5	--	--	--	--	suspended
		D	33º 14.3286' N	136º 42.7040' E	2197.5	LWD	976.0	0.0	976.0	--	--	--	--	LWD (GVR-sonic-seismic-ADN)-MWD-APWD
	C0002	A	33°18.0192′N	136°38.1810′E	1936	LWD	1401.5	0.0	1401.5	--	--	--	--	LWD (GVR-sonic-seismic-ADN)-MWD-APWD
314	C0003	A	33°13.3982′N	136°42.1382′E	2453	LWD	533.5	0.0	533.5	--	--	--	--	LWD/lost BHA
	C0004	A	33°13.2424′N	136°43.3349′E	2632	Pilot	400.0	0.0	400.0	--	--	--	--	Pilot without MWD-GR-APWD
		B	33°13.2264′N	136°43.3461′E	2637	LWD	400.0	0.0	400.0	--	--	--	--	LWD (GVR-sonic-ADN (caliper)-seismic)-MWD-APWD
	C0005	A	33°13.5603′N	136°43.1050′E	2446.5	Pilot	524.0	0.0	524.0	--	--	--	--	Pilot without MWD-GR-APWD
		B	33°13.4141′N	136°43.2245′E	2524.5	Pilot	37.0	0.0	37.0	--	--	--	--	Pilot without MWD-GR-APWD
	C0006	A	33°01.6430′N	136°47.6550′E	3875	Pilot	885.5	0.0	885.5	--	--	--	--	Pilot with MWD-GR-APWD
		B	33°01.6350′N	136°47.6390′E	3871.5	LWD	885.5	0.0	885.5	--	--	--	--	LWD (GVR-sonic-ADN (caliper)-seismic)-MWD-APWD
	C0001	E	33°14.3442′ N	136°42.6924′ E	2198	Coring	118.1	0.0	118.1	118.1	112.7	95.4	13	HPCS (13); lost inner core barrel in hole, APCT-3 (in HPCS coring)
		F	33°14.3437′ N	136°42.7067′ E	2197	Coring	248.8	0.0	248.8	140.8	137.3	97.5	21	HPCS (19), ESCS (2), APCT-3 (in HPCS coring)
		G	33°14.3237′ N	136°42.6933′ E	2196.5	Coring	74.5	0.0	74.5	--	--	--	--	N/A; ROV cable tangled around drillpipe
315		H	33°14.3233′ N	136°42.6840′ E	2197	Coring	590.5	0.0	590.5	228.6	126.3	55.2	26	RCB (26); hole caving
		I	33°14.2030′ N	136°42.4330′ E	2198.5	Coring	520.0	0.0	520.0	--	--	--	--	N/A; hole caving
	C0002	B	33°17.9928′ N	136°38.2029′ E	1937.5	Coring	1057.0	0.0	1057.0	582.0	208.3	35.8	66	RCB (66)
		C	33°18.0026′ N	136°38.1869′ E	1936.6	Coring	13.8	0.0	13.8	13.8	13.8	99.8	2	HPCS (2)
		D	33°18.0075′ N	136°38.1910′ E	1937.1	Coring	204.0	0.0	204.0	204.0	161.9	79.4	18	HPCS (16), ESCS (2), APCT-3
	C0004	C	33°13.2278′N	136°43.3312′E	2627	Coring	135.0	0.0	135.0	131.3	135.2	103.0	18	HPCS (15), ESCS (4), APCT-3
		D	33°13.2190′N	136°43.3287′E	2630.5	Coring	400.0	0.0	400.0	300.0	130.8	43.6	56	RCB (56)
	C0006	C	33°01.6458′N	136°47.6282′E	3880.5	Coring	9.5	0.0	9.5	9.5	10.3	108.0	1	HPCS (1)
		D	33°01.6431′N	136°47.6282′E	3877.5	Coring	9.5	0.0	9.5	9.5	10.2	107.4	1	HPCS (1)
		E	33°01.6444′N	136°47.6282′E	3875.8	Coring	409.4	0.0	409.4	409.4	330.3	80.7	49	HPCS (14), ESCS (35), APCT-3, DVTP (in ESCS coring)
		F	33°01.6242′N	136°47.6282′E	3875.5	Coring	208.0	0.0	208.0	208.0	56.5	27.2	23	RCB (23)
316	C0007	A	33°01.2326′N	136°47.9485′E	4081	Coring	3.1	0.0	3.1	3.1	3.1	101.3	1	HPCS (1)
		B	33°01.2326′N	136°47.9485′E	4081	Coring	12.6	0.0	12.6	9.5	10.0	105.6	1	HPCS (1)
		C	33°01.2326′N	136°47.9485′E	4081	Coring	176.1	0.0	176.1	163.5	59.3	36.3	18	HPCS (4), ESCS (12), APCT-3, DVTP (in ESCS coring)
		D	33°01.3167′N	136°47.8872′E	4049	Coring	493.5	0.0	493.5	318.5	87.9	27.6	35	RCB (35)
	C0008	A	33°12.8229′N	136°43.5997′E	2751	Coring	357.8	0.0	357.8	357.8	271.2	75.8	43	HPCS (29), ESCS (14)
		B	33°12.7313′N	136°43.6727′E	2797	Coring	9.5	0.0	9.5	9.5	9.8	103.4	1	HPCS (1)
		C	33°12.7313′N	136°43.6727′E	2797	Coring	176.2	0.0	176.2	176.2	189.7	107.6	25	HPCS (21), ESCS (1), EPCS (3), APCT-3 (in HPCS coring)
319	C0009	A	33°27.4704'N	136°32.1489'E	2054	Core/Wireline/Mud L	1603.7	0.0	1603.7	84.2	68.7	81.6	9	MWD-APWD, Wireline (PEX, HLRA, FMI, SonicScanner, MDT)
	C0010	A	32°12.5981′ N	136°41.1924′ E	2523.7	LWD/casing	560.0	0.0	555.0	--	--	--	--	LWD (GVR)-MWD-APWD
	C0011	A	32°49.7302'N	136°52.8905'E	4049	LWD	952.0	0.0	952.0	--	--	--	--	LWD (GVR)-MWD-APWD
	C0011	B	32°49.7369′ N	136°52.9074′ E	4048.7	Coring	881.0	0.0	881.0	483.3	329.2	68.1	61	RCB (61)
322	C0012	A	32°44.888′ N	136°55.024′ E	3510.7	Coring	576.0	0.0	576.0	576.0	207.0	35.9	58	RCB (58)
		B	32°44.888′ N	136°55.024′ E	3510.7	N/A	499.0	0.0	499.0	--	--	--	--	Failed
326	C0002	F	33°18.507′ N	136°38.2029′ E	1968	casing ops	872.5	0.0	872.5	--	--	--	--	Drilled and cased hole (20-inch csg) for future riser extension
	C0013	A	27°47.4150′ N	126°53.8605′ E	1035	Coring	7.0	0.0	7.0	7.0	0.0	0.0	1	HPCS (1-no recovery)
		B	27°47.4140′ N	126°53.8602′ E	1035	Coring	9.5	0.0	9.5	9.5	1.4	15.2	1	EPCS (1)
		C	27°47.4119′ N	126°53.8606′ E	1035	Coring	12.5	0.0	9.5	9.5	9.7	102.1	1	HPCS (1)
		D	27°47.4130′ N	126°53.8609′ E	1036.5	Coring	35.5	0.0	32.5	32.5	17.9	55.1	4	HPCS (2), EPCS (1), ESCS (1)
		E	27°47.4157′ N	126°53.8546′ E	1034	Coring	54.5	0.0	45.0	45.0	11.6	25.8	8	HPCS (3), ESCS (5), LDC (1)
		F	27°47.4122′ N	126°53.8601′ E	1035.1	Coring	7.5	0.0	7.5	7.5	9.5	126.7	1	HPCS (1)
		G	27°47.4100′ N	126°53.8554′ E	1035.1	Coring	9.3	0.0	1.8	1.8	1.8	100.0	1	HPCS (1)
		H	27°47.4098′ N	126°53.8565′ E	1035.1	Coring	9.9	0.0	0.6	0.6	0.6	100.0	1	HPCS (1)
331	C0014	A	27°47.4140′ N	126°54.0487′ E	1059.5	Coring	6.5	0.0	6.5	6.5	5.3	81.8	1	HPCS (1)
		B	27°47.4131′ N	126°54.0448′ E	1059	Coring	44.5	0.0	44.5	44.5	45.0	101.1	5	HPCS (5)
		C	27°47.4194′ N	126°54.0391′ E	1060	Coring	6.5	0.0	6.5	6.5	4.9	75.4	1	HPCS (1), APCT-3 (in HPCS coring)
		D	27°47.4158′ N	126°54.0406′ E	1060	Coring	16.0	0.0	16.0	16.0	12.5	78.1	2	HPCS (2), APCT-3 (in HPCS coring)
		E	27°47.4158′ N	126°54.0406′ E	1060	Coring	35.0	0.0	19.0	19.0	15.3	80.5	2	HPCS (2)
		F	27°47.4185′ N	126°54.0443′ E	1060.8	Coring	4.2	0.0	4.2	4.2	4.2	100.0	1	HPCS (1), APCT-3 (in HPCS coring)
		G	27°47.4165′ N	126°54.0463′ E	1059.8	Coring	136.7	0.0	136.7	136.7	74.4	54.4	28	HPCS (10), ESCS (6), EPCS (12), APCT-3 (in HPCS coring)
	C0015	A	27°47.6678′ N	126°53.4981′ E	885	Coring	6.3	0.0	6.3	--	--	--	--	
		B	27°47.6673′ N	126°53.4981′ E	886	Coring	6.5	0.0	6.5	6.5	6.2	95.4	1	HPCS (1)
		C	27°47.6689′ N	126°53.4993′ E	885.5	Coring	9.4	0.0	2.9	2.9	2.9	100.0	1	HPCS (1)

Exp	Drilled Site Name	Hole	Lat	Long	Water Depth (mbsl)	Drilling Type	Total Depth (m)	Drilled interval (m) Top	Drilled interval (m) Bottom	Cored Interval (m)	Core recovered (m)	% core recovery	Number of cores	Drilling Comment
331 (continued)	C0016	A	27°47.4548′ N	126°53.8034′ E	982	Coring	18.0	0.0	18.0	--	--	--	--	
		B	27°47.4538′ N	126°53.7860′ E	995	Coring	44.9	0.0	44.9	44.9	1.7	3.9	3	Industry Coring System (3)
	C0017	A	27°47.5030′ N	126°54.7176′ E	1129	Coring	8.8	0.0	8.8	8.8	8.8	100.0	1	HPCS (1)
		B	27°47.5027′ N	126°54.7176′ E	1129	Coring	18.3	0.0	9.5	9.5	9.5	100.0	1	HPCS (1), APCT-3 (in HPCS coring)
		C	27°47.5039′ N	126°54.7202′ E	1129.6	Coring	50.0	0.0	19.0	19.0	18.0	94.7	2	HPCS (2), APCT-3 (in HPCS coring)
		D	27°47.5049′ N	126°54.7217′ E	1129.5	Coring	150.7	0.0	90.7	90.7	50.6	55.8	12	HPCS (6), ESCS (4), EPCS (2), APCT-3 (in HPCS coring)
332	C0002	G	33°18.0130′ N	136°38.1500′ E	1936	LWD	980	0.0	980	--	--	--	--	Set casing, LWD(ARC)-MWD, LTBMS deployment
	C0010	A	32°12.5981′ N	136°41.1924′ E	2552	--	--	--	--	--	--	--	--	SmartPlug recovery, GeniusPlug deployment
333	C0018	A	33º 09.4195' N	136º 40.8888' E	3084.35	Coring	314.2	0.0	314.2	314.2	271.4	86.4	36	HPCS (23), EPCS (7), ESCS (6), APCT-3 (in HPCS coring)
	C0011	C	32º 49.7436' N	136º 52.9250' E	4050.5	Coring	22.5	0.0	22.5	22.5	23.0	102.2	3	HPCS (3)
		D	32º 49.7436' N	136º 52.9250' E	4050.5	Coring	380.0	0.0	380.0	359.0	351.5	97.9	52	HPCS (22), EPCS (3), ESCS (27), APCT-3 (in HPCS coring)
	C0012	C	32º 44.8947' N	136º 55.0417' E	3510.5	Coring	124.5	0.0	124.5	124.5	128.6	103.3	15	HPCS (15), APCT-3 (in HPCS coring)
		D	32º 44.9001' N	136º 55.0418' E	3510.5	Coring	180.0	0.0	180.0	63.8	66.4	104.0	13	HPCS (13), APCT-3 (in HPCS coring)
		E	32º 44.9001' N	136º 55.0418' E	3510.5	Coring	528.5	0.0	528.5	28.5	13.9	48.6	3	ESCS (3)
		F	32º 44.8815' N	136º 55.0066' E	3510.5	Coring	525.5	0.0	525.5	5.5	2.7	48.2	2	RCB (2)
		G	32º 44.8848' N	136º 55.0153' E	3510.5	Coring	630.5	0.0	630.5	115.5	25.9	22.4	15	RCB (15)
343	C0019	A	37°56.3367′ N	143°54.8100′ E	6883.5	Jetting	28.0	0.0	28.0	--	--	--	--	Jetted in wellhead; release failed, recovered to surface
		B	37°56.3033′ N	143°54.7875′ E	6889.5	LWD	850.5	0.0	850.5	--	--	--	--	LWD (GVR)-MWD-APWD(ARC)
		C	37°56.3033′ N	143°54.7875′ E	6928.5		120.0	0.0	120.0	--	--	--	--	BHA broke at jar; left in hole
		D	37°56.3224′ N	143°54.8004′ E	6897.5	Observatory running	854.8	0.0	854.8	--	--	--	--	Observatory hole finished in 343T-3 d, 10 d
		E	37°56.3343′ N	143°54.8084′ E	6887.5	core	844.5	0.0	844.5	137.0	53.31	38.9	21	Coring hole; non-continuous coring
337	C0020	A	41°10.5983′ N	142°12.0328′ E	1180	Logging/Coring/WL Lc	2466	499.5	2466.0	263.5	200.9	76.2	32	Coring: RCB (31) and LDC (1), Mud Logging: Cuttings Logging and Real-time Mud Gas Monitoring
338	C0002	F	33°18.0507'N	136°38.2029'E	1939.0	LWD/MWD/Mud Logging	2005.5	842.0	2005.5	--	--	--	--	LWD (GVR-sonic)-MWD-APWD(ARC)-Anderreamer, Mud Logging: Cuttings Logging and Real-time Mud Gas Monitoring
		H	33°18.0252'N	136°38.2152'E	1936.5	Coring	1120.0	0.0	1120.0	19.0	3.91	20.6	2	RCB (2)
		I	33°18.0362'N	136°38.2077'E	1936.0	Coring	1360.5	--	--	--	--	--	--	RCB (N/A; hole caving)
		J	33°18.0173'N	136°38.2312'E	1937.5	Coring	940.0	0.0	940	38.0	22.19	58.4	7	RCB (7)
		K	33°18.0063'N	136°38.2103'E	1937.5	Coring	286.5	0.0	286.5	86.5	60.29	69.7	11	HPCS (2), EPCS (4), ESCS (5)
		L	33°17.9970'N	136°38.2200'E	1937.5	Coring	505.0	0.0	505	228.0	186.4	81.8	24	ESCS (24)
	C0021	A	33°10.0482'N	136°39.4854'E	2940.5	LWD/MWD	294.5	0.0	294.5	--	--	--	--	LWD (GVR)-MWD-APWD(ARC)
		B	33°10.0555'N	136°39.8610'E	2944.0	Coring	194.5	0.0	194.5	120.4	110.5	91.8	14	HPCS (12), ESCS (2)
	C0022	A	33º13.0680'N	136º43.4540'E	2675.5	LWD/MWD	420.5	0.0	420.5	--	--	--	--	LWD (GVR)-MWD-APWD(ARC)
		B	33º13.0833'N	136º43.4667'E	2674.0	Coring	419.5	0.0	419.5	340.5	305.51	89.7	41	HPCS (7), ESCS (3), EPCS (31)
	C0012	H	32°44.8783'N	136°55.0351'E	3509.5	LWD/MWD	710.0	0.0	710	--	--	--	--	LWD (GVR-sonic)-MWD-APWD(ARC)
	C0018	B	33°09.4319'N	136°40.8826'E	3084.5	LWD/MWD	349.9	0.0	349.9	--	--	--	--	LWD (GVR)-MWD-APWD(ARC)

	Exp	Source	Category	Recommendation/Comment
1	314, 315, 316	ORTF	Planning	The Operations Review Task Force recommends that for future Chikyu expeditions like NanTroSEIZE the specialty coordinators conduct formal onshore briefing/debriefing meetings. The length and typical agenda for these meetings should be specified in the specialty coordinator roles and responsibility document.
2	314, 315, 316	ORTF	Planning	The Operations Review Task Force recommends that the CDEX operations teams identify and familiarize themselves with similar operational scenarios experienced in previous DSDP/ODP/IODP operations, making use of lessons learned from both past successes and failures.
3	319, 322	ORTF	Planning	ORTF recommends that CDEX communicate with other IOs to share their knowledge and experience. Routing: CDEX, IODP-MI, IOs (IO meeting) Backgound: Individual Implementing Organizations' experience/operation knowhow has not been shared well among them.
4	319, 322	ORTF	Planning	ORTF recommends that the ROP used in the expedition planning should reflect the result of IODP-MI's Coring Scoping Studies and record of Chikyu's ROP in preparation of drilling program. Routing: CDEX, MQJ, IODP-MI, EDP Background: CDEX ROP estimation for operation planning is very vague without supporting information/data.
5	331	ORTF	Planning	ORTF Exp 331 recommends that when drilling is likely to be very complex, a rigorous review system should be in place to ensure that the best tools are chosen from the range available. Routing: CDEX Background: Drilling operation on site C0016 at Expedition 331 were expected to be difficult because of hard rock coring under high temperature. Site C0016 was drilled with a conventional/industry hard rock coring system leased by Baker-Hughes Inteq (BHI) to CDEX for Expedition 331. CDEX contacted several drilling equipment companies to select suitable drilling tools for Site C0016 condition. However, the BHI coring system, which CDEX selected, recorded very poor performance at Site C0016. Firstly, the system does not support wireline-type coring and the entire drill string had to be tripped every time to recover core sample, which took much more time than IODP coring system. Secondly, the friction-type core catcher on the system had problems holding core samples under strong vibration on drill pipe caused by sea current when recovering core sample. As a result, Chikyu could recover only 2.1 m of material from 45 m of penetration (4.7% recovery) at Site C0016.
6	332, 333	ORTF	Planning	ORTF Exp.332/333 recommends CDEX review previous cementing operations to identify any areas requiring improvement and explore new solutions, including alternate vendors for cementing services. Routing: CDEX Background: There has been a history of cementing problems during cementing and hole completion operations ever since the beginning of NanTroSEIZE. However, CDEX has to make a better effort to address these issues. Especially, cement mud contamination prevent system (Dart Deployment System) has been failing by some service provider. CDEX has been discussing the issues with the service provider, but has not reach the conclusion/found the causes and solutions.
7	338	ORTF	Planning	ORTF encourages CDEX to communicate to Industry (especially oil & gas frontier exploration), and to seek collaborations and funds. Routing: CDEX, JAMSTEC, CIB Background: For new IODP, it is important for CDEX/JAMSTEC to make and clarify new Chikyu business and operation model.
8	338	ORTF	Planning	As part of riser operation contingency planning, ORTF suggests that termination of the expedition should be one of the contingencies. Routing: CDEX, JAMSTEC, CIB Background: In this expedition, due to damaging riser system at the early stage, the entire on-board party faced very long contingent time. And it was more than planned/prepared contingency options, if expedition were conducted time-orientated manner. Significant differences exist between a Chikyu riser drilling expedition and a JR riserless drilling expedition. CDEX needs to develop a new Chikyu riser drilling expedition style, such as target driven etc., and inform/educate science community about all the different aspects of the new riser drilling approach.
9	338	ORTF	Planning	ORTF encourages CDEX to build lessons learned from Expedition 338 operation into future risk assessment and operation procedures. Routing: CDEX, JAMSTEC Background: Chikyu operation efficiency and effectiveness have been improving during the last few years, but there are some opportunities to do more, especially operational risk assessment by using gained experiences.
10	338	ORTF	Planning	ORTF recommends CDEX to create/identify contingency planning communication flow and decision making flow to control/facilitate several inputs such as scientific demand and operation feasibilities from different groups. Routing: CDEX Background: These functions exist on Chikyu and in CDEX, yet need to be documented for consistent procedural implementations.
11	343	ORTF	Planning	The ORTF recommends that the new IODP consider ways to rapidly carry out expeditions that can provide important science results in response to high impact events. For fast implementation of such important projects, there needs to be intense planning and preparations by the IO, as well as flexibility in funding. Routing: Facility Government Boards, IOs Background: Planning and implementation of the first IODP rapid-response drilling project Expedition 343/343T was done in a record short amount of time. There was less than 16 months from the time the project was proposed to the sailing date of Chikyu. The many logistical and difficult technical issues were discussed and solved hence the scientific objects of the expedition were mostly successful. These unique scientific accomplishments can be attributed to the conscientious efforts of PIs, CDEX, Project Management Team (PMT), Lead Agency and IODP-MI. The value of rapid-response expeditions has been illustrated and will be further demonstrated by the outcomes of Expedition 343/343T.
12	343	ORTF	Planning	The ORTF recommends that the new IODP should develop proposal screening processes to identify high risk projects that require dedicated, integrated planning teams and frontend funding. Routing: Facility Government Boards, IOs Background: During the planning phase of Expedition 343/343T, several screening processes were conducted by the Detailed Planning Group (DPG), PMT and External Technical Advice Committee. The DPG for the JFAST project was formed by SPC in March 2011 to provide a scientific assessment of the project's viability, strategy, time period for a potential rapid response drilling and to develop a proposal. After the DPG, a JFAST proposal was submitted to and approved by SPC. IODP-MI then formed the JFAST PMT in September 2011 to plan and coordinate the project in collaboration with CDEX and the PIs, from the beginning preparations through operations to the end of expedition. During the proposal process and later planning periods of the DPG and PMT, several technical issues arose suggesting the drilling risks of Expedition 343/343T were too high to warrant continuation of the project. Many of the issues were related to the ultra-deep water drilling required, in which not only Chikyu, but most industry drilling platforms, did not have previous experience. To help CDEX evaluate these issues, a group of several external drilling experts (External Technical Advice Committee) was assembled by IODP-MI with the PMT to provide advice on risk mitigation, particularly for the higher risk aspects.

List of ORTF recommendations and summarized comments in Expedition Evaluation Form

	Exp	Source	Category	Recommendation/Comment
13	314, 315, 316	ORTF	Planning: lead time	In order to provide adequate time for medical examinations, The Operations Review Task Force recommends that CDEX provide relevant medical forms to participants when issuing expedition invitation letters.
14	319. 322	ORTF	Planning: lead time	ORTF recommends CDEX to consider a scheme to have at least one year lead time before Expedition for successful preparation and staffing. Routing: CDEX, PMOs Background: The staffing schedule was delayed significantly. There was very short time for “call for participation” and it caused the difficulty on “selection of science party”, due to uncertainty of JAMSTEC operation budget, and Japanese budgeting system/timeline.
15	331	ORTF	Planning: lead time	ORTF Exp 331 recommends that staffing, especially the selection of CCs and other critical scientists, should be completed at least 6-12 months before the expedition. Routing: CDEX Background: Expedition 331 had a very short lead-time (less than 6 months) in which to prepare everything for the expedition, due to uncertainty of JAMSTEC operation budget, and Japanese budgeting system/timeline. This very short preparation period made it difficult to find appropriate non-Japanese CC candidates and onboard scientists until very late in the preparation period. As a result, those selected scientists/CCs could not participate as fully as would have been wished in the expedition planning process.
16	332, 333	ORTF	Planning: lead time	ORTF Exp.332/333 recommends an increase in the amount of time between call for scientific staffing and the expedition start. Consider making available a document that describes future NanTroSEIZE plans including details regarding plans and goals of expeditions. Routing: NanTroSEIZE PMT, CDEX Background: Short staffing lead times continue to plague NanTroSEIZE and is impacting the ability of the project to maintain high-quality research and science products. The ORTF’s opinion is that the image of the project suffers as a result of cancellation/postponement of proposed expeditions, rushed staffing decisions, and unavailability of experienced scientific personnel making it difficult to recruit the most-desired scientists. ALL efforts need to be taken to increase the lead time between calls and cruise dates. To provide forewarning and guidance to the potential applicant pool it is recommended that the NanTroSEIZE Project Management Team (PMT) provide a short, publically-available document that describes the NanTroSEIZE long term plans (including brief summaries of previous expeditions and results) with potential scheduling, timing, scientific goals, and staffing needs, including expectations of the scientific party regarding the amount and nature of engineering versus scientific operations. The concept of a mini-prospectus provided in advance of the official call for applications is considered to be a good idea. In the light of short-lead times the community deserves to have some idea of what the plans are. The document should be considered a living document and will be updated as plans evolve.
17	338	ORTF	Planning: lead time	ORTF recognizes the dilemma of scientific staff planning and MEXT/JAMSTEC budget timing. ORTF recommends bringing the issue separation/decoupled budget process and expedition planning, especially the call for scientists to Chikyu IODP Board (CIB). And ORTF suggests possibly mentioning the issue at CHIKYU+10 Workshop. Routing: CDEX, JAMSTEC, CIB, MEXT Background: Short lead times on staffing continue to plague NanTroSEIZE expeditions and are impaction the ability of the project to maintain high-quality research and science products. It has been caused by MEXT and JAMSTEC budgeting system/ timeline, and deeply coupled budget decision and official announcement approval. All efforts need to be taken to increase the lead time between “call” and expedition starting date.
18	343	Eval	Planning: lead time	Science party found difficulty on medical check completion within one month.
19	314, 315, 316	ORTF	Staffing	The Operations Review Task Force recommends that CDEX develop (and supply to all shipboard participants) a detailed description of responsibilities of all positions on Chikyu. As part of this task, CDEX should specifically: examine the role of the Well Site Geologist and Technical Advisor in riser and riserless operations (in light of potential redundancy with shipboard scientific staff), examine the use of the Yeoperson to assist the EPM with administrative duties, provide cross-training with USIO EPMs to develop consistent approach for all IODP EPMs, provide 24/7 IT and ET support
20	314, 315, 316	ORTF	Staffing	The Operations Review Task Force recommends that the NanTroSEIZE Specialty Coordinators develop a more detailed document of their roles/responsibilities and determine the best mechanism(s) to explain this important role and its responsibilities clearly to the science party prior to each expedition.
21	314, 315, 316	ORTF	Staffing	The Operations Review Task Force recommends that IODP-MI bring forth the specific pre-cruise staffing issues discussed in the Expedition 314-316 ORTF Briefing Book to the March 2009 Program Member Office meeting.
22	319, 322	ORTF	Staffing	ORTF recommends that LSS (Logging Staff Scientist) and IT supporting stuff to be on Chikyu all through the Expedition period. Routing: CDEX Background: On several occasions, there was a shortage of LSS and IT support on board CHIKYU, mainly due to availability of accommodation.
23	338	Eval	Staffing	Science party recommended that full-time IT support staff should be onboard.
24	338	ORTF	Staffing	ORTF encourages using Lead EPM concept from start of planning to completion of expedition. Routing: CDEX Background: There were several problems that arose during pre-expedition, due to having multiple EPMs involved in the planning, such as staffing. Many things were delayed, asked Co-chiefs multiple times and/or caused miscommunications. Also during expedition, rotating EPMs led to some delays and confusion on writing reports.
25	332, 333	ORTF	Staffing: difficulty in assigning biostratigrapher	ORTF Exp.332/333 recommends CDEX to take special effort to find scientific experts for critical scientific needs of the expedition. When conventional scientific expertise is not available by normal staffing methods, CDEX need to consider alternate methods (e.g., for biostratigraphy, sailing grad students and taking advantage of electronic means of consulting by visual images with onshore experts, etc.). Routing: CDEX, IOs Background: There was difficulty in assigning biostratigraphers for IODP Expedition 333. None of the PMOs could send biostratigrapher nominees to CDEX, which then had to assign a shore-based biostratigrapher from IODP Expedition 322 to whom samples could be sent for analysis. This was new approach and the data became part of shipboard data. This biostratigrapher provided a preliminary assessment of Expedition 333 Site C0018 biostratigraphy during the expedition; however, those for Sites C0011 and C0012 were provided after the end of the expedition.
26	338	Eval	Staffing: difficulty in assigning biostratigrapher	Science party recommended that "age determination staff scientist" should be assigned.
27	314, 315, 316	ORTF	Communication: while planning	The Operations Review Task Force recommends that the CDEX pre-cruise planning process include a specific contingency site/operation identification discussion that incorporates input and feedback from the co-chief scientists, the CDEX Well Planning Group, the CDEX Science Planning Group and representatives from the PMT. Discussion points should include the identification of lead-time and logistical requirements for gear and/or personnel and a specific priority for the contingency operations.
28	314, 315, 316	ORTF	Communication: while planning	The Operations Review Task Force recommends that CDEX provide appropriate operations personnel at all PMT and pre-cruise meetings. In addition, the Task Force recommends that the Expedition Project Manager be tasked with ensuring that all proposed operational changes are communicated and discussed with the co-chief scientists.

	Exp	Source	Category	Recommendation/Comment
29	319, 322	ORTF	Communication: while planning	ORTF recommends that CDEX create an appropriate plan for contingency operation in collaboration with CCs in timely manner. It is also recommended that CDEX make necessary preparation of hardware, software, human resources and procedures (e.g. EPSP) for contingency operation. Routing: CDEX Background: During PMT and pre-expedition meeting, Co-chiefs, Chief Project Scientists, Specialty Coordinator and CDEX discussed and examined contingency plan in detail, however, there were a few occasions, the contingency plan could not be performed, due to lack of resources.
30	319, 322	ORTF	Communication: while planning	ORTF recommends that CDEX provide information and discuss with Science Party on important operations (e.g. Cementing) which effect any scientific measurement on Expedition. Routing: CDEX Background: Several operation results cause huge impacts on the science goals and results, such as cementing seal capability (formation pressure & stress measurement, future casing plan), cement bonding to formation (VSP, observatory sensor measurements), mud type & weight (coring). When CDEX needs to choose a plan from several operations options which may result in different results and cause different impacts on the science, Co-chief scientists and science party has to be informed and be asked their consultation, such as priority of science goals.
31	331	ORTF	Communication: while planning	ORTF Exp 331 recognizes that chain of command of Chikyu for time sensitive decisions need to be clarified and implemented. Routing: CDEX Background: During Expedition 331, CDEX found that one of the holes (INH-6B) to be drilled at Site C0017 had been erroneously omitted from Scientific Prospectus of Expedition 331 and assumed that the hole was not approved by the Environmental Protection and Safety Panel (EPSP). CDEX rapidly requested EPSP approval for drilling Hole INH-6B, but they had to wait to spud the hole until they received this response from EPSP. Therefore, Expedition 331 lost a few hours of rig time for this extra process. However, Hole INH-6B - although not in the final Scientific Prospectus - had been included in the Site C0017 safety package to EPSP and was already approved with other holes before the expedition. The error was due to miscommunication between the EPM and CDEX.
32	331	ORTF	Communication: while planning	Whenever possible, the use of the ROV should be utilized to meet the scientific objectives, and not be solely for use in drilling. ORTF Exp 331 recommends that the IO should make available to the scientific community, without a commitment or promise of use, a summary of the capabilities of the ROV. Routing: CDEX Background: Chikyu has an onboard deep sea ROV normally used for assistance in drilling operations. Its use during science operations was valuable on Expedition 331. Before the expedition, the CCs had no information regarding the ROV aboard Chikyu and were not informed about any ROV availability for scientific operations from CDEX. If the information were available in advance, better expedition planning would be possible, or at least considered to add/achieve some more scientific objectives.
33	338	ORTF	Communication: while planning	To avoid negative impact on science and perceived time losses during operation, ORTF recommends CDEX to discuss and evaluate new technologies with scientists and engineering expertise at the expedition planning stage. ORTF also suggests CDEX to coordinate such discussion and meetings through EPM and if necessary, PMT (Project Management Team). Routing: CDEX Background: CDEX introduced RWD (Reaming While Drilling) technology to save drilling operation time by running bit, LWD and under-reamer simultaneously. The result was marginal. RWD impact on cuttings observations and measurements were exceeding CDEX operators' evaluations/pre-study and unacceptable by Science Party. Also, the pre-study results were not informed to Co-Chiefs properly.
34	314, 315, 316	ORTF	Communication during expedition	The Operations Review Task Force recommends that CDEX, as part of standard HSE training, conduct a formal workshop prior to each expedition on communication issues associated with the interaction of different cultures.
35	314, 315, 316	ORTF	Communication during expedition	The Operations Review Task Force recommends that CDEX examine the delivery of medical services aboard Chikyu to ensure that this important safety/health function meets the needs of the scientific staff.
36	314, 315, 316	ORTF	Communication during expedition	Expedition 314 co-chief scientists found that the pre-cruise plan was quite accurate in predicting the hours spent in the hole on actual drilling, hole cleaning, etc., but was always too optimistic on the preparation for spud-in (which took many hours or days longer than planned or anticipated). As the expedition continued, the OSI and CDEX Yokohama did not always provide updated plans with new time estimates based on actual experience gained during Expedition 314. As a result the co-chiefs spent a lot of time generating more accurate time estimates in order to determine remaining time for operations (and contingencies). Clearly, the key shipboard team (OSI and drilling engineer, OIM, Captain, co-chief scientists) should all be involved in the development of realistic time estimates, and these estimates should be continuously updated on board. In fact, this is what happened on subsequent expeditions (315 and 316) and is good example of "lessons learned" and applied in a timely fashion. The Operations Review Task Force recommends that all future Chikyu expeditions continue to use the shipboard "Executive Committee" model (including CCs, OSI, OIM, Captain, and EPM) as a routine daily forum to address operational, scientific and other issues.
37	319, 322	ORTF	Communication during expedition	ORTF recommends that CDEX maintain excellent performance of onboard Executive Committee which was used during these two Expeditions. Routing: CDEX Background: Such communications worked very well during Stage 1 and again during Stage 2.
38	331	ORTF	Communication during expedition	ORTF Exp 331 recognizes that CDEX needs to issue clarification of protocols and procedures and to shipboard and shore-based decisions. Routing: CDEX Background: Overall decision making on Chikyu during Expedition 331 functioned quite well. However, some critical communication errors and opaque operation protocols and procedures of CDEX critically affected some operational decisions and its operation results.
39	331	ORTF	Communication during expedition	ORTF Exp 331 recognizes that critical decisions should be made by consensus of the executive committee, which consists of CCs, OIM, OSI, and EPM. When shore-based input is required, the communication should go through this committee. Routing: CDEX Background: During Expedition 331, CDEX had held daily executive committee meetings, which included CCs, OIM, OSI, and EPM to discuss and decide the daily operation plan. However, some of the important decisions at the executive committee were overruled by onboard operation people without any consultation with CCs and EPM. For example, once the committee decided to use the hydrolift-type core catcher on BHI tools in Site C0016 after experiencing low recovery problems with using the friction-type core catcher, the decision was later overruled by onboard operation staff because the high temperatures from hydrothermal fluids could cause serious damage to the hydrolift-type core catcher seals. This important change was not related to, or discussed with the CCs and EPM, and resulted in continued poor core recovery. However, before making any decision the committee needs to have all the facts to make a decision. In this case, there was no guarantee that the hydrolift-type core catcher would work. The operational constraints, particularly with regard to heat, should have been made available to the committee. Then the committee would have been able to make an informed decision on whether the hydrolift-type core catcher should have been used. And the decision would have to be accepted by all parties.

	Exp	Source	Category	Recommendation/Comment
40	337	Eval	Communication during expedition	Science party recommended that opportunities to have casual recreation/chatting with ship crew and lab techs should be provided.
41	338	ORTF	Communication during expedition	ORTF recommends continuous effort to develop informal as well as formal communication paths on Chikyu, and encourages exchange of information between scientists and technical personnel, including drillers and service companies. Routing: CDEX Background: CDEX developed and has been improving formal communication paths on board among, Science Party (Co-chiefs), CDEX (OSI, EPM), and MQJ (OIM), such as the EXCOM "executive committee". However, on board researchers are still feeling some barriers to make informal information exchange to drilling operators. But also there are some concerns confusing/blurring command lines by informal communications. Need to clarify command lines, and differentiate commands and information exchanges clearly.
42	343	Eval	Communication during expedition	Science party recommended that lab techs should improve their English skill more.
43	337	Eval	Communication during expedition	Science party recommended that lab techs should improve their English skill more.
44	338	Eval	Communication during expedition	Science party recommended that lab techs should improve their English skill more.
45	319, 322	ORTF	Communication among scientists	ORTF recommends that CCs (supported by EPM and SCs) define task of each Science Party members prior to Expedition and make necessary modification during Expedition. Routing: CDEX Background: The same as Recommendation 319/322-03 background, such a long, complicated expedition will require clear tasks and work-sharing plan, prior to expedition start and timely update, during expedition.
46	338	Eval	Communication among scientists	Science party found difficulties on finalizing of report writing because they were separated into the former and later groups even though they had one-week crossover period.
47	314, 315, 316	ORTF	Communication: among scientists for multi-expedition	The Operations Review Task Force recommends that the specialty coordinators utilize their role and responsibility document to design a consistent model to educate the expedition participants to the data sharing responsibilities incumbent upon all in multi-expedition single-science party programs. In addition, the Task Force recommends that the co-chief scientists and EPM explicitly remind the shipboard participants (several times during an expedition) of their data sharing responsibilities.
48	319, 322	ORTF	Communication: among scientists for multi-expedition	ORTF recommends a pre-expedition meeting with all the science parties in attendance during pre-Expedition. ORTF also recommends longer crossover of science parties on board during Expedition with support of SC for better transition. (need discussion with PMOs) Routing: CDEX, PMOs Background: Especially Exp.319, it was very first time in IODP, expedition period became over 100days, and it required four Co-Chiefs and divided science party worked different period of expedition. Such long, complicated expedition will require solid crossover to make its success.
49	332, 333	ORTF	Communication: among scientists for multi-expedition	ORTF Exp.332/333 recommends that greater efforts be made in the development, documentation, and enforcement of standard operating procedures for and between the specialty coordinators, co-chiefs, science party, and expedition project managers. Routing: CDEX Background: The ORTF applauds the specialty coordinator system and the efforts of the team members. This team provides the overall guidance and structure that enables disparate science parties and expeditions to reach the overarching goals of the NanTroSEIZE project. As more expeditions are undertaken, this role becomes increasingly important and more difficult to manage. It is recommended that a standard operating procedure regarding the proper and timely communication of science parties with the specialty coordinators (as administered by the co-chiefs and expedition projects manager) be developed. All efforts should be made by the specialty coordinators in attending the pre-cruise briefing (maybe even by videoconference if possible) to help describe expedition expectations and communication procedures.
50	314, 315, 316	ORTF	Operation	The Operations Review Task Force recommends that JAMSTEC/CDEX meet with the new drilling contractor (MantleQuest) to discuss alternate dynamic positioning practices taking into account the basic types of scientific drilling, including: riser drilling in regions of possible overpressured hydrocarbons, shallow water; riser drilling in regions of possible overpressured hydrocarbons, deep water; riser drilling in geologic regions with no pressured hydrocarbons; riserless, open hole drilling. For the first category the existing beacon type and usage is expected/reasonable. For the other three categories, it would benefit all parties to examine alternate vessel positioning procedures and equipment including: GPS only; GPS with backup; low cost, disposable seafloor beacons launched from the ship.
51	314, 315, 316	ORTF	Operation	The Operations Review Task Force recommends that each operator develop a monitoring procedure to document coring issues, especially those associated with abnormalities in the coring process (e.g., incomplete stroke) and the extraction process (e.g., twisting of liner to remove it from core barrel).
52	314, 315, 316	ORTF	Operation	JAMSTEC/CDEX should meet with the new drilling contractor (Mantle Quest) to discuss the possibility of adding core techs to the Mantle Quest crew. These personnel should be repeatedly assigned to coring expeditions for the benefit of long-term continuity and operational/science optimization. The following possibilities and benefits should be thoroughly examined: Core techs (2 people to cover 24 hr operations if necessary) assigned to each expedition, Core techs as MQJ employees, Core techs who maintain coring tool inventory, including ordering and maintenance, Core techs with driller rank and training so that they can relieve drillers during meal hours, etc., Core techs whose role will naturally create a better rig floor to science party communication path about drilling and coring parameters and hole conditions for the benefit of scientific decisions and results, Core techs also trained as casing crews sufficient to eliminate the need of hiring casing crew subcontractors, similar to JR model, Core techs also trained as severing system operators, sufficient to implement pipe severing procedures, after explosives are brought out to the ship in an emergency situation, similar to JR model.
53	332, 333	ORTF	Operation	ORTF recommends that every effort be made to expand the Core Tech's role in every aspect of scientific drilling operations, including planning, plus hands-on experience with coring tools and drilling/coring operations If feasible, it would be beneficial to arrange participation in JOIDES Resolution expeditions to learn from the drillers and Core Techs on the JOIDES Resolution. Routing: CDEX Commentary: This learning and growing process will provide the Core Techs with invaluable experience as well as lead to their becoming invaluable in helping to plan and execute future scientific drilling, coring and logging operations. This added expertise will better prepare them for dealing with the normal difficulties found in this type of deep sea operations, including such things as: Optimum bit selection for various scientific target lithologies, Definition of piston corer refusal depths and when to switch to alternate coring methods, When to plan holes as single bit attempts vs re-entry or multi-hole options, How to handle difficult core liner extractions on deck, and when core liner failures can be considered relatively normal vs abnormal, Understanding and communicating when poor core recovery is more likely to be caused by formation difficulties vs improperly functioning coring tools, Helping with general time estimating for coring operations in the planning stages There is really no substitute for hands-on, practical experience in these areas amongst experienced personnel onboard Chikyu.

	Exp	Source	Category	Recommendation/Comment
54	314, 315, 316	ORTF	Operation	Vortex-Induced Vibration (VIV) Problems – Chikyu Drill string and Riser Operating in Kuroshio Current, Nankai Trough
55	331	ORTF	Operation	ORTF Exp 331 recommends that the availability of, or research on, downhole temperature measurement instrumentation should be periodically reviewed (including temperature above 100 °C). Temperature sensitive strips should be provided as standard equipment on every drilling expedition, but not as a general replacement for the APCT-3. This information also needs to be shared with the other IO's. Routing: CDEX Background: Frequent downhole temperature measurement was required for monitoring hydrothermal activity on drilling depth at Expedition 331. At the beginning of the expedition, temperature measurements were only available via the APCT-3 tool during coring operations. The APCT-3 can only measure temperatures up to 55 °C due to electrical component specifications. This 55 °C limitation was too limited a range for use in Expedition 331, where the formation temperatures were often greater than 150 °C. Conveniently, one CC brought Temperature Sensitive Strips, which are capable of a very wide range of temperature measurements. This strip is impregnated with plastic beads with different sets of melting temperatures in its surface and can be easily affixed on to the surface of core liners. This strip provided very useful downhole temperature measurement data during the expedition.
56	332, 333	ORTF	Operation	ORTF Exp.332/333 recommends that CDEX and Chikyu personnel re-consider the option of establishing hydrophones and DP software on Chikyu to allow station keeping to be done with rapidly deployable, expendable seafloor beacons at sites not intended for riser operations. Routing: CDEX Background: The present method of carefully establishing multi-transponder arrays on the seafloor using expensive transponders that then must be recovered using valuable Chikyu ship time is understood to be necessary and prudent for riser holes. However, for non-riser scientific drilling and coring operations in open holes the present method is overkill, expensive and excessively time consuming. The method for vessel positioning using expendable, less expensive seafloor beacons that can be free fall dropped from the ship is standard procedure onboard JOIDES Resolution and has a long-established record of success and time efficiency when conducting non-riser drilling operations. Chikyu could adapt to this method as an alternative when drilling at sites where the riser will not be deployed. Also, it is important to note that the requirements for dynamic positioning accuracy are less stringent for open hole drilling (compared with riser operations) where there are codified guidelines for acceptable vessel offset describing allowable upper and lower flex joint angles.
57	343	Eval	Operation	Science party disappointed LWD tool failure.
58	314, 315, 316	ORTF	Operation: core quality	Cores sampled by ESCS showed severe "biscuting." No specific cause (and hence no solution) arose during the Exp314-316 ORTF. The Extended Coring System on the JOIDES Resolution frequently experiences these biscuiting problems and the Task Force recognized that this tool needs improvement as part of a long-range technical plan by IODP. In addition, the Task Force recognized that the quality and quantity of core recovery of any of the tools is very dependent on Core Tech experience. Thus, the Task Force reiterated, that a first step toward addressing these coring issues is to maintain an experienced Core Tech crew.
59	319, 322	ORTF	Operation: core quality	ORTF recommends that CDEX improve coring technology (e.g. AHC) and train drilling technicians for better core quality and recovery. Routing: CDEX, MQJ Background: Core quality and recovery were still not enough, especially in riserless drilling. More efforts must be given.
60	337	Eval	Operation: core quality	Science party found core quality was good enough for geology but contamination by drilling induced mud was serious for microbiology.
61	338	Eval	Operation: core quality	Science party found core quality sampled by ESCS was very low due to "biscuitized."
62	343	ORTF	Operation: core quality	The ORTF recommends that IOs should technically collaborate in a joint effort to improve core recovery in both riser-less and riser applications. Routing: IOs, Facility Government Boards, Background: Expedition 343 cored 137 m at Site C0019 and recovered 53.6 m of cores (Total core recovery was 39.2%). Co-Chiefs and CDEX reported that coring during Expedition 343 was quite successful with good recovery rates for the upper portion of the borehole in the sediments of the sedimentary prism. They also reported that the attempted recovery of the very fragile and important cores from the fault zone seemed to succeed by using a series of extremely short coring runs (3 m). However, the external reviewers pointed out that 39.2% core recovery rate for the Expedition 343 should not be considered sufficient or acceptable for scientific drilling, and that IOs need more cooperative work and discussions on methods to improve core recovery rates, especially for riser-less drilling.
63	314, 315, 316	ORTF	Lab	Operations Review Task Force recommends that IODP-MI compile the laboratory issues identified in the Briefing Book and meeting discussion and task CDEX to provide a formal response to IODP-MI (via the Scientific Technology Panel) as to how they will address these issues with respect to the upcoming FY09 NanTroSEIZE expeditions and beyond.
64	314, 315, 316	ORTF	Lab	Operations Review Task Force recommends that the USIO and CDEX fully support the efforts of the small VCD working group to develop a primer for VCD data entry, migration, editing, and publication.
65	314, 315, 316	ORTF	Lab	The Operations Review Task Force recommends that CDEX develop on-line tutorials and/or manuals for each piece of equipment/software operated by scientists. In addition, CDEX may need to address, on a case-by-case basis, the need to bring in scientists to CDEX or other appropriate venues for additional training.
66	338	ORTF	Lab	ORTF recommends CDEX to continue lab technicians'training and up-date and expand lab facilities based on scientific demand. Routing: CDEX, JAMSTEC, CIB Background: Thin section preparation during this expedition was limited to five sections per day, which often became a limiting factor for sedimentologists and structure geologists to properly describe the formation. Unless solved, this problem will become more apparent in deeper drilling and/or hardrock expeditions.
67	343	Eval	Lab	Science party recommended that lab techs should learn more about measurement principle.
68	314, 315, 316	ORTF	Lab: J-CORES	The Operations Review Task Force recommends that IODP-MI provide a summary report to the Task Force describing what current (and future) programming efforts will be utilized to address the myriad of J-CORES issues described in the Briefing Book reports. If the current (or future) efforts will not address the major issues described in the reports (the most pressing being the ability to make data type/interval queries), the Task Force requests information from IODP-MI/CDEX as to how they will address these issues for upcoming Chikyu expeditions.
69	319, 322	ORTF	Lab: J-CORES	ORTF recommends that J-CORES have third-party evaluation (e.g. STP) for better future operation. Routing: CDEX, IODP-MI, STP, SPC Background: There were still several issues, related to J-CORES data entry as well as extract, although CDEX worked hard to modify/up-grade the system. ORTF has serious concern on the current situation and future development.
70	337	Eval	Lab: J-CORES	Science party found difficulties on J-CORES handling especially VCD registration.

	Exp	Source	Category	Recommendation/Comment
71	338	Eval	Lab: J-CORES	Science party recommended that J-CORES should have appropriate interface, function and database for cuttings and mud water/gas.
72	338	Eval	Lab: J-CORES	Science party recommended that J-CORES should be improved especially for VCD.
73	343	Eval	Lab: J-CORES	Science party found difficulties on J-CORES handling especially VCD registration.
74	331	ORTF	Lab: management	ORTF Exp 331 recommends that sufficient time needs to be scheduled for training scientists in the use of lab facilities. This can be a combination of port call and transit time. Routing: CDEX Background: Many of the scientists at Expedition 331 were new to an IODP expedition and they were lacking in experience on onboard measurement tools, standard measurements, sample requesting, IODP obligations and cruise reports. However, training in those items to scientists was not implemented in an effective and efficient manner by CDEX during the five days port call and one day transit. This insufficient training allowed for some confusions, delay on measurement and unnecessarily rushed work in the latter part of the expedition.
75	331	ORTF	Lab: management	While scientific measurements generally follow set protocols, provisions should be made for special scientific requirements or unforeseen scenarios. In this case, ORTF Exp 331 recommends that the decision of the CCs and EPM is the final word, and changes must be documented in writing. Routing: CDEX, MWJ Background: Expedition 331 had some problems with calibration and standardization on sample analysis in the various lab-equipment. Scientists found that the technicians on Chikyu were simply following a set of standard protocols from the instructions in the manuals, which did not provide useful measurement calibration for Exp 331. Technicians did not follow instructions from the CCs and EPM to use different calibrations, ones more appropriate for Exp 331. This miscommunication regarding calibration instruction resulted in some meaningless measurements in the early part of the expedition, but the situation was later resolved.
76	331	ORTF	Lab: management	ORTF Exp 331 recommends that time and temperature sensitive sampling on the catwalk should be allowed to be undertaken by scientists (e.g., high H2S levels), provided that they had approval from the ships Chief Safety Officer (CSO). Routing: CDEX Background: There was difficulty on handling core samples collected from the hydrothermal area at Expedition 331 because many of core samples contained H2S gas. The H2S gas measurement was conducted on most of the core samples for safety reason by Chikyu technicians immediately after the core sample arrived at the core deck. However, this process took too long. In some cases, scientist received core samples for first measurement six hours after the core sample had arrived on the core deck. Because Chikyu H2S safety regulations typically prevent scientists from performing time- and temperature-sensitive sampling on the core deck, H2S safety officers on Chikyu had trained some scientists to be able to work on core samples including H2S gas for their measurement. However, this information was not shared with all relevant personnel, so that the scientists were unfortunately denied access to the core deck and catwalk.
77	332, 333	ORTF	Lab: management	ORTF Exp.332/333 recommends considering a more flexible arrangement of lab technicians prior to the expedition start, according to staffing of onboard scientists and requests from Co-Chiefs and EPM. Routing: CDEX Background: The present arrangement of onboard technician on Chikyu is well established but not very flexible. For example, interpretation of X-CT images should be done by the scientists. On the other hand, the technicians could perform some of the routine sampling procedures. Furthermore, IT-related support is essential for onboard data processing. Therefore, a flexible and adequate assignment of lab technicians is important for the success of expeditions. According to requests from the Co-Chiefs and EPM, the arrangement of the onboard technicians should be changed adequately to obtain better scientific results.
78	338	Eval	Lab: management	Science party recommended Lab Measurement Manuals should be reviewed and updated more frequently.
79	338	Eval	Lab: management	Science party recommended that full-time LSS should be onboard though the expedition.
80	338	Eval	Lab: management	Science party recommended that logging software handling training/manuals should be improved.
81	343	Eval	Lab: management	Science party recommended that hard rock core flow should be improved.
82	343	Eval	Lab: management	Science party recommended Lab Measurement Manuals should be reviewed and updated more frequently.
83	337	Eval	Facility: Drilling monitor	Science party recommended that real-time drilling monitors should be installed in Lab Area.
84	338	Eval	Facility: Drilling monitor	Science party recommended that real-time drilling monitors should be installed in Lab Area.
85	331	ORTF	Facility: core liner	ORTF Exp 331 recommends that for high temperature coring operations, plastic core liners should not be used. Aluminum, Fiberglass, Steel or other appropriate material should be used instead. Routing: CDEX Background: At the beginning of drilling and coring operations on Expedition 331, HPCS, EPCS and ESCS, regular plastic core liners were used. Immediately on penetrating beyond several meters below the seafloor, greater than 150 °C hydrothermal fluids were discovered, catastrophically melting the plastic core liners. In the latter half of the expedition, the plastic core liners were replaced with aluminum ones by CDEX. These were very effective in the high temperature environment. External reviewers recognized that CDEX still needs more research to introduce new materials for future expeditions.
86	314, 315, 316	ORTF	Facility: Internet	The Operations Task Force recommends that CDEX/MEXT lobby the appropriate Japanese agencies to either work for change in the telecom restriction or obtain a waiver to operate at standards expected by the international scientific community.
87	319, 322	ORTF	Facility: Internet	ORTF strongly recommends that CDEX/JAMSTEC/MEXT enter discussion with Japanese government concerning permission to use reasonable-cost High-Speed Internet connection on Chikyu for better communication to on-shore side. Routing: CDEX, JAMSTEC Background: Japanese Government does not allow V-sat (high speed cheap satellite network) in Japan EEZ.
88	337	Eval	Facility: Internet	Science party recommended that internet speed should be improved.
89	338	ORTF	Facility: Internet	ORTF encourages CDEX/JAMSTEC and MEXT making further application to Ministry of Internal Affairs and Communications (MIC) to obtain permits/exemption for higher speed ship to shore communication for Chikyu. Routing: CDEX, JAMSTEC, CIB, MEXT Background: The current Chikyu broadband internet connection is not acceptable for international science projects/operations. And by Japanese law, Japanese Government (MIC) does not allow V-sat (high speed reasonable-cost satellite network) in Japan EEZ. It is necessary for CDEX/JAMSTEC and MEXT either to work for change in the telecom restriction or to obtain a waiver to operate by V-sat with Japanese scientific ocean drilling community help.
90	343	Eval	Facility: Internet	Science party recommended that internet speed should be improved.

	Exp	Source	Category	Recommendation/Comment
91	331	ORTF	Facility: Lab	ORTF Exp 331 recommends that additional -80 °C freezer capacity should be supplied onboard Chikyu. Routing: CDEX Background: During Expedition 331, scientists suffered a delay in the processing of microbiological samples because of limited capacity of -80 °C freezer space in the laboratory area. Chikyu has several freezers for freezing, processing and storing samples, but some of those were not fully used during the expedition because the temperature settings were different from that required for the processing. External Reviewer and CCs pointed out that those freezers on Chikyu may be able to change their temperature setting and may provide more flexibility/capacity on the sample storage for microbial research on future expedition.
92	337	Eval	Facility: Lab	Science party recommended that tools/facilities in Microbiology Lab should be improved.
93	338	Eval	Facility: Lab	Science party found poor collection of reference books.
94	338	ORTF	Facility: mud pump	New technology and deeper drilling/coring do require greater drilling mud pump capacity. ORTF suggests that consideration should be give to installing additional drilling mud pump capacity on Chikyu, which will also serve as back up to existing pump operations. Routing: CDEX, JAMSTEC, CIB Background: Newly introduced technology: RWD (Reaming While Drilling) required high flow-rate & pressure on mud pumps, and needed to use all three pumps on Chikyu. Therefore, if a pump failed, the operation had to be stopped. And there is a space for fourth mud pump on Chikyu.
95	338	ORTF	Facility: noise issue	ORTF recommends CDEX to address the accommodation and laboratory ventilation system issues immediately. Routing: CDEX, JAMSTEC Background: Ventilating fans and ducts in accommodation and laboratory had been often loud, interfering with conversations and sleeping. It was also noted that the fans (ventilation system whole) were very dusty. By inquiring to Ship operator, there is no regular maintenance and cleaning plan for the system. This is very high/serious health risk and may cause total operation shutdown.
96	338	Eval	Facility: noise issue	Science party found too noisy to work/stay at Lab Conference Room and Lab Lounge.
97	343	Eval	Facility: noise issue	Science party found too noisy to work/stay at Lab Conference Room and Lab Lounge.
98	332, 333	ORTF	Facility: Underwater TV	ORTF Exp.332/333 recommends that the Vibration-Isolated Television (VIT) frame be reconfigured back to original design with BUNGIE CORDS holding the inner up-down funnel to the outer frame. Routing: CDEX Commentary: This is an oilfield design predating ODP. It has proven successful in isolating the underwater TV camera and lights from damaging shocks while the frame is lowered down the outside of the drill string, as well as allowing the funnel-tube to bump its way over the hundreds of tool joints without hanging up. At present the steel cables that have been installed in place of the BUNGIE CORDS are causing unnecessary deployment and retrieval problems.
99	338	Eval	Facility: Underwater TV	Science party disappointed that contingency plan was limited due to no UWTV available.
100	319, 322	ORTF	Others	ORTF recommends that CDEX experimentally learn operation of tools in high current area to prevent any incident and operational troubles. Routing: CDEX, MQJ Background: Permanent observatory deployment dummy test/run was performed. The dummy run provided lots of valuable information to CDEX and MQJ. ORTF encourage CDEX/MQJ to conduct such technical/engineering tests.
101	319, 322	ORTF	Others	ORTF recommends that CDEX establish regular maintenance plan for reduction of mechanical down time. Routing: CDEX, MQJ Background: The CHIKYU equipment/hardware down time is still high compared to industry and IODP average. The down time caused difficulty to achieve science goals and complete plan.
102	319, 322	ORTF	Others	ORTF recommends that CDEX improve protocols for wireline logging during riserless operation on Chikyu. Routing: CDEX, MQJ Background: Poor (or no) logs have been collected during riserless wireline operations on Chikyu.
103	319, 322	ORTF	Others	ORTF recommends that IODP-MI hold ORTF meetings for NanTroSEIZE far enough in advance of the next phase of NanTroSEIZE drilling so that recommendations can actually be implemented in time to improve operations. Routing: IODP-MI Background: This ORTF occurred after NanTroSEIZE stage 3 started and, thus, was not able to have much influence on stage 3 operations.
104	319, 322	ORTF	Others	ORTF recommends that IODP-MI assign Specialty Coordinators to study how to better utilize cuttings for science and the result/report will be examined by STP to be an IODP guideline and apply to the future riser operation. Routing: IODP-MI, Specialty Coordinators (PMT), STP Background: The first riser cuttings scientific measurement and analysis had been performed during Exp.319 and after the expedition. However, there is no consolidated (include all science areas) report has been planned. The data and report will be very important for future riser operation.
105	331	ORTF	Others	ORTF Exp 331 recommends the remaining objectives of IODP Proposal 601, which have been approved by SAS, should be addressed by a future expedition. Routing: CCs, SAS, IODP-MI Background: There were 11 drilling sites in the original proposal (IODP Proposal 601). Only five sites during Expedition 331 could be occupied because the total operation was reduced to 34 days and they had to reduce the number of target sites to fit into this schedule. As a result, Expedition 331 could only achieve part of the scientific targets in the proposal. The part carried out achieved great success. However, after the expedition, SPC deactivated the proposal and the opportunity of revisiting the area to complete the remaining scientific objectives of the proposal has disappeared in the current program. The CC/Proposal PI is willing to submit a new proposal to the new IODP to complete remaining scientific objectives. The results from Expedition 331 will be used to demonstrate the importance of completing the original proposal.
106	338	ORTF	Others	Good publicity helps whole new Chikyu/IODP program, ORTF encourages CDEX to develop and maintain up-to-date website (information provider), and to conduct several different types of outreach, such as for science, operation, engineering. And it may include to oil & gas industry journals. Routing: CDEX, JAMSTEC, CIB Background: CDEX used to maintain very good real-time Chikyu operation website. Its importance should not be undervalued.
107	338	ORTF	Others	ORTF believes that PMT concept is valuable, should be continued in new program. Routing: CDEX, JAMSTEC, CIB Background: The projects that required long duration (multiple science parties) and/or multiple expeditions (stage approach) needed to have a project oversight function. The current NanTroSEIZE PMT is suited and functioned well.

	Exp	Source	Category	Recommendation/Comment
108	331	ORTF	Publication	It is the responsibility of the CCs and the EPM to finish the preliminary report ideally before disbandment. ORTF Exp 331 recommends that where this is not possible, it should be submitted no later than 1 month after the expedition. Routing: CDEX Background: It is standard procedure for every IODP expedition that all shipboard scientists are required to submit their sections of the Preliminary & Expedition Reports to the CCs and EPM/PA before disembarking. Usually scientists complete their report during transit to port at the end of each expedition. However, in the case of Expedition 331, scientists only had a day or less of transit to port. Better attention needs to be made on getting these report completed on time and adhering to the IODP publishing schedule.
109	314, 315, 316	ORTF	Publication	The Operations Review Task Force recommends that IODP-MI form a small ad hoc task force to review and address the specific issues identified in the Expedition 314-16 operations review and modify the CDEX/TAMU publication process accordingly. Because the Task Force heard of numerous issues related to the timing and involvement level of specialty coordinators in the process, the level of initial shipboard editing, the coordination and consistency of prospectus content between expeditions, the timing of prospectus development, access to draft reports, the timing of synthesis papers, understanding of timetables/deadlines, and migration of VCD data from J-CORES to Strater. In general, although the whole publication process worked well, there are numerous areas that need improvement. The Task Force members believe that the best mechanism to address the issues would be to have an Ad Hoc Task Force review the CDEX publication process in detail and work with CDEX/TAMU to make modifications where necessary.
110	319, 322	ORTF	Publication	ORTF recommends that IODP-MI assign appropriate persons (e.g. STP member) as external reviewers for future ORTF meetings considering the Expedition reports. Routing: IODP-MI, STP, EDP.
111	314, 315, 316	ORTF	Safety	The Operations Review Task Force recommends the CDEX address the specific safety equipment issues identified in the Briefing Book.
112	337	Eval	Safety	Science party recommended that lab safety training should be improved more.
113	338	ORTF	Safety	ORTF strongly recommends CDEX to conduct regular specific safety training in each laboratory and to emphasize importance of immediate incident reporting to lab technicians and scientists. Routing: CDEX Background: There was a safety incident in the geochemical lab that was potentially serious, fortunately nobody was injured. Investigation of the event by EPM identified multiple breakdowns in communication and protocol related to equipment operations and the incident reporting.
114	338	Eval	Ship life	Vegetarians felt strange why all meals included meats unless asked special meal for vegetarian.
115	343	Eval	Ship life	Vegetarians felt strange why all meals included meats unless asked special meal for vegetarian.
116	319, 322	ORTF	SMCS	ORTF recommends that IODP-MI re-consider procedures for sample requests. Routing: IODP-MI, CDEX Background: Core sample request system (SMCS: Sample Material Curation System) software/hardware had not performed well, caused lots of excess work for SAC (Sample Allocation Committee).
117	343	Eval	SMCS	Science party found difficulty on SMCS handling.
118	331	ORTF	Acknowledgement: High core recovery	ORTF Exp 331 acknowledges CDEX for the high core recovery rate (77%) - the best ever recorded on active subseafloor hydrothermal areas drilling in DSDP/ODP/IODP history.
119	331	ORTF	Acknowledgement: High quality staffing and operational preparations	ORTF Exp 331 acknowledges CCs and CDEX who successfully conducted high quality Science Party staffing and operational preparations (e.g., core flow schemes) despite the short lead-time. CCs acknowledge/admire ship-board personnel, including especially, Operations Superintendent (Ikuo Sawada, Tomokazu Saruhashi), EPM (Simon H.H. Nielsen), Curator (Satoshi Hirano), Laboratory Officer (Hiroaki Muraki) and Dynamic Positioning Systems Operators for their outstanding work.
120	331	ORTF	Acknowledgement: Wellhead completion	ORTF Exp 331 acknowledges CDEX for successful wellhead completion in extreme conditions at Sites C0013, C0014, and C0016 with using heavy triangular, gimbaled guide bases to allow reentry for deepening the holes and for post drilling operations, including casing and specially designed corrosion capping. This wellhead corrosion cap makes it possible for future scientists to retrieve indigenous subseafloor fluids and microbes at the seafloor through these cased holes using an ROV.
121	332, 333	ORTF	Acknowledgement: VIV control	ORTF Exp.332/333 acknowledges CDEX for its innovative means of controlling VIV by attaching ropes to the drill string in the area of high currents. This is a prime example of technology that can be transferred to the USIO to improve IODP operations overall.
122	332, 333	ORTF	Acknowledgement: Observatory installation	ORTF Exp.332/333 acknowledges CDEX for the first successful recovery and deployment of the temporary observatories (i.e. the SMART and GENIUS plugs) during Expedition 332, providing a means for the successful recovery of important borehole data for the science community.
123	332, 333	ORTF	Acknowledgement: LTBMS installation	ORTF Exp.332/333 acknowledges CDEX for the successful deployment of the LTBMS during Expedition 332. The LTBMS was a very complex undertaking, which was carried out smoothly with all indications that the instruments are working properly. Once connected to the DONET network, the LTBMS will provide the science community with valuable borehole data for years to come. A job well done.
124	343	ORTF	Acknowledgement: Successful expedition	Despite some operational difficulties, Expeditions 343/343T achieved notable success in a high-profile project at record setting depths, including collection of logs and cores and installation of a temperature-monitoring observatory across the plate boundary fault at the site of the large shallow slip of March 2011, Tohoku earthquake. This required a dedicated and intense planning effort on a tight schedule involving scientists and CDEX with strong support from funding agencies, and the ORTF commends all involved.

Agenda Item 9

Chikyu Budgetary Overview

- Summary of Previous Expeditions
- Budgetary Guidance of JFY2014

Agenda Item 10

Outline of Ship Schedule for JFY2014 and 2015

- NanTroSEIZE Planning Update

Agenda Item 11

Chikyu +10 Workshop report

CHIKYU+10 International Workshop Report in EOS

MEETINGS

Determining Scientific Projects for the Deep-Sea Drilling Vessel *Chikyu*

Chikyu+10 International Workshop; Tokyo, Japan, 21–23 April 2013

PAGE 256

An international, multidisciplinary community workshop convened to define scientific projects for the next decade of scientific ocean drilling utilizing unique capabilities afforded by the drilling vessel *Chikyu* ("Earth" in Japanese). The meeting, attended by 397 participants from 21 countries, featured 10 keynote lectures. Participants in working groups identified important projects that are fundamental to understanding the Earth system and that require deep penetration of the seafloor.

Chikyu, operated globally by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), is the riser-capable drilling platform provided to the new 2013–2023 International Ocean Discovery Program (IODP). After commencing service to the international scientific community in 2007, *Chikyu* has made important contributions to understanding seismogenic faults and the deep subsea biosphere. Current capabilities of the vessel include riser (deep penetration) drilling in a maximum water depth of 2500 meters and maximum total riser and riserless drilling depth (water and penetration) of 9000 meters. Plans to increase capabilities to water depths greater than 4000 meters (for riser drilling) and total riser and riserless drilling depth greater than 12,000 meters below sea level are under way.

The Chikyu+10 workshop program was built around five scientific themes: dynamic fault behavior, continent formation, deep life, ocean crust/Earth's mantle, and sediment secrets. These themes align with the IODP's 2013–2023 science plan (http://www.iodp.org/science-plan-for-2013-2023), and keynote presentations focused on the five themes as well as *Chikyu*'s drilling, logging, and sampling capabilities. Dynamic fault behavior encompasses seismogenic zones posing lethal hazards through seismic shaking and tsunamis and exploring different modes of fault slip illuminated in recent years. Continent formation addresses how Earth's continental and oceanic crust became differentiated and how continents originated through time. Deep life represents the new biological frontier of the mostly unmapped microbial ecosystem beneath the seafloor. Ocean crust and Earth's mantle include reaching the dominant part of Earth's interior, the mantle. Sediment secrets explores past high carbon dioxide climate-environment extremes and illuminates the effects of cataclysmic events, such as episodic flood magmatism and bolide impacts.

A portfolio of projects to address top priorities of Earth system science arose from the workshop. "Flagship" (multiyear) projects will investigate the conditions and limits of microbial life at depth, the dynamics and range of fault slip behavior strongly linked to geological hazards, the island arc origins of continents, the composition of the mantle, and environmental changes during ocean basin desiccation. Complementary "discovery" (partial year) projects will target hydrothermal arc volcano systems, extreme fault slip of great earthquakes, environment-altering large volcanic eruptions, and global anoxic events. Together, these projects—only achievable by *Chikyu* drilling—will illuminate Earth's past, present, and future and constitute a major contribution to the next decade of Earth exploration.

Workshop proceedings are available as a full report on the IODP Web site at http://www.iodp.org/workshops and will be the subject of an article in *Scientific Drilling.* The workshop was a major milestone in decadal planning of global *Chikyu* projects by the international scientific community and sets the stage for focused planning of specific projects. A list of contributors and Web sites for more information can be found in the supporting information in the online version of this meeting report.

—Millard F. Coffin, Institute for Marine and Antarctic Studies, University of Tasmania, Hobart, Tasmania, Australia; E-mail: mike.coffin@utas.edu.au; Holly K. Given, Integrated Ocean Drilling Program Management International, Tokyo, Japan; and Nobuhisa Eguchi, Center for Deep Earth Exploration, Japan Agency for Marine-Earth Science and Technology, Yokohama, Japan

Agenda Item 12

Proposals Overview

- Support Office activities
- Proposals ready for scheduling
    - List of proposals including riser drilling
    - Proposal cover sheets/proposal history
    - Proposed IODP Riser Drilling Sites/Areas
- Proposal at PEP

List of proposals including riser drilling

Proposal Number	category	Short Title	Lead Proponent	Ocean	Platform	Theme
Proposals in OTF						
537	CDP	Costa Rica Seismogenesis Project	von Huene	Pac	R	EM
537B	Full4	Costa Rica Seismogenesis Project Phase B	Ranero	Pac	R	EM
603	CDP3	NanTroSEIZE	Tobin	Pac	R	EM
603C	Full	NanTroSEIZE Phase 3: Plate Interface	Tobin	Pac	R	EM
698	Full3	Izu-Bonin-Mariana Arc Middle Crust	Tatsumi	Pac	R	EC
618	Full3	East Asia Margin	Clift	Pac	R+NR	CO
800	MDP	Indian ridge Moho	Dick	Ind	R+NR	EC
Proposals in PEP						
781	MDP	Hikurangi Subduction Margin	Wallace	Pac	R	EC
781B	Full	Hikurangi: Riser	Wallace	Pac	R	EC
707	MDP	Kanto Asperity Project	Kobayashi	Pac	R	EC
782	Pre	Kanto Asperity Project: Plate Boundary Deformation	Yamamoto	Pac	R	EC
805	MDP	MoHole to the Mantle	Umino	Pac	R	EC

Theme:

EM: Earth in Motion

EC: Earth Connections

CO: Climate and Ocean Change

Received 7 Feb 2006

IODP Proposal Cover Sheet

537-CDP7

☐ **New** ☒ **Revised** ☐ **Addendum**

Please fill out information in all gray boxes

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Title:	CRISP- Costa Rica seismogenesis project: investigating convergent margin seismogenesis
Proponent(s):	Baumgartner, Peter, Bilek, Susan, Brueckmann, Warner, Castillo, Pat, Clift, Peter, Deyhle, Annette, Dixon, Tim, Fehn, Udo, Fisher, Donald, Fulthorpe, Craig, Harris, Robert, Kastner, Miriam, Kinoshita, Masa, Lewis, Jonathan, Matsumoto, Takeshi, McIntosh, Kirk, Morgan, Jason, Morris, Julie, Patino, Lina, Schwartz, Susan, Snyder, Glen, Ranero, Cesar, Scholl, David, Vannucchi, Paola, von Huene, Roland
Keywords: *(5 or less)*	Seismogenic zone, Subduction factory, subduction erosion — Area: Costa Rica

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Permission to post abstract on IODP-MI Web site: ☒ Yes ☐ No

Abstract: (*400 words or less)*

CRISP is a project to understand the initiation of large earthquakes and seismic rupture by drilling on either side of the updip limit of seismogenesis. The shallow dip of the subduction zone off southern Costa Rica and relatively high subducting plate temperature cause this seismogenic environment to rise to drilling depth. Materials, temperature, lithification, fluid flow and chemical changes that occur down the subduction zone are hypothesized to cause the transition from stable to unstable slip that ultimately results in great earthquakes. Along the erosional convergent margin of Costa Rica the seismogenic plate interface is surrounded by eroded debris rather than by trench sediment.

CRISP involves the only known erosional end-member of convergent margins within reach of scientific drilling. Samples of the fault rock and observations of dynamics will be integrated with laboratory experiments to test 5 principal hypotheses as stated below in the scientific objectives. CRISP is structured in 2 programs that systematically lead to deep riser drilling of the seismogenic zone. The non-riser drill Program A will provide cores to characterize lower plate igneous basement rock and its hydrology. Paleo-depth indicators will allow a first estimation of eroded debris and trench sediment thickness input by the subduction channel into the seismogenic zone. Instruments will be deployed in the holes to record microseismicity and monitor fluid pressure. Program B involves 3.5-km and 6.0-km-deep holes that are engineered from results of Program A. Program B riser drilling samples the subduction channel along the plate interface and characterizes conditions in the zone of **stable slip** and then conditions in the zone of **unstable** slip. This provides observations to determine physical and mineralogical transformations and dynamic changes causing unstable slip. The riser-drilling sites are in 500m and 1000m deep water and in an area of optimum operating conditions nearly year around. Osa Peninsula provides the opportunity to expand investigation farther down the seismogenic zone with land drilling to ~7km should that become attractive in the future. With a low sediment supply, fast convergence rate, abundant seismicity, subduction erosion, and a change in subducting plate relief along strike, CRISP offers excellent opportunities to learn causes of earthquake nucleation and rupture propagation. It complements other deep fault drilling (SAFOD and NantroSeize) and investigates the first order seismogenic processes common to most faults and those unique to erosional margins.

537-CDP7

Scientific Objectives: (*250 words or less*)

The proposed drilling and accompanying geophysical programs will acquire data to test 5 key hypotheses:

1) Landward of the frontal sediment prism the transition from stable to unstable slip is accomplished by a transition from a fluid-rich broad fault-damage zone to a thinner and drier slip zone.
2) Fluid pressure gradient and fluid advection localize locking of erosional plate boundaries temporarily and spatially
3) Fault mechanics associated with the transition from stable to unstable slip are influenced by lithology, physical properties, and structure of eroded materials in the subduction zone
4) Fluid chemistry, P-T conditions and residence time affect the state of eroded basement material through alteration, diagenesis, and low-grade metamorphism influencing the transition from stable to unstable slip.
5) Variability in subducted plate relief and subduction channel thickness, affect material properties and fluid distribution triggering seismicity and controlling rupture propagation.

The deployment of observatories will provide capability to monitor any near-field precursory signals that indicate the stage of a rupture zone in an earthquake cycle. A physical properties map along the plate interface derived from seismic attributes and calibrated with the drill holes will indicate whether areas of locking offshore and potential hazardous earthquake locations can be identified from remote geophysical information.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	

Proposal history

537-CDP7 Costa Rica Seismogenesis Project

Date	Proposal_Submission	Review_Type	Watchdogs
15-Mar-98	Pre		
5-May-98		SSEP	
1-Oct-98	Full		
1-Nov-98		SSEP	
15-Mar-99	Full2		
25-May-99		SSEP	
1-Oct-99	Full3		
1-Nov-99		SSEP	
1-Feb-00		SSP	
1-Mar-00		External	
7-Apr-00	PRL		
8-May-00		SSEP	
1-Jul-00		SSP	
15-Jul-00	PRL2		
21-Aug-00		SCICOM	
30-Mar-02	Full4		
9-Jun-02		iSSEP	I) Mottl, Louden, Umino; E) Flemings
25-Sep-02	CDP		
20-Nov-02		iSSEP	I) Mottl, Chen, Blackman; E) Flemings, Soh
26-Feb-03		iSSP	Korja, Caress, Mochizuki
30-Mar-03	CDP2		
25-May-03		iSSEP	I) Devey, Bangs; E) Ohkouchi
30-Sep-03	CDP3		
23-Nov-03		SSEP	I) Tokunaga, Ogawa, Saffer; E) Flemings, Hasegawa
13-Feb-04		SSP	Neben, Tsuru, Carbotte
31-Mar-04	CDP4		
20-May-04		SSEP	I) Pedersen, Ogawa, Rosenberg ; E) Ito, Hayashida
17-Jun-04		SPC	Ildefonse, Mori, Austin
1-Oct-04	CDP5		
19-Nov-04		SSEP	I) Pedersen, Hirono, Ogawa, Erzinger, E) Ge
1-Apr-05	CDP6		
19-May-05		SSEP	Ogawa, Hirono, Saffer, Moore, Ishibashi
18-Oct-05	PRL3		
7-Feb-06	CDP7		

Received 27 Jan 2006

IODP Proposal Cover Sheet

537B-Full4

☐ **New** ☑ **Revised** ☐ **Addendum**

Please fill out information in all gray boxes

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Title:	CRISP Program B: The Transition from Stable to Unstable Slip at Erosional Convergent Plate Boundaries
Proponent(s):	C. R. Ranero, C. Marone, S. Bilek., U. Barckhausen, P. Charvis, J-Y Collot, H. DeShon, G. Di Toro, T. Dixon, L. Dorman, S. Galeotti, I. Grevemeyer, R. Harris, S. Husen, M. Kastner, M. Kinoshita, S. Kuramoto, T. Matsumoto, K. McIntosh, J. Morgan, J. Morris, C. Mueller, S. Neben, C. Reichert, D. Scholl, S. Saito, S. Schwartz, V. Spiess, E. Suess, P. Vannucchi, H. Villinger, S. Vinciguerra, R. von Huene, W. Wallmann.
Keywords: *(5 or less)*	Seismogenic zone, fluid flow, subduction erosion
Area:	Central America off Costa Rica

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Permission to post abstract on IODP-MI Web site: ☒ Yes ☐ No

Abstract: *(400 words or less)*

CRISP is designed to investigate the processes leading to seismogenesis at erosional convergent margins in 2 Programs. Each Program will involve sampling, downhole observatories, and laboratory experiments on the recovered materials. Program A focuses on the incoming oceanic plate, the decollement at the margin's front where slip is aseismic, and shallow structure of the overriding plate. Program B will investigate the plate boundary in the transition from stable slip to unstable slip by drilling and monitoring at two sites. One site is located updip, but near, the end of the seismogenic zone, and a second site is drilled into the seismogenic zone.

At least 50% of the world's subduction zones are erosional margins. Erosional convergent margins have a subduction channel containing material removed from the overriding plate mixed with sediment from the incoming plate. The nature and physical properties of this material are currently unconstrained. Similarly, the volume, distribution and chemistry of fluids at erosional plate boundaries are poorly known.

In Program B we propose a detailed investigation of subduction earthquake processes and to sample and monitor the plate boundary where temperatures range ~100-200°C. Previous work indicates that key processes become active in that temperature range and control the onset of seismicity. Drilling will for the first time sample eroded material and fluids in the subduction channel and investigate plate boundary fault mechanisms during tectonic erosion. CRISP Program B will provide the core material for detailed laboratory experiments designed to isolate the processes and physical conditions that control the onset of seismogenesis.

Four Major Goals of Program B Drilling, Monitoring and Laboratory Experiments are:

1) Quantify effective stress and plate boundary migration via focused investigation of fluid pressure gradient and fluid advection across the erosional plate boundary.

2) Determine the structure and fault mechanics of an erosional convergent margin and identify the processes that control the updip limit of seismicity.

3) Constrain how fluid-rock interaction affect seismogenesis by studying fluid chemistry and residence time, basement alteration, diagenesis, and low grade metamorphism.

4) Obtain physical properties of a 3-D volume that spans the seismogenic zone.

The subduction zone offshore Osa Peninsula provides the tectonic setting to reach CRISP goals. The shallow subduction angle and high temperatures bring to shallow depth processes that elsewhere occur at greater depth, beyond the reach of drilling.

537B-Full4

Scientific Objectives: (*250 words or less*)

CRISP Program B will sample and monitor the plate boundary environment to study physical conditions and material properties in the transition into the seismogenic zone. The scientific objectives of Program B are to test five main hypotheses central to understanding structure and seismogenesis at erosional plate boundaries:

1) Landward of the frontal sediment prism, the transition from stable to unstable slip parallels the transition from a fluid-rich and broad fault zone, with distributed slip, to a narrower zone of active deformation with localized shear and fluid compartmentalization.

2) Fluid pressure gradients and fluid advection affect the migration and coupling of erosional plate boundaries both temporally and spatially.

3) The lithology, physical properties, and structure of eroded materials influence fault mechanics and the transition from stable to unstable slip at subduction interfaces.

4) Fluid chemistry, P-T conditions and residence time affect the state of eroded material through basement alteration, diagenesis and low-grade metamorphism.

5) Lateral variability in subducted plate relief, subduction channel thickness, material properties and fluid distribution affect seismogenesis and rupture propagation.

These hypotheses will be tested by A) direct observation of the lithology, physical properties and structure of the plate boundary and surrounding rock, B) monitoring temperature, stress, pore-fluid pressure and chemistry, and seismicity, C) laboratory experiments on core samples, and D) dedicated geophysical surveys designed to expand regionally the results from drilling and monitoring.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Riser drilling
Drilling at >100°C and <200°C will require development of tools.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
CRIS-03A	84° 4.77852 W 8° 35.23956 N	530	700	2850	3550	Drilling and monitoring the plate boundary and subduction channel in the area of transition between aseismic and seismic slip and temperatures between 100°-150°C, updip, but near, the end of the seismogenic zone.
CRIS-06A	84° 9.77076 W 8° 45.16602 N	500	1920	4080	6000	Drilling and monitoring the plate boundary and subduction channel in the seismogenic zone at temperatures between 150°-<200°C.

Proposal history

537B-Full4 Costa Rica Seismogenesis Project Phase B

Date	Proposal Submission	Review Type	Watchdogs	Decision
31-Mar-04	Full			
17-May-04		SSEP	I) Blackman, Rosenberg, Ogawa; E) Kodama, Hine	
4-Aug-04		SSP	Carbotte, Corthay, Tsuru	
1-Oct-04	Full2			
19-Nov-04		SSEP	I) Hirono, Bangs, Erzinger, Ogawa, E) Ge	
23-Feb-05		SSP	Carbotte, Corthay, Tsuru	
1-Apr-05	Full3			
19-May-05		SSEP	Hirono, Morgan, Obana, Ishibashi, Iwai	
25-Sep-05		External		
19-Oct-05	PRL			
18-Nov-05		SSEP	Hirono, Morgan, Erzinger, Chen, Henry	
30-Jan-06	PRL2			
30-Jan-06	Full4			
9-Mar-06		SPC	Byrne, Mori, Ildefonse	
31-Jan-07	PRL3			
5-Mar-07		SPC	Tim Byrne, Jim Mori, Jan Behrmann	
30-Aug-07		SPC	Jan Behrmann, Gabe Filippelli, Jim Mori	
30-Aug-07		SPC	Barbara Bekins, Harue Masuda, Carolyn Ruppel	
6-Mar-08		SPC	Jim Mori, Jan Berhmann, Katsumi Marumo	Forward to OTF

Received 1-October-2003

603-CDP3

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IODP Proposal Cover Sheet

☐ **New** ☑ **Revised** ☐ **Addendum**

Please fill out information in all gray boxes

Title:	**NanTroSEIZE: The Nankai Trough Seismogenic Zone Experiment Complex Drilling Project**		
Proponent(s):	**Gaku Kimura, Harold Tobin, and the NanTroSEIZE Working Group (24 Co-Proponents)**		
Keywords: *(5 or less)*	**Seismogenic zone, earthquakes, tsunamigenesis, fault mechanics**	Area:	**Southwest Japan margin**

Contact Information:

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Permission to post abstract on iSAS Web site: ☑ Yes ☐ No

Abstract: (*400 words or less)*

This Complex Drilling Project (CDP) proposal describes the rationale and scientific objectives for an integrated program of geophysical and geologic studies, non-riser drilling, and riser drilling designed to investigate the aseismic to seismic transition of the megathrust system and the processes of earthquake and tsunami generation at the Nankai Trough subduction zone. **Our fundamental goal is the creation of a distributed observatory spanning the up-dip limit of seismogenic and tsunamigenic behavior.** This will involve sampling and instrumenting key elements of the active plate boundary fault system at several locations off the Kii Peninsula, where the plate interface and active mega-splay faults – implicated in tsunamigenesis – are accessible to drilling within the region of coseismic rupture in the 1944 Tonankai M8 great earthquake. The most ambitious objective is to access and instrument the Nankai plate interface within the seismogenic zone to advance our knowledge of fundamental aseismic and seismic faulting processes and controls on the transition between them. The strategy of NanTroSEIZE differs fundamentally from that of other proposed deep fault drilling programs because we will document the evolution of fault zone properties by trading time for space along the dipping plate boundary.

We propose 3 distinct phased IODP drilling efforts: **Phase 1** – *Inputs to the seismogenic zone system*, investigating variations in the sediments, oceanic crust, and fluids input to the plate boundary system; **Phase 2** – *Mega-splay (OOST) fault drilling* to sample and instrument thrusts which splay from the basal décollement up through the forearc, in order to characterize fault properties transecting the aseismic to seismic transition from 1 to 3.5 km depth shallow; and **Phase 3** – *Sampling and instrumenting the plate interface* (décollement) at ~ 6 km below seafloor, in a region predicted to be within both the zone capable of generating seismogenic behavior and in the zone of co-seismic slip in the 1944 great earthquake. Long-term monitoring of a wide range of phenomena will be a major part of the effort, to detect signals of fault zone processes in the near-field. In addition, ongoing seismological and geodetic arrays in the vicinity as well as in the deep boreholes, geologic studies, laboratory and modeling efforts are all integral components of the NanTroSEIZE project, essential to success in achieving project objectives.

603-CDP3

Scientific Objectives: (*250 words or less*)

The principal scientific objective of the proposed drilling is to acquire data bearing on and testing the following key hypotheses:

1. Systematic, progressive material and state changes control the onset of seismogenic behavior on subduction thrusts.

2. Subduction zone megathrusts are weak faults.

3. Within the seismogenic zone, relative plate motion is primarily accommodated by coseismic frictional slip in a concentrated zone.

4. Physical properties, chemistry, and state of the fault zone change with time during the earthquake cycle.

5. The mega-splay (OOST) thrust fault system slips in discrete events which may include tsunamigenic slip during great earthquakes.

Proposed **NanTroSEIZE** efforts will test models for the frictional behavior of fault rocks across the aseismic – seismogenic transition, the composition of faults and fluids and associated pore pressure and state of stress, partitioning of strain spatially between basal interface and splays, temporally between coseismic and interseismic periods, and between infraseismic and aseismic events vs. seismic events. Long-term borehole observations potentially ultimately will test whether interseismic variations or detectable precursory phenomena exist prior to great subduction earthquakes.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

In various combinations, the following non-standard measurements are desired for sites covered by this CDP:

During Drilling and Casing Installation: Logging/measurement while drilling, drill stem & wireline pressure/permeability tests, cross-hole hydrologic tests, offset/walkaway vertical seismic profiling, cross-hole seismic.

Long-Term Borehole Observatory Monitoring: Array temperature measurement, pressure measurement in packer-isolated intervals, array measurement for short-period, three-component seismometry, bottom-hole broadband and strong motion seismometry, bottom hole strain, multi-level tilt, and long-term fluid collection for biological and geochemical measurements. Many of these measurements will need to be made at temperatures of ~ 80 – 150+ C.

Proposed Sites:

SEE INDIVIDUAL PROPOSALS FOR EACH PHASE FOR SITE DESCRIPTIONS

Proposal history

603-CDP3 NanTroSEIZE

Date	Proposal_Submission	Review_Type	Watchdogs
28-Sep-01	Pre		
17-Nov-01		iSSEP	E) None; I) Tokunaga, Mottl, Ildefonse, Ashi
24-Jul-02		iSSP	Enachescu
1-Oct-02	CDP		
20-Nov-02		iSSEP	E) Filippelli, Li; I) Tokunaga, Ildefonse, Mottl
26-Feb-03		iSSP	McIntosh, Gutscher, Enachescu
1-Apr-03	CDP2		
25-May-03		iSSEP	I) Tokunaga, Bangs, Devey; E) Filippelli
1-Oct-03	CDP3		
23-Nov-03		SSEP	I) Ogawa, Tokunaga, Devey; E) Flemings, Kodama
17-Dec-03		PPSP	N. Morita
17-Jun-04		SPC	Austin, Ildefonse, Tatsumi
14-Sep-05		SSP	Gutscher, Tanaka, Corthay
17-Jan-07	Add		
11-May-07	Add2		
14-Jun-07	SRR		
19-Jun-07		EPSP	Sumito Morita
11-Jul-07	SRR2		
20-Jul-07		SSP	Masaaki Shirai, John Hopper, Seiichi Miura
8-Sep-07	Add3		
16-Oct-07	SRR2-Add		
8-May-08	SRR3		
14-May-09	SRR4		
12-Jun-09		EPSP	

IODP Proposal Cover Sheet

Received 1 April 2004

603C-Full

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☑ **New** ☐ **Revised** ☐ **Addendum**

Please fill out information in all gray boxes

Title:	**NanTroSEIZE Drilling and Observatory Phase 3: A Window into the Seismogenic Zone**
Proponent(s):	**Kiyoshi Suyehiro, Harold Tobin, Eiichiro Araki, Susan Bilek, Tadanori Goto, Pierre Henry, Gaku Kimura, Aitaro Kato, Masa Kinoshita, Chris Marone, Greg Moore, J. Casey Moore, Demian Saffer, Arito Sakaguchi, Masanao Shinohara, Ralph Stephen, Akito Tsutsumi, Kohtaro Ujiie, Kelin Wang**
Keywords: *(5 or less)*	**Seismogenic zone, fault mechanics, borehole observatory, tsunamigenesis** — Area: **Southwestern Japan margin**

Contact Information:

Contact Person:	**Harold Tobin**		
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Organization:	**New Mexico Tech**		
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E-mail:	**tobin@nmt.edu**		

Permission to post abstract on iSAS Web site: ☑ Yes ☐ No

Abstract: *(400 words or less)*

The principal goal of NanTroSEIZE is to understand seismogenesis and rupture propagation along subduction plate boundary faults by direct testing of key hypotheses related to the mechanics of subduction megathrusts. **NanTroSEIZE Phase 3 represents the culmination of the Seismogenic Zone Initiative: drilling into, sampling, and monitoring of the subduction zone plate interface at depths of coseismic slip.** This proposal centers on the deepest drilling effort in the NanTroSEIZE project: sampling a single site across the entire plate interface into the top of the subducting Philippine Sea plate. The proposed borehole will penetrate a major splay fault (~4 km bsf) potentially implicated in coseismic slip, as well as the master decollement (~6 km bsf), at a location of shallow large slip during the 1944 Tonankai Mw 8.2 earthquake.

The goal of this proposal is to address two key questions by a combination of logging, coring, down-hole experiments, and long-term monitoring:

(1) What controls the nature of fault slip and its spatial variability (i.e. the updip transition from aseismic to seismogenic slip)?

(2) What processes control temporal changes in slip behavior on a given fault?

Specifically, this proposal is aimed at testing hypotheses explaining controls on unstable slip, and documenting the roles of fault zone state (stress, fluid pressure, fabric) and composition in controlling frictional rheology. Down-hole and monitoring observations, core analyses, and post-cruise laboratory studies will provide direct tests of existing hypothesis for fault zone frictional behavior. One focus of Phase 3 will be on documenting the material properties and ambient conditions at each of the two faults, and comparing results with findings from shallower portions of the plate boundary system sampled during Phases 1 and 2 to rigorously characterize controls on fault slip behavior in an active megathrust system.

Proposed activities include (1) drilling, LWD, and casing of a main hole - with drillstem tests performed at casing set points, (2) creation of a sidetrack coring hole with continuous coring from 4000-6200 mbsf, and (3) well tests in perforated casing and installation of an observatory system for continuous monitoring of pore fluid pressure, temperature, strain, tilt, and seismicity. The borehole observatories, along with surface arrays of measurements, and regional geodetic and seismic monitoring, will provide critical data toward understanding the slip distribution, temporal variability, and controlling mechanisms of seismogenic faulting along the plate boundary system.

603C-Full

Scientific Objectives: (*250 words or less*)

The scientific objectives of NanTroSEIZE Phase 3 drilling are to use *direct observation* to rigorously evaluate the following hypotheses, which are central to understanding earthquake mechanics along subduction megathrusts:

(1) Systematic, progressive material and state changes control the onset of seismogenic behavior on subduction thrusts; (2) Subduction zone megathrusts are weak faults; (3) Within the seismogenic zone, relative plate motion is primarily accommodated by coseismic frictional slip in a concentrated zone; (4) Physical properties, chemistry, and state of the fault zone change systematically with time throughout the earthquake cycle; and (5) The mega-splay (OOST) thrust fault system slips in discrete events which may include tsunamigenic slip during great earthquakes. These hypotheses will be evaluated by detailed characterization – in fault zones and in the surrounding rock volume – of the lithology, structural geology, and physical properties of the rock; the geochemistry of pore fluids; the microbiological activity; the distribution of temperature, stress, and pore fluid pressure in space and time; the seismicity in the near-borehole environment and downdip; the temporal evolution of the strain field; and the evolution of physical properties in the volume around the borehole.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Essentially all technologies to be used are non-standard. These will include, but are not limited to:
Riser-based drilling, LWD suite, DVTP-P, active hydrofracturing tests (wireline packer test), VSP.
A borehole observatory with multi-level packers and perforated intervals, Geodetic (strain/tilt), seismic and hydrologic (P,T) sensors and other instruments will be installed for a long-term borehole observatory.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
NT3-01A	33°17.6'N, 136°38.6'E	1950	6000	200	6200	Study the progressive change in the fault properties by intersecting the splay fault at ~4.5km and the seismogenic fault at 5.8 to 6km depth
NT3-02A	33°12.9'N, 136°27.4'E	2100	6000	200	6200	Alternate site for NT3-01A

Proposal history

603C-Full NanTroSEIZE Phase 3: Plate Interface

Date	Proposal_Submission	Review_Type	Watchdogs	Decision
1-Apr-04	Full			
20-May-04		SSEP	I) Pedersen, Erzinger, Yamazaki, E) Ishibashi, Ge	
4-Aug-04		SSP	Sato, Twichell, Gutscher	
1-Oct-04		External		
5-Nov-04	PRL			
19-Nov-04		SSEP	I) Pedersen, Erzinger, Yamazaki, E) Ishibashi, Ge	
23-Feb-05		SSP	Sato, Twichell, Gutscher	
17-Mar-05		SPC	Ito, Duncan	Forward to OTF
22-May-06	SRR			
23-Jun-06		EPSP	Sumito Morita	
5-Jan-07	SRR2			
10-Jan-07		EPSP	Sumito Morita	

Received 10-September-2004

IODP Proposal Cover Sheet

618-Full3

☐ New ☒ Revised ☐ Addendum

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Title:	Dating Tibetan Uplift and Evolving River Drainage Patterns in East Asia using the Sedimentary Record of the Red and Mekong Rivers		
Proponent(s):	Peter D. Clift, Nguyen Trong Tin, Lars Henrik Nielsen, Yoshiki Saito, Vu Van Kinh, Nguyen Anh Duc, Gwang Hoon Lee, Le Dinh Thang, Steve Dorobek, Andrew Carter, Lars Ole Boldreel, Nguyen Van Dac, François Métivier, Yan Pin, Nguyen Huy Quy, Urs Schärer, Chi Cung Thuong, Ioannis Abatzis, Mike Bickle, Nicolas Chamot-Rooke, and Shouye Yang.		
Keywords: *(5 or less)*	Tectonics, Climate, Provenance, Erosion, Stratigraphy	Area:	SE Asia

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E-mail:	p.clift@abdn.ac.uk		

Permission to post abstract on IODP-MI Sapporo Web site: ☒ Yes ☐ No

Abstract: (*400 words or less)*

The rise of the Tibetan Plateau is understood to affect the intensity of the Asian monsoon. However, demonstrating the link between plateau uplift and the Asian monsoon has been hindered by a lack of information concerning the uplift history of Tibet preserved onland. Within the eastern Tibetan Plateau the great rivers of East Asia incise deep valleys whose excavation is linked to plateau uplift. This incision should correlate with an increase in clastic sediment supply to the adjacent Asian marginal seas. In addition, the uplift and eastward growth of the plateau has resulted in capture of headwater drainage from one river by another, especially close to the eastern Himalayan syntaxis, where the river courses lie close together. Such changes in drainage geometry should be recorded in the pattern of sediment dispersal from the mouths of these rivers and recorded in the thickness and distribution of sediment along the continental margin. Tibetan uplift is also linked to strengthening of the monsoon, which must have influenced erosion rates and weathering regimes in SE Asia. Thus recognition, documentation and dating of offshore sedimentation is the best avenue for dating the uplift of eastern Tibet, its spatial variability, and its relationship to the Asian monsoon. We propose to drill deep-penetrating riser wells in the shelf and offshore slope of the Mekong and Red Rivers and to sample the erosional flux from each river through the Cenozoic. Locating wells within the framework of a regional seismic stratigraphy will allow volumes of sediment to be defined and dated by magneto- and biostratigraphic methods to provide a high resolution sediment budget, which can be mass balanced with eroded volumes onshore. Core samples will be used to date times of drainage capture through application of bulk sediment and single grain isotopic provenance methods, which can identify loss or gain of distinct source terrains. Clay mineralogy and bulk sediment chemistry will be used to assess weathering regimes within each drainage, which might be expected to have evolved as the monsoon strengthened. The proposed drilling directly addresses issues of climate-tectonic interaction, highlighted for investigation by IODP and also contributes to IGCP projects 476, 475 and 430. Deriving reliable ages for Tibetan uplift also has significance for the continental tectonic community in that it bears on the process of continental deformation and how strain is accomodated following the India-Asia collision.

Scientific Objectives: (*250 words or less*)

The proposed drilling in the Nam Con Son Basin, Song Hong Basin and Xisha Trough of the South China Sea is aimed at documenting the overall pattern of sedimentary flux from Tibet, as well as the changes in the sources and rates of erosion in each river basin during the Cenozoic. The erosional flux from the east Asian rivers is principally controlled by the strength of the monsoon, exhumation in the major shear zones of Indochina and the topographic elevation of Tibet. Sea-level variation has only a moderate effect of the erosional flux because of the buffering influence of the alluvial plains. Study of the East Asian marginal seas is necessary because erosional records in the Indian Ocean fans are dominated by the Himalayas and do not allow a Tibetan signal to be isolated easily. Because the strength of the Asian monsoon is apparently linked to the extent and elevation of Tibet, offshore drilling will allow testing of this tectonic-climate coupling hypothesis, through comparison of the source and volume of the erosional flux with records of paleoceanographic evolution in the Indian Ocean, with continental climate development and with radiometric dating of tectonic activity onshore. In addition, these data will constrain the continental climate and provide important information on the spatial distribution of uplift of the plateau. The history of plateau uplift can be used to understand how strain has been accomodated during the India-Asia collision, an outstanding issue in the field of continental tectonics.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
VN-1	18°54’N 106°47’E	102	4900	10	4910	Sample erosional outflow from the Red River system and provide detailed age control to the regional seismic stratigraphy.
XI-1	17°11’N110°45’E	1564	3714	10	3724	As for VN-1 but providing additional age control for deeper water, more distal section, while allowing greater temporal penetration within a more condensed section.
VN-2	9°22’N 108°57’E	162	4982	10	4992	Sample erosional outflow from the Mekong River in order to date the onset of rapid sedimentation, as well as changes in provenance that would indicate drainage capture or loss in the headwaters
VN-3	8°38’N 109°43’E	1506	2800	10	2810	

Proposal history

618-Full3 East Asia Margin

Date	Proposal Submission	Review Type	Watchdogs	Decision
12-Sep-02	Pre			
20-Nov-02		iSSEP	E) Weissert, Soh, Brumsack; I) Ashi, Kominz	
26-Feb-03		iSSP	Tsuru, Enachescu	
31-Mar-03	Full			
25-May-03		iSSEP	E) Brumsack, Filippelli, Soh; I) Ashi, Kominz	
30-Jul-03		iSSP	Tsuru, Enachescu	
9-Mar-04	Full2			
20-May-04		SSEP	E) Filippelli, Hasegawa, Weissert; I) Yamazaki, Yamano	
4-Aug-04		SSP	Tsuru, Nogi, Twichell	
9-Sep-04	Full3			
19-Nov-04		SSEP	E) Hasegawa, Weissert, Thurow, I) Kominz, Fisher	
23-Feb-05		SSP	Tsuru, Nogi, Twichell	
1-Apr-05		External		
4-May-05	PRL			
19-May-05		SSEP	Hasegawa, Thurow, M. Ito, Morgan, Hirono	
28-Jun-05		EPSP		
14-Sep-05	Add			
14-Sep-05		SSP	Tsuru, Twichell, Noda	
24-Feb-06		SSP	Twichell, Rebesco, Kido	
9-Mar-06		SPC	Kawahata, Zhou, Quinn	
26-Jul-06		SSP	David Twichell, Yoshikazu Yaguchi, Jin-Oh Park	
5-Aug-06	Add2			
22-Feb-07		SSP	Yoshikazu Yaguchi, Jin-Oh Park, Nathan Bangs	
5-Mar-07		SPC	Zuyi Zhou, Gilbert Camoin, Ritsuo Nomura	
6-Sep-07	Add3			
25-Jan-08		SSP	Yoshikazu Yaguchi, Seiichi Miura, Nathan Bangs	
6-Mar-08		SPC	Gilbert Camoin, Qianyu Li, Larry Peterson	
15-Nov-08	Add4			
19-Mar-09		SPC	Gabe Filippelli, Gilbert Camoin, Larry Peterson	Forward to OTF
1-May-09	SRR			
12-Jun-09		EPSP		

Received 28 September 2010

IODP Proposal Cover Sheet

☐ New ■ Revised ☐ Addendum

698-Full3

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Please check if this is Mission proposal ☐

Title:	Continental Crust Formation at Intra-Oceanic Arc: Ultra-Deep Drilling to the Middle Crust of the Izu-Bonin-Mariana Arc		
Proponent(s):	Yoshiyuki Tatsumi, Katherine Kelley, Richard Arculus, Makoto Arima, Susan Debari, James B. Gill, Osamu Ishizuka, Yoshiyuki Kaneda, Jun-ichi Kimura, Shuichi Kodaira, Yasuhiko Ohara, Julian Pearce, RobertJ. Stern, Susanne M. Straub, Narumi Takahashi, Yoshihiko Tamura, Kenichiro Tani		
Keywords: *(5 or less)*	Intra-oceanic arc, upper crust, middle crust, continental crust, magmatism	Area:	Izu-Bonin

Contact Information:

Contact Person:	Yoshiyuki Tatsumi		
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Organization:	Japan Agency for Marine-Earth Science and Technology		
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Permission to post abstract on IODP Web site: ■ Yes ☐ No

Abstract: (*400 words or less)*

This proposal is for the ultra-deep drilling site of a series of IODP proposals in the Izu-Bonin-Mariana (IBM) arc that aim at comprehensive understanding of arc evolution and continental crust formation. We propose to drill a deep hole that penetrates through a complete sequence of intra-oceanic arc upper crust and into the *in situ* middle crust that may be a nucleus of continental crust. The average continental crust possesses an intermediate composition (~60 wt.% SiO_2), which raises the question of how intra-oceanic arcs produce continental crust if the dominant product of mantle wedge melting and a major proportion of intra-oceanic arc lava are basaltic (50 wt.% SiO_2). There is no pre-existing continental crust in the IBM upper plate, yet recent seismic studies of this arc reveal a thick middle crust layer with 6.0-6.8 km/s *Vp* that is hypothesized to be intermediate in composition. The primary goals of sampling the *in situ* arc crust through drilling are: (1) to identify the structure and lithologies of the upper and middle crust, (2) to test seismic models of arc crustal structure, (3) to constrain the petrologic and chronological relationship of the middle crust to the overlying upper crust, (4) to establish the evolution of arc crust by relating this site with other regional drill sites and exposed arc sections, and (5) to test competing hypotheses of how the continental crust forms and evolves in an intra-oceanic arc setting. These objectives address questions of global significance, but we have specifically identified the IBM arc system as an ideal locale to conduct this experiment. The composition of the pre-subduction upper plate was normal oceanic crust, and the tectonic and temporal evolution of this arc system is well-constrained. Moreover, the IBM system is considered as the best-studied intra-oceanic arc on Earth by extensive sampling of the slab inputs and arc outputs through field studies and drilling, and by a series of recent, focused geophysical surveys. We propose returning to the region of ODP Site 792 to drill, *via*. Eo-Oligocene upper crust, to the middle crust at proposed site IBM-4. The mid-crustal layer in this area is shallow enough to be reached by drilling, and heat flow is low enough for drilling to proceed at mid-crustal temperatures. Samples recovered from IBM-4 will complement the drilling objectives at other proposed sites in Eocene (IBM-2) and Neogene (IBM-3) arc crust and pre-arc oceanic crust (IBM-1), which are proposed separately.

698-Full3

Scientific Objectives: (*250 words or less*)

Petrologic objectives focus on (1) identifying the lithology, bulk composition, and structure of the rocks that comprise the *in situ* upper and middle crust beneath the Eo-Oligocene IBM arc; (2) establishing the age and thermal/petrologic history of the IBM middle crust and its temporal and petrologic relationship to the upper crust overlying it; (3) relating the petrology, structure, and composition of this mature arc crustal section to equivalent sequences from older (Eocene; IBM-2) and younger (Neogene; IBM-3) arc crust from the same system, to upper- and mid-crustal rocks exposed in accreted arc terranes, and to rocks that represent middle and bulk continental crust; and (4) testing models of the formation of arc middle crust, i.e., simple fractionation of mantle-derived basalt or andesite magmas vs. partial melting of mafic arc crust. The main geophysical objective focuses on using the recovered rocks and borehole data from this deep crustal site to evaluate geophysical models of the seismic velocity structure of the IBM arc crust, i.e., a layered structure with relatively homogeneous velocities within each layer *vs.* a gradational crustal velocity structure.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
IBM-4	32°24'N 140°23'E	1798	800	4700	5500	2000m penetration into the middle crust. 886 m of the necessary sampling at the IBM-4 Site has already been done by ODP Leg 126 Site 792

Proposal history

698-Full3 Izu-Bonin-Mariana Arc Middle Crust

Date	Proposal Submission	Review Type	Watchdogs	Decision
31-Mar-06	Pre			
31-May-06		SSEP	Konnerup-Madsen, Christeson, Anma, Fujiwara, Ito, T.	
29-Sep-06	Pre2			
16-Nov-06		SSEP	Ryo Anma, Mike Gurnis, Jens Konnerup-Madsen, Gail Christeson	
22-Feb-07		SSP	Masaaki Shirai, Stanley Locker, and Jin-Oh Park	
30-Mar-07	Full			
31-May-07		SSEP	Gail Christeson, Akira Ishiwatari, Luc Lavier, Eiichi Takazawa	
27-Sep-07	Full2			
15-Nov-07		SSEP	Gail Christeson, Jun-ichi Kimura, Peter Vrolijk, Timothy Elliott	
1-Mar-08		External		
21-Apr-08	PRL			
21-May-08		SSEP	Gail Christeson, Ryo Anma, Toshiya Fujiwara, Rob Zierenberg, Tim Elliott, Eiichi Takazawa	
15-Jan-09	Add			
6-Feb-09		SSP	Nathan Bangs, Lykke- Andersen, Stuart Henrys	
19-Mar-09		SPC	Eiichi Takazawa, Jan Behrmann, Donna Blackman	
29-Jul-09		SSP	Bangs, Pirmez, Henrys	
6-Jan-10	Add2			
29-Jan-10		SSP	Stuart Henrys, Daniel Ariztegui, Gil Young Kim	
26-Mar-10		SPC	Barbara John, Susumu Umino, Akira Takada	
27-Sep-10	Full3			
28-Sep-10	Full3			
1-Oct-10	Full3			
12-Nov-10		SSEP	Akira Ishiwatari, Joerg Erzinger, Ryo Anma, John Maclennan	
31-Mar-11		SPC	Gretchen Früh-Green, Akira Takada, Donna Blackman	
3-Dec-11		PEP	Neal, MacLennan	Forward to OTF

Received 1 October 2011

IODP Proposal Cover Sheet

781-MDP

- [x] **New**
- [ ] **Revised**
- [ ] **Addendum**

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		Please check if this is Mission proposal	☐
Title:	**Multiphase Drilling Project: Unlocking the Secrets of Slow Slip by Drilling at the Northern Hikurangi Subduction Margin, New Zealand**		
Proponent(s):	**Laura Wallace, Stuart Henrys, Philip Barnes, Demian Saffer, Harold Tobin, Nathan Bangs, Rebecca Bell, and the Hikurangi margin working group**		
Keywords: *(5 or less)*	slow slip events, subduction margin, Hikurangi, fault mechanics, fluids	Area:	New Zealand

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Permission to post abstract on IODP Web site: [x] Yes [ ] No

Abstract: (*400 words or less*)

Over the last decade, the discovery of episodic slow slip events (SSEs) at subduction margins around the globe has led to an explosion of new theories about fault mechanics and subduction interface deformation mechanisms and rheology. ***The northern Hikurangi margin is the only place on Earth where well-documented SSEs occur on a subduction interface within range of existing drilling capabilities.*** Drilling, down-hole measurements, sampling, and monitoring of the northern Hikurangi SSE source area provides a unique opportunity to definitively test hypotheses for the properties and conditions leading to SSE occurrence, and ultimately, to unlock the secrets of slow slip. Furthermore, ***northern Hikurangi SSEs recur every two years***, and thus provide an excellent setting to ***monitor changes in deformation rate, in situ conditions, and rock physical properties*** within and surrounding the SSE source area throughout a slow slip cycle.

We propose to drill the northern Hikurangi SSE source area with a 3 phase approach:
(1) Seven shallow (~400-1200 m below the seafloor) riserless sites to collect samples and geophysical logs of the overriding and subducting plates, and strategically install observatory equipment to monitor near-surface changes in deformation, seismicity and physical properties throughout a SSE cycle and characterize the distribution of SSE slip with very high fidelity.
(2) A deep riser hole (~6 km below the sea floor) that penetrates the subduction interface and ***directly samples rocks from the SSE source region***, collects logs across the fault zone(s), and measures temperature, fluid pressure and chemistry, and stress.
(3) Installation of a long-term borehole ***monitoring*** system to detect changes in deformation rate, and physical and chemical properties ***at the SSE source*** during a complete SSE cycle.

Sampling material within the SSE source area and incoming plate section (protolith for fault zone rock deeper down) ***will reveal the frictional, lithological and structural character*** of the interface in an active SSE source region. Observatory facilities to monitor changes in hydrology, strain rate and seismicity near and above the SSE source area throughout a two-year SSE cycle will elucidate the role that short-term variations of physical conditions play in the occurrence of aseismic vs. seismic slip. Comparison of properties of the interface at northern Hikurangi (dominated by aseismic creep and moderate, shallow subduction thrust events) and the Nankai margin (where stick-slip behaviour over large regions produces great megathrust earthquakes) may help solve the mystery of why some subduction margins rupture in megathrust earthquakes while others do not.

781-MDP

Scientific Objectives: (*250 words or less*)

Drilling, sampling, downhole logging and measurements, and instrumenting the proposed riserless and riser sites will resolve competing hypotheses and key questions regarding the generation of slow slip and the mechanics of subduction interface thrusts. **Major questions that will be addressed are:**

(1) Do slow slip events (SSEs) occur under highly elevated fluid pressures? **(2)** What is the role of fault strength and rock frictional properties in facilitating slow slip? **(3)** What are the rock compositions and fault zone architecture associated with slow slip? **(4)** Do short-term hydrological variations facilitate SSEs or is there no relationship? **(5)** How do fluid chemistry, pressure, temperature, and fluid flux (near the surface and at the SSE source) vary in response to SSEs? **(6)** What control does temperature have on the down-dip limit of the seismogenic zone and the depth to slow slip events? **(7)** Is the structural character and frictional properties of the subduction interface dominated by aseismic slip and moderate subduction thrust earthquakes (i.e., Northern Hikurangi) fundamentally different from that of subduction interface faults characterized by stick-slip behaviour and great megathrust earthquakes (such as Nankai)?

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Completion of the objectives will require development of one or more long-term borehole monitoring systems, based on existing CORK and LTBMS designs for both JOIDES Resolution and Chikyu drilling. Non-standard downhole measurements using the MDT (Modular Dynamic Tester) or similar for in situ pore pressure, stress, and permeability data may be required.

Proposed Sites:

SEE INDIVIDUAL PROPOSALS FOR EACH PHASE OF THE PROJECT FOR SITE DESCRIPTIONS

Proposal history

781-MDP Hikurangi Subduction Margin

Date	Proposal_Submission	Review_Type	Watchdogs
1-Oct-10	Pre		
12-Nov-10		SSEP	Casey Moore, Masanobu Yamamoto, Xin Su, Yoshinori Takano
4-Feb-11		SSP	Yoshio Inouchi, Peter Clift, David Mallinson
1-Oct-11	MDP		
3-Dec-11		PEP	MacLennan, Yamada, Moulin

IODP Proposal Cover Sheet

781B - Full

Hikurangi: Riser

Title: Unlocking the secrets of slow slip by drilling at the northern Hikurangi subduction margin, New Zealand: Riser drilling to intersect the plate interface

Proponents: L. Wallace, Y. Ito, S. Henrys, P. Barnes, D. Saffer, S. Kodaira, H. Tobin, M. Underwood, N. Bangs, A. Fagereng, H. Savage, S. Ellis, .. The Hikurangi Margin Working group,

Keywords: SSEs subduction Hikurangi earthquakes fluids

Area: New Zealand

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Abstract

Over the last decade, the discovery of episodic slow slip events (SSEs) at subduction margins around the globe has led to an explosion of new theories about fault rheology and slip behavior along subduction megathrusts. The northern Hikurangi margin is the only place on Earth where well-documented SSEs occur on a subduction interface within range of scientific drilling capabilities. Drilling, down-hole measurements, and sampling of the northern Hikurangi SSE source area provides a unique opportunity to definitively test hypotheses for the physical conditions and rock properties leading to SSE occurrence, and ultimately, to unlock the secrets of slow slip.

This proposal is for the deep, riser drilling component of a recently submitted Multi-phase Drilling Project (781-MDP) proposal for IODP drilling to discern the mechanisms of subduction zone slow slip events (SSEs) by scientific drilling in the region of shallow SSEs at northern Hikurangi. The primary aims of the riser phase are to sample, log, and conduct downhole measurements in the hanging wall and across the plate interface where SSEs occur.

Here, we propose a single riser borehole intersecting the plate interface at 5-6 km bsf, to collect samples, geophysical logs and make downhole measurements at the source of SSEs. The riser borehole is designed to address two fundamental scientific objectives: (1) characterize the composition, mechanical properties, and structural characteristics of the megathrust in the slow slip source area; and (2) characterize hydrological properties, thermal regime, stress, and pore pressure state above and within the SSE source region. Together, these data will test a suite of hypotheses about the fundamental mechanics and behavior of slow slip events, and their relationship to great subduction earthquakes. Without direct sampling of rocks from the SSE source and in situ measurements of physical properties (as proposed here), geoscientists are limited to speculation regarding the mechanisms that lead to SSEs.

We also expect that comparisons between cores and logs from deep, riser drilling of the subduction interfaces at both north Hikurangi and Nankai (the NanTroSEIZE project) will address the mystery of why some subduction zones rupture in Great earthquakes (e.g., Nankai), while others are dominated by aseismic creep (e.g., N. Hikurangi).

Scientific Objectives

Drilling, coring, geophysical logging, and downhole measurements will resolve competing hypotheses and key questions regarding the generation of slow slip and the mechanics of subduction interface thrusts. Major questions that will be addressed are:

(1) What control does temperature and pressure have on the down-dip limit of the seismogenic zone and the depth of slow slip events? (2) Does high fluid pressure at the plate interface influence the occurrence of SSEs, and what role do mineralogical dehydration transformations play in the supply of fluids to the SSE source area? (3) What are the lithologies hosting slow slip, and do they promote conditional stability? If so, do fast seismic slip and slow aseismic slip occur in the same location on the interface? Do SSEs represent prematurely arrested normal earthquakes, as is suggested from dynamic weakening in laboratory friction tests? (4) Are the structural character and frictional properties of a subduction interface dominated by slow, aseismic slip and moderate subduction thrust earthquakes (i.e., Northern Hikurangi) fundamentally different from that of subduction interface faults characterized by stick-slip behaviour and great megathrust earthquakes (such as Nankai)?

Non-standard measurements technology needed to achieve the proposed scientific objectives.

LWD tools: As complete a suite as is possible and practical for logging-while-drilling LWD) should be employed. At a minimum azimuthal resistivity imaging, sonic velocity, density and neutron porosity, gamma, and annular pressure logging are requested.

In situ pore pressure and stress measurements: a packer-based or similar wireline or LWD tool that can be used to conduct pumping and drawdown tests and mini-frac experiments (one example is the Schlumberger modular dynamic tester, or MDT, tool) is important to measure both stress and hydrogeologic state of the slow slip environment and upper plate.

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
HSM-01B	-38.727283, 178.614233	994	6000	0	6000	1.Coring and logging to assess physical properties and rock composition within and above the upper plate above SSE source region 2. Case and install temporary SSE observatory hole between drilling phases 3. Case and install long-term borehole observatory when the hole is completed

Proposal history

781B-Full Hikurangi: Riser

Date	Proposal_Submission	Review_Type	Decision
1-Apr-13	Full		
	21-Jun-13	PEP	External Review

IODP Proposal Cover Sheet

707 - MDP

Kanto Asperity Project: Overview

Title	Kanto Asperity Project: Geological and Geophysical Characterization of the Source Regions of Great Earthquakes and Slow Slip Events
Proponents	R. Kobayashi, Y. Yamamoto, T. Sato, T. Nishimura, C. Moore, M. Shishikura, D. Curewitz, N. Hayman, E. Shalev, P. Henry, T. Hirono, T. Hori, K. Koketsu, P. Malin, M. Matsu'ura, S. Nakao, T. Sagiya, H. Sato, R. Stein, W. Thatcher, N. Takahashi, K. Ujiie, K. Wang, M. Tanahashi, B. Shibazaki, S. Lallemant, J. Beavan,
Keywords	Earthquakes, Slow Slip, Monitoring, Asperity
Area	Central Japan margin

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Abstract:

The Kanto Asperity Project proposes a drilling and long-term monitoring program in the southern Kanto region of southeastern Japan with the aim of determining the characteristics of the plate boundary in and around the source regions (asperities) of great earthquakes and slow slip events (SSEs). This region (Tokyo Metropolitan Area) is a densely populated economic center that has been subjected to repeated great earthquakes.

Recent progress in supercomputer technology has enabled numerical simulations of the generation cycles of earthquakes and SSEs, but the parameters are not based on scientific data, and are not sufficiently reliable to assess the hazards associated with future earthquakes. The establishment of a realistic earthquake-generation model is of crucial importance in mitigating the danger posed by earthquake geohazards.

Three different types of slip events have occurred at similar depths; the 1923 Taisho Kanto earthquake, 1703 Genroku earthquake, and SSEs off Boso Peninsula. In the cases of Nankai and Cascadia, SSEs occur at deeper levels than the asperities, and the location can be controlled by temperature and pressure. The Boso SSEs occur at the same level as the asperities, raising the possibility that the conditions (materials, fluids, or surface roughness) in the Kanto region are different to those encountered at Nankai and Cascadia.

Our main objectives are to understand why the different types of events occur side by side at almost same depth (Objective 1) and to establish realistic earthquake-generation models using data on each step of the process of SSEs and data on frictional experiments (Objective 2).

This Multi-phase Drilling Project consists of the three programs. Program A proposes ultra-deep drilling to intersect plate boundaries in the Boso SSE region and the Taisho asperity to compare the geological materials at the two sites. Coring and logging at plate boundaries would also yield realistic frictional properties and effective normal stress, as derived from experiments and from measurements of pore pressure, respectively. Program B proposes long-term monitoring (borehole observatories) for recording in detail crustal deformations and seismicity during 2-3 cycles of Boso SSEs, enabling testing of the hypothesis that SSEs can be used to assess the validity of earthquake generation models. Program C proposes drilling at four sites to recover input materials from the Philippine Sea Plate. The cores, and the results of frictional experiments using the core materials, will be used to test the hypothesis that the different types of slip arise from different input materials.

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Scientific Objectives

We propose two main objectives to be achieved.
Objective 1: To understand why the three different types of events occur laterally, at similar depths in the Sagami Trough.
Objective 2: To establish realistic earthquake-generation models using data obtained at each step of the generation cycle of natural earthquakes.
To achieve these objectives, three programs A-C will test the following hypotheses.
For Objective 1:
Hypothesis 1-1: The different types of slips arise from different input materials.
Coring and logging at four sites on the Philippine Sea Plate just before subduction to identify and characterize the input materials (Program C).
Hypothesis 1-2: Coupling strength depends on elapsed time after subduction.
Ultra-deep drilling to intersect plate boundaries in the Taisho asperity and the SSE region to compare core materials, diagenetic and metamorphic conditions, pore-water chemistry. (Program A).
For Objective 2:
Hypothesis 2-1: The Boso SSEs can be used to assess models of earthquake generation.
Long-term monitoring for recording in detail of tilt, pressure, and seismicity during 2-3 cycles of Boso SSEs, to establish physical model of SSE cycle so as to interpret the observed spatio-temporal behavior (Program B). The model of SSEs is applied to that of earthquake generation.
Hypothesis 2-2: Constitutive parameters obtained from fault zone materials and pore pressure in a fault zone can be incorporated into numerical simulations of earthquakes.
Ultra-deep drilling to intersect plate boundaries to yield realistic frictional properties and pore pressures, as derived from experiments on recovered materials and by logging, respectively (Program A).

Non-standard measurements technology needed to achieve the proposed scientific objectives.

Extensive logging (Vp, Vs and anisotropy), in situ experiment, such as pore pressure, hydraulic properties and stress tensor, VSPs, and oriented cores are necessary for the initial values for geodetic and seismic monitoring. Long-term monitoring observatories will require tiltmeters, broadband seismometers, accelerometers, and pressure gauges installation.

Proposed Sites

Site Name	Position (Lon, Lat)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	

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Proposal history

707-MDP Kanto Asperity Project

Date	Proposal_Submission	Review_Type	Watchdogs
2-Apr-06	Pre		
31-May-06		SSEP	Jaeger, Yamazaki, Anma, Hirono, Fulthorpe
26-Jul-06		SSP	Osamu Takano, Alistair Harding, Roger Searle
30-Sep-06	Full		
16-Nov-06		SSEP	Julia Morgan, Mike Gurnis, John Jaeger, Glenn Spinelli, Mio Takuchi
22-Feb-07		SSP	Nathan Bangs, Xuelin Qiu, Roger Searle
2-Apr-07	Full2		
31-May-07		SSEP	Julia Morgan, Mio Takeuchi, Luc Lavier, Mike Underwood, Ken Takai
20-Jul-07		SSP	Sean Gulick, Akiko Tanaka, Roger Searle
30-Aug-07	CDP	SPC	CDP Designation of 707-Full2
1-Apr-09	CDP2		
28-May-09		SSEP	Rob Zierenberg, Jun-ichi Kimura, Daniele Brunelli, Tim Elliott, Achim Kopf
1-Oct-10	CDP3		
12-Nov-10		SSEP	Katsuyoshi Michibayashi, Mio Takeuchi, Julie Carlut, John Jaeger
3-Aug-11		SSP	Yasuyuki Nakamura, Andrew Goodliffe, William Sager
3-Dec-11		PEP	Strasser, Moulin, Michibayashi
1-Oct-12	MDP2		
12-Dec-12		PEP	

Received 1 October 2010

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■ **New** ☐ **Revised** ☐ **Addendum**

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Title:	Kanto Asperity Project Program A Geophysical/geochemical properties of slow slip and stick–slip asperities in the southern Kanto region –investigation of factors that produce different types of seismicity under the same P–T conditions–
Proponent(s):	Y. Yamamoto, T. Hirose, T. Sato, C. J. Moore, M. Shinohara, B. Shibazaki, R. Kobayashi, N. Takahashi, S. Miura, D. Curewitz, T. Ito, P. Malin, T. Sagiya, K. Ujiie, S. Lallemant, P. Henry, and K. Koketsu
Keywords: *(5 or less)*	slow-slip earthquake, earthquake generation model, geohazard — Area: Central Japan margin

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Permission to post abstract on IODP Web site: ■ Yes ☐ No

Abstract: *(400 words or less)*

Program A of the Kanto Asperity Project (KAP) proposes to drill through and retrieve drillcore from asperities at two sites in the southern Kanto region of central Japan, which show contrasting patterns of seismicity: (1) a slow slip asperity located southeast of Boso Peninsula (maximum slip of 15–20 cm over ~10 days, with a recurrence interval of 5–6 years); and (2) the asperity of the 1923 M~7.9 Taisho-Kanto earthquake, located in Sagami Bay (maximum slip of approximately 6 m, with a recurrence interval of 200–400 years). This program would involve detailed analyses of core materials collected from the asperities of both normal earthquakes (episodic hazardous earthquakes) and slow slip events (SSEs) drilled by the D/V *Chikyu* in the actively deforming KAP region, with the aim of (1) determining the constitutive parameters of fault zone materials, which can then be incorporated into numerical simulations of earthquakes; and (2) resolving important questions such as the nature of the physico-chemical properties of materials in areas where SSE/normal earthquakes occur. The main scientific objectives of this program are as follows:

A) Determine the nature of spatial variations in the constitutive parameters within the framework of a rate and state friction law.
B) Assess the distribution of fluid pressure along subduction fault zones.
C) Determine the conditions of diagenesis and low-grade metamorphism associated with SSE and normal earthquakes.
D) Constructing optimum earthqauke generation model based on the nature of fault rocks and fault structure encountered in the boreholes.

KAP provides the best opportunity to evaluate the earthquake-generation model which will be proposed by KAP Proposal-B (770-Full) by determining the values of the constitutive parameters from fault zone materials, *in situ* fluid pressure (e.g., effective normal stress) around the fault zone, and the diagenetic/metamorphic conditions of the fault zone. The values of parameters in the constitutive law can be measured by laboratory friction experiments on the fault zone materials to be recovered from the asperity/SSE regions. Spatial differences in effective normal stress may reflect spatial variations in pore-fluid pressure along the faults. The preliminary simulation predicts higher pore-fluid pressure in SSE regions. Therefore, measurements of pore fluid pressure in both the asperity and non-asperity regions would be important in revealing which factors cause the different events. Thus, ultra-deep drilling through both stick-slip/SSEs regions is the only way to assess the validity of the current simulation of earthquake generation around the KAP region.

782-Pre

Scientific Objectives: (*250 words or less*)

To (1) determine realistic constitutive parameters from fault zone materials, which can then be incorporated into numerical simulations of earthquakes; and to (2) resolve important questions such as the nature of the physico-chemical properties of fault-zone materials in areas where SSE/normal earthquakes occur, this proposal is designed to reach the following four scientific objectives.

A) Determine the nature of spatial variations in the constitutive parameters within the framework of a rate and state friction law.

B) Assess the distribution of fluid pressure along subduction fault zones.

C) Determine the conditions of diagenesis and low-grade metamorphism associated with SSE and normal earthquakes.

D) Constructing optimum earthquake generation model based on the nature of fault rocks.

The parameters employed in the constitutive law can be measured by laboratory friction experiments on the fault zone materials to be recovered from asperity/SSE regions (Objective A). Since the preliminary simulation predicts higher pore-fluid pressure in the SSE region, measurements of fluid pressure (Objective B) in both regions are important in terms of identifying those factors that cause the different events. Comparative study of diagenetic/metamorphic conditions, pore-water chemistry, and core materials (Objective C) would reveal the materials that make up the SSE/normal earthquake regions and diagenetic/metamorphic reactions that control variations in the parameters of the constitutive law and distribution of fluid pressure. The earthquake generation model that will be proposed by Program B will be verified using the parameters detected directly from core samples (Objective D), leading to construction of the most optimum earthquake generation model.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Extensive logging (Vp, Vs and anisotropy), in situ experiment, such as pore pressure, hydraulic properties and stress tensor, VSPs, and oriented cores are necessary for the initial values for geodetic and seismic monitoring.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
KAP-7	34.46143N/ 140.32372E	1880	6900	50	6950	Core SSE fault material and in-situ pressure measurement
KAP-8	35.09214N/ 139.26155E	900	6500	0	6500	Core asperity material in the Taisho-Kanto earthquake (hazardous earthquake) and in-situ pressure measurement

Proposal history

782-Pre Kanto Asperity Project: Plate Boundary Deformation

Date	Proposal Submission	Review Type	Watchdogs	Decision
1-Oct-10	Pre			
12-Nov-10		SSEP	Ryo Anma, Joerg Erzinger, Masa Kinoshita, Tomoaki Morsihita	Develop full
4-Feb-11		SSP	Gabriele Uenzelmann-Neben, Koji Kashihara, Yasuyuki Nakamura	
3-Aug-11		SSP	Gabriele Uenzelmann-Neben, Mikiya Yamashita, Akiko Tanaka	
3-Dec-11		PEP	Michibayashi, Neal	Submit Full proposal

IODP Proposal Cover Sheet

SloMo

800 - MDP

Title	Nature of the Lower Crust and Moho at Slower-spreading Ridges
Proponents	H. Dick, J. Natland, S. Arai, P. Robinson, C. MacLeoc, M. Tivey, I. Benoit, G. Ceuleneer, D. Teagle, K. Ozawa, M. Godard, J. Miller, R. Tribuzio, H. Kumagai, M. Kurz, J. Koepke, S. Miyashita, J. Maeda, R. Pedersen, J. Canales, G. Hirth, J. Lisenberg, A. Yoshinobu, H. Zhou, W. Bach, J. Snow, K. Edwards, V. Edgecomb, Y. NIu, A. Sanfilippo, . France, F. Klein, M. tominaga, T. Schroeder, N. Abe, B. Payot, M. Python, Y. Harigane, V. LeRoux,

Keywords	Moho Crust	Area	Southwest Indian Ridge

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Abstract:

This multi-phase drilling proposal is to drill through the Atlantis Bank gabbroic massif into mantle 2.2 km NE of 1.5-km deep Hole 735B to 500-m below Moho. There are 2 major objectives. First to recover the lowermost gabbros and crust-mantle transition to understand the processes creating Mid-Ocean Ridge Basalt – the most abundant magma type on Earth, and second, resolve the controversy as to whether the Moho at slow spreading ridges can be a serpentinization front. Based on geologic mapping, geochemistry, and seismic refraction the igneous crust-mantle boundary below Atlantis Bank is believed ~2.5 km above Moho. This is an ideal location, then, to test the serpentinization front hypothesis for Moho. If successful in penetrating serpentinized mantle, the drilling may not only extend the limits for life, but also document an entire new planetary biosphere below the ocean crust.

The drill site is at the center of the 700-km2-gabbro massif where the crust-mantle transition is most fully developed at the likely point of focused melt delivery from the mantle. This will test competing hypotheses for MORB petrogenesis: one supported by experimental petrology that it segregates at depths of 10 to 30 km where MORB melts would be last in equilibrium with the olivine and two pyroxene mantle assemblage, and then transported to the crust with little additional mantle interaction. The alternative hypothesis is that MORB aggregates and pools in the mantle at the base of the crust, where melt-rock reaction with the mantle and lower crust, significantly modifies the melt composition prior to intrusion to higher levels and eruption to the seafloor. The latter process has two major implications: 1) the assumed composition of primary magmas, based on compositions calculated assuming that MORB is produced by simple fractional crystallization of a parental melt is incorrect, and that 30 years of experimental petrology has used the wrong composition and model in predicting mantle-melt equilibrium, and 2) that mantle hybridized by melt-rock reaction at the base of the crust contributes significantly to the bulk composition of the crust. The results will profoundly affect understanding of magma generation and the linkages between the mantle, melt, and crust.

Combined with the existing holes the drilling will produce a transit spaced at ~ 1-km intervals to look at lateral heterogeneity of the crust, test the nature of magnetic reversals in plutonic rock, and document the stress-strain evolution of a plate boundary undergoing asymmetric seafloor spreading.

800 - MDP

Scientific Objectives

There are two principle objectives:
I. Test the hypothesis that the Moho beneath Atlantis Bank is a serpentinization front.
II. Recover the igneous lower crust and the crust-mantle transition at an average melt flux for slow and ultraslow-spreading ridges.
From this we seek to understand:
• The igneous stratigraphy of the lower crust
• How much mantle material is incorporated into the lower crust.
• How melt is transported through and emplaced into the lower crust
• How the lower crust and shallow mantle shapes the composition of mid-ocean ridge basalt, the most abundant magma on Earth?
• The primary modes of accretion of the lower crust.
• Lateral heterogeneity of the lower crust at magmatic time scales.
• The distribution of strain in the lower crust and shallow mantle in the shallow lithosphere during asymmetric seafloor spreading.
• The nature of magnetic anomaly transitions in the lower crust.
• The role of the lower crust and shallow mantle in the global carbon cycle.
• Life in the lower crust and hydrated mantle.
This drilling will:
Provide an important step towards a full penetration in the Pacific by providing critical needed experience in deep drilling in lower crustal and mantle rock.
Create a laboratory for hole-to-hole and ship-to-hole experiments for in-situ determination of the seismic character of lower crust and mantle rock at a seismically appropriate scale.

Non-standard measurements technology needed to achieve the proposed scientific objectives.

biogeochemical tools

Proposed Sites

Site Name	Position (Lon, Lat)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
AtBk-3	32.6716, 57.29166	700	0	1000	1000	AtBk-3 lies on the northernmost lip of the Atlantis Bank Platform and has the objective of examining the shallow igneous and high-temperature detachment deformation history at a significantly later point in its history (~500,000 yrs) than at either AtBk-1 or 1105A or 735B. We would occupy this location in the event that we were unsuccessful in spudding in at AtBk-2.
AtBk-2	32.68333, 57.339166	1700	3	1000	1003	Drill the dike-gabbro transition in ultraslow spread crust to examine the history of alteration, deformation and intrusion
AtBk-1a	32.7125, 57.28516	700	0	6000	6000	I. Test the hypothesis that the Moho beneath Atlantis Bank is a serpentinization front. II. Recover the igneous lower crust and the crust-mantle

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by if340_pdf / kk+w 2007 - 2011
(user 0.4043)

Proposal history

800-MDP Indian ridge Moho

Date	Proposal_Submission	Review_Type	Decision
1-Apr-12	Full		
15-May-12			
1-Oct-12	MDP		
12-Dec-12		PEP	
2-Mar-13	PRL		
29-Mar-13		PEP	Forward to JRFB

Received 25 March 2012

805-MDP

IODP Proposal Cover Sheet

☒ **New** ☐ **Revised** ☐ **Addendum**

Please fill out information in all gray boxes

Above For Official Use Only

Please check if this is Mission proposal ☐

Title:	MoHole to Mantle (M2M)
Proponent(s):	Susumu Umino, Benoît Ildefonse, Peter B. Kelemen, Shuichi Kodaira, Katsuyoshi Michibayashi, Tomoaki Moroshita, Damon A.H. Teagle, and the MoHole proponents (full list inserted after the reference list)
Keywords: *(5 or less)*	Mantle, Moho, oceanic lithosphere, oceanic crust, Mid-Ocean Ridge processes, hydrothermal cooling, carbon cycle, ultradeep drilling
Area:	Central/East Pacific

Contact Information:

Contact Person:	Katsuyoshi Michibayashi		
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Permission to post abstract on IODP Web site: ■ Yes ☐ No

Abstract: (*400 words or less*)

The M2M project will sample for the first time upper mantle peridotites that in the near geological past resided in the convecting mantle, and recently (~20 to 100 Myrs) underwent partial melting at a fast-spreading mid-ocean ridge. This will be achieved by drilling through intact fast-spread oceanic crust, and ~500m into the mantle lithosphere. This first in-situ sampling of fresh upper mantle rocks will provide hitherto unattainable information on the chemical and isotopic composition (including fluid mobile elements K, U, C, S, H_2O, noble gases), physico-chemical conditions (e.g., fO_2, fS), seismic velocities and magnetic signatures, physical properties deformation and rheology, and the scales of chemical and physical heterogeneity of the uppermost mantle. This information is essential to understand the formation and evolution of Earth, its internal heat budget, planetary differentiation and reservoir mixing by mantle convection, mantle melting, and melt focusing and transport at mid-ocean ridges.

On the descent to the mantle, the ultradeep hole (MoHole) will sample fast spreading ocean crust, and make the first in situ observations of the geological nature of the Mohorovičić Discontinuity (Moho), the uppermost primary seismic boundary in the Earth, assumed to be the crust-mantle boundary. Fast spreading ocean crust is targeted because it exhibits relatively uniform bathymetry and seismic structure, and is the great majority of crust recycled back into the mantle by subduction during the past 200 Myrs. Sampling a section of intact oceanic crust will test models of magmatic accretion at mid-ocean ridges, quantify the geometry and vigor of hydrothermal cooling and geochemical exchanges with the oceans, identify the limits of life in the sub-seafloor biosphere and its functions, and ground-truth remote geophysical observations.

This proposal provides the scientific justification for drilling a >6000 m borehole to the mantle. The rationale has been developed by six workshops since 2006, and summarizes the scientific state-of-the-art, and the current vision for engineering and technology development, and operations. M2M directly addresses Challenges 6, 8, 9 and 10 of the 2013-2023 IODP Science Plan. A site for mantle drilling has yet to be selected, but three potential target regions await additional site surveys.

Drilling into the mantle will be the most ambitious undertaking ever achieved by the geoscience community and must engage the full spectrum of scientific expertise. Observations of pristine upper mantle will transform our understanding of the evolution of our planet and challenge the fundamental paradigms that are the foundations of Earth science.

805-MDP

Scientific Objectives: (*250 words or less*)

The M2M project echoes long-term goals of Earth scientists since the late 1950's, to understand the oceanic lithosphere. With a MoHole, we will address first-order questions about the composition and structure of the Earth's convecting mantle, the geological nature of the Moho, the formation and evolution of oceanic crust, and the deep limits of life. Specific objectives of M2M are to:

- Determine the in-situ composition, structure and physical properties of the uppermost mantle, and the physics and chemistry of mantle melting and melt migration processes,
- Determine the scales of physical and chemical heterogeneity of the uppermost mantle,
- Determine the geological meaning of the Moho in fast-spread lithosphere,
- Determine the bulk composition of the ocean crust to establish the relationship between lavas at the seafloor and the melts that separated from their mantle sources,
- Determine the mode of magmatic accretion at fast spreading ridges,
- Understand the extent and intensity of hydrothermal exchange between ocean crust and seawater, and estimate the chemical flux returned to the mantle by subduction,
- Determine the contribution of the lower ocean crust and upper mantle to global geochemical cycles, including carbon and water,
- Establish the limits, and controlling factors of life in the ocean lithosphere.
- Calibrate regional seismic measurements against core samples and borehole experiments, including long-term geophysical and microbiological monitoring,
- Understand the origin of marine magnetic anomalies and quantify the contribution of lower crustal rocks to the magnetic signature of the ocean crust.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Continuous mud circulation (water depth > 3500 m); coring, logging, and fluid/gas sampling in a high temperature (≥ 200°C) environment; specialized drill bits for abrasive, hard, hot rocks; specialized drill string with high tensile strength; low weight, special drilling mud for use at high temperature; new casing and cementing materials and strategies; …

Proposed Sites:

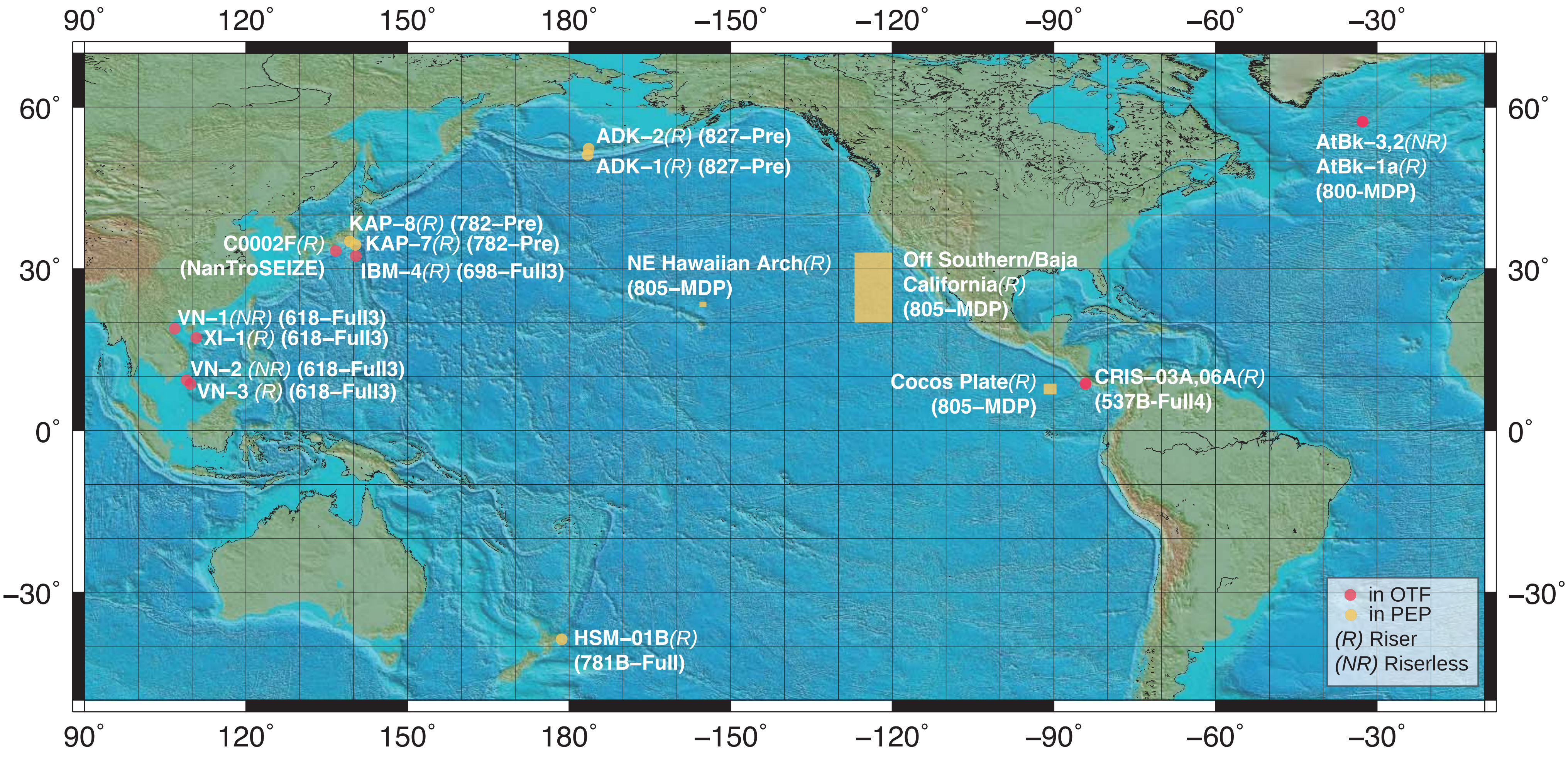
Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
Cocos Plate	6.7-8.7°N 89.5-91.9°W	3400-3650	250-300	>6000	>6000	
Off Southern/Baja California	20-33°N 120-127°W	Mostly 4000-4500	80-130	>6000	>6000	**MoHole site is yet to be determined, and other options may be considered**
NE Hawaiian Arch	22.9-23.9°N 154.5-155.8°W	4050-4500	~200	>6000	>6000	

Proposal history

805-MDP MoHole to the Mantle

Date	Proposal_Submission	Review_Type	Watchdogs
1-Apr-12	MDP		
15-May-12		PEP	

Proposed IODP Riser Drilling Sites/Areas



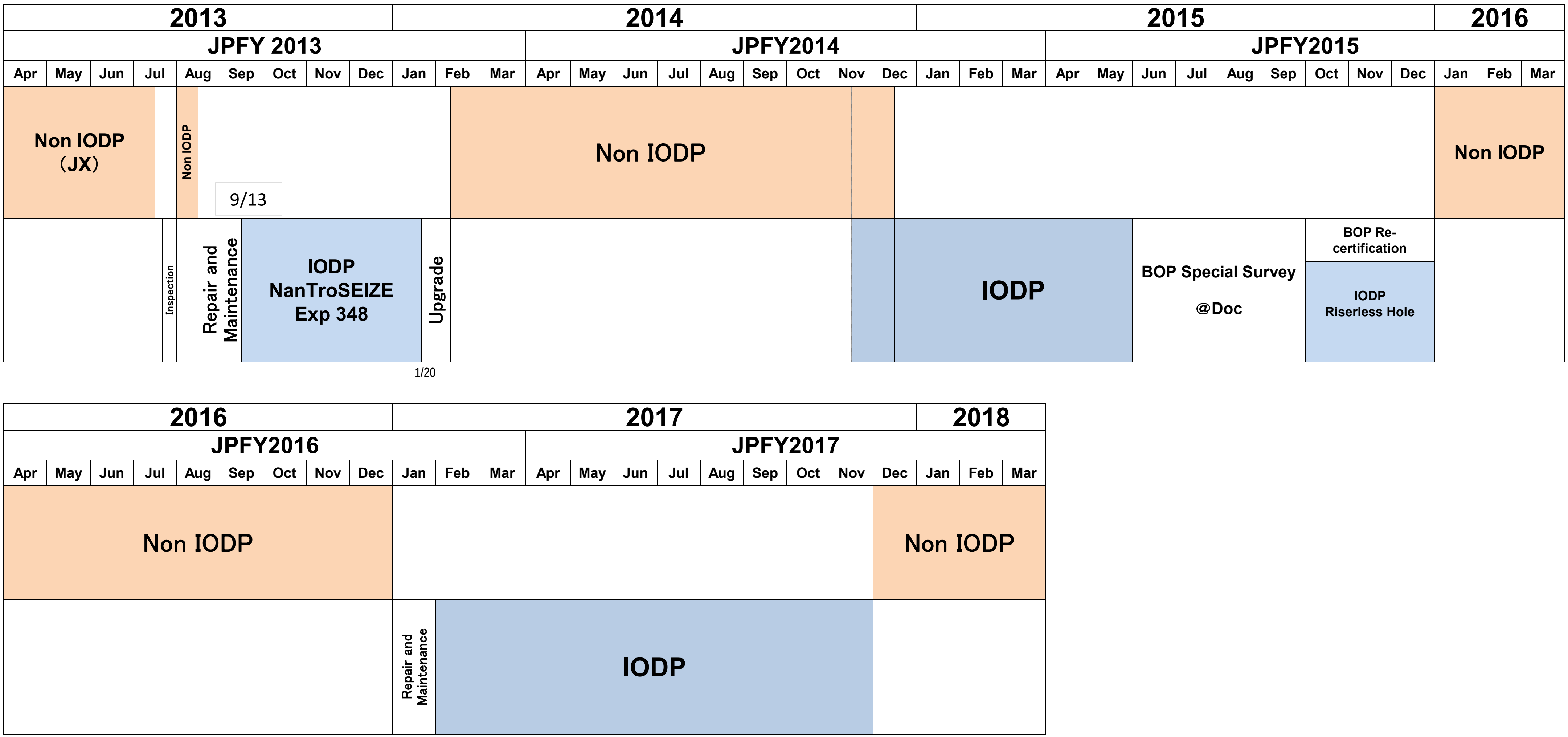
Agenda Item 13

Long-term Planning

- Post NanTroSEIZE Expeditions
    - *Chikyu* Long-term schedule
- *Chikyu* Riserless Expeditions

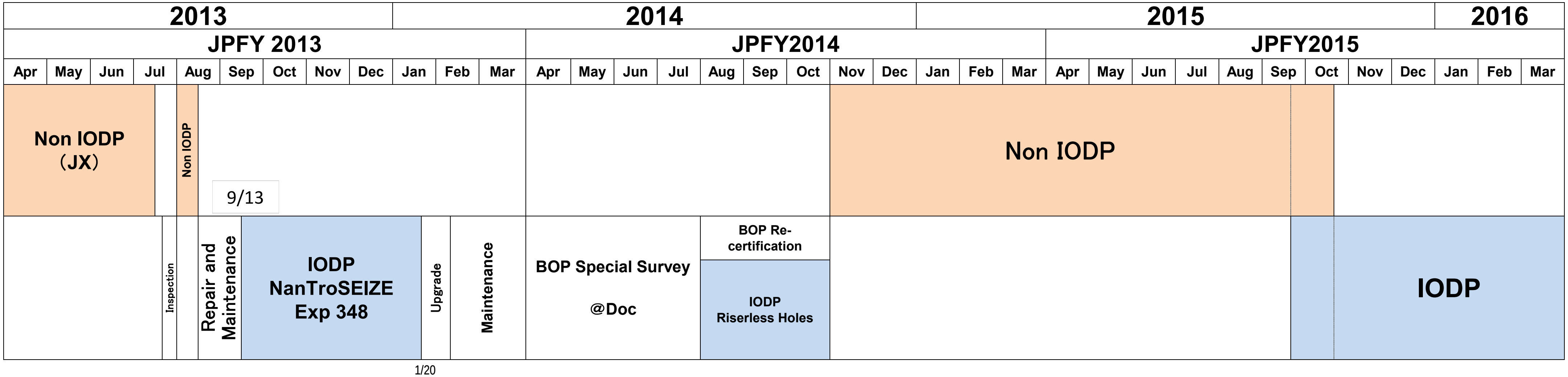
Chikyu Long term schedule(Plan A)

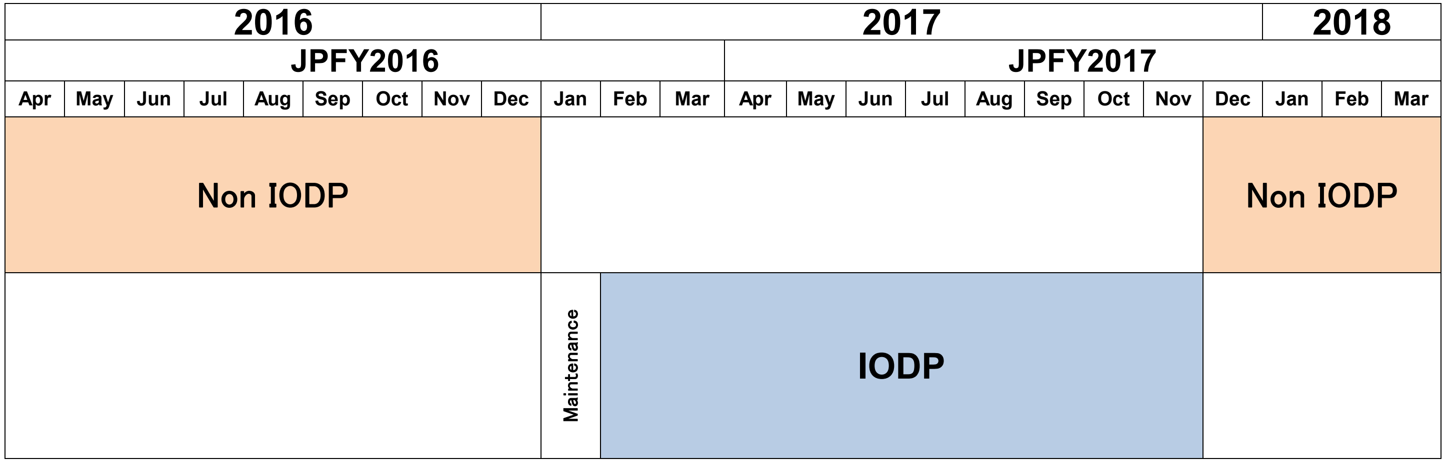
CDEX 2013/JUN/27



Chikyu Long term schedule(Plan B)

CDEX 2013/JUN/27





Agenda Item 14

Toward project advancement

- PCT Establishment
- WS planning
- TAT Discussion Items

Agenda Item 15

International collaboration

- Cooperation with ECORD and JR FBs
  - Berth exchange program document with NSF
  - Draft minutes of #1 ECORD FB meeting
  - Draft minutes of #1 JR FB meeting
- *Chikyu* new member recruitment

March 11 2012

Scientific Exchange Program Between USA and Japan under International Ocean Discovery Program (IODP)

This document confirms our agreement with regards to scientific exchange between Japan and the United States per Items No. 15 and 16 under the Program Exchange section in the International Ocean Discovery Program (IODP) framework document.

The U.S. and Japan will exchange scientists aboard the *JOIDES Resolution* and *Chikyu* with the objective to have the same number of total scientists exchanged annually. Specifically, four Japanese scientists will sail on each expedition of the *JOIDES Resolution* for an approximate total of 16 Japanese scientists per year (assuming four *JOIDES Resolution* expeditions per year). The same annual number of berths for U.S. scientists (16) will be made available for *Chikyu* expeditions. Factors such as geographic interest, the number of annual expeditions/expedition days, intellectual contributions, size of the scientific party, etc may also be considered in determining berths per expedition.

This agreement will be implemented October 1, 2013 through September 30, 2014 and revisited annually thereafter.

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ECORD Facility Board #1

March 7th and 8th, 2013

British Geological Survey, Edinburgh, UK

MINUTES Draft

Roster

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* Apologies

LIST OF ACRONYMS

ACEX	Arctic Coring Expedition, Expedition 302
ANZIC	Australia-New Zealand IODP Consortium
AP	Advisory Panels
APL	Anciliary Project Letter
APP	Annual Program Plan
BGS	British Geological Survey
BoG	IODP-MI Board of Governors
CIB	Chikyu Implementation Board
CMO	Central Management Office
CPP	Complementary Pre-Proposals
DIS	Drilling Information System
DLP	Distinguished Lecturer Program
EB	Executive Board
EC	European Commission
ECORD	European Consortium for Ocean Research Drilling
EDP	Engineering Development Panel
E-FB	ECORD Facility Board
EMA	ECORD Managing Agency
EPC	European Petrophysics Consortium
EPSP	Environmental Protection and Safety Panel
ESO	ECORD Science Operator
ESSAC	ECORD Science Support and Advisory Committee
ETP	ECORD Technology Panel
FB	Facility Board
ICDP	International Continental Scientific Drilling Program
ILP	ECORD Industry Liaison Panel
INSU-CNRS	Institut National des Sciences de l'Univers, France
IODP	Integrated Ocean Drilling Program
IODP	International Ocean Discovery Program
IODP-MI	IODP Management International, Inc.
IOs	Implementing Organizations
IWG+	International Working Group +
JAMSTEC	Japan Marine Science & Technology Center
JFAST	Japan Trench Fast Drilling Project
JR	JOIDES Resolution

KCR	Kochi Core Repository
KIGAM	Korea Institute of Geosciences and Mineral Resources
LAs	Lead Agencies
MARCOM project	Towards an Integrated Marine and Maritime Science Community project
MDP	Multiple-phase Drilling Proposal
MEXT	Ministry of Education, Culture, Sports, Science & Technology
MOST	The People's Republic of China Ministry of Science and Technology
MoU	Memorandum of Understanding
MSCL	Multi Sensor Core Logger
MSPs	Mission-specific platform
NanTroSEIZE	Nankai Trough Seismogenic Zone Experiment
NERC	Natural Environment Research Council, UK
NJSS	New Jersey Shallow Shelf
NSF	National Science Foundation, USA
NSF-OCE	NSF Ocean Sciences
NWO	Netherlands Organisation for Scientific Research
ODP	Ocean Drilling Program
OSP	Onshore Science Party
OTF	Operation Task Force
PCT	Project Coordination Team
PEP	Proposal Evaluation Panel
PMO	Program Member Offices
PMT	Project Management Team
POC	Platform Operation Costs
PPO	Project Partner Office
RMS	Routine Microbiological Samples
SAS	Science Advisory Structure
SIPCOM	Science Implementation and Policy Committee
SCP	Site Characterization Panel
SO	Support Office
SOC	Science Operation Costs
SPC	Science Planning Committee
SSC	Magellan Plus Science Steering Committee
SSDB	Site Survey Data Bank
ToR	Terms of Reference
USAC	U.S. Science Advisory Committee
USIO	U.S. Implementing Organization
USSP	U.S. Science Support Program
US-JR FB/ JR-FB	U.S. JOIDES Resolution Facility Board
VTF	Vision Task Force

Thursday, March 7th 9:00 – 17:30

1. Introduction

1.1 - Call to order and opening remarks (K. Gohl)

K. Gohl, the E-FB Chair, welcomed all participants, members and observers of the E-FB. He said that he is a geophysicist who has been involved in IODP as a proponent and co-proponent. He reviewed the meeting agenda.

1.2 - Introduction of participants (K. Gohl)

All participants introduced themselves.

1.3 - Welcome and meeting logistics (D.McInroy)

D. McInroy, the meeting host, welcomed all of the participants.

1.4 - Rules of engagement (Robert's rules, COI policy, etc.) (K. Gohl)

K. Gohl reviewed the **'Robert's Rules' of Engagement**.
The meeting's official language is English. All participants were encouraged to be sensitive to the difference in native language and to speak slowly, to avoid slang and figures of speech, to be sensitive to differences in culture, and only one person should speak at a time. Also, when in debate, the members should not cross-talk or talk directly to each other, when another member is speaking. Each participant should request to speak through Chair and all participants should listen when others are speaking. Issues for which a vote must be made will be formalized by motions. The board members should understand the majority rules, but the rights of the minority are always protected, by assuring those members have the right to speak and vote. More details on how to run a meeting are described in: "Robert's Rules of Order: Newly Revised – In Brief", Da Capo Press, 2011.

Decision Making

The ECORD-FB (E-FB) will usually reach decision by **general consent**, i.e. when a motion is not likely to be opposed. Reasonable effort will be made to attain a general consent. If a motion fails to be approved by general consent, the Chair can decide either to defer further action, or to ask for a standard vote involving only the Science Board members. A motion will be accepted if approved by the majority of the votes that are cast at the meeting. Voting will be done usually by a 'show of hands'.

Conflict of Interest (COI)

All potential COIs should be declared at the start of every meeting, or at an otherwise appropriate time during the meeting. Members of the ECORD FB or other meeting attendees, determined as having a COI regarding an MSP-related proposal, should not be present when the relevant proposal is evaluated, considered for ranking, ranked, considered for scheduling, or scheduled. COIs will be documented in the meeting minutes.

K. Gohl asked if there is a conflict of interest. D. Dickens said that he is institutionally involved with some of the proponents. The E-FB decided that there is no COI at such a level of involvement.

1.5 - Meeting agenda approval (K. Gohl)

Motion 13-01-01: *The E-FB #1 meeting agenda is approved unanimously.*
G. Dickens, D. Weis seconded. All members in favor of the motion.

2. IODP Facility Boards

2.1 - New IODP architecture (T. Janecek, G. Camoin and S. Shibata)

T. Janecek introduced **the structure of the International Ocean Discovery Program**. He reminded that many of the details of how the organization works would have to be determined in meetings such as the FB.

There are **4 major elements** to the program:

First, there will be three independent platforms that will be overseen by its corresponding Facility Board, instead of via co-mingled funds. There will be the US-JR FB, the Chikyu Implementation Board for Japan, and the E-FB for ECORD. Second, the **Advisory Panels** will be available to all Platform Providers and will consist of the Proposal Evaluation Panel, the Site Characterization Panel and the Safety/Environment Panel. Third, the support office will address proposal processing and logistics support for panels and the websites. Fourth, the IODP Forum is the international body that is intended for both the monitoring and advising of the Platform Providers.

Platform provider management

Each platform will be funded independently: national or consortia funding for MSP, for the JR-FB there will be national funding stream from the NSF and early subscription from the partners ECORD Brazil, China, India, Australia and New Zealand. There will be a project-by-project participation. The platforms are overseen by the FBs, which include several scientists, the funding agencies and the operators. They address the yearly scheduling, long-term planning and policies, and procedures of facility. The **Core Archives** consist of cores that are distribution according to the current IODP guidelines. The three main repositories locations include one in the Gulf Coast, one in Bremen and the **Kochi Core Repository**. T. Janecek reminded that the FB would have to further address the future distribution of the cores. The platform providers are responsible for the publications, engineering development, data management, and other duties.

The **three Advisory Panels (PEP, SCP and EPSP**) are internationally staffed and available for use by the platform providers. The selected membership is determined by quotas, which are in turn determined by the contributions to the JR Consortium. The members are selected by the **Program's Member Offices**. The proposals from the PEP are forwarded directly to the FBs. T. Janecek reminded that SIPCom will disappear after FY 2013 and its duties will be transferred to the IODP Forum and the Facility Boards.

The **Support Office** will be a small office that consists of 5 people. It will be funded by the *JR* Consortium and its primary functions include the support of the advisory panels for the proposal handling (such as drilling and workshop proposals), the meeting logistics for the Advisory Panel, the Forum, and the *JR* FB, support of the site survey data bank and maintenance of the IODP website.

The Support Office functions on a 5-year cooperative agreement. The US expects to rate and select a support office by June/July with a 3-4 month transition between the current and new programs.

The **IODP Forum** will be the venue where all IODP entities will meet early. The primary functions of the forum are the monitoring of the science plan delivery and providing advice on the Platform Provider activity. The forum participants will include active community scientists, funding agencies, operators, program member offices and other participants. The IODP Forum will be chaired by one well-recognized scientist. K. Becker was chosen unanimously by the IODP Board of Governors. The support of the chair is provided by the home country. The ToRs have been developed by SIPCom and approved by IWG+.

T. Janecek introduced the structure with the corresponding money flows. He and G. Camoin are in the process of creating a structure that also includes the direction of the proposal flow.

He mentioned that project-by-project basis funding may occur for all of the platforms, which can come from members, industry and other countries.

The **Fundamental core of the new program** will not change from the current program. The Science Plan will remain the guiding scientific document. The proposals can be submitted for any platform, there will be internationally-staffed advisory panels. In addition, the scientific community heavily involved in scheduling and long-term planning for all platforms. The programs member offices are in charge of nominating scientists for platform berth and Advisory Panels.

D. Smith asked if the platforms are compulsory. T. Janecek said that both the US and Japan want the proposals to go through an international proposal review system. R. Gatliff said that ECORD will maintain these standards by using the safety panels.

D. Kroon asked for the number of proposal for the Support Office. T. Janecek said that there were a lot of good proposals that presented good competition. An external panel of scientists was invited to review the applications. The reviews will be evaluated internally and a decision will be made soon.

2.2 - *JOIDES Resolution* Facility Board (T. Janecek)

The first *JR*-FB will be held on March 18-20, 2013 in Washington D.C. The **FB has several primary tasks.** First, the FB determines the *JR*'s Schedule, including its annual and long-term regional track for up to 2-4 years, if possible, in order to give the community a sense where the platform is going in order to use the ship in a fiscally efficient way. Second, the FB approves the **Annual Facility Program Plan**, which involves the *JR*'s schedule, publications data management, core curation, and technological and scientific development. Third, the FB must approve the annual support office program plan that is created by the US operator. The plan includes items such as the proposal processing, the SSDB, the website, support of the Advisory Panel, the Forum, and *JR*-FB. Fourth, the FB oversees the Facility Advisory panels' ToR and monitors the panels' functionality. Fifth, the FB develops and monitors the facility policies, such as data publication, core curation, COI, and etc.

The JR Facility Board Roster

The JR-FB Roster includes the funding agencies, where one representative attends from US, ECORD, Brazil, Australia, China, Korea and India. In addition, the US operator and scientific community consisting of 5 international scientists and the Chair from the US, are invited to attend. The FB will be attended by liaisons, such as the PEP/SCP/EPSP chairs, the IODP Forum Chair, the Support Office Chair, ESO and JAMSTEC representatives. Several observers may attend from the additional funding agencies, the IO and PMO representatives. The meetings are open to all observers.

T. Janecek said that the US looks forward to the attendance of PMO representatives at the FB. He mentioned that in the previous week a panel has reviewed multiple proposals for the operation of the *JR*. The review will be completed in the next month and news will be released as to who will operate the *JR*.

The *JR*-FB was selected by open competition. The **scientific community members** selected from 22 applicants. The recommendations were sent to the FB, and the FB accepted. The following participants have been selected:

Heiko Palike	University of Bremen - 3 year term
Rick Murray	Boston University - 3 year term

Susan Humphris Woods Hole Oceanographic Inst) - 2 year term

Akira Ishiwatari Tohoku University - 1 year term

Gabe Fillipelli Indiana Univ Purdue Univ Indianapolis - 1 year term

Each member will first hold 1-2 year terms and then it is planned that the future science members will hold 3-year terms with a staggering rotation.

2.3 - *Chikyu* Facility Board (S. Shibata)

S. Shibata introduced the Chikyu Policy update. He reviewed the members' policy, proposed amendments of the Chikyu framework chapter, the Chikyu IODP CIB details, and the Project Partnership Office (PPO) policy.

Members' Policy

A **Regular Member** is defined as one who will provide regular funds to the *Chikyu* operations for multiple consecutive years and will receive benefits in return. The applicable party includes countries, research organizations, universities and/or their consortia. The minimum level dues per year would amount to $ 1 M USD. The benefits from such participation would include 1 berth per each *Chikyu* expedition per a contribution of $1 M USD and a membership status at the CIB.

A **Partnership Member** is defined as one who will provide modest funds to the *Chikyu* operations for multiple consecutive years and will receive benefits in return. This member is primarily targeted in order for new or smaller partners to help them enhance their capabilities in earth science. The applicable party involves countries, research organizations, universities and/or their consortia. The dues per year would amount to $300 k USD, which is a fixed amount. The benefits from such participation would include the opportunity to board one *Chikyu* expedition per year subject to agreement of co-chief/availability of space, the prioritized opportunity to attend training courses conducted at Kochi Core Center, the opportunity to utilize selected Kochi Core Center research equipment by paying nominal fee, and an observer status at the CIB.

A **Project Member** is defined as one who will provide funds to the *Chikyu* operations of a particular project of interest and will receive benefits in return. The applicable party includes countries, research organizations, universities, foundations, private organizations, and/or their consortia. The dues would typically amount to more than $10 M USD per project. In addition to monetary contribution, in-kind contributions may also be accepted. The benefits from such participation would include a member status at the CIB and PCT (Project Coordination Team) and berths for the *Chikyu* expedition, if requested. Obtainable berths will be determined through negotiations based on the contribution level at each project team, and will be made clear in the MOU.

T. Janecek asked for a clarification of the definition of a 'Chikyu expedition' in terms of time duration, as the current Chikyu expedition duration is defined by 5 months. N. Eguchi said that the expedition has been divided in sub-legs. T. Janecek asked if one berth is accounted for each sub-leg or for the whole 5 months of the expedition. M. Webb reminded that the ECORD understanding of a berth is based on the discussed cost of $1M USD per expedition. K. Gohl said that the definition of a 'berth' should be clarified. S. Shibata said that he will refer to JAMSTEC and will present the answer to the question on March 8th.

Chikyu Expeditions Policy Update, March 8th

Following the March 7th question on the definition of a berth, S. Shibata clarified that the term '**Expedition**' is usually used to distinguish research voyages of different scientific themes. An expedition's length varies, typically 2-5 months, but it could be much longer, e.g. 10 months. He said that a '1berth per expedition' means that a space for one scientist during the expedition will be assured regardless of its duration. Since scientists usually rotate every 2 months, for example if Chikyu will have one 2-month expedition and another 4-month expedition for a certain year, 3 scientists in total will be on board for the year.

Proposed Amendment of the *Chikyu* Chapter Framework

S. Shibata said that he will propose the following changes to the Framework to be accepted by IWG+.

The *Chikyu* Planning and Project Architecture and Financial Contributions

Framework item # 32. The major portion of *Chikyu*'s operational time will continue to be allocated for scientific drilling. With flexible scheduling and dynamic geographical movement, the *Chikyu* will conduct large-scale riser projects, as well as ancillary shorter-term riserless projects of prioritized scientific themes.

Framework item # 33. Large-scale project proposals for *Chikyu* will be formulated and nurtured from an early stage through proposal formulation workshops participated by community scientists and engineers, Implementing Organizations, SAS representatives and potential partners among others.

Framework item # 34. The operation costs of the *Chikyu* will be supported through annual contributions of Regular Members, Partnership Members, and through project-based contributions of the Project Members.

Framework item # 35. Countries, research organizations, universities and/or their consortia can become a Regular Member by providing annual minimum contribution of $ 1 M USD for multiple consecutive years. Regular Member will obtain 1 annual berth of the *Chikyu* expedition per annual contribution of $1M USD, and will obtain a member status of CIB.

Framework item # 36. Countries/consortia, research organizations, universities and/or their consortia can become a Partnership Member by providing annual contribution of $300 k USD, a fixed amount, for multiple consecutive years. Partnership Member will obtain a boarding opportunity of *Chikyu* expedition every year subject to the approval of co-chiefs/space availability, obtain an observer status of the CIB, obtain prioritized opportunity to attend training courses conducted at the Kochi Core Center, and utilize selected scientific equipment at the Kochi Core Center by paying nominal fee. This member category is primarily targeted for new or smaller entities to help them enhance their capabilities in earth science.

Framework item # 37. Countries, research institutions, private organizations, universities, foundations or any other entities/consortia interested in supporting a *Chikyu* initiative/project are encouraged to become a Project Member by providing financial contributions that are typically more than $10 M USD per project. The Project Members' benefits will include a member status of the CIB/Project Coordination Team (PCT) and berths at the *Chikyu* expeditions, if requested.

The *Chikyu* IODP Board (CIB) Details

Mandate

The *Chikyu* IODP Board (CIB) will discuss and evaluate planning, technical and operational aspects of the *Chikyu* IODP implementations with a view to maximize the *Chikyu*'s engineering capacity and operational effectiveness, by obtaining attendances of the *Chikyu* members/project members, create liaisons of international IODP entities and other collaborators, and provide suitable recommendations to JAMSTEC and other relevant parties. The CIB specific tasks are that it discusses and evaluates: the Annual *Chikyu* IODP Implementation Plan of the next fiscal year; the Long-term *Chikyu* IODP Implementation Strategy every 4-5 years; the data management, core curation, publications, capacity building, outreach programs, and other related activities; the **Project Coordination Team (PCT)** and project scoping/formulation workshop issues; the activities of Project Partnership Office (PPO), and other related issues when needed.

Membership

The CIB will consist of **Members, Liaisons, and Observers**.

The CIB Members include three Japanese scientists and more non-Japanese, Regular Members, Project Members, the Director of IODP, MEXT, the Director of the Center for Deep Earth Exploration (CDEX) of JAMSTEC, and others that were appointed by JAMSTEC. The Liaisons include the IODP Forum Chair, the PEP Chair, the Director of the Project Partnership Office (PPO), the Director of the Support Office (SO), the USIO, ESO and the Director of the Kochi Core Center (KCC). The Observers include the NSF, the *Chikyu* Partnership Members, and the Program Member Offices. The Secretariat will consist of CDEX /JAMSTEC.

J. de Leeuw asked how the CIB differs from the other FBs? Is it because JAMSTEC takes the ultimate decisions? S. Shibata confirmed that that is the case. The CIB would provide recommendations to JAMSTEC and perhaps MEXT, and other entities.

The Chair and CIB Scientific Members

The Chair of the CIB will be selected from a list of Japanese leading scientists. The Chair will attend the IODP Forum meetings and other relevant international scientific conferences. The transportation and accommodation cost will be paid by JAMSTEC.

The Chair will serve for two years. The other five CIB scientific members will serve for three years in staggered rotations.

C. Escutia asked about the total number of scientists in the CIB. S. Shibata said that there are 3 Japanese, 3 non-Japanese, and a Japanese Chair. The CIB is still under selection advertisement, with a deadline of March 22, 2013.

Decisions

The CIB will make decisions by the common consent of the Members present. In the case that present Members fail to reach consensus, the Chair can make a final decision.

Meetings

The CIB will commence in late July, to be determined, in 2013. It will convene at least once a year. JAMSTEC will bear the transportation and accommodation costs for six CIB scientific members, including the Chair who will attend the CIB meetings.

Revision to the Terms of Reference

If it is needed, the Terms of Reference may be amended with the consent of the CIB Members after 2014. The CIB decisions are also made by common consent. The meetings will be held early July, at least once per year. The ToR may be amended with the consent of the CIB members when necessary.

The Project Partnership Office (PPO) Policy update

The PPO open to other platforms, multiplatform activities and initiatives. It provides relevant project planning and scoping support, fund raising, and attendance as a CIB member to provide suitable technical advice. The PPO functions will be conducted under the overall guidance of MEXT/JAMSTEC. The PPO will develop the collaborative partnerships of all stakeholders, and consortia if deemed appropriate, for large-scale IODP initiatives of *Chikyu*; and conduct relevant project planning and scoping support in close collaboration with *Chikyu* IODP Board (CIB), JAMSTEC and other relevant stakeholders. Also, the PPO will approach international foundations, research organizations and other relevant organizations, and secure international funding for the above initiatives. The PPO will attend the *Chikyu* IODP Board (CIB) as a member, and will provide suitable technical advice in long-term/annual planning of the platform.

Other Functions (optional)

The PPO may also facilitate multi-platform international collaborations for multi-platform initiatives; regularly update IODP science and engineering information, and compile riser and riserless project ideas and proposals; and conduct other relevant tasks.

S. Shibata reviewed the **Tentative Implementation Schedule**, shown next.

March	Preparation for Open Recruitment
April	Open Recruitment
May	Establishment of Selection Committee
June	Closing of open recruitment
July	Selection Committee
Late July	1st CIB
August	International Consultation/Implementation
October	Initiation of Activities

2.4 - ECORD Facility Board mandate and goals (G. Camoin)

G. Camoin reviewed the E-FB mandate and goals. The **E-FB purpose** is that it will serve as the key-planning forum for the MSP expeditions. The **E-FB mandate** is that it must determine the operations schedule for the MSPs to implement high priority science proposals that are forwarded to the E-FB by the Proposal Evaluation Panel (PEP), based upon science priorities, optimal geographic distribution and costs. In addition, the E-FB must approve the expedition section of the Annual ECORD Plan (the MSP schedule, Publications, Data Management, Core Curation, Technical Development, Education and Outreach) and will advise on long-term planning of MSP expeditions.

E-FB Decisions

The E-FB will usually reach decision by general consent, i.e. when a motion is not likely to be opposed. Reasonable effort will be made to attain a general consent. If a motion fails to be approved by general consent, the Chair of the E-FB can decide either to defer further action, or to ask for a standard vote involving only the Science Board members.

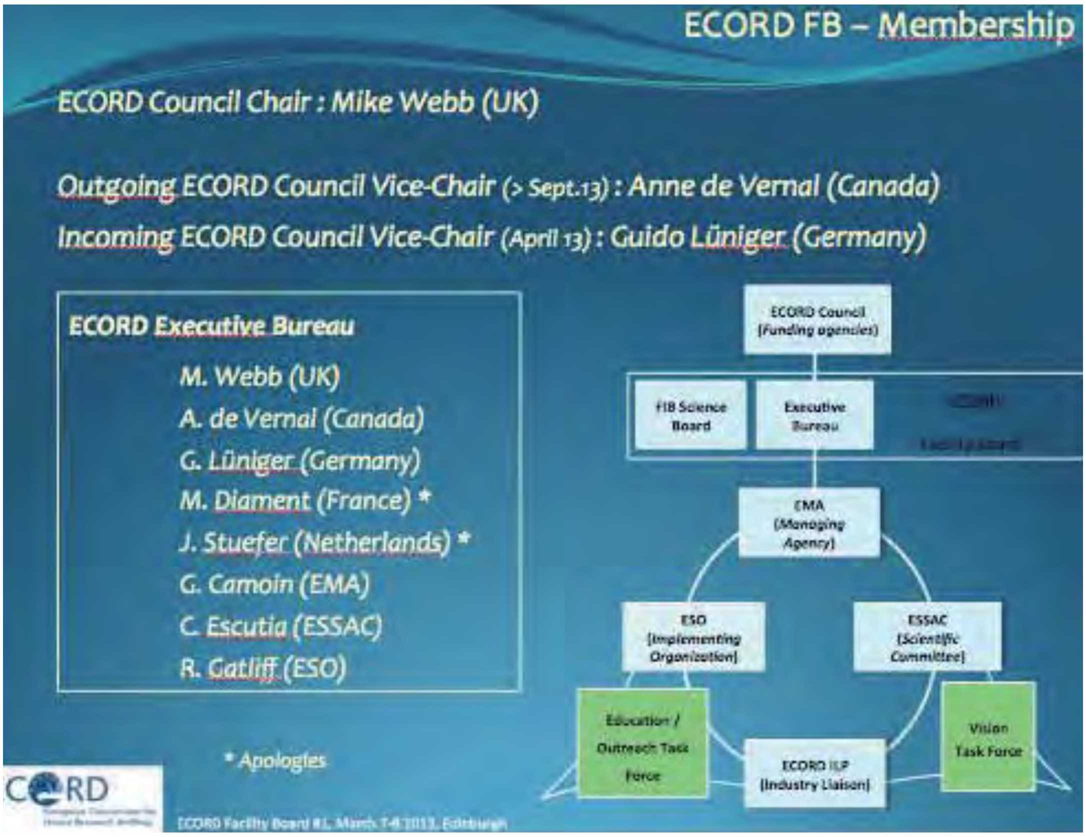
A motion will be accepted if approved by the majority of the votes cast at the meeting. Voting will be normally done by 'show of hands'.

Conflict of interest rules

All potential conflicts of interest will be declared at the start of every meeting, or at an otherwise appropriate time during the meeting. Members of the E-FB or other meeting attendees determined as having a conflict of interest regarding an MSP-related proposal should not be present when the proposals are evaluated, considered for ranking, ranked, considered for scheduling, or scheduled.

E-FB Membership

G. Camoin said that there is a new ECORD structure, shown below.



Science Board

The Science Board's call-for-an-applications was open from late June 2012 to October 2012. Seventeen applications were received by ESSAC, with 9 from ECORD, 7 from the US, and one from 1 Japan. All potential COI were considered. The first criteria was the candidates' expertise in order MSP scientific themes represented. ESSAC recommendations were sent to the ECORD Executive Bureau. The final nominations and

Chair were proposed by the ECORD Executive Bureau. The approval of the final nominations by the ECORD Council.

The **Science Board** consists of:

K. GOHL (Chair; ECORD) – Geophysics, sedimentary processes, ice sheet dynamics, paleoclimate.

D. WEIS (ECORD) - Geochemistry of the Earth's mantle

M. TORRES (US) *Apologies - Early diagenetic processes; Fluid transport processes at convergent margins; Methane hydrates; role of microbes in early diagenesis.

A. CATTANEO (ECORD) - Stratigraphy, Sedimentary Processes & Geohazards.

G. DICKENS (US) – Paleoclimate: geochemistry, paleoceanography, sedimentology, stratigraphy.

The FB members include the members of the Executive Bureau, the core group of the ECORD council and big contributors from ECORD, an additional ECORD Council member, the ESO chair, the ESSAC Chair and the EMA Director.

Additional **Members include** one representative from the Funding agencies: T. Janecek from NSF; S. Shibata from MEXT ; S.L. De Matos Mello from CAPES ; and Apologies for the absence of representatives from ANZIC, China, India and Korea.

E-FB Liaisons:

IODP Forum : K. Becker

SIPCom : J. de Leeuw

PEP : D. Kroon

SCP : G. Lericolais

CDEX : N. Eguchi

USIO : D. Divins

E-FB Observes and Guests

NSF : R. Batiza

ESO : S. Davies, U. Roehl, A. Stevenson, D. McInroy, D. Smith

USIO : Mitch Malone

EMA : M. Borissova

USSSP : J. Schuffert

J-DESC : Yasuhiro Yamada

J-DESC : Keita Umtesu

IODP-MI : Yoshi Kawamura

***Motion 13-02-01:** All members approved the E-FB Terms of Reference (ToRs).*

G. Dickens, D. Weis seconded. All members in favor of the motion.

ACTION: G, Camoin C. Escutia, G. Dickens and A. Cattaneo and D. McInroy to participate in a working group that will determine the ECORD policies on publications.

3. Mission Specific Platform operations

3.1 - Mission Specific Platform concept and costs (R. Gatliff)

&

3.2 - Flow of activities related to MSP operations (D. McInroy)

D. McInroy summarized the **MSP concept activities and costs**. ESO is the Implementing Organization (IO) and comprises of the British geological Survey (BGS), the University of Bremen-MARUM Center for Marine Environmental Sciences, and the European Petrophysics Consortium (EPC), that consists of the University of Leicester, a Geophysics and Borehole Research Group, the University of Montpellier and Aachen University. The ECORD Science Operator's (ESO) role is to provide MSP Expeditions under the auspices of IODP that are funded by ECORD and directed by E-FB.

IODP Platforms

IODP has had three types of platform operations: the US riserless *JR*, the Japanese riser *Chikyu* vessel and the ECORD MSPs.

MSPs in the new IODP

In the new IODP, the drillship-style will continue, along with MeBo, BGS Rockdrill 2, and long piston coring.

The role of ESO

ESO's role is to operate within the greater IODP set-up in several ways. First ESO

operates within the greater IODP set-up by operating within the IODP framework and policies: staffing, environmental protection, sample policies etc. The expeditions will be assessed by IODP's Science Advisory Structure (SAS). ESO will act on the ECORD Facility Board's instructions. ESO is involved in the **early planning of expeditions** and acts as a liaison at all IODP-panel and related meetings. In this way ESO is aware of what proposals are coming. ESO also meets with proponents and other scientists; attends workshops, convenes scoping meetings, convenes **Project Management Team (PMT)** meetings; researches the operational methods (which may lead to engineering developments); explores the permitting routes for the expedition; and documents the expedition planning (Scientific Prospectus and associated web content). ESO is also involved in **engineering development**, by holding the **ECORD Technology Panel** meetings; scoping new developments that are required to deliver up-coming proposal objectives; develops new tools (in-house and/or in collaboration); and purchases new tools 'off the shelf' if possible. D. McInroy clarified that so far all development has taken place outside ESO.

ESO appoints the co-chief scientists and the science party, as it receives the nominations from each Program Member Office and maintaining the national balance and expertise.

As an operator, ESO contracts services for the vessels, coring, logging and other expertise such as ice management. The in-house capabilities include coring tools, logging services, operational oversight, curation scientific facilities, data management, contracting and permits. An example of these in-house capabilities is the set-up of the ACEX Viking Vidar.

The **ESO Mobile Container Laboratories** include a curation container, MSCL container, clear laboratory container for geochemistry, general science container for core description, in addition to containers that are used for ESO office, ESO database and Microbiology. D. McInroy showed an image of the configuration of the *Greatship Maya*. In the implementation and management of the offshore operations, the on-board ESO staff includes an operations superintendent, drilling coordinators, expedition project managers, a petrophysics staff scientist, database managers, logging engineers, electronics engineers, core curators, technicians (e.g. petrophysics/geochemists). The listed crew is an addition to the drilling crew, ship's crew, logging crew (if contracted) and the Science Party. The Onshore party always includes an ESO staff member that is 'on call' at the BGS.

Differences between MSPs and IODP Platforms

The MSPs include customized scientists participation offshore; a focused offshore science program; an Onshore Science Party (OSP) that is held at the IODP Bremen Core Repository and MARUM Germany, a few months after the offshore operation. The vessels are contracted in a commercial environment with industry competition for the platforms. It is often difficult to give precise timing of the offshore operations, thus this requires flexibility from the operator, scientists and contractors. The duration of the offshore expeditions are defined by the costs. The expedition's end-date may be undecided for the first half of the expedition.

MSP Offshore Operations

The offshore phase is focused to fit within the MSP operational concept through core recovery, logging of drilling data, core curation (cores are not split), initial lithological description (core-catcher sample only), measurements of ephemeral properties and sample preservation in geochemistry and microbiology, multi-core sensor core logging (MSCL) measurement of physical properties and downhole logging.

The role of ESO: Implement and manage the Onshore Science Party (OSP)

The OSP is held at the Bremen Core Repository and MARUM a couple of months after the offshore operation. The cores are split and the IODP minimum and standard measurements are completed.

ESO coordinates the IODP MSP Expedition publications in collaboration with the US Implementing Organization (USIO) Publication Services and co-ordinates the post-expedition activities, such as post-expedition science meetings and the publication of results in peer-reviewed journals.

D. McInroy reviewed a table, shown next, of the **ESO costs expenditures for the time period of 2003-2013**.

ESO costs 2003-2013

	SOCs ($)	POCs ($)	Total ($)
2004 Exp. 302 Offshore Exp. 302 OSP	1,325,000	11,430,000	12,755,000
2005 Exp. 310 Offshore Exp. 310 OSP	818,000	6,006,000	6,824,000
2006	2,180,000	662,000	2,842,000
2007	1,613,000	880,000	2,493,000
2008	1,379,000	630,000	2,009,000
2009 Exp. 313 Offshore Exp. 313 OSP	4,009,000	9,425,000	13,434,000
2010 Exp. 325 Offshore Exp. 325 OSP	4,671,000	8,733,000	13,404,000
2011	2,417,000	238,000	2,655,000
2012	2,323,000	233,000	2,556,000
2013 (projected) Exp. 347 Offshore Exp. 347 OSP	3,744,000	11,339,131	15,083,360

D. McInroy reviewed the ESO FY13 Predicted Expenditures, shown in the table below.

ESO FY13 Predicted Expenditure

	SOCs ($)	POCs ($)	Total projected FY13 ($)
M&A	730,787	235,470	
TESS (excl. platform)	2,452,758[1]	479,208	
Core Curation	73,535	662,000	
Data Management	367,649	880,000	
Outreach	119,500	630,000	
Exp. 347 platform and drilling services		9,000,000[2]	
Contingency		900,000	
Chicxulub hazard survey		724,454	
Projected FY13 expenditure	**3,744,229**	**11,339,131**	**15,083,360**
Predicted FY13 under spend		3,004,246	
FY13 APP Budget inc. FY12 POCs carry forward	**3,744,229**	**14,343,377**	

[1]Includes Exp. 347 logging contract
[2]Includes estimate of non-fixed costs (drilling consumables)

D. McInroy said that *Table 3 Evaluation of the costs of combining various MSP expeditions over 10years from the ECORD Business Plan*, shows cost of the non-Arctic expeditions, which may have been underestimated. He showed the chart, shown below, with the new figure corrections.

ECORD income (USD M) over 10 years (annual budget = 21.4M)		214	
Budget available for ESO (USD M) over 10 years (annual budget = ~~14.2M~~) 11 M		~~142~~ 110 M	
MSP Options	Average cost	No. of expeditions	Total cost
Arctic	19.0	~~4~~ 2	~~76~~ 38
Non-Arctic	13.0	~~4~~ 4	~~52~~ 52
RV with seabed drill	3.5	~~4~~ 4	~~14~~ 14
Total over 10 years		~~12~~ 10	~~142~~ 104

Table 3. Evaluation of the costs of combining various MSP expeditions over 10 years.

T. Janecek asked that since ECORD is moving to different types of expeditions other than standard drillships and is using rock drills and piston cores, what advice and guidelines are given to the community as what consists of an acceptable level of operations, i.e. number of holes to be drilled? How is this information to be delivered to the community? G. Camoin said that first PEP will have to review the expeditions and then the FB will have to make a statement about the piston coring expedition. For long-piston coring expedition, in reference to the IMAGES community, an acceptable hole is a large-transect. G. Camoin reminded that ECORD has funded and IMAGES has initiated workshops, which will serve to relay the guidelines. The proposal guidelines will have to include piston coring expeditions, and such guidelines must come from collaboration in the FBs. G. Dickens said that there are different platforms and different budgets. The funds could fluctuate, whereas the other drillship programs have a fixed contribution. T. Janecek said that it is up to the E-FB to run things as they choose in accordance to their funds. Hence, it is up to the E-FB to take the best scenario of the budget. G. Camoin said that he will comment on the overall plan for the *expeditions, for which a two-year window must be allowed. ECORD does not have its final budget figures. This is why the E-FB needs a long-term view and why it is important to hear from PEP what proposals are currently in the system. ECORD will aim to implement the best proposals in the future based on co-funding sources. C. Escutia said that it would be best if the proposal guidelines are integrated with the other entities of the program.*

G. Dickens asked how joint projects would be done. R. Gatliff said that there will be joint tests. D. Kroon said that despite costs for piston coring operations, PEP could handle some of these types of proposals, but would recommend some integration with the drilling expeditions. C. Escutia said that the MagellanPlus workshops could be a good venue to express these guidelines to the community. G. Camoin added that some IMAGES representatives intend to submit large-scale proposal transects. T. Janecek asked whether the proposals for piston coring could come from IMAGES or anybody else. G. Camion confirmed that the long-piston coring proposals can be submitted by anybody.

K. Gohl said that the types of future in-kind contribution are difficult to guess, as national operations could provide some ship-time. D. McInroy said that some of the cost estimates assume that the ship-time will be offered for free.

J. de Leeuw said that the proposal guidelines are implicitly based to deal with traditional drilling, and with the upcoming new technologies, the rules and guidelines have to be changed in order to make sure that PEP is not overloaded with small proposals. He suggested that PEP requires the submission of a pre-proposal, which clarifies that the piston coring will be connected to a later drilling event in the operation. K. Golh and D. Kroon agreed that the piston coring proposal numbers may inundate PEP and that should be avoided ideally, by linking the proposals to drilling.

3.3 - Downhole logging data and core petrophysics measurements (S. Davies)

S. Davies presented the composition of the European Petrophysics Consortium (EPC). The Universities of Leicester Lead, Montpellier and Aachen have formed a consortium that provides ECORD with petrophysics staff scientists and petrophysicists, expertise in downhole logging and core petrophysics programs, dedicated equipment for core logging and discrete measurements, data calibration and quality control, and data evaluation and interpretation.

Personnel

The staffing is flexible and may consist of logging engineers, logging staff scientists, technicians, petrophysics staff and MSCL operators.

The Offshore Expedition Phase

An expedition consists of an offshore expedition, a pre-onshore and a onshore expeditions.

Typical Offshore Staffing from EPC

The **ESO Petrophysics** Staff scientists ensure that the acquired petrophysical data meets the expedition's scientific goals and is responsible for all MSCL & downhole logging measurements. The Petrophysics Staff scientists work with logging contractors and acts as the liaison between the logging contractor, ESO and the Science Party. The **ESO Petrophysicist's** primary responsibility is the MSCL, MSCL QA/QC and supports the Petrophysics Staff Scientist in downhole logging.

Downhole Logging for MSPS Expeditions uses a commercial single contractor, university-based single contractor and combined university-based contractors. The different models are applied to address the different science goals. **Choosing logging tools** has to be tailored to the scientific requirements and also it must be compatible with the drilling equipment. For example, some of the applied tools are a Schlumberger-JR for 90mm, a Weatherford COMPACT 57 mm, and EPC 40mm. The staff has to work with the constraints of the drilling.

The **EPC Downhole Tool Capability table** was reviewed showing tool uses for the different expeditions.

EPC Downhole Tool Capability

Tool	MSP tool run on	Owner
Optical Borehole Televiewer	Tahiti, Great Barrier Reef	Montpellier
Acoustic Borehole Televiewer	Tahiti, New Jersey, Great Barrier Reef	Montpellier
Hydrogeological Probe	Tahiti, Great Barrier Reef	Montpellier
Total & Spectral Natural Gamma Probe	Tahiti, New Jersey, Great Barrier Reef	Montpellier
Induction Resistivity Probe	Tahiti, New Jersey, Great Barrier Reef	Montpellier
Full Waveform Sonic Probe	Tahiti, New Jersey, Great Barrier Reef	Montpellier
Caliper Probe	Tahiti, New Jersey, Great Barrier Reef	Montpellier
Magnetic Susceptibility Probe	Tahiti, New Jersey, Great Barrier Reef	Montpellier
Checkshot (Vertical Seismic Profile)	New Jersey	Specific projects only

S. Davies explained that Slimline Downhole Logging Tools are used for geo-technical logging, hence their slim diameter. She mentioned that there are current **MSP-Downhole Logging Innovations** in OBI optical and ABI acoustic core analysis.

Core Petrophysics

In terms of capability development, a Multi-Sensor Core Logger (MSCL) 152 would allow for the stratographics correlation of different holes and the use of data for microbiology.

Pre-Onshore Expedition Phase

Natural Gamma Sensor rays can run up to 6 cores. The core gamma and log gamma are useful for the stratographic correlation of cores. Some of the applied offshore whole core petrophysics also involve measurements of P-wave velocity, magnetic susceptibility and electrical resistivity.

Capability development

Sally Morgan worked with Geotek to develop a dedicated system for rapid magnetic susceptibility core logging. A Multi-Sensor Core Logger (MSCL) 152 that is installed in a offshore container will enable timely stratigraphic correlation and rapid logging of cores for microbiological analysis. The MSCL-XYZ has a natural gamma sensor. S. Morgan is also working with Geotek to develop a more rapid NGR core logging system using a BGO, rather than NaI(TI). Further testing is expected in April 2013. **Thermal Conductivity** is used to measure the rate heat flows through material by heating material and measuring the temperature change with time.

Onshore Expedition Phase

During the onshore phase the cores are split and discrete samples are acquired. The typical Onshore staffing includes ESO petrophysics scientists and petrophysicists (EPC) and petrophysics technicians (EPS and Bremen).

The **Core petrophysical equipment** includes a standard MSCL-S, MSCL-XYZ (NGR), MAD, a PWLD and a Teka TK04. The MSCL is used offshore and serves as a discrete measuring system for p-wave velocities.

As EPC takes part in the **International consortium logging**, it provides logging operations on all of the platforms. The staff working on the platforms has a diverse experience in terms of logging. The consortium consists of the Lamont-Doherty Earth Observatory (US), the European Petrophysics Consortium (Leicester-Montpellier-Aachen) and the University of Tokyo (Japan). The provided services include **shipboard** logging operations and skilled logging/petrophysics staff scientists on each IODP platform, and ongoing scientific support for expedition participants and other interested scientists. The update of the IODP log database ensures aces to the **downhole legacy data**. The **Bremen Core repository Data Portal** ensures the legacy physical properties data.

EPC is also involved in **knowledge transfer** through the teaching, mentoring and advising on the acquisition and interpretation of downhole and core petrophysics measurements. ESO has participated in the 2010-2013 ECORD Summer Schools, Geosciences Summer School, UK IODP Student Conference and has welcomed visitors to the EPC Conference. The program's integrated approach encourages collaborative research. Over 750 publications have been generated, many of which are collaborative ventures.

EPC is involved in IODP, the International Logging Consortium, Teaching and research in petrophyics, has dedicated equipment, and in capability development and the academic-industry interface.

T. Janecek asked if the 750 logging requirements document could be distributed. S. Davies confirmed that she will send him the document.

It was mentioned that the **spectral gamma-ray tools** have a compatibility with the drilling equipment. The listed tools include: Schlumberger-JR 95.3mm, a Weatherford COMPACT 90 mm, and an EPC 40mm. Currently there is no ultra-slimline **resistivity-imaging tool** on the market. Two tools are available as part of the logging service: the Schlumberger FMI 127 mm and the Weatherford COMPACT 61 mm.

3.4 - Data collection, publications, and core curation (U. Röhl)

The MSP Operations include an Offshore and an Onshore Science Party. Bremen is the location of the European Core repository. U. Röhl showed a Offshore core flow chart and three diagrams of the equipment locations in the **Core Curation Container**, the **Geochemistry Lab Container** and the new **Microbiology Lab Container**, see PowerPoint. Such containers may be taken to the upcoming *Baltic Sea* Expedition.

Offshore objectives

The Onshore Science Party (OSP) splits the core and then there is a core flow for the onshore science party. The measurements and procedures are posted on the webpages, as well as online tutorials for the onshore phase. The Onshore objectives include performing the minimum and standard measurements, non-destructive analysis and sampling analysis. The Offshore objectives also include core recovery, logging of drilling data, core curation (cores are not split), initial lithological description (Core Catcher (CC)), core catcher photos, biostratigraphy (analysis of core catcher samples), physical properties (full core multi sensor core logging – MSCL) measurements, pore water geochemistry, microbiology, stratigraphic correlation (to aid drilling overlap and zonation), and downhole logging.

The Onshore science party performs a lot of analysis. U. Röhl showed a core flow diagram for the onshore science party. Online tutorials are available to the OSP.

Onshore Objectives

The objectives include the completion of the **minimum and standard measurements** and **non-destructive analysis** with whole core gamma rays, selected whole core repeats for density and magnetic susceptibility, thermal conductivity measurements, split core multi sensor core logging (MSCL), color reflectance of split-core surface, high-resolution digital imaging of split-core surface, and visual core description (macro- and microscopic). The sampling and analysis for Expedition Reports involves lithostratigraphy (smear slides), biostratigraphic analysis, x-ray diffraction analysis, discrete physical properties, inorganic and organic geochemistry, microbiology - any outstanding, paleomagnetic measurements (U-channels or discrete samples), sampling for post-expedition research, and writing all sections for the Expedition Report.

The OSP performs high-quality analysis in accordance with the IODP standards. The laboratories are diverse with a state of the art instruments and experience staff. There is an integrated repository at the laboratory facility at BCR-MARUM.

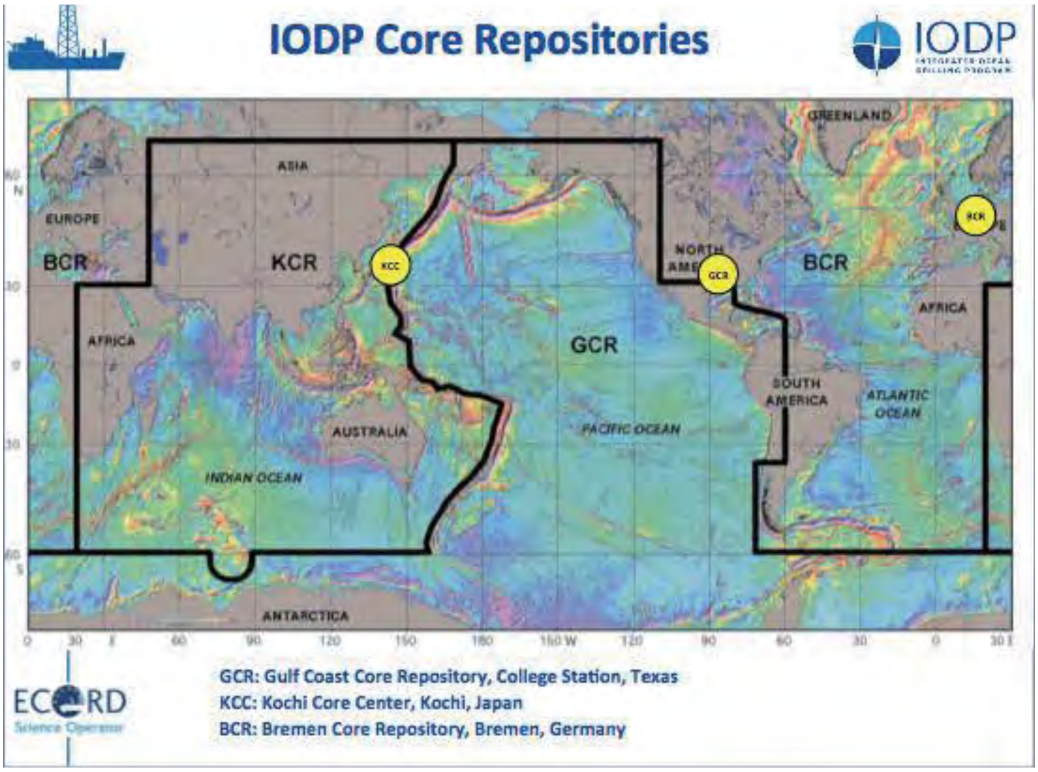
U. Röehl reviewed a diagram of the **IODP-MSP Data Management flow.** The correlation data and analytical data will go to the onshore expedition. PANGEA is the long-term storage of the data. There is an MSP Portal and a Bremen Core Repository Curation Data.

The **IODP-MSP datasets** can be found in PANGEA.

IODP Core Repositories

There are three core repositories: the Gulf Coast Core Repository (GCR), in College Station Texas, the Kochi Core Center (KCC) in Kochi, Japan, and the Bremen Core Repository (BCR), in Bremen Germany.

U. Röhl showed a map designation of how the cores are distributed regionally.



The **IODP Bremen Core Repository (BCR)**

There are over 152 km in core from the ECORD waters of the Atlantic-Antarctic-Mediterranean regions in Bremen. The BCR receives about 200 sample requests per year, *see PowerPoint*.

Generally a sampling party comes to the BCR.

Since 1969 there are over 5073 total sample requests from the BCR cores. A total of 1, 438,123 total samples were taken from the BCR cores, involving 2816 individual scientists.

Drilling Information System (DIS)

U. Röhl gave an example of a DIS sample entry window. DIS is a tool that produces a schematic lay out of the core to see what measurements have been already taken. There is a Web interface (XDIS) for curatorial data.

Obligations and Publications

The expedition obligations are to the: Scientific Prospectus (published at least 2 months before an Expedition); create a Preliminary Report (written during OSP and submitted 1 week after the OSP); and create an Expedition Report (written during OSP and submitted a.s.a.p. after the OSP). The **Post-expedition research obligations** are to Publish in either a peer-reviewed popular journal in English or as a Data Report in the Proceedings volume (submitted within 20 months postmoratorium*; all Science Party members have this obligation) and publish an expedition synthesis paper (submitted within 26 months postmoratorium*).

IODP Sample, Data and Obligations policy can be found at

http://www.iodp.org/program-policies/.

The Scientific Earth Drilling Information Service (SEDIS)

SEDIS is a data portal for information from IODP.

ECORD summer schools

ECORD has held summer schools in Bremen since 2007. Overall themes rotate between several main themes and the science plan. The school combines a practical on IODP-style “shipboard” methodologies and lectures and leads interactive discussions on the main themes of IODP.

The BCR is used for workshops such as the **2012 Crustal Processes Meeting**, which was a 3-day meeting, that was equally divided between a science conference and a training workshop, including the IODP-style “shipboard” methodologies.

In accordance to STP Consensus Statement 1209-11, the SEDIS portal will be continued in the new IODP. The ESO QAQC documents will be linked to the future databases.

T. Janecek asked how the publications would be handled, now that IODP is operating with independent platforms, he asked if the E-FB has an expectation of a minimum publishing requirement of people who sail on the MSPs. He said that that is a question for the US-FB to solve as well. C. Escutia said there are no current answers to this question, but there should be a minimal requirement for the publications. She said that that is a current issue as the policy may be set, but the people will choose if they will follow this policy.

T. Janecek said that the current JR facility needs are being re-written, as each of the platform providers takes care of the cores in a pre-agreed way. Hence, this may be a good opportunity for all FBs to agree on a common policy and to then create a workshop that would draft a common documents implementing these policies. The roles, responsibilities and authority of each FB in publication have to be clarified. K. Goehl asked if this has been a problem for the JR. It is expected that IODP will require a top quality number of publications. T. Janecek said that under the past co-mingled funds system the repositories were funded, but now as the individual platforms are funded individually, there may be a question as to how to create an overarching system for the publications.

The US FB will apply the old publications policy and then will tailor it to the current phase. G. Dickens asked where the current repository cores would go. It may be complicated if there would be different publication policies with differently directed core repositories. G. Camoin recommended that 2-3 members from the FB should begin working on this question. He proposed to be part of this working group and then to relate it to the JR-FB.

Consensus 13-03-01: *The E-FB decides to create a sub-work group to answer the Core Repository Recommendations, rules and procedures questions (U. Röhl).*

ACTION E-FB: to create a ‘Recommendation, Rules and Procedures’ work group, including U. Röhl, G. Dickens, A. Cattaneo, D. Weis, in order to write a start-up document.

3.5 – Outreach and Education (A. Stevenson)

A. Stevenson reviewed the IODP Science Plan and the emphasis on pursuing opportunities to convey the IODP science.

Main outreach objectives

The main objectives are to co-ordinate and promote integrated planning via the ECORD Outreach and Education Task Force; to create program identity and materials such as logos, letterheads, PowerPoint templates, and leaflets; to compile and maintain common resources via a website portal, provided information about IODP scientists, and photo archives; to facilitate international program activities via expedition outreach, event booths, and media relations; and to advance outreach by engaging the international community through the collaboration with educators and science magazines.

Co-ordinate and promote the integrated planning: the ECORD Outreach and Education Task Force

A. Stevenson reviewed the current IODP Outreach structure, where IODP-MI is the overarching structure that works with the Japanese Center for Deep Earth Exploration (CDEX) and ECORD: the EMA Outreach and Web Manager, the ESO Outreach Manager and the ESO Media Relations. In addition, IODP-MI worked with several IODP representatives: the Consortium for Ocean Leadership, the Lamont-Doherty Earth Observatory, and Texas A&M University.

The current Outreach team consists of the ESO Outreach Manager, the ESO Media Relations, the EMA Scientific Outreach Coordinator, ESSAC Chair and Science Coordinator and the EMA Assistant Director and EMA Director. A. Gerdes and A. Stevenson take care of the ESO website and MSP outreach.

The Outreach Task Force **Creates Program Identity and Materials** such as newsletters, posters, leaflets and brochures. A. Stevenson mentioned that in the past conferences the attendees have used less paper brochures, which may be a good opportunity to begin sending the brochures via technologies such as e-readers, I-phones, etc.

Compile and maintain common resources

CDEX, USIO and ECORD each have a website. ECORD attempts to avoid any duplications with the ESO-MSP website.

Facilitate International program activities

The MSP Communications Plan is compiled by the outreach and co-chief scientists, consists of communications objectives to target audiences, sends messages to convey FAQs, serves as the briefing document for the science party, aims for the organisation of press releases and media conferences, plans for the arrangement of port call visits (media, local school groups) and liaison with media for interviews, expects co-ordination with PR officers at universities, and the organisation of ship reports on the ESO website.

A. Stevenson explained that a press release is generally organized prior to an expedition. If there is an opportunity to hold a media conference for a port-call, the media is invited. For example, there were a series of successful interviews and conferences at the *New Jersey* expedition. A. Stevenson showed several examples of media coverage on IODP's science such as BBC news, The Washington Post, NBC news, and The NY Times. Other types of applied communication include RSS Newsfeed, Facebook and Tweeter.

An **ESO photo gallery** is in the process of development and is available for viewing on the ECORD website. So far only a few ECORD videos have been created due to considerations for the high costs. These videos were previously funded by IODP-MI, so the funding source of such projects will have to be identified in the future.

Conference booths/events listed

A. Stevenson reviewed the attended events such as Oceanology, London, the European Geosciences Union, in Vienna that includes media conferences on expeditions/IODP developments, the American Geophysical Union in San Francisco, the International Geological Congress, the Japanese Geosciences Union, the Asia Oceania Geosciences Society, the Polar Petroleum Potential (3P Arctic) Conference 2013 in Stavanger and the Goldschmidt 2013 in Florence.

ECORD has stopped attending the RTTC conference due to its high the cost of $6000 USD. It was decided that the conference was not targeted and effective enough as there are 35 000 people were attending.

Advance education by engaging the international community

Sometimes information about IODP-ECORD is made available on publications listed on

Amazon.com.

ESSAC Activities

The ESSAC activities include the ECORD Summer Schools and scholarships. The Bremen school addresses the topic of Deep-sea sediments and the Urbino school addresses Paleoclimatology. ESSAC oversees the Distinguished Lecturer Programme, with the following participants and discussion topics: R. Urgeles: Submarine landslides and tsunamis; B. Ildefonse: Mantle, ocean crust and seawater and C. Hillaire Marcel: The Arctic Ocean in the Cenozoic climate system. ESSAC overlooks the ECORD Research Grants, supports the 'Teachers at Sea' and 'School of Rock', and manages the distribution of teaching materials and core replicas.

A. Stevenson listed the IODP and ECORD websites.

K. Gohl asked if there is a policy on questions from NGOs about potential environmental impacts. A. Stevenson said that this issue will come up more often, especially if ECORD were to start working with industry in the Arctic.

J. de Leeuw asked if there are real-life onboard activities during the expeditions as was done on the JR. A. Stevenson said that whenever possible they will invite the media, but it is more complicated as there is not enough accommodation space for the media. The New Jersey expedition is an example that was performed an interview on a platform, so it depends where the expedition is taking place. D. Smith asked about A. Stevenson's perception of ESO and ECORD in relation to IODP, as they do not know how the whole unit works. A. Stevenson said that it is not relevant to see how ECORD and IODP are interrelated and it is difficult to convince media to mention the consortium. D. Smith asked whether the attention should be more on IODP or ECORD. He emphasized that it is important to show recognition of ECORD, so a balance must be achieved between publicizing involvement in IODP and ECORD. One of the biggest critiques is that ECORD concentrates only on the mechanics and do not focus so much on the science, so the media has to be interested in the story.

S. Shibata said that after October 2013, IODP-MI will be dissolved. A part of its role will be absorbed by the new Support Office, but the main functions will be conducted to each platform. What will be the relationship with the support office? A. Stevenson said that the question will have to be addressed at the E-FB.

3.5 - Site survey requirements (G. Lericolais)

G. Lericolais introduced the Site Characterization Panel's (SCP) Mandate. The SCP reviews site survey data packages the proponents submit to the IODP Site Survey Data Bank; verifies data quality and identifies data gaps for each proposal's site survey data package; provides early guidance to proponents and the PEP regarding necessary site characterization data; makes recommendations regarding the degree of completeness of each data package to the proponents, the PEP, and the SPC; assesses, on the basis of the proposal and data package, whether or not the scientific objectives of each drill site can be effectively achieved; examines and encourages opportunities for the use of new site survey technologies; and fosters cooperation and coordination for site survey data acquisition.

Classification Decisions

G. Lericolais said that the SCP begins its e-review discussions by email, but that is not enough, especially in situations where there are 3 watchdogs. He reviewed the classification mandate as following:

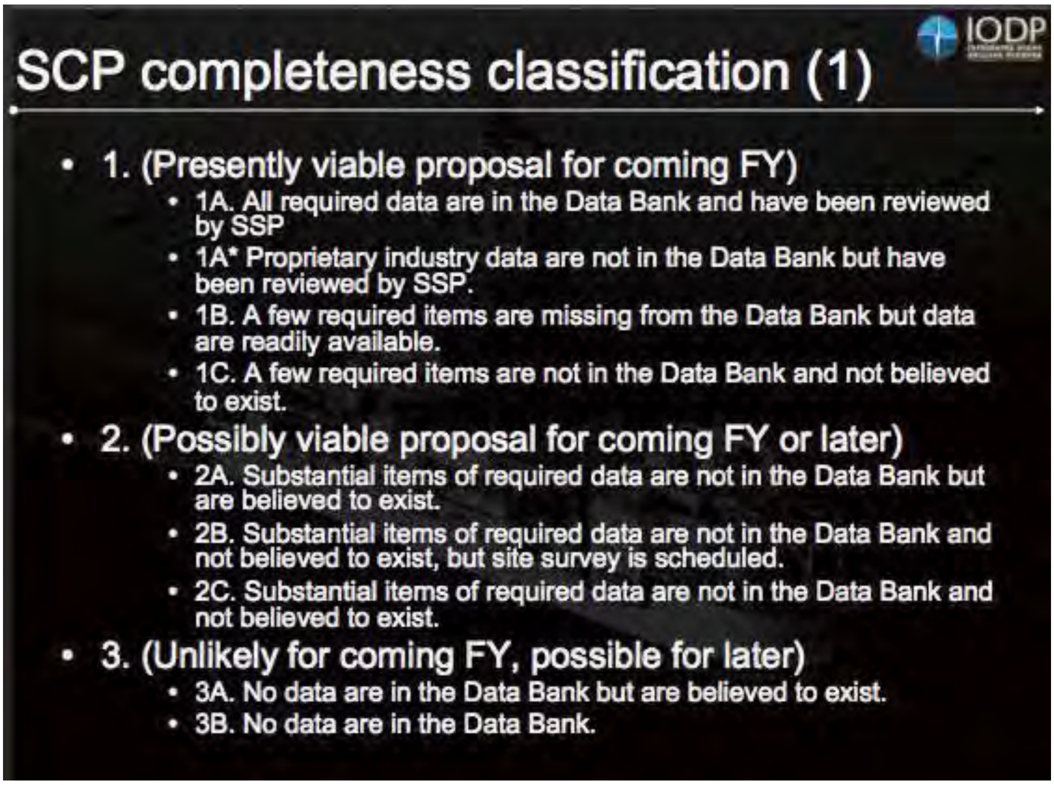
The site characterization completeness for each proposed drill site shall be evaluated by two or three SCP members serving as watchdogs and classified by general consensus of the SCP members during SCP meetings. Modifications of the site classification shall be by consensus of the SCP at a meeting or by e-mail. Site classifications shall be recorded in the meeting minutes.

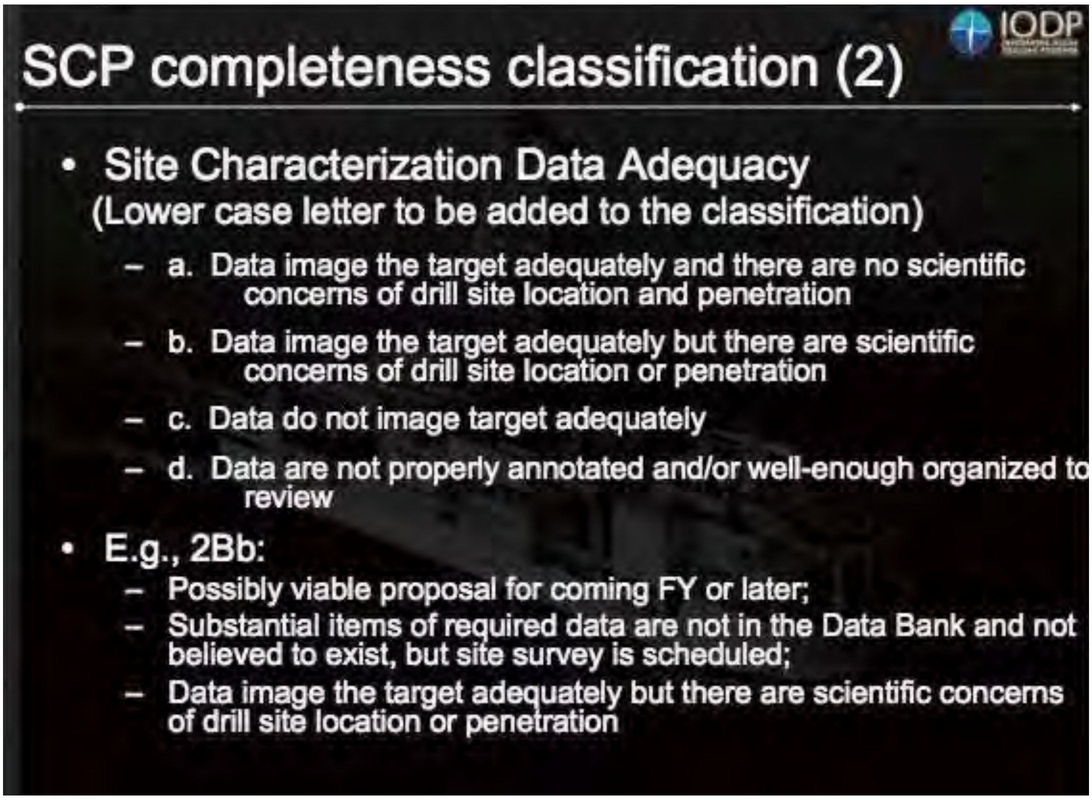
The site characterization completeness for each proposed drill site is assessed on a scientific basis by the SCP. The SCP's site classification does not preclude drilling.

G. Lericolais explained a SCP Appendix C Matrix diagram, *see PowerPoint*. He said that some of the listed data is required also by EPSP. The SCP is performing the matrix exercise with the goal to become a more objective panel and to assist the proponents. They still need criteria in the long-run to make determinations for the case-by-case situations. The SCP does not wish to make subjective decisions that are inconsistent with the program's goals.

SCP completeness classification

G. Lericolais recommended that it will be better to send one combined review for each proposal, that would also include the discussions from PEP and EPSP in order to address the global objectives of the proposal. A designation of 'A', means ready to drill, and small-case 'a' indicates that there is no scientific concern about the drill sites. Such classification needs to be clarified further, shown below.





The SCP will simplify this system, by adding the designation of a 'green light', meaning 'go ahead drill', 'orange light' indicates that the decision depends on the OTF, and 'red light' means a refusal to drill.

T. Janecek clarified that the SCP should provide recommendations and information about the proposed drill sites, but this panel should not make a decision if something should be drilled. This is why the SCP recommendations should be forwarded to the FB, which will decide whether they would follow these recommendations.

G. Lericolais said that the *Mediterranean Outflow* proposal was given an 'orange' recommendation and was sent to the proponents. The Segway was sent to the databank, so the drilling had gone to a wrong location.

G. Lericolais posed the question as to what will be the SCP future. The message that is received from the NSF and FB is considered in the SCP's function. The scientists will review most of the proposals, but there is a lacking review in geo-physics. For this reason a site survey is very important.

The SCP/SSDB new Matrix

A SCP back-to-back meeting has been organized with PEP in June. A sub-committee was created to review and revise the classification matrix. A background document was distributed during the E-FB. In 2003, a similar process was carried in order to review the matrix and to have automated guidelines. It was decided that there should be an easier process for inputting the site survey data into the databank for the review process.

C. Escutia asked if the SCP is considering that the new piston coring drilling will require different scenarios in the matrix. G. Lericolais confirmed that these changes have been considered to be included.

G. Camoin asked whether the minimum requirements are listed for the scientific objectives and not on the various types of environments. He said that if the categories are created just based on the scientific objectives, it is not appropriate and it should be more technically oriented for the type-of drilling. G. Lericolais said that the distributed document represents the basic set of requirements. Following these requirements, the SCP then tries to understand the scientific objective with the sought-out data. The watchdog then looks over the proposal reviews. He emphasized that he is against an e-review, because it is important to involve different types of knowledge and skills.

C. Escutia asked whether the proponents are provided the different requirement lists for the different types of proposals. G. Lericolais said that this information is provided through a form that is to be completed by the proponent, but this process needs to be improved and more visible to the proponents.

T. Janecek said that the provided document fits both the E-FB and JR-FB purposes. The JR team can evaluate if the document meets their specific needs. T. Janecek said that any information that is relevant to the scheduling of an expedition should be related to the FB.

G. Lericolais said that the SCP tries to improve the proposal science. J. de Leeuw said that there are a lot of proposals at OTF, which will be never implemented, because the SCP and PEP did not match up with the evaluations. It is needed to better integrate both panels' advice. T. Janecek agreed with J. de Leeuw that the PEP and SCP have to work together but the FBs have to weight in and give their review if the SCP documents and information is appropriate for the FB's purposes. K. Gohl recommended setting-up a small group from the FB to write these recommendations for the SCP.

ACTION E-FB: G. Lericolais, G. Dickens, A. Cattaneo and M. Torres to set-up a small working group from the E-FB members, in order to write a recommendation if the SCP matrix documents and information are appropriate for the FB's purposes.

4. ECORD Facility Board policies

4.1 - SIPCom legacy issues and transfer of SIPCom duties to Facility Boards (J. de Leeuw)

J. de Leeuw emphasized that little time has passed between the Science Implementation and policy Committee (SIPCom) meeting and the E-FB meeting in order to organize a list of issues for the FBs.
He summarized topics that were discussed at SIPCom. The real decisions will be made by the E-FB, *JR*-FB and the *Chikyu* IODP Board (CIB). This implies that efforts are required to make sure that the new program will remain a successful international program. The bodies within the new Science Advisory Structure are the PEP, SCP, and the EPSP. SIPCom met for the last time in January 2013. In June 2012, SIPCom decided that it was necessary to look at the proposal guidelines and the subcommittee re-drafted the document. SIPCom realized that during the transition period, it is not easy to draft

new guidelines and mainly discussed overarching/cross-platform issues to help the FB's and CIB as well as the future Forum to address these overarching issues in the future program. The overarching/cross platform building blocks for the new framework are the new Science Plan, the Science Advisory Structure (SAS) with its panels (PEP, SCP and EPSP), the Forum with the Forum Chair being "the face" of IODP, the website and the support office. The guidelines indicate at what stage the SCP and EPSP team should team up with PEP. PEP and SCP will meet back-to-back in June 2013 to discuss how they can better organize in the future.

The new guidelines describe the different types of proposals, how they are processed and how they are evaluated. The guidelines are flexible in the sense that both FB's as well as the CIB can adopt the rules despite their different procedures for selection of the best proposals to be implemented. The new guidelines also indicate how, at what stage and to what extent the Site Characterization Panel (SCP) and the Environmental Protection and Safety Panel (EPSP) team up with the PEP. It is interesting to note that a back-to-back meeting of PEP and SCP is planned for June 2013 to evaluate the new proposals.

J. de Leeuw reviewed several SIPCom consensus. SIPCom Consensus 1301-04 called for the creation of a document that provides guidelines and evaluation criteria. SIPCom Consensus 1301-04 stated the decision that Dick Kroon will remain as the chairman of the PEP. *See PowerPoint for details.*

J. de Leeuw said that the actual role of the new SAS is not clear and raised four questions for the FB, shown next.

The draft of the new guidelines for proponents leads to a number of questions on the exact role of SAS within the new IODP structure and on the roles of the individual panels within SAS.

1: The draft of the new guidelines for proponents suggests that the new SAS will provide advice on scientific, environment, safety and site survey issues to all FBs.
But when are the individual FBs going to decide whether they wish to use the new SAS and its panels or not? And what are the implications for the guidelines if a specific FB would not make usage of the new SAS or one of its panels?
The FB's and CIB indicated that they all will use PEP.

2: The authors of the draft of the new guidelines suggest a closer relationship between the two panels PEP and SCP but to what extent and how are PEP and SCP going to work together?

3: If PEP and SCP would collectively give advice on proposals, i.e. integrated advice to the FBs, then combining the two panels is a possibility/desirable. Is such a merger appropriate in future?
Ad. 2 & 3. Actions are already taken for a much closer collaboration of PEP and SCP so that, for example, per proposal the minimum of required site surveys can be defined.

4. In the new system STP will be deactivated, but how is consistency/standardization of all measurements, sampling and data acquisition/assurance/quality/management maintained across the drilling platforms? Will the recently revised scientific Technology Roadmap be leading for each FB?
Q. 4 was discussed separately (see hereafter).

SIPCom received 5 letters of the present STP chair and 4 (ex)members of the STP expressing their serious concerns regarding the handling of technical issues in the new framework without a cross-platform operating technology panel. These letters were discussed during the meeting. SIPCom realized that in particular cross platform issues such as consistency and standardization of measurements, sampling and data acquisition/assurance/quality/management are crucial, also in the new IODP. However, SIPCom is of the opinion that these issues will be taken care of by the Forum and the FB's and CIB as expressed in Consensus 1301-03.
SIPCom Consensus 1301-03 recognized that the "IODP Forum mandate" and framework documents for the new IODP documents should include the appropriate safeguards, oversight, and discussion mechanism. *See PowerPoint for details.*

Funding Workshop Proposals

SIPCom emphasized that the new program a substantial funding should be made available for the further enhancement and continuation of workshops. Since there are no comingled funds in the new program, it is regarded as very important that the individual FB's and CIB clearly indicate, through the IODP website with appropriate links, what possibilities exist for ECORD, US and Japanese leading scientists respectively. ECORD has established MagellanPlus to optimally support scientists to organize workshops. It is SIPCom's wish that the FB-JR and the CIB will also take actions to inform their scientific community how and where funding for IODP workshops can be obtained.

***Scientific Drilling* Journal**

SIPCom indicated that the journal is an important vehicle for scientific and technological developments and a joint publication of expedition results from IODP and ICDP. To reduce costs, SIPCom supported the new ideas for the future journal. i.e. a predominantly electronic journal to inform the scientific and technological community with a somewhat more outreach nature (extended newsletter) and with a limited number of hard copies, if possible being paid by those interested to have hard copies. An enhanced contribution (financial or in-kind) from ICDP would be welcome.

Forum

SIPCOm reviewed a "shopping list" of activities that should be taken care of the new program and the Forum. SIPCom realized that most of these activities will be monitored, fostered, advised by the Forum. Although the Forum will not have any decisive power SIPCom asks the FB's and CIB to communicate optimally with the FORUM and it's chair (the face of IODP) to ensure that the FORUM's voice is well heard.

SIPCom has asked how IODP expedition numbers will be arranged in the future.
J. de Leeuw reviewed a list of the transfer activities, shown below, and recommended that it should be revisited as a checklist and see if they are completed in the future.

Transfer of SIPCOM duties to other IODP entities post 2013
Jan de Leeuw's list of SIPCOM duties in black.
Draft response by Catherine Mevel and Tom Janecek in red

• Incidental workshop reviews
Depending on topic: Conducted by either Facility Governing Board (FGB) or Implementing Organization (IO).
• Monitoring science plan delivery
IODP Forum and individual Facility Governing Boards
• Long-term planning
Monitored by IODP Forum and implemented by Facility Governing Boards and Implementing Organizations
• Regional planning
Monitored by IODP Forum and implemented by Facility Governing Boards and Implementing Organizations
• Collaboration issues (ICDP,PAGES, OOI, DCO, etc.)
Coordinated by Forum Chair
• Monitoring website renewal
Support Office with advice from IODP Forum
• General performance assessment
NSF for JR; JAMSTEC/MEXT for Chikyu; ECORD/EMA for MSP
• Improving transparency at all levels
All entities; general IODP Forum discussion item

• Overarching educational issues
National and Facility Governing Board issues
• Overseeing the planning and scoping of the BEAM and other major projects which impact heavily on all other projects
Respective Facility Governing Board and Platform Provider issue
• Monitoring and evaluating engineering development
Implementing Organizations responsible for engineering development. Facility Governing Board monitor and determine level of interaction between platforms
• Monitoring and stimulating overarching outreach and PR activities
National Activity / Forum Chair
• Overseeing Rapid Response Drilling –type activities and their impact on planned expeditions.
IO/FGB activity
• Ethical issues, such as conditions of co-funding by commercial bodies
National/FGB issue
• Exploring optimum platform flexibility, e.g. exploring alternatives for corking expeditions by using local/regional research vessels, seabed drilling by local/regional research vessels, etc.
FGB/IO activity

• Standardization of reporting formats, an important issue now that individual FGBs will become responsible for data collection/archiving, shipboard reports, preliminary reports, etc., etc.
Framework specifies goal of common publications, sampling polices, etc. Individual FGBs to determine level of compliance.
• Budget approval for Support office
NSF –in consultation with Forum

Transfer of current IODP-MI tasks:

Data management - IO/FGB
Publications – IO/FGB
Outreach & PR – IO/FGB/National
New member attraction - Forum/FGB/IO
Curational Issues – IO/FGB/National
Technical Developments – IO/FGB

The E-FB discussed the 4 above-mentioned SIPCom questions.

D. Kroon said that it is not as helpful to hold the meetings back-to-back as would be if scheduled as parallel, but the new scheduling will be followed. There will be a common SCP and PEP session, and then the two will split into different groups. For some of the proposals, which have not been reviewed by the SCP, PEP will say there is not enough information about the proposal yet. A feasibility statement for the proposal is very important and the funding needs have to be clarified. G. Lericolais said that a SCP parallel session may be better. He said that the pre-proposals can be reviewed for the science only, the SCP does not need to require site survey data and when they have an answer, the proponents would have to be informed that they would need a clear site survey data for the full proposal.

J. de Leeuw said that the proponents are asked in the pre-proposal stage to indicate the site survey preferences. He proposed that PEP looks at these proposals.

Consensus 13-01-01: *The E-FB decides to use PEP and SCP for proposal evaluation.*

Consensus 13-02-01: *The E-FB supports the planed joined meetings between PEP and the SCP.*

4.2 – Maintenance of all measurements, sampling and data acquisition across drilling platforms in IODP (U. Röhl)

IODP Measurements

The current IOs are committed to maintaining a unified approach (with overarching STP). The Scientific Technology Panel (STP) will be deactivated at the end of the current program.

U. Röhl said that in reference item# 4 on J. de Leeuw's list, there is a recent **IODP Policies and Procedures/Guidelines documents**.

IODP Minimum measurements

The minimum measurements definition states that such a measurement shall be conducted in all boreholes and on all cores in IODP. This statement does not preclude the taking of whole-round core samples on an as-needed basis to achieve specific scientific objectives and/or obtain the legacy samples.

IODP Standard Measurements

The definition states that a standard measurement shall, whenever practicable and appropriate, be carried out across all platforms and/or shore-based labs.

Measurements in the new IODP

"Oversight of the technology, scientific measurements, and information handling on each platform is addressed by small panels and/or ad hoc committees working under each Implementation Organization (IO) to deal with platform specific issues." (*from*: 'Framework for the International Ocean Discovery Program')

Each IO will have autonomy to modify measurements and information management. Who will provide essential quality control and cross-platform standardization?

IODP Sample, Data and Obligations Policy

U. Röhl reviewed **STP Consensus Statement 1209-02**, which called for the continuation of the Existing Measurement and Sampling Policies into the New IODP.

STP strongly advises the leadership of the new IODP to continue to enforce the current IODP cross platform measurement and sampling policies regardless of the structure of the new IODP SAS.

IODP Curators Meeting

U. Röhl said that there is a lot of flexibility in how to implement the obligations policy.

During the December 6th, 2012 AGU fall meeting in San Francisco, the three IODP Curators (BCR, GCR, KCC) and the Chair of the Curatorial Advisory Board (CAB) met and discussed several topics. The primary purpose was to ensure a continuation of high-quality, standardized repository service to the scientific community in the International Ocean Discovery Program. It was agreed that we should act before the new drilling program begins.

Outcome IODP Curators Meeting

In reference to the IODP Sample, Data, and Obligations Policy, it was agreed that it will be crucial to continue the application of the IODP Sample, Data, and Obligations Policy into the new program. However, similar to the way it has been applied in the current IODP, implementation of the policy should remain flexible. In reference to the role of the Curatorial Advisory Board (CAB), it was agreed that the (CAB) should be kept in the new program as an advisory and mediating body. The *"Framework for International Ocean Discovery Program"* document states that "the repository heads will select members of the community to act as a Curatorial Advisory Board, which will act as an appeals board for issues associated with sample distribution and assist in reviewing and approving requests to sample permanent archives." To ensure the continuity of the CAB´s responsibility the curators recommend that (1) the existing CAB members should be asked if they would be willing to continue to serve on the CAB, at least into the beginning of the new drilling program. If they do not wish to stay on the CAB in the new program, the curators should identify people with appropriate scientific expertise to replace them, and (2) in the absence of the Scientific Technology Panel (STP) in the new program we recommend that one CAB member be considered to serve in some capacity on each of the respective Facility Boards (FB) in the new program. In addition, it is recommended that (3) The role of the CAB should be expanded to include them in adopting possible changes in the IODP Sample, Data, and Obligations Policy, in the absence of the STP. The IODP curators envisage the following process for making changes to the policy:

a. Curators submit any proposed changes in the policy to each other and to the CAB.

b. Once agreement has been reached, the CAB forwards the recommended policy change to the three facility boards for approval.

c. Approval by all the Facility Boards is followed by a written change in the policy to be made by the entity that hosts the policy document on its web page.

d. If the Facility Boards do not approve the change, they will suggest to the IODP Curators and CAB that they revise the proposed change or drop consideration of the proposed change.

In **reference to the sample and data requests systems**, there is a new "IODP Sample and Data Requests" system (**SaDR**). It was agreed to use it for post-moratorium requests, and then implement it for future IODP Expeditions when each IO agrees it is ready for their expedition requests. Expeditions currently using **SMCS** continue to use them through their moratorium period, so that all sample requests under the supervision of the Expedition SACs will be in the same database. When the post-moratorium period begins for each Expedition, the new system should then be used for them. The existing USIO consortium should ensure support for the new system through the end of FY14. Funding for the system in the future remains uncertain.

The Routine Microbiological Samples (RMS)

It was agreed at the **IODP Curators Meeting that taking Routine Microbiological Samples (RMS)** is a fundamental mandate of the Science Plan. Many geo-microbiologists are still not informed about the RMS or about the lists of available RMS in repository web pages.

The IODP curators identified the needs for better advertisement of the archived RMSs and agreed to ask the Center for Dark Energy Biosphere Investigations (C-DEBI) if they would be willing to link these lists on their webpage, as well as frequently mention RMS in their Newsletter.

Central Inventory (CI)

The IODP Curators agreed that **The Central Inventory (CI)** is intended for the creation of all sample records available in one database or through a single internet portal. The FY13 **Annual Program Plan (APP),** states (page 38) that the CI was launched in early FY2012. However, we have not yet seen anything related to the CI, and even lack of information when it will be developed. It was agreed that there is needed to apply well-developed and proven procedures, including the multi-repository requests.

Continuation of proven procedures

The IODP curators agreed to keep the well-developed and proven procedures, including: the multi-repository requests will be reviewed for approval by the IODP and the curator/repository that houses the lowest numbered leg/expedition listed in the sample requests.

The creation of permanent archive lists is the responsibility of the IODP Curator for the drilling operator that obtained the cores. It was agreed to hold quarterly conference calls (or more/ad hoc if needed). The chair of the Curatorial Advisory Board (CAB), or another CAB member, in the chair´s absence, will be invited to participate in the conference calls.

IODP Curation/repository web pages

The IODP curators agreed that the entire IODP Curation/Repository web pages should be made more prominent than they are now and that the new IODP Sample/Data Requests be made easily accessible from the front pages of all IODP sites. This would help provide the science community with a more integrated service, in the same manner as the future Central Inventory system.

In reference to the continuation of a high-quality, standardized repository service, the IODP curators seek the FB support for their mission to ensure the continuation of high-quality, standardized repository service to the scientific community in the International Ocean Discovery Program. It was also recommended that the repository webpages should be more easily accessible via the IODP webpage.

Shipping of core materials

The IODP curators decided that the shipping of core materials should be for non-destructive analyses (U-channels, entire sections, thin sections). The curators discussed loan agreements and potential budget issues as well as the applied procedures (ship-requested cores vs. evaluation of requests in detail with respect to local lab capacity and deciding on a case-by-case basis), risks for core during transport, at scientist´s labs, and due to improper core handling by inexperienced staff. Identified the need for flexibility in shipping budget (to build in contingency). U. Röhl said that it is necessary to continue the standardized repository service.

IODP Scientific Technology Panel (STP) Terms of Reference

U. Röhl presented the following STP ToR.

IODP Scientific Technology Panel (STP) Terms of Reference

1. General Purpose. The Scientific Technology Panel (STP) reports to the Science Planning Committee (SPC), and may communicate directly with IODP Management International (IODP-MI) and IOs and other panels. The panel shall contribute information and advice with regard to handling of IODP data and information, methods and techniques of IODP measurements (including factors that impact measurements, such as sample handling, curation, etc.), laboratory design, portable laboratory needs, downhole measurements and experiments, and observatories to the SPC and IODP-MI.

2. Mandate. STP recommendations shall be sent to the SPC. The STP shall provide advice on scientific measurements made onboard IODP platforms, within and around boreholes, and on samples collected by the IODP and associated programs. The STP shall develop guidelines concerning said measurements and shall furnish advice about scientific measurements, equipment, and on certain policies and procedures in the IODP. Specific responsibilities for the panel shall be advice on databases, sample handling, curation, computers, shipboard equipment usage and needs, as well as borehole and observatory measurements, equipment, usage, and needs. In addition, STP will give advice to the SSEP regarding specific proposals on an as needed basis as part of the proposal nurturing process.

The IODP Sample, Data and Obligations policy was updated on March 2012.

It has been discussed as to whether it would be possible to ask the existing CAB members to continue their functions in CAB. In the absence of STP in the new program, it was recommended that one CAB member serves on each of the respective facility boards.

The core repository curators discussed the necessary changes and submitted the recommendations to the advisory boards. Next, the recommended changes are forwarded for the decision of the Facility Boards.

U. Röhl reminded that the above is a list of points and recommendations for improvements.

K. Becker said that there exist policies and procedures that ECORD may apply to initiate some changes.

T. Janecek commented that the above-listed requests involves a lot of fiscal responsibility, but the Forum has no fiscal authority so it is rather the FB that should address these issues fiscally. First, it is essential to hear the issues that pass through the JR-FB. He asked for a prioritized list of the listed items and an indication of their corresponding associated costs.
D. Smith said that if ECORD defines the question list as the necessary items for each case, then it would be difficult to apply these recommendations to different projects across the world and may thus constrain the MSPs. U. Röhl said that the existing measurement document has different categories that must be addressed. It is expected that it must be considered what is acceptable and feasible with each separate expedition.
G. Camoin said that several principles and financial consequences for the addressed items would have to be further reviewed. He recommended that 2-3 members of the FB work with U. Röhl in redefining these principles in order and then these items could be evaluated in terms of financial consequences by the ECORD Council. K. Gohl recommended that these items should be also discussed via email.

ACTION: to create a 'Recommendation, Rules and Procedures' work group, including U. R., G. Dickens and A. Cattaneo, D. Weiss, in order to write a start-up document with the discussed above issues.

***Consensus 13-03-01:** The E-FB decides to create a sub-work group to answer the Core Repository Recommendations, rules and procedures questions (U. Röhl).*

***E-FB Consensus 13-04-01:** The E-FB agrees to work on a revised guidelines document for the ethical and environmental MSP issues and to prepare a document to the circulated to the E-FB.*

D. Weiss said that she would participate in the work group if the necessary documents were made available.

ACTION (FB Chair and one Scientist): K. Gohl and D. Weis to form a two-person working group to write a draft of the suggestions for the ECORD environmental policy for ECORD MSP operations.

4.3 – ECORD Technical Development Panel and Scientific Technical Panel (R. Gatliff)

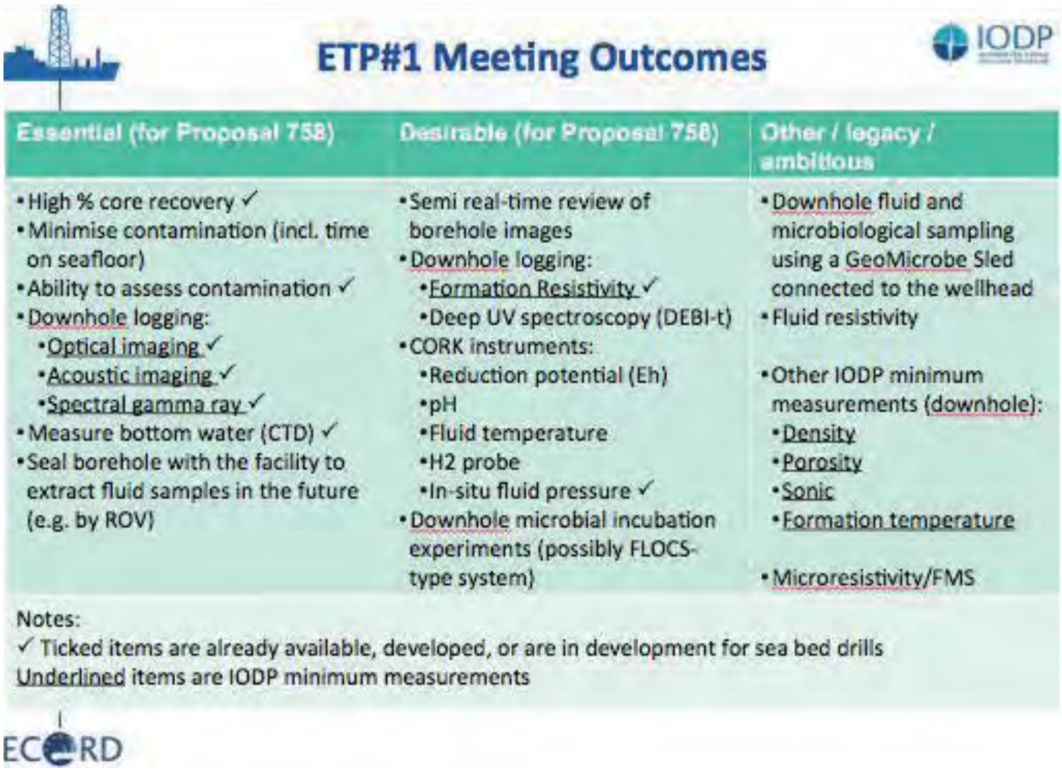
R. Gatliff said that it is needed to examine the current STP issues and to find a better approach than meeting each month as a panel.
R. Gatliff reviewed the ECORD Engineering and Technology Panel ETP #1 Meeting aims. He mentioned that it is necessary to prioritize a list of elements in order to evaluate how to meet the minimum measurement goals. ETP Meeting #1 occurred on November 8th at the BGS in Edinburgh, the UK. The ECORD ETPs will be project-driven, i.e. will examine what technology is needed in order to implement and schedule highly–ranked proposals. The participants will largely vary from meeting to meeting. The first meeting examined the fluid and microbiology sampling from sea-bed drills. He reviewed a list of participants, *see PowerPoint*.

ETP Meeting #1 Aims

The first meeting was primarily an information gathering exercise for ESO. It focused on the question of how ESO should meet the minimum requirements of IODP Proposal **758: Atlantis Massif Seafloor Processes**. The second part of meeting focused on IODP and on the questions of how should ESO enhance an expedition based on Proposal 758 and how it should provide more of the expected IODP legacy data (minimum measurements). The third part of the meeting focused on how ESO should provide and test new tools that the community can use on future proposals. Ultimately, ESO would like a prioritized list of sea-bed drill developments, and an indication of the level of development required. If ESO is going to develop/modify something, ideally it would like to collaborate with MARUM so the tools will work on both the BGS Rockdrill and the MeBo.

ETP Meeting #1 Outcomes

The following meeting outcomes were reviewed.



ETP#1 Meeting Outcomes

Essential (for Proposal 758)	Desirable (for Proposal 758)	Other / legacy / ambitious
• High % core recovery ✓ • Minimise contamination (incl. time on seafloor) • Ability to assess contamination ✓ • Downhole logging: • Optical imaging ✓ • Acoustic imaging ✓ • Spectral gamma ray ✓ • Measure bottom water (CTD) ✓ • Seal borehole with the facility to extract fluid samples in the future (e.g. by ROV)	• Semi real-time review of borehole images • Downhole logging: • Formation Resistivity ✓ • Deep UV spectroscopy (DEBI-t) • CORK instruments: • Reduction potential (Eh) • pH • Fluid temperature • H2 probe • In-situ fluid pressure ✓ • Downhole microbial incubation experiments (possibly FLOCS-type system)	• Downhole fluid and microbiological sampling using a GeoMicrobe Sled connected to the wellhead • Fluid resistivity • Other IODP minimum measurements (downhole): • Density • Porosity • Sonic • Formation temperature • Microresistivity/FMS

Notes:
✓ Ticked items are already available, developed, or are in development for sea bed drills
Underlined items are IODP minimum measurements

ESO will focus to perform all of the essential items before the end of the mission. The seal borehole will be an upcoming development project and ESO is in the process of discussion with MARUM. They envision to meet with the goal within the next 12 months. Under the desirable items, list reviewed. ESO prepared a list of the ambitious steps that could be undertaken and discussed the issues about how safe it is to use radioactive items for downhole measurements.

The Science and Technology Panel

SIPCom received and discussed 5 letters of the present STP chair and 4 ex-members of STP expressing their serious concerns regarding the handling of technical issues in the new framework without a cross-platform operating technology panel. SIPCom realized that in particular cross platform issues such as consistency and standardization of measurements, sampling and data acquisition/assurance/quality/management are crucial, also in the new IODP. However, SIPCom is of the opinion that these issues will be taken care of by the Forum and the FBs. R. Gatliff said that ESO views the STP type reviews are very important and will try to work with colleagues on a project basis.

According to **SIPCOM Consensus 1301-03** the "IODP Forum mandate" and "Framework for the International Ocean Discovery Program" documents include appropriate safeguards, oversight, and discussion mechanisms by which should such concerns be raised in the future that they can be resolved. For example, Item #2 of the IODP Forum mandate and Items # 5, 6, 12, 14, and 20 of the Framework document, as well as others, provide specific identification of matters of relevance and how they might be handled in the new IODP.

K. Gohl commented that the procedure for each MSP is well-thought out.
S. Davies said that the minimum and standard measurements were requested by the proponents and not done in isolation.
G. Dickens asked whether ESO foresees any long-term technological goals. R. Gatliff said that ESO is working with ECORD in creating a Research Infrastructure (RI), in hopes to get some funds for technological development from the EU. G. Camoin said that ECORD will begin working on such a proposal in the next few weeks and will submit it next year to the EU, as a second step of the ECORD development phase.
D. Smith said that expeditions in over-pressurized hydrate sediments and the Arctic could have a long completion schedule.

4.4 – Overarching educational and outreach issues (A. Stevenson)

A. Stevenson said that the IODP 2013-2023 Science Plan is emphasized on the training the next generation of scientists. IODP's main outreach initiatives such as training, fostering stewards of the planet, and working with more museum and national parks facilities and information, inspire the public through webpage material and social networks tools.

The IODP main outreach initiatives

The initiatives include the training of the next generation of scientists by engaging early-career scientists and graduate students in science expeditions and other activities (summer schools, etc.) where experience can be passed on. Another IODP outreach initiative is the fostering of stewards of the planet by: inspiring a sense of environmental stewardship and science interest in homes and schools; hosting outstanding educational materials; helping science educators to develop materials for museums, nature centers, national parks; hosting educational activities at core repositories, etc.; informing and inspiring the public; providing web-based material and social networking tools; linking classrooms and platforms electronically ; and developing applications and other electronic media.

ECORD's outreach objectives

A. Stevenson said that ECORD's outreach objectives are created in accordance with the ECORD Business Plan. The objectives include reaching opportunities at a **government** level by demonstrating that the results meet the funding agencies' needs, at an **industry** level by demonstrating opportunities for joint expeditions and by participating in **new funding opportunities** through the pro-active involvement in European science planning.

A. Stevenson said that the EC has recognized that it is needed to have more input from scientists on how money should be allocated, especially in the creation of an infrastructure.

He showed as an example the USIO **research *JR* vessel virtual tour**, along with a fun-and-games blogs section as a reach out tool to a younger audience. He emphasized that that it is important to do such outreach as early as possible. Also it is important to maintain a frequently-asked-questions related page about the needed opportunities and skills. He reviewed the JAMSTEC webpage, the *Chikyu* TV links and the *Chikyu Hakken* CDEX newsletter. Tweeter is a strong outreach tool that is applied by ECORD to get the attention of media. He recommended that such outreach facilities should be used more constructively.

Issues to consider in the new IODP

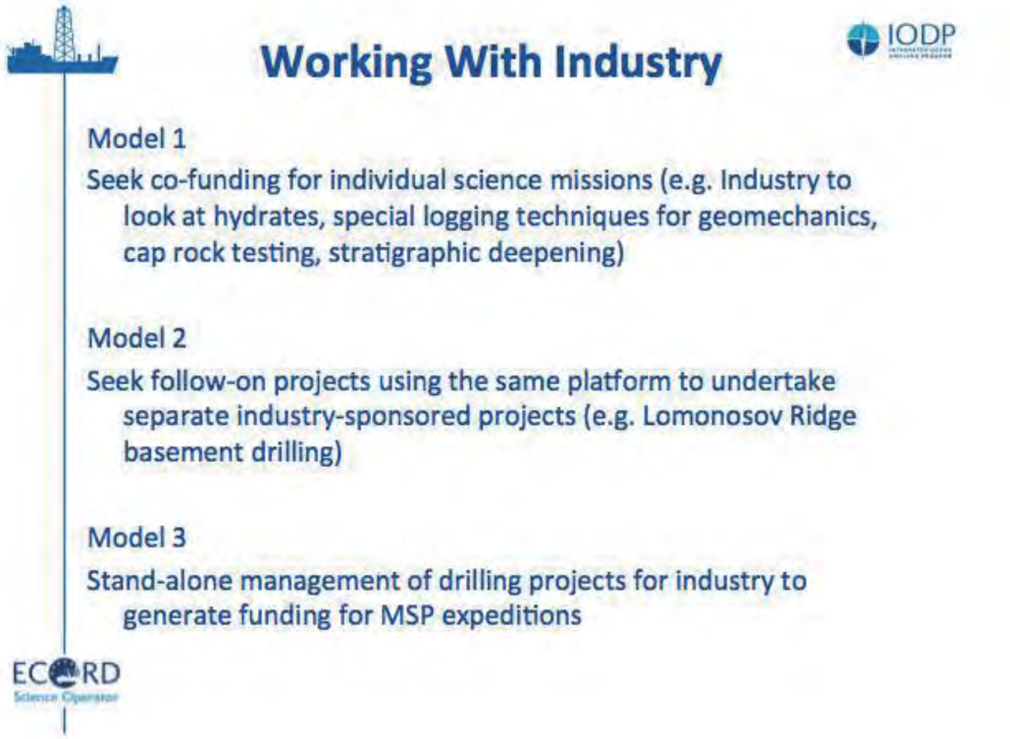
A. Stevenson reviewed a list of issues that should be considered:

relationship with Support Office (which will maintain IODP website). This relationship needs to be further clarified in terms of IODP website maintenance; **delivering overarching outreach** defined in the new Science Plan e.g. social media policy; resources for activities previously funded by IODP-MI. Currently there are no more resources to make more professional videos for ECORD. **Achieving educational targets (developing materials) on a multi-national level** also needs to be clarified. A. Stevenson asked whether such activities will involve more input from the national offices? In addition, the list **includes conveying the new business model**, e.g closer liaison with industry, especially in environmentally sensitive areas. He emphasized that this activity is relevant **to ECORD in terms of coral reef expeditions**; and **keeping up**

with media technology, as ECORD needs to become technologically agile enough and to acquire the necessary skills, which also involve the funding issues.
T. Janecek said that the delivering overarching outreach that is defined in the new Science plan should be dictated by the FB.

4.5 – Ethical issues (R. Gatliff)

R. Gatliff said that there is a need to create a future plan in the generation of extra funding.
Ethical Issues: Lessons from ICDP, JR, and Chikyu
R. Gatliff said that they found an affordable ship from Tonga, which will be sailed from around the world. He asked whether ESO should have refused using this ship and used instead a local ship.
He commented that it is clear that ECORD would like to go to the Arctic. He presented some challenges to such similar cases, such as the recent UK House of Commons announcements about minimizing projects to the Arctic. Shell has pulled out of the Arctic due to some controversy with leading such projects. He reviewed that ICDP has been involved in work with industry and has received funding with such actions.
R. Gatliff concluded that the other platforms are working with industry for one reason or another and that such actions do not interfere with their science. Based on ECORD's future plans to hold operations in the Arctic, such as the ACEX expedition, it should be considered in the future how ECORD will work in this region and whether it would involve industry.
Ethical Issues and Politics
Israel will join ECORD and Russia will be approached to become a member. Should ECORD approach any countries and should ECORD work in offshore regions of some countries of interesting science cases? Currently, ECORD does not have a written environmental policy and this may be an issue. He listed some of the deep-sea and mining anti-exploration publicity.
Working with Industry
He presented three types of working models shown next.



R. Gatliff recommended using model #2 of future expeditions to the Arctic.

D. McInroy said that IODP has a short environmental policy. J. de Leeuw commented that it is possible to follow model #3.

K. Gohl said that ECORD should not be too specific in its work plan with industry, but it should have some discussions about it in the future, especially for the purposes of Arctic drilling. Such discussions should be held specifically to each MSP, as each one is very different. C Escutia agreed that a broad document should be adopted, which can be applied to the individual MSP projects. T. Janecek agreed and said that they are also looking into developing a similar policy with the use of the JR, in which they will have to remove the label of many organizations that are not involved in the specific operations. He added that the JR environmental principles refer to when the JR operated in accordance with the IODP plan, but now the plan is written for an all-encompassing program, which in essence does not include the actions of other platform providers.

D. McInroy briefly displayed a short paragraph of the current program's Health, Safety, and Environmental policy, which may need to be clarified further in the future. T. Janecek said that there is no one entity on IODP so these types of questions will have to be decided by each operator.

G. Camoin said that there is a new **ECORD Industry Liaison Panel (ILP)**, which is planned for May 2-3 2013, where representatives from industry and academia will meet.

E-FB Consensus 13-04-01: *The E-FB agrees to work on a revised guidelines document for the ethical and environmental MSP issues and to prepare a document to the circulated to the E-FB.*

ACTION (FB Chair and one Scientist): K. Gohl and D. Weis to form a two-person working group to write a draft of the suggestions for the ECORD environmental policy for ECORD MSP operations.

4.6 – Long term planning (K. Gohl)

Policy for scientists and chief scientists

G. Camoin said that in the new system it has not been decided how the co-chiefs will be selected. The possibilities include either leaving this decision in the operator's hands or to leave it to the E-FB.

T. Janecek said that this is up to the E-FB's decision. He asked whether ECORD would want PEP to provide suggestions or to just involve the FB as the key player. Initially, the Science Planning Committee provided nominations, so PEP may be asked to provide nominations to the FB. K. Gohl agreed because the co-chief scientists should be nominated with the goal to define the science on this specific mission, and PEP is the correct panel to give the FB such recommendations. C. Escutia said that it is important that the operator be involved in the process of making final selection decisions of who the co-chiefs will be. The FB and operator will have to work on this together. M. Webb asked how many scientists' names should be generally considered. G. Camoin said that a sufficient number will have to be nominated in order to meet the given quotas, the expertise and to include several potential alternates who would be able to replace a nominee. D. Kroon commented that the first proponent on the first proposal is normally chosen as the co-chief, so then the rest of the names should depend on the expertise. The FB may choose the relevant expertise from the submitted applications.

J. Schuffert recommended that the potential candidates selection process could include interactions with the PMOs.

Consensus 13-05-01: *The E-FB recommends that PEP should provide 5-6 name recommendations for the co-chief scientists, in congruence with the operator. The PMOs may participate.*

ACTION FB: to ask PEP's recommendations for a minimum list of 5-6 co-chief scientists.

K. Becker asked at what point of the process these nominations should be ready. Generally, the nominations were provided when a proposal was forwarded. G. Camoin said that this process could take some time for the MSPs.
T. Janecek said that the IOs are communicating with each other the planned expeditions, and as this system works well it should be kept.

Consensus 13-06-01: *The E-FB recommends to keep the current system for expedition planning communications between the PMOs.*

G. Camoin recommended that the E-FB should make a two-plan expedition plan in order to ease the work process of ESO.

Consensus 13-07-01: *The E-FB agrees to create a two-year plan for the ECORD expedition plan.*

5. Complementary Project Proposals and Ancillary Project Letters for Mission Specific Platforms (R. Gatliff)

R. Gatliff said that ECORD has no CPPs and no APLs, hence it is a good idea for ECORD to have some of these types of proposals. It is possible to get EU Research grants as partial funding for the platforms is a good option.

Complementary Project Proposals (Full proposals with substantial external funding)

If ECORD is to negotiate with other grant-giving entities, ECORD should be open to negotiate the involvement of industry in the use of MSPs.

Anciliary Project Letters

Individual scientists may propose a project that requires less than 5-10% of the dedicated platform time, including transit.

Also a profit-making project that is not an APL, but separate for fund raising should be considered. If an APL comes up, there is a need for discussion time and while it may not be applicable to the science it is profitable. Such a project can be treated as an IODP non-related project.

K. Becker mentioned that there was a highly rated APL for the MSP, but the operator said that the proponent needed to raise the money. G. Camoin said that initially the APLs are done at the expense of another scheduled mission, so for the operator it is just a matter of time of scheduling.

M. Malone said that the APLs need a correct amount of time planning window in order to be implemented correctly. R Gatliff said that the other option is instead of taking time off from a mission, ECORD could spend extra funds on the APL. G. Camoin said that as the expedition schedule will be prepared two years in advance, the ESO would have more time to plan the scheduling of an APL. D. McInroy said that it is possible to be flexible by doing a change of tender in such a process.

T. Janecek said that if the terms of APL are written in an official FB document, such a project would relate to ECORD and not IODP. He said that the US will accept any money that would help the JR operations. The question is that at PEP, 70% funding level was enough to get the science through. But if there is a lower threshold of 10-20% funding, there is a dangerous situation in maintaining the integrity of the process, which may expedite science that is not good.

G. Camoin said that the 70% funding level was proposed for this reason, maintaining the scientific integrity. D. Kroon said that this step needs more discussion as PEP not only evaluates proposals, but also nurtures proposals. PEP makes sure that the proposals arrive at least at the "good" rating stage. In case that the science is not rated as such, then PEP would have to be honest and raise the question if there is good science. T. Janecek agreed that this is important to maintain the integrity of the program, as it must come under review.

6. Overview of active Mission Specific Platform proposals (D. Kroon)

Status of the MSPs within PEP

D. Kroon reviewed the proposal lists that are active and nurtured in PEP. The *Baltic Sea* expedition is included, as an overview as to how the science is progressing. Currently there are 17 MSP proposals. D. Kroon said that 3-4 proposals of this list might be forwarded to the E-FB.

Proposal_Number	Latest_Version	Short_Title	Lead_Proponent_Calc	Country_Lead_P	Ocean	Platform	SAS_Stage
548	Full3	Chicxulub K-T Impact Crater	Morgan	ECORD: UK	Atl	MSP	OTF
581	Full2	Late Pleistocene Coralgal Banks	Droxler	USA	Atl	MSP	OTF
637	Full2	New England Shelf Hydrogeology	Person	USA	Atl	MSP	OTF
672	Full3	Baltic Sea Basin Paleoenvironment	Andrén	ECORD: Sweden	Atl	MSP	OTF
680	Full	Bering Strait Climate Change	Powell	USA	Arc	MSP	PEP
708	Pre2	Central Arctic Paleoceanography	Stein	ECORD: Germany	Arc	MSP	PEP
716	Full2	Hawaiian Drowned Reefs	Webster	ANZIC: Australia	Pac	MSP	OTF
730	Pre2	Sabine Bank Sea Level	Taylor	USA	ac	MSP	PEP
756	Pre	Arctic Ocean Exit Gateway	Jakobsson	ECORD: Sweden	Arc	MSP	PEP
758	Full2	Atlantis Massif Seafloor Processes	Früh-Green	ECORD: Switzerland	Atl	MSP	OTF
761	Pre	South Atlantic Bight Hydrogeology	Wilson	USA	Atl	MSP	PEP
796	Full	Ligurian Landslide	Kopf	ECORD: Germany	Med	MSP	PEP
806	Pre	Beaufort Gas Hydrate	Paull	USA	Arc	MSP	PEP
750	Pre	Beringia Sea Level History	Polyak	USA	Arc	MSP+NR	PEP
797	Pre	Alaska Beaufort Margin	Ruppel	USA	Arc	NR+MSP	PEP

In the last two years, people have been very careful in submitting a full proposal because PEP gives them the opportunity to make only one revision.

D. Kroon highlighted the **812 Pre-Ross Sea Glacial History** and **813 Pre-Atlantic Paleoclimate** proposals.

For the ‘680 Full Bering Strait Climate Change’ lead proponent S. Fowell, PEP decided that the proponents should submit a revised full proposals possibly with 750-Pre, because the two proposals are very similar. For 680-Full, PEP decided that the proposal should be clearly revised as there were no clear testable hypothesis. There was too much concentration on the Cenozoic rather than the Pleistocene record. ESO responded that a platform is likely to be created as a lift-boat or jack-up rig. There are logistical issues and cost questions as the proponents estimate about 7 days coring. PEP is expecting the revised version.

750-Pre Beringia Sea Level History is a well-focused proposal, with Polyak as the lead proponents. The proponents were asked to combine their efforts with the 680-Full proponents.

The 750-Full objective include the history of Arctic-Pacific connections via the Bering Strait gateway, the impact of Late Cenozoic sea-level fluctuations on the high-Arctic depositional system and shelf architecture, and the Paleo sea-ice history in relation to climate change. Some of the issues related to the history of Beringia and the Arctic-Pacific connection are addressed in the IODP proposal 680 focused on drilling just north of the Bering Strait. However, the evaluation of relative sea-level changes in the Chukchi region requires additional drilling farther north on the Chukchi shelf and slope, notably in the filled channels. PEP recommended that the proponents combine their efforts with the proponents of the 750-Pre. A. de Vernal said that there is a workshop under way and she will attend it next week.

708-Pre2 Central Arctic Paleoceography (ACEX 2)

The lead proponent is Stein and the proponents were advised to submit a full proposal. The objective is a paleocenographic transect of the Central Arctic Ocean. PEP’s remark is that the proposal is about completing ACEX 1, and the proponents will need to satisfactorily demonstrate that the missing time intervals can be recovered at the proposed sites by integrating core-seismic data from ACEX 1 using existing and new seismic reflection data. PEP is awaiting a full proposal.

730-Pre2: Sabine Bank Sea Level

The lead proponent is Taylor. D. Kroon said he has his doubts about this proposal. The goal is to reconstruct the climate history of the WPWP and to obtain better estimates of the chance in the sea level. The problem is that the science is circular. This is because there is a lack of some subsidence history, making it difficult to reconstruct the sea-level. PEP decided to give them the benefit of the doubt so they asked for a full proposal. It was submitted two years ago to SSEP and then to PEP.

Proposal 756-Pre: Arctic Ocean Gateway

The lead proponent is Jakobsson. The two main objectives are 1) the evolution of the Fram Strait through the tectonic and rifting history of the Morris Jesup Rise and its subsidence history with respect to the Yermak Plateau conjugate physiographic feature and 2) the paleoceanographic evolution of the Arctic Ocean Exit Gateway with emphasis on water mass and ice properties, sources and flux rates. PEP said that proposal 756-Pre (1 Oct 2009) addresses several relevant issues in tectonics and paleoclimatology that are highly relevant to the IODP Science Plan. It is clear that the Morris Jesup Rise location is well placed to investigate the Cenozoic evolution of the Arctic Ocean and specifically (i) to monitor variability in the outflow of waters and from the Arctic Ocean and associated ice dynamics and (ii) the tectonic and rifting history associated with the opening of the Fram Strait. PEP liked 756-Pre and asked for a full proposal.

761-Pre: South Atlantic Bight Hydrogeology

The lead proponent is Wilson. PEP recommended that the proponents should develop a full proposal. The goal is to drill in five sites that are located in shallow water using a mission-specific platform (MSP). The panel (SSEP) recognized that such a transect has not been drilled before, has clear ties to the IODP Initial Science Plan (ISP), and that good scientific hypotheses have been articulated. PEP liked this proposal because it offers links between the ocean, sub-seafloor and the land-based hydrogeology.

796 Full: Ligurian Landslide

The lead proponent is Kopf. PEP asked for a full proposal. Proponents decided to drill a series of holes in the landslide. This is a geohazard proposal. The proponents propose to drill a series of holes at the Ligurian slope south of Nice where the water depths are less than 50 m, so that borehole monitoring becomes affordable, even in real-time. The drill sites aim is to characterize the metastable slope E and W of the former collapse structure, and the re-deposited material partly occupying the present-day landslide scar and deeper. PEP said that the proposal lacked a testable hypothesis, so it awaits for a revised full proposal. The proposal's strength is the assessment of the pore-pressure with time. PEP recommended that the proponents should focus on this aspect with model-based testable hypothesis.

806-Pre: Beaufort Has Hydrate

The proponent is Paul and the 797-Pre Alaska Beaufort Margin lead proponent Ruppel. PEP decided to ask the proponents to either write an individual proposal or to work together. PEP awaits one or two full proposals for this area, and hopes that there will be a comprehensive MDP proposal including ICDP drilling.
The 806-Pre objectives are to study the methane release and geological processes that are associated with the warming of permafrost and gas hydrate deposits beneath the Beaufort Sea Shelf and upper slope. In addition, they intend to study the geological processes that are caused by marine transgression, to determine the cause of observed seabed release and to estimate the sensitivity of this environment to climate change in the Arctic.

812-Pre: Ross Sea Glacial history (Wilson) and 813-Pre Antarctic Cenozoic Paleoclimate (Williams) (off George V)

The two proposals have the same objective of drilling and pro-grading sediment sequences using MeBo. PEP recommended that they develop a full proposal, including a well-designed drilling plan with the seismics.

D. Kroon suggested that some of these proposals could use the MeBo.

K. Gohls asked whether the proposals are all paleoclimate change-oriented and if the proposals are concentrated on a specific topic. The group said that the Paleoclimate topic is included. D. Kroon said that the ***Atlantis Massif*** *could be used for other purposes. G. Camoin said that once successful missions happen with the MeBo, it is likely that more proposals will be submitted.*

D. Kroon said that he does not hear often from the proponents and asked the E-FB whether PEP should follow up on these proponents. G. Camoin said that he spoke with the lead proponent R. Stein, who was not sure when to submit the proposal. K. Gohl said that the delay in such proposals comes from the lack of site survey data and also having a one-chance for revision of the proposal. A. de Vernal said that such an update of data is a large endeavor, hence the delay in proposal submission.

M. Webb suggested that a brief statement should be requested from the proponents, to show the level of their proposal development.

Consensus 13-08-01*: The E-FB agrees to ask the proponents, at the PEP system, and upon PEP's recommendation, to submit a small status statement about their plans on the revised proposal version.*

R. Gatliff said that the 3P Arctic session is coming up and there are no final proposals that could be presented. He asked that ESO be supported by PEP about which proposals are to be recommended in the October session. D. Kroon said if PEP does not dis-activate such proposals, then it means that the proposals have potential.

K. Gohl said that considering ECORD has funds for one MSP per year, he suggested that at each FB meeting, 4-6 proposals should be discussed as to which should be proposed for the next year. G. Camoin said that for the time being there are diverse proposals, with diverse costs and technologies.

K. Gohl said that seabed drilling is relatively cheap. There are groups that apply the usage of MeBo and that consider IODP as a funding source, but they know that with IODP they will have to wait 5-6 years before the expedition takes place. Hence, there are a lot of drop-outs from the system, because the proponents receive funding outside the IODP system.

Friday, March 8th

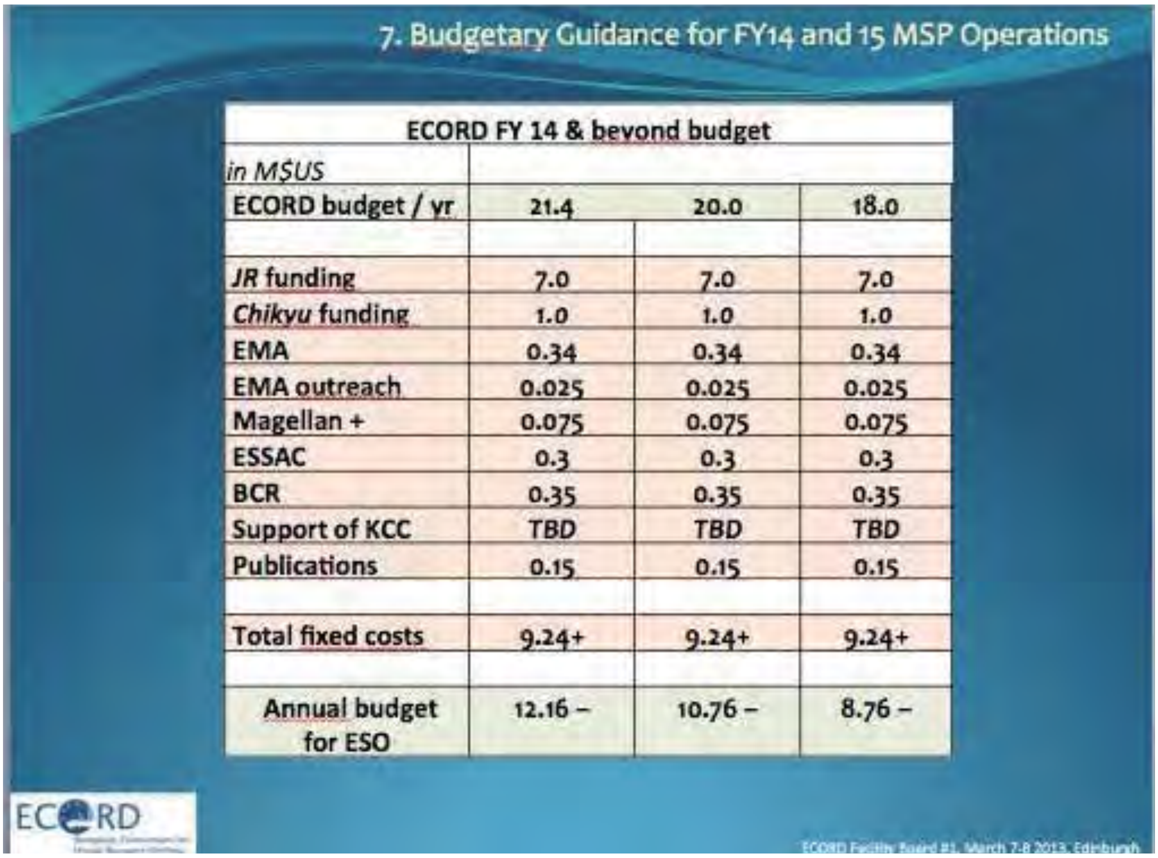
7. Overview of ECORD budget for FY14 and 15 Mission Specific Platform operations (G. Camoin)

G. Camoin reviewed the end of **FY12 budget** with a balance of $2,705,295 USD. C. Escutia is in the process of negotiations for the Spanish contribution. No contribution has been received from Spain in FY 11 and FY 12, thus totaling $1 524 000 USD and no contribution, $30 000 USD, has been received from Belgium in FY 12.

It is possible that the **FY13 balance** would be between $3-4 M USD, depending if Spain pays its membership.

ECORD FY 14 Budget and Beyond

G. Camoin reviewed the FY14 and Beyond budget table.


7. Budgetary Guidance for FY14 and 15 MSP Operations

ECORD FY 14 & beyond budget			
in M$US			
ECORD budget / yr	21.4	20.0	18.0
JR funding	7.0	7.0	7.0
Chikyu funding	1.0	1.0	1.0
EMA	0.34	0.34	0.34
EMA outreach	0.025	0.025	0.025
Magellan +	0.075	0.075	0.075
ESSAC	0.3	0.3	0.3
BCR	0.35	0.35	0.35
Support of KCC	TBD	TBD	TBD
Publications	0.15	0.15	0.15
Total fixed costs	9.24+	9.24+	9.24+
Annual budget for ESO	12.16 –	10.76 –	8.76 –

After including the costs for the Kochi Core Center, Magellan Plus, the ECORD booths, and the *Chikyu* funding, it is estimated that ESO would have about $12.16-8.76 M USD.

G. Dickens asked how the carry-over funds are used. G. Camoin said that ECORD could carry over the money if a cheaper MSP expedition is implemented, pay for one more year of the JR or add money to the Chikyu, based on what the Council decided. This sum includes only the ECORD countries' contributions and it does not take into account any potential co-funding or in-kind contributions. The ECORD bank account is in US dollars and it accumulates some interest. R. Gatliff said that ESO cannot sign a contract unless it has *some money on its account to prove that it could pay. G. Camoin said that it would be much easier for the operator to sign contracts if more countries decide to sign the MoU in the new phase for several year-contributions instead of for just one fiscal year.*

S. Shibata asked what the KCC support would include. G. Camion said that this is to be determined in terms of the regional expedition agreement that is negotiated by ECORD and Japan.

8. Review of the MSP proposals transferred from the Operations Task Force to the ECORD Facility Board

8.1 - 548-Full3 Chicxulub K-T Impact Crater

8.1.2 - Scientific objectives (A. Cattaneo)

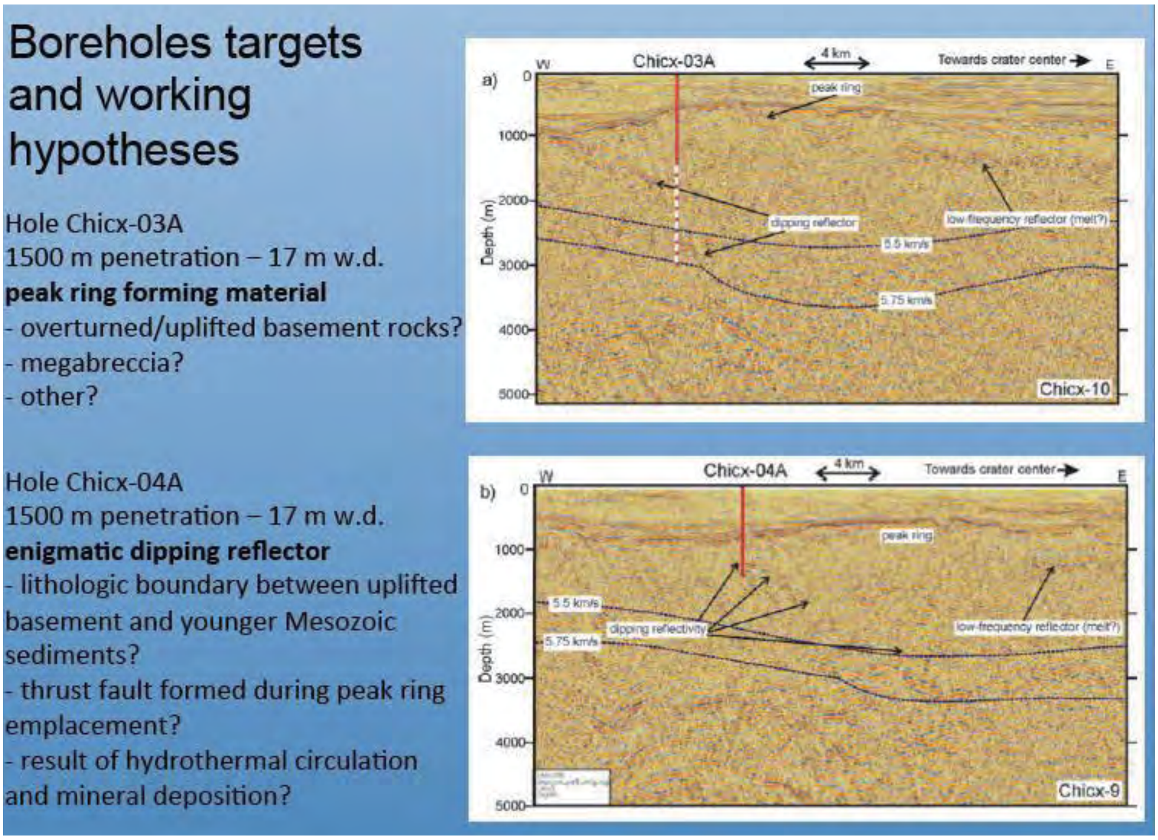
A. Cattaneo presented the **548-Full3 Chixulub** scientific objectives to drill in the Gulf of Mexico. The site location is an impact crater that is recognized as the mostly likely resort of an impact that led to mass extinctions, an unequivocal topographic “peak ring”, global ejecta layer and is linked to the K-T mass extinction.

Borehole Aims

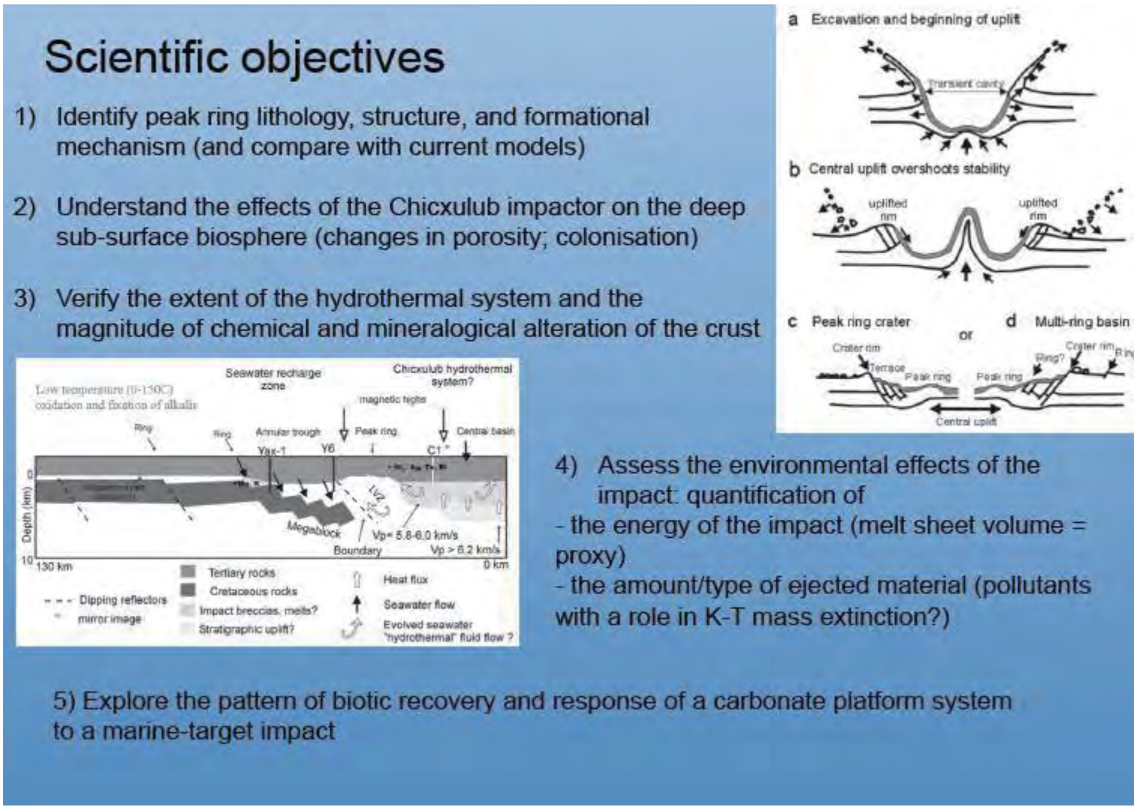
The aims are to constrain the formational processes and lithology of peak ring, and to determine the origin of the dipping reflections.

Borehole targets and working hypothesis

A. Cattaneo reviewed the following diagrams.



Scientific objectives



Relevance to the IODP Science Plan

The proposal is relevant to the deep biosphere and the ocean subseafloor topic, environmental change, processes and effects, in particular the environmental and biological perturbations that are caused by Chicxulub. In addition, the study is relevant to the Biosphere Frontier topic, involving deep life, biodiversity and environmental forcings of ecosystems.

Summary

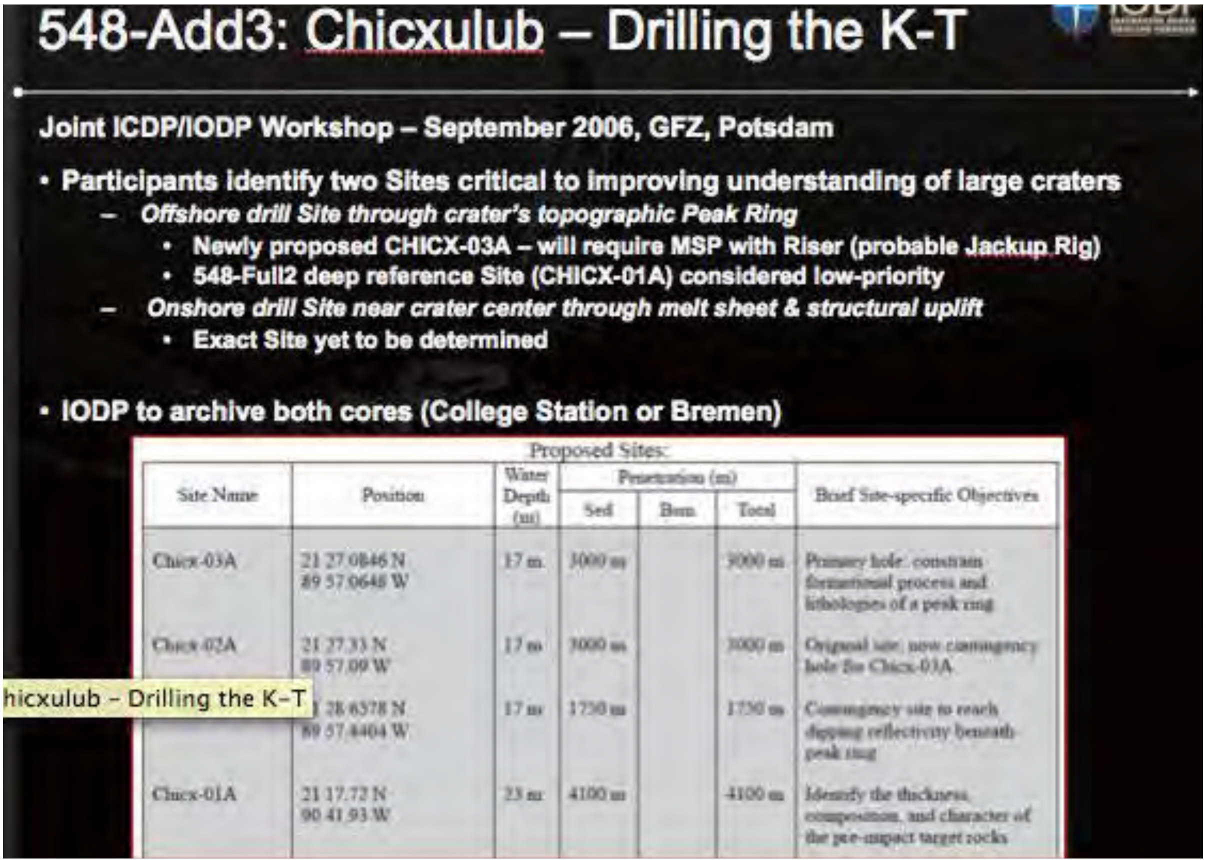
A. Cattaneo summarized that the proposal aims are to study a unique site that has a fully preserved large impact crater. The sites that are associated with K/T global mass extinction have the potential to reveal the impact dynamics mechanisms and to detail the global effect of the ecosystems' impact. He commented that the proposal is written with clear hypothesis driven tests, detailed strategy and could present the occasion for an effective outreach communication.

D. Kroon asked that considering this crater has been drilled not so long ago and considering the results of the previous drilling, whether this expedition will add to the previous expedition's result. A. Cattaneo said that there is a set of transects in the borehole that was drilled before the interpretation of the crater, it terms of hydrocarbons. The proponents make a point to demonstrate the complementarity of the proposed borehole. The marine based borehole would be more costly in an equivalent study on land.

8.1.3 - Site survey data (G. Lericolais)

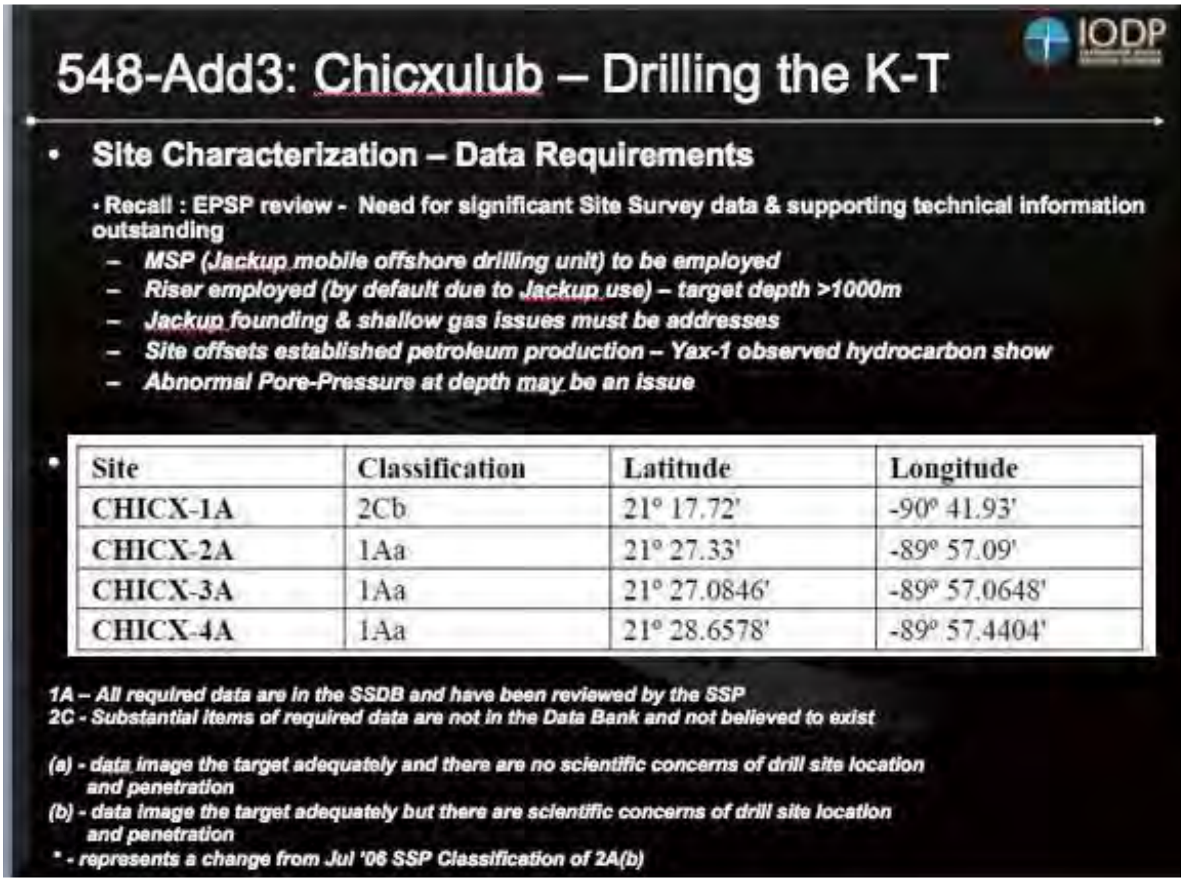
G. Lericolais **548-Add3 Chicxulub** received on January 15, 2007. Four sites will be analyzed. The SCP expressed concern that the first site information may not be enough to achieve the target. For the other three sites, the labeling is 1Aa, which means 'green light'. He said that the sites may be drilled without a problem. If necessary, the SCP can review the site again.

The site information is shown next.


548-Add3: Chicxulub – Drilling the K-T
Joint ICDP/IODP Workshop – September 2006, GFZ, Potsdam
• Participants identify two Sites critical to improving understanding of large craters
– *Offshore drill Site through crater's topographic Peak Ring*
• Newly proposed CHICX-03A – will require MSP with Riser (probable Jackup Rig)
• 548-Full2 deep reference Site (CHICX-01A) considered low-priority
– *Onshore drill Site near crater center through melt sheet & structural uplift*
• Exact Site yet to be determined
• IODP to archive both cores (College Station or Bremen)
Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
Chicx-03A	21 27.0846 N 89 57.0648 W	17 m	3000 m		3000 m	Primary hole: constrain formational process and lithologies of a peak ring
Chicx-02A	21 27.33 N 89 57.09 W	17 m	3000 m		3000 m	Original site; now contingency hole for Chicx-03A
[illegible]	[illegible] 28.6578 N 89 57.4404 W	17 m	1750 m		1750 m	Contingency site to reach dipping reflectivity beneath peak ring
Chicx-01A	21 17.72 N 90 41.93 W	23 m	4100 m		4100 m	Identify the thickness, composition, and character of the pre-impact target rocks

hicxulub – Drilling the K-T

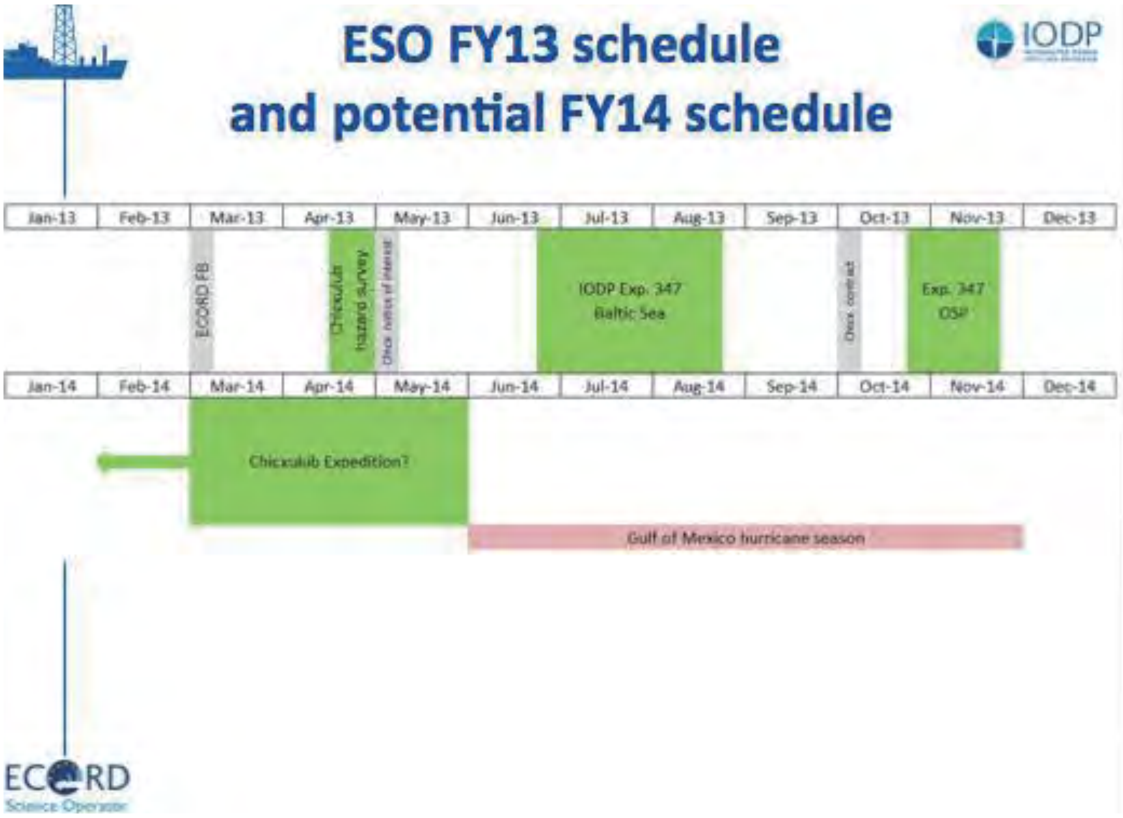

IODP
548-Add3: Chicxulub – Drilling the K-T
• Site Characterization – Data Requirements
• Recall : EPSP review - Need for significant Site Survey data & supporting technical information outstanding
– *MSP (Jackup mobile offshore drilling unit) to be employed*
– *Riser employed (by default due to Jackup use) – target depth >1000m*
– *Jackup founding & shallow gas issues must be addresses*
– *Site offsets established petroleum production – Yax-1 observed hydrocarbon show*
– *Abnormal Pore-Pressure at depth may be an issue*

Site	Classification	Latitude	Longitude
CHICX-1A	2Cb	21° 17.72'	-90° 41.93'
CHICX-2A	1Aa	21° 27.33'	-89° 57.09'
CHICX-3A	1Aa	21° 27.0846'	-89° 57.0648'
CHICX-4A	1Aa	21° 28.6578'	-89° 57.4404'

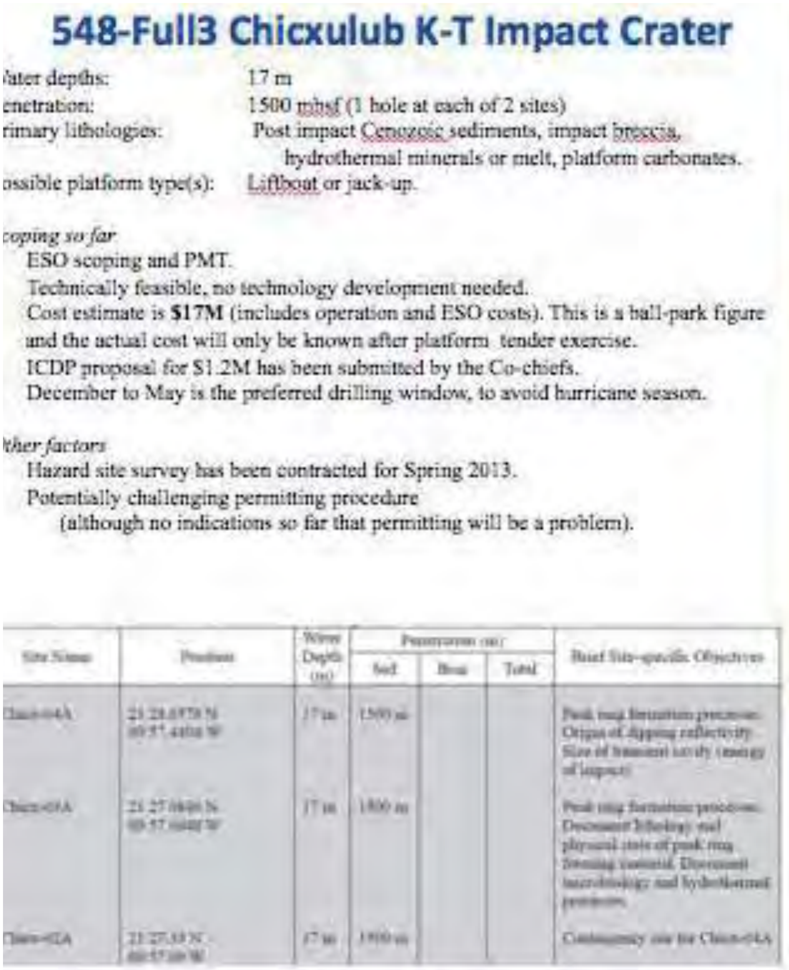
1A – All required data are in the SSDB and have been reviewed by the SSP
2C - Substantial items of required data are not in the Data Bank and not believed to exist
(a) - data image the target adequately and there are no scientific concerns of drill site location and penetration
(b) - data image the target adequately but there are scientific concerns of drill site location and penetration
** - represents a change from Jul '06 SSP Classification of 2A(b)*

8.1.4 – Drilling operations (ESO D. McInroy)

D. McInroy summarized the FY13 and potential FY14 schedules.



The **548-Full3 Chicxulub K-T Impact Crater** co-chiefs were nominated early because some PIs were sent to ICDP for a co-funding consideration. The cost estimate is about $17MUSD, but the relative figure will be apparent when ESO goes to tender, which will have a $2-3M USD difference.



548-Full3 Chicxulub K-T Impact Crater

/ater depths: 17 m
enetration: 1500 mbsf (1 hole at each of 2 sites)
rimary lithologies: Post impact Cenozoic sediments, impact breccia, hydrothermal minerals or melt, platform carbonates.
ossible platform type(s): Liftboat or jack-up.

coping so far
ESO scoping and PMT.
Technically feasible, no technology development needed.
Cost estimate is **$17M** (includes operation and ESO costs). This is a ball-park figure and the actual cost will only be known after platform tender exercise.
ICDP proposal for $1.2M has been submitted by the Co-chiefs.
December to May is the preferred drilling window, to avoid hurricane season.

ther factors
Hazard site survey has been contracted for Spring 2013.
Potentially challenging permitting procedure
(although no indications so far that permitting will be a problem).

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsmt	Total	
Chicx-04A	[illegible]	17 m	1500 m			Peak ring formation processes. Origin of dipping reflectivity. Size of transient cavity (energy of impact)
Chicx-03A	[illegible]	17 m	1500 m			Peak ring formation processes. [illegible]
Chicx-02A	[illegible]	17 m	1500 m			[illegible]

The sea data and site hazard survey will begin on April 16th. There is no indication that there will be problems for gaining drilling authority. There is an upcoming Yucatan officials meeting with the goal to organize ESO for working with the Mexican government.

D. Smith said that the time scale for the expedition is challenging. Chixculub has to happen somewhere between March 14th and April 14th, so in order to meet this deadline, they will need to go to tender in May 2013. R. Gatliff said that these would be the deepest two holes ECORD has ever drilled. Due to the high costs of the expedition, the net balance for FY13 would not be enough to fund this expedition. Hence, it is more likely that it would take place in 2015. D. Smith said that the platform also does not have enough berths places due to the deep biosphere technology equipment. R. Gatliff said that it will not be clear what size vessels would be used until ESO goes to tender. J. de Leeuw asked about the type of

proposal. D. McInroy said that it is an advanced logging operation, so a large percentage of the $1.2 M USD would be used for these costs.
*G. Lericolais said that the SCP has never received the **Full-3** evaluation, and it has been considered that it can be drilled. The Full-3 proposal should be submitted to SCP again as the new proposal has not been submitted and it must go to EPSP.*

8.2 - 581-Full2 Late Pleistocene Coralgal Banks

8.2.2 - Scientific objectives (K. Gohl)

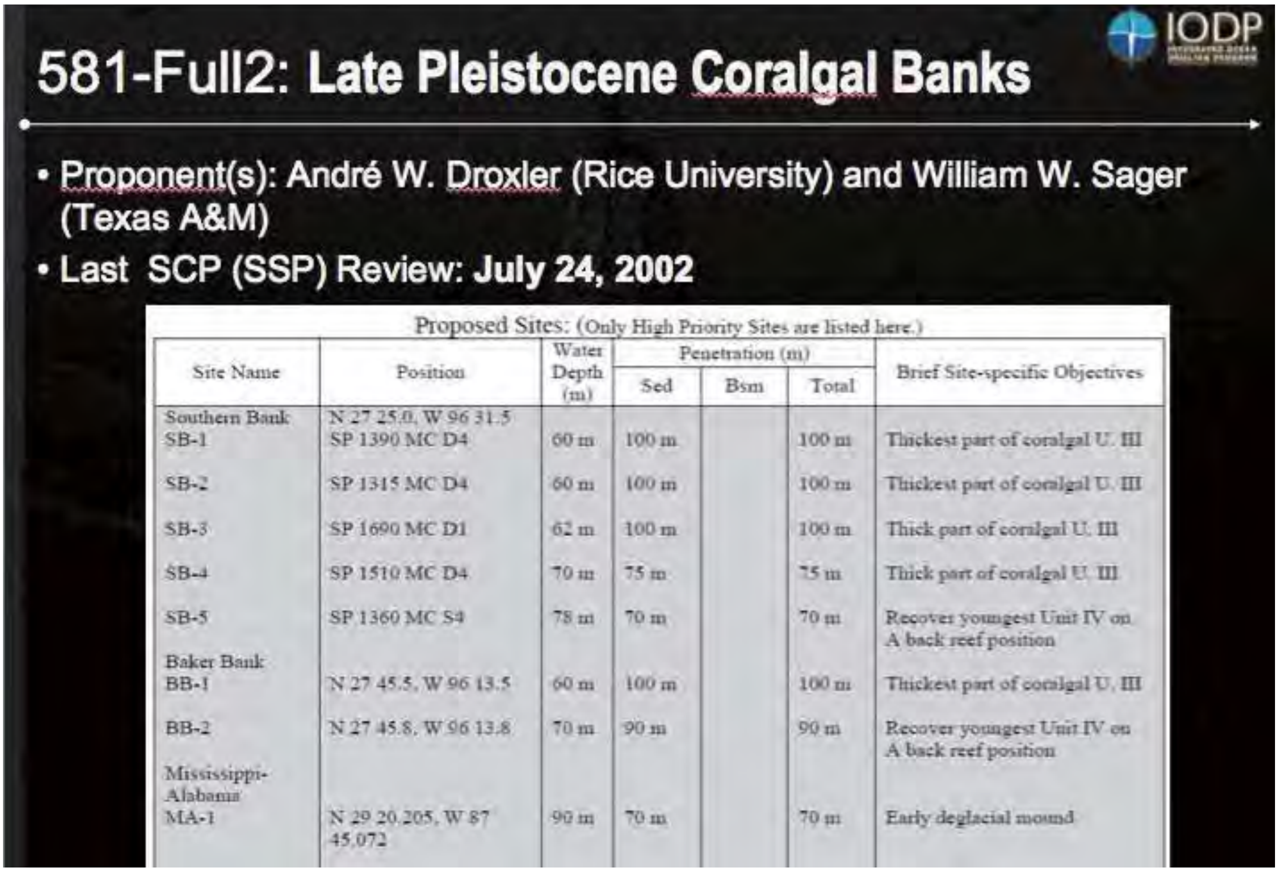
K. Gohl presented proposal **581-Full2**. The proposal was in the system for 13 years. The proposed location is the southern and Baker Banks. The Southern and Baker Banks are currently drowned coralgal reefs that are about 40 to 50 m thick on the edge of the South Texas Shelf 55 km offshore Corpus Christi. They are interpreted to have grown during the first half of the last sea level transgression on top of topographic highs occurring along a lowstand **siliciclastic paleo-coastline at the Last Glacial Maximum**.

The Drilling plan
There were 9 total proposed drill holes. K. Gohl said that a total of **7 drill holes, each 80 to 100 m deep**, consisting of an array of 5 boreholes through Southern Bank and a 2 borehole-transect through Baker Bank and their siliciclastic substratum. Each borehole will include at least two of the three following sedimentary packages:
(1) the **siliciclastic substratum** of the reef edifice,
(2) the **coralgal sequence** itself,
(3) the **mud blanket** that partially covers the reef edifices.
In addition a 2 borehole-transect across similar transgressive banks, that were observed at the edge of the Mississippi-Alabama continental shelf, has been integrated to this drilling proposal.
K. Gohl presented the exams of the seismic lines. He presented a diagram of the Baker Bank. The objective is to find out how the Colargal edifices flourished. The drilled matrial will improve the resolution of the last deglacial sea-level history from the late Glacial to the Younger Dryas, it will help better understand the sedimentary and biological processes that are involved with the origin (initial establishment), growth, and demise of the carbonate reef tract. In addition, the latest Pleistocene transgressive

coralgal reefs on the edge of the South Texas Shelf can be studied as recent analogs for reefal reservoirs buried in siliciclastic shelves.
G. Camoin asked whether ECORD has decided not to drill several holes and to only consider the Southern Bank. K. Becker and K. Gohl confirmed.

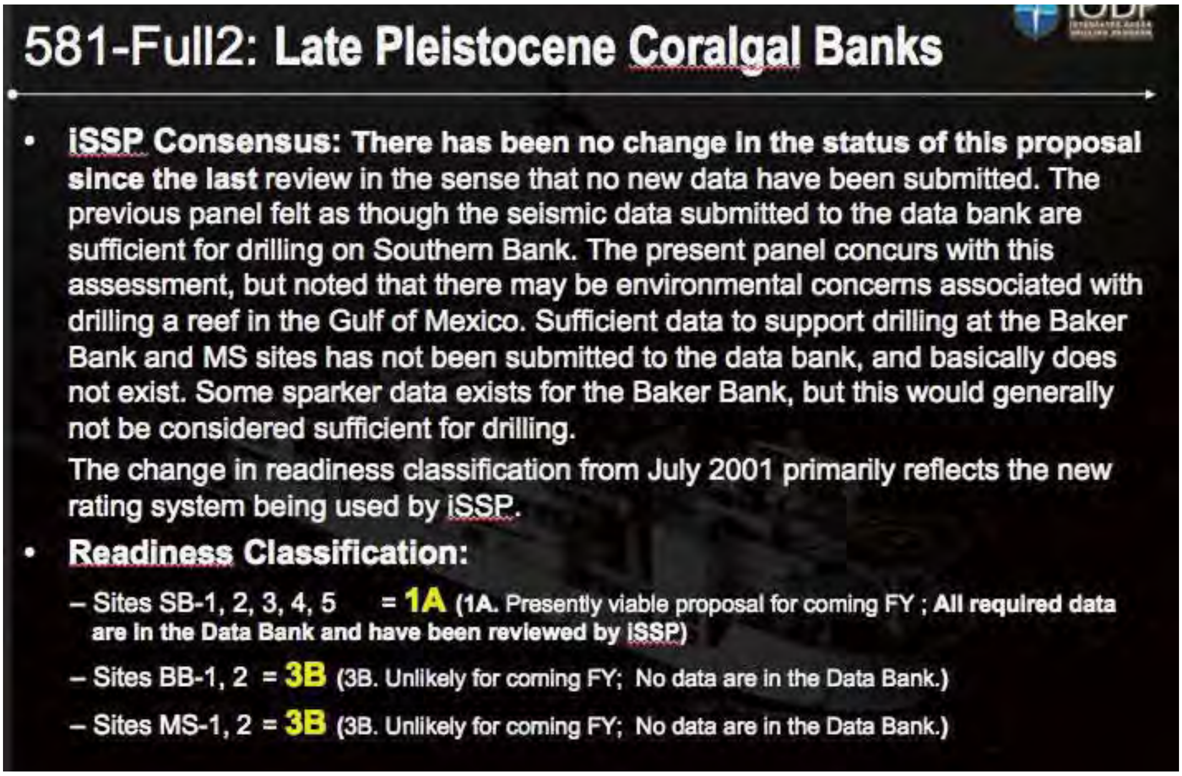
8.2.3 - Site survey data (G. Lericolais)

G. Lericolais presented the **581-Full2: Late Pleistocene Coralgal Banks** proposal. He said that all three sites are viable for drilling, as shown in the images below.



Proposed Sites: (Only High Priority Sites are listed here.)

Site Name	Position	Water Depth (m)	Penetration (m) Sed	Bsm	Total	Brief Site-specific Objectives
Southern Bank SB-1	N 27 25.0, W 96 31.5 SP 1390 MC D4	60 m	100 m		100 m	Thickest part of coralgal U. III
SB-2	SP 1315 MC D4	60 m	100 m		100 m	Thickest part of coralgal U. III
SB-3	SP 1690 MC D1	62 m	100 m		100 m	Thick part of coralgal U. III
SB-4	SP 1510 MC D4	70 m	75 m		75 m	Thick part of coralgal U. III
SB-5	SP 1360 MC S4	78 m	70 m		70 m	Recover youngest Unit IV on A back reef position
Baker Bank BB-1	N 27 45.5, W 96 13.5	60 m	100 m		100 m	Thickest part of coralgal U. III
BB-2	N 27 45.8, W 96 13.8	70 m	90 m		90 m	Recover youngest Unit IV on A back reef position
Mississippi-Alabama MA-1	N 29 20.205, W 87 45.072	90 m	70 m		70 m	Early deglacial mound



8.2.4 – Drilling operations (D. McInroy)

D. McInroy said that for the **581-Full2** can be performed with a geotechnical ship and a seabed drill. The cost estimate is about $13M USD, which involves a simple and cheap drilling at fairly shallow depth holes. It is recommended that it should be considered to combine this expedition back-to-back with another expedition, shown next.

581-Full2 Late Pleistocene Coralgal Banks

Water depths: 60-78 m
Penetration: 70-100 mbsf (1 hole at each of 7 sites)
Primary lithologies: Coralgal limestone, coastal sandstone, shelfal shale, mud blanket.
Possible platform type(s): Geotechnical ship with coring rig (future: sea bed drill?)

Scoping so far

- ESO scoping only, no proponent meeting or PMT.
- Technically feasible, no development needed.
- Cost estimate is **~$13M** (includes operation and ESO costs).
  Mob/demob costs would be disproportionate to the length of the expedition
- December to May is the preferred drilling window, to avoid hurricane season.

Other factors

- 100 mbsf is just beyond the current reach of BGS RD2 and MeBo.

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
Southern Bank SB-1	N 27 25.0, W 96 31.5 SP 1390 MC D4	60 m	100 m		100 m	Thickest part of coralgal U. III
SB-2	SP 1315 MC D4	60 m	100 m		100 m	Thickest part of coralgal U. III
SB-3	SP 1690 MC D1	62 m	100 m		100 m	Thick part of coralgal U. III
SB-4	SP 1510 MC D4	70 m	75 m		75 m	Thick part of coralgal U. III
SB-5	SP 1360 MC S4	78 m	70 m		70 m	Recover youngest Unit IV on A back reef position
Baker Bank BB-1	N 27 45.5, W 96 13.5	60 m	100 m		100 m	Thickest part of coralgal U. III
BB-2	N 27 45.8, W 96 13.8	70 m	90 m		90 m	Recover youngest Unit IV on A back reef position

D. McInroy said that A. Johnson who is the lead proponent had negotiated ship time with Fugro, and then set up a contract. Fugro then stopped all communication. ESO found out that they had lost the contract, because Fugro had another offer. The money for this purpose was carried over to the Baltic operation costs.

C. Escutia said that the reviews of this proposal indicated how this project could be complementary to the Tahiti expedition.

G. Camoin said that in order to solve the problems with the sea-level change questions, it is needed to have measurements of one site in the Caribbean and in the Indian Ocean. The Barbados record is biased. In 2009, the ranking was 20/28 and in 2008 the ranking measured 10/18 with the *JR* and MSPs included.

K. Becker commented that a past evaluation mentioned that the expedition was presented as inexpensive, but now the costs have increased. He asked if inflation has been taken into account. D. McInroy said that inflation has been partly accounted for in relation to the current market rates, but it is not clear what the costs will be until ESO goes to tender. D. Smith said that it is needed to fit the accommodation and facilities on a different vessel as such an operation would not fit on a geotechnical ship. Also if it would be possible to scale down the number of scientists and onboard work, then it would be possible to scale down the costs.

M. Webb asked when the MeBo will be ready and what will be the impact on the costs? K. Gohl said that according to MARUM, it is not clear when MeBo will drill at 2000m-water depth and this needs more tests if it will work. It has been discussed to use MeBo outside IODP, for the amount of $1-1.5M USD, not accounting for all of the IODP requirements. R. Gatliff said that the use of geotechnical ships and less people onboard, may cut costs, but as a result there may be a lack of some minimum measurements. G. Dickens said that going through the main objectives of the proposal are not pertaining to the main objectives, so could exclude some of these measurements. G. Camoin said that in order to get the glacial depth, they could drill at maximum 30-40 m. He recommended that D. McInroy asks the proponents that they relate the studies' aspects to the Tahiti expedition, in order to reconsider the equipment use and save on the costs.

Consensus 13-09-01: *The E-FB to approach the '581-Full2: Late Pleistocene Coralgal Banks' proponents and ask them if they could drill in lower penetration depths.*

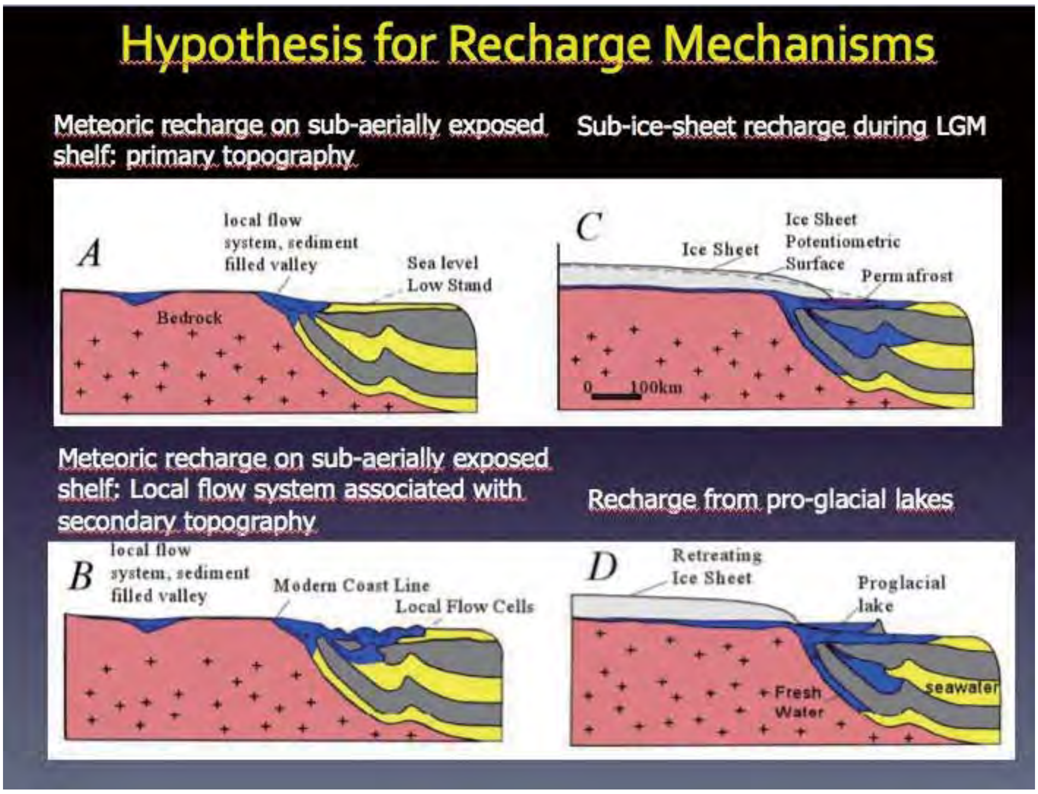
ACTION E-FB: to approach the '581-Full2: Late Pleistocene Coralgal Banks' proponents if they could drill in lower penetration depths.

8.3 - 637-Full2 New England Shelf Hydrogeology

8.3.2 - Scientific objectives (C. Escutia)

Apologies for M. Torres' absence. C. Escutia presented the **637-Full2**, which addresses drill areas from previous *New Jersey* expedition sites. The seismics in the proposal do not have much information, so the proponents had to provide a stratographic model of the depths. The study characterizes the distribution of the fresh-brackish water on the North-East shelf, the mechanisms and time of emplacement, quantity fluid, chemical and nutrient fluxes, and to understand the relationship between hydrogeochemistry, fluid flow and microbial activity.

C. Escutia presented the Hypothesis for the Recharge Mechanisms, shown next.

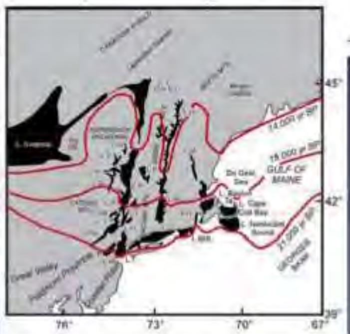


Different recharge mechanisms differentiated using environmental and isotope data, and ages

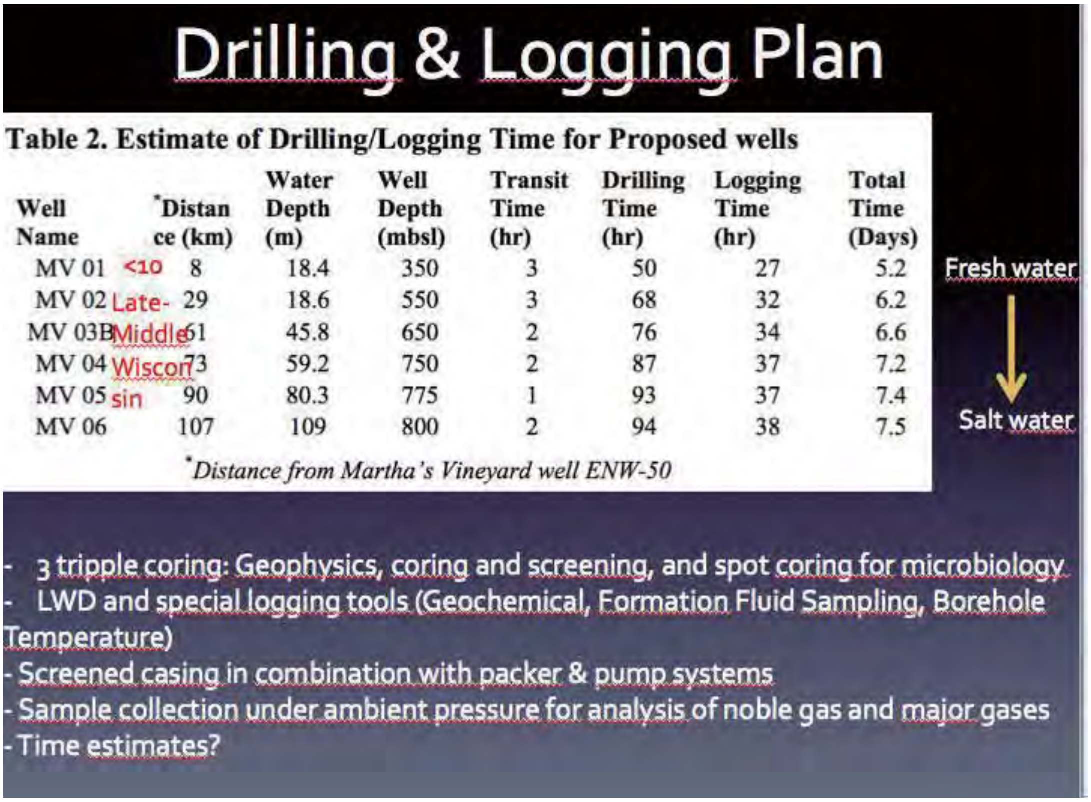
Table 1. How Proposed Recharge Mechanisms can be Identified Using Continental Shelf Environmental Isotope and Noble Gas Data

	^{14}C, ^{4}He, ^{81}Kr age (ka)	$\delta^{18}O$ ‰	$\delta^{2}H$ ‰	Ne (ccSTP/kg)	"Excess air" ΔNe %	Recharge Temperature reflects
Meteoric groundwater	<20 or interglacial	-6 to -10	-35 to -50	$2*10^{-5}$ to $5*10^{-5}$	30 to 100	Water table
Subglacial meltwater	20-30 or glacial	-45 to -35	< -350	$6*10^{-4}$ to $2*10^{-3}$	> 500	No unique solution
Proglacial lake/ surface water	20-30 or glacial 15-18 ka	-45 to -20	< -350	$2*10^{-5}$	1 – 5	Lake surface

If a combination of the recharge mechanisms: hydrological process models may unravel the distribution and age patterns



C. Escutia presented the drilling and logging plan of the expedition, shown next.



Drilling & Logging Plan

Table 2. Estimate of Drilling/Logging Time for Proposed wells

Well Name		*Distance (km)	Water Depth (m)	Well Depth (mbsl)	Transit Time (hr)	Drilling Time (hr)	Logging Time (hr)	Total Time (Days)
MV 01	<10	8	18.4	350	3	50	27	5.2
MV 02	Late-	29	18.6	550	3	68	32	6.2
MV 03B	Middle	61	45.8	650	2	76	34	6.6
MV 04	Wiscon	73	59.2	750	2	87	37	7.2
MV 05	sin	90	80.3	775	1	93	37	7.4
MV 06		107	109	800	2	94	38	7.5

*Distance from Martha's Vineyard well ENW-50

- 3 tripple coring: Geophysics, coring and screening, and spot coring for microbiology
- LWD and special logging tools (Geochemical, Formation Fluid Sampling, Borehole Temperature)
- Screened casing in combination with packer & pump systems
- Sample collection under ambient pressure for analysis of noble gas and major gases
- Time estimates?

The study will undertake several sampling and analysis methods: full suite geochemical, isotopic, and noble gas samples and measure fluid pressure to conduct hydrologic modeling, in order to distinguish between different flow mechanisms, salinization mechanisms, and microbial processes. As of 2009, the SCP has twice strongly endorsed the proposal. According to the EPSP, before they can make a final recommendation, there is a need for an independent shallow hazard survey, including high-resolution seismic data. Depending on the drilling vessel, a geotechnical survey may be also required. In terms of hazards, the proponents must also consider that the hurricane season will occur in the proposed region between March-August amid strong currents.

8.3.3 - Site survey data (G. Lericolais)

G. Lericolais said that the **637-Full2 New England Shelf Hydrology** site characterization is perfect, shown next.

637-Full2; New England Shelf Hydrology

- Lead Proponent : Mark Person
- SSP Watchdogs: Kiichiro Kawamura, David Mallinson, Peter Clift
- Review date 4 February 2011

Proposed Sites:

Site Name	Position		Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
				Sed	Bsm	Total	
MV-1C (Primary)	41.1936 N	70.4350 W	33	350		350	Characterize freshwater zone
MV-2B (Primary)	41.1171 N	70.3953 W	37	350		350	Characterize freshwater-brackish water transition
MV-3C (Primary)	40.8746 N	70.2697 W	42	550		550	Characterize brackish-seawater transition
MV-4B (Primary)	40.6206 N	70.1381 W	52	650		650	Characterize brackish-seawater transition
MV-5B (Primary)	40.3771 N	70.0119 W	79	650		650	Characterize seawater zone
MV-7A (Alt.)	40.42248N	69.85826W	76	650		650	Characterize seawater zone
MV-8A (Alt.)	40.9976 N	70.3334 W	41	350		350	Characterize brackish-seawater transition

He also presented some recommendations to the imaging of the sites.

637-Full2; New England Shelf Hydrology

- **SSP Consensus:**

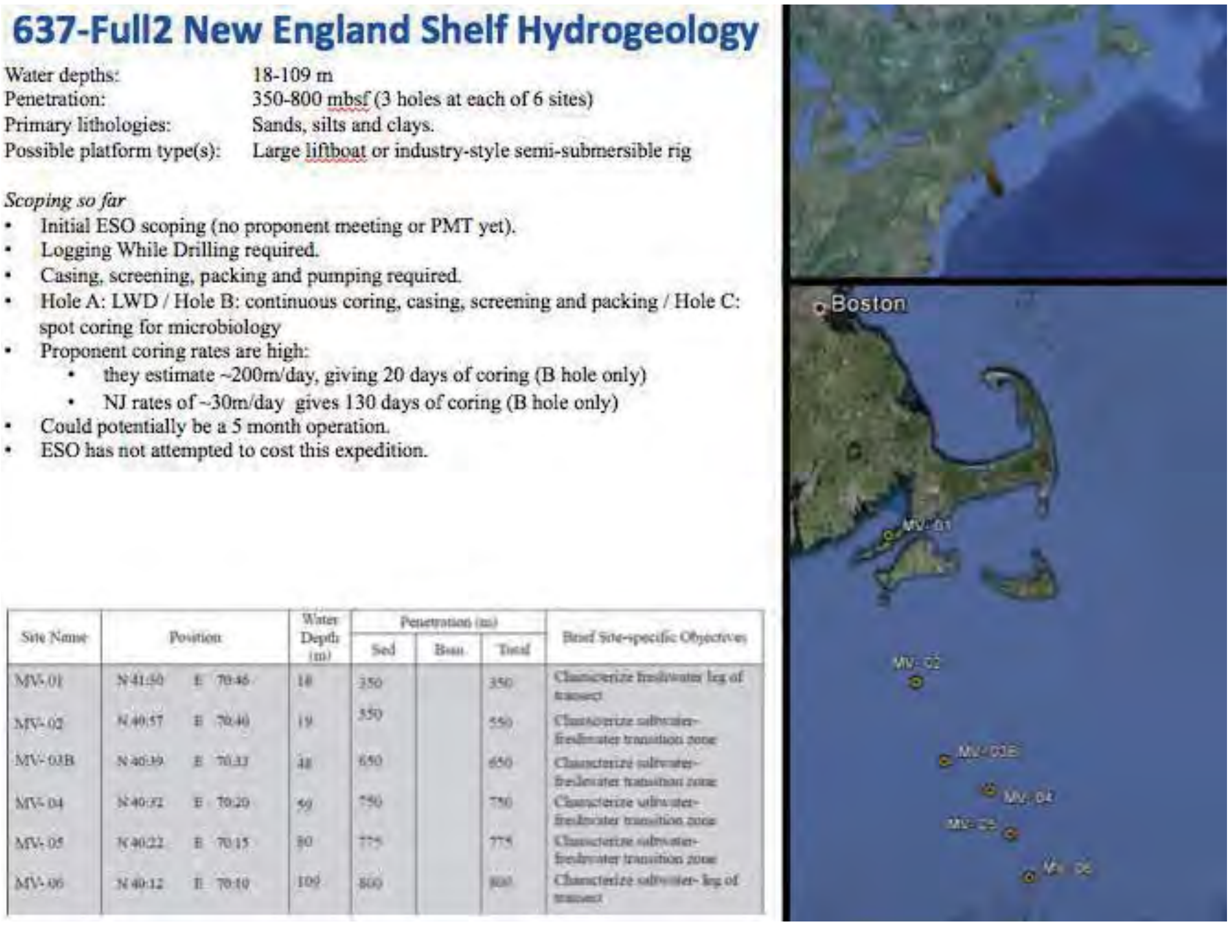
  The panel consensus is that all required data are in the databank and there are no scientific concerns, therefore the site characterization is 1Aa. However, the panel also recognizes that an EM survey would greatly benefit this investigation, and allow some initial better understanding of the system, which may aid in constraining the stratigraphic framework and necessary coring depths. Proponents are strongly encouraged to obtain EM data.
- **Site Characterization Completeness and Data Adequacy Classification:**

Site	Classification	Latitude	Longitude
MV-1C	1Aa	41.1936	-70.435
MV-2B	1Aa	41.1171	-70.3953
MV-3C	1Aa	40.8746	-70.2697
MV-4B	1Aa	40.6206	-70.1381
MV-5B	1Aa	40.3771	-70.0119
MV-7A	1Aa	40.42248	-69.85826
MV-8A	1Aa	40.9976	-70.3334
MV-9A	1Aa	40.32146	-69.83387

1A: All required data are in the Data Bank and have been reviewed by SSP.
a: Data image the target adequately and there are no scientific concerns of drill site location and penetration.

8.3.4 – Drilling operations (D. McInroy)

D. McInroy said that the **637-Full2** is one of the most expensive and complex science projects. Given the range of the water depth, it is difficult to choose a platform. The use of a lift-boat or semisubmersible rig would require very high costs. There are a lot of technical requirements for a proposal. There are 18 holes of moderate penetration, so the estimate for the operation's duration is 5 months.



Site Name	Position		Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
				Sed	Bsm	Total	
MV-01	N 41:50	E 70:46	18	350		350	Characterize freshwater leg of transect
MV-02	N 40:57	E 70:40	19	350		550	Characterize saltwater-freshwater transition zone
MV-03B	N 40:39	E 70:33	48	650		650	Characterize saltwater-freshwater transition zone
MV-04	N 40:32	E 70:20	59	750		750	Characterize saltwater-freshwater transition zone
MV-05	N 40:22	E 70:15	80	775		775	Characterize saltwater-freshwater transition zone
MV-06	N 40:12	E 70:10	109	800		800	Characterize saltwater- leg of transect

Another way to approach this expedition would be to involve two mobilizations and two platforms.

C. Escutia asked whether ESO has all of the required technology for the drilling. D. McInroy said that they will need to contract all of the technology. It is estimated that it would be more expensive than the Arctic expedition. G. Dickens said that the scientists probably did not consider the concept of budget. He recommended that ESO should convey the message that the changes in the operations could lower the costs. M. Webb said that the UK *encourages early discussions with the operator. Is this happening now? D. McInroy said that it started happening more lately and ESO does contact the proponents for the costs. G. Camoin said that this is why the MagellanPlus program offers technological input early in the proposal process. In this way the conveners involve the technological team from ESO, in order for the proponents to apply technology in the proposals that is necessary for their scientific goals. J. de Leeuw said that in the new system, such considerations and difficulties could become clear at the PEP level, so PEP could forward the proposals back to the proponents with the cost concern. D. Kroon confirmed that some of the recent recommendations have concentrated on asking the proponents to combine proposals in order to save technological sites. G. Dickens said that this approach may be problematic, because if all of the sites are changed then the science would be also changed, and the proponents would have to re-submit a new proposal.*

D. Smith said that if the use of LWD is reduced, the costs would be reduced, because it would involve using smaller vessels. Also removing a deeper water site could cut costs. The people that are interested in the Arctic, are usually the most proactive and asking questions. S. Davies said that the New Jersey expedition proponents requested a LWD, which they presently could not use successfully, but it would be possible to use other technology as normal wire-line logging.

***E-FB Consensus 13-10-01:** The E-FB to contact the '637-Full2 New England Shelf Hydrogeology' proposal proponents that they must give feedback to ESO on how the expedition costs could be reduced if some of the sites are changed.*

***E-FB Consensus 13-11-01:** The E-FB to relate the message to the '637-Full2 New England Shelf Hydrogeology' proponents that they may also look for funds from outside ECORD and to keep PEP informed about the progress of this discussion.*

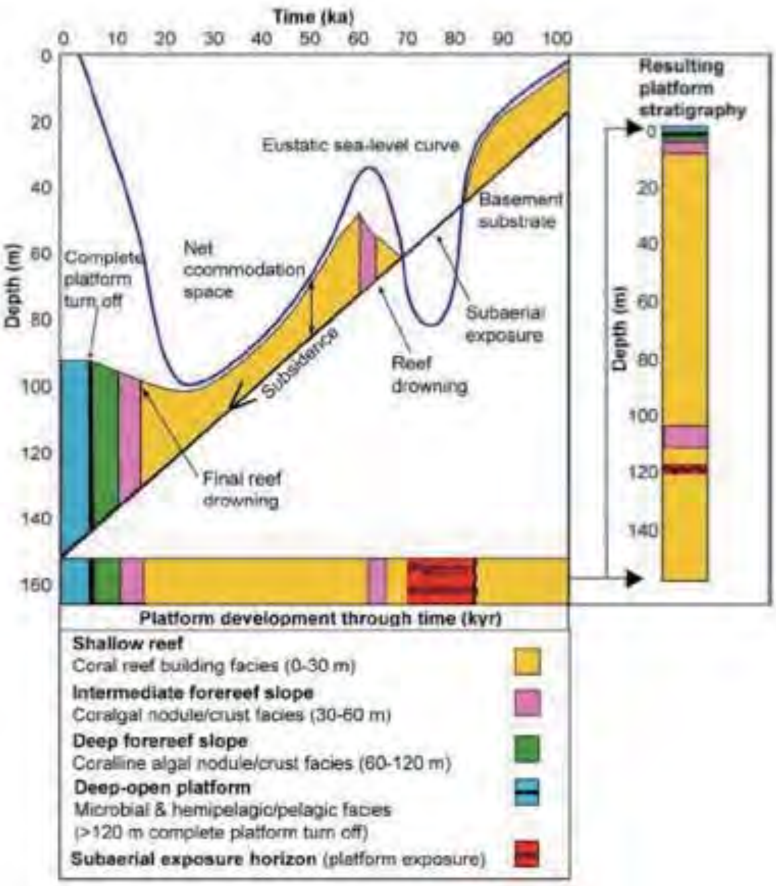
ACTION FB: to contact the '637-Full2 New England Shelf Hydrogeology' proponents with the request that the proponents to communicate with ESO on how to reduce proposal costs by changing some of the sites, to look for outside funds and keep PEP updated about the proposal changes.

K. Gohl recommended that the proponents should further discuss with ESO in order to apply cheaper platforms, even if this would involve changing the drill sites. G. Camoin suggested that the PEP Chair should be kept updated to such changes. D. Kroon said that the E-FB should relate the message to proponents to also look for funds from outside ECORD.

8.4 - 716-Full2 Hawaiian Drowned Reefs

8.4.2 - Scientific objectives (G. Dickens)

G. Dickens introduced a map of the shallow-water sites near the coast of Hawaii. He revised the similarities and differences in comparison to previous expeditions. There are similarities to the *Tahiti*, *GBR*, (recent MSP drilling) and the *Huon Peninsual* (on-shore). The differences are that the study examines the subsiding Margin (accommodation space during sea-level fall) at an area that is always submerged (diagenesis). The margin is subsiding and the sea-level falls. The reef can grow even though the sea level drops. He presented 4 diagrams of the model site predictions. He showed a diagram of the platform development through time, listed proposed sites and science objectives, shown on the following page. The science objectives are to define the nature of sea-level change in the central Pacific over the past 500 kyr and to determine the critical processes that determine paleoclimate variability in central Pacific (SST analyses of massive corals; seasonal records). In addition, the goal is to establish the response of coral reef systems to abrupt changes in environment (sea-level and climate) and elucidate the subsidence history of Hawaii. The proposal addresses the following **Science Themes: Challenge 2: How do ice-sheets and sea level respond to climate change**, and **Challenge 7: How sensitive are ecosystems to environmental change**.



Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
Primary						
KON-01A	19.600341N, -156.010975W	-145	140	10	150	H1d reef that spans MIS 1-5 (leeward, dry)
KAW-03A	20.018587N, -155.866458W	-154	140	10	150	H1d reef that spans MIS 1-5 (leeward, dry)
KAW-04A	19.995815N, -156.032933W	-419	140	10	150	H2d reef that spans MIS 6-7 (leeward, dry)
KAW-06A	20.036417N, -156.065696W	-737	140	10	150	H4 reef that spans MIS 8-9 (leeward, dry)
KAW-07A	20.137266N, -156.079341W	-988	140	10	150	H6 reef that spans MIS 10-11 (leeward, dry)
MAH-01A	20.055411N, -156.189697W	-1102	140	10	150	H8a reef that spans MIS 12-13 (leeward, dry)
MAH-02A	20.050262N, -156.192035W	-1154	140	10	150	H8b reef that spans MIS 12-13 (leeward, dry))
KOH-01A	20.290268N, -155.651218W	-410	140	10	150	H2d reef that spans MIS 6-7 (windward, wet)
KOH-02A	20.273958N, -155.490294W	-930	140	10	150	H7 reef that spans MIS 10-11 (windward, wet)
HIL-01A	19.758805N, -154.985708W	-134	140	10	150	H1d reef that spans MIS 1-5 (windward, wet)
HIL-05A	19.876999N,-154.939618W	-402	140	110	150	H2d reef that spans MIS 6-7 (windward, wet)
Alternate						
KAW-01A	20.011332N, -155.848480W	-109	140	10	150	H1b reef that spans MIS 1-5 (leeward, dry)
KAW-02A	20.017325N, -155.857206W	-131	140	10	150	H1c reef that spans MIS 1-5 (leeward, dry)
KAW-05A	19.978715N, -156.029159W	-466	140	10	150	H2d reef that spans MIS 6-7 (leeward, dry)
HIL-02A	19.883005N, -155.029932W	-271	140	10	150	H2a reef that spans MIS 4?-7 (windward, wet)
HIL-03A	19.867141N, -154.973387W	-338	140	10	150	H2b reef that spans MIS 5a?-7 (windward, wet)
HIL-04A	19.869407N, -154.954576W	-354	140	10	150	H2c reef that spans MIS 5a?-7 (windward, wet)
MAH-03A	20.140405N, -156.238194W	-1213	140	10	150	H9 reef that spans MIS 14-15? (leeward, dry)
MAH-04A	20.065165N, -156.266945W	-1234	140	10	150	H10 reef that spans MIS 14-15? (leeward, dry)
MAH-05A	19.994893N, -156.229296W	-1289	140	10	150	H11 reef that spans MIS 14-15? (leeward, dry)

C. Escutia asked how well constrained is the topic about subsidence. G. Dickens said that perhaps the science objectives could be achieved through the examination of multiple sites. K. Gohl mentioned that a lot of alternate sites are listed.

R. Batiza asked how the sample will be dated. D. Koon said that since there is little alterations in these depths, the study would need a small range of samples. G. Camoin said the proposal seems to be strong. In reference to the thermal subsidence, it can be probably modeled, as there is a high potential of dating and it is exceptional that the proponents' goal is to explore going back to 500 million years. He insisted on the quality of the survey data, which presents exceptional images of the seafloor. G. Dickens mentioned that it was discussed during the review that there is no dynamic typography of the sea-level. G. Camoin said that some collaboration is possible. C. Escutia confirmed that the proposal does model well the subsidal topography.

8.4.3 - Site survey data (G. Lericolais)

G. Lericolais said that the **716-Full2** proposal was previously discussed in 2009. He said that this proposal is a good example where they have asked the proponents new site survey data in order to review their proposals. The proponents sent data along with good explanations. The evaluation matrix asked for surface samples and video images. The video images were not provided but SCP agreed that that it is not really necessary even if it is in the matrix. They upgraded the sites to 1Aa, to proceed to drilling.

Proposed Sites

716-Full2: Hawaïan Drowned Reefs

- Lead Proponent: Jody Webster
- SSP Watchdogs: Ryota Hino, Christoph Gaedicke, Kiichiro Kawamura
- Review date: 28 July 2009

Proposed Sites.

Site Name	Position	Water Depth (m)	Penetration (m) Sed	Bsm	Total	Brief Site-specific Objectives
Primary						
KON-01A	19.600341N, -156.010975W	-115	140	10	150	H1d reef that spans MIS 1-5 (leeward, dry)
KAW-03A	20.018587N, -155.866458W	-154	140	10	150	H1d reef that spans MIS 1-5 (leeward, dry)
KAW-04A	19.995815N, -156.032933W	-419	140	10	150	H2d reef that spans MIS 6-7 (leeward, dry)
KAW-06A	20.036417N, -156.065696W	-737	140	10	150	H4 reef that spans MIS 8-9 (leeward, dry)
KAW-07A	20.137266N, -156.079541W	-988	140	10	150	H6 reef that spans MIS 10-11 (leeward, dry)
MAH-01A	20.055411N, -156.189697W	-1102	140	10	150	H8a reef that spans MIS 12-13 (leeward, dry)
MAH-02A	20.050262N, -156.192035W	-1154	140	10	150	H8b reef that spans MIS 12-13 (leeward, dry))
KOH-01A	20.290268N, -155.651218W	-410	140	10	150	H2d reef that spans MIS 6-7 (windward, wet)
KOH-02A	20.273958N, -155.490294W	-930	140	10	150	H7 reef that spans MIS 10-11 (windward, wet)
HIL-01A	19.758805N, -154.985708W	-133	140	10	150	H1d reef that spans MIS 1-5 (windward, wet)
HIL-05A	19.876999N, -154.939616W	-402	140	10	150	H2d reef that spans MIS 6-7 (windward, wet)
Alternate						
KAW-01A	20.011332N, -155.848480W	-109	140	10	150	H1b reef that spans MIS 1-5 (leeward, dry)
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KAW-05A	19.978015N, -156.029159W	-466	140	10	150	H2d reef that spans MIS 6-7 (leeward, dry)
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MAH-05A	19.994893N, -156.229296W	-1289	140	10	150	H11 reef that spans MIS 14-15? (leeward, dry)

716-Full2: Hawaïan Drowned Reefs

- **SSP Consensus:**

  The panel acknowledges submission of new site survey data to the SSDB. The proponents' response to the previous SSP review provides good explanations for selection of the sites and clarifies open questions. The SSP recognizes that the newly submitted location maps show the correlation between the locations of ROV observation points and proposed drill sites. For site KON-01A, the panel recognizes that backscatter data and seafloor images in the SSDB characterize the site well. The panel discussed whether surface samples are required for all proposed sites, but agreed that surface samples are not necessary for each drill site and seafloor images obtained at remote locations are sufficient for site characterization, given that the images are taken at the same level of reefs as the proposed drill sites. Since the last evaluation no new data were submitted to the databank for sites MAH-03A,MAH-04A, MAH-05A, but, as a consequence of the discussion, the panel re-classified and upgraded these three sites to 1Aa. All other sites are also classified 1Aa.

716-Full2: Hawaïan Drowned Reefs

IODP

- **Site Characterization Completeness and Data Adequacy Classification:**

Site	Classification	Latitude	Longitude
HIL-1A	1Aa	19° 45.5283'	-154° 59.14248'
HIL-2A	1Aa	19° 52.983'	-155° 1.79592'
HIL-3A	1Aa	19° 52.02846'	-154° 58.40322'
HIL-4A	1Aa	19° 52.16442'	-154° 57.27456'
HIL-5A	1Aa	19° 52.61994'	-154° 56.37708'
KAW-1A	1Aa	20° .67992'	-155° 50.9088'
KAW-2A	1Aa	20° 1.0395'	-155° 51.43236'
KAW-3A	1Aa	20° 1.11522'	-155° 51.98748'
KAW-4A	1Aa	19° 59.7489'	-156° 1.97598'
KAW-5A	1Aa	19° 58.7229'	-156° 1.74954'
KAW-6A	1Aa	20° 2.18502'	-156° 3.94176'
KAW-7A	1Aa	20° 8.23596'	-156° 4.76046'
KOH-1A	1Aa	20° 17.41608'	-155° 39.07308'
KOH-2A	1Aa	20° 16.43748'	-155° 29.41764'
KON-1A	1Aa	19° 36.02046'	-156° .6585'
MAH-1A	1Aa	20° 3.32466'	-156° 11.38182'
MAH-2A	1Aa	20° 3.01572'	-156° 11.5221'
MAH-3A	1Aa	20° 8.427'	-156° 14.29164'
MAH-4A	1Aa	20° 3.9099'	-156° 16.0167'
MAH-5A	1Aa	19° 59.69358'	-156° 13.75776'

1A: All required data are in the Data Bank and have been reviewed by SSP.
a: Data image the target adequately and there are no scientific concerns of drill site location and penetration.

G. Camoin asked about the ranking of the proposal, as he was the watchdog. It was ranked #6 out of 28 proposals.

8.4.4 – Drilling operations (D. McInroy)

D. McInroy said that if the proponents use a vessel base rig, the proposal may be feasible. It is possible to use a geotechnical MSP vessel. The second option is to use the *JR,* although the US is not keen to do this project for several reasons. He said that the overall cost would be about $13M USD. He reminded that at this stage it is very difficult to estimate the expedition's price. D. McInroy introduced the weather windows. He said that this is a very straightforward possibility for drilling. ESO has to contact the Hawaiian authorities to acquire drilling permission. The authorities were previously presented the project goals, they reacted positively and encouraged ECORD to submit an application when ready.

716-Full2 Hawaiian Drowned Reefs

Water depths:	134-1154 m
Penetration:	150 mbsf
Primary lithologies:	Carbonates and minor volcanics.
Possible platform type(s):	Geotechnical ship with coring rig (future: sea bed drill?)

Scoping so far

- ESO scoping and PMT meeting.
- Technically feasible, no development needed if using vessel-based rig
- Various approaches could be adopted:
  1. 'Normal' MSP using a geotechnical vessel (no technology development required).
  2. Use the *JOIDES Resolution*.
  3. Use a sea bed drill as far as possible, and then use the *JR* for the deeper coring.
- Cost estimate is **~$13M** (geotechnical ship option, includes operation and ESO costs).
- March-April or September-October are the preferred windows for drilling, to avoid weather and whales.

Other factors (concerning sea bed drill approach above)

- 150 mbsf is beyond the current reach of BGS RD2 and MeBo.

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
Primary						
KON-01A	19.600341N, -156.010975W	-145	140	10	150	H1d reef that spans MIS 1-5 (leeward, dry)
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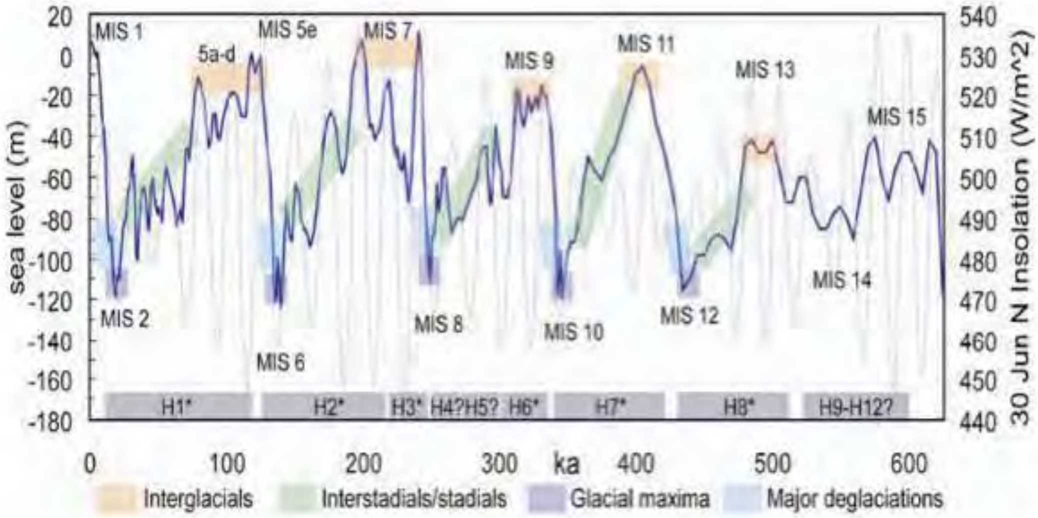
KAW-06A	20.036417N, -156.065096W	-737	140	10	150	H4 reef that spans MIS 8-9 (leeward, dry)
KAW-07A	20.137266N, -156.079341W	-988	140	10	150	H6 reef that spans MIS 10-11 (leeward, dry)
MAH-01A	20.055411N, -156.189697W	-1102	140	10	150	H8a reef that spans MIS 12-13 (leeward, dry)
MAH-02A	20.050262N, -156.192035W	-1154	140	10	150	H8b reef that spans MIS 12-13 (leeward, dry)
KOH-01A	20.290268N, -155.651238W	-410	140	10	150	H2d reef that spans MIS 6-7 (windward, wet)
KOH-02A	20.273956N, -155.490284W	-850	140	10	150	H7 reef that spans MIS 10-11 (windward, wet)
HIL-01A	19.738803N, -154.985708W	-134	140	10	150	H1d reef that spans MIS 1-5 (windward, wet)
HIL-05A	19.876999N, -154.959618W	-401	140	110	150	H2d reef that spans MIS 6-7 (windward, wet)

R. Gatliff said that the technological needs should be considered as well as the depth of the drilling. D. Smith said that it does not make sense to do this as an MSP geotechnical when the JR is available. K. Gohl asked why the JR is not available. The group said that this is probably due to the recovery percentage and also D. Divins added that drilling in Hawaii is an environmentally sensitive issue, such as the potential impact of drilling next to whale-inhabited regions. The JR has strict rules. M. Malone said that it is possible to core this expedition with the JR, but the recovery would be only 15%. G. Camoin suggested that such a recovery rate is not sufficient. D. Smith said that the MSP recovery would not be very much different. D. Divins said that this should be further investigated. R. Gatliff said that the recovery would be better with a rock drill, which would mean waiting until the MeBo is ready.

K. Gohl asked if in a near-shore situation the coring activities could be done on land in order to reduce the costs. D. Smith said that it depends on the availability of the systems. R. Gatliff said that the costs would be clear when ESO goes to tender. D. McInroy asked if ESO could propose to the proponents a maximum drilling depth. G. Camion said that they are considering different periods so they need all of the sites. G. Dickens said that in reference

to the two deepest sites, H7 is relatively 340-400 k years, and because it is located on a subsiding margin, the shallow sites get deeper going back in time. He asked if H7 would be a big gain in terms of science.
G. Dickens presented the following chart:



C. Escutia said that the other #700 and #400 sites would be drilled as in the JR, and may not still get the younger record. S. Davies said that the site depth has been discussed at OTF and the proponents did generate different site depths scenarios. D. McInroy reminded that the sites are shallow, but are not deep enough to provide a drill-use environment.
K. Gohl asked if the E-FB recommends that the proposal should be shifted from an MSP to the JR. The proposal could be handed to the US-JR. T. Janecek confirmed that such a forwarding of projects process for the consideration of the US-FB is possible.
R. Gatliff said that Hawaii has sloping volcanoes and terraces and that the proponents chose the terrace with less condensed sequence. Hence, if the scientists approach closer to land then they will encounter a concentrated sequence. D. Kroon said that if the proponents go higher up, then they would lose a part of the sequence. G. Dickens asked whether the MeBo depth is 81m in sediments and not hard rock. He reviewed the H2 and H1 diagrams.

The E-FB discussed that 150m interval gives the entire distance, but 100 m also gives the interval of interest. G. Dickens questioned whether the whole depth is required. D. Kroon said that it is still needed if need the sea-level fall and to see the amplitude and timing. D. Weis asked if should model volcano evolution, the average is 1M years, the longest the topography the better. It would be ideal to model the volcanic input. G. Dickens said that it involves a series of different intervals that could be connected. However, none of the sequences go back 100k years, so then each sequence will have to be connected. D. Weis asked if the landslides' impact is known. The group did not have the answer. D. Smith said that the MSPs work for shallow water and high altitudes, so if a site is located in deep water, it can be done with alternative technology. M. Webb suggested that there is critical dependence on the new incoming technology to do the operation. D. Kroon said that several proposals could be done via MeBo 2, but the low recovery from the JR is not enough. He suggested to wait for the development of the MeBo2. S. Davies said that the proponents have given information that they need those depths for their science. D. Smith said that there are existing techniques that can be applied with a drill to reach the needed depths. S. Davies said that logging is needed to correlate the holes. C. Escutia said that the proponents need to know the risks in the operation JR low recovery results or to wait until the MeBo2 is developed.

Consensus 13-12-01: *The E-FB to delay scheduling the '716-Full2 Hawaiian Drowned Reefs' proposal until after 2014/2015 and to contact the proponents that there are three options for their proposal: to either accept the low recovery results risks in a JR operation; to wait until the MeBo2 is developed; or to find alternatives to MeBo.*

8.5 - 758-Full2 Atlantis Massif Seafloor Processes

8.5.2 - Scientific objectives (D. Weis)

D. Weis introduced the **758-Full2 Atlantis Massif Seafloor Processes** proposal. The site location is in the *Atlantis Massif*. It is near a hydrothermal field, where 10 drill sites have been selected, using seabed rock drilling systems on an MSP for the first time. The proposal involves the integration of hard rock, geochemistry and the origin of organisms. The main goal is to explore the subsurface and its link to serpentinization, deformation and alteration processes in lithosphere of different age and rock type.

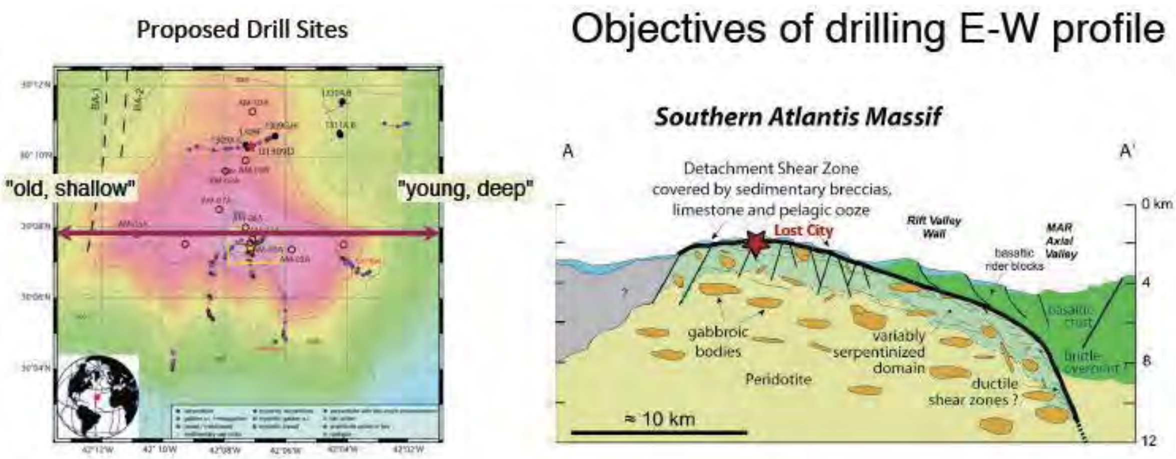
The study will do an East and West profile.

D. Weis emphasized that **serpentinization is a fundamental process**, that is identified as an important research target in the IODP New Science Plan.

The Lost City organisms are not related to the black smokers but related to alternation of sea magma rock. The Lost City is unlike any known submarine vent system, but is unlikely to be unique. Nothing is known of the sub-subsurface biosphere in this environment.

An Oceanic Core Complex exists at the *Atlantis Massif*. This provides an opportunity to study the seprentinization processes and microbial activity that is associated with the active fluid discharge at the Lost City. Also, the evolution of the massif may be further explored, including the understanding of the longetivity of and possible precursors to the Lost City, serpentinization processes and changes in the microbial activity in the footwall. Lastly, the *Atlantis Massif* provides an early history of the detachment fault which localized high stain deformation and fluid flow at 300-400 C° temperaure, possibly up to several kilometers below the seafloor.

D. Weis presented the objectives of drilling the E-W profile.

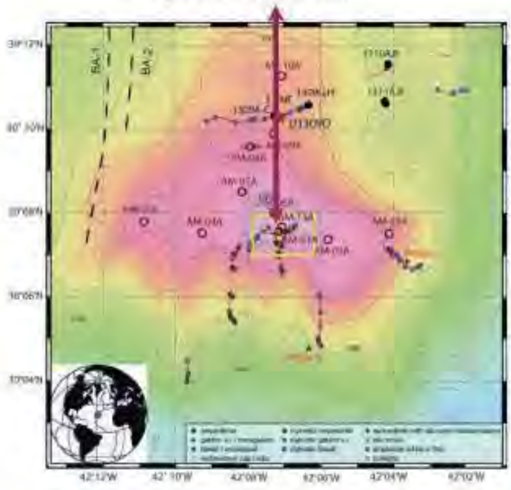


(1) To constrain the nature and distribution of microbial communities supported by H_2- and CH_4-rich fluids and determine how these vary with age and substrates;

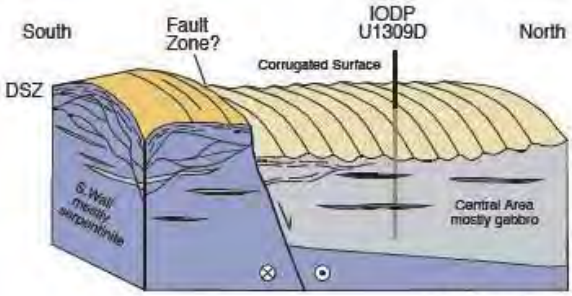
(2) To investigate the controls on fluid flow and the consequences of serpentinization for global (bio)geochemical cycles and carbon fixation, as biomass or solid carbonate; and

(3) To evaluate the links between denudation and hydrothermal circulation & to test the hypothesis that detachment faults channel hydrothermal fluids and ultimately lead to mid-ocean ridge vent fields.

Proposed Drill Sites



Objectives of drilling N-S profile, where basement changes from ultramafic to gabbroic



Karson et al., 2006

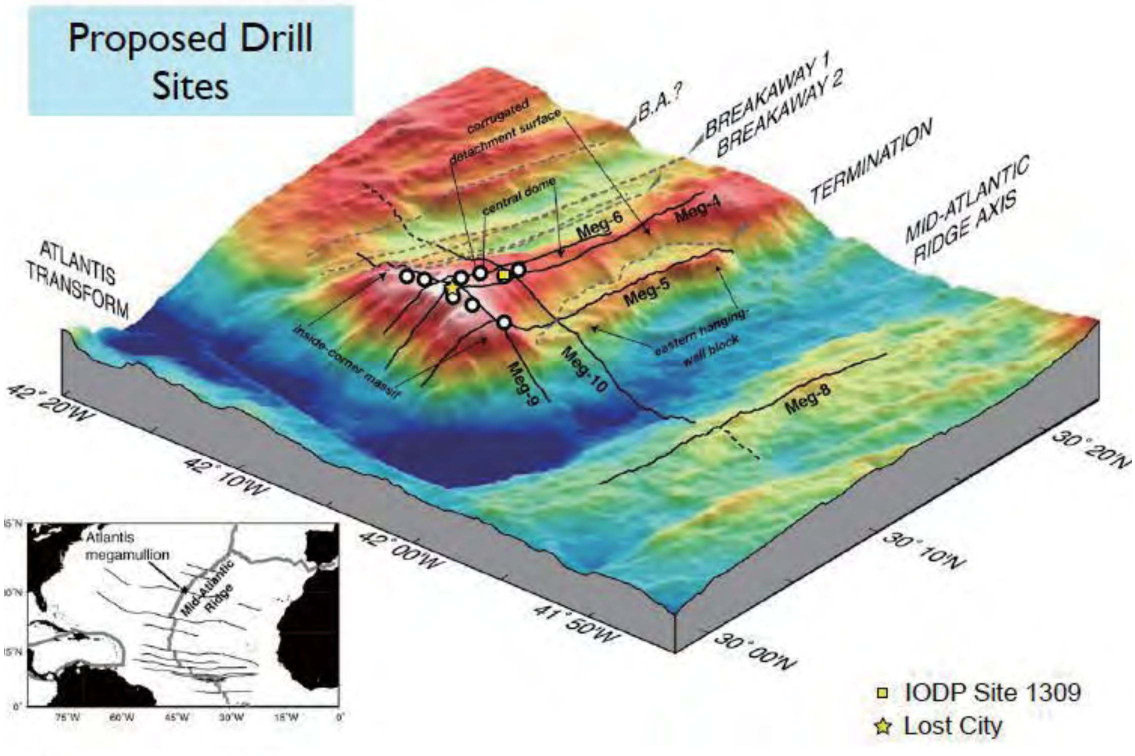
Investigate axis-parallel variations in lithologies, alteration, and microbial activity away from the focus of fluid discharge and in ~1.16 to 1.31 Ma lithosphere.

This profile will allow the evaluation of:

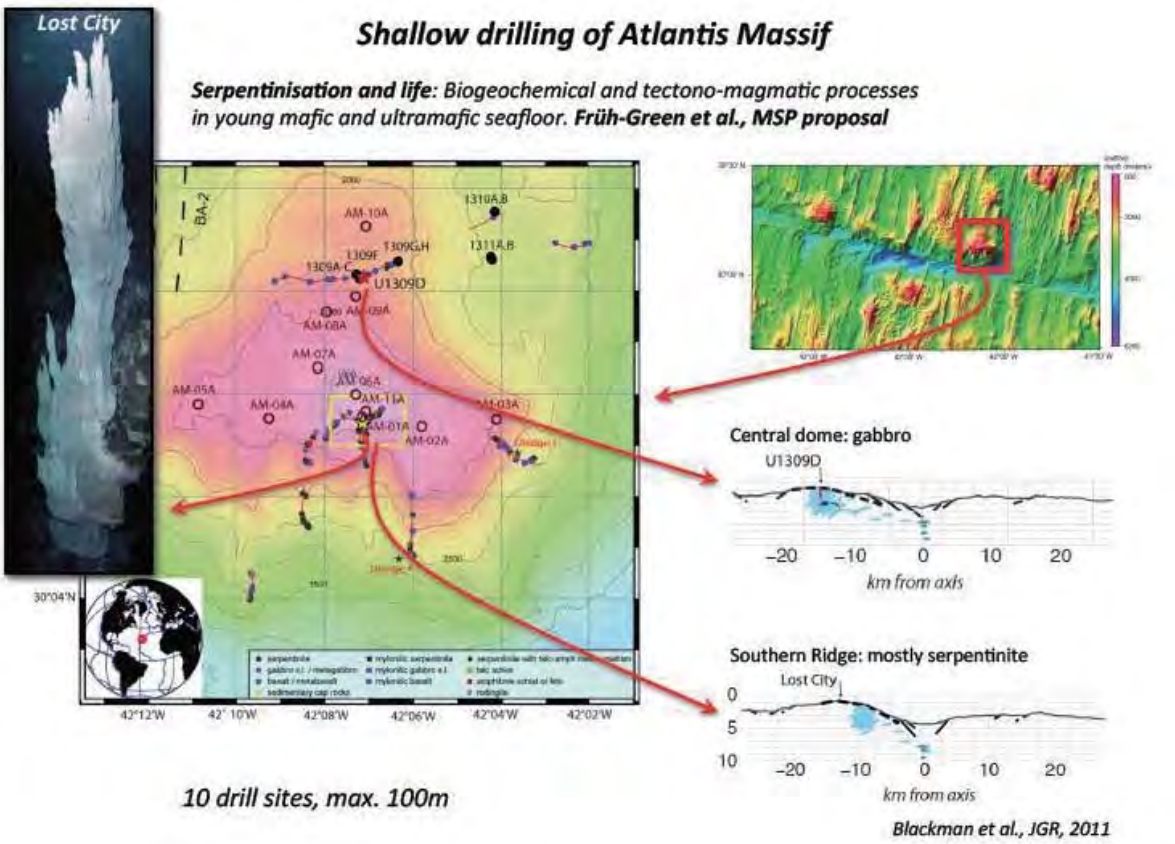
(1) the length scale of lithological and hydrothermal variability and the implications for heat and fluid flow paths/fluxes and microbial activity; and
(2) the rheological role of competent gabbros and weaker serpentinised ultramafic rocks in localizing deformation.

D. Weis reviewed the advantages of using a seabed rock drill: the possibility for deployment from conventional R/V, high recovery rates at about 70m, and current developments explore the opportunity to drill at a depth of 200m to allow for downhole measurements, and sampling for microbiology and fluids. The associated challenges with the seabed rock drills are that there is a need to devise the microbial contamination and sampling schemes, to adapt the conventional logging tools and design the low-cost fluid sampling and microbial observatory capabilities. It is also possible that the downhole tools such as the Deep Exploration Biosphere Investigative tool (DEBI-t), may be modified for deployment with the seabed rock drills.

The next diagrams display the proposed drill sites and a shallow drilling map.



Canales et al.. 2004



R. Gatliff asked if the science objectives would be reached if only 50m are drilled versus 100m. D. Weiss said that 50 m may be short, but it also depends on the drilled area.
R. Gatliff said that the MeBo is not available until 2015, so in order to launch this expedition in 2014, it could be done with parallel hole drilling. D. McInroy said that the proponents agreed to 50m deep drilling.

8.5.3 - Site survey data (G. Lericolais)

G. Lericolais reviewed the outcomes of the **758-Full2** SSP review of the sites. The SSP coded the sites as 1Ba. This means that several items are missing from the databank.

IODP

758-Full2: Atlantis Massif Seafloor Processes

- **Site Characterization Completeness and Data Adequacy Classification:**

Proposed Site	Classification	Latitude	Longitude
AM-01A	1Ba	30°7.55'N	42°7.15'W
AM-06A	1Ba	30°7.95'N	42°7.20'W
AM-11A	1Ba	30°7.63'N	42°7.10'W
AM-02A	1Ba	30°7.50'N	42°5.75'W
AM-03A	1Ba	30°7.67'N	42°3.91'W
AM-04A	1Ba	30°7.44'N	42°9.20'W
AM-05A	1Ba	30°7.86'N	42°10.82'W
AM-07A	1Ba	30°8.47'N	42°8.21'W
AM-08A	1Ba	30°9.60'N	42°8.10'W
AM-09A	1Ba	30°9.84'N	42°7.28'W
AM-10A	1Ba	30°11.43'N	42°7.04'W

1B: A few required items are missing from the Data Bank but data are readily available.
a: Data image the target adequately and there are no scientific concerns of drill site location and penetration.

In accordance to the SSP Consensus, the data was evaluated as good enough, but some information is missing about how the proposed penetration will be achieved. Also, there is missing video information in the proposed locations, but such lack of information cannot stop the proposals. The SSC recommended that the proponents should use a camera during the drilling. Hence, the 1Ba rating indicates that they are ready to drill, provided that they include some photography or ROV procedures during the positioning of the drill.

8.5.4 – Drilling operations (D. McInroy)

D. McInroy reviewed the scoping of the projects that are close to entering the expedition phase. There is a need to set a system in place that will provide the ability to see the borehole. The current seabed drills do not provide all IODP minimum requirements. He posed the question as to whether ESO should go forward by following just the proposal's minimum requirements. The estimated operation cost is $3.5M USD.

758-Full2 Atlantis Massif Seafloor Processes

Water depths: 750-1770 m
Penetration: 50-100 mbsf
Primary lithologies: Lithified pelagic carbonates and basaltic breccias (in carbonate matrix), serpentinized peridotite with zones of talc-amph-chl schists.
Possible platform type(s): Sea bed drill deployed from research vessel.

Scoping so far
- ESO scoping, 2 PMT meetings, and ECORD Technical Panel.
- Cost estimate is **~$3.5M** (includes operation and ESO costs, and assumes the research ship comes as a contribution in kind).

Other factors
- Sea bed drills do not currently provide all IODP minimum downhole measurements.
- Further sea bed drill tool development is needed to meet the minimum objectives of the proposal (developments identified at the ECORD Technical Panel) .

Site Name	Position		Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
				Sed	Bsm	Total	
AM-01A	30°7.55'N	42°7.15'W	800	1-3	50-100	100	*Uplifted region:* Recover sediments, hydrothermal deposits, fault surface & talc schist/serpentinite basement for petrological, chemical & microbiological analysis. Log if possible.
AM-06A	30°7.95'N	42°7.20'W	870	1-3	50-100	100	
AM-11A (alt. for AM-01A)	30°7.63'N	42°7.10'W	750	1-3	50-100	100	
AM-02A	30°7.50'N	42°5.75'W	1140	0.5-3	50-100	100	*Variations with age:* Recover sediments, fault surface & talc schist/ serpentinite basement for petrological, chemical & microbiological analysis.
AM-03A	30°7.67'N	42°3.91'W	1590	0.5-3	50-100	100	
AM-04A	30°7.44'N	42°9.20'W	1400	1-3	50-100	100	
AM-05A	30°7.86'N	42°10.82'W	1450	1-3	50-100	100	
AM-07A	30°8.47'N	42°8.21'W	1150	1-3	50-100	100	*Axis-parallel variations:* Recover sediments, fault surface & mafic basement for petrological, chemical & microbiological analysis.
AM-08A	30°9.60'N	42°8.10'W	1510	1-3	50-100	100	
AM-09A (U1309D)	30°9.84'N	42°7.28'W	1370	1-3	[illegible]-50	50	
AM-10A	30°11.43'N	42°7.04'W	1770	1-3	50-100	100	

D. Smith said that the proponents do not have enough information about the necessary technology. D. Weis asked about the sample contamination. D. McInroy said that a contamination assessment system is possible, but some level of contamination is inevitable. D. Weis asked how long it would takes to drill this operation. D. Smith answered that it would take about 24 hours.

J. de Leeuw asked if the applicants looked at proposal deadlines for a UK ship time and talked to national ship operators or if they are waiting for ESO's signal. R. Gatliff said that this is an ESO task. As it is late to get a research vessel, ESO will look to the possibility to *implement the operation by March 2015, the sooner a decision is reached.*

M. Webb said that this FB meeting is well-timed with the marine planning deadlines, which take place in April for the UK 2014/ 2015, the same for France and the UK. So it is possible to submit and get a vessel for 2014. D. Weiss asked what would be the negative aspect of pushing this expedition to 2014 and if the proponents agree to the 50m depth. K. Gohl agreed that the other proposals need more time. R. Gatliff said that the downside is that if they proceed in 2014, they will have one rock drill. If ESO proceeds in 2015, they will have two drills, which may be better in case that one of the drills breaks down. K. Gohl asked if a MSP vessel can accommodate two drills. M. Webb confirmed that the James Cook can accommodate two drills. D. Smith recommended waiting until the two drills are available for use onboard. G. Camoin said that it would be good to have one MSP expedition in the first year of the program in order to send a good signal to the community. He asked when the MeBo would be available. D. McInroy said that it would be available in 2015. D. McInroy said that choosing an early expedition would narrow down the number of achievable goals.

K. Gohl remarked that there are good expedition possibilities for 2015. It seems that for 2014 the Hawaiian Reef and the Coralbank expeditions may be more applicable, but without the MeBo. It is possible that the costs for each expedition could be reduced.

G. Camoin said that it is possible that the final budget will be available by May or June 2013.

K. Gohl said that the Chicxulub is not realistic due to its high cost. The E-FB should consider in the future if this proposal is affordable. G. Camoin asked ESO if they could re-explore the affordability of the Chicxulub. K. Gohl reiterated that it is important to start 2014 with an MSP and to maintain one MSP on average per year. R. Gatliff recommended that ESO prepares and requests funds for the Chicxulub expedition to take place in 2015. D. Kroon said that the E-FB should look at the whole packet of proposals and see how all can be scheduled within the next 3-5 years. He said that that it should be OK if ECORD cannot do one MSP in 2014 and rather waits one more year. A. de Vernal agreed.

R. Gatliff said that since two Arctic and two Antarctic projects with very important science will go through PEP, each should be a priority. He recommended that ECORD does not spend all of its funds on proposals that are not as good as the Arctic projects. D. Kroon said that it is too restrictive if ECORD concentrates to do one platform for FY14.

D. Weis said that if the Chixculub and Atlantis Massif are implemented consecutively, the total results could be very important to follow on the scientific goals.

K. Gohl recommended that the E-FB considers a package of 3-4 proposals that will be to be implemented in the next few years and to consider two missions in FY 2015.

G. Dickens said that perhaps the Hawaiian and Coralbank could be operated for less funds with the MeBo and then could have enough of funds to do an Arctic expedition in the next five years.

T. Janecek asked when any IMAGES proposals will come to the system between early October 2013 and April 2014.

J. de Leeuw said that a faster development and testing of the MeBo2 might imply a very significant reduction of long-term costs, so it should be considered if it is possible to set aside funds to promote the faster development of the drills. D. Smith said that it is not a cash-flow problem, but rather that time is needed to develop the technology.

D. Kroon said that it is very important to prioritize the expeditions in a long-term plan. He said that the New England Hydrogeological proposal is too expensive and should be put aside for the moment. The Atlantis Massif, Hawaii, Chicxulub and Coralbanks are high on the list. He agreed that these proposals should be prioritized scientifically, so there is plenty of time for these to be developed.

G. Dickens proposed to go forward with the Atlantis Massif and Chixulub in 2015, and to place Hawaii as priority #3, while trying to lower the costs. D. Smith asked what would happen when other proposals come in? A. Cattaneo asked for some time to request a rapid feedback response from the proponents in order to check if the foreseen scenarios are suitable for them.

9. Operation schedule for MSPs for FY14 and FY15 (K. Gohl / All)

All five scientists voted for the implementation of the below mentioned operation schedules.

Motion 13-03-01: *The E-FB to go forward with the Chicxulub (aim for end of 2014) and the Atlantis Massif (2015), provided that the budget objectives are met. The E-FB requests* *a rapid feedback response from proponents, if the foreseen scenarios are suitable for them.*

G. Dickens moved, M. Torres (C. Escutia as alternate) seconded, all approved.

ACTION E-FB: the E-FB to request a rapid feedback response from the Chicxulub (aim for end of 2014) and the Atlantis Massif (2015) proponents, if the foreseen scenarios are suitable for them.

Motion 13-04-01: *The E-FB to consider the 716-Full2 Hawaiian Drowned Reefs proposal as high priority for the next scheduling in the next years after 2015, with a rock drill or MeBo in order to try to lower the expedition costs, assuming it fits with the proposed science objectives.*

G. Dickens moved, D. Weis seconded, all approved.

10 - Review of Consensus, Motions and Actions (K. Gohl, M. Borissova / All)

K. Gohl reviewed the list of ‘Consensus, Motions and Actions’.

D. Kroon said that PEP could write to the proponents a scientific reply on the feasibility issues of each proposal. S. Davies agreed that the feasibility consideration is very important, rather than leaving PEP to only concentrate on the cost element. D. Kroon recommended that if it is clearly visible that a proposal is not feasible due to large costs, then PEP should contact the proponents.

11 - Next ECORD-FB meeting (K. Gohl)

K. Gohl recommended that the E-FB meets in Bremen, Germany during FY14, in the first week of March.

12 - Any Other Business (K. Gohl)

*D. Smith asked what would be the **new phase budget due date** that would reveal if there is enough funding for the projects. G. Camoin said that the ECORD Funding Agencies will need to reply by June 2013.*

*R. Gatliff said that it is needed to acquire a contract from few members in order to guarantee that they will contribute funds and in order for ESO to have proof of **funds for future contract commitments**. G. Camoin mentioned that the presented ECORD budget projections assume free ship-time.*

*S. Shibata presented the Chikyu Expedition definition clarifications. See section **2.3** sub-topic 'The **Chikyu Expeditions Policy Update, March 8th'** for the updated information.*

*S. Shibata further addressed the possible suggestions for amending the Framework. G. Camoin suggested that S. Shibata should add to framework item #32 the outcomes of **the Chikyu +10 workshops**, in order to avoid receiving a large amount of proposals from different sources.*

- **K. Gohl thanked all of the participants**
- **Session dismissed at 2:15pm**

JOIDES Resolution
Facility Board Meeting Notes
March 18-20, 2013
NSF, Arlington, VA

The first *JOIDES Resolution* Facility Board (FB) meeting was held March 18-20, 2013. The agenda is appended to these Minutes.

1. Welcome and Introductions

The meeting began with introductions around the room of all members, liaisons, and observers.

2. Approval of Agenda

The meeting agenda was approved by consensus.

3. Architecture of the new IODP

The National Science Foundation (NSF) began discussion of the new IODP architecture by providing a PowerPoint presentation detailing the Program's structure, reviewing the JRFB and detailing the Framework document for the Program. Discussion following the presentation concluded that the Terms of Reference for the international advisory panels are dedicated to the needs of the JOIDES Resolution (JR) management and facilities, but the advisory panels are available for other FBs to use for their respective programs. The advisory panel activities will be funded through the Support Office budget by the *JOIDES Resolution* consortium. NSF also noted that a panel was convened to make recommendations for the next operator of the JR and the Science Support Office, but NSF has not yet made a selection for either award.

Action Item:
G. Camoin and T. Janecek will create a structural diagram to detail flow of information within the new IODP.

4. JRFB Terms of Reference

The FB discussed its draft Terms of Reference and made the following revisions and changes:

Mandate: Text will be added under item #1 to state, "Monitor progress relative to the Science Plan". The JRFB will also implement a mechanism to maintain communications with, and receive feedback from, other FBs regarding the effectiveness of the panels in meeting their needs (item #4).

Membership: The JRFB agreed that the scientist nomination/application process will be run by the U.S. Science Support Program (USSSP), and that the JRFB would then have final approval of new members. In addition, because of the importance of continuity in its operation and the value of corporate memory, the Chair will not be selected based on a call for a new Chair, but rather the JRFB will appoint its own Chair from those scientists who are members. The service panel chairs will be added as liaisons.

Meetings: The desirability of more than one meeting a year was discussed, and all agreed that in its first year of operation, a second meeting will be required to approve the Annual Program Plans for the facility and the support office, and address remaining issues with facility and program policies and procedures. This second FY'13 meeting will be held in July-August depending on the availability of the Annual Program Plans and the scheduling of the Chikyu Facility Board meeting. If two meetings are needed in future years, they will likely be held in February and August. The February meeting would be held primarily to schedule JR operations, while the August meeting would be held to approve the Annual Program Plans, if this could not be accomplished electronically because of the complexity of issues.

Action Item:
S. Humphris will revise the Terms of Reference as discussed and circulate for comment, with approval planned at the August 2013 JRFB meeting.

5. Advisory Panels

The FB reviewed the Terms of Reference for the three advisory panels that had been red-lined prior to the meeting.

PEP*:* The JRFB agreed that the current Terms of Reference include too much implementation rather than policy. In particular, the text detailing the workings of PEP through sub-panels will be stricken in order to allow the Panel to be flexible in its operations according to the needs at each meeting. In terms of membership, PEP must strive for a balance of expertise across all areas of the Science Plan.

There was discussion about the Chair selection process, which is currently done by an independent search committee. The JRFB felt that, because of the importance of continuity in its operation and the value of corporate memory, the Chair should be nominated by members of the PEP, and that nomination forwarded to JRFB for approval.

EPSP: It was noted that the EPSP does not follow the conflict of interest policy referred to as common to all advisory panels because it requires the proponents to participate in the discussion of their proposal. Hence, the COI policy needs to be revised. In addition, the EPSP does not hold electronic meetings, but rather electronic reviews. The Chair of the JRFB will provide guidance when appropriate to EPSP as to which proposals need review.

SCP: Revisions as red-lined.

SCP-PEP Interactions: With the recommendations for proposals reading for scheduling moving directly from PEP to JRFB, the status of site survey data will need to be considered during the PEP decision process. This requires close coordination between SCP and PEP to avoid proposals reaching the JRFB that cannot be drilled due to the status of the site survey requirements. There has been discussion of merging the two panels and, in June, the two panels will meet in the same geographic location with a day's overlap for a joint meeting. While there are questions relating to required expertise on each panel, and the workload change for a merged panel, the Chairs of PEP and SCP will review the consequences of such a merger after the June meeting, and recommend either a merger or a joint meeting plan at the next JRFB meeting.

Based on general agreement that site survey data would be required before proposals are advanced to the JRFB for consideration, and the Environmental Protection and Safety Panel (EPSP) must review the information prior to scheduling, The JRFB recommended that preliminary proposals include a section on the status of site survey data.

Action Items:
S. Humphris and Dick Kroon will revise the PEP Terms of Reference for review and approval at the August 2013 JRFB meeting.

D. Mallinson will review and recommend revisions to the SCP Terms of Reference for review and approval at the August 2013 JRFB meeting.

B. Katz will review and recommend revisions to the EPSP Terms of Reference, including updating the flow chart.

D. Kroon and D. Mallinson will review the PEP-SCP interactions after their June meeting and recommend either merger of the two panels or a plan for joint meetings. This will be an agenda item at the August 2013 JRFB meeting.

Recommendation to the Science Support Office:
The JRFB recommends that the requirement for a brief discussion of the status of site survey data and how it will be sufficient to address the scientific objectives be added to Preliminary Proposals. The page limit can be extended to include this section.

6. Conflict of Interest for JRFB and Advisory Panels

The JRFB reviewed a red-line version of the Conflict of Interest policy and agreed it needs to be simplified and the Appendix removed. In addition, the paragraph concerning SAS activities needs to be deleted. The policy also needs to be revised to enable **EPSP** to involve discussion with proponents of their proposals, which is currently not permissible under the current policy.

Action Item:
S. Humphris will revise and simplify the Conflict of Interest policy, circulate for comment, and then revise for approval at the August 2013 JRFB meeting.

7. Procedures and Guidelines for JR Expeditions

Staffing Procedures:

- Staffing of the JR will continue with the current process of nominations from Program Management Offices (PMO) for scientist to participate in each expedition.
- Co-Chief Scientist nominations will be provided by PEP initially to IODP-MI (until September 2013) and thereafter to the JR Operator. Nominations from the PMOs for Co-Chief Scientists will be requested by IODP-MI (until September 2013) and thereafter directly by the JR Operator.
- An effort will be made to balance international representation at all levels.

Standard Measurements: The JRFB discussed the possibility of developing a set of standard measurements across drilling platforms based on needs for post-cruise sampling, risk of loss of ephemeral data, cruise comparison, downhole measurements and the potential audiences for the data from such standard measurement. A subgroup (M. Malone, R. Murray, H. Palike, C. Yeats) was created to develop a set of basic measurements and options for discussion at the next JRFB meeting. This will be shared with the other FBs to try to standardize across platforms within the resources available to the operators.

Third Party Tool Guidelines: The JRFB believes that the current policy has been effective. It is particularly beneficial because it places the onus upon the tool developer to incorporate the technology and make the most effective use of it. The section of the policy that needs revision is that concerning the adoption of the tool by IODP. Although this should be kept as an option, it needs to be de-emphasized. A subgroup (Murray, Palike, Yeats, Malone) was created to revise the document for approval at the next JRFB meeting.

EPSP Safety Review Guidelines: The JRFB agreed to update the EPSP safety review guidelines that refer to “paper copies” and “Expedition Safety package distribution” to reflect that information is distributed electronically. In addition, the flow chart needs revision to reflect additional sites that may be added while a cruise is underway. The FB had significant discussion on cruise plan contingencies and the benefits inherent in targeting Sites of Opportunity when initial drilling plans fail. The FB considered having proponents develop well-defined secondary plans in their Full Proposals, with special consideration of promoting nearby sites with alternative.

Action Items

M. Malone will revise the staffing procedures document for review at the August 2013 JRFB meeting.

M. Malone (lead), R. Murray, H. Pälike, C. Yeats will revisit the list of standard measurements and revise the Standard Measurements document to reflect what should be basic measurement and what should be optional for the JR. This needs to be completed by early July 2013 to be shared with the *Chikyu* FB.

R. Murray (lead), H. Pälike, C. Yeats, M. Malone will revise the Third Party Tools document to de-emphasize adoption of tools by IODP for review and approval at the August 2013 JRFB meeting.

S, Humphris and B. Katz will revise the EPSP Safety Review guidelines for review and approval at the August 2013 JRFB meeting.

8. Core Curation

The JRFB needs advice from the core curators regarding curatorial procedures. It was generally agreed that a standard procedure for requests for samples taken with all platforms is desirable. The JRFB determined that the best approach would be for all three Facility Boards to request a from the core curators a proposed plan for standardizing curatorial procedures. The proposal created by the core curators must include budgetary information and prioritized activities.

Action Item
S. Humphris will bring up this curatorial issue to the CIB when it meets in July. After that meeting, the FBs can jointly request the core curators to propose standard procedures for core curation.

9. Data Management and Publishing Criteria

The JRFB agreed that Data Management and Publishing Criteria would be discussed in the summer when the JR Operator is known.

10. Overview of Proposals Ready for Scheduling

The PEP Chair gave a presentation of the science objectives of the JR proposals that have been brought forward to the JRFB for scheduling, as well as their site survey status. This included:
Proposal 505: Mariana Convergent Margin
Proposal 552: Bengal Fan
Proposal 567: Paleogene South Pacific Transect
APL 693: South Chamorra Seamount
Proposal 732: Sediment Drifts off the Antarctic Peninsula
Proposal 770: Kanto Asperity Project
Proposal 778: Tanzania Offshore Paleoclimate
Proposal 781: Hikurangi Subduction Zone, New Zealand
Proposal 793 CPP: Arabian Sea

Proposal 795: Indian Monsoon Rainfall
Proposal 800: Nature of the Lower Crust and Moho
Proposal 807: Indonesian Throughflow

Two others were also mentioned as important to longer term planning:
Proposal 702: Agulhas Current (needs reconsideration of site locations and review by SCP)
Proposal 704: Sumatra Subduction Zone (proposal needs further revision).

11. Overview of JR Operations and Costs

D. Divins provided a history of JR operations and costs. On an annual basis since 2004, time spent on site has varied between 72 and 190 days, with transit time ranging from 34 to 93 days.

For FY'13, the total USIO budget is $70.97M with 85% of that being used to support technical, engineering and science support.

The average cost to add an expedition is ~$2.5M, although costs vary widely depending on the complexity of the cruise. The average cost to add a CORK is ~$1M.

The FY'13 average operating day rate is $86K, which results in an annual day rate cost of $30.9M. In FY'14 some savings on the day rate (~$14K) will be realized as the day rate decreases due to completion of payments to the ship owner for the JR upgrade. This will provide an annual savings of ~$5.25M and a total annual day rate costs of ~$25.7M.

12. Budgetary Guidance from NSF

NSF provided details on its budgetary constraints and discussed current Foundation priorities, including Science, Engineering and Education for Sustainability (SEES) and Ocean Observatories Initiative (OOI) operations and maintenance as well as the sequester cuts. NSF does not have final figures for budgets for FY 2013 or 2014. The JRFB was told to assume four expeditions for the FY'15 planning.

Renewal of *JOIDES Resolution* operations beyond FY'14 will require National Science Board (NSB) approval this year, with the NSB providing final guidance on financial request amounts should they approve renewal of facility operations.

13 & 14. Options for, and Development of, an FY'15 Schedule

M. Malone provided several options for an FY'15 schedule. The ship will end FY'14 at IBM in the western Pacific. Three options were presented for consideration, all of which included Indian Monsoon (795), Bengal Fan (552) and Arabian Sea (793) and only varied in the fourth cruise.

The JRFB discussed the options, taking into account the status of the site survey data available, the feasibility of proposals that included observatories, weather windows, transit times, and the positioning of the ship for FY'16. Based on this information, the JRFB recommended that Indonesian Flowthrough (807) be the fourth project. It was also agreed that lead proponents of all proposals considered by the JRFB should receive a letter from the JRFB Chair updating them on the status of the schedule and providing any addition instructions to the proponents on how to proceed to resolve any outstanding issues.

Action Item:
S. Humphris and D. Kroon will prepare letters to lead proponents of all proposals under JRFB consideration informing them on the status of scheduling and how to proceed. These will be sent through IODP-MI this time, but eventually through the Science Support Office.

15. Overview of JR Proposals at PEP

The JRFB reviewed current and anticipated proposal pressure to determine likely geographic locations of operation a few years from now, and discussed the need to generate proposals in preparation for work in those areas.

Consensus

Taking into consideration current and anticipated proposal pressure, the JRFB considers that the JOIDES Resolution is likely to remain in the eastern Indian and western and south western Pacific oceans through 2016 and 2017, followed by a likely track across the southern Pacific Ocean, with an opportunity for drilling in the southern and central Atlantic Ocean in 2018 and 2019.

The JRFB noted there are three projects in the western Indian Ocean waiting for scheduling (Tanzania – 778, Atlantis Bank – 800, and Agulhas Current – 704), although one of them (Tanzania – 778) is in a piracy area that has seen some improvement. Hence, a detour into the western Indian Ocean is likely when the ship is in the southern Atlantic. While providing general guidance to the community, this anticipated long-term ship track will be reviewed every year to ensure efficient scheduling of projects ready for drilling and achievement of the challenges laid out in the Science Plan.

The JRFB agreed to encourage the community to begin planning workshops to develop drilling proposals for the Atlantic.

16. Operational/Scientific Expedition Reviews by the JRFB

The JRFB considered the merit of continuing scientific and operational reviews of each expedition. Under a Cooperative Agreement, NSF has an increased role in reviewing the performance of the operations and management of the JR Operator. Multiple reviews are unnecessary and cost inefficient. Given NSF's mandatory operational review process, and the scientific review conducted by the IODP Forum, the JRFB discussed what additional information it would like a review to provide that could be incorporated into the NSF review. The JRFB agreed that for expedition year 2014, reports from the operator and the Co-Chiefs summarizing the expedition experience would be sufficient. For expedition year 2015 and beyond, the JRFB would assist NSF in writing the charge to the review panel, and one member of the JRFB would be a member of the NSF review panel.

17. Long-Term Planning

The JRFB discussed implementation of the recommendations that came out of the US Strategies Workshop concerning operational planning for the JR. The JRFB recommends that the APL process be implemented to take advantage of sites of opportunity along transits.

18. Other JR Issues

Expedition Length: There was discussion of the traditional two-month duration of an expedition. The two-month duration appears to represent a balance between crew rotation requirements and fiscal/time constraints of transit in and out of port. The scientific community has become accustomed to tailoring proposals to fit the available time. However, there are projects whose scientific objectives could be met with shorter drilling times. The JRFB agreed to allow proponents to propose projects of flexible time lengths. Shorter projects will fit well within the new regional scheduling model of the *JOIDES Resolution* and allow the ship operator to create an efficient expedition schedule by packaging two of three smaller projects into a two-month expedition time slot. This change will require that proponents develop a drilling strategy that justifies the requested length of the project. This change will be advertised and written into the proposal submission guidelines.

Weekly vs. Site Reporting: The weekly and site reporting requirements during JR expeditions are burdensome and repetitive particularly when new sites are being drilled in rapid succession. The JRFB agreed to require weekly site reports for expeditions only when the site occupancy was two weeks or longer. Site reports are to continue to be required for all sites.

Expedition and Site Number Designations: The JRFB agreed to continue the current method of designating expedition and site numbers with the operators coordination assignment of expedition numbers.

Recommendation for the Science Support Office
Change the Proposal Submission Guidelines to allow for projects with less than 2-month drilling requirements.

19. Proposal Submission Guidelines

The JRFB agreed to maintain proposal submission dates in April and October.

The JRFB reviewed the revised version of the Proposal Submission Guidelines. There was some discussion about the need to include the level of detail found in the document but the JRFB members ultimately agreed that the detail is necessary for newcomers to the proposal process. However, the JRFB members noted that the number of documents on the IODP website that relate to proposal submission can be confusing to a newcomer. There needs to be simple explanatory materials to explain the relationship between all the documents. Examples of this explanatory material include a flow chart detailing how proposals move through the system and links to recent examples of successful proposals. JRFB created a working group (G. Filippelli, D. Kroon, G. Camoin) to address this need.

The JRFB reviewed the status of Complementary Project Proposals (CPP) and considered benefits including day-rate relief, new opportunities for partnerships, and active outreach groups seeking new CPP possibilities. After considerable discussion, the JRFB agreed that the 70% level would be maintained for the JR.

Action Item

G. Filipelli, D. Kroon and G. Camoin will improve the accessibility of documents relating to proposal submission by providing explanatory text and visuals.

Recommendation to the Support Office
The following recommendations will be made to the new Support Office:
(1) Update the proposal submission guidelines and the website flow chart of how proposals move through the system based upon material provided by the JRFB workgin group.
(2) Provide links to recent examples of successful proposals.
(3) Keep the Google Earth overlay of completed and proposed sites up to date.

20. Publications

Expedition Prospectus: The JRFB agreed that a pre-cruise prospectus is required for all scheduled projects. All efforts should be made to make this available prior to the scientist application process. The prospectus should include a short summary for the general public. The JRFB also noted that the emphasis for the prospectus should be on timely publication rather than production aspects (e.g. layout, undue graphical editing, etc.).

Preliminary Reports: The JRFB needs to consider what information the Preliminary Report needs to impart and who is the audience in order to determine specific content requirements. This is best done is a discussion with the JR Operator.

Post-Cruise Reporting Requirements: The JRFB established the following with respect to post-cruise reporting requirements:

Immediate post-cruise reporting needs to target several audiences. For the funding agencies, there needs to be a summary of achieved objectives and operations, and results of drilling. Scientists need a similar summary, data on core recovery, and some summary figures of the major findings. For the general public, there should be press releases and media kits. For research clearance requirements, there needs to be summary maps and a project abstracts. One year post-cruise the shipboard party will be required to have published a report in Scientific Drilling.

One year post-cruise, the scientific party should have an article published in a journal such as Scientific Drilling.

One year after the sampling party, the scientific party will have produced an Initial Reports volume similar in content and quality to the current publication, with a summary overview chapter and an expedition bibliography.

It was agreed that the Expedition Bibliography will be maintained in the new IODP.

Liaisons from other JRFBs agreed to maintain the same format of publications across their programs.

21. JR Facility Policies

Action Items
S. Humphris will revise the proposal confidentiality policy for approval at the JRFB August 2013 meeting.

D. Mallinson and the SCB will review the site survey confidentiality policy and then update it for JRFB review and approval at the August 2013 meeting.

U. Rohl, W. Azuma, J. Allan, N. Eguchi and D. Divins will begin review of the Sample, Data and Obligations Policy. The curators will be requested to provide an implementation process. It was noted that data are not dealt with appropriately in the policy.

S. Humphris will rewrite the Environmental Principles policy and send to the FBs for each platform.

23. Next Meeting

The date of the next meeting depends on 1) the schedule for production of the Annual Program Plan, and 2) on the date of the *Chikyu* FB meeting. It will be sometime in July or August, and will be held in Washington, DC.

Agenda Item 16

Chikyu Facility Procedures, Guidelines and Policies

- Environmental Protection and Safety Policy
    - IODP (Integrated Ocean Drilling Program) Environmental Principles
    - *IODP Environmental Principles (Draft – May 2013)**
    - EPSP Safety Review Guidelines (August 2006)
    - *EPSP Safety Review Guidelines (Draft – May 2013)**
- Sample, Data and Obligation Policy
    - *IODP Sample, Data and Obligations Policy (March 2012)*
- Proposal Confidentiality Policy
    - Proposal Confidentiality Policy (Integrated Ocean Drilling Program)
    - *Proposal Confidentiality Policy (Draft – May 2013)**
- Staffing Procedures
    - IODP Staffing Procedures (September 16, 2011)
- Proposal Submission Guidelines
    - *IODP proposal guide primer (Drafted by JRFB working group)*
    - *IODP SCP drill site characterisation data guiding statement and rationale (Drafted by SCP - June, 2013)*
- Onboard Measurements Guidelines
    - IODP Measurements Document (February, 2008)
- Third Party Tool Guidelines
    - IODP Third-Party Tools Policy (9 March, 2006)
    - IODP Third Party Tool and Laboratory Instrumentation Development, Procurement and Deployment Guidelines ver. 4 (September 8, 2008)
    - *JOIDES Resolution Third-Party Tools and Instruments Policy (Draft: July 14, 2013) **
- Site Survey Data Requirements
    - IODP Site Survey Data Confidentiality Policy (May 2009)
    - *IODP Site Survey Data Confidentiality Policy (Draft – May 2013)**
    - Site survey data requirements: A simple guide
- Second Post Expedition Meeting
    - IODP approval guidelines for Second Post-Expedition Meetings

*: Drafted by JRFB

Italic: Newly drafted version for the new program

IODP Environmental Principles

As a community conducting research of the ocean floor, we recognize that we all carry a responsibility to ensure that our activities have a negligible environmental impact. We therefore are determined to conform to the highest accepted levels of environmental sensitivity: All members of the IODP ocean science community will familiarize themselves with the principles outlined below and will ensure that they are adhered to by project personnel. These principles will enhance awareness of environmental issues in members of the community and, as such, will constitute a basis for IODP's expectations of scientific staff, particularly those participating in drilling operations. These principles define the standards that IODP operational organizations and contractors are committed to adhere to fully.

The implementing organizations (JA, CDEX and ESO) and their operational contractors are fully responsible and accountable for drilling and related activities to their funding organizations, the NSF, MEXT and ECORD, as well as to the international public.

Protection of marine life and the environment

- IODP will minimize the release of substances into the marine environment that could harm marine organisms.
- When operating, IODP seismic data will be collected according to the latest guidelines for seismic operations to minimize impact on marine mammals.
- The operators will obtain all necessary permits.
- A review of hazards to the environment will be conducted by IODP's Pollution Prevention and Safety Panel and by the contracted operators for all drilling operations to determine the associated risk level.
- IODP will act to minimize any and all environmental risks identified through appropriate control measures.

Disposal of waste materials and restitution of the environment

- When operating within national jurisdictions IODP will follow host country requirements for the handling of drilling by-products.
- All other materials will be disposed of in accordance with applicable environmental legislation, standards, guidelines and codes.

Storage and curation of potentially harmful substances/organisms

- Samples will be transported and stored in such a way as to prevent contamination of the environment.

Keeping the public informed of our activities

- We will inform the public of our operational plans.

IODP Environmental Principles

Draft (May 2013)

As a community conducting research of the ocean floor, we all carry a responsibility to ensure that our activities have a negligible environmental impact. We therefore are determined to conform to the highest accepted levels of environmental sensitivity: All members of the IODP ocean science community will familiarize themselves with the principles outlined below and will ensure that they are adhered to by project personnel. These principles will enhance awareness of environmental issues in members of the community and, as such, will constitute a basis for IODP's expectations of scientific staff, particularly those participating in drilling operations. These principles define the standards that IODP operational organizations and contractors are committed to adhere to fully.

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- A review of hazards to the environment will be conducted by IODP's Environmental Protection and Safety Panel (EPSP) and by the contracted operators for all drilling operations to determine the associated risk level.
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Disposal of waste materials and restitution of the environment

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Keeping the public informed of our activities

- IODP will inform the public of its operational plans.

Guidelines for the EPSP Safety Review Report and Presentation, and Expedition Safety Package

Introduction

This document describes (A) the Environmental Protection and Safety Panel (EPSP) Safety Review Report, and accompanying presentation, and (B) the Expedition Safety Package. Part C defines the parties responsible for creating the various products described in this document, and the distribution lists for these products.

Some terms used in this document:

EPSP Preview and **Review**. The EPSP assesses proposed drill sites in either a preview or review mode. In either case, a representative proponent attends the review meeting and makes a presentation (see below for Safety Presentation Guidelines). The **preview** is an opportunity for the panel to identify key issues that should be addressed before the final review is made. These issues could include data processing requirements, and the need for additional data (including shallow hazard assessments). The **review** is considered the final presentation before the EPSP, where drilling recommendations (see below: Possible EPSP Actions) are made for each of the proposed sites.

The **Safety Review Report** is a PDF document written by the proponent(s), and its contents, in distilled form, are presented by a proponent during an EPSP review (or preview) of proposed sites (see Safety Presentation below).

The **Safety Presentation** is typically a PowerPoint (or PDF) presentation given by a proponent to the EPSP, summarizing the information in the Safety Review Report.

The **Expedition Safety Package** is a collection of documents and site survey data assembled by the Implementing Organization (IO) with the assistance of the expedition Co-chiefs, proponent(s), and IODP-MI, as described in Part B of this document. This package includes the Site Survey Data Package.

The **Site Survey Data Package** is the collection of all site survey data (both raw data, e.g., segy, and data in image format, e.g., PDF) required for an expedition. The authoritative list of required data is defined by the IO, Co-chiefs and/or proponents and is published in the expedition Scientific Prospectus.

The **Site Survey Data Bank (SSDB)** (http://ssdb.iodp.org) is the repository for all IODP proposal- and expedition-related site survey data. All site survey data within the site survey data package must be housed in the SSDB.

Note that in addition to safety reviews by the EPSP, the safety panel for the concerned IO performs an independent review of proposed sites. The IO's safety panel has the authority to override decisions made by the EPSP.

The attached figure shows the typical procedural steps and required actions for a proposal as it moves beyond the usual Science Advisory Structure review process (i.e, reviews by the Science Steering and Evaluation Panel, Site Survey Panel and Science Planning Committee) to the Operations Task Force, through to scheduling and subsequent preparation for the expedition.

Part A. EPSP Safety Review Report & Presentation

1. <u>Safety Review Report & Presentation General Guidance</u>

Under normal circumstances a representative proponent will be asked by the panel chair to attend an EPSP meeting and make a presentation to the panel. The proponent making the presentation should be aware not only of the scientific justification for the program but the technical details associated with the site survey data presented during the panel meeting and in the Safety Review Report, including acquisition and processing parameters. (If no single proponent is capable of making this presentation the panel chair will invite two presenters to represent the proposal.)

The proponent will be required to submit a Safety Review Report to IODP-MI for distribution to the panel. An EPSP watchdog will be assigned to answer proponent questions and insure that the completed Safety Review Report is satisfactory.

The Safety Presentation typically is broken down into two general sections: (i) an overview; followed by (ii) a site-by-site review.

(i) The general overview is typically 15-30 minutes in duration. The presentation of the overview normally includes:
1. an overview of the proposed scientific program.
2. status of the site survey information.
3. the proposed drilling program (number of sites, types of coring, logging program, necessity of riser capability, etc.).
4. description of key safety and pollution issues as understood by the proponents.

(ii) For the site-by-site review, all relevant information should be presented including:
1. reason(s) for the selection of the site location.
2. planned type(s) of coring, sampling, and logging.

Specifically the panel needs to know:
1. proposed depths of penetration.
2. nature of the section to be penetrated (including the identification of any potential hydrocarbon reservoirs and seals).
3. an expression of your degree of confidence in the velocity control for depthing and your proposed lithologic column.
4. possibilities of thermally mature hydrocarbon source rocks in the vicinity of proposed drilling targets and effective migration pathways.
5. results of any industry and/or previous scientific drilling.
6. likelihood of either abnormal pressure or subsurface fluid flow.
7. environmental and safety issues that may be specific to your leg (including how sites will be located, availability of crossing seismic lines, order of drilling, etc.).

The proponents should consider the following recommendations for site selection when bringing their requests for EPSP approval forward:

- Locate on existing seismic line, if possible (if not, explain rationale for locating offline).
- Locate on cross-line, if available and possible.

Under certain circumstances the EPSP may require from the IO a shallow hazards or other special survey or a drilling protocol document. This may include a request for an interpretation of hazards survey data by an independent entity.

2. Safety Review Report Guidelines

The Safety Review Report is a PDF document created by the proponent(s). Some exemplary previous Safety Review Reports can be obtained by request to the chair of the EPSP. The report should include:

- A summary of the scientific objectives and environmental issues of the proposed expedition.
- Completed site summary forms.
- Always include a contoured seafloor bathymetry map with an appropriate contour interval to illustrate the topography. Especially in areas of complex bathymetry (e.g., reefs), bathymetric maps should be at the highest resolution possible.
- Multibeam maps should be included (contours at 50 or 100m intervals). Shaded relief maps are also helpful in areas of complex bathymetry.
- Track chart of available seismic data. Data included in the report should be highlighted. This chart should be at the same scale as the bathymetry maps. This is usually best done by co-registering and overlaying the seismic acquisition lines on the regional and multibeam bathymetry maps. This map should also identify any known hazards, communication cables, and/or protected areas, as well as any prior commercial wells or scientific drilling sites.
- When appropriate and data are sufficient, map key horizons and intervals when anticlines are present in the near-surface section.
- At a minimum, show an uninterpreted section with the drill-site annotation.

The following type and basic information should be included on all maps:

- Indicate North either with arrow or grid lines
- Include scale bar or other indication of distance
- Label any contours present at a regular interval and ensure that the contour interval is easy to identify
- Indicate the grid resolution in metres for any maps showing gridded (e.g., seafloor bathymetry)
- Label all trackline and shot points at a regular interval
- All charts should use the same projection and the projection should be identified

The following basic information should be included on all seismic data presented:

- Provide as much information as possible about acquisition and processing of the seismic data used.
- Shot points should be labelled.
- Clearly indicate the horizontal and vertical scales.
- All records associated with a single site should be presented at the same vertical and horizontal scales.
- Mark drill sites with “sticks” indicating anticipated depth of penetration based on best time-depth conversion.
- Intersection of cross-line(s), if present should be clearly marked
- Highlight on seismic records any structures or features that are important to both your science case and safety issues. For example, identify potential structural traps (anticlines, etc.), stratigraphic traps (sand bodies and cap formations), bright spots and wash-out zones (e.g. potential free gas).

3. Safety Presentation Guidelines

The Safety Presentation is a PowerPoint or PDF document created, and presented during an EPSP review (or preview), by the proponent(s). Some exemplary previous Safety Presentations can be obtained by request to the chair of the EPSP.

- Keep all text, maps and diagrams simple and clear to read from a distance of 10 m. Do not include lots of pages of text or complex tables of data. This material may be included in the Safety Review Report.

- Maps and seismic data included in the Safety Presentation should include the same basic and labeling information as that included in Safety Review Report.

- The presentation should include high-resolution digital images of the seismic sections. A PDF file with as much detail as possible to allow zooming in to seismic sections is one way this may be accomplished. *It is also recommended that the proponents arrange to have large format paper records and copies of all relative seismic sections and charts.*

- The PowerPoint presentations are attached to the final minutes and will be included as part of the final Expedition Safety Package.

4. Possible EPSP Actions

After each site review the panel will make a recommendation. EPSP site recommendations are forwarded to the Science Planning Committee (SPC), IODP Operations Task Force, and the IO. Possible site recommendations are:

- Approve as requested.
- Approve to a specified depth other than that originally requested.
- Approve at a new site based on discussions between panel members, proponents, and operator.
- Defer any recommendation until additional specified information is provided.
- Not approve

In addition, the panel may recommend a specific drilling order and/or specific monitoring requirements.

5. Frequently Asked Questions by EPSP members

When preparing the Safety Review Report and associated presentation the proponents should prepare themselves to answer the following frequently asked questions:

- How and when were the data collected?
- How were the seismic data processed?
- What was the velocity control used to establish target depths? What is the uncertainty associated with these estimates?
- Are there any velocity anomalies on the profiles near the proposed drilling sites?
- Do additional industry data (seismic, drilling) exist in the relevant area and could these be accessed?
- What was the navigation used (especially important for older data)?
- Are all of the map projections consistent?
- If applicable, have the requested depths accounted for any logging tools?
- Have you considered alternative locations if the EPSP cannot approve the sites as proposed?
- Have alternative sites been prepared if weather, currents, ice, etc. prevent drilling or if additional time is available during the planned expedition?
- What would happen to the science plan if the proposed depth of penetration cannot be approved?
- Do you have a recommended drilling order and why?
- Are there any biological communities within 100 metres of any of the proposed drill sites, what are they (e.g., vents, deep-water reefs, etc.), and what is the evidence for their existence (e.g., sampling, visual, etc.)? When and by whom were these data collected?
- Is the proposed drilling location in the vicinity of a fisheries (species, typical gear, etc.), known breeding/feeding ground or migration route, or “home” of threatened or endangered species?
- Is there a probability of encountering H_2S or hydrates during coring or core recovery?
- Are there are any reasons to suspect that an over-pressured section will be encountered?
- Is there petroleum industry interest in the area? Are the proposed drilling sites located within current or proposed license blocks?
- Have any commercial “dry” wells been examined to determine whether hydrocarbon shows may actually be present?
- Are there any indications of active (or previously active) vent systems or hydrocarbon seeps in the area of proposed drilling?
- Is there an expectation that reservoir facies may be present?
- Are there any other environmental or safety issues that the EPSP should be aware of?

Part B. Expedition Safety Package

The Expedition Safety Package contains all data and documentation necessary to support a safe operation.

Components of the Expedition Safety Package

- Safety Review Report
- Safety Presentation
- Any required shallow hazard or special survey reports required by the EPSP or the IO.
- The portions of the EPSP and IO safety panel minutes that are relevant to the specific expedition(s), which would include the panel's recommendations
- Scientific Prospectus (SP), which would normally include images of key seismic profiles. The SP also includes the authoritative list of site survey data required for the expedition as defined by the IO, Co-chiefs and/or proponents. This list, which includes the URL link to each item in the Site Survey Data Bank, includes all data necessary to conduct a safe expedition and to address all safety and scientific contingencies, such as the need to relocate or add a new drilling location.
- The Site Survey Data Package (SSDP), which is one (or more as necessary) CD or DVD containing all site survey data (both raw data, e.g., segy, and data in image format, e.g., PDF) required for the expedition as defined in the authoritative list published in the SP.
- Any required governmental approvals for the expedition that may limit site relocation and/or modification to the approved drilling plan.

Part C. Responsible Parties and Distribution of Products

1. Responsible Parties

Site Survey Data – Prior to an EPSP review the proponent is responsible for ensuring that all data (raw digital data and/or image format data) presented in the Safety Review Report are submitted to the Site Survey Data Bank. When an expedition is scheduled, the Co-chiefs and proponent, with the assistance of the IO, are responsible for ensuring that all data (raw data and/or image format data) required for the expedition are submitted to the Site Survey Data Bank (SSDB). The IODP-MI science coordinator responsible for site survey data issues is available to assist users of the SSDB.

Large format paper plots for EPSP review – If applicable, proponents are responsible for producing and transporting to the meeting.

Expedition Safety Package – The overall responsibility for the assembly and distribution of the Expedition Safety Package rests with the IO. The Expedition Safety Package needs to be distributed prior to the onset of the expedition. Responsibilities for preparing and delivering the components of the package are as follows:

- **Safety Review Report** – Proponents and/or Co-chiefs, if assigned, will prepare. Forwarded directly to IODP-MI by the proponents and/or Co-chiefs via either email or, if necessary because of size, via ftp (IODP-MI will provide an ftp site for uploading the report). The report is due 4 weeks in advance of the EPSP meeting. IODP-MI will distribute (on CD media) to EPSP members for review at least two weeks prior to the semi-annual meeting. IODP-MI will forward to the IO for inclusion in the Expedition Safety Package when the expedition is scheduled.
- **Safety presentation** – Proponents and/or Co-chiefs, if assigned, will prepare and deliver at the time of the EPSP meeting to the chair or co-chair. Forwarded by the EPSP chair to IODP-MI with the final panel minutes. IODP-MI will forward to IO for inclusion in the Expedition Safety Package when the expedition is scheduled.
- **EPSP recommendations** – EPSP chair or co-chair. Forwarded to IODP-MI when the minutes are finalized. IODP-MI will forward to IO for inclusion in the Expedition Safety Package when the expedition is scheduled.
- **IO's safety panel actions** – Forwarded directly by IO's safety panel to IO.
- **Scientific Prospectus** – Created by IO. Forwarded to IODP-MI when completed. To be completed six months prior to the start of the expedition.
- **Site Survey Data Package** – IODP-MI creates CD(s) or DVD(s) containing data specified in the Scientific Prospectus. IODP-MI forwards to the IO for inclusion in the Expedition Safety Package and distribution to expedition participants. The Safety Package should be delivered to the IO three months prior to the start of the expedition, or as soon as possible after all required data have been identified and submitted to the SSDB.
- **Expedition specific approvals** – The IO is responsible for providing as necessary.
- **Shallow hazard or special survey reports and/or drilling protocol documentation** – The IO is responsible for forwarding to IODP-MI for distribution to EPSP members together with the Safety Review Report.
- **Expedition Safety Package** – The IO is responsible for packaging together the components described at the top of Part B. The Expedition Safety Package is forwarded by the IO to all concerned parties as described below.

2. <u>Distribution</u>

The following distribution is intended to ensure a common data/document package onboard the ship and onshore to facilitate any discussions and/or decisions that may be required once an expedition has begun.

EPSP Safety Review Report (provided by proponent/Co-chiefs 4 weeks prior to EPSP meeting and distributed by IODP-MI):

- EPSP members, liaisons and IO representatives attending the EPSP meeting

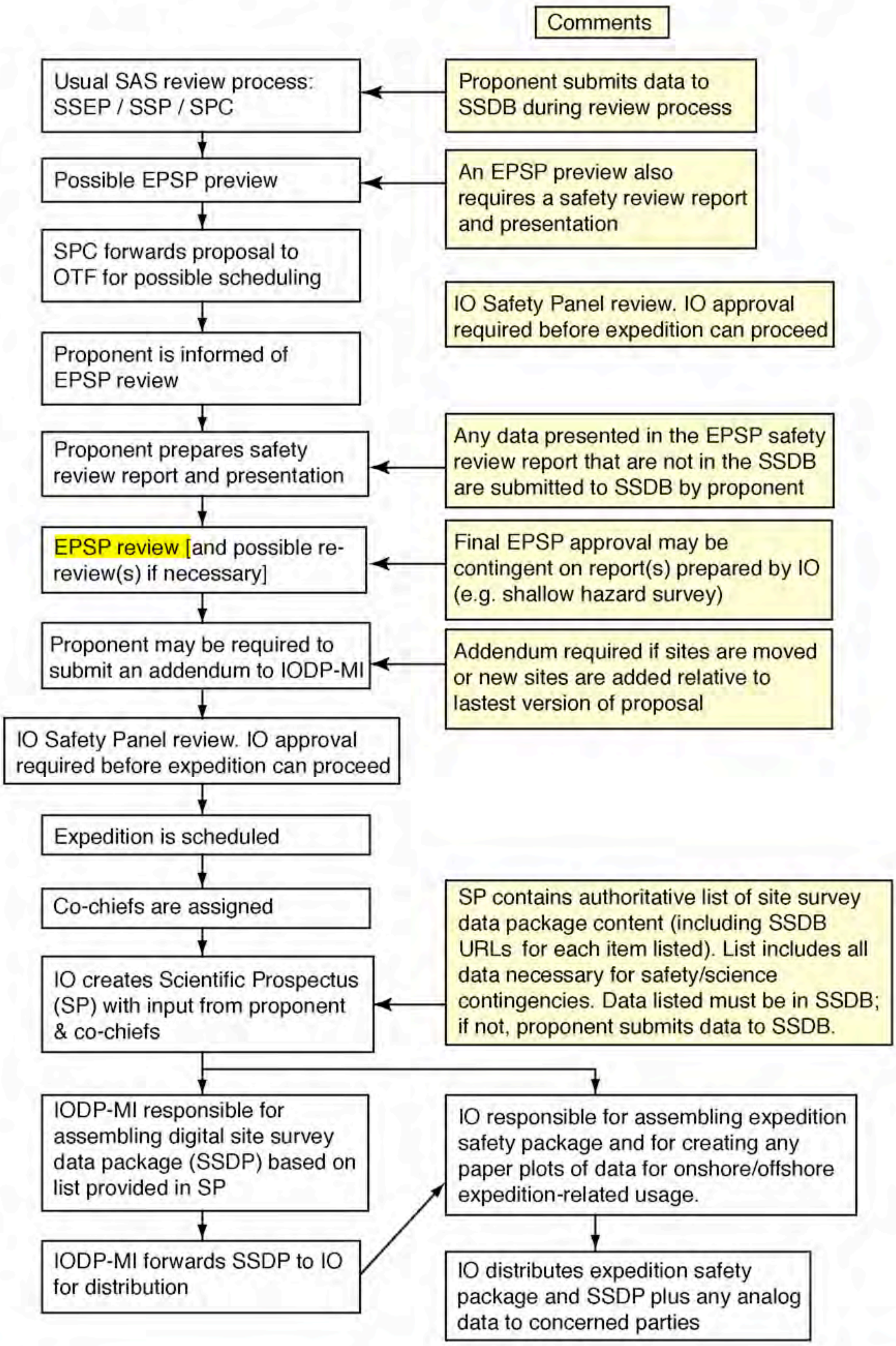
Expedition Safety Package (provided and distributed by the IO):

- Co-chief scientists
- Expedition staff scientist
- Chair and co-chair of EPSP
- Chair of SPC

- IODP-MI (Sapporo and Washington, D.C. offices)
- IO

Site Survey Data Package (provided by IODP-MI and distributed by the IO)
- Same distribution as the Expedition Safety Package, plus
- All invited scientific expedition participants

Proposal / expedition activity surrounding an EPSP review



Acronyms:

EPSP	Environmental Protection & Safety Panel	SAS	Science Advisory Structure
IO	Implementing Organization	SP	Scientific Prospectus
IODP-MI	Integrated Ocean Drilling Program - Management International	SPC	Science Planning Committee
OTF	Operations Task Force	SSDB	Site Survey Data Bank
		SSDP	Site Survey Data Package
		SSEP	Science Steering & Evaluation Panel

Last updated: 2006-8-14

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Introduction

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Note that in addition to safety reviews by the EPSP, the safety panel for the concerned IO performs an independent review of proposed sites. The IO's safety panel has the authority to override decisions made by the EPSP.

The attached figure shows the typical procedural steps and required actions for a proposal as it moves beyond the scientific review process through scheduling and subsequent preparation for the expedition.

Part A. EPSP Safety Review Report & Presentation

1. Safety Review Report & Presentation General Guidance

Under normal circumstances, a representative proponent will be asked by the panel chair to attend an EPSP meeting and make a presentation to the panel. The proponent making the presentation should be aware not only of the scientific justification for the program but the technical details associated with the site survey data presented during the panel meeting and in the Safety Review Report, including acquisition and processing parameters. (If no single proponent is capable of making this presentation the panel chair will invite two presenters to represent the proposal.)

The proponent will be required to submit a Safety Review Report to the Science Support Office for distribution to the panel. An EPSP watchdog will be assigned to answer proponent questions and ensure that the completed Safety Review Report is satisfactory.

The Safety Presentation typically is broken down into two general sections: (i) an overview; followed by (ii) a site-by-site review.

(i) The general overview is typically 15-30 minutes in duration. The presentation of the overview normally includes:

1. an overview of the proposed scientific program
2. status of the site survey information
3. the proposed drilling program (number of sites, types of coring, logging program, etc.)
4. description of key safety and environmental issues as understood by the proponents.

(ii) For the site-by-site review, all relevant information should be presented including:

1. reason(s) for the selection of the site location
2. planned type(s) of coring, sampling, and logging.

Specifically EPSP needs to know:

1. proposed depths of penetration (including the required “rat-hole” for logging tools)
2. nature of the section to be penetrated (including the identification of any potential hydrocarbon reservoirs and seals)
3. an expression of your degree of confidence in the velocity control for depthing and your proposed lithologic column
4. possibilities of thermally mature hydrocarbon source rocks in the vicinity of proposed drilling targets and effective migration pathways
5. results of any industry and/or previous scientific drilling
6. likelihood of either abnormal pressure or subsurface fluid flow
7. environmental and safety issues that may be specific to your leg (including how sites will be located, availability of crossing seismic lines, order of drilling, etc.).

The proponents should consider the following recommendations for site selection when bringing their requests for EPSP approval forward:

- Locate site on an existing seismic line, if possible (if not, explain rationale for locating offline)
- Locate site on a cross-line, if available and possible.

Under certain circumstances, the EPSP may require from the appropriate IO a shallow hazards or other special survey or a drilling protocol document. This may include a request for an interpretation of hazards survey data by an independent entity.

2. Safety Review Report Guidelines

The Safety Review Report is a PDF document created by the proponent(s). Some exemplary previous Safety Review Reports can be obtained by request from the chair of the EPSP. The report should include:

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- Completed site summary forms
- A contoured seafloor bathymetry map with an appropriate contour interval to illustrate the topography. Especially in areas of complex bathymetry (e.g., reefs), bathymetric maps should be at the highest resolution possible
- Multibeam maps (contours at 50 or 100 m intervals). Shaded relief maps are also helpful in areas of complex bathymetry
- Track chart of available seismic data. Data included in the report should be highlighted. This chart should be at the same scale as the bathymetry maps. This is usually best done by co-registering and overlaying the seismic acquisition lines on the regional and multibeam bathymetry maps. This map should also identify any known hazards, communication cables, and/or protected areas, as well as any prior commercial wells or scientific drilling sites
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- At a minimum, show an uninterpreted section with the drill-site annotation.

The following type of basic information should be included on all maps:

- Indicate North either with arrow or grid lines
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- Label any contours present at a regular interval and ensure that the contour interval is easy to identify
- Indicate the grid resolution in meters for any maps showing gridded data (e.g., seafloor bathymetry)
- Label all trackline and shot points at a regular interval
- All charts should use the same projection and the projection should be identified.

The following basic information should be included on all seismic data presented:

- As much information as possible about acquisition and processing of the seismic data used
- Labelled shot points
- The horizontal and vertical scales

- All records associated with a single site presented at the same vertical and horizontal scales
- Drill sites marked with "sticks" indicating anticipated depth of penetration based on best time-depth conversion
- Intersection of cross-line(s) if present should be clearly marked
- Highlight on seismic records any structures or features that are important to both your science case and safety issues. For example, identify potential structural traps (anticlines, etc.), stratigraphic traps (sand bodies and cap formations), bright spots and wash-out zones (e.g. potential free gas).

3. Safety Presentation Guidelines

The Safety Presentation is a PowerPoint or PDF document created, and presented during an EPSP review (or preview), by the proponent(s). Some exemplary previous Safety Presentations can be obtained on request to the chair of the EPSP.

- Keep all text, maps and diagrams simple and clear to read from a distance of 10 m. Do not include lots of pages of text or complex tables of data. This material may be included in the Safety Review Report.

- Maps and seismic data included in the Safety Presentation should include the same basic and labeling information as that included in Safety Review Report.

- The presentation should include high-resolution digital images of the seismic sections. A PDF file with as much detail as possible to allow zooming in to seismic sections is one way this may be accomplished.

- The PowerPoint presentations are attached to the final minutes and will be included as part of the final Expedition Safety Package.

4. Possible EPSP Actions

After each site review, the panel will make a recommendation. EPSP site recommendations are forwarded to the *JOIDES Resolution* Facility Board and the IO, or other appropriate Facility Board and platform provider who is utilizing *JOIDES Resolution* Facility advisory panels. Possible site recommendations are:

- Approve as requested
- Approve to a specified depth other than that originally requested
- Approve at a new site based on discussions between panel members, proponents, and operator
- Defer any recommendation until additional specified information is provided
- Not approve.

In addition, the panel may recommend a specific drilling order and/or specific monitoring requirements.

5. Frequently Asked Questions by EPSP members

When preparing the Safety Review Report and associated presentation the proponents should prepare themselves to answer the following frequently asked questions:

- How and when were the data collected?
- How were the seismic data processed?
- What was the velocity control used to establish target depths? What is the uncertainty associated with these estimates?
- Are there any velocity anomalies on the profiles near the proposed drilling sites?
- Do additional industry data (seismic, drilling) exist in the relevant area and could these be accessed?
- What was the navigation used (especially important for older data)?
- Are all of the map projections consistent?
- If applicable, have the requested depths accounted for any logging tools?
- Have you considered alternative locations if the EPSP cannot approve the sites as proposed?
- Have alternative sites been prepared if weather, currents, ice, etc. prevent drilling or if additional time is available during the planned expedition?
- What would happen to the science plan if the proposed depth of penetration cannot be approved?
- Do you have a recommended drilling order and why?
- Are there any biological communities within 100 metres of any of the proposed drill sites, what are they (e.g., vents, deep-water reefs, etc.), and what is the evidence for their existence (e.g., sampling, visual, etc.)? When and by whom were these data collected?
- Is the proposed drilling location in the vicinity of a fisheries (species, typical gear, etc.), known breeding/feeding ground or migration route, or "home" of threatened or endangered species?
- Is there a probability of encountering H_2S or hydrates during coring or core recovery?
- Are there any reasons to suspect that an over-pressured section will be encountered?
- Is there petroleum industry interest in the area? Are the proposed drilling sites located within current or proposed license blocks?
- Have any commercial "dry" wells been examined to determine whether hydrocarbon shows may actually be present?
- Are there any indications of active (or previously active) vent systems or hydrocarbon seeps in the area of proposed drilling?
- Is there an expectation that reservoir facies may be present?
- Are there any other environmental or safety issues that the EPSP should be aware of?

Part B. Expedition Safety Package

The Expedition Safety Package contains all data and documentation necessary to support a safe operation.

<u>Components of the Expedition Safety Package</u>

- Safety Review Report
- Safety Presentation
- Any required shallow hazard or special survey reports required by the EPSP or the IO.
- The portions of the EPSP and IO safety panel minutes that are relevant to the specific expedition(s), which would include the panel's recommendations
- Scientific Prospectus (SP), which would normally include images of key seismic profiles. The SP also includes the authoritative list of site survey data required for the expedition as defined by the IO, Co-chiefs and/or proponents. This list, which includes the URL link to each item in the Site Survey Data Bank, includes all data necessary to conduct a safe expedition and to address all safety and scientific contingencies, such as the need to relocate or add a new drilling location.
- The Site Survey Data Package (SSDP), which is one (or more as necessary) CD or DVD containing all site survey data (both raw data, e.g., SEG-Y, and data in image format, e.g., PDF) required for the expedition as defined in the authoritative list published in the SP.
- Any required governmental approvals for the expedition that may limit site relocation and/or modification to the approved drilling plan.

Part C. Responsible Parties and Distribution of Products

1. <u>Responsible Parties</u>

Site Survey Data – Prior to an EPSP review, the proponent is responsible for ensuring that all data (raw digital data and/or image format data) presented in the Safety Review Report are submitted to the Site Survey Data Bank. When an expedition is scheduled, the Co-chiefs and proponent, with the assistance of the IO, are responsible for ensuring that all data (raw data and/or image format data) required for the expedition are submitted to the Site Survey Data Bank (SSDB).

Expedition Safety Package – The overall responsibility for the assembly and distribution of the Expedition Safety Package rests with the IO. The Expedition Safety Package needs to be distributed prior to the onset of the expedition. Responsibilities for preparing and delivering the components of the package are as follows:

- **Safety Review Report –** Proponents and/or Co-chiefs, if assigned, will prepare this report. The proponents and/or Co-chiefs will forward it directly to the Science Support Office via either email or, if necessary because of size, via ftp (the Science Support Office will provide an ftp site for uploading the report). The report is due 4 weeks in advance of the EPSP meeting. The Science Support Office will distribute the report (on CD media) to EPSP members for review at least two weeks prior to the semi-annual meeting. The Science Support Office will also forward it to the IO for inclusion in the Expedition Safety Package when the expedition is scheduled.

- **Safety presentation –** Proponents and/or Co-chiefs, if assigned, will prepare and deliver the presentation at the time of the EPSP meeting to the chair or co-chair. The presentation will be attached to the final panel minutes. The Science Support Office will forward it to the IO for inclusion in the Expedition Safety Package when the expedition is scheduled.
- **EPSP recommendations –** The EPSP chair or co-chair will forward the panel's recommendation to the Science Support Office when the minutes are finalized. The Science Support Office will forward it to the IO for inclusion in the Expedition Safety Package when the expedition is scheduled.
- **IO's safety panel actions –** Forwarded directly by the IO's safety panel to the IO.
- **Scientific Prospectus –** Created by the IO. Forwarded to Science Support Office when completed. To be completed six months prior to the start of the expedition.
- **Site Survey Data Package –** The Science Support Office creates CD(s) or DVD(s) containing data specified in the Scientific Prospectus, and forwards them to the IO for inclusion in the Expedition Safety Package and for distribution to expedition participants. The Safety Package should be delivered to the IO three months prior to the start of the expedition, or as soon as possible after all required data have been identified and submitted to the SSDB.
- **Expedition specific approvals –** The IO is responsible for providing as necessary.
- **Shallow hazard or special survey reports and/or drilling protocol documentation –** The IO is responsible for forwarding these to the Science Support Office for distribution to EPSP members together with the Safety Review Report.
- **Expedition Safety Package –** The IO is responsible for packaging together the components described at the top of Part B. The Expedition Safety Package is forwarded by the IO to all concerned parties as described below.

2. Distribution

The following distribution is intended to ensure a common data/document package onboard the ship and onshore to facilitate any discussions and/or decisions that may be required once an expedition has begun.

EPSP Safety Review Report (provided by proponent/Co-chiefs 4 weeks prior to EPSP meeting and distributed by IODP-MI):

- EPSP members, liaisons and appropriate IO representatives attending the EPSP meeting

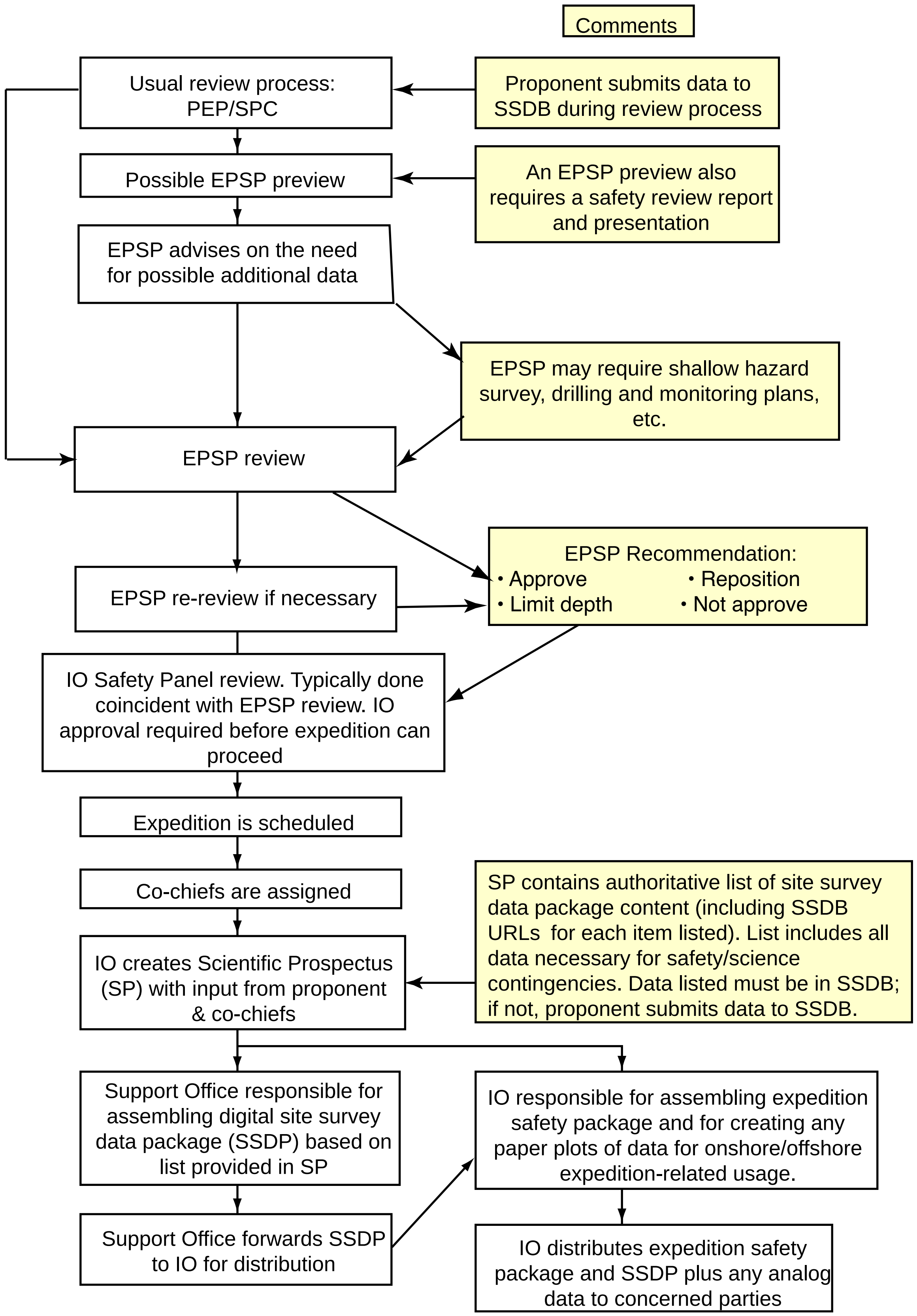
Expedition Safety Package (provided and distributed by the IO):

- Co-chief scientists
- Expedition staff scientist
- Chair of PEP

Site Survey Data Package (provided by IODP-MI and distributed by the IO)

- Same distribution as the Expedition Safety Package, plus
- All invited scientific expedition participants

Proposal / Expedition Activity Surrounding an EPSP Review



Acronyms:

EPSP	Environmental Protection & Safety Panel	SCP	Site Characterization Panel
IO	Implementing Organization	SP	Scientific Prospectus
PEP	Proposal Evaluation Panel	SSDB	Site Survey Data Bank
		SSDP	Site Survey Data Package

Last updated: 2013-6-25

Integrated Ocean Drilling Program

Sample, Data, and Obligations

Policy

March 2012

CTS Appendix

Integrated Ocean Drilling Program
Sample, Data, and Obligations Policy

Table of Contents

1. Policy Overview

This document outlines the policy for distributing Integrated Ocean Drilling Program (IODP), Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP) samples and data to research scientists (Science Party members and postmoratorium researchers), educators, museums, and outreach institutions and the obligations that recipients of these samples or data incur.[1]

The specific objectives of the IODP policy are to

- Ensure availability of samples and data to Science Party members so they can fulfill the objectives of the drilling project and their responsibilities to IODP;
- Encourage scientific analyses over a wide range of research disciplines by providing samples to the scientific community;
- Ensure that dissemination of the scientific findings of all IODP drilling projects/expeditions are planned so as to gain maximum scientific and public exposure;
- Preserve core material as an archive for future description and observations, nondestructive analyses, and sampling;
- Disseminate “Expedition Research Results” papers published in the *Proceedings of the Integrated Ocean Drilling Program* from drilling project-related research; and
- Support education and outreach related to the drilling program by providing core materials to educators, museums, and outreach institutions.

There are three categories of policy users: (1) Science Party members, (2) postmoratorium researchers, and (3) educators, museums, and outreach institutions. Section 2, “Policy Guidelines,” provides details for these users on how to submit sample requests and the specific reporting obligations that sample and data recipients incur.

2. Policy Guidelines

2.1. Guidelines for Science Party Members

2.1.a. Definition of Science Party

The Science Party includes all invited shipboard and shore-based expedition scientists plus other scientists who have been approved by the Sample Allocation Committee (SAC; see Appendix C for contact information) for working on expedition material during the moratorium period and publishing their research results. By program decision, two or more thematically linked expedition cruises can be designated as a single IODP project with a joint Science Party and a common moratorium period. In this case, expedition results are published in a single *Proceedings of the Integrated Ocean Drilling Program* volume.

2.1.b. Submitting Sample Requests

Science Party members may submit sample requests to IODP prior to the pre-expedition planning meeting; however, sample requests will also be considered during the expedition and within the moratorium period. The IODP Sample Request Form is available at www.iodp.org/access-data/ (see Appendix D.4. for guidelines to estimating sample volumes).

The SAC (see Appendix C for contact information) will review the sample requests, and approval will be based on compatibility with the Sampling Strategy (see Appendix D.1.). The sample requester may choose to appeal any decision by the SAC or the IODP Curator to the Curatorial Advisory Board (CAB; see Appendix C for contact information). If a conflict arises over the allocation of samples during the moratorium period, expedition participants will have priority over those who did not participate in the expedition.

[1] Obligations incurred during ODP will be carried forward into IODP.

2.1.c. Accessing Data

The Science Party may access expedition data online at a password-protected Web site during the moratorium period (see www.iodp.org/access-data/).

2.1.d. Obligation

All Science Party members are obligated to conduct research and publish the results of their work. To fulfill the obligation, papers must be published in a peer-reviewed scientific journal or book that publishes in English, or as a peer-reviewed data report in the *Proceedings of the Integrated Ocean Drilling Program.* To fulfill the obligation, manuscripts must be submitted within 20 months postmoratorium.

Following completion of sample investigations, or in the event that research is discontinued, nondestroyed sample material must be returned maximum 36 month post sample receipt at the investigator's expense to the IODP core repository where the core materials are stored (see Appendix D.5. for sample distribution information).

If Science Party members are unable to fulfill their obligation because appropriate samples or data were not retrieved during the expedition, or because data could not be obtained during post-expedition analyses, a letter of explanation must be submitted to the Platform Curator with a copy to IODP Management International IODP-MI; see Appendix C for contact information). The letter must provide specific reasons for not fulfilling obligations such as lack of conclusive analytical results (quality or quantity), personal reasons or external factors. Pending the situation an extension of the obligation period up to one year can be requested. The request will need to justify the reasons for the extension and document the plan for releasing data obtained from IODP samples within the extension period. The request will be considered by repository curator and, if required, the CAB and IODP-MI. Scientists who do not meet IODP their obligations may be restricted from obtaining future samples and data and from participating in future IODP expeditions.

2.1.d.i. Submitting Manuscripts during the Moratorium Period

Science Party members who wish to submit manuscripts or abstracts for publication before the moratorium period has expired must comply with the following guidelines:

- Receive prior written approval by a majority of the expedition scientists. This approval will be coordinated by the IODP Staff Scientist associated with the expedition. The Staff Scientist will circulate the manuscript among the expedition participants, tabulate the responses, and notify the author of the expedition participants' decision.
- Comply with all written collaborative agreements identified in the expedition sampling strategy (see Appendix D.1.).
- Use the authorship "Expedition ### Scientists" (where ### is the expedition number).
- Include the words "Integrated Ocean Drilling Program" or "IODP" in the abstract.
- Acknowledge IODP using the following wording: "This research used samples and/or data provided by the Integrated Ocean Drilling Program (IODP). Funding for this research was provided by _________."
- Provide the following key words, as appropriate, to the manuscript publisher: "Integrated Ocean Drilling Program," "name of drilling platform," Expedition ###," "expedition title," and/or "Site ###" (where ### is the expedition or site identifier).
- Notify the Editorial Review Board (ERB) of manuscript acceptance and submit complete citation information to IODP-MI (see Appendix C for contact information).

2.1.d.ii. Submitting Manuscripts that Subject Key Findings from the Expedition to the Conditions of a temporary Publication Embargo

When electing, during the moratorium period, to publish the key scientific findings from an expedition in a journal that requires a temporary embargo on publication of IODP reports, news releases, and/or publications, the expedition Staff Scientist on behalf of the Science Party must provide notification to the IODP MI (VP-SP with CC to Director of Communications and Publications Manager) of their intent before the end of the expedition. The expedition Staff Scientist is responsible for coordinating and completing the notification process including communication to the IO media staff and the entity that prepares the Preliminary Report for publication. IODP-MI approval to postpone publication of the Preliminary Report and expedition news release must be requested by the expedition Staff Scientist no later than two weeks post-expedition. The manuscript must be submitted to a journal with copy to IODP-MI within two months post-expedition. If this deadline is missed, the Preliminary Report and news release will automatically be published without further delay. All of the requirements in 2.1.d.i will apply. Re-submission to the original journal (or submission to a second journal) requires notification to IODP-MI. However, publication of the Preliminary Report and the news release will not be held back in case of submission to a second journal, if this takes place more than two month post-expedition. A status report to IODP-MI is due at six months post-expedition.

2.1.d.iii. Submitting Manuscripts after the Moratorium Period

Science Party members who submit manuscripts for publication after the moratorium period has expired must comply with the following guidelines:

- Comply with all written collaborative agreements identified in the expedition sampling strategy.
- Submit to the Editorial Review Board at the time of the second postcruise meeting the planned titles for all papers that fulfill their IODP obligations and any supplementary publications that they intend to publish.
- Submit manuscripts for publication by 20 months postmoratorium.
- Include the words “Integrated Ocean Drilling Program” or “IODP” in the abstract.
- Acknowledge IODP using the following wording: “This research used samples and/or data provided by the Integrated Ocean Drilling Program (IODP). Funding for this research was provided by _________.”
- Provide the following key words, as appropriate, to the manuscript publisher: “Integrated Ocean Drilling Program,” “name of drilling platform,” Expedition ###,” “expedition title,” and/or “Site ###” (where ### is the expedition or site identifier).
- Notify the Editorial Review Board (ERB) of manuscript acceptance and submit complete citation information to IODP-MI (see Appendix C for contact information).

2.2. Guidelines for Postmoratorium Researchers

2.2.a. Definition of Postmoratorium Researchers

Postmoratorium researchers are researchers who request samples after the moratorium period has ended.

2.2.b. Submitting Sample Requests

Scientists who wish to conduct research on DSDP, ODP, and/or IODP core materials may submit sample requests after the moratorium period has expired. The IODP Sample Request Form is available at www.iodp.org/access-data/ (see Appendix D.4. for guidelines to estimating sample volumes).

2.2.c. Accessing Data

Expedition data are available online (see www.iodp.org/access-data/).

2.2.d. Obligation

Scientists who use core for research (destructive sampling or nondestructive analyses) after the moratorium period are obligated to publish the results of their work. To fulfill the obligation, papers must be published in a peer-reviewed scientific journal or book that publishes in English, or as a peer-reviewed data report either in the open literature or in a relevant issue of Proceedings of the Integrated Ocean Drilling Program. If investigators are unable to fulfill this requirement within 36 months after receipt of samples, a letter of explanation must be submitted to the Repository Curator(s) with a copy to IODP Management International IODP-MI; see Appendix C for contact information). The letter must provide specific reasons for not fulfilling obligations such as lack of conclusive analytical results (quality or quantity), personal reasons or external factors. Pending the situation an extension of the obligation period up to one year can be requested. The request will need to justify the reasons for the extension and document the plan for releasing data obtained from IODP samples within the extension period. The request will be considered by the repository curator and, if required, the CAB and IODP-MI, Failure to comply with this procedure will automatically require that unused samples and samples requested for non-destructive analysis must be returned to the relevant IODP core repository and may result in future requests for IODP samples or expedition participation being denied. Following completion of sample investigations, or in the event that research is discontinued, non-destroyed sample material must be returned at the investigator's expense to the IODP core repository where the core materials are stored (see Appendix D.5. for sample distribution information).

2.2.d.i. Submitting Manuscripts based on Postmoratorium Sample Requests

Postmoratorium researchers must comply with the following guidelines:

- Submit a manuscript for publication within 36 month after receiving samples.
- Include the words "Integrated Ocean Drilling Program" or "IODP" in the abstract.
- Acknowledge IODP in all publications that result from the data collected from samples received using the following wording: "This research used samples and/or data provided by the Integrated Ocean Drilling Program (IODP). Funding for this research was provided by _________."
- Provide the following key words, as appropriate, to the manuscript publisher: "Integrated Ocean Drilling Program," "Ocean Drilling Program," or "Deep Sea Drilling Program", "name of drilling platform," Expedition or Leg ###," "expedition or leg title," and/or "Site ###" (where ### is the cruise or site identifier).
- Notify the Repository Curator and copy IODP-MI of manuscript acceptance and submit complete citation information to the Repository Curator (see Appendix C for contact information).

2.2.d.ii. Submitting Manuscripts based on Postmoratorium Data

Postmoratorium researchers who use IODP, ODP, or DSDP data after the moratorium period do not incur obligations to publish their results. However, if they do publish papers based on these data, they are required to comply with the following guidelines:

- Include the words "Integrated Ocean Drilling Program" or "IODP" in the abstract.
- Acknowledge IODP, ODP, and/or DSDP, as appropriate in all publications that result from the data using the following wording: "This research used samples and/or data provided by IODP**.** Funding for this research was provided by _________."
- Provide the following key words, as appropriate, to the manuscript publisher: "Integrated Ocean Drilling Program", "Ocean Drilling Program" or "Deep Sea Drilling Program", "name of drilling platform," "Expedition or Leg ###," "expedition title," and/or "Site ###" (where ### is the cruise or site identifier).
- Notify IODP-MI of manuscript acceptance and submit complete citation information (see Appendix C for contact information).

2.3. Guidelines for Educators, Museums, and Outreach Institutions

2.3.a. Submitting Requests

After the moratorium period has expired, core materials can be used for the following purposes:

- Viewing and describing for teaching and educational purposes,
- Sampling by educators (if core materials are abundant in the collection, and thus not in demand for research purposes), and
- Public display, such as in museums or at professional meetings.

To request materials, submit a sample request to IODP. The IODP Sample Request Form is available at www.iodp.org/access-data/ (see Appendix D.4. for guidelines to estimating sample volumes). Upon receipt, an IODP Curator will contact the requestor to discuss the request and identify the most suitable core materials. For museum loans, an IODP Curator will consult with the CAB for approval.

Requestors are responsible for paying for shipping materials to and from their institutions.

2.3.b. Obligations

Educators, museums, and outreach institutions who receive samples for educational or display purposes incur the following obligations to IODP:

- All recipients are required to submit a report at the conclusion of the loan period (or other time frame designated by the Repository Curator) that documents (a) how the core materials were used, (b) how many students/visitors were impacted, and (c) the activities that were organized related to the loan.
- All public displays of IODP material must properly credit IODP using the following wording: “This project used samples and/or data provided by the Integrated Ocean Drilling Program (IODP).”

Appendixes: Definitions and Procedures

Appendix A. Terms and Definitions

A.1. Archive and Working Halves
Cores are split into halves for shipboard analysis to uniquely identify split-core halves for measurements and sampling. The halves are referred to as the “working half” and “archive half.” The entire working half is available for sampling. The concept and definition of an archive half is designed to enhance scientific flexibility and to enable greater access to important material. In certain circumstances the archive is available for sampling.

A.2. Composite Splice
Paleoceanographic cruises typically recover sediment cores from multiple holes cored side by side at a given site using an advanced hydraulic piston corer (APC) and/or an extended core barrel (XCB). A composite stratigraphic depth section is constructed by establishing correlations between adjacent drill holes, using the variations in properties measured on cores by nondestructive sensors. A composite depth table describes the resulting (delta) depth offsets between holes. These offsets represent the difference between the meters below seafloor (mbsf; i.e., cored depth) and the meters composite depth (mcd) values that are derived from these correlations. Another data table describes the unique intervals in specific holes at a given site that have been used to construct the “ideal” section, also known as the “composite splice.” The purpose of a composite splice is to describe the most complete sedimentary section at a given site, without gaps in core recovery (i.e., missing sediment), which then can be used for developing high-resolution sampling strategies and analyzing time series. Scientists often prefer to sample using the composite splice as a guide, rather than to sample down a single hole at a given site, because of gaps in recovery between cores in a single hole.

A.3. Critical Intervals
Critical intervals are lithologic spans of such scientific interest that there is extremely high sampling demand for them. These intervals may vary from thin, discrete horizons to thick units extending over an entire core or more. Examples include, but are not limited to, décollements, sediment-basement contacts, igneous contacts, impact/tektite horizons, gas hydrates, marker ash horizons, scaly fabric, magnetic reversals, and particular biostratigraphic levels. The Sample Allocation Committee (SAC; see Appendix C for contact information) is responsible for anticipating the recovery of critical intervals and for developing a strategy for sampling and/or conserving them. For postmoratorium sampling, the Integrated Ocean Drilling Program (IODP) Curator at the appropriate repository will work with investigators to ensure that previously defined critical intervals are sampled only when necessary.

A.4. Educators, Museums, and Outreach Institutions
Grade school through university educators, museum educators, curators of museum exhibits and collections, and professional conducting outreach related to the program.

A.5. Drilling Project
A single expedition or multiple expeditions that are defined as one project during the expedition scheduling phase.

A.6. Implementing Organization
The organization that provides drilling and support operations for a drilling platform. Three Implementing Organizations (IOs), in Japan, the United States, and Europe, serve as science operators of the riser vessel, riserless vessel, and mission-specific platforms, respectively.

A.7. Moratorium Period

The moratorium period is one year long and begins either (1) after the conclusion of an expedition cruise if the majority of the sampling occurred during the cruise or (2) after the conclusion of the expedition onshore sampling party (onshore science party in case of the mission-specific platform).

During the moratorium period, the only researchers permitted to receive expedition core materials and data are members of the Science Party. After the moratorium period ends, samples are given or loaned to persons whose requests have been approved by an IODP Curator. Project data are also publicly available (www.iodp.org/access-data/).

A.8. Nondestructive Analyses
Requests to perform nondestructive analyses on cores (e.g., descriptions, imaging, X-rays) should be submitted to the IODP Curator at the appropriate repository after the completion of the IODP Sample Request Form (www.iodp.org/access-data/). Investigators who conduct nondestructive analyses incur the same obligations as scientists who request samples.

A.9. Permanent Archive
A "minimum permanent archive" is established for each IODP drill site. Archive core earmarked "permanent" is material that is initially preserved unsampled and is conserved in the core repositories for subsequent nondestructive examination and analysis. In "unique intervals," this minimum permanent archive consists of at least one half of each core, excluding whole-round samples that require more than the working half (e.g., for interstitial pore water analysis). If so desired, the SAC (see Appendix C for contact information) may choose to designate more, but not less, than this amount as the permanent archive. In "non-unique intervals," the permanent archive will consist of at least one half of one set of cores that span the entire drilled sequence, again, excluding whole-round samples. The permanent archive is intended for science needs that may arise five years or more after drilling is completed.

In practice, if holes are cored continuously, the minimum permanent archive may consist of one half of each core taken from the deepest hole drilled at a site. As such, the archive halves of cores from additional holes drilled to equal or shallower depths that contain replicate copies of stratigraphic intervals constituting the minimum permanent archive need not be designated as permanent archive, but can be, if so desired by the SAC. If not deemed permanent archive, these cores are "temporary archive." If a composite splice section is constructed and the sampling demand exceeds the working half, an alternative curatorial strategy may be required to ensure that all samples can be taken from the spliced section. In this case, the permanent archive can be defined from cores that are not part of the splice (e.g., from cores from different holes). Sampling of the permanent archive is feasible five years postcruise if the working and/or temporary archive halves of the core have been depleted.

A.10. Postmoratorium Researchers
Researchers who request samples after the moratorium period has ended.

A.11. *Proceedings of the Integrated Ocean Drilling Program*
An IODP serial publication published by IODP-MI that contains a detailed summary of expedition technical operations and scientific results and related peer-reviewed data reports and synthesis papers that cover post-expedition research.

A "data report" is a short report of useful data that mainly consists of data sets and does not contain interpretation of results.

An expedition "synthesis paper" summarizes in a review-type fashion the findings related to the key goals and themes of the drilling project and links to the broader and global theme(s) addressed. While this is primarily based on the scientific papers and data reports resulting from the expedition, it is not a synopsis of all papers and data reports in all fields of observations. The style should be close to that of a thematic review paper for the open literature, though obviously tied closely to the actual expedition(s). An expedition could have more than one synthesis paper, if the diversity of science and findings would be best served by that. Likewise, synthesis papers from drilling projects with multiple expeditions, joint scientific party membership, and a common moratorium period would not normally be broken down according to specific expeditions, but would be presented as a single manuscript.

Each *Proceedings* volume will be completed at 36 months post moratorium.

A.12. Science Party
The Science Party includes all invited shipboard and shore-based expedition participants plus scientists who have been approved by the SAC (see Appendix C for contact information) for working on expedition material during the moratorium period and publishing their results.

A.13. Temporary Archive
Cores taken from non-unique intervals that are not part of the “minimum permanent archive” will be considered “temporary archives” unless stipulated otherwise by the SAC in the Sample Strategy. If required for special shore-based analysis, some cores may be left unsplit on the platform and shipped to the designated IODP core repository or laboratory as whole-core sections. If split (the common scenario), the temporary archive may be sampled just as the working halves are when (a) either the working halves have been depleted by sampling or (b) when pristine, undisturbed material is needed for special sampling needs, such as taking U-channels or slab samples.

A.14. Unique and Non-unique Intervals
A cored interval is designated “unique” if it has been recovered only once at a drill site. The most common occurrence of a unique interval is one that results when only one hole is drilled at a site. If the cored interval is recovered from two or more holes, then the interval is considered “non-unique.” A critical exception to this definition occurs when drilling into igneous basement rocks, metamorphic rocks, or metalliferous deposits. Every hole drilled into these lithologies is considered unique because of their inherent lateral heterogeneity. Lithostratigraphic analysis of advanced piston cores from multiple holes drilled at one site may reveal that short sedimentary intervals (generally less than 2 m) are commonly missing between successive cores from any one drill hole, even where nominal recovery approaches 100%. These missing intervals can be ignored when considering whether or not an interval is unique.

A.15. Whole Round
Whole rounds are collected for special analysis (e.g. interstitial water analysis) and pre-defined purposes (e.g. "community" whole round). Intervals of whole rounds depend on the pre-defined purposes of sampling and type of special analyses applied. The Sample Allocation Committee (SAC; see Appendix C for contact information) is responsible for developing a strategy for whole round sampling in the early stage of expedition planning and for including a clear description of the whole round sampling strategy in the IODP Scientific Prospectus.

A.15.1. “Community” Whole Round
“Community” whole rounds are collected in order to preserve an “archive” of unsplit material for future tests for a variety of purposes. Science party members with common research interests decide some intervals of cores to be treated as "Community" whole rounds under agreement with SAC. “Community” Whole Rounds are treated as “special” archives and are made available to science party members after approval of their sample requests by the Sample Allocation Committee (SAC). In the Post-moratorium period, these whole rounds are available to any requester after approval of his/her sample request by the Curatorial Advisory Board (CAB). If necessary, the CAB can seek advice from other experts on specific sample requests.

Appendix B. Roles and Responsibilities

B.1. IODP Curators

There are three Integrated Ocean Drilling Program (IODP) Curators who are responsible for (1) curation and sampling of core during an IODP drilling project and
(2) oversight and use of IODP, Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP) core collections that are stored in the IODP repositories (see Appendix C for contact information and repository locations).

B.1.a. Platform Curator

Each Curator serves as the Platform Curator to oversee all curation tasks from the preplanning stage through the arrival of the core after an expedition at the repository where the core material will be stored. The Platform Curator has responsibility to oversee use of the core materials through the end of the moratorium period.

B.1.b. Repository Curator

Each Curator serves as the Repository Curator with responsibility for the preservation of the core once it arrives at the repository where the core material will be stored. The Repository Curator has responsibility to oversee the use of core material after the moratorium period ends.

All Curators maintain records of all distributed samples, both from the platform and from the repositories. Sample records include the names of the recipients, the nature of the proposed research, the volume of samples taken, and the status of the request. This information is available to investigators upon request through the Repository Curator.

B.2. Curatorial Advisory Board

The Curatorial Advisory Board (CAB) is a standing body that consists of two IODP senior managers and three members of the scientific community (selected by the IODP Scientific Technology Panel) who serve overlapping four-year terms. Every effort will be made to ensure that CAB membership represents a variety of scientific disciplines.

The CAB has two main roles:

- Act as an appeals board vested with the authority to make final decisions regarding sample distribution if and when conflicts or differences of opinion arise among any combination of the sample requester, IODP Curator at the repository of interest, and the SAC.
- Review and approve requests to sample the permanent archive and requests for loans of core material for outreach and education.

A person appealing to the CAB may contact any member of the Board directly (see Appendix C for contact information).

B.3. Editorial Review Board

The Editorial Review Board (ERB) is established for every drilling project and comprised of the Co-Chief Scientist(s) for the drilling project and the IODP Staff Scientist assigned to the expedition. These individuals may select external scientists/specialists to serve with them. The need for external ERB members will be determined based on the Co-Chief Scientists' and Staff Scientist's workloads and expertise. An ERB remains active for 36 months postmoratorium (See Appendix C for contact information.)

The ERB has four main roles:

- Coordinate the writing of the drilling project results;
- Monitor all post-drilling project research and associated publication of results;
- Make decisions on issues relating to the publication of research related to the drilling project to fulfill IODP obligations; and
- Monitor obligation fulfillment by the Science Party.

The members of the ERB hold the following specific responsibilities:

	All ERB Members	**Staff Scientist**	**Co-Chief Scientists**
Coordinate the writing of the Expedition Reports section of the *Proceedings of the Integrated Ocean Drilling Program,* attend the first postcruise meeting, and review the Expedition Reports section galleys.	X		
Ensure that all manuscripts published in the "Expedition Research Results" section of the *Proceedings of the Integrated Ocean Drilling Program* are complete and of reviewable quality before they are sent out for review. Manuscripts that do not meet IODP's standards will be returned to the author and will not go through the review process unless they are revised to meet IODP standards before the submission deadline.		X	
Collect all proposed publication titles related to the expedition (papers published in the *Proceedings of the Integrated Ocean Drilling Program* volume and journals or books).	X		
Approve all papers that fulfill IODP obligations.	X		
Approve the final table of contents for the *Proceedings of the Integrated Ocean Drilling Program* volume.	X		
Check each journal or book manuscript submission, within three months of receipt, for proper citation of site summaries and site chapters and for proper use of data and conclusions from other members of the Science Party.	X		
Implement the peer-review process for data reports and synthesis papers submitted to the *Proceedings of the Integrated Ocean Drilling Program* as soon as the Staff Scientist approves each one as being of "reviewable quality."	X		
Write or coordinate a drilling project synthesis paper to be published in the *Proceedings of the Integrated Ocean Drilling Program* or a journal.			X
Submit synthesis paper by 26 months postmoratorium.			X
Coordinate the peer-review process for synthesis paper if submitted to the *Proceedings of the Integrated Ocean Drilling Program.*		X	
Document the status of the Science Party members' actions to fulfill their obligations requirements.	X		
Regularly provide updates to the Expedition-Related Bibliography that is part of each *Proceedings* volume published by IODP-MI (http://www.iodp.org).	X		

B.4. IODP Management International (IODP-MI)

IODP Management International (IODP-MI) has offices in Washington, D.C. and Sapporo, Japan and is responsible for program-wide science planning, and oversight of engineering development, publications, education and outreach, site survey data management, and core sample repositories for the Integrated Ocean Drilling Program.

The IODP-MI Publications Manager is responsible for monitoring obligation fulfillment by the Science Party.

B.5. Sample Allocation Committee

The Sample Allocation Committee (SAC), which is established for each drilling project, consists of the Co-Chief Scientist(s), IODP Staff Scientist, and Platform Curator. During the drilling project, the Platform Curator designates authority and responsibilities to the drilling project Curatorial

Representative (see Appendix C for contact information).

The SAC establishes a project-specific sampling strategy and makes decisions on project-specific sample requests received before the drilling project, during the drilling project, and during the moratorium period. In the event of an evenly divided vote, the Platform Curator at the repository associated with the expedition will make a decision. The sample requester may choose to appeal the SAC's or Platform Curator's decision to the CAB.

Appendix C. Contact Information

Title	Name	Contact Information
IODP Curator for riserless drilling platform and East Coast Repository (ECR; Columbia University), **Gulf Coast Repository** (GCR; Texas A&M University), and **West Coast Repository** (WCR; Scripps Institution of Oceanography)	Dr. John Firth	E-mail: firth@iodp.tamu.edu Phone: 001 979 845 0507 Fax: 001 979 845 1303 Mailing address: Integrated Ocean Drilling Program Texas A&M University 1000 Discovery Drive College Station TX 77845, USA
IODP Curator for mission-specific drilling platforms and Bremen Core Repository (BCR; Bremen University)	Dr. Ursula Röhl	E-mail: uroehl@marum.de Phone: 49 421 218 65560 Fax: 49 421 218 98 65560 Mailing address: ESO Curation Manager Bremen Core Repository (BCR) MARUM building Bremen University Leobener Strasse 28334 Bremen, Germany
IODP Curator for riser drilling platform and Kochi Core Center (KCC; Kochi University)	Dr. Lallan P. Gupta	E-mail: gupta@jamstec.go.jp Phone: 81 88 878 2241 Fax: 81 88 878 2192 Mailing address: Kochi Institute for Core Sample Research, Japan Agency for Marine-Earth Science and Technology (JAMSTEC), 200 Monobe-otsu Nankoku Kochi 783-8502 Japan
Sample Allocation Committee (SAC)	For each drilling project, this committee comprises the Co-Chief Scientist(s), IODP Staff Scientist, and IODP Curator.	Contact information for the Co-Chief Scientist(s) and Staff Scientist of each project can be found in the *Scientific Prospectus* or the *Preliminary Report* (http://www.iodp.org). See also IODP Curator contact information.
Curatorial Advisory Board (CAB)	Jamus Collier, IT and Publications Manager IODP- Management International, Inc.	E-mail: jcollier@iodp.org Phone: 81 3 6701 3182 Fax: 81 3 6701 3189 Mailing address: Tokyo University of Marine Science and Technology Office of Liaison and Cooperative Research, 3rd Floor 2-1-6, Etchujima, Koto-ku, 135-8533, Tokyo, Japan
	TBD, IODP- Management International, Inc.	E-mail: Phone: Fax: 81 3 6701 3189 Mailing address: Tokyo University of Marine Science and Technology Office of Liaison and Cooperative Research, 3rd Floor 2-1-6, Etchujima, Koto-ku, 135-8533, Tokyo, Japan

	Dr. Masanobu Yamamoto	E-mail: myama@ees.hokudai.ac.jp Phone: 81 11 706 2379 Fax: 81 11 706 4867 Mailing address: Faculty of Environmental Earth Science Hokkaido University Kita-10, Nishi-5, Kita-ku Sapporo 060-810, Japan
	Dr. Clive Neal (Chair)	E-mail: neal.1@nd.edu Phone: 001 574 631 8328 Fax: 001 574 631 9236 Mailing address: Department of Civil Engineering & Geological Sciences 156 Fitzpatrick Hall University of Notre Dame Notre Dame IN 46556, USA
	Dr. Heinrich Villinger	E-mail: vill@uni-bremen.de Phone: 49 421 218 4509 Fax: 49 421 218 6173 Mailing address: FB Geowissenschaften Universität Bremen Postfach 330 440 D-28334 Bremen, Germany
	Dr. Noritoshi Suzuki	E mail: suzuki.noritoshi@nifty.com Phone: 81-22-217-6623 Fax: 81-22-217-6634 Mailing address: Institute of Geology and Paleontology, Graduate School of Tohoku University, Sendai, Miyagi, 980-8578 Japan.
	Dr. David C. Smith	E-mail: dcsmith@gso.uri.edu Phone: 1 401 874 6172 Fax: 1 401-874-6889 Mailing address: Graduate School of Oceanography, University of Rhode Island, Narragansett, RI 02882, USA
Editorial Review Board (ERB)	For each drilling project, this board comprises the Co-Chief Scientist(s), IODP Staff Scientist, and one external scientist (optional).	Contact information for the Co-Chief Scientist(s) and Staff Scientist of each project can be found in the *Scientific Prospectus* or the *Preliminary Report* (http://www.iodp.org).
IODP Management International (IODP)	TBN	Phone: 81 3 6701 3185 Fax: 81 3 6701 3189 Mailing address: Tokyo University of Marine Science and Technology Office of Liaison and Cooperative Research, 3rd Floor 2-1-6, Etchujima, Koto-ku, 135-8533, Tokyo, Japan

Appendix D. Curatorial Procedures

D.1. Sampling Strategy

To ensure the best possible use of the core and distribution of samples, a sampling strategy is developed by the Sample Allocation Committee (SAC) for each drilling project during pre-expedition planning. The strategy will integrate and coordinate the programs for drilling, sampling, and downhole measurement to best meet the drilling project's objectives and the scientific needs of the Science Party. The strategy may evolve during the expedition and the moratorium period.

D.2. Expedition-Specific Sampling Strategy Guidelines

Once a proposal has been scheduled for drilling and the Co-Chief Scientists have been selected, the SAC will write a formal expedition-specific sampling strategy that meets the specific objectives of the expedition and define the minimum permanent archive and any supplements that the SAC deems necessary. The strategy will be published in the Integrated Ocean Drilling Program (IODP) *Scientific Prospectus* series. The Sampling Strategy becomes the basis of the sampling plan used during the drilling project and the moratorium period.

A successful sampling strategy will

- Define the amount of core material available to the Science Party for sampling by deciding if and when more than a minimum permanent archive is needed;
- Anticipate and possibly define limits on the volume and frequency of shipboard sampling for routine analyses, pilot studies, and low-resolution studies;
- Estimate the sampling volume and frequency that is needed to meet the objectives of the expedition, as per scientific subdiscipline and request type;
- Anticipate the recovery of critical intervals and develop a protocol for sampling and/or preserving them;
- Propose where and when sampling will occur;
- Determine special sampling methods and needs (e.g., Pressure Core Sampler, microbiology, whole rounds);
- Consider any special core storage or shipping needs (e.g., plastic wrap, freezing sections); and
- Identify disciplines/personnel needed for shore-based sampling.

The Sampling Strategy should be formatted using the following categories.

- Needs
- Critical intervals
- Sampling timetable
- Permanent archive
- Temporary archive
- General sampling procedures

For examples, review expedition-specific sampling strategies from previous expeditions in the *Scientific Prospectus* series (www.iodp.org/scientificpublications/).

D.3. Sample Request

D.3.1. Procedures for Requesting Samples

Requests for samples should be submitted using the IODP Sample Request Form (www.iodp.org/access-data/). To assist the sample requester a Curator may provide advice and guidance to the requester when considering sample volumes and frequencies (see Appendix D.4.) as well as relevant information about previous sample requests and resultant studies on specific core intervals.

D.3.1.a. Moratorium Period Sampling
During the moratorium period, only members of the drilling project Science Party receive samples.

D.3.1.b. Postmoratorium Period Sampling
After the moratorium period has expired, samples may be provided to any researcher, educator, museum, or outreach institution with the resources to complete a scientific investigation or prepare materials for educational or curatorial purposes.

D.3.2. Sample Request Approval
D.3.2.a. Moratorium Period Sampling
The SAC will supervise moratorium period sampling. After reviewing the sample requests, approval will be based on compatibility with the Sampling Strategy. Sample requests will be approved if a majority of the SAC endorses the requests. In cases where a sample request is considered incompatible, the SAC may (1) recommend modifications to the request, (2) modify the Sampling Strategy, or (3) reject the request if the other options are inappropriate. In the event of an evenly divided vote, the Platform Curator will make a decision. The sample requester may choose to appeal any decision to the CAB. If a conflict arises over the allocation of samples during the moratorium period, expedition participants have priority over other scientists in the Science Party.

D.3.2.b. Postmoratorium Period Sampling
The Repository Curator and the CAB supervise postmoratorium sampling. The Repository Curator will evaluate postmoratorium sample requests for completeness and adherence to the provisions in this policy.

When considering a sample request, the Repository Curator will ascertain whether the requested material is available in the working half or the temporary archive half of the core (see Appendix A.1. for definitions). If the material is unavailable, the Repository Curator will consult with the requester to determine if the range of the requested interval(s) or the sample spacing within the interval(s) can be modified. If the request cannot be modified because of scientific requirements, a request to sample the permanent archive will be considered.

Approval of sample requests will be based on the availability of material and the length of time it will take the investigator to complete the proposed project. Typical studies will take two to three years, but a study of longer duration will be considered under certain circumstances. If a sample requester disagrees with the Repository Curator’s final decision, the sample requester may choose to appeal any decision to the CAB.

All requests to sample permanent archive material will be reviewed by the CAB after preliminary review by the Curator. The CAB will evaluate the request based on its scientific merit and on the extent to which the working half is depleted. If necessary, the CAB may also consult with members of the original SAC who established the permanent archive being considered for sampling. The CAB will strive to maintain a representative continuous section of core material for archival purposes whenever possible.

D.4. Typical Sample Volumes

The following volumes are guidelines, not limits:

Sample type	Recommended volume
Thin section billets	10 cm^3 up to 50 cm^3 for large-grained plutonic rocks
Alkenone (U^{k}_{37})	5 cm^3
X-ray diffraction	5 cm^3
X-ray fluorescence	20 cm^3 (sediments), 20–50 cm^3 (igneous/sulfides—varies depending on grain size and homogeneity of rock)
Carbonate	2 cm^3
Paleomagnetism	7-cm^3 cubes, 12-cm^3 minicores, 600-cm^3 U-channels
Moisture and density	10–20 cm^3
Grain size	10–20 cm^3, depending upon coarseness
Planktonic foraminifers	10 cm^3
Benthic foraminifers	10–20 cm^3
Nannofossils	2 cm^3
Diatoms	5–10 cm^3
Radiolarians	10 cm^3
Palynology	10–15 cm^3
Organic samples	20 cm^3
Interstitial porewaters	whole rounds 5–20 cm long, based on water content
Inorganic geochemistry	10 cm^3
Organic geochemistry	10 cm^3
Sedimentology	10–20 cm^3
Slabs (for laminae studies)	25–50 cm^3, depending on slab length
Slabs (large grained plutonics)	50–100 cm^3, often shared by scientists for multiple analyses
Stable isotopes (C, O)	10–20 cm^3

D.5. Sample Distribution

Sample requests are processed differently depending upon whether they are shipboard, moratorium, or postmoratorium. Shipboard and moratorium sampling steps are outlined in Appendix D.3. and Appendix D.4. Postmoratorium Sample Requests are processed in order of approval. This approximates the order of submission and receipt of requests, however the review and approval process may cause certain requests to be delayed for various reasons, e.g., lack of available material causing a discussion and revision of which cores to be sampled. In addition, after approval, other factors may cause requests to be processed out of order, e.g., a request for thousands of samples may take several weeks of labor to complete, whereas requests for small numbers of samples may take only hours. When different sized requests are pending at the same time at a repository, small requests may be completed before or during the work on a large request, so that they are not all held up by the large request. Requests that are tied to visits to the repository by the requester are dependant upon the schedule of that visit. Requests for material from more than one repository are processed separately at each repository following the procedures and exceptions above. Most requests of small to moderate size and complexity may be expected to be processed within a month.

Appendix to the IODP Sample, Data, and Obligations policy.

IODP Community Thin Sections
Procedures for Borrowing, Tracking, and Returning Them.

Thin sections made during DSDP, ODP, and now IODP drilling cruises (on the *DV JOIDES Resolution*, on the *DV Chikyu*, or during an Onshore Science Party of MSP Expeditions) are the property of IODP, for long term use by the science community, because they are the reference thin sections for lithologic/petrologic data gathered by expedition scientists, stored in IODP science databases, and published in the Expedition Reports (*IODP Proceedings, Initial Reports*). They are termed hereafter as 'community thin sections (CTSs)', to establish their crucial difference from personal thin sections made by scientists using personally requested samples. The responsibility of safekeeping, safe transport, inventory control, long term preservation, and lending of the CTSs rest with the IODP Curators and Repository Staff in Bremen (BCR), Texas (GCR) and Kochi (KCC).

Since DSDP, CTSs made during cruises have incurred many losses, resulting in very large gaps in the overall collection[1]. To minimize future loss of this highly valuable reference material and so that the wider scientific community may have greater access to it, the IODP Curators and Repository Superintendents have agreed upon the following procedures.

Primary Conditions for Use of CTSs

CTSs, being the property of IODP, may only be loaned to requesters, with a signed loan agreement containing a predetermined loan duration of no longer than 1 year, after which they must be returned to the appropriate IODP repository. If a requester possesses CTSs from previous requests beyond their approved loan duration, he/she cannot receive additional CTSs or other IODP samples until they return the overdue CTSs to the appropriate repository. Exceptions may be considered for cases with valid scientific justification from the requester. Once CTSs have been returned to their repository, they may be requested for use by anyone, including the previous requester, for a new approved loan duration.

Moratorium Follow-up Requests for CTSs

Requests during an expedition for further Moratorium-period onshore analyses of the expedition's CTSs must contain a specified list of the CTSs to be sent to each scientist, with a predetermined loan duration for each scientist to complete their analyses. This list and loan duration, constituting a loan agreement, must be submitted to the Expedition SAC for approval. If the CTSs are made aboard the *DV JOIDES Resolution* or the *DV Chikyu*, the CTSs along with the distribution list/loan agreement will be shipped to the IODP repository in charge of the expedition's cores and CTSs.In rare cases where the *DV Chikyu* offloads small shipments of materials each month during an extended multi-month drilling project, the Kochi IODP Curator might consider making an exception to the shipping procedure. CTSs made at the University of Bremen, as part of the MSP Onshore Science Party, will already have such CTSs housed in the BCR for future distribution.

- Under no circumstances may expedition scientists be given CTSs to hand-carry to their laboratory, to avoid the risk of loss or damage during travel, including delays or problems with customs and import controls, lost or mishandled baggage by air carriers, or having them stolen along with other luggage.
- Shipments made by the IO's using their experienced shipping staff ensure the CTSs will arrive safely at the repository. If a core shipment will only take 1-2 weeks to arrive at its designated repository, then the CTS collections will be sent with the core shipment. If the core shipment will take several weeks or more to arrive at the designated repository, then the thin sections will be sent separately by air freight, using the IO's experienced shipping staff to ensure they arrive quickly and safely at the repository.
- A first post-expedition action item for the receiving repository will be to distribute the CTSs using typical 1-2 day air freight to the designated scientists, along with copies of the distribution list/loan agreement, containing the approved loan duration for each scientist. The repository staff will also contact each scientist before shipping to ensure they or their representative will be at their work address to receive the CTSs.
- Under no circumstance may scientists forward CTSs directly to another scientist. Instead, they must return CTSs to the repository at the end of their approved loan duration, for inventory and for checking on the state of the CTSs (e.g., broken, complete, etc.). The repository will be responsible for quickly forwarding CTSs to other scientists.
- As with regular sample requests for core samples, formal requests for borrowing expedition CTSs may be either added to a pre-existing sample request, or, if more appropriate, a new request should be submitted if it involves several people wanting to continue moratorium analyses on the same set of CTSs in a coordinated sharing schedule.

Post-Moratorium Requests for CTSs

- Requests for CTSs submitted after the moratorium will be reviewed for approval by the appropriate IODP Curator or repository staff.
- Depending on the number of CTSs requested (> 15 nos.) by one person at any time,

the number of approved CTSs first sent to the requester may only be a portion (e.g., from 25-50%) of the total approved. Return of the first portion of approved CTSs to the repository will result in the shipment of the subsequent portion or portions of the CTSs to the requester. This procedure for requests of large numbers of CTSs will help ensure that they will get returned at the end of the research project. Requests for small numbers of CTSs (e.g., <10-15) may be filled with one shipment of all CTSs. The disposition of CTSs for each request will be up to the responsible Curator and repository staff to decide on a case by case basis.

John Firth, IODP Curator: riserless drilling platform and Gulf Coast Repository (GCR)

Ursula Röhl, IODP Curator: mission-specific drilling platforms and Bremen Core Repository (BCR)

Lallan Gupta, IODP Curator: riser drilling platform and Kochi Core Center (KCC)

1 *The reasons for this are manifold: the primary misconception of many scientists who receive these is that they are considered to be their own personal samples, similar to their other personal core samples. From this standpoint, many scientists have forgotten agreements and promises to return them after a year or longer. Some may have shared the thin sections with graduate students and other colleagues, and the collections got dispersed without traceable records. Repeated attempts by curatorial staff, in DSDP, ODP, and now IODP to track down and collect outstanding community thin sections have resulted in very little success. Scientists either do not know where the thin sections are, claim to be unable to send them back, or even do not reply. A very few scientists have decided to not return community thin sections that they acknowledge they have, because they say they may have future need of them for research or teaching.*

Proposal Confidentiality Policy

Release of Integrated Ocean Drilling Program (IODP) Proposal Information

The Integrated Ocean Drilling Program Management International (IODP-MI) is responsible for all matters related to IODP proposal handling, including confidentiality and release to the public.

Proposals are confidential documents throughout the nurturing, evaluation, ranking, and scheduling processes in the IODP Science Advisory Structure (SAS), with their distribution limited to the relevant SAS committees, panels, and detailed planning groups (DPGs); implementing organizations (IOs); IODP funding agencies; IODP-MI project scoping or management groups; and external reviewers designated by the IODP-MI. However, such proposals may be released to the public or any designated subset thereof with the consent of the lead proponent during the nurturing, evaluation, ranking, and scheduling processes.

Proposals are confidential documents throughout the nurturing, evaluation, ranking, and scheduling processes in the IODP Science Advisory Structure (SAS), with their distribution limited to the relevant SAS committees, panels, and detailed planning groups (DPGs); implementing organizations (IOs); IODP funding agencies; IODP-MI project scoping or management groups; and external reviewers designated by the IODP-MI. However, such proposals may be released to the public or any designated subset thereof with the consent of the lead proponent during the nurturing, evaluation, ranking, and scheduling processes.

A proposal that does not result in drilling by the IODP will be retained by IODP-MI for the lifetime of the IODP but will be released to the public only with the consent of the proponents or to the extent required by law.

Proposal Confidentiality Policy

Draft – May 2013

Release of International Ocean Discovery Program (IODP) Proposal Information

The IODP Support Office is responsible for all matters related to IODP proposal handling, including confidentiality and release to the public.

Proposals are confidential documents throughout the nurturing, evaluation, ranking, and scheduling processes in the *JOIDES Resolution* Facility Board (JRFB) and advisory panels. Their distribution is limited to the JRFB or other appropriate Facility Board, relevant advisory committees, panels, and detailed planning groups (DPGs); implementing organizations (IOs); IODP funding agencies; project scoping or management groups; and external reviewers designated by the IODP Support Office. However, proposals may be released to the public or any designated subset thereof with the consent of the lead proponent during the nurturing, evaluation, ranking, and scheduling processes.

A proposal that does not result in drilling by the *JOIDES Resolution* or by other Platform Providers utilizing the *JOIDES Resolution* Facility advisory panels will be retained by the IODP Support Office for the lifetime of the IODP, and will be released to the public only with the consent of the proponents or to the extent required by law.

September 16, 2011

IODP Staffing Procedures

Process for Call for Applications:

1. Upon approval of the operations plan by the Science Implementation and Policy Committee (SIPCOM), a Call for Applications can be generated.

2. The Implementing Organizations (IOs) work with IODP-MI and the Program Member Offices (PMOs) to collaboratively determine the deadline(s) for nominations for each expedition or set of expeditions, any special staffing requirements, and other relevant requirements/information to be included in the Call for Applications.

3. IOs generate an initial draft of the Call for Applications for expeditions related to their respective platforms, incorporating information generated in Item#2 (above). IODP-MI and the PMOs will provide comments to this initial draft within one week.

4. IOs generate the appropriate expedition science information for each approved expedition and places the material on the IODP web page prior to release of the Call.

5. IODP-MI will distribute the Call for Applications to the PMOs, place the call on the IODP web site, and advertise in appropriate venues.

The staffing procedures for Co-Chief and Science Party members:

A. Co-Chief Scientist Selection

1. SIPCOM, PMT and PMOs provide Co-Chief Scientist recommendation to IODP-MI when drilling schedule is determined. IODP-MI provides candidate list and their CVs to the IOs. The PMOs will assist in the acquisition of CVs.

2. The IOs review the recommendations for Co-Chief Scientists and determine the most appropriate individuals based on expedition science requirements, individual qualifications, the member country balance, and previous IODP performance.

3. The IOs circulate the initial co-chief staffing strategy to IODP-MI, the SIPCOM chair, the PMOs, and Project Management Team (PMT) Chairs (if any) for comments. This step ensures continuity and provides the opportunity for issues to be identified prior to invitations being issued. The IO has the responsibility for the final staffing decision given that they have the responsibility for delivery of the expedition.

4. Official letters are sent from the IO directly to the individual inviting them as Co-Chief Scientist for a specific expedition. Copies of the letter are sent to the PMOs, IODP-MI, and PMT chair(s).

B. Science Party Staffing

1. PMOs receive applications directly from their science communities and evaluate them through their internal methods.

2. PMOs provide their nominations (including nominees' applications and relevant supporting material) to the IOs. Member countries should be aware of the need for flexibility, and should provide an adequate number of nominations representing a variety of scientific expertise. Although each member country/consortia is entitled to their full representation according to the MOUs, there will be no "banking' of unused berths. Berth space can be "traded" between member countries/consortia subject to approval by IODP-MI.

3. The IOs share nominations and supporting materials with the Co-Chief Scientists and consider their recommendations when making final staffing decisions.

4. Official invitations are sent by the IO directly to each scientist. Copies are sent to Co-Chief Scientists and PMOs.

   Staffing may a two-step process. Initial invitations are sent to key science participants. Key individuals are those considered to provide critical expertise to delivery of the expedition science. Remaining invitations are sent after responses are received from the initial invitations. Sending invitations in two different groupings provides the opportunity to tune the science party based on the results of the initial invitations. This allows for greater flexibility and for maximizing the expedition science.

5. In the event that an invited science party member withdraws, the IO will ask the relevant PMO to either approve another nominated scientist or nominate a qualified replacement.

6. While understanding that the IOs hold the ultimate authority for staffing decisions, the IOs will consult and collaborate with the PMOs on significant deviations from the PMO's nominations.

7. After the science party is finalized, the IO will notify all nominated scientists who were not selected, in a timely manner.

8. IODP Management International is responsible for monitoring overall expedition staffing to ensure member balance as prescribed in the Memoranda of Understanding between IODP Member countries is maintained over a ~18-24 month period.

The Integrated Ocean Drilling Program (IODP) proposal guide primer

Proposal submission and review process

At first, the entire IODP, and the way from scientific idea to actual drilling operations (‘Expedition’) can be difficult to understand. But there are some simple steps to follow to help guide you through the proposal process. These, along with a list of some frequently asked questions, are presented in this primer. IODP technical terms and acronyms are plenty and ever evolving, but these are not really important to the initial stages of submitting a science proposal to the IODP, and are largely avoided here.

Science in IODP is driven by community-generated proposals targeting the research themes outlined in the overall science plan for the program (http://www.iodp.org/science-plan-for-2013-2023/). The program provides multiple platforms (http://www.iodp.org/ships-platforms/), and ocean drilling efforts constitute **“Big Science”** for the Earth and Ocean sciences community. Each two-month-long expedition with the riserless platform JOIDES Resolution costs USD 8-14 million, operations with the riser vessel CHIKYU and major missions even much more. A level of investment in science that goes beyond an individual researcher or research group, and can require knowledge about scientific drilling that not all proponents may initially possess. Thus, the proposal structure, review and planning processes are comprehensive and may differ from those applied to mainstream grant applications. The biggest difference likely is that the IODP process is somewhat iterative and quite open to communication between the science proponents, the advisory panels, and the drilling platform operators. As a result, the proponents (roughly analogous to the group of Principal Investigators (PIs)) are in communication with various groups, committees and implementing organizations within IODP, each of which may require different information from the proponents. It is a system designed to transform exciting science into successful expeditions. Another difference is that for the most part, the detailed technical planning, implementation and financial responsibilities involved are managed within the program. Therefore, for regular proposals not offering co-funding (drilling time; special instrumentation), there is no budget section in an IODP proposal.

Drilling proposals for use of any of IODP’s drilling platforms are reviewed by the **JOIDES Resolution Facility Advisory Panels (AP)** (http://www.iodp.org/sas/). This is the first program entity you will meet after you have submitted your proposal to the program. The AP comprises members of the international scientific community who volunteer to serve on review teams and to provide guidance and critical advice about the science and feasibility of proposals that are submitted. In the late stage of proposal review (mature proposals), the AP will also draw on program-external, anonymous peer review. The AP can be a rich advisory resource for proponents with regards to improving science objectives and feasibility of the proposed project.

How do I start?

You start by writing a proposal outlining science that addresses one or more of the four major themes of the IODP Science Plan (summarized as Climate, Deep Life, Planetary Dynamics, and Geohazards) and requires scientific ocean drilling. The

Science Plan (http://www.iodp.org/science-plan-for-2013-2023/) is intended to provide a context for generating proposals, but is not intended to be prescriptive.

Proposals typically come into the program as **Preliminary proposals**, which you can submit to the program through the Science Support Office (NEW URL?) at any time, and are reviewed by review committees twice per year. These Preliminary proposals are relatively short (up to 2700 words), more like a generic proposal with a compelling hypothesis or idea supported by a conceptual drilling strategy. They range from hypothesis-driven to question-driven, from very discipline-specific to very interdisciplinary, from simple to complex. They should address questions that are of interest to the global scientific community and be linked to relevant parts of the science plan.

What is next?

The review panels within the AP will receive your Preliminary proposal from the Science Support Office. Panel chairs will assign watchdogs to examine and present your proposal to the panel, who will review your Preliminary proposal and develop recommendations based on their assessment. Soon after the panel meeting, you will receive feedback from the panel that has reviewed the Preliminary proposal, with contact information for all of the watchdogs involved in the review, as well as the chairs of the review panel, all of whom you can then contact for additional feedback or clarification. The feedback you will receive typically will include the following points:

1) Great idea, in line with the science vision of the program, likely achievable by scientific ocean drilling
2) Interesting concept with potentially high impact, but difficult to see how the problem is addressed by scientific ocean drilling
3) Idea not as interesting or transformative as others received, and thus not likely to move forward as a drilling proposal in its current state

Most importantly, though, you will receive a decision of whether the panel (1) recommends that you develop a Full proposal and/or pursue workshop funding to further develop your idea, and potentially coordinate your efforts with other closely-related proposals, into a comprehensive Full proposal, or the panel (2) deactivates the Preliminary proposal.

The recommendation will include the contact information for all of the watchdogs, and you should contact one or more of the watchdogs to discuss their recommendation and to gain more insight into the next steps for your proposal if you have any questions in this regard.

What is a Full proposal and what constitutes an excellent one?

A Full proposal includes the operational information necessary to determine feasibility, data availability, and site assessment needs (http://www.iodp.org/proposal-submission-overview/). Think of it as a step from a great idea to one that can be implemented in the real world, with present technology and within a reasonable length of time. Prior reviews and/or workshop input should be carefully considered and be addressed in a Full proposal. Excellent Full proposals range from complicated and extremely interdisciplinary programs to simple and discipline-specific ones, but they do share a number of elements common to all good science proposals:

1) They are responsive to input from science panels

2) They have a strong and compelling science question(s) that require ocean drilling

3) They are innovative, and have an acceptable balance between risk and potential for achievements

How do workshop proposals and workshops fit into the proposal structure?

Workshops can be valuable for developing community-based scientific plans and prioritizations, and are often an integrated part of the IODP science planning process. Proposals for workshops funded by the program (as opposed to many national activities) are of three types:

1) Unsolicited Workshop proposals for thematic workshops that have a potential for developing new scientific approaches.

2) Unsolicited or solicited proposals that will address scientific opportunities in a particular region, with or without a specific scientific theme in mind, with the purpose being to more efficiently use the research platforms in the program.

3) Proposals specifically solicited by the Proposal Evaluation Panel (PEP), and from the proponents of favourably reviewed Preliminary proposals, and with the goal of developing a strong, Full proposal. Thus, workshop proposals span a broad range of purposes and contexts, but share the common feature that they are designed to effectively transform ideas into proposals that can be executed.

What proposals don’t move forward?

Reasons that a proposal might not advance in IODP are mostly similar to why science proposals in general ultimately aren’t funded:

1) Science to be addressed is incremental—i.e., makes only a small step forward

2) Science to be addressed is one-sided—i.e., doesn’t account for alternative hypotheses

3) Proponents are unresponsive to review comments

4) Proposals that display little effort on the part of the proponents to understand what makes science drillable; i.e., pursues science that is simply undrillable

5) Proposals that do not critically select drilling targets to answer well defined questions, but more take a ‘shotgun’ approach.

6) Proposals that do not clearly state how the proposed measurements will be used to answer the proposed questions. A successful proposal will have a clear outline of all proposed sampling, shipboard or shore measurements and/or logging data that are needed and planned

7) Proposals with scientific objectives that conform poorly with the overall goals of the program’s science plan, and do not bring added value to the science plan

8) The data that is needed to characterize the drill site (location and target depth), and place it in a proper context are not sufficient to underpin the science or to conduct operations safely.

Are there other proposal types for special circumstances?

Several other proposal types can result in IODP operations. The most common is when a researcher or research group requests additional data/samples from an already scheduled expedition. In some cases, valuable science can be obtained with minimum additional time, which can be allocated from an already scheduled expedition. The mechanism to request additional coring or logging is through an Ancillary Project Letter (APL). These short requests (http://www.iodp.org/proposal-submission-overview/) are received by the Science Support Office with the same deadlines as all other proposals, and are reviewed by the advisory panels. If approved, they are available for implementation in association with a planned expedition.

The other proposal type is a Complementary Project Proposal (CPP). These are full proposals (http://www.iodp.org/proposal-submission-overview/) that have a substantial amount of financial support already secured from an entity outside of IODP. It is entirely appropriate to contact the Chair of the appropriate Facility Board to enquire about the required relative amount of outside money to total costs of a drilling program, usually 70%. These proposals are reviewed by the AP. Because of the specialized nature of these programs, it is highly advisable to discuss potential plans for developing a CPP with staff at the Support Office or appropriate IO before a proposal is written.

Frequently Asked Questions

The review comments say that I need to bring in other expertise for my Preliminary proposal. Why?

When a platform implements an expedition, it is not a single-focus effort—some locations lend themselves to different or interdisciplinary science efforts, and may address related but somewhat independent questions. If you can do more, and do it well, with additional proposal components, it enhances the impact of the project.

Why does it take so long to get a proposal drilled?

Expeditions are complicated and very expensive efforts. As such, they must be carefully planned and often require some additional technological development and site assessment before being scheduled. Additionally, drilling platforms cannot be airlifted…the reality that ships need to slog through the ocean to get from place to place means that operationally, the program is tied to shiptracks. Thus, the expedition schedule is typically defined by ocean region. In order to minimize transits, which increase costs and reduce time that can be dedicated to science, the platforms tend to work in one ocean basin, or one part of an ocean basin, for some time before moving on. Finally, in this current phase of the program, there is not adequate funding for full year operations, and thus the platforms have periods of non-operation limiting the speed at which great proposals can be implemented.

Is IODP an Insider's Club?

The answer is no. In fact, the IODP is eager to engage new scientists, and new fields of science that require ocean drilling, and actively reaches out to other science programs, like the International Continental Drilling Program. On the other hand, experience with drilling and the program certainly makes things easier for the proponent. Nevertheless, writing a proposal is a very significant effort for everyone. However, "support" guidance from AP, national offices, implementing organizations and the Science Support Office is something we recommend you take full advantage of.

I am not sure if my idea is do-able…can I ask somebody?

Yes, you can and you should. Your first contact would be the Science Support Office (NEW URL?), who will then direct you to the proper individuals for discussion.

I have questions about the review comments on my proposal…am I allowed to talk to someone?

Yes, you are allowed, and in fact encouraged, to do so. Watchdog names and contact information are on review comments that you will receive after your proposal is evaluated.

I am an early-stage Investigator (Assistant Professor or Assistant Scientist)…should I write a proposal?
Yes, because writing an IODP proposal can help you establish a national/international reputation and broaden your sphere of colleagues. But should you depend on that for promotion? NO! Programs can take significant time to be implemented, and even longer for results to come in - total time can easily be in excess of five years. Successful grant applications that can be achieved in a few years therefore work better for promotion.

Are there ways I can get involved in the program besides writing a drilling proposal?

Yes - by applying to sail on scheduled expeditions (http://www.iodp.org/expeditions/) and volunteering to serve in the advisory panels (http://www.iodp.org/scientific-advisory-structure

IODP drilling proposal guidelines

Introduction

The International Ocean Discovery Program (IODP) receives drilling proposals, or piston coring proposals to support drilling proposals, from the scientific community and evaluates those proposals through the Advisory Panels (AP) and through external peer review. Proposals are submitted to the Science Support Office. This document specifies the requirements for submitting proposals and outlines the review process. It also briefly describes multi-phase drilling projects, the requirements for designating drilling sites, and the requirements for preparing Site Summary Form 6. Unless otherwise specified, all submitted items related to drilling proposals must arrive in the Support Office by 23:59 GMT on the semi-annual deadlines of either 1st of April or 1st of October.

Proponents must submit the required materials through the online submission system http://proposals.iodp.org/. Required documents except cover sheet and Site Summary Forms must be in one PDF file to upload, with all pages in A4 or U.S.-letter size (12-point font and 1.5 line spacing are recommended). Figures should have sufficient resolution to show all relevant details. Data available to image the sites should be uploaded to the Site Survey Data Bank. See the additional requirements below for submitting Preliminary proposals (pre-proposals), Full proposals, Multi-phase Drilling Proposals, addenda, Ancillary Project Letters, and response letters. Questions regarding proposal submission and proposal handling should be directed to the Science Support Office (science@iodp.org).

Preliminary Proposals (Pre-proposals)

Proponents who have a new idea for scientific ocean drilling are strongly advised to initially submit a Preliminary proposal (Pre-proposal) before engaging in the preparation of a Full proposal. A Preliminary proposal can be up to 2700 words long excluding references, with up to 8 figures including tables. Pre-proposals must also include the following items that do not count against the page limit:

-an official proposal cover sheet, complete with an abstract of 400 words or less, a statement of the scientific objectives, and a list of the proposed drilling sites,

-an initial site summary form for each proposed drilling site, with designated site names conforming to the established system (see below),

-a list of all proponents, specifying the name, affiliation, and expertise of each proponent.

A well-prepared Pre-proposal should:

-state the scientific objectives and explain how those objectives relate to, or advance beyond, the IODP Science Plan 2013-2023, including the theme(s) and challenge(s) addressed,

-justify the need for drilling to accomplish the scientific objectives,

-present a conceptual strategy for addressing the scientific objectives through drilling, logging, or other down-hole measurements,

-describe the proposed drilling sites, penetration depths, expected lithologies,

Note: It is now possible to submit a proposal for operational time of a few weeks only rather than a two-month expedition. Such shorter scientific efforts will be implemented in hybrid expeditions.

-briefly discuss the availablility or acquisition plans of site-survey data, and discuss the recovery rates needed to achieve key goals.

-describe any development of advanced and non-standard tools, special sampling techniques, down-hole measurements, bore-hole observatories or others,

-identify any logistical problems, e.g. extreme weather, sea-ice, piracy, or others,

-describe briefly any relationships to other international geoscience programs and /or initiatives

The Science Support Office sends all received Pre-proposals to the Proposal Evaluation Panel (PEP). The PEP assesses each proposal in terms of its relevance to the IODP Science Plan 2013-2023, the suitability of the study area, study sites, and platform for addressing the proposed scientific objectives, and whether the achievement of those objectives will likely result in any fundamental scientific advances. The PEP seeks advice on technical aspects of the drilling proposal through a representative of the appropriate Implementing Organisation (IO; i.e. Platform Operator). The PEP also determines whether a given Pre-proposal may be appropriate for developing a Multi-phase Drilling Project (MDP).

Proponents receive a written summary of the PEP review, instructing them whether to develop it into a Full proposal or a MDP with or without a workshop. In some cases the PEP may ask proponents to collaborate with another group of proponents. The PEP deactivates the Pre-proposal if the science objectives are not well described or are not compelling enough, if the conceptual drilling strategy doesn’t adequately support the science questions, and/or if the proposed drilling program is simply not feasible

Full Proposals

Proponents who have previously submitted a Pre-proposal may submit a Full proposal if advised to do so by the PEP. However, a Full Proposal can also be submitted without prior submission of a Pre-proposal. A Full proposal requires extensive documentation of the drilling plans and all aspects of the full scientific experiment. It is therefore highly recommended to seek programmatic advice through submission of a Pre-proposal before developing a Full proposal.

All Full proposals (new Full proposals, revised Full proposals, and new or revised Complementary Project Proposals) can be up to 7800 words long excluding references, with up to 12 figures including tables. All Full proposals must also include the following items that do not count against the page limit:

-an official proposal cover sheet, complete with an abstract of 400 words or less, a statement of the scientific objectives, and a list of the proposed drilling sites,

-the appropriate set of site summary forms for each proposed drilling site, with designated site names conforming to the established system (see below),

-a list of all proponents, specifying the name, affiliation, and expertise of each proponent, plus a two-page curriculum vitae or biographical sketch for one or more of the lead proponents,

-a list of at least five potential reviewers external to the SAS.

A well-prepared Full proposal should also:

-state the scientific objectives and explain how those objectives relate to, or advance beyond, the IODP Science Plan 2013-2023, including the theme(s) and challenge(s) addressed,

-justify the need for drilling to accomplish the scientific objectives,

-present a well-defined strategy for addressing the scientific objectives through drilling, logging, or other down-hole measurements,

-provide detailed estimates of, and justification for, the time required for drilling, logging, or other down-hole measurements. In addition, discuss required recovery rates (general) as a function of depth and highlight particular target zones including required recovery rates for these in order to achieve key goals, and finally comment on the impact on the science if such recovery rates are fully achieved.

Note: It is now possible to submit a proposal for operational time of a few weeks only rather than a two-month expedition. Such shorter scientific efforts will be implemented in hybrid expeditions.

-describe the available site-survey data and/or any plans for acquiring additional data, and discuss how the drilling targets relate to those data. In addition, the

proponents are reminded to upload the available site survey data in the Site Survey Data Bank if the data are available, or asap after collection of new data.

-discuss the expected scientific outcome of drilling and any subsequent work required to complete the overall project.

-describe any development of advanced and non-standard tools, special sampling techniques, down-hole measurements, bore-hole observatories or others, and include an out-year plan for observatory data recovery, maintenance and ultimate termination.

-describe any external funding for non-standard tools,

-identify any logistical problems, e.g. extreme weather, sea-ice, piracy, or others,

-describe briefly any relationships to other international geoscience programs and/or initiatives.

Shortly after each proposal deadline, all new and revised Full proposals go to the PEP for review. The PEP seeks advice on technical aspects of the new and revised Full proposals through a representative of the appropriate Implementation Organisation (Platform Operator).

How are 'New Full proposals' handled by PEP?

The PEP issues a written review advising the proponents how to improve or revise their new Full proposal, or PEP deactivates it if the science objectives and drilling plan are not sufficiently described. The PEP may directly send the new Full proposal for external peer review if it has reached a sufficient state of development. **New Full proposals can be revised only once**. There is no time limit for resubmission as time may be required for the proponents to seek essential advice on technical and funding aspects from the IO to improve the overall feasibility of the drilling proposal. Moreover, proponents may wish to organise a workshop to advance their scientific objectives, drilling plan, or indeed to develop new techniques (in case the drilling plan requires new techniques, it is advised to ask representatives of the IO in question to attend the workshop).

How are 'Revised Full proposals' handled by PEP?

The PEP recommends the revised Full proposal for external peer review, or the PEP deactivates the proposal if it hasn't reached a sufficient state of development for external review. If the PEP deems the proposal to be worthy for external review, then the Support office selects reviewers and sends out the proposal for review. The reviewers are asked to comment on the importance of the scientific objectives toward the advancement of the IODP Science Plan 2013-2023, the suitability of the study area for addressing the scientific objectives, the likelihood of achieving the scientific objectives with the proposed drilling and logging strategy, and the scientific competence of the proponents, keeping in mind that many scientists besides the proponents ultimately participate in planning and executing an IODP expedition. The external reviewers remain anonymous to the proponents and PEP at all times.

Proponents receive the external reviews of their proposal from the Support Office and may submit a brief response letter (see below) before the next PEP meeting. The PEP then reviews the proposal again, together with the external reviews, response letter, and decides whether it should advance to a Facility Board for possible implementation by the appropriate IO. If recommended for implementation, the PEP writes a final review assessing the priority of the proposal with respect to the IODP Science Plan 2013-2023, and the PEP rates the proposal according the above described criteria.

The PEP forwards the Full Proposal to the appropriate FB if the proposal satisfies most requirements of the Site Characterization Panel (SCP) and Environmental Protection and Safety Panel (EPSP).

The final decision whether a proposal is actually implemented is made by the FB overseeing the scheduling of the platform in question. At this stage, the Full Proposal must satisfy all SCP and EPSP requirements before it can be implemented.

How are Complementary Project Proposals with substantial external funding) handled by PEP?

Full proposals with external funding (CPPs) are scientifically motivated proposals having a commitment from a third party source of a certain relative amount of at least 70% funding of total cost for the platform operating costs of the expedition(s). Expeditions arising from such proposals will follow the normal IODP rules for designation of co-chief scientists, scientific staffing, and the IODP Sample, Data and Obligations Policy that defines data moratorium, data access and publication responsibilities.

CPPs should be prepared as regular IODP proposals but, in addition, must include a description of the formal financial commitment arrangement from a third party, or must include a description of a to be arranged financial commitment to support the estimated platform operating costs for the proposed expedition(s).

CPPs can receive fast-track consideration by the AP if required by the situation (e.g., funding source, operational plans etc.). Shortly after each proposal deadline, these proposals go to the PEP for review. The PEP assesses each proposal with external funding on the basis of scientific quality just like normal Full proposals without additional substantial external funding. If fast-track consideration is required, the PEP, after an internal science review, may forward the proposal directly to the relevant IO(s). If fast track is not required, the PEP may send the proponents a written review advising them how to improve or revise their proposal. The revised proposal may be sent out to external reviewers for additional comments depending on time pressures. The proponents then receive the external review of their proposal from the Support Office and may submit a brief response letter before the next PEP meeting. The PEP then reviews the proposal again, together with the external reviews and response letter and forwards all information to the relevant IO and FB, and the PEP rates the proposal with external funding according the criteria as described under Full proposals (see above).

The final decision whether a proposal is actually implemented is made by the FB overseeing the scheduling of the relevant platform. At this stage, the Full Proposal must satisfy all Site Characterization Panel (SCP) and Environmental Protection and Safety Panel (EPSP) requirements before it can be implemented.

Multi-phase Drilling Project (MDP)

A multi-phase drilling project (MDP) can take different forms, but the unifying concept is that the project cannot be done in a single drilling expedition. Examples of an MDP include, but are not limited to, a project that requires a long site occupation in one location, a series of scientifically related projects located in close proximity, or a project that addresses (a) large, overarching scientific question(s) requiring data from geographically distant sites.

The initial proposal, or the umbrella proposal, of a potential MDP should define the overall scientific objectives of the entire project and justify the need for a multi-platform or multi-phased drilling strategy to achieve those objectives; this may not require site-specific information beyond some generic site description. The umbrella proposal should follow the Pre-proposal format, but without site specific information.

The PEP reviews the umbrella proposal and may endorse it, may recommend revision, or may deactivate it if the science objectives and drilling plans (multiple platforms) are not sufficiently described.

After endorsement, the PEP will ask the proponents to develop a set of closely interrelated proposals that describe the individual steps or phases in detail (multiple proposals), and to identify actual drill sites in each individual proposal. PEP evaluates each proposal (either Pre-proposal or Full proposal) of the set within the broader context provided by the umbrella proposal. All components (individual proposals besides the umbrella proposal) of a MDP must otherwise fulfil the normal requirements for Pre-proposals and Full proposals, or ancillary project letters, and follow the normal review process. The PEP decides whether a component (individual proposal within the set of proposals) of the MDP has reached a sufficient stage of development for external peer review and whether it should be recommended to the FBs for possible scheduling. The Science Support Office will ask the reviewers to assess the individual proposal as a component of the MDP within the context of the umbrella proposal.

Ancillary Project Letters (APLs)

An individual scientist or group of scientists may propose a project that requires less than 10-15% of dedicated platform time in an expedition, including transit. APLs can require an investment of drilling, logging, and technician time, as well as a platform berth; therefore, the IODP will strive to integrate such projects with an appropriate drilling proposal as early as possible in the normal planning process. For Mission Specific Platforms (MSPs), the submission of APL(s) will rely on a call for applications issued by ESSAC as the implementation of APLs by MSPs will primarily depend on the available budget. This call will include the scale of the APL in terms of possible added platform time and facilities.

Investigators must submit an APL to the Science Support Office in accordance with the normal proposal deadlines. An APL can be up to 1600 words excluding references, with up to 5 figures including tables, and it must include the following items that will not count against the word count limit:

-an official proposal cover sheet, complete with an abstract of 400 words or less,

-the appropriate set of site summary forms for each newly proposed drilling site, if any, with designated site names conforming to the established system (see below),

-a list of all proponents, specifying the name, affiliation, and expertise of each proponent.

A well-prepared project letter should also:

-describe the project and its overall scientific goals,

-identify the locations of interest for drilling,

-explain the proposed types of shipboard measurements and data collection,

-define the requirements for ship time and shipboard personnel.

-identify any feasibility issues: weather windows, piracy, etc

Shortly after each proposal deadline, all APLs go to the PEP for review. The PEP may advise the investigators to develop their ideas into a Pre-proposal or collaborate with the proponents of an existing proposal. If the latter, the Support Office or the PEP Chair can initiate contact between the two groups of investigators. The PEP may also decide to forward an APL directly to the FB**,** particularly if it relates to a drilling proposal that has already undergone external review.

Addenda

Proponents of Full proposals that have been externally reviewed may submit an addendum to provide an update on relevant scientific research including new data, to fulfill a specific request for more information, or perhaps to present an offer of support from another scientific program or agency. However, if the supplementary material implies a significant change to the objectives or strategy of the original proposal, the proponents must submit a revised proposal instead of an addendum, and the revised proposal would return to the PEP for review. Addenda can be up to 2700 words long excluding references, with up to 8 figures including tables. Addenda must also include the following items that do not count against the page limit:

-an official proposal cover sheet, complete with an abstract of 400 words or less, a statement of the scientific objectives, and a list of the proposed drilling sites,

-the appropriate set of site summary forms for each newly proposed or modified drilling site, if any, with designated site names conforming to the established system (see below).

Response Letter

Proponents may submit a brief letter in response to the external reviews of their Full proposal. Response letters can be up to 1600 words long excluding references, with up to 5 figures including tables, and they must address only the specific comments or questions posed by the reviewers. Occasionally, an advisory panel or committee may request an additional response letter during subsequent stages of the review process. The Support Office will set an appropriate deadline for receiving such response letters, typically at least four to six weeks in advance of the next relevant panel or committee meeting.

Drilling Site Designation

The IODP follows a uniform system for naming proposed drilling sites whereby any seafloor site ever considered for possible drilling receives a unique name. Site names must conform to the general format AAAAA-nnX, where AAAAA represents a string of up to five alphanumeric characters (first character alphabetic only) referring to the geographic area of the proposed drilling site, nn represents the specific site number within that area, and X represents an alphabetic character that indicates the version of a specific site. For all newly proposed sites, X=A. Whenever proponents relocate a proposed drilling site, they must also rename it by incrementing X, changing nn, or changing AAAAA, depending on the relative geographic proximity and similarity of the scientific objectives compared to the original site. Designated site names should not encode any indicators of relative priority because site priorities often change as a proposal develops and matures. Alternate sites therefore must have unique site numbers.

Example: PIG-3B refers to the second (hence “B”) proposed location of Site 3 in Pigafetta Basin. PIG-4A could represent a newly proposed alternate site for PIG-3B.

Site Summary Form 6

For Full proposals and APLs, Site Summary Form 6 summarizes the supporting data that exist in the Site Survey Data Bank (SSDB), or that will in the near future be submitted to the SSDB, for each proposed drilling site. This required form does not substitute for submitting data to the SSDB. Proponents must create Site Summary Form 6 as a single-page PDF document (see attached example) that contains the following four elements, depending on data availability:

-A label identifying the document as Site Summary Form 6 and indicating the proposal number (first three digits only) and site name,

-A list of the file names of the relevant site-survey data that exist in the SSDB, i.e., the file names corresponding to the seismic data (images and SEG-Y) and navigation data presented on this form; for any displayed data that have not been submitted to the SSDB, the form should specify when the data will be submitted,

-A clearly annotated map showing all relevant details around the proposed drilling site, including seafloor bathymetry, with labelled contours or a depth scale; the exact site location; track charts for the key seismic lines, annotated at regular intervals with the same horizontal unit (e.g., CDP, shot-point number, etc.) as the accompanying seismic profiles; and a distance scale if not apparent from the horizontal and vertical annotation,

Two profiles for each seismic line that crosses the proposed drilling site where appropriate. One profile should include an annotated vertical line showing the location (e.g., Site ABC-1A, CDP 4871) and penetration depth (or time using best depth-to-time conversion) of the proposed drilling site. This profile may also show an interpretation of the seismic data. The second profile should show the same image as the first profile, but without showing the drilling site or any interpretation. Each seismic profile should indicate the name and orientation (e.g., NW–SE) of the survey line, have well-annotated horizontal and vertical axes, including a horizontal scale bar (in km), and have sufficient resolution to show the relevant structure imaged by the data.

Here links to simple site survey instructions, possibly separately for each FB, should be provided to specify which data are really mandatory.

IODP SCP drill site characterisation data guiding statement and rationale

The method and rationale for data evaluation are outlined as follows. The proponents choose sites, which according to their knowledge and existing data will allow answering of questions, testing of hypotheses, and achieving of objectives presented in their proposal. The Site Characterisation Panel (SCP) reviews all data in the Site Survey Data Bank (SSDB), advises the proponents on the adequacy of the drill site characterisation package, and provides an assessment of whether or not the scientific objectives of each drill site can be effectively achieved on the basis of the proposal and data package.

The rationale for this review is to ensure that IODP expeditions will have a high probablility of success and that ship time, researcher time, and funds are not wasted by drilling in the wrong location or to the wrong depth, or recovering sediments or rocks that will not achieve the objectives of the proposal. This is the guiding statement for SCP reviews, and represents the standard to which the site survey data package is held. Actual data requirements are based on meeting this standard, and are at the discretion of the SCP. The fundamental responsibility of proponents with respect to demonstrating the feasibility of the science is to demonstrate via their data that the proposed target is adequately imaged and there are no structural complications. It is recommended that every proposal include a proponent who has the ability to manipulate and interpret geophysical data and prepare figures and statements regarding the adequacy of the data.

For example, high resolution palaeoceanographic objectives require a sedimentary column that is nearly complete and not disturbed by erosional unconformities, faults, or mass transport deposits. Thus, to ensure success, the data provided to SCP must be of sufficient resolution and continuity (i.e., a 2d SCS or MCS grid) to develop a regional image of the target and the structural configuration of the target area in order to avoid structural complications (faults, mass transport deposits, unconformities, etc.). For some targets, which are very small (e.g. gas seeps) or deep (e.g. crustal slip planes) only a 3d grid of MCS data (or 3d seismic volume) provide a detailed image. For deeper targets seismic refraction data as well as gravity and magnetic data may be needed to provide necessary information on the structural configuration.

Bathymetric data are needed to characterise the seafloor surface. Surface samples and side scan/back scatter data as well as 3.5 kHz, Parasound, Topas, or other high-frequency subbottom profiler data may be needed to characterise the shallow environment and thus provide valuable information about the shallow subsurface which are vital for drilling operations (what materials are being spudded) and for scientific purposes as related to high-resolution studies (paleoclimate reconstructions), geohazard studies (slumps, slides, fluid flow, etc), or shallow crustal objectives.

Seismic velocities are always needed to a) convert the seismic data from two-way travel time into depth, and b) characterise changes in lithology, e.g. gas, volcanic, crystalline basement.

In order to correctly evaluate the data submitted to the SSDB, SCP needs as much information about acquisition and processing parameters as possible (i.e., metadata). Coordinates unequivocally identifying the location of the data as well as unambiguous seismic trace numbers (either shot point SP or Common Datum Point CDP) are needed to correctly locate and evaluate the proposed drill site.

Definitions and Idealized Survey and Data Parameters

- High resolution Multi-Channel Seismic (MCS) (theoretically allows a resolution of layers > 6 m thickness)
  - optimum sampling rate (SR)= 1 ms (max 2ms)
  - shot interval ≤ 25 m
  - streamer offset ≥ 1200 m
  - fold~ 50
  - CDP interval ≤ 25 m
  - source frequency content up to 150 Hz
  - true amplitude preservation
- 2d grid MCS: line spacing max 10 km
- 3d grid MCS: a dense 2d grid, line spacing should be determined case-by-case, 1 km in general
- Cross lines: seismic lines crossing each other at roughly 90°, need to extend at least 10 km beyond the proposed site.
- Single channel seismic (SCS) data will be considered on a case by case basis, e.g. if the proposed sites are located in ice covered areas where one cannot always collect MCS data, or if target depths are very shallow (<100 m subsurface). The determining factor is whether or not the data adequately image the targets.
- 3D seismic volume, which was acquired to fill a box-shaped area, sorted into "bin", migrated with 3D-migration technique, will be required on a case by case basis, e.g.. very small target, deep target with very complicated structure which should be properly imaged only in 3D seismic volume

General Data Guidelines

- **Digital seismic data** (SCS or MCS depending on objectives and targets) in SEGY format with the following header information to allow proper evaluation
  - Trace sequential number bytes 1-4
  - Shot point number bytes 17-20
  - Common datum point (CDP) number bytes 21-24
  - Coordinate units bytes 89-90
  - Scalar to be applied to coordinates bytes 71-72
  - Navigation with the coordinate units and scalar defined above
    - MCS data should contain CDP location bytes 181-184 and 185-188
    - SCS data should contain source location bytes 73-76 and 77-80
  - Record length bytes 115-116
  - Sample rate bytes 117-118
  - If the header location does not follow the SEGY standard as mentioned above, proponents must provide the table describing the location of the headers.
- Detailed information on acquisition and processing parameters

  Acquisition
  - Type and frequency content of seismic source
  - Streamer length and channel interval
  - Sample rate, record length, filters applied during recording
  - Shot interval, CDP interval, fold

  Processing
  - Processing sequence including information on filters and gain applied (at what stage, type filter flanks, type of gain)
  - Static corrections?
  - Deconvolution?

    - Multiple suppression?
    - Stacking, type and parameters
    - Migration, type and parameters
    - Depth conversion or depth migration (for depth section)?
- **Figures** (jpg, pdf, tif, gif) of seismic lines (interpreted and un-interpreted) with clearly annotated SP or CDP (the same as in digital files), scale, orientation and information on filters and/or gains applied. Interpreted lines should include the location, with proposed penetration depth, of proposed sites.
- **Swath bathymetric data** as image files (jpg, pdf, tif, gif) as well as ASCII xyz-files or net-cdf grids with information on cell size
- **Navigational data** as ASCII xyz-files with either SP or CDP number, which directly relates to the same parameter in the digital seismic data, seismic figures and location maps
- **Location maps** annotated with lat/lon for each site with bathymetry across the proposed site and available seismic lines with annotated SP or CDP numbers (same as digital seismic data, seismic figures and navigational data)
- If available, information from nearby wells or cores.

Examples of Needed Data (arranged according to broad objectives).

<u>Ocean and Climate Change (e.g. 318 Wilkes Land, 339 Mediterranean outflow, 342 Paleogene Newfoundland Sediment drifts) or</u>
<u>Biosphere Frontiers (e.g. 331 Deep Hot Biosphere, 336 Mid Atlantic Ridge Flank, 337 Deep Shimokita Coalbed)</u>

- High resolution MCS (or SCS where target depth is <100mbsf).
- Depending on target, 2d or 3d (lateral high resolution or very deep) grid of MCS
- Sites ideally located on or near crossing lines (this depends upon demonstrated regional continuity of reflections and EPSP considerations).
- Acoustic backscatter data (side-scan or multibeam) to characterise the seafloor
- High resolution bathymetry
- Seismic velocities appropriate to demonstrate the local velocity fields
- For very shallow target, 3.5 kHz, Parasound, Topas or other subbottom profiling data both as figures and SEGY similar to MCS data to characterise shallow subbottom structures and determine the thickness of sediment cover.
- Surface samples to provide information on surface sedimentary composition and structure (e.g. gas seeps, fluid flow) as figures and tables for shallow targets and expected gas seeps of fluid flow; add locations to base maps
- .
- Video/photography if drilling into a hard irregular outcrop (e.g. a reef, or basalt outcrop)

<u>Earth Connections (e.g. 331 Deep Hot Biosphere, 340T Atlantis Massif)</u>
- Middle resolution MCS (SR= 2ms, shot interval 25-50 m, CDP interval 25-50 m, fold 50-100)
- 2d grid, 3d grid MCS or 3D seismic volume for fluid and volatile flow (on a case-by-case basis).
- Sites ideally located on or near crossing lines
- Acoustic backscatter data (side-scan or multibeam) to characterise seafloor

- Refraction seismic data and structural model for deeper target where the MCS section with interpretation cannot properly image.
- Seismic velocities, both reflection (appropriate to demonstrate the local velocity fields) and refraction
- Surface information providing the surface sedimentary composition and/or structure, e.g. surface samples, video/photography" for these. Sub-bottom and/or backscatter may be also included.
- High resolution magnetic and gravity data as well annotated maps and ASCII xyz-files

Earth in Motion (e.g. 340 Lesser Antilles Volcanism and Landslides, 343 Japan Trench Fast Earthquake Drilling Project JFAST)

- High or middle resolution MCS, depending on target
- 2d grid MCS, or 3d grid MCS or 3D seismic volume depending on target (e.g. gas hydrates, fluid flow, deeper complicated structure)
- Sites ideally located on or near crossing lines
- Refraction data and structural model to accurately image deeper targets (e.g. fault zones, slip planes)
- High resolution gravity and magnetic data for deeper targets
- Acoustic backscatter data (side-scan or multibeam) to characterise seafloor in case of e.g. fluid flow or landslides

IODP Measurements Document
Revised February, 2008.

Categories of IODP Measurements

- Minimum measurements
- Standard measurements
- Supplemental measurements
- Safety measurements
- Measurements that affect drilling decisions:
    - Specific Site
    - Specific Expedition

This document provides an overview of IODP measurements that each IO is fully responsible for collecting during IODP operation.

The list of measurements as posted was reviewed by SAS in January 2006 and updated in February of 2008. It is subject to change and updates responding to technological developments and SAS review.

Minimum Measurements:

Defined as measurements that shall be conducted in all boreholes and on all cores in IODP. This statement does not preclude the taking of whole-round core samples on an as-needed basis to achieve specific science objectives and/or obtain legacy samples.

Biostratigraphic
Visual core description
Smear slides Thin sections
Split-core digital photography (section line-scan and/or table layout)
Core logging: • natural gamma ray • gamma ray attenuation • magnetic susceptibility
Temperature profile
Moisture and density/porosity (discrete samples)
Downhole logging: • natural gamma ray • spectral gamma • density • porosity • resistivity • sonic • borehole imaging
Borehole depth scale

IODP Standard Measurements:

Defined as standard measurements that shall, whenever practicable and appropriate, be carried out across all platforms and/or shore-based labs).

Core Petrophysics:

Natural remnant magnetism (NRM) with step-wise demagnetization
Core logging: P-wave velocity
P-wave velocity (on split cores)
P-wave velocity (discrete samples)
Thermal conductivity (both whole core and pieces)
X-ray CT scanning
Whole round core digital surface photography
Color reflectance
Close-up and micro-imaging
Core orientation and structural measurements

Downhole Petrophysics:

Vertical seismic profile or checkshot
Downhole pressure
Open-hole temperature
Caliper
Magnetic susceptibility
Magnetic field

Note: For MSPs, downhole minimum/standard measurements may be dependent on the size of the borehole.

Microbiology and Geochemistry:

Pore Water Chemistry **(**e.g., nutrients, pH, alkalinity, sulfate, chloride, major and trace elements**)**
Whole rock major and trace elements
Microbiology (Cell counts on fixed samples)
Bulk carbon-hydrogen-nitrogen-sulfur (CHNS) analyses
Contamination testing
Carbonate analyses

Rig Floor

Weight on bit
Penetration rate
Mud pressure
Mud density
Mud logging (including gas analysis)
Driller depth
Pumping rate
Rotation rate
Heave compensation

IODP Supplemental Measurements:

Defined as measurements that if are needed to satisfy expedition objectives should be made available to IODP. Some of these techniques will undoubtedly be 3rd party tools or require single expedition leasing of a tool.

Downhole Petrophysics:

Logging While Drilling and Measurements While Drilling
Logging While Coring
Permeability through packer tests
High-resolution gamma
Nuclear magnetic resonance
Formation testing
Pressurized core sampling
Downhole sidewall sampling
Pressurized fluid/gas sampling
Spontaneous potential (SP)

Core Petrophysics:

Anhysteretic Remanent Magnetization (ARM) and Isothermal Remanent Magnetization (IRM) with step-wise acquisition and demagnetization (step-wise acquisition and demagnetization)
Permeability on discrete samples
Vp and Vs, anisotropy and attenuation
Vs
Thermal imaging of core with infrared
Nuclear magnetic resonance
Particle size analyzer
Shear strength (i.e., miniature vane method)
Non-contact resistivity
XRF scanner

Geochemistry and Microbiology:

Laser ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS)
DNA, biomarker, and Phospholipid microbiological analysis
Microbial activity measurements using radiotracers

Measurements for safety:

Expedition specific as implemented by IOs with advice from Environmental Protection and Safety Panel (EPSP)

Measurements that Affect Drilling Decisions

The following a measurements that could affect drilling decisions while an expedition is underway. There are two categories of measurements – those that could affect drilling at a specific site and those that could affect drilling during a specific expedition.

Specific Site

Safety Measurements
Minimum Measurements:
Biostratigraphy
Visual Core Description
Smear Slides Thin Sections
Moisture and density/porosity (discrete samples)
Core logging: natural gamma ray gamma ray attenuation magnetic susceptibility
Standard Measurements:
X-ray CT scanning
Pore Water Chemistry **(**e.g., nutrients, pH, alkalinity, sulfate, chloride, major and trace elements**)**
Whole rock major and trace elements
Penetration rate
Mud pressure
Mud logging (including gas analysis)
Driller depth
Pumping rate
Cell counts on fixed samples
Supplemental Measurements:
Logging While Drilling and Measurements While Drilling

Measurements that Affect Drilling Decisions (continued)

Specific Expedition

Minimum Measurements:
Temperature profile
Downhole logging: natural gamma ray spectral gamma density porosity resistivity sonic borehole imaging
Standard Measurements:
Natural remnant magnetism (NRM) with step-wise demagnetization
Core logging: P-wave velocity
Vertical seismic profile or checkshot
Caliper
Downhole Magnetic susceptibility
Whole rock major and trace elements
Cell counts on fixed samples
Supplemental Measurements:
High-resolution gamma
Formation testing

IODP Third-Party Tools Policy

(Approved by Science Planning Committee, 9 March 2006)

General Principles Governing Third-Party Tools and Instruments

In addition to the standard instruments and tools that are available on all Integrated Ocean Drilling Program (IODP) scientific expeditions, ocean drilling expeditions have historically drawn upon tools or instruments that were purchased or developed outside the framework of the primary contractors. These are known as third-party tools. In IODP the term tool includes all forms of scientific instrumentation intended for use as part of an IODP expedition. Third-party tools may be classified as either developmental or certified for deployment. Broadly speaking, tools can be divided into three types: (1) downhole (transient borehole measurements), (2) observatory (left behind in the hole after hole is completed), and (3) laboratory (shipboard or IODP core repository). Each of these categories has unique characteristics, but all of them require technical support from the implementing organizations (IOs) that, in turn, may require IODP-MI approval of associated science operating costs. In the Appendix to this statement of principles, we specify guidelines for development and acceptance of third-party tools.

Support for the purchase or development of third-party tools can come from a variety of sources. In the United States, third-party tools have generally been supported by the National Science Foundation, using funds earmarked for ocean drilling and allocated to highly ranked, unsolicited proposals. International partners operate similar procedures. It is recognized that the IODP cannot impose standards on external funding agencies, but it is hoped that principal investigators and those agencies will ensure that proposals for funding of third-party tools include plans and funds for satisfying the criteria set out in this document. The final responsibility for the use of a third-party tool during an IODP expedition or in an IODP core repository rests with the IODP-MI and the IOs.

It is important that third-party tools are certified as satisfying all of the operational and safety criteria that the IODP applies to its own in-house tools and instruments. Careful pre-cruise planning is essential if third-party tools are to be successfully integrated into the scope of shipboard work. This planning is particularly necessary when a tool requires dedicated ship time for deployments. Funding agencies are urged to include sufficient funds in a third-party tool development project for travel to the IO’s main office to participate in pre-expedition planning that will ensure proper communication and laboratory testing during development, as well as sufficient funds for field tests of the tool(s) prior to deployment during an IODP expedition. The principal investigator (PI) for a third-party tool is responsible for providing funds for planning activities, shipping the tool to the site of deployment, and integrating tool deployment into the expedition work and data flow. Requests for deployment of third-party tools often are made late in the schedule when IODP program budgets have been completed. Work that the IO is expected to contribute must therefore be identified as early as possible to minimize the impact of potential resource requirements.

It is important to note that funding of a third-party tool by an external agency does not guarantee time or space aboard a drilling platform for experiment execution. Scheduling of implementation of a tool on an expedition is subject to approval by the Operations Task Force (OTF) and Science Planning Committee (SPC) during their iterative planning process. Deployment also depends on acceptance by the IO. The primary responsibility for integrating a tool into IODP operations rests with the PI and not with the IO. The level of integration and potential sharing of associated costs depend on the nature of development and timing. Tools that are not ready for deployment or demand inordinate operator resources during the course of an expedition are a drain on support and platform time for all expedition participants. It is crucial that the IO accept a tool for deployment before an expedition begins and that there are no ambiguities in operation and support responsibilities.

Data and/or samples acquired through the use of certified third-party tools are subject to the same dissemination rules as any other data or samples collected by the IODP. Furthermore, the data produced through the use of third-party tools is the property of the IODP and therefore will be made publicly available after the moratorium period ends. Any third-party tool deployment plan must specify the current and potential future data and sample deliverables for the tool. PIs are required to submit a Deployment Report and relevant digital data files for the *Proceedings of the Integrated Ocean Drilling Program* volume for the expedition.

If a certified third-party tool has proven itself as crucial for answering certain scientific questions, the PIs and the operator are encouraged to work collaboratively to add it to the standard pool of IODP capabilities for the duration of the program to make it accessible to the IODP community. After the tool has been added to the IODP standard measurement capabilities, it is no longer considered a third-party tool.

Appendix: Guidelines for Third-Party Tool Development and Deployment

Communication is the key to the successful development and deployment of third-party tools. It is the responsibility of the scientist wishing to deploy a third-party tool to consult with the appropriate IO early in the development planning process and provide tool specifications and operational criteria. Where the tool is a laboratory instrument to be operated by the PI, this process may simply require power, space, safety information, and a sampling and measurement plan. Off-the-shelf borehole tools will additionally require plans for integration with existing systems (e.g., drilling pipe, cable heads, data retrieval and storage). In the case of developmental tools for downhole or observatory deployment, the investigator must identify development milestones in terms of both the level and the timing of technical achievements such that the tool will be ready when it is scheduled for operation.

For all categories of tools, the project planning phase must define explicitly how much time and resources (funds and personnel) are needed and how much the IO is willing to commit during the development phase (if applicable) and during deployment. Development timelines and requirements as described below may be modified by agreement between the IO and the PI, subject to approval by Integrated Ocean Drilling Program Management International (IODP-MI) because the necessary IO support is related to science operating costs (SOCs). Such agreements will be reported to the Scientific Technology Panel (STP), Engineering Development Panel (EDP), and Operations Task Force (OTF).

The following guidelines for third-party tool development and deployment have been formulated to reflect the fact that the IOs are responsible for assisting with and monitoring third-party tool developments and reporting status to the STP, EDP, OTF, and IODP-MI. These guidelines indicate a general progression through which new tools are introduced to IODP operations.

Developmental Tool: For a non-certified tool to be considered for deployment on an IODP expedition, the following criteria must be met:

1) There must be an identified PI who is the primary proponent and point of contact for the use of the tool by the IODP.

2) The PI must formulate a development plan in consultation with the appropriate IO. Where a tool is intended for multiple platforms, the appropriate IO will be the one responsible for the first deployment. The lead IO will coordinate with the other IOs and the IODP-MI as necessary.

3) The development plan should, where appropriate:

- indicate the usefulness of the proposed measurements and the financial and technical feasibility of making them
- include a brief description of the tool, schematic diagram(s), details of the operational procedure, and technical specifications such as dimensions, weight, temperature and pressure ratings, cable-length restrictions, cable type, etc.
- identify a development timeline in terms of technical achievements and reporting requirements, including a specific deadline for a yes or no decision by the IO on deployment
- provide for initial testing on land, when possible, and request ship time if testing from the drillship is necessary, subject to OTF approval
- satisfy safety considerations
- specify shipboard requirements such as the data processing necessary to make the information accessible aboard ship, if applicable, any special facilities (emphasizing where the tool is not compatible with existing hardware and software), and appropriate technical support
- specify the data deliverables
- provide for transporting tools for shipboard testing, in terms of both cost and time
- contain a signed (pro forma) statement of agreement with these requirements

4) The IO will report the submission of development and deployment plans to the STP, EDP, OTF, and IODP-MI. The STP will normally bear the responsibility of determining action on these submissions in accordance with the panel mandate and will provide advice to the IO regarding further tool development. In the instance of engineering development playing a significant role in the delivery of a tool for an expedition, the STP and EDP will designate individuals to coordinate panel input to the OTF, SPC, and IOs. The EDP may take the lead where engineering is the major focus of the development. The IODP-MI will ensure that this third-party tools policy is enforced.

5) If the IO and the STP (and/or EDP when appropriate) endorse the development plan, a staff liaison will be appointed by the appropriate IO to monitor the tool's progress through the development plan. The IO's tool liaison will be charged with providing status reports of the tool's progress to the STP, EDP, and OTF through their panel liaisons, and to the IODP-MI.

6) With a positive OTF recommendation, an IODP development tool may be scheduled for testing during an upcoming expedition. Development tools must be deployed in test mode. By their very definition, they are not certified tools, and therefore the scientific success of an expedition must not be contingent upon the proper functioning of such a tool.

7) It is incumbent upon the PI to ensure that the appropriate IO is fully advised of the tool's status. If the development plan falls seriously behind schedule and the PI is unlikely to have satisfied all of the above criteria prior to a planned deployment, the IO has the right to withdraw the tool from further consideration for an expedition after consulting with the IODP-MI. The shipboard test may be canceled, and an agreement may be reached on a revised schedule.

8) If the above procedures have not been followed, then the tool in question cannot be regarded as an IODP development tool and therefore cannot be scheduled for testing in future

expeditions. A development tool cannot be deployed during an IODP expedition unless the IO and the IODP-MI are fully satisfied that the terms of the development plan have been fully met.

Certified Tool: For a tool to be considered an IODP certified tool, and thus suitable for routine scheduling on IODP expeditions, the following criteria must be met:

1) The tool must have satisfied all the requirements for an IODP development tool.

2) The tool must have been tested at sea during an IODP expedition(s) and performed satisfactorily in the opinion of the relevant (lead) IO.

3) The PI must formulate a request for certification in consultation with the appropriate IO.

4) The request for certification should:

- be prepared in coordination with the operator's tool development liaison (or designate) to ensure adequate communication between the developer and the operator
- indicate the cost of routine shipboard operations including data processing
- outline the operational requirements for routine deployment and data processing
- detail the availability of spare components,;
- provide information on adequate maintenance facilities
- include an operating and maintenance manual
- satisfy safety considerations
- confirm the long-term usefulness of the data
- confirm accessibility of the data
- provide source code with documentation where appropriate
- define performance specifications (pressure, temperature, vibration, shock limits, etc.)

5) The request for certification must be submitted for approval to the lead IO .The lead IO submits a request for certification to the IODP-MI. The IODP-MI seeks agreement from the other IOs and coordinates a discussion if appropriate. If and when an IO consensus has been achieved, the IODP-MI seeks endorsement by the STP and/or the EDP.

6) If and when the STP and/or the EDP endorse the request for certification, the IODP-MI will issue a certificate confirming the satisfactory conclusion of tests and compliance with all requirements to the PI. A copy of this certificate must be forwarded to the STP and EDP chairs.

7) Maintenance and operation of an IODP certified tool remains the charge of the third party. A certified tool can be scheduled for deployment during an upcoming IODP expedition and would be expected to contribute to the scientific success of the expedition.

8) Third-party tools that do not possess a certificate cannot be programmed for scientific deployment on future expeditions as part of the regular planning process.

IODP

INTEGRATED OCEAN DRILLING PROGRAM

IODP Third Party Tool and Laboratory Instrumentation Development, Procurement and Deployment Guidelines

Version 4.0

September 8, 2008

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Table of Contents

Executive Summary

The IODP Tool Development, Procurement and Deployment Guidelines is the next step in the evolution of the process that governs the development and deployment of tools and equipment, such as laboratory instrumentation new to IODP, which includes tools previously designated as a “third-party tool”

A third party tool, which has been defined as a tool or instrument developed with funds or resources outside the realm of the Integrated Ocean Drilling Program (IODP), must adhere to the development and deployment guidelines established by the IODP Science Advisory Structure (SAS) prior to deployment on any IODP expedition. The IODP SAS, in conjunction with IODP-MI and the Implementing Organizations (IO), has created a policy to provide consistent oversight of third party development activity and to provide guidance to all proponents with technology or developments new to the IODP. This document expands upon the Third Party Tool policy by providing additional contextual and timing elements to assist proponents, Implementing Organizations, and the SAS in executing this policy.

[NOTE: Blue text in the body of this document represents text quoted directly from the Third Party Tool Policy].

Definition

A third party tool has been defined as a tool or instrument developed, purchased, or leased with funds or resources outside the realm of the Integrated Ocean Drilling Program (IODP).

Former Third Party Tool Policy Overview

The guidelines for third-party tool development and deployment have been formulated to reflect that the IOs are primarily responsible for assisting with and monitoring third-party tool developments and reporting status to the STP (Scientific Technology Panel), EDP (Engineering Development Panel), OTF (Operations Task Force), and IODP-MI. It is the responsibility of the scientist wishing to deploy a third-party tool to consult with the appropriate IO early in the development planning process and provide tool specifications and operational criteria. Where the tool is a laboratory instrument to be operated by the proponent, this process may simply require the proponent to define power, space, safety information, and a sampling and measurement plan. Off-the-shelf borehole tools will also require plans for integration with existing systems (e.g., drilling pipe, cable heads, data retrieval and storage). In the case of tool development for downhole or observatory deployment, the investigator must also identify development milestones in terms of both the level and the timing of technical achievements such that the tool will be ready when it is scheduled for operation.

For all categories of tools, the project planning phase must define explicitly the time and resources (funds and personnel) required for both the development (if applicable) and deployment phases. Development timelines and requirements as described below may be modified by agreement between the IO and the proponent subject to approval by IODP-MI. Such agreements will be reported to the STP, EDP, and OTF.

Tool Lifecycle

A number of steps/milestones are required to successfully move a tool from the proposal stage to final deployment, including:

Third Party Tool Idea: A third party tool may enter the program as a proposal or as completed tool.

Development: The tool is designed, constructed, bench and land tested.

Scheduling: If the development process is completed satisfactorily, then the tool may be considered for scheduling by the OTF.

Deployment: The tool is deployed.

Review: The results of the initial deployment are evaluated by SAS and the IODP-MI Operations Review Task Force.

Certification: If development, deployment and review are completed satisfactorily, an application can be made for tool certification to IODP-MI.

Review: Following all subsequent deployments, a tool operations report is provided to the IODP-MI Operations Review Task Force.

Details of these Third Party Tool implementation steps/milestones are provided below and shown graphically in Appendix A.

Implementation Pathways

This section outlines the implementation pathway for the three types of third party tools: Development Tools, Certified Tools, Off-the-Shelf Tools, and Laboratory Instrumentation. A graphical depiction of the process outlined below may be found in Appendix A.

Development tool:

A development tool includes: (1) a new technology that has been created, (2) modifications to existing technology that have been completed, (3) an existing prototype tool untested at sea, or (4) an existing prototype tool that has been used at sea, but has not been certified.

For a (development) tool to be considered for deployment (testing) on an IODP expedition and for eventual certification for standard usage, the following criteria must be met:

1) Identification of a proponent who is the point of contact for the use of the tool.

2) The proponent must formulate a development plan in consultation with the IO most likely to deploy the tool first. In cases where a tool is intended for use on multiple platforms, the appropriate IO will be the one responsible for the first deployment. The lead IO will coordinate with the other IOs and the IODP-MI as necessary.

3) The development plan should, where appropriate:

- indicate the usefulness of the proposed measurements and the financial and technical feasibility of the development.
- include a brief description of the tool, schematic diagram(s), details of the operational procedure, and technical specifications (i.e., dimensions, weight, temperature and pressure ratings, cable-length restrictions, cable type, etc.)
- identify a development timeline in terms of technical achievements and reporting requirements, including a specific deadline for a deployment decision by the IO
- provide for initial testing on land, when possible, and request ship time if testing from the drillship is necessary (subject to OTF approval; see below)
- satisfy safety considerations defined by the operator.
- specify shipboard requirements including data processing necessary to make the information accessible aboard ship, special facilities (emphasizing where the tool is not compatible with existing hardware and software), and appropriate technical support
- specify the data deliverables
- define the tool or instrument performance expectations
- provide for transportation of the tools for shipboard testing, in terms of both cost and time
- contain a signed (pro forma) statement of agreement with these requirements

4) The IO will report the submission of development and deployment plans to the STP, the EDP, the OTF, and IODP-MI. The STP will determine the action on these submissions in accordance with the panel mandate and will provide advice to the IO regarding further tool development. Where engineering development is significant, the STP and EDP will designate individuals to coordinate panel input to the OTF, SPC, and IOs. The EDP may take the lead where engineering is the major focus of the development. The IODP-MI will work in concert with the SAS, the IO's and proponents to ensure that this third-party tools policy is fully utilized.

5) Once the IO and SAS panel(s) endorse the development plan, a staff liaison will be appointed by the appropriate IO to monitor the tool's progress through the development plan. The IO's tool liaison will provide status reports on the tool's progress to the STP, EDP, OTF and IODP-MI.

6) When the lead IO is satisfied that the development has progressed to a point where it is ready for a sea-trial, the lead IO will notify IODP-MI. IODP-MI will then bring the development to the attention of the OTF for a possible scheduling recommendation.

7) With a positive OTF recommendation, an IODP development tool may be scheduled for testing during an upcoming expedition. Development tools must be deployed in test mode (i.e., the scientific success of an expedition must not be contingent upon the proper functioning of such a tool).

8) It is incumbent upon the proponent to ensure that the appropriate IO is fully advised of the tool's status. If the development plan falls behind schedule and the PI is unlikely to have satisfied all of the above criteria prior to a planned deployment, the IO has the right to withdraw the tool from further consideration for an expedition after consulting with the IODP-MI. The shipboard test will be rescheduled after reconsideration by the OTF.

9) Following initial deployment, a tool operations report is provided to the SAS and included in the standard expedition operations report provided to the IODP-MI Operations Review Task Force.

Certified Tool:

A certified tool includes: (1) a new or modified existing technology that has been tested at sea (following the steps described in the previous section for Development Tools). For a tool to be considered an IODP certified tool, and thus suitable for routine scheduling on IODP expeditions, the following criteria must be met:

1) The tool must have satisfied all the requirements for an IODP development tool.

2) The tool must have been tested at sea during an IODP expedition(s) and performed satisfactorily in the opinion of the relevant (lead) IO and the Operations Review Task Force.

3) The PI must formulate a request for certification to IODP-MI in consultation with the appropriate IO.

4) The request for certification should:
- be prepared in coordination with the operator's tool development liaison (or designate) to ensure adequate communication between the developer and the operator
- indicate the cost of routine shipboard operations including data processing
- outline the operational requirements for routine deployment and data processing
- detail the availability of spare components
- provide information on adequate maintenance facilities
- include an operating and maintenance manual
- satisfy safety considerations as defined by the operator(s)
- confirm the long-term usefulness of the data
- confirm accessibility of the data
- provide source code with documentation where appropriate
- define performance specifications (pressure, temperature, vibration, shock limits, etc.)

5) The lead IO submits the request for certification to IODP-MI. If the tool has potential cross platform usage IODP-MI will coordinate a multi-operator agreement. IODP-MI will then seek endorsement by the STP and/or the EDP.

6) Upon STP and/or the EDP endorsement of the certification request, IODP-MI will issue a certificate confirming the satisfactory conclusion of tests and compliance with all requirements to the proponent (with copies sent to the STP and EDP chairs).

7) Maintenance and operation of an IODP certified tool remains the charge of the third party. A certified tool can be scheduled for deployment during an upcoming IODP expedition and would be expected to contribute to the scientific success of the expedition.

8) Following all certified tool deployments, a tool operations report is included in the standard operations report provided to the IODP-MI Operations Review Task Force.

Off-the-Shelf Tool:

Off-the-shelf or leased tools play a vital role in successful IODP operations and they typically include (1) a technology new to IODP that has been utilized routinely in other markets, or (2) leased or purchased tools/instruments from recognized providers.

In order to deploy an off-the-shelf tool during an IODP expedition, the following steps must be taken:

1) Ensure that no other similar technology exists within known IODP tools. Formal or informal discussions should be held with IO's prior to selecting off-the-shelf technology. If needed, the OTF could be consulted.

2) Procure detailed specifications including performance requirements of the desired tool or instrument and ensure that it is suitable to meeting the objectives of a specific IODP expedition.

3) A lead IO will be assigned to work with the proponent to develop a deployment plan. The deployment plan should demonstrate adherence to policy and procedure outlined in the QA/QC Task Force Report adhere to policies and procedures outlined in the QA/QC Task Force Report (http://www.iodp.org/qaqc-taskforce/). The assigned lead IO is determined by the platform on which the technology will first be deployed.

4) The SAS must be informed by the proponent/Lead IO of the potential use of the technology. A positive recommendation by SAS allows the tools or instruments to be considered for scheduling by the OTF. IODP-MI should be briefed on potential tool usage by the lead IO well in advance of the SAS meeting to ensure appropriate time is allocated for discussion of the tool.

5) The results of the initial deployment are evaluated by SAS and the IODP-MI Operations Review Task Force. Following all subsequent tool deployments, a tool operations report is included in the standard operations report provided to the IODP-MI Operations Review Task Force.

Laboratory Instrumentation:

Often it is necessary for a scientist to bring aboard his or her own laboratory equipment in order to meet a specific expedition objective or simply to make the most of the unique opportunity and collect additional exciting and important ancillary data. The third party tool category of Laboratory Instrumentation includes (1) an instrument new to IODP that has been utilized routinely in other markets, or (2) leased or purchased instrumentation from recognized providers.

In order for a third-party laboratory instrument to be included as part of an IODP expedition, the following steps must be taken:

1) Contact the appropriate IO to ensure that the specific instrument is not already a part of the IODP platform's laboratory.

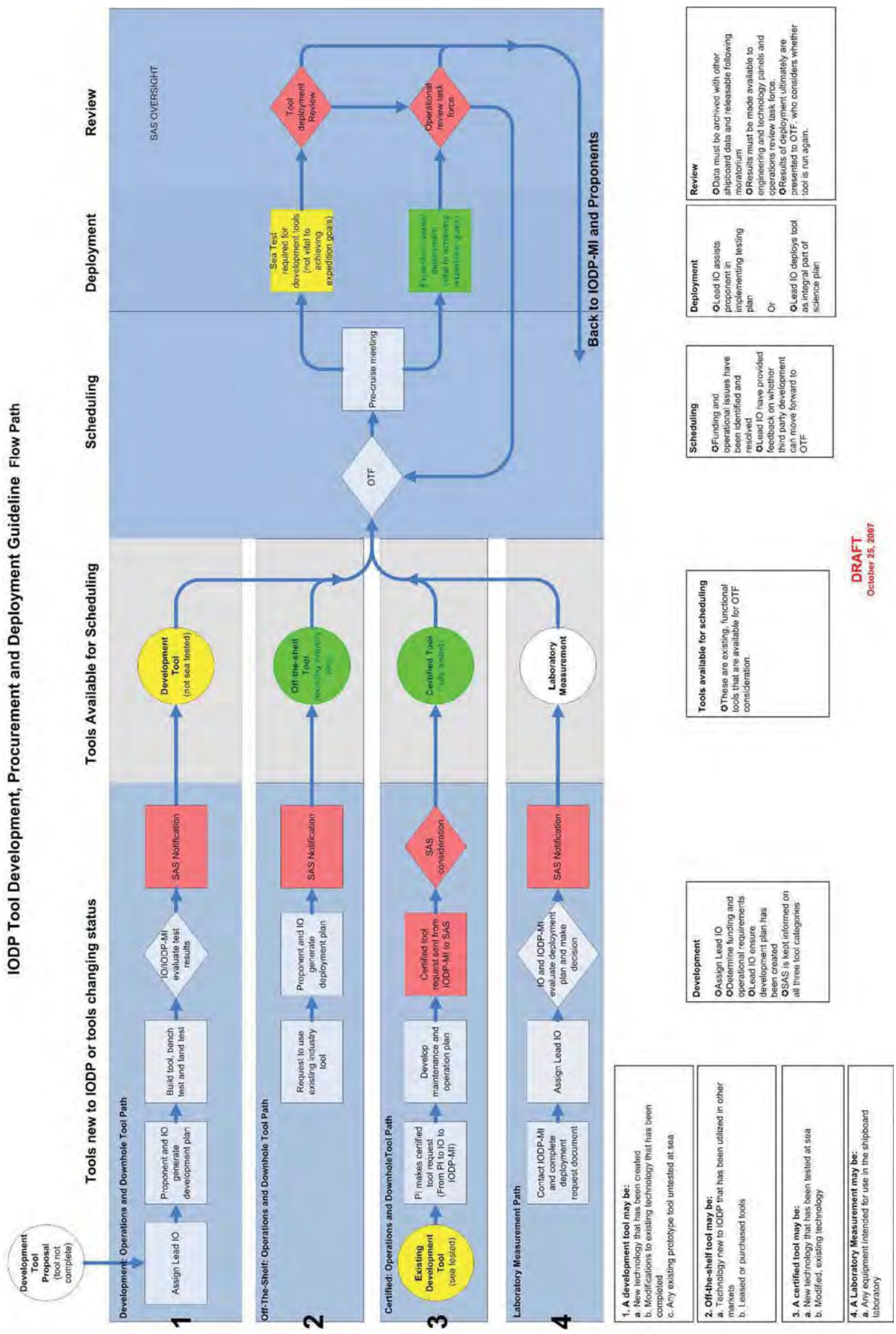
2) Procure detailed specifications including performance requirements of the desired instrument and ensure that it is suitable to meeting the objectives of a specific IODP expedition.

3) A lead IO will be assigned to work with the proponent to develop an instrument deployment plan which will identify the most appropriate laboratory space for the instrument, access power requirements, address data dissemination plans, adhere to policies and procedures outlined in the QA/QC Task Force Report (http://www.iodp.org/qaqc-taskforce/) , and any other logistical considerations that may apply. The assigned lead IO is determined by the platform on which the technology will first be deployed.

4) The SAS must be informed by the proponent/Lead IO of the potential use of the instrument. A positive recommendation by SAS allows the instruments to be considered for scheduling by the OTF. IODP-MI should be briefed on potential instrument usage by the lead IO well in advance of the SAS meeting to ensure appropriate time is allocated for discussion of the instrument.

5) The results of the initial instrument use are evaluated by SAS and the IODP-MI Operations Review Task Force. Following the expedition, an instrument performance report should be included in the standard operations report provided to the IODP-MI Operations Review Task Force.

Appendix A


IODP Tool Development, Procurement and Deployment Guideline Flow Path
Development Tool Proposal (tool not complete)
Tools new to IODP or tools changing status
Tools Available for Scheduling
Scheduling
Deployment
Review
Development: Operations and Downhole Tool Path
1
Assign Lead IO
Proponent and IO generate development plan
Build tool, bench test and land test
IO/IODP-MI evaluate test results
SAS Notification
Development Tool (not sea tested)
Off-The-Shelf: Operations and Downhole Tool Path
2
Request to use existing industry tool
Proponent and IO generate deployment plan
SAS Notification
Off-the-shelf Tool
Certified: Operations and DownholeTool Path
3
Existing Development Tool (sea tested)
PI makes certified tool request (From PI to IO to IODP-MI)
Develop maintenance and operation plan
Certified tool request sent from IODP-MI to SAS
SAS consideration
Certified Tool
Laboratory Measurement Path
4
Contact IODP-MI and complete deployment request document
Assign Lead IO
IO and IODP-MI evaluate deployment plan and make decision
SAS Notification
Laboratory Measurement
SAS OVERSIGHT
OTF
Pre-cruise meeting
Sea Test required for development tools (not vital to achieving expedition goals)
Tool deployment Review
Operational review task force
Back to IODP-MI and Proponents
1. A development tool may be:
a. New technology that has been created
b. Modifications to existing technology that has been completed
c. Any existing prototype tool untested at sea
2. Off-the-shelf tool may be:
a. Technology new to IODP that has been utilized in other markets
b. Leased or purchased tools
3. A certified tool may be:
a. New technology that has been tested at sea
b. Modified, existing technology
4. A Laboratory Measurement may be:
a. Any equipment intended for use in the shipboard laboratory
Development
Assign Lead IO
Determine funding and operational requirements
Lead IO ensure development plan has been created
SAS is kept informed on all three tool categories
Tools available for scheduling
These are existing, functional tools that are available for OTF consideration.
Scheduling
Funding and operational issues have been identified and resolved
Lead IO have provided feedback on whether third party development can move forward to OTF
Deployment
Lead IO assists proponent in implementing testing plan
Or
Lead IO deploys tool as integral part of science plan
Review
Data must be archived with other shipboard data and releasable following moratorium
Results must be made available to engineering and technology panels and operations review task force.
Results of deployment ultimately are presented to OTF, who considers whether tool is run again.
DRAFT
October 25, 2007

JOIDES Resolution Third-Party Tools and Instruments Policy

Draft: July 14, 2013

General Principles Governing Third-Party Tools and Instruments

In addition to the standard instruments and tools that are available on all JOIDES Resolution International Discovery Program (IODP) scientific expeditions, ocean drilling expeditions have historically drawn upon tools or instruments that were purchased or developed outside the framework of the primary contractors. These are known as "third-party tools and instruments". Broadly speaking, tools and instruments can be divided into three types: (1) downhole (transient borehole measurements), (2) observatory (left behind in the hole after hole is completed), and (3) laboratory based (shipboard or IODP core repository). Each of these categories has unique characteristics, but all of them require technical support from the implementing organization (IO) that, in turn, may require approval of associated operating costs by the JOIDES Resolution Facility Board (JRFB).

Support for the purchase or development of third-party tools and instruments can come from a variety of sources. The JRFB cannot impose standards on external funding agencies, but it is hoped that principal investigators and those agencies will ensure that proposals for funding of third-party tools include plans and funds for satisfying the criteria set out in this document. The final responsibility for the use of a third-party tool or instrument during a JOIDES Resolution IODP expedition or in an IODP core repository rests with the IO

Third party tools and instruments must satisfy all of the operational and safety criteria that the IO applies to its own in-house tools and instruments. Careful pre-cruise planning is essential if third-party tools and instruments are to be successfully integrated into the scope of shipboard work. The principal investigator (PI) for a third-party tool or instrument is responsible for providing funds for planning activities, shipping the tool to the site of deployment, and integrating tool deployment into the expedition work and data flow. Work that the IO is expected to contribute must therefore be identified as early as possible to minimize the impact of potential resource requirements.

Funding of a third-party tool or instrument does not guarantee time or space aboard the JOIDES Resolution for use of that tool or instrument. The primary responsibility for integrating a tool or instrument into IODP operations rests with the PI and not with the IO. Should the IO accept a tool or instrument for deployment then there should be no ambiguities in operation and support responsibilities.

Data and/or samples acquired through the use of third-party tools and instruments are subject to the same dissemination rules as any other data or samples collected by the JOIDES Resolution during IODP expeditions. For example, the data produced through the use of third-party tools and instruments will be made publicly available after the moratorium period ends. Any third-party tool or instrument deployment plan must specify the current and potential future data and sample deliverables for the tool or instrument. PIs are required to submit a Deployment Report and relevant digital data files for the "*Proceedings*" volume(s) for the expedition.

Guidelines for Third-Party Tool and Instrument Development and Deployment

Communication is the key to the successful development and deployment of third-party tools. The scientist wishing to deploy a third-party tool or instrument should consult with the appropriate IO early in the development planning process and provide-specifications and operational criteria. For example, for a laboratory instrument to be operated by the PI this process may simply require power, space, safety information, and a sampling and measurement plan. Off-the-shelf borehole tools will additionally require plans for integration with existing systems (e.g., drilling pipe, cable heads, data retrieval and storage). In the case of developmental tools for downhole or observatory deployment, the investigator must identify development milestones in terms of both the level and the timing of technical achievements such that the tool will be ready when it is scheduled for operation.

For all categories of tools, the project planning phase must define explicitly how much time and resources (funds and personnel) are needed and how much the IO is willing to commit during the development phase (if applicable) and during deployment. Development timelines and requirements as described below may be modified by agreement between the IO and the PI, subject to approval by the JRFB.

The following guidelines for third-party tool and instrument development and deployment have been formulated to reflect the fact that the IO is responsible for assisting with and monitoring third-party tool and instrument developments and reporting status to the JRFB. These guidelines indicate a general progression through which new tools and instruments are introduced to JOIDES Resolution IODP operations.

Developmental Tool or Instrument: For a non-certified tool or instrument to be considered for deployment on a JOIDES Resolution IODP expedition, the following criteria must be met:

1) There must be an identified PI who is the primary proponent and point of contact for the use of the tool or instrument by the JOIDES Resolution during an expedition.

2) The PI must formulate a development plan in consultation with the IO.

3) The development plan should, where appropriate:

- indicate the usefulness of the proposed measurements and the financial and technical feasibility of making them,
- include a brief description of the tool or instrument, schematic diagram(s), details of the operational procedure, and technical specifications such as dimensions, weight, temperature and pressure ratings, cable-length restrictions, cable type, etc.,
- identify a development timeline in terms of technical achievements and reporting requirements, including a specific deadline for a yes or no decision by the IO on deployment,
- provide for initial testing on land, when possible and appropriate, and request ship time if testing from the drillship is necessary, subject to JRFB approval,
- satisfy safety considerations,
- specify shipboard requirements such as the data processing necessary to make the information accessible aboard ship, if applicable, any special facilities (emphasizing where the tool is not compatible with existing hardware and software), and appropriate technical support,
- specify the data deliverables,
- provide for transporting tools and instruments for shipboard testing, in terms of both cost and time,
- contain a signed (pro forma) statement of agreement with these requirements.

4) The IO will report the submission of development and deployment plans to the JRFB. The JRFB will normally bear the responsibility of determining action on these submissions and will provide advice to the IO regarding further tool or instrument development.

5) If the IO and JRFB endorse the development plan, a staff liaison will be appointed by the IO to monitor the tool’s progress through the development plan. The IO will be charged with providing status reports of the tool’s progress to the JRFB.

6) With a positive JRFB-recommendation, a JOIDES Resolution IODP development tool or instrument may be scheduled for testing during an upcoming expedition. Development tools and instruments must

be deployed in test mode. By their very definition, they are not certified tools or instruments, and therefore the scientific success of an expedition must not be contingent upon the proper functioning of such a tool or instrument.

7) It is incumbent upon the PI to ensure that the IO is fully advised of the tool's or instrument's status. If the development plan falls seriously behind schedule and the PI is unlikely to have satisfied all of the above criteria prior to a planned deployment, the IO has the right to withdraw the tool or instrument from further consideration for an expedition after consulting with the JRFB. The shipboard test may be canceled, and an agreement may be reached on a revised schedule.

8) If the above procedures have not been followed, then the tool in question cannot be regarded as a JOIDES Resolution IODP development tool or instrument. A development tool or instrument cannot be deployed during a JOIDES Resolution IODP expedition unless the IO and the JRFB are satisfied that the terms of the development plan have been fully met.

Certified Tool or Instrument: For a tool or instrument to be considered a JOIDES Resolution IODP certified tool, and thus suitable for routine scheduling on JOIDES Resolution IODP expeditions, the following criteria must be met:

1) The tool or instrument must have satisfied all the requirements for a JOIDES Resolution IODP development tool.

2) The tool or instrument must have been tested at sea during a JOIDES ResolutionIODP expedition(s) and performed satisfactorily in the opinion of the IO.

3) The PI must formulate a request for certification in consultation with the IO.

4) The request for certification should:

- be prepared in coordination with the operator's tool or instrument development liaison (or designate) to ensure adequate communication between the developer and the operator,
- indicate the cost of routine shipboard operations including data processing,
- outline the operational requirements for routine deployment and data processing,
- detail the availability of spare components,
- provide information on adequate maintenance facilities ,
- include an operating and maintenance manual,
- satisfy safety considerations,
- confirm the long-term usefulness of the data,
- confirm accessibility of the data,
- provide source code with documentation where appropriate,
- define performance specifications (pressure, temperature, vibration, shock limits, etc.).

5) The request for certification must be submitted for approval to the IO .The IO submits a request for certification to the JRFB~~.~~

6) If and when the JRFB endorses the request for certification, the IO-will issue a certificate confirming the satisfactory conclusion of tests and compliance with all requirements to the PI.

7) Maintenance and operation of a JOIDES Resolution IODP certified tool or instrument remains the charge of the third party. A certified tool or instrument can be scheduled for deployment during an upcoming JOIDES Resolution IODP expedition and would be expected to contribute to the scientific success of the expedition.

8) Third-party tools and instruments that do not possess a certificate cannot be programmed for scientific deployment on future expeditions as part of the regular planning process.

IODP Site Survey Data Confidentiality Policy

(Approved by the SASEC, March 2007, with clarifying edits by IODP-MI May 2009)

Site-survey data in support of an IODP proposal must be submitted to the Site Survey Data Bank (SSDB) in electronic form. Data objects submitted to the SSDB are flagged, at the discretion of the submitter, as either non-proprietary or proprietary. The metadata (data that describe an object) of all data objects held in the SSDB, whether of a proprietary nature or not, are publicly available for viewing and downloading. Non-proprietary data objects are publicly available for both viewing and downloading. Proprietary data objects associated with a proposal can be viewed and downloaded by all proponents associated with that proposal (i.e., any proponent registered with the SSDB and given proponent-level access to the proposal by IODP-MI). Additionally, during the period of time that a proposal, or part of a proposal, resides with the Science Advisory Structure (SAS), proprietary data objects associated with the proposal can be viewed and downloaded by SAS panel and committee members for purposes of scientific or safety evaluation and by Implementing Organization (IO) representatives for purposes of expedition planning. All other uses of proprietary data by SAS panel and committee members and IO representatives is forbidden. When a proposal, or part of a proposal, becomes a scheduled expedition, the expedition Co-chiefs, proponents and/or IO are responsible for ensuring that all site-survey data necessary to conduct the expedition and to address all scientific contingencies are copied and/or uploaded to the expedition data collection on the SSDB; this collection is called the *Site Survey Data Package*. A link to the Site Survey Data Package on the SSDB is published in the expedition Scientific Prospectus (SP). The data comprising the Site Survey Data Package, including any proprietary data, can be viewed and downloaded by members of the Science Party when the SP is published. At the end of the expedition sample and data moratorium period, all data in the Site Survey Data Package become publicly available for viewing and downloading. Exceptions to the latter can be made on a case by case basis for proprietary data provided by an industry for-profit organization. Proprietary data objects associated with deactivated proposals that have not become an expedition remain proprietary and can be viewed and downloaded only by the proponents associated with the proposal.

Data inherited from the Ocean Drilling Program were submitted under a policy whereby data were generally considered proprietary unless they were freely available from other data repositories. To honor that policy, legacy data submitted prior to the start of the IODP are flagged as proprietary in the SSDB. Only with the written approval of a responsible proponent can the proprietary status of these data be changed to non-proprietary.

IODP Site Survey Data Confidentiality Policy

Draft – May 2013

Site-survey data in support of a proposal to be reviewed by the *JOIDES Resolution* Facility (JRF) advisory panels must be submitted to the Site Survey Data Bank (SSDB) in electronic form.

Data objects submitted to the SSDB are flagged, at the discretion of the submitter, as either non-proprietary or proprietary. The metadata (data that describe an object) of all data objects held in the SSDB, whether of a proprietary nature or not, are publicly available for viewing and downloading. Non-proprietary data objects are publicly available for both viewing and downloading. Proprietary data objects associated with a proposal can be viewed and downloaded by all proponents associated with that proposal (i.e., any proponent registered with the SSDB and given proponent-level access to the proposal by IODP-MI).

Additionally, during the period of time that a proposal, or part of a proposal, resides with the JRF advisory panels, proprietary data objects associated with the proposal can be viewed and downloaded by JRF advisory panel members for purposes of scientific or safety evaluation and by Implementing Organization (IO) representatives for purposes of expedition planning. All other uses of proprietary data by JRF advisory panel members and IO representatives are forbidden.

When a proposal, or part of a proposal, becomes a scheduled expedition, the expedition Co-chiefs, proponents and/or IO are responsible for ensuring that all site-survey data necessary to conduct the expedition and to address all scientific contingencies are copied and/or uploaded to the expedition data collection on the SSDB; this collection is called the *Site Survey Data Package*. A link to the Site Survey Data Package on the SSDB is published in the expedition Scientific Prospectus (SP). The data comprising the Site Survey Data Package, including any proprietary data, can be viewed and downloaded by members of the Science Party when the SP is published. At the end of the expedition sample and data moratorium period, all data in the Site Survey Data Package become publicly available for viewing and downloading. Exceptions to the latter can be made on a case-by-case basis for proprietary data provided by an industry for-profit organization. Proprietary data objects associated with deactivated proposals that have not become an expedition remain proprietary and can be viewed and downloaded only by the proponents associated with the proposal.

Data inherited from the Integrated Ocean Drilling Program were submitted under a policy similar to that described above. Data inherited from the Ocean Drilling Program were submitted under a policy whereby data were generally considered proprietary unless they were freely available from other data repositories. To honor that Ocean Drilling Program policy, legacy data submitted prior to the start of the Integrated Ocean Drilling Program (2003) are flagged as proprietary in the SSDB. Only with the written approval of a responsible proponent can the proprietary status of these data be changed to non-proprietary.

Site survey data requirements: A simple guide

Early in the life of a drilling proposal, the Integrated Ocean Drilling Program (IODP) Site Survey Panel (SSP) will begin to review the site survey data associated with the proposal. The primary purpose is to ensure that the proposed drilling target has been adequately imaged and has a good probability of being successfully drilled. For example, if the target is a continuous sedimentary succession, the SSP wants to check that there is no evidence for pinch-outs, unconformities or hiatuses in deposition; if the target is igneous basement, the SSP needs to be assured that it has been correctly interpreted and that its depth is consistent with the proposed drilling depth. The SSP normally briefly reviews Pre-proposals after the Science Steering and Evaluation Panel (SSEP) has recommended that a Full proposal be developed. For Pre-proposals, the SSP offers advice on the likely site survey needs. The SSP will also normally review brand new Full proposal submissions. Any proposal for which new data have been submitted to the IODP Site Survey Data Bank (SSDB) will also be reviewed. Once a proposal has been recommended for drilling, the Environmental Protection and Safety Panel (EPSP) will also review the site survey data. While the EPSP may use many of the same data as SSP, they may also require some additional data, which nevertheless it may be useful to collect in an early site survey cruise.

Once acquired, the site survey data should be submitted (in digital form) to the SSDB as described below under “Submitting data to the data bank”. The type of data required will depend on the geological and seafloor environment to be drilled, and will be considered by the SSP and EPSP on a site-by-site basis. This document provides a simple guide to some of the more common data types required, and an explanation of how they are collected and how the panels use them. The IODP is also developing a simple on-line tool that will provide a specific list of requirements in response to some simple questions to the proponent. However, because each site is unique, proponents are warned that these can only be guides, and that additional data may be requested at any stage by the panels. As an additional guide to those unfamiliar with site surveys, this document includes a glossary of the more common types, including an explanation of their use and the data formats required by the data bank.

Basic requirements

Certain basic data are required for all drill sites. These included position (latitude, longitude, water depth), proposed target depth below seafloor, geological or sea-floor setting (e.g., active continental margin, passive margin, open-ocean, ocean crust, bare-rock, palaeoenvironment…), and presence of nearby drill-holes or wells. An indication of man-made hazards (e.g., pipelines), environmental restrictions and/or hydrocarbon shows should be provided as appropriate. This basic information should be given in the site summary forms which accompany a proposal submission.

Surface characterisation

All drill sites require a bathymetric map showing the depth and shape of the surrounding seafloor, and a description of the seafloor lithology (sediment or rock type). Other data will be required depending on the setting. Seabed images (photography or video images) will be required where a site is located on hard rock or irregular rock outcrops. Multibeam bathymetry is *recommended* for all sites, it and/or side-scan sonar (acoustic backscatter) imagery may be *required* in areas of active margins, bare rock outcrop, suspected gas seeps, and when bottom-founded or riser drilling platforms are operationally required. Sea bed samples (rock or sediment) are needed to characterise palaeo-oceanographic, bare-rock, "tectonic window", proposed re-entry sites, and sites with seafloor slope >10°. An assessment of geotechnical properties (sediment or rock strength, etc.) is needed where bottom-founded or anchored drilling platforms are envisaged.

Seismic reflection data

One of the most important site survey data types is seismic reflection, which uses acoustic energy to image sub-surface reflectors. There are several different types of seismic data depending on details of the source and receivers used in acquisition; these are described in the Glossary. A minimum requirement for all sites is two seismic lines that cross at near 90° *at the proposed drill-site.* Further data are often required, or at least highly desirable, to enable interpretation of drilling results to be properly placed in a regional context. The precise type and quantity of seismic data required is decided on a case-by case basis, but generally depends on sub-seafloor penetration depth and geological setting.

Soft rock (sediment)

For penetration up to 100m, two crossing high-resolution single-channel seismic lines may be adequate provided they image the target well.

On passive and active margins with penetration up to 1000 m, a *grid* of crossing multi-channel seismic lines is required, with line spacing typically a few kilometres.

In the open ocean, two crossing single-channel lines are often sufficient for penetration between 100 m and 400 m; for penetration between 400 m and 1000 m, a *grid* of crossing multi-channel seismic lines is required, with line spacing typically a few kilometres.

For sites with penetration greater than 1000 m, either a grid of multichannel seismic (with line spacing to be determined on a case-by case basis), or a full 3-D multichannel survey will be required.

Hard rock

Targets into the *top* of crystalline basement require one single channel or multichannel seismic line.

Targets *within* the crystalline basement require two crossing multichannel seismic lines.

Targets within structurally complex crystalline basement will require a grid of multichannel seismic lines *or* a 3-D multichannel seismic survey, to be determined on a case-by case basis.

Other sub-surface characterisation

Other types of data can supplement seismic data. An assessment of seismic velocity (usually derived either from seismic refraction data or from multichannel seismic processing or where available from borehole logging) is needed to accurately convert seismic travel-time to depth. Velocity information is recommended for all sites, and is required for all riser drilling and for non-riser drilling with greater than 200 m penetration.

Gravity and/or magnetic data may be required (on a case-by-case basis) to assist interpretation of sub-surface structure or rock type (e.g., magnetic data are very sensitive to volcanic rock intruded or buried in sediment, and to ferrous metal hazards on the seafloor such as wrecks and pipelines).

Heat flow data may be required for safety assessment where there are suspected hydrocarbon provinces or suspected high heat flow.

Other data

Additional data will be needed in certain circumstances for environmental and safety assessment. These include, but are not limited to, the following.

Environmental information such as water currents, ice cover, weather window and tidal data will be needed depending on the location.

Measurements of sediment pore pressure and fracture gradients, and predictions of pore pressure, may be needed for safety assessment for riser drilling or suspected areas of high pressure.

An estimate of maturity will be needed in potential hydrocarbon provinces with more than 2 km sediment thickness.

Where drilling in an Exclusive Economic Zone is planned, an Environmental Survey may be required.

Submitting data to the data bank

The IODP Site Survey Data Bank http://ssdb.iodp.org/ is now entirely digital. See Eakins et al. (2006) for an article describing the SSDB. The SSP mainly uses image data (such as maps, graphs and seismic sections) in its reviews, so *all* data should be submitted in an image format (e.g., pdf, jpg, tiff) where appropriate (maps, seismic sections, graphs, velocity profiles, etc.). In addition, proponents are encouraged to upload original digital data in an acceptable format (ASCII table, SEGY, GMT grd file, etc.) A list of acceptable file types is posted on the SSDB web site [http://ssdb.iodp.org/about.php]. Please do not submit Adobe Illustrator or similar application files: convert them to one of the above formats first. *All* images should be fully annotated (including vertical and horizontal scales, latitude and longitude, contour interval, seismic CDP or shot point, etc., as appropriate). In addition, the data package should contain at least one map showing the location of each data object, and proposed drill sites must be marked on all data sections and maps.

Glossary

[Acceptable data formats for the Site Survey Data Bank are given after each item.]

Bathymetry. Consists of measurements and maps of seafloor depth. Usually made from ships using hull-mounted single-beam echosounders (usually with limited horizontal resolution) or **multibeam** (**swath**) bathymetry systems – see below. [SSDB: Bathymetry maps can be image files (PDF, TIFF, JPEG) or document files (PDF, RTF, Word Document); gridded data can be submitted as image files, grid data file, ASCII XYZ file, GMT GRD file, ARC GRD file]

Gravity. Measurements of very small fluctuations in the Earth's gravity field are made by instruments mounted in ships. The results reflect variations in the sub-surface density distribution, and can be used to help constrain sub-surface structure. [SSDB: Gravity maps can be image files (PDF, TIFF, JPEG) or document files (PDF, RTF, Word Document); gridded data can be submitted as image files, grid data file, ASCII XYZ file, GMT GRD file, ARC GRD file]

High-resolution seismic. A type of (usually) **single-channel seismic reflection** in which a higher frequency acoustic source (such as the "Boomer", "Parasound", "Chirp" and 3.5 kHz systems) is used to image the shallow (~100 m) sub-seafloor at higher (sub-metric) resolution than conventional seismic. [SSDB: Seismic data can be submitted as image files (PDF, TIFF, JPEG) or in SEG-Y format]

Magnetics. Measurements of very small fluctuations in the Earth's magnetic field are made using either instruments towed behind (or occasionally mounted on) ships, or, for improved resolution, mounted on deep-towed, remotely operated vehicles (ROVs) or submarines near the seafloor. Magnetic data reflect variations in the magnetisation of rocks and ferrous materials. They are sensitive to the presence of igneous rocks (e.g., lavas, sills and dykes) within or beneath sediments, and also to man-made ferrous objects such as pipelines and ship-wrecks. [SSDB: Magnetic maps can be image files (PDF, TIFF, JPEG) or document files (PDF, RTF, Word Document); gridded data can be submitted as image files, grid data file, ASCII XYZ file, GMT GRD file, ARC GRD file]

Multibeam bathymetry (also known as swath bathymetry). Consists of measurements and maps of seafloor depth. Measurements are made with an array of many (~100) narrow acoustic beams projected from transducers mounted on the hull of a surface ship or of a deep-towed or remotely operated vehicle (ROV) near the seafloor. Typically these systems provide (from surface ships) swathes of bathymetry several kilometres wide with horizontal resolution of ~200 m or better. [SSDB: Bathymetry maps can be image files (PDF, TIFF, JPEG) or document files (PDF, RTF, Word Document); gridded data can be submitted as image files, grid data file, ASCII XYZ file, GMT GRD file, ARC GRD file]

Multichannel seismic reflection. A type of **seismic reflection** system in which multiple receivers (typically 48, 96 or more) are used, usually with an array of seismic sources. This gives much improved signal-to-noise ratio, and offers the possibility of extensive processing to improve the image resolution, penetration and accuracy, to remove interference such as multiple reflections, to estimate seismic velocities in the sub-surface, and to focus the imaging on specific depth intervals of interest. [SSDB: Seismic data can be submitted as image files (PDF, TIFF, JPEG) or in SEG-Y format]

Samples. Many types of samples may be collected. Rock samples are often collected by dredging (dragging a collector over the seafloor) or by using specialised corers or drills deployed from ships. Sediment samples can be recovered using ship-deployed "gravity" and "piston" corers, which can penetrate a few metres to tens of metres into soft sediment. Water samples can be obtained using special sampling tools lowered from ships or mounted on deep-towed or remotely operated vehicles (ROVs) or submarines. [SSDB: Sample descriptions should be submitted as document files (PDF, RTF, Word Document)]

Seismic reflection data. Seismic reflection (often just called "seismic") data are collected by using relatively low frequency acoustic sources to provide a pulse that can penetrate the seafloor and superficial sediments and is reflected at interfaces to form an image of the sub-surface. The system uses sources and receivers towed near the sea surface behind ships. This is the most common data type used in site survey. It can show the disposition of features such as sediment horizons, igneous intrusions, faults, folds, channels and crystalline basement. Typical vertical resolution is a few tens of metres and penetrations can exceed several kilometres. [SSDB: Seismic data can be submitted as image files (PDF, TIFF, JPEG) or in SEG-Y format]

Sidescan sonar. Unlike bathymetry, in sidescan sonar the acoustic beam is directed sideways with a shallow depression angle. Acoustic energy is reflected or scattered back toward the instrument, and its amplitude is displayed against travel-time (a measure of range). Repeated scans build up an acoustic image of the seafloor similar to an oblique aerial photograph over land. Sidescan data are usually acquired using an instrument towed behind a ship, either near the surface or (for improved resolution) near the seafloor. Sidescan is very useful for mapping rock outcrops among sediments, different types of sediment (e.g. mud, sand, gravel), geological structures such as submarine channels and slumps, sites of gas seeps, and hazards such as pipelines and wrecks. [SSDB: Sidescan sonar maps can be image files (PDF, TIFF, JPEG) or document files (PDF, RTF, Word Document)]

Single-channel seismic system A type of **seismic reflection** system in which a single sound source and receiver are used. A basic seismic section can be achieved, but usually with limited penetration, resolution and signal-to-noise ratio. [SSDB: Seismic data can be submitted as image files (PDF, TIFF, JPEG) or in SEG-Y format]

Swath bathymetry. See **multibeam bathymetry**.

3D seismic data This is similar to **multichannel seismic**, except that data are acquired on a very closely spaced grid, typically with a grid spacing of only 25 m in both horizontal dimensions, so that a complete 3D volume of the sub-seafloor is virtually continuously imaged with ~25 m resolution in all three spatial dimensions, and with increased geometrical accuracy. Such surveys are expensive, and limited to relatively small areas, typically a few tens of kilometres on a side. [SSDB: Seismic data can be submitted as image files (PDF, TIFF, JPEG) or in SEG-Y format]

Visual imaging The seafloor may be directly imaged using still or video cameras lowered or towed on wires from a ship, or mounted on deep-towed, remotely operated vehicles (ROVs) or submarines near the seafloor. [SSDB: Visual imagery can be image files (PDF, TIFF, JPEG) or document files (PDF, RTF, Word Document); digital video of the immediate drilling area can be MPEG or DIVX]

References

Eakins, B.W., Miller, S.P., Helly, J., Zelt, B., and the SSDB Staff, 2006. The fully electronic IODP Site Survey Data Bank. *Scientific Drilling*, 2. Download the journal at http://www.iodp.org/scientific-drilling/

IODP SSP and EPSP Drill Site Characterization Data Requirements Matrix

Introduction

In the following document, the indented site characteristics apply to the next higher subheading only. For example:

Numbers 1, 2, 3 etc. are independent of each other: choose one or more that fit your site.
Numbers 2a and 2b are alternatives under 2 but independent of 1.

Thus, if you have a site located on an active margin, penetration depth between 100–400m into sediment without a riser, with no suspected overpressure, numbers 1, 2b(i), and 5a would apply, plus any of 6 to 21 depending on the precise situation.

For more information about many of the data types referred to in this document, see http://ssdb.iodp.org/documents/Site_Survey_Guide_v1.pdf.

Basic Requirements

1. A bathymetric map is required for surface characterization of all sites.
2. Information about lithologic projections and structural configurations is required for all sites. (Usually achieved by seismic profiling using data as indicated in the table below.)
3. Gravity and magnetic data are required by the **SSP** on a case-by-case basis.
4. Weather window, current, ice and tidal data may be required (on location-specific basis) by the **EPSP** (and IO) where these aspects are recognized as a specific threat to operations. Current and tidal data are required by the **SSP** on a case-by-case basis.
5. Information about potential man-made hazards, hydrocarbon shows and environmental restrictions are required by the **EPSP**.
6. Other basic information required for all sites:
    a. Latitude & longitude
    b. Water depth
    c. Depth of penetration
    d. Tectonic/depositional setting
    e. Relevant nearby drill sites and/or wells

Data Requirements

The term “Requirement”, as applied to site survey data in this table, should be interpreted to mean that the listed data types are *usually* required by either the Site Survey Panel (**SSP**) and/or the Environmental Protection and Safety Panel (**EPSP**) for review purposes. Either panel may waive a requirement, or request additional requirements on a case-by-case basis. These panels are also responsible for judging the quality of the available data; poor quality data may not satisfy their "requirements". A site survey data package that does not include all of the "required" data types does not necessarily preclude drilling; the Science Planning Committee (SPC) and, ultimately, the drill ship Operator are responsible for determining whether an expedition can go forward.

Number	Site Characteristic	Data Requirement
1	Site on active/subduction margin	**SSP:** Swath bathymetry; Backscatter or sidescan
2	Target in sediment	
2a	Penetration depth <100 m	**SSP** & **EPSP:** Two nearly perpendicular crossing 2-D single-channel high resolution (or ultra-high resolution if it images the target) seismic lines that image the drill target at the intersection
2b	Penetration depth ≥100 & <400 m	
2b(i)	Site located on active/subduction or passive/rifted/transform margin	**SSP** & **EPSP:** Grid of 2-D multi-channel seismic lines
2b(ii)	Site located away from active/ subduction or passive/rifted/ transform margin (open ocean)	**SSP** & **EPSP:** Crossing 2-D single-channel seismic lines
2c	Penetration depth ≥400 & <1000 m	**SSP** & **EPSP:** Grid of 2-D multi-channel seismic lines
2d	Penetration depth ≥1000 m	**SSP** & **EPSP:** Grid of 2-D multi-channel seismic lines with line spacing to be determined, or a 3-D multi-channel seismic survey (to be determined on a case-by-case basis)
3	Target in crystalline basement	
3a	Target into top of crystalline basement	**SSP:** Single-channel or multi-channel seismic line
3b	Target within structurally simple crystalline basement	**SSP:** Crossing 2-D multi-channel seismic lines
3c	Target within structurally complex crystalline basement	**SSP:** Grid of 2-D multi-channel seismic lines with line spacing to be determined, or a 3-D multi-channel seismic survey (to be determined on a case-by-case basis)
4	Riser required [*]	**SSP:** Swath bathymetry; Backscatter or sidescan; Sub-seabed sound velocity profile (time-depth control); also required by EPSP on case-by-case basis **EPSP:** Pore pressure; Fracture gradient; Pressure prediction; Well program; Abandonment plan
4a	Deep (>1000 m) riser drilling in structurally complex areas (with potential for multiple hazards and environmental and operational risks)	**EPSP:** 3-D multi-channel seismic survey
5	Riser not required [*]	
5a	Penetration depth > 200m	**SSP:** Sub-seabed sound velocity profile (time-depth control); also required by EPSP on case-by-case basis
5b	Suspected overpressure	**EPSP:** Pore pressure; Fracture gradient; Pressure prediction; Well program
6	Drilling into hard rock	**SSP:** Swath bathymetry; Backscatter or sidescan; Surface samples
7	High-resolution sedimentary or palaeontological study	**SSP:** Surface samples
8	Drilling into hard irregular outcrop	**SSP:** Video/Photography
9	Drilling into living reefs or chemo-synthetic communities	**EPSP:** Video/Photography
10	Total sediment thickness at drill site > 2 km	**EPSP:** Organic maturity indicator: e.g., measured or modeled vitrinite reflectance data or other indicator of the extent of possible hydrocarbon generation and/or preservation
11	Suspected gas seep	**EPSP:** Side-scan
12	Re-entry site	**EPSP:** Surface samples
13	Surface slope > 10°	**EPSP:** Surface samples
14	High risk area. (E.g., shelf areas/continental crust and passive and active margins where shallow hazards were previously encountered or are likely to occur, in areas with proven petroleum occurrence.)	**EPSP:** Shallow drilling hazard assessment (usually carried out by contractor/IO)
15	Low risk area. (Same as "High risk area" but for sites on oceanic crust.)	**EPSP:** Shallow drilling hazard assessment may be required (usually carried out by contractor/IO). Determined on case-by-case basis by EPSP
16	Suspected hydrocarbon province	**EPSP:** Heat flow; Hydrocarbon thermal maturity
17	Suspected high heat flow	**EPSP:** Heat flow
18	Drilling in an EEZ (Exclusive Economic Zone)	**EPSP:** Waste disposal plan (on case-by-case basis); Environmental survey (on case-by-case basis)
19	Returns (e.g., cuttings, mud) to the seafloor [**]	**EPSP:** Waste disposal plan [**]
20	Require use of bottom-founded rig [*]	**EPSP:** Side-scan; Geotechnical properties; High resolution magnetic (usually carried out by the IO); determined on case-by-case basis by EPSP
21	Require use of anchored rig [*]	**EPSP:** Geotechnical properties; High resolution magnetic (usually carried out by the IO); determined on case-by-case basis by EPSP

[*] Choice of riser or non-riser vessel or rig type is made by the IODP
[**] Mainly an operator issue; waste disposal plan would normally be incorporated into a drilling protocol document, not prepared by proponent. Particularly important when drilling into living reefs.

IODP approval guidelines for Second Post-Expedition Meetings

General
The main purpose of the second post-expedition meeting is to maximize scientific impact through review and coordination of post-expedition investigations in advance of publication of scientific results in accordance with the IODP Sample, Data, and Obligations Policy. It is the responsibility of the Co-chief scientists with help from the staff scientist to plan for and chair an efficient and timely meeting. The meeting requires authorization by the IODP-MI Science Managers.

Request for meeting and approval process
The staff scientist will on behalf of the Co-chief scientists, and with the consent of the Implementing Organization (IO), submit a meeting request to the IODP-MI science managers (science@iodp.org) for meeting authorization. This request must be made a minimum of 6 months pre-meeting and should include primary and alternate choices for a meeting site, a draft agenda, comments on timeliness in relation to progress of work and publication obligations, a named host, indications of the level of costs (accommodations and facilities) and an initial roster. It should also briefly explain the rationale behind the choices of meeting venue. A majority of the expedition participants must support the choices of meeting venues submitted for approval.

Meeting location and costs
Second post-expedition meetings should take place in an IODP member country and must have a host, preferably an expedition participant. The host will be responsible for all costs associated with the meeting facilities, excluding accommodations and meals. The meeting facility will require suitable meeting room(s), audio-visual facilities, internet access, and printing and copying equipment, as deemed necessary for a specific meeting. Meeting attendees travel on their own travel funds and may seek support from their national IODP program. An appropriate balance of meetings among IODP member countries is desirable. Meeting locations requiring complex and/or expensive travel should be avoided. The national IODP support programs are encouraged to provide guidelines for the level of travel support that meeting attendees can expect to obtain.

Related activities
Holding meetings in conjunction with related scientific conferences or at locations of specific scientific relevance (e.g., geology, institution, outreach) is encouraged. If an associated field excursion is proposed the rationale for this and possible travel and cost implications it might impose on the meeting participants must be documented. Authorization by the IODP-MI of a meeting with an associated field excursion does not imply that meeting attendees will be reimbursed for participation in the field excursion by their national support program.

Agenda Item 17

Core Curation

- KCC Core Curation Process
    KCC Role & Responsibility in the new IODP framework
- Collaboration with Bremen and TAMU

KCC Role & Responsibility in the *new* IODP framework

As a member of the CIB, we at KCC plan to conduct following tasks:

- Curation of samples according to the IODP geographical model
  - Legacy & (old) IODP cores
  - Cores, cuttings and DeepBIOS to be obtained in the new IODP
    Shipping of DeepBIOS outside Japan may not be allowed [Nagoya Protocol].
- Chikyu mirror site
  - Complement sampling & measurements unfinished during Chikyu expeditions
    Complement sampling for JR expeditions in the geographic area assigned to KCC
- Encourage more intensive use of core and related information
  - Offer core information through Virtual Core Viewer, Core Summary and Sample Availability
- Curation-specific research
  - Monitor changes in core quality over long-term storage at room temperature
- Facilitate access to analytical facility of KCC by IODP researchers from abroad
- Pre-cruise training & J-DESC core school
- Follow and revise IODP Sample, Data & Obligations Policy
- Collaborate with 2 other IODP core repositories: BCR and GCR

Curation tasks

- ➢ Core storage management
- ➢ Sample request evaluation
- ➢ Sampling plan for Chikyu IODP expeditions
- ➢ Organize sampling party
- ➢ Sample data management
- ➢ Education & Outreach

Curation of core material

IODP Expedition → IODP core curation

Including Legacy core curation

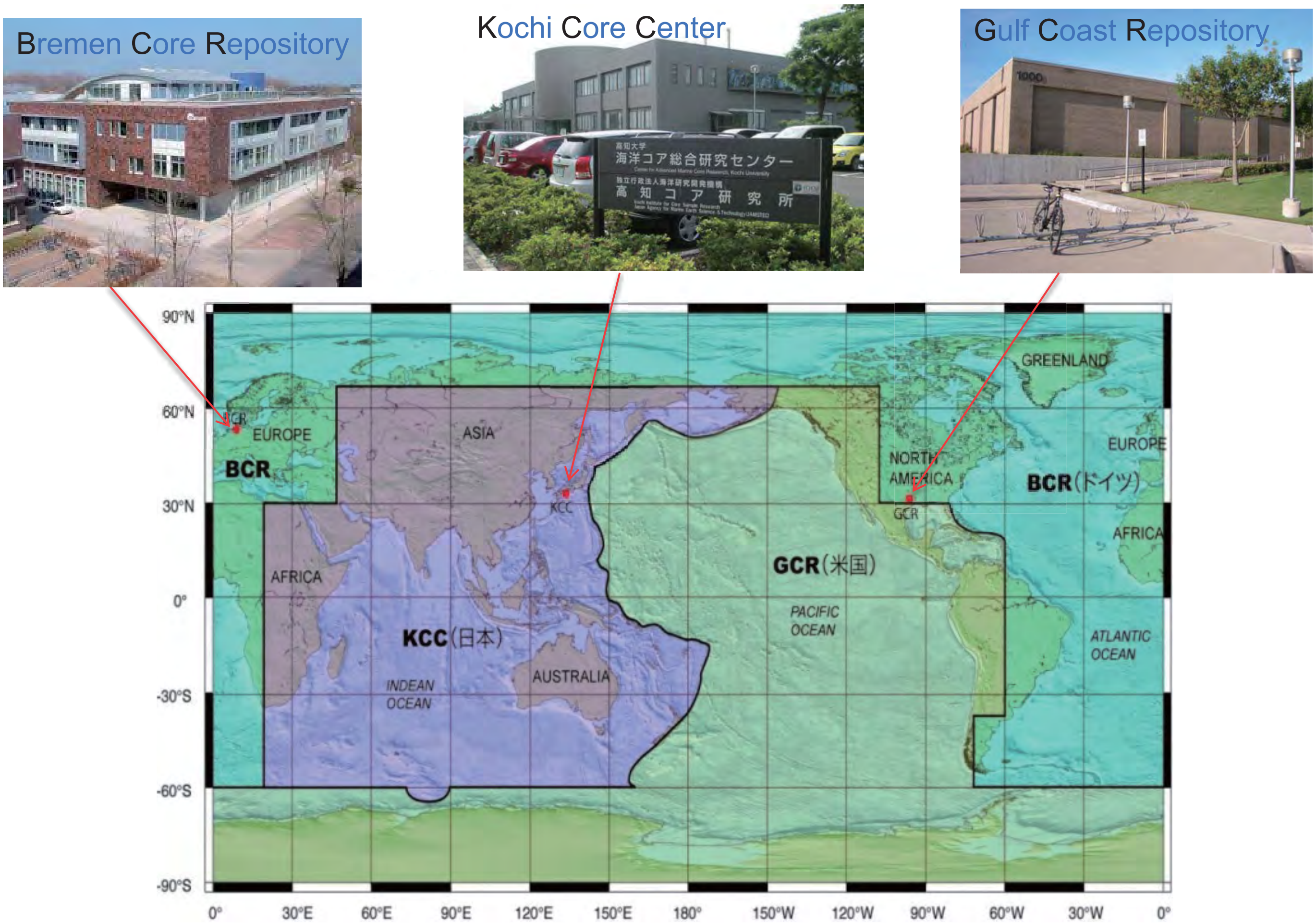
Non-IODP Expedition → JAMSTEC core curation

including Chikyu shakedown cruises

IODP Sample Data & Obligation Policy

- Ensure availability of samples and data to Science Party
- Encourage scientific analyses across various disciplines
- Preserve core material for future description and observations, nondestructive analyses, and sampling
- Support education and outreach by providing core materials to educators, museums, and outreach institutions.

IODP geographic model: 3 oceanic regions, 3 core repositories



IODP & Legacy (ODP/DSDP) cores

Repository	Institution	Amount of core
BCR	University of Bremen	151 km
GCR	Texas A&M University	126 km
KCC	JAMSTEC & Kochi University	94 km
NJ Geological Survey	Rutgers University	0.62 km ODP Leg 150X

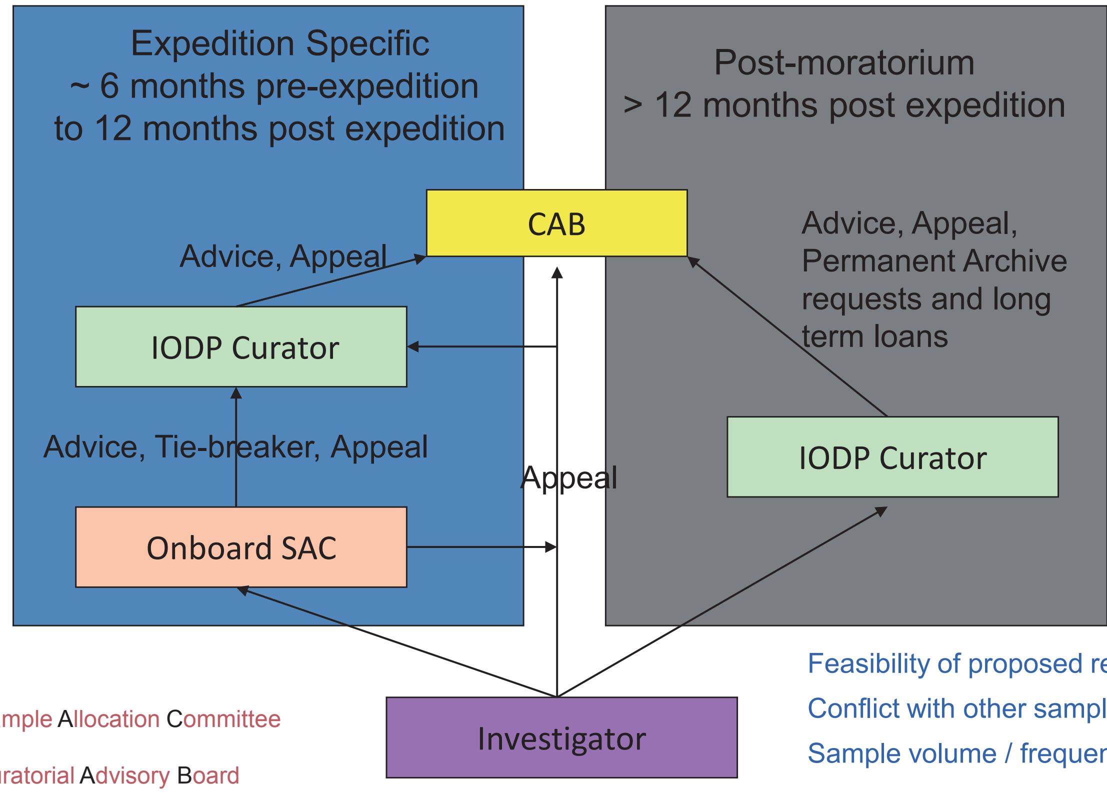
Curation of core material

Storage of cuttings at +4˚C & 80% humidity
622 nos.

Storage of core sections at +4˚C & 80% humidity
ca. 94 km

Storage of whole rounds
(DeepBIOS) at -80˚C
214 nos.

Sample Request decision making

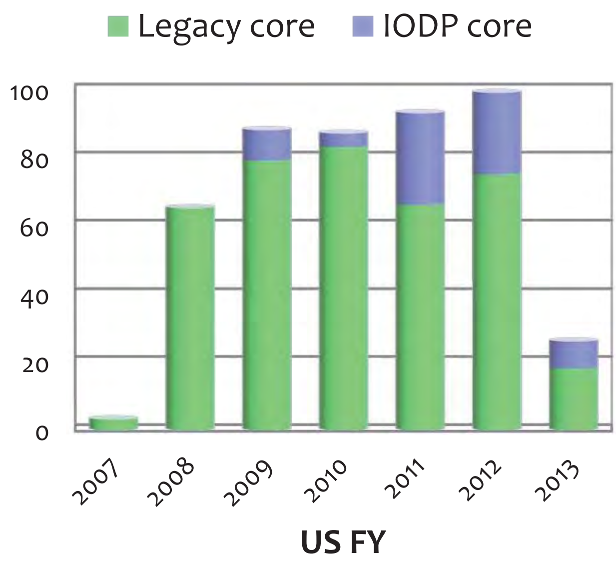


Feasibility of proposed research
Conflict with other sample requests
Sample volume / frequency

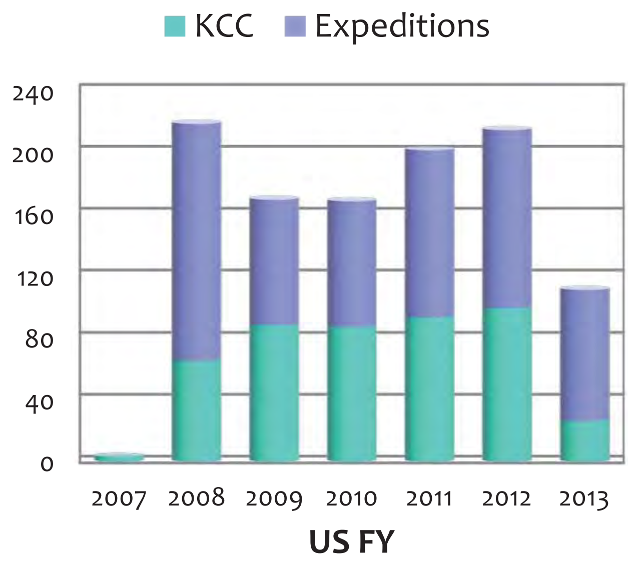
SAC : Sample Allocation Committee

CAB : Curatorial Advisory Board

Sample requests



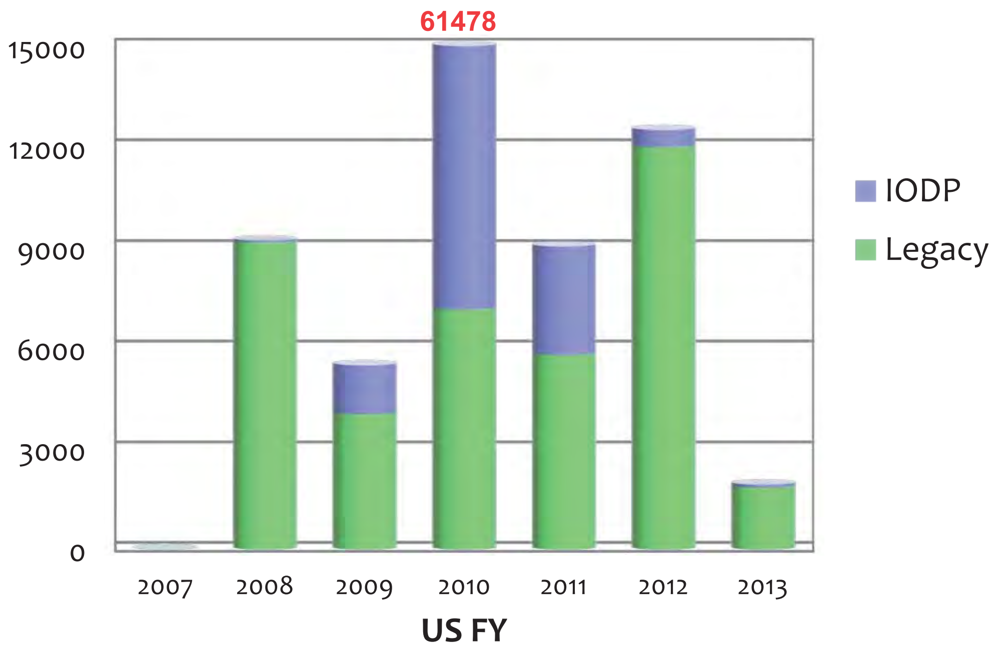
Total 461



Total 1084

(as of Dec. 2012)

Samples shipped

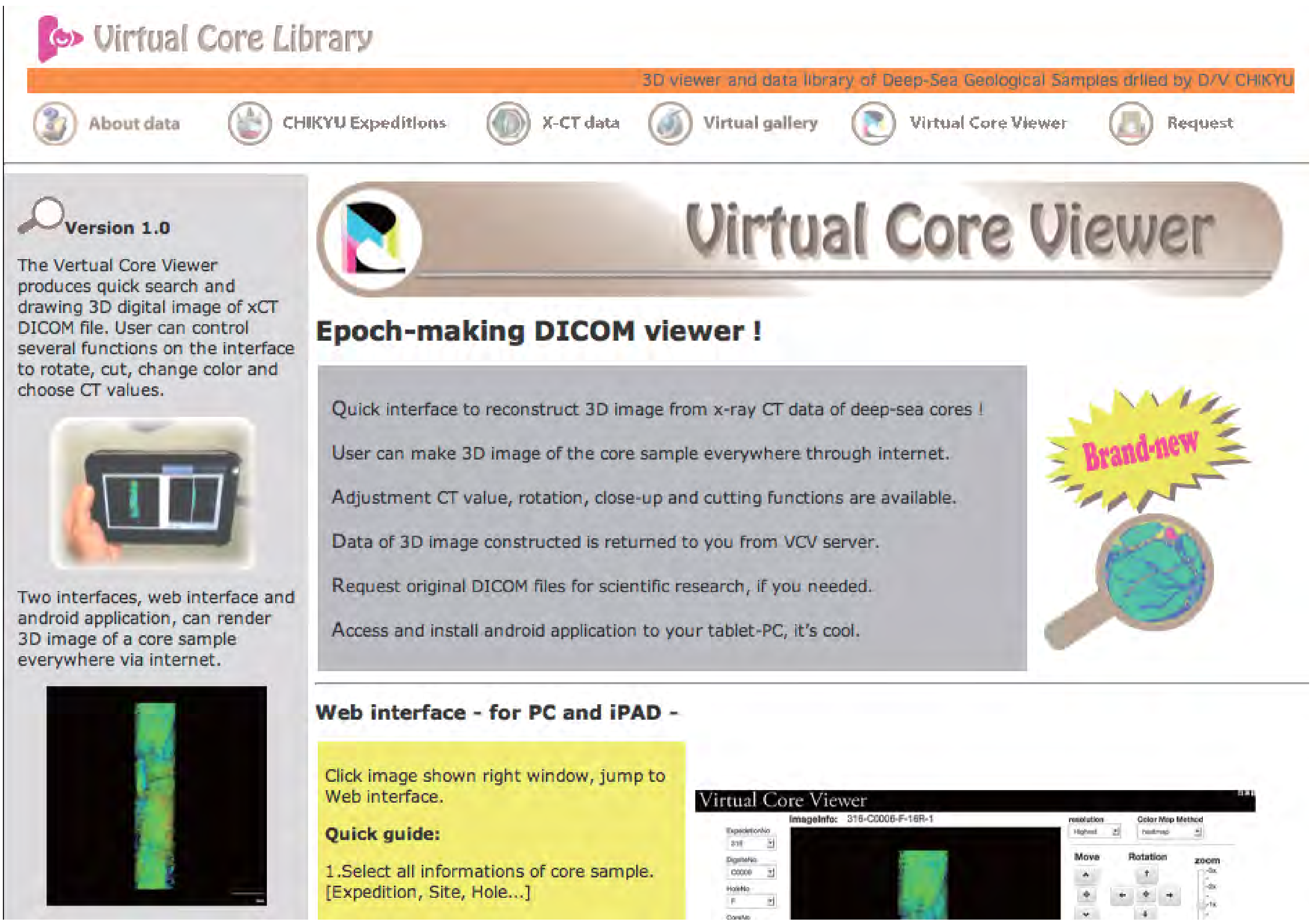


Total 99629

(as of Dec. 2012)

Publications based on sample requests

2	Nature Geoscience
1	Nature Climate Change
4	Paleogeography, Paleoclimatology, Paleoecology
3	Geology
3	Paleoceanography
3	Stratigraphy
2	Earth and Planetary Science Letters
2	Marine Geology
1	Geochimica et Cosmochimica Acta
1	Chinese Science Bulletin
1	Geochemistry, Geophysics, Geosystems
1	Geological Magazine
1	Jounal of Nannoplankton Research
1	Journal of Foraminiferal Research
1	Quaternary Research
1	Quaternary Science Reviews
1	Review in Micropaleontology
1	Studia UBB Geologia
Total 30	



www.kochi-core.jp/cs/

Core Summary

» Check sample availability | » View all core sites (link to Google map) | » Request samples (link to IODP website)

× close search window

Leg / Exp. # 184 | Site # -- | Hole # -- | Location South China Sea

Geological age Holocene ~ Pleistocene | Lithological feature (e.g., diatom, ooze, ash, basalt, etc.)

Water depth range m ~ m | Drilled interval range m ~ m

SEARCH | RESET

Leg	Site	Hole	Geographical location	Latitude	Longitude	Water depth (m)	Drilled interval (m) Top	Drilled interval (m) Bottom	Core length (m)	Core recovered in	Approximate age Top	Approximate age Bottom	All core view, Lithology, Age model, etc.	Core description	Detailed report	Sample availability
184	1143	A	South China Sea	9°22'N	113°17'E	2771	0	407	377.9	Mar. 1999	Recent	late Miocene	Download	Major features	URL	In prepn.
184	1143	B	South China Sea	9°22'N	113°17'E	2773	0	259	246.4	Mar. 1999	Recent	late Miocene	Download	Major features	URL	In prepn.
184	1143	C	South China Sea	9°22'N	113°17'E	2774	0	510	477.5	Mar. 1999	Recent	late Miocene	Download	Major features	URL	In prepn.
184	1144	A	South China Sea	20°3'N	117°25'E	2036	0	453	468.9	Mar. 1999	Recent	Pleistocene	Download	Major features	URL	In prepn.
184	1144	B	South China Sea	20°3'N	117°25'E	2039	0	452	445.9	Mar. 1999	Recent	Pleistocene	Download	Major features	URL	In prepn.
184	1144	C	South China Sea	20°3'N	117°25'E	2037	0	204	198.2	Mar. 1999	Recent	Pleistocene	Download	Major features	URL	Check now
184	1145	A	South China Sea	19°35'N	117°38'E	3176	0	200	186.1	Mar. 1999	Recent	late Pliocene	Download	Major features	URL	In prepn.
184	1145	B	South China Sea	19°35'N	117°38'E	3174	0	207	179.4	Mar. 1999	Recent	late Pliocene	Download	Major features	URL	In prepn.
184	1145	C	South China Sea	19°35'N	117°38'E	3176	0	201	189.2	Mar. 1999	Recent	late Pliocene	Download	Major features	URL	In prepn.

www.kochi-core.jp/sample-availability/

Sample Availability

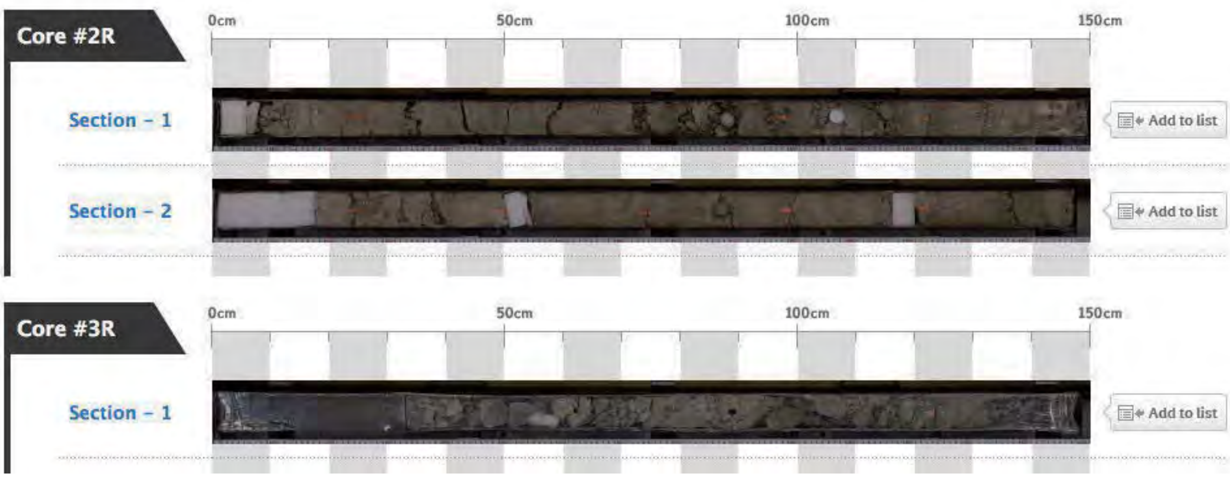
» Sample Availability – Top » Core Summary » Kochi Core Center

You may check here availability of material in Working half of IODP core sections being curated in the KCC.
For lithological details of core material, please consult preliminary reports of expeditions.
If Working half is considerably depleted, samples may be requested from the Archive half.
Please refer to the details in the IODP sample, Data, and Obligations Policy (http://www.iodp.org/program-policies/).

19 | 187 | * | Core | Search | Reset

19–187*

Check the Sample List >



Collaborate with BCR & GCR

- Evaluation of multi-repository sample requests
- Discuss modifications in curatorial procedures
- Discuss modifications in IODP policy

Analytical facility for IODP researchers

- **Opened for IODP community outside Japan since June 2012**

- Logging equipment : *XCT scanner*
  - ***MSCL-S, -color, -NGR***
  - ***XRF core scanner***
  - ***Core Image Scanner***

Pre-cruise training and J-DESC core school

About IODP policy and shipboard measurements

- Pre-cruise training

  IODP Expeditions: 324, 330, 336, 338, 340, 342, 345

- J-DESC core school

  Once every year

Core materials to be received in KCC 2013 - 2014

- Chikyu (IODP Exp. 348 – NanTroSEIZE Deep Riser)

- JOIDES Resolution

  (IODP Exp. 346 – Asia Monsoon)

  (IODP Exp. 349 – South China Sea)

  (IODP Exp. 350 – IBM Reararc)

  (IODP Exp. 351 – IBM Arc Origins)

  (IODP Exp. 352 – IBM Forearc)

Additional repository by March 2014

Curatorial issues in new IODP

- Continuation of CAB (Curatorial Advisory Board) ?
- No STP in new program !
  – Who shall advise on policy/procedural issues ?
- Transfer role of STP to CAB ?

For example, new procedures for core material curation (cuttings, DeepBIOS), modification of IODP Sample, Data & Obligations policy, etc.

Curatorial budget

Existing program : SOC

New program : multi-year contract with USIO,
especially for curation of Legacy and JR cores

(about 400K USD/year)

Further actions

- Secure the budget associated with curatorial activities at KCC, especially for the database renewal and integration
- Work out a plan for transferring core samples to new core storage space
- Discuss how to deal with the Nagoya Protocol on Access and Benefit-sharing (ABS) to genetic resources in Convention on Biological Diversity (CBD)

Agenda Item 18

Data Management

Agenda Item 19

Publication

Agenda Item 20

Outreach Program

Current outreach activities

OUTREACH

Current outreach activity is driven by main two activities for both public relation and education.

Movie and newsletter

Digital contents are important tools to promote the IODP activity for general public. CDEX is responding to changing technology environment for new devices such as PC, tablet PC, smart phone.

CHIKYU TV is our main initiative to realistically convey the situations of scientific drilling, with actual voice of onboard scientists and engineers, tied up with special web contents of each expedition. The internet live was broadcasted to general public during expedition and public events.

This newsletter is also appeared as web site and digital book, involving not only article but also cartoon. CDEX newsletter is published twice a year and distributed at AGU, EGU and JPGU.

CHIKYU TV

Newsletter

Cartoon

Products

CDEX is promoting CHIKYU activities in variety ways. Plastic model of CHIKYU (1/700 scale) was launched by private company with JAMSTEC supervision. All main equipment such as riser pipes, derrick and helicopter deck is reproduced.

About digital contents, CHIKYU virtual tour application was developed with tablet PC, which is downloaded in a total of more than 10,000.

CHIKYU plastic model

Media

Expedition schedule and scientific results are promptly made public for domestic and international press at each case. Briefing sessions for press were held at the end of expedition and the significant scientific achievements.

CDEX also cooperate for reporting in TV program, newspapers, journals and books, as arrangement for interview, onboard reports, ship tour, offering photos/movies and editorial supervising, including BBC, NHK, KBS, Discovery Channel, National Geographic, Scientific American, other prestigious domestic TV programs.

CHIKYU report by BBC   Special TV program by NHK

Port call activities

Port call activities of CHIKYU consisted of open ship for general and special ship tour. Special ship tour is made for stakeholders in IODP activity such scientists, students, media, educators, relating commercial company, congressional representatives and local government officials. Since delivery CDEX had open ship in cooperation with city office at host port and more than 100,000 people visited CHIKYU.

Open ship

Conference exhibition

For exhibition, CDEX participated or offered promotional materials at the annual meetings of Japan Geoscience Union (JpGU), American Geophysical Union (AGU), the European Geosciences Union (EGU), the Asia Oceania Geoscience Society (AOGS) and domestic meetings such as Geological society Japan. CDEX supported town-hall meeting at JpGU, which is organized by Japanese IODP program partnership office J-DESC.

Cooperation for museum

Cooperation for museum involves seven science museums of permanent exhibitions (the National Museum of Nature and Science of Japan, Smithsonian National Museum of Natural History of USA, National Museum of Emerging Science and Innovation (Miraikan), Nagoya City Science Museum, Marient (Hachionhe City Marine Biology Museum), Tsukuba Expo Center, and Mitsubishi Minatomirai Industrial Museum). CDEX/JAMSTEC has been cooperating special exhibition events at science museum.

Lectures and Science Café

CDEX staff and program participants gave presentations more than 10 times a year. Audience for the presentations is students and teachers as well as general public at university, schools, museum and city hall, etc.

Sand for Students (Field excursion program)

Sand for Students is an educational program involving field excursion and observation of rock and minerals. This program was held twenty times since 2005. KCC offers core samples for students to understand the microfossils and characteristics of deep-sea sediments with response to the request. Sand for Students and/or observation of deep sea cores are also available for educators.

Field excursion at Sand for Students

School for Educator

Onboard school for educator was organized twice in 2010. Participants made the educational contents during the school and make public for their onboard experience to younger generation. CDEX inform and support for educator to apply for School of Rock organized by USIO. Two Japanese teachers participated the School of Rock and they got published for onboard experience to Japanese geoscience education community.

CHIKYU onboard school

Agenda Item 21

Review of Consensus Statements and Action Items

Agenda Item 22

Next CIB meeting

Agenda Item 23

Any Other Business