IODP Scientific Technology Panel (STP)

6th Meeting, 18th – 20th February 2008
Sendai Excel Hotel Tokyu,
Sendai, Japan

Synopsis

STP met for 3.0 days in Sendai, Japan. STP considered items (recommendations, consensus statements and action times) from previous meetings, bringing closure to many of these discussions and tasks). In addition STP discussed the status of Microbiology within IODP (in the context of a recent report from the IODP-MI Task Force on Microbiology), the implementation of the recent IODP-MI QA/QC Task Force Report, and the development of an STP Roadmap, combining community input with the IODP Initial Science Plan, and the need to look towards renewal of the program in 2013.

Conflicts of Interest:
Lovell noted he had a potential continuing conflict of interest, having temporarily become involved as a member of ESO following Tim Brewer's death in summer 2007. Since the Beijing STP meeting (August 2007) Sarah Davies at Leicester has taken over the role as coordinator of the European Petrophysics Consortium and Lovell's involvement is now minimal. No other major conflicts of interest were identified at the start of the meeting; but during voting representatives from the Kochi Core Centre (KCC) abstained from voting on matters relating specifically to the KCC.

EXECUTIVE SUMMARY

The STP forwards the following recommendations, consensus statements, and action items to the SPC or the IODP-MI as appropriate, and for distribution to the IOs as required. STP suggestions for whether items should be forwarded to SPC and/or IODP-MI are indicated, as are priorities for action items. Brief overviews/background are provided where appropriate in italics.

STP Recommendations

STP Consensus Statement 0802-01: Implementation of IODP-MI QA/QC TF Report
STP recommends to IODP-MI that the IOs implement the IODP-MI QA/QC Task Force Report. STP asks IODP-MI to request the IOs develop clear implementation plans including default procedures and protocols, and reporting formats (i.e. forms) for documenting deviations to QA/QC, as well as calibration and operation issues. An important aspect of the QA/QC process is the interaction of the IOs with STP (and SAS) in reviewing QA/QC for individual expeditions, and with other IOs, IODP-MI and STP in long term monitoring for single platforms and across platforms and shore based facilities. STP is interested in receiving suggestions for how this engagement between IOs and STP can best be facilitated. STP also asks that the IOs document the nature of standards used in calibrations to encourage dialogue between IOs and consistency across platforms.

STP highlights the following issues and concerns and asks that the IOs consider these:

Quantitative data:

1. *The possibility of circulating standards between platforms? Need to standardize physical standards between platforms;*
2. *The need to limit ability for scientists to change protocols except where valid justification can be made.*
3. *The need to get the science party to buy in to QA/QC: expedition handbook contains QA/QC details; managed by co chiefs and expedition manager.*
4. *A proposal to circulate QA/QC policy prior to expedition. This should be routine for communication between staff scientist and science party*
5. *The emphasis should be on defining a default QA/QC procedure/protocol for each measurement, and identifying exceptions to the default QA/QC.*
6. The need to capture raw (original) data and metadata to enable calibration to be revisited – traceability is vital.
7. Different disciplines use different techniques – the IOs should identify appropriate calibration standards for each measurement (see IODP Measurements Document). Should there be inter-platform standards?
8. The need to document what was done to sample, and time stamp.
9. What happens regarding QA/QC for CORKS, observatories, 3rd party tools, and all post expedition data?
10. The need to define when QA/QC reports will be delivered by IOs: post expedition (3 month) review should detail QA/QC deviations and problems.
11. The need to keep QA/QC reporting simple but thorough.

12. Need to note human factor in some measurements (e.g. cell counting addressed in an STP Consensus Statement 0802-05: Specific Proposals Related to QA/QC for Microbiology): technician and scientist training is important.

Qualitative data

13. Consistency between shifts, expeditions, platforms – need reference slide sets for training of expedition participants to ensure consistency.
14. Consistency between shifts (and parties, for MSP): is it possible to assign scientist/technician to carry out checks and to ensure reporting consistency? For example it may be possible to have 2 different groups of scientists. Random QAQC may be necessary to maintain consistency within an expedition.
15. Digital capture of smear slides, thin sections, fossil assemblages with metadata; need protocols.
16. Need ability to flag data: for example, sedimentologists could flag suspect zones to phys props.
17. Note that scientists, post expedition, often pick data without looking at QA/QC.

Dictionaries:

18. Development and maintenance, and cross-platform issues/consistency (including the Taxonomic Name List (TNL), Digital Taxonomic Dictionary, Litholology List/ Dictionary/ Catalogue).

Long term monitoring
19. How can STP and the IOs work together towards long term monitoring of QA/QC?

Voting record: 16 For, 0 Against, 0 Abstentions
Priority: High
STP suggests this be forwarded to IODP-MI and SPC.

Background to STP Consensus Statement 0802-01: *The IODP-MI QA/QC Task Force reported in autumn 2007 following a final meeting in Beijing in August 2007. It established the framework for IODP shipboard and shore-based QA/QC laboratory procedures, and aimed to establish policies to ensure that the highest quality data possible are produced on all IODP platforms and at associated shore-based facilities. These policies were aimed at defining guidelines for establishing traceability of measurements and observations, documenting procedures, recording results, and determining uncertainty for all data generated by IODP. The document proposed a strategy and means for implementing QA/QC across IOD, whilst leaving the detail to each IO. In open discussions in Sendai, STP identified several items of concern. While many of these are embodied in the original task force document, STP lists these here, together with the need for addressing QA/QC of both quantitative ad qualitative measurements and description, for the benefit of the IOs. This Consensus Statement does not materially revise the original IODP-MI QA/QC document, but seeks to encourage the IOs to implement the recommendations.*

STP Consensus Statement 0802-02: IODP Measurements Document Addendum.
STP recommends that IODP add an addendum to the current Measurements Document that shows those measurements that can affect drilling decisions.

Voting record: 16 For, 0 Against, 0 Abstentions

Priority: High
STP suggests this be forwarded to SPC and/or IODP-MI

Background to STP Consensus 0802-02: *With the current fiscal reality within IODP, STP has taken a fresh look at the Measurements Document to emphasize those measurements that can affect drilling decisions as a specific site and during a specific expedition. If measurement capabilities need to be reduced due to shrinking budgets, it will ensure that measurements critical to drilling decisions are not inadvertently cut from the program.*

STP Consensus Statement 0802-03: Patent Issue
The STP recommends that IODP-MI address issues related to intellectual property rights resulting from IODP activities. STP is particularly concerned with respect to novel materials of potential biotechnological value.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: HIGH
STP suggests this be forwarded to IODP-MI and SPC

Background to STP Consensus Statement 0802-03: *This issue has been addressed in numerous other environmental microbiology programs and the technological advancements of the past few years (e.g., metagenomics, high throughput sequencing, new genome amplification techniques, etc.) mean that such commercially valuable biological information is now relatively accessible. Reference: Lovell's recollection of SCIMPI discussions in Honolulu, HI meeting.*

STP Recommendation 0802-04: Legacy Sample Center at Kochi.
The STP thanks Yuki Morono for his presentation related to the Kochi Core Center (KCC). The STP also requests that IODP-MI ask the Microbiology Task Force to consider whether the KCC can be used as a center for preserving legacy samples in liquid nitrogen for the microbiological community.

Vote: 15 For, 0 Against, 1 Abstentions (Lin)
Priority: HIGH
STP suggests this be forwarded to SPC and IODP-MI

Background to STP Recommendation 0802-04: *There is a consistent need for sample preservation (reference the IODP-MI Microbiology Task Force Recommendations 2/08 and the presentation by Morono-san regarding the KCCBioArchive at STP Sendai Meeting which included a proposal for archiving core samples for biological analysis at the Kochi Core Center). As raised during the presentation, the STP has some concerns about amplification of DNA extracted from legacy samples and the associated QA/QC issues. Reference also the STP recommendation related to Patent Issues.*

STP Consensus Statement 0802-05: Specific Proposals Related to QA/QC for Microbiology. The STP recommends that the following specific tasks be implemented during cruises for which microbiology is a research priority:
- SYBR-Green should be adopted as the dye of preference for direct microscopic counts.
- Adopt cell-counting standards for a given cruise, i.e., establish cross-scientist controls that will account for counting variability between scientists.
- With respect to depth, randomize the samples for cell counts.
- Provide photographic documentation of routine and unique samples.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: HIGH
STP suggests this be forwarded to IODP-MI and SPC

Background to STP Consensus Statement 0802-05: *This recommendation references the IODP-MI QA/QC Task Force report. For SYBR-Green microscopic counts, reference* ***Lunau, M., A. Lemke, K. Walther, W. Martens-Habbena, and M. Simon.*** *2005. An improved method for counting bacteria from sediments and turbid environments by epifluorescence microscopy. Environmental Microbiology* ***7:****961-968.*

STP Consensus Statement 0802-06: Detection and Control of Contamination Issues During Riser Drilling. STP proposes that multiple contamination tests using PFT (PerFluorocarbon Tracer), and fortuitous or additional inorganic tracers (e.g., barium, lithium bromide, potassium bromide) be used during riser coring. Sampling of drilling mud should be scheduled so that microbial communities in this medium can be compared to those in the samples. Also, STP asks EDP to investigate drilling fluids and/or techniques that are less likely to adversely impact interstitial water geochemistry, rock geochemistry, and microbiology. The best way to initiate this may be to have an appropriate presentation to EDP by Rick Colwell (STP member).

Vote: 16 For, 0 Against, 0 Abstentions
Priority: HIGH
STP suggests this be forwarded to IODP-MI, EDP, and SPC

Background to STP Consensus Statement 0802-06: *Drilling fluids contain high levels of active microbial cells and high concentrations of heavy mineral salts (e.g., barium) that are potential contaminants of microbiology and geochemistry, respectively. Growth of microbes in drilling fluids was observed during the training cruise of Chikyu (Inagaki et al. unpublished). The microbes utilize xanthan gum a common drilling mud additive. Also, drilling fluids are highly alkaline and contain high concentrations of specific heavy mineral salts (such as* $BaSO_4$*, LiBr). Thus, these drilling fluids may affect both the core microbiology and the inorganic geochemistry (e.g., pH, specific cation and anion concentrations, etc.) of interstitial water and also trace element geochemistry of igneous rock core (eg lithium isotopic composition).*

STP Recommendation 0802-07: IODP-MI Subsurface Life Task Force Recommendations
The STP thanks the IODP-MI Subsurface Life Task Force for the detailed implementation plan in support of the consensus achieved at the community-wide IODP/JOI Workshop on *Exploring Subsurface Life with the Integrated Ocean Drilling Program* in October 2006. The STP requests that IODP-MI ask the Task Force to respond to questions and issues raised by STP with reference to this implementation plan.

Response requested before the next STP meeting
Vote: 14 For, 0 Against, 2 Abstentions (Ishibashi, Nunoura)
Priority: HIGH
STP suggests this be forwarded to IODP-MI

Background to STP Recommendation 0802-07*: The IODP Science Plan places research related to the subseafloor biosphere among the top priorities for the program. Accordingly,*

there needs to be a sustained effort to develop the interest in the microbiology research community and to develop the IODP sample collection, characterization and preservation practices that are required in order to adequately understand subseafloor life. Following a 2003 working group meeting and a 2006 IODP/JOI workshop on the subject, in September 2007 IODP-MI commissioned a Subsurface Life Task Force that drafted an implementation plan that would advance critical areas for subseafloor life research within IODP. This recommendation is a response to the STP review of that implementation plan with detailed questions and comments derived from the three STP working groups (Petrophysics, Core Description and Geochemistry-Microbiology):

Questions:

Abiotic measurements

1. *It is not clear from the document what petrophysical parameter needs to be determined. Is the measurement of the formation factor the most efficient or even the correct measurement to be made?*

2. *With regards to the formation factor, how are complications (e.g., clay content effect on electrical resistivity) accounted for? Have the costs associated with collecting the formation factor measurements (labor and time intensive) been considered?*

3. *Are there other abiotic properties of the rocks that should be measured or preserved for measurement that will be essential for interpreting microbial activity or distribution (e.g., electron donor/acceptors pairs, grain size)?*

Sampling

4. *Would two sampling protocols be more acceptable based on the science goals of a given expedition? Are there lesser sampling requirements that would be acceptable for non-subsurface life expeditions? Would limiting non-subsurface life expeditions to soft sediment sampling only be sufficient? Can an approach for triaging samples based on sample quality be implemented in order to determine which samples should be preserved?*

5. *Can the task force provide an estimate of the resources (freezer space, personnel, time restrictions, etc.) required for legacy sampling?*

6. *What are some of the logistical requirements required post-cruise (e.g. shipping frozen samples, long term archiving)?*

7. *With respect to the legacy sampling program, are the techniques for such sampling sufficiently evolved? Are there examples from other environmental research programs where such sampling has been undertaken that could serve as a model for this proposed effort? Are there other situations, possibly more controlled or lower risk (e.g. shallow lake sampling) where sufficient experience could first be gained? What is the basis for recommending the legacy sample protocol including the frequency of collection, sample size, replicate number, etc.? Would "archival sample" be a better term?*

Contamination testing

8. *Without specialists how would contamination be identified later? Would contamination need to be assessed on the ship, after shipment or by the post-cruise meeting? Will contamination testing be implemented across platforms in a consistent manner?*

Comments

1. *The state of the science of microbiology is not yet at the point where such detailed procedures can be established. Before STP can recommend a fixed, long-term sampling plan for legacy samples, we need a testing period for microbiology.*

2. *STP suggests that in order to be tested, microbiology should be added as a science goal for all missions over the next few years. This would ensure microbiologists would participate in all the legs, and that at least some post-cruise funding would be available for analysis. The remainder of IODP Phase 1 could be used for this testing and with legacy sampling to begin in Phase 2 (2013). If this model is used, then there is no loss of opportunity for microbiology, unless no microbiologist sails. What are the criteria that would need to be achieved during the remainder of Phase 1 of IODP to establish microbiological legacy sampling during Phase 2?*

3. *Subsequent evaluation of the microbiology dataset would then be used to develop a fixed, long-term sampling plan. These data could also be used to perfect sampling and analytical techniques.*

4. *One of the major concerns is the total loss of information for whole round sampling (no smear slides, etc), as occurred on the Chikyu shakedown cruise. Soft- sediment sampling with syringes is not as much of an issue because the sample can be analyzed.*

5. *Actual sampling strategy should be in agreement with the science goals for a given expedition? No automatic sampling is recommended because of the potential permanent loss of large intervals of data. STP, as a scientific community, would be more willing to accept a permanent loss of data if it can be proven that the microbiology sampling and subsequent analysis has a significant benefit to science.*

STP Consensus Statement 0802-08: Core-Log Seismic Integration.
STP requests:
1) A response from CDEX and ESO with regards to the procedures and/or methodologies to be used to carry out such integration.
2) A response from the IOs with regards to comments on the still draft version IODP Depth Scales Errors and Corrections document, and
3) A response from CDEX with regards to their latest experiences with core log seismic integration from the recent Expeditions 314-316.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: Medium
STP suggests this be forwarded IODP-MI

Background to STP Consensus 0802-08: *STP requested (Recommendation 0708-17) an update from the IODP-MI (DMCG and/or DSWG) on the status of STP Recommendation 0507-09 with regards to the inclusion of depth correlations between core, log, and seismic data.*

In addition, IODP-MI has developed two documents:

1) *IODP Depth Scales Terminology (Version 1.0 – June 14, 2007): completed, and the related document.*
2) *IODP Depth Scales Errors and Corrections (Draft Version 1.0 – June 14, 2007)*

USIO has provided a response to this request indicating the tools and procedures used to carry out this integration.

In light of these documents and also because of recent drilling experience The initial recommendation 0507-09 suggested that standardized software was necessary across all IODP platforms for making inter-hole composite depth sections of recovered cores, for core-log-seismic integration, and for comparison of depths between multiple expeditions to the same study area potentially by different platforms. Discussions at IODP-MI ??? concluded that the development of a standardized software was not practical. The depth scale working group (DSWG), however, was instigated to 1) provide a set of commonly understood definitions (document 1 above which is now complete) and 2) the document regarding depth scale errors and corrections which is currently in draft form only and needs to be completed.

STP Recommendation 0802-09: ***Virtual Core Repository at Kochi Core Center (KCC).***
STP thanks Lallan Gupta for his presentation on the proposed Virtual Core Repository at KCC, and acknowledges the potential positive impact of such a repository to the quality of IODP science.

STP recommends KCC to investigate the feasibility of integrating 3-D core images with downhole measurements such as televiewer images and logging data, and to report back on future developments of the project.

Vote: 15 For, 0 Against, 1 Abstentions (Lin)
Priority: Low
STP suggests this be forwarded to IODP-MI

Background to STP Recommendation 0802-09: *Lots of X-ray CT scanner data on whole cores are being generated onboard Chikyu, but currently there is no routine way of disseminating this information effectively (i.e., 3-D vs. 2-D image analyses) to the scientific community. The proposed virtual core repository is an attempt to solve this problem.*

STP Consensus Statement 0802-10: Lithologic Description Reference Collections
The STP recommends that all platforms maintain a basic set of reference slides for lithologic description. These smear slide and thin section collections should illustrate the main lithological constituents of marine sediments and igneous petrology. Additional sets keyed to regional sedimentology/ petrology would add to the utility of the reference collection. The ability to refer to a set of standards will improve QA/QC.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: High
STP suggests this be forwarded to IODP-MI.

Background to STP Consensus Statement 0802-10: *The STP recognizes that QA/QC on qualitative data such as core description is an issue. The STP views a lithologic description reference collection as one of the few means of improving consistency of collection of such data. The STP makes a clear distinction between the inclusion of general microfossils in this*

lithologic description reference set, and a taxonomic micropaleontologic reference set.

This issue has been addressed in STP Consensus Statement 0708-12: Common reference collections
STP recommends the IODP-MI to establish a work plan that can provide common reference collections for smear slides and thin sections across all platforms as soon as possible. If necessary this work plan could be endorsed by an ad-hoc working group similar to that created to consider micropaleontological issues

Background to STP Consensus Statement 0708-12: Common reference collections for smear slides and thin sections is a long-term issue, that has been previously addressed in STP recommendation 0507-02. These recommendations were superseded by IODP-VCD/Lithology Report, but STP has concerns over the specific point of common reference collections, whose current status is unclear.
STP Recommendation 0507-02 proposed that "common reference collections for smear slides and opaque minerals in polished thin sections should be prepared for all drilling platforms and on-land facilities". This is a follow up to that recommendation. STP also suggests IODP-MI investigates using such collections in education and outreach efforts.

STP Consensus Statement 0802-11: Acceleration of Paleontology Coordination Group
The STP thanks IODP-MI for its response to the request from the Paleontology Coordination Group (PCG). However, STP expresses its concerns that for over a half-year, the PCG could not proceed because of a lack of communication between IODP-MI and PCG. STP recommends that IODP-MI should maintain frequent contact with the PCG, and by such communication, thus aid in the efficient progress towards the development of a Taxonomic Digital Dictionary.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: High
STP suggests this be forwarded to IODP-MI

Background to STP Consensus Statement 0802-11: *This is related to STP Consensus 0708-21 and 0612-06 from Paleontology WG 2004 Report Recommendation PALEO-3.*
STP requested that IODP-MI instruct the PCG to accomplish Levels 1 (taxonomic name list) and 2 (synonymy) for each fossil group within one year as a standard list for IODP after thorough review. This process began immediately. The PCG met in Berlin on 12-13 August 2007 to develop an action plan. The PCG has been ready to proceed with development of Levels 1 and 2 since this meeting in August, but did not receive guidance from IODP-MI. Thus, there has been no practical progress for a half year.

Relevant statements in previous consensus and recommendation are shown below:
STP Consensus 0708-21: *STP welcomes further progress on Digital Taxonomic Dictionaries. STP requests IODP-MI instruct the PCG to accomplish Levels 1 (taxon name list) and 2 (synonymy) for each fossil group within one year as a standard list for IODP after thorough review. STP also requests IODP-MI to provide guidance on responsibility for maintenance of the database.*
Background to STP Consensus 0708-21: *Taxonomic Dictionaries with stratigraphic databases IODP must coordinate their efforts regarding digital taxonomic dictionaries and cyber atlases and related issues with other national and international initiatives such as CHRONOS, NEPTUNE and et. al. The Paleontology Working Group recognizes the*

importance of international cooperation and interaction among the IOs and the micropaleontologists community and encourages collaborations with IMRC curators to develop these dictionaries to be used on the IODP drilling platforms The microfossil groups to be covered should include calcareous nannofossils, planktic foraminifera, benthic foraminifera, diatoms, silicoflagellates, radiolarians, and palynomorphs (dinoflagellates and pollen). The taxonomic dictionaries for the Cenozoic and Mesozoic should be updated and expanded on a regular basis (e.g., at least once per year).

STP Consensus Statement 0802-12: IODP Drilling Proposal SSEP Review Form.
STP requests that the SSEP continue to bring to STP's attention any potential issues within a given proposal that would need STP input and comment. This could be through the re-introduction of the Review Form proposed by STP in 2005.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: High
STP suggests this be forwarded to SSEP, SPC, and IODP-MI

Background to STP Consensus Statement 0802-12*: iSciMP at the Edmonton, Rhode Island, Boston, and Kona meetings revised the proposal cover sheet to allow issues to be highlighted regarding non-standard measurements and instruments that would be needed to achieve the science goals. This new cover sheet was designed to allow SSEP to bring the proposal to the attention of STP for comment. To date, we have only received 3 proposals (all at the Bremen, 2005 meeting) to comment on. Although the pressure on the SSEP is recognized, we request that their continued vigilance is necessary to ensure that the proposals that go out for external review and on to SPC are of the highest quality.*

STP Consensus Statement 0802-13: Open Hole VSP
STP thanks EDP for their advice on this issue and recommends that planning for open hole VSP surveys be initiated early in the pre-expedition planning stages and that adequate expedition time is allocated to collecting the VSP data.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: Medium
STP suggests this be forwarded to IODP-MI

Background for STP Consensus Statement 0802-13: *STP requested advice from EDP (STP Consensus 0601-03) regarding the capabilities for open hole VSPs. EDP investigated the situation and noted that the equipment exists and no engineering development is required. STP determined that successful planning was the key requirement to acquiring high-quality VSP data. It was also noted that in most cases the VSP is used as a vertical seismic check-shot and not a full VSP survey.*

STP Consensus Statement 0802-14: Vp Measurements on Core Samples at High Pressure
STP considers this issue (statement 0708-17) closed. After the facility has been completed and data have been collected, STP requests that CDEX present a summary of Vp results to STP.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: Medium
STP suggests this be forwarded to IODP-MI

Background for STP Consensus Statement 0802-14: *CDEX has been working on technology to measure Vp on core samples at high pressure and is establishing a facility to do this on the Chikyu. CDEX purchased and will install equipment in an onboard laboratory during March 2008 dock work. The specifications of the equipment include a pressure vessel rated to 200 MPa (maximum) and a receiver capable of operating at frequencies as high as 2 MHz without data loss. This work is built upon the Vp work in previous statements:*

0507-05 Methods for measuring Vp & Vs under pressure.
0601-02 Investigation of T/P-controlled physical properties measurements
0601-03 Vp & Vs at elevated pressures for the riser vessel
0606-08 Measurements at High Pressure and Temperature
0612-02 CDEX report on feasibility of Measurements at High P &T
0708-17 Vp Measurements on Core Samples at High Pressure

STP Consensus Statement 0802-15: New down-hole magnetic susceptibility tool (MSS).
STP thanks Trevor Williams for his excellent presentation on the new downhole magnetic susceptibility tool that was developed by the borehole logging group (LDEO).
STP encourages IODP-MI to enable the deployment of the new tool during IODP expeditions and is impressed with the quality of the pre-cruise test results that were presented.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: HIGH
STP suggests this be forwarded to IODP-MI

Background to STP Consensus Statement 0802-15: *During the following discussion, STP raised questions on absolute calibration of susceptibility data. It appears that the Borehole Logging Group is doing about as well as can be done, as there are no absolute calibration standards for this tool. The magnetics community uses standard materials (i.e., magnetite) as a general calibration method, and this is what BLG is doing. A suggestion was made to exchange calibration samples between Lamont and US-MI labs. A further question regarding the multi-frequency capability of present sensors was raised? Present tool uses single frequency sensors.*

STP Recommendation 0802-16: Curatorial Advisory Board (CAB)
In response to a request from IODP-MI, STP nominates Noritoshi Suzuki for membership of the CAB with respect to micropaleontology.

Vote: 15 For, 0 Against, 1 Abstention (Suzuki)
Priority: Medium
STP suggests this be forwarded to IODP-MI

STP Consensus Statement 0802-17: Oriented Cores.
STP thanks Youn Soo Lee for his presentation on oriented cores. STP brings this to the attention of the IOs in order that if they are orienting cores all data and associated metadata need to be captured and be available in the database.

Vote: 16 For, 0 Against, 0 Abstentions
Priority: Medium
STP suggests this be forwarded to IODP-MI for distribution to the IOs

Background to STP Consensus Statement 0802-17: *Oriented cores necessary to fully interpret paleomagnetic, structural and anisotrophic physical property data.*

STP Consensus Statements 0802-18: Noritoshi Suzuki
STP would like to thank Noritoshi Suzuki for his contribution to the panel. As the only known person who truly understands the MRC concept, we will miss his contributions to micropaleontology- related issues. We regret that he was not able to secure funding for MRCs, but submit that in memory of his hard work for the past 3 years, we will actually discuss future proposals that mention the MRCs, rather than simply receiving them.

STP Consensus Statements 0802-19: Hongkui Ge
The STP would like to thank Hongkui Ge for his contribution to the panel. Now that we know how to pronounce his name, we hope to have him return to the panel so that we can practice its correct usage. We have considered the possibility of enshrining the number on his credit card in homage to its remarkable contribution to STP progress. However, we decided that this deification of a number would be premature (and also, we would not be able to use it anymore).

STP Consensus Statements 0802-20*:* Noritoshi Suzuki
The STP would like to thank our host Noritoshi Suzuki for his outstanding hospitality as host of this meeting. We are grateful for his detailed presentations on shopping, transportation, and MRC. We appreciated his enthusiastic leadership. We will always remember the Radiolarian on a Stick, and suggest that in future meetings the host consider making their own stuffed representatives of their research interests. We especially appreciate his commitment to our safety, and his assurance that, should we survive, he'd happily lead us out of the building following an earthquake.

STP Consensus Statements 0802-21: Yuki Yoshioka
The STP wishes to thank Yuki Yoshioka for her work as executive host of the STP meeting. We greatly appreciate her assistance in meeting all of our special needs, including translating menus, providing directions, and aiding in the smooth progression of the meeting itself. We also greatly appreciate her ability to organize the meeting files, etc., and recognize a great time saving (over having the chair and vice chair attempt to do this). Because of this, we request that Yoshioka-san be present at all future STP meetings, especially those held in Japan. We also suggest that in the future, IODP-MI refer to her as Hohoemi no Koakuma (the smiling devil).

STP Consensus STP Consensus Statements 0802-22: Yasufumi Iryu
The STP wishes to thank Yasufumi Iryu of Tohoku University for his extreme generosity and hospitality to the panel. Our time spent in the teahouse greatly aided the strengthening of the STP "*spirit"*. In the future, the teahouse might benefit from advance notice so that they can be fully stocked up on tea before arrival of such a parched crowd.

Action Item 0802-23: Scientific Technology Roadmap
STP members are encouraged to develop a dialogue with the IODP community in discussing possible additions and changes to the draft Scientific Technology Roadmap. This should include reviewing reports from recent IODP workshops.

Action by: Clive, Brandon, Beth, and Rick.
When: Two weeks prior to the next meeting.

Proposed next STP meeting: 14-16 July 2008 or 28-30 July 2008
Location: Europe or Canada (either date)
Host: TBN or Doug Schmitt

IODP 6th Scientific Technology Panel Meeting

18 - 20 February 2008,
Sendai Excel Hotel Tokyu,
Sendai, Japan

Final Agenda

Monday 18th February, Start 09.00

1. Welcome, meeting logistics, safety, introduction, Robert's Rules, COI (Suzuki/Lovell/20 minutes)

2. Approval of meeting agenda (Lovell/10 minutes)

3. Approve Minutes from STP Meeting #5 (Lovell/10 minutes)

4. Preliminary discussion of next meeting locations and dates; panel rotations. (Lovell/10 minutes)

5. Review status of previous meeting action items and recommendation (includes proposal statistics from SSEP) (Kawamura/IODP-MI/20 minutes)

6. SPC Report (including IODP Implementation Plan) (Mori/20 minutes)

7. SAS Activity: EDP (Lovell/10 minutes)

8. Consideration of issues from routine reports, supplied pre-meeting, from IODP-MI, SPC, lead agencies, & IOs; discussion focused on issues raised by Panel Members (no formal presentations) (60 minutes)

Lunch

9. SODV Update (USIO) (30 minutes)

10. IODP Implementation Plan (15 minutes) – taken as part of Agenda Item 6 - (Mori)

11. IODP Budget Reduction Models Summary of progress from IODP-MI (Larsen). Note no further input from STP is requested by IODP-MI). (5 minutes)

12. Consideration of outstanding issues from previous meetings, including the following from the previous meeting and any other outstanding items: (90 minutes)

    a. IODP-MI QA/QC Final Report (IODP-MI)
    b. STP Consensus Statement 0708-12: Common reference collections (IODP-MI)
    c. STP Consensus Statement 0708-13: Post-Expedition Data Capture (IODP-MI/IOs)
    d. STP Consensus Statement 0708-14: STP Geochemistry and Microbiology WG report (IOs/IODP-MI)
    e. STP Consensus Statement 0708-15: Open Hole VSP (EDP)
    f. STP Consensus Statement 0708-16: Temperature and pressure resolution, accuracy and calibration (IOs)
    g. STP Consensus Statement 0708-17: Vp Measurements on Core Samples at high pressure (CDEX)

h. STP Consensus Statement 0708-18: Core Log Seismic Integration (IODP-MI (DMCG and/or DSWG)
i. STP Consensus Statement 0708-19: Core Splitting Techniques (IODP-MI)
j. STP Consensus Statement 0708-20: Seismic Sources (IOs)
k. STP Consensus Statement 0708-21: Progress report on Paleontology Coordination Group (IODP-MI)
l. STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog. Progress report from IODP-MI.
m. STP Action Item 0708-33: Measurements that Affect Drilling Decisions

End: 17.30

Tuesday 19th February, Start 09.00

13. IODP Measurements – Measurements Affecting Drilling Decisions

14. Expedition reviews: (90 minutes)
    a. scientific technology issues - raised by STP, IOs and/or REVCOM. IODP
    b. Operations and Planning: discussion on how STP can best review operations, including assessing the success of QA/QC procedures across platforms, and how any review mechanism links to the proposed IODP-MI reviews of expeditions

15. Development of STP Roadmap – session 1 (60 minutes)

Lunch

Development of STP Roadmap – session 1 continued (60 minutes)

16. Microbiology report from IODP-MI (small task force meeting, September 2007 to discuss science and implementation issues in microbiology; this report and the Vancouver WS report (in Scientific Drilling, this fall issue) will be considered (Colwell for D'Hondt). (60 minutes)

17. Proposal for a Microbiology Reference Centre (Morono: 30 minutes)

18. Virtual Core Repository (Gupta; Kochi Core Centre: 30 minutes)

End: 18.00

Wednesday 20th February, Start 09.00

19. Magnetic Susceptibility Sonde (USIO/Williams)

20. Development of STP Roadmap – session 2 (120 minutes)

21. Panel Rotation; review of STP expertise and future needs (30 minutes)

22. Select Meeting Location, determine outline agenda and propose provisional dates (30 minutes)

Lunch

23. Finalize Consensus Items and Recommendations (120minutes)

End: 16.00

Meeting participants:

Panel Members

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ECORD/ TBN			

(*chair, **vice-chair; *** unable to attend)

Alternates Attending:

Schmitt, Doug	doug@rock.phys.ualberta.ca	(alternate for Natalie Vigier)
Ishibashi, Junichiro	ishi@geo.kyushu-u.ac.jp	(alternate for Minoru Ikehara)

Liaisons and Guests Attending:

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IODP Scientific Technology Panel (STP)

6th Meeting, 18th – 20th February 2008
Sendai Excel Hotel Tokyu,
Sendai, Japan

MINUTES

In these minutes, the Recommendations, Consensus Statements, and Action Items are not repeated in detail or in their final format. Please refer to the Executive Summary above for the full and final text of each, as indicated.

The minutes are not intended to be a literal transcription of the meeting. Statements represent overall the speaker's comments and are not intended as direct quotations. Text in reduced fontsize represents additional notes.

Monday 9:00
Lovell opened meeting, introduced Suzuki-san;

Suzuki-san introduced meeting logistics and gave an overview of the perilous seismic hazards present in Sendai.

9:15 Introductions of panelists

Present: All panelists except Vigier (Schmitt substituting) and Ikehara- san (Ishibashi-san substituting)

Approval of agenda: Monday will focus on reports; reduce ongoing recommendations/ consensus statements. Tuesday will focus on open discussion on how to review drilling operations and assessing QAQC, and development of roadmap with focus on success for renewal of program. Wednesday will focus on return to roadmap; MSS tool; panel rotations; meeting location; finalized consensus statements

Neal added finalization of IODP measurements document associated with drilling decisions

9:31: Agenda approved
Minutes from last meeting approved at 9:30 (moved by Neal)

9:35 Conflict of interest policy reviewed; 2 conflicts of interest identified: Lovell, who has been involved with guiding Leicester's relationship to ESO although he is not currently receiving funds from IODP-MI (and doesn't do much in this capacity as Head of Department); and Weirin Lin, who abstained from voting on matters related to the Kochi Core Center (KCC). Ishibashi and Nunoura abstained from Life Task Force recommendation because they are on Task Force.

9:37 Robert's Rule of Order reviewed; Neal reminded panelists to speak clearly to enhance participation of all panel members and liaisons, particularly those who are using English as a second language

9:40
STP mandate reviewed
Panel rotations reviewed at 9:40
Brief discussion of location of next meeting; order dictates that next meeting should be in Europe, thus a European host is sought (including Canada).
Mori said that SPC is looking for a late August meeting and requests STP work around that schedule; Larsen suggests consideration of agenda; Lovell summarized the possibilities: whether the meeting should be held preceding SPC (July) or following SPC (Autumn). There was a clear view that STP should meet before the next SPC meeting
9:50 Presentation by Kawamura. IODP-MI Science Coordinator
Overview of proposal submission process
SAS meeting schedule, noting first SAS meeting (SSEP) in Korea
115 active proposals with only 3 new proposals submitted for last deadline (0ct 2007)- the lowest ever, with lead status led by US, thenECORD, then Japan. The majority of the proposals are basin Pacific Ocean. Most are non-riser proposals.
New issue of Scientific Drilling, including IODP/ICDP Fault Zone Drilling WS Report, which is distributed via website.

9:55 Kawamura reviewed status of previous action items, Recommendations and Consensus Statements, deferring most explanation of most responses to preliminary reports, with the exception of wireless in the meeting rooms, which he notes Suzuki-san has *Terminated*.

Neal noted that ESO and CDEX reports do not address all recommendation and consensus statements; Kawamura clarified that IODP-MI assigned ESO and CDEX to respond/comment on specific action items.

10:00 SPC and SASEC reports by Jim Mori. Long-term planning is key to successful renewal, with goal of in 2013, being able to show successful program. Most of his report focuses on critical planning/ strategies linked to the next 5 years. Expedition scheduling impacted by delays on JR and MSP NJ margin, with significant impacts from budget issues. Likely JR scheduling is such that the first likely leg will be Equatorial Pacific, followed by Canterbury and Wilkes Land. Chikyu is doing non-riser drilling and then non-IODP work. Propsal pressure is high (23 sent by SPC to OTF), which is enough to fill next 4- 5 years. The OTF should not be scheduling on basis solely of logistical and cost issues; instead, SPC should re-prioritize proposals.

Neal asked for clarification on reprioritization. Mori responded that 2 groups of proposals are sent to OTF: high and low priority based on relationship to initital science plan and which give a good balance to the entire program. They ignore logistics and cost initially; now SPC is looking to re-evaluate proposals on science, but incorporating cost and logistics, with the fear that OTF will focus on high recovery/ high number of holes at the expense of some more expensive programs (such as CORK). Ultimate goal is to still maintain science as the baseline for reprioritization.

Neal asked for further clarification on gaps. Mori agreed that SPC is looking to ensure there are no gaps in planning, relative to the science plan.

Neal asked if STP can assist. Mori noted that STP can aid in proposal planning by assessing QA/QC of data collected, etc.

Johnson asked if scheduling/ geography plays a role in selection; Mori confessed that logistical issues may ultimately play a role but SPC has not yet decided on that. Castillo noted that these considerations are important for proposal writers.

Mori-san indicated proposals were pulled back with nearly everything going back to SPC and left a few very highly ranked proposals to OTF for scheduling.

Missions are being used as a way of bringing in umbrella types of proposals to ensure rapid delivery of high importance science. Mission Monsoon was not designated as a mission because it's already being covered in other areas. Birth of Oceans was not designated a mission because the proposals were disparate and not packaged as a uniform program. Mission Moho was nearest to the mission concept, but deemed too challenging scientifically. Thus, mission proposals are tough to implement but it's a great concept and may be part of 2013, although no new calls for mission proposals will go out. Functionally, NanTroSEIZE is a mission although not designated as such.

CDP (Complex Drilling Project) is similar to a mission but it's been a long-standing part of the program. No one seems to be able to distinguish between the two, although CDP proposals are in action. Sagami Bay Seismic Monitoring was designated as a CDP but Izu-Bonin-Mariana Arc Evolution was not. There are a total fo 3 active CDPs.

Implementation plan (SASEC) for Phase II is an update to the ISP (initial science plan). Upshot is that the program needs to reach major milestones etc. but provide balance between cost, risk and impact. Four areas of scientific foci emerged, but public response indicated scientific community should guide scientific program through proposal competition, and not SASEC via the 4 targeted areas of research. Thus, SPC and SSEP will refer to focus areas in ISP to judge the science. Science planning meeting in late 2009 will produce an ISP.

SPC accepted and received recommendations. Acceptance constitutes an endorsement or accepts some responsibility, whereas receiving may leave an action item, etc. in limbo. Mori reiterates that it is imperative that an STP member be a representative at SPC. Most recommendations were received; 2 were accepted (IODP measurements and integrating microbio sampling). SPC agreed with both 0708-09 and 0708-10 in principal but formally received the item. SPC notes it receives many recommendations but they have limited opportunity for action on many of them, In particular, policy issues can only be endorsed by them. There needs to be a way to close the loop on statements.

Eguchi (former IODP-MI Science Coordinator) responded there are 2 types of policy. One can be forwarded to SASEC, the other can be sent to IOs.

Lovell reiterated that in the past, there was no way to directly communicate with the IOs, but now that it can go through IODP-MI that has aided the ability to communicate. Still, there is a need to close the loop so that IOs can respond to STP with respec to comments from IODP-MI. Mori agreed with the statement.

Lovell summarized that no recommendations have been bounced back to STP.

Neal asked about the statements that SPC received but didn't know what to do with it (e.g., 0708-04). Will it languish? Mori indicates there are some responses in the notes from SPC. Lovell reiterates that STP must check the meeting notes from SPC to ensure there is action on a particular item. This will enable items stay active. Colwell agreed that he followed this approach. When sending items back, Mori-san noted that including a direct action for SPC would be useful for them.

10:40. EDP meeting summary by Lovell. Major comment was EDP Consensus 0801-14: VSP. Background is such that VSP problems existed during ODP time, and that industry and

the EDP may be able to improve on VSP. EDP focused only on the basic vertical check-shot and not the more complex definition. Ultimately discussion revealed that the time allowed for the VSP impacted success, which in turn is linked to scientific objectives, and therefore resources, and thus out of their purview.

Higgins notes document on air-gun statement illustrates frequency of VSP. They identified insufficient planning for VSP therefore not maximizing capability shipboard. Thus, they suggest the standard protocol must be modified at time, and this is something STP can successfully comment on. Despite it is being done routinely, it's not being done as well as it can be. Lovell summarized the problem is not an engineering issue and so it must be addressed, but from a monitoring perspective. Castillo volunteered it's a QA/QC issue.

SSEP benefits from the presence of EDP at SSEP; STP might also be useful, although it's an issue with cost and ability of one person to cover the whole STP mandate..

Neal thought that SSEP would formally request a representative and appropriate expertise would be sent. Lovell commented that a checklist coversheet was forwarded to SPC to aid readers in identifying unusual aspects of proposals (such as CORK). However, no completed coversheet has ever been returned to STP, and no proposals have been sent to STP for comment on scientific technology issues at an early stage.

Larsen indicates he can look into coversheet; Lovell wants to clarify that STP is not interested in telling SPC what to do. Neal volunteered to track this down. Mori indicated this is on the agenda for SPC and so will be useful input.

10:55. Change in agenda order, to move Item 9 and 11 before lunch. Item 8 and 12 will be considered after lunch to facilitate breakout groups.

10:55- 11:15. Break.

11:15 Houpt presented SODV update. Progress is significant, but there is still more to be done. Challenges include slippage of shipyard delivery and keeping pace between engineering designs and other deliverables. Likely, the delivery will be much later than March 31, with a revised schedule coming in before mid-March.

Neal asked if there is a penalty to the shipyard for the delay. Houpt suggests that a return of funding is possible. Johnson said that with the Langseth, the shipyard was very delayed and they found it difficult to retain contract workers (shakedown sailed with 50% crew because of this, and was reduced to 12 hour days). Jack asked that he make it clear that TAMU is delivering science capabilities on time. Christensen asked if micropaleo labs are isolated with doors; Houpt indicated that final drawings are still in flux. Neal indicated original plans had separation space from the work area. DESClogik is the data capture application they've developed for electronic capture of data. Custom NGR development proceeding. Other shipboard laboratories are also proceeding, including purchase of instrumentation (XRD, etc). There is some slippage in delivery of science systems but all will be shipped and deployed for first leg. NSF requires an IOC (Independent Oversight Committee). For scheduling, Equatorial Pacific and Southern Ocean cruises (Canterbury and Wilkes Land) are on line, but funding and scheduling are still up in the air. Christensen asked about time required for setup (42 days discussed in presentation and so on). Higgins added that estimates for ship coming onboard include all work on ship, thus September estimates are for date of ship release to operations. Larsen asked for details on IOC. Houpt said it's in preparation, with Delaney organizing and recruiting committee. Higgins indicated assessment is difficult to organize without firm schedule. Houpt confirmed that Southern Oceans would still be focus of operations, but both legs have weather windows.

11:45: Lovell introduced Larsen, who summarized budget reduction models (without visual aids). IOs have prepared a set of models from baseline to very high set of measurements. Basically, costs come in when you start splitting and describing cores, and nearly 90% of cost savings is consumed at that point. Recalled that STP recommended splitting, and SPC and others have endorsed that. Thus, we are moving forward on calculating costs, which include splitting. As the deployments get closer, IOs are better able to predict costs. The most essential guidance has been given (split cores); the rest is too complex for meaningful guidance from STP. A further complication is that a rearrangement of budget allocation has occurred; Science Operational Cost budget has been further divided into operations costs and other on NSF request. How it will work exactly is still under discussion. Funding models will continue to change as we learn more about costs with new vessels and operations.

Lovell summarized that budget-related issues are of concern, but in flux.

11:50 Lovell proposed lunch at 13:00.
11:55 Break-out groups reviewed, and leaders identified.
All groups evaluate QA/QC report; Post expedition data capture (0708-13)
Core description: B: Item 0708-12; K, L: 0708-21, 23
Petrophysics: EFGHJ: items 0708-15, 16, 17, 18, 20
Core description and geochem/ micro: I: item 0708-19
Geochem and Microbio:D: item 0708-14

Direction: Read through the 3 IO reports. Consider each item and determine if there has been a satisfactory response from each group. Then, look at reports, and identify any topics not on the list that STP should address as a group. Groups will work until breaking for lunch at 1:00. Then, break-out groups will reconvene from 2:00 – 3:30.

Lovell reconvened the group at 3:40. Petrophysics presents first, then core description and then Geochem/ Microbiology.

Johnson summarized petrophysics. They recommend closing out many of the action items/ recommendations. Under QA/QC, many of the issues go beyond the purview of the STP. The remaining recommendations/ consensus statements are summarized in the working group document. In summary, the petrophysics group was happy with most of the reports with the exception of core-log seismics.

Lovell asked for questions. None were raised. Suggested core-log seismic integration may be a recommendation statement (Schmidt and Johnson "nominated") for follow-up by STP.

Higgins notes there are already action items from IODP-MI on depth scale issue, so question is how to issue an action item on action item. Lovell indicates that STP should develop a recommendation to IODP-MI asking for status. Kawamura updated creation of data document, and tried to initiate discussion with IOs but then data manager left. New data manager may move forward. USIO expressed confusion. So, Lovell suggests a recommendation or consensus statement to rejuvenate forward motion, which should be written by Paul and Doug after they talk with Kawamura and Higgins. Larsen commented on post-expedition data recovery, and noted they are looking into this as a project with MARUM (Bremen University) in Germany.

Core description group is presented by Georges Gorin. QA/QC discussion was deferred. Reference collections are necessary and play an essential role in QA/QC. This should be a recommendation (Gorin, Christensen).
Lovell asked for comment by IOs and got none.
Houpt asked for clarification. Suzuki suggested a set of complete set of reference slides would be prohibitively expensive. Therefore a very general reference set is necessary for smear slide identification.
Christensen and Gorin will write the recommendation, asking for this across all platforms.
Roehl comments that scientists who sail are invited for their expertise and thus they should know what quartz looks like; the general consensus is that it is not a perfect world and sometimes the scientist won't be a specialist in all aspects of it. Suzuki suggests preparation of practical sets of smear slide collection would be a good outreach opportunity.
Neal reminds us that the smear slides are curated already and so could be used to easily develop a set of smear slides from what was already collected during ODP. Lovell suggests this be part of the recommendation, for both smear slides and thin sections.

Naruse presented core splitting techniques, which is closed as the new core splitter will produce a surface with very low roughness for USIO. Neal asked CDEX and ESO. CDEX says their new one is too rough still and don't have the money to replace the existing splitter and hope to get a new on in the future. Houpt asked for clarification on variation in surface roughness for XRF core scanner (1 mm). Roehl added that new core splitter in ESO is an improvement over the JR and is about as good as it gets, due to the problems associated with lithologic variation. They use an XRF scanner that can take more variability. Lovell summarizes that the USIO and ESO core splitters are OK but that CDEX may have some issues. Lee-san commented that core splitter required for paleomagnetism utilizes.

Naruse presented Paleontology Coordination Group (STP 0708-21).
May need a recommendation from STP to address USIO need for taxon list. Larsen commented that issues developed later in fiscal year of last year, and is now trying to squeeze in the available funding. He notes it takes 1 to 1.5 years to implement such things. Larsen commented that IODP-MI needs guidance on responsibility of maintenance of database, particularly since there is no funding.
Suzuki commented that the PCG is not dependent on funding.
Lovell asked for clarification, that IODP-MI will slowly but surely develop database. Larsen said he's moving forward with development of database. Lovell suggests that database maintenance is not an issue until the database is developed. Suzuki-san says PCG is working with IODPMI on voluntary basis, and so the lack of communication is the greatest hindrance and not the funding. Lovell summarized that a better dialogue between PCG and IODPMI will aid in lead to greater progress; Suzuki-san will write a recommendation to encourage dialogue. Lovell suggested leaving discussion of maintenance until later, when database is begun.

Naruse presented lithology dictionary development.
IODP-MI should identify the e-mail discussion group it refers to in its report and this may need action.
Also, there is little apparent communication between the IOs. Roehl confirms that ESO is using the USIO list but it will vary by expedition. CDEX is using J-CORE lithology. Strater is being used by all IOs for platforms.

Larsen confirms that there should be no central lithology definition as determined by a meeting about 1.5 years ago, so that each expedition could develop its own nomenclature that is documented. A second meeting was held to see if IOs could do this. Lovell summarizes the clarification from the IOs indicates there is good communication between them. Tomorrow we will discuss the existing email discussion group. Larsen indicates that this is not a formal group and has been dissolved. Lovell suggests this item be closed, with the caveat that it be revisited.

Colwell led Geochem/ Microbiology WG report. It is unclear where the legacy samples, should they be collected, be sent. Ultimately it seems to be a circular issue- legacy samples should be collected, and so they are held at high cost, but don't get requests, and drop them, and then finally microbiology argues that they are necessary. They suggest IODP be proactive about alerting people to the availability of these samples. Colwell asks if there is an online reference. Houpt confirms it would likely be a direct request to the curator, and not available through a Janus search.
Summary? The issue is not closed.

Colwell indicates QA/QC needs not directly addressed by USIO for microbiologists. Houpt responded that specifics for any discipline were not included in original documents, and each platform would develop its own. Colwell reiterates that the task force brought up the issue. Lovell asked for clarification on needs, Colwell returned that a set of procedures need to be in place so that routine samples can be collected apprpopriately. Nunoura pointed out that contamination testing is very important, and biomass counting is also important. Lovell summarized that we need to return to QA/QC, and raise concerns that IOs take these into consideration as they develop their procedures (beware of being too restrictive). Neal suggests that recommendation state that they recognize that there are many techniques, and that the IOs maintain consistency. Nunoura brought up the fact that there is little agreement among the community. Higgins reiterated that this is a long- standing problem. Lovell suggests this be continually monitored, and thus Colwell and Nunoura should stay on STP forever. Houpt reminds us that the same methodology may be applicable across all 3 platforms. Lovell asks that they return to it tomorrow.

Colwell continues with post-expedition data capture, which they feel has been adequately addressed and can be closed. STP Consensus 0708-14 has 4 elements. They say the rec 4 should include understanding that sampling for microbiology (and training) should be part of tech's job. Core splitting techniques are adequate but they caution that 1) the WRC may be necessary and 2) a microbiologist should be present when core is split.
Lovell clarified that for 0708-14, is item closed? Ishibashi-san asked for comment from ESO and CDEX; Lovell asked Colwell to write a recommendation (on Rec 3) to elicit a response form ESO and CDEX.

Lovell asked for questions. None came. He summarized.
Item 12 and IO reports have been reviewed; Recommendations for Item B (Christensen, Gorin), D (Colwell), H (Schmitt, Johnson), K (Suzuki, Christensen). The others have been closed. Some issues remain with microbiology legacy samples but that discussion is postponed to QA/QC. These may not be all be recommendations; instead a request for an explanation may be appropriate for Item H.

4:55. Lovell inserted Item 13 into agenda (measurements affecting drilling decisions). Neal presented outcome of electronic discussion on identification of measurements that could impact drilling decisions. All safety measurements are essential minimum measurements. Roehl asked why thin sections affect drilling decisions but not smear slides. The panel agrees that thin sections could influence drilling decisions, and so can smear slides. Neal clarified for Lovell that with respect to downhole logging, it influences drilling decisions at that hole, and for future holes. Lovell queried if borehole depth scale would impact decisions; Schmitt confirms that it could happen if your measured depth and seismic depth are inconsistent. Lovell points out that it could impact subsequent holes. Larsen asked that isn't it only a means of reporting depth? Neal summarized that borehole- depth scale should not be added to measurements that impact drilling. Larsen asked that it be made clearer, for that hole, subsequent holes, etc. Neal responded that the issue is one of measurements that impact drilling, and that they are to provide guidance for drilling within the expedition. Higgins commented that it may be even finer scale than within an expedition. Lovell suggests 2 categories (drilling that affects this hole) and what measurements within that hole affects drilling within the expedition on subsequent holes (data won't be collected until it's too late). Neal will split the list into two categories: those that bear on the hole that is being drilled at the time,and 2) those that bear on the holes that will be drilled in the same materials.
Neal will move WRC digital surface photography to its rightful place (from standard to supplemental). Dugan suggested downhole pressure is important for drilling next hole. Schmitt suggested temperature. Johnson argues that magnetic susceptibility is a stratigraphic tool. Higgins points out it's on the list as a downhole measurement (not as MST). Lee commented that tensor tool did not work efficiently.
Williams suggested penetration rate should be added. Houpt suggests driller depth is important. Larsen reminds us these and heave compensation are important for knowing if you can stay on the location.
The panel agrees ARM and IRM measurements are made after drilling ends and you're on to the next hole, so it's not essential.
XRF scanner should also be removed as something that impacts drilling (Higgins notes detailed work is done post-cruise).
Dugan argued that knowing sediment strength (Formation Testing) could impact drilling decisions on future holes, e.g., casing a hole.
Neal will revise document to reflect the 2 types of decisions while drilling under consideration.

Lovell set tomorrow's agenda at starting with older item 13- how to assess how well equipment is functioning on a platform, and whether the data are high quality appropriately underpinnings for the science.
Lovell asked for questions. None.
Lovell ended discussion at 5:21. Banquet begins at 6:00.

Tuesday February 19, 2008

Lovell convened meeting at 9:05. Started with Item 14 on the agenda, and many breakout sessions.
Neal led discussion of powerpoint on expedition reviews for STP, with the goal of making a standardized reporting form. Traceability of data is a key component to the review, particularly for calibrations, standards. The goal is to determine what information is required from the labs, and what level of review the STP is interested in.

Christensen asked how we'd get the information recorded on the forms (i.e., is it required) and Lovell indicated that this could be part of the implementation plan for QA/QC. He expanded to remind us that we need to consider how data going into the database are consistent between platforms as well.
Johnson notes that the first expedition will be a shakedown cruise in terms of data, and he asked if there is group set up to assess the data flow, etc. Houpt reminds us that there is an IOC that will be sailing during the sea trials, but still there is likely a need for additional assessment, some of which will come from the IOs. Johnson wanted to know if the entire sequence will be evaluated during the sea trials, and Houpt confirmed that the sea trials will utilize all instruments, etc. Larsen reiterated the need for legacy of data, and reminds us that there is a data management meeting next week. Johnson asked if Larsen has been in communication with Steve Miller who is running data management at UNOLS; Larsen confirmed he is in close contact with Miller.

Lovell introduced the strategy and means for implementing QA/QC across IODP as part of the QA/QC report "IODP and STP will provide the means for reviewing … the data". A major element of breakout session will be to consider how the panel functions. Formerly, STP was in close contact with ODP technicians. Is that an appropriate model for the multiple platforms?

Colwell asked if there is a sense that the existing QA/QC will work and be accepted by the community? Lovell reminds us that the document is not to prescribe individual direction to the IOs, but instead we need to list data requirements and require them to develop some kind of reporting/ implementation. He and Neal remind us that the issues are larger now, working across platforms. Neal reminds us that ODP data often did not collect calibration data, thus limited our ability to travel data. Houpt corrected Neal that calibration data were captured on ODP, but it wasn't in an easily recoverable format (e.g. lab notebooks, archived hard drives, etc.). The goal is to make calibration data readily available to scientists.

Lovell points out #3 requires STP review/synthesize cross- platform QA/QC issues, and propose changes for implementation to IODP-MI for monitoring across platforms, and long-term monitoring.

Goal of breakout session is to look at the big picture and gain input from the IOs to constrain discussion as a matter of practicality.
Higgins reminds us that QA/QC is a shared responsibility, with IOs relying on science community to ensure it works. Colwell suggests we identify things that the science community can benefit from it, e.g., provide examples of long-term gains for science party.

Larsen asked Roehl to make comment on her experience with multi-platform calibration. Roehl said each leg performs its own calibration. So far, no real correlation exists between MSP and JR expeditions. ESO does rely on international standards for geochemical analysis. Eguchi says for CDEX they are using international standards, and are capturing calibrations but they aren't comparing data with USIO. Roehl reminds us that databases are more flexible than in the past and so they are capturing more metadata (descriptive parameters, etc). Houpt says that QA/QC data are captured with data, but kept separate so that the database is easy to work with (i.e., metadata are mucking up files); however, it's easy to access. He reminds us that LDEO keeps a database of calibration. Eguchi reminds us that the temperatue tools are being calibrated by the USIO for CDEX and the UISO. Houpt indicates that they would calibrate for the ESO on MSP if requested.

Meeting broken into working groups.

11:15 Lovell reconvened entire group.
Johnson presented Petrophysics results.

Conversation stalled at details of archiving raw/original data; ultimately, each instrument should collect all data and retain raw/original data for those who want to use it differently than the calibration used shipboard.
Important to provide chief scientists will tools to limit outside instrumentation, and get total buy-in of science party, possibly be signing something in advance.
One option is to retain the ODP style of explanatory notes, but only document the exceptions to standard QA/QC.
Complete documentation of everything done to the sample is critical.
Dealing with more subjective data such as core descriptions, is going to be tricky.
Routine calibration between platforms may not be necessary, until a problem arises.
CORKS raise a special issue for QA/QC? Currently data goes directly into labs.
Larsen notes that all post-expedition data is not collected by IODP. And CORK data falls as post-expedition data.
Johnson says that CORKS count as individual experiments but there currently is no mechanism to include the data despite public funds used for them. Similarly, observatory databases need to be dealt with, as in who is in charge of QA/QC on these, particularly if they are expedition specific.
For long-term monitoring, who does this, and where will the data be archived? There is a possible linkage between putting instruments in, and the use of the drill ship, and the ultimate use of the data.
Colwell asked if the group is suggesting STP should see all data, or just some subset to see if it's in conformance.
Dugan clarified that the group thought that exceptions should be documented and explained as a review.
Neal suggests we need to see documenting data supporting changes in protocol, and any deviations in data.
Dugan recalls that QA/QC report explicitly states a set of data, but that they are requesting a short report to alert STP to which datasets they need to review.
Johnson asks who will id weird data.
Neal suggest shipboard scientists and techs would do it.

Larsen suggests that the first post-cruise meeting would be a good time to review data. As for co-cheifs maintaining QA/QC, it may be more reasonable for the staff scientist in addition to the co-chiefs to do that work.
Houpt points out that staff scientist training will vary so all 3 need to be involved.
Castillo asks that QA/QC be incoproated into the Science Handbook, and thus sign off on a commitment to cfollowing QA/QC.
Hongkui Ge points out that a key point of raw data is the key to good QA/QC assessment
Dugan said that a conversation early in the planning between staff scientist and cochiefs should include discussions on raw data.
Lovell pointed out that this would include deviations from the defaults set by IOs.
Johnson asks that this occur early in the planning stage.

Castillo presents the geochemistry section of Geochem and Microbio WG. Geochemistry QA/QC is straightforward, and this is held up in routine requirements for publication in journals. The issue is implementation as well as the issue of documenting deviations.
Castillo noted a form is easy to make once the protocols and methods for each expedition.
Lovell notes that many geochemists will want to alter protocols, and how do IOs feel about it.
Houpt said the USIO would prefer to maintain protocols and they are set up to accept differences, but it's not preferred. They do recognize that there are times when a protocol won't work, and so the database needs to be adaptable.
Larsen made statement that the IODP way is the robust way, and that protocols should be followed. There are very few instances where this would be necessary to deviate.
Eguchi: CDEX also asks that scientists follow protocol.

Colwell presented microbiology. They suggest using cell count standards and possibly randomized cell counts, plus photographic documentation of routine and unique samples to aid in calibration of qualitative data. The protocols should remain flexible to incorporate new technology. Suzuki reiterated that the human factor is very important component of QA/QC on these sorts of data, and so outreach and training may need to play a role to return consistent results. Colwell reiterated that when training a new student, that student gets trained well. Lovell pointed out that the STP has stated that technicians need training in all these aspects so that there is some consistency across platforms, and this needs to be reinforced.

Larsen asked if common standards is an international standard or is it something that is decided upon in the community or between IOs.
Need to continue to reinforce the collection of metadata so that new revelations may result in the future, using the data collected in the past.

Larsen commented that Kochi Core Center (KCC) has already started devloping a system for automatic cell count. Gupta added that such system is already functional at the KCC, and Colwell pointed out that such a system would be very useful for overcoming qualitative issues. Lee- san reminds us that time stamps are a very important part of data collection. Lovell and Neal added that time stamps were sent to SPC and Mori-san notes it was forwarded to IODP.

Gorin presented for Core description WG. Discussion emphasized human factor associated with the qualitative and/or subjective data associated with the core description working group. Observations are fundamentally different.

Lovell summarized that the group presents a set of means of reducing issues related to qualitative data, not necessarily solving it. Gorin suggests that while ship is underway to the first site, the working groups need to work closely together to ensure consistency.
Castillo reiterated that QA/QC must be part of the handbook. Christensen suggested that postcruise funding might be linked to QA/QC cooperation.

Lovell asked for STP to consider a form that comes to STP. Should it come far in advance of the meeting to evaluate it critically before the meeting (and thus put it on the agenda). Or should it come after the data has been dealt with at the first post-cruise meeting. Larsen suggests STP should wait until after that first post-cruise meeting.

Second question is how to deal with cross-platform monitoring, as it increases complexity and may be linked to funding issues.

Third question is how to deal with long-term monitoring of the data on each platform.
Fourth, how should IOs define default QA/QC procedures. Higgins notes that's already a requirement for each of the IOs. Larsen suggests that a list should be developed recording if there are international standards etc already in existence, and whether they have to be developed. Neal suggests starting with the measurements document, look at standards and calibration procedures, and use that as an alert ot the IOs. Higgins suggests having Houpt and other IOs deliver list of standards in use to STP. May need a recommendation to have these lists sent from the IOs.
Larsen reminds us that on many of the new expeditions (MSP, riser drilling), there is no time to develop protocols, etc as a science party while underway to the first site.

12:10. Lovell winded down meeting, to reconvene at 2:00. Afternoon will be presentation of task force report, and virtual core repository and microbiology reference center. After that, the roadmap.
Suzuki- san gave overview of how to get to airport and suggested places to visit.

12:15 meeting broke for lunch.

2:05 Lovell opened meeting after lunch. Nunoura presented the IODP-MI microbiology task force report. The task force resulted in recommendations for new standard measurements; collections of legacy samples and how to store them; technological developments for future standard measurements; and technological developments for use of legacy samples. They also recommend IODP requiersments for microbiology studies, including the means of archiving sequencing data and standardizing contextual data, as well as depositing all published culture strains in publicly accessible culture collection.
Gupta asked about the sample volume, and need for quadruplicate samples at -80C as that can be a limiting factor not on land but on the ship. Nunoura replied that each sample should be around 10 cc, and use a 15 ml syringe; high resolution (one per section) above 20-30 mbsf; below that we require one sample per one core. One of the issues is concern about training of curatorial staff and if curatorial staff are well trained, sample size can be reduced.

Ishibashi notes that the study is one of habitablility of bacteria, and since IODP is a unique program, it is important to have routine sampling from every core and every cruise. Lovell asked Larsen what IODP-MI wants STP to do with this task force report. Larsen commented

would like to get STP feedback on impact of sampling plans, etc on the rest of science, as well as suggested plans for storing, etc.
Neal indicates volume of material and sampling in quadruplicate in presentation is different than document which states multiple paired samples. The harder sediments requires adjacent whole rounds. Nunoura agreed it's a large sample but suggests one whole round could be divided to achieve multiple samples, but contamination and training is an issue. Higgins asked if it's for each core, all the way to base, and Nunoura said yes. Johnson asked about igneous rocks. Nunoura indicated igneous rocks are hard to collect as legacy samples, but that some pieces of igneous rock should be collected. Roehl indicates the frequency will lead to conflict with sampling, predicting that 1 whole round every 10 m may be too much. Castillo reminds us that there is no routine legacy sampling being implemented currently for microbiology, and wants to know if this requires another recommendation. Schmitt asked about formation factor, and commented it's difficult to measure. Lovell adds it's never been successfully done. Nunoura says formation factor is important because microbiological activity requires space therefore geophysical data can be used to calculate activity of subsurface biosphere. Schmitt suggest porosity is the measure to use, but Lovell adds it may be used by the geochemist. Larsen asks for additional comments on routine sampling, including whether whole round sampling is necessary to the greatest detph. Neal wanted to know if routine sampling should occur in rotary cores because of potential contamination, and Nunoura answered yes. Neal worried about sample volume, contamination issues and other issues. Colwell comments that the ship needs to have a tech on board trained in microbiology. Neal worries that contamination studies could void other studies, and so frequency is definitely an issue. Thus, any tracer used should not impact other's use of material. Also, any kind of sampling frequency must be evaluated in light of impact on other science plans, particularly for the whole round samples; the high sampling frequency for whole rounds may limit buy-in. Johnson – shares Neal's concern in the fact that this is a lot of samples being requested and resistance of co-chiefs and people with other science goals – perhaps have two scales of required depending on goals of expedition.
Houpt asked if there is any legacy sampling in other coring programs such as lakes. Larsen suggests Bremen may have set this up.
Johnson worries that there will be resistance from chief scientists for routine sampling, therefore may want to consider two levels of standards, one which would be used for sampling for missions with a microbio component, and one for other missions.
Castillo asks about the associated costs. Higgins reminds us that this will require a long-term buy in from NSF to commit to storing, etc. He suggests that before mandating a high level of sampling, the samples that exist now should be used to test methods. Colwell aggress in principle, but that he isn't aware that there are a lot of well- preserved samples that exist. There are some samples that exist but these have been disturbed by taking samples to low pressure and then stored at high pressure. Houpt says he doesn't have an inventory of the samples. Colwell says that working groups are given the task of developing reports, without constraints. Lovell suggests the goal is to think about it as an exercise in what is idealistically necessary for the science, and then STP tries to fit those needs inot a realistic science plan. Houpt said Firth said he advertised microbiology samples were available for use, and that there was little interest in them, but he doesn't know how he advertised, etc.

Lovell suggests STP sends a recommendation to IODP MI with a series of questions, including what would be the impact of this proposal if only soft sediment samples and not whole core samples, or frequency changed, or issues associated with formation factor.

Come up with a series of points (comments and questions) to send back to the task force, on any issue at all, from impact of sampling plan on expedition science (what would you gain; what would you lose), costs of storage, etc., how many samples (quadruplicate, paired, etc). Colwell will collate comments into a single statement. Neal comments that each working group needs a copy of Nunoura's presentation. Nunoura asked if he should include this in APLs; Lovell answered that's not an STP matter.

Meeting broke into break-out groups at 2:50.

Meeting reconvened at 3:25. Colwell given documents to collate. Microbiology reference repository proposal presented by Morono. KCCBioArchive (Kochi Core Center). Of all the Biological materials to be analyzed, RNA is the easiest to be degraded; the others (DNA, etc) are more robust. They suggest 2 types of archives: core archive (in liquid nitrogen) and DNA archive, with aseptic sub-sampling of core. If materials are frozen, asceptic sampling needs to be developed for cutting frozen materials. Storage would be in PFA jars and stored in liquid nitrogen system, with 396 50-cc samples per liquid nitrogen storage tanks (400 L but volume is lost to racks, etc). Neal points out the report reveals a lower number, but Morono said the report contains a mis-calculation. Morono says up to 30 tanks can be connected in a line. Issues include loss of labels (They fall off!). Ge asked if the Chikyu has such a facility. Nunoura said there is a small tank on Chikyu.
Neal calculated that for 4 50 cc syringes every 10 meters, the tanks will fill after 30, 1 km cores. Morono-san says that volume can be reduced to improve storage.
DNA archive can be stored at –20°C, and can be amplified, meaning a small sample can be used to increase the DNA 10,000 fold, thus a small volume can be shared with many researchers. KCC is undergoing a pilot study from 2008-2011, then hopefully full operation in 2011, with storage and hopefully, distribution of materials.
Nunoura-san asks about QA/QC and basic and applied science. DNA amplification represents the opportunity for biotech applications, thus patents are potentially an issue.
Suzuki expresses concern about who can use the samples and distribution priority. Morono will consider distribution of materials using IODP sample dissemination. Houpt indicates that microbio samples would be treated as any other sampling request.
Larsen says there is nothing in the sampling policy about patents, and maybe there should be WRT microbiology.
Suzuki asked who pays for maintenance? Morono is paying for storage during pilot study, and hopes that IODP-MI will share costs after pilot. Suzuki said it is analogous micropaleontology reference centers (MRC's), and there has been no support for 30 years. Lovell summarized that MRC's are not funded by IODP yet they play a strong supporting role to get recognition within IODP but they are still not supported. Thus, JAMSTEC is supporting a reference center in the hopes that IODP will pay. Higgins asked if there are other uses for the facility and Morono said he didn't think so. Lovell brought up the issue of patents, and previous discussion was centered on who gets the right to patents. It was passed on to SPC and didn't go farther. Larsen said the general policy is that you cannot patent anything that comes directly from the program (such as data), but added intellectual value is maybe outside the program. Johnson pointed out the patents in the US reside with the institution, and Lovell indicated in the UK the researcher gets the revenue. Lovell suggests STP is outside the purview of the STP. He asked for advice from Mori and Larsen for advice on what STP should do with it. Larsen would like to have comments on it, including fiscal consequences. Neal points out that some of the techniques identified in the task force report may be worked on in the pilot study, which will lead to mutual benefit to both the KCC plan and the task

force report. Higgins asked if the pilot study has already been funded. Morono said its within the JAMSTEC budget, and they only need funds for next year. Naruse pointed out that sampling interval is impacted by capacity of facility. Nunoura asked about aseptic subsampling. Morono said sterilization of hard, frozen core is under development. Nunoura asked about DNA extraction, and Morono said it would done using KCC method. Nunoura asked about DNA amplification, and contaminiation during process of DNA extraction. How has QA/QC on amplified DNA been evaluated? Morono said they aren't working on QA/QC on DNA amplification, yet, although they are performing some analyses on quality of DNA produced. Colwell asks if sample will be available for quantitative analysis that hasn't been amplified.
Lin wants to know how long can the core stay cold. Morono said as long as there is a LN supply, and they are automatically refilled. Lovell asked Colweell and Nunoura to write Recommendation for thanking Morono, and Recommendation asking for an updated report to IODP-MI . Suzuki would like it to include that these sites as an analogue to the MRC. Recommendation also needs to be written asking about patent. Naruse asked for clarification on patents. Lovell reiterated that STP needs to raise issue for SPC to consider the question: who will get patent rights? Larsen suggested it may need to go to IODP council.
Lee asked about using a vacuum instead but Morono said they want to use what is appropriate for animal cell storage.

4:10 a break

4:20 Lovell reconvened. Gupta presented presentation on virtual core repository. He reminds us that one of the major objectives in the science plan is understanding earthquake mechanisms, and that requires understanding of details of sample. To that end, they have an X-ray CT scanner. It allows you to generate color images of the core (using standard software – free versions and commercial versions), and even develop 3D images/ movies. XCT is shipboard data, but only 2D images will be available via the web. There is a huge difference between 3D (1 Gb) and 2D (100 kb) data file size; by slicing the 3D image raw data to a set of smaller files , they want to develop a means of extracting data from 3D core image, and ship it via DVD to researchers. Why is this necessary? At some point, data will be migrated to MEDID, with limited access. Plus, KCC handles the data requests and infrastructure to ship sample. This infrastructure can be used in shipping 3D image raw data on portable media. They also want to keep the XCT data available for future reference.

Dugan asked if there is a set of standards for calibrating/interpreting values XCT scans; Gupta said they use an Al bar having different thickness at different places and placed inside a plastic tube filled with distilled water to calibrate density shipboard. It yields more a relative difference in density than actual values.
Castillo asked for clarification if USIO will be getting one. Houpt answers no, and Roehl says they are purchased one for occasional use (no plans to put on routine schedule). Naruse asked if the software is free, and Gupta said yes there are free and commercial versions. Williams reminds all that XCT is useful for more than structural geology and that they used it on a particular leg.
Higgins asked Larsen about how they will deal with CT scans. Larsen said they need to consider it, now that science parties are interested in it. Houpt said something. Gorin asked if there is a plan to put XCT on the JR. Houpt said no, because it was too expensive. Castillo asked if there is a way of combining with FMS images to improve utility. Williams agrees it would be possible to do this. Neal asked if this is a way to orient XCT core data using FMS.

Neal suggests to Gupta to consider intergration of XCT with logging data. Houpt asked Gupta for a 5 minute scan, what is the resolution. Gupta said 1 mm slice but wasn't sure what the resolution was. Schmitt asked if there is a way to compress the data for ease of transmission via the internet. Gupta said that's a possibility but the raw data are required to fully utilize the data.

Lovell**:** Recommendation is necessary thanking Gupta for his presentation (Schmitt). Be sure to recommend that integration with logging data is very important.

Lovell went over list of recommendations: PAT virtual core center
Rick: patent, microbio task force, legacy center, QAQC items on microbio
QA/QC recommendation
Beth, George- common reference collections
Beth- PWG?
Doug,
Clive- etc

4:45. Nunoura presented a presentation on microbiology contaminations from drilling fluids. They contain bacteria but also high levels of organic contaminants. The assumption is that it's too difficult to sterilize drilling fluid using heat or chemicals. They need to find a way to reduce contamination.
One way is to eliminate use of organic additives. He asked CDEX if it's possible; CDEX does not know at this point.
Another way is to use better tracers, or fortuituous mud constituents such as Barium (will id chemical contamination as well).
Dugan asked about monitoring bit activity; Higgins said it's weight on bit etc. Dugan clarified that it's using existing datasets. Colwell suggests it means a greater communication with drillers (e.g., awareness of soft material). Dugan pointed out that drillers check data at a lower frequency but can increase frequency of rig floor data by discussing with drillers in advance. Hgiggins pointed out data are going to become available. Eguchi asked about recommended fortuitous tracers. Nunoura said it had been done in the past for continental drilling. NantroSEIZE also used contamination tests. Lovell asked for guidance on the topic: further discussion or take it to CDEX?
Nunoura thinks input from geochemist is a good idea. Neal said he's hesitant to add a tracer such as lithium, because it will impact science. Ishibashi pointed out the recently barium in pore fluid is an issue so adding it could impact it. Johnson adds that microbes in drilling fluids could impact negatively perception of program. Ge asks about petroleum industry developments on sealed coring and suggests it may need several approaches. Gupta pointed out that microbes in the drilling fluids means to count microbes that are in the fluiods as opposed to dosing the fluids with microbes. Colwell said this has been done before, adding cells to drilling fluids (bakers yeast) but usually they rely on identification of bacteria that already reside in drilling fluids because it's easier. Neal suggests using barium since it's in the mud. Houpt reminds us that barium isn't soluble, so it wno't move as other materials might. So it's not such a great idea. Colwell would like to recommend that riser drilling interface with microbio task force. Houpt suggests an additive that is not naturally occurring and so wont impact shipboard measurements.
Suzuki asked about the detergents often present in muds. Nunoura said it doesn't impact microbio because the sample comes from an uncontaminated portion of core.

Lovell suggests Colwell write a recommendation (Colwell and Nunoura) that the task force visit the topic, and document what has been found (as background). The goal is to id the problem but not necessarily to identify one particular solution.
Ge asked if the issues should be discussed with EDP. This would require a recommendation to EDP asking for advise on how to get uncontaminated cores by clearly stating the problem and asking them for advise, since it's not STP job for finding resolution.
Higgins suggests he wants a quick answer, so maybe it requires some mechanism for getting a fast response.
Colwell a suggests a two phase approach, first that we recommend a fortuitous tracer approach and a second that we ask EPD for advise.

Gorin reminds them that some drilling fluid will always be necessary and therefore some contaminiation is necessary.

STP roadmap; Lovell would like recommendations written before start of meeting. Give recommendations to Yuki at 8:30 am.
Neal presented STP roadmap.

Houpt commented that it seemed more like EDP: Neal clarified that it's a document to assess the impact of these technologies on the science.

Lovell asked that we as a panel add our own suggestions for the ST Roadmap. Larsen asked if we want to be proactive, or reactive to requests made by the community. Lovell suggests it's a combination of both proactive and reactive.
Questions to focus discussion include:

Does scientific technology to achieve objectives exist?
Is proposed technology adequately tested or is it a concept or prototype?
What will the cost be?
Will the new technology impact other areas of the program (positively or negatively)?
We need to plan for the future? Is there work we could do by getting some new measurements?

Lovell reminds us that we need to plan for the future, e.g., what work could you do if you were to be able to take uncontaminated core. This will helps us plan for the future (>2013). After 2013, we'll look to upgrade instruments going in now; will we want to replace them with newer versions, or get new instruments?

EDP examined science plan and came up with 13 technology challenges. They then developed 3 groups, and listed 10 items not initially prioritized. Many of these overlap with STP and that's probably not an issue. At the same time, we need to continue to listen to the community and discuss it.
We will revisit it tomorrow.

Higgins asks if this is an opportunity to integrate EDP roadmap, and tying it back to the science plan for first phase. Lovell suggests it's more important to think about the next phase. Higgins asks if this is really a roadmap for now, or for next phase. Lovell and Neal say it needs to be linked to the ISP, and at the same time thin about the future.

Larsen again comments on this as being proactive or reactive, and consider if we should be going there. Neal said he pulled list from LIPS meeting and microbiology discussions.
Larsen said for the 2013, it makes sense to link to previous workshops.
Lovell reminds us it's about ideas and how to get there,
Meeting is closed at 5:28. Use the time to write recommendations, and discuss roadmap.

Wednesday, February 20

Lovell convened meeting at 09:06.

Williams Presentation on MSS Logging tool (09:09). Asking for endorsement of tool, deployment plan and measurement. NSF-funded project.

Johnson reminds us that running dual frequency magnetic susceptibility tools allows you to deconvolve the signal, and determine particle size of magnetic materials.

Houpt asked about calibration, since test cores from Bartington don't give correct values. Williams said they are assuming the Bartington hand held device is calibrated. Houpt suggested they develop a calibration tool that LDEO could use as well. Johnson reminds us that the entire community has the same problem, which is that you need to assume a saturation value of pure magnetite, and that is the best you can do.
Lin said with APC cores they find a clear magnetic susceptibility value in the center of active fault zones, and so the use of this tool holds great potential in these environments.
Schmitt asked why the rig up/down was so slow; Williams responded the length of time was consistent with their standard practices at LDEO. Higgins reminds us that there is now a permanent rig up- rig down system on the JR so speed will be improved. Neal asked if it will run on the Chikyu; Williams responded that there is only one tool and so it could be used on any platform, assuming co-cheifs buy in (which they are waiting to receive from the Wilkes Barre leg co-chiefs).
Lovell reminds us that IODP-MI gives ultimate approval for tools, but welcomes our comments. A major comment is calibration, away from LDEO. Does the panel want to give its support to this development? The panel has a positive view of the development of this tool, although there are a few issues to consider.

Meeting broke up into breakout groups at 9:43.

Meeting reconvened at 11:40

Dugan presented phys props report. They broke measurements into 2 categories, reflecting the 2 groups of folks who would be making decisions. They suggest moisture, density and p-wave velocity measurements do not affect drilling decisions and should be removed.

Lovell suggests some measurements will be both safety and science, so it may not work really well.

The QA/QC document captured discussion. They have a few suggestions keyed to the document numbers.

Castillo asked for clarification that we aren't asking that the document be changed. He noted that this is a mix of items in the report and our concerns.

The Roadmap discussion produced a set of techniques and tools that could be done and hopefully improve science goals.
Neal asked for clarification on long- term measurements associated with pore pressure; Dugan responded that this applies to measurements that are a few seconds long, a few minutes, hours, or even longer as with observatories.
Neal clarified that presentations on cuttings analysis were presented by CDEX, and it's appropriate to return to those minutes. Nobu added that during riser drilling operations, it was decided that cuttings analysis would be included. Gorin commented its standard material for petroleum instrustry. Lovell clarified that CDEX gave a report a few years ago on the potential, and now STP needs to find out where they are in delivery, as this has not yet been done within the program. We need to learn more about this as it is new to IODP. Eguchi added we can add more as we start riser drilling and learn.

Johnson noted they weren't constrained by reality or finances.

Colwell presented for the Geochem and Microbiology WG.
Measurements: They are posing the question that microbio observations could impact drilling decisions in unusual considerations.
QA/QC: The highlighted and re-ordered some of the statements in the report. Castillo notes that qualitative data did not arise in the task force.

Lovell asked if panel was happy with suggestions on merging/ reordering.
Roadmap considerations. They make a clear statement regarding roadmap needs to be in sync with IODP. They also recognize that some of the issues they have brought up might require the recruitment of specialists to assist in preparation. They present a list for consideration, including a set of needs to develop a delivery system of real time on-board data. A major issue is the need to stay abreast of technologies being developed for other arenas (such as homeland security).

Houpt commented that such real time projection of digitally collected data is coming online soon.

Lovell asked for comments. Lin-san would like to amend the sentence to include better recovery in young crust and active fault zones.

Dugan comments that recent workshop reports, including LIPS and geohazards, can aid in developing roadmap consistent with community and IODP needs.

Castillo comments that this method is a good way of setting up the shopping list.

Dugan said that they put together a list of the things they target as key, but after discussion with the community, the list will be redefined.

Lee aggrees more recovery in active fault zones is necessary, particularly for sediments.

This led to a discussion on limits of APC- water depth or strength of sediment? Dugan suggests it's strength of sediment.

Gorin presented for core description working group. There were minimal comments on measurements, other than redundancy.

Dugan commented that caliper measurements do not impact future drilling decisions (as the core has already been drilled)

For QA/QC, dictionaries should be added to the list as they are neither quantitative or qualitative. For qualitative data, they add that platforms might have two parties working.
Roadmap includes desire to find a way to integrate microbio data shipboard, which requires faster counts shipboard, which could lead to a reduction in accuracy of shipboard data that

could be amended shore-based (like biostrat does with core catcher estimates). There is the potential to develop a technique for grain size analysis to identify gross abundances of bacterial counts.

Dugan asked for clarification of seismics while drilling, and Gorin explained how it improves accuracy. Ge asked about logging while coring. Williams confirmed that in contrast to logging while drilling, logging while coring is only in the developmental stage.
Lovell proposes Neal generate a short rough Roadmap document that will form the basis for an action item that the panel should then evaluate, by reading workshop reports to evaluate how community is thinking on these topics. Kawamura will make sure the reports are available. Lovell confirms that this is not an overnight agenda but that it is something that will benefit from conversations within the community over the next few months.
Lovell asked about plans for measurements document. Neal confirmed that the readon for the document is to make sure that critical measurements are made even if cost-cutting measurements lead to a reduction in services. He sees the way forward as a means of making addendums to the measurements document. Lovell indicates moving it forward as an addendum may require an action item or recommendation.

Christensen commented on the need to evaluate the number of native speakers on the panel, as this impacts their ability to make contributions (note taking, presentations, group leadership). Lovell asked what we need in terms of notetaking. Larsen points out that an annotated executive summary is sufficient record.

Lovell pointed out that the next meeting is restricted by SPC's meeting in late August, and the habit of August vacations in Europe. Provisional meeting dates: week of July 14; July 28. Provisional locations include European outpost (Edmonton).

Suzuki presentation at 12:35 on his personal digital taxonomic dictionary. He has done this for html format, including all the species described through 1985; database include location of samples as well as author, stratigraphic range, and citations/ synonyms and associated illustrations. He also includes a digital link to all the samples listed in publications at the level of assemblages but including geographic locations, etc. He has done this enormous amount of work all voluntarily. Recommendation is necessary.

Neal suggests an approach to NSF as a geochemical reference model (GRM). It's now run through a university (possibly Columbia University).
Larsen asks why the library doesn't exist.
Johnson asks if private foundations have been investigated as a source of funding, through taxonomic groups.
Suzuki argues that fewer specialists are being trained these days.
Neal suggests that industry collaboration might be an opportunity for funding. Suzuki suggests that there is not an industry application from all fields.
Larsen cautiously stated that minor funding for small projects ($10 – 30k) are possible within IODP-MI. A project such as what Suzuki demonstrated would be a very viable potential project for funding, such as what IODP-MI has funded with Chronos.

1:05 meeting broke for lunch.

2:10 Lovell called meeting to order. Begin process of approving recommendations and consensus statements.

4:00 Meeting ended after approval of all statements with many thanks to our Japanese hosts.

IODP 6th Scientific Technology Panel Meeting

18 - 20 February 2008

Sendai Excel Hotel Tokyu,
Sendai, Japan

Final Agenda

Monday 18th February

Start 09.00

1. Welcome, meeting logistics, safety, introduction, Robert's Rules, COI (Suzuki/Lovell/20 minutes)

2. Approval of meeting agenda (Lovell/10 minutes)

3. Approve Minutes from STP Meeting #5 (Lovell/10 minutes)

4. Preliminary discussion of next meeting locations and dates; panel rotations. (Lovell/10 minutes)

5. Review status of previous meeting action items and recommendation (includes proposal statistics from SSEP) (Kawamura/IODP-MI/20 minutes)

6. SPC Report (including IODP Implmentation Plan) (Mori/20 minutes)

7. SAS Activity: EDP (Lovell/10 minutes)

8. Consideration of issues from routine reports, supplied pre-meeting, from IODP-MI, SPC, lead agencies, & IOs; discussion focused on issues raised by Panel Members (no formal presentations) (60 minutes)

Lunch

9. SODV Update (USIO) (30 minutes)

10. IODP Implementation Plan (15 minutes) – taken as part of Agenda Item 6 - (Mori)

11. IODP Budget Reduction Models Summary of progress from IODP-MI (Larsen). Note no further input from STP is requested by IODP-MI). (5 minutes)

12. Consideration of outstanding issues from previous meetings, including the following from the previous meeting and any other outstanding items: (90 minutes)

    a. IODP-MI QA/QC Final Report (IODP-MI)
    b. STP Consensus Statement 0708-12: Common reference collections (IODP-MI)
    c. STP Consensus Statement 0708-13: Post-Expedition Data Capture (IODP-MI/IOs)

d. STP Consensus Statement 0708-14: STP Geochemistry and Microbiology WG report (IOs/IODP-MI)
e. STP Consensus Statement 0708-15: Open Hole VSP (EDP)
f. STP Consensus Statement 0708-16: Temperature and pressure resolution, accuracy and calibration (IOs)
g. STP Consensus Statement 0708-17: Vp Measurements on Core Samples at high pressure (CDEX)
h. STP Consensus Statement 0708-18: Core Log Seismic Integration (IODP-MI (DMCG and/or DSWG)
i. STP Consensus Statement 0708-19: Core Splitting Techniques (IODP-MI)
j. STP Consensus Statement 0708-20: Seismic Sources (IOs)
k. STP Consensus Statement 0708-21: Progress report on Paleontology Coordination Group (IODP-MI)
l. STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog. Progress report from IODP-MI.
m. STP Action Item 0708-33: Measurements that Affect Drilling Decisions

End: 17.30

Tuesday 19th February

Start 09.00

13. IODP Measurements – Measurements Affecting Drilling Decisions

14. Expedition reviews: (90 minutes)
    a. scientific technology issues - raised by STP, IOs and/or REVCOM. IODP
    b. Operations and Planning: discussion on how STP can best review operations, including assessing the success of QA/QC procedures across platforms, and how any review mechanism links to the proposed IODP-MI reviews of expeditions

15. Development of STP Roadmap – session 1 (60 minutes)

Lunch

Development of STP Roadmap – session 1 continued (60 minutes)

16. Microbiology report from IODP-MI (small task force meeting, September 2007 to discuss science and implementation issues in microbiology; this report and the Vancouver WS report (in Scientific Drilling, this fall issue) will be considered (Colwell for D'Hondt). (60 minutes)

17. Proposal for a Microbiology Reference Centre (Morono: 30 minutes)

18. Virtual Core Repository (Gupta; Kochi Core Centre: 30 minutes)

End: 18.00

Wednesday 20th February

Start 09.00

19. Magnetic Susceptibility Sonde (USIO/Williams)

20. Development of STP Roadmap – session 2 (120 minutes)

21. Panel Rotation; review of STP expertise and future needs (30 minutes)

22. Select Meeting Location, determine outline agenda and propose provisional dates (30 minutes)

Lunch

23. Finalize Consensus Items and Recommendations (120minutes)

End: 16.00

Welcome STP meeting in Sendai

1st day (18th/Feb. Mon.):

9:00--- 17:30 Meeting (MAPLE ROOM)
Tea room with small snacks: in WOOD ROOM (the same floor)

Lunch: Please by yourself.
(1) Restaurants in 1F and B1F(-1F) of this hotel.
(2) Minamimachi-Dori Avenue, Summall Ichibancho
(3) buying lunch box in convenience store and eat in OAK ROOM

18:00- 20:00 Official banquet (in OAK ROOM)
All the attendants and their accompanying persons are free.

Many Sake-baras (I'zaka-ya) : along the Kokubuncho-Dori

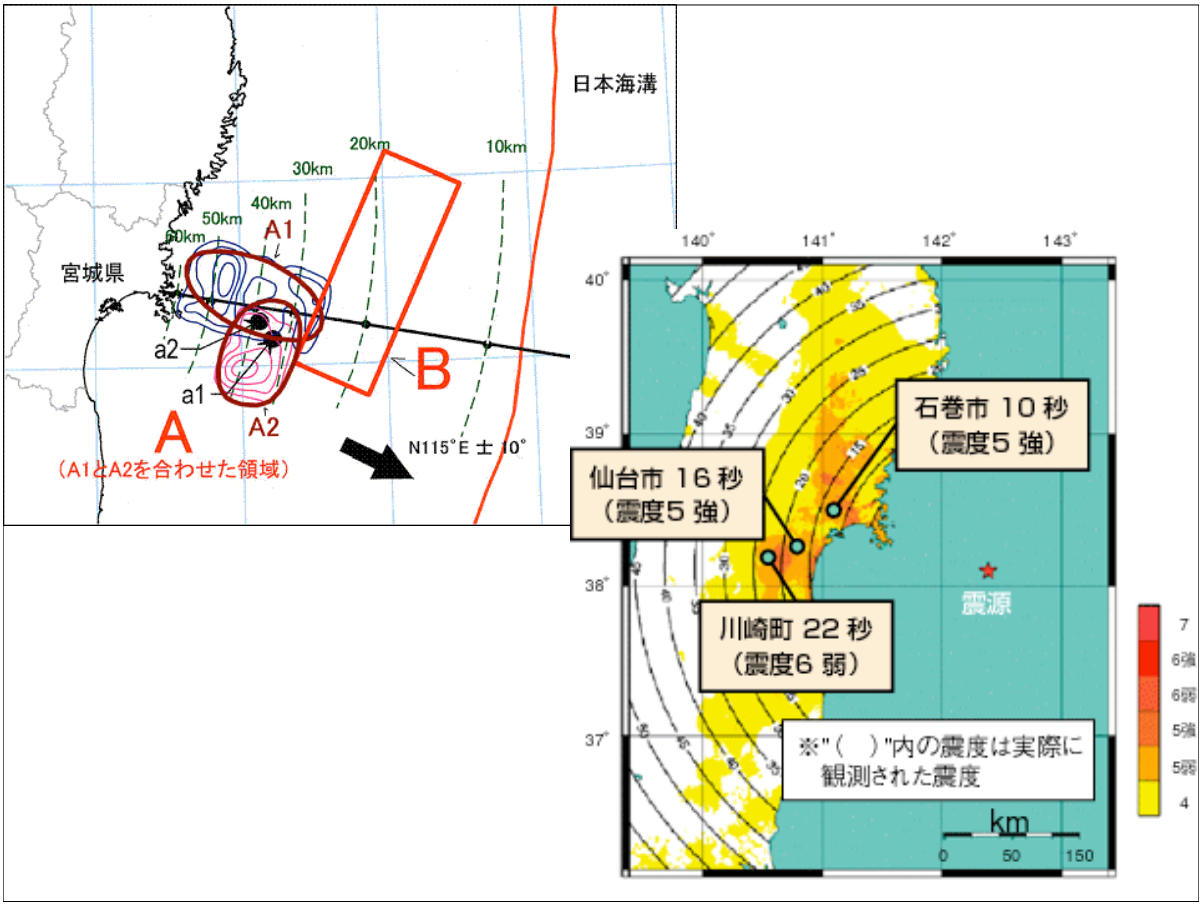
Safety instruction

- Sendai area is the most attractive place for seismologists

- Statistic probability of large earthquake in Sendai is …

>60 % within 10 years, >90% within 20 yrs.,

▲倒壊した家屋の撤去作業。被害の大きかった仙台市，泉市，米山町，迫町，小牛田町，鳴瀬町には災害救助法が適用され，救援活動が行われた　（写真・迫町提供）


日本海溝
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60km
A1
宮城県
a2
a1
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（A1とA2を合わせた領域）
N115°E ± 10°
140°
141°
142°
143°
40°
39°
38°
37°
石巻市 10 秒
（震度5 強）
仙台市 16 秒
（震度5 強）
震源
川崎町 22 秒
（震度6 弱）
※"（ ）"内の震度は実際に
観測された震度
km
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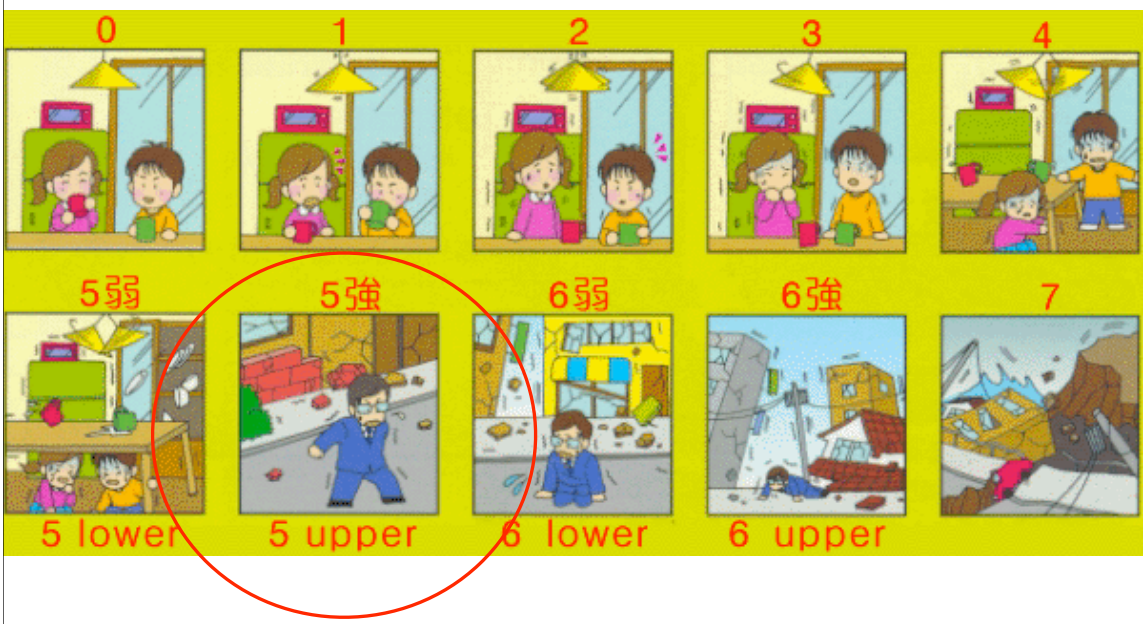
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6 upper

If you feel a tremor on the floor….

If you feel a tremor on the floor….

Never run away from the room!

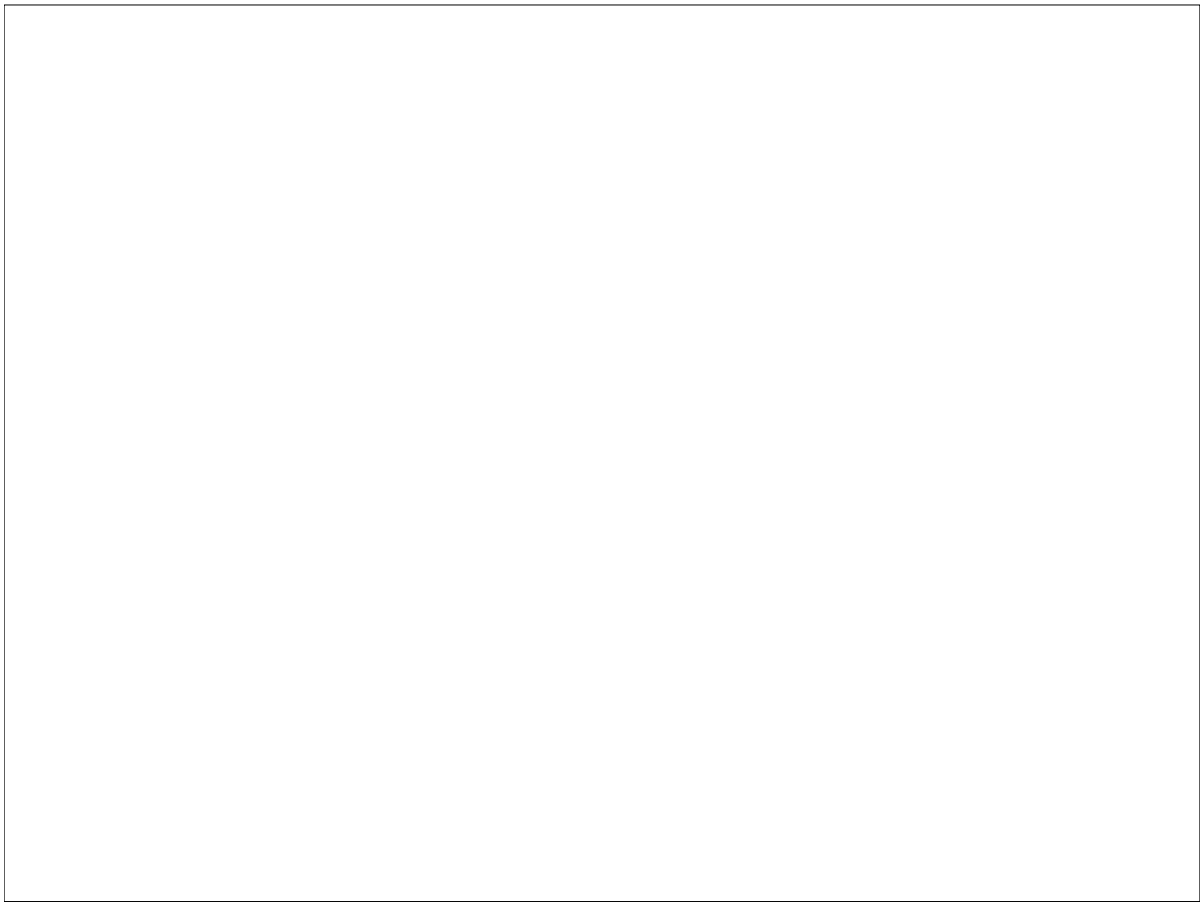
Await there until the earthquake ends,
but take care of broken light above your head.
Protect your head by hands during quake.

After the large earthquake ends,

The hosts will guide evacuation.

You have never use elevator during and after the earthquake.

Antisesimic reinforcement is already implemented in this hotel, we have no worry even the building strongly shakes like attractions in Disneyland.



6th Meeting of the IODP Scientific Technology Panel
STP

18th – 20th February 2008

Sendai Excel Hotel Tokyu

Sendai, Japan

Welcome and logistics

Local Host:

Dr. Noritoshi Suzuki

Tohoku University, Sendai
Japan

Introductions of continuing and new members, guests, liaisons

Apologies:

Nathalie Vigier (ECORD) CRPG-CNRS

Inorganic Geochemistry

Peter Blum, USIO

Alternates Attending:

Doug Schmitt – Canada; Europe ECORD
(the empire is reborn…)
as alternate to Nathalie Vigier

Junichiro Ishibashi attends as alternate of Minoru Ikehara

New Members:

Brandon Dugan, Rice University (USA)

Stefan Krastel-Gudegast – IFM GEOMAR - Kiel, Germany (Europe) ECORD

- Introductions…..

- Approval of Agenda…

Agenda

Monday 18th February

Start 09.00

1. **Welcome, meeting logistics, safety, introduction, Robert's Rules, COI (Lovell/20 minutes)**

2. **Approval of meeting agenda (Lovell/10 minutes)**

3. **Approve Minutes from STP Meeting #5 (Lovell/10 minutes)**

4. **Preliminary discussion of next meeting locations and dates; panel rotations. (Lovell/10 minutes)**

Agenda

5. **Review status of previous meeting action items and recommendation (includes proposal statistics from SSEP) (Kawamura/IODP-MI/20 minutes)**

6. **SPC Report (Mori/20 minutes)**

7. **SAS Activity: EDP (Lovell/10 minutes)**

8. **Consideration of issues from routine reports, supplied pre-meeting, from IODP-MI, SPC, lead agencies, & IOs; discussion focused on issues raised by Panel Members (no formal presentations) (60 minutes)**

9. **SODV Update (USIO) (30 minutes)**

10. **IODP Implementation Plan (SASEC/IODP-MI) (15 minutes)**

11. **IODP Budget Reduction Models Summary of progress from IODP-MI (Larsen). Note no further input from STP is requested by IODP-MI). (5 minutes)**

12. **Consideration of outstanding issues from previous meetings, including the following form the previous meeting and any other outstanding items: (90 minutes)**

a. IODP-MI QA/QC Final Report (IODP-MI)

b. STP Consensus Statement 0708-12: Common reference collections (IODP-MI)

c. STP Consensus Statement 0708-13: Post-Expedition Data Capture (IODP-MI/IOs)

d. STP Consensus Statement 0708-14: STP Geochemistry and Microbiology WG report (IOs/IODP-MI)

e. STP Consensus Statement 0708-15: Open Hole VSP (ED

f. STP Consensus Statement 0708-16: Temperature and pressure resolution, accuracy and calibration (IOs)

g. STP Consensus Statement 0708-17: Vp Measurements on Core Samples at high pressure (CDEX)

h. STP Consensus Statement 0708-18: Core Log Seismic Integration (IODP-MI (DMCG and/or DSWG)

i. STP Consensus Statement 0708-19: Core Splitting Techniques (IODP-MI)

j. STP Consensus Statement 0708-20: Seismic Sources (IOs)

k. STP Consensus Statement 0708-21: Progress report on Paleontology Coordination Group (IODP-MI)

l. STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog. Progress report from IODP-MI.

Official banquet in restaurant Aoba

Time: 18:00-20:00

Restaurant Aoba
(1st floor in the Sendai Excel Hotel Tokyu)

Day 2:

Start 09.00

13. **Expedition reviews: (90 minutes)**
    - **a. scientific technology issues - raised by STP, IOs and/or REVCOM. IODP**
    - **b. Operations and Planning: discussion on how STP can best review operations, including assessing the success of QA/QC procedures across platforms, and how any review mechanism links to the proposed IODP-MI reviews of expeditions**

14. **Development of STP Roadmap – session 1 (60 minutes)**

Development of STP Roadmap – session 1 continued (60 minutes)

15. Microbiology report from IODP-MI (small task force meeting, September 2007 to discuss science and implementation issues in microbiology; this report and the Vancouver WS

report (in Scientific Drilling, this fall issue) will be considered (Colwell for D'Hondt). (60 minutes)

16. Proposal for a Microbiology Reference Centre (30 minutes)
17. Virtual Core Repository (Gupta; Kochi Core Centre)

Start 09.00

17. Development of STP Roadmap – session 2 (120 minutes)

18. MSS Tool (possible agenda item)

19. Panel Rotation; review of STP expertise and future needs (30 minutes)

20. Select Meeting Location, determine outline agenda and propose provisional dates (30 minutes)

Lunch

21. Finalize Consensus Items and Recommendations (120minutes)

End: 18.00

COI policy

- IODP Conflict of Interest Policy is clearly stated on the IODP-MI website and all attendees are referred to this.

COI policy

- 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.

Declaration of COI

- Panel Members, Guests and liaisons must declare COI at the start of the meeting; these must be recorded in the minutes
- If any further COI arise during the meeting they must be identified and recorded in the minutes.
- Other attendees can indicate when they think there is a conflict of interest.

Roberts (Millard’s) Rules of Order

(from Robert's Rules of Order)

- The basic principles behind Robert's Rules of Order are:
  - someone has to facilitate and direct the discussion and keep order.
  - all members have the right to bring up ideas, discuss them, and come to a conclusion.
  - members should come to an agreement about what to do.
  - members should understand that the majority rules, but the rights of the minority are always protected by assuring those members the right to speak and vote.

Roberts Rules of Order

Take up business one item at a time.

a. Each meeting follows an agenda.
b. Only one main motion can be pending at a time.
c. Only one member can speak at a time.
d. Members take turns speaking.
e. No member speaks twice until all members have had the opportunity to speak.

Roberts Rules of Order

a. Members take their seats promptly when the chair calls the meeting to order, and conversation stops.
b. Members raise their hands to be recognized by the chair and don't speak out of turn.
c. In debate, members do not 'cross talk', or talk directly to each other, when another member is speaking.

Roberts Rules of Order

d. Members keep their discussion to the issues, not to personalities or other members‘ motives (unless COI).

e. Members speak clearly and loudly so all can hear.

f. Members listen when others are speaking – the majority rules, but the rights of individual, minority, and absent members are protected.

STP Mandate

1. General Purpose.

The Scientific Technology Panel (STP) reports to the Science Planning Committee and may communicate directly with IODP-MI.

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; through the SPC, to the Science Planning and Policy Oversight Committee (SPPOC) and IODP-MI; and, through IODP-MI, to the implementing organizations (IOs).

STP Mandate

Decisions. Decisions shall be made either by consensus or voting, as decided on a case-by-case basis. Votes shall be decided by a majority of all members present and eligible to vote. A quorum shall consist of at least two-thirds of the voting members. Voting records shall be kept and reported in the meeting minutes.

Meetings. The panel shall convene biannually, generally approximately mid-way between SPC meetings, and additional electronic meetings may be held as appropriate.

0802 STP rotations

08-02	08-08	09-02	09-08	10-02	10-08
Ge	Castillo	Nonoura	Colwell	Brueckmann	Neal
Suzuki	Christensen		Ikehara	Gorin	Vigier
	Lovell		Johnson	Lin	
			Lee	Naruse	

China ECORD IAC Japan USA

Review of previous action items and recommendations

Scientific Technology Panel
6th Meeting
18–20 February 2008
Sendai, Japan

Hiroshi Kawamura
IODP-MI Science Coordinator

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Recommendation 0708-02: IODP Measurements Document

STP has revised the IODP Measurements Document and recommends this new version replace the existing document on the IODP web site.

STP suggests this be forwarded to SPC and IODP-MI.

Now posted under http://www.iodp.org/program-policies/7/

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Recommendation 0708-03: Effects of Riser Drilling on Cores

In reference to the STP Action Item 0612-29, the STP recognizes the effect of drilling fluid invasion on the microbiology of cores during riser drilling is unknown. Accordingly, STP recommends that at the earliest opportunity during riser drilling, contamination monitoring with either PerFluorocarbon Tracer (PFT) or natural chemical and/or molecular tracer(s) should be performed both on cores and circulation mud samples. STP further recommends that contamination monitoring should be conducted as appropriate on expeditions that use riser drilling.

STP suggests this be forwarded to IODP-MI

Comments in CDEX report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Recommendation 0708-04: Legacy Samples

In reference to STP Action Item 0612-31, the STP recommends that microbiology legacy samples shall be a part of any IODP sampling plan. Collection and storage of legacy samples should follow the guidelines presented in the 2003 Microbiology Working Group report.

STP suggests this be forwarded to SPC and IODP-MI

Comments in Subsurface life TF report & USIO report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Recommendation 0708-05: Integrating Microbiological Sampling into Expedition Sampling Plans

STP recommends that microbiology sampling be integrated into expedition plans. Such integration should be flexible enough to accommodate the scientific plans for each respective expedition.

STP suggests this be forwarded to SPC and IODP-MI

Comments in Subsurface life TF report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Recommendation 0708-06: Non-magnetic core barrels

The STP thanks Oda for his presentation, and acknowledges the scientific interest in using non-magnetic core barrels. STP acknowledges the efforts made by the USIO in enabling at least two non-magnetic core barrels to be available for Expeditions and the efforts made by C-DEX in providing a non-magnetic cutting shoe.

STP encourages CDEX and ESO to work towards providing non-magnetic core barrels for future expeditions.

STP suggests this be forwarded to IODP-MI

Comments in CDEX, ESO & USIO reports

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Recommendation 0708-07: Leak Off Test

The STP thanks Lin for his presentation, and acknowledges the scientific interest of performing Leak Off Tests (LOT) as part of Chikyu (riser) operations.

STP recommends that IODP-MI requests CDEX to investigate the feasibility of using LOT/Extended (X)LOT data for estimating the minimum horizontal principal stress for riser drilling as a supplemental scientific measurement.

STP suggests this be forwarded to IODP-MI

Comments in CDEX report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Recommendation 0708-08: QA/QC Draft Report

The STP welcomed the opportunity to provide input to the draft report of the IODP-MI QA/QC Task Force. Suggestions for changes and additions to the report are detailed in an appendix to the minutes. STP looks forward to receiving the final QA/QC Task Force report.

STP suggests this be forwarded to IODP-MI

All suggestions are incorporated in newer version of the report and distributed to STP.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus 0708-10: Internet connection during STP meeting sessions:

STP recommends limiting internet access within the meeting sessions be adopted as a general policy of STP and considered across all SAS meetings.

STP suggests this be forwarded to SPC and IODP-MI

Nori has already terminated all internet connection !!

STP Consensus Statement 0708-11: Time stamp

The STP thanks Basile for his presentation on time stamps for measurements and procedures. The issues resulting from this presentation have been incorporated in STP's response to the IODP-MI QA/QC Task Force report (draft 1) and submitted to IODP-MI.

STP suggests this be forwarded to SPC and IODP-MI

All suggestions are incorporated in newer version of the report and distributed to STP

STP Consensus Statement 0708-12: Common reference collections

STP recommends the IODP-MI to establish a work plan that can provide common reference collections for smear slides and thin sections across all platforms as soon as possible. If necessary this work plan could be endorsed by an ad-hoc working group similar to that created to consider micropaleontological issues.

STP suggests this be forwarded to IODP-MI

Comments in USIO report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-13: Post-Expedition Data Capture

STP requests that an update be given prior to our next meeting regarding inclusion of post-expedition generated results (data and processed data). STP is particularly interested in the mechanism for this data capture, when it is likely to be implemented, and what the arrangements are for QA/QC of the data.

STP suggests this be forwarded to SPC and IODP-MI

IODP-MI will present its plan in Agendum 12
Comments in USIO report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-14: STP Geochemistry and Microbiology WG report

In reference to the Action Item 0612-28, the STP refers to the original recommendations made to IODP-MI. STP requests action to endorse and implement these recommendations.

STP suggests this be forwarded to IODP-MI

Comments in Subsurface life TF report & USIO report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-15: Open Hole VSP

STP requested advice from EDP (STP Consensus 0601-03). STP wishes to follow up this general request and again seeks advice from EDP on whether there are "off the shelf solutions" or whether STP should seek to investigate technology development in seeking solutions to IODP requirements.

STP suggests this be forwarded to SPC

Comments in CDEX & USIO reports

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-16: Temperature and pressure resolution, accuracy and calibration

A draft report on resolution, accuracy and calibration of temperature and pressure measurements (STP Consensus 0606-13) has been circulated by IODP-MI (STP Consensus 0612-07) among the IOs. STP requests the IOs to report back on implementation plans for report recommendations prior to the next meeting.

STP suggests this be forwarded to IODP-MI

Comments in reports from IOs

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-17: Vp Measurements on Core Samples at high pressure

CDEX have been investigating the feasibility of making high Pressure and high Temperature Vp and Vs measurements on core samples. STP understands that as a result of this investigation CDEX are in the process of establishing a high pressure facility for measuring Vp on core samples on the Chikyu.

STP requests CDEX report to STP prior to their next meeting on the status of this development.

STP suggests this be forwarded to IODP-MI

Comments in USIO report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-18: Core Log Seismic Integration

STP recommended (Recommendation 0507-09) that the IODP databases allow for the inclusion of depth correlation data to support inter-hole composite depth sections of recovered cores and core-log-seismic integration. To facilitate depth correlation, the STP recommended the development of software that can be used across all IODP databases.

STP requests an update from IODP-MI (DMCG and/or DSWG) on the status of this recommendation prior to the next STP meeting.

STP suggests this be forwarded to IODP-MI

Included in IODP Depth-scale documents and USIO report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-19: Core Splitting Techniques

STP Consensus 0612-18 on Core Splitting Techniques requested IODP-MI together with the IOs investigate solutions to this problem and encouraged dialogue with other scientific communities (for example, lake sediments and geology groups). STP restates its request to IODP-MI to report on their findings prior to the next STP meeting.

STP suggests this be forwarded to IODP-MI

Comments in USIO report

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-20: Seismic Sources

The STP recommended equipping an appropriate size of a seismic source on IODP drilling platforms. STP requests an update from the IOs on the status of seismic sources on IODP platforms prior to the next meeting.

STP suggests this be forwarded to IODP-MI

Comments in CDEX, ESO & USIO reports

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-21: Progress report on Paleontology Coordination Group

STP endorses recent progress on Paleontology Coordination Group (PCG) under IODP-MI held on 12-13 August 2007 in Berlin, Germany. STP welcomes further progress on Digital Taxonomic Dictionaries.

STP requests IODP-MI instruct the PCG to accomplish Levels 1 (taxon name list) and 2 (synonymy) for each fossil group within one year as a standard list for IODP after thorough review.

STP also requests IODP-MI to provide guidance on responsibility for maintenance of the database.

STP suggests this be forwarded to IODP-MI

IODP-MI will present its plan in Agendum 12

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog

STP recommends IODP-MI to form a Lithology Working Group to maintain dictionaries/catalogs related to VCD/lithology (sediment/rock classifications) with support from the scientific community. This could follow the model provided by the Paleontology Coordination Group.

STP suggests this be forwarded to IODP-MI

Comments in CDEX, ESO & USIO reports

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Action Item 0708-32: Science Technology Roadmap

STP will develop a framework for a science technology roadmap to allow resource planning in order to take advantage of new technology that will enhance IODP science

This framework should be put together for discussion by our next meeting.

Leads: Neal & Lovell + All Panel Members

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Action Item 0708-33: Measurements that Affect Drilling Decisions

STP will continue to examine the IODP Measurements Document to identify those Standard and Supplemental Measurements that could enhance scientific return in a given expedition by affecting drilling decisions.

Leads: Neal, Lovell, Christensen + All Panel Members

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Action Item 0708-34: Modifications to Drilling Fluids During Riser Drilling on Cores Acquired for Microbiology.

Geochemistry and Microbiology Working Group members Rick Colwell and Takuro Nunoura will investigate strategies for controlling the numbers of microbial cells that develop in drilling fluids used during riser drilling and report their findings at the next STP meeting.

Leads: Colwell, Nunoura

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

SPC and SASEC Meetings

10th SPC August 27-30, 2007
Santa Cruz, California

5th SASEC January 15-16, 2008
Santa Cruz, California

Report to February 2008 STP meeting
Jim Mori, SPC Chair

1. Expedition Scheduling
2. Evaluation of Proposals at OTF
3. Missions
4. CDP's
5. Implementation Plan
6. Science Planning Meeting, 2009
7. STP Issues
8. Other Issues

1. Expedition Scheduling

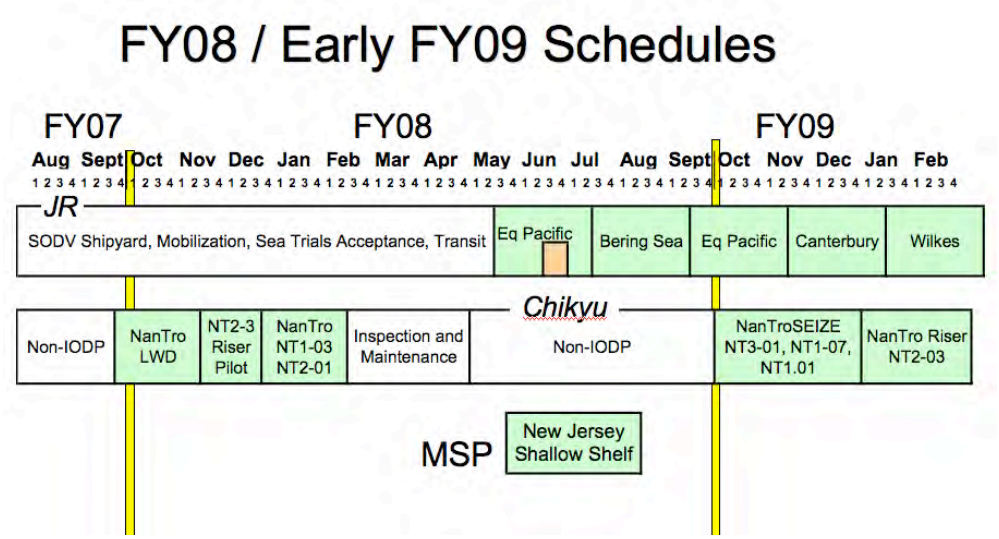
- First Chikyu expedition in Sep. 2007 !

- Delivery of new JOIDES Resolution delayed several months until September 2008 because of shipyard schedules. Previously approved schedule needed to be delayed.

- For MSP, non-availability of platform resulted in one year delay for New Jersey expedition to 2008 (Great Barrier Reef in 2009).

- New financial situation (only 8-9 months/year of ship operations) introduces complex problems for IODP scheduling.

Schedule approved by SPC



This schedule will to be modified !

2. Evaluation of Proposals at OTF

- Currently 23 proposals sent by SPC to the Operations Task Force (OTF) await scheduling (4 to 5 non-riser expeditions will be scheduled per y

- SPC needs to re-prioritize these proposals (otherwise scheduling will be decided by OTF mainly on cost and logistical issues)

- Need priorities for longer range planning of riser and other challenging programs

Because of lack of time, not all proposals were discussed.
It was important to discuss the 'high cost' proposals, because OTF needs guidance in the present fiscal situation.

Proposals were discussed in 3 groups
- Proposals with observatory components
- Riser proposals
- MSP proposals

For each proposal, one of the following actions was decided
- Remain at OTF as high priority proposal
- Return to SPC to be re-ranked with new proposals
- Deactivate

Proposals with Observatory Components

505	Mariana Convergent Margin (coring program without CORKs)	Leave at OTF
537A	Costa Rica Seismogenesis Project Phase A	Return to SPC
537B	Costa Rica Seismogenesis Project Phase B	Return to SPC
553	Cascadia Margin Hydrates	Return to SPC
589	Gulf of Mexico Overpressures	Return to SPC
621	Monterey Bay Observatory	Deactivate (permitting not possible)
633	Costa Rica Mud Mounds	Return to SPC
677	Mid-Atlantic Ridge Microbiology	Leave with OTF
693	APL S. Chamorro Seamount CORK	Leave with OTF

Riser proposals

537B	Costa Rica Seismogenesis Project Phase B	Return to SPC
595	Indus Fan and Murray Ridge	Leave with OTF

＊This decision sets the current priority for the next riser drilling progra

Mission Specific Platform (MSP) Proposals

548	Chicxulub K-T Impact Crater	Return to SPC
581	Late Pleistocene Coralgal Banks	Return to SPC
637	New England Shelf Hydrogeology	Return to SPC

Proposals Not Discussed

These proposals will be discussed at the next SPC meeting In March and ranked with new proposals and those returned from OTF

477 Sea of Okhotsk Plio-Pleistocene
549 Northern Arabian Sea Monsoon
605 Asian Monsoon
522 Superfast Spreading Crust
552 Bengal Fan
644 Mediterranean Outflow
654 Shatsky Rise Origin
659 Newfoundland Rifted Margin
661 Newfoundland Sediment Drifts

3. Missions

Over arching principles for Missions

(1)Effectively and efficiently address scientific themes of global significance that originate from the scientific community;

(2) Missions do not replace regular proposal process

(3) Definition and planning should integrate scientific strategies, technological approaches, management and education and outreach plans

(4) Should be proposed only when there are compelling reasons for development of complex strategies or coordination of multiple expeditions

(5)Engage a broader array of scientific stakeholders, including the younger generation and new communities

Criteria for Mission designation

(1)Plan should lead to considerable scientific success and be a high IODP priority

(2) Has compelling reasons for considerable technological development and/or complex drilling strategies require advance planning on a longer term than for typical expeditions

Discussions included,

- Watchdog comments
- SSEP reviews
- Reviews from an external review panel

Mission Monsoon

- Not designated as a Mission
- Mission designation not needed to accomplish scientific goals. There are several good proposals at OTF and in the system.
- Components should be unbundled and submitted as individual proposals
- As requested by SSEP, a DPG is to be formed for coordinating active proposals on Asian Monsoons

Birth of Oceans

- Not designated as a Mission
- Does not have a clear description of a coherent and integrated plan for reaching its scientific goals
- There are currently a sufficient number of proposals on continental break-up and initiation of seafloor spreading

Mission Moho

- Not designated as a Mission
- Split SPC vote
- Proponents should improve proposals through normal process
- Request EDP to look into developing deep hole technologies

Pros

Ambitious high-profile project, that addresses long-standing goal in geophysics.

Challenging engineering issues for a deep hole

Received high reviews from the external review panel

Cons

Not feasible for time lines specified in the Implementation Plan

Challenging engineering issues for a deep hole

Low social relevance

Some components are not ready

High cost, not possible before 2013

Missions

SPC evaluated 3 Mission proposals.
None were designated as Mission.

SASEC decided *not* to have another call for mission proposals

Mission idea may be part of the science plan for the 2013 renewal

4. CDP's

SPC discussed the CDP designation for umbrella proposals, using the following criteria

(1) Strong potential to significantly advance understanding of ISP themes
(2) Comprised of an umbrella and closely interrelated component proposals
(3) Has overarching objectives that can be attained solely by completion of components, not by a series of independent proposals
(4) Requires multi-phased and/or multi-platform expeditions

4. CDP's

707 Sagami Bay Seismic Monitoring **was designated** as a CDP
- Satisfies CDP criteria
- Important to extend land-based observations off-shore
- Addresses seismic hazards in a densely populated area

694 Izu-Bonin-Mariana Arc Evolution **was not designated** as a CDP
- Split vote
- Maybe, some difference in SPC and SSEP definition of CDP (SPC watchdogs recommended CDP designation)
- Some components can stand alone as individual proposals. Is this a reason 'not' to designate a CDP ?
- Decision probably reflects current fiscal situation, especially in regards to drilling a deep 6 km hole.

5. Implementation Plan

SASEC Guiding Principles for Phase II

1. High scientific impact in next 5 years;
2. Necessary precursor for future investigations - build for future;
3. Reach major milestones
4. Balance among risk, cost, and scientific impact
5. Integrated, interdisciplinary approach
6. Societal relevance
7. Minimum requirements
   MSP - one program every two years;
   Chikyu - average of 7 months/year over two-yr period
   (must include riser operations);
   JOIDES Resolution - average of 7 months/year over 5-years

Implementation Plan

SASEC Special Focus Areas for Phase II of the IODP

1. Limits of life - microbial biosphere
2. Rapid and extreme climate and sea level change
3. Seismogenic zone and initiation of borehole observatories
4. Deep crustal section

Implementation Plan

Mostly negative comments from community

General support for the guiding principals but not for the 4 focus areas of research

⇒ SASEC will publish the implementation plan without the 4 focus areas

6. Science Planning Meeting 2009

In preparation for the renewal process of IODP in 2013, plans for a large conference to discuss future scientific goals.

Outcome will be a science plan similar to the IODP Initial Science Plan (ISP)

Meeting in late 2009

Steering committee now being formed.

7. STP Issues

SPC 0708-06	SPC accepts STP 0708-02	IODP measurements, especially microbiology recommendations
SPC 0708-07	SPC receives STP0708-04	microbio legacy samples, follow guidelines 2003 working group report
SPC 0708-08	SPC accepts STP0708-05	integrating microbio sampling
SPC 0708-09	SPC receives STP0708-09	SASEC SAS review (joint meetings with EDP have not been formally proposed.)
SPC 0708-10	SPC receives STP0708-10	Internet access during SAS meetings Each panel should decide
SPC 0708-11	SPC receives STP0708-04	Time stamps, forwarded to IODP-MI
SPC 0708-12	SPC receives STP0708-04	Post-expedition data capture, forwarded to IODP—MI

7. STP Issues

SPC 0708-23	SPC receives STP Recommendation 0708-01 on budgetary reduction models and encourages IODP-MI to work wth IO's and STP in developing recommended models
STP 0708-02	STP requests advice from EDP on Open Hole VSP Discussed at January 2008 EDP meeting
EDP 0801-14	VSP. EDP believes that adopting and adapting industry standard procedures for check-shot surveys should result in high quality velocity profiles. Thus, there is no apparent need for engineering development at this time.

8. Other Issues

See meeting minutes for details

- Approval of new SSEP co-chair Heiko Pälike (July 2007)
- Nominations for *Scientific Drilling* Editorial Board
  (Camoin, Ohkouchi, Yamamoto, Behrmann, Becker)
- Site Survey Panel (**SSP**)
  (Data Bank working well, wants to meet twice a year)
- Environmental Protection and Safety Panel (**EPSP**)
  (looking at pre-prop, may shift to 1 meeting/year,
  cannot reduce size of panel)
- Engineering Development Panel (**EDP**) proposals
  (technology roadmap, S-CORK/SCIMPI development)
- Report of the Hotspot Geodynamics DPG
- Industry-IODP Science PPG (**IIS PPG**)
- Consideration of Hybrid Industry-IODP proposals

SPC thanks **Nobu Eguchi** for his dedicated and skillful service as Science Coordinator

SPC thanks the following members for their knowledgeable and conscientious efforts

Tim Byrne
Chris MacLeod
Hiroyuki Yamamoto
Barbara Bekins

SPC especially thanks **Keir Becker** for his wise and careful leadership as chair of the committee

Sixth Meeting of the Engineering Development Panel (EDP)

February

Nice, France

Mike Lovell represented STP

EDP Consensus 0801-14: VSP

EDP responds to STP Consensus Statement 0708-15 (Open Hole VSP) requesting advice. EDP believes that adopting and adapting industry standard procedures for check-shot surveys should result in high quality velocity profiles. Thus, there is no apparent need for engineering development at this time.

Background:

At the 0601 STP meeting in Kochi, Japan, Gulick & Sakamoto presented a report on their attendance at the Core Log Seismic Integration workshop in 2005. This report suggested VSP problems had been encountered in ODP and proposed that these could be improved through help of industry/EDP. Furthermore it encouraged the involvement of EDP in Core-Log-Seismic Integration.

It is EDP's interpretation that 'VSP' refers to a vertical check-shot wherein air guns are set off at the surface and the signal is recorded downhole. In considering this matter, Alberty (EDP) and Goldberg (USIO) provided comments by email to the EDP discussion in Nice.

The outcome of this discussion suggests that while soft formations and downhole clamping may be problematic, the overarching problem may be that a lack of time is committed for conducting successful VSPs.

It was noted that the importance of the VSP varies with the scientific objectives of each expedition, and therefore the resources committed to recording VSPs will vary.

SSEP:

There was discussion about representation at the Science Steering and Evaluation Panel. EDP believed there was good reason for EDP to be reprinted at the panel with clear benefits to the Integrated Ocean Drilling Program.

The consensus of the discussion, with no formal proposal made, was that IODP would also benefit from the presence of STP at the SSEP.

Scientific Technology Panel

6th Meeting

18–20 February 2008
Sendai, Japan

Hiroshi Kawamura
IODP-MI Science Coordinator

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Outline

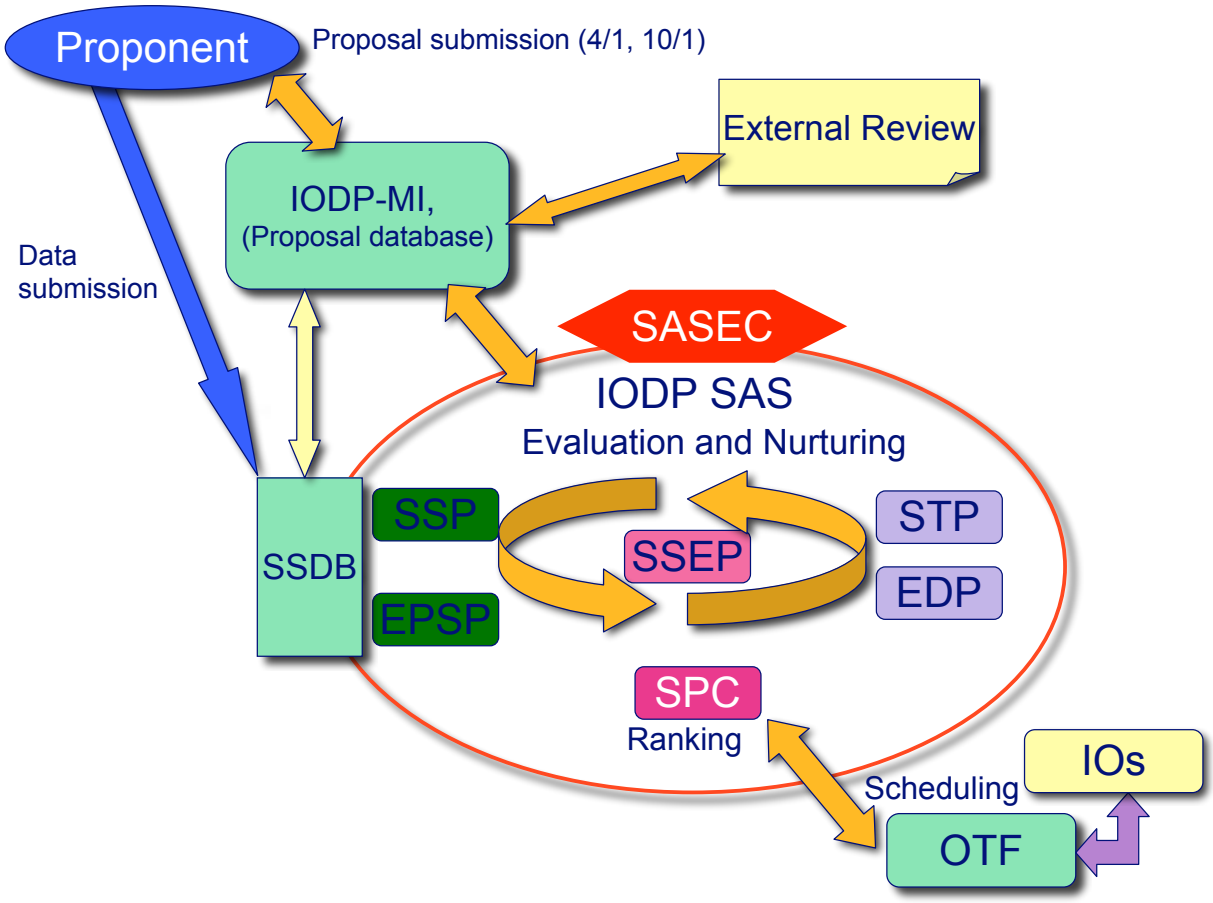
Review of IODP proposal process

SAS meeting schedule

Proposal submission statistics

Other news

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL



SAS Meeting Schedule

STP	18-20 Feb. 2008	Sendai, Japan
SPC	3-6 Mar 2008	Barcelona, Spain
SSEP	*19-22 May 2008*	*Busan, Korea*
EPSP	*16-18 June 2008*	*Hannover, Germany*
SASEC	*June 2008*	*Hangzhou(?), China*
SSP	*July*	*USA?*
EDP	16-18 July	Salt Lake City, USA
STP	*July or August*	*Europe?*
SPC	*August*	*Japan?*

INTEGRATED OCEAN DRILLING PROGRAM
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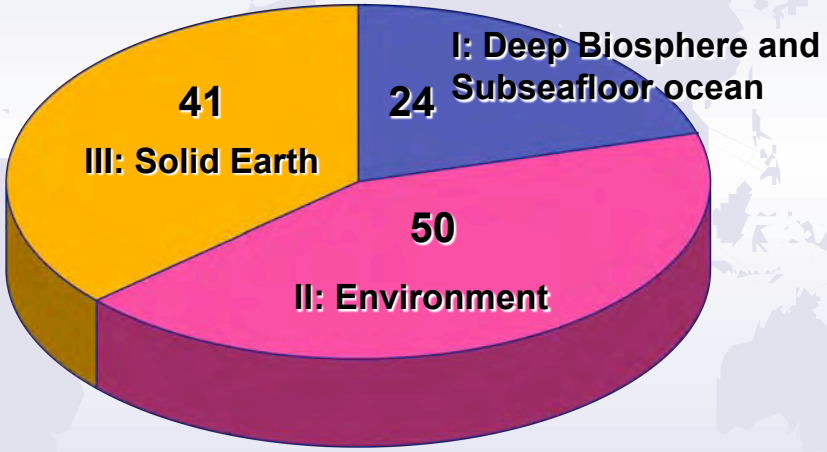
Active proposals: 115
by ISP Themes

As of 21 Jan. 2008



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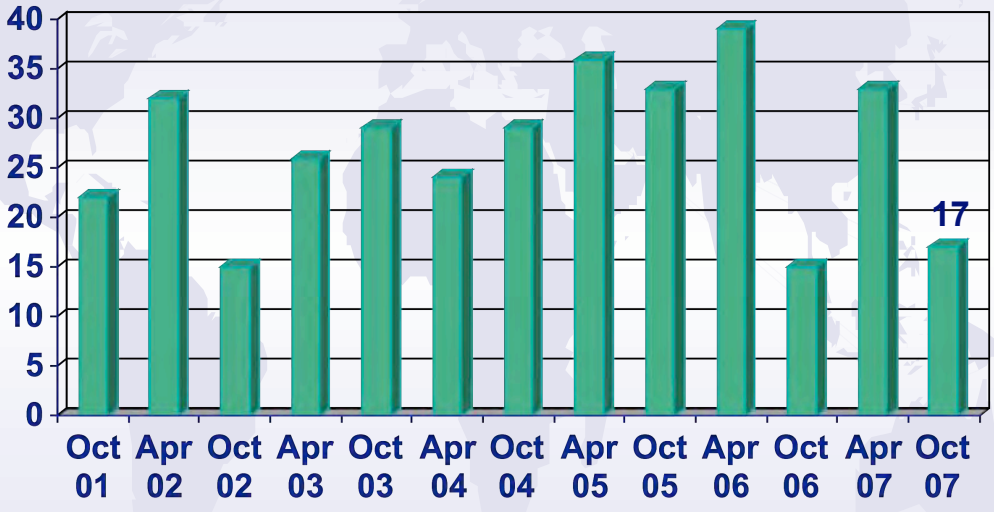
Proposal submissions (total)

13 submission deadlines



INTEGRATED OCEAN DRILLING PROGRAM
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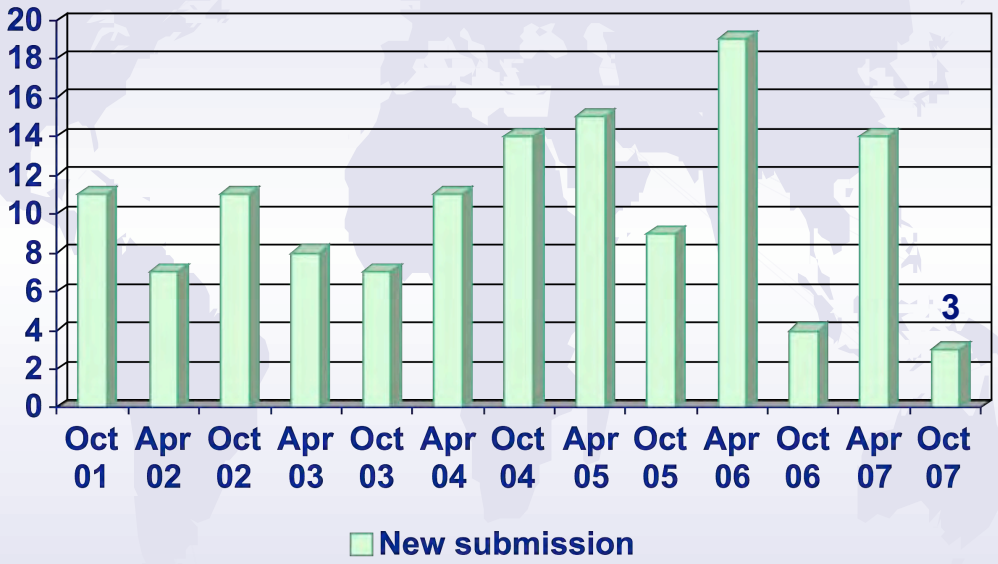
New proposal submissions

13 submission deadlines



INTEGRATED OCEAN DRILLING PROGRAM
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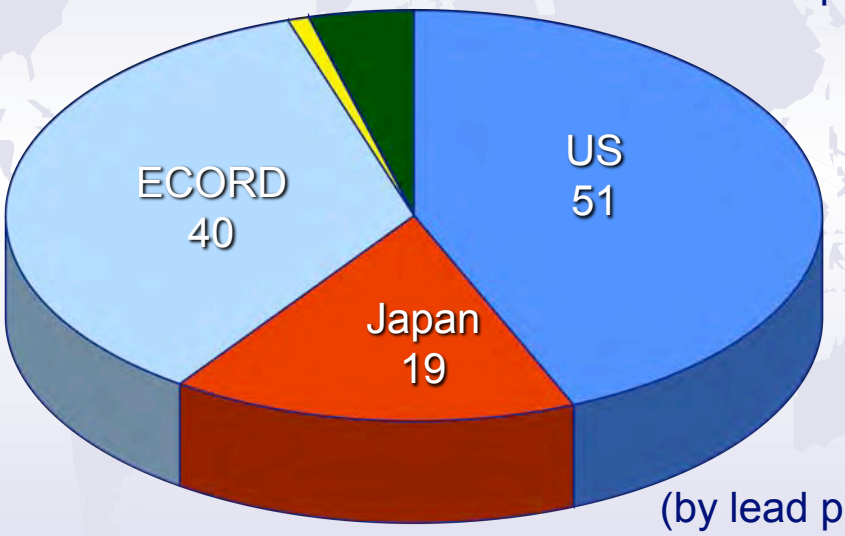
Active Proposal distribution by IODP Members

As of 21 Jan. 2008

China 1

Others 4

115 proposals



(by lead proponent)

INTEGRATED OCEAN DRILLING PROGRAM
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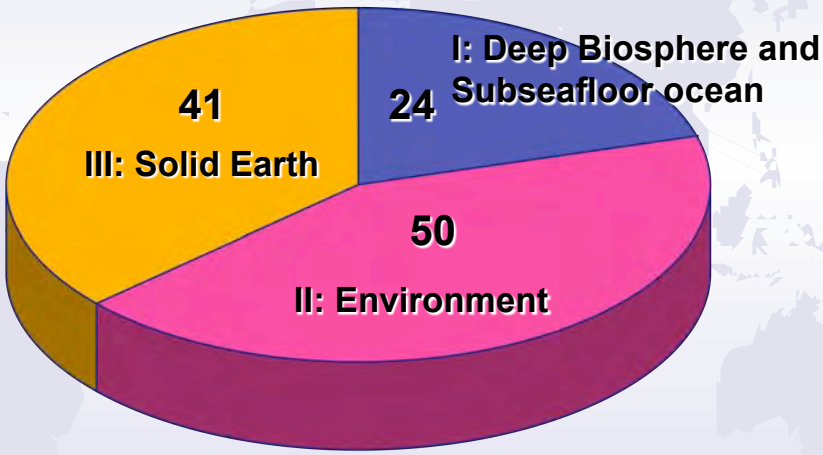
Active proposals: 115
by ISP Themes

As of 21 Jan. 2008



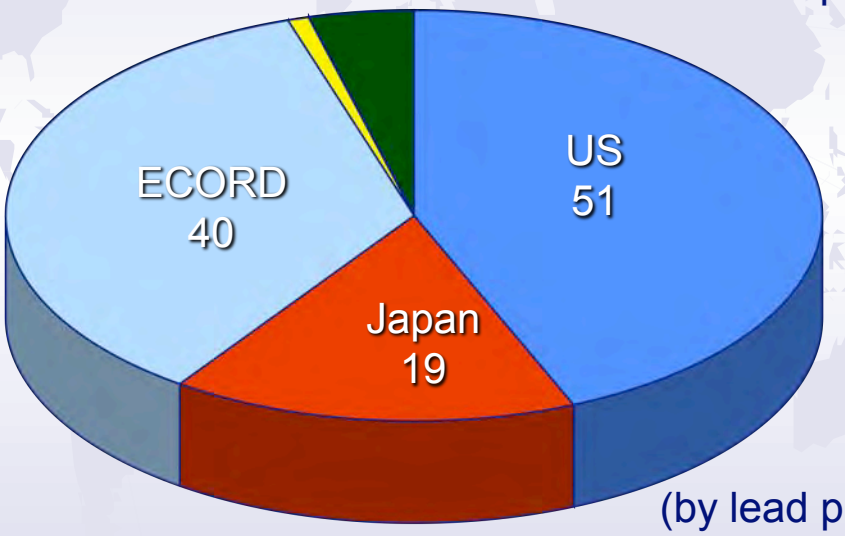
INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

Active Proposal distribution by IODP Members

As of 21 Jan. 2008

China 1
Others 4

115 proposals



(by lead proponent)

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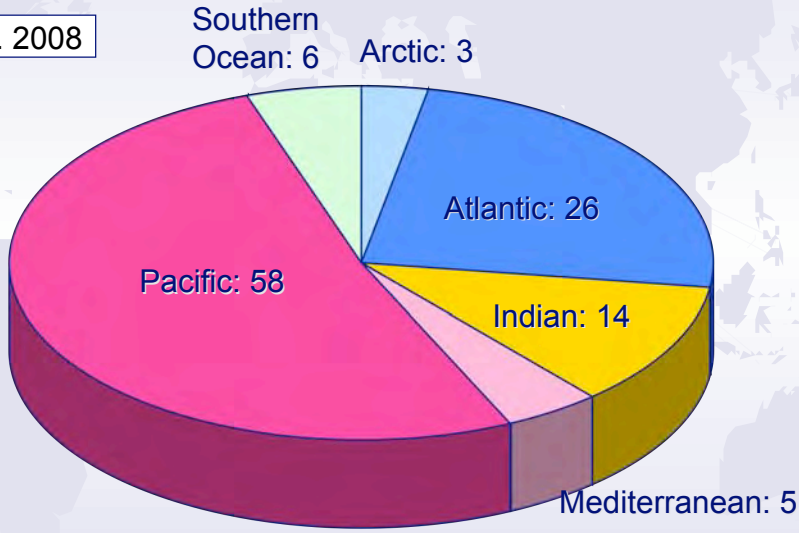
Active proposal status: 112 (exclude 3 CDPs)
by geographic distribution

As of 21 Jan. 2008



INTEGRATED OCEAN DRILLING PROGRAM
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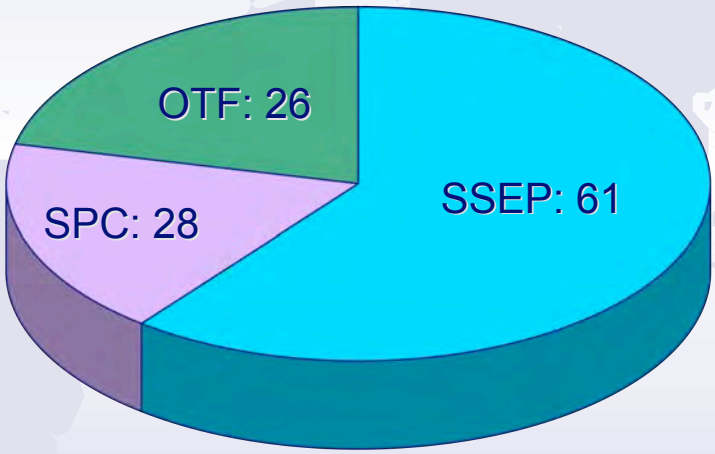
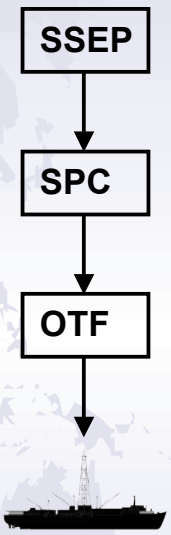
Active proposal status: 115
by evaluation process

As of 21 Jan. 2008





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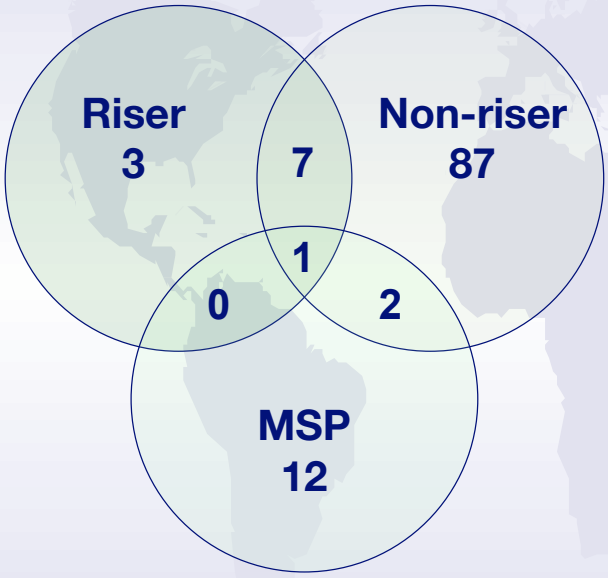
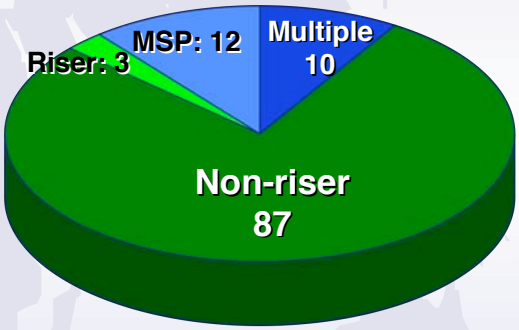
Drilling Platforms for Active Proposals



Platform distribution

As of 21 Jan. 2008



Total: 112 proposals
(not counting 3 CDPs)

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Planning Workshops in 2008

- High to Ultra-high Resolution Sedimentary Records
  29 Sept. – 1 Oct. 2008, Naples or Potsdam
  - recommended for funding

Long Term Thematic Review

- Oceanic Crustal Structure and Formation
  Dates / location to be determined

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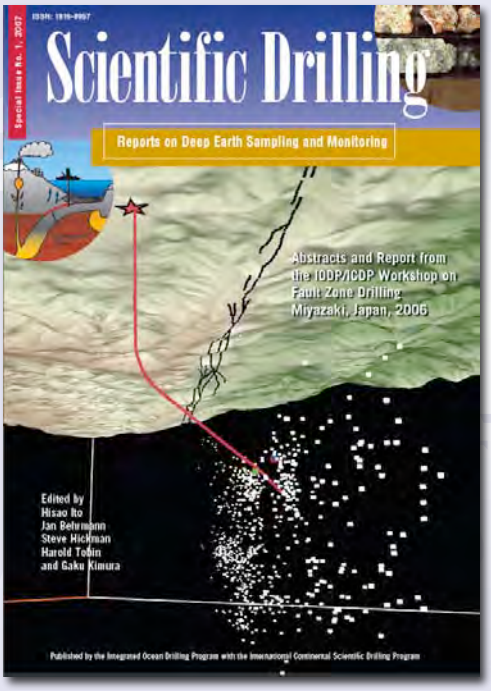
Scientific Drilling

No. 5 Sept. 2007

Special Issue No. 1 2007:
IODP/ICDP Fault Zone Drilling WS Reports



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INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

USIO Report for the Scientific Measurement Panel (STP) February 2008 Meeting in Sendai, Japan

Prepared 27 January 2008

Lithology Content Management

STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog
STP recommends IODP-MI to form a Lithology Working Group to maintain dictionaries/catalogs related to VCD/lithology (sediment/rock classifications) with support from the scientific community. This could follow the model provided by the Paleontology Coordination Group.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki)
Priority: High
STP suggests this be forwarded to IODP-MI

Background to Consensus Statement 0708-23: Establishment of dictionaries (taxonomic, lithologic classifications, time-scales) is critical to QA/QC because it reduces uncertainty in the following observations (biostratigraphy, core description). Because dictionaries are living documents, references to the version of dictionaries used must be explicit. However, a route to manage the content of the dictionary (list of dictionaries) is currently not sufficient for the scientific community. Therefore STP investigates the method to provide and maintain dictionaries for observation under commitment of the scientific community. The dictionary for the VCD lithology should be updated and expanded when it is necessary.

Lithology Content Management

- SODV capabilities:
  - USIO will be using a new application named DESClogik for capturing descriptive and interpretative information (DESCINFO).
  - DESClogik is largely based on the use of *value lists*, which are managed through a web-based companion application.
  - One of the value lists is for classified *lithology* names.
  - *Content management* for the value lists will be a USIO responsibility until a more suitable entity, process, and QA/QC for reviewing and updating the content is in place.

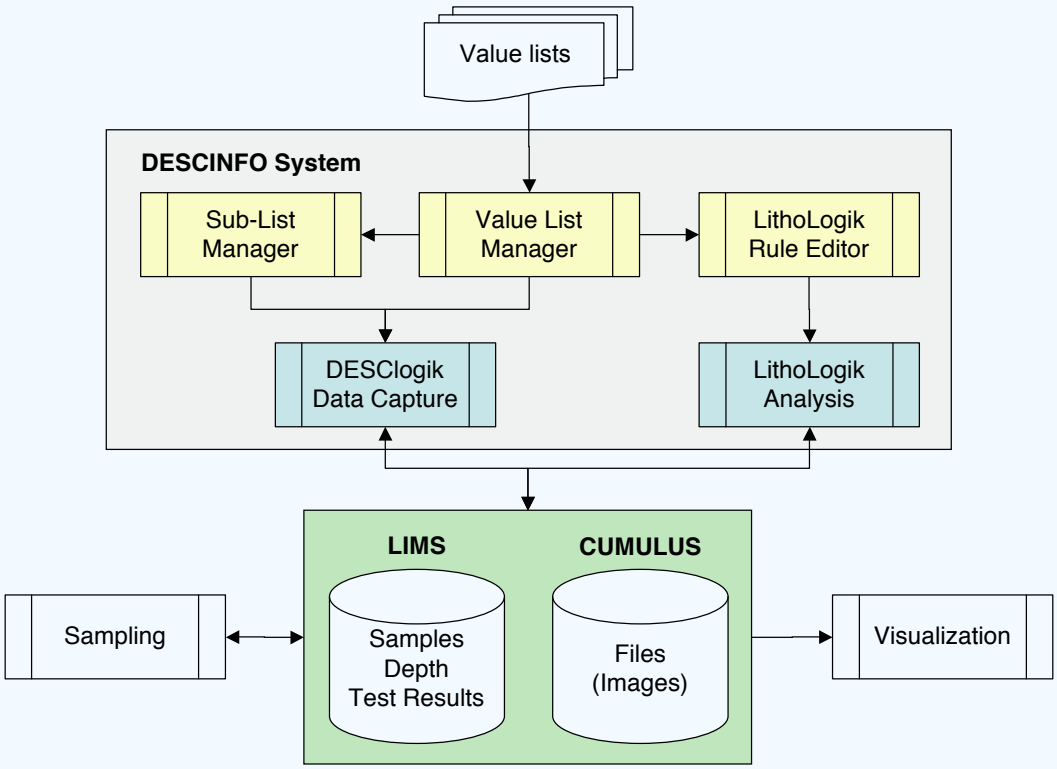
Lithology Content Management

- USIO recommendation:
  - Most of the value list review and content update may happen during expeditions, when experts actually use the lists.
  - In addition, community-based review teams may be needed to review and amend the *content* of the value lists in a more formal process.
  - How could this work?
    - IOs - manage and QA/QC tools, services, and physical value lists for data capture and storage.
    - IODP-MI - establish and manage expert review groups with input from STP and IOs.
    - STP - review overall process, recommend experts for review teams.
    - Review teams - subject expert must be willing to volunteer time in the area of their interest.
    - General user - through simple and well established avenues, user must be able to add values on the fly from ship and shore.
      - Additions must be flagged as such.
      - Additions must initiate a change/review requests.

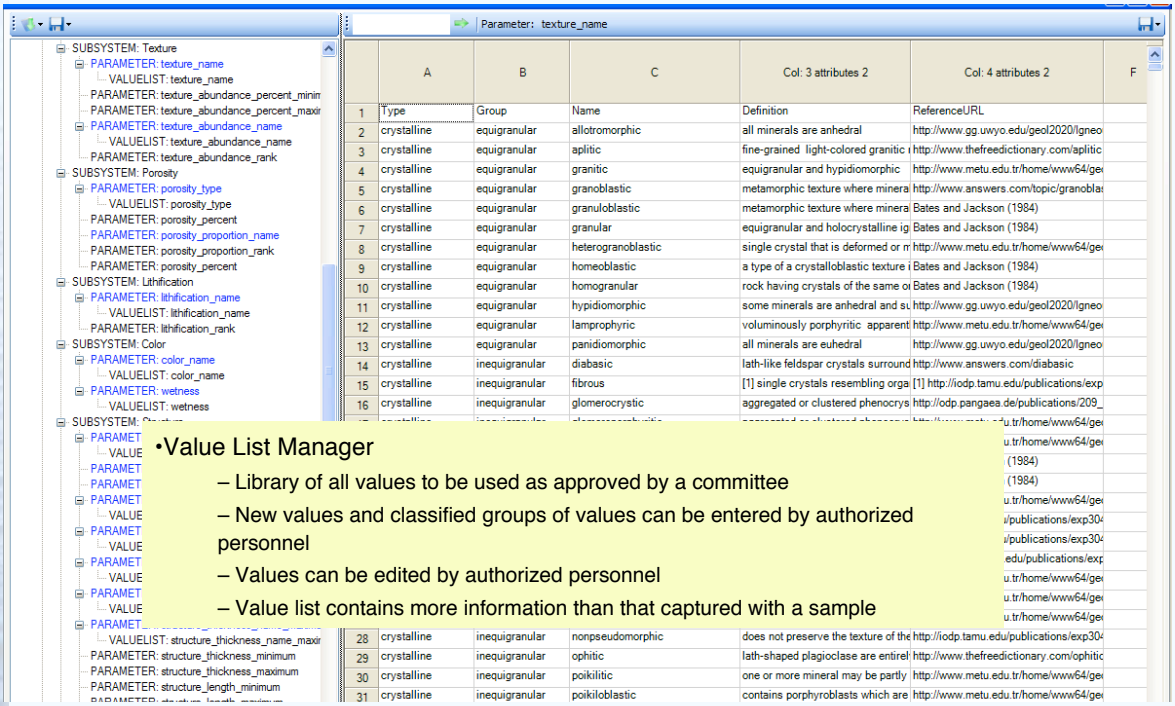
Lithology Content Management

- USIO background:
  - DESCINFO is a flexible schema for any type of descriptive data.
  - DESCINFO consists of several concepts, where each concept has several components.
  - At least one component is associated with a value list (i.e., concept_name).
  - Other components may have value lists and/or may allow direct entry of numeric values.
  - DESCINFO concepts:
    - Composition (25 components; 10 value lists)
    - Texture (6 components; 2 value lists)
    - Porosity (6 components; 2 value lists)
    - Lithification (3 components; 1 value lists)
    - Color (4 components; 2 value lists)
    - Structures (30 components; 8 value lists)
    - Fossils (27 components; 7 value lists)
    - Lithology (6 components; 1 value list)
    - Datums (7 components; 1 value list)
    - Units (12 components; 1 value list)

Lithology Content Management



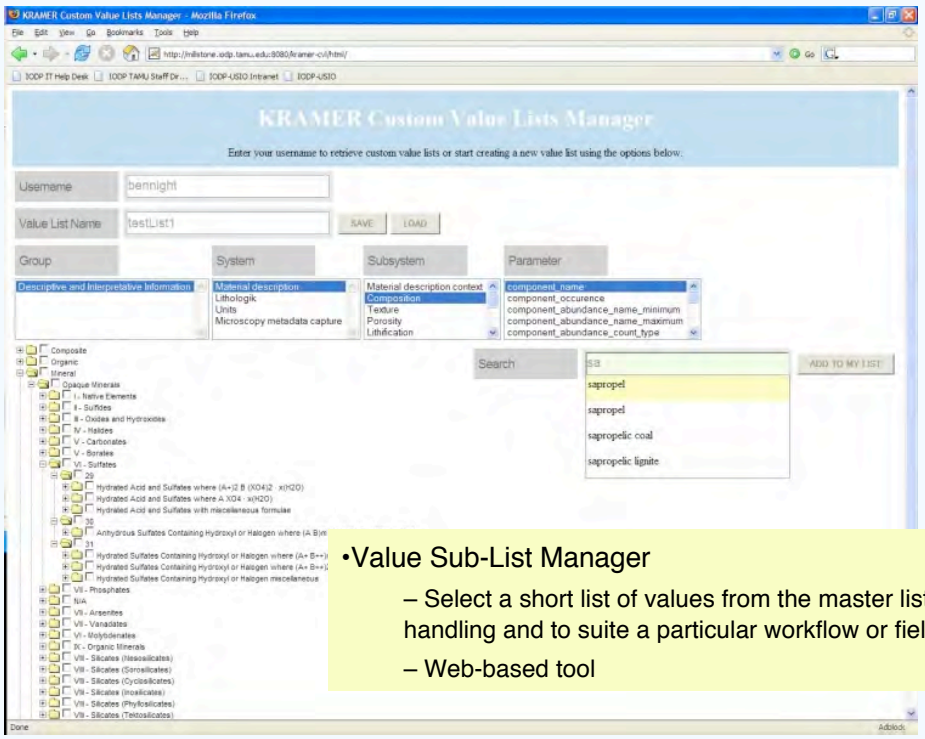
Lithology Content Management



	A	B	C	Col: 3 attributes 2	Col: 4 attributes 2	F
1	Type	Group	Name	Definition	ReferenceURL	
2	crystalline	equigranular	allotromorphic	all minerals are anhedral	http://www.gg.uwyo.edu/geol2020/lgneo	
3	crystalline	equigranular	aplitic	fine-grained light-colored granitic	http://www.thefreedictionary.com/aplitic	
4	crystalline	equigranular	granitic	equigranular and hypidiomorphic	http://www.metu.edu.tr/home/www64/ge	
5	crystalline	equigranular	granoblastic	metamorphic texture where minera	http://www.answers.com/topic/granobla	
6	crystalline	equigranular	granuloblastic	metamorphic texture where minera	Bates and Jackson (1984)	
7	crystalline	equigranular	granular	equigranular and holocrystalline ig	Bates and Jackson (1984)	
8	crystalline	equigranular	heterogranoblastic	single crystal that is deformed or n	http://www.metu.edu.tr/home/www64/ge	
9	crystalline	equigranular	homeoblastic	a type of a crystalloblastic texture	Bates and Jackson (1984)	
10	crystalline	equigranular	homogranular	rock having crystals of the same o	Bates and Jackson (1984)	
11	crystalline	equigranular	hypidiomorphic	some minerals are anhedral and s	http://www.gg.uwyo.edu/geol2020/lgneo	
12	crystalline	equigranular	lamprophyric	voluminously porphyritic apparent	http://www.metu.edu.tr/home/www64/ge	
13	crystalline	equigranular	panidiomorphic	all minerals are euhedral	http://www.gg.uwyo.edu/geol2020/lgneo	
14	crystalline	inequigranular	diabasic	lath-like feldspar crystals surround	http://www.answers.com/diabasic	
15	crystalline	inequigranular	fibrous	[1] single crystals resembling orga	[1] http://iodp.tamu.edu/publications/exp	
16	crystalline	inequigranular	glomerocrystic	aggregated or clustered phenocrys	http://odp.pangaea.de/publications/209_	
28	crystalline	inequigranular	nonpseudomorphic	does not preserve the texture of the	http://iodp.tamu.edu/publications/exp304	
29	crystalline	inequigranular	ophitic	lath-shaped plagioclase are entirel	http://www.thefreedictionary.com/ophitic	
30	crystalline	inequigranular	poikilitic	one or more mineral may be partly	http://www.metu.edu.tr/home/www64/ge	
31	crystalline	inequigranular	poikiloblastic	contains porphyroblasts which are	http://www.metu.edu.tr/home/www64/ge	

- Value List Manager
  - Library of all values to be used as approved by a committee
  - New values and classified groups of values can be entered by authorized personnel
  - Values can be edited by authorized personnel
  - Value list contains more information than that captured with a sample

Lithology Content Management



- Value Sub-List Manager
  - Select a short list of values from the master list; for easier handling and to suite a particular workflow or field of study
  - Web-based tool

Lithology Content Management

- Current DESClogik and LIMS components for lithology:

Concept	Component	Type	Units	Value List or Numeric Range	Description
Lithology					**Assigns an established and classified lithology to a sample based on user's implicit or explicit summation of descriptive information from the material under investigation.**
Lithology	lithology_principal_name	text	-	Lithology	Classified lithology name, were the respective classification is identified in the component lithology_classification.
Lithology	lithology_classification	text	-	Lithology	Name of classification scheme from which the lithology name was selected; may be a general designation or author/year.
Lithology	lithology_interval_abundance	integer	%	0 to 100	Relative abundance of lithology within the sample or sample interval. Only one (mean) value is allowed per lithology to simplify composite lithology calculation and validation.
Lithology	lithology_modifier_major	text	-	Lithology	A major modifier can optionally be selected (whether supported be classification scheme or not).
Lithology	lithology_modifier_minor	text	-	Lithology	A minor modifier can optionally be selected (whether supported be classification scheme or not).
Lithology	lithology_comment	text	-	free text	Any comment that further describes the lithology of the sample under investigation.

Paleontology Coordination

STP Consensus Statement 0708-21: Progress report on Paleontology Coordination Group
STP endorses recent progress on Paleontology Coordination Group (PCG) under IODP-MI held on 12-13 August 2007 in Berlin. STP welcomes further progress on Digital Taxonomic Dictionaries.
STP requests IODP-MI instruct the PCG to accomplish Levels 1 (taxon name list) and 2 (synonymy) for each fossil group within one year as a standard list for IODP after thorough review.
STP also requests IODP-MI to provide guidance on responsibility for maintenance of the database.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to IODP-MI.

Background to STP Consensus 0708-21: This is a progress report corresponding to STP Consensus 0612-06 from Paleontology WG 2004 Report Recommendation PALEO-3: Taxonomic Dictionaries with stratigraphic databases IODP must coordinate their efforts regarding digital taxonomic dictionaries and cyber atlases and related issues with other national and international initiatives such as CHRONOS, NEPTUNE and et. al. The Paleontology Working Group recognizes the importance of international cooperation and interaction among the IOs and the micropaleontologists community and encourages collaborations with IMRC curators to develop these dictionaries to be used on the IODP drilling platforms The microfossil groups to be covered should include calcareous nannofossils, planktic foraminifera, benthic foraminifera, diatoms, silicoflagellates, radiolarians, and palynomorphs (dinoflagellates and pollen). The taxonomic dictionaries for the Cenozoic and Mesozoic should be updated and expanded on a regular basis (e.g., at least once per year).

Paleontology Coordination

- SODV capabilities:
  - USIO will be using Taxa Name Lists (TNL) within the DESCINFO framework.
  - Initial TNL content will be based on IODP Phase 1 lists unless extended and quality controlled lists are provided by an entity accepted by IODP, STP, and the paleontological community.

- USIO background:
  - USIO has been managing Taxa Name Lists (TNL) (as well as Datum lists and Zone lists) during ODP.
  - Lists were partly reviewed by scientists:
    - Never consistently for all fossil groups
    - Never consistently for all geological time segments
    - Never on a consistent review schedule

Paleontology Coordination

- Minutes of the First IODP Paleontology Coordination Group (PCG) Meeting, 12-13 August 2007, Museum für Naturkunde, Berlin

  - Action Item 1 - IODP-MI should ensure that frequency of name use in DSDP-ODP literature be provided to specialists who will carry out TNL development work to assist them in setting work priorities.

  - Action item 2 - IODP should contact CHRONOS and discuss ways by which IODP and CHRONOS can work more closely together, in particular in IODP using CHRONOS tools as appropriate for paleontology and age model information management.

  - Action Item 3 - IODP-MI should discuss with its IT providers if the lists of names for editing and inclusion in the planned TNL can be annotated with the source publication where they were encountered.

  - Action Item 4 - IODP-MI should, as soon as possible, determine the appropriate form and formally contract the needed work for the community based initial compilation of a TNL for the fossil groups planktonic foraminifera, calcareous nannofossils, radiolarians, and diatoms. Suggested lead/contact persons are Huber, Wise, Lazarus, and Iwai.

Paleontology Coordination

- Minutes of the First IODP Paleontology Coordination Group (PCG) Meeting, 12-13 August 2007, Museum für Naturkunde, Berlin
  - Action Item 1 - IODP-MI should ensure that frequency of name use in DSDP-ODP literature be provided to specialists who will carry out TNL development work to assist them in setting work priorities.
  - USIO Response:
    - "Frequency" needs to be defined such that it makes sense in the analysis of usage; e.g.:
      - Number of samples where taxon was observed?
        - » (Note need to include postcruise observations and access to sample-observation records.)
      - Number of IODP site reports that mention taxon?
      - Number of published papers that mention taxon?
      - More sophisticated counts?

Paleontology Coordination

- Minutes of the First IODP Paleontology Coordination Group (PCG) Meeting, 12-13 August 2007, Museum für Naturkunde, Berlins
  - Action item 2 - IODP should contact CHRONOS and discuss ways by which IODP and CHRONOS can work more closely together, in particular in IODP using CHRONOS tools as appropriate for paleontology and age model information management.
  - USIO Response:
    - USIO has been in contact with Chronos.
    - Original data capture is primary task for IODP - Chronos does not provide relevant capture tools.
    - Age-depth modeling is a type of analysis the USIO plans to support in the future.
      - If users like the Chronos tool they can use it at any time (it is online).
      - The USIO plans to provide an analysis tool that meets shipboard workflow requirements and takes advantage of all relevant data collected in a hole.
        - » Plenty of analysis options and graphical feedback; therefore probably not a web-based tool.
        - » Other organizations will be able to use the tool with their data.

Paleontology Coordination

- Minutes of the First IODP Paleontology Coordination Group (PCG) Meeting, 12-13 August 2007, Museum für Naturkunde, Berlin
  - Action Item 3 - IODP-MI should discuss with its IT providers if the lists of names for editing and inclusion in the planned TNL can be annotated with the source publication where they were encountered.
  - USIO Response:
    - For TNL additions based on shipboard data collection work, the source (investigator, expedition) can easily be added.
      - Needs to be defined and added to the component (parameter) list.
    - For TNL additions based on analysis of published work, this can presumably be done quite easily as well.
      - Small part of overall significant effort to analyze publications.

Paleontology Coordination

- Minutes of the First IODP Paleontology Coordination Group (PCG) Meeting, 12-13 August 2007, Museum für Naturkunde, Berlin
  - Action Item 4 - IODP-MI should, as soon as possible, determine the appropriate form and formally contract the needed work for the community based initial compilation of a TNL for the fossil groups planktonic foraminifera, calcareous nannofossils, radiolarians, and diatoms. Suggested lead/contact persons are Huber, Wise, Lazarus, and Iwai.
  - USIO Response:
    - Still waiting for guidance by IODP-MI.
    - Concerted implementation among IOs requires:
      - Detailed parameter definition for fossil taxa
      - Detailed parameter definition for fossil datums
      - Detailed format of TNL to be exchanged between expert reviewers and IOs
      - Definition of “sub-TNLs” (as opposed to one mega-list) to move forward in a timely manner
      - Initial compilation of (sub-) TNLs in a timely manner
      - Definition of review process for coordinated updating of the TNLs with input from multiple sources and experts

Paleontology Coordination

- Current DESClogik and LIMS components for fossil:

Concept	Component	Type	Units	Value List or Numeric Range	Description
Fossils					**Identifies and describes remains or traces of plants and animals.**
Fossils	fossil_name	text	-	Fossils	Formal name (Genus species), or informal name commonly used in paleontological investigations. Selection of formal name from the value list stores pre-determined values for f_suspecies_name, f_author_year , f_taxonomic_status, and f_group programmatically.
Fossils	f_subspecies_name	text	-	Fossils	Aditional qualification of fossil name, including subspecies, forms, varieties, informal morphotypes, etc.
Fossils	f_author_year	text	-	Fossils	Author and year of publication of the fossil name. The value is entered programmatically if it is associated with the fossil_name value in the Fossil Names list.
Fossils	f_taxonomic_status	text	-	Fossils	Flag as to whether the taxon is currently valid or considered a synonym.
Fossils	f_group	text	-	Fossils	Informal grouping commonly used in the user community and useful for data analysis.

- DESClogik and LIMS provide 22 additional components for fossil:
  - Composition
  - Size (name, numeric)
  - Abundance (%, name, count, rank, min, max)
  - Preservation (min, max, name, rank)
  - Fragmentation (min, max, name, rank)
  - Comments

Paleontology Coordination

- Current DESClogik and LIMS components for datum:

Concept	Component	Type	Units	Value List or Numeric Range	Description
Datum					**Assigns an established datum (geological age) to an interval between two samples or data points based on user's interpretation of descriptive or instrumental data.**
Datum	datum_name	text	-	Datums; free text	Name of datum. In the case of fossils, this includes Genus, species, subspecies. The Datums value list includes more information that is programmatically retrieved and written to the fields datum_author_year, datum_group, datum_type, datum_age_old, and datum_age_young if available.
Datum	datum_author_year	text	-	Datums; free text	Autor and year of publication of the datum is retrieved programmatically from the Datum List.
Datum	datum_group	text	-	Datums; free text	Group name based on IODP-specific informal classification (fossil groups, instrument data sources, etc.) is retrieved programmatically from the Datum List. This information serves to facilitiate age-depth modeling.
Datum	datum_type	text	-	Datums; free text	The type of datum (FAD, LAD, ACME, etc.) is retrieved programmatically from the Datum List.
Datum	datum_age_old	number	Ma	Datums; free text	The oldest age (or the average or only age) of the datum based on the publication specified in fossil_datum_author_year is retrieved programmatically from the Datum Types list.
Datum	datum_age_young	number	Ma	Datums; free text	The youngest age of the datum based on the publication specified in fossil_datum_author_year is retrieved programmatically from the Datum Types list.
Datum	datum_comment	text	-	free text	Flag that helps age-depth modeler define a selection of age indicative fossils for analysis

Common Reference Collection

STP Consensus Statement 0708-12: Common reference collections
STP recommends the IODP-MI to establish a work plan that can provide common reference collections for smear slides and thin sections across all platforms as soon as possible. If necessary this work plan could be endorsed by an ad-hoc working group similar to that created to consider micropaleontological issues.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to IODP-MI.

Background to STP Consensus Statement 0708-12: Common reference collections for smear slides and thin sections is a long-term issue, that has been previously addressed in STP recommendation 0507-02. These recommendations were superseded by IODP-VCD/Lithology Report, but STP has concerns over the specific point of common reference collections, whose current status is unclear.
STP Recommendation 0507-02 proposed that "common reference collections for smear slides and opaque minerals in polished thin sections should be prepared for all drilling platforms and on-land facilities". This is a follow up to that recommendation. STP also suggests IODP-MI investigates using such collections in education and outreach efforts.

Common Reference Collection

- SODV capabilities:
  - A. Digital collections
    - *Proceedings* of the ODP and IODP are fully searchable and available on the web.
    - Thin sections are now routinely scanned (for overview image) and made available in the USIO database with any other micrograph deemed useful by scientists.
    - Electronic Calcareous Nannofossils via the International Nannofossil Association (Woody Wise)
      - Originally ODP funded (The Cenozoic NannoWare Database)
      - http://www.nhm.ac.uk/hosted_sites/ina/announce/INACDv3.htm
    - Atlas of Paleocene Planktonic Foraminifera, Contributors: Richard K. Olsson, Christoph Hemleben, William A. Berggren, Brian T. Huber (Editors) and Members of the Paleogene Planktonic Foraminifera Working Group
      - http://services.chronos.org/foramatlas/pages
    - Access to public resources, e.g.:
      - Radiolaria.org, http://www.radiolaria.org/
      - Ellis and Messina Catalogue (http://micropress.org, foraminifers and diatoms)
    - Individual scientists' digital catalogues and reference collections

Common Reference Collection

- SODV capabilities (cont.):
  - B. Physical collections
    - Foraminifer collection had been on the ship from undetermined source (DSDP?)
      - Shipboard foraminifer specialists determined that specimens were mixed up and samples were missing
      - Deemed unfit for deployment
    - Woody Wise nannofossil reference collection donated to ODP
      - Excellent collection
      - Close to 50% disappeared from the ship within a year during ODP/IODP
    - Radiolaria donated by Annika Sanfilippo
      - Good condition, will be re-deployed with check-out procedure
    - Smear slides and thin sections produced on the JR
      - Stored on shore
      - Smear slides are rarely used by scientists; virtually no postcruise use through ODP/IODP
      - Thin sections regularly provided to investigators on request
        - » Many have not been returned
        - » Effort to recover thin sections have been labor-intensive and mostly unsuccessful
      - Specific selections can be sent to the ship for specific expeditions upon request by expedition management.
    - Scientists personal reference collections if these are important for their work

Postexpedition Data Capture

STP Consensus Statement 0708-13: Post-Expedition Data Capture
STP requests that an update be given prior to our next meeting regarding inclusion of post-expedition generated results (data and processed data). STP is particularly interested in the mechanism for this data capture, when it is likely to be implemented, and what the arrangements are for QA/QC of the data.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to SPC and IODP-MI.

Background to STP Consensus Statement 0708-13: This is a follow-up request to STP Recommendation 0606-03: Post-Expedition Results "The STP recommends that the IOs include post-expedition generated results (data and processed data) in the expedition database. The original data should be maintained in the database. Submissions should address methodology, QA/QC, and if necessary, include an explanation of how the added dataset differs from previous versions. The IODP-MI QA/QC taskforce should develop a policy for ensuring QA/QC of these results. The IOs would determine if data submission is voluntary or obligatory."

Postexpedition Data Capture

- USIO capabilities:
  - Currently no organizational commitment for postcruise data capture
  - Technically ready to receive post-expedition data:
    - A) Data that correspond and conform to shipboard data
      - Purpose: complement shipboard data acquisition
      - Properly stored and flagged as postcruise
      - Method and QA/QC must conform to USIO requirements
      - Data can be directly accessed with USIO data visualization, reporting, and analysis tools
      - Resource requirement: moderate, mainly personnel for QA/QC
    - B) Data that have no shipboard equivalent
      - Purpose: make data files easily accessible to investigators
      - Stored as files, with simple metadata catalogued (expedition, hole, author,…)
      - Method description and QA/QC mostly responsibility of author
      - Data cannot be directly accessed with USIO data visualization, reporting, and analysis tools
      - Resource requirement: moderate, mainly QA/QC personnel for QA/QC
    - C) Data that have no shipboard equivalent, but are generated routinely in many labs
      - Purpose: make data files easily accessible to investigators in standardized form
      - Stored as data (parsed)
      - IODP requires method description and QA/QC by the author
      - Data can be directly accessed with USIO data visualization, reporting, and analysis tools
      - Resource requirement: moderate, mainly QA/QC personnel for QA/QC

Microbiology

STP Consensus Statement 0708-14: STP Geochemistry and Microbiology WG report. In reference to the Action Item 0612-28, the STP refers to the original recommendations made to IODP-MI. STP requests action to endorse and implement these recommendations.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to IODP-MI.

Background to STP Consensus 0708-14: The STP Geochemistry Microbiology Working Group has found that the recommendations of the original 2003 IODP Microbiology Working Group report have not been acted upon (see minutes of SPC 0406: Item 14.2 SPC Consensus 0406-25). Revisions to the original IODP Microbiology Working group recommendations include adoption of the microscopic cell count protocol (Lunau et al. 2005. Environ. Microbiol. 7: 961-968), routine use of contamination tests (suggested as standard measurements in the IODP Measurements reference), and use of the pressure-temperature coring system whenever possible. The relevant recommendations generated by the IODP Deep Biosphere Workshop held in Vancouver, BC in October 2006 should also be consulted and incorporated, as needed (D'Hondt et al. Scientific Drilling. In press).

Microbiology

- WG Recommendation 1: IODP should establish a repository for samples routinely collected and stored appropriately for subsequent microbiological analysis. The samples should be taken in sterile syringes (50 cm^3 capacity) as soon as the core arrives and stored as described below depending on the subsequent analysis.
  a. Samples for nucleic acid analysis should be placed immediately in liquid nitrogen and transferred to ultra-low freezer or liquid nitrogen on board for storage. Alternatively, whole round samples used for this purpose should be placed directly in an ultra-low freezer or liquid nitrogen as soon as possible. Because these samples [types, size, shape, number?] are not useful for nucleic acid analysis after long term storage (> 1 year), they should be made available for other types of analyses (e.g., chemical) if appropriate.
  b. Samples for culturing work should be transferred to gas-tight trilaminate bags containing an oxygen scrubber, heat sealed, and stored at 4°C. [holding time?]
  c. Samples for microscopy should be preserved with an aldehyde solution (glutaraldehyde or paraformaldehyde) and stored at 4°C. [holding time?]

Microbiology

- SODV capability in response to Recommendation 1:
  - The USIO has ensured that the infrastructure is in place
    - liquid nitrogen and/or –80°C sample storage on ship
    - limited amount of both types of storage at the repository
      - Eight 30-50 G liquid N Dewars
      - Three –80°C freezers (about 75% filled)
  - Shipboard participants sampling sample preservation for post-expedition research needs will be supported.

- USIO recommendation in response to Recommendation 1:
  - Systematic long-term storage for potential community use is not warranted for scientific and fiscal reasons (also see “Legacy samples” agenda item).

Microbiology

- WG Recommendation 2: Drilling methods that yield cores of optimal quality for microbiological studies should become standard.
  a. Routine use of the drillover method extends the useful range of the APC method and provides superior results for microbiological studies and should be implemented.
  b. The continued development of the pressure retaining core barrel [Pressure Coring System, PCS], and subsequent handling under in situ pressures is highly valuable to the microbiology research and must be given highest priority.
  c. Optimization of core processing with the goal of minimizing increases in temperature and exposure to oxygen should be implemented.
  d. Continued performance and further improvements to the methods for contamination testing (House et al., 2003) while coring.

Microbiology

- SODV capabilities in response to Recommendation 2:
  a. The APC drillover method is applied when scientific objectives benefit from it, as long as core quality can be optimized, and if operational safety is not compromised. Some microbiological objectives in the past had targeted igneous rocks, which can only be recovered with the RCB system.
  b. The PCS continues to be available; its deployment is contingent on operational priorities established by the expedition management, which is guided by SPC recommendations and overall science objectives. To meet the microbiological community's expectation, significant development of the PCS would be required (an organizational goal but currently not funded).
  c. The SODV will include a cold room, equipped with a glove box and appropriate microbiological sampling tools.
  d. The USIO will continue to provide the capability to inject tracers into the drill string and to analyze the core material for those tracers. This includes both the use of perfluorocarbon tracer compounds and fluorescent microspheres.

Microbiology

- WG Recommendation 3:
  - IODP should adopt similar policies that are established within the international community of microbiologists for the exchange of culture and sequence data.
    a. Unique nucleic acid sequence data derived from cores and published in IODP publications or scientific journals must be submitted to one of the internationally recognized, publicly accessible databases (e.g. DDBJ, EMBL, and GenBank).
    b. Subcultures of organisms derived from cores and published in IODP Publications or scientific journals must be deposited in at least two internationally recognized, publicly accessible culture collections (e.g. ATCC, JCM, DSMZ, and CCUG).

- USIO recommendation in response to Recommendation 3:
  - The basic responsibility for this appears to rest with the author.
  - A policy for IODP publications would have to be established by IODP-MI; USIO will not act unilaterally on this.

Microbiology

- WG Recommendation 4.
  - IODP institute routine measurements that will be performed in support of an ongoing study of microorganisms in the marine subsurface. The data produced from these assays will be submitted to the general IODP database and be subject to the same stipulations as other data. IODP should routinely sail a technician in the microbiology laboratory. This technician will be responsible for training sailing microbiologists in the sampling procedures and sample analysis, maintaining the equipment in the microbiology laboratory, and ensuring that an adequate inventory of supplies are on hand prior to sailing. The technician should be specifically trained in microbiological techniques and procedures, including the use of radioisotopes, for the microbiology laboratory.
  - The routine measurements listed in the WG Report include:
    a. Biomass
       1. Direct cell counts, using acridine orange or other fluorochromes (e.g., SYBR Green).
       2. Vital stains to determine the level of metabolic activity (e.g., 5-cyano-2,3-ditolyl tetrazolium chloride).
       3. Phospholipid analysis to estimate total microbial biomass in sediment.
       4. Adenosine-5'-triphosphate (ATP) quantification to estimate total biomass in sediment.
    b. Metabolic Rates, i.e., the use of radioisotopes in the bio-rad van.

Microbiology

- SODV capabilities in response to Recommendation 4:
  - The IODP-USIO does not in general provide analyses carried out by technicians. Seagoing technicians support:
    - Sampling
    - Availability of infrastructure, instruments, methods
    - Calibration of instruments and laboratory maintenance
    - Participating scientists who perform the bulk of the analyses
  - The exception are chemical analyses carried out by IODP technicians for drilling safety reasons.
  - The request that the program sail a microbiology technician fully trained in microbiological procedures including the use of radioisotopes is beyond the current scope of manpower and budget.
  - The only technique that could at this time qualify as a “routine” measurement is the direct cell count using acridine orange.

Legacy Samples

STP Recommendation 0708-04: Legacy Samples.
In reference to Action Item 0612-31, the STP recommends that microbiology legacy samples shall be a part of any IODP sampling plan. Collection and storage of legacy samples should follow the guidelines presented in the 2003 Microbiology Working Group report.

Voting record: 15 Yes; 0 No; 1 Abstention (Lovell); (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to SPC and IODP-MI.

Background to STP Consensus 0708-04: This Consensus statement follows on from and supercedes Consensus statement 0502-08 and STP recommendation 0507-07. The reason for collecting legacy samples is that such core materials may permit: 1) future characterization when scientists recognize the need to test hypotheses that were not apparent at the time of original sampling, 2) retroactive characterization of the microbial communities as methods develop, 3) cross-reference of other methods and 4) recruitment of new microbiologists to IODP.

Legacy Samples

- SODV capabilities:
  - No routine “legacy” sampling program for microbiology is in place.

- USIO Recommendation:
  - Microbiology samples should be tied to a request by an individual or a scientific party, with appropriate scientific justification and readiness of analytical capabilities.
  - If legacy samples are to be implemented:
    - Funding needs to be prioritized throughout IODP;
    - Usage needs to be carefully monitored;
    - Samples should be shipped directly to an adequate microbiological laboratory.

Legacy Samples

- ODP historical perspective: organic geochemistry (OG) “legacy samples”:
  - Goals
    - Preserve the often rare and thin beds containing significant amounts of organic material for potential later analysis.
    - Scientists can re-test samples for which analyses have already been produced.
  - Usage
    - Legacy sample were taken from DSDP days up to Leg 134 (1990).
    - Curatorial staff reports that very few requests were ever made for these legacy samples.
    - Curator's efforts to advertise the samples for use by microbiologists and others led to no use at all.
    - Only uses of OG samples were for non-OG analyses (e.g., biostratigraphy) that happened to need core intervals that fell within the OG WR samples.
    - Only 1 known use of frozen OG use for OG analysis.
  - Status
    - After reviewing use of legacy samples, JOIDES panel recommended in the early 90s to thaw the legacy samples.
    - All legacy samples were finally thawed in the fall of 2007.

Legacy Samples

- ODP experiments with microbiology “legacy samples”
  - Goals
    - Scientists can re-test samples for which analyses have already been produced
  - Case: Hydrate samples from Leg 204
    - One request for 2 frozen hydrate samples
    - One request for two pressurized hydrate samples
    - One request for four pressurized hydrate samples
    - One request for ODP to replaced investigator’s personal samples degraded during shipment (shipment by investigator, not ODP)

IODP Measurements Document

STP Recommendation 0708-02: IODP Measurements Document.
STP has revised the IODP Measurements Document and recommends this new version replace the existing document on the IODP web site.

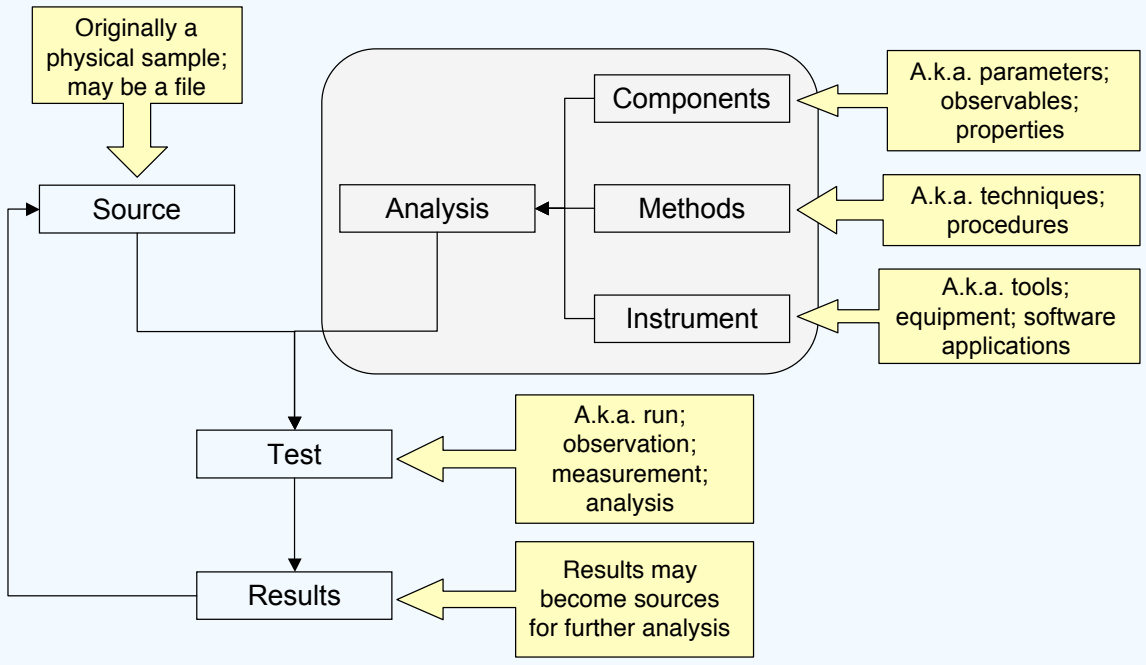
Voting record: 15 Yes; 0 No; 1 Abstention (Lovell); (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to SPC and IODP-MI.

Background to STP Recommendation 0708-02: This recommendation makes some minor changes to the IODP Measurements Document. A revised version is subkitted to IODP-MI and reflects a need for flexibility in the collection of samples such that whole round cores, which may be required for some microbiological samples, can be acquired in some situations. Recommendations to the standard and supplemental measurements reflect current best practices with respect to microbiological procedures and an understanding of what is possible under current shipboard programs.
For the definition of minimum measurements, change to portray that while usual minimum practice is that all cores are split this does not preclude the collection of whole round cores in certain instances;
Under standard measurements, 1) “depth” be added as a Minimum Measurement; 2) the measurement of phospholipids should be moved to the Supplemental category under “biomarker”, and 3) add “fix samples for microscopic cell counts”; 4) move XRF scanner to Supplemental Measurements.
Under supplemental measurements, add “ Microbial activity measurements using radiotracers”
Other changes are proposed and include the deletion of the comment column (which formed the original basis for assessing whether measurements existed in ODP) from the new version.

IODP Measurements Document

- USIO update:
  - The USIO has no issues with the IODP Measurements document in principle or in substance.
  - The USIO is reporting on its definition and implementation of "measurement" at the next two levels of granularity:
    - Analysis: Collection of data associated with a method (and its sub-methods if appropriate), which may involve one or more instruments (sensor, detector)
      - USIO defined ~40 analyses
    - Components: One or more components are associated with each analysis; they represent the finest granularity of information definition and are associated with units and ranges
  - Analysis and components are implemented as part of the Laboratory Information Management System (LIMS).
  - This level of definition will allow the IODP to address issues of comparison and integration.

IODP Measurements Document



Temperature Resolution, Accuracy, Calibration

STP Consensus Statement 0708-16: Temperature and pressure resolution, accuracy and calibration
A draft report on resolution, accuracy and calibration of temperature and pressure measurements (STP Consensus 0606-13) has been circulated by IODP-MI (STP Consensus 0612-07) among the IOs. STP requests the IOs to report back on implementation plans for report recommendations prior to the next meeting.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to IODP-MI.

Deadline: 1 month prior to next STP meeting

Background to STP Consensus 0708-16: This is a follow up (3rd) request to STP Consensus 0612-07, which was a follow up (2nd)request to STP Consensus 0606-13 to IODP-MI to circulate a draft report to the IOs for comment and feedback at the next STP meeting.

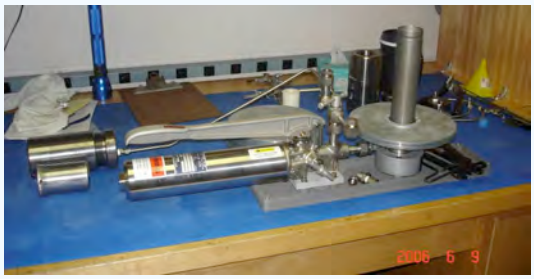
Temperature Resolution, Accuracy, Calibration

- SODV capabilities:
  - Formation pressure can currently not be measured reliably during drilling and coring operations.
    - Pressure port issues on tip of Villinger Temperature and Pressure Probe (DVTPP).
    - Will be addressed as resources permit.
  - Formation temperature measurements have been improved with the following service enhancements:
    - Implementation of shore calibration facilities
    - Implementation of APCT3 (to replace APCT)
    - Implementation of Sediment Temperature Tool (SET); to replace Davis Villinger Temperature Probe (DVTP)
      - Will eventually be equipped with pressure capability
    - Implementation of new third-party temperature modeling software (TFIT)
    - Integration of formation temperature data in USIO database
      - Tool calibrations
      - Measurement data
      - Computed formation temperatures
    - Service contract with CDEX to provide formation temperature measurements on the Chikyu in FY08

Temperature Resolution, Accuracy, Calibration

- USIO shore-based calibration facility:
  - Temperature calibration
    - Readout—Hart Scientific Black Stack unit with SPRT input module and standard thermistor input module, which interface with IODP SPRT and thermistors
    - SPRT temperature range -200° to 480°C with an accuracy of 5 mK at 0°C and 7 mK at 100°C
    - Standardized thermistor with an accuracy of 1.3 mK at 0°C and 1.5 mK at 100°C
    - Standardized thermistors with temperature range from 0°C

  - Pressure calibration
    - Amatek Deadweight Tester calibrated to specific gravity in lab location
    - Uncertainty of measurement—0.025% over range of 50 to 10,000 psi



Temperature Resolution, Accuracy, Calibration

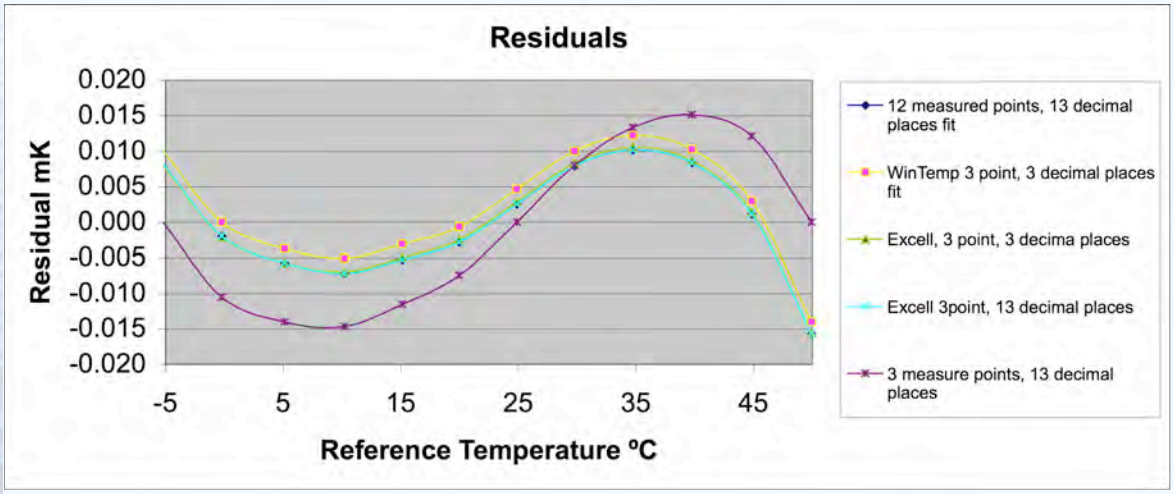
- Temperature accuracy for APCT3 and SET:
  - Electronic resolution: 1 mK (0°–50°C)
  - Laboratory calibration accuracy: 10 mK
    - Bath temperature 1 mK
    - Thermistor 1 mK
    - Data reduction: 10 mK
  - Formation temperature estimation: 0.01–0.1 K

Advance Piston Core Temperature Tool, Model 3 (APCT3)

Sediment Temperature Tool (SET)
Davis Villinger Temperature Probe (DVTP

Temperature Resolution, Accuracy, Calibration

- Temperature calibration:
  - Bath reference temperature measured using reference standard thermistor.
  - Resistance measured in submerged and equilibrated tool.
  - Twenty minute measurement periods at each of 13 steps at ~5° intervals.
  - Temperatures estimated by tool are calculated at particular resistances using the Steinhart and Hart coefficients determined by the original measured data fit.
  - Residuals between calculated tool and bath reference temperatures are being analyzed (see graph).



Core Log Seismic Integration

STP Consensus Statement 0708-18: Core Log Seismic Integration
STP recommended (Recommendation 0507-09) that the IODP databases allow for the inclusion of depth correlation data to support inter-hole composite depth sections of recovered cores and core-log-seismic integration. To facilitate depth correlation, the STP recommended the development of software that can be used across all IODP databases.

STP requests an update from IODP-MI (DMCG and/or DSWG) on the status of this recommendation prior to the next STP meeting.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to IODP-MI.

Deadline: 1 month prior to next STP meeting

Background to STP Consensus 0708-18: The background to the initial recommendation 0507-09 states that "Depth correlation data includes how the measured and processed depths and seismic two-way-travel times relate between coring, logging, and seismic datasets for that expedition as determined by the scientific party. Standardized software across all IODP platforms is important for making inter-hole composite depth sections of recovered cores, for core-log-seismic integration, and for comparison of depths between multiple expeditions to the same study area potentially by different platforms.[.....] Seismic two-way-travel time of the site survey line at the drilling site and the most appropriate time-to-depth conversion (as determined by the science party) needs to be included along with the depth measurements for accurate core-log-seismic integration. [.....] Flexibility in depth scale presentation is advisable allowing the scientific party to choose between different measured or processed depth scales for core-log-seismic integration or comparisons between holes, sites, and expeditions. Software implementation across all platforms of depth and travel time correlation data is currently being worked on by the IODP-MI Data Management Coordination Group. STP requests to be kept informed of the development progress and future use in IODP expeditions.

Core Log Seismic Integration

- SODV capabilities:
  - Multiple depth scales and depth maps
    - Scales based on cores are implemented in the new Laboratory Information Management System (LIMS).
      - All core data can be viewed against the depth scales commonly used for cores.
    - Maps between any scale types will also be implemented in the LIMS.
      - Does not include mapping tools.
      - Does not necessarily include capability to view all data associated with depth maps (in the near future).
    - Wireline logging and LWD depth scales and maps will be available in the LDEO database.
  - Depth mapping tools
    - Correlator will be the updated application to replace Splicer and Sagan used in the ODP and IODP Phase 1.
      - "Splicer" part to create core composite depth scales and spliced sections is completed.
      - "Sagan" part used for core-log depth scale mapping to be completed soon.
    - Schlumberger IESX software combines check shot and synthetic seismograms to map between the seismic section two-way-time and core and log depths.

Core Log Seismic Integration

- Background:
  - Depth scales and depth scale mapping implementation in the LIMS
    - Within the materials and analysis database (Laboratory Information Management System - LIMS), each hole is defined with a specific depth scale based on drilling information and/or recovered material.
    - These scales were defined by a working group in late 2006.
    - Any of these default scales for a hole can also be mapped to other scales as needed.
    - At least one type of map is created in Correlator, providing a series of depth pairs between the different scales. Depths between depth pairs are computed by linear interpolation.
    - The same scale can be mapped to multiple holes. This allows splice definitions to be created for those holes.
    - These scales can include a scale specific to the seismic information. No tool has been identified for creating this mapping.

Core Splitting Techniques

STP Consensus Statement 0708-19: Core Splitting Techniques
STP Consensus 0612-18 on Core Splitting Techniques requested IODP-MI together with the IOs investigate solutions to this problem and encouraged dialogue with other scientific communities (for example, lake sediments and geology groups). STP restates its request to IODP-MI to report on their findings prior to the next STP meeting.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to IODP-MI.

Deadline: 1 month prior to next STP meeting

Background to STP Consensus 0612-19 was recommendation number 1 in the Core Description Working Group report (2004) available on the STP web page of the IODP web site.
STP requested IODP-MI together with the IOs investigate solutions to this problem and encouraged dialogue with other scientific communities (for example, lake sediments and geology groups). STP requested IODP-MI to report on their findings at the next STP meeting. This is a follow up request to IODP-MI.

Core Splitting Techniques

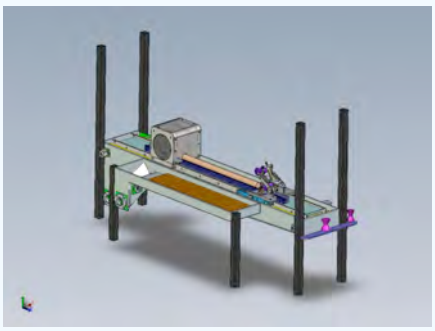
- From the Core Description Working Group report SciMP 2004
  - 2.1. Core splitting
  - Cores are typically split into two halves after whole round core measurements and sampling. One half is used for visual core description and archiving (archiving half). The other half is used for routine analyses and sampling by approved requesters (working half). Development of precise split technique is recommended. Roughness of split surfaces is less than 1 mm for non-destructive measurements (especially for data quality control of XRF core logger). Individual hard rock pieces also require precise split technique more careful than in ODP.
  - Recommendation 1: Core Description WG recommends the development of precise splitting techniques of cores to provide maximum quality of surfaces to be described.

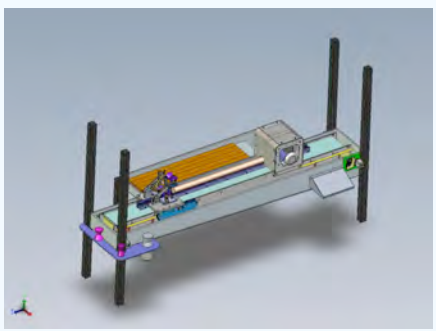
Core Splitting Techniques

- USIO capabilities:
  - USIO refurbished DSDP/ODP/IODP Phase 1 splitter
    - Shafts and bearing replaced.
    - Track straightened, guide strips replaced.
    - Uneven (bent) core splitting experienced in the past should be mitigated (testing is pending).

Core Splitting Techniques

- USIO outlook:
  - New core splitter in development - to be deployed in FY08 or FY09
    - Roller-based core clamp.
    - Actuator allows application of variable cutting speeds.
    - Bigger saw, motor should improve hard rock cutting.
    - Modular design for potential future extension if funding becomes available:
      - Canopy to contain H_2S fumes
      - Anoxic environment during splitting
      - Water jet cutting capability





Seismic Sources

STP Consensus Statement 0708-20: Seismic Sources
The STP recommended equipping an appropriate size of a seismic source on IODP drilling platforms. STP requests an update from the IOs on the status of seismic sources on IODP platforms prior to the next meeting.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to IODP-MI.

Deadline: 1 month prior to next STP meeting

Background to STP Consensus 0612-20: This topic was first proposed in an initial request from STP (STP 0601-04) detailed in SPC Consensus 0603-8. STP 0606-01 followed up with specific details to IODP-MI.

Seismic Sources

- SODV capabilities:
  - USIO inventory of shipboard seismic sources:
    - Sercel GI gun
      - "True GI" mode: 150 in^3 (G 45 in^3, I105 in^3)
      - Harmonic modes: 90-255 in^3
    - Sercel G. Gun parallel cluster (2 x 250 in^3; can be reduced to 2 x 180 in^3)
  - VSP application:
    - GI Gun for shallower penetration, higher resolution
    - G. Gun parallel cluster for deeper penetration
  - Towed seismic survey application:
    - GI Gun
    - G. Gun parallel cluster as a spare
  - Given the seismic applications of the past several years, these sources will primarily be used for VSPs (check shots).
  - Recommendation for the future is to purchase an entire GI Gun or the parts necessary to convert the two G. Guns to a GI Gun.

Source: Sercel Marine Sources Brochure, 09/04, www.sercel.com

Open Hole VSP

STP Consensus Statement 0708-15: Open Hole VSP
STP requested advice from EDP (Consensus 0601-03). STP wishes to follow up this general request and again seeks advice from EDP on whether there are "off the shelf solutions" or whether STP should seek to investigate technology development in seeking solutions to IODP requirements.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to SPC.

Deadline: 1 month prior to next STP meeting

Background to STP Consensus 0708-15: VSPs have been implemented infrequently in ODP and IODP phase 1 and have met with limited success. At the international Core-Log-Seismic workshop on October 3-4, 2005, participants widely agreed that VSPs are vital to proper core-log-seismic integration the problems encountered by ODP were largely due to the open hole conditions that non-riser operations. Industry has a long history of successful VSP operations but also generally has must greater well control. EDP is the perfect group within the SAS to investigate this issue due to its strong connection with industry. Both improved downhole receiver technology or even downhole source technology could be considered.

STP Contacts for this discussion are: Georges Gorin; Hongkui Ge

Open Hole VSP

- IODP Phase 1 statistics:
  - VSP measurements with the *JOIDES Resolution* during IODP Phase 1 are summarized in a report distributed with these slides.

Time Stamps

STP Consensus Statement 0708-11: Time stamp
The STP thanks Basile for his presentation on time stamps for measurements and procedures. The issues resulting from this presentation have been incorporated in STP's response to the IODP-MI QA/QC Task Force report (draft 1) and submitted to IODP-MI.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to SPC and IODP-MI.

Background to STP Consensus Statement 0708-11 follows and closes STP Action Item 0612-27: Time stamp for measurements & procedures.

Time Stamps

- SODV capabilities:
  - Timestamps as metadata generated automatically with every database transaction:
    - SAMPLE
      - login_date - Timestamp when sample information was added to the database
      - changed_on - Timestamp a sample record was last changed
    - TEST
      - date_received - Timestamp a test record was created
      - changed_on - Timestamp a test record was last changed
    - RESULT
      - entered_on - Timestamp a result record was created
      - changed_on - Timestamp a result record was last changed
  - Date/time records for method-specific events:
    - SAMPLE
      - Recvd_date – Timestamp when sections are split into section halves
    - TEST
      - completed_date – Timestamp when test was completed

Grain Size Measurements

STP Consensus Statement 0708-22: Grain Size Measurements
The STP thanks Naruse and Basile for their presentation, and acknowledges the scientific interest of performing grain size measurement on soft rocks during IODP expeditions. A laser granulometer or another apparatus to measure grain size onboard a drilling vessel during a scientific mission, appears to be scientifically valuable but there are considerable technical concerns.
STP refers this for further discussion by STP as a possible component of the STP roadmap.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki)
Priority: High

Background to Consensus Statement 0708-22: This follows on and supersedes STP Action Item 0612-34. It also meets item 7 of the agenda (scientific roadmap)

Grain Size Measurements

- SODV capabilities:
  - Instrumented grain size analysis will not be available on the JR.
- ODP historical perspective:
  - Laser type grain size analyzers have been deployed at least twice during ODP.
  - The instruments were removed after a few expeditions because of the inherent problems associated with sample preparation and instrument reliability.

Grain Size Measurements

- USIO recommendation:
  - Based on an evaluation of the latest particle analyzers (demonstrations by vendors and hands-on tests) the instruments, computing methods, and configuration options seem well refined and applicable to soft sediments.
  - Instrument acquisition cost is reasonable (<$100k).
  - The main issue with particle size analysis is still the sample preparation:
    - No single method is adequate for all sediment compositions;
    - Methods also change with increasing lithification (consolidation, cementation) for the same sediment composition;
    - Fine grained (clay-rich) materials commonly recovered in IODP are particularly problematical to disaggregate and keep in suspension;
    - Sample preparation is laborious.
  - Routine shipboard measurements are therefore not considered feasible without addition of significant technical support.

Non-Magnetic Core Barrels

STP Recommendation 0708-06: Non-magnetic core barrels
The STP thanks Oda for his presentation, and acknowledges the scientific interest in using non-magnetic core barrels. STP acknowledges the efforts made by the USIO in enabling at least two non-magnetic core barrels to be available for Expeditions and the efforts made by C-DEX in providing a non-magnetic cutting shoe.

STP encourages C-DEX and ESO to work towards providing non-magnetic core barrels for future expeditions.

Voting record: 15 Yes; 0 No; 1 Abstention (Lovell); (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.
Priority: High
STP suggests this be forwarded to IODP-MI.

Background: SciMP Recommendation 0406-12 proposed that non-magnetic core barrel be used for all IODP APC coring to minimize drilling induced magnetic overprint on sediments. SPC Consensus 0410-23 accepted this with the proviso of recommending rather than requiring the use of non-magnetic core barrels for all APC coring. STP here acknowledges the positive steps taken by the USIO and C-DEX, and encourages C-DEX and ESO to further work towards using non-magnetic core barrels where apopropriate.

Non-Magnetic Core Barrels

- SODV capabilities:
  - The following inventory has been acquired and will be available at the beginning of Phase 2 operations:
    - 29 non-magnetic Core Barrels, 15 ft
      - Two 15 ft barrels are required for a typical APC core barrel assembly
      - For RCB non-magnetic coring we often run a non-magnetic barrel on the bottom and a standard barrel on top because we rarely get more than 50% recovery.
    - 9 non-magnetic 12-1/8 in. Inner Barrel Subs (made from 10 ft 15-15 LC barrels with connections missing)
    - 19 non-magnetic Liner Seal Subs (some have had the worn seals removed and re-sealed)
    - 17 non-magnetic Liner Support Subs
    - 7 non-magnetic Catcher Subs
    - 11 non-magnetic Flapper Bodies
    - 18 non-magnetic Flappers (cast)
  - Everything but the D-Monel cast flappers is made from Gamalloy 15-15 LC.

Non-Magnetic Core Barrels

- USIO recommendation:
  - Future non-magnetic components will be made with K-500 Monel.
  - Casting the flapper using Monel reduced the price from $500 to $190 and also cut 5 months off the required delivery time.
  - Non-magnetic equipment is one order of magnitude more expensive than standard equipment.
  - IODP may have to evaluate a year or two from now how much inventory/replacement it can afford based on use and equipment attrition rates.

IODP Phase I Historical Airgun Usage 2003-2007

During Phase I of IODP, ten vertical seismic profile experiments were carried out on seven expeditions. Operations on Expedition 309 were aborted due to tool/hole problems. No seismic surveys were made during IODP Phase I. A compilation of airgun usage, size, durations, number of shots fired, and expedition specific deployments is provided in Table 1.

TABLE 1: IODP Phase I Airgun Usage 2003-2007

Expedition	Location	Hole	Airgun Source SSI GI GUN Generator(in3) /Injector (in3)	Airgun Deployment Depth (m)	Purpose	VSP Tool Used	Approx. Duration	Total Shots Fired (~15/Station)
301	Juan de Fuca Ridge	U1301B	TRUE GI MODE G45/I105	2	Zero-offset VSP	WST	~2 hrs	75
305	Atlantis Massif-Mid-Atlantic Ridge	U1309D-1	TRUE GI MODE G45/I105	2	Zero-offset VSP	WST	~5 hrs	250
305	Atlantis Massif-Mid-Atlantic Ridge	U1309D-2	TRUE GI MODE G45/I105	2	Zero-offset VSP	WST	~2 hrs	75
307	Porcupine Basin	U1317D	TRUE GI MODE G45/I105	2	Zero-offset VSP	WST	~3 hrs	108
308	Brazos Trinity Basin IV	U1320A	TRUE GI MODE G45/I105	2	Zero-offset VSP	WST	~3 hrs	140
308	Ursa Basin	U1324A	TRUE GI MODE G45/I105	2	Zero-offset VSP	WST	~2 hrs	140
309	Guatemala Basin	1256D-2	TRUE GI MODE G45/I105	2	Zero-offset VSP	WST		Aborted Attempt
311	Cascadia Margin	U1327D	TRUE GI MODE G45 /I105	2	Zero-offset VSP	WST	~7 hrs	~ 160
311	Cascadia Margin	U1328C	TRUE GI MODE G45 /I105	2	Zero-offset VSP	WST	~5 hrs	~300
312	Guatemala Basin	1256D-3	Harmonic Mode G150 /I105	7	Zero-offset VSP	VSI	~10 hrs	~900

Seismic source and typical deployment:

A single SSI (Sercel) GI Gun airgun configured in True GI mode which consisted of a 45 in^3 generator chamber volume (G45) and a 105 in^3 injector chamber volume (I105) on all expeditions except Expedition 312. The Expedition 312 deployment used the GI Gun in Harmonic mode with a 150 in^3 generator chamber volume instead of 45 in^3 due to the depth of the hole. The GI Gun is two air guns within the same body where the first air gun, or Generator, produces the primary pulse, while the second air gun, or Injector, is used to control the oscillation of the bubble produced by the Generator (Sercel 2005). The GI Gun was operated @ 2000 psi air pressure for all deployments. The delay time between the Generator and Injector shots was ~40 ms for the G45/I105 deployments and ~39 ms for the G150/I105 deployment. The GI Gun was suspended by a floating buoy at a depth of 2 m below the sea surface (Figure 1) for all expeditions except 312, which was suspended at a depth of 7m. The monitoring hydrophone was attached with the GI Gun and we could confirm that the source wavelet had minimum phase with the above-described setting. The gun was positioned 14.6 m portside from the ship by crane, and the length between the GI Gun and the center of moon pool became 44 m (Figure 1).

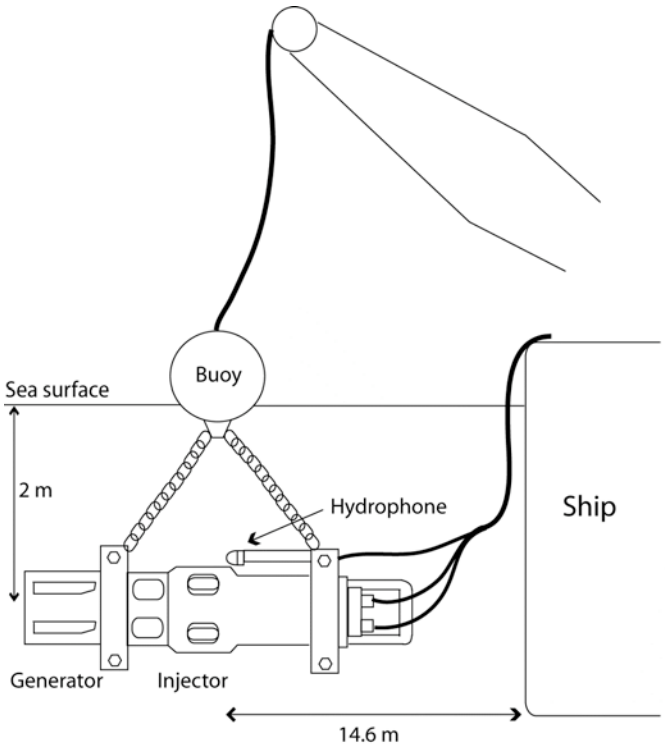


Figure 1: Schematic diagram of GI Gun mooring.

Typical Receiver Deployment for Phase I IODP:

For almost every receiver deployment during Phase I IODP operations, the well seismic tool (WST) was used. In one expedition, an alternate tool, the versatile seismic imager (VSI) was used (See Table 1).

Well Seismic Tool (WST)

The WST is a Schlumberger single axis check shot tool used for zero offset vertical seismic profiles (VSP). The WST consists of a single geophone, pressed against the borehole wall. After each shot, we recorded 5 seconds with a starting point at 600 ms, and the sampling rate was 1 ms. The example shown below is from Expedition 301 Based on caliper observations, three potential intervals were identified for WST stations; 3075, 3050, and 3025 mbrf. The detailed depth and shot numbers at each station are shown below.

(1) 413.6 mbsf (3081.4 m) – 19 shots recorded (# 72-90)

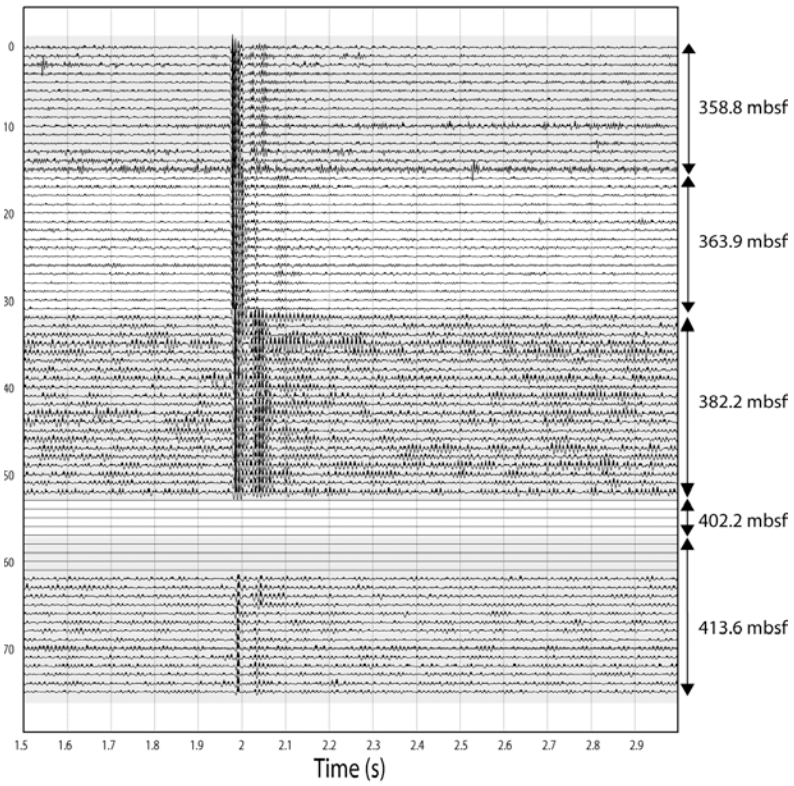
(2) 402.2 mbsf (3070.0 m) – 4 shots recorded (# 91-94)

(3) 382.2 mbsf (3050.0 m) – 21 shots recorded (# 95-115)

(4) 363.9 mbsf (3031.7 m) – 16 shots recorded (# 116-131)

(5) 358.8 mbsf (3026.6 m) – 15 shots recorded (# 132-146)

Figure 2: All of the waveforms acquired by the Well Seismic Tool.



The Versatile Seismic Imager (VSI) represents the latest available technology in the acquisition of seismic waves generated by a seismic source. The VSI employs three-axis single sensor seismic hardware and software and advanced telemetry for efficient transmission of the data from the borehole to the surface. Each sensor package delivers high-quality wavefields by using three-axis geophone omnitilt accelerometers, which are acoustically isolated from the main body of the tool and provide a flat response from 3 to 200 Hz. The configuration of the tool (number of sensor packages, sensor spacing, and type of connection (stiff or flexible), varies to provide the maximum versatility of the array. A maximum of 20 shuttles can be used, though only one has been used so far in the ODP (Leg 204) and IODP (Expedition 312).

Reports:

At each location a log form was generated detailing the seismic sound source deployment and marine mammal observation. Necessary personnel were briefed on the Marine Mammal policy and observers posted. The only marine mammal sighting was on expedition 308 at Site U1320 where a mammal was sighted during soft start procedure and the system was shutdown until the area was cleared for re-starting the VSP experiment. An example of the seismic survey log form is provided below in Figure 3 from Expedition 305. An operational report summary is also generated for each deployment.

Figure 3: Integrated Ocean Drilling Program

Log of Seismic Source Use During a Seismic Survey

Used in Conjunction with the Marine Mammal Observation Form

R/V JOIDES Resolution

Record the use of seismic sources while surveying or performing a VSP.
Indicate start time, stop time and any changes. (Times are in GMT)

Expedition: 305 **Observer: Forward Mate on Watch, Aft, Chieh Peng/ Lisa Crowder**
Site: U1309D
VSP 1

Date	Time (GMT) -3 ZD	Gun	Configuration	Air Pressure (psi)	Activity
February, 1, 2005	0920	GI	45/105 VSP setup		Begin 1 hour pre-shooting marine mammal watch
					No Marine Mammals sighted
	1020	GI		500	Soft start of GI seismic gun
	1025			750	
	1030			1000	
	1035			1250	
	1040			1500	
	1045			1750	
	1050			2000	Begin firing GI seismic gun
	1050 to 1525	GI	45/105 VSP setup	2000	250 SHOTS FIRED
	1525				Secure gun and end watch
					No Marine Mammals sighted

References

Sercel, 2005, GI Gun Operation and Maintenance Manual, Sercel Marine Sources Division, Toulon, France

CDEX report to IODP-MI regarding IODP Scientific Technology Panel recommendation.
Ver. 1.0

STP Consensus Statement 0708-15: Open Hole VSP
STP requested advice from EDP (STP Consensus 0601-03). STP wishes to follow up this general request and again seeks advice from EDP on whether there are "off the shelf solutions" or whether STP should seek to investigate technology development in seeking solutions to IODP requirements.

Background to STP Consensus 0708-15: VSPs have been implemented infrequently in ODP and IODP phase 1 and have met with limited success. At the international Core-Log-Seismic workshop on October 3-4, 2005, participants widely agreed that VSPs are vital to proper core-log-seismic integration the problems encountered by ODP were largely due to the open hole conditions that non-riser operations. Industry has a long history of successful VSP operations but also generally has must greater well control. EDP is the perfect group within the SAS to investigate this issue due to its strong connection with industry. Both improved downhole receiver technology or even downhole source technology could be considered.

STP Contacts for this discussion are: Georges Gorin; Hongkui Ge

CDEX comments;
CDEX understands importance of open hole VSP for core-log-seismic integration and waiting for EDP and STP input regarding this issue.

STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog
STP recommends IODP-MI to form a Lithology Working Group to maintain dictionaries/catalogs related to VCD/lithology (sediment/rock classifications) with support from the scientific community. This could follow the model provided by the Paleontology Coordination Group.

Background to STP Consensus Statement 0708-23: Establishment of dictionaries (taxonomic, lithologic classifications, time-scales) is critical to QA/QC because it reduces uncertainty in the following observations (biostratigraphy, core description). Because dictionaries are living documents, references to the version of dictionaries used must be explicit. However, a route to manage the content of the dictionary (list of dictionaries) is currently not sufficient for the scientific community. Therefore STP investigates the method to provide and maintain dictionaries for observation under commitment of the scientific community. The dictionary for the VCD lithology should be updated and expanded when it is necessary.

CDEX comments;

CDEX agrees to maintain dictionaries/catalogs related to VCD/lithology and willing to cooperate on this matter. Recently scientists in J-DESC created a VCD/lithology classification scheme guideline and it will be published as CDEX technical report soon. CDEX uses this guideline as J-CORES VCD/lithology scheme on D/V *Chikyu* as well as related onshore research. CDEX also has been developing a method to transfer data from J-CORES to Strater, software used to prepare VCD figures for graphic report. The process of data transfer includes automated conversion of an exported file from J-CORES to optimal format for use in Strater, and establishment of a link between the converted data to specific graphic symbols/fills in VCD figures. This method has been almost developed and will be used for the NanTroSEIZE Stage 1 expeditions.

STP Recommendation 0708-03: Effects of Riser Drilling on Cores. In reference to the STP Action Item 0612-29, the STP recognizes the effect of drilling fluid invasion on the microbiology of cores during riser drilling is unknown. Accordingly, STP recommends that at the earliest opportunity during riser drilling, contamination monitoring with either PerFluorocarbon Tracer (PFT) or natural chemical and/or molecular tracer(s) should be performed both on cores and circulation mud samples. STP further recommends that contamination monitoring should be conducted as appropriate on expeditions that use riser drilling.

Background to STP Consensus 0708-03: Diagnostic monitoring of potential contamination from drilling fluids is necessary in order to ascertain the quality of cores obtained during studies of deep subseafloor life. Pilot studies (and the terrestrial coring literature) have demonstrated that fluid penetration from core surface to the interior of cores is sensitive to time before samples are processed, temperature at which the cores are held, and permeability of the geological material. Appropriate sampling procedures, monitoring technologies, and core processing have been developed during microbiology-dedicated, riser-less expeditions. However, the degree of contamination that may occur during riser drilling has not been determined. Under these conditions high mud pressures and muds that may be conducive to microbial growth impinge upon the core and may alter the indigenous microbial communities.

CDEX comments;

CDEX realized that an importance of conducting contamination monitoring during raiser drilling, not only for microbiological study but also geochemical study as well. Currently CDEX has PerFluorocarbon Tracer onboard *Chikyu* however we have not conduct any contamination monitoring during Expedition 314-316 (no riser operation took place). Compare with *JOIDES Resolution*, mud circulation system on *Chikyu* is complicated but finally CDEX decided how PFT (or other tracing materials) would be mixed with circulating mud during riser drilling. Therefore, it would be possible to use the same procedures for monitoring contamination during non-riser drilling. Onboard laboratory has already been equipped for detecting PFT using gas-chromatography. However, we have not decided either PFT is the best material for tracing contamination during a riser drilling, therefore CDEX still seeks for alternate materials for tracing contamination during future riser drilling. CDEX very much

appreciate, if STP discuss and give some advice on this issue under STP action item 0708-34.

STP Recommendation 0708-06: Non-magnetic core barrels
The STP thanks Oda for his presentation, and acknowledges the scientific interest in using non-magnetic core barrels. STP acknowledges the efforts made by the USIO in enabling at least two non-magnetic core barrels to be available for Expeditions and the efforts made by C-DEX in providing a non-magnetic cutting shoe.

STP encourages CDEX and ESO to work towards providing non-magnetic core barrels for future expeditions.

Background: SciMP Recommendation 0406-12 proposed that non-magnetic core barrel be used for all IODP APC coring to minimize drilling induced magnetic overprint on sediments. SPC Consensus 0410-23 accepted this with the proviso of recommending rather than requiring the use of non-magnetic core barrels for all APC coring. STP here acknowledges the positive steps taken by the USIO and C-DEX, and encourages C-DEX and ESO to further work towards using non-magnetic core barrels where appropriate.

CDEX comments;
CDEX had a conversation with a manufacture of non-magnetic core barrels for HPCS. Initial estimation for the barrels using Monel K-500 was much expensive than usual CrMo HPCS barrel, although CDEX does not have exact number yet. Another option could be using less expensive material such as DNM110 instead, however this material is still expensive, about $3.3M for one set of outer and inner barrels. Current budget situation in CDEX simply does not allow purchasing these non-magnetic barrels using either material. CDEX may have a budget for purchasing few sets of normal HPCS barrels in next Japanese fiscal year and if that budget fits for the price of non-magnetic core barrel and if there is a scientific necessity for using it for coming expedition, CDEX might order e.g., one set of those non-magnetic core barrel next year. And CDEX keeps seeking for budget purchasing non-magnetic core barrels in future. During the Stage 1 of NanTroSEIZE expeditions, CDEX used non-magnetic cutting shoe for HPCS coring.

STP Recommendation 0708-07: Leak Off Test
The STP thanks Lin for his presentation, and acknowledges the scientific interest of performing Leak Off Tests (LOT) as part of *Chikyu* (riser) operations.

STP recommends that IODP-MI requests CDEX to investigate the feasibility of using LOT/Extended (X)LOT data for estimating the minimum horizontal principal stress for riser drilling as a supplemental scientific measurement.

Background: Leak off tests are a routine engineering measurement on riser drill platforms, but with minimal extension can provide valuable scientific information (i.e., stress tests). This request is for a study of the feasibility of incorporating extended

leak off tests into the riser vessel program. Further details of the test are provided in the appendices to this meeting.

CDEX comments;
CDEX conducted Extended Leak Off Test during the Shimokita shakedown cruise at a depth of 525 meters below seafloor in 1180 m water depth. The detailed results will be shown in the next issue of Scientific Drilling Journal (Lin et al.). In summary, although the data had not shown expected results, the experiment during Shimokita shakedown shows importance of (extended) leak off test to understand in situ stress magnitude at a depth. In recognition the importance of leak-off test both for operational and scientific means, CDEX will have clear plan on this after discussion between co-chief scientists and CDEX operations personnel at pre-cruise meeting of NanTroSEIZE Stage 2 planned in late Spring, 2008.

STP Consensus Statement 0708-16: Temperature and pressure resolution, accuracy and calibration
A draft report on resolution, accuracy and calibration of temperature and pressure measurements (STP Consensus 0606-13) has been circulated by IODP-MI (STP Consensus 0612-07) among the IOs. STP requests the IOs to report back on implementation plans for report recommendations prior to the next meeting.

Background to STP Consensus 0708-16: This is a follow up (3rd) request to STP Consensus 0612-07, which was a follow up (2nd)request to STP Consensus 0606-13 to IODP-MI to circulate a draft report to the IOs for comment and feedback at the next STP meeting.

CDEX comments;
Temperature measurements with APCT3 and DVTP were conducted during the expedition 315 and 316. CDEX purchased new three APCT3. Rest of APCT3 and DVTP tools were rented from Texas A&M University. These equipments were calibrated at TAMU before the expeditions and shipped to Chikyu. The temperature sensors in both APCT3 and DVTP have +/-0.02 degree accuracy.
Temperature at the seven depths between 13.6 and 171.0 mbsf in 2,217m water depth, were measured with APCT3 at Site NT2-03 during Exp. 315.
Temperature at the six depths between 15.4 and 159.0 mbsf in 1,937m water depth, were measured with APCT3 at Site NT3-01 during Exp. 315.
Temperature at the six depths between 12.6 and 81.09 mbsf in 3,876m water depth, were measured with APCT3 and DVTP at Site NT1-03 during Exp. 316.

STP Consensus Statement 0708-17: Vp Measurements on Core Samples at high pressure

CDEX have been investigating the feasibility of making high Pressure and high Temperature Vp and Vs measurements on core samples. STP understands that as a result of this investigation CDEX are in the process of establishing a high pressure facility for measuring Vp on core samples on the *Chikyu*.

STP requests CDEX report to STP prior to their next meeting on the status of this development.

Background to STP Consensus 0708-17: This item has been discussed over a significant period of time by both STP and the IOs, particularly CDEX since it applies initially to deep riser drilling, through various Statements:

0507-05 Methods for measuring Vp & Vs under pressure.
0601-02 Investigation of T/P-controlled physical properties measurements
0601-03 Vp & Vs at elevated pressures for the riser vessel
0606-08 Measurements at High Pressure and Temperature
0612-02 CDEX report on feasibility of Measurements at High P &T

The results of these investigations have led to the proposed implementation by CDEX and STP looks forward to hearing an update to the development prior to its next meeting.

CDEX comments;

CDEX purchased and will install an equipment for measuring Vp in high pressure in onboard laboratory for the future expeditions at coming March 2008 dock work. Spec of pressure vessel will be tolerant to maximum of 200MPa. And the receiver will be able to receive high frequency pulse such as ~2MHz without any data loss.

STP Consensus Statement 0708-20: Seismic Sources

The STP recommended equipping an appropriate size of a seismic source on IODP drilling platforms. STP requests an update from the IOs on the status of seismic sources on IODP platforms prior to the next meeting.

Background to STP Consensus 0612-20: This topic was first proposed in an initial request from STP (STP 0601-04) detailed in SPC Consensus 0603-8. STP 0606-01 followed up with specific details to IODP-MI.

CDEX comments;

CDEX used three seismic sources (Air-guns of 250 cu. in. each) which were suspended from crane #1 about 55 m horizontally from the rigfloor. All sources are from Schlumberger for seismicVISION-while-drilling (seismicVISION) data acquisition.

The seismicVISION tool records seismograms using a hydrophone and a three-component geophone in the tool and a surface source and hydrophone. The source was a trio of 250 cu. in. Air-guns that were suspended from crane #1 about 55 m horizontally from the rotary table and fired at 1700-2000 psi and a depth of 6 m below

sea level. Time correlations of the shots are ensured with high-precision clocks at both the surface hydrophone and the downhole hydrophones. The surface hydrophone was suspended 3 m below the airguns (total 9 m below mean sea level) and the zero times of the waveforms were corrected to mean sea level.

ESO Report for 6th STP Meeting

Sendai, Japan, 18-20 February 2008

Expeditions:

Tahiti Sea Level – Expedition 310

A very successful post-expedition meeting was held in Tahiti in November 2007, and tracking of post-expedition research output is ongoing.

New Jersey Shallow Shelf - Expedition 313

Planning had been continuing for this expedition with the expectation of a 2007 start using DOSSEC as the drilling contractor. When the start date slipped to mid-August at the earliest it was decided that continuing the expedition into the late autumn/early winter was not a viable option and the New Jersey expedition was postponed from 2007 to 2008.

There was continuing discussion with DOSECC to try to obtain a platform to start in May 2008. After consideration, DOSSEC withdrew from the contract discussions. A new tendering procedure was initiated in early October. Expressions of interest were received through the Official Journal of the European Union, and tender documents sent to interested parties with a closure date in late January. Following review of the tender returns, contractual discussions will now take place aiming for a May start to operations.

The Onshore Science Party will be held in FY2009, preferentially during October-November, or late January-February.

Great Barrier Reef Expedition

Planning is proceeding for the Great Barrier Reef Expedition with a view to implementation in September-November 2009. It has now been decided that it is not feasible to plan the expedition in 2008. A site survey was carried out in September-October 2007 with excellent results, but SSP and EPSP approval remains a requirement. A drilling permit application was made in June 2007 to the Great Barrier Reef Marine Park Authority; the present position is that this has been refused, but as part of the formal procedure, a request for reconsideration has been submitted following the publication of the refusal decision in the Commonwealth Gazette.

Other expeditions

At present there are no other MSP proposals residing with OTF, but discussions have taken place with the proponents of the Chixculub proposal.

Input/comments from ESO on STP items:

STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog

As a first step ESO has downloaded the USIO catalogue of DESCINFO observable parameters (Composition, Texture, Color, Lithification, Lithology names, Structures, Fossils Datums, Zones and Interpretation). These terms will be implemented in the Drilling Information System (DIS), the database for ESO expeditions. The next step will be to enable the DIS to connect to a planned IODP 'Central Catalogue' to download specific classification schemes and to upload new and updated list values resulting from MSP Expeditions. This assumes a standardized exchange procedure and format, which has yet to be defined. For this task more technical discussions between the IOs are necessary.

STP Recommendation 0708-06: Non-magnetic core barrels

The STP thanks Oda for his presentation, and acknowledges the scientific interest in using non-magnetic core barrels. STP acknowledges the efforts made by the USIO in enabling at least two non-magnetic core barrels to be available for Expeditions and the efforts made by C-DEX in providing a non-magnetic cutting shoe.

STP encourages C-DEX and ESO to work towards providing non-magnetic core barrels for future expeditions.

ESO use a variety of different drilling techniques and core barrels depending on the requirements for specific expeditions. Therefore the ESO can investigate the option of using non magnetic core barrels on request by the scientific party of a distinct expedition. Note that there will inevitably be an additional cost that may be significant.

STP Consensus Statement 0708-16: Temperature and pressure resolution, accuracy and calibration

A draft report on resolution, accuracy and calibration of temperature and pressure measurements (STP Consensus 0606-13) has been circulated by IODP-MI (STP Consensus 0612-07) among the IOs. STP requests the IOs to report back on implementation plans for report recommendations prior to the next meeting.

ESO: ESO now have an STP-approved set of temperature sensors (Antares). The selection of deployment method needs to be expedition-specific because of different sizes of the wireline coring equipment. In all cases the probe will be pushed into the formation and left until equilibrium is established.

STP Consensus Statement 0708-20: Seismic Sources

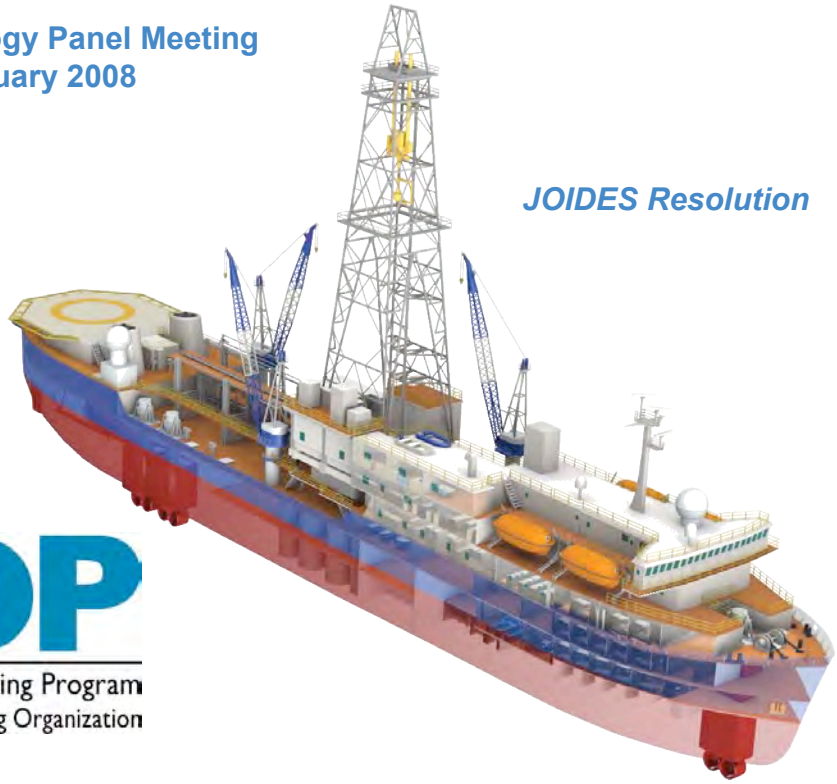
The STP recommended equipping an appropriate size of a seismic source on IODP drilling platforms. STP requests an update from the IOs on the status of seismic sources on IODP platforms prior to the next meeting.

The ESO can provide their drilling platforms with appropriate seismic sources as may be necessary for the scientific objectives of the expedition, subject to any operational restrictions such as permits, deck/accommodation space etc. Provision of such equipment will entail some additional costs such as compressor hire and the need for a qualified engineer to operate.

Ursula Röhl, Jenny Inwood, Feb 6, 2008.

SODV Update

Scientific Technology Panel Meeting
Sendai, 18-20 February 2008



JOIDES Resolution

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Outline

- Vessel conversion (Singapore)
  - Overview
  - Pictures
  - Issues
- Science facilities (College Station)
  - Overview
  - Pictures
  - Issues
- Expedition schedule

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7:30 AM Ready on dock side

Vessel Conversion

- Vessel conversion in Singapore
  - Overseas Drilling Limited (ODL) is contracting with Jurong shipyard
    - Construction of structures
    - Outfitting of structures
    - Installation of vessel and drilling infrastructure and equipment
  - USIO has a project management team on site
    - Represents TAMU/TAMRF
    - Coordinates between ODL and College Station
    - Provides guidance on science, technical deliverable, and budget issues
    - Receives shipments from TAMU and LDEO

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Vessel Conversion

- 2007
  - Refurbishment of rig
  - Removal of old structures

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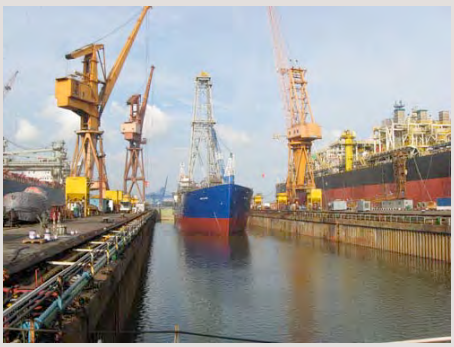
Vessel Conversion

- Dry dock
  - 2007



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Vessel Conversion

- Propulsion (dry dock, summer 2007)

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Vessel Conversion

- Main Deck and room bulkheads

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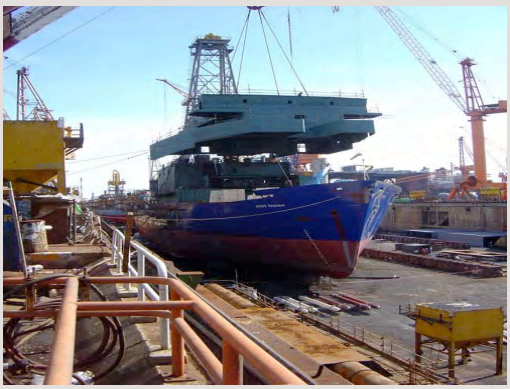
Vessel Conversion



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Vessel Conversion

- Core Deck
- Core receiving platform

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Vessel Conversion

- Bathroom/shower modules

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Vessel Conversion

- Bridge outfitting

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Vessel Conversion

- Chemistry laboratory

- Bridge Deck offices

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Vessel Conversion

- Exterior and interior stairs

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Vessel Conversion

- High pressure cement lines

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Vessel Conversion

- Top Drive
- Drill Line

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Vessel Conversion

- Construction and installations completed:
  - Superstructure installed
  - Emergency generator room steel work
  - Port side storage areas welded out
  - Radar mast sand blasted, repaired and painted
  - Wireline logging deck installed
  - Anchor winch moved onto foundation
  - All propulsion motors
  - New bearings port stern tube
  - Shaft, propeller and rudder
  - All highpressure air bottles for PHC
  - Main blocks rigged up with drill line
  - Iron roughneck high pressure mud pump piping above and below decks
  - New drill line
  - Thrusters

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Vessel Conversion

- Construction and installations in progress:
  - Joiner panel divisions laid out
  - Installation of ventilation ducting, piping, cable, trays, electrical
  - Stairs, handrails, platforms, doors, and toilet shower modules
  - Equipment foundations for science equipment, air handlers, galley equipment, bridge and radio room equipment
  - Windows installation
  - Fuel heater
  - Ventilation fans
  - Trash compactor
  - High pressure cement lines
  - Emergency generator
  - Engine panel replacement
  - Thruster electrical terminations

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Vessel Conversion

- Issues
  - Slippage of shipyard delivery
    - Driven by global economy - shipyards have more business than they can handle
    - JR conversion is a small project in the yard
  - Versioning of engineering designs by shipyard
    - Shipyard engineering is at a premium
    - Keeping engineering design in pace with other deliverables is challenging
- Mitigation
  - Management and engineering are engaged in daily “war room” meetings
  - Transocean (Houston) management engages with management and shipyard teams in Singapore
    - Weekly conferences
    - Site visits to emphasize Transocean is placing high priority on this project

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Vessel Conversion

- Delivery schedule
  - We do not anticipate that the the 31 March vessel delivery date can be met
  - TAMU/TAMRF team in Singapore is presently engaged with shipyard to redefine the schedule through mechanical completion and commissioning
  - Anticipate revised schedule in next three weeks

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Shipboard Laboratories and Analytical Systems

- All work packages other than vessel conversion:

	Total No.	No. Completed	No. In Acceptance Testing	No. Work In Progress	No. To be Completed Onboard
Analytical Systems	35	21	6	5	3
Support and Recreational Systems	21	16		3	2
Computer and Network Systems	10	10		0	0
Coring Systems	11	4		5	2

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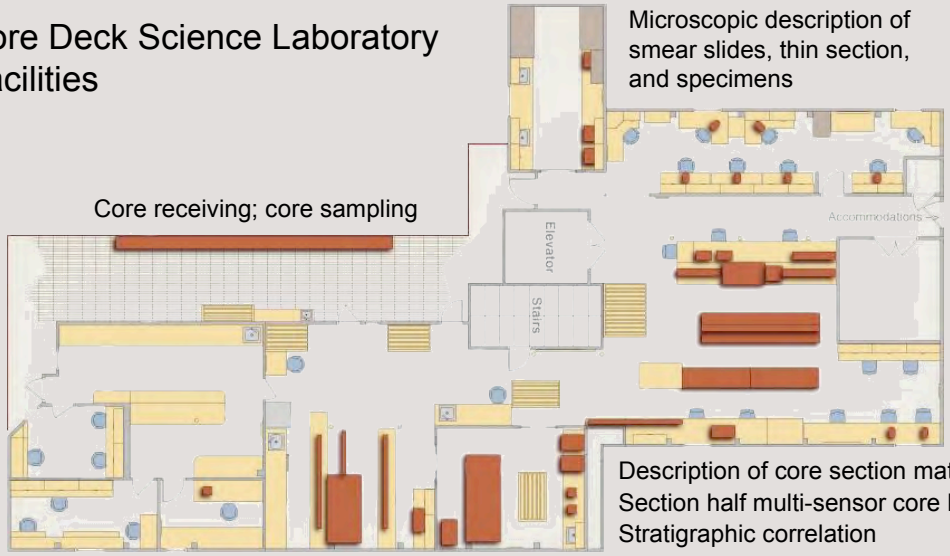
Shipboard Laboratories and Analytical Systems

- Core Deck Science Laboratory Facilities



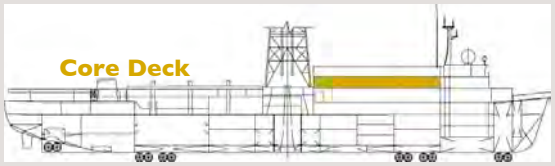
Microscopic description of smear slides, thin section, and specimens

Core receiving; core sampling

Description of core section material
Section half multi-sensor core logging
Stratigraphic correlation

Formation Temperature
Wireline logging
Logging while drilling

Whole round multi-sensor core logging



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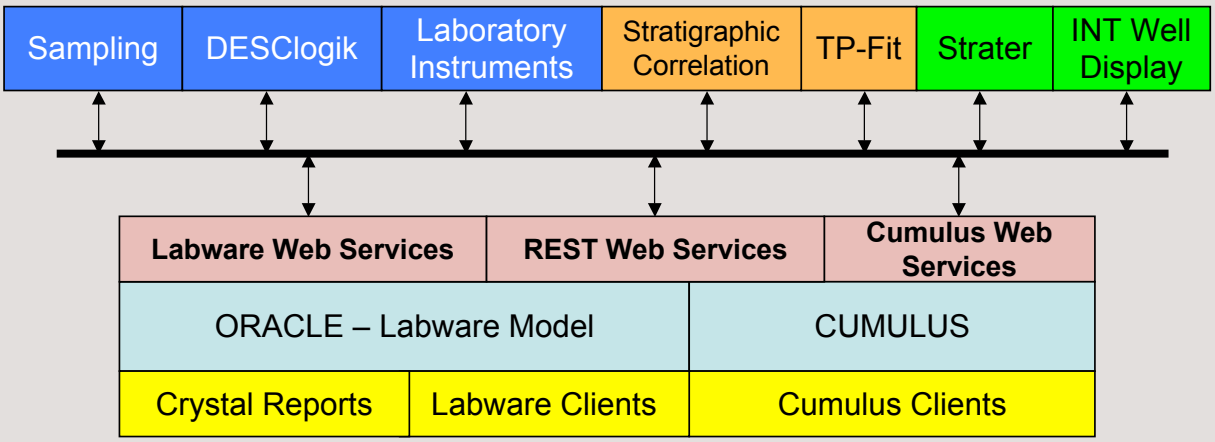
Laboratory Information Management System (LIMS)

- Data management
  - USIO developed or third-party developed
  - Data capture, analysis, and reporting/display



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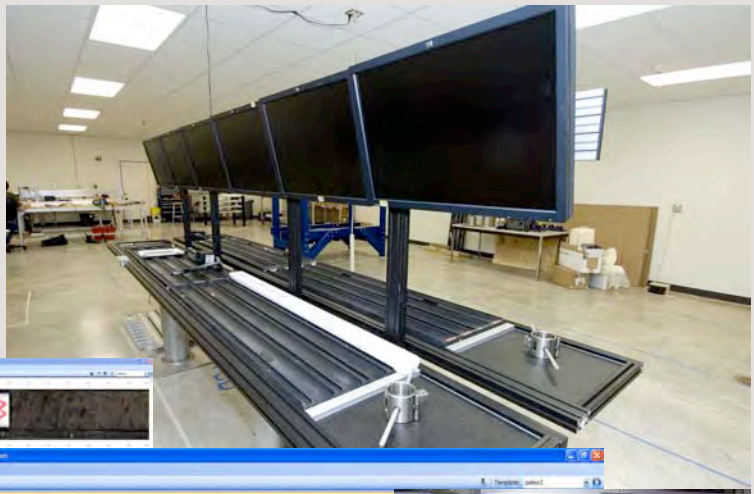
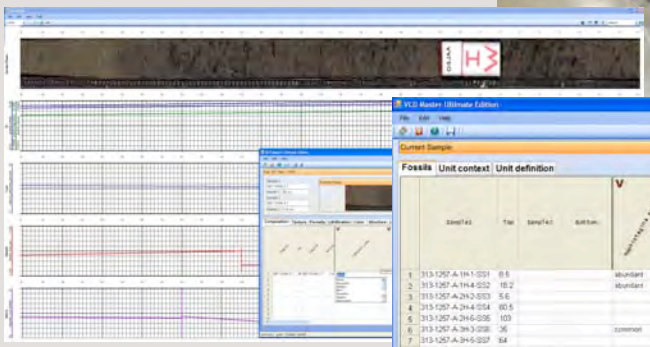
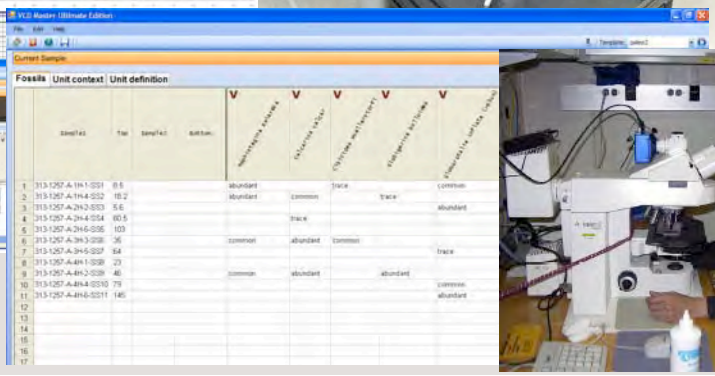
- DESClogik data capture application
  - Sedimentology
  - Paleontology
  - Petrography
  - Petrology
  - Structural geology







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Shipboard Laboratories and Analytical Systems

- Whole-round multi-sensor core logging
  - Magnetic susceptibility
  - Gamma ray attenuation bulk density
  - Acoustic velocity (P-waves)
  - Resistivity (induction method)
- Second logger for out-of sequence logging ("fast track")
  - Magnetic susceptibility

Bartington MSC loop sensor and meter)

IODP-TAMU configured 137-Cs source and DigiBase PMT

IODP-TAMU caliper-type p-wave velocity logger

GeoTek resistivity meter

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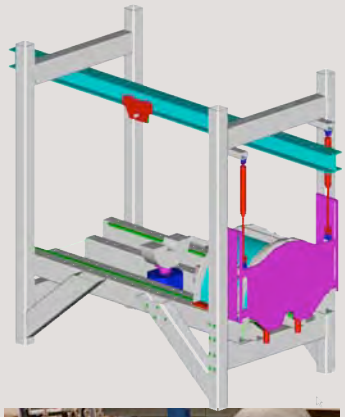
- Natural gamma radiation multisensor logger
  - Construction complete; automation software in progress

IODP-TAMU Natural Gamma Radiation system (NGR)



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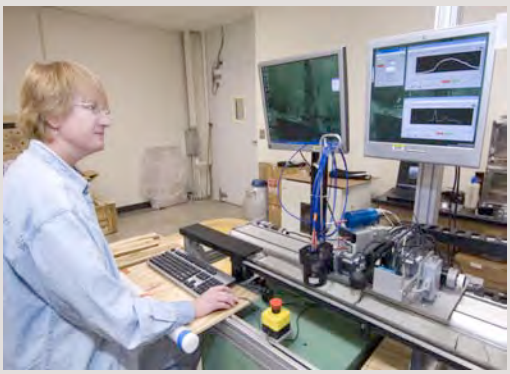
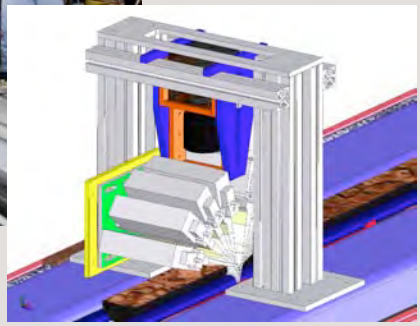
- Section half image logger
  - High-resolution imaging
- Section half multi-sensor core logger
  - High-resolution reflectance spectroscopy
  - Magnetic susceptibility



Ocean Optics spectrophotometers

Bartington magnetic susceptibility “point sensor” and meter

IODP-TAMU Image Logger



High-intensity LED illumination system

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Shipboard Laboratories and Analytical Systems

- Superconducting rock magnetometer
- Other rock magnetic instruments
  - AF demagnetizer
  - Thermal demagnetizer
  - Impulse magnetizer
  - Spinner magnetometer
  - Kappabridge susceptometer

DTECH D-2000 AF demagnetizer
Schonstedt TSD-1 thermal demagnetizer
ASC IM-10 impulse magnetizer

Molspin Minispin spinner magnetometer

KappaBridge KLY-4S magnetic susceptibility meter

Core section-half 2G 750-R
cryogenic magnetometer

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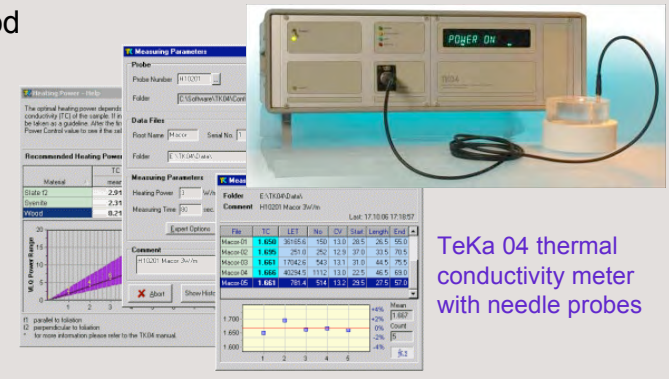
- Moisture and Density Analysis
  - Mass
  - Volume by sample geometry
  - Volume by helium pycnometry
  - MAD analysis
- Thermal conductivity
  - Thermal conductivity, full-space and half-space needle methods
- Section Half Measurement Gantry
  - Acoustic velocity, caliper method
  - Acoustic velocity, spear probes
  - Sediment strength

Pair of Mettler-Toledo balances
IODP-TAMU configured Micromeritics pycnometers

IODP-USIO P-wave sensors and capture software
Giesa GMBH miniature vane



TeKa 04 thermal conductivity meter with needle probes

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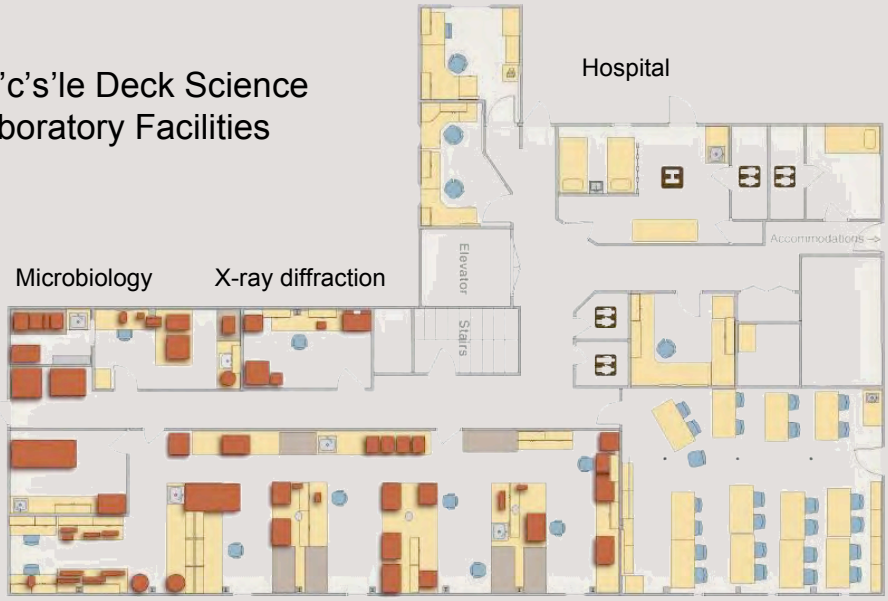
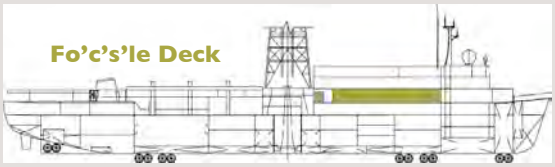
- Fo'c's'le Deck Science Laboratory Facilities



Gas chromatography
Thermal analysis of organic material
Elemental analysis
Ion analysis in aqueous solutions



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Shipboard Laboratories and Analytical Systems

- Gas chromatography
  - Hydrocarbons
  - Natural gas
  - PFT tracers
- Thermal analysis of organic material
  - Rock maturity characterization
  - Total organic carbon analysis

Humble Instruments Source Rock (SR) Analyzer

Agilent 6890 gas chromatograph with 5973 MSD

Shimadzu TOC-5000A analyzer

Agilent 6890 gas chromatographs

Agilent 5890-II GC equipped with 63Ni electron capture detector (ECD) for the analysis of perfluorocarbon tracer (PFT)

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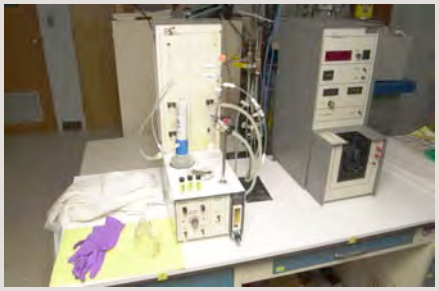
- Elemental analysis
  - ICP-AES
  - CHNS analysis
- Coulometry

Horiba-Jobin-Yvon JY 2000 Ultrace ICP-AES

CHNS analysis: Thermo Electron Flash EA 1112 element analyzer



Coulometrics CM5011 coulometer

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Shipboard Laboratories and Analytical Systems

- Ion analysis in aqueous solutions
  - Ion chromatography
  - Colorimetric analysis
  - Salinity
  - Alkalinity

Dionex Corp. ICS3000 ion chromatograph

OI Corp. DA3500 discrete analyzer

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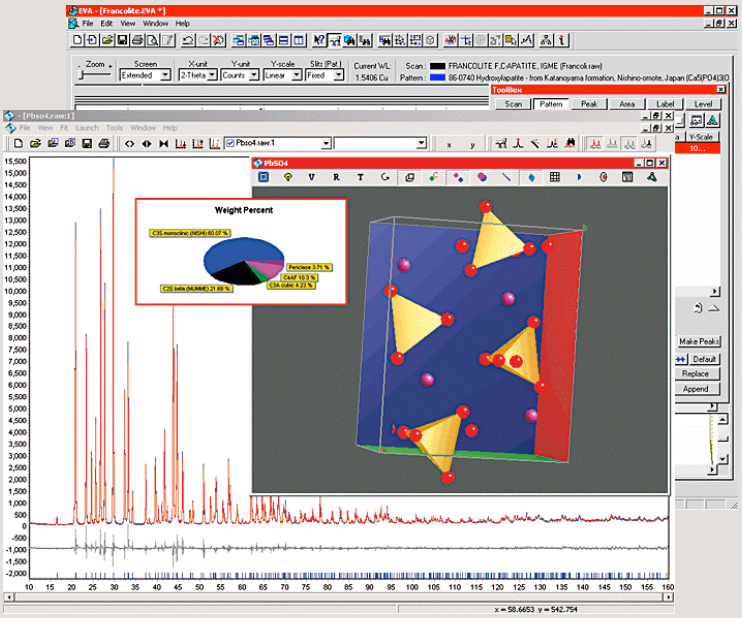
Shipboard Laboratories and Analytical Systems

- X-Ray Diffraction (XRD) Mineralogy

Bruker AXS D4 Endeavor



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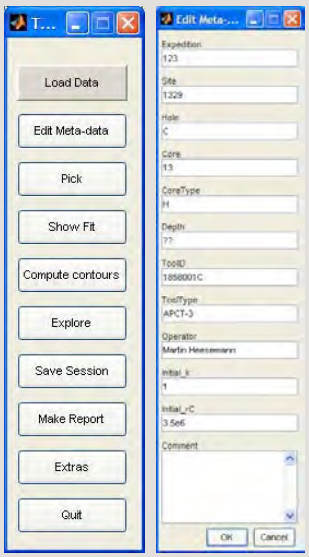
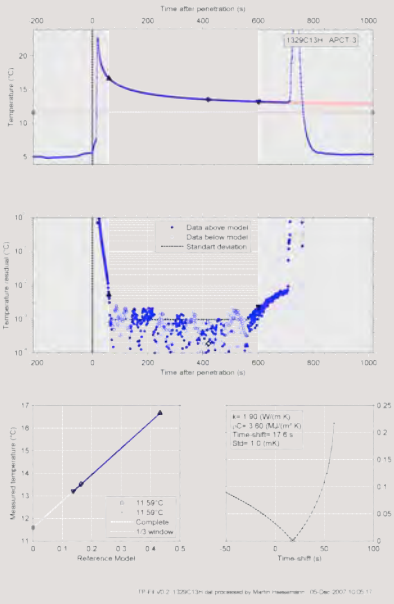
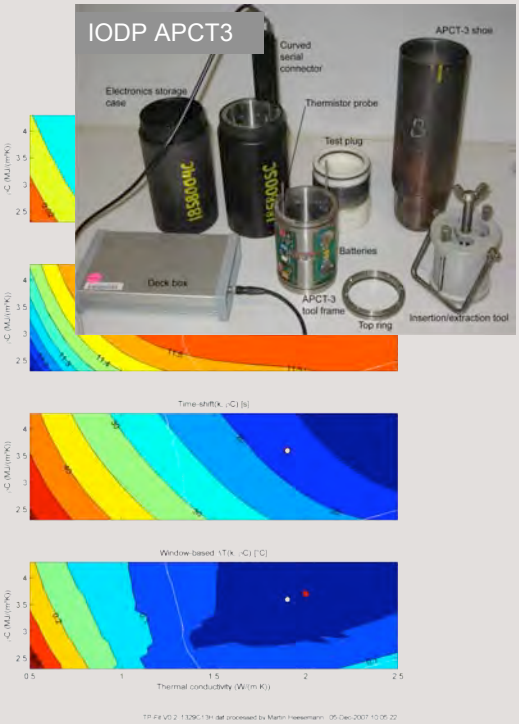
Shipboard Laboratories and Analytical Systems

- Formation temperature and heat flow analysis







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Heesemann et al, 2007

Shipboard Laboratories and Analytical Systems

- Tuas Warehouse: equipment from College Station is being received and stored/organized for deployment on the JR

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Shipboard Laboratories and Analytical Systems

- Issues
  - Slippage in delivery schedules for some science systems
  - All science systems will be shipped and deployed in time for the first expedition
    - Includes all systems specified in the baseline plan
    - Includes systems previously deployed on the JR and not replaced by new equipment as part of the SODV project
    - Excludes systems formally eliminated from the SODV project in 2006/2007 due to funding limitations (de-scoping).

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Shipboard Laboratories and Analytical Systems

- Deployment and sea trials: sequence of events
  - Receive analytical systems and support equipment in Singapore
  - Get access to the laboratories and accommodations
    - Minimal equipment installation can be done prior to ship deliver Install scientific equipment on the ship
  - Conduct incline test
  - Shipyard delivers vessel to ODL
  - 42 days in Loyang area for lab outfitting and loading
  - Conduct sea trials
    - 7 days, on transit from Singapore to Honolulu (pending OTF plan)
    - Test site will be DSDP site 62
  - Integrate, test, and accept complete science system
    - Stop over in Guam
  - Arrive in Honolulu; ready for first expedition
- Schedule contingent on shipyard delivery date and OTF plan

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Shipboard Laboratories and Analytical Systems

- Acceptance testing
  - Phase 1 Acceptance testing in College Station
    - Functionality of individual systems
    - Excludes testing of systems that can only be done after shipboard deployment
    - Tested by IODP-TAMU internal acceptance teams (other than project teams)
    - Majority of packages have been accepted
    - Significant testing currently ongoing
  - Phase 2 Acceptance on JR
    - Functionality of individual systems after installation on ship
      - Repeat and extensions of tests done in College Station
    - Integrated workflow testing
      - Data Capture
      - Data Transfer
      - Data access
      - Expedition Simulation

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Shipboard Laboratories and Analytical Systems

- Readiness Assessment
  - Independent Oversight Committee (IOC)
    - NSF requirement
  - Assessment of readiness for science operations
    - Has the SODV project delivered the science capability specified in the program baseline?
    - Is that capability and supporting infrastructure ready for science operations?
    - Can enhancements outside the scope of the SODV project be identified that should be considered for the future?

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Expedition Schedule

- Up to four expeditions proposed to OTF (contingent on OTF approval and available funding):
  - Equatorial Pacific
  - Canterbury Basin
  - Wilkes Land
  - Equatorial Pacific and Juan de Fuca
- Bering Sea expedition was eliminated from schedule when it became clear that the 2008 weather window would be missed
- We do not understand our funding level at this point, but it is very unlikely that more than the proposed four expeditions will happen
  - SODV is one of many MREFC projects
  - NSF expected a significant funding increase, which didn't materialize
  - Operational support for many programs is challenged
  - IODP is soliciting non-IODP work for platforms
    - Exploring many opportunities
    - Have no work schedule at this time

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STP Consensus Statement 0708-13: Post-Expedition Data Capture

STP requests that an update be given prior to our next meeting regarding inclusion of post-expedition generated results (data and processed data). STP is particularly interested in the mechanism for this data capture, when it is likely to be implemented, and what the arrangements are for QA/QC of the data.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.

Priority: High

STP suggests this be forwarded to SPC and IODP-MI.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-13: Post-Expedition Data Capture

Background to STP Consensus Statement 0708-13: This is a follow-up request to STP Recommendation 0606-03: Post-Expedition Results "The STP recommends that the IOs include post-expedition generated results (data and processed data) in the expedition database. The original data should be maintained in the database. Submissions should address methodology, QA/QC, and if necessary, include an explanation of how the added dataset differs from previous versions. The IODP-MI QA/QC taskforce should develop a policy for ensuring QA/QC of these results. The IOs would determine if data submission is voluntary or obligatory."

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STP Consensus Statement 0708-13: Post-Expedition Data Capture

SPC Consensus 0708-12: The SPC receives STP Consensus 0708-13 concerning post-expedition data capture, forwards this request to IODP-MI and suggests that IODP-MI provides an update on inclusion of post-expedition generated results at the February 2008 STP meeting.

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STP Consensus Statement 0708-13: Post-Expedition Data Capture

IODP-MI has outsourced this task to MARUM, Germany in 2007

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STP Consensus Statement 0708-13: Post-Expedition Data Capture

Outsourced tasks

Task 1

Research and identify all current and legacy IODP post cruise publications.

Explanation: IODP, ODP and DSDP related publications can be identified by searching the major reference databases (i.e. AGI Georef, ScienceDirect etc.). IODP already has a contract with GeoRef to track IODP and ODP publications. This data will be available to the contractor, and serve as a basis to start work, which eventually will include other sources as required for maximum coverage. In addition most articles after 2001 are available in digital form, allowing for easy identification, download and extraction of data. Older articles might require manual search through printed journals a scan of paper copies or manual data entry.

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STP Consensus Statement 0708-13: Post-Expedition Data Capture

Task 2: Identify data sets that have not yet been captured in IODP databases or are not yet accessible through SEDIS. This can be accomplished by comparing the source's metadata with the IODP databases and publication metadata.

Task 3:Capture metadata for and data from these publications using the standards defined by IODP for shipboard data (i.e. in terminology, accuracy, type of metadata captured).

Task 4: Establish proper QA/QC measures (i.e. proofreading) to ensure verified capture of data as published or with modifications approved by the author or an IODP data management authority

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STP Consensus Statement 0708-13: Post-Expedition Data Capture

Task 5:Publish this data in a publicly available archive accessible to the IODP SEDIS system (i.e. in Pangaea). The data should be accessible in an IODP compliant standardized way.

Task 6: Provide statistics on the amount of postcruise data captured on an annual basis. As experience is increasingly gained during data capture, it is necessary to project how much data is still missing and how complex the project actually is. As such, the contractor is asked to deliver statistics on the data capture, such as: how many references cited, where, when published, how much data in these references, how much time did it take to capture, etc.

Task 7: Provide a contact address to the scientific community through the IODP SEDIS web pages where postcruise publications and data may be submitted.

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STP Consensus Statement 0708-18: Core Log Seismic Integration

STP recommended (Recommendation 0507-09) that the IODP databases allow for the inclusion of depth correlation data to support inter-hole composite depth sections of recovered cores and core-log-seismic integration. To facilitate depth correlation, the STP recommended the development of software that can be used across all IODP databases.

STP requests an update from IODP-MI (DMCG and/or DSWG) on the status of this recommendation prior to the next STP meeting.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list.

Priority: High

STP suggests this be forwarded to IODP-MI.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-18: Core Log Seismic Integration

Background to STP Consensus 0708-18: The background to the initial recommendation 0507-09 states that "Depth correlation data includes how the measured and processed depths and seismic two-way-travel times relate between coring, logging, and seismic datasets for that expedition as determined by the scientific party. Standardized software across all IODP platforms is important for making inter-hole composite depth sections of recovered cores, for core-log-seismic integration, and for comparison of depths between multiple expeditions to the same study area potentially by different platforms. Measured depths may include core depth (curation depth), wireline logging depth (Lmbsf), drill pipe depth (Dmbsf), and mud logging depth (Mmbsf). Processed depths may include meter composite depth (mcd), revised composite depth (rmcd), core-logging integrated depth (imbsf), core-logging composite depth (imcd), etc. Seismic two-way-travel time of the site survey line at the drilling site and the most appropriate time-to-depth conversion (as determined by the science party) needs to be included along with the depth measurements for accurate core-log-seismic integration. Also advantageous is the ability to include multiple tie lines through a drill site rather than only a single tie line. Flexibility in depth scale presentation is advisable allowing the scientific party to choose between different measured or processed depth scales for core-log-seismic integration or comparisons between holes, sites, and expeditions. Software implementation across all platforms of depth and travel time correlation data is currently being worked on by the IODP-MI Data Management Coordination Group. STP requests to be kept informed of the development progress and future use in IODP expeditions.

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-18: Core Log Seismic Integration

Status update:

September 26-27, 2006: Depth-scale IODP meeting, TAMU-USIO, College Station, Texas, USA

June 15, 2007: IODP-MI distributed the final version of "IODP Depth-Scales: Terminology" document to IOs in with instruction that this document has to be followed.

IODP-MI has also distributed a version of "IODP Depth-scale: Errors and Corrections" and waiting for responses from IOs.

February 21-22, 2008: this issue will be discussed in DMCG meeting in Sapporo, Japan

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-21: Progress report on Paleontology Coordination Group

STP endorses recent progress on Paleontology Coordination Group (PCG) under IODP-MI held on 12-13 August 2007 in Berlin, Germany. STP welcomes further progress on Digital Taxonomic Dictionaries. STP requests IODP-MI instruct the PCG to accomplish Levels 1 (taxon name list) and 2 (synonymy) for each fossil group within one year as a standard list for IODP after thorough review. STP also requests IODP-MI to provide guidance on responsibility for maintenance of the database.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki); note alternates present in attendee list. Priority: High

STP suggests this be forwarded to IODP-MI.

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STP Consensus Statement 0708-21: Progress report on Paleontology Coordination Group

Background to STP Consensus 0708-21: This is a progress report corresponding to STP Consensus 0612-06 from Paleontology WG 2004 Report Recommendation PALEO-3: Taxonomic Dictionaries with stratigraphic databases IODP must coordinate their efforts regarding digital taxonomic dictionaries and cyber atlases and related issues with other national and international initiatives such as CHRONOS, NEPTUNE and et. al. The Paleontology Working Group recognizes the importance of international cooperation and interaction among the IOs and the micropaleontologists community and encourages collaborations with IMRC curators to develop these dictionaries to be used on the IODP drilling platforms The microfossil groups to be covered should include calcareous nannofossils, planktic foraminifera, benthic foraminifera, diatoms, silicoflagellates, radiolarians, and palynomorphs (dinoflagellates and pollen). The taxonomic dictionaries for the Cenozoic and Mesozoic should be updated and expanded on a regular basis (e.g., at least once per year).

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Paleontology Coordination Group

Progress since 8-2007

Goal: The paleontology coordination group shall coordinate IODP and community collaboration to develop a strategy to set up and maintain TNLs and DTDs.

Progress: Draft taxon lists have been created by IODP-MI contracted Pat Diver by merging Chronos/Neptune data with ODP data. These lists need to be reviewed, completed and updated.

Paleontology Coordination Group

Progress: Group experts are designated to organize review of the taxonomic lists generated by the merger of ODP and Neptune lists.

IODP-MI has arranged for travel funding for the designated members to meet with colleagues to review the lists.

Coordinators for the groups are:
Brian Huber: planktonic foraminfers
Woody Wise: calcareous nannofossils
Masao Iwai: Diatoms
Dave Lazarus: Radiolarians
(Francine McCarthy: Dinocysts)
(NN: Benthic Forams)
(Carlos Zarikian: Ostracods)

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STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog

STP recommends IODP-MI to form a Lithology Working Group to maintain dictionaries/catalogs related to VCD/lithology (sediment/rock classifications) with support from the scientific community. This could follow the model provided by the Paleontology Coordination Group.

Voting record: 16 Yes; 0 No; 0 Abstentions (Absent: Bruckmann, Sakurai, Wheat, Inagaki)

Priority: High

STP suggests this be forwarded to IODP-MI

INTEGRATED OCEAN DRILLING PROGRAM
MANAGEMENT INTERNATIONAL

STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog

Background to STP Consensus Statement 0708-23: Establishment of dictionaries (taxonomic, lithologic classifications, time-scales) is critical to QA/QC because it reduces uncertainty in the following observations (biostratigraphy, core description). Because dictionaries are living documents, references to the version of dictionaries used must be explicit. However, a route to manage the content of the dictionary (list of dictionaries) is currently not sufficient for the scientific community. Therefore STP investigates the method to provide and maintain dictionaries for observation under commitment of the scientific community. The dictionary for the VCD lithology should be updated and expanded when it is necessary.

INTEGRATED OCEAN DRILLING PROGRAM
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STP Consensus Statement 0708-23: Content management of the Lithology dictionary / catalog

IODP-MI recognizes importance of keeping the dictionary/catalogue updated.

Alternatively, IODP-MI suggests

- use of existing e-mail discussion group for now.
- formation of the CG after completion of initial drilling phases.

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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

Subsurface Life Task Force Report to IODP-MI

Task Force Participants

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The community-wide IODP/JOI Workshop on *Exploring Subsurface Life with the Integrated Ocean Drilling Program* brought together 90 international scientists to (chaired by S. D'Hondt and F. Inagaki, October 2006). A general outcome of the workshop was consensus that the microbiological community needs to take advantage of the full range of IODP expedition possibilities to meet the multiple challenges of **(1) describing deep subsurface microbial diversity, (2) accurately constraining microbial biomass and activity, and (3) mapping habitable space within the subseafloor ocean** (D'Hondt et al., 2007).

To provide an implementation plan in support of that consensus, an IODP Task Force was created to hold a single meeting. The meeting was held September 17-19, 2007, at the IODP-MI office in Washington, D.C. This report constitutes that implementation plan. It defines **(1) generic science strategies for study of subseafloor life and habitability, (2) recommendations for standard measurements and legacy samples, (3) recommended protocols for implementing standard measurements and legacy sampling, and (4) recommended requirements for microbiological study of IODP materials. It also recommends concrete steps for encouraging subsurface life studies on IODP expeditions, expeditionary data and legacy samples.**

These strategies and recommendations provide specific guidelines for meeting many of the scientific and technological objectives identified by the community-wide workshop. They also define a framework for initial and basic IODP progress on study of subseafloor life within the time frame of 2008 - 2013.

The sample and measurement recommendations build on the Workshop white paper and the 2003 STP Microbiology Working Group Report. The discussions of standard measurements and legacy samples include recommendations on: (1) circumstances or categories of expeditions for which those samples and measurements should be taken. Where appropriate, these discussions also include a strategy for consistently getting the measurements done.

If published as a task force report, the task force recommendations for general sampling and generic strategies may help to guide the broader community in proposal writing.

To undertake this project, IODP-MI paid travel and meeting expenses for 9 people to participate. The task force included multiple representatives from Japan, Europe and the United States. To maximize the depth of and appropriateness of the recommendations, it included scientists who are active in the international drilling community and scientists who are deeply versed in appropriate microbiological/biogeochemical techniques and study areas but not yet active in the drilling community. An ICDP observer also participated in the meeting.

Generic Science Strategies

The generic science strategies include guidelines for strategies (site location, samples and sample treatment) specific to major scientific themes and objectives identified by the workshop. These generic strategies include scientific objectives that may be best met with

(1) Standard measurements on IODP expeditions,

(2) A legacy sampling program,

(3) Targeted addition of subsurface life studies to IODP expeditions, and

(4) Expeditions specifically dedicated to study of subseafloor life.

Scientific priorities for all categories of objectives are rooted in the 2006 Workshop report. However, the Task Force provides a practical focus for scientific priorities by suggesting implementation priorities.

The case for new biosphere-targeted standard measurements

IODP standard measurements focused on subseafloor life include contamination tests, cell counts on fixed samples, and a few standard measurements of interstitial water chemistry (nutrients, alkalinity, sulfate). Other minimum and standard measurements are relevant because they help to constrain the habitability of subseafloor environments. These include physical properties (discrete-sample density and porosity), lithology (carbonate content), and chemical analyses relevant to redox habitability and electron donors (bulk carbon-hydrogen-nitrogen-sulfur analyses and natural gamma logs).

For sediments, the present standard measurements allow scientists to make very modest progress in mapping three-dimensional patterns of subseafloor habitability,

particularly physical and chemical habitability, and subseafloor respiration. However, the standard IODP measurements will not significantly advance understanding of subseafloor life unless they are expanded and paired to a comprehensive legacy sampling program. Even this will not fully constrain subseafloor distributions of microbial communities and habitability because some important subseafloor sedimentary environments (such as regions distant from shore) will not be drilled by IODP unless they are deliberately targeted for study of subseafloor life.

Several key biogeochemical variables are not addressed by standard measurements. **These include concentrations of dissolved electron donors (microbial "foods" such as hydrogen, short-chain fatty acids, sulfide, and ammonium) and of electron acceptors such as nitrate and oxygen. Although it is the principal product of organic-fueled respiration, dissolved inorganic carbon (DIC) is not among the standard analytes. The standard measurements of pH do not accurately represent *in situ* conditions. The formation factor (ratio of saturated sediment resistivity to pore fluid resistivity) is not a standard measurement although it provides a critical basis for calculating fluxes of electron donors and acceptors** (e.g., D'Hondt et al., 2004). **Because the formation factor and complete suites of metabolic reactants and products are not routinely determined, those biologically relevant properties that *are* routinely measured (e.g., the concentration of sulfate) are not consistently usable for quantitative studies. In situ temperature is not a standard measurement although it is necessary for all quantitative assessments of microbial activities, for determination of proper culturing conditions, and for interpretation of all microbiological results.**

At present, **the intervals at which interstitial water is sampled are often so coarse** that rates of biogeochemical processes cannot be accurately quantified. **A ten-meter interval (once per core) is appropriate for defining concentration profiles over hundreds of meters of depth but does not provide enough resolution to accurately quantify rates in intervals of special interest.** For example, to quantify the respiration for an entire subseafloor sediment column, interstitial water samples must be taken at the meter scale or less for the first several meters below seafloor and for the last several meters above the interface with the basement.

Microbial cell counts were identified as a standard measurement by the IODP SAS in 2007. **Counts of appropriately fixed samples will allow significant progress in mapping geographic distributions of subseafloor sedimentary biomass and in constraining global estimates of subsurface biomass.** In practice, routine cell counts are unlikely to be useful for most non-sedimentary (e.g., basalt and gabbro) samples, which are commonly extensively contaminated during drilling. For all subseafloor environments, ensuring that cell counts are reproducible and comparable from one expedition to another will require clearly defined sample handling procedures and parallel sampling for post-expedition verification of results.

Essential modifications of the standard measurements include routine measurements of the formation factor; the ratio of the electrical resistivity of sediment (or rock) filled with water (saturated sediment resistivity) to the resistivity of that water (pore fluid resistivity). It is nothing more. It is used as a term in advection-diffusion modeling of chemical profiles because the electrical resistivity is affected by many of the same properties as the chemical transport (tortuosity, etc., and of **the concentration of DIC**. This will allow quantification of **(1) in situ pH (from [ALK], [DIC], in situ temperature and in situ pressure)** and **(2) gross heterotrophic (organic-fueled) respiration in the subseafloor sediment column of most drill sites** (using the approach outlined by Wang et al., 2006).

Contamination testing was identified as a standard measurement by the IODP SAS in 2007. To ensure the quality of microbiological legacy samples and routine cell counts, **perfluorocarbon tracer (PFT) must be routinely injected into the drilling fluid for all holes from which microbiological samples are taken**. The concentration of the tracer must then be measured for the same stratigraphic horizons from which microbiological samples are taken. Recommendations for implementation of contamination testing will be discussed later in this report.

The highest priority new standard measurements are

- **Routine measurement of in situ temperature (e.g., ADARA, DVTP)**
- **Routine measurements of formation factor in sediment**

- **Measurement of DIC concentration as a standard interstitial water measurement (in combination with measurement of formation factor, [ALK], [Ca^{2+}] and [Mg^{2+}]).**

Strategies for legacy samples

Appropriately selected legacy samples will allow significant progress on mapping subseafloor biomass, diversity, community composition, habitability and activity. Here, we describe the scientific value of such samples. Appropriate sampling techniques are described in a later subsection.

Bulk sediment samples frozen to -80C are necessary for post-expedition analyses of biomass, diversity and community composition (via nucleic acid analyses and organic biomarker analyses). They are also useful for some analyses of potential *in situ* microbial activities, e.g. hydrogenase activity (Soffientino et al., 2006) or other enzymatic assays. Analyses of nucleic acids provide the ultimate basis for determining the diversity and phylogenetic composition of the total community via DNA (Inagaki et al., 2006) and of the active community via RNA (Sørensen and Teske, 2005). Organic biomarkers (e.g., phospholipids) provide independent proxies for biomass (through their abundance) and for community composition (through their structures) (Biddle et al., 2006). Furthermore, since these investigative techniques are developing rapidly, storage of legacy samples at -80° C will insure that a useful archive will be available from *all* pertinent IODP expeditions.

Sediment samples fixed with formalin and frozen to -80C are necessary for post-expedition determinations of total cell abundance (e.g., SYBR Green I counts) and active cell abundance and composition [e.g., CARD-FISH counts of bacteria and archaea (Schippers et al., 2005)].

To provide sufficient material for multiple technical approaches and for analyses by multiple laboratories, multiple sub-samples should be taken for each category (frozen bulk sediment or frozen formalin-fixed sediment). Such sub-samples are necessary to guarantee reproducibility of results and to allow complementary analyses.

Greatly increased understanding of the redox (energetic) habitability of both basalts and sediments can be achieved by routinely taking samples appropriate for post-expedition quantification of the abundance and redox states of sulfur, iron and carbon in solid phases. Relevant analyses include measurements of ferrous/ferric ratios and combustion oxygen demand (Perks and Keeling, 1998). Aside from redox habitability, the potential for advances with routine basement samples or measurements is greatly limited by the near-impossibility of drilling hard rocks without contamination of the microbial communities and formation fluid. Therefore, outside of these redox habitability measurements, the legacy sampling that we recommend is, at present, limited to sedimentary environments.

Routine sampling of interstitial waters from sediment would allow post-expedition measurements of several dissolved microbial reactants and products, including short-chain fatty acids (acetate, formate, lactate), dissolved inorganic carbon, sulfide, ammonium, iron, manganese and nitrate. When combined with standard measurements (e.g., dissolved sulfate, alkalinity, calcium, magnesium, etc.), these samples will allow (1) thermodynamic studies of microbial energetics in the deep subseafloor ecosystems (e.g., Hoehler et al., 2001; Wang et al., 2006) and **(2) quantification of subseafloor reaction rates (if combined with shipboard measurements of the formation factor). However, the task force recognizes the complexity of appropriate sampling and storing interstitial water samples for these various compounds.** Consequently, **we suggest that inclusion into detailed sampling requests or APLs by the subsurface life community may be a better approach to meeting this level of detail for interstitial water samples.**

We have not included +4°C (refrigerated) or room temperature samples as part of the suggested legacy program because artifacts due to sample oxidation and pressure changes significantly hamper the long-time viability and variability of such samples. As with expanded interstitial water sampling, we suggest that the best approach for taking refrigerated or room-temperature samples may be incorporation into detailed sampling requests or APLs by the subsurface life community.

The highest priority legacy samples for studies of subseafloor life are:

- **-80C bulk sediment for molecular studies of diversity, community composition and biomass**

- **formalin-fixed samples for post-cruise censuses of total cells, active cells and community composition**
- **solid-phase samples of sediment and basement for studies of energetic habitability**

Strategies for targeted addition of subsurface life studies to IODP expeditions

With carefully targeted studies, understanding of subseafloor life can be advanced by addition of biosphere-focused subprojects attached to IODP expeditions with non-biosphere primary objectives. Depending on the study, such advances will require modest IODP investment by the addition of sites, holes and/or biosphere-focused shipboard scientists. **To ensure that these "piggy-back" projects are defined and protected fully enough to maximize their success, such studies would probably best be advanced *via* submission and acceptance of Ancillary Program Letters.**

Addition of one or more projects to individual expeditions will allow shipboard scientists to understand how environmental properties (e.g., lithology, temperature) specific to the targeted environment control subseafloor microbial diversity, community composition, and activities and effects on the environment (e.g., sediment diagenesis and fluxes of chemicals between the sediment and the ocean). Successful addition of such projects to multiple expeditions will advance general understanding of the distribution of subseafloor life (activities, diversity and biomass) and may advance understanding of the environmental limits to life on Earth.

The potential nature of such advances will vary from one expedition to another, depending on the environment to be drilled. Consequently, discussion of specific advances requires reference to specific expeditions or environments.

For example, understanding of environmental controls on subseafloor diversity, biomass and activity can be advanced by incorporation of "piggy-back" projects into expeditions presently proposed for the Bering Sea, the equatorial Pacific, the Nankai area, the Marianas Forearc and Costa Rica mud mounds.

1) Bering Sea drilling will provide a unique opportunity to test the control of oceanographic properties on global distributions of biomass and heterotrophic activity in subseafloor sediments. The Bering Sea sites presently scheduled for drilling will sample the sediments beneath extremely high-productivity waters. No oceanographically equivalent sites are scheduled for drilling elsewhere. Such a project might be best advanced by inclusion of one or two appropriate scientists on the expedition (to respectively take microbial samples (for biomass and nucleic acids) and take interstitial water samples. The sampling strategy would require high-resolution (decimeter-scale to meter-scale) samples near the seafloor and the basement interface and regular sampling at 10-m scales throughout the sediment column of representative sites. Given the need for relatively continuous records to meet the paleoceanographic objectives of the expedition, the high-resolution near-seafloor sampling might be best provided by taking a shallow (20 to 30-m) biosphere-dedicated core at representative sites.

2) Equatorial Pacific drilling will provide an excellent opportunity to test how Milankovitch-scale (glacial/interglacial) paleoceanographic changes and resultant variations in lithology shape the compositions of present-day subseafloor communities. This might best be done with a sampling strategy similar to that outlined for the Bering Sea drilling (above).

3) Effects of tectonic activity on subseafloor habitats and ecosystems could be modestly advanced by incorporation of biological studies into drilling efforts in the Nankai area.

4) Explicit incorporation of biological studies into Marianas Forearc drilling would advance understanding of how subseafloor microbial ecology is coupled to plate-tectonic cycling via the effects of subduction-zone fluid flow on subseafloor microbial communities and activity. It would also provide an opportunity to search for a pH limit to subseafloor life.

5) Drilling of the Costa Rica mud mounds will provide an opportunity to examine the effect of temperature on organic degradation and its consequences for the subseafloor microbial ecosystem.

In each case, non-routine samples, appropriate shipboard scientists (microbiologists, biogeochemists, physical property specialists) and perhaps dedicated holes or sites will be required

Strategies for dedicated expeditions

A major advance in understanding of subseafloor life within the next five years will require at least one dedicated IODP expedition per year. Improvement of routine measurements and samples and "piggy-back" projects are important but cannot substitute for dedicated expeditions.

First and foremost, only dedicated expeditions can allow a sustained attack involving a large number of specialists, multiple dedicated sites, and many days of operation. Many objectives in study of subseafloor life require focused attention by scientists from diverse fields. These **include hydrologists, physical-property specialists, sedimentologists or igneous petrologists, and biostratigraphers** in addition to **microbiologists and biogeochemists.** Second, dedicated expeditions are necessary to meet any objectives that require operation in environments not targeted by other IODP proposals.

Dedicated expeditions are required to determine the energetic limits to life in subseafloor sediments and the distribution of organisms and activities at energetic extremes. Examples of such extreme environments include sediments in mid-ocean gyres, where concentrations of organic matter and electron donors are extremely low, and high-latitude upwelling regions, where abundances of organic matter and electron donors are extremely high but coupled at great sediment depths to extremely low concentrations of electron acceptors.

Dedicated expeditions are necessary to understand fully the influence of fluid flow (e.g., hydrothermal transport) and of hydrocarbons (petroleum, gas) on sedimentary communities and activities. For example, the energetics of microbial communities in hydrocarbon deposits and the roles of microbial processes in the

generation and destruction of hydrocarbons are poorly known. Concentrations of electron acceptors and thermodynamic limits to microbial activities may be especially significant. Drilling in these environments may require the riser capabilities of the *Chikyu*. These objectives may provide a significant opportunity for IODP-industry cooperation.

Dedicated expeditions are necessary to fully understand lithologic control of subseafloor communities and activities. Most fundamentally, if the same horizon is sampled repeatedly in different holes and at multiple sites, is the diversity and composition of the community always the same? At a more exotic level, a dedicated expedition could identify the extent to which "hydrothermal" sediment just above basement-sediment interfaces sustains and is modified by microbial redox cycling of metal and sulfur in concert with introduction of O_2 and NO_3^- from seawater in the upper basement.

Dedicated expeditions are necessary to understand the evolution of habitability in basement water-rock reaction zones as a function of crustal age and in response to ventilation by subseafloor circulation. Understanding of the interplay between age, ventilation, and the basalt-hosted biosphere will require drilling in on-axis, open-flow environments; off-axis, closed-flow (sediment-sealed) environments; and off-axis, open-flow environments. Seamounts are natural bioreactors and a major focal point for these studies; both hot systems and old, cold systems are hydrologically active and thus foci for microbial activity. Dedicated expeditions are required to study their role in the evolution of redox habitability, ventilation of the subseafloor ocean, and effects on the distribution of subseafloor life in both basaltic crust and sediments.

Studies of microbial life in ridge crest environments (both high-temperature and low-temperature serpentization zones) will also be aided by dedicated expeditions, as will studies of subseafloor life in arc, back arc and plume-related marine volcanic systems, including volcanogenic sediments.

Some of these problems will require multiple expeditions. Detailed mapping of microbial ecosystems at an active ridge complex provides one example. Determination of the energetic limits to organic-fueled (heterotrophic) subseafloor life will require at least two expeditions, one focused on a region with extremely low organic abundances and one to sites with extremely high abundances of electron donors but a general absence of electron acceptors such as O_2 and SO_4^{2-}. Because the scientific gains from well-planned individual expeditions are likely to be great, expeditions that collectively address these kinds of broader problems need not be rigidly linked.

Other problems will require CORK-based microbial observatories, particularly in basement environments where mineral habitability is the only microbially relevant property unlikely to be altered or contaminated at the time of drilling.

Implementation

Implementation of standard measurements

New standard measurements.—The highest priority new standard measurements are

- **Routine measurement of in situ temperature (e.g., ADARA, DVTP)**
- **Routine measurements of formation factor in sediment**
- **Measurement of DIC concentration as astandard interstitial water measurement (in combination with measurement of [ALK], [Ca^{2+}], [Mg^{2+}] and formation factor**

IODP protocols already exist for in situ temperature measurements. At least four to five in situ temperature measurements should be made at different depths in the sediment at each site.

Formation factor should be measured at the same frequency or higher than the IW sampling interval. Formation factor should be measured as described in the ODP Leg 201 Initial Report (Shipboard Scientific Party, 2003).

Formation Factor

Formation factor (F) was determined from **electrical resistivity measurements** taken adjacent to discrete MAD samples on split-core sediments. Four in-line electrodes, 2 cm long and spaced ~1 cm apart mounted on a plastic block, were inserted into the split-core sediments. The two outer electrodes produce an alternating current (5-10 kHz) in the sediment. The resulting potential difference is measured by the two inner electrodes (Wenner array). In samples saturated with saline interstitial water, polarization effects are minimal in this frequency range and the measured resistivity is largely independent of frequency.

At each sampling location two measurements of sediment resistance were made, one oriented axially ($R_{core,\ axial}$) and the other transverse ($R_{core,\ trans}$) to the core axis, as with discrete P-wave velocity data collection. Measurement of resistance for room-temperature seawater (R_{wtr}) was made regularly so that formation factors,

$F_{axial} = R_{core,\ axial}/R_{wtr}$ and (7)
$F_{trans} = R_{core,\ trans}/R_{wtr}$, (8)
in each direction could be calculated. Temperature measurements for the sediment and seawater were not made, as both were equilibrated to ambient laboratory temperature.

This simple method for determination of formation factor does not take into account surface conductivity effects of the sediment matrix. However, this is not of concern in high-porosity sediments where the conductive pathways depend dominantly on intergranular porosity and pore connectivity, even where the sediment matrix contains significant clays. Previous drilling at the sites cored during Leg 201 indicate that porosities should exceed 50% everywhere from seafloor to total depth.

Using the axial and transverse formation factors from equations 7 and 8, anisotropy can be computed as

anisotropy = 200 x (F_{axial} - F_{trans})/(F_{axial} + F_{trans}). (9)

To quantify total heterotrophic respiration at each site, **concentrations of dissolved inorganic carbon [DIC], Ca^{2+} and Mg^{2+} should be measured at relatively high resolution (one- to two-meter intervals) for the first 20 to 30 meters below the seafloor (mbsf) and the last 20 to 30 meters above the sediment/basalt interface.** A sample should be taken at about one mbsf (ideally, two or more samples would be taken in the first 1.5 mbsf). **For sediment depths greater than 20 to 30 mbsf and farther from basement than 20 to 30 meters, it should be measured at the same 10-meter interval as standard IW samples.** DIC concentrations can be measured with the existing carbonate coulometer in the shipboard geochemistry laboratory using the Leg 201 protocol (Shipboard Scientific Party, 2003). Concentrations of Ca^{2+} and Mg^{2+} can be measured with the shipboard ICP (Shipboard Scientific Party, 2003).

Implementation of standard contamination tracer measurements.—**Standard Perfluorocarbon tracer (PFT) measurements should be undertaken on holes and stratigraphic horizons where microbiology legacy samples are taken (sediments).** The PFT should be introduced and measured as described in the Leg 201 Initial Report (House et al., 2003).

Implementation of standard cell counts.—The IODP SAS declared cell counts a standard measurement in 2007. Such counts have historically been done on ODP and IODP samples with Acridine Orange (e.g., Parkes et al., 2000). However, Acridine Orange is no longer the best choice for nucleic acid staining of subsurface samples due to the development of more specific fluorochromes that produce a much brighter signal with much lower background fluorescence. **We strongly recommend that all standard cell counts be done with SYBR Green I, not Acridine Orange.** Samples stained with SYBR Green I are characterized by low background fluorescence and relatively slow signal quenching. **Standard sedimentary cell counts should be done at intervals similar to IW samples (one to two-meter intervals for the first 20 meters, 10-m intervals at greater depths, with a sample taken at one mbsf.**

Standard cell counts will be useless unless the results are reproducible by independent observers. The simplest way to minimize variation in observer bias would be to have all standard cell counts done by the same observer and to have representative subsamples checked by independent observers. We strongly recommend that parallel sub-samples be taken as legacy samples for post-expedition verification of results by independent laboratories.

Recommended technological developments for standard measurements.—**IODP or its funding organizations should fund development and testing of one or more dissolved contamination tracers that is less volatile in the environment than the currently used PFT, but easily volatilized for analysis.** The present PFT measurements have relatively high blanks because the tracer is so easily volatilized during handling of microbiological samples. For most environments (excluding very high pH environments), a dissolved contamination tracer volatilized by addition of a strong base may be ideal. An acid-liberated tracer is not recommended for high-carbonate sediment samples, due to the large amount of CO_2 that would be simultaneously liberated. A temperature-liberated tracer would not be ideal because it could not be used for high-temperature subseafloor environments.

IODP or its funding organizations should fund development and testing of membrane-inlet mass spectrometry (MIMS) or similarly related gas-chromatographic technology for quantification of in situ dissolved concentrations of methane and other gases. Use of MIMS technology, with void-space CH_4 concentrations normalized to O_2 and Ar concentrations, using the approach of Spivack et al. (2006) will allow routine shipboard quantification of in situ dissolved gas concentrations without the need for complex downhole technologies (such as pressurized core recovery).

Implementation of legacy samples

The highest priority legacy samples for studies of subseafloor life are:

- **-80 bulk sediment for molecular (DNA, RNA, biomarker) studies of diversity, community composition and biomass**
- **formalin-fixed samples for post-cruise censuses of total cells, active cells and community composition**
- **solid-phase samples of sediment and basement for studies of energetic habitability**

For the -80C bulk sediment samples, we recommend that multiple paired subsamples, e.g., **four sterilized large-volume (60cc?) cut-off syringes, be taken from the same central portion of the same cut surface. To take these samples, the core should be cut perpendicular to the core liner.** The outer edge of the core and any fractures or disturbed core should be avoided entirely by these samples. **These samples can be taken in association with IW samples (from a cut core surface that faces the IW sample).** These samples should be taken as quickly as possible after core recovery. The cores should be refrigerated until they are sampled. **Where cut-off syringes cannot be inserted because the sediment is too hard, we recommend that four adjacent 5-cm-thick whole rounds of the core be cut.** If subsequent demand indicates that this volume of legacy material is inadequate, then volume should be increased, e.g., to eight syringes or eight five-inch whole rounds. **These legacy samples must be taken routinely, even on legs where shipboard scientists take other samples for molecular studies.**

For the legacy samples to be fixed in formalin and frozen (-80C) for microscopic census of total cells (e.g., SYBR Green I), active cells (e.g., FISH assays) and other whole-cell analyses, we also recommend that multiple subsamples be taken. Similar to the bulk sediment samples, **we recommend that four such samples be taken with sterilized cut-off 3cc syringes. Individual 1cc aliquots of sediment should be transferred into an equal volume of formalin (2-3%) diluted in a sterile buffer of comparable in situ salinity (PBS is standard or 2.5% NaCl).** Fixed sediment for in situ hybridization (FISH) can be stored 6 hours-overnight at 4ºC and then transferred to -80ºC for long(er) term storage (or flash frozen in liquid nitrogen). **These samples can also be taken in association with IW samples (from a cut core surface that faces the IW**

sample). These samples should be taken from the same whole round as the -80C bulk sediment samples or an immediately adjacent whole round. As with the -80C bulk sediment samples, the outer edge of the core and any fractures or disturbed core should be avoided entirely by these samples. These samples should be taken as quickly as possible after core recovery. The cores should be refrigerated until they are sampled. These legacy samples must be taken routinely, even on legs where shipboard scientists take other samples for biomass studies.

The principal advantages of this formalin-based approach to legacy samples are increased longevity of samples for certain categories of microscopic study (such as FISH analyses) and the minimal shipboard sample-handling requirement of the approach. The latter advantage is a key feature if the samples are to be collected by non-dedicated personnel. However, it should be recognized that a systematic study of cell loss using this method has not been done; the accuracy of cell counts on samples fixed and frozen in this manner should be tested before the approach is used routinely on IODP missions.

For post-expedition studies of energetic habitability, a piece of core should be taken every 10 m, bagged in an N_2-flushed atmosphere or, if chips, sealed in a 12-mm evacuated tube and frozen at -80C. These samples are necessary for post-expedition studies of easily altered biogeochemical properties, such as sulfur speciation, ferrous/ferric ratio, concentrations of mineral-bound CO_2, H_20 and sulfur, and combustion oxygen demand (total oxidizable content of sediment). For sediment, these samples can be taken from squeeze cakes (the sediment that remains after squeezing sediment for interstitial water).

All frozen samples must be shipped from the drilling platform to their eventual destination (IODP repository or individual scientist) with temperature loggers to verify the temperature history of the shipping.

Recommended technological developments for legacy samples.—Two technological developments will significantly advance the potential for scientific yields from microbiological legacy samples. IODP or its funding organizations should fund development and testing of both developments.

First, the long-term consequences of formalin treatment and storage at -80C for microscopic assays of total biomass (e.g., SYBR Green I), active biomass (e.g., FISH) and other whole-cell analyses (e.g., secondary ion mass spectrometry) must be quantified by multi-year studies.

Second, a wide array of bulk-sediment sample processing techniques for genomic analyses must be rigorously tested and compared, in order to provide baseline techniques for analysis of subseafloor materials. This exercise could be done by a competition with a request for proposals focused on extraction techniques; the competition should require that the extractions by different techniques be done on parallel samples and that the results be provided for calibration exercises.

A less crucial technological issue is that sampling and medium to long-term storage of non-frozen, non-fixed samples continues to pose problems. A commonly accepted method to method is to store samples anerobically under N_2 gas in heat-sealed

aluminum "H_2S-bags" or gas impermeable trilaminate bags (Cragg et al. 1992). Without the inclusion of an extra chemical oxygen scrubber, oxidation very often occurs time periods of a year (Lin, Hinrichs, & Biddle, unpublished data). The addition of the commercial chemical oxygen scrubbers, however, can add substantial amounts of hydrogen. **Further exploration of proper sample packing and long-term storage will be needed before non-frozen non-fixed samples can be considered for legacy sampling.**

Recommended requirements for microbiological studies of IODP materials (shipboard and post-expedition)

The scientific value of molecular results and cultured microbial strains ultimately depends on their accessibility to the international scientific community. Public DNA sequence repositories are particularly invaluable resources for characterizing the diversity and global distribution of subseafloor life. To fully maximize the scientific benefits from this data, **we recommend that the IODP standardize the reporting of key metadata during the submission of sequence/ metagenome data to public databases.** This contextual data should at a minimum include information regarding IODP expedition number and site, sample location- lat/lon, depth, sample processing (PCR primers used, PCR cycle number, extraction type RNA/DNA), and the relevant publication (IODP cruise logs as well as peer reviewed literature).

Highest priority recommendation

- **IODP should require routine submission of all sequence data and standardized contextual data to an appropriate international database, such as *GenBank*, the *European Molecular Laboratory Nucleotide Sequence Database*, or the *DNA Databank of Japan*.**
- **IODP should require all published culture strains to be deposited in publicly accessible culture collections for ready access by the international scientific community.**

Second priority recommendation

- ***JCORE* and *JANUS* should be modified for post-expedition inclusion of designated data**

Steps for encouraging subsurface life studies of IODP materials

Subsurface life studies can only be undertaken on IODP expeditions if potentially interested scientists know of the opportunity far enough in advance to successfully apply for participation.

Several mechanisms are appropriate for inclusion of subsurface life studies on IODP expeditions. **These mechanisms include sample requests, shipboard scientist applications Ancillary Program Letters (APLs), and IODP proposals dedicated to study of subseafloor life.** Of these mechanisms, APLs are a particularly crucial tool for adding subsurface life studies to IODP expeditions scheduled with any primary objective. They force proponents of add-on projects to refine and justify their projects. They provide a clear mechanism for adding IODP resources (e.g., additional drilling time and transit time, dedication of shipboard science berths, etc.) to expeditions scheduled with different primary objectives. They protect the resources provided for the add-on projects from being sacrificed to other objectives during the course of the expedition.

None of these mechanisms are known to any significant fraction of the environmental microbiology and biogeochemistry communities. IODP must take concrete steps to make their existence more transparent to those communities. We recommend that the following minimum steps be taken by IODP MI:

- **Carefully constructed advertisements should be placed in appropriate journals and at appropriate meetings.** These advertisements should clearly state the likely expedition schedules well in advance. They should succinctly state the three principal scientific themes of the IODP Initial Science Plan (ISP). They should identify three categories of potential participation (sample requests, shipboard scientist applications, Ancillary Program Letters). They should include generic timelines for APL submissions, shipboard scientist applications and sample requests, and a link to likely expedition schedules far enough in advance that APLs can be developed and submitted. They can also advertise routine samples and routine measurements. In principal, all three principal themes of the IODP ISP could be advanced in this manner.
- **Microbiology must be included as a research category and frozen samples must be included as an archived sample category in IODP sample request forms.**
- **Information about microbiology and archived frozen samples (e.g., from ODP Legs 201, 204 and any other expeditions where such samples were/will be taken) must be provided on easily accessible IODP webpages that are clearly linked to the sample request forms.**
- **Post-314 sample request forms must be made easily accessible** [when we checked the page at our Sept Task Force meeting, the text of the introductory page was in German and the page did not allow us to log in (after registration, no log-in link appeared)— http://smcs.iodp.org:8080/smcs/. When checked by a Task Force member more recently (Feb 12, 2008), the site first loaded in Japanese, but switched to English when a random button was clicked.]
- **The new visitor page of the IODP web site needs a vision statement that concisely states the three major themes of the IODP Initial Science Plan, including study of the deep biosphere and the subseafloor ocean.**
- **APLs must be clearly identified as a proposal option on the IODP website and a clear pathway must be provided that links the new visitor page to the APL option.** As with the advertisements, the APL-related webpages should include generic timelines for APL submissions, shipboard scientist applications and sample requests, and a link to likely expedition schedules far enough in advance that APLs can be developed and submitted.

These steps will provide an information exchange and alert system intended to lead to APLs for one or two subsurface life projects per year, plus routine subsurface-life shipboard scientist applications and routine subsurface-life sample requests.

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IODP-MI Microbiology Task Force —Principal Technical Recommendations

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Recommended new standard measurements

- Quantify sedimentary temperature gradients at each site (e.g., via 4-5 ADARA or DVTP deployments)
  - Necessary to quantify microbial activities, determine proper culturing conditions, and interpret all microbiological results
- Routinely measure formation factor in sediment at each site
  - Necessary to quantify microbial activities and geochemical fluxes from dissolved chemical profiles
- Measure DIC concentration as a standard interstitial water measurement (in combination with formation factor, [ALK], [Ca^{2+}] and [Mg^{2+}]).
  - Necessary to quantify (1) *in situ* pH and (2) total organic-fueled respiration of the deep biosphere

Recommended legacy samples

- -80C bulk sediment in quadruplicate
  - Necessary for molecular studies of diversity, community composition and biomass
- Formalin-fixed -80C sediment samples (in quadruplicate)
  - Necessary for microscopic studies to quantify total biomass, active biomass and community composition
- Frozen solid-phase samples of sediment and basement
  - Necessary to quantify energetic habitability

Recommended technological developments (for standard measurements)

- Development and testing of a dissolved contamination tracer that is less volatile than the current PFT, but easily volatilized for analysis (e.g., a base-liberated tracer).
  - Will improve the detection limit of contamination tests
- Development and testing of membrane-inlet mass spectrometry for quantifying *in situ* concentrations of dissolved methane (and other gases).
  - Will allow routine shipboard quantification of *in situ* gas concentrations without complex downhole technologies

Recommended technological developments (for use of legacy samples)

- Multi-year studies to quantify long-term fate of formalin-treated samples stored at -80C
  - Necessary to maximize utility of formalin-fixed legacy samples
- Rigorous testing and comparison of many bulk-sediment sample-processing techniques for genomic analyses
  - Necessary to maximize utility of -80C bulk sediment samples

Recommended IODP requirements for microbiology studies

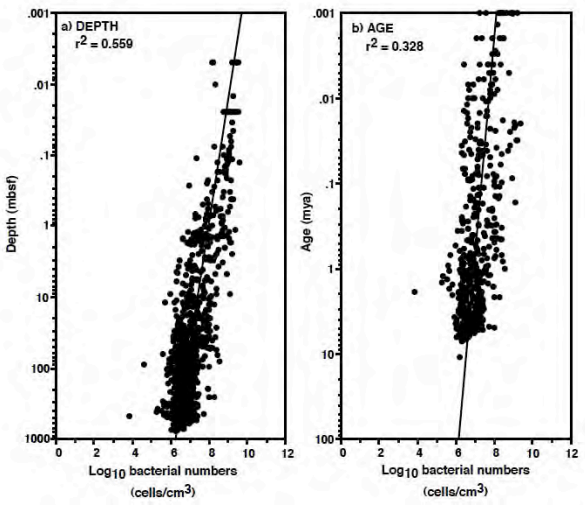
- IODP should require all sequence data and standardized contextual data to be submitted to an appropriate international database (e.g., *GenBank*, *EML Nucleotide Sequence Database* or the *DNA Databank of Japan*)
  - Necessary to maximize international dissemination of results and their utility for studies of environmental biodiversity
- IODP should require all published culture strains to be deposited in publicly accessible culture collections
  - Necessary to maximize international utility of the cultured microbes

KCCBioArchive

Archiving core samples for biological analysis in Kochi Core Center

Kochi Core Center, JAMSTEC
Yuki Morono, Fumio Inagaki,
Noriaki Masui, and Wonn Soh

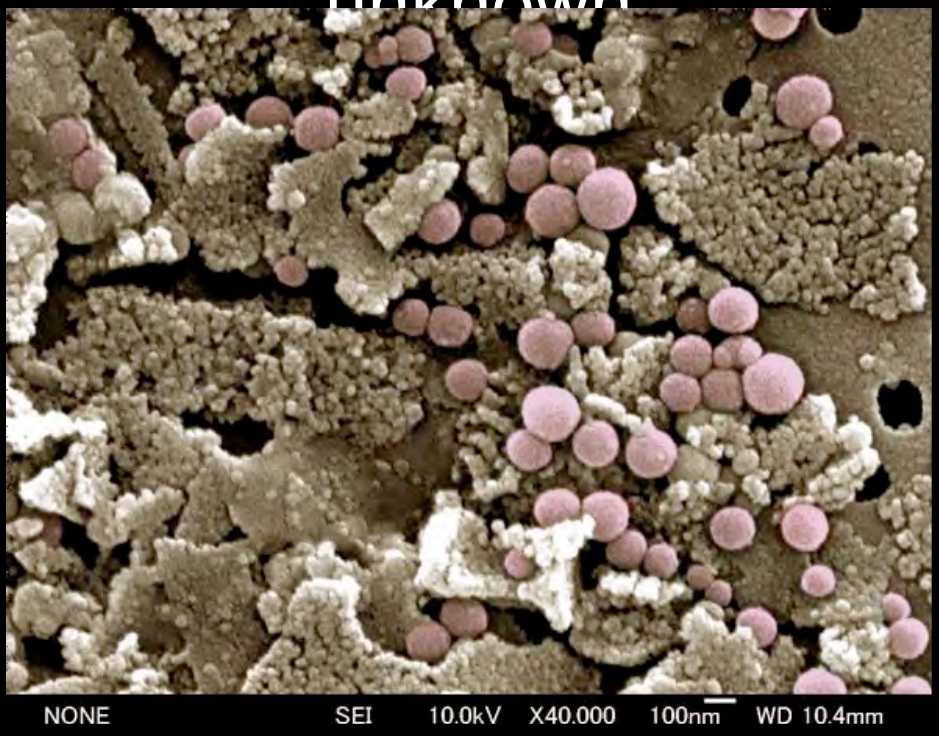
Life in subseafloor



AODC data from Parkes et al., *Hydorgeol. J.* 2000

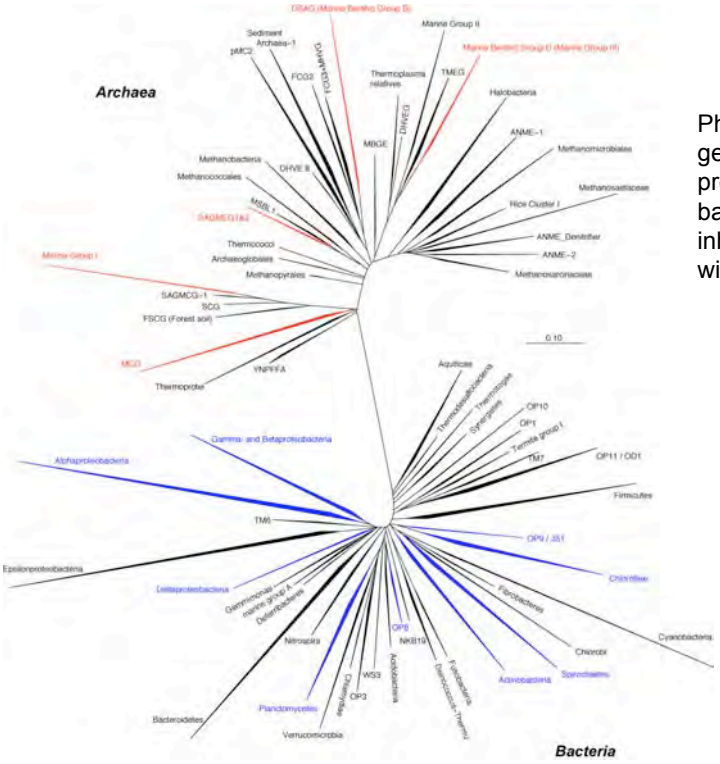
- Subseafloor sediments harbor remarkable number of microbial cells even in deep (~800 mbsf) and old (~10Ma) sediments.
- "The deep biosphere and limits of life" is one of the most important scientific objectives during the next phase of IODP

Life in subseafloor is almost unknown



Inagaki et al., *Nature Geoscience* in review

Phylogenetic diversity of subseafloor life



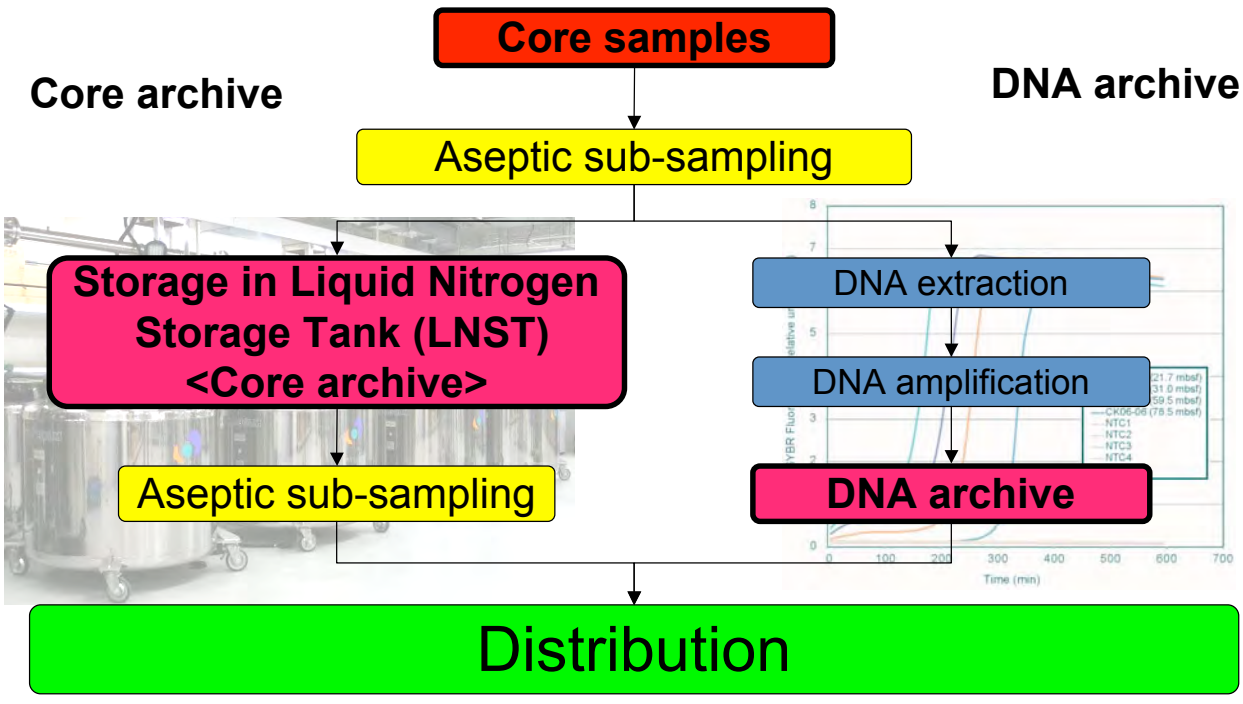
Phylogenentic analysis of 16S rRNA gene clone libraries revealed that previously uncultivated, unknown bacteria and archaea predominantly inhabit deep subseafloor sediments with remarkable diversity.

Inagaki et al., *PNAS* 2006

Concept of BioArchive

- Preserve core samples for future biological analysis
- Biological materials to be analyzed are..
  - DNA — Easiest to be degraded
  - RNA
  - Protein
  - Lipid
  - Other components (with future technologies)
- As low as possible temperature is the most important issue for keeping biological materials intact

Scheme for BioArchiving



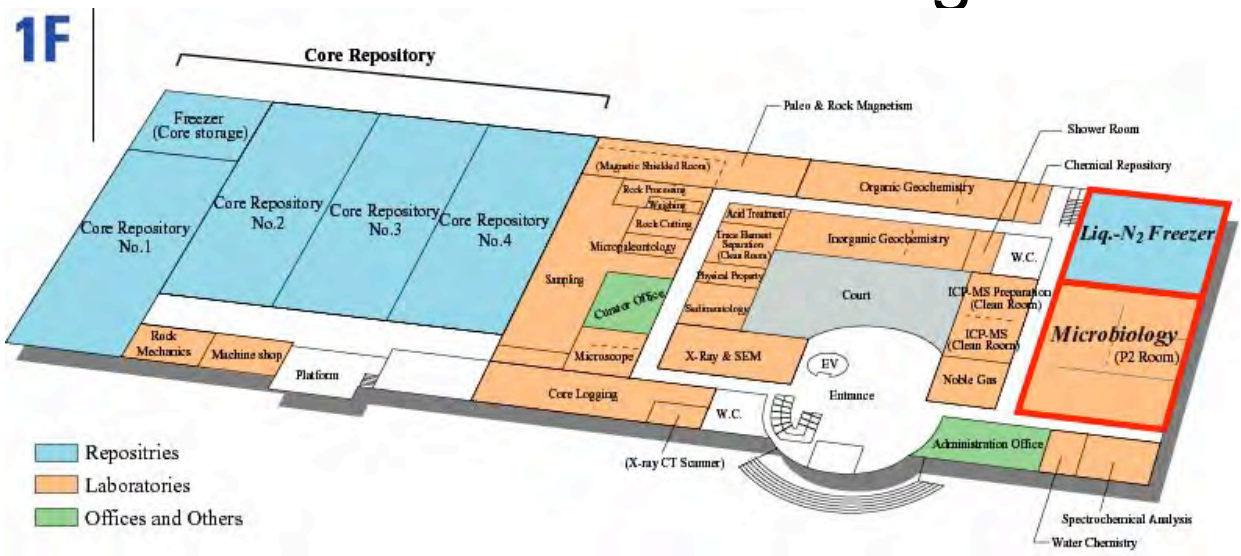
Aseptic sub-sampling and biological safety

- Biological safety cabinet
  - Prevents contamination of samples and surrounding environment
- Aseptic sampling procedure of frozen materials (will be developed)

Sample storage

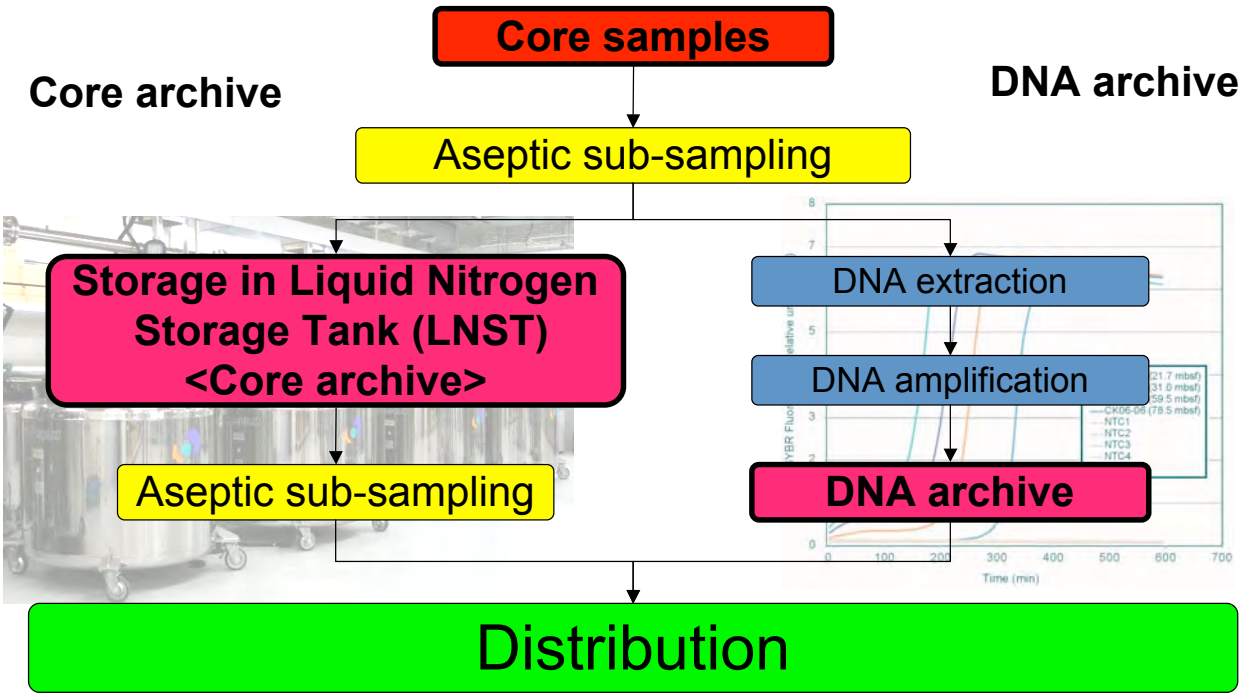
- Storage in Liquid Nitrogen Storage Tank (LNST)
  - Samples will be put in PFA jar
  - Keep -160 degree-C
  - Automatic LN2 refill system

Location of the storage



- Rapid sub-sampling with least damage
- Visiting researchers can conduct microbiological experiments

Scheme for BioArchiving



DNA archive

- DNA is the most widely used molecular biological signature
- Easy to handle, store, and analyze
- Amplifiable (Multiple Displacement Amplification)

DNA archive

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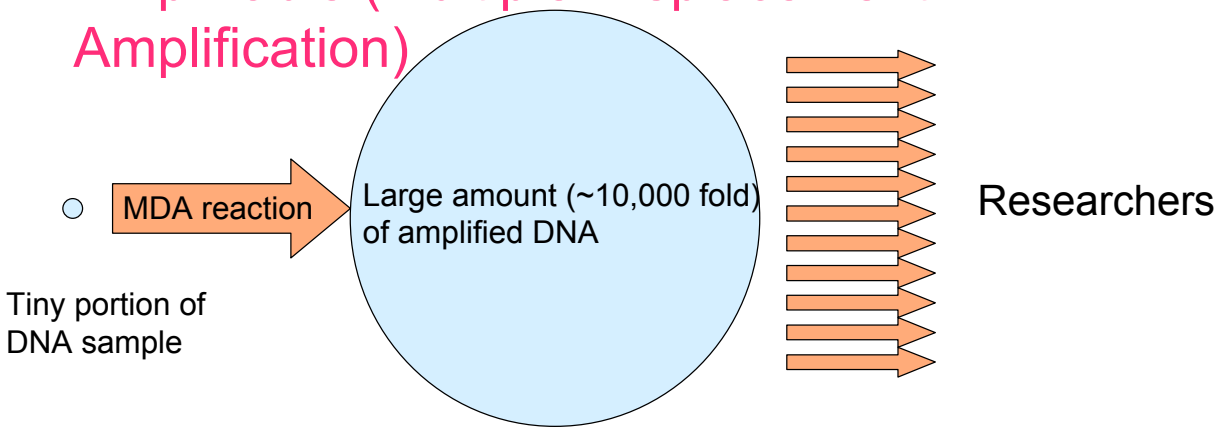


Plan

Pilot study (2008~2011)

- Establish detailed protocol for
  - Aseptic handling
  - Storage and distribution of the core material
  - Extraction, amplification, and distribution of DNA archives
- Bring up trained personnel for the microbiological curation

KCC

Operation (2011~)

- Sample storage (archiving)
- DNA extraction
- DNA amplification and storage
- Distribution of materials on IODP sample distribution platform

KCC & IODP-MI

Virtual core repository

@ KCC

Lallan P. Gupta
IODP Curator
Kochi Core Center (KCC)

Objective

Understand the mechanism of earthquake (solid Earth)

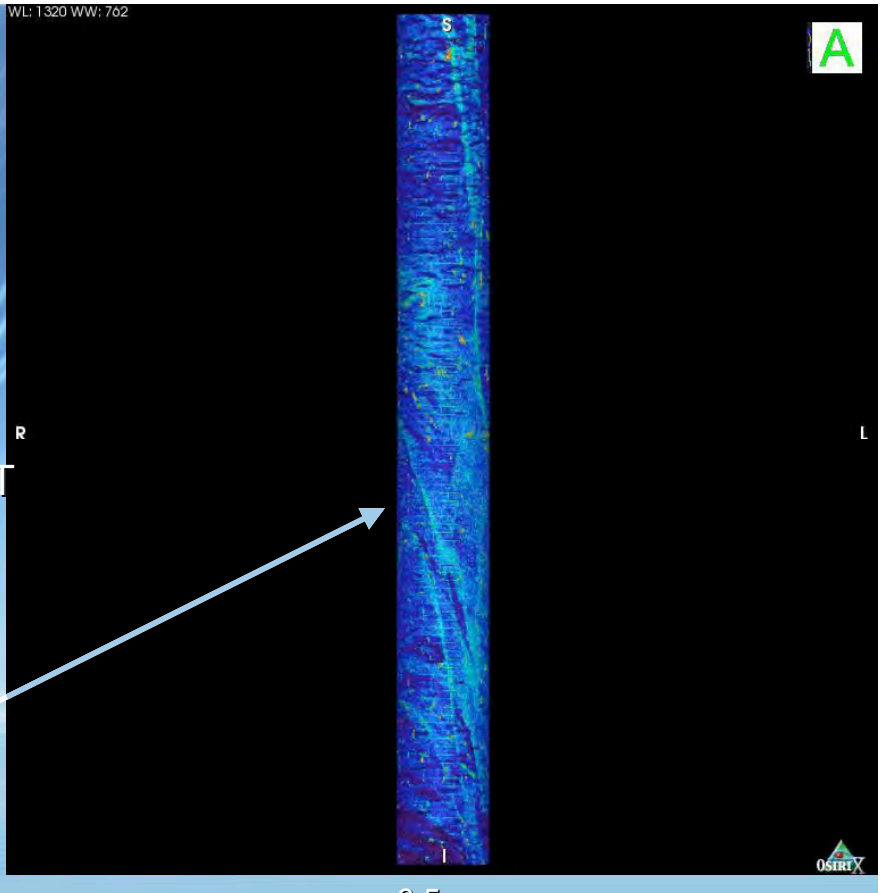
Detailed study of density difference within the core sample

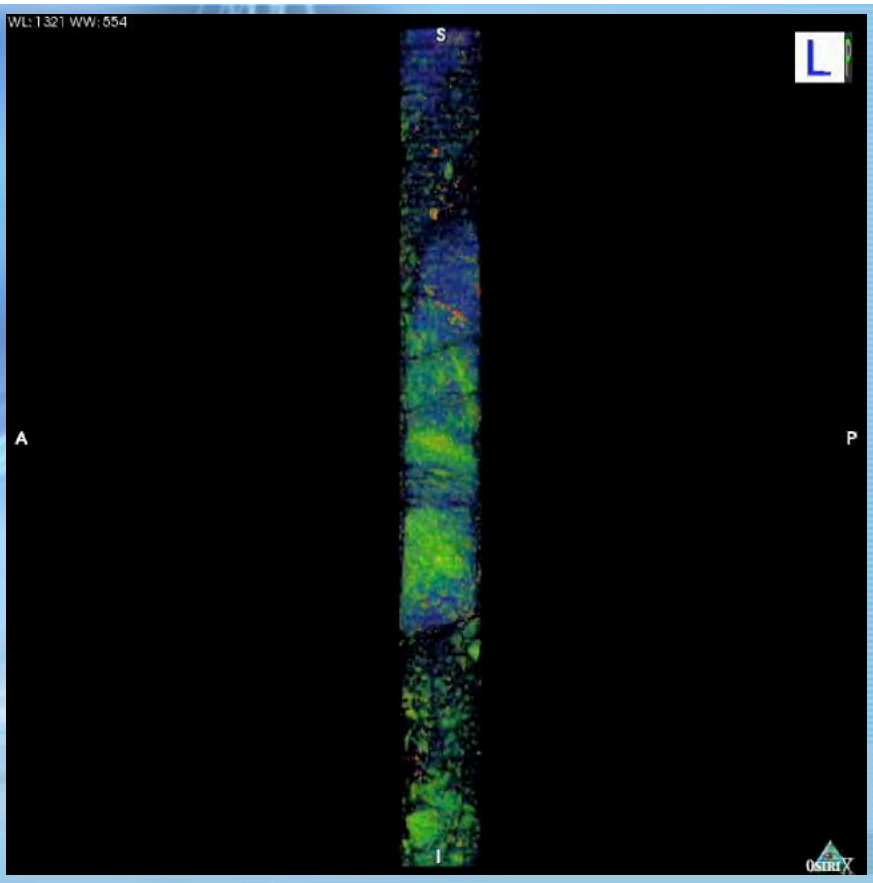
X-ray CT scanner on the D/V Chikyu

New method!

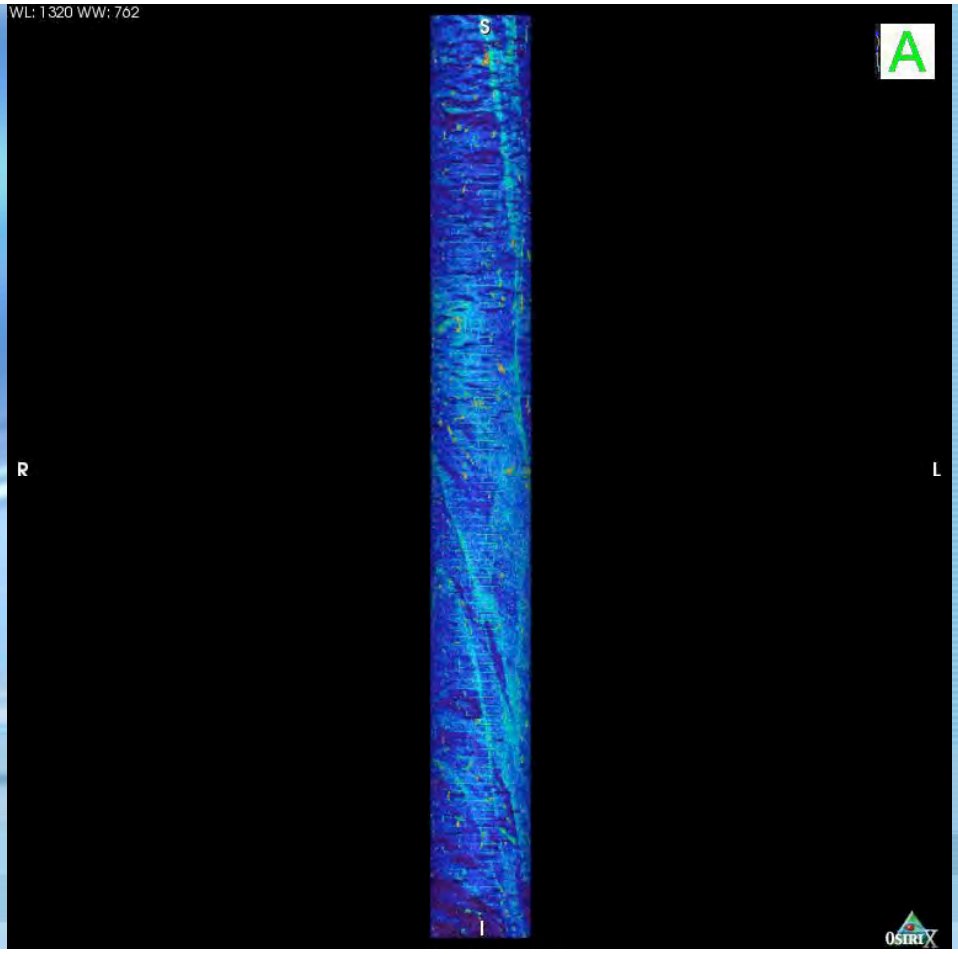
NanTroSEIZE is first trial of X-ray CT scanning for all cores:

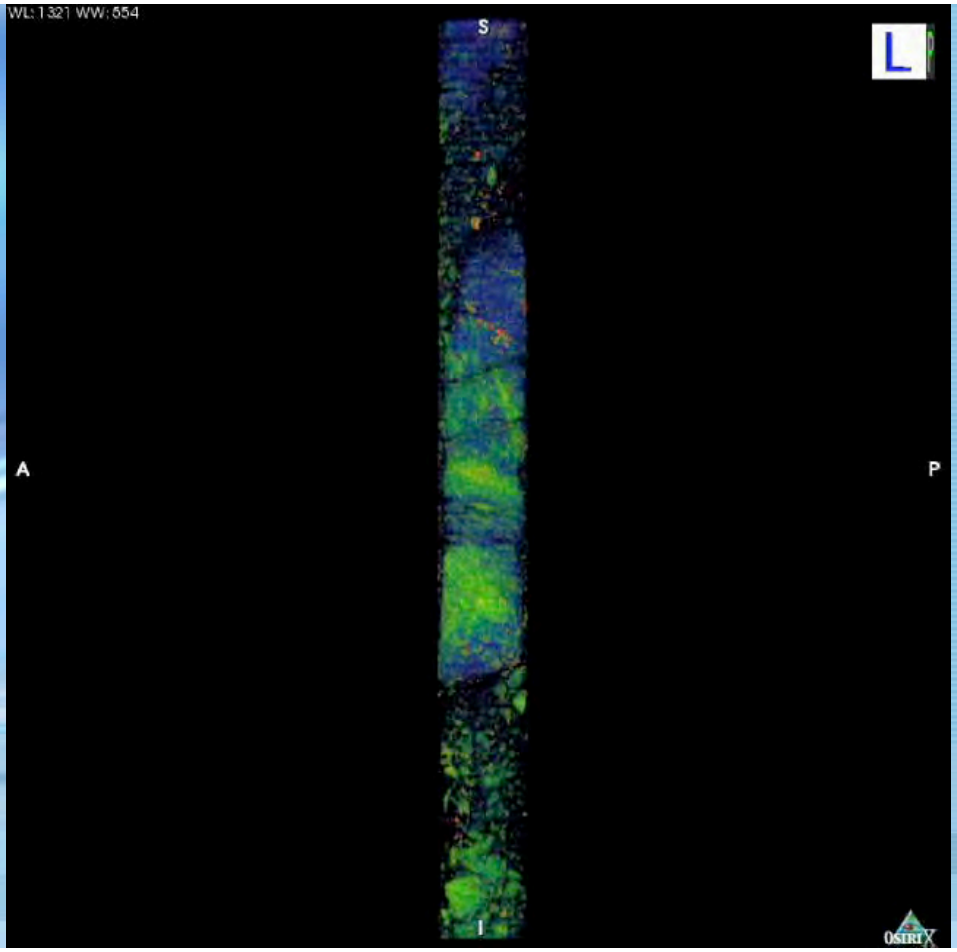
Identifying a fault zone!





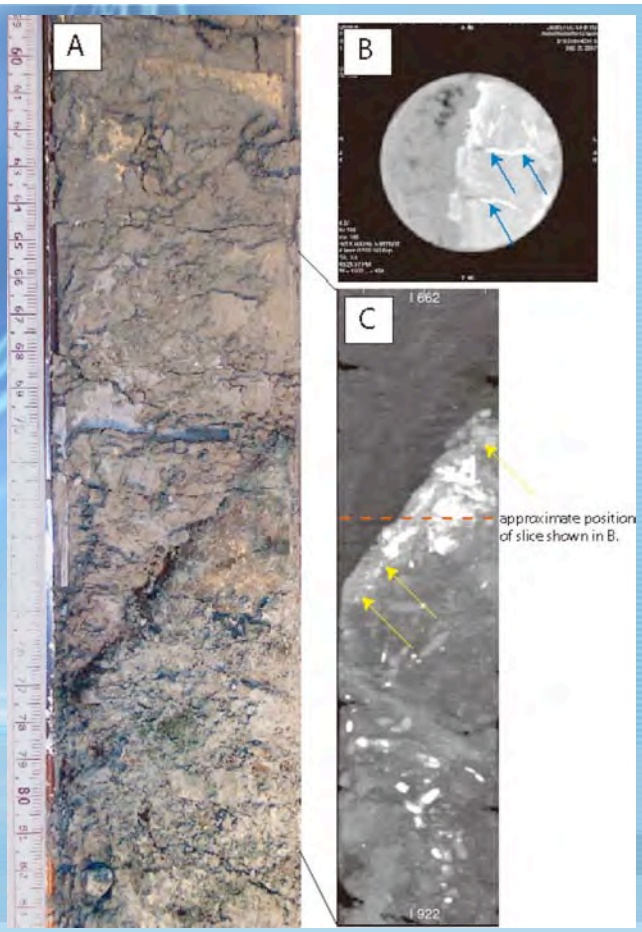
Target Megasplay Fault Zone!





IODP

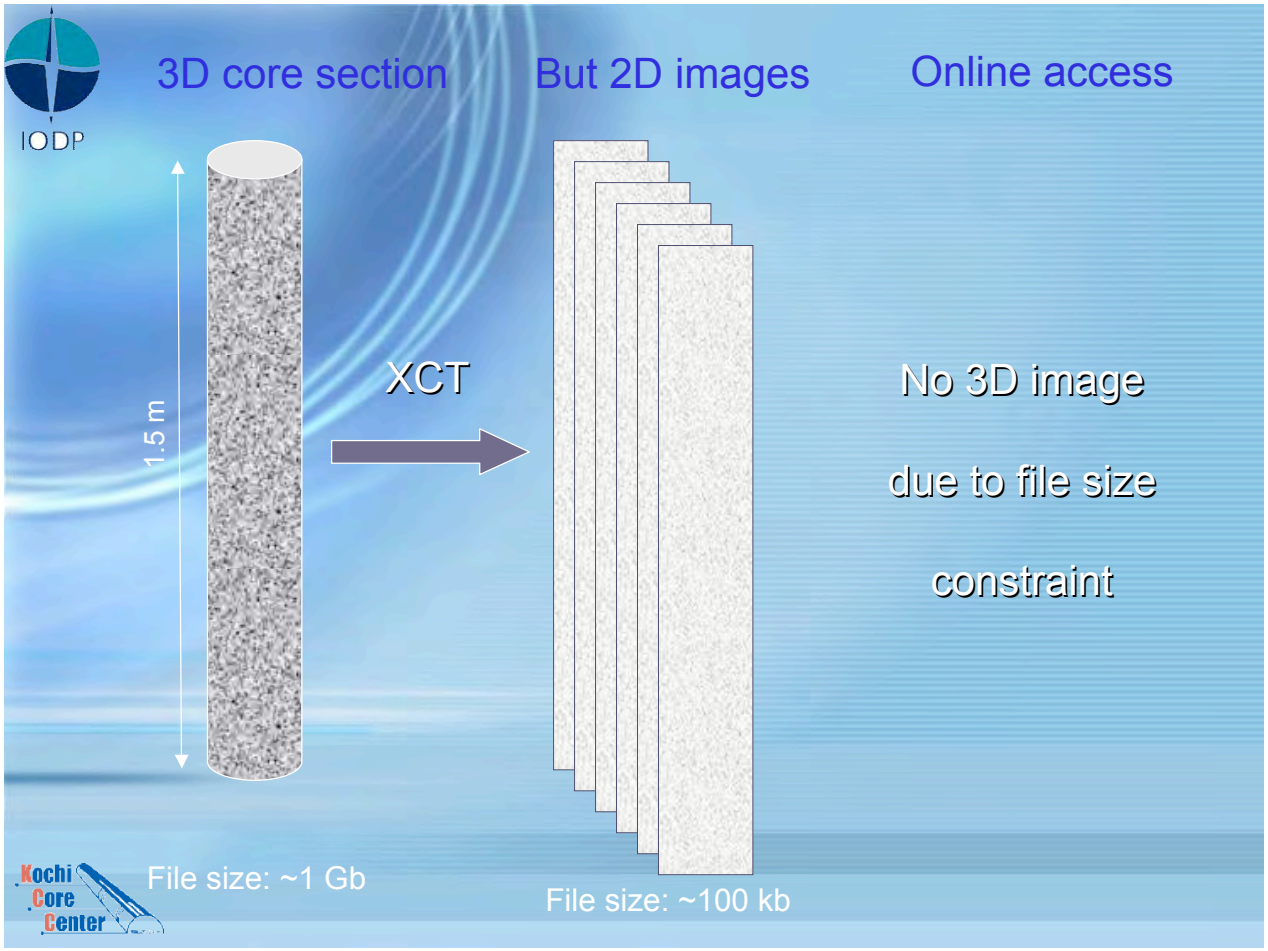
Unconformity

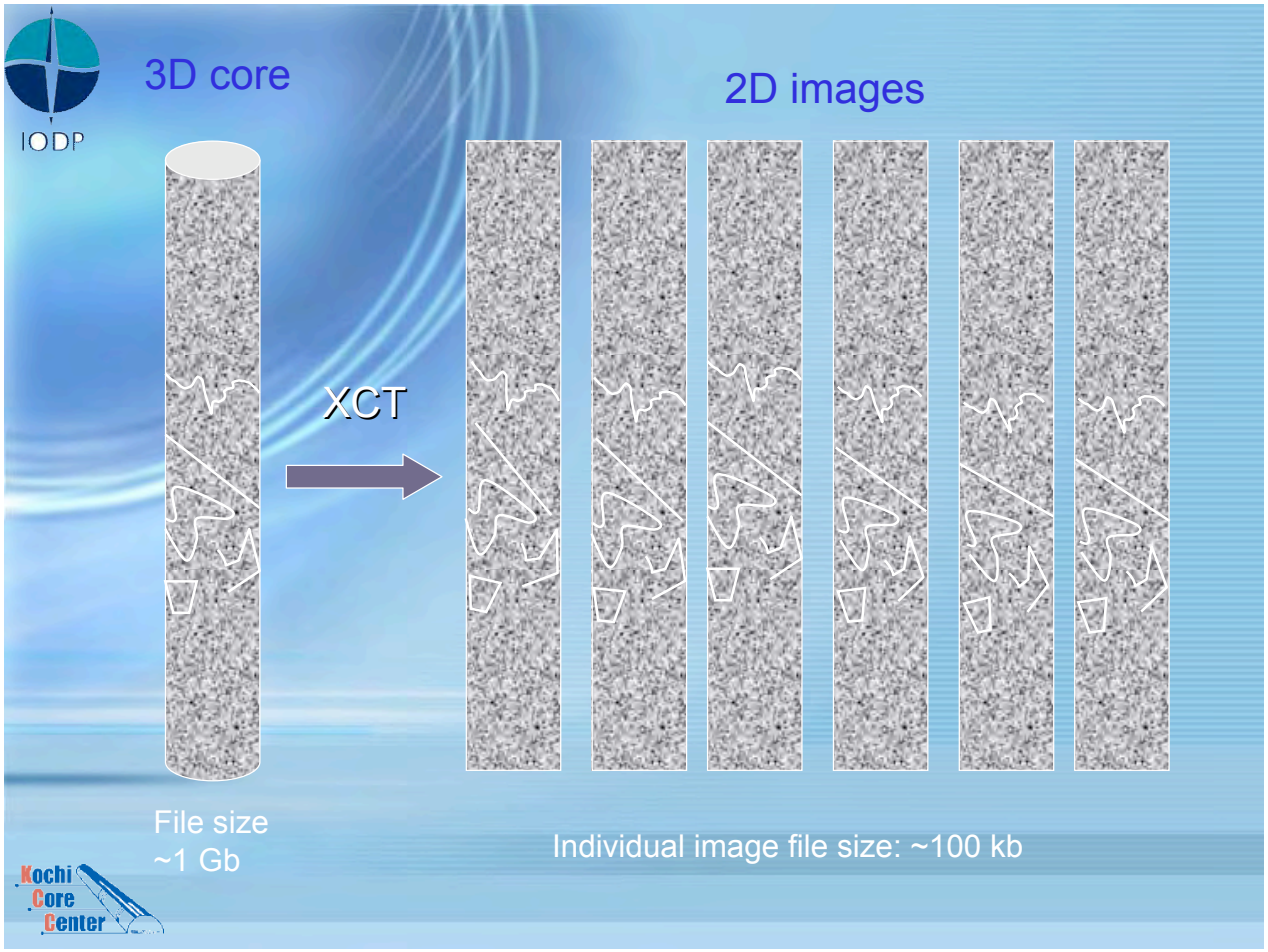


Real core

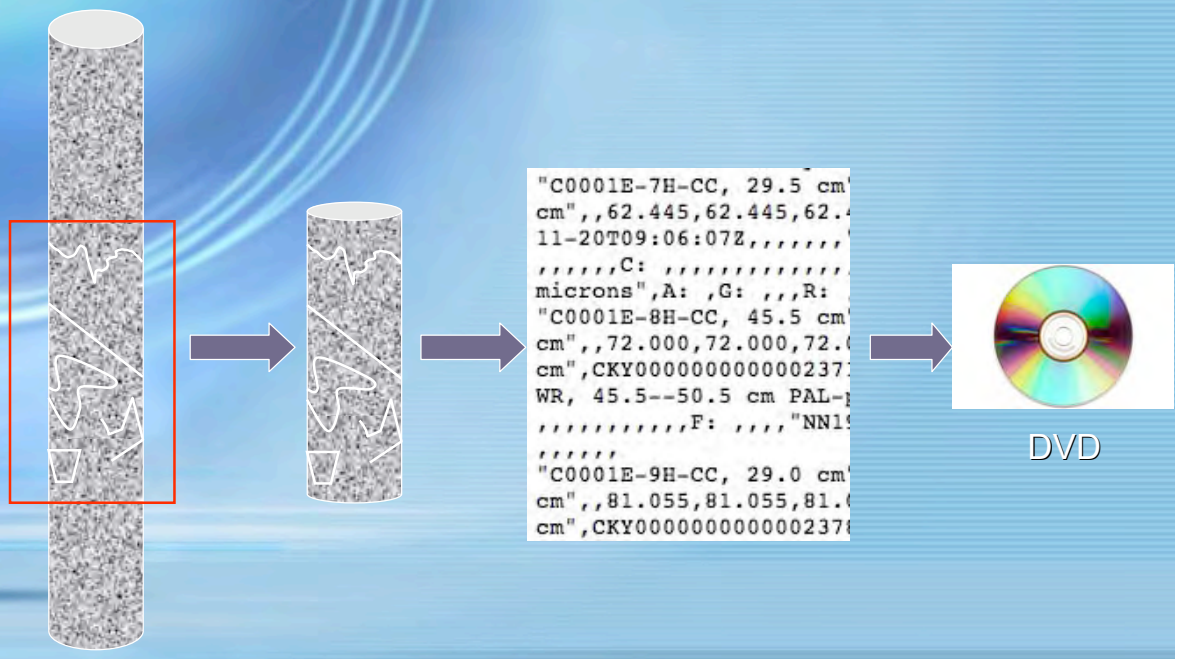
XCT scan

Kochi Core Center


IODP
3D core section
But 2D images
Online access
1.5 m
XCT
No 3D image
due to file size
constraint
Kochi Core Center
File size: ~1 Gb
File size: ~100 kb


IODP
3D core
2D images
XCT
File size
~1 Gb
Individual image file size: ~100 kb
Kochi Core Center

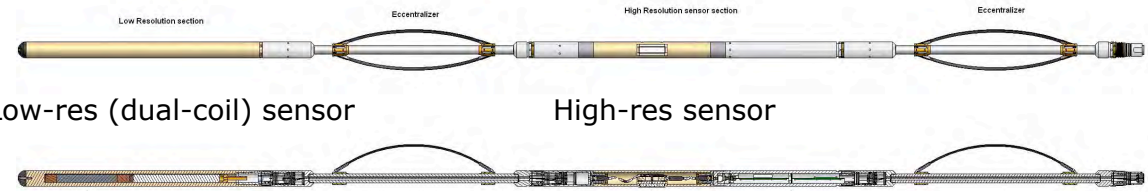
Data extraction from 3D core image



Why @ KCC ?

- Original data at MEDID
- Sample/data requests @ KCC
- Infrastructure to ship sample @ KCC
- Large data file on portable media
- For future reference

MSS - Magnetic Susceptibility Sonde



Low-res (dual-coil) sensor High-res sensor

Magnetic Susceptibility Sonde (MSS) STP Presentation - Feb 18 2008

Project summary (project was NSF-funded)

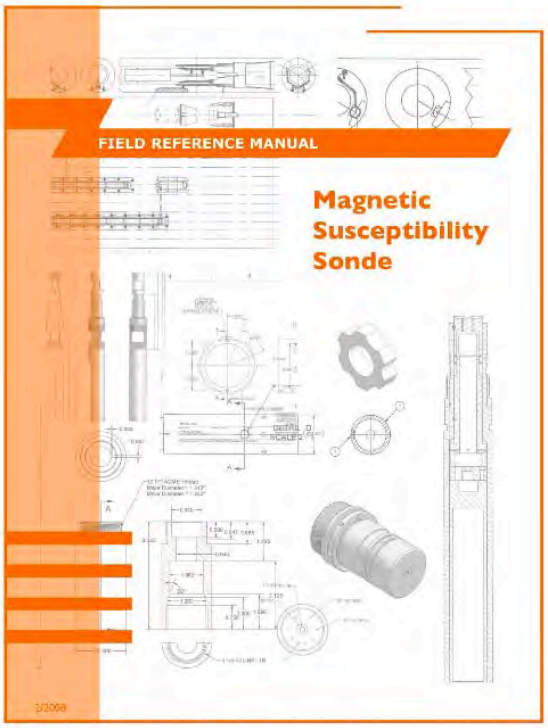
Year 1: Design of a two-sensor tool with ±1 x 10^{-5} SI accuracy:
- High resolution (~10cm) sensor by Bartington Instruments Ltd (UK)
- Low resolution (~40cm) sensor from U. Munich / Geophysical Institute of Göttingen (ODP Legs 109 and 197).

Year 2: Electronics and sensor design and development

Year 3: Construction, bench testing, installation of sensors in housing.

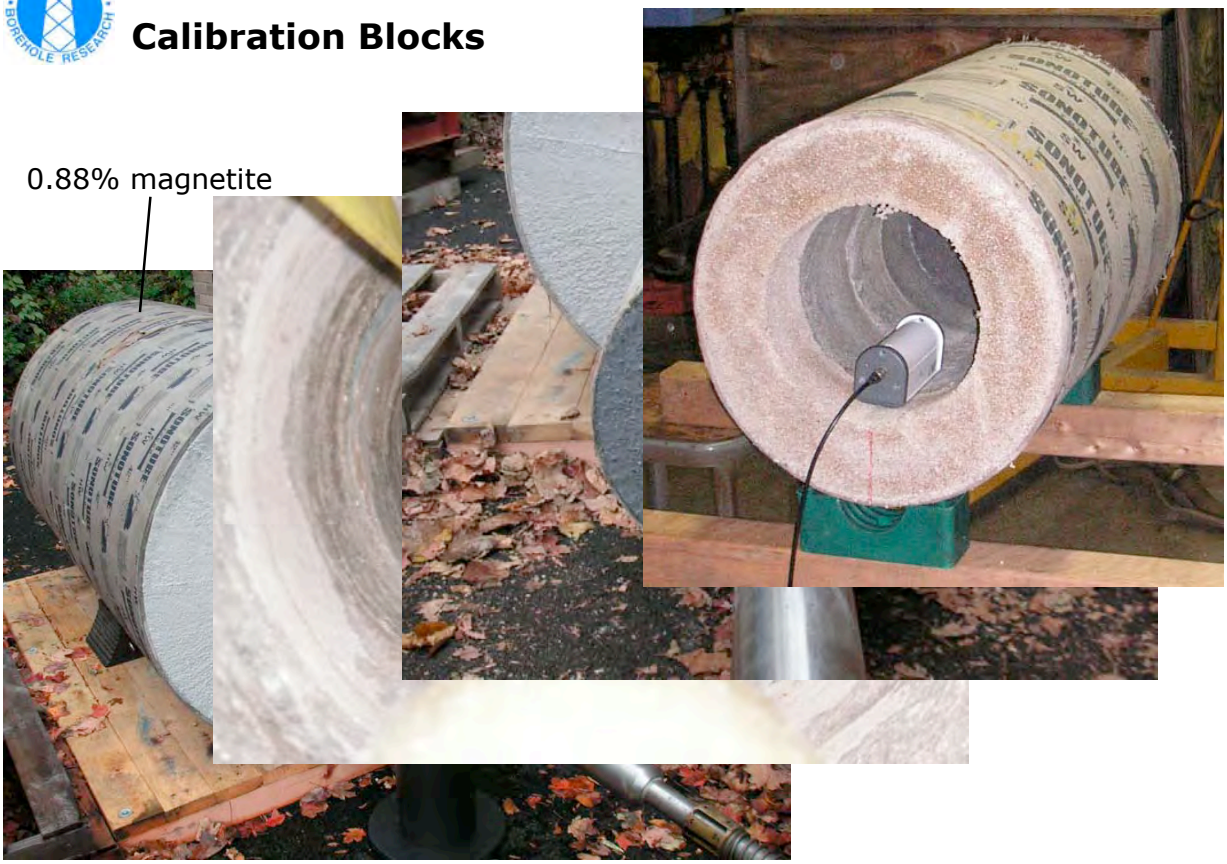
Calibration and first deployment at the Lamont test well.

Field Reference Manual

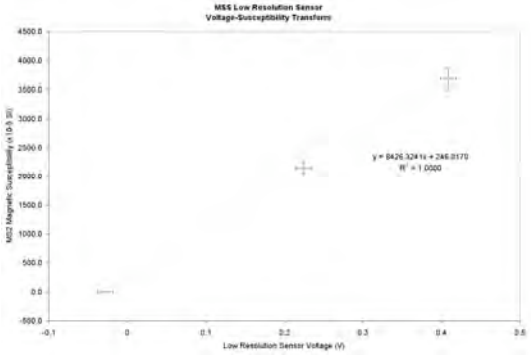


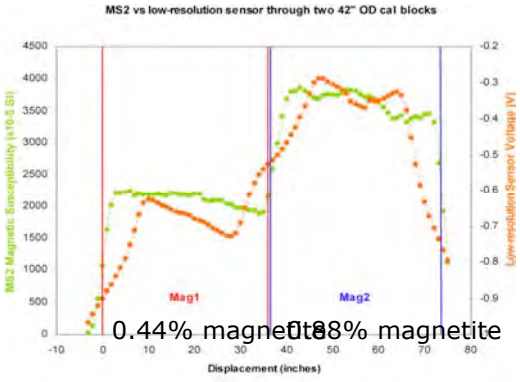
Magnetic Susceptibility Sonde (MSS) STP Presentation - Feb 18 2008

Calibration Blocks

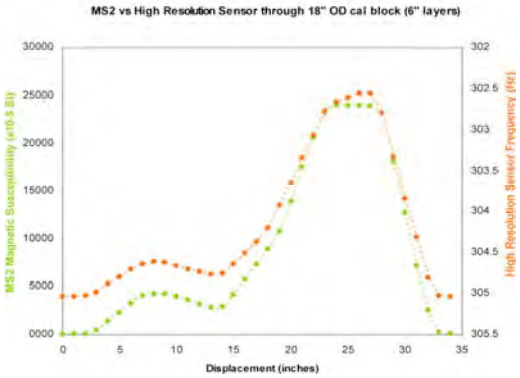


Calibration results 1: Low resolution (dual-coil) sensor





0.44% magnetite 0.88% magnetite



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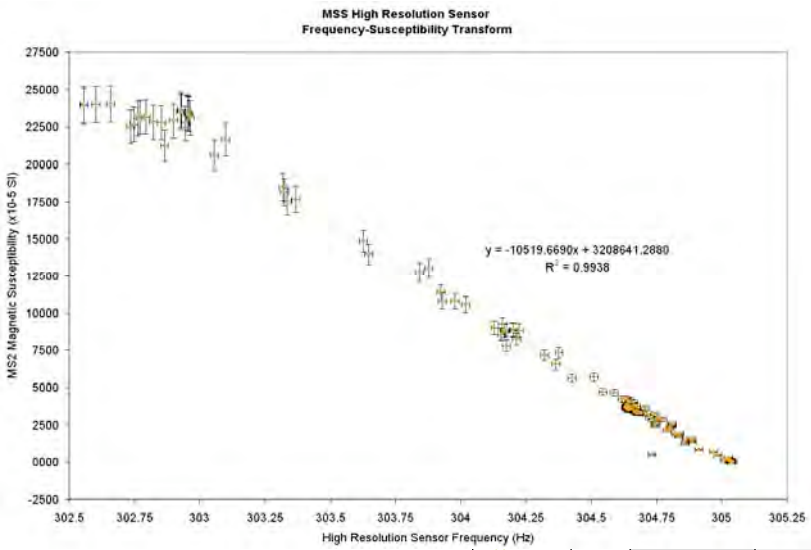
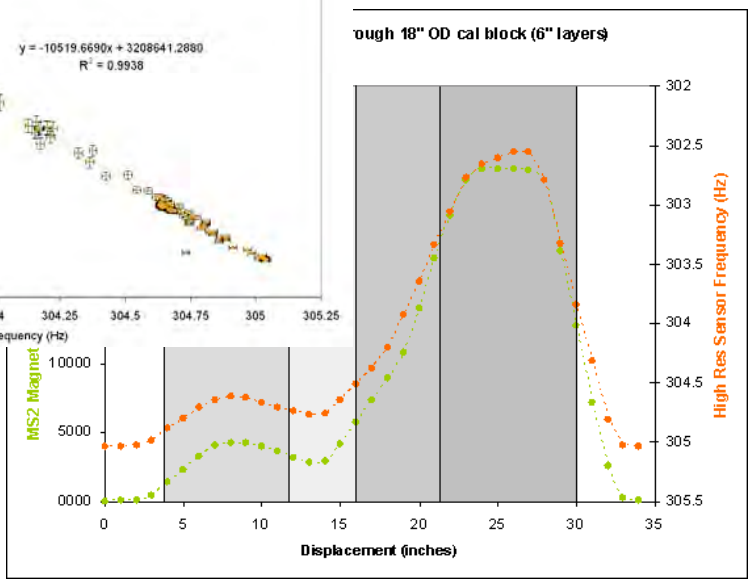
Calibration results 2: High resolution sensor





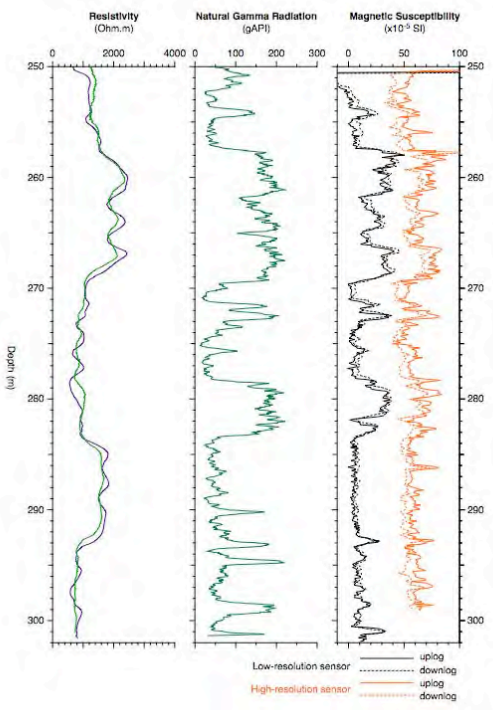
Lamont test well results 1

High susceptibility dolerite sill overlying Triassic siliciclastics

Magnetic Susceptibility Sonde (MSS) STP Presentation - Feb 18 2008

Lamont test well results 2

Triassic siliciclastics under the sill, 250-300m depth



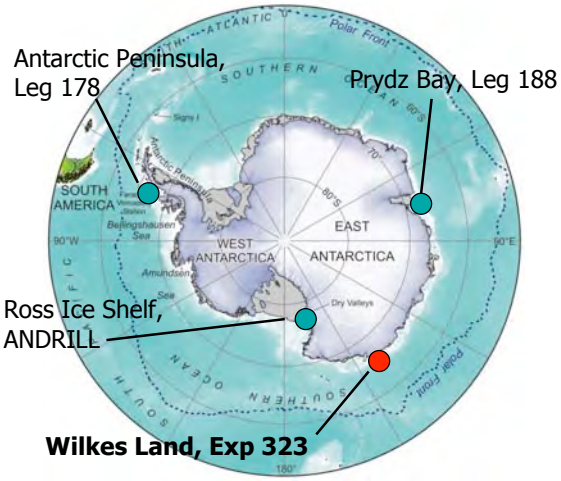
Proposed Deployment Plan

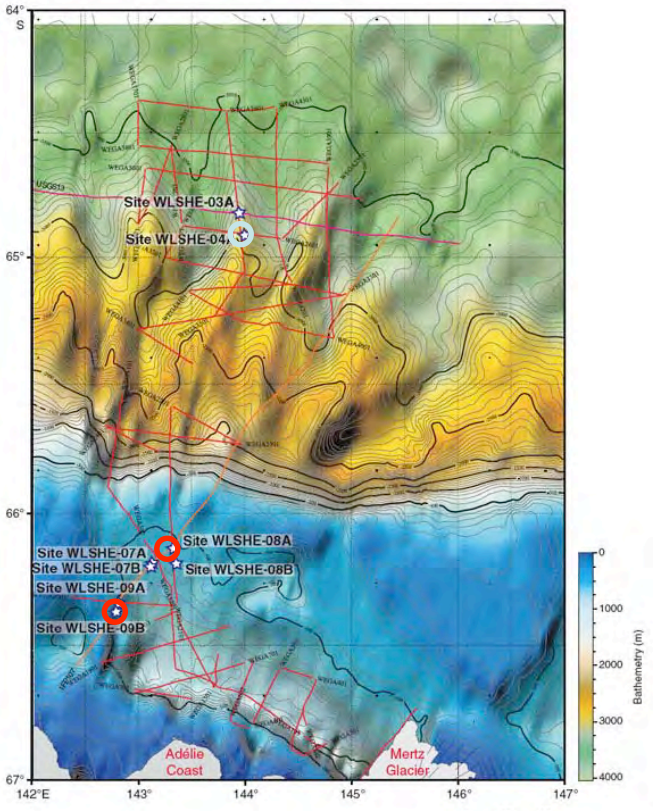
1. Lamont Test Well, Nov 2007 - Feb 2008
2. JOIDES Resolution shakedown cruise, W. Pacific (DSDP Site 62?)
3. IODP Exp. 323, Wilkes Land, Antarctica, Jan-March 2009

Magnetic Susceptibility Sonde (MSS) STP Presentation - Feb 18 2008

IODP Expedition 323, Wilkes Land, Target sites for MSS deployment

WLSHE 9B, 525m water depth
WLSHE 8A, 525m water depth
(secondary: WLRIS 4A, 3075m)

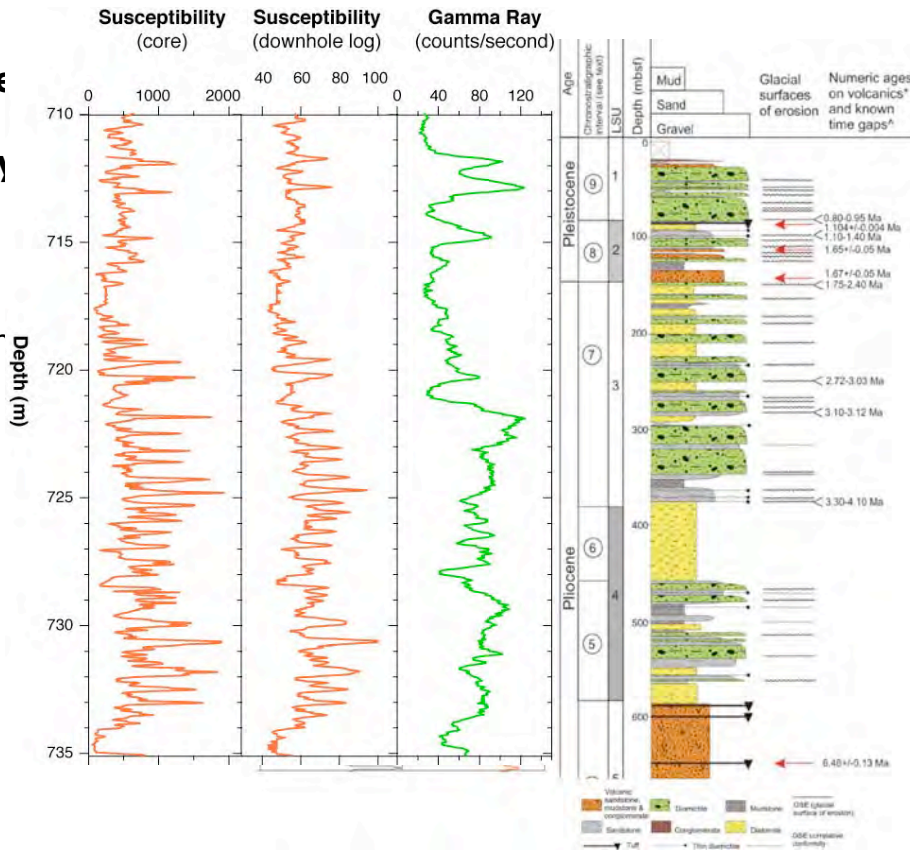




(draft figure from Exp 323 Prospectus by de Santis, Escutia)

High-latitude magnetic susceptibility

Example from ANDRILL McMurdo Ice Sh



Magnetic Susceptibility Sonde (MSS) STP Presentation - Feb 18 2008

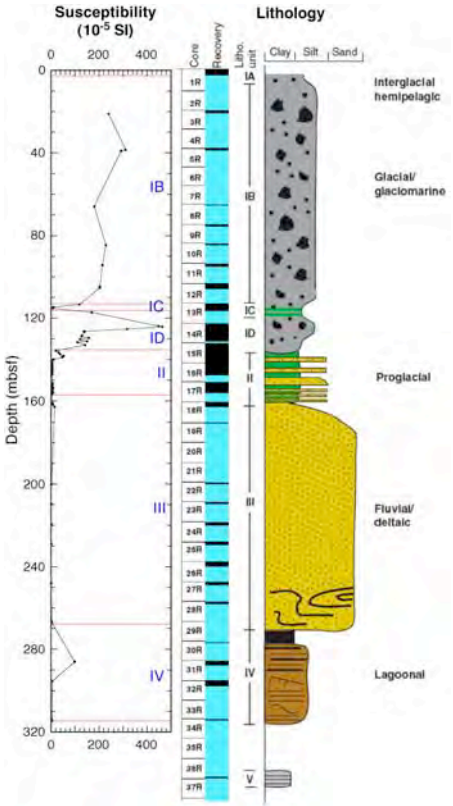
High-latitude magnetic susceptibility 2

Example from ODP Leg 188, Site 1166, Prydz Bay Shelf

Hole 1166A recovery: 18.7%

Antarctic Peninsula shelf sites:

Hole 1103A recovery: 12.3%
Hole 1097A recovery: 13.6%

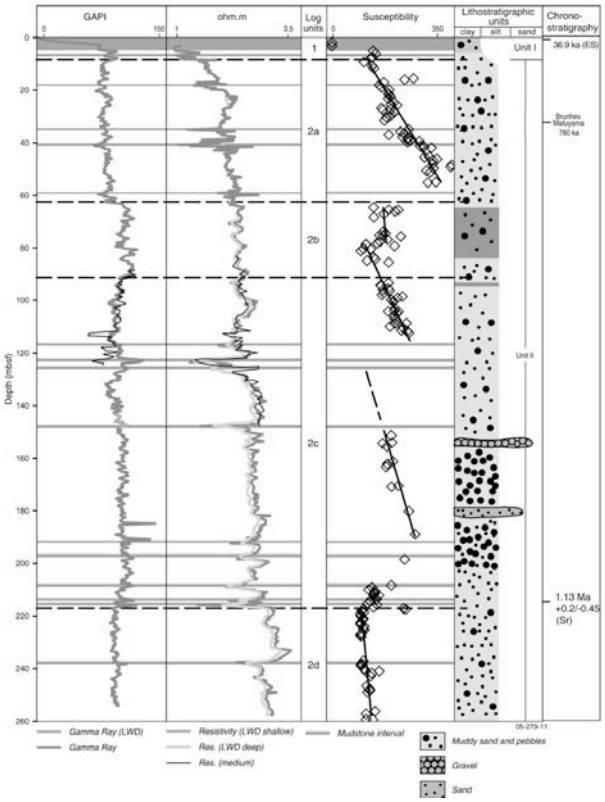


High-latitude magnetic susceptibility 3

Example from ODP Leg 188,
Site 1167,
Prydz Bay Trough-mouth fan

Hole 1167A recovery: 42.8%

If over-deepening was the predominant process controlling sediment composition, the trend in detrital composition would be a single reduction in sedimentary detritus that marked the maximum depth of erosion possible in the graben. The presence of an earlier phase of basement-dominated sedimentation implies



Time requirements

Primary:
Sites WLSHE-9B and 8A: 525m water depth, 220m TD, 2 passes:
4 hours per site: 2.5 hours deployment, 1.5 hours rig-up/rig-down

Secondary:
Site WLRIS-4A: 3075m water depth, 1000m TD:
12 hours.

Planned enhancements

- 4 measurements/second (presently 1/second)
- extended pressure (depth) capability to 10 kPSI
- integration of the MSS with Schlumberger telemetry software

Processing/analysis

- comparisons
  - between dual-coil and high-resolution sensors,
  - between repeat passes,
  - with core susceptibility (during expedition)
- speed correction
- evaluation of borehole width correction
- deconvolution of the input signal

Data availability

The processed and original data will be available on the IODP-USIO log database, subject to the expedition moratorium.

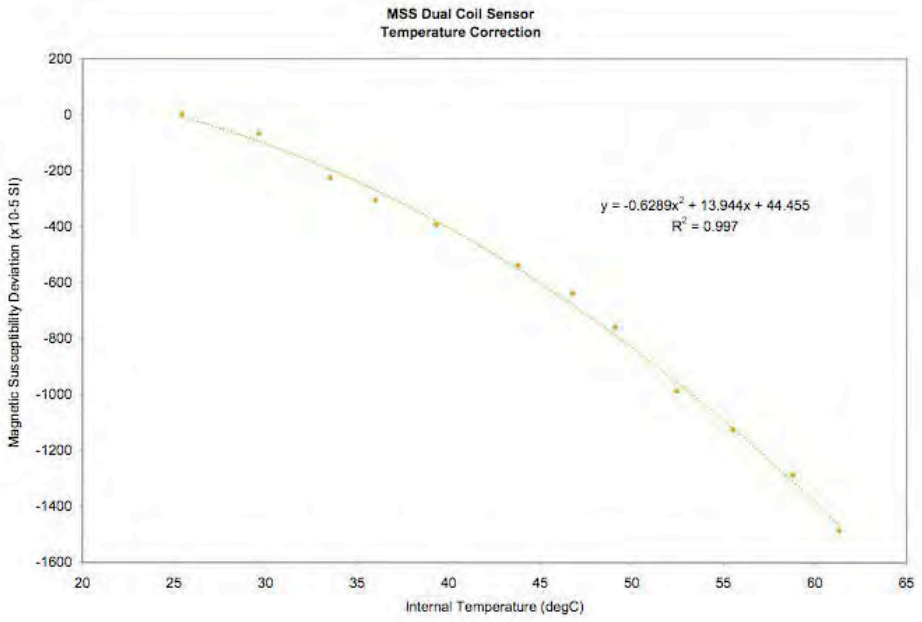
Magnetic Susceptibility Sonde (MSS) STP Presentation - Feb 18 2008

Thank you for your attention!

Extra slides

Magnetic Susceptibility Sonde (MSS) STP Presentation - Feb 18 2008

Temperature correction

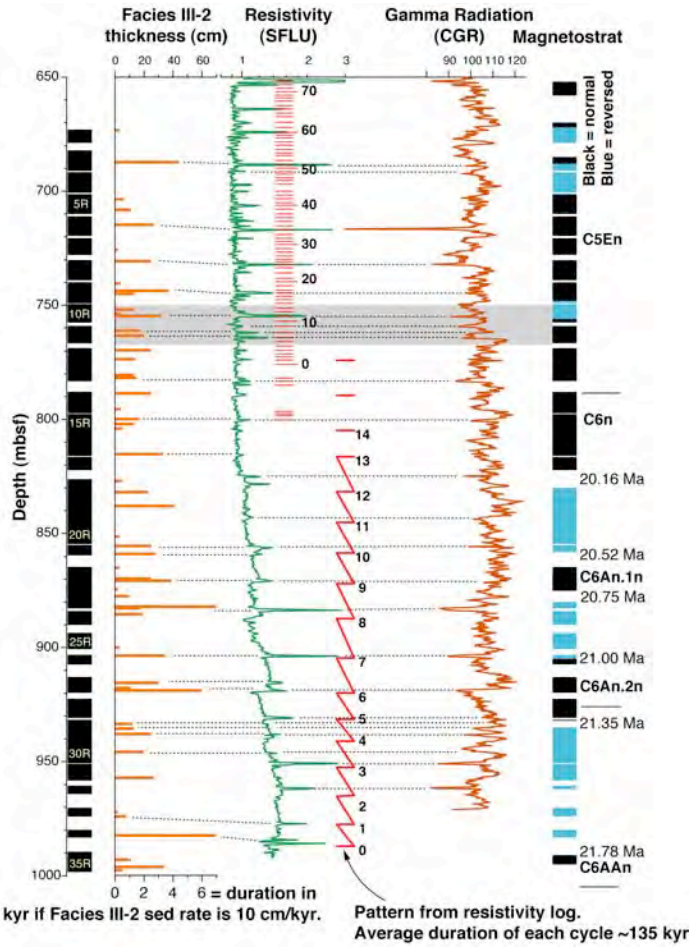


Test block with handheld sensor

Magnetic Susceptibility Sonde (MSS) STP Presentation - Feb 18 2008

Team in logging cab

Site 1165 - continental rise offshore of Prydz Bay



STP Consensus Statements 0802-18:
Noritoshi Suzuki

- *The STP would like to thank our host Noritoshi Suzuki for his outstanding hospitality as host of this meeting. We are grateful for his detailed presentations on shopping, transportation, and MRC. We appreciated his enthusiastic leadership. We will always remember the Radiolarian on a Stick, and suggest that in future meetings the host consider making their own stuffed representatives of their research interests. We especially appreciate his commitment to our safety, and his assurance that, should we survive, he'd happily lead us out of the building following an earthquake.*

- We appreciate the effort put in to the construction of the pink radiolarian to ensure the success of the STP fieldtrip

STP Consensus Statements 0802-xx: *Noritoshi Suzuki leaving panel*

- *STP would like to thank Noritoshi Suzuki for his contribution to the panel. As the only known person who truly understands the MRC concept, we will miss his contributions to micropaleontology- related issues. We regret that he was not able to secure funding for MRCs, but submit that in memory of his hard work for the past 3 years, we will actually discuss future proposals that mention the MRCs, rather than simply receiving them.*

- We understand that the rigors of hosting a meeting are nothing compared to the perils of climbing the Great Wall of China