

IODP Science Planning Committee**14th Meeting, 25–27 August 2009****IFM-GEOMAR/Kiel University, Kiel, Germany*****Science Planning Committee (SPC)***

Jan Behrmann	Leibniz Institute for Marine Sciences, IFM-GEOMAR, Germany
Donna Blackman	Scripps Institution of Oceanography, USA
Gilbert Camoin*	CEREGE, Centre National de la Recherche Scientifique, France
David Feary	National Academy of Sciences, USA
Gabe Filippelli (vice chair)	Department of Earth Sciences, Indiana University-Purdue University Indianapolis, USA
Gretchen Früh-Green	Institute for Mineralogy and Petrology, ETH Zurich, Switzerland
Hugh Jenkyns	Department of Earth Sciences, University of Oxford, United Kingdom
Takeshi Kakegawa	Department of Earth and Space Material Sciences, Tohoku University, Japan
Junzo Kasahara	Tokyo University of Marine Science and Technology, Japan
Yong-Il Lee (non-voting)	School of Earth and Environmental Sciences, Seoul National University, Korea
Qianyu Li* (non-voting)	Laboratory of Marine Geology, Tongji University, China
Chun-Feng Li ^a	School of Ocean and Earth Sciences, Tongji University, China
James Mori (Chair)	Disaster Prevention Research Institute, Kyoto University, Japan
Naohiko Ohkouchi	Institute for Frontier Research on Earth Evolution (IFREE), JAMSTEC, Japan
Larry Peterson	Rosenstiel School of Marine and Atmospheric Science, University of Miami, USA
Carolyn Ruppel	United States Geological Survey, Woods Hole, USA
Hiroaki Sato ^b	Department of Earth and Planetary Sciences, Kobe University, Japan
Elizabeth Screaton ^c	Department of Geological Sciences, University of Florida, USA
Rüdiger Stein (non-voting)	Alfred-Wegener-Institute for Polar and Marine Research, Germany
Akira Takada	Institute of Geology and Geoinformation, Geological Survey of Japan, AIST, Japan
Tomochika Tokunaga*	Department of Environment Systems, University of Tokyo, Japan
Ben van der Pluijm	Department of Geological Sciences, University of Michigan, USA
Jody Webster	School of Geosciences, The University of Sydney, Australia
Toshitsugu Yamazaki ^d	Institute of Geology and Geoinformation, Geological Survey of Japan, AIST, Japan

^aAlternate for Qianyu Li^bAlternate for to-be-determined new Japanese member^cAlternate for to-be-determined new U.S. member^dAlternate for Tomochika Tokunaga

*Unable to attend

Liaisons, Guests, and Observers

Jamie Allan	National Science Foundation (NSF), USA
Dae Kyo Cheong	Kangwon National University, Korea
David Divins	Consortium for Ocean Leadership, USA
Dan Evans	ECORD Science Operator (ESO), British Geological Survey, UK
Neville Exon	Australia-New Zealand IODP Consortium (ANZIC), Australia
Jun Fukutomi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Barry Katz (EPSP)	Chevron Corporation, USA
Hiroshi Kawamura	IODP Management International, Inc., Sapporo Office, Japan
Shin'ichi Kuramoto	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Siegfried Lallemand (NanTroSEIZE)	University of Cergy-Pontoise, France
Hans Christian Larsen	IODP Management International, Inc., Sapporo Office, Japan
Alberto Malinverno	Borehole Research Group, Lamont-Doherty Earth Observatory, USA
Mitch Malone	Integrated Ocean Drilling Program, Texas A&M University, USA
Catherine Mével	ECORD Managing Agency (EMA), Paris Geophysical Institute (IPGP), France
Greg Myers	IODP Management International, Inc., Washington, D.C. Office, USA
Takashi Nakagawa	Ministry of Education, Culture, Sports, Science, and Technology (MEXT), Japan
Clive Neal (STP)	Department of Civil Engineering and Geological Sciences, University of Notre Dame, USA
Heiko Pälike (SSEP)	National Oceanography Centre, Southampton, University of Southampton, UK
Jin-Oh Park (SSP)	Ocean Research Institute, University of Tokyo, Japan

14th SPC (25–27 August 2009) Meeting

Jeff Schuffert United States Science Support Program (USSSP), The Consortium for Ocean
Leadership, USA
Harold Tobin (NanTroSEIZE) Department of Geology and Geophysics, University of Wisconsin-Madison, USA
Barry Zelt IODP Management International, Inc., Sapporo Office, Japan

IODP Science Planning Committee

14th Meeting, 25–27 August 2009

IFM-GEOMAR/Kiel University, Kiel, Germany

DRAFT EXECUTIVE SUMMARY (v1.2)

1. Introduction

1.3. Approve SPC meeting agenda – highlight action items

SPC Consensus 0908-02: The SPC approves the revised agenda of its fourteenth meeting on 25–27 August 2009 in Kiel, Germany.

1.4. Approve last SPC meeting minutes

SPC Consensus 0908-03: The SPC approves the minutes of its thirteenth meeting on 16–19 March 2009 in Miami, USA.

1.5. Items approved since the March 2009 meeting

SPC Motion 0908-01: SPC understands the validity of the proponents' strategy outlined in 742-APL to obtain a more complete paleomagnetic history for this site. However, we have major concerns about the loss of three days from the main Shatsky Rise expedition and the effect that this would have on the expected science results from the planned operations. The allocated drilling time for this leg is already limited due to the relatively long transit to the next port call. Therefore, SPC does not recommend 742-APL for scheduling at this time.

Mori moved; Behrmann seconded; 13 in favor (Behrmann, Blackman, Camoin, Feary, Filippelli, Jenkyns, Mori, Ohkouchi, Peterson, Screaton, Tokunaga, van der Pluijm, Yamazaki); 1 abstained (Kasahara); 3 did not vote (Kakegawa, Ruppel, Takada); 4 non-voting (Früh-Green, Lee, Li, Webster).

4. IODP Management International, Inc. (IODP-MI) report

4.2. FY2011/2012 engineering development

4.2.2 SPC discussion and prioritization

SPC Consensus 0908-04: The SPC approves the engineering development plan for FY2011. The SPC also endorses expanding the definition of IODP-related engineering developments to include those with external funding and those developed outside the IODP framework.

7. Science Advisory Structure (SAS) panel reports

7.1. Science Steering and Evaluation Panel (SSEP) report

SPC Consensus 0908-05: The SPC appoints Hendrik Brinkhuis as co-chair of the Science Steering and Evaluation Panel (SSEP), effective immediately.

7.4. Scientific Technology Panel (STP) report

SPC Consensus 0908-06: The SPC receives STP Consensus 0908-05 on expedition measurement plans and Consensus 0908-06 on platform time for non-expedition specific purposes.

SPC Consensus 0908-07: The SPC accepts STP Recommendation 0908-09 on routine microbiological sampling on IODP expeditions, with the understanding that primary expedition objectives receive top priority.

7.5. Engineering Development Panel (EDP) report

SPC Consensus 0908-08: The SPC receives EDP Consensus 0907-07 on field testing of the riserless mud recovery system, 0907-11 on the EDP roadmap, 0907-13 on integrating engineering development, and 0907-14 on the at-sea engineering testing policy.

SPC Consensus 0908-09: The SPC receives EDP Consensus 0907-12 regarding two vice-chair leadership for the EDP. The SPC directs the EDP to nominate one vice-chair according to the panel's terms of reference.

SPC Consensus 0908-10: The SPC accepts EDP Consensus 0907-15 on the current support of EDP by IODP-MI and forwards it to IODP-MI. The SPC acknowledges the valuable role that IODP-MI provided to EDP, and wishes to see a good continuity of this function during and after the relocation of offices.

8. Report on International Working Group *Plus* (IWG+)

SPC Consensus 0908-11: The SPC receives the IWG+ guidance for INVEST and endorses all elements of the guiding principles. The SPC recommends that discussions of post-2013 scientific ocean drilling incorporate: (1) more seamless integration with other major geoscience programs (e.g., ocean observatories, ICDP, ANDRILL), as appropriate; (2) further recognition of the importance of onshore to offshore transects for some types of scientific studies; and (3) substantial flexibility in program and expedition planning and formulation.

10. “Flexible Expedition Implementation” Working Group report

SPC Consensus 0908-12: The SPC commends the efforts of the “Flexible Expedition Implementation” Working Group (Filippelli, Ohkouchi, Peterson) to explore schemes at the proposal level and SPC level that would ensure achievement of top science objectives while allowing maximum implementation flexibility.

The SPC endorses the guidelines outlined in the working group report and acknowledges the need to be more pro-active in maximizing scientific outcomes for the program while retaining the primary objectives of proposals. The SPC will consider evaluating, on a case by case basis, possibilities for combining expedition objectives and/or staffing and crew, and/or for implementing flexibility in the length of expeditions.

To aid in future scheduling considerations, the SPC asks IODP-MI to contact proponents of proposals currently residing at SPC and at OTF (but not scheduled) to prioritize their scientific objectives in light of potentially reduced implementation and operational times.

11. OTF Report: IODP expedition scheduling II

11.2. SPC discussion and approval

SPC Consensus 0908-13: The SPC approves the following five-month operational plan and contingencies for *Chikyu*, with starting date in FY2011 to be determined.

Case 1 (top priority): (1) Site NT2-01 (observatory); (2) Site NT3-01 (riser drilling); and (3) Site NT3-01 (riserless observatory).

Case 2 (second priority): riser drilling at Site NT3-01.

Case 3 (third priority if the Kuroshio current is determined to be too strong for riser drilling): (1) Site NT2-01 (observatory); (2) Site NT3-01 (riserless observatory); (3) NT3-01 (non-riser drilling of riser top hole); and (4) Okinawa Trough Deep Biosphere (Proposal 601-Full3).

If extreme Kuroshio currents prohibit Case 3, Case 4a and Case 4b are to be considered (more information needs to be provided by CDEX to determine the priority ranking between cases 4a and 4b):

Case 4a: (1) Site NT2-01 (observatory); (2) Site NT3-01 (riserless observatory); and (3) Okinawa Trough Deep Biosphere (Proposal 601-Full3).

Case 4b: (1) Site NT2-01 (observatory); (2) Site NT3-01 (riserless observatory); and (3) Mariana Convergent Margin (Proposal 505-Full5).

Month	1				2				3				4				5			
Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Case 1	NT2-01				NT3-01 Riser								NT3-01RL Observatory							
	Observatory				36" Conductor + 20" + 16" CSG, TD=2100mbs								LWD=1000m, CSG, Observatory							
Case 2	NT3-01 Riser 36" Conductor + 20" + 16" + 13-3/8" CSG, TD=3300mbs (depend on coring, wireline, etc.)																			
Case 3	NT2-01				NT3-01RL Observatory				NT3-01 Riser Top Hole				Port Call	601 Okinawa						
	Observatory				LWD=1000m, CSG, Observatory				36" Conductor + 20" CSG					High priority sites only						
Case 4a	NT2-01				NT3-01RL Observatory				Port Call	601 Okinawa (4~5week opr * 2times) All sites proposed except 9A&10A (Reference sites/lower priority)										
Observatory				LWD=1000m, CSG, Observatory																
Case 4b	NT2-01				NT3-01RL Observatory				Port Call	505 Mariana Convergent Margin (Possible conflict with Chikyu's IODP window)										
	Observatory				LWD=1000m, CSG, Observatory					Riserless, CSG & CORK										

SPC Motion 0908-14: Of the two options presented for prioritizing the Superfast Spreading Crust (Proposal 552-Full5) + Costa Rica Seismogenesis Project (CRISP) Phase A (Proposal 537A-Full5) slot in the FY2011 *JOIDES Resolution* schedule (see below), the SPC prefers option 2.

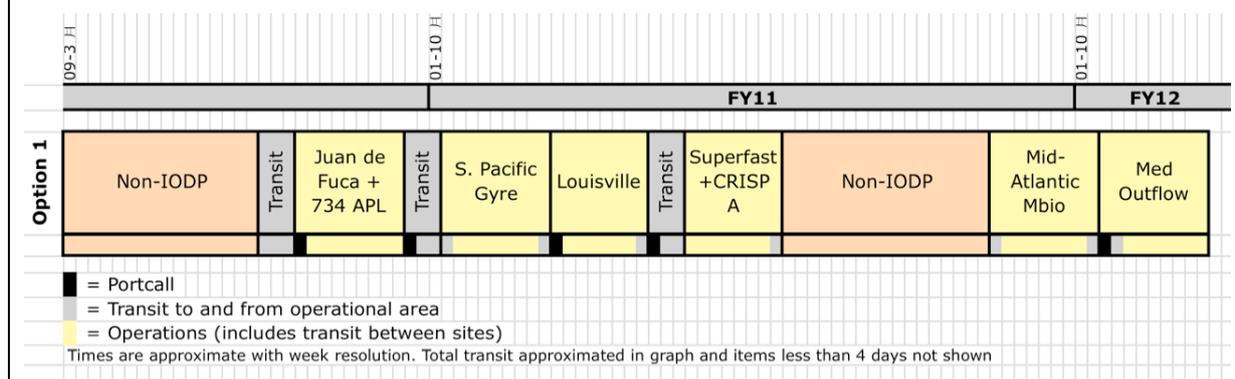
- (1) Deep objective of Superfast is the prime objective; if the existing hole is not suitable, CRISP A will be the contingency.
- (2) Superfast and CRISP A are both objectives. If conditions at Superfast warrant, a decision tree will decide whether an increased proportion of time would be spent at Superfast, or a decreased proportion of time.

Peterson moved; Jenkyns seconded; 13 in favor (Behrmann, Blackman, Feary, Filippelli, Jenkyns, Kakegawa, Kasahara, Mori, Ohkouchi, Peterson, Sato, Takada, van der Pluijm; 1 opposed (Früh-Green); 4 non-voting (Lee, Li, Stein, Webster); 2 absent (Screaton, Yamazaki)

SPC Consensus 0908-15: The SPC approves the following *JOIDES Resolution* schedule for late FY2010 and FY2011: (1) Juan de Fuca Flank Hydrogeology (Proposal 545-Full3) and Cascadia Accretionary Prism CORK (Proposal 734-APL); (2) South Pacific Gyre Microbiology (Proposal 662-Full3); (3) Louisville Seamounts (Proposal 636-Full3); (4) Superfast Spreading Crust (Proposal 552-Full5) + Costa Rica Seismogenesis Project (CRISP) Phase A (Proposal 537A-Full5); and (5) Mid-Atlantic Ridge Microbiology (Proposal 677-Full).

The SPC asks the Operations Task Force (OTF) to use the guidelines of the Flexible Implementation Working Group report to develop a plan that optimizes the allocation of

operational days to these expeditions. Scheduling of the Mediterranean Outflow (Proposal 644-Full2) expedition is tentatively set for early FY2012 but needs to be confirmed later.



SPC Consensus 0908-16: The decision tree for the Superfast Spreading Crust (Proposal 552-Full5) + Costa Rica Seismogenesis Project (CRISP) Phase A (Proposal 537A-Full5) slot in the FY2011 *JOIDES Resolution* schedule would involve several steps, guided by the following basic premises:

- (1) Superfast would be implemented first, with the only objective being the deep hole;
- (2) CRISP A would have a guaranteed operational window (~50% of the operational days).

If hole conditions at Superfast preclude significant advancement of objectives, operations will cease at Superfast and begin immediately at CRISP A objectives.

If site conditions are adequate and Superfast can commence, operations will continue at Superfast, and stop without debate at a time such that ~50% of the operational days can occur at CRISP A.

13. Expedition Reviews: NanTroSEIZE Stage 1

SPC Consensus 0908-17: The SPC appreciates the post-expedition reports from Expeditions 314, 315, and 316 (collectively, Phase 1 of the NanTroSEIZE effort), and commends the NanTroSEIZE participants, co-chief scientists, the project management team (PMT), and CDEX for their success at truly integrating efforts across expeditions and for rapid dissemination of high quality publications resulting from these efforts.

18. Approval of new Engineering Development Panel (EDP) chair

SPC Consensus 0908-18: The SPC appoints Bill Ussler as chair of the Engineering Development Panel (EDP), effective immediately.

19. Nomination of SPC members on Operations Task Force (OTF)

21. Other business

SPC Consensus 0908-19: The SPC nominates Junzo Kasahara, Gretchen Früh-Green and (after her expected appointment to the SPC on 1 October 2009) Barbara John as new members of the IODP-MI Operations Task Force (OTF).

SPC Consensus 0908-20: The SPC deactivates the following three ancillary project letters (APLs):

Proposal 712-APL (Sediment-CORK Trial Installation);

Proposal 728-APL2 (Gulf of Papua Coralgall Barrier Reef);

Proposal 742-APL (Shatsky Rise High-Resolution Climate).

SPC Consensus 0908-21: The SPC thanks Tom Janecek for his invaluable service to the IODP since the program's inception and for his strong commitment to scientific drilling throughout his career. Tom's technical and scientific knowledge, keen insights, and thorough understanding of complex issues will be sorely missed by the SPC. The SPC wishes Tom every success in his future endeavors.

23. Review of motions and consensus statements

SPC Consensus 0908-22: The SPC thanks Yong Il Lee for his careful and conscientious service to the IODP program. He was the first Korean representative (Interim Asian Consortium) to the SPC and has set a fine example for future SPC members from Korea. Thank you, Yong Il!

SPC Consensus 0908-23: The SPC is happy to acknowledge Carolyn Ruppel's deep knowledge of the program, and her comprehensive understanding of interactions between U.S. federal agencies and the drilling program that have frequently informed our discussions. Thank you Carolyn, there is no question that we will miss your energy and contributions.

SPC Consensus 0908-24: The SPC gratefully thanks Jan Behrmann for his dedicated service on the SPC, and especially for his careful presentations and impartial assessments of science objectives. His insight, humor, and leadership on issues related to tectonics, hydrogeology and subduction zone processes have been critical in shaping SPC decisions. The SPC also thanks Jan for his valuable contribution as liaison to the OTF and the ICDP.

SPC Consensus 0908-25: The SPC thanks Jim Mori for his great efforts in serving as chair over the last two years. He is recognized for his international outlook which acknowledged the various cultural differences of this panel, as well as trying to accommodate varying opinions to accomplish difficult jobs.

SPC Consensus 0908-26: The SPC thanks Jan Behrmann for organizing this meeting and pre-meeting field trip. He provided gracious hospitality and pride for the city of Kiel.

IODP Science Planning Committee

14th Meeting, 25–27 August 2009

IFM-GEOMAR/Kiel University, Kiel, Germany

DRAFT MINUTES (v1.1)

Tuesday	25 August 2009	08:00-17:00
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1. Introduction

1.1. Call to order and introductions

SPC chair Jim Mori called the meeting to order at 08:30. All meeting participants introduced themselves. Stein stated that he was the non-voting European Consortium for Ocean Research Drilling (ECORD) member for this meeting.

1.2. Welcome and meeting logistics

Local host Jan Behrmann welcomed the meeting participants to Kiel and outlined the logistics for the meeting.

1.3. Approve meeting agenda – highlight action items

Jim Mori listed some of the major agenda items for the meeting: (1) approval of the late FY2010 through FY2011 operational schedules; (2) discussion on long-range planning; (3) discussion of flexible expedition implementation; and (4) scientific assessments of the Stage 1 NanTroSEIZE expeditions (Expeditions 314, 315 and 316). Mori asked if there were suggestions for changes to the agenda. Ruppel announced that the U.S. delegation proposes a thirty minute executive session to discuss long-term issues related to scheduling. Mori suggested inserting this on the second day after lunch. Mori also noted that the SPC needs to designate new members for the Operations Task Force (OTF). He suggested doing that after agenda item 19 on the final day of the meeting.

SPC Consensus 0908-02: The SPC approves the revised agenda of its fourteenth meeting on 25–27 August 2009 in Kiel, Germany.
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1.4. Approve last SPC meeting minutes

Jim Mori asked for comments or suggestions for changes to the draft minutes for the thirteenth SPC meeting (March 2009, Miami, USA). With no comments the committee approved the minutes by consensus.

SPC Consensus 0908-03: The SPC approves the minutes of its thirteenth meeting on 16–19 March 2009 in Miami, USA.

1.5. Items approved since March 2009 SPC meeting

Jim Mori noted that since its previous meeting the SPC decided to not recommend the scheduling of Proposal 742-APL (Shatsky Rise High-Resolution Climate) as a part of Expedition 324 (Shatsky Rise).

SPC Motion 0908-01: SPC understands the validity of the proponents' strategy outlined in 742-APL to obtain a more complete paleomagnetic history for this site. However, we have major concerns about the loss of three days from the main Shatsky Rise expedition and the effect that this would have on the expected science results from the planned operations. The allocated drilling time for this leg is already limited due to the relatively long transit to the next port call. Therefore, SPC does not recommend 742-APL for scheduling at this time.

Mori moved; Behrmann seconded; 13 in favor (Behrmann, Blackman, Camoin, Feary, Filippelli, Jenkyns, Mori, Ohkouchi, Peterson, Screaton, Tokunaga, van der Pluijm, Yamazaki); 1 abstained (Kasahara); 3 did not vote (Kakegawa, Ruppel, Takada); 4 non-voting (Früh-Green, Lee, Li, Webster).

Mori said that the SPC needs to decide what to do with 742-APL: leave it with the SPC or deactivate it. He suggested leaving the ancillary project letter (APL) with the SPC for possible implementation in the future depending on the *JOIDES Resolution's* ship track. Filippelli requested clarification; he wondered if in the past an APL not recommended for scheduling was automatically deactivated. Feary thought this was the case. Filippelli could see no problem with having an APL reside with the SPC. He thought it would provide additional flexibility for future scheduling. He added that the alternative, if the APL was deactivated, was for the proponents to resubmit the APL; he felt this would just create extra, unnecessary work for the proponents when the APL could just as easily remain with the SPC. Ohkouchi suggested the APL should be deactivated because the proponents have not tried to use existing material collected during other expeditions.

Filippelli suggested that, in general, APLs should be allowed to remain with the SPC if not forwarded to the OTF or specifically deactivated. Jenkyns wondered, for the case of 742-APL, what would be lost scientifically by deactivation. Filippelli replied that, in general, flexibility in scheduling was lost. Ruppel preferred to deactivate APLs that are not forwarded to the OTF. She suggested that, in addition to 742-APL, Proposal 728-APL2 (Gulf of Papua Coralgall Barrier Reef) be deactivated. Mori recommended that a small working group recommend a course of action for all APLs residing with the SPC. Feary, Ohkouchi and Stein volunteered. Their recommendations are presented under agendum 20 (other business).

1.6. SPC procedures and protocol

1.6.1. Terms of reference, Robert's Rules, ranking/voting procedures

Jim Mori referred to the SPC terms of reference and noted that an SPC decision requires either a consensus or an affirmative vote of at least two-thirds of all members present and eligible to vote. He also pointed out that a quorum comprises two-thirds of the committee. Mori mentioned that the SPC occasionally uses straw votes, which are unofficial and generally do not appear in the minutes (unless specifically requested by the chairperson). He explained that SPC meetings are conducted according to Robert's Rules of Order, and listed some of the salient points from this set of rules. Mori, noting that English was not the first language for most meeting participants, asked everyone to speak slowly and clearly, and to make their point in as few words as possible.

1.6.2. Conflict-of-interest policy and statements

Jim Mori reviewed the conflict-of-interest procedures for the meeting. He stated that potential conflicts should be declared before the committee discusses scheduling. He deferred declarations until Wednesday (after the Tuesday afternoon OTF meeting) when it would be known which proposals would be discussed.

On Wednesday, Mori asked the meeting participants to declare all potential conflicts, including institutional conflicts, although in the past institutional conflicts have not generally been regarded as real conflicts. The committee members and other meeting participants declared the following direct or potential indirect conflicts of interest regarding potential discussions; the chair's ruling follows each member's declaration(s).

SPC members, liaisons and observers conflict-of-interest declarations:

Name	Declaration	Ruling by Mori*
Blackman	Institutional: 636-Full3 Louisville Seamounts	No conflict
Lallemant	NanTroSEIZE proponent and co-chief	Conflict: 1
Neal	Proponent: 548-Full3 Chicxulub K-T Impact Crater	No conflict
Ohkouchi	Institutional: JAMSTEC	No conflict
Park	NanTroSEIZE proponent	Conflict: 1
Screaton	NanTroSEIZE proponent and co-chief	Conflict: 1
Tobin	NanTroSEIZE proponent and co-chief	Conflict: 1
Webster	Proponent 716-Full2 Hawaiian Drowned Reefs	Conflict: 1
Yamazaki	Proponent 695-Full2 Izu-Bonin-Mariana Pre-Arc Crust	Conflict: 1

***Conflicts:**

1: Conflicted for agendum 11 (OTR report: IODP expedition scheduling II).

2. Agency reports

2.1. Japan Ministry of Education, Culture, Sports, Science, and Technology (MEXT)

Takashi Nakagawa noted that he was the new MEXT liaison to NSF. He reviewed the previously distributed MEXT report, touching on recent riser drilling by *Chikyu*, J-DESC Core School for nurturing young scientists and technicians, and a recent IODP campaign in Japan organized by J-DESC and JAMSTEC and supported by MEXT, comprising lectures for students designed to encourage participation in IODP activities. Nakagawa noted that the federal election in Japan at the end of August may see a change in the ruling party.

Ruppel commented that the Japanese election could have an impact on the IODP. Mori suggested that while the minister for MEXT may change, the person within MEXT who oversees the IODP should not change. Ohkouchi agreed, but added that it was unknown what would happen.

2.2. U.S. National Science Foundation (NSF)

Jamie Allan presented an addendum to the NSF report in the agenda book. He noted that recent activity at the NSF has been associated with the American Recovery and Reinvestment Act (ARRA) funds. Allan reported that the NSF received \$25M for the drilling program, and intends to supply the *JOIDES Resolution* to the program for 70% of the time until the end of 2013. He reviewed several activities that would be funded with FY2009 or ARRA funds, including site surveys, ship time, new equipment grants, and other major grants, the latter using FY2009 and FY2010 funds.

Allan noted that IODP-MI would be consolidating its two offices into one office in Tokyo. On behalf of the NSF he thanked the Washington, D.C.-based IODP-MI employees for their contributions to the program. Allan added a personal thanks to former IODP-MI President Manik Talwani for his work in establishing IODP-MI. He described Talwani as one of the giants of twentieth century marine geophysics. Allan thanked former IODP-MI Vice-President for Science Operations Tom Janecek for the extraordinary contributions he made to the program. He said it would be difficult to imagine the IODP without Janecek's leadership. Allan also thanked former IODP-MI Director of Communications Nancy Light for her efforts in establishing outreach and branding for the program. Allan welcomed new IODP-MI President Kiyoshi Suyehiro. He also thanked IODP-MI Vice President for Science Planning Hans Christian Larsen and Engineering Manager Greg Myers for their work, adding he was very grateful they would remain with IODP-MI and looked forward to working with them in the future. Allan welcomed Brad Clement as new Director of Ocean Leadership at Texas

A&M University (TAMU). He described the refurbished *JOIDES Resolution* as an amazing ship, adding that, until you see it, it is hard to grasp the differences.

Ruppel suggested that Allan should mention the new Arctic research vessel. Allan said that construction has been approved, and funds are included in the budget. He mentioned that the vessel, which would be able to work in the Arctic, would be constructed under a cooperative agreement with the University of Alaska. Ruppel said the vessel would be ready in 2013 and give more flexibility for future drilling in the Arctic.

Fukutomi asked about the time frame for a 3-D seismic survey for the Costa Rica Seismogenesis Project (CRISP). Allan replied that the survey was scheduled for FY2011.

2.3. ECORD Managing Agency (EMA)

Catherine Mével took the report in the agenda book as read. She noted that, at present, ECORD is faced without the prospect of a future mission specific platform (MSP) operation. She clarified that ECORD hopes to undertake two more MSP operations after Great Barrier Reef (not three, as mentioned in the agenda book report). Addressing the impending closure of the IODP-MI Washington, D.C. office, Mével said ECORD hoped new people will be appointed soon, especially in the area of outreach. She added that ECORD also wrote a statement of thanks to Tom Janecek. Finally, Mével noted that Kiyoshi Suyehiro's attendance of the June 2009 ECORD Council meeting in Lisbon was appreciated by the Council.

2.4. China Ministry of Science and Technology (MOST)

Chun-Feng Li provided an update on Chinese IODP activities. He: (1) reviewed participation by Chinese scientists in past and future IODP expeditions; (2) mentioned his recent drilling proposal (735-Pre South China Sea Tectonic Evolution); (3) showed new publications (in Chinese); (4) noted that fifteen travel grants of \$1500 each are available for Chinese scientists to attend the IODP New Ventures in Exploring Scientific Targets (INVEST) meeting; (5) mentioned that China is in the early stages of planning a new drillship, similar in size to the *JOIDES Resolution*, but with a riser (draft budget of about \$600M); and (6) noted that the annual IODP-China meeting will take place 25–26 August in Beijing, will have about 40 participants including Kiyoshi Suyehiro, and will focus on developing plans for INVEST, China's involvement in the program after 2013, and the new drilling vessel. Li added that China is considering full membership in the program in the future.

van der Pluijm asked about opportunities for the international community to use the new vessel. Li replied that he thought the new vessel would be involved in drilling under the new program, but was not certain. Larsen stated that Pinxian Wang has said the intention is that the new vessel would be used for the new program part-time. Larsen reminded Li that posters on potential facilities for the new program are welcomed at the INVEST meeting.

2.5. Korea Institute of Geoscience and Mineral Resources (KIGAM)

No report. The KIGAM representative was not present.

2.6. Australian Research Council (ARC)

Jody Webster reported on Australia-New Zealand IODP Consortium (ANZIC) activities. He reviewed ANZIC's membership in the IODP, noting that the consortium comprises several universities and government agencies, together forming a 30% membership unit in IODP. He also explained the organizational structure of ANZIC, and identified key personnel in the organization. Webster noted that three ECORD Distinguished Lecturers have or will visit Australia/New Zealand in 2009; the completed talks were very well received and supported. Webster reported that eight scientists from Australia/New Zealand will attend the INVEST meeting; white papers are being written; Chris Yeats (CSIRO) represents ANZIC, China, India and Korea in the IWG+ long-term planning group. Webster noted that Australia/New

Zealand presently lack heavy seismic capacity for deep site surveys, but Australia plans to have a new research vessel in service in 2013 which should have good seismic capabilities.

Webster reviewed upcoming expedition activity in the ANZIC region (Great Barrier Reef, Canterbury Basin, Wilkes Land). He noted that port calls provide invaluable publicity for IODP. Webster also provided a status report on discussions on formation of an Asian-Pacific IODP consortium, with the goal being full membership in IODP. He reported that a working group has drafted a set of principles for potential membership. Finally, Webster presented ANZIC's proposal to host the next (March 2010) SPC meeting in Sydney (see agenda 21.2.1).

2.7. India Ministry of Earth Sciences (MoES)

Jim Mori asked if there was any information available on the status of India in the IODP. Allan stated that India has joined the IODP as an associate member, paying slightly less than \$1M for FY2009. Mori asked if India would have the right to a non-voting member on the SPC. Allan said yes.

3. Implementing Organization (IO) reports

3.1. Center for Deep Earth Exploration (CDEX)

Jun Fukutomi reported that drilling at Stage 2 NanTroSEIZE site NT2-1 was recently completed; drilling was about to start at contingency site NT1-07. Fukutomi showed two brief movies. The first included underwater images of the blowout preventer (BOP) landing on the hole, and images onboard *Chikyu* showing the riser tensioners in action. The second movie showed images from a walkaway vertical seismic profile (VSP) experiment, shot using the JAMSTEC vessel *Kairei*. Fukutomi noted that the VSP was acquired along a 56-km long north-south line; a 50-km circular shooting profile was also acquired.

Tobin added further information about the walkaway VSP experiment. He noted it was a third party project, with JAMSTEC funding *Kairei* operations, and many people from outside Japan involved, such as Nathan Bangs and Roland von Huene. Tobin explained that the 3-D seismic data were not acquired with long offsets, therefore they do not provide good deep velocity control. The long offset wide-angle shooting from the walkaway VSP (recorded at twenty instruments down the borehole) will provide better deep velocity information, which is critical for planning the next operation, i.e., how deep is it necessary to drill at the riser sites. Tobin noted that while industry frequently performs VSP operations, the NanTroSEIZE VSP is probably a world record in terms of offset.

Tobin noted Expedition 319 (NanTroSEIZE Stage 2: Riser/Riserless Observatory 1) would end in three to five days, and has accomplished everything it set out to do a week ahead of schedule. The second site (riserless hole for a future observatory) was successfully cased and cemented. A P-T observatory was installed. He characterized the first riser expedition (which reached the target depth of 1063m) as having gone incredibly well, adding that CDEX staff deserves a lot of credit.

3.2. U.S. Implementing Organization (USIO)

David Divins reviewed the FY2009 *JOIDES Resolution* expedition schedule:

Expedition 320	Pacific Equatorial Age Transect (PEAT) 1	5 March–5 May 2009
Expedition 321	PEAT 2/Juna de Fuca	5 May–5 July 2009
Expedition 323	Bering Sea	5 July– 4 Sept. 2009
Expedition 324	Shatsky Rise	4 Sep. –4 Nov. 2009

Divins reviewed some of the science highlights from PEAT 1, PEAT 2 and Bering Sea. Ruppel asked why the APC recovery rate for the Bering Sea expedition was better than usual. Divins explained that the remodeled *JOIDES Resolution* has a refurbished passive heave

compensation system. The improved stability results in better core recovery. Malone agreed that was probably the reason, but said it was hard to quantify. Malinverno noted that the heave was very small during the Bering Sea expedition.

Divins presented draft schedule options for FY2010 and FY2011 *JOIDES Resolution* operations, stressing that the schedules were for discussion only. He noted that the only workable time window for Juan de Fuca (Proposal 545-Full3) is July–August 2010.

Divins provided an update on plans to use the *JOIDES Resolution* for industry work. He noted that negotiations on the Korea gas hydrates project were underway with KNOC and Transocean. The work would be 75–85 days plus about twenty days of transit in the March–June 2010 time window.

Divins mentioned that, as of 1 August 2009, Brad Clement is the new Director of Science Services, IODP-USIO at TAMU. He said Clement will be a great asset to the USIO team. Interim Director Steve Bohlen will remain for one more week. Divins also announced that Sean Higgins has left Ocean Leadership where he was Associate Director. Divins thanked Higgins for his contributions to Ocean Leadership, adding he will be greatly missed.

Divins summarized past and future port call activities, and described USIO education activities. The latter included the 2009 School of Rock, Teacher at Sea Program, and the HBCU Educator at Sea pilot USIO diversity initiative.

3.3. ECORD Science Operator (ESO)

Dan Evans provided a summary of Expedition 313 New Jersey Shallow Shelf, which was completed on 17 July 2009. He noted the onshore science party in Bremen would start 6 November 2009. Evans summarized outreach activities associated with the expedition. He described the objectives and, for each of the three holes drilled, summarized the results. The overall core recovery rate was ~75%. Feary asked about the recovery rate for sandy intervals. Evans replied that he did not have the details, but a lot of the recovered intervals were sandy.

Evans also provided a status report on planning for Expedition 325 Great Barrier Reef Environmental Changes. He noted that a contract to use the platform *Bluestone Topaz* was signed on 11 May 2009. Mobilization would be in Singapore in late September 2009 with a start of the ~45-day expedition from Townsville around 1 November. Evans added that the science party was now complete; the onshore science party in Bremen was scheduled for 16 April 2010. (Subsequent to the SPC meeting it was learned that the intended platform was not viable; acquiring another platform will result in delays so that the above mentioned dates are no longer valid.)

Filippelli asked about the size of the science party for Great Barrier Reef. Evans said the total would be 27 (8/8/8 U.S./Japan/ECORD + 1/1/1 China/ANZIC/India).

4. IODP Management International, Inc. (IODP-MI) report

4.1. General report

Hans Christian Larsen noted that in 2009 the IODP simultaneously operated three platforms for the first time. Larsen presented statistics for active drilling proposals, noting that twelve new proposals were submitted for the 1 April 2009 submission deadline. He called this a good sign, and said there was no evidence to indicate the community is not interested in continuing with scientific ocean drilling. Larsen showed part of the text for the most recent call for proposals, which mentions an implementation plan, to be completed by June 2010, which will outline the high priority science that needs to be completed within the current phase of the program. Additionally, proposals submitted, but not implemented, before the end of the IODP will form an important basis for a new scientific ocean drilling program. Larsen

explained that the community needs to be informed of the changing situation within the IODP as the program approaches its end in 2013.

van der Pluijm commented that to “form an important basis for a new scientific ocean drilling program” the scientific priorities of the new program need to be known. He expressed concern that proponents will risk targeting their proposal for the current science plan, while the new program will have a new science plan. Allan said that the community needs to realize that the nature of the post-2013 science plan is still very much under discussion. He suggested that there was a variety of ways that proposals could be used, for example, to help develop larger plans that address one topic in a different way from how things are done now. He added that the important message is that these proposals constitute an important resource to draw on for the next program. Sreaton wondered who would write the implementation plan. Larsen explained that the Board of Governors asked the SASEC to come up with the plan at its June 2010 meeting. Li wondered how proposals that have not been implemented during the IODP will be treated. Larsen said that this was undecided, and up to the IWG+ to decide. He said the IWG+ feels that such proposals should be a resource for the next program, but exactly how they would be used is unknown.

Larsen summarized the plan for the restructuring of IODP-MI, following a request from the Board of Governors to consolidate the two IODP-MI offices into a single office. The new IODP-MI office will be hosted by the Tokyo University of Marine Science and Technology, and the consolidation should be completed during March 2010. Larsen showed the proposed new office structure. He said the overall goal was to achieve higher efficiency and reduce the number of high level managers and key staff.

Mori asked where the remaining IODP-MI staff in the U.S. would be located. Larsen said this was not currently known. Neal wondered if these staff could be housed in the Ocean Leadership offices in Washington, D.C. Larsen did not know if that idea was under consideration. Divins said there has been no discussion. Larsen noted that Suyehiro has already visited Ocean Leadership and established communications.

Larsen mentioned that an external review of IODP-MI was required every three years, as mandated by the NSF. The first triennium review focused on the functionality of IODP-MI as the program’s central management office (CMO); office consolidation is partially a response to the findings of the first review. Larsen explained that the second triennium review should occur in early FY2010; focus on the effectiveness of the IODP science planning process; and examine SAS functionality, and relationships between the SAS, IODP-MI, and IOs. He hoped that some members of the second triennium review committee would attend the November 2009 SSEP meeting, while some other members would attend the March 2010 SPC meeting. Larsen said that for the committee to understand the important role that nurturing plays in the development of proposals, it should see it in action.

Larsen provided a brief update on the status of the Ocean Drilling Consortium (ODC). He explained that the ODC was an initiative led by former IODP-MI President Manik Talwani to use the *JOIDES Resolution* for projects of joint interest to industry and the scientific community. He noted that 14 June 2009 was the deadline for receiving responses from interested entities; however, no official responses were received. The IODP-MI Board of Governors has recommended that a formal response be obtained from industry to establish the status of the ODC, and effectively transition the responsibility for it to the Consortium for Ocean Leadership. Larsen asked Divins if he had additional information. Divins said that they received one response from a company which had obligated money towards the ODC. But, he added, as put together, the ODC will unfortunately not go forward. Blackman requested clarification on Ocean Leadership’s responsibility with the ODC. Larsen said this

meant that Ocean Leadership should pursue on its own these kinds of collaborative projects with industry using the *JOIDES Resolution*.

4.2. FY2011-2012 engineering development

4.2.1. IODP-MI recommendations

Greg Myers reported on engineering development projects both in progress and proposed. He summarized the status of current (FY2009) projects: (1) Long Term Borehole Monitoring System; (2) Simple Observatory Initiative; (3) Motion Decoupled Hydraulic Delivery System (MDHDS); and (4) an in-house coring study. Myers characterized the first two as progressing nicely. He said the MDHDS was in the design stage, while the latter item is a low-dollar study to look at core quality and quantity issues which involves looking at past records. Myers noted that the Sediment CORK (S-CORK) project has been withdrawn by the proponents.

Myers briefly summarized the FY2010 engineering plan as it appears in the annual program plan. In addition to the above mentioned projects, which will all continue into FY2010, there is one new project (multi-sensor magnetometer tool). He noted that the EDP endorsed this plan in EDP Consensus 0901-09.

Myers described the engineering development proposal submission process. He noted there were several pathways for funding: science operating cost (SOC) funding, non-SOC funding such as platform operating cost (POC) funding and external funding.

Before discussing FY2011 engineering proposals, Myers asked if there were any conflicts. Malinverno declared a conflict with one of the proposals and left the room for the remainder of the discussion. Myers listed the three proposals received for FY2011 and reviewed by the EDP: (1) wireline hydraulic testing and imaging tool; (2) development of carbon fiber reinforced plastic riser pipe for 4000m deep water; and (3) replacement of the magnetic susceptibility sonde. He noted that the latter two are not within IODP-MI's funding purview. For the first item, Myers noted that the EDP gave it two stars; he said the idea was good but IODP-MI should not be funding tools designed for onshore drilling. With no new projects recommended for FY2011, Myers outlined the FY2011 draft engineering plan, which comprises:

- (1) continuing projects (simple observatory initiative, multi-sensor magnetometer tool);
- (2) no new SOC engineering projects;
- (3) pursuit of externally funded projects; and
- (4) integration of engineering projects from all funding sources, even those outside of IODP-MI's funding purview.

Ruppel wondered why proponents are submitting proposals that cannot be funded by IODP-MI. Myers explained that the IODP web site stresses that proponents should contact IODP-MI prior to proposal submission, and urges submission of a letter of intent. In this case, the proponents did not contact IODP-MI. Mori wondered if there could be proposals submitted that are tied to a specific platform, and therefore not worth funding. Myers agreed this was possible. He wondered if Mori was suggesting that the EDP should not spend time reviewing proposals that are not fundable. Ruppel commented that she would not advocate having the SSEP look at non-viable proposals. Myers pointed out that the volume of engineering proposals is very low, so is not a problem workload-wise for the EDP.

Blackman asked what was meant by "integration of engineering projects". Myers said this refers to knowledge of what is happening at the different IOs, e.g., dissemination of information on web pages to make proponents aware of what technology already exists or is under development. Fukutomi said that CDEX appreciates that comment. He said that

drilling development costs are in the many millions of dollars, and industry is far ahead of the IODP technology-wise. CDEX does not want to duplicate industry development efforts, but would rather join with industry if possible.

Myers noted that IODP-MI will soon receive requests for engineering testing time for four projects: (1) USIO logging while coring (LWC) system testing; (2) wireline heave compensation testing and calibration; (3) SCIMPI tool “dummy” deployment; and (4) MDHDS. Each project will require less than three days of ship time. Within the next six months the SPC will be asked to approve the requests. Myers also noted that the third party tool policy will be modified to reflect the engineering testing time policy. The SPC should see the new policy at its March 2010 meeting.

Myers provided a brief status report on the riserless mud recovery project, an externally funded project with funding from the DeepStar consortium. He explained that the objective of the project is to modify a *JOIDES Resolution*-type of ship to allow a return of mud to the ship. This allows for the mitigation of shallow hazards. Myers noted that the next step in the project would be sea trials, which would be partially externally funded. Funding sources are currently being sought. Feary asked about the duration of sea trials. Myers said about a month at sea with probably another month on either side for a potential total of three months. He added that the *JOIDES Resolution* would require modifications to install the system. Myers listed the benefits of the riserless mud recovery system: (1) environmentally friendly; (2) continuous circulation of engineered mud; (3) cuttings and mud returned to vessel; (4) gas kick detection; (5) useful on all IODP platforms; and (6) provides alternatives for drilling very deep holes in very deep water. Ruppel commented that there is excitement amongst industry people about this system, which will significantly extend the capabilities of the *JOIDES Resolution*. She said this could be the first time the program brings something useful to industry, thereby providing the kind of synergy the program is looking for.

Tobin said that the deployment of the system on *Chikyu* would be straightforward. He asked if Myers was in communication with MQJ. Myers said he was not, but has spoken to CDEX about the system, and CDEX is interested in it as a way to get beyond current limitations. Fukutomi said that CDEX was very interested in this technology because it could possibly be used when drilling in regions with no oil or gas without having to use the very expensive riser. Tobin asked if the main difference between the riserless mud recovery system and riser drilling was the absence of blowout prevention capability. Myers said this was true, though the system would have some gas detection ability.

Larsen asked how the new system reacts to strong currents. Myers said that would have to be assessed during field trials, but he expected the effects of current to be much less than with a riser due to the reduced cross section. Neal wondered if the system would result in improved core quality. Myers said he thought this was the case, but his information was anecdotal. In previous legs where not a lot of mud was available the core recovery and quality went down. For Expedition 308 (Gulf of Mexico Hydrogeology), where lots of mud was available, core quality went up. Myers said that suppressing the natural tendency for a hole to close up should lead to increased quality. Neal wondered if it would have helped the recovery of sandy layers during Expedition 313 (New Jersey Shallow Shelf). Myers thought it would have helped immeasurably.

Allan asked if the *JOIDES Resolution* would have to be modified with a spar that would swing out. Myers replied that some system to separate the hose from the drill string would be necessary. Ruppel commented that each component is extremely expensive; she wondered if industry would provide these items. Myers said yes. He noted that pumps already exist, but would need to be modified. He added that everything already exists; the challenge is to

employ the system on a floating, dynamically positioned drillship in deep water. Myers said he is sure it is possible.

4.2.2. SPC discussion and prioritization

Mori asked Myers to redisplay the draft FY2011 engineering plan. He noted that previously there have been newly proposed projects to be endorsed by the SPC, whereas this time there is nothing new, just the continuation of previously initiated projects. He asked if the committee was prepared to endorse the presented plan. There were no comments. The committee approved the plan by consensus.

SPC Consensus 0908-04: The SPC approves the engineering development plan for FY2011. The SPC also endorses expanding the definition of IODP-related engineering developments to include those with external funding and those developed outside the IODP framework.

5. Science Advisory Structure Executive Committee (SASEC) report

Jim Mori reported that at its June 2009 meeting the SASEC focused on four main topics: (1) approval of the FY2010 annual program plan; (2) activities associated with program renewal; (3) SPC activities; and (4) SAS structure. Mori presented SASEC Consensus 0806-03.

SASEC Consensus 0806-03: SASEC reaffirms IODP's commitment to maximize riser drilling with *Chikyu* over the next five years. The program is presently constrained to one riser operational area with 3-D seismic coverage (i.e., NanTroSEIZE), and that area has other logistical limitations (e.g., Kuroshio Current). SASEC encourages acquisition of 3-D site survey data for other potential, highly-rated projects in order to provide other opportunities to utilize riser drilling. Any future riser drilling is critically dependent on such data.

Mori said that the SASEC reaffirmed the importance of this statement and wants the SPC to give serious consideration to the important issue of riser drilling beyond, and as a contingency to, NanTroSEIZE. He added that the SASEC stresses the importance of maximizing riser drilling over the next few years.

Mori noted that at the previous (January 2009) SASEC meeting, he made the point that the three-layer Board of Governors, SASEC, SPC structure should ideally be reduced to two layers, perhaps by eliminating the SASEC. Mori, commenting that it is difficult for a group to disband themselves, presented the SASEC response to this suggestion.

SASEC Consensus 0906-08: Having discussed the report of the subcommittee that evaluated the Board of Governors/SASEC/SPC structure, SASEC is reinvigorated in performing its mandate to carry out its executive authority to endorse the science plan (in January) and annual program plan (in June), and to be the caretaker of the Initial Science Plan implementation and long-range science planning. We thank the subcommittee (John Hayes, Hodaka Kawahata and Gerold Wefer) for their provocative and constructive input.

van der Pluijm asked about the distinction between long-range science planning and science planning. He said the SPC was the best group to do both, and asked if the SASEC members read the proposals. Mori said no. van der Pluijm wondered if the SASEC was doing its homework in order to do the long-range planning. He wondered why there was an apparent disconnect between the committees. Ruppel agreed. She noted that it was the SASEC that drafted an implementation plan (*SASEC Implementation Plan for IODP Expeditions: 2008–2013*, March 2008) which, in an early draft, specified four scientific areas that the IODP would focus on for the remainder of the program. She cited this as evidence of a fundamental disconnect, and suggested that if the SASEC is going to take its role seriously, its members should attend SPC meetings to see what the SPC is all about. Ruppel said that, as caretakers of the ISP, the SASEC was not doing a great job. Mori said that he has pointed out to the

SASEC that it is the SPC that does much of the long-range planning, e.g., by forming detailed planning groups.

Neal commented that there appeared to be little opportunity at the INVEST meeting to gauge community opinion on the effectiveness of the SAS. Mori suggested that INVEST was not designed to do that. Allan said that everyone acknowledges that the science advisory planning structure has to change. He suggested that changes cannot wait until the next program. Further, there is a lot of interest in starting the change now. The second triennium review will come up with ideas for changes to the SAS. At the January 2009 SASEC meeting there was a discussion about changing the Board of Governors/SASEC/SPC structure. Allan pointed out there is a contractual requirement to have an executive authority, which means you cannot eliminate the SASEC or Board of Governors, but does not mean that the SASEC and SPC could not be merged, giving SPC the executive authority. Jenkyns commented that in the old days, the executive committee dealt with financial and political issues, and did not weigh in on scientific issues. He wondered if the SAS executive authority should revert to its former role.

Filippelli said that the SASEC is not in the SAS. He wondered if Allan was saying that the executive authority can reside within the SAS. Allan said yes, the memoranda of understanding do not disallow that. He also explained that an executive authority is needed because the IODP Board of Governors represent member institutions of IODP-MI, not the IODP membership. Allan said he did not understand why the SASEC is a subcommittee of the Board of Governors, adding that he was unsure whether this model is serving the program well.

van der Pluijm said the issue is more about content than form, i.e., where SASEC's responsibilities should start and end. He said it was not so important where the SASEC sits with respect to the SPC and Board of Governors. The problem is that the role of the SASEC is too close to that of the SPC. Allan said he understood this concern. He noted that in the ODP the fiduciary role of the executive authority was very clear, but in the IODP only a small portion of the funds are commingled. Allan thought it worthwhile to look into a scheme that collapsed the SPC and SASEC into one group. Mori commented that there was very little the SPC can do to address this.

6. Operations Task Force (OTF) Report

6.1. Long-range expedition planning

Hans Christian Larsen reported that the IODP-MI Board of Governors have asked the *“SASEC to come up with a three year plan (FY2011 to FY2013) for the rest of the program with the SPC to work out the details. The Board requests this by June 2010.”* Larsen listed a number of implications: (1) proposals forwarded to the SPC at the next SSEP meeting will likely be the last ones to have a chance to be considered for scheduling before the current program ends in 2013; (2) by spring 2010, the SPC must provide guidance to the OTF on IODP “golden spikes”, i.e., projects that “must” be completed by the end of the program; (3) the OTF must determine (with SPC approval) tentative schedules for FY2012–2013 including viable efficient ship tracks, and report this to the IODP-MI Board of Governors; and (4) funding requirements must be communicated as soon as possible to the funding agencies.

6.2. Scheduling options

Larsen listed the ISP initiatives and noted that most (deep biosphere, gas hydrates, extreme climates, rapid climate change, large igneous provinces, 21st century Mohole, seismogenic zone) have been, or will shortly be, addressed by IODP drilling. Continental breakup and sedimentary basin formation is the one initiative that has not, and may not be addressed by

the end of the program. Larsen also summarized activities relating to seafloor life, and noted that Katrina Edwards received a \$500K grant to establish a network.

Larsen presented statistics for active proposals (broken down by ocean and SAS stage). He noted that of the 25 proposals which propose drilling in the Atlantic, only two are ready to go. He also listed the 24 proposals currently residing with the OTF, including scheduled proposals, and six proposals in the “holding bin”, the latter representing proposals that have ostensibly been forwarded to the OTF, but held back because they do not have SSP or EPSP approval. He also listed fifteen proposals residing with the OTF that remain to be scheduled. All but four of these propose drilling in the Pacific; two each propose drilling in the Atlantic and Indian Oceans.

Larsen displayed the current FY2010 operational schedules for each platform, and showed potential schedules for late FY2010 and FY2011. He also displayed the March 2009 SPC ranking results (28 proposals ranked; top ten forwarded to the OTF). He also listed five APLs for consideration during FY2009–2011 expeditions. He noted that: (1) 728-APL Gulf of Papua Coralgal Barrier Reef was rejected due to a lack of site survey data; (2) 738-APL Nankai Trough Submarine Landslides would require 10+ days if drilled by *Chikyu*, in which case it would not be an APL; 739-APL Bering Sea Subseafloor Life is currently being drilled as part of Expedition 323 (Bering Sea); and (4) 742-APL Shatsky Rise High-Resolution Climate was rejected by the SPC.

6.3. Riser Contingency Plans

Larsen said that as a generic program priority, *Chikyu* is to be used for riser drilling (or activities that draw on the special capabilities of *Chikyu*), initially NanTroSEIZE. Drawing from this he listed the following priorities for *Chikyu*: (1) NanTroSEIZE riser drilling, targeting a deep hole; (2) observatory installation and preparation for riser holes; (3) non-NanTroSEIZE riser drilling of highly ranked proposals; and (4) non-riser drilling of highly ranked proposals that will require or benefit from *Chikyu*'s capabilities.

Larsen summarized the status of alternate riser proposals, noting that of the three relevant proposals residing with the OTF: (1) Proposal 537B-Full4 CRISP-B was ruled out as financially impractical; (2) Proposal 595-Full3 Indus Fan and Murray Ridge was ruled out because of political issues; and (3) Proposal 618-Full3 East Asia Margin was ruled out because some sites are located in disputed waters. Larsen noted that Proposal 698-Full2 IBM Arc Middle Crust currently still resides with the SPC and may also be affected by the Kuroshio current.

Larsen showed options for a FY2010–2011 five-month operational plan (with an unspecified start time) developed by CDEX for *Chikyu* comprising four cases: (1) riser drilling at Site C0002; (2) split between observatory installation at C0010 and C0002 and riser drilling at C0002; (3) riser drilling at IBM; and (4) split between observatory installation at C0010 and C0002 and non-riser drilling of Proposal 601-Full3 Okinawa Trough Deep Biosphere. The first three cases assume the Kuroshio current at the NanTroSEIZE and IBM site is not strong.

van der Pluijm wondered if Larsen was asking the SPC to reconsider IBM as a riser contingency for NanTroSEIZE. Ruppel wondered why CDEX was making up schedules. She wondered if the USIO did the same thing. Larsen replied that the USIO does do the same thing.

Larsen asked if the SPC had any input for the OTF meeting to take place later in the day. Tobin noted that the NanTroSEIZE project management team (PMT) has already provided a statement on the best use of *Chikyu*. Ruppel recalled seeing a recommendation that riserless drilling at NanTroSEIZE be done by the *JOIDES Resolution* while *Chikyu* focused on riser

drilling. Larsen said this was a SASEC recommendation. Ruppel suggested that the SPC should reconsider this option. Larsen said that if there were no other options, the SASEC would understand.

Ruppel, referring to the Board of Governors recommendation that the SASEC do long-range planning to the end of the program by coming up with a three year plan, commented that the phrase “long-range planning” was vague. She wondered if this meant the SASEC would be interfering with OTF business. Mori explained that the Board of Governors is instructing the SASEC to come up with a general plan specifying the important proposals that should be implemented by the end of the program. Ruppel asked if he meant “goals” as opposed to “proposals”. Mori said he meant proposals. Ruppel suggested that the Tier 1 rankings should be the guide.

7. IODP Science Advisory Structure (SAS) reports

7.1. Science Steering and Evaluation Panel (SSEP)

Heiko Pälike, commenting on the proposal statistics shown earlier by Larsen, noted that for the first time the majority of active proposals do not reside with the SSEP. He observed that there is a steady state of proposals taking into account new proposals and deactivations. Pälike reviewed the dispositions of all 23 proposals reviewed by the SSEP at its May 2009 meeting. He described in more detail the SSEP reviews of three proposals that were forwarded to the SPC and noted their star grouping: (1) 548-Full3 Chicxulub K-T Impact Crater (four stars); (2) 681-Full2 Lesser Antilles Volcanic Landslides (four stars); and (3) 732-Full2 Antarctic Peninsula Sediment Drifts (five stars). Pälike also provided details on Proposal 742-APL Shatsky Rise High-Resolution Climate, which was also forwarded to the SPC.

Pälike noted that the two component proposals and one proposed component proposal of the Kanto Asperity Project (KAP) complex drilling project (CDP) were deactivated, leaving the umbrella proposal, 707-CDP2 Kanto Asperity Project: Overview, as the only active proposal. Pälike explained the SSEP’s rationale for the deactivations. Ohkouchi thought it unusual to deactivate the components, leaving just the umbrella proposal.

Pälike reported that, as input to the INVEST meeting, the SSEP discussed high priority scientific ideas. A summary of the discussion will be forwarded to the INVEST steering committee. Pälike also noted that the SSEP nominated Hendrik (Henk) Brinkhuis for its next co-chair (replacing Pälike). Mori noted that Brinkhuis’s CV had been previously distributed to the SPC. He asked if the committee had any comments. Peterson said that Brinkhuis was a good choice. With no further discussion, the SPC approved the appointment by consensus.

SPC Consensus 0908-05: The SPC appoints Hendrik Brinkhuis as co-chair of the Science Steering and Evaluation Panel (SSEP), effective immediately.

7.2. Site Survey Panel (SSP)

Jin-Oh Park provided a brief review of the July 2009 SSP meeting, noting that eight full proposals, five preliminary proposals, and two APLs were reviewed. Of these, Park provided detailed information on the site survey status of the seven proposals residing with the SPC and OTF.

Larsen asked about SSP issues with Proposal 738-APL Nankai Trough Submarine Landslides. SSP member Li explained that more interpretation was required on the presumed landslide deposits, because with the current data the deposits are difficult to assess. Feary (SPC liaison for the July 2009 SSP meeting) noted that the proponents were asked to map the MTDs in the 3-D data to make sure the sites are in the right place. Mori commented that this APL should have been placed in the holding bin when reviewed by the SPC in March 2009.

7.3. Environmental Protection and Safety Panel (EPSP)

Barry Katz provided a summary of EPSP activities at and prior to its June 2009 meeting. He commented that the EPSP takes its job very seriously as the environmental stewards of the program. Katz explained that the panel has reduced the number of meetings to one per year without downsizing, but he noted that the two-day June 2009 meeting was too short; the next meeting will be three days.

Katz reviewed several actions taken by the panel in between the June 2008 and 2009 meetings. The panel dealt with requests to: (1) re-enter Site 807 during the *JOIDES Resolution* sea trials; (2) modify (eliminate LWD/MWD) the operational plan for Expedition 313 (New Jersey Shallow Shelf); (3) approve alternate Site NAV-1B on Expedition 323 (Bering Sea); (4) alter the operational plan (eliminate LWD/MWD) for NanTroSEIZE site NT1-07 – this was not approved; (5) approve Site PEAT-8D on Expedition 321 (Pacific Equatorial Age Transect 2); and (6) approve alternate Site BOW-14B on Expedition 323 (Bering Sea) – this was not approved.

Katz summarized electronic reviews of two proposals, 636-Full3 Louisville Seamounts and 662-Full3 South Pacific Gyre Microbiology. He noted that all proposed sites for both proposals were approved.

Katz summarized the results of five proposals that were reviewed at the June 2009 meeting: (1) 549-Full6 Northern Arabian Sea Monsoon – eight sites approved, two not approved but relocated; (2) 552-Full3 Bengal Fan – all six sites approved; (3) 654-Full2 Shatsky Rise Origin – all fourteen sites approved; (4) 716-Full2 Hawaiian Drowned Reefs – all twenty sites approved; and (5) 738-APL Nankai Trough Submarine Landslides – all three sites approved. In addition the EPSP recommended contingent approval to 7000m depth for NanTroSEIZE site C0002E.

Katz summarized the results of three proposals that were previewed at the June 2009 meeting: (1) 618-Full3 East Asia Margin – proponents were asked to prepare structure and amplitude maps, acquire drilling summaries of nearby wells, estimate pore pressures; (2) 637-Full2 New England Shelf Hydrogeology – asked for a shallow hazards survey (similar to New Jersey), proponents asked to propose additional alternate sites; and (3) 705-Full2 Santa Barbara Basin Climate Change – several suggestions for proponents and requests to provide additional information. Katz noted that an EPSP watchdog was assigned for Santa Barbara Basin. He added that the proponents of this proposal insist on drilling structural highs, seemingly not recognizing that there are limits to what the panel will approve. Katz stated that the only way this would be acceptable would be for the proponents to show that the beds penetrated are exposed to the seafloor (i.e., no trap).

Katz also commented on CDEX peer-review meetings. He said that these meetings were an important part of the review process, but non-Japanese EPSP members were unable to attend because of a lack of funding. Katz said that the EPSP is provided with a final plan for approval rather than being an active member in the planning process itself. He added that both sides agree there needs to be an attempt to improve communications.

Alluding to the preview of Proposal 705-Full2, Allan suggested that this was an example of how the system is not working as well as it needs to. He said that the ranking process needs to take into account or be aware of technical realism, national and legal issues, etc. Allan said that the NSF would not be able to approve a program plan that included Santa Barbara Basin without an environmental assessment, and that a deep hole without that assessment or perhaps even an Environmental Impact Statement would not be possible. Allan added that the proponents need to meet the requirements of the EPSP. Katz said there is, in general, a naïve

view of the capabilities of the drilling platforms. Blackman thought drilling at Santa Barbara did not appear to be impossible. She suggested it was normal to get this kind of feedback from an EPSP preview. Allan stated that fundamental problems should have been identified earlier. He said the proponents cannot do what they have proposed (i.e., drilling such a deep hole, expecting and requiring 100% recovery for the science objectives); it is not possible to get such sediment records and recovery with the available drilling technology. Katz noted that when first previewed, it was made clear that the only way this proposal would get drilled would be by doing a series of short cores. But now the proponents want to add in a deep hole because they think it is necessary to accomplish the goals. Behrmann suggested there was no compelling reason for why all the objectives could not be met by offset drilling. He said if deep drilling was required, the proposal should be deactivated. Ruppel suggested that the SSEP did its job by flagging the proposal for an early EPSP preview. She also suggested that the SPC was doing its job according to its mandate, and that the EPSP previews have been very constructive. Ruppel felt that criticism of the SPC by the NSF and Board of Governors was unfair. Allan said that his comments were not directed at the SPC, but at the entire SAS, including the SASEC. He said he has great concerns. Malone pointed out that the version ranked by the SPC (705-Full2) did include a deep hole. Mori suggested that the system is working; what is needed is improved feedback to the proponents.

Mori noted that at the previous SPC meeting Proposals 549-Full6 Northern Arabian Sea Monsoon and 552-Full3 Bengal Fan were placed in the holding bin because they had not been reviewed by the EPSP. He said that, because all sites for both proposals were now approved, these proposals have been removed from the holding bin and forwarded to the OTF. Feary asked about Proposal 716-Full2 Hawaiian Drowned Reefs. Mori confirmed that this proposal was also removed from the holding bin and forwarded to the OTF.

7.4. Scientific Technology Panel (STP)

Clive Neal presented a report on the August 2009 STP meeting, at which fifteen consensus statements, one recommendation and eleven action items were generated. Neal noted that the STP roadmap has synergies with the EDP roadmap. The STP will present a poster at the INVEST meeting, and possibly prepare an article for *Scientific Drilling* on the STP roadmap. Neal presented a list of consensus statements from the meeting. He commented that STP Consensus 0908-02 on the preservation of cuttings from riser sites was a response to a request from NanTroSEIZE co-chiefs. Referring to STP Consensus 0908-04 on expedition QA/QC reporting, Neal noted that no QA/QC reports were received, despite there being an agenda item on the reports. He presented STP Consensus 0908-07 on field testing of the riserless mud recovery (RMR) system, noting that the STP fully supports the idea of field testing and would be interested in reviewing the results. Neal noted that STP Consensus 0908-08 endorses the IODP-MI efforts to integrate engineering activities, while STP Action Item 0908-25 requests that IODP-MI establish a uniform set of metadata so that the interface with SEDIS is seamless.

Neal presented STP Consensus statements 0908-05 on the approval of expedition measurement plans, and 0908-06 on the reserving of platform time for non-expedition-specific purposes. These were both received by the SPC.

STP Consensus Statement 0908-05: The STP approves the Expedition Measurement Plans for Shatsky Rise (324), Canterbury Basin (317), Wilkes Land (318), NanTroSEIZE Stage 2 (322), and Great Barrier Reef (325) as presented by the IOs.

STP Consensus Statement 0908-06: The STP supports SPC's changes to guidelines that suggest 3 platform days per 2-month expedition be automatically set aside for other purposes (e.g., APLs, engineering).

SPC Consensus 0908-06: The SPC receives STP Consensus 0908-05 on expedition measurement plans and Consensus 0908-06 on platform time for non-expedition specific purposes.

Neal presented STP Recommendation 0908-09 on the recommendations for routine microbiological sampling on IODP expeditions.

STP Recommendation 0908-09: The STP recommends the following approach to assist routine microbiological sampling on IODP expeditions (including those for which microbiology is the primary scientific objective) so that samples are adequately and consistently preserved for future microbiological analysis. The panel further recommends that a microbiologist sail as part of the science party with each expedition in order to oversee the proper sampling, preservation, and integration of these materials into specific expedition objectives.

Larsen noted that in the FY2010 annual program plan, the CDEX budget includes a specialist in microbiological sampling at the Kochi Core Center (Larsen noted that the program plan has not yet been approved.)

Ruppel wondered if the microbiology samples will be used. Neal commented that microbiologists say yes, while historical evidence says no; however, the program is now doing a better job of getting information out to the community. Malone pointed out that there is a cost issue to the program because people would have to be hired. Ruppel suggested a trial run for N years to see if anyone wants to use samples. Neal said he has been told that there is pressure, and will be pressure. Larsen thought that currently there is not significant pressure for requests. He suggested that microbiological sampling be established; after a few years there should be a review to see if the samples are being used. van der Pluijm commented that he would be surprised if microbiology is not a major part of any future program. Kakegawa said he liked the idea, but was concerned about priorities. Neal said it was not intended for microbiological sampling to interfere with the expedition goals. Mori asked if the SPC accepted STP Recommendation 0908-09.

SPC Consensus 0908-07: The SPC accepts STP Recommendation 0908-09 on routine microbiological sampling on IODP expeditions, with the understanding that primary expedition objectives receive top priority.

Neal also presented two STP “Certificates of Appreciation” for Sean Higgins (STP Consensus 0908-14) and Tom Janecek (STP Consensus 0908-15).

7.5. Engineering Development Panel (EDP)

Greg Myers, substituting for EDP chair Bill Ussler, presented a number of EDP consensus statements for the information of the SPC, including: 0907-11 on the adoption of version 3.0 of the EDP technology roadmap; 0907-13 on the endorsement of IODP-MI’s effort to integrate all IODP engineering activities; and 0907-14 on the endorsement of modifications to the at-sea engineering testing policy. Myers also presented EDP Consensus 0907-07 on the EDP’s endorsement of field testing of the riserless mud recovery system, which was received by the SPC.

EDP Consensus 0907-07: The EDP endorses field testing of the Riserless Mud Recovery System (RMR) if an opportunity is presented for using an IODP vessel. Development of a RMR system is an appropriate step for advancing deep water, deep hole drilling technology. Riserless mud recovery offers potential benefits for all IODP platforms.

SPC Consensus 0908-08: The SPC receives EDP Consensus 0907-07 on field testing of the riserless mud recovery system, 0907-11 on the EDP roadmap, 0907-13 on integrating engineering development, and 0907-14 on the at-sea engineering testing policy.

Mori presented EDP Consensus 0907-12 on EDP's recommendation for a two-vice chair system.

EDP Consensus 0907-12: The EDP recommends a one chair, two vice-chair system for future panel leadership. The EDP recommends Hiroshi Asanuma and Maria Ask to become the next EDP co-vice chairs.

Mori described this request as problematic because it conflicted with the EDP terms of reference. He suggested receiving the statement and asking the EDP to nominate a single vice-chair. Otherwise, he suggested that the EDP should request a change to the terms of reference and provide a reason for the requested change. Ruppel recommended telling the EDP that it must have one vice chair. Filippelli agreed. After further discussion on whether the EDP statement should be received, accepted or rejected, the SPC reached a consensus to receive the statement.

SPC Consensus 0908-09: The SPC receives EDP Consensus 0907-12 regarding two vice-chair leadership for the EDP. The SPC directs the EDP to nominate one vice-chair according to the panel's terms of reference.

Mori presented EDP Consensus 0907-15, in which the EDP requests clarification on future support of the panel after consolidation of the two IODP-MI offices.

EDP Consensus 0907-15: The current IODP-MI Washington, DC office is integral to the functioning of the EDP. Given the consolidation of the IODP-MI offices, the EDP would like clarification of the plan for providing continuing IODP-MI support of the EDP

Mori recommended accepting this statement. The committee agreed by consensus.

SPC Consensus 0908-10: The SPC accepts EDP Consensus 0907-15 on the current support of EDP by IODP-MI and forwards it to IODP-MI. The SPC acknowledges the valuable role that IODP-MI provided to EDP, and wishes to see a good continuity of this function during and after the relocation of offices.

Wednesday

26 August 2009

08:00-17:00

8. Report on International Working Group *Plus* (IWG+)

Hans Christian Larsen provided an overview of the IWG+, describing its membership, mission and meeting activity. The IWG+ has three co-chairs; one each from Japan, U.S. and ECORD. All current program members have membership on the IWG+. The group first met during the June 2009 SASEC meeting, will meet during INVEST (September 2009) and again during the January and June 2010 SASEC meetings. The IWG+ includes observers from the SAS, IOs and IODP-MI.

Larsen explained that the vision of the IWG+ is to frame a new multinational program architecture that promotes delivery of the best possible and most exciting and relevant science to the broad science community and the public through scientific ocean drilling. Larsen noted that the IWG+ is determined that the post-2013 program will be a new program with a new structure, not a renewal of the IODP. He explained that the mission of the IWG+ is to design a new drilling program that, among other things, is simple, efficient, and able to deliver go/no-go decisions on drilling proposals fairly and quickly, and operates in the most efficient and effective way, at the lowest possible costs. The purpose of the IWG+ is to implement a review of the current program and prepare for a new program in 2013, including defining new program principles and new memoranda of understanding (MOU). The IWG+ will not conduct science planning.

Larsen listed input from the IWG+ to the INVEST meeting. These points covered scope of the program, the new science plan, science community input, and platform availability. Larsen noted that the new science plan must emphasize science relevant to society, and will have to include firm deliverables. Full funding will cost about \$200M per year, thus the budget for ten years of full funding will be about \$2B. Larsen noted that while the IWG+ input made no mention of other nations potentially providing platforms, the group was not against this. Larsen also suggested that the first one or two big riser drilling project themes need to be defined at the INVEST meeting.

Larsen showed a post-2013 planning timeline, including different levels of review of the new science plan, ending with an Academy of Science-level review.

Referring to the need for firm deliverables in the new science plan, Neal asked what guidance the IWG+ has provided. Allan said that there is a feeling that the implementation of the current ISP has been a bit of a random walk. He explained that the science plan outlines the things the program will do. He suggested the plan needs to be less broad-based and include a bit more explanation of how the plan will be implemented. Neal wondered if deliverables were equivalent to milestones. Allan said that the science plan should be more prescribed, though not over-prescribed to the extent that good ideas are excluded, and more easy to follow. Larsen suggested that, as an example, the science plan should contain more firm wording that the program will provide a set of observations on sea level change or climate models. He said the science plan should provide a more firm commitment relative to the current ISP. Neal expressed concern that this could set the program up for failure by promising to deliver something that is not delivered.

Ruppel expressed disappointment that the information from the IWG+ appeared to focus on ocean drilling as a standalone program. She said this was a necessity in many ways, but problems of the future will require a greater level of coordination and flexibility in working with other constituencies and programs. For example, any drilling in the Arctic will require a mixture of resources. Ruppel said she was concerned that the new program was focusing on open water ocean drilling and not looking outside that box. She reiterated her concern that the IODP has been a standalone program, adding that she hoped the IWG+ will think about ways to avoid this. Mével said that this is something the IWG+ is really thinking about. Ruppel suggested that this was not reflected in the IWG+ information. Larsen said it is, but the wording is weak. Allan said that the NSF shares Ruppel's concern; i.e., the new program has to be more open to collaboration, and with boundaries that are somewhat seamless so that collaborations are easier. He added that, because the scientific problems are interdisciplinary and cross boundaries, the program needs to be flexible also. van der Pluijm said he had hoped to see a more explicit statement linking offshore and onshore science. Larsen encouraged everyone to make their points at INVEST; he said that is where the process starts.

Allan said that one of the fundamental strategies of the IWG+ is to include operators and others to ensure the ideas expressed here are incorporated. He suggested it might be useful for the SPC to make a statement regarding what it feels is important to be included in the new science plan. Mori asked if the committee wished to make a statement now, or create a report to send to the IWG+. Ruppel suggested making a statement now. Others agreed.

SPC Consensus 0908-11: The SPC receives the IWG+ guidance for INVEST and endorses all elements of the guiding principles. The SPC recommends that discussions of post-2013 scientific ocean drilling incorporate: (1) more seamless integration with other major geoscience programs (e.g., ocean observatories, ICDP, ANDRILL), as appropriate; (2) further recognition of the importance of onshore to offshore transects for some types of scientific studies; and (3) substantial flexibility in program and expedition planning and formulation.

9. Program renewal activities and timelines

Hans Christian Larsen gave an overview of planning for the INVEST meeting. He listed the steering committee co-chairs and members, summarized steering committee activities to date, and outlined the INVEST meeting structure. He explained that the meeting would comprise keynote talks, plenum sessions and breakout sessions based on six overarching themes. Larsen also listed the detailed day-by-day meeting agenda.

Larsen presented the call for nominations for the science plan writing group appearing in *Eos*. He noted that the writing group would comprise ten to twelve outstanding scientists to be selected by the SASEC. The SASEC has already decided that the two INVEST co-chairs and one other member of the steering committee would be on the writing group. Larsen also noted that the new science plan “must address fundamental and unresolved questions in Earth system sciences, be inclusive to new and emerging fields of science and methodologies, be open to other global science initiatives, and demonstrate a clear awareness of societal needs to understand Earth systems in the 21st century.” van der Pluijm suggested that, rather than being “open to” other global science initiatives, it would be better “to seek”.

Larsen presented a tentative timeline for the writing of the new science plan, comprising: (1) formation of the writing group by November 2009; (2) first draft of the science plan during 2010; (3) second (mature) draft ready around late 2010 or early 2011, followed by submission for high level review; and (4) final science plan in early 2011.

Schuffert observed that the qualifications mentioned in the call for nominations did not include good writing skills. He wondered if there was a plan to use editors to ensure a polished document. Larsen said there was not a concrete plan, but the mature draft would be run past an editor. He added that being a good writer will be one of the requirements. Ruppel expressed concern that this could close the door to people whose first language is not English.

Tobin commented that the IWG+ message makes it clear that prioritization is important. He asked how the outcome from the various working groups would be translated into high level prioritization. Larsen explained that each working group has a set of questions to be addressed; one of these addresses prioritization. He said that the big challenge is how to prioritize one big area or theme against another. He suggested this could not be done at the three day INVEST meeting, but would have to be left as a task for the science plan writing group, with reviewers providing input to adjust the balance. Tobin wondered if the INVEST meeting was structured in a way that would focus ideas for the next few deep riser drilling projects. Larsen said no, but the message will be given during the meeting.

10. “Flexible Expedition Implementation” Working Group report

Gabe Filippelli summarized the report of the Flexible Implementation working group (Filippelli, Ohkouchi, Peterson), which was established by SPC Consensus 0808-29 to explore schemes “at the proposal level that ensure maximum science and maximum implementation flexibility”. Filippelli noted that the objective of the study was to determine how best to utilize drilling platforms and their travel paths to increase the number of top proposals that can be implemented, and maximize the science that can be achieved by scientific ocean drilling. He added that the working group’s study focused on *JOIDES Resolution* operations. Filippelli noted that several scientific issues (e.g., assessing the relative impact of various objectives within proposals, and considering how to maximize scientific outcomes while retaining the primary core of proposals) and operational issues (e.g., cost, crew staffing flexibility, science party compositions and capacities for hybrid expeditions) have to be considered.

The working group’s suggested short-term approach for existing proposals was for IODP-MI to contact proponents of proposals currently residing at the SPC and OTF, asking them to submit an addendum including the following information related to their proposal: scientific objectives, sites involved, age/depth ranges of sites involved, drilling time estimates, priority of sites in achieving the objectives. Where there are multiple scientific objectives, the proponents should be asked to rank the objectives in terms of perceived importance. For proposals in the system but not yet at the SPC, and for proposals new to the system, the working group suggested that the above information should be solicited by IODP-MI and submitted before the SPC receives the proposal for ranking.

The working group’s report noted that the basic functional expertise for Initial Reports-type science must be involved on a hybrid expedition. This could be achieved by substantially broadening the definition of the scientific party, including both ship-based and shore-based personnel. The working group also recommended utilizing the enhanced communication and data sharing capabilities of the *JOIDES Resolution* (e.g., live teleconferencing, transfer of large files, coordinated software systems, etc.), as a means to engage shore-based participants as virtual shipboard scientists. The working group noted that deviating from the normal two-month expedition model would incur the additional cost of a port call to accommodate two scientific proposals within a three month window. One option would be to have a full port call with crew, scientist rotation and other platform readiness activities. A second option would be to insert an additional port call for transferring of scientists only within a two month interval.

Blackman recommended more flexibility regarding the additional port call; for example, using a cheaper vessel to transfer people. Divins noted that the longest the *JOIDES Resolution* can go without refueling is ~75 days.

Ruppel commented that the drilling community thinks in terms of two-month expeditions. She suggested that some of the difficulties associated with more flexible scheduling could be circumvented if proponents could be educated to think more flexibly in terms of their drilling needs. Pälke suggested that the system currently has flexibility in how proposals are scheduled. He cited Porcupine Basin (Expedition 307) and Juan de Fuca cementing (part of Expedition 321), which varied from five to nine weeks, as examples. Pälke explained that during the nurturing process, the SSEP may ask for objectives to be added, re-focused or re-prioritized to maximize the science that can be achieved. He suggested that when a proposal is forwarded to the SPC, the prioritized science is already in the proposal, including site forms and usually a prioritized list of sites. He was skeptical if a short response letter from proponents would help very much. Filippelli countered that asking proponents up front to

provide information about prioritization will educate them about the seriousness of the process.

Allan expressed support for the concept of more flexible expedition implementation. He said that earlier in the program nearly all expeditions had mixed objectives and science parties (e.g., Lau Basin: ODP Leg 135), and a wide mix of scientists involved; however, around Leg 140 expeditions became more focused on a single objective. He expressed support for asking proponents to prioritize their objectives. Malone noted that some more recent ODP legs (e.g., Leg 161: Western Mediterranean) and early IODP expeditions were of variable length.

Ruppel noted that for some proposals, the objectives will require a full length expedition. Larsen agreed. He said it was important to take the proponents' input very seriously. Larsen stated there would need to be a mechanism to evaluate the proponents' response regarding a reduced scale of experiment. He suggested proposals might have to go back to the SSEP for re-evaluation. Filippelli suggested that as an interim solution for the March 2010 SPC meeting, one SPC watchdog could assess the information provided by the proponents. Behrmann agreed, saying the process should be jump started now. He thought that developing some other process would take too much time. Filippelli acknowledged that there may be some problems, but the committee would be able to learn from them.

Schuffert observed that the underlying assumption of this discussion is that a collection of short stories is more valuable than a lesser number of in-depth novels. He wondered what evidence could be cited to support this view. Filippelli disagreed with the analogy, saying the premise is incorrect. He said the objective is to continue stepwise progress that could not be made with the current fixed-length expeditions.

Divins reported that the first option (adding an additional port call) would cost on the order of \$500K, while the second option (transfer of personnel only) would cost ~\$200–300K. Filippelli asked how long an operational crew can contractually stay on the ship. Malone said about two months maximum. Divins added that the real issue is fairness between the two crews; having one crew out for eighty days followed by the second crew out for thirty days would lead to contractual issues. Allan stated that a \$500K port call could buy two weeks of fuel and insurance for operations. He said there was a cost-benefit tradeoff. Malone observed that either option (full port call or transfer of personnel) increases transit relative to operational days, which could add up to a lot, e.g., increasing transit by 5-10%. Filippelli asked for the USIO to summarize some of the costs involved. Allan stated that total operational costs are about \$6M per month; incremental costs are fuel and travel costs. He said the important thing is the number of problems that can be addressed, i.e., if it makes more sense to address two problems in three months rather than one problem in two months, that would be cost effective.

Mori suggested establishing a working group to look at scenarios, costs, and number of projects that can be covered. Früh-Green expressed confusion on what the committee was being asked to do. She said that this exercise can only be done when you know which proposals will be scheduled. Filippelli agreed that it does have to be based on schedules, but reiterated that proponents of all proposals should be asked to prioritize the objectives of their proposals. Divins pointed out that there is a time issue in terms of implementation. He said that cost estimates for FY2011 cannot wait until March 2010. Information about the FY2011 schedule is required immediately by the USIO so it can put together a program plan. He said that specifics, not generalities, were needed to move forward. Schuffert pointed out that any expansion of the science party would have cost implications. Behrmann said that the cost impact may not be as big as anticipated.

Mori said that he did not see a clear path forward. He recommended waiting until after the scheduling options for FY2011 were presented. Filippelli agreed.

van der Pluijm expressed frustration with the changing role of the SPC, observing that, up until now, watchdogs have never looked at proposals together – only individually. Now watchdogs have to think about how proposals should be combined and time has to be set aside to discuss which proposals may be combined. He stated that, ultimately, science should be the driver. Ruppel delivered a cautionary message, saying that the committee has played around with and changed proposals before, e.g., removing observatory elements from proposals at the August 2007 SPC meeting. She suggested that the committee would have to be fully aware of which elements of a proposal were to be considered during the ranking process.

Filippelli said that the SSEP does the most comprehensive science review. He thought the SPC should not reiterate the review work done by the SSEP, but instead should think in terms of planning. He advised remodeling the way the SPC evaluates and ranks proposals.

Filippelli asked if the report as presented, with modifications suggested at this meeting, can be taken as the consensus plan. Mori agreed. He said the committee will need to think how the recommendations can be effectively implemented. Ruppel asked for clarification on what was to be implemented. She asked if IODP-MI will ask the proponents for additional information, or would the SPC glean this information from the proposals. Filippelli said it would be the former. Larsen noted that this would impose non-trivial additional work during a busy transition time, but IODP-MI would figure out a way to do it. Früh-Green volunteered to write a statement of support for the working group's report.

The SPC discussed the wording of the draft consensus statement. Larsen commented that proponents are usually not very good at estimating drilling times. He suggested the IOs should be involved. Ruppel asked if proposal site forms include drilling time estimates. Larsen confirmed that they do. Divins said that some estimates are very accurate; others are optimistic. Blackman agreed that asking proponents for information does have drawbacks. She wondered if it would be more useful to have the SPC watchdog take on the task of determining the high priority objectives of a proposal, rather than the proponents, though the proponents could be contacted for assistance. Ruppel said the program owes it to the proponents to give them a chance to prioritize their science. Filippelli suggested that the information supplied by the proponents would be subject to the usual scrutiny that any document from a proponent would receive. He agreed that the IOs should be involved in drilling time estimates. He stressed that the requested information needs to be available at the next SPC ranking meeting.

Larsen suggested that, in some sense, the program takes ownership of proposals at the SPC level, therefore the workload should be placed more on the program, i.e., on the SPC. As an alternative, he suggested that first the program takes on the task of prioritizing the science, then the proponents could be asked for a response letter. Allan disagreed that the program takes ownership of the proposal. He said the proponents retain the intellectual property rights. Therefore, it is appropriate for the proponents to decide how to prioritize the science of the proposal. Pälke noted that each proposal cover sheet has a 250-word box for listing the scientific objectives. He said that almost all have a prioritized list, thus it is not clear what additional information is being requested. van der Pluijm said the SPC needs to know the high priority objectives; if this information is not available from the proponents, the SPC may decide the priorities. He stated the proponents need to understand this. Früh-Green said that many proposals were written before the difficult financial situation came to light. The

proponents need to understand that the rules have changed a bit, which is why the new information is required.

Filippelli said that he will work with IODP-MI on an e-mail message to proponents. Malone recommended that the proponents be given more specific guidance. Filippelli said this would be given in the e-mail message. Larsen wondered why this process should apply to proposals residing with the SPC; he asked how it would impact these proposals. Ruppel said it should not. Feary said that the earlier the information is received, the better. Filippelli agreed. Blackman also agreed. She said that part of this process was to allow the SPC to know which subset of a proposal's objectives it was ranking. Larsen said he understood, but thought this could be done when a proposal is forwarded to the OTF.

The committee endorsed the working group's report by consensus.

SPC Consensus 0908-12: The SPC commends the efforts of the “Flexible Expedition Implementation” Working Group (Filippelli, Ohkouchi, Peterson) to explore schemes at the proposal level and SPC level that would ensure achievement of top science objectives while allowing maximum implementation flexibility.

The SPC endorses the guidelines outlined in the working group report and acknowledges the need to be more pro-active in maximizing scientific outcomes for the program while retaining the primary objectives of proposals. The SPC will consider evaluating, on a case by case basis, possibilities for combining expedition objectives and/or staffing and crew, and/or for implementing flexibility in the length of expeditions.

To aid in future scheduling considerations, the SPC asks IODP-MI to contact proponents of proposals currently residing at SPC and at OTF (but not scheduled) to prioritize their scientific objectives in light of potentially reduced implementation and operational times.

11. OTF Report: IODP expedition scheduling II

11.1. OTF update

Conflicted meeting participants left the room (see agendum 1.6.2 for list of conflicts). Hans Christian Larsen presented recommendations from yesterday's OTF meeting, starting with the OTF-recommended options for five months of FY2010–2011 *Chikyu* operations. These comprised five cases: (1) NanTroSEIZE riser drilling plus observatories; (2) NanTroSEIZE riser drilling only; (3) NanTroSEIZE observatories and riser top hole (riserless) drilling plus one month of operation on Proposal 601-Full3 Okinawa Trough Deep Biosphere); (4a) NanTroSEIZE observatories plus 8–10 weeks at Okinawa Trough; and (4b) NanTroSEIZE observatories plus 8–10 weeks at Proposal 505-Full5 Mariana Convergent Margin (see figure in SPC Consensus 0908-13, agendum 11.2). Fukutomi noted that the starting date for operations has not been fixed. Options are June, August or October 2010. Also, the decision on whether riser drilling can proceed will be made three months prior to the start of planned operations. After discussion by the committee (see agendum 11.2) these options were approved by the SPC.

Larsen presented the OTF-preferred option for the late FY2010 through early FY2012 *JOIDES Resolution* operational schedule. Starting ~July 2010 this comprised Proposals: (1) 545-Full3 Juan de Fuca Flank Hydrogeology; (2) Proposal 662-Full3 South Pacific Gyre Microbiology; (3) 636-Full3 Louisville Seamounts; (4) 522-Full5 Superfast Spreading Crust; then, after ~three months of non-IODP work (5) 677-Full Mid-Atlantic Ridge Microbiology beginning in late FY2011; and starting in early FY2012 644-Full2 Mediterranean Outflow. After discussion by the committee (see agendum 11.2) a slightly revised version of this schedule, with Proposal 734-APL Cascadia Accretionary Prism CORK added to Juan de

Fuca, and the Superfast slot divided into two and shared with Proposal 537A-Full5 CRISP-A, was approved by the committee (see figure in SPC Consensus 0908-15, agendum 11.2).

Larsen noted that ESO did not have funds for an expedition in FY2011, thus no action was required by the SPC at this time. Scoping of Proposal 637-Full2 New England Shelf Hydrogeology and Proposal 716-Full2 Hawaiian Drowned Reefs will be initiated following Expedition 325 Great Barrier Reef Environmental Changes. Katz commented that it would take a lot of work to get New England to go forward. Mével said ESO is aware that New England will require a lot of planning. She added that ESO plans to implement Hawaii before New England.

11.2. SPC discussion and approval

Discussion and approval of Chikyu schedule

Larsen asked the SPC to endorse cases 1 and 2 as the top priorities. He noted that case 3 was the OTF's third priority. Filippelli noted that the PMT-preferred option was case 1. Mori noted that the OTF recommended case 3 as the highest priority if case 1 or 2 cannot be implemented because of a strong Kuroshio current. Blackman suggested that if the Kuroshio current was low it might be more advisable to devote full time to the ultimate goal, i.e., riser drilling. Fukutomi stated that if Mariana is to be considered an option, and operations start in June 2010, preparation would have to begin now (e.g., selecting co-chiefs). Larsen suggested that CDEX be asked to do initial scoping of Mariana. Feary noted that Proposal 505-Full5 has not been reviewed by the EPSP. Katz said it could be done by email if necessary.

Filippelli said he thought that high temperatures at Okinawa made it impossible to implement with current technology. Fukutomi said that it was doable. Kakegawa wondered if four weeks was sufficient to accomplish all the objectives of Okinawa. Larsen said no, but it would be enough time to establish if there are problems that would make returning unnecessary, or great results that would make a return desirable.

van der Pluijm expressed frustration over a lack of precise information. He supported case 3 as the first priority after cases 1 and 2. Mori noted general support for this prioritization. He asked if cases 4a and 4b should be deleted as options or left as possible contingencies to be discussed later on if necessary. Filippelli wondered what would be the trigger for cases 3, 4a and 4b. Mori explained that if riser operations were not possible, case 3 would be implemented. If the Kuroshio current was so strong as to preclude case 3, then case 4a or case 4b would be considered. The committee agreed with the PMT-recommendation to prioritize cases 1 and 2 as the top two priorities. Case 3 was accepted as the third priority. Cases 4a and 4b would be considered if necessary, though more information (to be obtained later if necessary) would be needed to prioritize these two cases.

SPC Consensus 0908-13: The SPC approves the following five-month operational plan and contingencies for *Chikyu*, with starting date in FY2011 to be determined.

Case 1 (top priority): (1) Site NT2-01 (observatory); (2) Site NT3-01 (riser drilling); and (3) Site NT3-01 (riserless observatory).

Case 2 (second priority): riser drilling at Site NT3-01.

Case 3 (third priority if the Kuroshio current is determined to be too strong for riser drilling): (1) Site NT2-01 (observatory); (2) Site NT3-01 (riserless observatory); (3) NT3-01 (non-riser drilling of riser top hole); and (4) Okinawa Trough Deep Biosphere (Proposal 601-Full3).

If extreme Kuroshio currents prohibit Case 3, Case 4a and Case 4b are to be considered (more information needs to be provided by CDEX to determine the priority ranking between cases 4a and 4b):

Case 4a: (1) Site NT2-01 (observatory); (2) Site NT3-01 (riserless observatory); and (3) Okinawa Trough Deep Biosphere (Proposal 601-Full3).

Case 4b: (1) Site NT2-01 (observatory); (2) Site NT3-01 (riserless observatory); and (3) Mariana Convergent Margin (Proposal 505-Full5).

Month	1				2				3				4				5			
Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Case 1	NT2-01				NT3-01 Riser								NT3-01RL Observatory							
	Observatory				36" Conductor + 20" + 16" CSG, TD=2100mbs								LWD=1000m, CSG, Observatory							
Case 2	NT3-01 Riser 36" Conductor + 20" + 16" + 13-3/8" CSG, TD=3300mbs (depend on coring, wireline, etc.)																			
Case 3	NT2-01				NT3-01RL Observatory				NT3-01 Riser Top Hole				Port Call	601 Okinawa						
	Observatory				LWD=1000m, CSG, Observatory				36" Conductor + 20" CSG					High priority sites only						
Case 4a	NT2-01				NT3-01RL Observatory				Port Call	601 Okinawa (4~5week opr * 2times) All sites proposed except 9A&10A (Reference sites/lower priority)										
Observatory				LWD=1000m, CSG, Observatory																
Case 4b	NT2-01				NT3-01RL Observatory				Port Call	505 Mariana Convergent Margin (Possible conflict with Chikyu's IODP window)										
	Observatory				LWD=1000m, CSG, Observatory					Riserless, CSG & CORK										

Discussion and approval of JOIDES Resolution schedule

Larsen reported that the USIO says it should be possible to re-enter hole 1256D at Superfast, but he said there was always a risk in re-entering a hole. He noted that the OTF recommended contingency for the Superfast slot was Proposal 537A-Full5 CRISP-A. Ruppel asked if Superfast was the consensus choice of the OTF for that slot. Behrmann said he did not think so. Filippelli said he understood that the idea was to have facilities and staff for CRISP-A on board should the hole at Superfast prove to be not enterable. Malone stated that it would be difficult to come up with a science party that would be happy to do Superfast and then move to CRISP-A, or vice versa. Behrmann said his understanding from the OTF meeting was that Superfast/CRISP-A would be a test case for the first hybrid expedition. Larsen was not certain how viable that would be, because if the Superfast hole is successfully re-entered, operations would then potentially have to cease before making significant progress.

Mori asked if the SPC preferred Superfast as the priority expedition, or a hybrid expedition comprising both Superfast and CRISP-A. van der Pluijm supported the hybrid approach. Ruppel and Früh-Green expressed concern that scientific goals at Superfast might not be achieved in half of an expedition. They thought this might be unfair to the Superfast proponents. Filippelli suggested, rather than splitting the expedition into two halves, using a decision tree, e.g., start at Superfast, but abandon after a ~one week if unsuccessful in re-entering the hole, or extend operations by ~one week if making good progress.

van der Pluijm suggested the rankings do not support having Superfast as a priority over CRISP-A. Larsen said that success at Superfast would finish a very successful project. Blackman said progress at Superfast would represent a significant step towards the Mohole – getting well into the gabbros and making significant strides in understanding crustal formation would help to design the next deep project. Malone again raised the issue of the science party for a hybrid expedition. As an example he said to consider the case where after five days at Superfast it proves impossible to get in the hole, so the ship goes to drill at

CRISP-A. He wondered who would want to be on that science party. Früh-Green agreed that young scientists in particular would only be interested in one area or the other.

Filippelli presented two draft options for prioritizing Superfast versus CRISP-A (see SPC Motion 0908-14). Mori suggested that option 1 implied a quick look. Filippelli said he thought about one week on site would be needed to decide; the trigger to move to CRISP-A would be based on whether or not significant engineering was required to re-enter the hole. For option 2, Superfast would have at most five weeks of the nine-week expedition slot. Malinverno pointed out that option 2 implies that some minimum amount of time will be devoted to CRISP-A. Allan agreed that a trigger was needed to decide when to abandon Superfast, but he suggested that two weeks would be a more realistic time frame. He recommended getting input from the operations managers at TAMU. Mori said that at this point he was not too concerned about the time; one or two weeks was acceptable. Larsen said that Allan's point was good, but he expressed concern over micromanagement of the operational aspects. He suggested that the SPC should focus on the science. He reminded the committee that the agenda book contains the IODP-MI Thematic Review on Oceanic Crustal Structure and Formation. He recommended that everyone read the report, then return to this issue tomorrow. Ruppel said that the SPC recognizes the needs of that community, but the committee's decisions are not necessarily guided by those needs. van der Pluijm expressed concern over the fairness of promoting one report over another. He said it should be assumed that everyone has read the report in the agenda book.

Mori conducted a straw poll to gauge the members' preference for prioritizing Superfast versus CRISP-A. Approximately two-thirds of the members preferred option 2 (Superfast and CRISP-A are both objectives). Peterson moved that the SPC prefers option 2; Jenkyns seconded. This motion passed.

SPC Motion 0908-14: Of the two options presented for prioritizing the Superfast Spreading Crust (Proposal 552-Full5) + Costa Rica Seismogenesis Project (CRISP) Phase A (Proposal 537A-Full5) slot in the FY2011 *JOIDES Resolution* schedule (see below), the SPC prefers option 2.

- (1) Deep objective of Superfast is the prime objective; if the existing hole is not suitable, CRISP A will be the contingency.
- (2) Superfast and CRISP A are both objectives. If conditions at Superfast warrant, a decision tree will decide whether an increased proportion of time would be spent at Superfast, or a decreased proportion of time.

Peterson moved; Jenkyns seconded; 13 in favor (Behrmann, Blackman, Feary, Filippelli, Jenkyns, Kakegawa, Kasahara, Mori, Ohkouchi, Peterson, Sato, Takada, van der Pluijm; 1 opposed (Früh-Green); 4 non-voting (Lee, Li, Stein, Webster); 2 absent (Screaton, Yamazaki)

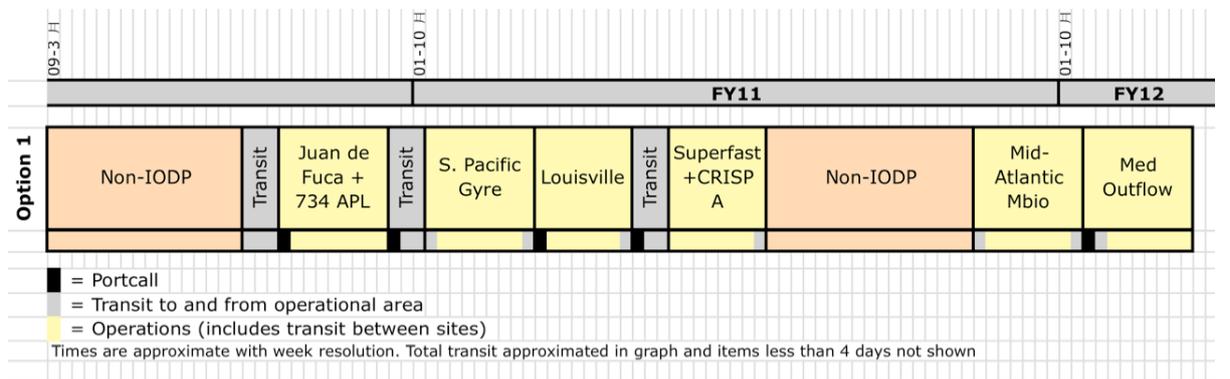
Ruppel pointed out that the proposed Cascadia Accretionary Prism CORK (Proposal 734-APL) would connect with the NEPTUNE Canada cabled network. She noted that the APL currently resides with the OTF. Blackman wondered if there was sufficient operational time to include the APL in the Juan de Fuca Flank Hydrogeology (Proposal 545-Full3) expedition slot. Malone replied that the APL would require just under three days. He added that the Juan de Fuca expedition was already a bit long. Mori asked if the SPC agreed to add the APL to the Juan de Fuca slot. The committee agreed (see Consensus 0908-15).

Larsen said that the SPC did not have to decide on Mediterranean Outflow (Proposal 644-Full2) at this time, since it was currently planned for FY2012, and thus is not a part of the FY2011 annual program plan. He added that the OTF did not discuss it at yesterday's meeting. Divins recommended leaving it on the schedule. He said it would be useful for

looking towards the future and sending a message for what science the program wants to accomplish. In addition, it would help the USIO in planning future expeditions. The committee decided to leave Mediterranean Outflow on the schedule.

SPC Consensus 0908-15: The SPC approves the following *JOIDES Resolution* schedule for late FY2010 and FY2011: (1) Juan de Fuca Flank Hydrogeology (Proposal 545-Full3) and Cascadia Accretionary Prism CORK (Proposal 734-APL); (2) South Pacific Gyre Microbiology (Proposal 662-Full3); (3) Louisville Seamounts (Proposal 636-Full3); (4) Superfast Spreading Crust (Proposal 552-Full5) + Costa Rica Seismogenesis Project (CRISP) Phase A (Proposal 537A-Full5); and (5) Mid-Atlantic Ridge Microbiology (Proposal 677-Full).

The SPC asks the Operations Task Force (OTF) to use the guidelines of the Flexible Implementation Working Group report to develop a plan that optimizes the allocation of operational days to these expeditions. Scheduling of the Mediterranean Outflow (Proposal 644-Full2) expedition is tentatively set for early FY2012 but needs to be confirmed later.



The committee discussed the decision tree for the Superfast/CRISP-A hybrid expedition. van der Pluijm said the decision tree needs to guarantee that CRISP-A will have a block of time. Filippelli agreed, though he said it might not necessarily be 50%. Jenkyns suggested that an absolute cap on the time spent at Superfast was needed. Ruppel requested that the decision tree be codified in an official SPC statement. Blackman cautioned against defining a specific date at which point operations would switch from Superfast to CRISP-A. Pälke wondered if the SPC had any preference for the priority of CRISP-A sites. He thought this would be useful guidance for the proponents. Malone noted that previous scheduling discussions have pointed out the long transit between Superfast and CRISP-A. He added that Janecek had asked the CRISP-A proponents what could be accomplished in 20–25 days; the proponents replied.

Filippelli presented draft wording for a decision tree. Subsequent discussion led to editing of the original wording. This was accepted by consensus of the committee.

SPC Consensus 0908-16: The decision tree for the Superfast Spreading Crust (Proposal 552-Full5) + Costa Rica Seismogenesis Project (CRISP) Phase A (Proposal 537A-Full5) slot in the FY2011 *JOIDES Resolution* schedule would involve several steps, guided by the following basic premises:

- (1) Superfast would be implemented first, with the only objective being the deep hole;
- (2) CRISP A would have a guaranteed operational window (~50% of the operational days).

If hole conditions at Superfast preclude significant advancement of objectives, operations will cease at Superfast and begin immediately at CRISP A objectives.

If site conditions are adequate and Superfast can commence, operations will continue at Superfast, and stop without debate at a time such that ~50% of the operational days can occur at CRISP A.

* * *

The committee convened an executive session which lasted ~30 minutes.

11.3. Nomination of co-chief scientists

Mori asked the IO representatives about the deadline for receiving co-chief nominations. Malone said as soon as possible, e.g., end of September. Fukutomi said that CDEX wants to receive the nominations by 22 September (prior to the NanTroSEIZE PMT meeting to be held during the INVEST meeting). He asked for nominations for NanTroSEIZE (observatory and riser operations) and Okinawa, but said nominations for Mariana were not presently needed because it is a lower priority. Stein asked how the nomination process worked. Schuffert explained that the SPC co-chief nominations will be collected by IODP-MI and forwarded to all of the program member offices (PMOs). The PMOs consult with the nominees, collect CVs, and then send the names and CVs of those nominees willing to serve as co-chiefs back to IODP-MI. IODP-MI forwards the names and CVs to the IOs.

The committee proceeded with nominating potential co-chief scientists for each of the late FY2010-2011 USIO and CDEX operations except Mariana (and Mediterranean Outflow). The IODP-MI science coordinators were asked to e-mail the list of nominations to all SPC members after the meeting to allow for further nominations.

12. International Continental Scientific Drilling Program (ICDP) report

Jim Mori provided a status report on ICDP activities. He listed the eight major research themes, summarized membership (current and under negotiation), and showed the organizational structure of the ICDP. He noted that the total ICDP budget was probably one or two orders of magnitude lower than the IODP's. He described the ICDP's Science Advisory Group (SAG) as approximately equivalent to the IODP's combined SAS, providing science and technical capabilities. The ICDP's Executive Committee (EC) is analogous to a hybrid of the SPC and SASEC; this group takes technical reviews from the SAG and makes decisions on implementation or rejection. The ICDP's Operation Support Group (OSG) helps organize ICDP workshops, assists PIs in scientific and engineering drill site operations and management, provides drilling equipment, downhole tools and field laboratory facilities, and offers a robust data management system, amongst other tasks. Mori listed the membership of the SAG and EC. He also noted that the ICDP annually runs a training course; its most recent course (October 2008 in Sweden) attracted 34 participants from 15 countries.

Mori presented a flowchart for the ICDP proposal process. This comprises two phases: (1) pre-proposal phase which, if successful, culminates in a workshop; and (2) full proposal stage which, if successful, leads to an approved ICDP project. Mori stressed that workshops are an essential element in the preparation of a full proposal because they allow the PIs to: (1) invite leading experts in the respective field from all over the world; (2) deepen and broaden the project; (3) form an international science team; and (4) prepare a detailed science, operations, and budget plan for a full proposal. Filippelli asked about the rejection rate for workshop proposals. Mori replied that last year there were 4–5 proposals, of which 3–4 were funded.

Mori listed the selection criteria for ICDP projects, and summarized the total number of proposals submitted (201), ICDP workshops (50), and ICDP drilling projects (25). For

several example projects he listed the total funds and ICDP-contributed funds, which average about 21% of the total funds. He noted that the ICDP does not fully fund any project; typically more than half of the funding has to be raised externally. Mori listed the six new preliminary and five new full proposals recently evaluated by the SAG. He briefly described several ICDP projects, either in the planning stages or ongoing, and noted that there was significant scientific and technological overlap with IODP projects. As examples he pointed to a new full proposal for drilling into coral reefs, which he said was similar the IODP Great Barrier Reef Environmental Changes expedition, and a recent (2008) workshop on “scientific drilling for human origins,” which he said has objectives that are similar to IODP Proposal 724 Full Gulf of Aden Faunal Evolution. Mori also noted that IODP Expedition 313 (New Jersey Shallow Shelf) was partly funded by the ICDP. Finally, he noted that the somewhat portable InnovaRig, which is capable of drilling and coring to 5000m depth, is the one piece of hardware owned by the ICDP. Behrmann noted that the InnovaRig was currently doing commercial work, which represents shakedown for the rig.

Neal asked how many IODP proposals residing with the SPC have ICDP components. Mori cited three: (1) 548-Full3 Chicxulub K-T Impact Crater; (2) 637-Full2 New England Shelf Hydrogeology; and (3) 564-Full2 New Jersey Shallow Shelf (which has now been drilled as Expedition 313). Larsen said that multi-component (land-ocean) proposals present a problem because there is no single place to submit the proposal. He explained that a couple of years ago the ICDP was asked if it would like to have a common submission process. The response was that the IODP proposal process was too complex, so this sharing never materialized. Ruppel voiced support for more integration between the two programs.

13. Expedition Reviews: NanTroSEIZE Stage 1

13.1. Expedition 314: LWD Transect *(SPC watchdogs: Kasahara, van der Pluijm)* *NanTroSEIZE overview*

Harold Tobin presented an overview of the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) project followed by a summary of Expedition 314. He said the NanTroSEIZE drilling transect is tied closely to various geophysical measurements designed to address questions of subduction megathrust fault systems. He described the Nankai Trough as the type location for studies of subduction earthquakes and tsunamis. Sites target the large slip region from the M8.1 1944 Tonankai earthquake. NanTroSEIZE objectives include: (1) sample and instrument the up-dip end of the seismogenic fault zone to better understand the nature of fault locking, seismic versus aseismic processes, and tsunamigenic slip; (2) document the material properties and state of the plate boundary fault system at several points with different P-T conditions and fault evolution, testing hypotheses for stable versus unstable frictional behavior; (3) investigate partitioning between seismic versus aseismic processes on the main plate boundary through monitoring of microseismicity, VLF, borehole strain and tilt, pore fluid pressure, and temperature; and (4) calibrate observations in the broader geophysical volume (imaged by 3D seismic) surrounding the boreholes to the rock properties and state. Tobin summarized the drilling plan, comprising ~six primary sites spanning the up-dip end of the interplate seismogenic zone, with planned depths ranging from ~300 to ~7000m below the seafloor. Core sampling, logging, downhole testing, and long-term monitoring will provide data on fault physics. Stage 1 expeditions, which started September 2007, began the transect with riserless drilling.

Expedition 314 review

Tobin noted that the objective of Expedition 314 was to obtain a comprehensive suite of geophysical logs at sites along a transect from the incoming plate to the Kumano forearc basin using LWD technology. The logging program included resistivity imaging, P-wave sonic, checkshot seismic, gamma, neutron porosity and density, and downhole pressure.

LWD was performed at five sites, but not all sites planned for LWD were logged (e.g., input sites were not logged). Tobin described this as the most comprehensive LWD tool deployment in any scientific drilling program. It also represented the deepest LWD penetration in ODP and IODP, and the deepest drilling into an accretionary wedge setting.

Tobin summarized the log units and lithologies at the five logged sites. He noted that drilling conditions at site C0002 (now planned to be the main deep riser site) were excellent; many logs were recorded. In addition, checkshot data from this site were helpful in calibrating the velocity structure. Checkshot versus sonic velocities tied closely. Site C0001 was intended as a pilot for the deep riser hole, but information from this hole led to a change in planning to C0002 for the riser hole. At site C0003 the LWD tool was lost due to sticking caused by strong cave-ins to the hole that were probably associated with a thrust fault. Site C0004 drilled across the splay fault with no difficulties. Work addressing the physical properties of the fault zone is ongoing. At site C0006 (accretionary prism toe) thick (~5m) turbidite repeating sandy intervals were found, interpreted as thrust repetition in the section. Tobin described the results from borehole breakouts determined from the LWD resistivity log. The results show a difference in stress state between outer wedge sites and Kumano basin sites, suggesting that the maximum horizontal stress is controlled by large-scale tectonic convergence in the outer wedge, but not in and under the forearc basin.

Behrmann wondered if the structures in the Kumano Basin gave an indication of the kinematic and chemical coupling between the upper and lower plate. Neal sensed that the loss of the LWD tool did not severely impact the results. He wondered if this was true. Tobin replied, at the time, it seemed a terrible loss. He added that, scientifically, one would want to get back the litho density and neutron porosity data; however, combined with the core the resistivity information is good, so one can create pseudo density. Sreaton noted that without cores, resistivity by itself can be difficult to convert to porosity. Kasahara asked what, other than the stress field, was the major finding from LWD. Tobin said that the major findings come from combining LWD with core results; stress is the most interesting purely from LWD. Also the recording of physical properties and velocity structure across the splay fault zone was important. He added that a lot of lab work on whole round samples was ongoing, e.g., determining frictional strength of rock, permeability. Takada said that when doing deep drilling, cores will sample many faults. He asked if it would be possible to identify the active fault causing big earthquakes or slow slip events. Tobin said that was the key question, but difficult to answer. He added that, based on other projects that he's been involved with, it should be possible to figure out which faults are the main structures. Kasahara asked about differences in source solutions for slip derived from tsunamis and seismic recordings. Tobin replied that there are limits on how much information can be derived from the 1944 data, but indications are there was large slip in some regions. Blackman wondered if the ground truthing of the 3-D velocity model was a major result. Tobin said that the results made the team happy, but did not change things very much. He noted that a 4-km streamer was used in water depth of 2 km to record the seismic, which gave good velocities for the upper ~1 km; the deeper velocities are the real issue. Tobin said the recent walkaway VSP will test the deeper velocity model. Mori asked if the largest reflections in the seismic data correspond to the largest physical features in the borehole. Tobin said yes; the tie between logging and seismic was generally very good, particularly at site C0004. He added that the 3-D seismic proved its worth in terms of a predictive tool for what would be drilled through.

See Appendix A for the SPC scientific assessment of Expedition 314.

13.2. Expedition 315: Megasplay Riser Pilot *(SPC watchdogs: Früh-Green, Kakegawa)*

Siegfried Lallemand presented a summary of Expedition 315. He noted that the initial objectives of the expedition were to drill and core down to 1000m below the sea floor at a single site (C0001) and install casing and collect physical property data for future Stage 2 riser drilling. This was the shortest Stage 1 expedition (one month; November-December 2008). “Sticky” drilling conditions resulted in failure to core down to 1000m at site C0001. Objectives were then changed to coring as much as possible at site C0002 (the alternate riser site). Lallemand reviewed the development of the forearc basin-splay fault system as inferred from Expedition 315 results. He summarized the biostratigraphic age models for sites C0001 and C0002, noting the latter showed a high sedimentation rate in the upper section. Lallemand said the most surprising result was the young age of the basin, where a thickness of more than 1 km was deposited in less than 1.7M years. Other results from litho- and biostratigraphic analyses are: (1) ages of the trench-to-slope transition (through the CCD) fit reasonably with a “continuous growth model” of the wedge; and (2) the main period of landward tilting (which could be related to splay fault activity) is 200,000 years between 1.2 and 1 Ma.

Lallemand noted that the second important result from coring at the two sites were associated with stress orientation and faulting. He noted that: (1) above the unconformity, ~90% of the faults described are sets of normal faults dipping at 60° either northeast or southwest; (2) stress orientations based on these normal faults suggest deformation in the slope apron is dominated by extension sub-parallel to the trench; and (3) at site C0002 in the Kumano forearc, the stress regime changed through time, with recent extension perpendicular to the margin overprinting an older regime quite similar to the one observed at present in site C0001.

Kasahara asked about the consistency of the stress orientations with Expedition 314 results. Kakegawa asked if the intention was to develop a model for the development of the forearc basin to accretionary prism, and to determine the stress history. Lallemand said yes, but was uncertain if it could be done solely based on results from Expedition 315. Takada asked why the basin structure started to develop, since normally it would be subducted. Lallemand suggested that tectonic topography is acting as a barrier.

See Appendix B for the SPC scientific assessment of Expedition 315.

13.3. Expedition 316: Shallow Megasplay and Frontal Thrusts

(SPC watchdogs: Blackman, Sato)

Liz Sreaton presented a summary of Expedition 316. She noted that the scientific objectives of the expedition were to determine the: (1) history of slip along the splay fault and frontal thrust and its relationship to seismic activity; and (2) relationships between fluid behavior and fault slip and deformation. In the shallow megasplay region, an unconformity at site C0004 and mass transport deposits at site C0008 record the initiation of the megasplay as an out of sequence thrust below the CCD. Sreaton presented a conceptual model of splay-fault development and mass-movement activity featuring megasplay fault activation at 1.55 Ma. She also described ongoing work on splay fault microstructural studies and friction experiments. Fluid flow studies suggest that the permeable slope basin layers provide fluid escape routes; this leads to dilution and dispersion of fluids flowing up the fault, and implies strengthening of the fault, and may contribute to an upward shift of slip. In addition, slope stability may decrease at the seaward end of the basin.

Turning to the frontal thrust region, Sreaton noted that this complex area was structurally very distinct from other Nankai transects. This complexity may be related to perturbation by a nearby subducting seamount. Dating of the transition from prism to slope sediments indicates the region has been active since 0.436–0.78 Ma. This constrains the initiation and

slip rate on the frontal thrust, suggesting accommodation of 13–34% of plate convergence. The lowermost part of one of the fault zones (438mbsf) contains an age reversal of 1.67My which indicates the shear zones accommodated more than 200m of slip. No porosity jumps were observed across faults suggesting that multiple faults and underthrust turbidites create many paths for fluid escape. Initial results suggest higher permeability than other Nankai transects. Finally, the frontal thrust region is significantly colder than predicted from models, possibly indicating active fluid circulation.

Filippelli commented that he was very impressed by all three presentations of results from the Stage 1 NanTroSEIZE experiments, including the ability of the participants to put out high quality publications at an early stage of analysis. Allan said that the reports he heard about the post-expedition meeting showed that it was much more involved than typical post-expedition meetings. Tobin explained a single, combined second post-expedition meeting was held for all three expeditions. He said a few things were done differently than most post-expedition meetings. One important difference that helped a lot is that no attention was paid to the difference between Expeditions 314, 315 and 316. Sreaton noted that the meeting was held earlier than normal, too. Tobin said that having the meeting barely one year after the first expedition fostered collaboration. There were no talks or presentations; there were posters and breakout groups plus meetings to discuss the breakout results. Tobin said that feedback on the meeting format was 100% positive.

Blackman asked if any evidence of overprinting of prior fluid flow history was found or looked for. Sreaton replied that one of the geochemists is convinced there is some signature of seawater. She said it was a difficult issue. Blackman wondered if the findings from this expedition inform the extent to which the larger project will be successful. She asked if there were any disappointments from this expedition, and do they have implications for where the project will go. Sreaton replied that there will be challenges for drilling because there is a lot of instability and broken up, faulted material. Tobin said that the riserless drilling accomplished what was hoped for. For deep drilling, the question is how to get logs from deep fault zones – that is a technically challenging thing to do.

See Appendix C for the SPC scientific assessment of Expedition 316.

* * *

Tobin gave a brief overview of Stage 2 NanTroSEIZE expeditions: 319 (Riser/Riserless Observatory 1), which is in progress; and 322 (Subduction Inputs) scheduled for September–October 2009. He noted that the objectives of the drilling are to prepare to install seismic/geodetic/hydrologic observatories at two sites above the seismogenic zone and core the subduction inputs to basement. During Expedition 319, site NT2-11B will be the first riser drilled observatory. Tobin said that the observatories would be more complex than a CORK, containing several instruments, e.g., strainmeter, broadband seismometers, tiltmeter, and others. The site will be tied to the Japanese cabled network DONET. In Expedition 322 the primary objective will be to sample above the basement low. The basement high will also be sampled if time permits.

Tobin also briefly described future, Stage 3, plans for NanTroSEIZE operations. He explained the deep borehole observatory concept. The targets are the splay fault system, top of the subducting basement and the plate interface at 4.5 and 6 km depth. Tobin said one difficult aspect will be getting across the faults if they are brecciated. One approach would be to use LWD to drill across a fault as quickly as possible, then come back and take cores off the side. Tobin said this would be a much more complex operation. He estimated that the time to drill down to the plate interface could be one year, while all Stage 3 operations will

probably take a couple of years to complete. Tobin gave an overview of the DONET cabled observatory network. Some of the NanTroSEIZE observatories will tie into DONET nodes, giving real-time data. Work to lay the DONET cable is ongoing.

Blackman asked if the network would allow two-way control, e.g., to adjust the sample rate. Tobin explained that DONET is designed for power delivery to holes. He said it would be two-way to some extent (i.e., power one way, data the other way), but a lot of aspects were still to be determined. He was uncertain if it would be possible to control the instrumentation.

Ruppel suggested that the SPC write a statement of support for NanTroSEIZE operations. Filippelli drafted a statement that was accepted by consensus of the committee.

SPC Consensus 0908-17: The SPC appreciates the post-expedition reports from Expeditions 314, 315, and 316 (collectively, Phase 1 of the NanTroSEIZE effort), and commends the NanTroSEIZE participants, co-chief scientists, the project management team (PMT), and CDEX for their success at truly integrating efforts across expeditions and for rapid dissemination of high quality publications resulting from these efforts.

Thursday

27 August 2009

08:00-17:00

14. Clarifying OTF holding bin concept

Hans Christian Larsen presented a brief report on the OTF “holding bin” concept. He asserted that proposals residing with the OTF should be ready to be implemented. He added that if a holding bin is needed the criteria for placing proposals in the bin need to be clearly defined. Larsen listed the proposals currently residing with the OTF and the six proposals placed in the holding bin as a result of SPC Consensus 0903-13. He noted that some proposals not in the holding bin (e.g., 724-Full Gulf of Aden Faunal Evolution) are not ready to go because of site survey and safety issues. Larsen listed some criteria that should be considered when determining if a proposal should go in the holding bin: site survey readiness, EPSP approval, need for long-lead items, permitting issues, pending third party contributions, others.

Ruppel stated that the holding bin was established to address site survey (SSP) and safety/environmental (EPSP) readiness. She pointed out that the committee did not go back and look at proposals previously forwarded to the OTF. Feary said he had noticed this and has made a list of current OTF proposals that should be in the holding bin. He added that he thinks the holding bin process has worked, and pointed out that the SPC chair has released a number of proposals from the holding bin because of clearance by the SSP and EPSP. Screaton thought that perhaps the entire SPC might want to see proposals after the SSP review. Ruppel noted that Proposal 677-Full Mid Atlantic Ridge Microbiology was specifically designated as a Tier 1 proposal and not put in the holding bin for political reasons.

15. Clarifying the Tier 1 and 2 concept

Jim Mori commented that this issue will feed into long range planning (agendum 16). He presented SPC Motion 0803-17, within which Tier 1 proposals are defined as that small subset of proposals with very high priority science to be scheduled in the current phase of the IODP (i.e., prior to September 2013); Tier 2 proposals are defined as high quality proposals that are available for scheduling by the OTF to complete efficient ship tracks. Mori noted that Tier 2 proposals reside with the OTF for two years, returning to the SPC if not scheduled during that time. He said the tier concept was designed to help the OTF make decisions so that proposals would not have to return to the SPC for each scheduling decision. Mori listed the current Tier 1 proposals.

Number	Title	Ocean
505-Full5	Mariana Convergent Margin	Pacific
537B-Full4	Costa Rica Seismogenesis Project Phase B	Pacific
545-Full3	Juan de Fuca Flank Hydrogeology	Pacific
601-Full3	Okinawa Trough Deep Biosphere	Pacific
636-Full3	Louisville Seamounts	Pacific
662-Full3	South Pacific Gyre Microbiology	Pacific
644-Full2	Mediterranean Outflow	Atlantic
677-Full	Mid-Atlantic Ridge Microbiology	Atlantic
552-Full3	Bengal Fan	Indian
724-Full	Gulf of Aden Faunal Evolution	Indian

Mori stated that items needing to be clarified are the status of: (1) Proposal 605-Full Asian Monsoon, which was assigned group 1 in March 2006; (2) Proposal 595-Full3 Indus Fan, which was not previously assigned a tier; and (3) MSP proposals. He said this would be done later.

16. Long-range planning of expeditions

Jim Mori presented the following recommendation from the IODP-MI Board of Governors: “Ask SASEC to come up with a three year plan (FY2011 to FY2013) for the rest of the program with SPC to work out the details. The Board requests this by June 2010.”

van der Pluijm said that the SASEC is charged with long-range planning. He said three years is not long-range planning; the SPC should be doing three-year planning. Larsen said he could convey that message back to the Board. van der Pluijm requested that Larsen do so.

Mori showed the late FY2010 and FY2011 schedule for the *JOIDES Resolution* (see SPC Consensus 0908-15). He suggested it would not be too much work to plan through to 2013. He noted that the SPC has already discussed contingency plans for *Chikyu*, while for MSPs, there will probably be two more expeditions after Great Barrier Reef. Mori concluded that the SPC can easily put together a plan for what is important to accomplish by 2013. He recommended that at the March 2010 meeting the SPC: (1) look at all of the Tier 1 proposals and decide which ones are the highest priority to complete by the end of the current program; and (2) put together tentative schedules that can accomplish this. This would be done for all three platforms. He wondered if it would be worthwhile to form a working group in January to prepare options prior to the March meeting.

Feary commented that presumably this exercise would not fill in all the expedition slots. He was against outlining the program plan until the end of the program at the March 2010 meeting. Mori said that the level of discussion would be, for example, deciding to send the *JOIDES Resolution* to the Atlantic or Indian Ocean. Larsen stated that the chairman of the Board of Governors was not asking for a final schedule. Rather, science priorities, themes to be addressed, and plans for efficient ship tracks should be established. He noted that the latter would partly be defined by commercial work, which would make it difficult to know how far planning could go in that direction. Larsen said that by August 2010 the SPC will have to approve a schedule for FY2012 anyway. He thought the planning exercise was manageable and would be useful.

17. Approval of new SSEP co-chair

See agenda 7.1.

18. Approval of new EDP chair

Jim Mori noted that Bill Ussler was the EDP nominee for panel chair. He stated that Ussler has been working very well as vice chair. With no additional comments, Ussler was approved as EDP chair by consensus.

SPC Consensus 0908-18: The SPC appoints Bill Ussler as chair of the Engineering Development Panel (EDP), effective immediately.

19. Nomination of SPC vice chair

Jim Mori noted that this agenda item was a mistake: the SPC does not nominate the vice chair. Instead, nominations come from the PMOs. Yamazaki reported that J-DESC nominates Junzo Kasahara for SPC vice chair.

20. Other business*Nomination of SPC members to serve on the OTF*

Jim Mori noted that replacements are needed for Behrmann, Mori and Ruppel. Mori nominated Kasahara. Filippelli nominated Barbara John, who will start as a new U.S. SPC member on 1 October. Behrmann nominated Früh-Green. These nominations were accepted by consensus of the committee.

SPC Consensus 0908-19: The SPC nominates Junzo Kasahara, Gretchen Früh-Green and (after her expected appointment to the SPC on 1 October 2009) Barbara John as new members of the IODP-MI Operations Task Force (OTF).

Clarification of the status of three APLs

David Feary gave a short presentation on behalf of the small working group, which included Ohkouchi and Stein, looking at APLs residing with the SPC. He posed two questions: (1) what should the SPC do with the existing APLs that reside with the SPC – deactivate or retain at SPC; and (2) in general, what should the SPC do with APLs that are not forwarded to the OTF for scheduling. Feary noted that three APLs currently reside with the SPC: 712-APL Sediment-CORK Trial Installation, 728-APL2 Gulf of Papua Coralgal Barrier Reef, and 742-APL Shatsky Rise High-Resolution Climate. Feary recommended deactivating 712-APL (the proponents have withdrawn their engineering development proposal for the S-CORK); deactivating 728-APL because the required site survey data was not collected in time; and deactivating 742-APL after Expedition 324 (Shatsky Rise) is completed. For the latter, he said this would retain flexibility to do the APL if there are a few days available and it is not possible to address the main expedition objectives. The committee generally agreed with the recommendation to deactivate 712-APL and 728-APL2; these were not discussed further.

Malone noted that Proposal 742-APL proposes to drill on the central high, while the bulk of Expedition 324 will be spent drilling on the southern high. He said it was highly unlikely that all of the sites on the southern high would be exhausted, leaving the likelihood of having extra time to drill 742-APL extremely poor. Mori said that Feary's suggestion would require going against SPC Recommendation 0908-01 (see agendum 1.5) to not schedule 742-APL. Pälke said that the current operational plan for Shatsky Rise has already been pared down. Furthermore, the expedition has plenty of optional sites. He noted that the SSEP thought the added science from the APL would be incremental.

Mori asked if the committee preferred to deactivate 742-APL or send it to the OTF as a contingency for Expedition 324. Ruppel expressed dissatisfaction with both options. She interpreted the vote on the APL (SPC Recommendation 0908-01) to imply deactivation. van der Pluijm agreed. Feary disagreed and recommended treating each APL on a case-by-case basis. He felt that automatically deactivating an APL that was not forwarded to the OTF

might in the future constrain the SPC. Jenkyns thought it inconceivable that 742-APL would be implemented; he recommended deactivation. Mori suggested that APLs should be evaluated on an up/down basis, i.e., either forward to the OTF for implementation or deactivate. Filippelli recommended deactivating APLs if they are not forwarded for scheduling.

Katz cautioned against leaving decisions to the last minute, otherwise, particularly if coring or drilling is required, the EPSP will not have time to review the APL. Ruppel commented that long lead times can be an issue because the IOs need time to plan even simple operations. She said that if an APL isn't scheduled immediately it often doesn't go anywhere. Ruppel opined that forwarding an APL to the OTF does not imply that the operator has to schedule it. Evans stated that for the case of 728-APL2 Gulf of Papua Coralgall Barrier Reef, the primary reason it was not implemented was lack of site survey data, but had the necessary data existed he thought that ESO was obliged to undertake implementation.

Mori asked if there was a consensus to deactivate the three APLs under consideration. There were no objections.

SPC Consensus 0908-20: The SPC deactivates the following three ancillary project letters (APLs):

Proposal 712-APL (Sediment-CORK Trial Installation);

Proposal 728-APL2 (Gulf of Papua Coralgall Barrier Reef);

Proposal 742-APL (Shatsky Rise High-Resolution Climate).

Feary presented some suggestions for dealing with APLs at the SPC. He suggested that APLs that are not sent to the OTF be dealt with on a case-by-case basis. He listed a few options: (1) deactivate immediately; (2) retain at the SPC until the target expedition is implemented, then deactivate the APL; or (3) retain the APL indefinitely as a target of opportunity. Filippelli suggested tabling the discussion. He recommended that APLs be solicited for Proposals 636-Full3 Louisville Seamounts and 662-Full South Pacific Gyre Microbiology.

Role of the SPC within the IODP Science Advisory Structure

Ben van der Pluijm requested a discussion on the topic of how the SPC is viewed as a part of the SAS and its role within the SAS. He said he was not pleased with a slide shown earlier which suggested the SASEC should be doing three-year science planning. He added that science planning seems to have been removed from the SPC, but it is the SPC that should be doing the science planning. Filippelli agreed that it might be a good idea for the SPC to completely understand its own role, and then transmit that to other committees. He explained that what van der Pluijm expressed represents what several U.S. members have discussed. He wondered if other SPC members feel the same way, i.e., the SPC should be in charge of long and short term science planning and assisting in the implementation of all the science the IODP does. Filippelli said that this involves planning for next year, planning for three years from now, deciding how to handle proposals, deciding on the classification of proposals, and how to handle less common items such as APLs. He added that if the SPC can agree on its own role, perhaps that should be more clearly articulated to the SASEC and Board of Governors.

Pälike noted that the SASEC is the body that claims to be in charge of long-range planning. Behrmann, careful to note that he was not presenting a European view, said that the SPC is perceived as the group that ranks proposals. He suggested clarifying to others that the SPC's role is more than that; it is basically setting the pace of the entire program. He thought this

was not well understood outside the SPC (or sometimes by the SPC). Behrmann said he was impressed by the quality of work done by the SPC, but he was also impressed by the asymmetry of communication. He observed that committee discussions were typically dominated by very talkative U.S. members, with European members tending to be less talkative, and Japanese, Korean and Chinese members typically being much less talkative. He said he was unsure how to remedy this, but stated that it needs to be remedied. He noted that there are a lot of observers at SPC meetings that monitor what the SPC does, so this is important. Mori agreed that this is an important issue, but asked to return the discussion to how the SPC perceives its own role, and what the SPC wants to be doing for the program.

Mori said that the SASEC sets the broad programmatic goals, while the SPC chooses the science that gets done; the decisions made by the SPC define the program. In that sense the SPC is the most important committee in the IODP. Kakegawa agreed. He noted that the SPC sometimes receives directions from the funding agency representatives, but the SPC does not report to funding agencies. Larsen agreed with Kakegawa. He said that the SAS provides advice to IODP-MI, while the funding agencies define the playing rules at the beginning; the SPC does not report to the funding agencies. Larsen stated that when the Board of Governors asked for a long-range plan it wasn't meant to express dissatisfaction with the SPC. He said the plan will be the last chance to demonstrate the strength of the program before renewal, which requires getting into a mode of doing better long-range planning. Larsen added that he thinks IODP-MI receives brilliant advice from the SAS, although things can always get better. He suggested that a few years ago the SPC was repeating too much of the SSEP's work and not focusing enough on programmatic issues. Mori stated that there have been changes in how proposals are looked at, e.g., advice from DPGs is taken more seriously, and proposals with similar objectives are looked at together. He said this was not done so much three or four years ago, so in that sense the committee has progressed. In addition, the SPC is now looking more at where the program is going rather than looking at proposals one by one. Mori also said that there has been quite a change in the discussions associated with ranking.

Filippelli observed that the ability of the SASEC to conduct long-term science planning is limited because that committee does not look at the proposals that drive the science, and this results in a disconnect. He suggested the SASEC should focus on providing guidance on high priority themes when planning science. Ruppel, referring to an early draft of the SASEC *Implementation Plan for IODP Expeditions: 2008-2013* said that the SASEC did stipulate priorities, but received very negative comments when it did so. She said the draft Implementation Plan reemphasized and refocused priorities which appeared to undermine the ISP, but this was shot down by the community and by the SAS. Blackman suggested that things worked out: the SASEC made some suggestions and they weren't adopted. She expressed surprise at the defensiveness of the comments expressed by Ruppel. Allan stated that the SASEC had good intentions; it was execution of those intentions that went awry. He explained that the program needed to make choices about where to put resources in order to address the ISP, but the SASEC set priorities without adequate buy-in by the community or the SAS. He suggested it was this exclusionary aspect which alienated the community, but had the SASEC used a different process the community might have reacted differently.

Stein said that the SPC's mandate is reasonable; however, the focus on long-term planning overlaps with the SASEC. He did not understand this. Mori said that when he first became chair of the SPC he met with Larsen and SASEC chair Masaru Kono and tried to modify the mandates. Changes in wording were proposed: workshops and long-term planning would be removed from the SPC mandate, and the SASEC would be caretaker of the ISP and do long-term planning. While the SASEC would be mandated to do long-term planning, the SPC would be mandated to execute the program plan. Mori noted that the suggested changes were

not implemented. Filippelli wondered, in this context, what is long-term planning. He wondered if this meant, for example, deciding which ocean to send the *JOIDES Resolution* in 2011. Mori said he did not think so, rather the SASEC guides the program in terms of where emphasis should be placed.

Fukutomi commented that the program should have goals and timelines to reach those goals. He said he has not seen such a plan from the SPC or SASEC, despite a lot of talk about long-term planning. Larsen stated the real long-range plan is the ISP, and the real role of the executive committee was to make sure that the schedules approved by the SPC over the years accomplished the goals. He said that now the planning is shorter term because the program has been in survival mode for the last few years, and it is difficult to do long-range planning under these conditions. Mori said there have been some attempts to set milestones, such as the SASEC Implementation Plan.

Filippelli noted that IODP-MI coordinates thematic reviews which help to elucidate the aspects of the ISP that have not yet been addressed. He asked if these reviews were completed. Larsen said no – in September there will be a thematic review of the third ISP theme (deep biosphere and seafloor ocean). By the end of this year or early next year, reports will be available on each theme. Filippelli said the one thematic review he was involved in concluded that the Arctic was extremely high priority, and the program should try to accomplish at least one more Arctic project before 2013. He added that one option is for the program to wait for a good Arctic proposal to be submitted, or the program could encourage individual proponents. Feary noted that the SPC can establish a program planning group (PPG) to focus on this type of issue, e.g., encourage proposals for a specific area.

Katz noted that its mandate allows the SPC to encourage individuals and groups to put together proposals. He pointed out that some proposals take six or seven years to get through the system. He quipped that if that is short-term, he is concerned about what long-term looks like. Katz voiced concern over the length of time it takes to get a proposal through the system. He suggested the process needs to be speeded up. Commenting on the hybrid expedition concept, Katz said that, historically, the program has been building larger and larger projects to accomplish “everything” (e.g., adding a microbiology component to a proposal). The hybrid expedition concept now suggests taking components out. Katz suggested that, with three years left in the program, this approach will not make much difference. He advised developing some recommendations for the next program on how to deal with short- and long-term projects.

Filippelli disagreed with the negative tone of Katz’s remarks. He said he does not feel that the program is a sinking ship that will die out in three years. Filippelli said there is a lot of work to do, and reorganization that is done now can become a part of the new program. He added that everyone realizes it sometimes takes seven to nine years to get a proposal drilled, but a two-month drilling project costs ~\$10M (more for *Chikyu*), so proposals have to be carefully reviewed. There is a tradeoff between proper oversight and the ability to get things done quickly.

Filippelli said the biggest disconnect has always been between the SPC and SSEP. He said the SSEP, with its broad scientific background, spends many hours reviewing proposals. Filippelli stated that this is where the SPC can make its mission a little more clear, i.e., the SPC should accept more of what the SSEP does. At the same time, the SSEP should be encouraged to give more clear signals beyond the star rating. The SPC should spend more of its time considering bigger issues and ensuring high priority science is accomplished. Ohkouchi expressed frustration with how the SPC takes advice from the SSEP, noting that sometimes a 5-star proposal from the SSEP is not ranked highly by the SPC. He added that

some aspects of the SPC overlap with the SSEP, while others overlap with the SASEC. He suggested the role of the SPC was not transparent.

van der Pluijm said he sometimes questions if there is a need for the SPC. The SSEP does a good job of reviewing proposals, while the SPC just ranks proposal. He wondered if the SPC and SASEC should be collapsed into one group. Katz said that proposal ranking is an important role, analogous to that of the editorial review process: the SPC takes previous reviews and ensures proper balance. He added that if he was on the SPC, he would want to see some accomplishment before rotating out after three years. Katz suggested that short-term could be defined as three years, and recommended that nurturing should not be longer than three years. He thought that if a proposal was not successful after that time, there is probably some fundamental problem with it. He stressed again that the SPC does, however, have a very important role, analogous to an editorial body looking at a lot of good reviews. Filippelli said the role of the SSEP is to nurture proposals to maturity and advance mature proposals to the SPC with a grouping. He claimed that at its March meetings, the SPC spends twenty minutes presenting the science of each proposal that the SSEP has already reviewed. Ruppel agreed, noting that the SPC looks at a lot of different proposals and should not review the SSEP reviews. She suggested that for each proposal, the SPC should show two slides that show the major points of the proposal. Ruppel felt that the SPC need not be apologetic as it goes through growing pains. She cautioned that the IWG+ minutes suggest that if some parties have their way, there will be no SPC type of body in the new program. She suggested that the SPC needs to be a better advocate for the good work it is doing, especially during difficult times resulting from funding shortages.

Schuffert suggested that one way to view the differences between the SSEP, SPC and SASEC is to look at the demographics: SPC members typically have a bit of grey hair; SSEP members are generally at an earlier stage in their career, and typically are experts on a narrower range of topics; SASEC members are “suits and ties” with management experience. He said there is a fundamental difference in these groups.

Früh-Green suggested ending the discussion. She expressed confusion over the purpose of the discussion which she considered to be one-sided, with primarily only U.S. members contributing. She asked about the goal of the discussion. Mori explained that van der Pluijm wanted a discussion on how members of the SPC view the role of this committee. He said it was useful, although he did not see any conclusion. Früh-Green wondered where this discussion was leading. Filippelli said he heard a lot of valuable things from SPC members and liaisons, but agreed the discussion should be stopped. van der Pluijm said the objective was to learn if there is a reason to have the SPC. He said this was a big question to ask and, based on the discussion, was not convinced there should be an SPC within the program. Jenkyns pointed out that from 1968 onwards there has always been a planning committee.

Früh-Green stated that having a multi-tiered structure (SSEP and SPC) gives an additional check to the program. She said the membership of these groups comprise many different disciplines and cultures, and discussions are dominated by those who speak the best and are most active in certain communities. She felt the role of the SPC is to provide an additional viewpoint to the science that emerges from within the program. Larsen said the key question is whether or not the SSEP/SPC/SASEC structure comprises one layer too many. He suggested there was perhaps half a layer too much. Larsen noted that the SASEC recently seriously considered removing themselves, but there are legal reasons for not eliminating the executive authority. He opined that the next program will try to reduce the number of layers, but thought there will still be a need for an SPC type of group.

Fukutomi likened the SPC to the chief operating officers for a company. He said the SPC is responsible for driving and maximizing the science derived from the three platforms. He suggested the goal of this discussion should be to look at the performance of the SPC in carrying out its responsibilities. Fukutomi felt it is time to review and perhaps change the way things are being done. Kuramoto said the most important thing is to take the global view when identifying the best science. Kasahara felt the discussion was useful to help clarify the SPC's mandate. He said that in ranking proposals, the SPC needs to maximize the science achieved by the program. He also agreed with Kuramoto's comment on taking the global view. Stein interpreted van der Pluijm's comment to mean that driving science is more important than ranking science. Stein felt that both elements are important aspects of what the SPC should do. Kakegawa recommended that this discussion be shared with other panels and the funding agencies. He said that others should be aware that frustration exists because of the overlap of both the SSEP and SASEC with the SPC. Allan commented that most SASEC members are former SPC members, and perhaps this partly explains why sometimes the executive authority takes on SPC responsibilities.

Mori closed the discussion, commenting that he thought it was very useful.

Statement of thanks to Tom Janecek

Carolyn Ruppel presented a statement of thanks to former IODP-MI Vice President for Science Operations Tom Janecek. This was accepted by consensus of the committee.

SPC Consensus 0908-21: The SPC thanks Tom Janecek for his invaluable service to the IODP since the program's inception and for his strong commitment to scientific drilling throughout his career. Tom's technical and scientific knowledge, keen insights, and thorough understanding of complex issues will be sorely missed by the SPC. The SPC wishes Tom every success in his future endeavors.

21. Future meetings

21.1. Liaisons to other panels and programs

The committee decided on the following liaison assignments for upcoming SAS meetings:

SSEP November 2009	Junzo Kasahara
EDP January 2010	Junzo Kasahara
SSP January 2010	Gabel Filippelli
STP March 2010	Jody Webster

21.2. 15th and 16th SPC meetings

21.2.1. March 2010 (Asia)

Jody Webster volunteered to host the next SPC meeting in Sydney, Australia. Tentative dates were set for the weeks of 15 and 22 March. A subsequent e-mail poll of SPC members established the next meeting dates to be 23-26 March.

21.2.2. August 2010 (USA)

Donna Blackman said she may be able to host this meeting at Scripps in San Diego, USA.

22. Review of motions and consensus statements

Resolutions were presented for departing SPC members Lee, Ruppel, Behrmann and Mori. The committee thanked Jan Behrmann for hosting its fourteenth meeting in Kiel, Germany.

SPC Consensus 0908-22: The SPC thanks Yong Il Lee for his careful and conscientious service to the IODP program. He was the first Korean representative (Interim Asian Consortium) to the SPC and has set a fine example for future SPC members from Korea. Thank you, Yong Il!

SPC Consensus 0908-23: The SPC is happy to acknowledge Carolyn Ruppel's deep knowledge of the program, and her comprehensive understanding of interactions between U.S. federal agencies and the drilling program that have frequently informed our discussions. Thank you Carolyn, there is no question that we will miss your energy and contributions.

SPC Consensus 0908-24: The SPC gratefully thanks Jan Behrmann for his dedicated service on the SPC, and especially for his careful presentations and impartial assessments of science objectives. His insight, humor, and leadership on issues related to tectonics, hydrogeology and subduction zone processes have been critical in shaping SPC decisions. The SPC also thanks Jan for his valuable contribution as liaison to the OTF and the ICDP.

SPC Consensus 0908-25: The SPC thanks Jim Mori for his great efforts in serving as chair over the last two years. He is recognized for his international outlook which acknowledged the various cultural differences of this panel, as well as trying to accommodate varying opinions to accomplish difficult jobs.

SPC Consensus 0908-26: The SPC thanks Jan Behrmann for organizing this meeting and pre-meeting field trip. He provided gracious hospitality and pride for the city of Kiel.

Mori adjourned the meeting at 15:49.

SPC 0908 Minutes, Appendix A**SPC Scientific Assessment of IODP Expeditions 314****NanTroSEIZE Stage 1: LWD Transect**

(by SPC members Junzo Kasahara and Ben van der Pluijm)

Expedition 314 was conducted between 21 September–15 November 2007 in the Nankai region offshore Japan. This represents a major development in Deep Sea Drilling Project/ODP/IODP history for two important reasons: (1) the goal was to drill and log a transect of six primary sites with the full suite of LWD/MWD tools, including two sites on the incoming plate, and two sites which penetrate through major active thrust faults; and (2) one site would serve as a pilot hole for deeper riser drilling while also addressing scientific targets in the splay fault thrust sheet and the Kumano forearc basin and underlying prism. The operational plan was structured differently from previous ODP/IODP expeditions, with approximately one-third of the total 57 days allocated as undivided contingency time. They also used a logging system new to IODP (seismicVISION), as well as several recent systems (sonicVISION and adnVISION).

The SPC was glad to hear about the overall success of this first expedition for the new ship *Chikyu*. Expedition 314 is the first part of the NanTroSEIZE complex drilling project (CDP) in IODP, and is a portion of a much larger effort. The CDP consists of multi-stage expeditions to investigate fault mechanics and seismogenesis along subduction mega-thrusts through direct sampling, *in situ* measurements, and long-term monitoring. The project expects to obtain a comprehensive suite of geophysical logs and other downhole measurements at sites along a transect from the incoming plate to the Kumano forearc basin using state-of-the-art logging-while-drilling (LWD) technology. This is a fitting start for the new vessel and SPC has high expectations for this major effort for the current IODP program.

Expedition targets

The targets of the expedition were the accretionary prism and faults, and the major forearc basin overlying the hypothesized seismogenic zone. The objectives were to drill a transect of riserless sites that would characterize the lithologies, physical and mechanical properties, structures, and stress conditions in the sediments at relatively shallow depths below seafloor on the Nankai margin and establish the riserless “top-hole” conditions and properties at the two sites slated for deep riser drilling in later stages of the NanTroSEIZE project. The specific goal of this leg was to obtain the maximum possible *in situ* data by logging in dedicated LWD holes.

Site C0006B was drilled and logged from 0 to 885.5 mbsf in the frontal thrust toe of the accretionary prism. Site C0004B was drilled from 0 to 400 mbsf across the out-of-sequence megasplay fault system. Site C0001D was drilled from 0 to 1000 mbsf into the thrust sheet above the megasplay, as a pilot hole for future riser drilling. Site C0002A was drilled from 0 to 532 mbsf as a second site in the thrust sheet. Site C0002B was drilled from 0 to 1401 mbsf and crossed 976 m of the Kumano forearc basin and 425 m of the underlying older accretionary prism rocks, to complete the pilot hole for the future riser drilling effort.

During this expedition, a suite of LWD logging was conducted, including gamma radiation, resistivity imaging, sonic velocity, neutron porosity, lithodensity, and check shot seismic. This produced a body of data that is the most advanced LWD data collected in scientific ocean drilling to date, as well as the largest distance logged with LWD during a single expedition. Hole C0002B represents the deepest penetration into an accretionary prism to date and is the deepest LWD hole in scientific ocean drilling.

Principal results of Expedition 314

The main scientific results, as summarized in the preliminary report of Expedition 314, provide the basis for several current papers, as well as information that supports further NanTroSEIZE drilling.

- The megasplay thrust sheet is composed of highly deformed and fractured rocks that are anomalously well indurated relative to their present depth.
- Present-day stress varies markedly along the NanTroSEIZE transect, and stresses in the upper 1.4 km are strongly compressional in the outer, active accretionary prism, while extensional in the forearc basin.
- The occurrence of gas hydrate as a cement preferentially located in sandy portions of turbidite beds above a bottom-simulating reflector was quantified.
- Drilling at Sites C0001 and C0002 also provides important pilot hole information that will help prepare for the planned deep-riser sites for later stages of NanTroSEIZE drilling.

Collectively, the results of Expedition 314 LWD drilling show that both the tectonic history and present-day stress conditions in the forearc basin region differ from those in the outer accretionary prism thrust sheets and faults. This is manifested in both the logging and image data, and by the difficult drilling conditions in the splay fault thrust sheet, where borehole caving and collapse was a near-constant risk. The apparent boundary in the state of stress between Sites C0001 and C0002 (only 10 km apart) implies that these sites span the updip-locked boundary zone. Future deep riser drilling will test these hypotheses when drilling from the forearc basin region to the actual plate interface fault system.

Lithology and structure of faults and thrust sheets

The SPC views that the intense efforts to gain geological information from the logging procedures was successful. The geophysical logs, especially resistivity imaging, was effectively used to infer structural deformations, in the absence of cores. The logging information is largely consistent with the known sedimentary geology, such as the slope-basin deposits seen at the trench site (C0006) which are dominated by hemipelagic muds/mudstones and turbidites, with relatively little sand.

The splay fault system was one of the main targets for this expedition and was successfully sampled. Directions of bedding planes and faults observed in the cores are generally consistent with reflectors seen in the seismic data, although the cores show the structures in much more detail. For example, the thrust sheet in the hanging wall of the megasplay fault at Sites C0001 and C0004 shows a strongly deformed zone with bedding that is clearly differentiated from the slope basin sediments above and the strata below. Logging results helped to characterize physical properties, such as showing that the rocks of the underlying prism below the thrust zone at Site C0001 are anomalously dense with high sonic/seismic velocity for their burial depth, indicating more advanced lithification.

Borehole breakouts and stress

The results from the borehole breakouts at four sites provide an interesting story about the complicated stress field in the forearc basin. The orientations of the breakouts at Sites C0006, C0001, and C0004 indicate northwest–southeast directions for the maximum horizontal stress, which is consistent with the overall compressional state of the subduction zone. However, site C0002 in the Kumano Basin shows a maximum horizontal stress that is almost perpendicular to this direction. These observations may provide an explanation for observed

normal faults in the basin. This information about the local stress field will be important for interpreting the cores along the NanTroSEIZE transect, since it indicates that the shallow stress field can change rapidly across a distance of a few kilometers.

Gas hydrates and bottom-simulating reflector

The identification of gas hydrates at Site C0002, associated with a well-developed BSR provided another example of the usefulness of the logging information, Resistivity logs, sonic velocities, and gamma response were used to characterize the BSR which was interpreted to consist of coarse basal beds in turbidite deposits. In contrast, similar sands below the BSR reflector depth show no elevated resistivity response. The logging data indicate that the BSR reflectivity is a response to both a small velocity high from hydrate cement in the hydrate stability zone and a more significant velocity low caused by the presence of uncemented sediments and/or free gas below the stability field. Further studies will determine the amount of pore space charged with hydrates, and combined with the 3-D seismic images, the total amount of gas in this area of the Kumano Basin can be estimated.

Operational challenges

There were many organizational and operational difficulties for this first expedition of *Chikyu*, as might be expected for a new vessel, new crew, and new implementation organization. Participants from the United States and Europe found operational procedures on *Chikyu* to be different from what they were accustomed to during the ODP. The co-chiefs reported that eventually good working relationships and efficient methods were developed during the course of the expedition. Further attempts to help improve the operational culture are underway.

The SPC has been kept informed about the serious problems that the Kuroshio Current is causing for completion of the overall NanTroSEIZE project. For this phase of the operation, drilling was often carried out with the current at 3 kt or more. This caused severe vibrations in the drill string which shortens the lifespan of the equipment. Also, the strong current meant that the ship had to often be re-positioned up stream of the current when the pipe was being lowered.

The effects of the strong current, fishing regulations, and weather (typhoons), all present operational problems that need to be addressed for the future drilling in this area. The NanTroSEIZE project management team (PMT) is looking into the various options to meet the scientific priorities of this CDP. CDEX is also examining technical solutions that may allow riser drilling under the fast current conditions. The SPC supports the planning of the PMT for prioritizing the scientific goals and would like to be kept informed of the operational changes that may take place.

SPC 0908 Minutes, Appendix B**SPC Scientific Assessment of IODP Expeditions 315****NanTroSEIZE Stage 1: Mega-splay Riser Pilot**

(by SPC members Gretchen Früh-Green and Takeshi Kakegawa)

IODP Expedition 315 was the second and shortest of three individual expeditions carried out within the NanTroSEIZE Stage 1 complex drilling project (CDP). This expedition was designed as a pilot study for future deep riser drilling of the megasplay fault to 3500 meters below seafloor (mbsf) in NanTroSEIZE Stage 2. Expedition 315 focused on coring operations of the mega-splay fault thrust sheet and forearc basin at two sites, C0001 and C0002, which were previously investigated with LWD drilling during Expedition 314. This expedition also served as an important shake-down cruise for future riser drilling operations and was particularly a test for RCB drilling and flexibility of crew rotations.

Site C0001: Out-of-sequence Mega-splay Fault Zone

Site C0001 is located at a small bench on the hanging wall of the main branch of the mega-splay fault where a small slope basin with coherent layered reflectors is developed and which overlies a more seismically-chaotic thrust sheet above the splay fault. Pilot drilling of the uppermost ~1000 mbsf at Site C0001 was planned to test conditions for riser drilling and to set the surface casing for future drilling. Drilling operations proved challenging at this site: difficult hole conditions were encountered between 460-540 mbsf, with borehole caving, enlargement, and partial collapse in an interval that is now called “the sticky zone”. Numerous attempts were made at coring multiple holes at Site C0001, however, the challenges posed by the sticky zone proved too great and no coring was achieved below 458 mbsf. The planned casing was also postponed at this site because of strong currents. The nature of the sticky zone still remains unclear, however, the results of the pilot study at Site C0001 suggest that this may be a difficult location for a riser site, and the original plan is being re-evaluated.

Results of coring of C0001 confirmed observations made during the previous LWD Expedition 314 and document the age and make-up of the deformed mega-splay thrust sheet and overlying slope apron deposits. Coring also allowed characterization of structural features and inferences on the evolution of the stress state. The establishment of a biostratigraphy on the cored samples is one of the most important results of this expedition and allowed precise ages for each stratigraphic unit as well as sedimentation rates to be established. The cored interval includes the slope basin (Unit I) and the top ~250 m of the underlying accretionary prism (Unit II). Unit I is composed mainly of Quaternary to late Pliocene silty clay and clayey silt with volcanic ash, while Unit II is made up of older (late-Pliocene to Miocene) mud-dominated sediments. The boundary between Units I and II was identified at 207 mbsf and is an unconformity occurring immediately below a thick sand layer. High resistivity and low gamma ray horizons frequently intercalated with mud were interpreted as turbidites during Expedition 314; however, most of them proved to be in fact volcanic ash layers through coring. Unit II exhibits much more deformation at both core and seismic scales, and also revealed a range of small-scale structures including normal, thrust, and strike-slip faults. A further important result was that interstitial water geochemistry and organic geochemistry data on the cores at the frontal thrust area showed no clear evidence for advection of chemically distinct fluids from depth.

Site C0002: Kumano Forearc Basin Region

Since casing operations were cancelled for this expedition, the remaining 10 days were used to core at Site C0002 and recover sediments from the Kumano forearc basin and the

underlying old accretionary prism material. This site is slated to be the centerpiece of the NanTroSEIZE project, with six or more kilometers of drilling planned to access the plate boundary at seismogenic zone depths in a later stage (originally planned for Stage 3). The principle goals of Stage 1 drilling at this site were to characterize the physical properties and document tectonic processes and lithology in the hanging wall of the plate boundary. This site is important because it records the timing and history of the mega-splay system in the formation and filling of the Kumano basin, and provides important constraints on the present-day stress regime in this portion of the margin. Drilling also provided crucial high-quality borehole engineering parameters to plan future riser drilling.

During Expedition 315, cores were obtained at Site C0002 in two separate holes at intervals of 0-204 m core-based depth below seafloor (CSF) and 475-1057 CSF. The forearc basin sequence was divided into two units based on lithofacies. All units are dominated by mud and mudstone; however, Units I and II contain more sand and silt intercalations and record a much higher sedimentation rate than the basal deposits of Unit III. The underlying accretionary prism consists of sediments that are moderately more lithified and much more deformed. One of the surprises of drilling at Site C0002 was that the Kumano Basin is a young feature, mostly of Quaternary age, with a high sedimentation rate ($>800\text{m/Ma}$), and overlies a late Miocene accretionary prism. Another important finding is that the transition from Pliocene to late Miocene strata occurs as a marked age gap around 922 m, as indicated by biostratigraphic data (predominantly by nannofossil zones) and magnetostratigraphy.

Biostratigraphic data provided good constraints on the sedimentation rates and allowed the development of a wedge growth model for the Kumano forearc basin: the accretionary prism (Unit IV) developed during the late Miocene (5–6 Ma). The basal forearc basin was formed before 1.7 Ma and is associated with slope apron and slope deposition. The sedimentation rate in the upper and lower forearc basins (Units I and II: 1.7 to ~ 1.2 Ma) was high. Deposition was followed by landward tilting and continuous development of the forearc basin (~ 1.2 to 1.0 Ma), with sedimentation continuing to the present (1.0 Ma to present).

Faults and shear zones are clustered at depths around 700, 920–950, and 1000–1050 m CSF, and core-scale structures can be used to infer paleostress regimes. Kinematic solutions computed from normal and thrust faults indicate that northwest–southeast extension is concentrated primarily in Unit IV, which is interpreted to be the accretionary prism. A middle phase of northeast–southwest extension occurred along the margin, and a final, still ongoing, phase of generally north–south extension is recorded primarily in structures in Unit II from the Kumano forearc basin.

Overall the structural data allowed the following conclusions to be obtained from Expedition 315: (1) ages of the trench-to-slope transition fit with a “continuous growth model” of the wedge; (2) the main period of landward tilting, which could be related to the splay fault activity, was rather short between 1.2 and 1 Ma; (3) observations at the core-scale structure confirm that presently, the domain immediately south of the splay fault shows maximum horizontal principal stress (SH_{max}) perpendicular to the margin whereas the Kumano domain shows SH_{max} parallel to the margin; (4) at Site C0001, SH_{max} corresponds mostly to the intermediate principal stress in the upper sections whereas it coincides with the maximum principal stress in the deeper accretionary sections; and (5) at Site C0002 in the Kumano forearc, the stress regime changed through times. The recent extension perpendicular to the margin (with a SH_{max} parallel to the margin) overprints an older regime quite similar to the one observed at present in Site C0001.

Interstitial water analyses were made on 31 whole-round samples. Changes in concentration for most elements seem to be controlled by unit boundaries. A downward increase of ethane

and concomitant decrease of C₁/C₂ ratios in Unit IV suggest some contribution of thermogenic hydrocarbons. Physical properties show complex trends with depth. Downhole temperature was measured at eight depths to 159.0 m CSF and showed an almost linear downhole increase with a gradient of 0.043°C/m, identical to that found at Site C0001.

In spite of difficult drilling conditions and strong currents encountered during Expedition 315, important contributions to Stage 1 were made in terms of documenting lithologies, structural features, and age of sediments in the shallow part of the accretionary prism and the overlying slope/forearc basin sequences at both planned riser sites (C0001 and C0002). These sites are located at vital positions and also elucidate the relationships between the growth of the accretionary prism and the evolution of the splay fault system.

SPC 0908 Minutes, Appendix C**SPC Scientific Assessment of IODP Expedition 316
NanTroSEIZE Stage 1: Shallow Megasplay and Frontal Thrusts**
(by SPC members Donna Blackman and Hiroaki Sato)

IODP Expedition 316 was one of the expeditions comprising the NanTroSEIZE complex drilling project (CDP). It was based on proposals 603A-Full2 and 603B-Full2, which were sent to the Operations Task Force (OTF) from the SPC in June 2004. The proposals of the CDP led to the Expedition 316 Scientific Prospectus which was augmented by an addendum in 2007. Expedition 316 (December 2007–February 2008) conducted drilling by *Chikyu* at four sites during its 49-day cruise: two sites (C0006 and C0007) near the frontal thrust area (original site NT1-03B), and two sites (C0004 and C0008) in the shallow end of the megasplay fault (original site NT2-01B).

The scientific objectives of drilling at proposed Site NT1-03B are: (1) to clarify the evolution of the frontal thrust from its birth to death; (2) to clarify the function of the frontal thrust with respect to large earthquakes; and (3) to evaluate the relationship between fluid behavior, slip, and deformation within the fault zone.

Site C0006 was previously drilled during Expedition 314, in which LWD logs were obtained to 885.5 m depth below seafloor. During Expedition 316, coring was completed down to 603 m core depth below seafloor (CSF), with an average core recovery rate of 64%. Poor hole conditions hindered drilling at this site, which aimed to reach the major frontal thrust but had to stop a few hundred meters short of that goal. The recovered section is lithologically divided into three units, with the upper two units being Pleistocene trench fill silt to sandstone. The lower unit III (449.67-603m) is Miocene to early Pleistocene, and consists of silty clay with interbedded volcanic ash layers, similar to the Shikoku basin facies. Concentrated zones of deformation were noticed in several horizons with deformation bands, fractures, tectonic breccias and fault gouge. Low porosity (ca. 48%) of the Unit I suggests erosion of the slope material. Thermal gradient at this site is 27°C/km, somewhat lower than 42°C/km observed in the neighboring site C0007.

Site C0007 is located ca. 1 km trenchward of site C0006, and targeted the main frontal thrust at the seaward edge of the accretionary wedge. The lithology of at site C0006 is trench-fill silty clay to sand with volcanic ash layers, Shikoku basin facies, and sand- and gravel-rich deposits. The lowermost unit consists of unconsolidated sand with poor recovery, above which the main frontal thrust is suggested by the presence of fractures, polished and slickenlined surfaces and foliated fault gouge.

The scientific objectives of drilling at proposed Site NT2-01B (C0004 and C0008) were: (1) to clarify the character and behavior of the shallow portion of the megasplay; (2) to characterize the slip, deformation mechanisms, and evolution in the stable region seaward of the unstable seismogenic fault; and (3) to investigate the relationship between fluid behavior, slip, and deformation along and adjacent to the megasplay fault zone. Site C0004 is located ca. 400 m upslope of the intersection of the megasplay fault and sea bottom surface, whereas site C0008 was drilled downslope of this intersection and cored the slope-basin stratigraphic succession and the top of the underlying accretionary prism.

Site C0004 was drilled down to 400 m depth, and the section is divided into four units. The megasplay fault is encountered at a depth of 307.52 m where an age reversal was observed between units III and IV. The carbonate content of the cores gradually increases upward in unit I, suggesting slow uplift of the site from below the CCD to its present water depth of

2632 m. A significant age gap was observed between units I and II, where nannofossil and geomagnetic data suggest a depositional break of 1.77 and 1.95 Myr. Near the boundary between units III and IV, fractured and brecciated zones with polished and slickenlined surfaces, and fault breccias are recovered. There was apparently no obvious evidence of fluid-rock interaction in the fault zone. A fairly high geothermal gradient of 52°C/km was observed at site C0004.

Site C0008 was drilled to evaluate the basin material that was shed from upslope, presumably from thrust blocks uplifted by the megasplay systems. Drilling down to 357.75 m revealed two lithologic units at this site. Unit I consists of a 272 m succession of hemipelagic silty clay with thin sand beds and volcanic ash layers. At the base of Unit I, a 40 m section of clayey gravel containing rounded clasts of clay and pumice constitutes sub-unit IB, which is interpreted as a series of mass-wasting deposits accumulated in the lower slope basin. Unit II includes ca. 57 m of sand-rich sediment for which there was very limited recovery. This sand, along with a minor gravel component, contains a diverse detrital grain assemblage that includes clasts of sedimentary, metasedimentary, plutonic, and volcanic rocks. The sediments in the site C0008 holes are undeformed to weakly deformed. Downhole temperature measurements showed high geothermal gradients of 51-57°C/km in the holes of site C0008. All of the sites of Expedition 316 showed evidence for gas hydrate. Inorganic geochemical data suggest that the sulfate-methane transition is reached at 6-10 m CSF.

In general, the downhole variation and depths of the lithologies recovered are well correlated with the seismic reflection data. Use of the new X-ray CT scan data allowed recognition of several zones that are interpreted to be triggered slope deposits (containing suspended clasts). Pb210 dates obtained for the youngest such deposit (1925-1950) suggest that it was associated with the 1944 Tokankai earthquake.

Although the drilling did not achieve the planned depths of the initial proposals and prospectus, Expedition 316 did penetrate the fault zones of both the frontal thrust and the mega-splay fault of the Nankai accretionary prism. The originally-planned casing operations for a hole in the megasplay region were shifted to a later Expedition (319) based on results obtained during Expedition 314. Further onshore analyses of the core are focused on quantifying the characteristics and behavior of the faults penetrated and the possible role of fluid flow. The drilling results of C0004 and C0008 with a model for evolution of a splay fault were published in *Nature Geoscience* (August 2009 issue; Strasser et al.). The evolution model is based on the detailed chronology of cores determined from nannofossil and geomagnetic data. The SPC welcomes the rapid and successful publication of these results from the expedition.

The following points may be resolved by further onshore studies of the cores of the expedition, which may be relevant for modeling the fault systems in the accretionary prism of the Nankai subduction zone.

1. Analyses and constraining the origin of the mud breccias encountered in some of the cores.
2. Analyses of the fault gouge materials.
3. Temperature modeling of the accretionary prism may be revised utilizing the results of the downhole temperature measurements of Expedition 316. Specifically, high geothermal gradients observed in C0004 and C0008 (more than 50°C/km) could be relevant to the drillability of the deep hole. If we extrapolate this gradient, the bottom temperature may exceed 300°C. Previous thermal modeling of the accretionary prism showed a convex upward geothermal gradient due to possible fluid flux in the interior of

the prism. However, the low permeability of the compressed sediments may be used to reassess the geothermal gradient in the sites. In the deep riser drilling of Stage 3 of NanTroSEIZE, the drilling targets ca. 7000 meters, where the main fault of the seismogenic zone would be reached, and the temperature condition is crucial in both evaluating the physical properties of the fault gauge, and the drillability of the hole in high temperature conditions.