

# IODP Science Planning Committee

8<sup>th</sup> Meeting, 28-31 August 2006

Solstrand Hotel & Bad  
Os, Norway

## *Science Planning Committee - SPC*

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Keir Becker (chair)	Rosenstiel School of Marine & Atmospheric Science, University of Miami, USA
Barbara Bekins	U.S. Geological Survey, USA
Hans Brumsack	Institute for Marine Chemistry and Biology (ICBM), University of Oldenburg, Germany
Tim Byrne	Department of Geology and Geophysics, University of Connecticut, USA
Bob Duncan	College of Oceanic & Atmospheric Sciences, Oregon State University, USA
Patricia Fryer*	Hawaii Institute of Geophysics, University of Hawaii, USA
Benoît Ildefonse	Laboratory of Tectonophysics, ISTEEM, University of Montpellier II, France
Hiroshi Kitazato	Institute for Research on Earth Evolution (IFREE), JAMSTEC, Japan
Youn-Soo Lee	Korea Institute of Geoscience and Mineral Resources (KIGAM), Korea
Chris MacLeod	Department of Earth Sciences, Cardiff University, United Kingdom
Katsumi Marumo	Geological Survey of Japan, Japan
Harue Masuda*	Department of Geosciences, Osaka City University, Japan
James Mori (vice-chair)	Disaster Prevention Research Institute, Kyoto University, Japan
Greg Mountain	Department of Geological Sciences, Rutgers University, USA
Ritsuo Nomura	Faculty of Education, Shimane University, Japan
Rolf Pedersen	Department of Earth Science, University of Bergen, Norway
Terry Quinn	College of Marine Science, University of South Florida, USA
Hiroaki Sato	Department of Earth and Planetary Sciences, Kobe University, Japan
Hiroyuki Yamamoto	Department of Marine Ecosystem Research, JAMSTEC, Japan
Toshitsugu Yamazaki <sup>a</sup>	Geological Survey of Japan, Japan
Zuyi Zhou	Department of Marine Geology and Geophysics, Tongji University, China

<sup>a</sup>Alternate for Harue Masuda

\*Unable to attend.

## *Liaisons, Guests, and Observers*

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Jamie Allan	National Science Foundation (NSF), USA
Jack Baldauf	JOI Alliance, Texas A&M University, USA
Rodey Batiza	National Science Foundation (NSF), USA
Jan Behrmann (Exp. 308)	Leibniz Institute for Marine Sciences, IFM-GEOMAR, Germany
Nobuhisa Eguchi	IODP Management International, Inc., Sapporo Office, Japan
Dan Evans	ECORD Science Operator (ESO), British Geological Survey, United Kingdom
Peter Flemings (EDP)	Department of Geosciences, Pennsylvania State University, USA
Holly Given	U.S. Science Support Program, Joint Oceanographic Institutions, Inc. (JOI), USA
Tom Janecek	IODP Management International, Inc., Washington, D.C. Office, USA
Barry Katz (EPSP)	Energy Technology Company, Chevron, USA
Shin'ichi Kuramoto	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Hans Christian Larsen	IODP Management International, Inc., Sapporo Office, Japan
Mike Lovell (STP)	Department of Geology, University of Leicester, United Kingdom
Alberto Malinverno	JOI Alliance, Borehole Research Group, Lamont-Doherty Earth Observatory, USA
Catherine Mevél	ECORD Managing Agency (EMA), Paris Geophysical Institute (IPGP), France
Kate Moran (Exp. 302)	Graduate School of Oceanography, University of Rhode Island, USA
Julie Morris	National Science Foundation (NSF), USA
Greg Myers	IODP Management International, Inc., Washington, D.C. Office, USA
Seung-il Nam	Korea Institute of Geoscience and Mineral Resources (KIGAM), Korea
Toshiyuki Oshima	Ministry of Education, Culture, Sports, Science, and Technology (MEXT), Japan
Michael Riedel (Exp. 311)	Pacific Geoscience Centre, Geological Survey of Canada, Canada
Jeff Schuffert	IODP Management International, Inc., Sapporo Office, Japan
Roger Searle (SSP)	Department of Earth Sciences, University of Durham, United Kingdom
Rüdiger Stein (SSEP)	Geosciences Research Division, Alfred Wegener Institute, Germany
Damon Teagle (Exp. 309)	School of Ocean & Earth Science, University of Southampton, United Kingdom

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## DRAFT EXECUTIVE SUMMARY (v1.2)

### 1.3. Approve SPC meeting agenda – highlight action items

**SPC Consensus 0608-01:** The SPC approves the revised agenda for its eighth meeting on 28-31 August 2006 in Os, Norway.

### 1.4. Approve last SPC meeting minutes

**SPC Consensus 0608-02:** The SPC approves the revised minutes of its seventh meeting on 6-9 March 2006 in St. Petersburg, Florida, U.S.A.

### 7.2. SPC discussion and approval of FY2008 science plan

**SPC Consensus 0608-03:** The SPC approves the science plan and operations schedule of the U.S. scientific ocean drilling vessel (SODV) as recommended by the Operations Task Force for FY2008 and earliest FY2009, as well as the readjustments required in the event of a delay in the starting date for SODV operations. The recommended expeditions will begin in November 2007 and proceed as follows:

- Equatorial Pacific Paleogene Transect I (Proposal 626-Full2)
- NanTroSEIZE Stage I (Proposals 603A-Full2, 603B-Full2, 603C-Full)
- NanTroSEIZE Stage I continued
- Bering Sea Plio-Pleistocene Paleoceanography (Proposal 477-Full4)
- Juan de Fuca Flank Hydrogeology II (Proposal 545-Full3)
- Equatorial Pacific Paleogene Transect II (Proposal 626-Full2)

In the event of a slight delay in the start of SODV operations, the entire schedule should simply shift later, as long as good weather windows remain open for the Bering Sea and Juan de Fuca expeditions. In the event of a longer SODV delay that would preclude such a simple shift, the first Equatorial Pacific expedition would be deferred until later and the schedule would begin with NanTroSEIZE Stage I operations.

**SPC Consensus 0608-04:** The SPC approves the science plan and operations schedule of the *Chikyu* for NanTroSEIZE non-riser and riser operations (Proposals 603A-Full2, 603B-Full2, 603C-Full) in FY2008 and early FY2009 as recommended by the NanTroSEIZE Project Management Team in July 2006 and the Operations Task Force (OTF) in August 2006.

**SPC Consensus 0608-05:** The SPC approves the mission-specific platform operations for the Great Barrier Reef component of Proposal 519-Full2 South Pacific Sea Level in FY2008-09, provided that (a) the proponents complete the proposed site surveys and submit the site-survey data in a timely and satisfactory manner and that (b) a successful EPSP review is completed in a timely manner as defined by the Operations Task Force (OTF).

## **8. IODP Science Advisory Structure**

### **8.1. Panel reports**

#### **8.1.1. Science Steering and Evaluation Panel (SSEP)**

**SPC Consensus 0608-06:** The SPC thanks the Science Steering and Evaluation Panel (SSEP) for formulating plans to organize IODP planning workshops and endorses their continued efforts. In particular, the committee endorses SSEP Recommendations 0605-01 and 0605-02 and the proposed international workshops on “Ultra-high Resolution of Paleoclimate” and “Extreme Climates and Abrupt Climate Change during the Cretaceous and Paleogene.” The committee encourages the workshop planners to synthesize the results of previous meeting reports, include contributions of and participants from existing national and international scientific programs and panels addressing these subjects, and evaluate predictions of future climate prepared by groups such as the Intergovernmental Panel on Climate Change (IPCC). The SPC forwards these two workshop proposals to the Science Advisory Structure Executive Committee (SASEC) for further consideration and strongly encourages the IODP-MI to seek increased funding to support such planning workshops.

**SPC Consensus 0608-07:** The SPC receives SSEP Recommendation 0605-03 on two possible themes for the first IODP missions based on an assessment of current drilling proposals and forthcoming planning workshops.

**SPC Consensus 0608-08:** The SPC receives SSEP Recommendation 0605-04 on developing a borehole tool that would deploy seismometers as part of a dedicated seafloor observatory (e.g. SeisCORK) and forwards it to the Engineering Development Panel (EDP) for evaluation. The EDP should report on this issue at the March 2007 SPC meeting.

**SPC Consensus 0608-09:** The SPC receives SSEP Consensus 0605-07 and commends the Science Steering and Evaluation Panel (SSEP) for redefining its five-star grouping system.

#### **8.1.2. Site Survey Panel (SSP)**

**SPC Consensus 0608-10:** The SPC receives SSP Consensus 0607-01 concerning the drilling and sampling technology for Proposal 637-Full2 New England Shelf Hydrogeology. The committee notes that the Engineering Development Panel (EDP) and the Scientific Technology Panel (STP) have already reviewed this proposal and provided feedback to the proponents and the program.

**SPC Consensus 0608-11:** The SPC promotes Dale Sawyer to chair of the Site Survey Panel (SSP) effective immediately. The committee also accepts SSP Consensus 0607-02 and appoints Yoshikazu Yaguchi as the new SSP vice chair effective immediately.

#### **8.1.4. Scientific Technology Panel (STP)**

**SPC Consensus 0608-12:** The SPC receives STP Recommendation 0606-03 on including post-expedition results in the expedition database and supports this recommendation in principle. The committee recommends that the IODP-MI proceed in working on this issue together with the implementing organizations (IOs) and the Scientific Technology Panel (STP) and report regularly to the SPC on any progress.

**SPC Consensus 0608-13:** The SPC promotes Mike Lovell to chair of the Scientific Technology Panel (STP) effective immediately. The SPC also accepts STP Consensus 0606-19 and appoints Clive Neal as the new STP vice chair, effective as of the beginning of his appointment to the panel on 1 October 2006.

### **8.3. New Program Planning Groups (PPGs) and Detailed Planning Groups (DPGs)**

**SPC Consensus 0608-14:** The SPC appoints Robert Duncan as chair of the Hotspot Geodynamics Detailed Planning Group, effective immediately.

**SPC Consensus 0608-15:** The SPC appoints the following individuals as regular members of the Hotspot Geodynamics Detailed Planning Group: Nicholas Arndt, Takeshi Hanyu, Yasushi Harada, Karen Harpp, Kaj Hoernle, Dennis Kent, Anthony Koppers, Will Sager, Bernhard Steinberger, John Tarduno, and Yi-gang Xu. The committee may still consider additional nominees for membership on this DPG.

*[Note: the SPC voted by e-mail shortly after the meeting to approve one additional member of the Hotspot Geodynamics DPG.]*

**SPC Motion 0609-01:** The SPC appoints Louise Kellogg as an additional member of the Hotspot Geodynamics Detailed Planning Group, effective immediately.

Ildefonse moved, Quinn seconded; 16 in favor, none opposed, 1 absent (Fryer), 3 non-voting (Lee, Pedersen, Zhou).

### **10. Review of Proposal 693-APL**

**SPC Consensus 0608-16:** The SPC forwards Proposal 693-APL South Chamorro Seamount CORK to the Operations Task Force for potential scheduling.

### **11. IODP expedition scheduling II**

#### **11.1. Presentation of OTF scheduling options for FY2009-10**

**SPC Consensus 0608-17:** The SPC approves a ship-track model for SODV operations in FY2009-10 that would proceed clockwise through the Pacific Ocean, assuming a start at Wilkes Land.

### **12. Mission Implementation Plan II – SPC discussion**

**SPC Consensus 0608-18:** The SPC registers its unwavering support of strategies that foster the imaginative conception and testing of bold scientific ideas through ocean drilling. For missions to be effective in this regard, we emphasize that the IODP funding agencies need to continue developing fiscal mechanisms that enhance the support of acquiring site-survey data essential to the integrated structure of mission planning.

### **13. FY2008-09 engineering development II – SPC prioritizations**

**SPC Consensus 0608-19:** The SPC recommends including the down-pipe camera development project in the FY2008 program plan, together with the two previously considered engineering projects for a pulse telemetry module and long-term monitoring system (see SPC Consensus 0505-01 and Consensus 0603-25).

## 20. Review of motions and consensus items

**SPC Consensus 0608-20:** The SPC thanks Patty Fryer for her service to the committee from 2004 to 2006. She has always engaged actively in discussions and shown concern for the optimal functioning of the program, while imparting her special wisdom in interdisciplinary projects among geochemistry, subduction dynamics, and microbiology. We wish Patty all the best in her future endeavors, including the recovery of pristine fluid samples and abundant extremophiles.

**SPC Consensus 0608-21:** The SPC bids a fond adieu to Bob Duncan – but not for long! We thank him for three years of stellar service on the committee, following on multiple past terms on ODP panels. During his term on the SPC, his even-handed and expert assessments of a wide range of important topics were essential in helping us achieve our objectives and make a few difficult decisions. We especially thank Bob for agreeing to chair the Hotspot Geodynamics DPG as he rotates off the SPC, and we look forward to seeing him again in about a year for a comprehensive, concise, and timely report from the DPG.

**SPC Consensus 0608-22:** Ode to Terry Quinn (sung to the tune of *Danny Boy*)

Oh Terry Boy, the vacuum lines are wheezing  
From your mass spec, away 'cross Texas wide  
Your term is done, no more will Keir be calling  
'Tis you, 'tis you must go and we must bide.

But come ye back to tell of Vanuatu  
Or that the world is bathed in CO<sub>2</sub>  
We'll still be here with missions, SAS, and ESO  
Oh Terry Boy, oh Terry Boy, we'll miss you so.

**SPC Consensus 0608-23:** This is the last meeting of two of the ECORD delegates, Hans Brumsack and Benoit Ildefonse. The SPC thanks both of them for their contribution to the committee and to the other SAS panels on which they have served faithfully and selflessly over many years.

We here extend thanks  
To ECORD rep Hans,  
His comments are wry,  
His humor is dry,  
And his pipe lends an air of romance.

And also to a chap named Benoit,  
With whose name there is no possible rhyme,  
But who's insight's stupendous,  
With knowledge compendious,  
And always meets deadlines on time.

So goodbye SPC  
They'll tell us, with glee  
'Tis not a goodbye  
Wipe that tear from your eye  
Our replacements are better, you'll see.

**SPC Consensus 0608-24:** The SPC thanks Roger Searle for his years of service as chair of the Site Survey Panel (SSP). He guided the SSP through a critical time of working with a new Site Survey Data Bank and developing new protocols that move proposals toward the goal of accomplishing good science. His clear, deliberate manner in running panel meetings, plus his concise and useful reporting to the SPC, present a challenge for all subsequent panel chairs to match. We are pleased that he will remain as an SSP member for an additional year and will help his replacement maintain the high standards of performance that he himself has set.

**SPC Consensus 0608-25:** The SPC thanks Makoto Okada for his devoted contribution to the Scientific Technology Panel (STP). He has worked as a vice-chair and chair of the STP and successfully organized many important issues in IODP scientific technology. He is a quiet, self-effacing person, but he is always filled with a Japanese smile. Okada-san is a prominent paleomagnetist in the late-young generation of the Japanese earth science community, and his personal magnetism attracts younger earth scientists; thus, he is very hopeful and would be a key person to the future of scientific ocean drilling. We regret that his term as STP chair has ended; however, we believe that he will stay involved with the IODP community and continuously promote IODP science with more powerful magnetism.

**SPC Consensus 0608-26:** The SPC thanks Rolf Pedersen, his colleagues at the University of Bergen, and the ECORD Managing Agency (EMA) for hosting this SPC meeting in the wonderful setting of the Solstrand Hotel & Bad in Os, Norway. Despite a minor amount of rain, the setting was spectacular, the hotel, food, and reception were superb, the meeting room was nearly perfect, and the excursions were truly unique.

# **IODP Science Planning Committee**

**8<sup>th</sup> Meeting, 28-31 August 2006**

**Solstrand Hotel & Bad  
Os, Norway**

**DRAFT MINUTES (v2.0)**

**Monday**

**28 August 2006**

**10:30-18:00**

## **1. Introduction**

### **1.1. Call to order and introductions**

After a morning bus ride from Bergen, Keir Becker called the meeting to order at 10:25 and the meeting participants introduced themselves.

### **1.2. Welcome and meeting logistics**

Rolf Pedersen welcomed everyone to Norway and explained the meeting logistics.

### **1.3. Approve SPC meeting agenda – highlight action items**

Keir Becker highlighted several action items for the meeting. He noted one change in the agenda, with Myers reporting instead of Janecek under Agendum 9, and asked for any other changes or additions. Without further comment, the committee approved the agenda by consensus.

<p><b>SPC Consensus 0608-01:</b> The SPC approves the revised agenda for its eighth meeting on 28-31 August 2006 in Os, Norway.</p>
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### **1.4. Approve last SPC meeting minutes**

Keir Becker noted several minor changes to the draft minutes and asked for any other comments or suggested changes. Bekins noted that the list of attendees should include Greg Moore of CDEX. The committee approved the revised minutes by consensus.

<p><b>SPC Consensus 0608-02:</b> The SPC approves the revised minutes of its seventh meeting on 6-9 March 2006 in St. Petersburg, Florida, U.S.A.</p>
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### **1.5. Items approved since March 2006 SPC meeting**

Keir Becker noted that the SPC had approved the draft mission implementation plan by e-mail immediately following the March 2006 SPC meeting (see SPC Motion 0603-36). He mentioned the availability of a revised plan superseding the version included in the agenda book and suggested that the committee could review it later during the meeting under Agendum 12 and forward comments to the SASEC working group.

### **1.6. SPC procedures and protocol**

#### **1.6.1. Terms of reference, Robert's Rules, voting procedures**

Keir Becker referred to the SPC terms of reference and briefly summarized a few salient points from Robert's Rules of Order.

#### **1.6.2. Conflict-of-interest policy and statements**

Keir Becker reviewed the conflict-of-interest policy and statements. He noted that the meeting participants should declare all potential conflicts now, including institutional, though in the past the committee had not generally regarded institutional conflicts as real conflicts. The committee members and other meeting participants declared the following direct or potential indirect conflicts of interest regarding the proposals available for scheduling in FY2008-10.

**Proponent of proposal currently residing with the Operations Task Force:** Mountain (564-Full2, currently scheduled for FY2007), Flemings (589-Full3), Kuramoto (537B-Full4), Morris (537-CDP7, 537A-Full5, 537B-Full4), Riedel (553-Full2), Teagle (545-Full3).

**Former proponent of proposal currently residing with the Operations Task Force:** Becker (545-Full3), Kuramoto (603B-Full2).

**Colleague at same institution as proponents of proposal currently residing with the Operations Task Force:** Becker (537-CDP7, 537A-Full5, 537B-Full4), Ildefonse (537A-Full5), Kitazato (477-Full4, 537-CDP7, 537B-Full4, 553-Full2, 603-CDP3, 603D-Full2, 654-Full2), MacLeod (626-Full2), Quinn (600-Full), Baldauf (654-Full2), Flemings (537-CDP7, 537A-Full5, 537B-Full4, 603-CDP3, 603D-Full2), Searle (654-Full2).

**Other potential conflicts for proposals currently residing with the Operations Task Force:** Quinn (519-Full2, member of science party for Expedition 310).

**Potential conflicts for IODP expeditions under assessment at this meeting:**

Brumsack (Exp. 302 sample request), Ildefonse (Exp. 312 shore-based party member), Sato (Exp 309-312, received samples from ODP Leg 206 at same holes), Stein (Exp. 302 science party member).

Kuramoto explained that he actually had no involvement in developing Proposals 537B-Full4 and 603B-Full2 and had twice asked the proponents to remove his name from the list. Morris stated that she no longer had any involvement with Proposals 537-CDP7, 537A-Full5, and 537B-Full4, though she still appeared listed as a proponent of those proposals. Ildefonse noted that the moratorium had already expired for Expedition 302, thus precluding any conflict for the assessment in terms of sample requests.

Becker did not regard former proponents as conflicted, and he absolved Kuramoto and Morris of any continuing conflict of interest. He also concluded that Riedel and Teagle must leave the room during the scheduling discussions, whereas Flemings could stay because the OTF had not considered his proposal as an option for this round of scheduling. Becker did not see any real conflicts of interest concerning the expedition assessments.

## **2. Agency reports**

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

Toshiyuki Oshima added a few minor comments to the MEXT report in the agenda book. He identified Kazu Shukuri as the new principal official at MEXT for the IODP.

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

Jamie Allan took the NSF report in the agenda book as read and offered no additional comments. Duncan asked about the new NSF rotator personnel. Allan identified Kevin Johnson and Adam Schultz as new NSF personnel.

### **2.3. ECORD Managing Agency (EMA)**

Catherine Mevél took the written EMA report as read. She highlighted a geohazards workshop scheduled for late October 2006 in Barcelona, Spain, chaired by Angelo Camerlenghi.

### **2.4. China Ministry of Science and Technology (MOST)**

Zuyi Zhou explained that he would report for the IODP-China office and not MOST. He referred to the latest issue of the IODP-China newsletter and identified the seven scientific participants of IODP expeditions so far from China. Zhou announced the 9th International Conference on Paleoceanography in Shanghai, China, on 3-7 September 2007, co-organized by IODP-China.

### **3. IODP Management International, Inc. (IODP-MI) report**

Hans Christian Larsen previewed the SAS meeting schedule through May 2007. He reviewed the basic statistics of recent proposal submissions and noted an increase in the number of proposals requiring riser drilling. Larsen listed the four workshops for long-range planning in FY2006 and noted two workshops considered by the SASEC for FY2007. He outlined the current activities of the Site Survey Data Bank (SSDB), described a new online proposal database under development, and emphasized the new Site Summary Form 6 for illustrating key site-survey data for each proposed drilling site. Larsen also outlined the three-phase project for creating the Scientific Earth Drilling Information Service (SEDIS). He stated that four vendors responded to the request for proposals for the first phase, and he hoped to enter a contract with one of them by the end of FY2006. Larsen described three data management meetings planned for September 2006 on VCD and lithology, common depth scale frameworks, and paleontology data, and he previewed the third issue of *Scientific Drilling* due out in September 2006.

Allan asked to clarify the statistics on proposal submissions. Larsen presented the data again. Byrne questioned the necessity of constructing the new proposal database with an archive feature for proponents. Schuffert explained that the system would archive proposals primarily for administrative purposes, and it presented no problem to give proponents access to the archive of their own proposals.

### **4. Implementing Organization (IO) reports**

#### **4.1. Center for Deep Earth Exploration (CDEX)**

Shin'ichi Kuramoto described the 3-D seismic survey conducted in early 2006 for the NanTroSEIZE project and showed some representative data. He referred to onboard data processing by PGS of Perth and said that CGG of Kuala Lumpur should complete additional processing by mid November 2006. Kuramoto outlined the *Chikyu* shakedown activities off the Shimokita Peninsula, charted the drilling operation plan, and noted that CDEX had invited advisers from the international IODP community to participate on the shakedown cruises. He also reviewed the CDEX planning for the NanTroSEIZE project and outlined the development of a long-term monitoring system. Kuramoto presented the *Chikyu* operations schedule for 2006-2007, including ten-months of overseas drilling and systems integration testing off Kenya and Australia.

Brumsack asked about the target depth for riser drilling on the test cruises off Kenya and Australia. Kuramoto said greater than 2000 m water depth and 2000 m penetration. Quinn asked if the September 2007 starting date for the NanTroSEIZE expeditions remained firm. Kuramoto confirmed so.

#### **4.2. U.S. Implementing Organization (USIO)**

Jack Baldauf outlined the main issues of the USIO report. He announced several staffing changes at JOI, TAMU, and LDEO and identified several vacancies to fill. Baldauf highlighted several aspects of the ongoing Scientific Ocean Drilling Vessel (SODV) project, including the completed engineering design and the first project management review, the release of the request for proposals (RFP) for the shipyard and ongoing yard visits, and the escalated estimates for shipyard costs. He raised the possibility of adjusting the overall scope of the project depending on the final estimated shipyard costs but added that the USIO still aimed to receive the vessel in November 2007. Baldauf listed several activities and forthcoming decisions related to using larger-diameter drill pipe, an active heave compensator, and a fiber-optic VIT system. He presented the schedules for the overall SODV conversion, the ODL engineering design phase, and the shipyard transition in 2006. Baldauf

cited various USIO planning activities for the NanTroSEIZE project and reviewed the schedules for staffing the upcoming IODP expeditions. He updated the core redistribution project now underway and the sharing of curatorial staff among the IOs for training purposes. Baldauf also mentioned a project for digitizing the ODP and DSDP results volumes.

Duncan inquired about the procedure for deciding how to reduce the scope of the SODV project and whether the Project Advisory Committee (PAC) had prioritized the various elements of the refit. Baldauf identified the highest priority as stretching the vessel if funds allow it, but that might mean deferring delivery of some scientific capabilities. Becker asked if the USIO anticipated seeking further advice from the SAS on setting priorities. Baldauf replied that the timeframe probably would only allow going through the PAC, which he viewed as largely representing the community. Flemings recalled the early estimates of a 20% cost difference for a stretched versus non-stretched vessel and wondered if that difference had changed. Baldauf could not say yet for certain. Mountain asked if the use of larger-diameter drill pipe on the SODV would parallel the plans for the *Chikyu*. Baldauf believed that the IOs did not have to coordinate their plans for drill pipe. MacLeod asked about the expected availability of more information for prospective participants of future expeditions. Baldauf expected to know more in the coming weeks after finalizing the conversion schedule. Given noted that the call for participants had gone out several weeks ago and received a very low response so far in the U.S., possibly because of the uncertainty in the dates. Bekins asked if the call for the NanTroSEIZE expeditions involved just the SODV operations. Baldauf answered that the USIO and CDEX would coordinate closely on the staffing of all five expeditions for Stage 1 of the NanTroSEIZE project.

#### **4.3. ECORD Science Operator (ESO)**

Dan Evans referred to the ESO report in the agenda book. He highlighted the strong coverage and worldwide publicity from the Arctic Coring Expedition and stated that the Operations Review Task Force characterized the Tahiti expedition overall as a great success. Evans updated the progress in preparing for the New Jersey Shallow Shelf expedition in FY2007. He reported that the ESO had met with the preferred contractor, confirmed the two co-chiefs, and invited the science party members. Evans mentioned the plan to use a jack-up platform and identified several major issues to resolve before signing a contract, including conducting a geotechnical survey to satisfy the insurance company, obtaining permits, and confirming the platform availability, but he saw no serious concerns at the moment. He said that this platform required slimline logging tools and thus would not allow LWD. Evans expressed concern about the uncertainty of possible post-2007 work as no currently viable proposals for mission-specific platforms (MSP) reside with the OTF. He mentioned recent progress with securing site-survey data for the Great Barrier Reef component of Proposal 519-Full2 South Pacific Sea Level and said that the ESO had started planning to implement that project in September-November 2008. Evans noted that Proposal 637-Full2 New England Shelf Hydrogeology, the only other highly ranked MSP proposal, also lacks site-survey data and involves some technical concerns.

Bekins inquired about the incompatibility of LWD with the slimline logging tools for the New Jersey expedition. She also asked if LWD plans appeared in the original drilling proposal as well as the subsequent RFP. Evans confirmed that the original drilling proposal included LWD as a preferred option. He explained that the project involved separate contracts for the drilling platform and for logging, and the available budget did not suffice for chartering a platform that would allow LWD. Evans characterized the drill string as too narrow to accept regular LWD tools, but he believed that the expedition could still achieve the science objectives.

## **5. Science Advisory Structure Executive Committee (SASEC) report**

Keir Becker reported on the new SAS Executive Committee (SASEC). He believed that the SASEC acted much more effectively and energetically at its first meeting in early July 2006 than its larger predecessor, the SPPOC. Becker described a new working group created by the SASEC to reevaluate the SAS and report at the March 2007 SASEC meeting. He also noted that the working group on mission implementation did not recommend any significant structural changes to the SAS for implementing missions. Becker explained that the SASEC dedicated itself to updating the IODP Initial Science Plan by 2008, building on the IODP workshops in 2006 and 2007 and soliciting input from community organizations. He described the process as separate from the efforts that will begin in a few years to write a new science plan for the second ten years of the IODP. Becker reported that the SASEC wants the SPC to continue with expedition science assessments. He noted that they also approved a process for evaluating the longer-term IODP achievements through thematic review committees, and he identified three anticipated themes for the first IODP Topical Symposia. Becker also reported that the IODP-MI Board of Governors created a special committee to review the IODP-MI, including reviewing the efficiency of the SAS and SAS-IODP-MI relations.

Brumsack wondered about the main reason for dissolving the SPPOC and whether the new committee actually worked more effectively. Becker identified the main stated reason as the difficulty Japan had in staffing the SPPOC with enough senior level scientists, and he believed that the SASEC did work better at the first meeting than the SPPOC. Byrne expressed concern about the plan for updating the Initial Science Plan based on workshops conceived for other purposes. Becker noted that the SPPOC approved the workshop themes (see SPPOC Consensus 0601-7) and they correspond fairly well to the Initial Science Plan. Byrne saw even less need than to update the Initial Science Plan and decried the circular logic. Quinn expressed similar concerns about inventing too much work for very little payoff. Bekins asked how the workshop plans originated. Becker explained that the SSEP had recommended some and others derived from a call for workshop proposals. Bekins saw a potential flaw in the long-term evaluation process if it would just attach specific themes to specific expeditions because many disciplines such as hydrogeology and microbiology cut across many expeditions, even if not a main focus.

Duncan asked about the origin of the perceived need to reevaluate the SAS again already after having just implemented in 2005 the recommendations of the previous extensive review. Becker replied that the SASEC had not really cited any specific reasons, other than the advent of IODP Phase II operations, but just had a general feeling that the SAS could work more effectively and therefore wanted to review it again. He saw no need to solicit community input again. Byrne felt frustrated by the lack of obvious necessity for another SAS review and still wondered about the reason behind it. Larsen noted that the previous review of the SAS occurred without much IODP experience. Brumsack suggested that since the program would not begin operating all three platforms until next year, it seemed premature to devote limited resources to another extensive review of the system. Becker noted that the working group for the SAS review would likely present draft recommendations at the March 2007 SPC meeting before reporting to the SASEC. Flemings remarked that the request from the IODP-MI review committee to the SAS panel chairs referred mostly just to interactions between the IODP-MI and the SAS. Ildefonse felt puzzled by the lack of an external review plan. He recalled that previous community input had reflected the fact that any system has difficulty evaluating itself. Mevél also believed that the review should have a more external

component. She did not understand how the subcontractors who work with the IODP-MI could properly evaluate the relations.

## **6. Mission Implementation I - Mission Implementation Working Group report**

Keir Becker reviewed SASEC Action Item 0607-08 on mission implementation and distributed a revised draft report of the working group. He stressed that the working group had agreed not to implement a special process in the first year to designate the first one or two missions. Becker outlined the structure of the report and noted that it clarified the difference between a mission and a complex drilling project (CDP). He explained that the SASEC had not asked the SPC to approve the report, but the committee certainly could offer comments, and he encouraged everyone to read the report carefully and return later for further discussion under Agendum 12.

## **7. IODP expedition scheduling I**

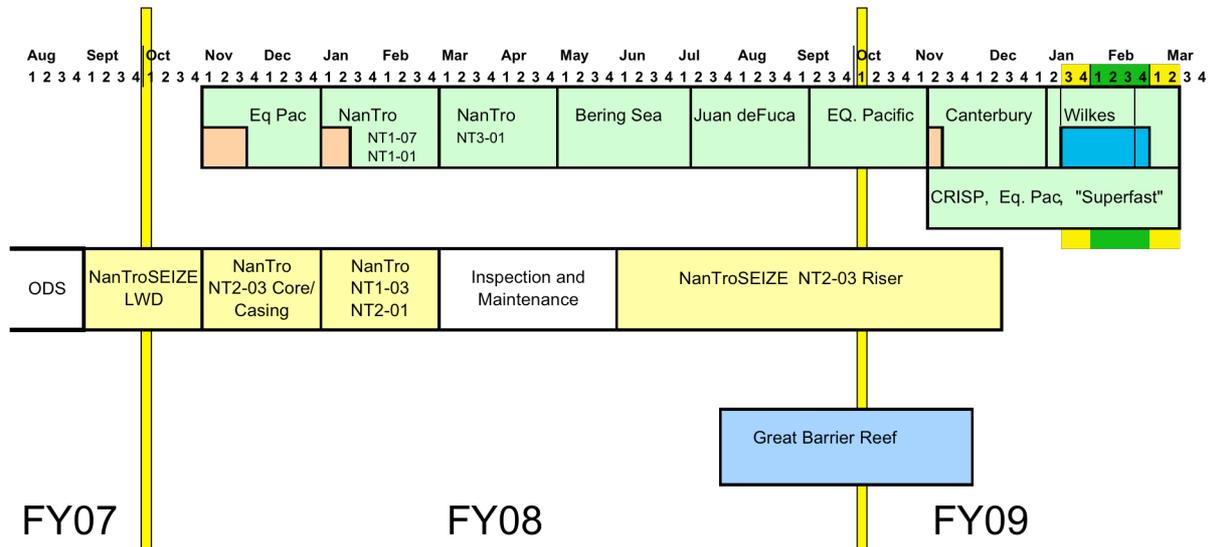
### **7.1. Operations Task Force (OTF) scheduling recommendations for FY2008**

Tom Janecek identified the set of twenty-two drilling proposals residing with the OTF for potential scheduling as of March 2006. Riedel and Teagle left the room as conflicted proponents. Janecek reviewed the schedule approved in October 2005 for SODV and *Chikyu* operations in late FY2007 and FY2008. He also reviewed the schedule as modified in March 2006 and extending into FY2009. Janecek outlined the additional changes since March 2006 and presented the refined SODV scheduling options. He identified several issues that involved prioritizing science, such as finishing projects versus starting new projects, the priority of the Asian Monsoon expedition versus additional NanTroSEIZE drilling, the potential to split the Canterbury Basin project into two parts, and the impact on moving to the Indian Ocean. Janecek added that the Costa Rica Seismogenesis Project (CRISP) presented significant issues for staffing and procuring equipment with a long lead-time.

Janecek showed two revised models for SODV operations in FY2008, each incorporating the delay of the SODV start date to November 2007 and the deferral of CRISP until some later date. The only difference between the two models involved the choice between either Equatorial Pacific Paleoclimate Transect I or Asian Monsoon as the first expedition. Janecek summarized the pros and cons of each model with respect to transit times, weather windows, clearance issues, and other factors, and he highlighted the reasons why several other potential SODV expeditions would not fit so well into the FY2008 schedule. Janecek stressed that both models still required some fine tuning to push the Wilkes Land expedition three weeks later into the optimal weather window, while any delay of more than two to three weeks in the start date of SODV operations would necessitate removing the first Equatorial Pacific expedition from schedule. Baldauf added that the weather window for the Juan de Fuca Flank Hydrogeology II expedition also constrained the schedule.

Janecek discussed the issues related to whether the Canterbury Basin project would require a hazard assessment for the shallow sites or a blowout preventer (BOP) for the deeper sites, and he identified several possible scenarios. These included a) using the SODV for the entire Canterbury Basin project and then proceeding to Wilkes Land, b) using the SODV for only part of the Canterbury Basin project and then proceeding to Wilkes Land, c) deferring the Canterbury Basin project until later but proceeding to Wilkes Land anyway, and d) deferring the Canterbury Basin and Wilkes Land expeditions until later. Janecek suggested several possible alternatives for replacing the Canterbury Basin and Wilkes Land expeditions and stressed the need to prioritize those options as soon as possible for the purposes of planning the FY2008 budget.

Janecek reviewed the *Chikyu* scheduling scenario for late FY2007 through early FY2009 and described a slight modification that would result in increased time for science operations in FY2008. He also reviewed the options for an MSP expedition in FY2008 and stated that the OTF recommended proceeding with the Great Barrier Reef expedition, assuming that the proponents complete the site surveys in time. Janecek then presented a final recommendation showing the following proposed schedule of all three platforms.



## 7.2. SPC discussion and approval of FY2008 science plan

Keir Becker sought to approve the FY2008 part of the schedule first and resume further discussion of the FY2009 options later under Agendum 11. Baldauf reminded the committee that the schedule did not yet incorporate certain budget factors because the target budget figures remained unavailable. Allan clarified that the eventual FY2008 budget could preclude certain options for FY2009 if the alternatives for FY2009 require purchasing long-lead-time items in FY2008.

Becker reviewed the past SPC recommendations on SODV operations in FY2008-09 (see SPC Motion 0510-23 and Consensus 0603-27) and noted the delay in the earliest realistic SODV start date from August until November 2007. He suggested how to modify the previous SPC recommendation and sought a consensus to approve a revised schedule for FY2008. MacLeod asked about the savings in total transit time by starting with the NanTroSEIZE project instead of the Equatorial Pacific expedition. Baldauf said that it would depend on the location of the shipyard, but the transit from Singapore to Honolulu would take about twenty-four days. Nomura asked about order of the sites in the event of deferring the Equatorial Pacific expedition. Becker answered that the OTF had not yet partitioned the sites between the two Equatorial Pacific expeditions, and they probably would have to ask the proponents to prioritize how best to use the time available. The committee then discussed the exact wording of the last paragraph. Becker later presented a slightly revised recommendation, and the committee approved it by consensus.

**SPC Consensus 0608-03:** The SPC approves the science plan and operations schedule of the U.S. scientific ocean drilling vessel (SODV) as recommended by the Operations Task Force for FY2008 and earliest FY2009, as well as the readjustments required in the event of a delay in the starting date for SODV operations. The recommended expeditions will begin in November 2007 and proceed as follows:

- Equatorial Pacific Paleogene Transect I (Proposal 626-Full2)
- NanTroSEIZE Stage I (Proposals 603A-Full2, 603B-Full2, 603C-Full)
- NanTroSEIZE Stage I continued
- Bering Sea Plio-Pleistocene Paleooceanography (Proposal 477-Full4)
- Juan de Fuca Flank Hydrogeology II (Proposal 545-Full3)
- Equatorial Pacific Paleogene Transect II (Proposal 626-Full2)

In the event of a slight delay in the start of SODV operations, the entire schedule should simply shift later, as long as good weather windows remain open for the Bering Sea and Juan de Fuca expeditions. In the event of a longer SODV delay that would preclude such a simple shift, the first Equatorial Pacific expedition would be deferred until later and the schedule would begin with NanTroSEIZE Stage I operations.

Becker presented a draft statement to approve the science plan and operations schedule of the *Chikyu*. The committee accepted the statement without comment.

**SPC Consensus 0608-04:** The SPC approves the science plan and operations schedule of the *Chikyu* for NanTroSEIZE non-riser and riser operations (Proposals 603A-Full2, 603B-Full2, 603C-Full) in FY2008 and early FY2009 as recommended by the NanTroSEIZE Project Management Team in July 2006 and the Operations Task Force (OTF) in August 2006.

Mountain inquired about the site-survey requirements for the Great Barrier Reef expedition. Katz said that the EPSP had not reviewed the proposed project at all, but he expected that bathymetry data would probably prove more useful than seismic data for selecting the drilling sites. He regarded the concerns as mostly environmental and identified the need to target the dead portions of the reef. Quinn believed that the success of the Tahiti expedition had revitalized the Great Barrier Reef component of the project. Becker wondered what would happen, given the lack of any other MSP option, if the committee would approve the Great Barrier Reef expedition now and the proponents would fail to complete the site surveys in time.

Becker later presented a draft statement to approve the MSP operations for FY2008. Katz recommended ensuring that the plan gives the ESO enough lead-time to prepare for the expedition. Evans worried that the suggested statement would not allow enough time. Becker thought that setting a specific deadline would help the proponents get the site surveys completed. Allan stressed the benefit to the program and the operator of knowing well in advance that an expedition will occur at a particular time. Mountain suggested assigning an SPC watchdog to follow through with guiding the proponents. Quinn reported that he spoke to the lead proponent in July and they know what they need to do. He added that specifying a December 2007 deadline would not preclude them from completing the survey earlier. Evans stated that the site survey would not occur until September-November 2007 even if they get approval now. He hoped to see a degree of flexibility that would allow the ESO to conduct the expedition in 2008, otherwise it would not happen until 2009. Searle offered that the SSP could perform an e-mail review between meetings if necessary. Janecek did not want to wait until the June 2008 EPSP meeting to receive the final approval of a project scheduled for November 2008. Becker suggested modifying the SPC recommendation to let the OTF define the timing of the EPSP review. The committee then approved the recommendation by consensus.

**SPC Consensus 0608-05:** The SPC approves the mission-specific platform operations for the Great Barrier Reef component of Proposal 519-Full2 South Pacific Sea Level in FY2008-09, provided that (a) the proponents complete the proposed site surveys and submit the site-survey data in a timely and satisfactory manner and that (b) a successful EPSP review is completed in a timely manner as defined by the Operations Task Force (OTF).

### **7.3. OTF schedule options and issues for FY2009-10**

Tom Janecek again listed the proposals available with the OTF for scheduling and showed several possible general ship tracks originating from the Wilkes Land area. Riedel and Teagle left the room as conflicted proponents. Janecek explained that the track transiting through the Indian and Pacific Oceans involved severe weather window risks during the middle portion of the schedule, and the track transiting through the Indian Ocean, Mediterranean Sea, and into the Atlantic Ocean involved proposals not quite ready for scheduling, whereas the clockwise transit through the Pacific Ocean involved minimal risk for weather windows and a relatively inexpensive package of expeditions. Janecek diagrammed the potential *Chikyu* operations and briefly mentioned the limited options available at the moment for MSP operations in FY2009-10.

Duncan asked if the OTF had enough viable proposals available to fill all of the slots on the *Chikyu* and SODV schedules. Janecek believed that the additional proposals coming up through the system would allow for developing some good scheduling scenarios. Becker suggested that the committee should consider reaffirming its previous commitment to the Southern Ocean swing (see SPC Motion 0510-23) if the Canterbury Basin expedition can proceed and recommend what to do if it cannot proceed.

### **7.4. Report of SPC working group for Canterbury Basin scenarios**

Greg Mountain reported on the findings of the working group composed of himself, Nomura, and Kitazato. He reviewed the relevant questions concerning a) whether a subset of the Canterbury Basin drilling sites could achieve a majority of the primary objectives, b) whether to proceed as planned with drilling the deep-water sites even if the shallow-water sites require a hazard survey, and c) whether to proceed as planned with drilling the shallower sites if some of the deep sites require a BOP. Mountain briefly reviewed the scientific objectives of Proposal 600-Full and 600-Add and summarized how each site would address specific objectives. He also summarized the SAS review history of the proposal. Mountain reported that the working group could not reach a consensus on any of the three questions in its charge. He explained, for example, that two members argued for the necessity of drilling all of the sites to preserve the integrity of the transect strategy, while one member identified the possibility, but did not advocate it, of eliminating one site and penetrating shallower than planned at two other sites.

Becker noted that the question of trimming the project did not arise from scientific grounds. Katz clarified that if the deep-water sites would require a BOP then the project could not proceed anyway as a single-vessel expedition. Nomura asserted that the shelf drilling should have the highest priority, though it might not yield the best core recovery. He suggested using an MSP for the shallow sites to improve core recovery. Quinn agreed that the shallow sites address the most exciting and important objectives. Kitazato worried that the proposal could go stale if the possibility of conducting a shallow hazard survey would force a partial or complete postponement of the project until 2010 or later. Janecek suggested reframing the question to identify an acceptable time lag between split components of the project. Mountain wondered about the viability of geochemical dating techniques for the more deeply buried carbonates. Quinn replied that the same question always applies when drilling shallow-water

carbonates, and he characterized this location as better than most. Becker inquired about the flexibility of moving certain sites along the transect to avoid hazards. Mountain thought enough flexibility existed to shift the sites, though the proponents would have to decide where to locate them. Becker sensed a convergence of opinion and saw a potential to stay on track with scheduling this expedition. He suggested deferring the final decision until after hearing the report on other FY2009-10 scheduling options under Agendum 11.

**Tuesday**

**29 August 2006**

**09:00-18:00**

## **8. IODP Science Advisory Structure (SAS)**

### **8.1. Panel reports**

#### **8.1.1. Science Steering and Evaluation Panel (SSEP)**

Rüdiger Stein reported on the May 2006 SSEP meeting in Potsdam, Germany. He listed the proposals reviewed at the meeting, summarized the dispositions, and explained why the SSEP deactivated one preliminary proposal. Stein briefly summarized the objectives of the three proposals forwarded to the SPC and noted that the panel refined its star rating system. Stein presented SSEP Recommendations 0605-01 and 0605-02 on convening international workshops focusing on ultra-high-resolution paleoclimate and extreme climates.

SSEP Recommendation 0605-01: The SSEP recommends that the SPC consider endorsing an international workshop to focus on “Ultra-high resolution of Paleoclimate.”

SSEP Recommendation 0605-02: The SSEP recommends that the SPC consider endorsing an international workshop to focus on “Dynamics of the Earth System during Extreme Climates of the Cretaceous and Paleogene.”

Given asked why the SSEP tried to pursue national funding for the workshops rather than respond to the IODP-MI call for workshop proposals. Stein replied that the panel understood that they might not have a chance to use that avenue in the next year. Becker added that the SSEP met after the deadline for workshop proposals and had no assurance that the program would issue another call for such proposals for the next year.

Becker noted that the SPC already endorsed the idea of an extreme climates workshop in March 2006 and the SSEP had proceeded with planning; hence, the committee could simply endorse the progress in that regard. He then sought comments on endorsing the recommendation for a workshop on ultra-high resolution paleoclimate. Duncan asked about the targeted interval of the geological timescale. Stein left it open to any period of rapid climate change as long as the possibility existed for obtaining high-resolution records. Mountain supposed that meant it should include other than marine records. Stein affirmed that the detailed workshop proposal from the SSEP included that idea. Becker noted that the SPPOC last year had considered this as a potential workshop topic. He believed it made sense for the SPC to endorse both of these workshop proposals. Duncan questioned the need for separate workshops on these two topics, since one topic seemed to encompass the other. Stein answered that separate groups of specialists work on these topics, and combining them would make it too large and dilute the effect. Quinn added that not all ultra-high-resolution studies involved extreme climates, and he believed that some of the recent high-profile research on this topic would likely yield significant advances in the future. Mori questioned the need for a workshop with so much work already underway on this topic.

Stein wanted to focus attention on the existing workshop proposals and develop a coherent strategy. He noted that the planning for the ultra-high-resolution workshop had not advanced quite as far as for the extreme climates workshop. Becker inferred that the SPC should also

encourage the SSEP to continue working to identify a potential steering committee. Larsen asked who would do the work to organize and support the workshop. Stein thought it would depend on the source of funding. Batiza remarked that workshops had proliferated on this topic with funding from various sources. He suggested organizing a group to synthesize the collection of reports and identify a more clearly defined goal. Becker asked if the SSEP knew of any other workshop efforts. Stein replied that the SSEP knew only about the lack of other IODP workshops addressing these topics. Becker suggested incorporating a charge in the proposal to synthesize other workshop reports.

Teagle wondered if the workshop proposal should reflect and address the mission concept. Mori viewed the workshop as a logical means for improving existing proposals and would find it acceptable if it resulted in a mission proposal. MacLeod saw no need for the SPC to recommend creating mission but only to endorse the workshop. He observed that it would cost the committee nothing to endorse these efforts to seek funding elsewhere. Mountain regarded the topic as worthwhile for a workshop but wanted to emphasize trying to integrate with other programs engaged in similar studies. Ildefonse agreed on the importance of integrating with other programs. Kitazato thought this type of work usually focused on Holocene records but could prove very effective if expanded to include older periods. He still preferred combining the two topics into one workshop. Pedersen favored the topic but worried about the *ad hoc* approach of endorsing workshops in the face of limited resources. Duncan also favored the topic and the strategy of linking it with the IPCC goals, and he agreed that the workshop should align more with the mission concept. Byrne favored endorsing the workshop and trusted that the SSEP had the expertise to evaluate these issues. Quinn said that he would endorse the two separate workshops and let them work out the best strategy.

MacLeod wondered whether or not the SPC should routinely consider such workshop proposals. Becker stated that the SPC must consider whatever comes from the SSEP, though he sensed that the committee should not engage in this exercise at every meeting. Ildefonse expressed concern about the lack of a coherent strategy for how to initiate workshop planning. He worried that having multiple pathways could confuse the community. Mori had no problem with taking an *ad hoc* approach because that reflected the nature of planning workshops. He appreciated the bottom-up approach of receiving ideas from the SSEP as well as receiving ideas from above. Given suggested recommending that the IODP-MI try to increase its budget for workshop funding, as that would resolve many of the issues under debate. Larsen added that the SPC also could encourage the SASEC to consider these two proposals in the pool with the others for FY2007. Bekins agreed that these proposals should go through the SASEC. Becker detected a consensus to encourage the IODP-MI to increase funding for workshops and to ask the SASEC to consider these two workshop proposals.

Later in the meeting Duncan presented a draft recommendation on the proposed workshops on ultra-high resolution paleoclimate and extreme climates. The committee resumed discussing various fine points of the wording with respect to the appropriate timescales and whether to refer to missions. Becker eventually sought approval of the revised recommendation and the committee agreed by consensus.

**SPC Consensus 0608-06:** The SPC thanks the Science Steering and Evaluation Panel (SSEP) for formulating plans to organize IODP planning workshops and endorses their continued efforts. In particular, the committee endorses SSEP Recommendations 0605-01 and 0605-02 and the proposed international workshops on “Ultra-high Resolution of Paleoclimate” and “Extreme Climates and Abrupt Climate Change during the Cretaceous and Paleogene.” The committee encourages the workshop planners to synthesize the results of previous meeting reports, include contributions of and participants from existing national and international scientific programs and panels addressing these subjects, and evaluate predictions of future climate prepared by groups such as the Intergovernmental Panel on Climate Change (IPCC). The SPC forwards these two workshop proposals to the Science Advisory Structure Executive Committee (SASEC) for further consideration and strongly encourages the IODP-MI to seek increased funding to support such planning workshops.

Stein reported that the SSEP had recommended potential initial missions on seismogenic zones and global climate change and carbon cycling; however, that recommendation had since lost relevance as the draft mission implementation plan developed and no longer distinguished the first-year missions as a special case.

**SSEP Recommendation 0605-03:** Based on its assessment of current proposals, the ISP, and plans for forthcoming workshops sponsored by the IODP-MI, the SSEP recommends that the SPC consider the following two major themes for possible missions (first year): (1) seismogenic zones and (2) global climate change and carbon cycling: testing and constraining predictions of future climate change. The SSEP will provide the SPC with the outlines and lists of potential mission team members before the next SPC meeting.

The committee thus regarded the SSEP recommendation on the first IODP missions as a moot point and merely received it.

**SPC Consensus 0608-07:** The SPC receives SSEP Recommendation 0605-03 on two possible themes for the first IODP missions based on an assessment of current drilling proposals and forthcoming planning workshops.

Stein reported that the SSEP discussed the SeisCORK tool, as described in the withdrawn Proposal 690-APL Juan de Fuca SeisCORK, and recommended encouraging its immediate development.

**SSEP Recommendation 0605-04:** The SSEP recommends that the SPC encourage the immediate development of a borehole tool that would deploy seismometers as part of a dedicated seafloor observatory. Borehole seismometers offer significant advantages over ocean bottom seismometers (improved coupling, reduced background noise, proximity to seismic sources), thereby allowing detection of very small earthquakes indicative of fluid flow and incipient rock deformation. Access to this tool would enhance the ability of future proposals and drilling operations to achieve the ISP objectives of integrating long-term observatory science into IODP operations.

Becker wondered why the proponents withdrew the APL. Schuffert explained that they had directed the APL specifically at the next Juan de Fuca Flank Hydrogeology expedition but did not get funding for the instrument in time. Batiza added that the proponents received advice to scale back the system, recognizing that it might cost considerably less to install a seismometer in a hole adjacent to the CORKed hole. Bekins noted that similar circumstances and advice applied to the Monterey Borehole Observatory. Searle referred to the name SeisCORK as potentially misleading as it implies a seismometer inside a CORK. Becker proposed receiving

the recommendation and passing it to the EDP for evaluation. Mountain suggested asking for a report from the EDP at the next SPC meeting.

**SPC Consensus 0608-08:** The SPC receives SSEP Recommendation 0605-04 on developing a borehole tool that would deploy seismometers as part of a dedicated seafloor observatory (e.g. SeisCORK) and forwards it to the Engineering Development Panel (EDP) for evaluation. The EDP should report on this issue at the March 2007 SPC meeting.

Stein presented the new translation of the SSEP five-star rating system and explained the new attitude of the panel toward deactivating full proposals and not just preliminary proposals.

**SSEP Consensus 0605-06:** The SSEP agrees by consensus that an initial submission, whether written as a pre-proposal, full proposal, or APL, can be deactivated without sending the proposal out for external review.

**SSEP Consensus 0605-07:** The SSEP agrees by consensus to a revised translation for its five-star grouping system, as included to the minutes as Attachment 9.

Becker stated that the SPC did not need to give its formal approval of the proposal deactivation practice or the star-rating system of the SSEP but could endorse those procedures if desired. Ildefonse inquired why the SSEP deactivated one preliminary proposal at the last meeting without giving the proponents a chance to revise it. Stein explained that it made no sense to revise that particular proposal based on the stated objectives, but rather the proponents should start over with a new proposal. Becker sought a consensus to endorse the SSEP star rating system.

**SPC Consensus 0608-09:** The SPC receives SSEP Consensus 0605-07 and commends the Science Steering and Evaluation Panel (SSEP) for redefining its five-star grouping system.

### **8.1.2. Site Survey Panel (SSP)**

Roger Searle reported on the July 2006 SSP meeting in Sapporo, Japan. He listed the reports delivered at the meeting, summarized the statistics of the proposals reviewed, and indicated the site survey readiness classifications for each proposal. Searle presented SSP Consensus 0607-01 concerning Proposal 637-Full2 New England Shelf Hydrogeology and said that he understood that a scoping group would address the concerns.

**SSP Consensus 0607-01:** The SSP commended the proponents of Proposal 637-Full2 New England Shelf Hydrogeology for attempting to assess fresh water deposits beneath the continental shelf. The results of the proposed MCS geophysical program are expected to provide geologic maps of the unconsolidated sands while the TDEM survey is expected to enable an understanding of the nature of the pore water contained in the sands. This survey will enable the proponents to optimize site locations and penetrations for the proposed program.

The SSP understands that drilling into unconsolidated sands, which may also be overpressured, is a difficult undertaking. The scientific success of the proposed program will hinge on a successful drilling and sampling effort. The proponents have proposed a variety of drilling and sampling methods (which are not necessarily complementary), but it is not clear to us that there is a body within the SAS with a mandate to develop and/or evaluate such methods. In order to avoid unnecessary delays in developing a drilling strategy for this proposal, the SSP urges the SPC to consider this issue as a matter of urgency.

Becker noted that the EDP and the STP previously assessed Proposal 637-Full2. He therefore believed that the SPC did not need to respond to the SSP consensus.

**SPC Consensus 0608-10:** The SPC receives SSP Consensus 0607-01 concerning the drilling and sampling technology for Proposal 637-Full2 New England Shelf Hydrogeology. The committee notes that the Engineering Development Panel (EDP) and the Scientific Technology Panel (STP) have already reviewed this proposal and provided feedback to the proponents and the program.

Searle described the site-survey requirements matrix that would soon appear as an online resource for proponents, and he cited the mostly positive experience of the SSP with accessing and using the SSDB from a remote location. Searle presented SSP Consensus 0607-02 nominating Yoshikazu Yaguchi as the new SSP vice chair, with Dale Sawyer, the current vice chair, slated to take over as chair before the next SSP meeting. He also identified the SSP liaisons to upcoming SAS meetings.

**SSP Consensus 0607-02:** The SSP recommends Yoshikazu Yaguchi as vice chair starting with the first meeting in 2007.

Becker sought approval of the new SSP chair and vice chair, and the committee agreed by consensus.

**SPC Consensus 0608-11:** The SPC promotes Dale Sawyer to chair of the Site Survey Panel (SSP) effective immediately. The committee also accepts SSP Consensus 0607-02 and appoints Yoshikazu Yaguchi as the new SSP vice chair effective immediately.

Ildefonse suggested trying to send the closest liaisons to other SAS meetings. Searle conceded that the SSP had moved away from the idea of assigning permanent liaisons. Mori said that he had received the impression that the SSP did not appreciate having the SPC put proposals in a holding bin because of insufficient site-survey readiness. Searle described it more as a question of whether the SPC should rank proposals with a low readiness classification. Allan stated that the SPC could choose not to rank proposals that do not have sufficient site survey data. Becker agreed that the SPC could certainly consider that point when deciding what proposals to rank. Mountain offered praise for Searle as the outgoing SSP chair. Becker asked Mountain to draft an appropriate tribute statement (see SPC Consensus 0608-24 below).

### **8.1.3. Environmental Protection and Safety Panel (EPSP)**

Barry Katz reported on the June 2006 EPSP meeting in Villefranche-sur-Mer, France. He summarized the review of Proposal 626-Full2 Pacific Equatorial Age Transect, the preview of 537A-Full5 Costa Rica Seismogenesis Project Stage 1, the informal review of the drilling sites and plan for the *Chikyu* shakedown cruises, and the preview of the Kumano Basin sites for the NanTroSEIZE project. He also updated the status of Proposals 600-Full Canterbury Basin and 595-Full3 Indus Fan and Murray Ridge. Katz noted that the panel discussed the reef drilling guidelines developed for the Tahiti expedition and had asked the ESO to update those guidelines. He explained that a high-resolution bathymetric survey might suffice in most cases, with seismic data much less useful for imaging targets in reef environments. Katz summarized the special preview of Proposal 705-Pre Santa Barbara Basin Climate Change and indicated that the EPSP would not likely approve the project as currently conceived. He believed that the proponents might have misunderstood the currently available drilling capabilities of the program. Katz mentioned that the EPSP had recommended several changes to the developing template for LWD and MWD operations. He expected the document to continue evolving as the tools and scientific questions change. Katz briefly described the newly developed guidelines for safety review reports and expedition safety packages. He

referred to the recent turnover in EPSP membership and the first use of alternate members and identified the resulting loss of continuity as a significant problem. Katz suggested identifying permanent alternates who could attend meetings as needed.

Duncan suggested that EPSP members should perhaps receive a more explicit description of the duties and expectations before their appointment. Mountain proposed that the individual members should take responsibility for identifying an alternate when necessary. Becker explained that the program member organizations have the responsibility for appointing SAS panel members and identifying alternates. MacLeod cited the difficulty of finding alternates, especially on short notice, and he stressed the responsibility of the panel members to inform their PMO immediately if they cannot attend a meeting. Kitazato asked if the new biology members of the EPSP had contributed effectively. Katz affirmed that those members had raised some interesting concerns, while the process of learning how to incorporate that expertise would continue and depended somewhat on the projects up for review. Stein noted that the SSEP had responded enthusiastically to the science of Proposal 705-Pre and recommended developing a full proposal pending the EPSP review, but now the EPSP review seemed to preclude moving forward with that proposal. Katz could not completely exclude the possibility of approving sites in that area but noted the additional requirement of approval by the IO safety panel.

#### **8.1.4. Scientific Technology Panel (STP)**

Mike Lovell reported on the June 2006 STP meeting in Helsinki, Finland. He presented STP Recommendation 0606-03 on post-expedition results and explained the background behind the recommendation.

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

Becker identified this issue as a long-standing problem. He did not understand why the IOs would have responsibility for determining the voluntary or obligatory nature of submitting such data. Instead, he thought it should constitute a program-wide requirement under the responsibility of the IODP-MI. Becker thus suggested modifying the final statement to say that the IODP-MI should work with the IOs to ensure a universal policy and procedures. Baldauf thought the problem required greater definition to move forward. Kuramoto stressed the necessity of ensuring the quality of the results. Brumsack imagined needing the proper expertise, such as the co-chiefs, to assess matters on a case-by-case basis. He suggested restricting the scope to the absolutely vital types of data and not necessarily including those that only interest a small group of specialists. Allan emphasized the ties between the databases, platforms, and operators and linked the issue to the question of how to structure the databases and fund them over the long term. He also advised considering this issue in the context of SEDIS development. Larsen recognized the importance of this issue for the IODP in the absence of programmatic scientific results volumes. He suggested that the SPC should offer a general statement of principle and leave the details to the IODP-MI to implement. Bekins wanted to see the IODP-MI move forward on this very complicated problem. Duncan wondered if the committee would want to hear a progress report. Quinn agreed in principle but expected that the problem would always exist in practice. He believed that the responsibility still rested with individual scientists to ensure that they had tracked down the

latest data to support their research. MacLeod suggested receiving the recommendation, encouraging the idea, and not getting involved with the details. Becker proposed a draft recommendation and the committee agreed by consensus.

**SPC Consensus 0608-12:** The SPC receives STP Recommendation 0606-03 on including post-expedition results in the expedition database and supports this recommendation in principle. The committee recommends that the IODP-MI proceed in working on this issue together with the implementing organizations (IOs) and the Scientific Technology Panel (STP) and report regularly to the SPC on any progress.

Lovell presented STP Recommendation 0608-04 on the QA/QC task force. He noted that the STP and the IODP-MI had already resolved most of the immediate issues, though perhaps some room still existed for improving the general communications between the STP and the IODP-MI.

STP Recommendation 0606-04: The STP thanks the IODP-MI for establishing a QA/QC Task Force. However, the STP believes the task force mandate should be reformulated to include the following points. 1) The STP recommends that the task force address the general policies for the QA/QC procedures, including the issues of complex documentation and data management. 2) These should be aimed at assuring quality across a range of platforms and expeditions. 3) The task force should address IODP minimum and standard measurements across the full range of disciplines (e.g., petrophysics, geochemistry and microbiology, core description). The IOs should then implement QA/QC policy and develop protocols for individual sets of measurements in conjunction with SAS input. The STP is prepared to provide liaisons as appropriate to this newly reformulated task force.

Becker concluded that with satisfactory progress already made toward resolving this issue, the committee should just consider this recommendation as presented for information purposes.

Lovell presented several STP recommendations related to the outfitting of the new SODV, but only for information purposes. These included STP Consensus 0606-09 on active heave compensation, STP Consensus 0606-10 on a system for visualizing the seafloor, and STP Consensus 0606-14 on using larger-diameter drill pipe for enhanced logging capabilities. Lovell then presented STP Consensus 0606-19 on nominating a new STP vice chair, with Lovell himself, as the current vice chair, expected to take over as chair before the next STP meeting.

STP Consensus 0606-19: Should Clive Neal be appointed by USAC to the STP, the STP recommends Clive as vice chair starting with the first meeting in 2007.

Schuffert confirmed that USAC had indeed appointed Neal as a new member of the STP beginning in October 2006. Becker sought approval of the new STP chair and vice chair, and the committee agreed by consensus.

**SPC Consensus 0608-13:** The SPC promotes Mike Lovell to chair of the Scientific Technology Panel (STP) effective immediately. The SPC also accepts STP Consensus 0606-19 and appoints Clive Neal as the new STP vice chair, effective as of the beginning of his appointment to the panel on 1 October 2006.

Lovell outlined several thoughts on the future direction of the STP. He believed that the STP and the EDP worked very well in parallel, with very little overlap between their respective topics of interest and the expertise of the individual members. Lovell also expressed the strong desire of the STP to continue working with the rest of the SAS, the IODP-MI, and the

IOs to develop effective, feasible plans for using existing, new, and innovative technology to advance scientific ocean drilling.

Baldauf suggested that the STP could engage in developing a technology roadmap for analytical equipment. Lovell accepted the idea.

#### **8.1.5. Engineering Development Panel (EDP) (except item 9)**

Peter Flemings reported on the June 2006 EDP meeting in Windischeschenbach, Germany. He noted that the issue of appointing the EDP vice chair remained unresolved because of a potential conflict of interest for the nominated candidate. Flemings presented EDP Consensus 0606-07 on the technology roadmap, briefly summarized the roadmap document, outlined the purpose of creating the roadmap, and identified a set of thirteen specific technological challenges. He highlighted the challenge of improving reliability analysis and monitoring and referred briefly to different characteristics of possible solutions. Flemings identified future steps of the EDP to classify specific engineering developments as SOCs or POCs, refine and revise the roadmap, and advocate for important engineering developments.

EDP Consensus 0606-07: The EDP, in closed session, discussed and debated the merits of each of the engineering development items in the technology roadmap. The EDP has formulated a list of about ten unranked items in each of the three subgroups, 1) Sampling, Logging, Coring, 2) Drilling Vessel Infrastructure, 3) Borehole Infrastructure, that are of high priority (Table 1.0, below). *No effort* has been made at this time to establish relative priorities either between subgroups. The EDP will continue to discuss the relative merit of every item in the roadmap, and it is expected that priorities will evolve over time.

Quinn identified the additional challenge of drilling limestone. Flemings agreed that the panel definitely could include that issue on the list. Becker commended the EDP for its efforts in developing the roadmap. He explained the circumstances surrounding the appointment of the EDP vice chair and proposed that he and Mori would try to resolve the matter as soon as possible. Becker also noted that the committee would receive a report on specific priorities for engineering development later under Agendum 9 and decide how to respond under Agendum 13.

#### **8.2. Industry–IODP Science Program Planning Group (IIS PPG)**

Tim Byrne reported on July 2006 meeting of IIS PPG in The Hague, Netherlands. He attended the meeting as an SPC liaison. Byrne summarized the PPG terms of reference and membership. He reviewed a table of active drilling proposals of possible interest to industry and summarized the participation of industry scientists so far on IODP expeditions, in the SAS, and on proposals. Byrne outlined a tentative plan of the PPG for preparing short white papers and using them as a basis for developing drilling proposals. He presented IIS PPG Consensus 0607-01, -02, and -03 and noted that the group had recommended a replacement for one of its members who wished to resign.

Becker noted that the SPC had already approved Stephen to advance to chair of the IIS PPG after the first PPG meeting (see SPC Consensus 0510-17). He proposed returning to the issue of appointing a replacement member after examining membership clause of the PPG terms of reference. Flemings asked if the PPG had discussed how to find proponents to take the lead in writing full proposals. Byrne replied that the PPG recognized that problem but decided to focus first on preparing the white papers.

#### **8.3. New Program Planning Groups (PPGs) and Detailed Planning Groups (DPGs)**

Keir Becker reported that the three recommended candidates for chairing the Hotspot Geodynamics DPG had all declined. He proposed outgoing SPC member Duncan as an

excellent candidate for the position. Duncan left the room. Several committee members voiced strong support for appointing Duncan as chair of the DPG, and the committee approved by consensus.

**SPC Consensus 0608-14:** The SPC appoints Robert Duncan as chair of the Hotspot Geodynamics Detailed Planning Group, effective immediately.

Duncan returned to the room. Becker explained that he and Duncan had identified a short list of preferred candidates for the DPG membership, derived mostly from the longer list recommended by the SSEP and including several proponents from the relevant proposals. After a brief debate, the committee recommended several additional candidates. Becker agreed to defer deciding on the DPG membership until later in the meeting. Duncan later presented a revised list of candidates who had already expressed a willingness to participate on the DPG. He believed that the group covered the necessary range of expertise and satisfied the entitlements for national balance. Duncan stated that three other candidates had not yet responded to the initial contact. He preferred keeping the group small and inviting others to participate as informal consultants. Becker proposed appointing those who had already agreed to participate. Ildefonse favored including a few outsiders. Duncan replied that at least half of those on the list are not seagoing scientists. Schuffert noted that the list of twelve, including Duncan, already included six from the U.S., and he suggested consulting with the U.S. program director before adding any more U.S. members to the DPG. Becker sought a consensus to approve the current slate of candidates now and approve any additional members later by e-mail if necessary.

**SPC Consensus 0608-15:** The SPC appoints the following individuals as regular members of the Hotspot Geodynamics Detailed Planning Group: Nicholas Arndt, Takeshi Hanyu, Yasushi Harada, Karen Harpp, Kaj Hoernle, Dennis Kent, Anthony Koppers, Will Sager, Bernhard Steinberger, John Tarduno, and Yi-gang Xu. The committee may still consider additional nominees for membership on this DPG.

*[Note: the SPC voted by e-mail shortly after the meeting to approve one additional member of the Hotspot Geodynamics DPG.]*

**SPC Motion 0609-01:** The SPC appoints Louise Kellogg as an additional member of the Hotspot Geodynamics Detailed Planning Group, effective immediately.

Ildefonse moved, Quinn seconded; 16 in favor, none opposed, 1 absent (Fryer), 3 non-voting (Lee, Pedersen, Zhou).

## **9. FY2008-09 engineering development I – EDP recommendations**

Flemings again presented EDP Consensus 0606-07 on prioritizing the list of engineering developments listed in the technology roadmap (see Agendum 8.1.5). He identified approximately ten higher priority items in each of three general categories, covering a wide range of projects and expense. Flemings referred to the list as a work in progress and welcomed suggested additions.

Ildefonse suggested adding the extension of riser capabilities to 4000 m water depth. Lee promoted the importance of improved core-splitting techniques for paleomagnetic studies. Teagle asked if the EDP had considered the recommendations from the expedition review committees. Fleming said not yet but they certainly could do so.

Greg Myers outlined the procedure for handling engineering development proposals and reviewed the two classes of engineering development projects defined primarily by cost. He presented EDP Consensus 0606-03 and provided an overview of the three engineering development projects proposed for FY2008, including the pulsed telemetry module, long-

term monitoring system, and down-pipe camera. Myers also mentioned an engineering Web page under development by the IODP-MI.

EDP Consensus 0606-03: IODP-MI has asked EDP for comment on two proposals: 1) USIO Engineering Proposal FY2008 Pulse Telemetry System Acquisition and Implementation, and 2) CDEX Engineering Development Proposal Program Plan for FY2007. The EDP supports the concepts presented as being aligned with the IODP Initial Science Plan. However, the feasibility studies that preceded each of these proposals have not been completed. Thus, the EDP does not have a proper basis to make further comment.

Becker recalled that the SPC had already considered two of the proposed engineering development projects in (see SPC Consensus 0505-01 and Consensus 0603-25) but had not yet considered the down-pipe camera. He wondered what the IODP-MI sought now from the SPC in terms of further endorsing or prioritizing these projects. Myers welcomed any and all input from the committee. Janecek added that, given the steps already taken, the IODP-MI really only wanted to know if the SPC wanted to stop any of these projects because of shifting science priorities. Flemings could not see how to prioritize the projects given the cost differences, and he asked if any clearly defined boundary existed between funding by POCs and SOC. Allan suggested that the panel chairs could gain some insight from the guidance given to the IODP-MI for developing annual program plans.

Mountain inquired about the efforts made to ensure cross-platform compatibility. Myers spoke of trying to generate discussions among the proponents and all of the IOs. Moran asked who would evaluate such projects to determine if similar developments had already occurred outside the program. Myers replied that both the IODP-MI and the EDP would evaluate the projects. Moran asked about the possibility of skipping the SAS review if not feasible on a short timeframe before deploying a tool on a scheduled expedition. Myers confirmed the possibility, primarily for low-cost projects. Mori asked about the potential uses of the down-hole camera. Myers responded that the camera would prove valuable for surveying the seafloor before spudding a hole. Becker indicated that the committee must decide under Agendum 13 whether to endorse the down-pipe camera and reaffirm the value of the two previously considered projects.

#### **10. Review of Proposal 693-APL South Chamorro Seamount CORK**

Barbara Bekins presented Proposal 693-APL South Chamorro Seamount CORK. Yamamoto and Becker offered their assessments as secondary watchdogs. The committee then discussed the scientific merits of this ancillary project before addressing the question of whether to forward it to the OTF.

Mountain inquired whether this APL could reasonably fit in the schedule pending availability of funding for the CORK. Baldauf said yes, provided that long-lead time and budgetary issues and the development of a detailed operational plan would allow it. Janecek stated that the OTF would try to integrate this APL in the schedule in the normal way, just like any other proposal. Becker clarified that the OTF would not consider this APL for FY2008, but as with any APL, the sooner it would go forward the better, assuming the committee agreed. Searle noted that the relevant site-survey data exist only in analog form and remain officially unlinked to this APL. Becker recognized that the proponents should properly link the site-survey data to the APL, but he reiterated that the SPC should base its decision strictly on the scientific merits. Becker asked if the SPC favored forwarding this APL to the OTF, and the committee agreed by consensus.

**SPC Consensus 0608-16:** The SPC forwards Proposal 693-APL South Chamorro Seamount CORK to the Operations Task Force for potential scheduling.

## **11. IODP expedition scheduling II**

### **11.1. Presentation of OTF scheduling options for FY2009-10**

Tom Janecek reviewed the SODV scheduling options for FY2009-10 and suggested identifying a preferred ship track and prioritizing the options along that track. Riedel and Teagle left the room as conflicted proponents. Janecek reviewed the potential *Chikyu* operations for FY2009-10 and emphasized the need to discuss the options with the USIO concerning the availability of potential non-riser expeditions for the *Chikyu*. He sensed that the SPC would prefer to see some operations in the Indian Ocean. Janecek also reviewed the potential MSP operations for FY2009.

### **11.2. Prioritize and approve scenarios**

Keir Becker asked what ship track the OTF preferred, putting aside the question of whether to retain the Wilkes Land expedition if the Canterbury Basin expedition could not proceed in FY2008. Janecek replied that the OTF preferred the clockwise Pacific track for several reasons, including that it would leave open the broadest range of options for what comes next. Becker noted that the *Chikyu* could potentially cover the previous SPC commitment to the Indian Ocean (see SPC Motion 0510-23). Ildefonso suggested that the committee could reconsider the matter later based on the new options that might come forward in March 2007. Janecek expected to have the FY2008 program plan more than half complete by then, and he cautioned that that approach would only work if it did not involve procuring expensive lead-time items in FY2008. Mountain regarded the Pacific track as very attractive for accomplishing a good variety of high-priority science. Brumsack expressed minor concern about leaving the ship in the Pacific for such a long time. MacLeod did not entirely favor the idea but recognized the need to plan ahead and agreed that the clockwise Pacific track looked like the best option at the moment.

**SPC Consensus 0608-17:** The SPC approves a ship-track model for SODV operations in FY2009-10 that would proceed clockwise through the Pacific Ocean, assuming a start at Wilkes Land.

Janecek reviewed the options concerning the outcome of the shallow hazard assessment for Canterbury Basin. Becker identified the main question as whether or not to absorb the transit penalty of going to Wilkes Land in the event of not going to Canterbury Basin. Mountain characterized the inboard sites at Canterbury Basin as critical to the success of the project, and without those sites then he might prefer deferring both proposals. Quinn conceded that the rationale for not scheduling Wilkes Land in the past still remained if Canterbury Basin could not proceed. Batiza cited the upcoming International Polar Year 2007-2008 as an auspicious opportunity for conducting Wilkes Land and promoting the program. Becker took a straw poll on whether or not to proceed with the Wilkes Land expedition in the early FY2009 timeslot even in the event of delaying the Canterbury Basin expedition. A simple majority of the committee wanted to postpone Wilkes Land if Canterbury Basin could not proceed on schedule. Despite recognizing Wilkes Land as a highly ranked proposal that already had waited a long time for scheduling, the majority preferred conducting Wilkes Land and Canterbury Basin together as a package to minimize the transit time and maximize the impact. Katz supposed that Canterbury Basin might present enough opportunity for drilling despite the potential safety issues, and he thought that it might require more than one expedition of drilling time anyway. MacLeod asked if enough flexibility would remain to revisit this issue after learning the outcome of the hazard assessment in January 2007 and

seeing the other proposals available in March 2007. Becker certainly hoped to have that flexibility, given the only other options of beginning to prepare for CRISP or some of the other projects in the FY2009-10 scenario.

Becker felt content to let the OTF develop further options for *Chikyu* operations in FY2009-10. Janecek conveyed some sense of urgency for determining the riser options but thought it could wait until March. Mountain preferred seeing the riser ship move into the Indian Ocean. MacLeod agreed because it would send a good signal to the community that the *Chikyu* would not just operate primarily in the Pacific.

Evans remarked that the Canterbury Basin project, if conducted with an MSP, would comprise a very expensive expedition and preclude any other MSP projects for a long time. Becker concluded that Proposal 637-Full2 New England Shelf Hydrogeology represented the only currently available option.

### **11.3. Nomination of co-chief scientists**

The committee deferred discussing this issue until Agendum 14.2 (see below).

**Wednesday**

**30 August 2006**

**09:00-18:00**

### **12. Mission Implementation Plan II – SPC discussion**

Keir Becker reviewed the draft report of the SASEC working group on the mission implementation plan, as distributed to the SPC at this meeting. Byrne argued that the stated goals for missions applied equally well to all proposals and thus did not distinguish missions in any way. He also worried that any further enhancement of the mission goals would result in too high of a standard. MacLeod suggested adding the goal of completing the broader scale objectives of the program. Becker mentioned the unstated goal of providing earlier scoping for complicated projects. Duncan suggested that the criteria for designating a mission should include some mention of requiring a global strategy. Byrne wondered about the meaning of urgent promotion, given that component proposals must follow the normal SSEP review process. He also thought that the wording of the call for mission proposals implied that the IODP itself would generate mission proposals through co-sponsored workshops. Zhou believed that the concept of mission proposals arising from workshops co-sponsored by the IODP-MI contradicted the statement concerning no IODP support for preparing mission proposals. He also noted that the IODP-MI clearly would give financial support for preparing the component proposals of missions, unlike for other IODP drilling proposals. Byrne noted that CDP proposals must have at least one full component proposal to undergo external review. He asserted that a single mission proposal without any of its component full proposals would not contain enough information to allow a thorough external review. Mountain expressed concern about involving the SASEC with selecting the review panel for mission proposals. Byrne wondered how the SASEC could select the review panel without first reviewing the proposals themselves. Becker replied that the SASEC would select a review panel of distinguished geoscientists in advance. Byrne viewed that as a closed-club approach.

Byrne doubted that the described composition of the Stage 1 mission team would help to produce a proposal that would receive favorable reviews from the SSEP and the SPC. Becker responded that the mission team should help in making a proposal ready to implement sooner. Byrne cited the risk of investing a lot of resources at an early stage in projects that have only undergone review as a concept. He worried that it would place inherent pressure on the SSEP to review such projects favorably. Teagle imagined that Stage 2 could extend over many years for projects that would require the initial results to plan later expeditions. Mountain agreed that the two-year timescale for the Stage 2 mission team seemed unrealistic given the limited number of platforms used by the program. He also asked if the IODP-MI would supply an

education and outreach specialist to mission teams. Becker said no, not necessarily. Ildefonso asked about definition or job description of the specialty coordinator. Janecek replied that the idea arose from the NanTroSEIZE project management team. He explained that the coordinator would assist the co-chiefs in integrating a project involving multiple expeditions. Byrne asked whether anyone had estimated how much the mission concept would cost. Becker replied that the working group had estimated that it would probably cost on the order of \$100,000-200,000 per year depending on salary support and travel for the mission teams.

Allan objected to the point concerning coordinated national funding of site surveys. Batiza explained that the word coordinated implied circumventing the normal competitive funding process of many nations. He stressed the need for clarifying to proponents the pathway for obtaining site surveys. Teagle appreciated the mission concept but did not think it provided any means to alleviate the difficulty of obtaining site surveys in a timely fashion. Searle and others agreed. Mountain wondered how much effort had occurred at government levels above the funding agencies to identify new ways of securing international funding for site surveys. Batiza stated that the will exists but not the money. Allan added that the agencies already strain just to fund the regular operations of the program. MacLeod hoped that the funding agencies and the program could somehow adapt better to reality and develop a structure that would not constantly get choked on this issue. Larsen supposed that the mission designation could help in obtaining site surveys but might hurt the chances of other proposals.

MacLeod still did not see any real difference between missions and CDPs. He did not believe that the program could support an unlimited number of CDPs, as claimed in the mission implementation plan, and he worried that the artificial construct of missions would just mislead proponents. Byrne noted that CDP components might not all stand alone, unlike mission components. Duncan found it easier to understand the word mission. Bekins believed that the NanTroSEIZE and CRISP CDPs had followed the same template as outlined in the mission plan and thus essentially amounted to missions. Larsen wondered if the SPC could at least reach a consensus not to have both CDPs and missions. Quinn asked whether in that case the two existing CDPs would remain designated as CDPs. Becker said yes. He then took a straw poll and concluded that the committee preferred not having CDPs in addition to missions.

Later in the meeting, Mountain presented a draft recommendation on missions and site surveys. Becker suggested referring to all funding agencies in the first part of the recommendation, and he identified a closing statement on commingled site-survey funds as perhaps controversial. Allan described the idea as inconsistent with the program memoranda and said that it would require renegotiating among the IODP members. Searle nonetheless saw no harm in stating what the community would like to see in the future. Byrne also favored making such a statement. Duncan wanted to encourage the funding agencies to pursue this goal. Allan suggested providing more context that would explicitly recognize the current situation. Janecek agreed that would it would help to have more context, but he recognized that the SPC should offer whatever advice it sees fit. Byrne just wanted to get the idea on the table. Becker proposed seeking a consensus on the first part of the recommendation and putting the second part on the agenda for further discussion at the next meeting. The committee agreed by consensus.

**SPC Consensus 0608-18:** The SPC registers its unwavering support of strategies that foster the imaginative conception and testing of bold scientific ideas through ocean drilling. For missions to be effective in this regard, we emphasize that the IODP funding agencies need to continue developing fiscal mechanisms that enhance the support of acquiring site-survey data essential to the integrated structure of mission planning.

### **13. FY2008-09 engineering development II – SPC prioritizations**

Keir Becker recalled that the SPC had already prioritized the engineering developments for the pulsed telemetry module and long-term observatories (see SPC Consensus 0505-01 and Consensus 0603-25). He wondered if the IODP-MI wanted the committee to reaffirm those priorities. Janecek expressed uncertainty about the SPC role in the process. Becker cited a relevant passage from the SPC terms of reference and suggested that the committee could simply vote on including these three projects in the FY2008 program plan. Ildefonse proposed that the committee only needed to approve the third project since it had previously considered the first two. Quinn supposed that a down-pipe camera could prove very useful on the Great Barrier Reef expedition. Becker imagined that such a camera could yield a scientifically interesting video. Bekins wondered if using the camera on the wireline would require paying for logging time. Evans said no. Myers explained that the camera tool would be designed for compatibility with logging equipment but its use would not fall under the logging contracts. He distinguished between a more-expensive downhole and a cheap down-pipe camera and said that the EDP would have to review a downhole camera development project. Becker sought a consensus to include the down-pipe camera in the FY2008 engineering development plan, together with the two previously considered projects.

**SPC Consensus 0608-19:** The SPC recommends including the down-pipe camera development project in the FY2008 program plan, together with the two previously considered engineering projects for a pulse telemetry module and long-term monitoring system (see SPC Consensus 0505-01 and Consensus 0603-25).

### **14. IODP expedition scheduling III (if needed)**

#### **14.1. Revisit and reprioritize scenarios**

The committee finished discussing this topic under Agenda 7 and 11 above and did not raise any further issues here.

#### **14.2. Nomination of co-chief scientists**

Riedel and Teagle left the room as conflicted proponents. Becker invited the committee to nominate additional candidates for co-chief scientists of future expeditions. The committee did not put forward any additional names beyond those previously identified at past SPC ranking meetings.

### **15. Proposal guidelines - revision timeline to add mission plan**

Keir Becker noted as a point of information the need to incorporate the mission concept in the proposal guidelines before releasing the first call for mission proposals.

### **16. IODP expedition reports and SPC assessments**

#### **16.1. Expedition 302 Arctic Coring Expedition (see Appendix A)**

Kate Moran presented the scientific results of Expedition 302 Arctic Coring Expedition. She outlined the broad objectives to recover a paleoceanographic record spanning the Cenozoic and determine the origin and tectonic history of the Lomonosov Ridge, as originally described in Proposal 533-Full3. Moran also listed the specific paleoceanography objectives and reported that they recovered a good sedimentary record from a site near the edge of the transpolar drift. She said that core recovery averaged 68%, primarily from two sites, and

allowed them to compile a reasonably good composite section of the entire sediment column, showing a significant hiatus or condensed interval in the middle of the section and a lowermost age of about 57 Ma. Moran noted that they succeeded in recovering the uppermost portion of basement crust, with an age of about 85 Ma, and it confirmed the origin of the ridge as a continental fragment. She reported that sediment deposited during the Paleocene–Eocene Thermal Maximum (PETM) indicated much warmer Arctic temperatures than previously believed, *Azolla* ferns indicated the presence of freshwater at about 48 Ma, and the oldest ice-rafted debris (IRD) occurred earlier than believed at about 45 Ma. Moran stated that the scientific results of the expedition, though impacted by moderate core recovery, could potentially address five of the seven paleoceanographic objectives and one of the two tectonic objectives. She suggested that a record of the long, missing time interval corresponding to the hiatus in the middle of the section might lie preserved elsewhere on the ridge.

Quinn asked about the previous wisdom of when ice first covered the Arctic, the origin and budget of the freshwater required to support the *Azolla* community, and the significance of the 18–23°C temperatures during the PETM. Moran said that former thinking indicated that the ice cover began around 7 Ma and intensified at 3 Ma. She described the Arctic as a closed basin during the Eocene, possibly the largest freshwater lake ever, and said that the high temperatures during the PETM meant a significantly diminished gradient between the equator and the poles. Nomura wondered how they could identify the PETM without carbonate microfossils. Moran said they used one specific dinoflagellate as a key indicator, plus some geochemical signals. Lee asked if the PETM onset occurred exactly the same as for the southern hemisphere. Moran replied that they did not recover a complete enough PETM section to answer that question.

Brumsack noted the lack of information presented on the pore-water results but appreciated the fact that the program could collect those data on an MSP expedition. He cited the importance of finding fairly organic-rich sediment and expressed no surprise concerning the freshwater signal since the Arctic often has a freshwater surface layer today. Stein commented that the organic carbon derived from algae and probably reflected high primary productivity. Brumsack also sought more information on the section with dark and light striped sediment layers. Moran suggested that the striped sediment layers might relate to the tectonic uplift of the ridge. Zhou asked if they obtained any new results on the history of the ridge and its place of origin. Moran replied that they did not really recover sufficient basement material for extensive studies, though they could determine its age by examining forams. Pedersen asked if they found any evidence of volcanic ash from rifting. Moran said no.

Quinn imagined that these new results would have a significant impact on the modeling community, and he inquired about the confidence and uncertainties in the age model. Moran described it as based initially on dinoflagellate stratigraphy and then supplemented with the paleomagnetic record. She said that the science party now agreed on a fairly robust though not high-resolution age model that accords with other observations. Mountain inquired about the age constraints on the hiatus. Moran estimated that it spanned the interval from 16 to 40 Ma. Duncan asked if anyone would work on the detrital material, aside from the IRD, for provenance studies. Moran said yes, they had completed quite a bit of such work already but not synthesized it yet. Kitazato wondered what activity the microbiologists engaged in during the expedition. Moran answered that the microbiologists still had work to do on the samples and had not yet presented any results. Brumsack wondered where to drill next in the Arctic from a scientific standpoint. Moran suggested trying to determine when the Fram and Bering

Straits opened. She also would study the gas hydrate reservoir on the margins and the export of freshwater to the North Atlantic.

### **16.2 Expedition 308 Gulf of Mexico Hydrogeology (see Appendix B)**

Peter Flemings and Jan Behrmann reported on the scientific results of Expedition 308 Gulf of Mexico Hydrogeology. Flemings identified the specific scientific objectives as described in Proposal 589-Full3 and 589-Add, explained the concept of sedimentation and overpressure, and showed a model of an overpressured sedimentary sequence. He described the geological setting and the downhole tools used to measure temperature and pressure, and he showed the results from the Ursa Basin, where overpressured intervals correlated with submarine landslide layers. Flemings emphasized the technical success of circulating mud down the boreholes during drilling to control overpressure. He explained that the technical challenge of holding the probes in place in weak sediment precluded making accurate measurements throughout the sedimentary sequence. Behrmann showed the results from the Brazos-Trinity Basin, where for the first time ever in the history of scientific ocean drilling they drilled one hole exclusively for LWD and no coring. Behrmann reported that the sediments at the margin of the Brazos-Trinity Basin experienced a higher degree of compaction than in the interior, and the interior of the basin showed similar overpressure to that observed in the Ursa Basin.

Bekins expected perhaps to see overconsolidation in the shear zones associated with slumps along the margins of the basins. Behrmann mentioned an effort to look for differences in the fabric between the slumped and intact sediments. Bekins also wondered whether the lower thermal gradient in the thick section resulted from advection. Flemings doubted that such elevated temperatures could result just from the velocity of flow and instead thought that it more likely reflected a thermal blanketing effect of rapid sedimentation. Mountain inquired whether *in situ* measurements yielded more information than uniaxial strain experiments. Flemings answered that direct measurements give different results than experiments and that experimental results would not accurately reflect conditions in sheared sediments. Mountain asked if the consistent results at the Ursa sites indicated a uniform compaction history. Flemings characterized the results as less consistent than they might appear. Moran inquired if measurements of vane shear strength correlated with pore pressure. Flemings replied that the slumps exhibited higher shear strength.

Zhou regarded the expedition as a great example of doing science of considerable interest to industry. He asked if they found any relation between slumping and sea-level change or any evidence of gas seepage in the cores. Behrmann replied that slumping seemed to occur naturally as part of basin formation, though the coincidence of slumping in the two study areas could imply some broader regional factor. Flemings added that the slumping also seemed to relate directly to higher sedimentation rate, which itself represented an effect of falling sea level. He also referred to the many mud volcanoes in the area but described the associated fluid and gas flow as decoupled from the shallow system investigated on this expedition. Mountain called the results a goldmine for studies of deep-sea fan sedimentation and turbidite deposition, and he wondered how well they would extrapolate to accretionary wedge systems. Flemings confirmed that several of the science party members definitely would focus their research on deep-sea fans and turbidites, and he believed the results would translate extremely well to accretionary wedges. Behrmann added that they also gained valuable knowledge for drilling into mud volcanoes. Bekins wondered what happened with the piezoprobe. Flemings explained that the probe must enter the sediment at a direct perpendicular attitude otherwise the tip bends. Yamazaki asked if they found any signs of magnetic excursions or variations in magnetic intensity. Behrmann said yes.

### **16.3 Expeditions 309 and 312 Superfast Spreading Crust II and III (see Appendix C)**

Damon Teagle presented the scientific results of Expeditions 309 and 312. He reviewed the scientific objectives and the history behind efforts to drill a complete section of intact oceanic crust. Teagle outlined the theory of ocean crust formation and stated that fast-spreading crust should prove simplest to understand. He characterized the sequence of rock types encountered in Hole 1256D and compared the observed depth to gabbros of 1406 m with the predicted depth of approximately 1400 m. Teagle noted the recovery of anhydrite for only the second time ever from oceanic crust, though less than predicted by some models. He showed geochemical data of the mafic content of the lavas, dikes, and gabbros indicating that the gabbros derived from highly fractionated magma. Teagle reported that they encountered a thick lava and thin dike sequence, contrary to what they expected for fast-spreading crust. He claimed that two drilling sites clearly did not suffice for typifying oceanic crust. Teagle summarized the principle achievements of the expedition and outlined the remaining goals, noting that the bottom of Hole 1256D still lies in the dike–gabbro transition.

Duncan inquired about the nature of the dike–gabbro contacts. Teagle said that they recovered all of the dike–gabbro contacts and found the most-recrystallized rocks about 10 m above the contacts. Duncan wondered if the experience gained here would help in returning to a site with a very different drilling history such as at Hole 504B. Teagle replied that the casing helped significantly, and the mud leftover from Expedition 308 and used on Expedition 309 might also have helped on Expedition 312. MacLeod asked about the rotation inferred from lineaments. Teagle referred to the very strong drilling overprint but said that they still found no magnetic evidence of rotation. Yamazaki wondered what caused the magnetic overprint problem that hampered the interpretations. Teagle believed it probably resulted from the rotation of the drill string and bits, but no one understood the exact cause. He noted that it took a long time to drill, so the rocks endured a lengthy exposure to the overprinting field.

Sato wondered if the large variation in geochemistry in the upper gabbro reflected repeated inclusions. Teagle said possibly, though the density certainly did not resemble that of primitive gabbros. Sato suggested that it might represent recycled basaltic material in the mantle below the peridotite. He noted that the preliminary report did not show water content. Teagle said that they only measured water content as loss on ignition. MacLeod cautioned against saying the gabbros had a basaltic composition given the wide range of cumulate compositions and the fact that they only penetrated the upper portion of the gabbros. Duncan asked how many cooling units they identified in the lava section. Teagle thought probably on the order of seventy or eighty. Ildefonse questioned the interpretation that the rocks represented off-axis lava flows given the abundance of evidence elsewhere for on-axis lava ponds. Teagle answered that the seismic velocities indicate that the flows exhibit some regional extent. Marumo asked if the cores contained chalcopyrite or sphalerite. Teagle said that they found some chalcopyrite but little if any sphalerite. Pedersen suggested that the surprisingly thin dike section could indicate a rising magma chamber during lava formation. He asked if they found any sign of porous flow through the gabbros. Teagle said not from the shipboard analyses. Larsen noted that certain models actually predict that faster spreading would give a thicker lava section.

### **16.4 Expedition 311 Cascadia Margin Gas Hydrates (see Appendix D)**

Michael Riedel presented the initial scientific results of Expedition 311. He showed an early model of the marine gas hydrate cycle, outlined the general objectives of the expedition, and summarized the operations that included almost two weeks of LWD and MWD. Riedel described the technology used for characterizing the gas hydrates and showed an example of infrared core imaging. He reviewed the use of the pressure coring tools and said that the PCS

degassing experiments allowed them to determine the precise composition of the gas. Riedel reported the discovery of considerable hydrates in sand layers situated well above the bottom-simulating reflector (BSR) and often little or no gas hydrate associated with the BSR. He speculated that the BSR represented mainly an effect of trapped free gas below the gas hydrate stability horizon. Riedel emphasized the large intra-site variability in gas hydrate occurrence and said that the results did not fit the old model. He also characterized the goal of estimating global gas hydrate abundances from seismic data as elusive. Riedel asserted that the expedition achieved many of the science objectives despite operational difficulties, and the long-term monitoring component of the proposal remained ahead.

Byrne suggested that the geometries and structures of the sediment package should help to determine the gas migration pathways. He wondered how to test the hypothesis that a small amount of gas hydrate might form a seal at the BSR. Marumo inquired about the possibilities of using the complicated chlorinity data to estimate gas hydrate amounts and using the gas composition to distinguish biogenic versus thermogenic sources. He also suggested that perhaps the faults act as a transport pathway. Riedel expected to learn more from later analyses of the fluids than from the chlorinity data. He also said that the C1/C2 measurements of void space samples gave only qualitative trends for inferring the gas sources. Riedel accepted the possibility of faults acting as flow paths but thought that would require shielding the gas from the fluid as it moves up through the hydrate stability field, or it might reflect a kinetic issue. Pedersen asked whether the occurrence of gas hydrate so far above the BSR represented a special case or a general example. Riedel expected to see similar things elsewhere, though the BSR only indicated that hydrate may form somewhere above it, but not exactly where or how much. Ildefonse wondered about the amount of hydrate required to trap gas at the BSR and how one could detect it. Bekins explained that capillary forces could trap the gas, and flow would follow the sands and faults from the original carbon source at depth. MacLeod suggested reexamining the logging images to look for evidence of fractures. Riedel identified that as an ongoing project. Flemings believed that the results of this expedition would change the previous decade of modeled flux calculations.

**Thursday**

**31 August 2006**

**09:00-15:00**

### **17. Report on Deep-Sea Biology Symposium**

Hiroshi Kitazato reported on the July 2006 Deep-Sea Biology Symposium in Southampton, U.K. He highlighted one session on management of the deep ocean with respect to environmental conservation and preservation of biodiversity. Kitazato explained the plans for establishing marine protected areas within the exclusive economic zones (EEZ) of many countries. He identified ecosystem-based management as the basic idea for conservation, with the intent of keeping an entire ecosystem from lowest to highest trophic level in well-balanced ecological condition. Kitazato noted that the United Nations Convention on Law of the Sea (UNCLOS) provides the only juristic background for controlling anthropogenic activities on the high seas, and the UN General Assembly (UNGA) had organized an open-ended, *ad hoc* working group to establish additional rules in that regard. He cited the InterRidge code of conduct as generally welcomed and accepted by deep-sea research communities and noted that biologists from several countries had already started cooperating with oil companies to prepare environmental impact assessments for evaluating the impact of commercial deep-sea drilling. Kitazato mentioned an important February 2007 UNGA meeting on marine biodiversity beyond national jurisdictions.

Becker noted that the committee recognized the importance of keeping aware of these issues and that the program had already instituted an environmental code of conduct. He encouraged Kitazato to report again at the next SPC meeting.

## **18. Other business**

The committee did not raise any other business for discussion.

## **19. Future meetings**

### **19.1. Liaisons to other panels and programs**

The committee identified its liaisons for the upcoming round of SAS panel meetings as follows: SSEP - Becker, Kitazato; EPSP - Becker; SSP - Mountain; STP - Bekins; EDP - Becker; IIS-PPG - Byrne.

### **19.2. 9<sup>th</sup> and 10<sup>th</sup> SPC meetings**

#### **19.2.1. 4-7 March 2007, Osaka, Japan**

Hiroyuki Yamamoto explained that SPC member Harue Masuda would host the next SPC meeting on 4-7 March 2007 in Osaka, Japan. He briefly described the meeting venue and noted the possible field trip on 3 March to see the fault systems in the Rokko Mountains, including the Nojima Fault that caused the 1995 Great Hanshin Earthquake in Kobe.

#### **19.2.2. August or September 2007, U.S.A.**

Keir Becker stated that the following SPC meeting in August or September 2007 should occur in the U.S. He tentatively identified either Bekins in Menlo Park or Filippelli in Indianapolis as the potential host. Becker noted that he might have a timing conflict with his cruise schedule but could not say for certain at the moment. Ildefonse wanted to avoid conflicting with the start of many academic calendars in September. Mori preferred avoiding the first week of August because of a general conflict with university entrance exams in Japan. The committee decided to wait until later to determine the exact dates. A poll conducted after the meeting indicated a clear preference for the dates of 27-30 August 2007.

## **20. Review of motions and consensus items**

Keir Becker promised to review all of the recommendations from this meeting with the science coordinators and produce a draft executive summary as soon as possible. Bekins, Becker, Mountain, and MacLeod presented tributes to departing SPC members Fryer, Duncan, Quinn, Brumsack, and Ildefonse. Mountain sang his tribute to Quinn in a rich baritone, with audio accompaniment. Mountain and Nomura thanked Searle and Okada for their service as chairs of the SSP and STP, respectively. Becker thanked Pedersen and his assistants for hosting the meeting.

**SPC Consensus 0608-20:** The SPC thanks Patty Fryer for her service to the committee from 2004 to 2006. She has always engaged actively in discussions and shown concern for the optimal functioning of the program, while imparting her special wisdom in interdisciplinary projects among geochemistry, subduction dynamics, and microbiology. We wish Patty all the best in her future endeavors, including the recovery of pristine fluid samples and abundant extremophiles.

**SPC Consensus 0608-21:** The SPC bids a fond adieu to Bob Duncan – but not for long! We thank him for three years of stellar service on the committee, following on multiple past terms on ODP panels. During his term on the SPC, his even-handed and expert assessments of a wide range of important topics were essential in helping us achieve our objectives and make a few difficult decisions. We especially thank Bob for agreeing to chair the Hotspot Geodynamics DPG as he rotates off the SPC, and we look forward to seeing him again in about a year for a comprehensive, concise, and timely report from the DPG.

**SPC Consensus 0608-22:** Ode to Terry Quinn (sung to the tune of *Danny Boy*)

Oh Terry Boy, the vacuum lines are wheezing  
From your mass spec, away 'cross Texas wide  
Your term is done, no more will Keir be calling  
'Tis you, 'tis you must go and we must bide.

But come ye back to tell of Vanuatu  
Or that the world is bathed in CO<sub>2</sub>  
We'll still be here with missions, SAS, and ESO  
Oh Terry Boy, oh Terry Boy, we'll miss you so.

**SPC Consensus 0608-23:** This is the last meeting of two of the ECORD delegates, Hans Brumsack and Benoit Ildefonse. The SPC thanks both of them for their contribution to the committee and to the other SAS panels on which they have served faithfully and selflessly over many years.

We here extend thanks  
To ECORD rep Hans,  
His comments are wry,  
His humor is dry,  
And his pipe lends an air of romance.

And also to a chap named Benoit,  
With whose name there is no possible rhyme,  
But who's insight's stupendous,  
With knowledge compendious,  
And always meets deadlines on time.

So goodbye SPC  
They'll tell us, with glee  
'Tis not a goodbye  
Wipe that tear from your eye  
Our replacements are better, you'll see.

**SPC Consensus 0608-24:** The SPC thanks Roger Searle for his years of service as chair of the Site Survey Panel (SSP). He guided the SSP through a critical time of working with a new Site Survey Data Bank and developing new protocols that move proposals toward the goal of accomplishing good science. His clear, deliberate manner in running panel meetings, plus his concise and useful reporting to the SPC, present a challenge for all subsequent panel chairs to match. We are pleased that he will remain as an SSP member for an additional year and will help his replacement maintain the high standards of performance that he himself has set.

**SPC Consensus 0608-25:** The SPC thanks Makoto Okada for his devoted contribution to the Scientific Technology Panel (STP). He has worked as a vice-chair and chair of the STP and successfully organized many important issues in IODP scientific technology. He is a quiet, self-effacing person, but he is always filled with a Japanese smile. Okada-san is a prominent paleomagnetist in the late-young generation of the Japanese earth science community, and his personal magnetism attracts younger earth scientists; thus, he is very hopeful and would be a key person to the future of scientific ocean drilling. We regret that his term as STP chair has ended; however, we believe that he will stay involved with the IODP community and continuously promote IODP science with more powerful magnetism.

**SPC Consensus 0608-26:** The SPC thanks Rolf Pedersen, his colleagues at the University of Bergen, and the ECORD Managing Agency (EMA) for hosting this SPC meeting in the wonderful setting of the Solstrand Hotel & Bad in Os, Norway. Despite a minor amount of rain, the setting was spectacular, the hotel, food, and reception were superb, the meeting room was nearly perfect, and the excursions were truly unique.

## SPC 0608 Minutes, Appendix A

### SPC Scientific Assessment of IODP Expedition 302 Arctic Coring Expedition (ACEX)

(by SPC members Terry Quinn, Hans Brumsack, Hiroshi Kitazato)

IODP Expedition 302 was based on Proposal 533-Full3 “Paleoceanographic and tectonic evolution of the central Arctic Ocean” and was the first IODP expedition to use a mission-specific platform (MSP) as a base of operation. This assessment focuses on the scientific results achieved to date (approximately two years post-cruise) relative to the objectives outlined in the Expedition 302 Scientific Prospectus, and it is based on the drilling results as summarized in the Expedition 302 Preliminary Report and presented at the August 2006 SPC meeting. The SPC assessment team used a relative scaling term (achieved, not applicable, not achieved) in evaluating how well Expedition 302 attained its scientific objectives.

The Expedition 302 Scientific Prospectus (<http://www.ecord.org/exp/acex/302SP.html>) defines the two major scientific objectives as understanding the paleoceanographic history and the tectonic evolution of the central Arctic Ocean. The paleoceanography objective is fortified by seven specific scientific objectives: 1) the history of ice rafting, 2) local versus regional ice-sheet development, 3) the density structure of Arctic Ocean surface waters, nature of North Atlantic conveyor, and onset of Northern Hemisphere glaciation, 4) the timing and consequences of the opening of the Bering Strait, 5) land-sea links: response of the Arctic to Pliocene warm events, 6) development of deep Fram Strait and deep-water exchange between Arctic and Greenland, Iceland, Norwegian (GIN) seas and the world ocean, and 7) the history of biogenic sedimentation. The overall tectonic objective focuses on the nature and origin of the Lomonosov Ridge and the factors affecting the history of the ridge over time.

#### **Paleoceanographic Objectives**

The first three paleoceanographic objectives (history of ice rafting, local versus regional ice-sheet development, and density structure of Arctic Ocean surface waters, nature of North Atlantic conveyor and onset of Northern Hemisphere glaciation) are grouped in this assessment under the heading “Arctic Paleoenvironmental History.”

#### ***Arctic Paleoenvironmental History***

Expedition 302 documented the highly dynamic hydrologic history of surface water in the Arctic. One of the most intriguing results is that the Paleocene-Eocene Thermal Maximum (PETM, ~55 Ma) could be identified by its sedimentary and isotopic signature. There is evidence that the Arctic was a semi-enclosed basin with estuarine circulation and short-term oscillations in fresh to brackish conditions. Periodic conditions of bottom-water hypoxia and anoxia also were noted. Overall an enhanced hydrological cycle is indicated for the Arctic with a relatively wet climatic regime and strong seasonality in precipitation. A strong fluvial contribution is evidenced by the *Azolla* horizon.

Expedition 302 found evidence for the first occurrence of ice-rafted debris (IRD) in the middle Eocene epoch (~45 Ma), some 35 million years earlier than previously thought. Previous drilling results from the Fram Strait and Yermak Plateau regions have documented a series of middle- and late-Miocene pulses of ice rafting that continued after 5 Ma. However, this evidence might represent local ice expansion events (Svalbard) rather than those resulting from glaciers in the central Arctic. The occurrence of a 1-cm-diameter dropstone in middle-Eocene sediment was judged by the Expedition 302 scientists not to have been derived from the Siberian continental coast because of distance and isolation considerations. This is a

remarkable discovery of early ice conditions in the Northern Hemisphere, as highlighted in Moran et al. (2006).

In addition to documenting middle-Eocene IRD, Expedition 302 found that the early Miocene (~14 Ma) sediment in the central Arctic Ocean was dominated by IRD in the form of dropstones and the initial occurrence of sand. The abundance of dropstones and sand suggests that sea ice and icebergs, calved from glaciers, were present in the Arctic Ocean. Physical properties data indicate a large influx of coarse-grained sediment beginning at ~3.2 Ma, consistent with the increased presence of sea ice and icebergs. This record of Neogene cooling and sea-ice variability in the Arctic is synchronous with the expansion of Greenland ice (~3.2 Ma) and East Antarctic ice (~14 Ma). Expedition 302 results suggest contemporaneous co-evolution of ice on the poles, and thus symmetry in cooling and a bipolar transition from the “greenhouse” to “icehouse” world. This is truly a first-order contribution to the history of cryosphere evolution during the Cenozoic.

The SPC assessment team judges that all three of the scientific objectives in this category were achieved with great success.

#### ***Timing and consequences of the opening of the Bering Strait***

A dramatic change in shallow-water marine faunas (e.g., influx of Pacific boreal molluscs in Iceland) has traditionally been interpreted to reflect the opening of the Bering Strait. Expedition 302 scientists report that carbonate sediments are not a significant part of the younger portion of the stratigraphic record at the ACEX drilling sites, probably because of dissolution. Hence, the sediment cores recovered on Expedition 302 cannot be studied by traditional means to determine the timing and consequences of the opening of the Bering Strait.

The SPC assessment team judges that this scientific objective could not be achieved because of the unforeseen occurrence of a >20-million-year hiatus separating the Neogene and Paleogene intervals.

#### ***Land–sea links: response of Arctic to Pliocene warm events***

The aforementioned hiatus in the sediment record may include the whole Pliocene, thus making it improbable that Expedition 302 results may be used to study land–sea links and the response of the Arctic to Pliocene warm events.

The SPC assessment team judges that this scientific objective could not be achieved because of the missing section.

#### **Tectonic Objectives**

The recovery of upper Cretaceous sediments of shallow-marine origin from beneath the regional unconformity confirmed the hypothesis that the Lomonosov Ridge forms part of the shallow Barents continental margin. The lack of significant recovery beneath the regional unconformity and the apparent uplift and erosion phase of the Lomonosov Ridge preclude detailed study of the tectonic history of the ridge. On the other hand, the presence of the hiatus and the potential emergence history of Lomonosov Ridge may shed light on the overall tectonic evolution of the Arctic.

The SPC assessment team judges that at least one of the two tectonic objectives was achieved.

#### **Other Significant Scientific Results**

Paleocene-Eocene Thermal Maximum (PETM) – Expedition 302 results indicate that surface water temperatures before and after the PETM were ~19°C and peaked at ~25°C during the PETM (~55 Ma) event. These peak warm values in Arctic surface waters imply a greatly

reduced planetary temperature gradient and have significant implications to the ocean–atmosphere climate system. Furthermore, a geographically isolated Arctic basin at that time would have limited oceanic interchange between the Arctic and the North Atlantic and decreased the likelihood that oceanic heat transport was directly responsible for warmth near the pole during the PETM.

Middle Eocene “Azolla” Event (50 Ma) – Expedition 302 results indicate that the free-floating fern *Azolla* were a dominant constituent of surface waters in the Arctic during an 800 ky<sup>-1</sup> interval of the middle Eocene, indicating the episodic freshening of Arctic surface waters at that time.

Paleogene Organic-Carbon-Rich Sequence – The 200-m-thick Paleogene sequence in the ACEX record is rich in organic carbon. Organic carbon records indicate that euxinic conditions, analogous to conditions in the modern Black Sea, characterized the early Eocene and middle Eocene Arctic Ocean. The preservation of organic carbon in the sediments is attributed to salinity stratification in response to freshwater discharge.

### **Microbiological and geochemical studies**

Most of the geochemical and microbiological studies are not yet completed and therefore cannot be assessed; however, the pore-water analyses were very successful. This in part reflected the newly applied Rhizon pore-water sampling technique, which allowed making high-resolution geochemical pore-water measurements of ammonia and alkalinity for site correlation.

Ongoing microbiological studies on the deep biosphere are focusing on methods to determine concentrations and activity of bacterial biomass and community composition. Despite partially low core recovery, twenty-one samples were preserved for microbiological investigations onshore. As it is still only two years post-expedition, results of microbiological studies to date are not yet published.

### **Missed Opportunity**

The original scientific objective of recovering a continuous sedimentary sequence was not realized because of the presence of a condensed and partially missing section spanning the interval from ~44 to 16 Ma. The original seismic profile used to characterize the drilling sites was interpreted to be a continuous sediment sequence unconformably overlying rifted continental crust. Expedition 302 drilling results documented that the sediment sequence was not continuous. This surely represents a missed opportunity, though perhaps newly acquired seismic data can be used to identify other sites on the Lomonosov Ridge where the sedimentary record might include the missing interval.

### **Overall Assessment of Expedition 302**

Overall the first MSP expedition of the IODP was extremely successful, despite the challenges associated with core recovery in this frontier environment. Five of the seven paleoceanographic objectives were met with great success and one of the two tectonic objectives was achieved. The high risk and high reward aspect of this expedition was rewarded by the high profile science that was achieved and attested to by a series of publications in *Nature* and other prominent scientific journals. The achievements of this groundbreaking expedition will likely be some of the most significant in the IODP.

## SPC 0608 Minutes, Appendix B

### SPC Scientific Assessment of IODP Expedition 308 Gulf of Mexico Hydrogeology

(by SPC members Barbara Bekins, Zuyi Zhou, Greg Mountain)

IODP Expedition 308 was based on Proposal 589-Full3 “Overpressure and fluid flow processes in the deepwater Gulf of Mexico.” This was the first of a two-part expedition to drill into overpressured sands and install a CORK for long term monitoring. The overall objective was to document how pressure, stress, and permeability control fluid migration at passive margins. Related objectives are described below. The study areas were located on the continental slope offshore Texas and western Louisiana, where individual mini basins are surrounded by elevated salt highs. Pleistocene sediments with relatively low sedimentation rates were drilled in Brazos-Trinity Basin and contrasted with sediments drilled in Ursa Basin where sedimentation rates were expected to exceed  $1 \text{ cm y}^{-1}$ . The proposed plan was to compare the properties of normally pressured sediments in Brazos-Trinity Basin with similar overpressured sediments in Ursa Basin. The expectation was for the Brazos-Trinity Basin sites to provide an excellent dataset on the nature of ponded and channelized turbidites, while the Ursa Basin sites would provide insights into controls on overpressure development and slope stability. The entire project would test new techniques for drilling in overpressured formations, estimating *in situ* pressures, and measuring sediment geotechnical properties.

#### **Brazos-Trinity Basin**

Sites U1319, U1320, and U1321 were drilled in the Brazos-Trinity Basin. Coring and MWD/LWD were conducted on the edge of the basin at Site U1319 and in the depocenter at Site 1320, whereas only MWD/LWD was performed at the intermediately positioned Site 1321. The recovered sequence of hemipelagic deposits and turbidites is condensed near the edge of the basin relative to that at the basin center. The drilling results from Sites 1319 and 1320 together with the logging results from Site 1321 allowed for dating of the turbidite flows and correlation with existing 3-D seismic images. On the basis of the drilling and seismic data, the sediments could be divided into the following sequence: (1) pre-fan deposits representing distal turbidity currents spilled over from adjacent basins before infilling of the basin began, (2) hemipelagic drape comprising the base of the basin infill and representing a dramatic decrease in sediment input during sea-level high-stand MIS 5e, (3) lower-fan, mud-rich sediments with less than 8% sand deposited between 120 and 90 ka, (4) middle-fan sediments comprised of 40% sand at the center increasing to 80% sand at Site U1321, and (5) upper-fan sediments that were capped by clay showing that deposition stopped at the last sea-level rise. The upper and middle fans were deposited between ~47–60 and ~10 ka and represent the main pulse of turbidity current influx into this basin. This implies an average accumulation rate between 2.5 and 3.5  $\text{m ky}^{-1}$  for the 130 m thick succession at Site U1320, compared with an average accumulation rate of ~0.2  $\text{m ky}^{-1}$  at the basin margin Site U1319.

Although this basin was expected to be normally pressured, the expedition results showed that overpressures of  $\lambda^*=0.6-0.7$  ( $\lambda^*$  = ratio of overpressure to hydrostatic vertical stress) exist at the depocenter. However, the lack of continuous sand layers extending from the center to the edge of this basin prevents the lateral migration of pressures observed at Ursa Basin.

Overall the results from these three Brazos-Trinity sites will achieve the objective of providing a high-quality dataset of ponded and channelized turbidites that will resolve contradictory seismic-facies-based interpretations of the basin-fill architecture published previously.

## Ursa Basin

Three sites were drilled in Ursa Basin. Site U1322 was located near the edge of the basin where overpressures were expected. This site was initially drilled with MWD/LWD stopping short of the Blue Sand that was expected to be the source of high pressures. Two good T2P and DVTTP pressure measurements at 150 and 236 mbsf provided the needed pressure data to meet objectives for the site. The temperature gradient at Site U1322 based on thirteen measurements is  $26.4^{\circ}\text{C km}^{-1}$ . Site U1323 was located between Sites 1322 and 1324 and was drilled with MWD/LWD but not cored. Site U1324 was located where the sediments were the thickest above the blue sands. This site was drilled using MWD/LWD and then cored. Successful fluid pressure measurements at 117, 300, 405, and 608 mbsf yielded values for  $\lambda^*$  between 0.2 and 0.6. Eighteen temperature measurements gave a geothermal gradient of about  $19^{\circ}\text{C km}^{-1}$ .

Numerous slump deposits were drilled at the three Ursa Basin sites. The coring and LWD data establish the physical properties of the slump slip surfaces and interiors and also the timing of the slumps. Subsequent shore-based studies using consolidation tests are expected to unravel how physical properties change during slumping driven by overpressures.

Pressure measurements at Sites U1322 and U1324 provided the data needed to achieve the objective of documenting how pressure and fluid flow develops in passive margin sedimentary basins. The suite of *in situ* pressure measurements with depth and distance from the basin center provide a map of the pore pressure distribution. They also demonstrate that such *in situ* measurements are possible in overpressured settings. The encouraging data obtained on this expedition demonstrate for the first time that these measurements are both possible and invaluable. Some difficulties, however, were encountered using the pressure tools. Negative pressures at the start of the deployment suggest that the pressure tool was being pulled from the sediment as the drill string was lifted to isolate the tool from the ship's heave. Similar results from ODP Legs 201 and 204 indicate that the colleted delivery system needs to be examined and possibly redesigned to provide more reliable deployment at shallow depths. Another issue concerned the strength of the T2P tip, which was observed to bend if not inserted vertically during deployment.

A final important result of the Ursa Basin sites was the combined use of MWD/LWD and heavy mud to control formation stability in overpressured sediments. This approach should prove useful in other overpressured settings such as active margins.

## SPC 0608 Minutes, Appendix C

### SPC Scientific Assessment of IODP Expeditions 309 and 312 Superfast Spreading Crust II and III

(by SPC members Robert Duncan, Chris MacLeod, and Hiroaki Sato)

IODP Expeditions 309 and 312 were based on Proposal 522-Full3 “A complete in-situ section of upper oceanic crust formed at a superfast spreading rate - Part II: Testing fundamental paradigms for formation of the oceanic lithosphere.” These two combined expeditions achieved a major scientific milestone by sampling for the first time the lower crust from an intact section of oceanic crust. In doing so, a major advance has been made toward the long-standing goal of drilling and sampling a complete section of oceanic crust. During Expeditions 309 and 312, lavas, sheeted dikes, and gabbro were encountered in a section of intact oceanic crust formed at a superfast-spreading ridge ( $\sim 220 \text{ mm y}^{-1}$ , East Pacific Rise).

The overall project began with ODP Leg 206 (Site 1256) and had four principal scientific objectives:

1. Test the prediction, from the correlation of spreading rate with decreasing depth to the axial melt lens, that gabbros representing the crystallized melt lens should be encountered at a depth of 900-1300 m sub-basement at Site 1256.
2. Determine the lithology and structure of the upper oceanic crust for the superfast-spreading-ridge end-member.
3. Correlate and calibrate remote geophysical seismic and magnetic imaging of the structure of the crust with basic geological observations.
4. Investigate the interactions between magmatic and alteration processes, including the relationships between extrusive volcanic rocks, the feeder sheeted dikes, and the underlying gabbroic rocks.

From the drilling penetration and core recovery, initial measurements onboard ship, and post-cruise science, it is apparent that these objectives will in large part be met. From a stratigraphic point of view, Hole 1256D is now the deepest penetration ever made into intact oceanic crust, encountering the sheeted-dike–gabbro transition for the first time. The advance of Hole 1256D into gabbros, with a borehole that is cased through the sediment–lava contact and is open for further drilling, promises favorable conditions for deepening the hole, possibly toward an eventual complete oceanic crustal section.

Site 1256 is located in 15 Ma oceanic crust on the Cocos Plate, formed during an extended period of superfast spreading ( $\sim 220 \text{ mm y}^{-1}$ ) at the East Pacific Rise. ODP Leg 206 began drilling at this site in 2002, when Hole 1256D was drilled through 250 m of sediment and 502 m into massive lavas and sheet flows. IODP Expedition 309 continued coring in 2005 and reached 1255 mbsf, into sheeted dikes, and Expedition 312 deepened the hole to 1507.1 mbsf and into gabbro. Core recovery during Expedition 309 was 36.3%, compared to 18.5% during Expedition 312. This is significantly greater than that encountered in the dikes at Hole 504B (8.6%).

The first objective of IODP Expeditions 309 and 312 was to test the hypothesis that the depth to the geophysically defined, axial melt lens decreases systematically with increasing spreading rate. In this model, gabbros representing the crystallized melt lens were predicted to be encountered at  $1162 \pm 140$  m sub-basement (msb) at Site 1256. The sheeted dike–gabbro transition in Hole 1256D was actually penetrated at a depth of 1157 msb (1407 mbsf), thus

remarkably affirming the hypothesis. The finding of the shallow depth to the gabbro (melt lens) as predicted will allow us to place many constraints upon models of crustal accretion and refine assessments of thermal budgets at fast-spreading oceanic ridges.

The second objective of the expeditions was to determine the lithology and structure of the upper oceanic crust for the superfast-spreading end-member. The upper part of Hole 1256D can be partitioned into six basement subdivisions, which in descending order down the hole, are: a ponded lava flow (ca. 90 m thick), inflated flows (184 m), sheet and massive flows (470 m), transition zone (57 m), sheeted dikes (346 m), and plutonic rocks (>100 m). Compared with Hole 504B, formed at intermediate spreading rates, Hole 1256D has a much higher proportion of sheet flows than pillow lavas, and a much thinner sheeted dike section (ca. 350 m, compared with >1000 m). Gabbros in Hole 1256D form at least two distinct intrusions that intrude metamorphosed sheeted dikes. They show wide variation in petrography, texture and geochemistry, very similar to relationships observed in the uppermost 'varitextured' gabbros in the Oman ophiolite and interpreted as the product of an axial melt lens. The bulk composition of the gabbros in Hole 1256D is similar overall to the overlying lavas, but the range of compositions encountered suggests local accumulation and in situ fractionation processes in the two separate, probably sill-like, magma bodies. The recovered basalts and gabbros have Mg#s ranging from 0.45–0.70 [ $=100 \times \text{Mg}/(\text{Mg}+0.9 \times \text{Fe})$ ]. These relatively fractionated compositions indicate that some crystal fractionation must have occurred from the magmas calculated to be in equilibrium with mantle olivine. This may be explained by the presence of a complementary cumulate residue in the lower crust. The limited evidence obtained so far in Hole 1256D may therefore be taken to favor the sheeted-sill rather than gabbro-glacier model of lower crustal accretion, but continued drilling into plutonic rocks at the site is necessary to explore these mechanisms further.

As regards the crustal structure at Site 1256, there is no evidence from core or geophysical wireline logs for substantial tilting of the dikes or lavas. This is consistent with seismic reflection images of sub-horizontal reflectors in the lower extrusive rocks across the site.

The third objective of the expedition was to correlate and calibrate remote geophysical seismic and magnetic imaging of the structure of the crust with basic geological observations. P-wave velocities increase with depth in well-log data, which is consistent with velocity measurements on core samples. Refraction velocity is slightly greater than equivalent borehole or sample velocities in the lower part of Hole 1256D (>1150 mbsf). Porosities decrease and velocities increase downhole in the gabbro (but are still less than  $6.5 \text{ km s}^{-1}$ ). A significant finding is that the position of the dike–gabbro boundary does not appear to correspond to the seismic layer 2–3 boundary and has little control over the seismic velocity structure of the crust. In Hole 504B, the seismic layer 2–3 boundary also did not correspond to the dike–gabbro transition and instead occurred within the dikes, whereas in Hole 1256D it presumably will be found in gabbros.

Magnetization in most samples in Hole 1256D is dominated by a pronounced drilling overprint. Although the strong drilling overprint has made determination of original rock magnetic properties difficult, samples from the lower parts (<1000 mbsf) have higher coercivities and an increase in the apparent quality of the magnetic data. The amplitude of the marine magnetic anomalies in the area of the site has been satisfactorily modeled by Wilson (1996) with a layer 500 m thick magnetized at  $10 \text{ A m}^{-1}$ . An average pre-drilling magnetization of  $2\text{--}5 \text{ A m}^{-1}$  is within the plausible range for the dikes and gabbros recovered at Site 1256, so they remain candidates for contributing to a significant fraction of the source of marine magnetic anomalies.

The fourth objective of the expedition was to investigate the interactions between magmatic and alteration processes, including the relationships between extrusive volcanic rocks, feeder dikes, and underlying gabbroic rocks. There is a stepwise increase in alteration grade downward from lavas into dikes, with low-temperature saponite in the lavas giving way to chlorite and other greenschist facies minerals in the sheeted-dike complex. Hornblende appears in the lower part of dike complex, indicating metamorphic temperatures of ca. 400–500°C. In the lowermost part of the sheeted dikes, basalts are partially to completely recrystallized to an assemblage of plagioclase, clinopyroxene, and magnetite with granoblastic textures. The lowermost rock recovered from Hole 1256D is a highly altered actinolite-bearing basaltic dike that lacks granoblastic textures and hence is interpreted to be a late dike that post-dates intrusion of the lower gabbro. Metamorphic temperatures of the granoblastic basalts are yet to be determined but imply a very high thermal gradient compared to that calculated for Hole 504B. A number of other differences in alteration characteristics of Hole 1256D were identified in comparison to other ODP and IODP drilling sites in upper oceanic crust. For instance, the proportion of alteration haloes in Hole 1256D (<15%) is very much lower than in Hole 504B (10-50%), which formed at an intermediate spreading rate.

Hole 1256D is the first borehole into intact gabbroic rocks in oceanic crust. Post-cruise analysis of the recovered core has the potential to resolve important questions about the thermal structure of the oceanic crust, such as whether the shallow gabbro, interpreted as the melt lens, is a transient feature just affecting its immediate surroundings (leading to formation of the granoblastic zones) or whether it is a stationary feature at temperatures near the solidus of basalts.

## **SPC 0608 Minutes, Appendix D**

### **SPC Scientific Assessment of IODP Expedition 311**

#### **Cascadia Margin Gas Hydrates**

( by SPC members Tim Byrne, Katsumi Marumo and Rolf Pedersen)

IODP Expedition 311 was based on Proposal 553-Full2 “Gas Hydrates on the Cascadia Margin.” The overall objective of Expedition 311 was to study the formation and nature of gas hydrates in marine sediments across an active accretionary prism. In this context the proponents outlined several specific goals in Proposal 553-Full2:

- 1 Determine the mechanism of formation, nature, magnitude and distribution of gas hydrate reservoirs across the prism
- 2 Investigate gas transport mechanisms, and migration pathways through sedimentary section, from source to reservoir
- 3 Examine the effect of gas hydrate on the physical properties of the host sediments
- 4 Investigate the microbiology and geochemistry of gas hydrate formation and dissociation
- 5 Establish sites for long-term hydro-geological monitoring

The across-prism transect and the establishment of long-term monitoring sites, including a cross-hole fluid-flow experiment, were planned to complement, and substantially expand on, previous ocean drilling investigations of gas hydrates. These new components were designed to investigate the relation between progressive, tectonically induced consolidation in the prism with hydrate character and evolution.

For various logistical and financial reasons, the full set of proposed objectives were not scheduled for Expedition 311. In particular, the installation of long-term observatories and some of the downhole measurements objectives was deferred to a future expedition yet to be scheduled, as is described in more detail below. The drilling program for Expedition 311 called for drilling five sites across the prism, including a reference site seaward of the prism toe with three holes at each site: Hole A was to be dedicated to LWD and MWD; Hole B to coring and additional temperature measurements as well as limited deployment of the pressure core sampler (PCS); and Hole C to pressure coring, using the PCS, HYACE Rotary Corer (HPC) and FUGRO Pressure Corer (FPC) systems.

Overall, Expedition 311 was very successful and achieved most of the planned objectives. The results from the drilling program show that: the previous models of gas hydrate formation on accretionary prisms need to be revised, although fluid expulsion is still required to explain large concentrations; hydrate occurrences in these environments appear to be driven by the availability of the right host strata (among other requirements) as evidenced by high concentrations of gas hydrate in coarse-grained sands throughout the core samples from most of the sites; the BSR appears to be mainly an effect of free gas below the gas hydrate stability zone and; there is a large intra-site variability in hydrate concentrations. Finally, a thick hydrate layer was found just below the seafloor near the active vent site. Together, these new observations suggest that global estimates of gas hydrate volumes will remain illusive.

Poor to severe weather conditions also hampered expedition 311. Weather conditions impacted down-hole tool deployment, including pressure coring and tools for temperature measurements (distributed temperature sensing data are needed rather than spot temperature readings), and core quality and limited wire-line data (e.g., acoustic logs and vertical seismic profiles, VSPs), and there was insufficient time to drill the reference site, although it was possible to include a cold-seep site just off of the transect that will provide a basis for comparison. The LWD-NMR tool also failed

A second expedition to this area yet to be scheduled by OTF and SPC will retrieve more tightly distributed temperature data, pore pressure and permeability data and install long-term monitoring experiments using circulation obviation retrofit kits (CORKs, CORK-IIs and Advanced CORKs and/or SCIMPIs). The long-term monitoring tools will be permanently installed at various sites along the transect, including the cold seep vent to study:

- Temporal changes in the temperature regime associated with fluid and gas flow
- Formation pressure variations associate with fluid flow
- Permeability on various length scales using the CORKs for a hydrogeologic cross-hole experiment, and
- More precisely constrain the extent of the gas hydrate stability zone

The long-term monitoring sites will also be connected to the NEPTUNE cable observatory that will be installed on the Juan de Fuca plate by summer 2008. Other NEPTUNE experiments and monitoring will include: seafloor electromagnetic imaging, an ocean-bottom seismograph network, near-seafloor high-resolution temperature monitoring, as well as chemical sensors that measure temporal variations in the amount of methane in the water column, for example.

More specifically, the second expedition should include:

- Deploy CORK/SCIMPI/DTS and link to NEPTUNE
- Drill/core Site CAS-04B
- Acquire LWD data for CORK/SCIMPI experiment
- Acquire NMR LWD data at selected Sites to complete study of concentration estimates (re-visit of U1327/U1326/U1325)
- Acquire walk-away VSP at selected Sites (U1326, U1327)
- MDT test (to acquire estimates of permeability, pore-pressure and *in situ* fluid sampling)

Finally, considering the relatively short time since the cruise ended and that the scientific party has not meet for its first post-cruise meeting (scheduled for April, 2007), we anticipate that the post-cruise science results will increase substantially.