



NanTroSEIZE: IODP's First Complex Drilling Project

H. Tobin, M. Kinoshita, M. Underwood, G. Kimura, D. Saffer, E. Screaton and G. Moore

The long push to drill and instrument the Nankai Trough in the Kumano Basin region off Japan's Kii Peninsula will come to fruition in 2007. Here, where the Philippine Sea plate is subducted beneath Japan, a tremendous history of and potential for earthquakes and tsunamis has inspired the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE).

As the December 2004 Sumatra-Andaman earthquake and Indian Ocean tsunami so tragically demonstrated, subduction earthquakes and their effects are perhaps the greatest natural hazards on the planet. NanTroSEIZE's overall objective is to drill, sample, and instrument boreholes spanning the transition from shallow aseismic to deeper seismogenic behavior on a plate-boundary fault—or megathrust—at a subduction zone where great earthquakes (moment magnitudes ≥ 8.0) have repeatedly occurred in the past (Tobin and Kinoshita, 2006a,b). The research effort's goal is to better understand the mechanisms responsible for the cycle of great earthquakes. Achiev-

ing this goal will involve drilling key elements of the active plate boundary system at several locations off Japan's Kii Peninsula (Figure 1)—from the material inputs to the subduction zone at reference sites, through the shallow thrust onset of the plate interface, and ultimately to depths at which earthquakes occur.

Based on a set of five linked drilling proposals (603-series), the IODP Science Advisory Structure has designated NanTroSEIZE as IODP's first Complex Drilling Project (CDP) and has scheduled multiple expeditions dedicated to NanTroSEIZE on both the new Japanese drillship *Chikyu* and the U.S. Scientific Ocean Drilling Vessel (SODV). Because of this complexity, the NanTroSEIZE CDP is being planned and implemented by a Project Management Team that includes proponents, ship operators, and representatives of the IODP organization. The Complex Drilling Project structure includes a

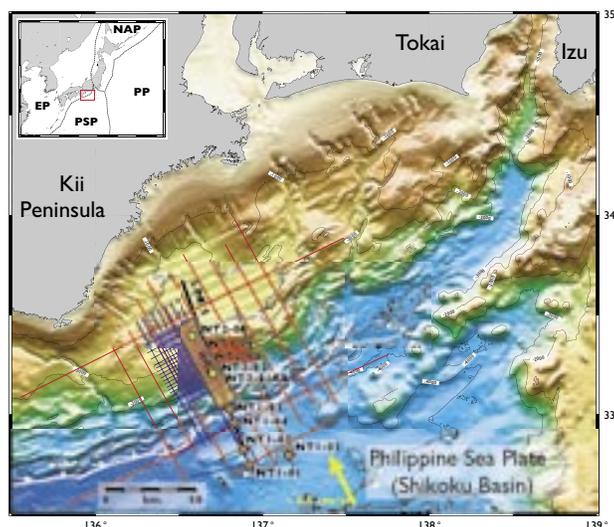


Figure 1. The Nankai Trough off Japan, showing NanTroSEIZE transects. Locations of several 2-D seismic reflection lines are shown, including Line 5 which is reproduced in Figure 2. The orange box indicates the 3-D seismic survey acquired in 2006.

new designation in IODP: Co-Chief Project Scientists who are charged with scientific guidance and coordination with the Implementing Organizations (CDEX and USIO) for the project as a whole, much as a Co-Chief is for an individual expedition.

continued on page 4

Inside

**Meet USAC's
New Members**

page 14

**Submit an IODP
Pre-Proposal**

page 6



Chikyu Shakedown Update



Contents

Fall 2006

Features



Photo: JAMSTEC/CDEX

- 6**
- 1 NanTroSEIZE:
IODP's First Complex Drilling Project**
by Harold Tobin, Masataka Kinoshita, Mike Underwood, Gaku Kimura, Demian Saffer, Elizabeth Screaton, and Greg Moore
- 6 Chikyu Shakedown Operations**
by Andrea Johnson
- 10 At the Beginning:
IODP Preliminary Proposals**
by Jeff Schuffert, Nobu Eguchi, and Barry Zelt
- 11 Apply to Sail on the Pacific Equatorial Age Transect**
- 12 JOI Proposes New Support Model for U.S. IODP Participants**
by Holly Given
- 14 New USAC Members**

Departments

- 3 Drill Bits**
- 8 Workshop Report:
Tectonics, Circulation,
and Climate in the
Caribbean Gateway**
by Paul Mann
- 9 Fellowship Profile: Matt O'Regan**
- 11 IODP News: U.S. Science Advisory Structure Members**
- 15 USAC Chair Letter: Christina Ravelo**



Assorted drill bits.

Photo: JAMSTEC

Cover Images

Bottom left: New USAC member Yildirim Dilek at the Grand Canyon.

Bottom right: A joint of drill pipe is lifted by the magnetic yoke on the Japanese drillship, Chikyu. Paleomagnetists measured the magnetic field around and inside the pipe before and after it was lifted by the magnetic yoke. (Photo: Gary Acton, University of California, Davis)

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Drill Bits

ODP Legacy Website Launched at www.odplegacy.org

JOI has created an Ocean Drilling Program (ODP) legacy website to preserve the program's data, documents, and publications, and to highlight the accomplishments of 20 years of scientific ocean drilling. As an evolving website, www.odplegacy.org will be populated with ODP information and materials as they become available. Please consider contributing ODP-related group photos, logos, documents (e.g., minutes, meeting reports), publications, or articles to the legacy project. Please e-mail electronic copies to odplegacy@joiscience.org or mail hard copies to:

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JOI's goal is to make this website as complete and useful as possible. You may send comments and suggestions to odplegacy@joiscience.org.

JOI Welcomes New Staff

JOI welcomes several new staff members. Jeffrey Schuffert will become the Associate Director of USSSP and Charna Meth will become USSSP's Assistant Director, joining Assistant Director Carl Ebeling and Director Holly Given. Most recently, Jeff was the Senior Science Coordinator in IODP-MI's Sapporo, Japan office, and before that he was the U.S. liaison and a Science Coordinator in the JOIDES Office at GEOMAR in Germany. Charna comes to JOI from EarthScope, a project of NSF/GEO/EAR. In addition, Sean Higgins has become JOI's Associate Director of Ocean Drilling. Sean was a Logging Scientist at Lamont-Doherty Earth Observatory's Borehole Research Group.

New IODP DPG Established

The IODP Science Planning Committee (SPC) recently created a new Detailed Planning Group (DPG) to develop a coherent strategy for combining and achieving the scientific objectives of current drilling proposals addressing hotspot geodynamics. Bob Duncan, College of Ocean and Atmospheric Science, Oregon State University, will chair the group which is planning its first meeting for mid-January 2007.

JOI and IODP Activity at the Fall AGU Meeting in San Francisco

Learn more about scientific ocean drilling and ocean observing activities at the American Geophysical Union's (AGU) annual Fall meeting, December 11 to 15, 2006, in San Francisco. JOI and IODP Management International (IODP-MI) will host booths at the conference. The IODP Town Hall Meeting will be held on Thursday, December 14 at the San Francisco Marriott, Salons 4-6. Following refreshments at 6:30 p.m., the program will start at 7:30 p.m. A Town Hall Meeting for the Ocean Research Interactive Observatories Networks (ORION) program is scheduled for Tuesday, December 12, from 5:30 to 7 p.m. The ORION meeting, which will begin with light refreshments, will be at the Hilton San Francisco Towers two blocks from Union Square (333 O'Farrell Street).

JOI Membership Reaches 31

The Massachusetts Institute of Technology and Old Dominion University have become the newest members of JOI bringing the total membership to 31 institutions. The list of JOI's current members is at www.joiscience.org/members.

JOI 2007 Calendars at AGU

The JOI 2007 calendar, featuring "expeditions and observatories that create discoveries" and "discoveries that shape society," will be available at JOI's AGU exhibit. You also may request one by contacting info@joiscience.org.

Available from JOI: ODP's Contributions to Paleomagnetism

The July 2006 issue of the journal *Physics of the Earth and Planetary Interiors* (PEPI) featured ODP's contributions to paleomagnetism. The types of ODP paleomagnetic studies have been as varied as the many different expedition goals and scientists that have sailed with the program. Most of the articles focus on behavior of the ancient geomagnetic field or magnetic stratigraphy, with a smaller number of contributions addressing rock and sedimentary magnetic properties, plate tectonics, and techniques. In particular, ODP's coring in thick Quaternary sedimentary sections provided new observations of short-term variability of the geomagnetic field, which has also proven

to be a powerful dating tool. The journal's guest editors were Will Sager, Texas A&M University; Gary Acton, University of California, Davis; Brad Clement, Florida International University; and Mike Fuller, University of Hawaii. This special issue is available from JOI by contacting info@joiscience.org or by stopping by JOI's exhibit at the Fall AGU conference.

Two New Workshops in 2007

JOI/USSSP will fund two workshops from proposals received in April 2006. A workshop on "Sea-Level Research within IODP," to be convened by Craig Fulthorpe of University of Texas at Austin, will expand upon discussions at the SEALAIX '06 Sea Level Symposium in Giens, France. It will re-examine strategies to address key questions of sea-level change. Current plans are to schedule the workshop for Fall 2007 to take advantage of initial "lessons learned" from IODP's New Jersey Shallow Shelf expedition planned for Summer 2007. With joint funding from USSSP and the ORION Project Office, JOI will also sponsor a workshop on "Gas Hydrate Observatories: Science Questions and Experimental Studies" to be convened by Marta Torres and Anne Trehu of Oregon State University. Its primary goal is to develop a focused plan for implementing needed technologies for a successful gas hydrate monitoring program. Once scheduled, both workshops will have an open application process advertised in *EOS* and through the JOI listserver. More information about USSSP's workshop program, which has two yearly deadlines of April 15 and October 15, can be found at www.ussp-iodp.org.

JOIDES Resolution Drills Hydrates

During the break between U.S.-operated IODP scientific expeditions, a mutual agreement between Overseas Drilling Limited and the JOI Alliance made it possible for the *JOIDES Resolution* to be employed in the India Gas Hydrate drilling program. In June, the India Gas Hydrate drilling program discovered a gas hydrate layer 420 feet thick in the southern Kaveri-Godavari Basin. This finding indicates a sizeable accumulation of gas hydrates and the event marks the first time in India's history that gas hydrate samples have been collected in the country's waters.

NanTroSEIZE: IODP's First Complex Drilling Project

continued from page 1

The plate interface and active megasplay faults within the coseismic rupture area of the 1944 Tonankai great earthquake (magnitude 8.1) are accessible to drilling offshore the Kii Peninsula. The Nankai Trough is perhaps the best-characterized subduction zone in the world. A 1300-year historical record exists of recurring (and typically tsunamigenic) great earthquakes, including the 1944 Tonankai earthquake (Ando, 1975; Hori et al., 2004). Slip inversion studies and seismic imaging suggest that past coseismic ruptures are shallow enough for drilling (Ichinose et al., 2003; Baba and Cummins, 2005; Nakanishi et al., 2002); an up-dip zone of large slip—known as an asperity—is targeted for riser drilling. Shallow coseismic slip has as likely occurred on the megasplay fault as on the décollement beneath it; therefore, the megasplay fault is a primary drilling target equal in importance to the basal décollement zone.

The NanTroSEIZE science plan entails sampling and long-term instrumentation of: 1) the inputs to the subduction zone conveyor belt, 2) faults that splay from the plate interface to the surface and that may accommodate a major portion of coseismic and tsunamigenic slip, and 3) the main plate interface at a depth of up to 6 km (Figure 2). The most ambitious objective is to use *Chikyu's* riser drilling capability to access and instrument the plate interface within

the seismogenic zone at Sites NT2-03 and NT3-01, at depths of ~3.5 km and 5.5 to 6 km below the seafloor, respectively.

NanTroSEIZE drilling will begin with five "Stage 1" expeditions scheduled for September 2007 through April 2008 (see Table, page 5). Three expeditions are slated for the *Chikyu*, and two expeditions will use the SODV. Stage 1 of NanTroSEIZE will undertake drilling, logging, coring, and downhole monitoring at six sites at depths ranging from several hundred to more than one thousand meters below the seafloor.

NanTroSEIZE Stage 1 calls for drilling in riserless mode at six of eight future sites (Figure 2) and specifically sampling the:

- Incoming sediment of Shikoku Basin and underlying oceanic crust (two sites),
- Frontal thrust system at the toe of the accretionary wedge,
- Mid-wedge megasplay fault system, and
- Seismogenic zone faults. (Approximately 1000-m-deep holes are planned at two sites which will be penetrated more deeply later. Ultimately, one site will have a subseafloor observatory).

The *NanTroSEIZE Stage 1 Scientific Prospectus* (Tobin and Kinoshita, 2006b)—available at www.iodp.org/NanTroSEIZE—contains

further information about individual expeditions during Stage 1. In summary, comprehensive coring and logging of the boreholes are planned, including extensive use

The Scientific Prospectus for NanTroSEIZE Stage 1 is available at www.iodp.org/NanTroSEIZE.

of logging-while-drilling (LWD) technology to obtain high-quality logs. One borehole observatory installation is planned for a pilot hole at proposed Site NT3-01 to monitor

pore-fluid pressure, strain, temperature, and seismicity above the plate boundary. This observatory deployment (see Becker and Davis, 2005; Araki et al., 2004) will serve as a prototype and testbed for some of the technologies that might be used in deeper borehole observatories in the future.

In itself, NanTroSEIZE Stage 1 represents the most sustained concentration of scientific ocean drilling efforts ever undertaken; however, later stages will extend the reach to even greater seismogenic depths. As IODP's first riser-drilling effort, Stage 2 of NanTroSEIZE drilling—slated to begin in mid-2008—may break the scientific-ocean-drilling depth record by targeting the megasplay fault at 3000+ meters below the seafloor. In Stage 3, plate interface drilling 5 to 6 km below the seafloor is planned, and in Stage 4, long-term monitoring systems will be installed in the deep boreholes. A summary of the overall plan (Tobin and Kinoshita, 2006a) and more details of the

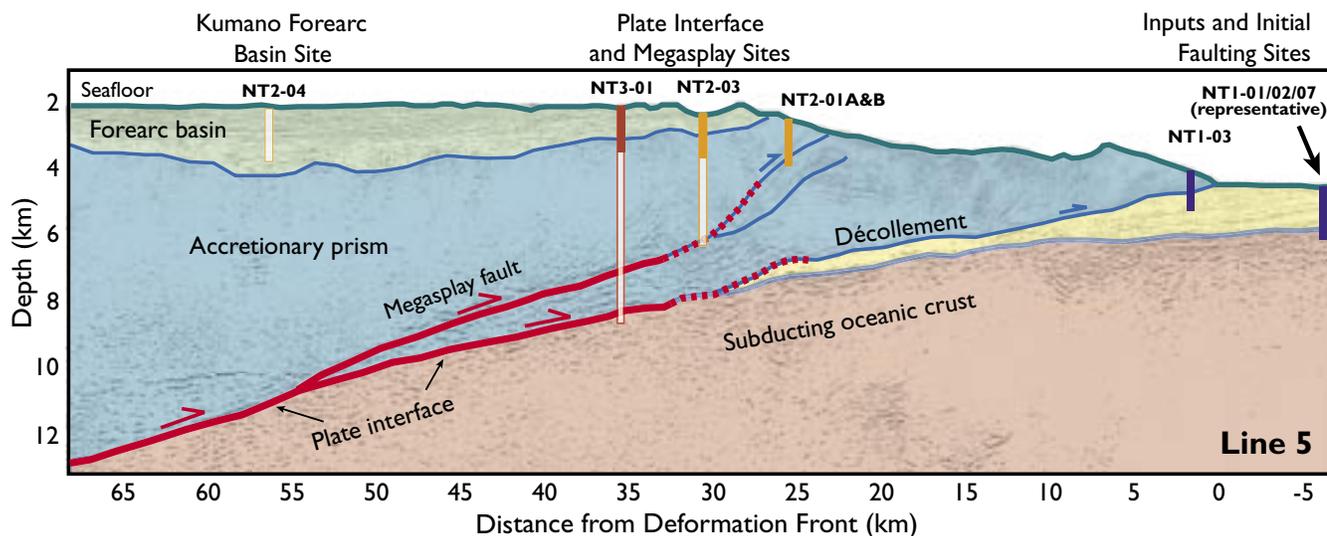


Figure 2. Pre-stack depth migrated seismic section of Line 5 of Park et al. (2002), with interpretation and site locations, as projected onto this single long line. Co-seismic slip during the 1944 Tonankai earthquake is shown in red, based on seismic and tsunami source inversion, with dashes indicating uncertainty in up-dip termination of slip. NanTroSEIZE Stage 1 drilling planned for 2007 to 2008 includes all filled site lines; later stages of operations include riser drilling to achieve deep targets at sites NT2-03 and NT3-01, shown in white.

scientific objectives and strategy can be found in the “umbrella” proposal document (603-CDP), available online at www.iodp.org/NanTroSEIZE.

Drilling will yield geophysical logs and physical samples of rocks, sediments, and fluids, as well as downhole measurements including long-term monitoring of key parameters such as temperature, pore pressure, deformation, and microseismicity. Sampling the inputs and splay faults at several depths, and the plate interface at great depth, will provide key data on the evolution of fault-zone composition, fabric development, and lithification state as functions of pressure, temperature, and cumulative slip. Logging and borehole imaging will determine *in situ* physical properties and help define stress state. Finally, long-term monitoring through downhole instrumentation will yield *in situ* time-series data sets during the interseismic period and after drilling disturbance signals have subsided, providing evidence to address key hypotheses on the nature of fault locking and strain accumulation.

In 2006, the planned drilling region was the target of a joint U.S. and Japan 3-D seismic

reflection survey, the first survey ever collected by a commercial vessel for academic purposes using multi-streamer, true three-dimensional techniques. The survey was funded by JAMSTEC, MEXT, and the U.S. National Science Foundation. Survey data were acquired by PGS Geophysical with the ship *Nordic Explorer*. The Kuroshio current presented a challenge for the four hydrophone streamers, but an 11 x 55 km area was successfully imaged. Other site surveys of the Nankai subduction zone have been conducted recently, including additional multi-channel seismic, side-scan sonar and swath bathymetry, dive programs, sampling and seafloor observations.

As this newsletter goes to press, more than 65 applications to participate in NanTroSEIZE expeditions have been received from U.S. scientists, and the Stage 1 scientific party nominations are in progress. We are heartened by this high level of interest and look forward to leading the new multiplatform era in scientific ocean drilling.

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References

Ando, M., 1975. *Tectonophysics*. 27:119-140.
 Araki et al., 2004. *Bull. Seismol. Soc. Am.*, 94:678-690.
 Baba, T., and Cummins, P., 2005. *Geophysical Research Letters*. 32, L08305. doi:10.1029/2004GL022320.
 Becker, K. and Davis, E., 2005. A review of CORK designs and operations during the Ocean Drilling Program. In Fisher, A. et al., *Proc. IODP*, 301: doi:10.2204/iodp.proc.301.104.2005
 Hori, T., et al., 2004. *Earth and Planetary Science Letters*, 228(3-4):215-226.
 Ichinose, G.A., et al., 2003. *Journal of Geophysical Research*, 108. doi: 10.1029/2003JB002393.
 Nakanishi, A., et al., 2002. *Journal of Geophysical Research*, 107. doi:10.1029/2001JB000424.
 Park, J.-O., et al., 2002. *Science*, 297:1157-1160. doi: 10.1126/science.1074111.
 Tobin, H., and Kinoshita, M., 2006a. *Scientific Drilling*, No. 2:23-27. doi:10.2204/iodp.sd.2.06.2006.
 Tobin, H.J., and Kinoshita, M., 2006b. Investigations of seismogenesis at the Nankai Trough, Japan. *IODP Scientific Prospectus, NanTroSEIZE Stage 1*. doi:10.2204/iodp.sp.nantroseize1.2006.

NanTroSEIZE Stage 1: Riserless Drilling Expeditions

Expedition	Estimated Duration	Expedition Nickname	Expedition Objectives	Invited Co-Chief Scientists
Chikyu 1	53 days	NanTroSEIZE Logging-While-Drilling Transect	Riserless drilling using LWD technology (no coring) at all six Stage 1 sites (NT1-01, NT1-07, NT1-03, NT2-01, NT2-03, NT3-01).	Masataka Kinoshita, JAMSTEC-IFREE, Japan Harold Tobin, Univ. of Wisconsin, Madison, USA
Chikyu 2	54 days	NanTroSEIZE Megasplay Riser Pilot	Riserless coring at Site NT2-03 to sample forearc basin sediments and deformed prism with fault zones derived from a megasplay fault system. Preparatory site for intermediate-depth (~3.5 kmbsf) Stage 2 riser site.	Juichiro Ashi, University of Tokyo ORI, Japan Siegfried Lallemand, University Cergy-Pontoise, France
Chikyu 3	57 days	NanTroSEIZE Thrust Faults	Riserless coring of frontal thrust (Site NT1-03) and splay fault targets (Site NT2-01).	Gaku Kimura, University of Tokyo, Japan Elizabeth Screaton, University of Florida, USA
SODV 1	54 days	NanTroSEIZE Subduction Inputs	Coring of Shikoku Basin sediments to define inputs to the seismogenic zone (Sites NT1-01 and NT1-07).	Achim Kopf, Bremen University, Germany Michael Underwood, Univ. of Missouri, USA
SODV 2	53 days	NanTroSEIZE Kumano Basin Observatory	Coring entire forearc basin section and upper portion of underlying prism. Installation of observatory to monitor seismicity, strain, pressure, and temperature. Pilot site for deep riser site.	Demian Saffer, Penn State University, USA Wonn Soh, JAMSTEC, Japan

Notes: LWD = logging-while-drilling. Expedition durations are subject to change. Please check www.iodp.org/expeditions for official expedition schedule.

Chikyu Shakedown Operations

Five U.S. Scientists Participate

Andrea Johnson, JOI

"The ship is truly amazing," writes Gary Acton, University of California, Davis, following his participation in recent shakedown operations focusing on the Japanese research vessel *Chikyu's* riser drilling capabilities. During a three-month period that began in August 2006 the ship operator, Japan Agency for Marine-Earth Science and Technology's Center for Deep Earth Exploration (JAMSTEC/CDEX), tested the *Chikyu's* riser handling, Blow Out Preventer (BOP), mud circulation, emergency disconnection, the wireline logging system, and three core sampling systems.

These tests mean that the end of the long journey to bring the *Chikyu* into service for the international scientific community is finally in sight. The drillship's construction began in 2001 following nearly a decade of planning and funding appropriation—with dreams for the vessel first beginning even earlier. *Chikyu's* hull was launched in January 2002 and the completed ship was delivered to JAMSTEC during the summer of 2005. Another year was necessary to train the ship's staff and to test its other systems before the riser drilling shakedown operations could begin this past August.

Operations on the *Chikyu* are somewhat akin to an orchestra: its many components must be in tune to produce beautiful science. This means lots of practice for all involved—separately and together. At this point, inevitable snags remain to be worked out as so many complex technologies—each with its own challenges—are coordinated.



Helipad on the bow of the *Chikyu*. (Photo: JAMSTEC/CDEX)

However, based on the vessel's current state of readiness, its first expedition for the Integrated Ocean Drilling Program (IODP) is tentatively planned for the fall of 2007. The *Chikyu's* first IODP expeditions will be for Stage 1 of the NanTroSEIZE project (see lead article in this newsletter).

The most recent phase of shakedown operations were conducted off northern Japan's Shimokita Peninsula in about 1200 m of water. In addition to the drilling tests, the readiness of *Chikyu's* Information Technology environment and laboratory facilities—including laboratory set-up, manuals, and core processing procedure—was also reviewed in real time with IODP scientific and engineering representatives on board. Among them were five researchers from the U.S. science community who were invited to participate by Japan's Center for Deep Earth Exploration (CDEX) due to their anticipated roles as Co-Chief Scientists of the NanTroSEIZE Stage 1 expeditions or their specific domain expertise in expedition science procedures.

JOI's U.S. Science Support Program for IODP sponsored the U.S. invitees' participation aboard the *Chikyu*. Liz Sreaton, University of Florida, led the way and was followed by Gary Acton, University of California, Davis. Mike Underwood of the University of Missouri, Demian Saffer of Pennsylvania State University, and Harold Tobin of the University of Wisconsin, Madison followed. Various technical staff (e.g., curation specialists, core technicians, and laboratory technicians) from the U.S. Implementing Organization also visited the *Chikyu* during the shakedown operations to share their expertise from working on the *JOIDES Resolution*.

During the shakedown, discussions of operational procedures and protocols, sampling procedures and requirements, and overall science program goals and philosophy were ongoing. The visiting scientists and techni-

cians from the IODP community discussed numerous issues with the CDEX staff including coordination and integration of IODP operations and planning for upcoming NanTroSEIZE operations. These discussions touched on curation issues, downhole measurement issues, staffing and coordina-

tion of science and technical teams, and much more. For instance, what specific data should be stored and available for scientists?

Follow the *Chikyu's* activities online by visiting the link: www.jamstec.go.jp/chikyu/eng/

"It's a shakedown cruise, so not surprisingly, problems occur," reported Liz Sreaton from the *Chikyu* in mid August. She added, "The good news is that getting parts/technicians by helicopter works out pretty well." After fixing some early problems, the first core of the expedition arrived on deck on August 18. Drilling crew changes, new bottom hole assemblies and hole reentry at the site assured lots of practice for all. A small science party interested in microbiology in the Shimokita cores—and requiring many whole-round samples—provided challenging opportunities for the laboratory curation and technical staff to practice their procedures and gain valuable experience.

Mike Underwood spent much of his week on the *Chikyu* reviewing core-flow issues and working with two shipboard technicians to test methods and calibrate state-of-the-art equipment in the X-Ray Diffraction (XRD) lab using individual mineral standards and standard mineral mixes. He welcomed the opportunity to contribute his experience because—although he found the *Chikyu* magnificent—there's still a long way to go in preparing it for IODP operations.

The *Chikyu's* riser tests themselves were a moderate success following many mechanical troubles and storms in August. In early October, riser drilling was suspended at 647 meters below the seafloor, short of the 2200-meter target drilling depth. Drilling was terminated at that point due to a malfunction of the cuttings transfer mechanism in the mud disposal unit. In summary, the tests were a challenging learning experience for all involved!

The participating U.S. scientists have plenty to report about their own experiences on the *Chikyu*. According to Acton, “The labs are generally spacious, contain the relevant instrumentation, and are staffed by enthusiastic technicians and staff scientists.” In addition, he says, “The rooms in the residential area are fabulous, with a quality comparable to a very good hotel room. Laundry services were also very efficient and the food healthy.” For the most part the labs are well designed and well on their way to being fully functional. In the well-designed residential area, everyone has a single room (with a private bathroom!) which is well equipped with lockers, cabinets, etc., and the recreation rooms are large.

Not surprisingly, the impressive ship is not totally perfect. As is often the case, something gained may mean something lost. For example, one shakedown participant noted that the location of the Co-Chiefs/Staff Scientist office in the lab area fosters good communications with the scientific staff but may hinder communications with the operations manager and drillers.

Although the *Chikyu* was surprisingly quiet in general, another scientist noted some noisy equipment near the core description table that may prove to be distracting. Work flow in that area also needs to be reevaluated to avoid potential congestion when people are working there. It would also be

beneficial to reallocate laboratory space to create more room for XRD and micropaleontology sample preparation.

In the residential area, the only place for improvement is the gym. It is small and its current equipment may not survive rigorous use. However, several scientists noted that due to the number of stairs on the *Chikyu* (five floors between the lab and Acton’s room, for instance), no Stairmasters are needed in this gym.

Part of the shakedown adventure for the participating U.S. scientists was the long journey to the vessel: planes, trains and helicopters. Fortunately, Sreaton (who went first) wrote up helpful notes for those who followed. All were rewarded by the awe-inspiring approach to the *Chikyu* by helicopter. One thing Sreaton found memorable was how high above the water the *Chikyu*’s helipad was; she was surprised when the helicopter touched down. She was struck also by the ship’s size, spaciousness, and stability.

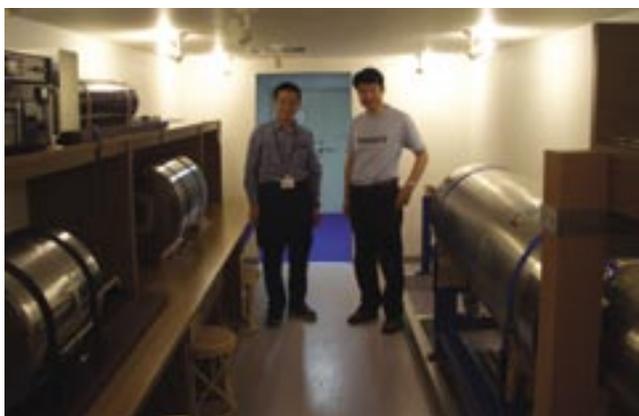
Regarding a few other practical shakedown matters, the U.S. scientists found abundant coffee makers on board and a galley serving food that is healthy and good, with lots of fish and rice. Last, but not least, the jacuzzi, known as the “jug bath” on the *Chikyu*, is not yet operational—but its time for tuning will come, too.



Chikyu’s “riser tensioner” (yellow) consists of four huge cylinders which pull up and support the riser pipe. (Photo: JAMSTEC)



Typhoons hampered some of the *Chikyu*’s shakedown activities, but there were periods of calm with beautiful sunsets. (Photo: G. Acton)



Chikyu’s paleomagnetism laboratory resides within a magnetically shielded room, which contains a longcore cryogenic magnetometer (right). Paleomagnetism technician, Takahiro Suzuki (left) maintains this lab. The equipment was tested and the magnetic field in the shielded room was surveyed during shakedown operations by Hirokuni Oda (right) and Gary Acton (not shown). (Photo: G. Acton)



Visiting scientists, staff scientists, and marine laboratory technicians in late August are shown on the catwalk next to the core rack. A joint of 36-inch casing, which was installed during the shakedown cruise, is in the background. Left to right: (top row) P. Gaillot, T. Sakamoto, G. Acton, M. Zhao, L. Maeda, K. Sugiyama, T. Suzuki, M. Nisimura, T. Tanaka, (bottom row) M. Ishimori, S. Hirano, J. Yum, Y. Kido, N. Suzuki, H. Hayashi, H. Oda, J. Ashi. (Photo: K. Aoike, Staff Scientist).

Tectonics, Circulation and Climate in the Caribbean Gateway

Paul Mann, UTIG

The thermohaline circulation system of the world's oceans, which has been likened to a large conveyor belt, extensively affects global and regional climates. Key components of the system are the northward-flowing Gulf Stream and North Atlantic Current, which deliver warmth and moisture to an otherwise frigid region of the North Atlantic. The conveyor belt is driven as these warm saline surface waters cool and sink, and then flow south as North Atlantic Deep Water (NADW). Glacial and interglacial cycles modulate the depth of NADW in the water column.

To improve our understanding of this system over longer time periods, two key questions must be answered. First, what tectonic and oceanographic processes have regulated the flow of deep and shallow waters in the conveyor belt through the "gateways" separating the South Atlantic, Caribbean, Gulf of Mexico, and North Atlantic? Second, what long-term geologic records—at sites suitable for deep ocean drilling—might include periods when these currents were active, waning, or non-existent?

Since the Cretaceous, the Caribbean Sea has been a critical junction or "valve" controlling the flow of warm water among several major ocean basins. Evaluating the full extent of its effect on global circulation

and climate is complicated by the region's complex Cenozoic tectonic evolution. The physiography of the present-day South Atlantic to Greenland portion of the oceanic conveyor belt has existed in its current state since the early Pliocene, when the Panama arc and land bridge collided with northwestern South America, closing the Central American Seaway. This closure created the modern meridional circulation system, which has been invoked to explain global climate changes—including the early Pliocene warm interval and the onset of major northern hemisphere glaciation.

The spatial arrangement of the conveyor belt between the late Cretaceous and prior to the Pliocene Panama closure is less well understood. It likely consisted of an east-west seaway spanned perhaps by a partially emergent Caribbean arc system trending north to south. Sustained meridional flow through the Caribbean began as early as the late middle Miocene as a result of foundering carbonate banks on the Nicaraguan Rise. This flow was recorded in its downstream direction by the appearance of common nannofossil assemblages in the northern and southern Caribbean, a regional erosional unconformity left behind by currents scouring the western Florida shelf, and by the formation of sediment drifts in the Straits of Florida.

USSSP workshop reports are available at: www.usssp-iodp.org/science_support/workshops/past_workshops.html

12 participants specializing in tectonics and marine geology.

A major task—one requiring a multidisciplinary group effort—is to identify all possible Caribbean gateways at a regional scale and to gauge their significance as potential targets for IODP drilling. To address these issues, 42 participants from six countries attended a Caribbean geology-paleoceanography-climate synthesis workshop held in Austin, Texas, from March 30 to April 1, 2006. The workshop, funded by the U.S. Science Support Program at Joint Oceanographic Institutions, brought together 30 participants specializing in paleoceanography and climate and

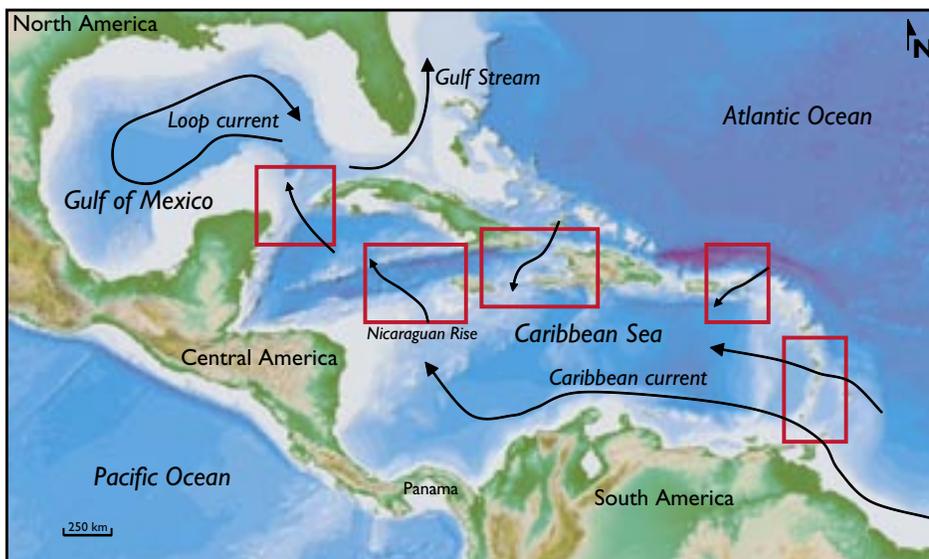
The workshop began with overview talks covering both tectonic and paleoceanographic/climatic topics and continued with poster presentations. Discussions followed in breakout groups and plenary sessions. Energetic discussions at the workshop led to several summary documents and interest groups addressing:

- 1) Marine geophysical surveys of Caribbean gateways (Paul Mann, University of Texas at Austin);
- 2) Caribbean volcanic ashes (led by Thor Hansteen, GEOMAR, Germany);
- 3) Marine geophysical surveys of the Cariaco Basin (Milene Cormier, LDEO);
- 4) Margins of Puerto Rico and the Virgin Islands (Nancy Grindlay, University of North Carolina at Wilmington);
- 5) Drilling of submerged Quaternary reef terraces in the Caribbean (Terry Quinn, University of Texas at Austin); and
- 6) The role of Caribbean volcanism in the global carbon cycle and climate (Bob Duncan, Oregon State University).

When complete, a full workshop report will be available at: www.usssp-iodp.org/science_support/workshops/past_workshops.html.

Author

Paul Mann, The University of Texas at Austin (paulm@ig.utexas.edu), prepared this article for *JOI News*. The workshop was co-convened by Paul Mann; Larry Peterson, University of Miami; and André Droxler, Rice University.



Gateways and major oceanic currents of the Caribbean and Gulf of Mexico region. Red boxes frame gateways and black arrows indicate currents. The Panama gateway closed in the early Pliocene.

Temperature and Fluid Flow at Nankai

In subduction zones, the role of temperature in driving diagenetic reactions is a critical parameter for understanding the initiation and evolution of fault-zone stability. Diagenetic changes affect local and regional fluid budgets and alter the thermomechanical properties of sediments and fluids. Detailed thermal profiles provide a means to identify zones of pertinent mineralogical phase changes, complement geochemical data in highlighting fluid-flow pathways, and provide a key tool for integrating petrophysical core and logging data. In practice, however, temperature profiles are often extrapolated from a few relatively shallow measurements by assuming linear, conductive heat flow—an assumption that may not be valid as drilling technologies advance and more dynamic environments are explored.

One of the principal objectives of the Ocean Drilling Program (ODP) expeditions to the Nankai subduction zone (Legs 131, 190 and 196) was to characterize sediments entering the subduction complex and to investigate how their mechanical properties influence the development and evolution of the décollement zone. Along the Muroto transect at Nankai, existing models suggest a causal link between the high geothermal gradient (>180°C/km) and the seaward propagation of the décollement zone (e.g., Morgan and Ask, 2004). Thermally controlled clay dehydration may also explain pore-water freshening observed seaward of the deformation front (Steurer and Underwood, 2005)—geochemical evidence previously interpreted as focused lateral fluid flow expelled from deep within the subduction zone (Spivack, et al., 2002). Constraining the thermal structure is important for understanding these processes and for identifying heat-flow anomalies linked to an active fluid-flow regime.

As part of my Schlanger Ocean Drilling Fellowship, I integrated core and logging data from the Nankai Muroto transect to refine *in situ* permeability estimates and constrain possible fluid-flow pathways. Accounting for the effects of temperature is a key el-



Matthew O'Regan

University of
Rhode Island
PhD Advisor:
Kate Moran

ement of this research that can be readily illustrated by a comparison between laboratory and *in situ* measurements of resistivity (O'Regan and Moran, 2005).

Temperature Inversion from Resistivity

Resistivity measurements are sensitive to changes in the temperature and salinity of the pore fluid. Resistivity is commonly reported as the formation factor (*FF*), defined as the ratio of the sample's bulk resistivity to resistivity of the pore fluid.

$$FF = \frac{R_{bulk}}{R_{fluid}}$$

In the laboratory, the known fluid resistivity can be used to determine the *FF* from bulk resistivity measurements. However, under *in situ* conditions, the resistivity of the formation fluid is unknown. The most significant change to the fluid resistivity from the *in situ* environment to the laboratory arises from temperature differences. The *in situ* temperature is derived by equating the laboratory and *in situ* *FF* and solving for the resistivity of the formation fluid (Figure 1):

$$FF_{lab} = \frac{R_{log}}{R_{fluid-in\ situ}}$$

This temperature inversion technique is sensitive to porosity rebound caused by stress relief during the coring process. Corrections to account for this rebound rely on Porosity-*FF* relationships from Site 1173 (ODP Leg 190) and use a coefficient of elastic rebound derived from laboratory geotechnical tests.

Despite the magnitude of the rebound correction, temperature profiles from the inversion process at Site 1173 are consistently higher than those predicted by a linear extrapolation of *in situ* measurements or those calculated assuming a conductive heat-flow profile. Refining the inversion process will allow high-resolution temperature profiles to be extracted to constrain thermal diagenetic models and to complement geochemical data in defining zones of potential fluid flow.

References

- Morgan, J., and Ask, M., 2004. *J. Geophys. Res.*, 109, B03102, doi:10.1029/2002JB002335
- O'Regan, M. and Moran, K., 2005. Extracting high-resolution temperature profiles from core and logging data—a case study from Nankai. *Core-Log-Seismic Integration Workshop*, JAMSTEC Tokyo Office. October 3-4, 2005. (abstract)
- Spivack, A., et al., 2002. *Geophysical Research Letters*, 177:193-207.
- Steurer, J., and Underwood, M., 2003. *Proc. ODP, Sci. Results*, 190/196 Manuscript number: 190SR-210.

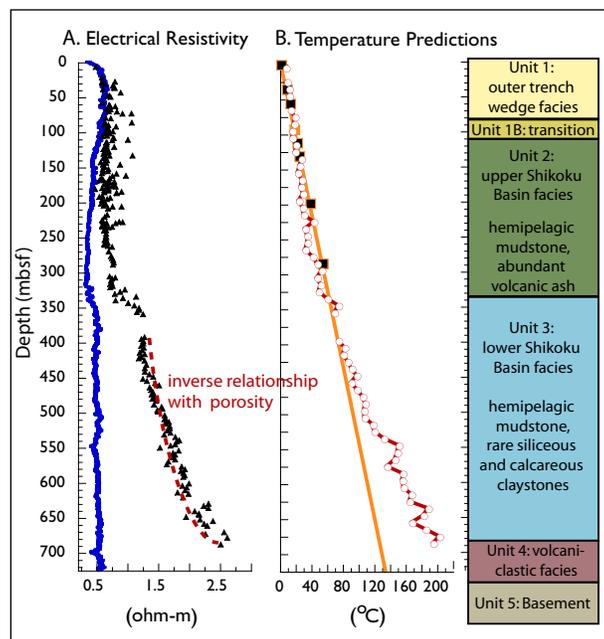


Figure 1A. Resistivity measurements on laboratory samples (mean of x, y, and z directions) show a characteristic downhole increase that is inversely related to a downhole reduction in porosity. Figure 1B. Linear extrapolation of the thermal gradient (orange line) from seven *in situ* temperature measurements (black squares). Temperature inversion results from resistivity data (red line), performed over five-meter windows using a porosity rebound correction that assumes hydrostatic pore pressures. Note: The stratigraphy column at the right gives context for the samples from ODP Site 1173.

At the Beginning: IODP Preliminary Proposals

Advice for Writing Pre-Proposals—the First Step in Creating an IODP Expedition

J. Schuffert, N. Eguchi, and B. Zelt

Every expedition of the Integrated Ocean Drilling Program (IODP) begins with a successful drilling proposal, and every successful proposal begins with a good idea. You might wonder exactly what it takes to turn one of your good ideas into a successful proposal and to see it translated into a drilling expedition.

Typically, the planning and development stage of a successful drilling proposal lasts at least several years. Several more years may also pass before IODP can position a suitable drilling platform in the right place at the right time. This means that above all you must persist with your efforts while remaining patient for the best opportunity. And the sooner you get started, the better. Although the entire process may seem rather daunting at first, you do not need to understand it completely to get started and you definitely will receive plenty of guidance along the way.

Here, we focus on preliminary proposals, the place where most proponents normally should begin. The short format of a preliminary proposal allows you to present your basic ideas and, through the review process, receive expert advice on how to proceed before undertaking the broader collaborative effort required for a full proposal. In a preliminary proposal, you should identify a set of testable scientific hypotheses or objectives, justify the need for drilling to achieve those objectives, and outline a general strategy for drilling, logging, and other borehole measurements. You also should focus on your main objectives and try to avoid casting too broad of a net. However, you should not totally ignore what to do, for example, with the sedimentary section that might lie between you and your primary target. In addition, you should begin assembling a team of proponents with an appropriate range of expertise to cover each of your main scientific objectives, recognizing that you might find it necessary to expand or modify the group later to encompass other areas of relevant expertise.

Given the costly nature of ocean drilling, the IODP naturally aims to maximize the

scientific achievements of each expedition. Unlike the process followed by most proposal granting agencies, the IODP review process works in an iterative fashion (see figure), with proponents receiving considerable feedback on how to improve their proposal at every stage. All preliminary proposals first undergo review by the Science Steering and Evaluation Panel (SSEP). This broad-based panel of nearly forty scientists aims to nurture good ideas through the initial planning stages and help proponents develop a thorough, comprehensive, and compelling scientific drilling proposal. At this stage, your proposal will compete only against itself.

To advance your proposal through the system, you must convince the SSEP that 1) your scientific objectives address an important and globally significant topic, 2) you absolutely must drill beneath the seafloor to achieve those objectives, and 3) you have chosen the best place in the world to do it. If your preliminary proposal does not succeed in meeting all three of those fundamental criteria, the SSEP may advise you to submit a revised preliminary proposal or to rethink your ideas and start over in a new direction. In most cases, however, the SSEP recom-

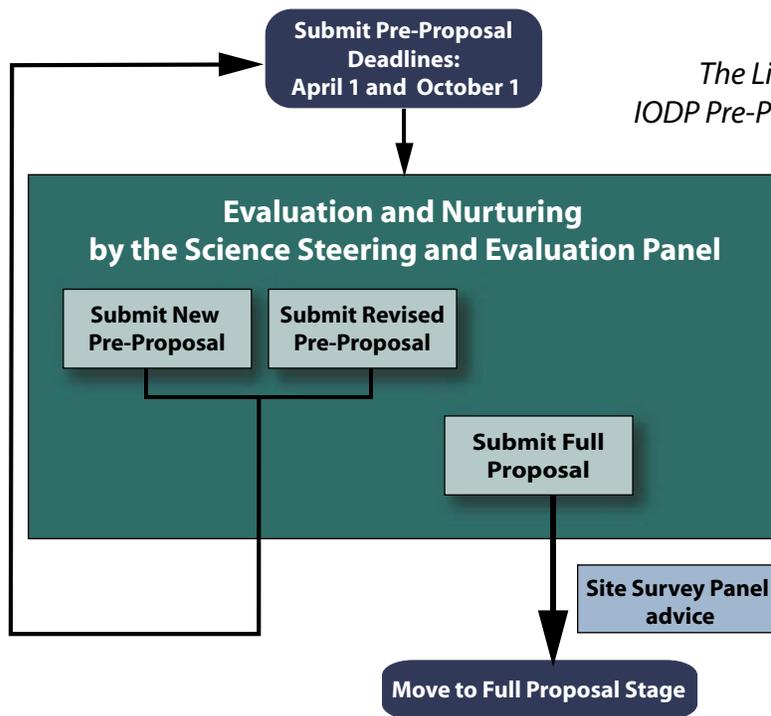
mends developing a full proposal and provides a detailed account of various points to consider. Once that happens, your preliminary proposal will then undergo a review by the Site Survey Panel (SSP) to provide you with early guidance on the types of site-survey data that you eventually should submit to support your proposal and characterize your drilling sites.

The IODP welcomes all interested scientists to submit their scientific drilling proposals at either the April 1 or October 1 submission deadlines. Before preparing a proposal, we strongly encourage you to consult the latest proposal submission guidelines available on the IODP web site (www.iodp.org). These guidelines describe the basic types of proposal documents, the specific requirements for each type, and the general review process. If you have any questions about the guidelines or about how to proceed, do not hesitate to contact the IODP-MI science coordinators at science@iodp-mi-sapporo.org for more information.

The Authors

Jeff Schuffert, Nobu Eguchi, and Barry Zelt are the science coordinators at IODP Management International.

The Life of an IODP Pre-Proposal



IODP Expedition: Pacific Equatorial Age Transect

Apply to Sail by December 18, 2006!

JOI is accepting applications from researchers at U.S.-based institutions to participate in the two expeditions of IODP's Pacific Equatorial Age Transect drilling project. The goal of the project is to obtain a unique sedimentary biogenic carbonate archive, especially for time periods just after critical climate events. Eight primary sites are planned. Multiple holes in the target intervals will be cored—to ensure stratigraphic continuity and overlap—with wireline logging for correlation.

The Pacific Ocean is intricately linked to major changes in the global climate system in the Cenozoic, during which the Pacific plate has had a northward component of motion. Thus, the thick sediment bulge of biogenic-rich deposits from what is now a narrowly focused zone of equatorial upwelling has been slowly moving away from the equator. Hence, older sections are not deeply buried and can be recovered by drilling. Previous drilling expeditions in the region (ODP Legs 138 and 199) were de-

signed as transects across the paleo-equator to study the changing patterns of sediment deposition across equatorial regions.

Because we have increased our knowledge of plate movement and the timing of critical climate events, IODP proposes to drill an age transect or "flow-line" following the position of the paleo-equator in the Pacific, targeting selected time slices where calcareous sediments have been preserved best. Events and time periods of interest include the Paleocene/Eocene boundary event, the Eocene cooling, the Eocene to Oligocene transition, the "one cold pole" Oligocene, the Oligocene to Miocene transition, and the Miocene.

Applicants at all career stages (including graduate students) are encouraged to apply for the two expeditions, especially those with expertise in biostratigraphy (planktonic and benthic foraminifera, radiolaria, nannofossils and others), sedimentology, paleomagnetism, organic and inorganic

geochemistry, stratigraphic correlation, and physical properties.

The application period closes December 18, 2006. The first expedition (addressing mostly Eocene objectives) is tentatively scheduled for late 2007; the second (with mainly Oligocene and Miocene objectives) is planned for September to October 2008. Note that expedition schedules and operational sequences may change depending on the completion date of the SODV conversion. For further general information and a summary of the Pacific Equatorial program, visit: www.iodp.tamu.edu/scienceops/expeditions/equatorial_pacific.html.

For more information, or to apply, visit: www.usssp-iodp.org/Science_Support/Sailing_Information/expeditions.html. JOI will provide financial support to U.S.-based researchers who are invited by IODP's expedition operators to join the international science parties.

U.S. Panel Members in the IODP Science Advisory Structure Current as of October 1, 2006

Science Advisory Structure Planning Committee (SASEC)

Susan Humphris (Chair), Woods Hole Oceanographic Institution
John Hayes, Woods Hole Oceanographic Institution
Ken Miller, Rutgers, The State Univ. of New Jersey
Eli Silver, University of California, Santa Cruz

Science Planning Committee (SPC)

Keir Becker (Chair), RSMAS, University of Miami
Barbara Bekins, U.S. Geological Survey
Tim Byrne, University of Connecticut
Steve D'Hondt, University of Rhode Island
Gabe Filippelli, Indiana University-Purdue University Indianapolis
Greg Mountain, Rutgers, The State University of New Jersey
Carolyn Ruppel, U.S. Geological Survey

Science Steering and Evaluation Panel (SSEP)

Ivano Aiello, Moss Landing Marine Laboratories
Jerry Dickens, Rice University
Jeff Gee, Scripps Institution of Oceanography
Mike Gurnis, California Institute of Technology
John Jaeger, University of Florida
Barbara John, University of Wyoming

Samantha Joye, University of Georgia
Julia Morgan, Rice University
Lori Summa, ExxonMobil
Marta Torres, Oregon State University
Mike Underwood (Co-Chair), University of Missouri
Alicia Wilson, University of South Carolina
Robert Zierenberg, University of California, Davis

Scientific Technology Panel (STP)

Paterno Castillo, Scripps Inst. of Oceanography
Beth Christensen, Adelphi University
Rick Colwell, Oregon State University
Paul Johnson, University of Washington
Clive Neal, Notre Dame University
Shinichi Sakurai, Occidental Petroleum Corporation
Geoff Wheat, University of Alaska/Monterey Bay Aquarium Research Institute

Site Survey Panel (SSP)

Gary Acton, University of California, Davis
Nathan Bangs, The University of Texas, Austin
James Corthay, ExxonMobil Corporation
Earl Doyle, Shell (retired)/consultant
Sean Gulick, The University of Texas, Austin
Stanley Locker, University of South Florida
Dale Sawyer (Vice-Chair), Rice University

Environmental Protection and Safety Panel (EPSP)

Robert Bruce, BHP Petroleum
Hans Juvkam-Wold, Texas A&M University
Barry Katz (Chair), Chevron Corporation
Donald Potts, University of California, Santa Cruz
Jerome Schubert, Texas A&M University
Craig Shipp, Shell International E&P
William Winters, U.S. Geological Survey

Engineering Development Panel (EDP)

Mark Alberty, British Petroleum
Peter Flemings (Chair), Pennsylvania State University
Jack Germaine, Massachusetts Inst. of Technology
Leon Holloway, ConocoPhillips
Stephen Sears, Louisiana State University
Bill Ussler, Monterey Bay Aquarium Research Inst.
Richard Von Herzen, Woods Hole Oceanographic Institution (retired)

Industry-IODP Science Program Planning Group (IIS-PPG)

Andrew Pepper, Amerda Hess
Martin Perlmutter, ChevronTexaco
Kurt Rudolph, ExxonMobil Exploration
Eugene Shinn, U.S. Geological Survey
Ralph Stephen (Vice-Chair), Woods Hole Ocean. Inst.

For more information about the SAS panels, visit www.usssp-iodp.org/advisory_committees/sas_members.html.

JOI Proposes a New Support Model for U.S. IODP Participants

Holly Given, JOI

In September 2006, JOI submitted a proposal to NSF for Years 4 to 10 of a U.S. Science Support Program (USSSP) associated with IODP. This program would continue to support the participation of U.S. scientists through the end of the funded international program in 2013 after the expiration of the current Cooperative Agreement for USSSP in February 2007. The centerpiece of JOI's \$65M proposal is a new support model for expedition science party members, developed largely by the U.S. Advisory Committee for Scientific Ocean Drilling (USAC).

JOI expects this new model to provide expanded support for the community and be simpler to administer. USAC recommended that JOI apply this model provisionally for the staffing exercises underway for the expeditions comprising Stage 1 of the Nankai Trough Seismogenic Zone Experiment (see page 1) and for the two expeditions of IODP's Pacific Equatorial Age Transect (see the call for applicants on page 11).

Background

For IODP's Phase 1, which included Expeditions 301 to 312, JOI supported U.S. science party participants using the basic model inherited from the Ocean Drilling Program: JOI provided a three-month salary award against a two-month cruise du-

ration, with U.S. Co-Chief Scientists receiving six-month salary awards in recognition of their greater responsibilities. In addition to salary support, participants competed for Post-Expedition Activity (PEA) funds to work on samples and data during the moratorium period following expeditions. Specific rules limited the size of Post-Expedition Activity awards—for example, only one month of principal investigator (PI) support and six months of graduate student support could be included. Although JOI did not explicitly limit the size of proposed budgets, these rules, and the budget pool of \$200,000 per expedition, led to a fairly uniform distribution of funds.

JOI issued 104 PEA awards during IODP's Phase 1 with award values ranging from \$10K to \$50K (Figure 1). Of these awards, 65% were between \$20K and \$30K, 24% were less than \$20K, and 11% were greater than \$30K, with the average award being \$24,178. Analyzing the awards revealed that the most common request was for salary (40% of requests), with 50% of salary requests being for one month of PI support, and 35% for graduate students (Figure 2). Thus, a significant amount of time of JOI staff and community volunteers was being used in a proposal review effort that resulted in roughly equal amounts to nearly every applicant, most commonly for one month of PI salary.

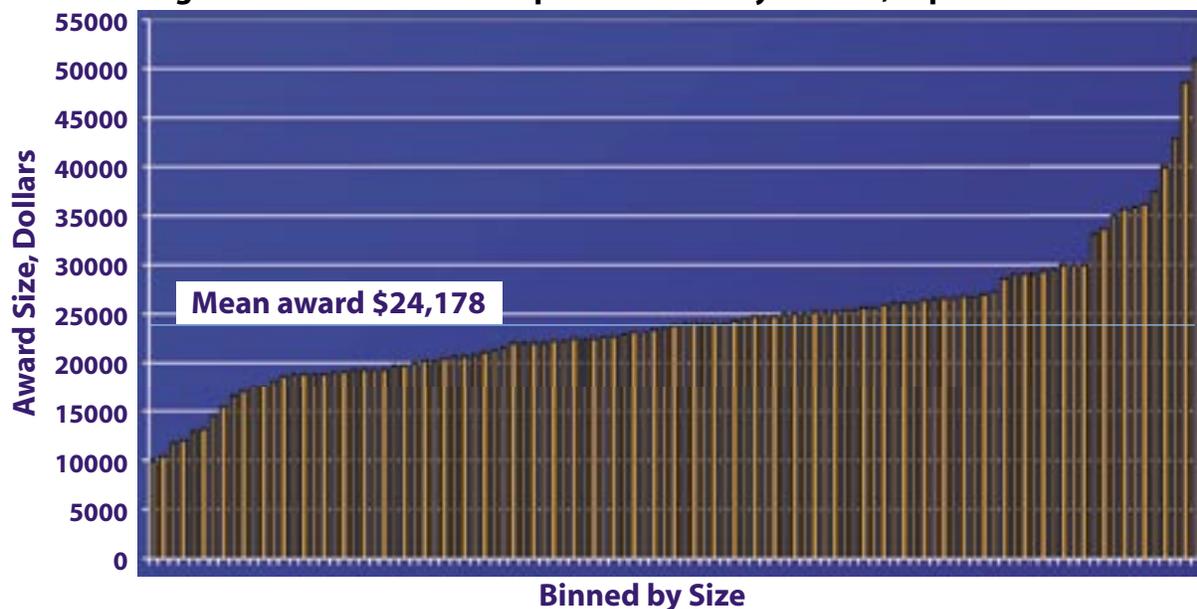
During Phase I, USAC continuously addressed community sentiment that this "\$25K" obtainable from the post-expedition mechanism was inadequate to do substantive work with expedition results. Yet JOI was limited by the Cooperative Agreement funding, and NSF sponsors indicated it was unlikely that efforts to increase this pool within the USSSP Cooperative Agreement were realistic when the general success rate of submissions to regular NSF/OCE panels was around 20%. Expedition participants had the option of competing for NSF funding outside USSSP by submitting Expedition Objective Research (EOR) proposals to the NSF/OCE solicitations for expanded support to carry out research beyond the scope of the intent of the Post-Expedition Activity mechanism.

Against this background, USAC in collaboration with JOI staff developed the new model over the course of three advisory committee meetings. USAC encouraged JOI to use the new model as the basis of its proposal to NSF for the next six years of science support. The new model was endorsed by JOI's Board of Governors when they voted in September 2006 to approve the proposal prior to submission.

New Scientist Support Model

The new model calls for the salary award period to increase to the equivalent of twice

Figure 1: Individual Post-Expedition Activity Awards, Expeditions 301-312



the expedition duration (“2n”); for example, participants would receive a four-month salary award for a two-month cruise. This grants the most-requested item, one month of PI salary, as an implicit part of expedition participation. This is an important acknowledgement that expedition participation is broadly defined, and that a science party member’s responsibilities do not begin and end when he or she gets on or off the drilling platform. In addition, participants may request up to \$13,000 (to be adjusted for inflation) in other support costs as justified in a one- to two-page Participation Plan submitted with the application to sail.

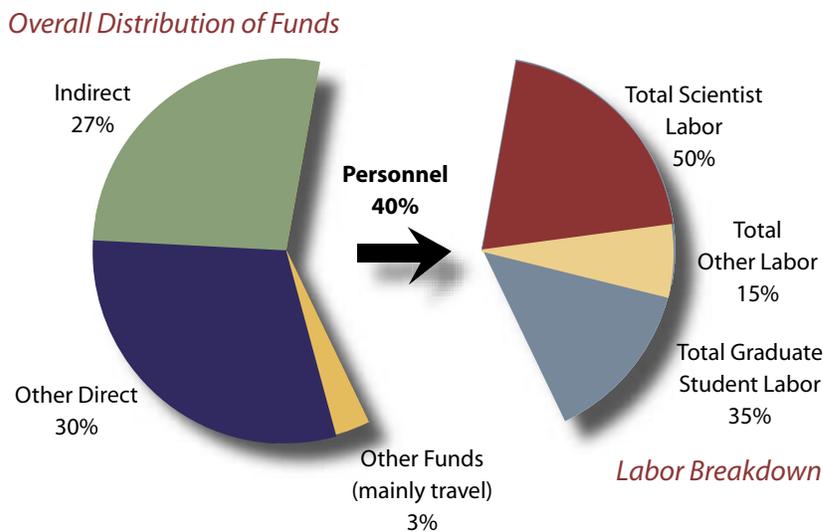
The purpose of the Participation Plan is to outline what kind of work the participant wishes to carry out with the samples and data, addressing expedition objectives and data that are required by the entire science party. Categories will not be limited, as long as the requests (e.g., PI salary, graduate student salary, equipment rental, reagents, travel) are consistent with the work envisioned in the Participation Plan. JOI also plans to increase salary awards for Co-Chief Scientists to nine months.

These proposed Extended Site Characterization Awards provide a new mechanism whereby expedition participants can compete for funding at an intermediate level between the base support provided by the up-front participant costs, and the higher-level funding associated with NSF’s Expedition Objective Research (EOR) or core program proposals to NSF for individual research.

Monetarily, for the average monthly salary of Phase 1 expedition participants, the new “2n+\$13K” model provides equivalent dollars to the old “1.5n+\$25K” model and thus is expected to meet the basic participation needs of many science party members. It acknowledges that the real competition occurs at the beginning of the process, when applicants are considered for the science party. It also will supply funds to participants earlier in the moratorium period.

With basic participation covered, USAC recommended that an additional source of funds be made available for competitive

Figure 2: Aggregate Request Categories for Post-Expedition Activity Awards, Years 1-3 USSSP-IODP



proposals for which there truly is no guarantee of award. Emphasis would be on the further collection of critical data sets needed to achieve complete site characterization. This category is intended to support analyses or measurement programs that are truly beyond the scope of what can be achieved via the basic participant support costs. These proposed Extended Site Characterization Awards provide a new mechanism whereby expedition participants can compete for funding at an intermediate level between the base support provided by the up-front participant costs, and the higher-level funding associated with NSF’s Expedition Objective Research (EOR) or core program proposals to NSF for individual research.

JOI is considering two deadlines a year for the Extended Site Characterization Awards, allowing expedition participants to submit proposals for the first two deadlines occur-

ring after the conclusion of their expedition. An *ad hoc* peer-review committee of specialty experts convened by USAC will make funding recommendations to JOI.

An obvious advantage to this new system is that it provides flexibility for varying the science support among expeditions, but that flexibility comes from competitive proposals and not from *a priori* judgments about how much money should be allocated to different expeditions. After applying the new model to the application process for NanTroSEIZE Stage 1, JOI looks forward to receiving comments. We will continue to refine the new model with feedback from expedition participants, expedition operators, and the U.S. Advisory Committee.

Author

Holly Given is Director of the U.S. Science Support Program at Joint Oceanographic Institutions (hgiven@joiscience.org).

Expedition Objective Research Funding Available

NSF/ODP encourages Expedition Objective Research (EOR) proposals from participants in IODP expeditions to address the scientific objectives of specific drilling expeditions. Resulting EOR grants may begin during the period between the Co-Chief Scientists’ approval of the expedition sampling plan and the end of the sample moratorium period.

Annual EOR Proposal Deadlines:
February 15 and August 15

For questions please contact:
Rodey Batiza
(rbatiza@nsf.gov)
Kevin Johnson
(kjohnson@nsf.gov)

www.geo.nsf.gov/oce/programs/drilling.htm



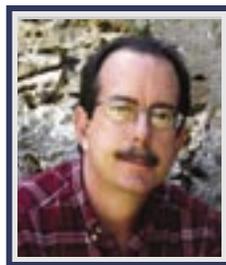
U.S. Advisory Committee Welcomes New Members

Beginning October 1, the U.S. Advisory Committee for Scientific Ocean Drilling welcomed five new members to replace outgoing members: Gabe Filippelli, Ellen Martin, Larry Peterson, David Smith, and Harold Tobin.



Dave Anderson

David Anderson is the Director for the World Data Center for Paleoclimatology, Chief of the Paleoclimatology Branch of NOAA's National Climatic Data Center, and an Associate Professor Adjoint at the University of Colorado. As a paleoceanographer, he is interested in the marine geologic record of tropical air-sea interaction and the ocean's role in regulating atmospheric carbon dioxide in the past and future. Current aspects of this research include reconstructing trends in the Asian monsoon over the past two millennia and reconstructing ocean carbonate ion concentrations during the Quaternary. Dave sailed on ODP Leg 117 and several site survey cruises. He has served on the ODP Scientific Measurements Panel and many other scientific committees. Much of his career has been with NOAA promoting the use of paleoceanographic and paleoclimate data in understanding past climate and environmental change. Dave is married to paleoclimatologist Katherine Anderson. They have two children and built a small cabin in the Rockies together. All four enjoy outdoor adventures from climbing and rafting to skiing and sailing.



Brad Clement

Brad Clement, a Professor of Geology, is chair of the Earth Sciences Department at Florida International University. He is a paleomagnetist with a particular interest in the past behavior of Earth's magnetic field, especially using deep-sea sediment records to document the field as it reverses polarity. After obtaining his PhD from Lamont Doherty Earth Observatory, he worked for four years as a staff scientist for the Ocean Drilling Program (ODP) before moving to Florida International University. His involvement with scientific ocean drilling includes sailing on Deep Sea Drilling Project Leg 94, and ODP Legs 105, 114 and 172. He has also served

on the Ocean History Panel for ODP and a previous term on USSAC, USAC's predecessor. More recently, he was the Associate Program Director of the Ocean Drilling Program at the National Science Foundation (2001-2003). Brad, his wife (former ODP marine technician and curatorial representative, Gail Peretsman), and two teenage sons enjoy living in Miami—at least when they aren't dodging hurricanes.



Jim Cowen

Jim Cowen is a Research Professor in the Department of Oceanography at the University of Hawaii, Manoa. His research interests include the microbial geochemistry of the seafloor (ocean basement) biosphere; the production, transport, and export of organic carbon within and from mid-ocean ridge hydrothermal systems; and the geomicrobiology of hydrothermal plume environments. He has been active within the RIDGE Program and is an associate editor of the *Journal of Geophysical Research—Biogeosciences*. He has spent several years at sea cumulatively, distributed over some 37 cruises—18 as chief or co-chief scientist and many involving submersibles. While Jim looks forward to his first IODP expedition, he is a committed and enthusiastic end-user of borehole CORK observatories. Jim earned his BA and MA at the University of California, Santa Barbara, and his PhD at University of California, Santa Cruz, where he met his wife Beverly. They have two wonderful sons, grown and almost grown. Jim's passions include surfing, woodworking, gardening, home remodeling, and his sons' sports.



Yildirim Dilek

Yildirim Dilek is a Harrison Scholars Professor at Miami University in Ohio. Following his Ph.D. at University of California, Davis, he worked at the Getty Conservation Institute and taught at Vassar College before joining the Miami faculty in

1996. His research interests include structure and petrology of ophiolites and modern oceanic crust, tectonics and magmatism in orogenic belts, extensional tectonics of the Aegean province, and the Precambrian geology of western Gondwana. He sailed on ODP Legs 148 and 153 and recently, he participated in JAMSTEC's M/V *Yokosuka* Mission YK05-08 and *SHINKAI 6500* Dive Program to the Nankai Trough. He has served as the Editor of the *Geological Society of American Bulletin* since 2003 and on the editorial boards of the *Journal of the Geological Society of London*, *Tectonophysics*, *Island Arc*, and *Ophiolite*. He has edited nine books on various aspects of ophiolites, oceanic crust, ODP research, and tectonics of continental margins. When not teaching, editing or conducting research, Yildirim enjoys reading, traveling, gardening, and watching soccer games.



Liz Screaton

Liz Screaton is an Associate Professor of Geological Sciences at the University of Florida. Her specialty is hydrogeology and her ocean drilling-related research focuses on the interrelationship of fluid flow and deformation at plate boundaries. She has previously served on the ODP Science Steering and Evaluation Panel and the ODP/IODP Scientific Measurements/Science Technology Panel. She has also sailed on five ODP expeditions: Cascadia Margin (Leg 146), Barbados Accretionary Prism LWD (Leg 171A), Woodlark Basin (Leg 180), Nankai Trough Accretionary Prism (Leg 190), and Costa Rica Subduction Zone (Leg 205). Currently, she is actively involved in the NanTroSEIZE project. Her onland research examines groundwater flow in karst aquifers. Liz received her BA degree in Geology from Carleton College, her MS in Earth Sciences from University of California, Santa Cruz, and her PhD in Geological Sciences from Lehigh University. She conducted post-doctoral work at Lehigh University and the University of Colorado before starting at University of Florida in 1998. Outside of work, she enjoys hiking, canoeing, and rafting.

Fathoming the Future

A Letter from the Chair

Becoming the new USAC Chair at this important time in the IODP is a thrill and an honor. I am extremely proud to be part of the U.S. ocean drilling community; I also look forward to working with you and basking in the glow of our collective scientific accomplishments. It is exhilarating to think of what will happen during my two-year term as USAC Chair. Exhilarating—as in that nervous-excited feeling you get atop the first hill on the *Giant Dipper* rollercoaster at the Santa Cruz Boardwalk. Exhilarating—as in we are embarking on the most complex and innovative phase of ocean drilling in history.



Over the next two years, we will begin to employ the 'mission concept' as an additional mechanism to achieve IODP's scientific goals. To paraphrase the working definition: A 'mission' is a global drilling strategy that addresses a major IODP scientific theme. I bring this up not only because I'm delighted about this new, inspired component of IODP, but also as a reminder that it will work only with your intellectual input. The protocol for defining and implementing a mission (see www.iodp.org/missions/) is almost finalized, and proposals for missions will come from the scientific community (you). So, consider this a big 'heads-up' that missions are to become an exciting new reality of IODP.

Over the next two years, we will witness the 'birth' of the U.S. Scientific Ocean Drilling Vessel (SODV). By the end of 2007 we will embark on new expeditions with a SODV whose features and labs were designed with our community's input starting with the work of the Conceptual Design Committee. If you haven't already, check out the website (www.joiscience.org/sodv/) to appreciate the intricacies and enormity of the vessel conversion project. Many thanks are owed to our dedicated colleagues at academic institutions, industry partners, and the IODP U.S. Implementing Organization (including TAMU, LDEO and JOI), for their ongoing efforts, and especially to NSF who continues to support this project in these extremely financially challenging times. I, for one, anticipate the excitement of stepping onto the SODV for the first time. Do ships have that 'new car' smell?

Over the next two years, we will experience Stage 1 of the NanTroSEIZE project to explore the Nankai Trough seismogenic zone (see page 1). The scale and technical complexity of this project is matched only by the scope of its science. NanTroSEIZE will be the first Complex Drilling Project that we bring to fruition, and it is an example of what the organizers of CONCORD and COMPLEX—the meetings through which the IODP *Initial Science Plan* was formulated—encouraged us to dream about.

We will also intensify our efforts to reach out beyond the traditional 'drilling' community to foster diverse interdisciplinary interactions and deeper international collaborations—key to sustaining our position at the cutting-edge of truly integrated geoscience exploration. Along with the increased complexity of IODP—soon there will be times, with the *Chikyu*, the SODV, and mission-specific platforms, when we will be running three expeditions simultaneously—comes increased opportunities to broaden our community. So please continue to generate those wonderful, collaborative proposals, to generously volunteer for national and international committees, to keep your eyes open for opportunities and application deadlines to participate in workshops and expeditions, and to give USAC feedback. (We are listening!)

In closing, I must mention Gabe Filippelli, the outgoing USAC chair, who, besides being a fellow UCSC slug, surely enjoys a ride on the *Giant Dipper*. Otherwise, how could he have lead us brilliantly through so many challenges and changes over the last two years while maintaining such enthusiasm, directed purpose, and a sense of humor? Thank you, Gabe.

Best wishes,

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Distinguished Lecturer Series

The 2006-07 Distinguished Lecturer Series (DLS) sponsored by JOI's U.S. Science Support Program (USSSP) for the Integrated Ocean Drilling Program (IODP) is in full swing. A schedule showing its speakers, lecture titles and abstracts, host institutions, and presentation dates is available at www.usssp-iodp.org/dls. The lectures are scheduled by each institutional host but visitors are welcome.

Brochures with the slate of speakers, lecture titles, abstracts, and an application for the 2007-08 lecture series are currently available from JOI. Request a brochure from info@joiscience.org or visit the website for more information: www.usssp-iodp.org/dls. Webcasts of lectures from previous years are available at the website.

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