JOI News
Spring 2007
from the Joint Oceanographic Institutions U.S. Science Support Program associated with the Integrated Ocean Drilling Program
Advancing global understanding of the Earth
IODP INTEGRATED OCEAN DRILLING PROGRAM

Facing the Future: Challenging Times Ahead

Steve Bohlen, JOI

Even casual observers of programs managed by Joint Oceanographic Institutions (JOI) may be puzzled by recent events—rumors of budget cuts in the Integrated Ocean Drilling Program (IODP), reductions in JOI's facilities construction efforts for the National Science Foundation (NSF), corporate mergers and change, and virtual silence about progress toward a new U.S. drill ship. What exactly is going on? It's time to update those of you who either participate in or observe JOI activities and to provide some perspective on the challenges ahead.

Business, Politics and Science Collide

In a nutshell, NSF is currently in a difficult position with respect to the balance between research grants and infrastructure costs such as ships and ocean observatories. This situation is the result of dramatic increases in the operations and maintenance costs of ships and the overall business environment for ocean activities combined with slow growth of the NSF budget. NSF's Division of Ocean Sciences has committed itself to curbing the continued erosion of the success rate of individual research grants by firmly managing a balance between research grants and infrastructure operations and maintenance (O&M) costs. This approach, developed in 2006, is manifesting itself at JOI by affecting IODP, the U.S. Scientific Ocean Drilling Vessel, and the Ocean Observatories Initiative.

Challenges with Deep Roots

The challenges we face are rooted in decisions made in the 1990s. Fifteen years ago, as plans for what would become IODP were taking shape, the NSF Division of Ocean Sciences (NSF/OCE) recognized the essential connection between emerging research directions and the need for infrastructure to support these new research endeavors. NSF began to place greater emphasis on large infrastructure and engaged with the executive and legislative branches in vigorous debate about the need for new, large-scale research facilities in all areas of science. At the time, NSF envisioned that these new facilities would stimulate increases in the science budgets that support them.

The labstack is removed from the JOIDES Resolution *while it is at a shipyard in Singapore. (Photo: IODP/TAMU)*

As authorization legislation (but not appropriation legislation) supporting a doubling of NSF's budget passed, the late 1990s became a heady time. NSF/OCE laid detailed plans for a new U.S. ship for scientific ocean drilling, a new seismic vessel, new UNOLS vessels in a range of sizes, and new facilities for observing the ocean around the clock. Success in advancing these initiatives led to OCE having three Major Research Equip-

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Bottom right: Night view of the JOIDES Resolution *underway (Photo: Robert Burger, Yale University).*

JOI News

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JOI manages the U.S. Science Support Program (USSSP) associated with the Integrated Ocean Drilling Program (IODP). Funding for USSSP is provided through a cooperative agreement between JOI and the National Science Foundation (NSF). The U.S. Advisory Committee (USAC) for Scientific Ocean Drilling offers guidance to JOI regarding the needs of the U.S. scientific community.

Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of NSF or JOI.

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IODP
INTEGRATED OCEAN DRILLING PROGRAM

Drill Bits

Holly Given Named Director of Ocean Observing Activities at JOI

In February 2007, Holly Given—Director of the U.S. Science Support Program at JOI for the last three years—became the new Director of Ocean Observing Activities at JOI. She replaces Kendra Daly, who has been guiding the Ocean Observatories Initiative (OOI) through its conceptual design phase for the past year. Kendra, who is returning to her research at the University of South Florida, will continue as a science advisor to OOI. Cathy O'Riordan, previously Public Affairs Manager at the American Geophysical Union, has taken over the position of USSSP Director (see story on page 6).

Large Igneous Provinces Workshop

Date: July 21-26, 2007

Where: Coleraine, Northern Ireland

This workshop will define scientific objectives and technological requirements for investigating transient large igneous provinces (LIPs) through drilling. It will also establish an integrated and interdisciplinary, long-term, global strategy for addressing fundamental LIP science questions. In addition to scientists representing a broad range of disciplines, drilling engineers will provide information about enhanced drilling, logging, and long-term borehole monitoring capabilities of IODP. Mike Coffin, University of Tokyo, and Clive Neal, University of Notre Dame, are co-chairing the workshop steering committee. The application deadline has passed but more information is available at: www.iodp.org/lips.

Gas-Hydrate Observatories Workshop: Application Deadline Soon!

Date: July 18-20, 2007

Where: Portland, Oregon

Application Deadline: May 22, 2007

The stability of gas-hydrate deposits is sensitive to climate, oceanographic, and tectonic processes, making these dynamic and complex systems of great interest to researchers. JOI is sponsoring the "Gas-Hydrate Observatories Workshop" to develop strategies to monitor gas-hydrate deposits using instrumented boreholes. The workshop will bring together scientists and engineers to discuss possible observatory designs and deployment strategies. Visit: www.joiscience.org/GHOBS to apply for this workshop. All interested scientists, researchers, engineers, and students are encouraged to apply. Partial travel support is available. If you have questions, please contact the workshop conveners: Marta Torres (torres@coas.oregonstate.edu), Anne Trehu (trehu@coas.oregonstate.edu), or Michael Riedel (mriedel@eps.mcgill.ca).

Workshop: Deciphering Long-term Sea-level Changes and Effects

Date: October 8-10, 2007

Where: Salt Lake City, Utah

Application Deadline: July 13, 2007

Scientific ocean drilling has provided high-quality stratigraphic records from the Cretaceous through the Holocene, leading to significant progress in reconstructing the history of long-term sea-level changes. New views on the roles of tectonics and sediment dynamics now challenge the fundamental assumptions used in previous sea-level studies. The workshop "Drilling to Decipher Long-term Sea-level Changes and Effects" will review past results and foster new proposals and collaborations. It is being sponsored by JOI, DOSECC, and the Chevron Corporation. For more information, visit: www.joiscience.org/sealevel. All interested scientists, researchers, and students are encouraged to apply by July 13, 2007. The workshop conveners are Craig Fulthorpe, the University of Texas at Austin, and Ken Miller, Rutgers University.

PETM Workshop for Educators

The beginning of the Eocene is marked by the Paleocene-Eocene Thermal Maximum (PETM), one of the most rapid and extreme global warming events recorded in geologic history. On March 26, Mark Leckie, University of Massachusetts, Amherst, and Debbie Thomas, Texas A&M University, taught a workshop for educators about the PETM at the Denver Museum of Nature and Science in Colorado. The workshop was designed to prepare its participants for a Distinguished Lecturer Series presentation by Jim Zachos, University of California, Santa Cruz, and to share PETM-related data that can be used in precollege classrooms. The Denver workshop was a pilot program linking teacher education activities with JOI's Distinguished Lecture Series.

Geologic Hazards Workshop

Date: August 26-30, 2007

Where: Portland, Oregon

The key goals of the workshop "Addressing Geologic Hazards Through Ocean Drilling" are to define outstanding research questions that can be addressed through scientific ocean drilling, establish scientific priorities, identify potential drilling targets, evaluate existing technologies and scientific approaches, and formulate strategies to overcome anticipated scientific and engineering challenges. The workshop is intended to enhance international collaborations and encourage teams of proponents to develop competitive IODP proposals addressing oceanic geologic hazards. Julia Morgan, Rice University, and Eli Silver, University of California, Santa Cruz, are co-chairing the workshop steering committee. The application deadline has passed but more information about the workshop is available at: www.iodp.org/geohazards.

Raising IODP's News Profile

JOI Communications documented 164 media clips relating to JOI's programs in 2006, with 146 of those pertaining to scientific ocean drilling. Clip totals in 2006 represent a 76% increase over 2005, and a tripling over 2004. In particular, significant increases in coverage by news and wire services greatly expanded the profile of all the programs.

Call for Distinguished Lecturer Nominations Deadline: June 29, 2007

The JOI/USSSP Distinguished Lecturer Series brings IODP's exciting scientific discoveries to students at the undergraduate and graduate levels and to the geoscience community in general.

Scientists to serve as Distinguished Lecturers in the 2008-2009 academic year will be chosen in July 2007. To continue this successful program, we need your help. Nominate a distinguished lecturer today! Self-nominations are also welcome.

To learn more about the Distinguished Lecturer Series and the nomination process, visit www.usssp-iodp.org/DLS.

Facing the Future: Challenging Times Ahead

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ment and Facilities Construction (MREFC) projects at or near the top of NSF priorities: the scientific ocean drilling vessel (SODV), the Alaskan Arctic Research Vessel (AARV), and the Ocean Observatories Initiative (OOI). In addition, NSF/OCE committed itself to building three mid-sized UNOLS vessels and to outfit a new seismic ship for 3-D seismic imaging. All of these initiatives have been included in the federal budget and most have been funded by the Congress in recent years.

Despite this success, these plans did not fare well in their collision with reality. NSF's budget has not kept pace with inflation, let alone doubled. Combined with the increased price of oil and everything related to ships and ship building, this leaves NSF, JOI and the research community in a paradoxical position.

The derrick of the JOIDES Resolution *has been removed and will be refurbished. (Photo: IODP/TAMU)*

We need—and have successfully argued for—new infrastructure to advance our science. However, we no longer have sufficient resources to accomplish all that was envisioned. Furthermore, the policy of NSF leadership to advance the research budgets of those divisions with new major facilities has changed. Funds to pay for research using the new facilities must come from existing research budgets. The current rationale is that the facilities are designed to transform the science, so the transformative science should take priority.

With this as background, where do we stand with the SODV, OOI, and IODP?

Scientific Ocean Drilling Vessel (SODV)

Good news: NSF will completely overhaul and enhance the *JOIDES Resolution* within its existing hull to produce the new U.S. scientific drill ship. The U.S. Implementing Organization (USIO) for IODP, in close cooperation with the shipowner, Overseas Drilling Limited, has redesigned laboratory, sleeping, and living spaces to meet the science community's objectives—as outlined in the Conceptual Design Committee (CDC) report—within the prescribed budget. Laboratory space, which will increase by 34%, will be more efficient and effective for handling cores and work flow. All staterooms will be double occupancy and the galley has been moved above the waterline. Ship stability and drilling capabilities will be enhanced.

The *JOIDES Resolution*'s transformation into the U.S. SODV is progressing at the Jurong Shipyard Ltd. in Singapore. The drilling equipment, including the derrick, has been removed to be refurbished and upgraded. The laboratory stack has been emptied and removed. In summary, the ship is being prepared for dry dock and conversion in all aspects.

Bad news: You may be aware that the initial conversion plans called for stretching the *JOIDES Resolution* by 30 feet, which would have led to even more berths and lab space. The stretch is no longer an option due to budget constraints. Fortunately, the USIO negotiated with the shipowner for the conversion of hold spaces to living and science space. This arrangement will provide nearly as much additional space as would have been provided in the plans to stretch the vessel. There will be slightly smaller laboratory spaces and fewer berths than envisioned in the stretched vessel, but one-third more lab space and 16 more berths than on the original ship.

The business environment in which we are operating is as hostile as experienced hands have ever witnessed. As drilling companies worldwide compete for scarce shipyard capacity, shipyards are able to demand a premium for time in the yard and for all aspects of their work. The global drilling companies are willing to pay whatever it costs, placing us at a distinct disadvantage. Throughout the conversion process we will continue to face severe budget and schedule challenges—the resolution of which are not yet clear.

Ocean Observatories Initiative (OOI)

Good news: Funding to build a research-driven ocean observatory was included in the continuing resolution for FY07 passed by Congress in February and is also in the president's congressional budget request for FY08. The OOI advisory committees have worked effectively and diligently to prepare a conceptual design that meets NSF's budget for O&M, although further design and cost analysis will be necessary. The program office has hired a cyberinfrastructure engineer and JOI will soon make an award for an implementing organization for a series of nodes to be located in the Pacific Northwest. The selection process for additional implementing organizations is ongoing. All efforts now are focused on the development and documentation necessary for the preliminary design review which is scheduled in December 2007.

Bad news: The Ocean Observatories Initiative was given an O&M budget ceiling that necessitated a redesign and reduction in scope of the system. The observatory will be smaller than envisioned and we are concerned that further design and costing work will require additional strategic focusing of assets. Our greatest worry is a potential repeat of the challenges faced by the SODV if the telecommunications industry awakens from a prolonged slump.

Integrated Ocean Drilling Program

Good news: Plans are progressing for the full incarnation of IODP as a three-platform ocean drilling program beginning January 2008. The Science Planning Committee has forwarded an ambitious list of drilling programs for scheduling and approval

(see planning schedule, page 14). Proposal pressure is high as IODP strives to meet the vision laid out in its *Initial Science Plan*. Science outcomes from expeditions during IODP's Phase 1 have repeatedly garnered the attention of the science press with their contributions to our understanding of sea level and climate history, gas hydrates, the deep biosphere and the ocean crust's structure.

Bad news: The IODP faces severely constrained budgets for the upcoming fiscal year (FY08). Increases in operations and maintenance costs for drilling platforms have been particularly severe, driven fundamentally by the cost of oil and the numerous other derivative cost increases. Japan has indicated that the *Chikyu* will conduct scientific drilling for less than a full year—and the U.S. may be in a similar situation with the SODV. The USIO is assessing the financial demands of the high-priority expeditions. We are looking carefully at our costs and developing scenarios for science services. At the moment we do not have a clear picture of our FY08 program plan. What is clear, however, is that the program from FY08 through FY2013 will be quite different from the one envisioned when the *Initial Science Plan* was adopted.

JOI's Future

Later this year, JOI and the Consortium for Oceanographic Research and Education (CORE) will be merged into a new, yet-to-be-named corporation. JOI focuses on providing the science community with effective leadership and management of programs, and CORE strives to advance ocean research, education and policy—making this merger a natural step. The merger will allow JOI and CORE to consolidate their efforts in program management, systems engineering, education, outreach, public awareness and advocacy. Some community members have suggested that the merger of JOI and CORE is being driven by a focus on ocean observing at the expense of scientific ocean drilling. This is not true; scientific ocean drilling will continue to have an important role in both the community and the new corporation.

The forward bow thrusters were removed from the JOIDES Resolution *to be updated and refurbished. (Photo: IODP/TAMU)*

Once it was cut free, the labstack was lifted from the JOIDES Resolution. *It was sold as unit to serve as living space in Thailand. (Photo: IODP/TAMU)*

Within JOI, several staff have been reassigned in recent months to meet community objectives. In ocean observing, we have accommodated former Program Director Kendra Daly's return to research and retained the talents of a very experienced and skilled program director, Holly Given. Furthermore, we are fortunate to have Cathy O'Riordan take Holly's place in leading the U.S. Science Support Program (USSSP). Cathy's experience in working with the science community and managing various programs—discussed further on page 6 of this newsletter—bodes well for continued progress on USSSP programs.

What can you do?

Given the challenges facing the entire ocean science research community, a logical question is "What can you do?" First, your continued input and suggestions are important. Over 220 community members serve on various advisory committees associated with the programs JOI manages. This support is vital to our decision-making in managing programs. Beyond this there are some specific steps we hope you will take. We need you to inform the leaders of your organizations and institutions of the value of these programs to you. If they see our programs as a clear priority, they can help guide the advocacy agenda of your institution in dealing with the executive and legislative branches of the federal government. Please also tell NSF leadership (such as the directors of the Geosciences Directorate and Ocean Science Division) which programs are essential to advancing your science. Help us spread the word about the value of your science via our education and communications activities. Let us know where and when we can help you in this regard; for example, publicizing upcoming papers in *Nature* and *Science* with news releases and other media contacts. Most importantly, do not underestimate your impact on what happens here in DC. Inform your elected representatives about the value of your science to the country and how the community programs we manage are vital to continued progress in understanding Earth and its oceans. JOI is happy to help you prepare for such dialogues.

Clearly we are amid challenging times. We look forward to new infrastructure to support the next two decades of research, but we also face some serious problems. JOI's promise is to provide creative leadership to support your research aspirations through good times and bad. As always, I appreciate your thoughts and comments.

The Author

Steve Bohlen is the President of Joint Oceanographic Institutions. You may reach him at sbohlen@joiscience.org.

Building Broader Support and Understanding

Meet Dr. Catherine O'Riordan, Director of JOI's U.S. Science Support Program

Andrea Johnson, JOI

Cathy O'Riordan thrives on challenges—both physical and intellectual. Some of her recent challenges include finishing The Nation's Triathlon, learning to play the violin, and becoming the new Director of the U.S. Science Support Program (USSSP) at JOI. Fortunately, Cathy has had a wealth of experiences to prepare her for these challenges—except for the violin playing!

Cathy O'Riordan, USSSP Director

Before arriving at JOI, Cathy was the Public Affairs Manager at the American Geophysical Union (AGU). In that position her goal was to engage AGU members in helping form and influence public policy. In addition to representing the AGU community to the U.S. Congress and federal science agencies, she worked with panels of AGU members to build consensus on "position statements" on topics that include teaching evolution in public schools, mitigating against natural hazards, and increasing the investment in oceans research. When Cathy first arrived at AGU eight years ago, she was the Society Activities Manager, a position where she worked behind the scenes on governance of AGU, including supporting all of AGU's disciplinary sections. One notable accomplishment was facilitating the launch of the Biogeosciences Section in 2000. Many scientific communities intersect via AGU, and its members recognized that the time had come for biogeosciences to stand alone as its own section. Although it initially drew upon existing AGU membership, the new section also attracted new membership becoming a huge growth area. The National Science Foundation recognized this trend and established its own biogeosciences section, as did the Geological Society of America.

As the Director of USSSP, Cathy plans to use her knowledge of programs in other communities, her network of contacts, and her professional experience in research, management, and working with broader groups. She hopes to leverage existing funds to benefit USSSP activities and to expand the U.S. ocean drilling community to include a broader and more diverse membership. Once the USSSP community develops new partnerships for conducting its activities, it will also automatically broaden its own base. Cathy has not been directly involved with scientific ocean drilling before, but she is no stranger to science and engineering.

While growing up as part of a large family in lower Bucks County, Pennsylvania—just north of Philadelphia—Cathy found herself interested in math and science early on. She decided to focus on engineering, which seemed both a challenging and practical career choice, and graduated from Case Western Reserve University with a degree in mechanical engineering. After college, she worked for IBM in production engineering and project management. She then worked for the Weyerhaeuser Company where she found herself in charge of a large construction project on a property with major environmental contamination. Managing this project required her to become knowledgeable about environmental issues and geology, eventually leading her to a job with the Massachusetts Division of Water Pollution Control. There, she monitored water bodies and wastewater treatment facilities which sparked her interest in fluid mechanics—a fascination that she explored with part-time graduate work.

Cathy's interest in fluid mechanics continued to grow and ultimately led to a Ph.D. in environmental fluid mechanics from Stanford University's Civil Engineering Department. For her dissertation research, she focused on the hydrodynamics of the feeding process of benthic clams. Her labwork included building mechanical clams and using laser velocimetry and digital analysis to study the mixing of siphonal jets. She showed that to quantify the depletion of water-column phytoplankton by benthic organisms, one must first understand the hydrodynamics of their feeding process.

After graduate school, Cathy received one of only eleven Chateaubriand Fellowships awarded to Americans each year by the Embassy of France. With the independence the fellowship gave her, she chose her own project and went to the École des Ponts et Chausses in Paris to study sediment transport issues in the Seine estuary. In addition to her research, she found herself intensely challenged by the need to become fluent in the French language in a very short time. After her fellowship, she went to L'ODYC at the University of Paris where, with European project funding, she studied nitrogen transport in the Gulf of Lyon. It was after this project that she decided to step away from research and work for AGU.

When Cathy returned to the United States, she brought her husband Arnaud Trouvé, now an Associate Professor of Fire Protection Engineering at the University of Maryland, and their two children Nolan, now age ten, and Margot, age eight. Before having a family, she was addicted to adventure outdoor sports including back-country skiing and SCUBA diving. These days she sticks to the downhill ski slopes with her children, grows vegetables in her garden, and releases her energy by training and competing in triathlons. Whether it stems from her interest in fluid mechanics or her years of swimming while growing up, she is most serious about the swimming portion of triathlons. Several days a week she is up to train at 5 AM with a local masters swim team, the Sea Devils. She also has competed two times in a four-mile swim across the Chesapeake Bay.

At AGU Cathy devoted her energy to working on broad-level issues important to science and society, but as Director of USSSP she looks forward to reconnecting with individual scientists and the research needs of the community as a whole. She welcomes the opportunity to become more familiar with the U.S. and international scientific drilling communities. One of her goals is to broaden the U.S. ocean drilling community and to increase public awareness of its research. She is eager to hear from community members so don't hesitate to contact her! You can reach her at coriordan@joiscience.org or 202-232-3900 (x1645).

Bringing an International Perspective to USSSP

Dr. Jeffrey Schuffert becomes Associate Director of JOI's U.S. Science Support Program

Andrea Johnson, JOI

When choosing between going somewhere new or somewhere familiar, Jeff Schuffert typically picks the unknown location and experience. This characteristic led Jeff to jobs in Germany and Japan, and this past winter it brought him to Washington, D.C. to become the Associate Director of the U.S. Science Support Program (USSSP) at Joint Oceanographic Institutions (JOI).

In his new position, Jeff is responsible for all aspects of U.S. participation on expeditions of the Integrated Ocean Drilling Program (IODP), including facilitating the nominations of U.S. science party members and coordinating expedition and post-expedition support. He also manages USSSP's pre-drilling activities, an initiative for U.S.-based researchers that funds small group meetings associated with planned expeditions, participation in site surveys, and pre-expedition analysis of existing data. In addition, he is the designated USSSP liaison for all expeditions of IODP's complex drilling project, the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE).

Jeff has always liked maps and, as a child, family vacations far and wide sparked his interest in exploring. Ever since, the map showing the places he has lived, visited, and studied has steadily been accumulating far flung X's. Although he has spent many months at sea during his career—becoming a certified "Shellback" and "Red Nose"—his personal journey began far from the ocean. He grew up in Euclid, Ohio as an active kid who loved sports, particularly softball and baseball. (These days, he rarely has time for sports but he is still waiting to see the Cleveland Indians win the World Series.)

When he began college at the University of Dayton, Jeff initially pursued computer science studies, but his love of maps and travel attracted him to geology, which he discovered while pawing through a textbook in a buddy's dorm room. After obtaining a geology degree, his work and graduate studies led him from Louisiana to California to Michigan. Along the way he discovered geochemistry while participating in a project that happened to require SCUBA diving in the caves of Mexico's Yucatan Peninsula. He also loved California so much that he managed both to return and stay awhile, with six oceanographic research expeditions to soothe his wanderlust.

In 1992, Jeff obtained his Ph.D. from Scripps Institution of Oceanography where he studied natural, experimental and theoretical growth of marine sedimentary minerals under the tutelage of Miriam Kastner. After that Jeff hit the road again as an inorganic and organic geochemist, first to do a post doc at the University of South Florida and then to become a Senior Research Associate at Brown University.

While at Brown, Jeff became involved in research related to scientific ocean drilling, and he eventually participated on ODP Leg 178 to study the Antarctic ice sheet's history. His interest in ocean drilling and the lure of a new experience tempted him to apply for the position of U.S. Liaison in the JOIDES Office while it was located at the University of Kiel's Research Center for Marine Geosciences (GEOMAR).

Jeff Schuffert, Associate Director, USSSP

As the U.S. Liaison, Jeff brought U.S. perspectives to the international JOIDES Office and communicated with the U.S. Advisory Committee about international concerns and issues. He also managed the submission and evaluation of scientific ocean drilling proposals and coordinated the proceedings of ODP's science advisory structure. During his two years in Germany (1999 through 2000) Jeff met and married his wife Bettina, who shares his love of travel and has a gift for learning languages. He also indulged his personal interest in genealogy, vacationing in the Transylvania region of Romania, formerly a part of Hungary, to trace his family history.

Once Jeff's stint in the JOIDES Office ended, moving to Japan and becoming involved in the soon-to-be-launched Integrated Ocean Drilling Program were natural steps. He first served as the Science Coordinator for the IODP interim Science Advisory Structure (iSAS) Office at the Japan Marine Science and Technology Center (JAMSTEC) in Yokosuka, Japan. When IODP officially began in 2003, he became the Senior Science Coordinator for IODP Management International at Hokkaido University in Sapporo. In this position, Jeff coordinated the proceedings of IODP's Science Advisory Structure and managed the submission, evaluation, and peer review of scientific drilling proposals. He also worked with planning and policy committees and was an editor of the journal *Scientific Drilling*. Meanwhile, Bettina added Japanese to her list of languages and gave birth to the couple's first child, Katalin.

Ever motivated by new experiences, Jeff was open to temptation after five years in Japan. In late December 2006, he brought his international perspective, research and management background to JOI as the Associate Director of USSSP. With his broad spectrum of professional contacts and intimate knowledge of scientific ocean drilling, he hit the ground running. Only the international move and the birth of his son, Henrik, in mid January 2007 have made him pause occasionally to catch his breath.

Jeff has found science management a rewarding career path and plans to continue along it for the foreseeable future. He sometimes misses the analytical challenges and the sense of discovery he experienced as a researcher, but feels more than compensated by the broader sense of involvement he achieves through facilitating science. In his current work, he also thoroughly enjoys the constant exposure to a diverse array of scientists and scientific disciplines.

Jeff is ready to hear from you; he can be reached at jschuffert@joiscience.org or 202-232-3900 (x1621).

More than a Memory

Preserving the Legacy of the Ocean Drilling Program

Margo Morell, JOI

History was made. Science was revolutionized—one core at a time, one day at a time for twenty years. With the drillship *JOIDES Resolution,* dedicated staff at multiple institutions, and scientific participants worldwide, the Ocean Drilling Program (ODP) conducted cutting-edge exploration from 1983 to 2003. Hard work, enthusiasm and careful planning by an international partnership of research institutions contributed to the program's phenomenal success. ODP's operational life may be over but its data and other archives still exist for additional scientific analysis and study. Not only did ODP create a superb databank of scientific knowledge, but it also serves as model for international cooperation.

Organized to explore the structure, history, and processes of the Earth beneath the ocean basins, ODP became one of the largest international ocean research programs ever created. More importantly, it radically changed the scientific community's view of Earth's history and global processes. Its successes include validating the theory of plate tectonics; revealing the hydrogeology of subduction zones; documenting the nature of gas hydrate deposits and the depositional setting in which they occur; and providing the first evidence of abundant microbes and diverse microbial activities deep beneath the seafloor. Countless cores also fueled the birth and evolution of paleoceanography as a completely new scientific discipline and advanced our understanding of climate extremes and climate change over the past million years.

These results, and many other accomplishments, were achieved following the start of ODP operations in January 1985 (Leg 100, Gulf of Mexico) and continued until the program's final expedition in September 2003 (Leg 210, Newfoundland Margin). During this time, more than 2600 international scientists sailed on 110 expeditions onboard the *JOIDES Resolution*, a 471-foot-long and 70-foot-wide research vessel named after James Cook's flagship of two centuries ago, the *HMS Resolution*.

Visit the ODP Legacy Website: www.odplegacy.org

In recognition of the importance of preserving and compiling the scientific, technological, and experiential legacy of ODP, Joint Oceanographic Institutions (JOI) created the ODP Legacy website (www.odplegacy.org). This website—launched in September 2006—aims to encourage interest, awareness, and understanding of ODP as a program; preserve the data, documents and publications produced during the program; and highlight the scientific and technical accomplishments of twenty years of scientific ocean drilling. Users can access scientific data generated during operations onboard the *JOIDES Resolution* and during later shore-based activities via links to various databases. In addition, those interested will soon be able to download documents that cover a wide spectrum of program information, from laboratory manuals and instrument manuals to journals and educational materials. The ODP Legacy website also includes some data and publications related to the Deep Sea Drilling Project, the ground-breaking precursor to ODP.

Help preserve ODP's Legacy

Although the ODP Legacy website contains many useful documents and materials, some ODP-related group photos, expedition logos, documents (e.g., minutes, meeting reports, public relations / outreach materials including documentaries, newspaper articles, and port call events, etc.), publications, and articles are still missing. If you sailed or participated in ODP, your help is needed to make these significant resources available for the community. Please join the effort to preserve ODP's legacy by e-mailing electronic copies of any materials with archival potential to odplegacy@joiscience.org. If you do not have electronic copies, please mail hard copies (indicating if you wish to have them returned) to:

ODP Legacy Coordinator, JOI
1201 New York Avenue, Suite 400
Washington D.C. 20005

Comments Welcomed!

Please visit the ODP Legacy website soon. JOI heartily encourages your input to make it more complete and useful to the scientific community. You may e-mail comments and suggestions to odplegacy@joiscience.org.

The Author

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First Cruise: ODP Leg 100 group photo, 1985. (Photo: ODP/TAMU)

Final Cruise: ODP Leg 210 group photo, 2003. (Photo: ODP/TAMU)

Education Opportunities and Resources

"School of Rock" Returns

This summer twelve educators will attend a teacher research experience at the Gulf Coast Repository—with its 60 miles of stored cores—at Texas A&M University. From July 22-28, the participants will conduct research activities similar to those associated with scientific drilling expeditions, learn from scientists familiar with IODP, and develop new teaching resources based on their activities and new knowledge. The "School of Rock 2007" was designed following the first seagoing "School of Rock" on board the *JOIDES Resolution* in November 2005 (Application Deadline: April 20).

Welcome Aboard

JOI welcomes Sharon Katz Cooper as the new Assistant Education Director. Sharon's professional background is in informal education, and her experience includes helping develop the Smithsonian's Ocean Hall (opening in September 2008) and working for NOAA. She also participated as an educator on the inaugural School of Rock Expedition. In her spare time, she writes children's books and magazine articles on science and social studies topics. Her formal education includes a bachelor's degree in Ecology and Evolutionary Biology from Princeton University and a Masters in Environmental Studies from the Yale School of Forestry and Environmental Studies.

Two HBCU Fellowships Awarded

JOI's Historically Black Colleges and Universities (HBCU) Fellowship seeks to encourage more young scientists of color to play a role in the geosciences. JOI offers these fellowships, funded by NSF, to undergraduate or graduate students enrolled at selected HBCUs. Elda Auxiliaire became an HBCU Fellow in August 2006. She graduated from the University of Florida with a degree in public relations and is currently in the Mass Communications and Media Studies Masters Program at Howard University in Washington, DC. Nicole Abdul, awarded an HBCU Fellowship in January 2007, is a graduate student in the Marine Sciences Program at Savannah State University. Nicole is working on core samples from ODP Leg 175 (Benguela Current). (For more information visit www.joiscience.org/diversity.)

Bringing Books to Life

In collaboration with City Year—an AmeriCorp program for young adults who work as tutors and mentors in New York City public schools—JOI staff Jessica Sharoff and Sharon Cooper traveled to New York from March 5 to 7, 2007. During nine presentations in five different schools, they were part of City Year's "Bringing Books to Life" program, reading excerpts from two books written by Sharon, *Using Water* and *Learning from Fossils*. They also engaged the participating children, grades K through 5, in activities relating to water and fossils.

Teacher Sabbatical in D.C.

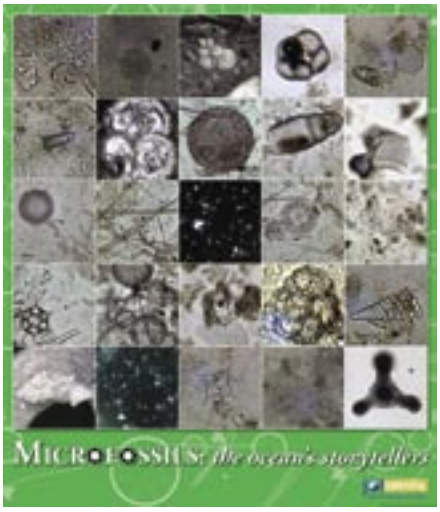
JOI Learning is offering a one-year teacher sabbatical at the JOI office during the 2007 school year (Application Deadline: April 20). The teacher selected for this pilot program will work with JOI staff to develop curricula, produce teacher-training workshops, and organize conference logistics. Visit www.joilearning.org to learn more.

Out and About

A core observation activity—allowing participants to examine smear slides and post their observations—highlighted *JOI Learning*'s exhibit at the 2007 annual meeting of the National Science Teachers Association (NSTA) which was held March 29 to April 1 in St. Louis, Missouri. JOI sponsored a double booth which was staffed continuously by staff members, teachers, scientists and technicians. It also featured IODP-related resources and opportunities including several teacher-developed activities. During the NSTA conference, JOI staff also participated in two National Earth Science Teachers Association Share-a-Thons.

Educate and Decorate!

JOI Learning recently released three posters with education activities. *The "Hole" Story About Ocean Cores* introduces students to the core description and curation techniques used during IODP Expedition 309. Lab groups can examine high-resolution photos and data from four cores taken at various depths in this complete section of oceanic crust. The activities were designed for high school and undergraduate courses, but the engaging nature of the poster makes it suitable for younger groups as well.



A new education poster focuses on microfossils.

The second poster, *Microfossils: The Ocean's Storytellers*, shows microfossil images photographed through microscopes. The poster activities—designed for middle and high school students—simulate the identification and use of microfossils to examine past climate change and earth history. The third and newest poster, *A World of Physics*, features the study of Earth's magnetic field, sound and seismic waves, and geophysics. Targeted primarily for high school students, it includes background information on the *JOIDES Resolution's* Underway Geophysics Laboratory and Paleomagnetism Laboratory and two career briefs.

These posters were developed by educators with input from researchers. Consider reviewing new *JOI Learning* materials as an easy way to become involved! To learn more and request posters, visit www.joilearning.org. While you're at the website, notice how one can search for educational activities by topic, audience, or content standard.

Ninetyeast Ridge Expedition

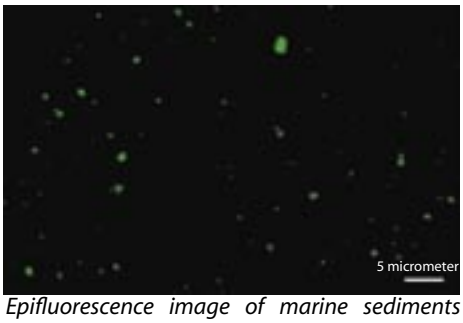
One lucky educator will experience ocean-going research during the Ninetyeast Ridge Expedition conducted aboard the R/V *Roger Revelle* from June 15 to August 15, 2007. This expedition is a site survey to explore and map an area in the Indian Ocean proposed for IODP drilling. The participating educator will interpret the expedition for a variety of shore-based audiences. Stay tuned to www.joilearning.org to learn more about this activity (Application Deadline: April 20) and future opportunities.

Exploring Subseafloor Life: Microbial Communities on the Edge

Patricia Sobecky et al.

They live on the edge—on the very edge, at the extreme limits of life itself. Dwelling deep in the seafloor's sediments and rocks, these unexplored microbial communities may resemble primordial ecosystems. Resource availability constrains their growth and dispersal, and unique processes mediate their evolution. Scientific drilling may reveal how life persists and evolves in Earth's most extreme ecosystems.

Cell concentration estimates suggest abundant microbial populations in the deep biosphere, but models do not account for their potential impact on global biogeochemical cycling. Scientists lack fundamental knowledge of community composition, diversity, distribution and metabolism. Nor are the limits of subsurface life known in terms of environmental properties such as depth, temperature, and energy availability. We do know that microbes play a significant role in chemical reactions previously thought to be abiotic. Although a surprisingly high diversity of microbial life in the subseafloor has been demonstrated, the relative abundances and roles of Archaea, Bacteria, Eukarya and viruses remain largely unknown.



Epifluorescence image of marine sediments (Juan de Fuca Ridge, IODP Expedition 301) containing microbes stained with SYBR Green I which interacts with double strand DNA. (Photo: Fumio Inagaki and Yuki Morono, JAMSTEC)

In October 2006, IODP-MI and USSSP co-sponsored the workshop "Exploring Subseafloor Life with IODP" to address the scientific issues and technical challenges of exploring subseafloor microbial life. Its 90 participants attended an overview including a presentation of a white paper written by the U.S. Working Group on IODP and the Deep Biosphere (www.iodp.org/subseafloor-life/#4). Daily breakout sessions led to recommendations in four key areas summarized below. Additional sessions reviewed current knowledge, metagenomics and new technologies for high-throughput nucleic acid sequencing, existing IODP proposals with microbiology objectives, and guidance for writing IODP proposals.

A full workshop report will be available at: www.iodp.org

Biogeography

Four aspects of biogeography should be research priorities. The first is to characterize subseafloor habitats, their microbiota, and their changes with age and depth. Some communities are controlled by surface inputs (e.g., sediment accumulation) and some derive energy from terrestrial processes (e.g., thermogenesis of organic compounds, subduction zone processes, or serpentinization). Other communities exist deep in seafloor basalts. The latter environment may be Earth's largest microbial habitat by volume, although its significance has yet to be confirmed. A second priority is to explore spatial and temporal controls on microbial diversity through 1) fine-scale analysis of cores from previously drilled holes, 2) new drilling expeditions that target contrasting sedimentary environments, and 3) installing deep subseafloor microbial observatories. Such studies will identify evolutionary controls and extend current biodiversity surveys. A third priority is to determine the mechanisms and rates of evolution under severe conditions. The fourth priority is to understand the deep biosphere's connection, if any, to the surface biosphere. Does lateral microbe migration allow the same biogeochemical zones in different oceans to contain the same communities or are there barriers to dispersal?

Genes, Cells, Populations and Communities

Microscopic observations of sediment and rocks should include modern cell staining procedures that maximize biological information. Combined with studies of nucleic acids and organic biomarkers, such direct counts can provide information on the abundance, distribution, and extent of microorganisms in the subseafloor biosphere. Relatively detailed information on microbial populations gathered using specific microscopic techniques will provide fundamental information about the phylogenetic status and activity of individual cells. Because viral populations potentially play important roles in cell death and in horizontal transfer of genes between microorganisms, their abundance in both sediment porewater and crustal fluids should be assessed. Microbial abundance studies will answer major questions regarding the extent of the subseafloor biosphere, per-cell rates of microbial activities, and roles of specific populations in major biogeochemical cycles.

Habitability

Defining the limits to habitability—as set by a variety of physical and chemical properties—will challenge future IODP research. In this largely unexplored realm of extreme environments, spatial transitions from habitable to nonhabitable environments may occur at different depths under different conditions. This information will be key to understanding the habitability of life on Earth and elsewhere in the universe. The geological and biological processes that control these transitions and that fuel growth and survival of subseafloor microbial communities remain to be determined, but the most important parameters can be modeled with field measurements of signatures such as metabolic and enzymatic activities, RNA, and intact polar lipids.

Technology

Technology issues were discussed during the workshop to help enhance and extend previous ODP and IODP microbiological studies. Workshop recommendations build on existing efforts and include establishing an IODP microbiology legacy sampling protocol. All data should be integrated with the existing IODP database structure, and more analyses must be added. If existing sampling and analytical protocols are modified, IODP will be better equipped to explore microbial life in the deep biosphere.

The Authors

Patricia Sobecky, Georgia Inst. of Technology, is corresponding author. Steve D'Hondt, Univ. of Rhode Island, and Fumio Inagaki, Kochi Institute for Core Sample Research, JAMSTEC, were the workshop co-chairs.

Mission Moho: Drilling Through the Oceanic Crust to the Mantle

David Christie, Benoit Ildefonse

Beyond our view, but no longer beyond our dreams, the Mohorovičić discontinuity (Moho) is a seismic boundary assumed to represent the frontier between Earth's crust and mantle. The goal of Mission Moho is to drill to and beyond this frontier for the very first time and to determine its nature using *in situ* sampling and downhole data collection. Deep drilling improves our understanding of the creation of ocean crust and how it repaves the ocean's basins every 100 to 200 million years. Using new technologies, Mission Moho will finally realize the very goal that inspired the start of scientific ocean drilling over 45 years ago.

A full workshop report is available at: www.iodp.org

The Mission Moho workshop, co-sponsored by IODP-MI, JOI, Ridge 2000, and InterRidge, was held September 7-9, 2006 in Portland, Oregon. Its purpose was to prioritize research objectives relating to formation and evolution of the ocean lithosphere that could be addressed by ocean drilling.

A clear consensus emerged at the workshop. Drilling a single deep, full-crustal-penetration hole in fast-spreading crust—through the Moho into the uppermost mantle—is the first priority and Mission Moho expeditions should pursue this goal as soon as feasible. With upper mantle samples in hand, we can define (in at least one place) the geological meaning of the Moho and address fundamental questions about mantle melt migration, mantle composition and deformation, and lithosphere cooling rates. Ocean crust produced at fast-spreading ridges appears to be relatively homogeneous. In contrast, crust created at slow-spreading ridges is spatially heterogeneous. The majority of crust subducted back into the mantle during the last 200 million years formed at fast-spreading ridges. Thus, understanding accretion processes at one fast-spread site might be extrapolated to describe a significant portion of Earth's surface.

The workshop participants also recognized that the primary Mission Moho objective of full crustal penetration must be supplemented by studies of spatial and temporal variability, especially at slower spreading rates, to fully understand ocean lithosphere formation. For example, slow-spread crust often includes fault-emplaced, serpentinized mantle rocks. Drilling through serpentinized crust down to fresh peridotite will help test competing hypotheses on the nature of the Moho and the behavior of seismic waves in the crust. A vital goal of deep-drilling through the peridotite-serpentinite transition is to understand the role of serpentinization in modifying the seismic signature of the crust and the transition to typical mantle velocities.

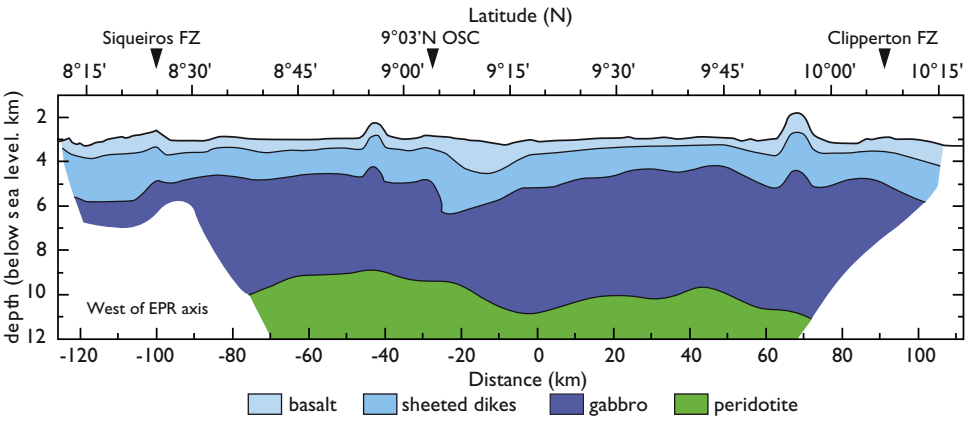
In a special panel, several drilling engineers joined experienced scientists to discuss technological requirements for achieving Mission Moho objectives. In addition to deeper drilling, desired developments include improved core recovery (balanced against maintaining satisfactory penetration rates), drilling and logging tools able to withstand temperatures greater than 200°C, and the ability to obtain oriented cores. Penetrating the entire ocean crust will require the *Chikyu*'s riser drilling technology. However, all potential deep-penetration sites are in deep water (reflecting relatively thin crust) and require a technically challenging modification of the riser, identified as a priority by the Japanese government, to extend its present 2500-meter maximum depth capability to 4000-4500 meters. Even with enhanced deep-water access, there are only a limited number of potential deep drilling sites that are old (and cooled) enough to be viable drilling targets but shallow enough to reach with riser capability.

Site 1256 in the eastern Equatorial Pacific was identified as the currently best-known potential location for deep penetration into fast-spreading crust. However, alternative sites must be identified and thoroughly evaluated before a final "Moho" site is identified. In the near term, riserless drilling should be used to deepen Hole 1256D as far as reasonably possible, to investigate one or more alternate sites, and then to prepare a cased hole for subsequent riser drilling at the selected deep-penetration site.

Because of the number of holes required for multi-hole transects, important issues such as crustal aging and evolution cannot be included as essential elements of a reasonably "sized" Mission Moho. However, workshop participants recognized that drilling strategies designed to increase understanding of the evolution of the oceanic crust remain fundamental scientific goals for IODP as a whole.

The Authors

David Christie, University of Alaska, Fairbanks, and Benoit Ildefonse, Centre National de la Recherche Scientifique, Université Montpellier, co-convened the workshop.



Lithostratigraphy of the fast-spreading East Pacific Rise crust, interpreted from a ridge-parallel wide-angle seismic refraction profile between 8°N and 10°N, immediately west of the ridge axis. (After Canales et al., 2003, Geophysical Journal International, *152(3):766-794)*

Five Schlanger Fellowships Awarded in 2007

The Schlanger Ocean Drilling Fellowship Program offers merit-based awards for outstanding graduate students to conduct research related to the Integrated Ocean Drilling Program. The $28,000-per-year award is to be used for stipend, tuition, benefits, research costs, and travel. Research may be directed toward the objectives of specific expeditions or broader themes.

Benjamin Harrison

California Institute of Technology

"Novel methods for characterizing microbe mineral colonization patterns in deep subsurface marine sediments"
Relevant Expedition: DSDP Leg 91 and ODP Leg 201

Research Abstract: The purpose of my Schlanger Ocean Drilling Fellowship research is to apply a new method—developed by my colleagues and me—for determining microbe-mineral interactions deep in subsurface marine sediments. Microorganisms

form selective patterns of colonization among mineral substrates as a result of differential attachment or *in situ* growth, with the mineral potentially serving as an important source of nutrients or energy-yielding reactants. Researchers are only just beginning to explore microbe mineral colonization patterns in deep subsurface marine sediments. Within the scope of this proposal, I will discern the potential for composition-dependent microbe mineral colonization in marine sediments in multiple localities spanning a range of surface water productivity and water depth conditions. I will separate discrete mineral fractions from bulk environmental samples for independent molecular characterization of associated microbial diversity. This approach should broadly characterize microbe mineral colonization patterns as a function of mineralogy, metabolism and nutrient availability in marine sediments.

Biography: I grew up in the Puget Sound region of Washington and developed an early interest in natural history from traveling around the state. I earned my bachelor's degree in computer science and geology from Carleton College in Northfield, Minnesota, deciding early on that I preferred a career in the geosciences. My undergraduate research focused on igneous petrology, with fieldwork taking me back to my home state. However, a senior-year course in geomicrobiology turned my head and I've branched into that field during my graduate work at Caltech. My goal is to bridge the disciplines of geology, geochemistry and microbiology. My present research focuses on developing a better understanding of the impact of mineral association on microbial ecology and the consequences of microbial colonization for mineral stability.

Daniel Murphy

Texas A&M University

"North Pacific intermediate water circulation over the last 60 kyr: Southern California margin"
Relevant Expeditions: ODP Legs 146 and 167

Research Abstract: Over the last 60 kyr, the organic carbon content of California Margin sediments has varied significantly (6 to 12 wt%) on stadial to interstadial timescales, likely reflecting changes in the strength of the oxygen minimum zone. Two mechanisms have been proposed to explain these variations: 1) regional changes in sea-surface productivity influenced seafloor oxygen levels, and/or 2) the source of intermediate waters changed, with a more proximal, oxygen-rich North Pacific source during the stadials, and a more distal Southern Ocean source during the interstadials. For my Schlanger Ocean Drilling Fellowship research I will test potential causes of enhanced interstadial organic carbon accumulation by tracking changes in intermediate water-mass composition—as recorded at ODP sites 893 and 1017—across interstadials 8 to 14 (~37 to 52 kyr ago) using Nd isotopes from benthic foraminiferal calcite. My preliminary results using coeval fish debris indicate that benthic foraminifera reliably record seawater Nd values and indicate a Southern Ocean intermediate-water source during interstadials.

Biography: Unlike many marine scientists, I did not grow up fascinated by the ocean. In fact, I had never even seen the ocean until I attended Hawai'i Pacific University where I ended up earning my bachelor's degree in marine biology. As a senior, I took geological oceanography as an elective and soon fell in love with paleoceanography. The questions it posed seemed bigger than those considered in marine biology—and more relevant given today's changing climate. After completing my master's degree at the University of California, Santa Barbara, I began my Ph.D. at Texas A&M University with Deborah Thomas as my advisor. Eventually, I hope to pursue a career in academia addressing questions from all time scales using the skill sets I am developing. The challenges presented to me by my research are almost as exciting as spending time with my wife Jonna and my daughter Autumn who was born in February 2007.

Heather Schrum

University of Rhode Island

"Quantification of low rates of metabolic activity in the deep subseafloor using sulfate oxygen isotopic compositions"
Relevant Expeditions: ODP Leg 201

Research Abstract: The purpose of this study is to develop a unique way to quantify low metabolic rates, which is essential for constraining the environmental limits on life. I propose to test hypotheses related to sulfate metabolism and to develop a method that will quantify low rates of sulfate reduction and potentially iron reduction in low activity subseafloor environments. The sulfate reduction method relies on the oxygen isotope composition of dissolved pore fluid sulfate, $\delta^{18}OSO_4$. Iron reduction rates are calculated from sulfate reduction rates, total

The Schlanger Ocean Drilling Fellowship Program is supported by the U.S. Science Support Program associated with the IODP through a cooperative agreement with the U.S. National Science Foundation. The fellowship is open to all graduate students enrolled at U.S. institutions in full-time Ph.D. programs.

carbon and alkalinity (Wang, G., 2006. URI Ph.D. dissertation). Because the sulfate and iron reduction rates are well constrained at Leg 201 Site 1226 (Wang, 2006), I will use these data to examine systematic relationships between oxygen isotope exchange and sulfate reduction rates. I will apply the results to a low activity site, Site 1225, to infer sulfate and/or iron reduction rates.

Biography: After spending my childhood exploring the coast of Connecticut, I headed to upstate New York to study geology at Hamilton College. Although deprived of the coast throughout most of the academic year, I was exposed to life at sea as a participant in the U.S. Antarctic Program in 2004 and 2005, when I studied climate change and its influence on the Larsen Ice Shelf. Luckily, my time at sea did not end there. As a second year Ph.D. student at the University of Rhode Island's Graduate School of Oceanography, I recently spent two months in the South Pacific studying interstitial seawater chemistry under the guidance of Arthur Spivack and Steven D'Hondt. When I'm not not focusing on science, I enjoy instructing yoga and fishing with my fiancée.

Sindia Sosdian

Rutgers University

"The mid-Pleistocene transition: deep sea temperature and global ice volume from Mg/Ca and $\delta^{18}O$ in benthic foraminifera"

Relevant Expeditions: DSDP Leg 94

Research Abstract: The mid-Pleistocene transition (MPT) (from ~1 to 0.7 Ma), is recorded in benthic foraminiferal oxygen isotope ($\delta^{18}O_b$) records as a shift in the periodicity of northern hemisphere glaciations from low amplitude 41-kyr to large amplitude 100-kyr glacial-interglacial cycles. The MPT has hypothetically been attributed to 1) global cooling due to a long-term decreasing trend in greenhouse gases; or 2) changes in internal dynamics of ice sheets, independent of changes in atmospheric pCO_2. Evidence in support of either hypothesis is inconclusive. However. I will construct a high-resolution bottom-water temperature record using Mg/Ca ratios in benthic foraminifera from North Atlantic DSDP Site 607 to quantify the extent of global cooling and, paired with $\delta^{18}O_b$, estimate the concomitant increase in ice volume.

Biography: I grew up 20 minutes from the New Jersey shore and when I was in high school I learned how to surf. My passion for surfing introduced me to the fundamentals of climate and oceanography. I earned a B.S. degree in chemistry at Monmouth University on the coast of New Jersey, and my combined background in chemistry and surfing motivated me to pursue graduate studies in oceanography. Currently, I am a fifth year Ph.D. student at the Institute of Marine and Coastal Sciences at Rutgers, The State University of New Jersey, in the paleoceanography group with Yair Rosenthal as my advisor. My main research, thus far, involves using geochemical proxies to quantify changes in temperature and ice volume to better understand the causes and mechanisms of Pleistocene glaciations.

Schlanger Fellowship applicants are encouraged to propose innovative and imaginative research projects. JOI convenes a panel of scientists familiar with scientific ocean drilling to evaluate fellowship applications. Fellow selection is based strongly on research potential and quality.

Next Application Deadline: November 15, 2007
For more information, please visit
www.usssp-iodp.org/Education/Fellowship/default.html
or e-mail schlanger@joiscience.org

Masako Tominaga

Texas A&M University

"Determination of volcanostratigraphy of ODP/IODP Hole 1256D: Core-log integration of oceanic crust formed at a superfast spreading rate"

Relevant Expeditions: IODP Expeditions 309 and 312

Research Abstract: For my fellowship research I will construct an unbiased quantitative volcanostratigraphy of ODP/IODP Hole 1256D on the East Pacific Rise. Incomplete core recovery makes the volcanostratigraphy extremely important for understanding processes of crustal construction, magmatism, and to estimating downhole seawater recharge flux that can indicate evolution of the oceanic crust and its alteration processes in the archetypical fast-spreading oceanic crust at Site 1256. First, I will determine a revised volcanostratigraphy by qualitative integration of recovered cores with downhole logs. Next I will construct an unbiased quantitative lithostratigraphy using these data and a new artificial neural network algorithm. Comparing shipboard, qualitative core-log integration and new, quantitative volcanostratigraphy will enable stratigraphic models to be evaluated. My technique will be applicable to other igneous basement holes where logging data are available making this study highly relevant to and valuable for future IODP drilling.

Biography: Using field techniques and physics to tackle complicated scientific problems has always interested me, especially those problems related to offshore drilling and marine geophysics and geology. After growing up in Kamakura, a historic seaside town in Japan, I attended Waseda University, also in Japan. In 2002, I received my B.E. degree in Petroleum Engineering, focusing on *in situ* rock mechanics around boreholes. In 2005, I completed a M.S. degree in marine geophysics and geomagnetism at Texas A&M University, where I studied under the supervision of Will Sager in the Department of Oceanography. Dr. Sager's understanding of my cultural background, respect for my independent research, and his involvement in ocean drilling have opened many doors for me. For receiving this fellowship, I am truly thankful to Drs. Teagle, Alt, and Sager for their guidance.

New and Upcoming Activities Funded by NSF-ODP

Expedition Objective Research

Ex. 302 ACEX: Cenozoic sea-ice history of the Arctic basin (Moran [URI])

Ex. 304/305 Atlantis core complex: reactive melt migration (Hellebrand [U. Hawaii])

Borehole

CORKs for Nankai Trough drilling (Saffer [PDSU] and Screaton [U. Florida])

Juan de Fuca microbial observatories (Cowen [U. Hawaiil] and Amend [Washington U.))

Lab studies

Kane Core complex petrology (Dick [WHOI])

Kane complex seismic studies (Canales [WHOI])

Seismic studies of Hydrate Ridge (Trehu [OSU])

Recently completed NSF-supported IODP-related activities

2006: Louisville hotspot chain (Lonsdale [SIO] and Mahoney [U. Hawaii], piggyback IODP Proposal 636)

2006: Cenozoic paleo-equator (Lyle [Boise State], IODP Proposal 626)

2006: Nankai CDP site survey in partnership with CDEX (Moore [U. Hawaii], IODP Proposal 603)

2006-07: South Pacific Gyre (D'Hondt [URI], IODP Proposal 662)

Upcoming NSF-funded site surveys supporting IODP proposals

2006-08: Analysis of NW Australia industry 3-D seismic data (Fulthorpe et al. [UTIG])

2007: Costa Rica MARGINS (Holbrook [Wyoming], IODP Proposal 537)

2007: Ninety East Ridge (Sager [TAMU] and Frey [MIT])

2008: Juan de Fuca hydrogeology expedition drilling preparation (Fisher [UCSC])

2008: *Fluid flow studies at Nankai* (Brown [SIO])

2008: *Seismic studies of Hydrate Ridge* (Bangs [UTIG])

Proposal Target Dates:
August 15 and February 15

www.nsf.gov/funding/pgm_summ.jsp?pims_id=13524

Balancing Priorities

News from the National Science Foundation

Jamie Allan, Program Director, NSF/ODP

The conversion of the *JOIDES Resolution* to the riserless Scientific Ocean Drilling Vessel (SODV) for IODP is continuing, as discussed in Steve Bohlen's article on page 1 of this newsletter. The conversion project is budgeted at $115 million. The first $73 million in funding was obtained in FY05 and FY06, with the remaining $42 million in the FY07 budget. Despite the continuing resolution for FY07 passed by Congress, FY07 conversion funds are being made available in a timely manner. NSF has informed IODP-MI that it intends to make the SODV available to the international community on January 1, 2008.

Rodey Batiza became the new Section Head of Marine Geosciences at NSF and replaced Julie Morris as the NSF IODP Principal Official. At press time, several candidates are being considered to replace Rodey as Program Director of NSF's Ocean Drilling Program. In February 2007, Margaret Leinen, NSF Assistant Director for Geosciences, became a Vice President and the Chief Scientific Officer of Climos, Inc., a for-profit start-up company that focuses on activities that mitigate global climate change. Jarvis Moyers is her acting replacement, and a search for her permanent replacement is underway. Also, Michelle Arsenault replaced Laura Snow as the NSF/ODP Science Assistant. Laura is now JOI's Assistant Director for Ocean Observing Activities.

Because of the continuing resolution, FY07 funding for NSF/OCE will be very tight—at or below FY06 levels. Despite a substantial increase in funding compared to the expected FY07 level, budget planning for FY08 and beyond indicates that available U.S. funds for IODP operations, support for U.S. participation in IODP, and IODP grant support will be substantially below what has been previously planned. Although the budget is still being determined, a heavy impact is expected on all these activities and significant changes—some structural—may be necessary. NSF/OCE has begun a process to address the current lack of balance between spending on facilities—such as SODV—versus spending on core science grants. This process will involve solicited input from the science community.

The U.S. Science Support Program (USSSP), which funds the participation of U.S. scientists in all aspects of IODP planning and at sea expeditions, is being re-competed by NSF, with proposal evaluation ongoing.

IODP Expedition Draft Planning Schedule

www.iodp.org/expeditions

ESO Operations	Platform	Tentative Dates
New Jersey Shallow Shelf	MSP	June—July 2007
USIO Operations	**Platform**	**Dates**
NanTroSEIZE *(Operational plan not final)*	U.S. SODV	January—March 2008
Equatorial Pacific *(Co-Chief Scientists: N. Ahagon & H. Palike)*	U.S. SODV	March—May 2008
Equatorial Pacific/JdF *(Co-Chief Scientists: M. Lyle & I. Raffi)*	U.S. SODV	May—July 2008
(JdF: Four operational days are included for remedial cementing at Juan de Fuca)		
Bering Sea *(Co-Chief Scientists: A. C Ravelo & K. Takahashi)*	U.S. SODV	July—September 2008
Canterbury *(Tentatively scheduled pending final FY08/FY09 budget)*	U.S. SODV	TBD
Wilkes Land *(Tentatively scheduled pending final FY08/FY09 budget)*	U.S. SODV	TBD
CDEX Organization	**Platform**	**Dates**
NanTroSEIZE (Stage 1) LWD Transect	*Chikyu*	September—October 2007
NanTroSEIZE (Stage 1) Mega Splay Riser Pilot	*Chikyu*	November—December 2007
NanTroSEIZE (Stage 1) Thrust Faults	*Chikyu*	January—February 2008
Maintenance	*Chikyu*	March—May 2008
NanTroSEIZE (Stage 2) Mega Splay Riser	*Chikyu*	June 2008—TBD

European Science Organization (ESO), U.S. Implementing Organization (USIO), Center for Deep Earth Exploration (CDEX)

Making Headway

A Letter from the Chair

When I became Chair of USAC, I was excited about the evolving U.S. Science Support Program (USSSP). JOI had proposed a number of changes including increasing education and outreach, further engaging people outside the "traditional" drilling community, and, most importantly, providing more research support for U.S. IODP participants. However, USSSP funding has decreased due to difficult financial times at NSF. The good news is that IODP scientist support will continue. The bad news is that some new program components are not funded because NSF IODP funding (including ship operations) was not increased to the requested levels. Our energy and ideas now exceed our funding. What next? Here are my suggestions for augmenting USSSP and promoting IODP.

Organize interdisciplinary conference sessions and workshops, especially on new topics that ocean drilling can address. USSSP and IODP-MI funding of synergistic activities (e.g., workshops, thematic working groups) may be more limited. Yet, it is critical for us to persist in highlighting IODP accomplishments within various communities and to continually infuse IODP with new ideas and perspectives. In other words, we can self-organize to promote and enhance science resulting from IODP.

Many exciting ideas for formal and informal educational activities are being developed, and JOI's limited resources for education could be leveraged. Check out some of the inspired work of Leslie Peart, JOI Education Director, at *JOI Learning* (www.joilearning.org). Many of you are talented geoscience educators who could develop materials and student and teacher support activities focused on scientific ocean drilling topics. Consider contacting and collaborating with JOI to pursue innovative ideas in informal and formal geoscience education at your institution and in your community.

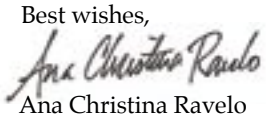
Help communicate the accomplishments of IODP. For example, acknowledge IODP in publications, presentations, interviews with the media, educational materials that you develop, etc. When you share data, ask its users to acknowledge IODP or IODP samples as its source. Susan Boa, JOI's Director of Communications and Development, is eager to help disseminate news about your scientific discoveries and to help translate findings for decision makers. If a press release is written about one of your publications or if your work is about to be published in a high-profile journal, let Susan know. We need to better publicize our endeavors and to excite the public about the unique perspective that drilling provides.

Let your department chair, dean, vice provosts, government relations officers, etc., know how important IODP and NSF are to you. Constant re-education of our university administrators is needed. Although they do not lobby for specific programs within NSF, when they advocate for increases in the NSF budget they should know that IODP is an example of an NSF program that impacts their institution. Also, be aware of congressional efforts to increase NSF funding (www.aip.org/fyi/) and write to your representatives asking them to join those efforts (www.aip.org/gov/commcong.html).

To promote increased funding, let NSF know how vital IODP is to your research. Contact the directors of Ocean Sciences, Geosciences, and NSF itself and members of the National Science Board (www.nsf.gov/nsb/members/). If your institution is a member of JOI/CORE, contact your Board of Governor representative and tell him/her about the value of IODP to you; JOI/CORE has a wide range of interests, so we need to remind our representatives to strongly promote IODP on our behalf.

Finally, check the IODP website for opportunities and volunteer to serve on committees and panels. And please, communicate with me and other USAC members. The glass really is more than "half-full," so let's maximize what we have.

Best wishes,



Ana Christina Ravelo

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JOI News

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IODP Needs YOU!

Call for U.S. Volunteers and Nominations to Scientific Ocean Drilling Panels and Committees
Deadline: June 30, 2007

Both experienced and new members are needed. Young scientists are strongly encouraged to become involved.

USAC is the U.S. Advisory Committee for Scientific Ocean Drilling

USAC will nominate new members in July 2007. Members are appointed by the Joint Oceanographic Institutions (JOI) Board of Governors and will serve three-year terms beginning October 1, 2007. USAC is the U.S. national committee for scientific ocean drilling, representing the interests of the U.S. scientific community to the Integrated Ocean Drilling Program (IODP). USAC provides guidance to JOI in managing the U.S. Science Support Program (JOI/USSSP), which supports U.S. participation in the IODP.

Science Advisory Structure (SAS) for the Integrated Ocean Drilling Program (IODP)

USAC invites expressions of interest and nominations to join more than 50 U.S. scientists and engineers serving in the Science Advisory Structure (SAS) of the IODP. At its July 2007 meeting, USAC will appoint new U.S. SAS members for the following panels:

- Science Steering and Evaluation Panel (SSEP)
- Site Survey Panel (SSP)
- Scientific Technology Panel (STP)

USAC will also make recommendations to the JOI Board of Governors for U.S. members of the SAS Executive Committee (SASEC) and the Science Planning Committee (SPC).

Please see **www.usssp-iodp.org/advisory_committees/panel_nominations** for more detailed information regarding these panels, their roles in the SAS, and terms and commitments of panel members.

U.S.-based scientists willing to represent the U.S. ocean drilling interests should send a two-page CV and a cover letter to: Carl Ebeling, JOI/U.S. Science Support Program, at cebeling@joiscience.org. Letters should briefly document any previous committee experience, include a description of interests in IODP and related activities, and indicate a preferred panel assignment. The nomination deadline is June 30, 2007.

For more information about this opportunity, contact Christina Ravelo, USAC Chair, at acr@ucsc.edu, Jerry McManus, USAC Nominations Subcommittee Chair, at jmcmanus@whoi.edu, or Cathy O'Riordan, USSSP Director, at coriordan@joiscience.org.