

## SHALDRIL: Quick Drilling on the Antarctic Continental Shelf

SHALDRIL (SHALlow DRILLing on the Antarctic Continental Margin) was designed to drill through stiff glacial overburden too hard for piston coring, to sample older deposits of the Antarctic continental shelf appearing close to the seafloor. SHALDRIL operates between the continental slope, where traditional drill ships work, and the fast-ice zone, where projects like ANDRILL operate. The SHALDRIL project uses a mobile drilling platform capable of operating in ice-covered waters, and a drilling system that can retrieve core within a few hours.

SHALDRIL II took place from 1 March to 5 April 2006 in the northwestern Weddell Sea. The primary drilling targets were in the northern portion of the James Ross Basin, known to contain one of the thickest, most complete Neogene successions on Antarctica and its adjacent margins. Seismic investigations had revealed a virtually continuous sequence of seaward-dipping strata on the continental shelf. The sequence spans the late Eocene through Pleistocene, based on correlations to outcropping strata on Seymour Island and confirmed by results from this cruise.

SHALDRIL I (March to April 2005) faced ice reaching nearly 10/10 coverage. The ice in 2005 was typically



Ice around *Nathaniel B. Palmer* during drilling operations. Photo by Captain Mike Watson.

thin, young ice that did not affect the ability to hold station. SHALDRIL II encountered large floes of very thick, multi-years sea ice (Fig. 1), that had to be treated like icebergs as the research vessel-icebreaker *Nathaniel B. Palmer*, would not be able to hold station. In addition the ice drift was frequently changing course and at a speed of almost 1 knot. The longest time achieved on station was eighteen hours, making it impossible to drill through even 10 m of glacial overburden for older strata; Hence the primary target sites could not be drilled as planned. Focus was put on the alternate sites having thinner overburden. These had been selected using the available seismic and stratigraphic framework. Selection proved to be successful, as the third drilling attempt reached the targeted Late Eocene strata.

Severe ice conditions still prevented most drilling attempts even on alternate sites. The SHALDRIL team therefore decided to conduct a seismic survey to select alternate drilling sites near the Joinville Plateau, where ice conditions were better. On the margin of the plateau, strata from deep in the sedimentary section were observed to onlap acoustic basement. This provided a good target for a “drill and run” strategy. This area had not been mapped or imaged previously; however, drilling was successful and two holes recovered the targeted Pliocene material. During drilling operations on the third hole, two breaks occurred in the drill string, resulting in the loss of material. These breaks can probably be attributed to strong bottom currents in the region, leaving the expedition with only one complete bottom hole assembly remaining on board. Since it was still early in the cruise, it forced the expedition to return to the drifting ice rather than dealing with the difficult sub-sea currents. Drilling during the remainder of the expedition remained difficult, but in the end paid off by successively reaching all targeted intervals with short holes, making it possible to splice together a full stratigraphic succession for the Antarctic correlating core with seismic images.

In conclusion, SHALDRIL II proved, that a flexible, quickly operating platform can yield excellent results in the unpredictable environments of the Antarctic. This was also made possible due to the excellent work of the drilling contractor Seacore Ltd.

SHALDRIL I and II tested the ship and the drilling and coring systems under the most adverse conditions and have gathered considerable data for planning future cruises. The ship is capable of holding station in winds up to 45 knots, the drilling system is capable of penetrating up to 20 meters of glacial overburden and sampling strata below within 24 hours time. Core recovery in partially lithified sedimentary material is greater than 80%.

For more information about SHALDRIL and reports of the cruise please visit <http://shaldril.rice.edu>. SHALDRIL will host a Town Hall meeting at AGU in December 2006. Details will be announced on the Web page.

## The School of Rock Expedition: Maximizing the Value of Transits and Program Outreach

Last November, the U.S. implementing organization for the IODP sponsored the School of Rock Expedition—a seagoing, hands-on discovery expedition for educators—during the IODP Expedition 312 transit from Victoria, British Columbia, Canada, to Acapulco, Mexico. This pilot program was designed to take advantage of the unused laboratory facility and berths on the vessel during the transit and to expose educators to the nature of scientific ocean drilling research, which depends on inquiry, technology, and teamwork as well as the data and discoveries resulting from nearly four decades of scientific ocean drilling.

Thirteen educators from the United States spent eleven days on the JOIDES Resolution learning about ocean drilling science and developing education materials, followed by two days of education and assessment work on shore. At sea, two professors with extensive scientific ocean drilling experience (Dr. Mark Leckie and Dr. Kristen St. John) provided daily science lectures

and led laboratory exercises on topics related to scientific ocean drilling using ocean drilling cores and data. Supplemental lectures were provided by USIO scientists during port call (Dr. Jeff Fox) and on the vessel via videoconference from USIO/TAMU (Dr. Adam Klaus). The educators were also introduced to the procedures and equipment used by the ship's staff in the course of a two-month science expedition. After the seagoing technical staff introduced the analytical systems used in the laboratories, the educators worked with previously recovered cores and published data from fifty-six drilling sites from twenty-six scientific ocean drilling cruises to investigate scientific procedures used by shipboard scientists. The educators discovered for themselves that published scientific data are accessible and applicable to the Earth system science curricula they teach in the classroom and present in museum displays.

After inquiry-based experiences using real data were completed, the educators used their expertise to transform the content into materials appropriate for the ages and audiences they teach (grades 5–12). The outcome was the development of fifteen classroom activities based on scientific ocean drilling cores, scientific procedures, and data. In addition, twenty biographies were created to highlight the diverse career profiles of the shipboard staff, as well as three instructional lab demonstration videos. These materials were field tested in classrooms during the school year, and the participants will be attending a post-expedition meeting in August 2006 to complete the peer-review process before the activities are published. To view these activities, and the undergraduate-level educational materials developed by the scientists for the School of Rock



Expedition participants, go to the “Classroom Activities” section of the JOI Learning Web page (<http://www.joilearning.org>).

### **J-DESC holds domestic IODP symposium**

On 19 May 2006, Japan Drilling Earth Science Consortium (J-DESC), Ocean Research Institute (ORI, University of Tokyo), and Japan Agency for Marine-Earth Science and Technology (JAMSTEC) held the first domestic symposium on the status of the past IODP expeditions at ORI auditorium.

The symposium was aimed mainly at discussing the Japanese contribution to the past IODP expeditions and at sharing information on scientific highlights, expedition related topics (e.g., planning, staffing, life on board, etc.), and the upcoming expeditions. There were sixty-six attendees in the symposium.

IODP-MI vice-president Hans Christian Larsen illuminated the current status and future of the IODP. During the main session, Japanese co-chief scientists and participants of Expeditions 301 (Juan de Fuca Hydrogeology), 302 (Arctic Coring Expedition), and 303 (North Atlantic Climate 1) presented expedition summaries and progress reports of various projects. Finally, the upcoming NanTroSEIZE expeditions were introduced. Professor Noriyuki Suzuki, Chair of J-DESC's IODP section, concluded the symposium. J-DESC now plans to hold this domestic symposium twice a year, the next being held in November 2006.

### **10<sup>th</sup> Annual Continental Scientific Drilling Workshop**

A workshop on continental scientific drilling was held 4–6 June 2006 at the University of California, Davis. A diverse group of forty participants heard talks from nineteen scientists on topics involving past and future continental scientific drilling projects, issues, and plans. A field trip, “Crossing a Plate Margin: Great Valley to Napa Valley,” was also included in the workshop. Drilling, Observation and Sampling of the Earth's Continental

Crust, Inc. (DOSECC) hosted the workshop.

Further details of the workshop and select slide show presentations are available at [http://www.dosecc.org/html/workshop\\_2006.HTM](http://www.dosecc.org/html/workshop_2006.HTM). The 11<sup>th</sup> Annual Continental Scientific Drilling Workshop is tentatively scheduled for 3–5 June 2007.

### **ICDP enters second decade**

The International Continental Scientific Drilling Program is launching its new phase after passing a very successful international peer review and a thorough discussion of future scientific goals in a major conference (see: Conference on Continental Scientific Drilling, *Scientific Drilling* No. 2, 2006, 43–45).

The program began in 1996 by a Memorandum of Understanding among Germany, the USA, and China. Drilling operations were funded from 1998 onward with increasing financial and operational support for several projects. The recent review served to assess the structure and past performance of the ICDP and to evaluate the new science plan. The positive review and the new science goals will form the backbone of the ICDP in the next decade.

Details on the reviews are available on the ICDP webpage at: <http://www.icdp-online.org/review/>.

### **New ICDP Web Site Online**

The ICDP is proud to announce the relaunch of its Web site. Most of the previous content has already been transferred. In a few cases, some links may still guide to ‘old’ pages. This will be reduced step-by-step. The existing URLs for the homepage [www.icdp-online.org](http://www.icdp-online.org) and the individual project links remain valid.

New features include improved navigation, advanced user features, and many new options available through the new content management system, allowing distributed editorship. We apologize for problems during the transition phase. Please visit the new ICDP web site at <http://www.icdp-online.org>.