## SHALDRIL II Sailing With New Sampling Tools

SHALDRIL II, the second leg of a drilling program from the RV/IB *Nathaniel B. Palmer* in the Weddell Sea, Antarctica, will take place from 28 February to 5 April, 2006, and will have several new sampling tools available. The first SHALDRIL cruise in 2005 (see *Scientific Drilling* Number 1, 2005), was a shakedown cruise to test the new drilling rig designed and operated by Seacore Ltd. The soft sediment sampling was very successful. Penetrating the stiff tills that overlie much of the continental shelf in the region proved to be difficult. Thus, new sampling options are developed for this second cruise and new tools were purchased from Drilling, Observation and Sampling of the Earth's Continental Crust Inc. (DOSECC). Five of the six proposed drill sites for the upcoming season are expected to have stiff diamicton overlying the lithified Tertiary section that is of interest to this leg. The sixth target is a 100-m thick section of very pebbly, highly compacted diamicton.

In general, two methods have been devised for coring during this leg. These include coring tools being advanced with a common bottom hole assembly (BHA). This BHA also allows a piggybacked diamond coring system (PBCH) to be used when a more competent formation is encountered. The PBCH is provided by Seacore Ltd. If advancement cannot be made with this BHA, then a more robust BHA with a roller cone bit and center bit is deployed. The center bit must be removed before diamond coring can begin. Details of these coring tools are given below.

The first option surrounds a suite of DOSECC tools that were designed to work within a common BHA. These tools were designed to operate with a drill bit with an internal diameter (ID) of 3.345 inches. However, for SHALDRIL, the bit throat was modified to accommodate a larger 3.85 inch ID. The larger throat will allow the PBCH to be deployed through the common BHA bit should high speed diamond coring be required. Since time on site is limited when drilling in drifting ice, it is important to have multiple tools fitting the same BHA in order to reduce tripping times to change the BHA.

Two coring assemblies and one non-coring tool were developed for this suite of tools to be operated in a common BHA. These include an extended-nose spring-loaded corer and another DOSECC assembly known as the alien corer. The extended nose corer is typically used for sediments after push or piston sampling is exhausted. The alien corer is similar to the extended nose corer but is designed to sample harder material. Due to the larger throat size in the primary BHA bit, it has the same core size as the extended nose corer. Both the extended nose option and the alien have secondary bits that rotate in tandem with the outer BHA bit.

The drill rig on the Nathanial B. Palmer during Shaldrill I in 2005 (by A. Frazer).

As noted above, the first option allows up to three sampling systems to be deployed through the same string. Should rock be encountered at a very shallow depth where the common BHA bit cannot be advanced easily then an altogether different approach can be deployed. This hardware, which was originally developed at ODP and slightly modified for SHALDRIL, uses a robust roller cone bit and a one cone center bit latched into its throat. The center bit is removable via wireline once the BHA has been drilled to depth to allow a clear passage for the PBCH to be initiated. See http://shaldril.rice.edu for updates during the cruise.

## Andrill Starts Drilling McMurdo Ice Shelf in 2006

After several years of planning, the follow-up projects to the Cape Roberts Project are underway and scheduled. They will start in October to November 2006 with the McMurdo Ice Shelf Project (MIS). The drilling of the Southern McMurdo Sound (SMS) will follow in October to November 2007. Both projects have been scheduled by Andrill in 2004, and staffing for participation has been completed in 2005.

The key aim of the MIS Project is to determine past ice shelf responses to climate forcing, including variability at a range of timescales. To achieve this aim, one drillhole will sample a 1200-meter-thick body of Plio-Pleistocene glacimarine, terrigenous, volcanic and biogenic sediment that has accumulated in the Windless Bight region of a flexural moat basin surrounding Ross Island in approximately 900 m water depth.

The key aim of the SMS Project is to establish a robust history of Neogene Antarctic ice sheet variation and climate evolution that can be integrated into continental and global records toward a better understanding of Antarctica's role in the past, present and future global system. To achieve this aim, two drillholes (~500 m and ~700 m) will sample a sequence of strata identified on seismic lines and inferred to represent a middle Miocene to upper

Miocene sequence of seismic units that expand basinward. The two drillholes will recover a composite thickness of >1000 m of strata that lie stratigraphically above the lower Miocene section recovered at the top of the nearby Cenozoic Investigations in the Western Ross Sea (CIROS)-1 drillcore, and above the 1400-m composite section recovered by the Cape Roberts Project (CRP) (~34 to 17 Ma).

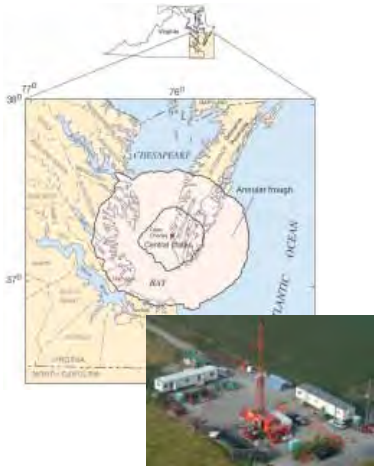
The drilling rig was successfully tested in Canterbury New Zealand in October 2005. The new rig is now headed to Antarctica, shipping out of Lyttleton Harbour in New Zealand. It will be offloaded in McMurdo Station and prepared for drilling in October 2006.

See http://www.andrill.org for the latest information about this project.

## Chesapeake Bay Impact Structure Successfully Drilled

The Chesapeake Bay Impact Structure Deep Drilling Project started drilling in the late Eocene Chesapeake Bay crater in September 2005. The goal was to drill a deep hole through the post-impact sediments that cover the crater, through the complete section of impactites, and into the crater floor. The drill site was located at Eyreville near Cape Charles in Northampton County, Virginia, U.S.A., approximately midway between the collapsed central uplift and the crater margin.

Coring began at a depth of 125 m within upper Miocene sediments on 15 September and proceeded at a rapid pace through most of September. The




Location of the Chesapeake Drillsite.

The Chesapeake Drillsite at night.

base of the post-impact sediments was penetrated on 22 September, after coring the upper Miocene through upper Eocene shelf sediments continuously with an excellent (>96%) recovery. Subsequently the coring of the underlying Exmore breccia began. The upper part of the Exmore consists of clasts that represent all pre-impact sedimentary units "floating" in an unsorted muddy sand matrix. The lower part consists of very large blocks of Cretaceous sands and clays. The project faced several drilling obstacles, when rods got stuck and mud circulation was lost in the clay-dominated Exmore sections. This required extensive re-drilling and greatly slowed progress during the first half of October. The drilling was delayed again, when the drill bit encountered an unexpected, 275-m thick block of granite below the Exmore on 26 October. The granite proved to be underlain by a section of suevite, lithic breccia, and blocks of various crystalline rocks. Drilling was continuing in the impactite section at a depth of 1.6 km on 23 November 2005. Coring continued until 4 December reaching a total depth of 1766.3 m.

The project also included a geophysical logging program, collecting natural gamma ray and temperature logs. Core sampling will take place in the second half of March 2006 at the United States Geological Survey National Center in Reston, Virginia., U.S.A. In addition a microbiology group collected samples for DNA analysis, enumeration and culturing for numerous research groups at different institutions. For the International Continental Scientific Drilling Program (ICDP) the Chesapeake Bay drilling is a microbiology pilot project to learn about the needs for subsurface microbiology studies on drill sites. In particular a rigorous sampling protocol is developed, that can reduce potential contamination during sample collection in the dusty on-site conditions.

The project is financially and operationally supported by the ICDP and the U.S. Geological Survey. Drilling, Observation and Sampling of the Earth's Continental Crust Inc. (DOSECC) is serving as the general contractor, and Major Drilling America, Inc. is the contract driller. For more information about the Chesapeake Bay Impact Structure Deep Drilling Project visit http://chesapeake.icdp-online.org.

## NELSAM Continues Work in Tautona Mine (RSA)

One major obstacle in earthquake investigations is the lack of direct and near-field observations that are essential for the validation of models and concepts. The Natural Earthquake Laboratory in South African Mines (NELSAM) project significantly reduces this limitation by investigating seismogenic processes at focal depths of earthquakes. This can be achieved drilling in deep gold mines of South Africa, which extend down to 3.6 km below the surface. During October to December 2005 the NELSAM project continued to drill in the Tautona mine in South Africa. After successfully completing the first borehole DAFAULT1, which was drilled at angle of 19° downward across the Pretorius fault to the planned depth of 60 m, it was continuously cored and cased with steel casing. The drilling of DAFAULT2 has been done in December 2005 as well. DAFAULT2 is collinear with DAFAULT1. Together they will host a 120-m displacement meter. Drilling continues with further monitoring holes. In addition 3-component accelerometer systems

NELSAM scientists in the gold mine. From left: Onno Oncken (Germany), Vincent Heesakkers (U.S.A.), Masao Nakatani (Japan), Georg Dresen (Germany), Aleksander Milev (S. Africa), George Kgori (S. Africa), Shaun Murphy (S. Africa), Jonas Machake (S. Africa), Ze'ev Reches (U.S.A.), Joerg Erzinger (Germany)

were installed in two sites. Three additional sites were drilled to 10 m, and accelerometers will be installed in early 2006.

More information about the NELSAM project is available from http://earthquakes.ou.edu/ and http://witwaters.icdp-online.org.

## ESSAC Office Moves to Cardiff, U.K.

After two years in Amsterdam, the European consortium for ocean research drilling (ECORD) science support and advisory committee (ESSAC) office has moved to Cardiff, U.K on 1 October 2005. The office is headed by Chris MacLeod, the new ESSAC Chair, and Julian Pearce, who is the acting Chair for an initial period. Federica Lenci from Italy is the new Science Coordinator, maintaining the international flavor of the office. Gilbert Camoin, from CEREGE in Aix en Provence, has been nominated and appointed as the new Vice-Chair. One of the challenges of the new office is to extend outreach to more ECORD scientists as well as to scientists from the new EU member states. Another challenge will be to manage and coordinate the new ESF Programs in an efficient manner to maximize the participation and scientific impact of European scientists in the Program. As a first step the ESSAC Web site has been redesigned and improved to help meet these challenges. Take a look at http://www.essac.ecord.org.

## New IODP Sample, Data and Obligation Policy in Place

The new Sample, Data and Obligations Policy for the Integrated Ocean Drilling Program's (IODP) came into effect November 1st 2005. This policy defines user groups of IODP samples and data, moratorium periods for samples and data following the IODP expedition by which they were acquired, rules for publication of results during moratorium periods for researchers involved in the actual IODP expedition and more. The policy also defines the obligations that individuals obtaining samples and data incur. For researchers this is an obligation to publish the results of their research in a peer-reviewed journal publishing in English. In addition, the policy define the roles of certain bodies, list members with contact details. These are the curatorial advisory board, which acts as an appeals board in case of conflicts between the sample requester and the core curator, the editorial review board, which organizes and reviews expedition publications and monitors fulfillment of obligations for an expedition, and the sample allocation committee, which provides the sampling strategy for each drilling project.

The IODP Sample, Data and Obligations Policy might seem to be an administrative monster to many scientists, but traffic rules are complex when written down. The IODP obligations policy serves a number of purposes including the following: (1) provide broad community access to samples and data while providing reasonable protection of expedition participants first right of investigating material; (2) define publication rules during moratorium to ensure fair treatment of all expedition participants; (3) maximize research done, but also ensure sufficient legacy core for the archives; and (4) provide core for display in museums and for teaching. The policy can be accessed online from the IODP Web site at http://www.iodp.org/program-policies/. An old policy for ODP samples obtained before 1 November 2005 can be found in the same place. The new policy applies to all IODP samples regardless of sampling data and to all DSDP and ODP samples sampled after 1 November 2005.