

February 7, 2005

**IODP EXPEDITION 305:  
OCEAN CORE COMPLEX FORMATION, ATLANTIS MASSIF  
WEEK 4 REPORT**

**OPERATIONS**

In preparation for logging, the bottom of the pipe was set at 170 mbsf. This allowed overlap with previous logging runs performed during Expedition 304 and positioned the pipe below an interval where minor obstructions were encountered in the borehole during reentry. The first logging run with the Triple-Combo tool covered the full length of open hole. Logging with the FMS sonic tool also covered the interval from the bottom of the hole to 170 mbsf. Following the completion of the FMS-sonic log, we completed a test of the wireline heave compensator to evaluate the performance of the new drum-compensator and compare it with the performance of the older LDEO wireline compensator. The third logging run was a Vertical Seismic Profile (VSP) utilizing the 3-component Well Seismic Tool (WST) and the GI air gun. A single joint of pipe was removed from the string placing the bit at 161 mbsf before deploying the tool. The fourth logging run utilized the Ultrasonic Borehole Imager (UBI). The UBI was deployed with a sinker bar to enhance deployment speed. Owing to an inconsistent borehole geometry in some intervals of the hole, only intervals from 824 to 724 mbsf and 704 to 503 mbsf were imaged with the UBI. A final logging pass was made with the Borehole Magnetometer (GBM). The internal gyrocompass of the tool was oriented with the vessel heading prior to lowering into the pipe. The GBM recorded data in both directions as it traversed from 170 mbsf to 837 mbsf. The drill string was raised 10 m as the GBM approached the pipe. The internal gyrocompass was oriented a second time when the tool was recovered. Logging operations were completed at 1040 hr on 2 February.

After logging, we tripped the pipe to continue coring in Hole U1309D. Rotary coring resumed at 2130 hr, 2 February and advanced from 837.4 mbsf to 919.0 mbsf by 1545 hr on 5 February. After 50.8 rotating hr, we tripped the pipe to replace the bit. A total of 81.6 m was cored and 69.75 m recovered (85.5% average recovery) during this coring operation. The average ROP while coring with this bit was 1.6 m/hr. In accordance with routine, a 20-barrel mud sweep was circulated every 10 m of advance. By 0615 hr, 6 February, rotary coring was resumed in Hole U1309D. Shortly after initiation of the second coring interval (at ~929 mbsf), pump pressure decreased so the core barrel was extracted and a bit deplugger deployed to ensure the throat of the bit was clear. Coring continued through Core U1309D-193R (to 938 mbsf).

**INITIAL SCIENTIFIC RESULTS**

From 30 January to 2 February, we conducted a series of downhole logging runs. Five logging runs were completed, with data recovered from Triple Combo, FMS/Sonic, VSP, UBI, and GBM. Wireline heave compensation tests were also completed. Caliper data indicate that the hole remains in good shape. The lower few hundred meters of Hole U1309D has fewer small breakout zones than the top several hundred meters. Resistivity, seismic velocity, and borehole scan data (FMS, UBI) all show some clear correlations to rock type recovered and/or structural features in the core.

We continued coring Hole U1309D on February 2. From Core 305-U1309D-172R to Core 305-U1309-193R (837.4 to 938.2 mbsf, average recovery 91.6 %), we continued to recover dominantly medium- and coarse-grained gabbro, with less abundant intervals of microgabbro, oxide gabbro, gabbro-norite, and olivine gabbro. Olivine rich rocks are more common in the lower part of this interval. Modal changes are commonly subtle. Most grain size transitions are sharp and dipping, but attitude of dip is variable from steep to subhorizontal. A basaltic dike with a sharp, undulose contact intruded medium-grained gabbro in Core 305-U1309D-179R (~ 875 mbsf).

Alteration continues to be weak, and to decrease progressively down core. It is primarily manifested in thin cataclastic intervals, as halos around veins, and as alteration of olivine. Overall veining intensity is decreasing. Several anhydrite-bearing veins have been found in Core 305-U1309D-150R (~ 738 mbsf) and below. The abundance of zeolite has been increasing below that depth. Evidence of deformation suggests generally very low strain with more pronounced magmatic and sub-solidus plastic deformation being limited to finer grained intervals.

Shipboard measurements continue apace with the steady core recovery. Average bulk densities, porosities and P-wave velocities of the samples all reflect the dominantly gabbroic rock types: 2.9 g/cm<sup>3</sup>, <1%, and 5.9 km/s, respectively. Paleomagnetic inclination determinations on core samples continue to show dominantly reversed magnetization but a few ~20 m intervals appear to have normal polarity magnetization, even after demagnetization to remove overprints. Fe-Ti oxide gabbros and troctolites have relatively high magnetic susceptibility and low median destructive field (MDF). In contrast, medium and coarse grained gabbros have relatively low magnetic susceptibility and high MDF.

#### **LABORATORY STATUS**

The shipboard labs are busy processing the excellent recovery of hard rock cores at Site U1309. The week began with logging of the site. A VSP/Check shot logging run with the Three-Component Well Seismic Tool was successfully conducted on Tuesday, February 1. In accordance with IODP Policy, prior to the VSP, a one-hour visual survey of the water within a 700 m radius of the vessel was undertaken to ensure that no marine mammals were present prior to the start of the VSP experiment. Also consonant with the policy, the GI gun was soft-started (gradually increased intensity for the first 30-minutes of operation) at the initiation of testing. The marine mammal watch was maintained until the VSP was secured and no marine mammals were sighted during the experiment.

#### **HSE**

A fire and lifeboat drill was held on Monday, 31 January, for all the ships crew. Both shifts of the IODP technical staff were given a class concerning the lifeboats. The primary purpose was to get the staff capable of launching and starting up a lifeboat should the need arise in an emergency.