

December 20, 2004

**IODP EXPEDITION 304:  
OCEAN CORE COMPLEX FORMATION, ATLANTIS MASSIF  
WEEK 5 REPORT**

**OPERATIONS**

After our first HRRS installation attempt at Site U1310 (prospectus site AMHW-01A) ended without success, the HRRS was redeployed, this time with a wing-style reamer bit and two joints of casing. After 6 hours, penetration stopped and we were unable to maintain rotation. We pulled the hammer assembly from the seafloor, moved 10 m north, and attempted a third penetration. After 5 hours, penetration stopped again with about 6 m of hole, so we pulled and inspected the hammer system. The bit was missing gauge buttons from the outside of the wings. The casing was shortened to a single joint and a new wing-style reamer bit was installed. We elected to reenter the short hole started with our previous installation attempt to reduce the required depth of penetration. After a total of ~ 13 m of penetration, the penetration rate was so slow we decided to release the casing and continue with the reentry funnel deployment. However, we could not extract the pilot bit from the hole even after multiple attempts. After a several hour struggle, we were finally able to extract the assembly, casing in tow, from the seabed. When brought to the rig floor, we determined the running tool had released the casing, but the wing-style reamer bit was lodged in the lower end of the casing preventing extraction of the bit. One reamer arm was missing and the lower part of the casing was bent. Since no installation was successful, but basalt pieces were recovered from behind the arms of the hammer and within the casing, we elected to call all the attempts collectively Hole U1310A, and curated the material recovered as Core U1310A-1M (miscellaneous).

For fear that the missing reamer arm lay at the bottom of Hole U1310A the vessel was offset 10 meters to the east and an RCB coring assembly was deployed to initiate a bare rock hole at Hole U1310B. Hole 1310B was spudded at 2250 hours 15 December 2004. The first coring interval (Core U1310B-1R, 0-18.5 mbsf, 7% recovery) required 30 hours to complete. High torque and rubble falling into the hole were relentless during the coring operation. After recovering Core U1310B-1R, 3 m of fill had to be cleared from the hole before continuing coring. Cutting Core U1310B-2R required an additional 16.5 hr. When the wireline failed to retrieve the core barrel (after two attempts), the operations team surmised we had lost the lower part of the BHA. Recovery of the pipe proved this to be the case and ended operations at Site U1310.

A < 1 nm transit brought us to our alternate hanging wall drilling location (Site U1311, alternate site AMHW-02A). After a brief subsea camera survey, Hole U1311A was spudded with a RCB assembly at 2040 hr, 18 December. Core 304-U1311A-1R (0-12 mbsf) required >26 hr to cut.

**SITE U1310 INITIAL SCIENTIFIC RESULTS**

Drilling conditions at Site U1310 proved very difficult (but typical for young basalt with essentially no sediment cover), and we exhausted options for the hammer-in/casing that we'd hoped to set. We retain reentry options with the RCB and free-fall funnel systems, so continue to aim for achieving some of the hanging wall objectives. We spent most of the week on a series of attempts at Site U1310- small

fragments caught in the bit and lower BHA were recovered when we had to abandon Hole U1310A (30° 11.485'N, 42° 03.926'W), a single core obtained from 4-18.5 mbsf at Hole U1310B (30° 11.484'N, 42° 03.920'W) contained 1.3 m of basalt, including fresh glass.

On December 18 we moved to alternate Site U1311 (30° 10.609' N, 42° 04.190'W) in hopes of addressing the objective of recovering rock from an unexposed portion of the detachment fault. Hole 1311A is located on a small knoll near the break in slope where the corrugated dome meets the adjacent volcanic block. Analysis of morphology, seismic reflection data, and seafloor video (a brief camera survey before spudding in) suggest that this could be volcanic klippe. A reflector below is within reach of a single-bit hole, if conditions hold. Core U1311A-1R (0 to 12 mbsf, 13% recovery) contained fresh, plagioclase-olivine phyric basalt with glass preserved.

Analysis of core data and logging results from Site U1309 continue with lively, and still evolving, discussions on whether the thin serpentinized peridotite intervals in Holes U1309B and D can be correlated, whether one or several of the diabase units correlate between the holes, what the differences in gabbro composition, texture, and alteration mean when considered in light of their 20 m separation.

#### **LABORATORY STATUS**

It has been a slow week in the labs, reflecting low core recovery. 35 m were cored and 2.8 m recovered. X-ray and ICP samples are still being processed.

Some investigative work continues on the DIS intermittent image irregularities, modifying the code supporting the natural gamma sensor, and replacing communication boards in the Kappabridge. The port magnetometer sensor is ready to test. The Fast Track magnetic susceptibility equipment used by stratigraphic correlators on Expedition 303 was set up in the down hole lab. Our software developer will review the programs supporting the equipment with intent to improve it. This technical crew will use the Fast Track device on Expedition 306.

#### **HSE**

We have focused this week on reviewing and updating the Hazardous Inventory Report associated with our SIMAN inventory system. This week's ship drill was rescheduled for Monday.