

August 1, 2005

**IODP EXPEDITION 309:
SUPERFAST SPREADING RATE CRUST 2
WEEK 3 REPORT**

OPERATIONS

REENTRY #3 (RCB BIT #2): The drill string was redeployed and reentered Hole 1256D at 1911 hr on 22 July. The bit was lowered to bottom and coring was resumed at 2330 that day. Core 86R was recovered with 3.65 m recovery. All core catcher dogs were missing and it appeared that some of the core had fallen into the drill string. The next core barrel was dropped and high pump pressures were noted. The barrel was pulled and a deplugger was deployed twice to clear any obstructions. A core barrel was dropped again and pressures had returned to a normal range. Coring was resumed at 1045 hr on 23 July.

Coring continued without incident to a depth of 4543.2 mbrf (897.8 mbsf). The bit was pulled after core 96R with 52.1 rotating hours and cleared the cone at 0245 hr on 26 July. The bit cored a total of 76.8 m with 17.9 m recovery (27.3 %) and an ROP of 1.47 m/hr. The bit was in good condition with some broken inserts, the seals were effective, and the bit was ~3/16" under gauge.

REENTRY #4 (RCB BIT #3): After the drill string was recovered, a new bit was deployed (S/N BF-854) and the drill string reentered Hole 1256D at 1610 hr on 26 July. The drill string began taking weight at 4525 mbrf. The top drive was picked up and the hole washed and reamed to bottom. Approximately 3 m of fill was found at the bottom of the hole. The hole was cored without incident from 4543.2 mbrf to 4604.2 mbrf (897.8 mbsf to 958.8 mbsf). Penetration rates and recovery dropped through this cored interval.

The bit was pulled after 52.8 rotating hours. The bit cored a total of 61.0 m with a recovery of 14.85 m (24.3%) and an average ROP of 1.15 m/hr. The bit cleared the cone at 1840 hr on 29 July. The bit was in good condition with only one broken insert, the bearings were effective, and the bit was ~1/4" under gauge.

REENTRY #5 (RCB BIT #4): The drill string was recovered and a new bit deployed (S/N BF-856). The bit was lowered to a depth of 3640 mbrf and the WSTP was deployed to obtain a sea floor water sample and temperature measurement. The WSTP was recovered and Hole 1256D was reentered at 1013 hr on 30 July. The bit was lowered to a depth of 4514 mbrf. The top drive was picked up and the hole reamed to bottom. Approximately 4 m of fill was encountered at the bottom of the hole. Coring resumed at 1445 hr on 30 July at 4604.2 mbrf (964.8 mbsf).

SCIENCE UPDATE

From July 24 to July 30, 105.4 m of basaltic basement was cored (Cores 89R-107R), yielding a total of 20.5 m of recovery (20%) that are grouped into three igneous units (33-35). Units 33 and 35 are sheet flows and Unit 34 is a massive basalt flow. Thin section descriptions confirm that the majority of the basaltic flows are aphyric (phenocrysts abundance <1 vol. %). Variolitic flow margin and subophitic to intergranular flow interior textures as well as rare glomeroporphyritic textures have been observed.

Slight, dark-grey, background alteration is pervasive throughout the basalts recovered in Cores 89R-107R. Numerous veins are present, filled with combinations of Mg-saponite, celadonite, iron oxyhydroxides, amorphous silica, quartz and minor pyrite. Veins are

between 0.1-0.4 mm thick and are commonly flanked by cm-scale mixed or single black halos with rare pyrite fronts. Brown halos are sparse. Downhole from Core 85R there is a reduction in the number of veins filled with iron oxyhydroxides and related mixed alteration halos with Mg-saponite and pyrite being the dominant secondary minerals. XRD analyses confirm the presence of anhydrite in Core 81R and laumontite in Core 91R.

From Core 86R-1 to Core 87R-3, fracturing is heterogeneously distributed and partitioned mostly in shear veins and centimeter-scale cataclastic zones. From Core 88R-1 to Core 98R-1 slight to moderate fracturing is confined to cooling-related structures. From Core 99R-1 downhole, steeply-dipping to vertical veins are dominant. High fracture density and associated vein networks occur locally in Core 100R-1 to 102R-2.

Paleomagnetic measurements on samples from 821 to 951.5 mbsf continue to show the same overprinting characteristics observed from 752 to 821 mbsf. Stable paleomagnetic directions were isolated after demagnetization under 20-40 mT fields. Characteristic directions have positive inclinations, except for the segment between 910.4 and 951.5 mbsf which yielded negative inclinations. Remanent magnetic intensity, after demagnetization of 20 and 30 mT, shows the intensity peaks are well correlated with the upper and lower margins of defined lava units while lows occur within units.

Physical properties measurements continue to be consistent with results from the lower units of Hole 1256D during Leg 206. The most distinctive change in physical properties is an increase in thermal conductivity in the massive flows. Measurements made on 12 discrete samples indicate an average bulk density of 2.94 g/cc and an average seismic velocity of 5.3 km/s.

Twenty four percent of the core pieces recovered range in length from 80 mm to 200 mm, with an average length of 122 mm and are being scanned with the DMT. Corrections made to the camera's position have greatly enhanced the color quality of the images.

LAB REPORT

The moderate recovery has been time consuming for the technical staff as much of the recovery is fractured, resulting in innumerable labels. This week featured the first sample party, with 56 sections laid out for review and sample selection. Rare pieces with chilled margins prompted requests for thinner diamond saw blades to conserve as much material as possible. The wooden core clamp made on the vessel has worked well aiding cutting of z-axis samples from select whole round pieces. All equipment and instrumentation is available for use.

The WSTP was deployed and collected a bottom water sample and temperature measurement prior to the last bit change re-entry.

Periods of heavy rain have occurred the past couple days causing the main deck hatch to leak directly into the bilge while on site. The driving rain has overcome design features in the lab stack air intakes built to keep out water. Rain water has penetrated into hold stores, the mezzanine gas bottle and chemical storage area, the main deck/lab stack seam (collecting in the stairwell), and into the paleo prep area and microscope lab, perhaps from an overflowing floor drain. No damage was done but it certainly was a nuisance.

The air humidity also taxes the lab stack AC system with water being entrained into the ducting at the machine room on the upper tween landing. It is controlled there with buckets and rags.

HSE: An abandon ship drill was conducted with three of the lifeboats being lowered to the embarkation deck. Ship's officers or designates described the operation. Continuing rain abbreviated the drill. Those on the night shift were to gather to lower the remaining boat at 18:30 but that event was postponed because of the rain.

ALO Peng with METS guided a group of the ship's fire fighting team through the lab stack and IODP areas, pointing out hazards and chemical and gas storage areas for new participants and as a refresher for the others.