

IODP Expedition 335: Superfast Spreading Rate Crust 4

Week 3 Report (25 April – 1 May 2011)

Operations

On 24-25 April, the drilling assembly was run in the hole to test the result of the cementing operation. The bit tagged the bridge at 922.0 mbsf, indicating that the 5 barrels of cement deployed earlier were not sufficient to fill the void above the obstruction. The driller's effort to wash and ream past the ledge met with high erratic torque and was given up after an hour. The drill string was tripped to the surface with the bit clearing the rotary table at 0615 h on 25 April.

The cementing assembly was deployed for the second time with the bit entering the reentry cone for the fifth time at 1445 h on 25 April. The bit was placed at 922 mbsf and this time 50 barrels of 15 ppg cement was pumped into the hole. The bit was recovered at 0345 h on 26 April. The drilling assembly with the Atlas bit was redeployed and entered the cone with the sixth reentry at 1520 h on 26 April. The top of the cement plug was found at 882 mbsf. The 40 m cement plug was drilled out at an average rate of penetration of 10.7 m/h.

At 2230 h on 26 April, washing and reaming the hole at ~920 mbsf resumed and continued until 0600 h on 28 April with no apparent progress. The driller worked stuck pipe for one hour during this interval. The drill string was recovered to change the bit, which had accumulated 33.3 hours. The used bit was found to be in gauge and exhibited little wear on the cones and bit body. The two junk baskets were emptied and contained basaltic cuttings ranging from fine angular sand to small pebbles. Rare small (up to cm-scale) chunks of cement were also recovered. The quantity of material was noticeably less than that from the previous junk basket deployment.

A new hard formation Smith Q7JS (IADC code 735) bit was made up and deployed with the drilling assembly. The nozzles were reduced to 14/32" from the usual 16/32" to increase the downhole hydraulic horsepower. The junk baskets were not added to the BHA to reduce the risk of downhole hardware failure. The bit entered the reentry cone for the seventh time of the expedition at 0135 h on 29 April. Washing and reaming resumed and this time persistence was finally rewarded when the bit passed through the obstruction at 922 mbsf shortly before midnight on 29 April. The pipe got stuck for 2 hours at 1162 mbsf. The total depth achieved during Expedition 312 (1507.1 mbsf) was reached at 0915 h on 1 May 2011. Six meters of hard fill was encountered at the bottom of the hole, which was ground and removed before the bore was flushed with a 100-barrel high viscosity mud sweep. The wiper trip to 890 mbsf was without incident. A pill of 60 barrels of heavy mud was spotted across the zone extending from 920 to 960 mbsf to keep the formation from bridging over the open hole prior to retrieving the pipe trip to the surface.

We will reenter the hole with the cementing assembly and attempt to stabilize the problem region by placing a 60-barrel cement plug across the zone prior to recovering the

drill pipe. The next objective will be to change to an RCB coring assembly, reenter the hole, drill through the cement, and resume coring in Hole 1256D.

Science Results

The science party laboratory teams continued to configure their measurement systems. Major effort has gone into the development of core and thin section description templates, largely based on the migration of Expedition 312 data and the rigorous re-description of Expedition 312 gabbro cores from Hole 1256D (Cores 312-1256D-213R-1 to 234R-1; 1406.1 to 1507.1 mbsf). USIO staff used the specifications to configure the data capture application DESClogik, to be used for the entry of data from new cores to be recovered from Hole 1256D. Imaging and other core logging measurements were carried out as well on the Expedition 312 cores. Further training into report writing protocols has taken place with science discipline teams submitting draft methods sections and beginning to write reports on their observations and measurements of Expedition 312 cores. This will ensure seamless, self-consistent observations down from the Hole 1256D dike-gabbro boundary. The science seminar series continued throughout week 3 with daily presentations by shipboard participants on a range of topics directly or indirectly related to the Expedition objectives. This has been an excellent opportunity for early career scientists to showcase their research. The talks of a consistently high caliber have sparked vigorous discussions that have often required curtailment to allow feeding.

Education and Outreach

Regular updates about the expedition continue to be posted to the JR.org blog, Facebook, and Twitter. Numerous members of the science party helped spread the word to schools and universities around the world regarding the opportunity to sign up for a live video broadcast with the ship, and the first video broadcast was scheduled with a high school in Virginia for Thursday, May 5. In addition, the NSF has again asked Deep Earth Academy to do a broadcast to NSF for this year's winners of the Presidential Awards for Excellence in Mathematics & Science Teaching (PAEMST), which is the U.S.'s highest honor for K-12 teachers of mathematics and science. NSF administers PAEMST on behalf of the White House Office of Science and Technology Policy. The PAEMST broadcast from the ship will be on May 18.

Technical support and HSE activities

Technical staff continued to support the science party's reexamination of Expedition 312 cores while drilling operations prepared Hole 1256D for coring.

- Support for the DESCLogik project continued.
- Installation and testing of new pycnometer interface board continued.
- Science pallet storage reorganization project continued with the installation of various storage areas. Work on lighting and power relocation and gas bottle storage started.
- Unable to effect repair of aft VSAT, parts moved from forward installation aft successful.
- Technical cross training continued with the thin section, physical properties, DESClogik, and RigWatch systems.

- ODL staff completed modification to the Bridge work deck that will allow supplies to be shifted from the port side to the elevator.

The weekly fire and abandon ship drill was held as scheduled. No incidents to report.