

IODP Expedition 335: Superfast Spreading Rate Crust 4 Week 7 Report (23-29 May 2011)

Operations

Following the 3rd run of the Reverse Circulation Junk Basket (RCJB), the drill string was pulled out of the hole clearing the seafloor at 1015 h and the rotary table at 1645 h on 22 May. The RCJB was filled with congealed sepiolite containing four large rocks with a total weight of 8.9 kg. The largest sample weighted 3.9 kg. The 3 external junk baskets (EXJB) contained fine cuttings, small pebbles, and a few tiny metal fragments.

The RCJB was rebuilt and deployed for the fourth time of the expedition along with the three EXJBs and reentered Hole 1256D at 0635 h on 23 May. The trip in was extended for 3 hours while the drill crew repaired the pneumatic control lines for the high clutch in the draw works. Following the routine of working the EXJBs and flushing the hole with 100 barrels of sepiolite mud, the RCJB was activated and advanced to the bottom of the hole at ~1521 mbsf. The RCJB assembly was pulled free of the seafloor at 1725 h on 23 May and recovered on deck by 0215 h on 24 May. The RCJB contained 3 rocks with a total weight of 5.0 kg. The angularity of the rocks indicated that they were freshly deposited with a suspected origin somewhere in the bottom 7 m of the hole. One rock (1.4 kg) was gabbro, suggesting that the “promised land” may be tantalizingly close. The junk basket contained the usual suspects ranging from gravel-sized cuttings to small pebbles with a few metal filings distributed throughout.

The fifth and last RCJB run of the expedition was deployed with three EXJBs at 0545 h on 24 May. The tool entered the reentry cone at 1115 h for the 21st reentry of the expedition. The trip to the bottom of the hole was routine. After working the junk baskets and circulating 100 barrels of sepiolite mud, the RCJB was activated and succeeded in reaching the bottom of the hole at ~1521 mbsf. The RCJB was retracted at 1845 h and the bottom of the hole displaced with 200 barrels of drill water for logging purposes. The RCJB cleared the seafloor at 0100 h following a one-hour interruption to replace a damaged cam roller on the dual elevator handling system. The drill string was recovered at 0700 h on 25 May. The EXJBs contained the usual collection of fine cuttings and small gravel. The RCJB contained four small rocks. The trend of the progressively smaller-sized rocks and lighter yield for each succeeding run of the RCJB indicated that the rubble pile at the bottom of the hole had been successfully removed. However, the lack of significant metal in all junk basket runs was perplexing. It was decided to delay the start of the logging program and attempt to recover any metal debris at the bottom using the fishing magnet.

The 9” Bowen fishing magnet (FM) was made up along with 3 EXJBs and deployed. The fishing assembly entered Hole 1256D at 1645 h on 25 May. After working the EXJBs and fishing magnet at the bottom of the hole for 30 min, another 200 barrels of drill water was pumped into the bottom of the hole. The routine 100-barrel mud sweep was omitted to save time. The fishing magnet cleared the seafloor at 0230 h on 26 May and was on deck at 0900 h. The EXJB contained the routine assorted samples of cuttings and pebbles. The magnet contained only small filings and minor amount of metal.

A lightweight logging assembly was made up comprising a 9 ½” logging bit, landing saver sub, a controlled length drill collar, a tapered drill collar, 5 transition joints of 5 ½” drill pipe, and a crossover sub. The logging assembly entered the cone at 1725 h on 26 May for the 23rd reentry of the expedition. The bit was placed at a depth of 218.9 mbsf.

The first log was the Triple combo (GR/APS/HLDS/HRLA/GPIT), which was deployed into the pipe at 2255 h and recovered at 0700 h on 27 May. The tool successfully reached the bottom of the hole although the caliper did not open until ~1490 mbsf. The bottom of the hole, not logged on Expedition 312, was logged using standard procedures up to ~1300 mbsf. A caliper log for the rest of the hole right up into the rat hole was measured to assist planning of cementing operations at the end of the cruise. The triple-combo tool returned with three damaged bow springs of the upper centralizer and these were replaced in preparation for the second scheduled logging run with the FMS-sonic tool. It was initially deployed into the pipe at 1050 h, but had to be retrieved at 1410 h when it was unable to exit the BHA into the borehole because of some mechanical obstruction at the bit. Once on the surface, one damaged bow spring of the lower centralizer was replaced in preparation for the second run. The FMS-sonic was redeployed at 1500 h and again experienced difficulty exiting the BHA. On this occasion the tool became irretrievably stuck while partially outside the pipe. The Kinley crimping and cutting tool had to be utilized to sever the logging cable. The loose end of the logging cable was recovered at 0330 h and secured. The BHA with approximately 20m of logging tool extending below the logging bit was carefully withdrawn from the reentry cone at 0425 h.

After the BHA was recovered and the FMS-sonic centralizer extracted from the landing saver sub, a 3-stand RCB coring assembly was made up with a new Ultrerra 9 7/8” RCB bit. The last activity of the expedition was to run in with the RCB assembly and deposit cement plugs at the bottom of the hole and from 910-940 mbsf. Before pumping the cement, it was decided to core the bottom of the hole until the core bit debris lost in the hole on May 6 stopped progress, or until the little time remaining expired, whichever came first.

The RCB assembly entered the reentry cone for the 24th time of the expedition at 2225 h on 28 May. A fresh core barrel was deployed at 0515 h on 29 May and by 0545 h coring resumed in Hole 1256D. The core barrel was recovered after advancing from 1520.2 to 1521.6 mbsf. The nominal recovery for the 1.4 m advance was 0.5 m (36%) and consisted of 10 large pebbles. The average rate of penetration was 0.6 m/hr. The total recovery for the 14.5 m of coring during this expedition was 11%. There was no metal in the core barrel or signs of junk in the coring process.

Time for coring had expired and cementing operations began at noon. The first cement plug was emplaced at 1521 mbsf (15 bbl.) and the second plug was placed from ~940-910 mbsf (60 bbl.). These cement plugs are intended to stabilize the two problem regions in the hole to facilitate reaching the bottom of the hole to core on a future expedition.

Science Results

The core description teams finished the descriptions of the samples recovered during cleaning and fishing operations in the Hole. In addition, thin section descriptions were completed. The rocks were found to represent a metamorphosed dike complex, intruded by evolved plutonic rocks. Recovered rocks include contact metamorphosed dikes recrystallized to granoblastic assemblages. These rocks are slightly altered to amphibole, and are cut by small amphibole veins. Also present are fine-grained feldspar-rich (>90%) leucocratic rock fragments, which maybe metasomatized dikes. Local 1-cm wide diorite intrusions are highly altered to amphibole and secondary plagioclase. Paleomagnetic, physical properties and geochemical measurements have been completed. Scientists worked on their method and site chapters.

The science party held a sampling party on May 24 and 25 for a coordinated sampling approach to the Expedition 312 working section halves. This post-cruise research activity will complement the work already done by the Expedition 312 scientific party, and will result in scientific studies based on Hole 1256D material recovered on multiple expeditions. A second sampling party, on material recovered during Expedition 335, is underway. Part of the rocks recovered during the fishing runs has been archived.

Education and Outreach

The last of a total of 12 video broadcasts with schools (elementary, middle, and high schools in the USA, China, Australia, France, and the UK) during Expedition 335 was successfully completed, with over 450 students participating. Communications regarding Expedition 335 continued on the joidesresolution.org blog, as well as on Facebook and Twitter.

Technical support and HSE activities

Technical staff provided support for coring operations on Hole 1256D, routine laboratory services, and sampling parties. Other technical activities included continued support for the DESClogik project, several IODP software applications upgrades, continued work on the Science Pallet Storage Re-Organization Project, and stores inventory.

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