

IODP Expedition 323: Bering Sea Paleoceanography

Week 3 Report (19-25 July 2009)

25 July 2009

OPERATIONS

Hole U1339C, in the Umnak Plateau, was spudded at 2230 hr on July 18th and at the start of the third week we were recovering Core U1339C-3H with the APC system. Core advance was a continuous 9.5 m except for Core U1339C-16H which contacted a drop stone at 4.5 m stopping the APC core barrel. A portion of the drop stone was recovered at the top of the next core. APC coring continued through Core U1339C-17H to a depth of 156.8 m DSF using the FLEXIT core orientation system and non-magnetic coring assemblies. The standard APC coring system was then used through Core U1339C-21H to a depth of 194.8 m DSF. Overall core recovery for the APC was 102.2%. The drill string was pulled clear of the seafloor at 1610 hr July 19th officially ending Hole U1339C.

The ship was offset 28 m and 195° from Hole U1339C and Hole U1339D was spudded at 1725 hr on July 19th. Core U1339D-1H recovered 6.6 m of sediments establishing a seafloor depth of 1879.4 m DSF. Twenty-two APC cores were cut to a depth of 200 m. Hole U1339D was cored using non-magnetic core barrels down through Core U1339D-17H. Steel core barrels were then used as APC coring continued through Core U1339D-22H. Apart from the first mudline core there was one other short core caused by a premature firing of the APC. This was most likely caused by damage to the shear pins caused by running the core barrel assembly into the landing seat at too high a speed. APC core recovery was 102.9%. The coring tools were secured and the hole was swept clean with 50 barrels of attapulgitic mud. There was no fill identified at total depth. The LFV was locked open, and the end-of-pipe (EOP) was placed at ~80 m DSF. Rig-up for wireline logging began at 1130 hr on July 20th. Wireline logging in Hole U1339D was successfully completed using the Triple Combo and the FMS-sonic tool and all logging equipment was rigged down by 0200 hr on July 21st. Two logging strings were deployed to total hole depth of 200 m. The drill string was then pulled out and secured for transit. The ship was placed in cruise mode at 0745 hr on July 21st for the scheduled 1.4 day (344 NMI) transit to Site U1340 (BOW-12B) on the Bowers Ridge. Official APC coring totals for Site U1339 include 69 cores, 624.2 m penetrated, 643.67 m recovered, for 103.1% recovery.

After a 1.6 day transit to Site U13340 (BOW-12B), rig floor operations commenced at 2315 hr on July 22nd. The pipe trip to the seafloor was uneventful. The top drive was picked up and the drill string was spaced out placing the bit at 1300.4 m DSF or 5 m above the "corrected" PDR depth of 1305.4 m DSF. The first APC barrel was pressured up and fired and the barrel recovered 3.9 m of core and an official seafloor depth was established at 1306 m. APC coring continued through Core U1340A-17H to a depth of 1461.9 m DSF (or 156.5 m in the hole) using non-magnetic coring assemblies and with the FLEXIT orientation tool installed. The non-magnetic coring equipment was changed

to the standard APC coring system and coring continued. Coring with the APC system was suspended after Core U1340A-42H with two successive short, incomplete strokes of the core barrel. The XCB coring system was deployed from Core U1340A-43X through U1340A-62X. After 3 successive zero recovery cores and an apparent formation change, a decision was made to redeploy the APC coring system at 543.9 m DSF. The APC system recovered very sandy core sections to 566 m DSF. The XCB system was then again deployed for Cores U1340A-68X through U1340A-71X. The hole was terminated after Core U1340A-71X when the cutting shoe spacer sub fractured, leaving half the sub and the XCB cutting shoe in the hole. The drill string was pulled back to the seafloor at 2100 hr on July 25th officially ending the hole. Overall recovery for Hole U1340A using the APC coring systems was 105 % with 398.8 m recovered. Overall recovery for Hole U1340A with the XCB coring system was 61% with 136.7 m recovered.

The vessel was then moved eastward 350 m and Hole U1340B was spudded at 2340 hr at the end of the third week of Expedition 323.

SCIENCE RESULTS

This week, we recovered a total of 543.51 m of sediments at Site U1339 (Holes U1339A, U1339B, U1339C, and U1339D) in the Umnak Plateau and 642.87 m at Site U1340 (Holes U1340A, U1340B, U1340C, U1340D) in the Bowers Ridge.

Early in the week we completed the description of all remaining sediment cores from Site U1339. The stratigraphic section recovered in these holes is predominantly green to grayish green diatom ooze and silty diatom ooze with variable amounts of dispersed vitric ash, isolated pebbles, distinct ash layers as well as bioturbated ash/diatom ooze layers and laminated intervals. Bioturbation varies from slight to strong although areas described as having no visible bioturbation may be intensely bioturbated. Rare dolomite indurated layers are found in bottom half of the section. All core sections were successfully measured with the core laboratory track systems for natural gamma radiation, density, magnetic susceptibility and thermal conductivity tools and the data uploaded to the Library Information Management System (LIMS).

The age interval recovered at Site U1339 covers from the Recent to about 0.74 m.y. based on silicoflagellate, radiolarian and diatom biostratigraphy. The more recent age estimates are well supported by our physical property records that are in good agreement with other records from piston cores from the region.

We performed chemical analysis of interstitial water (IW) and squeeze cakes samples collected from Holes U1339A and U1339B. We determined concentrations of dissolved sulfate, ammonium, sulfide, major (i.e., Ca, Na, etc.) and minor (i.e., Fe, Mn) elements among other chemical species. Analysis of solid phase fractions included nitrogen and carbon. In addition, we performed extensive sampling for postcruise microbiological analyses at Hole U1339A.

We completed logging operations in Hole U1339D between midday and midnight on July 20th. Two tool strings were deployed: the Triple Combo (natural gamma ray, porosity,

density, resistivity) and the FMS-Sonic string (electrical images and sonic velocity). Operations proceeded smoothly and the caliper logs indicate that the hole was in good conditions and that all data should be of good quality. Some time was dedicated during operations for the continuing evaluation of performance of the new wireline heave compensator. All logging data were processed on site and transmitted to LDEO for quality control before online publication. Preliminary data were distributed to the science party for integration with the ongoing core measurements and description. Comparison with the gamma ray and density core track data show an excellent agreement that will allow tying precisely the logs with the stratigraphy and deposition history of the Umnak Plateau.

We arrived at Site U1440 (BOW-12B) on Jul 22nd at 2300 hr and Hole U1340A was spudded at 0520 hr on July 23rd. The stratigraphic section at this Bowers Ridge site contains light to dark green to grayish green diatom ooze and silty diatom ooze with minor foraminifera-bearing diatom ooze. Cores U1340A-4H through 7H, as well as 10H and 11H, contained slumped sediment intervals. There are occasional thin dark- and light-colored ash layers and bioturbated ash-rich layers and rare silicoflagellate rich- and monospecific diatom laminae. A dark gray sand layer composed of diatom-bearing, sponge spicule-rich coarse-ashy sand was recovered in Core U1340A-64H. Bioturbation varies from slight to strong throughout.

HSE AND TECHNICAL SUPPORT ACTIVITIES

During this week, the technical staff was fully engaged with processing cores from Sites U1339 and U1340, assisting scientists with instruments and data processing, and solving equipment issues as they arise.

USIO staff continue to fine tune issues with analytical systems. On a time available basis, work continues on the reorganization of the ship's storerooms. Ship's crew has completed the painting of the decks in the Science Pallet and Logistic Store room. There are no facility infrastructure issues to report.

The weekly fire and boat drill was held as scheduled.