November 2, 2004

IODP EXPEDITION 303: NORTH ATLANTIC CLIMATE I
WEEK 6 REPORT

OPERATIONS

Site U1306

Hole U1306A was spudded with the APC at 0910 hr on 23 October 2004. Thirty-three piston cores were collected to a total depth of 304.3 mbsf with an average recovery for the cored interval of 101.2%. One core was a partial stroke (141.3 mbsf to 141.8 mbsf) resulting in the interval from 141.8 to 142.8 mbsf being drilled without coring. Only one core barrel required drill over. After achieving the depth objective, coring was halted and the bit was pulled clear of the seafloor at 1550 hr on 24 October, ending operations in Hole U1306A.

The ship was offset 30 m east of Hole U1306A and Hole U1306B was initiated at 1710 hr on 24 October. Piston coring and drilling advanced the hole to a total depth of 309.3 mbsf with 103.5% average recovery for the cored interval. The interval from 162.8 to 166.8 mbsf was drilled to maintain stratigraphic offset with Hole 1306A. Four of the last five core barrels had to be drilled over. The bit cleared the seafloor at 0330 hr on 26 October, concluding operations in Hole U1306B.

After offsetting the vessel 30 m to the east, Hole U1306C was spudded at 0500 hr on 26 October. Piston coring and drilling advanced the hole to 256.0 mbsf. Recovery in the cored section averaged 103.8%. In addition to coring, two intervals were drilled (20.0 to 24.0 mbsf and 223.5 to 227.5 mbsf) to adjust stratigraphic overlap with the previous holes. Operations officially concluded when the bit cleared the seafloor at 0800 hr on 27 October.

The ship was offset 30 m east of Hole U1306C, and Hole U1306D was initiated at 0910 hr on 27 October. Piston coring and drilling advanced the hole to a total depth of 180.0 mbsf when coring was terminated after necessary stratigraphic overlap was achieved. Average recovery was 100.9% for the cored section. The interval from 83.0 to 85.0 mbsf was drilled to adjust overlap with previous holes.

Our original plan was to depart the Eirik Drift area for prospectus site IRD1A. However, a low pressure system centered southeast of Newfoundland was moving slowly northeastward and was forecasted to pass between our present location and IRD1A. Instead, we opted to core at a nearby alternate Eirik Drift site LAB8C and wait for a weather window to open that would allow a safe voyage to IRD1A. After retrieving the drill string and the vessel was secured for transit, we departed Site U1306 at 0830 hr on 28 October.

Site U1307

The 28 nmi transit from Site U1306 to U1307 (LAB8C) was accomplished in 3.1 hours at an average speed of 9.2 knots. Hole U1307A was spudded with the APC at 1425 hr on 28 October. Piston coring and drilling advanced the hole to a total depth of 162.6 mbsf, with an average recovery for the cored interval of 102.5%. Five cores were advanced by recovery, and two intervals had to be drilled without coring (47.5 to 50.5 mbsf and 50.5 to 52.5 mbsf). The bit deplugger was deployed several times before the last core could be obtained. Because our strategy at this site was to core until a weather window opened to allow a safe transit to prospectus site IRD1A, the depth objective was limited by the available operational time, and the desire to acquire at least a duplicative record. Operations at Hole 1307A ended when the bit cleared the seafloor at 1155 hr on 29 October.

The ship was offset 30 m to the northwest and Hole U1307B was spudded at 1250 hr on 29 October. Piston coring advanced the hole to a total depth of 154.6 mbsf with an average recovery of 101.6%. Only one core experienced a partial stroke of the APC. Coring was terminated when the available operational time was exhausted and the passing low pressure system began to effect drilling operations. We departed Site 1307 at 1300 hr on 30 October to safely transit behind the storm as the weather deteriorated to a Force 8 gale with winds gusting to 40 knots and 5.5 m seas.

Site U1306 Preliminary Science Results

The sediments at Site U1306 are composed of Holocene to uppermost Pliocene terrigenous and biogenous sediments, which are gradationally interbedded at scales of a few meters or less. The most common lithologies are silty clay, silty clay with diatoms, and nannofossil silty clay. Calcium carbonate content is low ranging from 0.3-12.3 wt% (mean = 3.2 wt%). Calcareous and siliceous microfossils are generally abundant to few and preservation is typically well to moderate in the upper ~175 mcd. Below this depth, a drop in abundance and preservation is observed for these groups that extends to total depth. Nannofossil preservation and abundance, however, increases below ~225 mcd. All samples contain moderately well to well preserved palynomorphs, but variable numbers of dinocysts, which are abundant only in a few samples. The sediments at Site U1306 are a good geomagnetic recorder. The Iceland Basin Event, Brunhes/Matuyama boundary, and Jaramillo, Cobb Mountain, and Olduvai Subchronozones are clearly identified. Very similar to nearby Site U1305, complete sulfate reduction is achieved at shallow depths at Site U1306 (85 mbsf) despite the low organic carbon content (mean 0.3 wt%). Methane increases below 85 mbsf reaching a maximum of 46,000 ppmv. Overall magnetic susceptibility, natural gamma ray, density, and color reflectance provide excellent high resolution records for hole to hole correlation. A continuous stratigraphic sequence to ~337 mcd was constructed with one interval of some uncertainty (326-330 mcd) where the overlap between cores is small. Initial interpretations indicate that Site U1306 is characterized by expanded glacial sedimentation in contrast to its deeper-water counterpart (Site U1305), which has an expanded record during interglacials. The contrasting sedimentation patterns and water depths of these two sites will allow documentation of changes in outflow of the Western Boundary Undercurrent, hence production of North Atlantic Deep Water, and reconstruction of deep-sea circulation patterns. Shipboard paleomagnetic and paleontologic data indicate this record can be placed in a tight chronological framework.

Technical Support and HSE Activities

Week 6 of Expedition 303 saw the completion of Site U1306, a 3-hour transit to Site U1307 and commencement and ending of coring at that site. On Saturday October 30 the vessel got underway to U1308 on what is an anticipated 3.5-day transit. As of the end of Site U1307 3467 meters of core have been recovered and processed. A total of 2506 samples and 164 IW whole rounds have been taken.

Laboratory Status: The labs are running smoothly. The second loop was reinstalled on the magnetic susceptibility core logger (MSCL).

HSE: A fire and boat drill was held on 1 November 2004 for the entire ship's complement.