

October 25, 2004

IODP EXPEDITION 303: NORTH ATLANTIC CLIMATE I WEEK 5 REPORT

OPERATIONS

Hole U1305A was initiated with the APC at 0600 hr on 17 October. Piston coring advanced to a total depth of 280.0 mbsf with an average recovery of 105.2%. Recovery percentages were affected by gas expansion at this site (see Geochemistry, this chapter). Two cores were advanced by recovery, and six cores had to be obtained by drill over. Hole 1305A concluded when the bit cleared the seafloor at 1645 hr on 18 October.

The ship was offset 30 m east of Hole U1305A. Hole U1305B was spudded at 1945 hr on 18 October recovering 8.25 m, which provided an estimated seafloor depth of 3459.2 mbsl (3470.1 mbrf). Piston coring advanced to a total depth of 264.8 mbsf with an average recovery of 103.6%. One core was affected by a partial stroke of the APC, and only two core barrels had to be drilled over. Hole 1305A operations concluded when the bit cleared the seafloor at 0215 hr on 20 October.

After offsetting 20 m east of Hole U1305B, Hole U1305C was spudded at 0400 hr on 20 October. Piston coring advanced to a final depth of 287.1 mbsf with an average recovery of 103.9%. Five cores were partial APC strokes, but only one had to be advanced by recovery. No core barrels required drill over in Hole U1305C.

After completing coring operations, Hole U1305C was prepared for logging, and the Triple-Combo tool string was deployed to ~258 mbsf, (~29 m from the bottom of the hole). The open hole and the interval within the pipe to the seafloor were successfully logged. The tool was lowered back to 110 m below the pipe for a short, repeat pass. After completing the run in the open hole, the tool string could not be pulled into the pipe. After several unsuccessful attempts to work the tool into the pipe, the drill string was lifted, which freed the tool. After recovering the tool, it was discovered that the caliper arm was broken and the logging line had been damaged. Following a review of the heave conditions (up to 4 m), the condition of the hole, tool safety, operational constraints, and the scientific objectives of the expedition, it was decided to forgo the deployment of the FMS-sonic tool string. After recovering the drill string and disassembling the bottom hole assembly for transit, we departed for Site U1306 (LAB7A) at 1400 hr on 22 October. The 103 nmi transit to Site U1306 was accomplished in 11.3 hours at an average speed of 9.1 knots.

SCIENTIFIC RESULTS

Preliminary Science Results Site 1305

The sediments at Site U1305 are composed of dark gray to very dark gray silty clay with varying abundance of microfossils. Thin-bedded detrital carbonate beds are present throughout the cored interval. Calcium carbonate content is generally low (mean = 12 wt%) ranging from 1-49 wt.%. Despite the low organic carbon content (mean < 0.4 wt%), complete sulfate reduction is achieved by 58 mbsf, below which bacterially mediated methanogenesis is the dominant organic matter degradation reaction. Calcareous, siliceous, and organic-walled microfossils are moderately to well preserved throughout the cored interval. However, the abundance of microfossil assemblages is variable below ~ 200 mcd. Biostratigraphic and paleomagnetic data indicate the cored succession to be latest Pliocene to Holocene in age. The sediments at Site 1305 carry a well defined magnetization

component and provide good records of geomagnetic transitions including the Brunhes/Matuyama boundary, and the top and bottom of the Jaramillo and Cobb Mountain Subchronozones. The top of the Olduvai Subchronozones is also tentatively identified. A continuous stratigraphic sequence was constructed to ~295 mcd with a single problematic interval between 197.2 and 206 mcd with invariant core logging properties, which made correlation among holes difficult. In addition, downhole logging data look promising for core-log integration. Overall magnetic susceptibility, natural gamma ray, density, and color reflectance provide excellent high resolution records, not only for hole to hole correlation, but also for easy correlation to similar records in neighboring, precruise piston cores (e.g., HU90-013-013 (P-013), MD99-2227). These correlations confirm interpretations that Site U1305 is characterized by expanded interglacial sedimentation. This site provides a high resolution, deeper-water record from the Eirik Drift of instabilities in the Laurentide and Greenland ice sheets over the last ~1.8 Ma. Site U1305 will provide an important template, not only for monitoring ice sheet instability, but also changes in the Western Boundary Undercurrent, and therefore changes in the production of North Atlantic Deep Water. Shipboard paleomagnetic and paleontologic data indicate this record may be placed in a tight chronological framework.

TECHNICAL SUPPORT AND HSE ACTIVITIES

Week 5 of Expedition 303 saw the completion of Site U1305 and an 11.3-hr transit to Site U1306 (LAB-7A), and commencement of coring at this fifth site. As of the end of Site U1305 2316.7 m of core have been recovered and processed. A total of 1902 samples and 125 IW whole rounds have been taken.

Laboratory Status: The labs are running smoothly. Coring is preceding with a core on deck approximately every 45 min at Site 1306. The two new drill presses for the core lab sampling station were installed. The new Java Curation and Java Corelog programs are undergoing the requested testing.

HSE: A fire and boat drill was held on 25 October 2004 for the entire ship's complement. Marine Specialists participated in checking the lab stack alarm systems functionality.