

October 18, 2004

## **IODP EXPEDITION 303: NORTH ATLANTIC CLIMATE I WEEK 4 REPORT**

### **OPERATIONS**

Hole U1304A was spudded with the APC coring system at 1345 hr on 9 October. Piston coring advanced the hole to 239.0 mbsf taking 26 cores with an average recovery of 105.6%. The drill-over technique was used for Cores U1304A-19H to 22H and 24H to 26H. Coring operations ceased when the formation became too stiff to continue and shattering of core liners became common.

The vessel was offset 20 m southeast of Hole U1304A and Hole U1304B was spudded with the APC at 2105 hr on 10 October. Piston coring advanced the hole to a final depth of 242.4 mbsf with an average recovery of 104.0%. Cores U1304B-20H and 26H were advanced by recovery and drill over was used to obtain Cores U1304B-20H, 21H, 24H, and 25H.

The ship was offset 20 m southeast of Hole U1304B and Hole U1304C was spudded with the APC at 0445 hr on 12 October. Piston coring advanced to 69.6 mbsf when operations had to be terminated because of deteriorating weather conditions. The passage of a cold front during the early morning hours of 12 October was accompanied by a steady 20 to 25 knot wind, wind gusts as high as 50 knots, and 16-18 foot seas, which caused vessel heave to exceed 4 m. These conditions made it difficult to successfully land the core barrel without prematurely parting the shear pin of the corer and compromising core quality. At 1425 hr, the bit was pulled clear of the seafloor ending operations at Hole 1304C.

From 1430 hr to 1745 hr, the ship remained positioned at the site with the drill string suspended above the seafloor waiting for the weather to abate. At 1745 hr, the vessel was offset 20 m southeast of Hole U1304C and Hole U1304D was spudded and drilled with a center bit to 52.0 mbsf where coring was initiated. The hole was APC cored from 52.0-243.9 mbsf with an average recovery of 97.3%, with the exception of the interval from 180.3 mbsf to 181.3 mbsf, which was drilled (i.e., not cored). Cores U1304D-14H and 20H were advanced by recovery and drill over was used to obtain Cores U1304D-15H to 17H and 19H to 21H. At 1230 hr on 14 October, we departed for the next site.

At the conclusion of operations at Site 1304, weather forecasts predicted an extensive high pressure system to be over the Eirik Drift by 16 October. With an excellent weather window available, we proceeded to Site 1305 (LAB-6A). The 577 nmi transit was accomplished at an average speed of 10.4 knots. Hole U1305A was spudded with the APC at 0600 hr on 17 October advancing the hole to 75.4 mbsf by the early afternoon with an average recovery of 104.0%.

### **SCIENTIFIC RESULTS**

#### **Preliminary Science Results Site 1304**

The sediments at Site U1304 are composed of light gray, greenish gray, and dark gray nannofossil ooze, silty clay with nannofossils, and silty clay alternating with olive gray, gray and dark gray diatom ooze (mats and laminae). Calcium carbonate content ranges from 5-70 wt.% and organic carbon content is low (generally < 0.5 wt%). Both calcareous and siliceous microfossils are abundant throughout the cored interval. Diatom layers range in

thickness from centimeters to ~8 m with interbeds of silty clay. Diatom mats are composed of almost monospecific diatom layers, mainly needle-shaped diatom *Thalassiothrix/Lioloma* complex. Biostratigraphic and paleomagnetic data indicate the cored succession to be late Pliocene to Holocene in age (1.8 Ma and younger). Overall, the sediments are a good geomagnetic recorder, and the Brunhes/Matayama boundary, the Jaramillo subchron, the Cobb Mountain event, and the top of the Olduvai are all clearly identified. Magnetic susceptibility, natural gamma ray, density, and color reflectance provide excellent cyclic records for hole to hole correlation. A virtually complete composite section was constructed spanning 0-258.1 mcd. The one exception is a small gap at 199 mcd that falls within the thickest diatom mat interval. Initial results from Site U1304 indicate a remarkably continuous record back to 1.8 Ma, which correlates well to ODP Sites 983 and 984 on the northern Gardar Drift. Site U1304, with high sedimentation rates (11-18 cm/k.y.), promises to yield an excellent record of Quaternary environmental change enhanced by excellent preservation of benthic and planktonic foraminifers, nannofossils, and diatoms. Physical properties measurements can be matched to astronomical solutions indicating the potential for astrochronological age control, and implying that the recovered section is devoid of significant hiatuses.

## TECHNICAL SUPPORT AND HSE ACTIVITIES

During week 4 of Expedition 303, we completed Site U1304, transited 2.3 days to Site U1305 and commenced coring. By end of operations at Site U1304, 1212.7 m of core have been recovered and processed. A total of 999 samples and 76 IW samples (34 whole rounds) have been taken.

**Laboratory Status:** The labs were up and running smoothly this week. During the transit to Site U1305 the port magnetometer began to have intermittent problems so it was retrieved and the starboard magnetometer deployed with good results. The new Isotemp Hybridization Incubator was installed in the microbiology laboratory. Two new drill presses for the core lab sampling station are being prepared to replace the old presses. The curator used the new cast-cutting tool to good effect in curating some shattered core liners. The new Java Curation and Java Corelog programs are undergoing the requested testing.

**HSE:** A fire and boat drill was held on 18 October 2004 for the entire ship's complement. A Transocean interactive DVD safety-training module on risk management was viewed by the IODP Expedition 303 technical staff.