

October 13, 2004

IODP EXPEDITION 303: NORTH ATLANTIC CLIMATE I WEEK 3 REPORT

OPERATIONS

SITE 1302 (ORPH3A) CONTINUED

After offsetting the vessel 30 m to the northwest of Hole U1302A, Hole U1302B was spudded at 1340 hr on 3 October 2004. With only 50 cm recovery in Core 1302A-1H, the bit was positioned 4.5 m above Core 1302A-2H to achieve a good mudline core. A full core was obtained, which did not establish the mudline. Piston coring advanced to 104.7 mbsf, recovering 102.82 m (98.2%). Hole 1302B was terminated when the APC partially stroked in the debris flow interval.

The vessel was offset 30 m to the northwest again, penetrating the seafloor at 0330 hr on 4 October initiating Hole U1302C. Correlation of Holes U1302A and U1302B records to a previous piston core from Orphan Knoll (MD99-2237) suggested we had missed some of the upper section. Therefore the bit was positioned 4.5 m higher than it was during spudding of Hole U1302B. A full core was obtained for Core 1320C-1H suggesting additional section remained unsampled. Hole 1302C was advanced to 104.5 mbsf, recovering 97.06 m (92.9%), before refusal was experienced at Core 1302C-11H

The vessel was offset 30 m to the northwest and Hole U1302D was spudded at 1625 hr. A good 3.63 m mudline core was recovered, indicating a seafloor depth of 3555.7 mbsl (3566.5 mbrf). A second core was taken to provide overlap with core breaks from the previous holes; however, only 1.24 m (13%) was recovered. With the poor recovery in Core 1302D-2H, to ensure complete recovery of the upper section, we choose to core a Hole 1302E.

The ship was offset 30 m to the northwest and Hole U1302E was spudded at 1910 hr on 4 October recovering a 5.6 m. Core 1302E-2H (94.6% recovery) was taken to provide additional material for overlap with previous holes. The drill string was pulled to 2095 mbrf in preparation for transit, ending operations at Site 1302 at 2215 hr on 4 October.

SITE U1303 (ORPH2A)

The 3 nm transit from Site 1302 to 1303 was made in dynamic positioning mode in 3.75 hr. Hole U1303A was spudded at 0445 hr and continuous coring advanced the hole to 93.9 mbsf (Cores 1H-10H) with 73.6% recovery. Difficult coring (partial strokes of the APC) and poor recovery led us to terminate the hole. The drill string was pulled clear of the seafloor at 1650 hr concluding operations at Hole 1303A.

The ship was offset 40 m southeast and Hole 1303B was spudded at 1849 hr on 5 October. The bit was positioned 15 m shallower than at Hole U1303A because correlation to Site 1302 indicated a substantial upper section was not recovered in Hole U1303A. The hole was cored to 85.7 mbsf (Cores 1303B-1H-9H) with 83.5% recovery. The hole was terminated when the same difficult to core interval from Hole 1303A was encountered. With the combined recovery at Sites U1302 and U1303 sufficient to produce a composite record for the Orphan Knoll region, we decided to end coring and proceed to the Eirik Drift area. The drill string was retrieved to the rig floor and ship was made ready for transit at 1315 hr on 6 October, ending operations at Site U1303.

TRANSIT: On the morning of 7 October, the daily forecast for Eirik Drift area indicated that

a low pressure system over northwestern Canada was moving eastwards, and projected to affect the LAB6A area by the afternoon of 9 October with the wind increasing to 35-40 knots from the east-southeast. The wind was then expected to build eventually reaching 40-50 knots with gusts to 65 knots from the northwest by 11 October. After considering the potential for 4-5 days of weather downtime waiting for the storm to pass as well as the potential danger to the vessel presented by this system, we decided to alter course to the closest alternate primary site, GAR2A, at 0840 hr on 7 October.

SITE U1304 (GAR2A)

We arrived at Site U1304 at 0630 hr on 9 October. After the drill string was deployed, we spudded Hole U1304A with the APC at 1345 hr. Piston coring had advanced to 220 mbsf with 102% average recovery by the afternoon of 10 October.

PRELIMINARY SITES 1302/1303 SCIENTIFIC RESULTS

The sediments recovered at Sites 1302 (ORPH3A) and 1303 (ORPH2A) are Pleistocene in age (< 1.16 Ma). One lithologic unit was recognized, which was subdivided into two subunits. Subunit IA (~90 m thick) is composed of gray, greenish gray and grayish brown silty clay, clay, and nannofossil ooze. Calcium carbonate content ranges from 1 to 47 wt.% and total organic carbon content is low, averaging 0.5 wt.%. Subunit IB (~17 m thick) is defined by a debris flow(s) comprised of gray to dark gray silty clay to nannofossil silty clay, and gray to dark gray silty sand. Calcareous microfossils are abundant throughout the cored interval, whereas the abundance and preservation of siliceous microfossils is variable. There is also variable content of organic-walled microfossils with a terrigenous component that is often dominant. Because of the proximity and similarity of core logging data for Sites U1302 and U1303, a single splice was created for the combined sites. The spliced section was constructed almost entirely from Site U1302 with one core from Site U1303. Most of the succession is of normal polarity (Brunhes) and is a good record of the geomagnetic field. A geomagnetic excursion, the Iceland Basin Event (MIS Stages 6/7 boundary), is recorded at both sites. High-resolution physical property measurements show a well defined pattern of glacial–interglacial variability. Although penetration was stymied by a presumed debris flow, Sites U1302 and U1303 provide an excellent proximal record of the Laurentide Ice Sheet instability over the last ~ 1 Ma. This record is manifested by numerous detrital layers that appear to have both an Ice Rafted Debris (IRD) component, and a component deposited from suspension. The latter may be related to turbiditic activity in the Northwest Atlantic Mid-Ocean Channel, located ~200 km east of the sites

TECHNICAL SUPPORT AND HSE ACTIVITIES

Week 3 of Expedition 303 saw the completion of Sites U1302 and U1303, a 3-day transit to Site U1304 and commencement of coring at this third site. At Sites U1302 and U1303, 451.7 m of core was recovered and processed. A total of 535 samples have been taken at the first two sites. With the exception of organic geochemistry and porewater samples, personal sampling has been deferred to a postcruise sample party.

LABORATORY STATUS: Initial lab activities during the first site presented numerous problems with instrumentation and critical software. Instrument problems included failure of the magnetic susceptibility loop and p-wave logger on the whole-round multisensor track (WRMST), among other minor glitches. Problematic software included programs designed to upload data from the cryogenic magnetometer and magnetic susceptibility core logger (MSCL), and download software to facilitate data access to Splicer, the stratigraphic correlation software. The MSCL was specially designed for Expeditions 303 and 306 to provide real-time feedback to the driller for maximizing recovery of the stratigraphic section. As a result of these challenges, shipboard technical and scientific personnel designed work arounds for data access critical for drilling decisions. Shipboard technical

staff repaired the WRMST susceptibility loop within about one day. Shipboard and shorebased staff have been troubleshooting data upload and download problems on a priority basis. By the start of coring at the third site, most of the major problems have been resolved while work on additional problems is ongoing.

HSE: A fire and boat drill was held on 11 October 2004 for the entire ship's complement. An interactive DVD safety-training module covering Risk Management has been received from Transocean and will be viewed by the IODP Expedition 303 staff.