

April 25, 2005

## IODP EXPEDITION 306: NORTH ATLANTIC CLIMATE 2 SITE U1315 SUMMARY

Hole U1315A Latitude: 67°12.740'N, Longitude: 02°56.242'E  
Water depth: 1271.8 m

ODP Leg 104 Site 642 (Site U1315) is located on the Vøring Plateau in a water depth of ~1270 m (Eldholm, Thiede, Taylor et al., 1987). At Hole 642E, a 1229 m deep sequence has been drilled that is composed of upper Eocene to Quaternary biogenic and terrigenous sediments with volcanoclastics in the lower part (Units I to IV; 0-315 mbsf), and Eocene tholeiitic (upper series) and andesitic (lower series) basalt flows with interbedded volcanoclastic sediments (315 to 1229 mbsf).

The primary objective at Site U1315 is to document bottom water temperature variations and monitor its subbottom diffusion over a 5-year period. Bottom water temperature and salinity variations are monitored with instrumentation that sits in the water column via an elevated reentry cone. Diffusion of the thermal wave through the subsurface is monitored with a 150 m thermistor string deployed in a cased and CORKed borehole. Hole 1315A was drilled to a depth of 179.07 mbsf and cased with 10-3/4" casing. The base of the casing was cemented and the casing string was displaced with bentonite mud. The thermistor string is attached to Spectra rope using friction tape, cable ties, and marine duct tape, to carry the weight of the load and 250 lb sinker bar. The thermistor string is connected to a data logger and external battery at the top.

To assess current background thermal conditions in the region, a downhole record of temperature from nearby Hole 642E was obtained, using the Lamont Temperature, Acceleration, and Pressure (TAP) tool in combination with the Triple Combo to a total depth of 588 mbsf, where an impassable obstruction was reached. In addition, the Formation Micro Scanner (FMS)-Sonic tool was deployed. The TAP tool indicates a bottom water temperature at the seafloor of ~0.2°C. The upper 10 m of the borehole has a very steep gradient (~2500°C/km). Below this depth, the borehole has a relative low gradient of ~22°C /km. At a depth of ~500 mbsf, a strong positive temperature excursion to ~42°C may indicate inflow. FMS imaging of the hole yielded good results and will allow the correlation to existing core data and filling in the gaps (~60% of the formation). In combination with detailed FMS resistivity measurements and imaging, and sonic data, it will be possible to get reliable permeability estimates. Understanding the permeability will allow better understanding of fluid flow and temperature gradients observed in the borehole.