IODP Expedition 327: Juan de Fuca Ridge-Flank Hydrogeology

Site 1027 Summary

24 August 2010

Background

Ocean Drilling Program Leg 168 completed a transect of eight sites across 0.9–3.6 Ma seafloor, collecting sediment, rock, and fluid samples; determining thermal, geochemical, and hydrogeologic conditions in basement; and installing a series of CORK observatories in the upper crust (Davis, Fisher, Firth, et al., 1997). Two of the Leg 168 observatories were placed in 3.5–3.6 Ma seafloor in Holes 1026B and 1027C, near the eastern end of the drilling transect. One of the primary objectives of this expedition was to recover the existing CORK in Hole 1027C, core and deepen the hole by ~40 m, and deploy a multilevel CORK to monitor and sample basement fluids.

Operations

Following operations at Hole U1301B, the ship offset in dynamic positioning mode to Hole 1027C. At 1000 hr on 18 August the CORK recovery tool was slipped onto the Hole 1027C CORK head and by 1015 hr engagement of the J-slots with the CORK lugs was verified. Another 3-1/2 hr were spent attempting to recover the CORK without success. Ultimately it was realized that to release this type of CORK another set of lugs further down on the CORK head (below the CORK platform) had to be engaged, and we did not bring the correct recovery tool to sea for this purpose. The recovery tool deployed was not long enough to reach these latches so the drill string was recovered to the surface while a discussion of options took place. Finally, it was decided that the crew could fabricate the required recovery tool using the existing tool as a starting point, which took 36 hr to complete. A test-fitting jig was built to emulate the 1027C CORK head to be recovered, a section of 20 inch casing was used to extend the length of the tool so it could reach deep enough to engage the lower set of CORK latches, the lower section of the tool was enlarged to the correct inside diameter, and the small reverse cone used to enhance the ability to get over the CORK head was cut down to a 32 inch diameter. Everything had to be welded back together, doubler plates were added for extra strength, and then the tool was fit over the test jig for the final time. The drill string was tripped to the seafloor and at 1200 hr on 20 August the new recovery tool was slipped over the Hole 1027C CORK head. The tool was lowered down through the 48 inch hole in the center of the CORK platform and by 1245 hr the lower latches on the CORK head were engaged with the “modified” recovery tool J-slots. The next 3-1/2 hr were spent trying to pull the CORK but the latching mechanism would not release. Attempts were cycled between allowing the recovery tool to hammer down on the CORK head with 10,000 lbs to exerting an overpull of up to 100,000 lbs, again without success. At 1615 hr the recovery tool was disengaged from the CORK head and the drill string was recovered back to the surface. The VIT/subsea TV was recovered and at 2130 hr on 20 August the recovery tool cleared the rotary table, ending operations at Hole 1027C.

References

Davis, E.E., Fisher, A.T., Firth, J.V., et al., 1997. *Proc. ODP, Init. Repts.,* 168: College Station, TX (Ocean Drilling Program). doi:10.2973/odp.proc.ir.168.1997