**IODP Expedition 317: Canterbury Basin Sea Level**

**Week 8 Report (20-26 December 2009)**

28 December 2009

## Operations

The week began tripping drill pipe out of Hole U1352C after completing coring operations. Four hundred barrels of high viscosity logging mud were displaced into Hole U1352C. The trip out of the hole experienced excessive drag and required the top drive to be re-installed. The trip out continued with rotation until the end of the string reached 545 m DRF. The upper guide horn was removed and the VIT camera was deployed to observe and document the cone of cuttings at the seafloor while logging. The drill string was set to a logging depth of 458 m DRF and the logging string was rigged up to run a modified version of the triple combo. The first logging run indicated that the hole had collapsed and the tool string was unable to pass 562 m WRF. The tool string was pulled back to surface and rigged down. The drill string was tripped back and operations at Hole U1352C ended at 2200 h on 20 December.

At the time operations at Hole U1352C were concluded, the winds and swells were too high for operations at the next site in shallow (<200 m) water. In anticipation of a delay of ~24 h due to weather, it was decided to core Hole U1352D while waiting on weather. Hole U1352D operations commenced at 2200 h on 20 December and Cores U1352D-1H through 14H to a depth of 127.0 m DSF recovered 130.8 m of core (103%). Non-magnetic coring assemblies were used and core orientation was measured on all cores.

After an 18 nm transit the vessel was positioned at Site U1353 (proposed site CB-01A; water depth 84.2 m) at 2320 h on 21 December. Coring in Hole U1353A began at 0230 h on 22 December with the APC/XCB system and continued through Core U1353A-8H (56.0 m DSF) using non-magnetic coring assemblies. Orientation was measured on the first six cores and a temperature measurement was taken with Core U1353A-5H. Contamination testing was done on all cores with microspheres. Total recovery for Hole U1353A was 56.4 m (101%).

Operations in Hole U1353A ended and those in Hole U1353B began at 1530 h on 22 December. The vessel was positioned 20 m south of Hole U1353A and Hole U1353B was piston cored to a depth of 80.2 m DSF with a total recovery of 80.7 m (101%). Because of the rough piston coring conditions in Hole U1353A, the core orientation tool was not deployed. The APC system was pushed hard because it offered nominal recovery of ~100% (recovery by advance). However, strokes were incomplete and penetrations short. Moreover, liners shattered regularly and much of the recovered material consisted of shell hash and other sediment that fell into the bottom of the hole or was disturbed by the coring process. The XCB system allowed for faster penetration but was essentially unable to recover any significant amount of core. From Core U1353B-1H to 60H (0-258 m DSF), the APC was used 51 times and recovered 188.3 m over an interval of 188.0 m

(average advancement 3.7 m; average recovery 100%); and the XCB system was deployed 9 times and recovered 2.63 m over an interval of 69.7 m (average advancement of 7.7 m; average recovery 4%). Below 258 m DSF, the XCB was deployed exclusively to the total depth of 614 m DSF with a recovery of rate of 6%.

A cement plug was pumped per IODP policies for drilling on a continental shelf and operations at Hole U1353B were completed at 2050 h on 26 December. A total of 212 m of core were recovered over an interval of 614 m (average recovery rate of 34%). At 2230 h on 26 December, drilling Hole U1353C as a dedicated logging hole began.

**Science Results**

The deepest core (U1352C-148R: 1918 to 1924 m CSF) from Hole U1352C was opened and described. It contained white, silty limestone with up to 3-cm thick intervals of well laminated, light greenish gray very fine sandy marlstone. Fourteen cores (U1352D-1H to 14H) were retrieved from Hole U1352D (0-127 m CSF) with an average nominal recovery of 103%. These cores were described by sedimentologists. Lithology is same as that of Holes U1352A and U1352B.

Cores from the second shelf site, Site U1353, opened to date are Cores U1353A-1H to 8H (0–56 m CSF) and U1353B-1H to 97X (0–604 m CSF). Cores U1353A-1H through 8H and U1353B-1H to 11H consist of green muddy very fine-grained sand, greenish gray mud with rare shells, and thick (1-6 m) beds of very fine-grained, well-sorted massive sand with scattered shell fragments (beach sand). The Holocene interval is ~6-7 m thick.

Below 80 m CSF, poor coring conditions persisted, with short APC advances and XCB coring attempts with no recovery. Much of the recovered sediment comprised shell hash and shelly gravels interpreted as cave-in. Short intervals of gray mud were recovered and they were considered to represent the in situ formation. At least one significant lithologic boundary was recovered in Core U1353B-28H. This boundary may correlate with similar surfaces at other sites drilled during Expedition 317.

The age of Core U1353B-11H is ~0.44 Ma and that of Core U1353B-30H is 2.7-3.1 Ma, based on calcareous nannofossils. The age of Cores U1353B-60X to 65X is ~3.7 Ma based on macrofossils and nannofossils. Precise shipboard age determination is difficult because of poor preservation of nannofossils and planktonic foraminifera. It is difficult to determine the age of the bottom of the hole because of low abundance of diagnostic microfossils. However, nannofossils suggest an early middle Miocene age. If so, we will have reached an unconformity that has already been recognized at both Sites U1351 and U1352, but had not been interpreted on seismic profiles. This provides an excellent basis for a revised and improved seismic interpretation in this interval.

Geochemical measurements of IW samples show a zone of low salinity and chloride at ~50 m CSF. This may indicate a fresh water wedge extending from the shore beneath the shelf floor or, alternatively, residual fresh water from periods of shelf exposure during

sea-level lowstands.

## Technical Support and HSE Activities

The shipboard labs were processing cores and samples from Site U1353. Off going shipments are being prepared. A fire and boat drill was held on December 20 for the entire ship's complement.