

IODP Expedition 317: Canterbury Basin Sea Level

Week 7 Report (13-19 December 2009)

21 December 2009

Operations

The week began with RCB coring at 1426 m DSF (1781 m DRF) with a target depth of 1700 m DSF. Core recovery was erratic, varying from 0% to 100% recovery through cored intervals, but has averaged ~50% during the course of Hole U1352C. At 1662 m DSF on 15 December at 2030 h, a 50 barrel sweep was pumped and a wiper trip of the drill string was made to approximately 1000 m DSF. The wiper trip from bottom to 1000 m and back took 7 h to complete and coring resumed at 0545 hours on 16 December. On 17 December, when it became evident that the scientific objective for the hole was deeper than anticipated, permission was requested and received to exceed the original EPSP limit of 1913 m DSF by up to 250 m, to 2163 m DSF. The Marshall Paraconformity (MP) was cored between 1851 and 1861 m DSF on 18 December. Coring continued to 1927.5 m DSF to create a rat hole for the logging tools as part of the plan to log across the MP. Last core on deck from Hole U1352C occurred at 1740 h on 19 December. After the last Core U1352C-148R was recovered, the hole was swept clean with a 50 barrel sweep of high viscosity mud, the RCB coring bit was released and the drill string was tripped out 2 stands with the top drive ending the week.

Hole U1352C established a new single bit, single expedition record for the *JOIDES Resolution*, and the deepest sediment hole ever drilled by IODP and its predecessor programs.

The weekly totals are 498.9 m cored and 302.7 m recovered (61%). Hole U1352C had 631.1 m drilled, 1296.4 m cored, and 655.0 m of core recovered (51%).

Science Results

Cores from Hole U1352C opened for description to date are Cores U1352C-89R to 147R (1381-1917 m CSF). Above ~1700 m, the sediment consists of dark and lighter greenish gray marlstone with wavy lamination and cm-scale sandy intervals with planar and cross lamination. The interval contains dm-scale sand layers, some with very coarse clasts, graded beds, lamination and fluidization structures. Cores U1352C-88R, -94R and -105R contain slump deformation. White shell fragments, black carbonaceous components, and glauconitic clasts are included in the sand layers. Some laminated intervals have a relatively high abundance (>2%?) of organic constituents. Below ~1700 m, the sediments become glauconitic limestone. Glauconitic sand also occurs as prominent discrete, cm-scale, parallel and cross-laminated layers that often crosscut the underlying sedimentary structures.

The Marshall Paraconformity, the deepest objective at Site U1352, was encountered in Core U1352-140R at ~1860 m CSF. Recovery was low at the paraconformity, which was represented by a dm-scale rubble zone, marking the boundary between overlying lower

Miocene glauconitic limestone and underlying lower Oligocene recrystallized pelagic nanofossil limestone containing trace fossils and stylolites.

Based on calcareous nanofossils and planktic foraminifers, the Pliocene/Miocene boundary occurs in Core U1352C-73R (1275-1285 m CSF). The upper Miocene section contains a major unconformity at ~1400 m CSF with at least 5 m.y. missing. The middle Miocene extends from ~1497 to 1679 m CSF. The middle/early Miocene boundary is thought to coincide with a seismic reflection at the base of the middle Miocene progradational section. More than 1500 m of Miocene sediment was recovered. The Marshall Paraconformity at ~1860 m CSF represents a hiatus of 11-12 m.y. between the early Miocene and early Oligocene. The age at the bottom of the hole is 35.2-36.6 Ma (late Eocene) based on calcareous nanofossils and planktic foraminifers datums.

Magnetic susceptibility and natural gamma ray signals below ~1500 m show a decrease downhole while reflectance L* increases, probably reflecting increasing carbonate content. Discrete sonic velocities of up to 4500 m/s were measured in the limestones. Headspace gas analysis show a conspicuous interval of low ethane, propane and methane contents between 1330 and 1500 m, with lowest values peaking at ~1400 m.

Technical Support and HSE Activities

The shipboard labs were processing cores and samples from Hole U1352C. The end of cruise memo was distributed to scientists and staff to prepare for the end of cruise activities. A fire and boat drill was held on 13 December for the entire ship's complement.