

October 3, 2005

**IODP EXPEDITION 311:  
CASCADIA MARGIN GAS HYDRATES  
WEEK 5 REPORT**

**OPERATIONS**

**HOLE U1329A (CAS-05D):** Hole U1329A was spudded at 18:30 hr on 25 September. LWD/MWD drilling progressed without incident and within the prescribed protocol guidelines reaching the total depth of 220 mbsf at 08:00 hr on 26 September. After displacing the hole with 10.5 ppg mud, the arrival of the last of the tools and the bit on deck at 13:30 hr officially ended operations in Hole U1329A, and we offset 15 m to the north to Hole U1329B.

**HOLE U1329B:** On the morning of 26 September, we learned that the LWD/MWD-transfer boat had to return to Coos Bay, Oregon twice; once to drop off a sick passenger and the second time because of engine problems. However, the engine problems were not serious and the transfer boat was quickly repaired and left Coos Bay at 10:25 hr. The exchange boat arrived at 16:30 hr on 27 September. Offloading of the tools and personnel transfer was completed and the boat was away at 21:25 hr. While waiting for the boat and during transfer operations, the drill string was tripped to near the seafloor. Hole U1329B was spudded with first core on deck at 21:05 hr, recovering 10.02 m, indicating we did not recover the mudline.

**HOLE U1329C:** We picked the bit up 5 m higher than for the Hole U1329B spud position, and without offsetting, spudded Hole U1329C. Core U1329C-1H recovered 8.19 m, providing an estimated seafloor depth of 946.4 mbsl (957.4 mbrf), which indicated the bit was over 6 m below the seafloor for the first core in Hole U1329B. APC coring in Hole U1329C continued to 140.2 mbsf (106% recovery) where we switched to XCB coring system and advanced the hole to 188.5 mbsf (82% recovery). Two PCS cores (U1329C-7P and 14P) were collected at 55.6 and 114.6 mbsf, respectively, with Core U1329C-14P recovered without pressure. The third PCS core deployment, Core U1329C-23P, returned to the rig floor at 02:10 hr on 29 September without the bit, which was left in hole. Attempts to drill past it were unsuccessful. Hole U1329C coring was terminated at 189.5 mbsf, ~30 m shy of target depth.

Swell from a nearby low pressure system (> 5 m heave) made conditions too rough to attempt wireline logging or expect quality piston cores from a new hole. Thus, we decided to wait on the weather to improve to continue operations. After four hours of waiting on weather, the morning forecast predicted continued poor conditions throughout the day, but improvement for the following day, so we decided to pull out of Hole U1329C and drill a dedicated logging hole.

**HOLE U1329D:** We offset 15 m south of Hole U1329A and spudded Hole U1329D at 11:15 hr on 29 September. At 19:55 hr, after drilling Hole U1329D to 165.6 mbsf, ship heave had increased enough (>6 m heave) that we needed to suspend operations again. By 21:30 hr improving conditions allowed us to resume drilling Hole U1329D. After relatively slow drilling (~5 m/hr) in the lower ~35 m, we decided to take a single XCB core (Core U1329D-1X; 1.03 m recovered) at the bottom of Hole U1329D, which was completed to a total depth of 210.5 mbsf at 10:15 hr on 30 September. After reaching total depth in Hole U1329D, we switched over to the wireline logging program. The first tool deployed was the standard triple-combo, which was able to reach a depth of 209 mbsf and the hole was logged without incident. The second logging run consisted of two passes of the FMS-sonic tool. On the first

lowering the FMS-sonic tool reached a depth of 209 mbsf, but on the second lowering the FMS-sonic tool only reached a depth of 171 mbsf. The caliper log showed that parts of the hole were severely enlarged. The wireline tools were recovered, the hole was displaced with 10.5 ppg mud, and we pulled out of the hole, clearing the seafloor at 00:20 hr ending Hole U1329D.

HOLE U1329E: After offsetting 15 m to the north, Hole U1329E was spudded at 02:35 hr on 1 October. The hole was advanced with the APC system to 33.5 mbsf, followed by deployment of the PCS (Core U1329E-5P), which was recovered without pressure. After washing down to 54.5 mbsf, an APC core (U1329E-6H) was taken to obtain an APCT temperature measurement, returning with almost no recovery. The DVTP was deployed immediately after Core U1329E-6H to provide a calibration point with the ACPT. The rest of the hole was devoted to pressure coring runs with intervening washed intervals. The PCS was deployed two more times at 73.5 and 125.0 mbsf, both successful runs. The Fugro pressure corer (FPC) was deployed at 104.0 mbsf; however, the tool returned without pressure. The HYACE rotary corer (HRC) was deployed at 114.5 mbsf and retrieved a full core under pressure. After displacing the hole with 10.5 ppg mud, the BHA was pulled clear of the seafloor at 22:32 hr on 1 October, ending Hole U1329E. The drill string was tripped to the rig floor in preparation for the short transit to Site U1327.

## **SCIENCE**

Preliminary analysis of resistivity and other LWD/MWD downhole logs indicated that Site U1329 contains only limited to no gas hydrate. IR scanning and visual observation of cores did not yield any evidence of gas hydrate, consistent with this initial interpretation of the Hole U1329A MWD/LWD data.

Cores U1329C-1H through 16H (0-136.5 mbsf) are Pleistocene gray and dark greenish gray clay and silty clay with occasional diatom-rich intervals. Core U1329C-17H marks an abrupt change to late Miocene age sediments. Cores U1329C-17H through 23X (135.6-188.5 mbsf) are very dark olive gray to dark greenish gray homogeneous silty clay and Core U1329D-1X (201.0-202.0 mbsf) is very dark gray clayey silt. The lower part of Hole U1329A is also characterized by unusually high resistivity and density log values, consistent with a highly indurated section.

Initial interstitial water analysis indicates the sulfate/methane interface is at ~9 mbsf, coincident with a shallow alkalinity maxima (21.8 mM). The  $\text{Cl}^-$  profile steadily decreases to a minimum value of 380 mM at the base of the section (210 mbsf), a ~ 30% decrease from the near seafloor value. A distinct  $\text{Cl}^-$  minimum is observed at an equivalent depth to the BSR. An increase in ethane and propane concentrations at 186.2 mbsf ( $C_1/C_2=3980$ ) and in the lowermost PCS core also suggests the influence of a different fluid regime at depth. Although log caliper data indicate enlarged hole conditions in Hole U1329D, acoustic wireline log data are of good quality.

## **TECHNICAL ACTIVITIES**

This week core arrived on deck and in the labs for the first time. A supply boat transferred the LWD tools and personnel back to shore.

HSE Activities: There was a fire and boat drill on September 27. The METs team did not respond as they were busy handling core. The rest of the technicians and scientists reported to their lifeboat stations. The scientific party watched a presentation on the dangers of  $\text{H}_2\text{S}$ .