IODP Expedition 342: Paleogene Newfoundland Sediment Drifts

Week 1 Report (1-9 June 2012)

OPERATIONS

Expedition 342 (Paleogene Newfoundland Sediment Drifts) began on 1 June 2012 while located dockside Ireland Dockyard Commercial Berth, St. George, Bermuda. On 2 June, the ship's crew (Siem Offshore) and USIO technical staff completed a crew change and the scientists boarded the ship. The vessel was secured for sea and the last line was released from shore at 0612 h on 4 June, beginning the passage to ODP Site 1073.

After a 582 nm transit from Bermuda to Site U1402 (ODP Site 1073) averaging 10.1 knots, the vessel arrived at the first expedition location to perform engineering qualification tests on the Motion Decoupled Hydraulic Delivery System (MDHDS). The vessel was on Site U1402 at 1542 h (UTC-3 h) on 6 June. The bottom-hole assembly (BHA) was drifted and the drill pipe lowered to 608 mbrf. The MDHDS with the Temperature and Pressure (T2P) tool were made up for deployment using the developmental electronic release system (ERS) tool on Schlumberger wireline. After running the tools through the blocks, a surface test was performed to check all components prior to deployment. A communication problem with the tool was fixed and the Schlumberger wireline was run into the drill pipe to ~250 mbrf, where the ERS released prematurely, allowing the MDHDS and T2P to fall ~400 m to the landing seat in the BHA. An attempt was made to reattach the ERS tool to the MDHDS without success and the Schlumberger wireline was pulled from the drill pipe. An MDHDS mechanical latch assembly with sinker bars was assembled and deployed on the coring line in an attempt to fish the MDHDS tool, but this did not work. Upon retrieval of the coring line, the sinker bars were observed to have parted from the retrieval sub (RS) overshot, leaving a configuration that was impossible to fish. The decision was made to pull the drill string out of the hole to retrieve the test equipment inside the BHA.

At 0800 h the motor vessel North Star arrived on location and was secured to the port side of the vessel within reach of the #3 crane. Three pallets of provisions and a pallet of drill string severing materials were unloaded from the vessel and the North Star was released and clear of the JOIDES Resolution at 0828 h.

After tripping out of the hole, the test equipment was removed from the BHA, and inspected for damage. At 1145 h on 7 June, the drill string was run back into the hole and Hole U1402A was spudded at 1405 h. Seafloor was recorded at 650 mbrf. Hole U1402A was washed down to 96.4 mbsf (746.4 mbrf) and the MDHDS, T2P and ERS were assembled and run down to the BHA for a second test. Both temperature and pressure signals were successfully transmitted to the rig floor and recorded. After circulation was re-established for the last part of the test, the tools could not be retrieved by wireline. The ERS was released and the Schlumberger wireline was pulled from the hole, the top drive was set back and the drill string was tripped from the hole. The bit cleared the rotary table at 0110 h ending Hole U1402A.

Since there was a short amount of time remaining before the ship had to depart for the primary Expedition 342 drilling area, the science party decided to take a few cores to test core flow and refine laboratory procedures. After recovering the MDHDS tools from the BHA, the drill pipe was run back to just above the seafloor. The vessel was offset 20 m to the east and Hole U1402B was spudded at 0625 h on 8 June. Mudline Core U1402B-1H was 7.02 meters long and the seafloor depth was calculated at 650.5 mbrf. Core U1402B-2H was a partial stroke (8 m) and the liner shattered. The core was retrieved by wire line, extracted from the core barrel on the rig floor and placed into split liner sections. The coring system was disassembled to remove the core and liner and reassembled and the decision was taken to pull out of the hole and to get underway for the next site.

While working on retrieving the second core a scheduled helicopter arrived on deck at 0932 h with 4 USIO staff. The helicopter refueled, took on 5 MDHDS scientists/engineers and luggage and departed the JOIDES Resolution at 1020 h.

The rig floor was secured at 1330 h on 8 June, ending Hole U1402B, and the vessel was underway at full speed to Site 1403 (proposed site JA-1A).

SCIENCE RESULTS

The plan for the sea trial of the Motion Decoupled Hydraulic Delivery System (MDHDS) was to carry out two tests of the tool set in the water column, wash to a depth of 100 m, test the MDHDS in situ for at least 30 minutes, turn on the pumps to clean the hole, take an APC core, test the tool in situ again, and take three more APC cores. The MDHDS is a development intended to serve as a foundation for future penetrometer and other downhole tool formation measurements. The MDHDS is designed so that downhole tools that are in the formation can be decoupled from the heave of the drill string, which negatively impact these measurements.

The planned testing program quickly changed when the MDHDS detached from the wireline during its initial deployment and fell ~400 m into the bottom hole assembly (BHA) while the BHA was still in the water column. An attempt to fish the tool failed with the loss of the sinker bar, and the drill pipe was tripped to recover the MDHDS. The failed deployment was associated with a strong current and considerable chatter in the drill string as the tool banged against the side of the pipe wall on its initial descent.

After retrieval of the MDHDS tools, pipe was again tripped, this time to the seafloor. A 96-m hole was drilled without coring. The MDHDS was deployed, and data were obtained through the telemetry system of the tool for 30 minutes with limited circulation. When circulation was re-established to test the effects of circulation on formation pore pressure, telemetry was lost and it was found that the tool could not be withdrawn using the wireline system. The drill string was tripped to retrieve the MDHDS and it was found that the tether within the MDHDS had worked between the tool and the inside of the BHA aperture, jamming the tool in place and preventing recovery. This concluded the MDHDS sea trial.

During the sea trials, the shipboard science party received introductory presentations and training on operations and laboratory methods, equipment and software. Science plans were presented and discussed, and shipboard sampling plans established. A daily science seminar provided participants with opportunities to present their work and discuss ideas with each other. When the MDHDS tests were concluded, several hours remained until a helicopter would arrive to exchange departing engineers with arriving science support technicians. The science party requested that a few cores be obtained from site U1402 to test lab equipment and provide experience for the science staff. The drill string was deployed a third time and two cores were taken from 0-15 mbsf, with 100% recovery. Core U1402-1H was a 7-m long mudline core, and Core U1402B-2H was an 8-m long partial stroke core that suffered significant core liner damage.

Core analysis showed the sediment to be unconsolidated, sticky, grey to dark grey-brown Pleistocene-Holocene silty mudstone. The mud contains abundant woody organic matter and patches of sulfides as well as mollusk shell fragments. The sediment is similar to pro-glacial muds elsewhere along the continental margin. Section U1402B-1H-1 has normal polarity and a short reversed interval was detected in Section U1402B-1H-3. The microfossil assemblage consists of sponge and diatom fragments, a foraminifer assemblage dominated by benthic species, and a late Pleistocene calcareous nannoplankton assemblage. Both the benthic foraminifer and calcareous nannoplankton assemblages include, in addition to Pleistocene species, a mixed reworked assemblage. For example, reworked calcareous nannoplankton include markers for the lower Oligocene, the upper Eocene, and the Cretaceous. Planktonic foraminifers are dominated by cold water Pleistocene species. Benthic foraminifers are typical of slope water depths of 400-600 m.

EDUCATION AND OUTREACH

The education team had a busy first week with five ship-to-shore broadcasts. Caitlin Scully interacted via Skype with over 200 students, teachers, and members of the general public in (a) Islamabad, Pakistan, (b) San Antonio, Texas, (c) San Diego, California, and (d) Pittsburg, Pennsylvania. Social media outreach continues through Facebook, Twitter, and tumblr. The JOIDES Resolution Facebook page reached 3,000 “likes” on Saturday – a great accomplishment. Caitlin Scully, Chris Hollis, and Brian Romans contributed a total of eight new posts to the joidesresolution.org blog. Richard Norris led the entire science party in a brainstorming session to develop core messages that extend the public reach of Expedition 342. Dan Brinkhuis continues to gather video footage and work on the first documentary-style video for Expedition 342. This week his primary interview was with Peter Blum.

TECHNICAL SUPPORT AND HSE ACTIVITIES

Laboratory and safety tours where given to the oncoming scientists upon their arrival. The first fire and boat drill was held on 4 June. Scientist and technicians prepared

laboratories for receiving cores and trained on laboratory systems. Following the MDHDS testing, two cores were taken and processed through the labs.

On 8 June, after conclusion of the MDHDS sea trial, four marine technicians arrived via helicopter.