

June 27, 2005

**IODP EXPEDITION 308:
GULF OF MEXICO HYDROGEOLOGY
WEEK 4 REPORT**

OPERATIONS

Hole U1324A

Reentry in Hole U1324A was made at 1828 hr on 19 June and the bit placed at the logging depth of 54.2 mbsf. A tool string consisting of the HNGS, DSI, and GPIT was deployed first. The end of pipe was set at 54.2 mbsf, and later moved to 49 mbsf to ease passage of the logging string. A downlog was recorded and we encountered two obstructions at 59 mbsf and 509.6 mbsf. The shallow obstruction was passed after a few attempts but the deeper one remained impassable. After attempting to clear the obstruction for ~15 minutes and getting some overpull, we decided to log up from this point. We measured gamma-ray and P&S mode at 15 Hz sampling rate in the first pass at 275 m/hr up to 84.0 mbsf. The tool string was lowered for a second pass to 509.6 mbsf where the same obstruction was encountered. We began the 2nd pass from this depth recording gamma ray, P&S, low frequency lower dipole, and Stoneley modes at 15 Hz sampling rate.

The second deployment consisted of the wireline seismic tool (WST). The marine mammal watch began one hour prior to the WST deployment and the operation started with putting the GI gun in the water for the beginning of the soft start. The LFB obstructed lowering the WST into the open hole and we had to pump seawater to ease the tool into the borehole. After this, a bad electrical line was preventing power transfer to the main trigger box of the shooting setup. The line was changed and the computer had to be powered down before the configuration worked. During this time, a corroded plug connecting the electrical leads to the GI gun was also found. This problem was also resolved but delayed the beginning of the experiment by ~1.5 hrs. Based on LWD caliper recordings, 16 stations were targeted at approximately 25 m intervals. The Schlumberger equipment was rigged down by 1330 hr on 20 June. The hole was then displaced with 44.0 barrels of 11.0 ppg neat cement forming a 145-meter plug. The hole was successfully abandoned at 1745 hr when the bit cleared the FFF.

Hole U1324B

The bottom hole assembly for Hole U1324B was identical to the bottom hole assembly used to core the Brazos-Trinity sites. After the VIT performed a survey of the sea floor, the driller tagged the bottom at 1066.8 mbrf. Hole U1324B was spudded with the APC at 0250 hr. The recovery of the first core established the sea floor depth at 1067.5 mbrf. Piston coring advanced without incident to a depth of 117.8 mbsf where the corer did not achieve a complete stroke, but did recover 9.91 m (104%). APC coring continued to 357.9 mbsf by advancing by recovery. At this depth, one XCB core was obtained prior to each deployment of the DVTP-P and T2P probes. Piston coring continued to a total depth of 394.5

mbsf by advancing by recovery. A total of 48 piston cores were taken in penetrating to this depth with an average recovery of 101.3%. Non-magnetic core barrels were used for all piston cores. The cores were oriented starting with U1324B-4H. The APCT was deployed in 14 cores, and a special Fugro cutting shoe was deployed in cores 4H, 7H, and odd numbered piston cores up to and including 49H. Coring resumed with the extended core barrel (XCB) and deepened the hole to 608.2 mbsf. The XCB cored portion of the hole was 223.8 m with an average recovery of 80.8%. The total cored interval of 608.2 m was obtained with 93.7% average recovery. In compliance with the operational protocol, heavy mud (10.5 ppg) was continuously pumped starting at 481 mbsf and sustained until the bottom of the hole. The DVTP-P was deployed ten times in this hole (229.1 mbsf, 362.4 mbsf, 387.9 mbsf, 464.3 mbsf, 493.1 mbsf, 522.0 mbsf, 541.2 mbsf, 560.4 mbsf, 589.2 mbsf, and 608.3 mbsf). There were also ten deployments (approximately 30-minutes each) of the T2P probe (51.3 mbsf, 89.3 mbsf, 117.8 mbsf, 136.3 mbsf, 368.0 mbsf, 394.5 mbsf, and 593.2 mbsf). In accordance with the operating protocol, the hole was plugged with 44 barrels of 11.0 ppg neat cement forming a plug of ~145 m. The cement was followed by 40 barrels of 10.5 ppg mud and then chased with 50 barrels of seawater. The hole was observed by the VIT camera with the bit at ~80 mbsf and no flow was detected. The bit was pulled free of the hole at 0025 hr on 26 June. As the vessel was moved off location, a sub-sea release dart was pumped down to swab the inside of the pipe.

Hole U1324C

The vessel was dynamically repositioned 20 m west of Hole U1324A. After a VIT survey of the seafloor of the new hole failed to indicate any obstructions, Hole U1324C was spudded when the driller tagged the sea floor at 1066.5 mbrf. The hole was then drilled ahead to 50.0 mbsf where the T2P was deployed with good results. Following the retrieval of the probe, a single APC core was obtained for physical properties analysis. The hole was then drilled in increments of 50 meters, alternating between T2P and DVTP-P deployments and taking APC cores for geotechnical analysis. As of 2400 hr on June 26, drilling operations were down to 200 mbsf, coring Core U1324C-4H.

PRELIMINARY SCIENCE RESULTS

Results from the vertical seismic profile (VSP) experiment show velocity variations in the shallower section. This data will be useful for interpretation of the seismic data. Sonic logs obtained by wireline logging were of good quality but show little variations, whereas gamma ray data confirmed the trends already observed with the MWD/LWD string.

The lithologies encountered in Hole U1324B are mainly greenish gray clay with silt. Silt increases with depth, and between Cores U1324B-52X and U1324B-54X (396.8 to 419 mbsf), the major lithology is a sandy silt. From Core U1324B-54X to Core U1324B-59X, the lithology is again a greenish gray mud with clay. One of the conclusions drawn from core description is that the intervals of coarser

lithologies detected in MWD/LWD and wireline logs are characterized by silty sediments, and not necessarily sand.

Results from micropaleontological analysis indicate that sedimentation rates were very high, and establishing a biostratigraphic framework for Site U1324 has proved to be difficult. Based on the lithologies encountered in Hole U1324B, we interpret the following geologic history. In the Pleistocene, the Mississippi River brought sediment to the Ursa region. These sediments were deposited as hemipelagic mud, interbedded with silt and sand transported by turbidity currents. Sometime in the Upper (?) Pleistocene, sediments became progressively finer. Finally during the Holocene the location of the Mississippi delta changed and a drape of hemipelagic mud was deposited at the location of Site U1324.

Coring operations in Hole U1324B gave us the opportunity to deploy the two temperature and pressure probes available on board, the T2P and DVTP-P. Abnormal readings of below hydrostatic pressure in the formation puzzled us. Considering the degree of deformation present in APC cores, we inferred that suction on the formation deformed the soil. However, multiple testing on XCB cores and further analysis of the tool proved that the problem resided with the tools leaking, and not with the coring technique.

Obtaining in-situ pressure data is crucial for the complete success of Expedition 308; hence every effort was made to solve this problem. Hole U1324C was dedicated to geotechnical sampling and deployment of the T2P and DVTP-P. Deployments of both probes in Hole U1324C proved that the tools were now working well. The pressures recorded in-situ in Hole U1324C are in between lithostatic and hydrostatic, which is in agreement with the model of an over pressured basin tested by Expedition 308. Further measurements and data analysis is needed, but results obtained at Site U1324 are very promising.

TECHNICAL SUPPORT ACTIVITIES

A supply boat arrived on the morning of June 20 to take off the LWD tools and 2 engineers. IODP received a shipment of microsphere tracers, 4 racks of argon gas and spares for the T2P tool. The LWD hole U1324A was wire line logged and a VSP was successfully run on June 20 after the supply boat departed. Hole 1324B was then core and the shipboard labs were busy processing the cores throughout the week. The week ended with Hole 1324C and multiple down hole tool runs with the T2P and WSTP-P tools.

HSE ACTIVITIES

The Marine Emergency Team (MET) was walked through their part in the upcoming fire drill by the First Mate.