

**Week 1 Drilling and Scientific Report for IODP Expedition 313
New Jersey Shallow Shelf**



30th April – 6th May 2009

1. Operations

Note on coring tool terminology

This expedition is carrying three types of coring tool: a hydraulic piston corer (HPC, equivalent to the APC), an extended nose corer (EXN, equivalent to the XCB) and a standard rotary corer (ALN, equivalent to the RCB). The tools will be referred to as HPC, EXN and ALN in this and subsequent reports.

Operations

On Friday 24th April, the *L/B Kayd* arrived at the Coast Guard Station in Atlantic City. The mobilisation commenced immediately by DOSSEC, the drilling contractor, who loaded the drilling and ESO containers onto the platform. The mobilisation continued for 6 days, during which time local outreach activities were conducted. An IODP outreach film team visited the mobilisation, took footage and conducted interviews with some of the staff. A local press event was held at the Trump Marina Hotel Casino, followed by a visit to the platform. The media event was attended by several reporters and camera teams.

At 1030 hrs on Thursday 30th April, the *L/B Kayd* and IODP Expedition 313 set sail from Atlantic City and headed for the first coring site (MAT-1). A brief stop was made on the way to amend the flooring of cantilevered drilling platform, which was being forced up by waves breaking on the *Kayd*'s bow. At 2345 hrs, the *Kayd* arrived at Site MAT-1, and prepared to position above the first hole.

At 0003 hrs on Friday 1st May, the *Kayd* was positioned above Hole MAT-1A (IODP Hole M0027A) and the legs were lowered to tag the sea bed. Once the sea bed was tagged, the preload procedure began by gradually increasing the load on the sea bed. The preload procedure was interrupted to reposition the *Kayd* such that the communication satellites were not eclipsed by the legs. The preload and settlement procedure continued until 1053 hrs, when the *Kayd* was jacked-up out of the water to 30 ft. Normal access to the working deck was permitted, and all teams prepared to begin coring. At 1215 hrs, the supply vessel *Rana Miller* arrived at the platform and delivered equipment and personnel, which included the logging tools and the remaining scientific staff. At 1640 the drill rig was started, the mast raised and the conductor pipe was run to the sea bed. The core barrel was lowered to just above the sea bed and the 1st hydraulic piston core (HPC) was fired just before midnight.

The 1st core arrived on deck at 0010 hrs on Saturday 2nd May. Coring continued using HPC and the hole was advanced by recovery. Sixteen HPC attempts resulted in 2 non-fires and a penetration of 28 m in just under 20 hours, passing through sand into clay and back into sand and gravel. Three core runs showed signs of caving, with the amount of caving fill between 0.33 and 0.72 m. Once the base of the sand layer had been established, coring was stopped. At 2035 hours, the drill string was tripped and the conductor pipe extended into the sea bed as casing.

At 0130 hrs on Sunday 3rd May, the conductor pipe was set 17.6 m into the sea bed. The hole was conditioned with thick mud, and the PQ drill string was run to the base of the hole where coring using HPC commenced. After 2 HPC attempts, hard clay was encountered. The coring tool was switched to the extended nose corer (EXN), which produced poor core recovery. The coring method was switched back to HPC, upon which 6 m of cavings were encountered. In an attempt to stabilise the hole, the mud was changed and the hole was reamed with a full face bit in a standard rotary coring barrel (ALN). Hole stability problems continued and the full face bit broke off. No damage to the string was apparent after tripping back to the surface. The string was re-run to the base of the hole and coring continued with the HPC, which when retrieved contained a few pebbles and had a dented nose. The ALN was run to clear the hole shortly before midnight.

During the re-run of the ALN corer, the bit blocked again. A second ALN corer was run, which on the 2nd attempt advanced the full 3 m but recovered no core. At 0353 hours on Monday 4th May, coring using HPC advanced the hole, but ended when the drill string became stuck in the hole. After the drill string was freed, it was recovered to the deck and checked for damage. The string was lowered back into the hole to within 9 m of the base, where it was stopped by infill material. It was also suspected that pieces of the previously broken

full face bit had been encountered, and the hole was reamed out with the ALN corer to save the PQ string bit. Coring recommenced using the EXN tool. At 1620 hrs it was decided that the depth of casing in the hole should be increased. After pulling the PQ string, the casing could not be moved in the hole, and so the hole was re-entered using the PQ string and the hole advanced using the EXN tool. The EXN was used in favour of the HPC, as the HPC seemed to encourage hole collapse.

By 0400 hrs on Tuesday 5th May, Hole M0027A was good, clean and free-running with circulation at the base. EXN coring continued throughout the day with mixed recovery. The core barrel handling procedure was modified such that 2 EXN core barrels were always operational, which reduced the time the hole was left vulnerable to cave-ins. This, coupled with using the EXN, dramatically improved the coring.

Three hours of weather downtime occurred shortly after midnight on Wednesday 6th May due to a thunderstorm. Coring restarted using the ALN, but problems with crushed liners blocking the bit occurred throughout the first half of the day. The supply vessel *Rana Miller* arrived at the platform at 1045 hrs and delivered personnel, equipment supplies, food supplies and fresh water. At 1500 hrs the mud mix was altered slightly, and the ALN corer switched for the HPC tool which improved recovery slightly.

At 1830 hrs a meeting was convened to discuss how to best advance the hole, as progress to date has been slow. All agreed to HPC spot core in maximum 60 ft increments (6 x 10 ft pipe lengths, ~18 m), or sooner if a variation in drilling parameters is encountered. This will be done to ~180 mbsf, where continuous coring will resume. The first open-hole interval commenced at ~2100 hrs, and continued past midnight.

Deck tests of the ALN were carried out and showed that it is currently not performing as expected, and cannot be used in its present condition. In general the hole is currently stable with minor cavings between core runs.

2. Hole summary

Hole	M0027A
Latitude	39° 38.04606 N
Longitude	73° 37.30146' W
First core	02/05/09 at 00:10
Last core	----
Cores recovered	1H to 50H (50 cores)
Drilled length	100.32 m
Recovered length	56.51 m
Recovery	56.33 %
Depth at midnight 6/5/2009	97.62 mbsf

3. Science

Hole M0027A has so far yielded 19 m of medium to coarse, well-sorted sand with shell fragments and occasional metamorphic pebbles, comprising a transgressive sheet overlying 7 m of stiff, uniform, sticky clay presumed to be lagoonal mud of Late Pleistocene age. This grades downwards into intervals of featureless sand and clay. By 33 mbsf, loose sand dominates the section and is very difficult to recover with HPC. The switch to EXN at 42 mbsf provided nearly full recovery of medium to coarse quartz sand with rare dark grains and cm-sized fragments of lignite, presumed to indicate a regressive nearshore/fluvial deposit. Recovery decreased rapidly below 50 mbsf in intervals of well-rounded granules and pebbles of quartz and metamorphic grains. A change in facies at 79 mbsf to mica-bearing fine to medium sand with clay matrix and several lignite layers may be the middle Miocene Kirkwood equivalent, though the return to medium quartz-rich sand by 82 mbsf suggests we may still be in the late Miocene Cohannsey formation.

4. HSE Activities

A vessel safety and orientation briefing was conducted by Captain Farrel of the *L/B Kayd* at 1800 hrs on Tue 28th April.

At 1400 hrs on Wed 29th April, a man overboard drill was conducted. Boat drills will be conducted on a weekly basis

The first daily meeting (Ship's Captain, DOSSEC Director of Operations, ESO Operations Superintendent, ESO Staff Scientist, Co-Chief Scientist) was held at 0815 hrs on Thursday 30th April.

A vessel fire drill was held at 1700 hrs. All personnel reported to the muster station with life jackets.

Platform induction and health and safety briefings were given to newly arrived staff shortly after boarding.

5. Figures

On next three pages:

Figure 1 – Recovery at Hole M0027A, up to 2400 hrs on 6th May.

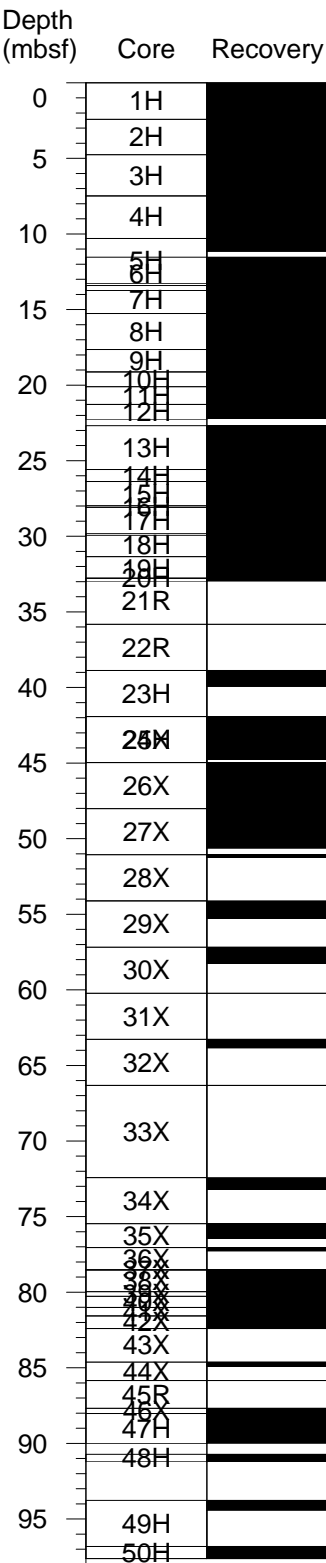
Figure 2 – Depth versus time plot, up to 2400 hrs on 6th May.

Figure 3 – Breakdown of hours, up to 2400 hrs on 6th May.

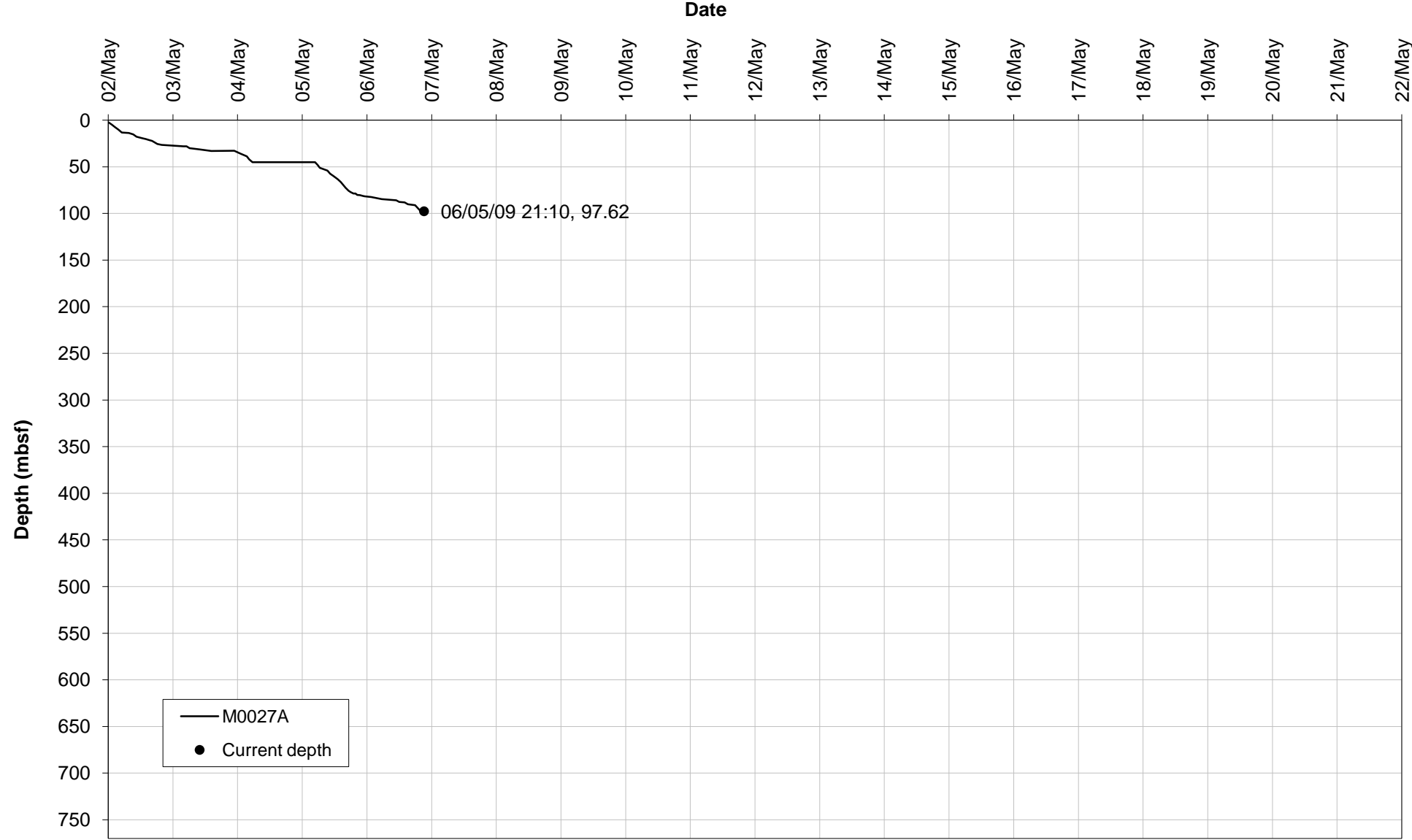
IODP Expedition 313

Hole M0027A recovery summary

Latitude: 39° 38.04606 N
Longitude: 73° 37.30146' W
Water depth: 33.5 m



IODP Expedition 313 Progress



IODP Expedition 313 - Breakdown of hours

