**Week 3 Drilling and Scientific Report for IODP Expedition 313**
**New Jersey Shallow Shelf**

**14th May – 20th May 2009**

## 1. Operations

The week began with coring using the ALN corer, with good recovery until 466 mbsf. It became apparent that the BHA stabiliser rings were worn and needed replacement. The string was tripped in order to replace both rings. The trip was completed by 0800 hrs, the rings replaced and the pipe run back into the hole. The bottom hole was tagged at 335 mbsf, at which depth open holing commenced to clear a bridge. A zone of high pressure water was encountered, which continued until 345 mbsf. Below this, the back pressure decreased to normal and the string broke through the blockage. Infill was encountered after another 8-10 m of air gap beneath the bridge. Approximately 100 m of fill was drilled out to reach the bottom of the hole. Coring recommenced using the ALN corer.

Progress slowed on May 15th with 16 core runs and 36.6 m penetration by the end of the day. Core recovery was generally good with near 100% for many of the runs. However, some sections of some cores were undersized. The ALN corer was replaced by the EXN corer for one run to see if it gave better results. The lithology proved to be unsuitable for EXN coring with little penetration, high back pressure and torque, so the ALN corer was used for the rest of the day. In the evening, the core barrel got stuck in the BHA at a depth of 509 mbsf. It was eventually freed, but after this event core recovery was poor and there were ongoing problems with core barrel latching and retrieval. By the end of the day the depth of the hole was 515 mbsf.

Steady progress was made on May 16th with 16 core runs and over 39 m penetration using the ALN corer. Core slippage occurred on some core runs but the core was usually retrieved on the next run. May 17th saw another good day of drilling and coring with 15 core runs and over 45 m penetration using the ALN corer. Most cores were 100% recovery. Repairs to the wireline and bit refurbishment caused some delays in the afternoon and early evening.

On May 18th 11 core runs were made with over 30 m penetration using the ALN corer. The recovery was more variable than in recent days (85%). In some cases this was due to core slippage, although slipped material was often recovered in the next run. The rate of penetration slowed due the combination of the formation becoming harder and the round trip of the core barrel taking longer with increasing depth in the hole. There were reports of a “petroleum smell” from the drillers in the early morning. However, there was no reading on the gas monitors. A slight increase in torque was noticed in the evening. Shortly before midnight on the 18th May, the core barrel was recovered to deck with no core. It was suspected that the core barrel had not latched into the BHA. Another barrel was deployed and became jammed in the upper section of the drill string. This was discovered by the overshot as it latched onto the barrel at approximately the waterline.

After removing 11 double stands of pipe, the overshot with the latch head would also not pass through although the overshot alone could. The core barrel was deployed with the latching indicator ball installed, and successfully latched into the BHA. After adding pipe to return the string to the base of the hole, increased torque and back-lash during rotation was noted. Back-pressure on the mud gauge was also noted, and when the string was broken to add further lengths frothing and overflow of mud occurred. On lowering the overshot, slack on the wireline indicated it was being temporarily stopped in the drill string. The overshot latched on as normal, but on recovery the assembly became jammed at approximately 25 m below deck level. After two attempts to release the core barrel it was recovered to deck. Scratches and spiral polishing were noted on the outside of the barrel.

At 0600 hrs on 19th May, the coring operation at Hole M0027A was stopped and preparations made to start the logging program. Because of the instability in the upper part of the hole, the decision was taken to log, in open-hole conditions, in three sections. We acquired Total Gamma Ray, through the pipe, along the full length of the hole and acquired Resistivity and Magnetic Susceptibility, in open hole, for the bottom section only, from 430-634m. Logging continued for the rest of the week, running sonic velocity, acoustic imagery and spectral gamma ray for the lower interval. The pipe was then pulled to 195 mbsf, and Resistivity, Magnetic Susceptibility and Spectral Gamma Ray were acquired between 195-347 mbsf. A bridge that formed at 347 mbsf prevented logging of the section between 347 – 430 mbsf.

## 2. Hole summary

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|---|---|
| **Hole** | M0027A |
| **Latitude** | 39° 38.04606 N |
| **Longitude** | 73° 37.30146' W |
| **First core** | 02/05/09 at 00:10 |
| **Last core** | 18/05/09 at 22:10 |
| **Cores recovered** | 1H to 224R (224 cores) |
| **Drilled length** | 555.3 m |
| **Recovered length** | 471.59 m |
| **Core recovery** | 84.93 % |
| **Final depth** | 631.01 mbsf |
| **Hole recovery** | 74.74 % |

## 3. Science

The week began seeing continuous coring through the difficult toe of the large clinoform bodies, that showed an overall fining upward section of glauconitic, shelly, medium to coarse-grained sands to silty clays/clayey silts, passing down into glauconite, fine-grained sandstone with hardgrounds. At a depth of over 500m, the sediments represent the lowermost Miocene. Between 500 – 540m depth, the nature of the sediment was very monotonous i.e. quartzose, glauconite, silty shales with forams, pyrite, phosphatic grains and shell fragments. The shell fraction seems to increase down section, and we are getting very well preserved marine fauna. May 16th saw coring of the Oligocene. With sediments showing very subtle changes in grain size and composition. May 17th saw coring of the base of the Oligocene, with a nice prograding sequence of sediment from dark-green, glauconite clays to fossiliferous, slightly quartzose, fine-grained glauconite sands. At the Oligocene/Eocene boundary the sediments were brownish, slightly glauconitic clays with a deep water assemblage of forams with Eocene age affinities (preliminary results) and a barren interval. May 18th saw coring of the Upper Eocene, made up of a quite monotonous series with very subtle changes in composition. From base to top, we probably cored two progradational trends bounded, on seismic lines, by a high amplitude reflector. The two trends are (1) clays and glauconitic clays, giving rise to foram bearing, fine to medium-grained sandy and silty clays overlain by (2) expanding glauconite clays passing upward to foram bearing, shelly, bioturbated glauconitic clays. Coring may have ended ~20 m from the base of the Priabonian, with a very good record of the Oligocene/Eocene climatic transition and (hopefully) tektites from the Chesapeake Bay meteorite impact.
Logging began on May 19th, acquiring Total Gamma Ray through pipe initially. The hole was then split into three logging intervals. The close of the week saw Resistivity, Magnetic Susceptibility, Sonic Velocity, Acoustic Imaging and Spectral Gamma Rays logging, in open-hole conditions of the lower interval (430 – 634m). The suite of logging tools were then deployed, in open-hole conditions, in the middle interval (418 – 195m). However, the formation of a bridge at 347m depth has resulted in losing 71m of logging between 347 – 430m. The data are not yet processed but the quality of the raw data is very good. We can identify the main lithologies and the main unconformities bounding stacks of progradational and retrogradational events.

## 4. HSE Activities

A platform induction and health and safety briefing was given by ESO to the newly arrived staff at 1215 hrs, and by Captain Clem at 1900 hrs on Wednesday 20th May.

At 1140 hrs on 18th May, 3 whales were spotted approximately 2 miles NE of the *L/B Kayd* by the Captain. The sighting was confirmed by several other participants, including the Staff Scientist. The mammals appeared to be moving north. No airguns were in the water at the time. Whales were again spotted intermittently on both May 19th and 20th. When VSP logging commences, ESO has trained marine mammal observers who will call a halt to the airguns should a marine mammal be spotted within 250 m of the *L/B Kayd*.

## 5. Figures

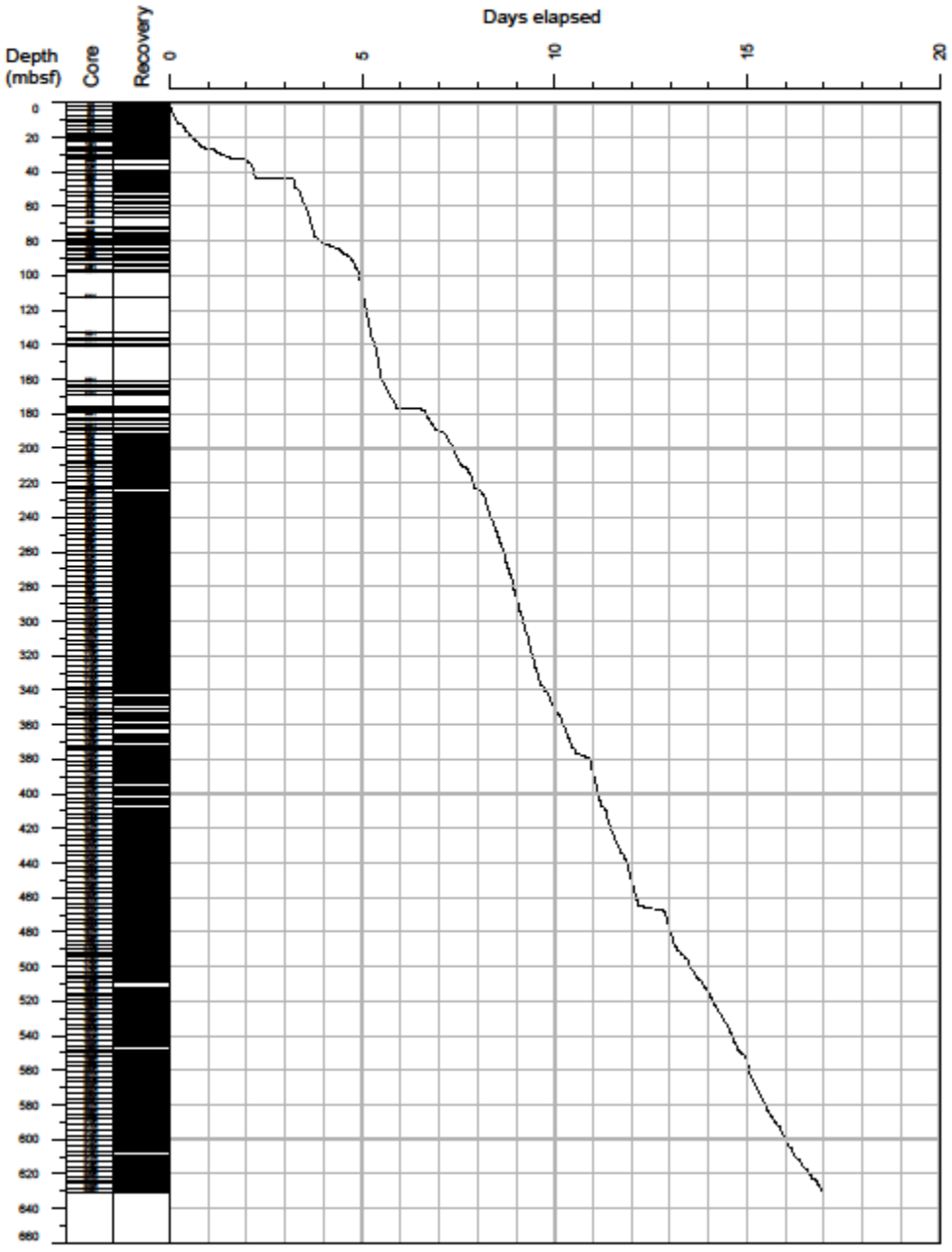
On next two pages:

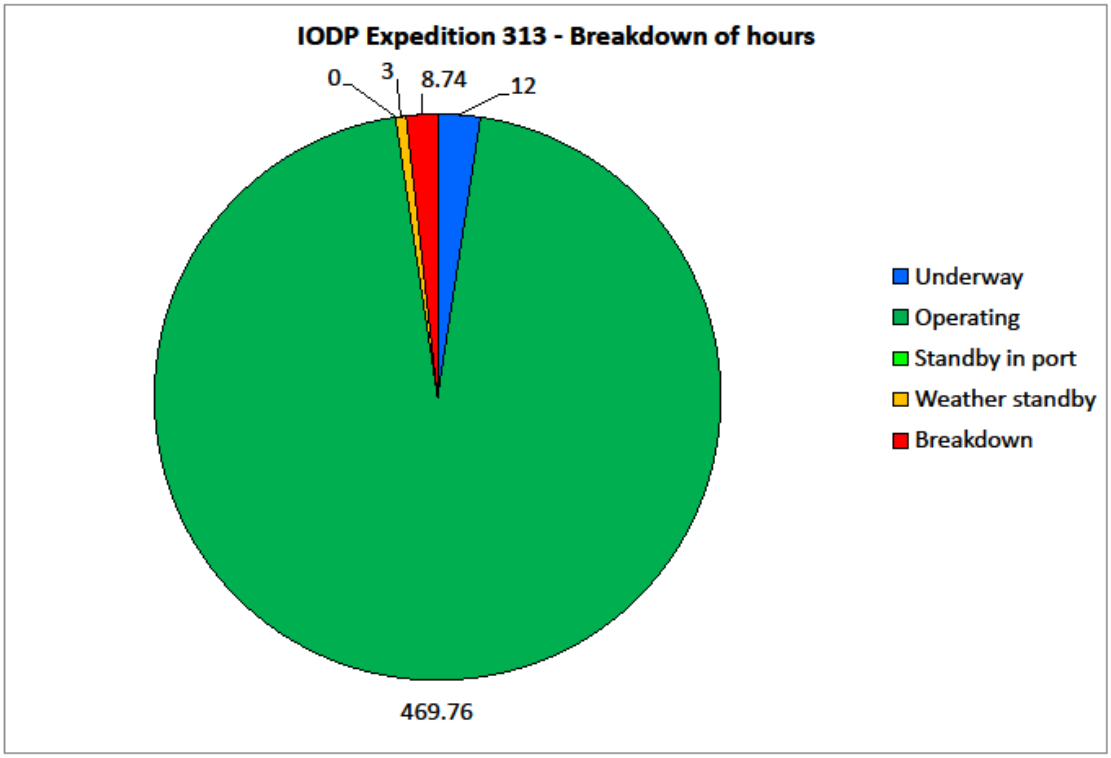
Figure 1 – Recovery and depth versus time plot at Hole M0027A, up to 2400 hrs on 20th May.
Figure 2 – Breakdown of hours, up to 2400 hrs on 20th May.

# IODP Expedition 313

## Hole M0027A progress summary

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




IODP Expedition 313 - Breakdown of hours
0
3
8.74
12
469.76
Underway
Operating
Standby in port
Weather standby
Breakdown