

Week 7 Drilling and Scientific Report for IODP Expedition 313

New Jersey Shallow Shelf

11th – 17th June 2009



1. Operations

At the start of the day on the 11th of June, there was a smell of H₂S on the drill floor although none was registered on the gas monitors. The first core of the day had a smell of H₂S, and registered 4.3 ppm on the gas monitor, which soon dissipated. Drilling continued with regular checks for H₂S returning with the mud. The 2nd and 3rd cores also had a smell of H₂S, but did not register on the gas monitor. Several more core runs were made resulting near 100% recovery but failed to penetrate the full length of the 3 m core run in harder material. As the lithology changed to a more loose material, full core runs were made.

An electrical storm briefly halted operations early on the 12th of June. Penetration rates had slowed from previous days, but with no discernable change in the lithology.

Early on the 13th of June, the drill string was pulled and it was found that the outer cutting edge of the bit had worn away. Later in the day, a very high mud back pressure indicated a blocked bit and we were unable to latch the core barrel with the overshot. A second HQ trip was made, and sand was found behind the core barrel blocking its release. On running the HQ string back in, it was found that the PQ string had filled up with sand to 250 mbsf, and flushing was required. At ~439 mbsf, the drill string was easily dropped down into the hole.

The HQ string reached the base of the hole at 0530 hrs on the 14th of June, and coring recommenced. Core recovery varied throughout the day, but improved slightly on the 15th of June when we entered stiff, swelling clays.

The salvage boat was expected to arrive early in the morning on the 15th of June to start the process of recovering the casing from the seabed. However, 10 miles from the *L/B Kayd* the salvage team reported that they were returning to shore as it was too rough for diving operations. A new salvage solution was found that will isolate the *L/B Kayd* from the salvage operation, meaning the completion of the hole and the logging operation will continue as planned with no interference.

At 0225 hrs on the 16th of June, the end of coring at Hole M0028A was declared. The call was made by the Co-chief Scientist, in consultation with other Science Party members. At 0240 hrs, the final core was curated. The last 10 double rods (61 m) were lifted to ream out the bottom of the hole in readiness for logging. The wireline and VSP logging winches were set up either side of the drill rig. At 1140 hrs, through-pipe spectral gamma ray logging began, followed by through-pipe vertical seismic profiling.

Shortly after midnight on the 17th of June, the VSP tool was returned to the deck the HQ string pulled to a clay layer approximately 25 m below the PQ string, below the loose sand that caused earlier coring and reaming problems. Between 0450 and 2100 hrs, wireline logging and VSP of the lower open hole interval was conducted with no problems. The airguns were left in water, test firing until the next VSP run (through-PQ pipe) starts at ~0200 hrs on the 18th June.

2. Hole summaries

Hole	M0027A	M0028A	Total
Latitude	39° 38.04606 N	39° 33.94279' N	
Longitude	73° 37.30146' W	73° 29.83481' W	
First core	02/05/09 at 00:10	26/05/09 at 15:15	
Last core	18/05/09 at 22:10	16/06/09 at 02:40	
Cores recovered	1H to 224R (224 cores)	1R to 170R (170 cores)	394 cores
Drilled length	555.3 m	476.78 m	1032.08 m
Recovered length	471.59 m	385.29 m	856.88 m
Core recovery	84.93 %	80.81 %	83.02 %
Final depth	631.01 mbsf	674.15 mbsf	
Hole recovery	74.74 %	84.52 %	

3. Science

We began week 7 with Core 118R (534-537 mbsf) in lower Miocene glauconitic sands and sandstones of sequence m5.6. The proportion of quartz increased downwards after we crossed the lower boundary of m5.6 below Core 126R (549-552 mbsf). Recovery remained high in glauconitic sands throughout sequence m5.7. This lithology remained a monotonously uniform 60-80% quartz sand (in bimodal distribution between medium to coarse, sub-angular grains and well-rounded granules and pebbles) and fine- to medium- sized glauconite; mica grains were noticeably absent. Some intervals were cemented to sandstone by a hard brown matrix. The glauconite component decreased downwards and correspondingly the quartz content increased to 80-90%, and penetration rates declined. The first downward trace of mica appeared in Core 145R (598-601 mbsf). By core 149R (610-613 mbsf) the quartz granules and pebbles disappeared, the amount of glauconite decreased further, and mica became common. We believe this marked the top of a lower Miocene sequence that has not been sampled in previous drilling in this region, both onshore and off. Our seismic correlations indicate it is preserved only seaward of the m5.8 clinoform and was not sampled at our previous site, Hole M0027A. The sediment became finer in the next few cores, grading to muddy sand and then silty clay, eventually classed as silty clay with common mica, lignite and a trace of possible shell fragments. The lignite and mica content began to fluctuate by core 163R (650-653 mbsf), and though we found a few calcareous concretions, no carbonate fossils were observed. Our pre-drilling depth predictions for the top of sequence m5.8 were proven accurate when Core 168R (665-668 mbsf) recovered an abrupt change to hard glauconitic sand. The next two cores became finer grained and more indurated. To allow sufficient time for high-priority logging in this hole and time for the third site, we called a halt to coring with Core 171R at a TD of 674 mbsf in hard clay containing glauconite, echinoid spines, shell fragments and forams. The close similarity of this facies traced seismically to Hole M0027A assures we had bottomed in lowermost Miocene sequence m6.

We then switched to logging operations that began with a through-pipe (HQ size) run of the spectral gamma tool. Excellent data were measured from TD to 396 mbsf; spectral gamma ray data had been collected previously through the PQ pipe above that depth. Results show clearly the sequence boundaries described above. We then collected a vertical seismic profile through the HQ pipe without difficulty. Initial results showed excellent data from TD up to 610 mbsf, but above that depth pipe reverberation interfering with the data showed that an open-hole VSP experiment was needed. The HQ pipe was raised to 425 mbsf and open-hole measurements were made below that depth using the induction, magnetic susceptibility and acoustic imaging tools. The induction and magnetic susceptibility data were excellent and will be valuable part of verifying core-log-seismic correlations. Because the centralizer for the acoustic imager was too large to fit through the HQ bit, it could not be used and data quality suffered as a result. We then repeated the VSP run done the day before, but this time in open-hole up to the base of the HQ pipe. Without the interference of pipe reverberations the data were excellent, showing sharp first arrivals and reflections from major surfaces that will determine accurately the depth of major seismic sequences. The HQ pipe was then pulled out of the hole to prepare for VSP measurements through the remaining PQ pipe, from 398 mbsf to seafloor. Based on the success of through-pipe (PQ-size) VSP measurements at our first site, we were reasonably confident these, too, would be good quality.

4. HSE Activities

Three instances of H₂S on the drill floor were recorded on the 11th of June – two from core ends and one from the returning drill mud. Although the occurrence of H₂S seemed to pass, an evacuation procedure was relayed to the scientists in the unlikely event of a major H₂S release from the borehole. There has been no further indication of H₂S by human nose or gas monitor.

A sea turtle was spotted 50 m from the *L/B Kayd* at 0950 hrs on the 13th June. No acoustic equipment was being used at the time.

At 1750 hrs on the 14th of June, the ESO curator suffered a minor accident. He lacerated the palm of his right hand while using a knife to ease an end cap onto the HQ liner. The procedure has been changed such that a mallet, rather than a hand, will be used to slip the end cap on.

A boat drill was conducted at 1830 hrs on the 14th of June. All personnel reported to the muster station.

5. Figures

On next two pages:

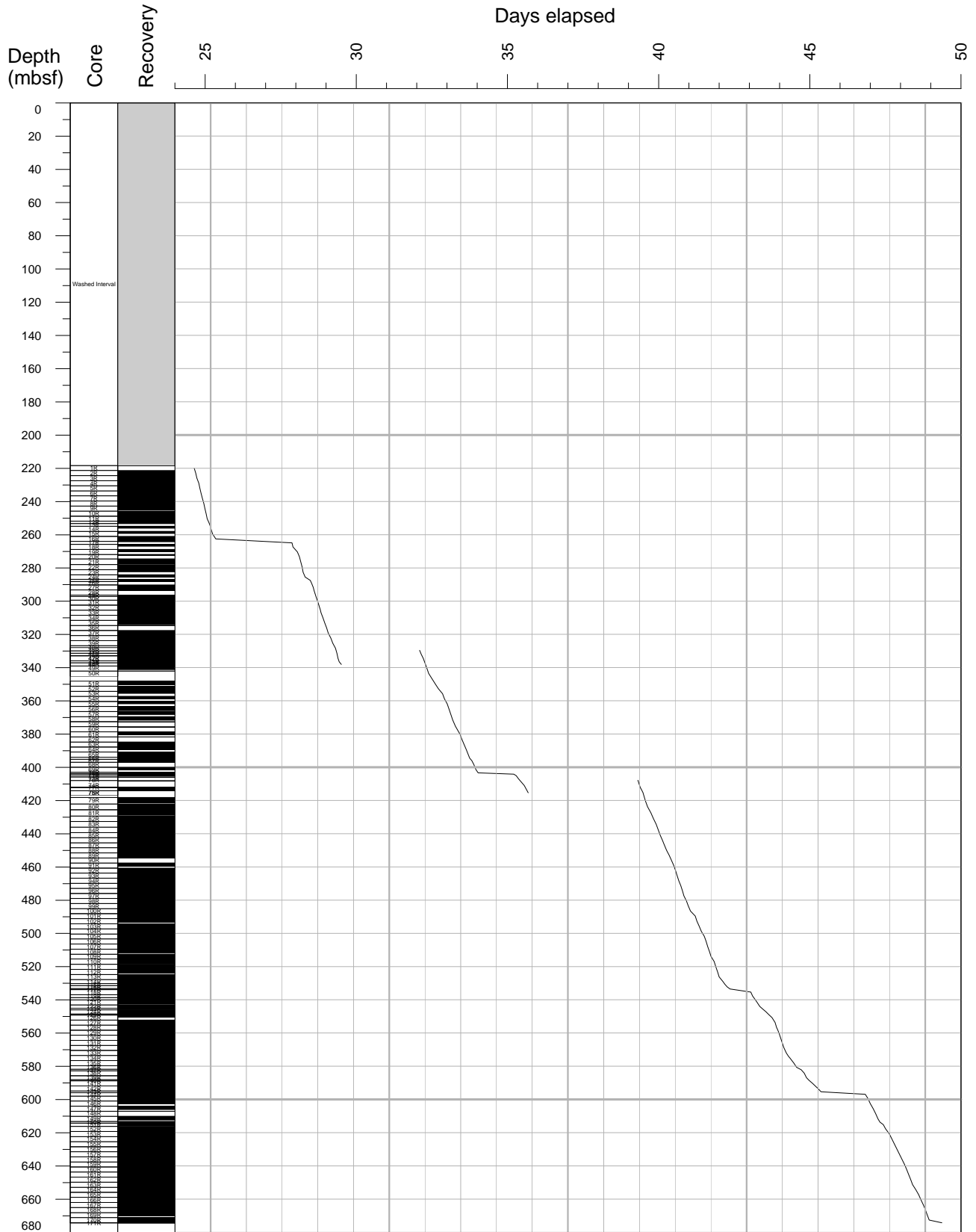
Figure 1 – Final depth versus time plot for Hole M0028A.

Figure 2 – Breakdown of hours up to 2400 hrs on 17th June.

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Hole M0028A progress summary

Latitude: 39° 33.94279' N
Longitude: 73° 29.83481' W
Water depth: 35.1 m



IODP Expedition 313 - Breakdown of hours

