



Week 2 Drilling and Scientific Report for
IODP³-NSF Expedition 501
New England Shelf Hydrogeology, 2025



16th June 00:00 – 22nd June 24:00 EDT Eastern Daylight Time (UTC -4)

1. Operations

The 16th of June began with preparations for a pump test at Hole M0111C, but issues were encountered trying to inflate and recover the packer. Attempts were made to free the packer by rotating the string and flushing the borehole, to partial success, and it was decided instead to run a gamma log through the pipe before successful removal of the packer. The rest of the evening was spent working the drill string and setting up pipe cutting equipment.

The CHD string and BHA were recovered by 06:45 on the 17th of June, and casing was recovered by 08:00. Preparations were made to secure equipment and the LB Robert transited to site MV-08A by 12:00. The LB Robert was positioned on site, legs lowered, and pre-loading was ongoing at midnight.

Pre-loading was completed at 04:30 on the 18th of June and coring of Hole M0112A began at 07:10, with first core recovery from the HPC at 10:40. Coring proceeded carefully to a depth of 25.79 mbsf at midnight on the 18th of June.

Coring continued on the 19th of June using a combination of HPC and ALN corers until competent clay at 55 mbsf. Casing was prepared and run until midnight. Poor weather meant the arrival of the OSV for supply run and crew change (originally scheduled to arrive to the LB Robert around 23:00 on the 19th) was postponed for 36 hours.

The 20th of June was spent creating a cutting returns system and running casing to 59.61 mbsf. The CHD rods were extracted and the hole cleaned and filled with fresh water before a bentonite plug was added at 21:30.

The bentonite plug was left to set and coring commenced again on Hole M0112A at 02:00 on the 21st of June. Some issues were encountered with crushed core liner, with better results using the HPC. Coring continued until midnight, with a total of 13 cores recovered. The delayed crew change took place with the new Expedition team members arriving via the OSV Gaspee at 04:30, and the transfer off completed by 06:15.

Week 5 ended with a full day of coring on the 22nd of June using a mixture of HPC and Alien corers. A total of 18 cores were recovered, and depth at midnight for Hole M0112A was 103.38 mbsf.

A breakdown of hours can be seen in Figure 1 and recovery log is shown in Figure 2.

2. Hole Summary – 16th to the 22nd of June.

Hole	M0112A
Latitude	40.9976°N
Longitude	70.3334°W
First Core	1H
Last Core	68H
Cores Recovered	68
Drilled Length (coring)	103.38 m
Drilled Length (open hole)	n/a
Recovered Length	90.67 m
Depth in Hole	103.38 mbsf
Hole Recovery	88%

3. Science

During Week 5 the Expedition 501 Science team concluded the core and sample based analyses and began data synthesis. The science team assembled for an overview science meeting where groups presented results from M0111—all on board were invited and many from the drilling crew joined. The team started analyzing cores and interstitial water from Hole M0112A once coring began on the new site.

The aqueous geochemistry team finalized collection of shipboard measurements and began the integration of data at Site 0111. Preliminary comparison of the pH data amongst Holes M0111A-M0111C and the pump tests conducted in Holes M0111B and M0111C suggest that the observed differences between Hole C pH and Holes A and B are due to a real change in interstitial water chemistry rather than an analytical artifact. At Site M0112A, the team measured salinity, ammonium, alkalinity, and pH on samples from interstitial waters collected from sands between 0 and 56 mbsf using rhizon samplers and squeeze cakes in the clays between 57 and 104 mbsf. Interstitial water results showed freshening below 55 mbsf, within the clays. Alkalinity increased in the freshened interval, similar to observations in Site M0111. Some gas expansion was observed by curation when processing the clay cores

The physical properties team finalized the data from Hole M0111C and integrated the MSCL and logging data across the three holes of Site M0111. Overall, the data showed agreement between holes and between core and log data. Some depth offsets between the cores and logs will require further evaluation. At Site M0112A, the team processed cores through the multi-sensor core logger for measurements of P-wave velocity, bulk density, magnetic susceptibility, electrical resistivity, and natural gamma radiation measurements.

The hydrogeology team continued to work towards a pump test in the large sand interval between 204 and 231 mbsf at Hole M0111C, but hole conditions prompted an end to the test and the hole. From both the successful and unsuccessful pump tests in Hole M0111C, we learned more about how to approach pump tests in M0112. After the tests, the hydrogeology team began analyzing the data recovered and made a preliminary attempt at quantifying the hydrologic conditions in the formation. The hydrogeologist team is documenting the protocols and working through approaches to using the new manifold constructed between the first and second pump tests at M0111C.

The shore-based sedimentology group provided an update using the core photographs for M0111C and M0112A. For M0111C, descriptions were produced for cores 21 to 39 and the lithologies match well with those observed in M0111B. Sands were observed to be grey or dark grey, while muds were generally darker. Little evidence for sedimentary structures could be observed from the photographs. More distinctive greenish sediments were also observed, and some evidence for alteration. In Hole M0112A, initial work show lithologies interpreted as sandstone, with some mud intervals showing as darker grey in colour.

4. HSE Activity

A fire drill was carried out at 18:00 on the 22nd of June.

The ship's deck was checked regularly for stranded seabirds.

5. Outreach Activity

- 3 blog posts and corresponding stories
- several social media posts on X/Twitter (5), Bluesky (5), Instagram (2) and Mastodon (5) linking the blogsite plus corresponding stories
- 2 Newsletter articles (UK IODP, Uni of Leicester)
- Research interview news agency
- Interview Le Monde
- Interview and virtual tour Local New England Media

6. Figures

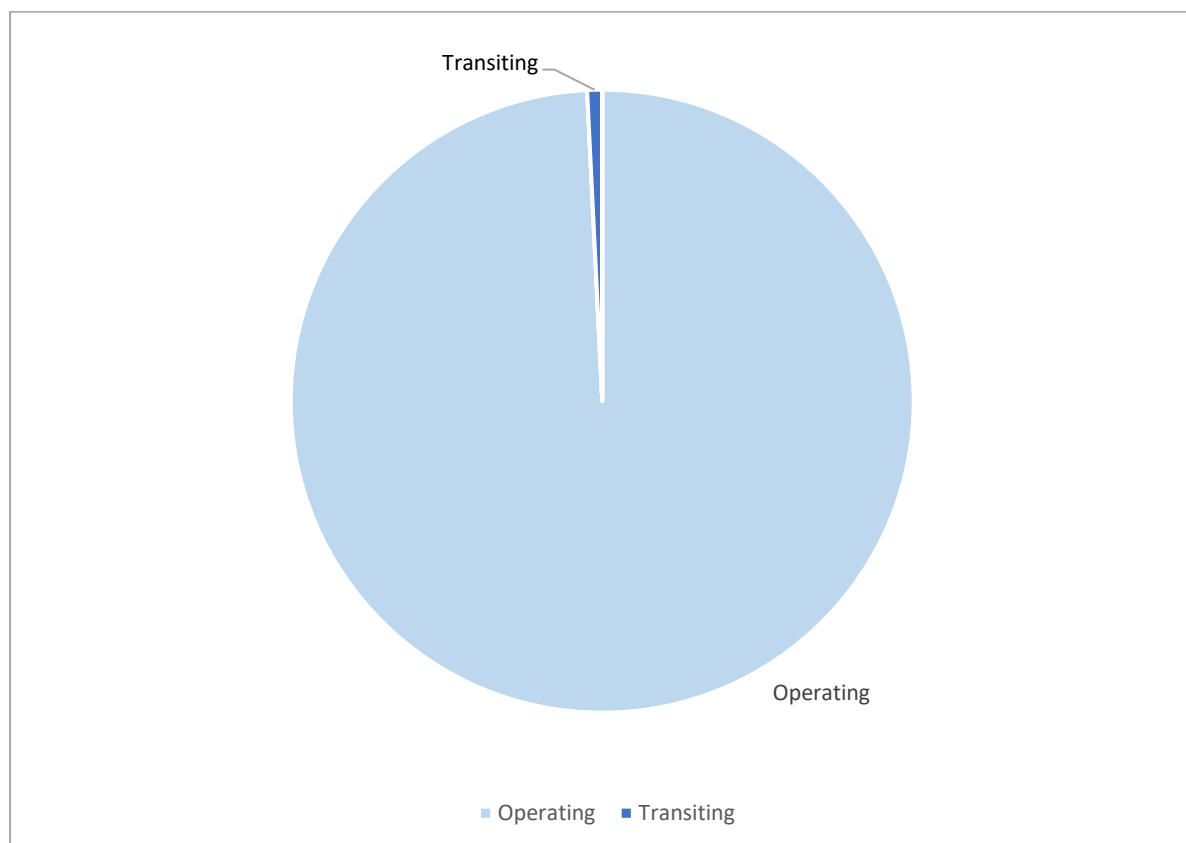


Figure 1 Breakdown of hours for week 5 (16th to 22nd June 2025).

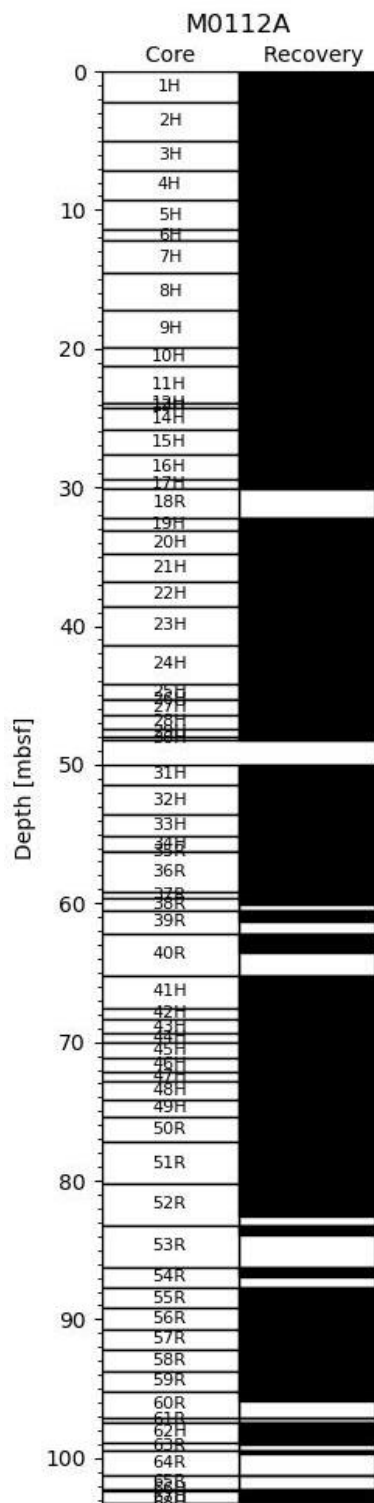
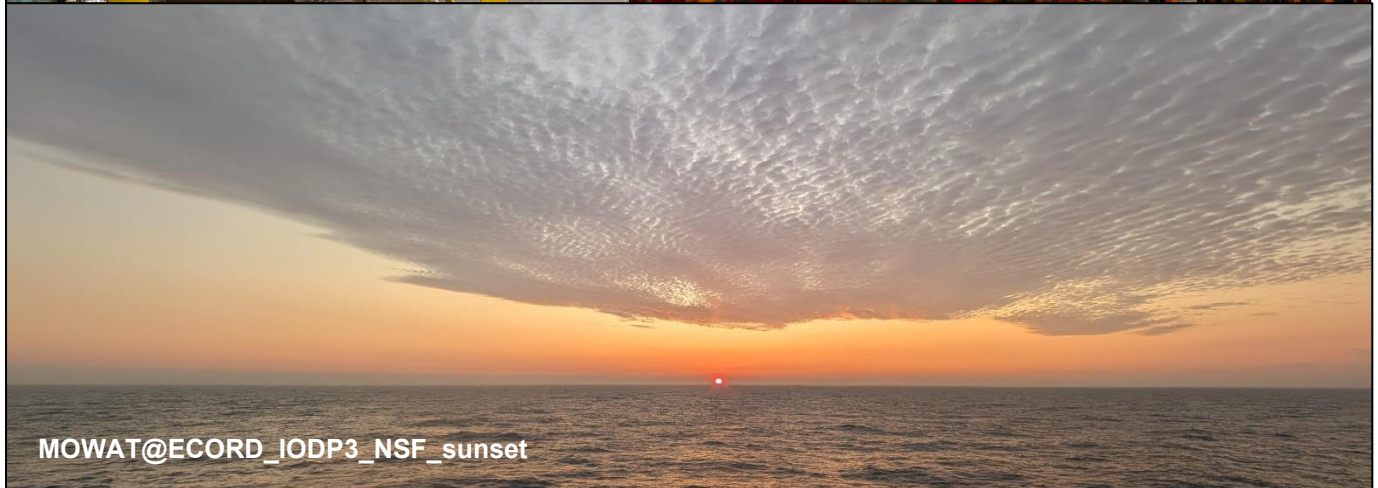
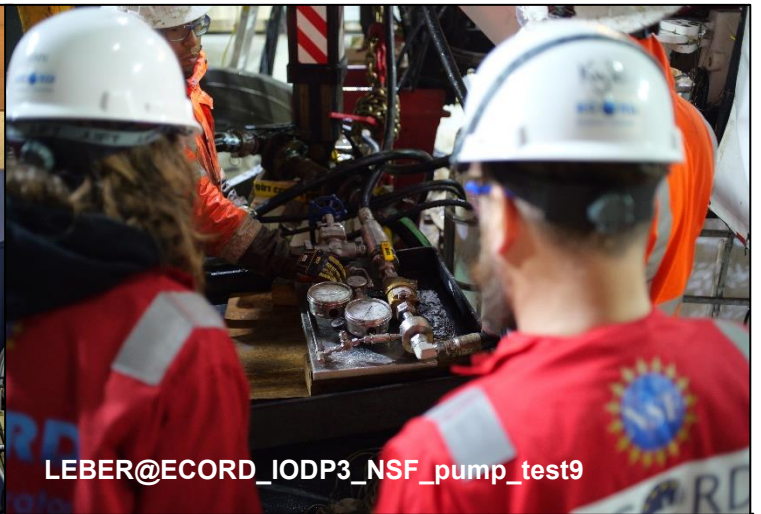


Figure 2 Core recovery for week 5 for Hole M0112A.

7. Photographs



Clockwise from top left: Cutting core at the curation table. Setting up for pump testing. Co-chiefs on the drill rig. Sunset after bad weather.