Week 2 Drilling and Scientific Report for
IODP[3]-NSF Expedition 501
New England Shelf Hydrogeology, 2025

23rd June 00:00 – 29th June 24:00 EDT Eastern Daylight Time (UTC -4)

1. Operations

The 23rd of June saw continued coring at Hole M0112A using a mixture of hydraulic piston corer and alien corer to a depth of 133.59 mbsf. Coring continued throughout the 24th with very good average recovery of 80% and depth at midnight 180.25 mbsf. On the 25th of June, the Hole was progressed a further 39.56 m with excellent recovery at 89%.

The 26th started with a round trip of the CHD string to check bit condition, which was found to be worn and was changed out. Borehole advance continued using a mixture of hydraulic and piston corers through sands and clays.

On the 27th of June, a brief period of downtime (50 minutes) occurred while the remote operator for the pipe handler was repaired. Hole M0112A was then advanced to 294 mbsf through a mixture of sands and clays. Two sections were open-holed due to difficult drilling conditions but total recovery remained high at 72%.

Hole M0112A was progressed to 324.01 mbsf after a day of drilling on the 28th using the alien corer. Hard sands and soft clays proved difficult to core and so the decision was made to switch to shorter runs. Average recovery was 67%.

Coring of Hole M0112A was completed at 05:55 on the 29th of June to a depth of 328.71 mbsf. Logging began at 08:05 and carried on until midnight. 8 X501 team members transferred on at 20:00 and 6 team members transferred off.

A breakdown of hours can be seen in Figure 1 and recovery log is shown in Figure 2. Figure 3 shows the recovery log for the whole of M0112A.

2. Hole Summary – 23rd to the 29th June.

Hole	**M0112A**
Latitude	40.9976°N
Longitude	70.3334°W
First Core	69R
Last Core	221R
Cores Recovered	153
Drilled Length (coring)	225.33
Drilled Length (open hole)	7.42
Recovered Length	165.29
Depth in Hole	328.71 mbsf
Hole Recovery	73%

3. Science

During Week 6, the Expedition 501 Science team completed a comprehensive sample and data collection program in Hole M0112A. This included curation of 255 m of core and collection of 446 discrete samples. The overall core recovery for M0112A was 80%. Downhole logging of M0112A is ongoing. A personnel transfer was completed late on June 29th. Thanks to all off-going science, ship, and drilling personnel and welcome to all new and rejoining team members. The Science team is planning for a pump test in Hole M0112B, once the next ship personnel transfer is completed the L/B Robert is moved to its new position.

The shore-based sedimentology team completed preliminary core descriptions for Hole M0112A. Four main sequences were identified from top to bottom: (1) green-grey clays and sands, (2) black sands, (3) light grey mudstones with beige sands, and (4) grey to red muds with interbedded white sands. Red muds are predominant from approximately 285 mbsf.

The aqueous geochemistry team finalized curation and splitting of 84 interstitial water samples and the shipboard measurement of salinity, alkalinity, pH, and ammonium for Hole M0112A. The team is comparing the data between Hole M0112A and similar data collected at Site M0111. Shifts towards freshened waters downhole occur at both sites, although the shifts appear to occur at shallower depths in Hole M0112A compared to the composite for Site M0111 and the minimum salinity value at Hole M0112A is lower than any measured in Site M0111, consistent with the nearshore position of Site M0112. Similarly, the peak in alkalinity observed in Site M0111 also occurs slightly shallower but within what appears to be the same clay layer in Hole M0112A.

The physical properties team measured all measurable core sections collected in Hole M0112A through the multi-sensor core logger. Measurements of P-wave velocity, bulk density, magnetic susceptibility, electrical resistivity, and natural gamma radiation provide a comprehensive stratigraphy of the borehole that reflects the interbedding of clays and sands. After the ongoing, final stages of logging of Hole M0112A, the team will be processing the logging data and making core-log comparisons. Preliminary natural gamma, collected through the drill string, shows excellent consistency with the core-based measurements, with little obvious depth offsets.

The hydrogeology team spent the week preparing for a complete turnover of personnel. The shipboard team produced and refined a comprehensive handover document outlining the pump testing procedures, created videos explaining the manifold used for monitoring flows and distributing water samples, and conducted calls with the onboarding hydrogeologist.

4. HSE Activity

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

X501 team members were made aware of deck and operational changes prior to the switch to logging the hole. Continued reminders were made to the team to take care in windy and wet conditions, and to stay hydrated and wear sunscreen in strong sunshine.

5. Outreach Activity

- 2 blog posts and corresponding stories.
- several social media posts incl collab posts/reposts on X/Twitter (3), Bluesky (3), Instagram (2) and Mastodon (2) linking the blogsite plus corresponding stories.
- 1 news item (Stockholm University)
- 1 news magazine article mentioning the expedition (Focus, Germany)

6. Figures

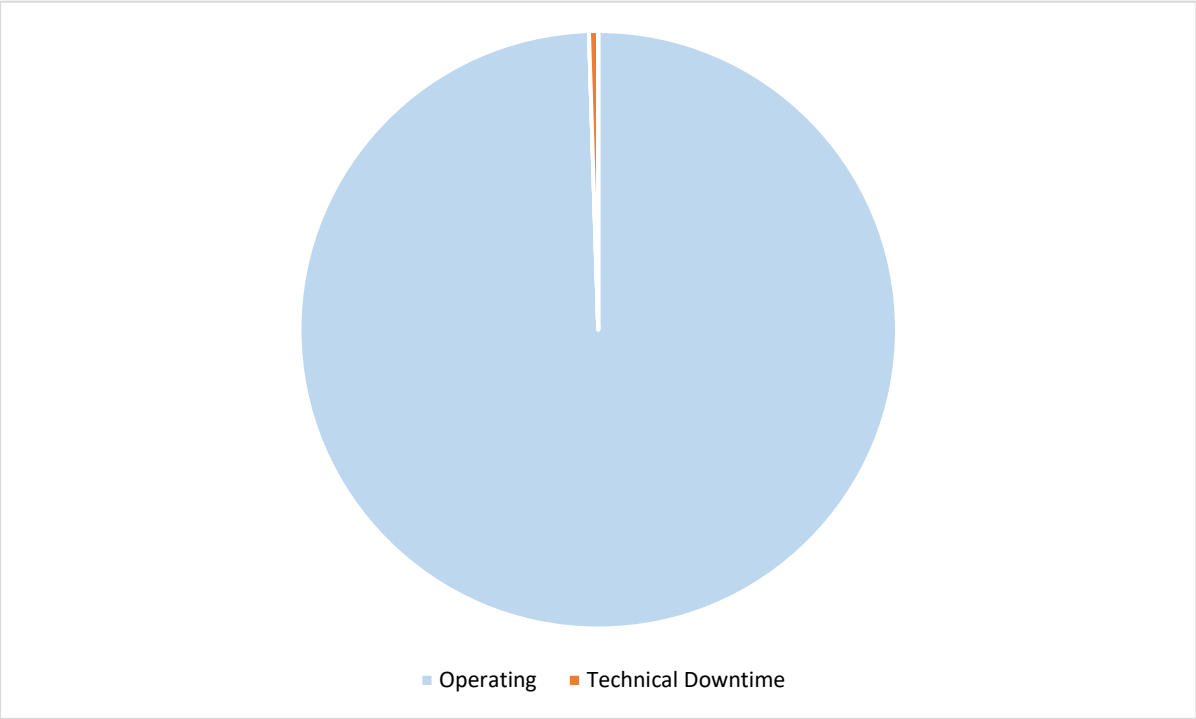

Figure 1 Breakdown of hours for week 6 (23rd to 29th June 2025).

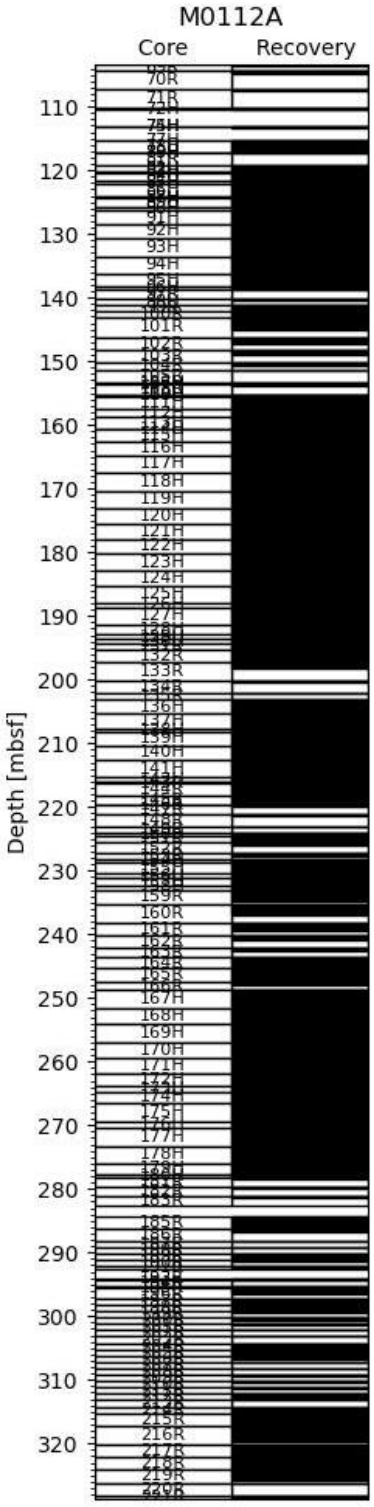

Figure 2 Core recovery for week 6 for Hole M0112A.

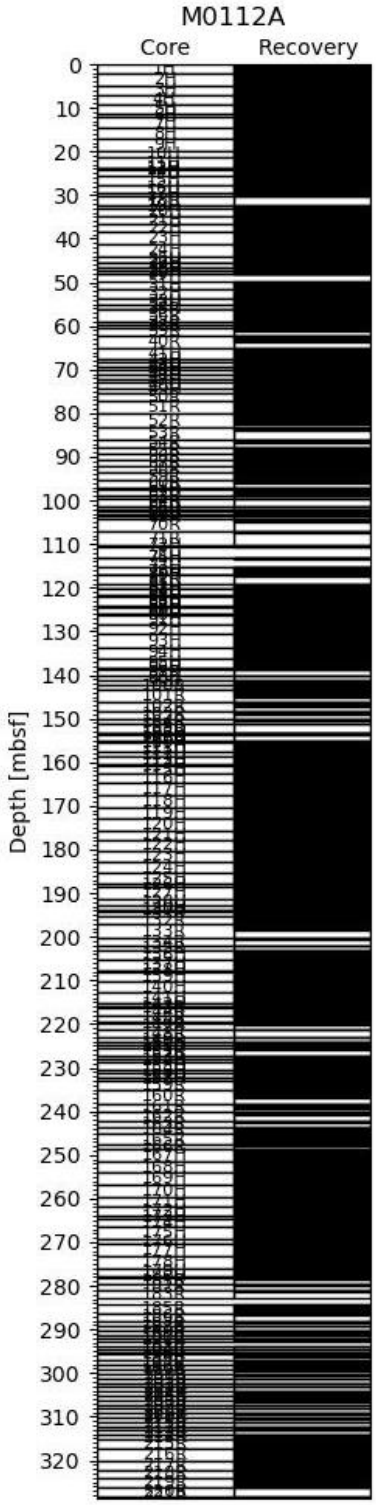

Figure 3 Recovery plot for Hole M0112A completed on the 29th of June

7. Photographs

From top left clockwise: PPS Andrew McIntyre and Logger Fadl Raad test a logging tool. Dragonfly on the wireline. Scientist Sara Polanco records ESO team member Antonio Ferreira running the sediment squeezer. Sunset after fog.