Week 1 Drilling and Scientific Report for
IODP^3-NSF Expedition 501
New England Shelf Hydrogeology, 2025

19th May 00:00 – 25th May 24:00 EDT Eastern Daylight Time (UTC -4)

1. Operations

The L/B Robert left port at 06:30h EST on the 19th of May to make the transit to site MV-03C and by 09:11hrs on the 20th had reached the site at 40.8746°N, 70.2697°W. The pre-load sequence completed and the vessel jacked up to working height (working deck approximately 10m above wave height) by 07:15 on the morning of the 21st of May.

Operations began immediately with casing being run and the seabed was tagged at 13:00. Hydraulic piston coring (HPC) commenced. Coring continued until 00:30 on the 22nd when casing was washed into the borehole due to challenges caused by vibration and bending. HPC coring recommenced at 06:00 and the switch was made to Extended Nose Coring (EXN) because of poor recovery. The EXN also suffered from poor advance, the cause of which was preliminarily interpreted as glauconitic sands. Further difficulties continued through the day with poor recovery and resistance. Casing was washed down to pass the difficult interval, but issues involving the mud return system slowed progress through the evening. Coring operations resumed before midnight using the EXN and then the HPC.

Throughout the 23rd coring operations continued, returning 15 cores and advancing to 63.65 mbsf with Core 29H received on deck at 15:25. During the morning of the 23rd, 7 new expedition team members arrived on the L/B Robert for the start of Rotation 3.

Following recovery of Core 29H and while trying to recover Core 30H, the drilling crew encountered a stuck core barrel. At 17:30 the decision was made to cut cable and pull out of hole. Unsuccessful attempts to recover the core BHA continued until 04:00 on the 24th. The decision was then made to pull the casing from the borehole. By 09:30, 36 m of casing was removed from the hole and preparations were made to start Hole M0111B.

During the morning of the 24th casing was run from surface to 18 mbsf in Hole M0111B until hitting a resistant lithology, and the decision was made to begin rotary drilling and wash down to 62 mbsf. From 18:30 to 21:00 preparations for rotary drilling were made by hanging casing and installing the mud system. Rotary drilling (open hole, no coring) commenced at 21:00 and continued until depth objective 62 mbsf was reached at 05:00 on the morning of the 25th. Coring commenced with the HPC until a depth of 72.76 mbsf where challenging hole conditions were encountered so operations switched to rotary coring continued throughout the day. At 22:40 the HPC was redeployed. By 24:00 on the 25th Hole M0111B a depth of 98.76 mbsf had been reached with 21 cores retrieved, and a total recovered length of 25.34 m.

A breakdown of hours can be seen in Figure 1, and logs of recovery in Figures 2 and 3.

2. Hole Summary

Hole	**M0111A**
Latitude	40.8746°N
Longitude	70.2697°W
First Core	01H
Last Core	29H
Cores Recovered	29
Drilled Length (coring)	45.05 m
Drilled Length (open hole)	18.3 m
Recovered Length	48.85 m
Depth in Hole	63.35 m
Hole Recovery	76.75%

Hole	M0111B
Latitude	40.8746°N
Longitude	70.2697°W
First Core	001H
Last Core	021H
Cores Recovered	21
Drilled Length (coring)	36.76 m
Drilled Length (open hole)	62 m
Recovered Length	25.34 m
Depth in Hole	98.76 m
Hole Recovery	69%

3. Science

Over the course of Week 1 the Expedition 501 Science Team began initial description of cores, analyses of water chemistry, and bulk physical properties based on multi-sensor core logger (MSCL) data for Site M0111.

The sedimentology team provided a preliminary lithological description based on core section photographs taken while the cores were in the liners. Preliminary observations of core from Hole M0111A (0-63.35 mbsf) indicate a predominance of sand or silt/fine sand. Sediment color is generally grey to dark grey, with some intervals of lighter brownish-grey. Shell fragments were abundant from the seafloor to ~15 mbsf.

The aqueous geochemistry team collected a seawater sample upon arrival on site and collected interstitial water samples using Rhizon and squeeze cake sampling methods. Salinity, ammonium, alkalinity, and pH analyses were completed for the seawater sample and interstitial water to ~85 mbsf. Data between Hole M0111A (0-63.35 mbsf) and Hole M0111B (62-~85 mbsf) show good continuity. In addition, the geochemistry team and microbiology team completed sample splits and preservation for shore-based interstitial water and microbiological analyses.

The physical properties team conducted non-invasive measurements of P-wave velocity, bulk density, magnetic susceptibility, electrical resistivity, and natural gamma radiation using the MSCL. All cores from Hole M0111A were logged and QA/QC of these data have been completed. Data are ready for initial interpretation and correlation with seismic interpretations, preliminary core descriptions, and interstitial water data.

The expedition science team held one ship-to-shore meeting (21st of May) to provide onshore scientists with updates about offshore operations.

4. HSE Activity

19/05 ESO safety briefing and shift working guidance to all Science Team and ESO staff on board

5. Outreach Activity

The first ESO Offshore Outreach Officer joined the vessel and began a full campaign of image and video capture, alongside interviews of Science Team and ESO staff members.

6. Figures

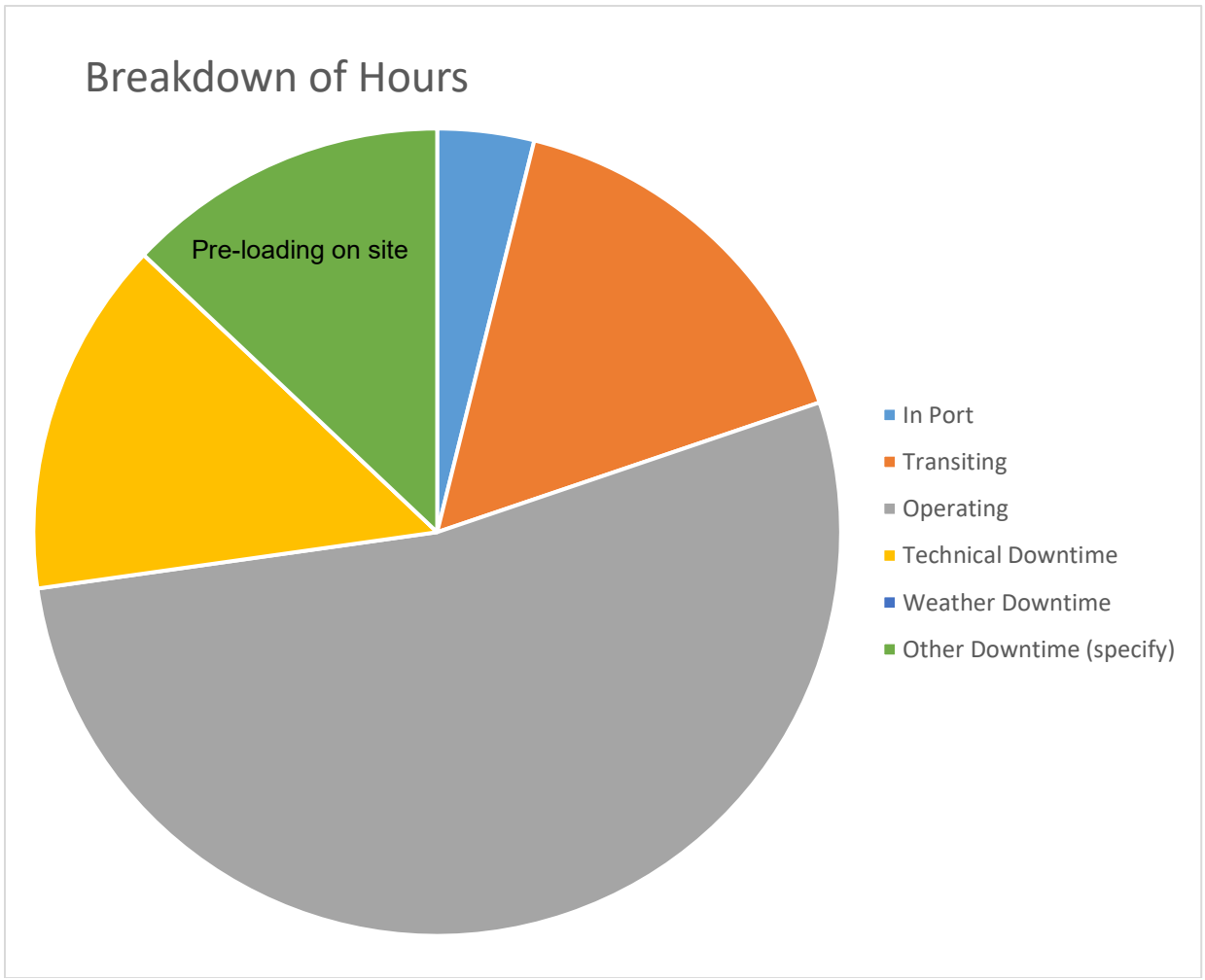


Figure 1: Breakdown of hours from 00:00 May the 19th to 24:00 May the 25th 2025

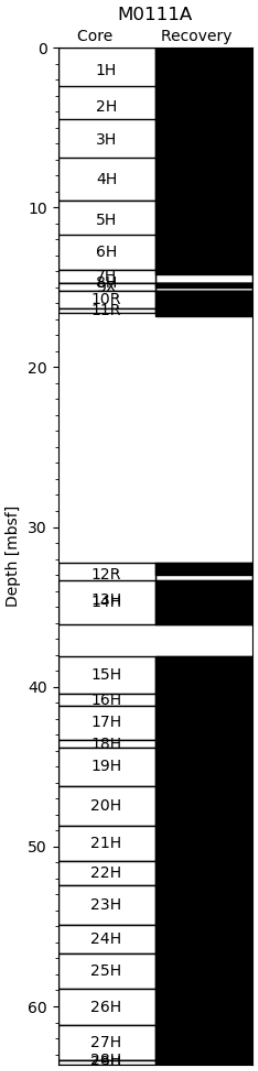


Figure 2: Core Recovery for Week 1 from Hole M0111A (white gaps indicate no recovered core)

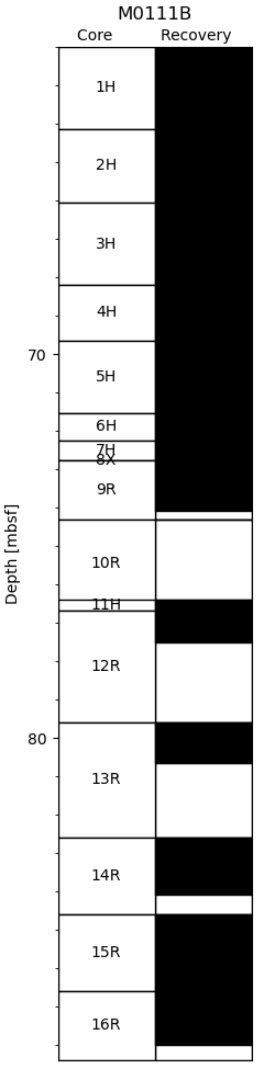
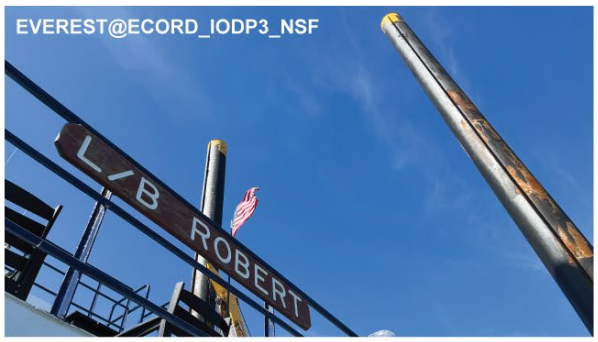


Figure 3: Core Recovery for Week 1 from Hole M0111B (white gaps indicate no recovered core)

7. Photographs



Clockwise from top left: The nameplate and port and starboard forward legs of the L/B Robert; the L/B Robert alongside in Bridgeport, CT; installing Rhizon samplers to extract interstitial water samples; sample discussion in the Geochemistry laboratory; the automatic pipe handler on the drill floor.