

Scientific report for IODP³ – NSF Expedition 501

New England Shelf Hydrogeology



Weekly report – 21st January to 27th January 2026

1. Location

Bremen Core Repository, MARUM – Center for Marine Environmental Sciences, University of Bremen, Germany.

2. Activity summary

During the first two days of Onshore Operations (OnO) Week 2, core processing continued for Hole M0111B, followed by Hole M0111C for the next three days, completing the work for Site M0111 on the 26th of January 2026. The last two days of Week 2 saw processing begin for Hole M0112A, which remains ongoing. A cumulative total of 431.69 metres has been split, analysed and described during the first two weeks of the OnO and 1742 samples taken (Table 1). Science Team contributions to the IODP³ Proceedings Methods paper were submitted and reviewed by the Co Chiefs and EPMs. Alongside their duties in the lab, the Science Team began preparation of their manuscripts for the Site M0111 Report, as well as preparing scientific summaries for the Site M0111 Summary meeting on Thursday the 29th of January.

Hole	Total core length (m)	Split core described (m)	Total samples recovered
M0111A	50.37	50.37	178
M0111B	201.33	201.33	889
M0111C	65.57	65.57	201
M0112A	255.96	114.42	474
M0112B	58.52	0.00	0.00
M0113A	241.49	0.00	0.00

Table 1 – Progress summary (cumulative) for Week 2 (21st to 27th January 2026)

3. Scientific assessment

The major activities of the past week included the completion of a first draft of the Methods chapter, core processing, and starting first drafts of the Site M0111 reports. Core processing, including sampling and descriptions, continued through Holes M0111B and M0111C and into M0112A.

The sedimentology and lithostratigraphy team completed the visual core descriptions and smear slide analyses of Site M0111. Four main lithologic units were defined based on major lithological changes. These changes broadly map with major unconformities. Lithologic unit 1 is sand-dominated with some shell-rich intervals. The top of Lithologic unit 2 correlates with a seismically interpreted unconformity, and sediments within the unit are mud-dominated. Lithologic unit 3 contains heterolithic muds and sands. Lithologic unit 4 includes mottled clays interbedded with quartz-rich sands. The team also worked with the physical properties and petrophysics team to finalize the layout for the Expedition barrel sheets.

Biostratigraphy continued to work their way through the described sections. More than 40 samples have been inspected for planktic foraminifera, spanning almost 400 meters of core, and

smear slides were analysed for calcareous nannofossils in Holes M0111A and -B. Nannofossil datums suggest the sedimentary sequence at Site M0111 spans the Pleistocene to the Cretaceous while a small number of foraminifera are Pliocene, Miocene, and Cretaceous in age.

The physical properties team have been busy scanning archive halves to obtain high-quality linescan images and RGB data. Working halves were scanned for colour reflectance data. The team completed scanning all sections from Site M0111 and stayed on track with the core flow processing of Hole M0112A. Moisture and density (MAD) and discrete P-wave samples have been taken at regular intervals, where possible. MAD measurements show porosity trends that potentially document different porosity trends based on lithology and lithologic unit. Shear strength was measured and formation factor was calculated at discrete ~10 m intervals within the mud-rich lithologies of Site M0111. Correlation of these data with porosity is ongoing. Scanning, sampling and discrete measurements continued in Hole M0112A.

The geochemistry team focused on preparing and analysing interstitial water samples taken from Sites M0111, M0112 and M0113 during offshore operations. A total of 539 samples were diluted and/or derivatised to analyse dissolved anions (e.g. chloride, bromide, sulphate), major and minor elements (e.g., calcium, magnesium, iron and manganese), and sulphide. Results of the first analyses were expected towards the end of the week (30th January). In addition, the subsampling of frozen squeeze cakes for personal requests was completed. A total of 904 squeeze cake subsamples were taken for post-cruise research and archiving purposes. This effort greatly benefited from the support of Expedition 501 team members who lent the geochemists a hand with the hammer and chisel, and the label printer. The geochemists are now able to focus on new samples that are taken every day from the split cores for onshore geochemical and mineralogical analysis. By the end of Week 2 53% of the expected samples had been taken and prepared for further analysis.

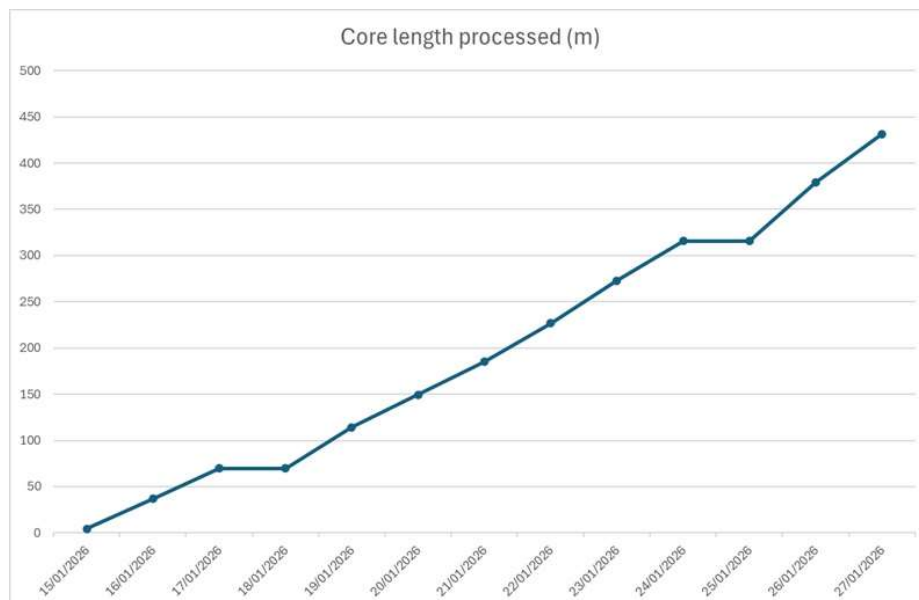


Figure 1 – Core progress chart (from the OnO start date 15/01/2026 until 22:30, 27/01/2026)

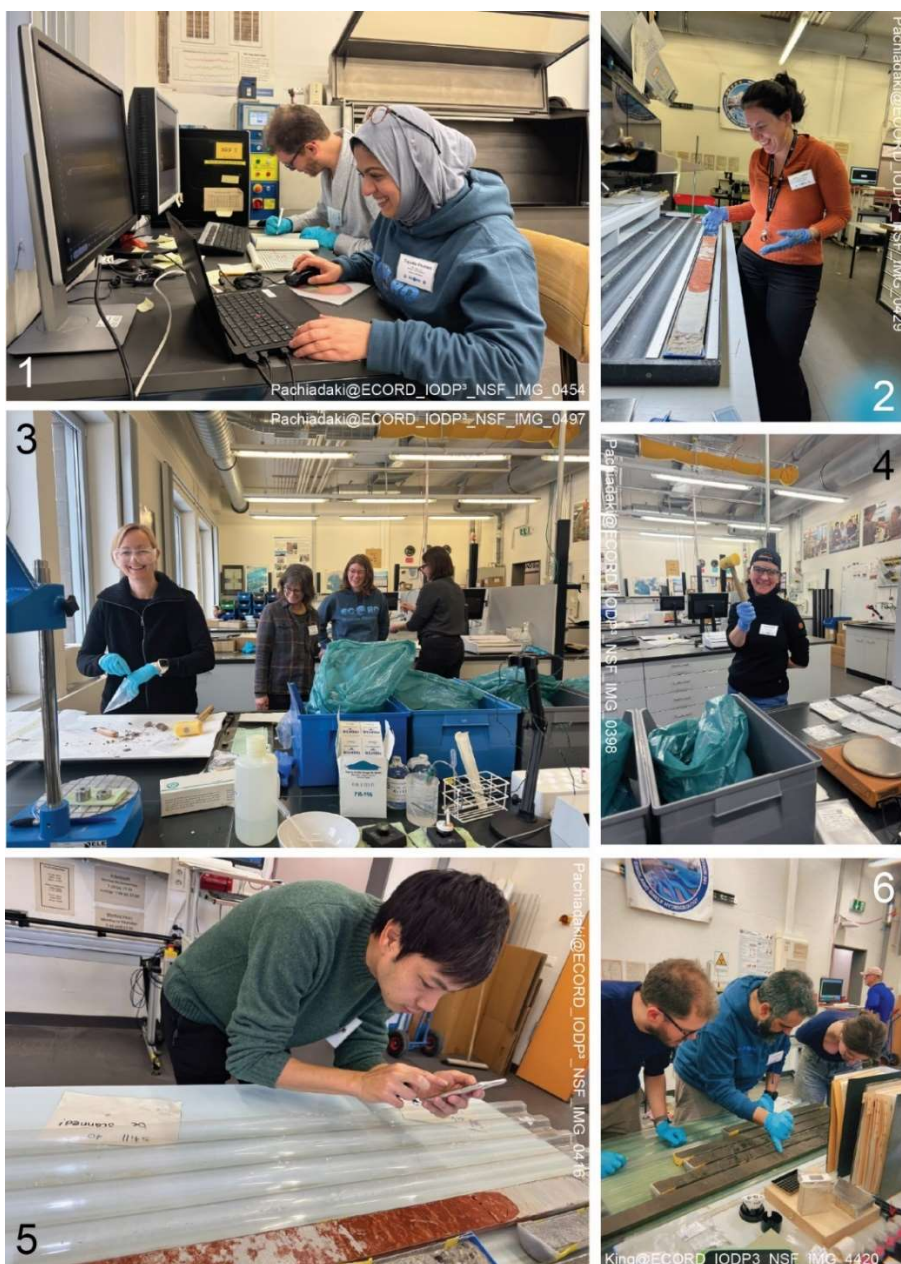


Photo 1. ESO staff members Tayyaba Khurram and Tim van Peer recording linescan measurements (Pachiadaki@ECORD_IODP³_NSF_IMG_0454)

Photo 2. Scientist Sara Polanco describing a core (Pachiadaki@ECORD_IODP³_NSF_IMG_0429)

Photo 3 & 4. Scientists Laura Wehrmann and Verena Heuer splitting frozen squeeze cake subsamples joined by Co-chief scientist Rebecca Robinson and Bremen student assistant Leola Pfaffling (Pachiadaki@ECORD_IODP³_NSF_IMG_0497, Pachiadaki@ECORD_IODP³_NSF_IMG_0398)

Photo 5 & 6. Science team members (physical properties specialist Tsuyoshi Shintani, sedimentologists Cristina Corradin and, Davide Gamboa as well as ESO team member Tim van Peer) discussing core sections (Pachiadaki@ECORD_IODP³_NSF_IMG_0416, King@ECORD_IODP³_NSF_IMG_4420)