



**21<sup>st</sup> July 00:00 – 27<sup>th</sup> July 24:00 EDT Eastern Daylight Time (UTC -4)**

## 1. Operations

During the 21<sup>st</sup> to 23<sup>rd</sup> of July coring continued apace, with daily wiper trips and recovery of the BHA to deck for cleaning and inspection, with being replaced as necessary to improve recovery quantity and quality.

On the 24<sup>th</sup> coring proceeded until mid-morning when a potential aquifer sand was recovered. After proving sufficient thickness it was decided to set the packer and attempt to extract water from the formation. The operation was completed in good time without any issues. The initial extraction of water from the drill string proceeded well until late in the evening when the pump failed. Rebound of the water level was recorded but after an hour it was noted there was no further increase in water into the string. Recognising behaviour seen in previous tests at different sites, at midnight it was decided to recover the MP1 pump and packer assembly and abandon the pump test at this depth.

Following an unsuccessful attempt to clear the packer assembly on the morning of the 25<sup>th</sup> it was agreed the pump test should be stopped and the packer was recovered to deck. The seawater in the borehole was replaced with drilling fluid and coring resumed. During the late morning, it was decided to use stronger release pins for the packer. The bit was raised and the packer set just below the previous test position and a second attempt at a pump test began at 1645 hrs.

Groundwater was successfully extracted from the borehole throughout the day on the 26<sup>th</sup>, initially to replace the water that had been flushed into the string with water from the borehole formation. Once the level of the head had settled, the water was replenished at a constant rate and there was little need to adjust the pump speed to maintain the flow. Sampling commenced at 19:00 and continued through the night.

An extremely successful water pumping test was completed: all samples requested were collected and consistent data recorded. The packer was recovered and the bit washed down to the bottom of the hole without incident. Coring progressed well until operations had to be suspended on safety grounds to allow a lightning storm to pass.

## 2. Hole Summary – 21<sup>st</sup> to 27<sup>th</sup> July

Hole	M0113A
Latitude	40.618333°N
Longitude	70.136972°W
First Core	501_M0113_A_083R
Last Core	501_M0113_A_0174H
Cores Recovered	92
Drilled Length (coring)	139.35 m
Drilled Length (open hole)	0
Recovered Length	90.5 m
Depth in Hole	277.74 m
Hole Recovery	64.9 %

### 3. Science

During Week 10 the Expedition 501 Science Team focused their efforts on Site M0113 where they analyzed core through liners, collected and interpreted multi-sensor core logging (MSCL) and interstitial water data, and completed an extensive groundwater pumping test. In the weekly ship-to-shore meeting the Science Team discussed what they had learned so far at Site M0113 and summarized plans for completing Site M0113 which will wrap up offshore operations for Expedition 501.

MSCL data from Site M0113 were collected through 260 mbsf and were used to guide a preliminary interpretation of the sedimentary section. Below an upper section that was characterized by alternating sand and mud sediment packages, the team interpreted a 100+ m thick, fine-grained package with relatively high natural radiation values that had minimal gamma radiation variations. The magnetic susceptibility of this package also showed little variability. In contrast, the gamma bulk density and non-contact electrical resistivity showed more variation. Visual inspection of cores through the liner confirmed a generally consistent fine-grained sedimentary matrix in this thick package, and also facilitated the identification of multiple igneous and metamorphic clasts, which at times were cobble-sized.

The interstitial water and microbiological teams were busy processing samples through 260 mbsf. Salinity data to this depth documented two separate horizons of freshened water. Alkalinity values over the interval showed a general downhole increase similar in shape and values to that observed at Site M0112. pH values at M0113 were broadly consistent with observations at Sites M0111 and M0112. Alkalinity values at Site M0113 initially increased downhole to the highest values observed during the Expedition and then decreased deeper in the hole; a trend that differed significantly from Sites M0111 and M0112.

With the general sediment characterization, physical properties data, and interstitial water data, the science team selected a target for the final groundwater pumping test of the Expedition. The pumping test provided significant volumes of water for aqueous geochemical, noble gas, and microbiological analyses and sample collection. The test also provided a large time-series data set to help address the physical and chemical hydrogeology of this offshore freshened groundwater aquifer.

### 4. HSE Activity

The ship's deck was checked regularly for stranded seabirds. A White Faced Storm Petrel was found on the main deck in the early morning of the 22<sup>nd</sup> and flew away.

24<sup>th</sup> A shackle fell to the deck from the main crane, landing initially on the ESO Curation container and then bouncing on a tarpaulin covering Main St. It is thought it had worked itself loose in the breezy conditions, at the end of a dangling strop. No one was hurt although ESO staff, scientists and Boart Longyear drillers were on deck at the time.

The ship's crew moved quickly to lower the crane hook, and remove all remaining strops and shackles. The crew were instructed to ensure no rigging is to remain attached when the crane is not in use. All ESO staff and Science Team were informed and reminded to observe PPE rules at all times when on deck.

On the 26<sup>th</sup> A Science Team member slipped and fell on the lower deck, badly bruising their knee. Ice was applied and the scientist took every opportunity available to rest and elevate the knee.

### 5. Outreach Activity

- 3 blog posts and corresponding stories
- several social media posts including collaborative posts/reposts on X/Twitter (2), Bluesky (2), Instagram (7) and Mastodon (5) linking the blogsite plus corresponding stories
- 1 news item (Stockholm University: <https://www.su.se/english/news/chasing-freshened-groundwater-beneath-the-seafloor-1.830408>)
- 1 newspaper article featuring the expedition (Taz, Germany): "[Eine Angel Gegen die Panik](#)" | taz.de

## 6. Figures

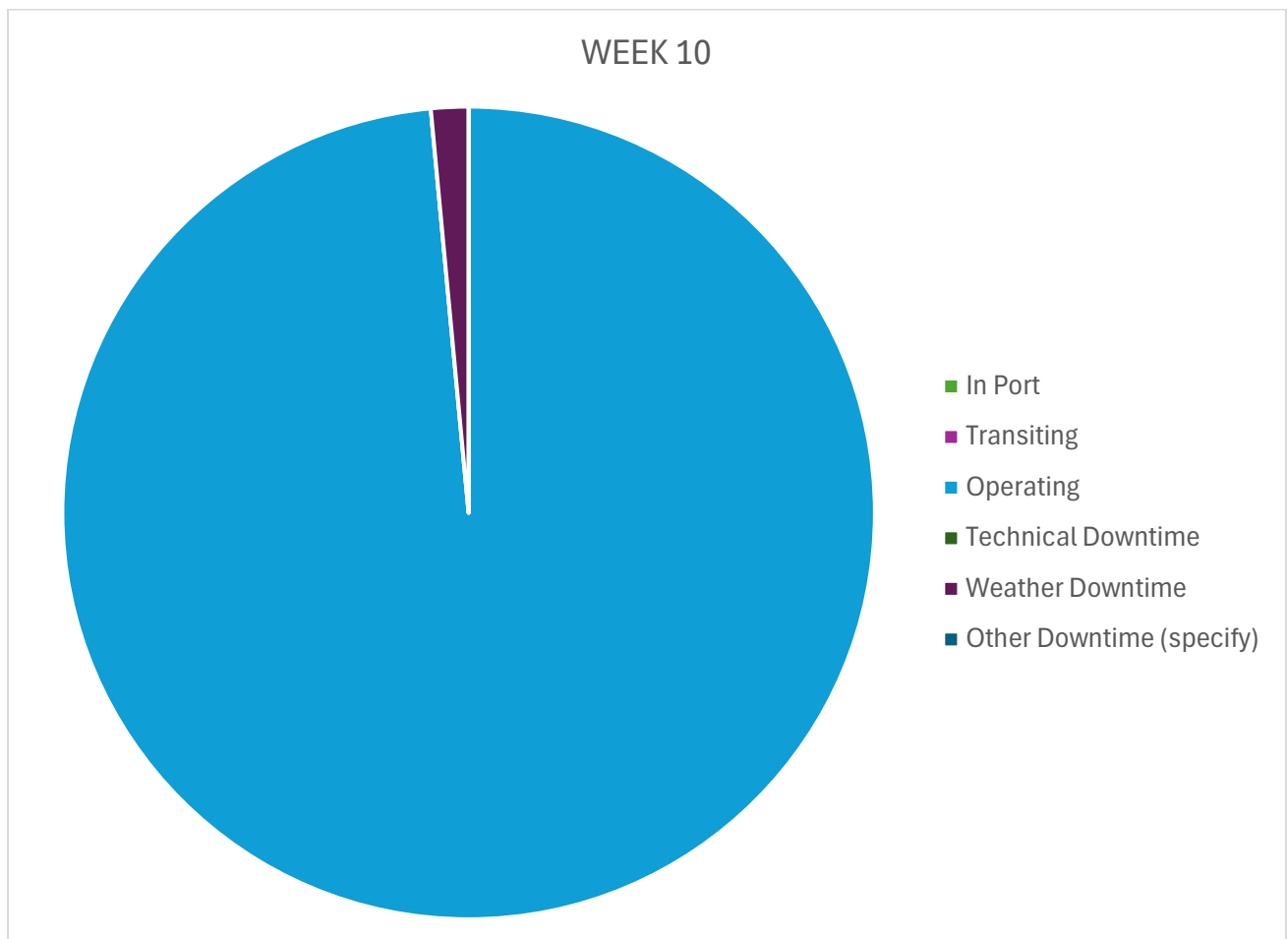


Figure 1: Breakdown of hours for week 10 (21<sup>st</sup> to 27<sup>th</sup> of July).

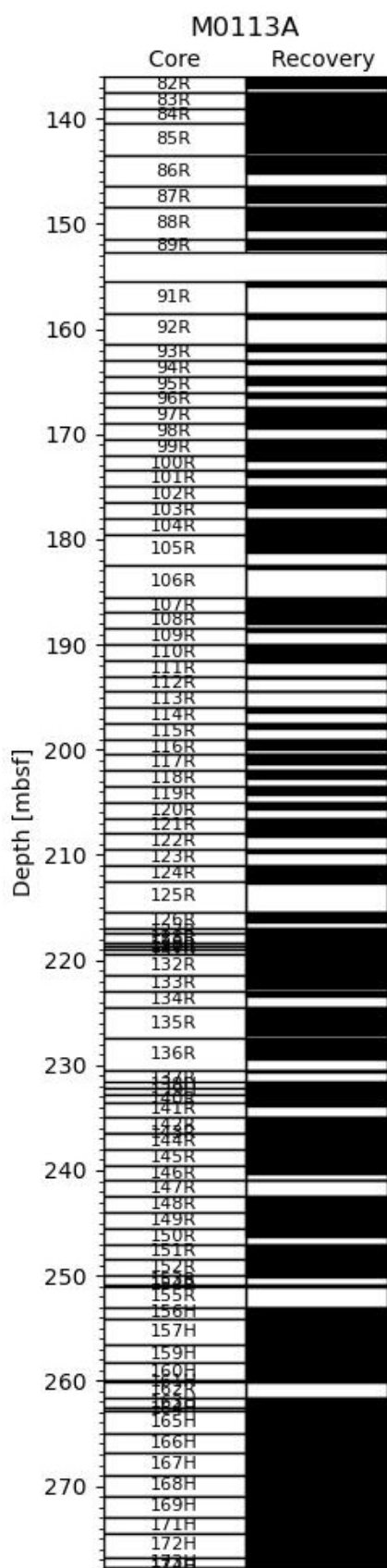
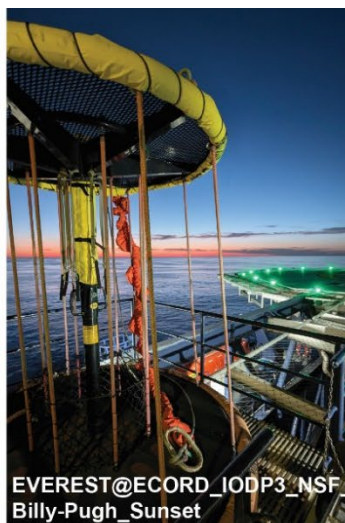


Figure 2: Recovery Plot for Week 10, 21<sup>st</sup> to 27<sup>th</sup> of July.

## 7. Photographs



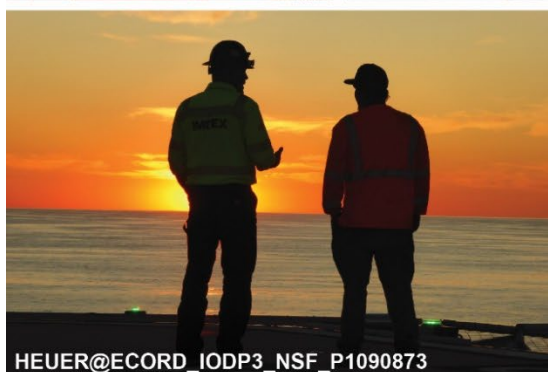
Brickell@ECORD\_IODP3\_NSF  
Happy\_Hydro\_24.07



EVEREST@ECORD\_IODP3\_NSF  
Billy-Pugh\_Sunset



Rydzy@ECORD\_IODP3\_NSF\_PMP105



HEUER@ECORD\_IODP3\_NSF\_P1090873



ZHANG@ECORD\_IODP3\_NSF\_Geochem\_Prep



Brickell@ECORD\_IODP3\_NSF\_Noble\_press4\_21.07



McIntyre@ECORD\_IODP3\_NSF\_Football\_Break

Clockwise from top left: ESO Hydrogeologist Chelsea Bambrick completes a water level test of the borehole; A view across the helideck towards sunset; ESO Geochemist Antonio Ferreira takes a sample from the manifold to test for salinity; scientist Verena Heuer taking ammonia samples; a break in operations allows some of the team to watch Germany v Spain in the European Cup; Alizé Longeau prepares a sediment sample for noble gas analysis; Shaun Wilson (IMDEX) and Chandler Maine (Boart Longyear) enjoy sunset on the helideck.