MAREANO'S FIRST CRUISE TO THE ARCTIC MID-OCEAN RIDGE

2025007011 Cruise Report

Cruise leader(s): Heidi Kristina Meyer and Pål Buhl-Mortensen (IMR)

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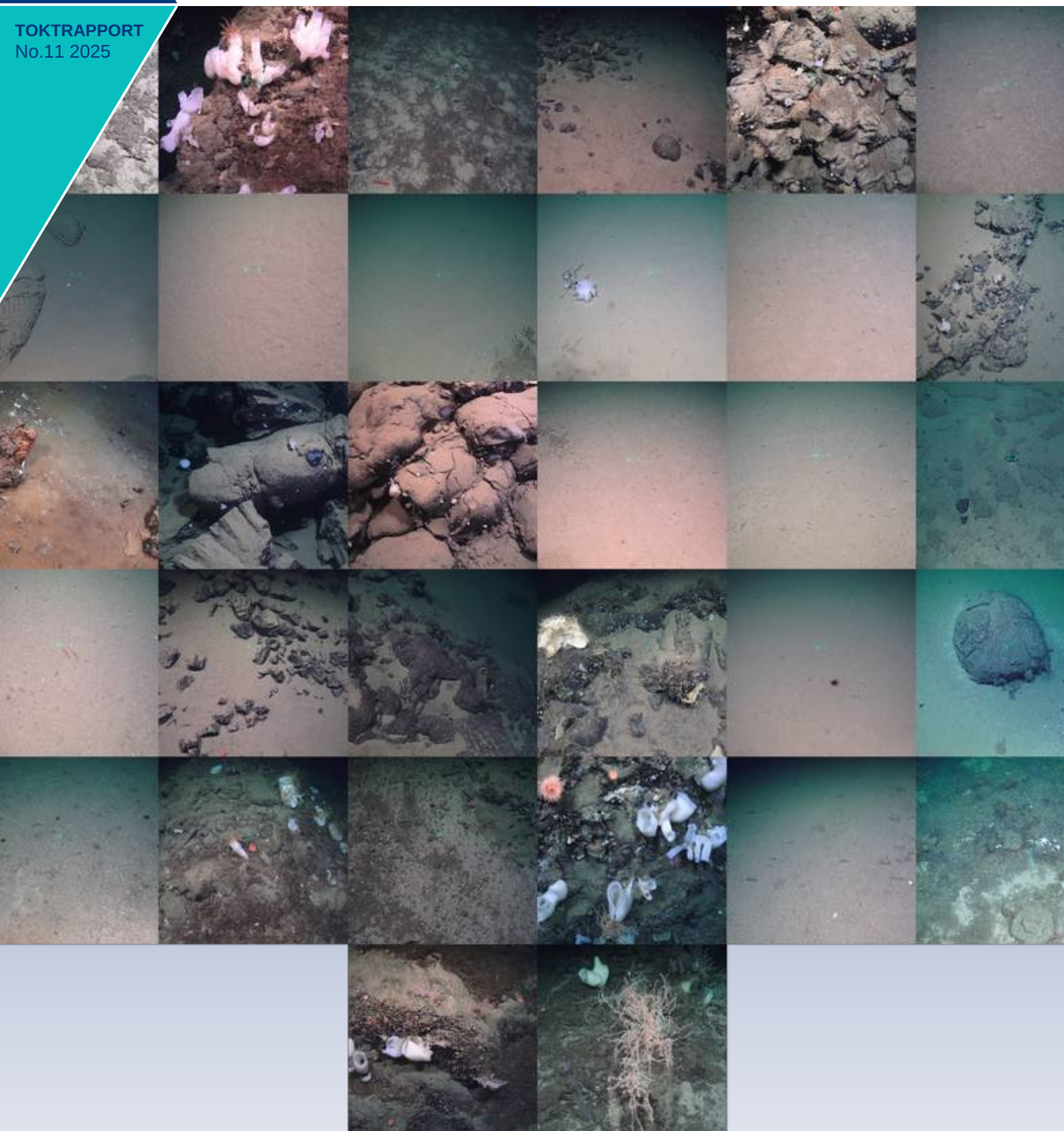

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Summary (English):

The 2025007011 cruise report provides an overview of the activities completed during MAREANO's first cruise to the Arctic Mid Ocean Ridge (AMOR) in September and October 2025. The work done on this cruise required an adjustment of methodology to fit the needs of working in deep and heterogeneous environments that is common on AMOR. This report records the activities performed on the cruise, detailed descriptions of the new methods used, preliminary analyses of the data with a first look at the habitats and geological setting present in the surveyed region, and recommendations for future MAREANO cruises in the area.

Summary (Norwegian):

Toktrapport for 2025007011 gir en oversikt over aktivitetene som ble gjennomført under Mareanos første tokt til den arktiske midthavsryggen (AMOR) i september og oktober 2025. Arbeidet som ble utført på dette toktet krevde en tilpasning av metodikken i forhold til utfordringene knyttet til prøvetaking og visuelle undersøkelser i dype og heterogene miljøer med kupert terreng som er vanlig på AMOR. Denne rapporten presenterer en oversikt over aktivitetene som ble utført på toktet, detaljerte beskrivelser av de nye metodene som ble brukt, foreløpige analyser av dataene med et første blikk på habitatene og geologiske forhold som forekommer i det undersøkte området, samt anbefalinger for fremtidige Mareano-tokt i området.

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1 - Introduction

MAREANO Cruise 2025007011 is MAREANO's first cruise to the area that Norway has opened for mineral activity on the Arctic Mid-Ocean Ridges (AMOR). MAREANO is tasked with providing knowledge and baseline ecodiversity information that can address the management needs for the Deep Norwegian Sea both inside and outside of the mineral exploration area through the collection of bathymetric, geological, biological, and chemical data.

AMOR is an ultra-slow spreading ridge located between Greenland and Norway made up of 6 ridge segments - Ægir, Jan Mayen, Kolbeinsey, Mohn's, Knipovich, and Gakkel Ridge (Pedersen et al., 2021). There are large variations in depth along the spreading axis of AMOR generally ranging between >3500 m to <500 m depth. This is due to the deep rift valleys at the spreading axis extending into the steep mountainous terrain along the axis before turning into deep abyssal plains as one moves farther away from the spreading zone. However, some areas on AMOR can be much shallower or deeper than the average, such as the Seven Sisters Vent Field near Jan Mayen at 130 m depth or Molloy Deep on Knipovich Ridge at 5569 m depth.

Parts of AMOR (particularly along the crest of AMOR in the Norwegian Sea) has also been defined as a *particularly vulnerable and valuable areas* (SVO-områder: Særlig verdifulle og sårbare områder på norsk; NH4; *Meld. St. 21 (2023–2024) - regjeringen.no*). This includes the Jan Mayen ridge, Jan Mayen fracture zone, Mohn's ridge, Knipovich ridge and the Molloy Deep. Parts of the survey boxes on this cruise overlap with this SVO-area.

Due to the great depths and heterogeneous terrain in AMOR that differs from standard MAREANO conditions on the Norwegian Shelf, intensive planning and adjustment of methodology was required for the preparation of the cruise, as suggested in the Deep-Sea Strategy (Ross et al., 2025). In addition to mapping the priority area, a secondary objective of this cruise was to test and determine the effectiveness of the modifications and refine sampling methodology for future cruises along AMOR. Detailed description of the methods used are described below in **Section 3. Methodology**.

1.1 - Oceanographic Setting

Located between the Greenland, Iceland, and Norwegian (GIN) Seas, AMOR is subjected to a complex oceanographic setting as it forms a boundary between the Greenland and Lofoten Basins. Due to its positioning, AMOR interacts with different water masses on both sides of the ridge system. At the surface (approximately upper 50 m), the cool and low salinity Greenland Polar Water ($T < 5°C$, $S < 34.4$ ppt) is brought down from the northwest with the East Greenland Current and the warm and high salinity North Atlantic Water comes up from the southeast with the Norwegian Atlantic Current ($T > 2°C$, $S > 35$ ppt) (Hopkins, 1991). Moving down in the water column, transitional water (or intermediate water) forms between the surface waters and the deep waters, where to the west of AMOR, the less dense, cooler and fresher Greenland Arctic Intermediate Water forms ($T < 2°C$, $S \sim 34.7$-34.9 ppt), and to the east is Norwegian Arctic Intermediate Water ($T \simeq 0.5°C$, $S \simeq 34.88$). Deep water is formed in the GIN Seas basin, where forming in the Greenland Basin, the cooler and fresher Greenland Sea Deep Water forms below 2000 m ($T = -1.25°C$, $S = 34.89$), and the Upper Norwegian Deep Water ($T = -0.5°C$, $S = 34.92$) and Norwegian Sea Deep Water ($T \sim -1.05°C$, $S \sim 34.91$) in the Norwegian Sea above 2500 m and below 2500 m, respectively.

While the surface water is known well in the area (Hopkins et al., 1991; Roberts et al., 2018), there is limited data on the deep and intermediate water masses in the region, particularly in oceanographic models. Water

masses are continually reported as important factors that influence the distribution of benthic fauna and respective biotopes (Burgos et al., 2020; Roberts et al., 2021), therefore it is important to collect data from the deeper regions where possible.

1.2 - Station Planning

The priority boxes for Cruise 2025007011 were located on Mohn's Ridge (figure 1) – NH3-B06, NH3-B07, and NH3-B08 with a total of 79 stations with 6 full stations (2 per box). Two additional boxes (NH3-B09 and NH0-B03) with a total of 47 stations with 4 full stations (2 per box) were planned as reserve in case of spare time or weather limited access in the priority areas. Bathymetry would be collected between the boxes during transit.

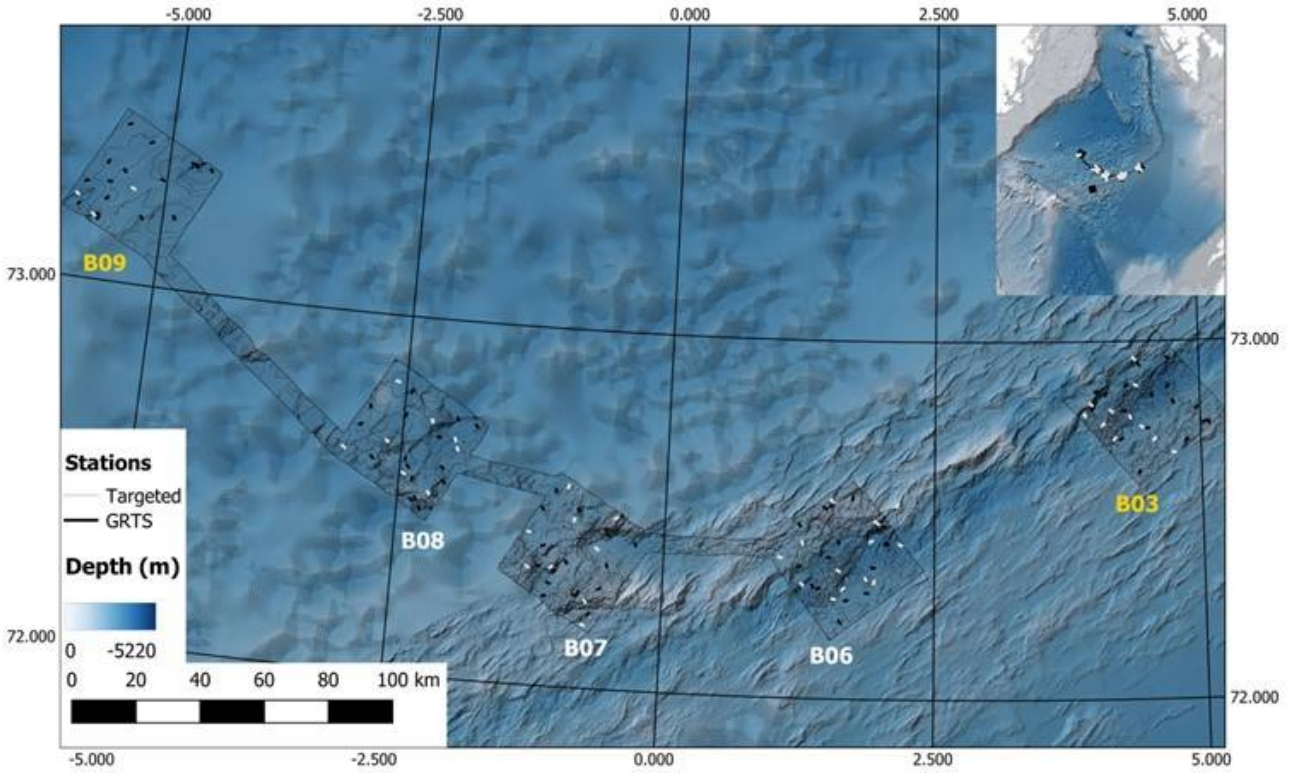


Figure 1. Map of the planned survey area for Cruise 2025007011, which includes priority boxes (white text): NH3-B06, NH3-B07, NH3-B08; and reserve boxes (yellow text): NH0-B03 and NH3-B09.

NH3-B06 (approx. 1300 km^2) was the first box to be surveyed (Figure 2). It is located directly on the spreading zone and has heterogenous terrain consisting of vent fields (e.g., Ægir Spring), seamounts (e.g., DeepInsight), volcanic mounds, ridges, and rift valleys, with the stations covering a depth range of 1320 to 3340 m, with an average depth of 2500 m. There were 17 GRTS (Generalized Random Tessellation Stratified) and 14 Targeted stations planned, with one of the targeted stations (P88) located just outside of NH3-B06 to investigate a bamboo coral aggregation observed in a survey conducted by the Norwegian Offshore Directorate in 2024. There were 5 potential stations for full stations.

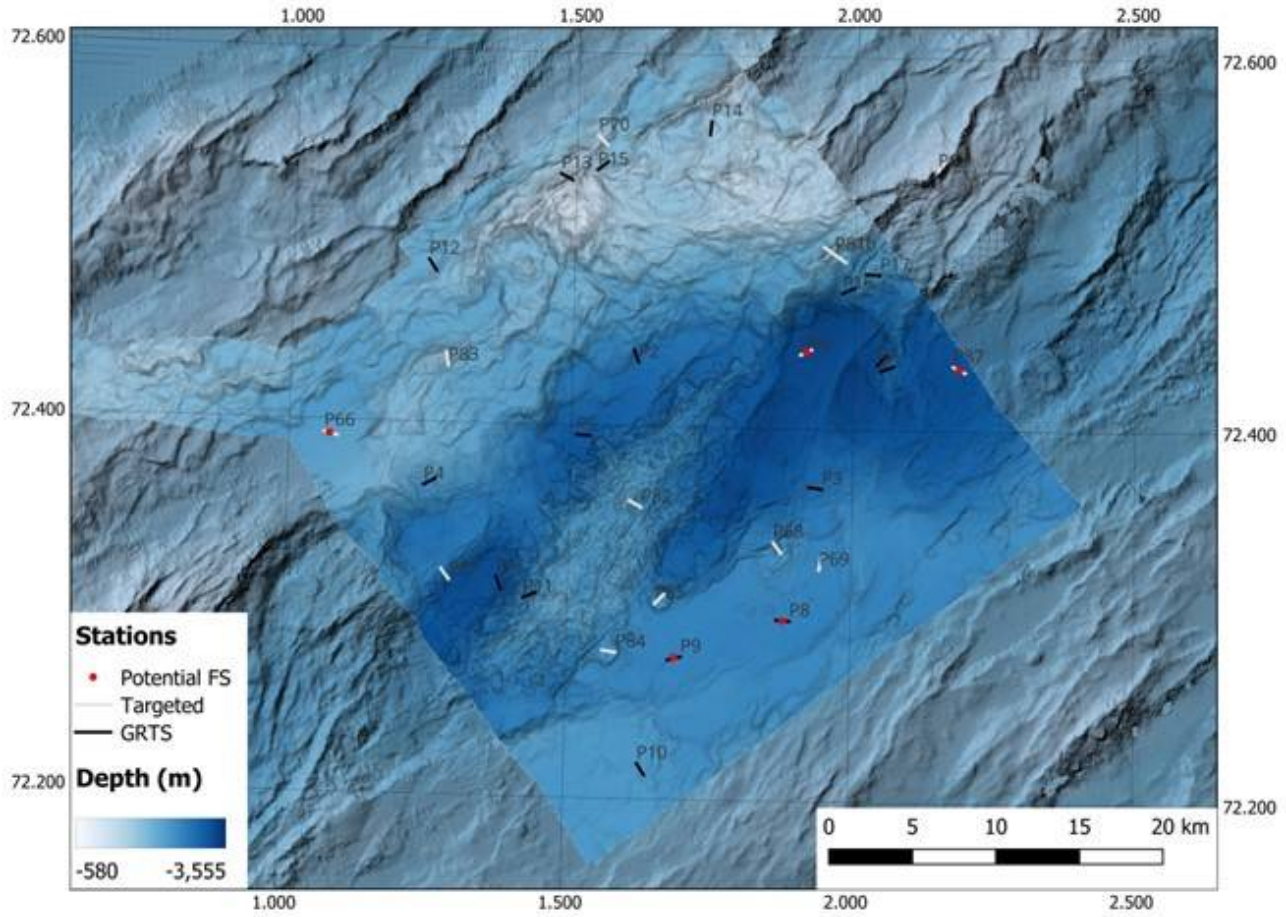


Figure 2. Map of NH3-B06 with the locations of the targeted stations (grey line), GRTS stations (black line), and potential full stations (red circle).

NH3-B07 (approx. 1300 km^2) was the second planned box and the stations covered a depth range of 1155 to 3340 m depth (Figure 3). It was located off the main spreading axis and contained heterogeneous terrain consisting of ridges, seamounts, and deep basins. It had 16 GRTS and 8 Targeted stations planned, with 5 potential stations for full stations.

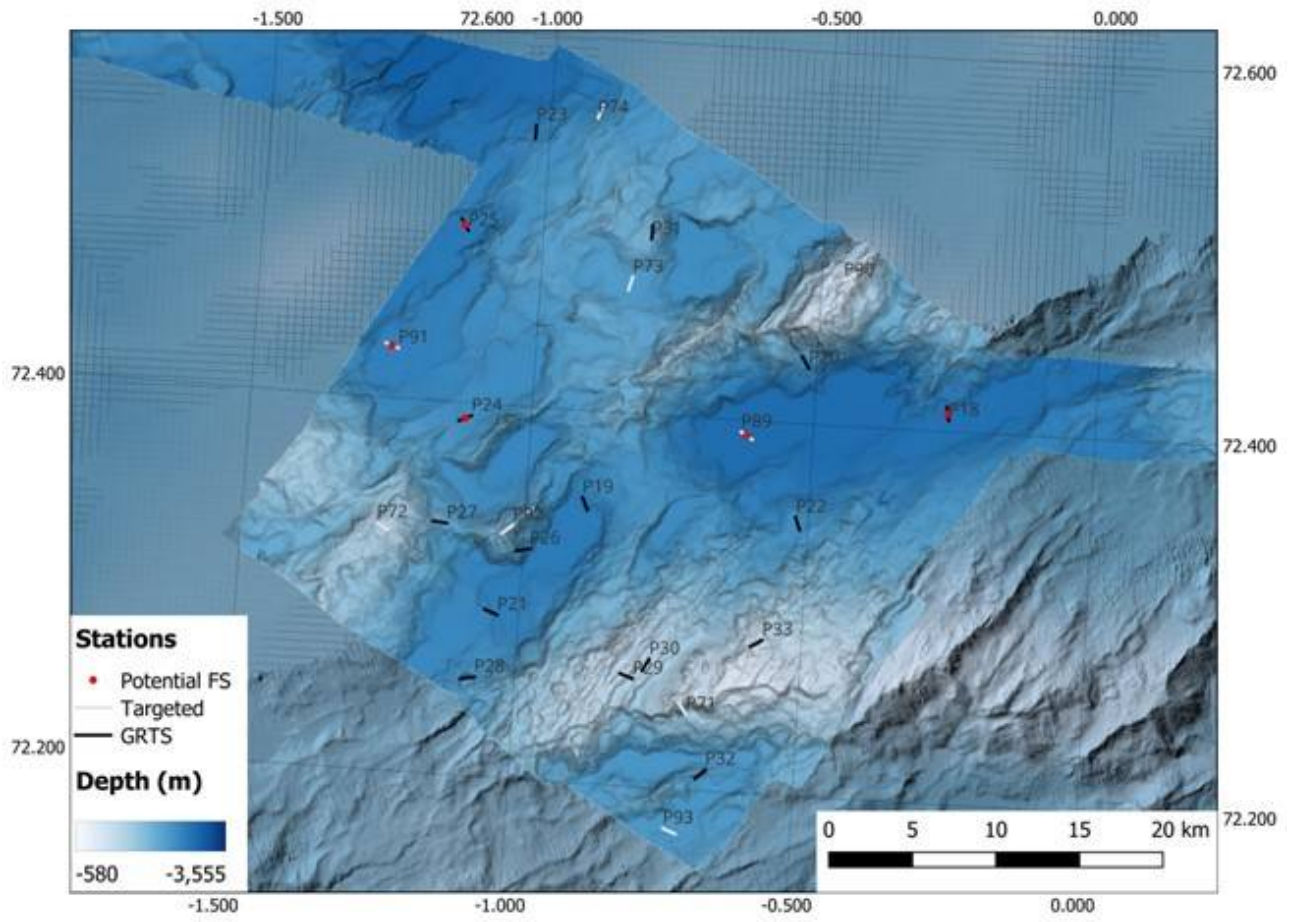


Figure 3. Map of NH3-B07 with the locations of the targeted stations (grey line), GRTS stations (black line), and potential full stations (red circle).

NH3-B08 (approx. 1300 km^2) was the third planned box, located off of the spreading axis entirely (Figure 4). It had a depth range of 1850 to 3275 m in fairly homogeneous terrain consisting of small seamounts and deep basins. It had 16 GRTS and 8 Targeted stations planned, with 4 potential full stations.

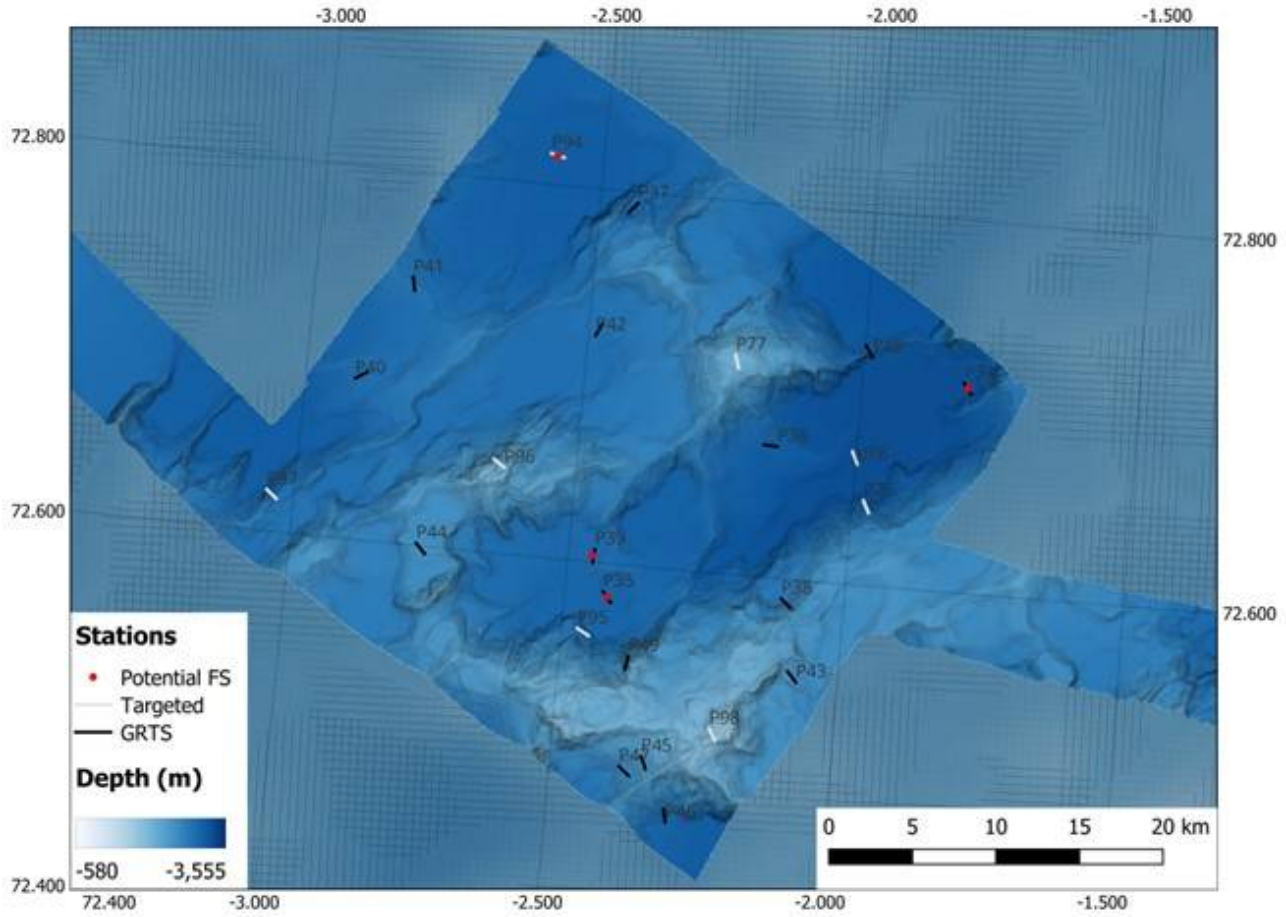


Figure 4. Map of NH3-B08 with the locations of the targeted stations (grey line), GRTS stations (black line), and potential full stations (red circle).

2 - Cruise Participants

Table 1. List of cruise participants on MAREANO cruise 2025007011.

Name	Institute	Role
Heidi Kristina Meyer	HI	Cruise Leader
Pål Buhl-Mortensen	HI	Cruise Leader
Roy Holger Robertsen	HI	Instrument Chief
Fredrik Frigstad	HI	Instrument
Kjell Bakkeplass	HI	Data Management
Stepan Boitsov	HI	Chemist
Èric Jordà Molina	HI	Biologist
Ragni Olssøn	HI	Biologist
Camille Saint-André	HI	Biologist
Heidi Gabrielsen	HI	Biologist
Jonatan Fredricson Marquez	HI	Biologist
Nils Piechaud	HI	Biologist
Irina Zhulay	HI	Biologist
Valérie Bellec	NGU	Chief Geologist
Lilja Rún Bjarnadóttir	NGU	Geologist
Christine Tømmervik Kollsgård	NGU	Geologist
Daniel Hesjedal Wiberg	NGU	Geologist
Rosalyn Fredriksen	SoDir	Observer
Anja Helene Bang	UiB	Master’s Student
Björn Löfqvist	ROV	ROV Night Supervisor
Andreas Storebø	ROV	ROV Day Supervisor
Johan Sköld	ROV	Pilot
Hilbert Í Grógv	ROV	Pilot
Kenneth Ågotnes Fosse	ROV	Pilot
Dánial Johannesen	ROV	Pilot

Photo 1 . Starting from the back left: Jonatan Fredricson Marquez, Valérie Bellec, Stepan Boitsov, Ragni Olssøn, Daniel Hesjedal Wiberg, Lilja Rún Bjarnadóttir, Christine Tømmervik Kollsgård, Kjell Bakkeplass, Nils Piechaud, Irina Zhulay, Rosalyn Fredriksen, Heidi Gabrielsen, Camille Saint-André, Pål Buhl-Mortensen, Heidi Kristina Meyer, Anja Helene Bang, and Èric Jordà Molina. Photo taken by Fredrik Frigstad / Institute of Marine Research.

3 - Methodology

To effectively survey the deep sea, a variety of modifications were required from the Standard MAREANO survey design for both video lines and full stations (ref. to previous survey design) to be able to use the time most wisely and sample most effectively.

3.1 - Video Lines

Video lines were adjusted from the standard 200 m to 800 m long, where there would be 4x 200 m long dedicated transects per video line. Sampling and investigation were only possible in sections between the 200 m long transects.

The naming conventions used in the deep-sea video lines were also adjusted where all non-quantitative portions of a video line would be called “Section” and denoted with a letter rather than “Still” or “Hang”, and all quantitative portions of the video line would be called “Transect” and denoted with a number rather than the segment only being referred to as a letter.

During a “Transect”, the ROV would move at a stable speed (approximately 0.4 knots) and altitude (approximately 1 m) without stopping. Any points of interest would be noted and revisited for further investigation or sampling during the following “Section”. **Transects are the segment of the videos meant for quantitative analysis post cruise.** During a “Section”, the ROV would scan the field of view before investigating, sampling, or moving to waypoints placed during the “Transect”. **Sections will not be annotated post cruise; however, they may be used to get clearer identifications of objects or species post cruise** .

3.1.1 - Standard MAREANO Video Line Design:

Traditional MAREANO surveys on the Norwegian Shelf typically use the towed camera system, Chimaera, and have 200 m long video lines (Figure 5).

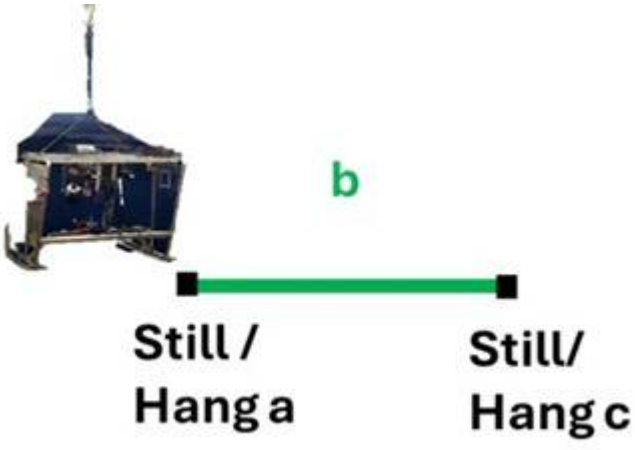


Figure 5. Schematic of a traditional MAREANO 200 m video line.

3.1.2 - Deep MAREANO Video Line Design:

Deep-sea MAREANO surveys on AMOR used NORMAR’s remotely operated vehicle (ROV) *Ægir6000* and

have 800 m long video lines made up of 4x 200 m transects (Figure 6).

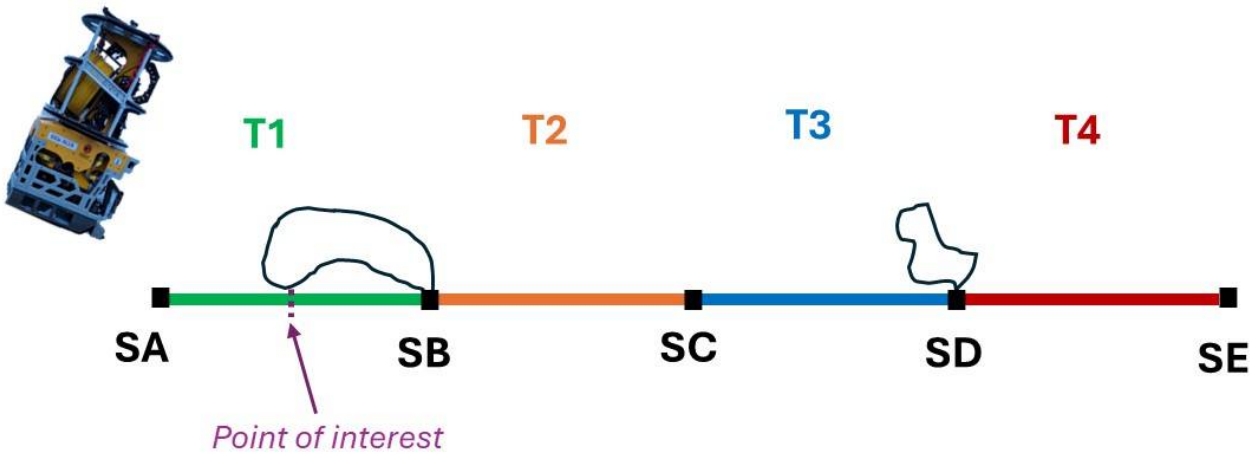


Figure 6. Schematic of the modified MAREANO 800 m video line for the deep sea with 4x 200 m long transects. T denotes "Transect" and S denotes "Section".

3.2 - Remotely Operated Vehicle (ROV)

Due to the difficult terrain and great depths, NORMAR ROV *Ægir6000* was used in place of MAREANO's towed-camera Chimaera for collecting the visual data. *Ægir6000* is a work-class ROV manufactured by Kystdesign AS (Haugesund, Norway) that has a depth rating of 6000 m water depth. Its dimensions are 2.75 x 1.70 x 2.20 m with the tool skid and has a load capacity of 350 kg. It has a hydraulic drawer mounted on the skid, with a mountable suction sampler. It has two Imenco Spinner II (HD) cameras mounted on the top and center of the ROV. Two green Manta Ray mk2 Parallel Lasers are mounted directly on top of the center camera and spaced 9 cm apart. It has two manipulator arms: TITAN 4 with an arm camera, LED light and a lift capacity of 122 kg; and ATLAS which has a lift capacity of 250 kg. *Ægir6000* is attached to the Tethered Management System (TMS) to improve stability and operability when operating at large depths.

In addition, geological, biological, and chemical samples were collected *in situ* during designated sections along the video line with the use of sampling gear designed for *Ægir6000*. Due to the lack of knowledge of the biology in the area and the difficulties in accessing the deep sea, it is important that MAREANO collects biological samples during video lines to detect diversity that otherwise would be missed in the video for identification and to achieve higher taxonomic resolution than is possible from video alone, and as a supplement to the physical fauna collection.

During a standard dive, not a full station, the following gear were mounted onto the ROV (Photo 2):

- 2 plastic push corers on the drawer
- 8 plastic push corers mounted on the TMS
- 2 mesh nets (1 long and 1 short)
- 1 "Frankenstein" scoop

- 1 suction sampler (with 5 chambers)
- 2 toolboxes (for biological/geological samples)
- 1 “biobox” (for biological/geological samples)
- 1 knife

Photo 2. Standard gear set up for NORMAR ROV Ægir6000 for a dive. Photo by Heidi Kristina Meyer.

Additional gear that was brought for specific dives in targeted stations or stations with specific conditions were:

- 2 niskin bottles (for eDNA or water samples)
- 1 temperature probe
- 1 major sampler (for water samples)
- 2 blade corers with the transparent plexiglass plates (for biological samples)

Additional gear that was brought for full stations were:

- 2 niskin bottles (for eDNA)
- 2 blade corers with aluminum plates (for chemistry)
- 2 aluminum push corers mounted on the TMS (in place of 2 plastic push corers; for chemistry)

3.2.1 - ROV Geological Sampling

Sediment push cores (up to 40 cm long and 9 cm in diameter) were retrieved for geology at the beginning and/or end of the video lines, and during sections if the seabed was suspected to have changed. Photos were taken during sampling to see the area it was retrieved from, and the coordinates and depth noted down. When the samples were on board, photos were taken of the outside before opening (Photo 3), of the core after opening and of the core split in two. Then the core was logged by MAREANO standards and hand samples taken for future evaluation of the grain size and archive, before everything was entered into NGUs sample description logs in Survey123.

Photo 3. Example of an external push corer photo once on board. Photo by Geological Survey of Norway.

Physical rock samples were retrieved using the ROV-Arm or the ‘Frankenstein’ scoop. Photos were taken during sampling to see the area it was retrieved from, and the coordinates and depth noted down. The samples were also assigned an event number (see further description in **Section 3.2.2. ROV Biological Sampling**). When the samples were on board, they were briefly described in hand-written paper logs and photo-documented (Photo 4). New Survey123 sample description logs will be designed for rock samples before the next cruise to the area.

Photo 4. An example of a rock sample collected by NORMAR ROV Ægir6000. Photo by Geological Survey of Norway.

An attempt was made to measure the temperature inside an active chimney with a temperature probe, but this was unsuccessful as it did not record it due to its logging time being shorter than the manual said.

3.2.2 - ROV Biological Sampling

Biological samples were taken with the ROV *Ægir6000* with a wide variety of tools (Figure 7; see **Section 3.2**. **Remotely Operated Vehicle (ROV)**). The sampling was aimed at improving the taxonomic resolution of species observed in the video footage. Each time the ROV sampled an item (biology, geology, and chemistry) with either a new tool or different location, the sample was assigned a rolling “Event ID” number and logged as a comment in Seabed Field Observer (SFO; described further in **Section 3.3. Seabed Field Observer**). A photo of the screen was captured during the sampling event to help identify the sample once *Ægir6000* was on deck. In a physical log, the Event ID was recorded with the sampling gear type, the storage compartment on the ROV and a “video name” describing what the targeted specimen(s) or object(s).

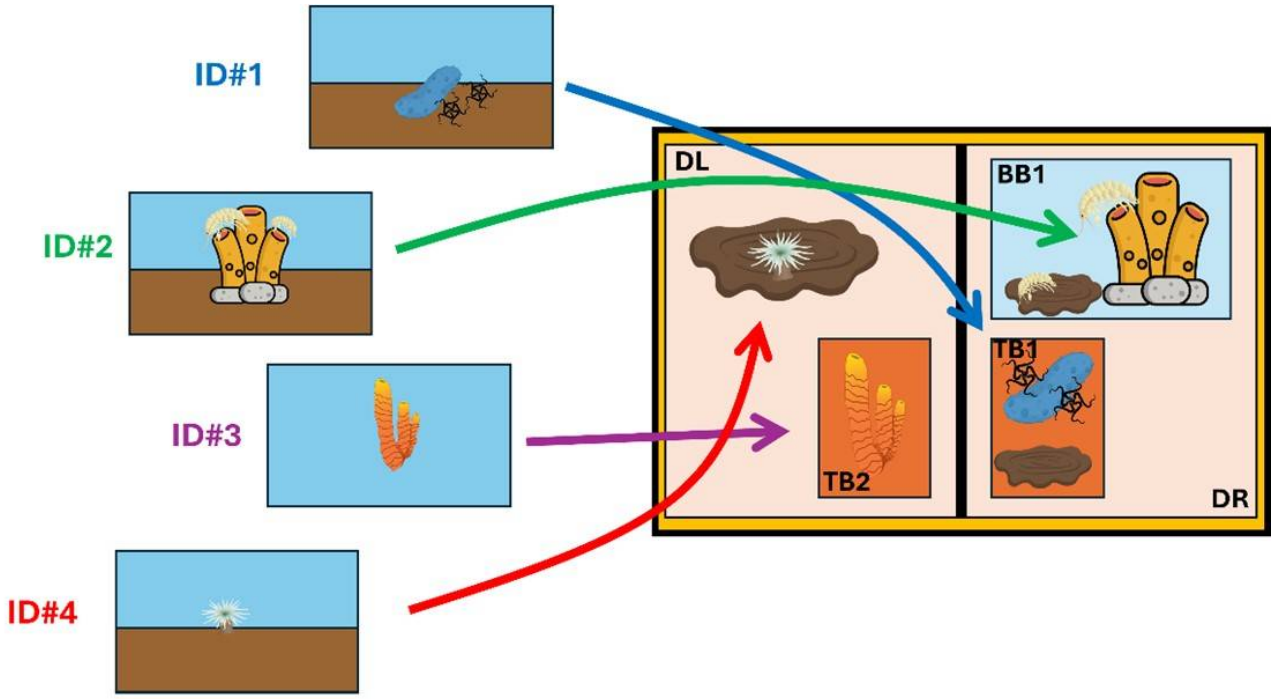


Figure 7. Schematic of the ROV sampling procedures with the Event ID (ID#) and the storage within the ROV drawer (DL – Drawer Left, DR – Drawer Right, BB1 – Biobox 1, TB1 – Toolbox 1, TB2 – Toolbox 2).

Once the ROV was on deck, processing containers (e.g., buckets and trays) were prelabelled with the Event ID and storage information for the different samples collected during the dive (Figure 8). The samples were retrieved from the storage compartments (namely, toolboxes, biobox in the left and right drawers, and suction sampler chambers) then deposited in the buckets with cool saltwater. Given that the two drawers from the ROV (left and right) were connected, it was impossible to attribute from which sample event the contents in them came from. Therefore, after each dive, a new sample event was given to the whole content of the drawer (both left and right). In that case, the whole content of the drawers was flushed through a side drain on top of a 300 µm sieve.

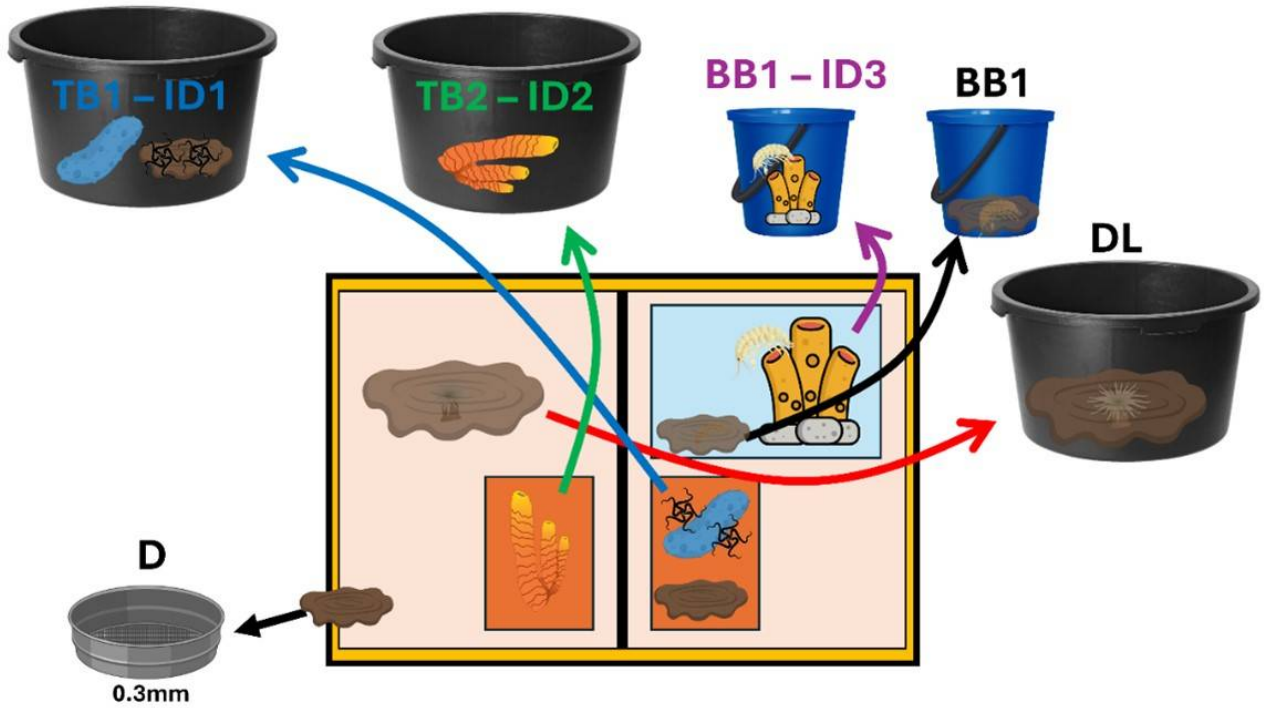


Figure 8. Schematic of retrieving the samples from the ROV where premade labels would include the storage information and EventID. Water from the drawer (D) was sieved with a 0.3 mm sieve.

A similar situation occurred with the suction sampler since the chambers were not completely sealed, and some mixing could occur between them. Therefore, if multiple samples were stored in several chambers but some were left unused, the leftover content from the unused chambers was collected and sieved over a 300 µm sieve, and a new sample event number was assigned to the combined content from all unused chambers.

Once in the lab, the biological samples were sieved over a 300 µm sieve. For each sample, the targeted specimens seen on video were located and picked, photographed with a scale, and preserved in separate jars/vials with ethanol 96%. Other megafauna in the sample that was easily visible on video, although not directly targeted, were also picked, photographed, and preserved in separate jars/vials in ethanol 96%. All of the other associated fauna and sediment were bulk fixed with ethanol 96% for further sorting in the lab on land. Majority of the ROV sampling was qualitative (given that the area or volume of sample are unknown).

The only quantitative samples for biology taken by the ROV were the ones sampled with the blade corers. Upon retrieval, the blade corers were carefully placed and secured in tubs. Before opening, a picture of the side showing the sediment profile, was taken with a ruler for scale. After that, the plexiglass side of the core was unscrewed and the whole sediment content was poured into the tub. The sediment sample was then sieved through a sequential sieving of 1 mm, 500 µm and 300 µm, until all material was fractioned into the three meshes (see **Section 3.4.6. Box Corer (0.25 m^2)** and figure 12). The content of each sieve was then fixed in ethanol 96% and labelled accordingly.

For all biological samples collected with the ROV, ethanol was changed after ca. 12 hours. Samples were kept cold (2 °C) and in the dark in a cooler room.

3.2.3 - ROV Chemical Sampling

Six push cores were taken for chemistry at one full station, R3753, with the purpose of comparing the results to those from traditional sampling with multi corer (see below). These push cores were collected in the same way

as for geology (described above), but two of the cores were in stainless steel tubes. When onboard, the cores were retrieved and handled in the same way as described below for the multi corer, see **Section 3.4.8. Multi Corer**.

An extra sample for chemistry was taken at one full station, R3753, using blade corers adjusted for this purpose, with aluminum plates rather than transparent plexiglass plates used for biology (Photo 5). This was done with the purpose of comparing this way of sampling to traditional sampling done by box corer (see **Section 3.4.6. Box Corer (0.10 m^2)**) for analysing contaminants of emerging concern (CECs). Since the blade corers with aluminum plates are not transparent, the blade corers were sunk into sediments roughly to the half of blade corer height, close to the opening of the metal plate in its middle, to have the sediment surface easily retrievable upon opening the side of the blade corer. Because the surface area of blade corers is smaller than what is necessary for obtaining three high quality samples, it was necessary to deploy two blade corers for this sampling. Due to risk of contamination, the blade corers were taken aside when onboard and only opened by the chemist after other personnel was away. The samples were then retrieved and handled in accordance with the traditional MAREANO procedure available at https://www.mareano.no/kart-og-data/kjemidata, see short description in **Section 3.4.6 Box Corer (0.10 m^2)**.

Photo 5. Side-by-side photo of the blade corers with plexiglass plates (left) and aluminum plates (right).

3.3 - Seabed Field Observer (SFO)

For annotating the dives live, an updated version of Seabed Field Observer (SFO) was used rather than using Campod Logger. Like the former SFO, the new SFO allowed annotators to log fauna, seabed features, litter, and operational comments as they occurred, as well as logging of the seabed at 10 second intervals. However, with the new SFO, habitat types for biology could now be logged at 10 second intervals as well. In addition to

the standard Operational Commander (or the person who starts and stops a session and logs the operational comments (e.g., start/stop record, start transect, etc.)), two additional roles were added to the updated software, which were Seabed Annotator and Habitat Annotator who controlled the seabed and habitat interval logging, respectively.

For identifying the taxa observed during the ROV dives, we used the “Norwegian Deep Sea Image Catalogue” developed by Meyer, Zhulay, and Fredriksen in January 2025, which can be freely accessed **here**. The “Norwegian Deep Sea Image Catalogue” is a living catalogue that will continually be updated and was developed to form a standardization in the naming conventions of morphotaxa observed in visual data (e.g., imagery and videos) collected on and around AMOR.

3.4 - Full stations

Like in standard MAREANO cruises on the Norwegian Shelf, two full stations (per 1000 km^2) were selected in each box for more intensive physical sample collection of benthic biological, geological, and chemical samples in addition to the video line. Modifications of the full station design were required to adjust to the conditions and time requirements for working in the deep sea (Figures 9 and 10), as proposed in the Deep-Sea Strategy (Ross et al., 2025).

3.4.1 - Standard MAREANO Full Station Design:

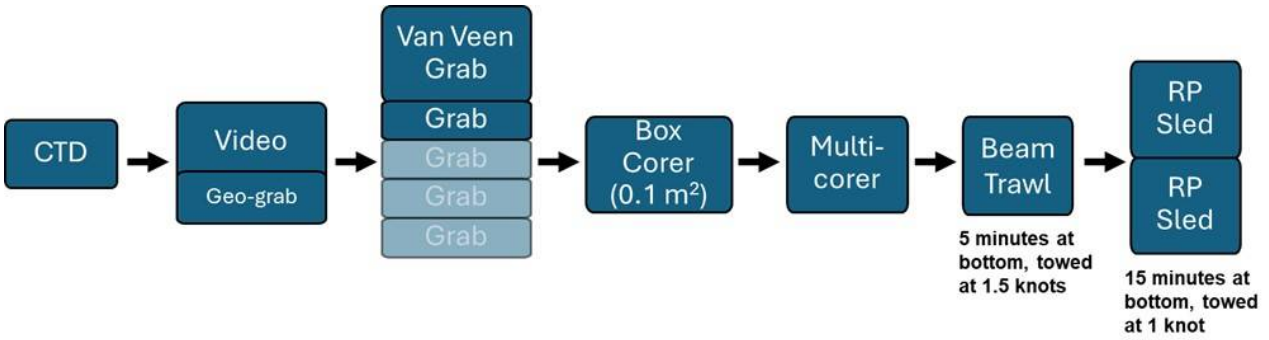


Figure 9. Schematic of a traditional MAREANO full station design.

3.4.2 - Deep MAREANO Full Station Design:

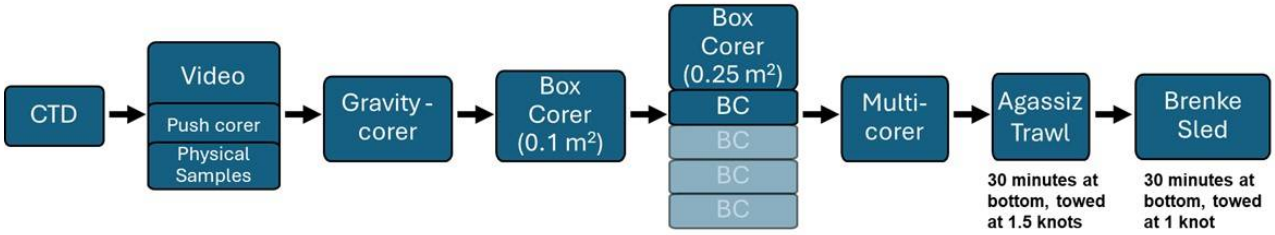


Figure 10. Schematic of a modified MAREANO full station design for the deep sea.

3.4.3 - Sub bottom profile and Multibeam

As for standard MAREANO cruises, sub bottom profile (SBP) and multibeam was collected when in transit between stations. However, due to the sensitivity of some of the gear (e.g., gravity corer) and the time it takes to

deploy and retrieve gear in the deep sea, a more systematic acquisition of SBP was necessary for assessing the suitability of stations for physical sampling at the full stations. Therefore, unlike traditional MAREANO cruises, it was not possible to completely confirm the location of full stations until after the SBP (and video line) were performed to ensure the conditions suited the needs of the drop gear (hence the need for identifying potential full stations during the planning phase, Figures 2-4).

3.4.4 - CTD

Due to the complexity of the oceanographic setting on AMOR and the limited amount of raw oceanographic data points in the area, for this cruise CTD deployment was not only limited to the full stations as is the case for majority of the standard MAREANO cruises previously. However, the collection of bottom water from the CTDs were retained to full stations and regions with suspected increased or unique biodiversity such as hydrothermal vents and seamounts. We increased the number of CTD casts to gather a more representative coverage of the oceanographic conditions in each box to help with interpretation of the water masses in the region.

3.4.5 - Gravity Corer

Gravity cores were collected at the full stations with the aim of establishing sedimentation rates and genesis of the area (Photo 6). The gravity corer was borrowed from The Arctic University of Norway (UiT) due to shipping problems which caused parts of NGU's gravity corer to not arrive in time for the cruise. A casing allowing core lengths of up to 6 m was used for both samplings. NORMAR ROV *Ægir6000* filmed the sediment collection for both occasions but only recorded the latter. The cores were cut into 1 m sections and stored cold before shipment to NGU for further analysis.

Photo 6. Showing a retrieved gravity corer up on deck.

3.4.6 - Box corer (0.10 m^2)

In accordance with the standard MAREANO sampling strategy (see the detailed sampling procedure given at https://www.mareano.no/kart-og-data/kjemidata), a separate box corer (surface area 0.10 m^2) was taken for

sampling sediments to analyze CECs at one full station per area. The results of this sampling are to be compared to blade corer sampling, see **Section 3.2.3 ROV Chemical Sampling**. Precautions are necessary when taking this sample to avoid contamination. For this reason, the sampling location (on this cruise, R3753) was chosen in advance for the chemist to be able to prepare for the sampling. Other personnel were asked to keep aside when the box corer was opened. The box corer was taken to the side and opened when no one except the chemist was present. The field blank sample was opened at the same time as the box corer. The surface water was removed and a photo of the surface was taken. Three surface sediment samples (0-2 cm) were taken into glass jars which were sealed, marked and kept frozen until delivery to IMR laboratory together with the field blank sample.

3.4.7 - Box Corer (0.25 m^2)

Due to the high risk of failure of operating Van Veen grabs at such great depths and to ensure comparability to international standards for sampling deep-sea infaunal biodiversity, a 0.25 m^2 USNEL box corer was used to survey infauna in place of the Van Veen grab used in Standard MAREANO surveys. For this cruise, a USNEL box corer from Akvaplan-Niva was employed. At each box corer deployment, the ROV *Ægir6000* stayed at the bottom to film live each of the landings and to ensure that the box corer was released properly.

Due to the lower macrofaunal diversity and species patchiness in the deep sea, box corer replicates were increased to 5 replicates at half of the full stations (the deepest full station per box) to precisely capture the macrofaunal diversity and species composition. The other half of the full stations had 2 box corer replicates, which corresponds with the usual number of Van Veen Grab replicates in MAREANO shelf surveys.

Given the foreseeable number of species unknown to science or poorly described that are expected in the deep sea, an end-to-end approach was applied (Figure 11). The box corer was split into two halves with the help of divider plates. After processing, one half of the box corer was fixed in ethanol 96%, and the other half was fixed in a 4% formaldehyde solution buffered with borax. This allows organisms fixed in ethanol to be genetically barcoded and then linked to morphologically described taxa in the formalin half.

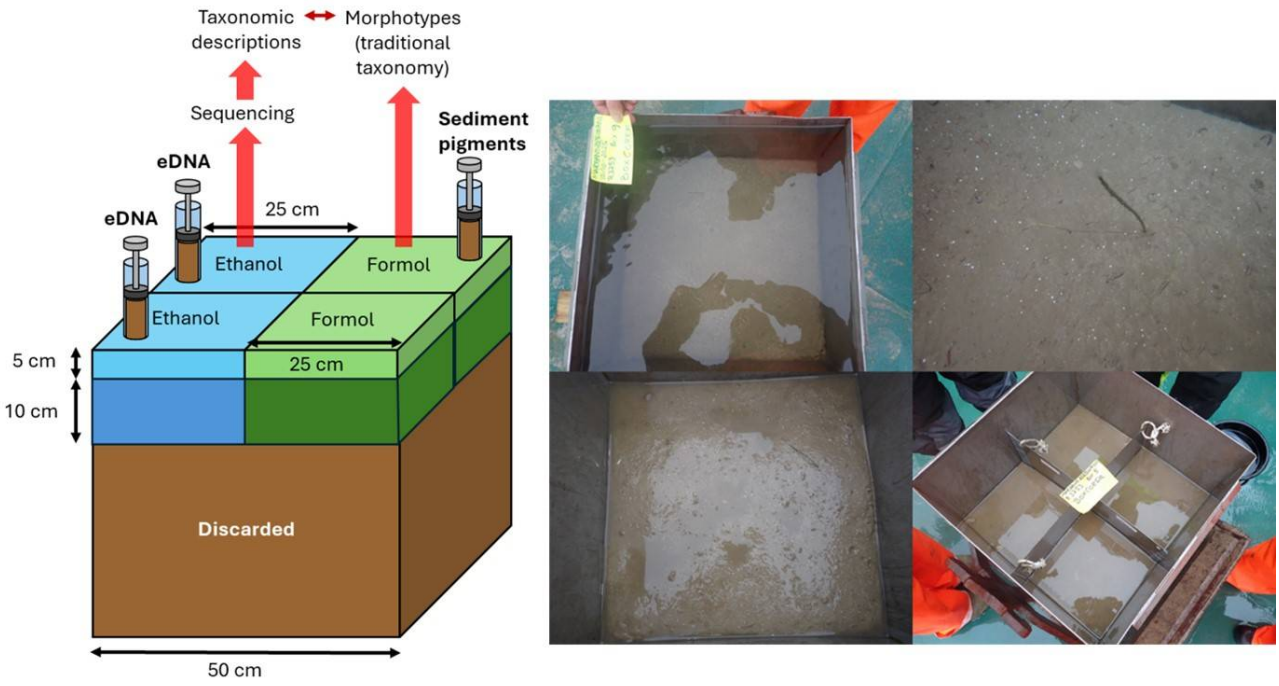


Figure 11. Schematic representation of the box core subsampling (left) and pictures showing the undisturbed sediment surface up on deck before and after removing the overlaying water (right).

The two halves were further split vertically into two layers: the surface layer between 0-5 cm and the deeper layer between 5-15 cm. The overlaying water was carefully siphoned out with a hose over a 300 µm sieve to capture any hyperbenthic organisms. After the overlaying water was removed and the sediment surface was documented photographically, the splitters were inserted. At this point, two eDNA samples were taken from the ethanol preserved half and one sample replicate for sediment pigments was taken with a cut-off syringe from 0-2 cm sediment depth on the formalin half. After that, the two vertical layers of 0-5 cm were scooped out gently into buckets, keeping the two halves separate (ethanol vs formalin).

In the lab, the 0-5 cm layer was sieved over a sequential sieving procedure, where the sediment samples were passed through a 1 mm sieve, followed by a 500 µm sieve and lastly, a 300 µm sieve (Figure 12). The remaining sediment passing through the 300 µm sieve was discarded. This procedure was done for both halves of the box core, and the sieve contents were ultimately preserved and labelled in respective jars with either ethanol or formalin.

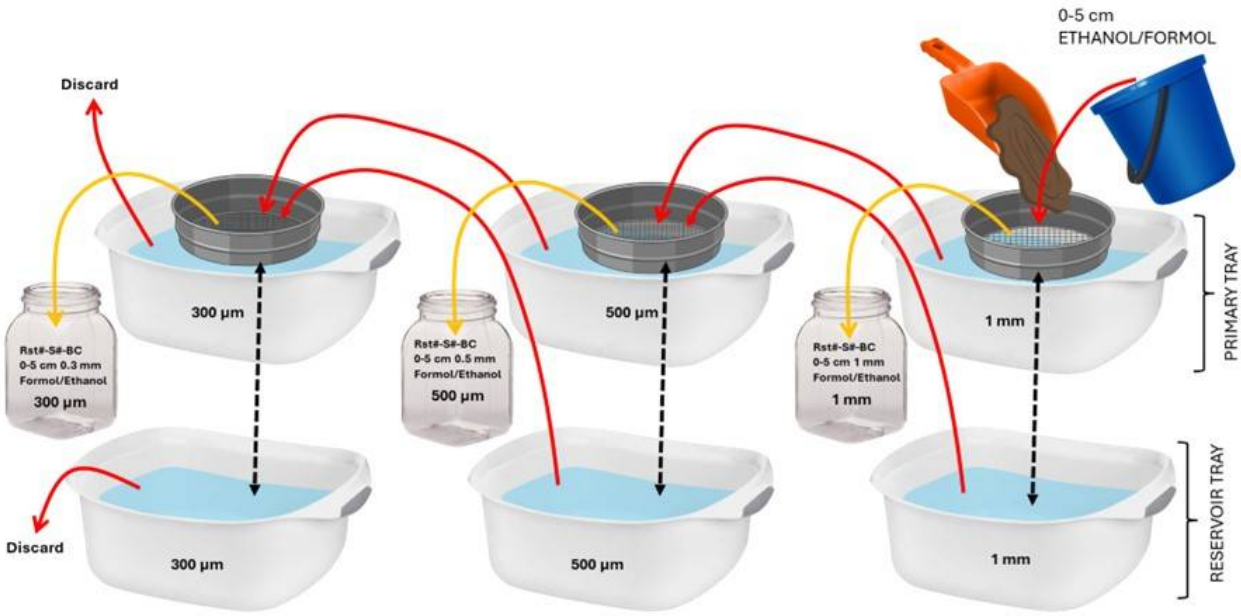


Figure 12. Schematic of the sieving workflow for the 0-5 cm layer of the boxcore sediment samples. Note that two set-ups like the one shown were used for ethanol fixed and formalin fixed halves of the box core.

The 5-15 cm layer was then scooped out into tubs and poured into a hand-made elutriation device, which was built for this cruise partially following the device descriptions in Santos et al. 1996 (Figure 13). Each half of the box corer (ethanol/formalin) for the 5-15 cm layer was poured into a tank with a saltwater inflow at the bottom. The water uptake connection to the tank had a 200 µm mesh to avoid losing any part of the sample. Once the device was turned on, the elutriated fraction left the tank through an outflow hole in the upper part of the tank connected to a hose that led to a partially submerged 300 µm sieve. The sample was left elutriating for about 1 to 1.5 hours, gently stirring the surface every now and then. The elutriated fraction of the 300 µm sieve was then bulk fixed in ethanol or in formalin respectively, for the different halves of the box core. Finally, the remaining fraction in the tanks (what we refer to as “heavy fraction”) was sieved over a 300 µm sieve and both halves were combined into a large bucket and fixed with formalin 4% solution and borax.

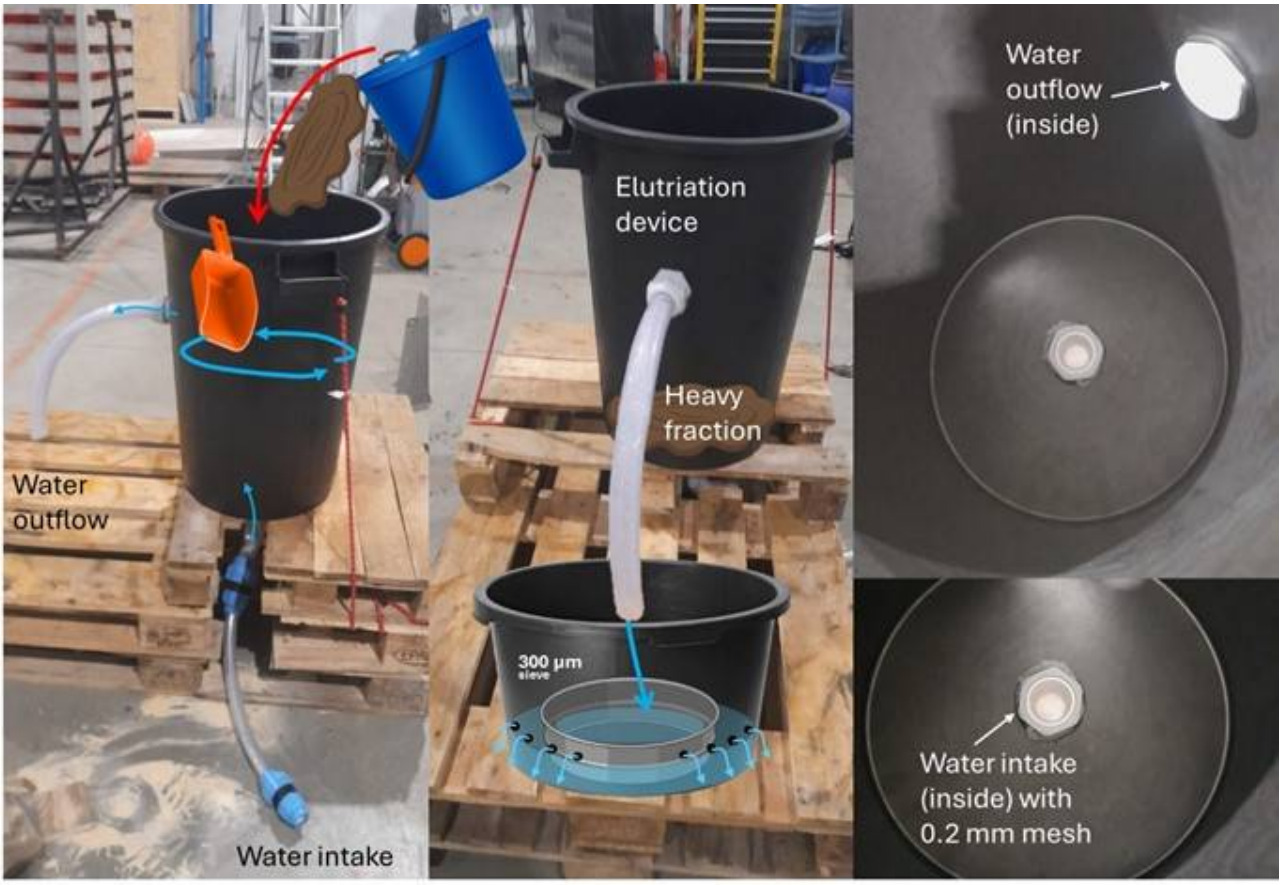


Figure 13. Elutriation device used to process the 5-15 cm layer of the box core sediment samples.

All ethanol fixed samples from the box corer were kept in a cold room (2 ^{o}C) and kept in the dark.

3.4.8 - Multi corer

Like in standard MAREANO cruises (see the detailed sampling procedure given at https://www.mareano.no/kart-og-data/kjemidata), multi corers were conducted at the full stations. Six cores are obtained with each multi corer deployment, four in plastic tubes and two in stainless steel tubes (Photo 7). Once on board, we check if enough cores are approved (3 in plastic tubes, 1 in the steel tubes), measure their height and decide the owner (A-E). Photos are taken of the cores with a scale, label and core number on the frame, including pictures of both sides of the multi corer. We also take photos of the surface of core A and B before slicing them and describe core A in detail (on paper + Survey 123). Core A is the longest plastic core, and the slices are sent for inorganic contaminants, grain size and other sediment characteristics measurements at NGU. Core B is a plastic tube core for measuring organic contaminants at IMR. The two shortest plastic tube cores and two steel tube cores are sealed for later measurements such as XRI and microplastics at NGU and IMR. Due to expected low sedimentation rates, we subsample the sliced cores, slicing them into 0.5 cm thick slices in the top 10 cm of the cores and 1 cm slices below (normal MAREANO standard is 1 cm). Sliced samples were stored frozen (-18°C) and cores stored at room temperature.

Photo 7. Photo of the multi corer.

3.4.9 - Agassiz Trawl

Due to the depths and risk of failure in case the beam trawl landed incorrectly and to ensure comparability to international standards for sampling epifaunal biodiversity, the Agassiz trawl was used to capture the physical epibenthic samples in the full station. However, due to a difference in mesh sizes between the two gears where the inner mesh of the Agassiz trawl was approximately 1 cm and the inner mesh of the Beam Trawl was approximately 5 mm, the Beam Trawl was also used in both stations to determine if the catch was vastly different and if the gear is not suitable for the conditions.

The wire length used when deploying the gear was dependent on the depth, where the length was decreased with increasing depth to reduce the amount of slack on the wire as per recommendation from technicians, deck crew and captain (e.g., those experienced with trawling). The ideal wire length for trawling at great depths is between 1.3 to 1.7x the depth of the station. The trawl was set out at 1.5 knots until the depth stopped decreasing, then the ship stood still for 15 minutes to allow the trawl to reach the seafloor. Then the trawl was towed at 1.5 knots for 30 minutes.

Following standard MAREANO procedures, samples were photographed and generally sieved over a 5 mm sieving table. However, the deep-sea fauna is characterized by thinner, less heavily mineralized calcium carbonate structures (e.g., shells, skeletons) and are, therefore, generally more fragile during sampling and processing than their shallow-water counterparts. Thus, in some cases, it was decided to sieve the catch over a

2 mm sieve to avoid destroying delicate fauna on the grids of the sieving table. In MAREANO standards, a 1 mm sieve is usually placed under the sieving table to capture smaller fauna. However, given that the body size of macro- and megafauna decreases exponentially towards the deep sea, a 0.5 mm sieve was used instead. All content from the catch was fixed in ethanol 96%. After ca. 12 hours, the ethanol of the samples was exchanged. The 0.5 mm fraction was sent to the University Museum in Bergen (UMB). Samples of fish and cephalopods were frozen in -20°C. For abundant fish species that could be identified to species level on board, individuals were counted, weighed and then discarded, as no further taxonomic inspection was required.

3.4.10 - Brenke Sled

While we attempted to acquire a Brenke Sled for this cruise for collecting hyperbenthos and small epifauna near the sediment surface (Brenke, 2005), we were unable to and had to use MAREANO's RP Sled instead. However, we used the modifications that were suggested for the Brenke Sled for deep-sea sampling on the RP Sled.

Only one sled would be deployed per full station unless the first sled failed. The RP sled was slowly set out to the wire length before the ship stopped for 15 minutes to allow the sled to reach the seafloor. The sled was towed at 1 knot for 30 minutes.

We followed the processing procedures used in standard MAREANO cruises.

4 - Activity Timetable

Table 3. Daily overview of the activities on MAREANO cruise 2025007011 by date and time. Specific activities are denoted by color: gray - logistics; white - multibeam, sub bottom profiler (SBP) and CTD; blue – ROV dives (with MAREANO video line and Ægir6000 dive number included); yellow – standby; and green – full station physical gear.

Day #	Date	Time	P #	R #	Activity #	Activity
1 – Tuesday	23.09.2025	08:00				Mobilization
2 – Wednesday	24.09.2025	08:00				Left Isfjorden
	24.09.2025					Transit
	24.09.2025	13:25				ROV Test Dive
3 – Thursday	25.09.2025					Transit
4 – Friday	26.09.2025	09:00				Multibeam and SBP
	26.09.2025	10:00	P14	3740	454	CTD
	26.09.2025	12:20	P14	3740	3831/1024	ROV
	26.09.2025	18:30				Standby due to weather
5 – Saturday	27.09.2025					Standby due to weather
6 – Sunday	28.09.2025					Standby due to weather
	28.09.2025	04:00		3741	37	Multibeam
	28.09.2025	04:00		3741	38	Sub Bottom Profiler
	28.09.2025	6:20	P70	3741	3832/1025	ROV
	28.09.2025	12:15	P15	3742	455	CTD
	28.09.2025	13:30	P15	3742	3833/1026	ROV
	28.09.2025	20:10	P13	3743	3834/1026	ROV
7 – Monday	29.09.2025	00:10		3744	39	Multibeam
	29.09.2025	00:10		3744	40	Sub Bottom Profiler
	29.09.2025	02:55	P81	3744	456	CTD
	29.09.2025	04:30	P81	3744	3835/1027	ROV
	29.09.2025	09:00	P81b	3744	3836/1027	ROV
	29.09.2025	15:00	P16	3745	3837/1028	ROV
	29.09.2025	21:00	P17	3746	3838/1028	ROV
8 – Tuesday	30.09.2025	01:10		3747	41	Multibeam
	30.09.2025	01:10		3747	42	Sub Bottom Profiler
	30.09.2025	02:10	P88	3747	457	CTD
	30.09.2025	03:35	P88	3747	3839/1029	ROV
	30.09.2025	08:30		3748	43	Multibeam
	30.09.2025	08:30		3748	44	Sub Bottom Profiler
	30.09.2025	10:35	P87	3748	458	CTD
	30.09.2025	13:00	P87	3748	3840/1030	ROV

	30.09.2025	22:00	P1	3749	3841/1031	ROV
9 – Wednesday	01.10.2025	02:10	P7	3750	3842/1031	ROV
	01.10.2025	09:10	P86	3751	3843/1032	ROV
	01.10.2025	15:00		3752	45	Multibeam
	01.10.2025	15:00		3752	46	Sub Bottom Profiler
	01.10.2025	16:50	P3	3752	459	CTD
	01.10.2025	19:00				Standby due to weather
10 – Thursday	02.10.2025					Standby due to weather
11 – Friday	03.10.2025					Standby due to weather
	03.10.2025	07:05	P8	3753	460	CTD
	03.10.2025	08:55	P8	3753	3844/1033	ROV
	03.10.2025	17:05	P8	3753	1	Box Corer (0.1m^2)
	03.10.2025	20:25	P8	3753	2	Box Corer (0.25m^2) – Failed
	03.10.2025	23:00	P8	3753	3/4	Box Corer (0.25m^2) – Failed
12 – Saturday	04.10.2025	23:35	P8	3753	3/4	Box Corer (0.25m^2) – Not new.
	04.10.2025	03:50	P8	3753	1	Agassiz Trawl
	04.10.2025	07:05	P8	3753	1	RP Sled
	04.10.2025	09:00	P68	3754	3845/1034	ROV
	04.10.2025	16:45	P3	3752	3846/1035	ROV
13 – Sunday	05.10.2025	00:05	P69	3755	3847/1036	ROV
	05.10.2025	07:10		3756	47	Multibeam
	05.10.2025	07:10		3756	48	Sub Bottom Profiler
	05.10.2025	08:00	P82a	3756	461	CTD
	05.10.2025	11:50	P82a	3756	3848/1037	ROV
	05.10.2025	18:00	P82b	3757	3849/1037	ROV
14 – Monday	06.10.2025	01:30	P82c	3758	3850/1037	ROV
	06.10.2025	08:45	P8	3753	1	Gravity corer
	06.10.2025	11:30	P8	3753	5	Box Corer (0.25m^2)
	06.10.2025	13:55	P8	3753	6	Box Corer (0.25m^2)
	06.10.2025	16:20	P8	3753	1	Multicorer
	06.10.2025	21:25	P8	3753	2	RP Sled - Failed
15 – Tuesday	07.10.2025	01:30	P8	3753	2	Beam Trawl
	07.10.2025	05:50		3759	49	Multibeam
	07.10.2025	05:50		3759	50	Sub Bottom Profiler
	07.10.2025	06:05				Standby due to weather
16 – Wednesday	08.10.2025					Standby due to weather
	08.10.2025	19:55	P10	3759	462	CTD

	08.10.2025	22:05	P10	3759	3851/1039	ROV
17 – Thursday	09.10.2025	05:00		3760	51	Multibeam
	09.10.2025	05:00		3760	52	Sub Bottom Profiler
	09.10.2025	06:15	P9	3760	462	CTD
	09.10.2025	08:00	P9	3760	3852/1040	ROV
	09.10.2025	15:20	P84	3761	3853/1041	ROV
	09.10.2025	21:15	P85	3762	3854/1042	ROV
18 – Friday	10.10.2025	04:30	P8	3753	7	Box Corer (0.25m^2)
	10.10.2025	07:30	P8	3753	8	Box Corer (0.25m^2)
	10.10.2025	09:25	P8	3753	9	Box Corer (0.25m^2)
	10.10.2025	11:50		3763	53	Multibeam
	10.10.2025	11:50		3763	54	Sub Bottom Profiler
	10.10.2025	14:00	P66	3763	464	CTD
	10.10.2025	16:00	P66	3763	3855/1044	ROV
	10.10.2025	21:00	P66	3763	2	Gravity corer
19 – Saturday	11.10.2025	00:00	P66	3763	10	Box Corer (0.25m^2)
	11.10.2025	02:00	P66	3763	11	Box Corer (0.25m^2)
	11.10.2025	04:45	P66	3763	2	Multicorer
	11.10.2025	07:50	P66	3763	3	RP Sled - Failed
	11.10.2025	12:40	P66	3763	4	RP Sled
	11.10.2025	17:45	P66	3763	3	Beam Trawl
	11.10.2025	22:50	P66	3763	4	Agassiz Trawl
20 – Sunday	12.10.2025	01:25	P4	3764	3856/1046	ROV
	12.10.2025	07:05	P67	3765	3857/1047	ROV
	12.10.2025	13:20	P6	3766	3858/1048	ROV
	12.10.2025	19:25	P11	3767	3859/1048	ROV - Aborted
	12.10.2025	21:55		3768	55	Sub Bottom Profiler
	12.10.2025	22:00		3768	54	Multibeam
21 – Monday	13.10.2025	02:20	P2	3768	3860/1049	ROV
	13.10.2025	08:00		3769	55	Multibeam
	13.10.2025	08:00		3769	56	Sub Bottom Profiler
	13.10.2025	08:20	P2	3769	3861/1050	ROV
	13.10.2025	14:40	P11	3767	3862/1051	ROV
	13.10.2025	19:50		3769	56	Multibeam
	13.10.2025	20:30		3769	57	Sub Bottom Profiler
	13.10.2025	21:00				Standby due to weather
22 – Tuesday	14.10.2025					Standby due to weather

	14.10.2025	11:30	P83	3770	3863/1052	ROV
	14.10.2025	17:10		3771	58	Multibeam
	14.10.2025	17:10		3771	59	Sub Bottom Profiler
	14.10.2025	18:25	P12	3771	3864/1053	ROV
	14.10.2025	23:00		3772	59	Multibeam
	14.10.2025	23:00		3772	60	Sub Bottom Profiler
23 – Wednesday	15.10.2025	05:50	P90	3772	465	CTD
	15.10.2025	6:40	P90a	3772	60	Multibeam
	15.10.2025	6:40	P90a	3772	61	Sub Bottom Profiler
	15.10.2025	07:00	P90a	3772	3865/1054	ROV
	15.10.2025	14:30	P90b	3773	3866/1055	ROV
	15.10.2025	21:30	P90c	3774	3867/1055	ROV
24 – Thursday	16.10.2025	02:50	P20	3775	3868/1056	ROV
	16.10.2025	08:50		3776	62	Multibeam
	16.10.2025	08:50		3776	63	Sub Bottom Profiler
	16.10.2025	11:20	P29	3776	466	CTD
	16.10.2025	12:30	P29	3776	3869/1057	ROV
	16.10.2025	16:05	P30	3777	3870/1057	ROV
	16.10.2025	21:25	P71	3778	3871/1058	ROV
25 – Friday	17.10.2025	04:00	P71b	3779	3872/1059	ROV
	17.10.2025	12:30				Left AMOR
	17.10.2025					Transit
26 – Saturday	18.10.2025					Transit
27 – Sunday	19.10.2025					Transit
	19.10.2025	13:00				Arrive in Longyearbyen
28 – Monday	20.10.2025	08:00				Demobilization

5 - Time Spent Overview

We completed 41 video lines over 42 ROV dives making up 164x 200 m long transects and 2 full stations in 16 days (Table 4). We have lost 5 days due to variables outside of our control, such as weather or gear failure (explained in detail below in **Section 8. Limitations**). The time lost does not include expected delays due to transit time or gear deployment. When conditions allowed, we averaged 3 to 4 dives per 24-hour period. On average, each ROV dive from ROV deployment to recovery took approximately 5.5 hours, and each 800 m video line took approximately 2.5 to 3.5 hours to complete depending on the sampling intensity.

Table 4. Time spent per activity in days and hours.

Activity	Total Time Spent (Hours)	Total Time Spent (Days)
Mobilization	24	1
Demobilization	24	1
Transit to/from Longyearbyen	117.5	5
Work	384.5	16
Standby due to weather	120	5

6 - Cruise Summary

By the end of the cruise 2025007011, all of B06 and part of B07 were completed (Figure 14). We completed 33 stations with 2 full stations in B06 and 8 stations in B07 (no full stations).

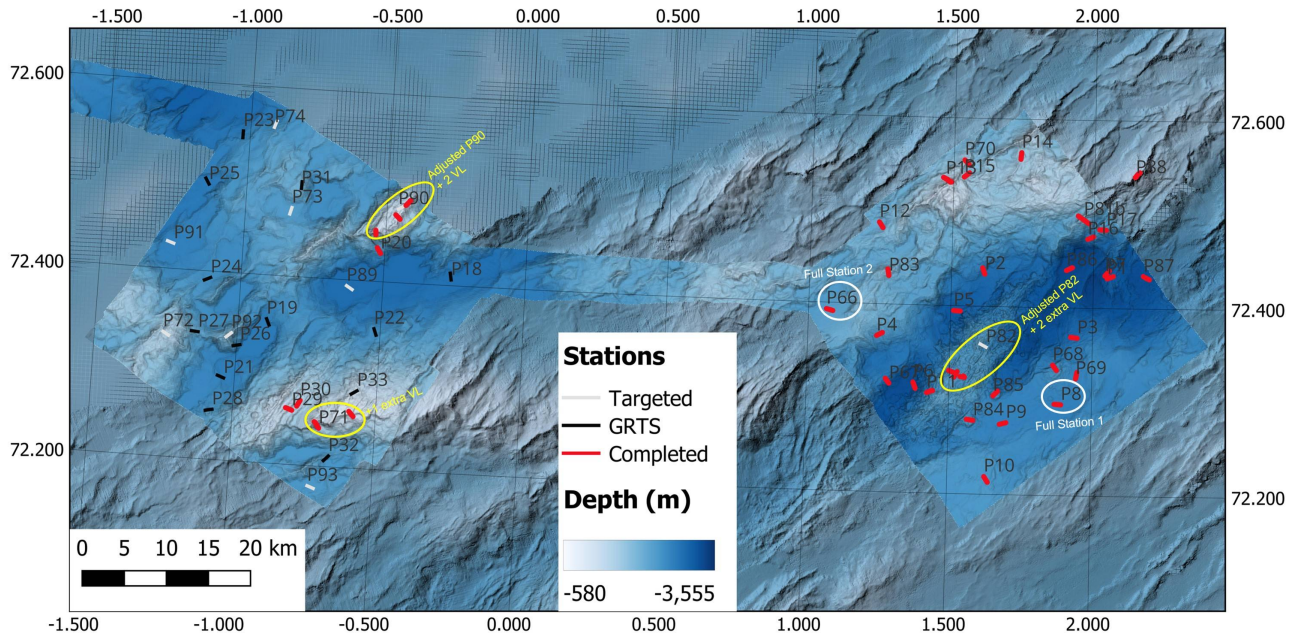


Figure 14. Map of the completed stations (red) in NH3-B06 (right) and NH3-B07 (left) with full stations circled in white and adjusted stations circled in yellow.

6.1 - Video Lines

There were 77 push corers taken, approximately 19 rock samples collected, 10 chemical sampling events, and 105 biological sampling events over the course of the 41 video lines.

During the cruise, we adjusted the location and lengths of some of the video lines due to incorrect initial placement or not taking the steep terrain into consideration in the planning phase. In NH3-B06, it was realized that the location of Ægir Spring (P82) was not correct and thus was readjusted once we were closer to the station. We also made the decision to add two more video lines at P82 to cover the geo- and biodiversity of the venting and background area since MAREANO has relatively limited experience mapping around hydrothermal vent fields. In NH3-B07, we decided to add 2 more targeted video lines on P90 and adjust its initial location and 1 more video line on P71 to cover the depth gradients on the seamounts since studies have shown biotope zonation patterns on seamounts on AMOR that would have otherwise been missed.

6.1.1 - Biology

While SFO does not provide exact numbers or a thorough analysis of the visual data, general trends of relative abundances and richness at the stations can be observed using the software. It must also be stated that general biases cannot be overlooked when examining the data, such as: 1) the loggers' experiences improved throughout the cruise as they became more familiar with the taxa and habitats; 2) the number of people available for logging where logging would be better if a "caller" was available to call out taxa observed on the screen; and 3) loggers' distance to the screen. Therefore, the results presented in this cruise report simply

visualize the trends that were observed and should not be taken as completed analysis of the visual data.

Based on the field reports (and preliminary data) generated with SFO, there were 166 morphotaxa and 511 029 individuals logged in SFO. Echinoderms had the most individuals logged across the dives, with 220 947 individuals, followed by Porifera (89 034 individuals), and Annelids (71 844 individuals) (Figure 15). Porifera were the most diverse group amongst the dives with 44 morphotaxa otus logged, followed by Cnidarians (25 otus), and Echinoderms (24 otus).

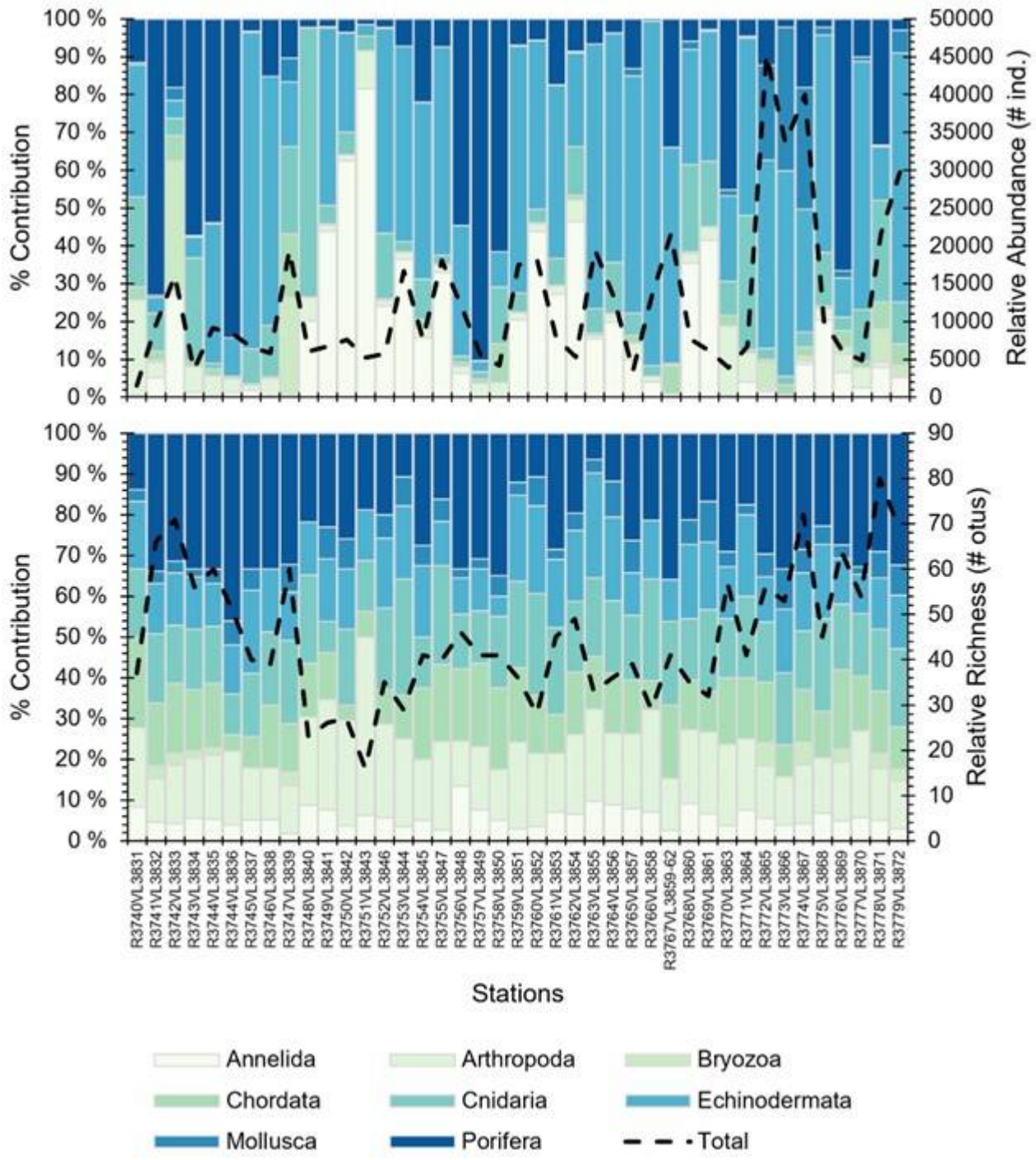


Figure 15 . Percent contribution and relative abundance (top) and relative richness (bottom) of the main phyla observed for each reference station.

The station with the least and most individuals logged were R3740VL3831 (P14) and R3772VL3865 (P90a) with

1 539 and 45 283 individuals, respectively. The station with the least and most morphotaxa logged were R3751VL3843 (P86) and R3776VL3871 (P71) with 16 and 80 otus, respectively.

To examine the preliminary community trends from the SFO data, preliminary cluster analysis were conducted on the dataset. An Indicator Species Analysis was then performed on the clusters to identify which morphotaxa were most consistently present within the proposed clusters. More detailed annotation and analysis of the visual data is required to identify the biotopes present in the region and the clusters presented here is just a “first glimpse” into the main habitats that were observed during the cruise. Many of the morphotaxa observed were labeled with video names that require further examination from experts and physical samples to confirm the identifications. Therefore taxa names may change or differ in the future as identifications are confirmed.

Table 5 . Habitats identified by a cluster analysis of the SFO data. Main sessile and mobile taxa present were identified using an Indicator Species Analysis.

Cluster	Habitat	Depth Range (m)	Main Sessile Taxa	Main Mobile Taxa
1	*Neohela* field with anemones	1640-2145	*Neohela sp., Actiniaria dark purple, Actiniaria epizoic, Bathycrinus carpenterii, Thenea sp., Antedonoidea,*	*Amphipoda, Bythocaris sp., Neobirsteiniamysis inermis, Prosobranchia, Hymenaster pellucidus, Mysidae, Lycodes frigidus, Pourtalesia jeffreysi, Lycodes sp, Polynoidea*
2	*Geodia* sponge ground/wall	1610-1980	*Geodia parva/Stelletta raphidiophora, Geodia hentscheli, Geodia sp., Amphidiscella monai, Aphrocallistidae, Lissodendoryx (Lissodendoryx) complicate, Asbestopluma furcata, Craniella sp., Cladorhizidae, Polymastiidae, Spinularia sp., Porifera fan, Bathycrinus carpenterii, Antedonoidea, Actiniaria, Actiniaria dark purple Sabellidea, Neohela sp.*	*Amphipoda, Bythocaris sp., Neobirsteiniamysis inermis, Prosobranchia, Hymenaster pellucidus, Mysidae, Lycodes frigidus, Lycodes sp, Amathillopsis spinigera, Ptychogastria polaris, Polynoidea, Tylaster willei*
3	Glass sponge ground	1080-1910	*Schaudinnia/Trichasterina/Scyphidium, Gersemia, Ciona intestinallis longissima, Molgulidae Actinostolidae, Hormathiidae, Actiniaria, Actiniaria epizoic, Bryozoa, Idmidronea, Antedonoidea, Sabellidae, Serpulidae, Geodia hentscheli, Geodia sp., Craniella sp., Asbestopluma furcata, Cladorhiza sp., Cladorhizidae, Polymastia thielei, Spinularia sp., Polymastiidae, Porifera off white irregular, Porifera fan*	*Gaidropsarus.argentatus, Amphipoda. Bythocaris sp., Neobirsteiniamysis inermis, Mysidae, Tylaster willei, Hymenaster pellucidus, Asteroidea, Prosobranchia, Ptychogastria polaris, Polynoidea*
4	Hard bottom sponge ground with crinoids (unstalked)	2000-2390	*Lissodendoryx (Lissodendoryx) complicata, Spinularia sp., Polymastiidae, Porifera small round, Amphidiscella monai, Aphrocollistidae, Porifera encrusting, Porifera fan, Geodia parva/Stelletta rhaphidiophora, Geodia hentscheli, Geodia sp., Antedonoidea, Bathycrinus carpenterii, Ascidiacea colonial encrusting, Gersemia, Actinostolidae, Actiniaria dark purple, Actiniaria epizoic, Neohela sp.,*	*Amphipoda, Bythocaris sp., Neobirsteiniamysis inermis, Mysidae, Prosobranchia, Asteroidea, Hymenaster pellucidus, Lycodes frigidus, Lycodes sp.*
5	*Bathycrinus* field with Sabellidae and anemones	2375-3270	*Bathycrinus carpenterii, Sabellidae, c.f.Bathyphellia sp., Actiniaria dark purple, Actiniaria epizoic*	*Amphipoda, Bythocaris sp., Mysidae, Lycodes frigidus, Lycodes sp.*

6	Bamboo coral reef	935-995	*Keratoisidiidae, Idmidronea, Bryozoa, Hydrozoa bush, Gersemia sp., Actinostolidae, Actiniaria epizoic, Ciona intestinallis longissima, Ascidia obliqua, Molgulidae, Antedonoidea, Schaudinnia/Trichasterina/Scyphidium, Lissodendoryx (Lissodendoryx) complicata, Hemigellius sp., Cladorhiza sp., Asbestopluma furcata, Cladorhizidae,Porifera white epibiont, Porifera fan, Craniella sp., Hexadella dedritifera, Stylocordyla borealis, Polymastiidae, Limatula sp., Pectinidae, Serpulidae*	*Gaidropsarus.argentatus, Amblyraja hyperborea, Tylaster willei, Asteroidea, Ophiuroidea, Prosobranchia, Caridea, Neobirsteiniamysis inermis, Mysidae*
7	*Bathyphellia* and Sabellidae tube field with glass sponges	3225-3255	*c.f.Bathyphellia sp., Sabellidae, Asconema megaatrialia Porifera small, Actiniaria*	*Amphipoda, Bythocaris sp., Lycodes sp.*
8	Sabellidae tube field with *Bathycrinus*	2870-3340	*Sabellidae, Bathycrinus carpenterii, Thenea sp., c.f.Bathyphellia sp.,*	*Pourtalesia jeffreysi, Eplidia sp., Amphipoda, Bythocaris sp., Mysidae, Pycnogonida, Lycodes frigidus*
9	*Kolga* aggregation in Bathycrinus and/or Sabellidae tube field	2270-2680	*Bathycrinus carpenterii, Sabellidae, c.f.Bathyphellia sp., Actiniaria dark purple, Actiniaria epizoic, Thenea sp.,*	*Kolga hyalina, Pourtalesia jeffreysi, Amphipoda, Neobirsteiniamysis inermis, Pycnogonida, Hymenaster pellucidus, Mysidae, Lycodes frigidus, Lycodes sp., Prosobranchia*
10	*Bathycrinus* and Sabellidae field with anemones and Kolga	2400-2925	*Bathycrinus carpenterii, Sabellidae, c.f.Bathyphellia sp., Actiniaria dark purple, Polymastiidae, Thenea sp.,*	*Amphipoda, Neobirsteiniamysis inermis, Hymenaster pellucidus, Mysidae, Pycnogonidae, Eplidia sp., Lycodes frigidus, Pourtalesia jeffreysi, Lycodes sp., Prosobranchia,*
11	Hard bottom sponge aggregation (Polymastiidae, encrusting, branching, and fan sponges)	2270-2560	*Polymastiidae, Lissodendoryx (Lissodendoryx) complicata, Amphidiscella monai, Asconema megaatrialia, Hymedesmiidae, Porifera fan, Bathycrinus carpenterii, Antedonoidea, Actiniaria, Actiniaria dark purple, Ascidiacea colonial encrusting*	*Amphipoda, Bythocaris sp., Neobirsteiniamysis inermis, Mysidae, Lycodes frigidus, Lycodes sp.*
12	Glass sponge ground with Ophiuroid bed	915-1390	*Schaudinnia/Trichasterina/Scyphidium, Geodia sp., Polymastia thielei, Polymastiidae, Asbestopluma furcata, Cladorhiza sp., Cladorhizidae, Hexadella detritifera, Porifera encrusting, Ciona intestinallis longissima, Molgulidae, Antedonoidea, Gersemia sp., Actinostolidae, Hormathiidae, Actiniaria, Hydrozoa bryozoa soft bush, Idmidronea, Serpulidae, Sabellidae, Limatula, Pectinidae, Scalpellidae*	*Ophiuroidea, Gaidropsarus.argentatus, Amphipoda, Caridea, Neobirsteiniamysis inermis, Tylaster willei, Hymenaster pellucidus, Asteroidea, Ptychogastria polaris, Prosobranchia*
13	*Neohela* aggregation with *Geodia* patches	1335-1495	*Neohela sp., Geodia parva/Stelletta rhaphidiophora, Porifera encrusting, Polymastia thielei, Spinularia sp., Polymastiidae, Porifera off white irregular, Bathycrinus carpenterii, Actinostolidae, Actiniaria dark purple, Actiniaria, Serpulidae*	*Ophiuroidea, Amathillopsis spinigera, Amphipoda, Bythocaris sp., Caridea, Neobirsteiniamysis inermis, Mysidae, Tylaster willei, Hymenaster pellucidus, Asteroidea, Lycodes frigidus, Lycodes sp., Ptychogastria polaris, Polynoidea, Prosobranchia,*

Overall, 13 Clusters were identified. The initial main splitting in the cluster analysis is consistent with substrate type, where clusters 5, 8, 9, and 10 corresponded with purely deep soft bottom communities, and while the

remaining clusters generally corresponded with comparatively shallower and/or hard(er) bottom communities. Many of the identified habitats are consistent with what was described by Meyer et al., 2023.

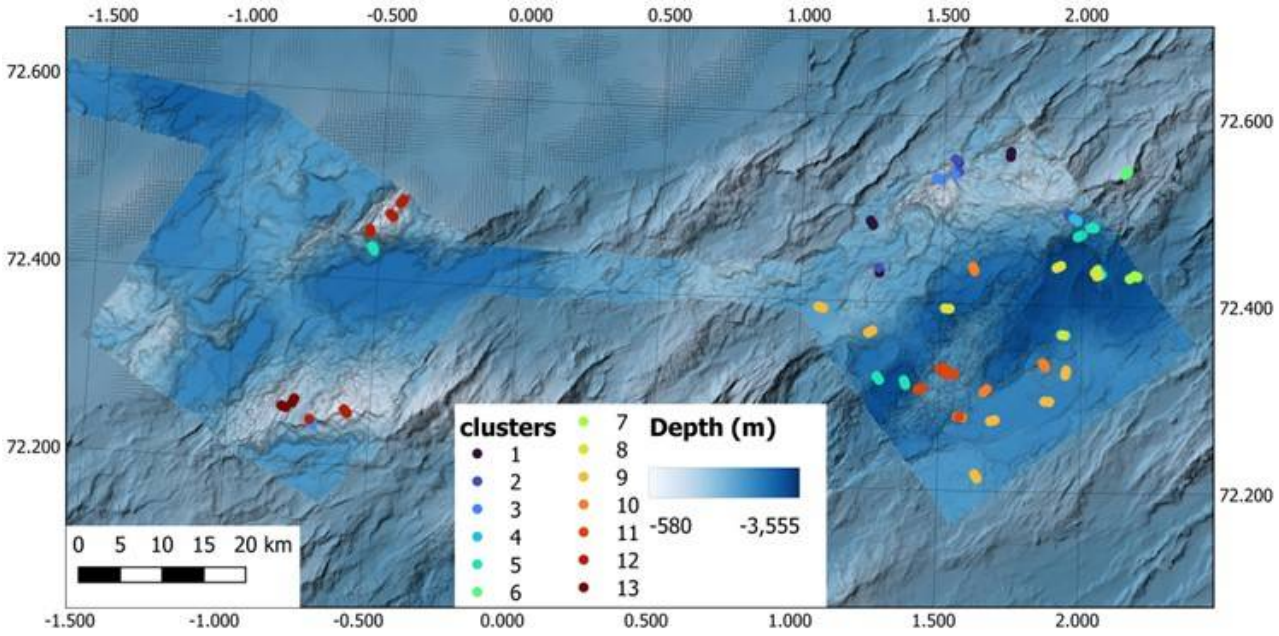
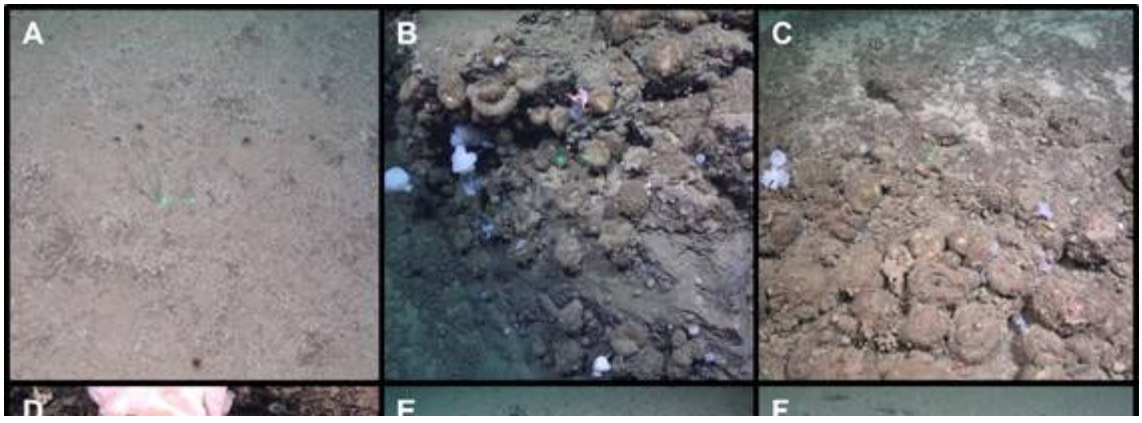


Figure 16. Map of the habitat clusters in NH3-B06 and NH3-B07. See Table 5 for Cluster descriptions.

Cluster 1 and 13 is consistent with the *Neohela fields* with anemones and agglutinated foraminifera observed between 1640 and 2145 m depth (Figure 17A & O). Cluster 2 is categorized by *Geodia* sponge grounds/walls found at 1610-1980 m depth and is dominated by *Geodia* and *Stelletta* sponges on either soft bottom or hard susbtrate (Figure 17B & C). Cluster 3 and 12 are glass sponge grounds found between 915 and 1910 m depth primarily formed by the glass sponges *Schaudinnia rosea, Trichasterina borealis, Scyphidium septentrionale* (Figure 17D & M). Cluster 4 and 11 were dominated by hard bottom sponges (polymastids, encrusting, branching, and fan sponges) and Antedonoidea crinoids from 2000-2560 m (Figure 17E & L). Clusters 5, 8, 9, and 10 were all dominated by either the stalked crinoid *Bathycrinus carpenterii* or Sabellidae tubes (or both) on soft bottom from 2270 to 3340 m depth, although Cluster 9 consistently had high densities of the sea cucumber *Kolga hyalina* present (Figure 17F, I, J, & K). The bamboo coral reef found between 935 and 995 m made up cluster 6 (Figure 17G). Cluster 7 was dominated by the anemone c.f. *Bathyphellia* with tube worms and the glass sponge *Asconema megaatrialia* present on hard substrate and occurred between 2375 and 3270 m (Figure 17H). In addition to the glass sponge ground, Cluster 12 also was dominated by brittle stars, burrowing bivalves, and scallops between 915 and 1390 m (Figure 17N).



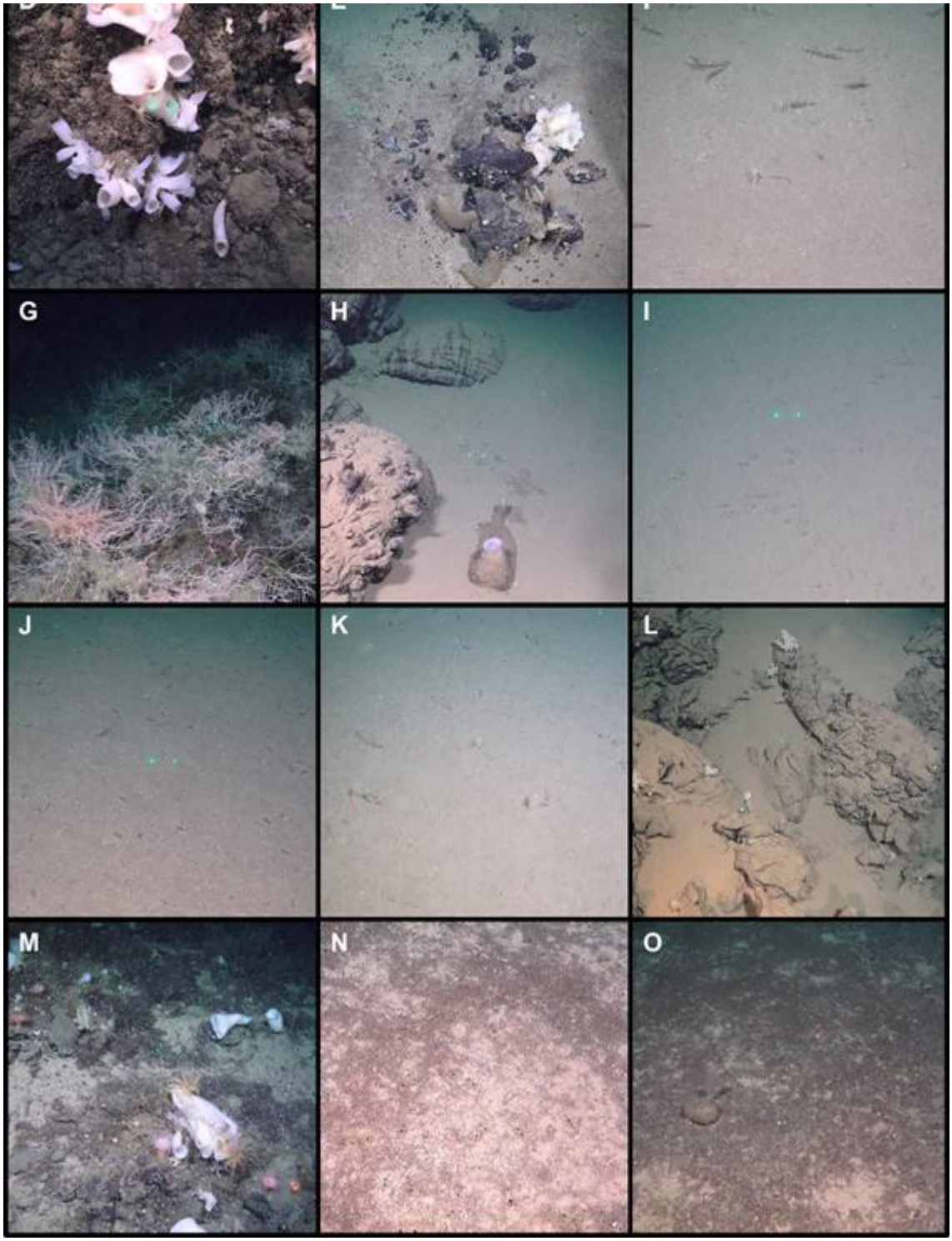


Figure 17. Habitats observed in the NORMAR Ægir6000 footage during the MAREANO 2025007011 cruise, corresponding with the habitats identified in the cluster analysis. A) Neohela field with anemones; B) Geodia sponge wall; C) Geodia sponge ground; D) Glass sponge ground; E) Hard bottom sponge ground with crinoids (unstalked); F) Bathycrinus field with Sabellidae and anemones; G) Bamboo coral reef; H) c.f. Bathyphellia and Sabellidae tube field with glass sponges; I) Sabellidae tube field with Bathycrinus; J) Kolga aggregation in Bathycrinus and/or Sabellidae tube field; K) Bathycrinus and Sabellidae field with anemones and Kolga; L) Hard bottom sponge aggregation (Polymastiidae, encrusting, branching, and fan sponges); M) Glass sponge ground; N) Ophiuroid bed with burrowing bivalves and pectinidae; O) Neohela aggregation with Geodia patches.

While the cluster analysis identified similar habitat types that were observed during the ROV dives, some habitats were missed due to low sample size (e.g. limited video lines), such as the known *Sclerolinum* forests in the diffuse venting regions of Ægir's Spring (which was put into Cluster 11) and the brittle star beds observed in

Cluster 12. Other clusters perhaps could be combined into one cluster, such as Clusters 5, 8, 9, and 10. Further annotation of the visual data is needed (and planned).

6.1.2 - Geology

The study areas on this cruise are located on a mid-ocean spreading ridge (Figure 18). The landscape in this area is young, dynamic and dramatic. It is characterised by long (<40 km) and up to 1300 m high mountain ridges, with several peaks. The main ridges are separated by valleys and deep flat-bottomed basins (<3400 m b.s.l.), containing up to tens of meters thick sediment deposits. Their time of deposition is unknown, but may have taken hundreds of thousands, or even millions of years. Along the crest of Mohn's ridge, the up to 15 km wide rift valley marks the boundary between the North-American and the Eurasian tectonic plates. This is where seafloor spreading is actively taking place.

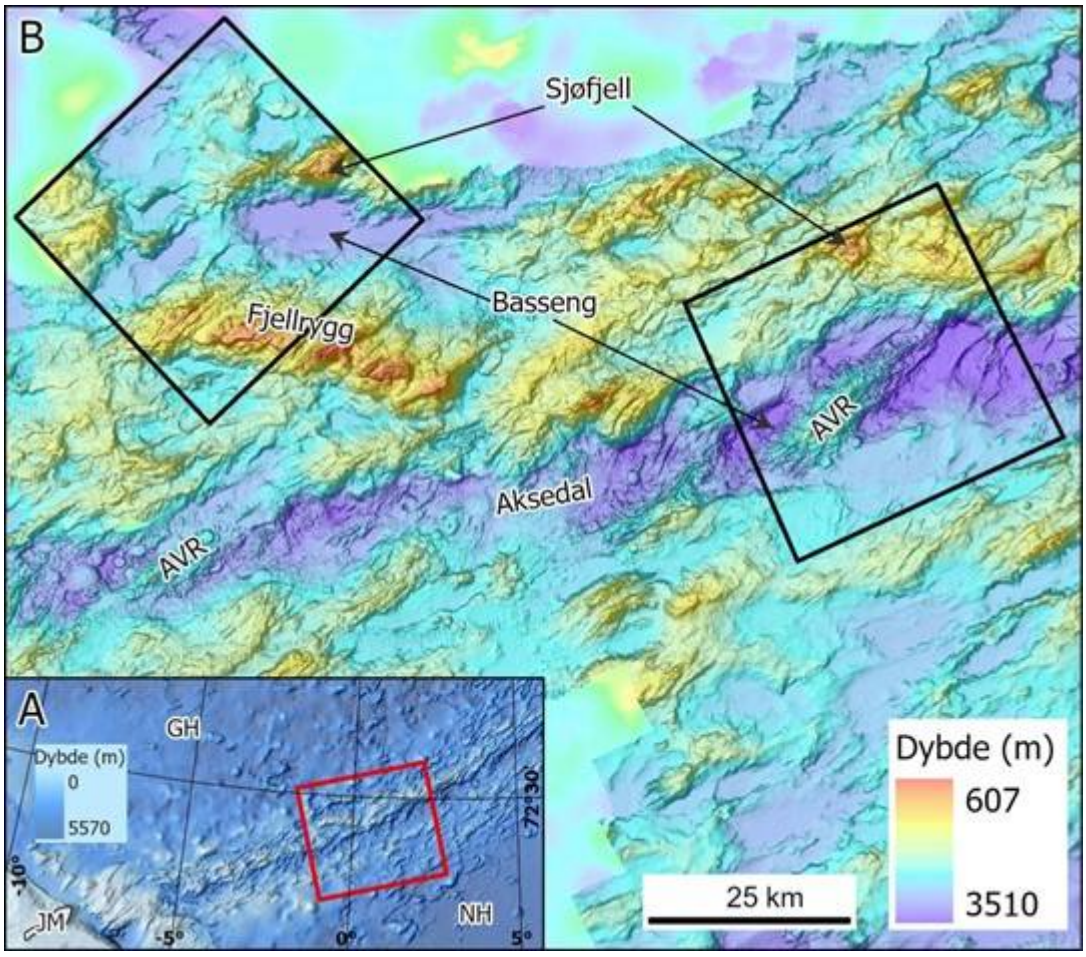


Figure 18. A) Map that shows the extent of the map B. JM: Jan Mayen, GH: Greenland Sea (Grønlandshavet), NH: Norwegian Sea (Norskehavet). B) Overview map showing this year's survey areas (black squares). Examples of a mountain ridge and seamount (over 1000 m high), basin, axial valley and axial volcanic ridges (AVR) are shown on the map.

In survey area NH3-B06 there are multiple examples of volcanic activity. The youngest part within the rift valley is a large axial volcanic ridge, which is prominent in bathymetry data, along with volcanic cones, flat-topped volcanos and several fault scarps. In this area we have also observed pillow lava structures and large fissures on video. Evidence of active hydrothermal fields such as bacterial mats, precipitates and hydrothermal chimneys with active outflow were also observed. Warm magma flowing up from the deep along with tectonic processes such as faulting and earthquakes cause seabed displacement, e.g. local uplift of 100s to 1000s meters along the margins of the rift valley. This also leads to repeated mass movement events, recognisable

from bathymetry data, and in sub-bottom sediment profiles and video. Survey area NH3-B07 on the other hand is outside the rift valley, and has a slightly simpler and more subdued landscape, although it too is characeterised by high mountain ridges interlain by flat-bottomed basins and valleys.

Generally, a range of geological processes are active in the area and the geodiversity in the area is high. Especially for seabed morphology and geomorphology, but also with respect to substrate, ranging from very fine grain sizes such as S*andy mud* to mixed and very coarse grain sizes such as *Cobbles and boulders*. There is also a lot of *Exposed bedrock* in the survey areas, primarily on the mountain ridges.

6.2 - Full Stations

Two full stations were completed during the cruise, R3753 (P8) and R7363 (P66). A total of 2 gravity cores for establishing sedimentation rates and genesis, 2 multi corers for chemistry, 1 box corer (0.1 m^2) for emerging contaminants (CECs), 10 box corers (0.25 m^2) for macrofauna, 2 Agassiz trawls and 2 Beam trawls for epifauna, and 4 RP sleds for hyperbenthos were deployed. However, given the time constraints and weather conditions, only one station of 5 replicates and one station with 2 replicates at box NH3-B03 were sampled.

6.2.1 - R3753 (P8)

The first full station took approximately 54.5 hours over the course of 5 separate days (3, 4, 6, 7, and 10 October), due to weather conditions limiting the deployment of gear or requiring all operations to stop.

Starting on 3 October, a CTD was deployed and collected bottom water for eDNA before the ROV went into the water. After the completion of the video line, in addition to the 2 push corers for geology, the ROV collected chemistry samples with 2 blade corers in modified aluminum frames to compare to the 0.1 m^2 box corer sample and 6 push cores (two of these with aluminum liners) to compare to the multi corer samples. Both the blade corer sampling and the push core sampling for chemistry were successful. Additionally, 2 Niskin Bottles mounted on the ROV were fired to collect bottom water for eDNA to compare to the bottom water collected by the CTD; however, due to a mounting error, both Niskin Bottles on the ROV misfired and did not collect any bottom water. The ROV stayed at the bottom as the box corers were deployed to ensure success in the sampling of the drop gear.

The first drop gear that was deployed was the small box core (0.1 m^2) rather than the gravity corer due to the weather conditions. Video observation from the ROV showed the box corer bouncing off the seabed due to poor weather conditions before taking the sample when landing again. The sample was presumably disturbed at the surface, but was still taken to be compared to the samples taken with blade corers. Three larger box core (0.25 m^2) attempts were then performed. The first 2 casts failed, as the box corer did not release due to technical problems in the release mechanism. On the third attempt, the box corer did not release either, and the ROV had to manually release the box corer mechanism to trigger the spade. However, due to the bad weather picking up and the wave conditions increasing, the box corer bounced twice against the seafloor when landing in the third attempt, massively disturbing the surface. Nonetheless, the sample was processed once upon deck, although eDNA and sediment pigments samples were not taken.

The catch of the Agassiz trawl was very small and was not sieved through the sieving table (Photo 8). Instead, the entire catch was sorted into taxonomic groups and placed in trays and petri dishes and the whole content was preserved. The catch was dominated by sea cucumber *Kolga* sp. Due to the uncertainty of whether this was a realistic catch with the mesh size (1 cm), it was unclear if the sample was viable or if the deployment failed. Afterwards, the RP sled was deployed and contained only sediment fragments in the net and part of the cod-end connecting apparatus was missing upon retrieval. It was suspected the gear landed incorrectly and that

the sampling failed. Sampling then was postponed due to bad weather. During the bad weather window, it was made sure that the release mechanism on the box corer worked properly on deck and adjustments were made to guarantee successful triggers.

Photo 8. Agassiz Trawl catch at R3753 sorted into petri dishes and trays. Depth 2693 m.

On 6 October, when the weather calmed down, we returned to R3753 to continue the physical sampling. The first gravity corer was successfully retrieved and collected 435 cm of sediment (Table 6). Then 2 more casts of the larger box core (0.25 m^2) were retrieved successfully, containing mud, foraminifera, polychaeta tubes of Sabellidae family, and a *Kolga*. Then the multi corer was successfully deployed, although there were signs of disturbance in some of the cores. The longest core (up to 56 cm) had a crack in the middle and was therefore assigned core D. Another core with signs of disturbance (possible sample loss at the bottom of the core) was assigned core C, while the two primary cores for chemistry analyses, A and B, seemed to be intact and of sufficient length (44.5 cm for core A and 35.5 cm for core B). All the cores had seawater above the surface and the multi corer was therefore approved. The results are to be compared to those from push core analysis.

Table 6. Gravity core specifications.

Core name	Lat (DD)	Long (DD)	Depth (m)	Core Length (cm)	# of Section	Retrieval Date (UTC)	Retrieval Time (UTC)	Comments
KPH25-711-GC01	72.2996	1.8641	2669.6	435	5	06.10.2025	08:50	**R3753.** Core catcher in separate bag.
KPH25-711-GC02	72.3908	1.0846	2273.8	478	5	10.10.2025	21:03	**R3763.** Top 0-4 cm is in separate bag. Core catcher in separate bag.

Due to the failure of the 1st RP sled, it was decided to re-deploy the RP sled, only for it to come up with the cod-end completely missing. It was also decided to deploy the spare beam trawl due to the uncertainties of the net mesh size on the Agassiz trawl to compare the catch size (Photo 9). The catch from the beam trawl had lots of stones and boulders in it. In fact, the net of the beam trawl ripped apart due to big boulders. In this case, the smaller fraction of the catch containing small stones and gravel was sieved through a 2 mm sieve and a 0.5 mm

sieve was placed beneath the main sieve to retain the finer fraction of sediment with fauna, which will be sent to the UiB Museum for further processing, while the big rocks were washed and kept aside until they were checked for animals. Animals found on the rocks were added to the catch when found and then the rocks were discarded. While washing the sample, delicate fauna was separated from the rest of the fauna and sediment, particularly from stones, into a small tray. The catch was composed by *Kolga* sp., anemones, incl., c.f. *Bathyphellia* sp., Gastropoda indet. and some polychaeta tubes.

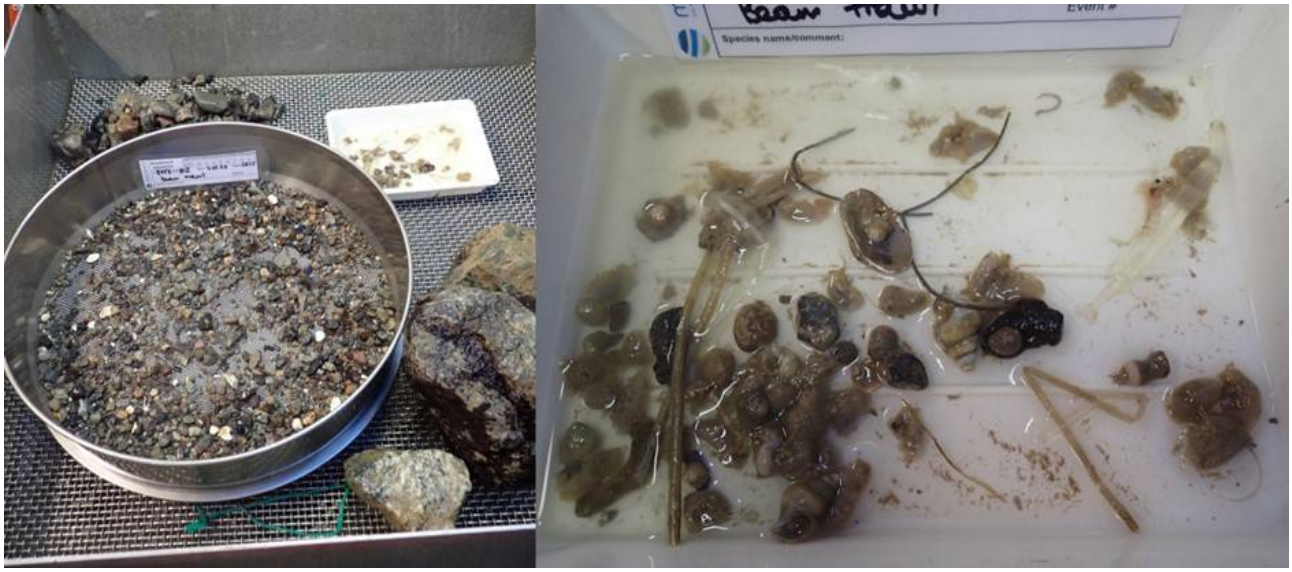


Photo 9. Beam trawl catch at R3753 . Depth 2615 m.

The remaining three larger box core samplings were resumed on 10 October. The first deployment that day happened when there were still considerable waves, and from ROV footage we could see that the box corer landed too fast against the seafloor, and a lot of sediment was flushed out through the top opening doors of the gear. Additionally, when lifted on deck, the box corer slammed against the A-frame several times, disturbing even more the sediment surface. The sample was anyway processed but deemed of bad quality. After that, weather conditions improved, and two more successful box cores with perfect landings and undisturbed sediment surfaces were retrieved. The viable samples contained mud, foraminifera, Sabellidae tubes and some porifera of genus *Thenea*.

6.2.2 - R3763 (P66)

The second full station took approximately 34.5 hours to complete over the course of 2 continuous days (10 and 11 October).

Starting on 10 October, the CTD was deployed and collected bottom water for eDNA. Then the ROV was deployed for the video line and stayed at the bottom during drop gear deployment. Once the video line was completed with biological and geological sampling, 2 Niskin Bottles mounted on the ROV were successfully fired for eDNA. The gravity corer was successfully deployed and collected 478 cm sediment (Table 6). Then the two larger box core casts were retrieved. The first deployment was successful, however, on the second cast the box core landed very close to the hole made by the previous landing, probably sampling slightly disturbed sediments. The sample was processed, but results should be interpreted carefully. The multi corer was then successfully retrieved, delivering six high quality cores of up to 31 cm length.

Then the 3rd RP sled was deployed, and once again the cod-end was missing upon retrieval, with the RP sled coming up empty. It was then decided to attempt one last time with the RP sled and adjust the towing time to 15

minutes rather than 30 minutes. When the 4th RP sled was retrieved, the net and cod-end was completely filled with sediment consisting of mud and foraminifera, and there were many *Kolga* and Prosobranchia in the sample, resulting in a long processing and decanting time. The sample was decanted and goldwashed following standard MAREANO procedures, however due to the sediment and *Kolga*, another decanting was required to attempt to clean the sample as best as possible. This resulted in polychaetes and crustaceans in the decanted fraction and approximately 25 L of foraminifera and other fauna remaining. It is suspected that the RP sled dragged in the sediment while being towed and the wire length may have been too long (at 1.7x the depth), thus scrapping the seafloor and suspending the sediment in front of the sled, completely filling the net with towed epibenthos and sediment rather than purely hyperbenthos.

The beam trawl catch at station R3763 was the largest trawl catch of the cruise. The sample was, therefore, washed over a 5 mm sieve on the sieving table, with the finer fraction collected on a 0.5 mm sieve placed underneath. The number of stones and their size were lower in this samples compared to the previous beam trawl sample. Stones without fauna attached were separated from the samples as much as possible and discarded.

Due to the size of the catch, only partial sorting into major taxa was possible on board. Fragile and rare fauna, and fauna attached to stones were picked from the main catch and were separated into different containers to avoid fauna damage during preservation. Fragile and rare fauna, and fauna attached to stones were picked from the main catch and were separated into different containers to avoid fauna damage during preservation.

Kolga sp. was by far the most abundant taxon. Other common taxa included anemones and poriferans attached to small stones, and molluscs (gastropods and bivalves). This haul captured higher diversity than the other trawl samples, including, e.g., the only trawled sea star (*Tylaster* sp.), delicate bivalves *Hyalopecten* sp., wood fragments with possible associated fauna, and pieces of fishing gear overgrown with epifauna. Fish collected in trawl included 15 individuals of *Lycodes frigidus* and one *Paraliparis* sp. (Photo 10).

Photo 10. Beam trawl catch at R3763 . Depth 2339 m.

The Agassiz trawl sample at R3763 was relatively small, contained almost no sediment, and included no stones. The sample was washed over a 1 mm sieve for larger organisms, and with a 0.5 mm sieve underneath to collect the finer fraction. The catch was sorted into major taxa on board. *Kolga* sp. again heavily dominated. Other common taxa included arthropods (mainly decapods), gastropods, poriferans, and polychaeta tubes. The sample also contained fish (eight *Lycodes* sp. and three *Lycodes frigidus*) and one cephalopod (*Cirroteuthis muelleri*) (Photo 11).

Photo 11. Agassiz trawl catch at R3763 . Depth 2693 m

6.3 - CTDs

A total of 11 CTDs were deployed in B06 and 2 CTDs in B07. In general, the top layer was made up of warm water typically greater than 4°C, where the stations from NH3-B06 were between 6 and 10°C, and NH3-B07 were cooler (T<5°C). The salinity at the surface fluctuated between the stations, generally remaining between 34.5 and 35.2 ppt, although the stations in NH3-B07 (S = 34.55 to 34.65) were generally fresher than the stations in NH3-B06 (S = 34.8 – 35.1). At approximately 50 m, there was a spike in salinity to around 35 ppt before steadily decreasing. The thermocline and halocline observed were between 50 and 400 m. The water temperature continued to slowly decline before stabilizing at -0.5°C around 1500 m. Salinity slowly increased before stabilizing at around 34.94 ppt at 2000 m. There were elevated dissolved oxygen concentrations observed between 50 to 500m before it steadily reduced with increasing water depth.

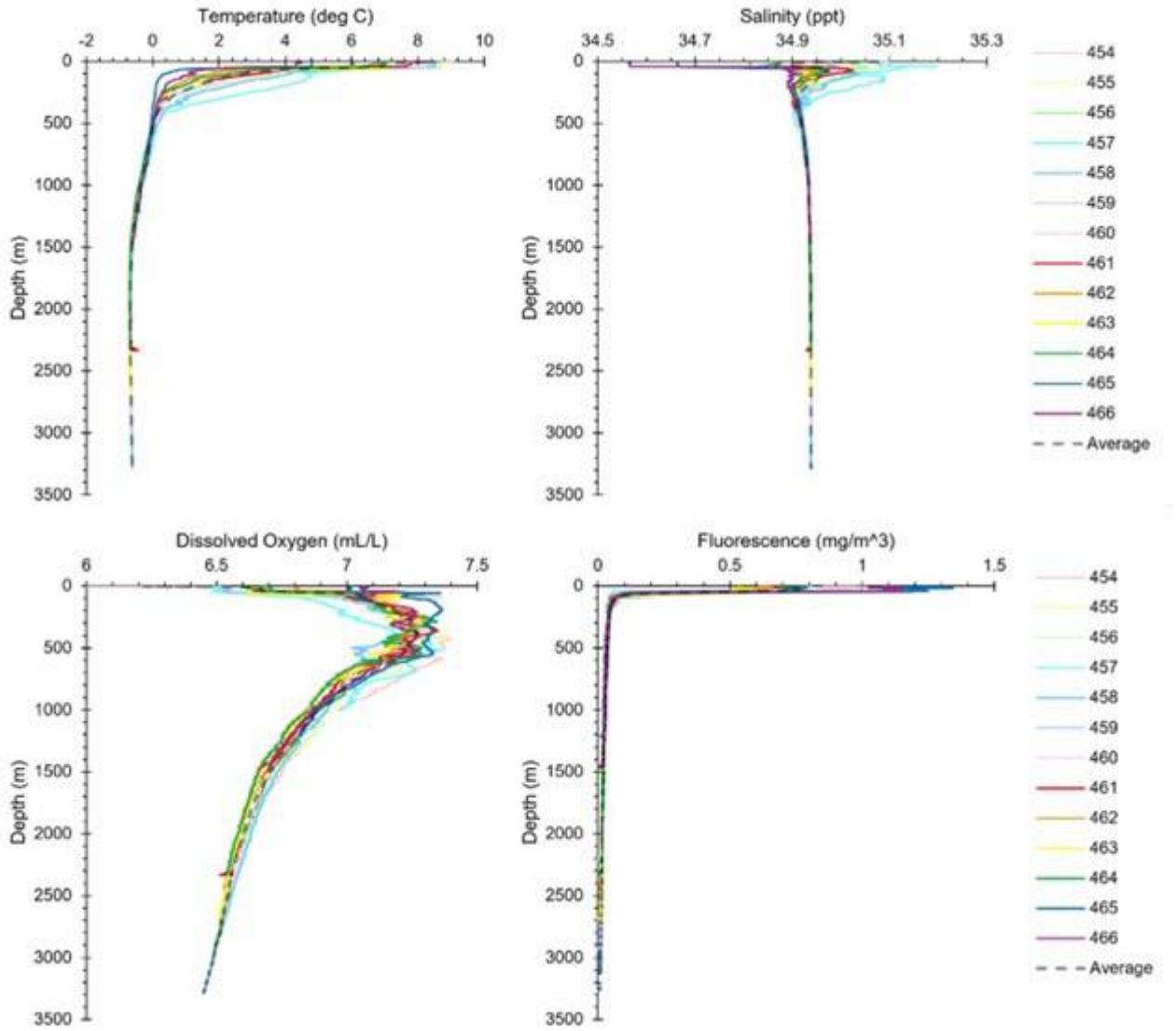


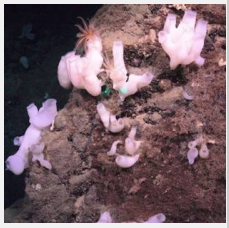
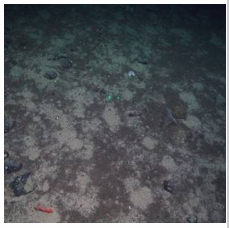
Figure 19. Profiles of the 13 CTD casts taken in NH3-B06 and NH3-B07.

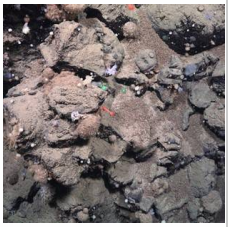
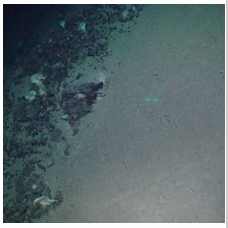
Some patterns that deviated from the average were observed at some of the stations. The thermocline and halocline for R3747 (CTD457) was generally more pronounced compared to the other stations in NH3-B06 where warmer and more saline water was present in the upper 500 m. The elevated dissolved oxygen concentrations at R3747 were observed at 500 m and 700 m. At R3756 (CTD 461), or Ægir's Spring, there was a spike in temperature and drop in both salinity and dissolved oxygen observed in the profiles at approximately 2300 m (where the vent field is).

It must be stated however that the CTDs only capture a single time point of data and likely do not reflect the entirety of the oceanographic parameters at the stations. More standardized replicates over a time series and well planned CTD transects are required for a more thorough evaluation of the oceanographic conditions in the region.

7 - Station Summaries

Table 7. Descriptive summary of the stations surveyed during 2025007011 with a reference picture by ROV *Ægir6000* (NORMAR) included.

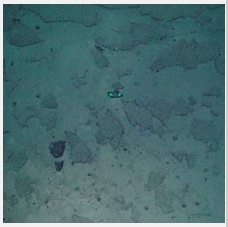
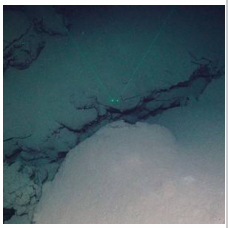
Station	P#	Box	VL & Dive Duration (Hours)	Start Depth (m)	Activities	ROV Samples	Short Summary	Representative Picture by ROV *Ægir6000* (NORMAR)
R3740VL3831	P14	NH3-06	3:25 & 5:30	1669	Multibeam SBP CTD ROV	2 biology 2 geology	Video line consisting of sandy mud with agglutinated foraminifera and *Neohela* burrows. *Neohela* and actiniaria present throughout.	*Center-20250926134121.jpeg.*
R3741VL3832	P70	NH3-06	4:05 & 5:40	1825	Multibeam SBP ROV	5 biology 2 geology	Video line switching between sandy mud, exposed bedrock, and pillow lava. Mainly soft bottom with tetractinellida and polymastida sponges present and patches of spicule bottom.	*Center-20250928095329.jpeg.*
R3742VL3833	P15	NH3-06	3:00 & 3:50	1825	CTD ROV	2 biology 2 geology	Video line switching between exposed bedrock, muddy sand, and gravelly muddy sand. High density of rossellidae sponges and bryozoans on the exposed bedrock wall. Subsea transit to P13.	 *Center-20250928164316.jpeg*
R3743VL3834	P13	NH3-06	3:40 & 4:20	1453	ROV	1 biology 3 geology	Video line consisting of gravelly sandy mud with agglutinated foraminifera and *Neohela* burrows. *Neohela* sp. and actiniaria present throughout with patches of rocky outcrops and spicule mats dominated by sponges.	 *Center-20250928205610.jpeg*

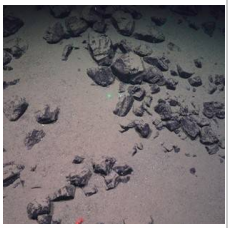
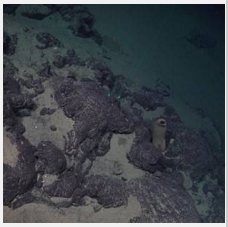
R3744VL3835	P81	NH3-06	3:30 & 4:35	2211	Multibeam SBP CTD ROV	4 biology 4 geology	Video line consisting of gravelly sandy mud with some agglutinated foraminifera and patches of exposed bedrock. Stalked crinoid *Bathycrinus carpenterii*, actiniaria and some *Neohela* sp. present with patches of sponges dominating exposed bedrock. Subsea transit to P81b.	*Center-20250929080044.jpeg*
R3744VL3836	P81b	NH3-06	2:55 & 5:00	2010	ROV	2 biology 2 geology	Video line consisting of gravelly sand and gravelly sandy mud with some agglutinated and calcareous foraminifera then transitioning to a steep wall of pillow lava. Steep wall dominated by tetractinellida and polymastida sponges. Subsea transit to P16.	 *Center-20250929111259.jpeg.*
R3745VL3837	P16	NH3-06	2:35 & 3:55	2826	ROV	2 biology 3 geology	Video line consisting of muddy sand all the way with lots of lebensspuren. Video line dominated by *Bathycrinus carpenterii*. Subsea transit to P17.	*Center-20250929165534.jpeg.*
R3746VL3838	P17	NH3-06	2:45 & 4:00	2474	ROV	3 biology 1 geology	Video line consisting of sandy mud, mud and sand with gravel, cobbles, and boulders, and exposed bedrock. Soft bottom dominated by *Bathycrinus carpenterii* and hard bottom dominated by sponges and unstalked crinoids of Antedonoidea family.	 *Center-20250929215137.jpeg.*
R3747VL3839	P88	NH3-06	2:50 & 3:55	998	Multibeam SBP CTD ROV	3 biology 2 geology	Video line consisting of exposed bedrock and biogenic coverage. Video line dominated by bamboo coral and bryozoans with some sponges, tunicates, and other associated fauna.	*Center-20250930062113.jpeg.*

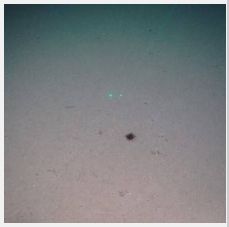
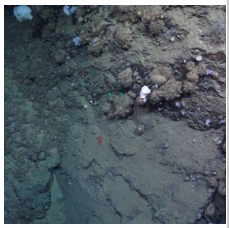
R3748VL3840	P87	NH3-06	4:55 & 7:10	3236	Multibeam SBP CTD ROV	1 biology 3 geology	Video line consisting of pillow lava with mud and sandy mud. Video line dominated by c.f. *Bathyphellia* sp. and sabellidae tubes.	*Center-20250930153132.jpeg.*
R3749VL3841	P1	NH3-06	2:50 & 4:20	3091	ROV	3 biology 2 geology	Video line consisting of sandy mud and lebensspuren. Video line dominated by *Bathycrinus carpenterii* and sabellidae tubes, with some *Thenea* sp. and *Elpidia sp*. Subsea transit to P7.	*Center-20250930234534.jpeg.*
R3750VL3842	P7	NH3-06	3:05 & 5:50	3198	ROV	2 biology 2 geology	Video line consisting of sandy mud and lebensspuren. Video line dominated by *Bathycrinus carpenterii* and sabellidae tubes, with some c.f. *Bathyphellia* sp.*, Thenea* sp. and *Elpidia* sp. and patches of biogenic debris.	*Center-20251001050609.jpeg*
R3751VL3843	P86	NH3-06	03:05 & 5:50	3334	ROV	2 geology	Video line consisting of mud with biogenic debris. Video line dominated by sabellidae tubes and amphipods, with some *Caulophacus arcticus*.	*Center-20251001105505.jpeg.*
R3752	P3	NH3-06		2900	CTD		Delay of station due to adverse weather.	

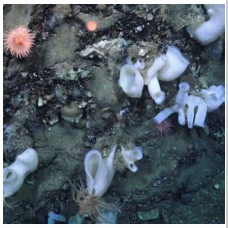
R3753VL3844	P8	NH3-06	5:55 & 9:05	2677	Full Station: Multibeam SBP CTD ROV Box Corer (0.1 m^2) Box Corer (0.25 m^2) Agassiz Trawl RP Sled	1 CTD – bottom water for eDNA 2 ROV biology 8 ROV chemistry 2 ROV geology 1 Box Corer (0.1 m^2) chemistry 2 Box Corers (0.25 m^2) biology – failed 1 Agassiz Trawl biology 1 RP Sled biology – failed.	Video line consisting of sandy mud with calcareous foraminifera and lebensspuren. Video line dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Thenea* sp. and c.f. *Bathyphellia* sp. ROV stayed at bottom during gear deployment. Had to abort the full station early due to weather. Box corers for biology hit the bottom of the seafloor due to waves and were not viable. Agassiz trawl catch was small. RP Sled had nothing in the cod-end. Multicorer, Gravity Corer, and additional Box Corers were delayed due to weather.	*Center-20251003131609.jpeg.*
R3754VL3845	P68	NH3-06	4:15 & 6:45	2673	ROV	3 biology 3 geology	Video line consisting of sandy mud, muddy sand, and exposed bedrock with lebensspuren and calcareous foraminifera all the way. Soft bottom regions dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Thenea* sp., *Pourtalesia* sp., and c.f. *Bathyphellia* sp.. Bedrock dominated by sponges and ascidians.	*Center-20251004131348.jpeg.*
R3752VL3846	P3	NH3-06	2:45 & 5:55	2900	ROV	1 biology 3 geology	Video line consisting of sandy mud, gravelly sandy mud, pillow lava and exposed bedrock with several deep crevices. Soft bottom regions dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Thenea* sp., *Pourtalesia* sp., *c.f. Bathyphellia* sp. and other actiniaria.	*Center-20251004203654.jpeg.*
R3755VL3847	P69	NH3-06	2:35 & 6:25	2638	ROV	1 biology 2 geology	Video line consisting of sandy mud with lebensspuren and calcareous foraminifera. Video line dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Thenea* sp., *Pourtalesia* sp., c.f. *Bathyphellia* sp. and other actiniaria. Recorded the top camera on ascent by external request.	*Center-20251005035432.jpeg.*

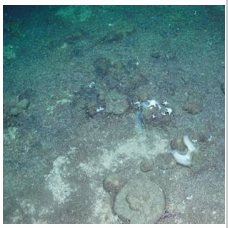
R3756VL3848	P82a	NH3-06	4:25 & 6:15	2308	Multibeam SBP CTD ROV	1 CTD – bottom water for eDNA 2 biology 2 geology	Video line started at the vent field and contained bacterial mats, pillow lava, and muddy sand then it transitioned outside of the venting area to muddy sand and pillow lava/exposed bedrock. Video line contained a siboglinid tubeworm *Sclerolinum contortium*, *Bathycrinus carpenterii*, and Antedonoidea then transitioned to sponge domination on the exposed bedrock. 2 blade corer samples of *Sclerolinum contortium* were collected for an external party. Subsea transit to P82b.	*Center-20251005134850.jpeg.*
R3757VL3849	P82b	NH3-06	5:40 & 7:30	2330	ROV	4 biology 10 geology	Video line containing mostly pillow lava and exposed bedrock with some patches of sandy mud and muddy sand. Video line contained unstalked crinoids and sponges on exposed bedrock. An additional video was recorded for exploration only. Subsea transit to 82c.	*Center-20251005201215.jpeg.*
R3758VL3850	P82c	NH3-06	2:35 & 5:30	2432	ROV	1 geology	Video line containing mostly pillow lava, lava tubes, and exposed bedrock. Video line contained sponges, unstalked crinoids, ascidians, and Actiniaria. Recorded the top camera on ascent by external request.	*Center-20251006024215.jpeg.*
R3753	P8	NH3-06		2677	Full Station: Gravity Corer Multi Corer Box Corer (0.25 m^2) Beam Trawl RP Sled	1 Gravity Corer geology 1 Multi Corer chemistry 2 Box Corer (0.25 m^2) biology 1 Beam Trawl biology 1 RP Sled biology – failed 2 ROV niskin bottles for eDNA – failed	Continued with the full station sampling. Due to uncertainty in the quality of the Agassiz Trawl catch since it was small, a Beam Trawl was also done and came up muddy and the net was damaged by rocks. The RP Sled came up empty and was missing the cod-end. Had to stop due to weather. ROV stayed down at bottom during the drop gear sampling.	

R3759VL3851	P10	NH3-06	2:55 & 6:20	2423	Multibeam SBP CTD ROV	4 biology 2 geology	Video line containing sandy mud/muddy sand with calcareous foraminifera. Video line dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Thenea* sp., *Pourtalesia* sp., c.f. *Bathyphellia* sp. and other actiniaria. There were patches of dead *Pourtalesia* shells throughout.	*Center-20251009001930.jpeg*
R3760VL3852	P9	NH3-06	3:20 & 6:00	2665	Multibeam SBP CTD ROV	3 biology 2 geology	Video line containing sandy mud with lebensspuren. Video line dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Thenea* sp., *Pourtalesia* sp., c.f. *Bathyphellia* sp. and other actiniaria. Two copper lines were observed on the seafloor.	*Center-20251009101646.jpeg.*
R3761VL3853	P84	NH3-06	2:50 & 4:45	2453	ROV	2 geology	Video line containing sandy mud with patches of pillow lava at the start and signs of slides. Soft bottom dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Thenea* sp., *Pourtalesia* sp., c.f. *Bathyphellia* sp. and other actiniaria. Hard bottom dominated by sponges.	 *Center-20251009172731.jpeg.*
R3762VL3854	P85	NH3-06	2:25 & 4:35	2531	ROV	1 biology 2 geology	Video line containing sandy mud/muddy sand with calcareous foraminifera and lebensspuren then transitioning to exposed bedrock and pillow lava with fissures. Soft bottom dominated by sabellidae tubes, crinoids, anemones, and *Thenea* sp. *Kolga* sp. present in variable densities. Hard substrate dominated by sponges and crinoids.	 *Center-20251010003732.jpeg.*
R3753	P8	NH3-06		2677	Full Station: Box Corer (0.25 m^2)	3 Box Corer (0.25 m^2) biology	Continued with the full station sampling. Box Corers contained mud, foraminifera and some polychaeta tubes. ROV stayed down at bottom during the drop gear sampling.	

R3763VL3855	P66	NH3-06	3:15 & 3:55	2251	Full Station: Multibeam SBP CTD ROV Gravity Corer Multi Corer Box Corer (0.25 m^2) RP Sled Beam Trawl Agassiz Trawl	1 CTD – bottom water for eDNA 2 ROV biology 2 ROV Niskin bottles for eDNA 2 ROV geology 1 Gravity Corer geology 1 Multi Corer chemistry 2 Box Corers (0.25 m^2) biology 2 RP Sled biology – 1 failed 1 Beam Trawl biology 1 Agassiz Trawl biology	Video line consisting of sandy mud with calcareous foraminifera and lebensspuren. Video line dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Neohela* burrows. ROV at the bottom during drop gear deployment. All drop gear were deployed successfully, 1st RP sled lost the cod-end so a second one was deployed with a shorter towing time (15 minutes) and came back with mud, foraminifera, epifauna and hyperbenthos. Due to a miscommunication, the Beam Trawl was deployed before the Agassiz Trawl, both had a viable catch.	*Center-20251010180950.jpeg.*
R3764VL3856	P4	NH3-06	2:25 & 4:35	2425	ROV	1 biology 2 geology	Video line containing sandy mud with calcareous foraminifera and lebensspuren. Soft bottom dominated by *Kolga* sp., *Bathycrinus carpenterii*, and sabellidae tubes, with some *Thenea* sp., *Pourtalesia* sp., c.f. *Bathyphellia* sp. and other actiniaria. Small patches of *Neohela* aggregations.	*Center-20251012035913.jpeg.*
R3765VL3857	P67	NH3-06	3:25 & 4:50	3080	ROV	5 geology	Video line containing variable substrate from steep slopes with cobbles and boulders to exposed bedrock to gravelly sandy mud to sandy mud. Soft bottom dominated by *Bathycrinus carpenterii*, some sponges, crinoids, and anemones on hard substrate.	 *Center-20251012083300.jpeg*
R3766VL3858	P6	NH3-06	2:55 & 4:30	3269	ROV	1 biology 2 geology	Video line containing sandy mud with patches of exposed bedrock and biogenic debris (dead sponges) and calcareous foraminifera. *Bathycrinus* sp. and Sabellidae tubes dominated the soft bottom. Large glass sponges (*Caulophacus arcticus* and *Asconema megaatralia*) present on hard substrate. Subsea transit to P11.	 *Center-20251012164200.jpeg.*

R3767VL3859	P11	NH3-06	1:15 & 2:30	2610	ROV	1 geology	Video line mainly with exposed bedrock of pillow lava with varying sediment coverage and soft sediment patches. Both soft bottom and hard bottom dominated by crinoids. Porifera also present on hard substrate. Dive aborted due to weather.	*Center-20251012200741.jpeg.*
R3768VL3860	P2	NH3-06	2:45 & 5:10	2929	ROV	2 biology 2 geology	Video line with mainly sandy mud with lebensspuren and patches of compacted sediment. Soft bottom dominated by Sabellidae, *Elpidia* sp., and *Bathycrinus carpenterii* with some *Thenea* sp. and actiniaria. *Kolga* appeared at the end of the dive.	 *Center-20251013035007.jpeg*
R3769VL3861	P5	NH3-06	2:30 & 4:25	3094	ROV	4 geology	Video line with mainly sandy mud with lebensspuren and patches of pillow lava. Soft bottom dominated by *Bathycrinus carpenterii* and actiniaria with some patches of dead *Asconema megaatralia*.	*Center-20251013113801.jpeg.*
R3767VL3862	P11	NH3-06	2:05 & 4:20	2545	ROV	1 biology 3 geology	Video line with mainly exposed bedrock of pillow lava and tubular flows and patches of sandy mud. Soft bottom dominated by crinoids and hard bottom dominated by crinoids and porifera. Continued where dive stopped when aborted.	*Center-20251013165351.jpeg*
R3770VL3863	P83	NH3-06	3:15 & 5:20	1960	ROV	2 biology 2 geology	Video line mainly muddy sand with calcareous and agglutinated foraminifera and lebensspuren, and some patches of exposed bedrock. There were several fluid escape features and depressions on the seabed. Soft bottom dominated by crinoids, anemones, Sabellidae tubes, and crustaceans like amphipods, *Neohela*, and *Bythocaris*. Hard bottom dominated by tetractinellida and polymastida sponges.	 *Center-20251014151452.jpeg.*

R3771VL3864	P12	NH3-06	2:55 & 4:00	2140	Multibeam SBP ROV	1 biology 2 geology	Video line with mainly muddy sand and gravelly muddy sand with lebensspuren and 80% cover of calcareous and agglutinated foraminifera. The beginning of the video line was dominated by *Kolga*, then stalked crinoids, anemones, Sabellidae tubes, and *Neohela* dominated the line.	*Center-20251014191359.jpeg.*
R3772VL3865	P90a	NH3-07	4:50 & 6:35	1263	Multibeam SBP CTD ROV	1 CTD – bottom water for eDNA 8 biology 4 geology	Video line consisted mainly of bedrock with patches of muddy sand, muddy sandy gravel, gravelly muddy sand, or spicule mat. Soft bottom dominated by brittle stars and bivalves and hard bottom dominated by glass sponges, unstalked crinoids, and soft corals.	*Center-20251015084422.jpeg.*
R3773VL3866	P90b	NH3-07	3:30 & 3:45	1272	ROV	6 biology 2 geology	Video line consisted mainly of gravelly muddy sand with patches of spicule mat, with some areas containing lots of agglutinated foraminifera. There were some fluid escape features that contained egg-like masses. Soft bottom dominated by brittle stars and bivalves and hard bottom dominated by glass sponges, unstalked crinoids, and soft corals. Numerous fish *Gaidropsarus argentatus* were observed near the glass sponges. Subsea transit to P90c.	*Center-20251015180224.jpeg.*
R3774VL3867	P90c	NH3-07	3:10 & 4:05	1462	ROV	1 biology 1 geology	Video line with mainly exposed bedrock with patches of biogenic debris like spicule mat. Glass sponges, encrusting sponges, carnivorous sponges, brittle stars, bryozoans, and bivalves dominated the video line.	 *Center-20251015225905.jpeg.*
R3775VL3868	P20	NH3-07	2:40 & 5:20	2519	ROV	1 biology 1 geology	Video line with mainly muddy sand with lebensspuren and foraminifera all the way. Area dominated by *Bathycrinus* and anemones, with *Kolga* becoming more present at the end.	*Center-20251016053144.jpeg.*

R3776VL3869	P29	NH3-07	2:50 & 3:40	1461	Multibeam SBP CTD ROV	1 CTD – bottom water for eDNA 2 biology 2 geology	Video line with mainly muddy sand and gravelly muddy sand with a lot of agglutinated foraminifera and patches of exposed bedrock. Soft bottom dominated by brittle stars and anemones, spicule and hard bottom dominated by *Geodia*, *Stelletta* and other tetractinellida and polymastida sponges.	 *Center-20251016142043.jpeg.*
R3777VL3870	P30	NH3-07	2:25 & 3:20	1485	ROV	2 biology 1 geology	Video line mainly consisted of muddy sand and gravelly muddy sand with agglutinated foraminifera and spicule mat. Spicule mat dominated by *Geodia* and *Stelletta* and soft bottom dominated by anemones and brittle stars.	*Center-20251016184447.jpeg*
R3778VL3871	P71	NH3-07	4:30 & 5:50	1639	ROV	2 biology 3 geology	Video line started with muddy sand then transitioned to exposed bedrock with patches of spicule mat covering the bedrock areas. Agglutinated foraminifera present on the muddy sand. Hard bottom and spicule mat dominated by *Geodia, Stelletta*, and glass sponges and soft bottom covered with anemones. An additional transect was conducted to reach the top.	*Center-20251017012602.jpeg.*
R3779VL3872	P71b	NH3-07	5:00 & 6:00	1145	ROV	2 biology 2 geology	Video line with mainly gravelly muddy sand and muddy sandy gravel with agglutinated and calcareous foraminifera and areas of exposed bedrock. Soft bottom dominated by brittle stars and sabellid worms, with patches of Keratoisididae coral on biogenic substrate. Hard bottom dominated by glass sponges. Conducted an exploratory section at the end of the video line and found more Keratoisididae aggregations.	*Center-20251017052336.jpeg*

8 - Limitations

MAREANO cruise 2025007011 to Mohn's Ridge encountered numerous difficulties due to ship and equipment limitations and weather conditions, which ultimately impacted our ability to complete all 3 boxes as planned (NH3-B06, B07, B08). Regardless of those difficulties, it was unrealistic to expect to finish all 3 planned boxes and expectations need to be adjusted for future cruises to the deep sea. Work at the deep sea is considerably more time consuming and that needs to be clearly communicated. The following sections go into more detail about the limitations encountered on this cruise.

8.1 - Mobilization time and Demobilization time

ROV Ægir requires 24 hours minimum for mobilization and roughly 12 hours for demobilization, where the ship needs to be stationed near shore after the ROV is loaded onboard.

We could not start mobilization until the 23 September because Research Vessel Kronprins Haakon was anchored and not at the dock until the morning of 23 September.

There were 2 more cruises following 2025007011 that will use the ROV Ægir6000, with 1 cruise between that will not. Due to this cruise time allocation, we must completely demobilize Ægir6000 so the cruise between 2025007011 and 2025007013 can use the moonpool. This means we must return to port 1 day earlier than planned (19 October rather than 20 October) to demobilize Ægir6000 as well as MAREANO equipment.

We lost 1.5 days of this cruise to mobilization and demobilization time.

8.2 - Weather conditions

Mohn's Ridge and the Norwegian Sea is prone to adverse weather conditions from September to November, making it not an optimal timeframe for MAREANO cruises. MAREANO cruises require conditions that allow operating an ROV and traditional sampling gear (gravity corer, multicorer, box corer, trawl, and sled) to be able to collect the data necessary for fulfilling our deliverables. Due to the nature of the open ocean, when adverse weather comes there is no place to shelter and the ship must stop all operations and wait.

In addition, when the weather is bad, the ROV must take longer to ascend and descend to account for the heave of the swell. On normal conditions, the ROV can go up to 0.8 knots for ascending and descending. During bad weather, the ROV may need to reduce the speed to 0.4 knots to reduce risking damage to the winch.

Kronprins Haakon's working deck is very exposed, making it dangerous to operate drop gear (e.g. gravity corer, multicorer, box corer) in adverse weather conditions. This means full station operations cannot be completed in adverse weather conditions. When we did deploy any drop gear in remotely bad weather, the sampling failed due to the gear hitting the seafloor upon deployment or hitting the ship when retrieving it out of water (see more below).

We lost 5 days due to adverse weather conditions prohibiting gear deployment, especially drop gear during full stations.

8.3 - Equipment failure

Due to engine problems slowing our speed, it took 52 hours rather than the estimated 42 hours to arrive to our

first station.

R/V Kronprins Haakon also does not have a heave compensator on the A-frame to dampen the impacts of the waves when the weather is bad. This has affected the quality of our physical sampling drop gear (gravity corer, multicorer and box corer) where the gear has hit the bottom multiple times due to the swell despite the lowering speed being reduced at 50 to 100 m before reaching the bottom. The box corer also hit the A-frame of the ship when lifting it out of water, thus disturbing the surface layer. This caused our samples to be unusable and required more replicates to get a viable sample. This is critical for the correct deployment of the box corer and the multi corer and should be urgently considered to be fixed for next cruises on board Kronprins Haakon.

We lost 10 hours due to engine problems.

We lost 6 hours due to drop gear failure due to weather.

8.4 - Towed gear failure

In the Deep-Sea Strategy, we planned to acquire an Agassiz Trawl to collect the megafauna and a Brenke Sled to collect the hyper- and epibenthos at the full stations. These gear types are suited for the depths that are within the survey area and can handle variable terrain conditions, unlike the traditional MAREANO towed gear – RP Sled and Beam Trawl. Despite attempts to acquire the proposed gear, we failed to find an available Brenke Sled to rent and were uncertain on the condition and mesh size of the Agassiz Trawl, as it was unknown and could not be checked by the renter – University of Bergen. Therefore, we brought three MAREANO RP Sleds for surveying the hyperbenthos and two MAREANO Beam Trawls as a backup in case the Agassiz was inadequate and could not capture the smaller megabenthos.

It was not realized until we were on board that we lacked the appropriate depth rated scanmar and floaters (for the RP Sled) to be attached to the geared equipment, therefore it was not possible to track the true lengths and time of the towed gear at the bottom.

8.4.1 - Agassiz trawl and Beam trawl

We measured the inner mesh size of the Agassiz Trawl to be 1 cm once we were onboard, which was larger than MAREANO’s Beam Trawl (5 mm). After the first Agassiz Trawl at P8, it was clear all epifauna smaller than 1 cm were not captured by the Agassiz Trawl and the catch size was small. We made the decision to use the Beam Trawl afterwards to see if we would get a comparable catch size, however the Beam Trawl was filled with mud, rocks and big boulders once it came onboard, indicating the seafloor was too heterogeneous and the mesh size captures lots of sediment and rocks.

When at the second full station, P66, we intended to deploy the Agassiz Trawl first, then deploy the Beam Trawl in case the Agassiz Trawl catch was inadequate and, if time allowed, have a comparison between gear types to test the suitability of the Beam Trawl in the deep sea in order to make a decision to not include the Beam Trawl for future surveys in the region. However, due to miscommunication on deck, the Beam Trawl was deployed before the Agassiz Trawl. The catch on the second Beam Trawl was more viable than the first Beam Trawl at P8. The second Agassiz trawl had a smaller catch than the Beam Trawl and only captured epifauna larger than 1 cm, though it did contain some overlapping species found in the Beam Trawl.

It is recommended that the Beam Trawl is only brought on the next cruise on the condition that a Brenke Sled is also brought to allow a full comparison of the diversity caught between the three gear types (Agassiz Trawl with a modified mesh size, Beam Trawl, and Brenke Sled).

8.4.2 - RP sled

At the first full station, P8, the first RP Sled had very little in the cod-end indicating it may have landed incorrectly. Therefore, we decided to attempt a second RP Sled when we returned to P8 to complete the station. However, the cod-end was missing once the second RP Sled came back on deck, resulting in an empty catch.

At the second full station, P66, we attempted the third RP Sled at the standard towing time (30 minutes), and once again, the replacement cod-end was missing once it came on deck and the RP Sled was empty. We attempted a fourth RP Sled and adjusted the towing time to 15 minutes instead. When the RP came up on deck, the cod-end was filled with foraminifera, mud, and epibenthos, indicating that it had dragged along the seafloor rather than “glided” as it was meant to.

It is recommended that the RP Sled is not used for future surveys in the deep sea and only brought as a back-up with appropriate scan mar and floaters.

We lost 20 hours due to inadequate towing gear not suited for the deep sea.

8.5 - Depth

Operating in the deep sea takes much longer for operations to take place and that must be considered when planning future cruises. Under normal conditions, gear can be lowered between 0.5 and 0.8 knots, depending on the gear type. When the weather is bad, the gear (like ROV) needs to be lowered at half the speed (0.4 knots) for safe deployment. Deployment and retrieval are the most dangerous times for the ROV and drop gear, and conditions need to be appropriate for them to operate safely and be of good quality.

Dives at 1500 m to 2000 m took approximately 4 hours to complete (from leaving deck to back on deck), where ascending and descending takes approximately 1 hour combined. Dives at 2000 to 3000 m took approximately 5 to 6 hours to complete, where ascending and descending takes approximately 2 hours combined. The video lines (800 m long with 4 x 200m long transects) take approximately 2.5 hours to complete on average with standard amount of sampling (3 biological samples per VL line and 2 push cores for geology). When more sampling is done on a VL, the VL can take approximately 3 to 4 hours to complete.

9 - Suggestions for Future Cruises

9.1 - Station Planning

MAREANO station planning (using GRTS) ensures spatially balanced random samples are created. Coupled with a stratification of selected environmental variables (resampled to 50 m resolution), this approach naturally places more samples in strata with more environmental variability and greater (planar) area than in flat, homogenous areas. Video lines of 800 m (planar) will cover considerably more than 800 m distance over ground in steep terrain, while in flat-moderately sloping terrain this effect is negligible. This, together with the fact that the video data are needed to ground-truth a sufficient number of pixels in gridded multibeam data, for onward interpretation and modelling, were discussed at pre-cruise station planning meetings, but with a consensus to adapt as necessary during the cruise. We therefore started the cruise with an open mind on shortening selected video lines as we gained a realistic estimate of ROV-based survey time in this rugged terrain. During the cruise, it quickly became clear that the effects of the sloping and variable terrain (including fine-scale variations not captured in the multibeam bathymetry) were having significant impact on the survey time and resulting in very long video lines (>>800 m) in terms of the distance over ground. We started to adjust the length of the lines that covered considerable depth differences before each dive, however this was an ad-hoc solution for each video line, to bring the length closer to 800 m over ground while keeping it long enough for effective ground-truthing.

For future cruises we suggest a more systematic approach is adopted for shortening video lines in steep terrain, and that this is incorporated in pre-cruise survey planning routines. Several approaches may be adopted but systematic calculation of the distance over ground can be incorporated, optionally with profile views of each survey line, seem to offer a good solution. A formula can then be developed to shorten video line lengths based on slope values and variation, to an agreed minimum (planar) length (e.g. 400 m) matched to the resolution and quality of the multibeam (bathymetry and backscatter) data in a given area (i.e. what is needed for ground truthing and onward use in 2D map products), and experience based estimates of dive time. Whilst some modification during the cruise may still be needed in certain cases, (e.g. if the direction is altered for practical reasons) this pre-planned adaptation will provide a more realistic and time-efficient starting point for those on board and minimize the need for ad-hoc planning. This approach to line length adaptations can be applied equally to GRTS and targeted lines, although the latter could be planned from the outset, to ensure the features of particular interest are retained.

9.2 - Refuge Boxes

During this cruise the reserve boxes were primarily defined on the basis of priority. Due to their proximity to the priority boxes on this cruise, they are not suitable as refuge boxes in case of bad weather. It is highly suggested that in the future refuge boxes are planned in addition to reserve boxes, in case it is necessary to seek shelter, and that these are placed farther away from the priority area, e.g. closer to port and/or closer to Jan Mayen.

9.3 - Full Crew

Due to the changes in workflow, short turnaround between stations and now the possibility of collecting samples with the ROV, which requires people to process them as quickly as possible, it is suggested that for cruises on AMOR, we have a full ship with 4 extra biologists on board. The current workload on the deep-sea cruise is not sustainable with the MAREANO standards of 3 biologists per shift. We would often be diving during mealtimes or processing samples as the ROV was descending and when it arrived at the bottom, biologists were still

occupied with tasks down at the lab. Extra biologists would help with the workload and ensure opportunities for switching loggers during the shift since continuous logging fauna in highly biodiverse regions while staring at a screen for extended periods of time can be mentally and physically demanding.

9.4 - Seabed Field Observer (SFO)

Further development into the updated version of SFO is needed to improve the efficiency of logging and processing the annotations made during the video line.

- Ability to rearrange the order of the buttons
- Ability to set colors of the buttons
- Ability to set favorites that appear at the top of the annotation list
- Ability to see which annotations have been made during a session by all the users
- Order of the files needs to be sortable by file name or date, it is currently ordered randomly
- Button order needs to be sortable by group (e.g. Phylum), alphabetical, most used, object ID
- Ability to log multiple habitats or seabeds at a time for interval logging
- A narrow top line with e.g. seabed, habitat, that does not disappear when scrolling down.
- Ability to use shortcuts to e.g. add quantities to a button, add comments, seabed types and seabed features
- Ability to change session list or template while in a session
- Ability to automatically write a comment when the comment field opens (instead of having to click on the input field first) and to get suggestions from previous comments

9.5 - Video and Data Processing

Data processing can be significantly streamlined to further minimize the manual input error rate in the archiving of the data during and after the cruise as well as facilitate the rapid delivery of preliminary data products. The current ad-hoc protocol used in this cruise will be formalized in parallel with the discussions involving the developers of SFO so that procedures and scripts can be further refined and ensure the needs of all the cruise participants are covered. Furthermore, some of the tasks related to data management (e.g., video files and renaming) could be automated to save time and ensure a strict consistency.

A clearer definition of the exact level of details required during the live annotation will let the staff better manage their time and leave breathing room in time when processing physical samples requires part of the shift to be in the laboratory.

There is a need for consistent laser point distances, especially when using the same video platform. For this cruise, the laser points were set at 9 cm and could not be adjusted to MAREANO’s standard 10 cm. This is inconsistent with previous cruises with *Ægir6000*, where the former (red) laser points distances ranged between 15 to 17 cm, although hopefully the laser bracket is more stable and will not change in the future. Therefore, it is even more important than before to note the lasers distance for every dive in the logging sheets to ensure good documentation. Ideally the lasers distances with *Ægir6000* will not change much with a stable laser bracket, but to maintain good practice, always note the laser distances.

9.6 - Equipment Wishlist

It is important to consider the type of equipment that would be most useful for future work in the region. Therefore, we propose a “wish list” to keep in mind for the future.

9.6.1 - ROV Gear

Given that a lot of visited areas with the ROV were not suitable to deploy traditional gear to sample biology (i.e. box corer) due to the heterogeneous terrain or unsuitable conditions, quantitative biological samples were only retrieved at the two full stations (with the exception of some blade corers). As most tools that come with *Ægir6000* for sample biology are not-quantitative, we propose to develop some tools that would allow us to sample more quantitatively macrofauna at these sites and in a more standardized way than with the current options (having in mind limitations when it comes to sampling area and replication effort).

In addition to the need for quantitative sampling gear, our ROV wish list gear include:

- ROV-operated box corer
- ROV-operated grab
- ROV scraper or scoop
- Removable and modular sample storage boxes with lids
- Modified ROV skuff to fit blade corers (to be able to bring more blade corers)
- Niskin Bottle Stand for ROV Niskin Bottles
- Push corer holster/holder on the skuff to mount multiple push corers

9.6.2 - Ship or Physical Gear

- Deep-sea bouys/floaters for towed gear
- Trawl sensors for towed gear
- Heave compensator for A-Frame on the back of R/V Kronprins Haakon
- Brenke Sled
- Modified mesh size (5 mm) for Agassiz Trawl

10 - Data availability

The following data is available upon request.

In addition to Sub-bottom profiler (SBP) data collected during dedicated MBES surveys, SBP data are also collected between stations on dedicated sampling cruises. These data are shared within one month after the cruise via a file-sharing solution upon request **to marinedata@ngu.no**. For more information on datasets and map services for Acoustic Seabed Data, see: NGU's Map Catalogue | Mareano – gathering knowledge about the sea (https://www.mareano.no/kart-og-data/kartkatalog-1/ngu-kartkatalog).

Video files (with metadata/navigation data) are shared upon request within one month after the cruise. These data are shared via a file-sharing solution upon request to **Kjell Bakkeplass (kjell.bakkeplass@hi.no)** or **Pål Buhl-Mortensen (paal.buhl.mortensen@hi.no)**.

Seabed observations from the field (georeferenced observation logs for geology and biology) are shared within one month after the cruise upon request to **Kjell Bakkeplass (kjell.bakkeplass@hi.no)** or **Pål Buhl-Mortensen (paal.buhl.mortensen@hi.no)**.

11 - References

Brenke, N. (2005). An epibenthic sledge for operations on marine soft bottom and bedrock. *Marine Technology Society Journal*, 39(2), 10-21.

Burgos, J. M., Buhl-Mortensen, L., Buhl-Mortensen, P., Ólafsdóttir, S. H., Steingrund, P., Ragnarsson, S., and Skagseth, Ø. (2020). Predicting the Distribution of Indicator Taxa of Vulnerable Marine Ecosystems in the Arctic and Sub-arctic Waters of the Nordic Seas. *Front. Mar. Sci.* 7, 1–25. doi:10.3389/fmars.2020.00131.

Hopkins, T. S. (1991). The GIN Sea-A synthesis of its physical oceanography and literature review 1972-1985. *Earth Sci. Rev.* 30, 175–318. doi:10.1016/0012-8252(91)90001-V.

Meyer, H.K., Davies, A.J., Roberts, E.M., Xavier, J.R., Ribeiro, P.A., Glenner, H., Birkely, S.-R., Rapp, H.T. (2023). Beyond the tip of the seamount: Distinct megabenthic communities found beyond the charismatic summit sponge ground on an Arctic seamount (Schulz Bank, Arctic Mid-Ocean ridge). *Deep Sea Research Part I: Oceanographic Research Papers*, 191: 103920. DOI: http://dx.doi.org/10.1016/j.dsr.2022.103920.

Pedersen, R. B., Olsen, B. R., Barreyre, T., Bjerga, A., Denny, A., Heggernes Eilertsen, M., Fer, I., Haflidason, H., Hestetun, J. T., Jørgensen, S., Ribeiro, P. A., Steen, I. H., Stubseid, H., Tandberg, A. H. S., and Thorseth, I. (2021). Fagutredning mineralressurse i Norskehavet landskapstrekk, naturtyper og benthiske økosystemer. Bergen.

Roberts, E.M., Mienis, F., Rapp, H.T., Hanz, U., Meyer, H.K., Davies, A.J. (2018). Oceanographic setting and short-timescale environmental variability at an Arctic seamount sponge ground. *Deep Sea Research Part I: Oceanographic Research Papers, 138*, 98–113. https://doi.org/10.1016/j.dsr.2018.06.007.

Roberts, E. M., Bowers, D. G., Meyer, H. K., Samuelsen, A., Rapp, H. T., and Cárdenas, P. (2021). Water masses constrain the distribution of deep-sea sponges in the North Atlantic Ocean and Nordic Seas. *Marine Ecology Progress Series*, 659, 75–96. doi:10.3354/meps13570.

Ross, R., Thorsnes, T., Meyer, H.K., Bjarnadóttir, L., Molina, È.J., Dolan, M., Hodnesdal, H., Welde, H., Birkely, S-R., Boitsov, S., Buhl-Mortensen, P., Chand, S., Gonzalez-Mirelis, G., Holte, B., Jensen, G., Jensen, H., Johansen, Y., Kartveit, K.H., Malmquist, C., Marquez, J.F., Meek, T.J., Moy, F., Ofstad, A.E., Olssøn, R., Piechaud, N., Plotkin, A., Schimel, A., Voronkov, A., Westgaard, J.-I.(2025). MAREANO’s Deep-sea survey strategy. V4, 66 pp. Unpublished.

Santos, M. F. L. D., Pires-Vanin, A. M. S., & Muniz, P. (1996). A simple and efficient device for sorting large marine benthic samples. *Revista Brasileira de Oceanografia*, 44, 57-60.

12 - Appendix

Appendix 1. Overview of samples collected at the full stations (excluding the box corer samples, see **Appendix 2**) extracted from Marbunn.

Station	Date	Sample no	Depth (m)	Comment
Trawl				
3753	03.10.25	1	2678	Agassiz trawl. 1 cm mesh size on inner net. TRANSPONDER POSTION and DEPTH. Very small sample. Sample was sorted on board. Voucher: Kolga sp. (1/6): 136 stk, 0.05 kg, EtOH,ss=100). Hymnaster (2/6): 2 stk, 0.001 kg, EtOH,ss=100). Crustacea (3/6): EtOH,ss=100). Porifera (4/6): 11 stk, 0.013 kg, EtOH,ss=100). Jellyfish (5/6): 2 stk, 0.006 kg, EtOH,ss=100). Animalia indet (6/6): 2 stk, 0.003 kg, EtOH,ss=100). SL: RO. Subsample: 100 percent. 10_mm: 5x0.5L, 1x0.3L (Kolga sp.) Photo: 234-237.
3753	07.10.25	2	2617	Beam trawl. About 2/3 tub of mud, some stones and gravel. Used the normal beam trawl with 5_mm inner mesh. Trawl catch sieved over a 2_mm sieve. Net under chains forn. SL: RO. Subsample: 100 percent. 5_mm: 1x0.5L, 1x5L, EtOH to Tromsø¸. 0.5_mm: 1x3L, EtOH to Bergen Museum. Photo: 291-298.
3763	11.10.25	3	2293	Beam trawl. 1/3 black tub. Kolga dominating. Many species seen from video. 5 buckets of mixed animals. 8 containers with fragile, rare or animals on rocks. Frozen fauna: Lycodes figidus, 15 stk, 2.017 kg, ss_100, frozen for Rupert W. Paraliparis, 1 stk, 0.080 kg, ss_100, frozen for Rupert W. Pieces of wood, 10 stk, 0.0077 kg, ss_100, frozen. Subsample: 100 percent. 0.5_mm: 1x10 L (EtOH). 5_mm: 1x0.05 L,3x0.3 L,1x0.5 L,1x1 L,2x3 L, 5x10 L (13 buckets EtOH).
3763	10.10.25	4	2276	Agassiz trawl. The whole catch was not put through the sieving table. It was processed straight from the bucket and poured into 1_mm sieve. Under, a 0.5_mm sieve was placed to collect smaller stuff. Discarded fauna: Lycodes frigidus, 3 stk, 1.27 kg (discarded) in ss_100. Frozen fauna: Cirroteuthis muelleri, 1 stk, 0.237 kg (frozen) in ss_100. Lycodes sp., 8 stk, 0.283 kg (frozen for Rupert W.) in ss_100.
Gravity corer				
3753	06.10.25	1	2670	435 cm length. NGU_nb=143035.
3763	10.10.25	2	2274	5 tubes 1 bag 0-4 cm 1 bag with catches sediment. Core length 4.78 m (+ 4 cm). Top slightly cut (0.0-4 cm) -> in a bag. Core catches apr. 20 cm -> in a bag.
Multicorer				
3753	06.10.25	1	2672	6 cores (NGU:4, IMR:2)
3763	11.10.25	2	2274	6 cores (NGU:5, IMR:1). Hulrom ved 9.5-10 cm. Mye forams 15-18 cm, mindre forams fra 18 cm.
RP-sledge				
3753	04.10.25	1	2678	Very small sample. Subsample 100 percent. 0.5_EL: 1x0.1L (EtOH) 0.5_HF: 1x0.3L (EtOH)
3753	06.10.25	2	2681	MISS. Cod-end gone.
3763	11.10.25	3	2265	MISS. Net came loose.
3763	11.10.25	4	2285	Subsample: 100 percent. EtOH. 0.5_mm dec: 1x1 L, 2x5 L. 4_mm: 4x10 L. 1_mm: 5x10 L.

Appendix 2. Overview of box corer samples and their quality for cruise 2025007011. Quality type indicated by color: bad (red), good (green), and questionable (orange).

Date	R number	Sample no	Gear	Sediment Interval [cm] (OW=Overlaying Water)	Mesh size [mm]	Elutriation fraction (EL=Elutriated; HF=Heavy fraction)	Fixative	Area subsample [m^2]	Fractioning	Contain size [n
03.10.2025	3753	1	Small boxcore (0.1 m^2)	0-5	1	NA	EtOH	NA	Fractioned	300
03.10.2025	3753	1	Small boxcore (0.1 m^2)	0-5	0.5	NA	EtOH	NA	Fractioned	300
03.10.2025	3753	1	Small boxcore (0.1 m^2)	0-5	0.3	NA	EtOH	NA	Fractioned	300
04.10.2025	3753	4	Big boxcore (0.25 m^2)	OW	0.3	NA	EtOH	0.25	0,3 bulk	300
04.10.2025	3753	4	Big boxcore (0.25 m^2)	0-5	1	NA	EtOH	0.125	Fractioned	1000
04.10.2025	3753	4	Big boxcore (0.25 m^2)	0-5	0.5	NA	EtOH	0.125	Fractioned	1000
04.10.2025	3753	4	Big boxcore (0.25 m^2)	0-5	0.3	NA	EtOH	0.125	Fractioned	1000
04.10.2025	3753	4	Big boxcore (0.25 m^2)	0-5	1	NA	Formalin	0.125	Fractioned	1000
04.10.2025	3753	4	Big boxcore (0.25 m^2)	0-5	0.5	NA	Formalin	0.125	Fractioned	1000
04.10.2025	3753	4	Big boxcore (0.25 m^2)	0-5	0.3	NA	Formalin	0.125	Fractioned	1000
04.10.2025	3753	4	Big boxcore (0.25 m^2)	5-15	0.3	EL	EtOH	0.125	0,3 bulk	300
04.10.2025	3753	4	Big boxcore (0.25 m^2)	5-15	0.3	EL	Formalin	0.125	0,3 bulk	300

04.10.2025	3753	4	Big boxcore (0.25 m^2)	5-15	0.3	HF	Formalin	0.25	0,3 bulk	5000
06.11.2025	3753	5	Big boxcore (0.25 m^2)	OW	0.3	NA	EtOH	0.25	0,3 bulk	100
06.11.2025	3753	5	Big boxcore (0.25 m^2)	0-5	1	NA	EtOH	0.125	Fractioned	1000
06.11.2025	3753	5	Big boxcore (0.25 m^2)	0-5	0.5	NA	EtOH	0.125	Fractioned	1000
06.11.2025	3753	5	Big boxcore (0.25 m^2)	0-5	0.3	NA	EtOH	0.125	Fractioned	1000
06.11.2025	3753	5	Big boxcore (0.25 m^2)	0-5	1	NA	Formalin	0.125	Fractioned	1000
06.11.2025	3753	5	Big boxcore (0.25 m^2)	0-5	0.5	NA	Formalin	0.125	Fractioned	1000
06.11.2025	3753	5	Big boxcore (0.25 m^2)	0-5	0.3	NA	Formalin	0.125	Fractioned	1000
06.11.2025	3753	5	Big boxcore (0.25 m^2)	5-15	0.3	EL	EtOH	0.125	0,3 bulk	1000
06.11.2025	3753	5	Big boxcore (0.25 m^2)	5-15	0.3	EL	Formalin	0.125	0,3 bulk	500
06.11.2025	3753	5	Big boxcore (0.25 m^2)	5-15	0.3	HF	Formalin	0.25	0,3 bulk	10000
06.11.2025	3753	6	Big boxcore (0.25 m^2)	OW	0.3	NA	EtOH	0.25	0,3 bulk	100
06.11.2025	3753	6	Big boxcore (0.25 m^2)	0-5	1	NA	EtOH	0.125	Fractioned	500
06.11.2025	3753	6	Big boxcore (0.25 m^2)	0-5	0.5	NA	EtOH	0.125	Fractioned	500

06.11.2025	3753	6	Big boxcore (0.25 m^2)	0-5	0.3	NA	EtOH	0.125	Fractioned	500
06.11.2025	3753	6	Big boxcore (0.25 m^2)	0-5	1	NA	Formalin	0.125	Fractioned	500
06.11.2025	3753	6	Big boxcore (0.25 m^2)	0-5	0.5	NA	Formalin	0.125	Fractioned	500
06.11.2025	3753	6	Big boxcore (0.25 m^2)	0-5	0.3	NA	Formalin	0.125	Fractioned	500
06.11.2025	3753	6	Big boxcore (0.25 m^2)	5-15	0.3	EL	EtOH	0.125	0,3 bulk	300
06.11.2025	3753	6	Big boxcore (0.25 m^2)	5-15	0.3	EL	Formalin	0.125	0,3 bulk	300
06.11.2025	3753	6	Big boxcore (0.25 m^2)	5-15	0.3	HF	Formalin	0.25	0,3 bulk	1000
06.11.2025	3753	7	Big boxcore (0.25 m^2)	OW	0.3	NA	EtOH	0.25	0,3 bulk	300
06.11.2025	3753	7	Big boxcore (0.25 m^2)	0-5	1	NA	EtOH	0.125	Fractioned	500
06.11.2025	3753	7	Big boxcore (0.25 m^2)	0-5	0.5	NA	EtOH	0.125	Fractioned	500
06.11.2025	3753	7	Big boxcore (0.25 m^2)	0-5	0.3	NA	EtOH	0.125	Fractioned	1000
06.11.2025	3753	7	Big boxcore (0.25 m^2)	0-5	1	NA	Formalin	0.125	Fractioned	500
06.11.2025	3753	7	Big boxcore (0.25 m^2)	0-5	0.5	NA	Formalin	0.125	Fractioned	500
06.11.2025	3753	7	Big boxcore (0.25 m^2)	0-5	0.3	NA	Formalin	0.125	Fractioned	1000

06.11.2025	3753	7	Big boxcore (0.25 m^2)	5-15	0.3	EL	EtOH	0.125	0,3 bulk	1000
06.11.2025	3753	7	Big boxcore (0.25 m^2)	5-15	0.3	EL	Formalin	0.125	0,3 bulk	1000
06.11.2025	3753	7	Big boxcore (0.25 m^2)	5-15	0.3	HF	Formalin	0.25	0,3 bulk	10000
10.11.2025	3753	8	Big boxcore (0.25 m^2)	OW	0.3	NA	EtOH	0.25	0,3 bulk	300
10.11.2025	3753	8	Big boxcore (0.25 m^2)	0-5	1	NA	EtOH	0.125	Fractioned	1000
10.11.2025	3753	8	Big boxcore (0.25 m^2)	0-5	0.5	NA	EtOH	0.125	Fractioned	1000
10.11.2025	3753	8	Big boxcore (0.25 m^2)	0-5	0.3	NA	EtOH	0.125	Fractioned	1000
10.11.2025	3753	8	Big boxcore (0.25 m^2)	0-5	1	NA	Formalin	0.125	Fractioned	500
10.11.2025	3753	8	Big boxcore (0.25 m^2)	0-5	0.5	NA	Formalin	0.125	Fractioned	500
10.11.2025	3753	8	Big boxcore (0.25 m^2)	0-5	0.3	NA	Formalin	0.125	Fractioned	500
10.11.2025	3753	8	Big boxcore (0.25 m^2)	5-15	0.3	EL	EtOH	0.125	0,3 bulk	300
10.11.2025	3753	8	Big boxcore (0.25 m^2)	5-15	0.3	EL	Formalin	0.125	0,3 bulk	300
10.11.2025	3753	8	Big boxcore (0.25 m^2)	5-15	0.3	HF	Formalin	0.25	0,3 bulk	5000

10.11.2025	3753	9	Big boxcore (0.25 m^2)	OW	0.3	NA	EtOH	0.25	0,3 bulk	300
10.11.2025	3753	9	Big boxcore (0.25 m^2)	0-5	1	NA	EtOH	0.125	Fractioned	1000
10.11.2025	3753	9	Big boxcore (0.25 m^2)	0-5	0.5	NA	EtOH	0.125	Fractioned	1000
10.11.2025	3753	9	Big boxcore (0.25 m^2)	0-5	0.3	NA	EtOH	0.125	Fractioned	1000
10.11.2025	3753	9	Big boxcore (0.25 m^2)	0-5	1	NA	Formalin	0.125	Fractioned	1000
10.11.2025	3753	9	Big boxcore (0.25 m^2)	0-5	0.5	NA	Formalin	0.125	Fractioned	1000
10.11.2025	3753	9	Big boxcore (0.25 m^2)	0-5	0.3	NA	Formalin	0.125	Fractioned	1000
10.11.2025	3753	9	Big boxcore (0.25 m^2)	5-15	0.3	EL	EtOH	0.125	0,3 bulk	300
10.11.2025	3753	9	Big boxcore (0.25 m^2)	5-15	0.3	EL	Formalin	0.125	0,3 bulk	300
10.11.2025	3753	9	Big boxcore (0.25 m^2)	5-15	0.3	HF	Formalin	0.25	0,3 bulk	1000
11.11.2025	3763	10	Big boxcore (0.25 m^2)	OW	0.3	NA	EtOH	0.25	0,3 bulk	300
11.11.2025	3763	10	Big boxcore (0.25 m^2)	0-5	1	NA	EtOH	0.125	Fractioned	1000
11.11.2025	3763	10	Big boxcore (0.25 m^2)	0-5	0.5	NA	EtOH	0.125	Fractioned	1000
11.11.2025	3763	10	Big boxcore (0.25 m^2)	0-5	0.3	NA	EtOH	0.125	Fractioned	1000

11.11.2025	3763	10	Big boxcore (0.25 m^2)	0-5	1	NA	Formalin	0.125	Fractioned	500
11.11.2025	3763	10	Big boxcore (0.25 m^2)	0-5	0.5	NA	Formalin	0.125	Fractioned	500
11.11.2025	3763	10	Big boxcore (0.25 m^2)	0-5	0.3	NA	Formalin	0.125	Fractioned	500
11.11.2025	3763	10	Big boxcore (0.25 m^2)	5-15	0.3	EL	EtOH	0.125	0,3 bulk	300
11.11.2025	3763	10	Big boxcore (0.25 m^2)	5-15	0.3	EL	Formalin	0.125	0,3 bulk	300
11.11.2025	3763	10	Big boxcore (0.25 m^2)	5-15	0.3	HF	Formalin	0.25	0,3 bulk	10000
11.11.2025	3763	11	Big boxcore (0.25 m^2)	OW	0.3	NA	EtOH	0.25	0,3 bulk	300
11.11.2025	3763	11	Big boxcore (0.25 m^2)	0-5	1	NA	EtOH	0.125	Fractioned	1000
11.11.2025	3763	11	Big boxcore (0.25 m^2)	0-5	0.5	NA	EtOH	0.125	Fractioned	1000
11.11.2025	3763	11	Big boxcore (0.25 m^2)	0-5	0.3	NA	EtOH	0.125	Fractioned	1000
11.11.2025	3763	11	Big boxcore (0.25 m^2)	0-5	1	NA	Formalin	0.125	Fractioned	500
11.11.2025	3763	11	Big boxcore (0.25 m^2)	0-5	0.5	NA	Formalin	0.125	Fractioned	500
11.11.2025	3763	11	Big boxcore (0.25 m^2)	0-5	0.3	NA	Formalin	0.125	Fractioned	500
11.11.2025	3763	11	Big boxcore (0.25 m^2)	5-15	0.3	EL	EtOH	0.125	0,3 bulk	300

11.11.2025	3763	11	Big boxcore (0.25 m^2)	5-15	0.3	EL	Formalin	0.125	0,3 bulk	300
11.11.2025	3763	11	Big boxcore (0.25 m^2)	5-15	0.3	HF	Formalin	0.25	0,3 bulk	1000

Appendix 3. Overview of biological samples with the respective event ID and sample lot numbers collected with NORMAR ROV *Ægir6000* and how they were preserved in the lab. The first line is a template example of how the rest of the data is formatted.

Cruise number: 2025007011				**ROV Samples Data Sheet**								
* ID number is never repeated during a cruise! No 2 samples can have the same ID number, even when starting a new dive. Keep track of the last ID number from the previous dive! Samp-ID is the Sample ID, where 1 sample could be stored in multiple containers.				**Gear Types: BL** = blade corer (formerly BC), **CL** = claw, **FL** = Fluid Sampler, **FS** = frankenscoop, **NE** = net, **NB** = Niskin Bottle, **PC** = push corer, **SC** = scoop, **SH** = shovel, **SN** = Sniffer, **SS** = suction sampler, **TP** = Temperature Probe				**Storage Types: BB-ID** = biobox 1,2,3,4, **BL-ID** = blade corer 1,2,3,4 (formerly BC), **D** = drawer, **DL**= drawer left, **DR** = drawer right, **SS-ID** = Suction sampler chamber A,B,C,D, … (**SS-0** for hose), TB-ID = toolbox 1,2, **TMS** = above on the TMS				
Event ID	**Samp Lot**	**R station**	**VL number**	**Gear**	**Storage**	**Date**	**SFO Time stamp**	**Lat (DD) SFO**	**Long (DD) SFO**	**Depth (m) SFO**	**Video Sample Name**	**S**
####	*####*	*R#####*	*VL####*	*Gear Type*	*Storage ID*	*dd.mm.yyyy*	*HH:MM:SS*	*##.####*	*##.####*	*####*	*Name in SFO*	*N P S*
1	1	3740	3831	FS	DL-TB1	26.09.2025	14:51:22	72.5627	1.7379	1649.6	Spinularia njordi + Ophiuroidea	S nj
1	2	3740	3831	FS	DL-TB1	26.09.2025	14:51:22	72.5627	1.7379	1649.6	Spinularia njordi + Ophiuroidea	P
1	3	3740	3831	FS	DL-TB1	26.09.2025	14:51:22	72.5627	1.7379	1649.6	Spinularia njordi + Ophiuroidea	O se
1	4	3740	3831	FS	DL-TB1	26.09.2025	14:51:22	72.5627	1.7379	1649.6	Spinularia njordi + Ophiuroidea	S
2	1	3740	3831	NE	DR-TB2	26.09.2025	16:13:11	72.5590	1.7366	1667.9	Cerianthidae	C
2	2	3740	3831	NE	DR-TB2	26.09.2025	16:13:11	72.5590	1.7366	1667.9	Cerianthidae	S
3		3740	3831		D	26.09.2025						
4	1	3741	3832	SS	SSA	28.09.2025	08:07:46	72.5513	1.5496	1765.5	Bythocaris + Geodia	G
5	1	3741	3832	NE	DL-BB	28.09.2025	08:20:31	72.5513	1.5496	1765.5	Porifera	T se
5	2	3741	3832	NE	DL-BB	28.09.2025	08:20:31	72.5513	1.5496	1765.5	Porifera	B

6	1	3741	3832	SS	SSB	28.09.2025	09:17:55	72.5526	1.5456	1671.5	Nudibranchia + Bythocaris	B
6	2	3741	3832	SS	SSB	28.09.2025	09:17:55	72.5526	1.5456	1671.5	Nudibranchia + Bythocaris	G
6	3	3741	3832	SS	SSB	28.09.2025	09:17:55	72.5526	1.5456	1671.5	Nudibranchia + Bythocaris	C
6	4	3741	3832	SS	SSB	28.09.2025	09:17:55	72.5526	1.5456	1671.5	Nudibranchia + Bythocaris	B h
6	5	3741	3832	SS	SSB	28.09.2025	09:17:55	72.5526	1.5456	1671.5	Nudibranchia + Bythocaris	A m
6	6	3741	3832	SS	SSB	28.09.2025	09:17:55	72.5526	1.5456	1671.5	Nudibranchia + Bythocaris	N
6	7	3741	3832	SS	SSB	28.09.2025	09:17:55	72.5526	1.5456	1671.5	Nudibranchia + Bythocaris	S
7	1	3741	3832	SS	SSC	28.09.2025	09:20:15	72.5526	1.5456	1671.5	Craniella	C
7	2	3741	3832	SS	SSC	28.09.2025	09:20:15	72.5526	1.5456	1671.5	Craniella	S
8	1	3741	3832	CL	DR	28.09.2025	11:00:58	72.5553	1.5373	1632.0	Porifera branching (not Lissodendoryx)	S
8	2	3741	3832	CL	DR	28.09.2025	11:00:58	72.5553	1.5373	1632.0	Porifera branching (not Lissodendoryx)	G
8	3	3741	3832	CL	DR	28.09.2025	11:00:58	72.5553	1.5373	1632.0	Porifera branching (not Lissodendoryx)	S rh
8	4	3741	3832	CL	DR	28.09.2025	11:00:58	72.5553	1.5373	1632.0	Porifera branching (not Lissodendoryx)	P br
9	1	3741	3832		D	28.09.2025						S di
9	2	3741	3832		D	28.09.2025						P S
10		3741	3832	SS	SS0	28.09.2025						L su
11	1	3742	3833	CL	DL-BB	28.09.2025	16:20:49	72.5330	1.4829	1297.0	Skeleton coral	C sk
14	1	3742	3833		D	28.09.2025	16:18:35				Bulk	B
15	1	3743	3834	PC	PC-O	28.09.2025	23:06:04	72.5372	1.5364	1560.7	Actiniaria epibiont	A ep

16	1	3744	3835	CL	DR	29.09.2025	06:45:41	72.4910	1.9772	2163.7	Rock with Ascidiacea + Porifera	P er gr
16	2	3744	3835	CL	DR	29.09.2025	06:45:41	72.4910	1.9772	2163.7	Rock with Ascidiacea + Porifera	A er co va
16	3	3744	3835	CL	DR	29.09.2025	06:45:41	72.4910	1.9772	2163.7	Rock with Ascidiacea + Porifera	B
17	1	3744	3835	CL	DR	29.09.2025	06:50:10	72.4910	1.9773	2163.6	Small rock with Pectinidae attached	P
18	1	3744	3835	CL	DL	29.09.2025	08:58:24	72.4941	1.9624	1947.4	Rock for geologists with encrusting sponge	P er
18	2	3744	3835	CL	DL	29.09.2025	08:58:24	72.4941	1.9624	1947.4	Rock for geologists with encrusting sponge	E fa
18	3	3744	3835	CL	DL	29.09.2025	08:58:24	72.4941	1.9624	1947.4	Rock for geologists with encrusting sponge	A er co
19	1	3744	3835	CL	DL	29.09.2025	08:59:25	72.4941	1.9623	1947.5	Rock for geologists with crinoidea	C
19	2	3744	3835	CL	DL	29.09.2025	08:59:25	72.4941	1.9623	1947.5	Rock for geologists with crinoidea	P st
23	1	3744	3835		D	29.09.2025						H
23	2	3744	3835		D	29.09.2025						Is
23	3	3744	3835		D	29.09.2025						P
23	4	3744	3835		D	29.09.2025						B se
20	1	3744	3836	SS	SS-D	29.09.2025	11:23:52	72.4967	1.9491	1915.3	Asteroidea	A

21	1	3744	3836	SS	SS-E	29.09.2025	11:26:43	72.4968	1.9500	1916.1	Antedonoidea	A
21	2	3744	3836	SS	SS-E	29.09.2025	11:26:43	72.4968	1.9500	1916.1	Antedonoidea	B
22	1	3744	3836	SS	SS0	29.09.2025						S
NA	1	3744	3836	CL	Front drawer	29.09.2025						P
24	1	3745	3837	NE	TB-2	29.09.2025	18:12:45	72.4754	1.9932	2651.8	Elpidia sp.	E
24	2	3745	3837	NE	TB-2	29.09.2025	18:12:45	72.4754	1.9932	2651.8	Elpidia sp.	B
25	1	3745	3837	CL	DL	29.09.2025	18:49:54	72.4761	1.9982	2580.2	Rock with sponges	C Li
25	2	3745	3837	CL	DL	29.09.2025	18:49:54	72.4761	1.9982	2580.2	Rock with sponges	A en
25	3	3745	3837	CL	DL	29.09.2025	18:49:54	72.4761	1.9982	2580.2	Rock with sponges	P en
26	1	3746	3838	SS	SS-A	29.09.2025	22:04:55	72.4835	2.0373	2414.5	Bathycrinus sp.	B
26	2	3746	3838	SS	SS-A	29.09.2025	22:04:55	72.4835	2.0373	2414.5	Bathycrinus sp.	S
26	3	3746	3838	SS	SS-A	29.09.2025	22:04:55	72.4835	2.0373	2414.5	Bathycrinus sp.	G
27	1	3746	3838	CL	DR-TB1	29.09.2025	22:16:39	72.4834	2.0372	2414.9	Gersemia sp.	G
28	1	3746	3838	NE	DR	29.09.2025	22:47:21	72.4836	2.0316	2380.0	Irregular equinoderms (Pourtalesia sp.)	P fr
28	2	3746	3838	NE	DR	29.09.2025	22:47:21	72.4836	2.0316	2380.0	Irregular equinoderms (Pourtalesia sp.)	B
29	1	3746	3838		D	29.09.2025						B
30	1	3747	3839	CL	DL-TB2	30.09.2025	05:12:59	72.5413	2.1467	971.6	Bamboo coral	B K
31	1	3747	3839	NE	DL	30.09.2025	05:17:04	72.5413	2.1466	971.7	Ophiocten sp.	O
31	2	3747	3839	NE	DL	30.09.2025	05:17:04	72.5413	2.1466	971.7	Ophiocten sp.	P in
32	1	3747	3839	FS	TDR-TB1	30.09.2025	06:32:31	72.5439	2.1540	956.0	Scoop coral rubble for associated fauna	C sp

32	2	3747	3839	FS	TDR-TB1	30.09.2025	06:32:31	72.5439	2.1540	956.0	Scoop coral rubble for associated fauna	P
32	3	3747	3839	FS	TDR-TB1	30.09.2025	06:32:31	72.5439	2.1540	956.0	Scoop coral rubble for associated fauna	B ru fa
33	1	3747	3839		D	30.09.2025						B D
33	2	3747	3839		D	30.09.2025						A in
35	1	3748	3840	BL2		30.09.2025	14:37:37	72.4342	2.1779	3237.5	Blade corer for biology	B B
35	2	3748	3840	BL2		30.09.2025	14:37:37	72.4342	2.1779	3237.5	Blade corer for biology	B B
35	3	3748	3840	BL2		30.09.2025	14:37:37	72.4342	2.1779	3237.5	Blade corer for biology	B B
37	1	3748	3840	PC	PC-A	30.09.2025	18:56:57	72.4313	2.1977	3231.4	Push corer for geology	P in
38	1	3749	3841	NE	TB-1	30.09.2025	23:33:16	72.4318	2.0483	3091.5	Saduria sp.	S
38	2	3749	3841	NE	TB-1	30.09.2025	23:33:16	72.4318	2.0483	3091.5	Saduria sp.	B
40	1	3749	3841	NE	DR-TB2	01.10.2025	00:46:33	72.4331	2.0593	3054.9	Thenea-like	P T
40	2	3749	3841	NE	DR-TB2	01.10.2025	00:46:33	72.4331	2.0593	3054.9	Thenea-like	B
41	1	3749	3841	PC	PC-B	01.10.2025	02:06:57	72.4343	2.0703	3068.6	Pushcore with Lissodendoryx	Li
42	1	3749	3841	PC	PC-I	01.10.2025	03:44:13	72.4348	2.0404	3198.1	Pushcore for geologists	P tu
43	1	3750	3842	NE	DL-BB	01.10.2025	04:51:03	72.4363	2.0447	3200.7	Pectinidae, Pycnogonida, Bathyphelia, Fluff patch	P
43	2	3750	3842	NE	DL-BB	01.10.2025	04:51:03	72.4363	2.0447	3200.7	Pectinidae, Pycnogonida, Bathyphelia, Fluff patch	P in
43	3	3750	3842	NE	DL-BB	01.10.2025	04:51:03	72.4363	2.0447	3200.7	Pectinidae, Pycnogonida, Bathyphelia, Fluff patch	B sp
43	4	3750	3842	NE	DL-BB	01.10.2025	04:51:03	72.4363	2.0447	3200.7	Pectinidae, Pycnogonida, Bathyphelia, Fluff patch	B

44	1	3750	3842	PC	PC-H	01.10.2025	06:28:14	72.4402	2.0561	3200.2	Geo sampling with Sabellidae tube	P tu
45	1	3749/3750	3841/3842		D	01.10.2025						D se
49	1	3753	3844	NE	DL-TB1	03.10.2025	12:07:06	72.2970	1.8863	2680.5	Biology debries or sponge + sea urchin shells	B de
49	2	3753	3844	NE	DL-TB1	03.10.2025	12:07:06	72.2970	1.8863	2680.5	Biology debries or sponge + sea urchin shells	K
50	1	3753	3844	NE	DR-TB2	03.10.2025	12:50:50	72.2972	1.8810	2675.8	Tunicate?	C sp
50	2	3753	3844	NE	DR-TB2	03.10.2025	12:50:50	72.2972	1.8810	2675.8	Tunicate?	B
51	1	3753	3844	FS	DL-BB	03.10.2025	13:00:05	72.2972	1.8810	2675.7	Salp?	C sp
51	2	3753	3844	FS	DL-BB	03.10.2025	13:00:05	72.2972	1.8810	2675.7	Salp?	S
51	3	3753	3844	FS	DL-BB	03.10.2025	13:00:05	72.2972	1.8810	2675.7	Salp?	B
64	1	3753	3844		D	03.10.2025						Ly
64	2	3753	3844		D	03.10.2025						K
64	3	3753	3844		D	03.10.2025						B
67	1	3754	3845	BL-2		04.10.2025	12:54:45	72.3361	1.8690	2606.3	Blade core for biology	B
67	2	3754	3845	BL-2		04.10.2025	12:54:45	72.3361	1.8690	2606.3	Blade core for biology	B m
67	3	3754	3845	BL-2		04.10.2025	12:54:45	72.3361	1.8690	2606.3	Blade core for biology	B m
69	1	3754	3845	BL-1		04.10.2025	14:37:53	72.3333	1.8759	2458.6	Blade core for biology	B
69	2	3754	3845	BL-1		04.10.2025	14:37:53	72.3333	1.8759	2458.6	Blade core for biology	B m
69	3	3754	3845	BL-1		04.10.2025	14:37:53	72.3333	1.8759	2458.6	Blade core for biology	B m
72	1	3752	3846	NE	TB-1	04.10.2025	20:27:59	72.3682	1.9407	2856.8	Gastropoda	G
72	2	3752	3846	NE	TB-1	04.10.2025	20:27:59	72.3682	1.9407	2856.8	Gastropoda	B
73	1	3752	3846	PC	PC-H	04.10.2025	20:59:50	72.3680	1.9468	2831.9	Gravel push core	C
73	2	3752	3846	PC	PC-H	04.10.2025	20:59:50	72.3680	1.9468	2831.9	Gravel push core	P in

75	1	3752	3846		D	04.10.2025						B d
77	1	3755	3847	NE	DL-TB1	05.10.2025	02:45:13	72.3301	1.9465	2631.6	Thenea + Bathyarca + Pycnogonida and Kolga	K
77	2	3755	3847	NE	DL-TB1	05.10.2025	02:45:13	72.3301	1.9465	2631.6	Thenea + Bathyarca + Pycnogonida and Kolga	T
77	3	3755	3847	NE	DL-TB1	05.10.2025	02:45:13	72.3301	1.9465	2631.6	Thenea + Bathyarca + Pycnogonida and Kolga	B
77	4	3755	3847	NE	DL-TB1	05.10.2025	02:45:13	72.3301	1.9465	2631.6	Thenea + Bathyarca + Pycnogonida and Kolga	B
79	1	3756	3848	BL-1		05.10.2025	12:05:55	72.3288	1.5171	2313.4	Blade core on worm fields near bacterial mats	B o
80	1	3756	3848	BL-2		05.10.2025	12:29:40	72.3289	1.5175	2314.4	Blade core on worms and bacteria	B o +
88	1	3757	3849	FS	DR-TB2	05.10.2025	22:56:17	72.3289	1.5190	2294.5	Sediments by hydrothermal vent	B w a h v
93	1	3757	3849	FS	DL-TB1	05.10.2025	23:31:31	72.3288	1.5188	2296.4	Sediments few m away from vent	B fe a h v
95	1	3756/3757	3848/3849		D	06.10.2025						D fr
96	1	3759	3851	NE	DL-TB1	09.10.2025	00:41:45	72.2144	1.6388	2429.1	Sabellida + Bathycrinus + unkown creature on bathycrinus	B s
96	2	3759	3851	NE	DL-TB1	09.10.2025	00:41:45	72.2144	1.6388	2429.1	Sabellida + Bathycrinus + unkown creature on bathycrinus	S
96	3	3759	3851	NE	DL-TB1	09.10.2025	00:41:45	72.2144	1.6388	2429.1	Sabellida + Bathycrinus + unkown creature on bathycrinus	A e
97	1	3759	3851	NE	DL-TB1	09.10.2025	00:49:04	72.2144	1.6387	2429.2	Polymastiidae	P

97	1	3759	3851	NE	DL-TB1	09.10.2025	00:49:04	72.2144	1.6387	2429.2	Polymastiidae	B
98	1	3759	3851	NE	DR-TB2	09.10.2025	01:26:22	72.2159	1.6357	2432.0	Antedonoidea	A in
98	2	3759	3851	NE	DR-TB2	09.10.2025	01:26:22	72.2159	1.6357	2432.0	Antedonoidea	S in
98	3	3759	3851	NE	DR-TB2	09.10.2025	01:26:22	72.2159	1.6357	2432.0	Antedonoidea	B
99	1	3759	3851	SS	SS-B	09.10.2025	02:06:29	72.2174	1.6324	2431.1	Small brown balls	S ba cf
99	2	3759	3851	SS	SS-B	09.10.2025	02:06:29	72.2174	1.6324	2431.1	Small brown balls	K
99	3	3759	3851	SS	SS-B	09.10.2025	02:06:29	72.2174	1.6324	2431.1	Small brown balls	S in
99	4	3759	3851	SS	SS-B	09.10.2025	02:06:29	72.2174	1.6324	2431.1	Small brown balls	Is
99	5	3759	3851	SS	SS-B	09.10.2025	02:06:29	72.2174	1.6324	2431.1	Small brown balls	B
101	1	3759	3851	SS	SS0	08.10.2025						B
102	1	3760	3852	NE	DL-TB1	09.10.2025	09:39:16	72.2767	1.7024	2665.2	Sipunculida	B
104	1	3760	3852	NE	DR-TB2	09.10.2025	11:05:56	72.2758	1.6907	2653.4	Porifera round	P
104	2	3760	3852	NE	DR-TB2	09.10.2025	11:05:56	72.2758	1.6907	2653.4	Porifera round	Is
104	3	3760	3852	NE	DR-TB2	09.10.2025	11:05:56	72.2758	1.6907	2653.4	Porifera round	B
105	1	3760	3852	FS	D	09.10.2025	11:47:53	72.2753	1.6851	2653.0	Prosobranchia	P in
105	2	3760	3852	FS	D	09.10.2025	11:47:53	72.2753	1.6851	2653.0	Prosobranchia	Is
105	3	3760	3852	FS	D	09.10.2025	11:47:53	72.2753	1.6851	2653.0	Prosobranchia	B
108	1	3760	3852	PC	PC-A	09.10.2025	12:37:50	72.2749	1.6793	2645.9	Push core for geology on top of a Pourtalesia	P
110	1	3761	3853	FS	DL-TB1	09.10.2025	17:57:08	72.2790	1.5746	2419.3	Scoop of flake for geology	P

110	2	3761	3853	FS	DL-TB1	09.10.2025	17:57:08	72.2790	1.5746	2419.3	Scoop of flake for geology	A co
110	3	3761	3853	FS	DL-TB1	09.10.2025	17:57:08	72.2790	1.5746	2419.3	Scoop of flake for geology	A
112	1	3762	3854	NE		09.10.2025	22:39:53	72.3102	1.6710	2531.4	Bathycrinus with epibionts (Pentocriunus, serpulida, hydrozoa on stalk)	B sp
112	2	3762	3854	NE		09.10.2025	22:39:53	72.3102	1.6710	2531.4	Bathycrinus with epibionts (Pentocriunus, serpulida, hydrozoa on stalk)	H in
112	3	3762	3854	NE		09.10.2025	22:39:53	72.3102	1.6710	2531.4	Bathycrinus with epibionts (Pentocriunus, serpulida, hydrozoa on stalk)	cf
112	4	3762	3854	NE		09.10.2025	22:39:53	72.3102	1.6710	2531.4	Bathycrinus with epibionts (Pentocriunus, serpulida, hydrozoa on stalk)	B
122	1	3764	3856	NE	DL-TB2	12.10.2025	04:19:53	72.3686	1.2568	2361.3	Edwardsiidae	cf E
122	2	3764	3856	NE	DL-TB2	12.10.2025	04:19:53	72.3686	1.2568	2361.3	Edwardsiidae	B
129	1	3766	3858	CL	DR-TB2	12.10.2025	17:08:55	72.3126	1.3799	3233.6	Geo/Litter (black litter with Bathyphelia?)	A in
129	2	3766	3858	CL	DR-TB2	12.10.2025	17:08:55	72.3126	1.3799	3233.6	Geo/Litter (black litter with Bathyphelia?)	P in
133	1	3768	3860	SS	SS-B&G	13.10.2025	04:25:36	72.4360	1.6150	2919.6	Elpidia	E
134	1	3768	3860	SS	SS-E	13.10.2025	05:33:55	72.4394	1.6110	2803.2	Pycnogonida	P in
135	1	3768	3860	SS	SS0	13.10.2025						P in
141	1	3767	3862	NE	DL-TB2	13.10.2025	15:55:34	72.3075	1.4274	2545.8	Gersemia sp. + Bathycrinus	G + sp
142	1	3767	3862	CL	Front drawer	13.10.2025	17:07:25	72.3087	1.4370	2538.1	Rock for geology	S
142	2	3767	3862	CL	Front drawer	13.10.2025	17:07:25	72.3087	1.4370	2538.1	Rock for geology	E

142	3	3767	3862	CL	Front drawer	13.10.2025	17:07:25	72.3087	1.4370	2538.1	Rock for geology	P tu
142	4	3767	3862	CL	Front drawer	13.10.2025	17:07:25	72.3087	1.4370	2538.1	Rock for geology	Ta
142	5	3767	3862	CL	Front drawer	13.10.2025	17:07:25	72.3087	1.4370	2538.1	Rock for geology	Is
142	6	3767	3862	CL	Front drawer	13.10.2025	17:07:25	72.3087	1.4370	2538.1	Rock for geology	Tl
147	1	3770	3863	NE	TB2	14.10.2025	13:27:13	72.4320	1.2779	1884.3	Snail (Bulbeis cf.)	G in
147	2	3770	3863	NE	TB2	14.10.2025	13:27:13	72.4320	1.2779	1884.3	Snail (Bulbeis cf.)	B
148	1	3770	3863	SS	SS-B	14.10.2025	14:58:15	72.4355	1.2758	1809.7	Amathillopsis/ Cleippides	A sp
152	1	3771	3864	SS	SS-G,B,C	14.10.2025	21:15:04	72.4809	1.2539	2030.2	Neohela (sampled 4 holes)	N
152	2	3771	3864	SS	SS-G,B,C	14.10.2025	21:15:04	72.4809	1.2539	2030.2	Neohela (sampled 4 holes)	B
154	1	3772	3865	SS	SS-G	15.10.2025	08:25:46	72.4880	-0.4190	1264.1	Matrix with associated fauna	S as fa
155	1	3772	3865	SS	SS-B	15.10.2025	08:27:29	72.4880	-0.4189	1263.9	Pectinidae	P
155	2	3772	3865	SS	SS-B	15.10.2025	08:27:29	72.4880	-0.4189	1263.9	Pectinidae	P
155	3	3772	3865	SS	SS-B	15.10.2025	08:27:29	72.4880	-0.4189	1263.9	Pectinidae	B
157	1	3772	3865	NE	DR-TB1	15.10.2025	09:21:14	72.4867	-0.4228	1250.0	Bivalvia siphons + Ophiocten + Polychaeta	O
157	2	3772	3865	NE	DR-TB1	15.10.2025	09:21:14	72.4867	-0.4228	1250.0	Bivalvia siphons + Ophiocten + Polychaeta	P
157	3	3772	3865	NE	DR-TB1	15.10.2025	09:21:14	72.4867	-0.4228	1250.0	Bivalvia siphons + Ophiocten + Polychaeta	B
158	1	3772	3865	NE	DL-BB	15.10.2025	09:35:46	72.4869	-0.4205	1244.6	Teredinidae + piece of wood	T ar
159	1	3772	3865	FS	DL-TB2	15.10.2025	10:35:10	72.4853	-0.4268	1234.3	Siphons on spicule bottom	B m
160	1	3772	3865	SS	SS-C	15.10.2025	11:23:02	72.4840	-0.4308	1221.2	Bathyarca + rock	B
160	2	3772	3865	SS	SS-C	15.10.2025	11:23:02	72.4840	-0.4308	1221.2	Bathyarca + rock	P in
160	3	3772	3865	SS	SS-C	15.10.2025	11:23:02	72.4840	-0.4308	1221.2	Bathyarca + rock	B
162	1	3772	3865	SS	SS-D	15.10.2025	12:31:34	72.4826	-0.4348	1177.7	2 x Seastars	A in
162	2	3772	3865	SS	SS-D	15.10.2025	12:31:34	72.4826	-0.4348	1177.7	2 x Seastars	A in

162	3	3772	3865	SS	SS-D	15.10.2025	12:31:34	72.4826	-0.4348	1177.7	2 x Seastars	B
163	1	3772	3865	SS	SS-E	15.10.2025	12:32:06	72.4826	-0.4348	1177.7	2 x shrimps	C
165	1	3772	3865	SS	SS0	15.10.2025						B le
166	1	3772	3865		D	15.10.2025						B
168	1	3773	3866	SS	SS-B	15.10.2025	16:50:17	72.4699	-0.4610	1164.5	Siphons	Li
168	2	3773	3866	SS	SS-B	15.10.2025	16:50:17	72.4699	-0.4610	1164.5	Siphons	B
169	1	3773	3866	NE	DL-TB2	15.10.2025	16:54:41	72.4699	-0.4610	1164.5	Siphons/holes	Li
169	2	3773	3866	NE	DL-TB2	15.10.2025	16:54:41	72.4699	-0.4610	1164.5	Siphons/holes	B
169	3	3773	3866	NE	DL-TB2	15.10.2025	16:54:41	72.4699	-0.4610	1164.5	Siphons/holes	B
170	1	3773	3866	NE	DR-TB1	15.10.2025	17:11:46	72.4698	-0.4606	1169.6	Eggs?	P
171	1	3773	3866	SS	SS-C	15.10.2025	17:53:39	72.4711	-0.4651	1115.9	Siphon with green content	Li
171	2	3773	3866	SS	SS-C	15.10.2025	17:53:39	72.4711	-0.4651	1115.9	Siphon with green content	O in
171	3	3773	3866	SS	SS-C	15.10.2025	17:53:39	72.4711	-0.4651	1115.9	Siphon with green content	B
173	1	3773	3866	FS	DL	15.10.2025	18:44:36	72.4721	-0.4688	1056.0	Nudibranch	N in
174	1	3774	3867	SS	SS-D	15.10.2025	23:22:10	72.4511	-0.5346	1149.0	Various taxa	B
176	1	3774	3867	PC	PC-G	16.10.2025	00:17:28	72.4534	-0.5354	1086.0	Push core for geology /Bivalvia/siphons ?	Li
176	2	3774	3867	PC	PC-G	16.10.2025	00:17:28	72.4534	-0.5354	1086.0	Push core for geology /Bivalvia/siphons ?	B
177	1	3774	3867	CL		16.10.2025						C
177	2	3774	3867	CL		16.10.2025						B

177	3	3774	3867	CL		16.10.2025						B
177	4	3774	3867	CL		16.10.2025						B
178	1	3773-3774	3866-3867		D	16.10.2025						P sp
178	2	3773-3774	3866-3867		D	16.10.2025						B
179	1	3773-3774	3866-3867	SS	SS0	16.10.2025						Ly
179	2	3773-3774	3866-3867	SS	SS0	16.10.2025						B
181	1	3775	3868	FS	DL-TB2	16.10.2025	06:02:44	72.4346	-0.5242	2389.6	Branched sponge piece?	P
181	2	3775	3868	FS	DL-TB2	16.10.2025	06:02:44	72.4346	-0.5242	2389.6	Branched sponge piece?	B
183	1	3776	3869	FS	DR-TB1	16.10.2025	14:28:41	72.2585	-0.7976	1435.8	Geodia/Stelletta +bacterial mat + Asteroidea	Ty
183	2	3776	3869	FS	DR-TB1	16.10.2025	14:28:41	72.2585	-0.7976	1435.8	Geodia/Stelletta +bacterial mat + Asteroidea	P sp
183	3	3776	3869	FS	DR-TB1	16.10.2025	14:28:41	72.2585	-0.7976	1435.8	Geodia/Stelletta +bacterial mat + Asteroidea	S ba
184	1	3776	3869	NE	DL-TB2	16.10.2025	16:00:32	72.2602	-0.8147	1337.5	Benthic ctenophore with some forams	B
189	1	3775-3776	3868-3869		D	16.10.2025						B dr
189	2	3775-3776	3868-3869		D	16.10.2025						H
194	1	3778	3871	NE	DR-TB2	17.10.2025	02:45:15	72.2472	-0.7120	1036.2	Bryozoa soft bush	B

194	2	3778	3871	NE	DR-TB2	17.10.2025	02:45:15	72.2472	-0.7120	1036.2	Bryozoa soft bush	B N
195	1	3778	3871		D	17.10.2025						B dı
195	2	3778	3871		D	17.10.2025						O
197	1	3379	3872	NE	DL-TB1	17.10.2025	06:30:41	72.2577	-0.5855	966.2	Capitellidae	C
197	2	3379	3872	NE	DL-TB1	17.10.2025	06:30:41	72.2577	-0.5855	966.2	Capitellidae	B
198	1	3379	3872	CL	DR-TB2	17.10.2025	06:36:10	72.2578	-0.5855	966.2	Keratoisididae	K

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