Mohns Ridge and Norwegian-Greenland Sea

14.02.2024 - 02.03.2024

Cruise report

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Compiled by Ingvild Aarrestad

Image on front page: (NORMAR/Ægir 6000)

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Thank you very much to everyone who contributed to this report. Thanks to all the scientists, engineers, students, ROV pilots and to all the crew members on R/V Kronprins Haakon. We look forward to the next cruise already!

Cruise overview and main objective

This research cruise was a collaboration between the Norwegian Offshore Directorate (NOD) and the Center for Deep Sea Research at the University of Bergen (UiB). The main objective of the cruise was to investigate off-axis areas northwest of the central Mohns Ridge, advancing our understanding of the geology and marine mineral potential in these regions. The cruise built on results from two previous cruises with the RV G.O. Sars in 2021 and 2022, and on bathymetry collected by the R/V Helmer Hanssen for the Norwegian Offshore Directorate just prior to this expedition. This was essential for pinpointing areas of interest to explore using the Remotely Operated Vehicle (ROV) Ægir 6000. Most of the locations investigated during this cruise were previously unexplored and provided further knowledge on landscape evolution and the gradual growth of ferromanganese crust. In addition, an off-axis seafloor massive sulfide (SMS) that was discovered and drill-sampled during the DeepInsight23 research cruise in May 2023, was also targeted and sampled.

The research approach is multilayered, collecting a wide array of samples and data from 1) the water column, by CTD and water samples; 2) the seabed, by visual investigation with ROV, rock and sediment sampling; and 3) marine biology, by video survey and macrofaunal sampling. All ROV dives are video recorded in HD and stored for future references and additional surveying of both biology as well as geology. In addition, high resolution (4K) images and shorter videoclips are recorded during the dives at areas of particular interest. The most important tool used for this research cruise is undoubtedly the Remotely Operated Vehicle (ROV) "Ægir 6000", equipped with numerous additional tools to aid in efficient geological and biological research in the unexplored deep sea.

Figure 1: Cruise participants

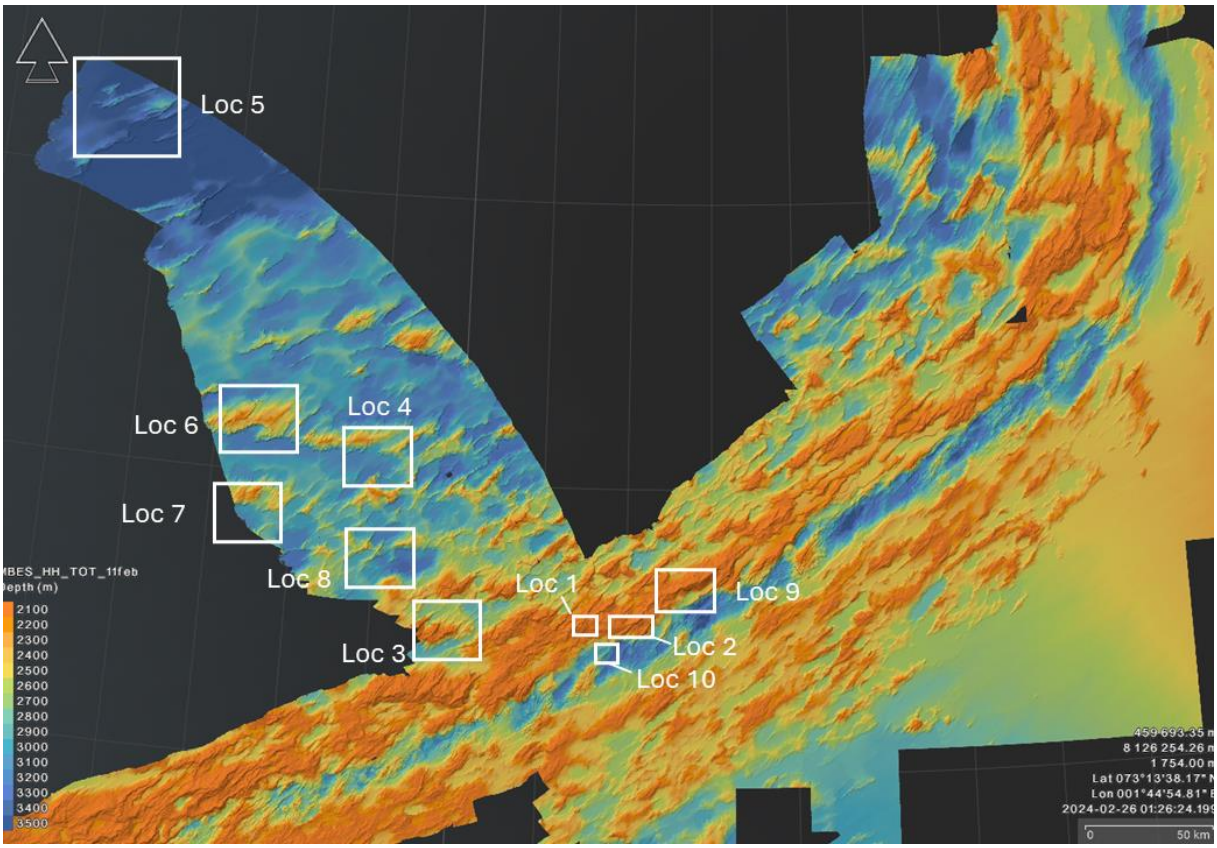


Figure 2: Overview map of the 10 different localities investigated during this cruise. More about each locality can be found further down in the report.

Methods and equipment

R/V Kronprins Haakon

The polar class 3 ice breaker research vessel Kronprins Haakon has a total length of 100 meters and weighs above 10.000 t. It is equipped with the very latest high-tech equipment, enabling us to perform complex studies, such as ROV operations, sediment coring, and water column measurements. The ship has 15 laboratories and the capacity of 55 passengers including 15-17 crew.

The ROV system is launched through a moonpool located on the 3rd deck of the ship, enabling the launch of the ROV in ice as well as in rougher seas compared to the standard launch over the side of the vessel. In addition, the R/V Kronprins Haakon is equipped with an EM302 multibeam echo sounder capable of mapping a swath width up to 3.5 times the water depth with a resolution of up to 25 m. During transit, the multibeam system is continuously recording bathymetry. R/V Kronprins Haakon has a cruising speed of 15 knots and can break through ice up to one meter thick. Kronprins Haakon represents a state-of-the-art research vessel. More details about the ship can be found here:
https://kronprinshaakon.hi.no/en/projects/kronprins-haakon/about-the-vessel/world-class-vessel

Remotely Operated Vehicle (ROV) *Ægir* 6000

The ROV *Ægir* 6000 is a Kystdesign 'Supporter' working class vehicle connected to a Kystdesign tether management system (TMS) capable of submerging down to 6000 m. Standard equipment on the ROV includes two manipulators (Schilling T4 and ATLAS), telemetry sensors, 4 horizontal and 3 vertical thrusters, a high precision positioning system, multiple cameras, and an array of fixed and adjustable LED lights. The TMS system is stacked on top of the ROV during launch and recovery, and the ROV is released from the TMS at a suitable depth above the seafloor. The ROV is connected to the TMS via a 600 m long tether with neutral buoyancy, which provides a large degree of freedom of movement along the seafloor. The TMS also holds a mounted hydraulic basket for larger samples or tools. Further, several additional tools are possible to utilize with the ROV, explained in more detail below.

Figure 3: The ROV Ægir 6000 and TMS. Equipped with the saw and suction sampler

Positioning

Positioning of the ROV is obtained from a combination of: (1) a High Precision Acoustic Positioning system (HiPAP), (2) a Doppler Velocity Logger (DVL), and (3) an Inertial Navigation System (INS). The HiPAP system utilizes the ship's GPS position and a transducer that receives acoustic signals from transponders mounted on the ROV and TMS. The Doppler system gives additional information on the direction and speed of the ROV. A gyroscope and an accelerometer in the INS provide precise data of rotation, velocity, altitude, and horizontal position. This combination of systems provides a 5-20 m accuracy on the ROV positioning.

Cameras

Ægir 6000 is equipped with multiple cameras including a pan-and-tilt HD camera for video recording, positioned at the center top of the ROV. The center camera is a pan-and-tilt 4K camera, used for high quality imaging through still photos and video recording. LED lights provide adequate background lighting.

Sampling

Rock sampling with the ROV is primarily conducted using two manipulators: the strong Schilling Atlas manipulator and the Schilling Titan 4 (T4), which offers greater precision and movability. Sampled rocks are stored in a basket on the underside of the ROV. Additionally, a custom-designed shovel, affectionately named "Frankenstein," is utilized for collecting loose and more fragile materials. For more rigorous rock sampling, the Ægir 6000 is outfitted with a diamond grinder that features a 50 cm diameter blade, powered by the ROV's High Pressure Unit (HPU). This saw is particularly effective for collecting samples from thick manganese crusts and solid rocks that are beyond the capabilities of the manipulators. Furthermore, the ROV is equipped with a suction sampler designed for macrofauna, which works by vacuuming specimens through a tube into five separate sample containers.

Push coring

During each dive, a total of 10 push cores for sediment coring are mounted to the TMS (Tether Management System), as indicated in Figure 4. Utilizing up to 1-meter-long core barrels, these push cores are deployed by the ROV's manipulators and pressed into the seafloor's sediment to collect samples. To ensure the samples remain securely within the core barrel, a one-way check valve is installed at the top of each barrel to maintain a vacuum. The cores are then securely placed in plastic holsters, which are fastened to the outside of the TMS using metallic hose clamps, allowing for the collection of up to 10 push cores per dive. Additionally, core catchers may be attached to the bottom of the push cores to further enhance the retention of collected sediments.

Figure 4: The 10 push cores (A-J) attached to the Tether Management System (TMS) by metallic hose clamps.

CTD and water sampling

At selected locations a CTD (conductivity, temperature, depth) instrument of the SBE911Plus type, with an attached oxygen sensor, was used to measure water column profiles and collect water samples. The CTD onboard R/V Kronprins Haakon is outfitted with a rosette featuring 12 Niskin bottles for water sampling. The CTD is lowered to 10 meters above the seabed using a winch while monitoring the depth by the ship sonar. On its descent, the CTD records the conductivity, temperature, density, and oxygen concentrations. In addition, salinity is derived from the conductivity, temperature, and pressure of the water. As the instrument ascends, the Niskin bottles are automatically closed at defined depths set in a computer program, ensuring undisturbed collection of water samples from various depths. The sampling strategy, i.e. the determination of sampling depths for the 12 Niskin bottles, is decided based on the profiles recorded by the CTD during the descent. This allows for a strategic sampling of the different zones seen in the CTD profile – e.g. the oxygen minimum zone, halocline, thermocline etc.. All water sampling depths are listed in table 1. Additional CTD results can be found in the appendix.

Figure 5: The CTD instrument with 12 Niskin bottles for water sampling.

Table 1: Water sampling depths for all four CTDs

	KH24-254-CTD1 72° 26.57’ N 001° 56.98’ E 17.02.2024	**KH24-254-CTD2** 73° 01.97’ N 000° 59.46’ W 20.02.2024	**KH24-254-CTD3** 74° 12.82’ N 004° 40.76’ W 21.02.2024	**KH24-254-CTD4** 72° 31.43’ N 001° 29.99’ E 27.02.2024
Niskin #	**Water sampling depths** (mbsl)			
1	3364	3240	3526	1118
2	3310	3190	3475	1069
3	3200	3109	3250	950
4	3000	2999	3000	871
5	2499	2500	2500	800
6	2002	2000	2001	700
7	1500	1498	1500	600
8	999	998	1200	500
9	560	549	1000	350
10	220	260	520	250
11	150	150	400	150
12	10	10	10	9

Gravity coring

During this cruise, one sediment core was obtained using a gravity corer. The corer consists of a 6-meter-long steel barrel with a plastic tube inserted and a load of 800 kg. To collect the sediment, the sampler is lowered by a winch and is pushed into the sediment using gravity. The sediments are pushed into the inner tube and are secured in place by a spring-based mechanism known as a "core catcher" at the base, ensuring that the sediments remain inside the tube as the core is lifted from the seabed. Additionally, a one-way closure is located inside the head to prevent water from entering the barrel during retrieval. To ensure the sampler penetrates vertically into the sediment, it is stabilized approximately 20-30 meters above the seabed before being lowered further with a speed selected depending on the predicted thickness and density of the sediments. Stabilization allows gravity to work more effectively and often results in deeper penetration into the sediment. More information about the gravity core can be found in the appendix.

Figure 6: The gravity corer being recovered to deck.

Mapping/processing

Bathymetry

EM302, a Kongsberg multibeam sonar is used for bathymetry mapping of the oceans subsurface. The multibeam is a 4x4 m 30 kHz instrument mounted under the flat keel of the ship, sending multiple beams at once at an opening angle of +-60 degrees. Making a profile of 432 elements, where every element has an opening angle of 1 degree. Making sets of element profiles for detailed bathymetric mapping. The multibeam is generally always running outside of the 12 nm territorial border.

Sub bottom profiler

Sub bottom profiler mapping is used to measure sediment thickness, for instance for preparation of gravity core sampling. The R/V Kronprins Haakon is equipped with an SBP300 (sub bottom profiler), a sonar with 2.5-7 kHz frequency, made by Kongsberg, which can penetrate up to 80-90 meters of sediments. CTD measurement is used to adjust the speed of sound in seawater, for accurate data acquisition. Emitting a single chirp (compressed high intensity radar pulse) beam with an 8-degree opening angle, the device's return period varies based on the ship's velocity and depth. The radar beam penetrates the sediment layers, reflecting the signal to the ship.

Surveying software

For dive planning and guiding the ship, EIVA NaviModel serves as the primary software. This program allows for the importation and integration of maps at various resolutions from previous surveys. The maps can be displayed in different "modes," including depth and slope gradients, among others. Before dives, waypoints highlighting areas or structures of interest are plotted. These waypoints can then be directly exported to the ROV's navigation system, streamlining both the planning and execution of dives. Moreover, EIVA NaviModel supports live logging with customizable layers (e.g., for biological features) that track the ROV's position in real-time. It also enables the live monitoring of data from both the ship and the ROV, such as speed, heading, and depth, enhancing operational awareness and efficiency.

After concluding a dive, the ROV's survey data, including tracks from each dive, are updated in the system. Videos captured during the dives can be linked to these tracks, enabling users to click on any point along the dive path for instant playback from the ROV's multiple camera angles. For each cruise, a comprehensive project is compiled that encompasses all dive positions, gravity cores, Sub-bottom profilers, CTD measurements, and other relevant data. This organized approach facilitates easy access to and analysis of the collected data, enhancing the understanding of the surveyed areas.

On-board sample handling and analyses

Rock samples and macrofauna

As Ægir6000 arrives onto the vessel, the first step is to gain an overview of the collected rock samples. To facilitate this, a sketch of the drawer where the samples were gathered has already been prepared. This leads to easy identification when the drawer containing all the samples is opened. Additionally, sample tags indicating the sample name and its coordinates have been prepared, ensuring that each sample is correctly matched with its corresponding label. If there is any biological matter of interest on the surface of the rock samples, they are examined and sampled. Once any biological sampling is complete, or if the sample lacks any biological matter of interest, the samples are rinsed with freshwater and set aside to dry, with each one placed according to its sample name for easy reference. Often, it is necessary to examine the interior of the samples. If necessary, the rocks are cut open for further investigation. All rock samples are measured, described, and identified (if possible) by observations of colors, structures, and any other relevant characteristics. Subsampling may be conducted if necessary for further analysis or distribution to other researchers. Finally, all samples are carefully packed and labeled accordingly for future reference. Sulfide samples are usually packed in sealed bags with nitrogen gas to avoid oxidation.

Sediment cores

After retrieving sediment cores from either the use of gravity cores or push cores with the ROV, some handling is required to safely store and be able to extract material for analysis. The sampled sediment material needs to be secured inside the plastic tube after collection, this is done with plastic end caps specially fitted for the tube dimensions (~110mm for gravity cores and ~90mm for push cores). The end caps are heated in hot water to ensure flexibility before application and a tight fit around the ends of the core. To avoid dehydration and movement of the sediment, OASIS (flower foam) is inserted between the sediment and the end cap, the end cap is then secured with duct tape. Capping is required in the top and bottom of the core. For gravity cores, the potential full length is 6 m, the core is split into shorter segments with a maximum length of 1.5 m. The cores are labeled with permanent markers on two sides and in top and bottom, the “up” direction of each core/core segment is indicated with arrows. For split cores, the depth interval section is noted on the tube (i.e. SEC1 is the uppermost section, SEC2 the next section etc.).

On-board analysis of sediment cores includes microbiology extraction, oxygen measurements and porewater sampling. When sampling sediment cores for microbial analysis, material needs to be extracted from the core shortly after collection (after capping and labeling). This includes sediment and pore water samples from different depths and oxygen measurements. The sediment is retrieved from the cores by drilling a hole (~1cm drill bit) in the plastic tube allowing for insertion of a plastic syringe (5-10mL) that is pushed into the sediment to get a sample. The drilled hole is covered with duct tape after the collection of sediment. The sediment is then transferred to plastic vials for storage and transport. To extract pore water, another set of drilled holes made with a smaller diameter drill bit is needed. These holes are drilled at the

same depths as for the sediment sampling. Porewater is collected from the sediment using vacuum syringes connected to a Rhizon sampler and PVC tubing. Before inserting the Rhizon sampler, shipboard oxygen measurements can be conducted using a PreSens optical O_2 meter equipped with a profiling O_2 Microsensor for insertion into the sediment through the drill hole. The drilled holes are taped over after finished extraction of pore water and measurements of oxygen. The collected sediment samples and pore waters, together with the remaining core is stored in either a refrigerated or freezer room before transport for final analysis onshore.

Water samples

After collecting water samples with the CTD, the 12 Niskin bottles, numbered 1 to 12, are each extracted in separate 60 ml syringes. For KH24-254-CTD1, KH24-254-CTD2, and KH24-253-CTD4 two aliquots of 60 ml of the water were sampled and sealed off with stopcock valves. For KH25-254-CTD3, only one 60 ml aliquot from each Niskin bottle was collected. Before closing the valves, air bubbles are removed from the syringe to avoid oxidation and precipitation. One aliquot was retained for filtration for each water sample from all CTDs. For the CTDs where two aliquots were collected the additional aliquot was retained as an unfiltered sample. By collecting both a filtered and unfiltered sample the dissolved ions in the water (filtered sample) can be compared with the composition of the unfiltered sample. For filtration, a 0.2 μm nylon membrane is used to ensure solution sterilization and particle removal. Finally, both unfiltered and filtered aliquots are acidified to 3 vol% HNO_3, using 1.85 ml concentrated nitric acid (HNO_3) to prevent precipitation during storage. All samples are stored in a fridge after acidification.

Location 1 - Deep Insight Hill (ROV01, 02, 13, 14)

Objective

During the Deep Insight expedition in May 2023, a significant sulfide deposit was discovered on the northwest flank of the Mohns Ridge. Revisiting this deposit for further investigation was one of the primary goals of the research cruise. The deposit, referred to as Deep Insight Hill, measures approximately 300 meters by 250 meters and is situated at a depth of around 1100 meters. It is located at the flank of the rift valley about 15 kilometers from an Axial Volcanic Ridge (AVR).
The first dive at this site (ROV01) aimed to achieve several key objectives:

- Recover the ADCP (Acoustic Doppler Current Profiler) that was deployed during the Deep Insight 23 research expedition. The goal was to download its data and service the instrument for future use.
- Sample the sulfide deposit with a focus on exposing and collecting samples from the underlying rock beneath the weathered surface layer. This includes investigating both the weathering processes affecting the sulfide deposit and the composition of the rock beneath the weathered rim.
- Conduct biological video surveys to observe the local fauna. This involves the potential collection of fauna samples across the area, contributing to the understanding of the ecosystem's biodiversity.
- Collect push cores, prioritizing the preservation of the top layer of sediment. The primary purpose of this is to enable DNA analyses, aiding in the study of genetic diversity within the deposit area.

The objectives for the subsequent dive (ROV02) were to:

- Redeploy the ADCP unit at the exact location from which it was retrieved during ROV01, following its servicing and data download to ensure continuous data collection.
- Sample additional fauna observed during ROV01, such as snails and brittle stars, utilizing the suction sampler. This task aims to enhance the biological data set with specific focus on species diversity and distribution in the area.
- Investigate the geological features northwest of Deep Insight Hill, particularly examining the ridge/breakaway to ascertain whether its origin is volcanic or tectonic. This exploration is crucial for understanding the geological processes shaping the region.

For the concluding dives at this site (ROV13 and ROV14), the primary goal was to explore and sample previously unexamined sections of the deposit. The main objectives were as follows:

- Collect multiple sulfide samples along the deposit's structure, aiming to map out the spatial distribution of the sulfides.
- Gather material for comprehensive analysis, with the intention of understanding the chemical and physical properties of the SMS deposit. This includes examining the mineral composition and formation processes.

Maps

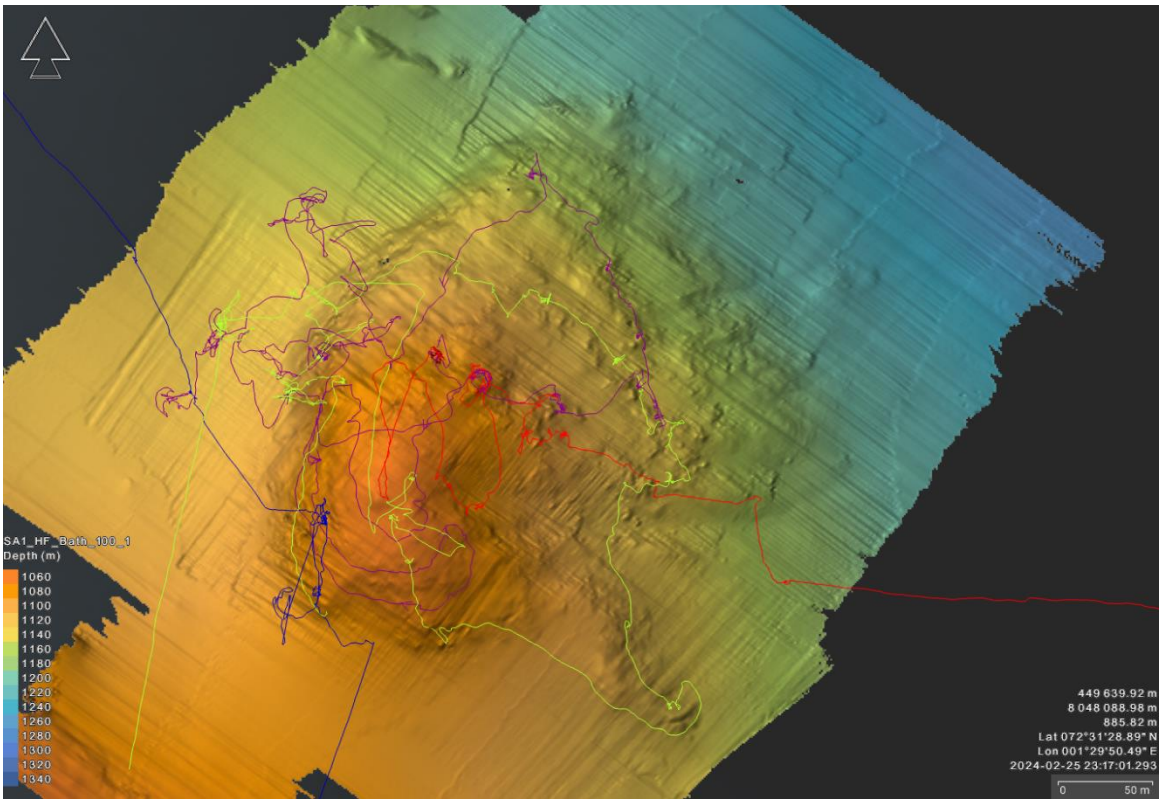


Figure 7: ROV tracks of all four dives at the Deep Insight Hill. ROV01 – Green; ROV02 – Blue; ROV13 – Red; ROV14 – Purple.

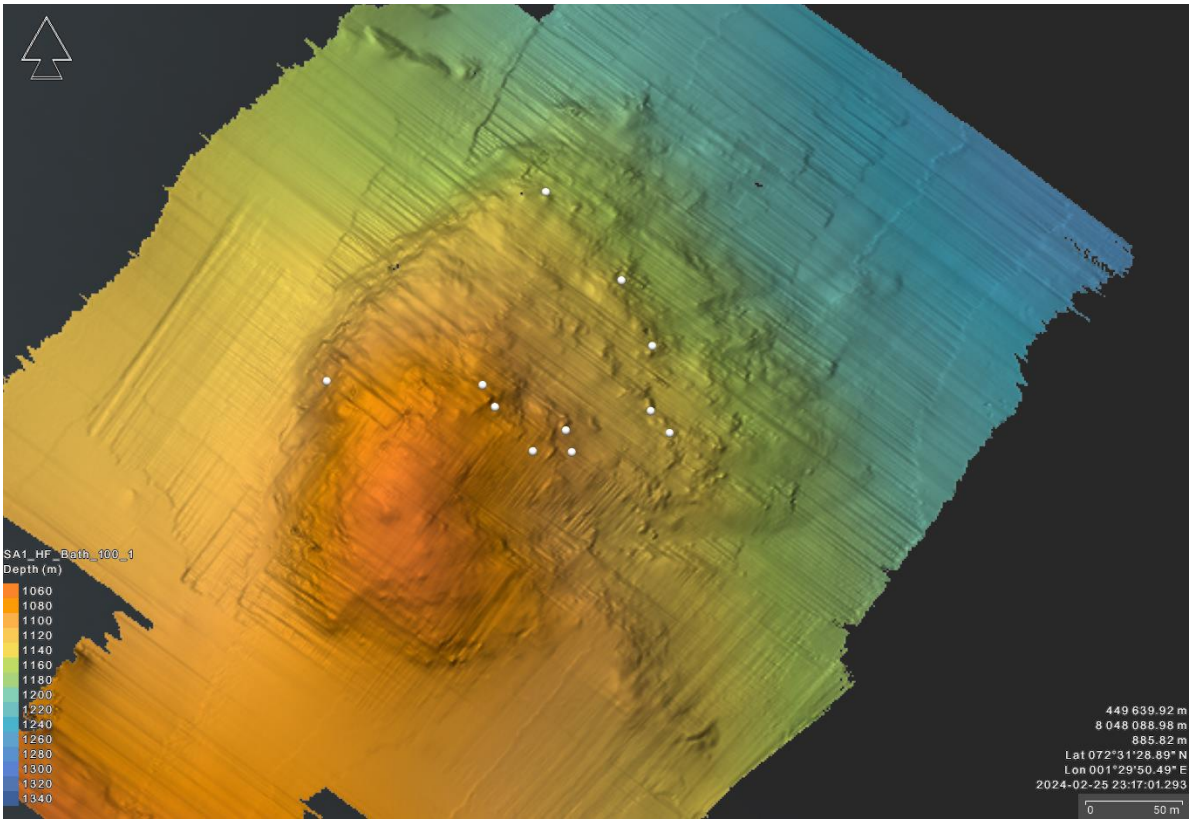


Figure 8: Sampling sites of all sulfides recovered from Deep Insight Hill during this cruise.

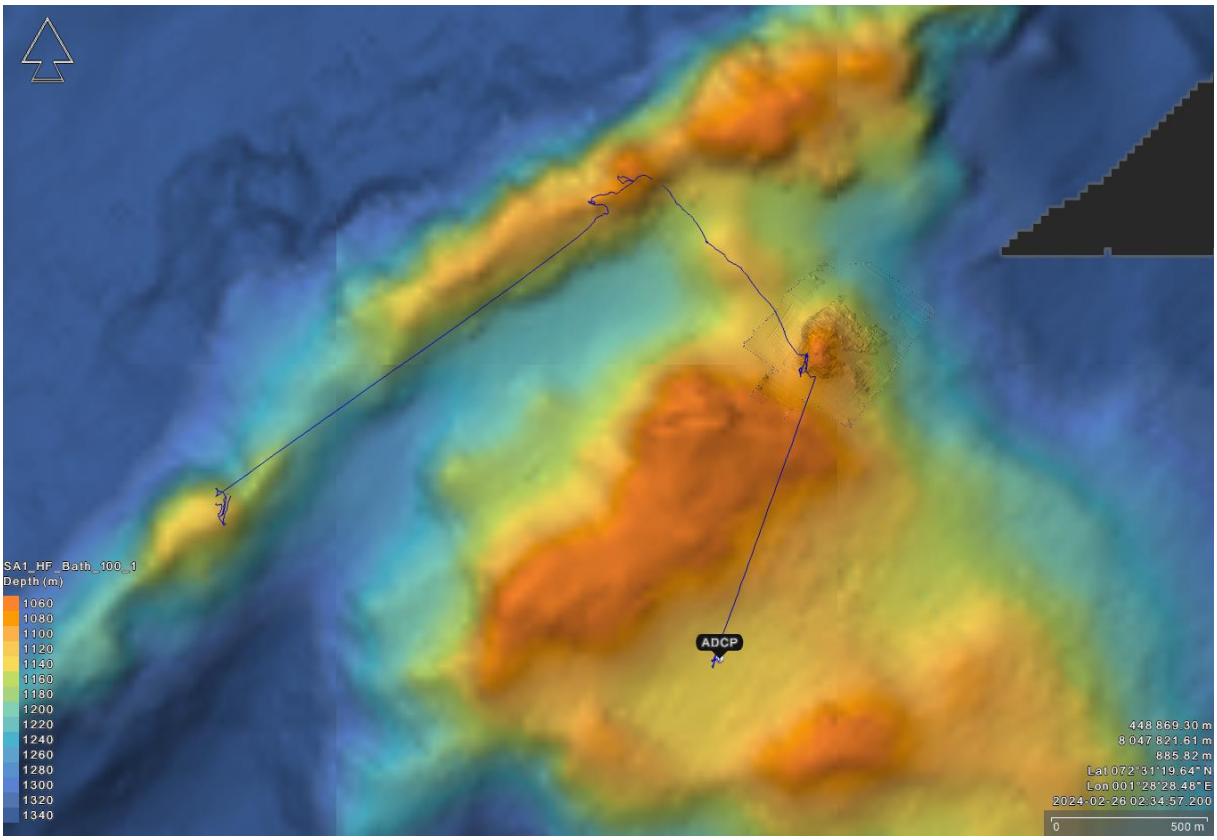


Figure 9: Full ROV track for dive ROV02, including redeployment of ADCP and investigation of breakaway.

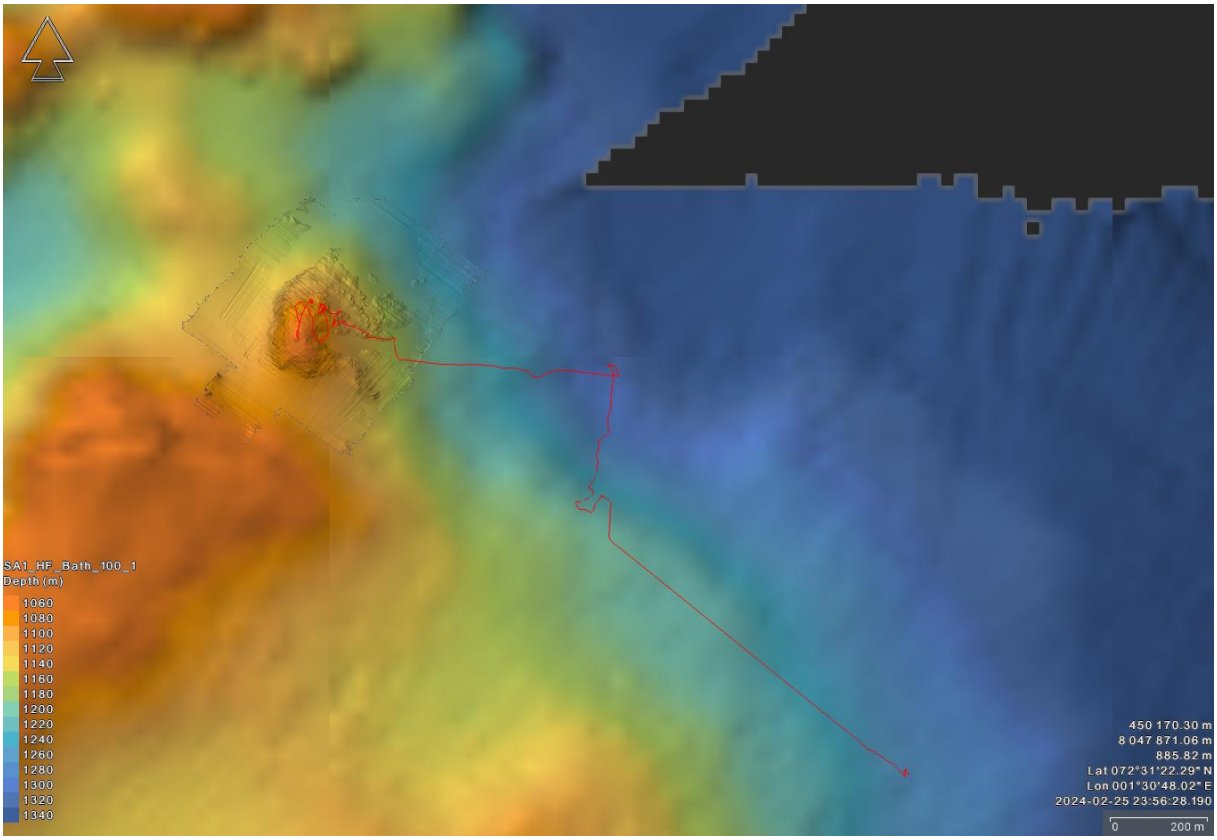


Figure 10: Full ROV track for dive ROV13.

Preliminary results

From dive ROV01, we collected 12 rock samples from different mound structures around the perimeter of the Deep Insight Hill. Sampling was challenging due to the rocks being very hard and solid underneath the weathered outer rim. The sawblade utilized during this dive (originally designed for asphalt) struggled to bite through the rock beneath the Fe-oxides/weathering and proved to be not ideal for this material. The thickness of the Fe-oxides appears to vary from only a few centimeters to several tens of centimeters. A thin layer of manganese crust (< 1mm) covers most samples. Two samples of massive sulfides with a thin weathering rim were recovered. Two basalts were also recovered, where one of them is strongly weathered, nearly all the way though, containing palagonite (weathered volcanic glass). The other basalt displays a variolitic texture. Most of the samples are iron oxides from weathering of sulfides or low temperature hydrothermal processes (reduced fluids). Two sulfide samples were recovered from ROV01. One sample of Fe-oxides (KH24-254-ROV01-R03) contains dark veins of iron-silica, indicating pulses of silica rich fluids during late-stage hydrothermal activity. Thin manganese crust covers most of the samples. The fauna was found to be dominated by common sponges, crinoids and variable occurrences of soft corals.

Figure 11: Thick iron oxide layer. This fresh exposure is from after sampling ROV01-R03.

For push coring, no suitable locations were found on top of the Deep Insight Hill as the sediment cover is only approximately 10 cm thick. Push cores were instead taken west of Deep Insight Hill, where the sediment layer is thicker. Unfortunately, the sediments here are very hard to collect with push cores, as the vacuum is not sufficiently strong to contain the sediments. Four push cores were sampled, however only two were contained within the push core liners when recovered to deck. Additionally, these two cores (KH24-254-ROV01-PC03 and PC04) were quite short, as a lot of the sediment had fallen out before getting the push cores in the holder on the TMS. The top layers of these two cores were sampled for DNA by scraping a few teaspoons of sediment into a vial with 96% ethanol for storage. The rest of the

cores are stored in sample bags due to the limited amount of sediments that were contained in the push cores.

For dive ROV02, the suction sampler was mounted to the ROV, and 3 chambers of biological material were collected in addition to 10 rock samples. Further, the sawblade was changed to a diamond blade prior to dive ROV02 which worked more efficiently than the sawblade used for dive ROV01. The entirety of dive ROV02 was simultaneously logged for biology, i.e. different biological species from e.g. tubeworms, sponges, and different fish were logged in EIVA NaviModel. All rock samples from this dive have a thin (<1 mm) layer of manganese crust. The rock samples are a mixture of volcanic, sedimentary and Fe-oxides.

Figure 12: Altered basalt breccia.

Exploring beyond Deep Insight Hill towards the potential breakaway structure to the north-northwest, the team encountered volcanic rocks and distinctive geological features. The pronounced ridge leading to the top is characterized by steep slopes on both sides, each displaying a symmetrical inclination of approximately 30 degrees and containing brecciated basalts, as illustrated in Figure 12. The ridge's top is locally about 2 meters wide and has a flat surface covered with sediment. Using the ROV, we navigated the structure's sides to collect observations to determine if the ridge is the top of a fault zone (breakaway) or another geological formation. With the surrounding terrain showing signs of faulting, we suggest that this feature could be a breakaway altered by mass-wasting on both sides. This indicates a dynamic geological history shaped by tectonic activity and erosion.

During the ROV13 dive, as illustrated in Figure 10, the exploration commenced from a point further southeast of Deep Insight Hill, with the approach to the main structure predominantly traversing areas blanketed by sediments. From this dive, a total of 11 samples were collected, encompassing basalt, sulfide, and iron oxide.

During the survey of the mound, which is the topographic manifestation of the SMS deposit, several knob or spire-like formations were discovered. These formations seem to be ancient, now-extinct hydrothermal chimneys. Significantly, these mounds supported a richer and more varied array of fauna compared to the adjacent areas, a diversity that is illustrated in Figure 13.

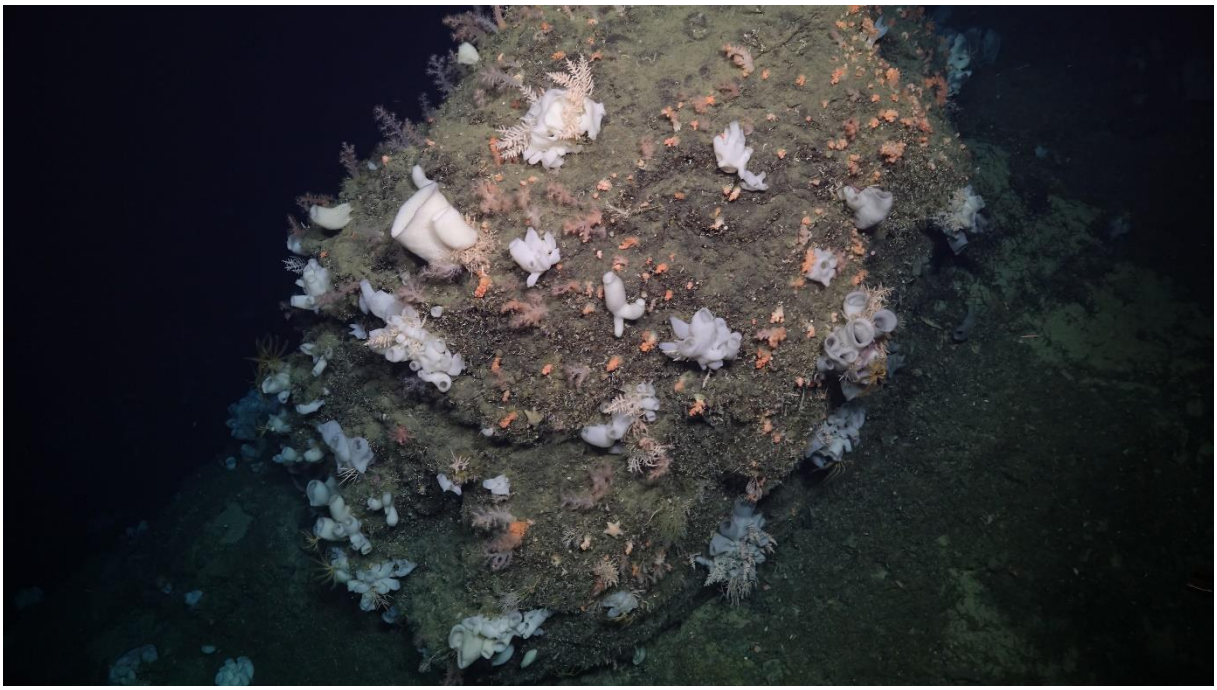


Figure 13: A sulfide mound with more abundant and diverse fauna compared to the surrounding areas.

From ROV14 (purple track in Figure 7), eight sulfide samples and one iron oxide sample were collected. This dive demonstrated that the sulfides are associated with knob-like structures across the slope. Both massive sulfides, characterized by high porosity or remnant fluid channels, and mineralized basalt breccia were recovered during dive ROV14, as shown in Figures 14-15. The mineralized basalt breccia is interpreted to represent the underlying stockwork of the deposit.

Figure 14: Cut surface of a massive sulfide sample with white veins (calcium carbonate).

Figure 15: Cut surface of a mineralized basalt breccia sample.

Location 2 – ROV03 + ROV04

Objective

The first objective at this location was to attempt to locate the Copper Hill deposit. During a research cruise in 2000 (SUBMAR), copper rich sulfides were dredged from a ridge in this area. Unfortunately, the sulfide deposit has never been found again due to a potential mix-up of coordinates. Thus, the first aim at this location (ROV03) was to attempt to find the dredge track from 2000, somewhere between the start and end points of a dredge (fig.16) and sample the feature throughout, in hopes of encountering the copper rich deposit on the way.

The objective for dive ROV04 was to investigate if mantle rocks are exposed at the deepest part of the ridge/fault and further explore the geology of the structure.

Map

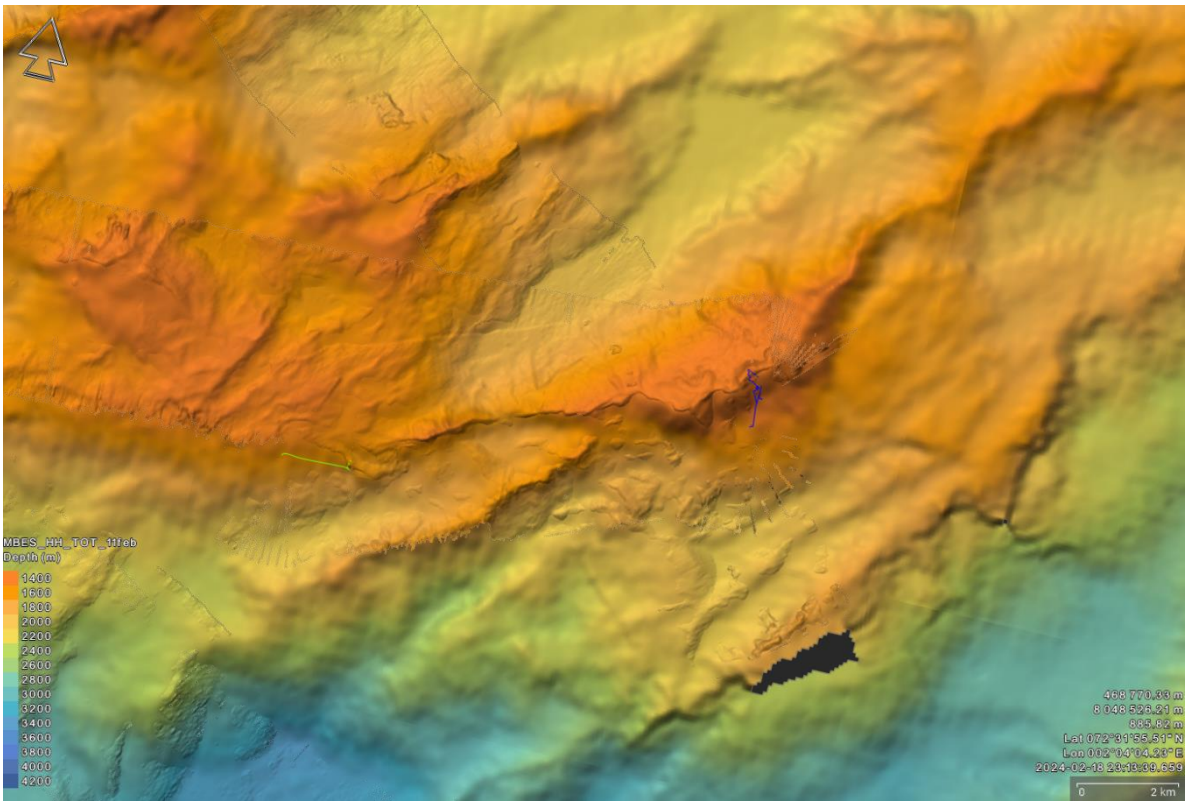


Figure 16: Map showing ROV tracks of ROV03 (blue) and ROV04 (green).

Preliminary results

For ROV03, we only had a rough start and end point (from ship gps) for the dredge, so we attempted to zigzag up the slope between the two waypoints looking for any signs of the dredge. We did not manage to find any clear signs of the dredge tracks, only a small potential mark/track that we could not follow for long. Up the slope we observed and sampled various basalts and Fe-oxides. Mast vesting features were common in the area, but also larger, coherent, smooth outcrops, with striation marks. Many contacts between vertical walls and sediments were also observed, as well as narrow, ridge-like structures. The rocks seem to be quite weathered as they are fragile, and orange colored and also covered by a thin layer of manganese crust (<5 mm). Lots of fauna observed, especially when reaching shallower depths. We went back to the known start point and did one more transect eastwards up towards the top but did not observe any signs of the dredge there either. Areas generally alternated between small boulders and sedimented flat areas. Towards the top it became steeper with lots of avalanched material. This material was mostly sorted. Ended the dive since no dredge marks, nor sulfides, were found.

The ROV04 dive started at the bottom of the slope at 1750 m depth. Here a mass-wasting deposit with the features of a talus fan was observed (fig. 17). The structure was followed towards the top of the slope. Along the ascent of the seamount, geological- and biological

samples were collected (using the suction sampler) and 4K videos/pictures were taken. While continuing in NE direction a few hundred meters, sediment became more dominant (fig. 18). 12 rock samples were collected, mainly basalt, with varying degrees of weathering and thin layers (<1 mm) of manganese crust. No mantle rocks were found. The structure likely represents a low-angle fault plane. The fauna at this location is dominated by abundant potato sponges. Additionally, annelids (segmented worms), sea anemones and some soft corals were observed.

Figure 17: Avalanche deposits

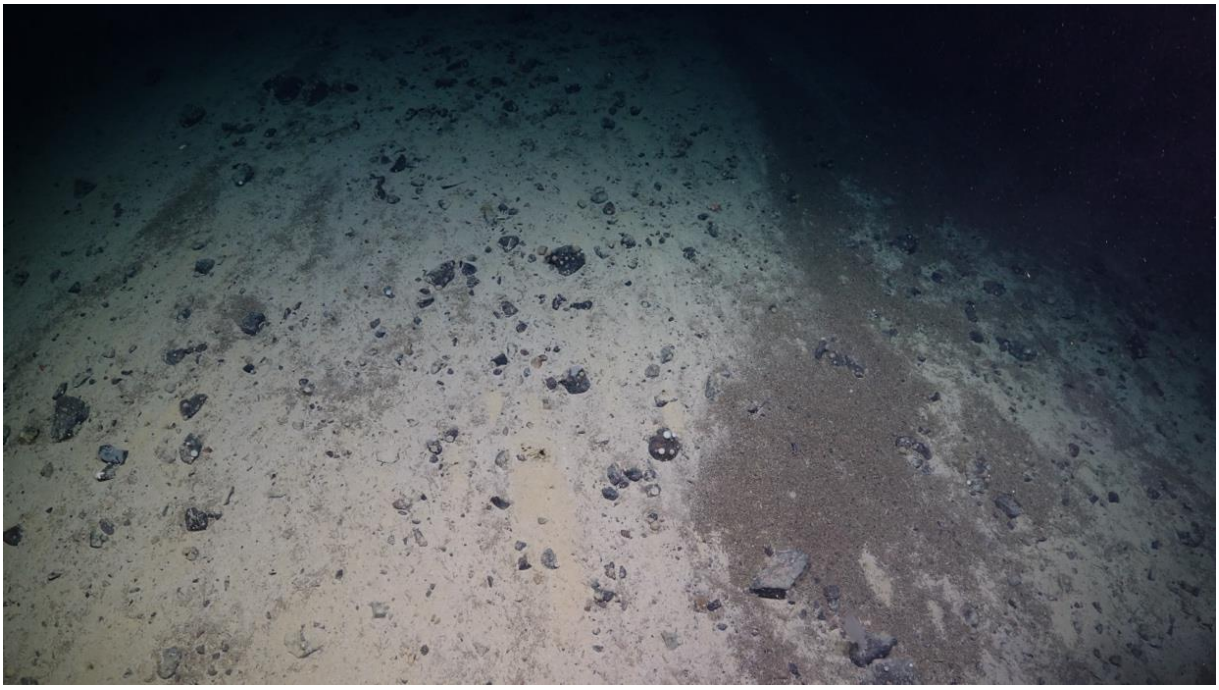


Figure 18: Sedimented slope with avalanche debris.

Location 3 - ROV05 + ROV06

Objective

At this site, the objective was to initiate the dive at the base of a fault/mass wasting pit along a ridge approximately 10 km in length, situated 40 km north of the spreading axis. The plan was to ascend the fault wall to study the geology and assess the thickness of the manganese crust. The exploration also aimed to examine circular volcanic features to analyze the sedimentary layer – specifically, to determine if these structures are completely enveloped in sediments and to collect samples from these volcanic formations if feasible. The mission was then to transition to a subsequent fault structure to conduct a similar survey as performed on the first fault, as illustrated in Figure 19.

Map

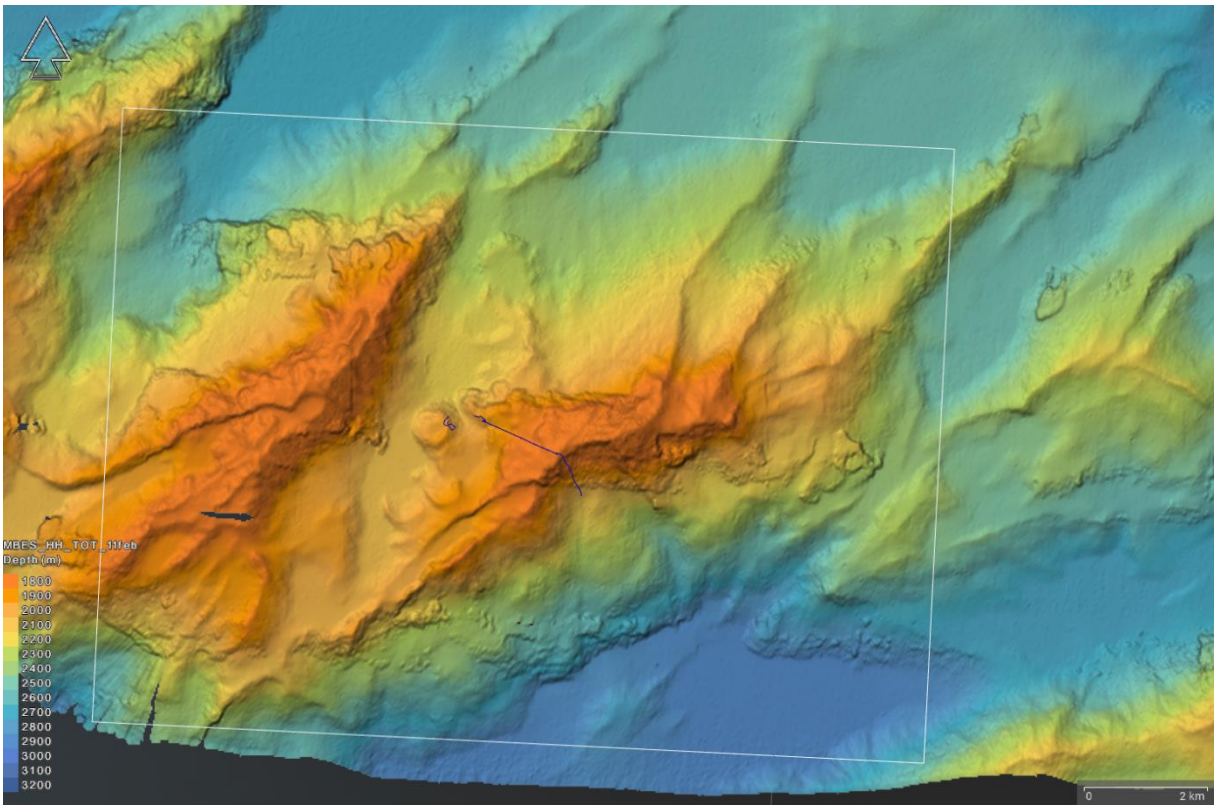


Figure 19: Map with ROV track of dive ROV06

Preliminary results

ROV05 was terminated quickly because of wrong coordinates. However, biological samples were taken. Sea pigs, starfish, and sponges were gathered using the suction sampler, and those together with bioturbation on the seafloor was taken photos of.

ROV06 started at the bottom of a mass wasting pit (2076 m). Beneath the fault structure, we first encountered a fully sedimented slope with abundant bioturbation by what is assumed to be polychaetes living inside small holes in the sediments (fig. 20). At 1890 meters depth, the first rock exposure was encountered. When sampling, a 4 cm manganese crust was collected. Moving up the slope, variable sedimented areas (with polychaete inhabitants) and larger rock exposures were encountered. It is difficult to conclude whether the rock exposures are in situ bedrock or huge blocks that have avalanched from the top of the structure. Several of the rock exposures are ridge-like structures. Sampling proved to be quite challenging as the manganese crust is quite fragile, whereas the rock beneath the crust is very hard and solid, and the rock exposures generally are very steep so pieces that were broken off fell far. When reaching the summit of the mass wasting fault structure we encountered a relatively flat plain with sediment coverage, unable to determine sediment thickness. A short video transect for biology observations was made before going into TMS to relocate 1250 meters in NE direction to some volcanic features. The crater itself was full of sediments, which led us to follow the sides of the structure. Again, the steep slopes made it difficult to collect samples, but after some attempts, basalts and manganese crust were gathered. One sample of basalt with up to 4.5 cm thick manganese crust was found, other than that the manganese crust did not seem particularly thick in this area. At the top of the crater (1944 m depth) a more diverse and richer fauna was observed, compared to deeper down the slope. Ending with some 4K recordings and photos of the rocks to visualize the thickness of the manganese crust in that area.

Figure 20: A polychaete inside its hole

Figure 21: Manganese crust on top of altered, vesicular basalt.

Figure 22: Manganese crust on altered basalt.

Location 4 - ROV07

Objective

The start of this dive was livestreamed as communication with Norwegian Ocean laboratories, to show how we use Ægir6000 to conduct research in the deep sea. Further, the aim was to investigate the biology of the sedimented flat area and study a seamount to sample manganese crust.

Map

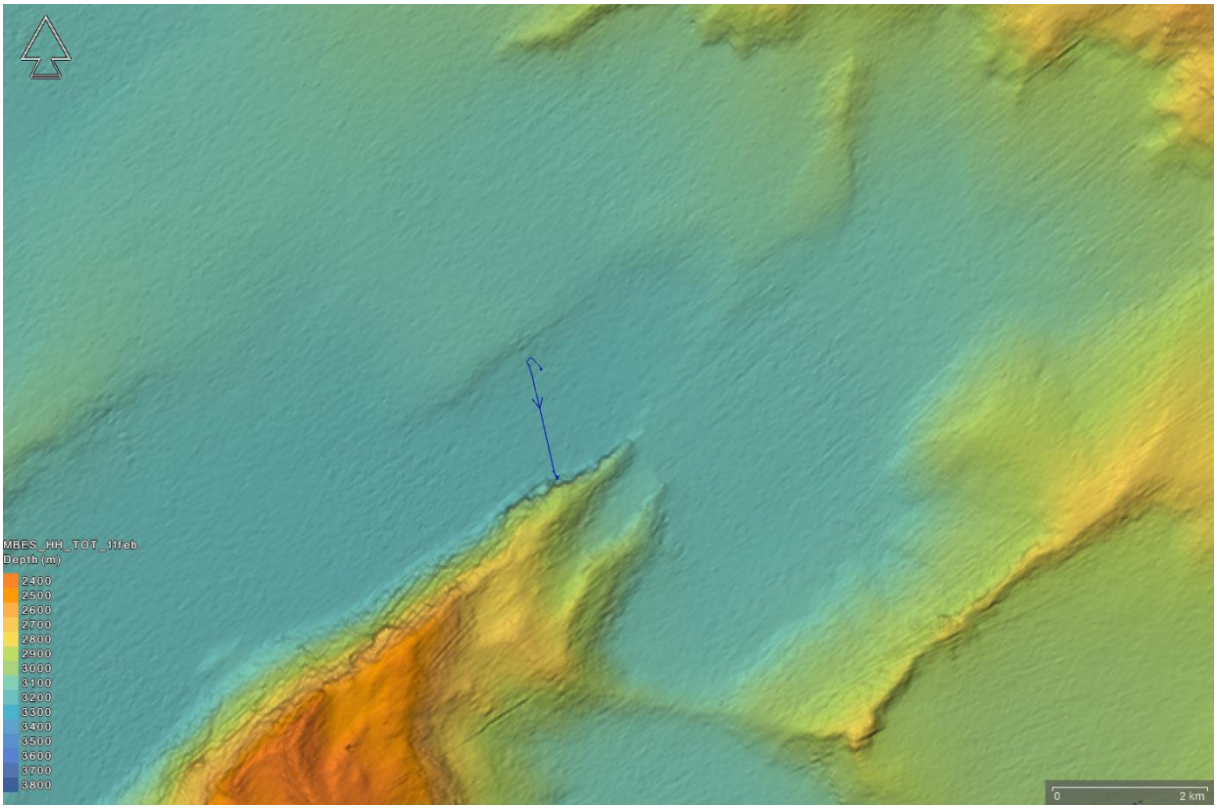


Figure 23: Map with ROV track for dive ROV07.

Preliminary results

This dive started in a basin at 3171 meters depth, where a push core was taken before a biological bottom survey was performed along the sedimented plain. This survey went in a NE direction mapping the different lifeforms existing in the flat sedimented areas, like sea anemones, sponges, and amphipods. After 400 meters the ROV turned and headed 1600 meters SE towards a nearby seamount, while continuing the biological survey. Steep rocky cliffs covered by manganese crust, defined the base of the seamount (fig. 24). The large structure was covered in approximately 3.5 cm manganese crust at the bottom of the structure (fig. 24). Moved up against the slope of the structure, tried to find better places to saw into the

manganese crust (fig. 25). Because of the steep slope this was challenging, therefore loose samples were collected as well while moving towards the top of the slope. 8 samples were collected. The thickness of the manganese crust varies through the samples - the thickest manganese crust measured on the recovered samples is 9 cm. The manganese encrusted rock exposure hosts practically no fauna, except some shrimps.

This dive commenced in a basin at a depth of 3171 meters, where a push core sample was initially collected, followed by a biological bottom survey along a sedimented plain. The survey proceeded in a northeast direction, mapping various life forms found in the flat, sedimented areas, including sea anemones, sponges, and amphipods. After covering 400 meters, the ROV altered its course, heading southeast for 1600 meters towards a nearby seamount, all the while continuing the biological survey.

The base of the seamount was characterized by steep rocky cliffs covered with a manganese crust (fig. 24). Ascending the slope of the seamount, efforts were made to identify more accessible locations for cutting into the manganese crust (fig. 25). The steepness of the slope posed a challenge for this task, leading to the collection of loose samples while progressing towards the peak of the slope. A total of 8 samples were gathered. Across these samples, the thickness of the manganese crust varied, with the thickest crust measured at 9 cm on the recovered samples. Notably, the manganese-encrusted rock exposure was almost devoid of fauna, except for some shrimps.

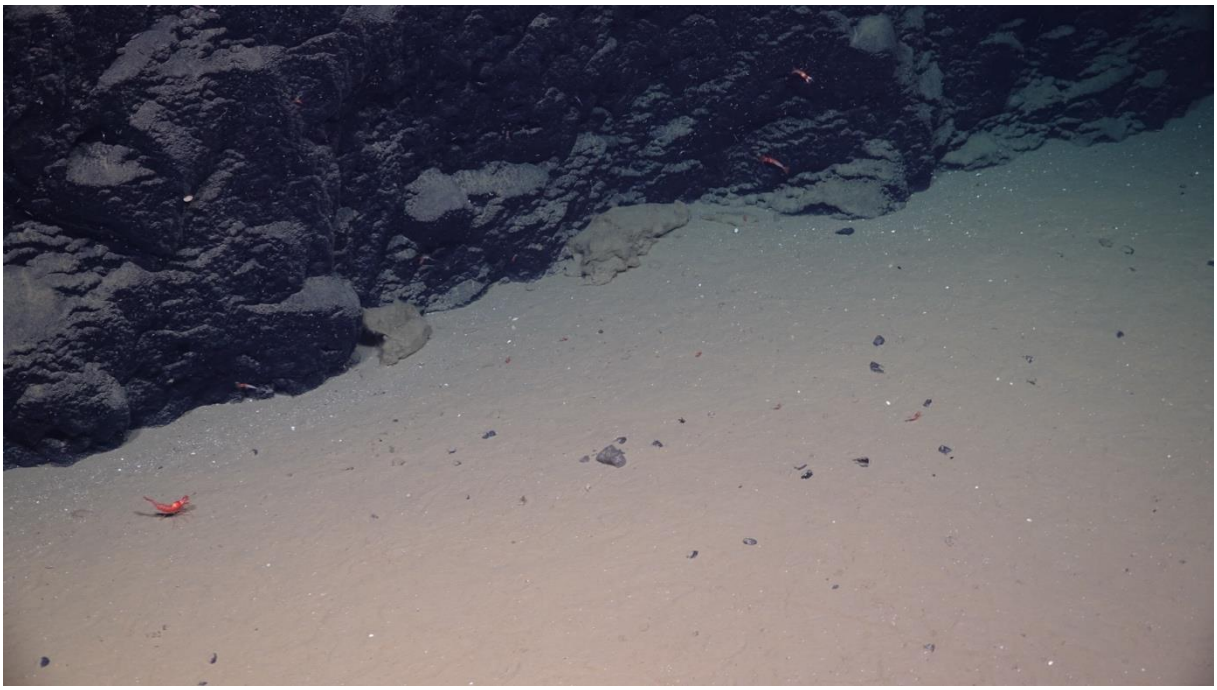


Figure 24: Contact between the sedimented plain and the exposure.

Figure 25: Thick manganese crust, and the yellow is weathered sediments.

Location 5 – ROV08 + ROV09

Objective

Investigate an approximately 25 km long NE-SW oriented ridge in the Greenland Sea. Bathymetric maps show that the ridge is approximately 450 meters high and steep. The bathymetry also shows that the side of the ridge is segmented into several terraces (fig. 26). The initial survey (ROV08) was conducted in the SW part of the ridge, while the second survey (ROV09) was conducted in the NE part (fig. 26). The overall aim of these dives was to investigate the geology, in particular manganese crust thickness, together with biological surveying and sampling of fauna using the suction sampler.

Map

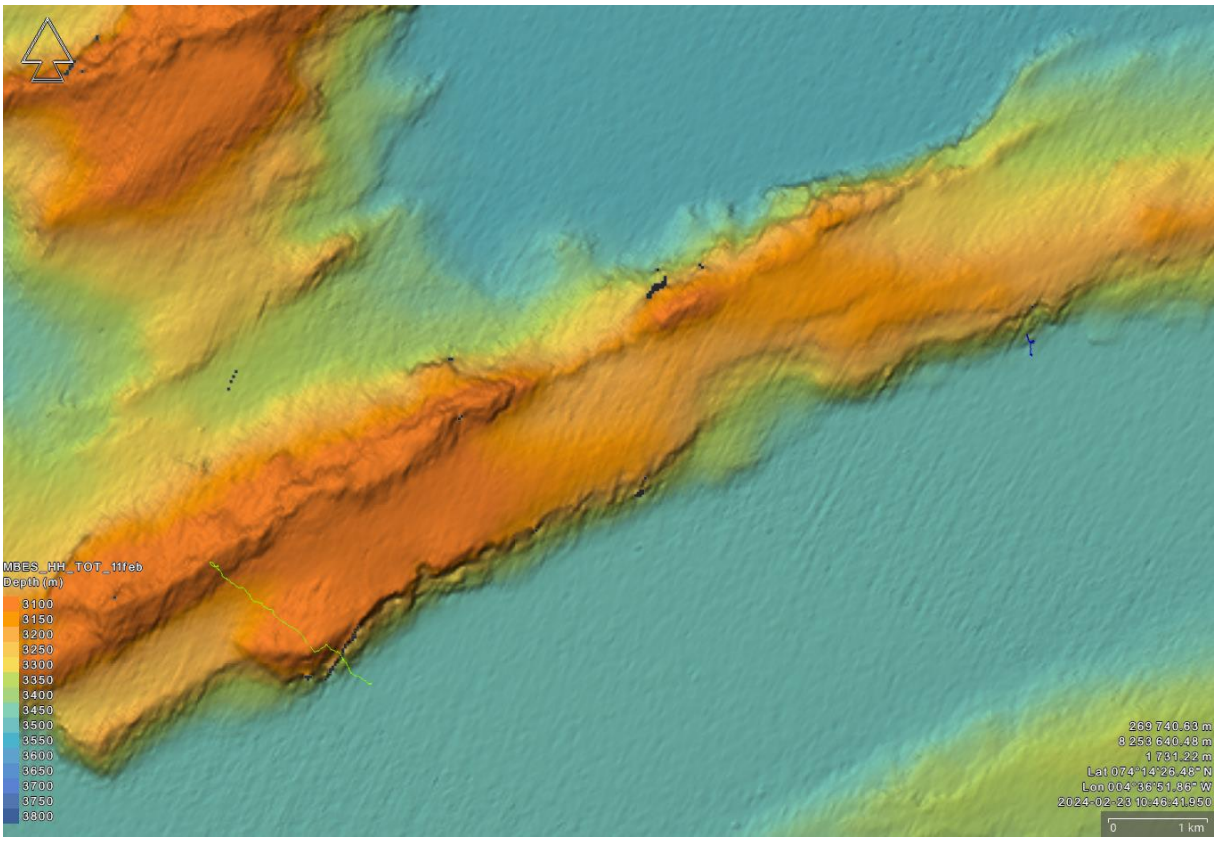


Figure 26: Map showing ROV tracks of ROV08 (green) and ROV09 (blue).

Preliminary results

Both ROV08 and ROV09 started on the flat sedimented seafloor basin before reaching a slope, thickly encrusted in manganese crust. Limited occurrence of marine life at this depth, except some bioturbation and shrimps. The steep slope transitioned between sediment filled plateaus, with rock fans above the sediments and steep rock exposures. The ridge consists of steep rock exposures (locally vertical exposures) encrusted with thick (up to ~30 cm) manganese crust, in some exposures the manganese crust looks fragmented. The crust appears to be lying on top of weathered basalt breccia. The ROV-team was able to cut several excellent samples of manganese crust, however, the layer of crust is generally too thick to expose bedrock due to the limitations of the saw blade dimension (50 cm in diameter). Dive ROV08 resulted in a total of 9 rock samples, mainly manganese crust, as well as two suction sampler containers of biological material. During ROV09, 4 thick samples (>20 cm) of manganese crust was collected.

Figure 27: Typical manganese crusted exposure.

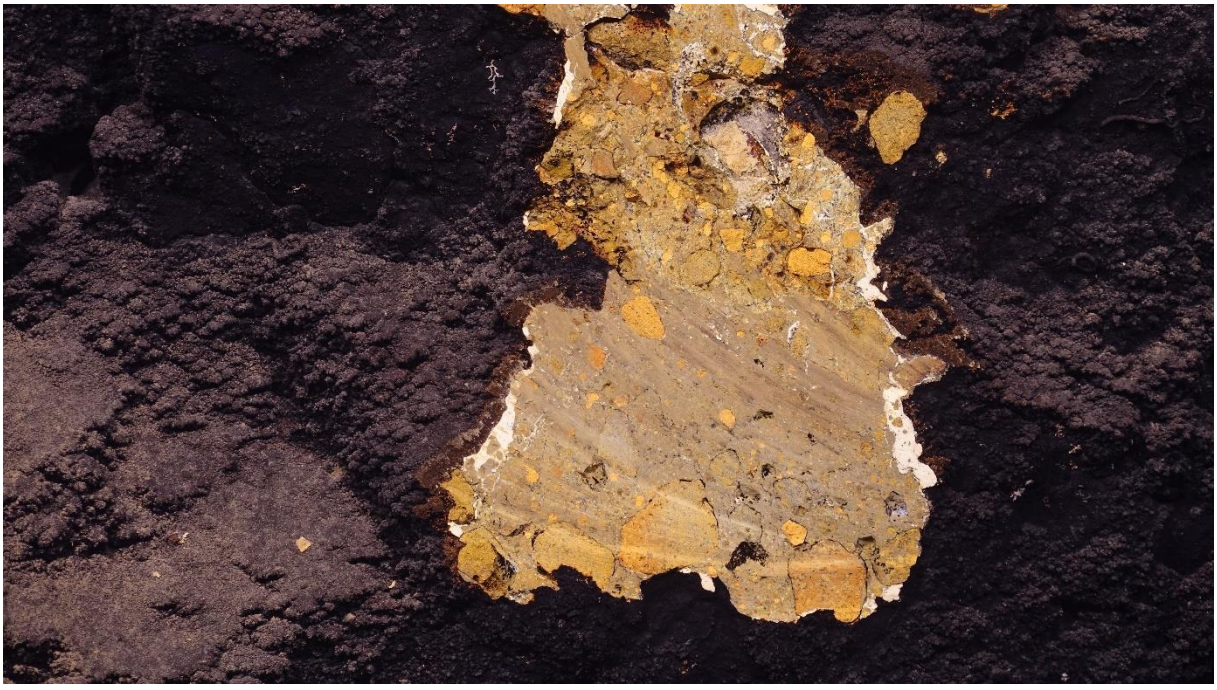


Figure 28: Cut surface of an altered basalt breccia.

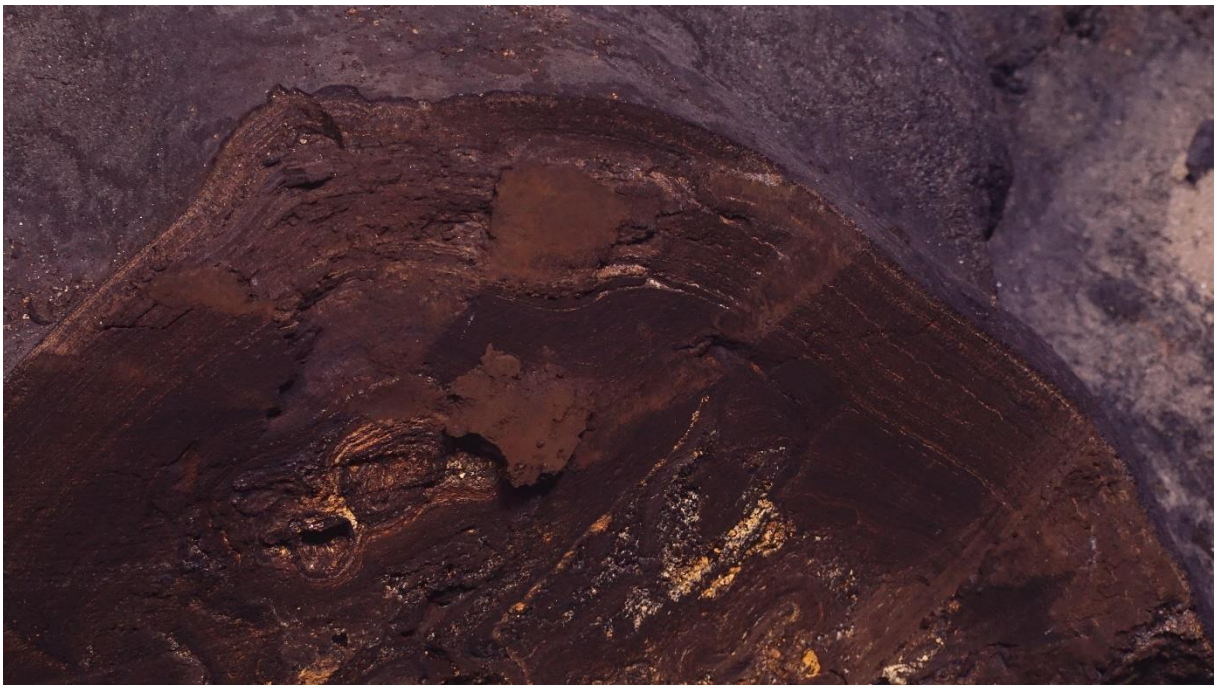


Figure 29: Laminated and nodular manganese crust.

Figure 30: Laminated and stromatolitic manganese crust

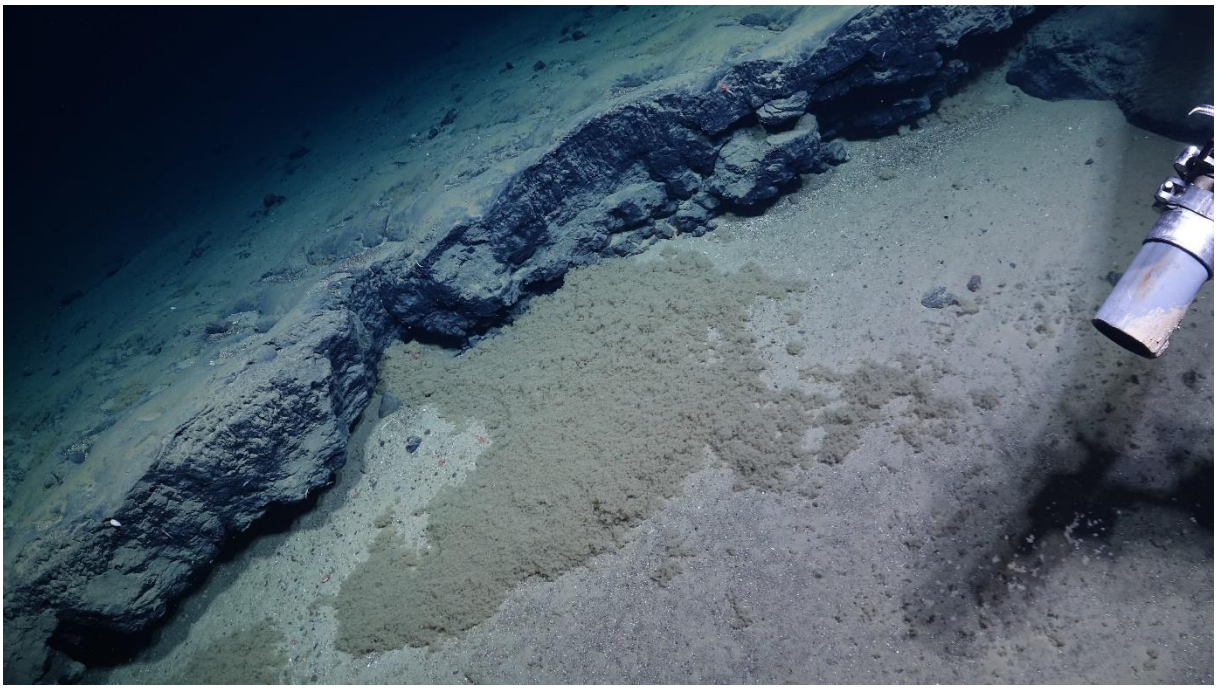


Figure 31: Potential egg sacks that were sampled with the suction sampler.

Location 6 – ROV10

Objective

An investigation was conducted on a W to E-oriented geological formation located in the Greenland Sea. The predominant structure, measuring approximately 3000 meter in length, and about 1000 m height, lays around 140 km away from the rift-valley of the Mohns Ridge. Previously collected bathymetry revealed a steep slope on the southern side of the structure, contrasting with more gradual incline on the northern side. The primary goal of dive ROV10 was to assess the thickness of the manganese crust and conduct a comprehensive examination of the structure on the southern side.

Map

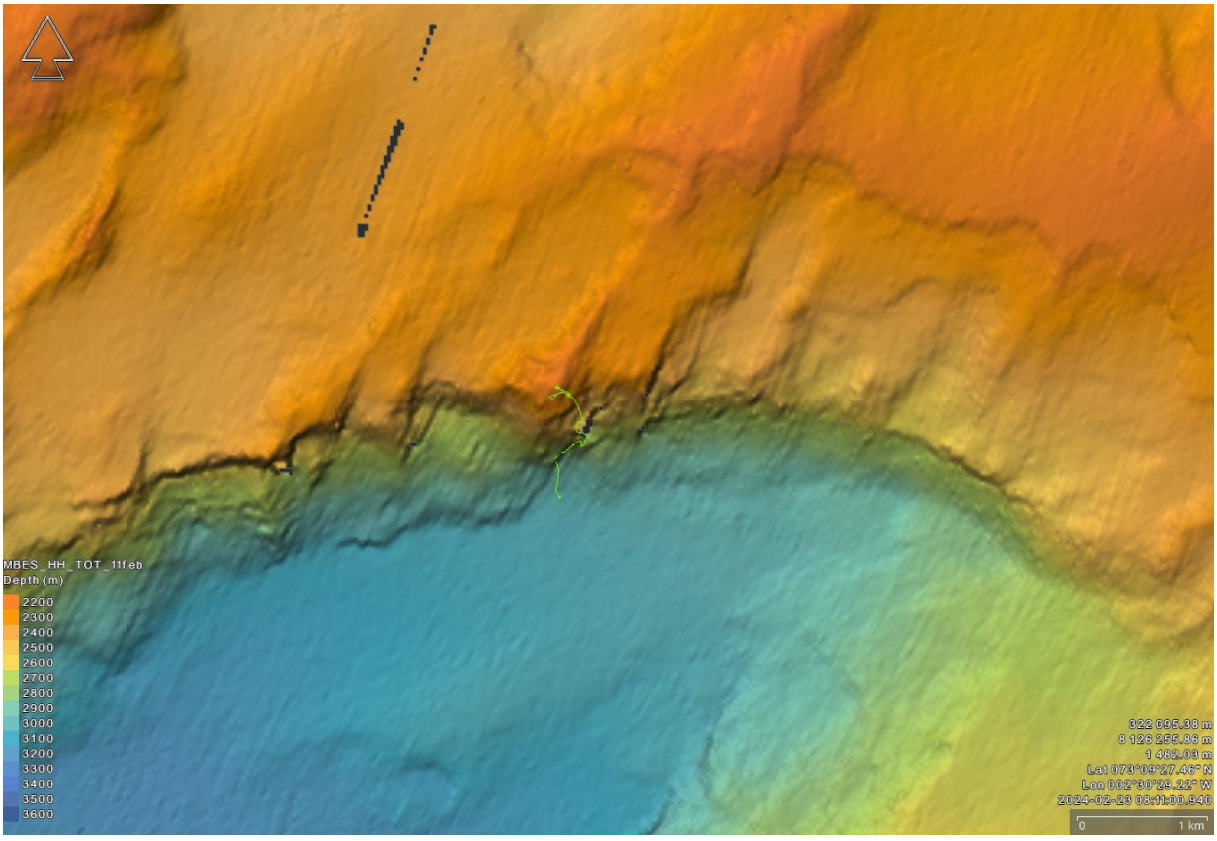


Figure 32: Map with ROV track of ROV10.

Preliminary results

The dive started in an area covered by sediment, featuring small rocks presumed to be debris from the adjacent hillside and drop-rocks originated from glacial icebergs. Upon encountering the structure, a distinct transition was observed between the structure and the sediment covering. The lower section of the structure exhibited a gentler slope, characterized by large

rocks with manganese crust alongside with some sediment layer. As the ascent progressed along the structure, the incline steepened considerably, reaching an approximately angle of 90 degrees. Green bacterial mats and sponges constituted the initial biological observations at the structure's base, persisting consistently throughout the ascent. Later Crinoidea and Axinellida dominated the hillside. Parts of the manganese crust displayed cracks containing sediments. There were multiple vertical hollow half-pipe-like structures (fig. 33), one of which was traced from 2853 meters depth to 2799 meters depth. These half-pipe-like structures, measuring 10-15 cm in width, featured circular black structures within, accompanied by brecciations, foldings and horizontally traversing passages. A weathered red hue surrounded these structures. At the summit of one hollow pipe-like-structure, a collection of small rocks was identified, potentially accounting for the presence of multiple vertically descending hollow pipe-like-structures. Later a broad and hollow horizontal passage was discovered, exhibiting a thick manganese crust on the ceiling. At this location, two distinct forms of manganese crust growth are observed. One resembling a ridge, and the other being a flatter, layered structure which also exhibited sediment coverage (fig. 35). The exploration of the structure proceeded in a NE direction, with an anticipated plateau. However, uncertainties arose due to missing sections of the map, making it unclear whether the flatter area sampled from truly represents the plateau. It is suggested that the plateau may not be as visually apparent in reality as indicated on the map. A total of 8 samples, containing manganese crust and basalt were collected during this dive.

Figure 33: Vertical hollow half-pipe-like structures

Figure 34: Cut surface of thick manganese crust.

Figure 35: Layered type of manganese crust.

Location 7 – ROV11

Objective

Investigate southern slope of a seamount located approximately 120 km NW off-axis. Attempt to uncover manganese crust thickness and underlying bedrock, as well as observe biology.

Map

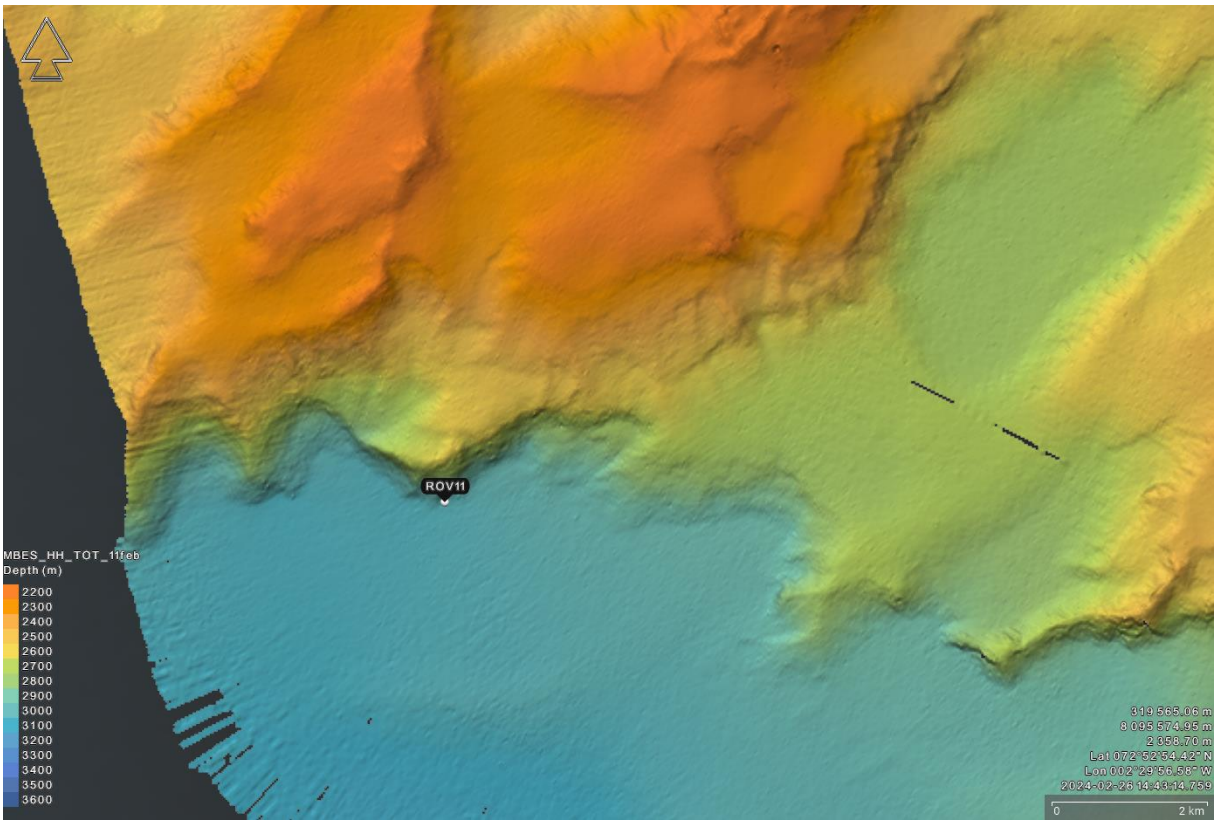


Figure 36: Map showing start location of ROV11 (no track available).

Preliminary results

The dive initiated at the seabed below the seamount at 3010 m depth. The side of the seamount consists of steep, near-vertical rock exposures covered in manganese crust. The rock wall hosts abundant rock living sponges. A total of 8 rock samples were collected along the transect from the bottom to the top of the seamount. The rock samples collected are mainly manganese crust (up to 8 cm thick upon recovery), and at least one sample of likely bedrock of altered basalt, containing vesicles and vesicles with white mineral growth inside them (fig. 37). Abundant rock living sponges were observed all the way from the deepest point (3010 m) all the way to the top (2609m). In addition, we observed a long, relatively narrow crack in the manganese crust (fig. 38).

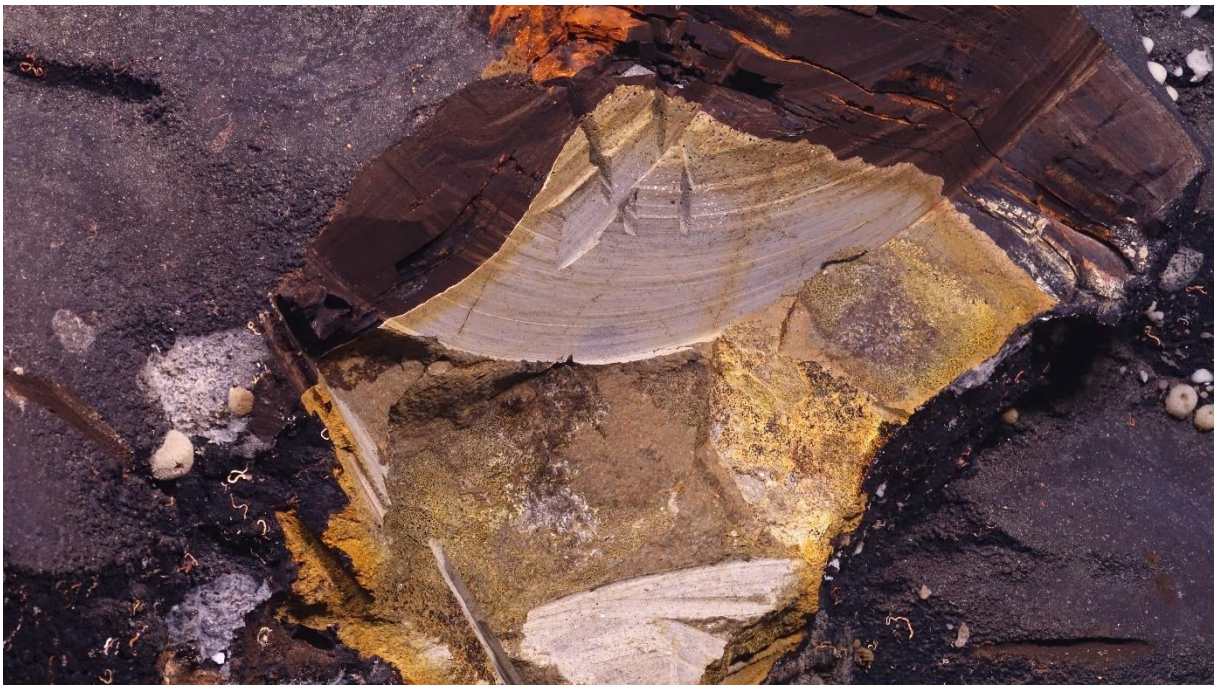


Figure 37: Thick manganese crust on top of basalt with vesicles and vesicles with white mineral.

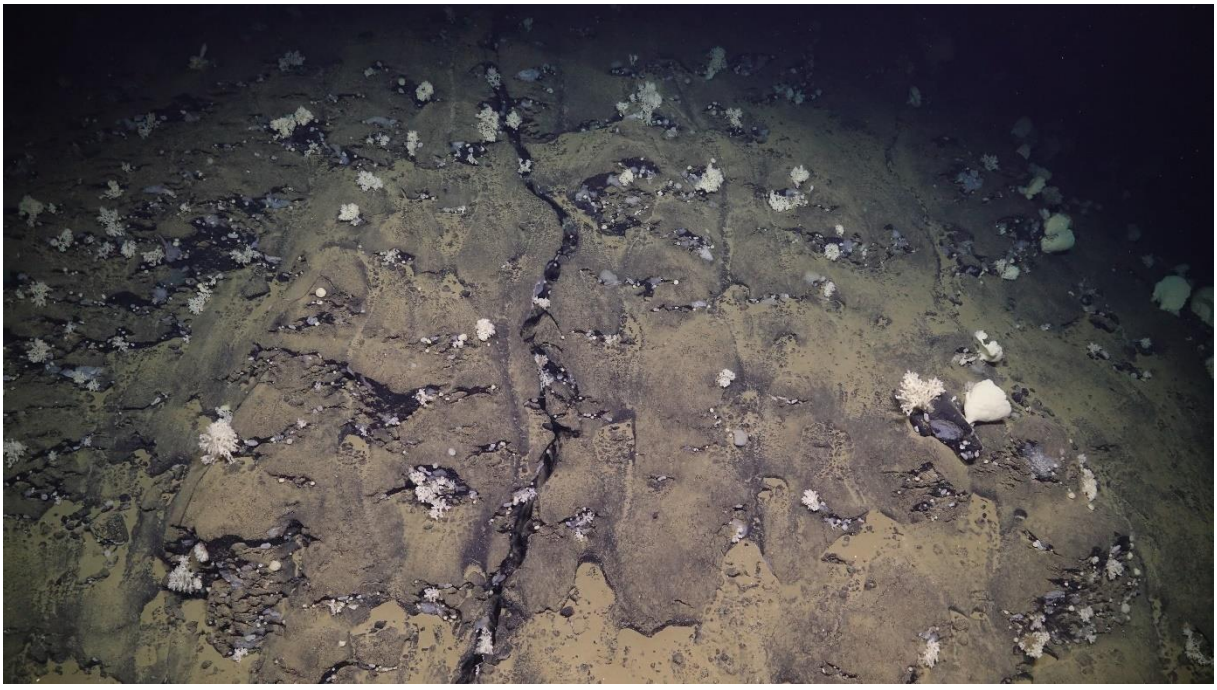


Figure 38: Long narrow crack in the exposure.

Location 8 – ROV12

Objective

Investigate approximately 400 meters high, very steep ridge located approximately 95 km from the axial volcanic ridge. Sample and investigate with focus on manganese crust thickness and underlying bedrock.

Map

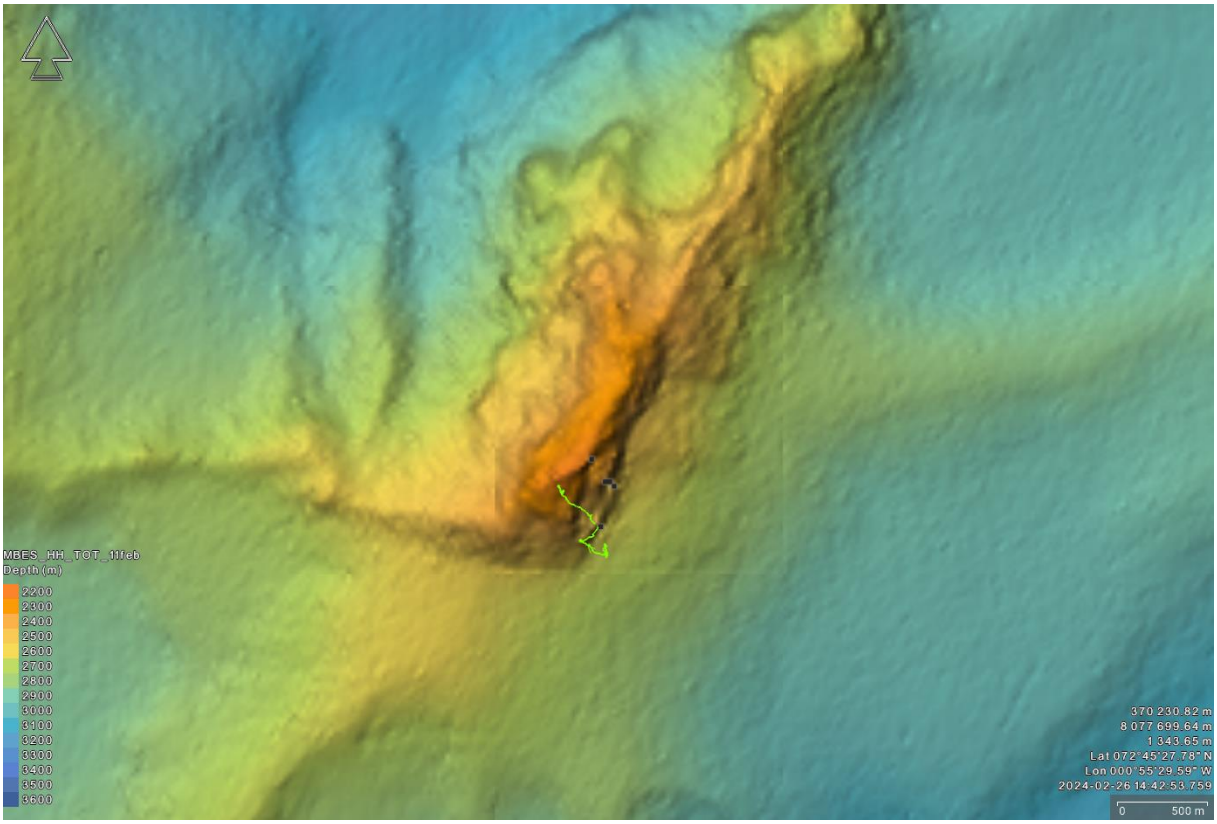


Figure 39: Map showing ROV track for ROV12.

Preliminary results

The dive started at 2631m depth and mostly consisted of climbing up the slope and trying to sample rocks during the ascent. The area of ascent on the ridge was very steep, nearly all the way a vertical wall. This complicated the sampling of the crust as there were no places for the ROV to sit down while sawing, and grabbing samples with the manipulators mostly resulted in disintegration of the crust as it is fragile. However, a total of 6 rock samples were collected from the steep sides as well as the highest point, before the dive had to be aborted due to a grounding error on the ROV. The samples collected were mostly FeMn-crust with varying thickness. Several high-resolution images were taken of the sampled sites, especially those

that were sawed out where FeMn-crust thickness is visible and measurable (fig. 40). The thickness of the FeMn-crust in the area is at least 8cm, this was measured in samples collected during the dive. Throughout the dive, different sedimentation was also seen, with some slopes completely covered indicating that the slopes were less steep while other slopes were sediment starved. Another interesting observation during the dive was some vertical structures looking like dikes or sills showing up further up the slope at 2250m, these were imaged by the high-resolution camera (fig. 41).

Worth noting is that the bathymetric map has some artefacts, as the map indicates at least two terraces in the steep slope, however these were not in fact terraces.

Figure 40: Thick manganese crust on top of microgabbro (ROV12-R03).

Figure 41: Exposure resembling a dike complex.

Location 9 – ROV15 + ROV16

Objective

The objective for ROV15 the aim was to search for one of the dredge tracks from SUBMAR 2000. The dive started at 2000 meters depth, climbing up the south-western part of Boyd seamount. While climbing upwards, a biological survey was logged. ROV 16 was a pure biological dive, starting at 600 m depth.

Map

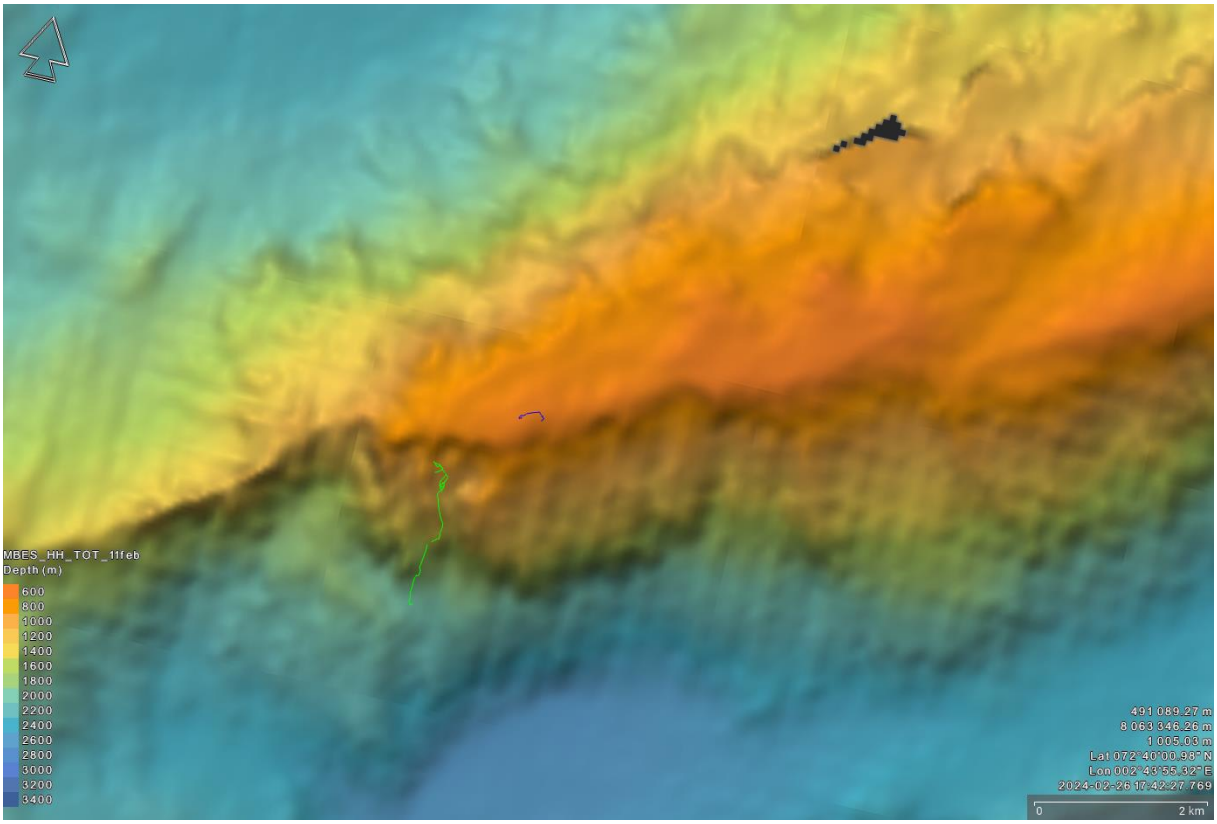


Figure 42: Map showing ROV tracks of ROV15 (green) and ROV16 (blue).

Preliminary results

For dive ROV15, a second dredge from the SUBMAR 2000 cruise was searched for along the Boyd seamount. Neither the dredge track, nor sulfides were encountered during this dive. 11 samples were collected, several metamorphic, some brecciated (ROV15-08) and a pillow basalt (ROV15-R06). Potential dikes and several fault- and shear zones upwards Boyd Seamount was observed (fig. 43). We measured some of the fault angles to be 025, 030, 045 (North-east direction).

Figure 43: Showing one of the faults.

Dive ROV16 was a biology focused dive on the shallow part (600 m) of the Boyd seamount. The shallow depth of the seamount is home to abundant fauna, like sea anemones, sponges, soft corals, shrimps and more. Several high resolution (4K) video clips and images were recorded during this dive.

Figure 44: Starfish, ascidians, sponge and sea anemones.

Figure 45: Sea-anemone.

Location 10 – ROV17

Objective
To collect volcanic samples from the outer edge of the axial volcanic ridge (AVR). The main purpose was to collect volcanic rocks and basaltic glass for geochemical analysis, to investigate the evolution of the magmatic activity at the AVR. Previous samples that have been analyzed from the AVR originate from further towards the center of the volcanic ridge, but very few/no samples have been collected from the aimed area for dive ROV17.

Map

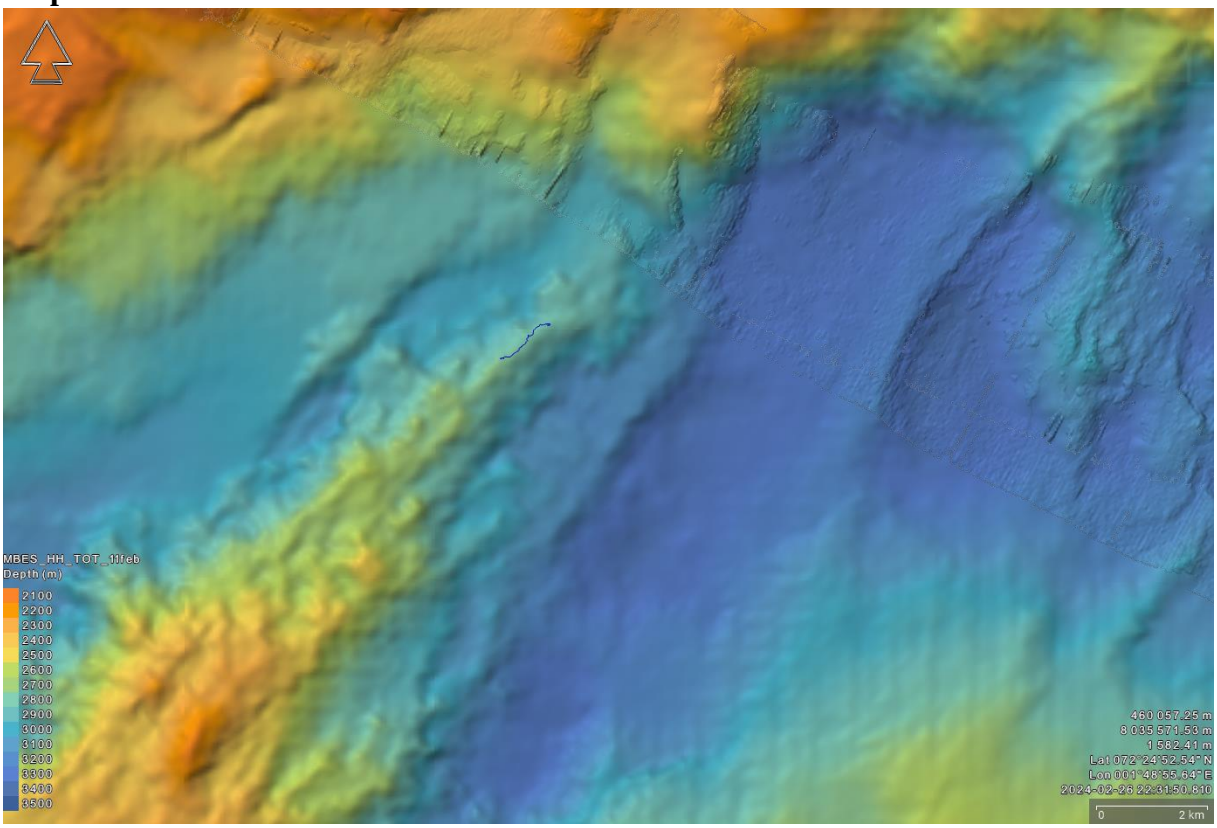


Figure 46: Map showing ROV track for dive ROV17, on the NE part of the AVR.

Preliminary results
Dive ROV17 was conducted at the NE edge of the axial volcanic ridge starting at 2850 meters depth, and a total distance of 1 km was covered moving in a SW direction following the ridges. In the beginning of the dive, a large number of broken basalts and pillow basalts was observed, the size of the separate rocks was very similar. Moving up the hill more and more pillow basalts became visible, and large walls of non-broken pillows stretched over 100 meters tall, likely representing fissure eruptions. In addition to the round pillows, many lava flows that were more tube structured were observed (fig. 48). There was basaltic glass on the outer rim of the pillows and the lava flows. There were many high-resolution images of the different structures taken. Both aphyric and porphyric (fig. 49) basalts were observed and sampled. A total of 16 samples were collected. Some samples consisted of pure basaltic glass while others lacked basaltic glass. Some porphyric samples show phenocrysts in the glass rim, indicating that the phenocrysts were crystallized before the eruption. The phenocryst presence represents intermittent under-cooling of the magma and that the magma chamber likely is

under stress and/or a small chamber due to the evidence of variable temperatures. Several large structures on top of the hills with the lava flows could indicate a feeding tube source of lava flowing down the sides creating the flow structures (fig. 50).

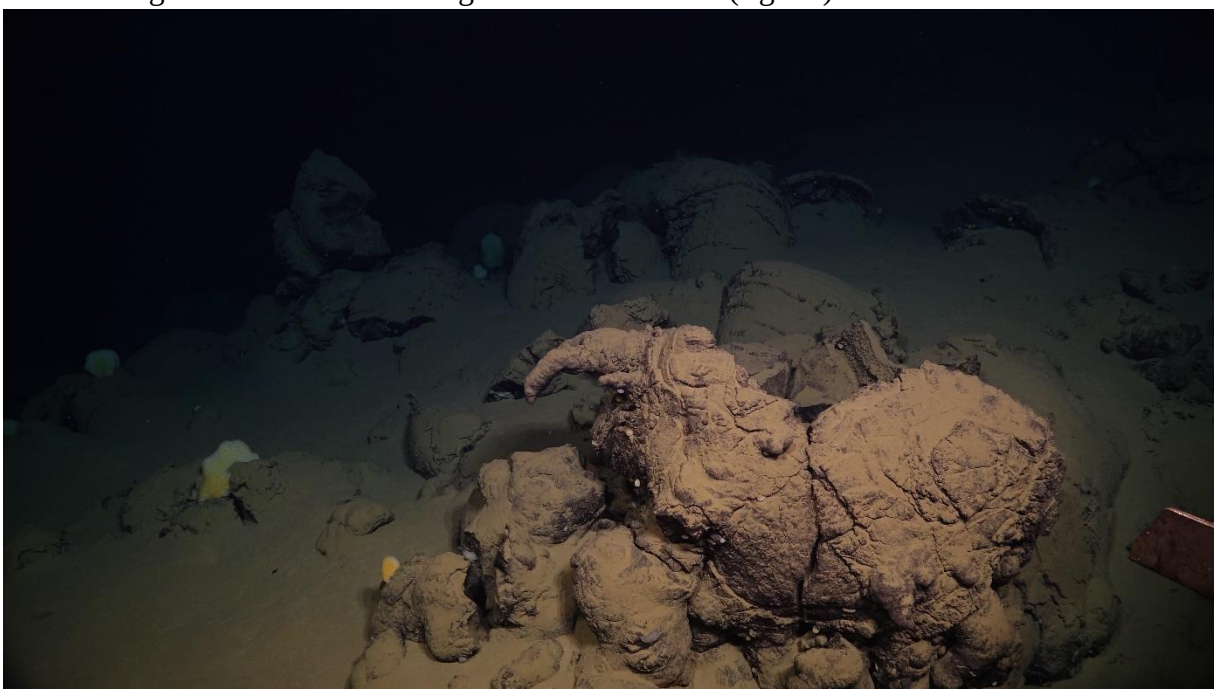


Figure 47: Eruptive lava structures.

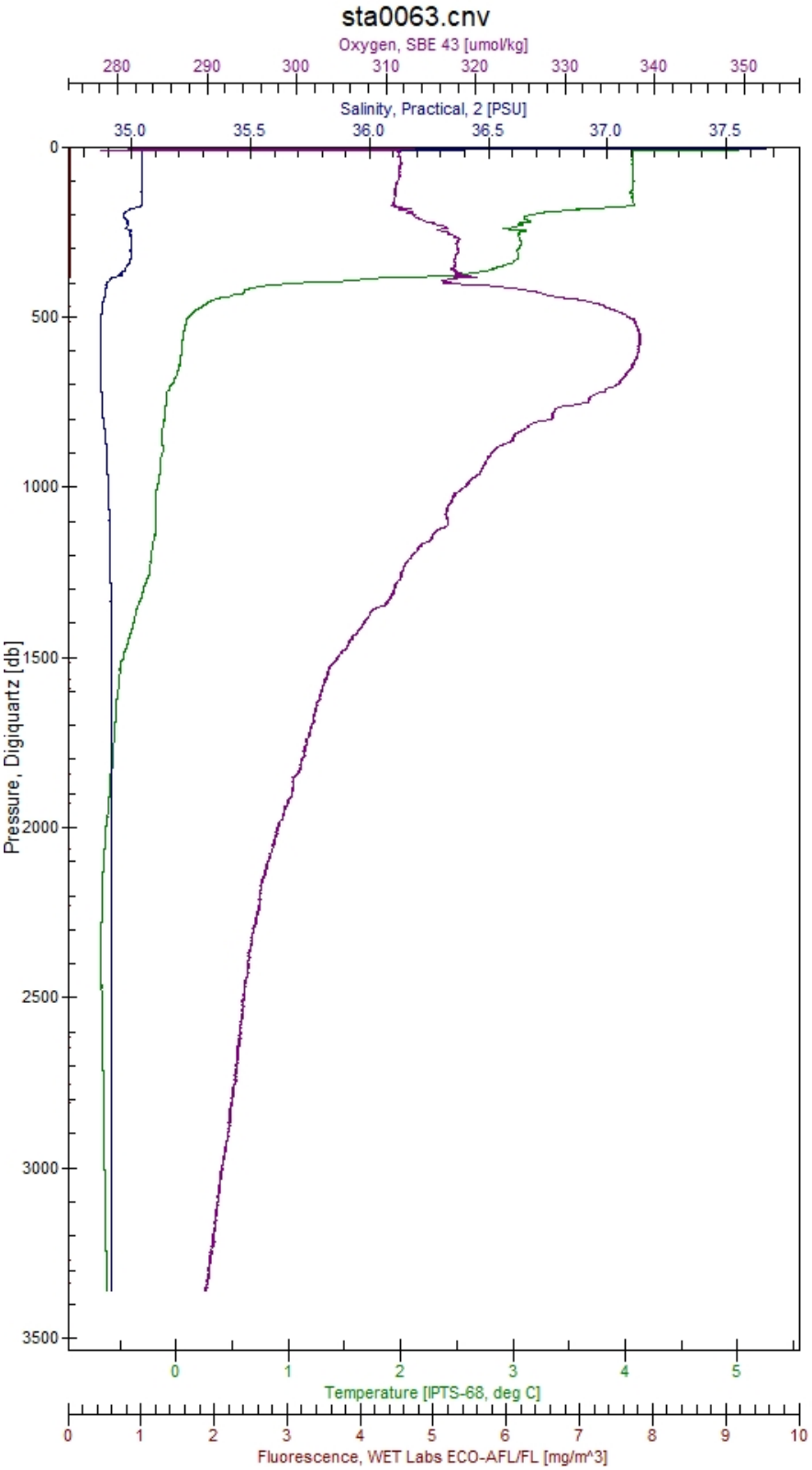
Figure 48: Tubular lava flows.

Figure 49: Large phenocrysts in this cut surface exposure.

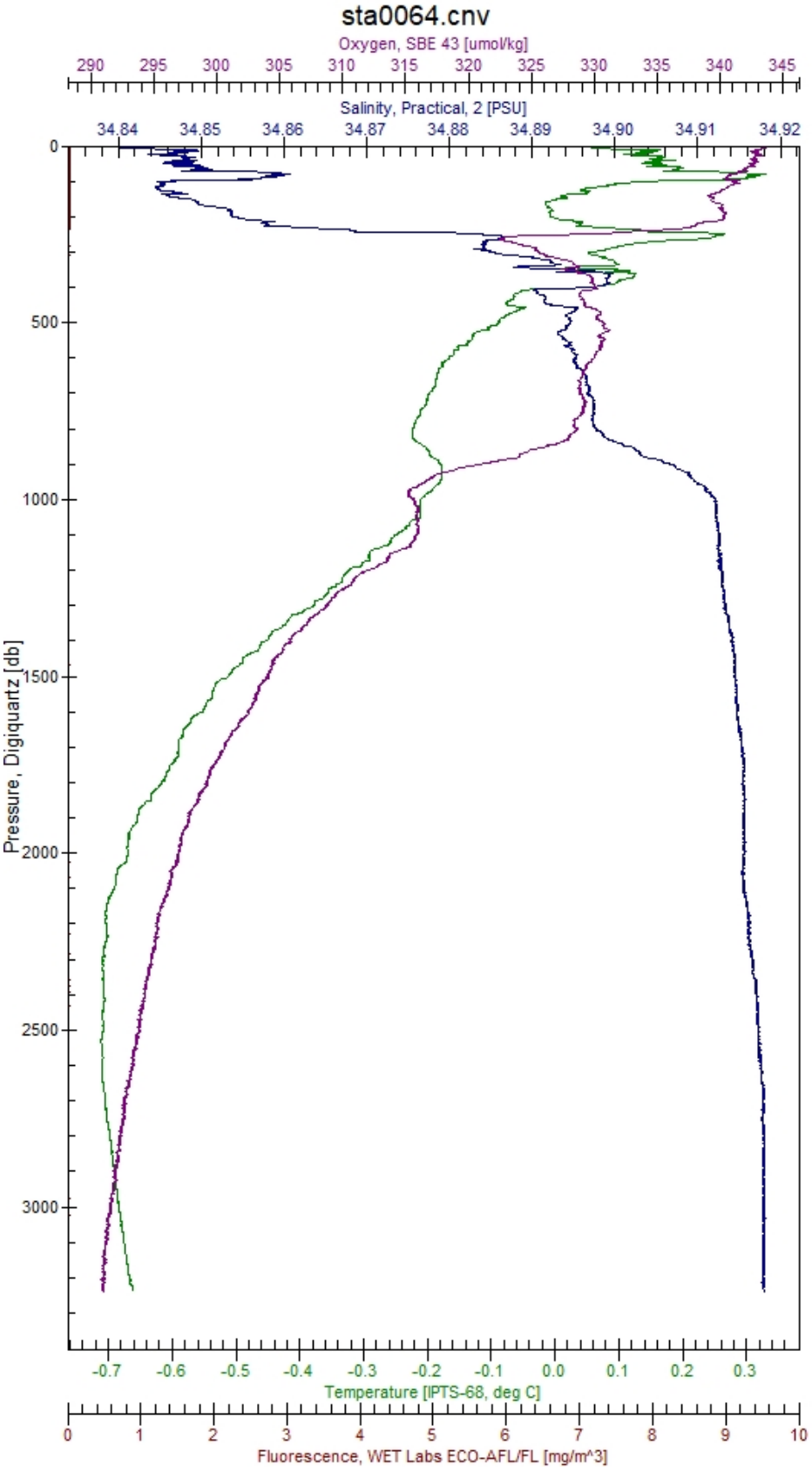
Figure 50: Lava feed structure on top of the structure.

Appendix A - CTD

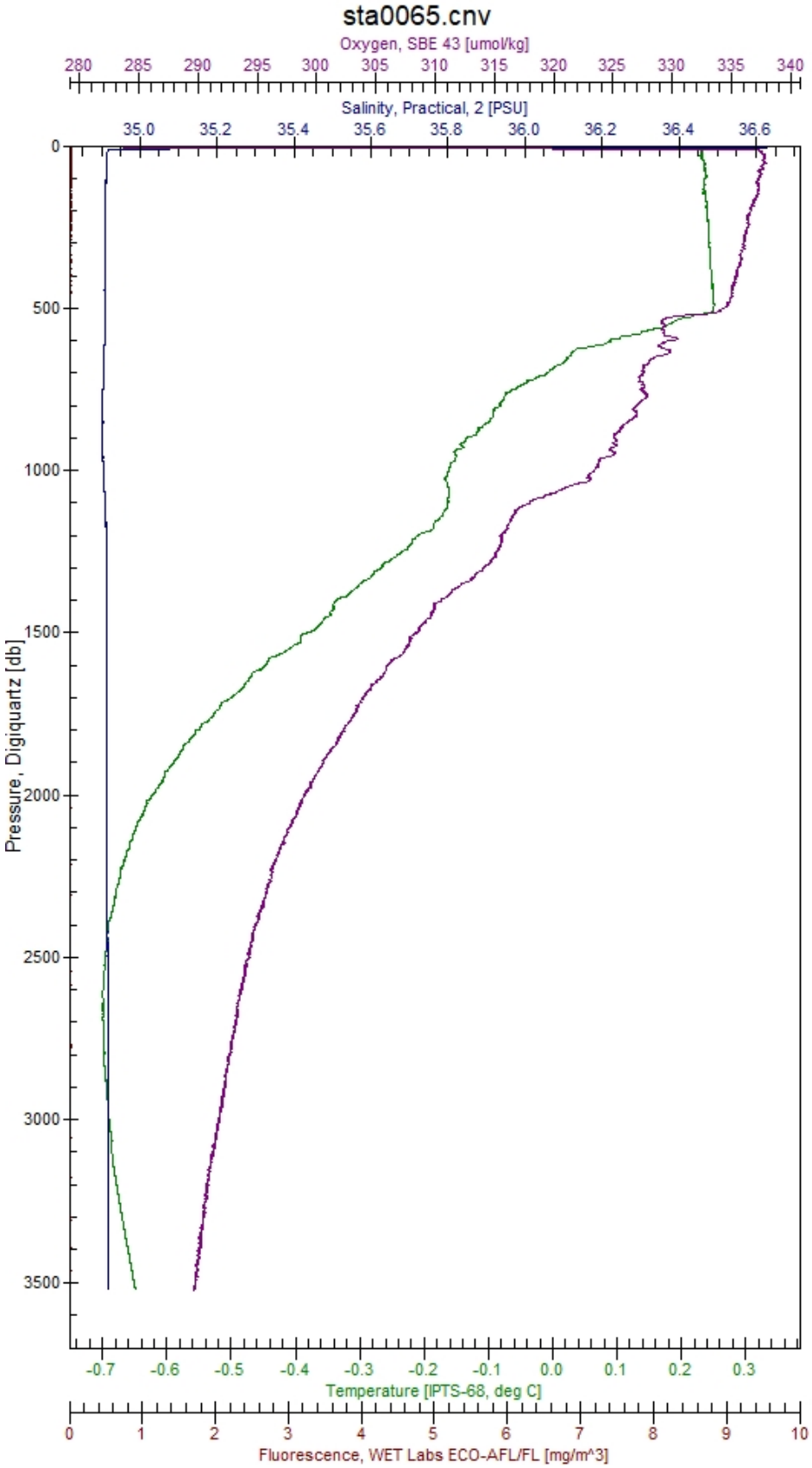
KH24-254-CTD1
72° 26.57’ N, 001° 56.98’ E
February 17, 2024, 09:47



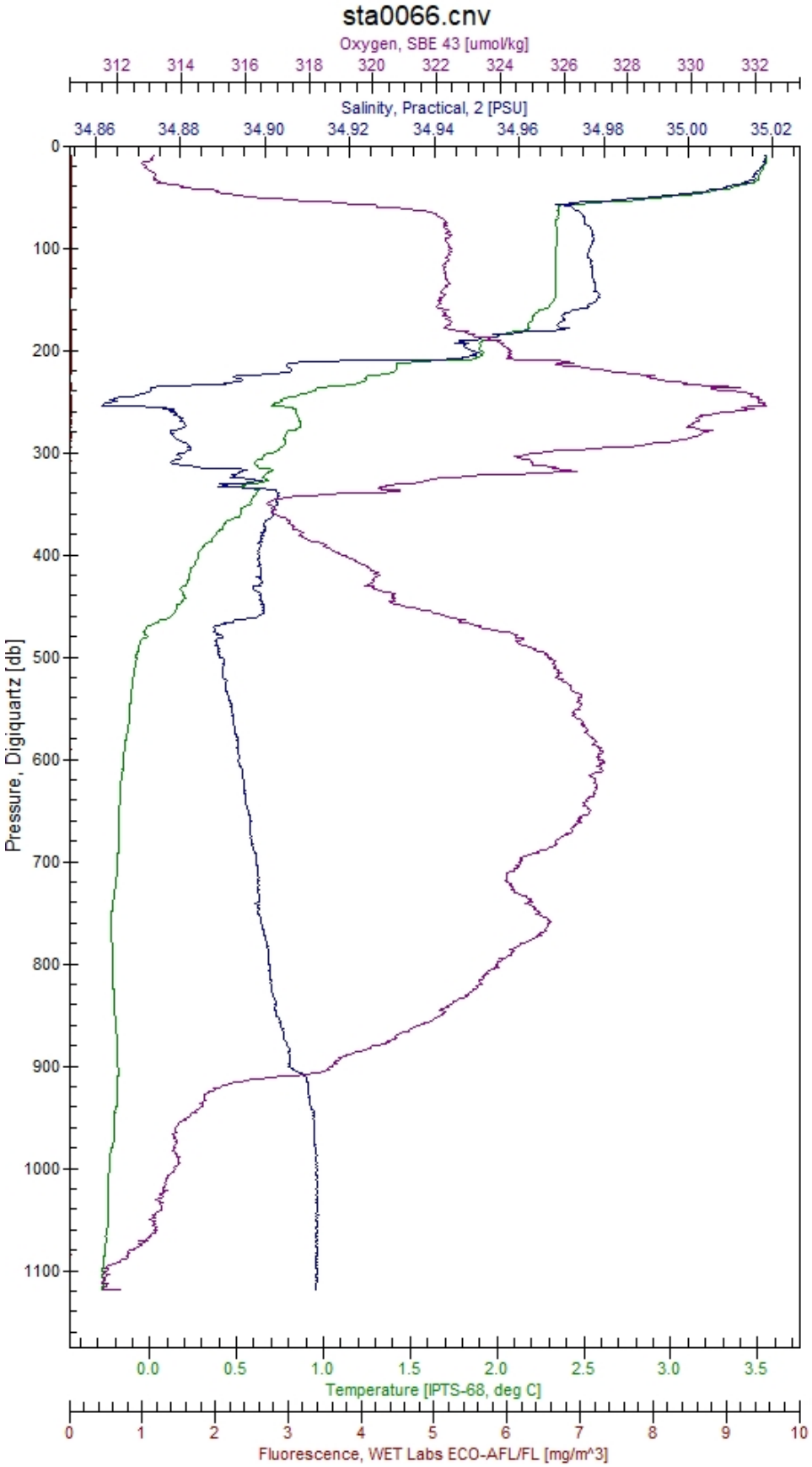
KH24-254-CTD2
73° 01.97’ N, 000° 59.46’ W
February 20, 2024, 21:03



KH24-254-CTD3
74° 12.82’ N, 004° 40.76’ W
February 21, 2024, 08:34



KH24-254-CTD4
72° 31.43’ N, 001° 29.99’ E
February 27, 2024, 12:09



Appendix B – Gravity Core

STATION	**GC01**	**KH24-254-GC01**

Date:	23.02.2024	UTC time:	On deck, 16:45
Latitude:	73° 05.650' N	Longitude:	002° 39.086'W
Water depth:	3200 m	Location:	Western Mohns Ridge flank

Core number:	GC01	Core Barrel length:	600 cm
		Apparent penetration:	600 cm
		Core length:	541 cm

Observations:		
Total No of section: 4		
Box No:	Labelling	Length:
1	KH24-254-GC01 – SEC1	150 (134 with sediments)
1	KH24-254-GC01 – SEC2	150
1	KH24-254-GC01 – SEC3	150
1	KH24-254-GC01 – SEC4	108
Weather report: Quite windy		

Done on the boat with the core:
Labeled, sealed, and cut into sections. Oxygen measurements at 3, 5, 10 and further every 10 cm down to 140 cm. Sediment samples for microbiology at varying depths in between Rhizon pore water samples. Rhizons pore water 3, 5, 10, then every 10 cm down to 150 cm, then every 30 cm throughout the core Winch speed into the sediments: 0.2 m/s

Appendix C - ROV log

ROV LOG - Centre for Deep Sea Research
KH24-254 2024/254 HI toktnummer: 2024007017

*Needs sawing in Bergen before shipping to SODIR

Dive Name	Syst. Dive #	Date	Time (UTC)	Lat(°dec)	Lon(°dec)	Depth (m)	Sample ID	Sample ID (NOD)	Comments and observations
ROV01	727	17.02.2024	17:15						ROV launched
ROV01	727	17.02.2024	18:40						ROV out of TMS
ROV01	727	17.02.2024	18:43	72.5237	1.4940	1073			Seafloor visible, lots of sponges
ROV01	727	17.02.2024	18:50	72.5236	1.4934	1084	KH24-254-ROV01-R01	NOD2024-1-1-1	Torn out, porous outer layer. Possibly porous inside - could also be hard. Take it out with Frankenstein. Red and somewhat grey color
ROV01	727	17.02.2024	18:56						Moving towards the slope, northward ish. Some shrimps
ROV01	727	17.02.2024	19:05	72.5247	1.4935				4K still photo of biology
ROV01	727	17.02.2024	19:12	72.5247	1.4935				Trying to take a sample of gastropod, not possible
ROV01	727	17.02.2024	19:13	72.5247	1.4936	1084			4K video - of soft corals, end still photos
ROV01	727	17.02.2024	19:16	72.5247	1.4936				Trying to take a sample of soft corals, but fails
ROV01	727	17.02.2024	19:18						Manages to grab soft coral with claw - in left drawer
ROV01	727	17.02.2024	19:21						Snails - looks like those found in hydrothermal vents
ROV01	727	17.02.2024	19:22						4K video - squid, finger-like sponge, starfish, sea spider
ROV01	727	17.02.2024	19:33	72.5247	1.4928	1108			Sawing (with new blade!). Brown-reddish-orange area
ROV01	727	17.02.2024	19:43	72.5247	1.4927	1108			Trying to saw again, close to the first sawing area. Difficult to saw. Might be manganese crust
ROV01	727	17.02.2024	19:48	72.5247	1.4927	1108			Sawing again, taking a sample. Difficult to saw - hard rock. Black manganese layer, white layer, reddish layer, something dark inside - very hard
ROV01	727	17.02.2024	19:58						Tried to break off piece
ROV01	727	17.02.2024	20:01	72.5247	1.4928	1108	KH24-254-ROV01-R02	Not recovered	NOT RECOVERED SAMPLE. Go back to first sawing area, breaking of a piece.
ROV01	727	17.02.2024	20:04	72.5246	1.4927	1107			Breaking of a huge piece to look inside. Thick layers - orange and red in color, sand, some black thin layers. Also some dark colored pieces
ROV01	727	17.02.2024	20:15	72.5246	1.4927	1107			Tried to saw off a piece of huge rock sample.
ROV01	727	17.02.2024	20:22	72.5246	1.4926	1110	KH24-254-ROV01-R03	NOD2024-1-1-6	Picking up sample RO3 from huge piece which fell off the slope. Put in TMS drawer.
ROV01	727	17.02.2024	20:51	72.5248	1.4932	1098	KH24-254-ROV01-R04	NOD2024-1-1-3	Clearly red rock. Yellow rim and gray inside. Shiny blue/gray.
ROV01	727	17.02.2024	20:54	72.5248	1.4931	1100	KH24-254-ROV01-R05	NOD2024-1-1-7*	Bigger piece of R04-sample. Shiny gray. Good rock sample. Put in TMS drawer, upper right.
ROV01	727	17.02.2024	21:15	72.5252	1.4959	1115			Trying to scratch and observe dark rock. No interesting findings.
ROV01	727	17.02.2024	21:17	72.5252	1.4959	1113	KH24-254-ROV01-R06	NOD2024-1-1-4	New sample found
ROV01	727	17.02.2024	21:21						4K video - Biology
ROV01	727	17.02.2024	21:24	72.5251	1.4966	1123			Trying to break off a rock sample with Atlas. Did not break off. Failed second try with saw. Orange layer when sawing like samples before.
ROV01	727	17.02.2024	21:42	72.5249	1.4978	1133			Following mound features/structures around the NE part of the hill. Lots of sponges and marine life along with hard mount features. Same rock features as samples before.
ROV01	727	17.02.2024	21:49	72.5248	1.4978	1133			Broke off a sample of the hard rock by using Atlas. Good rock size. Lost it during pick up.
ROV01	727	17.02.2024	21:56	72.5248	1.4978	1133			Searching around for a sample to break of, will try to recover the lost sample from cell above
ROV01	727	17.02.2024	22:00	72.4249	1.4979	1136			Very porous material when trying to break of piece.
ROV01	727	17.02.2024	22:01	72.4249	1.4979	1136	KH24-254-ROV01-R07	NOD2024-1-1-11	Got a sample that broke of a larger rock, the original rock was flat and large

ROV01	727	17.02.2024	22:03	72.5248	1.4982	1136			Continue move along the mound structures, very large and round mounds, all seeming very hard and difficult to break pieces off from. All mounds have extensive amount of sponges
ROV01	727	17.02.2024	22:06	72.5245	1.4984	1133			Slope areas with potential mass wasting seen by traces of avalanches
ROV01	727	17.02.2024	22:07	72.5245	1.4984	1133			Sponges are grouped in colonies, seen in many types of sponges and sponge-like organisms
ROV01	727	17.02.2024	22:09	72.5246	1.4988	1139			Larger area with no mounds sticking out visible
ROV01	727	17.02.2024	22:11	72.5246	1.4988	1141			Picked up a round rock to look at it, potential manganese crust on upper, darker side. But when turning around it looked like a granite, rock was discarded
ROV01	727	17.02.2024	22:16	72.5245	1.4987	1140	KH24-254-ROV01-R08		Rock that was loose underneath a solid structure. Red-orange color and a bit round.
ROV01	727	17.02.2024	22:19	72.5244	1.4987	1137	KH24-254-ROV01-R09	NOD2024-1-1-10	Also loose rock but looked like it had broken off larger piece with mounds.
ROV01	727	17.02.2024	22:21	72.5244	1.4989	1140			Moving upwards a slope with many mounds, one larger chimney-like structure. Trying to sample, visible red material appears when scratching
ROV01	727	17.02.2024	22:28	72.5244	1.4989	1140			Flying around the chimney structure, just taking regular HD video to show the structure.
ROV01	727	17.02.2024	22:30	72.5243	1.4987	1136			Attempt to break of piece, just resulted in a lot of red "smoke" coming, indicating very oxidized material
ROV01	727	17.02.2024	22:34	72.5243	1.4980	1125			Slope with many mound structures poking out, several looks promising for sampling. No success
ROV01	727	17.02.2024	22:43	72.5236	1.4981	1119	KH24-254-ROV01-R10	NOD2024-1-1-5	Picking up a lose piece
ROV01	727	17.02.2024	22:50	72.5232	1.4988	1131	KH24-254-ROV01-R11	NOD2024-1-1-8	Picking up a semi-lose piece
ROV01	727	17.02.2024	22:57	72.5232	1.4982	1120			Area with major abundance of loose rocks and sediments. Major occurrence of sediments. Little sign of marine life.
ROV01	727	17.02.2024	23:02	72.5235	1.4953	1083			Slope area with more occurrence of hard rocks and sponges.
ROV01	727	17.02.2024	23:08	72.5239	1.4947	1064	KH24-254-ROV01-R12	NOD2024-1-1-9	Area of interest as sample areas before. Hard rock structure with upper areas of brittle rock. Rock sample taken. Biological life: fish, sponges and starfish.
ROV01	727	17.02.2024	23:17	72.5241	1.4944	1059			Tracks from flexicore and area around borehole found.
ROV01	727	17.02.2024	23:36	72.5243	1.4947	1065			Push core sample (4). Unsuccessful. About 10 cm of sediment layer. Trying to find another spot 100 m north.
ROV01	727	17.02.2024	23:47	72.5251	1.4948	1111			New spot was not ideal for a push core sample (4). About 10 cm of sediment layer. New spot 50 m west from this position.
ROV01	727	17.02.2024	23:50	72.5251	1.4928	1133	KH24-254-ROV01-PC01		Successful push core (4) sample taken. Thick layer of sediments, most likely the thickness of the push core. More resistance at the end. Lost some of the sediments while sampling.
ROV01	727	18.02.2024	00:01						Some of the sample fell out in the TMS holder
ROV01	727	18.02.2024	00:09	72.5249	1.4921		KH24-254-ROV01-PC02		Push core sample (J/C). Got half a meter down in the sediments. Some of the sample fell out on the way to the TMS holder. Not sure if there is anything in it. The strap broke and might not hold the sample in the holder.
ROV01	727	18.02.2024	00:19	72.5250	1.4918		KH24-254-ROV01-PC03		Push core sample (B). Top layer may be disturbed
ROV01	727	18.02.2024	00:27	72.5251	1.4919	1136	KH24-254-ROV01-PC04		Push core sample (I). Not too deep, maybe 20-30 cm. Some (or all) fell out on the way to the TMS holder
ROV01	727	18.02.2024	00:34						Start transit to recover ADCP
ROV01	727	18.02.2024	01:55	72.5154	1.4857	1133			Found the ADCP and picked it up
ROV01	727	18.02.2024	01:57	72,5153	1,4855	1119			ROV ascending
ROV01	727	18.02.2024	02:45			0			ROV on deck

ROV02	728	18.02.2024	09:17						ROV launched
ROV02	728	18.02.2024	10:00						ROV out of TMS
ROV02	728	18.02.2024	10:05	72.5153		1.4856	1130		Seafloor visible
ROV02	728	18.02.2024	10:09	72.5153		1.4856	1133		ADCP placed back, 4K still photo taken.
ROV02	728	18.02.2024	10:15						Back to TMS, moving to Deep Insight Hill
ROV02	728	18.02.2024	11:17	72.5237	1.4932		1083		Seafloor visible
ROV02	728	18.02.2024	11:24	72.5237	1.4933		1080		Beginning with suction sampler
ROV02	728	18.02.2024	11:26	72.5237	1.4933		1080		Suction sampler, chamber 1
ROV02	728	18.02.2024	11:40	72.5237	1.4932		1080		Changing chamber to nr. 2
ROV02	728	18.02.2024	11:49	72.5240	1.4933		1070		Moving to a place to take rock samples
ROV02	728	18.02.2024	11:56				1072		Moving on the western side of the hill, most of rocks/flakes looks weathered
ROV02	728	18.02.2024	11:59	72.5240	1.4933		1075		Trying to saw
ROV02	728	18.02.2024	12:09	72.5241	1.4933		1074		Try to pick up one small sample from the sawing
ROV02	728	18.02.2024	12:11	72.5241	1.4933		1074	KH24-254-ROV02-R01	NOD2024-1-2-5 From the same formation that we tried to saw.
ROV02	728	18.02.2024	12:14	72.5241	1.4933		1074		Digging into the place that we were sawing in, very porous and yellow
ROV02	728	18.02.2024	12:18	72.5241	1.4933		1074		Try to pick out a larger rock from where we were sawing, but it just cracks
ROV02	728	18.02.2024	12:19	72.5241	1.4933		1074	KH24-254-ROV02-R02	NOD2024-1-2-6 Managed to get a smaller piece from the original rock (key sample)
ROV02	728	18.02.2024	12:25	72.5240	1.4933		1075		Trying again to pick out the big piece of sample 2.
ROV02	728	18.02.2024	12:30	72.5236	1.4927		1063	KH24-254-ROV02-R02	Managed to get the larger rock of sample 2 to the drawer, on second try (key sample). Fragile, weathered, big, covered in manganese crust and tubeworms
ROV02	728	18.02.2024	12:39	72.5237	1.4928		990		Laying the R02b sample in the TMS basket (because of the size)
ROV02	728	18.02.2024	12:45	71.5241	1.4932		1069		Seafloor visible again.
ROV02	728	18.02.2024	12:50	72.5240	1.4933		1075		Going back to the same place, to try to dig in the same area.
ROV02	728	18.02.2024	12:52						4K video of the area where we did sawing and digging, 4K still picture
ROV02	728	18.02.2024	12:57	72.5240	1.4933		1075		Start digging in the R02-sample-area.
ROV02	728	18.02.2024	12:59	72.5240	1.4933		1074		Hard material under the second sample, yellow-brownish
ROV02	728	18.02.2024	13:01						4K still picture - vein that goes up towards the left, very yellow-white ish color
ROV02	728	18.02.2024	13:03	72.5240	1.4933				A fish swimming and hiding in our rock samples.
ROV02	728	18.02.2024	13:04	72.5240	1.4933		1075	KH24-254-ROV02-R03	The third sample is from right under where we were digging.
ROV02	728	18.02.2024	13:07	72.5240	1.4933		1074	KH24-254-ROV02-R04	The fourth sample is stratigraphically under the earlier samples.
ROV02	728	18.02.2024	13:10						Moving against northwest (330 degrees), for 300-400 m
ROV02	728	18.02.2024	13:17	72.52469688	1.49118374		1124		Stopped by area with shells and sea stars, sedimented
ROV02	728	18.02.2024	13:24	72.52469577	1.49117107		1124		Vacuuming shells and sea stars into chamber 3
ROV02	728	18.02.2024	13:32						Continue further to wanted area
ROV02	728	18.02.2024	13:45	72.52529977	1.49026558		1132		Looking at marks on the sedimented seafloor, from DeepInsight23-expedition
ROV02	728	18.02.2024	13:47						Seaspider (?)
ROV02	728	18.02.2024	13:55	72.52658215	1.48690108				Changing direction, 300m 312 degrees
ROV02	728	18.02.2024	13:57						At top of mount , moving towards the flank
ROV02	728	18.02.2024	14:02	72.52692705	1.48528403		1118		4K pictures of grazing(?) structure on seafloor
ROV02	728	18.02.2024	14:09	72.527272889	1.48351926		1132		Reaching rocky area with sponges, looking for spot to sample rock
ROV02	728	18.02.2024	14:13	72.5272	1.4835322		1134		On top or side of ridge.
ROV02	728	19.02.2024	14:20	72.5273	1.4834		1153		Get ready the saw. Sawing through some pillow basalt (?), relatively easy to saw through
ROV02	728	20.02.2024	14:32	72.5272	1.4834		1135	KH24-254-ROV02-R05	Managed to separate sample R05 from ground with the saw (key sample). Brown, red, orange, weathered basalt.

ROV02	728	21.02.2024	14:37							4K video - of the weathered basalt and 4K still photo.
ROV02	728	22.02.2024	14:40	72.5273	1.4833		1136			Try to pick up one or two of the sea coral-thing
ROV02	728	23.02.2024	14:45							Start moving to a taller structure. 317 degrees, 130 m
ROV02	728	24.02.2024	15:01	72.5282	1.4809		1148			A weird black angular thing on the bottom. Tried to grab it, but it was stuck. Most likely a rock
ROV02	728	25.02.2024	15:06	72.5285	1.4800		1140			Moving 60 m north
ROV02	728	18.02.2024	15:23	72.5291	1, 4774	1070.55				4K video started - white sponge/plant
ROV02	728	18.02.2024	15:23	72.5291	1,4775	1070.55				4K video stopped
ROV02	728	18.02.2024	15:34	72.5291	1,4749	1058.53				Arriving on the top of the ridge
ROV02	728	18.02.2024	15:48	72.5286	1,4744	1065.73				Following the right side on the ridge
ROV02	728	18.02.2024	15:50	72.5286	1,4741	1066.87		KH-24-254-ROV02-R06		Sample R06, loose object, picked up
ROV02	728	18.02.2024	15:59	72.5285	1,4725	1077.96				Moving south west, following the top of the ridge
ROV02	728	18.02.2024	16:04	72.5283	1,4721	1088.61				Shift change
ROV02	728	18.02.2024	17:49	72,5191	1,4381		1121			Continuing dive, following curved structure
ROV02	728	18.02.2024	13:12	72,5197	1,4386		1163			Approx. 30 degree slope
ROV02	728	18.02.2024	17:57	72.5197		1.4387	1164	KH24-254-ROV02-R07	NOD2024-1-2-4	Loose rock sample. Sharp edges, red layer and mostly black.
ROV02	728	18.02.2024	18:00	72.5196		1.4387	1154			Flying up the ridge from NW to SE.
ROV02	728	18.02.2024	18:03	72.5193		1.4384	1120			Flying along the top of the ridge along SW. Pillow lava-like structures.
ROV02	728	18.02.2024	18:05	72.5191		1.4381	1119			Picked up a rock piece which could be a drop stone.
ROV02	728	18.02.2024	18:06	72.5190		1.4382	1118			Moving the boat 50 m south. Descending to the south of the ridge. Loose rocks, varies in rock size, sharp edges, most in clusters.
ROV02	728	18.02.2024	18:13	72.5188		1.4382	1126	KH24-254-ROV02-R08	NOD2024-1-2-2	Debris from the ridge. Sharp edges. Less marine life; mainly sea sponges. Thin sediment layer covering hard clusters of dark rocks. Elongated rocks. Some biology on the rock sample.
ROV02	728	18.02.2024	18:16	72.5188		1.4381	1124	KH24-254-ROV02-R09	NOD2024-1-2-1	Picking up new rock sample. Hard to pick up, stuck to the surface. Some biology covering this rock sample. Elongated rock.
ROV02	728	18.02.2024	18:18	72.5188		1.4381	1124	KH24-254-ROV02-R10	NOD2024-1-2-3*	Triangle shaped rock. Darker in color then last sample. Picked up from a rock cluster surface.
ROV02	728	18.02.2024	18:20	72.5188		1.4381	1120			ROV ascending to the ship.
ROV03	729	18.02.2024	21:15	72,5350		2,1599	0			ROV off deck
ROV03	729	18.02.2024	22:23	72,5349		2,16	1516			Visible seafloor, starting to explore and trying to identify the dredge trail
ROV03	729	18.02.2024	22:25	72,5349		2,1587	1528			Slope with sediment and scarce rocks spread out
ROV03	729	18.02.2024	22:29	72,5348		2,1602	1512			The slope looks very uniform with light and dark patterns, moving a bit toward north
ROV03	729	18.02.2024	22:33	72,5354		2,1598	1499	KH24-254-ROV03-R01		Collecting a rock sample that was in a larger pile of sharply edged rocks
ROV03	729	18.02.2024	22:36	72,5355		2,1604	1489	KH24-254-ROV03-R02	NOD2024-1-3-7	Rocks of crushed basaltic pillows, found a very large round pillow with crushed "shell" collected a sample from this
ROV03	729	18.02.2024	22:38	72,5358		2,1599	1486			Larger blocks of potential basalt visible in slope
ROV03	729	18.02.2024	22:40	72,5358		2,1605	1476			Another large pillow structure, seems very brittle
ROV03	729	18.02.2024	22:41	72,5358		2,1605	1476	KH24-254-ROV03-R03	NOD2024-1-3-3	Sampling from the pillow structure, a smaller piece
ROV03	729	18.02.2024	22:46	72,5363		2,1587	1479			Did potentially find the dredge trail
ROV03	729	18.02.2024	22:50	72,5363		2,1587	1479			Tried to scratch the trail like structure, seemed semi-solid, will follow it up the slope
ROV03	729	18.02.2024	22:59	72,5365		2,158	1458	KH24-254-ROV03-R04	NOD2024-1-3-4	Sampled a larger rock that looked like a potential weathered iron oxide. Two pieces.
ROV03	729	18.02.2024	23:05	72,5367		2,1575	1433			On a semi-top of a hill, a lava flow structure appeared, broke into it and it looks very oxidized

ROV03	729	18.02.2024	23:07	72,5367	2,1575	1433	KH24-254-ROV03-R05	NOD2024-1-3-5	Sampled the lava-flow structure mentioned above, very porous and broke in smaller pieces
ROV03	729	18.02.2024	23:11	72,5368	2,1573	1420	KH24-254-ROV03-R06	NOD2024-1-3-6	On a hill top where a layer poked out over the slope, we took a sample that was broken off, so a key sample
ROV03	729	18.02.2024							Depths written below with underline is potentially reported TMS depths and not ROV depths.
ROV03	729	18.02.2024	23:17	72.5371	2.1582	1415			Moving the boat and ROV towards east.
ROV03	729	18.02.2024	23:20	72.5373	2.1585	1415			Taking multiple 4K photos of the slope towards northwest.
ROV03	729	18.02.2024	23:23	72.5375	2.1585	1409			Flat polished surface of slope, breccia- like material further down the slope.
ROV03	729	18.02.2024	23:25	72.5377	2.1590	1351			Lots of rock fragments from a massive rockslide. Sharp edged and varies in grain size.
ROV03	729	18.02.2024	23:27	72.5378	2.1589	1352			Ascending towards the top of the rock avalanche source. At NNE direction 100 meters. Not much of a sediment cover over the rock fragments.
ROV03	729	18.02.2024	23:30	72.5379	2.1585	1330			More sediment cover further up. Covering solid rock with fissures.
ROV03	729	18.02.2024	23:32	72.5380	2.1583	1330			Found a unique red rock with xenolith-like structure. Most likely biological a biological organism. 4K pictures taken.
ROV03	729	18.02.2024	23:36	72.5381	2.1583	1330			Ripped off a small sample of the unique red rock. Brittle behavior.
ROV03	729	18.02.2024	23:39	72.5381	2.1583	1330	KH24-254-ROV03-R07	NOD2024-1-3-1	Orange red sample taken. The red mineral lays like a layer in the rock at this area.
RoV03	729	18.02.2024	23:43	72.5383	2.1587	1330			Ascending towards NNW part of the slope. Vertical walls of basalt fragments.
ROV03	729	18.02.2024	23:46	72.5385	2.1590	1331			Slope with black rock fragments.
ROV03	729	18.02.2024	23:48	72.5386	2.1591	1330			Sharp contact between solid vertical basalt wall and sediments. Steep wall. Scratched on the wall; red color.
ROV03	729	18.02.2024	23:51	72.5387	2.1592	1330			4K pictures taken of the wall.
ROV03	729	18.02.2024	23:54	72.5387	2.1592	1318			Possible fault fracture sones with fragments. Clear lines upwards towards NNE.
ROV03	729	18.02.2024	23:57	72.5388	2.1591	1310			Ascending towards west. Clear structures/lines towards NNE.
ROV03	729	19.02.2024	00:01	72.5388	2.1587	1311			Little sign of marine life. Some shrimps.
ROV03	729	19.02.2024	00:02	72.5389	2.1583	1291			Ascending and moving NNE
ROV03	729	19.02.2024	00:11	72.5390	2.1575	1291	KH24-254-ROV03-R08	NOD2024-1-3-10	Trying to break off a piece from a large boulder lying in the slope. Looks weathered, but is also quite solid. Gets a piece with the Atlas. Small piece breaks off and falls into the left drawer
ROV03	729	19.02.2024	00:20	72.5392	2.1577	1290			Keep moving toward the end point of the dredge coordinates. Quite steep area of variably smooth surfaces and fragmented rocks
ROV03	729	19.02.2024	00:25	72.5395	2.1585	1304			Large boulder sized blocks with basalts sticking out
ROV03	729	19.02.2024	00:29	72.5396	2.1590	1306			A very sharp and tall structure sticking out, tried to sample but the material was extremely porous and fragile, looked brown red ish
ROV03	729	19.02.2024	00:31	72.5398	2.1591	1295			Many avalanche trails visible in the slopes, very small grain sizes in the trails
ROV03	729	19.02.2024	00:38	72.5401	2.1591	1267	KH24-254-ROV03-R09	NOD2024-1-3-9	Sampled from a pillow structure, a rock that was a little stuck but able to remove and pick up
ROV03	729	19.02.2024	00:42	72.5401	2.1588	1259			Continuing to move north west towards the waypoint, still a lot of basalt and light sediment coverage on flat surfaces
ROV03	729	19.02.2024	00:56	72.5408	2.1567	1118			On top of the "ridge" still no sign of the dredge after we lost it, moving east to an area with less basalt
ROV03	729	19.02.2024	00:58	72.5409	2.1575	1120			A large single pillow poking out, trying to sample it by breaking of a piece with the atlas
ROV03	729	19.02.2024	01:02	72.5409	2.1575	1120	KH24-254-ROV03-R10	NOD2024-1-3-2	Sampling successful from the large pillow
ROV03	729	19.02.2024	01:09	72.5414	2.1586	1118			Approaching the end of the dredge, no trace of any dredge tracks

ROV03	729	19.02.2024	01:16	72.5415	2.1587	1113			At the end point. A wide area of only sediments that ends at the end point
ROV03	729	19.02.2024	01:24	72.5414	2.1595	1140			Reaching a near vertical outcrop
ROV03	729	19.02.2024	01:28	72.5412	2.1579	1111			Cannot find anything that resembles a dredge track after circling the end point. Deciding to continue up the feature beyond where the dredge ended
ROV03	729	19.02.2024	01:33	72.5418	2.1580	1094			Flying over an area of avalanched rocks and then reaching a flatter sedimented area
ROV03	729	19.02.2024	01:37	72.5420	2.1567	1081			Reaching some larger rocks sticking out from sediment, trying to sample a larger piece
ROV03	729	19.02.2024	01:39	72.5420	2.1567	1081	KH24-254-ROV03-R11		Got a large, sub angular sample put in right drawer
ROV03	729	19.02.2024	01:41	72.5421	2.1564	1062			More biology visible on the rocks, many different species growing in proximity to each other
ROV03	729	19.02.2024	01:43	72.5422	2.1560	1051			Moving along a ridge like structure with a lot of life, looks like it flattens out a bit, with a more even distribution of smaller rocks. On the slope sides, the sediment is more free of rocks indicating mass wasting.
ROV03	729	19.02.2024	01:51	72.5425	2.1539	995			Approaching a top with very steep sides and a lot of biology. Trying to break of a piece of a rock structure poking out.
ROV03	729	19.02.2024	01:53	72.5425	2.1539	995	KH24-254-ROV03-R12	NOD2024-1-3-8	Successful sampling of the structure, an elongated sample put in left drawer
ROV03	729	19.02.2024	01:57	72.5424	2.1528	994			Taking 4K pictures of a structures with very steep slopes on the sides
ROV03	729	19.02.2024	02:05	72.5430	2.1531	925			Ascending slope.
ROV03	729	19.02.2024	02:09	72.5432	2.1528	919	KH24-254-ROV03-R13		Picking up rock sample with biological mats
ROV03	729	19.02.2024	02:15	72.5432	2.1524	914			Flying 100m NE. Biological "Grass mats".
ROV03	729	19.02.2024	02:17	72.5434	2.1518	904			Lots of starfish. Biological "Ocean floor mats".
ROV03	729	19.02.2024	02:20	72.5435	2.1514	904			Flat sea floor with no rising slope. No sign of life. ROV turning to NW.
ROV03	729	19.02.2024	02:23	72.5439	2.1513	904			Wavey sand structure. With lots of shells.
ROV03	729	19.02.2024	02:24	72.5439	2.1512	950			4K video
ROV03	729	19.02.2024	02:26	72.5440	2.1511	903			Sheet flow
ROV03	729	19.02.2024	02:27	72.5440	2.1511	904			Tried to pick up a rock sample, no success. Plateau like structures around in the area.
ROV03	729	19.02.2024	02:30	72.5442	2.1518	904			Turning around again. Flying over the shells. Descending to dredge stop.
ROV03	729	19.02.2024	02:33	72.5438	2.1540	904			Descending the steep slope to dredge stop.
ROV03	729	19.02.2024	02:36	72.5438	2.1547	911			Rock slide area. Further down more sediments or sediment cover.
ROV03	729	19.02.2024	02:41	72.5437	2.1559	931			Still descending down. Area with sediment cover.
ROV03	729	19.02.2024	02:44	72.5435	2.1568	939			New area with clusters of shells
ROV03	729	19.02.2024	02:45	72.5434	2.1573	939			New steep slope with edged rocks. About 50 degree incline. Sea sponges and shrimps.
ROV03	729	19.02.2024	02:50	72.5433	2.1588	960			Moving the ship 50 m east. Less rock fragments.
ROV03	729	19.02.2024	02:51	72.5432	2.1589	1076			Depths written above with underline is potentially reported TMS depths and not ROV depths.
ROV03	729	19.02.2024	03:01	72.5423	2.1608	1133			Choosing a new ROV transect or route. Moving the ROV to the last starting point to do another transect upwards.
ROV03	729	19.02.2024	04:26	72.5350	2.1601	1510			Starting at the start again to look for tracks.
ROV03	729	19.02.2024	04:42	72.5357	2.1626	1470			Small basalt boulders almost everywhere near the bottom of the structure.
ROV03	729	19.02.2024	04:55						Dumbo spotted
ROV03	729	19.02.2024	04:58	72.1621	2.1620	1444			Moving the boat 200m north
ROV03	729	19.02.2024	05:01	72.5369	2.1608	1445			No boulders, sediment covered, a lot of shells from worms (dark spots)

ROV03	729	19.02.2024	05:04	72.5371	2.1608	1433			Seeing bigger boulders again, looks like solid rock
ROV03	729	19.02.2024							Alternating between smaller boulders and sediment in the area along the transit
ROV03	729	19.02.2024	05:11	72.5377	2.5159	1406			Lots of smaller boulders again, well sorted and the same sizes, avalanche material
ROV03	729	19.02.2024	05:16	72.5384	2.1593	1380			Very steep, part of hill, a lot of basalt and boulders
ROV03	729	19.02.2024	05:26	72.5394	2.1611	1347			Very steep, ca. 10 m altitude from ROV
ROV03	729	19.02.2024	05:28	72.5396	2.1613	1318			Looking straight into the mountain, no sediments, basalt structures might be sheet flows
ROV03	729	19.02.2024	05:35	72.5401	2.1604	1242			Still very steep, a thin layer of sediments over the basalt, flat surface
ROV03	729	19.02.2024	05:36	72.5401	2.1603	1240			Ending dive, going up
ROV03	729	19.02.2024	06:23						ROV on deck
ROV04	730	19.02.2024	09:00						ROV launched
ROV04	730	19.02.2024	09:57	72.5104	1.9365	1754			On seafloor
ROV04	730	19.02.2024	10:00						Moving down to the bottom of the slope
ROV04	730	19.02.2024	10:01	72.5101	1.9364	1770			Avalanche structure, talus
ROV04	730	19.02.2024	10:02	72.5101	1.9364	1771	KH24-254-ROV04-R01	NOD2024-1-4-8	Picking up the first sample, a small sponge on it.
ROV04	730	19.02.2024	10:06	72.5103	1.9362	1762			Moving upwards, seeing big rocks and talus fan in the edge of avalanche
ROV04	730	19.02.2024	10:08	72.5104	1.9362	1758	KH24-254-ROV04-R02	NOD2024-1-4-7 *	Second sample, from a relatively steep area
ROV04	730	19.02.2024	10:13	72.5105	1.9363	1750			4K video - 4K still picture of a rock with white sponges (bio)
ROV04	730	19.02.2024	10:17	72.5105	1.9362	1750	KH24-254-ROV04-R03	NOD2024-1-4-6 *	Third sample taken from avalanche-material
ROV04	730	19.02.2024	10:19						Continuing upwards
ROV04	730	19.02.2024	10:20	72.5105	1.9363	1746			4K still photo taken
ROV04	730	19.02.2024	10:23	72.5106	1.9364	1737			4K still photo taken (bio)
ROV04	730	19.02.2024	10:25	72.5106	1.9364	1733			Seeing a more angular structure appearing out from the steep slope. Using the T4 to see if it is weathered, which it was.
ROV04	730	19.02.2024	10:28	72.5106	1.9364	1726			Looks like a lot of avalanche material, with big rocks covered in a lot of sponges and biological stuff
ROV04	730	19.02.2024	10:32	72.5107	1.9364	1717	KH24-254-ROV04-R04	NOD2024-1-4-5	Fourth sample, taken from a massive rock. Could be an avalanche boulder.
ROV04	730	19.02.2024	10:35	72.5107	1.9365	1713	KH24-254-ROV04-R05	NOD2024-1-4-4	Fifth sample. Looks like a basalt.
ROV04	730	19.02.2024	10:37	72.5107	1.9365	1714	KH24-254-ROV04-R06	NOD2024-1-4-3	Sixth sample, ca. 1 m below sample number five. yellow/brown ish. Avalanche deposits
ROV04	730	19.02.2024	10:44	72.5107	1.9365	1712	KH24-254-ROV04-R07	NOD2024-1-4-2	Managing to crack off a sample from a bigger boulder, missed it behind the rock. Not sure if it is the rock we ended up with, but it looked similar.
ROV04	730	19.02.2024	10:49	72.5107	1.9366	1700	KH24-254-ROV04-R08	NOD2024-1-4-1	Sample a small rock, could just pick it up, from the top of a pillow basalt?
ROV04	730	19.02.2024	10:51						Continuing upwards
ROV04	730	19.02.2024	10:56	72.5108	1.9363	1686			Looking around a rounded edge on the side of the mount.
ROV04	730	19.02.2024	10:59	72.5108	1.9365	1677			4K still photo (biology)
ROV04	730	19.02.2024	11:01	72.5108	1.9365	1678			4K still photo (biology)
ROV04	730	19.02.2024	11:10	72.5109	1.9366	1655	KH24-254-ROV04-R09		Looking at some subangular rocks with red color and some with manganese crust, collecting one of them, the hillside behind the sample has the color is brown/gold/rusty
ROV04	730	19.02.2024	11:14	72.5109	1.9367	1644			The hillside becomes more angular
ROV04	730	19.02.2024	11:21	72.5109	1.9369	1633	KH24-254-ROV04-R10		Collecting a sample, looks like a tractor has driven there. Collecting a sample beside that was a bit loose, tore it out. It is angular, a bit small, looks like it has some manganese crust, probably basalt
ROV04	730	19.02.2024	11:21						Continuing upwards

ROV04	730	19.02.2024	11:25	72.5110	1.9370	1622	KH24-254-ROV04-R11	Collecting a sample close to the top of the mount, a pillow basalt
ROV04	730	19.02.2024	11:26	72.5111	1.9372	1619		At top of the mount, it is relatively flat, sediment covered with some debris of angular rocks and some bigger rocks + biology
ROV04	730	19.02.2024	11:27	72.5111	1.9372	1617		4K photo taken of bottom fauna
ROV04	730	19.02.2024	11:29					Suction sampler of fauna, same location as 4K still photo (fauna), and moving a few meters ahead to collect more. Testing the suction ability of the suction sampler: trying to collect a purple anemone and a sea star. Conclusion: it is better then it was
ROV04	730	19.02.2024	11:44					Ending the test of the suction sampler. Happy with the result of its functioning
ROV04	730	19.02.2024	11:45					Continuing investigating the top of the hill, and the amount of sediment
ROV04	730	19.02.2024	11:48					Moving the boat 100 meter at 020 degrees
ROV04	730	19.02.2024	11:53	72.6114	1.9373	1605		Using suction sampler to try and collect an anemone and a branched, white coral (?). White branched coral is also sampled by ROV arms into left drawer
ROV04	730	19.02.2024	11:59	72.5115	1.9373	1605	KH24-254-ROV04-R12	Collecting rock with biology sample
ROV04	730	19.02.2024	12:01	72.5116	1.9374	1605		The flat area on top of the mount contains less rock, dominated by sediment
ROV04	730	19.02.2024	12:03	72.5118	1.9374	1607		4K video of a glowing purple squid
ROV04	730	19.02.2024	12:05					Ending 4K video of squid
ROV04	730	19.02.2024	12:07	72.5119	1.9375	1608		4K video of pink fish
ROV04	730	19.02.2024	12:07					Ending 4K video of fish, trying to take picture (got half of the fish)
ROV04	730	19.02.2024	12:10	72.5120	1.9376	1609		Moving boat 100 meter in 020 degree
ROV04	730	19.02.2024	12:11	72.5120	1.9376	1609		Observing a seapen
ROV04	730	19.02.2024	12:13	72.5120	1.9376	1610		4k video of see-through-purple jelly fish
ROV04	730	19.02.2024	12:14					Stopped 4k video of jelly fish
ROV04	730	19.02.2024	12:14	72.5121	1.9376			4K video of more jelly fishes
ROV04	730	19.02.2024	12:15	72.5121	1.9376			stopped and started a new 4K video of another jelly fish
ROV04	730	19.02.2024	12:16	72.5121	1.9376	1610		4K video stopped, and boat stopped
ROV04	730	19.02.2024	12:18	72.5120	1.9374			ROV leaving seafloor, coming up to boat
ROV04	730	19.02.2024	13:15			0		ROV back on deck
ROV05	731	19.02.2024	17:37			0		ROV off deck
ROV05	731	19.02.2024	18:50	72.4691	0.0977	2474		ROV hovering over sea surface
ROV05	731	19.02.2024	18:55	72.4691	0.0982	2476		Sand covered seabed. White starfish. Some sea pigs. Vacuuming up a sample of biological matter. Bioturbation on seafloor.
ROV05	731	19.02.2024	19:01	72.4693	0.0982	2380		Taking first biological sample of starfish, sponges and sea pigs (chamber 4).
ROV05	731	19.02.2024	19:12	72.4693	0.0982	2477		Picking up a new species in same chamber (4).
ROV05	731	19.02.2024	19:15	72.4694	0.0981	2473		Wrong coordinates, new alternative position 6 km for ROV research.
ROV05	731	19.02.2024	19:18	72.4695	0.0982	2477		4K picture taken
ROV05	731	19.02.2024	19:21	72.4694	0.0981	2431		Moving ROV 6-7 km west. Preparing the ROV for ascending to ship deck.
ROV05	731	19.02.2024	20:28			0		ROV on deck
ROV06	732	19.02.2024	21:02			0		ROV off deck
ROV06	732	19.02.2024	22:02	72.4691	-0.0980	2076		At seafloor
ROV06	732	19.02.2024	22:04	72.4692	-0.0982	2059		Moving up the slope, only sediments this far
ROV06	732	19.02.2024	22:11	72.4696	-0.0985	2018		Start 4K video of seafloor for biology, small holes in the sediment and a small animal living inside. 4K still photo also

ROV06	732	19.02.2024	22:18	72.4700	-0.099	2007			Still sedimented slope with plenty of the observed holes with small animal inside
ROV06	732	19.02.2024	22:33	72.4708	-0.1011	1957			The slope is still the same. The animals are likely polychaetas and all the small brown areas are likely faces (bioturbation). A few avalanched rocks appears - they are covered in sponges and anemones
ROV06	732	19.02.2024	22:51	72.4717	-0.1025	1890			Finally encounter a rock exposure. Many potato sponges
ROV06	732	19.02.2024	22:54	72.4717	-0.1026	1891			Trying to sample the exposure. Taking a 4K still photo of the rock exposed at the break. Looks like maybe a few cm of manganese crust around something quite orange
ROV06	732	19.02.2024	23:00	72.4717	-0.1026	1891	KH24-254-ROV06-R01	NOD2024-1-6-1	Sample the piece of crust that was broken off. Mostly crust, not a lot of bedrock
ROV06	732	19.02.2024	23:12	72.4722	-0.1030	1853			Approaching another outcrop with rocks sticking out, trying to sample bedrock together with crust, did not get one from here, potentially just a avalanche deposit
ROV06	732	19.02.2024	23:15	72.4722	-0.1032	1852			Tried to sample at another site just to the side of the previous one, but the only thing coming off was crust. Moving up the hill a bit more.
ROV06	732	19.02.2024	23:18	72.4724	-0.1034	1829			The slope is going back to being just sedimented with a lot of the worm holes seen earlier
ROV06	732	19.02.2024	23:22	72.4726	-0.1039	1813			Dotted pattern of worm holes.
ROV06	732	19.02.2024	23:26	72.4729	-0.1046	1791			Pile of rocks, trying to collect a rock sample. First attempt fails.
ROV06	732	19.02.2024	23:29	72.4729	-0.1046	1790			Found new spot ideal for collecting a rock sample
ROV06	732	19.02.2024	23:31	72.4729	-0.1046	1790			Too loose rock. Broke.
ROV06	732	19.02.2024	23:31	72.4729	-0.1046	1789			Too big sample.
ROV06	732	19.02.2024	23:32	72.4729	-0.1047	1787			Pile of rocks in clusters.
ROV06	732	19.02.2024	23:37	72.4730	-0.1048	1784			Too hard rock to sample without saw.
ROV06	732	19.02.2024	23:38	72.4730	-0.1046	1783			Trying to find new spots on the same slope.
ROV06	732	19.02.2024	23:42	72.4730	-0.1046	1771			Picking up a loose rock. Did not sample it. Fell down the slope
ROV06	732	19.02.2024	23:44	72.4731	-0.1046	1768	KH24-254-ROV06-R02	NOD2024-1-6-2	Collected a good sample medium in size.
ROV06	732	19.02.2024	23:47	72.4731	-0.1046	1762			Following a ridge and flying upwards. Found an interesting observation; avalanche fan or waist fan. Went with the ROV to check it out. Soft sediments.
ROV06	732	19.02.2024	23:49	72.4732	-0.1048	1752			Fling on top of ridge or avalanche ridge. Steep sites. Some sediments laying on top of the surface in clasts. Well edged rocks. Some mushroom like sponges.
ROV06	732	19.02.2024	23:52	72.4733	-0.1055	1735			Following a plane of sand. Structures poking out of the sand (possible lava structures).
ROV06	732	19.02.2024	23:55	72.4735	-0.1061	1714			Sediment rich area covering big surface areas with wormholes.
ROV06	732	19.02.2024	23:58	72.4736	-0.1064	1705			Still observing polychaetes at shallower depths and sediment major covered areas.
ROV06	732	20.02.2024	00:01	72.4738	-0.1068	1693			Flying over plains of sediments. Found a new outcrop of hard rocks. Steep angle
ROV06	732	20.02.2024	00:04	72.4740	-0.1068	1681			New semi top or ridge.
ROV06	732	20.02.2024	00:05	72.4740	-0.1069	1676			Big rock structure, lot of fans from sediment slide. Mass wasting.
ROV06	732	20.02.2024	00:08	72.4742	-0.1074	1659			Almost on the top of the dive location.
ROV06	732	20.02.2024	00:10	72.4743	-0.1075	1649			Arrived on the top of the big structure. Hard rock walls. Trying to find a new ideal spot for sampling.
ROV06	732	20.02.2024	00:14	72.4744	-0.1075	1636	KH24-254-ROV06-R03	NOD2024-1-6-3	Much marine life. Picked up a rock sample close to the top of the big structure (volcanic ridge).
ROV06	732	20.02.2024	00:21	72.4746	-0.1080	1618			Lots of sediments, still polychaetes

ROV06	732	20.02.2024	00:32	72.4749	-0.1105	1588		Moving towards northwest. Moving slowly with center camera facing down for bio survey
ROV06	732	20.02.2024	00:34	72.4749	-0.1111	1593		4K video (for bio)
ROV06	732	20.02.2024	00:36	72.4750	-0.1116	1597		Video ending
ROV06	732	20.02.2024	00:37	72.4750	-0.1117	1597		Going up to TMS to move to volcanic crater structure. 1200 m away
ROV06	732	20.02.2024	02:17	72.4789	-0.1456	1917		At seafloor on new location, only sediments here. Trying to follow a bathymetrical feature to see if we can find some rocks exposed
ROV06	732	20.02.2024	02:24	72.4795	-0.1473	1921		Taking 4K still image of bioturbation tracks on the sediment surface
ROV06	732	20.02.2024	02:30	72.4796	-0.1496	1943	KH24-254-ROV06-R04	Trying to sample a rock poking out from the sediments, very small exposure. Quite solidly attached so it is difficult. Contemplating bringing the saw out. Gets a quite small piece with the T4, but brings it because sampling is so difficult
ROV06	732	20.02.2024	02:39	72.4796	-0.1496	1944		Bringing out the saw to try and get a larger piece
ROV06	732	20.02.2024	02:46	72.4796	-0.1496	1944	KH24-254-ROV06-R05	A good sized piece breaks off after sawing for a bit. The inside looks very lightly colored. Taking a 4K still photo of the surface exposed
ROV06	732	20.02.2024	02:51	72.4796	-0.1496	1941		Moving straight into a fully sedimented and quite flat terrain
ROV06	732	20.02.2024	02:54	72.4797	-0.1507	1954		And then into a much steeper slope with some avalanched small rocks
ROV06	732	20.02.2024	02:55	72.4797	-0.1511	1958		Trying to sample an exposure. Overall looks a bit layered/crusted over. When breaking off a small piece a quite thick layer of manganese crust is exposed. Taking a 4K still photo. The lasers indicates that the crust is at least 4 cm thick (i.e. Been exposed for about 4 million years?)
ROV06	732	20.02.2024	03:09	72.4797	-0.1511	1958		Been trying to saw for a little while, the manganese crust cuts very easily but the underlying rock is quite hard
ROV06	732	20.02.2024	03:15	72.4797	-0.1511	1958		Taking 4K still images of the exposed cut (with and without lasers). The manganese crust looks to be more than 4 cm here
ROV06	732	20.02.2024	03:20	72.4797	-0.1511	1958		Trying a different cut as the previous one was difficult to get loose, this one was clearly an avalanched rock, the saw blade stopped immediately, indicating that there is little to no manganese crust
ROV06	732	20.02.2024	03:29	72.4797	-0.1515	1956		The exposed rocks in the area are very difficult to sample, but images of crusts have been taken, flying closer to the volcanic crater(?), approx. 300m away
ROV06	732	20.02.2024	03:57	72.4798	-0.1592	2098		Move complete, starting to climb the round volcanic structure. Seafloor is sediment covered with some waste material (smaller debris) and larger "caves" than last locality
ROV06	732	20.02.2024	03:59	72.4796	-0.1606	2085		Potentially a rock exposure, opposed to only avalanched material
ROV06	732	20.02.2024	04:02	72.4795	-0.1617	2066		Grabbing a rock to see if it is loose or not. Seems to be attached i.e. Potentially not avalanched. Also exposes thick manganese crust
ROV06	732	20.02.2024	04:05	72.4795	-0.1617	2067		Rocks here seem to be very solid, bringing out the saw to try and do a cut
ROV06	732	20.02.2024	04:14	72.4795	-0.1617	2067		Managed to cut through quite a bit, trying to break it off with the T4 now. The manganese crust looks much thinner here
ROV06	732	20.02.2024	04:19	72.4795	-0.1617	2067		Cannot even get it loose with the Atlas. Trying to cut more with the saw
ROV06	732	20.02.2024	04:27	72.4795	-0.1617	2067		Another attempt with the claw, another exposure is made while sawing, and this looks like it has a lot more manganese crust. Taking 4K photos of it to be able to compare.
ROV06	732	20.02.2024	04:33	72.4795	-0.1617	2067	KH24-254-ROV06-R06	Finally able to break it of using Frankenstein
ROV06	732	20.02.2024	04:36	72.4795	-0.1617	2067		Taking more 4K images, starting to move further up the slope
ROV06	732	20.02.2024	05:03	72.4786	-0.1637	1974		Moving upwards the hill, trying to find a good place to saw

ROV06	732	20.02.2024	05:08	72.4784	-0.1636	1964		When we got close to the top, its only sediment landscape, so we moving along the side
ROV06	732	20.02.2024	05:19	72.4784	-0.1623	1994	KH24-254-ROV06-R07	Rounded sample
ROV06	732	20.02.2024	05:21	72.4784	-0.1624	1995	KH24-254-ROV06-R08	Picking up a more angular sample (difficult to saw because of the terrain)
ROV06	732	20.02.2024	05:23					Continue moving sideways on the volcanic structure, steep and covered in sediments
ROV06	732	20.02.2024	05:30	72.4778	-0.1603	1984		Moving straight over the volcanic structure, since the terrain was flattening out on the southside
ROV06	732	20.02.2024	05:36	72.4781	-0.1650	1944		Reaching the top of the volcano, seeing more plants/corals in the crater
ROV06	732	20.02.2024	05:44	72.4790	-0.1650	1987		Reaching a very steep area with bedrock exposed
ROV06	732	20.02.2024	05:50	72.4791	-0.1648	1996	KH24-254-ROV06-R09	Managed to crack off a sample from the area, key sample
ROV06	732	20.02.2024	06:03	72.4791	-0.1650	1993		Trying to saw a piece off, to see the manganese crust, during sawing, crust is flaking off.
ROV06	732	20.02.2024	06:16	72.4791	-0.1650	1993	KH24-254-ROV06-R10	Managing to cut a piece off and also put it in the drawer, sample 10
ROV06	732	20.02.2024	06:21	72.4791	-0.1650	1993		4K video of manganese crust, 4K still picture
ROV06	732	20.02.2024	06:34	72.4791	-0.1650	1993	KH24-254-ROV06-R11	Trying to cut of a slab of the manganese crust from same locality as KH24-254-ROV06-R10. Very steep slope, so hard to find a position to cut. Taking 4K still photo of the new cut.
ROV06	732	20.02.2024	06:45	72.4791	-0.1652	1994		Taking 4K video of the rock sample R10 & 11 is taken from, from another angle, studying the manganese crusts thickness
ROV06	732	20.02.2024	06:49	72.4791	-0.1652	1995		Taking 4K pictures of the manganese crust on same "sample host rock"
ROV06	732	20.02.2024	06:51					ROV leaving seafloor
ROV06	732	20.02.2024	07:55					ROV on deck
ROV07	733	20.02.24	12:35					ROV off deck
ROV07	733	20.02.24	13:59			3142		ROV out of TMS
ROV07	733	20.02.24	14:03			3152		Showing TMS for livestream (Stoltenberg representing NORCE is watching)
ROV07	733	20.02.24	14:05	73.0438	-0.9987	3171		ROV on seafloor: sedimented, some anemones, sponges and shells, seeing some potential bio-mounds
ROV07	733	20.02.24	14:09	73.0439	-0.9985	3172	KH24-254-ROV07-PC1	Taking long push core, taking it up to TMS, retrieved into holder "E", let it go, might be unsuccessful, fastened with rope (banchee)
ROV07	733	20.02.24	14:21	73.0439	-0.9986	3171		Back at seafloor, going to look around the same sedimented area
ROV07	733	20.02.24	14:24					Streaming for Marineholmen ended (might only be Ægir videos from this time)
ROV07	733	20.02.24	14:26					Moving boat 200m in 312 degrees
ROV07	733	20.02.24	14:27					Putting laser on (ROV pilots are unsure if they truly are 10cm, or if the left ones had been moved on)
ROV07	733	20.02.24	14:30	73.0445	-1.0002	3168		4K still photo (overview of sedimented seafloor with some different species on it)
ROV07	733	20.02.24	14:34					Starting a long biological transect.
ROV07	733	20.02.24	14:48	73.0446	-1.004	3160		Moving towards the steep slope of the structure after approx. two hours of bio-transect.
ROV07	733	20.02.24	16:36	73.0317	-0.9897	3186		New shift and reached the wall structure, clear contact between sediment and dark wall of potentially thick manganese crust
ROV07	733	20.02.24	16:45	73.0312	-0.9860	3185		Bringing out the saw to cut into some manganese crust from the vertical wall, finding a structure poking out. Could potentially be a mass wasted block with precipitated crust on top.

ROV07	733	20.02.24	16:50	73.0312	-0.9860	3185			Checked to see if the saw had cut into the rock, and it had touched it slightly, continuing the sawing
ROV07	733	20.02.24	16:59	73.0317	-0.9897	3185			The chosen site was too difficult to saw, trying to find a new spot. But some thick manganese crust was exposed after the initial sawing.
ROV07	733	20.02.24	17:00	73.0317	-0.9897	3185			Moving up the hill to find a spot where we can hold on to the wall with the atlas while sawing
ROV07	733	20.02.24	17:03	73.0317	-0.9896	3183			Scratching several blubs of crust sticking out, but all falls apart when pinching with the arm
ROV07	733	20.02.24	17:06	73.0316	-0.9896	3185			Going back down to the bottom of the wall to try to saw out a piece that pokes out in the contact between wall and sediment on the seafloor
ROV07	733	20.02.24	17:08	73.0316	-0.9896	3185			Waiting for the sediment plume to settle before attempting to saw
ROV07	733	20.02.24	17:14	73.0316	-0.9896	3185			The sediment on the seafloor is too fine grained, so the plume does not settle, need to fly up to saw
ROV07	733	20.02.24	17:18	73.0318	-0.9892	3176			Tried to see if the saw can be used up against the wall, but the ROV does not have anything to lean against, so it gets too tight
ROV07	733	20.02.24	17:21	73.0318	-0.9892	3173			Trying another sawing spot where the ROV is sitting on a "shelf" in the wall
ROV07	733	20.02.24	17:27	73.0318	-0.9892	3173			The plume emerging when sawing covers all the cameras and makes the visibility very low
ROV07	733	20.02.24	17:32	73.0318	-0.9892	3171			The attempted sawing was not successful
ROV07	733	20.02.24	17:41	73.0317	-0.9892	3170			Trying again with the saw
ROV07	733	20.02.24	17:51	73.0317	-0.9892	3170			The sawing looks better this time, will try to break it off with Frankenstein
ROV07	733	20.02.24	17:53	73.0317	-0.9892	3170	KH24-254-ROV07-R01		A small piece breaks off but falls down and balances on the edge of the cliff but falls down into the front drawer
ROV07	733	20.02.24	17:57	73.0317	-0.9892	3170			Taking 4K still photos of the exposed cut
ROV07	733	20.02.24	17:59	73.0318	-0.9890	3156			Moving further up the wall to look for better candidates for sawing, the manganese crust acts as a coating, effectively smoothing out all the features
ROV07	733	20.02.24	18:03	73.0316	-0.9890	3136			Found a slightly flatter area. Looks like the crest of a ridge, or a plateau. Also quite sediment covered. But the rock exposure is too smooth to find a good spot for sawing
ROV07	733	20.02.24	18:11	73.0315	-0.9894	3119	KH24-254-ROV07-R02	NOD2024-1-7-1	Picks up a small loos piece before beginning a cut with the saw
ROV07	733	20.02.24	18:14	73.0315	-0.9894	3119			Starting a new cut
ROV07	733	20.02.24	18:38	73.0315	-0.9894	3119			The cut looks successful, got the sample loose with Frankenstein
ROV07	733	20.02.24	18:39	73.0315	-0.9894	3119	KH24-254-ROV07-R03	NOD2024-1-7-2	Gets a sawed off piece sampled, could be pure manganese crust with a sediment layer inside?
ROV07	733	20.02.24	18:45	73.0315	-0.9894	3119			Starting a new cut just behind where R03 was sawed off
ROV07	733	20.02.24	19:01	73.0315	-0.9894	3119	KH24-254-ROV07-R04	NOD2024-1-7-3	Manages to break a piece of crust off, it rolls down the hill but luckily stops so we could get it
ROV07	733	20.02.24	19:05	73.0315	-0.9894	3119			Taking 4K still photos as an overview to show that there is relatively little life here
ROV07	733	20.02.24	19:07	73.0315	-0.9894	3119			4K still photo of elongated white fauna
ROV07	733	20.02.24	19:13	73.0314	-0.9893	3120			Suction samples the fauna into chamber 2
ROV07	733	20.02.24	19:17	73.0314	-0.9893	3120	KH24-254-ROV07-R05		Samples a small (loose?) piece
ROV07	733	20.02.24	19:20	73.0314	-0.9894	3119	KH24-254-ROV07-R06		Another small piece broken off with the T4
ROV07	733	20.02.24	19:23	73.0314	-0.9892	3113	KH24-254-ROV07-R07	NOD2024-1-7-4*	Picking up another loose (?) piece
ROV07	733	20.02.24	19:25	73.0313	-0.9893	3108	KH24-254-ROV07-R08		One more, definitely loose piece
ROV07	733	20.02.24	19:26	73.0313	-0.9893	3108			End of dive, recovering ROV to deck
ROV07	733	20.02.24	20:56			0			ROV on deck

ROV08	734	21.02.2024	11:00			0		ROV off deck
ROV08	734	21.02.2024	12:44	74.2143	-4.6817	3413		ROV out of TMS
ROV08	734	21.02.2024	12:47	74.2143	-4.6819	3467		ROV on seafloor: sedimented
ROV08	734	21.02.2024	12:49					Small variations in the topography of the sedimented seafloor
ROV08	734	21.02.2024	12:50	74.2146	-4.6837	3465		Moving boat 100 m, 300 degrees
ROV08	734	21.02.2024	12:51	74.2146	-4.6837	3465		4K pictures of seafloor
ROV08	734	21.02.2024	12:55	74.2147	-4.6845	3463		Starting to appear some rocks, can be debris from a structure nearby
ROV08	734	21.02.2024	12:55	74.2147	-4.6845	3463		4K pictures of bio-thing on a manganese coated rock
ROV08	734	21.02.2024	12:56					Laser points on, something is wrong with the laser-distance
ROV08	734	21.02.2024	13:01					Moving boat 70 meter on 300 degree + taking the TMS up 20
ROV08	734	21.02.2024	13:01	74.2149	-4.6859	3459		4K picture of seafloor with some grazing structure from a bio organism
ROV08	734	21.02.2024	13:04	74.2179	-4.6866	3457	KH24-254-ROV08-R01	Picking up an subangular sample from the sedimented seafloor, right side of drawer
ROV08	734	21.02.2024	13:08	74.2150	-4.6872	3455	KH24-254-ROV08-R02	Picking up smaller, angular + a bit rounded sample, right side of drawer
ROV08	734	21.02.2024	13:11	74.2151	-4.6861	3441		4K picture of sedimented slope with visible sedimented layers and a sediment debris below (like a sediment hill)
ROV08	734	21.02.2024	13:13	74.2151	-4.6883	3440		4K video of the same sediment debris slope, some rock debris on it as well, some hallow holes in it (could be an organism living in it), looks like consolidated to sandstone some places, but it is probably clay
ROV08	734	21.02.2024	13:18					ROV touching the structure from before, it is soft
ROV08	734	21.02.2024	13:19	74.2152	-4.6885	3435		Reaching structure of interest. Looks like an massive slope.
ROV08	734	21.02.2024	13:20	74.2152	-4.6886	3434		4K pictures of lava flow with manganese crust
ROV08	734	21.02.2024	13:23	74.2151	-4.6867	3431		Following the bottom of the slope side to look at the lava flow edges. Some sheets (is manganese crust that makes it look like it - Rolf), and some pillows
ROV08	734	21.02.2024	13:27	74.2152	-4.6885	3433		Alternating between fall out and laminated manganese crust, going to look up the hillside
ROV08	734	21.02.2024	13:31	74.2153	-4.6890	3406		Debris filled are to an structured sheet flow (but it is manganese cover - Rolf)
ROV08	734	21.02.2024	13:35	74.2154	-4.6891	3400		Entering more debris again
ROV08	734	21.02.2024	13:36	74.2154	-4.6893	3399		4K picture of sheet-like shape of the manganese crust
ROV08	734	21.02.2024	13:37	74.2154	-4.6892	3399		Tried sampling, but changed mind to go further up to find better spots
ROV08	734	21.02.2024	12:41	74.2154	-4.6890	3397		Measure depth of some holes in the manganese cover with the ROV arm (due to laser points being wrong) (at least 30 cm, Rolf estimated 40)
ROV08	734	21.02.2024	13:42	74.2154	-4.6891	3397		4K picture of ROV arm by manganese crust that is exposed probably due to an avalanche
ROV08	734	21.02.2024	13:44	74.2154	-4.6891	3397		Depth of the manganese crust is up to the light of the right ROV arm, which is 22 cm long.
ROV08	734	21.02.2024	13:46	74.2155	-4.6892	3393		Measured another sheet, up to the first mobility point (circle) of the right ROV arm. Taking the TMS up some more meters
ROV08	734	21.02.2024	13:48	74.6893	-4.6893	3387		Some topography difference in the hill side
ROV08	734	21.02.2024	13:50	74.2156	-4.6895	3381		A lot of holes in the manganese crust
ROV08	734	21.02.2024	13:51	74.2156	-4.6895	3370		Reaching another thick manganese crust, looks like a lobe
ROV08	734	21.02.2024	13:52	74.2156	-4.6896	3366		4K overview picture
ROV08	734	21.02.2024	13:57	74.2158	-4.6901	3341		Continuing straight upwards, studying the structure/wall
ROV08	734	21.02.2024	14:06	74.2162	-4.6910	3283		Slope is starting to flatten out, but still relatively steep.
ROV08	734	21.02.2024	14:09	74.2162	-4.6913	3267		Reaching the top, a flat area (scree), try to find a visible manganese crust

ROV08	734	21.02.2024	14:13	74.2162	-4.6917	3257			Coming to a new wall, where we will trying to saw out a sample
ROV08	734	21.02.2024	15:01	74.2163	-4.6917	3258			Did not managed to get the sample, but we will maybe try to get back (?), continuing along the side
ROV08	734	21.02.2024	15:07	74.2163	-4.6916	3253			Deciding to not go back, but continue to the top, still steep wall of manganese crust, almost vertical
ROV08	734	21.02.2024	15:25	74.2169	-4.6937	3104			Found a nice structure. Measuring the profile of what looks like manganese crust (measuring with the saw that is 50cm). It is ca 70 cm thick. However, it does not appear to be all manganese crust.
ROV08	734	21.02.2024	15:34	74.2168	-4.6939	3102			Sawing of a piece to see the structure of the thick manganese crust, inside looks brecciated. 4K video and picture
ROV08	734	21.02.2024	15:39	74.2168	-4.6939	3103			Trying to grind off some of the surface on another side of the structure. Small pieces falling into the front drawer.
ROV08	734	21.02.2024							Inside also looks brecciated. A very thin layer of Mn crust is covering the inside of the boulder. 4K picture taken here.
ROV08	734	21.02.2024	15:47	74.2169	-4.6939	3102			Going for another cut a little bit behind the last one. A big part came loose. 4K photos taken
ROV08	734	21.02.2024	16:03	74.2169	-4.6939	3102	KH24-254-ROV08-R03	NOD2024-1-8-1	Breaking of the manganese crust with Frankenstein. A flat layer is broken off. One of the pieces is in the front drawer, while the other is in the left drawer
ROV08	734	21.02.2024	16:10	74.2169	-4.6939	3102			Trying to collect more of the broken off pieces. These belong under the think crust of R03.
ROV08	734	21.02.2024	16:13	74.2169	-4.6939	3102			Poking again under the last sample. Looks like we reached the brecciated basalt.
ROV08	734	21.02.2024	16:31	74.2173	-4.6975	2978			4K picture taken of worm like organism.
ROV08	734	21.02.2024	16:34	74.2174	-4.6977	2972			Moving ship 40m 330 degrees.
ROV08	734	21.02.2024	16:37	74.2174	-4.6978	2972			Moving the ROV back in position for cutting rock
ROV08	734	21.02.2024	16:41						ROV crew change
ROV08	734	21.02.2024	16:42	74.2173	-4.6977	2974			Found ideal rock for cutting.
ROV08	734	21.02.2024	16:45	74.2174	-4.6978	2972			Starting to cut, possible a loose rock. Some ROV movement. Much dust in the water, hard to get good overview.
ROV08	734	21.02.2024	16:52	74.2174	-4.6978	2972			Cutting the rock in a different orientation.
ROV08	734	21.02.2024	16:58	74.2174	-4.6978	2972			Attempting to pick up the rock sample with Frankenstein. A subangular massive and big manganese covered sample.
ROV08	734	21.02.2024	17:02	74.2174	-4.6977	2973	KH24-254-ROV08-R04	NOD2024-1-8-2*	Sample picked up by titan.
ROV08	734	21.02.2024	17:04	74.2174	-4.6977	2972			4K pictures of thick rust brown colored manganese crust from rock sample cutting
ROV08	734	21.02.2024	17:07	74.2173	-4.6979	2972			Overview of manganese covered hill surface. Little sign of sediments at steep angle slopes. Some subangular drop rocks.
ROV08	734	21.02.2024	17:10	74.2170	-4.6990	2976			Visible overview of ridge.
ROV08	734	21.02.2024	17:11	74.2169	-4.6996	2978			More sediment cover.
ROV08	734	21.02.2024	17:13	74.2168	-4.6998	2981			Major abundance of manganese crust on rock surface.
ROV08	734	21.02.2024	17:15	74.2167	-4.7001	2979			More sediment covering manganese crust surface.
ROV08	734	21.02.2024	17:20	74.2166	-4.7011	2976			On top of a plateau
ROV08	734	21.02.2024	17:25	74.2166	-4.7013	2971			Cutting new sample on top off a plateau. Manganese crust landscape
ROV08	734	21.02.2024	17:34	74.2166	-4.7014	2971	KH24-254-ROV08-R05	NOD2024-1-8-3*	New cutting sample taken, 4K pictures taken.
ROV08	734	21.02.2024	17:35	74.2166	-4.7014	2971			4K overview picture taken. Some signs of bioturbation on manganese surface.
ROV08	734	21.02.2024	17:36	74.2166					Ship; 50 m 330 degrees. Sediment cover on plateau, a lot of separate angular rocks
ROV08	734	21.02.2024	17:42	74.2168	-4.7024	2976			Going down the ridge 310 degrees.
ROV08	734	21.02.2024	17:44	72.2170	-4.7027	2982			Taking 4K biology pictures of sediments; sand.
ROV08	734	21.02.2024	17:46	74.2170	-4.7028	2984			Sand shelf with current ripples on top

ROV08	734	21.02.2024	18:08	74.2182	-4.7075	3027			Seapen (?)
ROV08	734	21.02.2024	18:11	74.2183	-4.7083	3031			4K still photo - bioturbation on seafloor
ROV08	734	21.02.2024	18:24	74.2188	-4.7129	3068			Small ridge
ROV08	734	21.02.2024	18:27	74.2188	-4.7129	3067			Suction sampler - shrimp (chamber 1)
ROV08	734	21.02.2024	18:30	74.2189	-4.7131	3071			4K photo - dark crust and bio stuff (maybe eggs)
ROV08	734	21.02.2024	18:33	74.2189	-4.7131	3072			4K photo - bio (eggs)
ROV08	734	21.02.2024	18:34	74.2189	-4.7131	3072			4K video - bio (eggs)
ROV08	734	21.02.2024	18:45	74.2197	-4.7165	3107			rock fragments
ROV08	734	21.02.2024	18:56	74.2200	-4.7199	3134			4K photo of boring seafloor
ROV08	734	21.02.2024	19:12	74.2208	-4.7248	3147			4K video - bio (eggs)
ROV08	734	21.02.2024	19:28	74.2218	-4.7319	3109			4K video - shell fragments
ROV08	734	21.02.2024	19:31	74.2218	-4.7318	3109			Suction sampler - shell fragments (chamber 2)
ROV08	734	21.02.2024	19:38	74.2220	-4.7328	3092			Starting to see the start of the slope, debris material
ROV08	734	21.02.2024	19:39	74.2220	-4.7328	3085			See the wall
ROV08	734	21.02.2024	19:59	74.2220	-4.7333	3077	KH24-254-ROV08-R06	NOD2024-1-8-4*	Sawing of a piece of the wall, took some time
ROV08	734	21.02.2024	20:06	74.2220	-4.7333	3073			Moving up the wall
ROV08	734	21.02.2024	20:09	74.2220	-4.7333	3977	KH24-254-ROV08-R07	NOD2024-1-8-5	Picking up more of the same piece that was sawed off
ROV08	734	21.02.2024	20:16	74.2223	-4.7350	3034			Some bones (a spine?) lying on the seafloor. Picking up some of them with Frankenstein
ROV08	734	21.02.2024	20:22	74.2224	-4.7349	3032			At a smooth, manganese crust covered outcrop
ROV08	734	21.02.2024	20:28	74.2228	-4.7364	2981			Bringing out the saw for a new cut of manganese crust
ROV08	734	21.02.2024	20:41	74.2228	-4.7364	2981			The sample breaks easily when grabbed
ROV08	734	21.02.2024	20:45	74.2228	-4.7364	2981	KH24-254-ROV08-R08	NOD2024-1-8-6*	Gets a large piece with Frankenstein
ROV08	734	21.02.2024	20:52	74.2231	-4.7374	2947			About 50 m from the top of the structure. Smooth, manganese covered outcrop
ROV08	734	21.02.2024	20:59	74.2231	-4.7379	2930			Found a spot where the ROV can sit while sawing, beginning to saw. It looks like there is space underneath the piece that we will saw into, potentially easy to cut.
ROV08	734	21.02.2024	21:11	74.2231	-4.7379	2930	KH24-254-ROV08-R09	NOD2024-1-8-7	Samples a good size (but broken in a few pieces) sawed off
ROV08	734	21.02.2024	21:20	74.2235	-4.7395	2884			At the top. End of dive - recovering to deck
ROV08	734	21.02.2024	22:58			0			ROV on deck
		22.02.2024	01:55			0			ROV off deck, immediately cancelled due to malfunctioning of the suction sampler, the tube fell off
		22.02.2024							ROV back in the water, same system dive number as previous attempt (checked with the pilots)
		22.02.2024							Technical issues, dive is cancelled and ROV needs to come back on deck
ROV09	735	22.02.2024	08:05	74.2514	-4.4777	0			ROV off deck
ROV09	735	22.02.2024	09:53	74.2631	-4.7775	3466			Reach seafloor
ROV09	735	22.02.2024							Sediment covered, moving towards the steep slope
ROV09	735	22.02.2024	10:05	74.2524	-4.4786	3437			Reaching bottom of slope, covered in manganese crust
ROV09	735	22.02.2024	10:07	74.2525	-4.4788	3427			Studying an outcrop, trying to break the manganese crust, ca. 30cm (4K picture 10:09)
ROV09	735	22.02.2024							Moving upwards the slope
ROV09	735	22.02.2024	10:12	74.2524	-4.4790	3417			Reaching flatter part of slope, trying to saw
ROV09	735	22.02.2024	10:27	74.2526	-4.4789	3417	KH24-254-ROV09-R01	NOD2024-1-9-1*	Collecting sample of manganese crust with Frankenstein
ROV09	735	22.02.2024	10:30	74.2526	-4.4791	3416			Going back to grinder some more, trying to look into the bedrock
ROV09	735	22.02.2024	10:37	74.2526	-4.4790	3418			Taking 4K picture with laser scale on.
ROV09	735	22.02.2024							Did not reach the bedrock, this big boulder might be a fallen of flake.
ROV09	735	22.02.2024	10:40	74.2527	-4.4790	3490			Seeing another big flake when continuing upwards the slope

ROV09	735	22.02.2024	10:42	74.2528	-4.4794	3405			Reaching top of the shelf, flatter area.
ROV09	735	22.02.2024	10:43						Moving boat 40m 330 degrees
ROV09	735	22.02.2024	10:49	74.2528	-4.4796	3406			Sawing on the flat shelf, trying to find bedrock under the manganese crust, moving a bit underway the cutting to not cut the ROV arm off + cut around the crust. Using Frankenstein to sample it.
ROV09	735	22.02.2024	11:10	74.2592	-4.4795	3405	KH24-254-ROV09-R02	NOD2024-1-9-2	Collecting sample of manganese crust, looks like a half moon
ROV09	735	22.02.2024	11:11	74.2529	-4.4795	3407			4K picture of the remainings behind sample R02 (in the hill), laser on, about 25cm thickness of the remaining crust, still some remaining, want to try an cut it.
ROV09	735	22.02.2024	11:13	74.2529	-4.4796	3406			Try to cut more of the remaining manganese crust.
ROV09	735	22.02.2024	11:55	74.2529	-4.4795	3407			4K picture of remaining after some more cutting, with laser points on
ROV09	735	22.02.2024	11:56	74.2529	-4.4796	3406			Continue to cut into wall, goal: reach the basalt below
ROV09	735	22.02.2024	12:22						Stop sawing, looking at some blocks, Rolf is happy with that, want to know the thickness. About 35 cm.
ROV09	735	22.02.2024	12:23						4K picture of the thickness of the manganese crust, with laser on.
ROV09	735	22.02.2024	12:26	74.2529	-4.4795	3405			Rolf want to cut off a piece of the manganese crust, very close to the place we cut of a lot of crust
ROV09	735	22.02.2024	12:45	74.2529	-4.4795	3405			Cutting of a nice piece of crust. Going for another cut further down to see if it is possible to reach the bedrock. This manganese crust is now in two parts.
ROV09	735	22.02.2024	13:00	74.2529	-4.4795	3405			4K picture with laser on from this cut. And 4K video
ROV09	735	22.02.2024	13:14	74.2529	-4.4795	3405	KH24-254-ROV09-R03	NOD2024-1-9-3*	Picking up the cut manganese crust with Frankenstein. Two pieces
ROV09	735	22.02.2024	13:23	74.2592	-4.4795	3405			Picking up the remaining rocks from KH24-254-ROV09-R02. Might be a little bit hard to puzzle back together
ROV09	735	22.02.2024	13:39	74.2592	-4.4795	3405			4K video of R02 cut, also 4K photos
ROV09	735	22.02.2024	13:45	74.2529	-4.4795	3405			4K video of R03 cut, also 4K photos
ROV09	735	22.02.2024	13:50						Continue to climb the steep slope
ROV09	735	22.02.2024							4K pictures of shrimps
ROV09	735	22.02.2024	14:04	74.2531	-4.4801	3384	KH24-254-ROV09-R04	NOD2024-1-9-4*	Stop to saw and try to look on the bedrock
ROV09	735	22.02.2024	14:30						Ending the dive.
ROV09	735	22.02.2024	16:15	74.2531	-4.4801	0			ROV on deck
		22.02.2024	21:15						Test dive
ROV10	736	23.02.2024	03:30			0			ROV off deck
ROV10	736	23.02.2024	05:01	73.1520	-2.5182	2997			Reached seafloor: sediment covered, lots of purple anemones
ROV10	736	23.02.2024	05:08	73.1527	-2.5189	2966			Move boat 100m directly north
ROV10	736	23.02.2024	05:15	73.1531	-2.5188	2939			Move boat 40 m more, with the same heading
ROV10	736	23.02.2024	05:16	73.1533	-2.5187	2930			Starting to appear some small rocks + potential track from some rocks that might have fallen down from the large structure we´re heading to
ROV10	736	23.02.2024	05:21	73.1538	-2.5188	2900			Arriving to the large structure. Some small rocks of debris in front of it, but a relatively sharp distinction between the sediment and structure (contains big flat manganese crust, can´t sample it), not steep, a lot of sediment cover some places
ROV10	736	23.02.2024	05:22	73.1539	-2.5189	2891			Moving up the structure: green bacterial mats and sponges, still some sediment cover over the rocks
ROV10	736	23.02.2024	05:25						Moving boat 100 m in 035 degree
ROV10	736	23.02.2024	05:25	73.1542	-2.5194	2869			Reaching structure, it is steep with sponges and green bacterial mats on it, with manganese crust on it, some sediment in "cracks" in the manganese crust.

ROV10	736	23.02.2024	05:28	73.1543	-2.5194	2853		A red half-pipe looking structure vertical in the steep hill, it is very symmetrical going straight up, taking 4K pictures of it, laser on in the picture, what is it? Looks like half a core, 10-15 cm in width
ROV10	736	23.02.2024	05:31	73.1543	-2.5195	2850		4K video of the weird half-pipeline-structure, some weird structures in it, circular structures, and some blacks crust making it look brecciated some places, moving up some ganger through it, seems like there is no manganese crust on it.
ROV10	736	23.02.2024	05:35	73.1543	-2.5195	2848		Taking more 4K pictures of the vertical half-pipeline-structure, some black folding going through it, red color outside of the folding
ROV10	736	23.02.2024	05:40	73.1544	-2.5197	2828	KH24-254-ROV10-R01	Sample round rock from hillside, might be a drop rock, has some blue bacterial mat on it., put into left drawer
ROV10	736	23.02.2024	05:42	73.1544	-2.5198	2829	KH24-254-ROV10-R02	Sampling large rock next to the potential drop stone. This is larger, more angular/subangular, looks like a grave from a cartoon halloween movie, it is heavy
ROV10	736	23.02.2024	05:48	73.1545	-2.5199	2812		Still following the half-pipeline-structure
ROV10	736	23.02.2024	05:50	73.1545	-2.5199	2804		Generally little manganese crust, but there are some sediments
ROV10	736	23.02.2024	05:51	73.1545	-2.5199	2803		Taking 4K picture of the half-pipeline-structure, with laser, it is about 5 cm here, there are some clasts in it. Above it is a debris of small rocks, then it continues above. Could it be a ravine for small rock debris?
ROV10	736	23.02.2024	05:54	73.1546	-2.5200	2799		Could be the start location of the small rocks making the half-pipeline-structure. Following the structure towards the right
ROV10	736	23.02.2024	05:55	73.1546	-2.5199	2799		Found another half-pipeline-structure, apparently very normal according to Rolf
ROV10	736	23.02.2024	05:56	73.1546	-2.5197	2796		Starting to appear some other sponges/corals, different ones from earlier, taking 4K pictures of them. Growing on a very steep hillside, about 90 degree
ROV10	736	23.02.2024	05:58	73.1547	-2.5195	2796		Looks like a very thick ravine/half-pipeline-structure
ROV10	736	23.02.2024	05:59	73.1579	-2.5193	2796		A big, horizontal hollow crack/passage, but very big, with thick manganese crust on the "roof" of it
ROV10	736	23.02.2024	06:01	73.1547	-2.5194	2796		Poking/digging the wavy pattern on the hillside, looks like a downward wave ripple, it is brown, it is manganese crust, couldn´t dig all the way in, continuing to follow the hillside
ROV10	736	23.02.2024	06:06	73.1548	-2.5189	2796		There are some overhang from the hillside + a lot of particles in the water, so the manganese crust doesn't grow as fast, something makes it hard for the manganese crust to grow
ROV10	736	23.02.2024	06:07					Moving boat 40 m forward
ROV10	736	23.02.2024	06:07	73.1550	-2.5189	2794		Staring to move the ROV both sideways (towards the right) and upward at the same time
ROV10	736	23.02.2024	06:08	73.1550	-2.5189	2789		New hollow "passage" in the hillside, going horizontally, then a bit upward later (45 degree up from being horizontal), not as hallow as previous with the manganese crust on "roof"
ROV10	736	23.02.2024	06:09	73.1551	-2.5190	2785		4K video of some punctuated, flat, grey sponges, inside a cave-ish
ROV10	736	23.02.2024	06:12	73.1550	-2.5186	2786		Sponges growing from the roof
ROV10	736	23.02.2024	06:14	73.1550	-2.5183	2788		Starting to appear pink anemone, the heliometra (but not heliometra, further up the classification)
ROV10	736	23.02.2024	06:22	73.1552	-2.5174	2734		A wide and deep crack in the steep hillside
ROV10	736	23.02.2024	06:24	73.1552	-2.5172	2726		See some exposed rock. This area (in total) does not contain massive manganese crust, but rather those layered (downward wave ripple looking) manganese crust
ROV10	736	23.02.2024	06:25	73.1552	-2.5171	2727		Trying to sample manganese crust from an overhang/small cave-ish

ROV10	736	23.02.2024	06:28	73.1552	-2.5171	2725	KH24-254-ROV10-R03	NOD2024-1-10-1*	Sampling manganese crust with some biology on it. It is angular/subangular, inside a cave ish (overhang)
ROV10	736	23.02.2024	06:31						Moving boat 50 m forward
ROV10	736	23.02.2024	06:33	73.1553	-2.5170	2708			Manganese crust, big overhang, appearing some more sponge species
ROV10	736	23.02.2024	06:34	73.1553	-2.5169	2700			Trying to sample some manganese crust from an angular overhang
ROV10	736	23.02.2024	06:36	73.1553	-2.5169	2702	KH24-254-ROV10-R04	NOD2024-1-10-2*	Half-moon shaped manganese crust samples into right drawer
ROV10	736	23.02.2024	06:37	73.1553	-2.5169	2702			Taking 4K picture from where the manganese crust was sampled, seeing the structure inside the crust, some white "coral"/sponge beside + heliometra (but further up the classification), it looks laminated
ROV10	736	23.02.2024	06:40						Seeing some difference in the manganese crust growth, making some "ridges", while others are more flat with. Sediment cover on top, the others are smaller (the "wave ripples").
ROV10	736	23.02.2024	06:43	73.1553	-2.5168	2699			4K picture of the "downward wave ripple" manganese crust growth
ROV10	736	23.02.2024	06:51	73.1556	-2.5159	2678			Moving the boat 50 m directly north
ROV10	736	23.02.2024	06:53	73.1556	-2.5159	2678			Trying to rip of part of manganese crust using ROV claw. A lot of biological organisms in the area
ROV10	736	23.02.2024	07:00	73.1556	-2.5158	2678	KH24-254-ROV10-R05	NOD2024-1-10-3*	Sampling part of the manganese crust. Placed in the outer drawer.
ROV10	736	23.02.2024	07:04						Moving, following the structure sideways (north east direction)
ROV10	736	23.02.2024	07:04						Moving the boat 45m in 45 degrees
ROV10	736	23.02.2024	07:07	73.1558	-2.5153	2678			Taking 4K picture of biological organisms
ROV10	736	23.02.2024	07:11	73.1558	-2.5153	2677	KH24-254-ROV10-R06	NOD2024-1-10-4	Sampling bedrock with manganese crust, 3 samples from the same outcrop, placed in right shelf
ROV10	736	23.02.2024	07:18	73.1585	-2.5151	2677			Taking 4K bio-picture of organisms along the structure.
ROV10	736	23.02.2024	07:18						Moving sideways along with structure
ROV10	736	23.02.2024	07:26	73.1557	-2.5139	2667			Taking 4K pictures of structures
ROV10	736	23.02.2024	07:30						Moving around the structure (west direction)
ROV10	736	23.02.2024	07:34	73.1558	-2.5132	2646			Moving upwards, reaching one of the ridges (not the highest one)
ROV10	736	23.02.2024	07:35	73.1559	-2.5131	2644			4K biological picture of sponges on the ridge
ROV10	736	23.02.2024	07:35						Following the ridge upwards
ROV10	736	23.02.2024	07:41	73.1563	-2.5130	2600			4K biological picture of beige/brownish sponge on the ridge
ROV10	736	23.02.2024	07:45	73.1564	-2.5130	2591			Moving the boat 80m in 80 degrees
ROV10	736	23.02.2024	07:50	73.1565	-2.5142	2539			4K picture of fish (deepsea tusk)
ROV10	736	23.02.2024	07:54	73.1565	-2.5143	2533			4K picture of green biological material on the crust/bedding. Looks like three different shade of green
ROV10	736	23.02.2024	07:54						Moving upwards along the ridge
ROV10	736	23.02.2024	08:03	73.1569	-2.5156	2477			Moving boat 80m in 20 degrees
ROV10	736	23.02.2024	08:03						Looking for the expected plateau, steep slopes muddy on top, white sponges
ROV10	736	23.02.2024	08:14	73.1575	-2.5145	2446			Continuing upwards the steep structures, looking for where it is flattening out
ROV10	736	23.02.2024	08:39	73.1590	-2.5184	2233			Finding a flatter area for sawing off a little built up Mn-crust. Trying to saw down to the bedrock.
ROV10	736	23.02.2024	09:01	73.1590	-2.5184	2233	KH24-254-ROV10-R07	NOD2024-1-10-5	Cutting into some harder rock. Not sure if it is the bedrock or a drop stone laying beneath the Mn-crust. However, the rock/bedrock is light grey and weathered. The crust is approximately 10 cm at the thickest part.
ROV10	736	23.02.2024	09:08	73.1590	-2.5184	2233			4K photos of cut
ROV10	736	23.02.2024	09:18						Continuing up the hill.
ROV10	736	23.02.2024	09:24	73.1593	-2.5203	2184			4K picture of fan/elephant ear sponge with sea-lilies
ROV10	736	23.02.2024	10:15	73.1594	-2.5204	2181			Tried to saw out a cake sample, but failed. Looking for another place to saw

ROV10	736	23.02.2024							Continuing looking for a other crust to saw
ROV10	736	23.02.2024	10:34	73.1594	-2.5209	2174			Try again, to saw some crust - failed - continuing
ROV10	736	23.02.2024	11:03	73.1594	-2.5213	2171			4K picture of the sawing are
ROV10	736	23.02.2024	11:04	73.1594	-2.5213	2171			Sawing some more off the rock
ROV10	736	23.02.2024	11:24						Successfully cut off piece, taking 4K picture of it, some pictures with laser to see thickness
ROV10	736	23.02.2024	11:26	73.1594	-2.5213	2172	KH24-254-ROV10-R08	NOD2024-1-10-6	Taking samples from sawing area (loose material from the sawing), sampled into the right drawer, right to the big sample in right drawer. Taking one more, smaller sample, round angular one. And one more with some yellow on it (small angular).
ROV10	736	23.02.2024	11:35						Taking more 4K picture because we removed some loose rocks, with laser point.
ROV10	736	23.02.2024	11:38						One more very small sample (elongated, angular) from the same location. + One more small angular sample. + one more small angular one
ROV10	736	23.02.2024	11:43	73.1594	-2.5213	2172			Leaving seafloor
ROV10	736	23.02.2024	12:45			0			ROV on deck
ROV11	737	23.02.2024	18:40			0			ROV off deck
ROV11	737	23.02.2024	19:55	72.8699	-2.5591	3010			At seafloor, sedimented. Some consolidated sediment structures
ROV11	737	23.02.2024	19:57	72.8702	-2.5593	2993			Large rock exposure. Looks manganese crust covered. Steep and smooth
ROV11	737	23.02.2024	20:00	72.8703	-2.5596	2973			The plan is to climb the wall and sample if possible, but it is likely very difficult as it is near vertical
ROV11	737	23.02.2024	20:02	72.8704	-2.5598	2946			Relatively abundant life to be at 3000 meters depth. Lots of rock living sponges
ROV11	737	23.02.2024	20:04	72.8706	-2.5602	2925			Finds a rock that could be possible to sample, will attempt to grab it
ROV11	737	23.02.2024	20:07	72.8706	-2.5602	2925	KH24-254-ROV11-R01		The big rock is too difficult to sample, but grab a small one
ROV11	737	23.02.2024	20:09	72.8707	-2.5601	2915	KH24-254-ROV11-R02		A shelf of some sort (manganese crust perhaps) that looks sampleable. Grabs a loose one that looks like it has broken off from there
ROV11	737	23.02.2024	20:14	72.8708	-2.5604	2901			Taking 4K images of the steep, sponge covered exposure
ROV11	737	23.02.2024	20:16	72.8708	-2.5604	2901			4K video and still images. Taking a closer look at a long animal (cnidaria)
ROV11	737	23.02.2024	20:21	72.8709	-2.5607	2886			Taking 4K images as an overview of the sponges
ROV11	737	23.02.2024	20:22	72.8709	-2.5607	2886			4K video (long) of the outcrop - steep exposures, plenty of sponges, also a more fragmented/avalanched slope
ROV11	737	23.02.2024	20:27	72.8710	-2.5612	2879			Moving the ROV for a suitable spot to sample rock
ROV11	737	23.02.2024	20:28	72.8709	-2.5613	2879			In position for rock sampling using the saw
ROV11	737	23.02.2024	20:31	72.8709	-2.5614	2879			Started sawing
ROV11	737	23.02.2024	20:40	72.8709	-2.5614	2879	KH24-254-ROV11-R03	NOD2024-1-11-2	Stopped sawing, picking two parts of one sample.
ROV11	737	23.02.2024	20:45	72.8709	-2.5614	2879			Taking 4K still pictures of cutting edges into the manganese layer
ROV11	737	23.02.2024	20:46	72.8709	-2.5614	2879			Picking up one part of same sample
ROV11	737	23.02.2024	20:50	72.8711	-2.5611	2870			Steep manganese layered walls. Flying up to a ridge. Other side is filled with sediments; less steep
ROV11	737	23.02.2024	20:54	72.8716	-2.5617	2828			Flying up the ridge. ROV is about half way up. Taking one 4K picture
ROV11	737	23.02.2024	20:55	72.8717	-2.5717	2822			Much biologic life; taking 4K pictures of shrimps
ROV11	737	23.02.2024	20:59	72.8718	-2.5619	2813			Taking a 4K picture
ROV11	737	23.02.2024	21:01	72.8720	-2.5620	2797			Nice ridge to take samples. Going picking up the saw
ROV11	737	23.02.2024	21:04	72.8720	-2.5619	2797			Sawing to get a new sample, some sediment in suspension. Hard to get good view when sawing
ROV11	737	23.02.2024	21:19	72.8721	-2.5620	2798			Taking a 4K picture of the sawing/saw

ROV11	737	23.02.2024	21:26	72.8720	-2.6520	2798	KH24-254-ROV11-R04	NOD2024-1-11-3*	Sample collected after sawing, taking 4K images of the cut. It looks like we hit bedrock underneath the Mn crust.
ROV11	737	23.02.2024	21:30	72.8720	-2.6520	2796			Continuing up the slope
ROV11	737	23.02.2024	21:38	72.8727	-2.5617	2729			Large crack in the slope, taking 4K images
ROV11	737	23.02.2024	21:42	72.8727	-2.5618	2727			Will try to saw out a piece in the crack
ROV11	737	23.02.2024	22:00	72.8727	-2.5618	2727	KH24-254-ROV11-R05	NOD2024-1-11-4*	Sampling successful
ROV11	737	23.02.2024	22:03	72.8727	-2.5618	2727			4K images of the cut, no visible bedrock
ROV11	737	23.02.2024	22:04	72.8728	-2.5617	2727			Following the crack, quite a bit of sediments in the slope
ROV11	737	23.02.2024	22:07	72.8729	-2.5619	2710			Very steep terrain, lobes of crust sticking out, taking some 4K images of the structures
ROV11	737	23.02.2024	22:08	72.8731	-2.5619	2700			Reaching a top structure, taking 4K images of this too
ROV11	737	23.02.2024	22:13	72.8731	-2.5618	2699			Will try to saw into a round rock looking like it is covered with thick crust
ROV11	737	23.02.2024	22:34	72.8731	-2.5618	2699			The cut looks good, but needs another one from a second angle, starting the cut
ROV11	737	23.02.2024	22:49	72.8731	-2.5618	2699			Third cut is needed
ROV11	737	23.02.2024	22:53	72.8731	-2.5618	2699	KH24-254-ROV11-R06	NOD2024-1-11-1*	Sample broke off and put in drawer, it broke a bit when handling
ROV11	737	23.02.2024	22:56	72.8731	-2.5618	2699			4K images of the cut before starting to move further up the hill side
ROV11	737	23.02.2024	23:10	72.8740	-2.5613	2612			Getting close to reaching the top of the ridge structure,
ROV11	737	23.02.2024	23:12	72.8740	-2.5612	2602			The top, shortly getting into more sedimented flat areas, moving a bit down to find a suitable spot for sampling
ROV11	737	23.02.2024	23:16	72.8741	-2.5612	2610			Found a potential spot for sampling, but the sediments on the ground makes the visibility low
ROV11	737	23.02.2024	23:19	72.8741	-2.5612	2610			Starting to saw
ROV11	737	23.02.2024	23:27	72.8741	-2.5612	2610			Parts of the top layer of the sample flew off while sawing
ROV11	737	23.02.2024	23:51	72.8741	-2.5612	2610			The rock still looks stuck even after 3 different cuts with the saw. Attempting one more to get it loose
ROV11	737	23.02.2024	23:56	72.8741	-2.5612	2610			The dust coming off when sawing looks quite white, and it seems very hard, indicating that we are sawing through something that is not manganese crust. Hopefully it is bedrock
ROV11	737	24.02.2024	00:00	72.8741	-2.5612	2610			Will try to break off the sample with Frankenstein
ROV11	737	24.02.2024	00:04	72.8741	-2.5612	2610			Not able to break off, the sample needs more sawing from another angle
ROV11	737	24.02.2024	00:26	72.8741	-2.5612	2610			The rock seems impossible to get out, might indicate that it is a drop stone very well cemented to the wall since it is so hard, try to cut of just a small piece of it
ROV11	737	24.02.2024	00:34	72.8741	-2.5612	2610	KH24-254-ROV11-R07		Got the rock loose, but the Mn crust is lost. Visible pores in the rock. Taking 4K images.
ROV11	737	24.02.2024	00:40	72.8741	-2.5613	2609	KH24-254-ROV11-R08		Collecting one loose rock
ROV11	737	24.02.2024	00:41	72.8741	-2.5613				End of dive, ROV returning to deck
ROV11	737	25.02.2024	01:52			0			ROV on deck
ROV12	738	24.02.2024	17:43			0			ROV off deck
ROV12	738	24.02.2024	19:31	72.7507	-0.9260	2631			See the seafloor. Sand
ROV12	738	24.02.2024	19:32	72.7509	-0.9266	2617			See the wall. Looks like Mn crust, moving up against it
ROV12	738	24.02.2024	19:38	72.7510	-0.9267	2592			Sponges
ROV12	738	24.02.2024	19:39	72.7509	-0.9267	2590			Smoother wall, with loose rocks.
ROV12	738	24.02.2024	19:41	72.7510	-0.9267	2589			Looking at the loose pieces, might be drop stones
ROV12	738	24.02.2024	19:42	72.7510	-0.9268	2589	KH24-254-ROV12-R01	NOD2024-1-12-1*	One of the pieces looked good, putting in drawer
ROV12	738	24.02.2024	19:44	72.7510	-0.9268	2586			Continuing upwards along the wall
ROV12	738	24.02.2024	19:48	72.7510	-0.9271	2667			4K pictures of some holes in the manganese crust, might be from sediment fillings, reddish color.

ROV12	738	24.02.2024	19:51	72.7511	-0.9273	2550			Continue upwards, seeing more of the holes in the crust
ROV12	738	24.02.2024	19:53	72.7511	-0.9273	2550	KH24-254-ROV12-R02	NOD2024-1-12-2	Grab a sample with T4
ROV12	738	24.02.2024	19:56	72.7511	-0.9274	2540			An area of more sand over the Mn crusts
ROV12	738	24.02.2024	19:58	72.7512	-0.9279	2521			Smooth, long structures. Thick crusts?
ROV12	738	24.02.2024	19:59	72.7513	-0.9280	2517			Pinch the crust to see the thickness (does not look too thick)
ROV12	738	24.02.2024	20:04	72.7512	-0.9282	2515			Trying to cut with saw. Steep wall, drawer as close to the wall as possible
ROV12	738	24.02.2024	20:19	72.7512	-0.9282	2515			Trying to cut from another side
ROV12	738	24.02.2024	20:31	72.7512	-0.9280	2515	KH24-254-ROV12-R03	NOD2024-1-12-3*	Something fell in the front drawer (multiple small pieces), but the piece that we sawed are lost
ROV12	738	24.02.2024	20:33	72.7512	-0.9280	2515			4K pictures of the area that was sawed, and of the "Christmas three" (Mn crust) on the right side of the sawing area
ROV12	738	24.02.2024	20:37	72.7512	-0.9280	2515			Sawing at the same area once more
ROV12	738	24.02.2024	20:46	72.7512	-0.9280	2515			Did not get the whole crust, but picking up some pieces that belongs to R03
ROV12	738	24.02.2024	20:53	72.7512	-0.9280	2515			Continuing to move
ROV12	738	24.02.2024	20:56	72.7514	-0.9267	2547			On something that looks like a terrasse
ROV12	738	24.02.2024	20:58	72.7515	-0.9261	2585			Have to move further up, wrong terrasse
ROV12	738	24.02.2024	21:00	72.7520	-0.9255	2565			Very steep walls
ROV12	738	24.02.2024	21:02	72.7523	-0.9266	2511			Artefact bathymetry, seems like a plateau, but isn't.
ROV12	738	24.02.2024	21:04	72.7523	-0.9267	2506			Picking up a sample, dropped it. Looked like a drop stone
ROV12	738	24.02.2024	21:05	72.7523	-0.9266	2505	KH24-254-ROV12-R04	NOD2024-1-14-4	Picking up a new sample
ROV12	738	24.02.2024	21:10	72.7523	-0.9267	2504			Moving again
ROV12	738	24.02.2024	21:11	72.7525	-0.9266	2497			Overhanging block probably of basalt, taking 4K still pictures of it
ROV12	738	24.02.2024	21:15	72.7525	-0.9266	2496			4K video; an overview of slump like structure of basalt. Much calceous ooze
ROV12	738	24.02.2024	21:16	72.7525	-0.9269	2484			Fully sediment covered slope. ROV moving up
ROV12	738	24.02.2024	21:20	72.7526	-0.9274	2466			Possible sediment covered fan
ROV12	738	24.02.2024	21:21	72.7527	-0.9278	2454			Found a cracks in the manganese crust
ROV12	738	24.02.2024	21:23	72.7527	-0.9281	2446			Colluvial rock fan
ROV12	738	24.02.2024	21:25	72.7528	-0.9284	2430			Manganese layered wall of basalt, vertical
ROV12	738	24.02.2024	21:28	72.7529	-0.9289	2406			Cracks on vertical wall, chaotic clusters in basalt wall
ROV12	738	24.02.2024	21:31	72.7529	-0.9294	2373			Blocks of basalt on a plateau
ROV12	738	24.02.2024	21:36	72.7530	-0.9300	2342			4K picture taken, found a spot for sampling. To hard rock to rip off
ROV12	738	24.02.2024	21:41	72.7530	-0.9306	2308			Following a ridge heading 340 degrees to the summit
ROV12	738	24.02.2024	21:45	72.7532	-0.9308	2298			Starting to cut a rock
ROV12	738	24.02.2024	21:50	72.7532	-0.9308	2298			The whole rock is loose. Stopped sawing
ROV12	738	24.02.2024	21:52	72.7532	-0.9308	2298			4K picture taken, thin manganese crust
ROV12	738	24.02.2024	21:54	72.7533	-0.9310	2286			Flying up. Took a 4K picture
ROV12	738	24.02.2024	21:57	72.7534	-0.9316	2260			Vertical fissure structures in possible basalt wall. Very loose when
ROV12	738	24.02.2024	21:59	72.7533	-0.9316	2260	KH24-254-ROV12-R05	NOD2024-1-12-5*	Picking a sample, very brittle
ROV12	738	24.02.2024	22:01	72.7533	-0.9316	2258			Probably dykes/sills? 4K pictures taken
ROV12	738	24.02.2024	22:07	72.7535	-0.9317	2240			Sawing
ROV12	738	24.02.2024	22:15	72.7535	-0.9319	2241	KH24-254-ROV12-R06	NOD2024-1-12-6*	Using Frankenstein to gather the samples
ROV12	738	24.02.2024	22:24	72.7538	-0.9324	2197			4K overview picture, almost on top of the ridge
ROV12	738	24.02.2024	22:28	72.7538	-0.9323	2196			Sawing off a piece
ROV12	738	24.02.2024	22:40	72.7538	-0.9323	2196			Using Frankenstein to break it off, did not work. Rock broke in pieces
ROV12	738	24.02.2024	22:48	72.7538	-0.9325	2198			Found a new spot, trying to saw
ROV12	738	24.02.2024	22:59	72.7538	-0.9325	2198			End of dive, technical issues
ROV12	738	24.02.2024	23:55			0			ROV on deck

ROV13	739	25.02.2024	05:10			0			ROV off deck
ROV13	739	25.02.2024	05:53	72.5167	1.5309	1262			Seafloor visible
ROV13	739	25.02.2024	06:00	72.5168	1.5301	1256			Snake stars on the seafloor, a lot
ROV13	739	25.02.2024	06:48	72.5214	1.5130	1234	KH24-254-ROV13-R01		Sampling loose, angular rock, looks weathered, put into left drawer
ROV13	739	25.02.2024	06:51	72.5214	1.5129	1228			Following hill upward, some sponges, and pink small soft coral (?), Crinoidea, small branched sponge (?, not lissodendoryx I think)
ROV13	739	25.02.2024	06:54	72.5211	1.5124	1206			At top off hillside, want to go down and follow the top for a bit, want to look for samples
ROV13	739	25.02.2024	07:02	72.5211	1.5124	1206			Moving boat 100 m in 57 degrees
ROV13	739	25.02.2024	07:08	72.5225	1.5128	1283			4K picture of snake stars in the sediment
ROV13	739	25.02.2024	07:12	72.5225	1.5128	1283			Move boat 80 m in 040°
ROV13	739	25.02.2024	07:18	72.5225	1.5128	1283			Moving boat 100 m in 340°
ROV13	739	25.02.2024	07:26	72.5237	1.5135	1311			Looks like a lobe of sediment in the sediment cover, has a sponge on it
ROV13	739	25.02.2024	07:28	72.5237	1.5135	1311			Using ROV arm to poke in the lobe to see what it is, it is hard, might be manganese crust, want to try sample it. Could be a lot of drop stones here in the crust
ROV13	739	25.02.2024	07:31	72.5238	1.5132	1307			Trying to find a suitable place for sawing a sample
ROV13	739	25.02.2024	07:39	72.5238	1.5132	1307			Started sawing a sample
ROV13	739	25.02.2024	07:47	72.5238	1.5132	1307	KH24-254-ROV13-R02	NOD2024-1-13-2	Sampling a small subangular rock, could look like a basalt with thin manganese crust, put into right drawer. Leaving behind a small elongated angular/subangular sample that probably flew off while cutting.
ROV13	739	25.02.2024	07:49	72.5238	1.5132	1307			4K video + 4K picture of the lobe and the remaining rock from where the sample was cut off from
ROV13	739	25.02.2024	07:52	72.5238	1.5132	1307			Putting laser on for the 4K pictures
ROV13	739	25.02.2024	08:07	72.5237	1.5106	1283			Moving boat 150m in 273 + observing grazing structure in the sediment
ROV13	739	25.02.2024	08:09	72.5237	1.5100	1276			Small rock debris/drop stone
ROV13	739	25.02.2024	08:09	72.5237	1.5098	1269			Reaching a hillside with sponges and Crinoidea
ROV13	739	25.02.2024	08:11	72.5237	1.5098	1269			Stopping the boat to look more on the structure just encountered
ROV13	739	25.02.2024	08:12	72.5236	1.5088	1254			Sediment cover again, some rocks (debris or drop stones) with manganese crust and sediment cover on it, biology: soft coral, sponges, snail star
ROV13	739	25.02.2024	08:19	72.5236	1.5088	1254			Move boat 150 m in 283
ROV13	739	25.02.2024	08:26	72.5236	1.5088	1254			Move boat 320 (in total) m 282 degree.
ROV13	739	25.02.2024	08:36	72.5238	1.5007	1168			Stopping boat, looking at a locality with debris or drop stones
ROV13	739	25.02.2024	08:37	72.5238	1.5007	1169	KH24-254-ROV13-R03		Sampling a angular small rock into right drawer (more round than previous sample, but very alike)
ROV13	739	25.02.2024	08:40	72.5238	1.5006	1168			Trying to saw off a sample, next to a soft coral and next to the previous picked up sample. Looks like basalt underneath with thin manganese crust on top, looks like it might have some ores in it. Will collected the sample that flew away if founded
ROV13	739	25.02.2024	08:48	72.5238	1.5006	1168			Taking 4K picture of the sawing area/ the remaining basalt, and some pictures with laser on
ROV13	739	25.02.2024	08:50	72.5238	1.5006	1168			4k video of the same area
ROV13	739	25.02.2024	08:52	72.5238	1.5006	1169	KH24-254-ROV13-R03		Collected sample that flew off. It is small, angular, basalt, hopefully has a ore, from same area as the rock that was picked up
ROV13	739	25.02.2024	08:57	72.5239	1.5002	1163			Having a gradient in the sediments
ROV13	739	25.02.2024	08:59	72.5242	1.5002	1164			Arriving to new slope
ROV13	739	25.02.2024	09:02	72.5242	1.5001	1163	KH24-254-ROV13-R04		Picking up a small elongated angular/subangular rock into right drawer

ROV13	739	25.02.2024	09:08	72.5242	1.4994	1146			4K photo of fauna
ROV13	739	25.02.2024	09:12	72.5242	1.4986	1135			Big blocks and sponges - 4K still picture
ROV13	739	25.02.2024	09:36	72.5245	1.4970	1106	KH24-254-ROV13-R05	NOD2024-1-13-1	4K video - Sawing a new sample, lost the sample, but 4K picture of the cut, most likely sulfide. Trying to get a slice behind the other cut to get a slice.
ROV13	739	25.02.2024	10:00	72.5245	1.4971	1107			New 4K video of new cut
ROV13	739	25.02.2024	10:04	72.5245	1.4967	1099			Finding a new location with huge structures with lots of sponges on them. Taking a 4K picture of this.
ROV13	739	25.02.2024	10:25	72.5245	1.4964	1093			Cutting of a slice of a huge sulfide boulder. Has some sponges on it.
ROV13	739	25.02.2024	10:41	72.5245	1.4964	1093	KH24-254-ROV13-R06	NOD2024-1-13-3	Collecting the sample. Sulfide minerals. Not weathered
ROV13	739	25.02.2024	10:43	72.5245	1.4964	1093			4K video and picture of this cut.
ROV13	739	25.02.2024	11:03	72.5247	1.4956	1085			Trying to cut a new sulfide sample from several cuts, might be an potential ancient chimney
ROV13	739	25.02.2024	11:45	72.5248	1.4956	1085			Sawing from the underside of the structure to try to get the sample
ROV13	739	25.02.2024	12:33	72.5248	1.4956	1085	KH24-254-ROV13-R07	NOD2024-1-13-6	Collecting the sample.
ROV13	739	25.02.2024	12:40	72.5248	1.4956	1085			Two 4K videos of cut and some pictures.
ROV13	739	25.02.2024	12:46	72.5248	1.4956	1085			4K picture of top of the ancient chimney.
ROV13	739	25.02.2024	12:50	72.5248	1.4956	1085			Continuing up to top of hill. Of the small "valley" of Deep Insight
ROV13	739	25.02.2024	13:04	72.5241	1.4956	1084	KH24-254-ROV13-R08	NOD2024-1-13-5	Collecting a weathered piece of rock. Small.
ROV13	739	25.02.2024	13:06	72.5241	1.4957	1082			Continuing to move upwards in the slope
ROV13	739	25.02.2024	13:15	72.5241	1.4957	1082	KH24-254-ROV13-R09	NOD2024-1-13-4	Cutting of a slice of a huge sulfide boulder. Very weathered on the inside. 4K still photos taken.
ROV13	739	25.02.2024	13:18	72.5241	1.4957	1082			Continuing up the steep slope
ROV13	739	25.02.2024	13:26	72.5241	1.4955	1075			Finding another place to cut
ROV13	739	25.02.2024	13:31	72.5241	1.4955	1075	KH24-254-ROV13-R10	NOD2024-1-13-7	Cutting a piece of a bigger piece of a sulfide. This one is also very weathered. Has a huge sponge on it. 4K still photo of the cut.
ROV13	739	25.02.2024	13:40	72.5241	1.4956	1075			Going for a suction sampler sample. One spider, two sea feathers/feather lily(?).
ROV13	739	25.02.2024	13:53	72.5241	1.4956	1075			Headed towards the top of the "valley"
ROV13	739	25.02.2024	13:55	72.5242	1.4953	1074	KH24-254-ROV13-R11	NOD2024-1-13-8	Cutting of another bolder. Landed in the front drawer. Small piece, very weathered. 4K still photo taken.
ROV13	739	25.02.2024	14:10	72.5243	1.4951	1069			4K photo of a weathered rock that we tried to saw a sample from, difficult as it split into small pieces
ROV13	739	25.02.2024	14:12	72.5243	1.4951	1069			Continue from previous site, more sedimented towards the top. Move boat 60 m in 313 degree
ROV13	739	25.02.2024	14:18	72.5248	1.4943	1084			Found a spot for sawing off a sample, might be an old chimney. A lot of brown smoke as we´re sawing, might be Fe-oxides
ROV13	739	25.02.2024	14:31	72.5248	1.4943	1084			Did not continue to cut. Iron oxides.
ROV13	739	25.02.2024	14:38	72.5242	1.4942	1070			Reaching top of the hillside
ROV13	739	25.02.2024	14:39	72.5242	1.4942	1070			Leaving seafloor
ROV13	739	25.02.2024	15:30			0			ROV on deck
ROV14	740	25.02.2024	16:10			0			ROV off deck
ROV14	740	25.02.2024	16:52	72.5247	1.4925	1076			Seafloor visible, debris material with sponges spread out
ROV14	740	25.02.2024	16:56	72.5243	1.4948	1063			Looks like the ground is covered by loose material
ROV14	740	25.02.2024	17:00	72.5240	1.4944	1062			Most of the ground is sediment covered with some rocks poking out
ROV14	740	25.02.2024	17:10	72.5243	1.4931	1080			Found a spot to try and saw out a piece
ROV14	740	25.02.2024	17:35	72.5243	1.4931	1080	KH24-254-ROV14-R01	NOD2024-1-14-1	After sawing it appears to be Fe-ox, with some white veins (calcite?). No visible sulfides
ROV14	740	25.02.2024	17:41	72.5243	1.4931	1080			Taking 4K still photos of the cut, some calcite veins?
ROV14	740	25.02.2024	17:57	72.5237	1.4954	1074			Taking 4K still photos of the sedimented seafloor

ROV14	740	25.02.2024	17:58	72.5237	1.4954	1074			Semi-systematically moving around the hill (where we haven´t previously been), moving towards where sample ROV01-R04 was collected (sulfide)
ROV14	740	25.02.2024	18:00	72.5237	1.4948	1073			Trying a few pinches in a rock to check if it is Fe-ox or sulfides. Behaves like pure Fe-ox
ROV14	740	25.02.2024	18:05	72.5241	1.4930	1082			Seems to be only Fe-ox exposed at this slope
ROV14	740	25.02.2024	18:14	72.5249	1.4931	1096			Back at the area where we sampled ROV01-R04
ROV14	740	25.02.2024	18:15	72.5249	1.4931	1096			Taking 4K still photos of the sampled exposure, bright rusty red and a small peek of the sulfides inside
ROV14	740	25.02.2024	18:22	72.5249	1.4931	1096			Starting to saw in the large sulfide boulder
ROV14	740	25.02.2024	18:28	72.5249	1.4931	1096			4K video of sulfide sawing
ROV14	740	25.02.2024	20:06	72.5249	1.4931	1096			Trying to cut from another angle
ROV14	740	25.02.2024	20:16	72.5249	1.4931	1096			Using Frankenstein to try to break it loose - failed
ROV14	740	25.02.2024	20:25	72.5249	1.4931	1096			Getting the saw ready again, different angle
ROV14	740	25.02.2024	21:25	72.5249	1.4931	1096			Trying to get it loose with T4. Still won't move
ROV14	740	25.02.2024	21:26	72.5249	1.4931	1096			Using Atlas to get it loose
ROV14	740	25.02.2024	21:31	72.5248	1.4932	1100			The piece fell, picking it up (only took 3t, 10m)
ROV14	740	25.02.2024	21:34	72.5248	1.4932	1100	KH24-254-ROV14-R02	NOD2024-1-14-2*	Picked up the rock sample
ROV14	740	25.02.2024	21:37	72.5248	1.4932	1100			Taking 4K pictures of the cut
ROV14	740	25.02.2024	21:38	72.5248	1.4932	1100			4K closeup pictures taken of the cut
ROV14	740	25.02.2024	22:05	72.5244	1.4932	1080			Trying to locate ancient chimney
ROV14	740	25.02.2024	22:08	72.5247	1.4955	1081			Red biological stuff on rock boulder structure. Trying to poke in a big rock, it feels very solid. Flying around it to get a better look
ROV14	740	25.02.2024	22:09	72.5247	1.4958	1082			Multiple 4K pictures taken of the boulder structure, this is one of the same sampled sites as in ROV13
ROV14	740	25.02.2024	22:23	72.5247	1.4958	1086			One structure sticking out from the larger structure, will try to saw it
ROV14	740	25.02.2024	22:29	72.5247	1.4958	1086			Starting to saw
ROV14	740	25.02.2024	22:38	72.5247	1.4958	1086			The dust emitted when sawing is dark and black ish, indicating sulfides
ROV14	740	25.02.2024	22:44	72.5247	1.4958	1086	KH24-254-ROV14-R03	NOD2024-1-14-3*	One piece fell off when sawing, putting it in the drawer
ROV14	740	25.02.2024	22:45	72.5247	1.4958	1086			Continuing to saw in the cut we started and got R03 from, the last piece fell off when trying to get the saw in place
ROV14	740	25.02.2024	22:47	72.5247	1.4958	1086			Getting the last piece in the drawer, also part of R03
ROV14	740	25.02.2024	22:50	72.5247	1.4958	1086			Taking some 4K pictures of the sawed cut
ROV14	740	25.02.2024	22:55	72.5247	1.4969	1103			Moving again
ROV14	740	25.02.2024	22:56	72.5247	1.4969	1105			Poking rock structure with titan
ROV14	740	25.02.2024	22:58	72.5246	1.4970	1105			Poking new structure with titan
ROV14	740	25.02.2024	22:59	72.5246	1.4970	1104			Didn't find a spot to cut. Trying to find another spot. Top layer; brown dust particles
ROV14	740	25.02.2024	23:04	72.5246	1.4970	1105			Trying to cut off a sample; hard rock with clasts of sulfides in matrix
ROV14	740	25.02.2024	23:12	72.5246	1.4969	1105	KH24-254-ROV14-R04	NOD2024-1-14-4*	Picking up a sample of sawed off sulfide. Seems like sulfides occur in boulders in the slope with much biological life on. Not too steep
ROV14	740	25.02.2024	23:14	72.5246	1.4969	1105			4K pictures taken, fissures in the basalt
ROV14	740	25.02.2024	23:16	72.5246	1.4973	1101			Moving again
ROV14	740	25.02.2024	23:18	72.5248	1.4981	1120			Moving to an interesting rock structure east for the hill seen from bathymetric map. Poking in the structure to check if it is hard
ROV14	740	25.02.2024	23:24	72.5247	1.4982	1135			Sawing of an edge
ROV14	740	25.02.2024	23:34	72.5247	1.4982	1135	KH24-254-ROV14-R05	NOD2024-1-14-5*	4K pictures taken of saw surface; sulfide with pyrite and possible sphalerite. Some manganese crust
ROV14	740	25.02.2024	23:38	72.5247	1.4985	1135			Found a possible new sulfide deposition. This area could be a big hydrothermic depositional environment
ROV14	740	25.02.2024	23:42	72.5246	1.4986	1136			Poking a new structure. Hard as well to rip off; grabbing the saw

ROV14	740	25.02.2024	23:43	72.5246	1.4985	1135			Starting the sawing; hard rock to cut trough
ROV14	740	25.02.2024	23:52	72.5246	1.4985	1135	KH24-254-ROV14-R06	NOD2024-1-14-6*	Breaking off the sample
ROV14	740	25.02.2024	23:55	72.5246	1.4985	1135			Taking 4K photos of the cut
ROV14	740	26.02.2024	00:01	72.5250	1.4982	1143			Looking at some small holes + an anemone, taking 4K pictures
ROV14	740	26.02.2024	00:04	72.5250	1.4982	1143			Sawing off a small piece of a rock, right next to the small holes
ROV14	740	26.02.2024	00:14	72.5250	1.4982	1143			Trying to break off the piece with T4
ROV14	740	26.02.2024	00:17	72.5250	1.4982	1143			Continue sawing
ROV14	740	26.02.2024	00:20	72.5250	1.4982	1143	KH24-254-ROV14-R07	NOD2024-1-14-7*	Picking up the sample
ROV14	740	26.02.2024	00:22	72.5250	1.4982	1143			Taking a 4K picture of the cut
ROV14	740	26.02.2024	00:23						Moving northwards
ROV14	740	26.02.2024	00:26	72.5253	1.4977	1147			Pinching the rock to see if its any good
ROV14	740	26.02.2024	00:30	72.5253	1.4977	1147			Sawing of a piece
ROV14	740	26.02.2024	00:38	72.5253	1.4977	1147			Zoomed in on the cut and saw what looks like basalt with vesicles - keep sawing
ROV14	740	26.02.2024	00:54	72.5253	1.4977	1147			Using T4 to try to break it loose
ROV14	740	26.02.2024	00:55	72.5253	1.4977	1147	KH24-254-ROV14-R08	NOD2024-1-14-8*	Got it loose, put in drawer. Looks like sulfide-basalt breccia
ROV14	740	26.02.2024	00:56	72.5253	1.4977	1147			4K pictures of the cut
ROV14	740	26.02.2024	00:57						Moving towards north - northwest
ROV14	740	26.02.2024	01:01	72.5257	1.4965	1155			Pinching the rock to see if we should saw off a piece
ROV14	740	26.02.2024	01:04	72.5257	1.4965	1155			Starting to saw
ROV14	740	26.02.2024	01:21	72.5257	1.4965	1155	KH24-254-ROV14-R09	NOD2024-1-14-9*	Got a piece. Taking 4K images of the cut. Approx. 190 meters away from the tallest point of Deep Insight Hill
ROV14	740	26.02.2024	01:26	72.5257	1.4967	1143			Will move to the west of the Deep Insight Hill to find an appropriate place to take push cores
ROV14	740	26.02.2024	01:30	72.5250	1.4947	1095			Flying over several pile structures that might be sulfide piles
ROV14	740	26.02.2024	01:37	72.5252	1.4936	1092			The "transit" to the sediments are done higher up, so the seafloor is no longer visible
ROV14	740	26.02.2024	01:42	72.5255	1.4936	1142			Back down at the seafloor, large sedimented areas, with some hard rock structures sticking out
ROV14	740	26.02.2024	01:53	72.5254	1.4930				Getting the first push core down from the TMS (J/C)
ROV14	740	26.02.2024	01:56	72.5256	1.4928	1149	KH24-254-ROV14-PC01		PC01 = J/C. Taking the first push core, looks successful, did not over penetrate
ROV14	740	26.02.2024	01:59						Getting the second push core (I)
ROV14	740	26.02.2024	02:01	72.5253	1.4932	1140	KH24-254-ROV14-PC02		PC02 = I. NOT RECOVERED. Taking the second push core, it did not fill up as mush as PC01, hit something hard. The corer filled up with water because it was removed from the hole before finishing coring
ROV14	740	26.02.2024	02:06						Getting the third push core (E)
ROV14	740	26.02.2024	02:20	72.5249	1.4915	1126	KH24-254-ROV14-PC03		PC03 = E. Successful PC taken in an area with a lot of brittle stars. It penetrated all the way, but did not look like it over penetrated.
ROV14	740	26.02.2024	02:25						Getting the fourth push core (D)
ROV14	740	26.02.2024	02:33	72.5245	1.4907	1123	KH24-254-ROV14-PC04		PC04 = D. Also many brittle stars, got the corer all the way into the sediment.
ROV14	740	26.02.2024	02:37						PC04 successfully put in TMS
ROV14	740	26.02.2024	02:40	72.5246	1.4908	1114			End of dive, need to get back on deck to start transit.
ROV14	740	26.02.2024	03:12						ROV on deck
ROV15	741	26.02.2024	06:03			0			ROV of deck
ROV15	741	26.02.2024	06:50	72.6437	2.6795	2000			Reached seafloor
ROV15	741	26.02.2024		72.6437	2.6795	2000			Moving up the slope, sediment covered
ROV15	741	26.02.2024	07:05	72.6446	2.6795	1970			Seeing some big boulders, while moving upwards
ROV15	741	26.02.2024	07:08	72.6449	2.6795	1963			Pictures of seafloor
ROV15	741	26.02.2024	07:14	72.6456	2.6796	1929			Reaching debris of basalt

ROV15	741	26.02.2024	07:19	72.6456	2.6793	1932		4K picture of debris
ROV15	741	26.02.2024	07:19	72.6456	2.6797	1932	KH24-254-ROV15-R01	Collecting sample from the debris material
ROV15	741	26.02.2024	07:20	72.6456	2.6797	1930	KH24-254-ROV15-R02	Collecting sample from the debris material
ROV15	741	26.02.2024	07:22	72.6456	2.6796	1929	KH24-254-ROV15-R03	Collecting sample from the debris material
ROV15	741	26.02.2024		72.6456	2.6796	1929		Continuing upwards the slope
ROV15	741	26.02.2024	07:28	72.6457	2.6799	1916	KH24-254-ROV15-R04	Collecting small sample from slope
ROV15	741	26.02.2024	07:38	72.6458	2.6800	1897		Moving a little downwards to the east seeing layering, shear zone, 040 degrees vertical layers
ROV15	741	26.02.2024	07:47	72.6458	2.6802	1899	KH24-254-ROV15-R05	Collecting sample from the shear zone
ROV15	741	26.02.2024		72.6458	2.6802	1899		Moving upwards
ROV15	741	26.02.2024	07:49	72.6458	2.6805	1896		Seeing steep slope, taking 4K picture of the structure (cracks and protrusion, fault zone)
ROV15	741	26.02.2024	07:50	72.6458	2.6805	1896	KH24-254-ROV15-R06	Collecting sample from the fault
ROV15	741	26.02.2024	08:01	72.6458	2.6805	1895		Fault in 25 degree (north-northeast direction)
ROV15	741	26.02.2024	08:02	72.6458	2.6805	1895		4K picture of fault + biology
ROV15	741	26.02.2024	08:04	72.6458	2.6805	1895		Very loose sediment cover on the hillside, continue upward
ROV15	741	26.02.2024	08:06	72.6459	2.6806	1885		4K picture of nice surfaces (rectangular, longest upward) near and in the fault sone.
ROV15	741	26.02.2024	08:08	72.6459	2.6806	1881		4K picture of potential passages (dykes), lots of fault surfaces, same orientation as previous (fissure erosion that is later filled). 30 degree angle of the surfaces from previous note
ROV15	741	26.02.2024	08:15	72.6459	2.6806	1883	KH24-254-ROV15-R07	Sample from the fault surfaces, into left drawer
ROV15	741	26.02.2024	08:18	72.6459	2.6806	1882		4K picture of surface that could be a part of dykes
ROV15	741	26.02.2024	08:22	72.6459	2.6810	1874		Arriving from a flat sediment covered hillside (this we arrived to right after the dykes), to more rocks sticking out from the wall
ROV15	741	26.02.2024	08:23	72.6460	2.6810	1870		Observing more dikes in the new rocky hillside
ROV15	741	26.02.2024	08:24	72.6460	2.6809	1866		New fault with same heading as previous fault
ROV15	741	26.02.2024	08:29	72.6461	2.6809	1840		4K still photo of biology, more species appearing in this section, most growing on bedrock
ROV15	741	26.02.2024	08:31	72.6461	2.6810	1826		New dikes
ROV15	741	26.02.2024	08:33	72.6462	2.6811	1821		Trying to sample a flat rock, could be a surface in connection with the fault and/or dikes
ROV15	741	26.02.2024	08:35	72.6462	2.6811	1811		Entering an area with less biology
ROV15	741	26.02.2024	08:46	72.6462	2.6809	1800		Entering more bedrock, meaning more biology as well
ROV15	741	26.02.2024	08:38	72.6463	2.6809	1798		Trying to sample from a top
ROV15	741	26.02.2024	08:39	72.6463	2.6810	1798	KH24-254-ROV15-R08	Collecting elongated, subangular shaped rock into right drawer
ROV15	741	26.02.2024	08:40					Continue upward the structure
ROV15	741	26.02.2024	08:42	72.6464	2.6810	1779		Large fault surfaces
ROV15	741	26.02.2024	08:50	72.6470	2.6807	1732		New large fault surfaces
ROV15	741	26.02.2024	08:52	72.6471	2.6807	1731		4K still photo of fault surfaces, some small bio life there
ROV15	741	26.02.2024	08:53					Trying to sample from the fault surface
ROV15	741	26.02.2024	08:54	72.6471	2.6807	1732	KH24-254-ROV15-R09	Gather small elongated piece from the fault surface. Trying to sample more.
ROV15	741	26.02.2024	08:57					Continue further up
ROV15	741	26.02.2024	08:58	72.6472	2.6807	1722		A fracture surface, covered with manganese crust, lots of biology at that specific area
ROV15	741	26.02.2024	09:05	72.6476	2.6808	1688		The hillside looks sheeted like (fracture surface)
ROV15	741	26.02.2024	09:08	72.6477	2.6809	1678		In between the sheet like fracture surfaces is a massive wall.
ROV15	741	26.02.2024	09:09	72.6477	2.6809	1671		Looks like a fractured surface
ROV15	741	26.02.2024	09:11	72.6478	2.6809	1666		Another fractured surface
ROV15	741	26.02.2024	09:15	72.6481	2.6811	1655		Some lobe like structures in the sediment cover
ROV15	741	26.02.2024	09:18	72.6483	2.6812	1748		Looks like lava flow

ROV15	741	26.02.2024	09:19	72.6485	2.6812	1630		Fracture surface
ROV15	741	26.02.2024	09:25	72.6489	2.6812	1621		Going out of a massive area into a sedimented area, with a lot of small rocks on it
ROV15	741	26.02.2024	09:28	72.6492	2.6831	1610		Entering a new massive area (bedrock or lava)
ROV15	741	26.02.2024	09:29					Moving boat 50 m further north
ROV15	741	26.02.2024	09:32	72.6494	2.6815	1605		4K still picture of basalt structures
ROV15	741	26.02.2024	09:35	72.6495	2.6819	1588		Pillow structures
ROV15	741	26.02.2024	09:37	72.6495	2.6823	1573		Reaching a almost vertical wall.
ROV15	741	26.02.2024	09:39	72.6396	2.6826	1550		Fault or dike
ROV15	741	26.02.2024	09:44	72.6498	2.6833	1499		Release point
ROV15	741	26.02.2024	09:50	72.6501	2.6847	1459		Basalt structures
ROV15	741	26.02.2024	09:52	72.6502	2.6848	1445		Dike structures
ROV15	741	26.02.2024	10:04	72.6509	2.6848	1357		Very steep wall of basalt
ROV15	741	26.02.2024	10:09	72.6512	2.6848	1331	KH24-254-ROV15-R10	Grabbing sample nr 10 from the wall (2 pieces)
ROV15	741	26.02.2024	10:14	72.6513	2.6849	1310		Decreasing steepness
ROV15	741	26.02.2024	10:18	72.6515	2.6849	1282		Moving upwards along a "ridge"-looking formation, with very steep on the westside comparing to the other
ROV15	741	26.02.2024	10:22	72.6519	2.6842	1234		Switching between bare rock and sediment
ROV15	741	26.02.2024	10:33	72.6528	2.6827	1155		Sediment dominated area, with some boulders
ROV15	741	26.02.2024	10:36	72.6531	2.6823	1135		Reaching a more rounded rock wall structure
ROV15	741	26.02.2024	10:42	72.6535	2.6817	1105		Continuing upwards the hilly terrain
ROV15	741	26.02.2024	10:54	72.6546	2.6807	1058		Vertical walls with both smooth and rough surface
ROV15	741	26.02.2024	10:59	72.6549	2.6817	1091		Reaching a massive wall, little life, some sponges
ROV15	741	26.02.2024	11:02	72.6551	2.6817	1094		Finding a structure that could be the dredge from 2004, following it for a bit to see what it is
ROV15	741	26.02.2024	11:03	72.6551	2.6816	1085		The potential dredge stopped, probably not it
ROV15	741	26.02.2024		72.6551	2.6816	1085		Wall is 266 degrees in heading
ROV15	741	26.02.2024	11:06	72.6551	2.6814	1080		Moving boat 60m in 348 degree, also looking at the wall in a zig-zag motion to look for the dredge
ROV15	741	26.02.2024	11:08	72.6552	2.6931	1076		4K picture of the wall with some layering, looks like stair step, going vertically
ROV15	741	26.02.2024	11:16	72.6558	2.6820	1067		The layered things appear again, could show movement of fault
ROV15	741	26.02.2024	11:19	72.6558	2.6816	1068		In a sediment covered area, wish to follow this as it is easier to see the dredge in sediment
ROV15	741	26.02.2024	11:21	72.6556	2.6812	1068		In a more massive area, some area with sediment and big rocks in it
ROV15	741	26.02.2024	11:22	72.6554	2.6809	1068		Sediment covered area, moving into a new massive rocky area a bit after
ROV15	741	26.02.2024	11:24	72.6553	2.6811	1069		Deciding to move the other way for the potential dredge to see if we can find it
ROV15	741	26.02.2024	11:28	72.6558	2.6819	1069		A huge wall sticking out next to a sedimented wall, followed by more massive rock wall
ROV15	741	26.02.2024	11:33	72.6561	2.6825	1071		Half which consist of sediment below, and bedrock above.
ROV15	741	26.02.2024	11:35	72.6562	2.6827	1070		Some big bedrocks sticking out, moving into an massive area after that
ROV15	741	26.02.2024	11:36	72.6563	2.6828	1071		4K still picture of a sedimented/massive area
ROV15	741	26.02.2024	11:37	72.6564	2.6828	1068		Finding an interesting gap in the bedrock, but it is probably from an avalanche. Need to move down deeper because we are close to where the dredge was lifted up from the seafloor
ROV15	741	26.02.2024	11:40	72.6561	2.6623	1066		Some light, slim vertical stripes going down the wall
ROV15	741	26.02.2024	11:42	72.6558	2.6820	1066		The large bedrock sticking out from the sediment and massive wall- Looks like the side of a pyramid due to the lines going horizontally
ROV15	741	26.02.2024	11:43	72.6558	2.6820	1066		Following the hillside downwards

ROV15	741	26.02.2024	11:49	72.6550	2.6819	1098			At the start point of the dredging, have to go up again to see if it can be found
ROV15	741	26.02.2024	11:51	72.6552	2.6819	1098			Looking at some green color between small rocks in the sediment. Was some green minerals from the dredge
ROV15	741	26.02.2024	11:53	72.6553	2.6816	1087			A massive lobe-like structure, could look like some greenish-color in the sediment. Taking 4K picture of the biological life there.
ROV15	741	26.02.2024	11:56	72.6553	2.6816	1087			Using ROV-arm to touch the rock. It is hard, looks weathered. Going to try and sample from it, saw it so we at least can see what is in there
ROV15	741	26.02.2024	12:01	72.6553	2.6815	1088			Start sawing, it is very hard to cut through, white smoke from the sawing
ROV15	741	26.02.2024	12:15	72.6553	2.6815	1088	KH24-254-ROV15-R11	NOD2024-1-15-1*	A small elongated sample, looks like a basalt, sampled into the right drawer. Remaining rock looks brecciated with some weathered matrix around it
ROV15	741	26.02.2024	12:18	72.6553	2.6815	1088			Taking 4K pictures of the basalt with some holes in it. Thin manganese crust
ROV15	741	26.02.2024	12:20	72.6553	2.6815	1088			Continue zig-zag upward
ROV15	741	26.02.2024	12:22	72.6553	2.6813	1079			Thin light grey vertically line in the sediment, probably from an avalanche
ROV15	741	26.02.2024	12:24	72.6554	2.6807	1061			Another big lobe from the sediments (can be the same seen previously)
ROV15	741	26.02.2024	12:39	72.6565	2.6828	1064			A very seep bedrock, over 90 degree at some places
ROV15	741	26.02.2024	12:41	72.6565	2.6830	1074			Change of plans, go to the dop, take a look for the dredge. But main goal: get ROV on deck, remove rocks, then take a new dive for the bio life on top of the structure
ROV15	741	26.02.2024	12:49	72.6572	2.6903	992			Still much of the same morphology with some sedimented areas, others more massive with some sponges
ROV15	741	26.02.2024	12:51	72.6573	2.6803	984			Taking 4K picture of biology + fish on a biologic rich bedrock sticking out from the sediments.
ROV15	741	26.02.2024	12:52			965			The bedrock is followed by massive ground + some big bedrock sticking out
ROV15	741	26.02.2024	12:56	72.6576	2.6789	933			Some rock debris + massive ground , sponges and anemones, soft corals
ROV15	741	26.02.2024	12:58	72.6576	2.6783	920			Taking 4K pictures of bio stuff on bedrock
ROV15	741	26.02.2024	13:00	72.6576	2.6773	896			More life is appearing the higher we go
ROV15	741	26.02.2024	13:02	72.6576	2.6772	895			4K still picture of biology + close picture of multiple anemones
ROV15	741	26.02.2024	13:05	72.6576	2.6772	896			4K video of biology for some minutes as we move upward for 2-3 minutes
ROV15	741	26.02.2024	13:10	72.6578	2.6767	871			Leaving seafloor
ROV15	741	26.02.2024	13:47			0			ROV on deck
ROV16	742	26.02.2024	14:11						ROV off deck
ROV16	742	26.02.2024	14:42	72.6641	2.7025	626			Lots of sponges yellow and white, brownish sediments
ROV16	742	26.02.2024	14:47	72.6646	2.7040	627			Continue along the ridge, towards the top
ROV16	742	26.02.2024	14:48	72.6647	2.7040	624			4K video with laser and photo
ROV16	742	26.02.2024	14:53	72.6647	2.7042	625			4K video of biology along the ridge
ROV16	742	26.02.2024	15:13	72.6652	2.7081	614			4K video of white sponge and a small starfish
ROV16	742	26.02.2024	15:20	72.6652	2.7081	614			4K video of a brittle star
ROV16	742	26.02.2024	15:23	72.6652	2.7081	614			4K video big sponge
ROV16	742	26.02.2024	15:30	72.6652	2.7081	614			4K video of red cnidaria
ROV16	742	26.02.2024	15:38	72.6652	2.7081	614			4K video of hydrocoral
ROV16	742	26.02.2024	15:42	72.6652	2.7083	614			4K video of the ground
ROV16	742	26.02.2024	15:46	72.6652	2.7083	614			4K video sponge with feather star

ROV16	742	26.02.2024	15:50	72.6652	2.7083	614		4K video of snake star
ROV16	742	26.02.2024	15:58	72.6652	2.7083	614		4K video of shrimp and snake star
ROV16	742	26.02.2024	16:07	72.6651	2.7090	614		4K video of a fat starfish and cnidaria
ROV16	742	26.02.2024	16:12	72.6651	2.7090	614		4K video of soft coral
ROV16	742	26.02.2024	16:20	72.6649	2.7098	619		4K video of sunstar who is eating sea star
ROV16	742	26.02.2024	16:45	72.6648	2.7099	621		Stopped vacuum-sampling
ROV16	742	26.02.2024	16:49	72.6648	2.7099	621		4K video of marine life; close up of coral
ROV16	742	26.02.2024	16:55	72.6648	2.7099	621		4K video of marine life; close up of coral
ROV16	742	26.02.2024	17:03	72.6648	2.7099	621		4K video of anemones
ROV16	742	26.02.2024	17:11	72.6648	2.7099	621		4K video
ROV16	742	26.02.2024	17:13	72.6648	2.7100	621		4K video of sea star creature
ROV16	742	26.02.2024	17:17	72.6648	2.7100	621		4K video of red fish inside sponge
ROV16	742	26.02.2024	17:20	72.6648	2.7100	621		4K video of a colony of many different sponges and anemones together
ROV16	742	26.02.2024	17:25	72.6649	2.7100	619		4K video of a large amount of small things swimming around and shrimp fight
ROV16	742	26.02.2024	17:30	72.6649	2.7100	619		4K video of shrimp
ROV16	742	26.02.2024	17:32	72.6649	2.7100	619		4K video if yellow sponge/moss looking thing
ROV16	742	26.02.2024	17:38	72.6649	2.7100	619		4K video of sea star
ROV16	742	26.02.2024	17:39	72.6649	2.7100	603		4K video of dumbo
ROV16	742	26.02.2024	17:40					End of dive, returning to TMS
ROV16	742	26.02.2024	18:06			0		ROV on deck
ROV17	743	26.02.2024	21:06			0		ROV off deck
ROV17	743	26.02.2024	22:26	72.4289	1.7821	2809		See seafloor, lots of loose rocks (pillow breccia)
ROV17	743	26.02.2024	22:34	72.4289	1.7830	2805		Try to find glass
ROV17	743	26.02.2024	22:36	72.4289	1.7830	2805	KH24-254-ROV17-R01	Found a nice sample
ROV17	743	26.02.2024	22:39	72.4289	1.7830	2805		Moving up the slope
ROV17	743	26.02.2024	22:40	72.4290	1.7833	2792		Seeing some pillow lava
ROV17	743	26.02.2024	22:43	72.4291	1.7832	2772		On the top of the ridge, lots of pillow basalt
ROV17	743	26.02.2024	22:46	72.4291	1.7830	2772	KH24-254-ROV17-R02	Found a small sample
ROV17	743	26.02.2024	22:49	72.4291	1.7835	2772		4K picture of a pillow basalt, with structures that is pointing out
ROV17	743	26.02.2024	22:50	72.4291	1.7835	2772	KH24-254-ROV17-R03	Using Frankenstein to collect the pieces (2) that sticks out of the pillow basalt
ROV17	743	26.02.2024	22:54	72.4291	1.7829	2770		Moving west, following the ridge
ROV17	743	26.02.2024	22:58	72.4291	1.7808	2776	KH24-254-ROV17-R04	Picking up a sample
ROV17	743	26.02.2024	23:00	72.4290	1.7800	2777		4K picture of pillow basalt in tall columns
ROV17	743	26.02.2024	23:02	72.4290	1.7799	2778	KH24-254-ROV17-R05	Picking up a sample from the top of one of the columns
ROV17	743	26.02.2024	23:08	72.4289	1.7790	2781		More sediments
ROV17	743	26.02.2024	23:14	72.4289	1.7779	2794		Using T4 to try to break off a piece - very small
ROV17	743	26.02.2024	23:15	72.4289	1.7779	2795		Trying again to break off a piece - too small
ROV17	743	26.02.2024	23:17	72.4289	1.7779	2795		Using Frankenstein to gather a sample, the whole thing fell off.
ROV17	743	26.02.2024	23:19	72.4289	1.7779	2794	KH24-254-ROV17-R06	Tried with Frankenstein from another angle, were able to break off a sample
ROV17	743	26.02.2024	23:24	72.4287	1.7774	2798		Lots of small rock pieces
ROV17	743	26.02.2024	23:25	72.4286	1.7770	2803		More pillow basalt on the top, also smaller pieces. Not too much sediment
ROV17	743	26.02.2024	23:27	72.4285	1.7761	2813		Looks like a wall full of pillow basalt. 4K photos
ROV17	743	26.02.2024	23:30	72.4284	1.7756	2814		Trying to pick up a pillow, did not work. Zooming in, taking 4K photos
ROV17	743	26.02.2024	23:34	72.4284	1.7758	2813		Lava flow tubic structures. Trying to saw

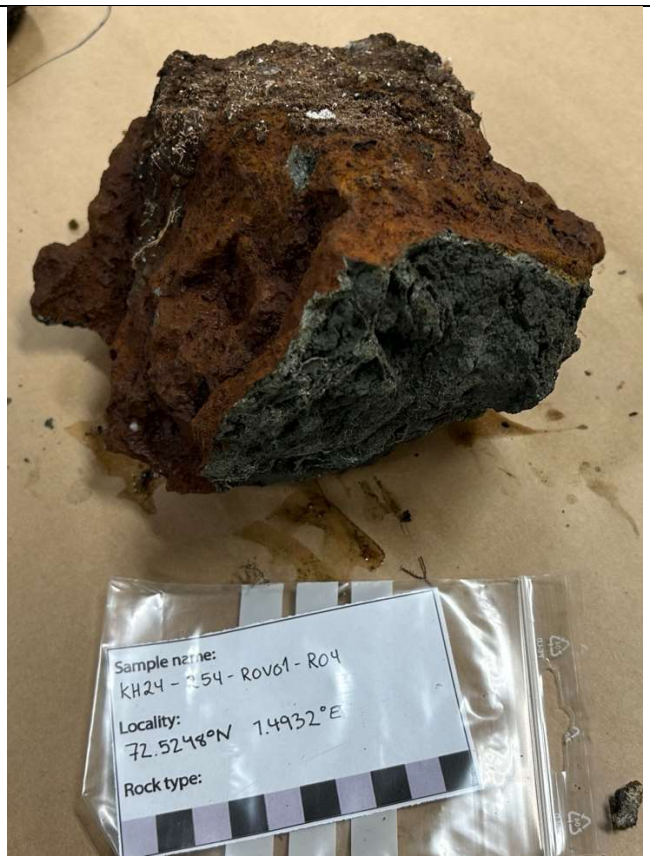
ROV17	743	26.02.2024	23:44	72.4285	1.7757	2814		Zoomed on a edge made by sawing. Interesting observation; big phenocrystals in the igneous basaltic rock. Probably plagioclase crystals. Slow crystallization.
ROV17	743	26.02.2024	23:46	72.4285	1.7757	2814		Halfway into the rock. Cutting perpendicular to the first cut. Some crust fell of when sawing
ROV17	743	26.02.2024	23:51	72.4285	1.7757	2814	KH24-254-ROV17-R07	Picking up the sawed rock. Taking a zoomed in picture of the cut.
ROV17	743	26.02.2024	23:54	72.4284	1.7757	2811		4K video of lava tube structures; steep slope
ROV17	743	26.02.2024	23:59	72.4282	1.7750	2777		On top of the volcanic structures; taking 4K overview pictures
ROV17	743	27.02.2024	00:01	72.4281	1.7749	2775		Trying to use Frankenstein to break off a part. Did not go as planned; broke off a big lava structure. Using Atlas to remove the whole structure for further geological observations of rock structure
ROV17	743	27.02.2024	00:08	72.4281	1.7748	2776		To much sediments on top of broken rock structure, unable to get a good observation
ROV17	743	27.02.2024	00:09	72.4281	1.7748	2776		The broken rock; has similar mineralogy and same amount of phenocrystals
ROV17	743	27.02.2024	00:14	72.4277	1.7744	2755		Visible fissure in the lava flow structure
ROV17	743	27.02.2024	00:16	72.4277	1.7744	2753		4K pictures taken of summit of new structure along the volcanic ridge
ROV17	743	27.02.2024	00:17	2.42767	1.7744	2752	KH24-254-ROV17-R08	Picked a new sample
ROV17	743	27.02.2024	00:24	72.4273	1.7741	2764		Found something mysterious ("lost fender to boat")
ROV17	743	27.02.2024	00:27	72.4274	1.7742	2758	KH24-254-ROV17-R09	Pulled off a new sample
ROV17	743	27.02.2024	00:30	72.4272	1.7731	2768		More sediment covering lava structure
ROV17	743	27.02.2024	00:33	72.4271	1.7723	2773		Steep slope
ROV17	743	27.02.2024	00:35	72.4266	1.7716	2793		Sediment dominated area. The end of basaltic lava tube structures. Found a fissure Multiple pictures of it (240 degrees). Planning to find rocks from the fissure
ROV17	743	27.02.2024	00:38	72.4268	1.7715	2796		4K picture taken; fissure with sediments on top, basalt structures bellow. Very fine grained sediment in suspension from the ROV's movement
ROV17	743	27.02.2024	00:41	72.4269	1.7719	2794		Found a new spot in the fracture to try to take sample from. Little to no biological life at this spot
ROV17	743	27.02.2024	00:44	72.4268	1.7719	2795	KH24-254-ROV17-R10	Rock sample from fracture taken
ROV17	743	27.02.2024	00:48	72.4267	1.7709	2795		Sedimented area
ROV17	743	27.02.2024	00:52	72.4262	1.7711	2785		Trying to pick a sample. Destroyed while sampling, due to too fragile rock
ROV17	743	27.02.2024	00:56	72.4262	1.7707	2785	KH24-254-ROV17-R11	Picked a sample with Frankenstein
ROV17	743	27.02.2024	00:58	72.4260	1.7706	2777		More sponges, found a fracture zone
ROV17	743	27.02.2024	00:59	72.4259	1.7705	2772		A sharp edge of vertical slope; moving up the edge
ROV17	743	27.02.2024	01:00	72.4256	1.7696	2773		A rock avalanche area. Picking up a rock sample. Well edged rocks, elongated and breaks in sheets. Looking at the edge at NW- direction
ROV17	743	27.02.2024	01:06	72.4256	1.7695	2775	KH24-254-ROV17-R12	Picked a new sample
ROV17	743	27.02.2024	01:08	72.4256	1.7688	2758		Going along sharp ridge. ROV going SW-degree .
ROV17	743	27.02.2024	01:09	72.4252	1.7675	2762		Massive wall of pillow basalt
ROV17	743	27.02.2024	01:12	72.4248	1.7670	2736		More sedimented area
ROV17	743	27.02.2024	01:13	72.4247	1.7671	2733		4K photo off a huge fracture and pillow basalt
ROV17	743	27.02.2024	01:17	72.4246	1.7667	2731	KH24-254-ROV17-R13	Picking up a loose rock sample from the top of a ridge/basalt column
ROV17	743	27.02.2024	01:18	72.4246	1.7667	2731		Continuing towards SW
ROV17	743	27.02.2024	01:23	72.4249	1.7650	2731		A lot of sediment on one side, steep pillow basalt wall on the other. Some sponges
ROV17	743	27.02.2024	01:30	72.4240	1.7635	2748		Saw a piece, but way too big
ROV17	743	27.02.2024	01:31	72.4239	1.7636	2749		Using T4 to break of a sample - difficult, not loose
ROV17	743	27.02.2024	01:35	72.4239	1.7635	2751		Tried to pick up a sample, but too much dust. Moving on

ROV17	743	27.02.2024	01:37	72.4237	1.7626	2756		Looks like many loose rocks, try to gather one sample. No glass
ROV17	743	27.02.2024	01:39	72.4237	1.7625	2755		Looked at another rock, but did not seem to be glass on it
ROV17	743	27.02.2024	01:41	72.4236	1.7623	2756	KH24-254-ROV17-R14	Got a sample
ROV17	743	27.02.2024	01:45	72.4236	1.7614	2750		Wall of lava flow/pillow basalt
ROV17	743	27.02.2024	01:47	72.4236	1.7604	2728		Pinching one of the basalts to see if it also has crystals in it
ROV17	743	27.02.2024	01:50	72.4237	1.7601	2720		Using T4 to see what's inside. This one has crystals. Taking 4K photos
ROV17	743	27.02.2024	01:52	72.4237	1.7601	2720		Using Frankenstein and T4 to get a sample - the rock will not move
ROV17	743	27.02.2024	01:55	72.4237	1.7601	2720		Continuing towards W
ROV17	743	27.02.2024	01:58	72.4236	1.7596	2712		Very round pillow basalt
ROV17	743	27.02.2024	01:59	72.4236	1.7595	2713		4K photo
ROV17	743	27.02.2024	02:03	72.4236	1.7595	2713	KH24-254-ROV17-R15	Gather a sample - only crust of pillow basalt
ROV17	743	27.02.2024	02:12	72.4234	1.7572	2704		4K photo of a pile of pillow basalt/lava flow
ROV17	743	27.02.2024	02:17	72.4234	1.7572	2704	KH24-254-ROV17-R16	Got the piece that stood on the top of the pile
ROV17	743	27.02.2024	02:20					End of dive
ROV18	744	27.02.2024	05:30			0		ROV off deck
ROV18	744	27.02.2024	06:30					Heave is to big for winch, so dive is canceled.

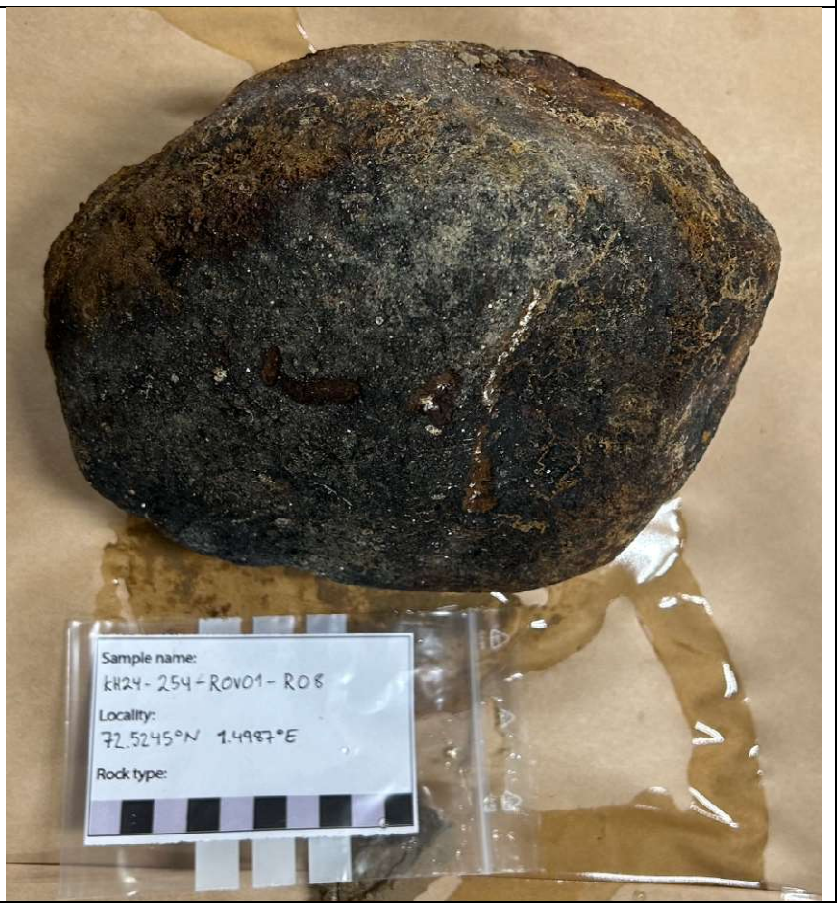
Appendix D – Sample description

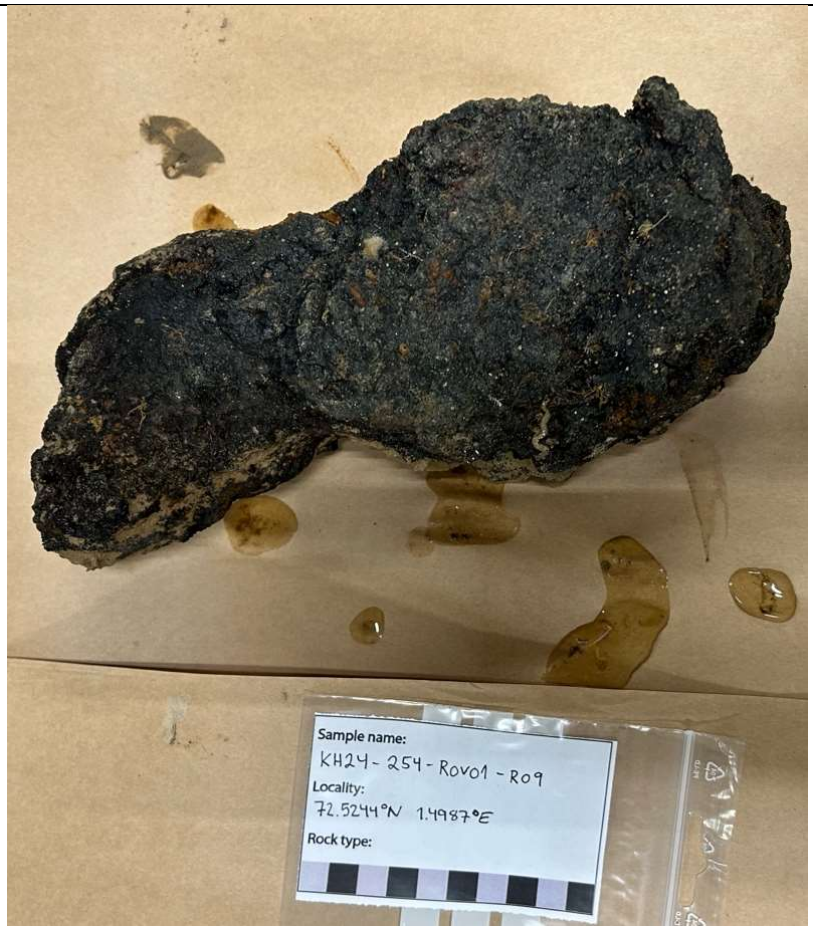
Dive ROV01: 17.02.24-18.02.24

KH23-253-ROV01-R01 Location: Deep Insight Hill Latitude: 72.5236°N Longitude: 1.4934°E Depth: 1804 m Measurements (l/w/h): 42cm/40cm/18cm Description: Red, orange, black. Covered in thin layer (<1 mm) of manganese crust. Covered in tube-worms. Breaks easily, fragile. Not very compact. Inside after cutting looks the same as outside. Rock type: Iron-oxide	
KH23-253-ROV01-R02 Location: Deep Insight Hill Latitude: Longitude: Depth: Not recovered	NOT RECOVERED

KH23-253-ROV01-R03 Location: Deep Insight Hill Latitude: 72.5246°N Longitude: 1.4926°E Depth: 1110 m Measurements (l/w/h): 65cm/40cm/25cm Description: Very weathered. Bright orange inside. Black veins: iron silica. Tubeworms. Compact. Rock type: Iron-oxide	
KH23-253-ROV01-R04 Location: Deep Insight Hill Latitude: 72.5248°N Longitude: 1.4932°E Depth: 1100 m Measurements (l/w/h): 16cm/18cm/12cm Description: Thin layer of weathering (red/orange Fe-ox). Massive sulfide. Remnant fluid channels, showing some larger crystals, looks like pyrite. Inside: dark grey, massive sulfide with veins. Rock type: Sulfide	

KH23-253-ROV01-R05 Location: Deep Insight Hill Latitude: 72.5248°N Longitude: 1.4931°E Depth: 1100 m Measurements (l/w/h): 60cm/35cm/26cm Description: Bigger piece of R04. See R04 description. Rock type: Sulfide	
KH23-253-ROV01-R06 Location: Deep Insight Hill Latitude: 72.5252°N Longitude: 1.4959°E Depth: 1113 m Measurements (l/w/h): 16cm/10cm/6cm Description: Colors – black, orange, brown. Weathered-iron oxides. Relatively light in weight. Fragile Rock type: Iron-oxide	

KH23-253-ROV01-R07 Location: Deep Insight Hill Latitude: 72.4249°N Longitude: 1.4979°E Depth: 1136 m Measurements (l/w/h): 20cm/13cm/10cm Description: black, brown, orange. Massive, weathered. Thin manganese crust on one side (<1 mm) Some layering inside with some bigger grains. Rock type: Iron-oxide	
KH23-253-ROV01-R08 Location: Deep Insight Hill Latitude: 72.5245°N Longitude: 1.4987°E Depth: 1140 m Measurements (l/w/h): 19cm/14cm/15cm Description: Very rounded. Likely dropstone Rock type: Dropstone	

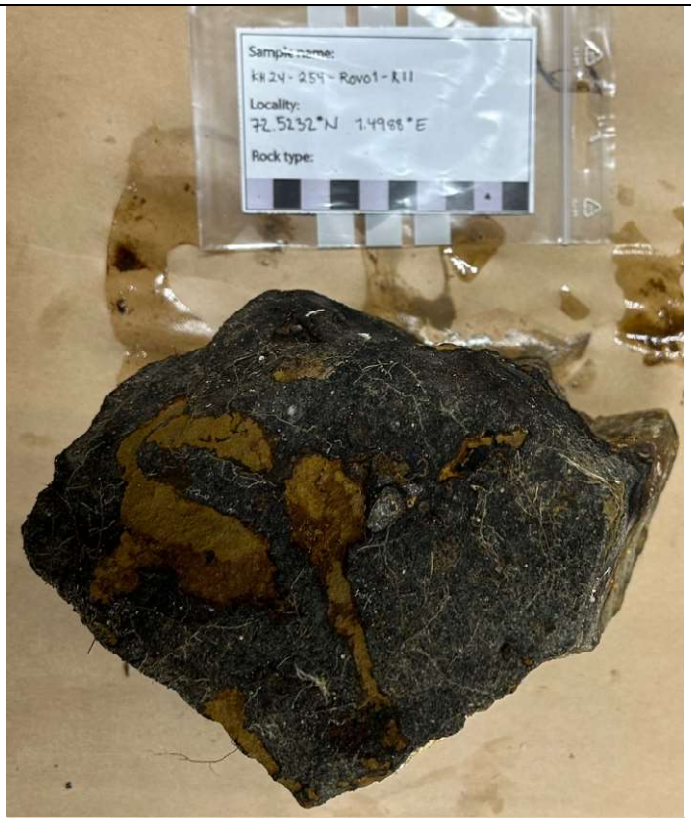
KH23-253-ROV01-R09 Location: Deep Insight Hill Latitude: 72.5244°N Longitude: 1.4987°E Depth: 1137 m Measurements (l/w/h): 22cm/10cm/9cm Description: Covered in manganese crust (<1 mm). Inside is dark red brownish colored with some lighter orange patches. Vein with sand-like grains (pale beige). Some darker zonation. Relatively heavy. Rock type: Iron-oxide	
KH23-253-ROV01-R10 Location: Deep Insight Hill Latitude:72.5236°N Longitude: 1.4981°E Depth: 1119 m Measurements (l/w/h): 17cm/10cm/11cm Description: Rounded, yellow/brown-ish. Inside: weathering rim/zonation throughout the whole rock. Rock type: Sedimentary? Dropstone?	

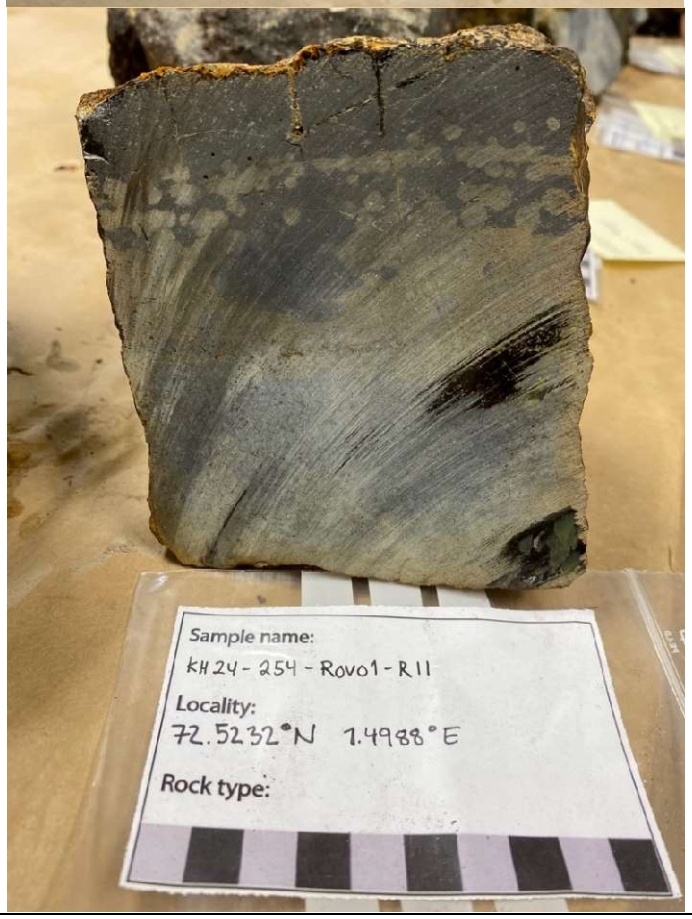
KH23-253-ROV01-R11

Location: Deep Insight Hill
Latitude: 72.5232°N
Longitude: 1.4988°E
Depth: 1131 m
Measurements (l/w/h): 16cm/14cm/14cm

Description:
Basalt. Thin glass rim (approx., 2 mm). Very thin manganese crust. Inside: first outer two cm – small white crystals. Next four cm: variolite texture. Rest is lighter colored and more homogeneous in texture. Relatively heavy.

Rock type: Basalt





KH23-253-ROV01-R12

Location: Deep Insight Hill
Latitude: 72.5239°N
Longitude: 1.4947°E
Depth: 1064 m

Measurements (l/w/h): 16cm/17cm/19cm

Description:
Orange, brown, black. Weathered. Massive.

Rock type: Iron-oxide

Dive ROV02: 18.02.24

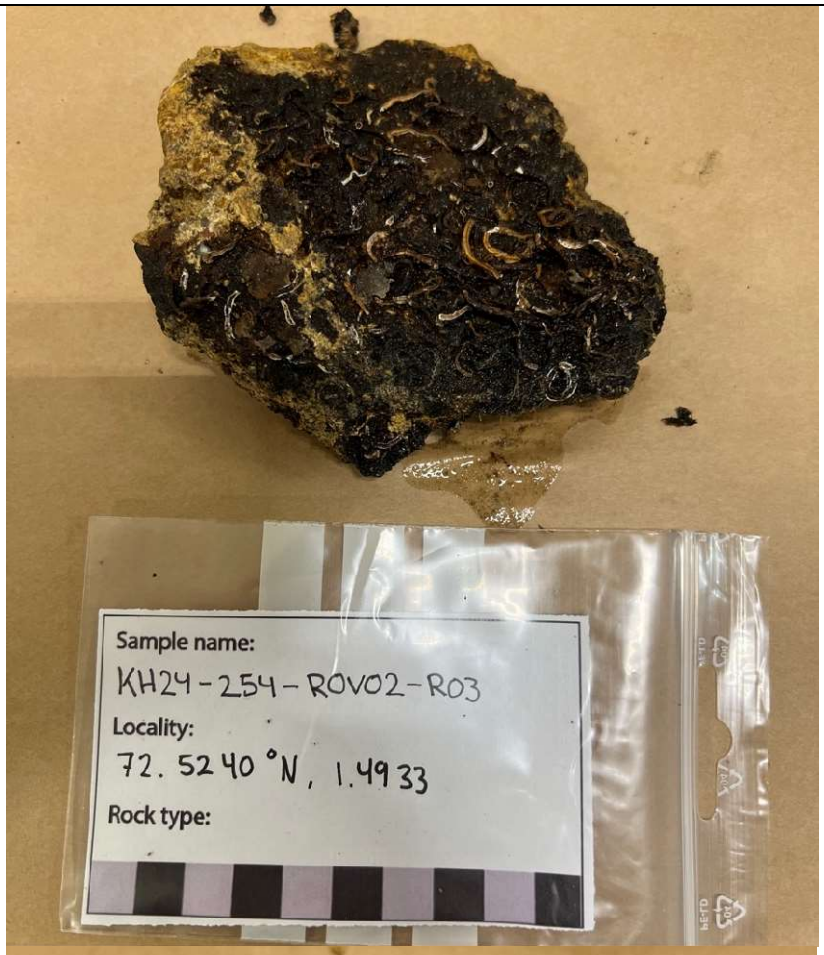
KH24-254-ROV02-R01 Location: Deep Insight Hill Latitude: 72.5241°N Longitude: 1.4933°E Depth: 1074 m Measurements (l/w/h): 20cm/15cm/12.5cm Description: Sandstone, likely dropstone. Sharp edges. Dark – almost black. Brownish in some areas. High density. Covered in tubeworms, some shells. Very compact, hard rock. Dull pink color inside, homogenous in texture. Manganese layer outside – very thin (less than 1 mm thick. Rock type: Dropstone, Sedimentary	
KH24-254-ROV02-R02 – ½ Location: Deep Insight Hill Latitude: 72.5241°N Longitude: 1.4933°E Depth: 1074 m Measurements (l/w/h): 17cm/9cm/10cm Description: Fragile, breaks easily. Medium heavy. Visible cleavage, breaks off in clusters. Dark brown and black. Some lighter brown-orange areas (might be weathering). Rock type: Iron-oxide	

KH24-254-ROV02-R03
Location: Deep Insight Hill
Latitude: 72.5240°N
Longitude: 1.4933°E
Depth: 1075 m
Measurements (l/w/h): 11.5cm/9.5cm/2.5cm

Description:

Dark layer off biology – tubeworms. Light brown, small pieces of garnet (maybe – used a loupe). Heterogenous – many different minerals/rocks. Brittle structure – breaks off easily as rock fragments with sharp edges. Grainy inside. visible pores, bioturbation. Light brown/beige layer and in the middle of this layer, there are grey-black rock fragments buried within.

Rock type: Sedimentary

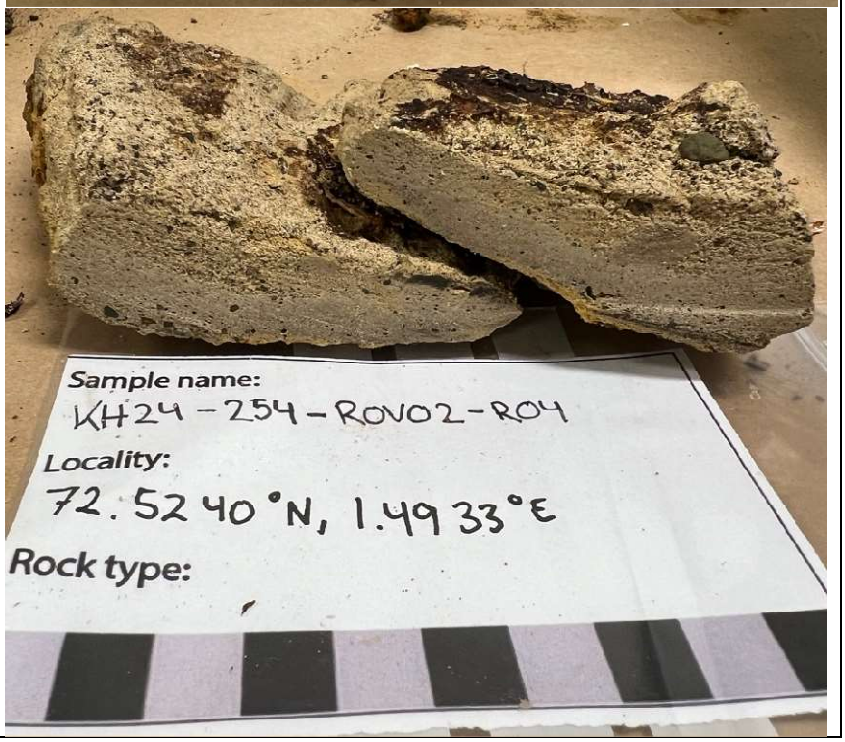


KH24-254-ROV02-R04
Location: Deep Insight Hill
Latitude: 72.5240°N
Longitude: 1.4933°E
Depth: 1074 m
Measurements (l/w/h): 14cm/8.5cm/4cm

Description:

Sandy structure with rock fragments inside (seen from the side). This is light brown colored. One layer is fine grain and compact, and the other has more visible grains (small rounded). Some of the grains are black are interlinked with shell fragments (rounded). Visible pores. On the outside there is a dark gray to light brown layer, and on the other side there are some tubeworms (this is right above the grainy part of the rock). This side is reddish brown.
Did react when doing an acid test, might therefor be carbonate.

Rock type: Sedimentary



KH24-254-ROV02-R05
Location: Deep Insight Hill
Latitude: 72.5272°N
Longitude: 1.4834°E
Depth: 1135 m
Measurements (l/w/h): 24cm/14cm/15.4cm

Description:

It has a biological layer on the outside, the layer is dark and up to 1 cm thick in some areas. Could be manganese. Inside there are a network structure. Almost looks like a root system, looks greyish. Around the “roots” it has brown “pocket” that might be iron-rich. Some ring structures/veins with different colors (light brown to black). On one side of the rock, there are an area of black to grey color (most likely basalt). When looking at the “underside” we can see lots of fissure structures, with a red vein going through it. Breccia can also be seen; these fragments are angular. Did react when doing an acid test, might therefor be carbonate. Red vain could possibly be palagonite.

Rock type: Basalt / Volcanic Breccia

KH24-254-ROV02-R06
Location: Deep Insight Hill
Latitude: 72.5286°N
Longitude: 1.4741°E
Depth: 1066 m
Measurements (l/w/h): 37.5cm/34.5cm/17.5cm

Description:
Dark on the surface. Tubeworms and other biological things. Looks homogenous, all dark color. Heavy. Subangular, with some rounded and some sharp edges.

Rock type: Needs sawing

KH24-254-ROV02-R07
Location: Deep Insight Hill
Latitude: 72.5197°N
Longitude: 1.4387°E
Depth: 1164 m
Measurements (l/w/h): 27cm/17cm/13cm

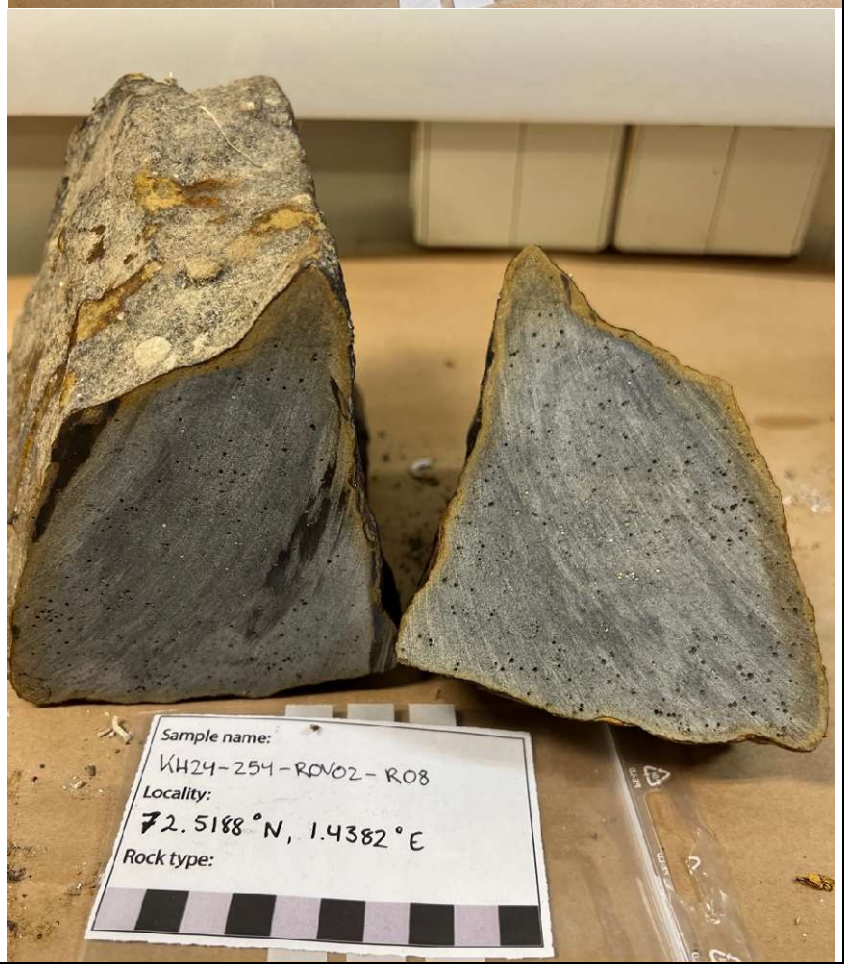
Description:
More biological stuff. Tubeworms. Black to reddish dark brown on the outside. Angular to subangular. Grey color inside, massive. Weathering rim 1-2 cm thick. Within the rim there are visible pores. Probably basalt.

Rock type: Basalt

KH24-254-ROV02-R08
Location: Deep Insight Hill
Latitude: 72.5188°N
Longitude: 1.4382°E
Depth: 1126 m
Measurements (l/w/h): 18cm/16.7cm/12cm

Description:
High density. The outer layer is mostly black/dark brown. Thin layer of manganese less then 1 mm. Then there is a light brownish layer up to 0.5 cm. Inside there is massive basalt with pores. Grey color inside. Some tubeworms and micro shells on the outside. Not sharp, but subangular.

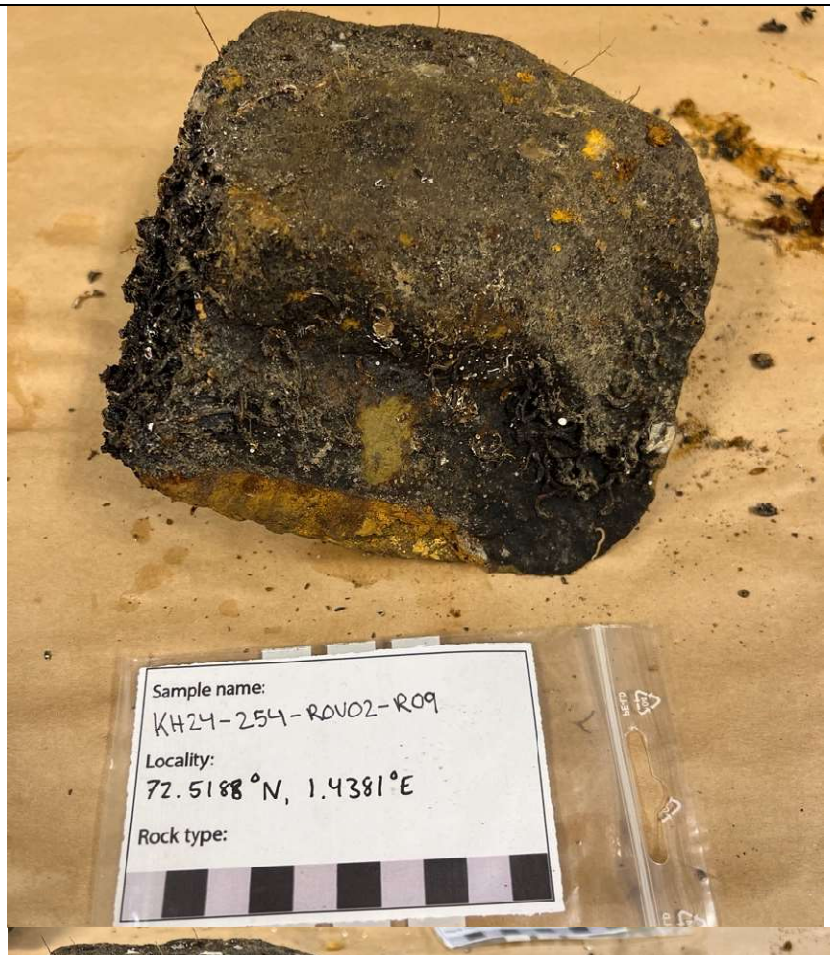
Rock type: Basalt



KH24-254-ROV02-R09
Location: Deep Insight Hill
Latitude: 72.5188°N
Longitude: 1.4381°E
Depth: 1124 m
Measurements (l/w/h): 15cm/14.5cm/9cm

Description:
Different layers at surface. On the top it is black with lots of biology (worms and shells). Below it has an iron brown and a black layer. Less than 1 mm thick layer of manganese. About 1 cm with rust-brown layer. This layer is most evident close to the side with most tubeworms. Inside it is grey, with pores. Larger pores in almost a straight line. Medium density. No sharp edges, but subangular. Compact.

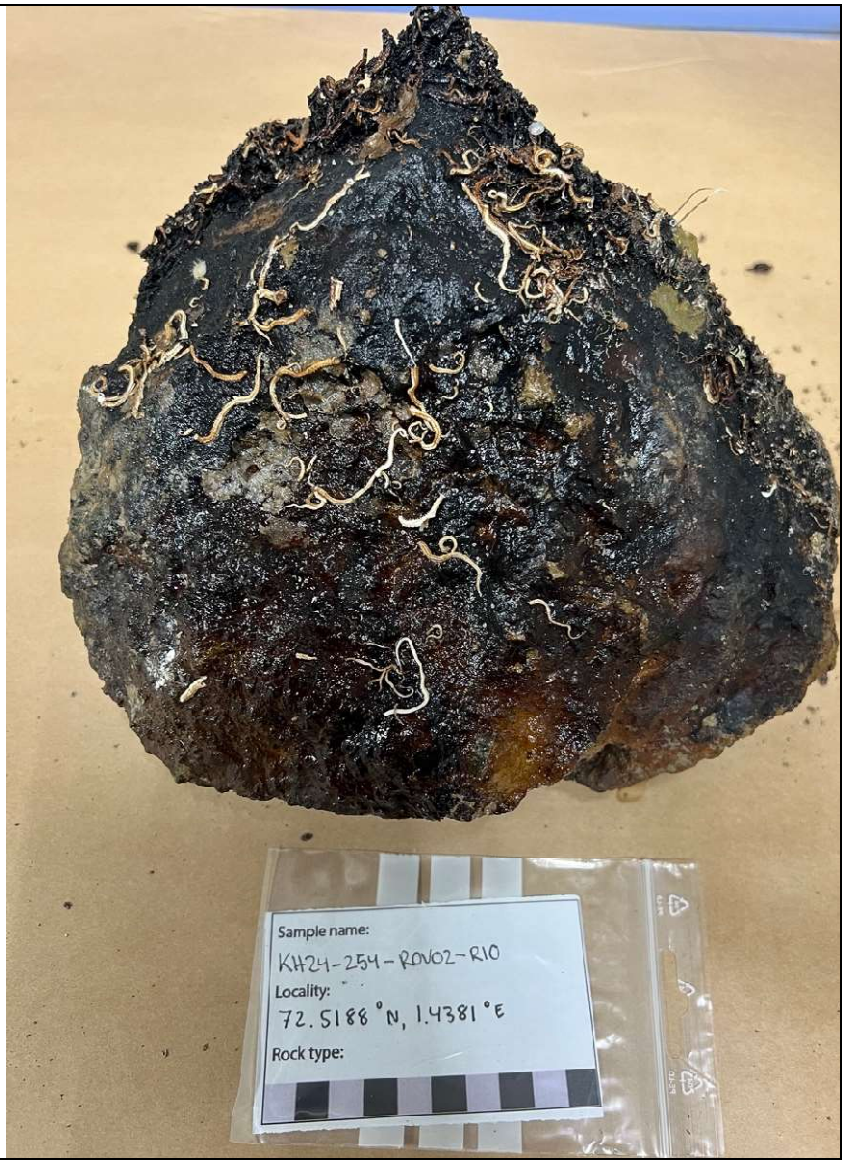
Rock type: Basalt



KH24-254-ROV02-R10
Location: Deep Insight Hill
Latitude: 72.5188°N
Longitude: 1.4381°E
Depth: 1124 m
Measurements (l/w/h): 22cm/22cm/18cm

Description:
Tubeworms and other biological stuff. Clay grey color inside covered with a layer that has a gradient from black to brown. Subangular, but not sharp edges. High density.

Rock type: Basalt



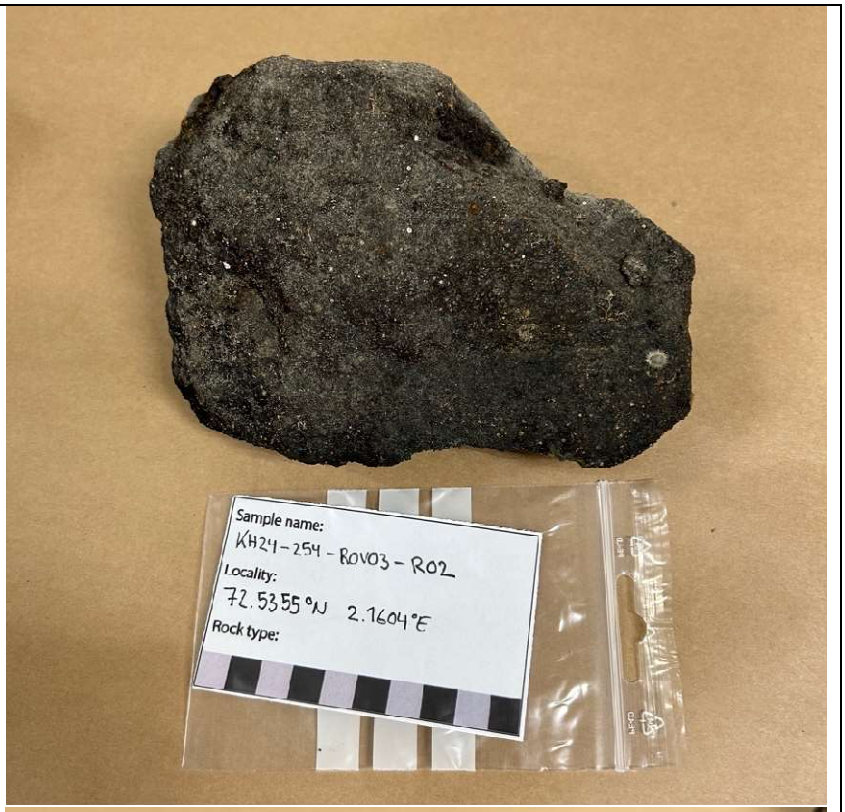
Dive ROV03: 18.02.24-19.02.24

KH24-254-ROV03-R01 Latitude: 72.5354°N Longitude: 2.1598°E Depth: 1499 m Measurements (l/w/h): 23 cm/17 cm/16 cm Description: Density: relatively heavy. Shape: pillow-ish, subangular. Can see the clasts inside a fine shiny matrix that is black in color. Some glass on the side. Color: grey, orange, blue. Rock type: Basalt (breccia?)	

KH24-254-ROV03-R02
Latitude: 72.5355°N
Longitude: 2.1604°E
Depth: 1489 m
Measurements (l/w/h): 18 cm/13 cm/9 cm

Description:
Density: relatively high.
Shape: Subangular.
Color: black, dark grey.
Covered in manganese crust ~2mm. Basalt.
Inside it is grey colored, weathering rim is lighter gray (1-7 mm). Some vesicles. Massive, looks like some tiny polygon structures – maybe reaction with water?

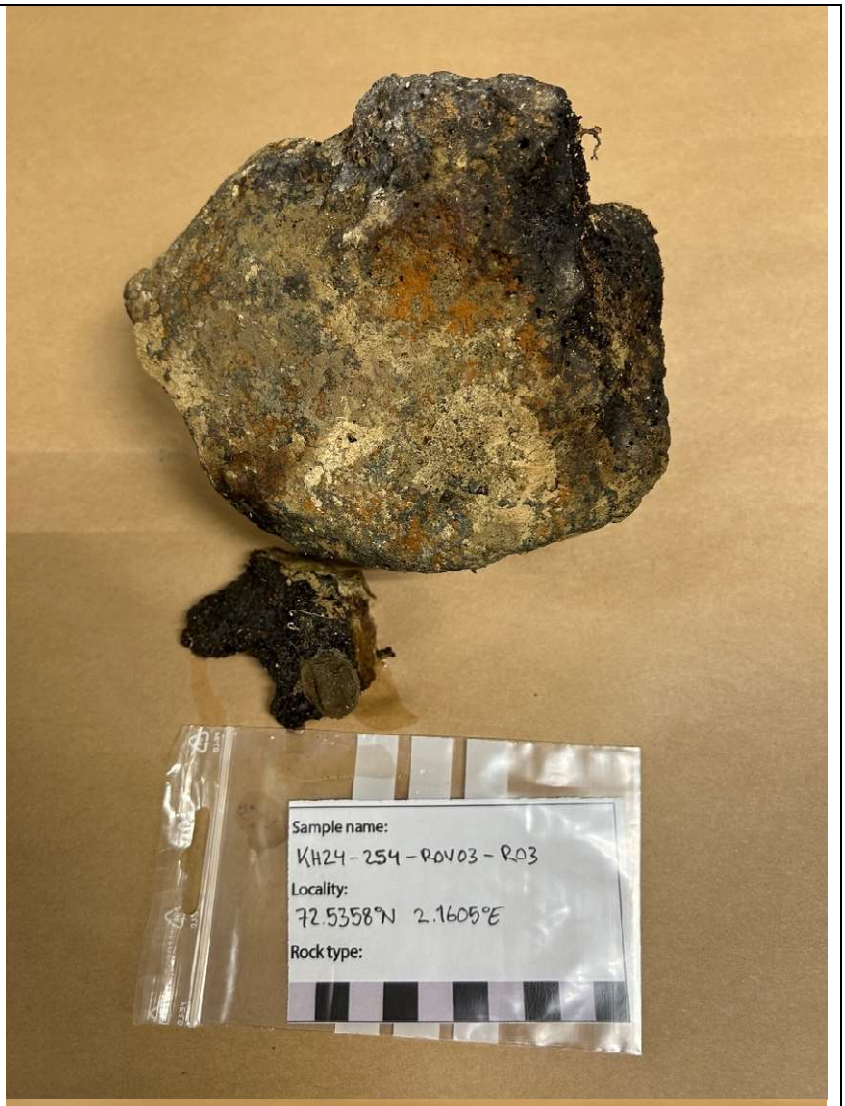
Rock type: Basalt

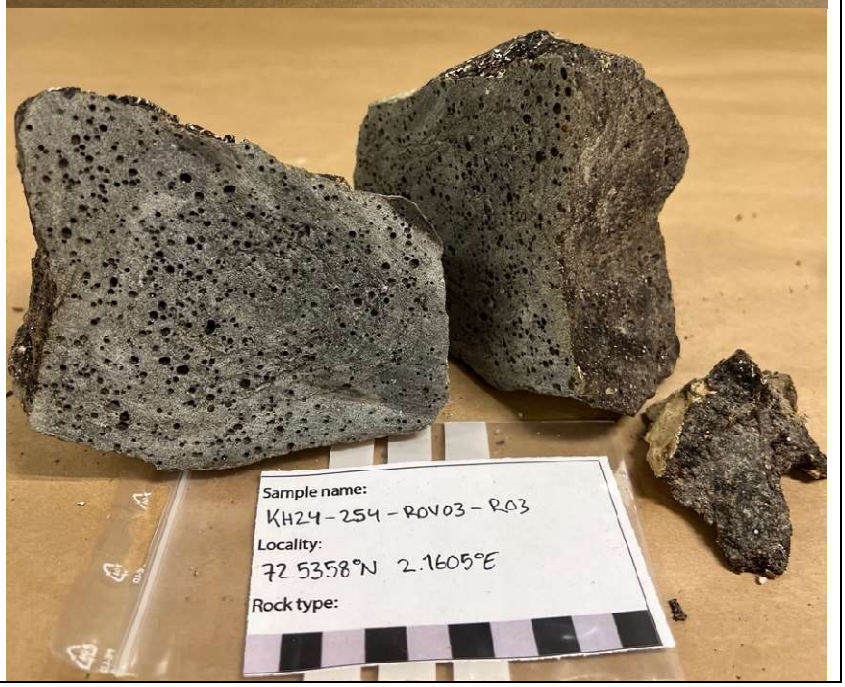


KH24-254-ROV03-R03
Latitude: 72.5358°N
Longitude: 2.1605°E
Depth: 1476 m
Measurements (l/w/h): 16 cm/12 cm/ 11 cm

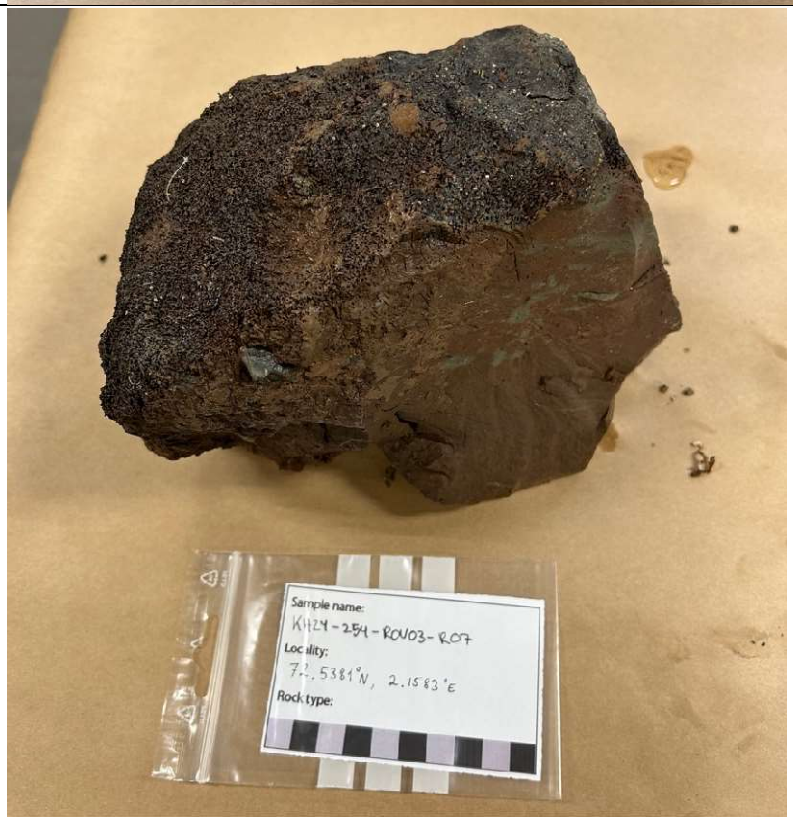
Description:
Density: relatively high.
Shape: round and subangular, can resemble pillow basalt.
Color: beige, orange, black.
Somewhat weathered.
Covered in manganese crust.
Some pores indicating escaping of gas.
Inside: gray with many vesicles (up to 5mm), stream flow-like lines/structures in circular motions.

Rock type: Basalt





KH24-254-ROV03-R04 Latitude: 72.5365°N Longitude: 2.1580°E Depth: 1458 m Measurements (l/w/h): 18 cm/17 cm/7 cm Description: Density: much less then R01 – 03. Shape: elongated, angular/subangular Color: black, grey, blue, orange. Weathered. Covered in manganese crust. Rock type: Iron-oxide	
KH24-254-ROV03-R05 Latitude: 72.5367°N Longitude: 2.1575°E Depth: 1433 m Measurements (l/w/h): 20 cm/ 15 cm/ 10 cm Description: Density: about the same as ROV03-R04. Shape: massive. Color: black, brown, grey. Weathered, crumbles easily. Covered in manganese crust. Rock type: Iron-oxide	

KH24-254-ROV03-R06 Latitude: 72.5368°N Longitude: 2.1573°E Depth: 1420 m Measurements (l/w/h): 16 cm/ 17 cm/ 10 cm Description: Density: About the same as R04-05. Shape: rounded, subangular, elongated. Color: black, grey, brown, beige, light grey. Covered in manganese crust. Some big clasts (blue/green). Could be part of a pillow basalt? Or breccia/conglomerate or maybe volcanic tuff? Rock type: Basalt	
KH24-254-ROV03-R07 Latitude: 72.5381°N Longitude: 2.1583°E Depth: 1330 m Measurements (l/w/h): 23 cm/ 17 cm/ 15 cm Description: Density: relatively heavy. Shape: rounded, subangular. Color: dark brown, black grey. Clay like texture on dark-brown area. Consolidated clay? Covered in manganese crust. Bioturbation. Rock type: Sedimentary	

KH24-254-ROV03-R08
Latitude: 72.5390°N
Longitude: 2.1575°E
Depth: 1291 m
Measurements (l/w/h): 31 cm/ 22 cm/ 10 cm

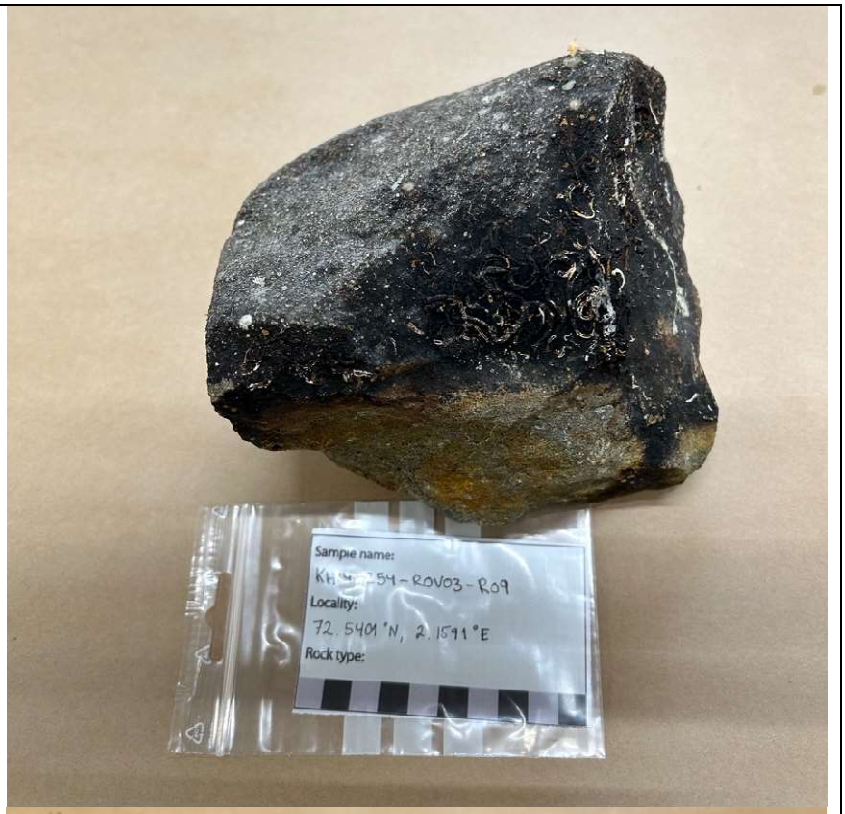
Description:
Density: relatively heavy.
Shape: elongated, somewhat rounded, subangular.
Color: dark grey, black, brown.
Covered in a thin manganese crust.
Some big clasts.
Fragile.
Inside it looks like breccia, with different sized clasts (<1mm to 3cm). Some rounded, others angular.

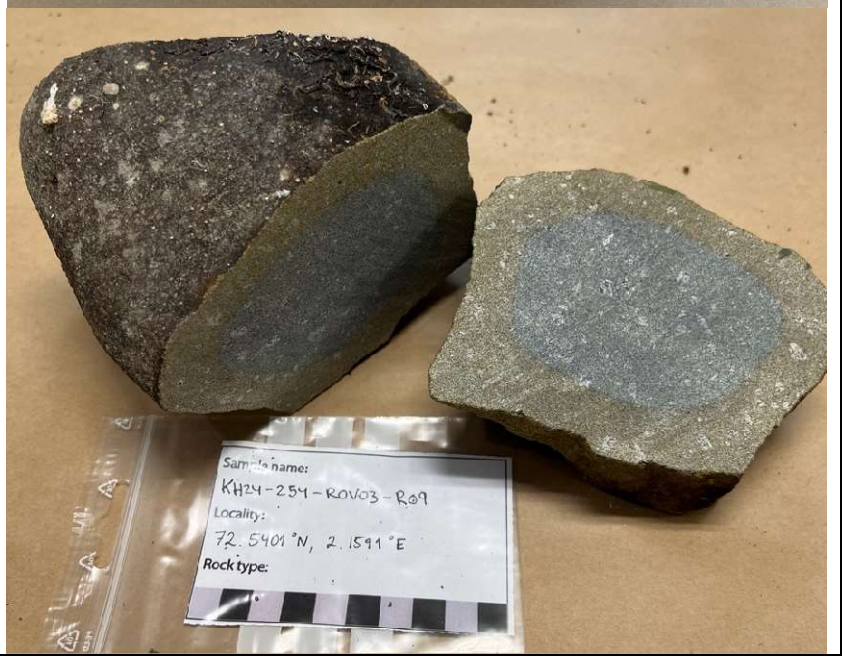
Rock type: Basaltic breccia

KH24-254-ROV03-R09
Latitude: 72.5401°N
Longitude: 2.1591°E
Depth: 1267 m
Measurements (l/w/h): 15 cm/16 cm/13 cm

Description:
Density: relatively heavy.
Shape: rounded, subangular.
Color: grey, orange, black.
Covered in a thin manganese crust.
Basalt, could be from a pillow.
Phyric, small white phenocrystals.
Inside it has a thick weathering rim (~1.5 cm), brownish. Rest of the rock is grey. Lots of small whiteish crystals (<1mm-0.7 mm). Some parts looks more blue.

Rock type: Basalt

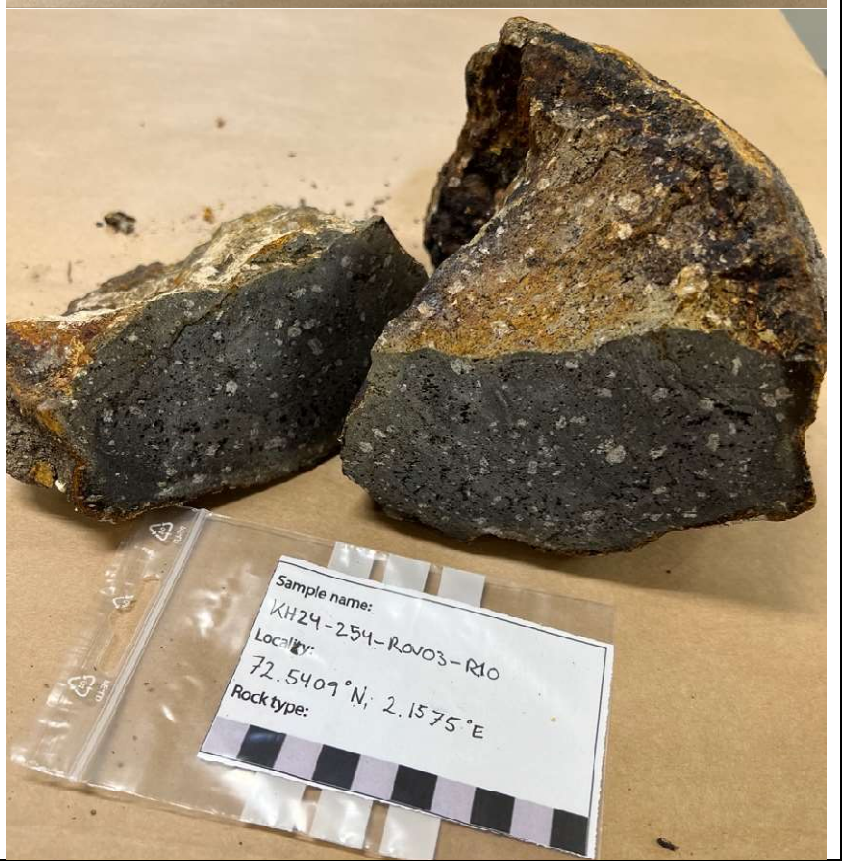




KH24-254-ROV03-R10
Latitude: 72.5409°N
Longitude: 2.1575°E
Depth: 1120 m
Measurements (l/w/h): 25 cm/14 cm/13 cm

Description:
Density: relatively heavy.
Shape: angular, subangular, elongated, rounded.
Color: black, orange, brown, grey, beige.
Covered in thin manganese crust.
Basalt, could be part of a pillow basalt.
Some clasts and minerals (both small and big ones) that are shiny, no color, potentially plagioclase-phyric crystals.
Some pores indicate escape of gas.
Inside the color is gray, weathering rim is not too visible. Some crystals have different shapes and up to ~0.7mm size.

Rock type: Basalt



KH24-254-ROV03-R11 Latitude: 72.5420°N Longitude: 2.1567°E Depth: 1081 m Measurements (l/w/h): 33 cm/32 cm/30 cm Description: Shape: subangular, rounded, pillow-ish. Color: black, orange, brown, red, grey. Covered in manganese crust. Basalt, could be from a pillow basalt. Pores indicating escape of gas. Rock type: Basalt	

KH24-254-ROV03-R12
Latitude: 72.5425°N
Longitude: 2.1539°E
Depth: 995 m
Measurements (l/w/h): 27 cm/ 18 cm/ 8 cm

Description:
Density: medium.
Shape: massive, elongated, subangular.
Color: brown, black, orange. Some weathering. Covered in thin manganese crust (<1mm).
Inside it is breccia like. The clasts are grey (probably basalt), varies in size (0.5-2.5 cm), subangular to angular. They are surrounded by rust brown matrix.

Fragile. Volcanic glass: black in color buried in the matrix.

Rock type: Volcanic breccia

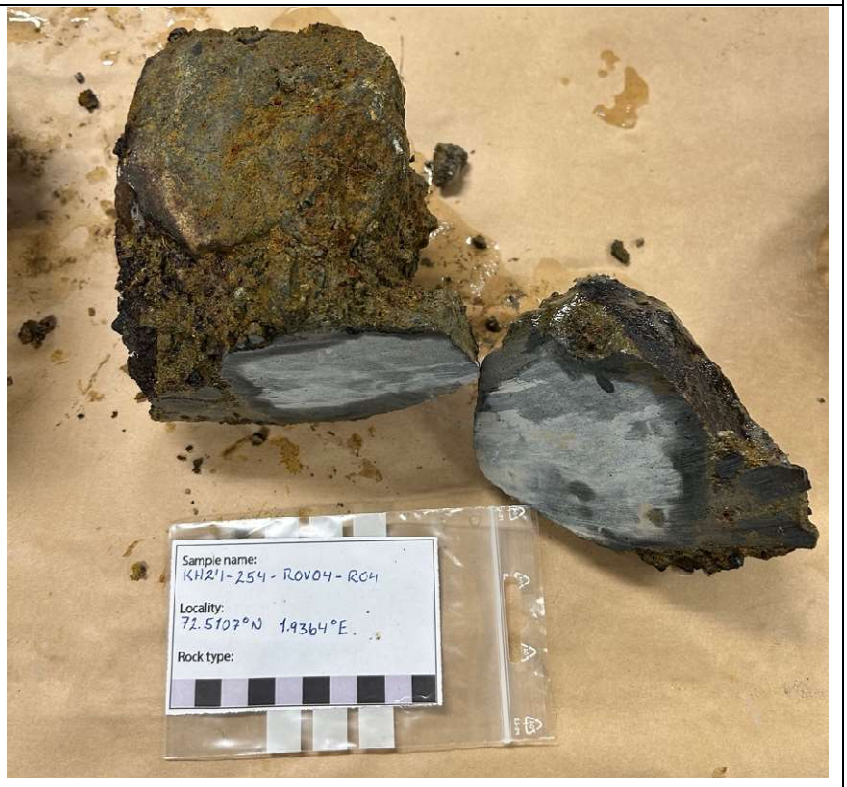
KH24-254-ROV03-R13
Latitude: 72.5432°N
Longitude: 2.1528°E
Depth: 919 m
Measurements (l/w/h): 18 cm/10 cm/7 cm

Description:
Density: relatively heavy.
Shape: subangular, elongated.
Color: black, brown/red, grey, beige.
Basalt.
Inside it has a light brown weathering rim (0.6cm-4cm on the pointy side). Grey inside, with stream flow in circular motion (black, but gets lighter to the core – pyroxene mixed with basalt). White plagioclase crystals up to 0.5 cm. Small dark/black crystals, <1mm. Some vesicles.

Rock type: Basalt

Dive ROV04: 18.02.24

KH24-254-ROV04-R01 Latitude: 72.5101°N Longitude: 1.9364°E Depth: 1771 m Measurements (l/w/h): 22 cm/17 cm/8 cm Description: Shape: subangular/angular, elongated. Color: black, dark brown, dark grey. Density: relatively medium. Wavy pattern with layers inside. Covered in thin manganese crust. Rock type: Basalt	
KH24-254-ROV04-R02 Latitude: 72.5104°N Longitude: 1.9362°E Depth: 1758 m Measurements (l/w/h): 28 cm/17 cm/17 cm Description: Shape: round (pillow basalt-ish), subangular, angular Color: black, beige, orange/red, grey Density: relatively medium. Rock type: Basalt (check after sawing)	

KH24-254-ROV04-R03 Latitude: 72.5105°N Longitude: 1.9362°E Depth: 1750 m Measurements (l/w/h): 19 cm/19 cm/13 cm Description: Shape: round, subangular, angular. Color: black, red, grey. Density: relatively heavy. Covered in manganese crust, Rock type: Basalt (check after sawing)	
KH24-254-ROV04-R04 Latitude: 72.5107°N Longitude: 1.9364°E Depth: 1717 m Measurements (l/w/h): 20 cm/19 cm/13 cm Description: Shape: elongated, subangular. Color: black, orange, red, grey/blue (inside) Density: relatively medium Some places covered in manganese crust Clasts in weathered matrix, some volcanic glass in the matrix. Rock type: Basalt	

KH24-254-ROV04-R05 Latitude: 72.6107°N Longitude: 1.9365°E Depth: 1713 m Measurements (l/w/h): 19 cm/14 cm/10 cm Description: Shape: angular, elongated. Color: brown, grey, red, yellow/beige. Inside: grey/blue, pores. Density: relatively heavy. Pores both inside and outside. Rock type: Basalt	
KH24-254-ROV04-R06 Latitude: 72.5107°N Longitude: 1.9365°E Depth: 1714 m Measurements (l/w/h): 22 cm/18 cm/10 cm Description: Shape: subangular/angular, elongated. Color: grey, dark grey, orange/brown, black. Density: relatively high. Weathered some places with glass. Small pores inside and outside. Covered in thin manganese crust. Rock type: Basalt	

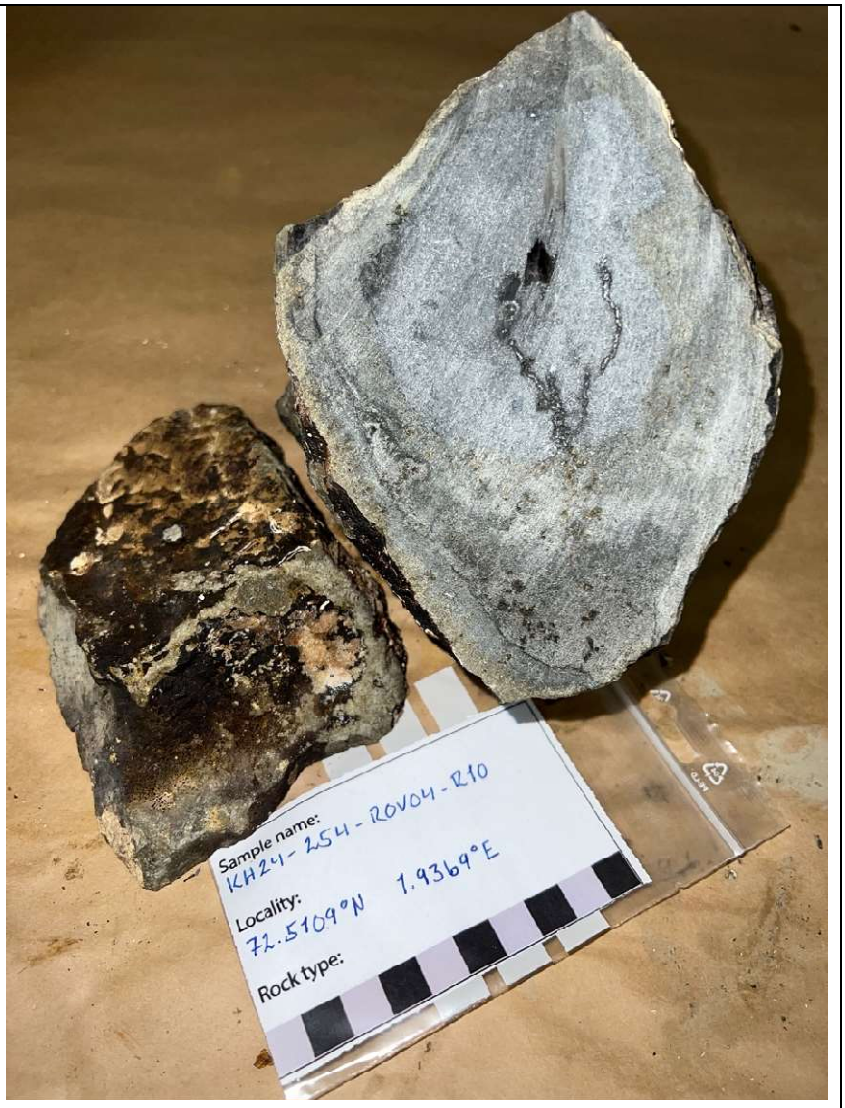
KH24-254-ROV04-R07 Latitude: 72.5107°N Longitude: 1.9365°E Depth: 1712 m Measurements (l/w/h): 11 cm/9 cm/7 cm Description: Shape: rounded, subangular Color: grey, yellow, black, brown. Inside: blue/grey Density: relatively high Small pores inside and outside Some spots with manganese crust. Rock type: Basalt	
KH24-254-ROV04-R08 Latitude: 72.5107°N Longitude: 1.9366°E Depth: 1700 m Measurements (l/w/h): 14.8cm/10cm/9.5cm Description: Outside it is a black layer (manganese), with a reddish iron layer inside. Subangular. Can see vesicles from the fractured side. Medium heavy. Basalt. Inside is massive grey, homogenous texture. Vesicles, some big but mostly small. A weak weathering rim (lighter gray) can be seen, up to 2 cm. Rock type: Basalt	

KH24-254-ROV04-R09 Latitude: 72.5109°N Longitude: 1.9366°E Depth: 1655 m Measurements (l/w/h): 15.5cm/11cm/7.5cm Description: Outside it has a light brown color covering a very thin manganese layer (less than 1 mm). Subangular. Basalt. Inside it has a layer of weathering (lighter gray) from 0.3-1 cm. The rest is grey, massive. Vesicles are visible. Medium density. Rock type: Basalt	

KH24-254-ROV04-R10
Latitude: 72.5109°N
Longitude: 1.9369°E
Depth: 1633 m
Measurements (l/w/h): 18cm/13.5cm/13cm

Description:
Outside it varies from black to sand-color. High density. Subangular. Basalt. It has a very thin layer of manganese crust. Close to the outside of the rock it is a vein with light grey crystals – looks like fluid has gone through it. Inside it is massive black, big vesicles in some areas close toward the outside. Close to the outside of the rock it is a vein with light grey crystals – looks like water has gone through it. Crystalline fractures filled with some white minerals (almost in the middle). Reflective fibers (length is ~5mm) seen in the whole sample (when using a light source from phone), chaotic orientation. Plagioclase tabular crystals.

Rock type: Basalt



KH24-254-ROV04-R11 Latitude: 72.5110°N Longitude: 1.9370°E Depth: 1622 m Measurements (l/w/h): 21cm/10cm/13cm Description: Browngrey-ish color on outside. Right-way-up can we see because of det pores on one side. One crack on the inside going straight over. Rock type: Basalt	
KH24-254-ROV04-R12 Latitude: 72.5115°N Longitude: 1.9373°E Depth: 1605 m Measurements (l/w/h): 24cm/15cm/9cm Description: Pink/beige/grey-ish on outside, and on the inside the color is clearer. Bonding or cracks are visible. The rock is very hard, and fine grained. Rock type: Unsure	

Dive ROV05: 19.02.24, NO GEO SAMPLES, wrong location

Dive ROV06: 19.02.24 – 20.02.24

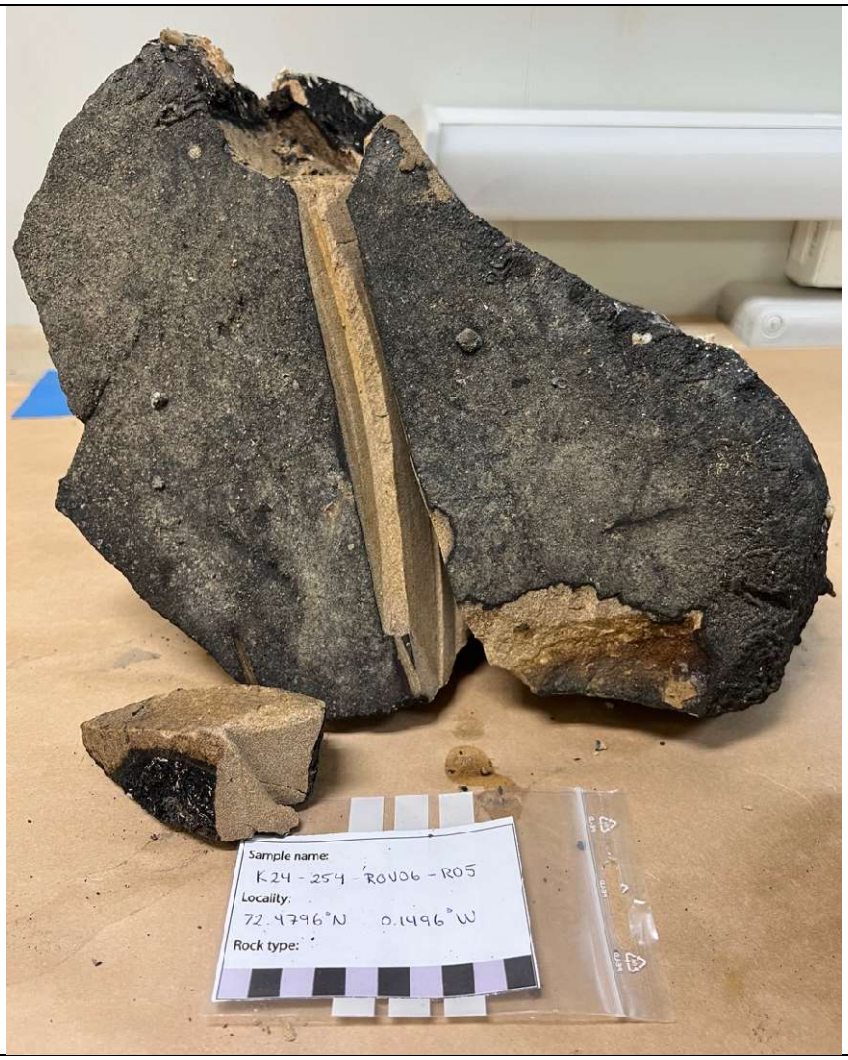
KH24-254-ROV06-R01 Latitude: 72.4717°N Longitude: 0.1026°W Depth: 1891 m Measurements (l/w/h): 13 cm/12 cm/4 cm Description: Manganese crust Some iron oxide Angular + elongated Color: black, orange, blue/grey Rock type: FeMn-crust	
KH24-254-ROV06-R02 Latitude: 72.4731°N Longitude: 0.1046°W Depth: 1768 m Measurements (l/w/h): 16 cm/ 13 cm/7 cm Description: Angular, elongated. Thick manganese crust (1,5 cm at thickest). Basalt. Vesicles inside Black, blue/grey Some small non-color + rusty mineral-grains Some bending/folding-ish structure inside the basalt Rock type: Basalt	

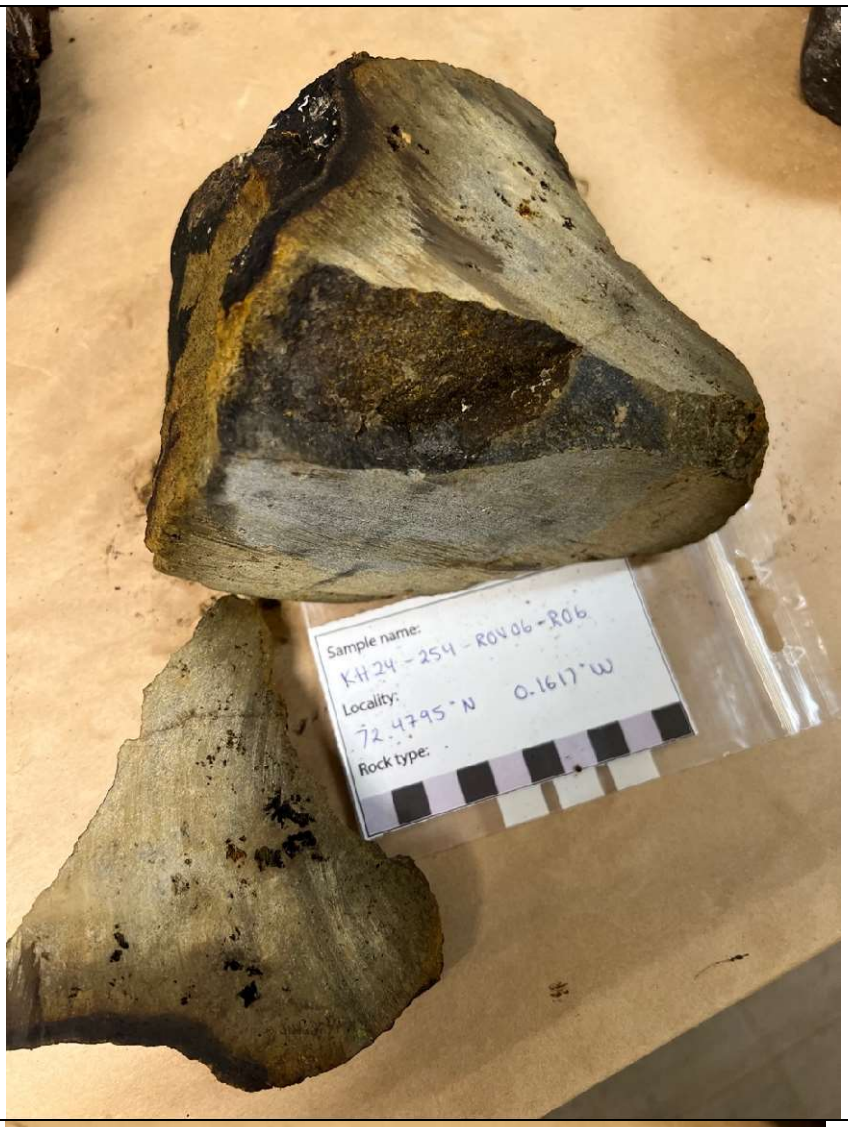
KH24-254-ROV06-R03 Latitude: 72.4744°N Longitude: 0.1075°W Depth: 1636 m Measurements (l/w/h): 14 cm/12 cm/10 cm Description: A rusty “vein” through the basalt. Could be brecciated. Covered in manganese crust (1-5 mm) Weathered somewhere with small glass crystals (palagonite). Vesicles inside Black, brow, orange, red, grey/blue Rock type: Basalt	
KH24-254-ROV06-R04 Latitude: 72.4796°N Longitude: 0.1496°W Depth: 1943 m Measurements (l/w/h): 10 cm/7 cm/1 cm Description: Manganese crust Rock type: FeMn-crust	

KH24-254-ROV06-R05
Latitude: 72.4796°N
Longitude: 0.1496°W
Depth: 1944 m
Measurements (l/w/h): 26 cm/30 cm/28 cm

Description:
Brown, black, beige
Thin manganese crust
Sandstone, dropstone

Rock type: Dropstone, sedimentary



KH24-254-ROV06-R06 Latitude: 72.4795°N Longitude: 0.1617°W Depth: 2067 m Measurements (l/w/h): 16 cm/15 cm/11 cm Description: Basalt Thin manganese crust Small elongated translucent minerals Vesicles inside and out (some big ones) Black, green, brown, blue/gray Some layering Rock type: Basalt	
KH24-254-ROV06-R07 Latitude: 72.4784°N Longitude: 0.1623°W Depth: 1994 m Measurements (l/w/h): 14 cm/14 cm/8 cm Description: Looks like a granite = dropstone Rock type: Dropstone, granite	

KH24-254-ROV06-R08 Latitude: 72.4784°N Longitude: 0.1624°W Depth: 1995 m Measurements (l/w/h): 35 cm/33 cm/19 cm Description: Manganese crust Black, brown, orange, red Subangular Rock type: Needs checking after sawing	
KH24-254-ROV06-R09 Latitude: 72.4791°N Longitude: 0.1648°W Depth: 1996 m Measurements (l/w/h): 20 cm/13 cm/9 cm Description: Blue/gray clasts inside a weathered matrix (brown/red) Thin manganese crust Rock type: Basalt	

KH24-254-ROV06-R10
Latitude: 72.4791°N
Longitude: 0.1650°W
Depth: 1993 m
Measurements (l/w/h): 26 cm/17 cm/18 cm

Description:
Big vesicles
Basalt
Manganese crust is of interest: 1,5-4,5 cm

Rock type: Basalt

KH24-254-ROV06-R11
Latitude: 72.4791°N
Longitude: 0.1650°W
Depth: 1993 m
Measurements (l/w/h): 12 cm/6 cm/5 cm

Description:
3 cm manganese crust
Weathered basalt?
Manganese crust is of interest.

Rock type: Basalt and FeMn-crust

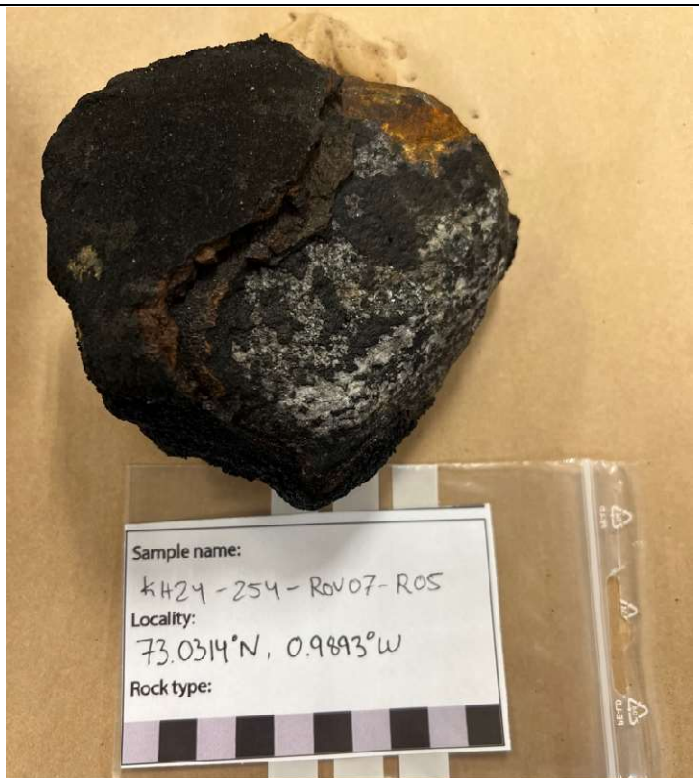
Dive ROV07: 20.02.24

KH24-254-ROV07-R01 Latitude: 73.0317°N Longitude: 0.9892°W Depth: 3170 m Measurements (l/w/h): 10cm/9.5cm/3.5cm Description: Black manganese crust. Up to 3.5cm thick. Some small areas have an orange/rust brown color. Grainy texture on one of the sides. Rock type: FeMn-crust	
KH24-254-ROV07-R02 Latitude: 73.0315°N Longitude: 0.9894°W Depth: 3119 m Measurements (l/w/h): 12cm/11.5cm/6cm Description: Black manganese layer surrounding a rust brown colored rock. The manganese layer varies in thickness from ~1mm up to 1.5cm. Grainy texture on one of the sides. The rock inside is subangular to rounded, probably dropstone. Rock type: FeMn-crust	

KH24-254-ROV07-R03
Latitude: 73.0315°N
Longitude: 0.9894°W
Depth: 3119 m
Measurements (l/w/h): 27cm/19cm/9cm

Description:
Thick manganese crust, up to ~9cm. Some areas have a rust brown color. Grainy texture on the smoother side of the sample. Something that looks like tubeworms. Subangular to angular (due to sawing).

Rock type: FeMn-crust

KH24-254-ROV07-R04 Latitude: 73.0315°N Longitude: 0.9894°W Depth: 3119 m Measurements (l/w/h): 28cm/10.5cm/12.5cm Description: 11cm thick black manganese crust. One of the sides have a smooth surface, the rest is subangular to angular (due to sawing). While looking at the sides, thin layering of manganese is visible. Other areas look homogenous. Rock type: FeMn-crust	
KH24-254-ROV07-R05 Latitude: 73.0314°N Longitude: 0.9893°W Depth: 3120 m Measurements (l/w/h): 10.5cm/10cm/7cm Description: Up to 1cm black manganese layer covering a rock. The rock looks granitic gneiss, black and grey color, grainy, maybe a dropstone (rounded). The manganese layer is grainy in some areas, some areas are smooth. Rock type: Dropstone and FeMn-crust	

KH24-254-ROV07-R06
Latitude: 73.0314°N
Longitude: 0.9894°W
Depth: 3119 m
Measurements (l/w/h): 20cm/15cm/12.2cm

Description:
Thin black manganese layer (not sure how thick), grainy texture. Iron precipitation inside, chaotic. Brown, rust brown, orange, and sandy color. Maybe bioturbation. Weathered basalt covered in sediments and a manganese layer? Small rock fragments (~1mm) inside clay-like sediments (easy to scratch). Solidified clay?

Rock type:
Sedimentary?

KH24-254-ROV07-R07
Latitude: 73.0314°N
Longitude: 0.9892°W
Depth: 3113 m
Measurements (l/w/h): 17cm/15.5cm/13cm

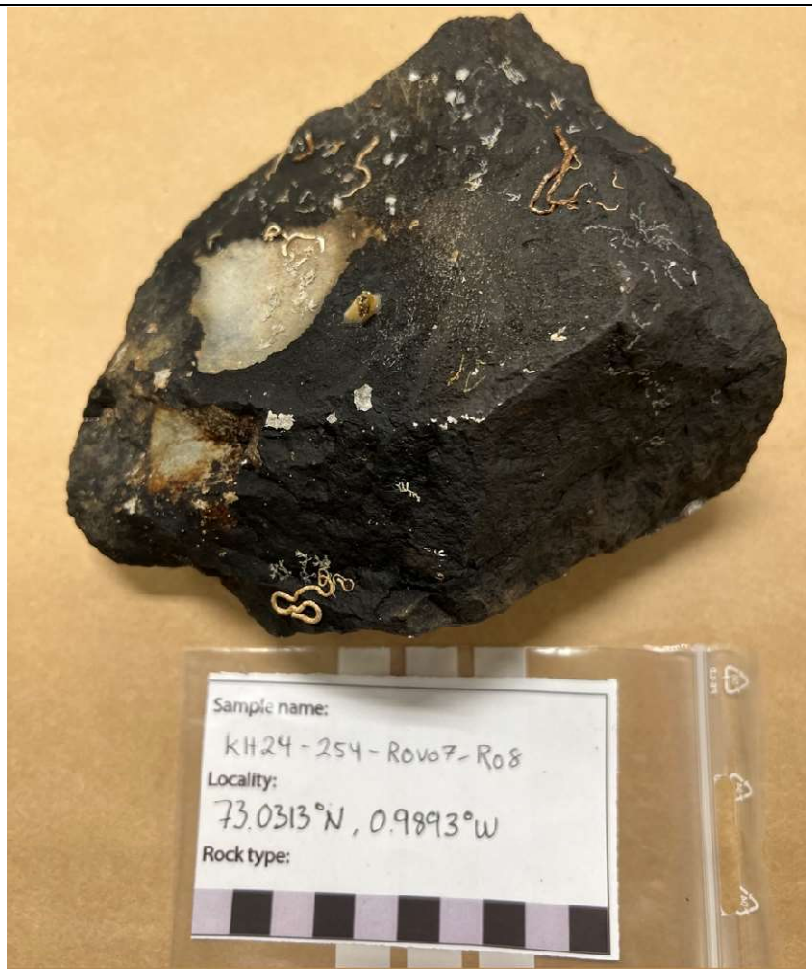
Description:
Black manganese layer, probably 1mm thick (difficult to determine). Grainy texture. Orange, brown, sand-like color. Veins going through. Clay/silt sediments on one side (very soft). Chemical weathered?

Rock type: Unknown, needs sawing

KH24-254-ROV07-R08
Latitude: 73.0313°N
Longitude: 0.9893°W
Depth: 3108 m
Measurements (l/w/h): 16cm/15cm/8cm

Description:
Probably a thin layer of manganese. Subangular to angular. Heavy. Some tubeworms. Some grey areas.

Rock type: Basalt?



Dive ROV08: 17.02.24-18.02.24

KH24-254-ROV08-R01
Latitude: 74.2179°N
Longitude: 4.6866°W
Depth: 3457 m
Measurements (l/w/h): 24.5cm/15.5cm/10cm

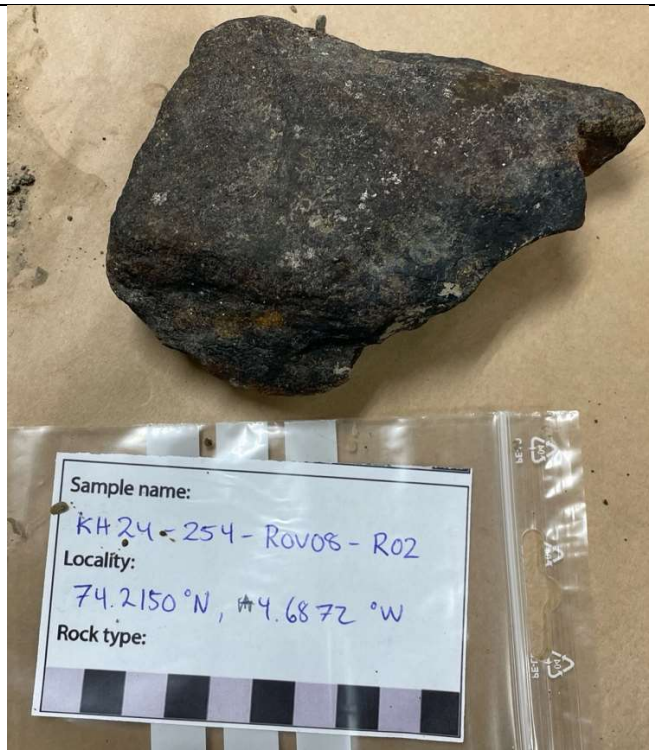
Description:
Dropstone, rounded, and elongated. White crystals in black matrix in chaotic orientation. Probably granite. Heavy. None to very little manganese crust on surface (<1mm).

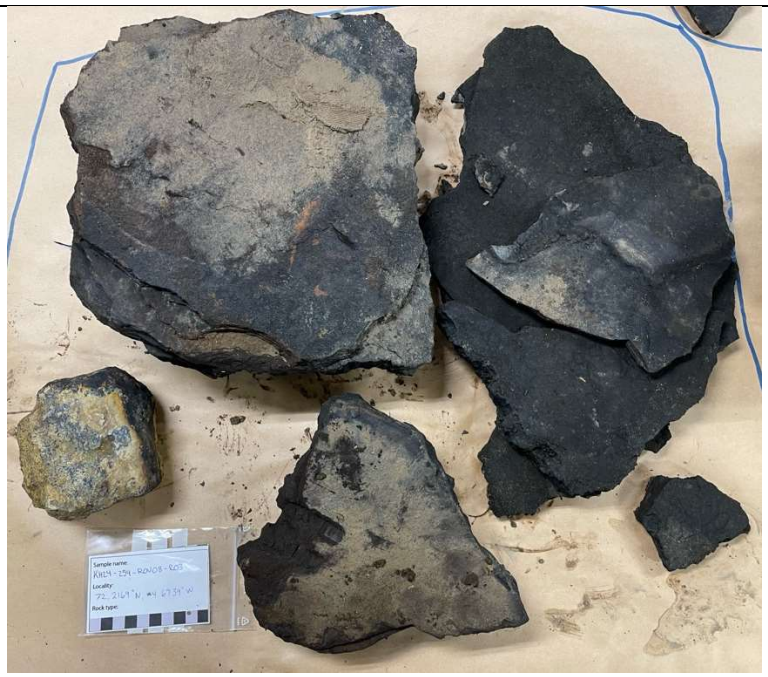
Rock type: Dropstone, granite

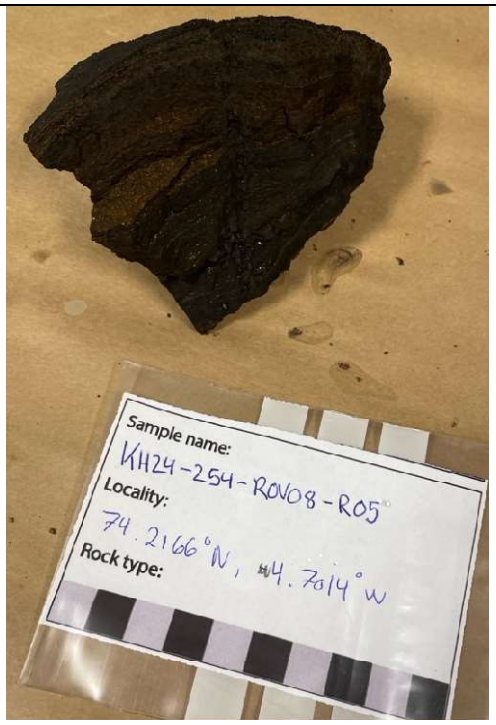
KH24-254-ROV08-R02
Latitude: 74.2150°N
Longitude: 4.6872°W
Depth: 3455 m
Measurements (l/w/h): 13cm/8.5cm/3.5cm

Description:
Massive granite with less then 1mm manganese layer covering the rock surface. Medium heavy.

Rock type: Dropstone, granite



KH24-254-ROV08-R03 Latitude: 74.2169°N Longitude: 4.6939°W Depth: 3102 m Measurements (l/w/h): 30cm/26cm/12cm Description: Fractured massive manganese crust sample. One dropstone of granite (down left). All other fractured parts originate from one rock. All are microlaminated manganese crust that varies in thickness from the biggest piece; 13.5 cm to smaller pieces with 8 cm, 2 cm thickness. Rock type: FeMn-crust	
KH24-254-ROV08-R04 Latitude: 74.2174°N Longitude: 4.6977°W Depth: 2973 m Measurements (l/w/h): 35cm/23.5cm/28cm Description: Large cut of a rounded Mn-crust. The inside dendritic to nodular cavities are filled with sediments. Laminated the outer 4 cm. Thickest microlamination is 10 cm (right). Rock type: FeMn-crust	

KH24-254-ROV08-R05 Latitude: 74.2166°N Longitude: 4.7014°W Depth: 2971 m Measurements (l/w/h): 11cm/9cm/6cm Description: Small piece of Mn crust. Approximately 7 cm thick laminated Rock type: FeMn-crust	
KH24-254-ROV08-R06 Latitude: 74.2220°N Longitude: 4.7333°W Depth: 3077 m Measurements (l/w/h): 33.5cm/15cm/20cm Description: Top part of crust has a stromatolithic texture structure with smaller rock fragments buried between. Bottom consists of fine laminated Mn crust (5 cm thick). The whole crust thickness is 15 cm. Rock type: FeMn-crust	

KH24-254-ROV08-R07 Latitude: 74.2220°N Longitude: 4.7333°W Depth: 3977 m Measurements (l/w/h): 42cm/18cm/17cm Description: Other part of ROV06 sample, broken off. One fine grained laminated crust on top (8cm). One layer of sediment at bottom Possible reversed right side up. Rock type: FeMn-crust	
KH24-254-ROV08-R08 Latitude: 74.2228°N Longitude: 4.7364°W Depth: 2981 m Measurements (l/w/h): 35cm/19.5cm/19cm Description: Thick massive Mn-crust 16,5 cm. Some of the flakes that had fallen off show some orange spots beneath. The thickness of crust is about 16 cm. Rock type: FeMn-crust	

KH24-254-ROV08-R09 Latitude: 74.2231°N Longitude: 4.7379°W Depth: 2930 m Measurements (l/w/h): 23cm/18cm/15cm Description: Separated in three fragments. Massive, laminated crust with. Weathered basalt inside. Also showing orange spots between the layers. The recovered part of the crust is about 6 cm. Mn crust thickness; 13cm, 12cm, 7 cm. Rock type: FeMn-crust	

Dive ROV09: 22.02.24

KH24-254-ROV09-R01 Latitude: 74.2526°N Longitude: 4.4789°W Depth: 3417 m Measurements (l/w/h): 30cm/15cm/12cm Description: One Dropstone to down right. 15 cm tick laminated Mn crust with layers looking like “wavey rifles”. Dotted surface. Rock type: FeMn-crust + Dropstone	
KH24-254-ROV09-R02 Latitude: 74.2592°N Longitude: 4.4795°W Depth: 3405 m Measurements (l/w/h): 45cm/25cm/25cm Description: Biggest manganese sample; 14 cm in thickness. With laminated structures looking dendritic (“wavey”). Nest biggest piece; 10 cm same layer structure as the big sample. Rock type: FeMn-crust	

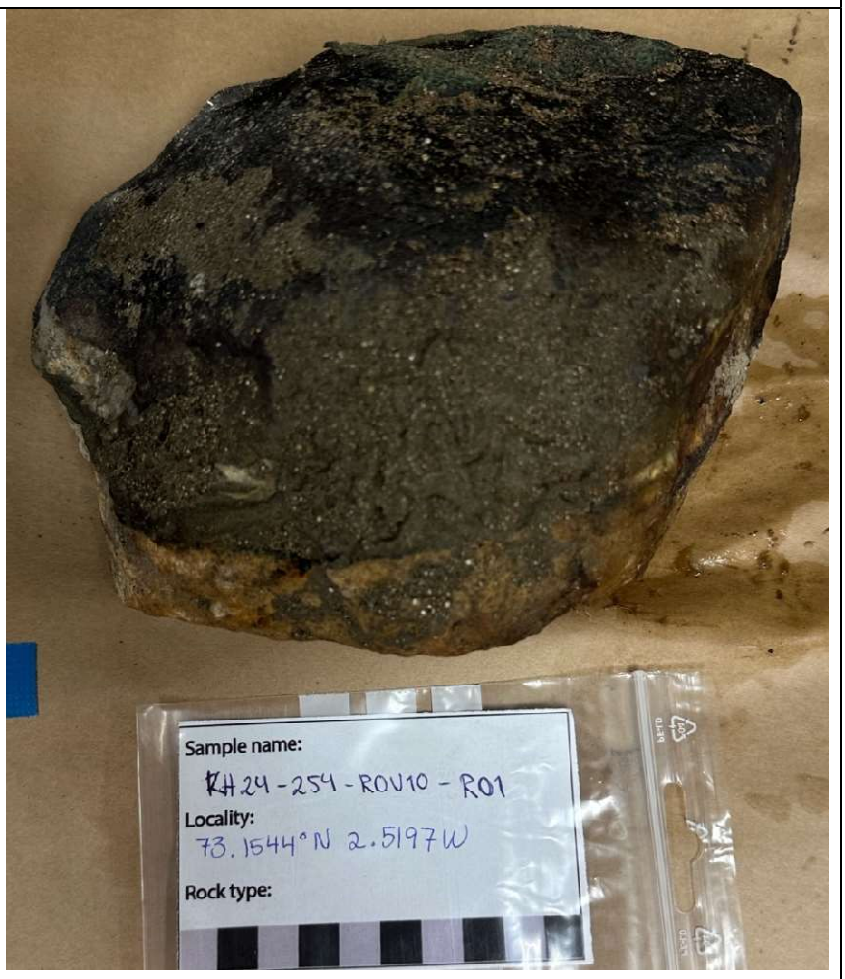
KH24-254-ROV09-R03 Latitude: 74.2529°N Longitude: 4.4795°W Depth: 3405 m Measurements (l/w/h): 40cm/20cm/12cm Description: Biggest sample; 24 cm of laminated Mn crust. Could possibly be dendritic (middle right). Smaller sample is similar to bigger sample but is much harder to observe Mn structures. Both are massive Mn crust with visible weathered basalt as orange color. Rock type: FeMn-crust	
KH24-254-ROV09-R04 Latitude: 74.2531°N Longitude: 4.4801°W Depth: 3384 m Measurements (l/w/h): 25cm/10cm/8cm Description: Could be dendritic surface, hard to observe any other structures. Rock type: FeMn-crust	

Dive ROV10: 23.02.24

KH24-254-ROV10-R01
Latitude: 73.1544°N
Longitude: 2.5197°W
Depth: 2828 m
Measurements (l/w/h): 18cm/16cm/9cm

Description:
Dropstone covered in thin manganese crust

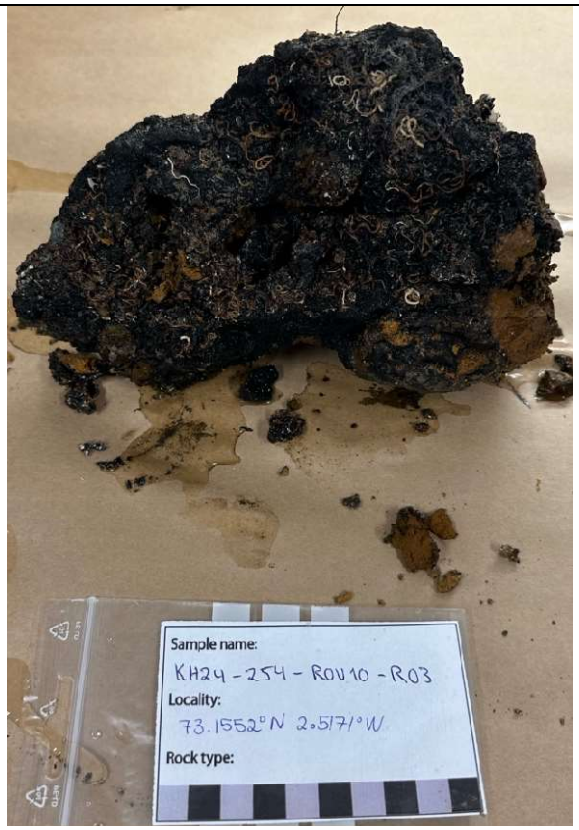
Rock type:
Dropstone

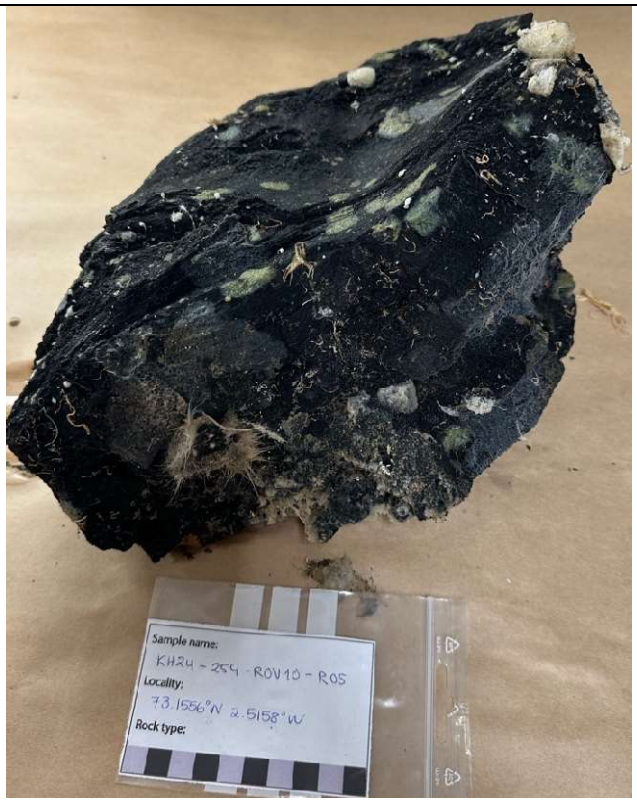


KH24-254-ROV10-R02
Latitude: 73.1544°N
Longitude: 2.5198°W
Depth: 2829 m
Measurements (l/w/h): 45cm/30cm/11cm

Description:
Huge Dropstone, potentially quartzite

Rock type:
Dropstone

KH24-254-ROV10-R03 Latitude: 73.1552°N Longitude: 2.5171°W Depth: 2725 m Measurements (l/w/h): 19cm/11cm/13cm Description: Manganese crust. Very crumbly and smaller rocks attached are weathered. Rock type: FeMn-crust	
KH24-254-ROV10-R04 Latitude: 73.1553°N Longitude: 2.5169°W Depth: 2702 m Measurements (l/w/h): 16cm/10cm/7cm Description: Shelf that was exposed, so thickness represent the shelf. Approx. 7 cm. Rock Type: FeMn-crust	

KH24-254-ROV10-R05 Latitude: 73.1556°N Longitude: 2.5158°W Depth: 2678 m Measurements (l/w/h): 32cm/19cm/15cm Description: Manganese crust. Approximately 13 cm thick. Massive with laminated structures. Rock type: FeMn-crust	
KH24-254-ROV10-R06 Latitude: 73.1558°N Longitude: 2.5153°W Depth: 2677 m Measurements (l/w/h): 20cm/24cm/14cm (the biggest piece) Description: three pieces of basalt. The biggest piece is vesicular and aphyric. Rock type: Basalt	

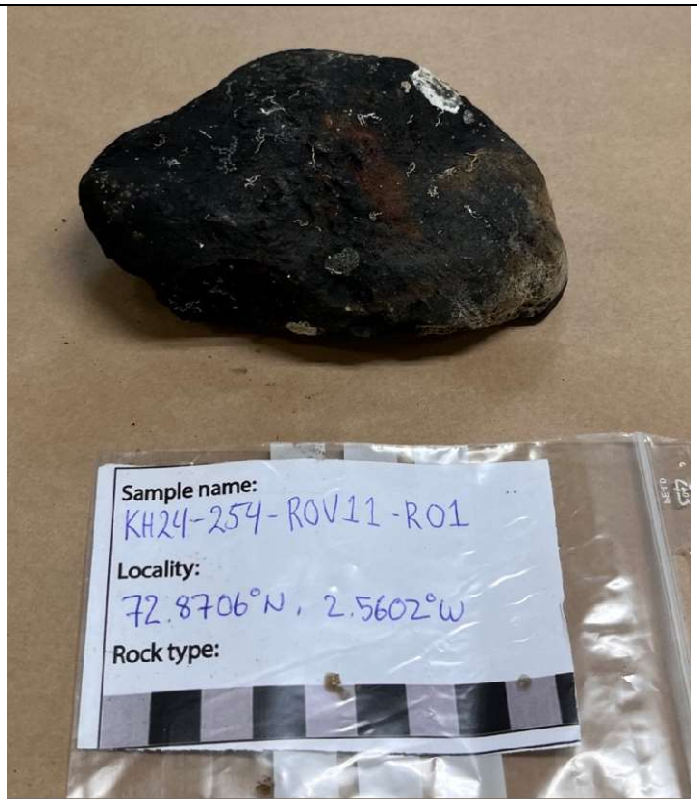
KH24-254-ROV10-R07 Latitude: 73.1590°N Longitude: 2.5184°W Depth: 2233 m Measurements (l/w/h): 24cm/6cm/21 Description: Manganese crust. A thin layer that fell of a bigger boulder. Approximately 6 cm. Rock type: FeMn-crust	
KH24-254-ROV10-R08 Latitude: 73.1594°N Longitude: 2.5213°W Depth: 2172 m Measurements (l/w/h): 27cm/28cm/9cm Description: Manganese crust, laminated 6 cm. Rock type: FeMn-crust	

Dive ROV11: 23.02.24-24.02.24

KH24-254-ROV11-R01
Latitude: 72.8706°N
Longitude: 2.5602°W
Depth: 2925 m
Measurements (l/w/h): 12cm/7cm/5cm

Description:
Small Dropstone

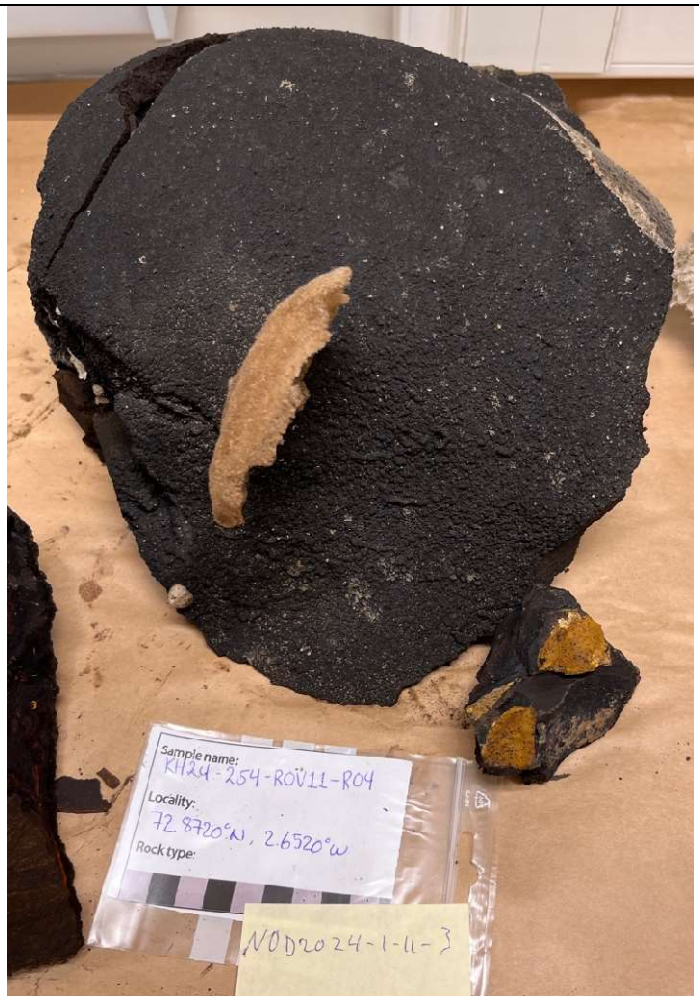
Rock type:
Dropstone



KH24-254-ROV11-R02
Latitude: 72.8707°N
Longitude: 2.5601°W
Depth: 2915 m
Measurements (l/w/h): 40cm/33cm/14cm

Description:
Manganese crust outside

Rock type:
Hard to tell, wait to see when sawed.

KH24-254-ROV11-R03 Latitude: 72.8709°N Longitude: 2.5614°W Depth: 2879 m Measurements (l/w/h): 16cm/16cm/8cm Description: Manganese crust, laminated 8cm Rock type: FeMn-crust	
KH24-254-ROV11-R04 Location: Latitude: 72.8720°N Longitude: 2.6520°W Depth: 2798 m Measurements (l/w/h): 30cm/36cm/20cm Description: Manganese rounded dome, height represent the manganese thickness Rock type: FeMn-crust	

KH24-254-ROV11-R05 Latitude: 72.8727°N Longitude: 2.5618°W Depth: 2727 m Measurements (l/w/h): 36cm/23cm/15cm Description: Manganese crust, laminated 11 cm. Rock type: FeMn-crust	
KH24-254-ROV11-R06 Latitude: 72.8731°N Longitude: 2.5618°W Depth: 2699 m Measurements (l/w/h): 37cm/19cm/9cm Description: Fine grained manganese laminated crust, thickness 8cm. Marks after sediment/stromatolitic growth. Rock type: FeMn-crust	

KH24-254-ROV11-R07
Latitude: 72.8741°N
Longitude: 2.5612°W
Depth: 2610 m
Measurements (l/w/h): 19cm/13cm/18cm

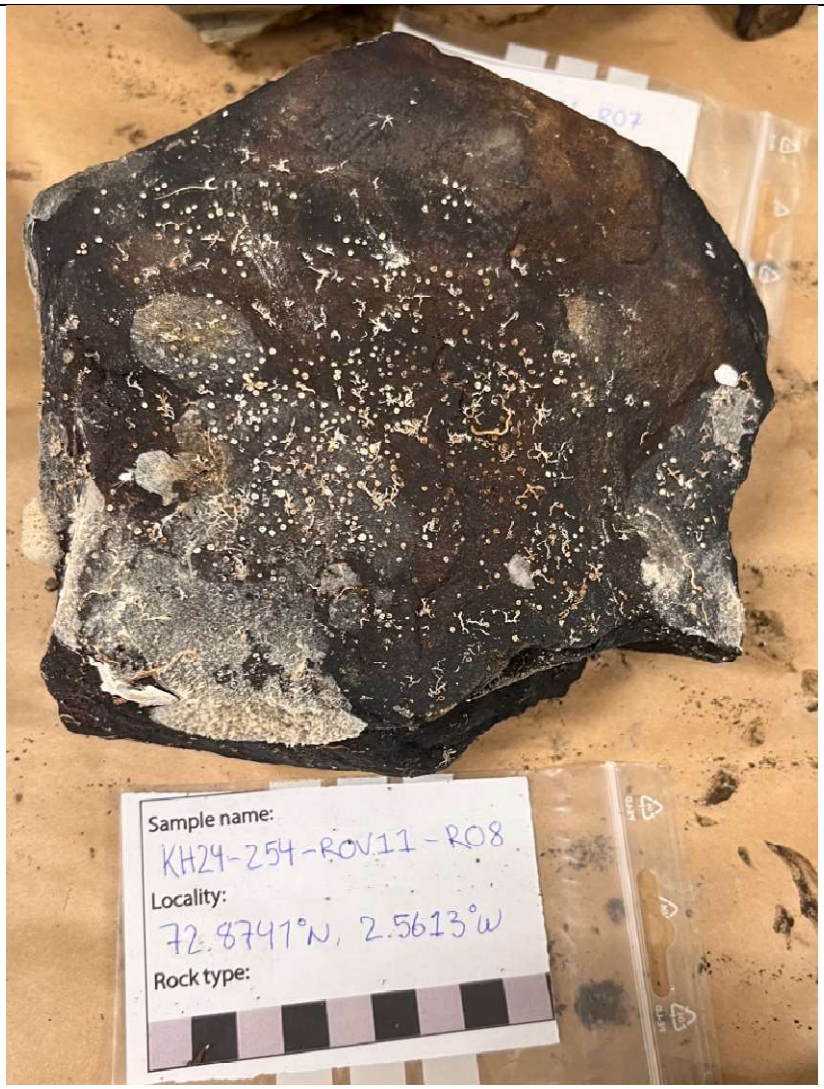
Description:
Basalt, thin spots with manganese crust, hard to tell the height of manganese crust, due to sawing everywhere.

Rock type:
Basalt

KH24-254-ROV11-R08
Latitude: 72.8741°N
Longitude: 2.5613°W
Depth: 2609 m
Measurements (l/w/h): 16cm/18cm/8cm

Description:
Most likely a Dropstone, covered in manganese crust.

Rock type:
Dropstone



Dive ROV11: 24.02.24

KH24-254-ROV12-R01
Latitude: 72.7510°N
Longitude: 0.9268°W
Depth: 2589 m
Measurements (l/w/h): 31cm/18cm/9.5cm

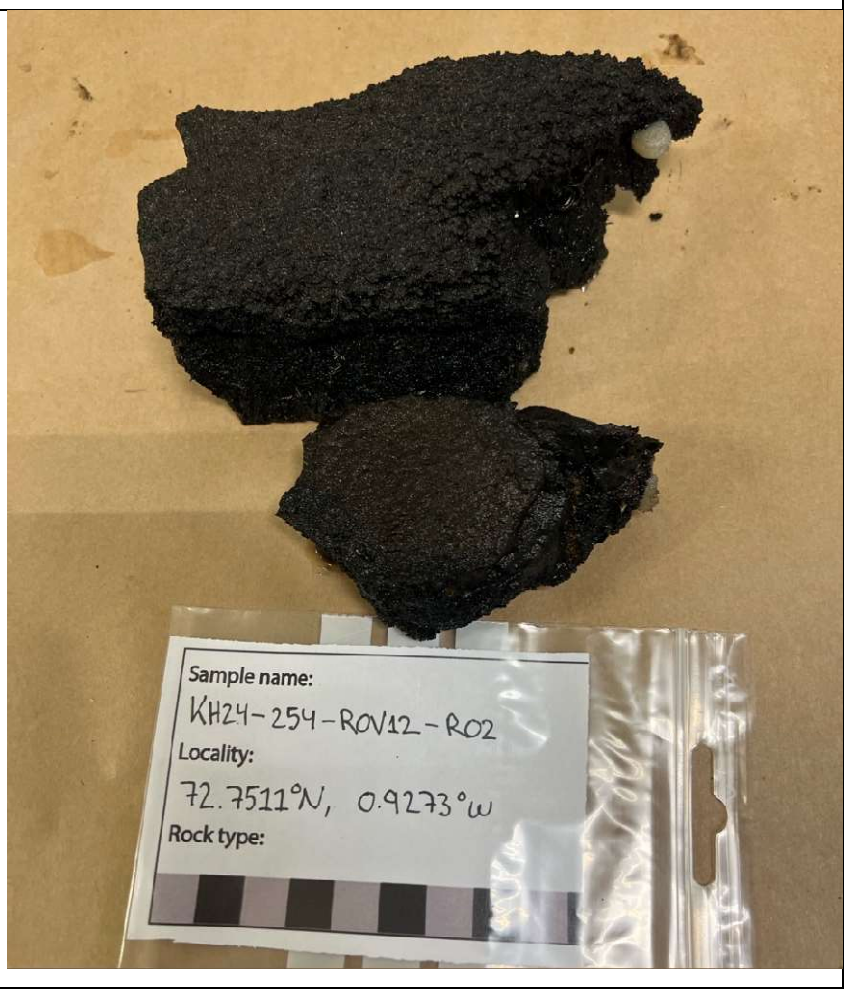
Description:
Dotted texture, black manganese crust. Laminated. Weathered basalt inside. Massive.

Rock type:
FeMn-crust

KH24-254-ROV12-R02
Latitude: 72.7511°N
Longitude: 0.9273°W
Depth: 2550 m
Measurements (l/w/h): 15cm/7cm/4.2cm

Description:
Manganese crust, black. Dotted texture. Laminated.

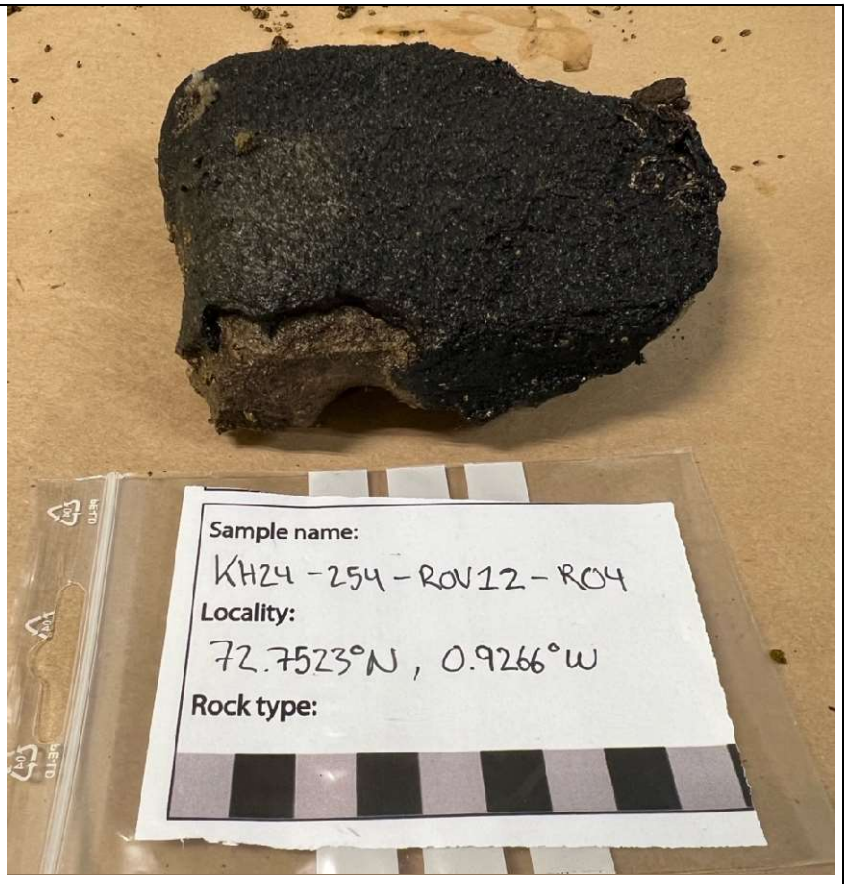
Rock type:
FeMn-crust



KH24-254-ROV12-R03
Latitude: 72.7512°N
Longitude: 0.9280°W
Depth: 2515 m
Measurements (l/w/h): 25cm/11.5cm/13cm

Description:
Black manganese crust, 8 cm thick and laminated. Might be weathered?
Micro gabbro/diabas

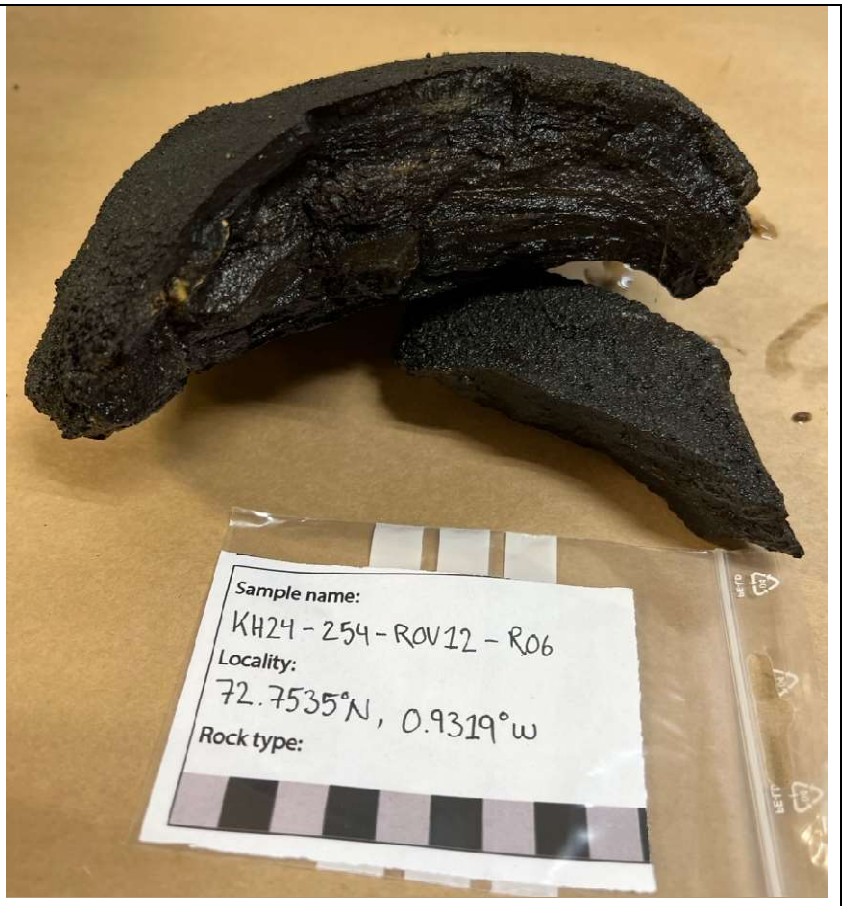
Rock type:
Gabbro + FeMn-crust

KH24-254-ROV12-R04 Latitude: 72.7523°N Longitude: 0.9266°W Depth: 2505 m Measurements (l/w/h): 12cm/11cm/3.5cm Description: Most likely a Dropstone, subrounded. Manganese crust (~0.5 cm) on top of it. Rock type: FeMn-crust	
KH24-254-ROV12-R05 Location: Latitude: 72.7533°N Longitude: 0.9316°W Depth: 2260 m Measurements (l/w/h): 24cm/23cm/17cm Description: Manganese crust (up to 2cm), laminated. Might be weathered basalt inside? Rock type: FeMn-crust	

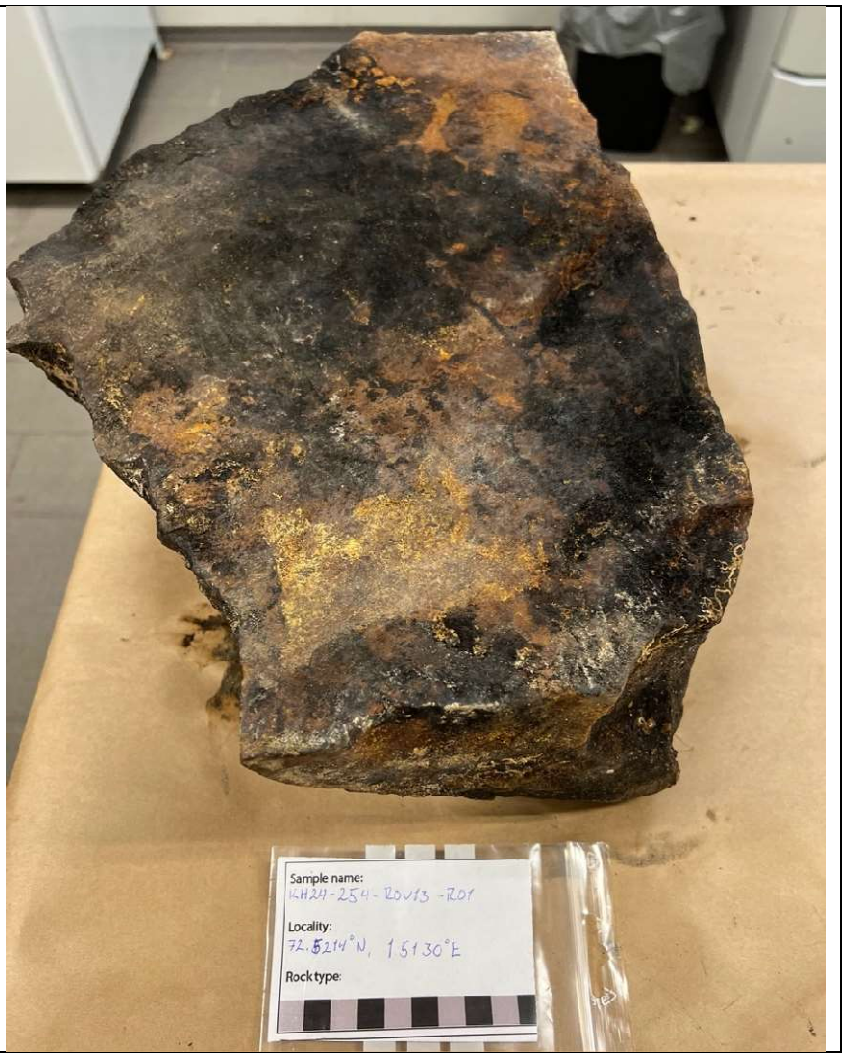
KH24-254-ROV12-R06
Latitude: 72.7535°N
Longitude: 0.9319°W
Depth: 2241 m
Measurements (l/w/h): 20cm/13cm/7cm

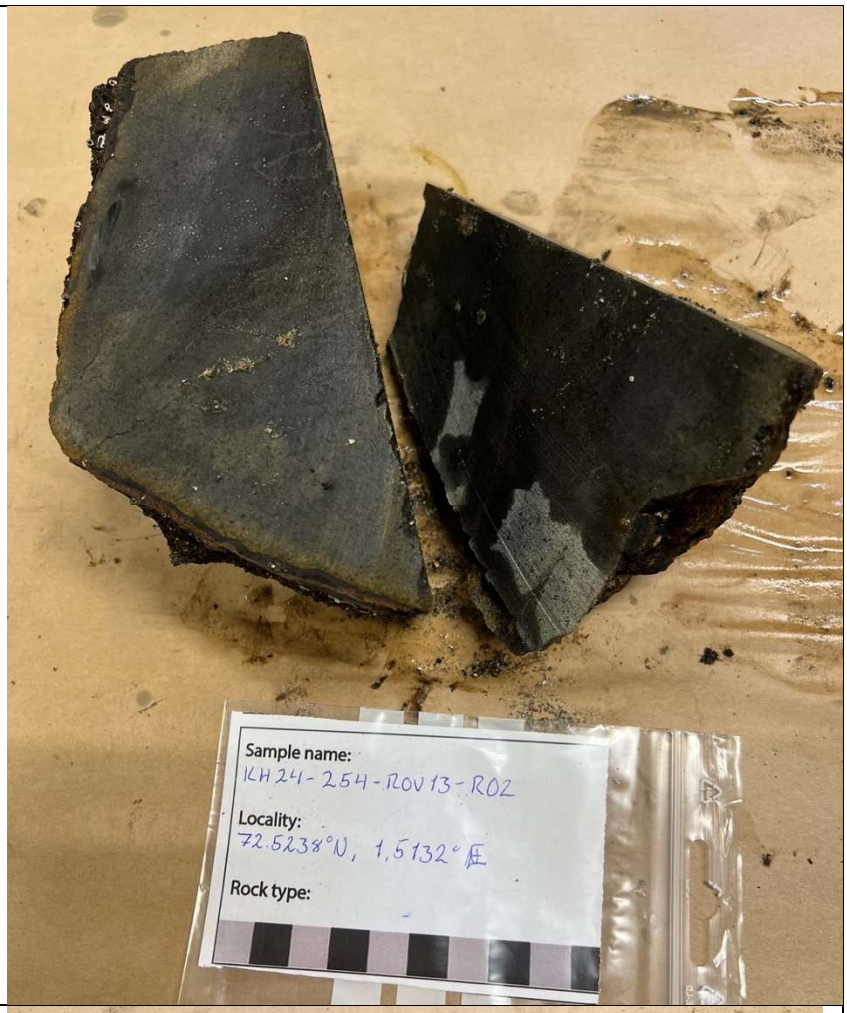
Description:
Manganese crust, up to 7cm thick. Laminated.

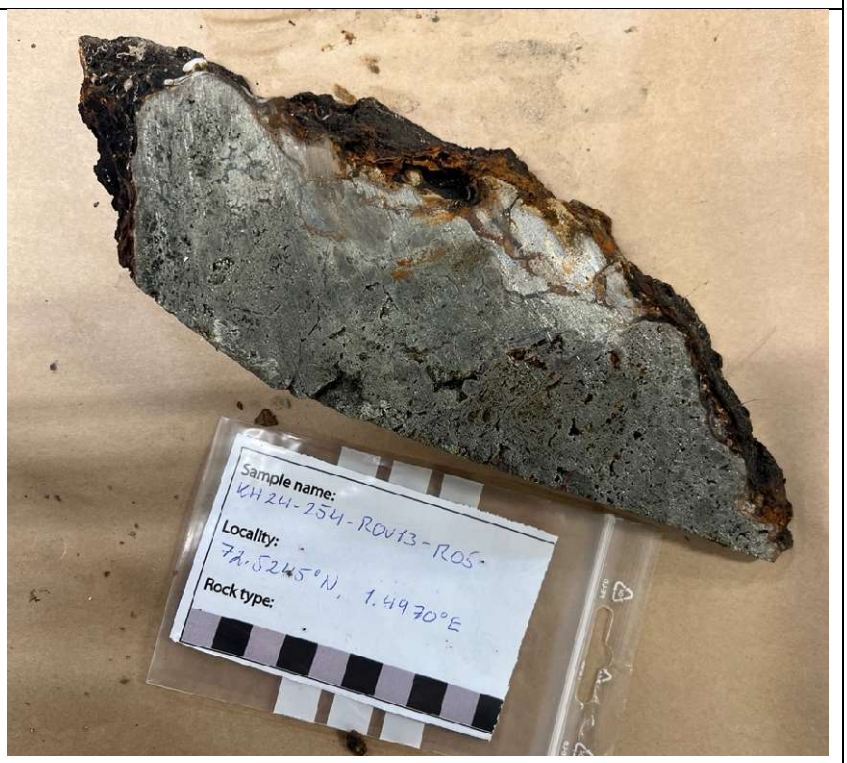
Rock type:
FeMn-crust

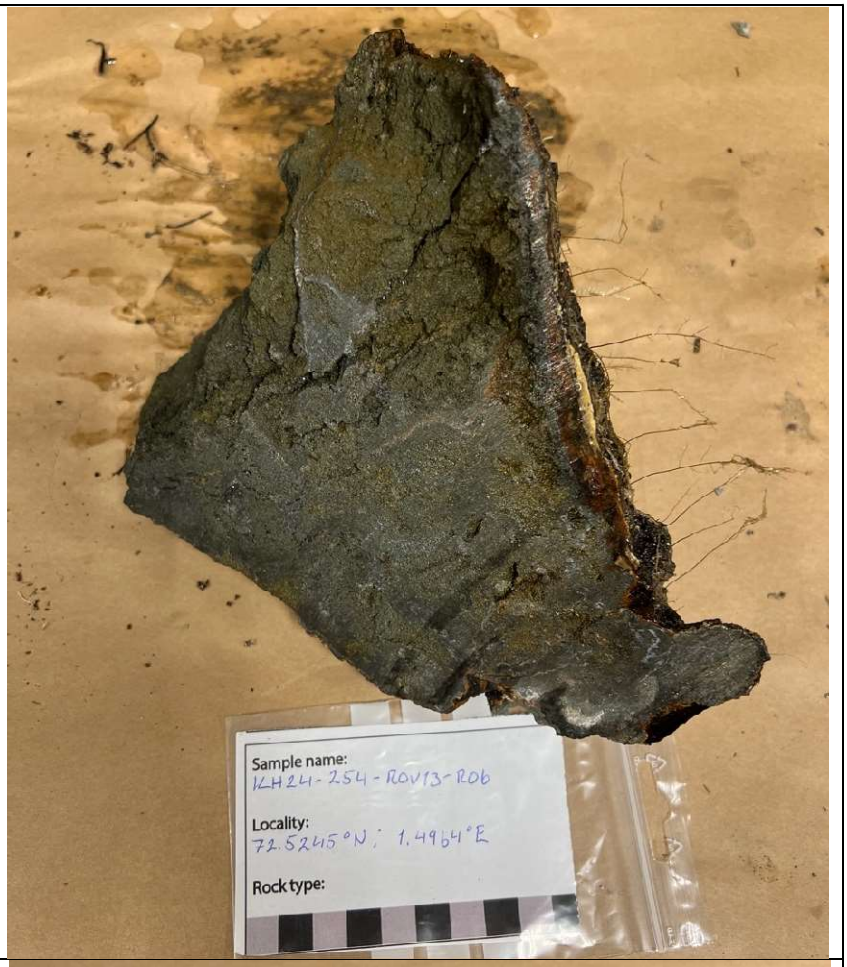


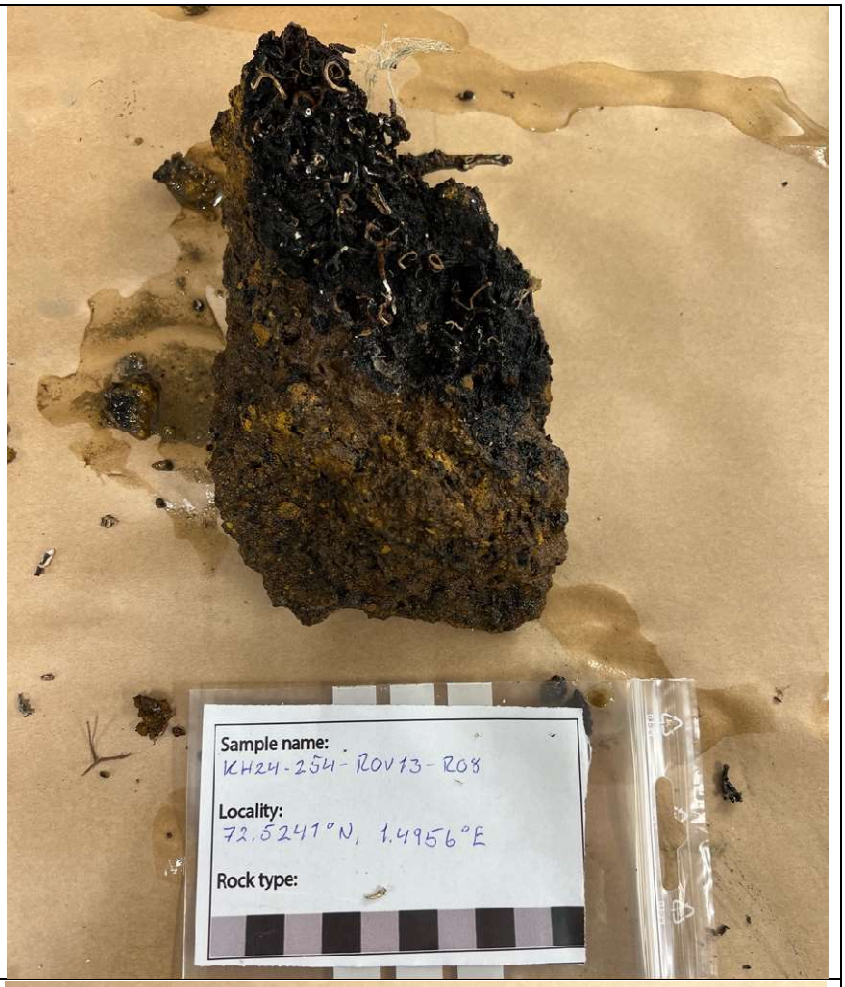
Dive ROV13: 25.02.24

KH24-254-ROV13-R01 Location: Deep Insight Hill Latitude: 72.5214°N Longitude: 1.5130°E Depth: 1234 m Measurements (l/w/h): 42cm/29cm/13cm Description: Black, rust brown, yellowish. Thin manganese crust (~1mm). Might be basalt, should be cut in two. Angular. Big and heavy. Rock type: Basalt	

KH24-254-ROV13-R02 Location: Deep Insight Hill Latitude: 72.5238°N Longitude: 1.5132°E Depth: 1307 m Measurements (l/w/h): 18cm/14cm/9cm Description: Black outside, gray inside. Basalt, manganese crust (up to 0.6cm). Subrounded. Grains inside (~1mm). Rock type: Basalt	
KH24-254-ROV13-R03 Location: Deep Insight Hill Latitude: 72.5238°N Longitude: 1.5007°E Depth: 1169 m Measurements (l/w/h): 15cm/14cm/7cm Description: Black outside, thin manganese crust (less than 1mm). Dropstone (granite?) Rock type: Dropstone	

KH24-254-ROV13-R04 Location: Deep Insight Hill Latitude: 72.5242°N Longitude: 1.5001°E Depth: 1163 m Measurements (l/w/h): 14cm/10cm/6.5cm Description: Black and brown outside, thin manganese crust (less than 1mm). Inside its gray, basalt. With weathering rim (1cm). Might be volcanic glass (1.5cm). Fracture throughout the basalt. Rock type: Basalt	
KH24-254-ROV13-R05 Location: Deep Insight Hill Latitude: 72.5245°N Longitude: 1.4970°E Depth: 1106 m Measurements (l/w/h): 25.5cm/8cm/6cm Description: Black outside, manganese crust (~1mm). Rust brown, grey and gold-yellow inside, shiny. Might be Chalcopyrite, pyrite, and zinc/pyrotite. Some long needles (seen with loupe – calcite). Rock type: Sulfide	

KH24-254-ROV13-R06 Location: Deep Insight Hill Latitude: 72.5245°N Longitude: 1.4964°E Depth: 1093 m Measurements (l/w/h): 20cm/15.5cm/12cm Description: Black, grey, rust brown. Manganese crust, up to 0.5 cm. Looks like weathered basalt, but it is also shiny. Some long needles (sphalerite). Rock type: Zn-sulfide	
KH24-254-ROV13-R07 Location: Deep Insight Hill Latitude: 72.5248°N Longitude: 1.4956°E Depth: 1085 m Measurements (l/w/h): 34cm/14.5cm/6cm Description: Thin manganese crust (~1mm). Blue-gray layer = silica. Might be zinc-rich basalt. “Irring”. Shiny. Might also be zinc. Rock type: Basalt, sulfide	

KH24-254-ROV13-R08 Location: Deep Insight Hill Latitude: 72.5241°N Longitude: 1.4956°E Depth: 1084 m Measurements (l/w/h): 17cm/9.5cm/6cm Description: Black, brown, orange. Weathered basalt, thin manganese crust. Porous. Tubeworms. Rock type: Basalt	
KH24-254-ROV13-R09 Location: Deep Insight Hill Latitude: 72.5241°N Longitude: 1.4957°E Depth: 1082 m Measurements (l/w/h): 24.5cm/13cm/11.5cm Description: Black, rust brown. Thin manganese crust (up to 0.5cm), weathered basalt. Porous. Tubeworms. Rock type: Basalt	

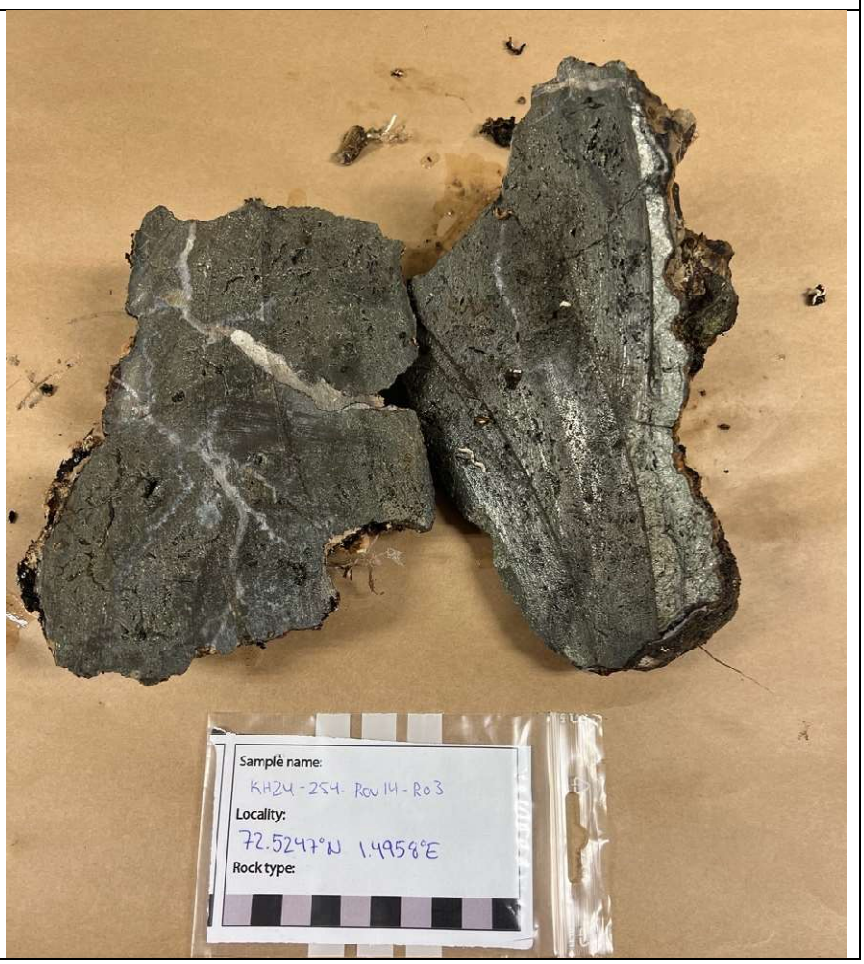
KH24-254-ROV13-R10 Location: Deep Insight Hill Latitude: 72.5241°N Longitude: 1.4955°E Depth: 1075 m Measurements (l/w/h): 27.5cm/12.5cm/7cm Description: Black, rust brown. Some tubeworms. 1 mm thick manganese crust. Chaotic structure inside, weathered basalt. Rock type: Basalt	
KH24-254-ROV13-R11 Location: Deep Insight Hill Latitude: 72.5242°N Longitude: 1.4953°E Depth: 1074 m Measurements (l/w/h): 18cm/8cm/8cm Description: Black, brown, rust brown. Three pieces, thin manganese crust (up to 0.5cm). Chaotic structure inside, porous. Probably weathered basalt. Rock type: Basalt	

Dive ROV14: 25.02.24-26.02.2024

KH24-254-ROV14-R01
Location: Deep Insight Hill
Latitude: 72.5243°N
Longitude: 1.4931°E
Depth: 1080 m
Measurements (l/w/h): 24 cm/25 cm/13 cm (measured biggest one).

Description:
Thin manganese crust. Massive, angular, subangular. Weathered. Black, brown, orange, red. It is relatively heavy to be an Fe-oxide, could there be sulfides on the inside?

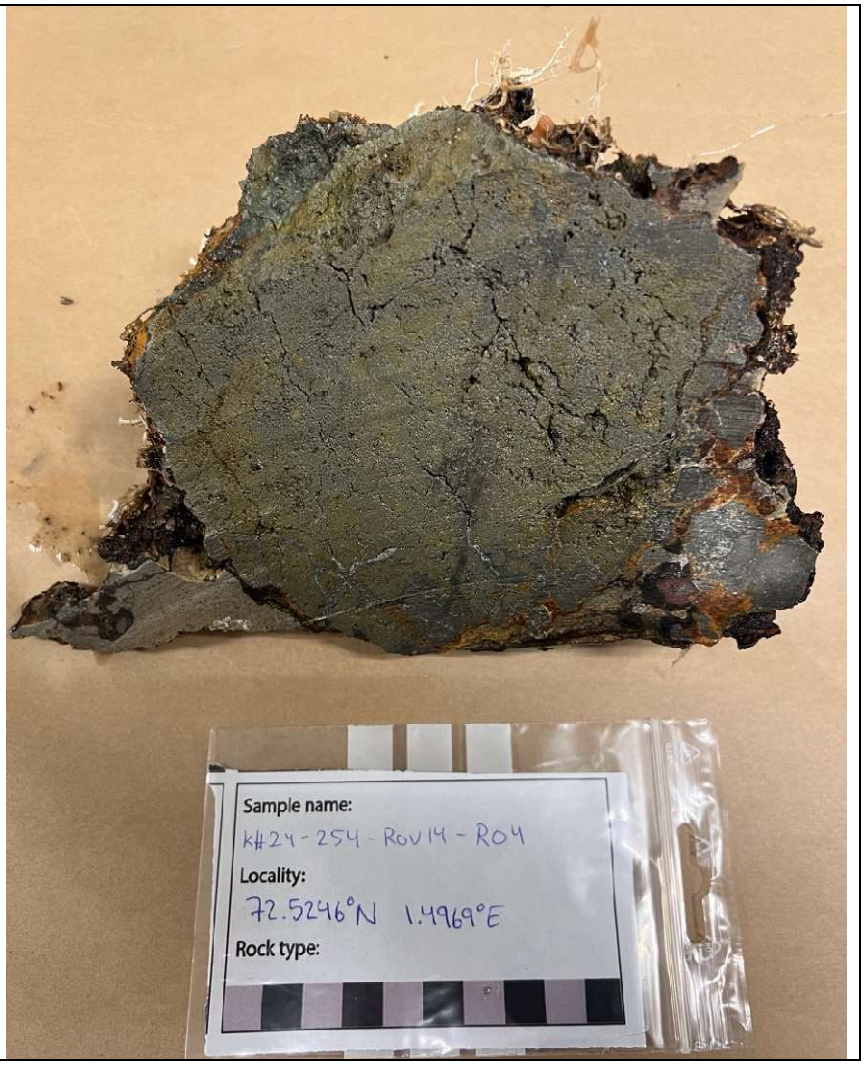
Rock type:
Fe-oxide

KH24-254-ROV14-R02 Location: Deep Insight Hill Latitude: 72.5248°N Longitude: 1.4932°E Depth: 1100 m Measurements (l/w/h): 40 cm/22cm/13 cm Description: Elongated, subangular. Brecciated. Some veins, some consisting of sulfides, others can be quartz or carbonate. A thin weathered red coat outside, grey inside. Rock type: Sulfide	
KH24-254-ROV14-R03 Location: Deep Insight Hill Latitude: 72.5247°N Longitude: 1.4958°E Depth: 1086 m Measurements (l/w/h): 33 cm/13 cm/11 cm Description: Big veins (carbonate or quartz). Elongated, angular, subangular. Thin manganese crust. Black, grey, ore: white, pink. Rock type: Sulfide	

KH24-254-ROV14-R04
Location: Deep Insight Hill
Latitude: 72.5246°N
Longitude: 1.4969°E
Depth: 1105 m
Measurements (l/w/h): 20 cm/12 cm/11 cm

Description: Rounded, angular, subangular. Small white, grey veins (silica or carbonate). A weathered section brecciated. Some cracks. Color: black, green/grey, red, orange, grey. Thin manganese crust.

Rock type:
Sulfide

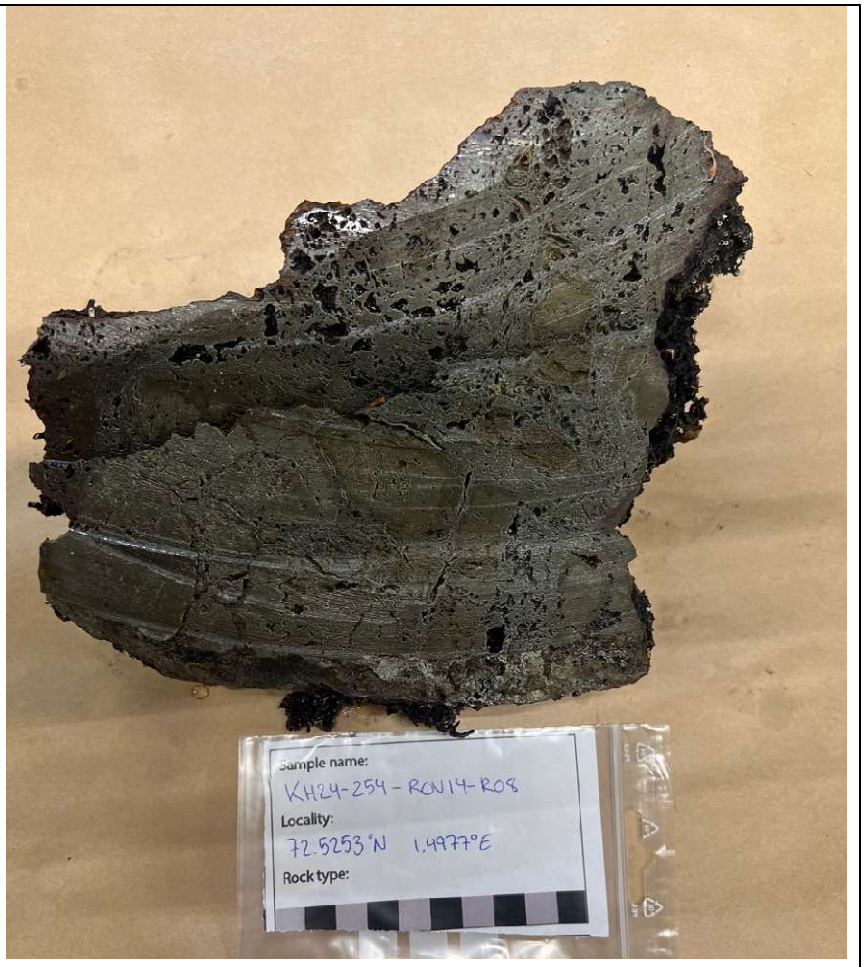


KH24-254-ROV14-R05 Location: Deep Insight Hill Latitude: 72.5247°N Longitude: 1.4982°E Depth: 1135 m Measurements (l/w/h): 27 cm/15 cm/15 cm Description: Elongated, subangular. Thin manganese crust + some weathered crust. Brecciated. Color: black, brown, orange, grey. Could potentially be some acicular out-crystallizations in the hollow rooms in the rock (can also be something hard biological). Rock type: Sulfide	
KH24-254-ROV14-R06 Location: Deep Insight Hill Latitude: 72.5246°N Longitude: 1.4985°E Depth: 1135 m Measurements (l/w/h): 26 cm/11 cm/13 cm Description: Elongated, angular, subangular. Thin manganese crust, and thin weathered crust. Brecciated. Some holes in it. Rock type: Sulfide	

KH24-254-ROV14-R07
Location: Deep Insight Hill
Latitude: 72.5250°N
Longitude: 1.4982°E
Depth: 1143 m
Measurements (l/w/h): 26 cm/13 cm/10 cm

Description:
Elongated, Angular, subangular. Thin manganese crust on top of thin weathered crust. Seems to be some acicular mineral growth on the side of the rock. Color: black, red, yellow, orange, brown, grey. Some holes in it. Looks like there are veins.

Rock type:
Sulfide

KH24-254-ROV14-R08 Location: Deep Insight Hill Latitude: 72.5253°N Longitude: 1.4977°E Depth: 1147 m Measurements (l/w/h): 17 cm/17 cm/8 cm Description: Massive, angular, subangular. Looks like vesicular covered with manganese crust inside, but is probably sulfides that has weathered and later been covered in manganese crust. Thin manganese crust. Brecciation. Color: black, grey, brown. Rock type: Sulfide	
KH24-254-ROV14-R09 Location: Deep Insight Hill Latitude: 72.5257°N Longitude: 1.4965°E Depth: 1155 m Measurements (l/w/h): 22 cm/14 cm/11 cm Description: Rounded, subangular. Thin manganese crust and weathered crust. Potential veins. Holes. Color: black, orange, grey, white, pink Rock type: Sulfide	

Dive ROV15: 26.02.24

KH24-254-ROV15-R01
Location: Boyd Seamount
Latitude: 72.6456°N
Longitude: 2.6797°E
Depth: 1932 m
Measurements (l/w/h): 17 cm/13 cm/18 cm

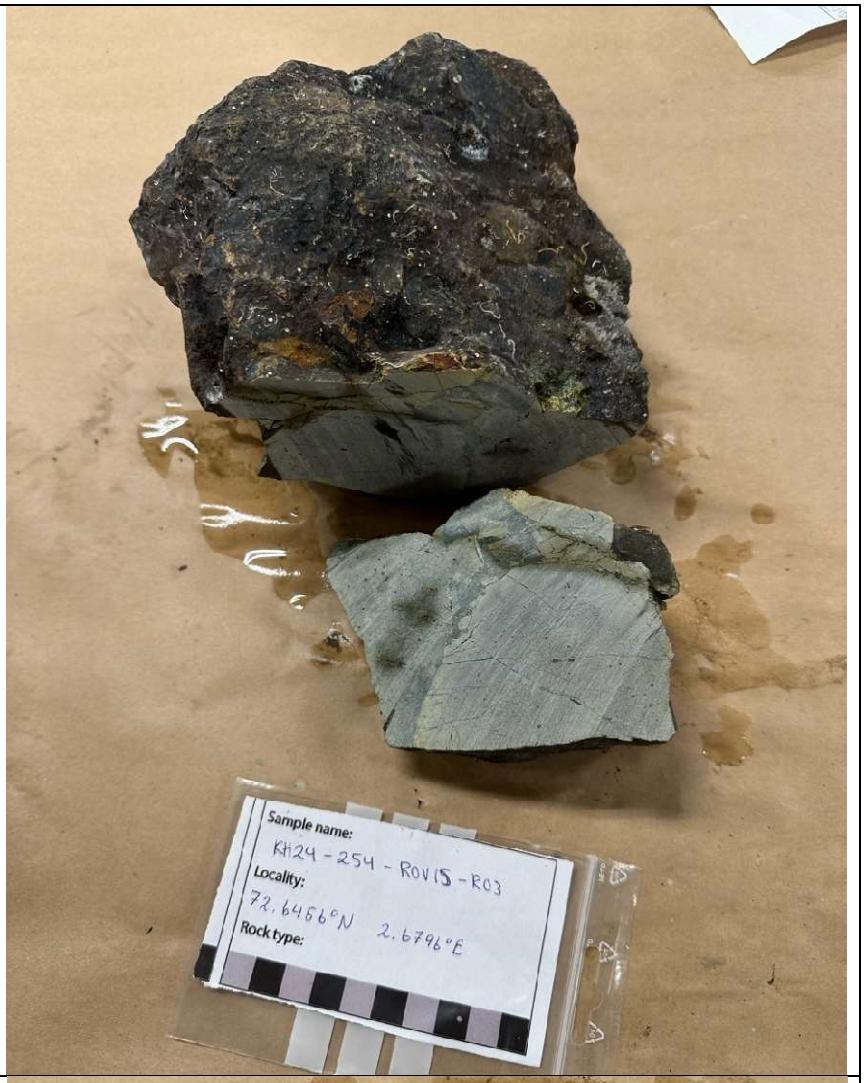
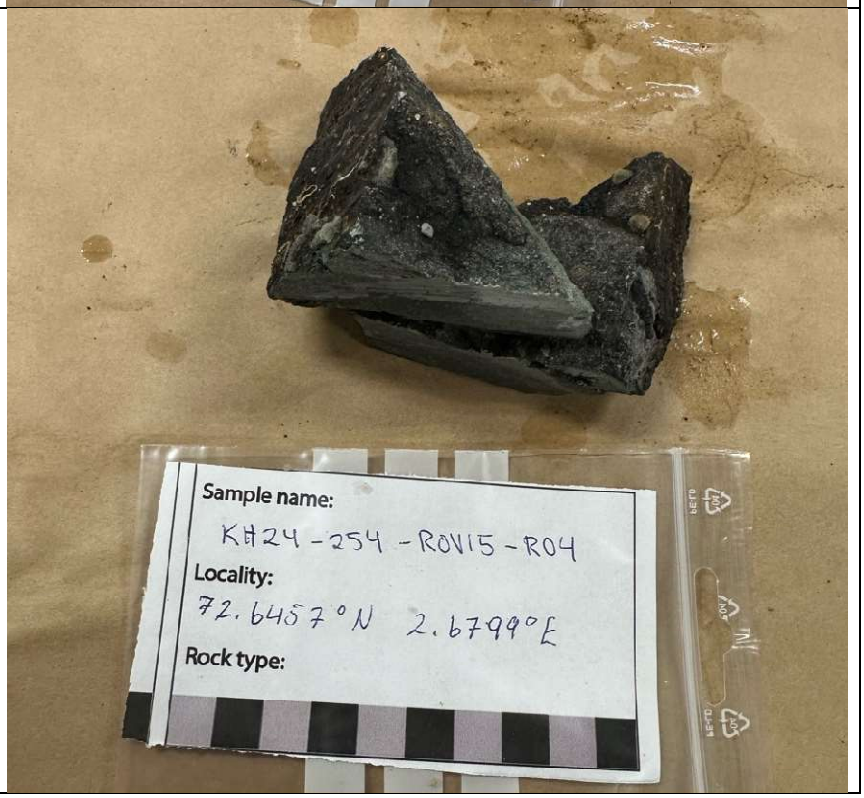
Description:
Thin manganese crust. Small vein. Angular, elongated. Color: red, black, grey/blue

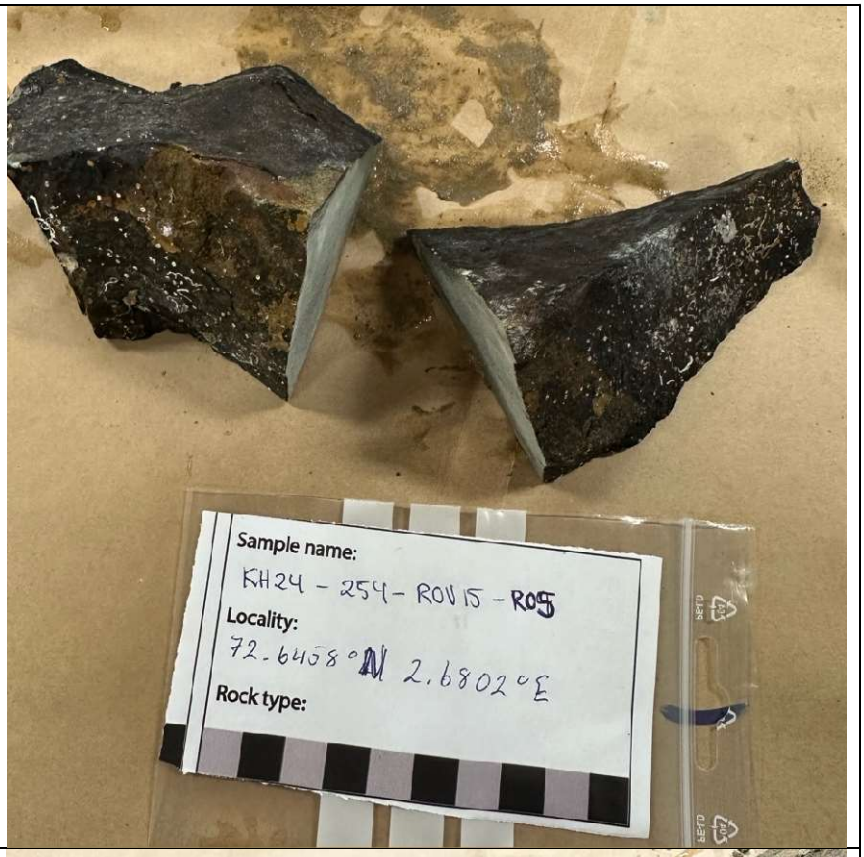
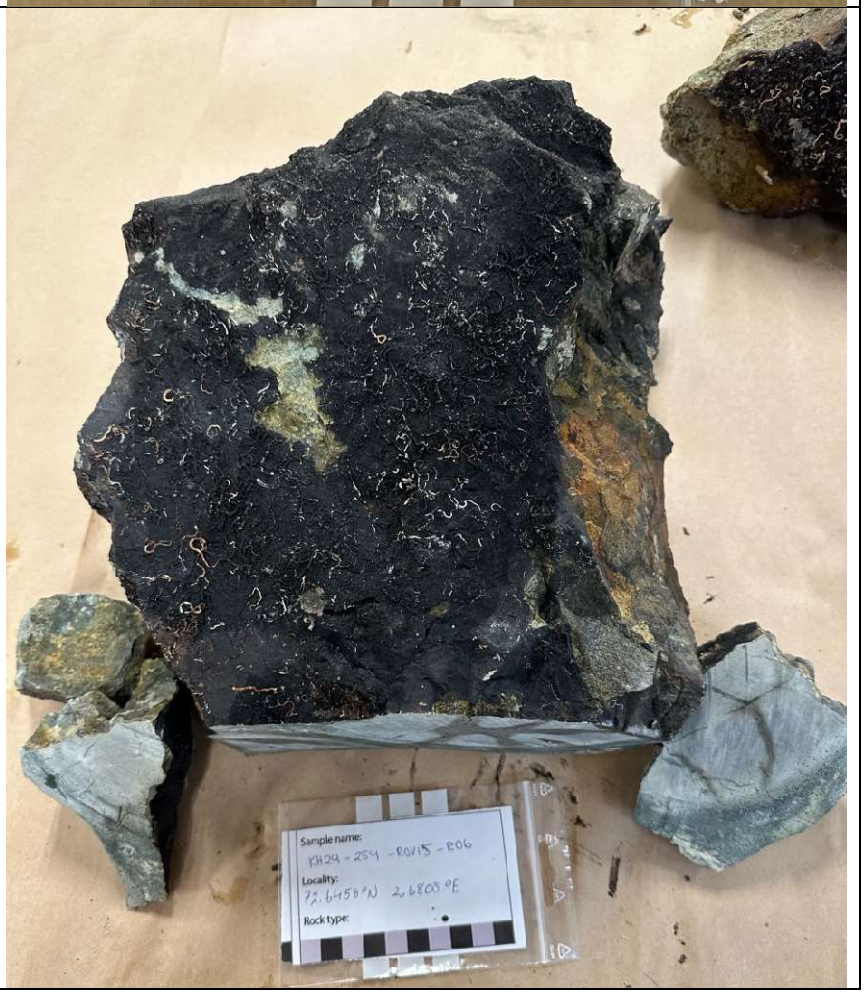
Rock type:
Basalt

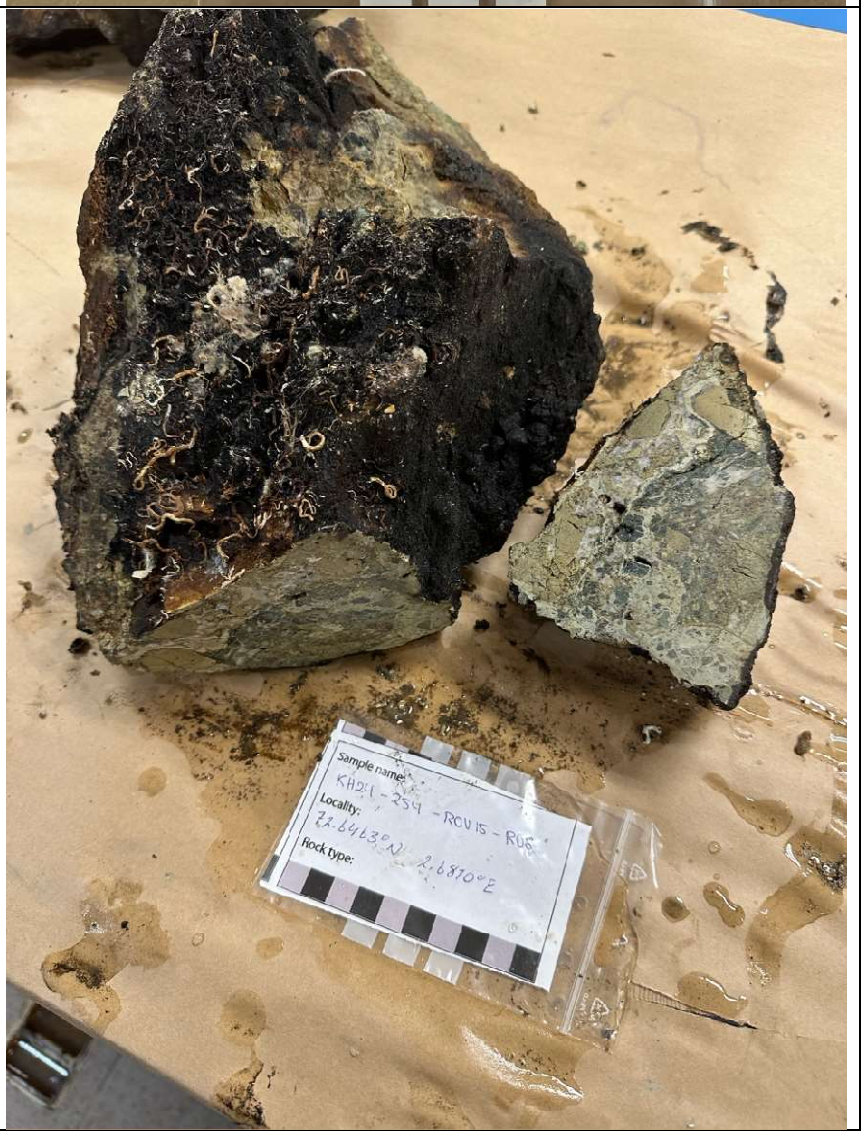
KH24-254-ROV15-R02
Location: Boyd Seamount
Latitude: 72.6456°N
Longitude: 2.6797°E
Depth: 1930 m
Measurements (l/w/h): 16 cm/15 cm/8.5 cm

Description:
Color: blue, green, grey, black, orange, brown. Angular. Green “vein” at top. Cracks, potential vein.

Rock type:
Altered basalt

KH24-254-ROV15-R03 Location: Boyd Seamount Latitude: 72.6456°N Longitude: 2.6796°E Depth: 1929 m Measurements (l/w/h): 24 cm/17 cm/10 cm Description: Color: black, orange, grey/blue/green. Brecciated. Thin manganese crust. Weathered veins/cracks inside. Angular, elongated. Rock type: Altered basalt	
KH24-254-ROV15-R04 Location: Boyd Seamount Latitude: 72.6457°N Longitude: 2.6799°E Depth: 1916 m Measurements (l/w/h): 14 cm/8 cm/2,5 cm Description: Color: black, green, blue/grey. Thin green “vein”. Thin manganese crust. Thin, elongated, angular. Rock type: Altered basalt	

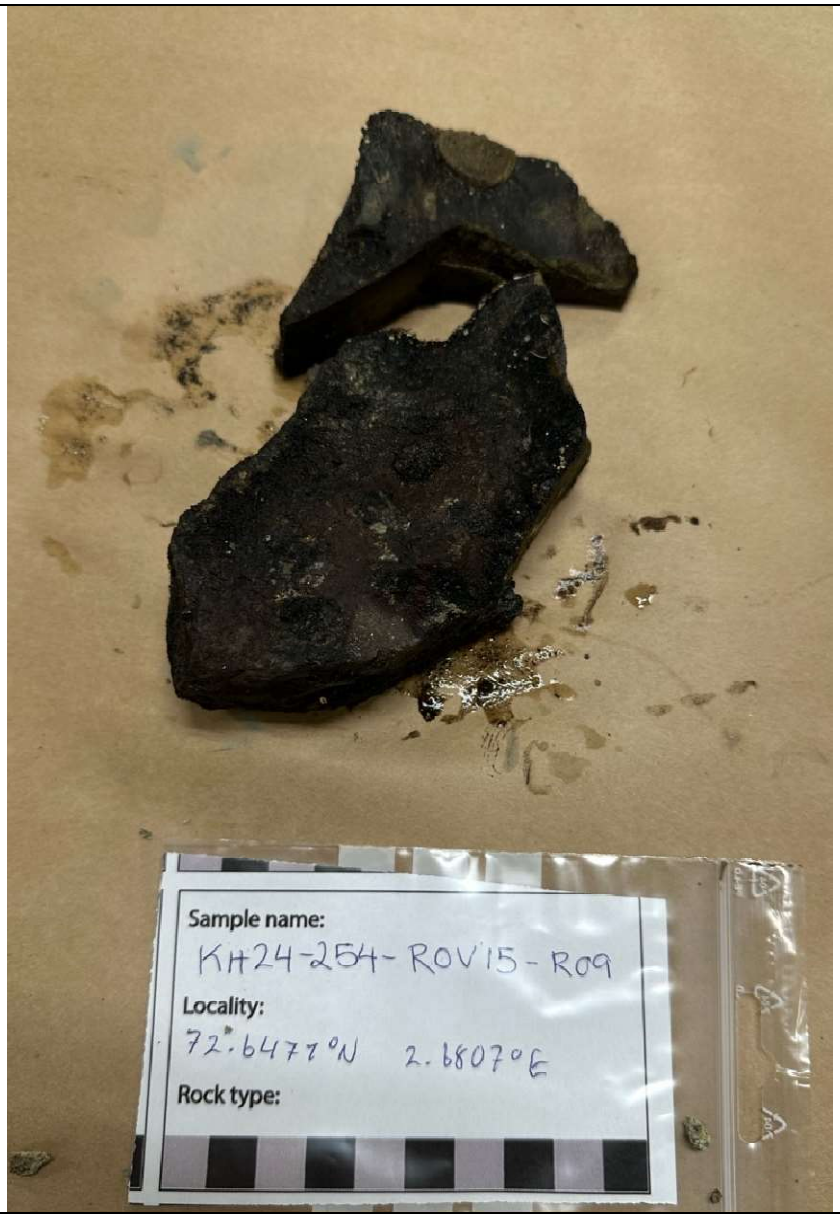
KH24-254-ROV15-R05 Location: Boyd Seamount Latitude: 72.6458°N Longitude: 2.6802°E Depth: 1899 m Measurements (l/w/h): 19 cm/10 cm/5 cm Description: Elongated, angular. Color: black, brown, blue/grey. Rock type: Basalt	
KH24-254-ROV15-R06 Location: Boyd Seamount Latitude: 72.6458°N Longitude: 2.6805°E Depth: 1896 m Measurements (l/w/h): 36 cm/27 cm/10 cm Description: Color: black, brown, blue/grey, blue/grey. Brecciated. Green/blue “vein” as “matrix”. Cracks/veins? Angular, elongated, subangular. Rock type: Altered basalt	

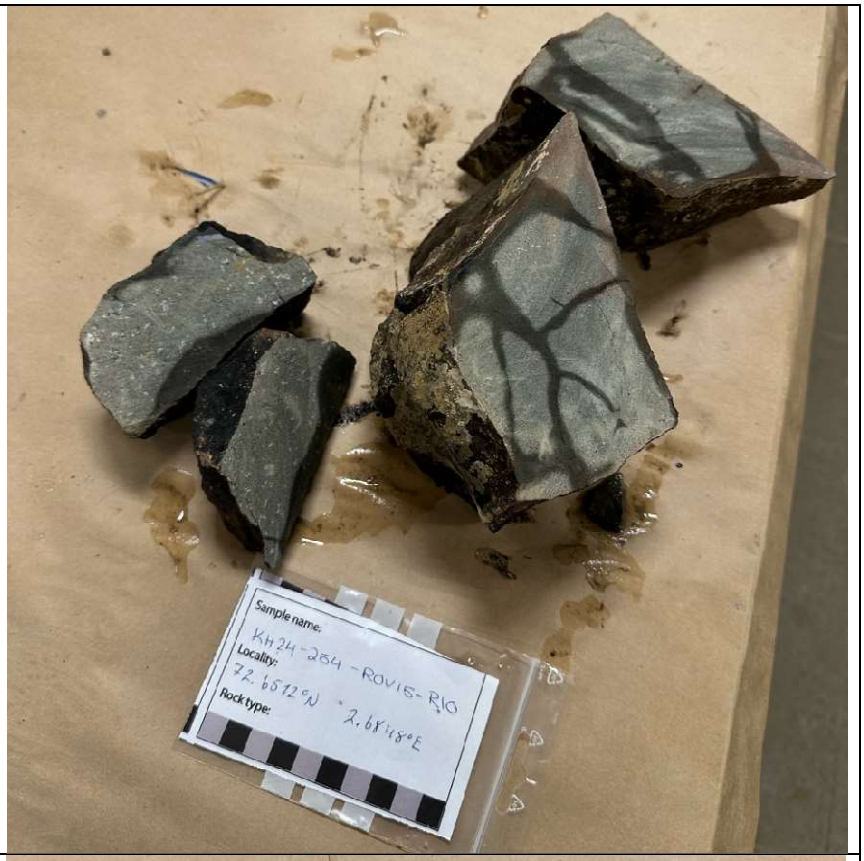
KH24-254-ROV15-R07 Location: Boyd Seamount Latitude: 72.6459°N Longitude: 2.6806°E Depth: 1883 m Measurements (l/w/h): 10 cm/10 cm/3 cm Description: Angular. Color: black, blue/grey, brown, red. Thin manganese crust. Rock type: Basalt	
KH24-254-ROV15-R08 Location: Boyd Seamount Latitude: 72.6463°N Longitude: 2.6810°E Depth: 1798 m Measurements (l/w/h): 48 cm/26 cm/15 cm Description: Color: black, red, green, white, egg-white, beige. Multiple veins. Brecciated. Thin manganese crust. Rock type: Breccia/altered basalt	

KH24-254-ROV15-R09
Location: Boyd Seamount
Latitude: 72.6471°N
Longitude: 2.6807°E
Depth: 1732 m
Measurements (l/w/h): 12 cm/7 cm/3 cm

Description:
Elongated, subangular. Color: black, brown, green/brown. Thin manganese crust.

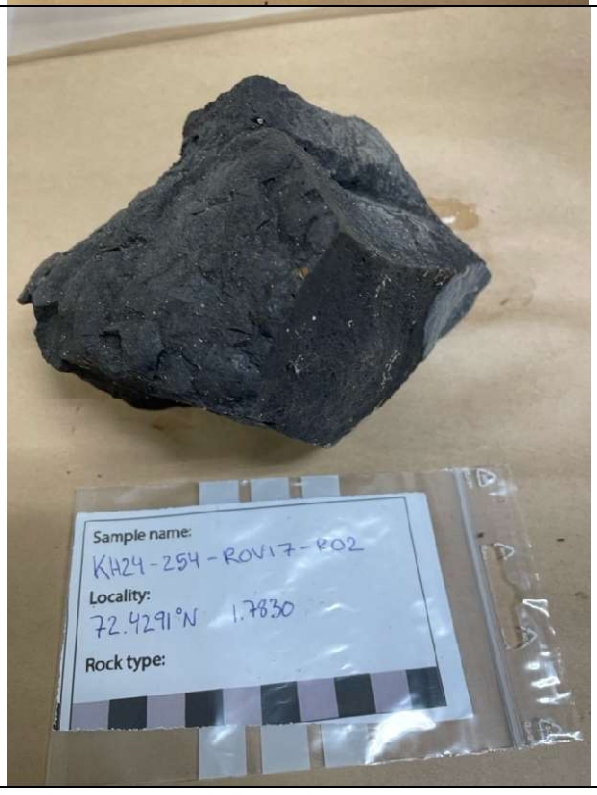
Rock type:
Altered basalt.

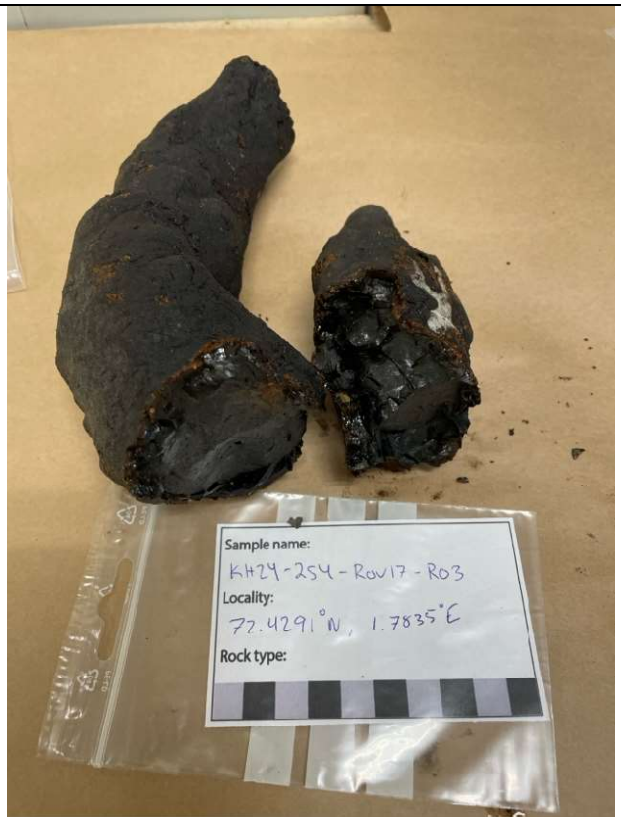
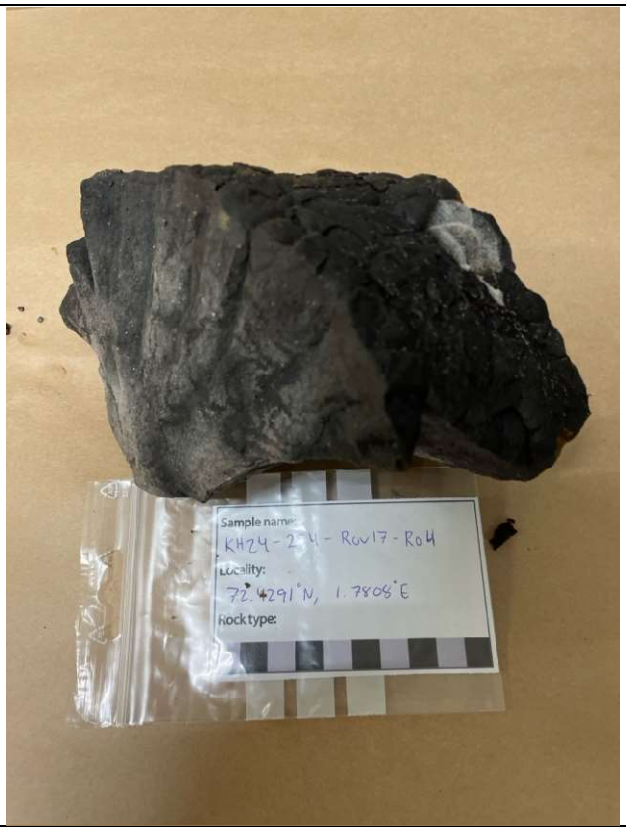


KH24-254-ROV15-R10 Location: Boyd Seamount Latitude: 72.6512°N Longitude: 2.6848°E Depth: 1331 m Measurements (l/w/h): 14 cm/9 cm/10 cm Description: Color: grey, white, black, red. White plagioclase crystals. Red weathering sone. Thin manganese crust. Some cracks. Rock type: Basalt	
KH24-254-ROV15-R11 Location: Boyd Seamount Latitude: 72.6553°N Longitude: 2.6815°E Depth: 1088 m Measurements (l/w/h): 19 cm/3 cm/7 cm Description: Color: black, orange, grey, white. White plagioclase crystals. A weathering layer beneath a thin manganese crust. Rock type: Basalt	

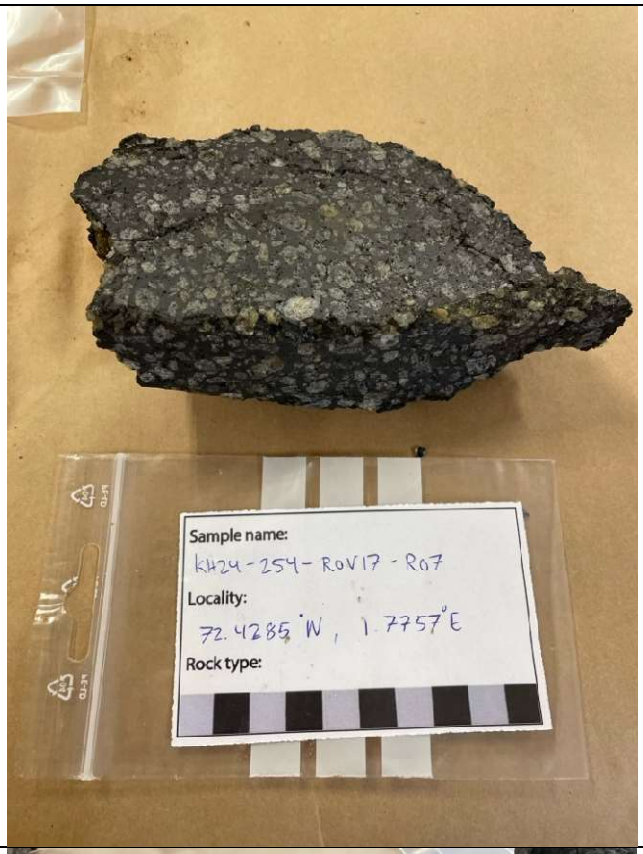
Dive ROV16: NO GEO SAMPLES.

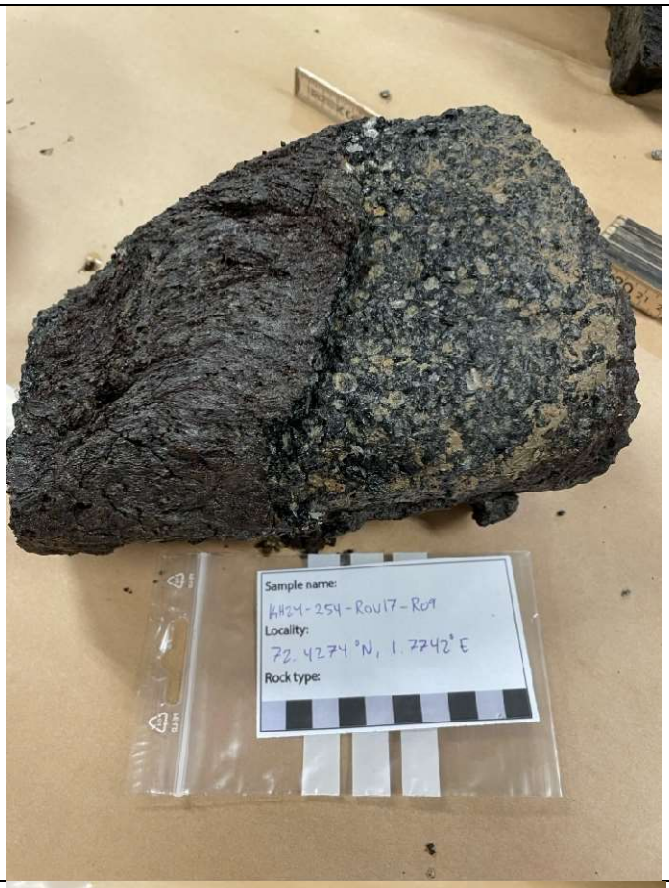
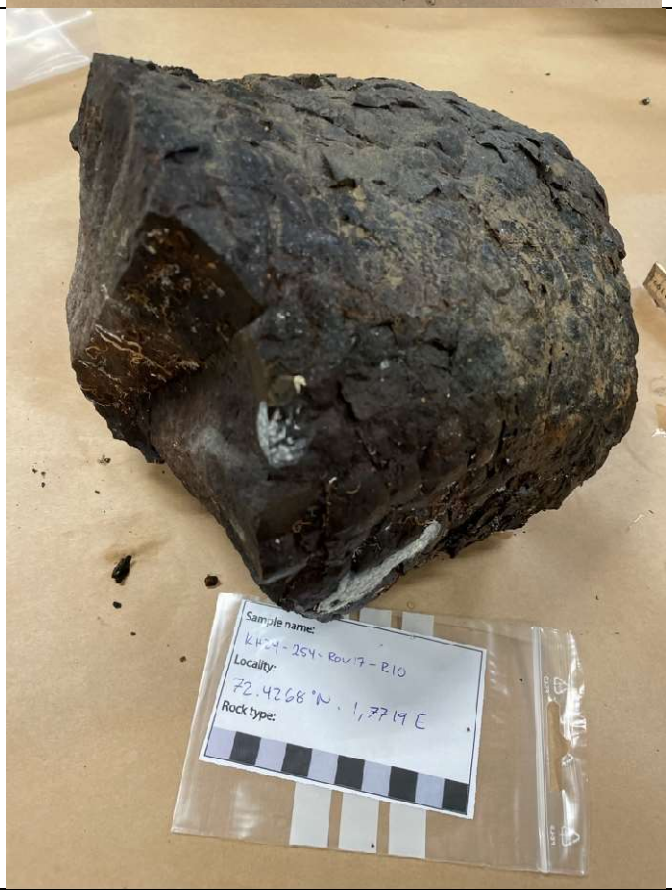
Dive ROV17: 26.02.24-27.02.24

KH24-254-ROV17-R01 Location: Axial volcanic ridge Latitude: 72.4289°N Longitude: 1.7830°E Depth: 2805 m Measurements (l/w/h): 30 cm/19 cm/14 cm Description: Color; grey, red, beige, black. Vesicular. Some volcanic glass on the outside. Columnar basalt. Rock type: Basalt		
KH24-254-ROV17-R02 Location: Axial volcanic ridge Latitude: 72.4291°N Longitude: 1.7830°E Depth: 2772 m Measurements (l/w/h): 14 cm/10 cm/9 cm Description: Color: grey, black. Few vesicles. Some glass. Angular. Rock type: Basalt		

KH24-254-ROV17-R03 Location: Axial volcanic ridge Latitude: 72.4291°N Longitude: 1.7835°E Depth: 2772 m Measurements (l/w/h): 17 cm/6 cm/7 cm (measuring the biggest) Description: Elongated, curved. Thick layer of glass. Flat black color inside, black volcanic glass outside. The basalt is fine grained. Rock type: Basalt	
KH24-254-ROV17-R04 Location: Axial volcanic ridge Latitude: 72.4291°N Longitude: 1.7808°E Depth: 2776 m Measurements (l/w/h): 18 cm/10 cm/10 cm Description: Glass fragments. Grey and black in color. Column, pillow shaped. Rock type: Basalt	

KH24-254-ROV17-R05 Location: Axial volcanic ridge Latitude: 72.4290°N Longitude: 1.7799°E Depth: 2778 m Measurements (l/w/h): 15 cm/10 cm/16 cm (measuring biggest, 4 pieces) Description: Light and dark grey, some orange. Vesicular. Glass outside. Columnar, Angular. Rock type: Basalt	
KH24-254-ROV17-R06 Location: Axial volcanic ridge Latitude: 72.4289°N Longitude: 1.7779°E Depth: 2794 m Measurements (l/w/h): 14 cm/9 cm/10 cm Description: Thick layer of volcanic glass. Columnar. Black, grey, some rusty colors, Flat black outside. A few vesiculas. Rock type: Basalt	

KH24-254-ROV17-R07 Location: Axial volcanic ridge Latitude: 72.4285°N Longitude: 1.7757° Depth: 2814 m Measurements (l/w/h): 14 cm/7 cm/4 cm. Description: Phenocrystals, plagioclase, size up to 1,5 cm. Fine grained matrix, grey. Angular, massive shape. Some glass. Rock type: Basalt		
KH24-254-ROV17-R08 Location: Axial volcanic ridge Latitude: 72.4276°N Longitude: 1.7744°E Depth: 2752 m Measurements (l/w/h): 26 cm/11 cm/13 cm (measuring biggest of 2 pieces) Description: Phenocrystals, plagioclase. Grey, blue, black matrix, some rust. Angular, massive. Some glass. Rock type: Basalt		

KH24-254-ROV17-R09 Location: Axial volcanic ridge Latitude: 72.4274°N Longitude: 1.7742°E Depth: 2758 m Measurements (l/w/h): 20 cm/ 14 cm/9 cm Description: Phenocrystals. Alike the previous ones. Elongated, subangular. Rock type: Basalt		
KH24-254-ROV17-R10 Location: Axial volcanic ridge Latitude: 72.4268°N Longitude: 1.7719°E Depth: 2795 m Measurements (l/w/h): 23 cm/21 cm/16 cm Description: Fine grained, no crystals. Brown, black, grey. Glass on the outside. Vesicles. Rock type: Basalt.		

KH24-254-ROV17-R11 Location: Axial volcanic ridge Latitude: 72.4262°N Longitude: 1.7707°E Depth: 2785 m Measurements (l/w/h): 22 cm/16 cm/12 cm Description: A basalt rose. Thick glass. Similar to ROV17-R06 on the inside. Rock type: Basalt	
KH24-254-ROV17-R12 Location: Axial volcanic ridge Latitude: 72.4256°N Longitude: 1.7695°E Depth: 2775 m Measurements (l/w/h): 26 cm/14 cm/17 cm Description: Thin glass layer, shelly. Grey, brown, black. Massive, columnar. Fine grained. Some vesicles. Rock type: Basalt.	

KH24-254-ROV17-R13 Location: Axial volcanic ridge Latitude: 72.4246°N Longitude: 1.7667°E Depth: 2731 m Measurements (l/w/h): 14 cm/16 cm/15 cm Description: Angular, columnar. Volcanic glass. Fine grained matrix like R06. Few vesicles. Verry black inside and outside. Rock type: Basalt.		
KH24-254-ROV17-R14 Location: Axial volcanic ridge Latitude: 72.4236°N Longitude: 1.7623°E Depth: 2756 m Measurements (l/w/h): 15 cm/12 cm/11 cm Description: Glass outside. Some small crystals. Grey, blue, black. Columnar, angular. Rock type: Basalt		

KH24-254-ROV17-R15 Location: Axial volcanic ridge Latitude: 72.4236°N Longitude: 1.7595°E Depth: 2713 m Measurements (l/w/h): 43 cm/60 cm/29 cm Description: Flat. Black. Some phenocrystals. Some glass. Drained lava flow. Rock type: Basalt	
KH24-254-ROV17-R16 Location: Axial volcanic ridge Latitude: 72.4234°N Longitude: 1.7572°E Depth: 2704 m Measurements (l/w/h): 47 cm/21 cm/22 cm Description: Elongated, rounded. Black, grey. Phenocrystals. Glass. Rock type: Basalt.	

Appendix E - Bio log

Grønne rader = bioregistrering

Dato	Område	ROV-nummer	Tid start (UTC)	Hendelse	ID-nummer	Tid stopp (UTC)	Kommentar
15.02.2024			11:46	ROV- testdykk utenfor Kvaløya		12:40	
17.02.2024			09:37	CTD posisjon			
17.02.2024			09:44	CTD ned		11:50	
17.02.2024			11:50	CTD på dekk			
17.02.2024			13:30	ROV dykk		13:44	Jordfeil på ROV-kamera
17.02.2024			15:00	ROV ned			
17.02.2024			15:30	ROV opp			jordfeil på lys
17.02.2024		ROV01	17:15	ROV ned			
17.02.2024	Deep insight		18:43	ROV på bunn			
18.02.2024	Deep insight		02:18	vekt av geologene, ROV på tur opp	KP24-254-ROV01		plukket dyr som vi fant på stein og de ble lagt på 96% etanol
	Deep insight		02:46	ROV på dekk	KP24-254-ROV01		
18.02.2024	Deep insight mot forkastningsrygg	ROV02	09:17	ROV på tur ned			
	Deep insight mot forkastningsrygg		10:05	på bunn, 1131m med ADCP			Starter å registrere i EIVA
	Deep insight mot forkastningsrygg		11:18	Starter å registrere bio, 1076m			
	Deep insight mot forkastningsrygg		16:15	slutter å registrere bio			
	Deep insight mot forkastningsrygg		19:10	ROV på dekk	KP24-254-ROV02		ROV på dekk etter å ha sondert igjen "deep insight" fra i går. Gikk mot forkastningen og hentet et par prøver med suction sample, 5 stk og har merket prøver med "KP24-254-ROV02-VAC (1,3,4,5)"
18.02.2024	Copperhill	ROV03	21:15	ROV ned på Copperhill	KP24-254-ROV03		
			22:24	ROV på bunn, 1518 m.			
19.02.2024			06:20	ROV på dekk med geoprøver			
19.02.2024			07:20	flytter til ny pos som er ca. 89km unna			

					registrerte fingerformet, som antageligvis er samme som fra deep insight, men som var mer rundt og så ut som en blomkål. Mindre svamper enn deep insight og
19.02.2024	"Location 3"	ROV04	09:00	Rov ned	forkastningsrygg.
			09:57	ROV på bunn , 1754m	
			10:06	Starter å registrere bio	
			12:17	Slutter å registrere bio, ROV på tur opp	
			13:37	ROV på dekk	
19.02.2024	C- Vulkansk struktur	ROV05	17:35	ROV på tur ned	
					blingsa på koordinat pga. 0-meridian.., så noen kule sjøgriser som vi prøvetok
			18:52	ROV på bunn , 2475m	med suction sampler
			19:58	ROV på dekk	
19-20.02.2024	C- Vulkansk struktur	ROV06	22:00	ROV på bunn	der den opprinnelig skulle være
			06:45	ROV på tur opp fra ~2400m	
			07:59	ROV på dekk	
20.02.2024	bunnkartlegging pågår med KPH		08:15:00-09:30	steaming til stasjon	
20.02.2024	mangannoduler	ROV07	12:40	ROV på tur ned til ~2700m	fant "manganvegg"
			13:33	Starter å registrere bio, 3166m	
			14:00	Streamer med UiB (test med push corer)	
			14:50	fortsetter å registrere bio	
			19:27	fra ~3100m	
			20:59	ROV på dekk	
			21:01	Start CTD	
			23:03	Slutt CTD	
21.02.2024			23:03	steaming til nordvestdypet	Steaming i ca. 9t til nordvest lokalitet på dypere områder.

				08:30	fremme ved posisjon	
				08:33	CTD ned til 3465m	
				09:30	CTD på bunn	
	fjellvegg	ROV08		11:02	ROV på tur ned	
				12:45	ROV på bunn 3440m	
				12:49	Starter å registrere bio	
				21:00	slutter bioregistrering	
				22:56	ROV på dekk	
22.02.2024		ROV09		08:06	ROV på tur ned	Registrering av bio
				09:58	ROV på bunn 3400m	
				10:06	Starter å registrere bio	
				14:16	Slutter å registrere bio, ROV på tur opp	feil med hydraulikk, vi går opp
				16:10	ROV på dekk	
23.02.2024		ROV10		03:30	ROV på tur ned	
			~05:00		ROV på bunn~2900,	
				07:03	starter å registrere bio	
				10:16	slutter å registrere bio	
				11:45	ROV på tur opp	
				12:45	ROV på dekk	
23.02.2024			12:45-16:42		sub buttom profiler og gravity corer	
				16:42	steaming til ny lokalitet	
23.02.2024		ROV11		18:40	ROV på tur ned	
				19:55	ROV på bunn 2998m	
23.02.2024				20:00	Starter å registrere	
				22:56	Slutter å registrere	
24.02.2024						venter på vær
24.02.2024		ROV12		17:42	ROV på tur ned ~2500m	
				19:33	Starter å registrere bio	
				23:00	Slutter å registrere bio, ROV på tur opp	Jordfeil, må opp umiddelbart
				23:56	ROV på dekk	
25.02.2024	mudderslett mot deep insight	ROV13		05:10	ROV på tur ned	
				06:30	ROV på bunn	
	Deep insight	ROV13_1		07:01	starter å registrere bio	

			09:27	slutter å registrere bio	veldig tregt EIVA-program, må lagre data før man fortsetter videre logging
		ROV13_2	09:55	Starter å registrere bio	
			14:41	Slutter å registrere bio	
			15:15	ROV på dekk	
	Deep insight	ROV14	16:10	ROV på tur ned	
			17:49	Starter å registrere bio	
			19:07	Slutter å registrere bio	
26.02.2024			03:10	ROV på tur opp	
26.02.2024		ROV15	05:56	ROV på tur ned, 2014m	
			07:03	Starter å registrere bio	
			12:23	slutter å registrere bio	

StasjonsID	Easting	Northing	ROV time (UTC)
ROV02	449502.7	8047976.0	11:18-16:15
ROV04	464320.9	8046176.3	10:06-12:17
ROV07	369862.5	8109817.1	13:53-->
ROV07			14:50-19:27
ROV08	267299.1	8251014.5	12:49-21:00
ROV09	273990.2	8254428.3	10:06-14:16
ROV10	321831.5	8126065.0	07:03-10:16
ROV11	317464.6	8094484.2	20:00-22:56
ROV12	370122.9	8076961.0	19:33-23:00
ROV13_1	450136.7	8047744.7	07:01-09:27
ROV13_2	450136.7	8047744.7	09:55-14:41
ROV14	449532.9	8047999.7	17:49-19:07
ROV15	489330.4	8060853.9	07:03-13:11

Område	dato	ID	Innhold	Beholder	Kommentar	lat	lon
Deep insight	18.02.2024	KH24-254-ROV01	Bløtkorall m/ hydrozoa + div.	500ml	Ingen koordinat - løs i skuffen - Festet på kalklignende struktur - dødt kalkskjelett fra koral??		
Deep insight	18.02.2024	KH24-254-ROV01	Sekkedyr	250ml	Ingen koordinat - løs i skuffen		
Deep insight	18.02.2024	KH24-254-ROV01-BI	Porifera, mollusca, amphipoda	2 x 15ml i pose	Ingen koordinat - løs i skuffen		
Deep insight	18.02.2024	KH24-254-ROV01-R01	Div.	15ml i pose	Diverse plukket fra geostein	72.5236	1.4934
Deep insight	18.02.2024	KH24-254-ROV01-R06	Polychaeta, Hydrozoa	2 x 15ml i pose	Rørbyggende polychaeta, polynoidae, hydrozoa	72.5252	1.4959
Deep insight	18.02.2024	KH24-254-ROV01-R07	Porifera?	15ml i pose	Diverse plukket fra geostein	72.4249	1.4979
Deep insight	18.02.2024	KH24-254-ROV01-R08	Div. polychaetarør	15ml i pose	Diverse plukket fra geostein	72.5245	1.4987
Deep insight	18.02.2024	KH24-254-ROV01-R11	Div.	15ml i pose	Diverse plukket fra geostein	72.5232	1.4988
Deep insight	18.02.2024	KH24-254-ROV01-R12	Div. fra geostein	15ml i pose	Diverse plukket fra geostein	72.5239	1.4947
Deep insight mot forkastningsrygg		KH24-254-ROV02-VAC1	Div. pycnogonidae, bryozoa	250ml	Vacuum sampler no.1 -	72.5237	1.4933
Deep insight mot forkastningsrygg		KH24-254-ROV02-VAC3	Opiocten-like, pecten-like, amphipoda	45ml	ved dette området var det svært mange ophiuroider og bilvalver som jeg har kalt "pecten-like.	72.5246	1.4911
Deep insight mot forkastningsrygg		KH24-254-ROV02-VAC4	Opiocten-like, pecten-like, bryozoa	45ml		8048094.7	449432.9
Deep insight mot forkastningsrygg		KH24-254-ROV02-VAC5	Themisto-like, amphipoda, pycnogonidae, juv. Bivalvia	15ml			
Deep insight mot forkastningsrygg		KH24-254-ROV02-R05	Pecten-like, hydrozoa, polynoidae	15ml			
Deep insight mot forkastningsrygg		KH24-254-ROV02-R06	polychaeta	15ml			
Deep insight mot forkastningsrygg		KH24-254-ROV02-BI	Amphipoda 3stk, polynoidae,	45ml	Ingen koordinat - løs i skuffen		
Deep insight mot forkastningsrygg		KH24-254-ROV02-BI	Gastropoda	45ml	Ingen koordinat - løs i skuffen		
Deep insight mot forkastningsrygg		KH24-254-ROV02-BI	Porifera - fluffydusk	250ml	Ingen koordinat - løs i skuffen		
Deep insight mot forkastningsrygg		KH24-254-ROV02-BI	Porifera - skål/traktformet med kalkpinne	1000ml	Ingen koordinat - løs i skuffen	8048394.9	449181.1
		KH24-254-ROV02-BI	Crinoidea prøver	poser		8048394.9	449181.1
"Location 3"	19.02.2024	KH24-254-ROV04-R12	Div. svamper + Gersemia-like, Craniella-like (potetsvamp med mudder), Tenthorium-like, rund glatt svamp og børstemarkrør.	250ml		72.5115	1.9373
		KH24-254-ROV04-R01	Spøkelseskreps (Caprellidae)	15ml		72.5101	1.9364
		KH24-254-ROV04-VAC3	Asterioidea (Poraniomorpha-like?)	45ml			
		KH24-254-ROV04-VAC4	pecten-like, anemone??	45ml			
		KH24-254-ROV04-VAC5	fingerlignende svamp (ligner på korall)	250ml			
		KH24-254-ROV04-R01	"hårete sedimentert potetsvamp"	1000ml		72.5101	1.9364
Skulle være C - Vulkansk struktur	19.02.2024	KH24-254-ROV05	Sjøgriser og poraniomorpha-like(?)	45ml		72.4690	0.0973
		KH24-254-ROV05	Sjømus	45ml		72.4690	0.0973
C- Vulkansk struktur		KH24-254-ROV06-BI	div. amphipoda	15ml	Ingen koordinat - løs i skuffen	72.4796	0.1496w
		KH24-254-ROV06-R05	Anthozoa	15ml		72.4784	0.1624w
		KH24-254-ROV06-R08	Fingerformet svamp + amphipoda	250ml			

Mudderbunnslette mot bratt vegg	20.02.2024	KH24-254-ROV07	?? Ukjent	15ml	bestemme dyregruppe (phylum) av. Ble tatt god video og noen bilder. Skrumpet inn ved berøring og kom opp som en slimklump. Brutal samplingsmetode med suction sampler..	8108081.3	370281.6
Mudderbunnslette mot manganvegg	21.02.2024	KH24-254-ROV08	div døde skjell	15ml	tatt med suction sampler		
		KH24-254-ROV08	Amphipode og decapoda	15ml	tatt med suction sampler		
	23.02.2024	KH24-254-ROV10-R01	to stk polychaetarør	15ml		73.1544	2.5197w
		KH24-254-ROV10-R03	Anemoner	15ml	Skjært løs fra stein, kan ha skadet anemonene	73.1552	2.5171w
		KH24-254-ROV10-R05	skorpesvamper	15ml	skorpesvamp fra stein av grønn og hvit farge	73.1556	2.5158w
		KH24-254-ROV10-R05	viftesvamp og poresvamp	500ml	poresvamp skjært løs fra stein	73.1556	2.5158w
		KH24-254-ROV10-R06	skorpesvamper	15ml	skorpesvamp fra stein av grønn og hvit farge	73.1558	2.5153w
	25.02.2024	KH24-254-ROV13-R01	To stk Polynoidae, liten mark(?) og kalkrørhus	5ml		72.5214	1.5130e
		KH24-254-ROV13-R03	Hydrozoa, bivalvia, liten amphipoda, polynoidae	5ml		72.5238	1.5005e
		KH24-254-ROV13-R06	to stk polynoidae, liten porifera, kalkrør	5ml		72.5245	1.4964e
		KH24-254-ROV13-R09	Bløtkorall og polynoidae	5ml		72.5241	1.4957e
		KH24-254-ROV13-R011	Caprellidae, to stk isopoda (?), anemone	5ml		72.5242	1.4953e
		KH24-254-ROV13-VAC	Crinoidea, amphipoda, blotkorall	200ml			
	26.02.2024	KH24-254-ROV15-R03	rørbyggende børstemark, pycnogonidae	45ml			

ROV	Område	Beskrivelse
ROV01	Deep insight	Området var preget av større steiner som var noe dekket av sedimenter. Sulfidavkastninger i området og lite turbiditet i vann. Dominerende fauna var skål/traktformet svamp, crinoider og spredte forekomster av bløtkoraller (bilder tatt). Ved brattere skråninger kunne man se høyere tetthet av svamp.
ROV02	Deep insight mot forkastningsrygg	Lik som Deep insight, men ved transitt var det endringer er i bunntopografi og sedimentsammensetning. På litt flatere områder var det bløtere sediment (sandig) med mye polychaetarør, Pecten-like skjell og veldig høy tetthet av slangestjerner over en lengre strekning (bilder tatt). Mot toppen av forkastningsryggen kunne man se en ny type svamp som hyppig forekom blant skål/traktformede svampene. Fikk inntrykk av mindre Crinoider her enn ved Deep insight. Flere reker synlig og mindre størrelse av den som ble registrert inniellom trakt/skål i ROV02 som ble registrert som massiv/rund.
ROV04	Location 3	Dypere områder enn tidligere som startet på 1754m dyp. Fløy oppover en bratt skråning som var preget av fastfjell og steiner på og mye "potetsvamper", flere reker. På hyllen opp mot topp, kom vi over en sandbunnslette som besto av børstemarkhus, anemoner og enkeltsteiner som var bestående av organismer registrert under fingerlignende. Usikker på om dette er koraller eller svamp. Noe bløtkoraller til stede av typen Gersemia sp.
ROV07	Mudderbunnslette for å se etter mangannoduler mot rygg	Startet på mudderbunn på ca 2700m. Mudderbunn med lite biologisk aktivitet. Noe reker, amphipoder og enkeltforekomster av svamper (fingerlignende). Kunne ikke se bioturbasjon, men enkelte børstemarker i tuberør. Da vi møtte manganveggen, kunne man se svært lite biologisk aktivitet. Kun reker å se.
ROV08	Mudderbunnslette mot manganvegg	Veldig likt som ROV07. på den svære hyllen på fjellet, var det bløtbunn og interessante forekomster av eggklaser i store områder. Lite dyreliv ellers, men var reker (trolig bythocaris sp. Og noen anemoner).
ROVV09	manganvegg	Likt som tilsvarende manganveggene
ROV10		Områdets geologi var nokså likt som ROV08 og ROV09, men her var det tilstedeværelse av mye forskjellig fauna. Svamper som vifter, fingerformet, krukke-, mudret trakt var dominerende. I tilleg kunne man se skorpedannende svamp på stein og svamper i mindre størrelse. Reker og amphipoder og sjøliljer kunne sees, der sjøliljene var mer dominerende ved tilstedeværelse av viftesvamper.
ROV11		Likt som ROV11, men inntrykk av mer fingersvamp og litt mindre påvekst av skorpesvamp. Tre typer svamp dominerere, mudret trakt, vifte og fingersvamp
ROV12		
ROV13	Mudderslette mot Deep insight	Startet biotransket på bløtbunn som hadde veldig høy tetthet av slangestjerner og en bunn dekket av børstemarkrør (bilde tatt). På Steiner og fast fjell opp over skråningen, kunne man se svamper (skålsvamp/dosvamp), bløtkorall, bryozoa, ulike fiskearter og crinoider på svamper. Veldig likt som ROV01
ROV14		
ROV15		