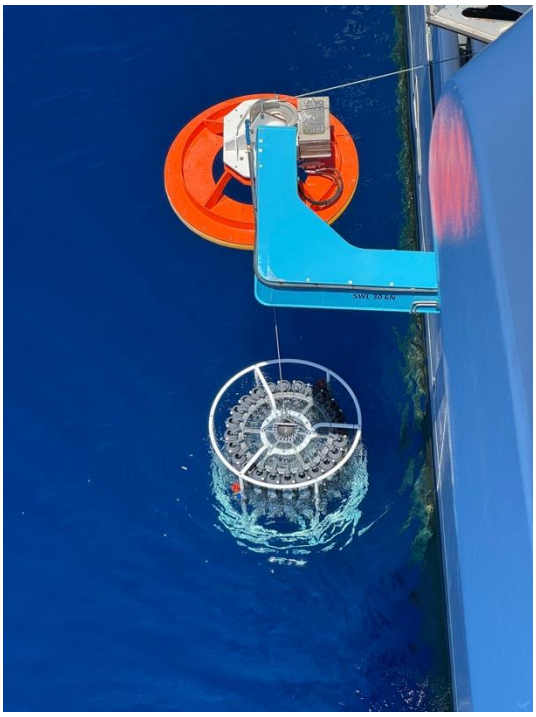
OceanX + OceanQuest - Around Africa Expedition 2025

Leg 1, Moroni, KM – Cape Town, ZA

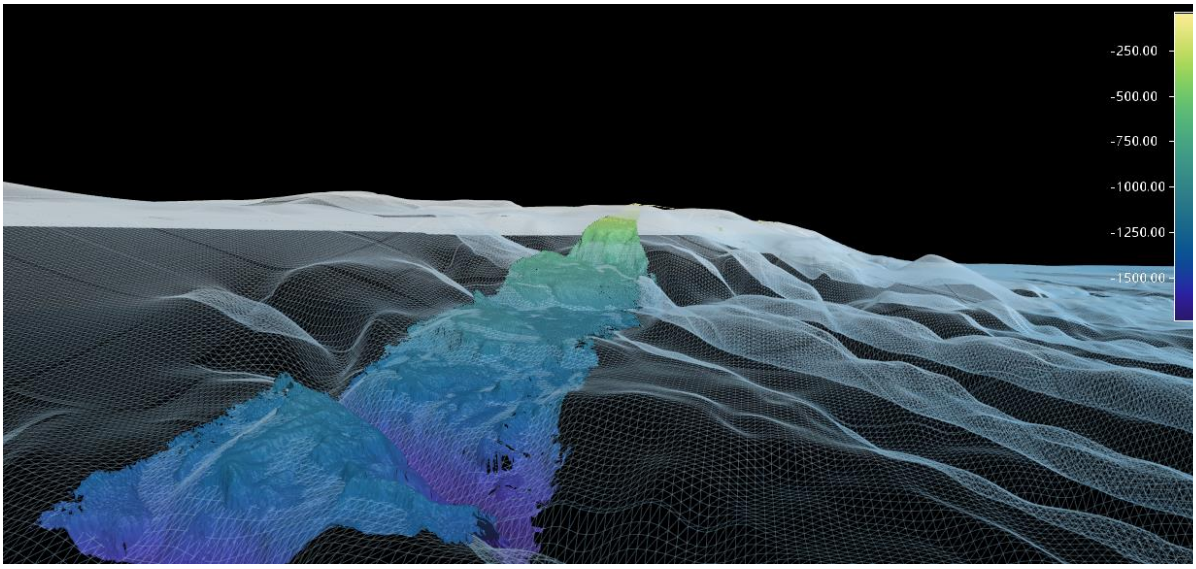
Weekly Report 2 (31 January – 06 February 2025)

The second week of our expedition saw us transition from open-sea transit into active scientific work. We left Grande Comoros on the evening of 30 January and entered Madagascar's Exclusive Economic Zone (EEZ) at approximately 9:30 a.m. the next day. As soon as we crossed into the EEZ, we activated all shipboard sensors to full recording mode, collecting water column data, atmospheric measurements, seafloor mapping, and sub-bottom sediment profiling, as we had received permission from the Madagascan government to allow sampling.

The hydroacoustic mapping team provided an excellent introduction to seabed mapping and data processing, particularly for early-career scientists, while even senior researchers picked up new insights. This was followed by the launch of our first CTD rosette water sampler. A CTD (Conductivity-Temperature-Depth) is an essential oceanographic instrument that also measures oxygen concentration, chlorophyll levels, and turbidity. The collected data are critical for multiple departments on board, including sound velocity corrections for echosounders and detailed water column analyses for our oceanographers and biologists. Additionally, the system's 24 ten-liter bottles allowed us to collect water samples from specific depths for further physical, chemical, and biological analyses. The onboard team filtered the samples for microorganisms and particulate matter, adding valuable data to our study of oceanic water masses.



The first CTD station in the Mozambique Channel reached a depth of 3,400 meters, providing the team with an opportunity to adapt to the available wet lab space. As expected in a dynamic research environment, some setups required minor adjustments, but all experiments were conducted successfully. The shared workspace became crowded at times, but efficient teamwork kept everything running smoothly.



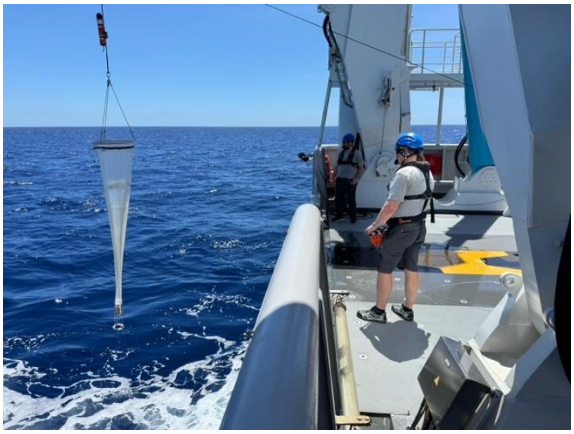
Seafloor maps are crucial for understanding geological structures, identifying ecological niches, and safely planning submersible and ROV dives. The image shows newly acquired multibeam bathymetric data from the Mozambique Channel. The wireframe overlay represents the lower-resolution data previously available. In the background, the shallow area marks Madagascar's continental shelf.

Sunday was dedicated to getting acquainted with the different diving systems. The morning began with an introduction to the 6,000-meter-rated work-class ROV Chimaera. The team learned about the vehicle's components, launch and recovery procedures, piloting operations, and sample storage systems. For many participants, this was their first exposure to ROV operations, making it an exciting learning experience.

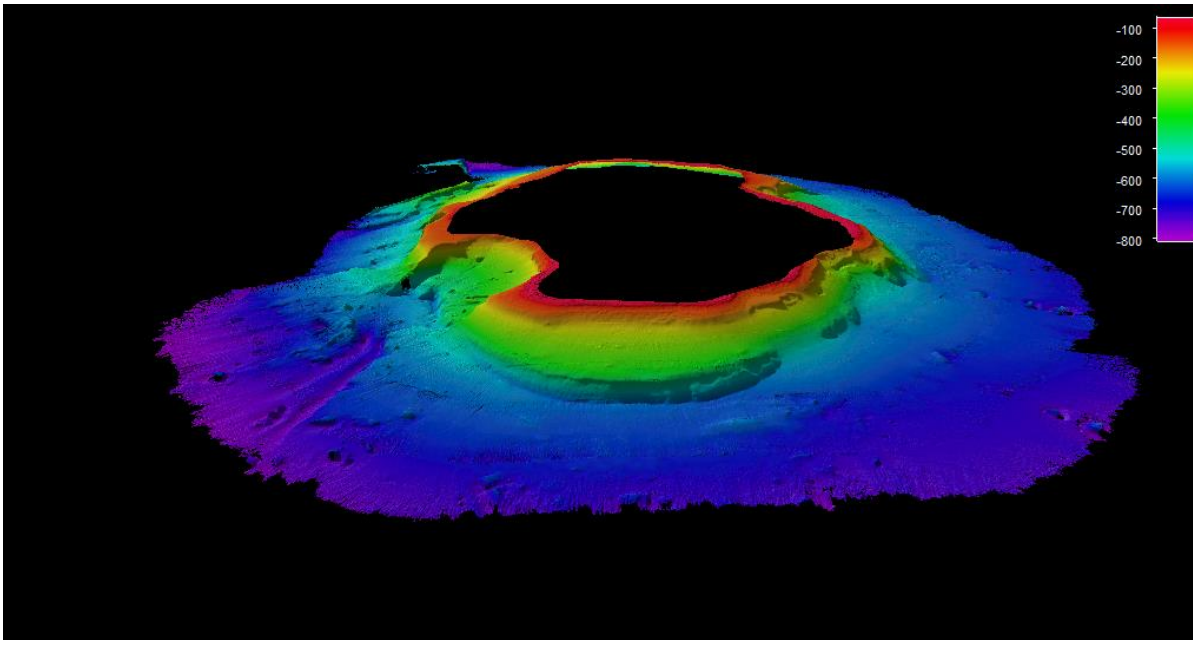
After the daily CTD station and water sampling, we tested the plankton sampling nets. The Bongo net, with a 200-micron mesh, was deployed for zooplankton sampling, followed by the smaller Hydrobios net, which has a 20-micron mesh for phytoplankton collection. Both were lowered to 200 meters, and the collected material was processed in the onboard lab. The afternoon brought a new highlight: an introduction to the 1,000-meter-rated manned submersibles Nadir and Neptune. The team received detailed briefings on safety, operation, sampling procedures, and launch and recovery techniques. Of course, a key question was also addressed: what to do when nature calls during a dive? Well, let’s say it´s better to not eat and drink too much before a long dive. A particular highlight was the opportunity for everyone to climb into the submarines, experience the confined space firsthand, and engage in discussions with the pilots.

The weather picked up significantly on Sunday night, with waves reaching nearly 3 meters. This slowed our transit considerably and led to the decision to temporarily suspend daily CTD stations. Our goal was to maximize good weather conditions for mapping the shallower parts of Walters Shoal and preparing for the first ROV dive.

Tuesday became a dedicated transit day, with an abandon-ship emergency drill and fire hose testing scheduled after lunch. Meanwhile, scientific discussions continued, including briefings on dive planning, sampling strategies, and data logging. We were introduced to the dive logging system, which ensured that all participants were familiar with protocols for recording observations and samples during long ROV operations.



The Bongo net features a small filter container at its end, where zooplankton is collected. It was deployed over the stern of the ship and lowered to a depth of 200 meters. After retrieval, the catch was processed in the onboard lab. Detailed analyses will require extensive work back in land-based laboratories. Many biological samples are preserved either frozen at temperatures as low as -80°C or stored in ethanol or formaldehyde, depending on the intended analytical procedures.



By Thursday morning, we had a nearly complete high-resolution bathymetric map of Walters Shoal. This new dataset proved essential for planning ROV and sub dives, as well as geological and ecological studies. Our mapping also revealed a massive submarine landslide on the seamount's southwestern flank, creating a large embayment, as well as a striking terrace with a steep slope at the southern end.

By Wednesday morning, we reached Walters Shoal Seamount. At around 10:00 a.m., we adjusted our heading and began a clockwise circumnavigation at a safe distance from the shallowest areas. The exact depth of the plateau remained uncertain—estimates in literature range from 18 to 12 meters, but these data had not been independently verified. Previous bathymetric data from a 2017 expedition were unavailable, so we relied on published maps to assist with our initial planning. To identify our first dive site, we needed a location with steep slopes, sufficient hard substrate (such as rock formations and crusts) for sessile organisms, and potentially significant geological features like caves and paleo-shorelines. Mapping continued throughout the day, with a focus on refining our understanding of the plateau's geomorphology. By sunset, we had completed mapping of the shallowest regions and shifted to deeper areas overnight.

Thursday, 6 February, marked the first deployment of all diving assets. With weather conditions favorable, we assigned Bibiana Nassongole (Lúrio University, Mozambique), Masimana Gaidi Marenjaka, and Andrinirina Mboy Jovial (University of Toliara, Madagascar) as science observers in the submersibles. The submarines were in the water and diving by 9:00 a.m., reaching the seafloor at the base of Walters Shoal shortly after. The ROV followed, entering the water at 9:40 a.m.

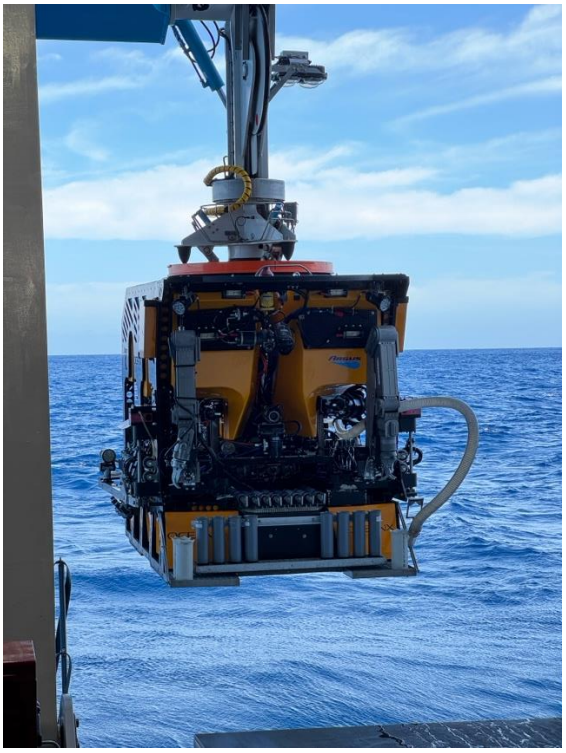
The subs Neptune and Nadir just before diving down to 550m at the foot of Walters Shoal in the southwestern Indian Ocean, 860 km south of Madagascar.

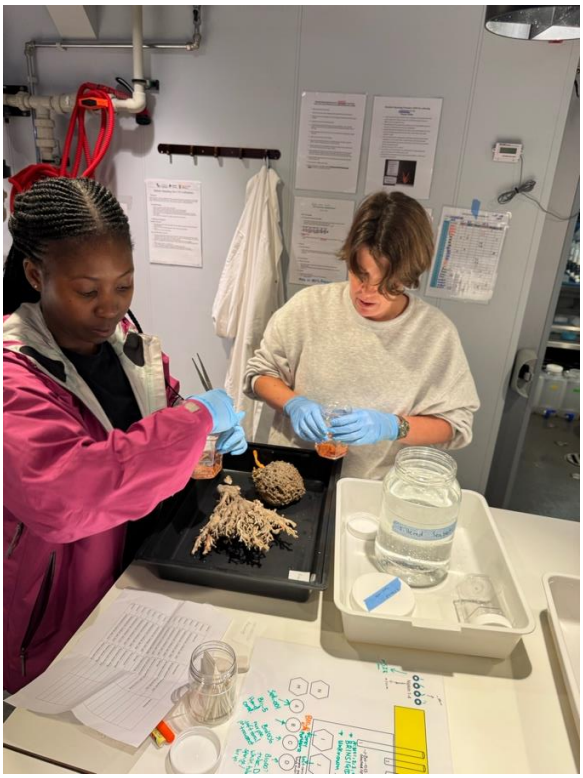
Upon reaching the seafloor, the subs and ROV reported a rocky landscape composed of carbonate pebbles and debris from the shallower reef structures above. The team observed various marine life, including brisingid sea stars, soft corals, hard corals, sponges, fish, and tiny crabs. A striking sight at 150 meters was a beautiful moray eel nestled within the rocky terrain. The ROV conducted three survey transects at 550m, 300m, and 150m depths, each being 200 m in length systematically collecting video footage and samples. Meanwhile, the submersibles operated more freely within the survey zone, accessing sites that the tethered ROV could not reach.

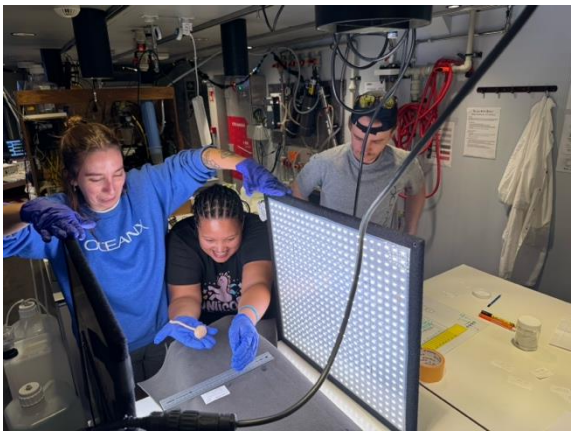
The ROV was back on deck by 4 pm, and the subs were back one hour later. There was little time to welcome our deep-sea divers back on board because the time-critical sample processing started immediately after the vehicles were back on deck. This will take time till the late evening. Before continuing seafloor mapping and sub-bottom profiling, one more CTD station (only till 200m) will collect more water samples. Of course, also the planning of the following dives and days is continuing.

Despite some weather challenges, the week was a major success. The team adapted well to the constraints of shipboard work, and our first dives at Walters Shoal provided valuable geological and ecological insights. The new high-resolution bathymetric data will be instrumental for future dives and analysis.

The submersibles are positioned on the working deck beneath the A-frame, which lifts and launches them over the stern of the ship. In contrast, the ROV Chimera is deployed via an L-frame system on the vessel's side.







Time is critical when biological samples arrive on board. DNA, soft tissue, and other biological components must be preserved immediately—either frozen or chemically fixed—to maintain their integrity. Despite the urgency, meticulous sample documentation, including detailed descriptions, photo records, and precise labeling, is essential to ensure that the collected data remains accessible and useful long after the expedition.

All participants are doing well, and the atmosphere on board remains fantastic. We are excited, well-prepared, and looking forward to the following days of our journey.

Greetings from RV OceanXplorer.

Nico & Lara

The video footage and collected samples will now be thoroughly analyzed to identify the full extent of the marine biodiversity observed during the dive. A Brisingida starfish at 550 meters at the foot of Walters Shoal and a beautiful moray eel at 150 meters were just two examples of the abundant marine fauna encountered.