



M187

25.01. - 04.03.2023

Walvis Bay - Walvis Bay (Namibia)

2nd Weekly Report (29.01. - 04.02.2023)

The second week of the research cruise M187 started with continued observation of the first targeted filament located around 24–25 °S. This filament has been a major and persistent feature in satellite images over the last few weeks, extending more than 200 km from the main upwelling region off Namibia outwards into the Southeast Atlantic. A total of seven stations located in the centre of the filament have been conducted, each with multiple deployments measuring physical, chemical and biological parameters throughout the water column. Stations were occupied daily, starting at around 08:30 ship time and lasting through to 15:30–17:00. Each station involved deployment of deep (1000 m) and shallow (100-120 m) CTD casts to collect water for chemical and biological samples including salinity, oxygen, nutrients (nitrate, phosphate, silicate, dissolved organic nutrients), trace gases (methane, nitrous oxide), nitrate isotopes, dissolved carbon, particulate carbon, phytoplankton concentrations, microbial genomics, and phytoplankton physiology. These were supplemented with the deployment of trace-metal-clean sampling bottles for collection of contamination-prone nutrient elements, such as iron, cobalt and zinc, as well as pumps deployed at 6-8 depths, which collect high particle loads for further chemical and biological analyses. Finally, hyperspectral light profiles and Secchi disk deployments were conducted to measure optical properties of the water.

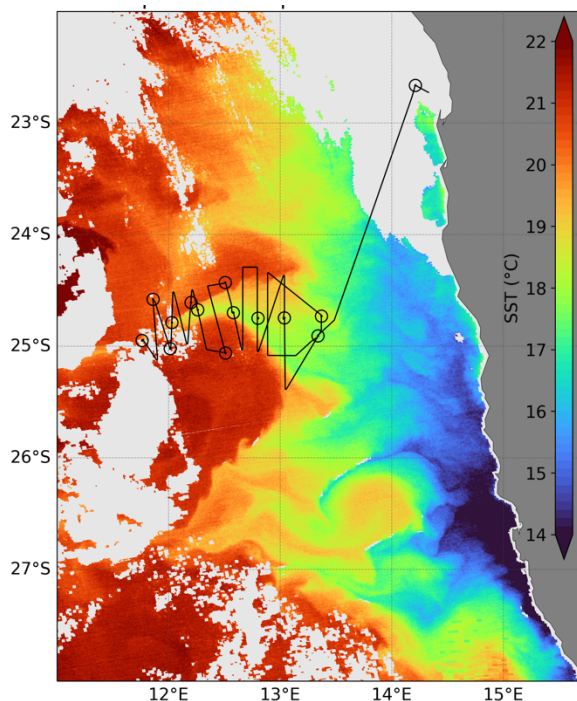


Fig. 1: A satellite image of the studied filament (SST = Sea Surface Temperature).

Following each of the daily stations, we continued sailing in a zigzag fashion through the filament, to map many of these parameters across and outside of the filament. At 16:00 ship time on the 31st January, we deployed the Scanfish for the first time. The Scanfish is a device deployed off the A-frame at the aft of the ship, connected via a conducting cable to a winch fitted to the ship's deck. Via movement of its wings, the device moves up and down through the water column between the surface and ~130 m whilst the ship is sailing. The Scanfish is equipped with several sensors including temperature, salinity, oxygen, and

chlorophyll fluorescence. Deployments therefore allow for high resolution, depth-resolved observations whilst sailing across the filament. The Scanfish was successfully



deployed and operated for several hours. However, at around 23:30 ship time the Scanfish winch failed, resulting in the cable rapidly unwinding and eventual breaking from the winch, resulting in loss of the Scanfish. The exact cause of the winch failure is still being investigated.

Fig. 2: First — and unfortunately last — deployment of the Scanfish during M187.

In addition to the underway water samples being collected as we sail across the filament, we are also measuring seawater optical properties continuously using above-water hyperspectral radiometry. These radiometers are placed at the bow of the research vessel pointing both towards the sea surface and to the sky. These observations

replicate those made by sensors on earth-orbiting satellites recording ocean colour. By collecting samples at sea alongside the shipboard radiometry measurements, this will allow us to better understand what information the satellites are providing. Ultimately, we hope to be able to use these signals to tell us which types of phytoplankton are living in different regions of the ocean and also provide information about their physiological status (health). Via satellite observations, these data would then be available at much larger spatial and temporal scales than we can cover on a research vessel.



Fig. 3: Radiometers measuring optical properties of the ocean at the front of the RV METEOR. Photo: Shungu Garaba.

On Thursday 2nd February the daily station was ended early, as it was necessary to return to Walvis Bay for a medical evacuation. We arrived in Walvis Bay early on 3rd of February and are now waiting for a replacement crew member to join the ship.

We continue to be very well looked after by Captain Korte and the rest of the ships team, the weather has been favourable, and the food excellent. Despite the very unfortunate loss of the Scanfish device earlier in the week, and subsequently the medical evacuation, the remainder of the research activities have proceeded very well up to this point.

We are fortunate that we were reaching the end of our first filament study when the research activities had to be put on hold. We look forward to continuing soon!

With best regards from the research cruise participants of M187 in Walvis Bay, Namibia,

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