

## 4<sup>th</sup> Weekly Report M208, Mindelo-Mindelo

3.3.-9.3.2025



The fourth week of Meteor cruise M208 began with section work near Dakar, the capital of Senegal. South of the Dakar peninsula, a strong upwelling cell is evident, characterized by cold surface waters. Thanks to the diplomatic authorization we received during the cruise, we were able to carry out our measurement program in that area, including CTD station work for water sampling, zooplankton net sampling, and, in particular, microstructure measurements across the intense upwelling front, marked by drastic surface temperature changes. Such fronts are hotspots for fisheries, and our nighttime measurements were nearly impossible due to the large number of local fishing boats, which made safe passage challenging.

After completing our work in the Senegalese upwelling system, we returned to the waters of Mauritania. At the beginning of our cruise, we had deployed one mooring, two landers and two gliders, all intended to collect data throughout the entire campaign and be recovered at the end. However, while we were still in Gambian waters, one lander watchdog sent a position message, indicating that the lander was no longer anchored to the seafloor. Upon arriving in the mooring area off Mauritania, we searched for the lander using acoustic communication and successfully located the lander about 4 nautical miles away from its original deployment position. The recorded data confirmed that it had been caught by a fishing boat and, after a few hours on board, was dropped back into the sea. While in the area, we noticed heavy fishing activity and we decided to recover all our moored instrumentation. All instrument could be recovered and almost all had full data records waiting for scientists and students to be analyzed.

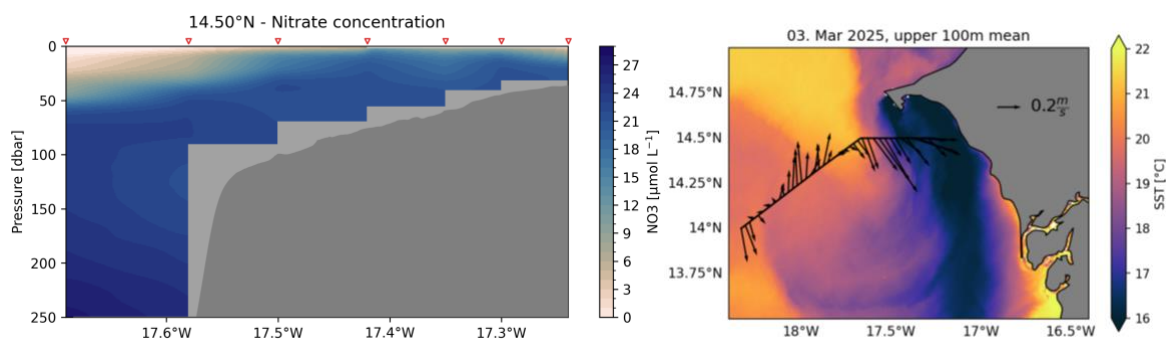
After recovering two gliders, we selected a suitable location for the planned filament study, identifying an optimal site to investigate upwelling filaments and their role in generating instabilities, mixing, and enhanced productivity. The chosen location is in the deep ocean at the edge of a warm-core eddy, where cold upwelling water circulates around the eddy. Here, we deployed two gliders—one equipped with an underwater vision profiler to measure sinking particles and zooplankton, and the other with a microstructure probe. Despite the continuous station work, the mood remains very positive, and we still find time for almost daily seminars, where scientists and students

present their research goals. These presentations help explain the often complex scientific work of different groups to an interdisciplinary audience of cruise participants.

While leaving the section south of Dakar, we were also able to celebrate—slightly delayed—the halfway point of our cruise. While preparing the barbecue on deck, we had a beautiful view of the city of Dakar, but we also encountered quite strong winds, which could partly not be avoided due to the many necessary course changes required to navigate around the large number of fishing boats. A big thank you to the nautical officers and everyone who helped keep watch during the night while navigating in these areas. In any case, the barbecue was excellent and well-prepared, allowing us to enjoy the short transit from the Senegalese to the Mauritanian working locations.

Greetings from the tropics,

Peter Brandt and the participants of Meteor cruise M208



**Fig. 1:** Measurements south of Dakar, Senegal: (left) Nitrate distribution along the 14°30'N section (Figure M. Franco Pire) and (right) satellite-derived sea surface temperature with velocity vectors from shipboard ADCP measurements (Figure A. Andrae). The satellite data reveal the cold upwelling cell south of the Dakar peninsula. Upwelling at the shelf and shelf break is associated with elevated nitrate concentrations, which fuel biological productivity.



**Fig. 2:** Recovery of the lander equipped with an acoustic Doppler current profiler (ADCP) and a SUNA nitrate sensor (left), and the tripod with an ADCP. The moorings were deployed at depths of 100 m and 50 m, respectively, to capture internal waves propagating toward the coast (Photos: Peter Brandt).