

Weekly report cruise POS532

By Helena Hauss

18/2/2019-24/2/2019 (written on 25/2/2019)

On February 18, we successfully ended our stationwork off Fogo with two JAGO dives, one in the early morning and one in the evening. These nighttime dives are an excellent opportunity to observe and sample species that spend the daylight hours at depth beyond JAGO's reach.

One of the goals of the expedition was to track and sample a mesoscale eddy. As opposed to our nearshore work at fixed stations off Santo Antao and Fogo, eddy sampling as such requires dynamic planning and to account for weather and swell offshore. We had postponed this survey to the very end of the cruise because of high swell and wind in the eddy area which were forecasted to decrease in the third week of our expedition. As predicted, the weather was more favourable between February 19 and 23, so that we realized a four-day eddy survey as planned in the proposal. The targeted eddy was located approximately 180 nautical miles SSW off Fogo and Brava. It was generated in the lee of the Fogo in the beginning of December 2018 and since then has moved slowly westward, while maintaining its characteristics. We could track these characteristics by remote sensing and they include a lower than mean sea level, a lower than mean sea surface temperature, and a higher than mean chlorophyll-a concentration. Following these observations we set an ADCP transect with CTD stations across its core (Fig. 1 and 2).

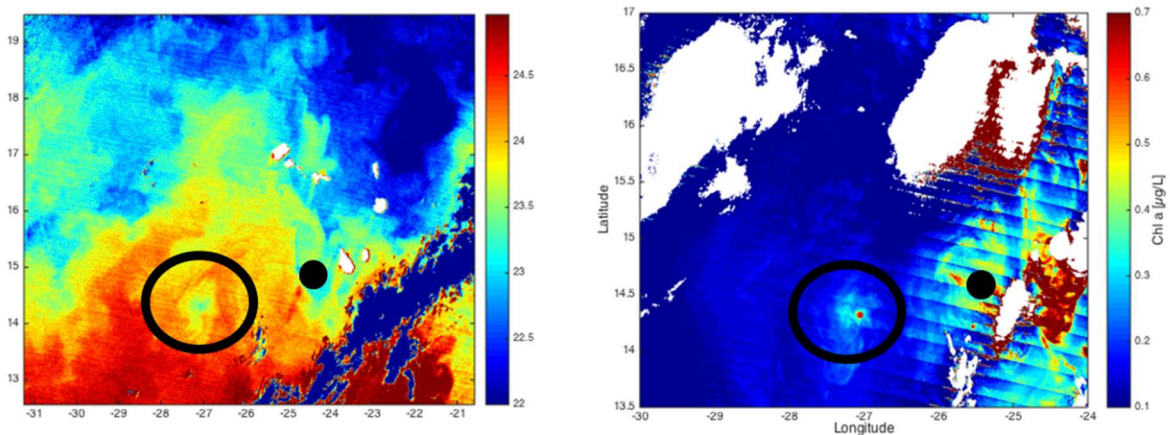


Figure 1: Sea surface temperature (left) and chlorophyll-a (right) in the study area. Fogo is marked with a black dot. The eddy is indicated by a black circle.

The track was chosen to not only section the productive cyclonic eddy, but also a neighboring anticyclone for comparison. In each eddy's core, a full biological sampling program was carried out, including day and night multinet hauls and video observations. When approaching the cyclonic eddy, it immediately became clear that this is a foraging hotspot for a variety of sealife. A lot more birds, marine mammals, epipelagic fishes and cephalopods than usual were spotted from the ship. CTD fluorescence was higher than at the coastal stations, which are already characterized by local upwelling. The gelatinous plankton community was dominated by filter feeders such as salps (*Cyclosalpa* sp.) and pyrosomes (*Pyrosoma atlanticum*). In addition to our in situ observations and multinet sampling, we used a scientific echosounder (Simrad EK80) mounted on the ship's pole for acoustic determination of zooplankton biomass distribution as well as fish school and single fish detection.

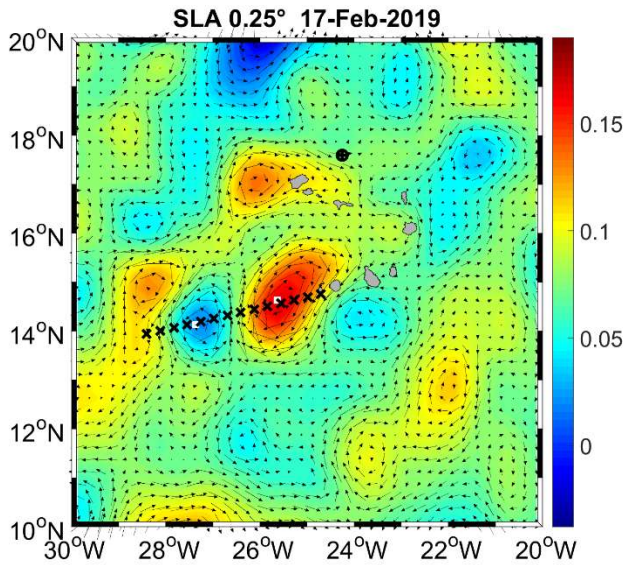


Figure 2: Sea Level Anomaly (SLA) prior to the start of the eddy survey, with planned track and CTD stations indicated. Cyclonic eddy in blue colors, anticyclone in red.

On the evening of February 19, we commenced stationwork in the anticyclone. Since the swell was still approximately 1.5 m, it was decided to reduce the gear deployment to instruments that are deployed over the side (Winch 2) only and not to use the A-frame (Winch 6 and fibre optic winch). The Winch 2 operations went smoothly, including a “pelagic OFOS” for basic video observations. When reaching the cyclonic eddy on February 20, the swell had decreased further and we could use all our gear, including the new PELAGIOS II over the fibre optic winch and the Multinet Max over Winch 6. We spent the next two days sampling the inner core as well as the margin of this eddy, and on the final day were even able to realize a JAGO dive within its core. To the best of our knowledge, this was the first targeted dive with a manned submersible into a mesoscale eddy. In the evening of February 22, we finished our nighttime work in the eddy core and ended the last station and all operations at 24:00 to begin steaming to Mindelo. During February 23, we demobilized our equipment and packed all boxes to be ready for unloading in Mindelo. Port call was at 09:00 on February 24. Our container was already waiting for us at the pier and unloading the vessel with the ship’s crane as well as loading the container went smoothly and was finished in the afternoon.



We would like to thank the R/V POSEIDON captain and crew for the safe and smooth operations. We feel we have reached all our goals, sometimes exceeding expectations!