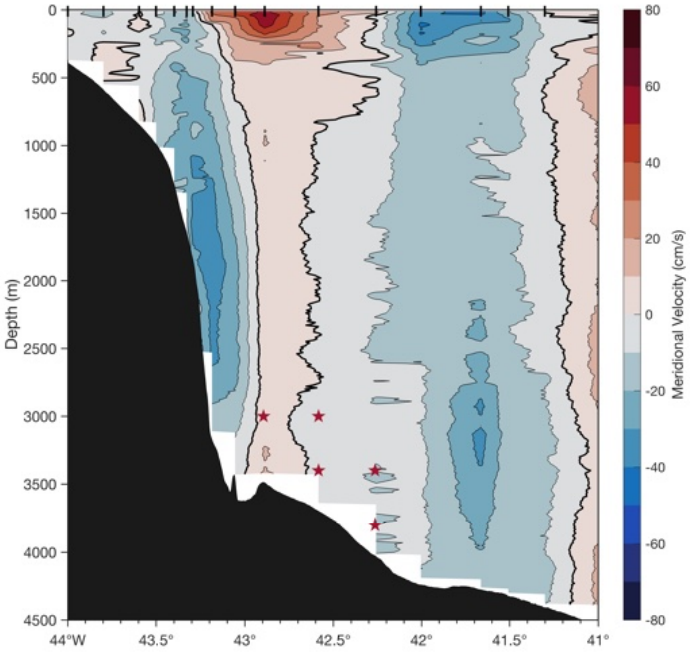
M212

Ponta Delgada — St. John's
July 30 — September 2, 2025

Weekly Report No. 2
(August 4 — August 10, 2025)

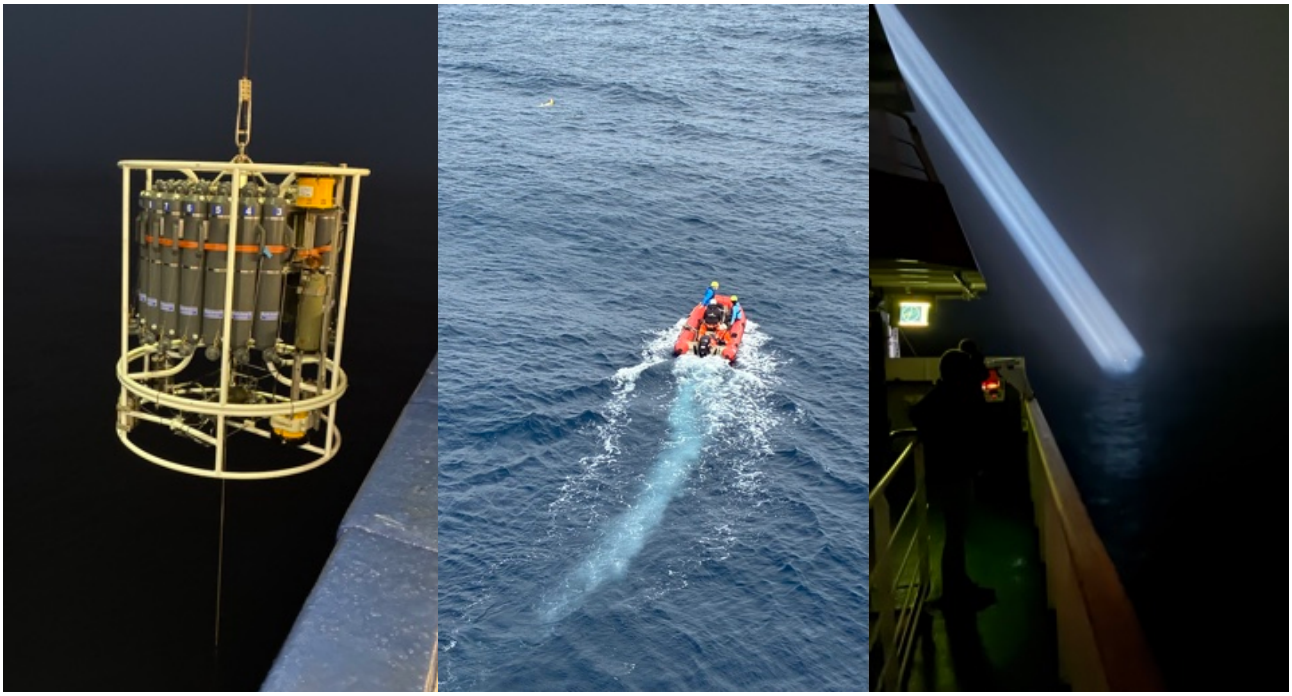
On Monday of last week, we continued the first CTD section of this cruise with several profiles over the steep continental slope east of Flemish Cap. The large-scale currents here are characterized by the so-called deep western boundary current, a southward-flowing current directly on the slope, with maximum current velocity at a depth of 2000 m. This current transports cold, relatively low-salinity water southward. East of 41°W the North Atlantic Current is located, which transports warmer and saltier water northward. Together, these two currents form an important part of the meridional overturning circulation in the Atlantic. Between these two currents, there is currently a relatively large eddy with a diameter of approximately 150 km.

On Tuesday morning we interrupted the CTD work for the deployment of two Slocum Gliders. These are autonomous instrument platforms, equipped with CTD sensors and microstructure probes, profiling the upper 1000 meters of the water column. The gliders can change their buoyancy by pumping oil into a rubber bladder, causing them to sink or rise. At the same time, they are propelled forward by the flow of water past them. The gliders were deployed in the eddy between boundary current and North Atlantic Current, at about 41° 41.8' W, which was in the center of the southward flowing part. The weather was quite calm during the glider deployment and both instruments completed their test dives successfully before they started with their missions. We then continued our CTD section in eastward direction.



Current velocities in north-south direction measured with acoustic current meters (ADCPs) mounted on the CTD/Rosette. The boundary current on the continental slope and a cyclonic eddy are clearly visible. At 41° W, the North Atlantic Current starts (Lara Aschenbeck).

On Thursday morning, we deployed 20 surface drifters at two stations, 10 drifters each. The first station was located within an eddy where the drifters are expected to circle the eddy a few times. The second deployment, 30 nm to the west, was in an area between two eddies, where currents cancel out each other. On both stations the drifters were deployed in triangles with 5 km side length. Three or four drifters were deployed in each corner of the triangle, also in the shape of a triangle, but with a smaller side length of only 100 m. To achieve this, the drifters were deployed simultaneously at the bow and stern of the METEOR while the ship slowly



Left: CTD/Rosette with acoustic current meters (ADCPs). Middle: Recovery of a Slocum Glider. Right: Recovery of an Inverted Echo Sounder (Photos: Christian Mertens).

traversed to the side. Shortly thereafter, the third drifter was deployed in the middle of the ship. After completing the drifter deployment, we began a transit to the next CTD section at 45° W, north of Flemish Cap. Thereby we also stayed clear from the effects of the former tropical storm "Dexter," which crossed our research area at 47° N on Friday, August 8.

We arrived at the first CTD station of the section at noon. In the evening, after the second CTD, a bottom mounted inverted echo sounder with pressure sensor (PIES) was released and thenrecovered about one hour an 15 minutes later. The CTD section along 45° W was completed during the night to Sunday, August 10. A 108 nm transit began toward the next station at the southeastern tip of Flemish Cap, but was interrupted in the morning of August 10 to change course in direction of one of the gliders. Data transmitted from the glider indicated an increasing weight, suggesting a probable leak. We arrived at the position in the early afternoon and with relatively calm seas and excellent visibility, the glider was found and recovered without problems. After that, we were able to continue with our normal program and recovered one more PIES during the night.

More information about our research activities and life on board can be found in the blog posts (https://epoc-eu.org/our-work/expeditions/m212/).

Best wishes from the scientific party of M212.

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