4th Weekly Report (29.08. – 04.09.2022)

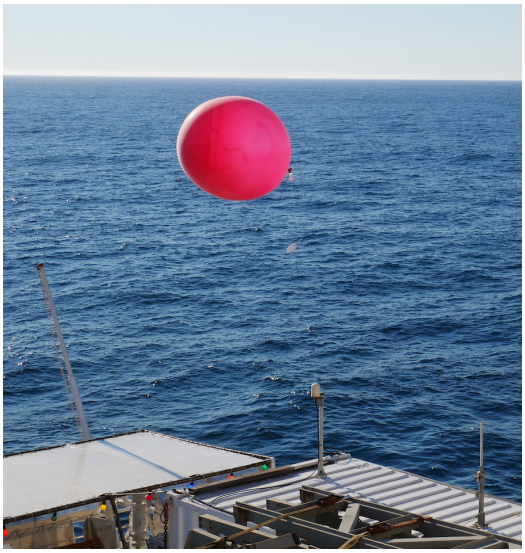
We made our second run at a number of work areas on this research cruise this week. Along the route to the position of the time series station K1, we conducted stations with the CTD about every 40km. Temperature, salinity, oxygen, water velocity, the penetration depth of light, photos of particles and microorganisms, and water color are measured continuously from the surface to the seafloor, sometimes more than 3.5km deep. The stations took us once across the Labrador Sea: from the northernmost point we are allowed to approach due to international safety regulations, to the 53°N observatory off the coast of Labrador. These CTD stations follow fixed positions and allow us to assess the current state of the ocean interior and its variations compared to previous measurements. We then continued to the northwest, to deploy the K1 mooring. The design of this mooring is complex because the mooring carries on its top a surface buoy about the size of a bouncy ball. This surface buoy has electronics that will send data in quasi real time via satellite for the next 2 years. The real-time data will be analyzed and also sent to ocean and weather forecasting centers. The deployment succeeded in a time of about 4 hours without any problems, despite fresh wind and 2m swell. This activity ended the mooring activities of the FS Meteor M184 cruise.

GEOMAR design Surface Telemetry module during the deployment of the K1 mooring. *Photo: J. Karstensen*

Next up was the recovery of the two underwater electric gliders. The two devices had been tirelessly collecting data in an eddy for over a week. The recovery of the gliders is usually a somewhat tricky affair and a Zodiac is often used for this purpose. However, wind and swell conditions did not allow using the boat and additionally very dense fog had come up with visibility below 100m. So the recovery was carried out directly with the FS Meteor. Slowly the ship advanced towards the GPS positions, which were transmitted to us by the gliders floating on the water surface on request. RV Meteor's rescue parachute was then successfully used for

Recovery of an underwater electric glider using a recue device on RV Meteor M184. *Photo: J. Karstensen*

the recovery and in less than 3 hours the two devices were safely on board undamaged.
For our work and route planning, the presence of the employees of the German Meteorological Service (DWD) is of great importance. Especially in these northern regions a drastic weather change within a few hours is not uncommon. The observation data collected on board are immediately sent to Germany and are used for the weather forecast on the same day - this also benefits us on board. The presentation of the weather data evaluations by the meteorologist is an important part of the daily meeting on the bridge to which Captain Korte invites us. At the moment we are paying special attention to the activity and track of hurricane "Danielle" with possible consequences for our route planning.


Launch of a radiosonde by the DWD weather technician on board RV Meteor *Photo: J. Wenzel*

The days after the glider recovery were mostly characterized by stormy weather and >2m swell. As the weather calmed slightly, preparations were made to deploy the underway CTD. This instrument measures the vertical structure in terms of temperature and salinity down to about 450m depth from the moving ship at full speed of 10 knots (about 20 km/h) and was ready for surveying additional eddies whose existence we had already proven during the first visit to the region. This work is very demanding, as the scientists on watch stand at the stern of the ship, day or night, in spray and rain, prudently recovering and deploying a small probe in turn. But even these measurements were remarkably successful and carried out with great care by the team on board. From about the longitude of Nunap Isua (also known as Cape Farvel or Uummannarsuaq) which is the southern tip of Greenland, we now started another CTD section until we approach the Reykjanes Ridge, a submarine mountain range that divides the sea area between Greenland and Scotland into two deep ocean basins. With the close-meshed measurements we hope to detect parts of the water masses formed in the deep convection region of the Labrador Sea on their propagation into the Irminger Sea east of Greenland.

As always, many interesting blog entries and images from this cruise can best be accessed via GEOMAR's Beluga web portal https://beluga.geomar.de/m184.

With greetings from aboard - Johannes Karstensen for the cruise participants of FS Meteor M184

(GEOMAR Helmholtz Centre for Ocean Research Kiel)