

**TRR 181 Expedition
SONETT
RV METEOR M180
23.02. - 14.04.2022
Montevideo - Cape Town**

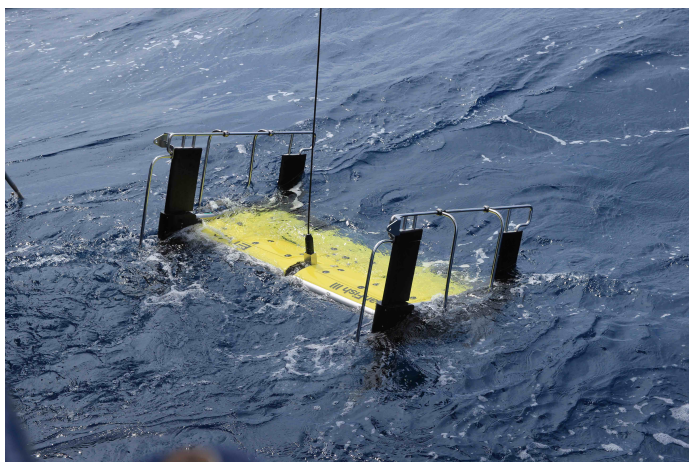


4. Weekly report (14.03.-20.03.2022)

The fourth week of the M180 expedition was dedicated to observations of the submesoscale fronts and filaments between the Agulhas rings, their structure and temporal and spatial development. We use several different instruments to do this: The ScanFish is a CTD system that is undulating over a set depth range while being towed by the ship with a speed of 5kn. It measures hydrographic properties like temperature and salinity, and is used for intermediate scale surveying of the upper 100 to 200m of the ocean. The ships' thermosalinograph records temperature and salinity at the sea surface underway, and can be used to identify and track temperature or density fronts. For more detailed observations and turbulence measurement, we use repeated profiling with a free-falling microstructure probe that is operated from a slowly moving ship and obtains data



from the upper 150m. The last tool in the box is the IOW research catamaran, a towed re-equipped catamaran hull outfitted with an acoustic Doppler current profiler (ADCP) to measure the upper ocean currents and a thermistor chain to observe stratification. The catamaran is towed to the side of the ship, and measures the mixed layer properties undisturbed by the ships' propeller and thrusters.



In addition to these eulerian transects and observations, the first set of surface drifters was released on Tuesday in the center of a filament. The drifters are deployment in a sort of self-similar pattern, where small triplets or quadruplets of drifter with an edge length of 30m combine to bigger triangles that combine to even bigger triangles over a horizontal scale of two to three kilometers. This type of deployment requires exact positioning and good communication between the deployment stations on the ship. The pattern ensures that the different scales of motion are covered when the the drifters are dispersed by the flow field. During and after the deployment, the surface currents are monitored with the wave radar

(upper panel) The IOW research catamaran follows behind the ship loosely tethered to the starboard side. Photo: J. Stake. (lower panel) The ScanFish is being deployed from the A-frame at the ships' rear. Photo: M. Schmitt.

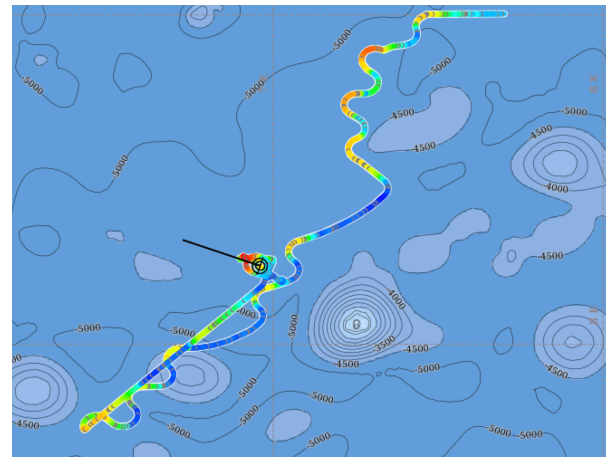
mounted on the METEOR, for a later comparison between the eulerian and lagrangian velocities.

Finally, three more gliders, two near surface and one deep (1000m) were deployed to measure hydrography and turbulence data independent from the ship, and are now navigating their way through the eddy field.

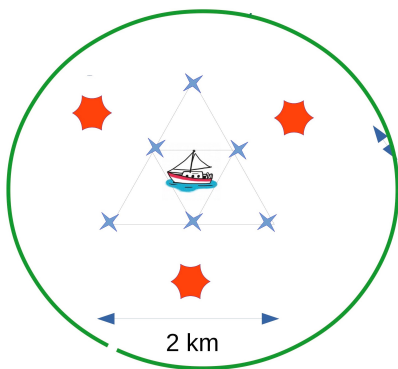
The end of the week marked the end of the first half of our expedition, and this occasion was celebrated with a nice barbecue with live music (provided by the captain!) on the deck on Saturday evening. We thank everybody for the fun and relaxing party!

Kind regards and greetings to all friends, families and colleagues on shore from the scientific party of M180,

Maren Walter
(Bremen University)



Spatial tracking of a front with the thermosalinograph from the moving vessel; red denotes warm, blue cold water at the surface.



*Schematic of the drifter deployment.
Figure: J. Dräger-Dietl.*



Two types of drifters after deployment: a small surface drifter manufactured by hereon (left), and the bigger SVP (Surface Velocities Project) drifter that has its drogue at 15 m water depth. Photos: J. Stake, H. Renzelmann.