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

3rd Weekly Report (07.03.-13.03.2022)

The past week was marked by highs and lows (as was, incidentally, the wave height). On Sunday evening we finally reached our working area after almost two weeks of transit. But the CTD system, that had worked fine for the tests during the transit, suddenly experienced problems: With increasing pressure, the CTD lost the connection with the deck unit, and we had to abandon the profile. We conducted several test, ruling out problems with the connecting cable and the winch in the process, and finally decided to use the backup CTD from the ship with our LADCPs and water sampling unit while fixing the problem with our CTD. However, the big shock was yet to come: Tuesday morning, during the second deep station, the conductor cable tore off outside the ship, and the CTD/ LADCP instrument package including 4000 m cable went down to the seafloor. We conducted three attempts at dredging the instrument, but no luck yet. However, we plan return to the site of the loss once more, to try to recover the instrumentation with a dredge equipment tailored to the lost instrument. Meanwhile, we continued with the parts of our working program not relying on the CTD and the long conductor cable, to give us time to regroup and adapt our program.

The first of the glider was deployed on Thursday in fine weather in the center of the ring structure. It is now slowly working its way out of the ring, adaptively navigating to find the shortest path, while making dives down to 1000m depth and gathering hydrographic and turbulence data. To complement the glider turbulence data, we did a radial transect of deep (max 1000 m) microstructure stations from the rim towards the center of the eddy.

A deep glider after being deployed from the zodiac, before it begins its mission to observe hydrography and turbulence in the ocean interior. Photo: M. Unterberger.

Self-contained microstructure profiler being deployed on a rope at the side of the ship. Photo: E. Breunig.

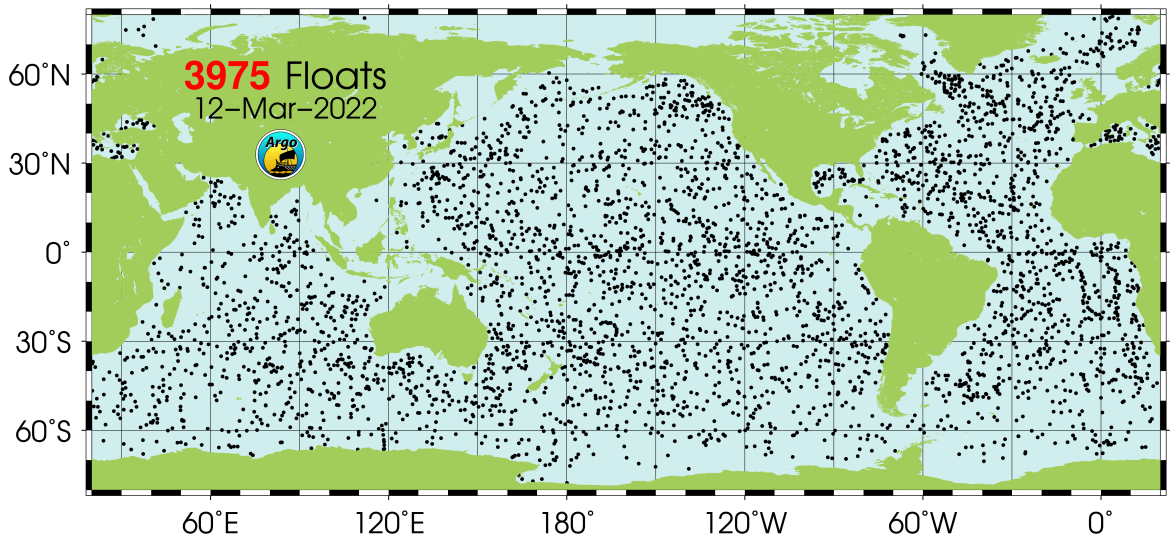
As the weather (or more precisely, the sea state with swell of up to 6m coming from the south) turned unfavorable for station work and further deployments during Friday, we have spend the weekend with ScanFish surveys crossing the ring structure and the filaments on its rims. Today in the morning, we got lucky and identified a strong density front suitable for further work. We will target this with shallow gliders, drifters, and microstructure observations once weather allows.

Subsequent tests on the remaining CTD instrument showed that the initial CTD problem was with one of the external sensors, and we are now in the process of eliminating the perpetrator by further tests to have a working system once the works on the shallow submesoscale features are concluded.

During the week, we also deployed the second of four Argo floats from the Bundesamt für Seeschifffahrt und Hydrographie (BSH) as part of German contribution to the Argo program (https://argo.ucsd.edu/). Argo floats are autonomous instruments that measure profiles of temperature, salinity and (some of them) other parameters going up- and down in the water column while drifting with the ocean currents in 2000 m depth in between. The global Argo fleet has been observing the ocean since 20 years, and at this moment, there are approximately 4000 floats in service, provide real time data from all oceans and many marginal seas.

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

Maren Walter
(University of Bremen)



Snapshot of the Argo fleet of the world ocean, March 12 2022.
Figure retrieved from https://argo.ucsd.edu/.