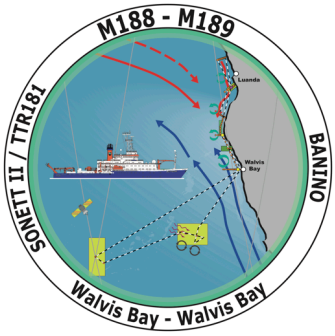

M188

Walvis Bay - Walvis Bay
07.03. - 13.04.2023

1st Weekly Report
(07. - 12.03.2023)

We left the port of Walvis Bay, Namibia, on Tuesday, March 7, at 10:20 local time for the transit to our first working area in the eastern South Atlantic. We unload our containers and started setting up the instruments and labs. On Wednesday evening we startet our underway measurements (e.g. shipboard ADCPs and wave radar) and made a short test of the CTD/Rosette, which went well. Our research program began on Friday noon, after three days of transit, with a so called time series station, with repeated vertical profiles of temperature/salinity and current velocity to observe energy fluxes of internal gravity waves. Propagating internal waves with tidal or near inertial frequencies cause oscillations of the density and velocity fields that can be seen in these time series. Breaking internal waves cause vertical mixing and dissipation of energy in the ocean, which is crucial for the energy budget.

Fig. 1: Pilot boat in the harbour of Walvis Bay at departure of the Meteor for cruise M188.

Expedition M188 is part of the collaborative project TRR 181 "Energy Transfer in Atmosphere and Ocean" funded by the German Research Foundation (DFG), an interdisciplinary research program on the representation of the oceanic and atmospheric energy cycles in climate models. The scientific party is formed by 18 scientists from the Universities of Bremen and Hamburg, and the Helmholtz-Centres hereon in Geesthacht and GEOMAR in Kiel.

In our study areas near the Walvis Ridge, energy is converted from barotropic to baroclinic tides, eddies emanating from the Agulhas retroflection pass through affecting eddy/internal wave interaction, and the formation of fronts and filaments. Our observational program will include the study of mixed-layer processes,

Fig. 2: First deployment of the microstructure profiler to measure turbulence in the upper ocean.

Fig. 3: Meteor on the way to Tristan da Cunha.

mesoscale and submesoscale circulation, horizontal mixing processes, internal waves, and energy dissipation. It is complemented by a modelling project where a general circulation ocean model is set up at MPI for Meteorology in Hamburg which has a telescoping high-resolution grid for the observed region to evaluate the consistency of the observations as well as validate the models against the observations.

On time series stations, we use repeated CTD and lowered ADCP casts over the full water depth, alternating with turbulence measurements with a free-falling profiler in the upper 1000 m, over a period of 1-2 days to observe the changes in stratification, currents, and energy fluxes caused by tides and near-inertial waves. Unfortunately we had to interrupt the station work already after only a few hours, due to a medical emergency on Tristan da Cunha. Tristan da Cunha is a group of volcanic islands on the Mid-Atlantic Ridge. It is actually considered to be the most remote inhabited archipelago in the world. Since Meteor is the only ship around that is able to help, we have left our research area and are currently on the way to Tristan.

The weather was very pleasant during the first week of our cruise, maybe except for the swell from the south, which was quite high at times. The atmosphere on board is good, helped by the excellent meals offered by the kitchen.

Best wishes from the scientific party of M188 to all families, friends, and colleagues on shore.

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