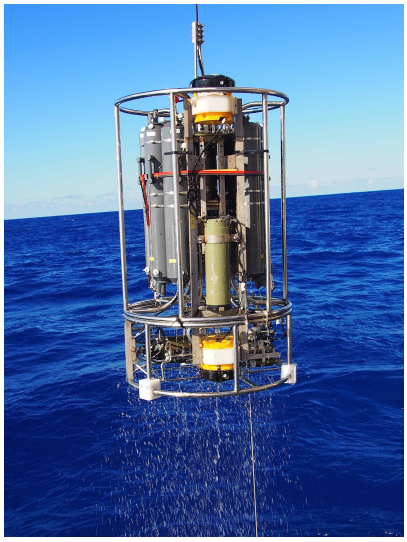
TRR 181 Cruise
Poseidon 523
2 — 23 May 2018

2. Weekly report (14 May 2018)

On Tuesday, May 8, at seven in the morning our first station was reached and work started in earnest. The position was one we already occupied during the cruise last year, but here, we had the opportunity to study the impact of longer-term tidal variability: the station work last year took place during a spring tide, and this year we reached the position during neap tide, the time of weakest tidal amplitude. The comparison between these two sets of measurements will yield insights into the impact of the spring-neap cycle on the internal wave energy and the energy dissipation. The following time series stations are dedicated to the latitudinal band between 28° and 30°N, where the critical latitude for the semidiurnal tide is located. Theory predicts an increase of non-linear interactions between internal waves of inertial and tidal frequencies in the vicinity of that latitude. We are interested to find signs of this effect in our observations. At the moment, we are nearing the end of our third time series station. At each station, we collect between ten and fifteen full depth profiles of stratification and currents, over a period of 36 to 48 hours. This time frame is needed to resolve both the semidiurnal tidal and the inertial period in our working area. The inertial period at a given latitude is determined by the Coriolis frequency, and rises from 23 hours in the North of our working area to 26 hours in the south.

Stratification is determined from CTD casts. The CTD measures temperature, conductivity, and depth, from which the density and hence the stratification of the water column is derived. The internal waves show up in these data as periodic displacements of density surfaces between individual casts. Current and current shear is measured by the Lowered Acoustic Doppler Current Profiler (LADCP). This instrument uses the frequency shift of sound signal that is emitted and subsequently reflected by tiny particles moving with the water to determine the velocity. The energy of the velocity shear on vertical wavelengths between 10 and 500 m serves also as a proxy for the energy of the internal wave field. The internal wave energy flux and the energy dissipation are calculated by using both stratification and shear.



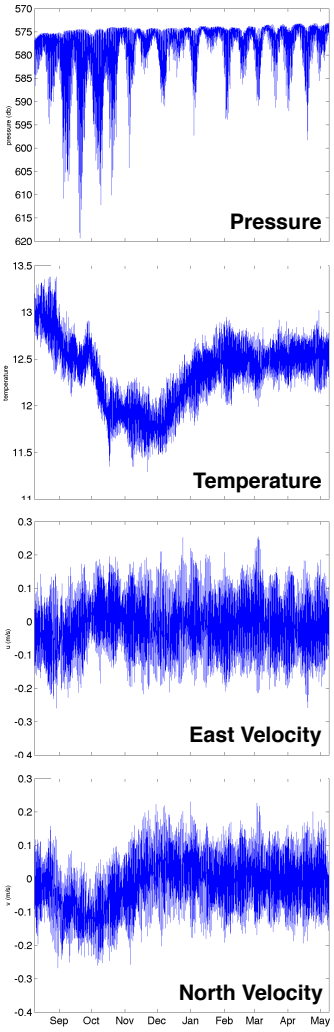
The CTD/LADCP system. The two yellow instruments are the current meter (LADCP), the CTD is installed at the bottom of the package, below the grey water sampling bottles.

On Thursday, May 10, we successfully recovered the mooring in between the first two time series stations. Thanks to the able work of the captain and crew of the Poseidon, all our instruments could be retrieved in good condition, having been in the ocean for nine months since August last year. All instruments have worked fine, and are now serviced and being prepared for the re-deployment of

the mooring, which is planned for next Friday. The first glimpses on the raw data show both a seasonal signal as well as a strong influence of the spring neap cycle of currents and stratification.

On the touristic side of things, we have encountered large groups of the beautiful and dangerous Portuguese man-of-wars passing by the ship during the station work and the mooring recovery.

Best wishes to all friends, families and colleagues on shore,
Maren Walter and the scientific party of POS523



Raw time series (p, T, u, v) measured by the uppermost current meter in the mooring.

Portuguese man-of-war floating close to the Poseidon. Photo: J. Köhler

The head buoy housing a current profiler is the first part of the mooring to be recovered after 9 months in the ocean. Photo: T. Reitz