POS514 – 2.Wochenbericht (03.06. - 09.06.2017)

Hartmut Schulz, Universität Tübingen, und Wissenschaft POS514

While the first week of our cruise was mostly dedicated to the up to >1000m-deep southern part (Strait of Otranto, south Adriatic Basin) of the Adriatic Sea, we worked in the last days mostly in shallow waters of the mid- and northern part with variable success. Bathymetric features of the mid and northern section of the ~800 km-long Adriatic is the up to 230 m-deep mid Adriatic basin, known as the "Mid Adriatic Pit", which dissects the Adriatic from SW to NE. This basin also plays an important role as a reservoir and passage area of the winterly formed North Adriatic Deep Water (NAdDW), that we can well recognize at the bottom of the CTD-profiles exploring the north. On our shallow site of Venice (21m water depth), we measured the coldest bottom water temperatures of only 10.8°C hitherto observed, while surface water temperature was at 22-23°C. This indicated a very strong stratification and thermocline between the still cold waters at the bottom and the warm sea surface. This observation confirmed, that the northernmost shallow Adriatic Sea plays an important role for the formation of dense, cool bottom waters during winter, that spread to the south and finally through the strait of Otranto, to the Ionian Sea. Surprisingly, this water still was young e.g. oxygen-rich (>4.0 mg/l).

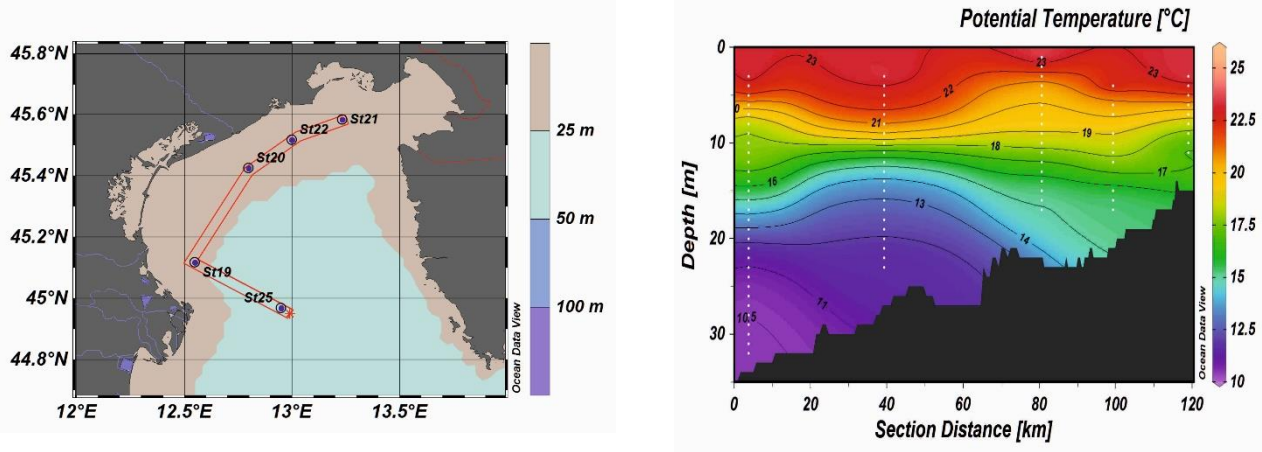

Figure 1. Shallow CTD-transect starting from the centre of the northern Adriatic Sea. Water temperatures, salinities, oxygen content and fluorescence for each station are analyzed by our Italian colleague oceanographers Giuseppe Siena and Catalina Reyes-Suarez (OGS Trieste). Note the extremely cold bottom water of <11°C (blue) and the strong stratification (layering) of more than 10°C difference to the already warm surface waters of the Italian Riviera (up to 25°C !).

On our way to the NE, we took doubled gravity cores of 6m, which will be shared between Tübingen and Vienna colleagues for coordinated macro- and micro-paleontological studies. A CTD-cast, fluorescence probe, multinets, Frahm- and multicorers add to the study of the basin, which we plan to sample the NE-part again in Croatian waters, starting on 09.06. 9:00 h from

Dubrovnik. The cores are characterized by structure-poor brown-grey silty clays, possibly resulting from the lateral transport of fine-grained material from shallower sites. Detailed mineralogical and sedimentological grain analyses are necessary to better understand the variable origin of the material during the past centuries to millennia. From a study of or Croatian colleague Nikolina Ilijanić et al. (2014), a sedimentation rate estimate of 3.1 mm/year at Paladruža Sill would result in ~2000 yr-long gravity core records.

Our team of biologists and paleontologists/geologists at all stations washed a large number of living and dead benthic species from the large volumes of sediment by the flexible numbers of casts possible. The ship crew assisted with patience to recover these many stations, when our excitement demanded for an even larger number of up to 6-7 individual grab cores, box cores, Frahm cores and two multicores at the same station. At shallow water depths of only a few tens of meters, one instrument in theory takes less than a few minutes to be back on deck.

During the last two weeks, the Vienna team already performed five feeding experiments on board to estimate carbon- and nitrogen fluxes by benthic foraminifera. Subcores taken from multicorer or box corer samples were collected between 950 m and 10 m water depth and incubated with labelled (^{13}C and ^{15}N) food material (*Dunaliella tertiolecta*, *Phaeodactylum tricornutum*) for 48 h. Further analysis of the tracer material in the biomass of the foraminifera will be made after transport home to Vienna. With these kind of ex situ experiments, it is possible to quantify carbon and nitrogen uptake rates of the analysed foraminifera and to deepen our understanding of the role of benthic foraminifera in converting organic material inside the marine carbon and nitrogen cycles.

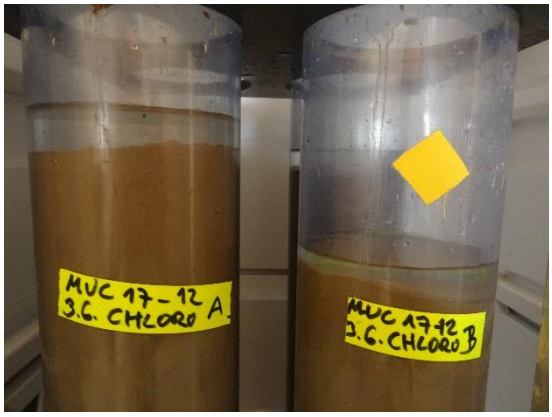

Figure 2. Subcores after feeding with green algae (*D. teriolecta*), incubated at 12°C.

Sampling results for the cruise being (09.06.2017, 8:45h): deployment of 19 CTD, 39 multinet, 17 gravity cores, 14 multicores, 20 Frahm cores, 30 box cores, 65 Van Veen grab cores; 5 series of up to 4 multicore tubes of benthic foraminiferal ex-situ incubation experiments.

Ilijanić, N., Miko, S., Petrinec, B., and Franić, Z., 2014. Metal deposition in deep sediments from the Central and South Adriatic Sea.- Geologia Croatica, 67/3: 185-205.