



SMART” Sardinia – Mallorca Repeated Transect: first results from a new glider line in the western Mediterranean Sea

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The Mediterranean Sea has been identified as a hot spot for climatic change, i.e. a region most impacted by ongoing warming trend. It is also a potential model for global patterns that will be experienced in the next decades worldwide not only regarding ocean circulation, but for the marine biota as well (Lejeune et al., 2010). Evidence of warming trend in the region has been already documented by the scientific community (e.g., Rixen et al, 2005). In addition to long-term trends, Schroeder et al. (Sci. Rep., 2016) reported an abrupt shift in terms of temperature, salinity and density in the deep Western Mediterranean Sea. This shift, originally called “Western Mediterranean Transition”, is actually moving the basic physical properties of the Western Mediterranean from an old equilibrium to a new different one. The warming and salinification, with faster increase than in the past, is also detected in the intermediate waters, with signals coming from the eastern Mediterranean that are now propagating into the western Mediterranean (Schroeder et al., Sci. Rep. 2017).

Since 2017 the new glider line Sardinia – Mallorca Repeated Transect (SMART) has been made operational. It integrates the existing distributed multiplatform observing system in the Western Mediterranean Sea. The SMART missions are scheduled twice a year (in spring and in fall) along a meridional track (latitude 39.8 °N), within a framework of collaboration between CNR and SOCIB. A deep Teledyne Slocum G2 glider (depth range 0-900 m) is measuring temperature, salinity and dissolved oxygen with high vertical and horizontal resolution. The glider is equipped also with a Rockland Scientific MicroRider for measuring the microstructure. The main goal is to set-up and maintain a long-term repeated transect to monitor medium-to-long-term variability of surface and intermediate water masses. It also supports mesoscale studies, operational forecasts and climate monitoring. The glider reaches the transitional layer between intermediate and deep water, which is undergoing the Western Mediterranean Transition, where thermohaline staircases likely develop.

Data coming from the first mission are under preliminary scientific analysis. The data show evidence of significant warming taking place in the area from 900 m depth horizon up to the lower interface of the surface waters (200m), consistent with a general warming trend of the Western Mediterranean Sea. In particular, it is observed a warming with respect to a mission run in 2013 (Olita et al., 2014) of 0.3° (0.065 °C /year), comparable with estimates provided by Schroeder et al., 2017 in the Sicily Channel. The mission shows a clear zonal distribution of salinity at the surface, with relatively new Atlantic water (lower salinity) to the east and older Atlantic water to the west.