CIRCULATION IN THE SARDINIAN SEA: A SYNERGETIC APPROACH BY IN SITU DATA, A THREE DIMENSIONAL MODEL AND INFRARED IMAGERY

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The Sardinian sea, located westward off Sardinia, is directly influenced by the southwestern Mediterranean circulation. In this area, the mesoscale activity is dominant with mainly the occurrence of anticyclonic eddies. Those ones bring less Modified Atlantic Water (MAW) to the Sardinian slope. Also, they should be able to act on the Levantine Intermediate Water (LIW) vein, a key point for understanding LIW path. Consequently, those eddies induce strong mesoscale variability on the local hydrology and dynamics. Nevertheless this variability is not enough understood, especially for LIW, and a study of the circulation in this area has been set on.

In the framework of the SIMBIOS project, the Sardinia Sea circulation has been diagnostically simulated by a three dimensional model. In order to compute the velocity field from the observed density, some hydrological measurements have been carried-out during 2 oceanographic cruises (March-April 2000 and May 2002). In situ data has been interpolated into the high resolution model grid, about 2 Km, by the Objective Analysis Method. The numerical model is integrated in diagnostic mode. By analysing in situ data and model results, the LIW and Winter Intermediate Water (WIW) flows are described along the western Sardinian slope. Infrared satellite images are also employed as they provide information of the surface layer dynamics.

In March-April 2000, LIW and WIW flowed continuously inshore the isobath 2000 m (WIW: tetȧ 13.25°C, ż 150-300 m; LIW: tetȧ 13.65-13.80 °C, Ṡ 38.64- 38.66, ż 300-800 m). About 30 km far offshore, LIW was more distributed in patches than in a vein and WIW deepened seawards from ~150 m to ~300 m. Associated to this variability, an anticyclonic eddy is observed in the surface layer (0-200 m) on satellites images,
computed velocity field, and hydrological data.
In May 2002, the situation is strongly different inshore the isobath 2000 m. Patches of WIW (WIW: $\theta \sim 13.4^\circ$C) extend horizontally from $\sim 100$ m to $\sim 500$ m and consequently LIW (teta $\sim 13.60 \ ^\circ$C, $S^\sim 38.64-38.66$) upper boundary varies between $\sim 300$ m and $\sim 500$ m (lower boundary still $\sim 800$ m). Some mesoscale phenomena are suspected to induce this variability.
This preliminary study shows that mesoscale structures can disturb the LIW and WIW flows of the Sardinia Sea and can trap LIW pieces. Involved processes will be investigated in the next step.