



Upper circulation in the Ionian basin (Mediterranean sea) as inferred from a high-resolution numerical model

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The circulation of the eastern Mediterranean basin is still under debate. Moreover the circulation variability is not well documented yet. The main objective of this study is to investigate the spatio-temporal variability of the eastern Mediterranean circulation. Our focus is on the Ionian basin. This question is addressed using a general circulation model with very high horizontal resolution (4.6-5 km), climatologies, in situ and remote-sensed observations. The model was initialized with the MEDATLAS-II climatology and was run for 24 years. It has been forced -several times- by the high resolution daily sea surface fluxes provided by the ECMWF analysis corresponding to the period March 1998-February 2003.

At the end of the run, the model is able to accurately reproduce the major water masses of the eastern Mediterranean basin. The surface circulation is in agreement with in-situ and satellite observations. The model shows two eastward major paths of the Atlantic Water. They consist on the Libyan current along the north African coast and the Atlantic Ionian Stream already well documented in the basin center. High energetic mesoscale eddies dominate the surface circulation. These eddies propagate eastward in the basin center and westward in the southern part of the basin along the Libyan shelf. These eddies have lifetimes of several months up to 3 years and propagation speeds of ~ 1 -2 km/day. Mesoscale and sub-basin circulations show a strong seasonal variability. At intermediate depth, the model shows that part of the Levantine Intermediate Water spreads into the Ionian basin following the Greek and Italian coasts in agreement with recent observations. And another part flows westward along the north African slope showing a new path which has never been documented in the literature. This work is supported by the MERCATOR project (France) and the HIMR(Syria).