CLIMATOLOGICAL CIRCULATION OF THE IONIAN AND LEVANTINE BASINS USING: HISTORICAL DATA AND NUMERICAL MODELLING

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Abstract
A climatological circulation analysis for the Ionian and Levantine Basins has been defined using the MEDATLAS grided data set for temperature and salinity fields. This has been carried out by computation of the geostrophic current using the dynamic height method with a 400 m as reference level. The Princeton Ocean Model has been implemented inorder to simulate at the climatological scale, the mesoscale features of the area. Several simulations have been done with different model configurations and different atmospheric forcing. Results obtained from the model are compared with the observed climatological circulation characteristics.
Keywords : Circulation, Ionian Sea, Levantine Basin, Models.

The work aims at analysing the climatological general circulation of the Ionian and Levantine basins by means of historical data (MEDATLAS temperature and salinity monthly gridded data set)[1]. The MEDATLAS data reveals the main water masses of the area and their seasonal variability, in particular the Atlantic Water (AW) and the Levantine Intermediate Water (LIW). From the MEDATLAS gridded data dynamic height has been computed with the geostrophic method using 400 m as reference level. The resulting geostrophic current gives a realistic picture of the main circulation patterns in the area in agreement with previous analyses [2, 3], as shown in Figure 1.

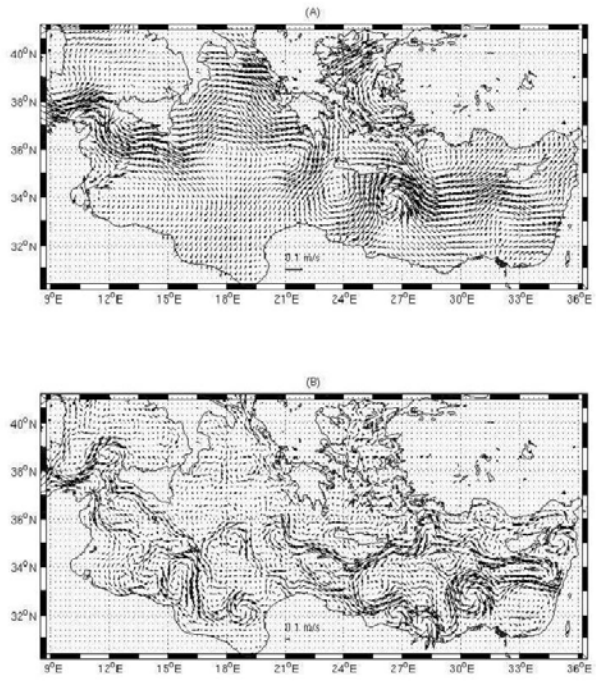

Fig. 1. Monthly average surface current in October: (A) Geostrophic current according to the dynamic height method using 400 m as reference level in m.sec^{-1}; (B) OGCM perpetual year surface current in m.sec^{-1}.

In order to get insight on the mesoscale characteristics of the Ionian and Levantine basins, the Princeton Ocean model has been implemented with a horizontal resolution of 1/12° and 1/24° with a vertical resolution of 25 sigma layers. Simulations of the general circulation have been carried out under perpetual year monthly variables. The model is one way nested with the Global Mediterranean General Circulation Model [4]. Several simulations have been carried out using different model configurations and different atmospheric forcing. The performed climatological runs of the nested model have presented the complex dynamics of the interested area. Comparing the model monthly average net volume transport across the open boundaries with the model monthly average water flux showed a consistency to demonstrate the skill and robustness of the simulation.

References

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