

The circulation of the Western Mediterranean Sea in spring 2005 as inferred from observations and from model outputs

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Abstract

In situ observations and numerical model simulations have been used to study the circulation of the western Mediterranean Sea during April-May 2005. A hydrological survey and direct current measurements carried out in the western Mediterranean Sea are analyzed with an inverse box model. The model result is a mean circulation of the region during spring 2005 along with simultaneous evaluation of water fluxes through eight transects and associated uncertainties. In order to evaluate the consistency of the results and the weight of currents at shorter temporal and spatial scales, an inter-comparison of differently achieved results is performed. The inverse solution is evaluated against both instantaneous current measurements and simulated velocity fields from a General Circulation Model. The results obtained and the general agreement between the three approaches are encouraging and confirms that the inverse box model is a powerful instrument to investigate flow fields in wide areas of the sea. The picture coming out confirms the previous qualitative knowledge on the mean circulation at all levels, providing, in addition, robust quantitative estimations of the water masses fluxes throughout the western Mediterranean basin.

Keywords: Western Mediterranean Sea; Circulation; Geostrophic transport; Water masses; Intercomparison; Modelling

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