



Assessment and intercomparison of numerical simulations in the Western Mediterranean Sea

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The Balearic Islands Coastal Observing and Forecasting System (SOCIB, www.socib.es) is developing high resolution numerical simulations (hindcasts and forecasts) in the Western Mediterranean Sea (WMOP). WMOP uses a regional configuration of the Regional Ocean Modelling System (ROMS, Shchepetkin and McWilliams, 2005) with a high spatial resolution of $1/50^\circ$ (1.5-2km). Thus, these simulations are able to reproduce mesoscale and in some cases sub-mesoscale features that are key in the Mediterranean Sea since they interact and modify the basin and sub-basin circulation. These simulations are initialized from and nested in either the Mediterranean Forecasting System (MFS, $1/16^\circ$) or Mercator-Océan simulations (MERCATOR, $1/12^\circ$). A repeated glider section in the Ibiza Channel, operated by SOCIB, has revealed significant differences between two WMOP simulations using either MFS or MERCATOR (hereafter WMOP-MFS and WMOP-MERC).

In this study, MFS, MERCATOR, WMOP-MFS and WMOP-MERC are compared and evaluated using available multi-platform observations such as satellite products (Sea Level Anomaly, Sea Surface Temperature) and in situ measurements (temperature and salinity profiles from Argo floats, CTD, XBT, fixed moorings and gliders; velocity fields from HF radar and currentmeters). A quantitative comparison is necessary to evaluate the capacity of the simulations to reproduce observed ocean features, and to quantify the possible simulations biases. This will in turn allow to improve the simulations, so as to produce better ocean forecast systems, to study and better understand ocean processes and to address climate studies. Therefore, various statistical diagnostics have been developed to assess and intercompare the simulations at various spatial and temporal scales, in different sub-regions (Alboran Sea, Western and Eastern Algerian sub-basins, Balearic Sea, Gulf of Lion), in different dynamical zones (coastal areas, shelves and "open" sea), along key sections (Ibiza and Mallorca Channels, Corsica Channel, ...) and during specific events.