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The circulation in the Levantine Basin as inferred from in-situ data and numerical modelling (1995-2013)

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The general anticlockwise circulation along the coastline of the Eastern Mediterranean Levantine Basin was first proposed by Nielsen in 1912. Half a century later the schematic of the circulation in the area was enriched with sub-basin flow structures. In late 1980s, a more detailed picture of the circulation composed of eddies, gyres and coastal-offshore jets was defined during the POEM cruises. In 2005, Millot and Taupier-Letage have used SST satellite imagery to argue for a simpler pattern similar to the one proposed almost a century ago. During the last decade, renewed in-situ multi-platforms investigations under the framework of CYBO, CYCLOPS, NEMED, GROOM, HaiSec and PERSEUS projects, as well the development of the operational ocean forecasts and hindcasts in the framework of the MFS, ECOOP, MERSEA and MyOcean projects, have made possible to obtain an improved, higher spatial and temporal resolution picture of the circulation in the area. After some years of scientific disputes on the circulation pattern of the region, the new in-situ data sets and the operational numerical simulations confirm the relevant POEM results. The existing POM-based Cyprus Coastal Ocean Forecasting System (CYCOFOS), downscaling the MyOcean MFS, has been providing operational forecasts in the Eastern Mediterranean Levantine Basin region since early 2002. Recently, Radhakrishnan et al. (2012) parallelized the CYCOFOS hydrodynamic flow model using MPI to improve the accuracy of predictions while reducing the computational time. The parallel flow model is capable of modeling the Eastern Mediterranean Levantine Basin flow at a resolution of 500 m. The model was run in hindcast mode during which the innovations were computed using the historical data collected using gliders and cruises. Then, DD-OceanVar (D'Amore et al., 2013), a data assimilation tool based on 3DVAR developed by CMCC was used to compute the temperature and salinity field corrections. Numerical modeling results after the data assimilation will be presented.