



The Copernicus Mediterranean Analysis and Forecasting Physical System: recent upgrades and validation

The Mediterranean Analysis and Forecasting System developed in the framework of the Copernicus Marine Service operationally produces analyses and 10-day forecasts of the main physical parameters for the entire Mediterranean Sea at 4km resolution. The system is composed of the hydrodynamic model NEMO (Nucleus for European Modelling of the Ocean) 2-way coupled with the third-generation wave model WW3 (WaveWatchIII) and forced by ECMWF (European Centre for Medium-range Weather Forecasts) high resolution atmospheric fields. The model solutions are corrected by means of the OceanVar, a 3D variational data assimilation system, which daily assimilates Sea Level Anomaly (SLA) and vertical profiles of Temperature and Salinity. Moreover a heat flux correction is implemented by using satellite Sea Surface Temperature (SST) data. The system has been recently upgraded to use the latest versions of NEMO and WW3, new Empirical Orthogonal Functions (EOFs), and to ingest more observational data. The system has been validated by comparing model daily analysis fields with respect to Copernicus Marine satellite and in-situ observations. The model skill is presented following two methods: (1) by interpolating daily mean model data on daily available observations to compute their difference and (2) by evaluating model misfits (difference between model background and observations at the time and location of the observations before being assimilated). Validation results show that both temperature and salinity errors and biases are reduced along the water column when compared with in-situ vertical profiles of ARGO floats, and the sea level anomaly error is also reduced when compared with altimeter along-track observations.

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