



Performance and quality assessment of the global ocean eddy-permitting physical reanalysis GLORYS2V4.

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The purpose of this presentation is to give an overview of the recent upgrade of GLORYS2 (version 4 and GLORYS2V4 hereafter), the latest ocean reanalysis produced at Mercator Ocean that covers the altimetry era (1993-2015) in the framework of Copernicus Marine Environment Monitoring Service (CMEMS; <http://marine.copernicus.eu/>). The reanalysis is run at eddy-permitting resolution ($\frac{1}{4}^\circ$ horizontal resolution and 75 vertical levels) with the NEMO model and driven at the surface by ERA-Interim reanalysis from ECMWF (European Centre for Medium-Range Weather Forecasts). The reanalysis system uses a multi-data and multivariate reduced order Kalman filter based on the singular extended evolutive Kalman (SEEK) filter formulation together with a 3D-VAR large scale bias correction. The assimilated observations are along-track satellite altimetry, sea surface temperature, sea ice concentration and in-situ profiles of temperature and salinity.

With respect to the previous version (GLORYS2V3), GLORYS2V4 contains a number of improvements. In particular: a) new initial temperature and salinity conditions derived from EN4 data base with a better mass equilibrium with altimetry, b) the use of the updated delayed mode CORA in situ observations from CMEMS, c) a new hybrid Mean Dynamical Topography (MDT) for the assimilation scheme referenced over the 1993-2013 period, d) a better observation operator for altimetry observations for the data assimilation scheme: e) A correction of large scale ERA-Interim atmospheric surface (precipitations and radiative) fluxes as in GLORYS2V3 but towards new satellite data set f) an update of the climatological runoff data base by using the latest version of Dai's 2009 data set for the global ocean together with better account of freshwater fluxes from polar ice sheet's glaciers. The presentation will show that the new reanalysis outperforms the previous version in many aspects such as biases and root mean squared error and, especially in representing the variability of global heat and salt content and associated steric sea level in the last two decades. The dataset is available in NetCDF format and GLORYS2V4 best analysis products are distributed onto the CMEMS data portal.