



Global oceanic thermo-haline warming trend in an eddy-permitting reanalysis context

Clement Bricaud, Gilles Garric , Nicolas Ferry , and Laurent Parent
Mercator-Ocean, France, www.mercator-ocean.fr

Mercator Ocean, the French ocean forecasting center (www.mercator-ocean.fr), has been developing several operational forecasting systems and reanalysis of the physical and biogeochemical 3D-Ocean. In the framework of the European MyOcean project (www.myocean.eu.org), Mercator has produced global eddy-permitting reanalysis over the altimetry years (1992-2012). They are driven by the ECMWF atmospheric re-analyses ERAinterim at the surface via the CORE bulk formulae without any relaxation. In order to better capture high frequency variability, the atmospheric forcing is sampled to 3H conjointly with a diurnal cycle applied to the downwelling shortwave radiative atmospheric forcing. Those global $\frac{1}{4}^\circ$ reanalysis are based on the NEMO OGCM platform with 75 vertical z-levels. NEMO sea-ice model LIM2 is used with EVP rheology. The assimilation method is a reduced order Kalman filter based on SEEK formulation with bias correction scheme for temperature and salinity and an Incremental Analysis Update. Data assimilated are in situ profiles (CORIOLIS GDAC), REYNOLDS 0.25° AVHRR-only SST, AVISO along track SLA, and Mean Dynamic Topography (CNES-CLS09).

Distribution of the 3D thermo-haline content in different layers is evaluated in terms of linear trend and compared favorably to estimations issued from in-situ data base (ARGO network). The 2-dimensional trend of the steric signal, in general agreement with in-situ estimation, is particularly emphasized. A similar experiment performed without assimilation also allowed us to qualify the model and the assimilation components of the reanalysis system.