Optimisation of ERA-Interim Heat and Precipitations Surface Fluxes for Oceanic Reanalysis Purposes

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Mercator-Ocean developed several operational forecasting systems of the 3D-Ocean and produces also oceanic reanalysis. The strategy of atmospheric forcing is essential to improve the oceanic forecasts and analysis skills. All Mercator systems use the NEMO OGCM model and the atmospheric forcing from the European Centre for Medium Range and Weather Forecasts (ECMWF) together with a bulk formulation methodology to calculate all the air-sea fluxes (radiative, turbulent, freshwater and momentum).

In this study, we have estimated the main biases of the ERAinterim radiative and precipitations fluxes at the global ocean surface by comparing them with fluxes issued from satellite measurements. From these results, a method has been developed to correct both the ERAinterim radiative and precipitation fluxes for hindcasts (reanalysis) purposes. This method, fully described in the poster, has been designed in order to correct only the mean spatio-temporal bias of the ERAinterim surface fluxes.

Corrected fluxes are then used to drive 21 years (1989-2009) inter annual experiments with the Mercator Ocean global ¼° configuration with no assimilation. With a general reduced amount of downwelling heat, the impact of the corrected radiative fluxes cools the global ocean by 0.3°C in average and reduces by 0.1°C (20 % of error) the mean global sea surface temperature bias. Similarly and with globally less precipitation, the corrected rainfalls lead to the increase and more realistic modelled sea surface salinity. Discussions are made on the vertical mixing impacts and on water masses properties in the upper layers of the different global oceanic basins.

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