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Atmospheric forcing data sets to drive eddy-resolving global ocean general circulation models

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Simulating the evolution of the global ocean over the last few decades using Ocean General Circulation models (OGCMs) has been made possible since globally gridded inter-annual weather reanalysis products have become available. Atmospheric fields from these reanalyzes are used to calculate fluxes applied as surface boundary conditions for OGCMs. The relatively high space ($\sim 1^\circ$) and time (3 to 6 hourly) resolution of reanalyses and their global coverage make reanalyses particularly well suited to drive eddy-resolving global ocean models, especially since reanalyses have skills in describing the weather, the seasonal cycle and, but to a lesser degree, the inter-annual variability. However the surface by-products of atmospheric reanalyses commonly used to force ocean models, such as a precipitation rate or radiative fluxes, are among the most difficult to represent while being of crucial importance for the ocean, and even small biases in the flux climatological means and or long term trends may induce serious drifts in the solution of ocean models.
This paper presents the most recent atmospheric surface data sets built to drive the global ocean models used by the Drakkar modelling community (the DFS - Drakkar Forcing Sets). Those forcing sets are based on ERAinterim and ERA40 reanalyses, two different atmospheric reanalyses produced at ECMWF and covering altogether the period 1958 to 2013. The DFS are a blend of surface fields from those reanalyses with corrections towards available observations in order to provide more suitable air-sea fluxes to the OGCMs while preserving the space and time coverage of the original reanalyses. The proposed corrections on each atmospheric field are described and their impacts on air-sea fluxes and OGCM solutions are evaluated.