



The spin-up of fluxes calculated from ECMWF forecast output and the response of the ORCA2 ocean model.

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The spin-up of fluxes calculated from ECMWF forecast output and the response of the ORCA2 ocean model. The output of meteorological variables produced by the ECMWF IFS atmospheric forecast model are used as part of the MERSEA Integrated Project to calculate bulk air-sea fluxes to force the ORCA2 ocean general circulation model (GCM). The modification of the atmospheric model fields by the 4D-Var data assimilation system used to initialize the ECMWF forecasts leads to a geostrophic adjustment, or spin-up, of the mass-circulation of the atmospheric model during the first 20 hours after the forecast start time. The objective of this study is to quantify the spin-up effect on the MERSEA bulk flux calculation and its impact in terms of forcing the ocean GCM.

A sensitivity study is carried out by forcing the ocean model with fluxes calculated before and after the 20 hour-long initial spin-up period. Since the spatial distribution of the spin-up fields is closely related to regions of important oceanic variability, processes such as western boundary current separation and ventilation may be sensitive to the spin-up effect. In terms of developing an operational ocean modelling system, it is important to determine whether it is best to force the ocean model with fluxes closer to observations though where the atmospheric model is not in equilibrium, or with fluxes that have reached equilibrium though with an increased forecast error.