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Multivariate statistical model for the air-sea heat fluxes

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Parameterization of air-sea heat surface fluxes is a key issue from a modelling point of view. In order to test the relative importance of the different heat fluxes, the ability of reproduce the Reynolds and Smith (1994) sea surface temperature (SST) is investigated by modifying the various parameters of the bulk formulas used to calculate the various components of the heat fluxes in the NEMO-OPA general circulation model. Our results agree with the well known fact that latent and sensible heat fluxes are the key components in the evolution of the model SST. Thus, proper parameterization of these heat fluxes continues to be a main issue in order to improve model simulations.

A new method is used to obtain new heat flux values in our study region. It is based on the statistical relationship between SST and the latent and sensible heat fluxes from a simulation of the NEMO-OPA forced by NCEP winds from January 2002 through December 2009. The statistical relationship is built following the methodology proposed by Kim (2008) and using the Multivariate Empirical Orthogonal Functions of the model.

Preliminary results validate the ability of the proposed method to reproduce the various components of the heat fluxes from both SST and wind speed data. Using the analyzed SST fields from Reynolds and the wind speed from NCEP, the original heat flux of the model can be corrected by the new heat flux, derived from our statistical multivariate model. The new heat flux fields allow the model to better represent the SST observations, validating the new methodology.