



Tropical ocean initialisation strategies for seasonal forecasting

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Operational seasonal ENSO forecasts show substantial skill in tropical regions, but are sensitive to the initialisation procedure used in the ocean. Due to errors in wind stress forcing and in modelling the vertical transfer of momentum, a bias correction method is often used during ocean data assimilation in order to assimilate hydrographic data, e.g. from the TOGA/TAO array. While this improves the ocean state, particularly the circulation, during the analysis, it leads to an inconsistency at the beginning of a coupled forecast, since the bias correction term is generally not retained during the forecast itself.

We present results from a number of ensemble simulations carried out with the European Centre for Medium-range Weather Forecasts (ECMWF) coupled forecast system, comparing different initialisation strategies for the equatorial ocean. Rapid adjustments in the ocean at the beginning of the forecast are found to induce additional variability in the thermocline. We then show that this spurious variability can be substantially reduced by persisting or more slowly adjusting the bias correction term during the first month, and that this leads to significant improvements in ENSO SST forecast skill, at lead times of 3-7 months. The results highlight the importance of ocean initialisation in maximising the skill of ENSO predictions.