



A posteriori adjustment of near-term climate predictions: Accounting for the bias dependence on the observed state

Neven-Stjepan Fuckar (1), Danila Volpi (1), Virginie Guemas (1,2)

(1) Catalan Institute of Climate Sciences (IC3), Climate Forecasting Unit, Barcelona, Spain, (2) Centre National de Recherches Meteorologiques/Groupe d'Etude de l'Atmosphere Meteorologique, Meteo-France, CNRS, UMR 3589, Toulouse, France

Climate predictions initialized from an observation-constrained state systematically drift to the attractor of unconstrained model, i.e. develop model bias, which makes essential the use of a-posteriori correction methods to disentangle the model bias from the climate signal of interest. We propose that correcting model bias, dependent on the initial and lead time, by applying linear regression of the bias on the observation-based state (OBS) associated with initial conditions offers an efficient method for bias reduction. The impact of this new method is examined on monthly means of tropical and high-latitude sea surface temperature, and the Northern Hemisphere sea ice extent in near-term climate predictions with the EC-Earth v2.3 model. Linear-trend adjustment in the phase space of monthly OBS shows reduction of forecast error with respect to established bias correction methods over the modern satellite era. Improvements are significant from at least in the first forecast year up to five years.