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Initialization of decadal predictions for EC-EARTH

Klaus Wyser[†]; Mihaela Caian; Torben Kˆnigk; Francisco Doblas-Reyes; Hui Du; Virginie GuÈmas
[†] SMHI, Sweden
Leading author: klaus.wyser@smhi.se

The EC-EARTH model couples the atmosphere model IFS to the ocean model NEMO and has been used to perform decadal prediction experiments for CMIP5. An essential part of and a real challenge for decadal simulations is the initialization of atmosphere, ocean, sea ice and soil with a state that is close to reality. In the full field initialization, the initial state is taken directly from an analysis or synthesis. With this method, the model drifts towards its own climate and this model drift has to be accounted for with an a posteriori bias correction. Anomaly initialization provides an alternative method: anomalies from the analysis or synthesis are added to the mean model climate to create an initial state. The model drift is if not completely avoided still mitigated to a great extent. Variables that are correlated in reality (e.g. SST and sea-ice) may be treated inconsistently in the anomaly initialization (e.g. there may be sea-ice in the initial state even where the temperature is above 273 K) and may give rise to spurious tendencies. Both full-field and anomaly initialization have their advantages and disadvantages. We will showdifferences and similarities in the results from decadal prediction experiments initialized with anomaly and with full-field initialization. The same version of the EC-EARTH model and the same NEMOVAR S4 ocean re-analysis is used in both sets of experiments. For the evaluation of the decadal predictions, we use the metrics package that has been developed for the COMBINE project. This package evaluates the relevant oscillatory indices (AMO, PDO) and estimate the forecast skills for temperature and precipitation globally and in selected regions.