SESSION: (B2) Modelling issues in S2D prediction

(B2-02)

Approaches to reduce model biases to improve in climate prediction

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Systematic model error is the cause of large biases climate models. The aim of this presentation is to first discuss the impact of these biases on prediction skill and second, to introduce the supermodel approach to reduce model systematic errors.

To illustrate the first point, we present seasonal prediction results for the equatorial Atlantic performed with a standard and an anomaly-coupled configuration of the Norwegian Climate Prediction Model (NorCPM). The biases in this region are particularly large and persistent among models. A significant reduction in these biases is achieved in NorCPM by anomaly coupling (i.e., by a static correction of the momentum and SST fields exchanged between oceanic and atmospheric model components). Reduction of the bias is shown to improve the simulated variability, enhance the quality of the ocean reanalysis, and significantly increase the skill in seasonal prediction of equatorial Atlantic climate. These improvements are related to a better representation of ocean-atmosphere interaction.

A superior representation is provided by a supermodel that can be constructed by interactively combining a number of different models in run time so that their individual model errors are made to compensate. We show that the approach is able to mitigate the double intertropical convergence zone bias found in most climate models. Importantly, non-linear ocean-atmosphere interaction enables the super model to out perform the standard averaging of the coupled models run separately. To demonstrate the broad applicability of the approach we have now used data assimilation between models to create a supermodel from three state-of-the-art climate models – NorESM, MPIESM, and ECEARTH. Initial results from this new supermodel will be presented.