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Analysing model drift in full-field-initialised seasonal hindcasts

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An essential component of a forecast using an imperfect model is the treatment, either through online correction or in post-processing, of the model's systematic bias. The manner in which a model drifts from an initial observed or analysed state towards its own climatological state should inform the choice of method used to account for the model's bias, but is typically not well known at present. Further, the development of bias in a coupled model will not, in general, occur in the same way as in atmosphere- or ocean-only simulations with the relevant model components, due to coupling feedbacks that can exacerbate the growth of errors.

We analyse the drift in a number of full-field-initialised coupled model hindcasts, with the aim of attributing the development of various model biases to deficiencies in physical parameterisations or to the initialisation process. The data used consist of two sets of 7-month hindcasts, one using the Hadley Centre's Glosea4 coupled prediction system (based on HadGEM3) and the other using the ECMWF IFS-NEMO coupled seasonal forecast model. Differences between the two models will be highlighted where relevant. Particular attention is given to the development of biases in the ocean and near-surface atmosphere within the first few days of the hindcasts, where evidence of an 'initialisation shock' is seen. We also look for negative impacts on predictive skill of the propagation of these errors further into the hindcasts.

We will comment on the implications of the results for initialisation and bias correction strategies.