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Improving the anomaly initialisation for decadal predictions

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We analyse results from a recently accomplished set of decadal prediction experiments using the EC-Earth model.
It consists of a 10-members ensemble with yearly restarts for the period 1960-2005 using anomaly initialisation method for ocean and sea-ice. Initial perturbations are generated for the ocean (time-lagged analysis) and ice (perturbed climatology). There is an increase in skill compared to 5-years sampling used previously at both global and regional scale. We show that the accuracy of the initialisation is directly related to the forecast skill up to year 4, and that it remains a necessary condition at decadal range.

We analyse the representation of the sources of decadal predictability by the model. In this respect we show that for the anomaly method, a key aspect is the accuracy of the main modes of variability's phase representation at the initial time, hard to achieve with a classical anomaly initialisation.

We developed a new initialisation method, aiming to improve that.This is a spectral method allowing to focus on physical process initialisation, through projecting the dominant observed modes'phases onto model's space. We compare these two anomaly initialisation methods and comment advantages.