

## Analysis of long term persistence in a perturbed physical ensemble

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### Abstract

Global climate model perturbed physics ensembles are currently being created with the goal of quantifying the uncertainty in climate change projections due to uncertain model parameterisations.

The perturbed physics ensemble (PPE) consists of typically hundredths of model runs obtained by setting the parameters to alternative values considered physically plausible by experts in the relevant parameterisation schemes. However, not necessarily all the regions in parameter space correspond to model runs that are consistent with physically sensible climates. It is clear that a simple comparison between the mean state of the atmosphere of a single model run and the observed climate does not guarantee that its dynamical properties are consistent with those of the climate system. In this work we focus on the analysis of the long term persistence of the ensemble model runs, comparing it with the observed long term correlations, and discuss the viability of this approach as a tool to validate model runs within the ensemble.