**Model dependence in climate ensembles**

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Modelling groups internationally share literature, parameterisations, data sets and even sections of model code, so the potential for shared biases among climate model simulations from different institutions is clear. Yet when examining projection estimates, we have no other option than to use a range of different climate models as a proxy for multiple working hypotheses, hoping to obtain independent estimates from different models.

The community has no agreed metrics for quantifying model dependence, which potentially affects both the mean and spread of ensemble-based climate change estimates. Explicit attempts to address dependence within climate model ensembles are rare. While a handful of techniques to address this issue have been published, they are typically statistically involved and seem to adopt incommensurable definitions of model dependence. Internal variability and limited observational data clearly make this problem even more difficult.

The lack of observational constraint for the evaluation of individual process representations, and the epistemological holism that results from it, makes defining dependence in terms of shared model structure difficult. Where process representations are tightly constrained by physical laws or observational data, models would ideally agree. It is only for poorly constrained processes, or those where computational limitations mean they can only be approximated, that we want different models to offer a variety of independent approaches. This distinction highlights the interconnectedness of model independence and model performance in any workable approach that quantitatively accounts for model dependence.

This talk will give a very brief introduction to existing approaches that deal with model dependence, before trying to contextualise them in an overarching framework.