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Reanalysing the deglaciation with models and data

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Using data assimilation techniques for climate reanalysis should provide the best description of how and why our climate has changed through the past and up to the present. Due to both computational and data limitations, previous paleoclimate reanalyses of the authors and others have typically focussed either on time slices (such as the Last Glacial Maximum or mid-Pliocene Warm Period) or the relatively short transient of the last millennium, using a wide variety of methods. The forthcoming PMIP6 simulations of the last deglaciation, together with recently published compilations of core data, should provide us a new opportunity to reconstruct the fully global transient evolution of the climate state over this period with more detail and accuracy than previously achieved.

Here we present some investigations and results using transient simulations which have been produced by the FAMOUS model and CCSM3, which builds on our previous work in state (LGM) reconstruction. We additionally integrate information from snapshot simulations every thousand years through the deglaciation, from the LOVECLIM, GISS, and HadCM3 models. We show that, in principle, it is possible to blend the data and model simulations in order to give a realistic reconstruction of the full deglatiation. Future challenges include handling errors in the timing and magnitude of forcing time series used to drive the models, and also in the chronologies of proxy data.