Geophysical Research Abstracts, Vol. 7, 03885, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03885

Ensemble based simulation of the last glacial maximum

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We have developed an efficient ensemble climate estimation and prediction method using the ensemble Kalman filter to generate multivariate parameter perturbations which sample the uncertainties in the modelling process. This method has been applied to the CCSR/NIES/FRCGC AGCM, MIROC 3.2 with slab ocean, to produce an ensemble of 40 models tuned to present day climatology. Running this ensemble of GCMs for various scenarios enables us to estimate not just climate change but also the uncertainty in the prediction. Results from the ensemble run for the Last Glacial Maximum show how the present day climate conditions constrain the model results for the LGM, and we compare the range of results obtained with the PMIP1 ensemble of opportunity. Further comparison with doubled CO_2 experiments gives an indication of the importance of paleoclimate simulations for constraining future climate changes.