High Frequency Climate Variability During the Last Deglacition

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Abstract

We seek to quantify the primary processes which drove high frequency climate variability during the last deglaciation. This will be achieved through a series of sensitivity experiments conducted using a set of ocean circulation models, atmospheric circulation models and a coupled atmosphere-ocean general circulation model. Our first set of experiments explore the role of freshwater forcing in the climate system, particularly the importance of a realistic meltwater distribution upon the strength of ocean circulation and heat transport to high latitudes. This is achieved by utilizing the output of a glacial systems model to introduce a set of meltwater distributions, comparable to those at the initiation of the Younger Dryas, into the ocean models and examining the range of responses exhibited by the system. Scaling issues are likely to present themselves with respect to the translation of present day climate fields and paleo-climate fields into the various model domains and remain to be addressed. Comparison of the model responses to proxy data will be investigated as one component to determine the efficacy of the sensitivity experiments, issues regarding model-data comparisons and scaling shall also be a central theme of this component of the work. Future experiments will investigate the role of other components of the Earth system such as sea-ice and orography within the framework of high frequency climate variability.