A coupled AOGCM simulation of the last glacial inception

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A simulation study of the last glacial inception (about 115,000 year before present; 115 kyrBP) has been conducted with the Meteorological Research Institute (MRI) coupled atmosphere-ocean general circulation model (AOGCM), which was basically the same model used for the IPCC AR4 (Forth Assessment Report of the Intergovernmental Panel on Climate Change) model simulations at MRI. Earth's orbital parameters at 115 kyrBP and preindustrial green house gas (GHG) concentrations were used as boundary conditions. The 115 KyrBP insolation slightly warms up the global mean surface air temperature as an annual mean and increases the atmospheric water vapor content. It also causes a cooler summer in the northern high latitudes and a relatively warmer winter in the northern low latitudes. These conditions increase the poleward energy transport in a form of latent heat, and create a suitable condition for the inception of northern high latitudes glaciations. Perennial snow covers in some of Canadian Arctic Islands and Russian Arctic Islands were produced after several hundreds years integration. Any other perennial snow covers, however, were not observed in this simulation. The results seems to be consistent with geological evidence, In addition, some positive feedback processes that contribute to expand the perennial snow coves were observed. It is expected that coupling with dynamic vegetation and ice sheet models further enhance the feedback.