



High-resolution regional climate model simulations for a 50-year period under Last Glacial Maximum conditions.

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The last glacial maximum climate is modelled with a fully coupled AOGCM for several hundred years. A 50-year period of this simulation is dynamically downscaled with a regional climate model operating at 50 km resolution over Europe. The high resolution of the regional simulation is important for a better representation of the boundary conditions (e.g. the topography associated with the ice sheet covering Scandinavia during this period). Model simulated temperature and precipitation is compared to palaeo reconstructions based on proxy data. The results show that the models are generally in broad agreement with the reconstructions. However, an exception is that the North Atlantic sea-surface temperatures are lower than those inferred from the reconstructions indicating a too cold climate also in northern Europe. Compared to proxy-based data from southern Europe the regional climate model show a good agreement for all seasons except summer when it is colder by some 2-5C than the reconstructions show. The strong correlation between the NAO index and wintertime climate in northern Europe in today's climate is not applicable during LGM conditions indicating that the temperature climate over the central ice sheet is governed by other processes than the atmospheric circulation over the North Atlantic.

Apart from the original setup of the forcing conditions according to the Paleo-climate model intercomparison project (PMIP) sensitivity studies with; 1) stronger radiative forcing due to enhanced mineral dust concentrations in the atmosphere and 2) regional changes in vegetation as derived from a dynamic vegetation model are tested. Both these experiments indicate that the resulting climate gets colder compared to the reference case.