



HIGH RESOLUTION SIMULATIONS OF LAST GLACIAL MAXIMUM CLIMATE OVER EUROPE - A SOLUTION TO DISCREPANCIES WITH OBSERVATIONS?

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Reconstructions of Last Glacial Maximum (LGM) climate indicate that the near-surface air temperatures of the coldest month were up to 40°C cooler than present in Western Europe. Standard GCMs are currently incapable of reproducing this large cooling, and typically predict and LGM cooling of only about 20°C in this region. One possible reason for the discrepancy is the relatively low resolution of the GCMs, which mean that the small-scale features and processes may be misrepresented.

Therefore, with 3 different GCMs (LMDz, HadAM3, CSSR), we have carried out both high and low resolution simulations of LGM climate, with a focus on the European region. The high resolution simulation varies between the models; CSSR is a global simulation, HadAM3 is a regional simulation, and LMDz is a zoomed simulation with variable resolution. The results show that as expected, all the low-resolution models are too warm over Europe at the LGM. The CSSR and LMDz high-resolution simulations show some cooling relative to the low-resolution, but only HadAM3 is capable of simulating the observed extreme cold. The reason for the greater cooling in the HadAM3 high-resolution simulation appears to be related to the heat-fluxes over sea-ice in the North Atlantic, which are greater in the high resolution simulation due to enhanced gustiness, and result in very cold air over sea-ice, which is advected over Western Europe.