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High Resolution Modelling of European Climate through the Deglaciation

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There is an increasing of high resolution regional modelling to investigate detailed aspects of climate change, especially around complicated topographic relief. Previous studies have shown some significant differences between such high resolution models and GCMs when studying European climates at the LGM (e.g. Jost et al, 2005).

We present new simulations using the Hadley Centre regional model (HadRM3), centred on Europe. The horizontal resolution is approximately 40km x 40km. We have performed a set of 22 simulations, every 1000 years from the Last Glacial Maximum (21kyr) to pre-industrial. These were driven by lateral boundary conditions from a global model (HadCM3).

The results show considerable regional improvements compared to global coarse resolution models when examining the absolute temperature and precipitation. However the changes in climate, compared to the pre-industrial simulation, shows much smaller differences between the regional and global coarse resolution models. The conclusion from these simulations is that the regional model adds relatively small benefits compared to the global model.

An additional set of simulations were performed at 3000 year intervals using a global high resolution model (HadAM3H, 1.25 degree resolution). These simulations are computationally equivalent to the regional model yet capture most of the additional robust results. These simulations have the additional benefit that all parts of the globe are simulated at high resolution.