



The importance of equilibration in glacial climate simulations

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Last Glacial Maximum (21 000 yrs BP; LGM) and Greenland Stadial 12 (44 000 yrs BP; GS12) climate has been simulated with the National Centre for Atmospheric Research (NCAR) Community Climate System Model version 3 (CCSM3). Although the simulations were initiated from simulated glacial climates, both simulations required 1500 years of additional integration to reach equilibrium under the imposed boundary conditions and forcings.

The annual global mean surface temperature changes by only 0.1°C during the last 1000 years of the 1500 year long GS12 simulation. Despite this small global change the slow equilibration is important for the simulated regional climate. The corresponding change in the annual mean surface air temperature in the North Atlantic region is more than 3°C with a maximum of 8°C in south-eastern Greenland. This regional change is coupled to a decrease of the sea ice extent in the North Atlantic region.

Both climates are compared to available proxy data of sea surface temperature (SST). The simulated SST changes by up to 2°C in the North Atlantic region during the last 1000 years of the GS12 integration which leads to a better agreement with proxy data. Simulated LGM SSTs are colder than the proxy data but show similar spatial patterns. Simulated GS12 SSTs are in better agreement with the available proxy data.