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Very High Resolution Climate Modelling in Northern Russia

M. Stendel and J.H. Christensen
Danish Meteorological Institute, Danish Climate Centre, Copenhagen 0, Denmark (mas@dmi.dk, 0045 3915 7460)

Simulations with global climate models (GCMs) clearly indicate that major climate changes for the Arctic can be expected during the 21st century. Already now, there are substantial changes in sea-ice extent and thickness and a considerable increase in air temperature in several regions.

Contemporary GCMs are unable to give a realistic representation of the climate and climate change in regions with steep orography, due to their coarse resolution. But even relatively high resolution regional climate models (RCMs) fail in this respect. We have therefore conducted a transient simulation with the newest version of the HIRHAM RCM, covering the period 1958-2001 over a region in northeast European Russia, including the Ural Mountains, with the unprecedented horizontal resolution of 4 km. For this simulation, a double downscaling procedure was applied.

Average and extreme values will be discussed, and a comparison of subsurface temperatures to a set of observations from the region will be presented.