



Changes of extreme precipitation and heat waves under global warming in a very-high-resolution RCM over Denmark

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A regional climate simulation with the HIRHAM model in 12km resolution has been performed over a European area with boundary conditions from the HadAM3H global atmospheric model for two 30-year time slices corresponding to the periods 1961-1990 and 2071-2100 according to the SRES A2 scenario. Sea surface temperatures are obtained from observations for the control period, and anomalies from the HadCM3 OAGCM are added for the scenario period. This setup is the one used extensively in the EU-funded project PRUDENCE, with the modification that future Baltic sea temperatures are obtained from the Swedish RCAO model.

The high resolution enables a better description of the processes responsible for weather extremes such as heavy precipitation and wind storms. The effects of resolution will be discussed through a comparison with corresponding simulations in 25km and 50km resolution.

At 12km resolution it becomes possible to investigate how local variation of precipitation extremes relate to single events and spatial correlation of precipitation, and how these relations may change in the future. We explore the spectra of grid point extremes and their geographical extent for Denmark. Also an analysis of heat waves will be presented for Denmark.

The numerical results are compared to daily observational time series of precipitation as well as minimum and maximum temperature existing since the 1870's. The effects of climate change will be assessed from the model results.