



## **Climate change signal in an ensemble of bias-corrected regional climate scenarios for Europe**

Renate Wilcke (1), Grigory Nikulin (1), Lars Bärring (1,2), Erik Kjellström (1,3)

(1) Rossby Centre, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden, [renate.wilcke@smhi.se](mailto:renate.wilcke@smhi.se), (2) Centre for Environment and Climate Research, Lund University, Sweden, (3) Department of Meteorology, Stockholm University, Stockholm, Sweden

In this study we investigate possible changes in temperature and precipitation on a regional scale over Europe from 1961 to 2100. We use data from an ensemble of regional climate model scenarios over the EURO-CORDEX domain. The ensemble consists of simulations with the Rossby Centre regional climate model RCA4 at a horizontal resolution of  $0.11^\circ$  (ca. 12.5 km). In these experiments RCA4 has been downscaling five different coupled atmosphere ocean general circulation models (AOGCMs) from the CMIP5 project under the forcing scenario RCP 8.5. The AOGCMs that have been run with horizontal resolution varying from about  $1^\circ$  to  $3^\circ$  are: CNRM-CM5, HadGEM2-ES, IPSL-CM5A-MR, EC-EARTH and MPI-ESM-LR. One of the results of these experiments is that RCA4 shows some pronounced biases in the control climate. This is true in particular for the AOGCM-driven simulations but also for a reanalysis-driven simulation taken as a reference. The most prominent biases include too much precipitation in parts of northern Europe, particularly in spring, and a cold bias in summer also in northern Europe. To remove the biases a distribution-based scaling (DBS) method has been used. The reference data used for bias-correction is a new data set from the European FP7-project EURO4M that builds on a new regional reanalysis at 25 km horizontal resolution and a subsequent optimal interpolation to the final 5 km resolution over all of Europe. In the study we address to what extent bias-correction alters the climate change signal over Europe and how that relates to the magnitude of bias to be corrected.