



Use of a large ensemble of regional climate model simulations to depict future climate change in Sweden

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In this study we investigate possible future changes in the European climate with a focus on Sweden. We use data from a regional climate model ensemble for the CORDEX domain covering Europe. The Rossby Centre regional climate model RCA4 has been used to dynamically downscale ten different coupled atmosphere ocean general circulation models (AOGCMs) from the CMIP5 project with horizontal resolution varying from about 1° to 3°. In the regional ensemble all ten AOGCMs are downscaled at 0.44° (c. 50 km) over the time period from 1951 to 2100 with two different forcing scenarios for the future, the RCP4.5 and RCP8.5 scenarios. In addition five of the AOGCMs have been downscaled to even finer resolution, 0.11° (c. 12.5 km) for both scenarios. Furthermore, there are also a few simulations for RCP2.6 at 0.44°.

The experimental setup allows us to investigate robustness of the climate change signal and to what extent it is representative for the larger underlying CMIP5 ensemble. We also explore the benefit of the higher horizontal resolution in RCA4 by comparing the results in the two RCA4 ensembles to the coarser driving AOGCM data. The significance of the results is investigated by comparing to i) the model simulated natural variability, and, ii) the biases in the control period. Finally, we present how this information is used in a national climate service perspective which includes dissemination through the SMHI web page and direct dialogue with end users of climate information in Sweden.