

DOWNSCALING OF GREENHOUSE GAS INDUCED CLIMATE CHANGE IN TWO GCMS WITH THE RCA1 REGIONAL CLIMATE MODEL FOR NORTHERN EUROPE

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Version RCA1 of the Rossby Centre regional climate model has been run at 88 km resolution with boundary data from two global AOGCMS, HadCM2 and ECHAM4/OPYC3, which both show a greenhouse gas induced global mean warming of 2.6° between the 10-year control and scenario run time slices used. The changes in time mean temperature and precipitation in the two RCA1 experiments are compared quantitatively which each other and with the driving GCM experiments. The two RCA1 experiments are generally found to be, even at the grid box scale, closer to their respective driving GCMs than the two GCMs are to each other. Thus, regarding changes in time mean temperature and precipitation in northern Europe, GCM produced scenarios may probably be used as meaningfully in impact studies as RCM produced scenarios (to which extent this applies to other climate change statistics and other areas remains to be studied, however). Internal variability is of major importance in the interpretation of these model results and is typically estimated to cause about a half of the differences between the two RCA1 scenarios. It also appears able to explain a substantial part of the differences in climate change between RCA and the driving GCMs, at least regarding precipitation.