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Northern hemispheric simulation with a regional climate model

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A well known problem in the majority of general circulation models (GCMs) is the simulation of a too strong westerly flow in the midlatitudes. This also affects simulations with regional climate models (RCMs), which are usually run on relatively small model domains to preserve the large scale information of the driving GCM. Possible reasons for this problem are a too low orography and the inability of simulating the complex structure of blocking situations due to the coarse resolution of GCMs. To investigate, if a higher resolution could at least reduce the problem, the Rossby Centre Atmosphere model version 3 (RCA3) has been run on a domain including the Northern hemisphere north of 10 N. The model is driven by the sea surface temperature (SST), sea ice distribution and atmospheric lateral boundary values from the coupled GCM ECHAM5/OM1. In such a model setup the RCM has more freedom to develop its own dynamics than in usual RCM simulations. The model setup allows us to realise a high horizontal resolution of 0.5 degrees compared to typical GCM resolutions. The intensity of the midlatitude westerly flow in our simulation appears to be between the driving ECHAM5/OM1 simulation and the ERA-40 reanalysis data. Other parameters such as 500 hPa geopotential height and temperature are also closer to ERA-40 reanalysis data in our simulation than in the driving ECHAM5/OM1 simulation.