

RCM-based climate prediction for the Carpathian basin using PRECIS simulations

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High resolution model results are essential for the generation of national climate change scenarios, as it is recommended by the United Nations Development Programme (UNDP). For analyzing the possible regional climate change in the Carpathian Basin, we have adapted the model PRECIS at the Department of Meteorology, Eotvos Loránd University.

The model PRECIS is a hydrostatic regional climate model HadRM3P developed at the UK Met Office, Hadley Centre, and nested in HadCM3 global climate model (GCM). It uses 25 km horizontal resolution transposed to the Equator and 19 vertical levels with sigma coordinates.

First, we evaluate the model capability of reconstructing the present climate (1961-1990) using two different sets of boundary conditions, (i) from the European Centre for Medium Range Weather Forecast ERA-40 reanalysis database, (ii) from the HadCM3 GCM output data. In order to fulfill the validation task the results of the different model experiments are compared to the monthly climatological datasets of the Climatic Research Unit (CRU) of the University of East Anglia as a reference. Then, we compare the model results for the periods 2071-2100 (using the HadCM3 GCM outputs as boundary conditions taking into account the SRES A2 and B2 emission scenario) and 1961-1990 (as the reference period).

The results suggest that the temperature increase expected in the Carpathian basin may considerably exceed the global warming rate (especially in summer). The climate of this region is expected to become wetter in winter and drier in the other seasons.