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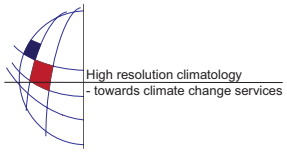

Trend analysis of simulated wet and dry conditions in the Carpathian basin using PRECIS outputs

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High resolution regional climate model (RCM) results are essential for the generation of national climate change scenarios, as it is recommended by the United Nations Development Programme (UNDP). In order to analyze the possible regional climate change in the Carpathian Basin, we have adapted the model PRECIS at the Department of Meteorology, Eotvos Lorand University. The present contribution evaluates the results of the accomplished PRECIS experiments for the 21st century for the Carpathian Basin using HadCM3 GCM outputs as boundary conditions taking into account the SRES A2, B2 and A1B emission scenarios. The model PRECIS is a hydrostatic regional climate model developed at the UK Met Office, Hadley Centre. The model uses 19 vertical levels with sigma coordinates, and the horizontal grid is transposed to the Equator in order to avoid spurious results due to high latitudes. The horizontal resolution of PRECIS experiments is 25 km, which seems to be appropriate and fine enough to model the fine scale spatial patterns.

Projected future changes (i.e. mean values, distributions, inter-annual varibility and empirical probabilities) are analyzed for the period 2071-2100 (compared to 1961-1990, as a reference period). A special emphasis is taken to the various drought indices, e.g., precipitation index, standardized precipitation anomaly index (SAI), De Martonne aridity index, Thornthwaite index, Lang's rainfall index, Ped's drought index, and Foley's anomaly index (FAI). According to the results, the following main findings will be presented: (i) In all the four seasons significant warming is projected at 0.05 level for all the evaluated scenarios, the largest warming is expected in summer. (ii) Not only the mean will change, but also the distribution of daily mean temperature implying more frequent warm and hot periods and larger record hot conditions than in the 1961-1990 reference period. (iii) By the end of the century the annual precipitation in the Carpathian Basin is likely to decrease by about 20%. (iv) Significant drying is projected in the region, especially, in summer, while in winter the precipitation is expected to increase in the region of Transdanubia. (v) Based on the PRECIS simulations the annual distribution of monthly mean precipitation is also expected to change. In the 1961-1990 reference period the wettest months in Hungary occurred from April to July, and the driest months were January and February. In the 2071-2100 future period, the driest months are projected to be July and August, while the wettest April, May and June.