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Analysis of PRECIS simulations using A2 and B2 emission scenarios: estimated mean and extreme climate trends in the Carpathian basin by 2071-2100

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The regional climate models (RCMs) nested into global climate models (GCM) are expected to improve the regional climate change scenarios for the European subregions. The present poster discusses the RCM experiments for the end of the 21st century using the model PRECIS for the Carpathian Basin using HadCM3 GCM outputs as boundary conditions taking into account the SRES A2 and B2 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.
Expected future changes (i.e., mean values, distributions and empirical probabilities) are analyzed for the period 2071-2100 (compared to 1961-1990, as a reference period). 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 both A2 and B2 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% for both A2 and B2 scenarios. (iv) Significant drying is projected in the region, especially, in summer (the seasonal precipitation is expected to decrease by 43% and 58% on spatial average in Hungary in case of B2 and A2, respectively) 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.