



Validation of EURO-CORDEX regional climate models in reproducing the variability of precipitation extremes in Romania

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EURO-CORDEX is the European branch of the international CORDEX initiative that aims to provide improved regional climate change projections for Europe. The main objective of this paper is to document the performance of the individual models in reproducing the variability of precipitation extremes in Romania.

Here three EURO-CORDEX regional climate models (RCMs) ensemble (scenario RCP4.5) are analysed and inter-compared: DMI-HIRHAM5, KNMI-RACMO_{2.2} and MPI-REMO. Compared to previous studies, when the RCM validation regarding the Romanian climate has mainly been made on mean state and at station scale, a more quantitative approach of precipitation extremes is proposed. In this respect, to have a more reliable comparison with observation, a high resolution daily precipitation gridded data set was used as observational reference (CLIMHYDEX project). The comparison between the RCM outputs and observed grid point values has been made by calculating three extremes precipitation indices, recommended by the Expert Team on Climate Change Detection Indices (ETCCDI), for the 1976-2005 period: R10MM, annual count of days when precipitation $\geq 10\text{mm}$; RX5DAY, annual maximum 5-day precipitation and R95P%, precipitation fraction of annual total precipitation due to daily precipitation $> 95\text{th}$ percentile. The RCMs capability to reproduce the mean state for these variables, as well as the main modes of their spatial variability (given by the first three EOF patterns), are analysed. The investigation confirms the ability of RCMs to simulate the main features of the precipitation extreme variability over Romania, but some deficiencies in reproducing of their regional characteristics were found (for example, overestimation of the mean state, especially over the extra Carpathian regions).

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