



Analysis of drought index trends for the Carpathian Basin using regional climate model simulations

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As a result of global warming, besides shifts of regional mean climate, the frequency and intensity of different climatological extremes associated to both temperature and precipitation are changing. In this contribution the main focus is on the analysis of past and future drought conditions calculated from monthly time series of different regional climate model (RCM) simulations accomplished for the entire period of 1951-2100 within the frame of the ENSEMBLES program. All the RCM experiments applied 25 km horizontal resolution, and they considered the SRES A1B scenario, for which the estimated CO₂ level by 2050 and 2100 is 532 ppm and 717 ppm, respectively.

For this complex analysis we use different types of drought indices. (i) Precipitation indices are simple and require solely precipitation data, however, they are suitable for separating dry and wet periods, as well, as determining temporal variability. Simple precipitation index (PI), and standardized precipitation anomaly index (SAI) are used in the present study. (ii) Water balance indices consider other elements of the water balance besides precipitation, mainly evaporation as a function of temperature. Among them Lang's rainfall index (LRI), De Martonne aridity index (MAI), and Thornthwaite aridity index (TAI) are used in the present study. (iii) Recursive indices consider data from preceding period, thus characterise long time periods. A classical example to recursive indices is the Palmer Drought Severity Index, which we did not use in this study due to the complex calculation algorithm. However, Foley's anomaly index (FAI) is used instead. (iv) Soil moisture indices are able to estimate loss in crop yields and water shortage. In the present study Ped's drought index (PDI) is used. The results suggest significant drying in the region, especially, in summer.