



Projected changes in the evolution of drought assessed with the SPEI over the Czech Republic

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In previous studies the spatial and temporal evolution of drought events in the Czech Republic were extensively analyzed by comparing results from the most advanced drought indices (e.g. the SPI and SPEI), which take into account the role of antecedent conditions in quantifying drought severity. In the present study, the Standardized Precipitation Evapotranspiration Index (SPEI) was adopted to assess and project drought characteristics in the Czech Republic based on the regional climate model ALADIN-Climate/CZ simulated data. The simulations were conducted at high resolution (10km) for the current (1961-2000) and two future climates (2021-2050 and 2071-2100).

First, the observed data of air temperature and precipitation totals was transferred into a regular grid of ALADIN-Climate/CZ model. The bias correction was applied on the scenario runs. The bias correction method is based on variable correction using individual percentiles whose relationship is derived from observations and control RCM simulation. The SPEI was calculated based on observed monthly data of mean temperature and precipitation totals for the period 1961-1990, as reference period, and for the periods 2021-2050 and 2071-2100, as future climates under A1B SRES scenario. The SPEI were calculated with various lags, 1, 3, 6, 12 and 24 months because the drought at these time scales is relevant for agricultural, hydrological and socio-economic impact, respectively. The study refers at the warm season of the year (April to September). As in the case of observational study, we have identified three climatically homogeneous regions, corresponding to the altitudes below 400 m, between 401 and 700 m and, above 700 m. For these three regions the frequency distribution of the SPEI values in 7 classes of drought category (%) were calculated based on grid point data falling in each region, both for the observed data and scenario runs. The paper presents the projected changes in frequency distribution of SPEI at various time scales, in intensity, duration and spatial distribution of drought over the territory of the Czech Republic under A1B scenario for the middle and the end of 21st century.

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