



Soil moisture trends in the Czech Republic between 1961 and 2012

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Central Europe is generally not considered a drought-prone region, and the drought research and support is traditionally focused on the Mediterranean and southeastern part of the continent and drying trends there. However, Central Europe, including the Czech Republic, recently experienced a series of drought events with substantial impacts, especially on crop production. Because agriculture systems, and vegetation in general, have adapted to evenly distributed precipitation, the region is susceptible to even short-term droughts. The recent drought events may be the result of multi-decadal climate variability or a more general trend, with some studies showing a link to a more frequent occurrence of atmospheric circulation patterns that are conducive to drought. This study introduces an innovation to the standard methodological approaches in evaluating drought climatology by analyzing soil moisture conditions over more than fifty years. This approach relies on state-of-the-art observed weather data and tested soil moisture model, and focuses on the dynamic simulation of soil moisture content with high temporal (daily) and spatial (500 m) resolution in a diverse landscape. Statistically significant trends of decreasing soil moisture content were found, notably during May and June between 1961 and 2012. In contrast, trends toward higher soil moisture content were noted during the October–March time period. When the periods of 2001–2012 and 1961–1980 were compared, the probability of drought between April and June was found to increase by 50%. This indicates a loading of the “climate dice” toward drier conditions. The probability of extreme drought events has been also found to increase. These results support the concerns about the potentially increased severity of drought events in Central Europe under projected climate change and has been submitted to International Journal of Climatology.

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