



Spatiotemporal variability of precipitation in Central and Eastern European countries: A 20-year time series analysis of CHIRPS data for the detection of extreme events

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In recent years, the impact of extreme weather events, such as droughts, has been reported more frequently in Central and Eastern European countries. Rising temperatures and increasingly variable precipitation patterns affect natural ecosystems and agricultural areas, which could impact water resources, agricultural productivity and livelihoods in the future.

This study analyses the Standardised Precipitation Index (SPI), derived from Climate Hazards Centre Infrared Precipitation with Stations (CHIRPS) data, over the last 20 years. The regional focus is on Central and Eastern European countries, with a spatial gradient from the Baltic Sea to the Adriatic Sea in order to cover several biogeographic regions.

The SPI is a widely used tool for assessing the severity and frequency of drought events, providing a standardised measure of precipitation anomalies over various temporal and spatial scales. This study uses SPI-1 and SPI-3 data (at 1- and 3-month scales) for Poland, the Czech Republic, Slovakia, Slovenia, Hungary and Croatia between 2005 and 2024. The aim of analysing these data is to initially identify spatial and temporal patterns in drought frequency, duration, and intensity for this period.

Our future collaborative work will assess the relationship between analysed precipitation patterns and other key climatic factors (e.g. temperature) and further environmental factors (e.g. soil, water and vegetation conditions). This can provide a deeper understanding of the spatial and temporal distribution of climatic extreme events in this region. Furthermore, SPI analyses should be complemented by climate projections to provide insights into potential future changes in precipitation patterns and the frequency of extreme events in Central and Eastern Europe.

