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Changes of drought vulnerability in the 21st century - the case study of the Vistula catchment in Poland

Emilia Karamuz, Tesfaye Senbeta, Ewa Bogdanowicz, and Jarosław Napiórkowski

Institute of Geophysics Polish Academy of Sciences, Warsaw, Poland (emikar@igf.edu.pl)

The ongoing climate change disrupts the water cycle and alters the hydrometeorological patterns at global and regional scales. The alarming intensification of droughts in Europe in recent decades may become the future new norm.

This study aims to assess the future spatio-temporal drought variability in the River Vistula basin, the largest river in Poland. This basin's vulnerability to drought is also investigated. Two drought indices, namely the Standardized Precipitation Index (SPI) and Standardized Precipitation Evapotranspiration Index (SPEI) are evaluated using the observed climatic data and meteorological projections for the 21st century. These projections of climatic variables are obtained from the EURO-CORDEX initiative based on fourteen climate models for the period 1971–2100 for the RCP4.5 and RCP8.5 emission scenarios. Drought vulnerability analysis is carried out by combining exposure, adaptive capacity and sensitivity metrics, using the vulnerability scoping diagram (VSD) method.

Preliminary results show that projected changes in precipitation and air temperature result in significant variations in temporal drought patterns in the River Vistula basin. The divergent results were obtained for the two analysed drought indices. The SPEI projections indicate drier conditions in the basin to be expected in the far-future period, whereas the SPI indicates wetter conditions. The analysis shows that areas in the central and southern parts of the basin are more vulnerable to drought.

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