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The impact of climate change on river discharges in Eastern Romania

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Climate changes imply many changes in different socioeconomic and environmental fields. Among the most important impacts are changes in water resources. Long- and mid-term river discharge flow analysis is essential for the effective management of water resources. In this work, the changes in two climatic parameters (temperature and precipitation) and river discharges and the connections between precipitation and river discharges were investigated. Seasonal and annual climatic and hydrological data collected at six weather stations and 17 hydrological stations were employed. The data sets cover 57 years (1950–2006). The modified Mann-Kendall test was used to calculate trends, and the Bravais-Pearson correlation index was chosen to detect the connections between precipitation and river discharge data series. The main findings are as follows: A general increase was identified in all the three parameters. The air temperature data series showed the highest frequency of statistically significant slopes, mainly in annual and spring series. All data series, except the series for winter, showed an increase in precipitation; in winter, a significant decrease in precipitation was observed at most of the stations. The increase in precipitation is reflected in the upward trends of the river discharge flows, as verified by the good Bravais-Pearson correlations, mainly for annual, summer, and autumn series