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Observed variability of drought and aridity and its impact on the hydrological regime in the Barlad catchment (Romania)

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The drought is a complex phenomenon with slow manifestation which engages, depending on its duration and intensity, a number of different components of the climatic, hydrologic, pedologic systems.
This paper investigates the relationships between drought and aridity on one hand and hydrological regime, on the other hand, in Bârlad river basin, in the eastern part of Romania. Recent studies have revealed that both meteorological and hydrological drought events have a significant frequency and magnitude in the area, so that an important impact on the hydrological regime is likely to occur. For the next decades, climate change scenarios estimate increasing temperatures and relatively low decreasing of precipitation. Therefore, eventual changes in the aridity characteristics can be expected, and they might have a considerable impact on the water supply or agriculture in the Bârlad catchment.
The analysis covers the period 1961-2013 and it is based on monthly data from meteorological and hydrological stations. Seasonal indices were calculated for characterising the drought (SPI, SFI, PDSI, PHDI) and aridity (UNEP, de Martonne, Pinna), while their temporal variability was further investigated in relations with specific hydrological parameters (monthly discharge time series). The spatial distribution of the selected indices was analysed in the same context using co-variables integrated in a GIS framework.
The results show that the hydrological drought is influenced and determined mostly by the meteorological drought. The highest variability between the aridity indices has been identified for the summer season, where the time lag between the hydrological response to the meteorological impulse is up to 2 months.

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