



Detection and attribution of flood trends in Spain

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Flood frequency analyses usually assume stationarity in observed series. However, non-stationarity assumptions question the results of traditional flood frequency analyses. Several factors can cause either trends or abrupt changes in flood time series, such as climate change, wildfires, volcanic eruptions, land-use changes, anthropogenic actions or relocation of gauging stations. Most of trend studies in Spain have been focused on annual, seasonal and monthly flows, which can be applied to water resources and droughts management. Nevertheless, a few local studies have analysed trends in floods in Spain at instantaneous or daily scales. A study to detect flood trends regarding magnitude, frequency and timing is carried out in Spain at a larger spatial scale.

A representative hydrological network of gauging stations where near-natural flow regimes can be considered was obtained. Both annual maximum and peak over threshold series were extracted. Three periods of time were selected: 1942-2009, 1949-2009 and 1959-2009, to account for a smaller data set with a longer temporal scale and vice versa. The Mann-Kendall test was used to detect trends in flood series. An attempt to relate detected flood trends to precipitation trends was conducted. As result, a general decreasing trend in magnitude and frequency of floods was detected throughout Spain. Regarding flood timing, floods tend to occur later in the northwest of Spain. Most of flood trends in magnitude could be related to decreasing trends in precipitation and changes that modify rainfall-runoff processes at the catchment scale.

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