

Flood-rich and flood-poor periods in Spain in 1942-2009

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Several studies to detect trends in flood series at either national or trans-national scales have been conducted. Mediero et al. (2015) studied flood trends by using the longest streamflow records available in Europe. They found a decreasing trend in the Atlantic, Continental and Scandinavian regions. More specifically, Mediero et al. (2014) found a general decreasing trend in flood series in Spain in the period 1959-2009. Trends in flood series are usually detected by the Mann-Kendall test applied to a given period. However, the result of the Mann-Kendall test can change in terms of the starting and ending year of the series. Flood oscillations can occur and flood-rich and flood-poor periods could condition the results, especially when they are located at the beginning or end of the series. A methodology to identify statistically significant flood-rich and flood-poor periods is developed, based on the comparison between the expected sampling variability of floods when stationarity is assumed and the observed variability of floods in a given series. The methodology is applied to the longest series of annual maximum floods, peaks over threshold and counts of annual occurrences in peaks over threshold series observed in Spain in the period 1942-2009. A flood-rich period in 1950-1970 and a flood-poor period in 1970-1990 are identified in most of the selected sites. The generalised decreasing trend in flood series found by Mediero et al. (2014) could be explained by a flood-rich period placed at the beginning of the series and a flood-poor period located at the end of the series.

References:

Mediero, L., Kjeldsen, T.R., Macdonald, N., Kohnova, S., Merz, B., Vorogushyn, S., Wilson, D., Albuquerque, T., Blöschl, G., Bogdanowicz, E., Castellarin, A., Hall, J., Kobold, M., Kriauciuniene, J., Lang, M., Madsen, H., Onuşluel Gül, G., Perdigão, R.A.P., Roald, L.A., Salinas, J.L., Toumazis, A.D., Veijalainen, N., Óðinn Þórarinnsson. Identification of coherent flood regions across Europe using the longest streamflow records, *Journal of Hydrology*, 528, 341-360, 2015.

Mediero, L., Santillán, D., Garrote, L., Granados, A. Detection and attribution of trends in magnitude, frequency and timing of floods in Spain, *Journal of Hydrology*, 517, 1072–1088, 2014.