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Flood change: a Pan-European detection of flood trends over the period 1965-2005

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There is a growing concern that flooding is becoming more frequent and severe due to an increasing number of extreme events observed. The objective of this study is to detect and compare changes in flood peaks across Europe in the period 1965-2005. Flood peaks are identified from daily discharge data provided by the Global Runoff Data Center at 629 gauging stations using a baseflow based algorithm. Stations are grouped into five hydro-climate regions of Europe: Alpine, Atlantic, Boreal, Continental and Mediterranean regions. Significant trends in Annual Maximum Flood (AMF) series are compared to significant trends in Peak Over Threshold (POT) series, compiled by 6 different exceedance thresholds, considering a 10% significance level. Results show that significant trends in flood frequency in POT series are more evident than significant trends in flood magnitude. Moreover, when a mean of one event per year is considered as threshold, POT series exhibit a lower evidence in significant trends in flood magnitude than AMF series. A general tendency of increasing flood magnitudes is detected in Atlantic and Mediterranean regions, while significant decreasing trends are found in the Boreal region. In the Alpine and Continental regions, trends in flood magnitude are sensitive to the selection of the threshold. Changes in flood frequencies are more consistent over the different POT series: decreasing trends are detected in the Alpine, Continental and Mediterranean regions, while increasing trends are detected in the Atlantic and Boreal regions. Data, tools and results are open and available at the Spatial Information Platform of the SWITCH-ON portal.