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Elucidating spatio-temporal changes in the flood seasonality along with their associated climatic and topographic controls

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For a given reach of a river, floods do generally not occur randomly throughout the year. Over a long time window of observations and for most hydrological stations one or two distinct flood seasons can be identified.

A unique European flood peak database, encompassing over 5000 hydrometric stations across Europe, is analysed for the last 60 years to evaluate the flood seasonality. At the European scale regions without or with a single a dominate flood season are presented together regions with multiple distinct periods in which flooding occurs.

Based on the timing within the year of these flood-rich periods and on the topography a link can be established with the dominant flood generating mechanisms.

However, in several European regions, the flood dominant generation mechanisms and hence floods are changing in time and/or space.
This is brought about by either changes in the timing of the dominant flood control or by a change in the relative contribution of a climatic control.
These changes in the controls are visible at large spatial scales across Europe, which result in changes in flood attributes such as timing, duration, magnitude and frequency.

Understanding the temporal changes in flood and their controls allows for a better physical understanding of changes in flood attributes already observed or expected with a changing climate.