



Regionalisation of a seasonal mixture-model for partial duration series

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Different environmental conditions such as climate and soil conditions can lead to very different types of flood events with essential differences in the peak-volume relationship. The magnitude and frequency of these event types depends much on the season they occur in. Hence, many statistical models distinguish between these event types and seasons. This often results in a vast amount of parameters to estimate, such that a large data set is needed to reduce uncertainty.

This problem is increased if a regionalisation for ungauged basins is done. Not only the large amount of parameters, often depending on very different catchment characteristics, but also local differences of the frequency and magnitude of flood events have to be taken into account. For example, snow-melt events with very large volume will mainly occur in the head catchments with high elevation, whereas flash floods are highly dependent on weather conditions (convective cells and the response time depending on the size of watersheds), such that catchments in lee regions are not as much affected by these. Here, a seasonal mixture model for different flood types based on the peak-over-threshold series of monthly maxima is considered and a regionalisation approach is proposed. It will be shown that the different model parameters can be estimated by different catchment characteristics, such as hypsometric curves or area, where mathematical as well as hydrological methods are used. Hereby, the different event types have to be handled separately, leading to different regional patterns. Although many parameters have to be estimated for this model, comparison to other well-known regionalisation studies show similar goodness of fit. The subdivision into seasons and event types can be used to define dominating flood types for different time periods as well as the probabilities of occurrence of flood discharges differentiated by their origin.