



Generalised synthesis of space-time variability in flood response: Dynamics of flood event types

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A analytical framework is used to characterise five flood events of different type in the Kamp area in Austria: one long-rain event, two short-rain events, one rain-on-snow event and one snowmelt event. Specifically, the framework quantifies the contributions of the space-time variability of rainfall/snowmelt, runoff coefficient, hillslope and channel routing to the flood runoff volume and the delay and spread of the resulting hydrograph. The results indicate that the components obtained by the framework clearly reflect the individual processes which characterise the event types. For the short-rain events, temporal, spatial and movement components can all be important in runoff generation and routing, which would be expected because of their local nature in time and, particularly, in space. For the long-rain event, the temporal components tend to be more important for runoff generation, because of the more uniform spatial coverage of rainfall, while for routing the spatial distribution of the produced runoff, which is not uniform, is also important. For the rain-on-snow and snowmelt events, the spatio-temporal variability terms typically do not play much role in runoff generation and the spread of the hydrograph is mainly due to the duration of the event. As an outcome of the framework, a dimensionless response number is proposed that represents the joint effect of runoff coefficient and hydrograph peakedness and captures the absolute magnitudes of the observed flood peaks.