

Stochastic Generation of Type-specific Flood Hydrographs for Design Floods

Svenja Fischer¹ and Andreas Schumann¹

(1) SPATE reserach unit, Ruhr-University Bochum, Bochum, Germany

Flood types improve the understanding of flood-generating processes, as they characterise meteorological and catchment-specific properties and reveal spatial relationships of floods. In combination with flood statistics, flood types can significantly expand the information used and improve the estimation of design floods. For example, type-based flood statistics consider volume and hydrograph shape in addition to the usual feature of peak. Based on such a type-specific statistical model, we present a framework for the stochastic generation of type-specific hydrographs for design floods of given return period. The hydrographs are simulated using different probability densities and their mixing distributions. They include a type-specific volume, the entry time of the peak and the hydrograph shape. Subsequently, flood scenarios are developed which take into account the probability of occurrence of the individual flood types. These scenarios can be used in water management for the operation of reservoirs so that they can be controlled in a targeted manner. The methodology is applicable to both observed and unobserved areas by separately regionalising the relevant characteristics of the individual types using clustering.