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Introducing empirical and probabilistic regional envelope curves into a mixed bounded distributi function

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Abstract. A novel approach to consider additional spatial informati flood frequency analyses, especially for the estimation of discharg recurrence intervals larger than 100 years, is presented. For this p large flood quantiles, i.e. pairs of a discharge and its correspondin recurrence interval, as well as an upper bound discharge, are com within a mixed bounded distribution function. The large flood quan derived using probabilistic regional envelope curves (PRECs) for all a pooling group. These PREC flood quantiles are introduced into ar flood frequency analysis by assuming that they are representative range of recurrence intervals which is covered by PREC flood quant recurrence intervals above a certain inflection point, a Generalised Value (GEV) distribution function with a positive shape parameter i This GEV asymptotically approaches an upper bound derived from empirical envelope curve. The resulting mixed distribution function composed of two distribution functions which are connected at the inflection point.

This method is applied to 83 streamflow gauges in Saxony/Germar analysis illustrates that the presented mixed bounded distribution adequately considers PREC flood quantiles as well as an upper bo discharge. The introduction of both into an at-site flood frequency improves the quantile estimation. A sensitivity analysis reveals tha target recurrence interval of 1000 years, the flood quantile estima less sensitive to the selection of an empirical envelope curve than selection of PREC discharges and of the inflection point between tl bounded distribution function.

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