

Spatio-temporal assessment of flood events by hierarchical Kendall-copulas

Svenja Fischer, Benedikt Gräler, and Andreas Schumann

Ruhr-University Bochum, Institute of Hydrology, Germany (svenja.fischer@rub.de)

In hydrological applications the dendritic structure of a river system is sometimes modelled in the multivariate case by a Vine-copula. This approach has the advantage that simultaneously occurring flood events of several gauges can be considered in a spatial coherence. Nevertheless, a complex river system can lead to structurally high-dimensional trees and even a classical copula approach with multidimensional copulas is hardly applicable. An alternative to Vine-copulas are the so called hierarchical Kendall-copulas, that are also based on a tree-like structure. In contrast to Vine-copulas this approach does not use the conditional bivariate copula-functions but the Kendall-function, that can be described as distribution function of copulas. This makes a univariate consideration of the single parts of the tree possible and reduces the structural dimension of the tree. Here, we want to combine spatial and temporal characteristics of annual maxima by considering pairs of peaks and volumes at different gauges. A seasonal differentiation of summer and winter events is taken into account to consider the different geneses of the events. The applicability is shown in a German case study and we compare the approach with the Vine-copula approach.