Comparing estimators for inferring dependence from records of hydrological extremes

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Hydrological extremes are regularly assumed independent in most practical and theoretical applications. The latter is indeed a convenient assumption as temporal independence is usually a prerequisite for the application of the widely used classical statistics. Motivated by the existence of dependence mechanisms in hydrological processes, i.e. Hurst-Kolmogorov dynamics or long-term persistence, we investigate the propagation of persistence from the parent processes into the series of extremes by focusing especially on the opportunity of inferring the former (persistence) from the latter (records of extremes). To this aim, we examine relevant stochastic indices such as the Hurst parameter and the Dispersion Index, and discuss their strengths and limitations. Additionally, we explore a new probabilistic characterization of clustering for extremes which is found to provide new insights into the identification and modeling of extremal dependence.