



## **Homogeneity testing: how homogeneous do heterogeneous cross-correlated regions seem?**

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Homogeneity is a fundamental requirement in order to perform an effective estimation of the design-flood (i.e., T-year flood quantile) using traditional regional flood frequency analysis techniques [see e.g., Hosking & Wallis, 1993]. Castellarin et al. [WRR, 2005] recently showed for a homogeneous region how to attach a probabilistic statement to the regional flood envelope curve (i.e., the envelope curve that represents the bound of flood experience in a region in terms of unit flood of record and catchment area) and how to use this statement to compute a first-guess estimate of the design-flood at any ungauged catchment in the region. In both cases, assessing regional homogeneity is a critical step. The scientific literature states that inter-site cross-correlation of floods is normally not negligible, nevertheless no studies seem to address the impact of cross-correlation on homogeneity tests. This paper analyses the effectiveness of a well-known homogeneity test proposed by the scientific literature [Hosking & Wallis, WRR, 1993] in presence of inter-site cross-correlation through a series of Monte Carlo experiments. The numerical experiments enable us to (1) identify an empirical tool that accounts for the impact of inter-site cross-correlation of floods, (2) comment on a possible theoretical correction of the test.