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A fresh look at long-term persistence and its relevance for climatic trend estimations

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Recent studies have shown that there is strong reliance (of orders of magnitude) between the level of significance of certain hydroclimatic patterns in historical time series and the type of temporal dependence assumed for the process. It is, however, not trivial to validate long-range dependence (also known as scaling in time) from relatively short records and to estimate the sample statistics, for which the classical statistical estimators are inadequate. This work analyzes several aspects of the problem and uses examples to study the performance of different approaches when used to infer scaling from data and do statistical testing.