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## **Investigating the clustering mechanisms of hydroclimatic extremes: from identification to modelling strategies**

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The understanding of the temporal properties of hydroclimatic extremes is critical to the mitigation of related risk as well as to society's perception of risk. While the marginal properties of extremes have been extensively studied in the literature, their temporal behaviours have been rather overlooked, or approached via deterministic reasoning. We focus on the temporal variability and clustering mechanisms of extremes as seen in long-term hydroclimatic records, highlighting their links to the inherent stochastic properties of the parent hydrological process. To this aim, we apply a new simulation algorithm (Koutsoyiannis and Dimitriadis, 2021) capable of simultaneously reproducing the time dependence structure of a stochastic process, from short-term dependence to persistence (i.e. Hurst-Kolmogorov dynamics), its time directionality as well as its marginal distribution, irrespective of its type. The performance of the methodology in reproducing the observed extremal patterns is evaluated and the practical implications of the findings are discussed.

Reference: D. Koutsoyiannis, and P. Dimitriadis, Towards generic simulation for demanding stochastic processes, *Sci*, 3, 34, doi:10.3390/sci3030034, 2021.