

Markov vs. Hurst-Kolmogorov behaviour identification in hydroclimatic processes

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Hydroclimatic processes are usually modelled either by exponential decay of the autocovariance function, i.e. Markovian behaviour, or power type decay, i.e. long-term persistence (or else Hurst-Kolmogorov behaviour). For the identification and quantification of such behaviours several graphical stochastic tools can be used such as the climacogram (i.e. plot of the variance of the averaged process vs. scale), autocovariance, variogram, power spectrum etc. with the former usually exhibiting smaller statistical uncertainty as compared to the others. However, most methodologies including these tools are based on the expected value of the process. In this analysis, we explore a methodology that combines both the practical use of a graphical representation of the internal structure of the process as well as the statistical robustness of the maximum-likelihood estimation. For validation and illustration purposes, we apply this methodology to fundamental stochastic processes, such as Markov and Hurst-Kolmogorov type ones.

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