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Investigation of the correlation structure behaviour through intermediate storage retention

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A typical problem in stochastic dynamics is the change of variability of a process through intermediate storage retention. In this study, we perform exhaustive Monte-Carlo experiments as to quantify this change through the estimation of the autovariance function, power-spectrum and climacogram (i.e. variance of scaled process vs. scale) and with focus in short-term (e.g. Markov or powered-exponential) and long-term (such as Hurst-Kolmogorov) processes. Also, we show how the simulation methods and results from this analysis can be used to perform a sensitivity analysis to real case applications of seismic activity through geological formations as well as of rainfall-runoff cross-correlations through soil.