

PERPLEXED BY PERSISTENCE

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Many geophysical systems have been found to present long-range persistence, where long-range persistence is characterized by a power law correlation function, $C(s) \sim s^{-\gamma}$, $0 < \gamma < 1$, where s is the time lag. Several methods for estimating the exponent γ from data are contrasted. While these methods have the advantage of being based on statistics in the time domain, and are thus easily calculated as a function of time lags, they are very sensitive to non-stationarities in the system, to a lack of sufficient data, and to noise and measuring errors in the data. By analysing surrogate data (with a known degree of long-range persistence) we evaluate these methods in terms of the spread and bias of their estimates. The amount of data required to obtain a reasonable estimate of the coefficient γ is also considered.