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Non-stationarity of the Hurst coefficient in hydrological time series: methodological artefact or observable property

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Since its introduction in the fifties of the last century, the Hurst coefficient has been the most used parameter to quantify long-range persistence in time series. Different methods have been introduced to determine the Hurst coefficient of the original river discharge time series. Other work already showed that different methods to determine the Hurst coefficient can lead to different results. In this article, it is shown that these methods behave differently from each other, when applied to overlapping subsets of the original time series. For some methods large non-stationarity in the Hurst-coefficients were found. This is surprising since the Hurst coefficient is thought to be a global parameter of the time series. This sheds new light on the discussion concerning the changing of the Hurst coefficient in some natural phenomena: are the phenomena changing or are we seeing a methodological artefact?