



The performance of wavelet-variance analysis as a method for estimating long-range memory in climatic temperature records

Lene Østvand (1), Kristoffer Rypdal (2), and Martin Rypdal (2)

(1) University of Tromsø, Department of Physics and Technology, Norway (lene.oestvand@gmail.com), (2) University of Tromsø, Department of Mathematics and Statistics, Norway

There exist a number of methods for estimating the long-range memory parameter H (Hurst exponent). When analyzing climatic time records, the underlying process generating long-range dependence is usually unknown, and various trends are often present. A non-parametric method for estimating H is preferable if a good model is hard to find, or as complement to parametric methods to strengthen the analysis.

The wavelet variance analysis (WVA) is considered as one of the more accurate non-parametric methods. Here we study the detrending abilities of WVA for synthetic fractional Gaussian noise superposed on various trends. We also study the effect of the length of the time series. The performance of this method is compared to that of the detrended fluctuation analysis (DFA), which until present is the most commonly used non-parametric method for analysis of long-range memory in climatic records.