

## Referre Report

I think the main result of the ms, that there is no scaling break in the holocene, is correct. But unfortunately, it is not new. In 2006, Rybski, Bunde, and v. Storch analyzed by DFA the Mann, Briffa, Esper, Moberg, and Jones record (the same records analyzed here) and came to the same conclusion which is also supported by DFA results from long AOGCM records. It is unfortunate that a thorough discussion in this ms is missing.

A major point of criticisms are the poor methods used in this ms, "poor" because in all methods are strong finite size effects which the authors obviously are not aware of. I suggest them to study more intensively the present literature also in physics journals, e.g. PRE or PRL. The question of finite size effects has been treated by Lennartz and Bunde in PRE (2009). The estimation of the authors that FA methods and WT methods are ok until  $s=N/4$  is simply wrong. This estimation only holds for DFA, for the other methods  $s=N/100$  is more serious.

The authors also do not seem to know MF-DFA. This method is considerably better than the simple structure function, because of the lower finite-size effects. In addition, the WT method has not been introduced by Lovejoy and coworkers in this field. It has been used already by Koscielny-Bunde in the 1998 PRL, and later (2006) by Kantelhardt et al and Koscielny-Bunde et al in J. Hydrology and J. Geophys. Res. But as I said before, these methods are only valid for SMALL  $s$ , for  $s$  above  $N/100$  the DFA2 method introduced by Kantelhardt et al in 2001 (also this ref. is missing) is superior.

In addition, I want to mention a general problem with paleo reconstructions which has been recently pointed out by Bunde et al and Bronnimann et al in 2 papers in Nature Climate Change. In these papers it was shown that paleo reconstructions based on tree ring widths considerably overestimate the Hurst exponent. It is possible that most earlier results as well as the present one are flawed because the underlying data sets do not give a realistic picture of nature. Also, the spectral method is probably the most inappropriate method used in this field. Due to strong finite size effects, cycles may appear out of the blue. Accordingly, the combination of paleo data and spectral analysis is not appropriate at all for finding out the correlation properties of the past 2000y (despite of its wide use in climate science).