

Nonlin. Processes Geophys. Discuss., referee comment RC2
<https://doi.org/10.5194/npg-2021-7-RC2>, 2021
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Comment on npg-2021-7

Anonymous Referee #2

Referee comment on "Comparing estimation techniques for temporal scaling in palaeoclimate time series" by Raphaël Hébert et al., Nonlin. Processes Geophys. Discuss., <https://doi.org/10.5194/npg-2021-7-RC2>, 2021

In this manuscript submitted to as special issue in paleoclimate time series analysis, the authors consider different analysis methods to estimate the H scaling index of paleoclimate series. For this they consider fractional Brownian motion simulations, with adequate modifications in order to introduce an irregular time step, and they systematically check all proposed methods. This work is well explained and the systematic work is convincing. I have some minor comments and one suggestion of significant change.

Major comment:

To understand and appreciate the results I need to see the estimated \hat{H} versus H , for $H \in (-1,1)$. This plot is the most important. If relevant the authors may plot in the same graph the standard deviation. The bias-std plots (Figs 3,4, 5 and 7) are only providing information on the fluctuations of the estimates. The mean value is the more important information for the reader. As I see from Figure 1, it seems that the spectral method may be less accurate when $H < 0$. This plot should help to visualize this property and any other...

Minor comments:

- In line 27, replace log-linear by log-log
- In the review lines 46-52, the authors should cite the literature coming from other fields where irregular sampling had importance, such as astrophysics (where the Lomb-Scargle spectrum was introduced) and also fluid mechanics where Laser Doppler Velocimetry produces irregular sampled velocity data; in this domain an important literature is devoted to the question of adequate procedures for estimating Fourier spectra from LDV measurements.
- reference Corral and Gonzalez seems to have a problem of LaTeX writing

- in the reference list I think it is not necessary to systematically provide the web address of each paper: the doi was introduced for this. Doi itself is sufficient (without <https://doi.org>). Example for the first reference: "doi: 10.1038/nclimate1456"

- in the Discussion section it is necessary to mention the limitation of the present work which addresses only the H exponent for scaling processes, and not the intermittency. They should cite works that showed that the climate proxy data have multifractal statistics and discuss the fact that time series with intermittent fluctuations may react differently to the different methods proposed here, and also that an adequate method must be used to extract intermittency parameters (i.e. all the moment function and not only one moment order). The spectral methods cannot do this.