

Interactive comment on “Estimating the timescale-dependent uncertainty of paleoclimate records – a spectral approach. Part I: Theoretical concept” by Torben Kunz et al.

Anonymous Referee #2

Received and published: 31 March 2020

1) General comments

The manuscript addresses the estimation of the uncertainty of proxy-based reconstructions taking into account that uncertainties are potentially serially correlated. I think that the study of the uncertainties of climate proxy reconstructions is extremely relevant for the investigation of the climate of the past.

The approach described in the manuscript does not take into account calibration errors and dating uncertainties, which seems to be an obvious limitation of the method. However the option of preferring analytic solutions rather than more complex formulations that could easily become untreatable is somewhat justified in the text (section 5).

C1

In my opinion the manuscript is solid and scientifically sound, and I only have some minor corrections to suggest.

2) Specific comments

- page 2, line 55: maybe it would be useful and illustrative to compare the results of numerical simulations with the results obtained using the analytic approach described in the manuscript.

- page 3, line 3: "representation of smoothing by bioturbation", please rephrase / clarify.

- Figure 1: since the stochastic signal and the deterministic seasonal signal are discussed first than the archive formation and sampling effects, maybe move Fig. 1a) to the last graph.

- line 214: maybe change the title of section 2.5 to "Reconstruction uncertainty", the term "versus" doesn't seem to be the most accurate here

3) Typos

- line 22 & line 37: typo (indispensible)

- line 117: equivalently

Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2019-150>, 2020.

C2