

Clim. Past Discuss., referee comment RC2
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Comment on cp-2022-57

Anonymous Referee #2

Referee comment on "Using data and models to infer climate and environmental changes during the Little Ice Age in tropical West Africa" by Anne-Marie Lézine et al., Clim. Past Discuss., <https://doi.org/10.5194/cp-2022-57-RC2>, 2022

In this manuscript, Lézine and colleagues present a synthesis of palaeorecords representative of the WAM covering the period between 850 – 1850 CE. They compare these data with recent simulations over the same period. The paper is interesting, well-written, and summarises the region's state-of-the-art quite nicely. As such, I recommend its publication in Climate of the Past, providing some clarifications of some technical elements supporting the study (see below). Most data seem to be represented with some indices. How these are constructed is rarely described, making reading and interpreting the figures quite difficult. The authors mention a 6 levels scale, but many plots display decimal values (e.g. 2.5 for GeoB9501 in fig. 4). Overall, the manuscript would greatly benefit if all the technical details of this study were better described.

Specific comments

L76: Is this the mean resolution of 100 years? Or the highest time between two consecutive samples should be 100 years?

L78-81: I understand this part perfectly, but I do not like the use of the term 'degraded', which is biased towards human perception. Plants or animal species that live in 'degraded' (as defined here) environments would probably not call it that way. A more objective description, from most arid to humid conditions, seems more appropriate.

L97-113: I think a description of how the ASWI is calculated is warranted. Not in detail,

because it has been published elsewhere, but with sufficient information to avoid checking the Gallego et al. 2015 ref.

L140: Why a reference to ENSO here? It doesn't seem to be contributing to the rest of the study.

L141: Define the acronym AMV

Fig. 3: This may be a problem with the preprint, but the axes and colour scale labels are difficult to read. This comment also applies to most figures.

L173-175: Replace 'slightly' with a measure in distance or degrees. The northward expansion seems to be several degrees south of where it should theoretically go. Then discuss why this is acceptable.

L180: An index is calculated or derived, not performed. What does this index measure? What do you do to the first and last 9 samples when computing the moving average since they do not meet the criterion of 10 samples for the moving average? Are you reducing the length of the record? (No wrong answers here, but the methodology needs more clarity).

L179-189: A better description of how the index is calculated and what it means is warranted here.

Fig. 4: What do the blue shades indicate? And how were they determined? Also, what are the numbers of the y-axes? ASWI values?

Results hydrological records: I am struggling to find commonalities within the groups of hydrological records, except for the Sahel region, where a general trend toward drier conditions seems to be consistently reconstructed. Perhaps the authors could run some statistical analyses to extract the trends shared by the records and limit the impact of the 'local' signals.

Results pollen records: How are pollen records summarised to one single curve? They seem to be plotted against – broadly speaking – the same scale as the hydrological records. Did the authors convert every pollen sample, a high-dimension type of data, to one single value by hand? More details are definitely needed here.

In addition, hydrological and pollen records from the same site are, more often than not, quite different.

Fig 6: The signal obtained from the data seems consistent, despite my comments above. Maybe this suggests that their representation in Fig. 4 could be somehow improved.

Another figure similar to Fig. 6 but for the MCA would be pretty important here to see if the changes captured by the data represent the effect of MCA to LIA transition or if it is something else.

Fig. 7A: How are these 'regional' curves derived? [I found the explanation later on lines 406-407. It would still be good to add it to the caption]