

Reply to Reviewer #2

We would like to thank the reviewer for the constructive feedback. We copied all comments below, numbered them in order of appearance (RC2-1 to RC1-5) and provided our Reply accordingly. We hope to have addressed all concern and improved the manuscript according to the reviewers suggestions.

Arne Ramisch (on behalf of all authors)

General comments:

RC2 - 1. Line. 9, Abstract: The term “long” as used here seems at best relative but perhaps also misleading. Roughly speaking this manuscript and the VARDA database cover the past 120k years, based entirely on freshwater sediments. The authors cite and apply a time-relevant segment of Greenland ice core data (NGRIP, e.g. Figure 4) but ice core data from e.g Antarctica extend at least 800k years. Ocean sediment records, depending on parameter, location, sedimentation rates, etc, can extend easily 107 years. Perhaps ‘long’ by freshwater standards but not by paleoclimate standards. Authors need to clarify or adopt a different word/phrase.

Authors response: We agree that the term “long” record is unspecific for paleoclimatic studies, considering the multitude of age scales covered by different climatic archives. We deleted “long” and instead highlight the “seasonal to annual resolution of varved records” (line 9) to avoid confusion and to emphasize the potential of varved lake sediments in paleoclimatic studies.

RC2 - 2. Line 61: First reference to Table 1 here. Unlike subsequent tables, which each merit a placeholder in subsequent text, I find no place designation for Table 1. Small error, authors will presumably fix at proof stage.

Authors response: Added placeholder for table 1 in line 70

RC2 - 3. Line 223 - Confusion about dates and VARDA time coverage. From this sentence a reader might conclude that varved sediment records extend back at least 106 years: “maximal age range of 1,208,643 yrs (from 10,475 to 1,219,118 BP) for Lake Malawi (Ivory et al., 2018). “ But Figure 4 ends at roughly 120k years BP. Likewise for the time series tool on the database landing page. A search on Lake Malawi in that VARDA database shows only one entry, 14C data, with a temporal range of 1240 to 10740 yr BP. The citation for that record (L&O 1991) does not match Ivory PNAS 2018 above. I accept the database as a work in progress, but in this case the description implies information not (or not yet) available? As a reviewer and potential user, I lose confidence when confronted by these discrepancies.

Authors response: The reviewer is right. Unfortunately, some chronologies were not visible in the frontend application of VARDA. We have corrected this mistake in the database. Since this error occurred on the frontend side of our application, all references to chronologies within the manuscript are based on the correct information from the datasets.

RC2 - 4. VARDA database landing page (which seems substantially out of date?) features PalMod. The PalMod project has stimulated a separate product - focussed on marine sediments for 130k years - recently published in ESSD (<https://doi.org/10.5194/essd-12-1053-2020>). Other than a single mention in Acknowledgements (line 707), this manuscript makes no mention of PalMod effort or products. No synergies? Compare event horizons or age-depth models? One validates or contradicts the other?

Advantages of VARDA (resolution?) relative to PalMod? Potsdam GFZ group doesn't talk to Bremen MARUM group? This seems a curious omission. Again, fails to build confidence.

Authors response: The reviewer is right that we did not sufficiently point out the connection within PalMod and other data products of this initiative which we now added in the revised version (references to the PalMod project (Latif et al., 2016) as well as to the marine synthesis (Jonkers et al., 2020)). Of course, we are in intensive exchange and discussion with our project partners and especially the MARUM group. Following these discussions, we decided to publish the initial varved lake synthesis products separately due to fundamental differences in data format imposed by different climate archives. An integration of these different data products is a major goal of the second PalMod phase. However, we need to point out that this is not trivial and will require in depth discussion. We even need to discuss to which degree an integration is meaningful and applicable.

RC2 - 5. Database itself seems useful, somewhat intuitive, but also missing some guidance / functions. Search function did not work (in Google Chrome). Zoom and time-period functions on the time series graphs worked, sometimes in surprising ways. Need some guidance or display management tools? Malawi search (mentioned above) required scroll-down of an alphabetical list or prior knowledge of geographical location. Eventually, both access routes worked.

Authors response: We added a search function for lake names according to the reviewers suggestion. We are currently integrating a visualization tool for proxy records, after which it will be possible to also integrate display management tools. Meanwhile, users experiencing technical difficulties can ask for technical support at varve@gfz-potsdam.de. We have added the contact information to the data availability section.