

Reply to Reviewers for egosphere-2024-3483

Summary of changes:

We would like to thank the reviewers once again for their feedback on our revised manuscript. The changes suggested were quite minor, but we especially appreciate the request for clarity on a couple of our figure captions. In addition to their suggestions, we revised some text for improved clarity and flow, corrected minor formatting errors, and replaced our figures in Appendix C with versions which better show the confidence levels in the histogram panels. Point-by-point responses to each comment follow below, with the reviewer's comments in standard typeface, our responses in **bold blue**. We thank you again for your time and expertise.

Sincerely,
Andrea L. Moore, Alyssa R. Atwood, and Raquel E. Pauly

Report #1, Anonymous Referee #1, 31 July, 2025

RC1.1 The authors have thoroughly revised the manuscript, resulting in a much-improved paper. There are a few remaining points that should be addressed before publication. These mainly concern clarifications, please find details below. **Thank you for providing your feedback. We found it very valuable.**

RC1.2 RC1.13. In your reply to my question on the forcings applied in the “ctrl” simulation, you answer that “the preindustrial control simulation is branched from the 9 ka simulation and all forcings and boundary conditions are identical to the 400-yr 9 ka simulation”. This answer is confusing me, because I assumed that your “ctrl” simulation was run with forcings for 9 ka, so that it represents the climate in quasi-equilibrium with the conditions at 9 ka. However, in your reply you refer to a “preindustrial control simulation”, suggesting that that preindustrial forcings (i.e. 1750 AD) are applied in the “ctrl” experiment. Please clarify.

That was a typo, and we apologize for any confusion it may have caused. The “ctrl” experiment should have been referred to as the “9 ka control simulation” and not “preindustrial”.

RC1.3 Figure 2. This is a nice figure that helps the reader to understand the applied methodology. However, I propose providing a bit more information in the figure caption. For instance, in step 3, what do the vertical orange lines and the horizontal red lines represent? Presumably the ages of the change points and the mean values between these points? Step 4: the light orange lines (90% confidence interval) are hard to see. I suggest adding that the histogram is shown in black. **Thank you for the feedback. We have updated the caption to specify that the red horizontal lines in step 3 are the mean proxy values calculated between the change points. We have also removed the vertical orange lines to reduce confusion when interpreting the supplemental stackplots in Appendix C, as those lines do not appear in those figures. The orange lines (90% and 95% confidence interval) in step 4 have been changed to red and blue to improve visibility.**

RC1.4 Figure B1, stackplots in Appendix C. Please explain the red triangles. Presumably 14C dates used in the age modelling?

Yes, those are the radiometric dates used in the age modelling. The captions for Figs. B1 and C1 have been updated to clarify this.

RC1.5 Stackplots in Appendix C: What is the blue bar signifying in the C1-plots? And why does this bar change in width between the upper and middle panels? Same for brown bars in C2-plots. Why are there no vertical orange lines included in the middle panels that show the change points as in Figure 2?

The blue bars represent "wet" events detected using the MM and actR methods in the top and middle panels, respectively. The width of the highlights reflects the different event durations calculated using those two methods. The brown highlights indicate "dry" events. The captions for Figs. B1 and C1 have been updated to make this explicit. The vertical orange lines in Fig. 2 were for demonstrative purposes only, and have since been removed from that figure to reduce confusion.

RC1.6 Page 2, lines 68 to 74. The volumes of freshwater are given in “x105 km³”, but this should be in superscript: x10⁵ km³.

Thank you for catching this. These have been corrected.