

Response to editor:

Dear Editor,

Thank you very much for your comments to improve our manuscript. We have responded to the comments one by one and revised our manuscript accordingly. Sorry for the misunderstanding about the insignificant vegetation changes, in the new version, we have deleted the description about the insignificant results.

The major changes as follows:

- include the citations of the data(sets) used in the main reference list (i.e. the publications for Appendix 2 need to be included in the manuscript and those for Appendix 4 need to be moved). Posting the references online is not sufficient as the original data producers are not credited for the appearance of a citation in a pangaea file (such citation don't count). You rely on their work (also for future syntheses), so they should be properly cited. Please see the instructions for manuscript preparation (https://www.climate-of-the-past.net/for_authors/manuscript_preparation.html), which explicitly mentions the proper citation of data sets.

Response: Agree. We have presented these publications in the main reference list in the new version. Please see the tracked version of this manuscript.

- I could not find a letter detailing the response to the reviewer and noticed that comment 6 (copied below) was not completely addressed, specifically wrt to the discussion. Please address this comment and provide a description/motivation of the changes together with your revised version. (6- Figure 3 and the related discussion. The groups that failed the broken-stick test are not assumed to be significant. Is that statistically correct to still use these insignificant results? Furthermore, do the authors have been using these groups to calculate the summary of frequency in figure 3? All of this should be specified and discuss (if data are used for discussion). I expect that if the broken-stick test failed, it does not mean that there is no changes but rather we do not have any thoughts about what is happening.)

Response: We had used these site groups with insignificant vegetation changes to calculate the summary of frequency in figure 3. In the new version, we have deleted the description and discussion about the insignificant results and modified the Figure 3.

Line 237-244:

“Overall, the middle Holocene (including 8.5, 7.5, 6.5, and 5.5 ka time-slices) has the highest frequency of primary vegetation changes. Records from inland areas such as the West Siberian Plain, central Yakutia, and northern Mongolia are characterized by relatively many middle-Holocene splits. There are seven site-groups whose primary vegetation changes during the early Holocene (including 11.5, 10.5, and 9.5 ka time-slices), and most of them from the south-eastern coastal part of the study area. Only three site-groups have late-Holocene primary vegetation changes (Fig. 3).”

Line 398-401:

“PFT datasets from only 19 site-groups pass the broken-stick test for clustering analysis, and most of them have only one significant vegetation change, further supporting the case that only slight changes occurred during the Holocene in northern Asia.”

And a few final grammar and typing changes. The line numbers below refer to the ms with tracked changes

-L101: change "into" to "to"

-L208: please reword the part in brackets

-L301: change "once" to "ones"

-L464: change "taxon" to "taxa"

-L527: unclear, please reword

-L581: change "an" to "a"

Response: Agree. We have corrected these sentences in the new version. Please see the version with tracked changes.