

2nd Author revision notes to *Biskaborn et al.: Diatom responses and geochemical feedbacks to environmental changes at Lake Rauchuagytgyn (Far East Russian Arctic)*

Associate editor decision: minor revision

Author's response

Dear Petr Kuneš

Thank you very much for the possibility to revise our manuscript a second time. We solved each of the issues brought up by Reviewer #2 and documented it in the point-to-point answer below. Reviewer's comments in black, our answers in blue and indented.

With best regards

Boris Biskaborn

Report #1 Referee #2

Authors have revised the manuscript based on early comments and suggestions. It can be acceptable after minor revisions.

Dear Reviewer #2

Thank you very much for reviewing the manuscript again and finding additional unclear points and typos. We are grateful for your volunteering support to increase the quality of our study presentation for Biogeosciences. We carefully addressed each of the issues you mentioned and documented it in the point-to-point answer below and a marked-up version of the manuscript.

Two moderate revisions

1) the explanation on the missing correlation between HgAR and DAR (L482-485) should be treated with caution. Before 16 ka BP, C/N ratios were relatively stable and less than 10, indicative the dominance of within-lake production in sediment organic matter.

Other potential reasons: improved preservation of nitrogen in prolonged ice cover period? alternatively, other algae (e.g., cold-tolerant chrysophytes or cyanobacteria) rather than diatoms flourished during the cold period

Thank you very much for this additional comment. We deleted the previous sentence and changed this paragraph to: "*Mercury in tundra catchments is closely related to*

non-vascular plants (Olson et al., 2019) and external supply of plant organic matter was reported to represented the main source of cold climate carbon deposition (Hughes-Allen et al., 2021). In Raachuagytygyn, however, the higher amount of nitrogen detected in the pre-Holocene core section suggests one or both of the following two reasons: (1) within-lake aquatic production by algae other than well-preserved diatoms flourished during the glacial (Hernández-Almeida et al., 2015) and/or (2) the preservation of nitrogen was higher during the prolonged ice cover period (Kincaid et al., 2022), than during the interglacial.”

2) Keep diatom zone names consistent in Figure 5 and Figure 7.

Thank you very much for noticing this issue! Yes, we somehow missed to upload the updated version. We revised the figure carefully in detail including an update of the diatom zonation. We also updated the caption of this figure accordingly.

other minor revisions:

3) L32 add 'the' before Younger Dryas

Thank you. We fixed this typo.

4) L123 add a dot after 'modelling approach'

Thank you. We fixed this typo.

5) L294 italic type 'L. ocellata'

Thank you. We fixed this typo.

6) L318 'highes' should be 'highest'

Thank you. We fixed this typo.

7) L433 'inbetween' change to 'between'

Thank you. We fixed this typo.