

18 September 2025, Frankfurt am Main

We thank the reviewers and the editor for providing feedback and valuable comments on the manuscript. We have incorporated final the technical remarks from the reviewer 1.

Remarks from the preceding review file validation

Figure B1 has separate captions for each panel. This is not allowed according to our policy. Please combine all panels in one single figure using (a), (b), (c) labels, etc. and combine all captions in one single caption.

R: Figure B1 one has been changed to show one caption. However the panels are large, therefore I cannot combined them in one single figure. I therefore provided 5 separate figures, including the name of each panel on each figure.

Editor Public justification

I would like to thank both the authors and reviewers for their time and commitment to moving this manuscript to production and I am now happy to accept it for publication subject to the minor; technical corrections suggested by reviewer 1. Please incorporate those into the final version of the manuscript for processing. Congratulations to the authors.

Best regards,

Response to Ramesh Glückler

From my perspective, the authors well implemented most suggestions from the previous reviews. The results and methods sections now feature a brief description of all analyses that are either newly done or used from previous publications, and a separate conclusion section improved the manuscript structure. The authors provide good reasoning for starting the discussion section with some methodological paragraphs. In general, many parts of the initial manuscript were improved, ambiguity reduced, mistakes corrected, and clarifications added where it was needed. Importantly, the potential temporal mismatch behind the main interpretation is now addressed more clearly in the discussion. I also appreciate the revised figures and the submission of the data to a publicly accessible database. As in the initial review, I think that this manuscript is worthy of publication in Biogeosciences. After reading the revised manuscript, I was left with the impression that some minor polishing would still be beneficial, but this concerns mostly small technical or formatting-related issues. I therefore recommend the acceptance of the manuscript after some additional technical corrections by the authors, considering also the remaining suggestions below.

Other

remarks:

L35: correct "from in"

R: ... "with satellite-derived fire datasets from northern Arctic". L.35

L36: Is there a double space between sentences? (also potentially in L239, 291, 305, 686)

R: We have removed double space from several places in the manuscript.

L44: "...the charcoal source area of our tundra fire..." – suggest rephrasing this, e.g., "our tundra

fire reconstruction”, and also add plural for “kilometers”

R: . . .”reconstruction encompasses broader landscapes over tens of kilometres.” L. 44

L71: I still cannot find a reference for “Vachula, 2020”, which is also mentioned in L257 and L269. Note also that in L629 the new reference to Vachula et al. is missing the publication year.

R: Vachula RS, Sae-Lim J, Russell JM. Sedimentary charcoal proxy records of fire in Alaskan tundra ecosystems. *Palaeogeography, Palaeoclimatology, Palaeoecology* 2020, 1, 541, 109564. <https://doi.org/10.1016/j.palaeo.2019.109564> L. 625

L73: Citation should be “Frank...” (also in L270, 272, 292)

R: Corrected to Frank-DePue and Chipman, 2025 here and the other lines.

L126: minus missing in concentration unit, same in L179, L180

R: Minus added to units, see L. 126 178, 179

L132: Double-check use of brackets here, it was slightly confusing to read and not sure if every opening bracket has a corresponding closing one. Maybe present rather as done in section 3.4?

R: adjusted to “We extracted shrub abundance from existing plant macrofossil and pollen records from TFSI, TFSII (Gałka et al., 2018), GaI, GaII (Gałka et al., 2023), NBb, and Erin (Gałka et al., 2025). L.131-132

L150: Maybe specify the baseline period range more clearly – does 2 ka refer to the 2000 years BP, i.e., before 1950CE?

R: “... standardization using a baseline period of last 2000 years.” L.150

L157: Standardize use of spaces around “=” (see also e.g. L169)

R: Space removed

L158: Here DTW is used as an abbreviation for “depth-to-water table”, before it was used for “water table depth” – suggest introducing the abbreviation only once and for the correct corresponding term

R: We standardized the term to : “Changes in peatland hydrology were assessed using existing testate amoeba depth-to-water level (DTW) ...” L. 141, 156, 157.

L240: I would suggest standardizing the use of en-dashes for ranges across the manuscript, as often a normal minus sign is used instead

R: Standardised to minus sign.

L301: I think there’s an opening bracket missing

R: ” ... (Fig. 3).” L.300.

L303: “this increase”?

R: “...between this increase in fire activity and expanded shrub cover ...” L 302

Fig. 3: For the topmost plot, the description “High” is slightly cut off, making the “g” difficult to read – maybe this could be easily adjusted.

R: corected too new Fig.3.

Kind regards,
Angelica Feurdean on behalf of the coauthors