

Subject: Cover Letter for 2nd Resubmission of Manuscript

Dear Prof. Dr. Garbarino, Dr. Hagedorn, Dr. Migliavacca and reviewers,

I am pleased to submit the revised manuscript, entitled 'The significant role of snow in shaping alpine treeline responses in modelled boreal forests' for your careful review and consideration for publication in your special issue on the interactions between abiotic and biotic factors shaping vegetation patterns in treeline ecotones.

I wish to express my sincere gratitude for your continued feedback and constructive comments during the review of the revised version of our manuscript. We have carefully addressed each of the reviewers' comments and recommendations, which has further improved the quality of our study. I am confident that the revised manuscript is now even more in line with the high standards set by *Biogeoscience*.

We are looking forward to your evaluation and the possibility of having the revised manuscript accepted for publication in *Biogeoscience*. Please feel free to contact me should you require any further clarification or information.
Thank you for your time and consideration.

Sincerely, on behalf of all authors,
Sarah Haupt

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Reviewers' Comments to Author and Author's Answers to Reviewers:
Reviewer: 1
Comments to the Author

Report #1 Submitted on 24 Jun 2025 Referee #1: Eryuan Liang, liangey@itpcas.ac.cn

RC1: The authors addressed most of my previous comments. Based on revised manuscript, I have following minor comments.

L235-249: It is better to provide references for the numerical figures. Alternatively, show indicate your analysis, if these results are from your analysis.

AC: We have revised the text in the methods section to clarify the processes implemented in the snow module and the principles on which they are based.

RC1: As figure 3 and 4 give clear information on study sites, thus, Table 1 could be moved to supplementary information

AC: We respectfully disagree with the referee's view that Figures 3 and 4 convey the same information as Table 1, and therefore wish to retain Table 1.

RC1: Figure 5, 6 and 7 could be merged into a single figure. It would be helpful to readers see the site-specific features at a glance

AC: In line with the referee's suggestion, we have combined Figures 5 to 7 into a single figure and renumbered the subsequent figures accordingly.

RC1: Table 5: most of information repeated from earlier figures and tables and could be moved to supplementary information.

AC: We believe that Table 5, in addition to the preceding tables containing numerous numerical values, offers a clear overview of the results and the extent to which expectations were confirmed. For this reason, and contrary to the referee's suggestion, we would prefer not to move this table to the supplementary information.

RC1: Several references with missing volume, issue and page, or article numbers, please check them carefully.

AC: Where available, we have supplemented the missing information in the references. Some older articles do not have a DOI.

Report #2 Submitted on 11 Aug 2025

RC2: The reviewed version of the manuscript has improved its quality and clarity. The authors also replied accurately to the comments I raised at the first revision stage. I appreciate the fact the authors supported their replies with extensive references. Regarding the general comment raised at the first revision stage I have no major observations at the authors' replies.

Regarding the specific comments, I appreciate the authors restructured the introduction section by shortening it and by including a figure representing all the processes/factors affecting alpine treeline move. For the comments involving the methodological section the inclusion of figure 2 and the different specifics regarding the model workflow really improved the comprehension and readability of the case study. Maps of the areas and formulas are included as suggested.

Best regards

In the end I would say the authors have done a great job and in my opinion the manuscript can be considered for publication.

AC: Referee 2 had no additional requests for changes.