

Drought responses of a Norway spruce forest on drained peat soil: combining sap-flow sensors, eddy-covariance, meteorological, soil and UAV data (egusphere-2026-568)

Response to review #1

We sincerely thank the anonymous Reviewer and Editor for handling this paper and providing many useful and constructive comments. All the comments have been taken care of, and realized in the updated version as concise additions. This has been one of the best review experiences I have ever had, all the more important in the case of a complex manuscript such as the one we submitted.

Please consider revisiting the abstract to more clearly convey the motivation and significance of the study, as well as its principal conclusions. As currently written, the abstract emphasizes the methodological choices disproportionately and does not provide a sufficiently clear overview of the study's rationale, key findings, and overall contribution. A stronger focus on the broader narrative and main takeaways of the manuscript would help readers better understand the significance of the work.

The Abstract has been revised in accordance with the suggestions.

I appreciate the authors' efforts to address the previous suggestions regarding the study objectives. However, in revising the objectives, the connection between these objectives and the discussion and conclusions sections has become somewhat less clear. I strongly recommend that the authors explicitly relate the discussion of the results to the objectives stated in the introduction, which would help readers better understand how the findings address the aims of the study.

Points related to the objectives and hypotheses were added to Discussion and Conclusions, where appropriate.

While the discussion effectively contextualizes the findings within existing literature, it could be further strengthened by addressing the broader implications of the study and identifying potential areas for future research. Moreover, the conclusions would benefit from a clearer connection to the stated objectives and the main findings of the study.

While I suggest that a broad discussion of potential developments in the field would be outside the scope of this already voluminous manuscript, I added a brief summary in the Section 4.2.3.

I provide specific points below for the authors' consideration.

Abstract:

- The text is still missing the motivation behind the study: why is studying droughts important in Finland or Boreal forests? What questions is this study trying to answer?
- Mention of the Bowen ratio in the abstract is not contextualized, so doesn't help the reader (lines 31-32).
- Conclusion is missing from abstract. Were the findings in line with what you expected, with what your hypothesis was? Please connect the conclusions to the objectives of the study.

The Abstract was modified as suggested.

Introduction

- The paragraph in lines 47-51 seem disconnected from the previous and the next paragraphs. I suggest incorporating the first sentence, between lines 47-48 in the first paragraph, and the sentence in lines 48-51 somewhere in the following paragraphs where introducing this research gap for peat soils makes more sense. The mention of peat soil as it currently stands is disconnected from the text and does not make sense in the flow of the introduction.
- The description of the SPEI is disconnected from the paragraph text (lines 68-70). Why is SPEI important other than as a formalization of drought for plant functioning? Its mention does not add any context for the reader in a usable manner. I suggest moving this to the methods.
- Consider rephrasing the hypothesis in lines 112-115 for greater clarity. For example, consider stating more directly that the contrasting behavior is that the selection-harvested stand will outperform the control block trees, and be clearer about what is meant by "more impaired functioning". Is this about growth, nutrient management? More specificity is better for the reader.
- Please consider rephrasing the second hypothesis in lines 117-120. An objective that "addresses the difficulty to harmonize drought indicators" is a vague description and seems more like a secondary finding than a primary goal, unlike the overview of how drought affects tree functioning, as delineated in lines 124-126.

The requested changes were made.

Material and methods

- A Python package is mentioned in line 280. Please consider adding a citation for the package and providing the Python version used for the calculations for reproducibility.

A citation is added.

- There is a mention of SPEI results in line 282 but that should be kept for the results section. That is not appropriate to include in this section.
- The Bowen ratio calculation is shown in lines 304-309 but still no further contextualization is given. For example, is there a threshold at which a certain ratio will indicate dry conditions? Why is it being used? That is still not clear.

Extra context for SPEI and BR is added.

Results

- Figure 3 is cited before Figure 2. Please consider reorganizing the results discussed to reflect the desired order.
- In the results section, lines 416-420, there is no guidance for the reader in how to interpret the SPEI: why is the summer of 2020 considered average in terms of drought? What value best describes average conditions? Please consider providing clarification here.
- In lines 422-423, it is explained that the days are marked as “no drought”, “air drought”, and “soil and air drought” in Figure 2b. However, that is not clear in the figure itself. Please correct the legend for figure 2b to reflect that. Moreover, please consider a general description for the plots in figure 2. For example, Figure 3 is described as “daily average meteorological and soil variables”, but figure 2 does not have an equivalent description. This helps the reader to understand the goal of the figure.
- Low values of SPEI are mentioned in line 451 but, again, no frame of reference is given. Please consider describing what these low values represent.
- In the description of the Bowen ratio results (lines 458-462), it is still unclear what the values suggest. In the results section, the authors should set the stage for the discussion. Why is the value of 3 or 4 important here? How does that relate to drought? How does that relate to the difference found in CWSI? Explaining the results here will help the reader better understand its implications later on. That is done well, for example, in the first paragraph of section 3.2.

All the requested changes are made.

Discussion

- I suggest a revision of the discussion to address the implications of the study findings in line with the objectives proposed in the introduction.
- What does it mean for the findings to align with what is in the literature?
- Is it possible to hypothesize about the functioning of Norway spruce forests under drier conditions due to climate change?
- Can the study include suggestions about future research that helps address open questions?

Done.

Conclusions

- Please consider aligning your conclusions with the objectives and hypothesis identified in the introduction. For example, in the introduction, it is said that one of the main objectives is to compare the drought response of adjacent stands, but that is not currently included in the conclusions section.

A paragraph on the missing Objective/Hypothesis 1 is added.