

## **General reply**

Dear Referee,

We thank you for the critical assessment of our dataset paper. BorFIT is intended primarily as a training dataset for artificial-intelligence (AI) applications. These applications will thereby improve our understanding of the boreal forest's vegetation reorganization. BorFIT itself already enables 3D spatial analysis of species distribution and stand structure across the circumboreal region. The reviewed preprint provides detailed information on how BorFIT was created, validated, and what the strengths and weaknesses of the dataset are. We agree with the comments regarding the overall clarity and structure of the manuscript and will integrate them when editing an updated version.

Best

Jacob Schladebach

Our response regarding specific comments:

## **Technical description**

We agree with the suggestions to introduce more specificity in the descriptions of the technical setup used for data collection and the limitations of such acquired data:

- “It is very important to make clear here that the source of the data collection is UAV laser scanning (ULS). This gives the user insight into the type of spatial resolution in this dataset. Consider including this information also in the abstract.”
- “Was any checkpoint or other feature used to verify the accuracy of the georeferencing? What is the estimated georeferencing accuracy?”
- “I think the specifications of the GNSS/INS system used and the expected accuracy of the position and attitude estimation for direct georeferencing are much more important here and should be clarified. Also, how the laser scanning system was set up is not clear: frequency used, angular resolution, FoV, angle of aperture, laser divergence, etc. The table with all the specifications of the sensors used is important to facilitate future users' information.”

The manuscript will be amended with average values for the georeferencing accuracy, and we will clearly state the use of UAV-LiDAR. The technical details of the laser scanner are provided in Appendix Table A1.

## **Comparison to other datasets and methodologies**

We especially agree with the need to expand the comparison of BorFIT with other datasets serving similar purposes, as suggested:

- “There are other datasets that provide individual trees, species, and leaf–wood separation, which could also be mentioned, even if they contain fewer samples. Extending the review here would improve the contribution discussion of this dataset and clarify the differences between the proposed open dataset and existing ones, particularly in terms of coverage, spatial resolution, and temporal resolution.”

The introduction and discussion will be extended with more comparisons to highlight BorFIT’s novelty. For example, ForINstance is currently mentioned only in the discussion but will be included in the Introduction to emphasize existing knowledge gaps we aim to close, including focus on circumboreal forests, spatial coverage, and quantity.

- “P1, Lines 27–30: I am not sure if I agree with the authors that this is the most used method nowadays. Some decades ago, yes, but nowadays there are many approaches, and stem detection has increased a lot, especially for boreal forests where the stems are often well visible. However, I agree that canopy-top or stem detection are the most common approaches for tree detection, although there are many other methods for segmenting trees depending on the spatial resolution, for instance, cluster-based ones are also very popular. I suggest mentioning more than one methodology here (‘the most used are’) and linking with some review.”

The introduction will be expanded to include more recent methodologies for individual tree segmentation. However, the key message, that manual segmentation was more accurate in our case, remains.

## **Selection of variables**

- “How were these eleven structural and two spectral variables selected? Could the authors link with previous works that also performed species classification to give more support to the method and chosen features?”

The spectral variables are based simply on what is possible with only RGB data. The structural parameters were chosen to simplify geometric shapes of crowns and point density distribution. The geometric shape fitting was inspired by the study by Qian et al. (2023), “Tree Species Classification Using Airborne LiDAR Data Based on Individual Tree Segmentation and Shape Fitting,” as mentioned in the manuscript. More variables, including intensity, were tested but did not add meaningful value to the random forest performance, so they were excluded.

## **Validation**

- “Regarding data validation, the species classification results could be discussed in more detail, clearly stating which classes users should be more cautious with when using the dataset. Including a table with estimated performance per species could be very helpful.”

A table with species-specific classification errors is provided in the appendix (Tables A2–A5). When editing the updated manuscript version, it will be included in a separate validation section.