

General reply

Dear Referee,

We thank you for the thoughtful assessment of our dataset paper. The boreal forest forms a continuous circumpolar biome, and vegetation reorganization processes transcend regional boundaries. Keeping the dataset unified acknowledges this continuity and supports research on large-scale drivers of change. At the same time, the metadata allows filtering by region, giving users the flexibility to create tailored subsets without fragmenting the dataset.

Nevertheless, we recognize that many users will focus on specific subsets, such as Yakutia in Eastern Siberia with its summergreen larch forests or the spruce-dominated stands of North America. To support this user-demand better as requested, we will update the PANGAEA metadata to include region, expedition, dominant tree species, and the random forest model used for prediction for each file, as we already discussed with the responsible PANGAEA editor. This will enable users to efficiently extract subsets relevant to their research questions.

We also agree with the comments on improving clarity in our descriptions and will address them in the revised manuscript. Find below answers to more critical comments.

Best regards

Jacob Schladebach

Our response regarding specific comments:

Comment:

I disagree that this is the most common approach for segmentation. There's plenty of research on satellite, airborne, and UAV lidar for segmentation, and even imagery-based approaches are more likely to use hyperspectral imagery than just color and IR.

Response:

We agree, that techniques based on true colour and infrared are outdated and other approaches are more common these days. We will update the text to include more recent techniques.

Comment:

I was confused by this segment. You appear to be attempting to describe why the boreal region presents special challenges, but none of these thoughts coalesce into a coherent explanation. Naming individual data sets in this context is similarly confusing. Consider rephrasing to make the challenges of this region more obvious. Suggest introducing BorFIT in a new paragraph.

Response:

The aim of the paragraph is to define the need for data sets, that close the gap between individual tree assessment and large-scale observations. We agree, that the specific challenges of the boreal region should be outlined separately and will edit the paragraph accordingly.

Comment:

Line 71: Please provide more detail about how sites were positioned. Were there formal criteria used or was this more ad-hoc?

Table 1: I have a lot of questions about how sites were selected. Why the large variation in number of point clouds and reference plots per region? Why was Alaska sampled twice?

Response:

The explanation for the site selection will be expanded. As mentioned in the manuscript, the primary positioning of field sites was based on satellite derived vegetation density (NDVI) and change detection, meant to cover different stand densities and fire scars. Further, very-high resolution imagery e.g. ESRI satellite imagery, was used to manually select transects in different forest types and structures. The transects in North America were established along highways and during different expeditions, that reach from the southern mixed forests towards the treeline and tundra. There is one Canadian transect established in 2022 covering especially the tundra and treeline ecotone in the north. Subsequently, the Alaskan transect established in 2023 covering forests and mountain treelines in the regions Southcentral, Interior and Far North, and in 2024 we went to western Alaska to the south of the Seward Peninsula to investigate the westernmost forests and treeline ecotone. During the last expedition included in this dataset (Alaska 2024), we were additionally revisiting formerly investigate sites in Alaska Interior and were additionally establishing new ones in this region. This is the reason why Alaska was sampled twice, at this point. However, BorFIT includes data at each reference plot from on point of time only, and data from Alaska 2024 were not examined the year before.