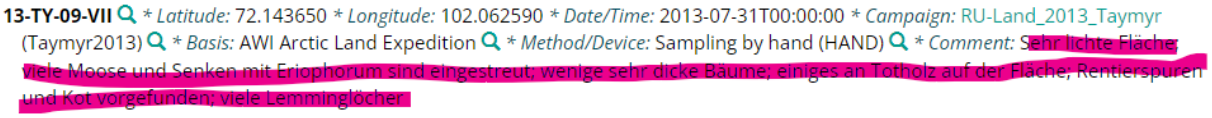
The manuscript *Forest structure and individual tree inventories of north-eastern Siberia along climactic gradients* by Miesner and colleagues is (1) a dataset of forest surveys in NE Siberia, (2) a brief analysis of the data set, and (3) a comparison of the field data to remote sensing products. The data are a truly important contribution to forest inventory data in NE Siberia, which are notably scarce considering the region's large extent and importance to global biogeochemical cycles. The data are reported clearly and consistently, and the methods and analyses employed by the authors are appropriate to answer their study questions.

Below, I detail my comments on (1) the dataset and (2) the manuscript.

Dataset available on PANGEA

In general, I found the data presentation easy to follow. The metadata are easily accessible, columns are defined, and units are easily findable. However, I suggest the following improvements:

- The data are currently organized with the metadata in the same file as the tabular data. This is problematic for reading the tabular data into R. I had to spend quite a bit of time figuring out how to delete the top metadata and then reading the tabular data into R correctly. I suggest I suggest having one file for metadata and one file for data, rather than combing them into one file.
- Within one data file, there are multiple columns with the same name (e.g., 'Plot', 'Tree height', 'Area/locality'), which is needlessly confusing. Some of the column names are very long and include spaces and parentheses (e.g., 'Height quantile [m] (Quantile (25th))'), which can be difficult for working with computer programs. I suggest that data columns be short and unique (e.g., 'Federation', 'District', etc.), or at the very least include an underscore (e.g., 'Location_federation', 'Location_District', etc.).
- Some of the comments in the database are in German; could these be translated into English? For example:



- The term 'Krumholz' is used in the dataset but not discussed in the text. For clarity, I suggest discussing how growth types (tree vs. krumholz) were determined.
- Were the latitude/longitude coordinates taken plot center or somewhere else? Was the WGS84 datum used to collect the coordinates? This information is important for geolocating in relationship to satellite products.

Manuscript

In general, I found the manuscript easy to read and easy to follow. The figures are easily understandable. That being said, the analytical methods (PCA, multilinear regression) need more explanation and in general, the Discussion could benefit from more rigorous analysis. I detail these points in the line-by-line comments below.

Line-by-line comments:

L4: Can you mention how many plots/site?

L 22: '… with much of these forests located in.."

L36-37: Do you mean there only a few inventories? What kind of 'studies' are you referring to here? There are many more papers that deal explicitly with larch dominated ecosystems of Russia, although maybe they are not inventories as defined here. The addition of a few descriptive words would suffice here.

L44-49: While it is true that these aspects are difficult to capture with remote sensing, there have been major advances in this area in the past decade and 'can hardly be captured remotely at all' does not accurately reflect recent advances.

L60: remove 'extremely'

L61: What kind of exceptions (more or less precipitation?)?

L107: Which variables? (Please list in this sentence). Also, there should be a flag in the dataset for whether the variable was measured directly or derived, which I do not see.

L141: "...observations of Landsat images (30 m resolution)."

L144 Specify that the tree cover gain/loss is binary (gained/lost) and not continuous (% lost/gained), as the wording currently implies.

L144-145 'The tree cover loss product is thus derived from the annual forest cover products…" this does not make sense to me, since there is not an annual tree cover product published by Hansen. The only annual product is loss/gain.

L154: Delete 'however'

L151: Is the value 100/no data relevant to this analysis? These specifics seem unnecessary.

L155: More information is needed about how the PCA was conducted. What package in R? Were any data transformations performed prior to ordination?

L158: More information is needed about how the multilinear regressions were performed. Were variables checked for the assumption of normality? Were variables removed for collinearity? How was the best model selected? Were the residuals checked for homogeneity of variance, etc. Why were univariate regressions performed in addition to multivariate? (I see no reason to perform a univariate regression when multiple predictor variables exist.) Which R packages was used?

L162: It is unclear to me what you are assessing with the t-test. As written, it implies you determined the sites with recent tree cover loss with a t-test, but on what? And doesn't the Hansen data show tell you that directly?

L169: Are these double inventoried trees flagged in the data? How can we distinguish them?

L172: delete 'only' and 'while 60 do not.'

L173: Presenting these numbers as percentages rather than absolute numbers would aid the reader in understanding.

L176: change to 'the two *Larix* species never occur…'

L179: delete 'only' and 'up'

L198: It is not clear to me why these plots were singled out. Are they representative of other plots? Instead of discussing these individual plots, I suggest discussing the meaning of the average Gini coefficient and whether you saw any regional differences in the Gini coefficient. Figure 5 is not discussed at all in the text, and this would be a good place for it.

L212: Re-word to say that *Pinus pumila* and *Salix spp.* occur more frequently between 65N and 70N.

L217: Which variables were highly correlated with the first (and second) principal component(s)? As written, the PCA plays a very small role in this paper, so you could consider deleting.

L223: I suggest focusing on the variables with statistically significant relationships rather than the R^2, which is likely to be quite low given how noisy ecological field data can be. One idea would be to update figure 7/this section to only include significant relationships, as determined by the properly selected multilinear model. This will draw the reader to which variables are important.

L227: A multilinear model is more relevant than individual regressions. When properly implemented, you can control for collinearity and report which variables are statistically significant. An R^2 of 0.356 is not unreasonable.

L240: Appendix is missing an A

L242: ORNL DAAC is the hosting service. Chen et al. is the correct citation.

L242: Does the field data at these 6 sites indicate there has been a stand replacing fire over this period? (i.e., does the field data corroborate the remote sensing data)?

L243: Does the Hansen data set also show losses where there have been stand replacing fires?

L243: This wording is unclear. Do you mean that there are 5 plots where Hansen shows forest loss and Chen at al do not? What do the field data say about those plots?

L247: Regarding the plots where dead trees do not contribute a relevant amount of the basal area, was there evidence of logging at these sites? Or perhaps the dead trees are not standing but fallen? This information is helpful in determining how well the Hansen data represent what is happening on the ground.

L257: delete 'very'

270: Here, a distinction should be made between the landscape-scale distribution (all plots combined), which seems to be close-to exponential, and the stand-level distribution (looking at

plots individually), which are not. It makes sense that at the landscape-scale, we would see continuous recruitment, but at the stand-scale, recruitment may be more episodic, likely in response to fires.

L275: Is there reason to believe that different species should NOT have different allometries? I thought the expectation is that allometries are species-specific.

L275: You may be able to determine if allometries for larch or pine vary by climate. For example, Berner et al., 2015 found that in some (but not all) species, boreal shrub allometries vary by ecoregion.

L276: What are the sample sizes?

L277: It should be fairly straightforward to calculate the relationship between the derived DBHs and your measured heights in a way that is comparable with data from the literature.

L293: Is this Santoro et al. (2018) a or b?

L293: Please give some context for the Santoro et al. (2018) sentence. What data set are they working with or assessing?

L300: What about logging by local communities?

L310: Extend = extent

L315: Reporting results from the multilinear model is more relevant here. Using model selection including variance inflation factors will help you get rid of variables that are collinear.

L319: Did you preform proper model selection? It seems that January temp may be too highly correlated with July temp and/or not important enough to be included in a multiple regression model.

L326: Please include a reference for this; Dobricic et al., 2020 or Collow et al., 2022 discuss extreme events, but please also include a reference for increasing drought stress.

L332: How can the reader access this additional data?

L339: The wording implies that the Potapov data set is expected to be released soon, but the citation says it was published in 2020.

L339: Please describe what the Potapov paper is about.

L343: aastern = eastern?

<u>Figure 2:</u>

-Please include the definition of DBS and DBH in the caption.

-It is difficult to see the colors of the different species groups. Can you make the circles in the legend bigger? Perhaps also just a little bigger in the graph.

-The term ‘krumholz’ appears in this figure but nowhere in the text. How is it defined here?

-Are the allometries here just for larch krumholz and not for larch trees?

-For the density allometries, are the different colored lines different quartiles? It seems like the bright yellow one (highest density) is not fit to any data (there are no bright yellow points, especially as height increases). It also seems like the high density line (yellow-grey) is below the low density (dark purple) and medium density (purple grey) lines but the highest density (bright yellow) line is above all of them. Why would this be (i.e., why isn’t there a negative progression from low to medium to high to highest)?

-In caption, can you clarify that the regression lines in the bottom graphs are for illustrative purposes only, because you used stand density as a continuous variable (rather than binned) to calculate DBH and DBS (or at least, this is what I understand from the methods)?

Figure 5: This figure is not discussed in the text. Also, please make the legend and entire plot larger for enhanced readability.

Figure 6: It is not clear to me what this plot adds, and it is not discussed much in the text.

Figure 8:

-Please report R^2 and p-values for both plots.

- Please discuss (in the text) what it means that the data fit better under the logarithmic transformation.

References

Berner, L. T., Alexander, H. D., Loranty, M. M., Ganzlin, P., Mack, M. C., Davydov, S. P., and Goetz, S. J.: Biomass allometry for alder, dwarf birch, and willow in boreal forest and tundra ecosystems of far northeastern Siberia and north-central Alaska, 337, 110–118, https://doi.org/10.1016/j.foreco.2014.10.027, 2015.

Collow, A. B. M., Thomas, N. P., Bosilovich, M. G., Lim, Y.-K., Schubert, S. D., and Koster, R. D.: Seasonal Variability in the Mechanisms Behind the 2020 Siberian Heatwaves, 1–44, https://doi.org/10.1175/JCLI-D-21-0432.1, 2022.

Dobricic, S., Russo, S., Pozzoli, L., Wilson, J., and Vignati, E.: Increasing occurrence of heat waves in the terrestrial Arctic, 15, 024022, https://doi.org/10.1088/1748-9326/ab6398, 2020.