



Comment on **essd-2022-152**

Anonymous Referee #2

Referee comment on "Forest structure and individual tree inventories of north-eastern Siberia along climatic gradients" by Timon Miesner et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-152-RC2>, 2022

The paper by Miesner et al presents a database of forest surveys distributed across a large area characterized by ecoclimatic gradients in northeastern Siberia. This geographic region has important influences on global carbon and energy dynamics due to its large area and sensitivity to climate change. Despite this importance there is a relative paucity of freely available and easily accessible data that can be used to inform observational and modeling studies. From this perspective, this manuscript describes an important dataset that is worthy of publication and dissemination. Some revision is required before the paper and data can be considered further for publication.

The overall structure of the manuscript is appropriate. The data are described reasonably well, and the comparison with various gridded data products is useful for understanding the utility and limitations of the data set. There are a number of areas where additional detail and/or discussion are warranted. Some of these are noted in my specific comments below, but in general the discussion seems a bit superficial. In particular, it would be useful to have a deeper discussion of errors associated with the use of height as the primary unifying measurement, as well as the visual estimates of height. To my mind, DBH is a more common and useful metric than height, and seems an easier measure than the several required to triangulate height using a clinometer. Related, it seems that there is a high potential for error, that is hard to quantify, associated with the visual estimates of height. More critical discussion here would be nice.

Regarding the data, I found the files a bit unwieldy to work with. There is a lot of awkwardly structured metadata at the top of each file, before the actual data, making it difficult to read the files into a program like R. There also seems to be some redundant data here, in terms of site names, campaign, PI, etc. It may be more appropriate to have separate metadata files in order to make the data more user friendly/analysis ready.

These are primarily suggestions - having the data described and available is important, and this paper accomplishes that. The edits/revisions I suggest would improve the utility of the data set.

Below are a number of specific/minor comments, more editorial in nature.

L120: Perhaps Gridded Data Products would be a more appropriate term here. The CHELSA data is downscaled reanalysis/climate data, not a remote sensing data set.

L161: What variable is suitable for comparison with biomass? A little more detail/information here would be nice.

L242-3: Are the field data consistent with this? Are vegetation conditions consistent with recent disturbance?

L246: Areas with tree loss in the Hansen data set hold more standing dead than those without? Please clarify.

L247: Plots indicated as having forest loss do not have any disturbed trees? Please clarify.

L256: It would be good to discuss in a bit more depth the error implications of visual height estimates. Also, since DBH is a common measure that is often allometrically related to height, biomass, LAI and other ecologically important processes it would be good to discuss the tradeoffs associated with using height instead.

L261-4: These sentences are almost too vague to be helpful. What does it mean that the plots are not weighed accordingly? I'm not sure what the last sentence is supposed to mean.

L270-1: Are there any patterns here, geographic or otherwise? Are sites recently affected by fire indicated in the database?

L288-9: What about variables produced at 30m resolution? How to explain the mismatch for these?

L311: Extend should be extent

L325: See also papers by Kropp et al and Walker et al for evidence of drought stress in Siberian larch.

L349: I didn't think the WorldClim data set was used in this study, please correct/clarify.

L355: I'm not sure this conclusion warrants a stand alone paragraph.

Figure 2 - panels should be labeled a, b, c, etc. and referred to as such in the text.

Figure 4 - it would be helpful if the figure capture indicated that these specific plots were selected to show examples of different size class distributions.

Figure 7 - are all of these results significant, and if so to what level?

Kropp, H., Loranty, M., Alexander, H. D., Berner, L. T., Natali, S. M., & Spawn, S. A. (2017). Environmental constraints on transpiration and stomatal conductance in a Siberian Arctic boreal forest. *Journal of Geophysical Research: Biogeosciences*, *122*(3), 487–497. <https://doi.org/10.1002/2016JG003709>

Kropp, H., Loranty, M. M., Natali, S. M., Kholodov, A. L., Alexander, H. D., Zimov, N. S., Mack, M. C., & Spawn, S. A. (2019). Tree density influences ecohydrological drivers of plant–water relations in a larch boreal forest in Siberia. *Ecohydrology*, *12*(7), e2132. <https://doi.org/10.1002/eco.2132>

Walker, X., Alexander, H. D., Berner, L., Boyd, M. A., Loranty, M. M., Natali, S., & Mack, M. C. (2021). Positive response of tree productivity to warming is reversed by increased tree density at the Arctic tundra-taiga ecotone. *Canadian Journal of Forest Research*, *cjfr-2020-0466*. <https://doi.org/10.1139/cjfr-2020-0466>