EGUsphere, referee comment RC1
https://doi.org/10.5194/egusphere-2022-79-RC1, 2022

Comment on egusphere-2022-79

Anonymous Referee #1

Referee comment on "Delineating the distribution of mineral and peat soils at the landscape scale in northern boreal regions" by Anneli M. Ågren et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-79-RC1, 2022

Ågren et al. map the spatial distribution of peat soils and organic layer thickness in Sweden using an existing soil moisture map and national-level field inventory data. The manuscript is well written and mostly sound, but I was left partly confused when reading the manuscript. I have the following major points

- Why did you predict thickness of organic layer based on soil moisture map and not from the original predictor variables that were used to produce the soil moisture map? This seems to be quite odd as there is now double uncertainty in the estimates, as the prediction of soil moisture was already a little uncertain. You should justify your approach better. It would be also interesting to compare different predictor variable sets (e.g. topography variables, satellite imagery etc.) to produce the thickness of organic layer and not just use one existing map.
- Based on Figure 4, the fit of the model between soil moisture and organic layer thickness is not very good. This should be discussed in more detail. Actually, there has been a lot of discussion that R2 should not be used for nonlinear regressions. You should justify why you evaluated model performance with R2 and you should also report how you calculated R2.
- Precision was lower in your map than in the topographic map. It seems that your mapping approach seems to overpredict peatlands, at least to some extent. This seems to be the case also when visually interpreting the material in Figs. 5 and A1 and looking at the information in Table 3. This should be accounted for and discussed in more detail. You could discuss e.g. why your approach seems to overpredict the extent of peatlands and overestimate thickness of thin organic layers. The overestimation of thickness of thin organic layers is probably due to the selected cubic model. You could potentially also use other (non-linear) regression models and discuss the pros and cons of different models.

Additionally, I have the following more detailed but mostly minor comments:

Abstract:

- Please remove the first sentence. It is not necessary.
- l17-19: it is not needed to report the results from an existing study. Please rephrase and shorten the sentence
- l25: please report also the precision results
- l28: "peatlands visible from airplanes" could be written "peatlands that can be visually detected from aerial imagery"
- l29: delete "most importantly"

Introduction:

- l80-87: the direct quote is unnecessarily long. Do you need to include it?
- l113: is the fourth objective necessary to include?
- l114: write "study provides a guide to map…"

Methods:

- l142-155: this paragraph could be shortened as it describes results from an earlier study, not the methods of this study
- Did you account for spatial autocorrelation when e.g., constructing the model and dividing the calibration and validation datasets?
- l195: This is difficult to understand. Does it mean that 1:25 000 map covers 1.7% of Sweden and so on?
- Why did you include the used accuracy metrics? Kappa has been heavily criticized (see e.g., https://doi.org/10.1016/j.rse.2019.111630). You could also have included F-score.
- Section 2.6: How were the field inventory datasets upscaled? Does this simply mean that you calculated national level statistics from the datasets using different methods?

Results

- the heading of 3.4 could be changed. Should it be "visual interpretation of peatland maps"?

Discussion and conclusions

- l375-376: This is misleading as you used ALS data very indirectly.
- l460: you write multiple times that the map should not be taken literally. It is not necessary to mention this multiple times.
- The section “The novelty of the developed maps” could be shortened and merged with conclusion section. Some text can also be moved to other parts of discussion.
- l509: delete “coarse”, “global mapping” is sufficient.
- l504-510: Sentinel-2 has 10 m resolution and it surely can be used for quite detailed planning. There is also other remote sensing than just ALS data that can be used in detailed planning.