

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
<https://doi.org/10.5194/hess-2021-560-RC2>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on hess-2021-560

Anonymous Referee #2

Referee comment on "Predicting soil moisture conditions across a heterogeneous boreal catchment using terrain indices" by Johannes Larson et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-560-RC2>, 2022

General comments

The manuscript rigorously compared the prediction of soil moisture maps via Digital terrain analysis. To this end, the authors made predictions using nine different terrain indices in combination with the available soil wetness maps, at varying resolutions and user-defined thresholds, with a field dataset of soil moisture registered in five classes from a forest survey covering a boreal landscape in Sweden. It's a cliched but intriguing research topic with new findings that perfectly align with the journal's scope. The manuscript is generally well-written; however, brevity and flow are missing which makes it rather verbose. The artwork is legible and flawless. However, I have some minor concerns regarding some sections.

Fatal flaws

The manuscript neither identifies the gap broadly in the scientific knowledge nor adds new knowledge to the overall body of scientific understanding. The novelty is based on the fact two recent studies (Abowarda et al., 2021; Ågren et al., 2021) of the same nature study area (Sweden) were flawed because the selected model for high-resolution terrain indices was restricted to 16000 plots and 28 maps, while the latter used machine learning which is prone to a vague combination of multiple resolutions and thresholds. Please further elaborate and align the flaws in the direction of gaps which you have covered by this study.

The abstract is general, please explain your robust findings to the readers as a take-home message. Please explain the freezing temperature range, duration, minimum tree height and canopy cover as this feature explain the boreal forests.

The discussion must be strong enough to support your findings. In its current form, it way weak and only convinces the readers regarding the consistency of findings with previously observed results. Please focus on the differences in climate, landscape types and soil texture, and terrain indices.

Figs. 2 and 3 are excellent but I would suggest combining these two figures for convenience. It will help the readers to understand the performance of each index. Similarly, please explain all details of the concerned figure once and all, the switching confuses the readers.