Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2022-121

Anonymous Referee #1

Referee comment on "Estimating leaf moisture content at global scale from passive microwave satellite observations of vegetation optical depth" by Matthias Forkel et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2022-121-RC1, 2022

The manuscript "Estimating leaf moisture content at global scale from passive microwave satellite observations of vegetation optical depth" presents developing a global scale LFMC estimation model using vegetation optical depth from passive microwave satellite data. Although LFMC is well known to be a critical component on estimating wildfire potential, little studies have been done on global studies yet. The large target region makes this study unique compared to the previous studies focusing on regional or local scale. Authors reasonably well deliver the new LFMC model development process. However, there are a couple of major concerns described below.

Major comments

- Section 2.6: authors employed 4 models (Model A to D). Where those models come from? Do authors created those equations or from previous studies? If so, it needed to be specified the references of each model.
- Authors used random forest model to find out parameter of Model B. Have you tried RF model for the global LFMC model? It looks like utilizing RF model directly for the LFMC estimation is more reasonable and may show better model performance.
- Section 3.3.1: Model performance looks fine overall. However, the needle-leaved tree has specifically poor performance. This is not because of your model calibration issue but non-linear relationship between soil moisture and vegetation moisture of needle-leaved trees. Do you think it is necessary to include this type of vegetation on LFMC model based on VOD?
- Section 3.4: One of the important roles of the coarse resolution with global scale model is to show the large-scale spatiotemporal patterns. However, global LFMC model validation using seasonal variation at single year is not enough. (e.g. Fig.8) It need to be shown that model can represent the continent levels interannual anomalies such as multi-year drought cases in the western US, Australia or other regions.

Minor comments

- Figure 3 x-axis label is confusing. Change [0,20] to 0~20%.
- Line 710 “procuts”