

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2021-426

Anonymous Referee #1

Referee comment on "A map of global peatland extent created using machine learning (Peat-ML)" by Joe R. Melton et al., Geosci. Model Dev. Discuss.,
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The authors provide a peatland map that was realized using a machine-learning approach. Data that were used to inform the mapping exercise include climate, soil, and remotely-sensed vegetation, and geomorphology/terrain. The model was trained using existing areas of peatland vs. non-peatland that were previously mapped by others. I very much enjoyed reading the manuscript. The literature background is well informed and the methods are described with sufficient details, in addition of being sound. I must say that I am not an expert on machine learning, so I cannot comment on this aspect of the study. An important result is the list of predictive features for peatland presence; I am particularly glad to see geomorphological landform and terrain slope as the most important ones. It reassures me to see these results, as they make intuitive sense and relate well with field observations, even though these localized landscape features may be challenging to represent in a model. The regional map products are well described and contrasted with existing literature. Likewise, the qualitative discussion on regional results is sound; in particular, I appreciate the authors' acknowledgement of limited ground-truthing data across the tropics as well as the dynamic ecohydrological processes operating across the tropics, which may limit confidence in their results and/or the power of their ML approach. Lastly, the model limitations are clearly spelled out.

I recommend publication of this manuscript as is.

Reviewer: Julie Loisel