

Comment on **essd-2021-428**

Anonymous Referee #2

Referee comment on "A 1-km daily surface soil moisture dataset of enhanced coverage under all-weather conditions over China in 2003–2019" by Peilin Song et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-428-RC2>, 2022

The authors present a downscaled soil moisture product, which combines the advantages of a 36-km resolution passive microwave remote sensing product with a 1-km resolution MODIS LST product. Such high-resolution soil moisture is very important for agriculture and water resource management. The manuscript is generally well-organized, I suggest accepting it with considering the following revisions:

1. The quality of the figures should be improved. Currently, some legends are too small to identify.
2. Fig. 7. was not used in the main text.
3. Also in Fig.7., it shows that the original PM SSM almost does not have any data in the winter season on the Tibetan Plateau. It is reasonable since, in the winter season, the soil is frozen and generally covered by snow, and then it is difficult for microwave remote sensing to identify soil moisture. However, as shown in this figure, the new 1-km downscaling product has some soil moisture data. How did it come? What did the soil moisture value during this season on the Tibetan Plateau mean? How about the accuracy of these downscaled SSM?
4. It is recommended to draw some time series of the soil moisture products, the new one, the original one, and SMAP high resolution one, on several stations, to demonstrate the advantages of this daily 1-km product.