Earth Syst. Sci. Data Discuss., referee comment RC1
https://doi.org/10.5194/essd-2022-21-RC1, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on essd-2022-21

Anonymous Referee #1

Referee comment on "An in situ observation dataset of soil hydraulic properties and soil moisture in a high and cold mountainous area on the northeastern Qinghai-Tibet Plateau" by Jie Tian et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2022-21-RC1, 2022

Review of "An in situ observation dataset of soil hydraulic properties and soil moisture in a high and cold mountainous area on the northeastern Qinghai-Tibet Plateau" submitted to ESSD by Tian et al., 2021

The authors provided datasets of soil properties and long-term soil moisture over the Qilian Mountain based on in-situ observations. The dataset is very useful and important to help the scientific community to understand the soil hydrological processes, to improve the land surface modelling and to develop the soil moisture products over QTP. As the field sampling of profile soil samples and long-term maintenance of soil moisture stations over large scale mountainous areas is difficult, led to the scarce of the large scale in-situ SHP and SM dataset over QTP. Overall, this is a clearly written paper and the structure of the manuscript is well organized. The manuscript can be accepted after addressing my following questions.

Major comments:

- **For the dataset, the spatial distribution of the soil properties datasets has been made public. Besides, it's suggested to upload the representative original measurements of the soil properties (e.g. the key SHP datasets for the main land covers), which can be applied for large-scale modelling and ecohydrological study easily. I also noticed that the number of different soil properties varied at different layers. Please add the detail instruction of the specific number of each soil properties, which is important for its application.**
- **Table1: Why the observed profile SHP is calculated as the average of the surface SHP and subsurface SHP? In my opinion, it should be calculated using the depth-weighting method. The different calculation of profile SHP will influence the validation of profile soil datasets.**

- **From Figure 6 I can find that the spatial distribution of different soil properties is generated through different method, such as the ordinary Kriging method, the Cokriging method, and the Inverse Distance Weighted method. In my opinion, the different spatial pattern of soil properties can also be caused by the different methods. What's more, what's the spatial resolution of the soil properties dataset?**
- **Please notice that the spatial resolution of different SHP datasets or SM datasets are different, which will influence your validation. Please discuss it in the manuscript. Besides, the authors are suggested to validate the three SM products at daily scale instead of monthly scale.**

Detailed comments:

- **L11: Please change the "describing and predicting" to "describe and predict"**
- **L18: Please delete the "of" before "SM".**
- **L35: Please change the "Earth" to "earth".**
- **L41: Please change the "soil-sampling" to "soil sampling"**
- **L42-43: Please rewrite the sentence.**
- **L50: I think "and" should be replaced by "especially".**
- **L51: Please use the abbreviation "SHPs" replace the "soil hydraulic properties"**
- **L52: I think that "individual" should be replaced by "different".**
- **L60-61: The statement is unclear, please rewrite the sentence.**
- **L68-69: The statement is unclear, please rewrite the sentence.**
- **L72: Please change the "soil-property" to "soil property".**
- **L83: Please change the "land-cover" to "land cover".**
- **L95: Please check the name of the dataset, we can't find the dataset in the website.**
- **L99: please delete the "mountainous"**
- **L106: It should be "study area"**
- **L109: Please change the "long-term" to "long term"**
- **L115: "Since the soil freezes in winter, SM data are only available for the growing seasons (May to October, Tian et al., 2019)". Why only the SM data are only available for the growing seasons? I think the ECH2O 5TE probe can measure the liquid soil water content during winters.**
- **L122: Please delete the "a" before metal cylinder.**
- **L131: You have mentioned the size of the cylinder above, no need to mention it again.**
- **L145: Please delete "," after "(also written as cm H2O)"**
- **L171: What is the specific depth of the surface layer and subsurface layer?**
- **L178: Please delete "types" after product.**
- **L201: Please unify the format of "CV" in the manuscript.**
- **L228: The parameter "l" should be n.**
- **Table3: What is log10Ks, please explain.**
- **L248: It should be Figure5, not Figure4.**
- **Figure7: The unit of bulk is wrong, please correct it.**
- **L314: Please change the "full profile SM" to "profile SM"**
- **L315: Please change the "or" to "and"**
- **L311: It's Figure 10 not Figure 11.**
- **L333-334: Please check the value of spatial CV and temporal CV.**
- **Figure 9: Please check the legend of the soil moisture value.**

- **L353: What is the equation of NRMSE?**
- **L359-362: It's better to move this sentence to the end of next paragraph.**
- **L361: What's the performance of ZhangYG dataset?**
- **Figure 12: Please add the unit of the soil moisture**
- **L401: Please check the format here.**
- **L421: Please delete the "of after "understanding".**
- **L428-L429: This paragraph is the discussion about soil moisture, please delete the "SHP"**
- **L442: Please change the "some" to "different".**