

## Comment on **essd-2022-254**

Anonymous Referee #2

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Referee comment on "ChinaCropSM1 km: a fine 1□km daily soil moisture dataset for dryland wheat and maize across China during 1993–2018" by Fei Cheng et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-254-RC2>, 2022

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This study provides a longer term soil moisture dataset (ChinaCropSM1km) for crop drylands across mainland of China. ChinaCropSM1km perform better than public product in both higher accuracy and more details (daily, more soil layers) by using machine learning technology. Such soil moisture dataset with higher resolutions is very valuable for the studies on crop model, yield estimation, and climate change impact assessment. Moreover, their methodology is robust, and their interesting results were well interpreted. The irrigation module is a novel way to improve highly moisture estimation. Therefore, I recommend it can be accepted after a minor revision.

Comments and suggestions:

- There is a problem with the resolution. The ground observation data is point measurement data, how to match the resolution of 1km? Please explain this in the manuscript.
- Section 2.1. The authors pointed out that the study area is dominated by dryland crops (i.e. wheat and maize) in China, how was the Chinacropland layer defined in Figure 1 according to the annual crop harvested area in mainland China from 2000 to 2015? please describe the details.

- In (1), the author judges the irrigation factors by comparing the observed soil moisture and the soil moisture evaluation index (SMI) according to the corresponding soil depth and phenology of crops. However, I notice that the SMI in Table 2 is a range, rather than an exact number. Please give reasonable explanation for this.
  
- In section 2.3.2, considering the new SM product has been derived by integrating the irrigation module into SM model, it is better to evaluate accuracy of the module (irrigation factor forecasting model) and supply such important information into new edition.
  
- Some typos are found in manuscript, and check manuscript carefully and correct them. e.g. Line143: delete 'in China'.
  
- Figure 2 should be improved. Currently, some labels are too vague to clearly identify.
  
- Please modify the line widths in Table 2.
  
- Line257: insert blank between two words. 'Figure8' -> 'Figure 8'.

- Figure S5 was not used in the main text, please cite it in main text or delete it from supplemental material.