I see that the authors have addressed several major concerns raised by the other reviewers. The paper is already in good shape and suitable for the journal, with only a few minor comments from my side related to data operations:

Response:

The authors gratefully appreciate your positive comments and valuable suggestions. We have carefully considered your comments and have responded as follows. The revised content is marked in red in the response.

The availability of an open-access soil moisture dataset with higher spatial and temporal resolution is desirable for both the Ag sector and the Earth system science community. My main concern is the long-term sustainability of the dataset. The current dataset covers the historical period from 2015 to 2023. Will data for the most recent years be made available in the future? The manuscript lacks a discussion on the sustainability and future availability of the dataset, which is crucial for readers who intend to reuse or build upon this work.

Response:

Thank you for the comments. We agree with the reviewer's view that the sustainability and future availability of the STF_SSM dataset are significant. As a result, we have modified Section 4.2 to illustrate this point further.

Currently, we have contacted the USGS data repository and transferred the available data. After review, the STF_SSM dataset will also be available on this platform. If this or any other platform requires us to update this dataset in real time, we are willing to do that too. In addition, we have opened the code at https://github.com/hhhhhaoxuanyang/STF_SSM-dataset.git for researchers who need it.

Lines 553-557

Due to a data-driven approach to production, real-time updates of the STF_SSM data have unavoidable latency time. This is because the latency time of the STF_SSM dataset depends on that of other auxiliary data. According to the investigation from the official website, the near real-time SMAP L4 SSM product and Crop-CASMA SSM dataset usually have three and two days of latency, respectively. Thus, if only available data within the year are adopted to update the STF_SSM data, the latency time of the near real-time STF_SSM scene is at least three days.

It is good to know the paper used soil moisture data products on Crop-CASMA as inputs and benchmark data. While Crop-CASMA is designed primarily to support USDA NASS operations and is produced operationally during the growing season, it is important to discuss how the new dataset can be used in more real-world applications (like near-real-time crop condition monitoring) beyond historical analysis. Meanwhile, I recommend including a data management plan and ensuring code availability in the manuscript, especially given its submission to a top data journal.

Response:

Thank you for the comments and suggestions. We admit that the application prospects of the dataset deserve further exploration. Hence, we have revised Section 4.1 and added some potential applications for SSM in agriculture in the future, such as irrigation management and crop yield estimation.

Furthermore, we are waiting for the review of the dataset by USGS data repository. If it goes well, our dataset will be published in UUSGS data repository for free access. The code has been opened at https://github.com/hhhhhaoxuanyang/STF_SSM-dataset.git.

Lines 530-536

It is clear from the mentioned cases that SSM information is closely linked to drought and flooding. This suggests that SSM can be applied to identify these events and quantify their severity. Thus, the developed STF_SSM dataset has great potential for application, especially in agriculture. For instance, near real-time crop conditions could be observed directly by dynamically monitoring SSM. It will provide a rational basis for refining irrigation management. In addition, SSM information with fine spatio-temporal resolution also has the potential to play an important role in crop yield estimation.