

Dear Reviewer #1 (RC1)

Thank you for your comments and suggestions. Based on your suggestion, I have made certain revisions to the manuscript. We will answer your question is divided into several sections:

Uncertainty. In order to improve the simulation accuracy, we have tried many machine learning methods in the early stage, and chose a more representative method to describe in the manuscript. And we also found that tree classifiers, especially XGB, have significantly better performance and efficiency compared to other classifiers.

In order to improve the accuracy, we set 16 days as a regression period. It reduces errors caused by poor timeliness of dynamic variables (such as NDVI and EVI) and little valid data for one day.

In order to verify the accuracy of our data, in addition to the limited in-situ observed soil moisture data and precipitation data, we also compared the data with some mainly existing reliable gridded soil moisture product, such as SMAP L2 SM (1 km and 3 km), GCOMW/ASMR2 SM (0.1°), C3S SM (0.25°), ERA5 SM (0.1°) and FLDAS SM (0.1°). It turns out that the data we produced has obvious advantages, which are mainly reflected in three points. First, the value of our data is generally in the middle of these products, and it is also relatively close to the in-situ measured values (see Figure 8). The second is time series. The product we produced generally has more valid data compared to other products, and its variation range is more reasonable than several other products (see Figure 9). The third is the spatial distribution of these products. Our products present a better spatial pattern of soil moisture, which is close to the actual situation, and its high spatial resolution makes some information displayed more clearly than other products (see Figure 11). Of course, the description of uncertainty in the manuscript is not detailed enough. We will try to modify this part of the content.

DOY is the day of year. Since all MODIS products use this Julian date, this manuscript also names the data in this way for convenience. This dataset is freely available at <https://doi.org/10.6084/M9.FIGSHARE.16430478.V5>. We will describe it in detail in the manuscript.

In addition to what has been described above, we have also made extensive revisions to the paper. For example, the comparison of grid SM products with in situ data was added to verify the accuracy of our products. Please see the modified version.

Looking forward to your next suggestions. Thank you!

Sincerely!

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