

## Comment on hess-2022-135

Anonymous Referee #2

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Referee comment on "Long-term reconstruction of satellite-based precipitation, soil moisture, and snow water equivalent in China" by Wencong Yang et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-135-RC2>, 2022

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This manuscript reconstructed a long-term precipitation data set using a stacking machine learning model according to MSWEP and CGDPA, and at the same time reconstructed long-term soil moisture and snow water equivalent data sets using the HBV model. The reconstructed data ranges from 1981-2017 and with a high spatial-temporal resolution, i.e. a 0.1 degree spatial resolution and daily temporal resolution. The results show that the data has a high reliability, especially the precipitation data. It provides valuable products across China for meteorological and hydrological domains, such hydrological modeling, assessing the hydrological response under climate change and etc. The manuscript is well-organized and well-written. It is suitable for Hydrology and Earth System Sciences. Therefore, I recommend a minor revision.

Detailed comments:

1. The spatial data used in this manuscript has different units, namely degree and km. Especially, the variables with different units, including precipitation, soil moisture, snow cover, and snow depth, were used for calibrating and validating HBV model. It isn't clear which geographic and projected coordinate systems were chosen and which unit were used for calibrating and validating.
2. Two types of precipitation, namely CMPA from 2008 to 2014 and CMPA\_1km from 2015 to 2017, were used for machine learning model. The uncertainty due to the precipitation inconsistency should be discussed.
3. The abstract stated "the short-term 0.1o CMPA", and I suggest clarifying time frame on the short-term.
4. On the names of the nine major river basins of China, I suggest replacing the Southwest Basin with the Southwest Basins, and replacing the Southeast Basin with the Southeast Basin, since either of them includes more than one basin.