ESSDD

Interactive
comment

Interactive comment on "WHU-SGCC: A novel approach for blending daily satellite (CHIRP) and precipitation observations over Jinsha River Basin" *by* Gaoyun Shen et al.

Anonymous Referee #3

Received and published: 21 February 2019

The manuscript presents a new method for combining high-resolution daily satellite precipitation estimates with rain gauge observations. The method is applied and evaluated over the Jinsha River Basin for the summer period in 2016 (June, July August). The performance of the method is compared to already existing satellite datasets CHIRP, which is also the base for the new dataset, and CHIRPS. The evaluation reveals an improvement in accuracy of precipitation estimates with rain rates of less than 20 mm per day compared to CHIRP and CHIRPS, however, the chosen time period of just 3 months seems to be rather short for this somewhat general conclusion. For heavy precipitation, however, no improvement could be found. The dataset and the blending method are described and the data is available for free.

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Discussion paper

The manuscript fits in the scope of ESSD, but some issues need to be addressed. I recommend taking the following suggestions and comments into account:

1. It is not quite clear to me what exactly is the reference dataset in this study. On page 6, line 170 the authors state that 70% of the total gauged stations and gridded points were used as the training dataset and the remaining 30% serve as reference dataset. How was decided which station / grid point was used for training and which station / grid point was used for evaluation? As I understand it is a mixture between actual station measurements and gridded, i.e. interpolated, station data. Is the ratio for both data types also 70% training and 30% reference data points? Is there a difference in performance metrics when only one of the two datasets is used for evaluation? Direct measurements from stations might be even more accurate than the interpolated data. A more detailed description of the reference dataset and decision making process is desirable, e.g. a map with the mean or the sum of precipitation during the observation period at the reference grid points and stations.

As far as I understand, using this evaluation dataset implies that only C1 and C2 grid points are evaluated, because they contain either a rain gauge station or a grid point of the interpolated station data. Is that correct? Can the authors give an assessment on the quality of the method at C3 and C4 pixels?

Does the selection of the stations and grid points for training have an influence on the model performance? Depending on the location of the points for adjustment the quality of the blended dataset may vary. An ensemble study using different compositions of the pool of training stations / grid points would give statistically more robust results.

2. CHIRP data is used as basis for the WHU-SGCC dataset and it is shown that the blending approach leads to better (light and moderate rainfall) or similar (heavy precipitation) results compared to measurements. CHIRPS, however, seems to perform much worse than the original CHIRP dataset although it is also adjusted to rain gauges. Can the authors give an explanation for that? It would also be desirable to expand the

investigated period to get more robust results, e.g. add more summer seasons from other years.

Specific comments:

- P.1, L.37: There is twice "without adjustment" in the sentence

- P.2, L.63 and 65: Remove the brackets at Bai et al. and Trejo et al.

- P.3, L.89: Section 5 is about data availability. Section 6 presents conclusions

- P.3, L.102-103: I'm a bit confused here. Does "average annual precipitation", "annual precipitation" and "total annual precipitation" mean the same thing? Or is the total (for me this refers to the sum) of the precipitation north of Shigu almost four times smaller than the mean annual precipitation in the whole Jinsha River Basin?

- P.6, L169: I would remove the numbering here, as it doesn't seem to be another part of the method, but refers to the overview of steps 1-4.

- P.11, L.309: Nash and Sutcliffe(1970) is missing in the references

- P.14, Table 4: How is the accuracy assessment of C3 pixels done? What is the reference here? Why is SCC < 0.5?

- P.17, Fig.10: It might be helpful to present the percentage deviation from the observations for clarification of the model performance. It seems that at some days, all three datasets deviate more than 70% from the observations.