

Earth Syst. Sci. Data Discuss., author comment AC1
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Reply on RC1

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Author comment on "A new merged dataset for analyzing clouds, precipitation and atmospheric parameters based on ERA5 reanalysis data and the measurements of the Tropical Rainfall Measuring Mission (TRMM) precipitation radar and visible and infrared scanner" by Lilu Sun and Yunfei Fu, Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-26-AC1>, 2021

Responses to RC1

We are grateful to the Editor and the Reviewers for reviewing our manuscript. The comments and suggestions are very helpful and valuable. Kindly find a point-by-point reply to the issues as follows.

RC1:

- Line 167, "weight-average method":

1) How to calculate weight in the "weight-average method"?

2) When the spatial resolution of the data is 5km, the signal is the average value of 5 km. When the spatial resolution is 2.5 km, the signal is the average value of 2.5 km, so it is better to use the simple average method or the weighted average method?

Response: Thank you for your questions.

- Due to the different spatial resolutions of the TRMM VIRS (2.2 km) and PR (4.5 km) pixels. There are usually about seven VIRS pixels near one 2A25 pixel in the same orbit. "Weight" here means "inverse distance weight". For each VIRS pixel within one PR pixel area, according to the distance between the VIRS and PR pixels, the spectral signals of the TRMM VIRS are calculated by weighted averaged in the 1B01-2A25-PMD dataset. (Fu et al., 2011)
- It is better to use the weighted average method. The spatial resolutions of the TRMM VIRS and PR pixels are different. Also, the relative location between the TRMM VIRS and PR pixels changes slowly due to the scanning angle and direction of the satellite. In order to obtain merged data, the resolution of the TRMM VIRS pixel should be reduced to 4.5 km which is the same as the PR pixel. Compare to the simple average method, the latter method is more reasonable in the data merging process theoretically.

- Line 173:

It should be described that the spatial resolution of 1B01-2A25-PMD is 5 km and the data width is 220 km

Response: Thank you for your advice. We have added the sentences in the revised manuscript. [Line 177-178]

- Line 195:

Atmospheric status or parameters

Response: Thank you. We have changed "the atmosphere" to "the atmospheric status". [Line 200]

- Lines 214-215:

The difference in $TB_{10.8}$ is also big.

Response: Thank you for pointing out the phenomenon.

The difference in $TB_{10.8}$ and $TB_{3.7}$ signals may be caused by the uneven cloud distribution. The difference in $TB_{3.7}$ is more obvious than that in $TB_{10.8}$, so we made further explanations on the difference in $TB_{3.7}$. The results shown in the Fig 2 can explain the mentioned phenomenon. We have added the descriptions on the difference in $TB_{10.8}$ in the revised manuscript. [Line 220-222] "Also the difference in $TB_{10.8}$ signal is noticeable. Although the ranges and the maximum of the $TB_{10.8}$ nearly unchanged after merging, but the shape of the PDF line is different near the maximum."

- Lines 251-256:

1) Figure 3 has proved that the difference after gridding is small, and there is no need to count the difference between the data.

2) The previous analysis is a special case (using a certain track data) analysis, and the statistical analysis is preferably an overall analysis, such as counting the average value of data differences over several years.

Response: Thank you for the suggestions.

- We present the table about the comparison of the parameters between the 1B01-2A25-PMD and 1B01-2A25-GD to quantify the influence of the gridding process.
- In this work, we focus on the characteristics of the single orbit data. Due to the limited length of the paper, the treatment on a longer period of data will not be included. The overall analysis of the data differences over several years will become the main point of our next step work.

- Line 262:

The M-1B01-2A25-GD data is not evaluated in this manuscript? How to evaluate this data?

Response: Thank you. According to the previous evaluations of the 1B01-2A25-PMD and 1B01-2A25-GD, the parameters of precipitation, cloud and atmospheric status are reliable in the finally merged dataset. The practical use and presentation of the parameters are mainly included in this section. Within the same orbit field, both precipitation, cloud and atmospheric parameters can be presented at the same time. We have changed the title of this section to "Presentation of the M-1B01-2A25-GD parameters". [Line 270]

- Line 410:

There is only one track of data, which cannot explain the overall error situation.

Response: Thanks. We have changed the description in the revised manuscript to avoid the misunderstanding. [Line 416] "In the arbitrarily chosen orbit, the difference in the mean value is no more than 0.87 and the STD is no more than 2.38 for the near-surface rain rate and signals measured by the VIRS."

All the above have been modified in the revised manuscript. Thank you again.

Fu, Y. F., Liu, P., Liu, Q., Ma, M., Sun, L., and Wang, Y.: Climatological Characteristics of VIRS Channels for Precipitating Cloud in Summer Over the Tropics and Subtropics, *Journal of Atmospheric and Environmental Optics (in Chinese)*, 6, 129-140, <https://doi.org/10.3969/j.issn.1673-6141.2011.02.009>, 2011.