

***Interactive comment on* “Evaluation and bias correction of satellite rainfall data for drought monitoring in Indonesia” by R. R. E. Vernimmen et al.**

Anonymous Referee #2

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Review of “Evaluation and bias correction of satellite rainfall data for drought monitoring in Indonesia” by R.R.E. Vernimmen, A. Hooijer, Mamenun, and E. Aldrian, submitted to Hydrology and Earth System Sciences Discussions

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General Comments

This study compares the performance of three satellite rainfall retrievals, TRMM 3B42RT, CMORPH and PERSIANN, against ground station data over Indonesia, to evaluate which can best be used for drought monitoring, to help guide water resource

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management. 3B42RT was selected, and a bias-correction scheme was applied to further improve its performance.

The paper is well-written, and it is clear that much thought has gone into conducting a fair assessment.

Specific Comments

1. It is inappropriate to refer to the TRMM 3B42RT product as “TRMM”, as this is the name of the satellite and the entire mission, whereas 3B42RT (or equivalently, TMPA-RT) is the name of just one of many TRMM products. The most glaring example is at the top of p. 5976. Furthermore, this assignment of the term “TRMM” is not formally made until Section 2.2, whereas phrases such as “TRMM data” are already used in reference to 3B42RT in the abstract and Sections 1 and 2.1.

The second paragraph on p. 5971 states “One of these satellites is TRMM”, then contrasts this with “Other satellite products are CMORPH and PERSIANN”. The sentence about TRMM is accurate, but it needs an introduction of the 3B42RT product before drawing a contrast with the others.

Table 4 should say “TRMM 3B42RT precipitation” rather than just “TRMM precipitation” in the title. Figs. 6, 7, and 9 should use “3B42RT” in the labeling, both for accuracy and for consistency with Figs. 4, 5, and 10.

2. p. 5971, line 25 – Your contention may be true within the hydrological community, but in the meteorological community as a whole, there have been plenty of studies that have made these comparisons simply to evaluate the algorithms themselves and/or to intercompare competing algorithms (Ebert et al., 2007, Bull. Amer. Meteor. Soc., 88, 47-64, just to cite one of many examples). Therefore, I suggest modifying the sentence to state “but within the hydrological community, these have mostly focused on. . .”. I do agree that the emphasis has been on high amounts.

3. p. 5972 – The statement about quality controlling the record by excluding longer

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periods that deviated from other stations and from the station record is rather vague. It would be helpful if this could be quantified somewhat, without going into great detail.

4. p. 5974 – The description of 3B42RT should mention that it also includes contributions from AMSU-B, MHS, and IR data to fill in gaps in spatial coverage from the microwave scanners (i.e., TMI, SSMI, and AMSR-E).

5. It is worth mentioning in the paper that a newer “Version 6” of 3B42RT was issued in 2009, with the record beginning in late 2008. The new version also includes an “uncalibrated” field that provides continuity with the previous version.

6. I was initially confused on p. 5976 that June-October was defined as the dry season because the six areas had monthly rates < 100 mm/hr, whereas Table 3 appeared to indicate otherwise, until I realized that the values in Table 3 are five-month totals. Even so, I note that Bogor had 715 mm, which is > 100 mm/month.

7. Table 4/p. 5978 – It should be noted that for 4 of the 6 regions, the average difference in annual precipitation actually got worse after bias correction! For the dry season (Table 5), the difference got better for 5 of the 6 regions. Perhaps the bias correction technique is better suited for the dry season than for year-round use?

Technical Comments

1. p. 5970 - Change “where most parts of it” to “most parts of which”.
2. p. 5971 – 2nd line, change “does at present not” to “does not at present”.
3. p. 5971 – Put commas on both sides of “and has full coverage of the entire country”.
4. p. 5972 – Switch the order of “Lampung and Banjar Baru” to be consistent with the order presented in the tables.
5. p. 5973 – A quarter-degree distance at the equator is indeed approximately 28 km, but the area is more accurately $27.78 \times 27.78 = 772$ km², rather than $28 \times 28 = 784$ km².

6. p. 5973- The phrase “as they occur in Indonesia” is unnecessary, as tropical rainstorms tend to be localized in general.
7. p. 5973 – A new paragraph should begin at “Average monthly ground station. . .”
8. p. 5973 – Insert a comma as follows: “is largely the same, with June-October”.
9. p. 5974 – Insert a comma as follows: “considerable bias, although this bias”.
10. p. 5974 – Change “of” to “or”: “either somewhat positive OR somewhat. . .”
11. p. 5976 – R squared does not show very much improvement, so it may not be worth mentioning in the text. If it is retained, insert a comma as follows: “annual basis, and improved RMSE”.
12. p. 5977 – Insert a comma as follows: “further explored, as this was”.
13. p. 5977 – Add the word “slightly”: “improved RMSE and slightly higher correlation coefficients”, because the improvement is generally small.
14. p. 5978 – change “4 mm/month” to “3.6 mm/month”.
15. p. 5978 – Insert a comma as follows: “applications, especially”.
16. p. 5978 – Change “but” to “and”: “(and in other data sparse...)”.
17. p. 5979 – A new paragraph should begin at “Clearly such. . .”
18. p. 5979 – Insert a comma as follows: “additional errors, using for instance”.
19. p. 5980 – Replace “can not” with “cannot”.
20. p. 5981 – References: For Huffman 2007, replace “TCMA” with “TMPA”.
21. References – there is some inconsistency in capitalization; e.g., Oldeman 1979 and Wyrtki 1956, compared to the other entries.