

An assessment of the accuracy of global rainfall estimates without ground-based observations

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Summary: This study proposes to use a Triple Collocation (TC) method to assess uncertainties associated with rainfall estimates using different products at the daily/1degree scale. The study addresses important issues that are relevant to the HESS readership. I recommend this manuscript for publication after minor revisions.

Page 1:

1. Title and throughout the text: I think there is some confusion regarding the difference between accuracy and precision (uncertainty vs. error, systematic vs. random). Accuracy refers to how close a measured value is to a standard value (i.e., the "true" value). Precision describes the statistical variability. Accuracy and precision are independent. It seems to me that the TC method provides a measure of precision (error variances and correlations), but no information regarding the accuracy, which would require a reference/benchmark. I urge the authors to clarify this difference in the text and revise the text where needed.
2. Line 1: remove "value"
3. Line 4: remove "of this variable"
4. Line 5: replace "among" with "with"
5. Line 18: is it really the best product? It is if precision is the chosen criterion, but it may not be the case if accuracy is considered to be more important.

Page 2:

6. Line 35: replace "provides" with "provide"

Page 3:

7. Lines 3 and 6: add "the" before "TC"
8. Line 9: rephrase as "if each product is affected by mutually-independent errors"
9. Line 20: deleted "analysis" and "the"
10. Lines 20-25: CMORPH and TMPA 3B42RT are not completely independent. Can the authors explain what is the implication with using these two products in the TC analysis?

11. Line 28: rephrase as "Section 2 presents datasets and methods;"
12. Line 31: rephrase as "Results and discussion are shown in Section 3 and the final remarks are presented in Section 4."

Page 4:

13. Line 13: delete "a"

Page 7

14. Lines 2-4: this is a fair model only to model the error for the "hit cases" when both sensor and ground truth are larger than zero or for cumulative rain over a long enough period of time. Otherwise, the multiplicative error model would assign zero anytime the sensor measure a zero. Some explanation is given towards the end of the paragraph, but I believe that this should be discussed when multiplicative error models are introduced. The authors can also refer to Tian et al. 2013: Modeling errors in daily precipitation measurements: Additive or multiplicative?

Page 8

15. Line 6: shouldn't it be "utilizes"? What's the subject of that verb?

Page 9:

16. Line 16: replace "serve to" with "are used to"

Page 10:

17. Line 6: please replace "assessing" with "to assess"

18. Line 32: please rephrase (2 verbs).

Page 11:

19. Line 9: drop the comma.

Page 12:

20. Lines 1-2: can the authors speculate on why this happens?

21. Line 17: rephrase as "this corroborates what shown by...."

Page 13:

22. Line 2: replace "paper" with "study"