Interactive comment

C. Peters-Lidard

I read this discussion paper with great interest, and we discussed some of the results in the Hydrology Working Group at the NASA Precipitation Measurement Missions Science Team meeting this week.

I applaud the authors on a comprehensive evaluation effort, and the results are useful for answering the questions posed by the authors.

We thank Dr. Peters-Lidard for her comment on our paper.

From a GPM perspective, one of the critical questions not answered by this analysis is the extent to which the errors are related to detection issues or bias issues. In Tian et al., JGR, 2009, we introduced a component analysis of errors where we quantified 3 orthogonal components of error, E: Hit Error (H), Missed Precipitation (M) and False Precipitation (F).

We provide individual scores for correlation, bias, and variability ratio for all 26 datasets (see Figures 1 and 2 in the main paper and S1, S2, and S3 in the Supplement). We do not agree that *"one of the critical questions not answered by this analysis is the extent to which the errors are related to detection issues or bias issues"* as detection issues are primarily reflected in the correlation values and bias issues in the bias values. We therefore certainly do make a distinction between detection and bias issues in the paper.

The drawback of a "hit, miss, false alarm" type of evaluation is that (1) it involves the (somewhat arbitrary) selection of a precipitation threshold for event identification and (2) the agreement in terms of magnitude beyond this threshold is not further evaluated. Conversely, the correlation does account for differences in magnitude beyond this threshold.

These independent components sum to the total error:
$E = H - M + F$

Like this study, we used Stage IV data as a reference, and in addition to producing maps of the total error and components for several products, we also found a significant seasonal cycle in these errors.

We have added a new question to the paper which compares the performance of the datasets between summer and winter (see Section 3.4 of the revised paper).

I think this reference is a critical one for this paper, and I strongly suggest that the authors dig deeper into the sources of error by computing these error components.

We have added a reference this very interesting paper. For reasons stated above and because it would make the paper considerably less concise we are not in favor of adding a “hit, miss, false alarm” analysis to the study.

From Tian et al., 2009: "The relation E = H - M + F raises a critical point. It implies that it is not enough to look at the total bias E as an indicator of the performance. The three individual components H, M, and F could have larger amplitudes than the total error E, but they could cancel one another, resulting in total bias smaller than some of the components. This is especially true for M and F, which always have opposite signs. Therefore it is important to realize that the amplitude of the total bias alone is not enough to serve as a measure of the performance of a set of estimates; one needs to look at the three components as well to truly understand the error characteristics. "

Thank you for the quote. However, we do not only focus on the bias in our study. We also focus on correlation and variability ratio. The correlation reflects the performance of the datasets in terms of event detection, as mentioned earlier in this response.

Further, as can be seen from Figures 2 and 3, the errors have a pronounced seasonal cycle. An investigation of the seasonal cycle of errors would also be a useful extension of the previous work.

Agreed. We have added a new question to the paper in which we compare the performance of the datasets between summer and winter (see Section 3.4 of the revised paper).

Reference: Tian, Y., C. D. Petersâ˘AˇRLidard, J. B. Eylander, R. J. Joyce, G. J. Huffman, R. F. Adler, K. Hsu, F. J. Turk, M. Garcia, and J. Zeng (2009), Component analysis of errors in satelliteâ˘AˇRbased precipitation estimates, J. Geophys. Res., 114, D24101, doi: 10.1029/2009JD011949.