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Hydrology and Earth System Sciences Discussions

Interactive comment on "Evaluation of high-resolution satellite precipitation products using rain gauge observations over the Tibetan Plateau" *by* Y. C. Gao and M. F. Liu

Anonymous Referee #2

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General Comments:

Quantifying errors in remotely sensed rainfall is very important, especially in areas of the globe where ground observations are sparse or totally on existent, for understanding the climate studies and water resource applications, among others. In the past, several satellite rainfall evaluation studies have been done in different parts of the world, and the current manuscript aims to extend such assessment work to the Tibetan Plateau (TP). The authors compare three different satellite precipitation estimates (all 0.25x0.25 degree and 3-hourly) and rain gauge for TP over a period of 6 years (2004-

9). Though their work is not original in terms of methodologies and data used, I still think the results are useful for the scientific community's understanding of the importance of satellite rainfall in the Tibetan Plateau. In summary, the following comments (some major, others minor) must be addressed before the manuscript is accepted for publication on HESS.

Specific Comments:

Abstract:

Page 2- line 7: Which version of TMPA is used? Be specific. I read it is 3842 V6 in later text but it is also important to inform readers earlier in the abstract.

Page 2- lines 17-19: Figure 6c doesn't support this claim of "PERSIANN produces obvious underestimation at low elevations and overestimation at high elevations." It seems to me that PERSIANN underestimates on the lower-right and overestimates on the lower-middle of Figure 6c (where they have comparable elevations.). Yes, Figure 8 tries to clarify this, but it is not statistically significant to make such a claim. The significance of the fit is small (<0.5) in almost all for PERSIANN. However, I agree with the statements on CMORPH and TMPA.

Introduction:

Page 2- line 23: Replace "4000 m" by "more than 4000m"

Study Area:

Page 5- lines 19-25: In Table 2, it would be better to show gauge-derived precipitation instead of satellite estimates, for accuracy reasons.

Rain gauge data:

Page 7- line 1: Spatial or temporal mean? Be specific.

Page 7- line 17 - : Would be better and easier for readers to include more details on

the downscaling method used here. The authors, understandably, refer to Sapiano and Arkin (2009) for the methodology, but I suggest more explanation is provided here because it is basically the backbone of the data set up for the evaluation work.

Evaluation as a factor of elevation:

Pages 12-13: The whole discussion on this section depends on Figure 8 a-g, where linear fits have been tried (biases vs elevation). However, none of the fits show if there is any clear bias-elevation dependence for all precipitation estimates. The significance of fit (R) is consistently low. Therefore I suggest that this section (section 3.4) be rewritten accordingly to report that there is no significant effect of elevation on the satellite precipitation in the TP; or completely left out of the paper if they do not create any important knowledge.

Tables and Figures:

Table 1: Please correct the caption, specifically the second sentence.

Table 2: As mentioned above, better to show the mean of precipitation from rain gauges instead of satellites.

Table 2: I see that the names of the climatic zones are later explained on legend of Figure 2, but it is important for readers of the HESS (great journal) to understand what they stand for when reading Table 2 as well. So may be add a sentence or two to the caption of table 2?

Table 3: Caption “versus”

Figure 2: Add the source of the climatic zone classification (reference?).

Figure 7: Is the underestimation of the high magnitude precipitation (Figure 7 c & d) due to the fact that satellite is spatial average over a grid (which dampens the peaks by averaging over area) while gauge is point measurement? If this is the case then, this result is not surprising. Please provide more explanation on this.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 9503, 2012.