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Hydrology and Earth System Sciences Discussions

Interactive comment on "Rainfall estimation over the Wadi Dhuliel arid catchment, Jordan from GSMaP_MVK+" *by* E. Abushandi and B. Merkel

Anonymous Referee #1

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General Comments:

This paper compared gauge measurements and satellite-based estimates (GSMaP) of rainfall over an arid catchment in Jordan for a five-year period (2003-2008). The authors had a fairly extensive review of studies of rainfall characteristics over Jordan, and demonstrated a working knowledge of satellite-based rainfall retrieval processes. This paper found gross mismatches between gauge measurements and GSMaP estimates, and attempted to adjust GSMaP data to gauge data with a multiple linear regression (MLR) model.

The major issue with this work is that the MLR adjustment methodology, and the conclusions based on it, are not warranted by the data. Figs. 8, 9, 10, 13, 14 and 15 clearly show that gauge data and GSMaP have almost no correlation whatsoever over

this particular watershed. This is understandable because the well-known weakness of satellite retrievals over desert. The correlation coefficients the paper obtained (-0.33, -0.28 and -0.32, pg. 1676) and the large P values associated with them (0.35, 0.28, and 0.37) indicate very bad agreement between the two datasets, especially by the negative correlation coefficients obtained. Therefore, with gauge data as "ground truth," GSMaP does not provide any added information to this area. Therefore Eqs. (1) - (8) are purely mathematical manipulation of the data without any physical basis, especially those negative coefficients for GSMaP (Eqs. 3, 4, 5, and 7). The adjust data fit well with the gauge data (Figs. 11 and 12) simply because there are nearly as many tunable parameters in the MLR model as the data points.

Therefore I recommend major revision of this paper, urging the authors to focus on clearly documenting the poor performance of GSMaP over this area, and ideally over a larger desert area. No adjustment scheme should be attempted if GSMaP has no, or even negative information content.

Specific comments:

Page 1676, line 16: "... shows significant correlation" – those numbers are by no means indicating significant correlation. On the contrary, they indicate very poor correlation.

Page 1679, line 26: "Overall, GSMaP_MVK+ showed the best performance in comparison with other satellite products." – How did the authors reach this conclusion?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 1665, 2011.