Hydrol. Earth Syst. Sci. Discuss., 12, C654–C657, 2015
www.hydrol-earth-syst-sci-discuss.net/12/C654/2015/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Comparing TRMM 3B42, CFSR and ground-based rainfall estimates as input for hydrological models, in data scarce regions: the Upper Blue Nile Basin, Ethiopia" *by* A. W. Worqlul et al.

Anonymous Referee #2

Received and published: 23 March 2015

This paper gives a study on comparison of TRMM 3B42, CFRS and ground-based rainfall estimate over Ethiopia with direct comparison of TRMM and CFRS with gauge observation as well as comparison through hydrologic response to stream flow. As we know, many related research about the evaluation of satellite-based precipitation products have been published. But from the paper, the authors did not mention the recent progress, especially recent literature with dense gauge over Ethiopia. Also, little description about the TRMM product is given, and the cited papers are about the old Version 6 TRMM, not the latest Version 7. In addition, the methodology of

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

comparison is not sound enough. I can't recommend publishing this paper because of these concerns. More specific comments are as follows:

1) T. G. Romilly and M. Gebremichael published a paper "Evaluation of satellite rainfall estimates over Ethiopian river basins" with much denser gauges network over Ethiopia. In this paper, the TRMM product shows good performance when compared with gauge observations. The authors did not compare the results in this paper with previous study and explain what/why are the same and different. The results presented in previous study seem more believable than current study. Recent literature: [1] Romilly T G, Gebremichael M. Evaluation of satellite rainfall estimates over Ethiopian river basins[J]. Hydrology and Earth System Sciences Discussions, 2010, 7: 7669-7694. [2] Gebregiorgis A S, Moges S A, Awulachew S B. Basin Regionalization for the Purpose of Water Resource Development in a Limited Data Situation: Case of Blue Nile River Basin, Ethiopia[J]. Journal of Hydrologic Engineering, 2012, 18(10): 1349-1359. [3] Evaluation through Independent Measurements: Complex Terrain and Humid Tropical Region in Ethiopia

2) A lot of study about the performance of latest V7 TRMM products have been published, but the authors have not mentioned in the papers, and the authors did not explain why the TRMM 3B42V7 shows poor performance over the study area. The authors seem to give an experimental report without scientific interpretation. Recent literature about V7 TRMM products, for example: [1] Saber Moazami, et al, 2014: Comprehensive evaluation of four high-resolution satellite precipitation products over diverse climate conditions in Iran. Hydrological Sciences [2] Yong, B., et al, 2015: Global view of real-time TRMM Multi-satellite Precipitation Analysis: implication to its successor Global Precipitation Measurement mission, Bull. Amer. Meteor. Soc [3] Chen, S., et al, 2013: Evaluation of the Successive Version-6 and Version-7 TMPA Precipitation Estimates over Continental United States. Water Resour. Res.doi: 10.1002/2012WR012795. [4] Chen, S., et al, 2013: Similarity and Difference of the two Successive V6 and V7 TRMM Multi-satellite Precipitation Analysis (TMPA) Perfor-

HESSD

12, C654–C657, 2015

mance over China. Journal of Geophysical Research. doi: 10.1002/2013jd019964. [6] Huffman, G. J., and D. T. Bolvin (2013), TRMM and Other Data Precipita-tion Data Set Documentation, Lab. for Atmos., NASA Goddard Space Flight Cent. and Sci. Syst. and Appl. [7] Huffman, G. J., D. T. Bolvin, E. J. Nelkin, and R. F. Adler (2011), Highlights of version 7 TRMM multisatellite precipitation analysis (TMPA), paper presented at the 5th International. Precipitation Working Group Workshop, Workshop Program and Proceedings, 11–15 Oct., Hamburg, Germany, edited by C. Klepp and G. Huffman, Reports on Earth Syst.Sci., 100/2011,Max-Planck-Institut f€ urMeteorologie, pp. 109–110.

3) The authors use the Thiessen Polygon to define a large area (» the grid of TRMM) for comparison of TRMM and gauge observations, this method would give misleading results about the performance of TRMM products. Since the gauge network is too sparse, the authors should compare the TRMM product with gauge observations based on the grids that were overlapped by gauge. In addition, the spatial resolution of TRMM and CFSR is quite different; the authors should consider the scale problem and cannot give simple conclusion that CFRS has better performance than TRMM.

4) For the hydrology modeling, the authors calibrate the hydrology models with TRMM, CFSR ,and gauge, respectively, and then use very quit different parameters for simulation during validation, and thus for comparison based on simulated flow. Results with such experiment would be unbelievable and don't make senses, because event the poor precipitation input can lead to good simulated flow if some important parameters are manfully tuned to fit the hydrograph in practice. The author, in my opinion, should re-design the experiments: calibrate the hydrology model with gauge observations to obtain a suit of best parameters, and then use the parameters to simulate stream flow for comparison. The authors can interpolate the gauge into gridded analysis with TRMM or CFSR based on Kriging/inverse distance weight/Optimal interpolation technique, or you can use the gauge gridded analysis product UniïňĄed Gauge daily precipitation Analysis [Chen et al., 2008b] provided by National Oceanic and Atmospheric

HESSD

12, C654–C657, 2015

Administration(NOAA) Climate.

5) The sentence “The study is comprised of two parts, in the ïňĄrst part, after estimating the areal long-term monthly rainfall estimates of gauged rainfall, CFSR and TRMM data from 1994–2006 for Gilgel Abay and Main Beles basins a comparison is done by using simple standard statistics (i.e., coeïňČcient of determination).” Is very long, and the subject part should be moved in the front. 6) For “. . .variation and CFSR data could capture 73% of the ïňĆow variation (Table 2)” on line 5 in page 2092, I see the regression coefficient for CFSR in Gilgel Abay basin is 0.77, not 0.73, in Table 2. Is it right?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 2081, 2015.