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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.

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GENERAL COMMENT

Although the comments of both reviewers were helpful in improving the manuscript,

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it is unfortunate and extremely disappointing that both reviewers rejected our paper based mainly on personal opinions that are contrary what is stated in the hydrological literature and are therefore not valid reasons for rejecting our paper. Reviewer 1 rejects the paper on grounds that rainfall point measurement represents the actual amount of rainfall in the basin (he/she called it the “gold standard”), and therefore, there was no need according to reviewer 1 to compare the satellite rainfall products to discharge measurements. The opinion of reviewer 1 is contrary to that distributed by the World Meteorological Organization (WMO). Extensive studies of the World Meteorological Organization (WMO, 1994) states that the minimum rainfall station network density for tropical regions is 100 to 250 km2 per station for mountainous regions. For the two watersheds considered in our study, the density of the rain gauge network was greater than 400 km2 for the Gilgel Abay and greater than 1000 km2 for the Main Beles where only one station is in the basin. Thus according to the WMO standards rain gauge measurements in our watersheds do not represent the general rainfall pattern (as input for models) and are clearly not a gold standard as suggested by reviewer 1 (for references and more details see our published response earlier submitted).

Reviewer 2 rejects the paper because our “methodology of comparison is not sound enough”. This is expressed in comment 6 as: “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 interpretation of reviewer 2 of our manuscript is wrong. The reviewer, states that we “use very quit different parameters for simulation during validation, and thus for comparison based on simulated flow” this is not true: We calibrate the hydrology model with gauge observations and satellite rainfall estimate from 1994 to 2003 to obtain a suite of best parameters, and then the best suite model parameter sets are validated by using a different set of gauged rainfall and satellite rainfall estimate from

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2004 to 2006. The reviewer said: “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 . . .. Analysis [Chen et al., 2008b] provided by National Oceanic and Atmospheric Administration.” After Reviewer 2 comment, we did exactly what reviewer 2 suggest and that is “interpolate the gauge into gridded analysis with TRMM or CFSR based on Kriging/inverse distance weight/Optimal interpolation technique” with the exception that we used the Thiessen polygon method. We have changed to the inverse distance method because it was suggested by the reviewer. It did not result in an improvement which was expected in this mountainous terrain. Finally, concerning the reviewers statement that “Results with such model experiment would be unbelievable and don’t make senses” we would like to point out that models have been used in the literature and can be used to validate rainfall products as shown by a number of authors that used the daily observations between 1961 and 1995 of the International Commission for the Hydrology of the Rhine basin (CHR) data set of the Rhine to evaluate and correct biases in climate model projections (Photiadou et al, 2011; Hurkmans et al. 2010; Shabalova et al. 2003, Terink et al.2010; Linde et al. 2010). In addition there are also many other occasions the rainfall products are compared with discharge, such as an example by Bitew and Gebremichael (2011) in Ethiopia and Szczypta et al (2012), see also response to reviewer 1). Finally our models are water balance models that have performed well in the Blue Nile and use a limited number of parameters that are impossible to fine tune to get a good prediction with a faulty rainfall record. In summary, the reasons used by the two reviewers for rejecting our manuscript are therefore not valid for rejecting our manuscript. We request a reconsideration of the “rejection” of our manuscript. The recommendation of both reviewers, who otherwise provided a very helpful and thorough review. As a result, their comments have improved the manuscript greatly.

The detailed response to reviewer 2 is in the attached pdf.

Regards, Tammo Steenhuis and Abeyou Worqlul

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Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/12/C2197/2015/hessd-12-C2197-2015-supplement.pdf

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