

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1  
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## **Comment on hess-2021-250**

Anonymous Referee #1

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Referee comment on "Performance of the Global Forecast System's medium-range precipitation forecasts in the Niger river basin using multiple satellite-based products" by Haowen Yue et al., Hydrol. Earth Syst. Sci. Discuss.,  
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The manuscript titled "Performance of the Global Forecast System's Medium-Range Precipitation Forecasts in the Niger River Basin" evaluated the performance of medium-range precipitation forecasts from GFS against 'IMERG final' products over Niger River basin, which could be useful for operational decisions. However, I think the study is superficial and not appropriate to the journal if major revisions are not conducted.

In the conclusions, the authors states that "The use of IMERG Early to calibrate GFS would improve GFS in terms of correlation and variability, but not in terms of bias". How do you come to this conclusion? Just via comparing the performance of GFS forecasts and IMERG Early products? I think it is inadequate. I strongly suggest that the authors should add some more analysis on the comparison of performance between raw GFS forecasts and calibrated GFS forecasts by IMERG Early products. In addition, the authors also evaluate the performance of some other Satellite Precipitation Products, such as CHIRP, IMERG Early and IMERG Early Cal, against the IMERG Final rainfall products. However, I do not understand why you evaluate these products? You evaluated these products but did not do any analysis on using these products to improve the GFS forecasts.

In section 3.4, what's the forecast uncertainty? How to evaluate or quantify the uncertainty? I think the "uncertainty" in section 3.4 is only the different performance, but not uncertainty. The authors stated that the GFS forecasts show large underestimation bias for heavy rain rates. I suggest to add some explanations for the poor performance, by evaluating other variables related to the physical mechanism that affect the

precipitation over the study region, or citing some relevant references.

In section 3.5, the authors states that the climatological bias correction approach is not effective in removing the bias in IMERG Early estimates. Why do you present the results? It is not meaningful for this manuscript. I think you could do some analysis for the effective method of bias correction to improve the IMERG Early estimates and thus to improve the GFS performance by calibration.

In addition, the introduction should be improved seriously. For example, the current studies on the evaluation of GFS forecasts and its performance on global scale or other regions should be added.

Minor comments:

The abstract should be carefully revised. For example, it should not include the detail introduction of study basin.

The resolution of GFS forecasts and Satellite Precipitation Products are not consistent, how do you deal with them? The authors do not describe any information about this.

Line 76: remove “)”

Figure 1: I suggest to add legend for the drainage basin, or use the appropriate color for the boundary of the sub-basin

What is R in Figure 2? Please classify.

Line 235: "How well is the annual precipitation total forecasted in each dam watershed?" I do not understand, please classify.