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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Daily evaluation of 26 precipitation datasets using Stage-IV gauge-radar data for the CONUS" *by* H. E. Beck et al.

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Short Comment

I was pleased to read the paper by *Beck et al.* who performed a comprehensive assessment of multiple precipitation datasets over Contiguous United States (CONUS). I believe the paper is a valuable contribution. However, by reading the paper two questions raised to my mind. I believe the authors might want to address these two questions in their paper:

1) What is the value of using the Kling-Gupta Efficiency (KGE) for assessing the performance of precipitation datasets? Is it suitable for determining the products performance

for applications (e.g., flood prediction)?

2) Are the results obtained over CONUS representative of other regions? Can we generalize the obtained results?

To answer these questions, and following the final suggestions of the authors "Similar evaluations should be carried out in other regions with ground radar networks (e.g., Europe) to verify and supplement the present findings.", we tested three different satellite-based products in Europe:

a) SM2RAIN-ASCAT dataset, i.e., a recent version of an SM2RAIN-based dataset based on the application of SM2RAIN to ASCAT soil moisture product (*Brocca et al., 2017*) (apologize for self-citations). This dataset is similar to SM2RAIN-CCI V2 dataset used in *Beck et al.*

b) TMPA, the real time version of 3B42RT, i.e., TMPA-3B42RT V7 in *Beck et al.*

c) CMORPH, the real time version of CMORPH, i.e., CMORPH V1.0 in *Beck et al.*

We have considered 646 basins in Europe, and by following the same approach proposed in *Camici et al., 2018*, we tested the three satellite-based products (uncorrected) against ground-based precipitation (E-OBS dataset as reference, *Haylock et al., 2008*) for rainfall dataset assessment, and against observed discharge observations through the application of rainfall-runoff modelling.

The figure at the end of the document shows the results, in the top, for rainfall assessment by using different performance scores (KGE, R: correlation, BIAS, REL.VAR.: relative variability, RMSE: root mean square error, ubRMSE: unbiased RMSE), and in the bottom for discharge assessment by using the KGE as target score. Each dot represents a basin in which the comparison between satellite products and E-OBS is performed for rainfall assessment (basin average rainfall), and the comparison between simulated (through rainfall-runoff modelling and the three satellite rainfall datasets as

input) and observed discharge is carried out for discharge assessment. The title of each plot shows the median value of the score.

The results shown in the figure are quite interesting and illustrative of the problem in selecting a score for rainfall datasets assessment. We suppose as target the results in terms of KGE for discharge assessment shown in the bottom row.

Firstly, we underline that the results in terms of KGE for rainfall assessment (first row in the top) are not representative of the results in terms of KGE for discharge assessment. Also the use of other rainfall scores might be not suitable, with the better performance in terms of relative rankings between the products obtained by using BIAS, RMSE and ubRMSE. However, in terms of spatial assessment, each score applied to rainfall assessment seems to be not representative of discharge performances.

Secondly, the results obtained over CONUS are quite different from those we obtained here in Europe. Particularly, we want to underline the good performance of SM2RAIN-ASCAT dataset, mainly in terms of discharge assessment. This question about the representativeness of the results obtained in one region with respect to other regions.

Several other comments can be raised analysing in details the figure, but they are not suited for a short comment.

As a final comment, we want to underline that we should be cautious in saying that the results obtained over a specific region or with a specific score can be used “as a guide to choose the most suitable precipitation dataset for a particular application.”. We believe that more research is still needed and a significant effort linking satellite, meteorological and hydrological community is needed for a robust assessment of the precipitation datasets for hydrological applications.

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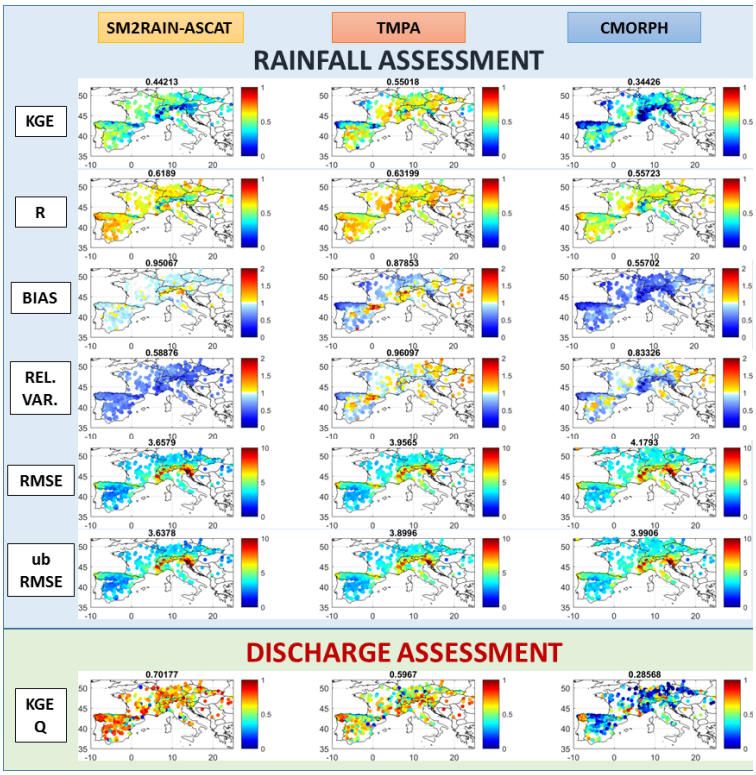
SM2RAIN-ASCAT
TMPA
CMORPH
RAINFALL ASSESSMENT
KGE
0.44213
0.55018
0.34426
R
0.6189
0.63199
0.55723
BIAS
0.95067
0.87853
0.55702
REL. VAR.
0.58876
0.96097
0.83328
RMSE
3.6579
3.9565
4.1793
ub RMSE
3.6378
3.8996
3.9906
DISCHARGE ASSESSMENT
KGE Q
0.70177
0.5967
0.28568

Fig. 1.