

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

Anonymous Referee #2

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This study compares 26 precipitation datasets with respect to the Stage-IV product at 0.1 degree resolution over the CONUS and at the daily time scale for the period 2008–2017. The Kling-Gupta efficiency is primarily used to rank the datasets, emphasizing the correlation component. The importance of gauge reporting times in daily gauge corrections is highlighted. Examples comparisons between product versions, satellite versus reanalyzes, deterministic versus ensemble reanalyzes are provided.

The topic fits the scope of the journal as it presents an overview of a selection of available precipitation products. The paper is easy to follow and the methodology is clear. However the limitations of such exercise need to be better highlighted. The paper would be suitable for publication after the following comments are addressed:

1. While the use of a score like KGE is convenient for intercomparison exercises, it

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must be recalled that such an integrative metric only partially depicts actual performances of precipitation products. This is all the more true since the median KGE values are primarily used in this analysis, which further prevents a detailed assessment. Errors are multi-faceted and scale dependent. As the authors point out KGE in this context emphasizes correlation, which tends to bias the assessment by favoring products designed to correctly capture the timing of daily events such as MSWEP. Other precipitation aspects such as daily totals are of primary importance for hydrological applications. The use of another metric could generate different conclusions. As stated by Gupta et al. (2009) who initially proposed the KGE score, “the primary purpose of this study is not to present an improved measure of model performance”, but “suggest possible ways forward that may move us towards an improved and diagnostically meaningful approach to model performance evaluation and identification”. It is recommended to explicit the relevance of the KGE with respect to the assessment purpose.

2. Stage IV is not a homogeneous precipitation product over the CONUS. Its generation varies across River Forecast Centers, e.g. it relies more heavily on PRISM in the Western U.S. A homogeneous reference is ideal for such assessment of precipitation products, and the lack thereof should be mentioned.

3. No seasonal dependency of the performances is reported in this analysis, although it is an important factor. See e.g. Gebregiorgis et al (2018) for a comparison between TMPA and IMERG over the CONUS. For example performances during the winter season are of significant interest especially for snow conditions. Accurate solid precipitation estimation is of primary importance for applications such as water resources management. Can the authors comment this aspect? Reference: Gebregiorgis et al., 2018: To what extent is the day 1 GPM IMERG satellite precipitation estimate improved as compared to TRMM TMPA? *J. Geophys. Res.* Atmospheres, 123, 1694–1707. <https://doi.org/10.1002/2017JD027606>

4. Other important aspects of precipitation such as occurrence or extremes are not

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assessed in this study, although they are of primary importance for an array of applications of precipitation products. Can the authors comment this aspect?

5. Precipitation (solid, liquid and mixed phase) has a large spatial and temporal variability. This scale dependency limits the representativeness of this intercomparison exercise to the daily time scale. Applications such as flash flood forecasting would require an evaluation at finer time scale. Can the authors comment this aspect?

6. For the above reasons it cannot be stated as in the abstract and in the conclusion that “Our findings can be used as a guide to choose the most suitable dataset for a particular application”. Applications require a refined and more detailed assessment than the one proposed in this study. Please modify this statement.

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