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Hydrology and Earth System Sciences
Discussions

Interactive comment on "The PERSIANN Family of Global Satellite Precipitation Data: A Review and Evaluation of Products" *by* Phu Nguyen et al.

Anonymous Referee #3

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General comments This short paper presents three PERSIANN satellite-based precipitation products. A comparison of the products with the CPC ground-based precipitation is performed over the United States from 2003 to 2015, as well as an intercomparison between products at the global scale. While this broad overview may be valuable to the research community and the topic fits the scope of the journal, there are some questions to address.

1. Applications of these precipitation products, especially for hydrological applications should be more discussed in the perspective of the presented performances. For example there is no discussion in the manuscript on the impact of uncertainty from PERSIANN-CCS on the GPM IMERG product.

2. The interpretation of the comparison results needs to be expanded throughout the

manuscript. More information is needed regarding satellite precipitation uncertainty structure. For example how do you explain PERSIANN-CCS climatological features in Fig. 2? Only gauge correction in PERSIANN-CDR seems to correct efficiently the PERSIANN and PERSIANN-CCS climatologies. How can this be explained? A discussion of precipitation products assumptions, strengths, and limitations should be added in the context of this evaluation. Aspects like remote sensing physics, precipitation physics and algorithmic influence should be addressed. For example regarding PERSIANN-CCS: under the assumption relating colder Tbs to higher rain rates using PDF matching, the resulting precipitation estimates could be influenced by the climatology of (cold) Tbs generated by specific types of precipitation systems, e.g. mesoscale convective systems in the Great Plains.

3. Can the authors elaborate on the representativeness of the CPC comparison analysis outside the U.S. (regarding all products), and especially at locations devoid of gauge networks (regarding PERSIANN-CDR)?

4. It is not fair to compare a gauge-adjusted product (PERSIANN-CDR) with satellite-only precipitation products (PERSIANN and PERSIANN-CCS). Besides it is important to use an independent reference for an objective comparison and evaluation. Finally the ground reference should present consistent accuracy across CONUS, which may not be the case with CPC if the gauge network density is not homogeneous.

5. The evaluation is performed at the daily time scale at the finest. As precipitation varies across space and time scales, the concluding remarks should recall this comparison scale. An evaluation at the native resolution of the products (i.e. hourly for PERSIANN and PERSIANN-CCS) would be more insightful and relevant. Can the authors comment on the representativeness of their findings and their dependence on resolution?

Specific comments:

1. p.3 l. 15-20: what about NOAA precipitation products?

2. p.6 l.16: “it combines all ground-based information sources”: does it combine also radar data?

3. What is the precipitation rate threshold used in categorical indices like POD and FAR?

4. p.7 ll.17-20: why not using the volumetric indices?

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