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Interactive comment on "A high-quality hourly, daily and monthly solar irradiance dataset in China during 1981–2014 based on MERRA-2 Reanalysis products" *by* Wenmin Qin et al.

Anonymous Referee #2

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General comments This paper calculated a data set of solar irradiance based on MERRA-2 reanalysis data and sunshine duration data over China. The description of method, data and the comparisons with other studies is ambiguous and make the result look dubious. Using daily cumulative sunshine duration to derive hourly cloud transmittance and hourly solar irradiance is illogical and maybe an obvious mistake. Also, I don't believe the accuracy of satellite retrievals would lower than that of reanalysis data corrected with ground observations (except for the station used to correct the reanalysis) because the reanalysis data is difficult to simulate the realistic clouds. I personally think the paper is outside the scope of regular articles because it is similar to the interpretation of data.

Specific comments 1. The words "high-quality" in title is inappropriate because its spatial resolution is coarse. 2.Most of the error indicators for accuracy evaluation are not frequently used and also redundant. 3. Data description is unclear. For example, the observation instruments, error, frequency, length, quality and so on. Moreover. The quality control method should be introduced in detail because it is very significant for accuracy evaluation. 4. How about the uncertainty about the interpretation of sunshine duration data because it is a main factor influencing the accuracy of your products. 5. how to derive the cloud transmittances, and how about its uncertainty? how to correct the solar irradiance of MERRA-2 with the cloud transmittances? How about the uncertainty of the correction process? 6. How to derive the hourly cloud transmittance because the sunshine duration is daily cumulative. This is the obvious mistake of this article. 7. In Fig.3 for GHInew, we can not observe the overall overestimation, but the MAE indicates that the GHInew is significantly overestimated. It's a contradiction and the results is unbelievable. 8. Table 3 is meaningless and the comparison with other studies is extremely unfair because the spatiotemporal resolution, the input data, and the observation data (also number of observation stations) for these studies are completely different with you.

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