Comment on essd-2022-5
Anonymous Referee #2


The paper by Tang et al. produced a 35-year (1984‐2018) high-resolution (3 h, 10 km) global gridded PAR dataset using ISCCP, MERRA-2, ERA5, MODIS and CLARRA-2 products as inputs in a physical-based model. In the paper, authors compared their instantaneous and daily PAR products against surface experimental stations, including SURFRAD, NEON, CERN networks, and CERES products. The results prove that the PAR product was found to be a more accurate dataset with higher resolution. This study could be a good supplement to meet refined analysis and understand climate variations. I believe this study can be valuable to the relevant community.

Overall, the study describes the background and introduction, and methods in a comprehensive way. However, the method in the paper contains inadequate innovations. Therefore, I would encourage the authors to submit a revised manuscript by addressing my specific comments below:

- First of all, to ensure the accuracy of surface network data, Does the surface network data used in the paper undergo the data preprocessing and the removal process of invalid values?
- How to compare ground-based stations with satellite pixels, the comparison process could introduce errors in the results.
- To some extent, the accuracy of the parameterized method used in the paper depends on the accuracy of the input data. The descriptions of the accuracy of the input data were insufficient.
- The algorithm used to map global gridded PAR in this study was the parameterization method developed by Tang et al. (2017), so the method used in the paper lack some innovations, more descriptions of Highlights are need in the paper.
- Is the band range of the PAR observations derived from the ground station consistent with the estimated PAR?