This study presented a new DSR and PAR dataset derived from GOES-R and Himawari at high spatial (1 km) and temporal (hourly) resolutions. The dataset achieved <20% and <10% relative errors for hourly and daily DSR, respectively, which were claimed to be higher than existing datasets. The manuscripts demonstrated the benefits of high spatial and temporal resolutions, and therefore partly justified the importance of developping this new dataset. In particular, Figure 9 is interesting, revealing that high resolution is critical for hourly radiation. However, I'm not convinced by this study for the following reasons:

1. The innovation is questionable. There are already many radiation datasets derived from geostationary satellite data, either from GOES-R or Himawari. Some of them are also high resolution. The manuscrit needs to clearly address the questions: why do we need a new one? What's the advantage of this study, e.g., distinct data sources or distinct algorithm?

We thank the reviewer for the valuable comments and suggestions! Through literature survey, we have identified at least six other products of DSR or PAR from various geostationary data. These products are typically based on a single satellite data source and available in the satellite map projection. Some data sets are not operational and do not provide convenient data access. In terms of data accuracy, there is also space for improvement. To address these issues, we adapted a mature physics-based retrieval algorithm to the enhanced collection of multiple new-generation geostationary satellite data archived through the GeoNEX platform to produce a new operational high spatiotemporal resolution product of DSR and PAR with improved data accuracy.

This physics-based retrieval algorithm has been initially developed for the operational NASA MODIS DSR and PAR product (MCD18). The extensive quality assessment of MCD18 showed that this algorithm is reliable, efficient, and highly accurate. It is the first time to adapt this algorithm to the new-generation geostationary satellite data. The product validation and comparison has demonstrated the superior performance of this algorithm over the geostationary data compared to other alternatives.

The GeoNEX project provides the enhanced access to multiple geostationary satellite data across the world. The GeoNEX archive is not simply another copy of the collected geostationary satellite data. It removed the residual geometric errors, applied the orthorectification correction and provided the pixel-level accurate view geometry information. Besides, the data from various satellite sensors are stored in a consistent global tile gridding system. All these preprocessing steps created the foundation for producing the high quality DSR and PAR product.

To be specific, the GeoNEX DSR/PAR product has the following features:

1. *The new product has higher accuracy than other existing products.*
2. *The new product is gridded and organized by tiles (600 by 600km), convenient for data transfer and analysis.*
3. *The GeoNEX data have gone through strict geometric correction to remove residual georegistration errors and terrain effects.*
4. *A consistent data product is provided across various satellite sensors.*
5. *It is an operational product and will provide continuous coverage.*
6. *The data are made publicly available through the NASA GeoNEX data portal. It is freely accessible to all the users and no registration is needed.*

2. As a data paper, the Method part is too short. A flow chart is needed, including graphyical links between Eq. (1), Eq. (2), inputs and outputs.

It is a great suggestion! A flow chart will be added to the revised manuscript.

3. Terrain effect was not considered. Considering many mountain areas are involved, this could be a big limitation.

Thanks for this valuable comment! The terrain effect was partially taken into account in the current study through two ways. 1) The GeoNEX collection has applied the orthorectfication correction to mitigate the topographic relief effect. 2) The retrieval algorithm has used the altitude-dependent LUT files to handle the impacts of elevation on DSR and PAR. Meanwhile, we acknowledged that the impacts of aspect and slope were not considered and need to be addressed in the future study.

4. As a data product, no detailed QC and quantitative uncertainty was provided. This is also a big limitation.

We are sorry for the confusion on QC. Actually, we provided a layer of QC to the product files to indicate the quality of each pixel. We will highlight this information in the revision.

5. The sensitivity to inputs/parameters could provide deeper insights for potential users.

Thanks for the suggestion! We will add a sensitivity study in the revision to evaluate the impacts of various inputs on the retrieval quality.

6. There was no map of the DSR and PAR products in the manuscript.

Maps of DSR and PAR will be added to the revised text.

7. Temporal coverage of the dataset was not mentioned. Is it operational and real time?

It is an operational product. We will add the information to the revision.

8. Why does this dataset has higher accuracy than other geostationary-based dataset? If high resolution only matters for hourly data, why does this dataset has much lower errors than others at daily scale?

The high quality of the new GeoNEX DSR and PAR product can be attributed to two major reasons.

1) The retrieval algorithm is a highly mature one that has been continuously improved and refined through decade long efforts. Our recent intercomparison study (Wang et al, 2021, RSE) has demonstrated the reliability and accuracy of this physics-based algorithm, especially when no reliable atmospheric products are available.

2) The enhanced geostationary data from GeoNEX were used as input. The GeoNEX data processing steps include removing residual geometric errors, applying orthorectification and calculating the pixel-level accurate view geometry information.

Because of the high accuracy of the hourly GeoNEX data, the daily data, which were aggregated from the hourly values, also show superior performance. The high quality of the GeoNEX daily DSR/PAR data are not only the result of high spatial resolution. Actually as shown in the manuscript, the data at coarser temporal resolutions have less dependency on spatial resolutions.

Reference:

Wang, D., Liang, S., Li, R., & Jia, A. (2021). A synergic study on estimating surface downward shortwave radiation from satellite data. Remote Sensing of Environment, 264, doi:10.1016/j.rse.2021.112639