

Response to Reviewers

A quality-assured dataset of nine radiation components observed at the Shangdianzi regional GAW station in China (2013–2022)

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Dear editor and reviewers,

We would like to thank the editor for handling our manuscript and the reviewers for their careful evaluation of our work and the valuable comments, suggestions, and questions. We believe that the manuscript will considerably benefit from the reviewers' feedback. Our detailed responses to all the comments are addressed as follows.

In order to clearly address each of the comments, we have copied comments in blue font and have addressed them one by one in black font. In addition, we use black italic font to quote text from the revised manuscript.

Yours sincerely,

Weijun Quan, Martin Wild, and co-authors

Response to Reviewer 2 Comments

General comments:

This manuscript reported 10 years of measurement of nine radiation components at the Shangdianzi station in China. The important details regarding measurement and quality control are well explained, making this dataset of great value to the community. The manuscript is well written and potential application of the dataset is discussed. I recommend publication of this work and I only have minor comments.

Thank you for this comment. We are grateful for the reviewer's constructive comments.

Specific comments:

1. Section 3.2. The instruments for several radiation components have changed over the years, such as for Inb, Id. Were any cross-validation or instrument performance comparisons done for these instruments? Instruments with the same model and manufacturer can sometimes behave differently, so it is important to make the comparison.

Thank you for this valuable comment.

It is really important to compare the instruments used in our work against the reference ones to improve the consistency of radiation measurements over a long period. To this end, we sent these instruments to the manufacturer (Jiangsu Radio Scientific Institute Co., Ltd.) to compare against the reference instruments (e.g. the CM21 pyranometer, the CHP1 pyrhelimeter, the CGR4 pyrgeometer, the UVS-AB-T radiometer, and the Li-200190SB sensor). These reference instruments had been compared against the national radiometric standards of China (e.g. the CM22 pyranometer, the H-F absolute cavity radiometer, the CG4 pyrgeometer, etc.), which were transferred from the World Radiation Center in Davos, Switzerland (e.g., Quan et al., 2010; Yang et al., 2015; PMOD/WRC, 2022; Yang et al., 2023).

2. Section 3.2.2. What is the frequency of instrument maintenance and calibration? I only see each instrument being calibrated once at the manufacturer and then they are used for several years. Is this frequency sufficient for high-quality measurement?

Thank you for this key question.

- During the period of 2013–2019, two campaigns for instrument calibration had been performed. One was carried out by the manufacture before all these instruments were installed to start observing (approximately Jun 2012). The other was performed in November 2018, in which all instruments used at SDZ were uninstalled and sent to the manufacture to compare with the reference instruments.
- In 2020, we purchased a set of instruments as the proxy for the original operation instruments. Thereby, since 2020, all instruments have been calibrating once a year.
- Fortunately, we found that most of the instruments used in this study, which are manufactured by the Kipp & zonen, are very reliable, i.e., the changes of the instrument's sensitivity are very small even after several year operation (See Table 3). Whereas, it is a pity to loss about one month radiation measurement in November 2018 because we have to send them to calibrate but we cannot provide the proxy instruments.