

Comment on amt-2022-105

Anonymous Referee #2

Referee comment on "Comparison of global UV spectral irradiance measurements between a BTS CCD-array and a Brewer spectroradiometer" by Carmen González et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2022-105-RC1>, 2022

The paper assesses the performance of a CCD-based spectrometer (BTS) in measuring the spectral solar irradiance in the UV range using data from 3 campaigns that took place in a period of 1.5 years. The comparison was done against data of a double monochromator Brewer spectroradiometer operating regularly at the campaign site. The BTS spectrometer is a rather new instrument and such studies to assess its long term performance are useful contributions for solar UV monitoring. The paper is well structured and addresses most of the usual aspects of intercomparisons of radiation instruments. To my opinion it is in a good stage to be accepted for publication, but I believe with some extra work as suggested in my specific comments below, the results could be further improved and possibly better substantiated. The language of the paper is good, despite some small flaws; some of them are mentioned in the "technical comments" section below.

Specific comments

1, 1: In the title, I suggest adding the word "spectral" before measurements.

3, 66: You actually mean range of intensity, therefore I suggest to avoid using the term UV Index in this context.

4, 98: What is "high-end light measurements"?

4, 101: The "measurement time ranging from 0.1 to 6000 ms" applies only to the photodiode or also to the CCD?

5, 138: I suggest to draw a darker horizontal line at 1.0, to guide the eye of the reader and make the comparison amongst the three panels easier. This applies also to figures 3 and 4.

5, 143: Concerning the increasing ratio towards shorter wavelengths below 300 nm, this could be partly produced by the cosine response of the BTS diffuser, if the cosine error is larger than the Brewer's. Please include this information in section 2.2, and if the error is larger than the Brewer's I suggest including a brief discussion. Moreover, from figure 1, I don't think that the 5% agreement is valid down to 300 nm. I would be more conservative to the lower limit (e.g. closer to 305 nm). This is also evident from table 1, where only the last column shows variabilities below 5%, contradicting the statement of line 148.

6, 157-159: The discussion around the noise level and its reset to 0 is not clear for inexperienced readers.

7, 173: For the plots of Figure 3, a more stringent time synchronization could be achieved for each wavelength band (of ± 2.5 nm) as opposed to the general synchronization based on the time at 326.5 nm. To be clearer, I mean to compare the data based on the difference between the time the central wavelength of each band is measured and the time of the BTS spectrum. This might further improve the results, especially at larger SZAs when small time differences increase notably the irradiance level. Actually, this might explain a small part the deviations at the shorter wavelengths, in addition to stray-light and (possibly) to cosine response.

8, 183: At the caption of Figure 3 please add a note to alert the reader for the x-axis scale change in the bottom panel. The same holds for Figure 4.

8, 185: A different time synchronization could also be applied for the UV Index comparisons, instead of the time at 326.5 nm. As the erythemally weighted irradiance peaks at between 306-308 nm (depending on SZA and total ozone) the time in this wavelength range would be more appropriate for the comparison and I believe would also improve the results.

Technical Comments

2, 45: "on arrays of CCD sensors". Do you mean "on arrays or CCD sensors"? Otherwise, just say "on CCD sensors".

2, 54: Replace "a considerable effort" with "considerable efforts"

3, 70: Replace "calibration" by "sensitivity"

3, 84: Omit the unnecessary term (double Brewer).

4, 99: "The spectral detector is a spectrometer". This doesn't make sense. Maybe you can omit "a spectrometer"?

5, 149: Replace "is similar to the one other stray-light-corrected CCD-array spectroradiometers have" with "is similar to other stray-light-corrected CCD-array spectroradiometers"

10, 200: I would prefer to see Figure 5 with axes of equal length.

10, 208: I assume you mean agreement within $\pm 5\%$.

11, 221: Replace "specific" with "regular"