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Atmospheric Measurement Techniques Discussions

Interactive comment on "Quality assessment of solar UV irradiance measured with array spectroradiometers" *by* L. Egli et al.

Anonymous Referee #1

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The paper describes a blind comparison of spectral UV irradiance measurements. The results of 14 detector array spectroradiometers were compared with those of a double-monochromator based reference instrument. The overall results are a bit disillusioning because none of the tested detector array instruments really performed convincingly although half of them were already optimized in a dedicated project to improve their performance. Various combinations of entrance optics and radiometers from different manufacturers were used in this comparison, as well as different evaluation procedures. So the approach does not seem to be well suited to systematically investigate what is behind the poor performances. Nevertheless, the paper is important because it shows the state of the art. It should be published after minor revision. Specific comments are given below.

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Interactive Discussion
Discussion Paper

1) More information on the calibration of instruments should be given. It is merely noted in the Introduction that “characterization and calibration services” were provided. I assume all calibrations were performed on the site with the same spectral irradiance standard lamp?

2) Are all employed array spectroradiometers sensitive enough to measure spectral UV-B (or UV indices) in the first place? For example Figure 1 in Blumthaler et al., 2013 implies that integration times of several seconds may be necessary not only for the calibration, but also for the measurements in order to obtain a sufficiently small noise equivalent spectral irradiance.

3) Some of the instruments show ratios well below unity (around 0.8, Fig. 4) even at wavelengths where stray light should be no issue. As mentioned in the text, ratios that decrease with increasing SZA probably indicate a poor cosine response but in the case of ARN and UEX there is no such indication. What could cause a 20% difference here (and a 20% difference between 450 nm and 495 nm in the case of UEX)?

4) The numbers in Tab. 3 have limited meaning. They’ll depend on measurement times and conditions, synchronization etc. So it makes little sense to report the number with the current precision. I would skip at least one digit.

5) I don’t understand the remark on page 13623, line 27: “However, in terms...” First the authors explain the advantages of making the comparison under clear sky conditions then they put all data together.

6) I don’t understand the remark on page 13630, line 17: “However, a large deviation...”

7) Apparently, the deficiencies of the array spectroradiometers are not specific for any manufacturer. If this is the case it should be stated clearly to avoid that a particularly good or poor performance is associated with a certain manufacturer.

Technical comments /typos:

Page 13611, line 15: Replace “low solar zenith angles” by “large solar zenith angles”.

AMTD

8, C4970–C4972, 2016

This typo probably occurred because “low sun” conditions were meant. Perhaps it’s generally better to use “large” and “small” solar zenith angles to describe “low” and “high” sun conditions, respectively.

Page 13611, line 21: “... a limited range of solar zenith angles”

Page 13614, line 21: “...where the instruments”

Page 13615, line 15: “0.5 K” (no degree symbol)

Page 13618, line 13: Should probably be “UKQ” instead of “UKG”

Page 13620, line 8: “to the other”

Page 13620, line 9: Avoid “w.r.t.”

Page 13621, line 11: Mention the type of optics used with the instruments EKX and EKB

Page 13626, line 27: “are averages of...”

Page 13633, line 3: “were” instead of “may be”

Page 13633, line 6: “was” instead of “are”

Table 2: Acronym JYO

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 13609, 2015.