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Atmospheric Measurement Techniques Discussions

Interactive comment on "Temperature dependence of the Brewer global UV measurements" *by* Ilias Fountoulakis et al.

Anonymous Referee #2

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Brewer spectrophotometers have been used extensively in the past for measuring global UV irradiance. The high number of such instruments performing such measurements worldwide for very long periods, makes investigations like the one submitted valuable for the UV community.

Comments

Section 2

Since this paper is introducing a number of different instruments with different characteristics, including hardware, calibration facilities e.t.c. it would be essential for the authors to start this paragraph describing the main problem.

Temperature effect on Brewer measurements can be linked with PMT, diffuser differ-

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ence in temperature compared with the ones during the standard calibration procedure, hysteresis effects, wavelength shift issues, other kind of stresses within the instrument.

The authors have to prioritize these effects and describe the methodology followed in order to eliminate or to investigate the effect of each of these factors.

A table with the instruments used together with some details on the method used for each one could be also useful for the reader.

Section 3

“carried inside” ? you mean moved from sun measurements to the calibration room ?

Figure 4 shows that changes are not wavelength independent, at least for some instruments

The standard deviations of what ? how many measurements have been performed for each temperature, wavelength ?

In addition it is worth noted that only one instrument has a positive change with temperature in TR3.

Are Ylliantilla results applicable to the Brewer using diffusers? Do some of the instruments use modified (that the Brewer initial) diffusers ?

Section 3.2

“This confirms that the different patterns found between the three TRs are due to the change in the transmissivity of the Teflon diffuser.”

Based on this and figure 2: For measuring the instrument response the calibration is performed with the 1000W lamps in an environmental temperature of 25 degrees. Do this results imply that it is possible that, based on the above statement, the total duration of the normal calibration procedure may affect the calibration results ? (by having the diffuser heating up). Or most importantly that sun and 1000W-lamp mea-

surements are partly incompatible due to the different diffuser temperature inside the calibration room and outside, even if the ambient and calibration room temperatures are 25 degrees ?

Figure 4. I wonder how reliable are the results for wavelengths below 300nm given the low counts that the instrument is measuring using the 1000W lamp.

Wavelength shifts for higher wavelengths is not out of the discussion even if a wavelength control/correction is performed at 297 (?) nm.

Conclusions

I understand that this is a mostly technical paper. But it would be interesting for the readers to demonstrate the brewer temperature effect a bit more clear and realistic. Reading this work I come to the conclusion that:

a. since there is a heater in the instrument (and not a cooling system), we are mainly interested by the temperature effects from 10 to 40+ degrees

b. Brewer temperature is different from ambient temperature (most probably the instrument (out on the sun) temperature is higher in the hot days than the temperature (measured in the shadow).

c. Temperature issues will affect mostly diurnal and seasonal global UV irradiance related investigations and not so much year to year trends.

So since the study is including a number of instruments that have different response in the temperature change and also perform measurements in very different environments concerning actual ambient (and Brewer) temperatures, it would be interesting to show the actual global UV % deviations for each site based on the actual brewer temperature. Either on a daily basis using the daily temperature change or during the year using the temperature at the measurement performed at the maximum -all year long existent- solar elevation angle.

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