

## ***Interactive comment on “Characterization of an EKO MS-711 spectroradiometer: aerosol retrieval from spectral direct irradiance measurements and corrections of the circumsolar radiation” by Rosa Delia García-Cabrera et al.***

**Anonymous Referee #3**

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Review of the “Characterization of an EKO MS-711 spectroradiometer: aerosol retrieval from spectral direct irradiance measurements and corrections of the circumsolar radiation.”

The paper presents results of direct sun measurements and aerosol optical depth (AOD) retrieval for an EKO MS-711 spectroradiometer. An extended investigation is presented for the circumsolar radiation correction.

In my opinion the paper is very well written and is well within the scope of AMT. Spectro-

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radiometers have been used less nowadays for atmospheric monitoring due to reasons that the authors quote in their manuscript and I personally agree. However, they are very important instrumentation as the spectral characteristics of the solar irradiance is the desired one in order to be used for a number of atmospheric-radiation related issues.

I only have some minor comments on the manuscript.

Instrument characterization and performance.

The authors use the term instrument characterization in the title so I would expect some results on other aspects such as linearity, stray light etc.

In their instruments characteristics table they quote that the instrument step is way less (~20 times) that the optical resolution. Can you provide some more information on how each measurement is performed? is it some kind of averaging ? or just a very wide entrance slit ?

The fact that the optical resolution is ~7nm compared with 2nm and 4nm for CIMEL UV bands (I had the impression that CIMEL 380nm filters are also 2 nm wide), could be a source of uncertainties in the Rayleigh or Langley constants parameters of the EKO compared with the CIMEL? Meaning that the spectrum relative changes for different solar angles and atmospheric conditions can be different for irradiances at 340nm  $\pm$ 7nm and 340nm  $\pm$ 2nm.

The calibration constants and difference with the manufacturer ones seems noisy in the UV range, authors claim that “differences are attributed to the low halogen lamp signal in this region experienced during the factory calibration, and low instrument sensitivity in this region” could this affect AOD at UV results?

However, the stability of the instrument in the visible+ range for the 3 year period between the manufacturer and the Langley calibrations are impressive. Maybe this also has to be pointed out in the text.

C2

### Circumsolar radiation

Circumsolar radiation contribution to the “true” measured direct irradiance is linked with AOD and also with aerosol types (phase functions). Higher AODs and forward scattering aerosols would introduce higher circumsolar correction factors. As in this work it is mentioned that a mixed (OPAC) based aerosol type is used, have you tested the actual correction and the effect on the AOD retrievals on a day with very high AOD and forward scattered aerosol type (e.g. dust aerosols) ?

Other Line 41 GAW-PFR showing lower values Table 1 : cosine response : is that applicable to the DNI spectral measurements ? Lines 108-110 : is this for direct or global irradiance ? Lines 212: 0.09”

Congratulations for a very interesting work.

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-467, 2019.