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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of UV-RSS spectral measurements and TUV model runs for clear skies for the May 2003 ARM aerosol intensive observation period" *by* J. J. Michalsky and P. W. Kiedron

Anonymous Referee #2

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General comments:

The paper by Michalsky and Kiedron presents a comparison of measured and modeled solar UV irradiance spectra during a period of seven days using independently measured ozone column, aerosol optical depth and surface single scattering albedo. The paper presents actually a sensitivity analysis on the effects of the aerosol optical properties (namely the asymmetry parameter and single scattering albedo) which may be considered as an indirect determination of those parameters.

Although such studies have been presented many times in the past with different instruments and models, this paper presents comparisons of two different types of measurements simultaneously (direct and diffuse). This may be considered as the main innovation of the paper. In addition the authors discuss the difficulties that are introduced in calculations of irradiance at the surface with RT models due to the absence of a widely accepted extraterrestrial solar spectrum, and they propose to compare measurements with model results using the spectral transmittance instead of the absolute irradiance.

The paper has many figures. I think that some of them could be easily eliminated, either by combining some of the results in one figure, or by describing the results in the text. In addition I suggest that figures should present fractional deviations in %, instead of absolute transmittances. Then it will be much easier to see the differences and also the absolute level of agreement, as well as to overlay more lines reducing thus the number of figures. In most figures there are small discrepancies in the spectral range of the ozone absorption which have not been discussed, and which will probably should up if the figure a plotted as % differences.

Specific comments:

17403, 29: The focus of this study should not only be to compare measurements with model results, but also to examine the sensitivity of their agreement to aerosol properties.

17406, 17: My feeling is that the chosen reflectivity is rather low, as discussed also by the authors later in the paper. I suggest to consider changing it to a higher and more realistic value (closer to 0.03 for example).

17408, 12: "well matched"; How well? Wouldn't it be better to specify a range of their agreement in %?

17409, 2: Figure 3 is unnecessary. It could be combined with figure 2.

ACPD

7, S7692–S7694, 2007

17409, 25: Would it be possible that the direct irradiance measurement was slightly wrong? How one can be certain that the optical depth was wrong? At least this possibility should be mentioned.

Technical corrections:

17402, 22: "global horizontal model" does not really describe a "radiative transfer model for global horizontal irradiance calculations".

17403, 8: "to compare 24 spectra" Remove "to" before "24"

17403, 23: Similarly to the first comment: What is "direct models"?

17404, 16: "is limited and a function". This sentense does not make sense.

17407, 6: Shouldn't it be Jerry Harder (personal communication)?

17408, 25: Remove "that" after 550 nm.

17409, 10: Change "asymmetry parameter" to "singe scattering albedo". I guess the value of 0.871 refers to ssa.

17411, 18: Replace "Dobson values" by "total ozone measurements".

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 17401, 2007.