

Interactive comment on “Seasonal distribution of aerosol properties over Europe and their impact on UV irradiance” by N. Y. Chubarova

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The answers to the Interactive comment on “Seasonal distribution of aerosol properties over Europe and their impact on UV irradiance” by N. Y. Chubarova by Anonymous Referee #3.

1. At the very end of the conclusions it is stated: “In addition, at high latitudes the Q_e variations due to aerosol are much more pronounced and can significantly influence the Q_e year-to-year variability, that should be taken into account while revealing the ozone component in Q_e long-term trend”. This statement does not take into account the methods using spectral data for trend detection. When using such methods the aerosol influence can be separated from the ozone influence due to its different wavelength characteristics. Therefore the statement needs to be modified. An analysis of the

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possibilities of UV trend detection can be found for example in “Glandorf M., Arola A., Bais A., Seckmeyer G.: Possibilities to detect trends in spectral UV irradiance, Theor. Appl. Climatol., DOI 10.1007/s00704-004-0109-9, 2004”.

Thank you for citing the paper which I did not know. Yes, of course, it is possible to take into account for aerosol influence in long-term trends. In the paper I only mentioned that this is necessary to take into account. Unfortunately, not many sites have the information on spectral UV measurements. I have added the following text (after the sentence “In addition, at high latitudes ...”) in the updated version of the paper:

This is possible to fulfill using spectral measurements as described for example, in Glandorf et al. (2004).”

2. The validation of the model by measurements with a broadband sensor is not ideal. Instead spectral measurement are to be preferred. In any case the author should discuss findings of other authors on the relationship between aerosol optical depth and UV attenuation and should analyze the consequences for the derived aerosol influence taking into account the uncertainty of the relationship between aerosol optical depth and UV. Especially different single scattering albedo may lead to different conclusions.

Yes, I agree, that spectral measurements give the most accurate information. But nevertheless, even broadband measurements can be used for this task if they have quite stable calibration and known spectral sensitivity curve.

I have added the text in the updated version of the paper: Before the paragraph beginning with “ In addition, ...” (p.1879) I have added the following paragraph:

The effects of aerosol on UV attenuation based on spectral measurements as well as model simulations have been discussed in many papers (see, for example, Arola et al., 2003, Badosa et al., 2007, Balis et al., 2004, Früh et al., 2003, Jaroslawski and Krzy’scin, 2005, Krotkov et al., 2005, etc.). For most cases the agreement between model and observed values lies within 10%. This uncertainty can be observed due

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to non accounting for some aerosol properties, and due to possible effects of gas absorption. However, aerosol optical thickness and single scattering albedo remain the most important characteristics, which knowledge is essential for UV retrievals.

3. The figures may be partly too small. The author and the editor should check that and should provide more readable figures.

I am ready to make the figures larger if the editor would recommend this. However, as I understand, in electronic version it is possible to significantly enlarge the figures without changing them.

Thank you for helpful comments!

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 1863, 2009.