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Discussions

Interactive comment on "Monte Carlo method for determining uncertainty of total ozone derived from direct solar irradiance spectra: Application to Izaña results" *by* Anna Vaskuri et al.

Anonymous Referee #3

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The article by Vaskuri et al presents a novel method for implementing correlations in measurement uncertainty calculations on the example of total ozone retrieval using spectral irradiance measurements. The approach presented is very promising and the high complexity of the scientific work dealing with correlated spectral irradiance measurements is of major importance for the community. The experimental and scientific work is on a very high level including a thorough characterization and understanding of the uncertainties of the applied instruments and methods. However, some of the scientific details are expressed incomprehensible and in some cases more details are needed prior to publication.

Specific comments:

P.4. Table1 1. – 3. The table for Uncertainties including the fraction of correlation need further explaining, especially since the issue of correlation is introduced much later in section 4. If these uncertainties have been published in that form earlier, quotation would be helpful in the figure caption. If not, these tables should be moved to section 4 prior to table 4 or in combination with table 4 since the explaining is done on p.15 L4-8. Why is uncertainty of radiometric calibration of AVODOR so much higher than for the other instruments? Just because of low SNR in the UV region? The stated uncertainties given in the tables are valid for the whole spectral range of the instrument? I would expect uncertainties related to radiometric calibration and measurement noise to be wavelength dependent. Or are these stated values the upper limit of uncertainties? In the following text, there is a lot discussion about straylight effects. However, there is no explicit uncertainty component related to straylight or straylight correction?

P. 7, L15 The least square fitting might lead to local minima instead of the global minimum. How is that accounted for? Especially if AOD and TOC are both fitting parameters.

P.9, L20 "In this paper, we do this for all components, where the mechanism of contributing to the uncertainty of TOC is known." I guess these components are those with correlation "full" and "random"? This could be specified here.

P.11, Figure 4 That figure is a bit confusing. For underlining the statement on full, unfavorable and random correlation the display of one colored graph is sufficient. The additional information gained from the u=5% and u=2.5% graph, as well as the black solid lines is not explained in the plain text and incomprehensible explained in the figure caption.

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