Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., community comment CC1
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Comment on amt-2022-104 from I. Veselovskii

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Community comment on "Estimates of remote sensing retrieval errors by the GRASP algorithm: application to ground-based observations, concept and validation" by Milagros E. Herrera et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-104-CC1, 2022

Authors provide very detailed description of application of GRASP algorithm to the Sun photometer data inversion, and to the combination of this instrument with multiwavelength lidar as well. The main goal of this study is estimation of uncertainties of inversion, which is definitely very important scientific task. The manuscript is very well written, though is rather long with large amount of illustrations. On another hand, it provides the reader with all necessary information to understand the inversion technique and expected retrieval uncertainties. So I think such length is acceptable.

I general, I think that this is very deep research, which is suitable for publishing in AMT. I have just several technical comments, concerning combining the lidar and Sun photometer.

Section 3.3. It would be useful to provide modal radii of the fine and coarse modes for aerosol types used in the model. Modal radii depend on the relative humidity and may change with height. Can it influence the uncertainty?

Fig.9. I am a bit confused. What is height distribution of particle concentration used in this modeling? For what height the results are shown? Does uncertainty depend on height?

Fig.11. The height distributions for dust and smoke are the same? In real situation these are always different, so would be good to discuss how it will influence the modeling. Again, for what height lidar ratios are shown?

Fig.12. The results are shown for the mixture of two components. Any chance to retrieve the profiles of two components separately?