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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Validation of aerosol backscatter profiles from Raman lidar and ceilometer using balloon-borne measurements" *by* Simone Brunamonti et al.

Anonymous Referee #2

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The manuscript shows an intercomparison between a Raman lidar, a commercial ceilometer and an optical in-situ sonde takes as reference. This contribution doesn't represent a substantial contribution to scientific progress and I agree that it is more indicated for Atmospheric Measurement Techniques than ACP.

Major Issues:

The FOV correction factor has been computed with a well defined aerosol distribution. How the results change if a more likely bi-modal distribution is used instead? Or changing the distribution width and/or the refractive index? As it is implemented, the correction is depending on a particular type of aerosol.

The statistical intercomparison is unclear and counter-intuitive. I would suggest to the authors to use the Pearson Cross Correlation coefficient paired with the Root Mean Square Error, on the whole atmospheric profile and at different altitude ranges, e.g. into the PBL, free troposphere... Figure 5 and 8 are unnecessary.

CHM15K inversion should be explained more in detail, as the molecular signal can be very low at 1064nm.

Optical measurements are strongly affected by water vapor absorption at 940nm. Usually, the ceilometers at this wavelength use a radiative transfer computation to correct the profile. What about COBALD sonde? In the text it is not mentioned. Moreover, some equations are needed to better explain lines 25-28 (Pag. 4).

It would be more interesting to intercompare the two instruments vs. COBALD for different meteorological conditions and aerosol loading.

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