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Atmospheric Measurement Techniques Discussions

Interactive comment on "Ceilometer aerosol profiling vs. Raman lidar in the frame of INTERACT campaign of ACTRIS" *by* F. Madonna et al.

Anonymous Referee #2

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Ceilometer aerosol profiling vs. Raman lidar in the frame of INTERACT campaign of ACTRIS.

by F. Madonna, F. Amato, J. Vande Hey, and G. Pappalardo

Several types of ceilometers are widely distributed over the globe and have the potential to be used for quantitative studies of atmospheric aerosol properties. In this paper, the capabilities of three common ceilometer types are investigated by comparing their aerosol profiles to the ones of an advanced Raman lidar system during the inter-comparison campaign INTERACT conducted at CNR-IMAA Atmospheric Observatory in Potenza, Italy. This campaign lasted for about 6 month so that a sufficient number of observations appear to be available for this study.

The paper concludes, besides an overall agreement of each ceilometer and the lidar in aerosol properties, that there are discrepancies: 1) in the temperature stability of the ceilometers, 2) the water vapour interference for two of the instruments, 3) the stability of the overlap function in one case, and 4) they found that the difference in backscatter coefficient between the lidar and the ceilometers is proportional to the value of the retrieved backscatter coefficient. However, these conclusions drawn are of more describing nature, than numbers and error bars.

Detailed comments sorted by page and line:

p.12410, l.29: VAISALA or Vaisala?

p.12411, l.18: The "idiosyncrasies of cloud base detection" is not studied in this paper.

p.12411, l.25: Again: VAISALSA

p.124114, l.27. Overlap for MUSA is 405 m or 330 as in Table 1?

p.12415, l.17: normalisation constant – normalization factor may be more appropriate in this case.

p.12416, l.18: roto-vibrational Raman signal: of the lidar, I suppose. This may be confusing.

p12416, l.21: How is the calibration factor automatically selected by the ceilometer? I guess you mean the amplification of the detectors sensitivity for adjustment of the signal to the atmospheric conditions.

p.12417, l.23: use: attenuated backscatter coefficient

p.12418, l.22: Z^2 is missing in equation (2), compare to equation (1).

p.12421: l.15-l.31: So, what is causing the large variability of 100% ? Did you find any reason besides the small WV contribution?

P12422, l.8: rather use overlap 'function' here. p.12425, l.1: backscatter coefficient

p12425, l.9: Transmittance is T

p.12426, l.8: CIAO Lidar = MUSA

p.12428, l.22: backscatter coefficients, see comment above.

p. 12428-29: the advantage of the use of particle extinction at 355 nm instead of beta is not clear, see also Fig 11.

Fig. 1 is not used in the text.

Fig. 2: The colours in the left panel seem to be mixed-up.

Fig. 5: The legend outside the figure (TITO) is not necessary, since its only one data series, IWP, shown here.

Fig. 7: very small labelling of the axes. The whole graphs are small.

Fig. 9: Would an overlap correction really account for the discrepancies in the lower altitudes for the CHM15k? Backscatter coefficient

Fig. 10: very small labels, difficult to read, Backscatter coefficient.

Fig.11: very small labels and figures. The dotted clouds are difficult to interpret. The graphs should also be named as a), b), c) . . . also on the other figures.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 12407, 2014.