

Interactive comment on “Recommendations for processing atmospheric attenuated backscatter profiles from Vaisala CL31 Ceilometers” by Simone Kotthaus et al.

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Response to Anonymous Referee #2

We would like to thank the referee for their positive feedback and the valuable suggestions to improve the manuscript. Please see comments below.

Please note that an additional dataset is included in the revised version as these observations provide additional insights on sensor-specific characteristics (e.g. the instrument-related background signal). Further, the near-range correction (Sect. 3.4) is updated in the revised version to make it more generally applicable, i.e. the new version can also handle more complex conditions. Conclusions and recommendations

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are updated to reflect results presented in the revised version.

This manuscript is an excellent example of how the scientific community (COST-TOPROF) can positively influence industrial developments (Vaisala).

The given final recommendations, along with the detailed corrections procedures, can serve the CL31 ceilometer users well. Simultaneously, it is shown how a nontrivial and especially technical approach should be undertaken, to properly use available off-the-shelf instruments.

→ Thank you for this comment. We have included in the summary that the initial product of the CL31 ceilometer, i.e. the cloud base height, might be readily useful without deeper understanding of the instrument-specifics, however, that special care needs to be taken when working with the attenuated backscatter.

I must agree with the Referee#1 that the weak point of the manuscript is the somewhat confusing introduction. I feel the introduction comes across as rather general, referring to scientific investigations conducted with any type of ceilometer. From one aspect, this is an interesting approach, as there are not that many technical or scientific papers on ceilometer remote sensing. However, the authors mention to great extent, only those publications that are referring to the CL31 ceilometer. It would be more beneficial to guide the reader toward studies also performed with other ceilometer types, such as

→ Given the current work focuses on Vaisala CL31 sensors, the introduction did not cover other sensor types. The Introduction still focuses on the CL31 ceilometer, however, now includes references to the Emeis et al. (2009) study which compares two CL31 sensors to each other and also to an LD-40. Further we include Haeffelin et al. (2011) who compare a CL31 attenuated backscatter profile to that of a Jenoptik CHM15K and Madonna et al. (2015) who compare a Vaisala CT25K to Jenoptik and Campbell systems.

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Heese et al., Ceilometer lidar comparison: backscatter coefficient retrieval and signal-to-noise ratio determination, *Atmos. Meas. Tech.*, 3, 1763–1770, 2010

→ Now referenced, page 2, line 27

Stachlewska et al., Ceilometer Observations of the Boundary Layer over Warsaw, Poland, *Acta Geophysica*, Vol. 60, No. 5, 1386-1412, 2012.

→ Now referenced, page 2, line 20

There are also comparative studies that were conducted with various types of ceilometers and/or other instrumentation or model outputs, that in my opinion, should be mentioned; to name just a few

Madonna et al., Ceilometer aerosol profiling versus Raman lidar in the frame of the INTERACT campaign of ACTRIS, *Atmospheric Measurement Techniques*, 8(5):2207-2223, DOI: 10.5194/amt-8-2207-2015

→ Now referenced, page 4, line 22

Emeis et al. Observation of the structure of the urban boundary layer with different ceilometers and validation by RASS data, *Meteorologische Zeitschrift*, Vol.18, No. 2, 149-154, 2009

→ Now referenced, page 3, line 22

Selvaratnam et al.: Comparison of planetary boundary layer heights from Jenoptik ceilometers and the Unified Model Forecasting Research Technical Report No: 605 October 13, 2015

→ Now referenced, page 2, line 20

I would however like to mention that I do appreciate how clearly and succinctly this paper is written, in particular the summary.

→ We have updated and restructured the summary to make it more accessible to the

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reader.

I hereby recommend publishing the manuscript after minor revisions.

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Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/amt-2016-87/amt-2016-87-AC2-supplement.pdf>

Interactive comment on *Atmos. Meas. Tech. Discuss.*, doi:10.5194/amt-2016-87, 2016.

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