

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

Anonymous Referee #3

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This manuscript presents a set of corrections to be applied to CL31 ceilometer data. It is worthy to highlight how the corrections are presented according to different firmware versions and sensors. The excellent scientific significance is evidenced by its contribution to the climatological studies which have to rely on old databases and, as it was already commented by the Anonymous Referee 2, by its contribution to the industrial developments. Despite I recommend its publication, the authors should consider the following comments:

- I agree with the previous Referees regarding the introduction and conclusion. Maybe the summary can be split into Summary with a 'list of corrections' and finally the Conclusions.

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- Following the previous comment, the Summary surprisingly provides more information about the ringing effect than its proper section. For example, the ringing period is not provided during the discussion but it is included in the summary: Page 17 Line 9-11: 'ringing effect at short time scales of hours to weeks'. I suggest a careful revision.
- The lack of references to other papers of other type of ceilometer have been evidenced by Anonymous Referee 2. The introduction may show other corrections as the overlap correction method proposed Hervo et al., 2016 (10.5194/amt-2016-30).
- The Section 3 and Section 4 are named 'Profile corrections' and 'low-level corrections', respectively. This is confusing since the low-level correction are also profiles corrections. I suggest to change name of Sections 3 and 4 by 'Far-field corrections' and 'Near-field corrections', respectively, or similar. Additionally, the phrase 'low-level correction' is confusing (is it about near range or 'not important' corrections?). Near- and far-field corrections or near- and far-range correction may help to avoid misunderstandings.
- Page 8 Line 11: state -> states.
- Page 8 Lines 18-22: In this section it is commented that the background noise cannot be analyzed below 2400 meters because of the aerosol and humidity and because of the termination hood is unusable. Then, the background is extrapolated from the upper region. Thus, this assumption is performed in the most important region (below 2400 m) where the aerosol used to be present. Authors should include a discussion about the uncertainty due to this assumption and/or how these uncertainties may be estimated. For example, measurements performed at high stations (at mountains) may avoid the aerosol and humidity and thus, the methodology might be applied without assumptions.
- Obstruction correction: as far as I understood, this section presents a method to correct the first 10 bins of the profile. This method uses a linear fit for the last 5 bins (5th-10th) whereas the 1st, 2nd and 4th are normalized to the 3rd one. The normalization of the first four bins is based on the following argument: 'Generally, the first four gates have height-invariant factors'. I think that this phrase means that the backscatter signal

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is usually height-independent in this region. Despite I agree with the sentence, 'generally' doesn't mean 'always'. I would like to warn that the continuous and widespread application of this correction may mask real signal changes in the first meters of the atmosphere as the first convection cells (after sunrise) or different hygroscopic growth at different altitudes during fog formation. Further studies in this way should be performed to assure that no real changes are being masked.

As it said before, I strongly recommend publishing the manuscript after minor revisions.

[Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-87, 2016.](#)

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