Review of the manuscript 'ampycloud: an open-source algorithm to determine cloud base heights and sky coverage fractions from ceilometer data'

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Dear Editor and Authors,

Here I present only a high-level review of the manuscript as requested by the editor. First, I want to disclose that I am not an expert on aviation rules and regulations, and I can only comment on the atmospheric physics aspects of the manuscript. I find the proposed algorithm reasonable and the authors' presentation satisfactory, although some points are unnecessarily convoluted. The biggest shortcoming is the reliance on the instrument's determined cloud base and vertical visibility. The authors present the algorithm as a way of avoiding the black box algorithms of ceilometers, but their algorithm is still crucially dependent on the black box algorithm used in the Vaisala CL31. There is no guarantee that different current or future models will use the same underlying algorithm, and this can in turn make the authors' algorithm unreliable depending on which particular CL31 models are used (I recommend reading Kotthaus et al., 2016 on this matter). It would obviously be much better to base the proposed algorithm on the backscatter reported by the instrument. This would also allow for more complex processing because the backscatter provides information about cloud thickness and can measure multiple cloud layers in one profile, to the extent that the laser signal is not attenuated. That said, if the potential users of the algorithm are warned about this and perform testing on their set of ceilometers before operational use, it might not be a big issue. I cannot judge the compliance with ICAO rules, and Referee 1 might have valid concerns on this. I also agree with Referee 1 that the methods used are perhaps too complex for the task. At the same time, performance is not really an issue with this algorithm because it is sufficiently fast for operational use. Another smaller issue is that the algorithm description (slicing, grouping, and layering) is relatively complicated, and the manuscript would benefit from a preceding section describing all three steps and the motivation for them in a high-level overview, as well as a better description of the parameters. For example, by adding a one-sentence description of each in Table 2. Overall, I am inclined to recommend the publication of this manuscript.

Kind regards,

Peter Kuma

References

Kotthaus, S., O'Connor, E., Münkel, C., Charlton-Perez, C., Haeffelin, M., Gabey, A. M., and Grimmond, C. S. B.: Recommendations for processing atmospheric attenuated backscatter profiles from Vaisala CL31 ceilometers, Atmos. Meas. Tech., 9, 3769–3791, https://doi.org/10.5194/amt-9-3769-2016, 2016.