

Author's response to:

RC#1 from Raphaela Vogel

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Dear Raphaela Vogel,

Thank you for again carefully reading the manuscript and pointing out some more minor issues. The requested clarifications were incorporated into the manuscript.

In order to separate the reviewer's comments and the author's response, we printed the comments in black and the response in blue.

Sincerely, on behalf of all authors

Heike Kalesse-Los

The revisions have clarified the manuscript very much and I suggest to accept the manuscript after addressing these minor issues:

L195ff: I still don't fully understand the CBH layer processing. You use a daily 'processing interval', so you identify the same layer heights for the entire day? What happens if stratiform layers near 2km only exists for <5% of the day? Will potential virga associated with these stratiform layers completely be ignored? Maybe an illustration would help readers understand this more quickly.

Yes, it is true that the Virga sniffer identifies the layers for the entire processing period. In our case it was one day, but it depends on the input data (for example, if you enter one hour of data, the processing interval is one hour). However, it is not true that the same height is assumed for each cloud in the layer (you wrote "same layer heights"), much more clouds of similar height (within the `cbh_layer_thres` threshold of in our case 500m) are considered with the same layer index for the processing period. In case this was not clear, we have expanded the explanation in the given text passage.

The second part of your question refers to the pre-processing of the CBH, in particular the "cleaning" module. You are of course correct, if there is a single stratiform slice that is less than 5% of the processing interval (72 minutes in our case) after interpolating gaps or filling LCL values, the slice will not be identified and the virga will be ignored. We would call a cleaning threshold of 5% "aggressive"-cleaning and this value should certainly be chosen with care by the user, taking into account the processing interval and cloud height variability. In our case, there were only a few isolated layers, so we find the 5% value justified. The threshold and its effect are discussed mainly in Appendix B1. We therefore refrain from an additional explanation in the manuscript.

We also refrain from a sketch for explanation in order not to additionally lengthen the manuscript. However, we are thinking about including a drawing in this direction in the documentation of the software package.

L316: Isn't time-step 6 'as time-step 1' (rather than as time-step 5)? → corrected.

L331: add (optional) here? → '3.4 Virga mask refinement (optional)?' → done