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Interactive comment on “Combined vertical-velocity observations with Doppler lidar, cloud radar and wind profiler” by J. Bühl et al.

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We feel to be forced to reply immediately to the comments of reviewer #1, just to avoid that other reviewers are too much influenced by this rather negative and for us surprising review with the final recommendation to reject the paper. This final conclusion of the review #1 is to our opinion not justified. In the following, we briefly list the reasons, we will reply later exhaustingly when we have all reviews in hand.

The points that are put forward are, to our opinion, mainly technical issues and cannot be used as arguments for rejection, because they can be easily met. We are quite surprised to be confronted with such a rejection statement during the open-discussion phase of a paper, that has already gone through the pre-review process. We have to

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point out that the paper has been written by remote-sensing experts of German Meteorological Service and TROPOS, so we are able to understand and to meet methodological and technical issues risen in the review. In this paper, we want to show what exciting new possibilities come up with such a combination of instruments. Maybe this did not become clear, but we can readily discuss this issue more thoroughly in the next revision of the paper.

Reply to some issues that were put forward by reviewer #1 as justification of rejection:

"About the uniqueness of the measurements" It is certainly true that ARM runs similar instruments on one site. However, to our knowledge, there is no paper that shows how such a combination of instruments is applied to vertical-velocity observations in mixed-phase layered clouds. Already the very small measurement interval of only 10s stands apart from other operational products derived from wind-profiler data and allows more insight into the small-scale variability of the atmosphere.

"Missing information about data quality and noise filtering" The criticism " Doppler lidar is still an uncommon instrument and few articles present its data and even less explain how to distinguish its valid observations from noise. In my opinion, it is essential that the techniques used to filter each dataset be presented in details. " is extremely vague. The Doppler lidar technique has been established for such a long time. Even though it is absolutely justified to ask for details of data processing, this is no reason to reject a paper.

"Classification of vertical velocity features" We show that this combination of instruments gives us a unique way of analyzing vertical velocity structures in the atmosphere. Those "structures" can, e.g. serve as an initial point for detailed cloud modelling. We agree to provide a more thorough discussion of the scope of this method.

"No validation or cross-comparison is offered for the terminal velocity retrievals" For direct cross-comparison another instrument would be needed that can sense the pure terminal fall velocity of the particles relative to the air. We can't imagine any instrument

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that could be used for such a cross-validation. If an instrument like this would be available, there would be no need for the development of such combined techniques. A validation on the basis of simulations may be possible, but this is outside of the scope of this work.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 353, 2015.

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