

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

Anonymous Referee #2

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See attached pdf.

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/8/C270/2015/amtd-8-C270-2015-supplement.pdf>

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

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Review: Combined Vertical-Velocity Observations with Doppler lidar, Cloud Radar and Wind Profiler. By, J. Bühl, R. Leinweber, U. Górsdorf, M. Radenz, A. Ansmann, and V. Lehmann

The dataset presented in this paper is very interesting and worth of publication, the potential to deliver excellent insight in aerosol-cloud-precipitation processes is definitely there. However the paper proceeds somewhat hastily from first-order assessments to conclusions. There is a surprising lack of discussion of the different spectral responses of the three instruments to various types of targets, and the 'retrieved velocities' seem to be treated all the same way (see comment on Figure 7). Much of the evidence presented is not clearly supporting the statements. I don't think the authors actually ignore the former, or that they can't provide the latter, but in this manuscript they are not evident. It would require substantial expansion and quality control to become publishable.

I also recommend to rebalance the text in highlighting the unique value of each of the three measurements. The authors do emphasize the synergistic value of having these three measurements collocated, but as it is, it seems the text tends to give the impression that advocacy for Doppler lidar over the other two may be affecting the selection of arguments. In some cases the claims seem very reasonable and well substantiated, but in other cases they appear either weak or even biased. It would be helpful if the authors highlighted the unique information provided by each measurement in a more detailed fashion.

Recommendation: Major revision.

Major comments:

Figure 4: by visual inspection only of the upper panel I cannot concur with the authors that Profiler and Lidar concur more often and only the Radar has outliers. I see one Radar outlier at ~4300 UTC, but also an area where Lidar and Radar agree, and Profiler is outlier at ~4400 UTC, and an area where Radar and Profiler agree and Lidar is outlier at ~4750 UTC. I will not draw conclusions based on this, other than a more quantitative analysis and specific explanation must be provided to make the stated point.

In regards to the fact that only lidar can make measurements at 100 m above the ground, also some more explanation should be provided. Since the Radar and Lidar have the same range resolution one would expect similar short range performance, any difference should be due by specific technical details adopted in each one based on affordability etc. A radar of 60 m resolution can be designed to detect targets at 100 m distance if one makes it a requirement for the system. The statement as provided in the manuscript is so general that one would think this being an intrinsic property of lidar vs radar, which would be incorrect. At the very least, it should read "For observation in the boundary layer it is most notable that, at the MOL site, the Doppler lidar... or something to that effect.

Fig. 1.

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