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Discussions

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Interactive comment on "Characterization of Boundary Layer Turbulent Processes by the Raman Lidar BASIL in the frame of HD(CP)^2) Observational Prototype Experiment" *by* Paolo Di Girolamo et al.

Anonymous Referee #2

Received and published: 6 October 2016

The authors report simultaneous and co-located measurements of higher-order moments of the turbulent fluctuations of water vapour mixing ratio and temperature. These measurements, in combination with measurements from other lidar and in-situ systems, are indeed important to verify and possibly improve turbulence parameterization in weather and climate models.

These appear to be the first measurements of this kind performed by a single lidar system. The capability to collect simultaneous and perfectly co-located measurements of turbulent parameters throughout the Convective Boundary Layer is itself a stand-alone

achievement of paramount importance. This demonstrated capability may ultimately lead to a gained confidence by the data user community, and the atmospheric science community at large, on these data. Additionally, the paper appears to be well written and all aspects of the system setup and data analysis necessary for the purpose of the measurements of turbulent fluctuations are carefully addressed.

Because of these arguments, I consider the paper suitable for publication after addressing few minor suggestions and corrections, which are hereafter listed.

Comments:

Abstract

In the abstract is missing a sort of "punch line". Why the measured values in terms of water vapor and temperature are important and who is going to use those measurements?

The retrieved planetary boundary layer height in the manuscript is 1290+/-77. I know that this number comes from the standard deviation calculation, but which is the physical meaning of this value as the lidar resolution is discrete? Doesn't make more physical sense to round up to the closest available range bin?

Pag 2 Line 30 please read "unstable"

Pag 7 Line 1-3. It is not clear if the calibration coefficients were calculated globally or for each single radiosonde launch

Page 11 Line 25, and in all the manuscript: please change leakage with "cross-talk"

Page 13 Line 18 Most of the backscattering values are less than 1 10-6 m-1 sr-1

Page 18 Line 21 I suggest adding two more works that will give an exhaustive view of PBL retrieval methods by lidar means. The works I suggest are: Haeffelin, M., Angelini, F., Morille, Y. et al. Boundary-Layer Meteorol (2012) 143: 49. doi:10.1007/s10546-011-9643-z and Conor Milroy, Giovanni Martucci, Simone Lolli, et al., "An Assessment of

Pseudo-Operational Ground-Based Light Detection and Ranging Sensors to Determine the Boundary-Layer Structure in the Coastal Atmosphere," Advances in Meteorology, vol. 2012, Article ID 929080, 18 pages, 2012. doi:10.1155/2012/929080

Pag 18 Line 27 see remarks in the abstract section

Pag 24 Line 10 Due to the intrinsic properties of lidar measurements, are the retrieved variables (water vapor and temperature) normal distributed (and then does it make sense to define 3rd and 4th moment?) Please clarify

Figure 4, 5 and 7 are not very clear and the resolution should be improved.

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Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-549, 2016.