

Interactive
Comment

Interactive comment on “Temperature profiling of the atmospheric boundary layer with rotational Raman lidar during the HD(CP)² observational prototype experiment” by E. Hammann et al.

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Response to the comments of Anonymous Referee #2

We thank the reviewer very much for reading the manuscript so carefully and for his/her very helpful comments. We will implement all points like suggested in the revised version and sent a more detailed response with it later. To the main questions, we would like to respond briefly already now:

It is true that we designed the low/high-background switch for the second rotational Raman filter for the exact laser wavelength and shapes of the transmission bands of

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our system. The optimum angles and central wavelengths will be different for other systems. Same is true for the altitude range in which the switch gives an advantage and also the magnitude of improvement. As suggested by the reviewer, we will extend the discussion in the revised version of the manuscript so that the reader can adapt the concept to other system parameters by applying the simulation to the corresponding excitation wavelength and background levels. Especially with less laser power or detection efficiency the improvement will already start at significantly lower altitudes or will be found for all altitudes. We believe that the concept will help to make existing rotational Raman lidars suitable for daytime measurements without degrading their night-time performance.

The reviewer is right about the factor 2 in equation 6. The correct factor is indeed $\sqrt{2}$.

Line 364: Indeed already a difference of up to 3 % is quite high even though it is found for temperatures of about 255 K which are outside of our main temperature range of interest; above 260 K, the modelled and experimental calibration curves agree much better with differences smaller than the statistical uncertainties of the measurements. There is a small uncertainty regarding the exact angle of the interference filters used during the measurements. In the revised version, we will further investigate and discuss this effect.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 28973, 2014.

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