

Interactive comment on “Evaluation of turbulent dissipation rate retrievals from Doppler cloud radar” by M. D. Shupe et al.

Anonymous Referee #1

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General Comments The authors present results from a technique to estimate cloud turbulent dissipation rate from Doppler radar at two sites. The retrievals from radar were compared to several in-situ and aircraft measurements and reasonable comparison was observed. The paper is well written; explaining all details of the project and clear explanation regarding the figures is also provided which is very helpful for the reader. The objectives of the paper are well defined. The referee thinks it is worthy of publication but has a few comments listed below. The comments are separated into major and minor comments.

Major Comments 1. Several dissipation rate retrieval techniques for radar/lidar have previously been studied and analyzed. The referee thinks it would be worthy to mention the other dissipation retrievals based on convolution of radar/lidar pulse, which

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accounts for the spatial averaging of the pulse. For example Frehlich et al. 1998, 2002, 2006. These techniques are based on the structure function approach, which has been shown to be more accurate than other techniques in lidar literature. Is there a specific reason why these techniques cannot be applied to cloud dissipation rate retrievals? 2. While calculating integral length scale from Equation 3, is any spatial averaging (R) performed? Are 2-3 range-gate's combined? 3. Error in variance of radial velocity fluctuations can be estimated based on evaluating the periodogram of the velocity fluctuations or estimating the co-variances of radial velocity estimates (Frehlich et al. 2002). This can be accounted in estimates of dissipation rate, which would be a good addition to the paper. Accounting for these errors might reduce the large scatter observed in dissipation estimates. Since techniques to estimate, a part of the, error in radial velocity are present out in the literature, the referee thinks they should be implemented in dissipation calculations, if possible. May be adding a figure, which shows the increase in variance of error with range (or height).

Minor Comments 1. Page 14, line 27 – “that” repeated twice. 2. Was there any filtering performed to radar data? If so, what was done?

References: Frehlich R, Hannon S, Henderson S. 1998. Coherent doppler lidar measurements of wind field statistics. *Boundary-Layer Meteorology* 86: 233–256. Frehlich R, Cornman L. 2002. Estimating spatial velocity statistics with coherent Doppler lidar. *Journal of Atmospheric and Oceanic Technology* 19: 355–366. Frehlich R, Yannick M, Michael LJ, Ben B, Sharman R. 2006. Measurements of boundary layer profiles in an urban environment. *Journal of Applied Meteorology* 45: 821–836.

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