

Interactive comment on “An Improved Hydrometeor Detection Method for Millimeter-Wavelength Cloud Radar” by Jinming Ge et al.

Anonymous Referee #2

Received and published: 13 January 2017

The paper presented a new approach to improve cloud detection from Millimeter-wavelength cloud radar measurements. The method has potentials. However, this paper didn't present enough evidence to demonstrate that the approach is really better. Thus, the paper needs significant improvements before accepting for publication.

1. As illustrated in Fig. 6, the new method picks up more thin clouds detected by MPL (correctly), but it also picks up significant more clouds in the lower troposphere due to noise. If this is the best case to illustrate the approach, it is hard to convince readers that the new approach is better.

2. Figure. 8 is a simple comparison between the two approaches; it is hard to demonstrate which one is more reliable. To show the new approach improving cloud detection

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for weak cloud signals, it is important to have lidar measurements as a truth for each cloud layer. Then you can provide quantitative assessments on improvements in both correct and false detections.

3. Although it is possible for cloud radar to detect dust storm when significant large dust particles were lifted in the atmosphere, such as dust storm illustrated in Auxiliary Figure 1. But it is not possible to detect elevated thin dust layer because large dust particles fall out quickly after transporting certain distances. Thus, dust is not a possible explain for increased cloud detection by the new method at the low atmosphere in Fig. 6. Do you have depolarization measurements from your lidar? It will be great that you can provide depolarization measurements to further illustrate the occurrence of dust.

4. For the bottom two figures of Fig. 7: How is the percentage calculated, related to the total measurement profiles or other parameters? The high increasing region in the upper troposphere is corresponding to small case numbers. So an important question is what is the over all impacts on cloud amount. From cloud microphysics retrievals, what are potential impacts on upper troposphere cloud water content and radiative heating? Any justification for the importance of these missing clouds is helpful to justify the value of the new algorithm.

5. Many typos in the paper need to be corrected, for example, line 349, “evens” should be “events”.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-1035, 2016.

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