

Interactive comment on “The importance of particle size distribution shape for triple-frequency radar retrievals of the morphology of snow” by Shannon L. Mason et al.

Anonymous Referee #2

Received and published: 28 April 2019

Review of amt-2019-100

General comments:

This study investigates the effects of PSD parameters and ice particle morphology on the triple-frequency radar signatures of snow. It introduces a novel methodology for the triple frequency Doppler radar retrieval of snow PSD parameters. Overall, the content of the manuscript is within the scope of the AMT journal. However, there is a concern about the short duration of the rimed vs. aggregated snow periods, where only one case is utilized in the radar analysis. This may not be sufficient for generalizing the results because of the absence of more robust rimed/aggregated radar-based statis-

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tics/measurements. If this paper is meant to be a single case study, it should be stated clearly from the beginning, and especially in the conclusion. Reading the paper, one can easily get an impression that the main findings of the study are potentially universal, but the generalization of the results should not be based off of a one case. Major revision is recommended.

Specific comments:

The greatest concern is about the representativeness of the measurements obtained from the 10 minutes of rimed and 15 minutes of aggregated snow from the case study. This may not be sufficient to draw generalized conclusions about how this approach and overall novel methodology works. Slightly different environmental conditions could potentially produce altered results. The recommendation is to increase the number of cases for your radar analysis, perhaps 4-5 should suffice. Measurements from different geographical/climatological regions could also help to solidify your findings. If there is not much difference between the updated and the findings from the current version of the manuscript, add few paragraphs and/or table describing the statistics of the new dataset and retain the rest of the current analysis. If large discrepancies occur, the suggestion is to present a case with the statistics close to the one obtained from all available measurements. In this way, the generalization of the results would be justified.

Technical corrections:

P7 L8: (Kneifel et al., 2015) should be Kneifel et al. (2015)

Figure 4: Add the temperature contours to the image if available.

Figure 9: “PSD shape μ ” should be “PSD shape parameter μ ”

P21 L10-14: This sentence is a bit hard to follow, perhaps split it in two.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-100, 2019.

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