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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Microphysical Properties of Three Types of Snow Clouds: Implication to Satellite Snowfall Retrievals" *by* Hwayoung Jeoung et al.

Anonymous Referee #1

Received and published: 25 August 2020

ACP-202-757 Microphysical Properties of Three Types of Snow 1 Clouds: Implication to Satellite Snowfall Retrievals (by Jeoung et al.)

Decision: Minor revision

1. General comments

This paper presents a study including detailed analyses of ground-based observation data for snow precipitation events and a Bayesian retrieval results at GPM GMI channels. I'd like to add value to this study in providing additional information on observational characteristics of snow events, which has been challenging and generally not sufficient for both numerical modeling and satellite retrieval. The data and results are

overall well organized and described, but there are some parts which need further clarifications and corrections for publication. Specific questions/comments I would suggest are below.

2. Specific comments

Line 23: Specify the region of the study. Different regions may show different snow characteristics.

Line 107-110: What does it exactly mean by this? Still explaining the Bayesian algorithms? Please clarify.

Line 135: It would be helpful for readers to specify the greatest DTB, and the thresholds for each very shallow or very deep.

Line 139: Please clarify the sentence. Add more explanation if needed.

Line 145: One additional sentence would be desirable to explain an object of the field study.

Line 146: Any reference for ICE-POP?

Line 152-153: This study also includes a Bayesian retrieval for GPM GMI, not just to analyze the observational measurements. Any additional goal to emphasize the value of this study?

Eq. (1): No need to adjust for snow events over Korea, and specifically for 94 GHz cloud radar?

Line 205-206: How to derive Tc. How is it considering the cloud base?

Line 238: 0.1 m/s is only in this case or averaged from multiple cases?

Line 244: "While quantitative analysis was not . . ." -> How do you expect this could impact on the results and future improvement (in conclusions)?

Line 266: "A common radar. . ." -> Any previous studies?

Line 268: Any references to determine snow event types over this region?

Line 291: -20 dBZ -> with that, light snow events can be yet counted sufficiently?

Line 294-295: Need more details about samples collected during the field experiment (such as the numbers basically as written in the conclusion part).

Line 427-428: Are those averaged profiles from observed samples?

Line 429: The heights to place the liquid layer are right above the snow cloud layer?

Line 433-434: Add the decreased TB values.

Line 544-545: Please make it clear that this is for the cases studied here or particularly over the target region in this study.

Line 571: What it means exactly? The half of a priori database was from model simulations?

3. Technical corrections

Line 288: Add year.

Line 556: with vast majority of “them”

Line 570: half “of”

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