On behalf of the co-authors, I would like to thank for all the comments and list of corrections that helped to improve the quality of our paper. The detailed responses to the raised issues are provided in the attached file. All the answers are written in red font to make them easier to find.

This manuscript describes a snow microphysical property retrieval algorithm that employs multi-frequency radar simulations. A novel aspect of this study is that no a priori particle size distribution (PSD) parametrization is used as part of the retrieval scheme. Instead, direct airborne PSD measurements, combined with state-of-the-art ice scattering models, are used in forward three-frequency radar simulations to retrieve microphysical properties that are then compared to independent and concurrent airborne microphysical observations. Two key findings that are not entirely unexpected, but still extremely valuable as quantifiable evidence for the community's benefit, are that multi-frequency radar and Doppler velocity measurements are key observables needed to produce optimal snow microphysical property retrievals.

Despite being limited to one case study, this study is an extremely useful addition to the literature as a proof-of-concept study that will provide useful guidance on future sensor development to ultimately produce more accurate snow property retrievals. The snowfall remote sensing community will benefit from lessons learned in this study. I find the manuscript written in a succinct and easily understandable fashion, yet provides sufficient analytical heft that conveys valuable results. I encourage its eventual publication after the following minor comments are considered by the authors.

1. Line 48: Should a different dielectric factor of liquid water be applied to the W-band radar reflectivity forward model simulations? This is a very basic methodological question, but causes much consternation among researchers applying or modeling radar simulations. The fact that the authors state that the 0.93 value is appropriate for "standard temperatures and frequencies below the Ka-band" might cause some confusion as to why this value is not altered for W-band simulations.

The convention we use relies on the fact that the dielectric constant of ice is very similar at all the frequency bands considered in this study. This makes the DWR equal to 0 dB for Rayleigh targets at the cloud top. The same convention was used to convert the power measured by the radars to the radar reflectivity so we follow the same approach.

2. Line 52: Minimizing W-band attenuation complications is another novel aspect of this study. The authors rightly highlight that W-band attenuation must be considered at longer distances from the radar under many circumstances, but the fact that these simulations are created using microphysical observations allows the authors to simplify the proof-of-concept message in the study.

Thank you for a positive feedback.

3. Figure 1 caption: I suggest adding the explicit year of the Morrison and Grabowski reference to the caption for completeness.

The year was added.

4. Lines 56-59 elicit a general methodological question: over what time span are the binned PSD observations aggregated? I cannot offer a strong opinion of the optimal time sampling needed to produce robust binned PSDs, but it would be good to advertise this value to the community. I presume PSD variability over short time scales is deemed somewhat muted for this stratiform event, but I would still appreciate the authors advertising the time scale used for PSD measurements that are utilised in the forward radar reflectivity model.

The following statement was added in the paper:
"All the PSD measurements are aggregated over 5 seconds. At a typical airplane speed of 150 m/s it is equivalent of approx. 8-minute integration for the ground-based instrument (for unrimed snowfall that sediments at approx. 1.5 m/s). This mitigates a problem of undercatchent of large snowflakes that are the most uncommon in the sampling volumes."

5. Line 60: Is the snowflake size automatically measured by analysis software? If so, do appropriate references exist for this procedure?

The details on the procedures for processing the particle images and getting the size of each particle sampled can be found in
https://usermanual.wiki/Document/MANUAL.598477337/help
It is not a standard academic publication thus we do not cite it in the paper. If you are interested in processing raw image data there is a software package called SODA designed to do that. Please see https://github.com/abansemer/soda2 for more detail.

6. Line 84: Minor typographical error. Change to "density *of* ice particles"

It was corrected.

7. Line 98: It appears as if a reference is missing (REF).

'(REF)' was removed.

8. Lines 98-110: This seems like a reasonable and creative method to deal with the complexity of possible snowflake morphology and atmospheric conditions.

Again, thank you for a positive comment.

9. Figure 2 caption: I suggest explicitly writing that the top row are expected values and the bottom row standard deviations of the quantities.

The caption was modified to accommodate your comment.

10. Figure 3: I suggest enlarging the font contained in various figure legends. The values are very difficult to read.

    The font size of the legend in the figures will be increased for the final version of the paper.

11. Figure 3: Panels d, e, and f show reflectivity observations for each radar frequency. Might it be better to show DWR values instead since DWR is explicitly shown in Fig. 2? Or somehow creatively combine DWR with the single frequency values shown? This is not a mandatory suggestion by any means, but I am left wondering if showing DWR observations might also be beneficial to better connect with meaningful information contained in the observations.

We decided to keep three panels with the reflectivity observations but to make them more readable and consistent with the other panels we show the reflectivity measured above and below the plane as the edges of the green shaded areas. By doing so we indicate that these measurements are used as the uncertainty limits for the estimates of the radar observations at the flight level. In addition, it makes it easier to see that the estimate of the reflectivities is within these limits throughout the flight. We acknowledge that the DWR signal might be useful for the reader to better understand the context so we decided to add another panel where these data are shown.