This article describes a dual-frequency method to estimate the amount of snowfall from radar measurements obtained by NASA's D3R radar during the GCPEX experiment in 2012. The proposed method hinges on a representation of the Z-SR relationship conditional to the DWR. The Authors demonstrate the superiority of their DWR-based algorithm when compared to traditional power-law relationships to retrieve the liquid-equivalent snow rate.
The article provides a nice illustration of the use of in situ microphysical data, with radiative-transfer models (T matrix with various assumptions about the mass-size relationship) constrained by remote sensing observations. However, before I can recommend this article for publication, the Authors should revise a few key points detailed below. The writing is of unequal quality with some paragraph extremely well written when others a filled with typos and unclear sentences. It would also be possible good to reduce the length of the manuscript by removing 1 or 2 figures and the overly long part that details the processing of the 2DVD images. Lastly, I couldn't find much about the efforts of the Authors to avoid or mitigate the effects of attenuation on the radar measurements, particularly at Ka band. Failing to do so can significantly bias the retrievals performed using the radar observations.

Detailed comments and suggestions (*technical questions in italic*)

- **General comment**
  - Please decide whether to use "gauge" (preferred) or "gage" and use this consistently throughout the manuscript. Similarly for mis-/miss-/mismatch
  - Please provide a table of acronyms and symbols.

- **Introduction**
  - Page 2 Line12 (P2L12): "In this study, we" …
  - P2L29: Please introduce the "Dual-\lambda" notation (e.g. in line 26) before using it.
  - *P3L4: "ratio of 4th moment to 3rd moment… ": "Dm" the mean mass-weighted diameter will be the ratio of the 4th to the 3rd moment only if the exponent of the m-D relationship is 3, which is seldom the case when dealing with snow… please reformulate.*
  - P3L14: "estimate the mass of"
  - P3L16: "based on a particle's mass"

- **Section 2**
  - P3L29: "dominates"
  - P4L16: please include a space between "\delta_0" and "in Bohn";
  - *P4L19: "parameterization error": Is this an error (i.e. producing wrong results) or a different convention?*
  - P5L15: "circumscribeding circle"?
  - *P5, last paragraph to the end of Section 2.2: This paragraph provides waaay too much detail on the operation of the 2DVD. Please refer to literature or move to an appendix. Similarly, I'm not sure that Figure 2 is really needed…*
  - P5L21&28: "optical planes"?
  - P5L31 to 34: is it miss-match or mismatch?

- P6L2: “manufacturer’s matching”
- *P6L8-10: “The Huang… because… size”. I do not understand the causality in this sentence. Please rephrase.*
- P6L26: “particles, which … Hence, the”
- P6L4: “Here, we use”
- P6L22: There is a typo in the units reported (200 and 400 \mu m ?)
- P6L24: “spheroids”
- Fig3: Since both quantities being plotted are positive, would a plot in log-log scale be more appropriate/revealing?

- **Section 3**
  - P8L8-9: Is Figure 4 necessary? It is already in Skofronick et al 2015… Please consider deleting this Figure otherwise.
  - P8L10: “with an extensive”
  - P8L14: “similar to a ‘vertical pointing”
  - P8L20: “Echo tops… high-altitude radar ~~was~~ were”
  - *Compared to Section 3.1, Section 3.2. is really well written. The Authors provide a clear description of their thorough QC efforts of the DWR data.*
  - *What do the Authors do to address attenuation especially at Ka band? This could have a strong effect on the DWR, right?*
  - P10L29: “amount of”
  - P11L22: “particles which, in principle, could”
  - P12L3: “Figure 11~~a,b~~ compares”
  - P12L8: “falls off as”
  - *P13L1: For the airborne radar data, please refer to APR2 and cite appropriate references.*
  - P13L2: “Skolfronik”?
  - P13L7: “mis-match” please decide between “miss-match, mis-match and mismatch” for the entre article…
  - P13L11: “found not to be ~~not~~ size dependent”
  - P13L12: “factor may be size”
  - *P13L20: “It is obvious from Fig. 13 that there is considerable scatter”, how about in a log-log scale, is there still a significant scatter?*
  - P13L21-22: “.. ranging from 55 to 70%... from 40 to 45%”
  - P14L1: Please re-write all “Ku” or “Ka” with a capital “K” even in the subscripts
  - P14L14: “~~don’t~~ do not use”
  - *P14L16-l17: There is a truly remarkable agreement between measured and simulated accumulated snowfall!*
  - P14L18: “Figure 15b is the same as…”
  - P14L20: why italics in “accumulat*ions*”?
  - P15L3: “~~at the same time~~ while maintaining”

- **Section 4**

- P15L6: “is to develop a technique ~~development~~ for … using a scanning”
- P15L26: “a large-scale synoptic … site of CARE during GCPEx.”
- P15L30: “explained by a possible”
- *P16 1st paragraph: Could the discrepancies that you couldn’t explain be due to attenuation, which could strongly affect the Ka-band measurements?*
- P16L13: “and LM ~~gave~~ (1.94 mm).”
- *P16L19-21: Is the smoothing of DWR actually a smoothing of Ka or is it necessary to first form DWR and then smooth only this parameter?*
- *Could you also provide some perspective as to how to extend your method to other dual-frequency datasets? Would the methods presented here still work if applied to a Ku-W or Ka-W data set? What would be the expected differences/commonalities? Similarly, would there be some potential or added value for airborne or spaceborne dual-frequency radars? Lastly, how would you extend your method to handle more frequencies (3,4,..)?*

- **References**
  - P17L24: “for scattering”
  - P17L31: “Orinetations”
  -
- **Figures**
  - Figure 10: legend: “that were directly measured…”
  - Figures 13 and 14:
    - Please use the same units for SR between the two plots (Figs 13 and 14) to help the reader compare plots;
    - In Fig. 13, would a logarithmic scale work better?
-