Review of "Drop Size Distribution Retrieval Using Dual Frequency Polarimetric Weather Radars"

The authors conducted a study to retrieve DSD parameters and subsequently compared them with disdrometer measurements. However, the methodology was not sufficiently elucidated in the text. The manuscript fails to address several uncertainties, which are neither considered nor discussed thoroughly when comparing retrieved and measured DSD. The study appears incomplete, requiring more comprehensive analysis and comparisons between the retrieved and measured DSD. Therefore, I suggest that this manuscript can be accepted only if the authors make major revisions. Please refer to the provided comments and suggestions for guidance.

General comments and suggestions:

1) The authors should consider and discuss height difference between radar gates selected for the DSD retrieval and the disdrometers. The height of the radars are quite high.
2) It is better to briefly introduce the synoptic scale weather conditions for the cases you selected, especially about wind direction and speed, temperature, and relative humility. Evaporation, collision-coalescence will affect the DSD measured at disdrometer station as the raindrops fall from the height of "terminal gate".
3) I suggest performing the DSD retrieval at the terminal gate continuously for at least several radar scan to check robustness of the proposed method.
4) Unify the variable names such as $Z^S_{measured}$, Φ_{DP}^S,measured (Eq.9), $Z^{S'}$, $\Phi_{DP}^{S'}$ etc. in the text and figures.

Specific comments and suggestions:

Line 5: What is the "assumptions of the collected data"? You should be more specific here.

Line 37: Delete word "remotely".

Line 60: Is the "phase" differential phase?

Line 61-71: The authors only depict the contents in section 2. What about section 3 and 4?

Line 74: Suggest changing the sentence to "the measurements of the two co-located polarimetric radars".

Line 93: Add year after "Jaffrain et al."

Line 98: Change "such and" to "such as".

Line 104: The description of the range rings "two rings with ranges of 20 km and 70 km are shown in Figure 2" is different from the one the Fig.2. Please make sure they are consistent.

Line 152: What is "Z^S"? reflectivity of S-band? Change "dB" to "dBZ".

Line 155: What is "terminal gate"?

Line 154: Multiplier "2" is missed in front of K_{DP} in Eq.6. Please also check your algorithm if K_{DP} is multiplied by 2.

Line 195: Delete word "minimum".

Line 203: Change to "converge to a solution".

Line 211: What is the coordinates? Please give more specific description about "The three coordinates".

Line 207-220: I did not find the PSO method mentioned or applied in the referred article (Zhang et al., 2001). Please give more explanations on the word "particle" used in the PSO.

Line 215-222:   Are the parameters α and β the same in Eq. 7 and 8? What does index "i" stand for in Eq.8?

Line 226-238: Based on my understanding, the parameters of DSD can be retrieved at each radar gate individually. If just used measured Z^S with less attenuation, $\Phi_{DP}{}^S$, and $\Phi_{DP}{}^C$ at "terminal gate" to retrieve directly instead of the way described here, what difference will make on retrieved DSD?

Line 246-251: Reorganize this part. Please also give the heights of radar "terminal gate" and the disdrometer stations and label them in Fig. 3.

Line 253-254: Rewrite this sentence.

Line 278-284: The "blue/red circles" and "blue/red triangles" are not found in Fig. 10.

Line 283-284: What is the "correction factor"? Please explain how do you "predict" what atmospheric effect.

Fig. 2: Suggest change the sentence in the caption to "radii are drawn around the radar location." In addition, delete "to indicate the data viability region."

Fig.3 and 4: At what elevation angle and time?

Fig. 5: Please define the $Z^{S'}$, $A^{S'}$, etc. in the caption.

Fig. 6: The $Z^S{}_h$, $\Phi^S{}_{DP}$, etc. in the dash line box should calculated. Please do not mix up with measured $Z^S{}_h$, $\Phi^S{}_{DP}$, etc. on the right side of figure.