This study compares two radar data assimilation methods including 3DVAR and LETKF for ICE-POP snowfall cases. It was found that water vapor adjustment is important for the radar data assimilation. However, water vapor and temperature adjustment has been developed for years. What is new for this conclusion? Also, it is weird to me that the assimilation of radar observation results constant negative increment of snow mixing ratio. Detail descriptions of reflectivity observation operators are needed. A possible explanation is the current radar data assimilation does not adjust the hydrometer variables. In that case, what is the meaning of reflectivity assimilation? Overall, I'm expecting some improvements of data assimilation method. Simple comparison between LETKF and 3DVAR does not meet the main target of GMD. Therefore, I will not recommend this paper for a publication in GMD.

Some more specific points are listed below:

1. Line 15-20: "… a lack of a water vapor and temperature observation operator." What does this mean? I believe the radar data assimilation also adjusts water vapor and temperature in LETKF. The cross variable correlation is an advantage for the common used EnKF. On the contrary, the empirical saturation adjustment of 3DVRA will lead to serious overestimation of precipitation. Please see more in Carlin et al (2017).

2. For section 2.2.3, how is the reflectivity data assimilated? Any adjustment of hydrometer variables for 3DVAR and LETKF? Detail descriptions are needed. Most important, for snowfall radar data assimilation cases, I think the direct adjustment of snow mixing ration for radar data assimilation are necessary. Otherwise, any explanations of the improvement of snow are hardly convincible.

3. About the LETKF, what are the analysis variables?

4. Line 172: 30 members? But it shows 50 members in Figure 4. How the initial members generated?

5. The spinup period before the radar data assimilation?

6. Line 195-200: A distance? What value?

7. Line 208-209, "…, depending on the DA method". What does this mean?

8. For Figure 6, the final analysis or the first analysis? Any explanation why both LETKF and 3DVAR get negative increment of snow mixing ratio?

9. For Figure 9, in what region? Key information should be clearly stated in the figure caption.

10. Please rewrite section 3. Studies have already compared the difference between 3DVAR and LETKF. What is new for this comparison?