

I'm underwhelmed with this article. I'm not sure that there's any new physics or knowledge gained. What would have been interesting is the authors directly related the particle size distributions to the updraft velocity. Likewise, relating the vertical velocity to the relative humidity would have been interesting and a validation of the relative humidity measurements. There is no discussion of the measurements of the relative humidity, and how they related to the interpreted spherical and non-spherical particles. No particle images are shown, so that one cannot draw interpretations about the presence of secondary ice particles. Another point is the misinterpretation of the vertical velocities in mid-latitude convective clouds. There is a wide body of information out there which shows that vertical velocities of 20 m/s or higher are present in mid-latitude convective clouds and that 4 m/s is about what is observed at cloud base in convective clouds. The literature cited is mostly recent, not drawing upon measurements and interpretations from earlier studies. No direct measurements of the liquid water content is presented. This would have been very valuable to validate the interpreted particle types. Likewise, measurements at temperatures warmer than 2 or 3°C would have been useful to evaluate the particle habits. No direct measurements of the condensed water content are available, unfortunately.

My specific comments appear below.

Line 28: Coexistence > Mixed Phase

30 midlatitude stratiform clouds

33: precipitating large ice

55: microphysical

55: and in altocumulus

80: I totally disagree with +/- 4 m/s being exceptionally high for midlatitude convective clouds

94: 50 microns is not "Large Ice". I would just call this ice phase. Large ice to me is >0.5 cm. Unfortunately, no measurements of particles above about 1 cm, and with a probe with a large sample volume, is available from the study.

110 "at lower temperatures" Not specific and incorrect

Section 2.3 is a very good discussion of potential errors and how they have been treated. Nonetheless, I'm still uneasy about the removal of shattered particles, particularly for the CIPg in the small size channels

Section 2.3. How was the relative humidity measured? What is the accuracy.

212. sample volume,

216 In the case

234. Interesting that the pinhole diameter was decreased to reduce coincidence effects

245: artifacts

302 I wouldn't consider large to be 50 microns

346-347. Not correct for mid-latitude convective storms.

360 "eliminated" to "reduced"

Important: It would have been nice to have a sampling leg at temperatures above 0C to check your habit classification schemes. Also, a direct measurement of the liquid water content with a King type probe

406. Is it possible that the low concentrations of ice crystals is due to misclassification in your habit identification scheme

407: "amounts" to "concentrations"

506. These are not "strong convective clouds" for midlatitudes. See for example <https://doi.org/10.1175/JAMC-D-12-0185.1>

516: Large ice.

524: sintering. How do you know that growth was occurring through sintering? Do you mean aggregation?

Sentence beginning on line 525. Without particle images shown, I'm uncomfortable with your statement about the implication of the presence of secondary ice

