

Editors Comments on the article:

I have carefully examined the three referees comments and provided my own to the authors. Two of the reviewers have rated the articles' significance and scientific quality poor. Dr. Baumgardner rated the latter two as fair. Issues relate to not adequately addressing the effects of mixing and instrument-related issues. On the basis of the reviews, I have little choice but to recommend rejection of the article in its present form. On the positive side, Referee 2 has a potential approach that could lead to an article that would give it a Good or Excellent rating. The suggestion is to use a theoretical model to examine what the effects of inhomogeneous mixing might be. I'd recommend that you consider that.

Sincerely,
Andy Heymsfield

Referee 2 comments:

The authors have not satisfactorily addressed several of the very reasonable and serious points made by the referees and editor. The primary concerns have to do with the effects of mixing and instrument-related issues. Referee 2 notes that the revised manuscript has changed very little, and that many of the problems listed in the first review remain in this manuscript.

1) Scientific Significance Poor

2) Scientific Quality	Poor
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3) Presentation Quality Poor

- The implicit basis of the analysis presented in the Gamma phase space is that one is dealing with a Lagrangian case. But, inevitably, with any sort of microphysical measurements different samples of particle populations are being sampled.
- What are the effects of mixing on the PSDs?
- The reviewer suggests that you could use simple theoretical/modeling calculations to also help you assess how the DSD characteristics are being affect by homogeneous/inhomogeneous mixing.

Referee 3 Comments (Baumgardner)

The referee states that he content has been somewhat improved from the original version, but he notes that it is still not ready to be released for publication until most

of his previous comments are better addressed than they were in the authors' original response.

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1) Scientific Significance Good

2) Scientific Quality Fair

- The referee suggested some wording changes to the underlying thesis of the study.

3) Presentation Quality Fair

- The referee notes and I agree that the results of this study, as currently presented, suggest that the height of precipitation initiation in any convective cloud can be represented by a single, integer multiplier of the cloud base droplet concentration. This is in line with interpretations by Rosenfeld using satellite data.
- The referee notes that there are numerous references to the measurements from the aircraft probes that need to be modified or added.

Referee 4 Comments

The referee states that “the authors have not satisfactorily addressed several of the very reasonable and serious points made by the referees and editor. As far as I can tell, the revised manuscript has changed very little. Many of the problems listed in the first review remain in this manuscript.

1) Scientific Significance Poor

2) Scientific Quality Poor

3) Presentation Quality Poor

- The reviewer notes that the authors have offered very little discussion of the limitations of the observations and processes which can break or increase the error in the simple relationship. This was raised by Referee 2 as well. That referee did offer a suggestion for how to consider this point in more depth.
- The referee notes that there are no figures showing the dynamical structure of the clouds.

- An issue was raised about inhomogeneous mixing occurring within the clouds and the effect on the effective radius.