We would like to thank Dr. Andrew Heymsfield for the comments as Editor to this manuscript. Following are our responses, based on the supplement of your comment.

1) **(Comment)** Page 6, Line 7: The problem I see with the model is that no activation is allowed above cloud base. However, this has been observed in data I published for the NAMMA field program, in convective updrafts. Activation is through air introduced via entrainment aloft and also due to fallout of particles from parcels which therefore allows the supersaturation to build up.

1) **(Answer)** Yes, the model has several simplifications that affect the results. However, we believe that the lack of activation above cloud base is not of concern to this particular analysis. As we comment in Section 2.3 and in the supplement, we try to avoid new droplet formation because of its effects on the DSDs. Higher in the clouds, when the droplets are bigger, new droplet formation would produce bi-modal DSDs that would greatly affect the Gamma parameters. New droplet formation would result in wider Gamma DSDs that may not be representative of the situation. We believe the condensational growth with new droplet formation should be treated separately of the condensation exclusively on pre-existing droplets because they produce different patterns in the Gamma phase space. The same can be said about other processes such as entrainment (homogeneous or inhomogeneous), sedimentation, etc. We clarified in the fourth paragraph of Section 2.3 that the CCN activation takes place only at cloud base. Additionally, we removed the comment underlined in the following sentence of the supplement: "The vertical speed was fixed at 0.5 m s^{-1} <u>as we wanted to minimize the effect of new droplet formation in the DSD shape</u>".

2) **(Comment)** Page 18, Line 2: I'm not terribly happy with this type of flight pattern-multiple convective clouds, some of which are different, are used in the analysis.

2) **(Answer)** We understand that the flight patterns may not seem ideal to the purposes of the type of analysis proposed here. However, the considerations used here bring us as close to the ideal scenario as possible within the limitations of aircraft campaigns.

3) **(Comment)** Page 20, Line 9: I would like to see how the addition of the CDP+CIP cloud drop spectra affect the gamma fit parameters. But, I totally agree that the sample volume for drizzle-size drops is very poor as is the sizing. This point should be made in the article.

3) **(Answer)** The addition of CIPgs would result in wider DSDs with bigger mean diameters, which affects the positioning in the Gamma phase space. In terms of the trajectories, it would obviously only affect the clouds that were able to produce rain – in our case mostly the cleaner clouds in RA1, RA2, and M1. Here we reproduce Figures 6 and 7 of the manuscript but only for the flights RA1 and AD2 and discriminating between "CDP-only" and "CDP+CIP" (using the underscore "prec" for the latter):

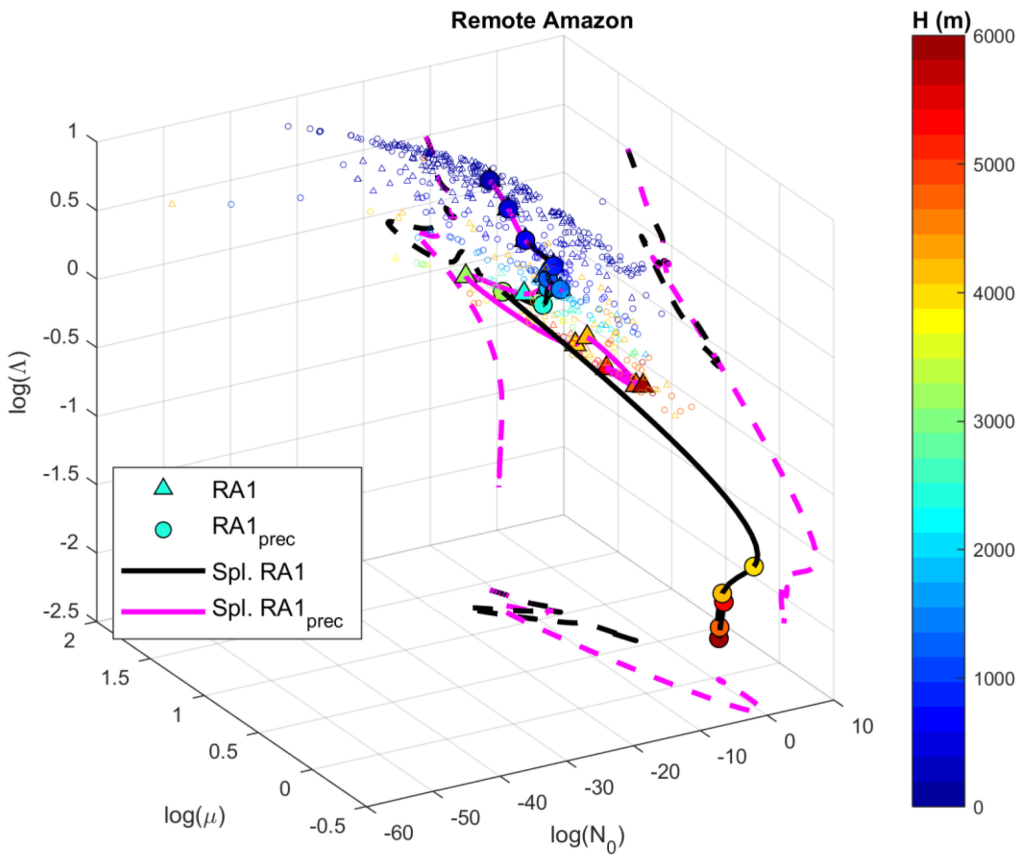

Figure R1: trajectories for flight RA1 for "CDP only" (RA1) and "CDP+CIP" ($RA1_{prec}$).

Note that for the flight AD2 (Figure R2), both trajectories are equal, given that there were basically no CIP-sized droplets. For flight RA1, the two trajectories start to deviate close to the 0 °C isotherm, and have big disparities in the mixed phase. That disparity is due to the formation of bigger hydrometeors that widen the DSDs and increases D_{eff} (we did not discriminate between ice and liquid droplets in this figure). From Figure R1 we have an indication of the impacts of adding CIPgs to the DSDs, but we believe it is more valuable to focus exclusively on CDP.

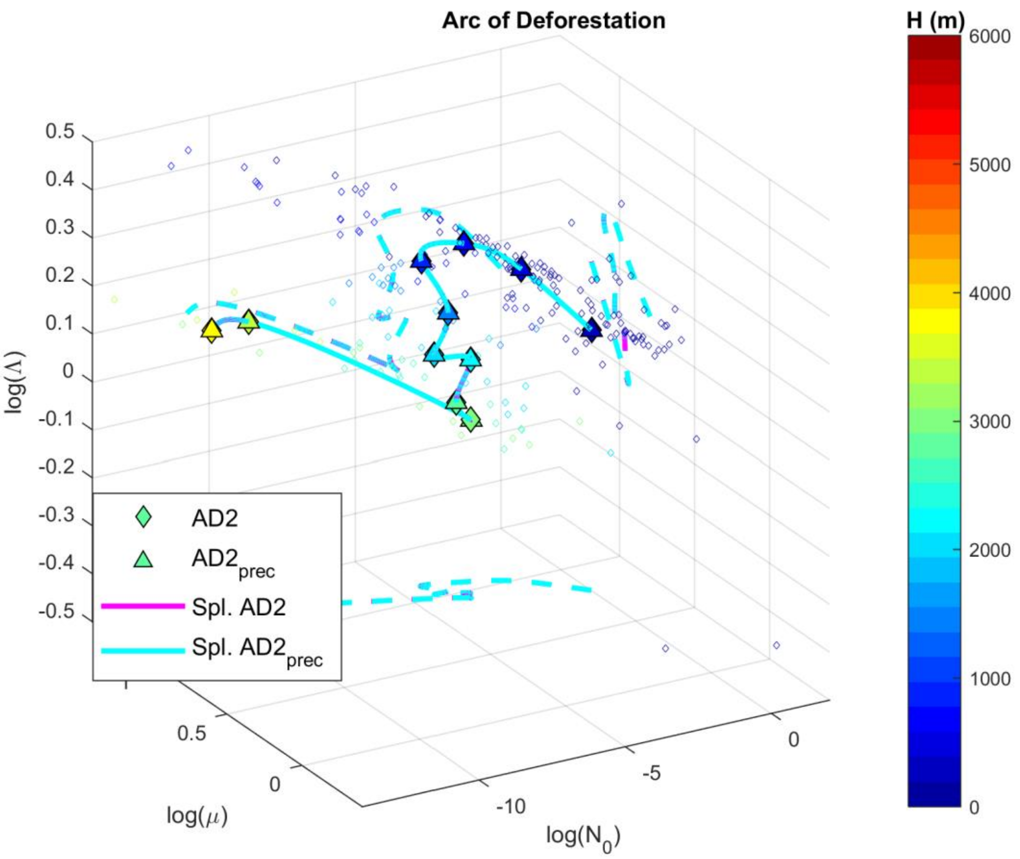

Figure R2: trajectories for flight AD2 for "CDP only" (AD2) and "CDP+CIP" ($AD2_{prec}$).

We complemented the respective sentence in Section 2.2 (second paragraph) for clarity (new text is underlined): "The number of data with $LWC_{D>50}$ > 0.1 g m^{-3} is only <u>12</u>% of the number of DSDs with $LWC_{D<50}$ > 0.1 g m^{-3}, <u>meaning that drizzle and precipitation are relatively infrequent in the dataset. This observation combined with the possibility of higher uncertainties (especially on the lower CIPgs bins) when combining two different instruments with distinct measurement principles further justify the focus exclusively on CDP</u>". Please note that the percentage changed from 8% to 12%. I re-assessed the data and found that the 8% was wrong. That value was for a bigger dataset that included other flights, which did not make it to the final manuscript. By limiting for the flights mentioned in the paper, we obtained the new value of 12%. We apologize for the error and the text is now corrected.

4) **(Comment)** Page 20, Line 22: I wouldn't mind seeing a figure that compares the gamma fit parameters for the incomplete and complete gamma psd, at least for a few selected examples.

4) **(Answer)** There are studies in the literature that suggest that, even though DSD truncation have effects on the Gamma parameters, it may leave their inter-dependence relatively unchanged. For instance, Brandes et al. (2003) uses the μ-Λ relation found by Zhang et al. (2001) to constrain the Gamma DSD from dual-polarized radar retrievals:

$$\Lambda = 1.935 + 0.735\mu + 0.0365\mu^2$$

And they note that "Fitting the observations with a gamma or a truncated-gamma DSD has little effect on the μ-Λ relationship. Magnitudes for both parameters are proportionately smaller for a truncated DSD". Additionally, Ulbrich (1985) analyzed the impacts on rainfall integral parameters considering the DSD truncation. They found that the β exponent in relations between rainfall moments is relatively insensitive to truncation, in the form:

$$M_p = \alpha M_q^{\beta}$$

In other words, the moments may change but the relative relation between them remains the same. Given that the Gamma parameters are obtained from the moments in our manuscript, we expect a similar patter – Gamma parameters may change but the overall appearance of the trajectories remain the same. We added the following text to the paragraph right after Eq. (5):

"Previous studies comparing the complete and incomplete (or truncated) Gamma fits suggest that, while there are differences in the resulting parameters, the relation between them remains similar. The first indication of that comes from the study of Ulbrich (1985) that analyzed the relation between rainfall DSD moments in the empirical form $M_p = \alpha M_q^{\beta}$ where p and q are the two distinct moment orders and α and β are fit parameters. The author notes that β is relatively insensitive to DSD truncation, meaning that the relation between the moments remain similar while their overall values change. Brandes et al. (2003) also note that the μ-Λ relation introduced by Zhang et al. (2001) is relatively insensitive to DSD truncation. In the present study, the focus is more on the relation between the Gamma parameters rather than their values itself. For that reason, we favor the use of the complete Gamma".

Full references cited here:

Zhang, G., J. Vivekanandan, and E. Brandes, 2001: A method for estimating rain rate and drop size distribution from polarimetric radar measurements. *IEEE Trans. Geosci. Remote Sens.,* **39,** 830–841.

Zhang, G., Vivekanandan, J., Brandes, E. A., Meneghini, R., and Kozu, T.: The shape-slope relation in observed gamma raindrop size distributions: Statistical error or useful information?, Journal of Atmospheric and Oceanic Technology, 20, 1106–1119, doi:10.1175/1520-0426(2003)020<1106:TSRIOG>2.0.CO;2, 2003.

Ulbrich, C.W., 1985: The Effects of Drop Size Distribution Truncation on Rainfall Integral Parameters and Empirical Relations. *J. Climate Appl. Meteor.,* **24**, 580–590,https://doi.org/10.1175/1520-0450(1985)024<0580:TEODSD>2.0.CO;2.

5) **(Comment)** Page 21, Line 6: The Braga article is not yet accepted for publication and issues relevant to this reviewers' comment apply to the reviews of the Braga article as well.

5) **(Answer)** The paper is in fact published: https://www.atmos-chem-phys.net/17/7365/2017/. The confusion might come from the other Braga paper that is still under review: https://www.atmos-chem-phys-discuss.net/acp-2016-1155/.

6) **(Comment)** Page 22, Line 3: However, single turrets are not followed. Thus, only in a broad sense can the results be used.

6) **(Answer)** Yes.

7) **(Comment)** Page 25, Line 8: But multiple turrets are penetrated.

7) **(Answer)** Yes.

8) **(Comment)** Page 28, Line 19: As I mentioned earlier, there are sample volume and sizing issues for the CIP drizzle-size data.

8) **(Answer)** See our answer #3 here in this document.