Reviewer #1 and reviewer #2 provided significant critiques and corrections for the manuscript. We respect their dedication to the journal and thank them for their efforts on our behalf.

In addition to the corrections explained below, we made the following changes to the manuscript:

1) Changed the acronym "IN" (ice nuclei) to INPs (ice nucleating particles) or to INP (ice nucleating particle)

2) Removed the reference to Snider et al. [2014] on L139 and replaced with reference to the PMS-PCASP manual (Particle Measuring Systems, 2002).

Reviewer comments for manuscript acp-2014-599: *Ice crystal concentrations in wave clouds: dependencies on temperature, D > 0.5 μm aerosol particle concentration and duration of cloud processing*

Specific Remarks:

Page 4

line 64: change 'is the temperature in the section of the CFDC operated above water saturation,' to 'temperature of the aerosol layer in the CFDC which was operated above water saturation,'

In our opinion, that the word "section" is adequate for this. In addition, the reviewer's correction emphasizes the fact that the D10 measurements were made above water saturation. It's a point worth stressing, but "how far above water saturation" requires elaboration and there is no room for that here. The details are in D10 and in the ACP paper from the CSU group that came out this year. For all these reasons, we prefer to leave the sentence as we originally wrote it.

line 65: change '273.1**6** K' to '273.1**5** K' (applies also to Appendix B, page 27, line 542, 547, 551-554)

The temperature 273.16 is used because that is the value in D10's fit equation (their Eqn. 1). We now stress this point with the following change to the sentence starting on L64.

"Here T is the temperature in the section of the CFDC operated above water saturation, T_o is the reference temperature adopted by D10 (273.16 K, their Eqn. 1), and a, b, c and d are the fitted coefficients."

Page 12

line 246 change 'four km' to either '4 km' or 'four kilometers'

Changed to 'four kilometers.'

Page 17

line 368 change 'things' to 'measurand' or something equivalent

Changed the phrase to "…,all other relevant properties the same,…"

Page 18

line 389 k_2 = 0.22 K^{-1} (since the temperatures are given in K) (applies also to page 32, line 619)

We changed Fig. 3a, changed the Fig. 3a legend, and changed the caption to Fig. 3. Now the dimension of k_2 is $°C^{-1}$ and the numerical value is k_2=-0.22 $°C^{-1}$. The caption now reads "...Fig. 3. a) Values of $N_{IC}(T_{low})$ ($\ln(N_{IC}(T_{low})) = k_1 + k_2 \cdot (T_{low} - T_{mp})$ with T_{mp} =273.15 K, k_1 = -4.04 and k_2 = -0.22 $^{o}C^{-1}$)…". Also, the text was changed on line 619.

It would also be better to provide T_{low} in the supplementary Excel file in K and not °C for consistency.

We prefer to keep the T_{low} values, in the supplementary file, in Celsius. Both Kelvin and Celsius are used for T_{low} in the manuscript.

line 389 change 'cat' to 'can'

Changed

Page 19

line 391 change 'is' to 'are'

Changed

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The authors have done a good job of addressing my concerns and i am mostly happy with the responses.

The authors have demonstrated that the affect of shattering is likely to be small. But i would note that although the fraction of shatterers is small, the shatterers contribution to the concentration may be large if they are smaller than 100 microns.

In our opinion, the last sentence cannot be proved or disproved with the data that is available.

The concentration comparison shows a good agreement between the CIP and 2DC. However, I note that the mode of the distributions is larger than 100 microns (fig. A1b) and so the problems associated with depth of field errors will be less important for that comparison. In fact, from fig. A1b it looks like the total concentration for particles larger than 100 microns will only be slightly smaller than the total. So thresholding to only include particles larger than 100microns would not change the results of the paper anyway.

I still have misgivings about the use of small sizes from these probes. The CIP can potentially have problems with very out of focus images (donuts) due to the increased spacing (dependent on the model) between the arms relative to the 2DC. Figure A1b gives me confidence that the results are not unduly affected by the choice of 50 microns as the threshold.

I believe that the revised paper with the additions proposed is publishable. If the authors were able to compute a ratio of N(D>50microns)/N(D>100microns) and state the mean value in the text to demonstrate that the choice of threshold is not a problem, this would be a good addition.
We addressed this point by revising Appendix A as follows:

Representative CIP and 2DC size distributions, from CAMPS, are shown in Fig. A1b. It is evident that most of the detected crystals are smaller than 400 μm, especially in the 2DC measurement. A size distribution from one of the 80 WAICO downwind track-streamline intersections is shown in Fig. A2a. The largest crystal detected in this five-second interval is 400 μm. The figure also demonstrates that the diameter-integrated concentrations N_{IC}(D>100μm) and N_{IC}(D>50μm) are comparable, and that the ratio N_{IC}(D>100μm)/N_{IC}(D>50μm) is only somewhat smaller than unity; for our 80 size distributions the average ratio is 0.7.