2nd Review of ACPD article now titled: *Impact of aerosols on ice crystal size*

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**General Comments:**

I have gone over all of the author responses to my comments, and am happy to say that all have been addressed very well. The authors have done an excellent job at revising their paper, which reflects a considerable amount of additional work (e.g. the improvements on modeling). As noted in the first review, this appears to be the first combined observational-modeling study showing the impact of aerosols on cirrus cloud microphysics under various meteorological conditions. The conceptual framework of the paper is now greatly improved, and I suspect this paper will be widely referenced in regards to cirrus cloud-aerosol-radiation interactions. There are just a few outstanding issues that should be addressed, as described below. Congratulations to the authors for this significant advancement in our understanding.

**Potential highlight paper**

This paper may be of particular interest to the broad geoscience community as it appears to be the first combined observational-modeling study to demonstrate how aerosol loading is likely to affect cirrus clouds under various meteorological conditions. This study should be a valuable resource for climate modelers attempting to predict the SW and LW forcing by cirrus clouds in relation to changes in aerosol loading.

**Major Comments:**

1) Page 8, line 33: Different investigators use different formula for calculating Rei; which equation is used here?

2) Page 16, lines 11-12, and Fig. 5 in general: Since the model has been improved to more closely mimic natural processes now (and predicted and observed Rei agree fairly well), it would be interesting to know what fraction of INP result in an ice crystal for aerosol number concentration > 300 $cm^{-3}$ (when nearly all ice crystals are produced by heterogeneous ice nucleation). This information would be useful for comparing with other cirrus cloud modeling studies.

Combining deposition and immersion INP together, the INP to aerosol ratio is 1:10,000. For an aerosol concentration of 300 $cm^{-3}$, the combined INP concentration should be 0.03 $cm^{-3}$, or 30 $L^{-1}$. But Fig. 5b relates this INP concentration to an ice crystal concentration ($N_i$) of ~ 300 $L^{-1}$. It seems that either I have made a mistake in this calculation (or assumed something incorrect), or the combined INP-to-aerosol ratio should be 1:1000 to account for an $N_i$ of 300 $L^{-1}$ (assuming all INP produce an ice crystal).

**Minor Comments:**

1) Page 4, lines 12-13: Might be more accurate to say that the DARDAR Rei retrievals, corrected for the crystal habit assumption used here, lie mostly between 10 and 80 microns.

2) Page 12, line 29: dcreases => decreases