

## *Review 2 of Use of an observation-based aerosol profile in simulations of a mid-latitude squall line during MC3E: Similarity of stratiform ice microphysics to tropical conditions*

Thank you for addressing my concerns. The manuscript is much improved, particularly organization and readability. It is ready for publication in my opinion. I make a few, minor suggestions below.

### **Specific comments / suggestions**

Page 4, Lines 20-24 – The first sentence could be rewritten for clarity, e.g., “The large spread between CCN, HTDMA, and ground-based CPC measurements reflect the large variability in nucleation mode aerosol concentrations.” To me, it also makes more sense to place this paragraph along with the first to separate discussions of number concentration and hygroscopicity.

Page 6, Line 1 – I would include the “user-determined size” employed in this case for nucleation mode truncation.

Page 9, Line 29; Page 10, Line 5 –  $-10^{\circ}\text{C}$  /  $-16^{\circ}\text{C}$  are the mean temperatures at these altitudes? Please include  $\bar{T}$  in the parentheses.

Page 11, Lines 5-6 – The Bigg 1953, Meyers et al. 1992, and Cooper 1986 schemes which are used for ice nucleation are known to have limitations since they do not account for spatiotemporal variation in INP, e.g. Prenni et al. BAMS 2007 or DeMott et al. PNAS 2011. This point could be made here in the note that “critical aspect of ice nucleation” may be missing.

Page 30, Figure 5 caption – Reword second sentence for clarity: “The campaign-wide median profiles at each elevation (red lines) are archived as Supplement 2.”

Page 31, Figure 6 – I still struggle to interpret all of the information in this figure. Given that the distributions in each mode are ultimately averaged in time, could these average number concentration, geometric mean dry diameter, and standard deviation values be presented? And the colored values from various Julian dates omitted or moved to Supplemental Information?

Page 36, Figure 11 right hand panels – Would it make comparison of the BASE simulation and observed number size distributions easier if the y scale were logarithmic?

Page 46, Table 2 caption – It would be helpful to indicate that the range in these values comes from the fact that they are calculated from “five level legs between 13.9 and 14.9 UTC” (otherwise, it seems as if there should be just two discrete values from the two methods).