We would like to thank the referee #1 for providing further valuable comments on our manuscript and we have carefully addressed the referee's comments as follows (referee's comments in black and our responses in red):

1. For the CCNC calibration, I would suggest the authors provide the parameterizations of water activity and surface tension of ammonium sulfate, considering these are two major parameters in the Köhler theory.

   Reply: In the CCNc calibration, the water activity (a_w) was approximated according to Rose et al. (2008),

   $$a_w = \exp(-i_s \mu_s M_w)$$

   where i_s, μ_s, and M_w is the van't Hoff factor, molality of solute, and the molar mass of water (0.01802 kg mol^{-1}), respectively. The van't Hoff factor i_s is calculated from a polynomial fit to Pitzer model output data (Morre et al., 2010). The surface tension of the ammonium sulfate solution was approximated by the surface tension of pure water (0.072 N m^{-1}) according to Seinfeld and Pandis (2007), based on the fact that surface tension can only produce minor impacts on supersaturation.

   We now incorporated several sentences to L18-22 on p. 10 and L1-3 on p. 11, "In the CCNc calibration, the water activity (a_w) was approximated according to Rose et al. (2008),

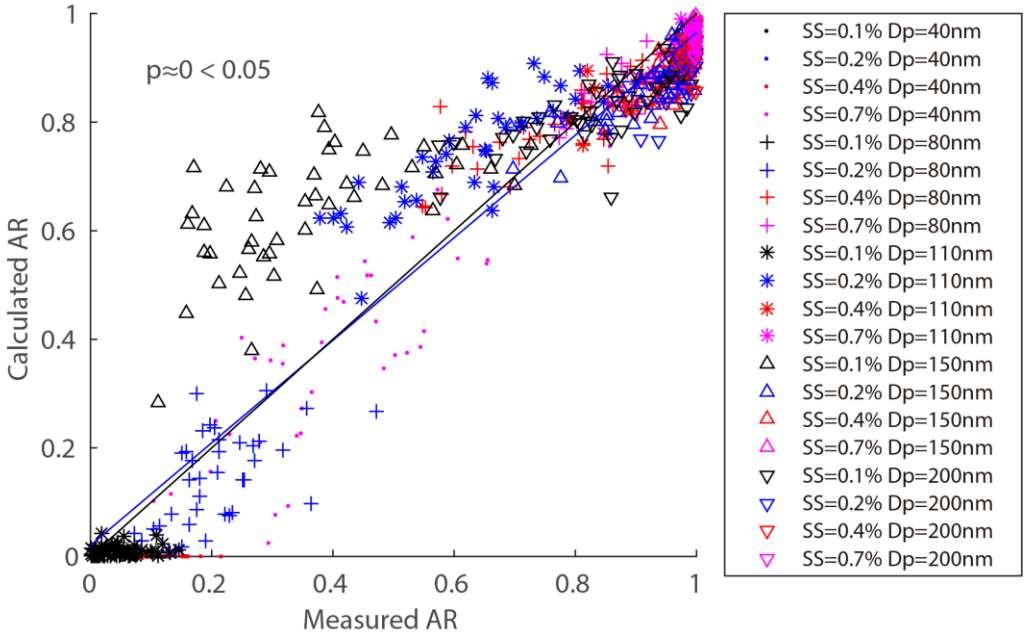
   $$a_w = \exp(-i_s \mu_s M_w) \quad (3)$$

   where i_s, μ_s and M_w is the van't Hoff factor, molality of solute, and the molar mass of water (0.01802 kg mol^{-1}), respectively. The van't Hoff factor i_s is calculated from a polynomial fit to Pitzer model output data (Morre et al., 2010). In this study, we adopted the simplest parameterization of the surface tension of the solution (Rose et al., 2008), that is, it was simply approximated by the surface tension of pure water (0.072 N m^{-1}) according to Seinfeld and Pandis (2007)".

2. Fig.9: the data seems dispersive but the R2 is 0.94, please recheck the data.

   Reply: Per the reviewer's suggestion, we rechecked the data and the R^2 of the linear regression fit using different programs (e.g., Excel and Igor). It turned out that the R^2 value is still 0.94. By further digging into the literature, we found that data such as "Anscombe's quartet" (Anscombe, 1973) can have a high R^2 value induced by a few outliers while the other data points do not show a strong

correlation. As shown in Fig. 9, our measured data points were constrained within a small area (i.e. certain supersaturations or particle diameters). It turns out that the R^2 value is not a good indicator to represent the correlation between the measured and predicted AR in our case. Instead of using the R^2 value, we now introduced the p-value with a value less than 0.05 meaning significant correlation. Figure 9 shows a p-value close to 0, indicating a significant correlation between the measured and predicted AR. We have now modified Fig. 9 and added one sentence in L5-7 on P. 25, "We calculated the p-value between the measured and predicted AR and the results showed that the p-value is close to 0, indicating a significant correlation between the two variables."



3. Did the authors perform any water-soluble organic carbon (WSOC) measurements during the campaign? If so, maybe it is better to compare the kappa-org with fraction of WSOC.

Reply: The reviewer raised a very good point. Unfortunately, the WSOC species were not measured during the campaign and hence we cannot compare the kappa-org with the fraction of WSOC.

References:

Anscombe, F.J. (1973). Graphs is Statistical Analysis, Am. Stat., 27, 17-21.

Moore, R., Nenes, A., and Medina, J.: Scanning Mobility CCN Analysis—A Method for Fast Measurements of Size-Resolved CCN Distributions and Activation Kinetics, Aerosol Sci. Technol., 44, 861-871, 2010.

Rose, D., Gunthe, S., Mikhailov, E., Frank, G., Dusek, U., Andreae, M. O., and Pöschl, U.: Calibration and measurement uncertainties of a continuous-flow cloud condensation nuclei counter (DMT-CCNC): CCN activation of ammonium sulfate and sodium chloride aerosol particles in theory and experiment, Atmos. Chem. Phys., 8, 1153-1179, 2008.

We would like to thank the referee #2 for providing further valuable comments on our manuscript and we have carefully addressed the referee's comments as follows (referee's comments in black and our responses in red):

1. In the response to Comment 8, it is stated that "…the one between kAMS and kCCN became statistically significant…". The p value should be provided here.

   Reply: We calculated the p-value between the κ_{AMS} and the κ_{ccn}. It turns out that it was close to 0, indicating that the correlation between the κ_{AMS} and the κ_{ccn} is significant. We have added one sentence in L20-21 on p.18, "The p-value between the κ_{AMS} and the κ_{ccn} was close to 0, indicating that the correlation between them is significant."

2. Regarding my Comment 12, I meant that the parameter C should be defined.

   Reply: The parameter C is only a fitting coefficient which does not have any specific physical meaning. The sentence in L3-5 on p.14 has been revised, "Note that the parameter C is a fitting coefficient with no specific physical meaning. However, a small C value indicates a steep activation curve."

3. In the new Figure 1, the legend in the inset of activation ratio vs Dp is blurred.

Reply: We used "AR" instead of "Activation Ratio" in legend. The figure has been revised, as shown below: