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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Variation of size-segregated particle number concentrations in winter Beijing" *by* Ying Zhou et al.

Anonymous Referee #1

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This manuscript analyzed 3 months continuous measurement of particle size distribution from 1.2 nm to 10000 nm during winter 2018 in Beijing. This kind of observation, that cover almost the full range of particle size and include both charged and neutral clusters/particles, is rather limited in China. New particle formation and haze days were discussed separately, and found a clear correlation between the cluster and nucleation modes during NPF days. In addition, the work found that all modes in the sub-micron size range were correlated with NOx, indicate traffic emission can contribute to all particle sizes. In general, the manuscript did provide useful information and knowledge, but some more in-depth analysis is encouraged. The manuscript is in general well written and documented. The topic fits well in the scope of ACP. I recommend this manuscript can be published after some revisions.

Comments: 1. More discussions on the charged ions/clusters from NAIS are encouraged. Can the ion induced nucleation be observed? Is it important?

2. There are some overlap for the particle size distribution between NAIS and PSD. It would be good that the authors can provide some information about the intercomparison between these two techniques.

3. I would suggest to provide 1 plot to show the traffic emission derived increase of cluster and nucleation mode particles, and maybe the correlation plot between cluster mode particles and NOx during the non-NPF days.

4. It is a bit unusual that there were no overlap between NPF and haze days. There were quite many studies that observed NPF with considerable high concentrations of PM2.5. What will happen if classify the haze days by the concentration of PM2.5, i.e. 100 ug/m3?

5. Table 2, change the color-marked numbers to, i.e. bold or italic.

6. Figs. 7-9, where were the data points of "others"?

7. Fig. 9, there showed pretty good correlation between Aitken mode particles and accumulation mode particles during NPF days. What's the possible reason?

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