

Interactive comment on “Insights into aerosol chemistry during the 2015 China victory day parade: results from simultaneous measurements at ground level and 260 m in Beijing” by Jian Zhao et al.

Anonymous Referee #3

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This manuscript presents a comprehensive study using a suit of on-line instruments aiming to describe the air quality improvement under the emission control and the vertical distribution of particulate matter in Beijing during the 2015 China victory day parade. The results show that the mass concentration of PM₁, during and after the parade, are significant different (~50% decreased) and the chemical composition and mass concentration at ground site and 260m tower general varied synchronously, suggesting the ground site also representing a regional signal. These results are very useful for validating the strategies of emission control and evaluating the radiation forcing of PM in the boundary layer in the future. The topic in this manuscript is fitted with

C1

the range of ACP and the paper is also well written, and the results present an interest for the scientific community. This paper should be accepted on completion of the minor revisions/clarification requested below. Major comments 1. It is interesting to compare the mass variation of each species between ground and 260m site which is useful to know the respective of ground observation. As shown in Fig. 6, all species at both sites generally display similar trends. One suggestion is that add a scatter plot in each species following the time series. 2. The explanation for the comparison of BC between two heights is somewhat not convincing. The uncertainties of these two aethalometers were not presented in the measurement section. Which wavelength results were used for each aethalometers? Are the data corrected for shadow effect and accumulation effect?

Minor comments P6, L1-2: It seems that PM₁ were not total neutralized based on the scatter plots between measured and predicted ammonium (slop = 0.85-0.88). P6: The formula for calculating the density of PM₁ is wrong in the denominator. It should be $[\text{NH}_4\text{NO}_3]$, $[(\text{NH}_4)_2\text{SO}_4]$, and $[\text{NH}_4\text{Cl}]$, other than $[\text{NO}_3]$, $[\text{SO}_4]$, and $[\text{Cl}]$. P8, L7-9: Please add the information of the location of Tsinghua University and the instrument used for this study. P8, L10: The content of this sentence is somewhat duplicated with previous sentences (P7, L27-28). P8, L21-23: This explanation is too general for explaining the phenomena of increased of nitrate and decreased of OA. I suggest that you can check what kinds of sources of NO_x have been closed during control period and how is the change of the level of O₃. P9, L13: The variation of mass concentration of COA is more than 30% higher during after control period than control period, which is not slightly. P10, L10: Are the average contributions of SOA to OA at both ground sit and 260 m all 65%? P11, L12-13: For the vertical variation of BC, does the uncertainty of the instruments in these two heights account for the strange variation? Please add some information for these two Aethalometers measurement in the section 2.2.

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C2