

Interactive comment on “Primary and secondary aerosols in Beijing in winter: sources, variations and processes” by Yele Sun et al.

Anonymous Referee #2

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This manuscript presents a comprehensive study during wintertime in Beijing using a suit of instruments. The data analysis is very thoughtful and focusing on the aqueous processing of secondary aerosol on the polluted urban area during wintertime. In addition, this work present substantial analysis on PMF analysis and show a convince PMF result. Overall, this is well written and organized. I recommend it is publication on ACP after a minor revision following the below comments. 1. One of major finding in this manuscript is aqueous processing on particulate water. However, the authors use relative humidity to demonstrate the aqueous chemistry which is at the function of atmospheric pressure and temperature. I suggest the author using specific humidity other than relative humidity. 2. The mass spectrum of CCOA of this work is characterized by the high signal at m/z 115 which is similar with previous studies. However, there are also significant signal at m/z 44 from CCOA in previous studies, such as Beijing (Hu

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et al., 2016), Lanzhou (Xu et al., 2016), and laboratory study (Dall'Osto et al., 2016) which could from the organic acids during coal burning. Please add the comparison and give the explanation for these differences. 3. It seems that the source of BBOA in this study from both the biomass burning and soft coal combustion based on the L/M ratio. These emissions may not from the residential or industry in Beijing due to the strict control, and could from the regional transport. So present the bivariate polar plots in supporting information could show some evidences on the source of BBOA. 4. P4, line13-14: please cite the reference at the order of year. 5. P6, line4: 350 nm ammonium nitrate is obtained from SMPS or AMS? 6. P6, line 25: please present the full name of NR-PM1. 7. P7, line 21-22: please show the R2 .

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