

Interactive comment on “Contrasting sources and processes of particulate species in haze days with low and high relative humidity in winter time Beijing” by Ru-Jin Huang et al.

Anonymous Referee #1

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In this study, Huang et al. used an aerosol chemical species monitor (ACSM) and an aethalometer to characterize the organic aerosol (OA) in wintertime Beijing. Positive matrix factorization (PMF) was applied to resolve the sources and processes for OA. The effect of RH on the mass concentration, the mass fraction, and the growth rate of various components in PM1 was analyzed. OA was found to dominate the components under both high-RH and low-RH pollution periods. But the change of sulfate and nitrate showed opposite RH-dependence. The results demonstrated the importance of photochemical oxidation and aqueous-phase processes on the formation of secondary aerosol during haze episodes. It could be helpful for understanding the haze formation in wintertime Beijing. Overall, the results are well presented. I recommend

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the manuscript be considered for publication after following comments being fully addressed. 1. First of all, the motivation of research should be explained more clearly in the introduction section. 2. The criterions to distinguish clean day and polluted days, as well as low RH and high RH seem a little bit arbitrary. The selection of the concentration threshold of PM1 for discriminating the clean and pollution period, as well as RH, should be explained. 3. It was noted that in Figure 4 where OOA reached a peak value at about 20:00 LT. The authors may give an interpretation about this phenomenon. Also, what is the reason that OOA increased more quickly under low RH condition than under high RH conditions? 4. Lines 328-332: Why the concentration of Ox (=O₃+NO₂) was lower than that of NO₂? Please check carefully. Meanwhile, the mass fraction of some species (e.g., Cl⁻) was missing in Fig. 5. 5. Lines 335-337: I don't think there was obvious difference in the mass fraction of nitrate in two types of pollution periods (14 % vs. 15 %). And references need to be cited in Line 337. In addition, this sentence is too hard to read. Rewrite it! 6. Lines 391-395: Was P3 assigned to high-RH or low-RH pollution during the analyses of sulfate and OA? 7. Line 423. The measurement of SO₂ was not described in the Section 2.1 Site description and instrumentation. 8. Conclusion. I think a brief description of atmospheric implications should be included in this section.

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