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Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "Vertically-resolved Characteristics of Air Pollution during Two Severe Winter Haze Episodes in Urban Beijing, China" *by* Qingqing Wang et al.

**Anonymous Referee #1**

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The paper presents real-time continuous vertical measurements of particle extinction, gaseous NO2, and black carbon (BC) from ground level to 260 m during two severe winter haze episodes at an urban site in Beijing, China. This study is very interesting and important in helping understand the formation mechanisms and evolution of severe haze episodes in China. I have a few minor issues to be considered before accepting this paper for publication. 1, P1 L14-16, it states "there were four types of vertical profiles with different occurrence rate", but 37%+5%+29%+16%+14%=101% not 100%? 2, The paper states "The travel height is 260m and the container travel at a constant speed of 8 m/s", so it takes 32.5 min to travel up and another 32.5 min to travel back down. But the time in Table S1 shows a very inconsistent travel time, some



have travel time of 28.5 min, some have 26 min. Why is that? 3, Because the measurements at different heights were not measured simultaneously (it had a ∼30 min lag), the sources and composition of aerosol may change in ∼30 min especially for local source, leading to biased vertical difference. How to address this? 4, P4, L12, it states "fossil OA (FOA) is predominantly from coal combustion emissions", why is this? Is it not possible to resolve traffic HOA in Beijing using HR-AMS and ACSM-PMF? 5, The ACTRIS ACSM intercomparison study (Crenn et al., 2015) shows that ACSM and HR-AMS measurement would vary (e.g., 36% for ammonium) to some degree even when measuring from the same inlet. Here in this study, the vertical difference between ACSM and HR-AMS would be less meaningful if they would already vary a lot. Do you have inter comparison study between ACSM and HR-AMS measuring from the same inlet?

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