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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term real-time measurements of aerosol particle composition in Beijing, China: seasonal variations, meteorological effects, and source analysis" *by* Y. L. Sun et al.

Anonymous Referee #1

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This manuscript reports one-year measurements of non-refractory submicron particles by Aerodyne Aerosol Chemical Speciation (ACSM) at an urban site in Beijing. Temporal variations of the particle concentration and composition as well as their associations with meteorological conditions are explored. The authors also provided footprint analyses for the potential source regions of aerosol components. Overall, this paper is well written and clearly describes the analysis. The paper addresses relevant scientific questions within the scope of ACP. Some results however seem to be over-interpreted and need additional constraints. New scientific findings also need more emphasis in

comparison with previous work. I recommend this manuscript be published after the following specific comments are addressed.

Specific comments: (1) In Abstract and Conclusion, it is not clear to me what the new findings are compared to previous studies. (2) Section 2.4: It is unclear how the footprints of air masses are converted to potential source concentrations of aerosol species. The authors should add a bit more details about the PSCF method. (3) Page 14557, line 16-18: Many possible reasons can lead high mass concentration of NR-PM1 in June compared to July and August. If the authors really think this is biomass burning impacts, they should provide evidence to prove, for example, fire product near the site or upwind. Mass spectral marks of biomass burning OA may also help. (4) Page 14558, line 8-9: What are the definitions of moderately or heavy polluted days herein? Is it based on daily average, or day-time average, periodical spikes (e.g., plume) or consistent high NR-PM1 loadings? Figure 4 needs clarification about how the data is treated. High frequency of data points does not necessarily represent polluted days. (5) Figures 3 and 4 show duplicate information. I suggest combining them into one figure. (6) Page 14559, line 3-4 and page 14560, line 4-5: Similar to comment #3, the authors should provide evidence to support the conclusion that "due to the impacts of agricultural burning in these two months". (7) Page 14561, line 6: Is the particle-phase ammonium sufficient to neutralize inorganic species? It may be better to show the ion balance information to support the forms of inorganic species. (8) Section 3.4: I am not convinced that the data for weekdays and weekend may really suggest anything about the emission strength without good constraints on meteorological conditions, atmospheric processing, and transport, life styles and so on in Beijing.

Technical remarks: In-text citations should be displayed in a proper format, for example, should be "Sun et al., 2013a" instead of "Sun et al., 2013b" in page 14552, line 5 and "Zhang et al. (2013)" instead of "R. Zhang et al. (2013)" in line 27. First-name initials appeared in many other places, which should not. Page 14553, line 6: Please provide references after "entire season". Page 14553, line 15 and later text: The word "organ-

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ics" doesn't exist in dictionary. Replace with "organic material" or "organic species". Page 14556, line 20: Metals are also refractory. Page 14558, line 2: Add "compared to other places in China" after "in Beijing". Page 14560, line 25-26: Define "POA" and "SOA". Page 14563, line 4: Replace "$\sim$ 8:00 until $\sim$19:00" by "about 8:00 to 19:00".

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 14549, 2015.