

This paper analyzed WSOC, EC, OC, inorganic ions and seven organic tracers in PM1, PM2.5 and PM10 filter samples collected in Beijing during the winter and spring of 2017. The contributions of primary versus secondary sources to WSOC were investigated by using PMF. The correlations of the organic tracers with meteorological parameters (e.g., temperature, relative humidity, solar radiation and wind speed) and ozone concentration were discussed. The objectives of this study include characterizing the distribution characteristics of WSOC in the different size of samples during the haze events in Beijing, quantitatively analyzing the contribution of different sources to WSOC, and elucidating the formation mechanism of WSOC in the city during the haze periods. WSOC is one of the major components of airborne particulate matter in the atmosphere, which poses significant impacts on climate change and human health. The topic of this manuscript is important, but the methodology and discussions are short of novelty and some discussions need to be clarified. In addition, this work only collected 10 days of samples (21 day/night samples in total) in the winter and 15 days of samples (30 day/night samples in total) in the spring to discuss size distribution, diurnal variation and seasonality of WSOC and related inorganic ions. The referee thinks such a small number of samples are not representative enough for discussing the aerosol chemistry seasonality. Following are the detailed comments, which should be addressed before this manuscript to be considered for publication by the journal.

1. Line 34-40, suspended soil dust is also an important source of WSOC.
2. Line 56-57, this is not true. In fact, many papers from China have reported WSOC and SOA formation, based on their field observation and lab simulation.
3. Line 70-75, how to define the haze episodes? Based on particle loading or visibility? Please clarify.
4. Line 70-82, as mentioned above, the number of samples collected in this study is small. Only ten days were selected for the winter and 15 days for the spring, why authors choose such a short time for the field measurement? How about the seasonal representativeness?
5. Line 83-85, why authors selected these seven organics as WSOC tracers to discuss WSOC sources and formation mechanisms? Here should give some explanation.
6. Line 95-102, the QA/QC, the recovery of 4-methyl-5-nitrocatechol is too low, which could cause a significant uncertainty for the measurement of 4-methyl-5-nitrocatechol concentration in real samples. Why only the concentration of 4-methyl-5-nitrocatechol was corrected by the recovery but others were not. If this difference in concentration correction could overestimate the importance of biomass burning and underestimate the contribution of other sources to WSOC?
7. Line 140-160, and also see Table 1. Why OC/EC ratio increased along with the increase of particle size in winter but decreased along with the particle size increase in spring?
8. Line 165-175, and also see Table 1, PM10-associated levoglucosan is on average two times that in PM1-associated, why? Levoglucosan is directly emitted from

- biomass burning and usually stay in fine particles.
9. Line 198-210 and Figure 2 (i.e., Section 3.2.2). PM1-associated cholesterol showed a similar diurnal concentration in winter, but PM2.5- and PM10-associated cholesterol showed a concentration much higher in the nighttime than in the daytime, why?
  10. Line 210-215. These statements are not reasonable. In fact, from Figure 2, we can see that *cis*-pinonic acid is higher in the daytime than in the nighttime, but other SOA tracers are higher at night, why?
  11. Line 215-217 Authors should give the specific evidence to demonstrate that effect of photochemical activities during the daytime is weaker on 2-methylerythritol and 3-hydroxylglutaric acid than on *cis*-pinonic acid. Moreover, line 217-219, if the enhanced 2-methylerythritol concentration at night in spring was due to the enhanced biomass burning emissions, how about the correlation of 2-methylerythritol with levoglucosan?
  12. Line 303-305 and also Figure 5, one may see that in winter SOC contributed to about 50%, 60% and 65% of PM1-associated, PM2.5-associated and PM10-associated WSOC, respectively. In other words, SOC was more enriched in 2.5-10 um size of coarse particles. Why?