Atmos. Chem. Phys. Discuss.,
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Source apportionment of organic aerosol from two-year highly time-resolved measurements by an aerosol chemical speciation monitor in Beijing, China" *by* Yele Sun et al.

Anonymous Referee #1

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Aerosol source apportionment is crucial for employing effective control strategies to improve air quality. This study presents seasonal and diurnal variations of different OA factors based on long-term (2 years) observations, and analyzes OA sources with the multilinear engine (ME-2), providing valuable information for studying the polluted events in Beijing. The manuscript is well written and figures are clearly presented. I recommend it for publication after some minor revisions. Comments: 1. In many sections, the manuscript uses evolution of atmospheric boundary layer (ABL) to explain diurnal and seasonal variations of OA factors. Are ABL measurements available?

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Discussion paper

It would be helpful if the authors can show ABL results and include a more detailed discussion comparing ABL and OA. 2. Regarding regional transport, the manuscript proposes 200 km as the distance of surrounding regions to control emissions in winter. Have the authors considered influences of different weather systems on regional transport in each season? Also, please provide more details on how '200 km' is determined? Is there any evidence from back trajectory? 3. For 'regional cloud processing' in line 20 on page 14, can the authors elaborate more on this? Also, will cloud convection influence MO-OOA transport? 4. The authors propose explanations for different phenomena, such as 'one explanation is that MO-OOA from a regional scale was circulated from the Bohai sea before arriving at Beijing', as well as some explanations in other paragraphs. Please provide references to justify these explanations. 5. In line 27 on page 15, can the authors explain more about 'the formation of MO-OOA from both aqueous-phase and photochemical processing'? The manuscript also mentions aqueous-phase processes in other paragraphs. It would be helpful if the authors can elaborate more on why MO-OOA and sulfate correlation leads to the conclusion that MO-OOA is formed through aqueous-phase reactions, and also provide some typical aqueous-phase reactions for MO-OOA formation. In addition, can the authors provide some insights on the possible contribution percentages of aqueous-phase processes and photochemical processes. Identifying dominant processes would be very useful for OA studies.

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