

Responses to comments of the reviewer #2

We appreciate the helpful comments and suggestions from the reviewer, which greatly improved the quality of our manuscript. The point-to-point responses to the comments are listed below in blue.

Responses to Reviewer #2:

Fine aerosol particle (PM_{2.5}) pollution has been one of the most severe environmental problems in the North China Plain (NCP) since the beginning of the new century. In order to elucidate the sources and formation processes of fine particles, here the authors have conducted a field campaign in urban Tianjin, a coastal megacity in NCP, to collect PM_{2.5} samples on a day/night basis during the winter of 2016 and the summer of 2017. The diurnal patterns are discussed according to the potential effects of land/sea breezes. Tracer-based methods are used to estimate the rough contributions of both primary and secondary sources to aerosol OC. In general, this is an interesting study focusing on the detailed molecular compositions of fine organic aerosols in the coastal regions of China. The results are informative to better understand the diurnal and seasonal trends of organic aerosols under the influence of local emissions and regional transport. I suggest the manuscript to be accepted for publication in ACP after some revisions based on the comments listed below.

Comments:

1. Page 5, lines 2-3: four or five rain events? In addition, please clarify the amount of precipitation in Figure 2; 0.06 mm should be 6 mm?

Response: Thanks for the reviewer for pointing this mistake. We have corrected the amount of precipitation of the four rain events in Figure 2. They were occurred on November 20-22 in 2016, May 21-22 and June 5-6, 20-22 in 2017 during sampling periods (please see Figure 2 and Page 5, Line 18-20).

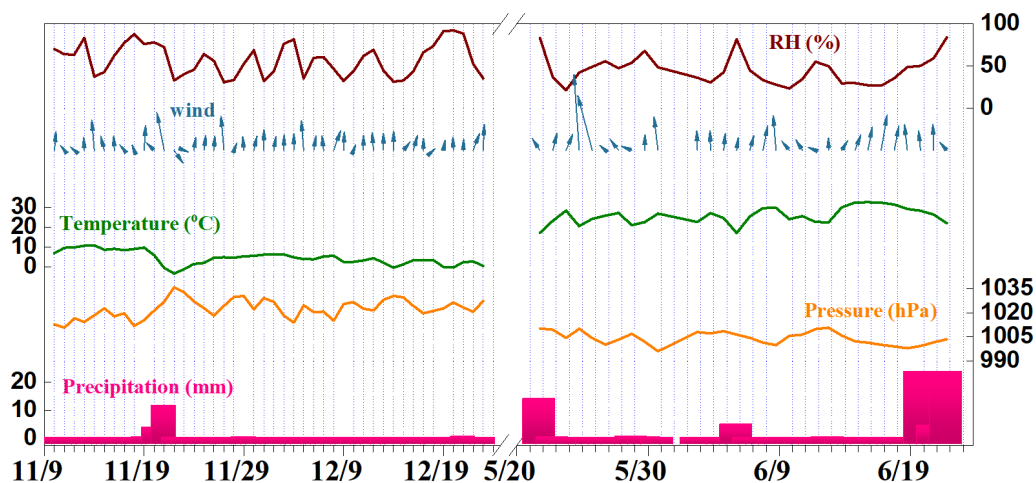


Figure 2. (revised)

2. In Page 5, the authors state that during the sampling periods, one rain event occurred in the winter and other four in the summer. Do you have any idea about the source strengths of both primary and secondary OC to total OC between the rainy days and fine days? I'd like to see a bit more discussions on this point in the section of 3.3.

Response: Thanks for the reviewer's suggestions. We have added the following paragraph in the revised manuscript (see Page 13, Lines 20-30).

“In this study, four rain events were recorded during the sampling periods. It is interesting to note that there were obvious differences between winter- and summertime samples in terms of the contributions of primary and secondary OC to total OC on rainy and fine days (Figure 12). The concentrations of primary and secondary OC decreased dramatically on rainy days in both seasons, mainly due to the washout effect on pollutants. In winter, the levels of primary OC were higher than secondary OC (mainly from anthropogenic VOCs) before the rain events. Although the concentrations of primary and secondary OC decreased on rainy days, the level of primary OC had a substantial reduction (Figure 12a). However, in summer, the concentrations of secondary OC (both biogenic and anthropogenic SOC) were significantly higher than primary OC before the rain event. We found that the summertime rain event affected little on the levels of primary OC and biogenic SOC, but it decreased the anthropogenic SOC obviously. Such seasonal differences may be attributed to the important and persistent sources such as fossil fuel combustion and biomass burning in the local regions in winter and biogenic VOC emissions in summer.”

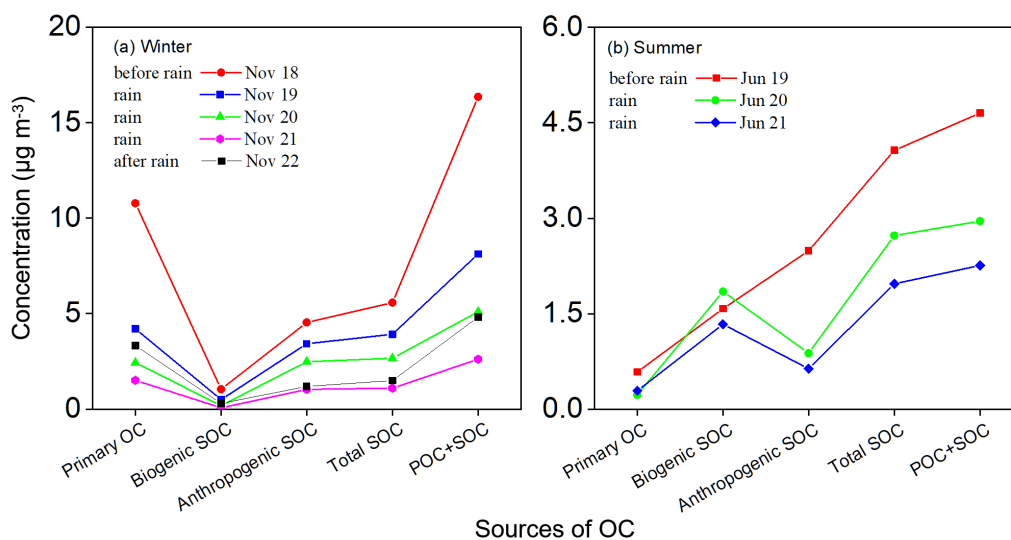


Figure 12: The concentration changes of primary and secondary OC during (a) winter- and (b) summer-time on fine and rainy days.

3. In the Caption of Figure 6, It would be better to provide the sampling periods (or seasons) for Categories A – D, which make readers easy to follow.

Response: Thanks. We have corrected it as suggested in the caption of Figure 6 on page 30 of the revised manuscript.

4. Page 11, Line 19, change “which were five times...” to “being five times...”.

Response: Thanks for the reviewer’s carefulness. We have corrected it as suggested on page 12, Line 19 of the revised manuscript.

5. Page 12, line 13, “The significant high concentrations...” should be “The significantly high concentrations...”.

Response: Thanks for the reviewer for pointing this mistake. We have corrected it as suggested on page 13, Line 14 of the revised manuscript.

6. Page 12, line 18, delete “particularly”.

Response: We have deleted it on page 13, Line 19 of the revised manuscript.

7. Page 13, Section 3.4.2, toluene SOC was found to be the predominant source to OC. What’s the main sources of toluene in local regions?

Response: Thanks for the reviewer’s suggestion. Vehicle emissions may be the main sources for toluene in Tianjin, and solvent usage in electronics manufacturing and

household product industries maybe also the sources of toluene in some other regions. And we have added this point on page 14, Line 31-32 and page 15, Line 1.

References:

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