

General comments:

This manuscript presents the quantification of organic compounds ($> C_6$) in PM_{2.5} aerosol samples collected in Beijing in wintertime of 2016 using GC×GC-TOFMS technique. More than 300 organic compounds were determined and they were classified into different groups for discussion. The dataset of the identified organic compounds in this study is very interesting and useful for atmospheric research. However, the data interpretation is not well organized and suggested to be improved. In addition, as many sentences in the text is not easy to understand, the English language needs to be modified. I think this manuscript would make a nice contribution to the literature if the following comments can be addressed.

Major comments:

1. Section 3.3 ‘The characteristics...’ is highly suggested to be improved in terms of data interpretation and English language.

The majority of words in the section was written for the data presentation of previous referenced studies, while only a few sentences were used to interpret the data observed in current study. I think the authors should describe/interpret the current data more in detail.

2. I’m wondering the conclusion in line 49 in the abstract stating that ‘organic aerosol is more highly oxidized and hence less GC-volatile on haze days’. Please see the comments 11 and 15 in the specific comments.

Specific comments:

1. Line 34 and throughout the manuscript: in some sections, ‘organic compounds ($> C_6$)’ is used, while in other sections ‘organic compounds ($\geq C_6$)’ is used. Please keep consistent throughout the manuscript.
2. Line 40 and throughout the manuscript: the full name of PAHs should be given at their first appearance in the manuscript and the abbreviation should be used in the following text. Meanwhile, the abbreviation of PAHs or PAH should keep consistent throughout the manuscript.
3. Line 43-44: the sentence ‘A near-unimodal...in most hydrocarbon groups’ is not understandable. Maybe you could rephrase ‘the most abundant of hydrocarbon groups were observed with carbon atom range of 19-28’ or something like that.
4. Line 106: The Figure 1 showing the sampling site is not found in the manuscript.
5. Section 2.2: Please generally state the analytical method in this manuscript, even it has been described in previous publication.
6. Line 125: ‘polycyclic aromatic hydrocarbons (PAHs)’, the abbreviation of PAHs should be used instead of the full name.

7. Line 124-136: please check the number of standards used in this study. For example, '6 alkyl-benzenes (...)'. However, there are only 5 standard compounds in the bracket. '15 alkyl-cyclohexanes (...) should only include 13 standard compounds?
8. Line 155: please define the full name of 'IS'
9. Line 167-168: what do the values of 18%, 20-30%..mean? Do they show the difference of concentrations observed in GC*GC method and conventional GC method?
10. Line 223: The title of section 3.3.1 shows the short chain fatty acids....and alkanones. However, I did not see any result or discussion of short chain fatty acids and alkanones.
11. Line 243-246: It shows that higher concentration of alkanonic acids was observed on non-haze days compared to that on haze days. Does it indicate that organic compounds in non-haze days experience more intensive oxidation process? However, this indication disagrees with the main conclusion in the Abstract, showing that organic aerosols is more highly oxidized on haze days.
12. Line 328-329: why the concentration of O-PAHs was calculated in both Σ O-PAHs and Σ alkylated-PAHs and O-PAHs?
13. Line 932: Figure 3, what does the dashed bar of 25-75% mean?
14. Line 335: I did not see the concentration of retene in Figure 3.
15. Line 356-357: Lower ratios of quinone: parent PAH were observed on haze days compared to non-haze days. According to this observation, I might think that organic compounds on non-haze days were highly oxidized, which is opposite with the author's conclusion in the Abstract (also see the comment 11).
16. Line 417-418: the sentence 'there is a clear...' is not understandable, please rephrase it.
17. Line 420-421: In Figure 4, the contribution of C19-C28 compounds to the total identified organic compounds looks similar between haze days and non-haze days. Why do you state that a higher contribution was observed in haze days? Could you please give the values of their contributions?
18. Line 494-495: the sentence 'a low ratio...' is difficult to understand. What does the 'low ratio' mean?