

Response to reviewer

Thanks for your valuable comments. We have tried to make a revision corresponding to your comments. They are shown as follows:

1. Page 3 Line 5-6, the cited reference for NO_x transportation was corrected by (Singh and Hanst 1981). And corresponding citation in the references was also updated.
2. For Figure 1, since Beijing was the international city in the world and our study mainly focused on the urban of the city, therefore, a larger or even regional scale map for this study was not that necessary. In addition, we only conducted a measurement in one site, namely, it was also so hard to build a link to large scale or regional scale PANs pollution.
3. Page 3 Line 9, the ratios of PANs by ECD were estimated by peak area.
4. Page 3 Line 20, we agreed with the reviewer's comments. We just tried to estimate the "actual NO₂". The reviewer indicated NO_x analyzer also responded to HNO₃, please provide related references for it. For RONO₂ species, even if, they were pretty low based on other studies. Therefore, the method for estimated NO₂ was practical even with some uncertainty.
5. For Table 1, we accepted the opinion to remove Table 1.
6. The first three sentences of paragraph 2 under section 3.1 were rewritten as follows: "The ambient pressure ranged by 994.3-1004.1 hPa and Std. dev. was 2.47. Wind speed was from 0 to 3.98 ms⁻¹ as shown in Fig. 3. 81% of the measured wind speed (total number was 862) was lower than 2 ms⁻¹."
7. Unfortunately, the statement of reviewer's comments towards "daytime maxima..." was hard to response. If the reviewer can provide us with more clearly statement about the mentioned

discussion. It would be more helpful to us.

8. We have changed “400 micrograms/m³” to “400 mg/m³”.
9. We agree with the reviewer’s statement that the ratio of PAN to MPAN was an indicator of the impact of AHCs. However, due to the instrument detection limit (5 pptv), the obtained data of MPAN was so limited and most of them were behind the detection limit. Therefore, the calculation of PAN to MPAN ratio was difficult. Furthermore, the generation of MPAN mainly contributed by isoprene. Conversely, isoprene can transform to other secondary pollutants rather than MPAN. In this study, the PPN data was available. So, we used the ratio of PAN to PPN instead.
10. HC emission inventories were so hard to be established, due to the limited data on this aspect. On this page, we just tried to use the ratio to generally identify AHCs or BHCs control types.
11. We wondered to know the problem for figures were used in the numbers reported.
12. We expected you to provide more statement about the “backwards” here. Did it have something to do with our study?
13. Regression method was a common method which had been comprehensively used in PANs studies (Roberts et al., 1998a; Roberts et al., 2007; Roberts et al., 1998b; Wang et al., 2010). There was lack of reasons whether we should image a situation in which someone has PPN and MPAN data, but not PAN data. Did it have something to do with this study?
14. The derived equations of 1-4 were based on the linearity of PAN, PPN and MPAN. Since PPN and MPAN mainly formed by AHCs and BHCs, respectively.
15. After a deep discussion within our group, we decided to accept the reviewer’s advice to

delete the Section 3.4.

16. On Page 13 Line 22-24, the mentioned “an appropriate range for heterogeneous reactions” was a hypothesis based on Figure 12.
17. We had added the citation by (Roberts et al., 1996).
18. The conclusion of this study was new to some extent. Since there was a lack of extensive PANs measurement in Asia, especially in China. The reported data itself was meaningful for us to have a better understanding about PANs pollution in metropolis city. For heterogeneous reactions, they mainly focused on observation study. We planned to conduct kinetic study in lab. For this study, the major aim was on field study.
19. We sincerely expected the reviewer to provide use the reasons for his or her statement about the possibility of overlapping interference.
20. The green data represented the ratio of PAN formed by AHC to BHC.

References:

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