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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characteristics and sources of carbonaceous aerosols from Shanghai, China" *by* J.-J. Cao et al.

Anonymous Referee #3

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This manuscript provides various measurement results for carbonaceous aerosol at heavy pollution area in China during 20 days to characterize temporal variation of carbonaceous aerosol and to evaluate their origin. I believe the data presented in this manuscript are valuable, especially the measurement data of stable C isotopes OC and EC, because of the limitation of these measurement data in this field and give significant information to the atmospheric community. However, estimation of source for carbonaceous aerosol using diagnostic ratios and EC tracer method used in this study have high uncertainty and QA/QC data for analysis of carbonaceous aerosols are insufficient in the manuscript, thus, it is difficult to follow the results and the conclusion of the manuscript in this stage. So, before the manuscript can be accepted for publication, more concrete supporting evidences are required.

The specific comments are as follows:

1. The authors applied injection port-TD method to extract PAHs and n-alkanes from the aerosol. This method is not traditional and new approach, so own QA/QC data should be provided before accepting this method in this manuscript. Although previous studies, for example, Ho and Yu, 2004 and Ho et al., 2011 provided sufficient QA/QC data for TD-GC-MS analysis, these data is not available to this study due to difference of laboratory and users. Thus, just use of reference is not acceptable. Also, more details for analytical process of PAHs and n-alkanes are needed. Did internal standards apply to GC-MS analysis in this study? What kind of internal standards are applied?

2. For the sampling artifacts: If there are no equipment system of removal of gas phase organic compounds for the sampling of SVOCs (semi-volatile organic compounds) in PM, high sampling artifacts could be occurred due to adsorption of gas phase SVOCs to the filter. The possibility of sampling artifacts for the measurements of SVOCs should be clarified.

3. Several diagnostic ratios applied in this manuscript have high uncertainty to estimate emission sources (please note the reference Galarneau, E. (2008) "Source specificity and atmospheric processing of airborne PAHs: Implications for source apportionment" published in Atmospheric Environment) because of a variety of the values even in the same source. Also, the references applied in this manuscript for the diagnostic ratios are most published before 2000. Thus, these ratios may not be similar to the diagnostic ratios of recent emission sources. The high uncertainty of these ratios should be verified and comparison of the recent studies with the previous results is required.

4. line 20 in 16818: The authors suggest that a slightly higher D/N for soot (1.3) compared with char (1.1) implies that the emissions of primary soot particles, possibly from motor vehicles,were somewhat greater during the daytime. For supporting this suggestion, the data arranged in Table 2 should be included standard deviation of the data because if the deviation of the data is large, it is difficult to suggest the value of

1.3 is higher than 1.1.

5. lines 12-17 in 16820: The authors explained that if a CPI value is close to unity, the aerosols are influenced from anthropogenic source materials, while, if a CPI value is around 10, higher plant waxes is major source. And they suggested that the relatively low CPI values (1.0 to 1.7) indicated that anthropogenic and biogenic sources for n-alkanes were both important but that the anthropogenic ones were stronger. In this suggestion, the reviewer can't understand why anthropogenic and biogenic sources for n-alkanes were both important although the CPI values measured in this study are close to unity. Please clarify this sentence and re-write English.

6. Low concentration of BaP compared to BeP: Generally, BaP concentration is similar to or higher than BeP concentration in the urban atmosphere. However, BaP concentrations reported in this study are very low compared to BeP concentration. BaP is more unstable than BeP at high temperature, thus, it is possible to decompose BaP when thermal desorption is applied for PAHs analysis. Thus, the possibility of decomposition of BaP during thermal desorption should be explained.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 16811, 2012.