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Atmospheric Chemistry and Physics Discussions

Interactive comment on “Quantitative evaluation of emission control of primary and secondary organic aerosol sources during Beijing 2008 Olympics” *by* S. Guo et al.

Anonymous Referee #1

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1) Prior studies (Table 3) indicate the importance of cooking contributions to organic carbon in Beijing. It is noted in the experimental section that cholesterol was not detected in most samples, however, it is reported in Table S2 as a quantified value for both PKU and Yufa sites. For the observed cholesterol levels, what concentration of cooking-derived organic carbon is estimated on average? What contribution from cooking might be expected for specific dates when cholesterol concentrations were greatest? How do other molecular markers that are characteristic of cooking (i.e. fatty acids, also reported in Table S2) provide insight to this source? How do CMB model results change when cooking tracers are included?

2) Table 1: Describe the calculation of the measurement uncertainty (or clearly indicate that this is the standard deviation, standard error, as applicable).

3) Table S1 is not useful, as fitting requirements are summarized in section 2.3.

4) References to CMB profiles appear erroneous or incomplete. For example, Zheng et al., 2005 is a source apportionment paper and not a primary article reporting a coal burning profile. Justification of the selection of profiles is needed, especially for biomass burning. Why is a profile for fireplace combustion of wood in the United States used, when open-burning from nearby provinces is expected to be the source of levoglucosan? What more representative profiles are available? And how do CMB results change with selection of biomass profile (i.e. sensitivity test).

5) Additional section in methodological description is needed discussing the statistical analyses used in comparing data across locations and time periods. It is suggested that section “2.4. Statistical analysis” follow the methodological description of source apportionment.

6) What accuracy and precision is expected for PAH concentrations (page 32891 lines 21-23) and hopanes concentrations (page 32892, lines 12-15)? It is questionable whether all of the reported digits are significant.

7) Discussion of PAH distribution (page 32891, lines 25-end): Citation needed for discussion of ring-number distribution and its relationship to temperature.

8) Levoglucosan concentrations (page 32892, lines 5-10) – are these to be nano-grams per cubic meter? If micrograms per cubic meter, they account for more than the observed PM organic carbon.

9) Hopane concentrations (page 32892) – do the relative amounts of hopanes provide insight to their sources? They can also be emitted from coal combustion, which is known to be an important source in the region.

10) Table 3 should explicitly report SOC sources (as suggested on page 32893, line

7). Likewise, a citation to Guo et al., 2012 should be included.

11) The calculation of the uncertainty in source apportionment results needs to be described in detail – is this standard error, 95% confidence intervals, or propagated measurement/model uncertainty?

12) Variation of organic particle sources – the F test (page 32895, line 7) is used to compare the variances of measurements. How and why were F-tests used to compare values across time periods? How were mean contributions of sources quantitatively compared? Summary statistics from which the authors draw conclusions should be incorporated into the Supplemental Information.

13) Biogenic vs. anthropogenic SOA – Need to be more quantitative about increases in biogenic SOC during the control period; “little higher” is insufficient (page 32897, line 17). Was this difference in biogenic SOC statistically significant? Data is needed to support the conclusion that “emission control constrained anthropogenic SOC”.

14) Conclusions – do the authors have any recommendations of how to reduce SOC pollution?

Minor typos- Entire manuscript would benefit from copy-editing with attention to grammar. Page 32886, line 17: precious -> previous Page 32887, line 15: chromatograph -> chromatography; ionic compounds -> ions Page 32891, line 1: n-alkanoic -> n-Alkanoic

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 32883, 2012.