**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Source apportionment of fine organic aerosols in Beijing" *by* Q. Wang et al.

Anonymous Referee #1

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This manuscript deals with the study of the composition of PM2.5 organic aerosol in the Beijing urban area during summer and winter campaigns. Organic aerosol composition evaluation was achieved through measurement of OC and EC and of specific organic tracers by GC/MS analysis. Several of these tracer compounds are specific of particular emission sources and can be used in the source apportionment of the aerosol. The authors employed CMB to apportion the sources of Organic matter and of total PM2.5 mass. CMB has advantages in source apportionment studies when the number of samples analysed is reduced, such it is usually the case of GC/MS organic tracer analysis. The method has however the limitation of not accounting with the formation of secondary aerosol mass and variability in source composition in space and time. The authors tried to improve the quality of CMB predictions by mostly using source profiles of local and regional origin. The fact that we they were dealing with urban aerosols of a large and polluted metropolis where the primary emissions are huge may

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reduce the interferences of secondary aerosol transformation and formation. However the lone utilization of organic profiles to calculate not only the organic aerosol load but also the contribution to total PM2.5 mass (including inorganic material) may introduce important errors in the estimations. Analysis of inorganic aerosol composition would be quite helpful to help in consolidating the estimations of source contributions. In my opinion the authors should invest some effort more in discussing the limitations and imprecisions of the methodology.

The information provided in the paper in relation to the CMB process is limited (a table with the profile compositions of all the sources used in CMB would be helpful). However the CMB outcome is reasonable and comparable with the results of other source apportionment studies performed in this urban area region. Especially interesting is the capability of the CMB to infer the important contribution of food cooking to the urban organic aerosol load.

I therefore recommend publication of the manuscript after some corrections, mentioned in the following lines, are done:

Page 9043, line 3 - Use <August 2005> instead of <August 2006>.

Page 9046, line 24 - Use <1.13> instead of <1.31>.

Page 9047, line 17 - Use <NIOSH> instead of <NOISH>.

Page 9047, lines 18-20 - In the sentence <Quartz filters ...were combined> it is not clearly explained if the combination was done separately for day and night or if day and night time samples were combined together. Anyway, the daytime and nightime separated collection of aerosols did not seem to be used in any further study and discussion of the aerosol characterization.

Page 9050, line 18 - The sentence <...in winter were 0.3-1.3-fold higher than in summer> does not give any clear information about higher pollution levels in winter. On the contrary, the average of the interval 0.3-1.3 (0.8) indicates lower values in win-

ter. So rephrase the sentence to be in agreement with your conclusions (or change the conclusions!).

Page 9053, lines 5-6 - From Figure 5 it is not possible to confirm the $<$strong odd-carbon number preference$>$. There was some preference which in winter was weak. Perhaps the calculation of CPI could better quantify this observation.

Page 9054, lines 24-26 - Hopanoids (C30 mainly) are also known to be present in certain higher plants (e.g. ferns). In the case of lignite combustion the dominant hopanoids are C30 (Oros and Simoneit, (2000), Fuel, 79, 515.

Page 9055, lines 10-11 - Add references to the sentence.

Page 9056, lines7-8 - Clarify in the sentence, when did the $<$Levo/EC increased markedly$>$.

Page 9058, line 24 - Substitute the value $<$2.8%$>$ by $<$8.2%$>$. This is the value tat can be calculated from the reference Zhang et al (2007) (8.2=4.52*0.546). Taking into account that 8.2 is bigger than 5.9, I have difficulties in understanding the sentence that follows $<$Given that all levoglucosan was emitted from wood burning and the use of a method similar to that described by Wang et al. (2007), ...$>$. Please correct or clarify.

Page 9060, lines 24-26 - Please clarify the reasoning related with this sentence. Which is the amount of coal combustion that is used at home heating by comparison with industrial utilization? If home heating emits at much higher rates than industrial burning why where the results of PMF much higher? Why, in CMB was not the industrial burning of coal taken into account?

Page 9061, lines 6-8 - Present an explanation for the variability on relative contribution of diesel and gasoline vehicles between summer and winter.

Page 9061, lines 11-13 - This sentence is not convincing. Was road dust composition taken into account in CMB? If not, the ratio of organics to PM2.5 in road dust should

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be completely different from car emission profiles.

Page 9068, Table 2 - Please reduce the number of significant digits in the Table.

Page 9073, Figure 2 - This figure does not add much more information to the paper and can be removed.

Page 9080, Figure9 - Change colour or form of points referred to wood burning and straw burning. Both are diamonds with similar reddish colours.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 9043, 2009.