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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Source apportionment of the particulate PAHs at Seoul, Korea: impact of long range transport to a megacity" *by* J. Y. Lee and Y. P. Kim

Anonymous Referee #1

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Review comment on "Source apportionment of the particulate PAHs at Seoul, Korea: impact of long range transport to a megacity" by J.Y. Lee and Y.P. Kim

General Comments: This manuscript describes the sources of particulate PAHs measured at Seoul, Korea between August 2002 and December 2003 using the CMB model. It is well written and the results are undoubtedly valuable dataset. However, there are a few major concerns. The most important concern is the validity of CMB results. Some of PAHs used in the CMB model are not conserved species such as phenanthrene, anthracene, and fluoranthene etc. PAHs used in the CMB model are normally those with molecular weight >= 252. Although the authors normalized PAHs

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to benzo(e)pyrene, it would be helpful to show the difference of CMB results by including or excluding these light and more volatile PAHs. The coal residential source was identified as one of the major sources of PAHs. The profile from China by Chen et al. (2004) was not used due to statistical problem. Thus, it was replaced by profiles presented by Li et al. (2003). This is not convincing. The authors need to better explain why the coal residential profile cited in Li et al. (2003) paper is more representative. Some of the samples have a DF (degree of freedom) of 3. The authors should put more effort in proving the validity of CMB results. These comments should be carefully addressed prior to publication.

Specific Comments:

1. The authors mention that "collinearity problem was not observed due to the distinctively different marker species of the each source profiles". What are the distinct markers for each source profile? Please specify.

2. The internal standard (phenanthrene-D10) was spiked into the sample after extraction and evaporation using an evaporator. Normally the internal standard is spiked before extraction. Any special reason for spiking it later?

3. "Abstract": This study indicates that some PAHs are transported from outside of Seoul, from China and/or North Korea. Is there any way to quantify the transported materials? Is there any transport from Japan?

4. "Measurement data" section: Quartz filters were pre-baked at 400 oC instead of commonly used temperature 550 oC. What species were found in the field blanks and lab blanks?

5. "Measurement data" section: Four species (Nap, Ace, Acy, and Flu) predominantly exist in gas phase and they were not included as fitting species in CMB. However, light PAHs (e.g., those with molecular weight 178) are also primarily in gas phase, especially in summer. It is recommended to remove more light PAHs from the fitting species list

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in the CMB model.

6. “4.1 General characteristics” section: Zhang et al. (2005) should be Zheng et al. (2005).

7. “4.2 Effect of biomass burning” section: “When the source profile from Schauer et al. (2001) was used instead of Ĕ, the source contributions for particulate PAHs was also high in fall and winter.” How different are the results when two different profiles are used?

8. Page 1492: “as the values of 2 being higher”: Do you mean “as the values of chi-square being higher”?

9. Footnote of Table 3: Should Li et al. (2005) be Li et al. (2003)? There is no Li et al. (2005) in the Reference section.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 1479, 2007.

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