

Interactive comment on “Size-resolved source apportionment of ambient particles by positive matrix factorization” by J. S. Han et al.

Anonymous Referee #2

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General Comments:

This paper describes the application of positive matrix factorization to chemical speciation analyses of ambient particles collected over Gosan, Korea. The overall organization of the paper is good. The mathematical techniques applied are well described and the results are interesting. However, the conclusions can be strengthened with a better description of the sampling techniques and the meteorological conditions observed during the sampling period.

Specific Comments:

The title would be more informative if it included the geographical location of the DRUM

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sampler, eg: Size-resolved source apportionment of ambient particles in southern Korea.

p. 5227: 1st Paragraph - What was the RH of the inlet to the DRUM sampler? What was the flow rate? What was the height of the sampler? What were the prevalent meteorological conditions during the time of sampling? What were the likely origins of the air masses?

p. 5230: 3rd Paragraph - It does not 'confirm' the successful application of PMF. However, it does 'suggest' or 'support' it.

p. 5230: 4th Paragraph - While secondary sources were not explicitly resolved, sulfur was. In fact a large portion of sulfur that was resolved was likely in the form of sulfate. How might this have impacted the results?

p.5231: 1st Paragraph - You only fourteen of the fifteen resolved sources. You should explicitly state that the ferrous metal source was resolved into coarse and fine mode here.

p. 5231: 2nd Paragraph - It is unclear to me how you compared the elements resolved in this paper to those of previous studies. Did you integrate the mass of each element over all sizes from your results? If this is the case, the sentence in the same paragraph 'and the known profiles from previous studies are simply averaged source compositions regardless of aerosol size range' is not clear to me.

p. 5233:1st Paragraph - Could the observation that ferrous metal-related source resolved into two 'independent' sources also be explained meteorologically? Do the atmospheric conditions support a rain-out of coarse mode aerosols when the source contribution is weak compared to the fine mode?

p. 5223: 3rd Paragraph - Briefly describe the Beta Ray Absorption method.

p. 5223: 3rd Paragraph - Where did the weighing factor of 1.02 assumption come from?

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p. 5234: 2nd Paragraph - Could water explain some of the difference in resolved and unresolved mass? What are the uncertainties associated with your chemical resolution techniques?

p. 5242: It would be useful to include the size cuts on each stage. How do you explain source number five's presence on stage five and seven, but not on stage six? Make sure to state the C = coarse and F = fine.

Figure 1: A key is needed for the symbols.

Figure 6: It would strengthen your conclusions if the temporal variations were compared to back trajectory analyses. This may be especially plausible for the volcanic emissions and biomass burning peaks.

Technical Corrections:

p. 5224: 1st Paragraph - the dust aerosols emitted has less to do with the high population density, and is more related to geography and farming practices.

p. 5225: 2nd Paragraph - Spell out particulate matter the first time you use PM.

p. 5226: 2nd Paragraph - Spell out DRUM the first time you use it.

p. 5234: 3rd Paragraph - 'Fig. 8' and 'Figure 8b' the 8 should be 9. This also applies to the same paragraph on the following page.

p. 5238: Paatero (1997) is miscited.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 5, 5223, 2005.

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