**Atmospheric
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Discussions

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Interactive comment on "Estimation of direct and indirect impacts of fireworks on the physicochemical characteristics of atmospheric fine and coarse particles" *by* Y.-Z. Tian et al.

Anonymous Referee #3

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General comments

This is a nice paper studying the direct and indirect impacts of fireworks on particulate matter in a megacity in China. The study is well designed and covered the period before and after the firework episode. It provided a comprehensive analysis through a combination of chemical characterization, microscopic analysis and receptor model. The method used to determine the indirect firework is very interesting and elucidates the fact that certain PMF factor profile is a combination of co-emitted sources. Overall, the paper adds nicely to the current knowledge of impact of firework on particulate matter and merits publication. There are, though, some specific questions need to be

clarified (listed below).

Specific comments

The grammar needs to be edited.

The title should be modified. The paper analyzed the firework impact on PM2.5 and PM10, but not "coarse particles", as shown in the title.

page 11077, line 27-28. Please explain why the "influence is continuous" given the fact of "firework-related pollution episodes are transient in nature".

page 11080, line 2-4. Only figure S2 is related to the QA/QC, and there is no "detailed information" available in the supplement. Please revise the sentence or add more information.

page 11081, line 23. As the obtained profiles of PM2.5 and PM10 were similar, is it necessary to combine them in PMF? Would it be better to combine chemical composition of PM2.5 and coarse mode (difference between PM2.5 and PM10, instead of PM10) into PMF?

page 11082, line 6-18. Please add the aim of CMB analysis here. It is until the very end of the manuscript before I understand why and how CMB was used.

page 11088, line 9. How many samples were included in PMF? Is the number of samples sufficient comparing with the number of species?

page 11088, line 13. The regression between modeled and observed PM can be used to check the model, but a good correlation does not necessarily suggest "perfect performance of PMF in this run". Besides, what are the correlations for other solutions (6-factor, or 7-factor)?

page 11088, line 17-25. The interpretation of the profiles rely on only the mass concentrations of a few major species. Trace metals with low concentrations are not visible at all. I suggest to include the percentage of species in one factor compared with the

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total concentration of that species.

PAGE 11090; LINE 20. Potassium is used as the marker of direct fireworks in the paper, however, an "indirect biomass burning" factor was characterized using CMB, which means K is also emitted from biomass burning. The question is how certain is the "indirect biomass burning" associated with firework? Is it possible to characterize a "biomass burning" factor directly from PMF?

Fig. 3. What are the contributions of indirect "biomass burning" from fireworks before February 9? If there were contributions, were they emitted from fireworks or from normal biomass burning sources? I am also wondering whether there were fireworks or not before February 9?

Fig. 4. The percentage contributions of total firework impacts to PM10 were zero from February 5-7, while the contribution to PM2.5 were between 5% - 10%. What's the reason for this?

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 11075, 2014.