

Interactive comment on “Exploration of PM_{2.5} sources on the regional scale in the Pearl River Delta based on ME-2 modeling” by Xiao-Feng Huang et al.

Anonymous Referee #2

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General comments:

This study apportioned the sources of fine particles in the Pearl River Delta (PRD) region of China using both PMF version 5 and ME-2 methods. The authors found that ME-2 model could produce better results than the PMF model. Ten sources of PM_{2.5} were found in the PRD region including secondary sulfate (21%), vehicle emissions (14%), industrial emissions (13%), secondary nitrate (11%), biomass burning (11%), SOA (7%), coal combustion (6%), fugitive dust (5%), ship emission (3%), and aged sea salt (2%). Furthermore, authors identified the source contribution from both local and regional emissions.

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In general, the scientific content in this manuscript is good for publication. However, I have some comments that I hope it could help author improve their manuscripts.

Major comments:

1, Line 109: The authors assumed OM/OC is 1.8. This ratio seems too high for me. According to He et al. (2011), the OM/OC is 1.6 for the urban areas. Could the author explain for this ratio? In addition, why do you use the OM, not OC as the input variable in the model? I think OM/OC ratios should vary following the sampling days. Therefore, if you input the OM instead of OC in the model, it will cause more uncertainties. How did the authors calculate the uncertainty for the OM?

2, PMF model vs ME-2 This study compared the PMF and ME-2, but I cannot find the information which shows how the authors conducted the PMF in details. I suggested that the author should write more about PMF version 5.0, what is difference between PMF v5.0 and ME-2. For example, in PMF v.5, they also have constrained factor functions, did the authors use this function to constrain the factor? In addition, the authors should write more how they select the number of the factors and optimize the PMF results. I would be grateful if the authors show correlations between the PMF and ME-2 results.

Line 164: $Q_{true}/Q_{exp} = 2.5$. Could the authors explain why they use the Q_{true}/Q_{exp} ratio of 2.5 to optimize the solution? I think the ratios depend on the number of factors and the uncertainties. Did the author add the extra uncertainty in the PMF model?

Other minor comments:

1, Line 172: Please define “EV”

2, Line 205-206: I think the much lower concentration of PM_{2.5} at DP because this sampling site near the sea therefore the air pollutants are more diluted. I am not really clear why low PM_{2.5} concentration at DP indicate the large contributions of pollution transported from outside region? Could the author explain for this?

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3, Line 227-230: The authors compared the PM_{2.5} between the cities. This comparison is not meaningful to me because the authors compared the levels at different time periods. For example the PM_{2.5} levels at Beijing and Tianjin were measured in 2012-2013, while the PM_{2.5} concentration measured in this study was in 2015. Please note that after 2012, the PM_{2.5} trends at Beijing and Tianjin also showed a huge decrease under the “Control Action Plan”. I suggest the author should update the PM_{2.5} level in the Table 4.

4, Line 252-256: Could the author explain “high OM concentration was considered to present the LV-OOA” and “high OM concentration was considered to represent SV-OOA”? Could you please discuss more about that: why the (NH₄)₂SO₄ associated with LV-OOA and NH₄NO₃ and SV-OOA shared same source?

5, Figure 8: Regarding the aged sea-salt factor, the contribution of this factor at QA and HS sites from the northerly flow was higher than those from the southerly flow. Could you explain for that?

6, Line 527: A typo-mistake “theMe-2”.

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