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Interactive comment on “Advanced source apportionment of size-resolved trace elements at multiple sites in London during winter” by S. Visser et al.

Anonymous Referee #2

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The manuscript describes the use of ME-PMF as source apportionment tool. The data set is composed by the data collected in three sites in London where DRUM impactors have been deployed. The analysis of the DRUM stages by S-XRF has been described in previous papers. ME-PMF is a pretty new topic with still few examples in literature and therefore I recommend the publication of the manuscript. However there are first several points to fix and/or clarify:

1) Eq 4, pag. 14742: this way to consider the uncertainties, i.e. neglecting any systematic term, could be acceptable if the DRUM-SXRF data only are used in the statistical analysis. This is only partially true in this case since aetholemeter and AMS values are

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quoted along in the text to comment/clarify the ME-PMF outcomes. Actually, the systematic uncertainties in the DRUM-SXRF approach could be quite large as previous papers shown. I think this point should be discussed more in depth and that a systematic term should be added to the final results when compared with other techniques.

2) The description of the ME-PMF approach is quite complex and a little bit assertive: the reader understand that many test and trials have been carried out but since this is an innovative procedure more information would be useful. I understand that the available space is limited however I encourage the Authors to revise this part maybe adding more information in the supplementary material

3) The significance of the ME-PMF results is limited by the lack of information on important components of the PM (EC/BC, OM, ions, etc). However, the Authors mention and use at least Aethalometer and AMD data which could had been used to fill the gap. Again, I understand that to collect everything in a unique data set and run a "complete" ME-PMF analysis would be quite complicate but this issue should at least be mentioned and commented.

4) Brake wear , suspended dust and traffic: the "traffic" source with a profile composed by Fe only is very suspicious and I believe it is actually the "residual" iron non incorporated in dust and brake wear. Sources should have a physical/chemical meaning and I do not understand which is the process that could produce Fe alone.... This is also related to my previous comment 2: is it really demonstrated that this is the best PMF-solution. Could this depend on the use of common profiles in the three sites (while a different traffic composition could ask for different profiles)?

5) sea salt, aged sea salt reacted Cl: same comment as above. Thi source with Cl only is a little bit suspicious...here the lack of information on nitrates is important to support the hypothesis considered in the text

6) S-rich: a mention to the fact that this source likely correspond to secondary sulphates should be given

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7) fig. 5: the correlation with NO_x and number of vehicles is quite weak or even absent, While the same plot is not provided for the rsuspendedc dust and the Traffic related (FE only...) sources? Is this the best correalation with independent traffic tracers that could be obtained?

8) fig. 12: as above: why the aethalometer data are compared with "solid fuels only? What about the correlation with the traffic related sources? In Fig. 12 there are several time periods in which the correlation get lost...

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 14733, 2015.

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