**Atmospheric
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Discussions

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Interactive comment on "In-situ, satellite measurement and model evidence for a dominant regional contribution to fine particulate matter levels in the Paris Megacity" *by* M. Beekmann et al.

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The authors thank the referee for his positive evaluation of the paper as an "solid and authoritative attempt to reconcile the results" obtained during the Megapoli Paris campaign.

In the following, we give detailed answers to the mostly technical or stylistic comments.

General: The authors have made use of footnotes on a few occasions, but the use of these is discouraged in ACP. Given that the information presented is in the form of additional information rather than technical details, these should be worked into the

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main text or removed.

In the revised text, footnotes have been, as recommended, worked into the main text, or omitted (in one case, where the information was also available in the supplementary material).

P8650, L28: 'Charbroiling' is probably too specific a term for cooking here, as other cooking techniques (e.g. stir frying) are also known to be significant.

'Charbroiling' has been replaced by 'cooking activities'.

P8651, L20: If you are citing a specific population estimate, can you be specific about the number rather than simply saying 'more than 10 million'?

The exact number of inhabitants given in the reference for the year 2015 is put in the revised text (10,84 millions).

P8653, L1: 'Aethalometer' is a proper noun and should have a capital 'A'. The model number should also be specified.

'Aethalometer' has been written with a capital 'A' and the model number has been specified (Magee Scientific, model AE-31) in the text.

P8654, L16: By 'error analysis', do you refer to the ambiguity of the PMF outputs? If so, this should be made more specific to avoid confusion with the errors used in the weighting matrix.

Yes, we refer to the ambiguity, or better uncertainty, of the PMF outputs. To make this more clear, we have rewrote the sentence as follows :

'Error analysis for PMF output is performed by varying the algorithm parameters (seeds, fpeak). A relative uncertainty for different factors of usually several tens of percent has been obtained (Freutel et al., 2013).'

P8655, L2: Does automotive fuel in Paris contain ethanol? If so, this could alter the

modern percentage, although the effect could be negligible if it is assumed the HOA originates solely from lubricating oils rather than fuel.

In 2009, SP-95 gasoline (to my knowledge the only sold ethanol containing gasoline in France) could contain up to 5 % ethanol. This part would indeed be modern. As the referee says, POA (HOA) sources are multiple. In France, only about 30 -40% of distributed fuel is gasoline, the largest part is diesel. In conclusion, the effect of modern HOA due to ethanol is largely within the error bars of the source apportionment analysis, and thus is neglected here.

P8662, L22: 'The broader picture' is perhaps too informal. Consider revising.

The section title 'The broader picture' has been replaced by 'Comparison to other Megacities'.

Figure 1: The text on the map is difficult to read against the colours. Consider a different scheme, such as numbered markers with a legend outsider of the plot.

The text on the map appears now on white background, which makes it easily readable.

Figure 4: Rather than 'left' or 'right', please use 'a' and 'b' to refer to the sub-figures. Also move the text above the plots rather than overlaying, for the sake of clarity.

This is done.

Figure 5: Again, please use letters to refer to the sub-figures. Also, the text in the rightmost plot is so small as to be unreadable, so please revise.

This is done.

Figure 10: What is the basis for the ordering of the cities on this plot?

The basis for ordering is the BC or EC concentration measured in a megacity. If several entries are present, then the largest one has been considered (e.g. for Bejing, EC and BC measurements, or for Tokyo, with two different time series).

Table S2: This data should perhaps be included in the main article; by placing the references in the supplement, the citations will not be included in the main references (which is used by indexing services), however given that their data is used in figure 10, it would seem that they should. We recognize the point raised by the referee. Table S2 and the references included there are shifted into the main paper (as new Table 1).

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 8647, 2015.