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Interactive comment

Interactive comment on "Variability of polycyclic aromatic hydrocarbons and their oxidative derivatives in wintertime Beijing, China" *by* Atallah El zein et al.

Anonymous Referee #1

Received and published: 14 March 2019

This is a nicely written paper that contributes new data to help improve understanding of urban sources and levels of PAHs and their derivatives, including day vs night variability. What is still missing from the paper in my opinion, is an expression of the study's significance. i.e. what is novel about this study and how/where do the results make an impact on advancing the field of science. I would expect this for a paper in ACP.

Minor things:

Line 76-86: Why only target PM and not gas-phase? Some explanation is warranted here I think. Also, when comparing results to other studies is this always based on PM and not total?

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[Discussion paper]

Line 83: Do the longer nighttime samples compared to daytime samples introduce a source of bias in the results? For instance, related to particle capture efficiency which changes as the filter becomes more loaded. Another question is heterogeneous reactions on the filter during the 15hrs the samples are being collected and exposed to a high volume of atmospheric oxidants. If these reactions are occurring they will impact the 15h samples to a greater extent. This issue has been considered in the literature and I think the authors should at least raise this concern.

Line 203-205 and elsewhere: please use consistent number of significant figures when reporting concentrations. In this section it ranges from 2 to 4. I think that either 2 or 3 significant figures is appropriate given method uncertainties.

Line 369+: I think the spatial variability within Beijing may be even more important than seasonal variability. The authors believe their results are representative of "Beijing" and present them as e.g. "...concentrations for Beijing". However, I wonder if that is appropriate without first investigating the representativeness of their sampling site for the entire metropolis of Beijing. There is also the potential for a dominant impact due to a local source (or sources) that may impact or bias results at a given site. The authors should be careful to address this possibility and not overstate the representativeness of their results (or other results from single sites in other studies), when making comparisons e.g. Beijing vs Athens. end/