

Interactive comment on “Polycyclic aromatic hydrocarbons (PAHs), oxy- and nitro-PAHs in ambient air of Arctic town Longyearbyen, Svalbard” by Tatiana Drotikova et al.

Anonymous Referee #1

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I enjoyed reading this paper; it is well written and scientifically sound. Furthermore, it makes an important contribution to the Arctic literature, providing results and interpretation of possible sources PAHs, oxy- and nitro-PAHs using ambient samples. I recommend the paper be accepted for publication with minor revisions.

Line 33 insinuates that the highest PAH levels observed in the Arctic are in the winter, and many of these would settle in the particulate phase because of the lower temperatures; in lines 55 it is suggested that the oxygenated and nitro PAHs would be higher in the summers due to the increased presence of oxidants and photodegradation. Wondering if there are actual environmental measurement studies that support this, or if

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the authors have considered measuring ambient levels in this region in the summer.

Check phenanthrene spelling in introduction and wherever else relevant.

Figure 4: I think it's interesting that the PAHs that seem to exist mostly in the gaseous phase (e.g. PHE, FLU, Ant, 2NNAp) tend to associate more with the lower temperature dry samples (A4 to A7). Curious as to whether the authors can clarify why.

Line 292-293: I can't seem to understand what the co-authors are trying to convey here. Why would A1 and A2 being negatively correlated indicate specific humidity is an essential parameter for the removal from the atmosphere? I thought it was interesting that A2 and A5 (the highest precipitation events) were quite separated on the PCA plot. Initially, I thought the differences could allude to the differences in scavenging efficiencies of snow and rain for PACs (i.e. where PAC concentrations in A5 lower than in A2?) But, then at the UNIS station you don't see the same separation for corresponding samples.

Could the captions of Figures 4-6 include what A1-A7 and U1-U7 represent? i.e. A1-A3 = humid, etc. It is stated in the text, but its easier for the readers to follow if these are added under the figures.

It would be interesting to include a table like Table S12 but a more comprehensive summary of PAHs levels in other Arctic regions. Because I found myself wondering how air concentrations were comparable to Arctic regions without a power-plant, for example.

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