

Interactive comment on “Polycyclic aromatic hydrocarbons in the atmosphere of two French alpine valleys: Temporal trends and examination of sources” by N. Marchand et al.

N. Marchand et al.

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You will find below additional comments relating to questions from the editor.

Question 1 : First, Reviewer #1 in Point # 2 asked that you consider PAH source apportionment studies (e.g. Kavouras et al.) and molecular diagnostic parameters for the reconciliation of PAH occurrence with emission sources (e.g Yunker et al.). Were these taken into consideration in the final version?

Answer : This point is discussed in the Introduction section. The PAH source apportionment studies are based on emission data sets. Because of the great variability of chemical fingerprint observed for the same class of sources (eg : vehicular emissions...) (discussed in section 3) these quantitative studies seem to be problematic considering only PAH. As example CMB studies using our PAH concentration datas

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are reported in Marchand 2003. The results obtained from the CMB model show a great variability with the emission data set used. In addition the uncertainty about relative contribution of one source is in the order of 50%. The methods used by Kavouras et al. or Yunker et al. are also based on the used of several compounds such as Alkanes or alkyl-substituted PAHs which are not quantified in our study. One objective of our work is to show the capacity of PAH profiles to accurately discriminate sources.

Question 2 :Second, did you follow the suggestion of U. Poschl to use the terminology of Schauer et al. 2003 in the gas/particle partitioning studies? If not, could you clarify to me as to why not?

Answer : This terminology is based on the number of aromatic cycles in each PAH (eg PAH(3,4); PAH(5,6)). It could be used when the PAHs classed in one group exhibit the same behavior with external parameter such as temperature. However our results show clearly that this is not true for the four cycles PAH (PYR, FLA, CHR et BaA). Indeed the relative contribution of FLA and PYR depend on the ambient temperature whereas CHR and BaA seems to be independant. Consequently to avoid confusion we have preferred to maintain a terminology based on the individual name of PAH.

Question 3 :The comment of U. Poschl (#5) to recognize previous measurements of PAHs in alpine environments seems valuable. Was it addressed?

Answer : The previous measurements of PAHs in alpine environments but also in other mountain environments (eg Fernandez et al et Schauer et al) are connected with sampling sites characterized by high altitude and in free troposphere. It's difficult to give some comparison with our study using sampling sites located in the valley floor and in the proximity of PAH sources (town, road...). In our condition the level of PAH concentration are more closed of those observed in large cities than those observed in high altitude sites.

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