

Interactive comment on “Drivers of atmospheric deposition of polycyclic aromatic hydrocarbons at European high altitude sites” by Lourdes Arellano et al.

Anonymous Referee #2

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In the submitted manuscript by L. Arellano et al. (leading author P. Fernandez) is reported a study on the drivers of atmospheric deposition of polycyclic aromatic hydrocarbons (PAHs) in three high altitude sites in Europe. This is an elaborated attempt to identify the drivers of the atmospheric deposition fluxes of PAHs and to compare them with settling fluxes within lakes. The manuscript, although is generally scientifically sound and interesting for the broader Geoscience community, is also subject to criticism. The authors should take into consideration the following remarks and suggestions in order to consider the manuscript for publication to ACP.

General comments 1) The work indeed contains the largest atmospheric deposition

C1

data set available for PAHs for high mountain areas and some lakes in their vicinity and for this reason is a worthwhile for the scientific community. 2) The approach to elucidate the drivers of atmospheric deposition is well designed and the results are solid. 3) Some flaws: a) is that wet deposition and dry deposition samples were not separately collected and studied; and b) air-water exchange was not calculated for lakes. (See Tsapakis et al. 2006). 4) The manuscript is subject to improvement.

Specific comments. 1) The authors use rather obsolete literature: e.g. P. 3, lines 90-95 (20 y old!). There many studies after 2005 that could be used a literature. 2) The authors, in the Experimental Section and Table 1, should report which of the 15 EPA-list PAHs are considered as LMW and HMW compounds. Since they compare with previous studies in which more PAHs were determined. They should also indicate the number of PAHs in the sum (Σ) (see Tables). 3) The interpretation of the presence of different PAHs on the basis of their diagnostic concentration ratios should be given very cautiously, since the individual compounds (especially the more reactive ones) are subjects to important degradation mechanisms during their atmospheric transport and before deposition and reaching the lacustrine environment (P. 8-9; I. 285-305). 4) Discussing the deposition fluxes and comparing them with those determined in different environments it would useful for the readers to focus on specific compounds. E.g. Those with the highest abundance

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C2