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Interactive comment on “Polycyclic aromatic hydrocarbons in atmospheric aerosols and air–sea exchange in the Mediterranean” by M. D. Mulder et al.

Anonymous Referee #1

Received and published: 2 April 2014

The paper represents important study of the PAH content in the atmosphere and can be published after some corrections.

Specific comments:

1. The first sentence of the abstract is not rather clear. It is not mentioned that measurements were made for the subset of PAHs (25 PAHs). May be there is also a need to characterize somehow what kind of PAHs were selected in the study (light, heavy, etc.) and may be to give the fraction in particulate phase as the range (not just one value – 8%).

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2. In the introduction (in the first statement) domestic heating also could be mentioned.
3. In section 2.1, the last paragraph might need reformulation as it is not rather clear that from the absence of difference between observed values on board of the ship it follows that ship-based sources were not significant.
4. In section 2.3, in the first sentence it could be useful to note more clear what data set is meant. It is also mentioned that no data on soot or PM composition is available, but it could be said at least that this process can also affect partitioning. The underprediction mentioned later on may be connected with this selection of partitioning models.
5. In section 2.5 the selection of RET for the simulations of air-sea exchange can be somehow explained.
6. In section 2.6 there is a need to give more detailed information on the generation of these retroplumes and their use for identification of potential sources.
7. Section 3.1: the value of total PAH concentration and its range differ from that given in the Table 1a. Some comments would be useful on those PAHs that were higher than previously measured. For gaseous phase (Table 2a) these are FLT and PYR, but for particulate phase (Table 2b) there are more PAHs that were higher than previously measured. This might be connected with difference in seasons or something else. . .
8. In section 3.2 again effect of sorption on OC and EC could be mentioned, not just the absence of data.
9. In section 3.3, the units of ($> 50 \text{ ngm}^3 \text{ d}^{-1}$) seems to be wrong.
10. In section 4, conclusions, it should be added that for most of measured PAHs the levels were lower than previously measured, again effect of sorption on OC and EC could be mentioned. Potential sources of pollution of marine atmosphere could also be mentioned as it was evaluated through the use of FLEXPART model.
11. Table 3a provides observed and predicted fractions of particulate phase, but the

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units mentioned are ng m⁻³ that seems to be not correct.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 5963, 2014.

ACPD

14, C1024–C1026, 2014

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