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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Source apportionment of submicron organic aerosol at an urban background and a road site in Barcelona, Spain" *by* M. Alier et al.

Anonymous Referee #2

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This paper is an interesting paper that can contribute to the scope of ACP. The results are well discussed and well presented.

Objectives of this paper study are to determine organic aerosols composition and apportion organic sources on two urban sites (Roadside and Urban background) in Barcelona during a fall intensive campaign (12-hours sampling in order to study daily evolutions).

However, before the publication, authors must be more define or must make some corrections or provide additional information on these different points:

1. Title: maybe adding season and source apportionment method

2. Abstract: - more nuanced some definitions of sources like it is detailed in the conclusions section - line 15: "local anthropogenic activities": what types of activities? Heating? Traffic? Industries?

3. Introduction: - Page 11169 line 27: "various atmospheric oxidants": which oxidants? - Page 11170 line 7: input some more recent references - Page 11171 line 1: adding after "source apportionment techniques" the sentence "applied on off-line filter data" - Page 11171 line 11: MCR-ALS has previously applied for environmental source apportionment: in which types of environment? Urban? Rural? Traffic? - Page 11171 line 14: MCR-ALS produce analogous results to PMF: discussed this sentence, add a discussion on advantages and disadvantages of these 2 methods, notably in MCR-ALS uncertainties on data are not taken into account (what it means on source apportionment results?)

4. Analytical procedures: - Page 11176 line 18: why using an external standard calibration while you add deuterated internal standards before extraction? - Page 11177 line 6: the calculation of LOQ do not take into account blank values and standard deviation of the measure, maybe you must use the term "Limit of Detection" than LOQ and calculate the LOD as the average concentration of 3 to 10 analysis of the low standard level plus standard deviation on these measures

5. Chemometrics: - Why do you not have applied CMB in order to apportion primary organic sources and to compare/validate your MCR-ALS results? - The number of samples in matrices is 52 and 51: is sufficient for a good statistic validation? - Why do you not include OC or OM in the matrices? - In the matrices, concentrations are in different range: 0.01 to 4 ng.m-3, has it an impact on the decomposition by MCR-ALS and on results?

6. Results_Chemical analysis: - Page 11179 line 19: input comparisons with European sites data (same comment for hopanes) - Page 11180 Hopanes paragraph: input

discussion on degradation of hopanes which could be observed at this season

7. Results_Multivariate data analysis: - Page 11186: the mass of selected organic components represents how many percent of OC mass? - Page 11186: authors says "selected organic components can be representative for the contributions to the organic fraction": components analyzed explain some organic sources but maybe other sources could contribute to OC mass? In particular industrial emissions? Input a discussion on it. - For POA Urban and BBOA results, add more comparisons of contributions of sources with other European sites - Page 11189 line 1: "35% of the total hopanes signal": it is a high part, could you discuss this result, maybe it is an artifact of the model - Page 11191: this component contains vehicular emissions, cooking, PAH, why the name OOA and not a name like "Urban aged" in opposition of the "POA Urban" source? And in order to estimate cooking, why other organic tracers like cholesterol were not analyzed?

8. Implications and conclusions: - Page 11192 line 18: "in the same location during winter": atmospheric conditions were different than those from this study, notably conditions that can be influenced SOA formation, discuss it. - Page 11193 lines 15-24: this paragraph must be more nuanced - Page 11194 line 26: some sources are not very well defined, so maybe give a range of percent of contributions

9. Table 1: an error in the title, the unit is ng.m-3 and not μg.m-3

10. Fig. 1: reference of figure? Google Earth?

11. Fig. 2 and Fig. S1: add the unit of the column on the left

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 11167, 2013.