

We thank the reviewers and editor for their comments.

Referee#1.

The manuscript by B. L. van Drooge and J. O. Grimalt, entitled "Particle sized-resolved source apportionment of primary and secondary organic tracer compounds at urban and rural locations in Spain" focuses on size distribution and characterization of organic aerosol collected in two different environments (urban site in Barcelona and rural site in the Pyrenees) in warm and cold seasons. The source apportionment was done using the innovative method of Multivariate Curve Resolution Alternating Least Squares (MCR-ALS). The results will be useful to understand how the two studied regions could be affected by different aerosols sources and how these features can be seasonal too.

This research helps to understand the atmospheric aerosol formation processes in the Mediterranean region and contributes with input data to climate change models. The manuscript language is fluent, is well-structured and the subject is of interest to the scientific community. However, the following comments should be taken into account before publication:

Page 9903, line 23. 2.2 Sampling and analytical procedure: Display ions used for the identification of the different compounds by GC-MS in a table, organized by families of compounds. This table may be placed in the main text or as supplementary material.

Reply: A table with the chemical compound families as well as the individual compound ions that were used for quantification by GC-MS (EI) is now included in the supplementary information (Table S2). The tables have been renamed throughout the manuscript (i.e. Table S2 is now Table S3).

Page 9908, line 21. 3.1.2 Oxygenated PH (quinones): The text says: "At the urban site, this is reflected with a proportion of this quinone of 6% and an anto/peno ratio of 1.1 (Fig. 3)." Figure 3 is unrelated to what is described in the text.

Page 9910, line 3 to 7. 3.1.4 n-alkanes: The description given in the text is in disagreement with what is presented in Figure 4.

Page 9935 and Page 9936: Figure captions 3 and 4 are interchanged.

Reply: The text captions of figures 3 and 4 were exchanged in the printed PDF version. This explains the confusion when reading the text. In case of the quinones, figure 3 was not referring to them, so this reference was removed from the manuscript.

Page 9939: Figure 7 needs to have legend, despite being related to the previous figure.

Reply: Figure 7 contains a legend which is further explained in the caption of the figure.

Page 9909, line 26 and Page 9910, line 1 and 2. 3.1.4 n- alkanes: “However, they are much lower than those observed in one site with heavy traffic in Barcelona 20 years ago (165–830 ngm⁻³; Aceves and Grimalt, 1993b).” It would be interesting to explain this finding.

Reply: The high concentrations in the past of n-alkanes, and the lower concentrations nowadays are probably a consequence of the introduction of cleaner cars and the combustion of natural gas for domestic heating in the urban area of Barcelona. This is now commented in the manuscript.

Page 9911, line 25. 3.1.6 Anhydrosaccharides (levoglucosan, galactosan and mannosan): . . .”while balactosan and mannosan showed similar”. . . galactosan is misspelled.

Reply: The spelling mistakes mentioned by the reviewers have been corrected in the new version of the manuscript, as well as the incorrect reference to citations of published papers.

There are many problems with the bibliographic references throughout the text and in the references list, for example: Page 9908, line 5: “Atkinson and Arey, 2007” is not in the references list. Page 9909, line 20 and Page 9910, line 10: “Simoneit et al., 1991” is not in the references list. Page 9906, line 3; Page 9913, line 16 and Page 9914, line 15: The reference: “Linuna et al., 2007” does not exist. The correct form is: “Iinuma et al., 2007”. Page 9913, line 17: “Medeiros and Simoneit, 2008” the reference year is wrong. Page 9913, line 26: “Mazurek et al., 1987” the reference year is wrong. Page 9915, line 25: “Alier et al., 2014” is not in the references list. Page 9922, line 7: “Reche et al., 2009” is not in the references list. Page 9922, line 24: “Hoyle et al., 2011” is not in the references list. Page 9928, line 19: References: The reference “Pandolfi, M., Querol, X., Alastuey, A., Jimenez, J. L., Day, D., Ortega, A., Jorba, O., Pey, J., Baldasano, J. M., van Drooge, B. L., Burkhardt, J. F., Comerón, A., Sicard, Seco, M. R., Peñuelas, J., Artiñano, B., Mohr, C., Prévôt, A. S. H., Di Marco, C., Nemitz, E., Schallhart, S., Metzger, A., Hansel, A., Llorente, J., Ng, S., and Jayne, J.: Effects of Sources and Meteorology of PM in the Western Mediterranean Basin: an overview of the DAURE campaign, *J. Geophys. Res.*, 119, 4978–5010, 2014.” is not cited in the text. Page 9930, line 25. References: The reference: “Sicre, M. A., Marty, J. C., Saliot, A., Aparicio, X., Grimalt, J. O., and Albaiges, J.: Background levels of atmospheric hydrocarbons, sulphate and nitrate over the western Mediterranean, *Atmos. Environ.*, 25, 1463–1471, 1991.” does not exist. The correct reference is: “Simó, R.; Colom-Altés, M.; Grimalt, J. O.; Albaigés, J.: Background levels of atmospheric hydrocarbons, sulphate and nitrate over the western Mediterranean, *Atmos. Environ.*, 25, 1463–1471, 1991.” Page 9932, line 1: References: The reference: “van Drooge, B. L., Fernandez, P., Grimalt, J. O., Stuchlik, E., Torres Garcia, C. J., and Cuevas, E.: Atmospheric polycyclic aromatic hydrocarbons in remote European and Atlantic sites located above the boundary mixing layer, *Environ. Sci. Pollut. R.*, 17, 1207–1216, 2010.” is not cited in the text.

Reply. Some of the references, i.e. Simoneit et al. 1991 and van Drooge et al. 2010, were no longer relevant because other references were already supporting the discussion statements. Thus, they have not been added to the reference list. Other reference mistakes such as wrong year of publication, or others have been corrected. The paper of Pandolfi et al. 2014 has been introduced to the text as reference of aerosol studies in the urban area of Barcelona in the recent past.

Referee#2.

This paper presents the determination of many organic compounds very relevant to atmospheric chemistry studies. The selected compounds are important to identify the emissions sources and formation of the pollutants. The number of Figures and Tables is precise. It is well written and organized, but some references are not cited in the list. A double check should be done before publishing.

Reply: See comment on referee#1