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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Particle sized-resolved source apportionment of primary and secondary organic tracer compounds at urban and rural locations in Spain" *by* B. L. van Drooge and J. O. Grimalt

Anonymous Referee #3

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This paper reports 72 organic compounds in the urban and rural aerosols from Barcelona, Spain. The authors conclude that winter organic aerosols are influenced by biomass burning whereas summer aerosols are by atmospheric oxidation of biogenic VOCs. The manuscript is relatively well written. I am positive to publish this paper in ACP. However, there are several problems that need a major revision.

Major comments:

1. In Abstract section, names of key tracers such as levoglucosan and pinic acid should

be added. With these key words, the readers could better understand the abstract.

2. The weak point of this manuscript is the discussion on dicarboxylic acids. Previous studies of dicarboxylic acids in atmospheric aerosols from many locations on the globe demonstrated that oxalic acid is generally the most abundant diacid species followed by malonic and succinic acids (e.g., Kawamura and Ikushima, 1993; Fu et al., 2013, and others). However, the authors did not review those studies. It will be a big misleading if the authors do not include those previous papers as references. Further, the previous studies showed that if the analytical procedure is not optimized for the quantitative detection of oxalic and malonic acids the results often showed the predominance of succinic acid. For example, Satsumabayashi et al. (1989) reported homologous series of dicarboxylic acids using methyl ester derivatization, but oxalic acid and malonic acids were significantly underestimated. Although the present authors reported the recovery of succinic acid (>70%), there is no report on the recovery of oxalic and malonic acids. It should be suspected that authors may have detected them at low concentrations, ignored them or have not detected. This reviewer strongly suggests the authors to describe that the method used is not available for the quantitative determination of oxalic and malonic acids, but they have been reported at much higher levels than succinic acid in the previous studied. This point should be clearly mentioned in the revised manuscript and the discussion should be revised accordingly.

3. The results are often compared with those from Europe; however, comparisons should be extended to other regions in the world including Asia. For example, biomass burning is very common in South and East Asia, where forest fires and agricultural waste burning as well as landfill solid waste burning are important source of organic aerosols as well as the photochemical production of secondary organic aerosols (e.g., Miyazaki et al., 2009; Wang et al. 2009; Fu et al., 2010; Ho et al., 2010). With the broader comparisons, the readers better understand the results of the authors from the Mediterranean area.

Minor comments:

1. Title, “sized-resolved” → size-resolved

2. Page 9902, line 9, meterorological → meteorological

3. Page 9906, line 3 and page 9913, line 16, Linuma → linuma

4. Page 9908, line 1, What is “PH”? It should be spelled out.

5. Page 9911, line 25, balactosan → galactosan

6. Page 9912, line 14, funghi → fungi

7. Page 9912, section 3.1.7, How about the contribution from pollens? There are many studies that explained the contribution of pollens to primary sugars (e.g., Fu et al., 2012).

8. Page 9914, line 20. Jang et al. 1997 is missing in the reference section. Is it “Jang and McDow, 1997”?

9. Page 9915, line 4, terphthalic → terephthalic

10. Page 9915, line 4 and others (e.g., page 9921, line 6), Terephthalic acid has been discussed to be derived from the burning of plastic bags (e.g., Kawamura and Pavuluri, 2010).

11. Page 9917, line 13, the most dominant → the dominant

12. Page 9920, line 26 and page 9922, line 13, Aged SOA → aged SOA

References: Kawamura and Ikushima (1993), ES&T, 27, 2227-2235.

Fu et al. Marine Chemistry, 148, 22-32, 2013.

Satsumabayasi et al., Tellus 41B, 219-229, 1989.

Miyazaki et al., J. Geophys. Res., 114, D19206, doi:10.1029/2009JD011790, 2009.

Wang et al., Atmos. Chem. Phys., 9, 8869-8882, 2009.

Fu et al., Atmos. Chem. Phys. 10, 2663-2689, 2010.

Ho et al. (2010), J. Geophys. Res., 115, D19312, doi:10.1029/2009JD013304.

Fu et al., Atmos. Environ. 55, 234-239, 2012.

Kawamura and Pavuluri, Atoms. Environ., 44, 5320-5321, 2010.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 9897, 2015.