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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Organosulfates and organic acids in Arctic aerosols: speciation, annual variation and concentration levels" *by* A. M. K. Hansen et al.

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We would like to thank the referees for their interest in our work and the helpful comments and suggestions to improve our manuscript. We have carefully considered all comments and the replies are listed below.

Sincerely Anne Maria K. Hansen and Marianne Glasius on behalf of all authors

Reply to Anonymous referee 2

This paper reports organosulfates and organic acids in Arctic aerosols. The results are interesting to be published in ACP. However, there are several mistakes in spelling,

misidentification of compound peak and unclear description. Those problems should be clarified before the consideration of acceptance.

1) Page 4746, line 4, and 2010, respectively. Add a comma.

Response: Done

2) Page 4751, line 16. Does the 90

Response: Yes the 90Page 4751, line 15 "The collected aerosol filters were extracted by sonication in 10 mL of a 90Furthermore we have also clarified the content of the solvent used for re-dissolution of the samples, by adding in MilliQ water on page 4751 line 19: "Each sample was re-dissolved twice in 0.5 mL of a solvent mixture of 0.1

3) Page 4756, line 2. Pimelic acid may be of biogenic origin, which is derived from the oxidation of unsaturated fatty acids together with azelaic acid (Kawamura and Gagosian, Nature 325, 330-332, 1987).

Response: This is a very good point and we thank the referee for the comment. We have now added a sentence explain, that pimilic acid may be of biogenic origin as well as anthropogenic. Page 4755, line 26: "In this study all organic acids are categorized into anthropogenic (benzoic acid, phthalic acid, adipic acid and pimelic acid) and biogenic (terpenylic acid, DTAA, pinic acid, pinonic acid, MBTCA, suberic acid and azelaic acid) tracers based on previous studies of their atmospheric formation and precursors (Williams et al., 2010; Claeys et al., 2009; Rybka et al., 2007; Ma et al., 2007; Mochida et al., 2003; Bunce et al., 1997; Hatakeyama et al., 1987). However, pimelic acid, here assigned to be an anthropogenic tracer, may be of biogenic origin as well, derived from the oxidation of unsaturated fatty acids (Kawamura and Gagosian, 1987)."

4) Page 4757, lines 19-20. Glycolaldehyde, hydroxyacetone, etc. are also produced by field burning of agriculture wastes such as wheat straws (Kawamura et al., Atmos. Chem. Phys., 13, 5369-5380, 2013). This point can be added in the text.

Response: We thank the referee for pointing out additional sources to the compounds

in question and they have been added to the manuscript together with the proper reference: Page 4757, line 19: “Several studies suggest that glycolaldehyde, hydroxyacetone, methacrolein and 2-methylglyceric acid originate from biomass burning, field burning of agriculture wastes and anthropogenic sources such as automobiles and fossil fuel combustion as well as photooxidation of isoprene (. . .Kawamura et al., 2013).”

5) Page 4761, line13. Add a period at the end of the sentence.

Response: Done

6) Page 4761, line 19. “emissiond” should be “emission”.

Response: Done

7) Page 4761, line 21. Artic ! Arctic

Response: Done

8) Page 4764, line13. Please add the reference for Tokyo.

Response: Original references for the measurements in Alert, Tokyo and the Chinese cities have now been added to the manuscript: Page 4764, line13: “. . .concentrations measured in Tokyo and in Chinese cities (Zhang et al., 2010; Ho et al., 2007; Kawamura and Yasui, 2005; Kawamura et al., 1996).”

9) Table 2. Give information for the abbreviations of DTAA and MBTCA as a footnote of the table, although they are given in the text.

Response: This is an excellent point and a footnote regarding the abbreviations has been added.

10) Fig. 1. The phrase “7 and 8. Phthalic acid” sounds strange. A single compound never shows two peaks. If peak 7 is phthalic acid, then peak 8 should be iso- or terephthalic acid. The authors need to identify the two peaks using authentic standards. If you do not have standards, the authors should at least describe that the peaks 7 and

8 are phthalic acid and its isomer (iso- or tere-phthalic acid).

Response: We agree with the referee that this point should be clarified and we have analysed authentic standards of phthalic acid, iso phthalic acid and terephathalicacid showing that peak 7 is phthalic acid and peak 8 is terephathalicacid. This has now been explained in the figure caption and on page 4755 line 23 as well: Fig. 1:“. . .7. Phthalic acid 8. Terephathalicacid”. page 4755 line 23: “11 organic acids (terpenylic acid, benzoic acid, phthalic acid (given as the sum of phthalic acid and terephathalicacid). . .”

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 4745, 2014.