

## ***Interactive comment on “On the abundance and source contributions of dicarboxylic acids in size-resolved aerosol particles at continental sites in Central Europe” by D. van Pinxteren et al.***

**Anonymous Referee #2**

Received and published: 19 January 2014

This paper presents results from size-resolved measurements of dicarboxylic acids from filter samples collected at several inland sites in Germany. This data is combined with results from a newly developed statistical back-trajectory analysis technique. Principal component analysis (PCA) is then used to the combined data set to determine the important factors that drive the dicarboxylic acid concentrations.

Dicarboxylic acids are the most abundant group of organic compounds that contribute to the total organic aerosol. Secondary organic aerosol formation, a process that is still not well understood, is likely an important source of these acids. This suggests that it is important to measure these acids and include them in atmospheric chemistry

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models. This paper is providing data that many in the atmospheric community would be interested in.

Overall, this is a good paper. It is generally well written and easy to follow. My only question is on the interpretation of the correlation of a PCA factor with the mean trajectory length. If this correlation is negative then wouldn't that mean that the emissions were local and/or fresh? It seems to me that the negative relationship observed for both PC1 and PC2 vs. mean trajectory length is being interpreted differently for the two different factors. This, along with a handful of other comments, are outlined in more detail below and need to be addressed before the paper can be considered for publication.

General Comments: 1.It is not clear what citation order is being employed. When a group of references are mentioned by the authors it can vary from being listed in chronological order, alphabetical order, or no order at all. Either of the first two are fine to use, but the same format should be used throughout the entire text.

Specific Comments: 1.Introduction Page 32095, Line 4 – Suggest adding of before cigarette

Page 32096, Line 4 – Suggest removing the by before about 21%

Page 32097, Line 2 – Suggest changing the respective to their respective

2.Materials and methods 2.1Sampling Page 32097, Line 14 – What does the abbreviation DWD stand for? It is not defined.

Page 32097, Line 18 – Should institute be capitalized?

Page 32097, Line 25 – Suggest removing (aluminum)

Page 32098, Line 1 – The chemical formula used is not defined

Page 32098, Line 5 – Suggest adding an as before evaporation

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Page 32098, Line 6 – I am not sure what the d after bounce is referring to.

Page 32098, Line 8 - Suggest adding an of after downstream

2.2Measurements Page 32099, Line 7 – The chemical formulas used are not defined

2.3Back trajectory Page 32099, Line 11 – To stay consistent with the rest of the text suggest adding a comma between back and trajectory

Page 32100, Line 6 – Suggest adding an as after regarded

2.4Principal component analysis Page 32101, Line 5 – Suggest changing was analyzed to were analyzed

Page 32101, Line 7 – Suggest changing do thus not to thus do not

3.Results and discussion 3.1PM10 concentrations and size distributions of DCAs Page 32101, Line 19 – Suggest adding by after differ

Page 32102, Line 13 – The abbreviation GC/MS is not defined. Also, suggest adding a the before GC/MS.

3.3.1PC 1: anthropogenically influenced gasSOA Page 32105, Line 18 – To stay consistent with the rest of the text suggest adding a comma between back and trajectory

3.3.2PC 2: anthropogenically influenced aqSOA Page 32106, Line 1 – anthropogenically is misspelled

Page 32106, Lines 8-11 – The authors mention that PC2 is anticorrelated to the mean trajectory length and likely represents aged air masses with long residence times. I am not sure I completely follow this. If a component is negatively correlated with trajectory length couldn't this mean that the air masses are local (i.e., they aren't traveling far and therefore aren't related to the air mass path taken)? Also, PC1 is anticorrelated with mean trajectory length and the authors suggest it be local and from quick formation.

3.3.3PC 3: traffic Page 32107, Line 19 – Suggest changing presumable to presumably

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3.3.5PC 5: sea salt Page 32108, Line 8 – Suggest adding a the before total

3.3.6PC 6: soil Page 32109, Line 3 – Suggest changing does likely not to does not likely

3.4Discussion of main DCA sources Page 32110, Lines 14-16 – I am not sure I completely follow this sentence. I think the authors are trying to indicate that condensed phase reactions could also occur, but would likely be lower than gas phase oxidation. If so, then I would suggest rephrasing this sentence.

Page 32110, Line 18 – Suggest changing is incorporated to are incorporated

Page 32110, Line 22 – The chemical formula used is not defined

Page 32111, Line 6 – The chemical formula used is not defined

Page 32111, Line 9 – Suggest adding an of before other

Page 32112, Line 10 – I am not sure I understand the use of the word manifold in this sentence. Are the authors trying to indicate that the precursors of dicarboxylic acids are numerous?

Page 32112, Line 12 – To stay consistent with the rest of the text suggest adding a comma between back and trajectory

Page 32112, Line 15 – What does the abbreviation RTI stand for? It is not defined.

4.Conclusions Page 32113, Lines 7 and 12 – To stay consistent with the rest of the text suggest adding a comma between back and trajectory

References Page 32119, Line 20 – Believe Krivacsy should have accent marks

Page 32120, Line 4 – Believe Gelencser should have accent marks

Page 32120, Line 25 – Believe Meszaros, Gelencser, and Krivacsy should have accent marks

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Page 32122, Line 20 – Simoneit is misspelled

Page 32124, Line 22 – Believe Muller should have accent marks

Tables Table 1 -It is not defined what the abbreviation bdl stands for -In reference column, believe Meszaros should have accent marks

Figures Figure 1 -I not sure if the units for the y-axis are correct. Should it be ng/m<sup>3</sup>/um?

Figure 2 -m<sup>2</sup> in the y-axis units for the Solar Flux at receptor plot should be m<sup>-2</sup> -In caption, to stay consistent with the rest of the text suggest adding a comma between back and trajectory

Figure 3 -In caption, I think screen should be scree

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 32093, 2013.

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