

## ***Interactive comment on “Development of an online-coupled MARGA upgrade for the two-hourly quantification of low-molecular weight organic acids in the gas and particle-phase” by Bastian Stieger et al.***

**Anonymous Referee #2**

Received and published: 7 November 2018

This paper presents a method for making hourly integrated gas and particle-phase organic acid measurements. This is accomplished by extending a Monitor for AeRosols and Gases in ambient Air (MARGA) system to include an additional Compact ion chromatograph. The details of the organic acid column testing and how the extension to the MARGA works are provided. Example application data from measurements made in Melpitz, Germany are presented.

Overall this is a good paper. I really just have a number of comments to help with the flow of the paper. All of these are outlined below and need to be addressed before the

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paper can be considered for publication.

General Comments -I think it would be helpful throughout the paper to refer to the Compact-IC as the additional Compact-IC or additional IC-system. This would really help to separate it from the ICs that are part of the original MARGA set-up.

Specific Comments First line of Title – Is two-hourly really correct? My initial thought was that it should be two hour integrated measurements. But actually isn't it that the hourly integrated sample from the MARGA is then additionally measured 1 hour later for organic acid. So then I think it is actually hourly integrated quantification of low-molecular weight organic acids.

Abstract Page 1, Line 12 – Same as above. I think two-hourly time resolution should be one hour integrated measurement

Page 1, Line 15 – Suggest removing the for before gradient

Page 1, Line 25 – Suggest removing the a after indicate

Page 1, Line 26 – Believe that something is missing at the end of the sentence. Should it be as a source or was present?

Introduction Page 1, Line 28 – Suggest changing were measured to have been measured

Page 2, Line 2 – Suggest changing formed secondary to formed as secondary products

Page 2, Line 7 – Suggest changing have a sensitive influence on the ecosystem to have an influence on a sensitive ecosystem

Page 2, Line 21 – (Steiger et al., 2018) should be Steiger et al. (2018)

Page 2, Line 34 – Suggest changing filter to filters

Page 3, Line 2 – Suggest changing resolution of to resolution from

Page 3, Line 3 – Suggest changing filter to filters

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Page 3, Line 6 – Suggest changing A detection to The detection  
Page 3, Line 11 – Suggest changing Therefore to In this case  
Page 3, Line 12 – Suggest changing is limited to was limited  
Page 3, Line 18 – Suggest changing applied to employed  
Page 3, Line 19 – Suggest changing of successful field application, first to of a successful field application, the first  
Page 3, Line 20 – Suggest adding an a before focus  
2. Instrumentation and materials Page 3, Line 29 – Should Rotation be Rotating?  
Page 3, Line 30 – Suggest adding a the before WRD  
2.2. Additional IC system Page 4, Line 6 – Believe the word compounds should be components  
Page 4, Line 7 – Suggest changing the as after systems to a comma, adding a comma after Scientific, and putting a period after alternatives  
Page 4, Lines 8-9 – Suggest having a new sentence begin with But the liquid. Also suggest adding a comma before especially and after autosampler  
Page 4, Line 29 – Suggest adding a the before MARGA  
Page 5, Line 8 – Suggest adding the phrase in the standard after ion  
3. Results and discussion 3.1. Development of the IC separation Page 7, Line 7 – Suggest adding a the before WRD  
Page 7, Line 10 – What is the eluent used for the isocratic separation on the Metrosep A Supp 16 250 mm column? I believe that only the chemicals used have previously been mentioned and not the eluent.  
Page 7, Lines 26-27 – The authors mention that it could be expected that the sepa-

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ration would worsen for high concentrations with this anion-exchange column. But no explanation for this is provided. I think it would be helpful to add some text for readers not as familiar with chromatography.

Page 8, Line 11 – Suggest changing tailing to tail  
Page 9, Line 9 – Suggest changing differently to different  
Page 9, Lines 10-11 – The authors list the Na<sub>2</sub>CO<sub>3</sub> part of the eluent, but not the NaOH part. I think it would be more accurate to include it since that both eluents A and B have to be made as a mixture.  
Page 9, Line 13 – Suggest changing analysis time before of the F- peak to time before the F- peak eluted. Also suggest removing the the before eluent  
Page 9, Line 15 – Suggest changing succeeding to successful  
Page 10, Table 2, first line of caption – Suggest adding a the before varied, changing column to the, and adding the words column along after 250 mm  
Page 11, Figure 4, third line of caption – Suggest adding a the before green  
Page 11, Line 10 – Suggest changing tailing to tail  
Page 11, Line 11 – Suggest changing Change to Changing  
Page 12, Line 1 – Suggest changing prolonged to extended  
Page 12, Line 3 – Suggest changing Resulting from the to Due to the. Also suggest removing the word long before coupled  
Page 12, Line 5 – Suggest changing prolonged to extended  
Page 12, Line 8 – Suggest changing carryovers to carryover and adding a for before starting  
Page 12, Line 11 – Suggest removing the the before eluent

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Page 12, Line 13 – Suggest changing solutions, but was to solutions and was

Page 12, Lines 13-14 - Suggest changing by the used chemicals or the used glassware is likely to from the chemicals or glassware used is likely

Page 12, Figure 5, first line of caption – Suggest adding the word columns after 150 mm and elution after gradient

Page 12, Figure 5, third line of caption – Suggest removing the phrase with a gradient system

Page 12, Figure 5, fourth line of caption – Suggest adding a the before green

3.2.Limits of detection and precision Page 14, Line 11 – (Funk et al., 2005) should be Funk et al. (2005)

Page 15, Line 2 – Suggest adding a the before case and removing the is before F

Page 15, Line 9 – Suggest adding a the before quotient

Page 15, Line 10 – Suggest removing the phrase results in the standard deviation of the method as it is stated previously in the sentence

Page 15, Line 12 – A colon is missing after given by

Page 16, Line 10 – A colon is missing after  $x = 0$  is

Page 16, Line 12 – A colon is missing after xLOD

Page 17, Line 1 – A colon is missing after T is

Page 17, Line 9 – Suggest changing of peak areas to of the peak area

3.3.Sample handling Page 18, Line 5 – Suggest changing display to displays

Page 18, Line 12 – Suggest changing solutions were directed into the waste to solution was directed to waste

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Page 19, Figure 7 - Might suggest changing either the black or blue line in plot b to another color as these two look very similar

Page 19, Figure 7, Fourth line of caption – Suggest adding a the before new

Page 20, Line 1 – Believe a two-hourly time resolution should be a hour integrated measurement

Page 20, Line 3 – Suggest adding the word column after pre-concentration

3.4.MARGA absorption solution Page 20, Line 13 – Suggest adding a the before absorption

Page 20, Line 14 – Suggest changing Metrohm-Applikon, the Netherlands, allowed integrating the to Metrohm-Applikon (Netherlands) allowed for integration of the

Page 20, Line 19 – The authors mention that the absorption solution in the MARGA was replaced with a 1% H<sub>2</sub>O<sub>2</sub> solution. But what is the typical solution used? It is not actually mentioned and this would be helpful to note since the authors are saying that it is important that the concentration be changed to add the additional analysis of organic acids.

3.5.Intercomparison of inorganic ions Page 20, Line 23 – Suggest adding a the before MARGA

Page 21, Line 1 – It should be a R2

Page 21, Table 4, First line of caption – Suggest adding a the before MARGA

Page 21, Line 19 – Suggest adding a the before MARGA

3.6.Example application in the field Page 23, Line 8 – Suggest changing averaged concentration in this to average concentration over this

Page 23, Line 9 – Suggest changing averaged to average

Page 23, Line 20 – Suggest adding a the before gas

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Page 23, Line 21 – There should be no hyphen between one and year

4. Conclusions Page 24, Line 10 – Suggest removing the it before was the case

Page 24, Lines 13-14 – the time resolution is listed as two hours, but I believe it is actually hour integrated

Page 24, Line 14 – Suggest adding a for before the investigation

Data availability Page 24, Line 18 – Suggest changing from authors on request to from the authors upon request

Author contribution Page 24, Line 20 – Suggest changing concepted to provided the concept for

Acknowledgements Page 25, Line 2 – Suggest changing support of to support for

Page 25, Line 3 – Suggest adding a the before deployment and changing system by to system from

References Page 26, Line 6 – Believe Rondonia should have an accent mark

Page 27, Line 20 – Believe Gelencser is missing accent marks

Supporting Information Page 15, Figure S15 - The same gradient program as for all the other tests is being used, correct? If so, then I might suggest just saying that in the caption. But if the authors do want to keep the program in the corner of the plot then it should probably say %B so it more clear.

Page 15, Figure S15 - Pyruvate/bromide and oxalate are mentioned in the text, but they are not actually labeled in the figure. It might be helpful to include them for the reader.

Page 18, Figure S17, first line of caption – Suggest adding a the before MARGA

Page 18, Figure S17, second line of caption – Suggest changing during one-year measurement to during the one year long measurement

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Page 19, Figure S18, first line of caption – Suggest adding a the before MARGA

Page 19, Figure S18, second line of caption – Suggest changing one-year measurement to one year long measurement

Page 10, Figure S19 – RH and P on the right hand y-axis should be capitalized

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-299, 2018.

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