

## ***Interactive comment on “A sub-decadal trend of diacids in atmospheric aerosols in East Asia” by S. Kundu et al.***

### **Anonymous Referee #3**

Received and published: 2 October 2015

This paper presents results from analysis of filter samples collected over the past decade at the Gosan site on Jeju Island, South Korea. The filter samples were analyzed for diacids. The diacids are used as surrogate compounds to examine the trend of secondary organic aerosols (SOA) in atmospheric aerosols over the past decade. The seasonality, distributions, temporal variations, and intensity increases of the diacids are explored.

The change in SOA has been predicted to be highly uncertain in the future atmosphere in Asia. This work aims to try to better understand this by examining the trends in diacids. Given that air quality regulations are becoming stricter and the results from this work could have implications on control strategies for Asia, many in the atmospheric community would be interested in this work.

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Overall, this is a good paper. The methods and analyses presented seem scientifically sound. The one main comment I have is that it can be a bit confusing using the words saturated and unsaturated acids in the text, but then naming the specific acids in the figures. Maybe it would be helpful to add the words saturated and unsaturated into the figure captions. Otherwise, I really just have a number of comments to help with the flow of the paper, which are outlined below and need to be addressed before the paper can be considered for publication

General Comments: -It is not clear what order is being used for the reference citations throughout the text. Sometimes alphabetical order is used, other times chronological order is used. Other way is technically fine, but it should be consistent throughout the text. I have noted below the ones I noticed.

Specific Comments: Abstract Page 22184, Lines 3-4 – Suggest changing we study a sub-decadal to we examine the sub-decadal

Page 22184, Line 4 – Suggest removing the of before major

Page 22184, Line 5 – Suggest changing from Gosan site in Jeju to from the Gosan site on Jeju. Also suggest adding a The before Gosan site

Page 22184, Line 6 – Suggest removing the the before pollution-outflows

Page 22184, Line 14 – The chemical abbreviation is not defined

Page 22184, Line 16 – Suggest removing the an before enhanced

1. Introduction Page 22185, Line 3 – Suggest removing the The before source

Page 22185, Lines 4-5 – It is not clear the order that is being used for the references

Page 22185, Line 9 - It is not clear the order that is being used for the references

Page 22185, Line 10 - It is not clear the order that is being used for the references

Page 22183, Lines 13-15 - It is not clear the order that is being used for the references

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Page 22183, Line 15 – Suggest changing emit from to be emitted from  
Page 22183, Line 17 – Suggest removing the the before precursors  
Page 22183, Line 19 – Suggest adding a the before diacids and a for before as much  
Page 22183, Line 22 – Suggest adding a the before water-soluble  
Page 22186, Line 3 – Suggest removing the The before chemistry-transport  
Page 22186, Lines 5-6 - It is not clear the order that is being used for the references  
Page 22186, Line 10 – Suggest changing emission has been to emissions have been  
Page 22186, Lines 11-12 - It is not clear the order that is being used for the references  
Page 22186, Line 15 – Suggest changing an importance to the importance  
Page 22186, Line 17 – Suggest removing the the after influenced by  
Page 22186, Line 20 – Suggest removing the The before East  
2.Experimental section 2.1.Site description Page 22187, Line 3 – Suggest changing Gosan site in Jeju to The Gosan site on Jeju  
Page 22187, Line 4 – Figure 3 is referred to before Figures 1 and 2  
Page 22187, Line 4 – Suggest removing the off the before south and adding a the before Korean  
Page 22187, Line 5 – Suggest removing the off the before east  
Page 22187, Line 6 – Suggest removing the off the before west and before northeast  
2.2.Aerosol sampling Page 22187, Line 15 – Suggest changing cannot be collected to could not be collected  
Page 22187, Line 20 – Suggest changing jar to jars

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Page 22187, Line 21 – Suggest changing was used to were used  
2.3.Analytical method Page 22188, Line10 – What does the phrase dissolved into n-hexane layer mean? It is not clear from the text.  
Page 22188, Line 11 – When does the water get added to the extraction? Is it before the derivatization?  
Page 22188, Line 11 – The chemical abbreviation is not defined  
Page 22188, Line 12 – Suggest adding a the before esters  
Page 22188, Line 14 – The abbreviation GC is not defined  
Page 22188, Line 16 – The abbreviation FID is not defined  
Page 22188, Line 20 – The abbreviation MS is not defined  
Page 22189, Line 13 – The chemical abbreviation is not defined  
3.Results and discussion 3.1.Interannual variations in the molecular distribution of diacids Page 22189, Line 18 – Suggest removing the an before important  
Page 22189, Line 26 – Suggest changing of individual year to of the individual years  
Page 22190, Lines 6-7 - It is not clear the order that is being used for the references  
3.2.Seasonal variations of diacids Page 22190, Line 22 – The chemical abbreviation is not defined  
Page 22190, Line 26 – The chemical abbreviation is not defined  
Page 22190, Line 27 – Suggest removing the the before satellite  
Page 22191, Line 3 – Suggest changing least to low  
Page 22191, Line 5 – Suggest adding a the before Gosan  
Page 22191, Lines 10-11 - It is not clear the order that is being used for the references

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Page 22191, Line 12 – Suggest removing the before atmospheric  
Page 22192, Line 5 – Suggest adding a the before major  
Page 22192, Line 6 – Suggest adding a the before 95%  
Page 22192, Line 18 – Suggest changing alike to like  
Page 22192, Line 19 – Suggest changing the peaks were emerged to a peak emerged  
Page 22192, Line 21 – Suggest removing the the before atmospheric  
Page 22192, Line 26 – Suggest adding a the before seasonality  
Page 22192, Line 28 – Suggest changing generate onto aqueous to be generated in aqueous  
Page 22193, Line 1 – Suggest adding a the before global  
3.3. Interannual variability of diacids Page 22193, Line 18 – Suggest adding a the before major  
Page 22194, Line 3 – Suggest adding a the before diacids  
Page 22194, Line 4 – Suggest changing The increase to An increase  
Page 22194, Line 7 – Suggest removing the the before combustion  
Page 22194, Lines 10-11 - It is not clear the order that is being used for the references  
Page 22194, Line 15 – Suggest removing the the after via  
Page 22194, Line 23 – Suggest changing of the cold to in the cold  
Page 22195, Line 1 - It is not clear the order that is being used for the references  
Page 22195, Line 14 – Suggest changing to generate from to to be generated from  
4. Conclusions and atmospheric implications Page 22195, Line 18 – Suggest removing

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the a before major

Page 22195, Line 21 – Suggest changing that it is required to that this required  
Page 22196, Line 1 – Suggest changing diacid increases to diacids increasing  
Page 22196, Line 5 – Suggest removing the the before recent  
Acknowledgements Page 22196, Line 18 – Suggest changing available to obtained  
References Page 22197, Lines 16-21 – This reference is the same as the one above it.  
Tables Table 1 -Sept. is the only month with a period after it  
Figures Figure 1 -The x-axis for the plots on the left is not labeled  
Figure 2 -The label for the x-axis for the plots on the left is cut-off  
Figure 3 -In caption, suggest adding a the before Gosan and changing in Jeju to on Jeju  
Figures 5 and 6 -In last line of caption, the acids mentioned for plots g and h do not match the legends. -Plot h is labeled as g -Suggest adding to the caption that the data is segregated by season  
Figure 7 -Suggest adding to the caption that the data is segregated by season  
Figure 8 -In last line of caption, suggest changing the linear to a linear  
Figure 9 -In last line of caption, suggest changing the linear to a linear  
Supporting Information Tables Table S1 -In first line of caption, suggest changing diacids with to diacids within -In second line of caption, suggest changing the linear regression using least squares to a linear regression using a least squares fit  
Tables S2 -In third line of caption, suggest changing oxalic acid with to oxalic acid within -In fourth and fifth lines of caption, suggest changing the linear regression using least

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squares to a linear regression using a least squares fit

Figure Captions Figure S5 Caption -In third line of caption, have 10th written with a superscript. Although this is not wrong, nowhere else in the text is in written this way.

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 22183, 2015.

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