

[Interactive
Comment](#)

Interactive comment on “Aerosol characterization over the southeastern United States using high resolution aerosol mass spectrometry: spatial and seasonal variation of aerosol composition, sources, and organic nitrates” by L. Xu et al.

Anonymous Referee #3

Received and published: 15 May 2015

The authors investigate the chemical composition of sub-micron aerosol particles in the southeastern United States with a special emphasize on the greater Atlanta region. The focus is put on the non-refractory fraction investigated by online aerosol mass spectrometry with a High Resolution Time of Flight Aerosol Mass Spectrometer (HR-ToF-AMS). Positive matrix factorization is used to deconvolve the organic as well as the organic + nitrate mass spectra. The authors present several factors including organic and inorganic nitrate factors and discuss their seasonal and spatial variability. The results obtained by the HR-ToF-AMS measurements are further compared to Aerosol

C2599

[Full Screen / Esc](#)

[Printer-friendly Version](#)

[Interactive Discussion](#)

[Discussion Paper](#)



Chemical Speciation Monitor (ACSM; in unit mass resolution) and long term organic carbon (OC) measurements performed in the same region.

The authors present and discuss the results of rather extensive mass spectrometric measurements including several approaches to determine the contribution of organic nitrates to the total particle mass. A comparison to a 14-years OC data set is presented giving the opportunity for further interpretation of existing long-term measurements of rather coarse time resolution. Therefore, the results presented are of interest not only to the AMS but to the general aerosol community as well. I recommend this paper for publication after the following comments are addressed.

General comments:

Page 10481, line 14 So far only the AMS and ACSM are mentioned. Therefore, it seems as if brown carbon was measured by one of these instruments. Give the instrument/s used to measure brown carbon

Page 10490, line 4 Only AMS publications are listed, but the aerosol community is much bigger. Could the authors list non-AMS publications presenting PMF results (or similar statistical analysis), since it is supposed to be widely applied in the aerosol community?

Page 10493, line 20 The authors might reconsider the wording. "Nitrate inorganic aerosol particles" would be solely consisting of inorganic compounds including nitrate but especially in the presented case, the aerosol particles consist of inorganic nitrate and organic compounds at the same time. How about hyphenating to clarify the word associations: Inorganic-nitrate aerosol particles in contrast to organic-nitrate aerosol particles?

Page 10495 line 9 General comment to ALL figures not just Fig. 3: Error bars are missing, which are of specific importance for the interpretation of diurnal profiles. The axes labeling and legend text is rather small. Please try to use the same scaling (or

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



multiplication) for multiple panels in one figure to support easy comparability.

Page 10496, line 6 Many readers might be more familiar with low-volatility (LV-) and semi-volatile (SV-) oxygenated organic aerosol (OOA). Please move the introduction of more-oxidized (MO-) and less-oxidized (LO-) OOA from page 10502 to here.

Page 10498, line 1 This reference might be obsolete. It seems as if the impact of the lower resolution on the number/type of PMF factors was discussed in this publication, but this is not the case. The authors of the cited publication rather recombine two separate OOA factors and proceed with a 2 factor solution (HOA and OOA) for an easier comparison to PMF results of a collocated HR-AMS instrument.

Page 10498, line 8 What are IEPOX? The authors should give a brief description as well as an explanation of the acronym since not all readers are chemists.

Page 10498, line 25ff Is the difference in fC₅H₆O₊ solely due to rural vs. urban? Could there be an influence from the seasonality in terms of transient (May, August) vs. summer (June/July) months?

Page 10502, line 26 The ranges given for LO- and MO-OOA are specific to this publication. Taking the cited references into account, it seems to be hard to generate a generality in the range of values. A short discussion on this might be helpful for non-familiar readers.

Page 10503, line 8 I suspect the authors consider the identification of specific sources of MO-OOA to be challenging but not the identification of the factor itself. In that case, please rephrase the sentence.

Page 10505, line 21 As a general comment, please check on your significant figures (digits) throughout the text and in all figures! The text in figure 9 is hard to read! Please reduce to/highlight the most important information (R values). Take the appropriate detection limits into consideration. Include a zero line to guide the eye of the reader. Give the color coding in the figure caption as well, especially, since the legends are

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



hard to read.

Page 10506, line 4 The authors mention inorganic nitrates other than ammonium nitrate but do not discuss possible compounds and sources. A short discussion maybe taking the results of Alfarra (2004; http://cires1.colorado.edu/jimenez/Papers/Alfarra_PhD%20Thesis_4Chapter4_Labwork.pdf) into account would be very informative.

Comment on figures in supplemental material:

Please check on readability of figure legends and axes labeling. Please extend the information in the figure captions. Most probably, figures as Fig. S5 are not as self-explanatory to a broader community as the short figure caption suggests. Please check on readability of the figures themselves. E.g. the readability of Fig S8 could be improved significantly when multiple panels were used each displaying only a subset of the lines.

Technical comments

Page 10483, line 3 Introduce SOA in the main text of the paper as well.

Page 10484, line 19 Change spectrum to spectra.

Page 10485, line 21 Introduce SEARCH (only done in abstract).

Page 10490 line 7 Change spectrum to spectra.

Page 10498, line 14 Change methytetrols to methyltetrols.

Page 10498, line 18 Is this a different “R” than the one mentioned on Page 10499, line 15? If not, please move definition of it to first appearance.

Page 10498, line 20 The first part of this sentence sounds strange. Somehow the “of” doesn’t make sense.

Page 10499, line 3 Change sentence to “The compound IEPOX is thought TO be an

C2602

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



...

Page 10502, line 15 This is a very long and awkwardly phrased sentence (especially "...might be due to that the...").

Page 10504, line 12 The reviewer is not familiar with the hyphenated version of FT-IR.

Page 10504, line 27 "Extremely" doesn't go too well with "low-volatility vapors". Maybe rephrase the sentence.

Page 10505, line 25 Change correlation to correlation coefficient.

Page 10507, line 11 Delete spaces (nitrates/organics).

Page 10509, line 2 Delete "are".

Page 10512, line 18 Change to "more spatially homogeneous in summer than winter".

Page 10512, line 21 Please rephrase, e.g. "This likely arise from biogenic VOCs, which are important precursors for SOA and are abundant and widely distributed..."

Page 10519 line 11 Change coefficient to correlation coefficient.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 10479, 2015.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

