

## ***Interactive comment on “Organosulfates in Atlanta, Georgia: Anthropogenic influences on biogenic secondary organic aerosol formation” by Anusha Priyadarshani Silva Hettiyadura et al.***

### **Anonymous Referee #1**

Received and published: 18 November 2018

The manuscript presents new measurements focusing on occurrence of organosulfates in aerosol samples collected in the city of Atlanta, USA. A detailed chemical analysis is reported, while the study would benefit from a more thorough discussion of relation to atmospheric parameters and broader implications for other regions. Such a discussion should cover influence of air mass transport from precursor source areas.

#### Specific comments

Abstract (page 1 line 26). I suggest to briefly explain the formation mechanisms of organosulfate, as this knowledge is needed to understand your point here. The abstract would also benefit from an introduction in the first sentences to put the work into context

C1

for the general reader.

#### Introduction.

The introduction needs a more thorough presentation of state of the art and previous studies of organosulfates in aerosols.

Page 2 Line 2: Suggest to rephrase to "Organosulfates are components of atmospheric secondary organic aerosol...".

P2 L3: "Organosulfates have been detected all around the world". Please be more specific and include references.

P2 L6: VOC are in the gasphase while sulfate radicals are in the particle phase.

P2 L8: "largely biogenic" - there have been many studies of biogenic precursors, and fewer of anthropogenic so this statement may not be correct because we have not yet investigated all precursors of organosulfates.

P2 L14: The influence of anthropogenic VOC has been established in e.g. Asian studies.

#### Experimental

P4 L30: What do you mean by "30% of the measurement"? Of the value?

#### Results and Discussion

All headlines include the words "in Atlanta". I suggest to leave this out and only specify the comparison with Centreville in that specific headline.

The time series in Figure 2 would benefit from showing time series of relevant pollution indicators.

P6 L14: "many species" - can you be more specific e.g. "many other organosulfate species originating from xxx"

C2

P6 L19-20: Please describe more clearly what you mean by these relative intensities (in the mass spectra, I assume?) of organosulfate and sulphonate species.

P7 L21: As all readers might not be familiar with HILIC, I suggest to explain this reasoning in more details.

P7 The first paragraph contains a lot of information and I suggest to divide into at least two paragraphs to improve readability.

P7 L2: Which "signal" do you refer to?

P7 L4-5: Please check that all compounds names are written correctly - it seems that spaces are missing in some names.

P7 L8: suggest to rephrase to "have also been identified as.."

P7 L16: nitooxy -> nitrooxy

P7 L30. Please explain how "isoprene-derived organic aerosol" was identified and quantified. Using AMS data?

P8 L32: The dodecyl sulfate from surfactants is not covered well by the title of the section.

P9 L24: It is not so clear which organosulfates are detected for the first time ever and which are detected for the first time in Atlanta.

P10 L15-16: This would need additional laboratory studies to confirm.

P10 Section 3.8: Please make it more clear that you are comparing samples collected in different years. Differences in levels are thus heavily affected by differences in meteorology affecting isoprene emissions, transport and mixing of biogenic and anthropogenic pollutants.

P11 L1-5: I suggest to specify that you measure inorganic sulfate as opposed to total sulfate measured by AMS.

C3

P11 L17: Can other species or photochemical processes related to NO<sub>x</sub> be ruled out?

P11 L19: I suggest to compare your results with some of the previous results obtained during SOAS.

P11 L22: Do you mean standard synthesis (instead of development)?

P11 L23: Suggestion: "Of these, a standard for methyltetrol sulfate was synthesized" -> "Of these, only a standard for methyltetrol sulfate was previously synthesized".

P12 L15: I suggest to divide this into two sentences to indicate more clearly which data are in the SI and which are being published elsewhere.

Table 1: Please check that the resolution of molecular structures is adequate.

Table 2: The number of significant figures should indicate the uncertainty for each number and does not have to be the same for all levels of concentrations. The number of significant figures should thus be reduced for the highest concentrations.

---

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-834>, 2018.

C4