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Atmospheric Chemistry and Physics
Discussions
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Interactive comment on "Composition and oxidation state of sulfur in atmospheric particulate matter" *by* Amelia F. Longo et al.

Anonymous Referee #2

Received and published: 11 July 2016

General comments:

This paper presents the results of a study on the speciation of sulfur in ambient aerosol samples from the greater Atlanta area. The topic is of interest to this journal and studied with an appropriate technique. The article is generally well written, but the description of data collection and processing needs to be improved before publication.

Specific comments:

Page 3, line 27: Given that secondary sources are discussed for reduced sulfur and the mention of organosulfates in the Discussion section, I think a short sentence on secondary S(+VI) would be warranted.

Page 5, line 13: I commend the inclusion of the standards database in the supple-

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mentary information. I do however think that more information on the nature of the measured standards (e.g. particle size) would vastly improve the usefulness of this database.

Page 5, line 29: the description of the settings doesn't add up properly to me. It states that a 50 eV range was scanned in 0.33 eV steps with a dwell time of 1 s per step. If three full spectra were collected per particle or area (which is how I'd interpret the following sentence), how can the total dwell time be only 3 s? Also, given that multiple spectra were collected for each particle, did you observe any indication of beam damage (especially for S(0))?

Page 5, line 34: It is stated how a potential drift in energy calibration could be monitored. However, no mention is made of the original method of energy calibration. Was a sulfur standard used and if so, which one?

Page 6, line 31: Some spectra and the associated fits should be shown so that readers are able to evaluate data and fit quality (if nor here, then at least in the Supplementary Information).

Page 6, line 34: The primary emission samples were only characterized at the bulk level. Given that most of the S(0) in the ambient samples was observed only for individual particles, wouldn't this lead to wrong conclusions regarding their comparability?

Page 8, line 22: This sounds as if this study comes to the conclusion that organosulfates were not present. However, as far as I can see no organosulfate standard was measured, nor are there any comparisons to literature data, so how do the authors come to this conclusion?

Table S1: It is clear from this table that measurements of individual particles were only taken for few of the collected samples, in particular at Fire Station 8. Is there any specific reason for that?

More information on the generation of the sulfur maps is needed, either in the Data

Analysis section or at least in the caption of figure S1. For example: are the maps normalized? What is the unit of the scale bars?

Technical corrections:

page 5, line 35: "monochrometer" should be "monochromator”

page 6, line 8: “raster” should be “rastered “

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