Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2017-396-RC2, 2017

Atmospheric Measurement Techniques Discussions

Interactive comment on "Superaggregates or instrument artifact?" *by* Ashley M. Pierce et al.

Anonymous Referee #2

Received and published: 29 December 2017

The paper reports a potential artifact during aerosol sampling due to aluminum tubing fretting. I think that making the community aware of this potential artifact is useful; however, I have some reservations regarding the title of the paper, the focus of the abstract/introduction, and the general organization. While the sentences are mostly clearly written, I found the paper confusing, I'll try to explain why next. As it is, I think, the paper (especially considering the current title) might be misinterpreted as if the superaggregates detected in past work, and discussed in the literature, have been erroneously identified as such, while they were just an artifact. In reality, the current paper and findings have little to say about soot superaggregates, in my opinion. The agglomerated particles presented here have, apparently at least, nothing to do with the soot superaggregates reported and discussed in the literature. These aggregates (e.g., from Figure 7) look very different (even just visually) from the soot aggregates reported in Chakrabarty et al., for example; these are composed of a mixture of elements, in-

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cluding an abundant amount of aluminum, while the soot superaggregates are mostly composed of carbon. The soot superaggregates morphology (including the nanostructure of their monomers) is clearly defined in literature, while in this paper there is no detailed morphological analysis to compare to. For example, there is no attempt to find the fractal dimension or the monomer size distribution, or their nanostructure. While I still think it is very valuable to make the community aware of the potential presence of these aggregates due to a possibly common sampling artifact, I think the link in the introduction, in the abstract and in the title to soot superaggregates is not clear at best, and deceiving at worst. In addition, while reading the paper for the first time (especially, because of the issues mentioned above), I was not really clear until the very end, where it was going to take me, and I think the main result should be highlighted much earlier on. So, while most of the method and analytical approach and description can be maintained almost as they are, my suggestion would be to: 1. Change the title and get away from the term superaggregate (these are just aggregates), and make it clear what the study is about: an artifact of particles aggregates containing aluminum. 2. Refocus the introduction, onto the real findings of this study, and much less about the "link" (which in my opinion is non-existent) to soot superaggregates. 3. Make the main findings clear early on in the paper; for example, the abstract does not even mention about the aluminum present in these aggregates and the possible tubing fretting corrosion origin, while I think that's the main interesting finding. Instead most of the abstract, since the beginning, focuses on soot superaggregatss, which again, in the end, have nothing to do with what sampled.

Some specific additional comments: - Line 12, page 6: Why "black"? This becomes clear later, but here is not clear. - Line 22-24, page 8: These correlations are discussed earlier on, the repetition here is a bit confusing, I would suggest consolidating all in the discussion. - Paragraph starting at line 30 of page 8: It is not very clear to me why hygroscopic growth is even considered or discussed here. I am not saying it should not be discussed, I am just suggesting it should be made clear why hygroscopic growth should result in aggregation? What is the hypothesis (e.g., a mechanism) behind a

possible link between the hygroscopic growth and the presence/formation of these aggregates? Line 34, page 9 and line 1 on page 10: SEM stays for scanning electron microscopy, I think; so, I believe you should not write "SEM... collected", you can't really collect SEM; maybe "SEM samples... collected" or "SEM images... collected", or something similar?

To summarize, from the point of view of the main material presented here, I would say only minor revisions are needed (no need for new or different analysis or data, for example). I chose major revisions just to underline that a change in title, focus, and organization, would make the paper stronger, clearer and more appropriate.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-396, 2017.

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