

## ***Interactive comment on “High spatial resolution mapping of aerosol composition and sources in Oakland, California using mobile aerosol mass spectrometry” by Rishabh U. Shah et al.***

**Anonymous Referee #2**

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### General comments

This paper presents a detailed study on aerosol composition, focusing on the organic components, in Oakland, California. A mobile laboratory carrying an aerosol mass spectrometer (HR-ToF-AMS) was used to map the city roads in about 160 hours of measurements, resulting in a highly spatial resolved data set. The organic aerosol was separated using PMF into HOA, COA, and SV-OOA. While the manuscript is technically very sound and presents the AMS data analysis in great detail, it falls short in the interpretation of the results. To my opinion, more could have been done (or has to be done) in this direction, before publication in ACP can be recommended. My detailed

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comments are listed in the following.

### Major comments

1) As written above, the interpretation of the results is not satisfying. That a large city like Oakland has a strong HOA influence would have been expected. The authors emphasize that Oakland has one of the largest shipping ports in the US. Thus, I would have expected to see as a result a separation of the HOA influence between ship exhausts, port-related traffic (trucks) and individual car traffic. I do not find any of this in the results or conclusions sections, only a little of such an analysis in section 3.2. The title suggests that not only the spatial distribution but also the sources of aerosol particles are investigated. It would have been interesting to learn about the reduction potential for the PM burden in a city like Oakland, e.g. whether reduction of ship emissions, truck or car traffic have a higher impact on PM loads.

2) The data analysis is restricted to AMS and black carbon data. But, as was written in section 2.2, also CO, CO<sub>2</sub> and particle number concentration was measured. Apparently neither CO<sub>2</sub> nor particle number were used here in the analysis. No correlation between CO and HOA is presented. I think that the addition of these parameters (e.g. ratios OA/CO, correlations between BC and CO, HOA and CO, HOA and particle number...) would be a benefit for the analysis.

### Minor comments

Page 2 line 24-25: Also in Paris (MEGAPOLI) COA was identified to be of high importance (Crippa et al., 2013; Freutel et al., 2013)

Page 7, Figure 2: The figure suffers from too much information. I suggest adding an extra figure in the Supplement with the number of unique samples and have in this figure only filled symbols color coded for OA.

Page 8, lines 8.9: "Ambient measurements typically exhibit a positively-skewed distribution under the influence of local emission events." Really? Are three papers enough

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to say "typically"? And why is that so?

Page 10, lines 11-15: It was suggested by Sally Ng's group (e.g., Xu et al., 2015) to replace "LV-OOA" and "SV-OOA" by "More-oxidized and less-oxidized oxygenated organic aerosol (MO-OOA and LO-OOA)". You may consider using LO-OOA instead of SV-OOA.

Page 12: lines 0-5: Oceanic air masses: There is literature on marine OOA factors (e.g. Ovadnevaite et al., 2011; Schmale et al., 2013). There is some potential in this marine influence on aerosol properties. You could make more of it.

Summary and conclusions: As already mentioned above, this section is very short. I think a statement on the relative influence of ships at the port, trucks at the port, and individual car traffic on the aerosol burden in the city would have been the desired output of this study.

#### Technical

Page 6, line 22: Link to appendix is missing

Page 12, line 34: Oberdörster

#### References:

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Xu, L., Suresh, S., Guo, H., Weber, R. J., and Ng, N. L.: Aerosol characterization over the southeastern United States using high-resolution aerosol mass spectrometry: spatial and seasonal variation of aerosol composition and sources with a focus on organic nitrates, *Atmos. Chem. Phys.*, 15, 7307-7336, <https://doi.org/10.5194/acp-15-7307-2015>, 2015.

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