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Atmospheric Chemistry and Physics Discussions

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 #1

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This manuscript shows high-resolution spatial patterns of PM composition and amount measured by an AMS on a truck in Oakland. Overall, I found the paper to be well within the scope of ACP, the analysis was well done, and the paper was well written.

I have several comments that I'd like addressed before publication in ACP.

General comment (because it shows up in a few places):

Bottom $\frac{1}{3}$ of P18, but also the abstract and point #3 on P23: To me, the simplest explanation as to why SV-OOA is higher in downtown is that it's the location that's farthest downwind (wind typically heading from west to east in Figure S16). The mid-day gradient in SV-OOA appears to be steadily increasing from west to east in Figure

9, rather than a step change to higher values when entering downtown. The air starts picking up SOA precursors when it first hits land (either on the west or east sides of the bay) and SOA forms as the air moves across Oakland. Certainly more precursors are being added in Downtown, which helps, but the air as simply had more time to make SOA from the precursors (or oxidize the HOA and COA) by the time the air reaches downtown.

The proposed hypotheses in the manuscript that deal with enhanced photochemical activity seem like less straightforward explanations. Downtown might be in a high-NOx regime, which would lower OH (acting against the proposed HONO source).

Unless I'm missing something, I don't know why the simple "amount of time spent over land" hypothesis isn't prominent in the paper.

Specific comments:

Abstract: The final sentence is subjective and unnecessary, in my opinion. The paper shows many things that would seem to be unique to Oakland (in addition to things that are likely common with other urban locations).

P2 L14-15: The length and time scales don't seem to match. Winds would need to be very stagnant («1 km/hr) in order for "hundreds of meters" to correspond to "hours".

P3 L7: need a comma after "legislations"

P3 L10: I had to look up what "drayage" meant, and I suspect others might not know as well. Since the word is used quite a bit in the paper, it may be worth giving a very brief explanation here.

P6 L25-30: I know, generally, what bootstrapping statistical methods are, and I've used some. However, there was not enough info in this paragraph to really understand what was done (I could not repeat the analysis based on this description).

2018.

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