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Comment on acp-2020-533

Anonymous Referee #1

Referee comment on "Physical and chemical properties of urban aerosols in São Paulo, Brazil: links between composition and size distribution of submicron particles" by Djacinto Monteiro dos Santos et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-533-RC1, 2021

The study investigated the physical and chemical properties of submicron aerosols in Sao Paulo, Brazil mainly based on the real-time measurements by aerosol chemical speciation monitor and scanning mobility particle sizer. The composition and sources of organic aerosol (OA) were analyzed with positive matrix factorization, and the results showed four OA factors relating to different sources and processes. A major highlight of this study is linking aerosol composition to the size distributions, showing different contributions of aerosol species to nucleation, Aitken and accumulation mode. The results are important for a better understanding of the impacts of different sources on air quality in metropolitan area of Sal Paulo. This manuscript is overall well written, and I have a few comments.

- Considering the authors have the measurements of both submicron aerosol species and size-resolved particle number concentrations, I suggest the authors comparing the mass measured by ACSM and MAAP with the volume or mass estimated from SMPS to validate the quality of the data.
- I suggest combining Figure 1 and Figure 2.
- Figure 3 did not show any error bars.
- The labels of $f_{m/z}$ in Figure 4 are not appropriate, for example, f_{44} is the fraction of *m/z* 44 in OA, it is better use 44.
- Please check the unit of SO_2 in the text. It was "ppm" sometimes.
- Figure 7, please check the scale of y-axis, missed "10^3"?