

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2022-289

Anonymous Referee #1

Referee comment on "Measurement report: Characterisation and sources of the secondary organic carbon in a Chinese megacity over 5 years from 2016 to 2020" by Meng Wang et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-289-RC1>, 2022

Wang et al. reported a five-year data containing organic carbon and elementary carbon in the Shanghai, one of the biggest cities in the world. The measurement of such long-term is very valuable for policy evaluation and numerical modelling. The manuscript is well written although subjected to a few linguistic typos. The data were presented in a concise but detailed way and the main conclusion from the manuscript is clear that secondary organic aerosol (SOA) is becoming more and more important for mitigating air pollution. I believe the manuscript is suitable for publication in ACP from addressing the following issues, most of them are minor:

- The "ambient" in the title can be removed.
- The introduction is a bit lengthy; I understand the carbon aerosol is a large topic and there are many existing knowledge, but you don't need to introduce them all, e.g. what's the point of citing all the carbonaceous aerosol studies from line 63 to line 67.
- Line 48. You mention carbonate carbon only once, what's the point using an abbreviation
- Line 55. Termed as
- Delete "in issues varying"
- Line 68 what is the relationship between this nationwide measurement with your study?
- Line 73 you don't need a reference to introduce Shanghai?
- Line 96 in PM_{2.5}, not fraction.
- Section 2 in Figure S1, please add a scale on the map.
- Section 3 as far as I understand, the concentrations is not normally distributed, the data should be reported in median (and 25th to 75th ranges)
- Line 172 what is the possible cause of the abrupt change of POC in 2020?
- Line 213 why is the weekend -weekday pattern important?
- The manuscript was focused on secondary organic aerosol, but a large fraction in 3.1 was given to primary organic aerosol.
- Section 3.2.1 It is intriguing to see the SOC increased with temperature, the authors represent a detailed analysis on the effect of temperature on SOC concentrations, but it is unclear how temperature impacts SOC. I understand that temperature can boost biogenic VOC in boreal area that act as SOC precursors, but in mega city in Shanghai it is uncommon. A possible reason should at least be given.

- Line 311. "The concentration of Ox"
- Line 392. Does this suggest that SOC observed in Shanghai is mainly originated from regional transport?