

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2022-220

Anonymous Referee #2

Referee comment on "Measurement report: Effects of anthropogenic emissions and environmental factors on the formation of biogenic secondary organic aerosol (BSOA) in a coastal city of southeastern China" by Youwei Hong et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-220-RC2>, 2022

Review on "Measurement Report: Effects of anthropogenic emissions and environmental factors on biogenic secondary organic aerosol (BSOA) formation in a coastal city of Southeastern China" for Hong et al.

The author conducted the field observation during summer and winter in the southeast of China, and discussed the formation of SOA tracers, especially BSOA tracers. The author found that the concentrations of SOA tracers were affected by photochemical oxidation in summer, and were affected by anthropogenic emissions in winter. They highlighted that anthropogenic emissions, atmospheric oxidation capacity and halogen chemistry have significant effects on the formation of BSOA in the southeast coastal area. The manuscript can provide unique data for SOA tracers in the coastal area, and clarified the influencing factors on SOA formation. However, there are still some content deficiencies and logical omissions in this manuscript, which need to be carefully revised. Overall, the manuscript could be accepted after addressing the following issues.

- Line 147-149. How many times the samples were ultrasonically extracted during the pre-treatment, it should be shown in the manuscript.
- Line 189-190. f_{SOC} of isoprene was 0.155 ± 0.039 in study of Kleindienst et al., 2007, the author should recheck your content.
- Section 2.5. The authors use both E-AIM IV model and ISORROPIA II model to calculate the aerosol pH. They need to discuss the correlation and difference between the results of two models, and explain which result is more reasonable for this manuscript. The

authors should also explain which model they chose for the following discussions.

- Section 3.1. In my opinion, it is clearer to list the average concentrations of these air pollutants during summer and winter, daytime and nighttime in Supporting Information as a Table.
- Line 250. The average concentrations of SOA_M , SOA_I and SOA_C in winter and summer should be given. As the author determined to discuss "total SOA tracers" (Line 249), the concentration of ASOA should also be shown here.
- Line 250-252. The author showed that "In summer, BSOA tracers showed much higher concentrations in the daytime than in the nighttime, while inverse results were observed in winter", the specific concentrations of BSOA tracers in daytime and nighttime of summer and winter should be displayed here.
- Line 252-258. Instead of using "for example" here, the author could display the average concentrations of SOA tracers (including SOA_I , SOA_M , SOA_C and ASOA tracers) during day, night, summer and winter in the Supporting Information as a Table directly.
- Line 275-279. As the concentrations of SOA tracers were higher in summer than winter, and the f_{SOC} values were constant in this manuscript, it was not surprisingly that the concentrations of SOC in summer was higher than that in winter. And this result could not demonstrate that the contributions of SOA tracers to SOC in summer was higher than those in winter.
- Line 283-286. This sentence is confusing, why does the "obvious trend of diurnal variations of SOC_I " was "consistent with the isoprene emission", and why this result was compared with the trend in winter? Considering the coherence of context, maybe the author intended to explain the diurnal variation of SOC_I was obvious in summer and the variation was consistent with isoprene emission in summer? The authors should give more explanation about it.
- Figure 3. The legend of Figure 3 might be SOC_I , SOC_M , SOC_C and ASOC.
- Line 306, it should be " SOA_I tracers", and Line 308, it should be " SOA_M tracers".
- Line 319. I think the first (PA and PNA) and later generation (HGA, AGA, HDMGA and MBTCA) products could only evaluate the aging degree of SOA_M , not all BSOA.
- Line 333-335. According to the logic of this section, it might be "Low ratio of HGA/MBTCA (~ 1.0) showed that α -pinene was the major precursor for SOA_M . The ratio of HGA/MBTCA with an average of 5.78 in Xiamen was high, suggesting the contribution of β -pinene to SOA_M ".
- Line 362. The author used the pH values calculated by ISORROPIA II here. Same as the Q3, the author should explain why they chose the pH calculated by ISORROPIA II, but not that calculated by E-AIM IV.
- Line 380. Table 1 should be listed after this paragraph, which refers to table 1 for the first time.
- As the contents of Figure 6 and Table 1 are similar, and the author has not discussed Figure 6 in detail, this figure should be moved to the supporting information section.
- Line 425-427. The author showed that "the correlations of SOA tracers in winter were found to increase with increasing NH_3 and chlorine ions in $PM_{2.5}$, while inverse results were observed in summer". The sentence is not rigorous, because NH_3 was not negative correlated with SOA tracers in summer as shown in Table 1.