

Comment on acp-2022-220 Anonymous Referee #3

Referee comment on "Measurement Report: Effects of anthropogenic emissions and environmental factors on biogenic secondary organic aerosol (BSOA) formation in a coastal city of Southeastern China" by Youwei Hong et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-220-RC3>, 2022

I think this is a good submission to ACPD along the current line of thinking in atmospheric chemistry. The authors investigated ambient PM_{2.5} in coastal areas of South-eastern China and reported experimental distribution of the main organic tracers (mainly BSOA), water-soluble inorganic ions and gas phase species including HCl, HONO, HNO₃, NH₃. The analytical method (qualitative and quantitative) used by Hong et al. is well established for these oxygenated compounds. The results of this study show that the concentrations associated with SOA organic tracers depends on the photochemistry in summer, and on the emission of anthropogenic compounds in winter. The results of this study are interesting to the scientific community including modeling as it provides experimental link between photochemistry, anthropogenic emission and BSOA tracers in a coastal area of southeastern China. This work would be beneficial for publication under *Measurements Reports* after considering my comments below:

Response: Thank you very much for all the valuable comments and suggestions. We have addressed each comment in the following point by point and have revised the manuscript accordingly.

The analytical technique used IS and the authors should comment on the use of only one non-polar IS. I do recognize the difficulties of finding the correct IS due to co-elution issue with the number of oxygenated species that are detected in ambient PM_{2.5}. Ketopinic acid is used by several groups as IS as it could not be detected in ambient PM and is a polar oxygenated specie!!

Response: Thank you for your kindly comments and suggestions. We have described it clearly in the revised manuscript. In this study, four surrogate standards (structurally resemble the analytes of interest) was used to compensate for unavoidable assay variance in each sample during the pretreatment process, then internal standard (IS) was added after this process and before the instrument analysis. Then, relative response factors (RRFs) of surrogate and internal standard were calculated to quantify the targeted organic compound in each sample, including SOA_I, SOA_M, SOA_C and SOA_A tracer.

These sentences have been rewritten, as follows:

Due to the lack of authentic standards, surrogate standards (including erythritol, malic acid, PA and citramalic acid) were used to compensate for unavoidable assay variance of SOA_I, SOA_M, SOA_C and SOA_A tracer in each sample during the pretreatment process, respectively (Fu et al., 2009; Lowes et al., 2011).

Then, relative response factors (RRFs) of surrogate and internal standard were calculated to quantify the targeted organic tracers in each sample. Details of SOA tracer's calculated concentrations based on RRFs were presented in our previous studies (Hong et al., 2019; Liu et al., 2020).

Lowes, S., Jersey, J., Shoup, R., Garofolo, F., Savoie, N., Mortz, E., Needham, S., Caturla, M. C., Steffen, R., Sheldon, C., Hayes, R., Samuels, T., Di Donato, L., Kamerud, J., Michael, S., Lin, Z. P., Hillier, J., Moussallie, M., Teixeira, L. D., Rocci, M., Buonarati, M., Truog, J., Hussain, S., Lundberg, R., Breau, A., Zhang, T. Y., Jonker, J., Berger, N., Gagnon-Carignan, S., Nehls, C., Nicholson, R., Hilhorst, M., Karnik, S., de Boer, T., Houghton, R., Smith, K., Cojocaru, L., Allen, M., Harter, T., Fatmi, S., Sayyarpour, F., Vija, J., Malone, M., and Heller, D.: Recommendations on: internal standard criteria, stability, incurred sample reanalysis and recent 483s by the Global CRO Council for Bioanalysis, *Bioanalysis*, 3, 1323-1332, 10.4155/Bio.11.135, 2011.

Are additional compounds associated with isoprene detected (hydro-carboxylic acids)?

Response: Unfortunately, hydro-carboxylic acids was not measured in this study. The reviewer raised a good point. In the future, we will pay more attention to the pollution characteristics of hydro-carboxylic acids, beneficial to study the atmospheric chemistry process of SOA formation.

The authors should provide additional evidence from the present work on the interaction biogenic-anthropogenic and its effect on PM formation.

Response: Thank you for your good suggestions. Indeed, I think it rather difficult to see how the presented work led to the conclusion that there is an impact from anthropogenic–biogenic interaction. We have changed the description of “anthropogenic–biogenic interaction” in the revised manuscript.

The sentence has been rewritten, as follows:

However, in winter, the formation of BSOA tracers were attributed to the impacts of anthropogenic emissions and atmospheric stagnant conditions.