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Comment on acp-2022-220

Anonymous Referee #1

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-RC1>, 2022

The work by Hong et al. investigated distribution of several organic tracer compounds, water-soluble inorganic ions in PM_{2.5} and gas phase HCl, HONO, HNO₃, NH₃ species in coastal areas of South-eastern China. The authors employed well established analytical techniques for identification and quantification of tracer compounds (e.g. TMS derivatisation). The obtained results are interesting and can be useful for researchers dealing with tracer compounds. I recommend this work for publication under **Measurements Reports** after considering my comments below:

Materials and methods:

The authors use **a single** internal standard (IS) to cover **fifteen** organic tracer compounds: Lines 152-153 state "At last, 140 µL of internal standard solution (13 C n-alkane solution, 1.507 ng µ L⁻¹) was added into the samples". The majority of considered tracer compounds are of highly polar nature (containing hydroxylic groups). What was the rationale for selecting a non-polar ¹³C n-alkane as an IS for polar compounds? One of the requirements for IS that it should structurally resemble the analyte of interest (structural analogue or stable label) such that it behaves similarly during sample preparation and analysis (Lowe et al., 2011). The IS that is added to each sample compensates for unavoidable assay variance due to, for example, extraction efficiency, ionisation effects and transfer losses, and thus I am concerned about the discussion of correlation of various tracers in this work if the observed variability or absence of correlation could be due to other than environmental variability factors.

Results and discussion:

The authors give a fair description of isoprene oxidation products; however, I can't say the

same about the other discussed tracers. For example, I realise that levoglucosan is commonly used as a marker compound for biomass burning; however, nothing is stated about stability of this compound. It has been shown that the oxidation of levoglucosan in atmospheric deliquescent particles is at least as fast as that of the other atmospherically relevant organic compounds and levoglucosan may not be as stable in the atmosphere, especially under high relative humidity conditions (Hoffmann et al., 2010). Can this be one of the reasons for absence of correlation with other tracers? Could you elaborate why are you expecting a correlation of CPA with levoglucosan (lines 357-358)? This is not clear to me. As I understand, the applied derivatisation technique allows separation of other biomass burning markers e.g. mannosan and galactosan, which often accompany levoglucosan. Have the authors observed these isomers along with levoglucosan? The relative ratios of levoglucosan to mannosan have been used for source reconstruction of combustion derived byproducts in atmospheric aerosols (e.g. Iinuma et al., 2007, 2009, Engling et al., 2009) and can be useful to support some of the conclusions made in this work.

Conclusion section:

At least the way how it is formulated in the text I find it rather difficult to see how the presented work led to the conclusion that there is an impact from anthropogenic–biogenic interaction.

Minor comment:

Line 27 (page 23) The authors state "These results also proved the obvious effects of anthropogenic emissions on secondary formation of aerosol particles under atmospheric relatively stability conditions during the winter." I think the use of correlations is indeed helpful to support some specific trends; however, I believe such data processing techniques are not sufficient to provide a definite answer on the specific emission source and therefore the words such as "obvious" should be avoided (at least in this context), or supported by other than correlation data.

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