

This manuscript by Zhang et al. represent a detailed analysis on tracer organic compounds quantified in PM_{2.5} samples collected at 23 sites in the Pearl River Delta (PRD) region. Based on the tracer concentrations, the authors performed correlation analyses and source apportionment to understand the source of secondary organic aerosol (SOA), as well as the impact of anthropogenic emissions to biogenic SOA (BSOA). The topic of the study is timely and is within the scope of ACP. Especially, the interaction of anthropogenic and biogenic emissions in relatively polluted regions, such as the PRD, is not well understood, and the results from this study is highly valuable. The manuscript is of high quality in terms of chemical analysis, discussion, implication, and literary presentation. I recommend publication of this work in ACP and I have a number of minor and technical suggestions:

- Section 2.2: The authors quantified quite a number of organic tracers. The authors should justify how representative are these tracers for SOA_I, SOA_M, and SOA_C. In particular, I am not familiar with HDMGA and HGA as tracers for monoterpenes. Citation is needed to justify the specificity and selectivity of these tracers.
- Section 2.3: It seems that the recovery for erythritol is low. Why it is low and how is the result of the recovery test reflected in the quantification of related tracers?
- The authors use Ox as an indicator of the atmospheric oxidative capacity. However, caution is needed, as Ox = (O₃ + NO₂) represents the total O₃. While O₃ is certainly an important oxidant, the contribution of OH radical (which is perhaps more important) is not considered in Ox. Is there any evidence showing that OH concentration is also high when the Ox concentration is high?
- Section 3.2.3: It is interesting that β-caryophyllenic acid (CA) was observed to be high in the winter and correlate with BB tracers. Can the authors comment on whether this observation place question on the selectivity and specificity of CA as a tracer for SOAc?
- Related to CA, I have come across compounds that have very similar names to β-caryophyllenic acid, namely, β-caryophyllinic acid and β-caryophyllonic acid. (Jaoui et al. (2007) *Geophys. Res. Lett.*; Bé et al. (2019) *ACS Earth Space Chem.*). Is β-caryophyllenic acid measured in this study a different compound or this is simply a typo?
- Section 3.3: The impact of anthropogenic emissions to BSOA is perhaps one of the most important implications in this manuscript, but the current discussion appears weak. Based on the slopes obtained from the correlation studies, the authors implies that reducing SO₄ and Ox in the atmosphere will lead to reduction of BSOA. However, this type of correlation analysis exhibits only correlation but not causation. The authors should justify why reducing anthropogenic emissions can likely reduce BSOA. One way to do this, I think, is to add more discussion on the mechanisms behind the influence of anthropogenic emissions to BSOA.