

Comment on acp-2021-293

Anonymous Referee #1

Referee comment on "Characterization of ambient volatile organic compounds, source apportionment, and the ozone-NO_x-VOC sensitivities in a heavily polluted megacity of central China: effect of sporting events and emission reductions" by Shijie Yu et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-293-RC1>, 2021

General Comments:

Overall, this study applied the observational data and air quality model to study how emission control can improve the air quality in Zhengzhou. I think it can be published after the authors address and fix some issues.

Specific Comments:

- "ppbv" and " $\mu\text{g}/\text{m}^3$ " are both used in the manuscript, it is better to use the consistent unit either "ppbv" or " $\mu\text{g}/\text{m}^3$."
- Line 249-251: "The highest hourly...respectively." Please confirm that the max hourly NO_x is $357 \mu\text{g}/\text{m}^3$ and the VOC concentration is 238ppb during the pre-NMG, and explain when they happened because I didn't see the NO_x concentration is higher than $357 \mu\text{g}/\text{m}^3$, and the VOC concentration is not higher than 120 ppbv in Figure 1.
- Line 254-255, "the O₃ precursor concentrations decreased significantly...NO_x", It is hard to identify the NO_x and VOC time series data change significantly; the T-test or box plots can be used to explain they are different.
- Line 257 "levelsaccounted," typo.
- Why 2019/08/26-2019/09/08 have high ozone and NO_x, but in the same NMG period 2019/09/10-2019/09/15, ozone and NO_x level decrease a lot??
- Line 308, "As illustrated in Fig. 2", I think it is Fig. 1. Typo.
- In Table1, the total VOC concentration or sum of the top 20 VOCs can be presented in the bottom row.
- Line 331, why discuss isoprene here? The isoprene is not in the top 20 VOCs.
- Line 367, why the chloromethane continually increases a lot?
- Figure 4. In the x-axis "m," typo.
- Figure 5, the time series plot is hard to compare the data pattern in those three periods; the box plot or range plot for each period may be a better way to present.
- Figure 8, the three panels are not the same size.

- Table list, Table 2 OFP contributions ($\mu\text{g}/\text{cm}^3$), please confirm it is correct. Please confirm all units are consistent.
- Figure S10 should provide the data in the support document.
- Line 510 "However.....ozone", following this sentence, the following section should connect with ozone sensitivity study, but the next section is "3.4.2 Risk assessment of individual VOC species". This may confuse the readers.
- Line 565-568, should be in the method section.