

Comment on acp-2022-283

Anonymous Referee #2

Referee comment on "Chemical characteristics and sources of PM_{2.5} in Hohhot, a semi-arid city in northern China: insight from the COVID-19 lockdown" by Haijun Zhou et al.,
Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-283-RC2>, 2022

This manuscript analyses the composition and sources of ambient PM_{2.5} in the Honhot region in China before and during the COVID-19 lockdown. The information presented in the study is relevant because, unlike other existing studies, data were collected well before beginning and after the lockdown period which allowed capturing business-as-usual and lockdown PM_{2.5} samples. Results are well presented and structured, and the discussion goes straight to the relevant findings. By applying the PMF model, it can be proposed those sources that contribute significantly to the ambient levels observed with statistical confidence. Nevertheless, some details must be addressed before it is accepted for publication at ACP.

1. Some sentences are repetitive in the abstract, e.g. L25-27, and within the entire document.
2. One aim is to identify the long-term characteristics of PM_{2.5} in the studied region, however, analysing one year is not sufficient to understand long-term variations unless their results are discussed and compared with those in existing studies, which are not reported.
3. Introduction includes studies from most regions of the world, but Latin America was not included where also interesting studies have been made. I recommend you revise and include the following studies where appropriate:

-Mendez-Espinosa, J. F., Rojas, N. Y., Vargas, J., Pachón, J. E., Belalcazar, L. C., & Ramírez, O. (2020). Air quality variations in Northern South America during the COVID-19 lockdown. *Science of the Total Environment*, 749, 141621.

-Hernández-Paniagua, I. Y., Valdez, S. I., Almanza, V., Rivera-Cárdenas, C., Grutter, M.,

Stremme, W., García-Reynoso, A. & Ruiz-Suárez, L. G. (2021). Impact of the COVID-19 lockdown on air quality and resulting public health benefits in the Mexico City Metropolitan Area. *Frontiers in public health*, 9, 642630.

-Nakada, L. Y. K., & Urban, R. C. (2020). COVID-19 pandemic: Impacts on the air quality during the partial lockdown in São Paulo state, Brazil. *Science of the Total Environment*, 730, 139087.

4. In line 129: the authors did not define what a strict analytical procedure is.

5. In several sections, calculations and results are reported for a year time-scale, but it is not defined if this refer to a calendar or sampling year.

6. It would be convenient if the authors propose a hypothesis in introduction and then discuss their findings in light of it, e.g. L196-199.

7. In most sections, PM2.5 composition is claimed to be different from other Chinese regions but the reason behind this is not discussed. This issue is critical and must be addressed.

8. L230-235: Statistical tests must be conducted to identify if the changes observed for each component between periods were significant.

9. L236-238: The percentage of SNA decreased during and post lockdown, but the reason behind this behaviour is not discussed.

10. Since the main objective of the study was identifying changes in emissions during the lockdown, why PMF was not applied to conduct an additional analysis of sources prior and during lockdown?

11. How did the apportionment to PM2.5 change during the lockdown? This is not reported.

12. Overall, the text is clear and understandable but there are some sentences that require re-writing and re-wording (L95-inhabitants?, L114-analysis, L181, L222-contributed by X % to total PM2.5..., 278-benefical?, L283-easier, you meant

faster?...).