Comment on acp-2021-1030

Anonymous Referee #1

Referee comment on "Measurement report: Characterization and source apportionment of coarse particulate matter in Hong Kong: insights into the constituents of unidentified mass and source origins in a coastal city in southern China" by Yee Ka Wong et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-1030-RC1, 2022

The given manuscript discusses the importance of PMcoarse in formulating policies due to its growing relative contribution to PM10 loading in urban atmospheres. The paper uses the PM composition data derived from the measurements conducted in Hong Kong. The use of positive matrix factorization resulted in identifying four PMcoarse sources, including soil dust, Cu-rich dust, fresh sea salt, and aged sea salt mixed +secondary inorganic aerosols. Results also showed that these four sources can explain unidentified fraction of PMcoarse. Overall, this work presents a simple approach to understand PMcoarse composition/sources which can be applied to other locations with similar monitoring needs.

This work is nicely constructed, and my comments are listed below to consider:

- Please add reference to the sentence "For example, nitrate in the coarse mode is formed by the reaction between nitric acid (HNO_3) from oxidation of NO_x and pre-existing alkaline aerosols (e.g., sea salt and dust)."
- Please provide more details on the uncertainty matrix. I can't find any information on the uncertainty of species those concentration is above the detection limit.
- Why was Deming regression applied?
- Line 155: What is the basis for using a ratio of 2 to calculate organics, author should provide clarification.
- Line 160: Add reference for using 1.6*OC.
- Add reference-"Coarse mode nitrate mainly forms by the uptake of HNO_3 by pre-existing alkaline particles forming $NaNO_3$ in reaction with sea salt and $Ca(NO_3)_2$ with soil dust."

- Line 220: Add reference for Si estimation.
- I am not convinced with the factor 1, it is a mix of two sources. Apart from crustal elements, there is also a significant contribution of Pb, V, Mn and Zn which suggests this source is not properly resolved.
- The discussion about the seasonal contribution/variation of PMF factors should be enhanced. Currently, the given discussion is not sufficient to understand their origin. In addition, it would be great if author can also provide some insight on sources based on the previous receptor modeling results. Are the present results aligned with the previous observations?
- Is the contribution of Cu-rich dust and construction dust by Zhou et al., comparable? What is the similarity between these two sites? Are the air masses originates from construction active area?
- In the section 3.4, author mentioned that the aerosol samples were not corrected for sampling artifact of nitrate. Did author try to apply the correction and observed any change in the nitrate measurement?