EGUsphere, referee comment RC2
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Comment on egusphere-2022-848

Anonymous Referee #2

Referee comment on "Measurement report: Rapid changes of chemical characteristics and health risks for highly time resolved trace elements in $PM_{2.5}$ in a typical industrial city in response to stringent clean air actions" by Rui Li et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-848-RC2, 2022

This paper reports occurrence levels of elements in $PM_{2.5}$ in Tangshan China, analyzes the temporal variations and evolution of $PM_{2.5}$-associated elements, assesses the contributions of emission and meteorology to these species, apportions sources of elements during the whole period and evaluated influence of pollution control measures on the changes of carcinogenic and non-carcinogenic risks. This manuscript tries to represent the observation results and address relevant scientific questions. The scientific methods and assumptions are almost valid and outlined so that conclusions are reached. The description of experiments and calculations are shown. Observed phenomena as presented in the text and SIs have been described in detail. However, there are some hypotheses in the manuscript lacking of crucial evidential data to support. The link between the observed data and suggested implications is not strong. I do not recommend the publication of this article in its current form except some points.

- The authors should go beyond reporting the measurements, present informative interpretations of the data and provide worldwide implication rather than local attention.
- Please introduce clean air actions and pollution control measures in detail. Which control measures are used to improve air quality?
- Atmospheric trace metals include nutrient elements and hazard elements. The nutrient elements are beneficial for ecosystem safety.
- A comparative analysis was performed on the concentration of the trace metals in PM_5 observed in different cities. A scientific summary is necessary. Moreover, considering that the analytical methods and sampling duration were probably different for the available data set from the measurement and the literature review and uncertainty existed, the difference in the concentration of trace elements should be obtained based on statistical analysis.
- Uncertainty on results of the random forest (RF) model (deweather) should be further shown in detail. Detailed input should be introduced into the model in detail.
- Sufficient information was not provided by authors to validate the quality of the data. Being a field/experimental study, I am surprised by the lack of details on the data quality assessment and/or quality control methods, instrument calibration, how uncertainties are estimated. How to obtain meteorological parameters and PM_5?
- No legends in some figures were given. Figure s has too crowded X-axe. Please modify

them.

- Why As had relatively high contribution in factor 1? Why was no vehicular emission identified in the results of source apportionment? As well known, dust (fugitive dust, dust storm, soil dust and road dust) have high or moderate loading of Ca, Cu and Fe.
- The overall carcinogenic properties of mass PM itself should be taken into account. Emissions from gasoline and diesel engines and metal smelting and refining are considered Class 1A carcinogens by IARC; numerous populations studies have demonstrated increased (lung) cancer risk in communities with high urban PM exposures. Thus, the overall cancer risk from mass-based PM is likely to outweigh the risk of a limited set of elements. The authors seem to overinterpret their own risk assessment. If a realistic assessment of the actual health risks was involved, the results would be more meaningful.
- Since RfD and HQ typically have (considerable) uncertainty/safety factors included, a HQ> 1 does not indicate "occurrence of adverse n-c effects" as claimed.
- Open biomass burning has been banned in China after the execution of clean air act since 2013, in particular after 2018. How authors judged that biomass burning or open waste incineration in NCP contributed to the concentrations of trace elements in Tangshan?