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Comment on egusphere-2022-780

I. Pérez (Referee)

Referee comment on "Superimposed effects of typical local circulations driven by mountainous topography and aerosol–radiation interaction on heavy haze in the Beijing–Tianjin–Hebei central and southern plains in winter" by Yue Peng et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-780-RC1, 2023

The current paper is focused on the air pollution by $PM_{2.5}$ at the Beijing-Tianjin-Hebei region in China. The subject merits to be investigated due to the noticeable impact on the affected population. The period investigated is around January 2017, although only three days are selected. Measurements are considered together with modelling analysis. Observations are provided by the National Environmental Monitoring Center, 149 stations, and the Hebei Meteorological service, 210 stations. Moreover, two kind of modelling calculations are used, one of them with the aerosol-radiation interaction, and the second calculation without this interaction. The synoptic pattern is presented at varied pressure surfaces, and vertical cross-sections with the airflow and concentration are also shown. Although the subject and procedure are suitable for a publication, some restrictions of this research indicate that this paper could be accepted in a journal with low impact, but not in Atmospheric Chemistry and Physics.

The main inconvenience lies on the extremely low number of situations where the study is made, only three days, 6th, 17th, and 24th. Although the analysis is detailed, the readers should know if these days are representative enough for the pollution days at this site. Moreover, the readers should know if these conditions could be reproduced at different sites.

Since the pollution levels are affected by factors such as the emissions and the meteorological variables, some information about the patterns of both factors could be useful to focus the pollution problem at the site.

Figure 2 presents the concentration evolution. The authors should comment the reason to discard the first days of the month when the concentrations are even higher than those selected for the analysis.

Some statistics to contrast the measured and calculated concentrations should be introduced. If the correlation is made with the Pearson correlation coefficient, the authors should consider that a good value of this estimator could not indicate a good agreement between measured and calculated values. A better statistic for this calculation could be the index of agreement.

Minor remarks.

The names of mountain ranges and sea should be introduced in Fig. 1a (indicated in the text, l. 51), not in Fig. 1b.