

Responses to editor

We would like to thank the editor for the helpful comments on our manuscript. We have studied the comments carefully and revised our manuscript accordingly, which can be found in the attached file (Track Changes). Our point-by-point replies to the comments are provided below. Referee comments are given in black, and our replies are given in blue.

Comments to the author:

I would like to thank the authors for incorporating the suggestions made by both reviewers. The revised version looks pretty good and it is almost ready for publication; however, I have the following additional comments before I can accept the manuscript.

Minor/Technical Comments:

Line 25: I think it should be "declined"

Response: We revised it.

Line 28: (from 35.5% to 4.4%)

Response: We revised it.

Line 34: Add a reference after (2.5 um)

Response: We revised it.

Line 36: Add an space between "2015" and "(MEEC"

Response: We revised it.

Line 39: Add a reference after "heating"

Response: We revised it.

Line 44: Add a reference after "PM2.5"

Response: We revised it.

Line 57: Add a reference after "measures"

Response: We revised it.

Line 59: Add a reference after "reduction"

Response: We revised it.

Line 65: Add a reference after "winter"

Response: We revised it.

Line 75: Add a reference after "period"

Response: We revised it.

Lines 76-77: This was somehow already mentioned in lines 65-66

Response: We deleted it.

Line 79: during the LD period. It should be "." instead of ","

Response: We revised it.

Line 97:...part of THE Inner...

Response: We revised it.

Line 100:...with THE Daqing...

Response: We revised it.

Line 100:...and THE Manhan...

Response: We revised it.

Line 102: Add a reference after "summer"

Response: We revised it.

Line 103: Add a reference after "spring"

Response: We revised it.

Line 104: Add a reference after "year"

Response: We revised it.

Line 106: Please add at how many meters above the ground the samplers were placed and also briefly described the surroundings of the sampling site.

Response: We revised it.

Revised text: *The sampling site was located on the rooftop (approximately 50 m above the ground) of the main building of the Ecological and Environmental Department of the Inner Mongolia autonomous region (Figure 1) and represents a typical semi-arid urban environment. The sampling site is surrounded by residential areas without industrial sources nearby. There is one main road named Tengfei Road 50 m to the east.*

Line 118: ...stored at -18C. In sealed Petri dishes?

Response: Every filter was stored in a preservation box (the following picture) separately.



Revised text: *After weighing, every filter was stored in a preservation box separately at -18 °C until analysis.*

Line 119: Please add the used SO₂, NO₂, CO, and O₃ sensors

Response: We revised it.

Revised text: *The hourly concentrations of SO₂, NO₂, CO, and O₃ were measured using T100, T200U-NO_y, T300, and T400 sensors produced by Automated Precision Inc. (USA), respectively.*

Line 124: WSI was already defined in line 113

Response: We revised it.

Line 125 and 126: OC and EC were already defined in line 113. Used it here

Response: We revised it.

Line 138:...using equations 1-2

Response: We revised it.

Line 138: Add a reference after "1-2"

Response: We revised it..

Lines 140-141:...using equations 3-5...

Response: We revised it..

Line 154: Define "Q/Q_{expected}"

Response: It is an output parameter of PMF. It can not be defined. We revised the sentence and added some references.

Revised text: *According to the changes in an output parameter ($Q/Q_{expected}$) and estimation diagnostics analysis (Ulbrich et al., 2009; Tian et al., 2020; Liu et al., 2021), six factors solutions were selected.*

Line 158: Here "profiles of PM_{2.5}" is mentioned; however, in figures S1-S2 PMF is

mentioned instead of PM2.5. Please be consistent

Response: We revised it.

Line 162: I suggest moving here lines 200-205.

Response: We revised it.

Line 162: I am wondering what the authors mean with "dynamically"

Response: We deleted it.

Line 170: How about panel 2e?

Response: We revised it.

Line 185: Add a reference after "period"

Response: It is a conclusion of our result. The conclusion is based on the following reasons: "Firstly, chloride in heating period is significantly higher than that in non-heating period. Secondly, Hohhot is an inland city, basically unaffected by sea salt. Thirdly, a higher average Cl^-/Na^+ ratio (3.43 for January) suggests the presence of non-marine anthropogenic sources of chloride." We revised the sentence to make it more clear.

Line 191: Add a reference after "RH"

Response: We revised it.

Line 201: Add a reference after "2020"

Response: We revised it.

Line 212: Change "result" with "results"

Response: We revised it.

Line 212: Add a space between "2015" and "(Wang"

Response: We revised it.

Line 217: Change "indicates" with "suggests"

Response: We revised it.

Line 222: Replace "relative humidity" with "RH"

Response: We revised it.

Line 222: Replace "wind speed" with "WS"

Response: We revised it.

Line 224: Add a reference after "area"

Response: We revised it.

Line 240: "(25th December, 2019 to 24th 240 January, 2020)". This was already defined

Response: We deleted it.

Line 256: ...ranked as pre-LD:.....; LD:.....and; post-LD:.....NH₄⁺ (1.8%). Compared...

Response: We revised it.

Lines 276-278: Please confirm that the "Less than" and "Less than or equal to" symbols are correctly used/placed.

Response: We revised it.

Revised text: **Figure 5.** (a) Concentrations and (b) percentages of chemical components in $PM_{2.5}$, (c) meteorological conditions, *SOR*, *NOR*, and *OC/EC* at different pollution levels and during different types of pollution events. *CP*, *SP*, *MP*, and *HP* represent the clean ($PM_{2.5} < 35 \mu\text{g}/\text{m}^3$), slightly polluted ($35 \leq PM_{2.5} < 75 \mu\text{g}/\text{m}^3$), moderately polluted ($75 \leq PM_{2.5} < 150 \mu\text{g}/\text{m}^3$), and heavily polluted periods ($PM_{2.5} \geq 150 \mu\text{g}/\text{m}^3$), respectively.

Line 287: Add a ")" after "m³"

Response: We revised it.

Line 290: Add "%" after "2.4"

Response: We revised it.

Line 318: Replace "was" with "were"

Response: We revised it.

Line 338: Define "BB"

Response: We revised it.

Line 397: There are two dots. Please delete one of them.

Response: We revised it.

References

- Liu, Y., Li, C., Zhang, C., Liu, X., Qu, Y., An, J., Ma, D., Feng, M., and Tan, Q.: Chemical characteristics, source apportionment, and regional contribution of PM_{2.5} in Zhangjiakou, Northern China: A multiple sampling sites observation and modeling perspective, *Environ. Adv.*, 3, 100034, <https://doi.org/10.1016/j.envadv.2021.100034>, 2021.
- Tian, Y., Zhang, Y., Liang, Y., Niu, Z., Xue, Q., and Feng, Y.: PM_{2.5} source apportionment during severe haze episodes in a Chinese megacity based on a 5-month period by using hourly species measurements: Explore how to better conduct PMF during haze episodes, *Atmos. Environ.*, 224, 117364, <https://doi.org/10.1016/j.atmosenv.2020.117364>, 2020.
- Ulbrich, I. M., Canagaratna, M. R., Zhang, Q., Worsnop, D. R., and Jimenez, J. L.: Interpretation of organic components from Positive Matrix Factorization of aerosol mass spectrometric data, *Atmos. Chem. Phys.*, 9, 2891-2918, <https://doi.org/10.5194/acp-9-2891-2009>, 2009.