

## **Response to Editor and reviewers**

**Dear Professor Xavier Querol:**

**Thanks so much for providing us a chance to revise and resubmit our manuscript. We have fully revised the manuscript according to all the comments raised by the reviewer.**

**Please feel free to contact us if additional revisions are requested.**

**The very best**

**Ziyue**

**To Reviewer 1:**

**R: Thanks so much for your encouragement and providing us another chance to further improve this manuscript. We have advised this manuscript fully according to your constructive comments. We are more than willing to conduct further revisions if you have additional comments.**

**Thanks again for your time and help.**

I would like to reflect only a few minor comments and recommendations:

-Line 69: Replace "per 3hour" with "3 hourly."

**R: Thanks so much for this comment. It's a very good suggestion and we have corrected it accordingly in the revised manuscript.**

-Line 138: Make it clear what each percentage corresponds to; it's not clear. I understand that one is for 3 hours and the other for 24 hours?

**R: Thanks so much for this comment. Actually, as show in Table 4, the consistence between dominant meteorological factors for PM<sub>2.5</sub>, PM<sub>10</sub> and O<sub>3</sub> at two temporal scales varied significantly, ranging from 31.68% ~ 61.29%. So the two percentage actually corresponds to the minima and maxima of the 12 percentage (3 pollutants \*4 seasons).**

**In the revised manuscript, we have revised it to better explain what the two percentage mean.**

-The sentence: "If we simply consider the difference between qualitative output (just the dominant meteorological factor with the largest  $\rho$ ) revealed at 3h and 24h scale to reveal the temporal effects of pollutant-meteorology association, the analysis was not complete." This sentence is not clear. From what can be deduced, the idea being conveyed is that because this is not sufficient, it is necessary to analyze the  $\rho$ , right?

**R: Thanks so much for this comment. Yes, you are right. This sentence mean, only know which meteorological factor had the largest  $\rho$  was just a qualitative conclusion, which cannot comprehensively reveal the difference of pollutant-meteorology association at 3h and 24h scales. Therefore, we should further analyze the detailed  $\rho$  for all meteorological factors, to present a quantitative and comprehensive comparison.**

**In the revised manuscript, we have revised it accordingly.**

- "Relatively 'mild' reactions," I believe "mild" is not precise; perhaps it would be necessary to replace the term or make it clear what is meant.

**R: Thanks so much for this comment. Here we would like to use the "mild" to show a difference to "intense" reactions. As you mentioned, this may not be accurate enough. And thus we prefer to change it to "less-intense" in the revised manuscript.**

- "The dominant meteorological factor for Northern China was mainly wind, especially during the heavily polluted winter." It's not clear to me if this is the case when looking at the graphs. What should be understood by "Northern China"? NW/N-Center/NE?

**R: Thanks so much for your comment. Yes, as you pointed here, we did not clearly and correctly explained that “Northeast China”. We have revised this part according to your comment.**

**Again, thanks so much for pointing this out.**

-Line 228: Remove the "and."

**R: Thanks so much for pointing this out. This word has been deleted.**

-“The heavily polluted season for O<sub>3</sub> and PM was winter and summer, respectively.” I think the authors mean the opposite.

**R: Thanks so much for this comment. It’s a very good suggestion and we have corrected it accordingly in the revised manuscript.**

At the end of line 336, add the year of the study.

**R: Thanks so much for this comment. It’s a very good suggestion and we have corrected it accordingly in the revised manuscript.**

### List of all relevant changes made in the manuscript:

Line 3: ‘Miaoqing Xu<sup>1</sup>’ → ‘Miaoqing Xu<sup>1,2</sup>’. ‘Manchun Li<sup>2</sup>’ → ‘Manchun Li<sup>3</sup>’. ‘Bingbo Gao<sup>3</sup>’ → ‘Bingbo Gao<sup>4</sup>’

Line 5: ‘College of Global and Earth System Sciences’ → ‘Faculty of Geographical Science’.

Line 7: ‘<sup>2</sup>Hubei Provincial Academy of Eco-environmental Sciences (Hubei Eco-environmental Engineering Assessment Center), Wuhan 430079, China’ has been added to the revised manuscript.

Line 9: ‘<sup>2</sup>School’ → ‘<sup>3</sup>School’.

Line 10: ‘<sup>3</sup>College’ → ‘<sup>4</sup>College’.

Line 71: ‘Per-3h’ → ‘3 hourly’.

Line 139: ‘For all three airborne pollutants, the dominant meteorological factor at the 3h and 24h scale was the same in only around 31.68% ~ 61.29%,’ → ‘As shown in Table 4, the consistence between dominant meteorological factors for PM<sub>2.5</sub>, PM<sub>10</sub> and O<sub>3</sub> at two temporal scales varied significantly (ranging from 31.68% ~ 61.29%)’.

Line 157: ‘As one can see’ → ‘As can be seen’.

Line 170: ‘In this case, if we simply consider the difference between qualitative output (just the dominant meteorological factor with the largest  $\rho$ ) revealed at 3h and 24h scale to reveal the temporal effects of pollutant-meteorology association, the analysis was not complete. Therefore, we further presented the detailed comparison of the influence of individual meteorological factors on O<sub>3</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> at 3h and 24h respectively.’ → ‘In this case, if we simply consider the difference between the dominant meteorological factor (with the largest  $\rho$ ) at 3h and 24h scale, the analysis was qualitative and not sufficient, which cannot comprehensively reveal the difference of pollutant-meteorology association at different temporal scales. Therefore, we further analyzed the detailed  $\rho$  for all meteorological factors on O<sub>3</sub>, PM<sub>2.5</sub> and PM<sub>10</sub> at two temporal scales respectively, to present a quantitative and comprehensive comparison.’.

Line 228: ‘relatively mild’ → ‘less-intensive’.

Line 263: ‘Northern’ → ‘Northeast’.

Line 264: ‘and’ has been removed.

Line 297: ‘O<sub>3</sub> and PM was winter and summer respectively’ → ‘O<sub>3</sub> and PM was summer and winter respectively’.

Line 344: ‘in 2020’ has been added to the revised manuscript.

Line 350: ‘relatively mild’ → ‘less-intensive’.