Review of V2 of ‘A modeling study of impact of emission control strategies on 1 PM2.5 reductions in Zhongshan, China using WRF-CMAQ’ by Jianhua Mai et al.

Although the subject of the paper is of general interest and I support the publication of the paper, the paper cannot yet be published in its current form. There are still several weaknesses in the revised manuscript. Although these are sometimes just minor, addressing them will significantly improve the quality and the benefit of the paper. In particular, important information is still missing at several places, some sentences appear a bit out of context, and the language quality must be improved significantly. I recommend consulting a native speaker or a language support service.

Specific comments:

1) Not all previous reviewer comments are addressed properly in the revised paper.

For example, I could not locate the information related to point 2 of the review in the

revised paper.

Point 3: Lines 115 to 117 of the revised paper do not describe very how the emissions

for the 9 km grid were prepared exactly. If it was just by interpolation (which is what I assume when looking at Fig. 2) then please mention this.

Point 11: The question if answered properly in the reply to the comments. However,

lines 379 to 381 of the revised paper do not include this information.

Answer: The information for point 2 is located in lines 110 to 111. The information for point 3 is in lines 131 to 133. And the information for point 11 is addressed in lines 371 to 375.

2) Lines 89 – 90: As the results of the WRF simulation will depend to some extent to the applied physics options, please add this information in an appendix.

Answer: A new table (Table 1) is added to present such information. The information about the physics options is also given in lines 93 to 96.

3) Fig. 1: Is b) identical with the nested CMAQ domain? If not, it would be better to plot the three emission categories for the CMAQ domain – and please mention this in the figure caption.

Answer: I’m sorry I still can’t get the point of this comment.

4) Caption of Fig. 2: Please mention which domain is shown.

 Answer: The information is added to the caption of Fig.2 (lines 142 to 145).

5) Fig. 3: Axis labels for the Pressure Difference are different from the other figures.

It is really difficult to locate a certain date when looking at the curves in Fig. 3. Please consider adding some vertical lines to lead the eye. Or mark the days with cold front activities by shaded areas.

Answer: The axis labels for the Pressure Difference are changed to fit other figures in Fig. 3. Besides, the days with cold front activities are mark by shaded areas and a short illustration is added to the caption of Fig.3.

6) Line 196: ‘So data from those four sites are processed to match with the model output’. What does this mean exactly?

 Answers: This sentence is changed to “Owing to the sites being close to each other, the averaged PM2.5 simulations are compared with the averaged observations at these four sites.” (lines 212 to 213).

7) Lines 210 ff.: It is very hard to see the mentioned features in the figures (see also comments related to Fig. 3).

 Answer: As Fig.3, the days mentioned in Section3.2 are marked in Fig.4 with shaded areas in order that the reader can get the features in the figure easier.

8) Line 219: I cannot see that the model can capture the observed patterns very well. As visibility is not only related to the PM2.5 concentrations but also to humidity (a discussion about the visibility should also include some information how optical properties of the aerosol and visibility is calculated in CMAQ, the dependence between aerosol water and relative humidity etc.).

Answer: The visibility is the reciprocal of the optical extinction coefficient and the extinction coefficient is defined in CMAQ as follow:

$β=10+3×f\left(RH\right)×\left[1.375×SO\_{4}^{2-}+1.29×NO\_{3}^{-}\right]+4×4.14×OC+ 10×EC+1×Soil+0.6×CM$

, where β represents the optical extinction coefficient, f(RH) represents a function vary with the relative humidity, and SO2- 4, NO- 3, OC, EC, Soil and CM are the concentrations of sulfate, nitrate, organic carbon, elemental carbon, crust elements and coarse mass, respectively. From above we can know that the visibility is not only related to the aerosol concentrations but also to relative humidity. When humidity rises, f(RH) increases significantly. So a low visibility event may happen with high humidity and low aerosol concentrations.

 A new discussion is presented in the text between lines 234 and 253.

9) Fig. 4: See comments on Fig. 3.

 Answer: As Fig.3, the days mentioned in Section3.2 are marked in Fig.4 with shaded areas in order that the reader can get the features in the figure easier.

10) Table 2: Please add correlation (and also some remarks in the text).

 Answer: Correlation is added in Table 3 and also some remarks about correlation are added in the text (lines 265 to 281).

11) Fig. 5: The blue color is not very favorable for reading the names of the cities in the figures.

 Answer: Fig.5 is re-plotted for easier reading.

12) Lines 303 -304: The second sentence is somewhat out of context.

 Answer: This sentence (now in lines 333-334) is necessary because it explain why the model overestimates the cross-region transport.

13) Table 3: % of what?

 Answer: This part of content is removed from the paper.

14) Lines 317 – 326: The paragraph about the visibility (and the first sentence in particular) is somewhat interrupting the discussion about PM2.5. The paragraph just includes very general statements and is not necessary anyway. Please consider to remove it or to move a much more in-depth discussion at the end of section 4.2.

 Answer: This part of content is removed from the paper.

15) Line 337: Why does aging decrease PM2.5 concentrations?

 Answer: aging is removed from the text.

16) Line 356 – 367 and Table 4: It is not clear, what the authors mean by 1st day. 2nd day, 3rd day. Is it the day after the passage of a cold front? Was the reduction estimated by an extra simulation or estimated by an analysis of the monthly run? Was a single 3-day episode considered, or is this an average of several (how many) 3-day episodes? Please describe in more detail.

Answer: 1st day, 2nd day and 3rd day in Table 4 refer to the day after the emissions of Zhongshan are turned off. The reduction is estimated by an additional simulation during a single 3-day episode when there is no cold front appears. More details about the sensitivity simulations are given in lines 371 to 375 and Table 4.

17) Section 4.4 is quite short, better merge it with 4.3. Furthermore, 4.4 is mostly introduction and does not contain many results.

 Answer: Section 4.4 is merged with Section 4.3 and the subtitle of Section 4.3 is changed to “**Impact of local emission controls under no cold front condition**”.

18) Lines 381 – 383: According to Table 5 the contribution of residential emissions is almost as large as the industrial emissions. Could changes in domestic heating also help to mitigate high PM2.5 concentrations?

 Answer: Of course the control of domestic heating helps to mitigate high PM2.5 concentrations. But this only happens in northern part of China because there is no domestic heating in southern China.

19) Lines 413 – 414: This holds only for the conditions of the considered episode. Therefore, please add restrictions (not only here).

 Answer: Such restrictions are added in lines 31 to 35, lines 394 to 395, and lines 430 to 432.

20) Reference 29: Please cite the developers and not just an application.

Generally, there is an extreme preference for Chinese references in this paper.

Answer: Reference 29 is replaced for a new article. There are 36 references in this paper and 2 of them are in Chinese.

21) Various locations: ‘No cold front’: Does this mean ‘stagnant conditions’. Please clarify (if appropriate).

 Answer: We give a criterion of ‘no cold front’ using the pressure difference in lines 317 to 318. Of course in most time ‘no cold front’ means ‘stagnant condition’, but we used ‘no cold front’ in the text to compare with the ‘strong cold front’ case.

Language Issues: ‘play higher contributions’, ‘In specific’, ‘have showed’, ‘a month 16 haze episode days’, ‘high concentration of PM2.5 plume’, etc.: Please improve the language quality.

 Answer: We have tried our best to improve the language in the text.