Dear Editor,

We appreciate the prompt reviews and would like to thank the reviewers for insightful comments and suggestions on our manuscript entitled "Impact of a subtropical high and a typhoon on a severe ozone pollution episode in the Pearl River Delta, China" (MS No.: acp-2022-290). We have carefully considered all comments and suggestions. Listed below are our point-by-point responses to all comments and suggestions of this reviewer (Reviewer's points in black, our responses in blue).

Anonymous Referee #2

"Impact of a subtropical high and a typhoon on a severe ozone pollution episode in the Pearl River Delta, China" by Shanshan Ouyang et al. discussed in detail the influence of a subtropical high and a typhoon weather process on severe O_3 pollution in the Pearl River Delta. The manuscript provides valuable information on the formation mechanism of ozone pollution in coastal areas under such weather conditions. There are some minor suggestions before publication.

Response:

We appreciate the encouraging comments and suggestions.

General comments

1. In Section 3.2, why the correlation between T and RH simulation results is as high as 0.97 and 0.84, while the correlation between WD_{10} and WS_{10} simulation results is only 0.69 and 0.64, can you give some explanation?

Response:

We appreciate this important comment. Since T_2 and RH themselves have regular diurnal variations, the WRF model tends to simulate them well. While the simulation of wind fields is affected strongly by terrains which tend to have large uncertainty. For mesoscale models such as WRF, the simulation of the near-surface wind fields under stable weather background is still a challenge due to uncertainties in the topography datasets (Wang et al., 2015; Lim et al., 2018; Wu et al., 2022) and differences in boundary layer parameterization schemes (Tymvios et al., 2018; Madala et al., 2019; Srivastava et al., 2021). Future studies are planned to improve the simulation of near-surface wind fields by using more detailed terrain data and more suitable boundary layer parameterization schemes.

2. In Section 3.3, the meteorological factors that are favorable to the development of ozone-polluted weather during the typhoon period and the subtropical high pressure period are the same? so why? Can you compare the two periods separately?

Response:

Thank you for the thoughtful comment. In general, both the typhoon periphery and the subtropical high bring sunny and dry weather conducive to O_3 production, but the differences in the position of the subtropical high and the typhoon will cause different changes in meteorological factors. As can be seen from the comparison of the different periods in Figure 6a, the pollution periods have lower RH, higher PBLH and stronger downdraft compared to the clean period, which is more conducive to photochemical production of O_3. Although both are considered as pollution periods, the meteorological factors under the influence of Typhoon Mina are significantly different from those under the influence of the subtropical high. As shown in Figure 6b, when PRD was under the influence of Typhoon Mina, it had a higher T_2, a switch to weak northwesterly winds and stronger Omega compared to the subtropical high period, indicating that the former has more severe meteorological conditions for O_3 photochemical generation than the latter. More detailed comparison has been added in section 3.3 of the revised manuscript.

Specific comments

1. In the introduction, please pay attention to the tense.

Response:

Thank you for the careful reading and for pointing out our tense errors. We have reviewed the introduction and corrected some of the tense mistakes in the revised manuscript.

2. Line 72: Summary and conclusions are presented in Section 4

Response:

Thank you. We have corrected it in the revised manuscript.

3. Figure 11(b): Please modify the abscissa of Figure 11(b). For example, change 2500 to 25.

Response:

Thank you. We have modified the abscissa accordingly in Figure 11(b) in the revised manuscript.

References

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