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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sensitivity Analysis of the Surface Ozone and Fine Particulate Matter to Meteorological Parameters in China" *by* Zhihao Shi et al.

Anonymous Referee #2

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The authors here have studied the effect of perturbation of meteorology on PM2.5 and O3 concentration across China. Overall, the manuscript was well written, method is sound, results are valid. I would recommend it to be published after addressing the following issues.

1. The authors here conduct the sensitivity analysis by perturbing the value of one meteorological parameter and keeping value of others constant. In real world when a meteorological parameter changes, a corresponding change in other parameters also takes place. This will affect the entire results.

2. Even if we assume that the authors are trying to only depict the sensitivity of PM2.5

and O3 on perturbation of meteorological parameters, the above said knowledge won't be handy to the authorities when trying to implement emission control in such scenarios. Since perturbation of one meteorological parameter will result in corresponding change in other parameters and since the current simulation is only based on assumption that only one parameter will change at any given time, the results from current sensitivity analysis won't be of any use.

3. Solar radiation apart from temperature is also one of the main factors affecting O3 why haven't the authors studied sensitivity of O3 concentration to change in solar radiation.

4. The authors doesn't mention on what basis they change the meteorological parameters i.e. on what basis is the magnitude of change in parameters considered.

5. Line 179-182, the authors discuss regarding effect of Temperature on Ozone in Ozone forming regime. Any references to suggest that the said areas in China are in ozone forming or ozone consumption regimes?

6. In Figures S8-S13, the authors estimate the quantitative sensitivity of O3 and PM2.5 concentrations to change in individual meteorological parameters by linear fitting of the changes. The authors should also report the corresponding R-squared, slope and significance values, it would help to understand the rate of change of PM2.5 or O3 per change in meteorological parameters and if at all the rate of change is statistically significant.

7. Does the authors perturb meteorology parameters only for China in the domain? As per spatial variation figures, the domain also constitutes parts of south-east Asia?

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