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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Mitigation of $PM_{2.5}$ and Ozone Pollution in Delhi: A Sensitivity Study during the Pre-monsoon period" *by* Ying Chen et al.

Anonymous Referee #2

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This manuscript uses Gaussian process emulation to generate a efficient surrogate for WRF-Chem to perform the sensitivity analysis of PM2.5 and O3 to sources, and to provide air pollution mitigation suggestions. The combination of WRF-Chem with Gaussian process emulation is novel to reduce computational complexity for sensitivity analysis. The results, especially the joint control suggestions for PM2.5 and O3, are useful in terms of air pollution control. The manuscript is well written, but some parts of it are not clear enough. I would recommend for publication after the authors address the following specific comments:

Line 45: please add references for this statement: Menon, S., Hansen, J., Nazarenko,

L. and Luo, Y., 2002. Climate effects of black carbon aerosols in China and India. Science, 297(5590), pp.2250-2253. Gao, M., Sherman, P., Song, S., Yu, Y., Wu, Z. and McElroy, M.B., 2019. Seasonal prediction of Indian wintertime aerosol pollution using the ocean memory effect. Science advances, 5(7), p.eaav4157.

Line 81: Is it possible to provide a clear definition of pollutant response surface?

Line 130-132: This statement is a bit general. Better to use measurements of precipitation and clouds to show this point.

Fig. 6: Better to provide similar plots for other important species, such as organics, SO2, etc.

Sect 4: It would be better to compare the results with other similar studies and explain the similarities and differences.

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