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Comment

Interactive comment on “Feasibility and difficulties on China new air quality standard compliance: PRD case of PM_{2.5} and ozone from 2010 to 2025” by H. Liu et al.

Anonymous Referee #2

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This paper used the Pearl River Delta (PRD) region as a case study to investigate the feasibility and difficulties in meeting Chinese new national air quality standards from 2010~2025 by utilizing observed data to validate model performance, designing control scenarios to estimate emission reduction, and using chemical transport model to predict possible air quality improvement. The approaches and methods used in this paper were robust. This paper presented a methodological framework and an example for analyzing air quality compliance in China, and it is a good attempt to answer these compliance questions and possible challenges, which will provide valuable policy implications for decision-makers, especially under the circumstances of controlling

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air pollution already becoming Chinese national tasks. In particular, this paper pointed out one important challenge: possible ozone increase if PM_{2.5} pollution-based control policies are implemented based upon validated model analysis results, while the governments currently focus on PM_{2.5} pollution control. From this point of view, this manuscript is a very timely research paper and worth to be published. The manuscript is well presented and organized, therefore I recommend publishing it with following minor revisions.

General comments:

1. Based on annual simulated average results, the PM_{2.5} seems to meet the new Chinese national standard. However, O₃ could not meet the new 8-hr maximum concentration standards. With the increased ozone concentrations, it might lead to the increased oxidability of atmosphere, which will possibly enhance the formation of secondary aerosols. Did authors analyze the possible increases of secondary aerosols in current modeling due to increased atmospheric oxidability? In other words, even both PM_{2.5} and PM₁₀ concentrations can meet the annual average limits, it is possible that the PM_{2.5} daily concentration may still exceed the national limits. Authors may need to investigate the potentials and have more discussions on this issue.

2. Still on ozone problems. Based upon currently modeling, the ozone non-attainment rates may go up, however, the current ozone pollution is already serious in the PRD region, such PM_{2.5}-based emission control scenarios may enhance the ozone pollution problems. It is suggested that authors need to have more spaces in this manuscript to discuss the challenges in both aspects of science and policy, and the purpose is to warn decision-makers to realize these challenges, and evidence-based multi-pollutant and multi-control policies are necessary.

3. Model evaluation is an important part of using air quality models to assess the impact of control policy scenarios. It would be great that authors can provide more robust model evaluation results and present model uncertainties, if possible, by using

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tables or figures.

4. Recently, it is said that the Chinese national air quality monitoring agencies updated air quality data regulations, is the $41\mu\text{g m}^{-3}$ the updated annual average PM_{2.5} concentration in 2011, or before updated? If the annual concentration used in the current manuscript is before updated, what is the updated annual PM_{2.5} concentration in 2011? If there is an updated annual PM_{2.5} concentration, can the current control policy scenarios still comply with new national PM_{2.5} standards? Are there any other problems coming up?

Specific Comments:

-p.20924, l.13: "A CIP was developed for Guangzhou, which focused on PM_{2.5} and O₃" instead of "Guangzhou CIP was then evaluated with PM_{2.5} and O₃ placed in a core position."

-p. 20926, l.7: "In accordance with the NAAQS, cities where the annual average concentration of SO₂, NO₂ and PM₁₀ is higher than the standards number 18, 51 and 201 of the 333 cities respectively (Hao et al., 2012)." I am not sure about what this means here. Please clarify.

- Page 20926, line 24: "reduction measures" instead of "emission reduction"

- p.20927, l. 6: "concentrations of pollutants" instead of "pollutant concentrations"

- p.20927, l.6: "dust control measures " instead of "dust control "

- p.20928, section 2.1: O₃: please add here the information what the daily maximum 8-h average concentrations limits are (daily limits of X $\mu\text{g}/\text{m}^3$)

- p.20930, section 2.3: PM_{2.5}: please add also here the information of the daily and annual limit value of PM_{2.5} (X $\mu\text{g}/\text{m}^3$)

- p.20932, l.1: "EPB": For the reference, the whole name and not only the abbreviation should be used

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- p.20935, l.18: "previous investigations" instead of "previous researches"
- p.20935, l. 20: better "were applied" than "were used"
- p. 20946, Figure I:, the Pearl River Delta region,

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