Atmospheric
Chemistry
and Physics

Discussions

EGU

Open Access

# *Interactive comment on* "Development and application of observable response indicators for design of an effective ozone and fine particle pollution control strategy in China" *by* J. Xing et al.

**J. Xing et al.**

xingjia@tsinghua.edu.cn

Received and published: 29 September 2019

[Comment]: Identifying strategies that reduce the concentrations of secondary or mixed air pollutants most effectively is always a challenging work. This study partially answers this question by providing a new technique with combination of observation and RSM modeling indicators. Overall the paper is well written, I have minor comments for the authors to improve the paper and meet ACP requirements.

[Response]: We thank the reviewer for recognition of the implications of the results

C1

of the analysis presented, and overall positive comments. We have followed all the comments and revised manuscript accordingly.

[Comment]: The indicators are based on the chemical mechanisms and emissions in current models. Thus, the indicators may change for a different location or with improved mechanisms. I suggest authors add the limitations of this study in inclusion parts.

[Response]: We agree with the reviewer that the indicators developed in this study were mainly based on the chemical mechanisms and emissions used in current study. They might change along with the improvement of scientific knowledge of chemical mechanisms. As the reviewer suggested, we point out such limitations in the revised manuscript, as follows.

(Page 22, Line 491-495) "We note that the discrepency between the observable indicator and the responsive indicator might also be influenced by uncertainties in the chemical mechanism of CMAQ as well as prediction errors of the pf-RSM. The new indicators were designed based on the existing chemical mechanism, and the transition values might be refined in the future as our understanding of atmospheric chemical processes improves."

[Comment]: Only the title uses "particle" to represent particulate matter.

[Response]: We thank the reviewer for noticing this issue. To address such problem and to be consistent through the text, we have modified the "fine particular matter" into "fine particle" when defining the PM2.5 in the abstract and the introduction section, as follows.

(Page 1, Line 19-21) "Therefore, this study developed new observable RSM-based indicators and applied them to ambient fine particle (PM2.5) and ozone (O3) pollution control in China."

(Page 3, Line 46-47) "In particular, ambient fine particles (PM2.5) and ozone (O3) are

C2

among the top risk factors for global mortality. . ."

[Comment]: Clarifying some places and correcting grammar errors would help readers understand the paper better.

[Response]: Followed the reviewer's suggestion, we corrected the grammar errors and did additional clarification in the revised manuscript.

[Comment]: Lines 57-58, this sentence is not correct, for example, O3 and NOx are correlated, but it is not due to the similarities in their atmospheric processes.

[Response]: We agree with the reviewer that the original statement is a bit misleading. We have clarified it in the revised manuscript as follows.

(Page 3, Line 57-59) "Chemical species in the atmosphere are often highly correlated with one another, since their concentrations are affected by common atmospheric physical processes (e.g., mixing and transport) and chemical reactions."

[Comment]: Line 58, not proper to call PM2.5 as secondary pollutants.

[Response]: We agree with the reviewer that the PM2.5 can also come from primary emissions. To make the statement more accurate, we have deleted the secondary in the revised manuscript as follows.

(Page 3, Line 59-61) "Concentrations of pollutants such as O3 and PM2.5 are typically determined based on the ambient levels of their gaseous precursors, implying that O3 and PM2.5 chemistry can be identified through a combination of concentrations of some of their related chemical species (i.e., indicators)."

[Comment]: Lines 106-108, this sentence does not belong here.

[Response]: We agree with the reviewer that the original location of this sentence is inappropriate. We have moved it to the beginning of that paragraph in the revised manuscript, as follows.

(Page 5, Line 104-105) "The design of an effective O3 and PM2.5 control strategy requires efficient quantification of air pollutant sensitivity to precursor emissions."

Please also note the supplement to this comment:
https://www.atmos-chem-phys-discuss.net/acp-2019-183/acp-2019-183-AC1-supplement.pdf

───────────────────────