

## ***Interactive comment on “Dominant role of emission reduction in PM<sub>2.5</sub> air quality improvement in Beijing during 2013–2017: a model-based decomposition analysis” by Jing Cheng et al.***

**Anonymous Referee #2**

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This paper systematically quantifies the relative importance of local control measures, surrounding emission reductions and meteorological changes in PM<sub>2.5</sub> air quality improvement in Beijing during 2013–2017. A number of sensitivity simulations are performed, which are huge load of work. The paper is generally well written and the conclusions have strong policy implications. I would suggest publishing it after addressing the following issues.

1 The authors provide comprehensive validation of meteorological variables and concentrations of criteria pollutants. It would be nice to include also validation of PM<sub>2.5</sub>

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compositions and draw conclusions on which species are more important for the declines in PM<sub>2.5</sub>.

2 The description of scenario design and decomposition analysis is very confusing. In equations (2) and (3),  $i=1..9$ , but in Table 2,  $i=1..7$ . I understand the other two cases are impact of meteorology and emission reduction of surroundings, but it would be better to improve the descriptions here. Additionally, the response of PM<sub>2.5</sub> is not linear to emission changes in the inventory, so it might be questionable to sum them up directly in equations (2) and (3).

Minor comments: Page 7 line 11: SIME17S13M17 and SIME17S13M17 typo?

Page 7 line 12: change “In both of these cases” to “in both cases”

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