

Interactive comment on “Source contributions and potential reductions to health effects of particulate matter in India” by Hao Guo et al.

Anonymous Referee #2

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This article studied the health effects of exposure to fine particulate matter in India using the source oriented CMAQ model. It quantified the premature mortality due to exposure to fine particulate matter in India based on CMAQ simulation of air quality for India in 2015. It also compared the mortality estimate with other existing studies. A new aspect of the study is that the source oriented CMAQ model allows it to quantify contributions to premature mortality from different source sectors. The residential sector was found to be the largest contributor. This can provide compelling argument for prioritizing emission control from that emission sector. In addition, it also estimated the health benefits if PM_{2.5} concentrations in India are reduced to levels corresponding to different air quality standards. Certainly, this highlighted the enormous health benefit from reduced PM_{2.5} concentrations. I found the findings of the article to be significant

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and relevant for publication. I have the following comments for the authors to address.

- 1.) Lines 105-106, the article can provide more information about the model performance, particularly with regard to PM_{2.5} predictions in India. It will also strength the paper if it can provide any comments on source apportionment results (e.g., comparison to other published study or observations if possible)
- 2.) Since SOA is found to be significant contributor to PM_{2.5} and mortality, any comments on the sources of the SOA (e.g., biogenic or anthropogenic)?
- 3.) Table S3 should be moved to the main body of the paper. In addition, this table can provide more information about the difference in these studies (e.g, models used, emissions, resolution, mortality estimate method, etc.)
- 4.) Lines 103-104, is “open burning” referred later in the article corresponding to wild-fires?
- 5.) Lines 113-120, what are the distribution assumptions used for Monte Carlo simulations?
- 6.) Line 137, a “.” is missing after Table S2. “ai is the remaining years...” should be moved to line 137.
- 7.) A map showing the locations that are referred in the paper could be provided in supplemental material. This will help readers who are not familiar with geography of India.
- 8.) Table 1 could be revised. The states can be grouped to east India, north India, south, northeast, west, and central as discussed in lines 144-154.
- 9.) Lines 194-200, the description about source contributions is not clear and needs to be revised. It seems that the maximum contribution among grid cells is used to describe the significance of source contributions. Would average values or population weighted average values in India be more appropriate? Similarly, in the conclusion

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and abstract part, this (e.g., 40 ug/m³ from residential sector) needs to be clear about whether it is maximum or average.

10.) Line 202, missing “are” after “power plants”.

11.) Line 257, “for” changes to “of”

12.) Line 260, add “respectively” after “0.39 year”.

13.) Line 273, similar to comment 9, the source contribution of ~ 40 ug/m³ is just the maximum contribution among different grid cells, correct?

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