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Interactive comment on "HTAP2 multi-model estimates of premature human mortality due to intercontinental transport of air pollution" by Ciao-Kai Liang et al.

Anonymous Referee #2

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This manuscript uses the multi-model results from HTAP2 project to estimate mortality for the baseline year 2010, and health benefits from reduced emissions in source regions. In general, it is well organized and written, and the multi-model results can provide more reasonable range than single model results in previous studies. However, some details are not well documented and explanations are too general, but important for readers.

Specific Comments:

1. Page 3, line 100: It is better to provide some brief explanation of reasons for large differneces in estimates (4.2 and 2.1 million premature deaths)

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2. Page 5, line 159: Please specify if the perturbation is increasing or decreasing.

3. Page 6, line 190-203: how do these models perform in simulating ozone and PM2.5

4. Page 7, line 246-257: what beta value is used in this study? any source for the used RR=1.040? Please clarify.

5. Page 8, line 264-271: The used RR framework here is not acturally the latest. Please refer to Cohen et al. (2017).

6. Page 8, line 276-277: Please clarify how you treat age distribution in the 2011 populaiton dataset.

7. Page 8, is sex difference considered in the estimation?

8. Page 8, line 282: Monte Carlo simulation is powerful to address uncertainty issues. However, the way of including model air pollutant concentrations is a bit misleading. The procedure in this study is actually the range of multi-model results. However, it is possible that this range deviate from the observations. Without showing model evaluation, we don't have confidence how reliable is the range from multi-models.

9 Page 9, line 306: The texts refer to supplemental plots many times. I would suggest move some important figures from supplemental materials.

10 Page 10, line 368-369: Please provide more details here: the updated baseline mortality rate in 2017, and how population is different. This comparison is too general here. In my understanding, the biggest change from GBD framework from old to latest (Cohen et al., 2017) is not just baseline mortality. In Cohen et al. (2017), the RR for stoke is totally different from previous version GBD, and LRI disease is added in addition to IHD, LC, COPD and stroke.

11 Page 11 line 382-383: Please clarify how the avoid deaths is calculated. the IER model is not linear: at the high end large changes in polluant will not reuslt in large changes in death, some studies used average changes, some used marginal. How is

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this addressed here?

12 Page 11 line 406-408: The explanation here is not convincing.

13 It would be great to make a table to inter-compare the response of sector reductions, which is highly uncertain from different models, and please discuss it too.