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# Comment on acp-2021-385

Anonymous Referee #1

Referee comment on "Impacts of emission changes in China from 2010 to 2017 on domestic and intercontinental air quality and health effect" by Yuqiang Zhang et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-385-RC1, 2021

The manuscript by Zhang and colleagues models the change in ozone and PM2.5 and related health impacts in China and downwind countries due to emission changes in China after the implementation of APPCAP. Overall, most of the results presented in this paper on decrease in PM2.5 in China post APPCAP is not new and has been established in multiple studies involving models/measurements. The new aspect is assessing its impact in details on PM2.5 and ozone exposure and related mortality burden in downwind regions, though the TF-HTAP initiative partly addresses this.

I list a few major issues which the authors may want to address-

- It might be interesting to check if there are any seasonal differences in change in PM2.5 and ozone in China and also in downwind regions after the implementation of APPCAP.
- China has a distinct east to west gradient in air pollution exposure. Rather than speculating this east to west gradient in changes in PM2.5 after the APPCAP, the authors may consider representing this information (on changes in population weighted PM2.5, ozone and averted premature death) by provinces in China, which might be more policy relevant. The authors may also plan to inspect changes in emissions in which provinces led to maximum benefit in terms of averted death in a downwind country, if feasible. They might also plan to estimate the averted mortality/exposure in a downwind country by province. Eg- In USA the maximum benefit is expected to be realized in the western states of CA, OR and WA.
- The authors may want to build few relevant emission scenarios and estimate their impact on PM2.5/O3 exposure in China and in downwind countries (eg. APPCAP is twice as effective in curbing emissions). This might inform the decision makers about the benefits of further curbing emissions in China.

Minor comments

- Line 190- please reconstruct the sentence
- Line 198- please add the changes due to emission changes in the corresponding years