Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC3
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Comment on acp-2021-554

Anonymous Referee #3

Referee comment on "Surface ozone impacts on major crop production in China from 2010 to 2017" by Dianyi Li et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-554-RC3, 2021

Li et al ("Surface ozone impacts on major crop production in China from 2010 to 2017") quantifies the crop production and economic loss from surface ozone (O3) in China over several years. Overall, the method used is sound and has been used by many studies previously. However, significant improvements must be made to the description of results, discussion and implications for this to be a meaningful scientific paper worth of publication in ACP.

Sections 3.2-3.4 should be simplified and reorganized (together or separately) to better highlight the main results, rather than list many values that can be found in tables and figures. Increase comparing/contrasting of different crops and regions and tie these to an improved discussion section.

The current discussion section is largely a restating of the intro, methods and results. Instead, expand the final paragraph to speak more about the implications of the work. Include discussion of the seasonal cycle of O3 that is carried through to the cropping season differences. Add more about the chemistry and policies throughout China that causes the results. For example, why O3 increases when PM regulations were successful. This section should also include discussion of the uncertainties in the model O3 concentration, AOT40 metric and economic valuation.

More specific comments/suggestions are listed below:

Line 74: Add at least the direction of adjustment. Increased due to vertical gradient near surface?

Line 77: Why compare model AOT40 and not model concentrations? AOT40 has also not yet been introduced.

Line 80: A figure showing the observed-model concentration comparison would be helpful, especially the expected seasonal cycle, despite the bias. Do the patterns match?

Line 85: Should “matrixes” be “metrics”?

Line 87: Why not use other metrics such as M12/M7 or others instead of or in addition to AOT40?

Line 125: Can purchase price be assumed to be the same as economic value? How does the value from the initial sale propagate fully into the economy?

Line 126: Is this the global price from FAOSTAT?

Lines 134-135: This section uses the annual values to show the general trends and distribution, not because of the varying growing seasons.

Line 185: “later” than?

Line 192: This is actually due to the seasonal cycling / varying O3 between the growing seasons, not the difference in calculation of the growing season itself

Figure 5: What is the a) and b) each referring to? Missing from the caption.

Figures 5-6: There are too many bars, with the variation between crops in many provinces roughly the same. Consider simplifying to highlight main points.