Atmospheric Chemistry and Physics Discussions

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Comment on acp-2021-554

Anonymous Referee #1

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-RC1, 2021

General Comments:

This study evaluated the temporal and spatial distributions of yield and economic losses due to long-term ozone exposure for major crops in China between 2010 and 2017. The results of this study are interesting, however, the novelty is not clearly stated, and the writing is very poor which requires almost a total revision. Please carefully address the comments below.

Major comments:

- About the Introduction

There are only two paragraphs in the introduction, with the first paragraph does not mention the impact of ozone on crops at all. Moreover, the scientific questions did not raise clearly in the second paragraph. Overall, I feel the introduction is not well structed, and the science question targeted in this study needs to be clearly stated.

- About the section 2.2

Line 85-90: The authors mentioned that there are many different crop-ozone matrixes available, and they adopted AOT40 in their study. The authors should at least lay out a few crop-ozone matrixes, and talk about the possible advantage and disadvantage among

different matrixes. At the end, give a reason why AOT40 is selected.

Line 94-95: The authors should specifically define or point out the crops corresponding to what growing season, as multiple growing seasons were mentioned in the manuscript.

Line 96-97: Are there any differences in the definition of the growing season between NWCACP and FAO? The authors only mentioned NWCACP and FAO with no details.

- About the section 3.3

There are redundant descriptions. For instance, the authors made some comparison to some literature, i.e., Lines 180, 181, 199, 205 and 206. However, they repeat similar discussions later (i.e., Line 270-273). In addition, the comparison does not specifically mention what year or period, making the comparison invalid.

Line 191-193

The authors highlight the differences in the calculations of the growing season lead to different years for the lowest values. In my opinion, this is nothing new worth highlighting.

Line 212-213:

It seems to be contradictory that the authors stated the lowest CPL in northeast China, and then emphasize Heilongjiang is the highest. Later on, I realize the statement of highest yield in Heilongjiang is probably in another year. The authors need to carefully check out the entire manuscript to make the statement clear and readable.

- The Discussions section needs a total revision.

There are many sentences duplicated in several places. For instance, Line 81-82, “In general, the model simulated AOT40 values were lower than the observation data, with normalized mean bias ranging from -5% in 2015 to -28% in 2017”. Line 244-246, and 278-279

Lines 238-246: very wordy, should be trimmed substantially and make clear what major message the authors want to convey.

The second paragraph of Discussions only lay out many results without any depth.

The authors mentioned many times of the year 2014 (i.e., Lines 185, 192, and 219), but what special with the year has never been mentioned.

The authors mentioned spatial heterogeneity across regions and provinces, but with no details.

The last few sentences talked about the ozone pollution control over different regions. However, the major role of ozone on CPL over these regions have not been well discussed at all.

Minor comments:

- Line 59-60: This message of the sentence is not clearly stated. The sentence writes that previous studies have focused on crop production loss from ozone at the global scale. Have any of the studies focused on China?
- Line 85: Matrixes: should be metrics?
- Line 129: The price for each crop during 2010-2017 is given based on the min/max, however, the readers do not know the specific price corresponding to each year. A table might be useful to lay out the prices.
- Line 162: RYLs for specific crops should be clearly written.
- Line 178: The citation of the Statistical Yearbook of China should be added.
- Line 183: "CPL" should be replaced by "wheat CPL"
- Line 223: studies changed to study.
- Table S13: The production loss of China in 2017 was miscalculated and "374" should be replaced by "74". Please carefully check all the calculations in the tables.
- Line 235: References should be added.
- Line 237: The authors said the previous studies only focused on small regions. However, in the introduction, the authors mentioned there are studies with a focus of the globe. This seems to be contradictory.
- Line 255: It should be written clearly whether the CPL and EL for a particular crop or the total CPL and EL for all four crops.