

## Responses to Reviewers.

### Response to Reviewer #1:

#### Minor Comments:

L16: ozone concentration by 1-2% (or 0.3-1.5 ppbv) in the column

This statement is confusing and incorrect. Column depths should be given in molecules cm<sup>-2</sup>, concentrations in molecules cm<sup>-3</sup>, and mixing ratios in ppv or ppm. You can refer to mean mixing ratios in the column and use ppbv; however, the range 1-2% is not consistent with 0.3-1.5 ppbv.

**Response:** We thank the reviewer for the comment. The numbers (1-2% and 0.3-1.5 ppbv) correspond to Figure 6, which shows “the average increase of ozone mixing ratio *in August 2019* at each model layer *within the troposphere*” rather than “in the column”. We agree that using the phrase “in the column” would cause confusion. The difference in ppbv would be much larger if the stratosphere is also included. The sentence has been rewritten to avoid being misunderstood.

L21-22: Are you saying that the production rate in “your” model needs to be refined or that your study indicates that the production rate commonly used by modelers needs to be refined. I believe you mean the former, but it is not clear. Also, rather than using “refined” be specific and use “increased” or “decreased”.

**Response:** We thank the reviewer for the comment. We meant “the LNO production used in our current study needs to be refined”, and the value is very likely underestimated. The sentence has been revised for clarity.

L421: The range 1-2% is not consistent with 0.3-1.5 ppbv.

**Response:** We thank the reviewer for the comment. As we explained under the first minor comment: the numbers correspond to Figure 6, which shows “the average increase of ozone mixing ratio *in August 2019* at each model layer *within the troposphere*” rather than “in the column”. The difference in ppbv would be much larger if the stratosphere is also included. The sentence has been revised to make it clearer.

#### Grammatical Comments:

L14: produces --> produced

**Response:** This was corrected.

L19: However, many of the numbers are --> These values are

**Response:** This was corrected.

L20: increases the contribution --> increases the relative contribution

**Response:** This was corrected.

L156: found relatively lower --> found to be relatively lower

**Response:** This was corrected.

L246: could be underestimated in this study --> could be underestimated in this study or overestimated in their study

**Response:** This was corrected.

L290: prediction skill --> predictive skill

**Response:** This was corrected.

L336:, which is similar to the ground-level performance as discussed in Section 4.2. --> To improve clarity, I suggest deleting this portion of the sentence

**Response:** This was corrected.

L383: can also be limited --> is also limited

**Response:** This was corrected.

L407: The elevation of air mass --> The elevation of the air mass

**Response:** This was corrected.

L422: not evenly --> unevenly

**Response:** This was corrected.

L441: needs to be increased --> could be increased

**Response:** This was corrected.

L441/442: A more reasonable LNO production rate --> A more accurate LNO<sub>x</sub> production rate

**Response:** This was corrected.

L446: particulate matters --> particulate matter

**Response:** This was corrected.