

Dear editor,

Here are our responses to the reviewer (Tom Butler)'s minor comments:

1. We have adopted Tom's suggestion. We have changed the "annual concentrations for the warm and cold seasons" to "seasonal concentrations for the warm and cold seasons" through the text and graphs. To be precise, we also added one sentence in the text to mention that the seasonal concentration was calculated for the warm/cold season for each year:

*To be precise, the seasonal mean concentrations in this study refer to the mean concentrations calculated for the warm (May – October) and cold (November – April) seasons for each year.*

2. The increase of NOx emissions in the US in 2002 due to a methodology change has been explicitly mentioned in the text, and the reference was provided:

*Note that there was a change in NOx measurement methodology from 20001 to 2002, and it caused a sharp increase in the reported NOx emissions in the US from 2001 to 2002 (EPA, 2019).*

3. All typos have been corrected.
4. Figure S1 & S2: We took Tom's suggestion, and added a species name to each graph to make the graph readable without enlargement. The order of species in the captions has been rearranged to be consistent with the order of the graphs.

Once again, we sincerely thank Tom and another reviewer for their very detailed and valuable comments and suggestions.

Best regards,

Jian