

## ***Interactive comment on “Summer ozone variation in North China based on satellite and site observations” by Lihua Zhou et al.***

**Anonymous Referee #2**

Received and published: 27 July 2018

This paper investigated summer ozone variation in North China based on satellite and site observations. The conclusion is the production rate of ozone is most sensitive to temperature change, instead of emissions changes. I have concerns about the conclusion of the paper and would like to recommend substantial improvements of the analysis.

General comments:

1. I recommend the authors to polish the manuscript with the help with native speakers. For instance, in the abstract, the 1st sentence is very lengthy; the term of “organic gas content” is not widely used. I guess the authors may want to use NMVOC instead. In introduction, the 2nd sentence is very hard to understand. It is very easy to be lost when reading the manuscript.

C1

2. Introduction. The introduction needs substantial improvements. It is difficult to follow the story line of the introduction. What are the existed findings? What new findings will be expected in this study? How would you like to organize your manuscript?

3. Page 2, line 26. The motivation of selecting summer as the study period is not convincing. I expect seasonal variations in O<sub>3</sub> and its precursors. The dominated driver for O<sub>3</sub> variations could change over seasons.

4. Section 3.2.4. “We conclude that although the concentration of nitrogen oxides decreased over this period, the concentration of O<sub>3</sub> did not decrease because VOCs have continued to increase (Duncan et al., 2010).” It loos risky for me to make the conclusion merely based on the upward trend of HCHO and downward trend of NO<sub>x</sub>. The authors followed to state that “Clearly, temperature and solar radiation are also important factors (Tang et al., 2006).”, without any further details. I’m not sure about what is “clearly” here.

5. The total columns of O<sub>3</sub> are used as indicators of surface O<sub>3</sub>, which looks improper for me.

6. Overall, I feel an in-depth analysis is missing. The manuscript only listed the trends of a few pollutants, which has been documented by existing literatures. The author may want to perform sensitivity analysis using CTMs to validate whether the conclusion is solid.

Specific comments:

1. Page 1, line 28, I don't get the meaning of the sentence.

2. Page 2, line 3, what do you mean by “macro changes”?

3. Page 2, line 13. The grammar seems not proper for “launched 15 July 2004”.

4. Page 2, line 16. It looks not right for me to say “The resolution of these data is 360° × 180°”.

C2

5. Page 2, line 17. The data source for daily SO<sub>2</sub>, NO<sub>2</sub> and 8-h O<sub>3</sub> data is missing.

6. Page 3, line 23. The statement of “Therefore, over long periods, the amount of NO<sub>2</sub> and the total amount of nitrogen oxides are basically the same. ” is not correct.

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-537>, 2018.