

Interactive comment on “Characteristics of Ground Ozone Concentration over Beijing from 2004 to 2015: Trends, Transport, and Effects of Reductions” by Nianliang Nianliang et al.

Anonymous Referee #1

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This manuscript presents discussions of surface ozone (O₃) characteristics based on the hourly monitoring data during 2004-2015 in Beijing, including the difference of O₃ production between local and rural area in Beijing, evaluation of the O₃ before, during, and after Sep 3 military parade in 2015, and the O₃ impact of emissions reductions during the APEC period. The long-term observed data used in the manuscript provides a detailed description of the O₃ variation in Beijing in recent 10 years. However, the manuscript lacks novelty, scientific analyses and discussions. Several similar papers focusing on the O₃ observation in Beijing have been published (e.g., Tang et al., 2009; Wang et al., 2012; Zhang et al., 2014; Ma et al., 2016), so what is new in the manuscript? The reviewer would like to recommend a major revision before publication.

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Major comments:

1. P6, Line 135-147, O₃1h increased with an annual concentration growth rate (AAGR) of 1.79 ppbv.yr⁻¹ and a higher growth rate of 2.84 ppbv.yr⁻¹ during May to September from 2004 to 2015 at the urban area, but at DL background station, O₃1h showed an increasing trend with an AAGR of 2.05 ppbv.yr⁻¹ and the growth rate during May-September was 0.14 ppbv.yr⁻¹, which is much smaller than the AAGR. More detailed analysis is needed to make comparison of O₃ concentrations between the urban and rural area. The authors just present a description of the distribution of O₃1h and O₃8h concentrations during different periods at twelve sites in the urban Beijing and DL background site. In addition, the authors should provide the reason for choosing the O₃ concentration from May to September.

Furthermore, Line 199-233, the authors provide the analysis of O₃ precursors to illustrate the high concentration in Beijing local area, but fail to present comprehensive explanations to compare the characteristics of O₃ production between local Beijing and DL site.

2. P11, Line 260-261, “In addition, the difference of ozone peaks between DL station and urban sites was significantly decreased from 18.20 ppbv to 2.72 ppbv during 2004–2010 and 2011–2015. ” Why is the years divided into 2004-2010 and 2011-2015? The time division in the manuscript is confusing, for example, Line 161-164, the authors divided the year of 2004-2015 into three parts: 2004-2007, 2008-2012, and 2013-2015. More detailed explanations for the time division are needed in the paper.

3. The section 3.3 only confirms the emission reduction implemented by the government. Although the authors have compared the effect of emissions reductions between Sep 3 military parade period and APEC meeting, sufficient scientific analyses of the difference between them are not presented, such as the characteristics of O₃ production, meteorology etc. The result “So different emission reduction ratio between NO_x and VOCs and different weather conditions led to different VOC/NO_x ratios during Sep

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3 military parade period and APEC meeting.” in Line 377 is too general.

4. In the abstract and conclusion, the authors emphasize that the difference of annual O₃ concentration at urban and rural area was attributed to different sensitivity regimes, but the manuscript does not provide sufficient analyses to prove the statement.

Minor comments

5. Line 185, revise “ increased ” to “ increase ”.

6. Line 200, “ Table 2 ” should be “ Table 1 ”.

7. Line 263, “ stationwas ” should be revised as “ station was ”.

8. Line 299, “ 8.05.0% ” should be changed to “ 8.05% ”.

9. Line 337, “ a ” should be deleted.

10. Pay more attention to the format of the reference.

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