

Interactive comment on “Impacts of meteorology and emissions on surface ozone increases over Central Eastern China between 2003 and 2015” by Lei Sun et al.

Anonymous Referee #3

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This paper analyzes the individual impacts of meteorological condition and emission on summertime ozone concentration in Central Eastern China based on GEOS-Chem model. This is generally a solid study with reasonable analyzing and discussion of the model results, and the manuscript is well organized. Therefore I would recommend the manuscript being accepted for publish if the following issues could be properly addressed

Major comments: There exists significant inter-annual variability of meteorological conditions in CEC, did the authors chose these two year (2003, 2015) to conduct the simulation due to their representativeness? Additionally, it is known that China's NO_x

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emission topped around the year 2011. So the impact of anthropogenic emission in 2011 might reach its maximum rather than in 2015. In addition, since the present work only studied one specific month (July), I personally do not think that the results can extrapolate for the whole year. Therefore, the season with concern ought to be specified in the title.

Process analysis is a diagnostic tool to quantitatively provide the relative contributions from different chemical/physical processes, which is suggested to be discussed with Section 3-4 to further support the conclusion, rather than as an isolated section. For instance, ozone concentration changes due to transport and dry deposition processes may be more closely related to the circulation as well as meteorological conditions, while those due to photochemistry can be interpolated by emission change.

Another suggestion is the inclusion of more in-depth analysis on precursors' response. Specifically, information on how the changes in emission and meteorology influence spatial pattern of NO_x and VOC can help better interpolate the model results.

Minor corrections: Section 3.1: Technically, model evaluation should include performance on reproducing meteorology, relevant precursors as well as ozone.

Table 3: What is the region for the emissions, China or global emission? It should be explained in the caption and also in the main text. Since this work mainly focused on ozone in China, I believe the comparisons of emission in China would make more sense.

Table 4: What the values in the parenthesis stand for? Another, it is better to sum up the horizontal and vertical advection into one single term to represent the contribution of transport.

Figure 5: What does the white color in Figure 5 mean?

Page 14 Line 25: What is difference between transboundary and long-distance transport here, and how the authors draw this conclusion based on this work?

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Page 2 Line 8: which controls

Page 14 Line 2: “Asia” should be “Asian”

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