Interactive comment on "Impacts of emission reduction and meteorological conditions on air quality improvement during the 2014 Youth Olympic Games in Nanjing, China" by Qian Huang et al.

General Comments

This paper tried to evaluate the impacts of emission reduction and meteorological conditions on the air quality improvement during an air pollution control period-YOG of Nanjing. Accurate quantification of the influence of emission reduction and meteorological conditions is important to evaluate the air pollution control measures. This paper used both observation data and modeling results to address this issue. However, this manuscript has major writing and structure problem. 1 The validation of model simulation and uncertainty analysis is essential and required but lack in the manuscript. 2 The paper lacks in-depth discussions of the observation data and model results. Some conclusions are too arbitrary and lack sufficient evidence to back the interpretations of the results (see detail comments below). 3 The literature review in the introduction section needs improvement. 4 The quality of English needs substantial improving. I believe that the paper needs substantial revisions before considering to be published at ACP.

Detail Comments

1 Line 22-26 This sentence here is not rigorous. What concentration? Hourly average? Daily average? From what data? Observation data at which site? You'd better give the standard deviations of the data.

2 The introduction section should be rewritten and reorganized. The references cited in the introduction section should be more targeted and well selected. Take Line 78-82 for example, the references cited here have nothing to do with the topic of the paper. Line 60-82, too many references are cited without summary and in-depth understanding.

3 Section 2.1, Line 97-103, the data description here is too simple and lack of important information. Why CCM and XL station are chosen for study? Can they represent the whole study

area of the modeling or Nanjing? What instruments are used for observation? How about the quality of the data and the uncertainty of the measurements?

3 Section 2.2, Fig. 1 is hard to read. The authors stated that the 9 stations were chosen for representing the whole Nanjing city. But all of the 9 stations located at the center part of the city. I doubt can they represent the whole city? Moreover, what is the purpose of these sites? For model validation? Please give the results of model validation.

4 Section 2.3 The description here is quite ambiguous. Which year of the emission inventory is used for simulation? How do the authors make the emission inventory after reduction? How to determine the reduction ratio? Based on the control measures? Is there any hypothesis here? If there is hypothesis? What is the uncertainty? Please state the experimental process in detail.

5 Section 3.1 The title of this section is inconsistent with the content. Why CCM and XL station are chosen for study? Can they represent the whole study area of the modeling or Nanjing (same as detail comments NO. 3)? The data analysis in this section should be more rigorous and more in-depth. Line 147-148 How to get the reduction percentage? Calculate from observation data or other ways? Line 154-156 Why the authors avoid discussion of NO_2 at CCM and CO at XL? Line 157-158 The discussion here is inaccurate. The deviation of PM_{10} and $PM_{2.5}$ is larger in 2014. Line 158-160 How to get this conclusion from the analysis above? Line 182-199 Similar problems as above. Line 190-191 The change percentage of NO_2 listed here is 19.8 %, but in Table 4 is -19.8%, please check the correctness and consistency of your results. In line 193-194, the authors said that "the pollutant concentrations declined with emission control, but rebounded after releasing control". How to explain the higher simulated concentrations of SO_2 and CO during August with strictly control measures? The authors listed too many tables in this section without in-depth analysis and solid discussions.

6 Line 221-232, The authors should avoid ambiguous discussion. The word such as "lower temperature and weaker winds", "rather worse meteorological conditions" is quite obscure to readers. Line 227, The authors stated "...... which was consistent with the observations", could you give more detailed comparison results of model and observations? How about the accuracy

of the simulated meteorological parameters? Fig. 6, What do "data1" and "data2" stand for? Fig. 7 How to explain the spatial distributions of the impact percentage? For CO and O_3, the simulated concentrations of Exp. 2 are lower than those of Exp. 3, especially for the north part of Nanjing city.

8 Section 3.3, Line 247-248, the statement here is ambiguous. 9.2% and 38.1% is from model results or others? 9.2% to 38.1% is a fuzzy range. Line 249-250, what do you mean? What is the definition of short-lived chemical composition? Line 250-251 How to explain the uneven distribution of the impact percentage? Line 256-257 The reduction ratios here are compared to what period? The authors should give more exact time during the discussion.

9 Section 3.4 Why do you choose 16th Aug. to 28th Aug. not the whole month of August as the study time here? Line 270-271 How can you make the conclusion here? From Fig. 9, it seems that the influence of meteorological conditions is more important for the air quality of Nanjing. Line 278-291 The authors focus on discussing difference of emission reduction influence at two sites. However, 0.9 %, 1.1 % etc. is quite small change. What is the result when considering the uncertainty of the model simulations? Line 299-308 The discussions here lack of evidence.

Technical Comments

1 The authors should refer to "the guidelines for authors" of ACP to prepare the manuscript.

2 Abbreviations should be given for the first time. Such as "CST" etc.

3 The date format need to be uniform.

4 Spaces must be included between number and unit.

5 Fig. 9 The legend makers "Met" and "Red" here are easy to lead misunderstanding. You'd better use "Met." and "Red.".

6 The reference format should be uniform. Too many references in Chinese are cited.

7 The English of this manuscript needs substantial improvement.