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Interactive comment on "The Role of Meteorological Conditions and Pollution Control Strategies in Reducing Air Pollution in Beijing during APEC 2014 and Parade 2015" *by* Pengfei Liang et al.

Anonymous Referee #1

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General Comments: This manuscript well selected two periods, i.e., the APEC 2014 and Parade 2015, to investigate the meteorological conditions and pollution control strategies in reducing air pollution in Beijing. It is scientifically sound, original, well written and concise. I recommend to accept it after minor revision as indicated below.

1 Too many tables included in the main text, so I suggest the authors adjusting the structures of the manuscript and move some of the tables and figures to the supplement to make it more concise and clear. 2 The authors used two methods to separate out the influence of meteorological conditions on the air pollutant concentrations to

give a fairly and accurate evaluation of effectiveness of pollution control strategies. It seems that the authors think the GLM method is better than the "stable meteorological condition" method? If so, why the authors focused on the explanations of the results of "stable meteorological condition" method?

Detailed comments

1 The abstract is too long, please give a concise and clearly written. Line 28, delete "dramatically". Line 23, the authors state that "During the APEC 24 (1 October to 31 December 2014) and Parade (1 August to 31 December 2015) sampling periods", but in Figure 1, 4, 6 and Line 235-240, the study periods were from 18/10/2014-22/11/2014 and 01/08/2015-23/09/2015. Please give more clear and consistent definition of your research periods in your manuscript, such as during, before and after "APEC" or "Parade", "AAPEC", "APEC", "BAPEC", "AParade", "Parade" and "BParade".

2 For the "Introduction" section, I suggest the authors move Table 1 and Table 2 and some related context to the "Methods" Section. Line 55, "(2013)" is the reference citation format correct? please check the format of the references throughout the whole manuscript more carefully. Line 59 "2012 levels" to "levels of 2012". Line 71-72, Please cite some scientific literatures here instead of "(SEPB, 2010)", "(GEPB, 2009)"ïijŇand "(CEPB, 2013)". Line 73-75, Only need to define abbreviations at their first occurrence. e.g. "APEC","Parade", "GLM" etc. Line 78, delete "control (Table1)". Line 83 "from" to "to". Line 86-90, Please rewrite these two sentences. You mean 54 % in Beijing, 26 % in Shijiazhuang, and 39 % in Tangshan. What is "the average concentration of total elements in PM2.5"? Line 92, what is "before" represent? Line 95, delete "e.g."

3 For the "Measurement and Methods", I just recommend the authors include the measurement, the research periods definition and control strategies, and the methods for the meteorological conditions separation in this section. Section 2.1, 2.2 and 2.3 can be combined, and some content in introduction and Section 3 can be moved to this part. Line 141, change to "the 4th Ring Road of Beijing". Line 2.2, why the authors

used the meteorological data from NCDC of the airport not the corresponding data from PKU site? Line 172, what is "AX105DR" represent for? Line 203-205, why define the variable WD? And what is the difference between (1) and (2). Line 208, change "Figure S2" to "Fig. S1", the tables and the figures should be labeled separately. Line 216, use the equation editor to give the proper format of the formulas.

4 For Section 3, the authors are suggested to rearranged the structure of the manuscript and give in-depth discussions of the results, not just mentioned the results. Line 235-240, move the annotations to the figure captions and keep the annotations in the Figure and the main text consistent, such as "Before APEC" means "BAPEC" in the main text? Line 245, delete "during the whole control period". Line 255-268, and Figure 2, the authors give detail explanations of the changes of the PM2.5 components for the "AAPEC", "APEC" and "BAPEC" etc., in my opinion, Figure 2 revealed a part of information of Figure 1, why the authors give this part of analysis? And why the components changes for different periods? Line 284-289, change "(SNA)/PM2.5" to "(SNA/PM2.5)". And why the proportion of SNA change like this? Line 290-296 Please give more clear and consistent definition of your research periods in your manuscript, such as during, before and after "APEC" or "Parade", "AAPEC", "APEC", "BAPEC", "AParade", "Parade" and "BParade". Line 311, add "(Fig. 1)" after sulphate information. Line 325-326 "during BParade and 326 AParade (25.7% and 20.3%, respectively)." to "during BParade (25.7%) and AParade (20.3%). Line 331-333, did the authors mean "the PBL heights during APEC and Parade were constantly high", but during these two periods, the PBL heights sometimes were low, please rewrite this sentence to give more clear statement. Section 3.2.1, Move this part to the methods section. What is the theoretical basis of this identification method? This method from previous study or developed by the authors? Did the authors combined the data of APEC and Parade, why not give the identification separately? Line 383, add "(S3)" after "Supplementary Information" Line 398-497, this part just description of the figures and lacks in-depth discussions of the results. What is Similarities and differences of the changes for different species and what caused the results?

5 Section 3.3 have structural problem, and I just recommend the authors adjust the manuscript in this section. Firstly, the authors should give a clear description of the model constructing and parameterization process (Table 8); Secondly, the authors should give the modeling results (Figure S4 should be moved to the main text) and give the validation check of the models (Figure 10-12); and then the authors can use the models to give the evaluations (this part in Section 3.3 is weak compared to the "stable meteorological condition method" and this part should be more emphasized in the manuscript). Line 548-550, "decreased by 58% and 63%" compared with what? Line 549-550, please correct the expressions like the following in the whole manuscript "the meteorological conditions and pollution control strategies contributed 30% and 28% to the reduction of the PM2.5 concentrations during APEC 2014, respectively, and 38% and 25% during Parade 2015, respectively". Did the authors mean the meteorological conditions decreased the PM2.5 concentrations by 30% and pollution control strategies decreased the PM2.5 concetration by 28%? Please check the manuscript and make more accurate statement.

Line 568 and table 10, why the sulfate increased by 44% ? The results is opposite to the "stable meteorological condition method" (Figure 9)?

6 For Figures and tables, the authors should give more accurate captions. Table 2, give the annotation of "AOD"("AOT"), "(MODIS/MISR)"(what does it mean?), Table 3 add "in this study" after "in the GLM", and clarified the minimum and maximum data is for daily or others? Table 4 give more accurate annotation of "BAPEC","APEC","AAPEC","Bparade","parade",and "AParade". Delete the ambiguous annotation "B:before;A:after".The same for other tables and Figures. Figure 1 "grey-shaded" to "blue-shaded", "Before APEC" to "BAPEC" and so on. Figure 8 What does this figure stand for? Not just give the explanations of "the black/red bars" or "the whiskers" stand for? Figure 9 delete "(SNA)" or "SNA=sulpate+nitrate+ammonium". Figure S4 move this figure to the main text and give the exactly labels of the x-axis, use the date format not just "the sampling period".

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