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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Significant reduction of $PM_{2.5}$ in eastern China due to regional-scale emission control: Evidences from the SORPES station, 2011–2018" *by* Aijun Ding et al.

Anonymous Referee #3

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The manuscript by Ding et al., reported a long-term continuous trend of PM2.5, chemical species, and the precursors at the SORPES station in Nanjing, which is defined as a regional background station in the YRD region. With application of LPDM and comprehensive analysis with other supporting data, the authors investigated the impacts of emissions from fossil fuel combustion and open biomass burning and of year-to-year meteorology on the trends of primary and secondary PM2.5 in this region. The study revealed the effect of air pollution control measures over the YRD region in the past years. The paper is structured and written in a clear, thorough, and objective fashion that gives readers a clear understanding of the trends of PM2.5, related compounds and the effect of air pollution control measures. I recommend the paper to be published

Printer-friendly version

Discussion paper

after minor revisions. Detailed comments are as follows:

1. Page 4 Line23, Fig. 2 shows the trends of PM2.5 mass concentration and the two key precursors (SO2 and NO2) since 2011, and the main PM2.5 chemical components (BC, SO42- and NO3-) since 2013. Please also give the trends of NH4+ and NO.

2. Page 4, Line 32-34, “Among the two precursors, SO2 showed an even more significant reduction with an annual decrease about 17

3. Page 5, Line 1-2, “. . .achieved a very big success of air pollution prevention from desulfurization in power plant factories in recent years”, this effect is not only due to the desulfurization in power plants, but also the measures including “replacement of coal with natural gas or electricity, etc”.

4. Page 5 Line 13-14, “Here the results show that the efforts in reducing PM2.5 also co-benefited to the mitigation of global warming”, please give more evidence or reference.

5. Page 5 Line 21-23, to examine the change before and after the “Ten measures”, the authors separate the time period into 2011-2014 and 2015-2018. Since the “Ten measures” policy was released in August, 2013; why did not the authors separate the time period into 2011-2013 and 2014-2018?

6. Page 5 Line 3, please give the full name of the shortened “TRMM” when it is the first time to appear.

7. Page 5 Line 17, “Intensive emission from these activities could cause a secondary maximum of PM2.5 in early summer”, K+ is a tracer of primary pollutants from biomass burning, therefore it should be primary instead of secondary.

8. Page 6 Line 14 and Line 25, “dominate” should be “dominant”.

9. Page 7 Line 1, “due to efficient control from large elevated coal burning sources, such as power plants” and coal replacement with natural gas or electricity.

10. Page 7, Line 12-15, another reason is that the Ox concentrations, or the atmo-

spheric oxidization capacity has been increasing in recently years, which will also enhance the formation of nitrate.

11. By only conducting the LPDM simulations based on the fixed MIX emission inventory for cold season (three months), could they quantify the influence of emission reduction and year-to-year change in meteorology?

12. Conclusions 2. an increased nitrate fraction in PM2.5 was observed because more NH3 were available for nitrate formation in the condition of reduced sulfate associated with a substantial reduction of SO2 and a moderate decrease of NOx. Another reason is the increase of Ox and atmospheric oxidization capacity.

13. Figure 4, why did the authors separate by 2012-2014 and 2016-2018 instead of 2012-2013, 2014-2018?

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