

## ***Interactive comment on “Intense atmospheric pollution modifies weather: a case of mixed biomass burning with fossil fuel combustion pollution in the eastern China” by A. J. Ding et al.***

**Anonymous Referee #1**

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Atmospheric aerosols have been found to be a key factor influencing climate change by influencing radiative transfer and cloud processes. Although a huge number of studies have been conducted in recent decades, there are very large uncertainty in our current understanding of the detailed processes and their roles in the atmosphere, particularly in Asia countries where the aerosol loading is very high and their sources are complicated but comprehensive measurements are very limited. This manuscript presents an excellent case to show how the mixed pollutants, from biomass burning and fossil fuel combustion sources, can influence the daily weather, and to show how important of a comprehensive measurement with multi-processes for the understanding of the atmo-

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sphere. Generally speaking, the measurements were well-organized and the data are of high quality, the data analysis and modeling are based on state-of-the-art methodologies, and the manuscript is well-organized and well-written. So I recommend the publication of this paper on Atmos. Chem. Physics after the following minor points addressed.

Minor comments:

1) For high sulfate concentration associated with SO<sub>2</sub> plume, the authors presents a very interesting mechanism of a mixing of regional biomass burning plumes with urban emissions. It will better if the authors added several sentence to discuss possible processes of a fast oxidation of SO<sub>2</sub> in the biomass burning plumes from the perspective of chemistry. 2) The authors presented a very good correlation analysis in Fig. 5 to shows the difference between episode and non-episode days and also to show the evidence of mixed plumes from biomass burning and fossil fuel combustion sources. For Fig. 5b and 5c, it is better to extend the linear fitting line crossing the data marked with ellipses with dashed lines. 3) In Figure 6a-6c, the authors show the air pollution index. It can be found that for Yangzhou city (Fig. 6b), a higher air pollution index appeared in June 9, but the difference between measured and simulated air temperature were relatively smaller than June 10. The author should mention this point and discuss the possible reasons related. 4) For the MAGAR instruments, it will be better to add 1-2 references related to the measurement methodology or application in China.

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