

## ***Interactive comment on “Characteristics of concentrations and chemical compositions for PM<sub>2.5</sub> in the region of Beijing, Tianjin, and Hebei, China” by P. S. Zhao et al.***

**Anonymous Referee #3**

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The manuscript of “Characteristics of concentrations and chemical compositions for PM<sub>2.5</sub> in the region of Beijing, Tianjin, and Hebei, China” described the results of the one year observational study on PM<sub>2.5</sub> in four key cities in North China Plain, where is suffering from serious air pollution in the past few years. It is valuable to report the seasonal variation of PM<sub>2.5</sub> mass concentration, chemical components and the possible sources. I believe publishing this paper will help us to have a deeper understanding on the pollution status and potential formation mechanism on PMs in North China Plain.

Comments: 1) The authors reviewed the some previous researches on particles in

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China, including mass concentration, chemical-physical characteristics, optical properties and photochemical processes. It will be better if the authors can summarize the references based on the parts in “Results and discussions” of this study.

2) More reference papers should be added, especially those conducted in the North China Plain. (e.g. the impact of chemical components on formation of particles, the trend analysis of PMs)

3) There is sth wrong about the introduction of the implementation of the newly revised national ambient air quality standard (GB3095-2012), in which the standard is supposed to be implementation step by step from key regions (Beijing-Tianjin-Hebei) to the key cities and then to the national level, from 2012 to 2016.

3) In section 3.2.2, the authors gave a very important information on the formation of NH<sub>4</sub>NO<sub>3</sub> and (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> (or NH<sub>4</sub>HSO<sub>4</sub>) under the condition of lack-in-NH<sub>4</sub><sup>+</sup>. It will be better if a deeper discussion were added on the possible impact (e.g. Pathak et al., 2009).

4) The authors mentioned the opposite seasonal trend of OC compared with the so called secondary ions. And the growth of particles was taken as the possible reason on high OC in winter. However, it has been well known that the upper limit size range of growth process is about 100nm to 150nm, in which the particles were not supposed to be responsible for the high mass concentration. Therefore a reasonable discussion will be needed in this part.

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