

**Anonymous Referee #1**

**This paper studied PM<sub>2.5</sub> speciation at four urban sites (Beijing, Tianjin, Shijiazhuang, Chengde) and a background site at shangdianzi in northern China during 2009-2010. Field measurement is indispensable to improving the understanding of fine particle pollution in this region. Findings in this work would also be helpful to policy makers as the properties of PM<sub>2.5</sub> in this region had changed in the last decade. Publishing this paper in ACP would be useful to the community if following problems can be addressed.**

**1) In the introduction part, literature of 1980s seem absent. Including those previous works would be very helpful to understand the evolution of aerosol pollutants in this region. Furthermore, expansion of literature pool with studies in other regions of China would be a plus as the characteristics of PM<sub>2.5</sub> in China is highly diverse, even in the region of present study.**

The main objective of this paper is to characterize spatial and seasonal concentration variations for PM<sub>2.5</sub> and its chemical compositions. In China, almost all of aerosol studies just focused on PM<sub>10</sub> and TSP before 2000. The sources and chemical compositions of coarse particulate matter (PM<sub>2.5-10</sub>) are quite different from PM<sub>2.5</sub>. And the coarse PM has less influence on human health and visibility. So the previous studies about coarse PM were not listed in the introduction. Beside in BTH, there were also many PM<sub>2.5</sub> studies carried out in the Yangtze River Delta and the Pearl River Delta. The chemical characteristics and seasonal variations of PM<sub>2.5</sub> in YRD and PRD are not the same with those in BTH. I will give some representative literatures in introduction.

**2) The statement of the implementation of new ambient air quality standard of China (GB3095-2012) is incorrect and misleading (page 865 line 26-27). The timetable for implementation of GB3095-2012 was announced in Feb 2012 by Ministry of Environmental Protection of China**

**([http://www.mep.gov.cn/gkml/hbb/bwj/201203/t20120302\\_224147.htm](http://www.mep.gov.cn/gkml/hbb/bwj/201203/t20120302_224147.htm))as follow:**

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**2012, Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta and other key regions and municipalities directly under the Central Government and provincial cities**  
**2013, 113 key environmental protection cities, and the National Environmental Protection Model City**  
**2015, all prefecture-level cities & above;**  
**January 1, 2016, the national implementation of the new standard.**

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**So according to the official statement, the new standard (GB3095-2012) is already effective in Beijing-Tianjin-Hebei region.**

I have misunderstood the timetable of standard implementation. The statement of the implementation of new AAQS will be revised in ACP.

**3) For section 3.2.3, It's fine to left the detailed description of SOC calculation to another paper, but some critical information is still needed for current paper, which is**

**necessary for readers to understand the SOC results. For example, what's the primary OC/EC ratio for SOC estimation and how is this ratio obtained?**

The paper of carbonaceous components in PM<sub>2.5</sub> has been published as shown below. Some critical information will be added in this paper when revised for ACP.

Zhao P S, Dong F, Yang Y D, et al. Characteristics of carbonaceous aerosol in the region of Beijing, Tianjin, and Hebei, China. *Atmospheric Environment*, 2013, 71: 389-398.