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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Carbonaceous species in $PM_{2.5}$ at a pair of rural-urban sites in Beijing, 2005–2008" *by* F. Yang et al.

Anonymous Referee #2

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General comments: There is a great concern about the concentrations of OC and EC in China's megacities due to their adverse effects on environment and human health and potential impact on regional climate. In this study, the authors presented a systematic dataset of OC and EC concentrations and their temporal (seasonal and annual through 2005-2008) and spatial (rural vs. urban sites) variations in Beijing, the capital of China, and also highlighted the impact of a human-perturbation experiment during the Olympics games in 2008. These data are very important to look into the reasons of carbonaceous pollution in China together with the control strategies. However, some explanation and discussion on the observed phenomenon in this study were limited on descriptive and qualitative dimension rather than quantitative one. Therefore, some questions should be responded before this manuscript is published in this high-quality journal of ACP.

Specific comments: 1. Lines 13-15 in Abstract. The “both” is an ambiguous word, and I am not sure it means OC and EC or minimum and maxima? According to the first paragraph on Page 8726, the maxima occurred in winter. Please clarify this description. 2. Lines 19-25 on Pages 8723. About the description of the urban and rural sites, more information should be presented such as the surrounding buildings and potential pollution sources around the two sites. These are very important to identify their representativeness for local or regional status. 3. The last paragraph on Page 8724. About the thermal method used in the study, a more detailed description should be given since OC and EC results are sensitive to the measurement method, and if a comparison between this method and other widely-used ones (e.g. TOT/TOR) is discussed, the data here will be more cited by and compared with other similar studies, such as those listed in Table 1 (in which the analysis methods were not pointed out). 4. Lines 22-24 on Page 8726. “. . .reflect the emissions resulting from space heating practices, since industrial and transportation activities are relatively constant throughout the year”. This is a specious sentence and should be carefully rewritten. The amount of industrial boilers and vehicles may keep constant all the year, but their OC and EC emissions can vary greatly due to the large temperature difference between summer and winter. For example, OC and EC emission factors from cold-start engines is much higher than from hot-start ones. For OC, much more organics stay in gaseous phase in summertime than cold seasons, and you cannot differentiate this aspect because only filter samples were collected in this study. 5. Lines 7-11 on Page 8727 and Lines 14-18 on Page 8728. About the stable carbon isotope data. The explanation of more positive stable carbon values by reduction of coal consumption and vehicle amount cannot be held if corresponding data for these emission sources are not presented. For example, if coal combustion and vehicular exhaust are the dominant contributor of EC in Beijing and their stable carbon isotope are similar, the reduction of consumption in 2008 can not explain the variation of isotope composition. A recent study by Cao et al. (2011, AE, 45: 1359-1363) may be referred to this aspect. Additionally, a detailed stable carbon isotope data for EC should be presented in the manuscript. 6. Lines 5-6 on Page

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8732. Shanghai is located in the Yangtze Delta Region in east China, not south China.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 8719, 2011.

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Interactive Comment