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Interactive comment on “Photochemical production of ozone in Beijing during the 2008 Olympic Games” by C. C.-K. Chou et al.

Anonymous Referee #2

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This manuscript analyzes measurements of ozone and its precursors from an observatory at Peking University, comparing observations during the August of the Summer Olympics with the same month two years before. The Beijing Olympics period has attracted great interest for air quality research, since associated emissions reductions have been well documented and provide an opportunity to gauge atmospheric response to those changes. The collocated measurements of O₃, NO, NO₂, NO_y, and NMHCs in this study allow for extensive analysis of the observational data, which the authors capitalize upon via calculations of O₃ production rates and other metrics. However, the contribution of this study to the already extensive literature regarding Beijing Olympics air quality is modest, since it considers only a single site (in contrast to the 3 considered by T. Wang et al., ACP 10, 7603-7615) focused on two days of case studies, and it does not use 3-D photochemical modeling as several other of the cited

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studies have done. Nevertheless, the approaches are sound and I recommend that this paper be published after addressing the following suggestions:

Specific comments: 1. The meteorological conditions from 2006 and 2008 are insufficiently compared, to gauge whether these may have contributed to the differences in concentrations between years. 2. The phrase “O₃/O_x production rates” is unclear; I assume you mean one of these terms, not the ratio (p. 1) 3. Cite your claim of 15 megacities, or state how megacity was defined (p. 2) 4. Unclear what is meant by “monthly averaged mixing ratio.” The phrase implies averaging over all hours, but results in the Wang paper were for daytime only. (p. 2) 5. Not clear how you conclude that there were “coupling influences of transport and in-situ photochemical production” based on a single monitor (p. 5) 6. What is the basis for claiming “enhanced wet deposition” may be responsible (p. 6)? Have you compared precipitation amounts in these months? 7. Not sure what is meant by “Chou et al indicated the conversion. . .” (p. 6) 8. It is unclear what is meant by “photolysis of NO₂ and production of OH are expected. . .” (p. 9) 9. A shift from VOC- to NO_x-limited ozone formation over the course of the day has been widely observed in numerous locations and is not a new finding of this study. (p. 11) 10. In Table 2, it would be informative to compare ozone on a peak or afternoon basis, rather than 24-hours.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 16553, 2011.

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