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Interactive comment on “Variations of ground-level O₃ and its precursors in Beijing in summertime between 2005 and 2011” by Q. Zhang et al.

Anonymous Referee #1

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Zhang et al. present a timeseries of measurements of NO_x, VOC and ozone taken between 2005 and 2011 at a single location in Beijing. They show that both ozone and total oxidants (ozone, NO₂, and other reservoir species of reactive nitrogen) have been increasing while both NO_x and VOC were decreasing. The authors discuss their measurements in the context of emission control strategies which have been implemented in Beijing, and of other measurement data for Beijing, including satellite measurements. I would like to see some discussion of how well the measurement site at PKU is representative of the rest of Beijing. The authors describe the situation of the site and its local sources well, but I would like to see some wider context here.

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Using measurements and a simplified model, the authors calculate the total oxidant production rate in Beijing between 2001 and 2011. It is not clear to me which data are used before 2005, as the authors' own dataset only begins in 2005. The authors should mention more explicitly which data are used as input to their model.

Using this method, the authors calculate an increase in $P(\text{Ox})$ from 2001 to 2006, consistent with the observed increase in ozone, but their calculation of a basically unchanged $P(\text{Ox})$ between 2006 and 2011 is not consistent with observations. The authors discuss this discrepancy in terms of the limitations of their method, in particular the lack of comprehensively speciated VOC input data including formaldehyde and other OVOCs. The authors suggest that better measurement of OVOCs for Beijing are required to better understand recent ozone production, which seems like a reasonable recommendation due to their role in oxidant production through their photolysis and associated radical production.

Elsewhere in the paper (Sect. 3.2), the authors mention the possibility of increased regional ozone production in the North China Plain due to changing emissions patterns, in particular the increased NO_x emissions associated with power stations in this region. In my opinion the authors should give more weight to the possibility that ozone pollution in Beijing is becoming more of a regional problem, than just a matter of local photochemistry.

In general, the paper is clearly and concisely written, and certainly suitable for publication in ACP once the authors address the above minor concerns.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 1019, 2014.

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