

## ***Interactive comment on “Ground-level ozone in four Chinese cities: precursors, regional transport and heterogeneous processes” by L. K. Xue et al.***

**Anonymous Referee #2**

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General comments: This work focuses on the ozone pollution in four large cities of China. Observation based methods are used in the analyses to understand the impacts of photochemistry, regional transport and deposition. In addition, some heterogeneous processes are considered and preliminary results show that they might be important to local ozone levels and should be incorporated into photochemical mechanisms.

Specific comments: 1. Site selection: The four sites are rural or suburban, not far from large cities (the biggest distance is about 50 km from the cities). However, the Beijing site is different in nature from other three sites, i.e. it's a pure rural mountain site and is the most distant from cities of the four sites. These features determine that the Beijing site is dominated by distant/regional transport, and the photochemical evolution processes (including the heterogeneous processes) might not be reflected

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by precursor concentrations observed. On the other hand, at this rural site the authors observed/recorded the highest ozone concentration (286 ppmv) in the area, which may not occur at a suburban site. It would be clearer if the authors explain the differences of the results between Beijing site and other three sites caused by the site locations.

2. Model validation: The observed based box model used to quantify the in-situ ozone production is built on the MCM v3.2 mechanism. However, no model validation results are provided in the manuscript.

3. The Guangzhou site: Some parameters were not observed at this site and took observations of same season at Tung Chung, Hong Kong. The authors did not mention which parameters were not measured at Guangzhou site. For some parameters, e.g. aerosol properties, there might be differences between Guangzhou and Hong Kong. It would be convincing if comparisons are provided when data sources are available (like PM<sub>2.5</sub> measurements by the Hong Kong EPD and Guangzhou EPB) for the two sites or cities.

Technical corrections: The writing of the manuscript is acceptable.

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