

## ***Interactive comment on “Characterization of atmospheric trace gases and particle matters in Hangzhou, China” by Gen Zhang et al.***

### **Anonymous Referee #2**

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The manuscript ‘Characterization of atmospheric trace gases and particle matters in Hangzhou, China’ by G. Zhang et al. reports the observational results from one-year monitoring of several trace gases and particulate matter at an urban site in the YRD region. The characteristics of these trace gases and particulate matter are discussed in association with meteorological conditions. Process analysis is also performed for case studies under photochemical pollution and haze condition. The measurement data are valuable, but the manuscript needs to be more concise and more logically structured. Further proofreading is also needed to correct grammar mistakes and inappropriate description.

Specific comments:

1. ‘Particle matter’ is used almost through the entire manuscript, it should be particulate

matter.

2. Was the air sample dried when measuring PM<sub>2.5</sub>? How about the drying system?
3. What is the temporal resolution of the meteorological data in the HYSPLIT model? Will the temporal resolution and also the spatial resolution as 0.5o×0.5 o influence your conclusions?
4. P9 L246-249, the author suggested comparable photochemical levels in different regions only based on measurements of NO<sub>2</sub> and O<sub>3</sub>, I am afraid it is insufficient to draw this conclusion.
5. The discussion on NO<sub>x</sub> or VOCs limitation of ozone photochemical production is based on measured CO. The author stated that VOCs and CO share common origins and play similar roles in ozone production in this region. Is there any data or previous study in this region to support this assumption?
6. The correlations of O<sub>3</sub> and PM<sub>2.5</sub> in warm and cold seasons were analyzed. The author attributed the positive correlation in warm seasons to secondary aerosol formation under high O<sub>3</sub> levels and negative correlation in cold seasons to NO titration effect. However, the ambient level of either O<sub>3</sub> or PM<sub>2.5</sub> is a result of emission, sinks, physical processes and complicated chemical reactions. The explanation has no solid foundation and also needs other supporting data.
7. The backward trajectory and PSCF analysis is not suitable for short-lived species such as O<sub>3</sub> and is specially not suitable in urban area with high local emission. So it's strange that those clean mountain area in south of Hangzhou could have more contributions? As well as that air masses coming from open seas contained higher concentrations of NO<sub>x</sub> and O<sub>3</sub>?

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Discussion paper

