

## ***Interactive comment on* “Concurrent observations of air pollutants at two sites in the Pearl River Delta and the implication of regional transport” by H. Guo et al.**

### **Anonymous Referee #2**

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This manuscript presents results from an intensive monitoring of air pollutants simultaneously at one site in the inland PRD (WQS) and one site in Hong Kong (TC) between 22 October and 1 December 2007. This study has high time resolution data for O<sub>3</sub>, NO<sub>x</sub>, CO, SO<sub>2</sub>, and measurements of NMHCs and carbonyls on some selected days. During the study period, 13 O<sub>3</sub> episode days, defined as the daily peak O<sub>3</sub> level exceeding 122 ppbv, were monitored at WQS compared to 2 episode days in Hong Kong. Due to the impact on human health and the oxidizing capacity of the atmosphere, O<sub>3</sub> is of great concern especially the causes and formation mechanisms of O<sub>3</sub>. The authors stated that “even the causes of O<sub>3</sub> episodes in the inland PRD remain unclear” (see lines 79–80). It is also mentioned in the manuscript that the O<sub>3</sub> episode could be dom-

inated by regional transport sometimes (Huang et al., 2006), while sometimes it could be due to local-scale recirculation (Wang T. et al., 1998). The authors should examine the causes of two O<sub>3</sub> episodes in Hong Kong and 13 episodes in the inland PRD site. Are they the same or not? What about the local vs. regional contribution to O<sub>3</sub> itself and its precursors (VOC and NO<sub>x</sub>) during episode days? Are they both VOC limited based on the data in this study? The authors should take advantage the simultaneous measurements to examine the difference between two sites.

TC is located at the western side of Hong Kong. During the study period, the average wind direction was 97°, which means sometimes besides local TC emissions, TC received regional transported materials plus emissions from urban emissions in Hong Kong. For example, NO<sub>x</sub> was found higher at TC. Is that from TC itself or impacted by other urban areas in Hong Kong with higher traffic density when wind blows from east to the west?

When northerly wind prevails, CO was increased while O<sub>3</sub> exhibited a decreasing trend. What about other pollutants?

Some of the analyses gave different conclusions. One example is the discussion of SO<sub>2</sub>. Based on lines 341-342, both the SO<sub>2</sub>/NO<sub>x</sub> and CO/NO<sub>x</sub> ratios suggest that the air masses at TC were mainly impacted by Hong Kong local emissions. However, lines 438-440 states that “the diurnal patterns of SO<sub>2</sub> and CO at the TC site were almost exactly the same, with a small and broad peak in the afternoon indicating the contribution of regional transport to Hong Kong by northerly winds”. The authors should give the readers a clear picture whether the air masses at TC were mainly impacted by local emissions or regional transport.

Minor questions include: 1) Line 161: what are the criteria of selecting those specific days for collecting NMHC samples? 2) Line 188: define “zero air” 3) Line 428-430: higher O<sub>3</sub> concentration at nighttime at TC was attributed to transport of O<sub>3</sub> from the South China Sea where O<sub>3</sub> was consumed less. Any data or evidence to show that

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O3 from the sea was higher during the study period?

Overall, this study provides high-quality data and it has rich dataset. In addition, there are few measurements conducted simultaneously in the inland PRD and Hong Kong. I feel the authors could have provided more new information and provided answers for important questions which cannot be answered by monitoring projects in a single area (either Hong Kong or PRD). Some suggestions have been listed above. The paper is well written and organized. I would recommend publication after revision.

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Interactive comment on Atmos. Chem. Phys. Discuss., 9, 9747, 2009.

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