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Interactive comment on “Study on the atmospheric boundary layer and its influence on regional air quality over the Pearl River delta” by M. Wu et al.

Anonymous Referee #2

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Boundary layer meteorology plays very important roles on air quality. In the Pearl River delta, many previous studies already reported the linkage between PBL meteorology and air pollution. However, most of these works are based on numerical modeling and limited surface measurement. There is a still a knowledge gap in the vertical structure of the PBL for typical air pollution episodes in this region. This study presents some results from two intensive campaigns carried out during PRIDE-PRD2004/2006. Generally speaking, the measurement results are very valuable for the community. However, an in-depth analysis and a significant improvement of presentation are needed before it can be accepted for publication on Atmos. Chem. Phys.

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Major comments:

1) The experiments were conducted for the two months in 2004 and 2006, but the authors mainly focused on three typical 1-day cases. Of course, it is important to compare the meteorology for three days. However, it is also important to discuss the evolution of each case, i.e. pre-episode, episode, and/or post-episode days. That kind of comparative study will provide more solid conclusion for the control mechanisms and processes for these pollution episodes.

2) Section 4 is supposed to present "results and discussion". We do see a lot of description of "results", but less "discussions". Discussions should be made to compare with other researchers founding from both modeling and measurement works. Unfortunately, we almost cannot find a reference cited in the entire section 4. The "discussion" part needs to be significantly strengthened by linking the findings with previous findings and discussing any agreed/disagreed conclusions.

3) The schematic charts in Fig.9 are far beyond what the data showed and what the analysis presented. For example, Fig.2 clearly shows that the two periods were under totally different synoptic background wind i.e. south vs. north. How the synoptic wind can affect the diurnal cycle of PBL and air pollution dispersion? Were there any evidences showing strong subsidence of the second case?

Minor comments:

1) The markers of wind vector in up-left hand of Figure 2 and Figure 4 (N 5m/s): should them be in south direction (S 5m/s)?

2) Figure 3: What is the data source of wind field? Observation or modeling?

3) Figure 1: please show the urban area as the authors tried to discuss the urban heat-island circulation.

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