

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 #1

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This manuscript presents “ the atmospheric boundary layer and its influence on regional air quality over the Pearl River Delta”. The authors discuss the situations of atmospheric conditions which related to the high pollution episodes. Most of the results relied on the radio sounding and the index they deduced. However, the authors fail to present some important concepts of physical processes. They totally confused the land-sea breeze processes with the prevailing wind and did not clearly identify so called” heat island circulation”. For example, they presented “sea breeze” developing from 1700 to 2300 LST (page 10, line10-22). Another example shown in Page 12, line1: “At 2300 LST, the wind speed reached maximum since the influence of sea breeze was

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most remarkable”

As we know the “sea breeze” is formed by increasing temperature differences between the land and sea during daytime. It is inappropriate to suppose all of the onshore flow as sea breeze. It could be prevailing wind. Also, the evidences are still too rough to define the “heat island circulation” just only from the radio sounding.

1. Overall, this paper discussed the well known situations of atmospheric conditions which related to the high pollution episodes. Thus, the data quality and the methods are quite critical for this paper to be published. What’s new in this study comparing to previous investigations (Fan et al. 2008, Fan et al. 2011) ? They all studied the cases in 2004 and 2006.

2. Abstract: line 20” The peak mixing heights were smaller than 700m in WPBCF cases, and were smaller than800m in SPCTC cases.” Why you emphasis this point? For me, this difference is not significant.

3. P9 “Figure 3 gives the surface wind fields from the main meteorological stations to provide overviews about the features of air flowing conditions in these three cases.” How do you plot this figures ? It seems to me the data are not from meteorological stations. I do not believe you have so density meteorological stations.

4. P10. Lin10-28: Section 4.2 As pointed in general comment, this section has seriously concept problem about the description of land-sea breeze processes.

5. Figure 4, What is the unit of x-coordinate and y-coordinate in Figure 4b and c

6. Figure 4: For me, the radio sounding already traveled away from the launch locations, Xinken and Panyu (from figure 4b and c). It is inadequate to explain the wind data as right up of these stations.

7. P11, line1-5, The wind speed is quite weak, it does not make sense to discuss the wind direction change.

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8. P12 line1: "At 2300 LST, the wind speed reached maximum since the influence of sea breeze was most remarkable." "At 2300 LST, the influence of sea breeze was most remarkable", I do not believe.

9. Page 13 Line 1: How do you clearly identify the updraft is only influence from so called "heat-island circulation", You do not have any data to show how strong the urban heat island effect is.

10. P14: line 10-20: The same question as pointed out in general comment.

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