Atmos. Chem. Phys. Discuss., 11, C3633–C3635, 2011
www.atmos-chem-phys-discuss.net/11/C3633/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterization and source apportionment of submicron aerosol with aerosol mass spectrometer during the PRIDE-PRD 2006 campaign" *by* R. Xiao et al.

R. Xiao et al.

yhzhang@pku.edu.cn

Received and published: 20 May 2011

Responses to Anonymous Referee #2's Comments:

Comment #1: Overall, the measurement results indicated that the total concentrations of submicron aerosol increased with decreasing relative humidity (RH) during different air mass categories. For the north and southwest categories, the size distributions for organics and sulfate generally showed unimodal characteristics and the mean peak diameter moved to larger size range. Please comment on this different trend.

Response to Comment #1: Yes, this is one of the key findings from this study. For the aged aerosol, it has been found in previous studies that sulfate and organics exhibited

unimodal characteristics and peaked in the second mode (Dva from 300-700 nm). In this study, we found, for the Southeast-South air mass category, which passed through the PRD urban areas, organics and sulfate showed bimodal distribution (first mode peaking at Dva around 200nm). The first mode was contributed by both secondary formation and combustion-related emissions based on the AMS data.

Comment #2: The measurement results indicated that the maximum concentration of organics as high as 20 ug m-3 between 17:00–20:00. The authors considered that the variations of organics might be attributed to the enhanced vehicular emissions during traffic hours. However, the variations of organics observed during other traffic hours (7:00-9:00) were not significant. Could authors provide more interpretation and information to address this issue?

Response to Comment #2: Figure 5 does show that the concentration of organics reached as high as 20 ug m-3 between 17:00–20:00. On page 1901 (Lines 12-15), we indicated the following reasons: 1) enhanced vehicular emissions during traffic hours; 2) lower mixing layer height; and 3) contribution of some photochemically formed secondary products. For the period in the morning (7-9 am), it is true for the first factor, but it lacks the last two factors compared to the late afternoon to evening period.

Comment #3: In this study, a new particle formation and growth event was observed at the BG site on July 21, during which OOA accounted for as high as 93% of OA mass. For clarity, authors should provide better interpretation to address this issue.

Response to Comment #3: New particle formation is an important pathway to form secondary organic aerosol. Therefore, it is possible OOA accounts for as high as 93% of organic aerosol. Right after this sentence, we have indicated in the original manuscript that "Zhang et al. (2004) suggested that extensive condensation of gaseous precursors of OA onto preexisting aerosol particles increases the secondary organic aerosol mass in the nucleation event."

References 1. Zhang, Q., Stanier, C. O., Canagaratna, M. R., Jayne, J. T., Worsnop,

D. R., Pandis, S. N., and Jimenez, J. L.: Insights into the chemistry of new particle formation and growth events in Pittsburgh based on aerosol mass spectrometry, Environ. Sci. Technol., 38(18), 4797–4809, 2004.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 1891, 2011.