

***Interactive comment on* “Mixing state of individual submicron carbon-containing particles and their seasonal variation in urban Guangzhou, China” by G. Zhang et al.**

Anonymous Referee #2

Received and published: 28 February 2013

Zheng et al have represented the results obtained from the investigation of mixing state of sub-micron carbon containing particles during spring and fall period of 2010 using an instrument called single particle aerosol mass spectrometer.

Based on the cluster analysis of single particle mass spectra they further classified observed particles biomass burning, organic carbon, fresh elemental carbon, etc. The paper appears to be well written and data represented could be of potentially important due to its origin from a geographical area of highly growing concern. I believe that with some major modifications suggested here and as pointed out by Referee #1 manuscript may achieve the adequate standards of ACP for publication.

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General comment: I echo the concern raised by Referee #1 that data points are too limited to draw the conclusions which authors have presented. They have gone to draw too many, mostly speculative, conclusions from the time limited dataset. I would suggest they focus on the more conclusive findings of the study. I believe that the figures represented in supplement appear to be more important and self-explanatory than the figures in main text. One can notice that from while reading that authors have referred to supplementary figures too many times. I would suggest merging or re-plotting some of the figures to bring supplementary figures in main text. I also think lots of the references from the previous studies from the same region are missing (like PRIDE PRD campaigns).

Specific comments:

1 Introduction:

I would request authors to rewrite the introduction as it does not explicitly in line with the major conclusion of this study. One major concern is authors have mentioned about Monsoon in the introduction saying it affects their number fraction as a function of aerodynamic diameter. This statement is not clear and should be supported by a reference. But except attributing the low concentration of aerosols they have not discussed anything; in spite of the fact that data is too short to study the effect of seasonal variation.

2 Experimental set-up and data analysis

Authors have not detailed the issues related with the calibration and other factors of the instrument used in this study. I am not really able to follow what authors mean by 700000 individual particles were investigated. Does that mean the measurements were not continuous? This needs to be properly explained. That is not clear from any of the figures presented in the manuscript.

The SMPS+C data used in this study do not have complete overlap with the SPAMS

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instrument. How does that affect the overall conclusions need to be explained.

3. Results and discussions

Page 32713 Line 21: How do authors, based on single particle analysis, confirmed that most of the carbon containing particles are internally mixed?

Page 32715 Line 13: Absence of coexistence. . . I rather believe it weak existence as it appears it is not completely absence.

Same page Line 25: It is probably not dry but relatively less humid

Page 32716 Line 7: Somehow I get the feeling from this sentence that biomass is not having any EC, is it true?

Page 32718 Line 3: It is very strong claim that it should facilitate the formation of SOA on EC core without any substantial evidence from the data presented.

Page 32718 Line 9: If biomass burning is more how regional transport is differentiated? Also if it is more, then how S and N increased in larger particle is not clear to me.

4 Conclusions

Based on the suggestions given above the conclusions are requested to be revised.
Technical corrections:

There are some typos and references need to be checked. The captions of the figures are too small to read and should be increased.

Page 32709 Line10: It could be “research” instead of researchers.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 32707, 2012.

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