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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Cloud condensation nuclei (CCN) and HR-ToF-AMS measurements at a coastal site in Hong Kong: size-resolved CCN activity and closure analysis" *by* J. W. Meng et al.

Anonymous Referee #1

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General comments:

The paper "Cloud condensation nuclei (CCN) and HR-Tof-AMS measurements at a coastal site in Hong Kong: size-resolved CCN activity and closure analysis" by J. W. Meng, et al. 2014 provide a good data set and the results are very valuable for understanding the aerosol impacts on Pearl River Delta area. The figures are clear. However, the author did not report any daily variation on the data, especially for foggy and hazy days and did not explain the assumptions or appropriate reasons to average the data in each selected period. In addition, the Methods listed in Table 3 are not very clear. Please clarify how to calculate kappa_AMS from bulk AMS measurements and

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size-resolved measurements. What is the difference? Is the difference significant for this study? If possible, please plot the time series of kappa_AMS calculated from bulk AMS measurements and size-resolved measurements. It also seemed the AMS part is used to mainly support CCN analysis in this paper. If authors plan to report AMS in a separate manuscript, please consider revise the title.

Specific comments:

Page 9068, Line10-12: Based on figure. S5, the average size-resolved CCN activation ratio at each SS, it seemed the variation on the D50 is around 10% of D50. That will lead to $\pm$0.1 variation on the determined kappa_CCN. Is the variation significant for this study? Page 9071, Line 5-10: Again, please clarify how to calculate kappa_AMS?

Page 9073, Line 14-20: Each SMPS scan is 6 mins, and at SS=0.15%, the system will finish 3 scans (18 mins) and wait 4 mins for stabilization, and the total will last 22 mins. However, at next SS, it lasted 12 min and also need $\sim$2 min to stabilize. Does that mean it should have lasted 14 mins? Please clarify the description of CCN running sequence.

Page 9075, Ling 12: What is signal to noise ratio and particle lens transfer efficiency of AMS at the size range less than 200 nm in this study? Please consider to provide it in supplement materials. Because the average activation size in this study is less than 120 nm in mobility size, which suggests the AMS data in the similar range is very important.

Page 9076, Line15-23, equation 3: what does author mean "fi ... the size-resolved volume fraction"? The subscript "I" stands for each species. Is f the volume fraction of averaged fraction from individual sizes or the bulk fraction of all size? If it is the averaged fraction, please provide time series of the averaged fraction and the bulk fraction.

Page 9077, section 3.1: what is the meteorology information during the sampling pe-

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riod? Does that explain the aerosol sources difference on foggy day or hazy day?

Page 9077, Line 17 and Figure 2: How does author calculate the bulk volume fraction of NR-species? What assumptions are used for the density?

Page 9078, Line 15, Figure 3: In page 9075, Dva=Dm*1.7. Dm=∼285 in foggy period, then the Dva will be around 484.5 nm. Does Figure 3(a-c) in Dm instead of Dva?

Page 9078, Line 18-19, Figure 3(d-f): why only focused on the range of 42-200 nm (Dm or Dva?) of AMS chemical composition? What about the AMS chemical composition larger than 200 nm?

Page 9078, section 3.2; Page 9081, section 3.3.1: I suggested using something like kappa_AMS_B and kappa_AMS_SR to represent the kappa_AMS calculated from different methods. Page 9079, Line 17-23: What is the O:C ratio in the foggy period and non-episode period? It is useful to include a time series O:C ratio in the main content to support the discussion.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 9067, 2014.