

Interactive comment on “A case study of aerosol processing and evolution in summer in New York City” by Y. L. Sun et al.

Anonymous Referee #1

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Sun et al. reported an observation on an aerosol processing and evolution event from 21–22 July 2009 in New York City. A HR-AMS collocated with many other instruments were employed to obtain the data of aerosol, trace gases, VOCs, etc synchronously. An aerosol evolution process with three clear stages of (1) aerosol wet scavenging, (2) nighttime nitrate formation, and (3) photochemical production and evolution of secondary aerosol processes were recorded. Elaborate data analyses and discussion are presented, interpreting the evolution process well.

Aerosol wet scavenging in an open system is a complicated and dynamic process. The O/C of OA may have some certain correlations with the wet scavenging rate generally. However, in this special case, authors should explain well why HOA, COA, nitrate, and chloride showed little changes during the aerosol wet scavenging and present

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more discussion about the positive scavenging rates of SV-OOA, COA, and HOA. "*OA on average became less oxidized due to the much faster scavenging of OOA than HOA.*" (Page 25761, line12-13) may not be a comprehensive conclusion if there was continuous input of HOA from local emissions. Nevertheless, this paper is suitable for publication in Atmospheric Chemistry and Physics after the following comments have been taken into account.

Specific comments:

Page 25752, line 17: "semi-volatile OOA" should be "SV-OOA" for it is the second time used in the paper.

Page 25752, line 24: The usage of the phrase "the sometimes lack" looks not proper.

Page 25753, line 18: The sentence "As the . . . , there is . . ." seems not logical, Suggest using "Though" instead of "As".

Page 25754, line 4: "revisited" is not a fine word to describe the action.

Page 25756, line 6: It will be better to offer the full names of "OC" and "EC" as they appear at the first time in the text.

Page 25757, line 12: "Figure S1" should be "Fig. S1" for consistent with others.

Page 25762, line 20: "BC" should be "EC" according to Fig. 1.

Page 25766, line 11: "0.7" should be "-0.7".

Page 25766, line 13: "0.5" should be "-0.5".

Page 25766, line 26: " $2\text{NH}_4\text{NO}_3(\text{NH}_4)_2\text{SO}_4$ " should be " $2\text{NH}_4\text{NO}_3 \cdot (\text{NH}_4)_2\text{SO}_4$ ".

Page 25767, line 20: "BC" should be "EC".

Page 25768, line 14: "secondary OA" should be "SOA".

Page 25769, line2: "that that" should be "to that".

Page 25778, Fig. 1: The labels of the plots (a, b, c...) are upside-down; The line for "Chl" in Fig. 1 (b) is hard to see; The caption of Fig. 1 is disordered and confusing, It will be better to rewrite the caption according to the sequence of a, b, c...

Page 25783, the caption of Fig. 6: Add "and" before "OA/ Δ CO₂".

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