A Case Study of Aerosol Processing and Evolution in Summer in New York City

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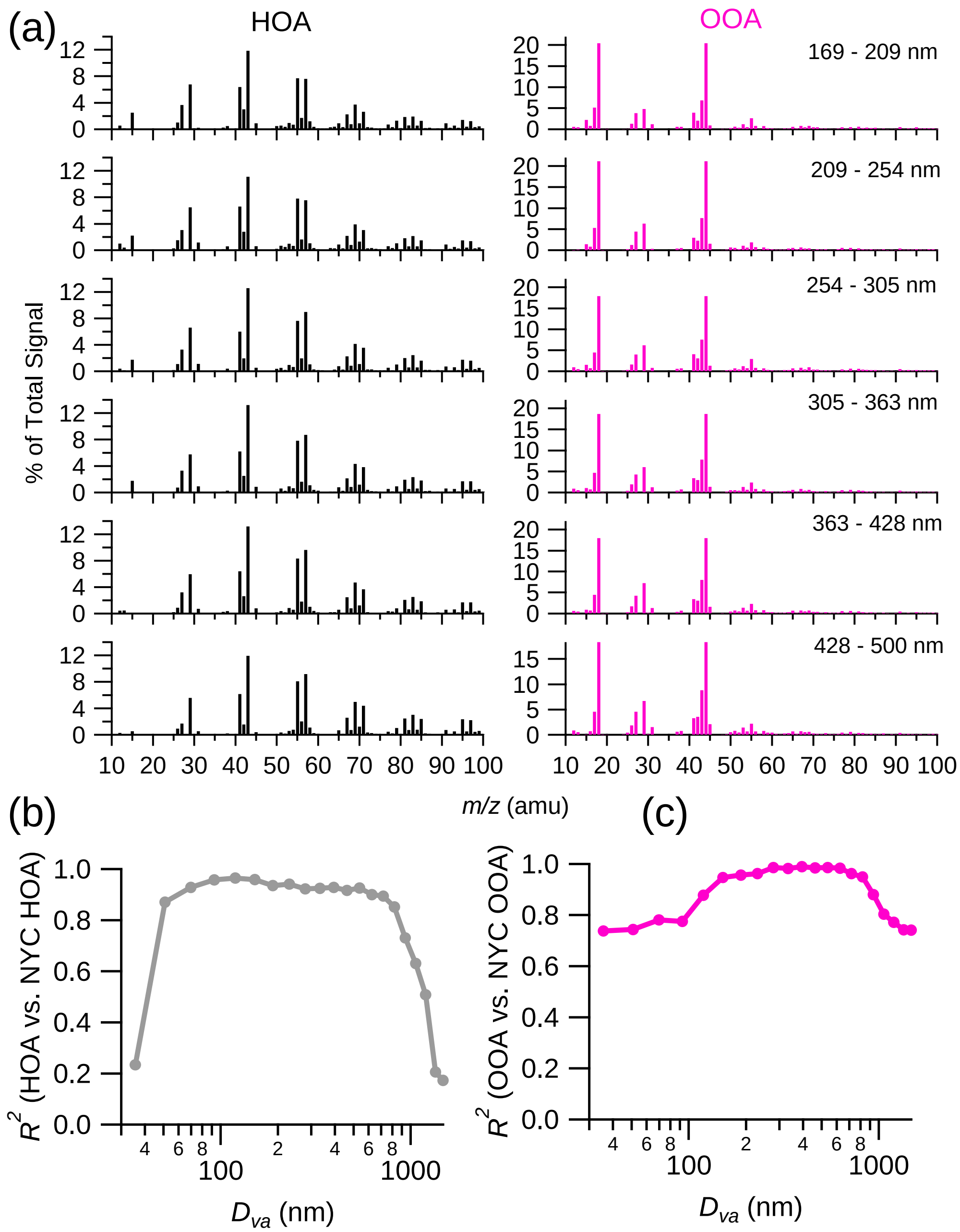

Fig. S1. (a) Mass spectra of HOA and OOA for different size ranges, (b) and (c) show the mass spectral correlations between HOA / OOA and those identified from 2-component PMF analysis of bulk mass spectra of OA during this campaign (Ng et al., 2011) as a function of size.

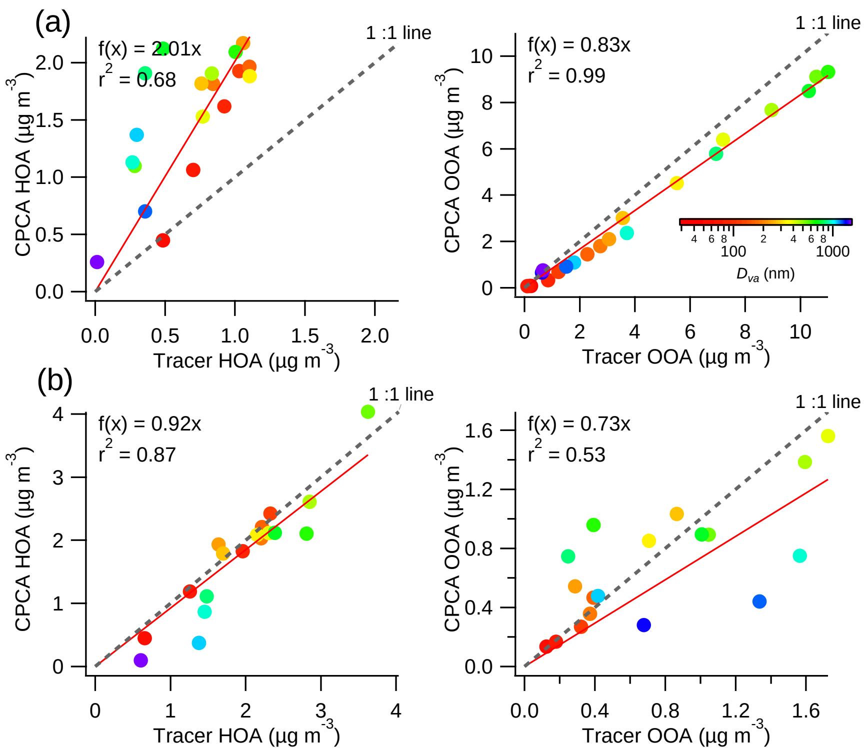

Fig. S2. Comparisons of HOA and OOA concentrations over different size ranges from CPCA with tracer-based method during (a) 14:00 – 18:00, 22 July (OOA: 85%; HOA: 15%), and (b) 5:00 – 9:00, 22 July (OOA: 19%; HOA: 81%).

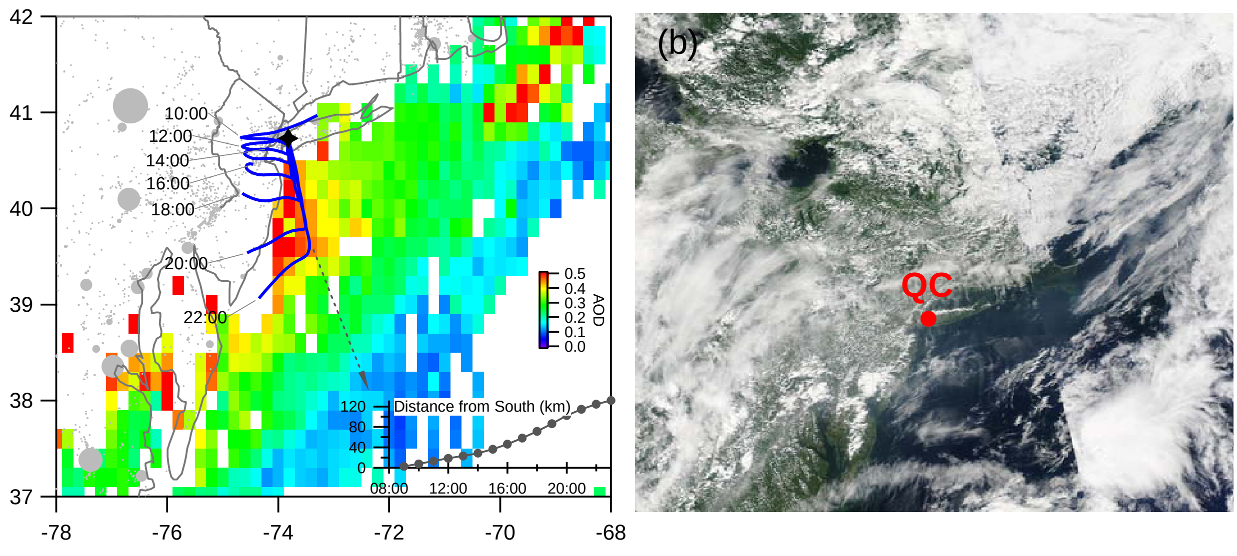

Fig. S3. 24-hour back trajectories arriving at QC on 22 July. The average aerosol optical depth (AOD) on 22 July is shown for a reference. The gray solid circles indicate the intensity of SO_2 emissions in U.S. The inset plot presents the straight distance of trajectories from the south. (b) shows the MODIS image from Aqua satellite (afternoon) on 22 July (http://rapidfire.sci.gsfc.nasa.gov/subsets/?subset=USA4).

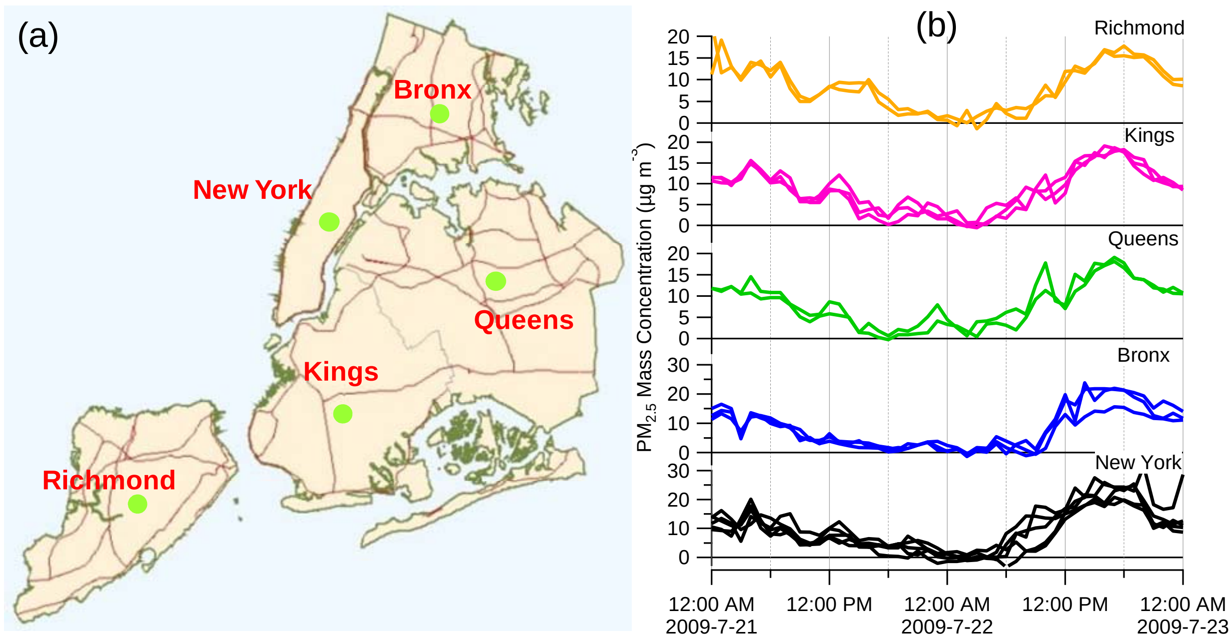

Fig. S4. Variations of $PM_{2.5}$ from TEOM measurements in different regions in New York City from 21-22 July, 2009. The multiple lines in (b) represent the data from various air monitoring stations in each region. The map and the data are obtained from http://www.dec.ny.gov.

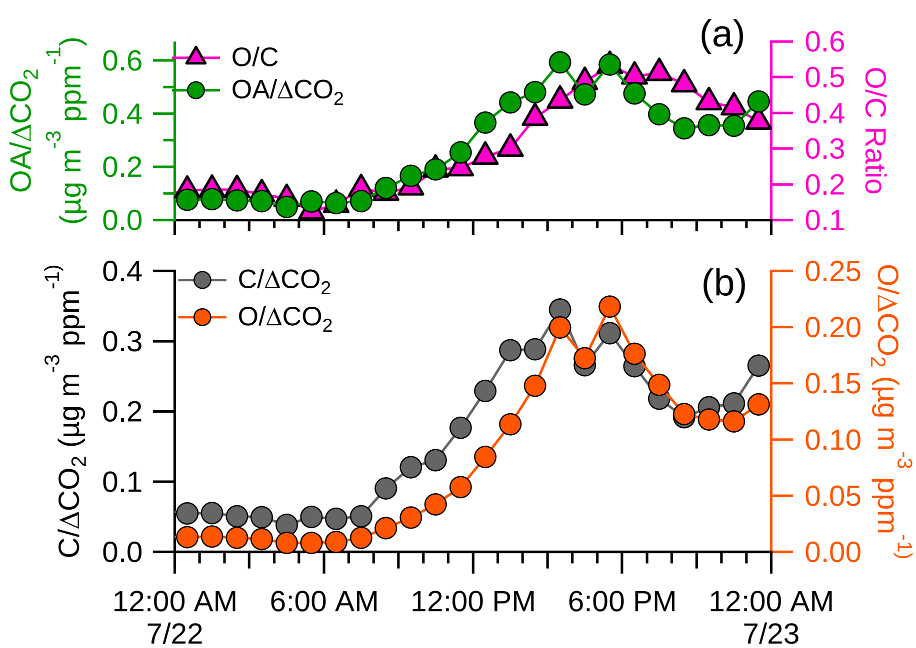

Fig. S5. Variations of (a) $OA/\Delta CO_2$ and O/C ratio, and (b) $C/\Delta CO_2$ and $O/\Delta CO_2$ on 22 July.

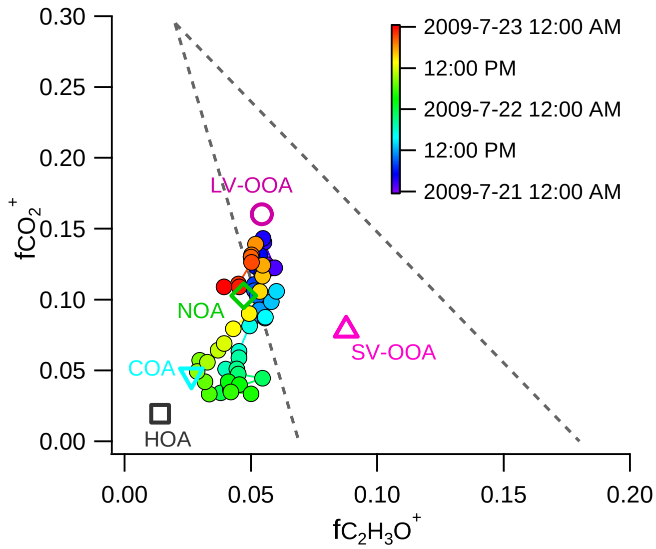

Fig. S6. (a) Relationship between fCO_2^+ (fraction of CO_2^+ to total organic signal) and $fC_2H_3O^+$ (fraction of $C_2H_3O^+$ to total organic signal) from 21 – 22 July. The fCO_2^+ vs $fC_2H_3O^+$ for five OA components are also shown. The dash lines represent the triangle region from Ng et al., (2010).

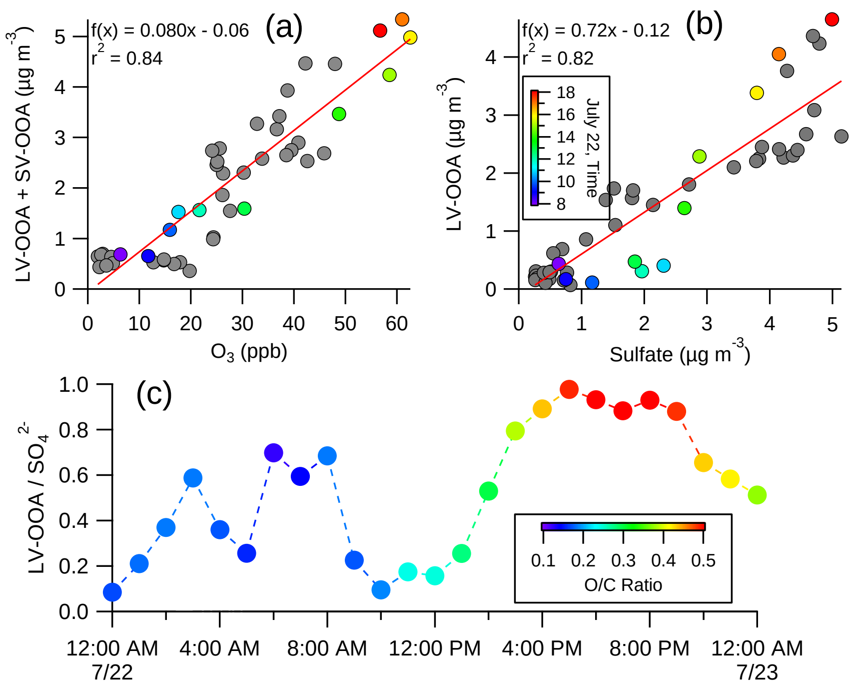

Fig. S7. Correlation plots of (a) LV-OOA+SV-OOA vs. O_3 and (b) LV-OOA vs. SO_4^{2-}. (c) shows the variation of LV-OOA/SO_4^{2-} ratio on 22 July. The correlations between 8:00 – 18:00 on 22 July are colored by the time.

References:

Ng, N. L., Herndon, S. C., Trimborn, A., Canagaratna, M. R., Croteau, P. L., Onasch, T. B., Sueper, D., Worsnop, D. R., Zhang, Q., Sun, Y. L., and Jayne, J. T.: An Aerosol Chemical Speciation Monitor (ACSM) for Routine Monitoring of the Composition and Mass Concentrations of Ambient Aerosol, Aerosol Sci. Tech., 45, 770 - 784, 2011.