

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

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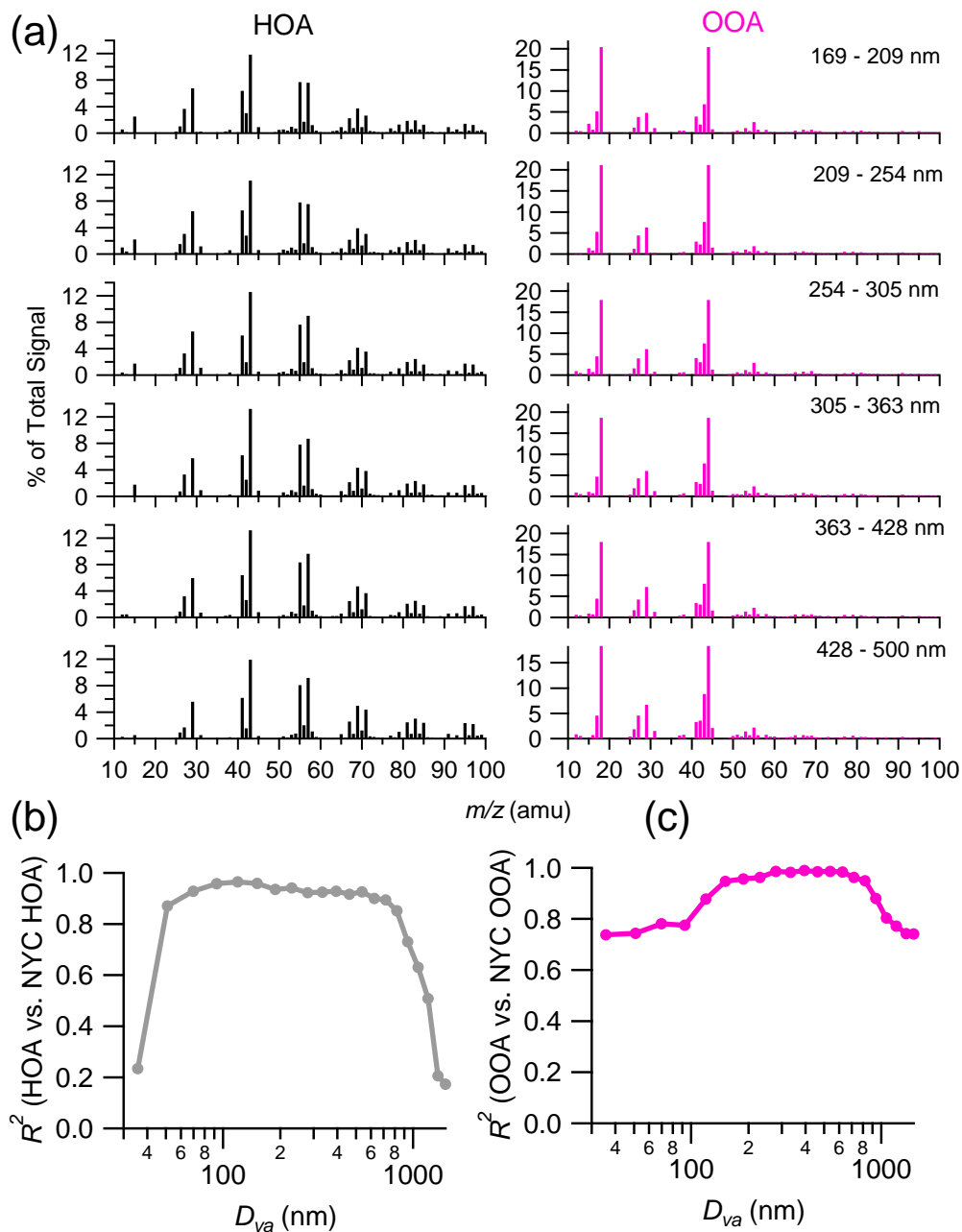
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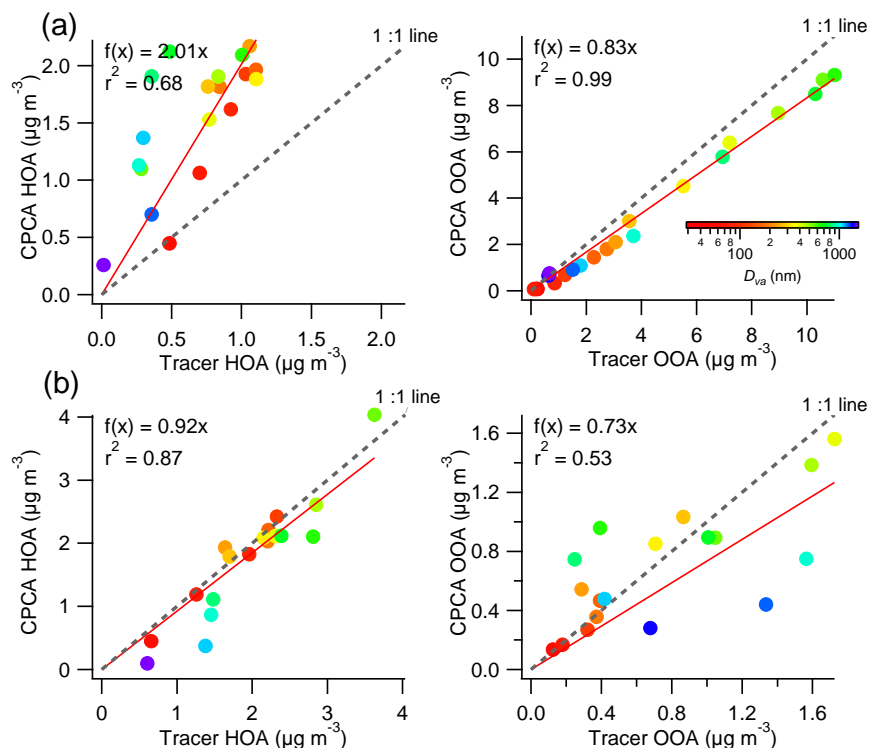
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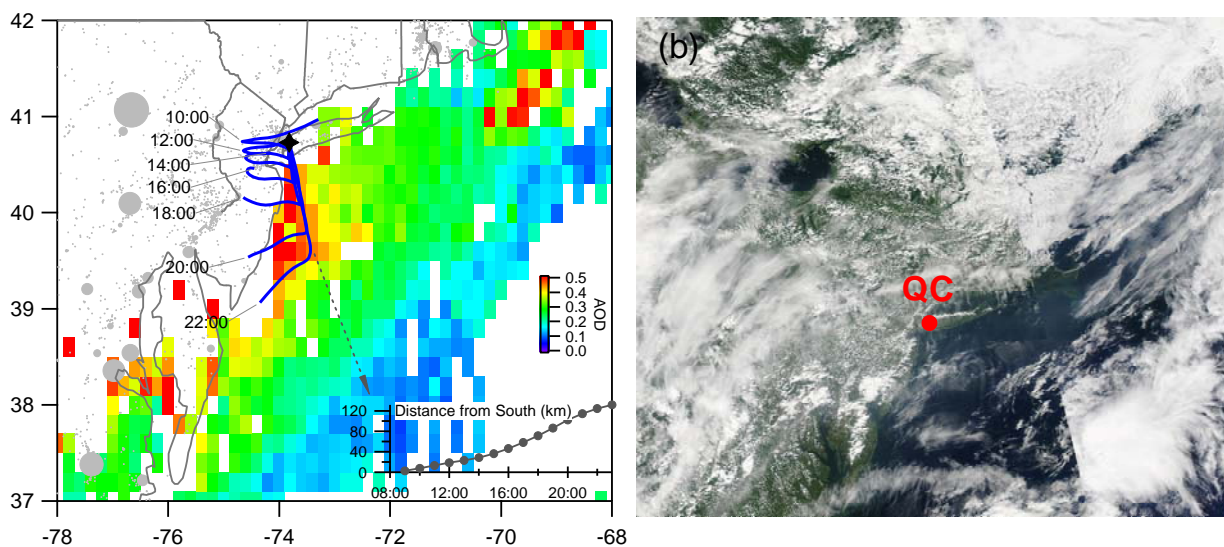
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19 Fig. S1. (a) Mass spectra of HOA and OOA for different size ranges, (b) and (c) show the mass
 20 spectral correlations between HOA / OOA and those identified from 2-component PMF analysis
 21 of bulk mass spectra of OA during this campaign (Ng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



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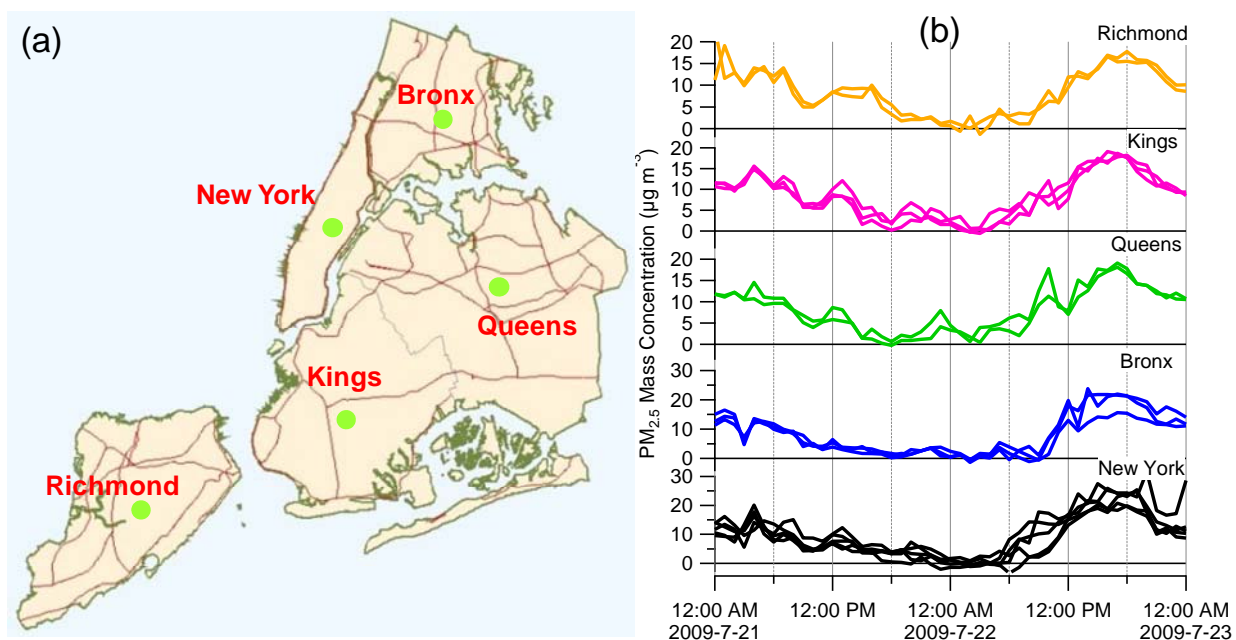
23 Fig. S2. Comparisons of HOA and OOA concentrations over different size ranges from CPCA
 24 with tracer-based method during (a) 14:00 – 18:00, 22 July (OOA: 85%; HOA: 15%), and (b)
 25 5:00 – 9:00, 22 July (OOA: 19%; HOA: 81%).



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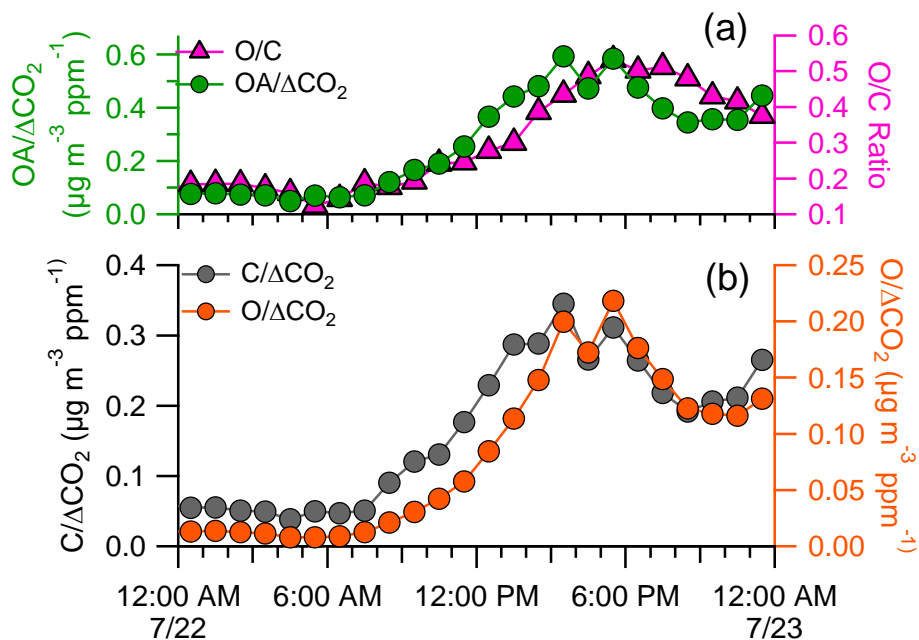
27 Fig. S3. 24-hour back trajectories arriving at QC on 22 July. The average aerosol optical depth
 28 (AOD) on 22 July is shown for a reference. The gray solid circles indicate the intensity of SO₂
 29 emissions in U.S. The inset plot presents the straight distance of trajectories from the south. (b)
 30 shows the MODIS image from Aqua satellite (afternoon) on 22 July
 31 (<http://rapidfire.sci.gsfc.nasa.gov/subsets/?subset=USA4>).

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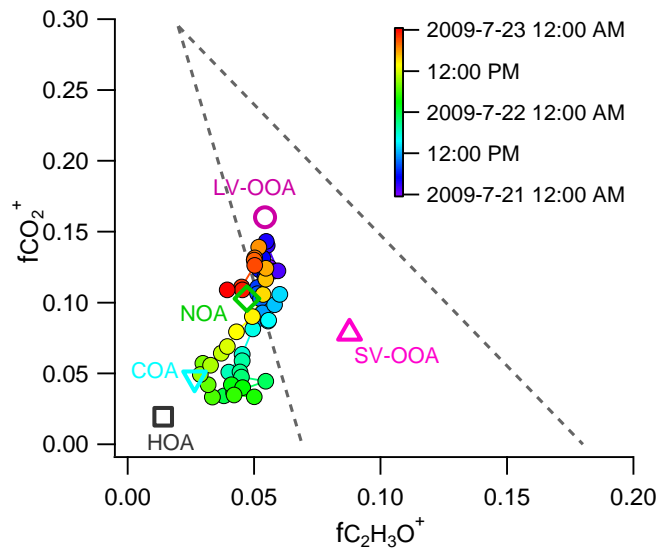
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34 Fig. S4. Variations of $PM_{2.5}$ from TEOM measurements in different regions in New York City
 35 from 21-22 July, 2009. The multiple lines in (b) represent the data from various air monitoring
 36 stations in each region. The map and the data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



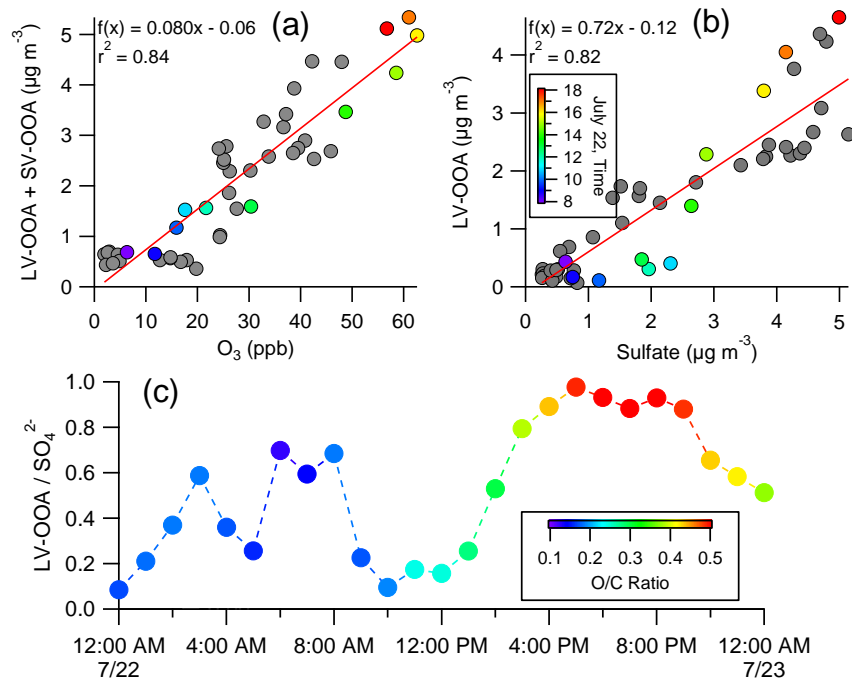
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38 Fig. S5. Variations of (a) $OA/\Delta CO_2$ and O/C ratio, and (b) $C/\Delta CO_2$ and $O/\Delta CO_2$ on 22 July.



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40 Fig. S6. (a) Relationship between $f\text{CO}_2^+$ (fraction of CO_2^+ to total organic signal) and $f\text{C}_2\text{H}_3\text{O}^+$
 41 (fraction of $\text{C}_2\text{H}_3\text{O}^+$ to total organic signal) from 21 – 22 July. The $f\text{CO}_2^+$ vs $f\text{C}_2\text{H}_3\text{O}^+$ for five OA
 42 components are also shown. The dash lines represent the triangle region from Ng et al., (2010).



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

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50 **References:**

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