

1 **Contrasting effects of secondary organic aerosol formations on organic aerosol**
2 **hygroscopicity**

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34 1. Site map

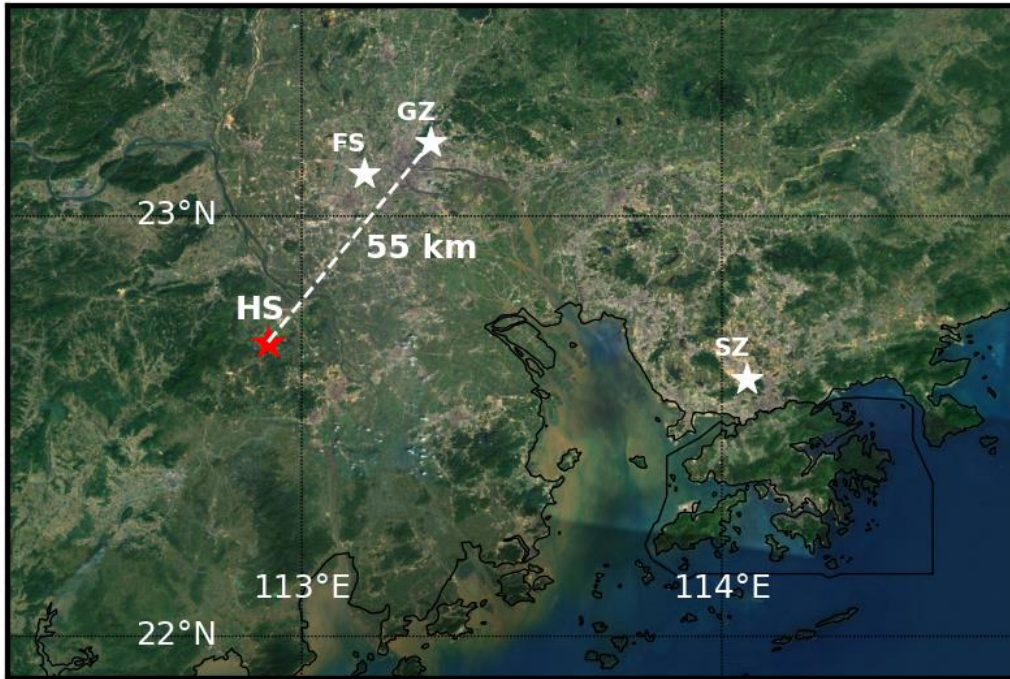


Figure S1. Locations of Heshan (HS) site, and other mega cities (FS:Foshan, GZ:Guangzhou, SZ:Shenzhen) in the Pearl river delta region (map background obtained through python from http://server.arcgisonline.com/ArcGIS/rest/services/ESRI_Imagery_World_2D/MapServer/, Copyright:© 2013 ESRI, i-cubed, GeoEye).

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36 2. Supplementary figures

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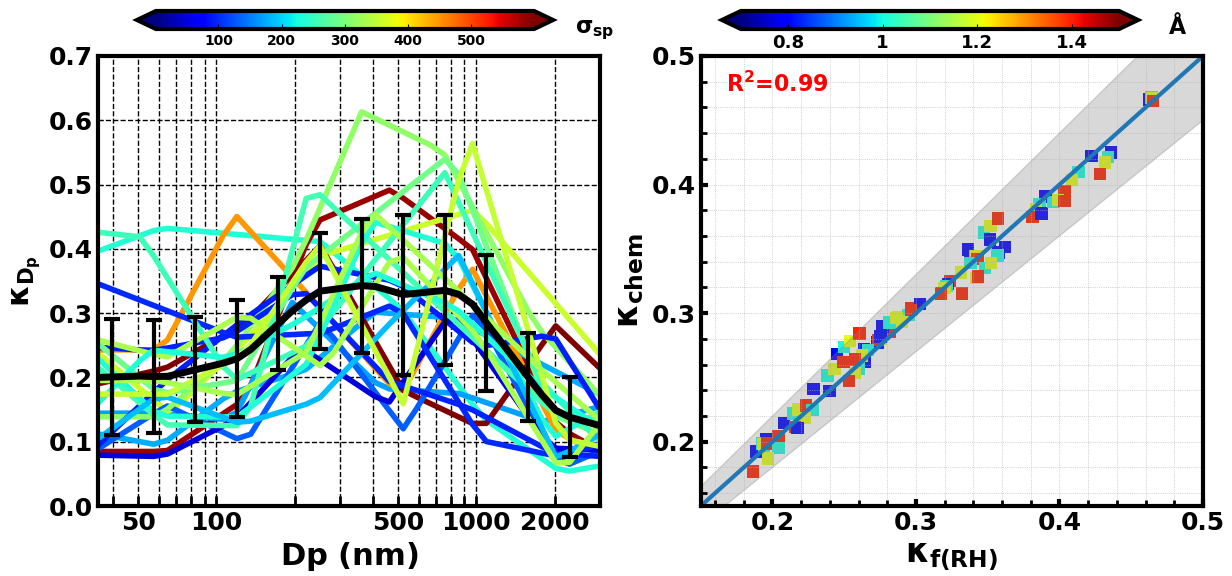


Figure S2. (Left) Size-resolved κ distributions which are derived from measured size-segregated chemical compositions during HaChi campaign, colors represent corresponding values of average σ_{sp} at 550 nm (Mm^{-1}), black solid line is the average size-resolved κ distribution and error bars are standard deviations. (reprint from (Kuang et al., 2018)); **(Right)** Comparison of simulated $\kappa_{f(RH)}$ of PM10 and κ_{chem} of PM1

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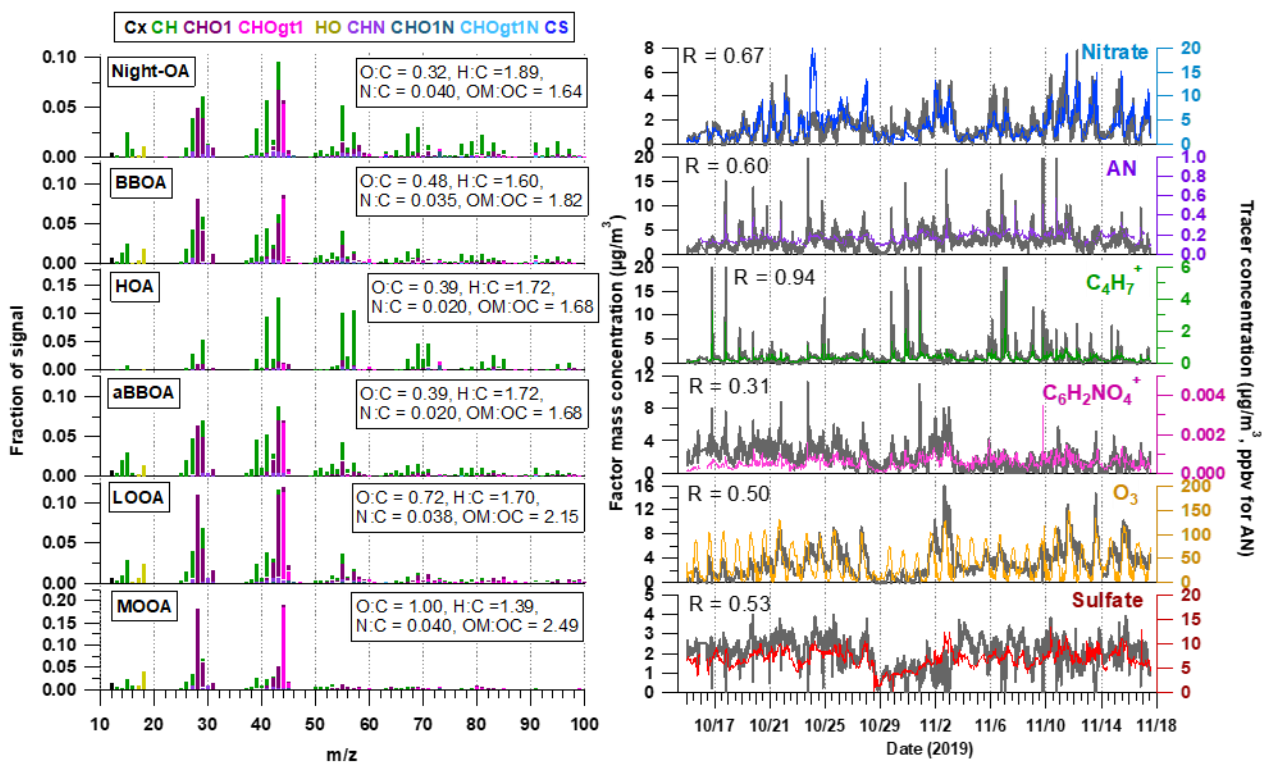
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48 **Figure S3.** (a) Mass spectral profile in family groups and (b) time series of PMF OA components. Also

49 exhibited are concentration variations of tracer compounds on the right axes.

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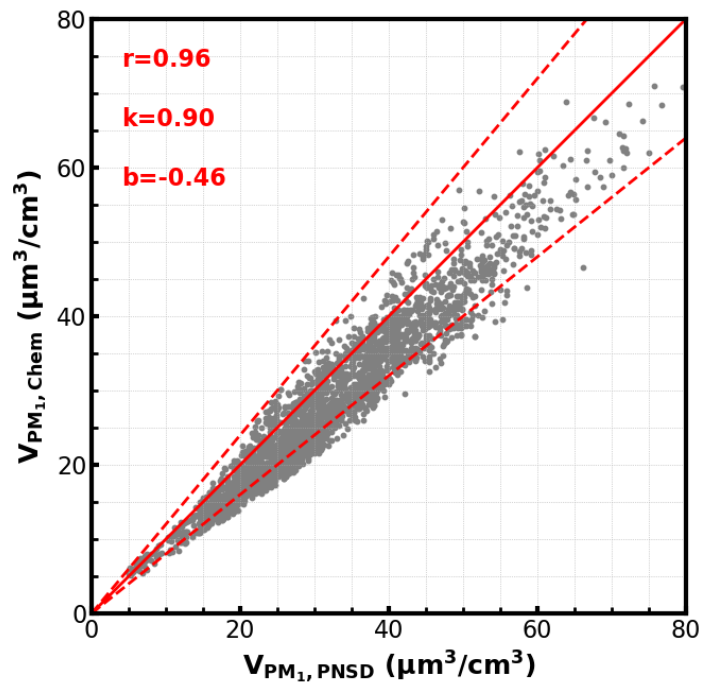
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66 **Figure S4.** Comparison between PM_1 volume concentration derived from SMPS (x-axis) and SP-AMS
 67 (y-axis) measurements. Dashed red lines represent 20% relative difference lines.

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79 Kuang, Y., Zhao, C. S., Zhao, G., Tao, J. C., Xu, W., Ma, N., and Bian, Y. X.: A novel method for calculating ambient aerosol
 80 liquid water content based on measurements of a humidified nephelometer system, *Atmospheric Measurement*
 81 *Techniques*, 11, 2967-2982, 10.5194/amt-11-2967-2018, 2018.

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