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*Supplement of*

## **Assessment of carbonaceous aerosols in Shanghai, China – Part 1: long-term evolution, seasonal variations, and meteorological effects**

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Figure S2. Long-term evolution of annual emissions (green areas; right y axis, unit:  $10^4$  metric ton) and concentrations of  $\text{SO}_2$  (left y axis, unit:  $\mu\text{g m}^{-3}$ ) in Shanghai. The blue lines indicate the annual  $\text{SO}_2$  concentrations (left y axis, unit:  $\mu\text{g m}^{-3}$ ) measured at Pudong supersite, and the lowest and highest of the vertical line representing the 5<sup>th</sup> and 95<sup>th</sup> percentiles, respectively.

Figure S3. Daily traffic flow during four seasons in Shanghai main streets. The original data was collected by Shanghai Traffic Administration Bureau, and provided by Prof. Yan Zhang at Fudan University.

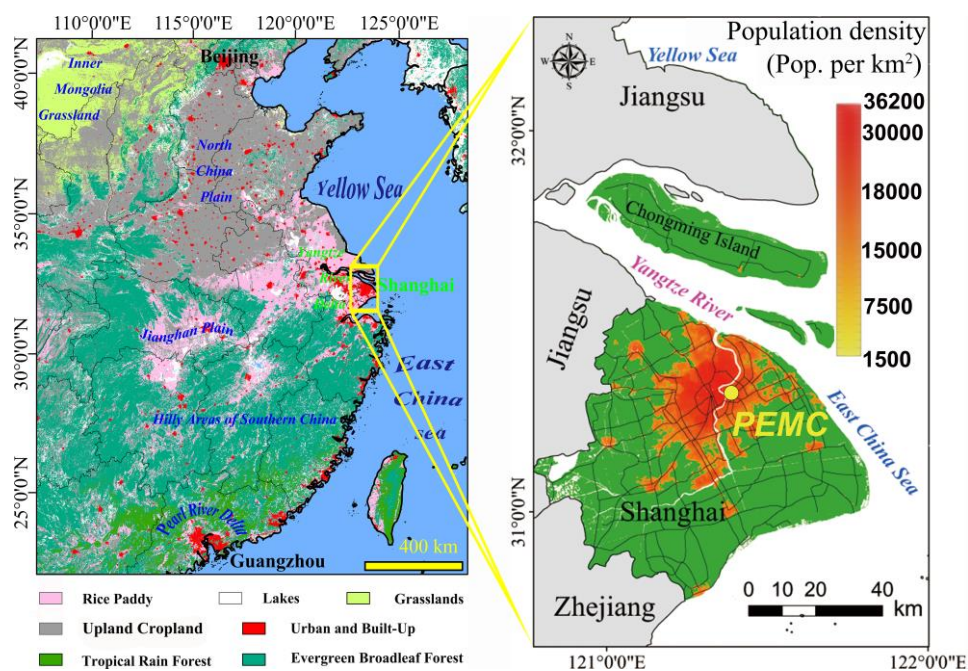
Fig. S4 Bivariate polar plots of seasonal OC concentrations ( $\mu\text{g m}^{-3}$ ) in Shanghai between July 2010 and December 2014. The center of each plot represents a wind speed of zero, which increases radially outward. The concentration of OC is shown by the color scale.

Fig. S5 Bivariate polar plots of seasonal OC/EC ratios in Shanghai between July 2010 and December 2014. The center of each plot represents a wind speed of zero, which increases radially outward. The ratio of OC/EC is shown by the color scale.

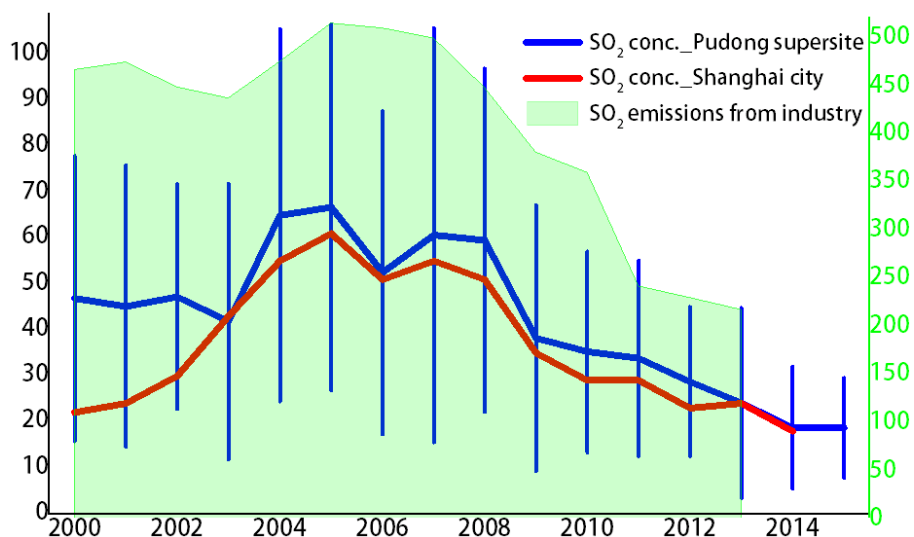
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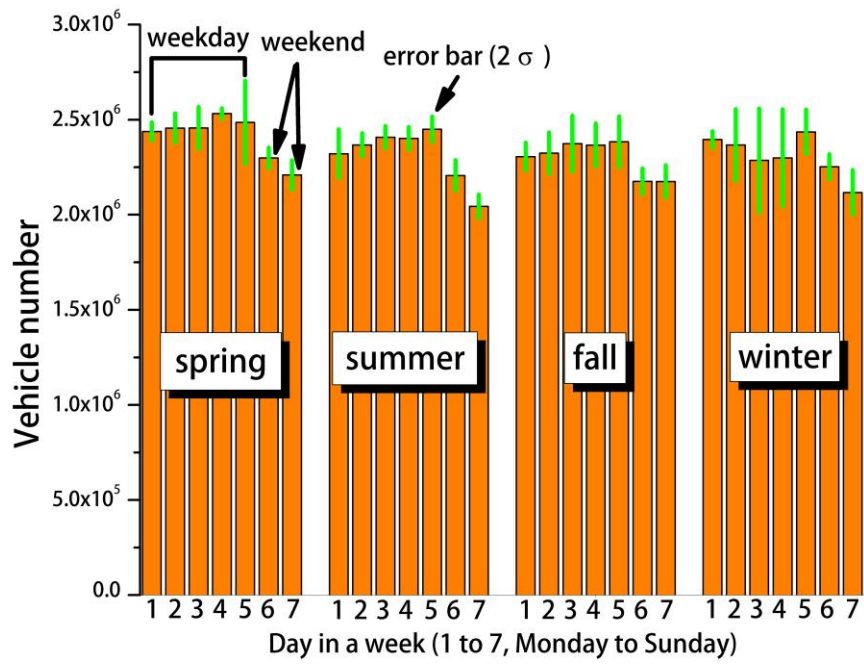
## Figures



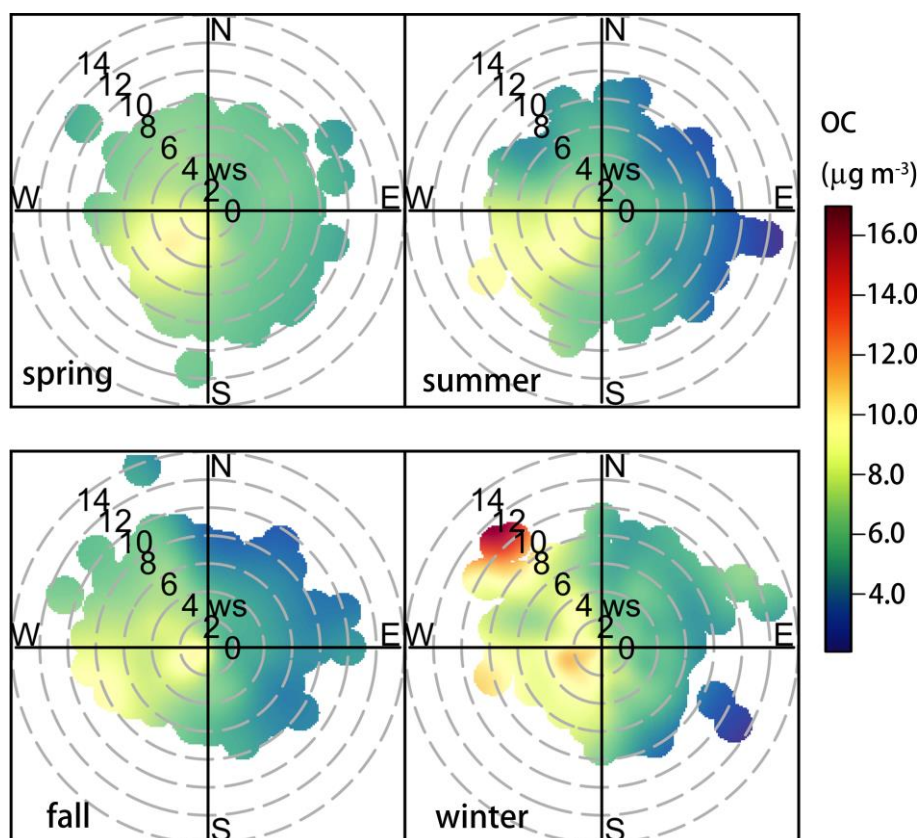
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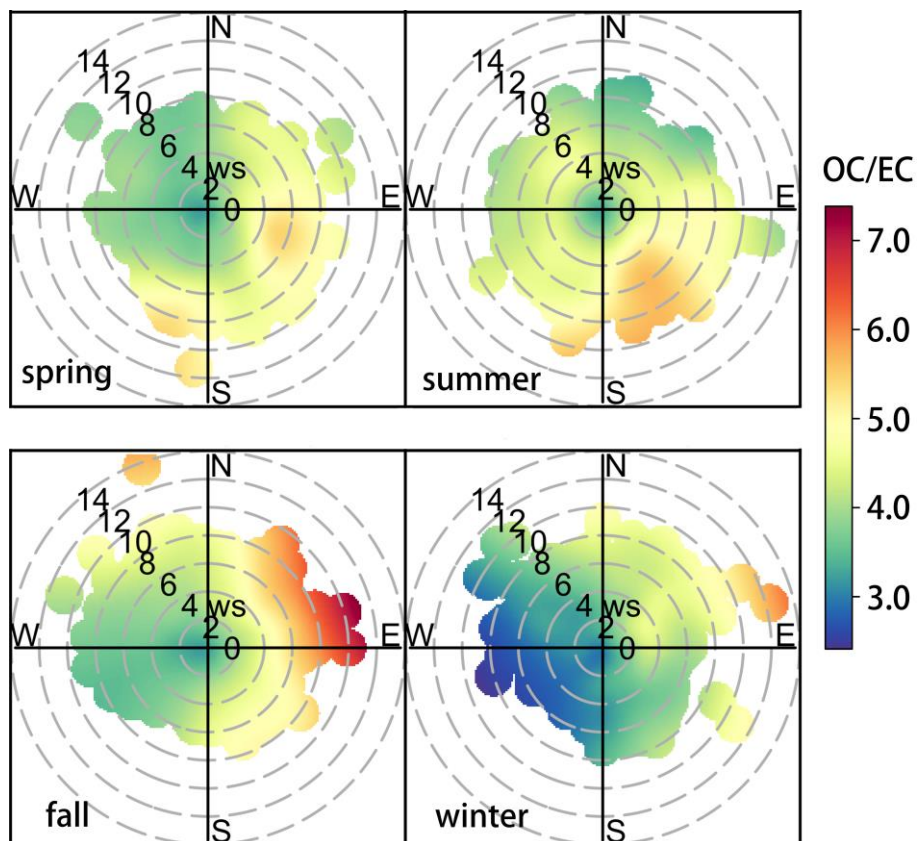
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**Figure S3.** Daily traffic flow during four seasons in Shanghai main streets. The original data was collected by Shanghai Traffic Administration Bureau.



**Figure S4.** Bivariate polar plots of seasonal OC concentrations ( $\mu\text{g m}^{-3}$ ) in Shanghai between July 2010 and December 2014. The center of each plot represents a wind speed of zero, which increases radially outward. The concentration of OC is shown by the color scale.



**Figure S5.** Bivariate polar plots of seasonal OC/EC ratios in Shanghai between July 2010 and December 2014. The center of each plot represents a wind speed of zero, which increases radially outward. The ratio of OC/EC is shown by the color scale.

Table S1. Ambient concentration ( $\mu\text{g m}^{-3}$ ) of carbonaceous aerosols measured in Shanghai, China.

Site name	type	Latitude	Longitude	a.g.l (m)	Sampling period	OC	EC	Reference
Tongji University campus	Urban	37°11'13"N	121°29'58"E	16	20/3/1999-27/3/2000	14.34	6.21	1
Hainan Road	Urban	31°15'13"N	121°29'11"E	18	5/5/1999-20/3/2000	15.43	6.77	1
Tongji University campus	Urban	37°11'13"N	121°29'58"E	16	3/1999-3/2000	14.6	6.1	2
Hainan Road	Urban	31°15'13"N	121°29'11"E	18	3/1999-3/2000	14.6	6.1	2
Yanchang campus of Shanghai University	Urban	31°16'43"N	121°27'11"E	25	10/2005-1,4,7/2006	14.7	2.8	3
Jiading Environmental Monitoring Station	Suburban	31°23'02"N	121°15'09"E	10	10/2005-1,4,7/2006	17.5	3	3
Pudong Environmental Monitoring Station	Urban	31°13'34"N	121°32'19"E	18	19/4/2007-31/12/2008		3.9	4

Reference 1: Ye, B., Ji, X., Yang, H., Yao, X., Chan, C. K., Cadle, S. H., Chan, T., and Mulawa, P. A.: Concentration and chemical composition of PM<sub>2.5</sub> in Shanghai for a 1-year period, *Atmospheric Environment*, 37, 499-510, 2003.

Reference 2: Yang, F., He, K., Ye, B., Chen, X., Cha, L., Cadle, S. H., Chan, T., and Mulawa, P. A.: One-year record of organic and elemental carbon in fine particles in downtown Beijing and Shanghai, *Atmospheric Chemistry and Physics*, 5, 1449-1457, 2005.

Reference 3: Feng, Y. L., Chen, Y. J., Guo, H., Zhi, G. R., Xiong, S. C., Li, J., Sheng, G. Y., and Fu, J. M.: Characteristics of organic and elemental carbon in PM<sub>2.5</sub> samples in Shanghai, China, *Atmospheric Research*, 92, 434-442, 2009.

Reference 4: Wang, X., Chen, R., Meng, X., Geng, F., Wang, C., and Kan, H.: Associations between fine particle, coarse particle, black carbon and hospital visits in a Chinese city, *The Science of the Total Environment*, 458-460, 1-6, 2013.