Supplementary Information

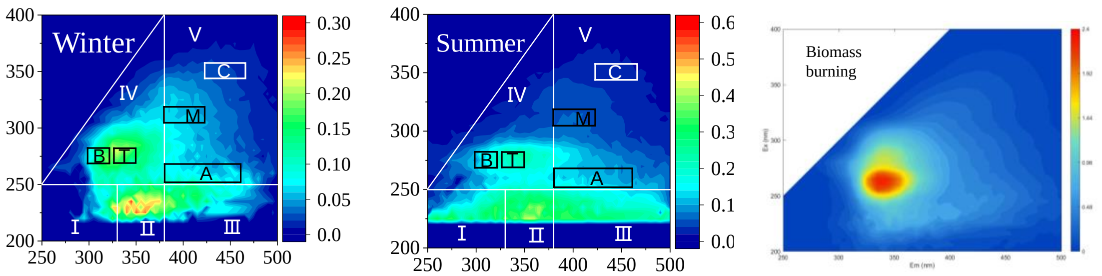
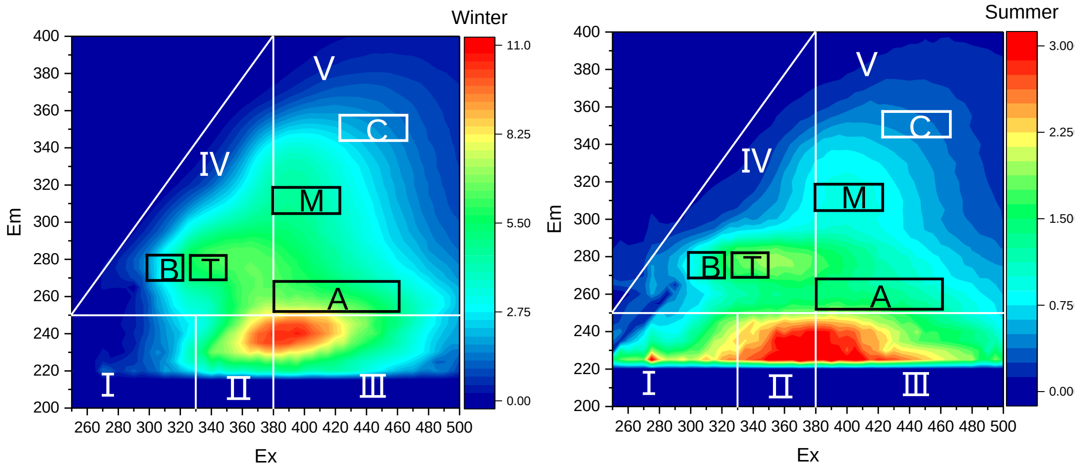
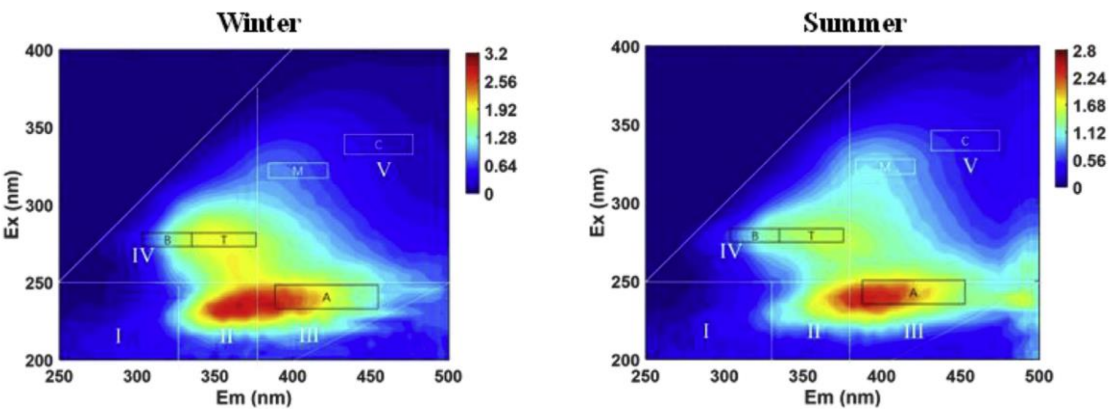


Figure S1 The EEM spectra of coarse mode particles were very alike and the fluorescence regions were accordant with biogenic sources.

(a)



(b)



(c)

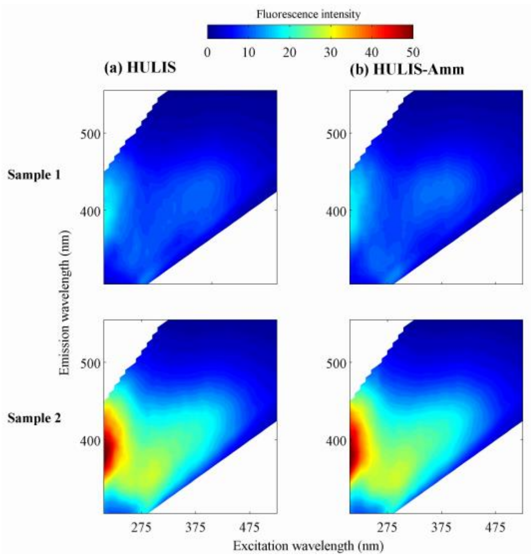


Figure S2 EEM spectra of present research (a) and other studies(b and c). The fluorophores showed many differences of Chen et al.(2016) and Qin et al. (2018).

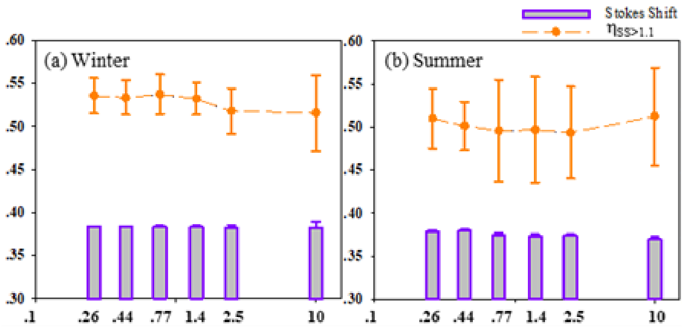


Figure S3 Some fluorescence indices that were not presented in our article. (a) and (b) were the size distribution of average fluorescence intensity of SS (purple bars) and $\eta_{SS>1.1}$ (orange lines) for winter and summer, respectively.

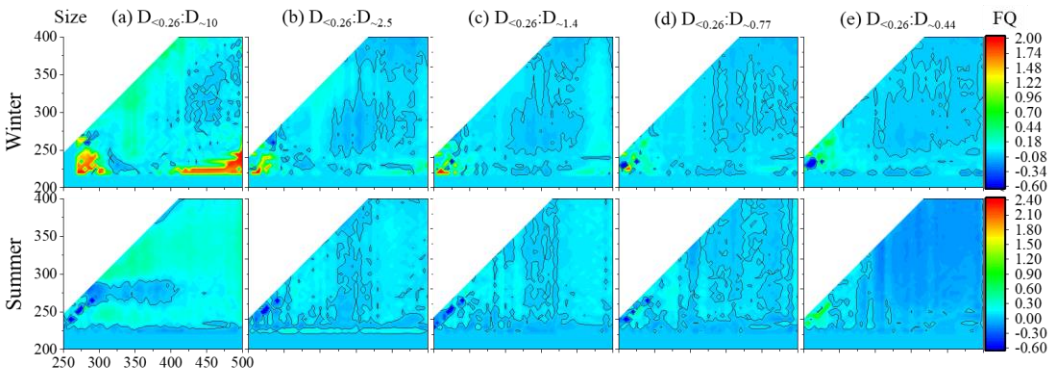


Figure S4 The fluorescence quotient among EEM of particle size <0.26 μm and the particles larger than it. (a) $D_{<0.26}$:$D_{\sim 0.44}$ (b) $D_{\sim 0.44}$:$D_{\sim 0.77}$ (c) $D_{\sim 0.77}$:$D_{\sim 1.4}$ (d) $D_{\sim 1.4}$:$D_{\sim 2.5}$ (e) $D_{\sim 2.5}$:$D_{\sim 10}$

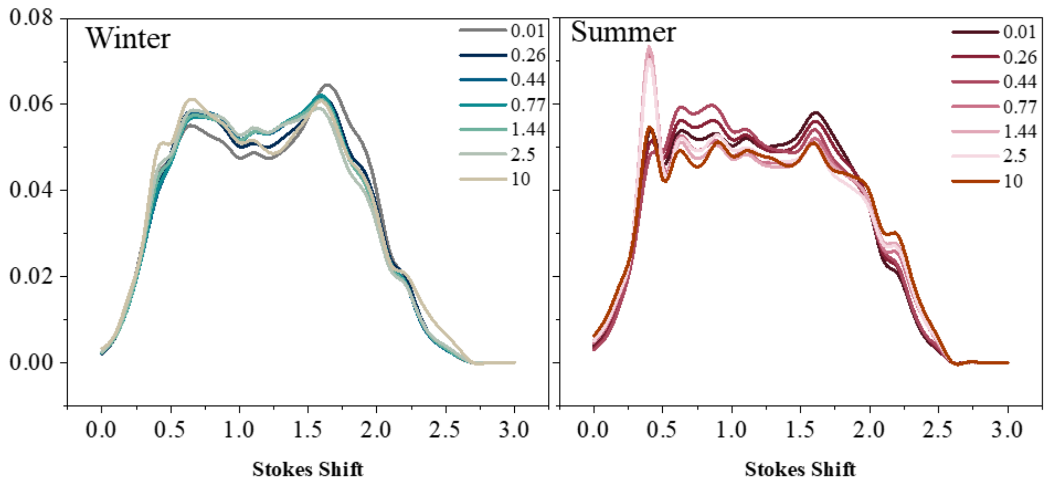


Figure S5 Stokes shift of Fluorescent WSOC in different particle sizes. Hydrophobic fractions tend to have higher intensity in stokes shifts >1.2, possibly as a result of the larger scale of the π conjugated system or higher π-electron density. In contrast, hydrophilic contents (such as polysaccharides) usually have lower aromaticity and, hence, smaller π-conjugated systems.

Table S1 Fluorescence indices of size-segregated WSOC for haze and non-haze days. HIX is the humification degree, BIX is the biological degree and T/C is the fluorescence intensity ratio of peak T and peak C.

		Nonhaze			Haze		
	size	HIX	BIX	T/C	HIX	BIX	T/C
Winter	0.13-	1.5±0.5	1.43±0.05	1.97±0.67	1.39±0.19	1.32±0.08	1.94±0.33
	0.35-	1.37±0.22	1.36±0.14	2.33±0.68	1.55±0.42	1.28±0.12	1.83±0.5
	0.60-	1.39±0.31	1.34±0.12	2.32±0.85	1.56±0.39	1.24±0.09	1.92±0.6
	1.09-	1.27±0.17	1.38±0.12	2.23±0.36	1.48±0.45	1.27±0.11	2.15±0.95
	1.95-	1.21±0.24	1.23±0.04	2.35±0.6	1.26±0.37	1.19±0.07	2.43±0.92
	6.25-	0.53±1.16	1.22±0.16	1.84±1.35	0.88±0.24	1.31±0.24	2.87±0.67
Summer	0.13-	1.63±0.26	1.06±0.03	1.14±0.06	1.32±0.27	1.01±0.1	1.04-2.34
	0.35-	1.76±0.12	1.03±0.09	1.06±0.19	1.61±0.21	0.93±0.03	0.83-1.49
	0.60-	1.24±0.11	1.11±0.18	1.36±0.22	1.26±0.29	1.02±0.05	0.8-2.14
	1.09-	1.05±0.2	1.04±0.07	1.58±0.42	1.14±0.25	0.98±0.06	0.95-2.56
	1.95-	1.07±0.11	1.08±0.11	1.97±0.67	1.19±0.25	0.9±0.04	1.09-2.42
	6.25-	1.04±0.12	1.18±0.29	2.28±0.73	0.91±0.16	0.98±0.06	1.16-4.36

References

Chen, Q C, F Ikemori and M Mochida, 2016. Light Absorption and Excitation-Emission Fluorescence of Urban Organic Aerosol Components and Their Relationship to Chemical Structure. Environ. Sci. Technol. 50: 10859-10868.

Qin, J, L Zhang, X Zhou, et al., 2018. Fluorescence fingerprinting properties for exploring water-soluble organic compounds in PM 2.5 in an industrial city of northwest China. Atmos. Environ. 184: 203-211.