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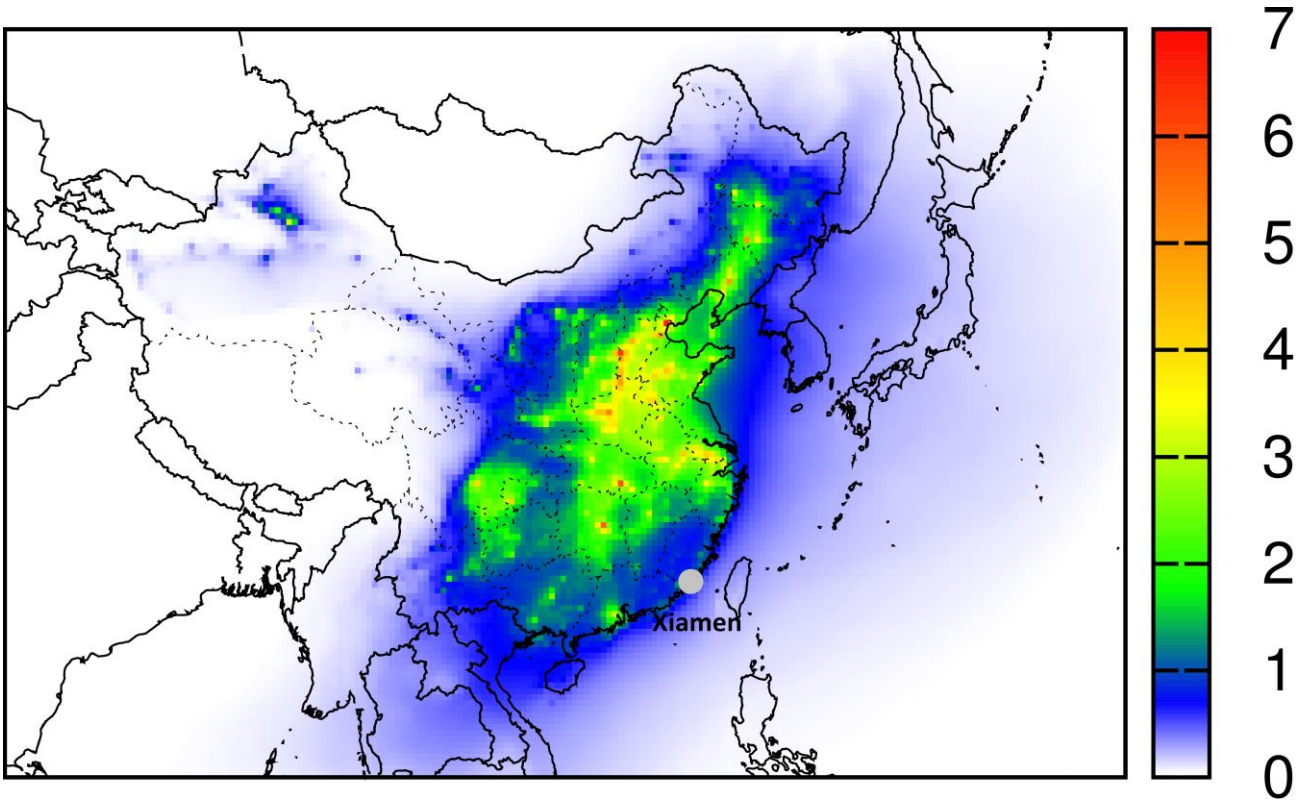
*Supplement of*

## **Source apportionment of black carbon aerosols from light absorption observation and source-oriented modeling: an implication in a coastal city in China**

**Junjun Deng et al.**

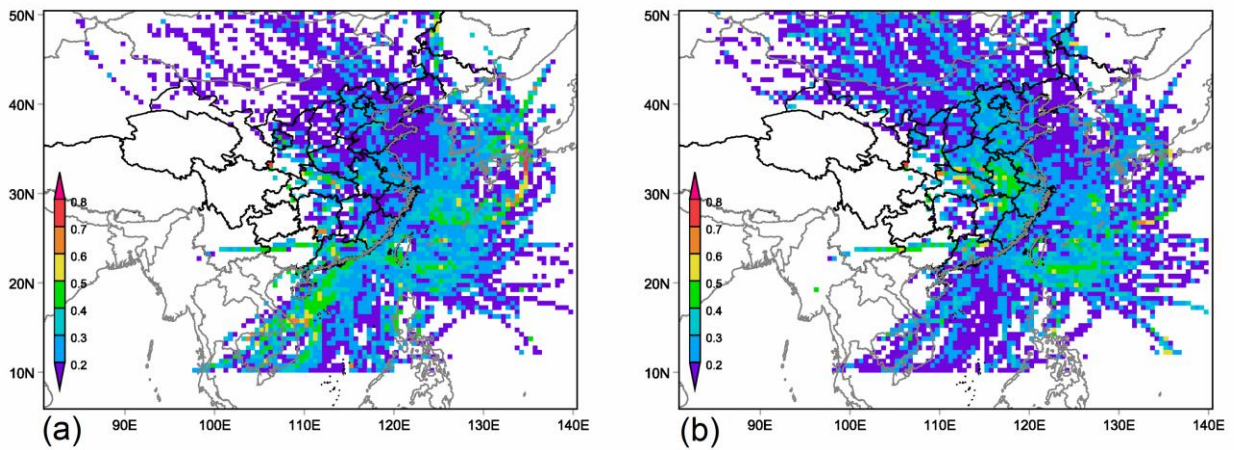
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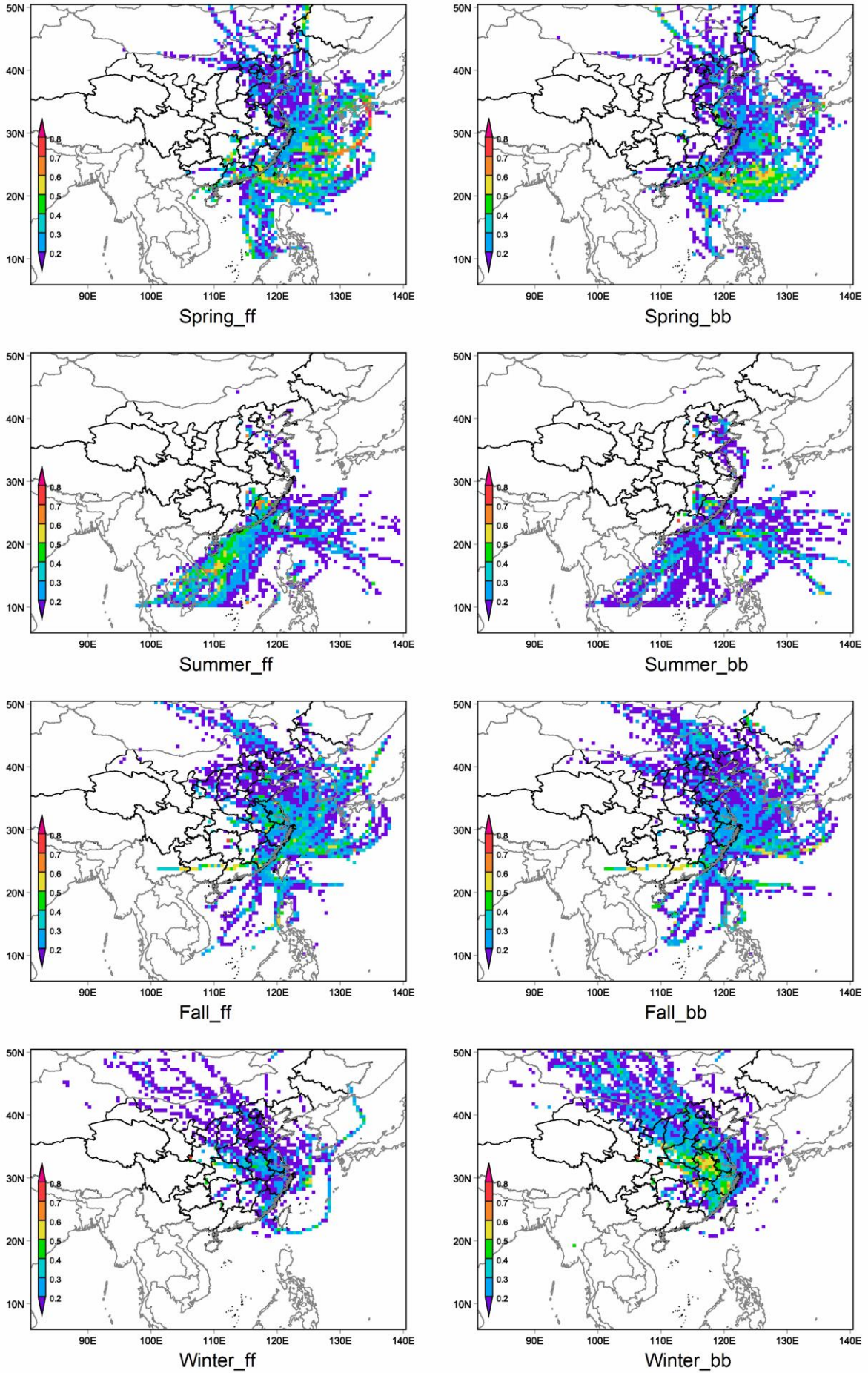
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Figure S1. Spatial distributions of annual average BC concentrations ( $\mu\text{g m}^{-3}$ ) in our domain.



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Figure S2. Potential source contribution function (PSCF) maps for (a)  $\text{BC}_{\text{ff}}$  and (b)  $\text{BC}_{\text{bb}}$  in Xiamen in 2014.

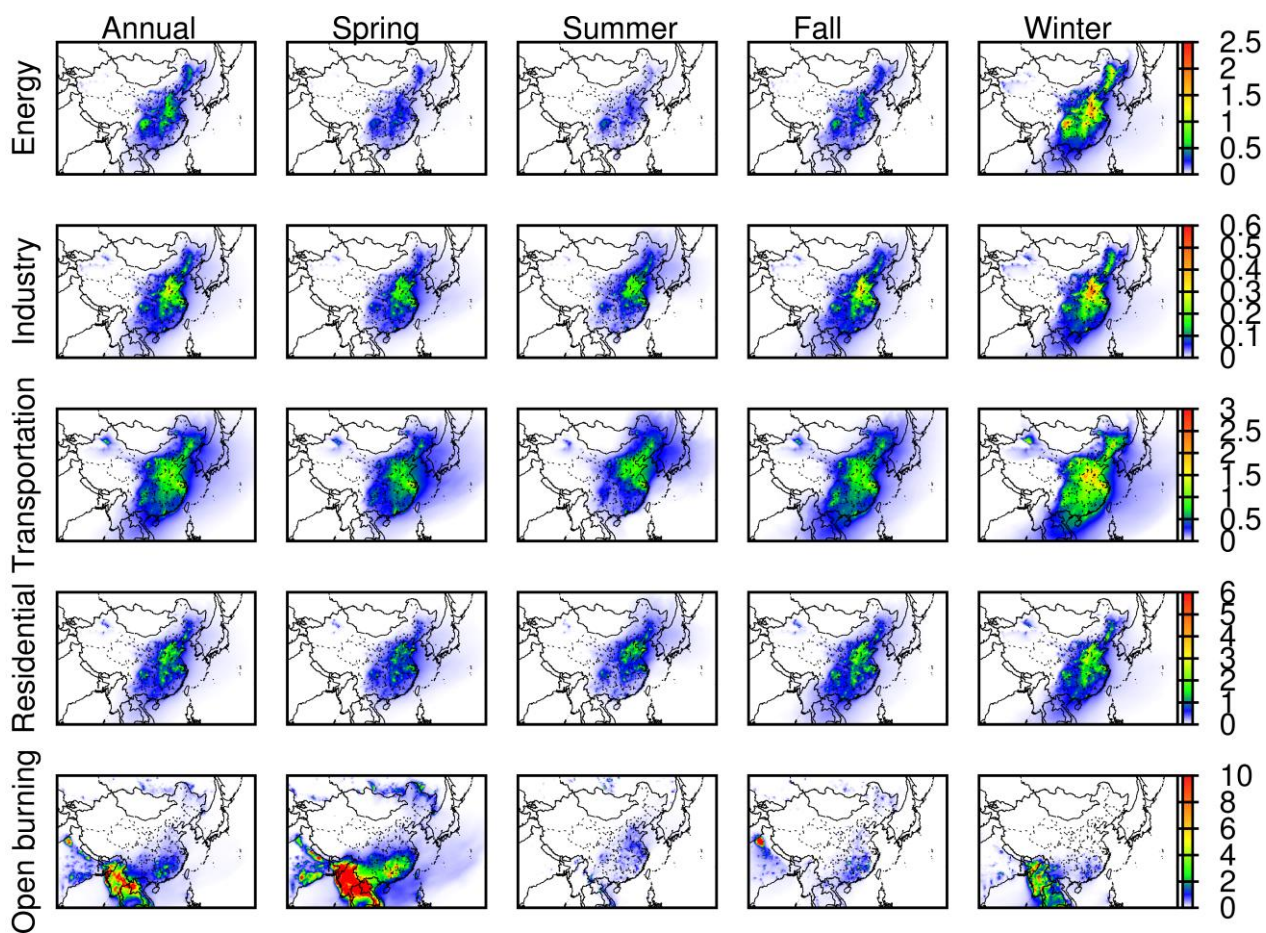


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17 **Figure S3. Potential source contribution function (PSCF) maps for  $BC_{ff}$  and  $BC_{bb}$  in Xiamen for different**

18 seasons in 2014.

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21 **Figure S4. Regional distributions of BC concentrations in five source sectors.**

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**Table S1.** AAE values for fossil fuel ( $\alpha_{ff}$ ) and biomass burning ( $\alpha_{bb}$ ) adopted in literature.

$\alpha_{ff}$	$\alpha_{bb}$	References
1.1	1.8–1.9	Sandradewi et al., 2008
1.0	2.0	Favez et al., 2010
0.9	1.9	Herich et al., 2011
1.1	2.0	Sciare et al., 2011
0.9	1.9	Kirchstetter and Thatcher, 2012
1.05	2.0	Harrison et al., 2012
1.0	2.2	Mohr et al., 2013
1.0	2.0	Crippa et al., 2013
0.96	2.0	Fuller et al., 2014
1.04	1.9	Liu et al., 2014
1.0	2.0	Crilley et al., 2015
0.9	1.7	Elser et al., 2016
0.9	1.68	Zotter et al., 2017
1.1	2.0	Rajesh and Ramachandran, 2017
0.9	2.09	Healy et al., 2017
1.1	2.0	Titos et al., 2017
0.97–1.12	1.63–1.74	Becerril-Valle et al., 2017
1.0	1.81	Martinsson et al., 2017
1.0	2.0	Petit et al., 2017
1.0	2.0	Vaishya et al., 2017
0.95/1.1	1.6	Helin et al., 2018
0.9	2.09	Mousavi et al., 2018
0.9	2.0	Kalogridis et al., 2018
0.9	1.82	Mousavi et al., 2019
1.0	2.0	Xiao et al., 2020

25 **Table S2.** Relative contributions (%) of fossil fuel ( $BC_{ff}$ ) and biomass burning ( $BC_{bb}$ ) to BC derived from the  
 26 Aethalometer method at different locations.

Location	Study period	$BC_{ff}$	$BC_{bb}$	References
Xiamen, China	2014	66.7	33.3	This study
Nanjing, China	2015–2016	81	19	Xiao et al., 2020
Delhi, India	2011.12–2012.03	94	6	Tiwari et al., 2015
Delhi, India	2015.12–2016.02	72	28	Dumka et al., 2018
Ahmedabad, India	2014.01–2015.12	77–84	16–23	Rajesh and Ramachandram, 2017
Gorakhpur, India	2013.08–2015.07	74	26	Vaishya et al., 2017

Chiang Mai, Thailand	2016.03–2016.05	36	64	Pani et al., 2020
Los Angeles, USA	2012–2013, 2016–2017	91	9	Mousavi et al., 2018
Ontario, Canada	2015.06–2016.05	74–88	12–26	Healy et al., 2017
Athens, Greece	2014.12–2015.02	67–71	29–33	Kalogridis et al., 2018
Zurich-Kaserne, Switzerland	2009.04–2010.10	76–90	10–24	Herich et al., 2011
Payerne, Switzerland	2008.03–2010.10	67–94	6–33	Herich et al., 2011
Magadino-Cadenazzo, Switzerland	2008.03–2010.10	70–98	2–30	Herich et al., 2011
Roveredo, Switzerland	2004.12–2005.01	49	51	Sandradewi et al., 2008
Granada, Spain	2014.11–2015.11	53	47	Titos et al., 2017
NAOK, Czech	2013–2017	67.4–74.9	25.6–33.5	Mbengue et al., 2020
London, UK	2009–2011	77–89	11–23	Fuller et al., 2014

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28 **Table S3.** Mean concentrations of BC, BC<sub>ff</sub>, and BC<sub>bb</sub> (ng m<sup>-3</sup>) of each cluster in different seasons.

	Cluster	BC	BC <sub>ff</sub>	BC <sub>bb</sub>
Spring	C1	4759	3381	1378
	C2	4342	3030	1312
	C3	3620	2229	1391
	C4	5632	4133	1509
Summer	C1	3792	2549	1243
	C2	3832	2680	1152
	C3	3910	2840	1070
	C4	3579	2305	1274
Fall	C1	4848	3412	1436
	C2	4379	2939	1440
	C3	3570	2199	1371
	C4	4050	2779	1280
Winter	C1	4587	2890	1697
	C2	3717	2105	1612
	C3	3779	2361	1418
	C4	4131	2816	1315

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