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*Supplement of*

## **Patterns in atmospheric carbonaceous aerosols in China: emission estimates and observed concentrations**

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# SUPPLEMENT

## Number of tables: 4

Table S1. The emission factor database of EC and OC for transportation, expressed as the mass fraction of PM<sub>2.5</sub>.

Table S2. The estimated emissions of EC and OC by source for China 2000-2012 (Unit: Gg).

Table S3. The analytical methods used for measuring residential OC and EC emission factors that are incorporated in current emission inventory.

Table S4. Annual average OC and EC levels in PM<sub>2.5</sub> ( $\mu\text{g m}^{-3}$ ) and OC/EC ratios by category of measurement site.

## Number of figures: 5

Figure S1. The time-series trend in EC EF of residential coal combustion and the fraction of briquette use in residential coal combustion at national scale for 2000-2012.

Figure S2. Locations of ground observation sites at which carbonaceous aerosol levels summarized in Table S4 were measured.

Figure S3. The seasonal distribution of data points included in OC/EC analysis for the period 2000-2005 and 2006-2010, expressed as %. The numbers in the parentheses indicate the total number of data points.

Figure S4. Similar as Fig 4, for studies applying IMPROVE\_TOR. Rural and remote sites are merged, so are suburban and urban sites, attributed mainly to less data points available from a given analytical method.

Figure S5. Similar as Fig 4, for studies applying NIOSH\_TOT. Rural and remote sites are merged, so are suburban and urban sites, attributed mainly to less data points available from a given analytical method.

**Table S1. The emission factor database of EC and OC for transportation, expressed as the mass fraction of PM<sub>2.5</sub>. The percentages in the parentheses after probability distribution types indicate the confidence intervals (CV).**

	PM <sub>2.5</sub> emission factor (g/kg-fuel)										Carbonaceous fraction to PM <sub>2.5</sub>			
	Pre-stage I		Stage I		Stage II		Stage III		Stage IV		EC		OC	
	Value	Distribution	Value	Distribution	Value	Distribution	Value	Distribution	Value	Distribution	Value	Distribution	Value	Distribution
On-road														
Diesel vehicle											43% (24-86%) <sup>1</sup>	Gamma	37% (1-72%) <sup>1</sup>	Logistic
LDDV	4.67	Lognormal (69%)	2.35	Lognormal (69%)	1.22	Lognormal (67%)	0.97	Lognormal (67%)	0.41	Lognormal (67%)				
LDDT	7.50	Lognormal (69%)	2.30	Lognormal (69%)	1.50	Lognormal (67%)	0.45	Lognormal (67%)	0.36	Lognormal (67%)				
HDDV	3.00	Lognormal (54%)	2.20	Lognormal (54%)	2.04	Lognormal (71%)	0.99	Lognormal (58%)	0.73	Lognormal (67%)				
Gasoline vehicle											2-81%	Uniform	3-65%	Uniform
LDGV	0.30	Lognormal (59%)	0.17	Lognormal (59%)	0.12	Lognormal (34%)	0.05	Lognormal (34%)	0.05	Lognormal (34%)				
LDGT1	0.25	Lognormal (59%)	0.14	Lognormal (59%)	0.14	Lognormal (34%)	0.05	Lognormal (34%)	0.05	Lognormal (34%)				
LDGT2	0.40	Lognormal (59%)	0.22	Lognormal (59%)	0.07	Lognormal (34%)	0.07	Lognormal (34%)	0.07	Lognormal (34%)				
HDGV	0.40	Lognormal (59%)	0.22	Lognormal (59%)	0.07	Lognormal (34%)	0.07	Lognormal (34%)	0.07	Lognormal (34%)				
MC	6.00	Lognormal (100%)	1.95	Lognormal (100%)	1.20	Lognormal (100%)	0.60	Lognormal (100%)	-	-				
Non-road											4-84%	Uniform	1-32%	Uniform
Railway	3.00		3.00		-		-		-					
Shipping	2.20		0.73		-		-		-					
Construction machine	6.70		3.79		1.71		-		-					
Tractor	13.3		7.51		3.39		-		-					
Rural vehicle	3.99		3.39		3.39		-		-					
Rural machine	4.40		2.49		1.12		-		-					

<sup>1</sup> 95% confidence interval (CI)

**Table S2. The estimated emissions of EC and OC by source for China 2000-2012 (Unit: Gg).**

Source category	EC													OC												
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Coal-fired power plant</b>	11	12	12	14	15	16	13	12	10	6	5	6	6	2	2	2	2	2	2	2	1	1	0	0	0	0
<b>Industry</b>	436	448	462	532	523	564	499	519	557	587	592	533	607	392	410	418	494	484	518	463	463	483	506	500	438	488
Cement production	17	19	15	24	23	22	22	23	16	16	12	11	11	43	48	36	59	57	55	56	56	41	41	31	27	27
Iron and steel plants	162	174	185	243	234	225	208	206	256	280	298	263	325	157	171	183	238	232	234	215	212	256	275	290	257	311
Lime production	0	1	2	3	4	4	6	4	4	5	5	5	3	1	2	3	5	6	7	10	8	8	8	9	9	8
Brick and tile production	160	158	164	158	154	179	144	143	132	134	121	96	101	160	158	164	158	154	179	144	143	132	134	121	96	90
Other industrial combustion	97	96	96	104	108	134	119	143	149	152	156	158	167	31	31	32	34	35	43	38	44	46	48	49	49	52
Coal	91	92	91	98	101	126	105	128	134	137	140	142	151	26	26	26	28	28	35	30	36	38	39	40	40	42
Oil	5	3	4	5	5	6	14	15	15	14	15	15	15	2	2	2	2	2	3	7	7	7	7	7	7	8
Gas	1	1	1	1	2	2	0	0	0	1	1	1	1	3	3	4	4	5	5	1	1	1	2	2	2	2
<b>Transportation</b>	212	234	221	230	244	257	261	276	268	281	296	305	311	98	111	104	105	109	137	114	119	118	126	131	134	136
On-road	52	62	58	54	53	55	51	52	52	58	60	58	59	45	54	50	47	46	70	44	45	46	51	52	51	51
Non-road	160	172	163	176	191	202	210	224	216	223	236	247	252	53	57	54	58	63	67	70	74	72	75	79	83	85
<b>Residential and commercial</b>	697	736	797	804	832	894	901	850	869	903	883	911	933	1636	1709	1807	1790	1885	2040	2044	1930	1986	2032	2020	2077	2125
Fossil fuel combustion	244	251	244	235	244	283	283	273	312	334	352	378	398	371	382	374	364	388	465	435	419	477	511	539	573	602
Coal	239	245	238	229	237	278	269	258	297	317	331	355	372	369	379	371	361	385	462	429	411	469	502	528	561	589
Oil	5	6	6	6	7	5	14	15	15	17	21	23	26	2	3	3	3	3	2	6	7	7	8	10	11	12
Gas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
Biomass combustion	453	485	553	569	588	611	618	577	557	569	531	533	535	1265	1327	1433	1426	1497	1575	1609	1511	1509	1521	1481	1504	1523
Biofuel	402	434	502	521	535	558	562	520	498	510	471	471	471	789	852	958	980	1005	1079	1087	984	958	972	927	927	927
Straw open burning	51	51	51	48	53	53	56	57	59	59	60	62	64	476	475	475	446	492	496	522	527	551	549	554	577	596
<b>Total</b>	1356	1431	1492	1578	1613	1731	1675	1658	1706	1777	1777	1754	1857	2127	2231	2330	2391	2483	2697	2624	2514	2588	2661	2650	2648	2749

**Table S3. The analytical methods used for measuring residential OC and EC emission factors that are incorporated in current emission inventory.**

	Reference	Sampling size	Analytical methods (instrument)
Biofuel	Li et al. (2007)	9	IMPROVE_TOR <sup>a</sup> (DRI 2001)
	Cao et al. (2008)	4	IMPROVE_TOR (DRI 2001)
	Li et al. (2009)	12	IMPROVE_TOR (DRI 2001)
	Shen et al. (2010)	9	NIOSH_TOT <sup>b</sup> (Sunset)
	Shen et al. (2012)	18	NIOSH_TOT (Sunset)
	H. Zhang et al. (2012)	1	IMPROVE_TOR (DRI 2001)
	Wei et al. (2013)	9	NIOSH_TOT (Sunset)
	Wei et al. (2014)	8	NIOSH_TOT (Sunset)
Coal	Chen et al. (2005)	6	NIOSH_TOT (Sunset)
	Chen et al. (2006)	9	NIOSH_TOT (Sunset)
	Liu et al. (2007)	6	NIOSH_TOT (Sunset)
	Zhi et al. (2008)	9	NIOSH_TOT (Sunset)
	Zhang et al. (2008)	3	NIOSH_TOT (Sunset)
	Zhi et al. (2009)	6	NIOSH_TOT (Sunset)
	Shen et al. (2010)	4	NIOSH_TOT (Sunset)
	H. Zhang et al. (2012)	1	IMPROVE_TOR (DRI 2001)
	Shen et al. (2013)	2	NIOSH_TOT (Sunset)

<sup>a</sup> Thermal/optical reflectance (TOR) method with IMPROVE (Interagency Monitoring of Protected Visual Environments) protocol.

<sup>b</sup> Thermal/optical transmission (TOT) method with NIOSH (National Institute of Occupational Safety and Health) protocol.

**Table S4. Annual average OC and EC levels in PM<sub>2.5</sub> (µg m<sup>-3</sup>) and OC/EC ratios by category of measurement site.**

Location <sup>a</sup>	Period	OC	EC	OC/EC	Analytic methods (instrument)	Reference
<b>Urban</b>						
Xian	Jan 2003, Jun-Jul 2003	64.8	14.3	4.4	IMPROVE_TOR <sup>b</sup> (DRI 2001)	Cao et al. (2007)
	Jan-Dec 2004	36.4	8.4	4.6	IMPROVE_TOR (DRI 2001)	Han et al. (2010)
	Dec 2007, Jun 2008	32.6	13.0	2.6	IMPROVE_TOR (DRI 2001)	Zhu et al. (2014)
	Jan 2004-Dec 2008	28.3	12.0	2.4	IMPROVE_TOR (DRI 2001)	Cao et al. (2012)
	Jul 2008-Jun 2009	21.5	7.6	2.7	IMPROVE_TOR (DRI 2001)	T. Zhang et al. (2014)
	Dec 2009, Jan, Jul, Aug 2010	26.5	5.7	4.6	IMPROVE_TOR (DRI 2001)	C. Zhang et al. (2013)
Shijiazhuang	Apr 2009-Feb 2010	26.4	9.7	2.7	IMPROVE_TOR (DRI 2001)	P. Zhao et al. (2013)
Changchun	Jan 2003, Jun-Jul 2003	25.9	8.2	3.2	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
Jinan	Mar 2006-Feb 2007	22.2	4.1	5.4	NIOSH_TOT <sup>c</sup>	Yang et al. (2012)
	2010	18.0	5.5	3.2	IMPROVE_TOR (DRI 2001)	Gu et al. (2014)
Beijing	Jul 1999-Jun 2000	23.9	8.79	2.9	IMPROVE_TOR (DRI 2001)	Yang et al. (2005)
	Jun-Jul 2002, Dec 2002	23.7	10.5	2.9	(C/H/N elemental analyzer)	Dan et al. (2004)
	Aug 2001-Sep 2002	22.9	10.3	2.2	(C/H/N elemental analyzer)	Duan et al. (2006)
	Jun, Dec 2002	21.4	5.7	3.8	NIOSH_TOT (Sunset)	Feng et al. (2006b)
	Jan-Dec 2005	20.1	7.1	2.8	IMPROVE_TOR (DRI 2001)	Wang et al. (2011)
	Mar 2005-Feb 2006	24.5	8.2	3.0	IMPROVE_TOR (DRI 2001)	Yang et al. (2011)
	Nov 2005-Oct 2006	15	5.8	2.6	NIOSH_TOT (Sunset)	Lin et al. (2009)
	2005-2008	22.1	9	2.4	EnCan Total 900c (Sunset)	Yang et al. (2011)
	Mar-Dec 2006	25.9	6.1	4.2	IMPROVE_TOR (DRI 2001)	Zhou et al. (2012)
	Apr 2009-Feb 2010	10.7	3.9	2.8	IMPROVE_TOR (DRI 2001)	P. Zhao et al. (2013)
	Apr, Jul, Oct 2009, Jan 2010	16.9	5.0	2.8	IMPROVE_TOR (DRI 2001)	R. Zhang et al. (2013)
Chengde	Apr 2009-Feb 2010	19.0	7.3	2.6	IMPROVE_TOR (DRI 2001)	P. Zhao et al. (2013)
Harbin	Aug 2008-May 2009	19.5	7.0	2.8	(C/H/N elemental analyzer)	Huang et al. (2011)
Tianjin	Jan 2003, Jun-Jul 2003	27.7	6.1	4.7	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
	Aug-Dec 2006	23.9	5.5	4.2	IMPROVE_TOR (DRI 2001)	Dong et al. (2013)
	Jan, Apr, Jul 2007	23.2	5.2	4.5	IMPROVE_TOR (DRI 2001)	Li and Bai (2009)
	Dec 2007-Oct 2008	22.9	7.8	2.9	IMPROVE_TOR (DRI 2001)	Wu et al. (2009)
	Jan, Apr, Jul, Oct 2008	16.9	5.7	2.9	IMPROVE_TOR (DRI 2001)	Gu et al. (2010)
	Apr 2009-Feb 2010	18.8	6.9	2.7	IMPROVE_TOR (DRI 2001)	P. Zhao et al. (2013)
Qingdao	Jan 2003, Jun-Jul 2003	15.8	3.9	3.9	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
Average for northern cities (all data included)		23.9	7.5	3.3		
Average for northern cities (IMPROVE_TOR)		24.8	7.5	3.4		
Chongqing	Jan 2003, Jun-Jul 2003	50.9	12.3	4.0	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
	Mar 2005-Feb 2006	30.1	6.4	4.7	IMPROVE_TOR (DRI 2001)	Yang et al. (2011)
	May 2012-Apr 2013	15.2	4.0	3.8	NIOSH_TOT (Sunset)	Chen et al. (2014)
Wuhan	Jan 2003, Jun-Jul 2003	26.2	5.7	4.7	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
	Jul 2011-Feb 2012	19.4	2.9	6.7	NIOSH_TOT (Sunset)	Cheng et al. (2012)
Chengdu	Apr 2009-Jan 2010	22.3	9	2.5	IMPROVE_TOR (DRI 2001)	Tao et al. (2013)
	May 2012-Apr 2013	19	4.6	4.3	NIOSH_TOT (Sunset)	Chen et al. (2014)
Hangzhou	Jan 2003, Jun-Jul 2003	23.9	6.5	3.7	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
Nanjing	Jun 2007-May 2008	15.7	10.4	2.4	IMPROVE_TOR (DRI 2001)	Chen et al. (2010)

**Table S4. Annual average OC and EC levels in PM<sub>2.5</sub> (µg m<sup>-3</sup>) and OC/EC ratios by category of measurement site (continued).**

Location <sup>a</sup>	Period	OC	EC	OC/EC	Analytic methods (instrument)	Reference
Guangzhou	Jan-Feb 2002, Jun-Jul 2002	15.5	5.3	2.9	IMPROVE_TOR (DRI 2001)	Cao et al. (2003)
	Dec 2002, Jul 2003	18.4	6.4	2.9	NIOSH_TOT (Sunset)	Feng et al. (2006b)
	Oct-Dec 2002, Mar-Jun 2003	17.6	4.4	4.1	NIOSH_TOT (Sunset)	Zheng et al. (2011)
	Jan 2003, Jun-Jul 2003	25.9	8.9	3.2	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
	Aug-Sep 2004, Feb-Mar 2005	20.7	4.8	4.3	NIOSH_TOT (Sunset)	Duan et al. (2007)
	Aug 2006-Aug 2007	7.1	4.0	2.0	IMPROVE_TOR (DRI 2001)	Huang et al. (2011)
	Apr, Jul, Oct 2009, Jan 2010	9.0	6.0	1.5	IMPROVE_TOR (DRI 2001)	Tao et al. (2014)
Xiamen	Jan 2003, Jun-Jul 2003	10.7	3.2	3.4	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
	Apr 2009-Jan 2010	19.3	3.3	5.8	NIOSH_TOT (Sunset)	Zhang et al. (2011)
Shanghai	Mar 1999- Mar 2000	22.6	8.3	2.5	IMPROVE_TOR (DRI 2001)	Yang et al. (2005)
	Nov 2002, Aug 2003	9.9	2.9	3.1	NIOSH_TOT (Sunset)	Feng et al. (2006a)
	Jan 2003, Jun-Jul 2003	21.0	5.6	3.8	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
	Oct 2005, Jan, Apr, Jul 2006	14.7	2.8	5.0	NIOSH_TOT (Sunset)	Feng et al. (2009)
	Apr 2006-Jan 2007	7.4	2.8	2.8	IMPROVE_TOR (DRI 2001)	Hou et al. (2011)
	Dec 2007-Dec 2008	8.4	4.0	2.1	IMPROVE_TOR (DRI 2001)	Wang et al. (2010)
	Jan 2010-Jan 2011	10.5	2.6	4.0	IMPROVE_TOR (DRI 2001)	Feng et al. (2013)
Shenzhen	Jan-Feb 2001, Jun-Jul 2002	10.4	5.2	2.0	IMPROVE_TOR (DRI 2001)	Cao et al. (2003)
	Oct-Dec 2002, Mar-Jun 2003	10.7	3.9	2.8	IMPROVE_TOR (DRI 2001)	Zheng et al. (2011)
Zhuhai	Jan-Feb 2001, Jun-Jul 2002	8.8	3.5	2.6	IMPROVE_TOR (DRI 2001)	Cao et al. (2003)
Fuzhou	Apr 2007-Jan 2008	8.5	2.2	3.9	IMPROVE_TOR (DRI 2001)	Xu et al. (2012)
Average for southern cities (all data included)		17.2	5.2	3.5		
Average for southern cities (IMPROVE_TOR)		17.3	5.8	3.2		
<b>Suburban</b>						
Beijing	Jun, Dec 2002	25.6	5.6	4.6	NIOSH_TOT (Sunset)	Feng et al. (2006b)
	Jan 2003, Jun-Jul 2003	22.2	5.9	4.1	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
	Mar-Dec 2006	29	6.4	4.5	IMPROVE_TOR (DRI 2001)	Li et al. (2013)
	Dec 2007-Dec 2008	11.9	4.7	2.4	IMPROVE_TOR (DRI 2001)	Wang et al. (2010)
	Jan 2010-Jan 2011	11.4	2.8	4.1	IMPROVE_TOR (DRI 2001)	Feng et al. (2013)
Tianjing	Dec 2007-Oct 2008	16.6	5.8	2.9	IMPROVE_TOR (DRI 2001)	Wu et al. (2009)
	Jun 2007-Feb 2008	13.3	5.3	2.5	IMPROVE_TOR (DRI 2001)	Kong et al. (2010)
Jinan	2010	14.3	5.1	2.8	IMPROVE_TOR (DRI 2001)	Gu et al. (2014)
Guangzhou	Dec 2002, Jul 2003	22.6	6.5	3.5	NIOSH_TOT (Sunset)	Feng et al. (2006b)
	Aug 2006-Aug 2007	8.2	3.8	2.2	IMPROVE_TOR (DRI 2001)	Huang et al. (2012)
Shanghai	Nov 2002, Aug 2003	10.7	2.8	3.5	NIOSH_TOT (Sunset)	Feng et al. (2006a)
	Oct 2005, Jan, Apr, Jul 2006	17.5	3.0	5.6	NIOSH_TOT (Sunset)	Feng et al. (2009)
	Jan 2010-Jan 2011	11.4	2.8	4.1	IMPROVE_TOR (DRI 2001)	Feng et al. (2013)
Xiamen	Apr 2009-Jan 2010	15.8	2.7	5.8	NIOSH_TOT (Sunset)	Zhang et al. (2011)
	Jun 2009-May 2010	15.2	2.9	5.2	NIOSH_TOT (Sunset)	F. Zhang et al. (2012)
Average for suburban sties (all data included)		16.4	4.4	3.9		
Average for suburban cities (IMPROVE_TOR)		15.4	4.7	3.3		

**Table S4. Annual average OC and EC levels in PM<sub>2.5</sub> (µg m<sup>-3</sup>) and OC/EC ratios by category of measurement site (continued).**

Location <sup>a</sup>	Period	OC	EC	OC/EC	Analytic methods (instrument)	Reference
<b>Rural</b>						
Xian	Nov-Dec 2007, Jun 2008	37.7	4.9	7.2	IMPROVE_TOR (DRI 2001)	Zhu et al. (2010)
Jinan	Mar 2006-Feb 2007	20.2	4.3	4.7	NIOSH_TOT	Yang et al. (2012)
Jinchang <sup>d</sup>	Jan 2003, Jun-Jul 2003	15.5	3.3	4.7	IMPROVE_TOR (DRI 2001)	Cao et al. (2007)
Beijing	Jan-Dec 2005	14.9	3.2	4.6	IMPROVE_TOR (DRI 2001)	Wang et al. (2011)
	2005-2008	12.3	4.0	3.1	EnCan Total 900c (Sunset)	Yang et al. (2011)
	Apr 2009-Feb 2010	10.8	3.9	2.8	IMPROVE_TOR (DRI 2001)	P. Zhao et al. (2013)
Daihai	Aug 2005-May 2007	11.8	1.9	6.6	IMPROVE_TOR (DRI 2001)	Han et al. (2008)
Changdao	Mar2003-Jan2004	8.4	1.8	4.8	NIOSH_TOT (Sunset)	Feng et al. (2007)
Guangzhou	Oct, Dec 2002, Mar, Jun 2003	9.2	1.4	6.5	NIOSH_TOT (Sunset)	Zheng et al. (2011)
	Aug, Sep, Nov, Dec 2008	15.1	3.3	3.4	NIOSH_TOT (Sunset)	Ding et al. (2012)
Hong Kong	Aug-Sep 2004, Feb-Mar 2005	5.8	1.1	5.2	NIOSH_TOT (Sunset)	Duan et al. (2007)
	Oct, Dec 2002, Mar, Jun 2003	4.9	0.82	6.1	NIOSH_TOT (Sunset)	Zheng et al. (2011)
	Jan-Feb 2001, Jun-Jul 2002	4.8	1.3	4.0	IMPROVE_TOR (DRI 2001)	Cao et al. (2003)
	Nov 2000-Oct 2001	4.2	1.7	2.5	IMPROVE_TOR (DRI 2001)	Louie et al. (2005)
Jinsha	Mar 2012-Mar 2013	7.5	0.7	11.5	NIOSH_TOT (Sunset)	F. Zhang et al. (2014)
Average for rural sites (all data included)		12.2	2.5	5.2		
Average for rural sites (IMPROVE_TOR)		14.2	2.9	4.6		
<b>Remote</b>						
Akdala	Jul 2004-Mar 2005	2.8 <sup>e</sup>	0.36 <sup>e</sup>	12.2	IMPROVE_TOR (DRI 2001)	Qu et al. (2009)
Zhuzhang	Jul 2004-Mar 2005	3.1 <sup>e</sup>	0.34 <sup>e</sup>	11.9	IMPROVE_TOR (DRI 2001)	Qu et al. (2009)
Muztagh Ata	Dec 2003-Feb 2006	0.5 <sup>f</sup>	0.06 <sup>f</sup>	10.0	IMPROVE_TOR (DRI 2001)	Cao et al. (2009)
Tengchong	Oct 2005-Oct 2006	4.8 <sup>f</sup>	0.5 <sup>f</sup>	9.6	NIOSH_TOT (Sunset)	Zhang et al. (2010)
Mt. Jianfeng	May 2005-Aug 2006	5.8 <sup>f</sup>	0.8 <sup>f</sup>	7.3	NIOSH_TOT (Sunset)	Zhang et al. (2010)
Nam Co	Jul 2006-Jan 2007	1.7 <sup>f</sup>	0.08 <sup>f</sup>	31.9	IMPROVE_TOR (DRI 2001)	Ming et al. (2010)
Lulang	Jul 2008-Jul 2009	4.3 <sup>f</sup>	0.52 <sup>f</sup>	11.4	IMPROVE_TOR (DRI 2001)	Z. Zhao et al. (2013)
Mt. Everest	Aug 2009-Jul 2010	1.4 <sup>f</sup>	0.25 <sup>f</sup>	6.7	IMPROVE_TOR (DRI 2001)	Cong et al. (2015)
Average for remote sites (all data included)		3.1	0.4	12.6		
Average for remote sites (IMPROVE_TOR)		2.3	0.3	14.0		

<sup>a</sup> Geographical locations of these observation sites are shown in Figure S2.

<sup>b</sup> Thermal/optical reflectance (TOR) method with IMPROVE (Interagency Monitoring of Protected Visual Environments) protocol.

<sup>c</sup> Thermal/optical transmission (TOT) method with NIOSH (National Institute of Occupational Safety and Health) protocol.

<sup>d</sup> Jinchang site is in a desert region with little local industry and has little population according to Cao et al. (2007). We categorize it as a rural site for this study.

<sup>e</sup> Refer to that measured in PM<sub>10</sub>.

<sup>f</sup> Refer to that measured in TSP.



Figure S1.

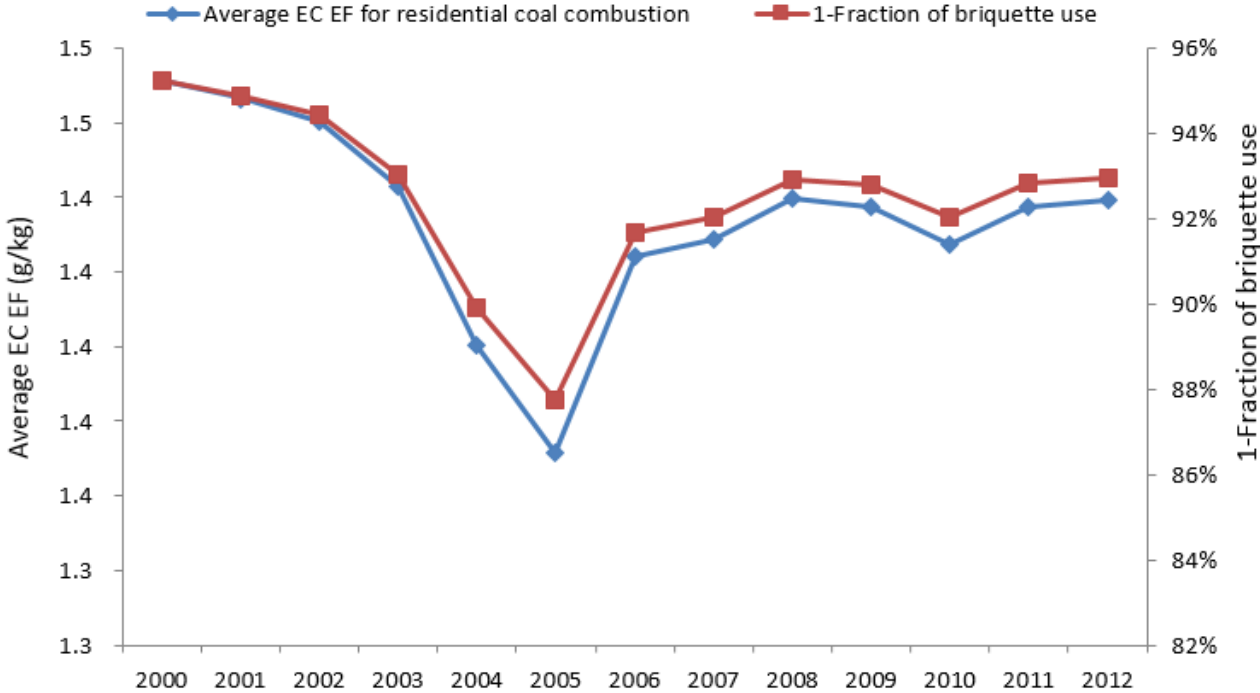


Figure S2.

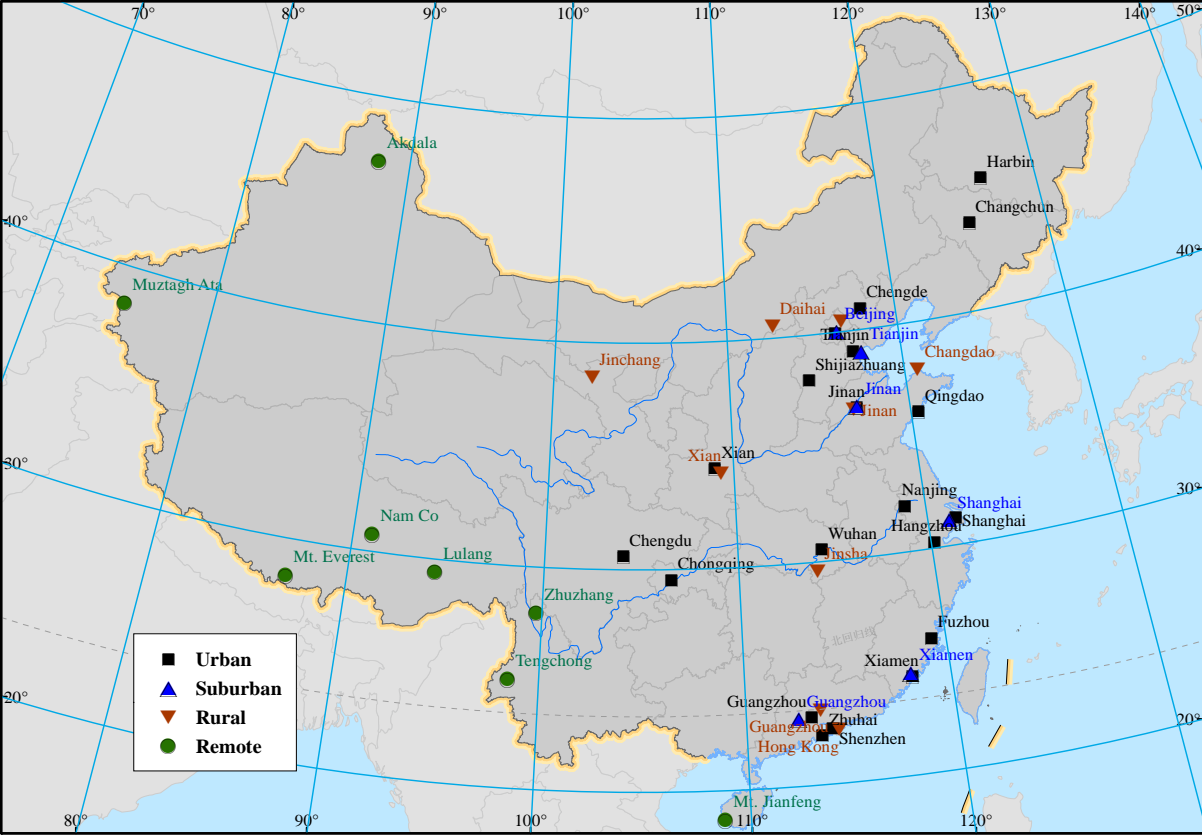


Figure S3.

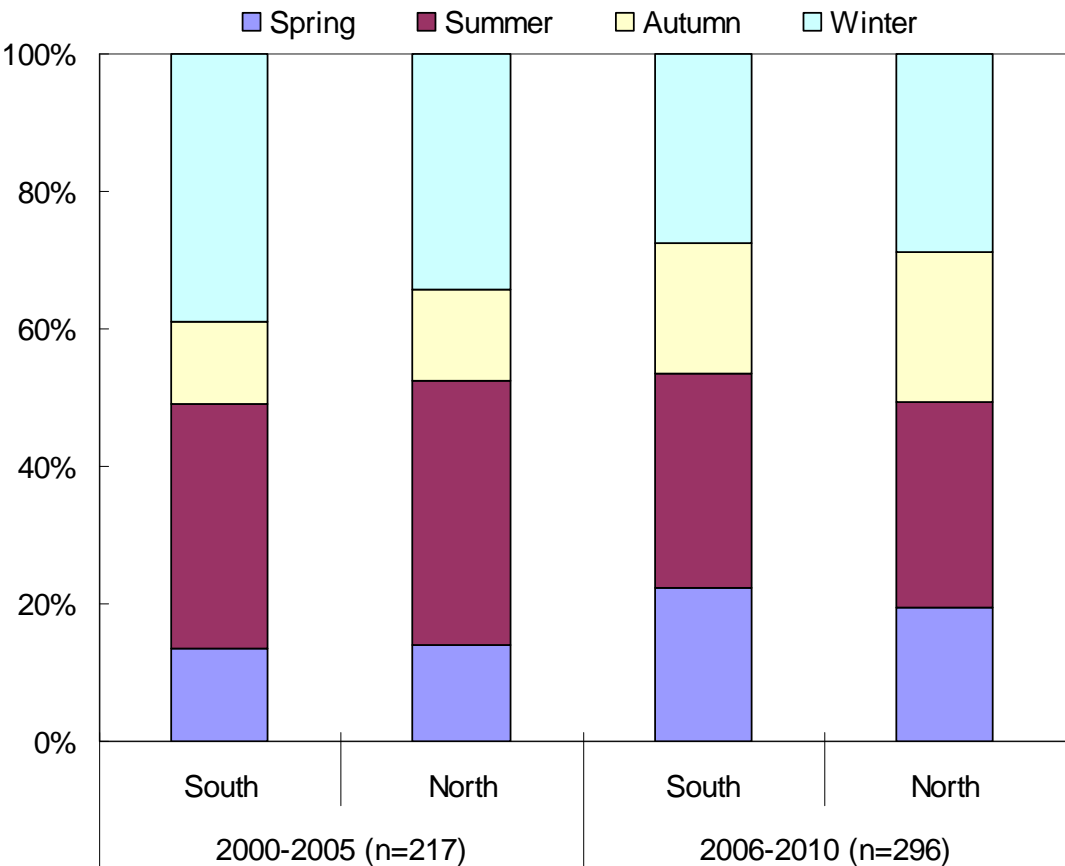


Figure S4.

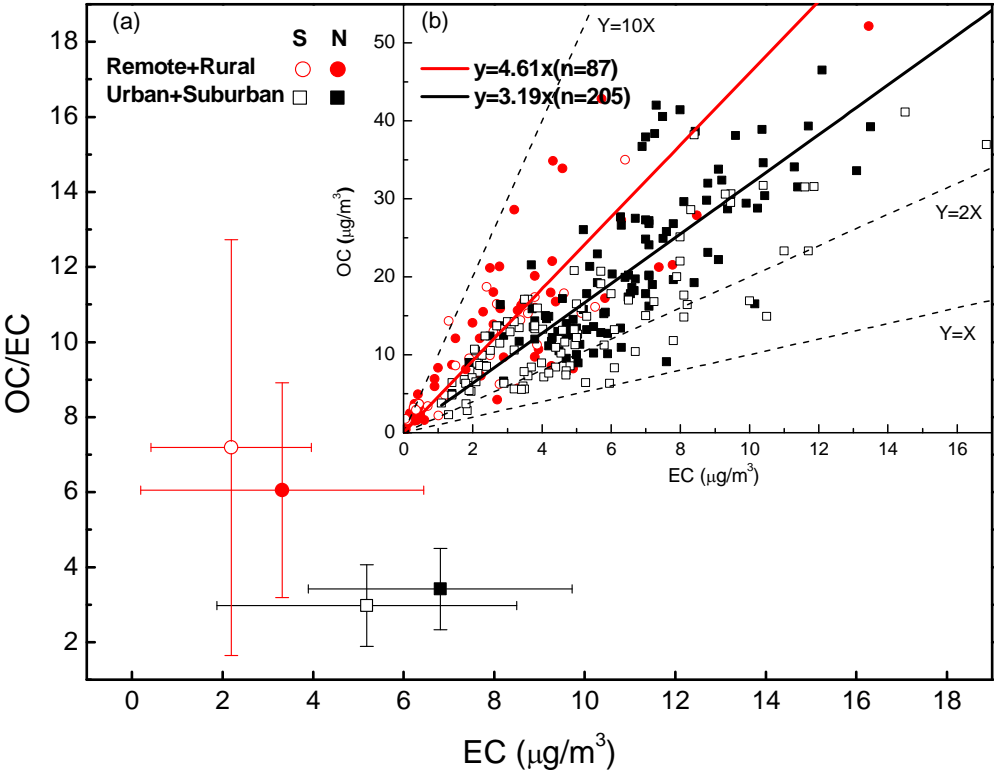
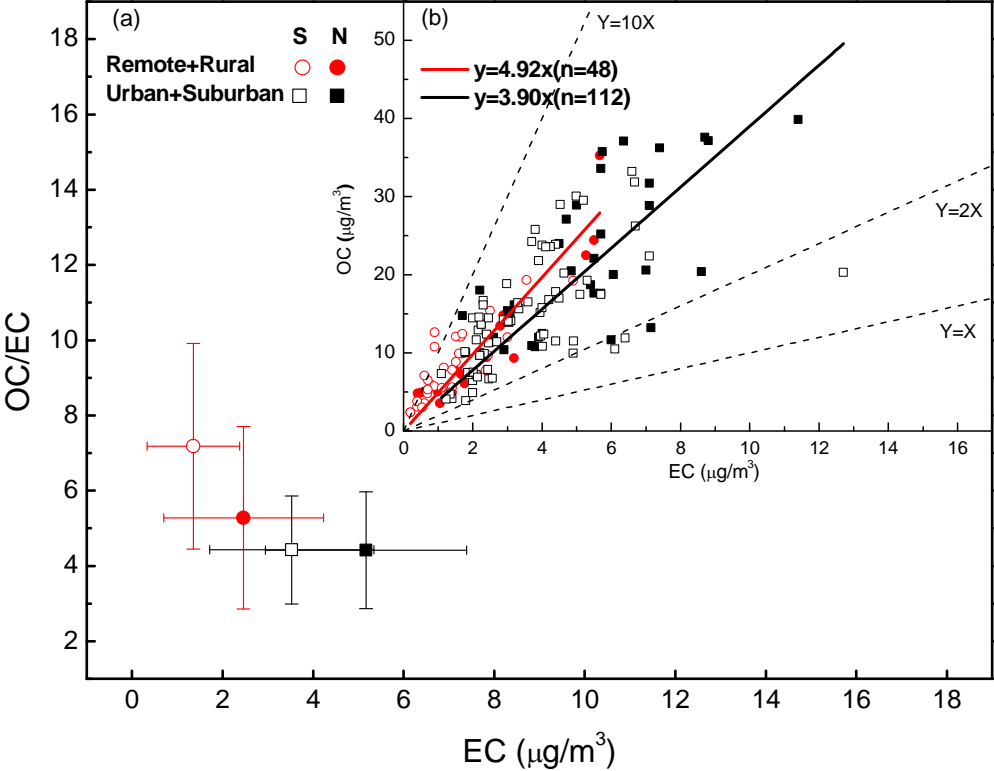


Figure S5.



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