Supplement

(a)

(b)
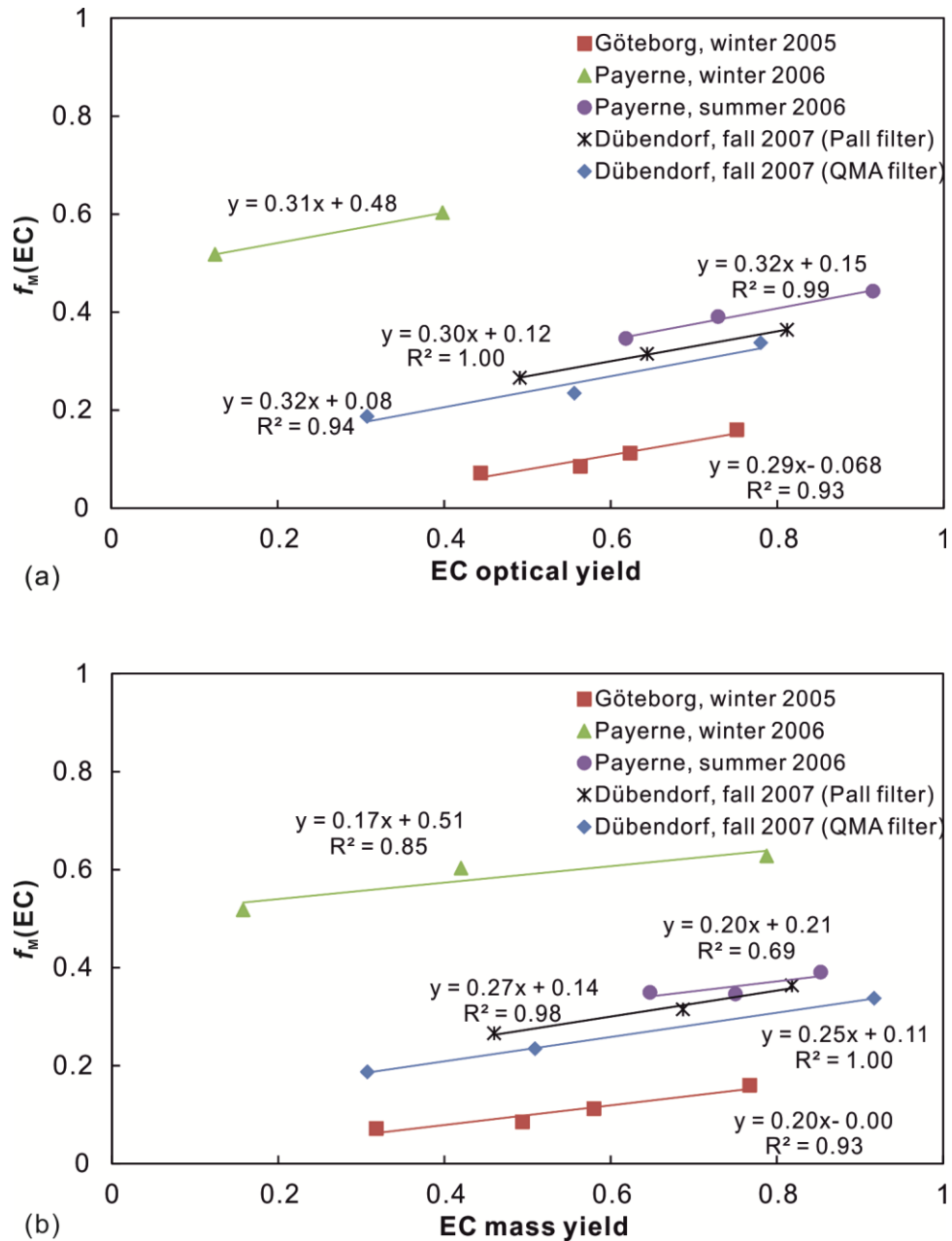
Fig. S1. $f_M(EC)$ as a function of EC optical yield (a) and EC mass yield (b) for the previous two-step combustion method (THEODORE method) as obtained by analyzing samples with different oven temperatures. For the THEODORE method, the EC optical yield is determined as the ratio of ATN after water extraction and ATN after OC removal in the oven using a white-light aethalometer (Lavanchy et al., 1999). The ratio of rEC (remaining EC after OC removal in the oven) and tEC is regarded as the EC mass yield. Varying slopes between (a) and (b) for identical filters indicate different absorption cross sections for non-rEC and rEC.

Tab. S1. Estimations of f_M values of total EC (f_M(tEC)) by extrapolation to 100% EC yield based on this work for previously published studies.

Site	Sampling time	f_M(rEC)	Reference	EC yield[a]	f_M(tEC)[b]
Zurich	16-21 Aug 2002	0.08±0.03	Szidat et al., 2004b;	0.53±0.08*	0.19±0.01
Zurich	21-26 Aug 2002	0.07±0.02	Szidat et al., 2006	0.59±0.09*	0.16±0.01
Zurich	19-21 Feb 2003	0.25±0.02		0.52±0.08*	0.36±0.05
Zurich	21-23 Feb 2003	0.33±0.01	Szidat et al., 2006	0.38±0.06*	0.48±0.05
Zurich	6-11 Mar 2003	0.13±0.01		0.27±0.04*	0.30±0.06
Zurich	21-26 Mar 2003	0.16±0.01		0.49±0.07*	0.27±0.04
Roveredo	13/14 Jan 2005, Morning	0.47±0.04		0.38±0.06*	0.64±0.09
Roveredo	13/14 Jan 2005, Evening	0.51±0.02		0.68±0.10*	0.60±0.06
Roveredo	19/20 Jan 2005, Morning	0.53±0.02		0.72±0.11*	0.60±0.05
Roveredo	19/20 Jan 2005, Evening	0.89±0.02		0.66±0.10*	0.98±0.06
Moleno	04/05 Feb 2005, Morning	0.06±0.02		0.54±0.08*	0.18±0.07
Moleno	04/05 Feb 2005, Evening	0.22±0.01	Szidat et al., 2007;	0.47±0.07*	0.37±0.07
Moleno	08/09 Feb 2005, Morning	0.21±0.01	Sandradewi et al., 2008a;	0.64±0.10*	0.31±0.06
Moleno	08/09 Feb 2005, Evening	0.17±0.01	Sandradewi et al., 2008b	0.38±0.06*	0.34±0.09
Roveredo	02/03 Mar 2005, Evening	0.65±0.02		0.49±0.07*	0.79±0.07
Roveredo	08/09 Mar 2005, Evening	0.91±0.05		0.68±0.10*	0.99±0.07
Roveredo	09/10 Mar 2005, Morning	0.24±0.03		0.79±0.12*	0.29±0.05
Roveredo	09/10 Mar 2005, Morning	0.44±0.01		0.79±0.12*	0.49±0.04
Roveredo	11/12 Mar 2005, Morning	0.32±0.02		0.67±0.10*	0.41±0.06
Roveredo	4-5 Dec 2005	0.86±0.05		0.59±0.09*	0.97±0.08
Roveredo	6-7 Dec 2005	0.60±0.11	Sandradewi et al., 2008a;	0.69±0.10*	0.69±0.12
Roveredo	8-9 Dec 2005	0.86±0.08	Sandradewi et al., 2008b	0.64±0.10*	0.96±0.09
Roveredo	11-12 Dec 2005	0.76±0.08		0.60±0.09*	0.87±0.10
Roveredo	14-15 Dec 2005	0.63±0.08		0.63±0.10*	0.73±0.10
Reiden	29-30 Jan 2006	0.45±0.03		0.58±0.06	0.57±0.04
Reiden	31 Jan - 01 Feb 2006	0.25±0.01		0.67±0.07	0.35±0.03
Reiden	1-2 Feb 2006	0.20±0.03		0.49±0.05	0.36±0.05
Reiden	5-6 Feb 2006	0.29±0.02		0.67±0.07	0.40±0.04
Reiden	6-7 Feb 2006	0.33±0.01		0.69±0.07	0.43±0.03
Sedel	29-30 Jan 2006	0.41±0.02		0.63±0.06	0.52±0.03
Sedel	31 Jan - 01 Feb 2006	0.29±0.01		0.59±0.06	0.41±0.03
Sedel	1-2 Feb 2006	0.24±0.01	Sandradewi et al., 2008b	0.58±0.06	0.37±0.03
Sedel	5-6 Feb 2006	0.54±0.02		0.54±0.05	0.67±0.04
Sedel	6-7 Feb 2006	0.39±0.03		0.59±0.06	0.52±0.05
Zurich	12 Jan 2006	0.36±0.02		0.78±0.08	0.42±0.04
Zurich	12 Jan 2006	0.27±0.02		0.50±0.05	0.42±0.04
Zurich	23-25 Jan 2006	0.33±0.02		0.81±0.08	0.39±0.03
Zurich	23-25 Jan 2006	0.19±0.03		0.47±0.05	0.35±0.05

Tab. S1 (continued).

Site	Sampling time	$f_M(rEC)$	Reference	EC yield[a]	$f_M(tEC)$[b]
Göteborg	11-14 Feb 2005	0.14 ±0.03		0.65 ±0.06	0.24 ±0.04
Göteborg	14-18 Feb 2005	0.15 ±0.02		0.78 ±0.08	0.21 ±0.04
Göteborg	18-25 Feb 2005	0.08 ±0.01		0.56 ±0.06	0.21 ±0.03
Göteborg	25 Feb - 4 Mar 2005	0.11 ±0.01		0.43 ±0.06*	0.22 ±0.03
Råö	14-18 Feb 2005	0.42 ±0.06	Szidat et al., 2009	0.63 ±0.06	0.53 ±0.07
Råö	18-25 Feb 2005	0.35 ±0.03		0.72 ±0.07	0.43 ±0.04
Göteborg	13-20 Jun 2006	0.13 ±0.02		0.75 ±0.07	0.20 ±0.03
Göteborg	20-27 Jun 2006	0.17 ±0.03		0.77 ±0.08	0.24 ±0.04
Göteborg	27 Jun - 4 Jul 2006	0.05 ±0.02		0.79 ±0.08	0.11 ±0.03
Massongex	26-27 Nov 2006	0.50 ±0.02		0.64 ±0.06	0.61 ±0.04
Massongex	27-28 Nov 2006	0.36 ±0.02		0.45 ±0.05	0.52 ±0.04
Massongex	28-29 Nov 2006	0.30 ±0.01		0.53 ±0.05	0.45 ±0.04
Massongex	29-30 Nov 2006	0.27 ±0.01		0.58 ±0.06	0.40 ±0.03
Massongex	1-2 Dec 2006	0.28 ±0.02		0.49 ±0.05	0.44 ±0.04
Massongex	2-3 Dec 2006	0.41 ±0.01		0.79 ±0.08	0.48 ±0.03
Massongex	3-4 Dec 2006	0.48 ±0.02		0.52 ±0.05	0.63 ±0.04
Massongex	5-6 Dec 2006	0.29 ±0.05		0.46 ±0.05	0.46 ±0.06
Saxon	28-29 Nov 2006	0.22 ±0.01		0.48 ±0.05	0.38 ±0.04
Saxon	29-30 Nov 2006	0.26 ±0.01		0.64 ±0.06	0.37 ±0.03
Saxon	1-2 Dec 2006	0.28 ±0.01		0.46 ±0.05	0.44 ±0.04
Saxon	2-3 Dec 2006	0.35 ±0.01	Perron et al., 2010	0.47 ±0.05	0.51 ±0.04
Saxon	3-4 Dec 2006	0.48 ±0.01		0.57 ±0.06	0.61 ±0.04
Sion	28-29 Nov 2006	0.13 ±0.01		0.55 ±0.05	0.27 ±0.03
Sion	29-30 Nov 2006	0.15 ±0.01		0.58 ±0.06	0.28 ±0.03
Sion	1-2 Dec 2006	0.19 ±0.01		0.81 ±0.08	0.25 ±0.03
Sion	2-3 Dec 2006	0.24 ±0.01		0.58 ±0.06	0.37 ±0.03
Sion	3-4 Dec 2006	0.31 ±0.02		0.39 ±0.04	0.50 ±0.05
Brigerbad	28-29 Nov 2006	0.18 ±0.01		0.61 ±0.06	0.30 ±0.03
Brigerbad	29-30 Nov 2006	0.24 ±0.01		0.59 ±0.06	0.36 ±0.03
Brigerbad	1-2 Dec 2006	0.23 ±0.01		0.48 ±0.05	0.39 ±0.04
Brigerbad	2-3 Dec 2006	0.37 ±0.02		0.28 ±0.03	0.59 ±0.05
Brigerbad	3-4 Dec 2006	0.55 ±0.03		0.34 ±0.03	0.75 ±0.05
Mexico City	21-22 Mar 2006	0.15 ±0.01		0.18 ±0.02	0.25 ±0.05
Mexico City	22-23 Mar 2006	0.05 ±0.02	Aiken et al., 2010;	0.37 ±0.04	0.13 ±0.04
Mexico City	26-27 Mar 2006	0.06 ±0.01	Hodzic et al., 2010	0.29 ±0.03	0.15 ±0.04
Mexico City	29-30 Mar 2006	0.04 ±0.02		0.40 ±0.04	0.12 ±0.04

Tab. S1 (continued).

Site	Sampling time	f_M(rEC)	Reference	EC yield[a]	f_M(tEC)[b]
Barcelona	27 Feb-1 Mar 2009	0.14 ±0.01		0.95 ±0.09	0.15 ±0.03
Barcelona	1-3 Mar 2009	0.15 ±0.01		0.94 ±0.09	0.17 ±0.03
Barcelona	13-15 Mar 2009	0.14 ±0.01		0.92 ±0.09	0.17 ±0.03
Barcelona	17-19 Mar 2009	0.14 ±0.01		0.91 ±0.09	0.17 ±0.03
Barcelona	19-21 Mar 2009	0.11 ±0.01		0.93 ±0.09	0.13 ±0.03
Barcelona	21-23 Mar 2009	0.24 ±0.01		0.92 ±0.09	0.26 ±0.03
Barcelona	23-25 Mar 2009	0.16 ±0.01		0.89 ±0.09	0.19 ±0.03
Montseny	27 Feb-1 Mar 2009	0.40 ±0.02		0.91 ±0.09	0.43 ±0.03
Montseny	1-3 Mar 2009	0.46 ±0.03		0.89 ±0.09	0.50 ±0.04
Montseny	13-15 Mar 2009	0.38 ±0.03		0.84 ±0.08	0.43 ±0.04
Montseny	17-19 Mar 2009	0.32 ±0.02	Minguillón et al., 2011	0.90 ±0.09	0.35 ±0.03
Montseny	19-21 Mar 2009	0.25 ±0.02		0.92 ±0.09	0.27 ±0.03
Montseny	21-23 Mar 2009	0.47 ±0.05		0.87 ±0.09	0.51 ±0.05
Montseny	23-25 Mar 2009	0.34 ±0.03		0.87 ±0.09	0.37 ±0.04
Barcelona	9-10 Jul 2009	0.07 ±0.02		0.92 ±0.09	0.10 ±0.03
Barcelona	11-12 Jul 2009	0.08 ±0.04		0.89 ±0.09	0.11 ±0.05
Barcelona	16-17 Jul 2009	0.10 ±0.03		0.90 ±0.09	0.14 ±0.04
Barcelona	22-23 Jul 2009	0.06 ±0.02		0.88 ±0.09	0.10 ±0.03
Barcelona	23-24 Jul 2009	0.20 ±0.01		0.89 ±0.09	0.23 ±0.03
Barcelona	28-29 Jul 2009	0.05 ±0.02		0.90 ±0.09	0.08 ±0.04
Montseny	9-29 Jul 2009	0.23 ±0.04		0.83 ±0.08	0.28 ±0.05

[a] EC yield refers normally to EC optical yield; EC mass yield is used when optical measurements were not available (indicated by an asterisk *).

[b] In general, f_M(tEC) is estimated by extrapolation of EC yield to 100% with the individual slope from linear regression of f_M(EC) and EC yield for the dedicated sampling sites as shown in Figs. 9 and S1. Concerning the samples without the individual slope (i.e. Zurich, Massongex, Saxon, Sion, Barcelona and Montseny), an average slope was used for estimation of f_M(tEC).