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Supplement of

Sources and contributions of wood smoke during winter in London: assessing local and regional influences

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Table S1: Average of daily calculated EC_{ff}, EC_{bb}, OC_{bb}, OC_{ff} and OC_{SOA} concentrations (μg m^{-3}). The OC/EC_{veh} and OC/EC_{bb} refers to the source ratio of vehicle emissions and biomass burning, respectively.

Source ratio used	Site		OC_{bb}	EC_{bb}	OC_{ff}	EC_{ff}	OC_{SOA}
Levoglucosan/OC = 0.136 OC/EC_{veh} = 0.58 OC/EC_{bb} = 6	**Detling**	Average	0.49	0.08	0.33	0.57	1.29
		Std. Dev.	0.36	0.06	0.19	0.33	1.23
	North Kensington	Average	0.57	0.1	0.83	1.44	2.12
		Std. Dev.	0.26	0.04	0.49	0.85	1.59
Levoglucosan/OC = 0.07 OC/EC_{veh} = 0.3 OC/EC_{bb} = 3	**Detling**	Average	0.97	0.32	0.10	0.33	1.05
		Std. Dev.	0.71	0.24	0.09	0.30	1.20
	North Kensington	Average	1.11	0.37	0.35	1.16	2.06
		Std. Dev.	0.51	0.17	0.22	0.75	1.59
Levoglucosan/OC = 0.17 OC/EC_{veh} = 1 OC/EC_{bb} = 10	**Detling**	Average	0.40	0.04	0.61	0.61	1.11
		Std. Dev.	0.29	0.03	0.35	0.35	1.14
	North Kensington	Average	0.46	0.05	1.49	1.49	1.58
		Std. Dev.	0.21	0.02	0.86	0.86	1.40
Levoglucosan/OC = 0.136 OC/EC_{veh} = 0.3 OC/EC_{bb} = 6	**Detling**	Average	0.50	0.08	0.17	0.57	1.45
		Std. Dev.	0.36	0.06	0.10	0.33	1.31
	North Kensington	Average	0.57	0.10	0.43	1.44	2.52
		Std. Dev.	0.26	0.04	0.25	0.85	1.76
Levoglucosan/OC = 0.09 OC/EC_{veh} = 0.58 OC/EC_{bb} = 6	**Detling**	Average	0.75	0.13	0.30	0.52	1.06
		Std. Dev.	0.55	0.09	0.19	0.32	1.16
	North Kensington	Average	0.86	0.14	0.81	1.39	1.85
		Std. Dev.	0.40	0.07	0.48	0.83	1.50
Levoglucosan/OC = 0.09 OC/EC_{veh} = 0.3 OC/EC_{bb} = 6	**Detling**	Average	0.75	0.13	0.16	0.52	1.21
		Std. Dev.	0.54	0.09	0.09	0.32	1.21
	North Kensington	Average	0.86	0.14	0.42	1.39	2.24
		Std. Dev.	0.40	0.07	0.25	0.83	1.66
Levoglucosan/OC = 0.098 OC/EC_{veh} = 0.58 OC/EC_{bb} = 8.2	**Detling**	Average	0.69	0.08	0.33	0.56	1.10
		Std. Dev.	0.51	0.06	0.19	0.33	1.17
	North Kensington	Average	0.79	0.09	0.83	1.44	1.90
		Std. Dev.	0.37	0.04	0.49	0.85	1.51

Table S2: Times of extended de-coupling at BT based on estimated turbulent mixing height (TMH) using lidar measurements during the summer and winter intensive observation periods.

Date	Initial time	TMH	Final time	TMH
24/01/2012	23:00	139	06:00	139
03/02/2012	18:00	139	04:00	139
25/07/2012	23:00	63	07:00	189
26/07/2012	22:00	63	08:00	153
30/07/2012	23:00	63	05:00	135
08/08/2012	21:00	99	07:00	63

Note: The minimum observable height depended on the lidar gate and the height that the instrument is placed (above ground level) at each site, and differed between the winter IOP (139 m) and summer IOP (63 m).

Table S3: Times of de-coupling estimated based on visual inspection of the NOx concentrations time series at BT and NK

ID	Start date	Start	Finish
1	15-Apr-12	22:00	06:00
2	19-Feb-12	19:00	07:00
4	11/03/2012	20:00	06:00
5	18/03/2012	20:00	06:00
6	12/04/2012	22:00	03:00
7	17/08/2012	19:00	04:00
8	18/08/2012	22:00	06:00
9	26/08/2012	20:00	00:00
10	07/09/2012	19:30	07:00
11	14/09/2012	19:00	05:30
12	18/09/2012	23:00	05:00
13	06/10/2012	18:00	07:00
14	14/10/2012	18:00	06:00
15	16/10/2012	20:00	03:00
16	29/04/2013	19:00	00:00
17	25/05/2013	20:00	00:00

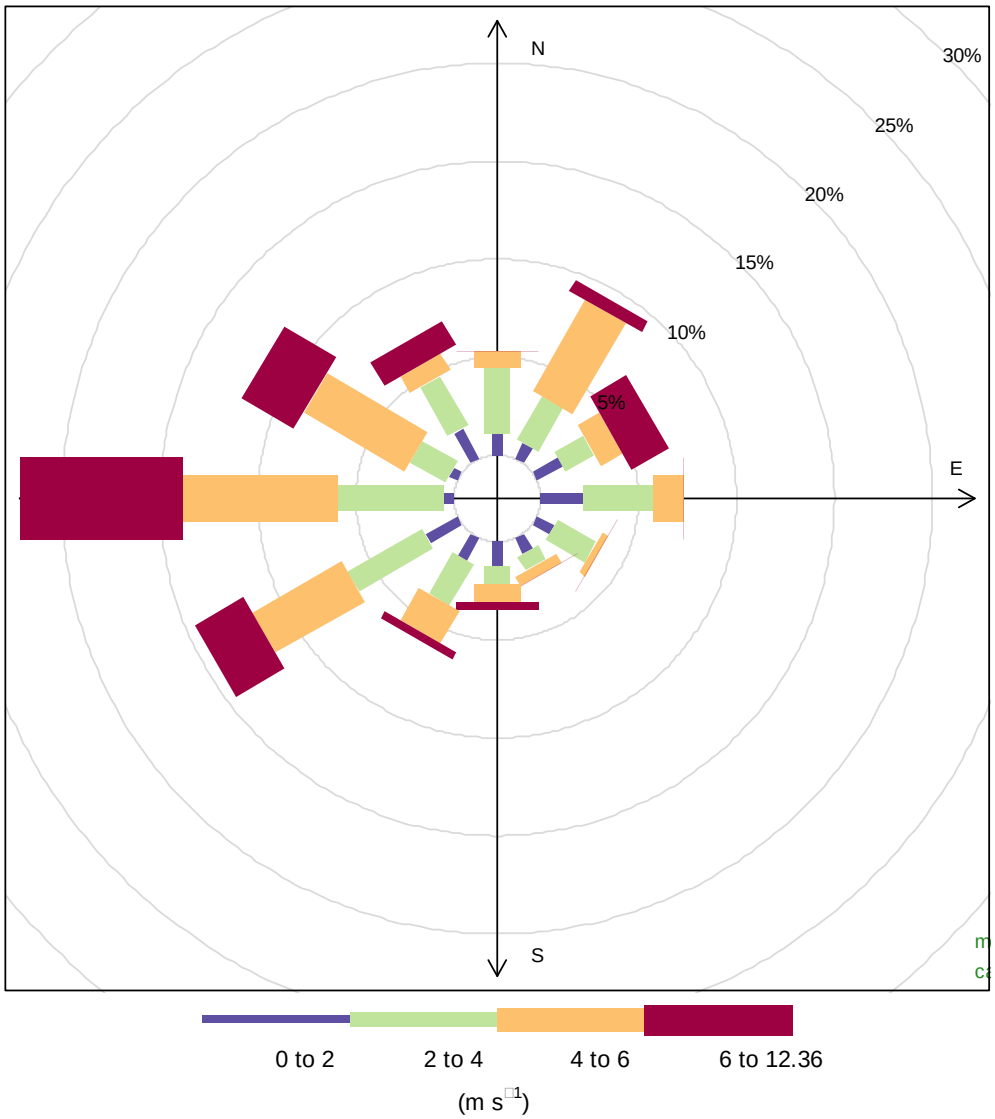

Figure S1: Wind rose plot for the winter IOP at Gravesend station. Wind speed is in m s^{-1}.

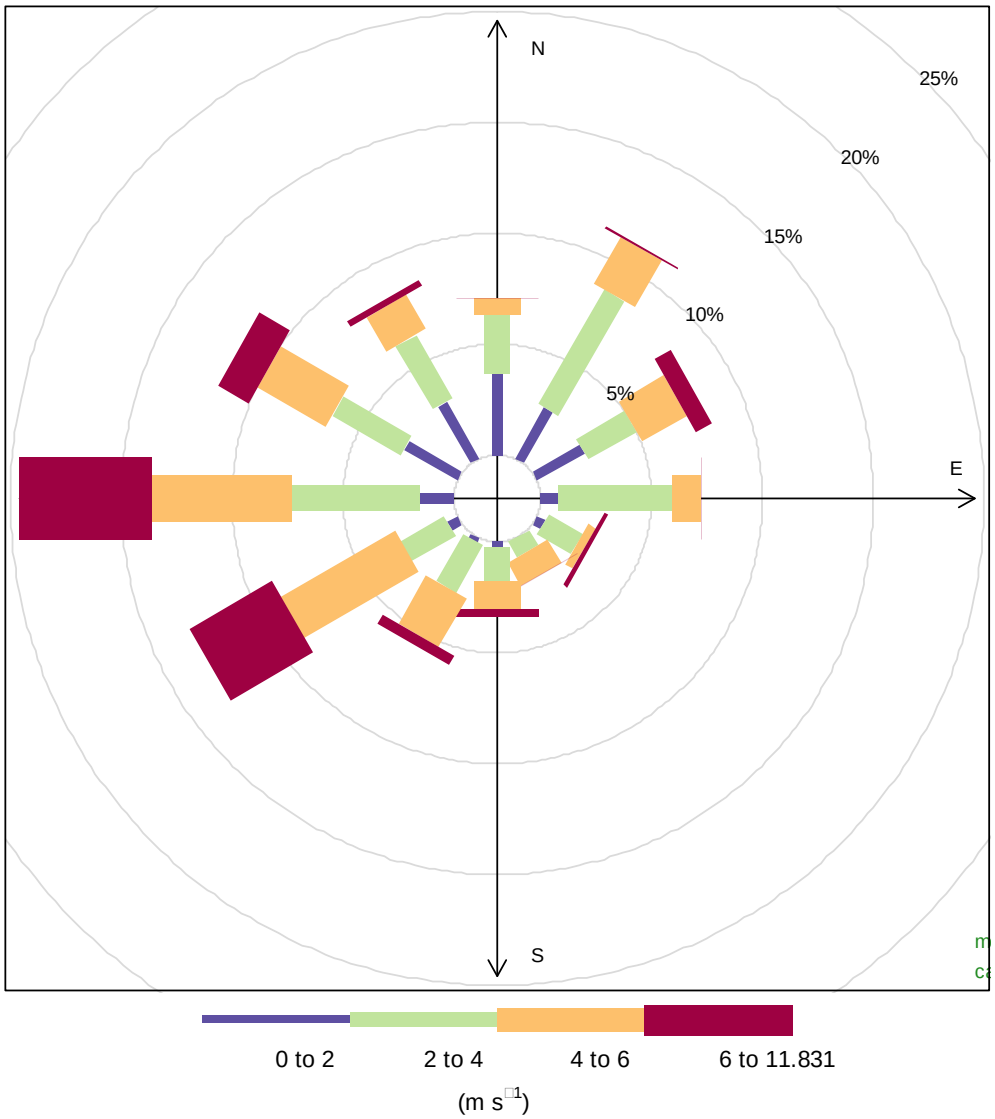

Figure S2: Wind rose plot for the winter IOP for Heathrow Airport station. Wind speed is in m s^{-1}.

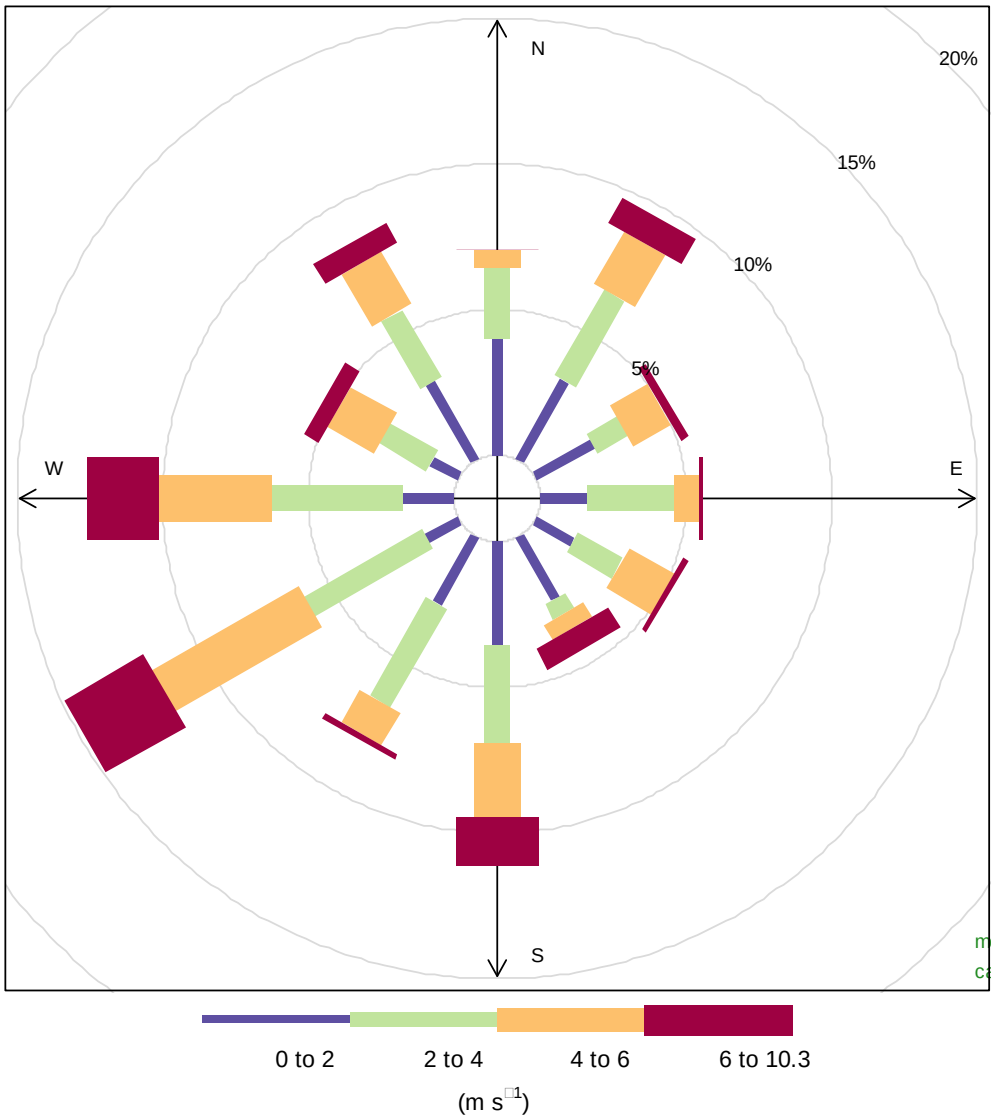

Figure S3: Wind rose plot for winter IOP at Benson station. Wind speed is in m s^{-1}.

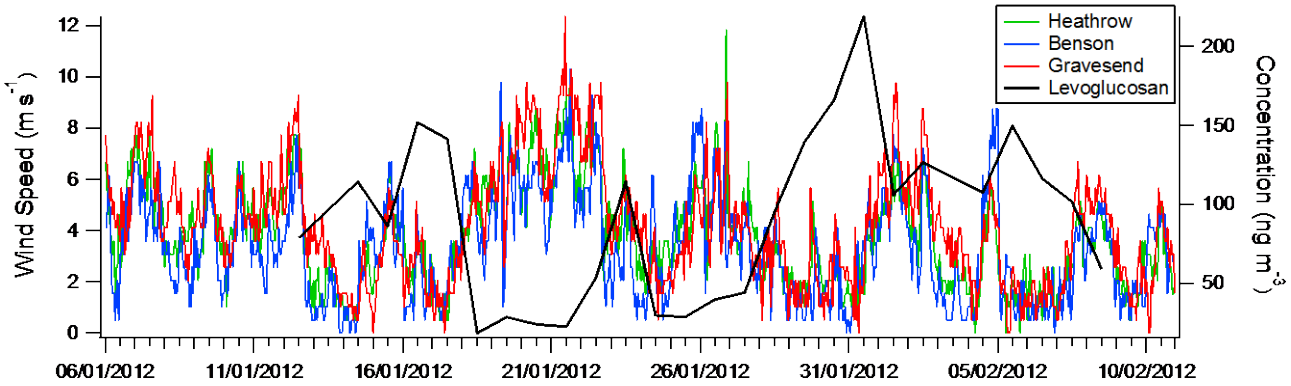

Figure S4: Wind speed as a function of time for the winter IOP. Concentration of levoglucosan included in this plot is from Harwell.

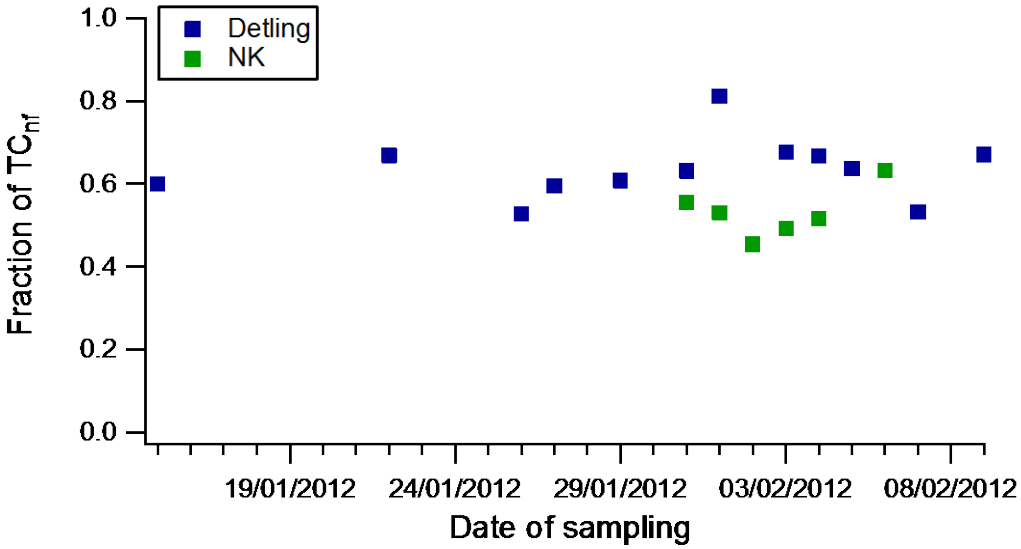

Figure S5: Daily values of the fraction of non-fossil TC (TC_{nf}) at Detling and North Kensington (NK). Note the date represent the start date of sampling.

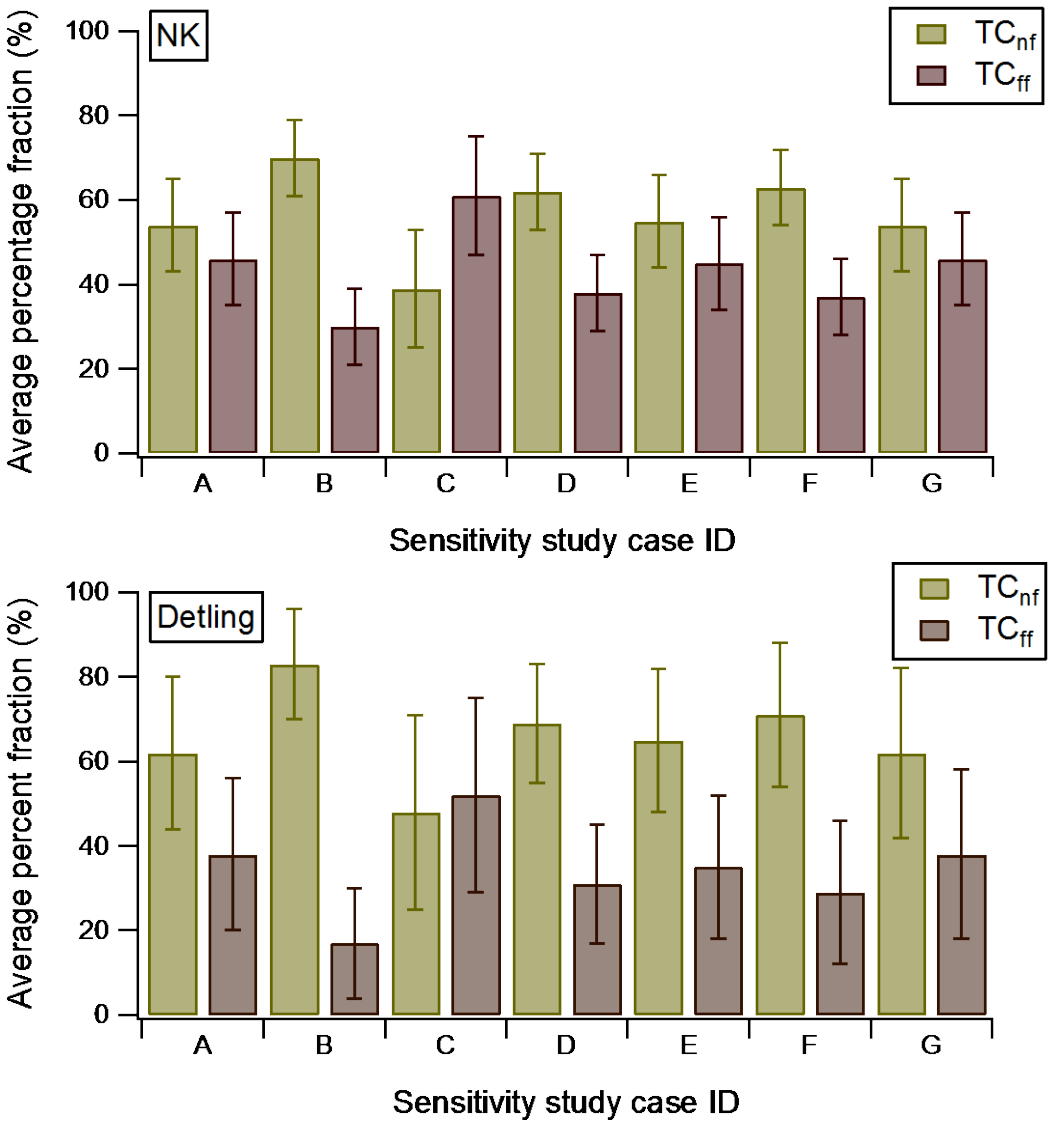

Figure S6: Daily average percentage of non-fossil total carbon fraction (TC_{nf}) and the total carbon fossil fraction (TC_{ff}) as calculated using different source ratios. For details on the source ratios used, refer to the case ID given in Table 4.

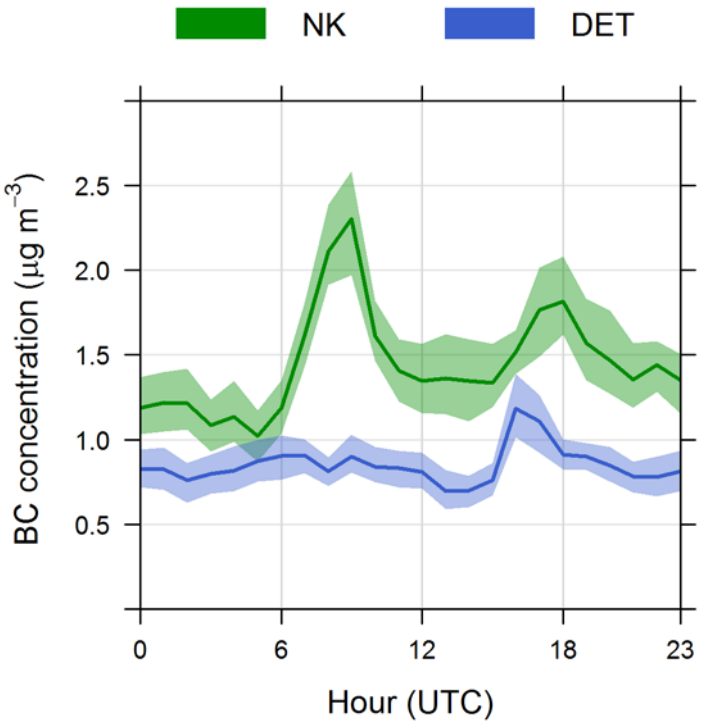

Figure S7: Mean diurnal variations in the BC concentrations during the winter campaign as measured by a 7W AE with the shaded areas indicating the 95% confidence intervals. Note in the key DET and NK represent Detling and North Kensington, respectively.

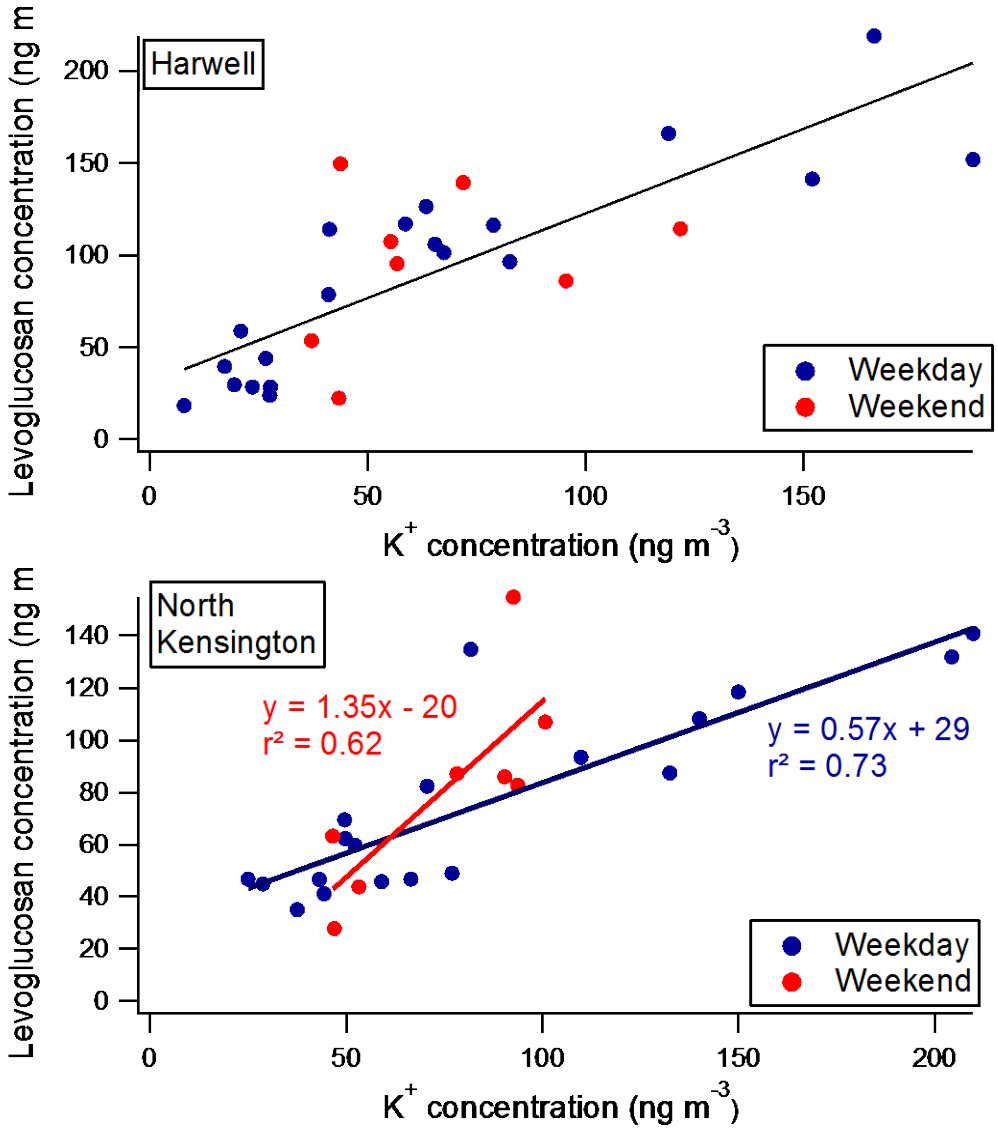

Figure S8: Scatter plots of levoglucosan to K^+ concentrations as a function of weekday and weekend at Harwell (upper panel) and North Kensington (bottom panel).

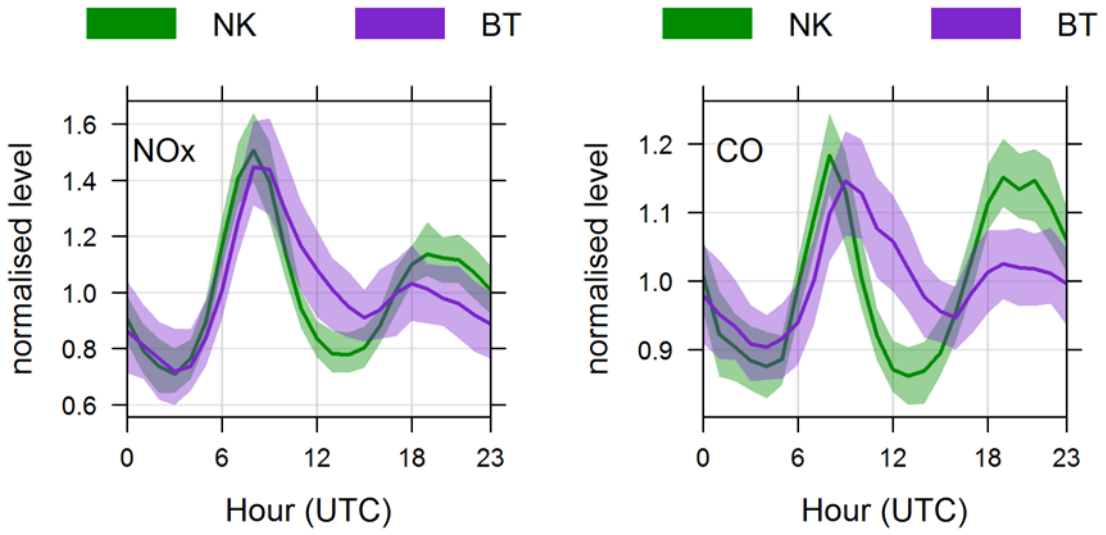

Figure S9: Mean diurnal variations of NOx and CO concentrations for the long-term measurements, normalised by the mean at NK and the BT tower (BT). Shaded areas represent 95% confidence intervals.

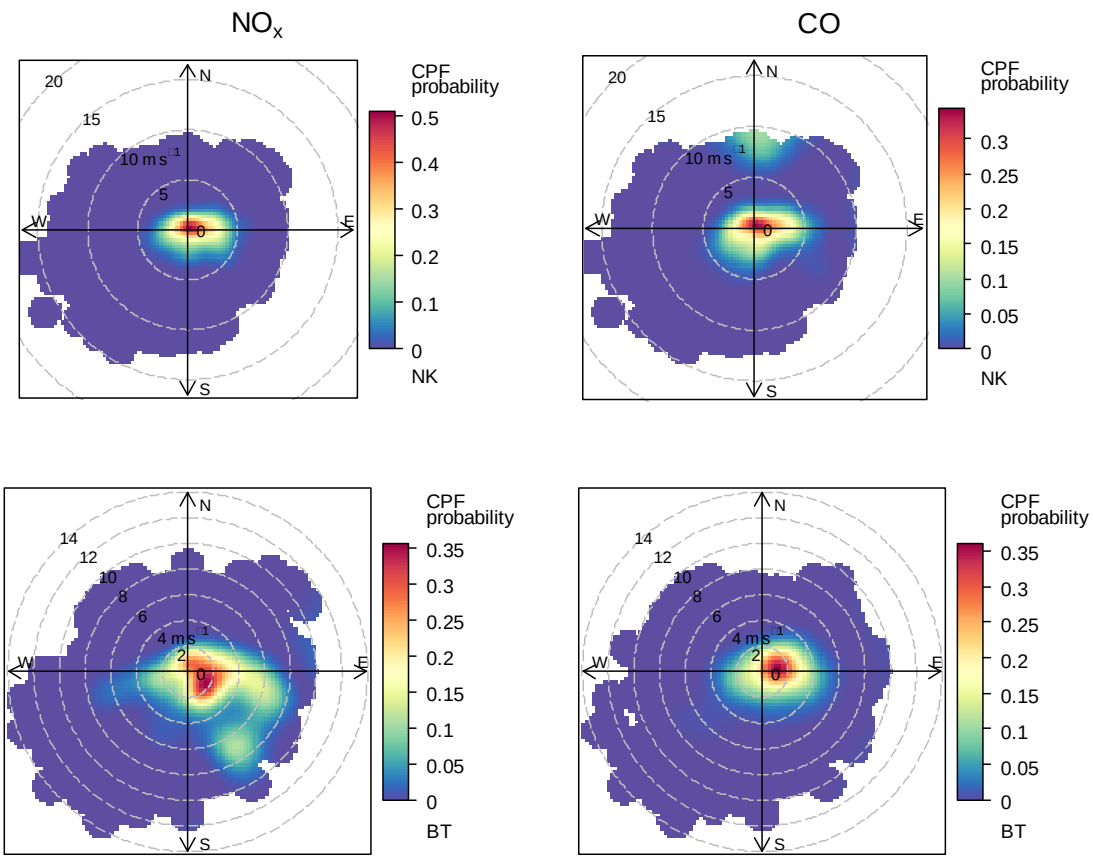

Figure S10: CPF analysis presented as polar plots for NO_x and CO concentrations at the sites over the whole sampling period. NK is in the top panels, with the BT tower (BT) in the lower.

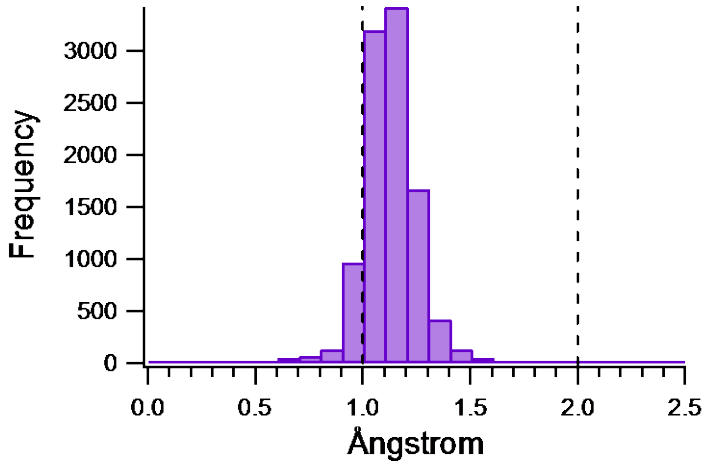

Figure S11: Histogram of hourly absorption Ångstrom co-efficient (α) for the whole sampling period at BT tower.

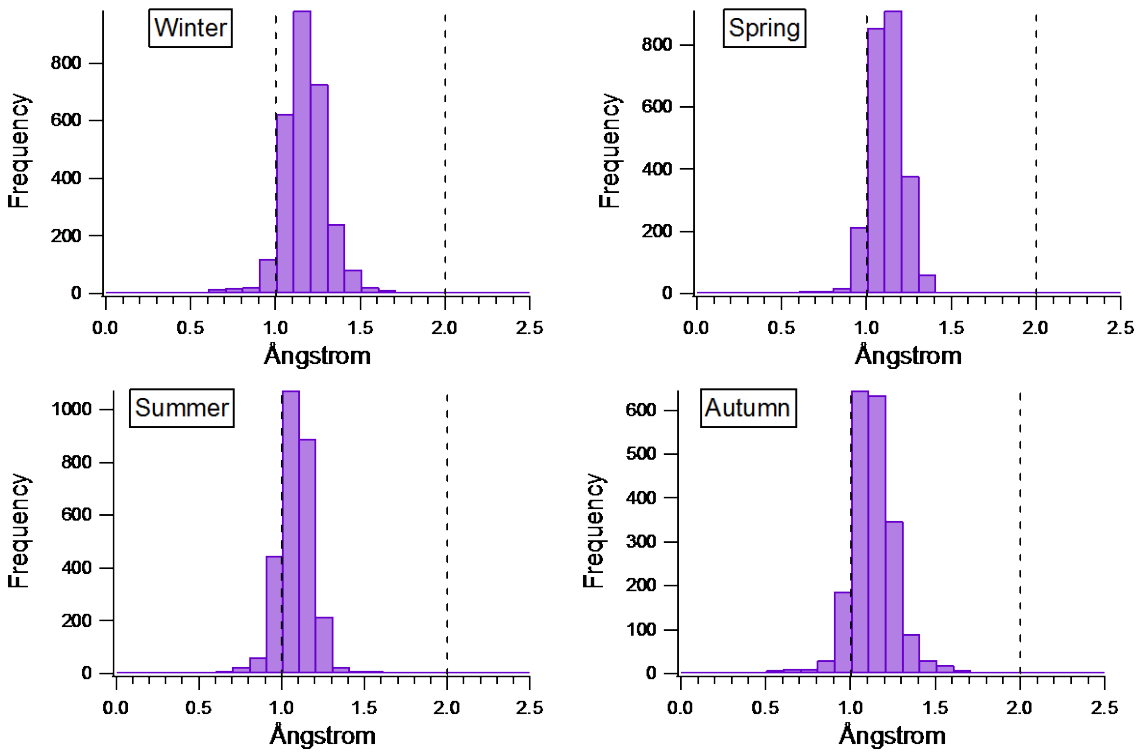

Figure S12: Histogram of hourly absorption Ångstrom co-efficient at BT tower by season.

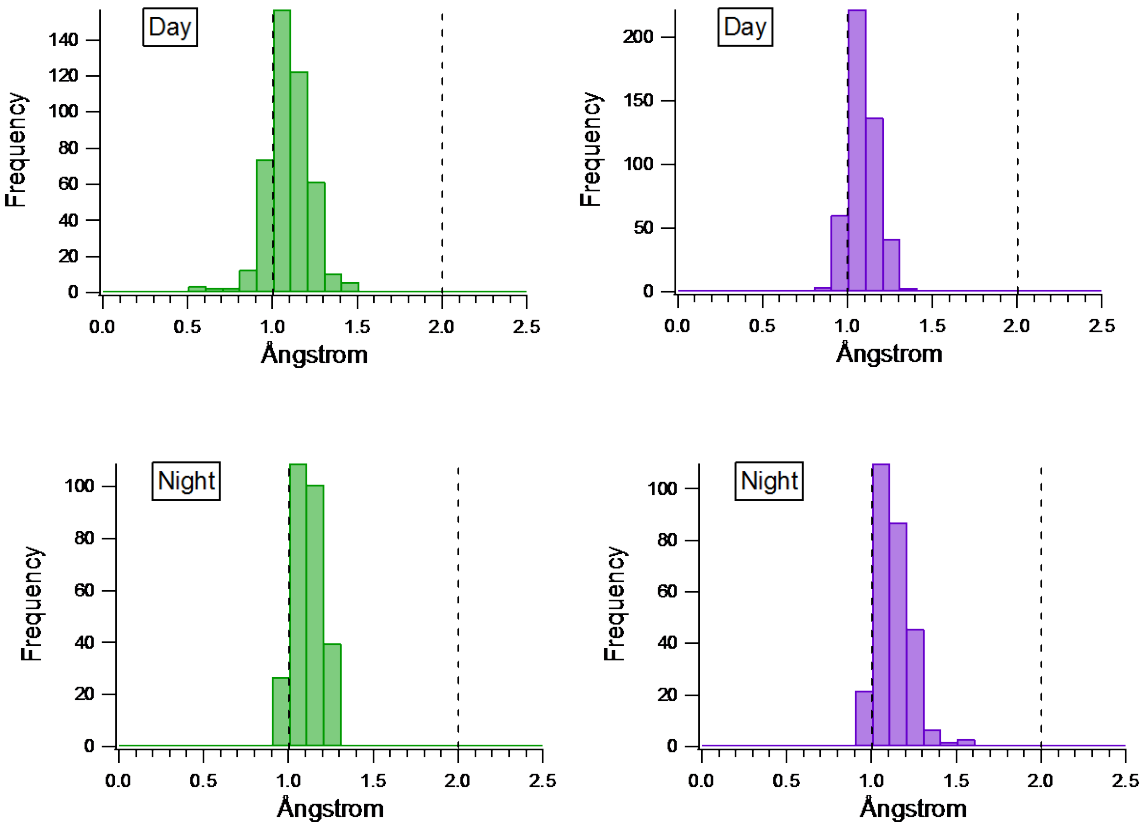

Figure S13: Histogram of hourly Ångstrom coefficients at North Kensington (green, left column) and BT tower (purple, right column) during the summer campaign for daytime and night time (21.00 until 05.00 inclusive).

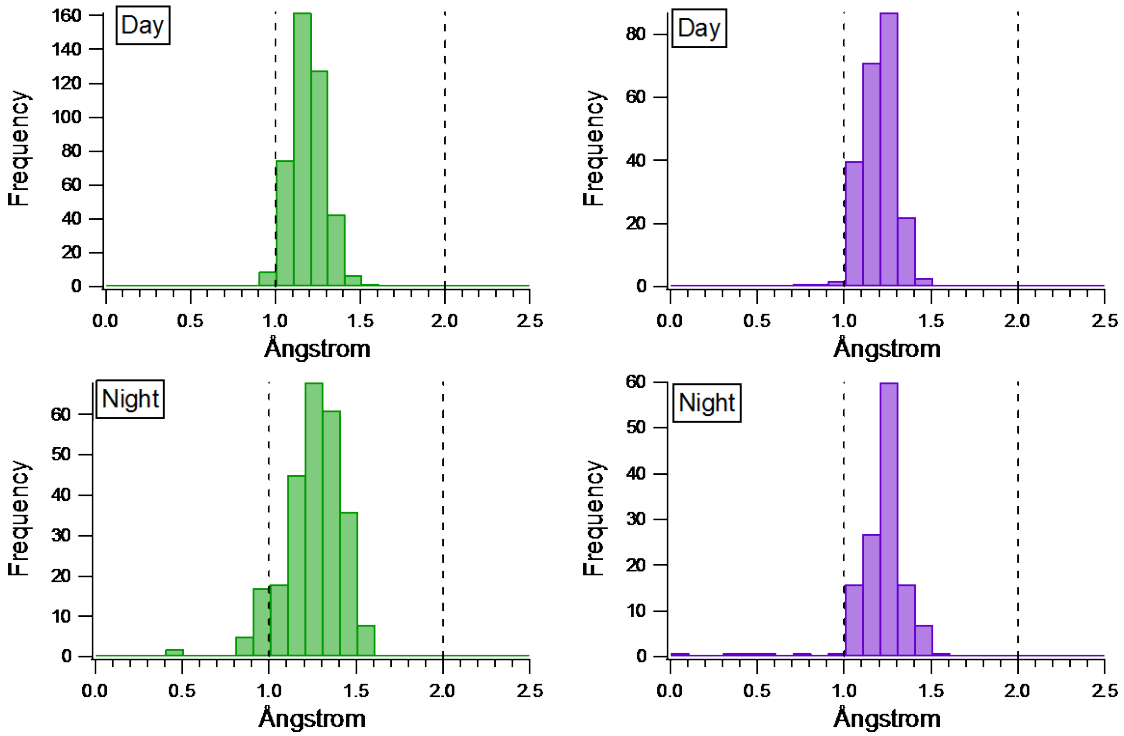

Figure S14: Histograms of hourly Ångstrom coefficients for the winter campaign at North Kensington (green, left column) and the BT tower (purple, right column) for day and night time (21.00 until 0.500 inclusive).

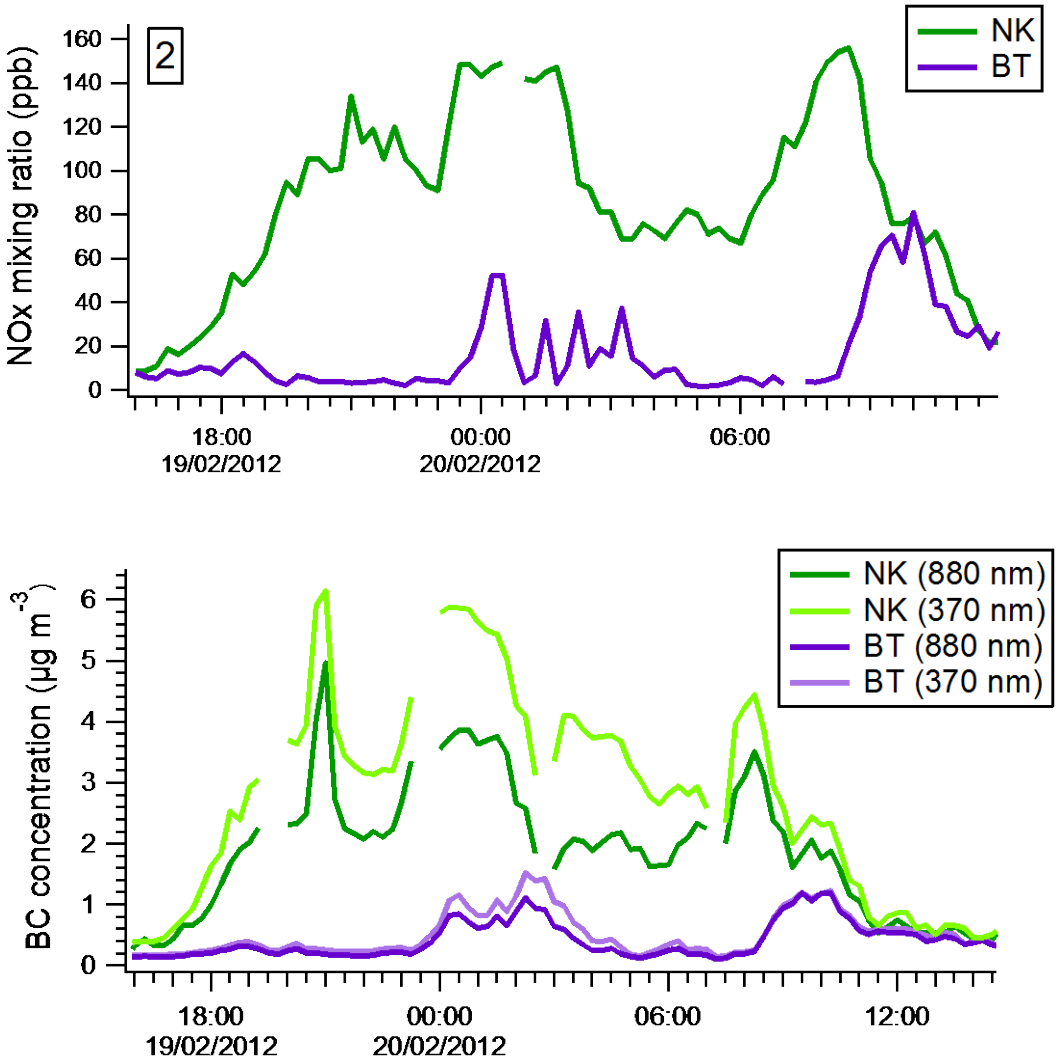

Figure S15: Time series of NOx (top) and BC concentrations measured at 370 and 880 nm (bottom) at North Kensington (NK) and the BT tower (BT) during de-coupling event 2 (Table S2). Note the BC concentrations were determined using a 2 wavelength aethalometer at NK.

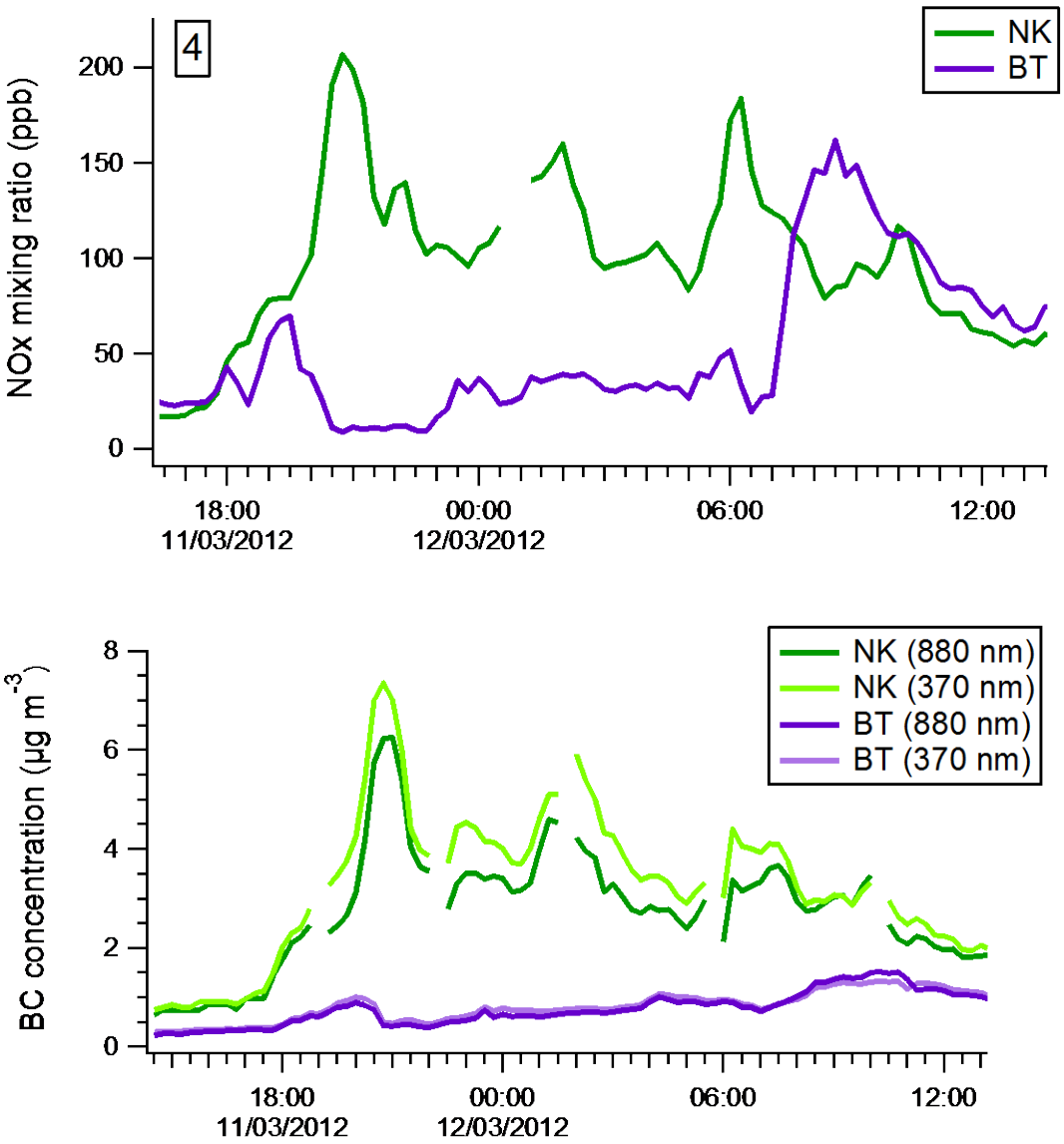

Figure S16: Time series of NOx (top) and BC concentration measured at 370 and 880 nm (bottom) at NK and the BT tower (BT) during de-coupling event 4 (Table S2). Note the BC concentrations were determined using a 2 wavelength aethalometer at NK.

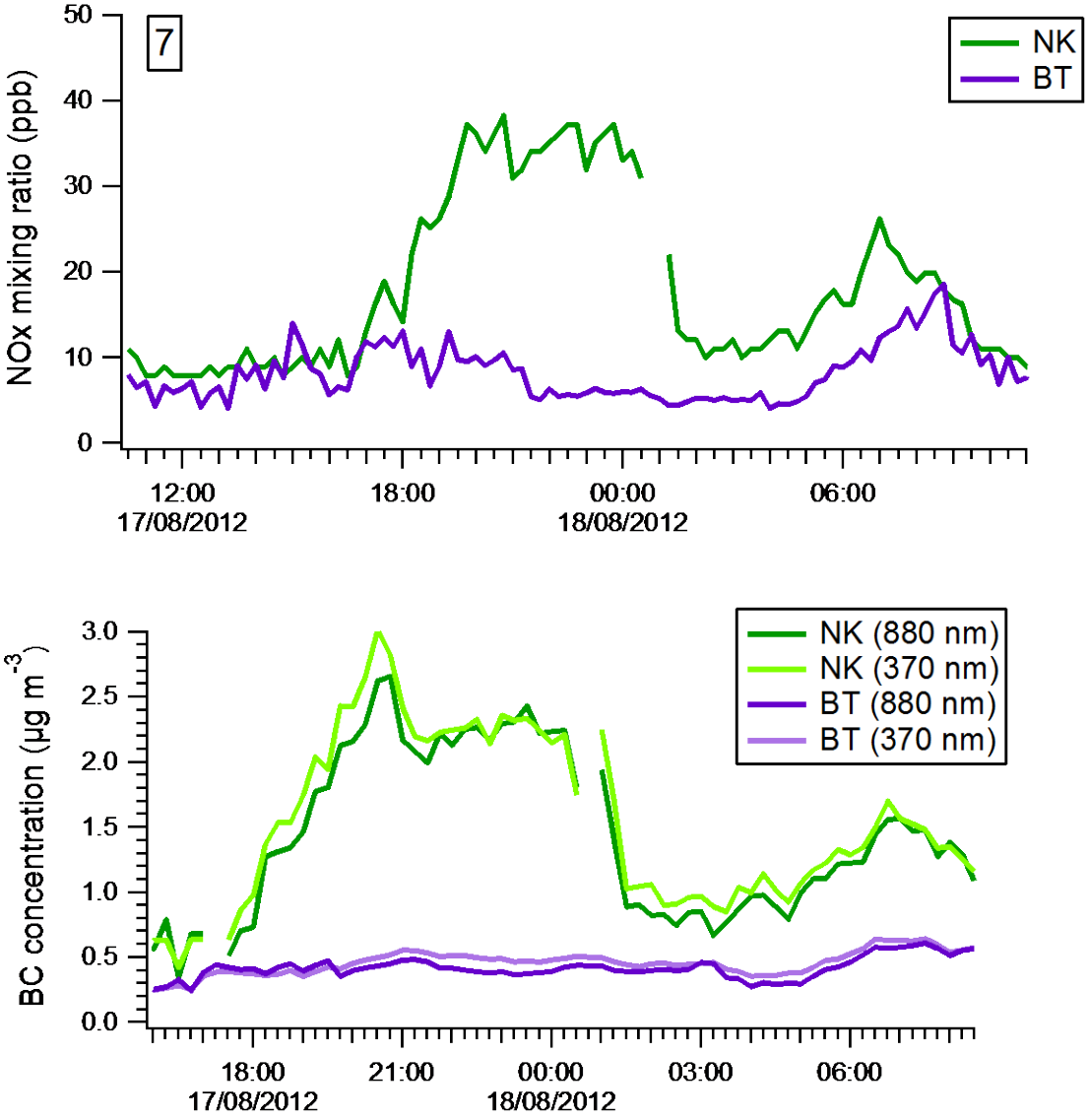

Figure S17: Time series of NOx (top) and BC concentration measured at 370 and 880 nm (bottom) at NK and the BT tower (BT) during de-coupling event 7 (Table S2). Note the BC concentrations were determined using a 2 wavelength aethalometer at NK.

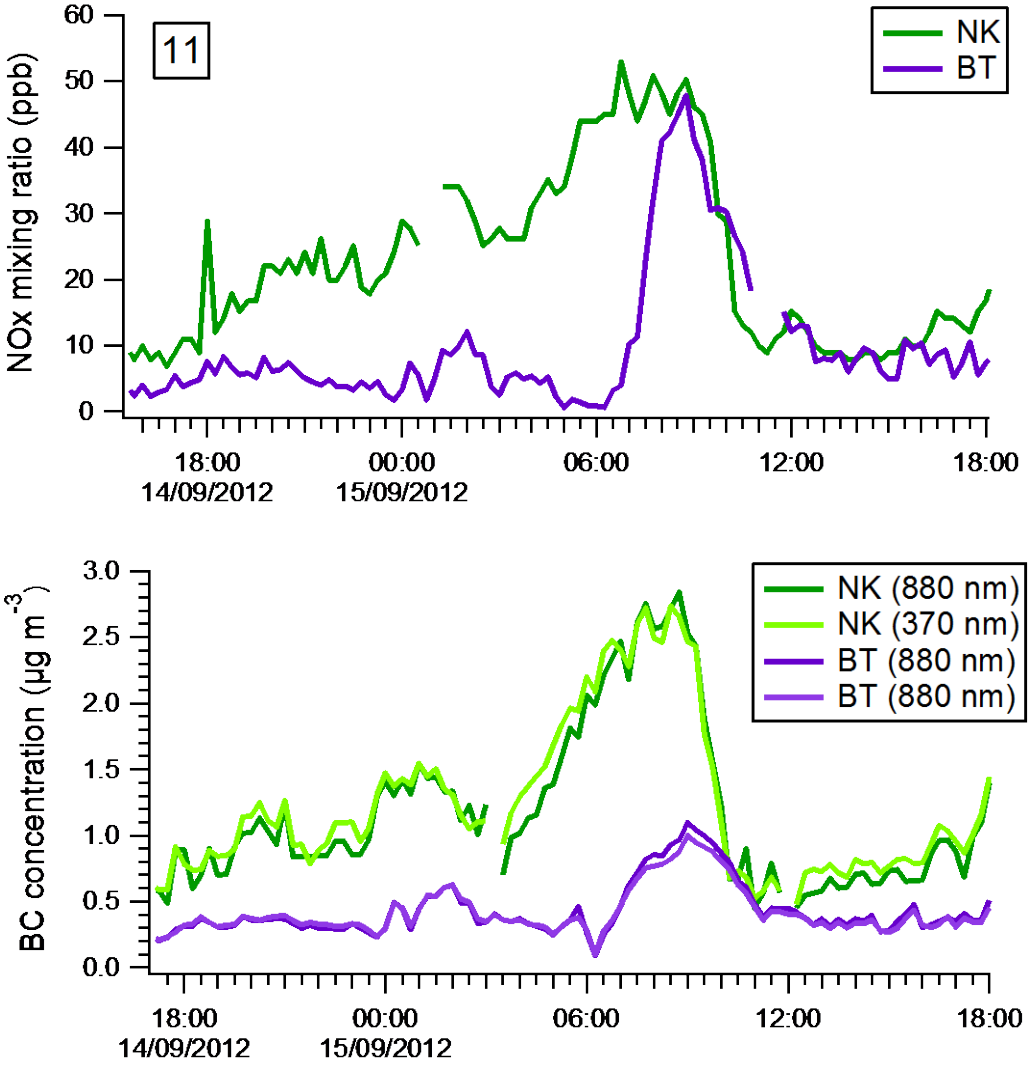

Figure S18: Time series of NOx (top) and BC concentration measured at 370 and 880 nm (bottom) at NK and the BT tower (BT) during de-coupling event 11 (Table S2). Note the BC concentrations were determined using a 2 wavelength aethalometer at NK.

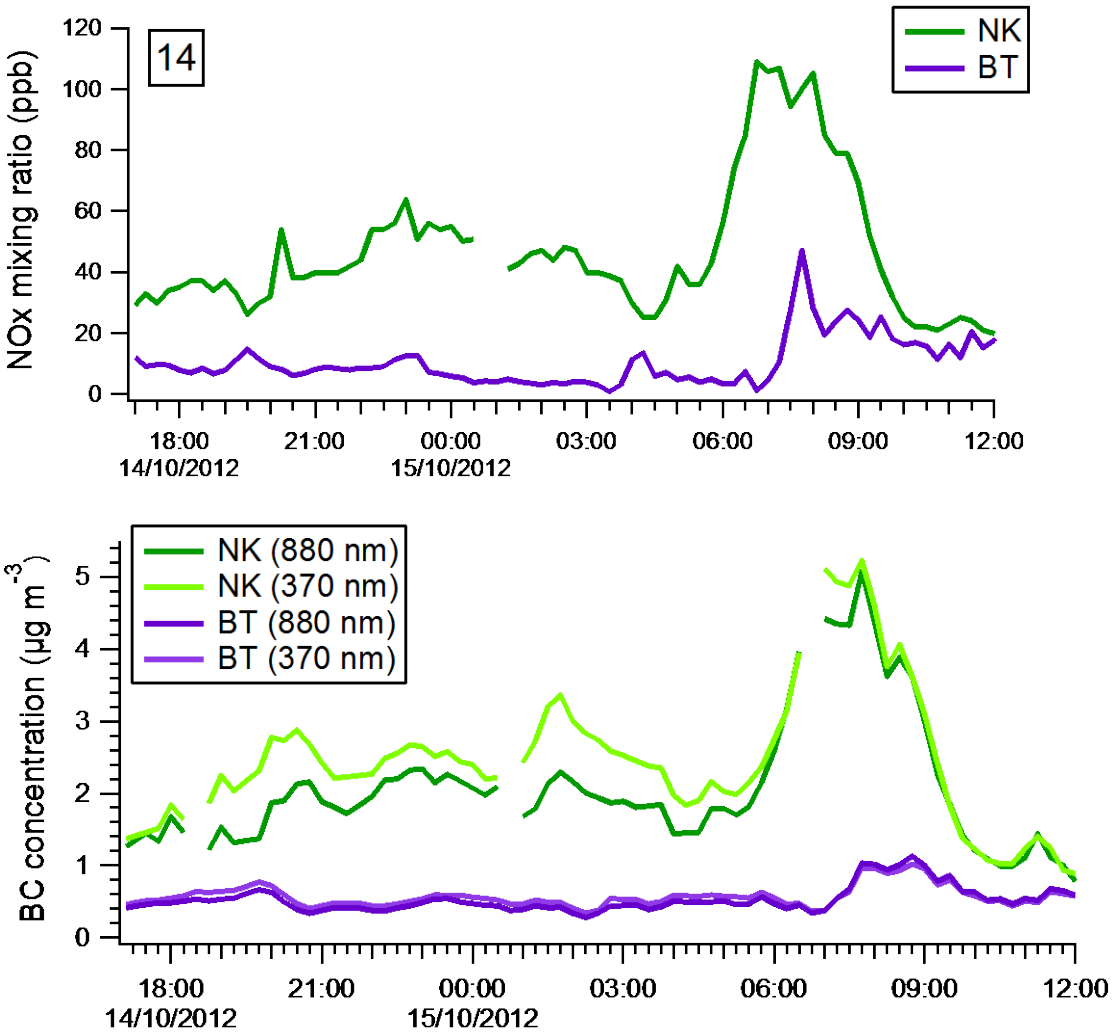

Figure S19: Time series of NOx (top) and BC concentration measured at 370 and 880 nm (bottom) at NK and the BT tower (BT) during de-coupling event 14 (Table S2). Note the BC concentrations were determined using a 2 wavelength aethalometer at NK.