Supporting Information

Identification of particulate matter sources in a wood burning community on an hourly time-scale

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This supporting information contains nine pages featuring three tables and eight figures.

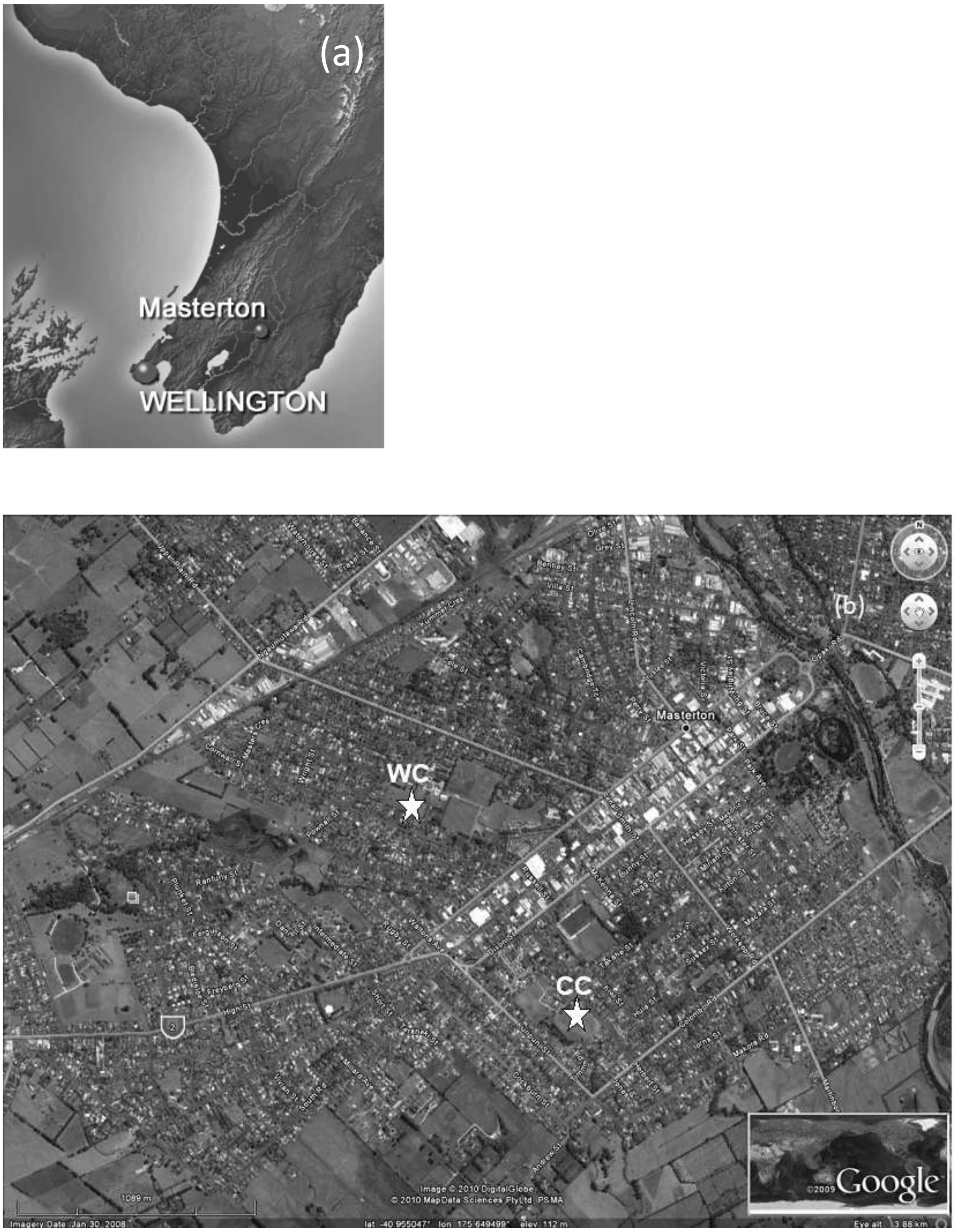

Figure S1. Location of Masterton (a) and locations of the sampling sites (indicated by stars) within Masterton (b)

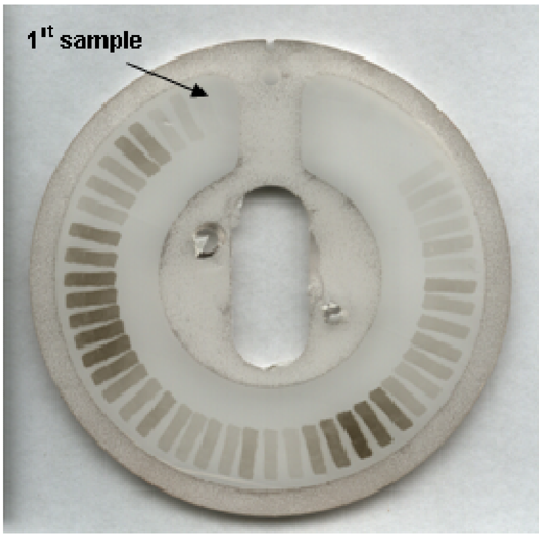

Figure S2. Streaker sampler filter showing individual hourly samples (dark bands)

Table S1. Parameters used for PMF analyses and diagnostics obtained from the analyses for Wairarapa College and Chanel College

	Wairarapa College	Chanel College
Extra modeling uncertainty (%)	15	15
Number of base runs	20	20
Base run seed	Random	Random
Number of bootstraps	200	200
Minimum correlation R-value	0.6	0.6
Bootstrap seed	Random	Random
Block size	24	24
Theoretical Q[a]	7613	8806
Robust Q	6097	5900
True Q	6098	5901
Number of bootstrapped factors mapped to original factor 1	200	200
Number of bootstrapped factors mapped to original factor 2	200	197
Number of bootstrapped factors mapped to original factor 3	200	200
Number of bootstrapped factors mapped to original factor 4	199	200
Number of bootstrapped factors mapped to no original factor	1	2
Maximum D value[b]	0.4	0.6

[a] Calculated based on the method reported by Paatero *et al.* (1)

[b] From the matrix containing the sum of squares between paired residuals (2)

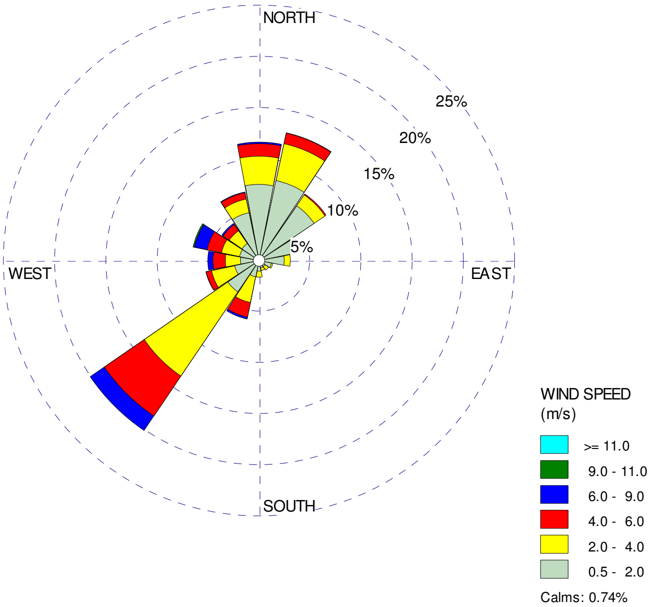

Figure S3. Wind rose plot over the entire sampling period from the Wairarapa College site. The radial dimensions indicate the frequency (%) of winds from each direction.

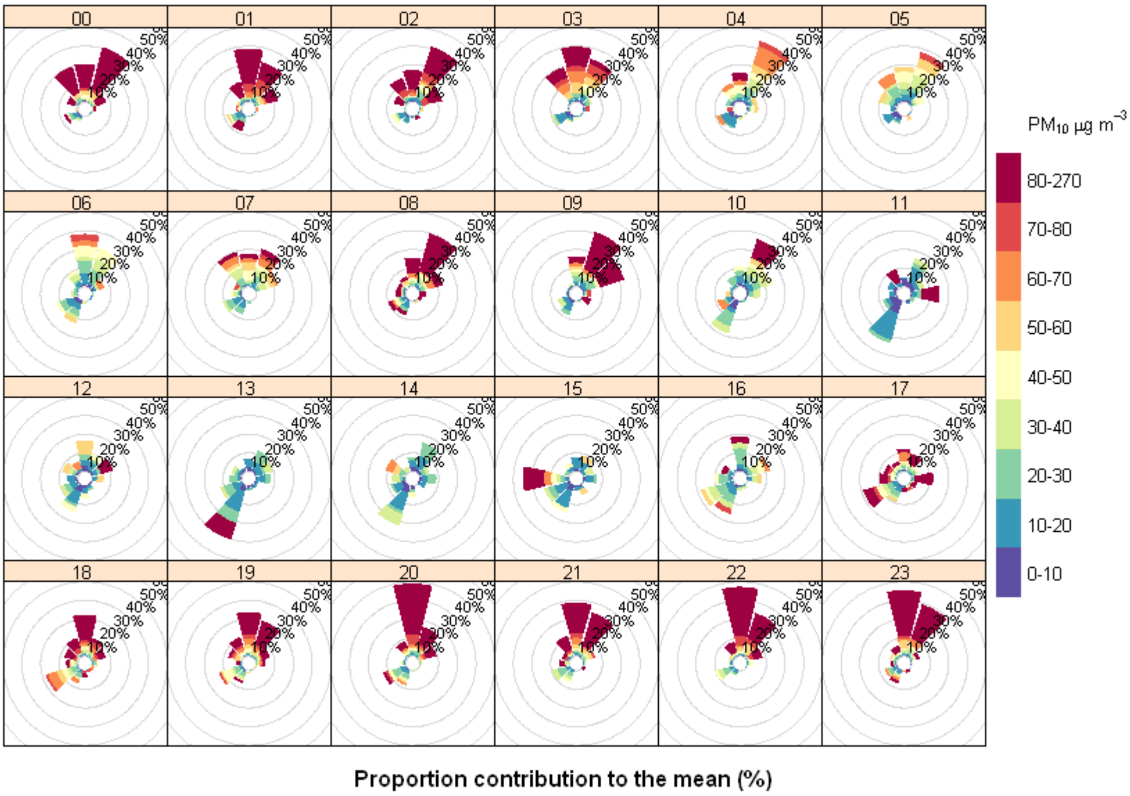

Figure S4. Hourly pollution roses from the Chanel College site (produced using the Openair package (Carlslaw and Ropkins, 2011)) indicating wind directions contributing the most to average hourly PM_{10} concentrations. The radial dimensions indicate the percentage of the total pollution that arrives from each wind sector during each one-hour period.

Table S2. PM_{10} (µg m^{-3}), BC (ng m^{-3}) and elemental (ng m^{-3}) data from the Wairarapa College site

	Average	**Maximum**	**Minimum**	**Median**	**Standard Deviation**	**Average Uncertainty**	**Average LOD**	**Number > LOD**
PM_{10}	25	213	0	14	30			
Fine BC	3144	21652	157	1566	3797	611	800	552
Fine S	234	1549	97	210	129	32	28	571
Fine K	231	2036	0	117	273	113	27	565
Fine Ca	104	770	0	81	91	109	24	565
Fine Fe	38	376	0	29	35	115	9	553
Fine As	7	91	0	0	15	108	35	41
Coarse Na	1544	57044	0	718	2779	283	567	466
Coarse Al	375	17901	0	71	1578	340	77	374
Coarse Si	475	9453	121	302	638	31	51	571
Coarse S	197	4767	0	101	303	150	39	520
Coarse Cl	1555	51507	0	386	2914	119	36	571
Coarse K	134	3099	0	83	179	157	37	532
Coarse Ca	764	25749	114	351	2468	25	32	512
Coarse Fe	137	7428	0	52	383	78	18	539

Table S3. PM_{10} (µg m^{-3}), BC (ng m^{-3}) and elemental (ng m^{-3}) data from the Chanel College site

	Average	Maximum	Minimum	Median	Standard Deviation	Average Uncertainty	Average LOD	Number > LOD
PM_{10}	32	484	0	19	39			
Fine BC	3716	20449	139	2011	4007	623	800	631
Fine S	236	645	106	228	71	22	37	680
Fine K	148	891	0	82	163	15	25	601
Fine Ca	56	339	0	48	38	21	22	554
Fine Fe	38	2774	0	22	152	11	8	554
Fine As	6	110	0	0	14	31	34	38
Coarse Na	508	13098	0	300	713	294	499	322
Coarse Al	110	2297	25	81	163	36	55	612
Coarse Si	168	2498	62	113	190	32	42	680
Coarse S	71	1510	0	49	89	34	51	410
Coarse Cl	643	17110	0	280	1046	57	41	672
Coarse K	42	1916	0	29	81	21	32	465
Coarse Ca	164	5565	40	106	387	27	28	680
Coarse Fe	54	4172	0	14	232	14	13	498

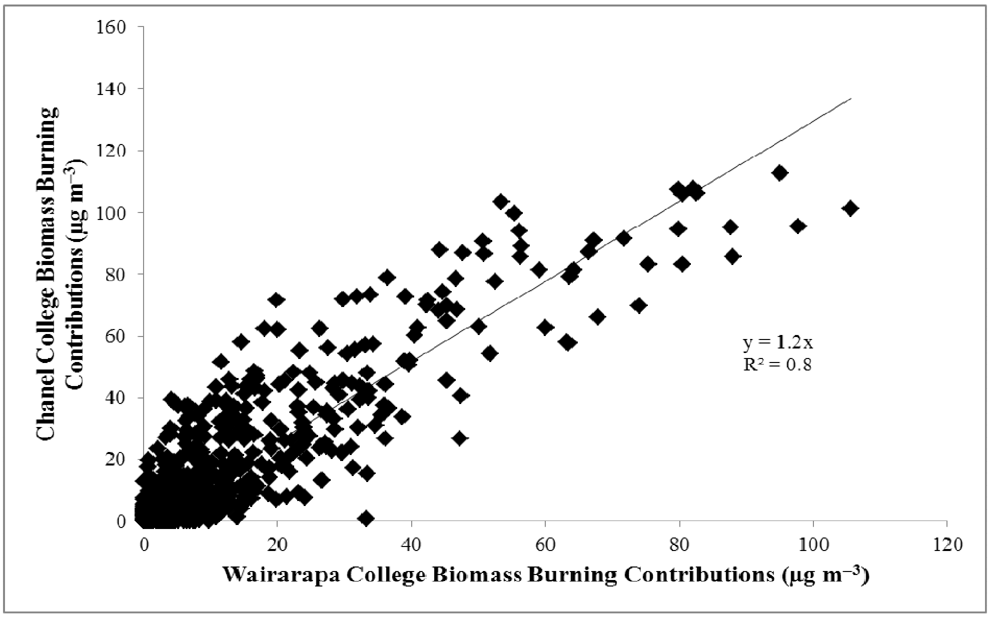

Figure S5. Plot of biomass burning contributions at Chanel College versus biomass burning contributions at Wairarapa College

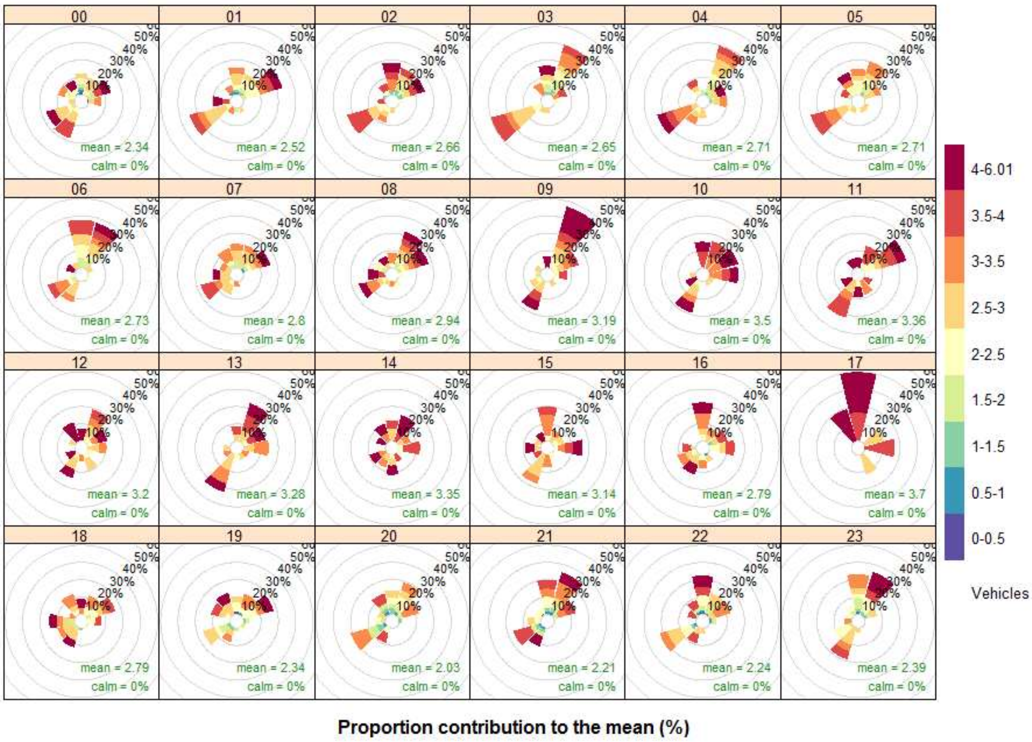

Figure S6. Hourly motor vehicle source roses from the Chanel College site indicating wind directions contributing the most to average hourly PM_{10} concentrations. The radial dimensions indicate the percentage of the total motor vehicle contribution that arrives from each wind sector during each one-hour period.

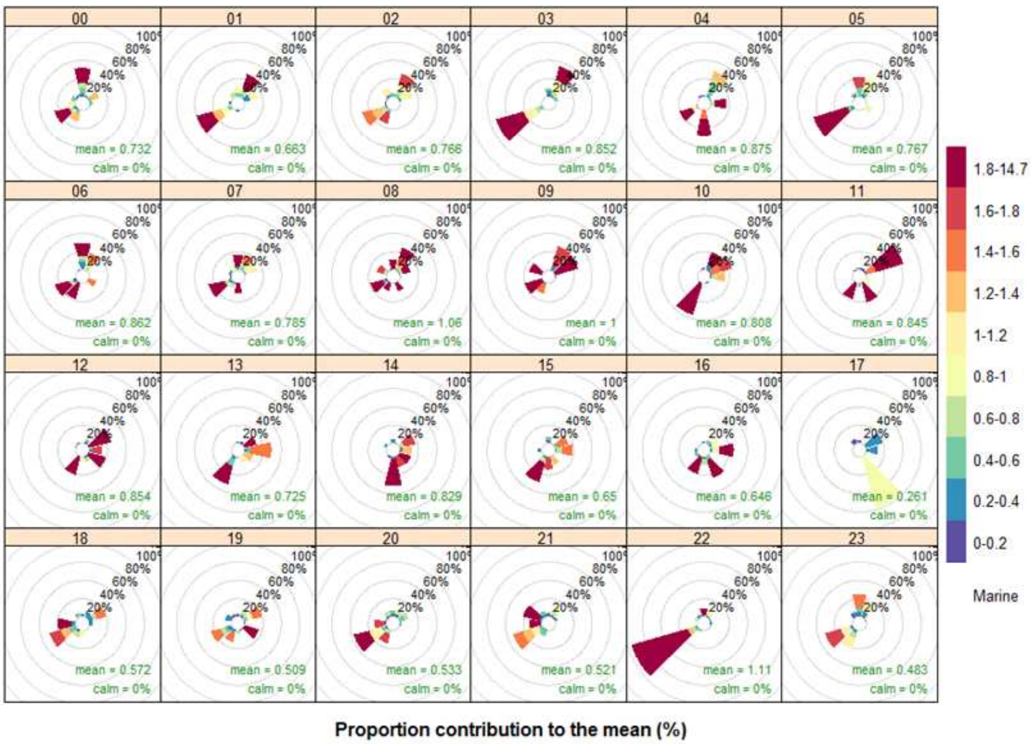

Figure S7. Hourly marine aerosol source roses from the Chanel College site indicating wind directions contributing the most to average hourly PM_{10}

concentrations. The radial dimensions indicate the percentage of the total marine aerosol contribution that arrives from each wind sector during each one-hour period.

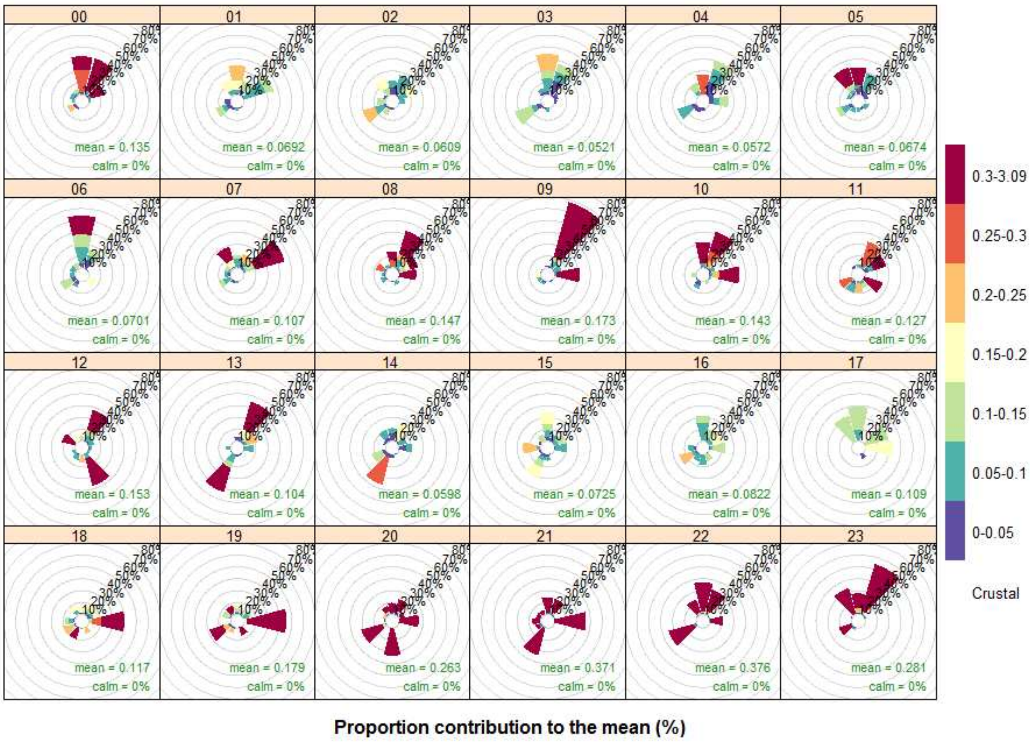

Figure S8. Hourly crustal matter source roses from the Chanel College site indicating wind directions contributing the most to average hourly PM_{10} concentrations. The radial dimensions indicate the percentage of the total crustal matter contribution that arrives from each wind sector during each one-hour period.

References

(1) Paatero, P.; Hopke, P. K., Discarding or downweighting high-noise variables in factor analytic models. *Analytica Chimica Acta* 2003, *490*, (1-2), 277-289.

(2) *EPA Positive Matrix Factorization (PMF) 3.0 Fundamentals and User Guide*. USEPA National Exposure Research Laboratory, Research Triangle Park, NC, 2008.