Table S1. Intercomparison of POC and SOC concentrations of PM_{10} calculated using two independent approaches for $(OC/EC)_{primary}$ derivation.

Station	Season	Model 1[a] $(OC)_{primary}=\alpha*EC+\beta$ [with season-independent parameters]				Model 1[a,b] $(OC)_{primary}=\alpha*EC+\beta$ [with season-specific parameters]				Model 2[c] $(OC)_{primary}=(OC/EC)_{min}*EC$		
		α	β	POC[d]	SOC[d]	α	β	POC[d]	SOC[d]	$(OC/EC)_{min}$	POC[d]	SOC[d]
Cape FuGuei	Spring	1.62	0.05	2.8(0.2)	2.2(0.1)	1.77	-0.37	2.7(0.2)	2.3(0.1)	1.48	2.5(0.2)	2.5(0.1)
	Summer			2.7(0.1)	2.4(0.2)	1.25	0.53	2.6(0.1)	2.5(0.2)	1.18	1.9(0.1)	3.1(0.2)
	Autumn			1.8(0.2)	1.5(0.2)	1.48	0.28	1.9(0.2)	1.4(0.2)	1.42	1.6(0.2)	1.7(0.2)
	Winter			2.7(0.2)	2.9(0.2)	1.48	1.04	3.4(0.2)	2.2(0.2)	1.48	2.4(0.2)	3.1(0.2)
Taipei	Spring	1.70	0.46	6.7(0.3)	2.2(0.2)	2.10	-0.96	6.7(0.3)	2.2(0.2)	1.48	5.4(0.2)	3.5(0.2)
	Summer			5.7(0.3)	2.6(0.3)	---	---	---	---	1.54	4.7(0.3)	3.5(0.3)
	Autumn			4.2(0.3)	1.5(0.2)	---	---	---	---	1.73	3.8(0.3)	1.9(0.2)
	Winter			5.6(0.4)	2.8(0.4)	---	---	---	---	1.96	5.9(0.5)	2.4(0.4)
Taichung	Spring	1.43	2.88	8.4(0.3)	3.1(0.3)	1.40	2.65	8.1(0.3)	3.4(0.3)	1.66	6.4(0.3)	5.3(0.3)
	Summer			7.3(0.5)	4.6(0.7)	---	---	---	---	1.58	4.8(0.5)	6.9(0.7)
	Autumn			9.5(0.5)	3.9(0.6)	1.32	3.39	9.5(0.4)	3.9(0.6)	1.36	6.3(0.4)	7.0(0.6)
	Winter			9.7(0.4)	3.8(0.5)	2.03	0.02	9.7(0.6)	3.8(0.4)	1.84	8.7(0.5)	4.7(0.4)
Tainan	Spring	1.56	3.54	8.9(0.3)	1.1(0.2)	---	---	---	---	2.13	7.3(0.4)	2.6(0.2)
	Summer			6.3(0.3)	1.3(0.3)	---	---	---	---	2.76	4.9(0.5)	2.5(0.3)
	Autumn			8.4(0.3)	2.6(0.4)	---	---	---	---	1.80	5.6(0.3)	5.4(0.4)
	Winter			9.2(0.5)	2.6(0.4)	---	---	---	---	2.15	7.8(0.7)	3.9(0.4)
Pingtung	Spring	1.85	4.77	9.7(0.3)	3.4(0.3)	---	---	---	---	2.60	7.0(0.4)	6.1(0.4)
	Summer			7.5(0.4)	4.6(0.9)	---	---	---	---	3.84	5.6(0.8)	6.4(1.0)
	Autumn			9.9(0.3)	3.6(0.8)	---	---	---	---	2.98	8.3(0.5)	5.0(0.8)
	Winter			10.3(0.4)	3.1(0.3)	---	---	---	---	2.15	6.4(0.5)	6.9(0.4)
Penghu	Spring	1.75	0.29	1.9(0.1)	1.3(0.2)	1.52	0.52	1.9(0.1)	1.3(0.2)	1.46	1.3(0.1)	1.8(0.2)
	Summer			1.5(0.1)	2.1(0.2)	1.85	0.77	2.1(0.1)	1.5(0.2)	1.68	1.2(0.1)	2.4(0.2)
	Autumn			1.7(0.1)	1.6(0.1)	2.14	0.06	1.8(0.2)	1.5(0.1)	1.91	1.5(0.2)	1.7(0.1)
	Winter			2.1(0.1)	1.3(0.1)	1.66	0.30	2.0(0.1)	1.4(0.1)	1.62	1.7(0.1)	1.8(0.1)
Hualien	Spring	2.36	-0.13	3.7(0.2)	2.3(0.1)	1.90	1.33	4.4(0.2)	1.6(0.1)	1.94	3.2(0.2)	2.8(0.1)
	Summer			3.5(0.1)	2.9(0.3)	---	---	---	---	2.12	3.2(0.1)	3.1(0.3)
	Autumn			3.4(0.2)	2.3(0.1)	2.21	0.48	3.8(0.2)	1.9(0.1)	2.00	3.0(0.2)	2.7(0.1)
	Winter			4.8(0.3)	2.0(0.2)	2.41	-0.54	4.5(0.3)	2.3(0.2)	2.00	4.2(0.3)	2.6(0.2)

a. The station-specific α and β were derived from the measurements with lowest 10% (OC/EC) values. The details of this approach are described in the main text.

b. Applying to the cases with N>50.

c. This method assumes the minimal (OC/EC) ratio is representative to the primary (OC/EC).

d. The standard error of each mean value is noted in parentheses

Table S2. Intercomparison of POC and SOC concentrations of $PM_{2.5}$ calculated using two independent approaches for $(OC/EC)_{primary}$ derivation.

Station	Season	Model 1[a] $(OC)_{primary}=\alpha*EC+\beta$ [with season-independent parameters]				Model 1[a,b] $(OC)_{primary}=\alpha*EC+\beta$ [with season-specific parameters]				Model 2[c] $(OC)_{primary}=(OC/EC)_{min}*EC$		
		α	β	POC[d]	SOC[d]	α	β	POC[d]	SOC[d]	$(OC/EC)_{min}$	POC[d]	SOC[d]
Cape FuGuei	Spring	1.73	0.04	2.6(0.2)	1.7(0.1)	2.02	-0.29	2.7(0.2)	1.6(0.1)	1.63	2.4(0.2)	1.9(0.1)
	Summer			2.0(0.1)	1.5(0.1)	1.00	0.98	2.1(0.1)	1.4(0.1)	1.28	1.5(0.1)	2.0(0.1)
	Autumn			1.8(0.2)	1.1(0.1)	1.73	-0.14	1.6(0.2)	1.3(0.1)	1.31	1.3(0.2)	1.5(0.1)
	Winter			2.4(0.2)	2.0(0.2)	1.47	0.70	2.7(0.1)	1.7(0.2)	1.53	2.1(0.2)	2.3(0.2)
Taipei	Spring	1.78	-0.76	5.3(0.2)	2.1(0.2)	1.67	-0.07	5.6(0.2)	1.8(0.2)	1.51	5.1(0.2)	2.3(0.2)
	Summer			4.7(0.4)	2.2(0.3)	---	---	---	---	1.48	4.5(0.4)	2.4(0.3)
	Autumn			3.4(0.4)	1.7(0.2)	---	---	---	---	1.37	3.2(0.3)	1.8(0.2)
	Winter			3.8(0.4)	2.2(0.2)	---	---	---	---	1.64	4.20.4)	1.8(0.2)
Taichung	Spring	1.63	0.07	5.7(0.3)	2.5(0.2)	---	---	---	---	1.26	4.3(0.2)	3.8(0.2)
	Summer			3.8(0.4)	4.9(0.8)	---	---	---	---	1.90	4.3(0.5)	4.3(0.8)
	Autumn			6.1(0.4)	3.3(0.4)	1.46	0.85	6.2(0.4)	3.2(0.5)	1.51	5.6(0.4)	3.8(0.5)
	Winter			7.5(0.5)	3.4(0.5)	1.35	1.36	7.5(0.4)	3.4(0.5)	1.44	6.6(0.5)	4.3(0.5)
Tainan	Spring	2.01	0.04	5.9(0.4)	1.2(0.2)	---	---	---	---	1.75	5.1(0.4)	1.9(0.2)
	Summer			4.0(0.4)	2.2(0.1)	---	---	---	---	2.70	5.3(0.6)	0.9(0.2)
	Autumn			6.1(0.4)	2.9(0.4)	---	---	---	---	1.98	6.0(0.4)	3.0(0.4)
	Winter			5.2(0.7)	2.7(0.4)	---	---	---	---	2.27	5.8(0.8)	2.0(0.3)
Pingtung	Spring	1.45	4.38	7.4(0.2)	2.0(0.3)	---	---	---	---	3.05	6.3(0.4)	3.1(0.3)
	Summer			6.3(0.2)	3.8(0.9)	---	---	---	---	4.49	6.1(0.7)	3.8(0.9)
	Autumn			7.6(0.3)	2.5(0.5)	---	---	---	---	2.68	6.0(0.5)	3.7(0.6)
	Winter			8.6(0.3)	3.3(0.4)	---	---	---	---	1.81	5.2(0.3)	6.6(0.4)
Penghu	Spring	1.51	0.00	1.2(0.1)	0.9(0.1)	1.20	0.26	1.2(0.1)	0.9(0.1)	1.12	0.9(0.1)	1.2(0.1)
	Summer			0.9(0.1)	1.1(0.1)	---	---	---	---	1.13	0.7(0.1)	1.3(0.1)
	Autumn			1.1(0.1)	1.1(0.1)	1.87	-0.10	1.2(0.1)	1.0(0.1)	1.54	1.1(0.1)	1.1(0.1)
	Winter			1.4(0.1)	1.0(0.1)	1.26	0.42	1.6(0.1)	0.8(0.1)	1.41	1.3(0.1)	1.1(0.1)
Hualien	Spring	1.90	-0.17	2.8(0.1)	1.2(0.1)	1.31	0.80	2.9(0.1)	1.1(0.1)	1.53	2.4(0.1)	1.6(0.1)
	Summer			2.1(0.1)	1.5(0.2)	---	---	---	---	1.57	1.8(0.1)	1.7(0.2)
	Autumn			2.2(0.2)	1.4(0.1)	1.94	-0.17	2.2(0.2)	1.4(0.1)	1.55	2.0(0.2)	1.7(0.1)
	Winter			3.4(0.2)	1.9(0.2)	2.20	-0.29	3.8(0.3)	1.4(0.2)	2.07	3.8(0.3)	1.4(0.2)

a. The station-specific α and β were derived from the measurements with lowest 10% (OC/EC) values. The details of this approach are described in the main text.

b. Applying to the cases with N>50.

c. This method assumes the minimal (OC/EC) ratio is representative to the primary (OC/EC).

d. The standard error of each mean value is noted in parentheses

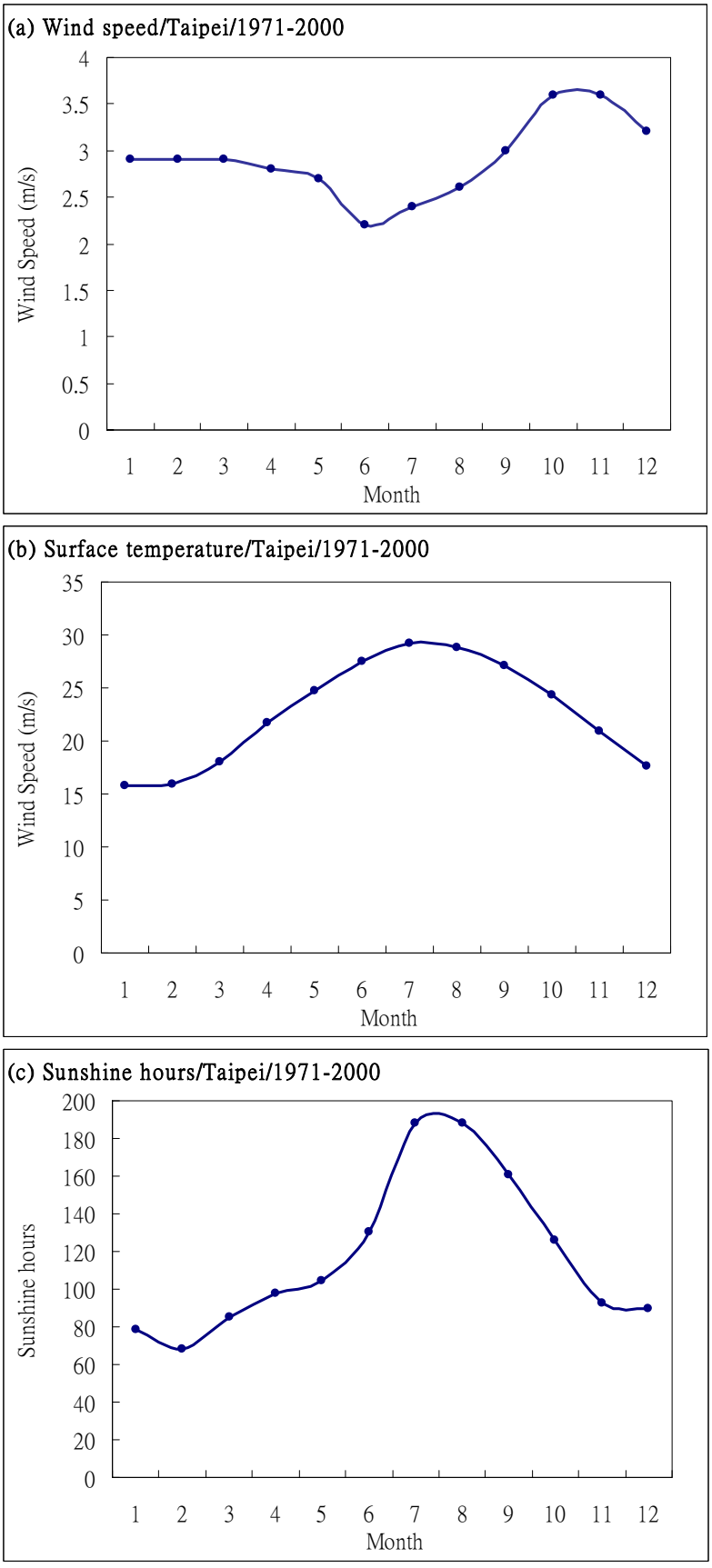

Figure S1. Climatology of meteorological parameters in Taipei, Taiwan. (source: Central Weather Bureau, Taiwan)