

## Supplementary material

**Table S1** Air quality index (AQI) values for PM<sub>2.5</sub> and PM<sub>10</sub>, colour codes and air pollutant level of health concern

AQI Value of Index	Levels of Health Concern	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	Daily AQI colour	Air Pollution Level
0 -50	Good	0 - 12	0 – 54	Green	Level 1
50 – 100	Moderate	12.1 – 35.4	55 – 154	Yellow	Level 2
101 – 150	Unhealthy for sensitive groups	35.5 – 55.4	155 – 254	Orange	Level 3
151 – 200	Unhealthy	55.5 – 150.4	255 – 354	Red	Level 4
201 – 300	Very unhealthy	150.5 – 250.4	355 – 424	Purple	Level 5
301 and Higher	Hazardous	250.5 - Higher	425 - Higher	Maroon	Level 6

**Source:** (Wambebe and Duan,2020)

**Table S2** Summary of temperature, relative humidity, wind speed and rainfall in Pretoria during 18 April 2017 and 17 April 2018

Variables	Autumn	Winter	Spring	Summer	Full study
Mean temperature (°C)	16.2	14.4	19.4	20.4	17.6
Min temperature (°C)	9.6	11.0	11.5	16.5	9.6
Max temperature (°C)	21.6	17.6	26.2	24.7	26.2
Mean RH (%)	64.1	49.9	45.1	57.3	54.3
Min RH (%)	37.4	22.7	14.1	30.1	14.1
Max RH (%)	81.9	80.0	73.2	84.1	84.1
Mean wind speed (m/s)	1.2	2.11	1.5	1.6	1.6
Max wind speed (m/s)	2.1	2.3	3.1	2.4	3.1
Mean rainfall (mm)	2.1	0	1.0	13.2	4.0
Min rainfall (mm)	0	0	0	0	0
Max rainfall (mm)	38.1	0	6.1	31.4	38.1

**Table S3** Correlation between air pollution and weather variables measured at the School of Health System and Public Health, University of Pretoria in Pretoria during 18 April 2017 and 17 April 2018.

Variable	PM <sub>2.5</sub>	Soot	BC	OC	Temp	RH	WS
PM <sub>2.5</sub>							
Soot	0.9629* 0.0000						
BC	0.7598* 0.0000	0.8744* 0.0000					
OC	0.7639* 0.0000	0.8548* 0.0000	0.9805* 0.0000				
Temp	-0.3181* 0.0016	-0.4914* 0.0000	-0.4945* 0.0000	-0.4591* 0.0000			
RH	-0.2238* 0.0284	-0.0272 0.7927	-0.0604 0.5587	-0.1208 0.2410	-0.3949* 0.0001		
WS	0.2090* 0.0410	0.1020 0.3227	0.1829 0.0745	0.2114* 0.0387	-0.3929* 0.0001	-0.0437 0.6725	

\*Significant (p < 0.05)

**Table S4** Trace elemental composition of PM<sub>2.5</sub> levels measured at the School of Health System and Public Health, University of Pretoria in Pretoria during 18 April 2017 to 17 April 2018 by season (in ng/m<sup>3</sup>)

<b>Elements</b>	<b>Autumn</b>	<b>Winter</b>	<b>Spring</b>	<b>Summer</b>
Si	424.2 ± 365.0	1039.4 ± 629.7	408.8 ± 414.2	374.1 ± 269.8
S	1599.2 ± 1650.2	1982.9 ± 1543.5	861.7 ± 707.7	1406.9 ± 773.5
Cl	62.2 ± 119.2	177.7 ± 230.7	19.3 ± 26.0	16.8 ± 37.2
K	201.5 ± 201.1	792.9 ± 379.8	308.8 ± 303.0	118.0 ± 92.7
Ca	160.2 ± 112.3	346.4 ± 204.5	95.4 ± 117.3	87.8 ± 54.0
Ti	26.1 ± 15.9	51.5 ± 30.1	21.7 ± 17.7	25.0 ± 14.9
V	1.7 ± 4.2	0.6 ± 0.0	2.2 ± 8.4	1.6 ± 5.3
Fe	329.1 ± 185.8	549.6 ± 202.9	354.7 ± 137.9	236.6 ± 102.7
Ni	105.6 ± 107.1	171.2 ± 85.6	205.3 ± 35.4	106.4 ± 76.1
Cu	9.8 ± 10.8	10.7 ± 6.9	5.1 ± 4.7	6.1 ± 10.3
Zn	85.2 ± 97.2	105.2 ± 103.1	20.9 ± 31.5	9.9 ± 10.9
As	1.9 ± 4.0	4.9 ± 6.1	0.5 ± 0.6	0.4 ± 0.0
Se	1.0 ± 1.4	2.2 ± 3.4	0.7 ± 0.9	0.6 ± 0.4
Br	24.9 ± 46.9	34.8 ± 19.3	8.0 ± 6.2	3.9 ± 2.5
Sb	12.0 ± 11.5	8.3 ± 6.6	12.1 ± 12.5	12.1 ± 11.3
Ba	11.5 ± 10.7	14.4 ± 12.5	11.9 ± 11.2	10.1 ± 9.2
Pb	12.4 ± 23.6	23.6 ± 42.1	2.5 ± 1.5	2.7 ± 3.2
U	1.2 ± 0.7	2.0 ± 1.8	1.5 ± 1.2	1.6 ± 1.2

**Table S5** The seasonal mean of transport cluster

<b>Season</b>	<b>Cluster number</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Total</b>
Entire year	Direction of clusters	NLP	EI	SIO	LIO	SWI	
	No of days	38	50	22	4	8	122
	%	31.1	41.0	18.0	3.3	6.6	100
Autumn	Direction of clusters	SEC	EMP	SIO	NLP	LIO	
	No of days	16	11	3	1	0	31
	%	51.6	35.5	9.7	3.2	0	100
Winter	Direction of clusters	WNW	NLP	EKZN	LAO	LIO	
	No of days	16	8	3	1	3	31
	%	51.6	25.8	9.7	3.2	9.7	100
Spring	Direction of clusters	SIO	LIO	NLP	SAO	LIO	
	No of days	4	18	5	1	2	30
	%	13.3	60.0	16.7	3.3	6.7	100
Summer	Direction of clusters	EIO	NLP	WCI	LIO	SIO	
	No of days	2	20	5	0	3	30
	%	16.7	66.6	16.7	0	10.0	100

WNW-Western North west, NLP-North Limpopo, EKZN-Eastern Kwazulu-Natal, LAO-Long Atlantic Ocean, LIO- Long Indian ocean, SEC-Southern Eastern cape, SIO-short Indian Ocean, EMP- Eastern Mpumalanga, SAO-South Atlantic Ocean, EI- Eastern Inland, WCI- Western cape inland, SWI-South-west Inland

**Table S6** Mean concentration of PM<sub>2.5</sub>, soot, BC and OC levels measured in Pretoria during 18 April 2017 to 17 April 2018 by transport cluster

Cluster		No of days	PM <sub>2.5</sub> (µg/m <sup>3</sup> )			Soot (10 <sup>-5</sup> m <sup>-1</sup> )			BC (µg/m <sup>3</sup> )			OC(µg/m <sup>3</sup> )		
			Mean	SD	Median	Mean	SD	Median	Mean	SD	Median	Mean	SD	Median
NLP	31%	38	32.5	16.4	35.2	3.6	2.4	2.5	5.7	3.3	5.6	4.4	2.0	4.5
EI	41%	50	17.9	11.8	15.3	1.6	1.4	1.3	2.8	2.2	2.1	2.7	1.5	2.2
SIO	18%	22	12.7	9.7	11.5	2.3	2.0	1.1	3.8	3.1	2.2	3.2	2.1	2.4
LIO	3%	4	10.1	4.9	10.7	1.4	0.3	4.5	2.5	0.3	0.8	2.8	0.3	1.0
SWI	7%	8	15.7	6.2	16.1	1.8	1.5	1.5	3.0	2.8	3.2	2.7	2.1	3.0

1: NLP- North Limpopo, 2: EI- Eastern Inland, 3: SIO- Short Indian ocean, 4: LIO- Long Indian ocean, 5: SWI-South-west Inland

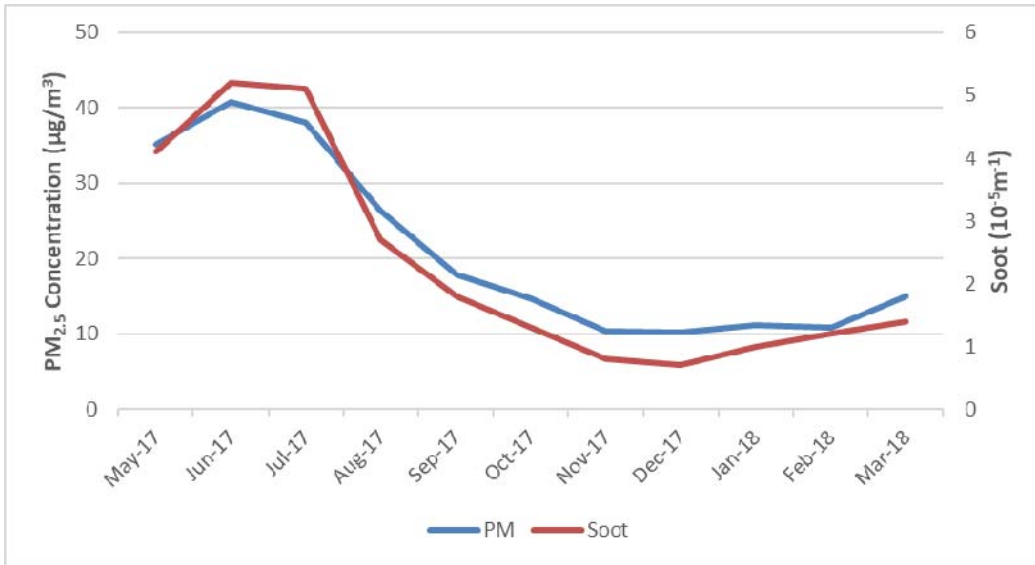


Figure S1: PM<sub>2.5</sub> and Soot levels in Pretoria during 18 April 2017 and 17 April 2018 by months.

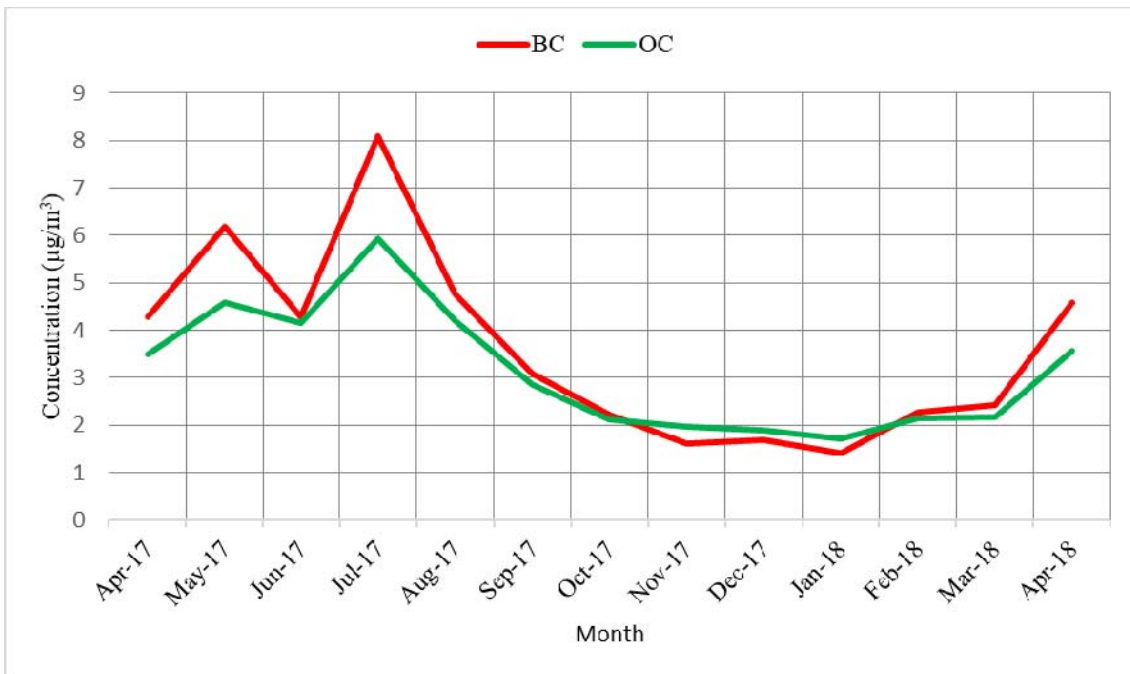
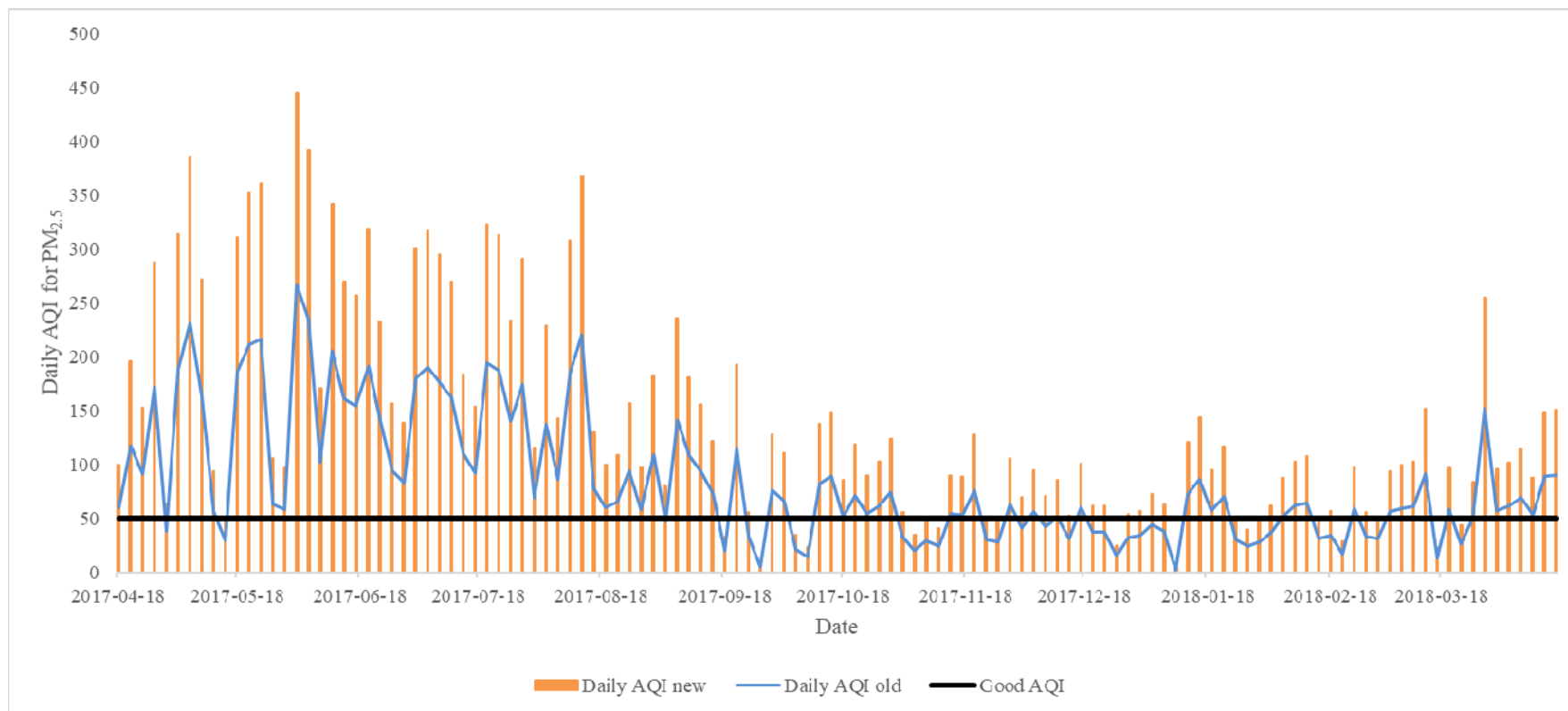


Figure S2: Black carbon and organic carbon levels in Pretoria during 18 April 2017 and 17 April 2018 by month.



**Figure S3: Daily air quality index using both old and new WHO air quality guideline for the entire study in Pretoria during 18 April 2017 and 17 April 2018**