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QUARTERLY GROUND LEVEL PARTICULATE MONITORING REPORT FOR BIRKENHEAD WORKS

COMPLIANCE DATE: 31/10/24 – Quarter 3, 2024
EPA Licence 1126: Ground Level Particulate Monitoring and Reporting Plan (U - 1555)

Licensed site: **Adelaide Brighton Cement, Birkenhead Works**

62 Elder Road, Birkenhead, SA 5015

Date of Submission: **31 October 2024**

Version Number: **1**

Report Submitted by: Business Partner - Environment

Glossary

Term	Definition
µg/m^3	micrograms per cubic metre
µm	micrometre
°C	degrees Celsius
m	metre
m^3	cubic metre
m^3/s	cubic metres per second
Nomenclature	**Definition**
PM_{10}	Particulate matter with a diameter less than 10 micrometres
$PM_{2.5}$	Particulate matter with a diameter less than 2.5 micrometres
TSP	Total Suspended Particulate
24 hour average	Calendar day (midnight to midnight)
Abbreviations	**Definition**
ABC	Adelaide Brighton Cement
Air EPP	South Australian Environment Protection (Air Quality) Policy 2016
GLPMRP	ABC's Ground Level Particulate Monitoring and Reporting Plan
EPA	Environment Protection Authority

Monitoring Locations	• *Map showing sampling locations, major infrastructure, sensitive environmental receptors, and north arrow.*

Monitoring locations are indicated by colour-coded dots on the above map.

NB: Four sampling points are located on the Birkenhead Works site; the other monitoring locations are in the community (Community Park), and Corner of Walton Street and Mary Street.

The property (not owned by ABC), on which the Gunn Street Monitor was located, was sold for redevelopment and was no longer available for use. As a consequence the monitor was removed on 28 June 2022. After a period of negotiating with the EPA and discussion with City of Port Adelaide Enfield Council, Adbri initiated the application process for installation of a permanent air quality monitor in the preferred location, the NW corner of Naval Reserve in November 2023. The application was ultimately not approved in June 2024 and Adbri will continue to work respectfully with both parties to reinstate a long term solution. In the mean time a trailer mounted air quality monitoir has been set up on the corner of Walton Street and Mary Street, Peterhead, until a long-term monitoring station can be established

Monitoring Objective	To provide monitoring and reporting of ground level particulate concentrations (PM10 and PM2.5), from a network of monitors located within and external to the site premises.
	• Monitoring data for each monitor (on site and off site) shall include:
	  ○ Monthly wind rose showing the distribution of wind directions
	  ○ Monthly dust rose showing the distribution of PM_{10} concentration
	  ○ Monthly dust rose showing the distribution of $PM_{2.5}$ concentration
	  ○ Monitoring data for each ABC monitor (on site and off site) including EPA monitor (Le Fevre 1) for comparison as follows:
	  ○ Monthly time series graph of 24-hour average PM_{10} concentration reported against the Air EPP for PM_{10} of 50 micrograms per cubic metre (24-hour average).
	  ○ Monthly time series graph of 24-hour average $PM_{2.5}$ concentration reported against the Air EPP for $PM_{2.5}$ of 25 micrograms per cubic metre (24-hour average).

Monitoring Plan	This monitoring report has been prepared in compliance with the Ground Level Particulate Monitoring and Reporting Plan (GLPMRP), approved 16 October 2023 by the South Australian EPA. The Plan is available on the ABC Birkenhead Community Website: https://adelaidebrightoncommunity.com.au/ In September ABC installed and commissioned trailer mounted monitoring stations at two locations in the local community. One of these was co-located at the ABC Community Park (Birkenhead), and the other was located on the corner of Walton Street and Mary Street, Peterhead, and is a replacement for the former Gunn Street monitor until a long-term monitoring station can be established. The trailer mounted monitoring stations have been set up to measure PM2.5, PM10 and TSP particulate sizes using the following equipment: • Thermo Scientific Model 5028i BAM which consistently measure PM2.5 and PM10. • Thermo Scientific Model 5014i BAM which consistently measure TSP. • 10m pump up mast 86000 Wind Speed/Direction Sensor • Wind speed and direction at each particulate monitor is measured continuously by a RM Young 86000 windspeed and direction sensor, mounted on a 10m pump up mast. This monitoring arrangement allows for analysis of the new BAM equipment capability and suitability, and to address concerns raised by the EPA with the PM2.5, PM10 and PM2.5/PM10 ratio measured by the DustTrak monitors, that have been in service.

	The new BAM's at Community Park and Walton Street commenced operation on the 10 and 11 September, respectively and have achieved at least 98% hourly data capture for the period of operation in September. A revised Ground Level Particulate Monitoring and Reporting Plan (GLPMRP), capturing the changes in monitoring has been submitted to the EPA for review and approval, and will be made available on the ABC Birkenhead Community Website: https://adelaidebrightoncommunity.com.au/ when approved.
Monitoring data for each ABC monitor	Monitoring reports for July, August and September, provide for each monitor the following: • $PM_{2.5}$, PM_{10}, 24-hour averages • $PM_{2.5}$, PM_{10} monthly wind & dust rose On the 9 July there was a SAPN power supply outage to the site, which resulted in insufficient data collection for a valid 24 hr average to be obtained for internal Northern Grounds, Eastern Grounds and Southern Grounds monitors. The Community Park monitor (different power supply), and Block 9 monitor (solar power) were not affected. In August, there was a communications issue associated with data transfer from the Community Park monitor which resulted in loss of monitoring data between, between 18-20 August (inclusive). The September monitoring report uses the new BAM monitoring data from the community monitors (from the 10 September), as the existing dust track monitor located at the Community Park was vandalised and the monitoring equipment was stolen on the 20 September 2024. There was a power outage at the Walton Street monitor on the 26 September, which resulted in insufficient data for a valid 24 hr average. There was a 24-hour exceedance of the $PM_{2.5}$ Air (EPP) criteria on the ambient particulate monitor in the community park, during this reporting period. This exceedance ocurred on the 10 August, and is summarised in Table 1 below, and the full report is included in the appendix. **Table 1: 10 August 2024** Monitoring Location / Pollutant / 24-hour average ($\mu g/m^3$) / EPP Air Criterion ($\mu g/m^3$) Community Park / PM_{10} / 27.0 / 50 / $PM_{2.5}$ / 26.4 / 25 Gunn Street / PM_{10} / / 50 / $PM_{2.5}$ / / 25

	Comment: The 24-hour average PM2.5 concentration measured at Community Park of 26.4 µg/m3 exceeded the EPP Air criterion of 25.0 µg/m3. All ABC monitors (on site and off site), showed similar particulate levels and trends. This indicates the particulate level was from a localised air shed condition, rather than related to any specific site activity. Also the wind movement for this 24 hr period was predominantly (51% of the day) blowing towards ABC. Low wind speeds and overnight temperatures resulted in increased particulate levels overnight / early morning, which dropped during the day as wind speed and temperatures increased. PM2.5 particulate is commonly produced from combustion sources (vehicles/ heaters). The PM2.5 particulate levels/trends are indicative of low night time temperatures, low wind speeds and reduced air shed flushing
Appendix	July, August and September Monitoring Reports 10 August $PM_{2.5}$ Exceedance Report

Contents

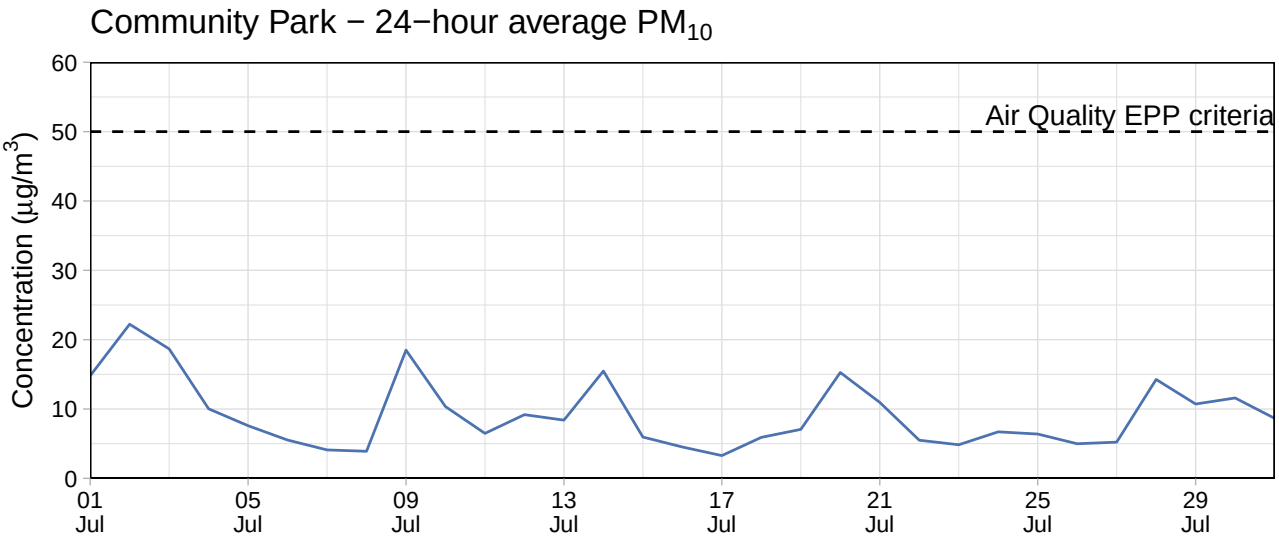
Monitoring Summary (01 Jul, 2024 - 31 Jul, 2024)

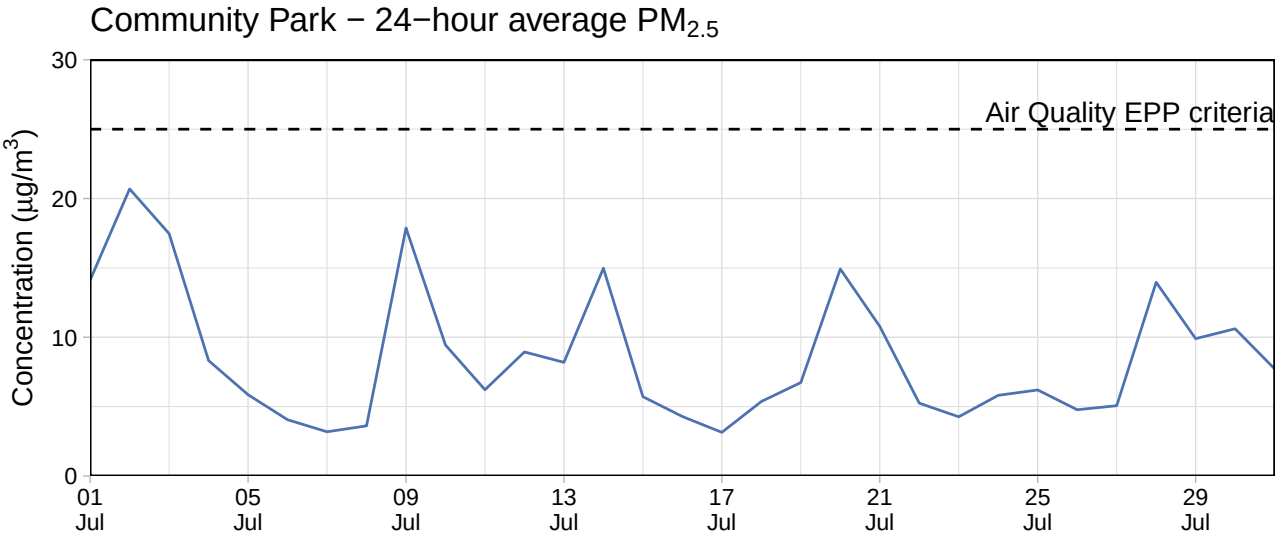
Public Monitors

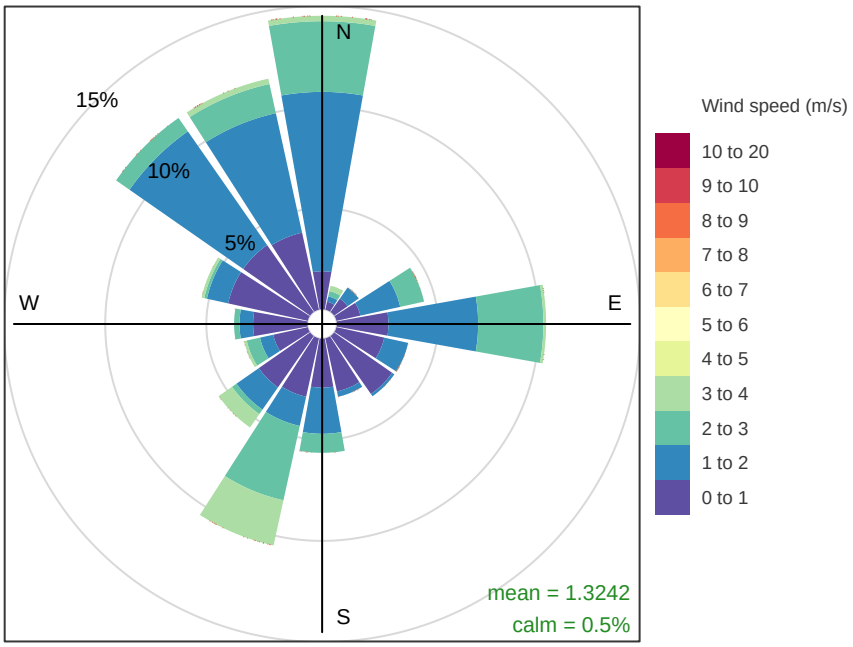
Table 1: Summary of 24-hour average data collected at public monitors (μg/m^3)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Community Park	3.3	9.3	22.2	100	3.1	8.6	20.7	100

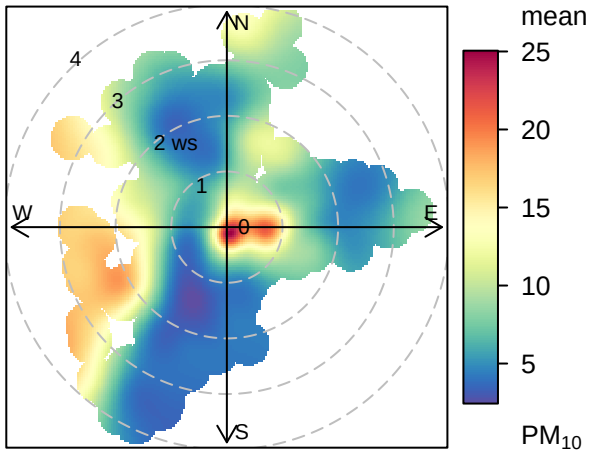
Community Park

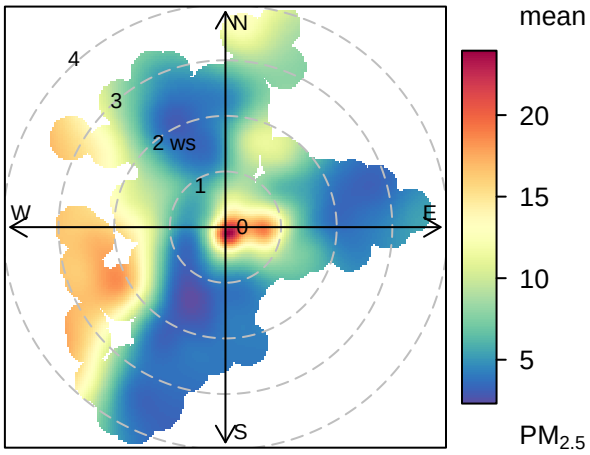






Frequency of counts by wind direction (%)





Gunn Street

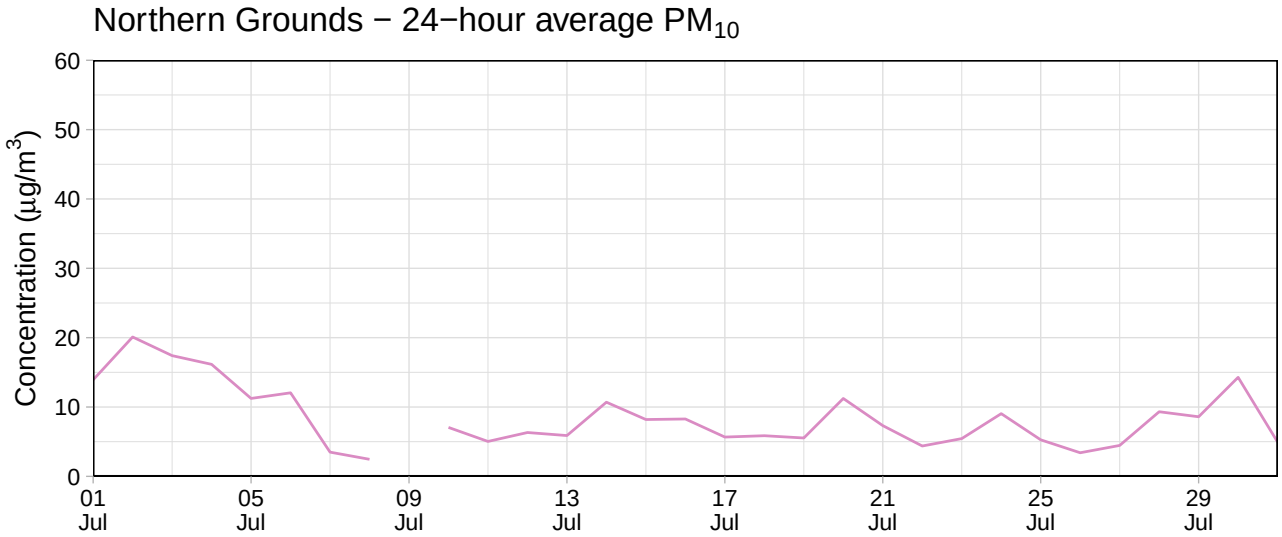
No data available for the reporting period.

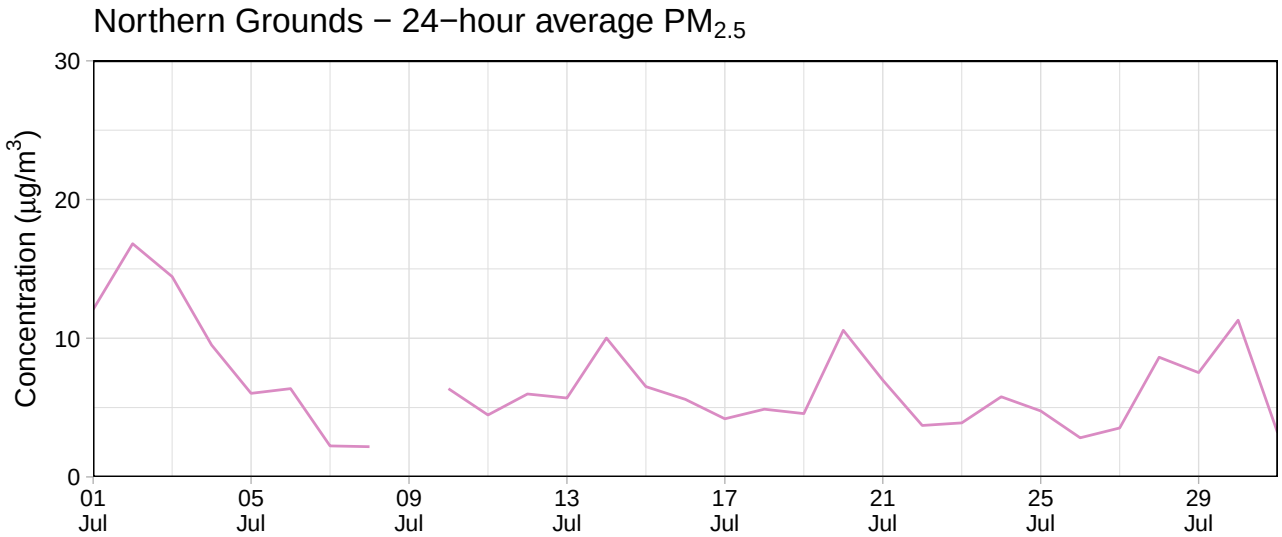
Internal Monitors

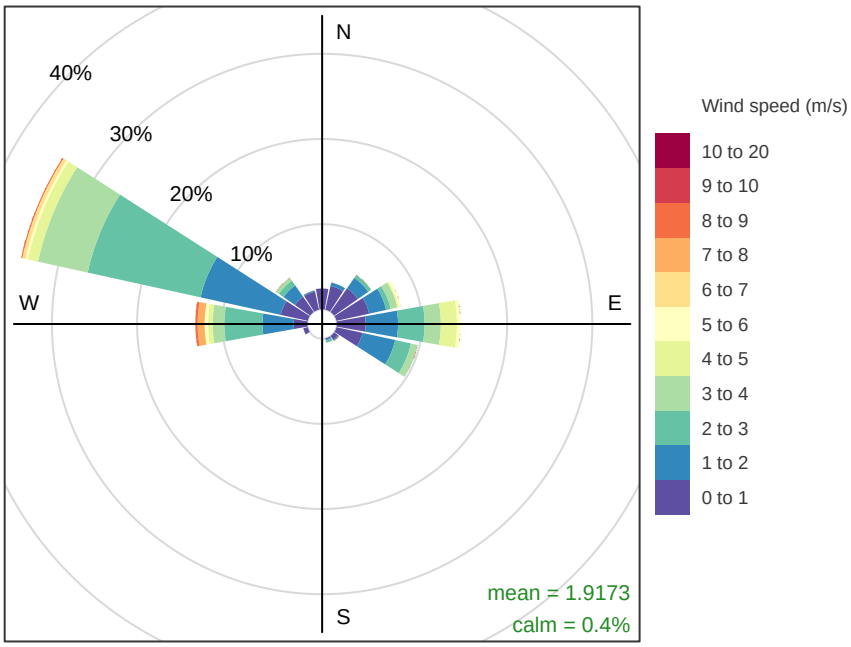
Table 2: Summary of 24-hour average data collected at internal monitors ($\mu g/m^3$)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Southern Grounds	2.1	7.4	18.7	96.8	2.0	6.8	17.3	96.8
Eastern Grounds	3.1	9.2	22.7	96.8	2.2	7.7	19.4	96.8
Block 9	2.2	5.9	14.3	100.0	2.1	5.2	13.2	100.0
Northern Grounds	2.5	8.4	20.1	96.8	2.2	6.7	16.8	96.8

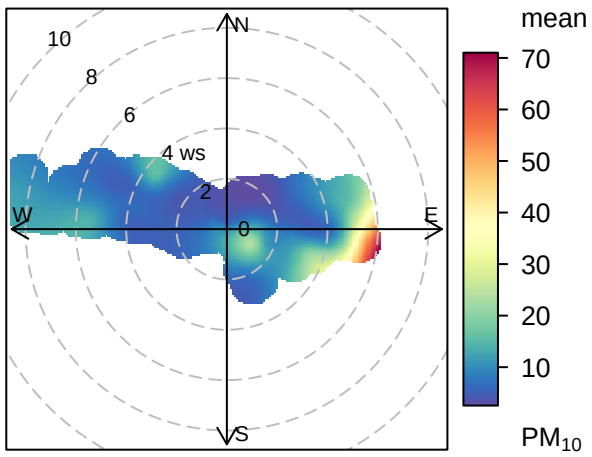
Northern Grounds

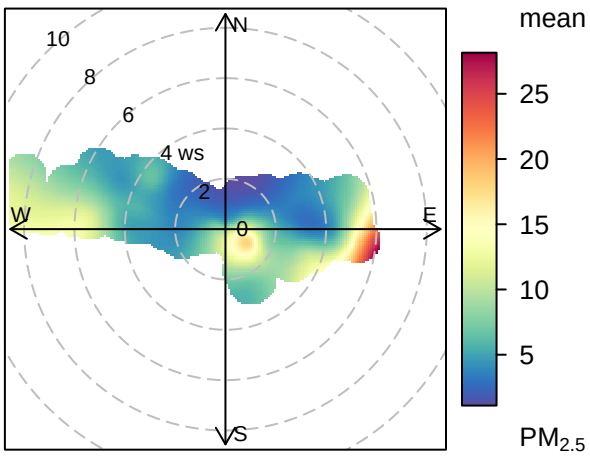




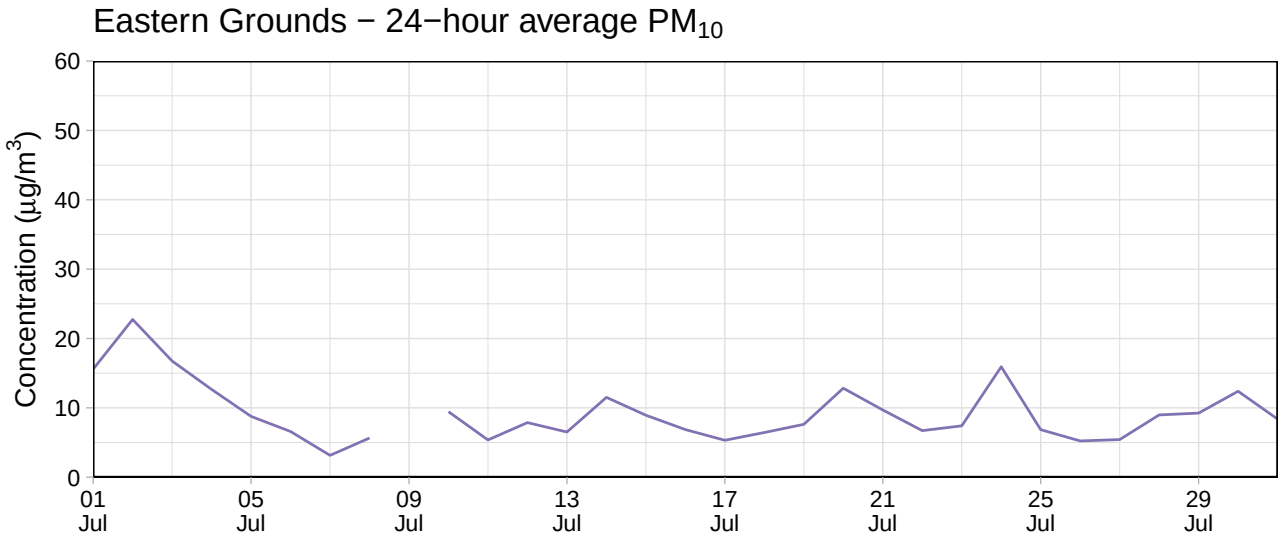


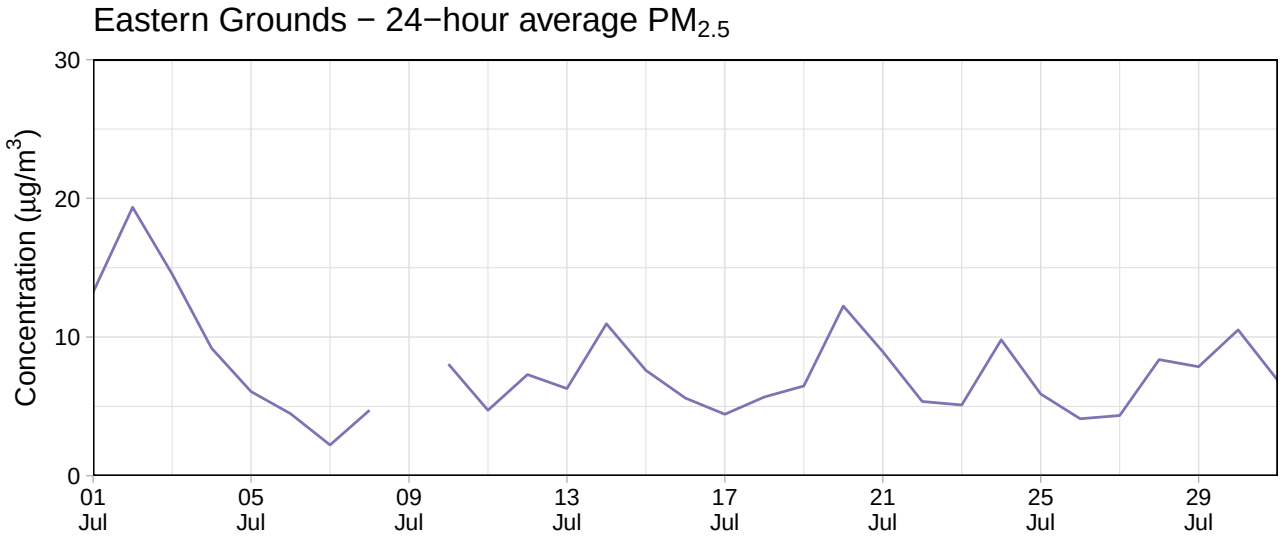
Frequency of counts by wind direction (%)

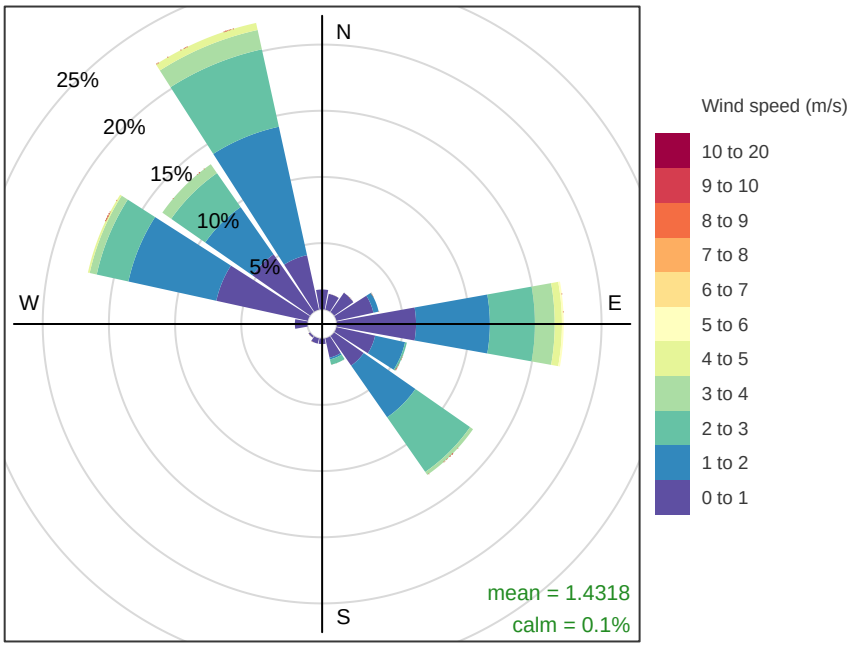




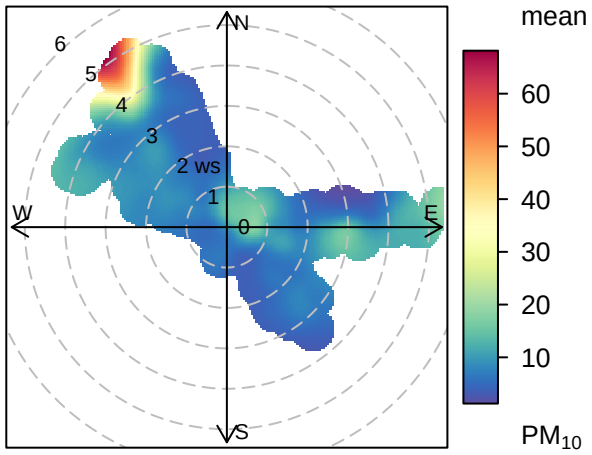
Eastern Grounds

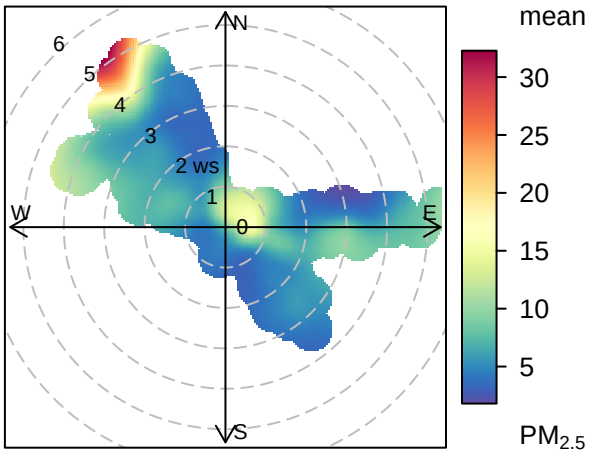




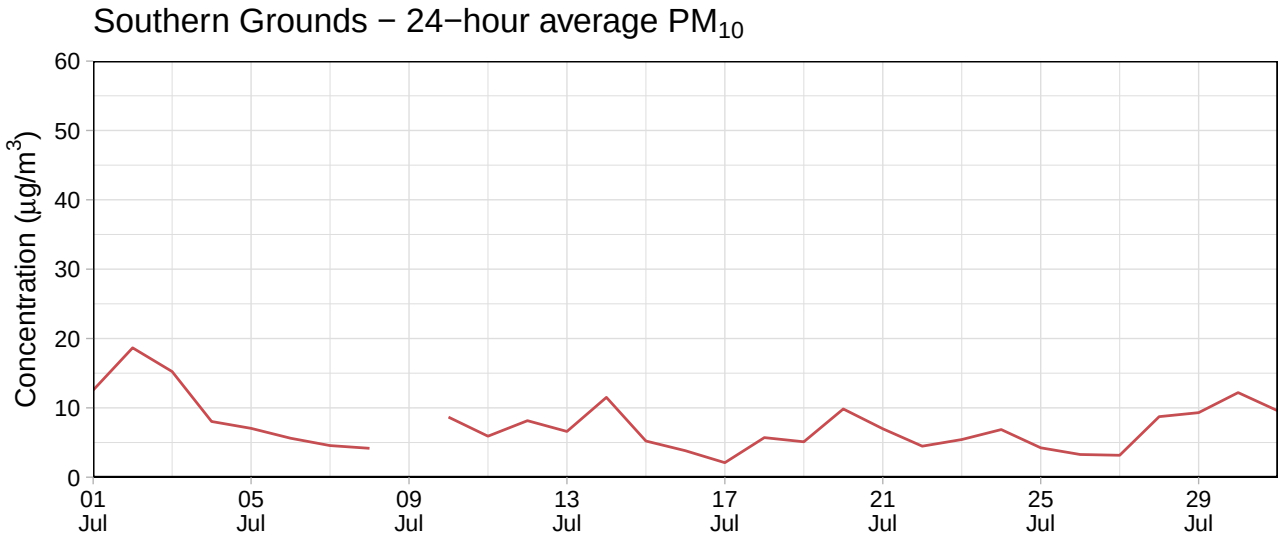


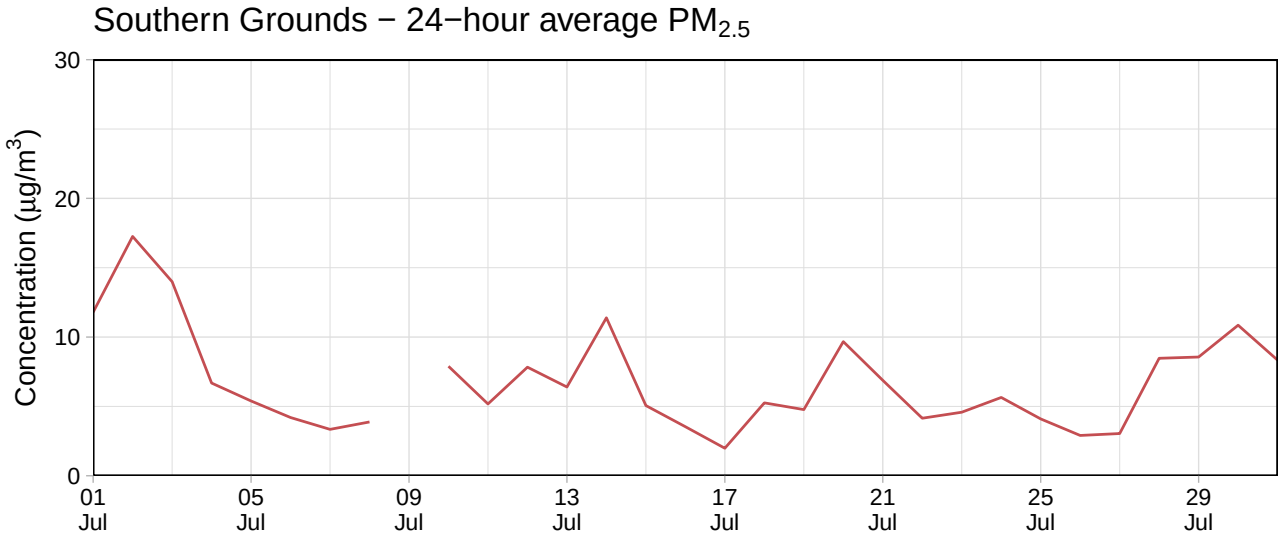
Frequency of counts by wind direction (%)

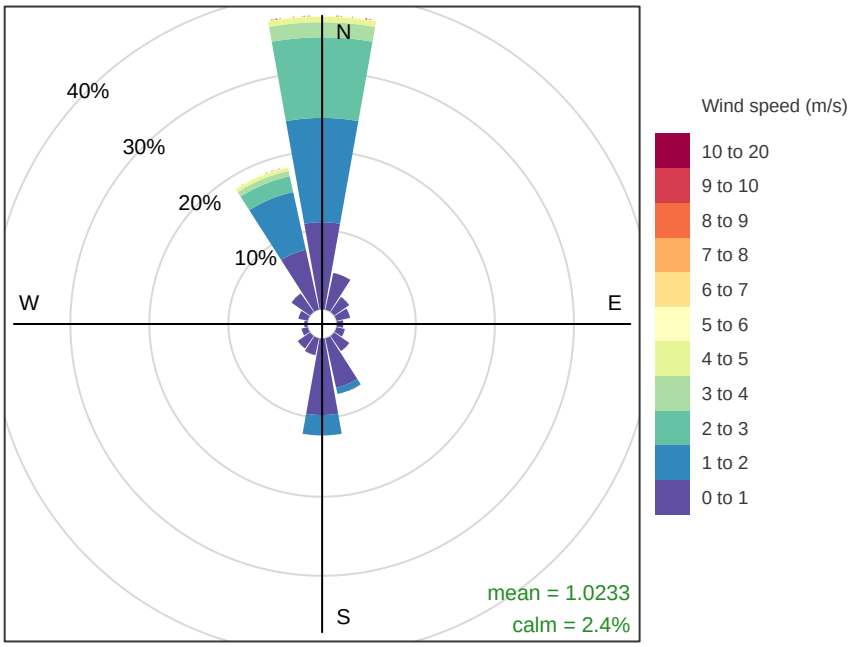




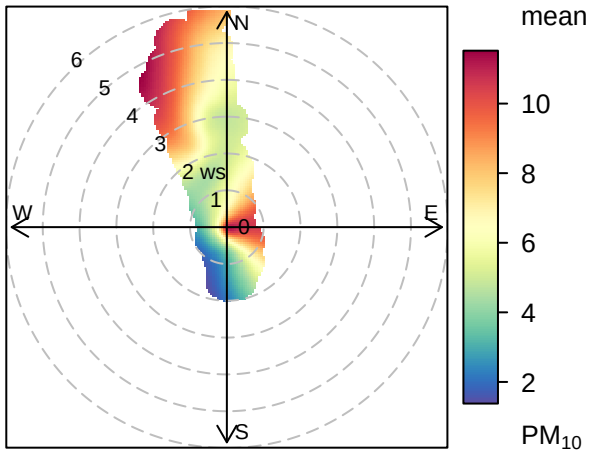
Southern Grounds

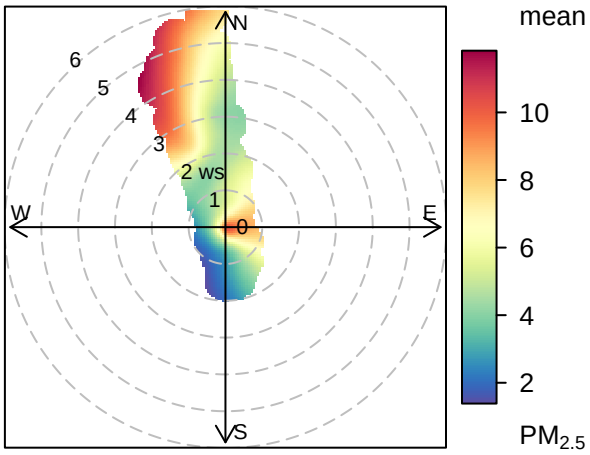




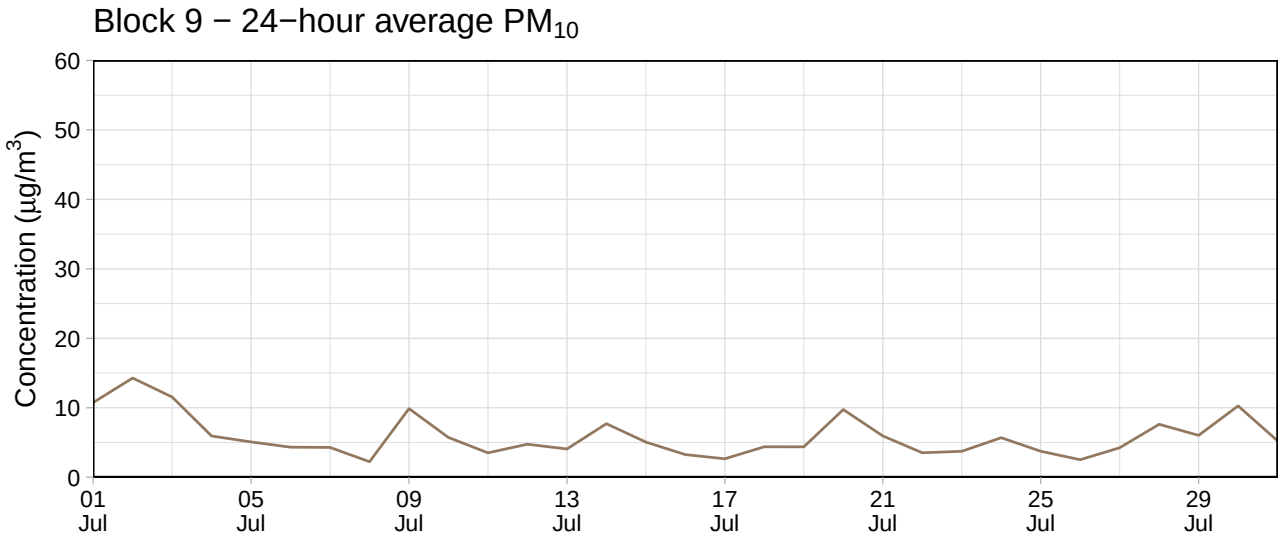


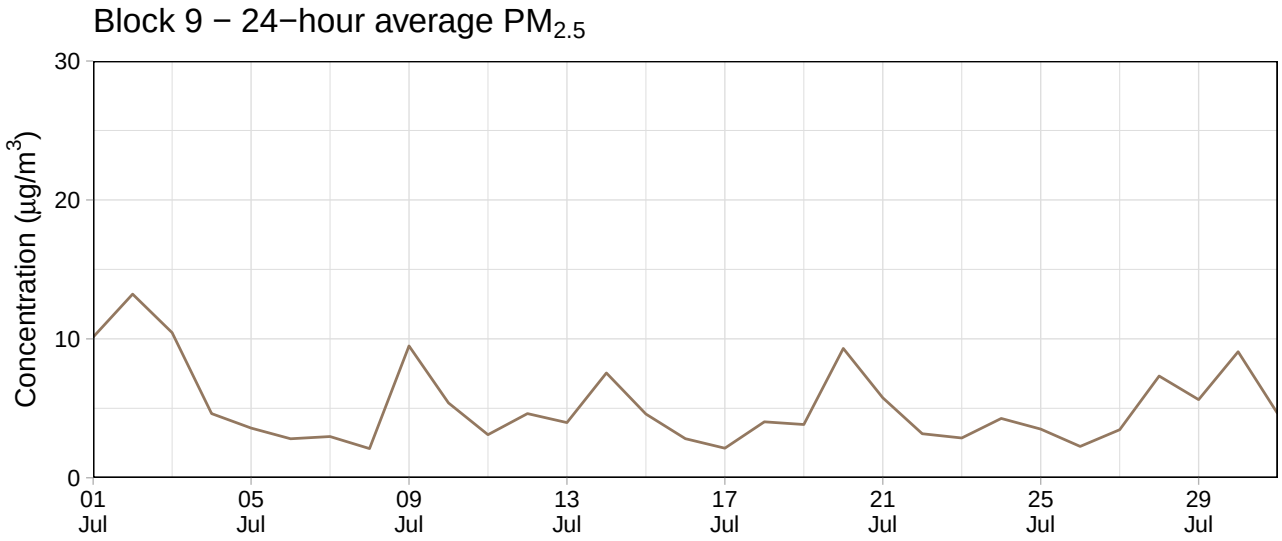
Frequency of counts by wind direction (%)

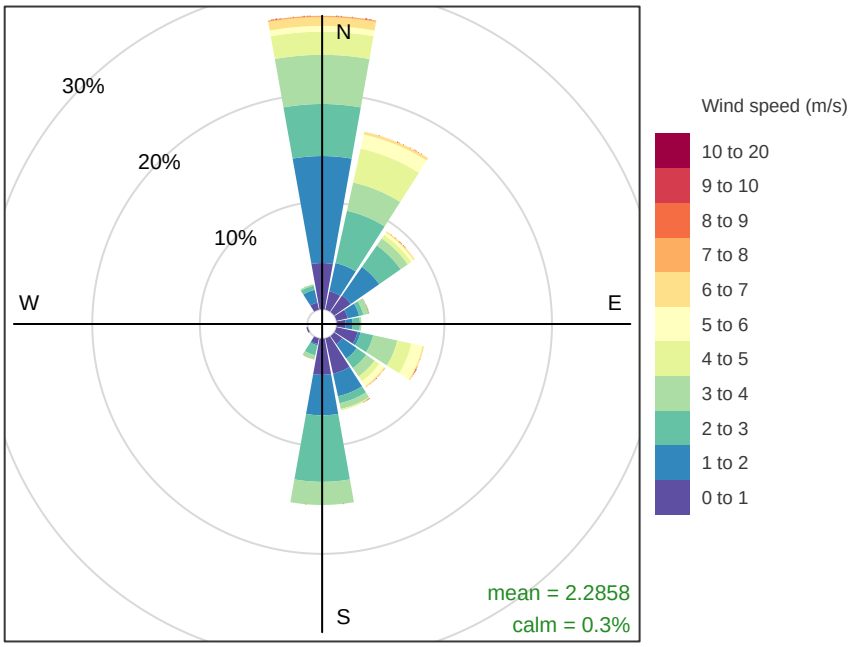




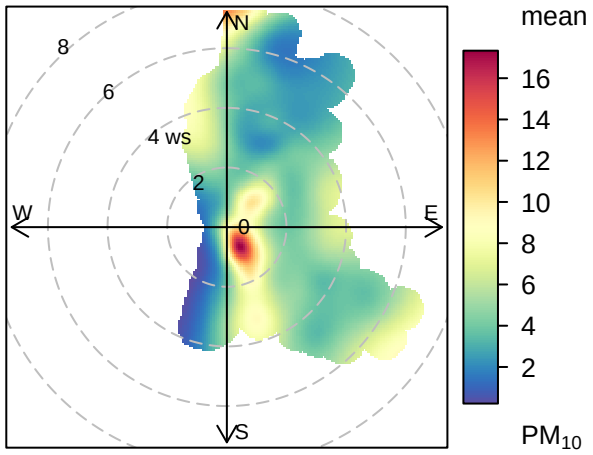
Block 9

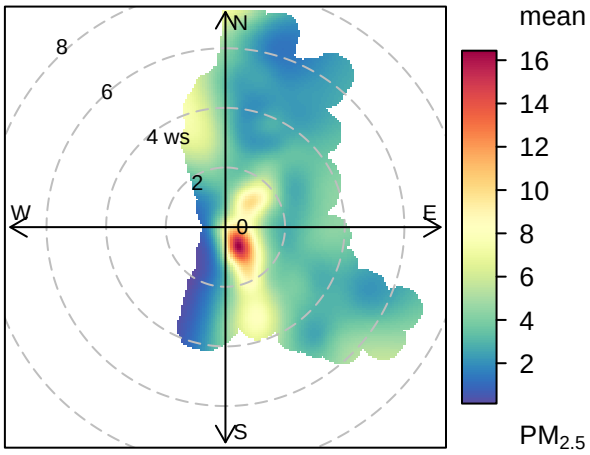

Block 9 − 24−hour average PM10
Concentration (µg/m3)
60
50
40
30
20
10
0
01 Jul
05 Jul
09 Jul
13 Jul
17 Jul
21 Jul
25 Jul
29 Jul


Block 9 − 24−hour average PM2.5
Concentration (µg/m3)
30
20
10
0
01 Jul
05 Jul
09 Jul
13 Jul
17 Jul
21 Jul
25 Jul
29 Jul



Frequency of counts by wind direction (%)



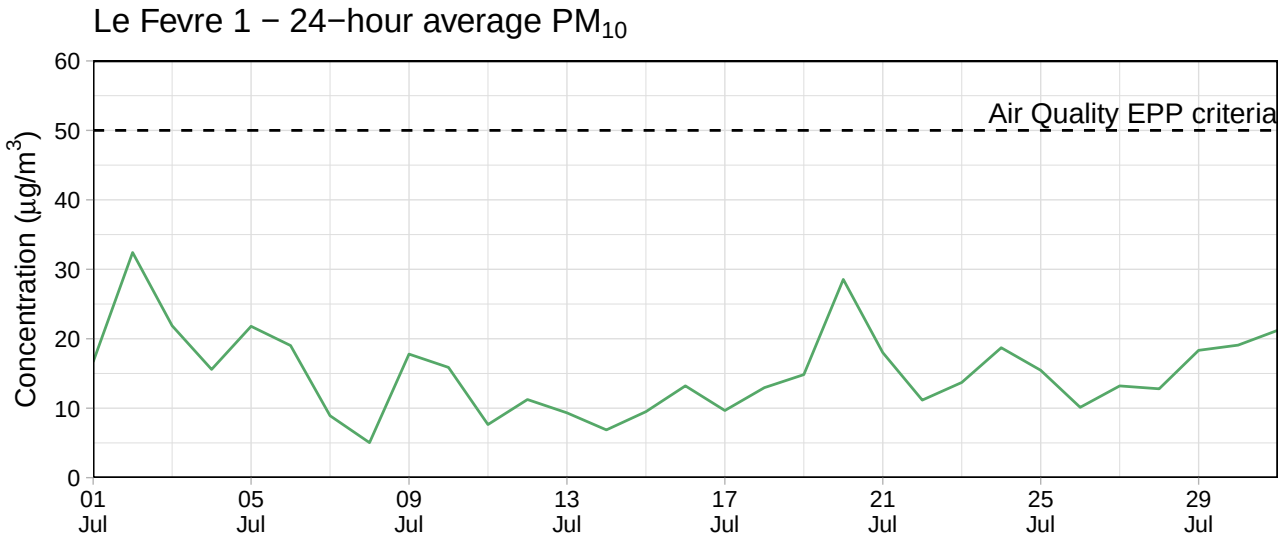


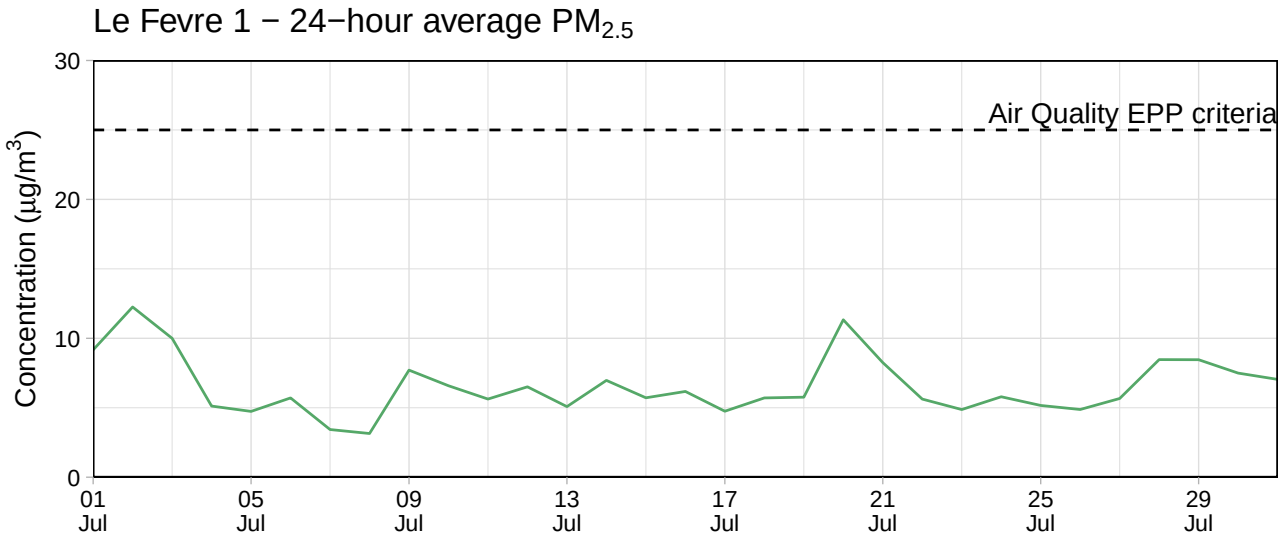
EPA Monitoring

Le Fevre 1

Table 3: Summary of 24-hour average data collected at EPA monitors ($\mu g/m^3$)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Le Fevre 1	5	15.2	32.4	100	3.1	6.6	12.3	100





Contents

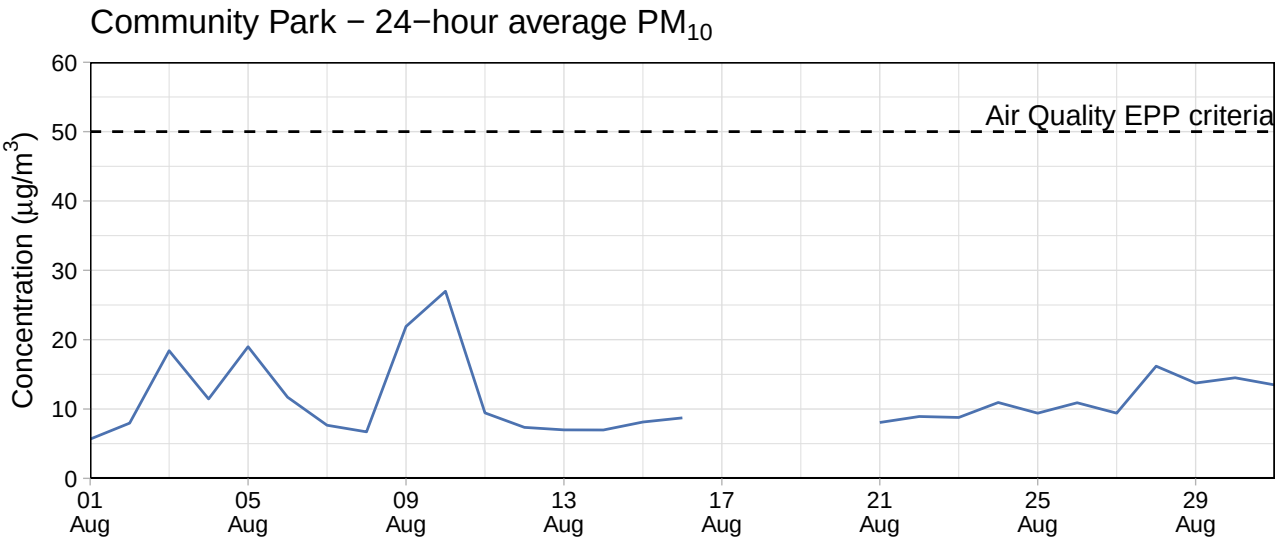
Monitoring Summary (01 Aug, 2024 - 31 Aug, 2024)

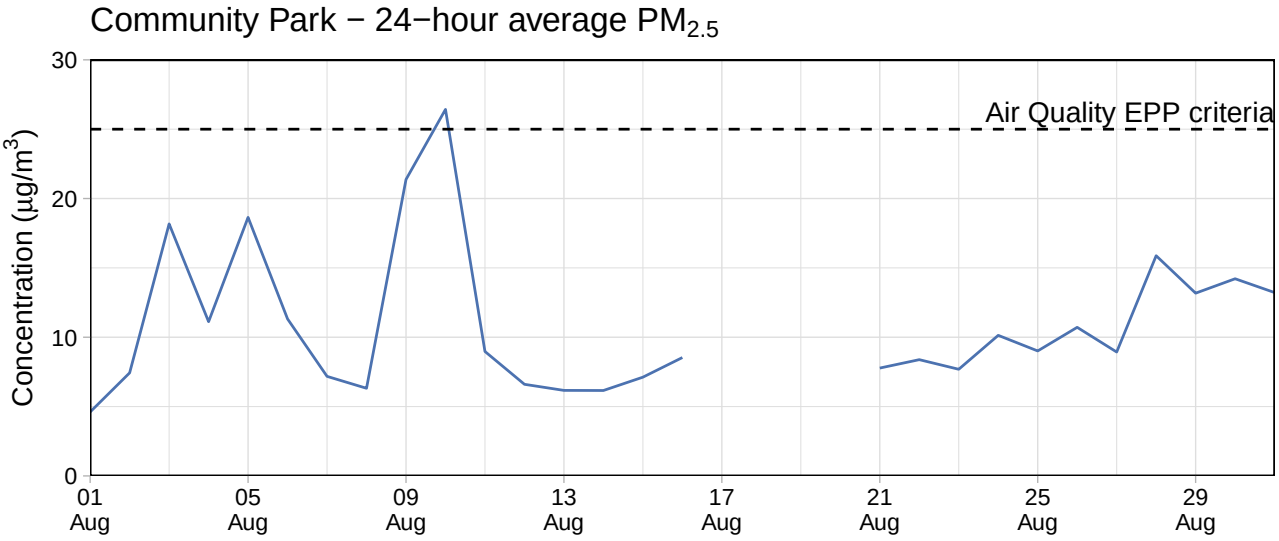
Public Monitors

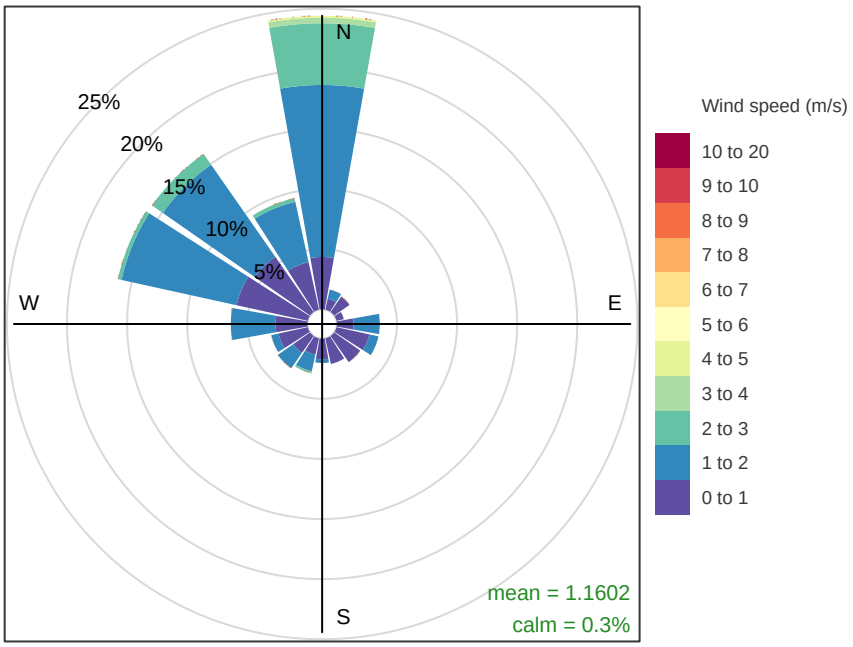
Table 1: Summary of 24-hour average data collected at public monitors (μg/m^3)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Community Park	5.7	11.5	27	87.1	4.6	10.9	26.4	87.1

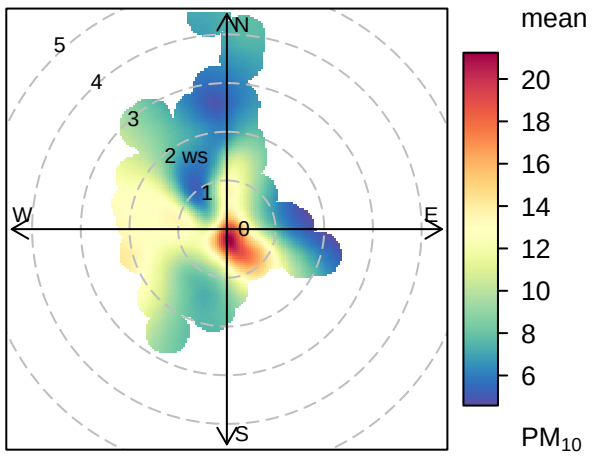
Community Park

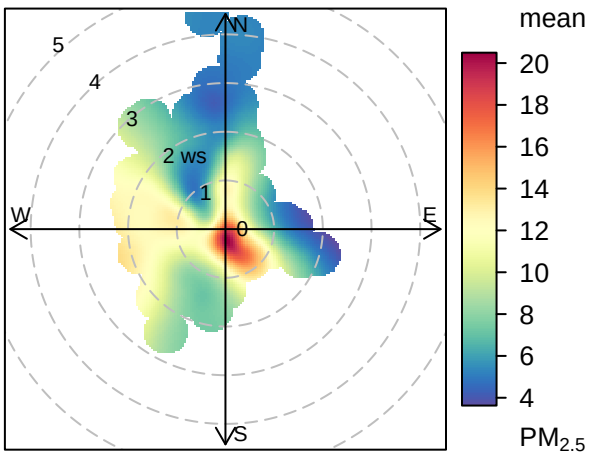






Frequency of counts by wind direction (%)





Gunn Street

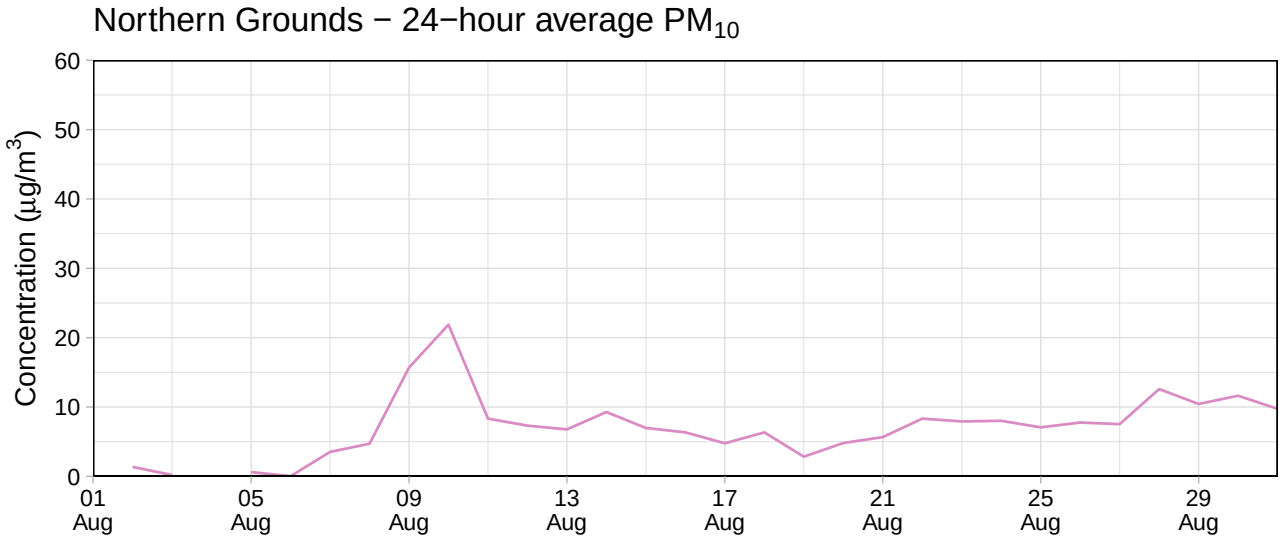
No data available for the reporting period.

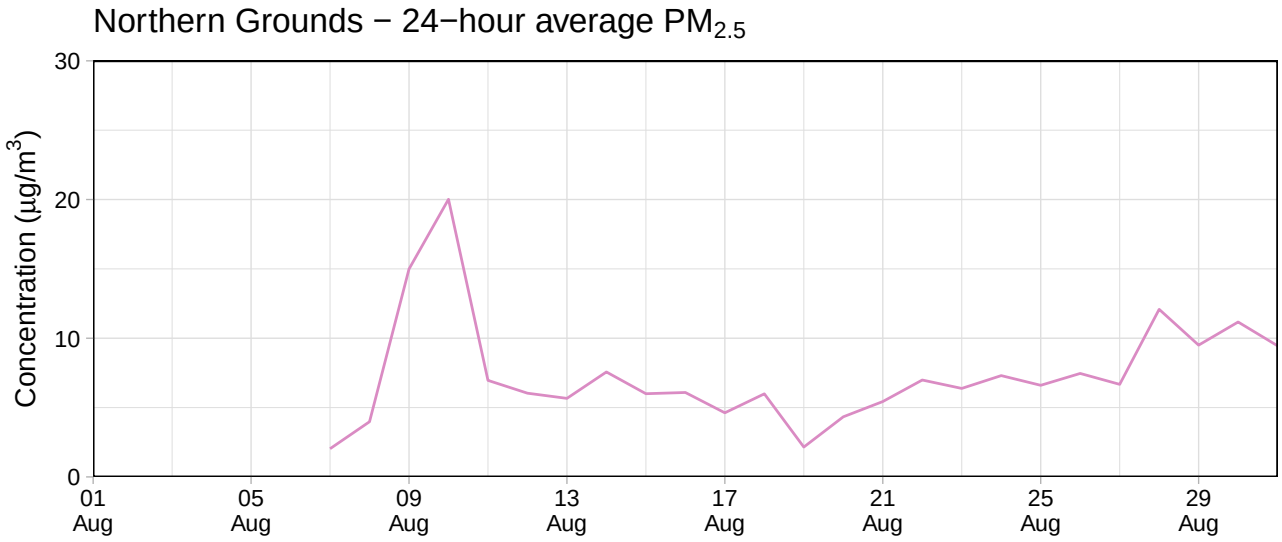
Internal Monitors

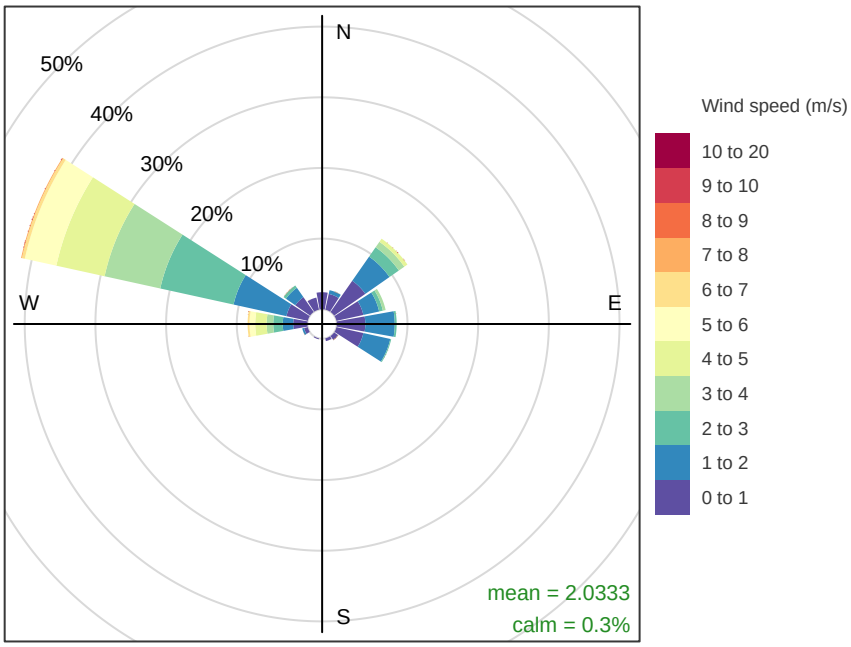
Table 2: Summary of 24-hour average data collected at internal monitors (μg/m^3)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Southern Grounds	4.7	9.1	21.1	100	3.4	8.5	20.5	100
Eastern Grounds	3.1	10.3	21.4	100	2.4	9.0	20.5	100
Block 9	1.7	7.2	18.4	100	1.4	6.7	17.8	100
Northern Grounds	-0.9	6.7	21.9	100	-2.0	5.8	20.0	100

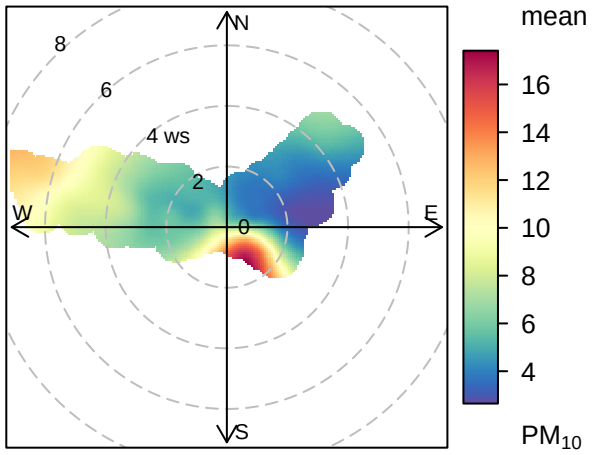
Northern Grounds

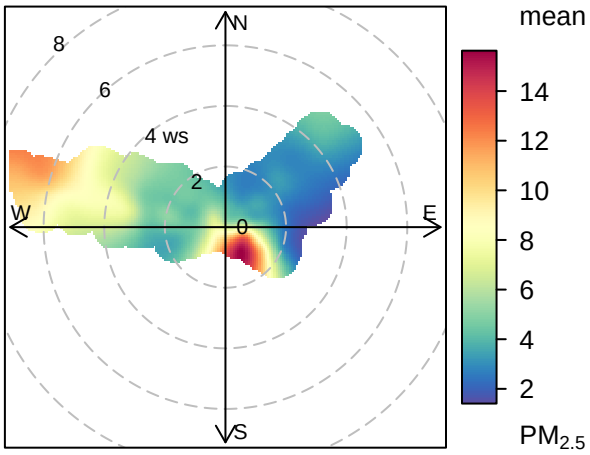




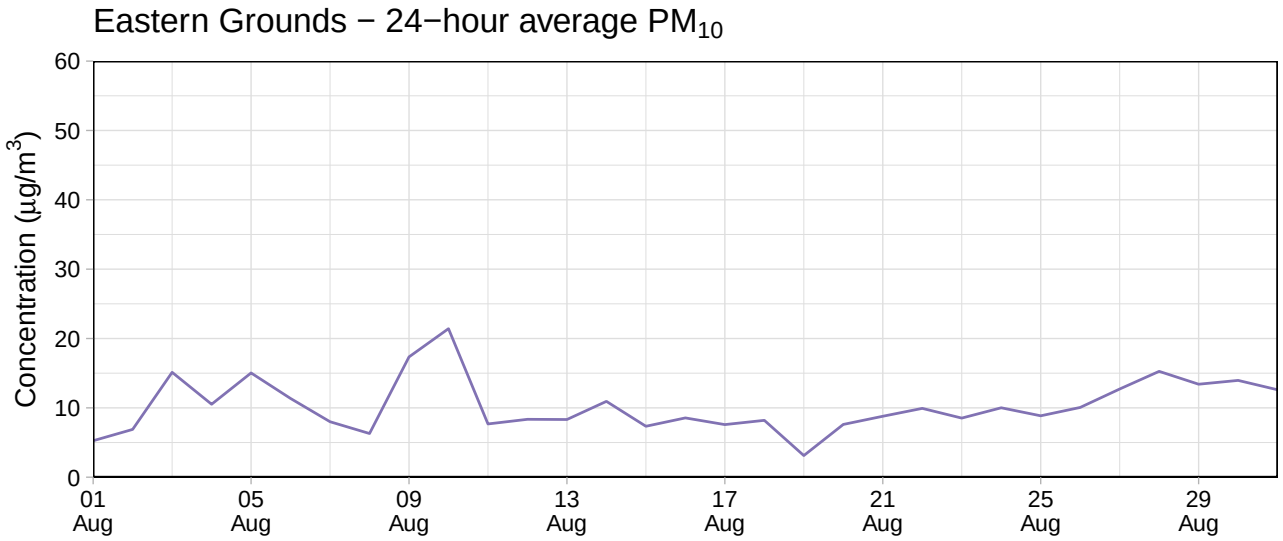


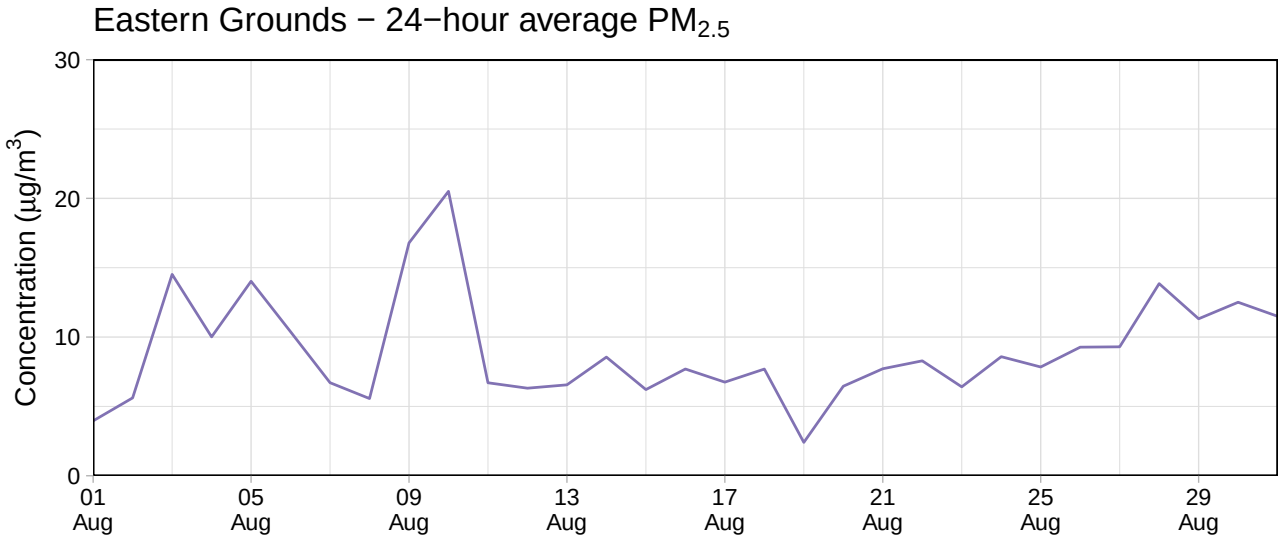
Frequency of counts by wind direction (%)

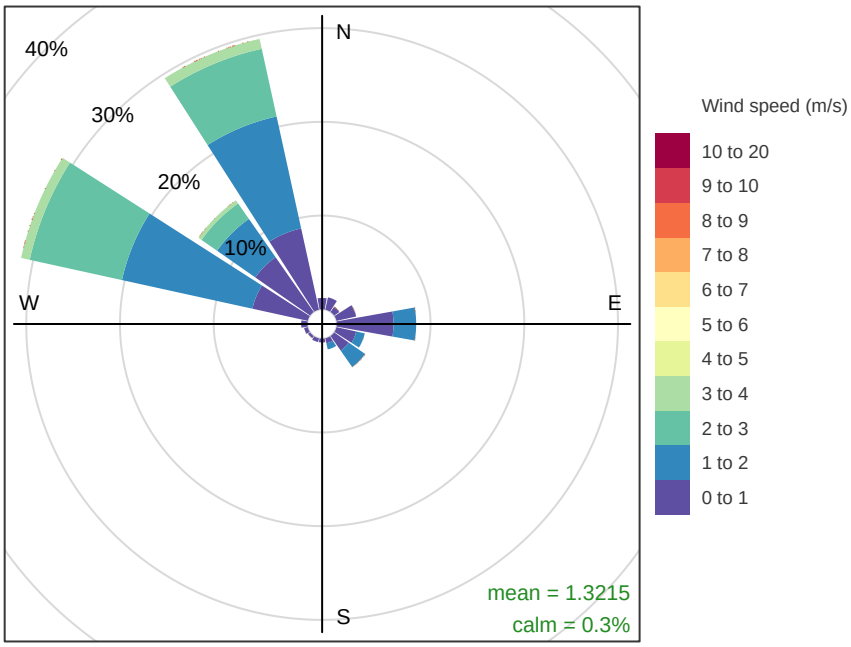




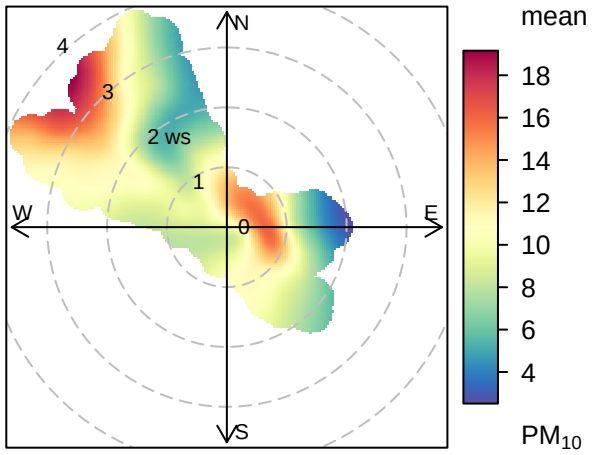
Eastern Grounds

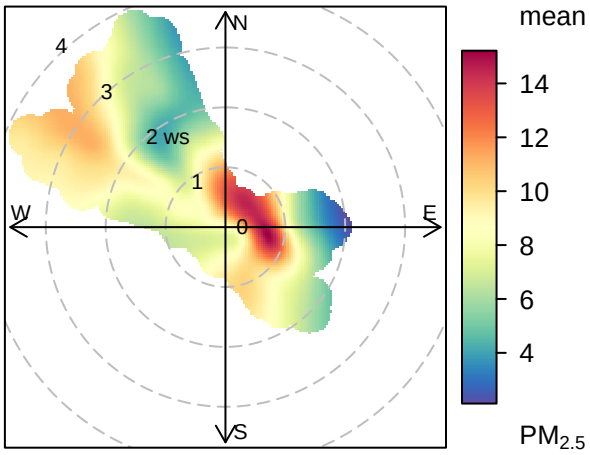




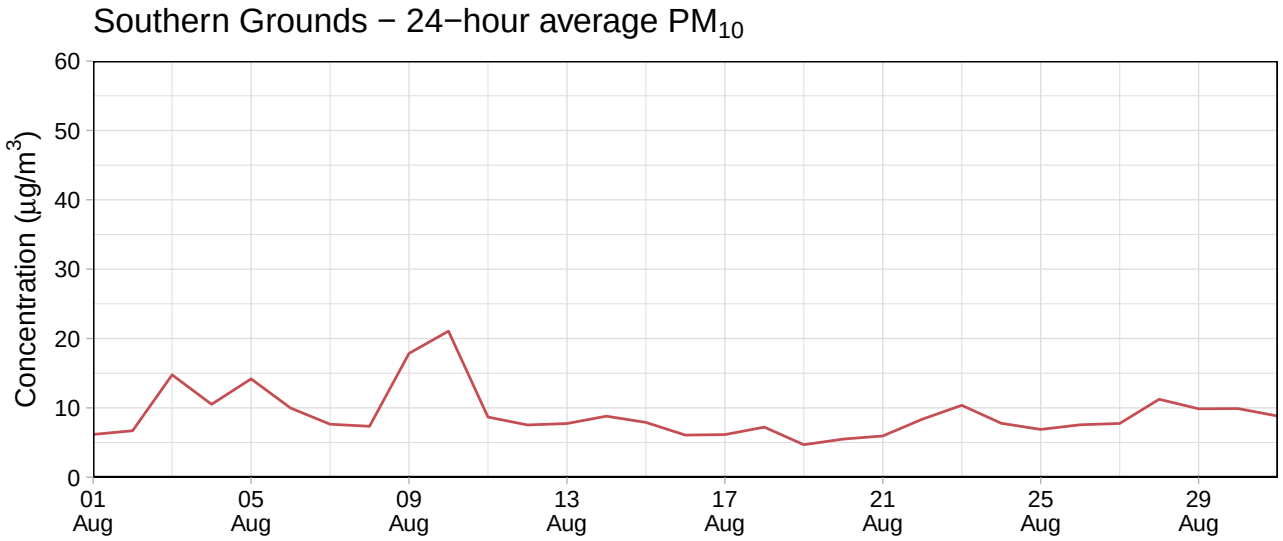


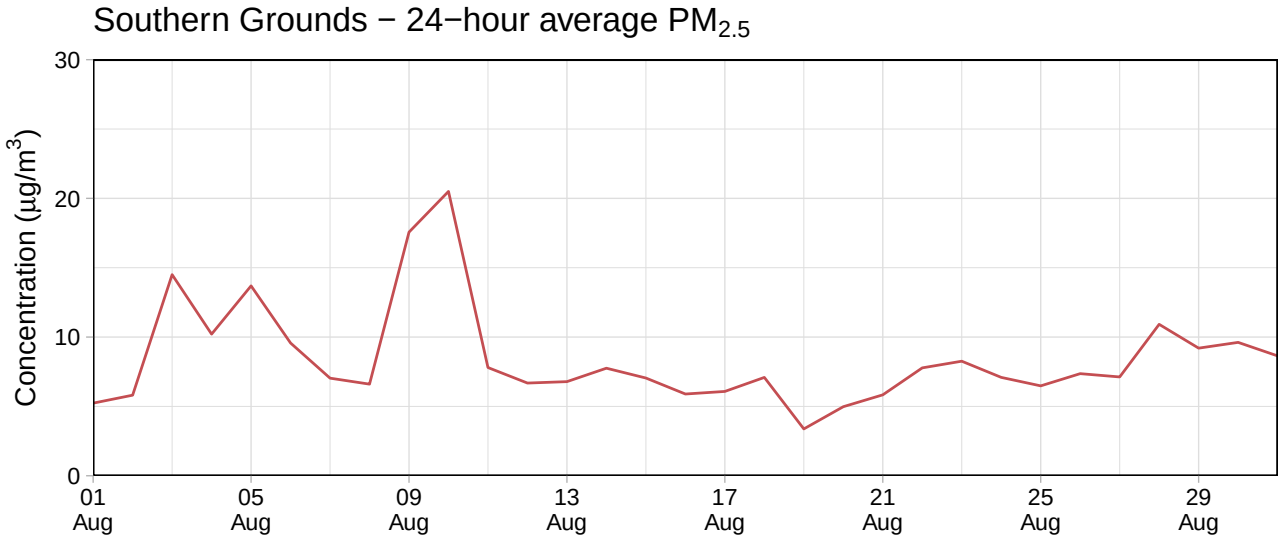
Frequency of counts by wind direction (%)

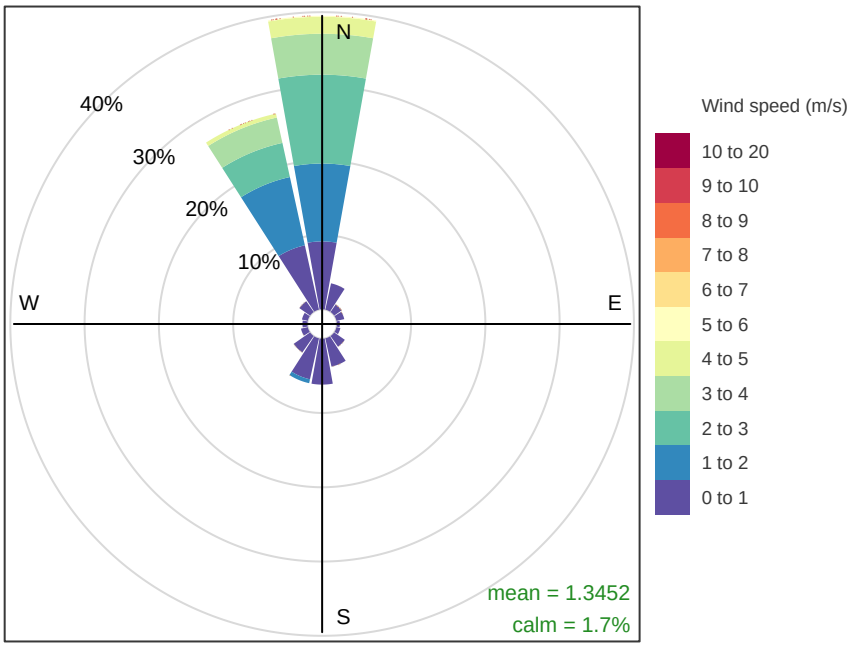




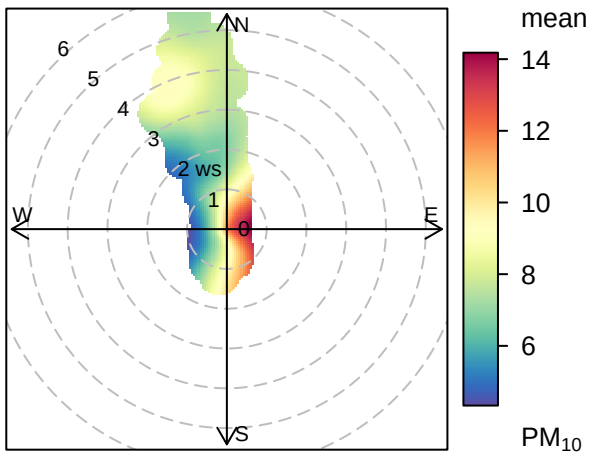
Southern Grounds

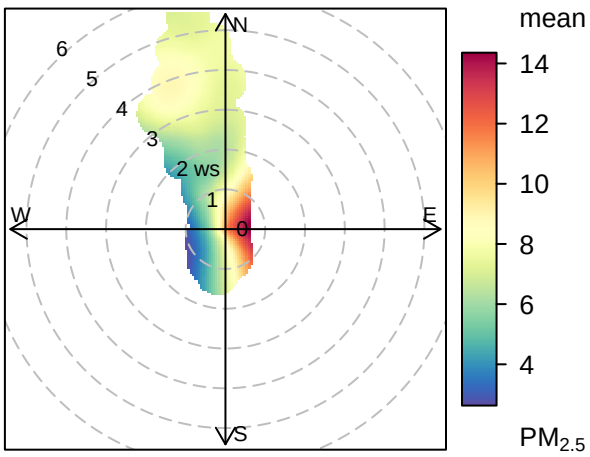




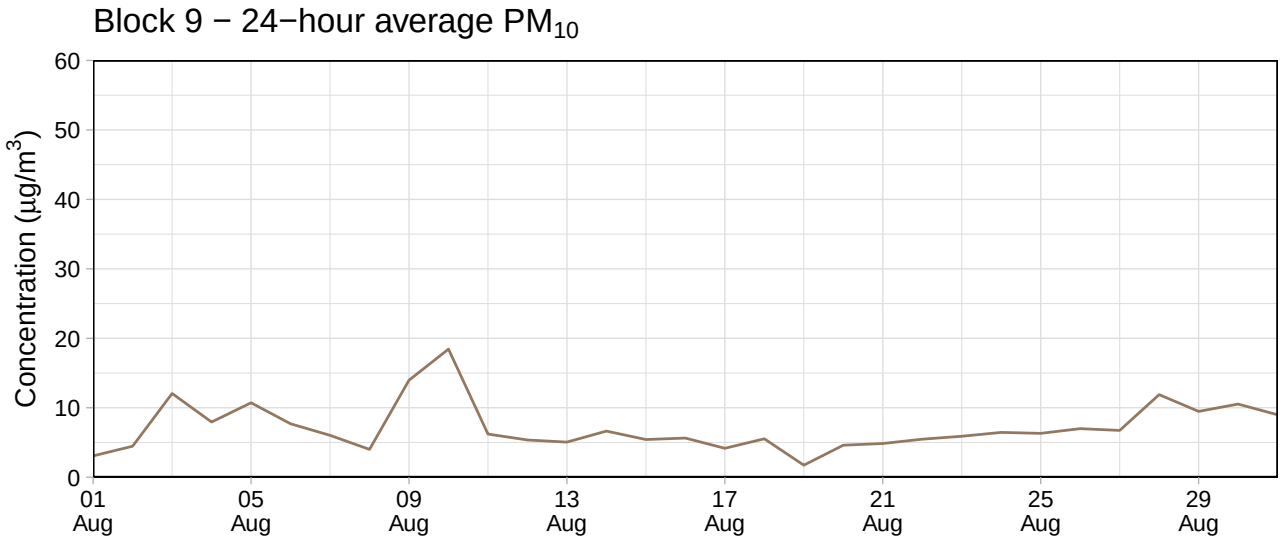


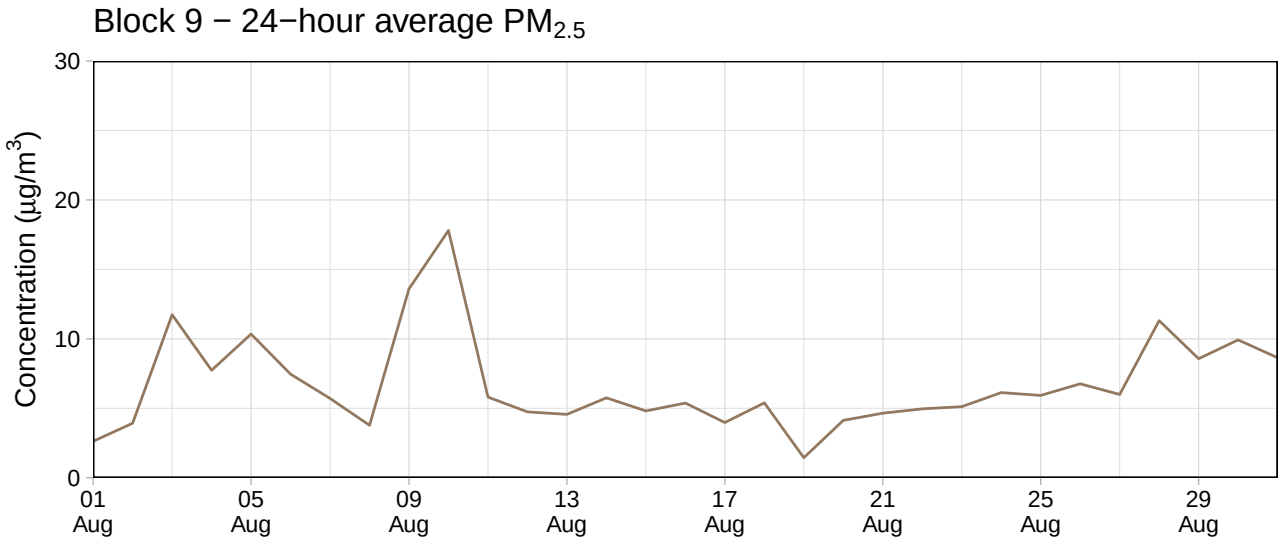
Frequency of counts by wind direction (%)





Block 9


Block 9 − 24−hour average PM10
Concentration (µg/m3)
60
50
40
30
20
10
0
01 Aug
05 Aug
09 Aug
13 Aug
17 Aug
21 Aug
25 Aug
29 Aug


Block 9 − 24−hour average PM2.5
Concentration (µg/m3)
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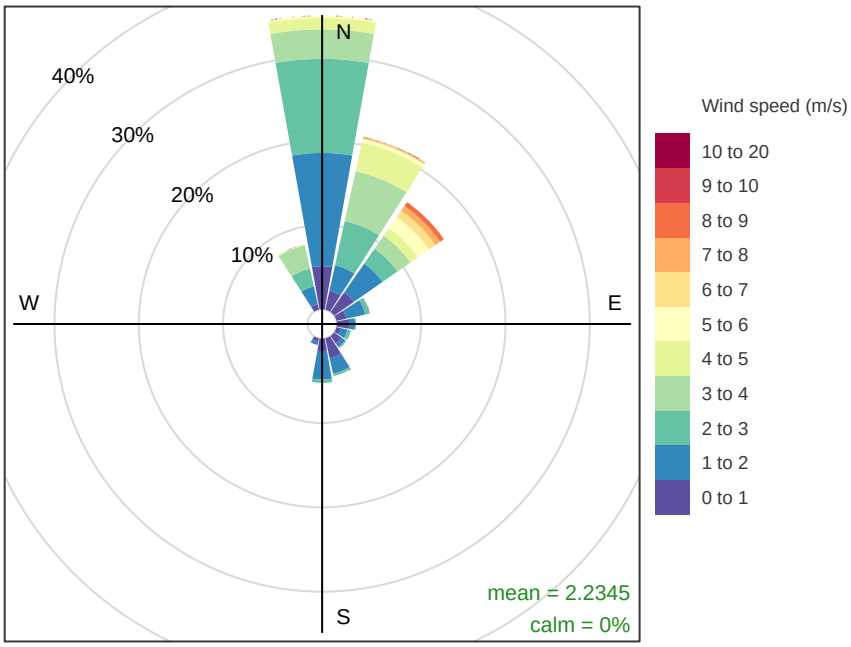
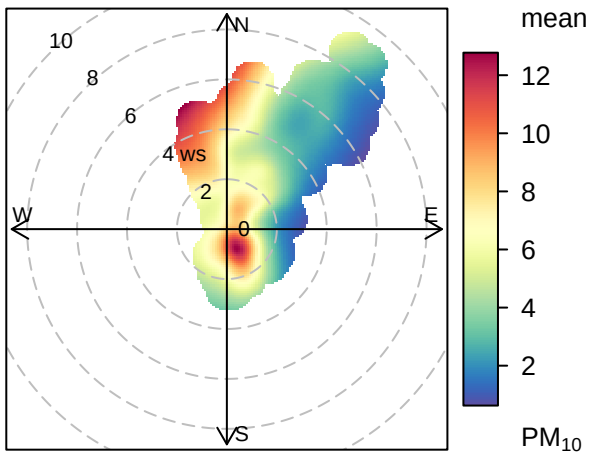
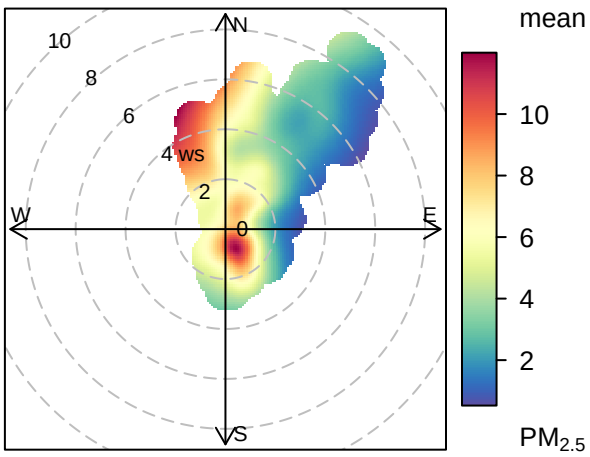
20
10
0
01 Aug
05 Aug
09 Aug
13 Aug
17 Aug
21 Aug
25 Aug
29 Aug



Frequency of counts by wind direction (%)



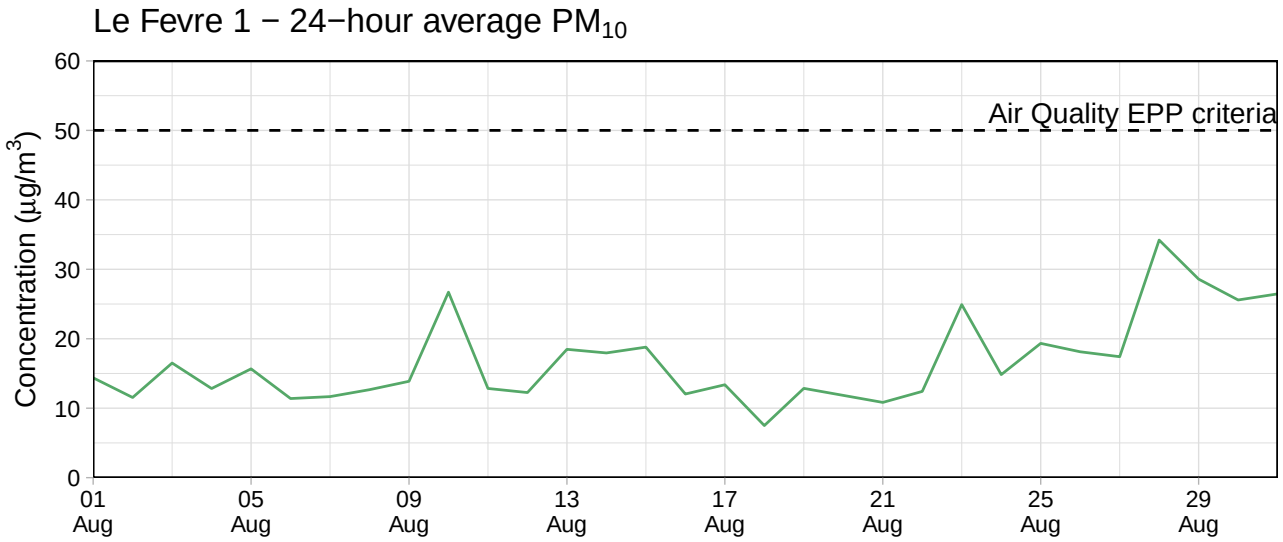


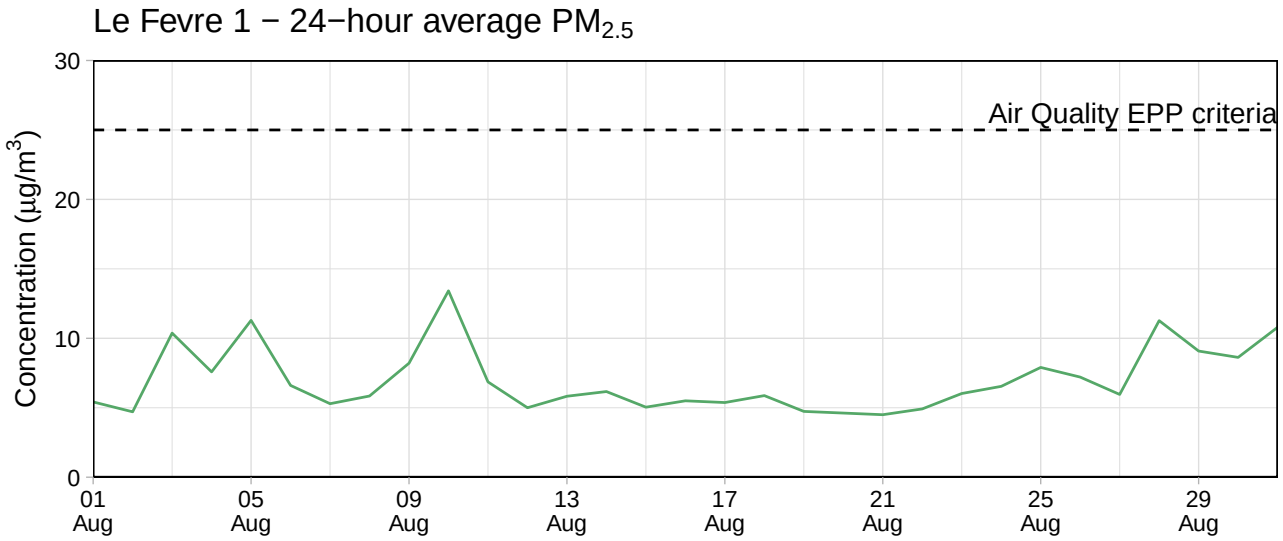
EPA Monitoring

Le Fevre 1

Table 3: Summary of 24-hour average data collected at EPA monitors ($\mu g/m^3$)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Le Fevre 1	7.5	16.9	34.2	100	4.5	7.1	13.4	100





Contents

Monitoring Summary (01 Sep, 2024 - 30 Sep, 2024)

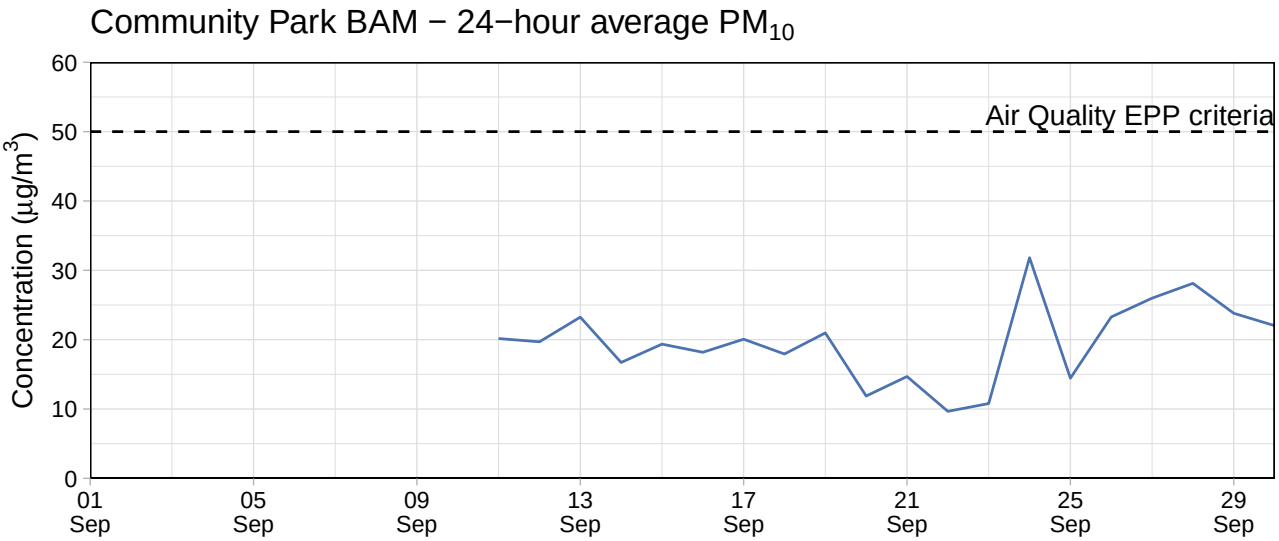
Public Monitors

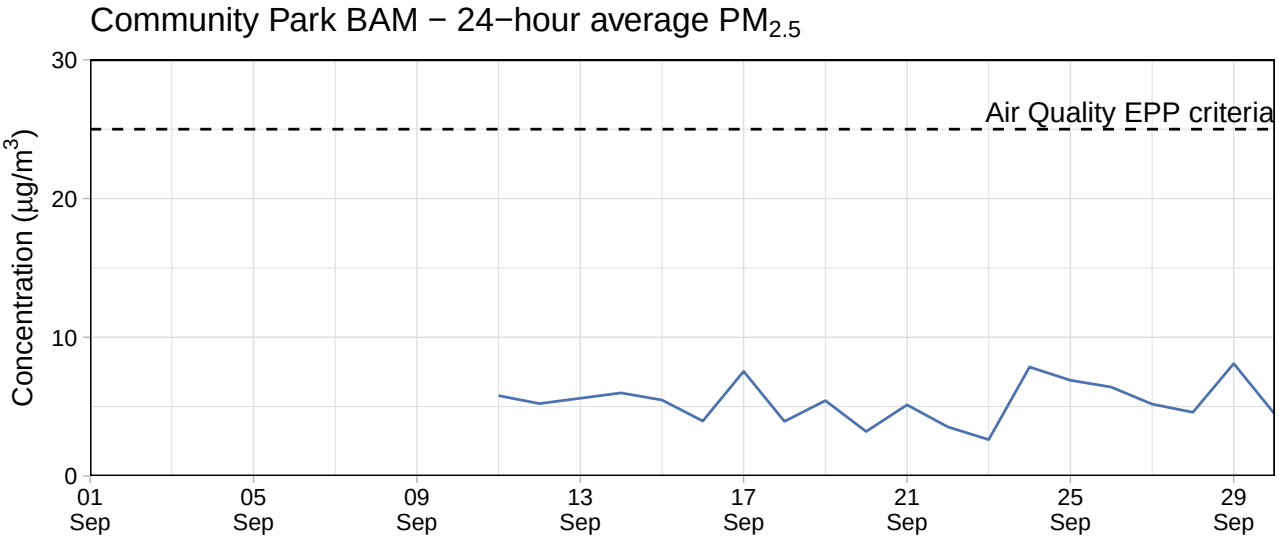
The new BAMs at Community Park and Walton Street commenced operation on 10 and 11 September, respectively, and achieved at least 98.5% hourly data capture between their respective commencements of operation and 30 September. Consistent with previous reporting, Table 1 presents the calculated data capture for the whole of September as a percentage of days in September with sufficient data to calculate a valid 24-hour average.

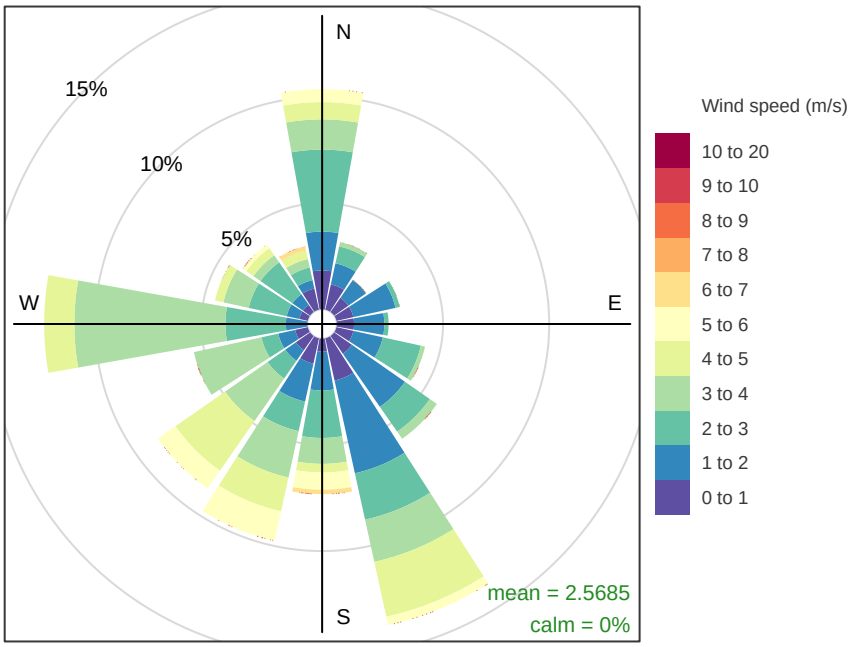
Table 1: Summary of 24-hour average data collected at public monitors (μg/m^3)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Community Park BAM	9.7	19.6	31.8	66.7	2.6	5.3	8.1	66.7
Walton Street BAM	9.5	17.2	25.4	60.0	2.1	4.7	7.3	60.0

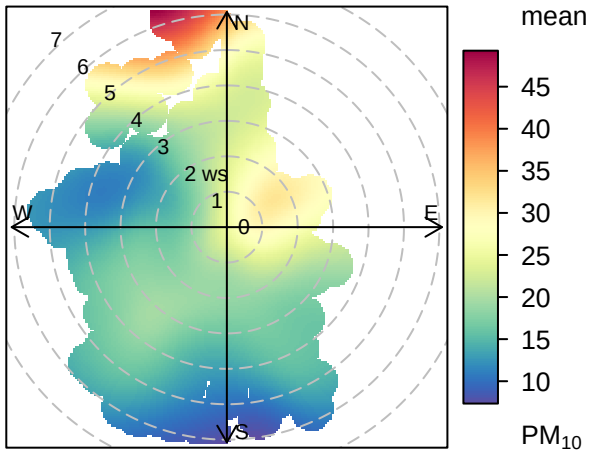
Community Park BAM

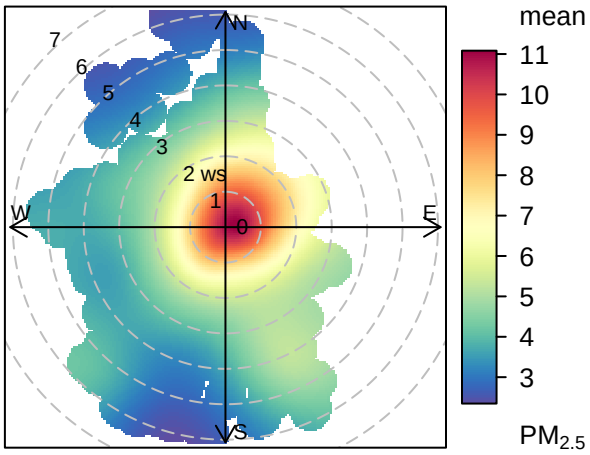




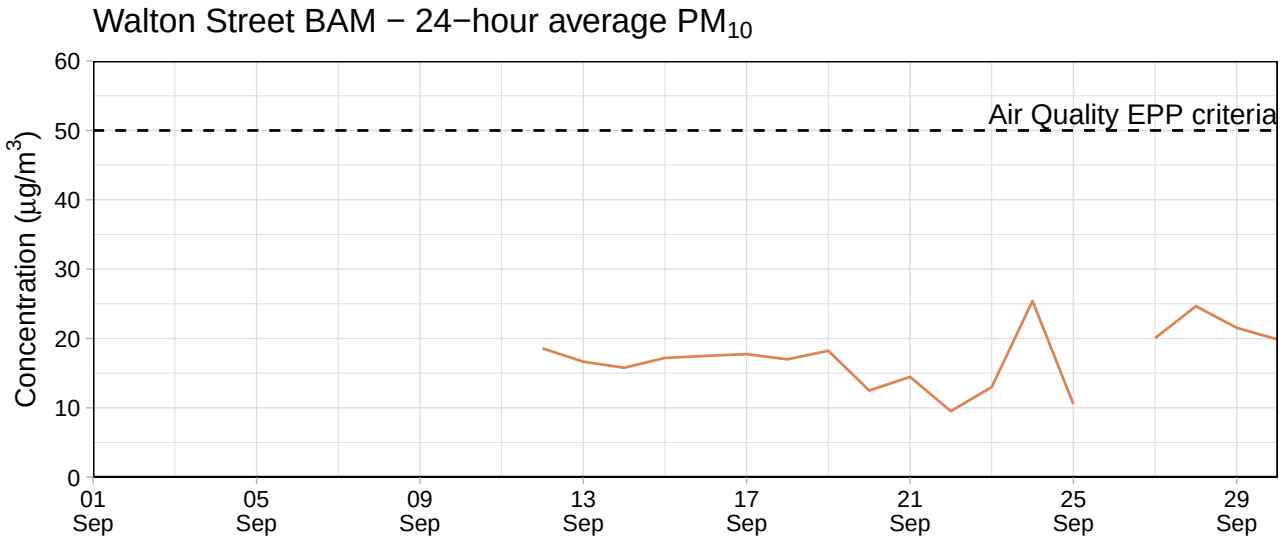


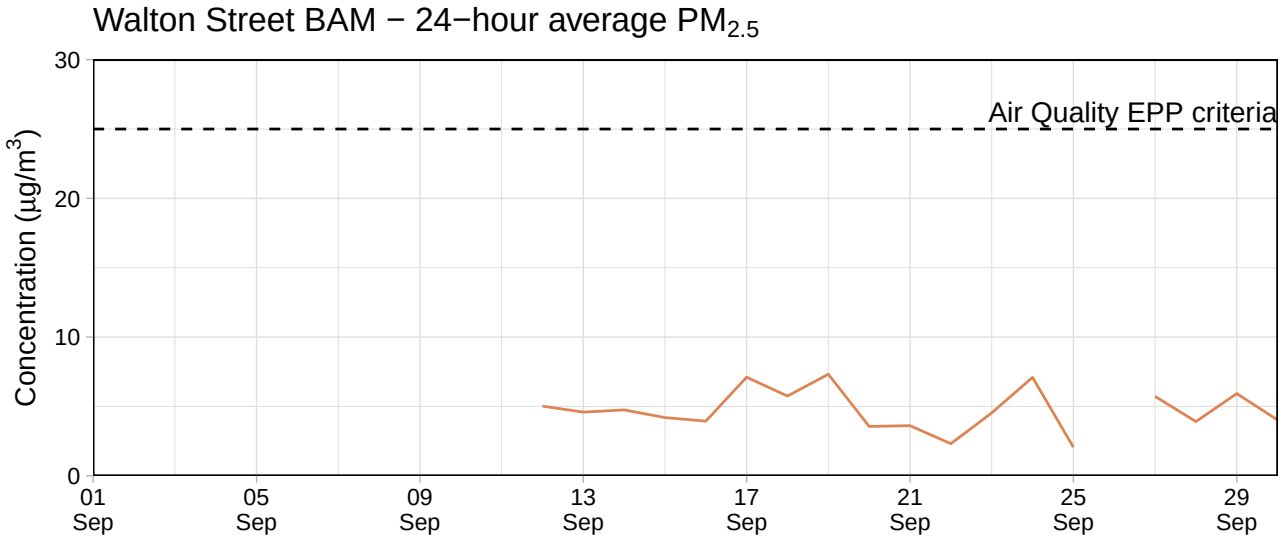
Frequency of counts by wind direction (%)

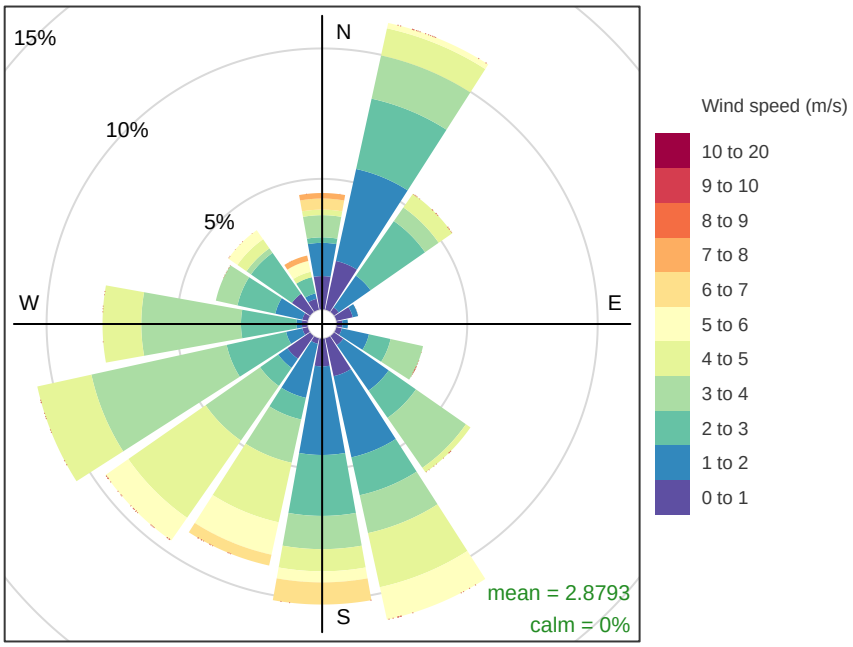




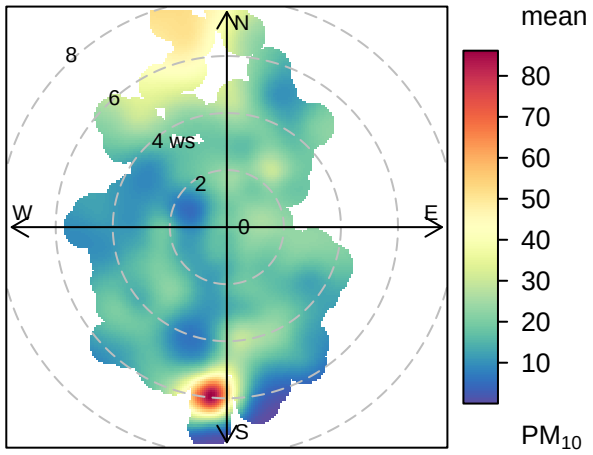
Walton Street BAM

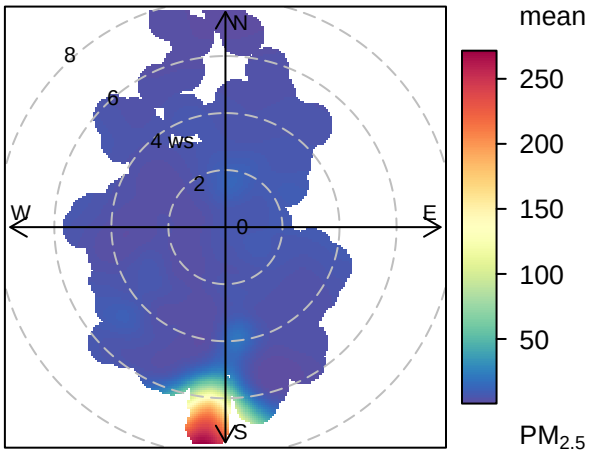






Frequency of counts by wind direction (%)



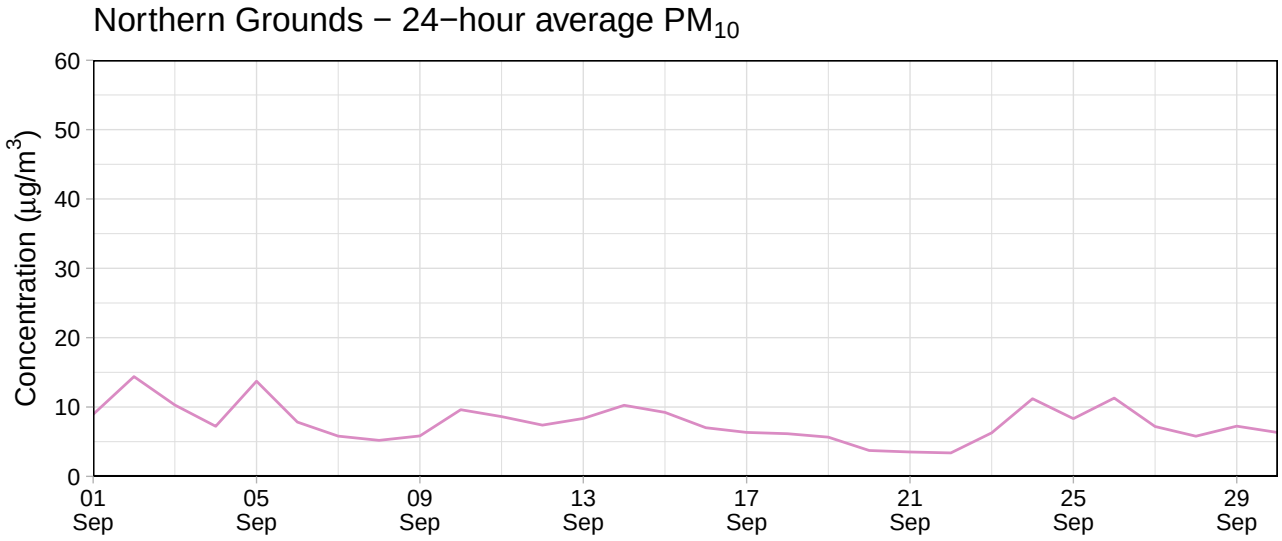


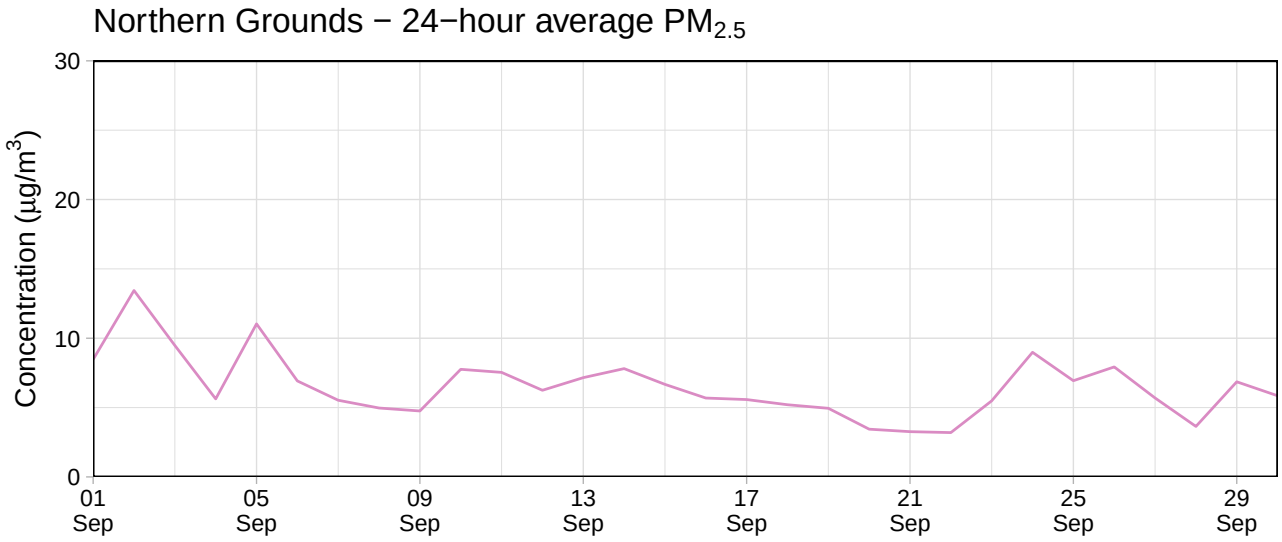
Internal Monitors

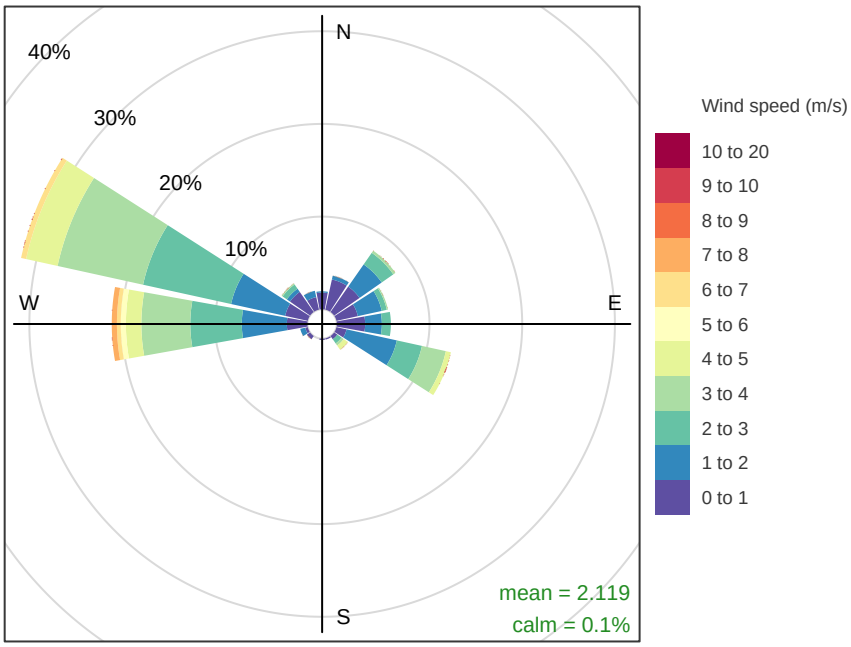
Table 2: Summary of 24-hour average data collected at internal monitors (μg/m^3)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Southern Grounds	2.8	6.5	13.8	100	2.6	5.9	11.7	100
Eastern Grounds	3.9	9.4	15.9	100	3.4	7.7	13.9	100
Block 9	2.1	6.3	14.1	100	1.9	5.6	12.8	100
Northern Grounds	3.4	7.7	14.4	100	3.2	6.5	13.4	100

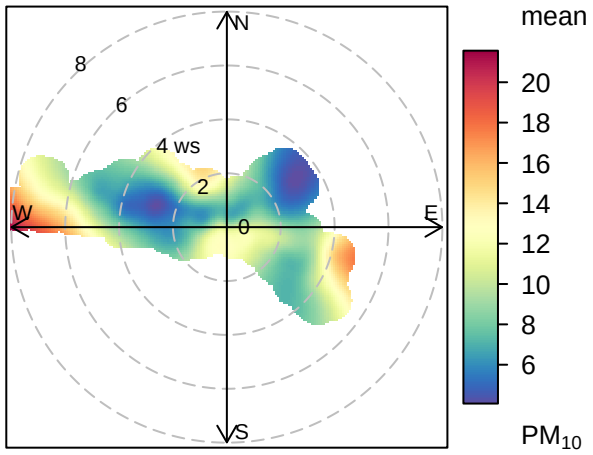
Northern Grounds

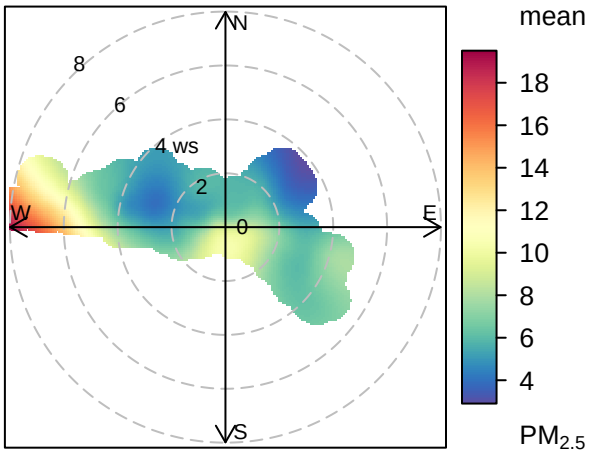




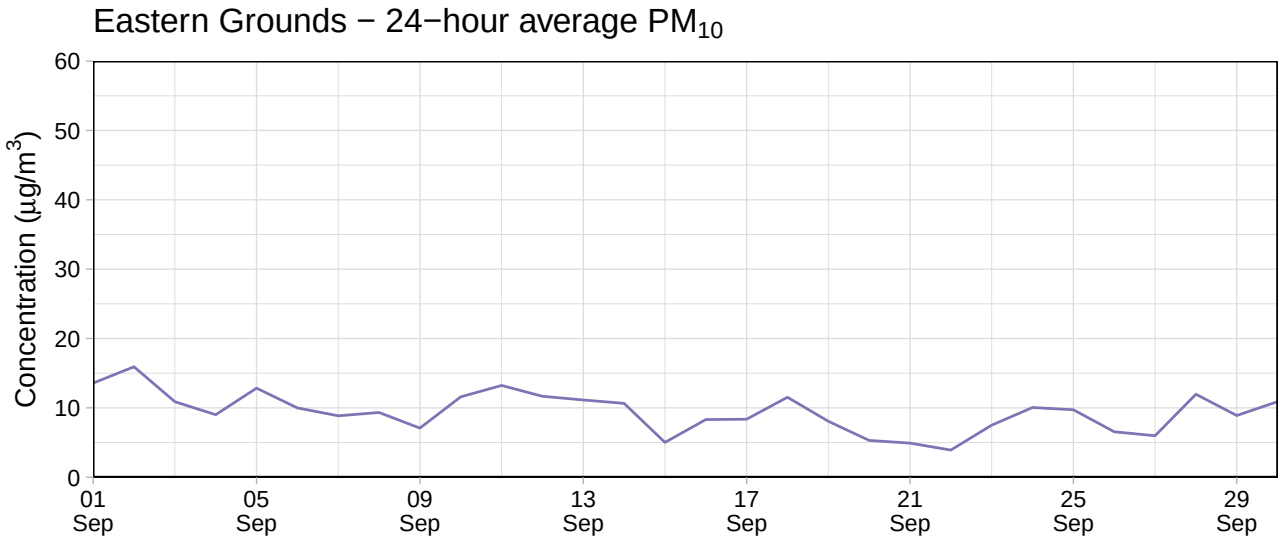


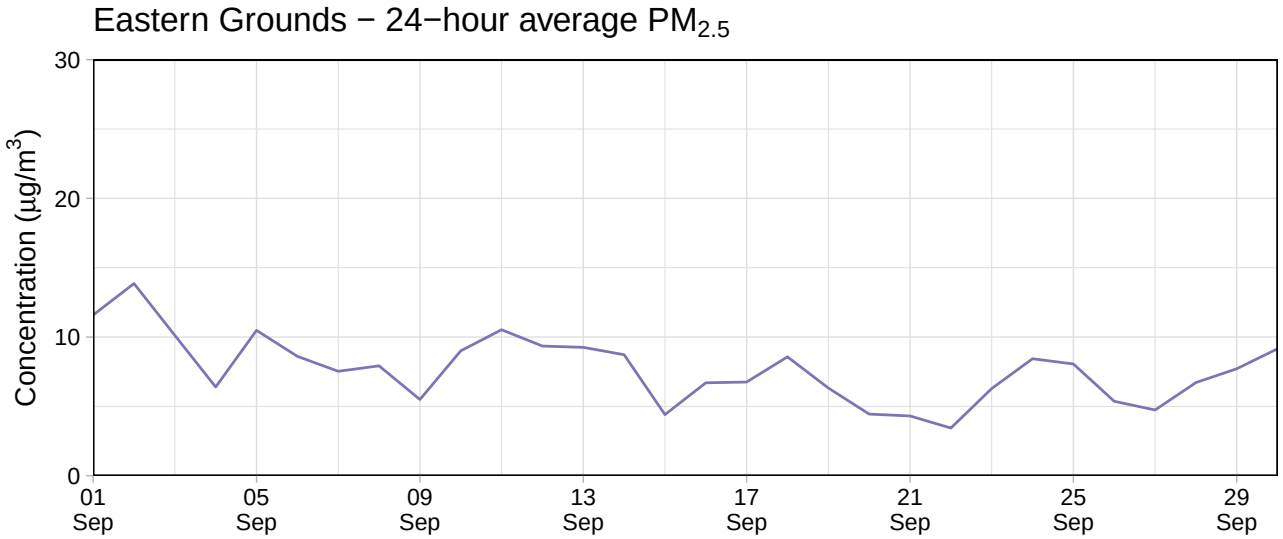
Frequency of counts by wind direction (%)

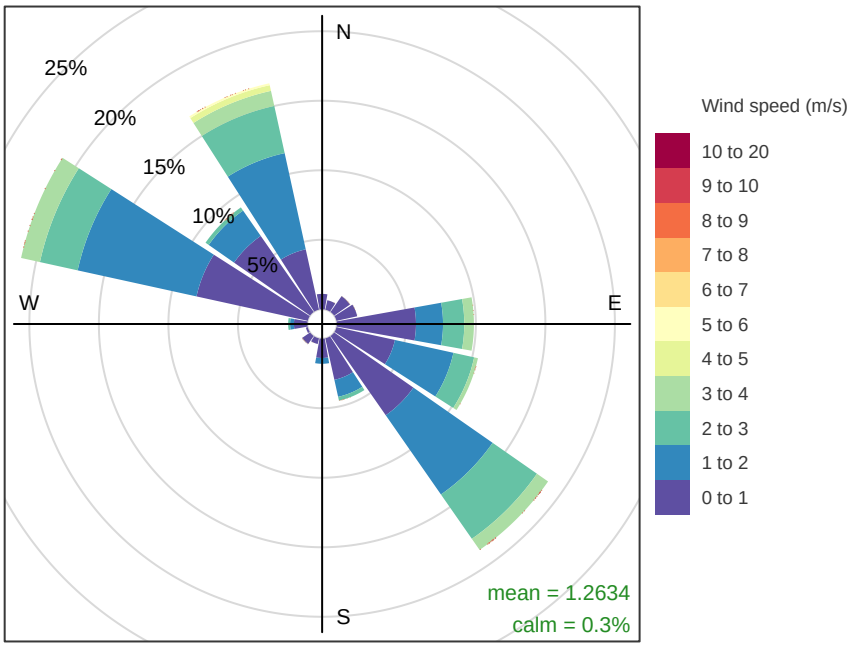




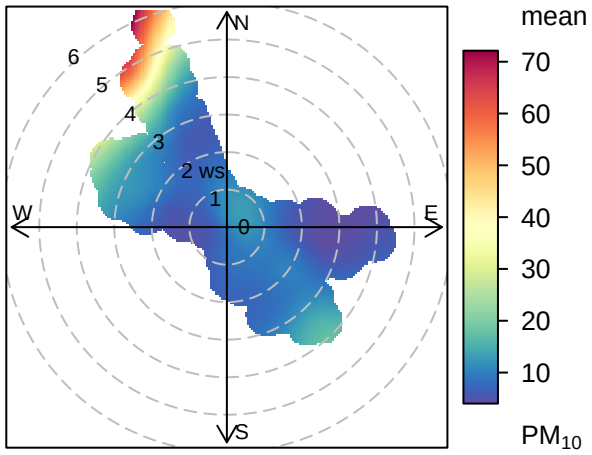
Eastern Grounds

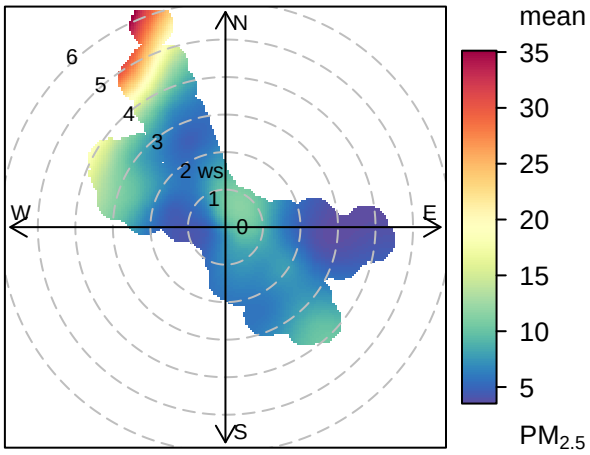




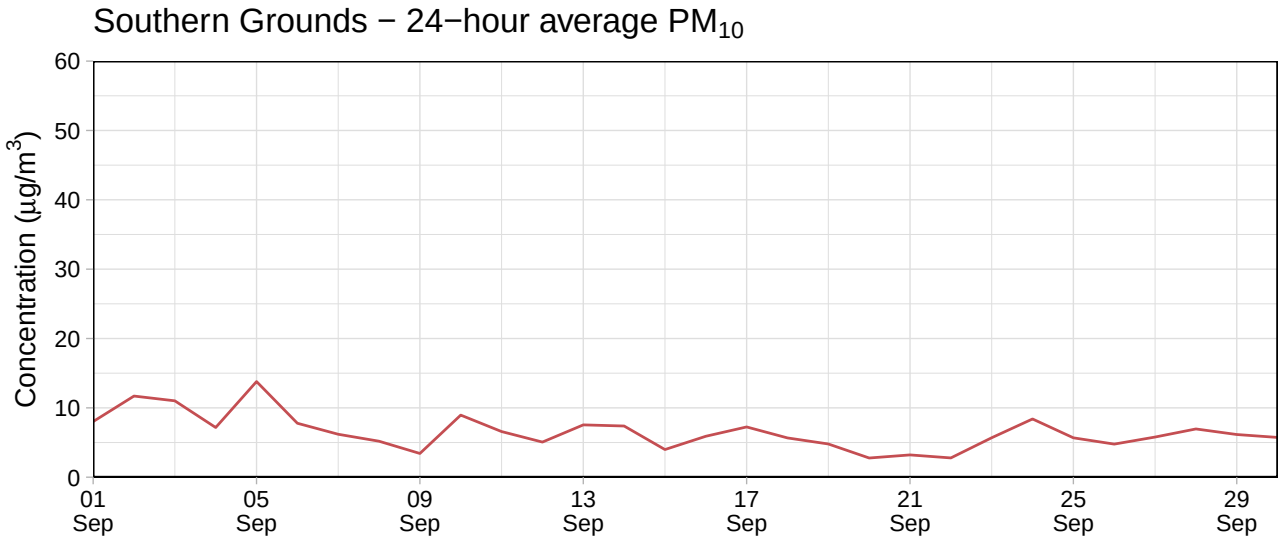


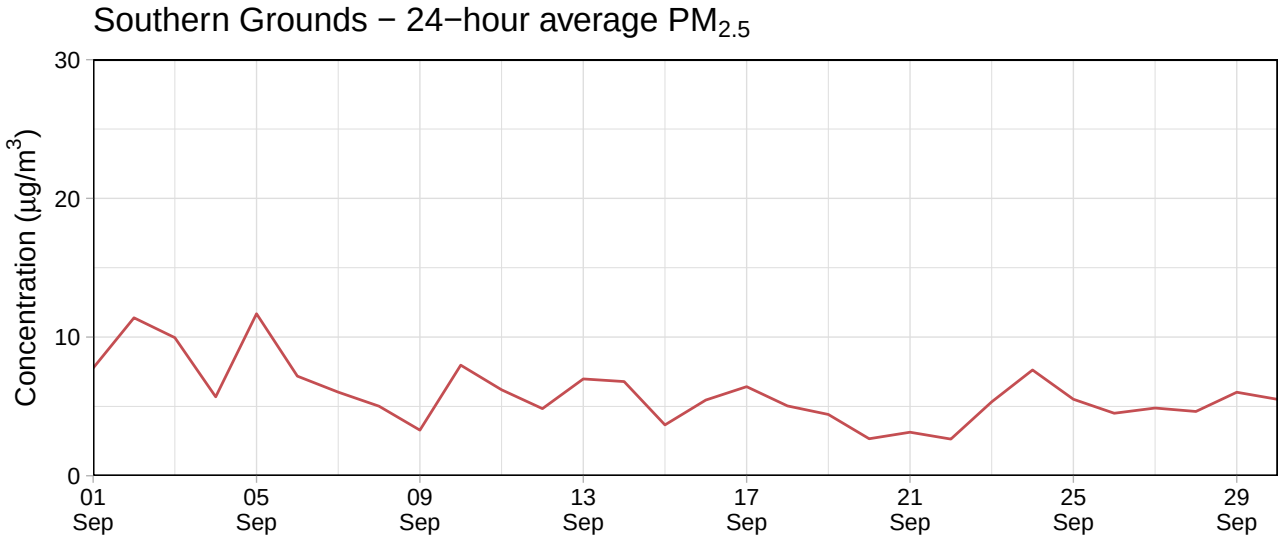
Frequency of counts by wind direction (%)

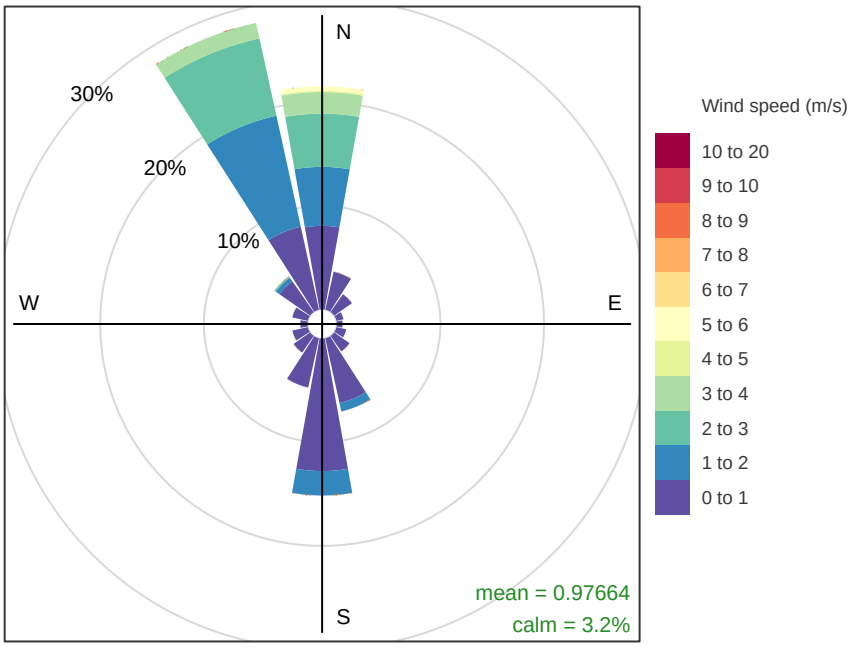




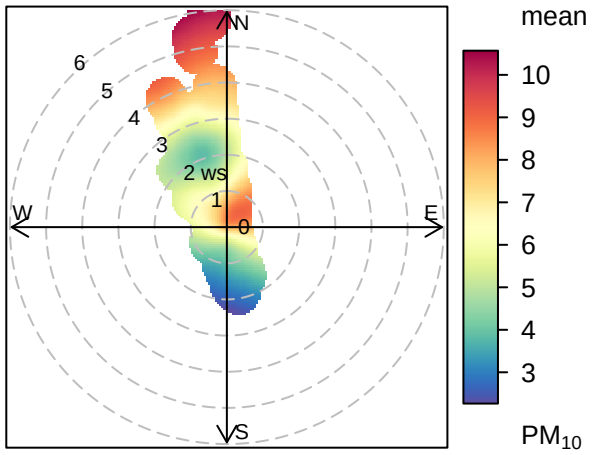
Southern Grounds

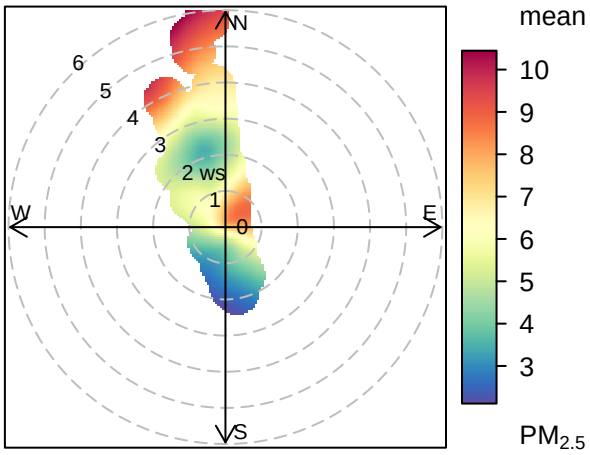




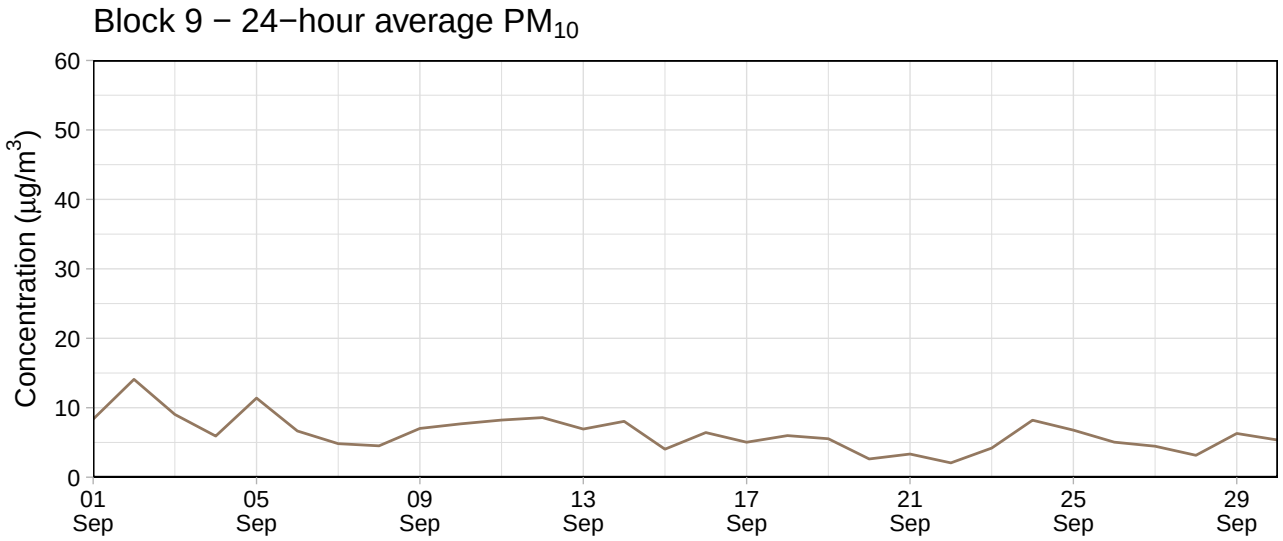


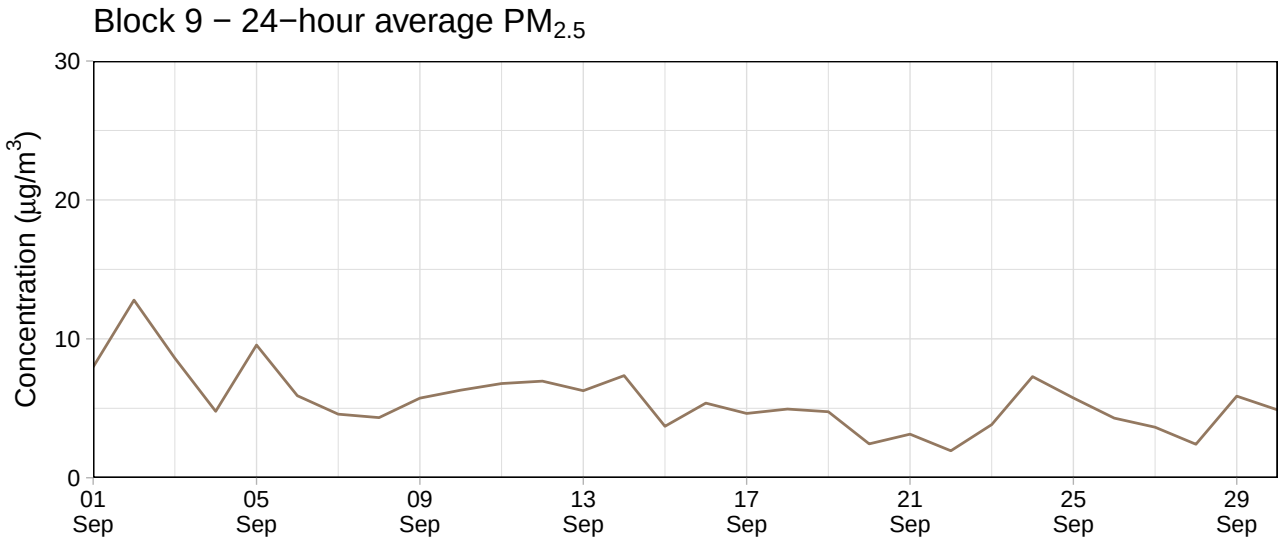
Frequency of counts by wind direction (%)

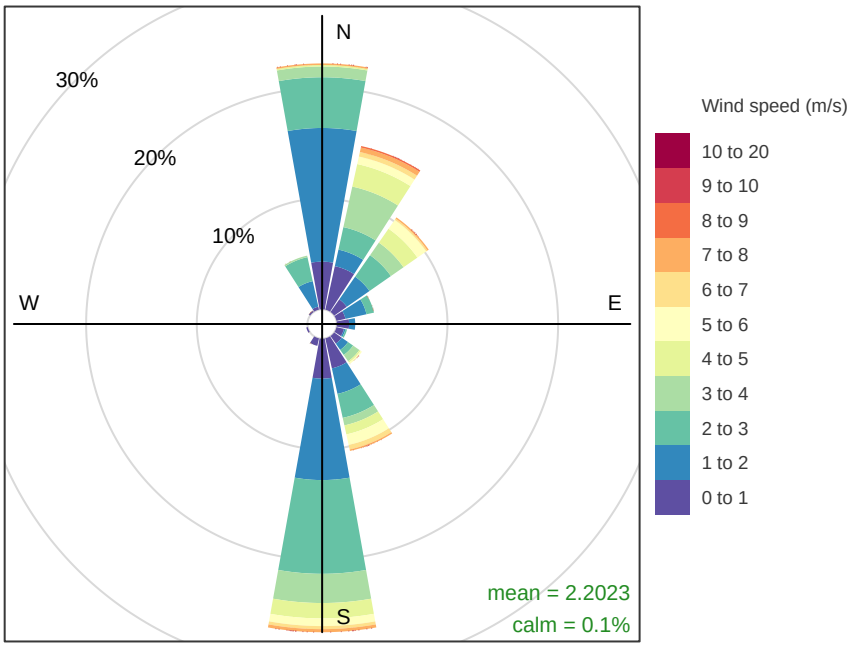




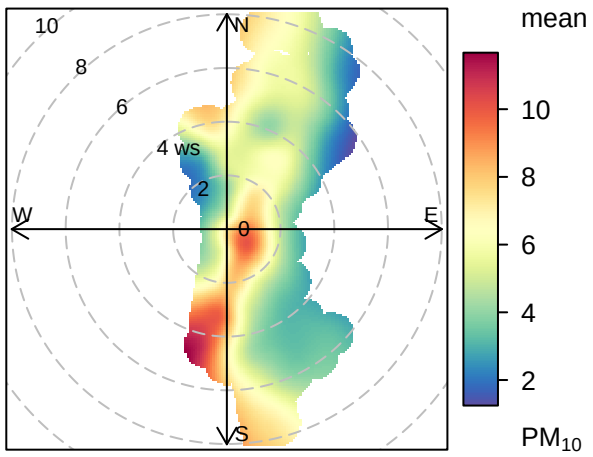
Block 9

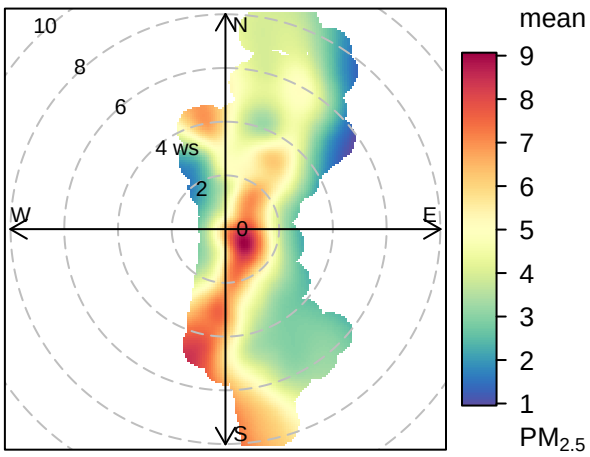

Block 9 − 24−hour average PM10
Concentration (µg/m3)
60
50
40
30
20
10
0
01 Sep
05 Sep
09 Sep
13 Sep
17 Sep
21 Sep
25 Sep
29 Sep


Block 9 − 24−hour average PM2.5
Concentration (µg/m3)
30
20
10
0
01 Sep
05 Sep
09 Sep
13 Sep
17 Sep
21 Sep
25 Sep
29 Sep



Frequency of counts by wind direction (%)



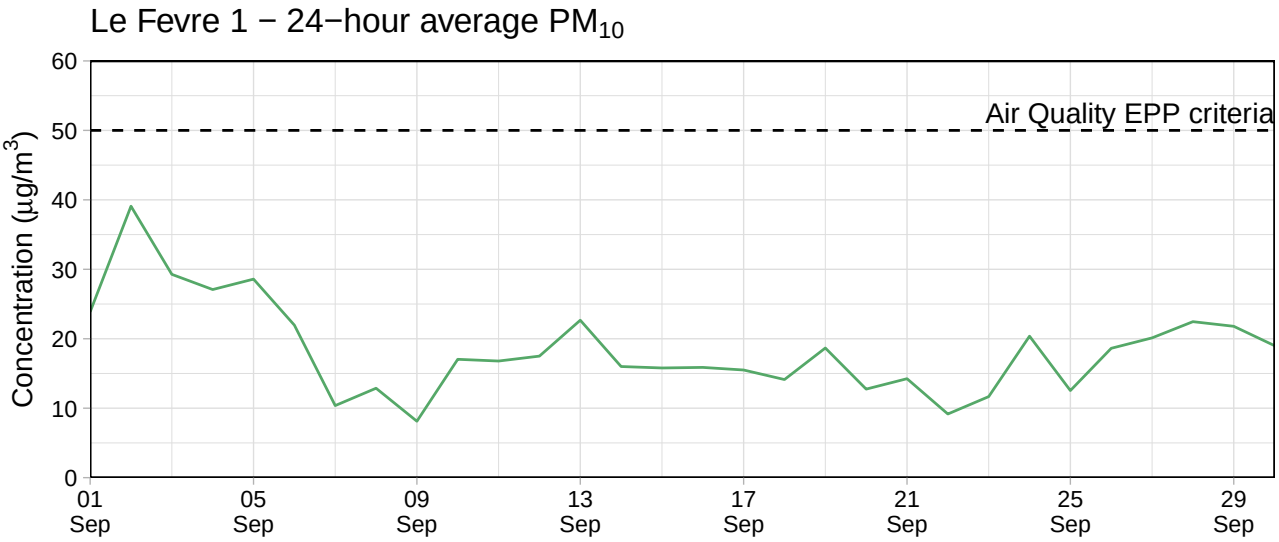


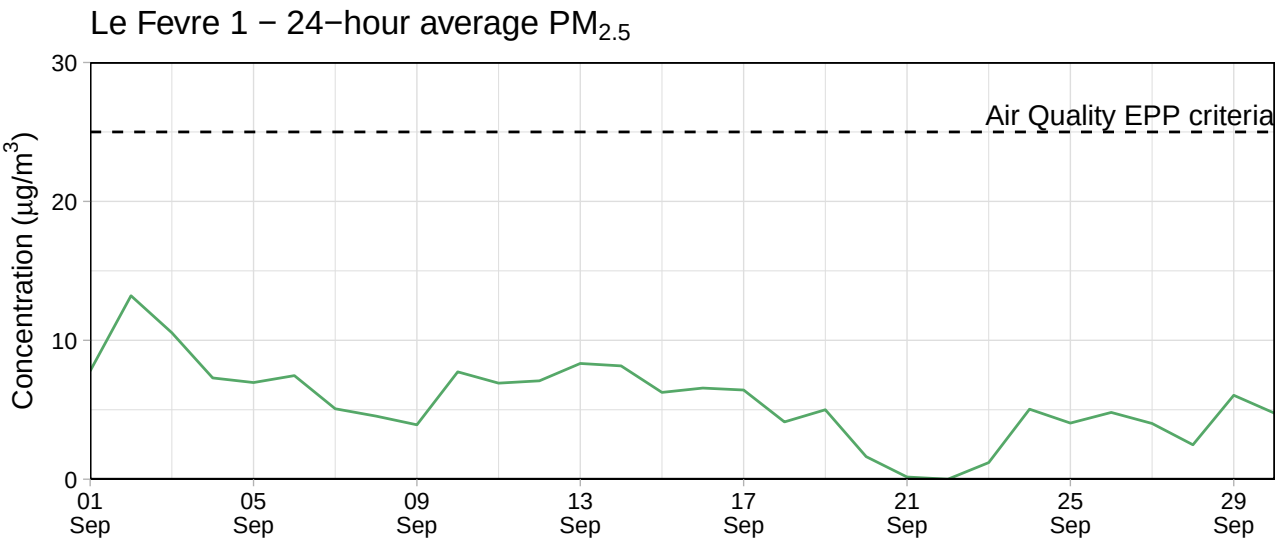
EPA Monitoring

Le Fevre 1

Table 3: Summary of 24-hour average data collected at EPA monitors ($\mu g/m^3$)

Site	PM_{10}				$PM_{2.5}$			
	Min	Avg	Max	Capture (%)	Min	Avg	Max	Capture (%)
Le Fevre 1	8.1	18.5	39.1	100	0	5.6	13.2	100





Ground Level Particulate Notification Report - 10 August, 2024

Adelaide Brighton Cement, Birkenhead Works
62 Elder Road, Birkenhead, SA 501
EPA Licence No: 1126

Summary

The 24-hour average particulate matter monitoring data collected at the Community Park and Gunn Street monitoring sites during 10 August, 2024 is shown in Table 1 below. The data indicates that:

- The 24-hour average $PM_{2.5}$ concentration measured at Community Park of 26.4 $\mu g/m^3$ exceeded the EPP Air criterion of 25 $\mu g/m^3$

Table 1: Monitoring Summary

Monitoring Location	Pollutant	24-hour average ($\mu g/m^3$)	EPP Air Criterion ($\mu g/m^3$)
Community Park	PM_{10}	27.0	50
	$PM_{2.5}$	26.4	25
Gunn Street	PM_{10}		50
	$PM_{2.5}$		25

The 24-hour average PM2.5 concentration measured at Community Park of 26.4 µg/m3 exceeded the EPP Air criterion of 25.0 µg/m3. All ABC monitors (on site and off site), showed similar particulate levels and trends. This indicates the particulate level was from a localised air shed condition, rather than related to any specific site activity. Also the wind movement for this 24 hr period was predominantly (51% of the day) blowing towards ABC. Low wind speeds and overnight temperatures resulted in increased particulate levels overnight / early morning, which dropped during the day as wind speed and temperatures increased. PM2.5 particulate is commonly produced from combustion sources (vehicles/ heaters). The PM2.5 particulate levels/trends are indicative of low night time temperatures, low wind speeds and reduced air shed flushing

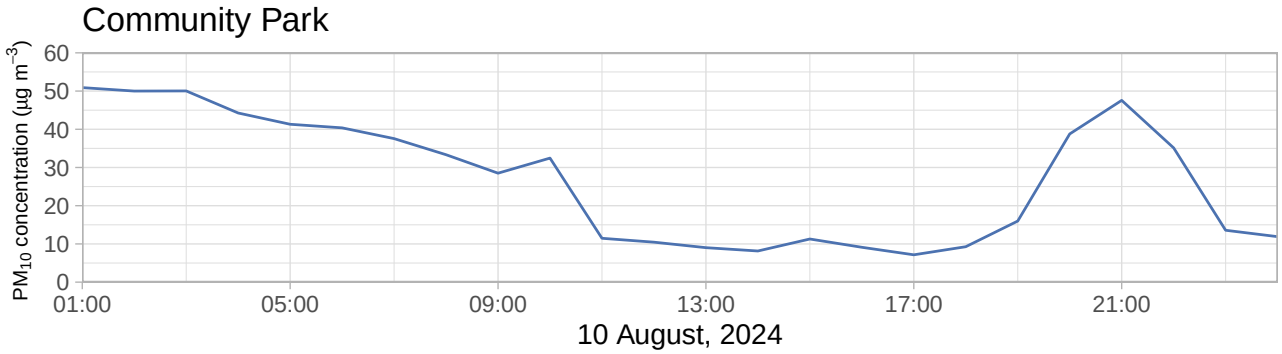
Community Monitoring

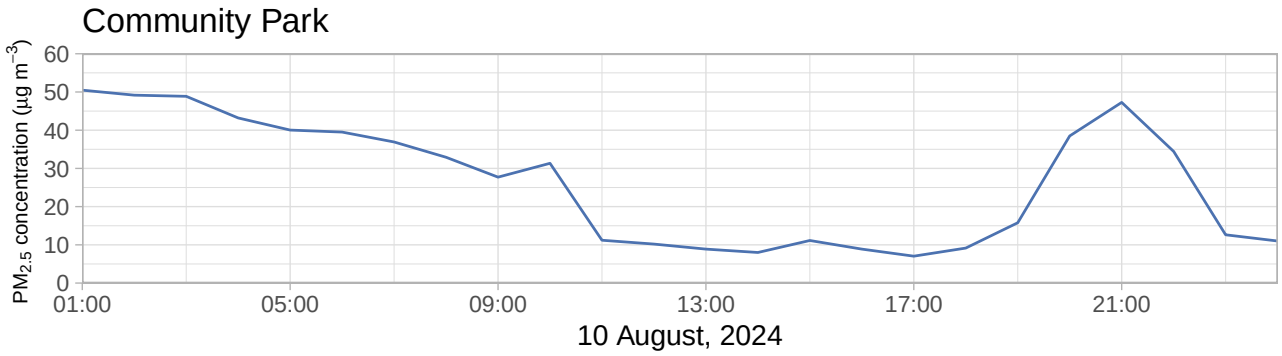
Monitoring data collected at the community monitoring sites is presented in this section.

The table below shows the proportion of PM_{10} and $PM_{2.5}$ measured at each monitor, according to the average wind direction at the time of monitoring.

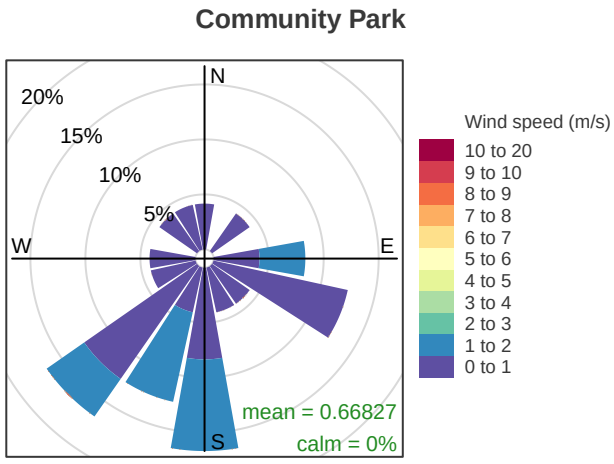
Monitoring Location	Direction	PM_{10} proportion (%)	$PM_{2.5}$ proportion (%)
Community Park	From direction of ABC (WD $<$ 180)	49	49
Community Park	From other direction (WD $>$ 180)	51	51

The figures below show the time series of 1-hour average measurements throughout 10 August, 2024



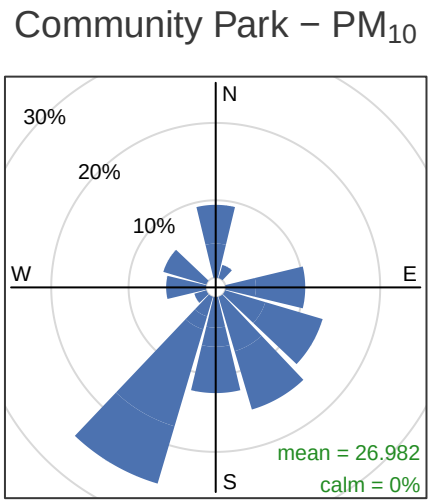


The figures below show wind roses summarising the period 10 August, 2024.



Frequency of counts by wind direction (%)

The figures below show dust roses summarising the period 10 August, 2024



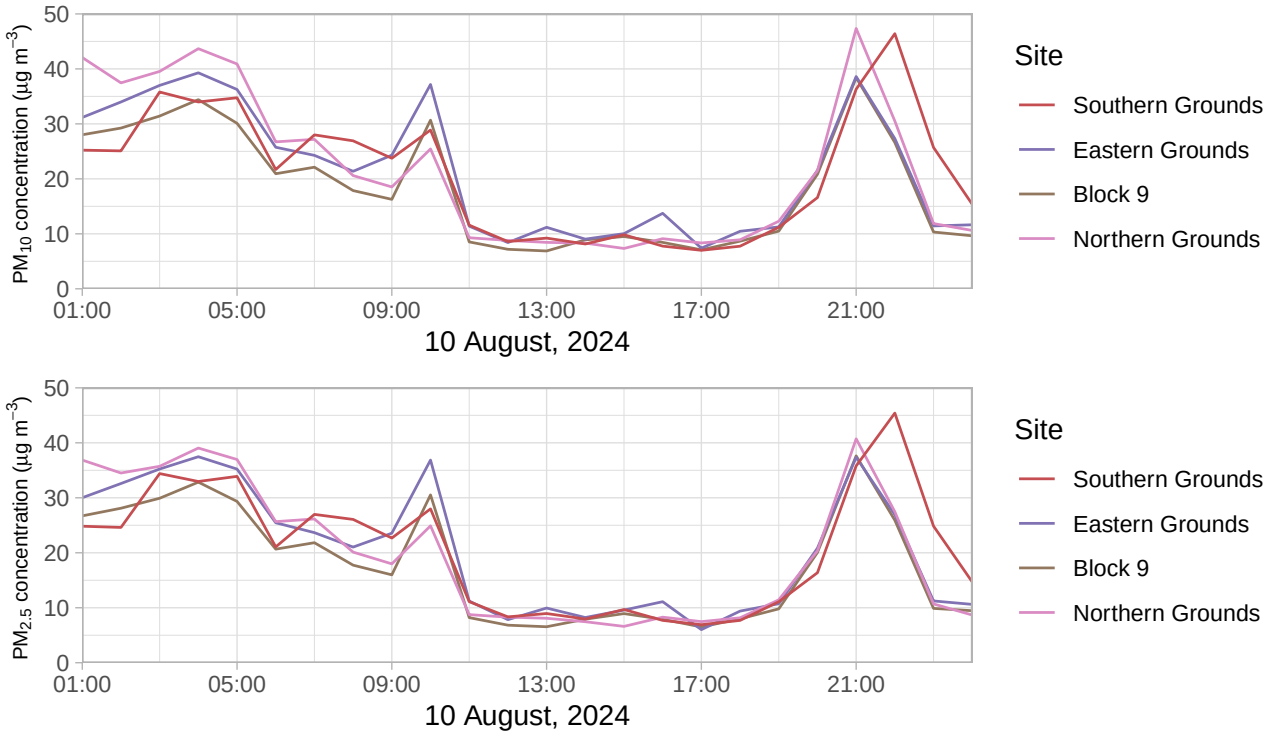
Proportion contribution to the mean (%)

Onsite Monitoring

Monitoring data collected at ABC's onsite monitors is presented in this section. The table below shows the 24-hour average concentrations measured at the onsite monitors.

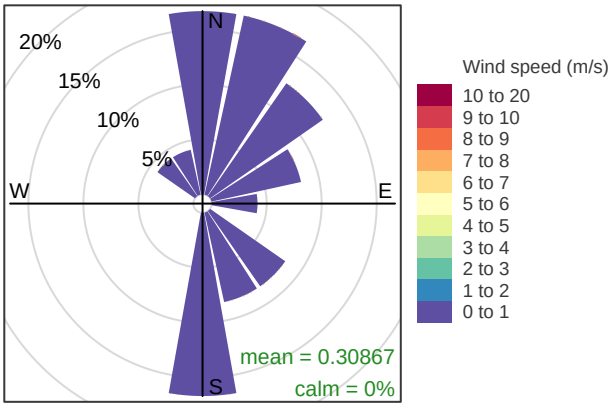
Monitoring Location	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
Southern Grounds	21	21
Eastern Grounds	21	21
Block 9	18	18
Northern Grounds	22	20

The figure below shows the time series of 1-hour average measurements throughout 10 August, 2024 for each onsite monitor.



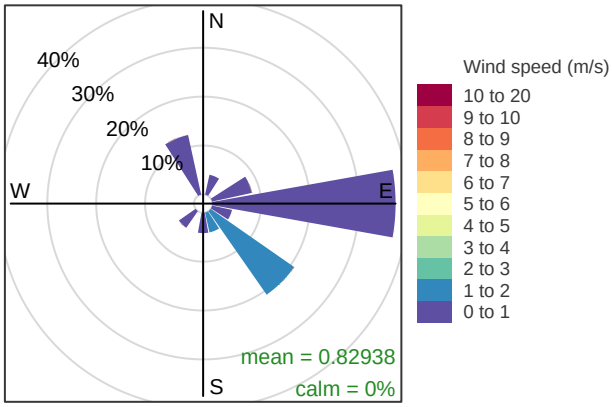
The figures below show wind and dust roses summarising the period 10 August, 2024 for each onsite monitor.

Southern Grounds



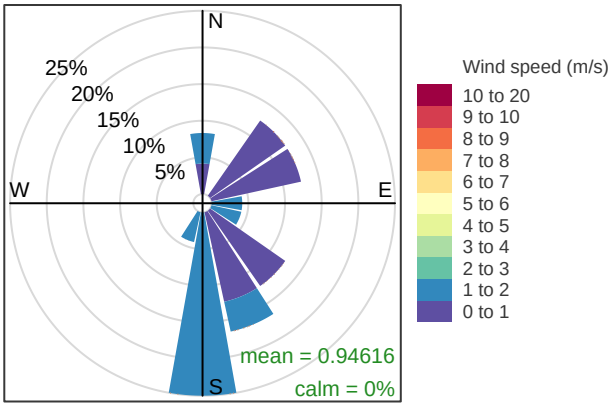
Frequency of counts by wind direction (%)

Eastern Grounds



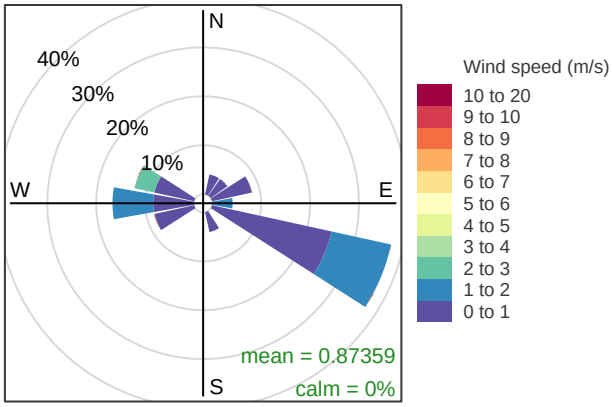
Frequency of counts by wind direction (%)

Block 9



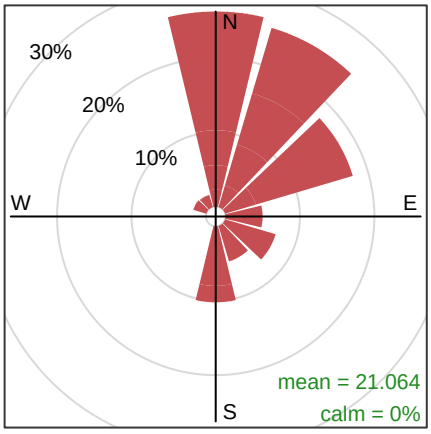
Frequency of counts by wind direction (%)

Northern Grounds



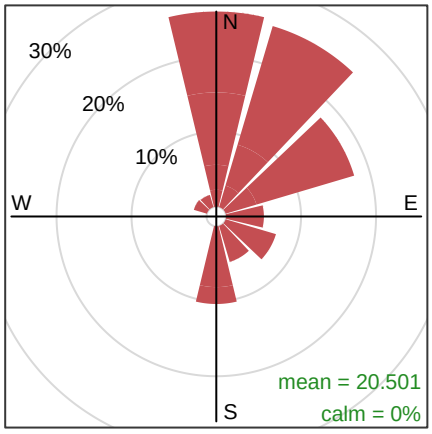
Frequency of counts by wind direction (%)

Southern Grounds – PM_{10}



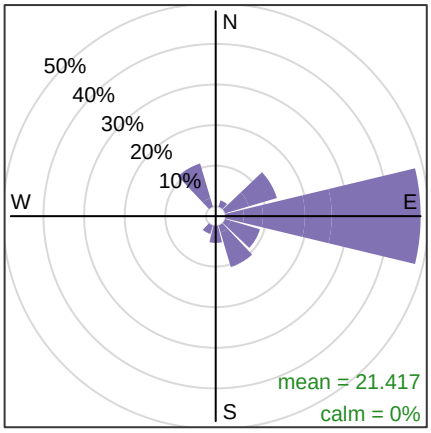
Proportion contribution to the mean (%)

Southern Grounds – $PM_{2.5}$



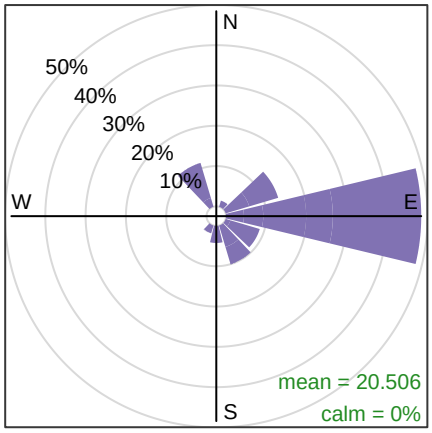
Proportion contribution to the mean (%)

Eastern Grounds – PM_{10}



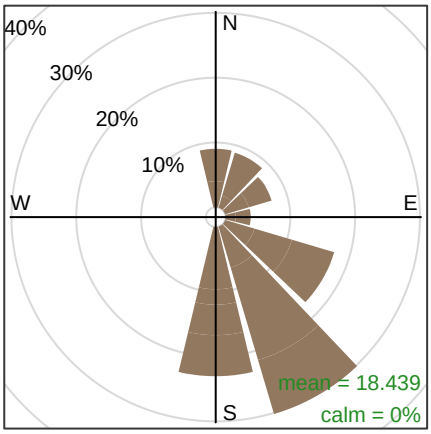
Proportion contribution to the mean (%)

Eastern Grounds – $PM_{2.5}$



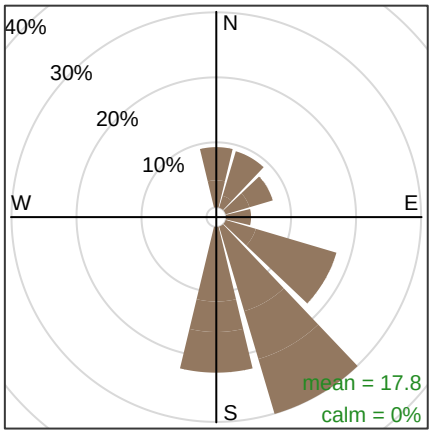
Proportion contribution to the mean (%)

Block 9 – PM_{10}



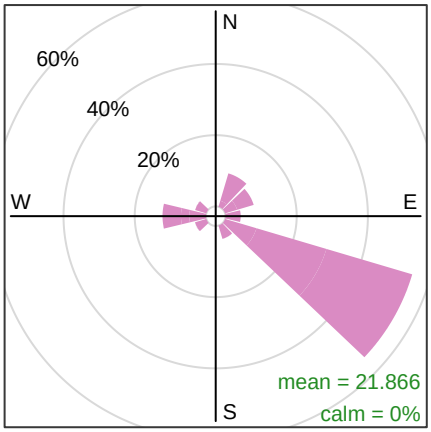
Proportion contribution to the mean (%)

Block 9 – $PM_{2.5}$



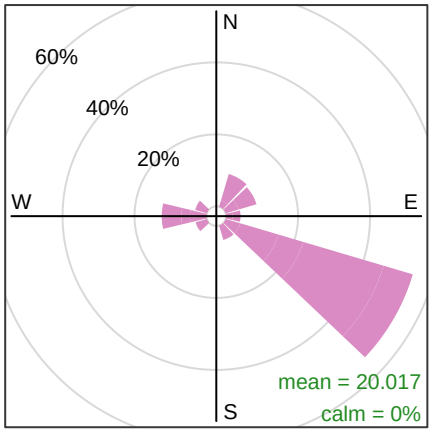
Proportion contribution to the mean (%)

Northern Grounds – PM_{10}



Proportion contribution to the mean (%)

Northern Grounds – $PM_{2.5}$



Proportion contribution to the mean (%)

Recent air quality data measured by ABC or EPA is indicative only and may be affected by instruments not working correctly, power failures and the like. Data is published directly from the monitors and will be validated at a later date.