White Bay Cruise Terminal

Air Quality and Meteorological Monitoring Report – May 2020

24 June 2020

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Air Quality and Meteorological Monitoring Report – May 2020

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1. INTRODUCTION

The Port Authority of New South Wales (NSW) has committed to undertaking air quality monitoring in the residential area adjacent to the White Bay Cruise Terminal (WBCT). This report presents a summary of monitoring data collected during May 2020.

For additional detail regarding the history of the monitoring program, the methodology, monitoring station equipment and technology, please refer to any of the monthly reports prior to February 2018.

2. AIR QUALITY DATA

The monitoring results are presented below with comparison to the ambient air quality criteria for SO_2 and $PM_{2.5}$ provided in The Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2017). The relevant averaging periods are 10 minutes, 1 hour and 24 hours for SO_2, and 24 hours for $PM_{2.5}$.

The 24-hour average SO_2 and $PM_{2.5}$ concentrations are also compared with the data from several NSW Department of Planning, Industry and Environment (DPIE) monitoring sites, formerly known as Office of Environment and Heritage (OEH).

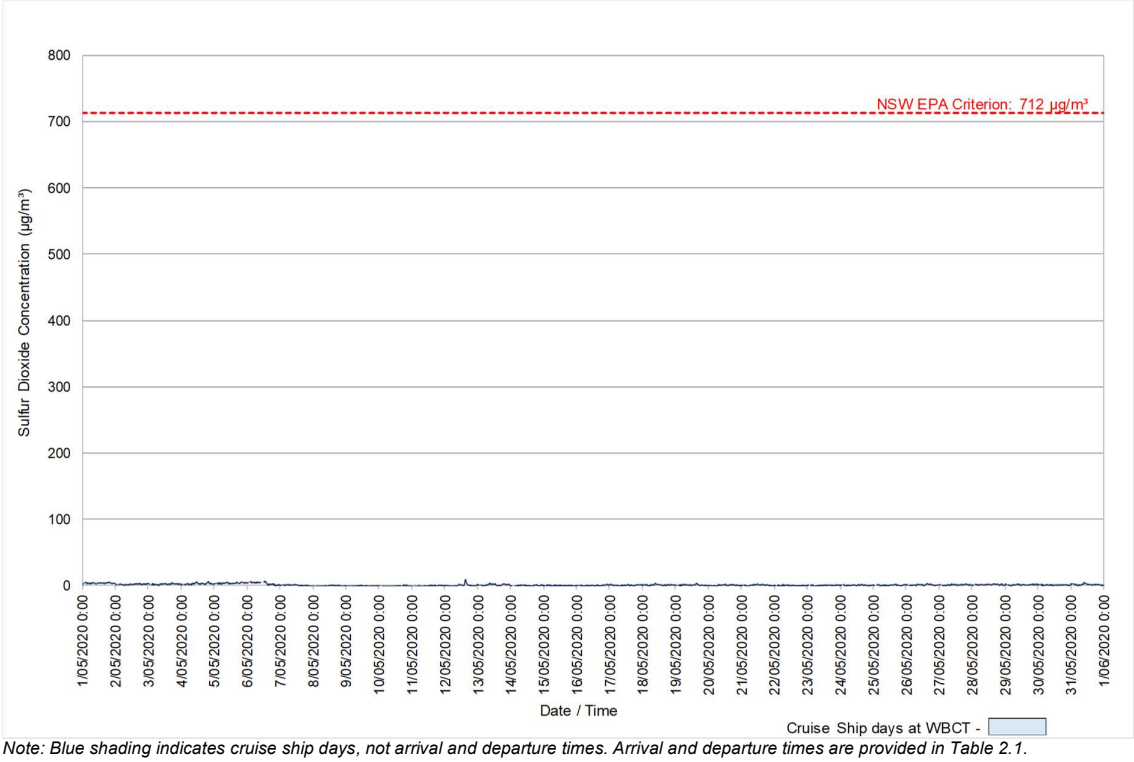
2.1 Cruise Ship Days

There were no cruise ships berthed during the month of May 2020 due to the COVID-19 outbreak.

2.2 10-minute Average Sulfur Dioxide Concentrations

A time-series plot of 10-minute average SO_2 concentrations for May is provided in Figure 2-1. No exceedances of the 10-minute average air quality criterion for SO_2 were recorded during the reporting period.

The highest 10-minute average SO_2 concentration (10 µg/m^3) was recorded on 12 May at 15:10 pm. This concentration is approximately 1% of the NSW Environmental Protection Authority (EPA) criterion.

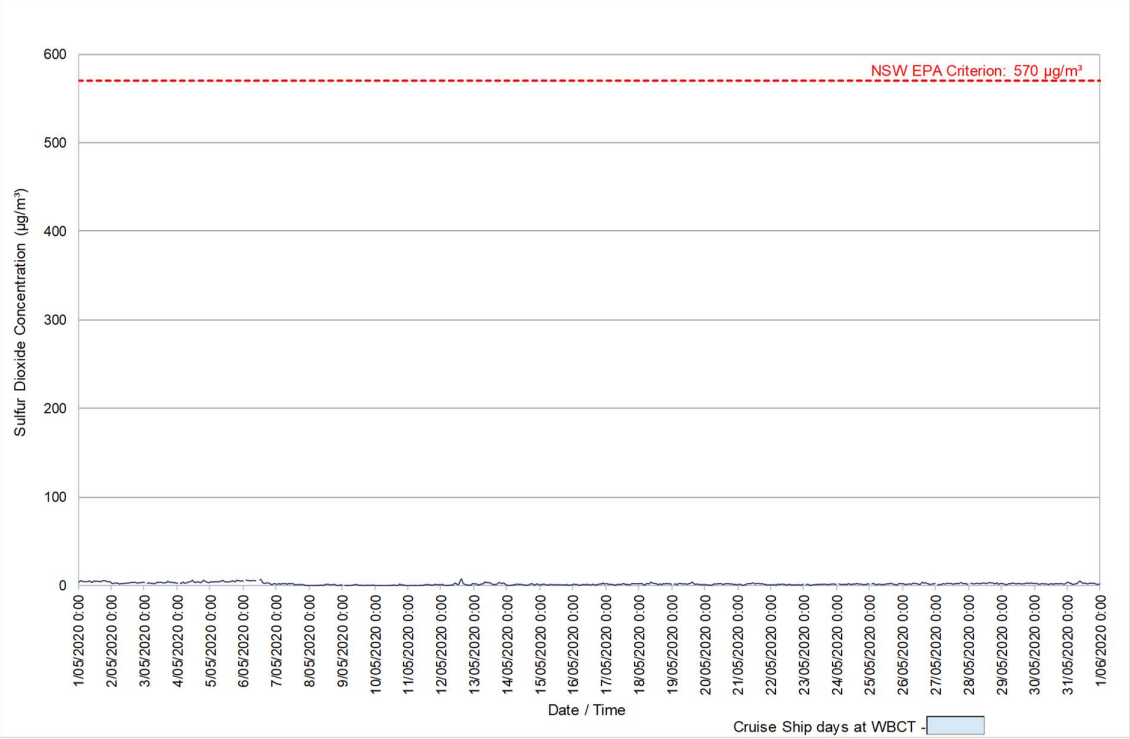


Note: Blue shading indicates cruise ship days, not arrival and departure times. Arrival and departure times are provided in Table 2.1.

Figure 2-1: 10-minute average SO_2 concentrations

2.3 1-hour Average Sulfur Dioxide Concentrations

A time series plot of the 1-hour average SO_2 concentration for May is shown in Figure 2-2. No exceedances of the 1-hour air quality criterion for SO_2 were recorded during the reporting period. The highest 1-hour average SO_2 concentration (7 µg/m³) was recorded on 12 May at 15pm. This concentration is approximately 1% of the NSW EPA criterion.



Note: Blue shading indicates cruise ship days, not arrival and departure times. Arrival and departure times are provided in Table 2.1.

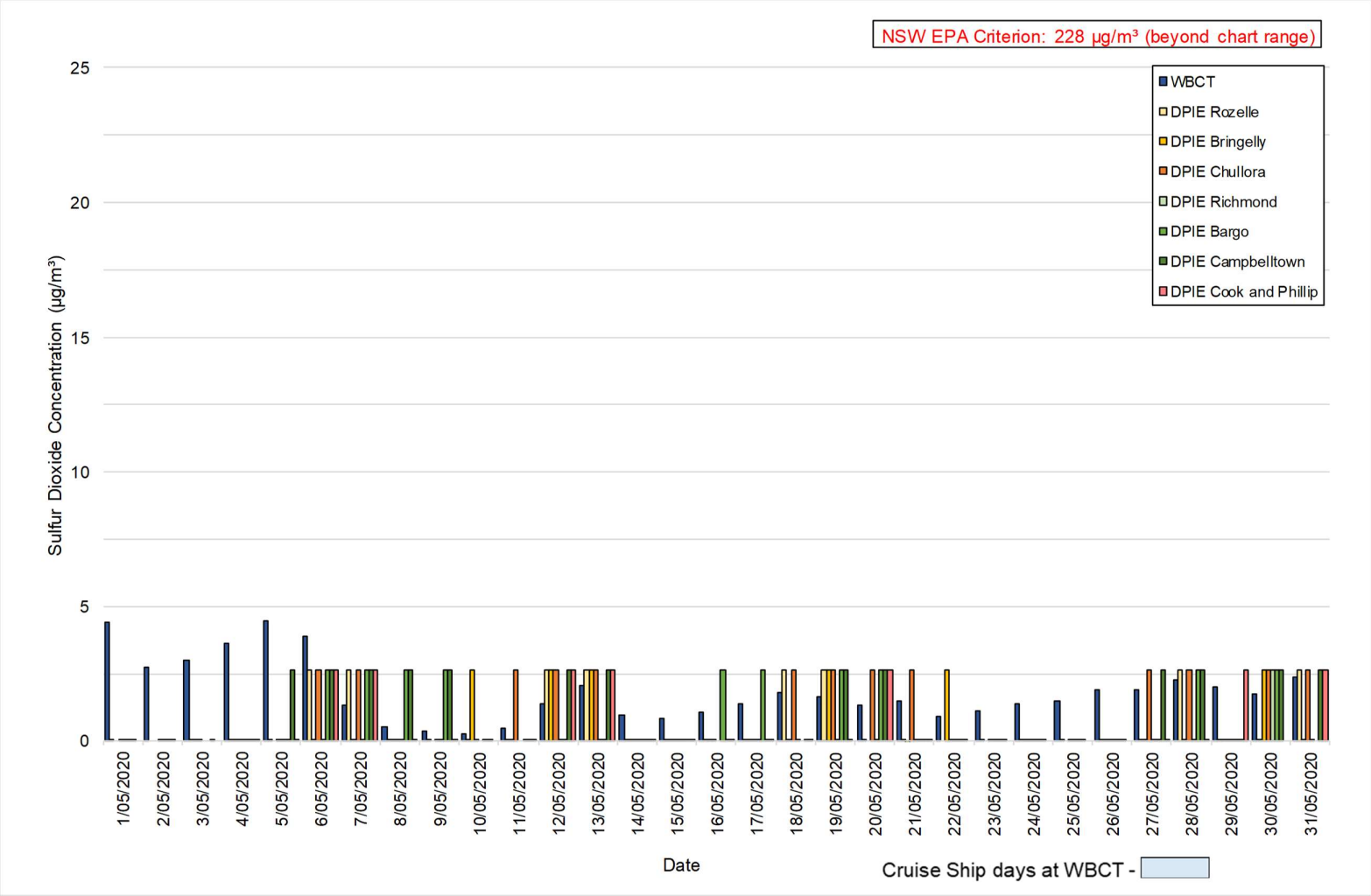
Figure 2-2: 1-hour average SO_2 concentrations

2.4 24-hour Average Sulfur Dioxide Concentrations

Time-series plots of 24-hour average SO_2 concentrations at WBCT and selected NSW DPIE urban background sites in Sydney are shown in Figure 2-3.

The selected DPIE monitoring sites that measure SO_2 include Rozelle, Bringelly, Chullora, Richmond, Bargo, Campbelltown and Cook and Phillip Park (Sydney CBD). 24-hour average SO_2 concentrations measured at White Bay are within the EPA criterion and are shown against those measured by DPIE stations in the region.

The highest 24-hour average SO_2 concentration (4 µg/m³) was recorded on 5 May.



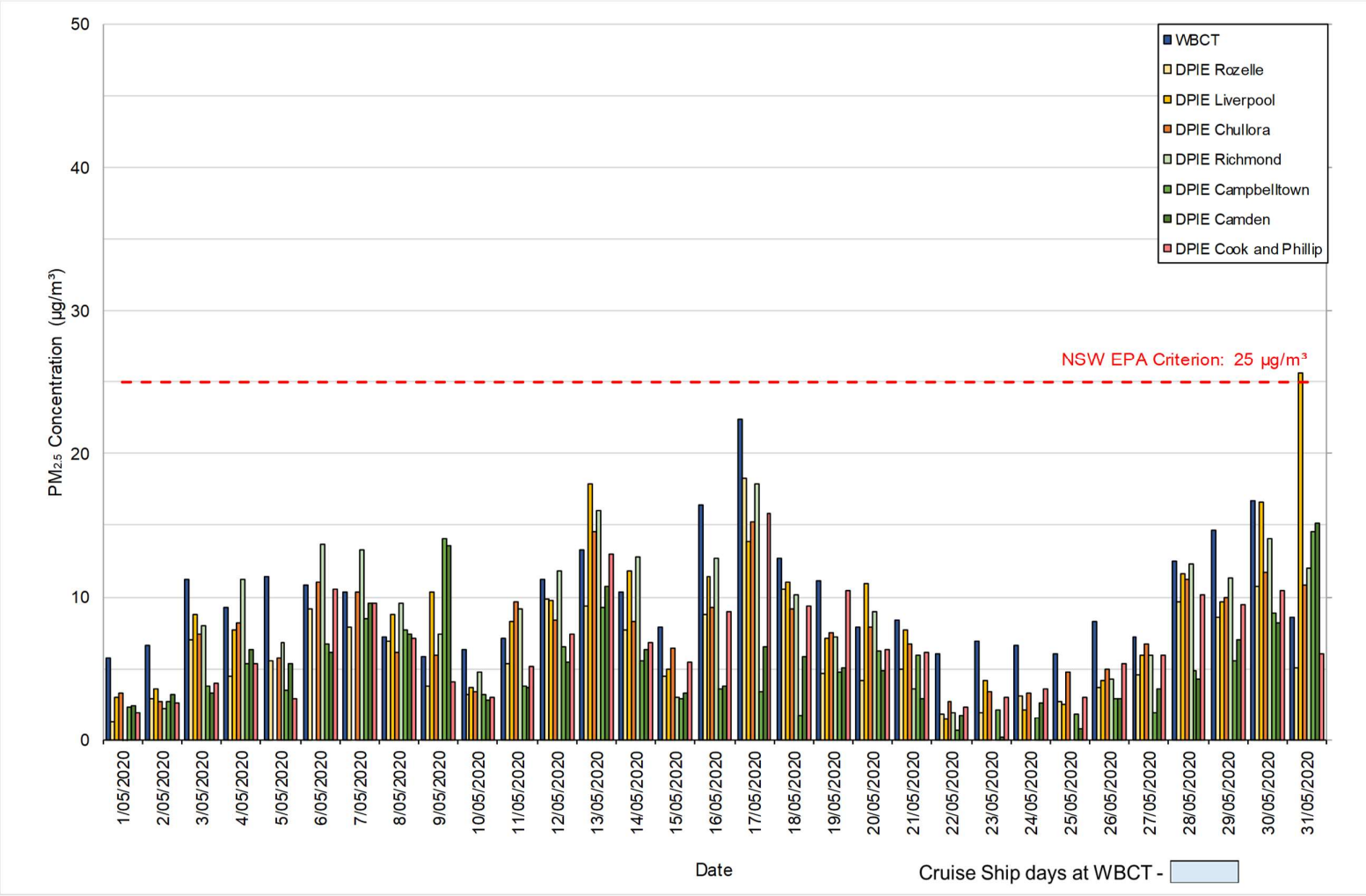
Note: Blue shading indicates cruise ship days, not arrival and departure times. Arrival and departure times are provided in Table 2.1. Zero data are graphed with a minor accentuation for visual purposes.

Figure 2-3: 24-hour average SO_2 concentrations at WBCT and DPIE monitoring sites

2.5 24-hour Average $PM_{2.5}$ Concentrations

Time-series plots of 24-hour average $PM_{2.5}$ concentrations at WBCT and selected DPIE monitoring sites are shown in Figure 2-4. Of the DPIE sites in Sydney, $PM_{2.5}$ is measured at a range of locations, including Rozelle, Liverpool, Chullora, Richmond, Campbelltown, Camden and Cook and Phillip.

There were no exceedances of the NSW EPA 24-hour $PM_{2.5}$ criterion (25 µg/m^3) in the month of May. The highest 24-hour average $PM_{2.5}$ concentration (22 µg/m^3) was recorded on 17 May.



Note: Blue shading indicates cruise ship days, not arrival and departure times. Arrival and departure times are provided in Table 2.1.

Figure 2-4: 24-hour average $PM_{2.5}$ concentration at WBCT and DPIE monitoring sites

2.6 Summary Statistics

Summary statistics for the SO_2 and $PM_{2.5}$ concentrations at WBCT are shown in Table 2-1.

Table 2-1: Summary statistics for SO_2 and $PM_{2.5}$ concentrations at WBCT (µg/m³)

Pollutant:	SO_2			$PM_{2.5}$
Averaging period:	10 minute	1 hour	24 hour	24 hour
Criterion:	712	570	228	25
Mean	2	2	2	10
Median	2	2	1	9
Standard deviation	1	1	1	4
Sample variance	2	2	1	14
Range	10	7	4	17
Minimum	0	0	0	6
Maximum	10	7	4	22
Maximum (cruise ship day)	N/A	N/A	N/A	N/A

3. METEOROLOGICAL DATA

A wind rose showing the frequency of counts by wind direction for the reporting period is shown in Figure 3-1. Guidance on the interpretation of wind roses is provided in the monthly reports prior to March 2018.

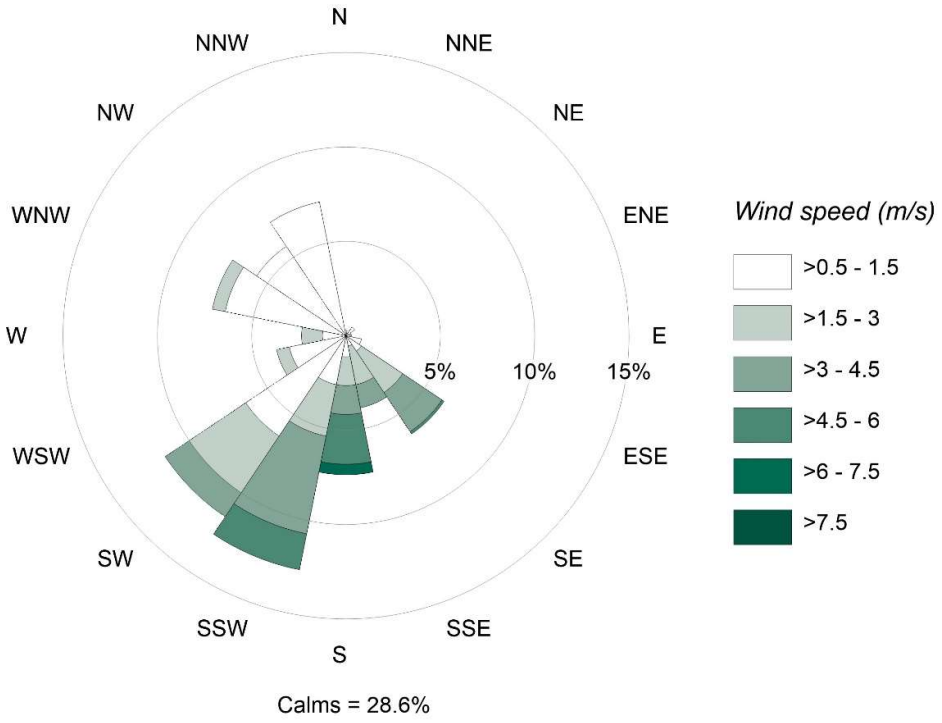


Figure 3-1: Wind rose for the reporting period

4. DATA AVAILABILITY

Data availability for SO_2 and $PM_{2.5}$ during the reporting period, based on the 5-minute average values, is shown in Table 4-1. An output summary and data distribution for 5-minute values of wind speed (m/s), wind direction, SO_2 (µg/m^3) and $PM_{2.5}$ (µg/m^3) concentrations are shown in Figure 4-1. Blue bars below each parameter represent captured data and the red bars represent missing data.

Table 4-1: Data availability and summary statistics for SO_2 and $PM_{2.5}$

Statistic	SO_2 (5-minute)	$PM_{2.5}$ (1-hour)
Possible values	8,556	744
Missing values	449	15
Availability (%)	95	100
95th percentile (µg/m^3)	5	23

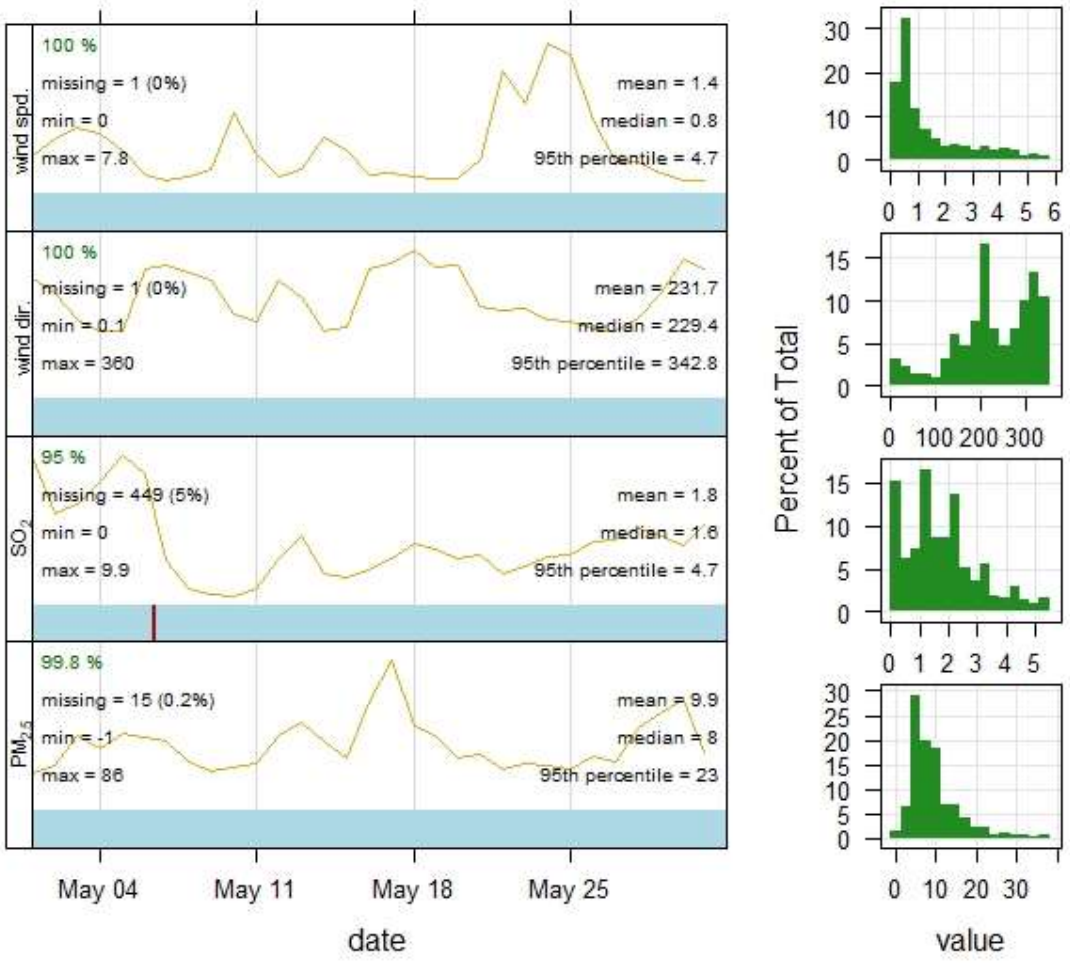


Figure 4-1: Output summary and data distribution

5. REFERENCES

NSW Environmental Protection Authority (EPA). 2017. The Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, New South Wales Environment Protection Authority, January 2017.