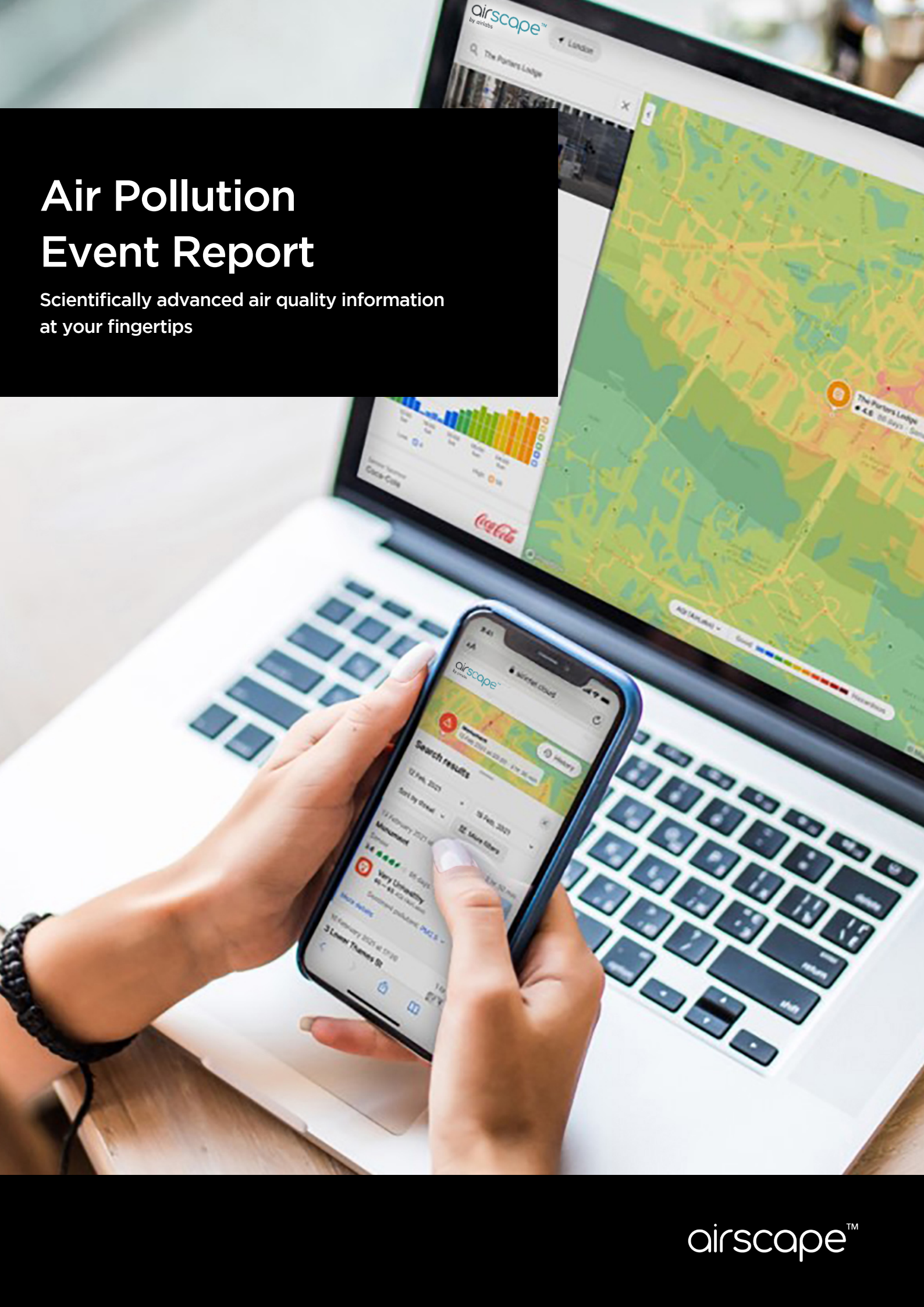


Air Pollution Event Report

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Camden, London May 2023

Title	Camden pollution events report (May 2023)
Report no	TR011
Report type	Event Assessment
Description	Report on recent pollution events in Camden, London
Authors	Szymon Kwiatkowski
Reviewers	Matthew S. Johnson
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Background

This document is an analysis of pollution patterns during May 2023 over a sensor network in Camden, London. For this report a representative sample of 80 nodes (1/3 of the whole network) was analysed based on hourly average of the following pollutants: PM_{2.5}, O₃ and NO₂. The pollutant concentrations were also compared to previous months and the findings are presented in this report.

Analysis

For the comparison purposes the data of Camden AirNodes covers the period between March 2023 and May 2023. Nevertheless, the focus of this report is on May.

NO₂: Consistency Amidst Changing Seasons

The analysis of NO₂ data, gathered from representative Camden devices, indicates marginal variation in average monthly concentrations, demonstrating a consistent daily pattern of pollutant formation (Fig. 2). The average NO₂ concentration in May decreased compared to previous months. However, Camden on average still exceeds the World Health Organization's guidelines for a 24-hour NO₂ average (25 ug/m³), continuing a pattern observed in previous months of the year (Fig. 1, Fig. 7).

Table 1: Monthly averages of observed pollutants			
Month/Pollutant	NO ₂ in ug/m ³	O ₃ in ug/m ³	PM _{2.5} in ug/m ³
March	40.8	37	6
April	42	40.9	8.6
May	34.3	42.7	5.7
3 months average	39.0 ± 4.1	40.2 ± 2.9	5.8 ± 1.6

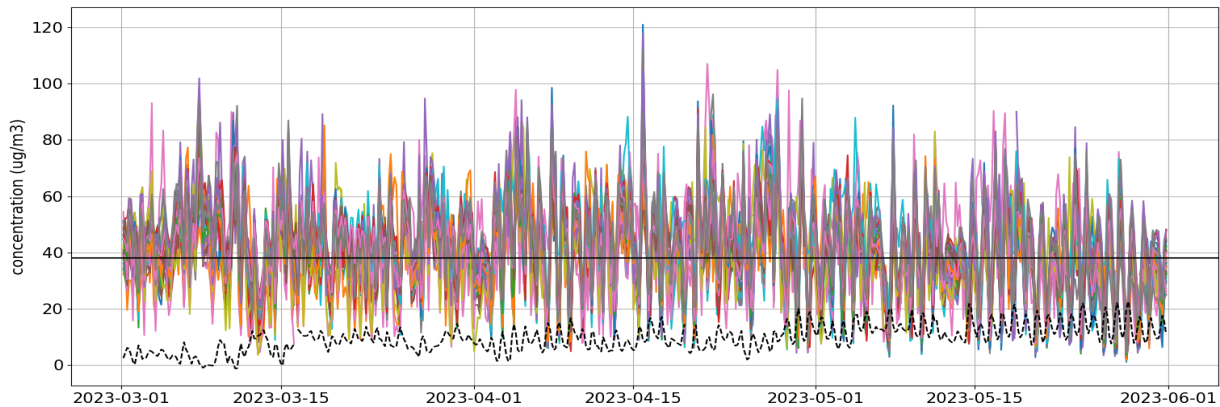


Fig. 1: NO₂ 4h average in March-May period.

The black horizontal line represents an average of AirNodes for that time period. The black dashed line represents temperature observed in the AirNode.

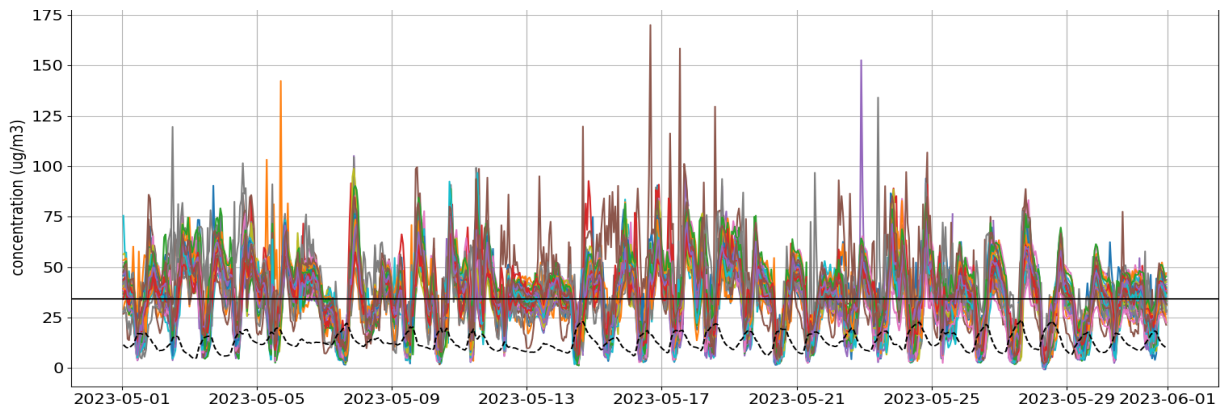


Fig. 2: NO₂ hourly average in May.

The black horizontal line represents an average of AirNodes for March. The black dashed line represents temperature observed in the AirNode.

O₃: The Interplay of Sunshine, Clouds, and Wind

The variability in Ozone (O₃) concentration is more pronounced in May in comparison to NO₂. The average concentration of O₃ exhibited a rising trend over the past three months, spanning March to May (Table 1, Fig. 3), a phenomenon likely attributed to extended sunshine durations and increase in average temperature.

Moreover, certain periods in May especially the period between 7th and 12th of May experienced a diminished O₃ concentration, which can be largely ascribed to low wind speeds, west winds and increased cloud coverage in that period (Fig. 4 and Fig. 8). The correlation between ozone concentration and factors such as wind speed, wind direction and cloud coverage remains perceptibly significant.

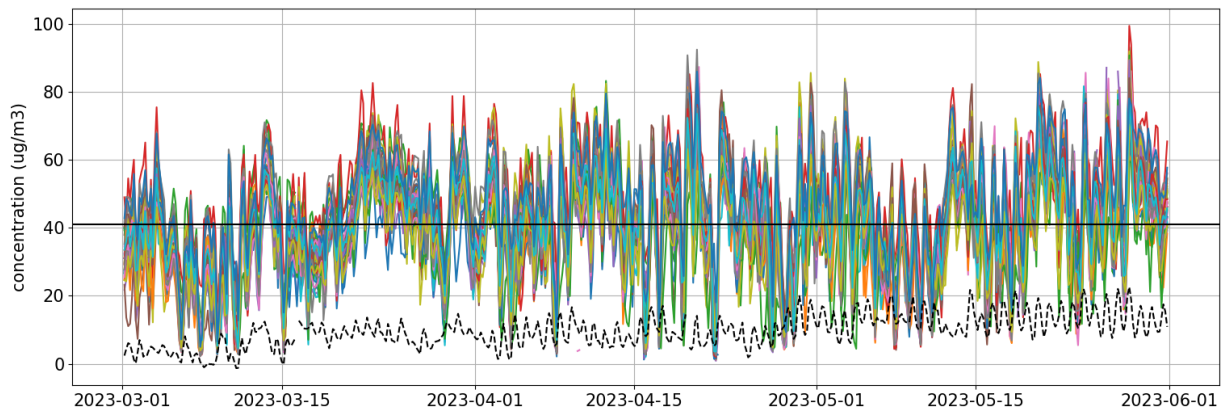


Fig. 3: O₃ 4h average in March - May.

The black horizontal line represents an average of AirNodes for that period.

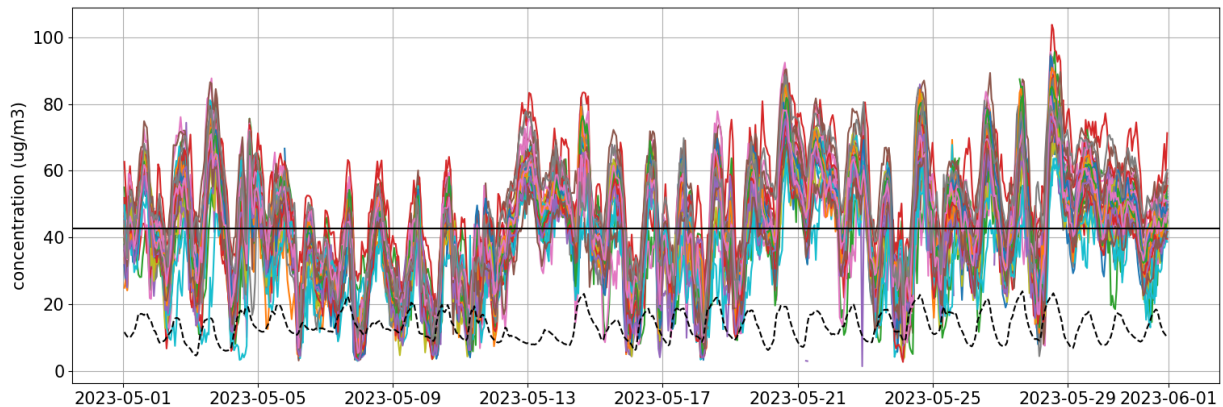


Fig. 4: O₃ hourly average in May.

The black horizontal line represents an average of AirNodes for March.

PM_{2.5}: Exploring Peaks and Unveiling Patterns

The PM_{2.5} dataset reveals a rise in concentrations, significantly exceeding the average, specifically observed over a few days in the first half of May (4th and 14th). Noteworthy was also the PM_{2.5} spike during the rail strike on 12th of May (Fig. 6).

On average, the PM_{2.5} concentration in May decreased compared to April and March (Table 1, Fig. 5). Additionally, localized spikes in pollution, unaligned with the broader trends, have been observed. Nodes situated in the southern region of Camden, specifically at High Holborn, experienced more frequent incidences of elevated PM pollution as noticed also in April.

Air Quality Index (AQI) levels in May saw a decrease in month over month readings.

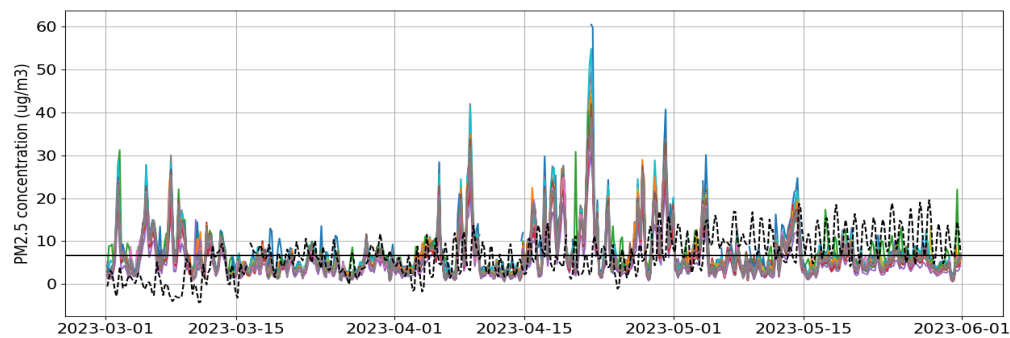


Fig. 5: PM_{2.5} 4h average in March-May.

The black horizontal line represents an average of AirNodes for that time period. The black dashed line represents temperature observed in the AirNode.

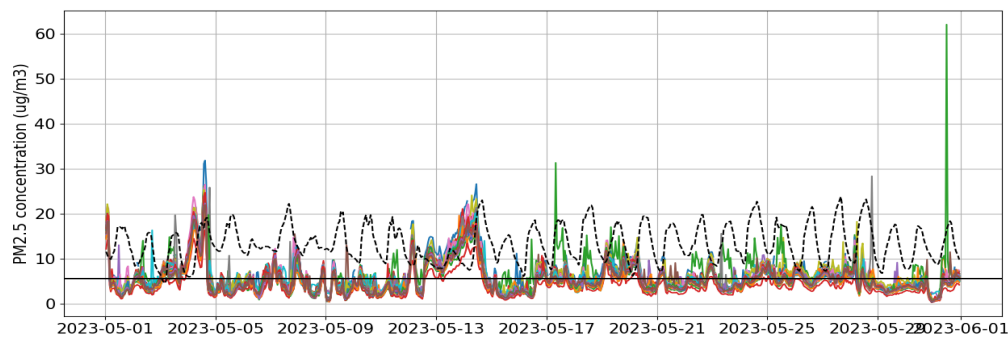


Fig. 6: PM_{2.5} hourly average in May.

The black horizontal line represents an average of AirNodes for that time period. The black dashed line represents temperature observed in the AirNode.

Summary

Our analysis provides valuable insights into pollution formation patterns and their correlations with weather conditions in Camden.

The **consistency in NO₂** with minor monthly fluctuations is worth noting, although the concentration levels occasionally exceed the World Health Organization's guidelines.

Ozone concentrations show a tendency to increase, likely due to longer periods of sunshine, higher average temperatures, and sunlight durations. The influence of wind speed, wind direction, and cloud coverage on O₃ concentration is significant.

In May, **specific peaks of PM_{2.5}** emissions were observed, notably on the day of the rail strikes. However, on average, the concentration decreased compared to previous months and remained lower than during the winter months, indicating a possible seasonal effect. Lastly, the Air Quality Index (**AQI**) **levels decreased** in month-over-month readings, indicating positive progress in overall air quality in May.

By examining the nuances and notable events within the data, we gain a better understanding of pollution patterns in Camden, making our efforts to combat air pollution more targeted and effective.

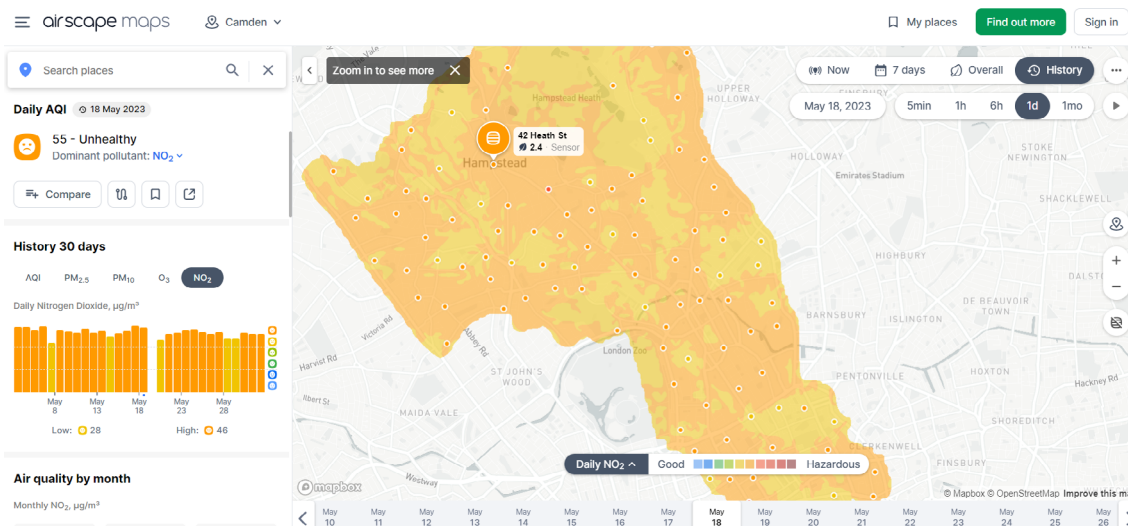


Fig. 7: PM_{2.5} one of the AirNodes on 18th May as seen on airscape.ai

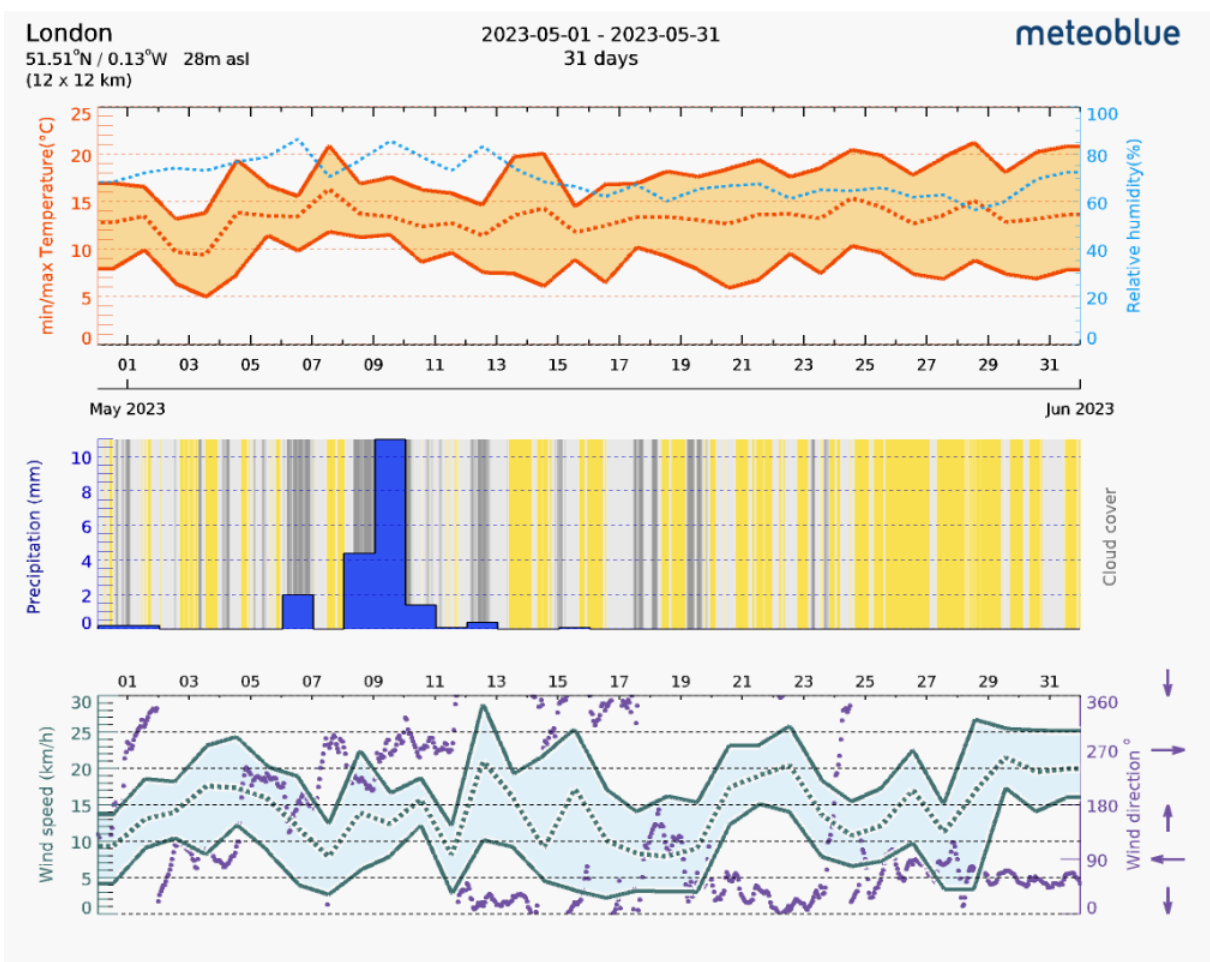


Fig. 8: Historical weather data from May 2023 (meteoblue.com)

Contact

Clare Crosley

Head of Operations and Customer Experience

clare.crosley@airscape.ai

07867 308055

support@airscape.ai

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