

Unveiling Particulate Matter Dynamics: Exploring Distance Effects and Environmental Implications

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INTRODUCTION

This research project explores the nuanced relationship between particulate matter (PM) concentrations and distance from pollution sources. Through rigorous data analysis and methodological precision, we aim to make the complex dynamics of PM dispersion and its implications for environmental health clear.

MATERIALS / METHODS

Our research utilizes the practical SPS30 sensor for PM measurements, targeting industrial, highway, and agricultural areas. Sessions record data at 5-meter intervals for 5 minutes, enabling short-term fluctuation detection. Weather conditions are documented concurrently. Statistical analysis of collected data will show trends, aiding comprehensive insights into PM dynamics.

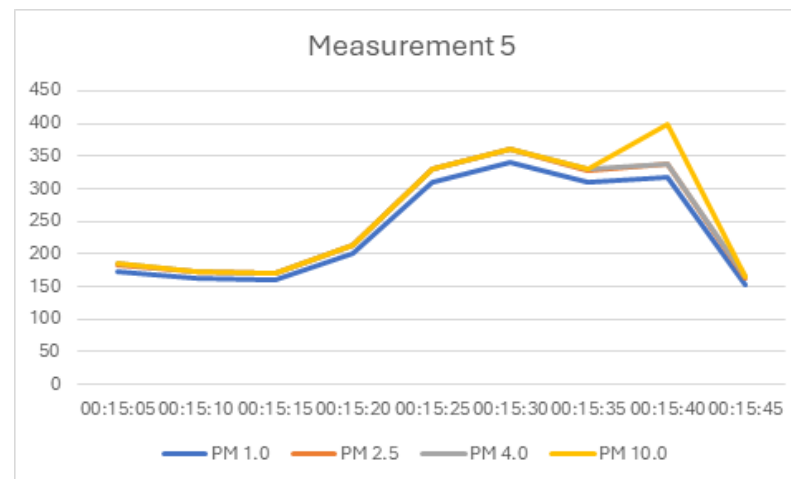
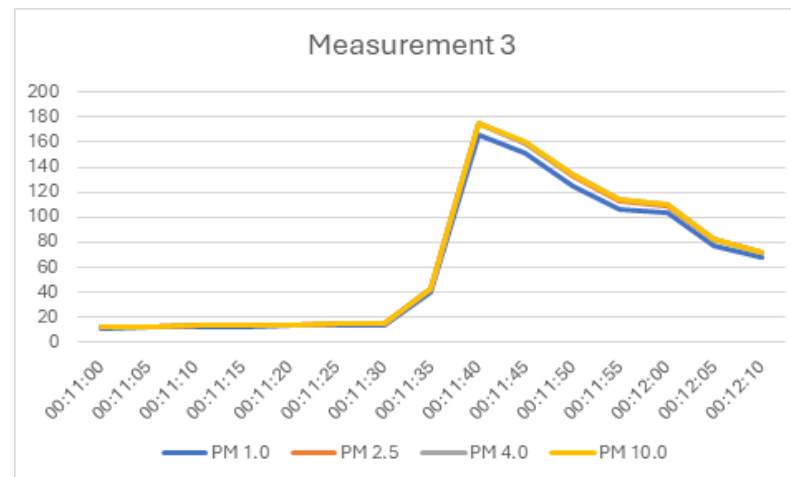
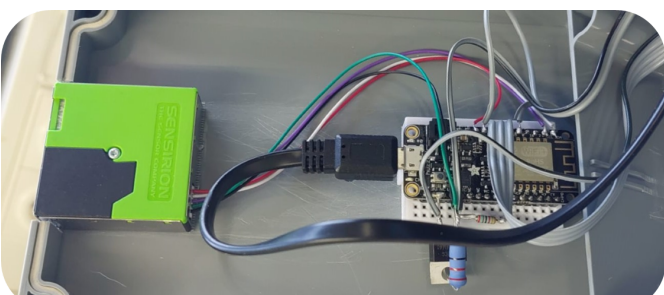


Chart explanation

In Measurement 3, a distinct spike in particulate matter (PM) concentrations occur at the same time with the ignition of fireworks. As we progressed towards the fireworks in Measurement 5, PM levels further escalated, demonstrating the direct influence of fireworks on air quality.

RESULTS OBSERVATIONS

In our study, we uncovered intriguing insights into particulate matter (PM) dynamics. We noticed a consistent pattern: when fireworks ignited nearby, PM levels surged, emphasizing their immediate impact. Moreover, as we moved closer to industrial zones and highways, PM concentrations exhibited a slight increase, indicating localized pollution sources. Interestingly, we observed variations in PM sizes, with PM10 dominating but PM1.0 and PM2.5 fluctuating. Environmental factors like wind speed and humidity also influenced PM levels, highlighting the interconnectedness of human activities and air quality.

CONCLUSION

Our study examines the influence of distance on particulate matter (PM) concentrations, revealing a modest decline with increasing distance from sources. The observed trend, supported by synchronized measurements, underscores the reliability of our findings and contributes to understanding air quality dynamics.

DISCUSSION

Validity concerns emerged as we grappled with the absence of repeated measurements, highlighting the need for methodological refinement. While our chosen sensors provided a level of reliability, we remained mindful of inherent uncertainties. Calibration variations and external factors underscored the importance of cautious interpretation. Looking forward, expanding sampling locations promises a deeper understanding of PM distribution. Diversifying research scope holds potential for comprehensive insights into air quality dynamics.

FURTHER RESEARCH

1. Agricultural Expansion: Extend research to farms to understand agricultural impacts on air quality.
2. Highway Analysis: Study air quality near highways to grasp their PM emissions impact.
3. Enhanced Sampling: Increase frequency to ensure reliable data collection.

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