

# Template for Scientific Paper in LaTeX

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November 16, 2024

## Abstract

This is a template for writing scientific papers in LaTeX. The abstract provides a concise summary of the research objectives, methods, results, and conclusions. It should not exceed 250 words.

## 1 Introduction

Polycyclic aromatic hydrocarbons (PAHs) are a group of organic compounds consisting of two or more fused aromatic rings. These compounds are primarily formed as byproducts of incomplete combustion processes, including fossil fuel combustion, industrial operations, vehicle emissions, and biomass burning [6]. PAHs are persistent in the environment due to their stable chemical structure and hydrophobic nature, making them highly prone to accumulation in atmospheric particulate matter, such as PM10 and PM2.5 [5].

The presence of PAHs in the atmosphere is of significant environmental and public health concern. Many PAHs are recognized for their mutagenic, teratogenic, and carcinogenic properties [3]. Benzo[a]pyrene, one of the most well-studied PAHs, has been classified as a Group 1 carcinogen by the International Agency for Research on Cancer (IARC) [2]. Chronic exposure to airborne PAHs is linked to an increased risk of respiratory diseases, cardiovascular disorders, and cancer, particularly in urban and industrial areas with high levels of particulate pollution [4].

PAHs undergo various atmospheric processes, including photochemical reactions, volatilization, and deposition. Their distribution and fate are influenced by meteorological factors such as temperature, wind patterns, and humidity, as well as by proximity to emission sources [1]. Understanding the spatial and temporal variability of PAHs in atmospheric particulate matter is critical for assessing their potential health impacts and for developing effective air quality management strategies.

This study aims to analyze the spatiotemporal distribution of PAHs in suspended particulate matter (PM10 and PM2.5) over a defined region and time frame. By integrating data on atmospheric PAH concentrations with meteorological parameters and source characteristics, the research seeks to provide insights into the dynamics of PAHs in the atmosphere and their implications for environmental health.

## 2 Materials and Methods

Provide a detailed description of the methods and materials used in the study. Include enough information to allow replication of the experiments.

### 2.1 Data Collection

Explain the data sources, sampling methods, and duration of data collection.

## 2.2 Data Analysis

Describe the statistical methods, tools, or software used to analyze the data.

## 3 Results

In this study, we analyzed the spatiotemporal distribution of polycyclic aromatic hydrocarbons (PAHs) in particulate matter. Below, we present the key findings through visual representations.

### 3.1 Histogram of Concentrations

The histograms in Figures ?? and ?? show the distribution of concentrations for PM10 and PAHs (WWA), respectively. These plots highlight the variability in pollutant concentrations across different measurements.

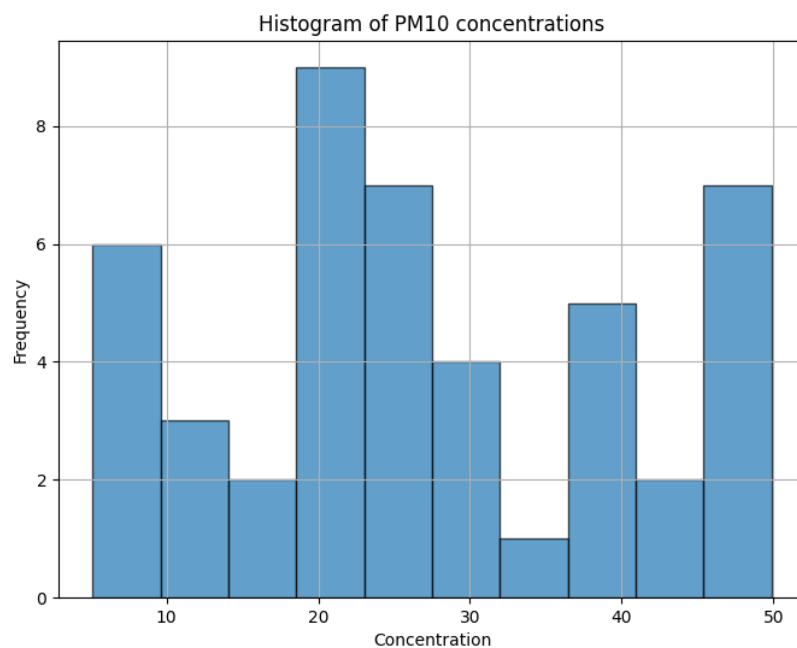


Figure 1: Histogram of PM10 concentrations.

### 3.2 Temporal Trends

Figure ?? presents the mean concentrations of pollutants over time. This time-series analysis reveals seasonal patterns and potential temporal variability in pollutant levels.

### 3.3 Summary

The visualizations indicate that the concentrations of pollutants exhibit significant variability, influenced by environmental conditions and sources of emissions. PM10 concentrations showed a wider range of distribution compared to PAHs, while temporal trends suggest a potential seasonal effect.

### 3.4 Statistical Analysis

Provide detailed results of the statistical tests conducted.

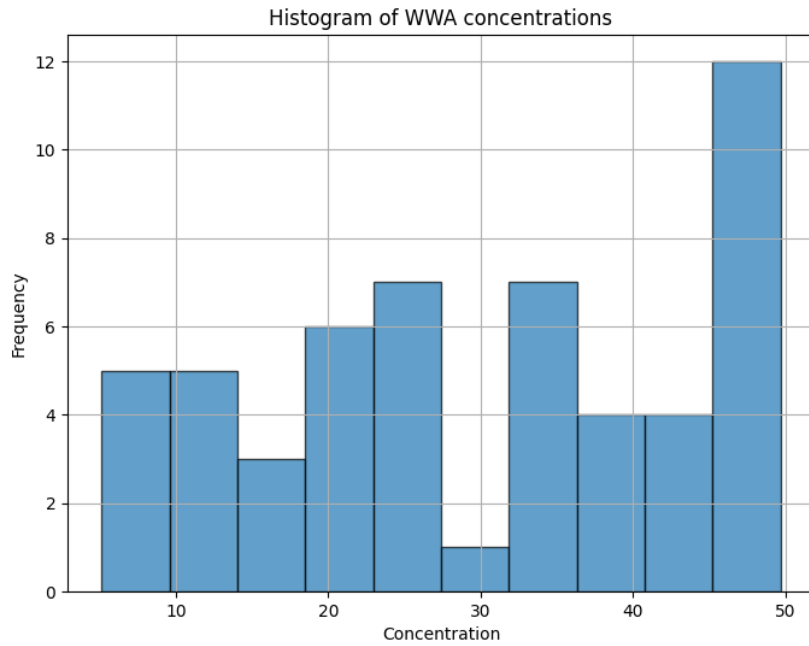


Figure 2: Histogram of PAH (WWA) concentrations.

## 4 Discussion

Discuss the significance of the results in the context of the objectives and previous research. Highlight the implications, limitations, and potential future work.

## 5 Conclusion

Summarize the key findings and their relevance. Provide a concluding statement.

## Acknowledgements

Acknowledge funding sources, collaborators, and other contributions.

## References

references

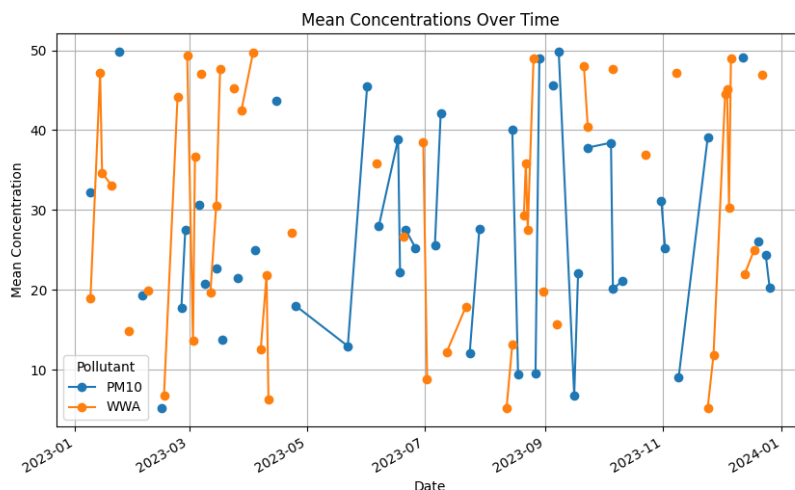


Figure 3: Mean concentrations of pollutants (PM10 and PAHs) over time.

## References

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