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CONTEMPORARY CHALLENGES IN AIR QUALITY MANAGEMENT
AND MONITORING IN ENVIRONMENTALLY VULNERABLE CITIES:
A CASE STUDY BASED ON YEREVAN DATA

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Air quality monitoring remains a significant challenge in developing countries, particularly in cities like Yerevan, the capital of Armenia. Located in the Ararat Valley, surrounded by mountains, and characterized by limited green spaces, Yerevan is particularly vulnerable to air pollution. The city faces high concentrations of airborne dust, along with fine particulate matter such as PM_{2.5} and PM₁₀, which have become key indicators of air quality. However, the available air quality data are often fragmented, incomplete, and inconsistent.

This study presents a comparative analysis of airborne dust data obtained from multiple monitoring platforms, including independent data sources. The data collected during the winter and summer periods of 2025–2026 were examined, with particular attention to the influence of climatic factors. The results show that Yerevan experiences high concentrations of total suspended particles (TSP), as well as PM_{2.5} and PM₁₀, especially during the winter months. Pollution levels worsen during winter due to thermal inversion conditions characteristic of the Ararat Valley, which contribute to the accumulation of suspended particles in the air. Furthermore, discrepancies between air quality indicators reported by different monitoring platforms for the same observation periods are evident. These inconsistencies are primarily attributed to significant gaps in monitoring systems and the absence of scientifically robust and standardized methodologies. The findings highlight the urgent need for coordinated and strategic approaches to improving air quality management in the city.

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