

The Visibility Test: How Particulate Matter Changes the Way We See Our City

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Abstract: Urban air pollution has a significant impact on public health and the visual quality of urban environments. Particulate matter (PM), particularly PM_{2.5} and PM₁₀, plays a major role in reducing atmospheric visibility through the scattering and absorption of light by aerosol particles. This study investigates how particulate pollution influences atmospheric visibility in an urban environment. Ground-based environmental monitoring data and satellite-derived aerosol observations were analyzed to examine the relationship between particulate matter concentrations and visibility degradation. The results demonstrate a strong inverse relationship between PM levels and atmospheric visibility, indicating that increased aerosol loading leads to significant reductions in visual clarity. The findings highlight that atmospheric visibility can serve as an effective indicator of urban air quality. Integrating visibility-based assessments with conventional air quality monitoring can support policymakers in developing strategies to reduce pollution and improve urban environmental conditions

Keywords: Particulate Matter (PM_{2.5}, PM₁₀), Urban Air Pollution, Atmospheric Visibility, Visibility Degradation, Urban Environment, Air Quality Monitoring