



Study the Diurnal and Seasonal Trends of Smog Particles

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Abstract

Smog particles are important components of atmospheric pollution and can significantly affect air quality, human health, and environmental conditions. Their concentration and characteristics vary throughout the day and across different seasons due to changes in emission sources, meteorological conditions, atmospheric chemistry, and pollutant dispersion. This study focuses on examining the diurnal and seasonal trends of smog particles and identifying the major factors responsible for their temporal variation. Diurnal patterns are influenced by traffic emissions, industrial activities, domestic combustion, solar radiation, temperature, wind speed, and atmospheric boundary-layer dynamics. Particle concentrations commonly change between morning, afternoon, evening, and nighttime periods as atmospheric mixing and emission intensity vary. Seasonal variations are associated with temperature, humidity, rainfall, wind patterns, and changes in anthropogenic activities. Winter conditions may promote the accumulation of particulate matter because of temperature inversions and reduced atmospheric dispersion, while rainfall during the monsoon season can remove particles through wet deposition. Summer conditions may enhance atmospheric mixing but can also contribute to the formation and transport of secondary particles under favourable conditions. Understanding these temporal trends is essential for assessing pollution episodes, identifying major emission periods, and developing effective air-quality management strategies. Continuous monitoring and analysis of particulate concentrations alongside meteorological parameters can provide valuable information for pollution forecasting and public-health protection. The study highlights the importance of understanding both short-term and seasonal variability in smog particles for sustainable urban environmental management.

Keywords: Smog particles, particulate matter, diurnal variation, seasonal variation, air pollution, atmospheric conditions, meteorology, air quality, pollution monitoring, environmental health.