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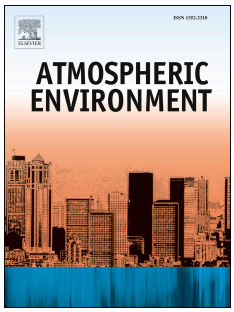

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Aerosol radiative effect in UV, VIS, NIR, and SW spectra under haze and high-humidity urban conditions

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Abstract

Aerosol properties derived from sun-photometric observations at Wuhan during a haze period were analyzed and used as input in a radiative transfer model to calculate the aerosol radiative effect (ARE) in ultraviolet (UV), visible (VIS), near-infrared (NIR), and shortwave (SW) spectra. The results showed that the aerosol optical depth (AOD) at 440 nm increased from 0.32 under clear-air conditions to 0.85 during common haze and 1.39 during severe haze. An unusual inverse relationship was found between the Ångström exponent (AE) and AOD during the haze period at Wuhan. Under high-humidity conditions, the fine-mode median radius of aerosols increased from 0.113 μm to approximately 0.2–0.5 μm as a result of hygroscopic growth, which