

Retrieval of aerosol properties over several metropolitan regions in China from total intensity and polarization

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In order to monitor and better understand the high aerosol loading over several metropolitan regions in China, aerosol optical and micro-physical properties were retrieved from PARASOL (Polarization and Anisotropy of Reflectances for Atmospheric Science coupled with Observations from a Lidar) observations of total intensity and polarization. An extended version of the Look Up Table (LUT) aerosol retrieval algorithm was used to derive aerosol properties including aerosol optical depth, fine mode weighting, single scattering albedo, size parameters and refractive index. Instead of using the surface reflectance model, the assumption of spectral reflectance shape invariance principle was used to separate the total radiance contribution of surface and aerosols. Case studies have been conducted in Beijing and evaluated using the coincident AERONET (Aerosol Robotic Network) measurements. The results indicated a significant agreement with a correlation coefficient of 0.913 and a Gfrac (fraction of accurate retrievals) of 78%. Aerosol properties were retrieved and compared over several metropolitan areas in China with relatively high aerosol loading, including Beijing-Tianjin-Hebei Metropolitan Region, the Pearl River Delta economic circle and the Yangtze River Delta economic circle.