

# Optical Properties of Atmospheric Aerosols Observed by means of Ground Instruments and Satellite Sensor

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A novel monitoring technique of several aerosol optical properties has been implemented by concurrent observations using ground-based instruments and satellite sensor. Using lidar systems (plan position indicator and slant path), ground-sampling instruments (nephelometer, aethalometer, optical particle counter), and a sunphotometer at the time of satellite overpass. The ground-based measurements are made satellite images in the visible band from both Landsat-8 and Himawari-8 are analyzed to extract the aerosol as well as surface information. The main purpose of these concurrent monitoring is retrieving aerosol extinction coefficient and carrying out radiative transfer calculation in the atmosphere. The extinction coefficient in boundary-layer is derived from ground sampling instruments. Both spatial and temporal distributions of extinction coefficient are obtained from the analysis of lidar data using Fernald method where values of aerosol lidar ratios are retrieved from Mie scattering calculation. On the other hand, the radiance and transmittance of both Landsat-8 and Himawari-8 are computed using the MODTRAN (MODerate resolution atmospheric TRANsmission) radiative transfer code. The essential input parameters include aerosol optical thickness (AOT), surface reflectance, solar zenith angle, and solar azimuth angle. The result showed us inter-correlation between surface and space observation. The lowest the extinction coefficient and aerosol optical thickness, the higher the apparent and surface reflectance, and vice versa.

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