

Aerosol Index (AI)

Aerosol index (AI), also referred to as the ultraviolet aerosol index, is one of the important parameters of aerosols representing the relative dominance of absorbing or scattering type of aerosols in the atmosphere. Positive values of AI indicate an atmosphere laden with predominantly absorbing type of aerosols (like dust, black carbon, etc.) and negative values indicate an atmosphere having dominance of scattering type of aerosols (e.g., sulfate). Higher positive (negative) value of AI represents stronger absorption (scattering) and vice versa. AI is estimated by separating the spectral difference of radiances due to aerosol effects at two wavelengths in the near-ultraviolet region. It is a promising index for tracking aerosol plumes from dust, volcanic ash, and biomass burning.

Aerosol Index (AI) from TROPOMI

TROPOMI (TROPOspheric Monitoring instrument) is a nadir-viewing spectrometer (ultraviolet, visible and shortwave infrared) onboard polar-orbiting ESA's Sentinel-5 Precursor satellite with high-spatial resolution of $3.5\text{ km} \times 5.5\text{ km}$ (across x along track for ultraviolet band), swath of $\sim 2600\text{ km}$ and equator crossing time $\sim 13:30$ local time. TROPOMI retrieves AI using ratio of three different pair of ultraviolet wavelengths (nm): 335/367, 340/380 and 354/388. Level-2 near-real time (NRTI) aerosol index (using 354 and 388 nm wavelengths) is spatially averaged to uniform $10\text{ km} \times 10\text{ km}$ grids for quality assurance of 0.5 and 0.75. Spatial averaging is carried out by $\sum (a_i \times y_i) / \sum a_i$; where a_i =area of i^{th} pixel and y_i = aerosol index over i^{th} pixel.