# An observational study of aerosol extinction efficiency and its spectral dependence from the retrieve direct solar radiation

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The intensity of direct solar radiation at ground level was measured with the help of multi wavelength solar radiometer at the tropical urban station Pune University (18.53 N Latitude, 73.85 E Longitude, 559 m AMSL) during Dec 99 - May 2001. Observation was done at nine spectral channels between 400 nm and 1020 nm; each equipped with narrow bandwidth interference filters. The attenuation of solar radiation at the observed spectral regions was caused by scattering and absorption by air molecules, ozone and aerosols. The Aerosol extinction coefficient was calculated by using the Bouguer-Lambert law. The magnitude of the extinction coefficients depends on turbidity at the different observed filters. If the aerosol size distributions are known, extinction coefficient can be calculated from the Mie theory and consequently the extinction efficiency is obtained. Theoretically extinction efficiency was evaluated for a given refractive index. It is found that particles with a radius between 100 nm and 546 nm are more efficient at 450 - 546 nm. The efficiency is more towards the shorter wavelengths than the longer wavelengths at the observed spectral ranges. For supporting the theoretical results, frequency distribution of aerosol extinction coefficient have been obtained from the data taken during 1999 - 2001. It was found that peak values of the Gaussian type distribution were shifted to the shorter wavelengths (450 -546 nm) from the longer wavelengths (750 - 1020 nm) regions of the observed interference filters. It indicates that higher extinction was obtained at the shorter wavelengths more efficiently. The more analysis parts of the results are discussed in the paper.