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Characteristics of Aerosol Optical Depth and Ångström Parameters over Mohal in the Kullu Valley of Northwest Himalayan Region, India

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Abstract

The measurements using a ground based multi wavelength radiometer (MWR) at Mohal (31°54′N, 77°07′E, 1154 m AMSL) in the Kullu valley of Northwestern Himalayan region show that the spectral aerosol optical depth (AOD) and turbidity coefficient, β, are high in summer, moderate in monsoon season, low in winter and lowest in autumn, while wavelength exponent, α, has an opposite trend. Average annual value of AOD at 500 nm is 0.24±0.01, 0.43±0.02, and 0.28±0.02; that of β is 0.14±0.01, 0.22±0.02, and 0.17±0.03; and that of α is 1.06±0.09, 1.16±0.10, and 0.86±0.13, respectively, for clear, hazy and partially clear sky days. The considerably greater value of β on hazy days indicates more coarse particles in mountain haze. The fractional asymmetry factor (AF) is more negative in summer and autumn months. The AOD and β have significantly positive correlation with temperature and wind speed, suggesting high AODs and turbidity on hot and windy days.

Key words: aerosol optical depth, multi-wavelength radiometer, fractional asymmetry factor, straight line correlation.