

Skynet-India: Preliminary results from Skyradiometer network of India

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Abstract

Tropospheric aerosols have a short lifetime; as a result they have high degree of variability in both space and time in their composition, number and size distribution. The geography of India is quite diverse, with everything from mountains, deserts and rainforests. For a good assessment of aerosol characteristics such measurements have to be performed frequently in locations with different aerosol types and in varying meteorological conditions in automatic mode. In order to examine aerosol impact on the local and global climate in addition to understanding and modeling the impact of aerosol on radiation budget and precipitation efficiency, India Meteorological Department has established a network of sun-skyradiometer consisting of twelve stations located in different geographic regions and named as Skynet-India. The sun-skyradiometer POM-02 acquires direct solar spectral irradiance and circum-solar radiance distribution within a 1° full field-of-view at eleven bands of 315, 340, 380, 400, 500, 670, 870, 940, 1225, 1600, and 2200 nm at every 10 minute. This paper presents the preliminary results from Skynet-India Network. The main properties of the aerosols which are being monitored from this network and important for climate studies are; Aerosol Optical Depth, Angstrom Exponent, Size Distribution of the aerosols, Scattering Phase Function, Single Scattering Albedo and Refractive Indices etc. Ranichauri is a high altitude background site with AOT as low as 0.03 on clear sky days. The Aerosol content is two to three orders lower as compared to Delhi. Single Scattering Albedo is more than 0.9 in all seasons as compared to Delhi where it is found to vary between 0.7 – 0.85. Rohtak is close to Delhi but the AOT is significantly lower and SSA higher as compared to Delhi. Jodhpur is located in desert area and shows significant variability in AOT, highest being during summer and lowest during rainy season. Guwahati is mostly affected by cloudy conditions but during clear sky conditions AOT as low as 0.1 is observed. Port Blair is an island station in the Bay of Bengal, Visakapatnam and Thiruvananthapuram are coastal stations and are dominated by sea salt aerosol as seen from the size distribution. Pune is located on leeward side of Western Ghats and relatively clean city with AOT values as low as 0.09 during clear sky days.