Aerosol single scattering albedo comparison between SKYNET and AERONET

*Pradeep Khatri[1], Hitoshi Irie[1], Tamio Takamura[1]

1.Center for Environmental Remote Sensing, Chiba University

SKYNET and AERONET are two aerosol observing networks in the world. Though aerosol optical thickness (AOT) between them are reported to agree fairly well, their aerosol single scattering albedo (SSA) values have some difference. To explore the reasons behind inconsistent SSA between SKYNET and AERONET, we analyzed collocated observation data of SKYNET and AERONET of four sites, Chiba (Japan), Pune (India), Valencia (Spain), and Seoul (Korea). SKYNET and AERONET algorithms are found to produce nearly same SSAs for similarity in input data, suggesting that SSA differences between them are primarily due to quality of input data due to different calibration and/or observation protocols as well as difference in quality assurance criteria. The most plausible reason for systematically overestimated SKYNET SSAs is found to be underestimated calibration constant for sky radiances determined from the disk scan method in SKYNET, though the disk scan method is noted to produce stable wavelength dependent values in comparison to those determined from the integrating sphere used by AERONET. Aerosol optical thickness (AOT) difference between them can be the next important factor for their SSA difference, if AOTs between them are not consistent. Difference in surface albedos between SKYNET and AERONET while analyzing data can also bring SSA difference between them, but the effect of surface albedo is secondary. The aerosol non-sphericity effect is found to be less important for SSA difference between these two networks.

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