

Study of aerosols and clouds using sky radiometer of SKYNET

*Pradeep Khatri¹, Hitoshi Irie¹, Tamio Takamura¹

1.Center for Environmental Remote Sensing, Chiba University

Long-term observations of aerosol characteristics over four typical SKYNET sites (Chiba, Fukuejima, Miyakojima, and Hedo) within Japan are analyzed to clarify the seasonal dependent characteristics of aerosols of different origins and their impacts on atmospheric heat budget. We found optically thicker aerosols with significant amount of light absorbing coarse-mode particles in the spring season. Such light-absorption phenomenon of coarse-mode aerosols is found to be the effect of not only mixed light-absorbing aerosols such as black-carbon, but also due to the effect of aerosol size. The aerosol radiative forcings at the surface and top of the atmosphere in the spring season can be roughly two times of the values in the winter season. We further present our new retrieval method of cloud parameters from sky radiometer of SKYNET, and discuss the optical characteristics of clouds obtained from the sky radiometer of SKYNET and Moderate Resolution Imaging Spectroradiometer (MODIS). Our analysis suggests that MODIS cloud optical depth (COD) may be underestimated, which in turn may lead to overestimate calculated shortwave flux.

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