

Synergistic use of the geostationary and the polar orbit satellites for surveying the cloud evolution process: plan

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The use of spaceborne radar and imager aboard the CloudSat, Aqua, EarthCARE, GCOM-C1, and the 3rd generation geostationary satellites for investigating cloud evolution process, is suggested. These satellites have been in orbit or will be launched in the middle of 2010-era and contribute for observing aerosols, clouds on the earth system. Since aerosols and clouds exert an important influence on the planet water and energy balances, more understanding of their lifecycle is required. Optical thickness and particle size of clouds are primal information for estimating the cloud evolution process. These parameters are retrieved from multi-spectral imageries obtained from space-borne satellite sensors. Recently, active sensors, such as the CloudSat cloud profiling radar (CPR) and the CALIPSO Lidar present a new epoch of aerosol and cloud observation with the purpose of revealing transition of particles, from cloud condensation nuclei to rain droplets via cloud and drizzle particles. They observe vertical cross section of the cloud system along the satellite footprint. As follow on the CloudSat / CALIPSO, the EarthCARE that has both active and passive sensors is planed by JAXA, NICT, and ESA collaboration. Doppler capability of the EarthCARE CPR will reveals vertical motion of cloud particles. Moreover, the 3rd generation geostationary weather satellite will appear in 2015 and observe aerosol and cloud system in every 10 or 2.5 minutes. Therefore, it is expected that the combined use of polar orbital passive/active sensors and geostationary satellites reveal details of cloud evolution process, statistically and dynamically. In this presentation, we introduce recent progresses of aerosol and cloud observations from satellites, showing the multi-sensor views of cloud growth process obtained from an active radar (CPR) and a passive imager (MODIS).

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