Quality assessment of SGLI/GCOM-C observed cloud properties using surface observation data

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Along with the advancement of satellite remote sensing, scientific community has made a significant progress in understanding the Earth’ s atmosphere and climate system. Though satellite observations from space have large spatial coverage, their accuracy is a great concern to research community; thus, quality assessment of satellite products has become a very important issue in recent years. Like several other satellite observed atmospheric components, cloud products from satellite observations need to be validated thoroughly by using reliable surface observation data. As part of it, we developed a new cloud retrieval algorithm applicable for sky radiometer and sun photometer instruments belonging to SKYNET and AERONET ground-based networks, and performed quality assessment of daytime MODIS and AHI observed water cloud properties in the past. This study deals with quality assessment of the Second-generation Global Imager (SGLI) aboard the Global Change Observation Mission-Climate (GCOM-C, “Shikisai” in Japanese), which was launched on December 23, 2017.The daytime cloud properties (Cloud optical thickness COT and cloud-particle effective radius CER) of both water and ice clouds are compared with those observed at surface by sky radiometer at five typical SKYNET observation sites within Japan for a period of January, 2018 to October, 2019. The surface observed global flux data are also used separately to understand the quality of SGLI observed CODs and cross check the comparison between sky radiometer and SGLI CODs. Like MODIS and AHI daytime CODs, SGLI daytime CODs are found to be overestimated (underestimated) for thin (thick) clouds for a majority of samples. This indicates that reflectance based COD observation from space can have this common feature, irrespective of sensor type. Further, CERs between satellite and surface observations are poorly correlated, and the large difference can occur for optically thin clouds rather than optically thick clouds.

Keywords: SGLI, cloud, validation

