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A preliminary analysis for the estimation of aerosol properties from new polarization imager SGLI on GCOM–C

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A new polarization imager, which is called second generation global imager (SGLI) on Japanese satellite, global change observation mission-climate (GCOM–C), has been successfully launched on 23rd December 2017. The SGLI has 19 observing channels from 380 nm to 12 μm. Two of those channels, 674 and 869 nm, are designed to measure semi-Stokes components (I, Q, and U) based on three different polarized filters, i.e., 0–60–120 degrees. Note that the polarization telescope is positioned forward or backward at 45 degrees of along satellite orbit. The IFOV of polarized channels is 1 km x 1 km in usual operation (45° fore/aft). The direction is selected based on the degree of scattering angle (Θ). The measurements are taken around middle scattering angle region ($\sim 90^\circ < \Theta <\sim 130^\circ$) in usual operation in order to avoid the water cloud contamination effect ($\sim 140^\circ$) also small polarization signal around backward region ($\sim 150^\circ < \Theta$). These forward/backward angles are equivalent to edge of CCD measurements of previous polarization imagers (POLDER–1, –2, and –3). The IFOV of POLDER around edge is quite large (over 10 km^2), but the SGLI provides much finer resolution. The IFOV for measuring visible and near IR optics, which is nadir direction sensor (like the MODIS's), give 250 m resolution information.

The SGLI is not fully functional operation until April of 2018. However, this work intends to retrieve the aerosol information, i.e., aerosol optical thickness (AOT), size index of particles, and single scattering albedo derived from the first lights of SGLI measurements based on combined use of the polarization measurements of 674 and 869 nm as well as total radiance at 443 nm. Finally, the retrieved AOT measurements will be compared with AERONET measurements.