

Detection of dense biomass burning area and the particle properties from GCOM-C/SGLI measurements

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Detecting and tracking of absorbing aerosols due to severe biomass burning plumes are important to understand of transportation of black carbons especially in the region from middle latitude to arctic, because large forest fire events happen in the tropical zone in usual. However, retrieved results of dense aerosol areas are not usually involved in the standard satellite aerosol products due to the upper limit of look up table and/or classified into clouds. This work intends to detect dense absorbing aerosols with very simple approach and retrieve the particle properties based on the measurements of new Japanese mission GCOM-C/SGLI.

The GCOM-C (Global Change Observation Mission – Climate) satellite was launched in late December of 2017. The GCOM-C carries SGLI (Second Generation Global Imager) to collect the physical variables of atmosphere, land and ocean. Some characteristics of the SGLI among current operational sensors are fine resolution (250 m) from near UV to near IR wavelengths. It should be also noted that polarization information is available with 1 km resolution. The POLDER series provided very useful information on aerosol from polarization channels, but with coarse resolution ($6 \times 7 \text{ km}^2$).

An algorithm to detect strong absorbing aerosols is based on the difference between light absorption behavior at near UV wavelength and that at blue one. A ratio of reflectance at 412 nm to that at 380 nm (called absorbing aerosol index; AAI) suggests the existing of absorbing particles, e.g., biomass burning plumes, desert dusts, and so on. This work also uses dust detection index (DDI; $R(1630 \text{ nm}) / R(380 \text{ nm})$), to distinguish dust particles from biomass burning aerosols. Next, we retrieve the particle properties from both reflectance and polarimetric measurements. The semi-infinite atmosphere model, which can provide the reflectance over the high AOT area, is adopted for estimating size and complex refractive index over very dense aerosol region.

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