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Elucidation of the aerosol plume by integrated use of polarization and multi-channel observations, a feature of Japanese mission GCOM-C/SGLI

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The Japanese space mission JAXA/GCOM (Global Change Observation Mission-Climate)-C (SHIKISAI in Japanese) launched in December 2017 carried a second-generation global imager (SGLI) [1]. The GCOM-C/SGLI has already passed its design life of 5 years, but is continuing to acquire observation data. The SGLI contains 19 channels from near-UV to thermal infrared (IR), including red (674 nm named PL1 band) and near-IR (869 nm; PL2 band) polarization channels. The instantaneous field-of-view (IFOV) of the SGLI is as fine as 250 m from the near-UV to short-IR wavelength range and 1 km for the polarization measurements. Note that this polarization measurement is at the best spatial resolution obtained to date at the global, multi-year scale. We have been engaged in the analysis of biomass burning aerosol (BBA) events from wildfires using the advanced measurement capabilities of SGLI [2, 3]. Large scale wildfires now frequently occur around the world. Consequently, large amounts of BBA have been released into the atmosphere. The BBA generated by wildfires can have long-range advection. While such long-range transport depends predominantly on the meteorological field, there are also reports of heat-driven flows affecting pollutant flows as a characteristic of mountain weather and climate. Therefore, topographic effects and meteorological information are essential to understand the advection of BBA generated by forest fires. The objective of this study is to better understand the severe BBA (SBBA) events through the integration of space-borne and ground-based measurements as well as the regional meteorological model. In order to reproduce the relevant meteorological field at a regional scale, the Scalable Computing for Advanced Library and Environment (SCALE) regional model is adopted in this study [4]. The SCALE regional model is used to reveal the altitude distribution of BBA particles obtained from this SGLI's simultaneous observations while taking into account the local topographic changes and meteorological conditions such as wind field variations [3]. Furthermore, the SBBA events provide information not only on the behavior of BBA aerosol properties but also on cloud-processed aerosols or cloud-aerosol mixing zones [5].

Keywords: retrieval algorithm, aerosol, polarization, regional model

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