



## **Feasibility study for GCOM-C/SGLI: Retrieval algorithms for carbonaceous aerosols**

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The Japan Aerospace Exploration Agency (JAXA) has been developing the new Earth observing system, GCOM (Global Change Observation Mission) project, which consists of two satellite series of GCOM-W1 and GCOM-C1. The 1st GCOM-C satellite will board the SGLI (second generation global imager) which also includes polarimetric sensor and be planed to launch in early of 2017. The SGLI has multi (19)-channels including near UV channel (380 nm) and two polarization channels at red and near-infrared wavelengths of 670 and 870 nm. EUMETSAT plans to collect polarization measurements with a POLDER follow on 3MI / EPS-SG in 2021. Then the efficient retrieval algorithms for aerosol and/or cloud based on the combination use of radiance and polarization are strongly expected.

This work focuses on serious biomass burning episodes in East Asia. It is noted that the near UV measurements are available for detection of the carbonaceous aerosols. The biomass burning aerosols (BBA) generated by forest fire and/or agriculture biomass burning have influenced on the severe air pollutions. It is known that the forest fire increases due to global warming and a climate change, and has influences on them vice versa. It is well known that this negative cycle decreases the quality of global environment and human health.

We intend to consider not only retrieval algorithms of remote sensing for severe air pollutions but also detection and/or distinction of aerosols and clouds, because mixture of aerosols and clouds are often occurred in the severe air pollutions. Then precise distinction of aerosols and clouds, namely aerosols in cloudy scenes and/or clouds in heavy aerosol episode, is desired. Aerosol retrieval in the hazy atmosphere has been achieved based on radiation simulation method of successive order of scattering<sup>1,2</sup>.

In this work, we use both radiance and polarization measurements observed by GLI and POLDER-2 on Japanese ADEOS-2 satellite in 2003 as a simulated data. As a result the possibility of GCOM-C1 / SGLI related to remote sensing for aerosols and/or clouds can be examined.

[1] Mukai, S., M. Yasumoto and M. Nakata, 2014: Estimation of biomass burning influence on air pollution around Beijing from an aerosol retrieval model. *The Scientific World Journal*, Article ID 649648.

[2] Mukai, S., M. Nakata, M. Yasumoto, I. Sano and A. Kokhanovsky, 2015: A study of aerosol pollution episode due to agriculture biomass burning in the east-central China using satellite data, *Front. Environ. Sci.*, 3:57, doi: 10.3389/fenvs.2015.00057.