軌道上でのGCOM-C/SGLI偏光感度評価
Preliminary results of on-orbit estimation for polarization sensitivity of GCOM-C/SGLI

*宮崎 理紗[1]、村上 浩[1]、堀 雅裕[1]
*Risa Miyazaki[1], Hiroshi Murakami[1], Masahiro Hori[1]

1. 宇宙航空研究開発機構
1. Japan Aerospace Exploration Agency

The GCOM-C has been launched successfully on 23th Dec. 2017 from the Tanegashima Space Center by H-IIA vehicle No.37. After the initial calibration/validation phase of one year after launch, all SGLI standard products have been released from JAXA’s data providing service (G-Portal) from Dec. 20, 2018.

In generally, the radiance reflected by the sea surface and the atmosphere is strongly polarized. When observing a large polarized light, the output radiance vary from the actual radiance because of the polarization sensitivity characteristic of the optical sensor. Especially for ocean color products, it is important to evaluate the effect of polarization sensitivity because it is necessary to extract the weak water-leaving reflectance (<10% of the whole) by the accurate atmospheric correction.
The polarization sensitivity of GCOM-C/SGLI of each NP (Non-Polarization) band has been measured in the pre-launch ground test. The ground test results of polarization sensitivity were shown to be <3.5% on average in the pixel direction in all bands. In this study, we evaluate whether the polarization sensitivity estimated from on-orbit observation data is consistent with the pre-launch test results. In this work, we report on the RED bands (VN07, VN08) and the NIR bands (VN10, VN11) of SGLI.
Polarization sensitivity on-orbit was evaluated based on Gordon and Zhang (1997) and Meister et al. (2005). We use the observation data by SGLI/PL (Polarization) band to estimate the real stokes vector components at the top of atmosphere (TOA). In order to obtain the polarization sensitivity with respect to directly observed radiance at TOA, L1B before inter-pixel sensitivity correction and before inter-telescope sensitivity correction was self-made from L1A data.
We analyzed the observation data of 12 path that PL band is observed nadir direction. The characteristics of the instrument for polarization sensitivity (polarization factor) were estimated by the least squares method. On the east side of the observation image, the error is large because of Sun-Glint. Although the variation in the pixel direction was still large, the estimated polarization factors (3 to 5 %) were consisted with the prelaunch ground test (~ 3.5%). However, sensitivity patterns in the pixel direction could not be identified, so we will continue to improve the evaluation in the future.

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