GCOM-C/SGLI VNR-PL degradation correction

Feb. 2021

Introduction

- GCOM-C/SGLI sensor sensitivity degradations are monitored by on-orbit calibrations (lunar calibration, solar diffuser calibration and internal light source calibration).

- Sensor sensitivity degradation corrections are applied to GCOM-C / SGLI Level 1B products as shown in the below table.
  - ✓ These corrections are applied to Level 1B(Ver.2) products of VNR-NP and IRS-SWIR.
  - ✓ Since the corrections aren't applied in Level 1B of VNR-PL, the correction method are shown in this document.

Table.1 Sensitivity degradation correction of GCOM-C/SGLI Level 1B product

Level1B Ver. \ Sensor	VNR-NP	VNR-PL	IRS-SWIR	IRS-TIR
Ver.1	Not applied	Not applied	Not applied	NA*2
Ver.2	applied[1]	Not applied	applied[1]	NA*2

*1 Refer[1] https://suzaku.eorc.jaxa.jp/GCOM_C/resources/files/17a_TaichiroHashiguchi_GCOM-C_SGLI_201117.pdf

*2 For the thermal infrared channel, every two-point calibration is automatic corrected for each scanning using the data obtained by observing the black body (high temperature calibration source) and deep space (low temperature calibration source).

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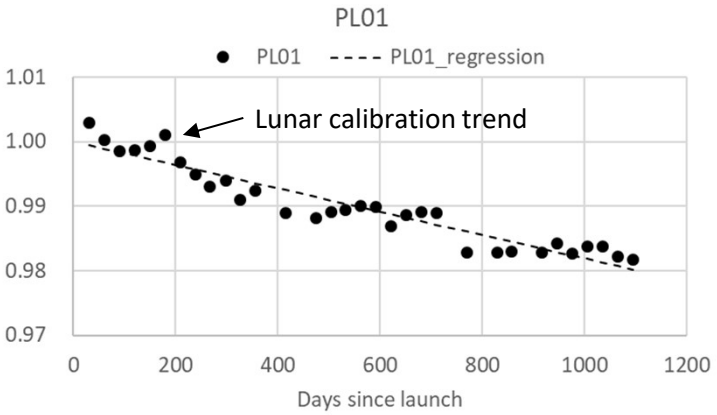
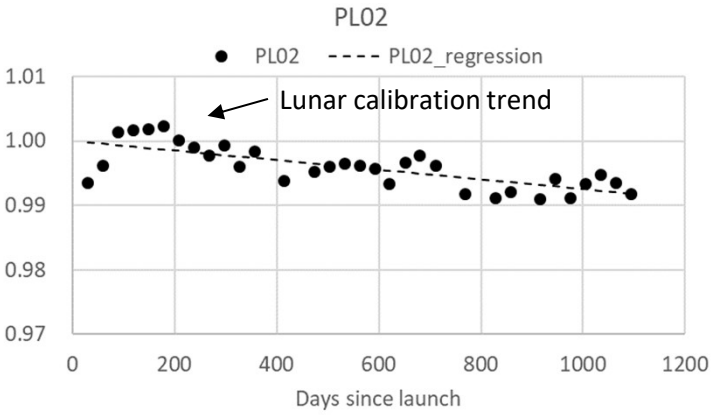
VNR-PL degradation correction

- VNR-PL sensor degradation factors α were derived from the lunar calibration trend[1].

Refer[1] https://suzaku.eorc.jaxa.jp/GCOM_C/resources/files/17a_TaichiroHashiguchi_GCOM-C_SGLI_201117.pdf

- VNR-PL degradation correction radiance value (L_{corr}) are corrected for the radiance values(L_{L1B}) of the VNR-PL L1B product using α and the observation date t.





	PL01	PL02
α [1/day]	-1.810E-05	-7.464E-06

$$L_{corr} = \Delta G_{degr\_n} \cdot L_{L1B}$$

$$\Delta G_{degr\_n} = \frac{1}{\{1 + \alpha \cdot (t - t_s)\}}$$

α: VNR-PL sensor degradation factors
t_s: 1st Jan, 2018
t: the observation date
L_{L1B}: the radiance values of L1B
L_{corr}: the corrected radiance values