

Status, new Products, and Role of GOSAT after more than twelve years in space

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TANSO-FTS onboard GOSAT has been providing radiance spectra of both solar reflected light with two linear polarizations and thermal emissions, simultaneously orbit since in January 2009. We will present the following topics.

(1) GOSAT on orbit status and operation

GOSAT have enough fuels to maintain the orbit position for another decade and 4 batteries are healthy enough to operate both TANSO-FTS and CAI even though both rotation of the two solar paddles has been stopped since 2018.

(2) Level 1 products

Since the major version up of V200 in 2015, updates in V210, V220, V230 and V230.231 are modification for collections of polarizations and nonlinearity and calibration. The most recent version V230.231 has updated the polarization corrections in the CO<sub>2</sub> band for forward viewing scenes. Now AIRS-GOSAT matchups show agreement from nadir to slant viewing case in all the TIR range over 12 years.

(3) EORC Research Level 2 products

The EORC L2 algorithm retrieve partial column density of lower and upper tropospheric CO<sub>2</sub> and CH<sub>4</sub>, which are roughly 0-4 km and 4-12 km, respectively, from simultaneously measured solar reflected light and thermal emission spectra. 12-year dataset will be available from <https://www.eorc.jaxa.jp/GOSAT/GPCG/download/GOSAT/> using V230.231

(4) Intercomparison between GOSAT, GOSAT-2, OCO-2, OCO-3 and TROPOMI

On June 26, 2020, 5 instruments acquired the radiance spectra over the calibration site of Railroad Valley, NV U.S.A. We confirmed the spectral radiances agree well within measurement uncertainty. We also intercompared retrieved XCO<sub>2</sub> by GOSAT, GOSAT-2, OCO-2 and XCH<sub>4</sub> by GOSAT, GOSAT-2, and TROPOMI. GOSAT will provide long term global and wide spectral range data.

(5) Detection of the COVID-19 slow down economy

Since January 2015, when we switched the pointing system from the primary to the secondary

one, we have allocated more sampling points over megacities. The differences between lower and upper tropospheric CO<sub>2</sub> over Beijing and Tokyo show the CO<sub>2</sub> enhancement reduction in early 2020 when compared with data of previous years.

(6) Contribution to the Global Stock Take of the Paris Agreement

Partial column products of lower troposphere can double the enhancement over hotspots. Subtracting the density of upper troposphere will improve quantifying the emissions from hot spots.