NIES-GOSAT2-SYS-20190129-062-05

NIES GOSAT-2
Product File Format Descriptions
(Product edition)

Vol.4

GOSAT-2 TANSO-FTS-2 SWIR L2
Chlorophyll Fluorescence and Proxy-method Product

February 2025

National Institute for Environmental Studies
GOSAT-2 Project

Revision History

Version	Revised	Page	Description
00	Dec. 2019	-	-
01	Apr. 2020	p.1	Changed product version
		p.3	Added the following group • SolarInducedFluorescence
		p.4	Fixed part of Table 3-1
		p.5	Change the special mention about “Group”
		p.8	Added the following group and datasets • SolarInducedFluorescence • SolarInducedFluorescence/SIF • SolarInducedFluorescence/SIF_uncert • SolarInducedFluorescence/SIF/quality_flag
			Removed the following datasets • RetrievalResult_B1_SIF/fluorescence_radiance_755nm_corr_B1_SIF • RetrievalResult_B1_SIF/fluorescence_radiance_755nm_quality_flag_B1_SIF
			Renamed the following datasets • RetrievalResult_B1_SIF/fluorescence_radiance_755nm_uncert_B1_SIF • RetrievalResult_B1_SIF/fluorescence_radiance_755nm_dfs_B1_SIF
02	Jul. 2021	p.1	Added product version
		p.6, p.11	Added the annotation to the following dataset • SceneAttribute/numSounding
03	Oct.2021	p.1	Added product version
04	Apr. 2023	p.1	Change product version
		p.8, p.9, p.10, p.11, p.12	Added the following datasets • RetrievalResult_B1_SIF_ils_stretch_factor_* • RetrievalResult_B1_Psrf_zero_level_offset_* • RetrievalResult_B1_Psrf_ils_stretch_factor_* • RetrievalResult_B2_1590_zero_level_offset_* • RetrievalResult_B2_1590_ils_stretch_factor_* • RetrievalResult_B2_1660_zero_level_offset_* • RetrievalResult_B2_1660_ils_stretch_factor_* • RetrievalResult_B3_2060_zero_level_offset_* • RetrievalResult_B3_2060_ils_stretch_factor_* • RetrievalResult_B3_2350_zero_level_offset_* • RetrievalResult_B3_2350_ils_stretch_factor_*
05	Feb. 2025	Entire	Modified document format (No revision line)
		p.1	Added product version
		p.2	Fixed part of the file naming convention
		p.3	Fixed part of Table3-1

Table of Contents

1 Introduction

1.1 Purpose

The purpose of this document is to define the file format of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product which is one of the Greenhouse gases Observing SATellite-2 (hereinafter referred to as “GOSAT-2”) products generated by the National Institute for Environmental Studies, Japan.

1.2 Product and version

The product and its version described in this document are listed in Table 1-1.

Table 1-1 Product and version

Product name	Product version
GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product	02.00 02.10

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2 GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product

(1) Product description

GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product is a dataset of multiple individual retrieval results under the assumption of clear-sky condition from spectral radiance data in TANSO-FTS-2 L1B Product (L1B Product) using MAP method*. This product stores solar induced chlorophyll fluorescence data retrieved from Band 1 spectral radiance data in L1B Product as well as column-averaged dry-air mole fraction of atmospheric gases retrieved from Band 2-3 spectral radiance data in L1B Product. In principle, all TANSO-FTS-2 SWIR data are subject to process to generate this product.

* MAP method: Maximum A Posteriori method

(2) Main contents

Solar induced chlorophyll fluorescence, XCH_4 (proxy method), XCO (proxy method)

(3) Category

Standard

(4) Unit

Daily (00:00-23:59 UTC)

(5) Format

HDF5

(6) File naming convention

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
G	O	S	A	T	2	T	F	T	S	2	Y	Y	Y	Y	M	M	D	D	_	0	2	S	W	P	R	V	M	M	N	N	R	R	o	o	o	o	.	h	5

GOSAT2: Satellite name (Fixed)
TFTS2: Sensor name (Fixed)
YYYYMMDD: Observation date (Year, Month, Day) (UTC) | 05
02: Processing level (Fixed)
SWPR: Product code (Fixed)
V: Processing identifier (V: Steady, T: Test), added as necessary
MMNN: Product version (MM: Major version, NN: Minor version)
RR: Revision
oooo: Input data version
h5: Extension (Fixed) | 05

(7) File size

Approx. 11 MB

3 File format

3.1 Dataset structure

The dataset structure of the product is shown in Table 3-1.

Table 3-1 Dataset structure of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (1/2)

No.	Group	Outline
1	Metadata	The following items are mainly included to describe overview of the product. • Processing date • Start/End date • Sensor name • Processing level • Algorithm researcher
2	SceneAttribute	The following items are mainly included to provide information related to the observation. • Number of retrievals • Number of bands • Number of albedo parameters
3	SoundingAttribute	The following items are mainly included to provide information related to the observation. • Sounding unique ID • Detailed operation mode • Observation time
4	SoundingGeometry	The following items are mainly included to provide information related to the observation. • Geodetic latitude/longitude • Mean of the DEM altitude within the FTS-2 IFOV • Sensor zenith/azimuth angle • Solar zenith/azimuth angle
5	L1QualityInfo	The following items are mainly included to provide information related to the observation. • Sounding quality flag transferred from GOSAT-2 TANSO-FTS-2 L1B product • SNR for synthesized spectrum
6	CloudInformation	The following items are mainly included to provide information related to the observation. • Confidence level within the FTS-2 IFOV (GOSAT-2 TANSO-CAI-2 L2 Cloud Discrimination Product) • Coherent within the FTS-2 IFOV (GOSAT-2 TANSO-CAI-2 L1B Product) • Cloud flags based on the FTS-2 TIR measurement (GOSAT-2 TANSO-FTS-2 TIR L2 Cloud and Aerosol Property Product)
7	GasColumn_Proxy	The following items are mainly included to provide information related to the observation. • XCH_4 (proxy method) • XCO (proxy method)
8	SolarInducedFluorescence	The following items are mainly included to provide information related to the observation. • Solar induced chlorophyll fluorescence
9*	RetrievalResult_B1_SIF	The following items are mainly included to provide information related to the observation. • Solar induced chlorophyll fluorescence (raw retrieval of total offset)

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Table 3-1 Dataset structure of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (2/2)

10*	RetrievalResult_B1_Psrf	The following items are mainly included to provide information related to the observation. • Surface pressure (clear-sky retrieval)
11*	RetrievalResult_B2_1590	The following items are mainly included to provide information related to the observation. • XCO_2 (clear-sky retrieval) • XH_2O (clear-sky retrieval)
12*	RetrievalResult_B2_1660	The following items are mainly included to provide information related to the observation. • XCH_4 (clear-sky retrieval) • XH_2O (clear-sky retrieval)
13*	RetrievalResult_B3_2060	The following items are mainly included to provide information related to the observation. • XCO_2 (clear-sky retrieval) • XH_2O (clear-sky retrieval)
14*	RetrievalResult_B3_2350	The following items are mainly included to provide information related to the observation. • XCO (clear-sky retrieval) • XCH_4 (clear-sky retrieval) • XH_2O (clear-sky retrieval)

* Each group of No.9 through 14 corresponds to each individual retrieval processing. Each retrieval processing is conducted under assumption of clear-sky condition; therefore, note that retrieval results are affected by cloud and aerosol.

The special mention about “Group” above is shown as follows:

- GasColumn_Proxy
  XCH4_proxy under GasColumn_Proxy is calculated by multiplying the ratio of XCH4_B2_1660 under Retrievalresult_B2_1660 to XCO2_B2_1590 under RetrievalResult_B2_1590 by XCO2_model under GasColumn_Proxy.
  XCO_proxy under GasColumn_Proxy is calculated by multiplying the ratio of XCO_B3_2350 to XCH4_B3_2350 under Retrievalresult_B3_2350 by XCH4_proxy under GasColumn_Proxy.
  Since these datasets may contain low-quality case data or invalid value, each quality flag (*_quality_flag) should be referred together.

- SolarInducedFluorescence
  SIF under SolarInducedFluorescence stores the value converted into solar induced chlorophyll fluorescence (SIF) by correcting fluorescence_radiance_755nm_raw_B1_SIF, estimated filling-in signal of solar Fraunhofer lines, under RetrievalResult_B1_SIF.
  Since these datasets may contain low-quality case data or invalid value, quality flag (SIF_quality_flag) should be referred together.

- RetrievalResult_*
  Datasets under RetrievalResult_* store results of each retrieval processing. Note that these results are under the assumption of clear-sky condition, and include error of optical path fluctuations.

3.2 File format details

The file format details of the product are shown in Table 3-2.

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (1/7)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
G	Metadata								
	fileID	1	1	H5T_STRING	File identifier	(none)	(none)	(none)	file identifier of the product
	processingDate	1	1	H5T_STRING	Processing date	UTC	(none)	(none)	date of product creation (UTC): Time format is "YYYY-MM-DDThh:mm:ss.ffffffZ".
	startDate	1	1	H5T_STRING	Start date	UTC	(none)	"-"	start date of file (UTC): Time format is "YYYY-MM-DDThh:mm:ss.ffffffZ".
	endDate	1	1	H5T_STRING	End date	UTC	(none)	"-"	end date of file (UTC): Time format is "YYYY-MM-DDThh:mm:ss.ffffffZ".
	geodeticDatum	1	1	H5T_STRING	Geodetic datum	(none)	(none)	(none)	reference ellipsoid model/frame of reference: "WGS84/WGS84" (Fixed)
	satelliteName	1	1	H5T_STRING	Satellite name	(none)	(none)	(none)	satellite name: "GOSAT-2" - Greenhouse gases Observing SATellite-2 (Fixed)
	sensorName	1	1	H5T_STRING	Sensor name	(none)	(none)	(none)	sensor name: "TANSO-FTS-2" - Fourier Transform Spectrometer-2 (Fixed)
	processingLevel	1	1	H5T_STRING	Processing level	(none)	(none)	(none)	processing level: "L2" - Level 2 (Fixed)
	algorithmName	1	1	H5T_STRING	Algorithm name	(none)	(none)	(none)	algorithm name: "TANSO-FTS-2_SWIR_L2" (Fixed)
	algorithmVersion	1	1	H5T_STRING	Algorithm version	(none)	(none)	(none)	algorithm version is stored
	productVersion	1	1	H5T_STRING	Product version	(none)	(none)	(none)	product version is stored
	inputDataVersion	1	1	H5T_STRING	Input data version	(none)	(none)	(none)	version of input data list is stored
	processingFacility	1	1	H5T_STRING	Processing facility	(none)	(none)	(none)	processing facility name: "G2DPS" - GOSAT-2 Data Processing System (Fixed)
	contact_01	1	1	H5T_STRING	Organization name 01	(none)	(none)	(none)	organization name: "Japan Aerospace Exploration Agency (JAXA)" (Fixed)
	contact_02	1	1	H5T_STRING	Organization name 02	(none)	(none)	(none)	organization name: "National Institute for Environmental Studies (NIES)" (Fixed)
	contact_03	1	1	H5T_STRING	Algorithm researcher	(none)	(none)	(none)	researcher
	e-mail	1	1	H5T_STRING	E-mail address	(none)	(none)	(none)	e-mail address
G	SceneAttribute								
	numSounding	1	1	H5T_STD_I32LE	Number of retrievals*1	(none)	(none)	0	number of retrievals
	numBand	1	1	H5T_STD_I32LE	Number of bands	(none)	(none)	(none)	number of FTS-2 SWIR bands "6" (Fixed)
	numAlb_B1_SIF	1	1	H5T_STD_I32LE	Number of layers	(none)	(none)	(none)	number of retrieved albedo parameters for B1_SIF
	numAlb_B1_Psrf	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for B1_Psrf
	numAlb_B2_1590	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for B2_1590
	numAlb_B2_1660	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for B2_1660
	numAlb_B3_2060	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for B3_2060
	numAlb_B3_2350	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for B3_2350
G	SoundingAttribute								
	soundingUniqueID	1	numSounding	H5T_STRING	Sounding unique ID	(none)	(none)	(none)	sounding unique ID is stored: Format is "YYYYMMDD_AAA_NNNN". "YYYYMMDD" - Observation date, "AAA" - Path No., "NNNN" - Sounding ID (0-1245)
	detailedOperationMode	1	numSounding	H5T_STRING	Detailed operation mode	(none)	(none)	(none)	detailed operation mode is stored: "OB1D" - Observation Mode (day/All data are observed by decimated mode.), "OB2D" - Observation Mode except for full-observation (day/All data are observed by decimated mode. specific bands are not observed.), "SUNG" - Sunglint observation Mode, "SPPT" - Specific point observation Mode
	observationRequestID	1	numSounding	H5T_STRING	Observation request ID	(none)	(none)	(none)	observation request ID is stored: Format is "XKYYYYMMDDaaaaannnn_mmmmmmm". "X" - Request from (J:JAXA, N:NIES), "K" - Kind of request (F:routine, T:temporary, I:internal), "YYYYMMDD" - start date of observation of request, "aaaaa" - observation code (e.g. "FT206"), "nnnn" - observation request Number (0000-9999), "mmmmmmm" - branch Number (0000000-9999999)
	observationTime	1	numSounding	H5T_STRING	Observation time	UTC	(none)	"-"	observation time of each sounding is stored: Observation time is expressed as follows: ObservationTime = Launched time of sample window + 2.012 sec. Time format is "YYYY-MM-DDThh:mm:ss.ffffffZ"
	scanDirection	1	numSounding	H5T_STRING	Scan direction	(none)	(none)	"-"	scan direction of each sounding is stored: "FWD" - Forward, "BWD" - Backward
	sensorGain	2	numSounding, numBand	H5T_STD_I8LE	Sensor gain	(none)	0, 15	-128	gain for each bands are stored in order of 1P, 1S, 2P, 2S, 3P, 3S
	IP_Request	1	numSounding	H5T_STD_I8LE	IP request flag	(none)	0, 1	-128	IP request flag is stored: 0 - Intelligent pointing was disabled. (IP="No") , 1 - Intelligent pointing was enabled. (IP="Yes")
	yawSteeringFlag	1	numSounding	H5T_STD_I8LE	Yaw steering flag	(none)	0, 1	2	yaw steering flag indicates the operation of yaw steering: 0 - Not execute (OFF), 1 - Execute (ON)
	pointingAT	1	numSounding	H5T_IEEE_F64LE	The motor rotation angle about the AT axis	deg	-180.0, 180.0	-999.0	The motor rotation angle about the AT axis at observation time is stored.The range that the motor can be physically driven is as follows: -180.0 < pointingAT <= 180.0

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (2/7)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	pointingCT	1	numSounding	H5T_IEEE_F64LE	The motor rotation angle about the CT axis	deg	-180.0, 180.0	-999.0	The motor rotation angle about the CT axis at observation time is stored.The range that the motor can be physically driven is as follows: -180.0 < pointingCT <= 180.0
G	SoundingGeometry								
	latitude	1	numSounding	H5T_IEEE_F32LE	Geodetic latitude	deg	-90.0, 90.0	-999.0	geodetic latitude of observation point is stored
	longitude	1	numSounding	H5T_IEEE_F32LE	Longitude	deg	-180.0, 180.0	-999.0	longitude of observation point is stored: -180 < longitude <= 180
	height	1	numSounding	H5T_IEEE_F32LE	Mean of the DEM altitude within the FTS-2 IFOV	m	-407.0, 8752.0	-999.0	mean of the DEM altitude within the FTS-2 IFOV
	surfaceRoughness	1	numSounding	H5T_IEEE_F32LE	Standard deviation of the DEM altitude within the FTS-2 IFOV	m	(none)	-999.0	standard deviation of the DEM altitude within the FTS-2 IFOV
	landFraction	1	numSounding	H5T_IEEE_F32LE	Percent of the land cover within the FTS-2 IFOV	%	0.0, 100.0	-999.0	percent of the land cover within the FTS-2 IFOV
	viewZenith	1	numSounding	H5T_IEEE_F32LE	Sensor zenith angle	deg	0.0, 180.0	-999.0	sensor (satellite) zenith angle at observation point is stored: 0 <= viewZenith <= 180
	viewAzimuth	1	numSounding	H5T_IEEE_F32LE	Sensor azimuth angle	deg	0.0, 360.0	-999.0	sensor (satellite) azimuth angle at observation point is stored: 0 <= viewAzimuth < 360
	solarZenith	1	numSounding	H5T_IEEE_F32LE	Solar zenith angle	deg	0.0, 180.0	-999.0	solar zenith angle at observation point is stored: 0 <= solarZenith <= 180
	solarAzimuth	1	numSounding	H5T_IEEE_F32LE	Solar azimuth angle	deg	0.0, 360.0	-999.0	solar azimuth angle at observation point is stored: 0 <= solarAzimuth < 360
	sunglintFlag	1	numSounding	H5T_STD_I8LE	Sunglint flag	(none)	0, 1	-128	the flag indicates whether each exposure is sunglint observation or not is stored: This flag is valid for any landType. 0 - Not sunglint, 1 - Sunglint
	specular_viewVector_angle	1	numSounding	H5T_IEEE_F32LE	The angle between specular reflection vector and view vector	deg	0.0, 180.0	-999.0	the angle between specular reflection vector and view vector of observation time is stored: 0 <= specular_viewVector_angle < 180
	solarDistance	1	numSounding	H5T_IEEE_F64LE	Solar distance	AU	(none)	-999.0	distance from sun to observation point is stored
G	L1QualityInfo								
	soundingQualityFlag	1	numSounding	H5T_STRING	Sounding quality flag	(none)	(none)	"NG"	quality of each observation point on a four level scale as follows: "Good", "Fair", "Poor", "NG"
	IMC_StabilityFlag	1	numSounding	H5T_STD_I8LE	IMC stability flag	(none)	0, 1	2	IMC stability flag is stored: 0 - Stable, 1 - Not stable
	missingFlag	2	numSounding, numBand	H5T_STD_I8LE	Missing flag	(none)	(none)	1	missing data flag is stored in order of 1P, 1S, 2P, 2S, 3P, 3S: 0 - Normal (No loss), 1 - Full loss of interferogram, 9 - Normal without data (No interferogram for the sounding)
	saturationFlag	2	numSounding, numBand	H5T_STD_I8LE	Saturation flag	(none)	0, 1	2	interferogram saturation flag is stored in order of 1P, 1S, 2P, 2S, 3P, 3S: 0 - DN saturation detection = Normal, 1 - DN saturation detection = Saturation
	spikeFlag	2	numSounding, numBand	H5T_STD_I8LE	Spike flag	(none)	0, 1	2	spike flag is stored in order of 1P, 1S, 2P, 2S, 3P, 3S: If spike flag is "1", interferogram data are removed spikes. 0 - Normal (no spike), 1 - With spike
	scanStabilityFlag	1	numSounding	H5T_STD_I8LE	Scan stability flag	(none)	0, 1	2	scan stability flag is stored: 0 - Stable, 1 - Not stable
	interferogramQualityFlag	2	numSounding, numBand	H5T_STD_I8LE	Interferogram quality flag	(none)	0, 1	2	interferogram quality flag for each band is judged by saturation, scan stability, DC level flag is stored in order of 1P, 1S, 2P, 2S, 3P, 3S: 0 - Normal, 1 - Abnormal
	spectrumQualityFlag	2	numSounding, numBand	H5T_STD_I8LE	Spectrum quality flag	(none)	0, 1	2	spectrum quality flag for each band spectrum is judged by out of spectral coverage data is stored in order of 1P, 1S, 2P, 2S, 3P, 3S: 0 - Normal, 1 - Abnormal
	SNR	2	numSounding, numBand	H5T_IEEE_F64LE	SNR	(none)	(none)	-999.0	simplified calculated SNR is stored in order of 1P, 1S, 2P, 2S, 3P, 3S
	SNR_synthesized	2	numSounding, numBand/2	H5T_IEEE_F64LE	SNR for synthesized spectrum	(none)	(none)	-999.0	simplified calculated SNR for synthesized spectrum is stored
G	CloudInformation								
	CAI-2_CLDD	3	numSounding, 2, 16	H5T_STD_I32LE	Confidence level within the FTS-2 IFOV (CAI-2 L2 Cloud Discrimination)	(none)	(none)	-999	frequency distribution of 16 levels of cloud discrimination for forward-/backward-viewing of CAI-2 within the FTS-2 IFOV are stored
	CAI-2_Coherent	3	numSounding, 2, 5	H5T_IEEE_F32LE	Coherent within the FTS-2 IFOV (CAI-2 L1B)	W/m^2/str/micro m	(none)	-999.0	standard deviation of observed radiance of each CAI-2 band (5 bands for each forward-/backward-viewing) within the FTS-2 IFOV
	FTS-2_2um	2	numSounding,2	H5T_STD_I8LE	Scattering matter existence flags (2um)	(none)	0,1	-1	higher-level scattering matter existence flags based on FTS-2 Band 3 P-/S-polarization measurement are stored: 0 - Not exist, 1- Exist
	FTS-2_TIR	2	numSounding,3	H5T_STD_I8LE	Cloud flags based on the FTS-2 TIR measurement (FTS-2 TIR L2 Cloud and Aerosol Property)	(none)	0,2	-1	cloud flags based on the threshold method, split-window method, and slicing method based on the FTS-2 TIR measurement are stored: 0 - No cloud, 1 - With cloud, 2 - Unclassifiable
	surface_pressure_delta	1	numSounding	H5T_IEEE_F32LE	Difference of surface pressure	hPa	(none)	-999.0	difference of retrieved surface pressure (clear-sky retrieval) and its a priori value

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (3/7)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	co2Ratio	1	numSounding	H5T_IEEE_F32LE	Ratio of XCO2	(none)	(none)	-999.0	ratio of retrieved XCO2 (clear-sky retrieval) in 1590 nm and 2060 nm CO2 band
	h2oRatio	1	numSounding	H5T_IEEE_F32LE	Ratio of XH2O	(none)	(none)	-999.0	ratio of retrieved XH2O (clear-sky retrieval) in 1590 nm and 2060 nm H2O band
	ch4Ratio	1	numSounding	H5T_IEEE_F32LE	Ratio of XCH4	(none)	(none)	-999.0	ratio of retrieved XCH4 (clear-sky retrieval) in 1660 nm and 2350 nm CH4 band
G	GasColumn_Proxy								
	XCO2_model	1	numSounding	H5T_IEEE_F32LE	XCO2 (model)	ppm	(none)	-999.0	model XCO2 as a proxy
	XCH4_proxy	1	numSounding	H5T_IEEE_F32LE	XCH4 (proxy method)	ppm	(none)	-999.0	XCH4 retrieved by the proxy approach, i.e., observed ratio of CH4/CO2 is multiplied with the model XCO2
	XCH4_proxy_quality_flag	1	numSounding	H5T_STD_I8LE	Quality flag for XCH4 (proxy method)	(none)	0,3	-1	quality flag for XCH4 (proxy method). 0 - Good, 1 - Fair, 2 - Poor, 3 - NG
	XCO_proxy	1	numSounding	H5T_IEEE_F32LE	XCO (proxy method)	ppm	(none)	-999.0	XCO retrieved by the proxy approach, i.e., observed ratio of CO/CH4 is multiplied with the proxy XCH4
	XCO_proxy_quality_flag	1	numSounding	H5T_STD_I8LE	Quality flag for XCO (proxy method)	(none)	0,3	-1	quality flag for XCO (proxy method). 0 - Good, 1 - Fair, 2 - Poor, 3 - NG
G	SolarInducedFluorescence								
	SIF	1	numSounding	H5T_IEEE_F32LE	Corrected chlorophyll fluorescence at 755 nm	mW/m^2/str/nm	(none)	-999.0	retrieved chlorophyll fluorescence at 755 nm after the correction of zero-level-offset
	SIF_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of corrected chlorophyll fluorescence at 755 nm	mW/m^2/str/nm	(none)	-999.0	uncertainty of corrected chlorophyll fluorescence at 755 nm
	SIF_quality_flag	1	numSounding	H5T_STD_I8LE	Quality flag for corrected chlorophyll fluorescence at 755 nm	(none)	0,3	-1	quality flag for corrected chlorophyll fluorescence at 755 nm. 0 - Good, 1 - Fair, 2 - Poor, 3 - NG
G	RetrievalResult_B1_SIF								
	fluorescence_radiance_755nm_raw_B1_SIF	1	numSounding	H5T_IEEE_F32LE	Raw retrieval result of total offset	W/cm^2/str/cm^(-1)	(none)	-999.0	raw retrieval result of total offset (fluorescence + zero-level-offset)
	fluorescence_radiance_755nm_apriori_B1_SIF	1	numSounding	H5T_IEEE_F32LE	A priori value of chlorophyll fluorescence at 755 nm	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value of chlorophyll fluorescence at 755 nm
	fluorescence_radiance_755nm_raw_uncert_B1_SIF	1	numSounding	H5T_IEEE_F32LE	Uncertainty of uncorrected chlorophyll fluorescence at 755 nm	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of uncorrected chlorophyll fluorescence at 755 nm
	fluorescence_radiance_755nm_raw_dfs_B1_SIF	1	numSounding	H5T_IEEE_F32LE	DFS for uncorrected chlorophyll fluorescence at 755 nm	(none)	(none)	-999.0	degree of freedom for signals for uncorrected chlorophyll fluorescence at 755 nm
	albedo_B1_SIF	2	numSounding, numAlb_B1_SIF	H5T_IEEE_F32LE	Surface albedo	(none)	(none)	-999.0	retrieved surface albedo at 755 nm retrieval window (for land case)
	albedo_apriori_B1_SIF	2	numSounding, numAlb_B1_SIF	H5T_IEEE_F32LE	A priori value of surface albedo	(none)	(none)	-999.0	a priori value of surface albedo at 755 nm retrieval window (for land case)
	albedo_uncert_B1_SIF	2	numSounding, numAlb_B1_SIF	H5T_IEEE_F32LE	Uncertainty of surface albedo	(none)	(none)	-999.0	uncertainty of surface albedo at 755 nm retrieval window (for land case)
	wind_speed_B1_SIF	1	numSounding	H5T_IEEE_F32LE	Surface wind speed	m/s	(none)	-999.0	retrieved surface wind speed (for ocean case)
	wind_speed_apriori_B1_SIF	1	numSounding	H5T_IEEE_F32LE	A priori value of surface wind speed	m/s	(none)	-999.0	a priori value of surface wind speed (for ocean case)
	wind_speed_uncert_B1_SIF	1	numSounding	H5T_IEEE_F32LE	Uncertainty of surface wind speed	m/s	(none)	-999.0	uncertainty of surface wind speed (for ocean case)
	dispersion_adjustment_B1_SIF	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor	(none)	(none)	-999.0	retrieved dispersion adjustment factor for 755 nm retrieval window
	dispersion_adjustment_apriori_B1_SIF	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for 755 nm retrieval window
	dispersion_adjustment_uncert_B1_SIF	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for 755 nm retrieval window
	ils_stretch_factor_B1_SIF	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor	(none)	(none)	-999.0	retrieved ILS stretch factor
	ils_stretch_factor_apriori_B1_SIF	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor	(none)	(none)	-999.0	a priori value for ILS stretch factor
	ils_stretch_factor_uncert_B1_SIF	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor	(none)	(none)	-999.0	uncertainty of ILS stretch factor
	iteration_B1_SIF	1	numSounding	H5T_STD_I32LE	Number of iterations	(none)	(none)	-999	number of iterations for clear-sky retrieval using 755 nm retrieval window
	residual_reduced_chi2_B1_SIF	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals	(none)	(none)	-999.0	squares of normalized residuals for clear-sky retrieval using 755 nm retrieval window
G	RetrievalResult_B1_Psrf								
	surface_pressure_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Surface pressure	hPa	(none)	-999.0	retrieved surface pressure (clear-sky retrieval from 760 nm retrieval window)
	surface_pressure_apriori_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	A priori value of surface pressure	hPa	(none)	-999.0	a priori value of surface pressure
	surface_pressure_uncert_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Uncertainty of surface pressure	hPa	(none)	-999.0	uncertainty of surface pressure (clear-sky retrieval from 760 nm retrieval window)
	surface_pressure_dfs_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	DFS for surface pressure	(none)	(none)	-999.0	degree of freedom for signals for surface pressure (clear-sky retrieval from 760 nm retrieval window)

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (4/7)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	fluorescence_at_reference_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Chlorophyll fluorescence at reference wavelength	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved chlorophyll fluorescence at reference wavelength (clear-sky retrieval from 760 nm retrieval window)
	fluorescence_at_reference_apriori_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	A priori value of chlorophyll fluorescence at reference wavelength	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value of chlorophyll fluorescence at reference wavelength
	fluorescence_at_reference_uncert_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Uncertainty of chlorophyll fluorescence at reference wavelength	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of chlorophyll fluorescence at reference wavelength (clear-sky retrieval from 760 nm retrieval window)
	fluorescence_slope_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Fluorescence slope	(none)	(none)	-999.0	retrieved fluorescence slope (clear-sky retrieval from 760 nm retrieval window)
	fluorescence_slope_apriori_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	A priori value of fluorescence slope	(none)	(none)	-999.0	a priori value of fluorescence slope
	fluorescence_slope_uncert_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Uncertainty of fluorescence slope	(none)	(none)	-999.0	uncertainty of fluorescence slope (clear-sky retrieval from 760 nm retrieval window)
	albedo_B1_Psrf	2	numSounding, numAlb_B1_Psrf	H5T_IEEE_F32LE	Surface albedo	(none)	(none)	-999.0	retrieved surface albedo at 760 nm retrieval window (for land case)
	albedo_apriori_B1_Psrf	2	numSounding, numAlb_B1_Psrf	H5T_IEEE_F32LE	A priori value of surface albedo	(none)	(none)	-999.0	a priori value of surface albedo at 760 nm retrieval window (for land case)
	albedo_uncert_B1_Psrf	2	numSounding, numAlb_B1_Psrf	H5T_IEEE_F32LE	Uncertainty of surface albedo	(none)	(none)	-999.0	uncertainty of surface albedo at 760 nm retrieval window (for land case)
	wind_speed_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Surface wind speed	m/s	(none)	-999.0	retrieved surface wind speed (for ocean case)
	wind_speed_apriori_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	A priori value of surface wind speed	m/s	(none)	-999.0	a priori value of surface wind speed (for ocean case)
	wind_speed_uncert_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Uncertainty of surface wind speed	m/s	(none)	-999.0	uncertainty of surface wind speed (for ocean case)
	dispersion_adjustment_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor	(none)	(none)	-999.0	retrieved dispersion adjustment factor for 760 nm retrieval window
	dispersion_adjustment_apriori_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for 760 nm retrieval window
	dispersion_adjustment_uncert_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for 760 nm retrieval window
	zero_level_offset_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset
	zero_level_offset_apriori_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset
	zero_level_offset_uncert_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset
	ils_stretch_factor_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor	(none)	(none)	-999.0	retrieved ILS stretch factor
	ils_stretch_factor_apriori_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor	(none)	(none)	-999.0	a priori value for ILS stretch factor
	ils_stretch_factor_uncert_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor	(none)	(none)	-999.0	uncertainty of ILS stretch factor
	iteration_B1_Psrf	1	numSounding	H5T_STD_I32LE	Number of iterations	(none)	(none)	-999.0	number of iterations for clear-sky retrieval using 760 nm retrieval window
	residual_reduced_chi2_B1_Psrf	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals	(none)	(none)	-999.0	squares of normalized residuals for clear-sky retrieval using 760 nm retrieval window
G	RetrievalResult_B2_1590								
	XCO2_B2_1590	1	numSounding	H5T_IEEE_F32LE	XCO2	ppm	(none)	-999.0	retrieved XCO2 (clear-sky retrieval from 1590 nm retrieval window)
	XCO2_apriori_B2_1590	1	numSounding	H5T_IEEE_F32LE	A priori value of XCO2	ppm	(none)	-999.0	a priori value of XCO2
	XCO2_uncert_B2_1590	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XCO2	ppm	(none)	-999.0	uncertainty of XCO2 (clear-sky retrieval from 1590 nm retrieval window)
	XCO2_dfs_B2_1590	1	numSounding	H5T_IEEE_F32LE	DFS for XCO2	(none)	(none)	-999.0	degree of freedom for signals for XCO2 (clear-sky retrieval from 1590 nm retrieval window)
	XH2O_B2_1590	1	numSounding	H5T_IEEE_F32LE	XH2O	ppm	(none)	-999.0	retrieved XH2O (clear-sky retrieval from 1590 nm retrieval window)
	XH2O_apriori_B2_1590	1	numSounding	H5T_IEEE_F32LE	A priori value of XH2O	ppm	(none)	-999.0	a priori value of XH2O
	XH2O_uncert_B2_1590	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XH2O	ppm	(none)	-999.0	uncertainty of XH2O (clear-sky retrieval from 1590 nm retrieval window)
	XH2O_dfs_B2_1590	1	numSounding	H5T_IEEE_F32LE	DFS for XH2O	(none)	(none)	-999.0	degree of freedom for signals for XH2O (clear-sky retrieval from 1590 nm retrieval window)
	albedo_B2_1590	2	numSounding, numAlb_B2_1590	H5T_IEEE_F32LE	Surface albedo	(none)	(none)	-999.0	retrieved surface albedo at 1590 nm retrieval window (for land case)
	albedo_apriori_B2_1590	2	numSounding, numAlb_B2_1590	H5T_IEEE_F32LE	A priori value of surface albedo	(none)	(none)	-999.0	a priori value of surface albedo at 1590 nm retrieval window (for land case)
	albedo_uncert_B2_1590	2	numSounding, numAlb_B2_1590	H5T_IEEE_F32LE	Uncertainty of surface albedo	(none)	(none)	-999.0	uncertainty of surface albedo at 1590 nm retrieval window (for land case)
	wind_speed_B2_1590	1	numSounding	H5T_IEEE_F32LE	Surface wind speed	m/s	(none)	-999.0	retrieved surface wind speed (for ocean case)
	wind_speed_apriori_B2_1590	1	numSounding	H5T_IEEE_F32LE	A priori value of surface wind speed	m/s	(none)	-999.0	a priori value of surface wind speed (for ocean case)

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (5/7)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	wind_speed_uncert_B2_1590	1	numSounding	H5T_IEEE_F32LE	Uncertainty of surface wind speed	m/s	(none)	-999.0	uncertainty of surface wind speed (for ocean case)
	dispersion_adjustment_B2_1590	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor	(none)	(none)	-999.0	retrieved dispersion adjustment factor for 1590 nm retrieval window
	dispersion_adjustment_apriori_B2_1590	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for 1590 nm retrieval window
	dispersion_adjustment_uncert_B2_1590	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for 1590 nm retrieval window
	zero_level_offset_B2_1590	1	numSounding	H5T_IEEE_F32LE	Zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset
	zero_level_offset_apriori_B2_1590	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset
	zero_level_offset_uncert_B2_1590	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset
	ils_stretch_factor_B2_1590	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor	(none)	(none)	-999.0	retrieved ILS stretch factor
	ils_stretch_factor_apriori_B2_1590	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor	(none)	(none)	-999.0	a priori value for ILS stretch factor
	ils_stretch_factor_uncert_B2_1590	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor	(none)	(none)	-999.0	uncertainty of ILS stretch factor
	iteration_B2_1590	1	numSounding	H5T_STD_I32LE	Number of iterations	(none)	(none)	-999	number of iterations for clear-sky retrieval using 1590 nm retrieval window
	residual_reduced_chi2_B2_1590	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals	(none)	(none)	-999.0	squares of normalized residuals for clear-sky retrieval using 1590 nm retrieval window
G	RetrievalResult_B2_1660								
	XCH4_B2_1660	1	numSounding	H5T_IEEE_F32LE	XCH4	ppm	(none)	-999.0	retrieved XCH4 (clear-sky retrieval from 1660 nm retrieval window)
	XCH4_apriori_B2_1660	1	numSounding	H5T_IEEE_F32LE	A priori value of XCH4	ppm	(none)	-999.0	a priori value of XCH4
	XCH4_uncert_B2_1660	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XCH4	ppm	(none)	-999.0	uncertainty of XCH4 (clear-sky retrieval from 1660 nm retrieval window)
	XCH4_dfs_B2_1660	1	numSounding	H5T_IEEE_F32LE	DFS for XCH4	(none)	(none)	-999.0	degree of freedom for signals for XCH4 (clear-sky retrieval from 1660 nm retrieval window)
	XH2O_B2_1660	1	numSounding	H5T_IEEE_F32LE	XH2O	ppm	(none)	-999.0	retrieved XH2O (clear-sky retrieval from 1660 nm retrieval window)
	XH2O_apriori_B2_1660	1	numSounding	H5T_IEEE_F32LE	A priori value of XH2O	ppm	(none)	-999.0	a priori value of XH2O
	XH2O_uncert_B2_1660	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XH2O	ppm	(none)	-999.0	uncertainty of XH2O (clear-sky retrieval from 1660 nm retrieval window)
	XH2O_dfs_B2_1660	1	numSounding	H5T_IEEE_F32LE	DFS for XH2O	(none)	(none)	-999.0	degree of freedom for signals for XH2O (clear-sky retrieval from 1660 nm retrieval window)
	albedo_B2_1660	2	numSounding, numAlb_B2_1660	H5T_IEEE_F32LE	Surface albedo	(none)	(none)	-999.0	retrieved surface albedo at 1660 nm retrieval window (for land case)
	albedo_apriori_B2_1660	2	numSounding, numAlb_B2_1660	H5T_IEEE_F32LE	A priori value of surface albedo	(none)	(none)	-999.0	a priori value of surface albedo at 1660 nm retrieval window (for land case)
	albedo_uncert_B2_1660	2	numSounding, numAlb_B2_1660	H5T_IEEE_F32LE	Uncertainty of surface albedo	(none)	(none)	-999.0	uncertainty of surface albedo at 1660 nm retrieval window (for land case)
	wind_speed_B2_1660	1	numSounding	H5T_IEEE_F32LE	Surface wind speed	m/s	(none)	-999.0	retrieved surface wind speed (for ocean case)
	wind_speed_apriori_B2_1660	1	numSounding	H5T_IEEE_F32LE	A priori value of surface wind speed	m/s	(none)	-999.0	a priori value of surface wind speed (for ocean case)
	wind_speed_uncert_B2_1660	1	numSounding	H5T_IEEE_F32LE	Uncertainty of surface wind speed	m/s	(none)	-999.0	uncertainty of surface wind speed (for ocean case)
	dispersion_adjustment_B2_1660	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor	(none)	(none)	-999.0	retrieved dispersion adjustment factor for 1660 nm retrieval window
	dispersion_adjustment_apriori_B2_1660	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for 1660 nm retrieval window
	dispersion_adjustment_uncert_B2_1660	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for 1660 nm retrieval window
	zero_level_offset_B2_1660	1	numSounding	H5T_IEEE_F32LE	Zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset
	zero_level_offset_apriori_B2_1660	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset
	zero_level_offset_uncert_B2_1660	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset
	ils_stretch_factor_B2_1660	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor	(none)	(none)	-999.0	retrieved ILS stretch factor
	ils_stretch_factor_apriori_B2_1660	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor	(none)	(none)	-999.0	a priori value for ILS stretch factor
	ils_stretch_factor_uncert_B2_1660	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor	(none)	(none)	-999.0	uncertainty of ILS stretch factor
	iteration_B2_1660	1	numSounding	H5T_STD_I32LE	Number of iterations	(none)	(none)	-999	number of iterations for clear-sky retrieval using 1660 nm retrieval window
	residual_reduced_chi2_B2_1660	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals	(none)	(none)	-999.0	squares of normalized residuals for clear-sky retrieval using 1660 nm retrieval window
G	RetrievalResult_B3_2060								
	XCO2_B3_2060	1	numSounding	H5T_IEEE_F32LE	XCO2	ppm	(none)	-999.0	retrieved XCO2 (clear-sky retrieval from 2060 nm retrieval window)
	XCO2_apriori_B3_2060	1	numSounding	H5T_IEEE_F32LE	A priori value of XCO2	ppm	(none)	-999.0	a priori value of XCO2

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (6/7)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	XCO2_uncert_B3_2060	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XCO2	ppm	(none)	-999.0	uncertainty of XCO2 (clear-sky retrieval from 2060 nm retrieval window)
	XCO2_dfs_B3_2060	1	numSounding	H5T_IEEE_F32LE	DFS for XCO2	(none)	(none)	-999.0	degree of freedom for signals for XCO2 (clear-sky retrieval from 2060 nm retrieval window)
	XH2O_B3_2060	1	numSounding	H5T_IEEE_F32LE	XH2O	ppm	(none)	-999.0	retrieved XH2O (clear-sky retrieval from 2060 nm retrieval window)
	XH2O_apriori_B3_2060	1	numSounding	H5T_IEEE_F32LE	A priori value of XH2O	ppm	(none)	-999.0	a priori value of XH2O
	XH2O_uncert_B3_2060	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XH2O	ppm	(none)	-999.0	uncertainty of XH2O (clear-sky retrieval from 2060 nm retrieval window)
	XH2O_dfs_B3_2060	1	numSounding	H5T_IEEE_F32LE	DFS for XH2O	(none)	(none)	-999.0	degree of freedom for signals for XH2O (clear-sky retrieval from 2060 nm retrieval window)
	albedo_B3_2060	2	numSounding, numAlb_B3_2060	H5T_IEEE_F32LE	Surface albedo	(none)	(none)	-999.0	retrieved surface albedo at 2060 nm retrieval window (for land case)
	albedo_apriori_B3_2060	2	numSounding, numAlb_B3_2060	H5T_IEEE_F32LE	A priori value of surface albedo	(none)	(none)	-999.0	a priori value of surface albedo at 2060 nm retrieval window (for land case)
	albedo_uncert_B3_2060	2	numSounding, numAlb_B3_2060	H5T_IEEE_F32LE	Uncertainty of surface albedo	(none)	(none)	-999.0	uncertainty of surface albedo at 2060 nm retrieval window (for land case)
	wind_speed_B3_2060	1	numSounding	H5T_IEEE_F32LE	Surface wind speed	m/s	(none)	-999.0	retrieved surface wind speed (for ocean case)
	wind_speed_apriori_B3_2060	1	numSounding	H5T_IEEE_F32LE	A priori value of surface wind speed	m/s	(none)	-999.0	a priori value of surface wind speed (for ocean case)
	wind_speed_uncert_B3_2060	1	numSounding	H5T_IEEE_F32LE	Uncertainty of surface wind speed	m/s	(none)	-999.0	uncertainty of surface wind speed (for ocean case)
	dispersion_adjustment_B3_2060	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor	(none)	(none)	-999.0	retrieved dispersion adjustment factor for 2060 nm retrieval window
	dispersion_adjustment_apriori_B3_2060	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for 2060 nm retrieval window
	dispersion_adjustment_uncert_B3_2060	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for 2060 nm retrieval window
	zero_level_offset_B3_2060	1	numSounding	H5T_IEEE_F32LE	Zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset
	zero_level_offset_apriori_B3_2060	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset
	zero_level_offset_uncert_B3_2060	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset
	ils_stretch_factor_B3_2060	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor	(none)	(none)	-999.0	retrieved ILS stretch factor
	ils_stretch_factor_apriori_B3_2060	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor	(none)	(none)	-999.0	a priori value for ILS stretch factor
	ils_stretch_factor_uncert_B3_2060	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor	(none)	(none)	-999.0	uncertainty of ILS stretch factor
	iteration_B3_2060	1	numSounding	H5T_STD_I32LE	Number of iterations	(none)	(none)	-999	number of iterations for clear-sky retrieval using 2060 nm retrieval window
	residual_reduced_chi2_B3_2060	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals	(none)	(none)	-999.0	squares of normalized residuals for clear-sky retrieval using 2060 nm retrieval window
G	RetrievalResult_B3_2350								
	XCO_B3_2350	1	numSounding	H5T_IEEE_F32LE	XCO	ppm	(none)	-999.0	retrieved XCO (clear-sky retrieval from 2350 nm retrieval window)
	XCO_apriori_B3_2350	1	numSounding	H5T_IEEE_F32LE	A priori value of XCO	ppm	(none)	-999.0	a priori value of XCO
	XCO_uncert_B3_2350	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XCO	ppm	(none)	-999.0	uncertainty of XCO (clear-sky retrieval from 2350 nm retrieval window)
	XCO_dfs_B3_2350	1	numSounding	H5T_IEEE_F32LE	DFS for XCO	(none)	(none)	-999.0	degree of freedom for signals for XCO (clear-sky retrieval from 2350 nm retrieval window)
	XCH4_B3_2350	1	numSounding	H5T_IEEE_F32LE	XCH4	ppm	(none)	-999.0	retrieved XCH4 (clear-sky retrieval from 2350 nm retrieval window)
	XCH4_apriori_B3_2350	1	numSounding	H5T_IEEE_F32LE	A priori value of XCH4	ppm	(none)	-999.0	a priori value of XCH4
	XCH4_uncert_B3_2350	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XCH4	ppm	(none)	-999.0	uncertainty of XCH4 (clear-sky retrieval from 2350 nm retrieval window)
	XCH4_dfs_B3_2350	1	numSounding	H5T_IEEE_F32LE	DFS for XCH4	(none)	(none)	-999.0	degree of freedom for signals for XCH4 (clear-sky retrieval from 2350 nm retrieval window)
	XH2O_B3_2350	1	numSounding	H5T_IEEE_F32LE	XH2O	ppm	(none)	-999.0	retrieved XH2O (clear-sky retrieval from 2350 nm retrieval window)
	XH2O_apriori_B3_2350	1	numSounding	H5T_IEEE_F32LE	A priori value of XH2O	ppm	(none)	-999.0	a priori value of XH2O
	XH2O_uncert_B3_2350	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XH2O	ppm	(none)	-999.0	uncertainty of XH2O (clear-sky retrieval from 2350 nm retrieval window)
	XH2O_dfs_B3_2350	1	numSounding	H5T_IEEE_F32LE	DFS for XH2O	(none)	(none)	-999.0	degree of freedom for signals for XH2O (clear-sky retrieval from 2350 nm retrieval window)
	albedo_B3_2350	2	numSounding, numAlb_B3_2350	H5T_IEEE_F32LE	Surface albedo	(none)	(none)	-999.0	retrieved surface albedo at 2350 nm retrieval window (for land case)
	albedo_apriori_B3_2350	2	numSounding, numAlb_B3_2350	H5T_IEEE_F32LE	A priori value of surface albedo	(none)	(none)	-999.0	a priori value of surface albedo at 2350 nm retrieval window (for land case)
	albedo_uncert_B3_2350	2	numSounding, numAlb_B3_2350	H5T_IEEE_F32LE	Uncertainty of surface albedo	(none)	(none)	-999.0	uncertainty of surface albedo at 2350 nm retrieval window (for land case)
	wind_speed_B3_2350	1	numSounding	H5T_IEEE_F32LE	Surface wind speed	m/s	(none)	-999.0	retrieved surface wind speed (for ocean case)
	wind_speed_apriori_B3_2350	1	numSounding	H5T_IEEE_F32LE	A priori value of surface wind speed	m/s	(none)	-999.0	a priori value of surface wind speed (for ocean case)
	wind_speed_uncert_B3_2350	1	numSounding	H5T_IEEE_F32LE	Uncertainty of surface wind speed	m/s	(none)	-999.0	uncertainty of surface wind speed (for ocean case)

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Chlorophyll Fluorescence and Proxy-method Product (7/7)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	dispersion_adjustment_B3_2350	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor	(none)	(none)	-999.0	retrieved dispersion adjustment factor for 2350 nm retrieval window
	dispersion_adjustment_apriori_B3_2350	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for 2350 nm retrieval window
	dispersion_adjustment_uncert_B3_2350	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for 2350 nm retrieval window
	zero_level_offset_B3_2350	1	numSounding	H5T_IEEE_F32LE	Zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset
	zero_level_offset_apriori_B3_2350	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset
	zero_level_offset_uncert_B3_2350	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset
	ils_stretch_factor_B3_2350	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor	(none)	(none)	-999.0	retrieved ILS stretch factor
	ils_stretch_factor_apriori_B3_2350	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor	(none)	(none)	-999.0	a priori value for ILS stretch factor
	ils_stretch_factor_uncert_B3_2350	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor	(none)	(none)	-999.0	uncertainty of ILS stretch factor
	iteration_B3_2350	1	numSounding	H5T_STD_I32LE	Number of iterations	(none)	(none)	-999	number of iterations for clear-sky retrieval using 2350 nm retrieval window
	residual_reduced_chi2_B3_2350	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals	(none)	(none)	-999.0	squares of normalized residuals for clear-sky retrieval using 2350 nm retrieval window

*1 If numSounding is 0, corresponding datasets under the following groups are not stored.
SoundingAttribute, SoundingGeometry, L1QualityInfo, CloudInformation, GasColumn_Proxy, SolarInducedFluorescence, RetrievalResult_B1_SIF, RetrievalResult_B1_Psrf, RetrievalResult_B2_1590, RetrievalResult_B2_1660, RetrievalResult_B3_2060, RetrievalResult_B3_2350

*2 If numAlb_* is 0, corresponding datasets under the following groups are not stored.
RetrievalResult_B1_SIF, RetrievalResult_B1_Psrf, RetrievalResult_B2_1590, RetrievalResult_B2_1660, RetrievalResult_B3_2060, RetrievalResult_B3_2350