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

Vol.5

GOSAT-2 TANSO-FTS-2 SWIR L2
Column-averaged Dry-air Mole Fraction Product

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National Institute for Environmental Studies
GOSAT-2 Project

Revision History

Version	Revised	Page	Description
00	Nov. 2019	-	-
01	Oct. 2020	p.1	Added product version
		p.5, p.9	Added the annotation to the following dataset • ScenceAttribute/numSounding
02	Oct. 2021	p.1	Added product version
03	Jul. 2022	p.1	Changed product version
		p.2	Changed the file size
		p.9, p.10	Added the following datasets • RetrievalResult/zero_level_offset_subband01 • RetrievalResult/zero_level_offset_subband01_apriori • RetrievalResult/zero_level_offset_subband01_uncert • RetrievalResult/zero_level_offset_subband02 • RetrievalResult/zero_level_offset_subband02_apriori • RetrievalResult/zero_level_offset_subband02_uncert • RetrievalResult/zero_level_offset_subband03 • RetrievalResult/zero_level_offset_subband03_apriori • RetrievalResult/zero_level_offset_subband03_uncert • RetrievalResult/zero_level_offset_subband04 • RetrievalResult/zero_level_offset_subband04_apriori • RetrievalResult/zero_level_offset_subband04_uncert • RetrievalResult/zero_level_offset_subband05 • RetrievalResult/zero_level_offset_subband05_apriori • RetrievalResult/zero_level_offset_subband05_uncert • RetrievalResult/ils_stretch_factor_subband01 • RetrievalResult/ils_stretch_factor_subband01_apriori • RetrievalResult/ils_stretch_factor_subband01_uncert • RetrievalResult/ils_stretch_factor_subband02 • RetrievalResult/ils_stretch_factor_subband02_apriori • RetrievalResult/ils_stretch_factor_subband02_uncert • RetrievalResult/ils_stretch_factor_subband03 • RetrievalResult/ils_stretch_factor_subband03_apriori • RetrievalResult/ils_stretch_factor_subband03_uncert • RetrievalResult/ils_stretch_factor_subband04 • RetrievalResult/ils_stretch_factor_subband04_apriori • RetrievalResult/ils_stretch_factor_subband04_uncert

Version	Revised	Page	Description
			_uncert • RetrievalResult/ils_stretch_factor_subband05 • RetrievalResult/ils_stretch_factor_subband05 _apriori • RetrievalResult/ils_stretch_factor_subband05 _uncert
04	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 Table 3-1
05	Mar. 2025	p.1	Added product version

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1 Introduction

1.1 Purpose

The purpose of this document is to define the file format of GOSAT-2 TANSO-FTS-2 SWIR L2 Column-averaged Dry-air Mole Fraction 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	02.00
Column-averaged Dry-air Mole Fraction	02.10
Product	02.20

| 05

2 GOSAT-2 TANSO-FTS-2 SWIR L2 Column-averaged Dry-air Mole Fraction Product

(1) Product description

GOSAT-2 TANSO-FTS-2 SWIR L2 Column-averaged Dry-air Mole Fraction Product stores column-averaged dry-air mole fraction of atmospheric gases retrieved by a full-physics method based on MAP method* using Band 1-3 spectral radiance data in TANSO-FTS-2 L1B Product. TANSO-FTS-2 SWIR data acquired under the condition where cloud-free or only optically thin cirrus clouds are present within the TANSO-FTS-2 instantaneous field of view, are used to generate this product.

* MAP method: Maximum A Posteriori method

(2) Main contents

XCO₂ (full-physics method), XCH₄ (full-physics method), XCO (full-physics method), XH₂O (full-physics 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	F	P	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)

02: Processing level (Fixed)

SWFP: 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)

(7) File size

Approx. 5 MB

3 File format

3.1 Dataset structure

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

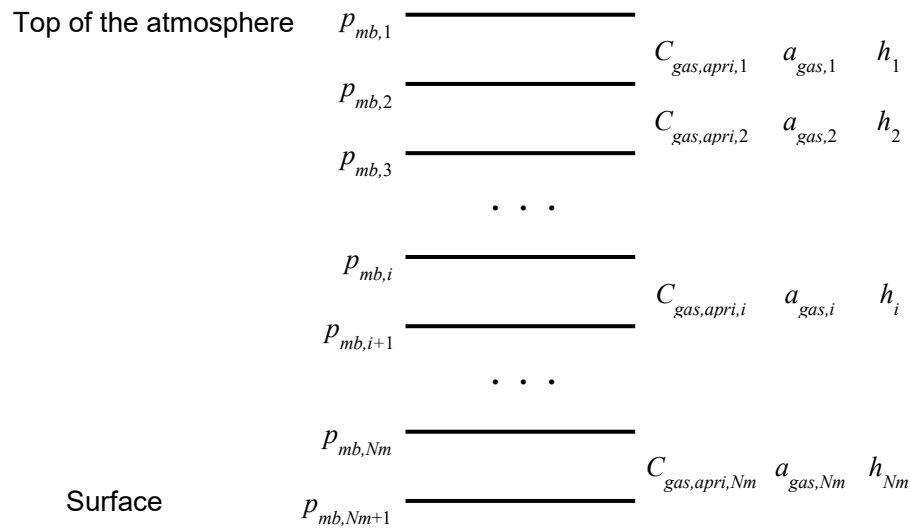
Table 3-1 Dataset structure of GOSAT-2 TANSO-FTS-2 SWIR L2 Column-averaged Dry-air Mole Fraction Product

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 retrieval layers • 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	RetrievalResult	The following items are mainly included to provide information related to the observation. • XCO₂ • XCH₄ • XCO • XH₂O

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

- RetrievalResult
xco2, xch4, xco and xh2o under RetrievalResult are retrieved column-averaged dry-air mole fraction. Since these datasets may contain low quality case data or invalid value, each quality flag (*_quality flag) should be referred together.
In SWIR L2 processing, not dry-air mole fraction at boundary layer, but partial column-averaged dry-air mole fraction for each layer is set as a state vector element, so following formulas are applied for calculating column-averaged dry-air mole fraction using vertical profiles of gas concentrations acquired by observation or model.

$$X_{gas,user} = \sum_{i=1}^{Nm} [C_{gas,apri,i} + (C_{gas,user,i} - C_{gas,apri,i}) \cdot a_{gas,i}] \cdot h_i$$



Symbol	Description	Group / Dataset of SWIR L2 product
Nm	Number of layer of main-layer	SceneAttribute/numLayer
$P_{mb,i}$	Pressure level at layer boundary	RetrievalResult/pressure_level
$C_{gas,apri,i}$	A priori value of partial column-averaged dry-air mole fraction of <i>gas</i> for each layer	RetrievalResult/ <i>gas</i> _profile_apriori
$a_{gas,i}$	Column averaging kernel of <i>gas</i>	RetrievalResult/x <i>gas</i> _culomn_averaging_kernel
h_i	Pressure weighting function	RetrievalResult/pressure_weighting_function

gas: CO₂, CH₄, H₂O, CO

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 Column-averaged Dry-air Mole Fraction Product (1/6)

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)
	numLayer	1	1	H5T_STD_I32LE	Number of layers	(none)	(none)	(none)	number of retrieval layers "15" (Fixed)
	numAlb_SB1	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for SB1
	numAlb_SB2	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for SB2
	numAlb_SB3	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for SB3
	numAlb_SB4	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for SB4
	numAlb_SB5	1	1	H5T_STD_I32LE	Number of albedo parameters*2	(none)	(none)	(none)	number of retrieved albedo parameters for SB5
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" - Sunlint 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), "mmmmmm" - 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)
G	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 Column-averaged Dry-air Mole Fraction Product (2/6)

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 Column-averaged Dry-air Mole Fraction Product (3/6)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
G	co2Ratio	1	numSounding	H5T_IEEE_F32LE	Ratio of XC02	(none)	(none)	-999.0	ratio of retrieved XC02 (clear-sky retrieval) in 1590 nm and 2060 nm CO2 band
	h2oRatio	1	numSounding	H5T_IEEE_F32LE	Ratio of XH20	(none)	(none)	-999.0	ratio of retrieved XH20 (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
	RetrievalResult								
	xco2	1	numSounding	H5T_IEEE_F32LE	XC02	ppm	(none)	-999.0	retrieved XC02 (full-physics retrieval)
	xco2_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value of XC02	ppm	(none)	-999.0	a priori value of XC02
	xco2_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XC02	ppm	(none)	-999.0	uncertainty of XC02 (full-physics retrieval)
	xco2_column_averaging_kernel	2	numSounding, numLayer	H5T_IEEE_F32LE	Column averaging kernel for XC02	(none)	(none)	-999.0	column averaging kernel for XC02 (full-physics retrieval)
	xco2_dfs	1	numSounding	H5T_IEEE_F32LE	DFS for XC02	(none)	(none)	-999.0	degree of freedom for signal for XC02 (full-physics retrieval)
	xco2_quality_flag	1	numSounding	H5T_STD_I8LE	Quality flag for XC02	(none)	0, 3	-1	quality flag for XC02 (full-physics retrieval) 0 - Good, 1 - Fair, 2 - Poor, 3 - NG
	xch4	1	numSounding	H5T_IEEE_F32LE	XCH4	ppm	(none)	-999.0	retrieved XCH4 (full-physics retrieval)
	xch4_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value of XCH4	ppm	(none)	-999.0	a priori value of XCH4
	xch4_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XCH4	ppm	(none)	-999.0	uncertainty of XCH4 (full-physics retrieval)
	xch4_column_averaging_kernel	2	numSounding, numLayer	H5T_IEEE_F32LE	Column averaging kernel for XCH4	(none)	(none)	-999.0	column averaging kernel for XCH4 (full-physics retrieval)
	xch4_dfs	1	numSounding	H5T_IEEE_F32LE	DFS for XCH4	(none)	(none)	-999.0	degree of freedom for signal for XCH4 (full-physics retrieval)
	xch4_quality_flag	1	numSounding	H5T_STD_I8LE	Quality flag for XCH4	(none)	0, 3	-1	quality flag for XCH4 (full-physics retrieval) 0 - Good, 1 - Fair, 2 - Poor, 3 - NG
	xco	1	numSounding	H5T_IEEE_F32LE	XCO	ppm	(none)	-999.0	retrieved XCO (full-physics retrieval)
	xco_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value of XCO	ppm	(none)	-999.0	a priori value of XCO
	xco_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XCO	ppm	(none)	-999.0	uncertainty of XCO (full-physics retrieval)
	xco_column_averaging_kernel	2	numSounding, numLayer	H5T_IEEE_F32LE	Column averaging kernel for XCO	(none)	(none)	-999.0	column averaging kernel for XCO (full-physics retrieval)
	xco_dfs	1	numSounding	H5T_IEEE_F32LE	DFS for XCO	(none)	(none)	-999.0	degree of freedom for signal for XCO (full-physics retrieval)
	xco_quality_flag	1	numSounding	H5T_STD_I8LE	Quality flag for XCO	(none)	0, 3	-1	quality flag for XCO (full-physics retrieval) 0 - Good, 1 - Fair, 2 - Poor, 3 - NG
	xh2o	1	numSounding	H5T_IEEE_F32LE	XH2O	ppm	(none)	-999.0	retrieved XH2O (full-physics retrieval)
	xh2o_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value of XH2O	ppm	(none)	-999.0	a priori value of XH2O
	xh2o_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of XH2O	ppm	(none)	-999.0	uncertainty of XH2O (full-physics retrieval)
	xh2o_column_averaging_kernel	2	numSounding, numLayer	H5T_IEEE_F32LE	Column averaging kernel for XH2O	(none)	(none)	-999.0	column averaging kernel for XH2O (full-physics retrieval)
	xh2o_dfs	1	numSounding	H5T_IEEE_F32LE	DFS for XH2O	(none)	(none)	-999.0	degree of freedom for signal for XH2O (full-physics retrieval)
	xh2o_quality_flag	1	numSounding	H5T_STD_I8LE	Quality flag for XH2O	(none)	0, 3	-1	quality flag for XH2O (full-physics retrieval) 0 - Good, 1 - Fair, 2 - Poor, 3 - NG
	pressure_level	2	numSounding, numLayer+1	H5T_IEEE_F32LE	Pressure grid for retrieved state	hPa	(none)	-999.0	pressure grid for retrieved state
	pressure_weighting_function	2	numSounding, numLayer	H5T_IEEE_F32LE	Pressure weighting function	(none)	(none)	-999.0	pressure weighting function for retrieved state
	dry_air_column	1	numSounding	H5T_IEEE_F32LE	Vertical column of dry air	molecule/cm^2	(none)	-999.0	vertical column of dry air for retrieved state
	dry_air_column_apriori	1	numSounding	H5T_IEEE_F32LE	Vertical column of dry air for a priori state	molecule/cm^2	(none)	-999.0	vertical column of dry air for a priori state
	co2_profile	2	numSounding, numLayer	H5T_IEEE_F32LE	CO2 profile	ppm	(none)	-999.0	retrieved CO2 profile (full-physics retrieval)
	co2_profile_apriori	2	numSounding, numLayer	H5T_IEEE_F32LE	A priori profile of CO2	ppm	(none)	-999.0	a priori profile of CO2
	co2_profile_uncert	2	numSounding, numLayer	H5T_IEEE_F32LE	Uncertainty of CO2 profile	ppm	(none)	-999.0	uncertainty of CO2 profile (full-physics retrieval)
	ch4_profile	2	numSounding, numLayer	H5T_IEEE_F32LE	CH4 profile	ppm	(none)	-999.0	retrieved CH4 profile (full-physics retrieval)
	ch4_profile_apriori	2	numSounding, numLayer	H5T_IEEE_F32LE	A priori profile of CH4	ppm	(none)	-999.0	a priori profile of CH4
	ch4_profile_uncert	2	numSounding, numLayer	H5T_IEEE_F32LE	Uncertainty of CH4 profile	ppm	(none)	-999.0	uncertainty of CH4 profile (full-physics retrieval)
	co_profile	2	numSounding, numLayer	H5T_IEEE_F32LE	CO profile	ppm	(none)	-999.0	retrieved CO profile (full-physics retrieval)
	co_profile_apriori	2	numSounding, numLayer	H5T_IEEE_F32LE	A priori profile of CO	ppm	(none)	-999.0	a priori profile of CO
	co_profile_uncert	2	numSounding, numLayer	H5T_IEEE_F32LE	Uncertainty of CO profile	ppm	(none)	-999.0	uncertainty of CO profile (full-physics retrieval)

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Column-averaged Dry-air Mole Fraction Product (4/6)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	h2o_profile	2	numSounding, numLayer	H5T_IEEE_F32LE	H2O profile	ppm	(none)	-999.0	retrieved H2O profile (full-physics retrieval)
	h2o_profile_apriori	2	numSounding, numLayer	H5T_IEEE_F32LE	A priori profile of H2O	ppm	(none)	-999.0	a priori profile of H2O
	h2o_profile_uncert	2	numSounding, numLayer	H5T_IEEE_F32LE	Uncertainty of H2O profile	ppm	(none)	-999.0	uncertainty of H2O profile (full-physics retrieval)
	fluorescence_at_reference	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 (full-physics retrieval)
	fluorescence_at_reference_apriori	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	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 (full-physics retrieval)
	fluorescence_slope	1	numSounding	H5T_IEEE_F32LE	Fluorescence slope	(none)	(none)	-999.0	retrieved fluorescence slope (full-physics retrieval)
	fluorescence_slope_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value of fluorescence slope	(none)	(none)	-999.0	a priori value of fluorescence slope
	fluorescence_slope_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of fluorescence slope	(none)	(none)	-999.0	uncertainty of fluorescence slope (full-physics retrieval)
	surface_pressure	1	numSounding	H5T_IEEE_F32LE	Surface pressure	hPa	(none)	-999.0	retrieved surface pressure (full-physics retrieval)
	surface_pressure_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value of surface pressure	hPa	(none)	-999.0	a priori value of surface pressure
	surface_pressure_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of surface pressure	hPa	(none)	-999.0	uncertainty of surface pressure (full-physics retrieval)
	temperature_shift	1	numSounding	H5T_IEEE_F32LE	Offset of temperature profile	K	(none)	-999.0	retrieved offset of temperature profile
	temperature_shift_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value of offset of temperature profile	K	(none)	-999.0	a priori value of offset of temperature profile
	temperature_shift_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of offset of temperature profile	K	(none)	-999.0	uncertainty of offset of temperature profile
	aerosol_profile_type1	2	numSounding, numLayer	H5T_IEEE_F32LE	Aerosol optical thickness profile (type 1)	(none)	(none)	-999.0	retrieved aerosol optical thickness profile (type 1)
	aerosol_profile_type1_apriori	2	numSounding, numLayer	H5T_IEEE_F32LE	A priori value of aerosol optical thickness profile (type 1)	(none)	(none)	-999.0	a priori value of aerosol optical thickness profile (type 1)
	aerosol_profile_type1_uncert	2	numSounding, numLayer	H5T_IEEE_F32LE	Uncertainty of aerosol optical thickness profile (type 1)	(none)	(none)	-999.0	uncertainty of aerosol optical thickness profile (type 1)
	aerosol_profile_type2	2	numSounding, numLayer	H5T_IEEE_F32LE	Aerosol optical thickness profile (type 2)	(none)	(none)	-999.0	retrieved aerosol optical thickness profile (type 2)
	aerosol_profile_type2_apriori	2	numSounding, numLayer	H5T_IEEE_F32LE	A priori value of aerosol optical thickness profile (type 2)	(none)	(none)	-999.0	a priori value of aerosol optical thickness profile (type 2)
	aerosol_profile_type2_uncert	2	numSounding, numLayer	H5T_IEEE_F32LE	Uncertainty of aerosol optical thickness profile (type 2)	(none)	(none)	-999.0	uncertainty of aerosol optical thickness profile (type 2)
	albedo_subband01	2	numSounding, numAlb_SB1	H5T_IEEE_F32LE	Surface albedo (sub-band 1)	(none)	(none)	-999.0	retrieved surface albedo at sub-band 1 (for land case)
	albedo_subband01_apriori	2	numSounding, numAlb_SB1	H5T_IEEE_F32LE	A priori value of surface albedo (sub-band 1)	(none)	(none)	-999.0	a priori value of surface albedo at sub-band 1 (for land case)
	albedo_subband01_uncert	2	numSounding, numAlb_SB1	H5T_IEEE_F32LE	Uncertainty of surface albedo (sub-band 1)	(none)	(none)	-999.0	uncertainty of surface albedo at sub-band 1 (for land case)
	albedo_subband02	2	numSounding, numAlb_SB2	H5T_IEEE_F32LE	Surface albedo (sub-band 2)	(none)	(none)	-999.0	retrieved surface albedo at sub-band 2 (for land case)
	albedo_subband02_apriori	2	numSounding, numAlb_SB2	H5T_IEEE_F32LE	A priori value of surface albedo (sub-band 2)	(none)	(none)	-999.0	a priori value of surface albedo at sub-band 2 (for land case)
	albedo_subband02_uncert	2	numSounding, numAlb_SB2	H5T_IEEE_F32LE	Uncertainty of surface albedo (sub-band 2)	(none)	(none)	-999.0	uncertainty of surface albedo at sub-band 2 (for land case)
	albedo_subband03	2	numSounding, numAlb_SB3	H5T_IEEE_F32LE	Surface albedo (sub-band 3)	(none)	(none)	-999.0	retrieved surface albedo at sub-band 3 (for land case)
	albedo_subband03_apriori	2	numSounding, numAlb_SB3	H5T_IEEE_F32LE	A priori value of surface albedo (sub-band 3)	(none)	(none)	-999.0	a priori value of surface albedo at sub-band 3 (for land case)
	albedo_subband03_uncert	2	numSounding, numAlb_SB3	H5T_IEEE_F32LE	Uncertainty of surface albedo (sub-band 3)	(none)	(none)	-999.0	uncertainty of surface albedo at sub-band 3 (for land case)
	albedo_subband04	2	numSounding, numAlb_SB4	H5T_IEEE_F32LE	Surface albedo (sub-band 4)	(none)	(none)	-999.0	retrieved surface albedo at sub-band 4 (for land case)
	albedo_subband04_apriori	2	numSounding, numAlb_SB4	H5T_IEEE_F32LE	A priori value of surface albedo (sub-band 4)	(none)	(none)	-999.0	a priori value of surface albedo at sub-band 4 (for land case)
	albedo_subband04_uncert	2	numSounding, numAlb_SB4	H5T_IEEE_F32LE	Uncertainty of surface albedo (sub-band 4)	(none)	(none)	-999.0	uncertainty of surface albedo at sub-band 4 (for land case)
	albedo_subband05	2	numSounding, numAlb_SB5	H5T_IEEE_F32LE	Surface albedo (sub-band 5)	(none)	(none)	-999.0	retrieved surface albedo at sub-band 5 (for land case)
	albedo_subband05_apriori	2	numSounding, numAlb_SB5	H5T_IEEE_F32LE	A priori value of surface albedo (sub-band 5)	(none)	(none)	-999.0	a priori value of surface albedo at sub-band 5 (for land case)

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Column-averaged Dry-air Mole Fraction Product (5/6)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	albedo_subband05_uncert	2	numSounding, numAlb_SB5	H5T_IEEE_F32LE	Uncertainty of surface albedo (sub-band 5)	(none)	(none)	-999.0	uncertainty of surface albedo at sub-band 5 (for land case)
	wind_speed	1	numSounding	H5T_IEEE_F32LE	Surface wind speed	m/s	(none)	-999.0	retrieved surface wind speed (for ocean case)
	wind_speed_apriori	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	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_subband01	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor (sub-band 1)	(none)	(none)	-999.0	retrieved dispersion adjustment factor for sub-band 1
	dispersion_adjustment_subband01_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor (sub-band 1)	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for sub-band 1
	dispersion_adjustment_subband01_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor (sub-band 1)	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for sub-band 1
	dispersion_adjustment_subband02	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor (sub-band 2)	(none)	(none)	-999.0	retrieved dispersion adjustment factor for sub-band 2
	dispersion_adjustment_subband02_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor (sub-band 2)	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for sub-band 2
	dispersion_adjustment_subband02_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor (sub-band 2)	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for sub-band 2
	dispersion_adjustment_subband03	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor (sub-band 3)	(none)	(none)	-999.0	retrieved dispersion adjustment factor for sub-band 3
	dispersion_adjustment_subband03_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor (sub-band 3)	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for sub-band 3
	dispersion_adjustment_subband03_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor (sub-band 3)	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for sub-band 3
	dispersion_adjustment_subband04	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor (sub-band 4)	(none)	(none)	-999.0	retrieved dispersion adjustment factor for sub-band 4
	dispersion_adjustment_subband04_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor (sub-band 4)	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for sub-band 4
	dispersion_adjustment_subband04_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor (sub-band 4)	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for sub-band 4
	dispersion_adjustment_subband05	1	numSounding	H5T_IEEE_F32LE	Dispersion adjustment factor (sub-band 5)	(none)	(none)	-999.0	retrieved dispersion adjustment factor for sub-band 5
	dispersion_adjustment_subband05_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for dispersion adjustment factor (sub-band 5)	(none)	(none)	-999.0	a priori value for dispersion adjustment factor for sub-band 5
	dispersion_adjustment_subband05_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of dispersion adjustment factor (sub-band 5)	(none)	(none)	-999.0	uncertainty of dispersion adjustment factor for sub-band 5
	zero_level_offset_subband01	1	numSounding	H5T_IEEE_F32LE	Zero level offset (sub-band 1)	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset for sub-band 1
	zero_level_offset_subband01_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset (sub-band 1)	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset for sub-band 1
	zero_level_offset_subband01_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level offset (sub-band 1)	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset for sub-band 1
	zero_level_offset_subband02	1	numSounding	H5T_IEEE_F32LE	Zero level offset (sub-band 2)	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset for sub-band 2
	zero_level_offset_subband02_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset (sub-band 2)	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset for sub-band 2
	zero_level_offset_subband02_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level offset (sub-band 2)	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset for sub-band 2
	zero_level_offset_subband03	1	numSounding	H5T_IEEE_F32LE	Zero level offset (sub-band 3)	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset for sub-band 3
	zero_level_offset_subband03_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset (sub-band 3)	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset for sub-band 3
	zero_level_offset_subband03_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level offset (sub-band 3)	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset for sub-band 3
	zero_level_offset_subband04	1	numSounding	H5T_IEEE_F32LE	Zero level offset (sub-band 4)	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset for sub-band 4
	zero_level_offset_subband04_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset (sub-band 4)	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset for sub-band 4
	zero_level_offset_subband04_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level offset (sub-band 4)	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset for sub-band 4
	zero_level_offset_subband05	1	numSounding	H5T_IEEE_F32LE	Zero level offset (sub-band 5)	W/cm^2/str/cm^(-1)	(none)	-999.0	retrieved zero level offset for sub-band 5
	zero_level_offset_subband05_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for zero level offset (sub-band 5)	W/cm^2/str/cm^(-1)	(none)	-999.0	a priori value for zero level offset for sub-band 5
	zero_level_offset_subband05_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of zero level offset (sub-band 5)	W/cm^2/str/cm^(-1)	(none)	-999.0	uncertainty of zero level offset for sub-band 5
	ils_stretch_factor_subband01	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor (sub-band 1)	(none)	(none)	-999.0	retrieved ILS stretch factor for sub-band 1
	ils_stretch_factor_subband01_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor (sub-band 1)	(none)	(none)	-999.0	a priori value for ILS stretch factor for sub-band 1
	ils_stretch_factor_subband01_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor (sub-band 1)	(none)	(none)	-999.0	uncertainty of ILS stretch factor for sub-band 1
	ils_stretch_factor_subband02	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor (sub-band 2)	(none)	(none)	-999.0	retrieved ILS stretch factor for sub-band 2
	ils_stretch_factor_subband02_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor (sub-band 2)	(none)	(none)	-999.0	a priori value for ILS stretch factor for sub-band 2
	ils_stretch_factor_subband02_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor (sub-band 2)	(none)	(none)	-999.0	uncertainty of ILS stretch factor for sub-band 2

Table 3-2 File format details of GOSAT-2 TANSO-FTS-2 SWIR L2 Column-averaged Dry-air Mole Fraction Product (6/6)

Group	Group / Dataset	Dataspace		Datatype	Dataset name	Attribute			
		Rank	Size			Unit	Valid range	Invalid value	Description
	ils_stretch_factor_subband03	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor (sub-band 3)	(none)	(none)	-999.0	retrieved ILS stretch factor for sub-band 3
	ils_stretch_factor_subband03_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor (sub-band 3)	(none)	(none)	-999.0	a priori value for ILS stretch factor for sub-band 3
	ils_stretch_factor_subband03_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor (sub-band 3)	(none)	(none)	-999.0	uncertainty of ILS stretch factor for sub-band 3
	ils_stretch_factor_subband04	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor (sub-band 4)	(none)	(none)	-999.0	retrieved ILS stretch factor for sub-band 4
	ils_stretch_factor_subband04_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor (sub-band 4)	(none)	(none)	-999.0	a priori value for ILS stretch factor for sub-band 4
	ils_stretch_factor_subband04_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor (sub-band 4)	(none)	(none)	-999.0	uncertainty of ILS stretch factor for sub-band 4
	ils_stretch_factor_subband05	1	numSounding	H5T_IEEE_F32LE	ILS stretch factor (sub-band 5)	(none)	(none)	-999.0	retrieved ILS stretch factor for sub-band 5
	ils_stretch_factor_subband05_apriori	1	numSounding	H5T_IEEE_F32LE	A priori value for ILS stretch factor (sub-band 5)	(none)	(none)	-999.0	a priori value for ILS stretch factor for sub-band 5
	ils_stretch_factor_subband05_uncert	1	numSounding	H5T_IEEE_F32LE	Uncertainty of ILS stretch factor (sub-band 5)	(none)	(none)	-999.0	uncertainty of ILS stretch factor for sub-band 5
	iteration	1	numSounding	H5T_STD_I32LE	Number of iterations	(none)	(none)	-999	number of iterations for full-physics retrieval
	residual_reduced_chi2_subband01	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals (sub-band 1)	(none)	(none)	-999.0	squares of normalized residuals of sub-band 1 for full-physics retrieval
	residual_reduced_chi2_subband02	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals (sub-band 2)	(none)	(none)	-999.0	squares of normalized residuals of sub-band 2 for full-physics retrieval
	residual_reduced_chi2_subband03	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals (sub-band 3)	(none)	(none)	-999.0	squares of normalized residuals of sub-band 3 for full-physics retrieval
	residual_reduced_chi2_subband04	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals (sub-band 4)	(none)	(none)	-999.0	squares of normalized residuals of sub-band 4 for full-physics retrieval
	residual_reduced_chi2_subband05	1	numSounding	H5T_IEEE_F32LE	Squares of normalized residuals (sub-band 5)	(none)	(none)	-999.0	squares of normalized residuals of sub-band 5 for full-physics retrieval

*1 If numSounding is 0, corresponding datasets under the following groups are not stored.
SoundingAttribute, SoundingGeometry, L1QualityInfo, CloudInformation, RetrievalResult

2 If numAlb_ is 0, corresponding datasets under the following group are not stored.
RetrievalResult