

AMSR3

Level 3 Product Format Manual

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Japan Aerospace Exploration Agency

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1. Introduction

1.1 Purpose

This document defines the format of the Level 3 product file for the Advanced Microwave Scanning Radiometer 3 (hereinafter referred to as AMSR3), a sensor mounted on the Global Observing SATellite for Greenhouse gases and Water cycle (hereinafter referred to as GOSAT-GW).

1.2 Overview

The AMSR3 Level 3 product consists of daily products that are averaged or overwritten daily using brightness temperature and physical quantity data calculated in Level 1 and Level 2 processing, and monthly products that are averaged monthly using the daily Level 3 data as input. The Level 3 product consists of 11 types of brightness temperature products and 12 types of physical quantity products, each of which is created as a separate product file. The file format is NetCDF-4/HDF5 format.

2. Related Documents

2.1 Applicable Documents

- Interface Condition Document for Advanced Processing of AMSR3 on Global Observing SATellite for Greenhouse gases and Water cycle (GOSAT-GW)
- Product Format Definition Document for AMSR3 on Global Observing SATellite for Greenhouse gases and Water cycle (GOSAT-GW)

2.2 Reference Documents

- Instruction Manual for High-Level Product Format of AMSR2 on the First-Generation Water Cycle Change Observation Satellite (GCOM-W1)
- Data Usage Handbook for the First Generation Water Cycle Change Observation Satellite "Shizuku" (GCOM-W1) (SGC-120010)

3. Product Description

3.1 Product Structure

The file structure of the AMSR3 Level 3 product (daily) is shown in Table 3.1-1, and the file structure of the AMSR3 Level 3 product (monthly) is shown in Table 3.1-2. Table 3.1-3 shows information on the number of stored data corresponding to each product, the creation unit, the projection method, and the spatial resolution. In addition, Table 3.1-4 shows the statistical method used when creating the Level 3 product daily.

Table 3.1-1 File structure of AMSR3 Level 3 Product (daily)

Structure		NetCDF-4/HDF5 Data Model	Content
Header section	Product metadata	Attribute	Stores product-specific information.
Data section		Dataset	Stores the following data. • Average/overwrite data • Quality information • Latitude and longitude • Time information

Table 3.1-2 File structure of AMSR3 Level 3 Product (monthly)

Structure		NetCDF-4/HDF5 Data Model	Content
Header section	Product metadata	Attribute	Stores product-specific information.
Data section		Dataset	Stores the following data. • Average data • Statistical information ⇒ Standard deviation ⇒ Number of valid data ⇒ Total number of data • Quality information • Latitude and longitude

Table 3.1-3 Number of stored data corresponding to each physical quantity and spatial grid

Product Name	Number of stored data	Statistical period	Equi-rectangular Projection (EQR)			Polar Stereo Northern Hemisphere 1 (PN1)				Polar Stereo Northern Hemisphere 2 (PN2)			Polar Stereo Southern Hemisphere 1 (PS1)				EASE-Grid 2.0 Global (EGG)			EASE-Grid 2.0 Northern Hemisphere (EGN)				EASE-Grid 2.0 Southern Hemisphere (EGS)			
			0.25deg	0.10deg	0.05deg	50km	25km	10km	5km	25km	10km	5km	50km	25km	10km	5km	25km	12.5km	6.25km	62.5km	25km	12.5km	6.25km	62.5km	25km	12.5km	6.25km
			EQR-L	EQR-M	EQR-H	PN1-P	PN1-L	PN1-M	PN1-H	PN2-L	PN2-M	PN2-H	PS1-P	PS1-L	PS1-M	PS1-H	EGG-L	EGG-M	EGG-H	EGN-Q	EGN-L	EGN-M	EGN-H	EGS-Q	EGS-L	EGS-M	EGS-H
Brightness Temperature	2※	daily/monthly	○	○	-	-	○	○	-	○	○	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
Atmosphere																											
Total Precipitable Water	2	daily/monthly	○	○	-	-	○	○	-	○	○	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
Could Liquid Water Content	1	daily/monthly	○	○	-	-	○	○	-	○	○	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
Precipitation	2	daily/monthly	○	○	-	-	○	○	-	○	○	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
Ocean																											
Sea Surface Temperature	3	daily/monthly	○	○	-	-	○	○	-	-	-	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
Sea Surface Wind Speed	1	daily/monthly	○	○	-	-	○	○	-	-	-	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
All-weather Sea Surface Wind Speed	1	daily/monthly	○	○	-	-	○	○	-	-	-	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
High-resolution Sea Surface Temperature	2	daily/monthly	○	○	-	-	○	○	-	-	-	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
Polar region																											
Sea Ice Concentration	1	daily/monthly	○	○	-	-	○	○	-	-	-	-	-	○	○	-	○	○	-	-	○	○	-	-	○	○	-
High-resolution Sea Ice Concentration	1	daily/monthly	○	○	-	-	○	○	○	-	-	-	-	○	○	○	○	-	-	○	○	○	-	-	○	○	○
Sea Ice Motion Vector	4	daily	-	-	-	○	-	○	-	-	-	-	○	-	○	-	-	-	○	-	○	-	○	-	○	-	-
Land area																											
Soil Moisture Content	1	daily/monthly	○	○	-	-	-	-	-	○	○	-	-	-	-	-	○	○	-	-	○	○	-	-	○	○	-
Snow Depth	2	daily/monthly	○	○	-	-	-	-	-	○	○	-	-	-	-	-	○	○	-	-	○	○	-	-	○	○	-

※For the brightness temperature products of the 165.5GHz, 183.3GHz ± 3GHz, 183.3GHz ± 7GHz channels, since the observation is only vertical (V) polarization, the number of stored data is 1.

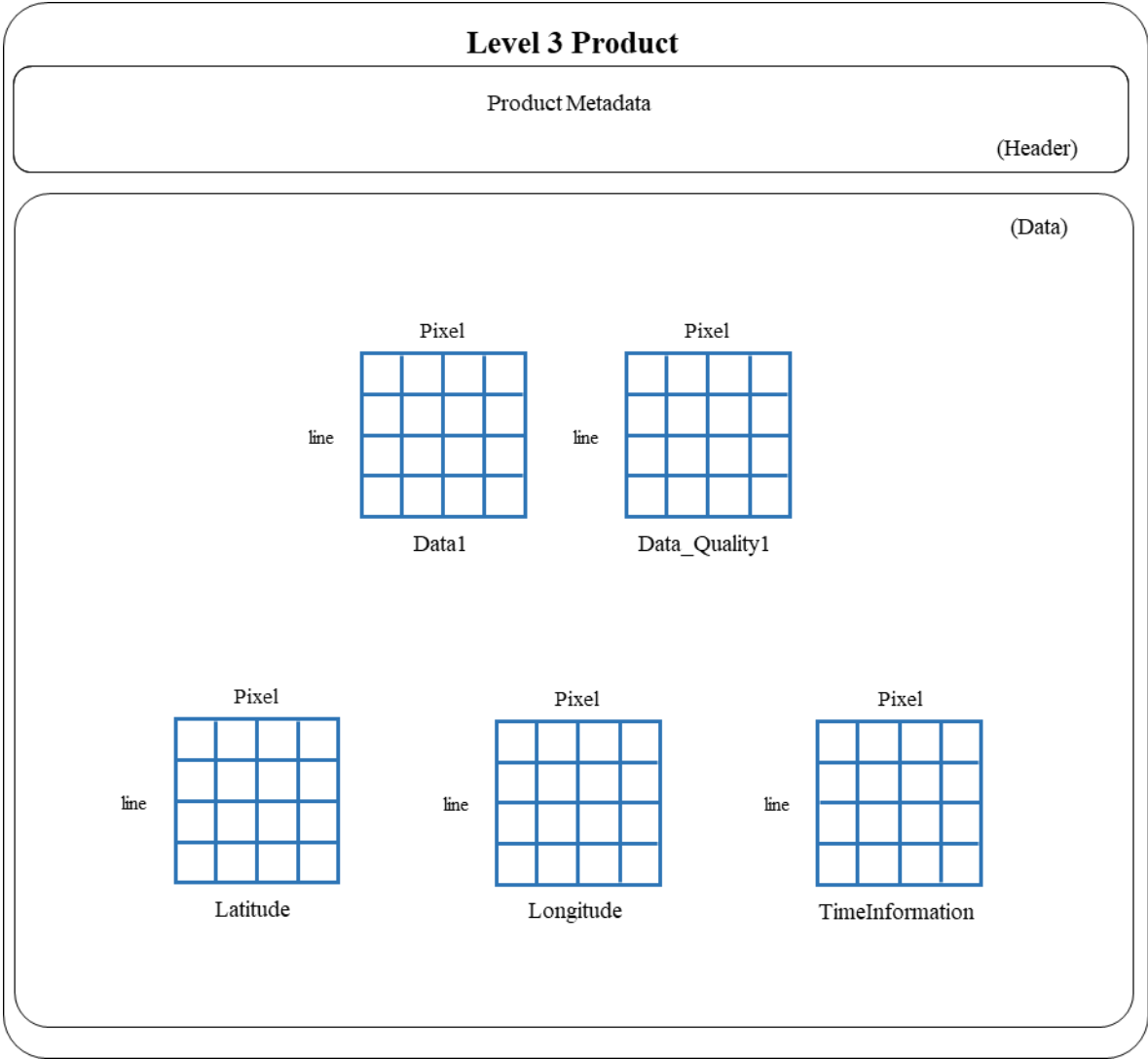
Table 3.1-4 Statistical method for Level 3 daily processing

Physical quantity	Statistical method
Brightness temperature	Average
Total water vapor amount	Overwrite
Total cloud water amount	Overwrite
Precipitation amount	Overwrite
Sea surface temperature	Overwrite
Sea surface wind speed	Overwrite
All-weather sea surface wind speed	Overwrite
High-resolution sea surface temperature	Overwrite
Sea ice concentration	Average
High-resolution sea ice concentration	Average
Sea ice motion vector	Average
Soil moisture content	Average
Snow depth	Average

※In Level 3 monthly processing, average processing is applied to all physical quantity products.

3.2 Data Structure

The data structure of the AMSR3 Level 3 Product (daily) is shown in Figure 3.2-1, and the data structure of the AMSR3 Level 3 Product (monthly) is shown in Figure 3.2-2.



Fogure 3.2-1 Data structure of AMSR3 Level 3 Product (daily)

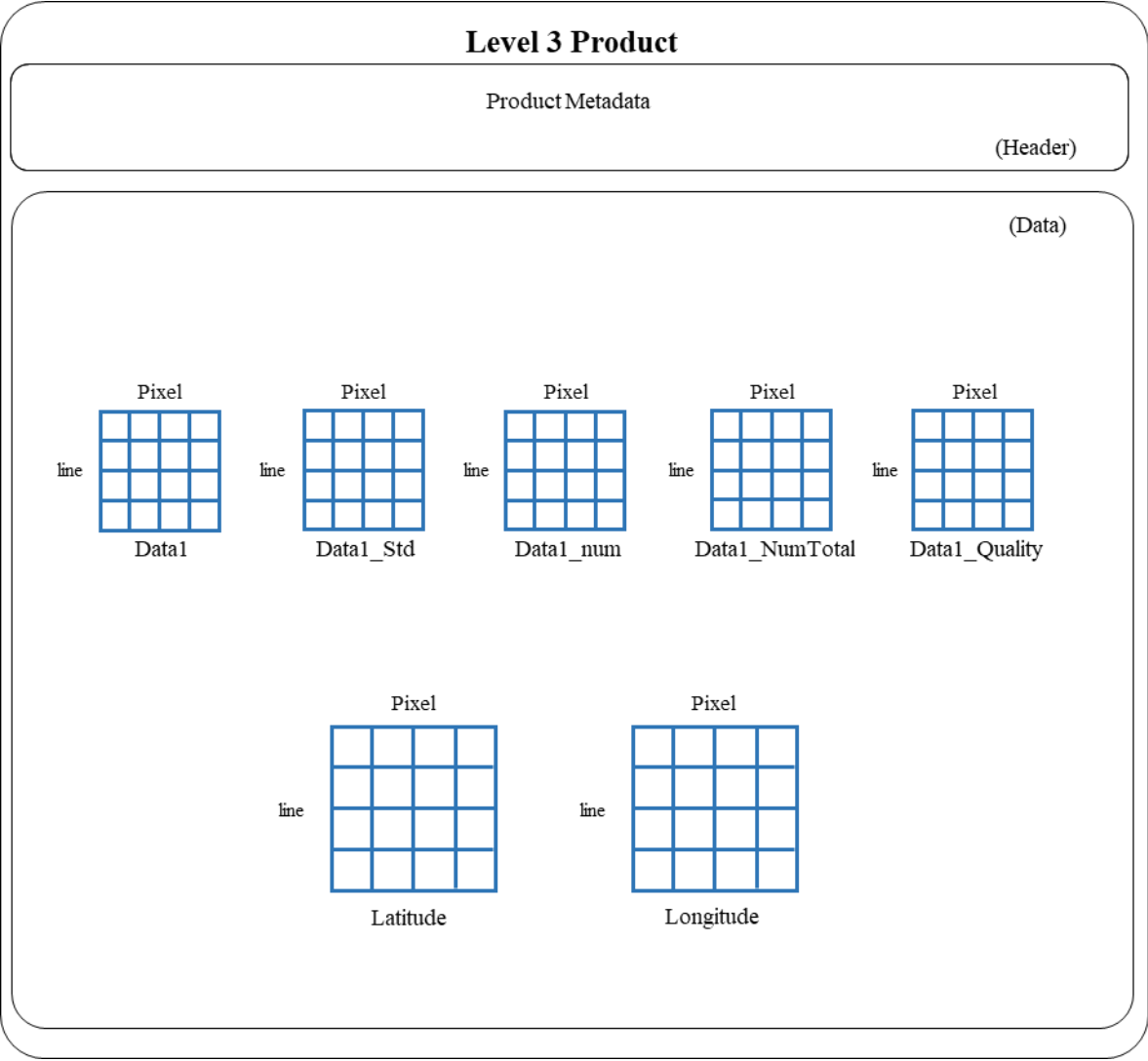


Figure 3.2-2 Data structure of Level 3 Product (monthly)

When showing multiple data, datasets with names increasing the number after "Data", such as Data1, Data2, Data3, are added. However, for quality information (_Quality), it does not necessarily correspond to each stored data, so an arbitrary number of datasets are added.

Table 3.2-1 Storage items of product metadata (Daily/Monthly)

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
1	Conventions	string	Variable	Convention (CFConvention, ACDDversion)	CF-1.7, ACDD-1.3
2	title	string	Variable	Product Name	GOSAT-GW/AMSR3 Level-3, [<i>ProductName</i>], [<i>OrbitDirection</i>], [<i>Daily/Monthly</i>], [<i>Projection</i>], [<i>Resolution</i>] ([<i>pixel/grid</i>] node) <i>ProductName</i> Brightness Temperature (89GHz,...) (Level 3) Total Precipitable Water Cloud Liquid Water Content Precipitation Sea Surface Temperature Sea Surface Wind Speed All-Weather Sea Surface Wind Speed Sea Ice Concentration High-resolution Sea Ice Concentration Soil Moisture Content Snow Depth High-resolution Sea Surface Temperature Sea Ice Motion Vector
3	institution	string	Variable	Organization Name	Japan Aerospace Exploration Agency (JAXA)
4	project	string	Variable	Project Name	JAXA GOSAT-GW Project
5	summary	string	Variable	Summary	Set a summary for each product.
6	license	string	Variable	Data Rights	https://gportal.jaxa.jp/gpr/index/eula?lang=en

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
7	creator_name	string	Variable	Product Creation Organization	Japan Aerospace Exploration Agency (JAXA)
8	creator_type	string	Variable	Organization Type	Institution
9	creator_email	string	Variable	Creation Organization Contact Email	z-gportal-support@ml.jaxa.jp
10	creator_url	string	Variable	Creation Organization Website	https://gportal.jaxa.jp/gpr/index/index?lang=en
11	keywords	string	Variable	Keywords	Set keywords that represent the contents of the file, separated by commas. Example : OCEANS, OCEAN TEMPERATURE, SEA SURFACE TEMPERATURE
12	standard_names_vocabulary	string	Variable	Glossary citing standard_name	CF Standard Name Table (v49, 12 February 2018)
13	id	string	Variable	Granule ID	Set the granule ID.
14	naming_authority	string	Variable	Organization Name	jp.jaxa
15	source	string	Variable	Data Generation Method	Set the method used to generate the data. If it's observational data, set a description that characterizes the observation. If it's data made from some model, set the model name and version.
16	processing_level	string	Variable	Processing Level	Level 3
17	comment	string	Variable	Comments	Set information about the file that is not included in other attributes.
18	date_created	string	Variable	Data Creation Date and Time (UTC)	YYYY-MM-DD T hh:mm:ss.uuuZ

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
19	time_coverage_start	string	Variable	Observation Start Date and Time (UTC)	YYYY-MM-DD T hh:mm:ss.uuuZ
20	time_coverage_end	string	Variable	Observation End Date and Time (UTC)	YYYY-MM-DD T hh:mm:ss.uuuZ
21	geospatial_lat_min	32-bit floating point	4	Minimum latitude within the map projection range (deg)	【EQR】 latitude : -90~90, longitude : 0~360 【PN1,PN2, PS1】 -9999.0(Set missing values) 【EGG】 latitude : -84.439789~84.439789, longitude : -180~180 【EGN】 latitude : 0~90, longitude : -180~180 【EGS】 latitude : -90~0, longitude : -180~180
22	geospatial_lat_max	32-bit floating point	4	Maximum latitude within the map projection range (deg)	
23	geospatial_lon_min	32-bit floating point	4	Minimum longitude within the map projection range (deg)	
24	geospatial_lon_max	32-bit floating point	4	Maximum longitude within the map projection range (deg)	

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
25	geospatial_vertical_min	32-bit floating point	4	Minimum elevation within the map projection range	-9999.0(Set missing values)
26	geospatial_vertical_max	32-bit floating point	4	Maximum elevation within the map projection range	-9999.0(Set missing values)
27	geospatial_vertical_positive	string	Variable	Vertical direction identifier	blank
28	geospatial_bounds	string	Variable	2D spatial range represented in OGC's Well-Known Text (WKT) Geometry format	【EQR, EGG, EGN, EGS】 blank 【PN1】 POLYGON ((168.35 30.98, 225 55.5, 279.26 33.92, 315 43.28, 350.03 34.35, 45 56.35, 102.34 31.37, 135 39.43, 168.35 30.98)) 【PN2】 POLYGON ((309.80 21.48, 7.53 42.61, 55.63 14.59, 90.12 24.91, 124.47 14.52, 172.52 42.36, 230.08 21.39, 269.86 34.82, 309.80 21.48)) 【PS1】 POLYGON ((317.76 -39.23, 270 -54.66, 225 -54.66, 180 -54.66, 135 -41.45, 90 -54.66, 42.24 -39.23, 0 -51.32, 317.76 -39.23))

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
29	geospatial_bounds_crs	string	Variable	Coordinate Reference System (CRS) for point coordinates in the geospatial_bounds attribute	Set the Coordinate Reference System (CRS) for point coordinates in the geospatial_bounds attribute.
30	geospatial_vertical_bounds_crs	string	Variable	Coordinate Reference System (CRS) for altitude/depth direction of point coordinates in the geospatial_bounds attribute	blank
31	language	string	Variable	Language used	en
32	topicCategory	string	Variable	Field code	Set the most appropriate field from the ISO19115 subject code table. If selecting multiple, list the codes separated by commas.
33	Role	string	Variable	Role code	Set the ISO19115 role code 003 (owner of the information).
34	history	string	Variable	File modification history	List the file modification history (date and time of modification, username, program name, and command line arguments).
35	characterSet	string	Variable	Character code	Set the ISO-19115 character code 004 (utf8).
36	acknowledgement	string	Variable	Supplementary information about the project	Set supplementary information about the project, etc.
37	publisher_name	string	Variable	Person in charge	JAXA GOSAT-GW Project

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
38	publisher_email	string	Variable	Person in charge email address	z-gportal-support@ml.jaxa.jp
39	publisher_url	string	Variable	Person in charge website URL	https://gportal.jaxa.jp/gpr/index/index?lang=en
40	DOI	string	Variable	Digital Object Identifier	Set the Digital Object Identifier to be assigned to the product.
41	DOIauthority	string	Variable	International DOI Foundation URL	http://doi.org/
42	AlgorithmDeveloper	string	Variable	Algorithm developer name	Japan Aerospace Exploration Agency (JAXA) ※Set the algorithm developer code for the sea ice motion vector (L3) product.
43	AlgorithmVersion	string	Variable	Algorithm version	Set the algorithm version (000~999).
44	AncillaryDataInformation	string	Variable	Ancillary data information	Set the ancillary data information used in the input L1/L2. ※For the sea ice motion vector (L3) product, set the ancillary data information used in the level 3 processing.
45	AutomaticQAFlag	string	Variable	Program check	Set either Good, Fair, or NG.
46	AutomaticQAFlagExplanation	string	Variable	Program check description	p=NumberOfPixelsAll-NumberOfPixelsOutsideArea, a=NumberOfPixelsRetrieved/p*100 (%); Good: p>0 and a>=80%; Fair: p>0 and a>0% and a<80%; NG: p=0 or NumberOfPixelsRetrieved=0;
47	ContactOrganizationEmail	string	Variable	Product creation agency email address	z-gportal-support@ml.jaxa.jp

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
48	ContactOrganizationName	string	Variable	Product creation agency name	Japan Aerospace Exploration Agency (JAXA)
49	DataCode	string	Variable	Abbreviation of stored data	Set the data code (Table 4.2-1, Table 4.3-1). If there are multiple, separate them with a semicolon.
50	DataDatasetName	string	Variable	Stored dataset name	DataX_P89o X:1~ If there are multiple, separate them with a semicolon.
51	DataDynamicRange	string	Variable	Dynamic range of physical quantity	Set the measurement range of each product. ※If there are multiple layers, set the measurement range of the first layer dataset.
52	DataLongName	string	Variable	Stored data name:	Set the name of the stored data.
53	DataNumber	32-bit integer	4	Number of stored data	Set the number of data to be stored.
54	DataType	string	Variable	Stored data type	Set the type of data to be stored.
55	EarthEllipsoidName	string	Variable	Earth ellipsoid model	WGS84
56	EarthFlatteningRatio	string	Variable	Earth flattening	0.00335
57	EarthSemiMajorAxis	string	Variable	Earth equatorial radius	6378.1km
58	FileFormatType	string	Variable	Format type	NetCDF-4/HDF5 File Format
59	FileFormatVersionHDF	string	Variable	HDF5 format version	Setting example : HDF5-1.x.x
60	FileFormatVersionNC	string	Variable	NetCDF-4 format version	Setting example : NetCDF-4.x.x

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
61	FileSizeByte	32-bit integer	4	Product file size (byte)	0~
62	GranuleID	string	Variable	Granule ID	Set the granule ID.
63	InputFileName	string	Variable	Input file name	Set the input file name. If there are multiple, separate them with a comma.
64	L3MeanType	string	Variable	L3 data averaging type	DayMean: Daily (average) DayOverwrite: Daily (overwrite) MonthMean: Monthly (average)
65	L3Projection	string	Variable	L3 map projection method	EQR : Equal latitude and longitude PN1: Polar Stereo Northern Hemisphere 1 PN2: Polar Stereo Northern Hemisphere PS1: Polar Stereo Southern Hemisphere 1 EGG : EASE-Grid 2.0 Global, Equal-Area (EPSG:6933) EGN : EASE-Grid 2.0 Northern Hemisphere, Lambert Azimuthal (EPSG:6931) EGS : EASE-Grid 2.0 Southern Hemisphere, Lambert Azimuthal (EPSG:6932)
66	L3Resolution	string	Variable	L3 spatial resolution	Setting example : 0.25x0.25 deg (pixel node)
67	MeteorologicalDataType	string	Variable	Used weather data	Set the weather data used in the input L1/L2. ※For the sea ice motion vector (L3) product, set the weather data used in the level 3 processing.

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
68	NumberOfInputFiles	32-bit integer	4	Number of input L1/L2 files	Set the number of input L1/L2 files.
69	NumberOfPixelsAll	32-bit integer	4	Total number of pixels	Set the total number of pixels.
70	NumberOfPixelsOutsideArea	32-bit integer	4	Number of pixels outside the target area	Set the number of pixels outside the target area.
71	NumberOfPixelsRetrieved	32-bit integer	4	Number of valid data	Count as 1 if there is at least one data present when multiple physical quantities exist.
72	NumberOfPixelsRetrievedEach DS	string	Variable	Number of valid data per dataset	Set the number of valid data for each dataset. If there are multiple, separate them with a semicolon.
73	NumberOfPixelsX	32-bit integer	4	Number of pixels (horizontal)	Refer to Table 3.4-3
74	NumberOfPixelsY	32-bit integer	4	Number of lines (vertical)	Refer to Table 3.4-3
75	ObservationEndDateTime	string	Variable	Observation data end time (UTC)	YYYY-MM-DD T hh:mm:ss.uuuZ
76	ObservationStartDateTime	string	Variable	Observation data start time (UTC)	YYYY-MM-DD T hh:mm:ss.uuuZ
77	OrbitDirection	string	Variable	Orbit direction	Ascending orbit: Ascending Descending orbit: Descending Both: Both Undefined: Undefined

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
78	OrbitNumberEnd	32-bit integer	4	Orbit end number	Orbit end number (cumulative number from launch)
79	OrbitNumberStart	32-bit integer	4	Orbit start number	Orbit start number (cumulative number from launch)
80	ParameterVersion	string	Variable	Parameter version	String of 000-999
81	PGENName	string	Variable	Data processing software name	GOSAT-GW Mission Operation System
82	PlatformShortName	string	Variable	Platform abbreviation	GOSAT-GW
83	ProcessingCenter	string	Variable	Data processing station	JAXA GOSAT-GW Project
84	ProductionCreationDateTime	string	Variable	Product generation time (UTC)	YYYY-MM-DD T hh:mm:ss.uuuZ
85	ProductName	string	Variable	Product abbreviation	AMSR3 L3 XXX (Level 3 product code) Refer to Table 3.4-2
86	ProductProcessingType	string	Variable	Product processing type	Standard product (Global)
87	ProductSupplement	string	Variable	Product supplementary information	Set the product supplementary information managed by each module.
88	ProductVersion	string	Variable	Product version	VVv VV: 00-99 v: A single alphanumeric character from A to Z
89	SatelliteAltitude	string	Variable	Satellite altitude	665.96km
90	SatelliteOrbit	string	Variable	Satellite orbit	Sun-synchronous_sub-recurrent

No	Attribute Name	Data Type	Data Size	Name	Configuration Description
91	SatelliteRevisitTime	string	Variable	Regression days	3days
92	SensorShortName	string	Variable	Observation sensor abbreviation	AMSR3
93	SensorSwathWidth	string	Variable	Swath width	1535km

Table 3.2-2 Configuration and size of the data set in the data section (Daily)

No.	Data Set Name	Data Type	Data Size (byte)	Array Size	Description
1	Data1	32-bit floating-point	4	Number of lines × Number of pixels	In the case of multiple data, additional datasets with names increasing the number after "Data", such as Data1, Data2, Data3, are stored. However, for quality information (_Quality), it does not necessarily correspond to each stored data, so an arbitrary number of datasets can be added.
2	Data1_Quality	8-bit unsigned integer	1		
3	Latitude	32-bit floating-point	4		-
4	Longitude	32-bit floating-point	4		-
5	TimeInformation	32-bit integer	4		-

※ The size of the array is defined for each combination of projection method and resolution, as shown in Table 3.4-3 L3 Projection Size.

Table 3.2-3 Configuration and size of the data set in the data section (Mohtly)

No.	Data Set Name	Data Type	Data Size (byte)	Array Size	Description
1	Data1	32-bit floating-point	4	Number of lines × Number of pixels	In the case of multiple data, additional datasets with names increasing the number after "Data", such as Data1, Data2, Data3, are stored. However, for quality information (_Quality), it does not necessarily correspond to each stored data, so an arbitrary number of datasets can be added.
2	Data1_Std	32-bit floating-point	4		
3	Data1_Num	16-bit integer	2		
4	Data1_NumTotal	16-bit integer	2		
5	Data1_Quality	8-bit unsigned integer	1		
6	Latitude	32-bit floating-point	4		—
7	Longitude	32-bit floating-point	4		—

※ The size of the array is defined for each combination of projection method and resolution, as shown in Table 3.4-3 L3 Projection Size.

3.3 Description of Data Items

The structure of each item layer that makes up the data part is as shown below. The size of each dimension is defined for each combination of projection method and resolution, as shown in Table 3.4-3 L3 Size by Projection Method.

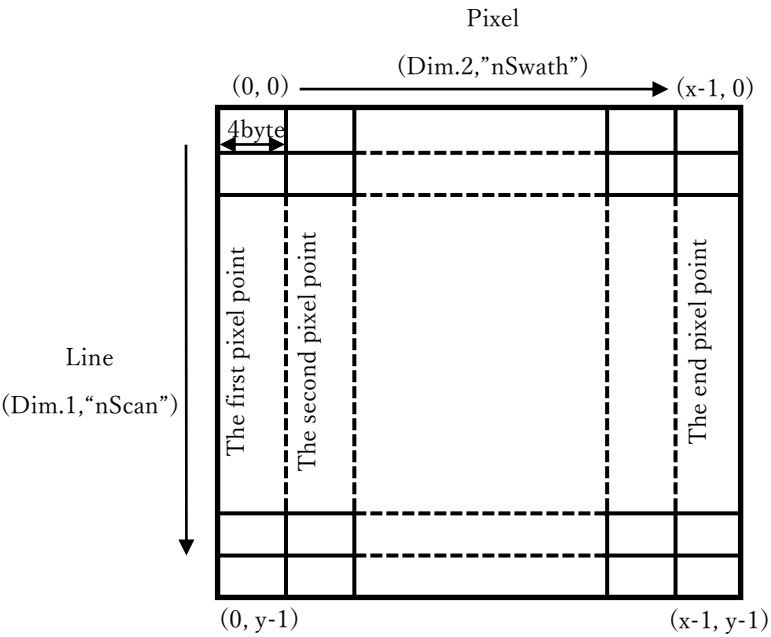


Figure 3.3-1 Structure of Data<n>, Data<n>_Std※, Latitude, Longitude, TimeInformation※ (daily/Monthly)

※Data<n>_Std is stored on a monthly, and TimeInformation is stored only on a daily.

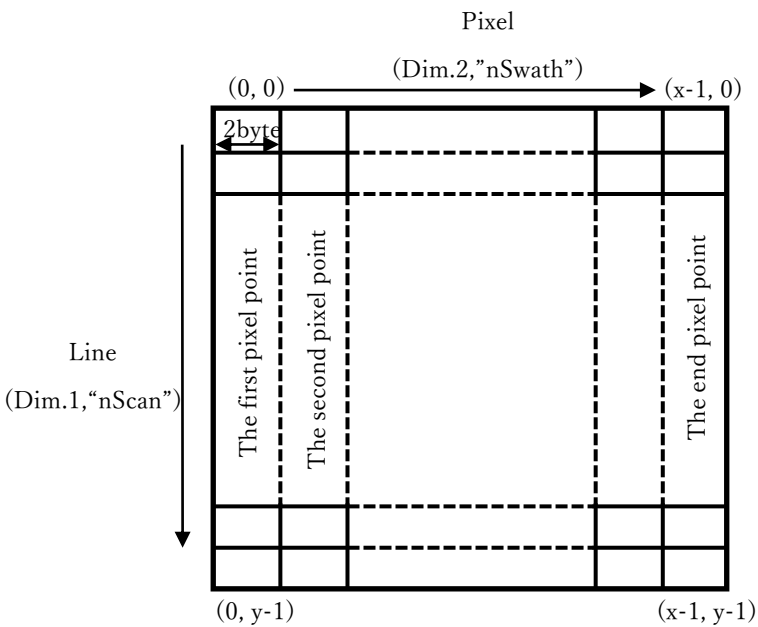


Figure 3.3-2 Structure of `Data<n>_Num`, `Data<n>_NumTotal` (Monthly)

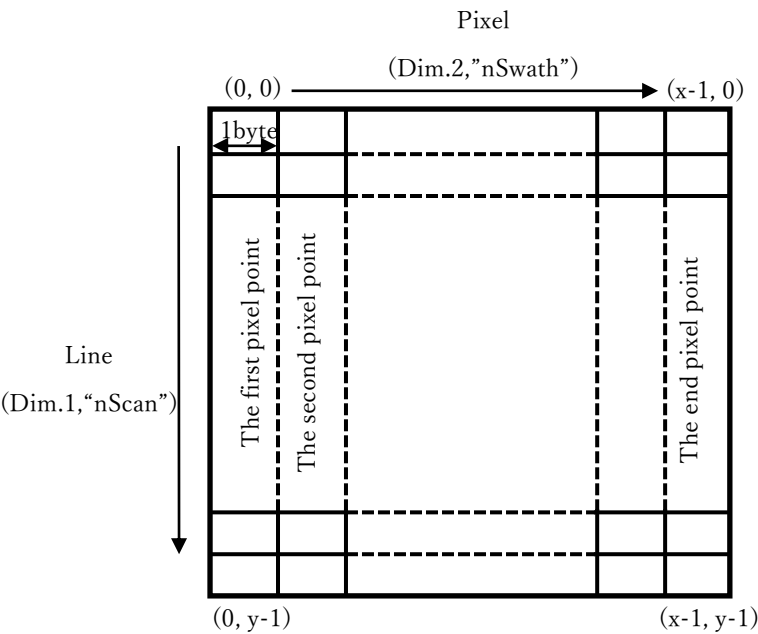


Figure 3.3-3 Structure of `Data<n>_Quality` (Daily/Monthly)

3.4 Others

3.4.1 File Name

The filename of the AMSR3 Level 3 Product is the granule ID with the extension ".nc". The convention for the granule ID is shown below.

	1										2										3										4										
Character position	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
File Name	G	G	W	A	M	3	_	Y	Y	Y	Y	M	M	D	D	_	t	t	t	X	P	P	P	_	x	L	L	K	K	K	A	A	d	V	V	v	y	y	d	d	d
sample (Physical Quantity)	G	G	W	A	M	3	_	2	0	2	3	0	9	0	1	_	0	1	D	A	E	Q	R	_	S	3	M	S	S	T	G	0	A	0	3	B	2	3	2	5	0
sample (Brightness Temperature)	G	G	W	A	M	3	_	2	0	2	3	0	9	0	1	_	0	1	M	A	E	Q	R	_	S	3	M	T	L	1	G	A	A	0	1	A	2	3	2	5	0

Table 3.4-1 Naming Convention for Level 3 Product Granule ID

String	Character position	Description
GGW	1-3	Satellite name (fixed GGW)
AM3	4-6	Sensor type (fixed AM3)
YYYYMMDD	8-15	Start date of statistical period (year in AD, time in UT) ※For monthly products DD=01
ttt	17-19	Statistical period 01D: Daily 01M: Monthly
X	20	Orbit A: Ascending orbit D: Descending orbit B: Both U: Undefined ※U is planned to be used for land assimilation products
PPP	21-23	Map projection type EQR: Equatorial PN1: Polar Stereographic Northern Hemisphere 1 PN2: Polar Stereographic Northern Hemisphere 2 PS1: Polar Stereographic Southern Hemisphere 1 EGG: EASE-Grid 2.0 Global, Equal-Area (EPSG:6933) EGN: EASE-Grid 2.0 Northern Hemisphere, Lambert Azimuthal (EPSG:6931) EGS: EASE-Grid 2.0 Southern Hemisphere, Lambert Azimuthal (EPSG:6932)

String	Character position	Description
x	25	Processing Type S: Standard Product/Standard Processing (Global) R: Research Product/Standard Processing (Global)
LL	26-27	Processing Level and Grid Size Code 3L: 0.25-degree grid/EASE Grid2.0 25km/PS 25km 3M: 0.10-degree grid/EASE-Grid2.0 12.5km/PS 10km 3H: 0.05-degree grid/EASE-Grid2.0 6.25km/PS 5km 3P: PS 50km 3Q: EASE-Grid2.0 62.5km 3N: 0.25-degree grid (Grid point node, size 1441x721)
KKK	28-30	Product Code: Refer to Table 3.4-2
AA	31-32	Area/Reception Code GA: Global GO: Global Ocean GL: Global Land PO: Polar Ocean
d	33	Developer Code Y (Processing System Developer) ※For L3 SIM products, this will be the algorithm developer code.
VV	34-35	Major Version Number (00-99) Updated when significant changes are made, such as recalibration of brightness temperature, changes in input data, revisions to the algorithm, etc. When the major version is updated, past products are reprocessed.
v	36	Minor Version Number (A-Z) Updated when minor changes are made that are compatible with the current existing product. In principle, past products are not reprocessed when the minor version is updated.
yyddd	37-41	Creation Date yy: Last two digits of the year ddd: Day of the year

Table 3.4-2 Level 3 Product Code

Code	Name (English)	Name (Japanese)
TPW	Total Precipitable Water	Total Water Vapor Amount
CLW	Could Liquid Water Content	Total Cloud Water Amount
PRC	Precipitation	Precipitation Amount
SST	Sea Surface Temperature	Sea Surface Temperature
SSW	Sea Surface Wind Speed	Sea Surface Wind Speed
ASW	All-weather Sea Surface Wind Speed	All-Weather Sea Surface Wind Speed
SIC	Sea Ice Concentration	Sea Ice Concentration
HSI	High-resolution Sea Ice Concentration	High Resolution Sea Ice Concentration
SMC	Soil Moisture Content	Soil Moisture Amount
SND	Snow Depth	Snow Depth
HST	High-resolution Sea Surface Temperature	High Resolution Sea Surface Temperature
SIM	Sea Ice Motion Vector	Sea Ice Motion Vector
TL1	Brightness Temperature 6.925GHz (Level 3)	Brightness Temperature 6.925GHz (Level 3)
TL2	Brightness Temperature 7.3GHz (Level 3)	Brightness Temperature 7.3GHz (Level 3)
TL3	Brightness Temperature 10.25GHz (Level 3)	Brightness Temperature 10.25GHz (Level 3)
TL4	Brightness Temperature 10.65GHz (Level 3)	Brightness Temperature 10.65GHz (Level 3)
TL5	Brightness Temperature 18.7GHz (Level 3)	Brightness Temperature 18.7GHz (Level 3)
TL6	Brightness Temperature 23.8GHz (Level 3)	Brightness Temperature 23.8GHz (Level 3)
TL7	Brightness Temperature 36.42GHz (Level 3)	Brightness Temperature 36.42GHz (Level 3)
TH1	Brightness Temperature 89.0GHz (Level 3)	Brightness Temperature 89.0GHz (Level 3)
TH2	Brightness Temperature 165.5GHz (Level 3)	Brightness Temperature 165.5GHz (Level 3)
TH3	Brightness Temperature 183.31+/-3GHz (Level 3)	Brightness Temperature 183.31+/-3GHz (Level 3)
TH4	Brightness Temperature 183.31+/-7GHz (Level 3)	Brightness Temperature 183.31+/-7GHz (Level 3)

3.4.2 Projection Method

The correspondence table of the projection method and grid size of the AMSR3 Level 3 product is shown in Table 3.4-3. Also, the coordinate definition of the Equatorial Cylindrical Projection (EQR) is shown in Figure 3.4-1. The coordinate definition of the Polar Stereographic Projection is shown in Figures 3.4-2 to 3.4-4. The coordinate definition of EASE-Grid 2.0 is shown in Figures 3.4-5 to 3.4-7.

Table 3.4-3 Size by L3 Projection Method

	PS-P(50km) /EASE2-Q(62.5km)		EQR-L(0.25°)/ PS-L(25km) / EASE2-L(25km)		EQR-M(0.10°)/ PS-M(10km) / EASE2-M(12.5km)		EQR-H(0.05°)/ PS-H(5km) / EASE2-H(6.25km)		EQR-N(0.25°)※	
	Vertical Direction (Number of Lines)	Horizontal Direction (Number of Pixels)	Vertical Direction (Number of Lines)	Horizontal Direction (Number of Pixels)	Vertical Direction (Number of Lines)	Horizontal Direction (Number of Pixels)	Vertical Direction (Number of Lines)	Horizontal Direction (Number of Pixels)	Vertical Direction (Number of Lines)	Horizontal Direction (Number of Pixels)
EQR	-	-	720	1440	1800	3600	3600	7200	721	1441
PN1	224	152	448	304	1120	760	2240	1520	-	-
PN2	-	-	574	432	1435	1080	2870	2160	-	-
PS1	166	158	332	316	830	790	1660	1580	-	-
EGG	-	-	584	1388	1168	2776	2336	5552	-	-
EGN/EGS	288	288	720	720	1440	1440	2880	2880	-	-

※ EQR-N is defined as a grid node where coordinates are assigned to each grid intersection. In other spatial grids, the coordinates of the cell center point are assigned to each pixel.

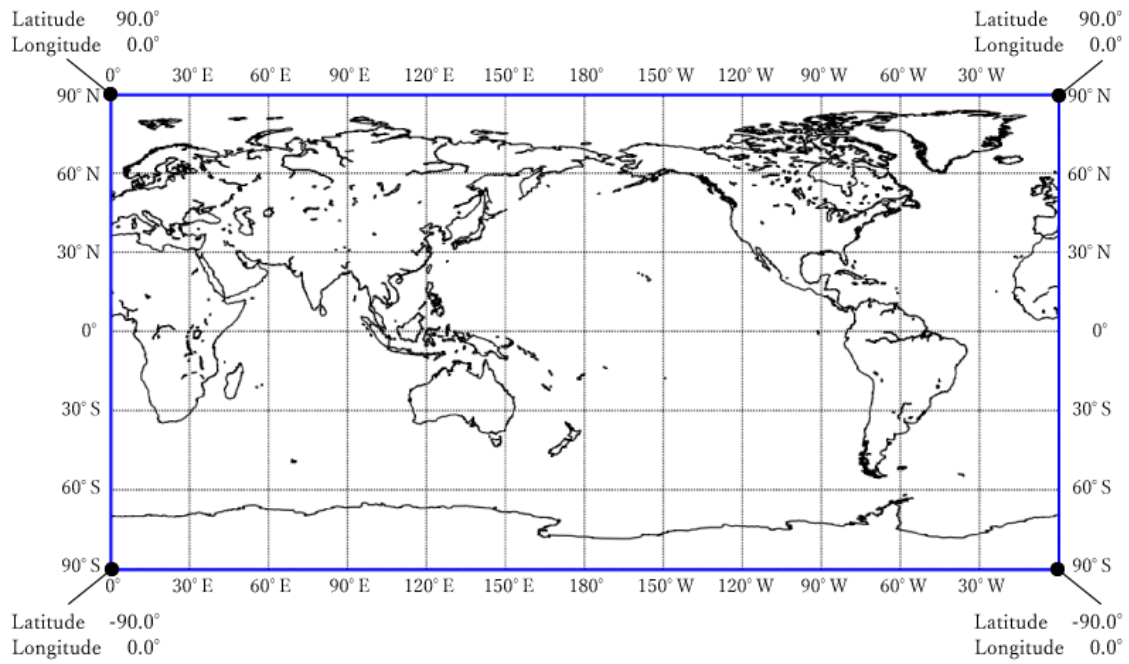


Figure 3.4-1 EQR Projection Definition

※ The latitude and longitude in the figure indicate the latitude and longitude of the grid width.

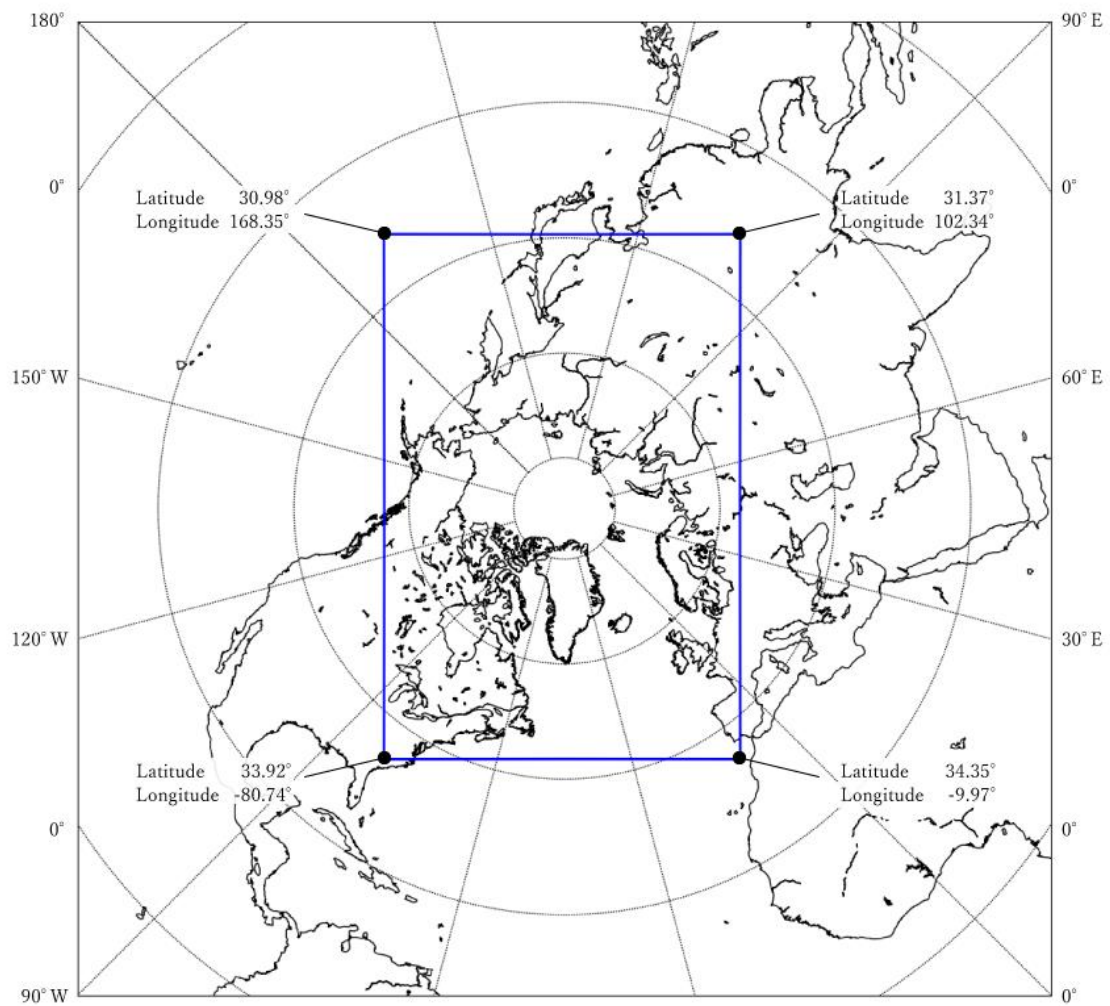


Figure 3.4-2 Polar Stereographic Projection Definition (Northern Hemisphere 1)

※ The latitude and longitude in the figure indicate the latitude and longitude of the grid width.

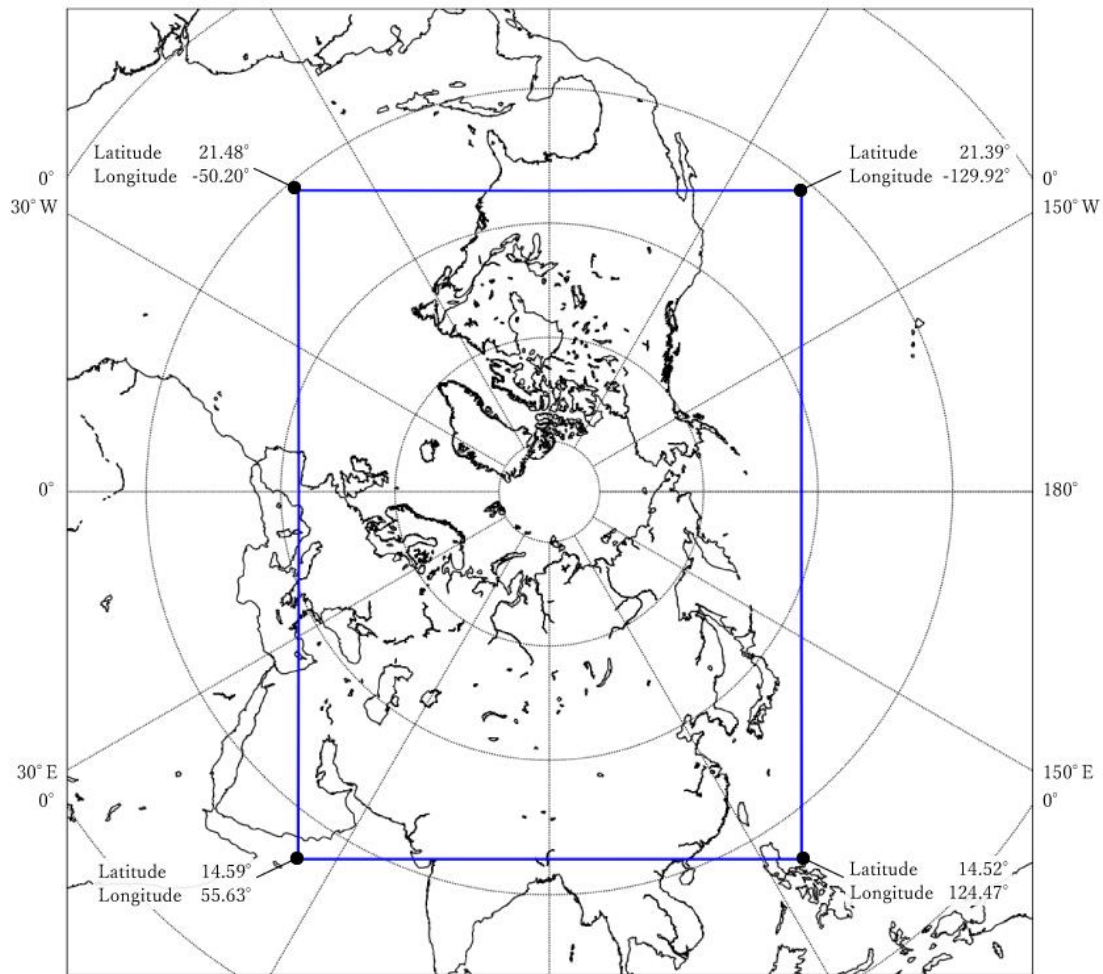


Figure 3.4-3 Polar Stereographic Projection Definition (Northern Hemisphere 2)

※ The latitude and longitude in the figure indicate the latitude and longitude of the grid width.

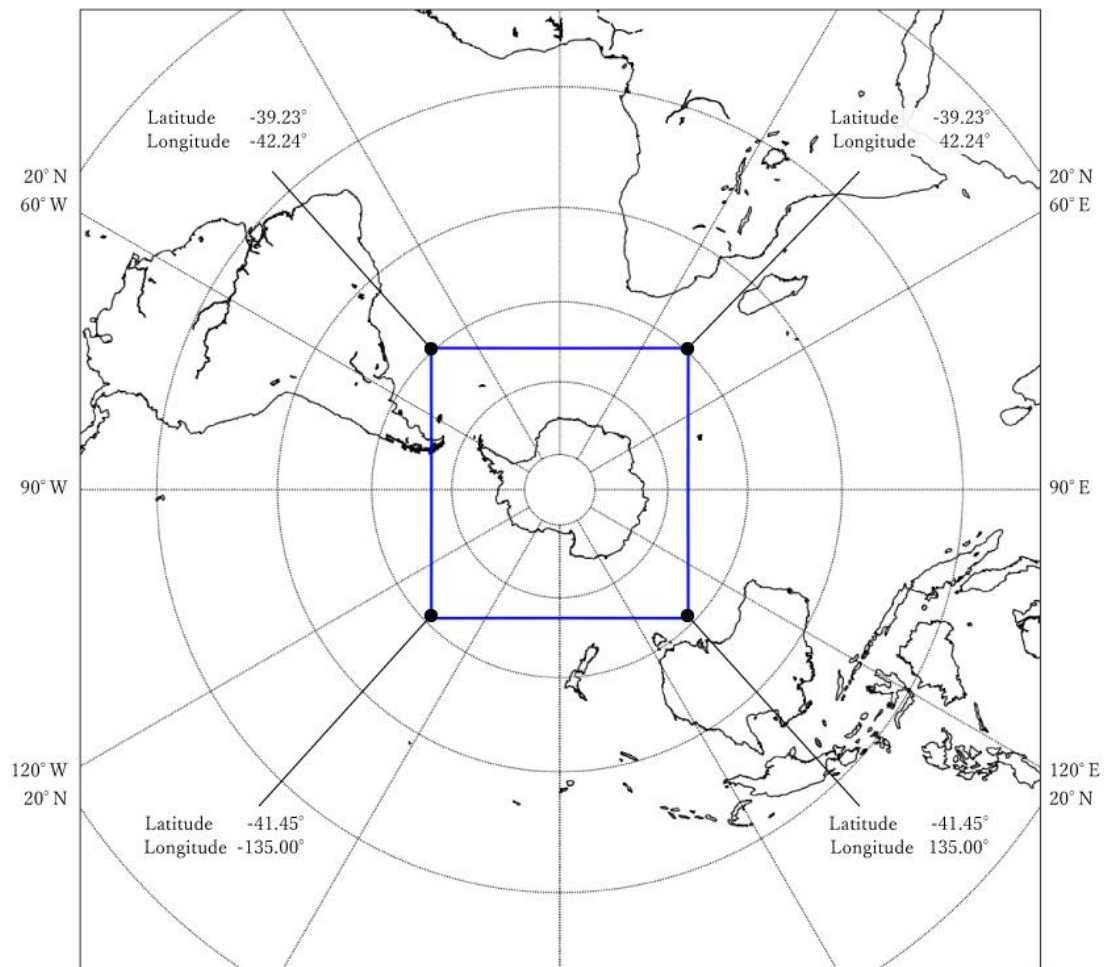


Figure 3.4-4 Polar Stereographic Projection Definition (Southern Hemisphere 1)

※ The latitude and longitude in the figure indicate the latitude and longitude of the grid width.

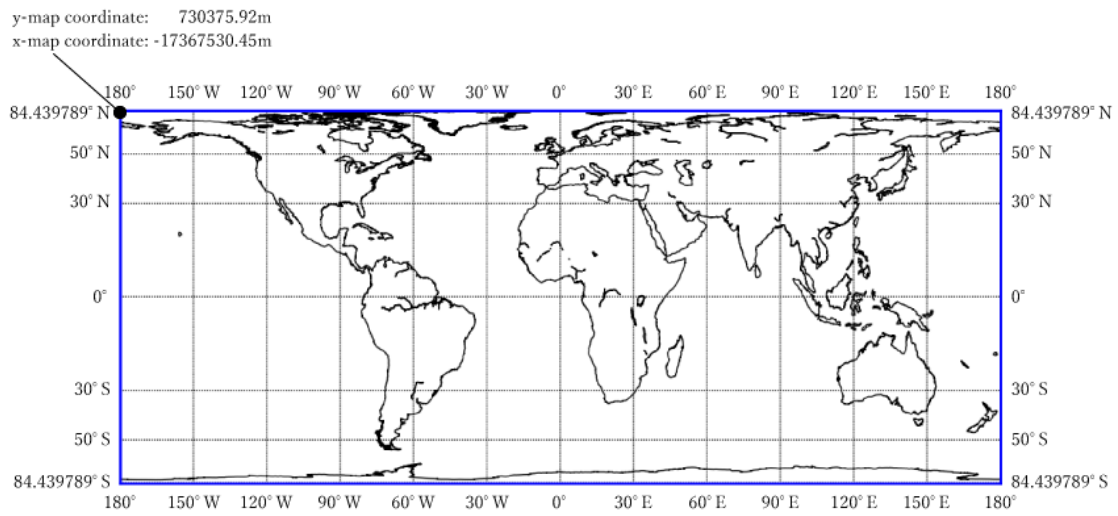


Figure 3.4-5 EASE-Grid 2.0 Projection Definition (Global, Equal-Area)

※ The latitude and longitude in the figure indicate the latitude and longitude of the grid width.



Figure 3.4-6 EASE-Grid 2.0 Projection Definition (Northern Hemisphere, Lambert Azimuthal)

※ The latitude and longitude in the figure indicate the latitude and longitude of the grid width.

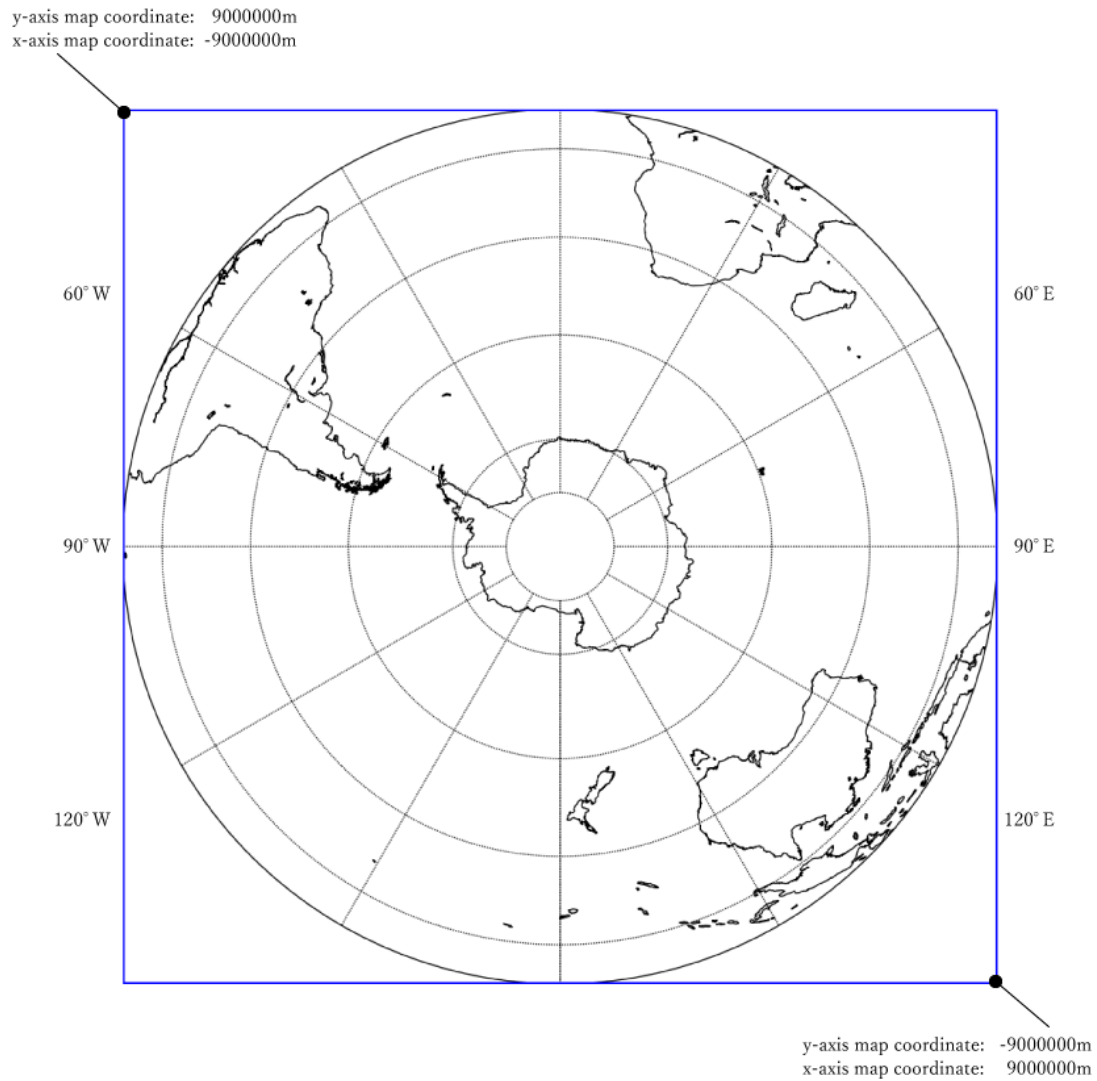


Figure 3.4-7 EASE-Grid 2.0 Projection Definition (Southern Hemisphere, Lambert Azimuthal)

※ The latitude and longitude in the figure indicate the latitude and longitude of the grid width.

3.4.3 Dummy Data

In Level 3 processing, there may be cases where physical quantities are not calculated due to reasons such as brightness temperature anomalies in Level 1 products, missing packets, areas not subject to calculation (for example, the calculation area for SST is the sea, so calculations are not performed for land areas), and unobserved areas (for example, outside the Swath or outside map projection).

-9999.0: Pixels within the Swath where physical quantities or brightness temperatures are not calculated.

-9998.0: Pixels within the Swath but outside the observation target area

-9997.0: Unobserved pixels

4. Data Description

4.1 Product Metadata

I will explain the items of the product metadata of the AMSR3 Level 3 product.

(1) Conventions

The common format conventions adhere to the standards of CF and ACDD, which are set as fixed values. This convention is revised in accordance with the version upgrade of the CF Convention and ACDD, and the latest version of CF Convention and ACDD is applied.

(2) title

Indicates the product name.

(3) institution

Indicates the name of the organization that created the product, set as "Japan Aerospace Exploration Agency (JAXA)".

(4) project

Indicates the name of the project that created the product, set as "JAXA GOSAT-GW Project".

(5) summary

Indicates a summary of the file.

(6) license

Indicates the rights and usage conditions of the data.

(7) creator_name

Indicates the name of the organization that created the product, set as "Japan Aerospace Exploration Agency (JAXA)".

(8) creator_type

Indicates the type of entity that created the product, set as "institution".

(9) creator_email

Indicates the contact email of the entity that created the product.

(10) creator_url

Indicates the URL of the website of the entity that created the product.

(11) keywords

Indicates keywords that represent the contents of the file.

(12) standard_names_vocabulary

Set as "CF Standard Name Table", a glossary that cites standard_name.

(13) id

Indicates the granule ID. For the granule ID, refer to section 3.4.1.

(14)naming_authority

Indicates the name of the organization providing the product, set as "jp.jaxa".

(15)source

Sets the method by which the data was generated. If it is observational data, a description characterizing that observation is set, and if it is data made from some model, the model name and version are set.

(16)processing_level

Indicates the processing level of the product. If it is level 3, set as "Level 3".

(17)comment

Sets comments about the product as needed.

(18)date_created

Indicates the product generation date and time (UTC) in the following format.

「YYYY-MM-DDThh:mm:ss.uuuZ」

YYYY : AD

MM : 01~12(month)

DD : 01~31(day)

hh : 00~23(hour)

mm : 00~59(minute)

ss : 00~59(second)(※ may be 60 when a leap second occurs)

uuu : 000~999(millisecond)

(19)time_coverage_start

Indicates the start date of the product observation (UTC). The format is the same as (18) date_created.

(20)time_coverage_end

Indicates the end date of the product observation (UTC). The format is the same as (18) date_created.

(21)geospatial_lat_min, geospatial_lat_max, geospatial_lon_min, geospatial_lon_max,

Indicates the minimum/maximum latitude and longitude for each projection method of the product. If the projection method is PN1/PS1/PN2, a missing value (-9999.0) is set.

(22)geospatial_vertical_min, geospatial_vertical_max

This item sets a missing value (-9999.0).

(23)geospatial_vertical_positive

This item is left blank.

(24)geospatial_bounds

It indicates the range of a two-dimensional space represented in the Well-Known Text (WKT) Geometry format of the OGC.

The polygon defining the positional information of the data area is stored as the latitude and longitude (deg) of 8 points + starting point counterclockwise from the starting point of the two-dimensional array. The latitude and longitude correspond to the center position of the grid. Using the relationship between the data position of the product shown in Figure 4.1-1 and the polygon, it is set in the following format. If the projection method is EQR/EGG/EGN/EGS, a blank is set. "POLYGON ((longitude latitude of POLYGON[0], longitude latitude of POLYGON[1], longitude latitude of POLYGON[2], longitude latitude of POLYGON[3], longitude latitude of POLYGON[4], longitude latitude of POLYGON[5], longitude latitude of POLYGON[6], longitude latitude of POLYGON[7], longitude latitude of POLYGON[8]))"

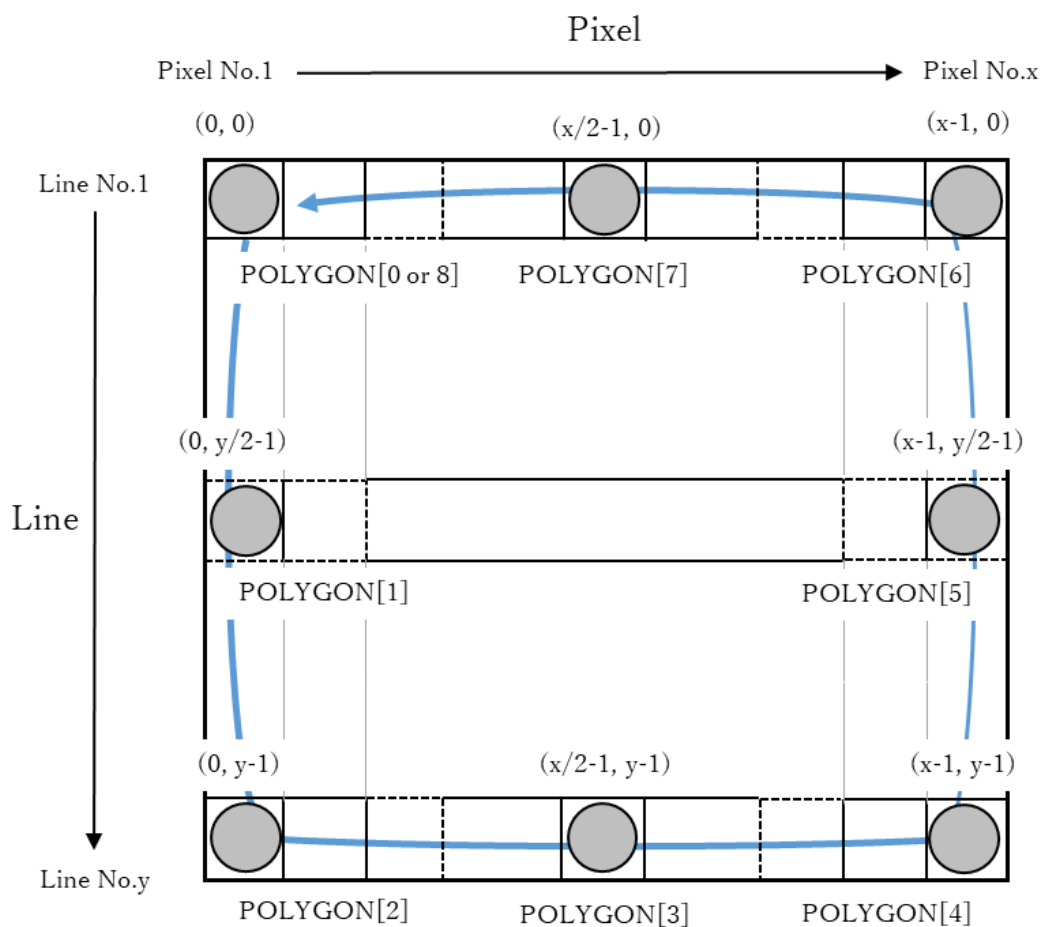


Figure 4.1-1 Relationship of data position in the product

(25)geospatial_bounds_crs

It indicates the Coordinate Reference System (CRS) of the point coordinates in the geospatial_bounds attribute.

(26)geospatial_vertical_bounds_crs

When indicating vertical direction data, set the Coordinate Reference System (CRS) of the altitude/depth direction of the point coordinates in the geospatial_bounds attribute.

(27)language

It indicates the language used, setting it to "en".

(28)topicCategory

Set the most appropriate field from the ISO19115 subject code table. If selecting multiple, list the codes separated by commas.

(29)Role

Set the ISO19115 role code 003 (owner of the information).

(30)history

It indicates the modification history of the file.

(31)characterSet

Set the ISO-19115 character code 004 (utf8).

(32)acknowledgement

It indicates supplementary information about the project.

(33)publisher_name

It indicates the person responsible for data publication, setting it to "JAXA GOSAT-GW Project".

(34)publisher_email

It indicates the email address of the person responsible for data publication, setting it to "z-gportal-support@ml.jaxa.jp".

(35)publisher_url

It indicates the website URL of the person responsible for data publication, setting it to "https://gportal.jaxa.jp/gpr/index/index?lang=en".

(36)DOI

It indicates the Digital Object Identifier to be assigned to the product.

(37)DOIauthority

It indicates the URL of the IDF (International DOI Foundation) that operates the DOI, setting it to "http://doi.org/".

(38)AlgorithmDeveloper

It indicates "Japan Aerospace Exploration Agency (JAXA)" as the algorithm developer name. For the Sea Ice Motion Vector (L3) product, describe the algorithm developer code.

(39)AlgorithmVersion

It indicates the algorithm version.

(40)AncillaryDataInformation

It indicates the ancillary data information used in the input L1/L2. For the Sea Ice Motion Vector (L3) product, set the ancillary data information used in Level 3 processing.

(41)AutomaticQAFlag

It indicates the automatic inspection results of data processing in product creation. The automatic inspection in data processing is judged by the criteria indicated in AutomaticQAFlagExplanation, and the following fixed values are set as results.

Item	Set Value	Description
AutomaticQAFlag	Good	The number of valid data is 80% or more of the target area pixel count
	Fair	The number of valid data is less than 80% of the target area pixel count
	NG	The number of valid data or the target area pixel count is 0

(42)AutomaticQAFlagExplanation

It indicates the judgment formula and criteria of AutomaticQAFlag.

(43)ContactOrganizationEmail

It indicates the contact email address, setting it to "z-gportal-support@ml.jaxa.jp".

(44)ContactOrganizationName

It indicates the contact organization name, setting it to "Japan Aerospace Exploration Agency (JAXA)".

(45)DataCode

It indicates the data code corresponding to the stored data, separated by semicolons.

(46)DataDatasetName

It indicates the stored dataset name, separated by semicolons.

(47)DataDynamicRange

Set the measurement range of each product. If there are multiple layers, set the measurement range of the first layer dataset.

(48)DataLongName

It indicates the name of the stored data, separated by semicolons.

(49)DataNumber

It indicates the number of stored datasets.

(50)DataType

It indicates the type of the stored dataset, and if there are multiple, they are separated by semicolons.

(51)EarthEllipsoidName, EarthFlatteningRatio, EarthSemiMajorAxis

It indicates the definition of the Earth ellipsoid used in the AMSR3 data processing software.

Item	Content	Set Value
EarthEllipsoidName	Earth Ellipsoid Model	WGS84
EarthFlatteningRatio	Equatorial Radius	6378.1km
EarthSemiMajorAxis	Flattening Ratio	0.00335

(52)FileFormatType

Set the format type to "NetCDF-4/HDF5 File Format".

(53)FileFormatVersionHDF

It indicates the HDF5 format version.

(54)FileFormatVersionNC

It indicates the NetCDF-4 format version.

(55)FileSizeByte

It indicates the product size (unit: Byte). Since the product size is calculated before all product metadata is shown, there may be a difference from the actual size.

(56)GranuleID

It indicates the granule ID. For the granule ID, refer to section 3.4.1.

(57)InputFileName

It indicates the input file name. If there are multiple input files, they are indicated by commas.

(58)L3MeanType

It indicates the data averaging unit. Depending on the day or month unit, set the following fixed values.

Item	Format
L3MeanType	DayMean : Daily (average) DayOverwrite : Daily (overwrite) MonthMean : Monthly (average)

(59)L3Projection

It indicates the map projection method. Depending on the projection method, set the following unique values.

Item	Set Value
Projection	EQR : Equal Latitude and Longitude PN1 : Polar Stereo Northern Hemisphere 1 PN2 : Polar Stereo Northern Hemisphere 2 PS1 : Polar Stereo Southern Hemisphere 1 EGG : EASE-Grid 2.0 Global, Equal-Area (EPSG:6933) EGN : EASE-Grid 2.0 Northern Hemisphere, Lambert Azimuthal (EPSG:6931) EGS : EASE-Grid 2.0 Southern Hemisphere, Lambert Azimuthal (EPSG:6932)

(60)L3Resolution

It indicates the resolution. For the resolution of each product, refer to Table 3.1-3 and Table 3.4-3.

(61)MeteorologicalDataType

It indicates the type of meteorological data used in the input L1/L2. For the Sea Ice Motion Vector (L3) product, set the type of meteorological data used in Level 3 processing.

Item	Format
MeteorologicalDataType	Analysis : Global Objective Analysis Value Forecast : Global Forecast Value blank : Not used

(62)NumberOfInputFiles

It indicates the number of Level 1 data or L2 data files. It matches the number of file names stored in InputFileName.

(63)NumberOfPixelsAll

It indicates the total number of pixels.

(64)NumberOfPixelsOutsideArea

As the number of pixels outside the target area, it indicates the total number of unobserved pixels (stored value -9997.0) and pixels within the swath but outside the observation target area (stored value -9998.0).

(65)NumberOfPixelsRetrieved

As the number of valid data, it indicates the number of pixels within the target area and where valid values are stored. If there are multiple physical quantities, it is counted if any one of them has data stored.

(66)NumberOfPixelsRetrievedEachDS

It indicates the number of valid data for each stored dataset.

(67)NumberOfPixelsX, NumberOfPixelsY

It indicates the number of pixels in the horizontal/vertical direction of the projection map. (Refer to Table 3.4-3)

(68)ObservationEndDateTime

It indicates the end date and time (UTC) of the observation data. The format is the same as (18) date_created.

(69)ObservationStartDateTime

It indicates the start date and time (UTC) of the observation data. The format is the same as (18) date_created.

(70)OrbitDirection

It indicates the orbital direction corresponding to the observation range of the product.

Ascending: Ascending direction

Descending: Descending direction

Both: Both (ascending and descending directions)

Undefined: Undefined

(71)OrbitNumberEnd, OrbitNumberStart

It indicates the satellite's orbit number at the first and last scan positions of the product.

The orbit number is a serial number from the launch of GOSAT-GW.

(72)ParameterVersion

It indicates the version of the parameter.

(73)PGENAME

It indicates the name of the data processing software and sets it to "GOSAT-GW Mission Operation System".

(74)PlatformShortName

It indicates the name of the satellite and sets it to "GOSAT-GW".

(75)ProcessingCenter

It indicates the data processing station and sets it to "JAXA GOSAT-GW Project".

(76)ProductionCreationDateTime

It indicates the product generation date and time (UTC). The format is the same as (18) date_created.

(77)ProductName

It indicates the sensor name, processing level, and product code, and sets it to "AMSR3 L3 XXX" (XXX: product code).

(78)ProductProcessingType

It indicates the type of processing and sets it to "Standard product (Global)".

(79)ProductSupplement

It indicates supplementary information about the product.

(80)ProductVersion

It indicates the version of the product.

(81)SatelliteAltitude, SatelliteOrbit, SatelliteRevisitTime

It indicates the specifications of the satellite (GOSAT-GW).

Item	Content	Set Value
SatelliteOrbit	Satellite Orbit	Sun-synchronous_sub-recurrent
SatelliteAltitude	Satellite Altitude	695.96km
SatelliteRevisitTime	Revisit Days	3days

(82)SensorShortName

It indicates the name of the observation sensor and sets it to "AMSR3".

(83)SensorSwathWidth

It indicates the swath width and sets it to "1535km".

4.2 Data Part (Daily)

It explains the data section (daily) of the AMSR3 Level 3 product. In addition to the processing unit (daily/monthly), the AMSR3 Level 3 product includes brightness temperature (V, H), projection method, and resolution, but the data range, description, etc. of the storage items are the same, so the description of the data items for each product is omitted.

(1) Data1

The average value (or the latest data, refer to Table 3.1-4) of valid physical quantity data (other than missing values) included in the grid is stored. If multiple data are indicated, they are assigned numbers after "Data", such as Data1, Data2, Data3.

The data stored in each file is as per Table 4.2-1.

Table 4.2-1 List of Stored Data (Daily)

Product Code	Data1	Data2	Data3	Data4	Data5
TL(1-7) /TH1	TL(1-7)_V /TH1_V	TL(1-7)_H /TH1_H	-	-	-
TH(2-4)	TH(2-4)_V	-	-	-	-
TPW	TPW_Ocean	TPW_Land	-	-	-
CLW	CLW	-	-	-	-
PRC	PRC_PrecipiRate : Precipitation Intensity	PRC_SnowProb : Snowfall Probability	-	-	-
SSW	SSW	-	-	-	-
SST	SST_6G	SST_10G	SST_Multi	-	-
SIC	SIC	-	-	-	-
SIM	SIM_U : X-direction Flow Speed	SIM_V : Y-direction Flow Speed	SIM_E : East-West Flow Speed	SIM_N : North-South Flow Speed	-
SND	SND	SND_SWE : Snow Water Equivalent	-	-	-
SMC	SMC	-	-	-	-
ASW	ASW	-	-	-	-
HSI	HSI	-	-	-	-
HST	HST_10G	HST_6G	-	-	-

The minimum and maximum values and units of each stored data are as per Table 4.2-2.

Table 4.2-2 Minimum and maximum values and units of stored data (daily)

Data Code	Data Name	Minimum Value	Maximum Value	Unit
TL(1-7)_(V/H) TH1_(V/H) TH(2-4)_V	Brightness Temperature *GHz V/H *Frequency	0	500	K
TPW_(Ocean/Land)	Total Precipitable Water over (Ocean/Land)	0	10000	kg/m ²
CLW	Cloud Liquid Water Content	0	10000	kg/m ²
PRC_PrecipRate	Precipitation Rate	0	10000	mm/h
PRC_SnowProb	Snow Probability	0	100	%
SSW	Sea Surface Wind Speed	0	10000	m/s
SST_(6G/10G/Multi)	(6GHz/10GHz/Multi-band) Sea Surface Temperature	-100	100	degree_Celsius
SIC	Sea Ice Concentration	0	100	%
SIM_(U/V/E/N)	(U/V/Eastward/Northward) Component	-200	200	cm/s
SND	Snow Depth	0	10000	cm
SND_SWE	Snow Water Equivalent	0	10000	mm
SMC	Soil Moisture Content	0	100	%
ASW	All-weather Sea Surface Wind Speed	0	10000	m/s
HSI	High-resolution Sea Ice Concentration	0	100	%
HST_(10G/6G)	High-resolution Sea Surface Temperature/6GHz High-resolution Sea Surface Temperature	-100	100	degree_Celsius

Also, the following information is set in the attributes of the data set.

Item	Set Value	Description
product_code	Product Code	Indicate the product code.
DataCode	Data Code	Indicate the data code.
long_name	Data Name	Indicate the data name.
standard_name	In the case of SST, set "sea_surface_temperature"	Set the name selected from the CF Convention's standard name table.
units	Unit	Indicates the unit.

Item	Set Value	Description
flag_values*	In the case of 【Overwrite】【Projection Method=All】 【Resolution=M】 : Store the value of flag_values of L2 that became input. In the case of 【Overwrite】【Projection Method=All】 【Resolution=L】 : Delete the "flag_values" item. In the case of 【Average】【Projection Method=EQR/EGG】 【Resolution=M】 : Store the value of flag_values of L1 or L2 that became input. In the case of 【Average】【Projection Method=EQR/EGG】 【Resolution=L】 : Delete the "flag_values" item. In the case of 【Average】【Projection Method=other than EQR/EGG】【Resolution=All】 : Delete the "flag_values" item. In the case of SIM: 0, 1, 2, 3, 128, 129, 130]	All possible values of data elements in the dataset are listed in the attribute flag_values (an array of integers).

Item	Set Value	Description
flag_meanings	In the case of 【Overwrite】 【Projection Method=All】 【Resolution=M】 : Store the value of flag_meanings of L2 that became input. In the case of 【Overwrite】 【Projection Method=All】 【Resolution=L】 : percentage_of_valid_data_in_the_area_average※1 In the case of 【Average】 【Projection Method=EQR/EGG】 【Resolution=M】 : Store the value of flag_meanings of L1 or L2 that became input. In the case of 【Average】 【Projection Method=EQR/EGG】 【Resolution=L】 : percentage_of_valid_data_in_the_area_average※1 In the case of 【Average】 【Projection Method=other than EQR/EGG】 【Resolution=All】 : numer_of_data_used_for_the_daily_average※ 2 In the case of SIM : Good.89GHz Good.36GHz Good.18GHz Good.inter_or_extrapolated NoData.ocean NoData.land_mask NoData.lat_limit	List the descriptions of flag_values for each item with a space. ※1 Spatial average valid data rate (= number of data used for spatial average / all viewpoints within a certain distance x 100, rounded down) ※2 Number of data used for the average in the time direction
cell_methods	point	Set to "point".

(3) Latitude

It indicates the latitude corresponding to each grid. The following information is set in the attributes of the dataset.

Item	Set Value	Description
long_name	latitude	Define as latitude.
standard_name	latitude	Set the name selected from the CF Convention's standard name table.
units	degrees_north	Indicates the unit.
_FillValue	-9999.0	Indicates the missing value.
scale_factor	1	Indicates the scale factor.
add_offset	0	Indicates the offset.
cell_methods	point	Set to "point".

(4) Longitude

It indicates the latitude corresponding to each grid. The following information is set in the attributes of the dataset.

Item	Set Value	Description
long_name	longitude	Define as longitude.
standard_name	longitude	Set the name selected from the CF Convention's standard name table.
units	degrees_east	Indicates the unit.
_FillValue	-9999.0	Indicates the missing value.
scale_factor	1	Indicates the scale factor.
add_offset	0	Indicates the offset.
cell_methods	point	Set to "point".

(5) TimeInformation

Convert the time of each grid obtained by the daily statistical method (overwrite, average) into "elapsed time (seconds) starting from 0:00:00 of the observation day" and store it.

If there is one time information corresponding to the grid, store that time. Also, if there are multiple time information corresponding to the grid, store the value of the average time multiplied by -1 in the case of the average processing statistical method, and the time of the latest observation data in the case of the overwrite processing.

However, the L3SIM product stores the midpoint of the observation time of the two brightness temperature images used for estimation, and a negative value indicates that the midpoint is before 0:00:00 of the observation day in the file name.

Set the following information in the attributes of the dataset.

Item	Set Value	Description
long_name	time	Define as time.
standard_name	time	Set the name selected from the CF Convention's standard name table.
units	seconds since <YYYY>-<MM>-<DD>T00:00:00Z	Indicates the unit.
_FillValue	-2147483648	Indicates the offset.
scale_factor	1	Indicates the unit.
add_offset	0	Indicates the missing value.
coordinates	Latitude Longitude	Set "Latitude Longitude".
cell_methods	point	Set to "point".

4.3 Data Part (Monthly)

This explains the data section (monthly) of the AMSR3 Level 3 product. Note that in addition to the processing unit (daily/monthly), the AMSR3 Level 3 product includes brightness temperature (V, H), projection method, and resolution, but the data range, description, etc. of the storage items are the same, so the description of data items for each product is omitted.

(1) Data1

The average value of valid (non-missing) physical quantity data included in the grid is stored. If multiple data are indicated, they are assigned numbers after "Data", such as Data1, Data2, Data3.

The data stored in each file is as shown in Table 4.3-1.

Table 4.3-1 List of Stored Data (Monthly)

Product code	Data1	Data2	Data3	Data4	Data5
TL(1-7) /TH1	TL(1-7)_V /TH1_V	TL(1-7)_H /TH1_H	-	-	-
TH(2-4)	TH(2-4)_V	-	-	-	-
TPW	TPW_Ocean	TPW_Land	-	-	-
CLW	CLW	-	-	-	-
PRC	PRC_PrecipiRate : Precipitation intensity	PRC_SnowProb : Snowfall probability	-	-	-
SSW	SSW	-	-	-	-
SST	SST_6G	SST_10G	SST_Multi	-	-
SIC	SIC	-	-	-	-
SND	SND	SND_SWE : Snow water equivalent	-	-	-
SMC	SMC	-	-	-	-
ASW	ASW	-	-	-	-
HSI	HSI	-	-	-	-
HST	HST_10G	HST_6G	-	-	-

The minimum, maximum, and unit of each stored data are as shown in Table 4.3-2.

Table 4.3-2 Minimum, Maximum, and Unit of Stored Data (Monthly)

Data code	Data name	Minimum Value	Maximum Value	Unit
TL(1-7)_(V/H) TH1_(V/H) TH(2-4)_V	Brightness Temperature *GHz V/H *Frequency	0	500	K
TPW_(Ocean/Land)	Total Precipitable Water over (Ocean/Land)	0	10000	kg/m^2
CLW	Cloud Liquid Water Content	0	10000	kg/m^2
PRC_PrecipRate	Precipitation Rate	0	10000	mm/h
PRC_SnowProb	Snow Probability	0	100	%
SSW	Sea Surface Wind Speed	0	10000	m/s
SST_(6G/10G/Multi)	(6GHz/10GHz/Multi-band) Sea Surface Temperature	-100	100	degree_Celsius
SIC	Sea Ice Concentration	0	100	%
SND	Snow Depth	0	10000	cm
SND_SWE	Snow Water Equivalent	0	10000	mm
SMC	Soil Moisture Content	0	100	%
ASW	All-weather Sea Surface Wind Speed	0	10000	m/s
HSI	High-resolution Sea Ice Concentration	0	100	%
HST_(10G/6G)	High-resolution Sea Surface Temperature/6GHz High- resolution Sea Surface Temperature	-100	100	degree_Celsius

Also, set the following information in the attributes of the dataset.

Item	Set Value	Description
product_code	Product Code	Indicate the product code.
DataCode	Data Code	Indicate the data code.
long_name	Data Name	Indicate the data name.
standard_name	In the case of SST, set "sea_surface_temperature".	Set the name selected from the CF Convention's standard name table.
units	Unit	Indicates the unit.

Item	Set Value	Description
valid_min	Minimum Value	Indicates the minimum value.
valid_max	Maximum Value	Indicates the maximum value.
scale_factor	1	Indicates the scale factor.
add_offset	0	Indicates the offset.
coordinates	Latitude Longitude	Set "Latitude Longitude".
cell_methods	mean	In the case of the L3 monthly product, set "mean".

(2) Data1_Std

The standard deviation calculated from all valid (non-missing) data used in the average processing is stored in each grid. Note that missing values are treated the same as Data1, refer to section 3.4.3.

If multiple data are indicated, they are assigned numbers after "Data".

Set the following information in the attributes of the dataset.

Item	Set Value	Description
long_name	<Data Name> (Standard deviation)	Indicate the dataset name. indicates the long_name of Data1.
standard_name	blank	Leave it blank.
units	Data1 Same unit as	Indicates the unit.
scale_factor	1	Indicates the scale factor.
add_offset	0	Indicates the offset.
coordinates	Latitude Longitude	Set "Latitude Longitude".
cell_methods	standard_deviation	Set " standard_deviation ".

(3) Data1_Num

The number of all valid (non-missing) data used in the average processing is stored in each grid.

If multiple data are indicated, they are assigned numbers after "Data".

Set the following information in the attributes of the dataset.

Item	Set Value	Description
long_name	<Data Name> (Number of data used for statistics)	Indicate the dataset name. indicates the long_name of Data1.
standard_name	blank	Leave it blank.
units	blank	Leave it blank.
_FillValue	-32768	Indicate the missing value.
scale_factor	1	Indicates the scale factor.
add_offset	0	Indicates the offset.
coordinates	Latitude Longitude	Set "Latitude Longitude".
cell_methods	point	Set to "point".

(4) Data1_NumTotal

A Regardless of whether it is invalid or valid, the number of data included in each grid is stored. In the case of multiple data, a number is added after "Data". The following information is set in the attributes of the dataset.

Item	Set Value	Description
long_name	<Data Name> (Total Number of observations)	Indicate the dataset name. indicates the long_name of Data1.
standard_name	blank	Leave it blank.
units	blank	Leave it blank.
_FillValue	-32768	Indicates the missing value.
scale_factor	1	Indicates the scale factor.
add_offset	0	Indicates the offset.
coordinates	Latitude Longitude	Set "Latitude Longitude".
cell_methods	point	Set to "point".

(5) Data1_Quality

As the quality of the physical quantity data calculated in each grid, it indicates the valid data rate (= number of daily data used for monthly average / number of days in a month x 100, rounded down). When multiple data are indicated, not necessarily corresponding to each stored data, an arbitrary number of datasets are added. The name of the dataset at that time is increased to any number after "Data".

Set the following information in the attributes of the dataset:

Item	Set Value	Description
long_name	<Data Name>(Quality)	Indicate the quality data name. Set the long_name of Data for .
standard_name	quality_flag	Set the name selected from the CF Convention's standard name table.
unit	blank	Leave it blank.
_FillValue	255	Indicates the missing value.
coordinates	Latitude Longitude	Set "Latitude Longitude".
flag_meanings	"percentage_of_valid_data_in_the_monthly_average"	Indicate the description of flag_values.
cell_methods	point	Set to "point".

(6) Latitude

Indicate the latitude corresponding to each grid.

Set the following information in the attributes of the dataset:

Item	Set Value	Description
long_name	latitude	Define as latitude.
standard_name	latitude	Set the name selected from the CF Convention's standard name table.
units	degrees_north	Indicates the unit.
_FillValue	-9999.0	Indicates the missing value.
scale_factor	1	Indicates the scale factor.
add_offset	0	Indicates the offset.
cell_methods	point	Set to "point".

(7) Longitude

longitude the latitude corresponding to each grid.

Set the following information in the attributes of the dataset:

Item	Set Value	Description
long_name	longitude	Define as longitude.
standard_name	longitude	Set the name selected from the CF Convention's standard name table.
units	degrees_east	Indicates the unit.
_FillValue	-9999.0	Indicates the missing value.
scale_factor	1	Indicates the scale factor.
add_offset	0	Indicates the offset.
cell_methods	point	Set to "point".