

Appendix. 3-4

AMSR-E Level 3 format description (NDX-000274B)

NDX-000274B

AMSR-E Level 3  
Product Format Description Document

Japan Aerospace Exploration Agency (JAXA)

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## 1. Introduction

### 1.1. Purpose

This document describes the format of AMSR-E level 3 product which is produced at Earth Observation Center (EOC) of National Space Development Agency of Japan (NASDA). This format specification describes the structure and contents of AMSR-E level 3 product.

### 1.2. Scope

AMSR-E on the EOS Aqua which is planned to solve the mechanism of trend warming on the earth and so on, and it observes various bands of microwave radiation even if it is cloudy or at night. The AMSR-E data is processed at the EOC, and its products will be distributed to users. There are 6 kinds of products shown in Table 1.2-1.

Table 1.2-1 Kinds of AMSR-E product

Product name	Outline
1A	Raw data observed by AMSR-E. It is the product that is processed on level 0 data for radiometric and geometric correction.
1B	Brightness temperature that is transformed from antenna temperature in level 1A by transformation coefficients.
2	Geophysical quantity for water, water vapor (WV), cloud liquid water (CLW), precipitation (AP), sea surface wind speed (SSW), sea surface temperature (SST), sea ice concentration (IC), snow water equivalent (SWE), and soil moisture (SM), are calculated from the level 1B.
3	Average data that is calculated level 1B or level 2, and projected it on each map by equirectangular and polar stereo graphic.
1B Map	Projected level 1B product on map.
2Map	Projected level 2 product on map.

Level 3 product contains the global data, which are the daily or monthly average data of each geophysical quantity, such as brightness temperature in level 1B product, WV, CLW, AP, SSW, IC, SWE, or SM in level 2 product. The data in level 3 is calculated average daily or monthly in each directions, such as ascending or descending, and projected by equirectangular or polar stereo graphic. In the case of polar stereo the data more than 60 degrees for latitude are projected.

Level 3 product is processed from level 1B or level 2 product. Level 1B product contains the value of brightness temperature which is calculated from temperature on antenna by transformation coefficients. Level 2 product contains the geophysical quantity calculated from level 1B. Both of level 1B and level 2 also contain observation point, orbit data, attitude data together.

The software inputs level 1B or level 2 product, project its data on a map, calculates average, and

outputs in the level 3 product whose type is an HDF( Hierarchical Data Format ). The average data is calculated by the day or month. It is the average on the grid. Calculated data list is shown in Table 1.2-2.

This document describes only an outline of data in level 3 product and its format.

Table 1.2-2 Data list of AMSR-E level 3 product

Product Code	Geophysical quantity	Calculating period	Method of calculating average	Data unit	Map projection
TB	Brightness temperature <sup>(*1)</sup>	Day or Month	Simple average	Global <sup>(*2)</sup>	Equirectangular <sup>(*3)</sup> Polar stereo <sup>(*4)</sup>
WV	Water vapor	Day or Month	Simple average	Global <sup>(*2)</sup>	Equirectangular <sup>(*3)</sup>
CLW	Cloud liquid water	Day or Month	Simple average	Global <sup>(*2)</sup>	Equirectangular <sup>(*3)</sup>
AP	Precipitation	Day or Month	Simple average	Global <sup>(*2)</sup>	Equirectangular <sup>(*3)</sup>
SSW	Sea surface wind speed	Day or Month	Simple average	Global <sup>(*2)</sup>	Equirectangular <sup>(*3)</sup>
SST	Sea surface temperature	Day or Month	Simple average	Global <sup>(*2)</sup>	Equirectangular <sup>(*3)</sup>
IC	Ice concentration	Day or Month	Simple average	Global <sup>(*2)</sup>	Polar stereo <sup>(*4)</sup>
SWE	Snow water equivalence	Day or Month	Simple average	Global <sup>(*2)</sup>	Equirectangular <sup>(*3)</sup> Polar stereo <sup>(*5)</sup>
SM	Soil moisture	Day or Month	Simple average	Global <sup>(*2)</sup>	Equirectangular <sup>(*3)</sup>

(\*1)A channel per a product.

(\*2)By ascending or descending.

(\*3)Its interval is 0.25°. There are 721 points along latitude and 1440 points along longitude. The origin is at lat. 90°S and long. 0°E.

(\*4)Northern hemisphere : The four corners of projection are as follows.

Lat. 30.98° N/long. 168.35° E, lat. 31.37° N/long. 102.34° E, lat. 33.92° N/long. 80.74° W, lat. 34.35° N/long. 9.97° W.

Its pixel spacing is 25km. There are 304 points for pixel and 448 for line.

Southern hemisphere : The four corners of projection are as follows.

Lat. 30.98° S/long. 42.24° W, lat. 39.23° S/long. 42.24° E, lat. 41.45° S/long. 135.00° W, lat. 41.45° S/long. 135.00° E.

Its pixel spacing is 25km. There are 316 points for pixel and 332 for line.

(\*5)Northern hemisphere : The projection area is as follows.

The upper side of quadrangle is on lat. 35.00° N, the lower side on lat. 25.00° N, the left side on lat.43.00° N, the right side on lat. 43.00° N.

Its pixel spacing is 25km. There are 431 points for pixel and 573 for line.

Southern hemisphere : Nothing.

## 2. Related and reference documents

### 2.1. Related Documents

(1)AMSR-E Product Specifications (NDX-000184)

### 2.2. Reference Documents

(1) 「RESEARCH ANNOUNCEMENT Retrieval Algorithm and Related Study Advanced Microwave Scanning Radiometer (GLI / AMSR) on Advanced Earth Observing Satellite-II」 (NDX-000098)

(2)ADEOS-II Science Plan (Science Research) (NDX-000114)

(3)ADEOS-II Science Plan (Science Plan) (NDX-000115)

(4)Document of ADEOS-II AMSR Retrieval Algorithm Development (Ver.0.00) (NDX-000156)

(5)AMSR-E/AMSR Level 2Map/3 Software Design (AMSR-HS-I-027B)

(6)ADEOS-II AMSR EORC Common Library Function Description (NDX-00146)

(7)Granule ID Denomination (NCX-000231)

(8)EOS-PM1 AMSR-E Level 1 Product Specifications (NEB-00011A)

(9)AMSR-E L2Map Product Specifications (NDX-000273)

(10)AMSR L2 Product Specifications (NDX-000154)

(11)EOC Toolkit Revision Requirement(Draft) (AMSR-SA-MS-I-006E)

(12)HDF Reference Manual Ver4.2r1, March 2005

(13)HDF User's Guide Ver4.2r0, December 2003

(14)DMSP SSM/I Brightness Temperatures and Sea Ice Concentration Grids for the Polar Regions User's Guide, NSIDC Distributed Active archive Center, Cooperative Institute for Research in Environmental Sciences(CIRES)

### 3. Structure of product

The estimated data in level 2 product from brightness temperature, such as WV, CLW, AP, SSW, SST, IC, SWE or SM, or brightness temperature in level 1B is projected on a map and calculated average by the day or the month, and stored in level 3 whose type is HDF format. A level 3 product contains only one geophysical quantity. In the case of polar stereo it contains only the data around the north pole or south. Level 3 product contains two major parts the header and data. The header part is composed of Coremeta data. Coremeta data describes the information about a product. Its detail is shown in the section 3.1.1.

The structure of level 3 product is shown in Figure 3-1.

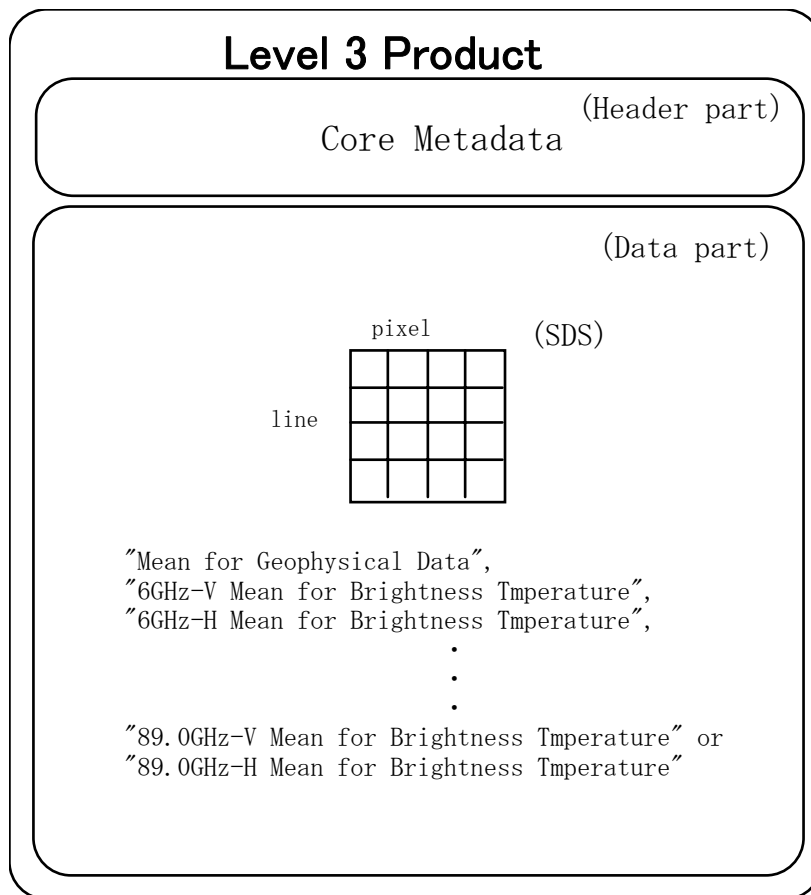


Figure 3-1 Structure of level 3 product.

## 3.1. Header part

### 3.1.1. Coremeta data

Coremeta data contains the necessary information about the product. These items are selected from the necessary attributes listed in the NASA ECS format, revision B.0. NASA ECS retrieves the dataset location with attributes. The meta data is stored in the Coremeta data and its name is considered as global attribute. Metadata in each global attribute is preserved in ASCII.

A list of Coremeta data is shown in Table 3.1.1-1.



Table 3.1.1-1 List of Coremeta data

Item	Explanation	Example
Short Name	Product name	AMSR-E-L3
GeophysicalName	Geophysical quantity name	Water Vapor/Cloud liquid water/Precipitation/Sea surface temperature/Sea surface wind speed/Sea ice concentration/Snow water equivalent/Soil moisture/Brightness temperature(6GHz V) etc.
VersionID	ID of product version	0-255
SizeMBECSDataGranule	Product size (Mbyte)	30(actual)
Local Granule ID	Number for production management	P1AME010101A_P3WV0Tak111E0
ProcessingLevelID	ID of processing level	L3
ProductionDate	Time of production (UT)	2002-1-3-T00:00:00.00Z
RangeBeginningTime	Time to start observing (UT)	00:00:00.00Z
RangeBeginningDate	Date to start observing (UT)	2002-1-3
RangeEndingTime	Time to end observing (UT)	01:00:00.00Z
RangeEndingDate	Date to end observing (UT)	2002-1-3
PGENAME	Name of software	(max 20 character )
PGEVersion	Version of software	(max 18 character )
InputPointer	Input file name	P1AME020101001MA_P01B0000000000.00
ProcessingCenter	Name of data processing center	JAXA/EOC
ContactOrganizationName	Organization name to contact about this product	JAXA,1401,Ohashi,Hatoyama-machi,Hiki-gun,Saitama,350-0393,JAPAN,+81-49-298-1307,orderdesk@eoc.jaxa.jp
StartOrbitNumber	Start orbit number	100
StopOrbitNumber	Stop orbit number	100
OrbitDirection	Orbit direction	DESCENDING
PlatformShortName	Abbreviated name of platform	Aqua
SensorShortName	Abbreviated name of observing sensor	AMSR-E
ECSDDataModel	Name of meta data model	B.0

### 3.2. Data part

There are 3 types for storing the average in level 3 product. In the case of equirectangular the data is stored as a SDS of 2 dimension array, which is 304 points for pixel and 448 for line. In Polar stereo it is 316 for pixel and 448 for line, or 431 for pixel and 573 for line. In the case of polar stereo of TB or IC the only average around the north pole or south is stored in SDS, for SWE the only the average around the north pole is stored.

As above the data part is composed of only one SDS.

The data part specifications is shown in Table 3.2-1~7. The structure of SDS is shown in Figure 3.2-1~4.

Table 3.2-1 Data part specifications (Equirectangular, TB)

No.	Items	Byte	Type	Scale factor	Pixel	Line	Unit
1	6GHz-V Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
2	6GHz-H Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
3	10.65GHz-V Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
4	10.65GHz-H Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
5	18.7GHz-V Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
6	18.7GHz-H Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
7	23.8GHz-V Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
8	23.8GHz-H Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
9	36.5GHz-V Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
10	36.5GHz-H Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
11	89.0GHz-V Mean for Brightness Temperature	2	signed int	0.1	1440	721	K
12	89.0GHz-H Mean for Brightness Temperature	2	signed int	0.1	1440	721	K

Table 3.2-2 Data part specifications (Polar stereo in the northern hemisphere, TB)

No.	Items	Byte	Type	Scale factor	Pixel	Line	Unit
1	6GHz-V Mean for Brightness Temperature	2	signed int	0.1	304	448	K
2	6GHz-H Mean for Brightness Temperature	2	signed int	0.1	304	448	K
3	10.65GHz-V Mean for Brightness Temperature	2	signed int	0.1	304	448	K
4	10.65GHz-H Mean for Brightness Temperature	2	signed int	0.1	304	448	K
5	18.7GHz-V Mean for Brightness Temperature	2	signed int	0.1	304	448	K
6	18.7GHz-H Mean for Brightness Temperature	2	signed int	0.1	304	448	K
7	23.8GHz-V Mean for Brightness Temperature	2	signed int	0.1	304	448	K
8	23.8GHz-H Mean for Brightness Temperature	2	signed int	0.1	304	448	K
9	36.5GHz-V Mean for Brightness Temperature	2	signed int	0.1	304	448	K
10	36.5GHz-H Mean for Brightness Temperature	2	signed int	0.1	304	448	K
11	89.0GHz-V Mean for Brightness Temperature	2	signed int	0.1	304	448	K
12	89.0GHz-H Mean for Brightness Temperature	2	signed int	0.1	304	448	K

Table 3.2-3 Data part specifications (Polar stereo in the southern hemisphere, TB)

No.	Items	Byte	Type	Scale factor	Pixel	Line	Unit
1	6GHz-V Mean for Brightness Temperature	2	signed int	0.1	316	332	K
2	6GHz-H Mean for Brightness Temperature	2	signed int	0.1	316	332	K
3	10.65GHz-V Mean for Brightness Temperature	2	signed int	0.1	316	332	K
4	10.65GHz-H Mean for Brightness Temperature	2	signed int	0.1	316	332	K
5	18.7GHz-V Mean for Brightness Temperature	2	signed int	0.1	316	332	K
6	18.7GHz-H Mean for Brightness Temperature	2	signed int	0.1	316	332	K
7	23.8GHz-V Mean for Brightness Temperature	2	signed int	0.1	316	332	K
8	23.8GHz-H Mean for Brightness Temperature	2	signed int	0.1	316	332	K
9	36.5GHz-V Mean for Brightness Temperature	2	signed int	0.1	316	332	K
10	36.5GHz-H Mean for Brightness Temperature	2	signed int	0.1	316	332	K
11	89.0GHz-V Mean for Brightness Temperature	2	signed int	0.1	316	332	K
12	89.0GHz-H Mean for Brightness Temperature	2	signed int	0.1	316	332	K

Table 3.2-4 Data specifications (Equirectangular, except for TB)

No.	Items	Byte	Type	Scale factor	Pixel	Line	Unit
1	Mean for Geophysical Data	2	signed int	0.1	1440	721	WV:kg/m <sup>2</sup>
		2	signed int	0.001			CLW:kg/m <sup>2</sup>
		2	signed int	0.1			AP:mm/h
		2	signed int	0.1			SSW:m/s
		2	signed int	0.1			SST:°C
		2	signed int	1.0			SWE:mm
		2	signed int	0.001			SM:g/cm <sup>3</sup>

Table 3.2-5 Data part specifications (Polar stereo in the northern hemisphere, IC)

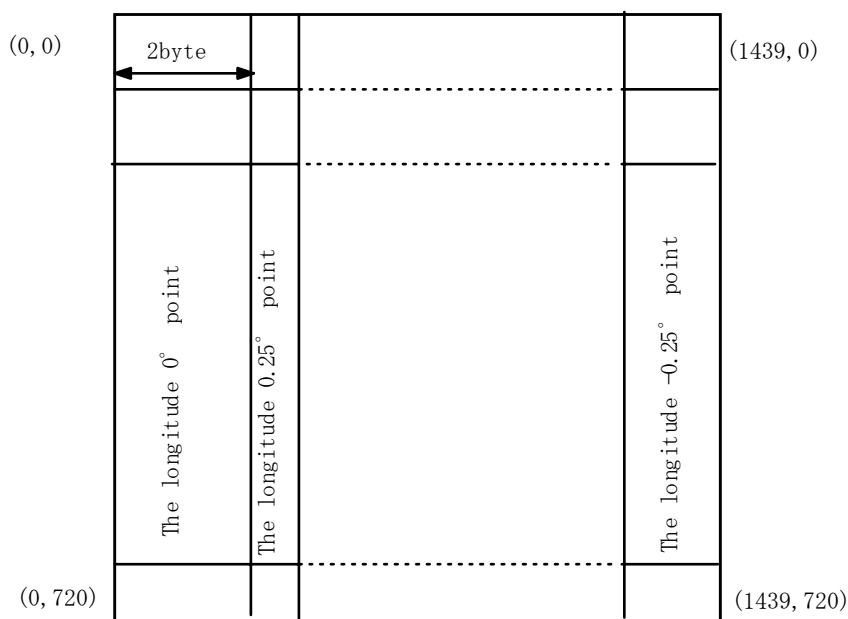
No.	Items	Byte	Type	Scale factor	Pixel	Line	Unit
1	Mean for Geophysical Data	2	signed int	1	304	448	%

Table 3.2-6 Data part specifications (Polar stereo in the southern hemisphere, IC)

No.	Items	Byte	Type	Scale factor	Pixel	Line	Unit
1	Mean for Geophysical Data	2	signed int	1	316	332	%

Table 3.2-7 Data part specifications (Polar stereo in the northern hemisphere, SWE)

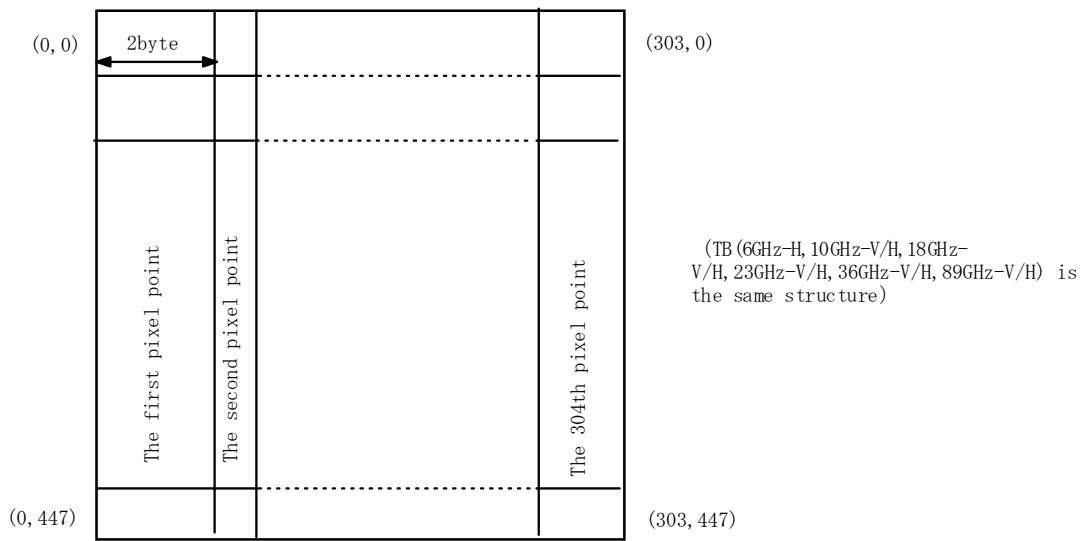
No.	Items	Byte	Type	Scale factor	Pixel	Line	Unit
1	Mean for Geophysical Data	2	signed int	0.1	431	573	mm



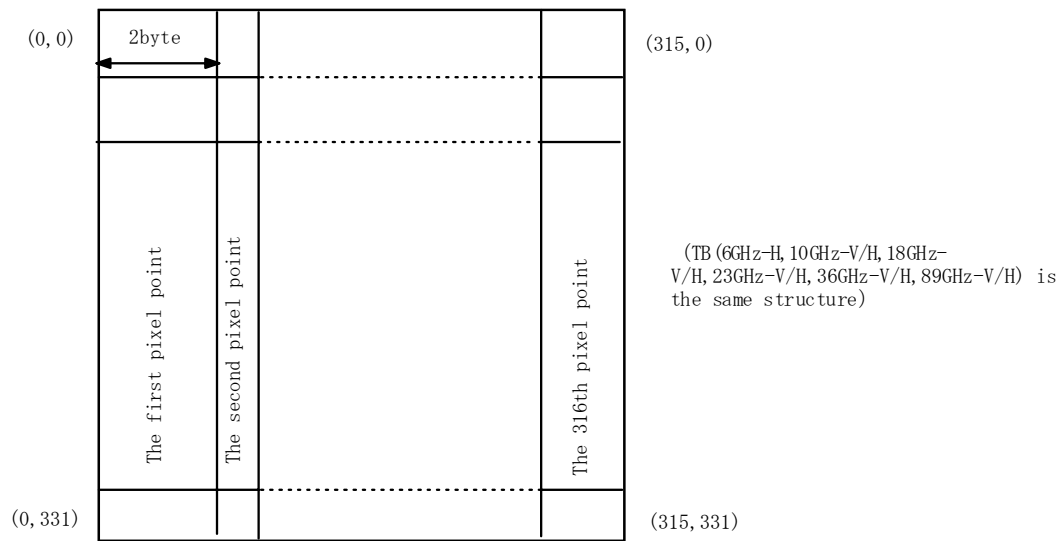
"Mean for Geophysical Data" or "6GHz-V Mean for Brightness Temperature" by the longitude/latitude equivalent map projection

(TB (6GHz-H, 10GHz-V/H, 18GHz-V/H, 23GHz-V/H, 36GHz-V/H, 89GHz-V/H), WV, AP, SSW, SST, SWE, CLW and SM is the same structure)

Figure 3.2-1 Data structure for equirectangular.

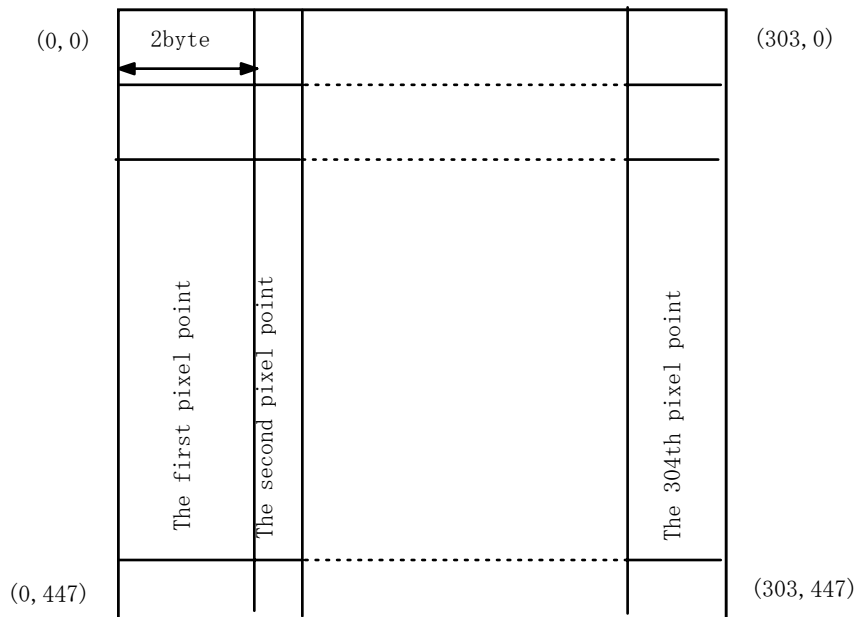


"6GHz-V Mean for Brightness Temperature" by the polar stereo map projection of Northern Hemisphere

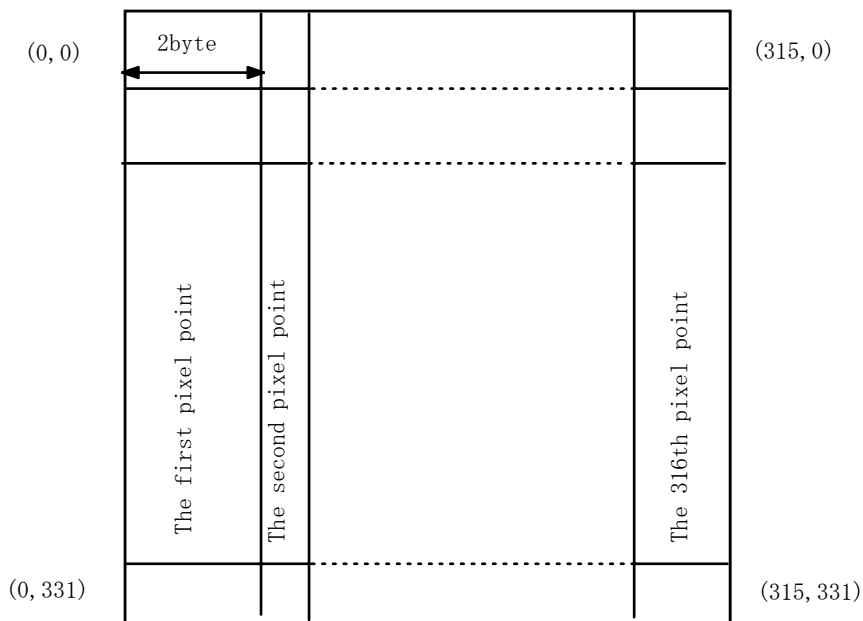


"6GHz-V Mean for Brightness Temperature" by the polar stereo map projection of Southern Hemisphere

Figure 3.2-2 Data structure for TB by polar stereo.



"Mean for Geophysical Data" (IC) by the polar stereo map projection of Northern Hemisphere

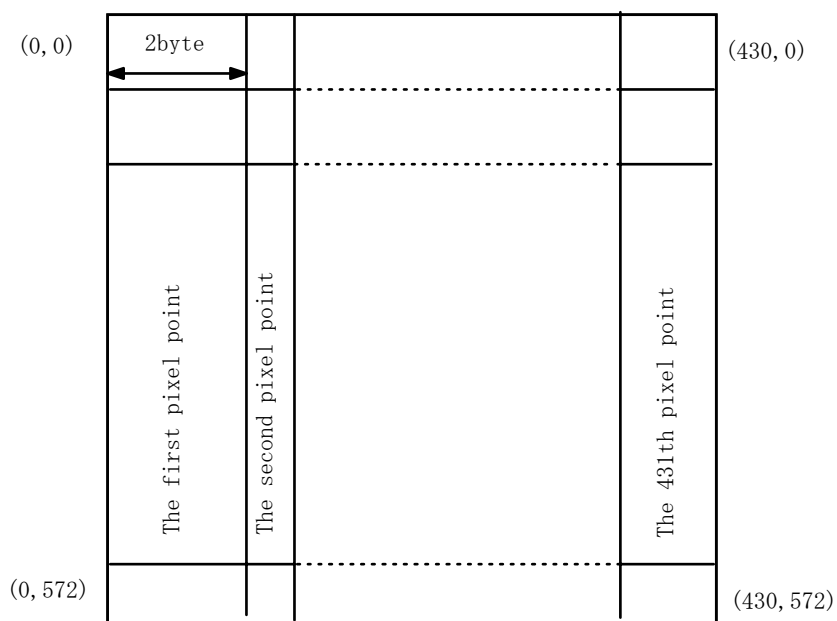


"Mean for Geophysical Data" (IC) by the polar stereo map projection of Southern Hemisphere

Figure 3.2-3 Data structure for IC by polar stereo.







"Mean for Geophysical Data" (SWE) by the polar stereo map projection of Northern Hemisphere

Figure 3.2-4 Data structure for SWE by polar stereo.

#### 4. Data size in Product

Data size in level 3 product is shown in Table 4-1~4.

Table 4-1 Data size in level 3 product.

(Equirectangular, TB/WV/CLW/SSW/SST/AP/SWE/SM)

Item	No. of Sample	No. of Bytes	Semi Total	Remark
Mean for Geophysical Data	1440	2	2880	
Total			2880	
Volume ( MB )			1.98	
Volume (Daily/Monthly) ( MB )			3.96	×2 (A/D)
Volume (Daily)/Monthly ( GB )			0.12	

Table 4-2 Data size in level 3 product.

(Polar stereo in the northern hemisphere, TB/IC)

Item	No. of Sample	No. of Bytes	Semi Total	Remark
Mean for Geophysical Data	304	2	608	
Total			608	
Volume ( MB )			0.26	
Volume (Daily/Monthly) ( MB )			0.52	×2 (A/D)
Volume (Daily)/Monthly ( GB )			0.02	

Table 4-3 Data size in level 3 product.

(Polar stereo in the southern hemisphere, TB/IC)

Item	No. of Sample	No. of Bytes	Semi Total	Remark
Mean for Geophysical Data	316	2	632	
Total			632	
Volume ( MB )			0.2	
Volume (Daily/Monthly) ( MB )			0.4	×2 (A/D)
Volume (Daily)/Monthly ( GB )			0.01	

Table 4-4 Data size in level 3 product.

(Polar stereo in the northern hemisphere, SWE)

Item	No. of Sample	No. of Bytes	Semi Total	Remark
Mean for Geophysical Data	431	2	862	
Total			862	
Volume ( MB )			0.47	
Volume (Daily/Monthly) ( MB )			0.94	×2 (A/D)
Volume (Daily/Monthly) ( GB )			0.03	

## 5. Others

### 5.1. Local Granule ID

A system of Local Granule ID is shown the following. Details for each item are shown in Table 5.1-1 and Table 5.1-2.

SASENYMMDDX\_XLPPPXXXVVMM

For example, in the case of Water Vapor by the day its Local Granule ID is as follows.

P1AME010101A\_P3WV0Tak111E0

Table 5.1-1 System of Scene ID

Format	Items	Contents
SASENYYMMDDPPPX		
SA	Satellite name	'P1':EOS-PM1
SEN	Kind of sensor	'AME':EOS-PM1 AMSR-E
YYMMDD	Date to start observing	It is expressed A.D.(UT). Set '00' as 'DD' for the product by the month.
X	Orbit direction	'A': Ascending 'D': Descending

Table 5.1-2 System of Product ID

Format	Items	Contents
XLpppxxxvvv		
X	Kind of product	'P': Planned product
L	Processing level	'3': Fixed
ppp	Product code	'WV0': Water Vapor 'CLW': Cloud Liquid Water 'AP0': Amount of Precipitation 'SSW': Sea Surface Wind 'SST': Sea Surface Temperature 'IC0': Ice Concentration 'SM0': Soil Moisture 'SWE': Snow Water Equivalence '06V': 6GHz-V of Brightness Temperature '06H': 6GHz-H of Brightness Temperature '10V': 10GHz-V of Brightness Temperature '10H': 10GHz-H of Brightness Temperature '18V': 18GHz-V of Brightness Temperature '18H': 18GHz-H of Brightness Temperature '23V': 23GHz-V of Brightness Temperature '23H': 23GHz-H of Brightness Temperature '36V': 36GHz-V of Brightness Temperature '36H': 36GHz-H of Brightness Temperature '50V': 50GHz-V of Brightness Temperature (This does not exist for AMSR-E.) '52V': 52GHz-V of Brightness Temperature (This does not exist for AMSR-E.) '89V': 89GHz-V of Brightness Temperature '89H': 89GHz-H of Brightness Temperature
xxx	Name of algorithm developer	Same as level 2 In the case of calculating from level 1B it is set '000'.
vvv	Algorithm version	Same as level 2
MM	Kind of projection	'E0': Equirectangular 'PS': Polar stereo in the southern hemisphere 'PN': Polar stereo in the northern hemisphere

## 5.2. Coordinate system

In the case of equirectangular, there are 1440 points for pixel and 721 for line, in global. Its data spacing is 0.25 degrees. The origin of its coordinate is on lat. 90°S and long. 0°E.

The definition of projection area by polar stereo is shown in Figure 5.2-1~3.

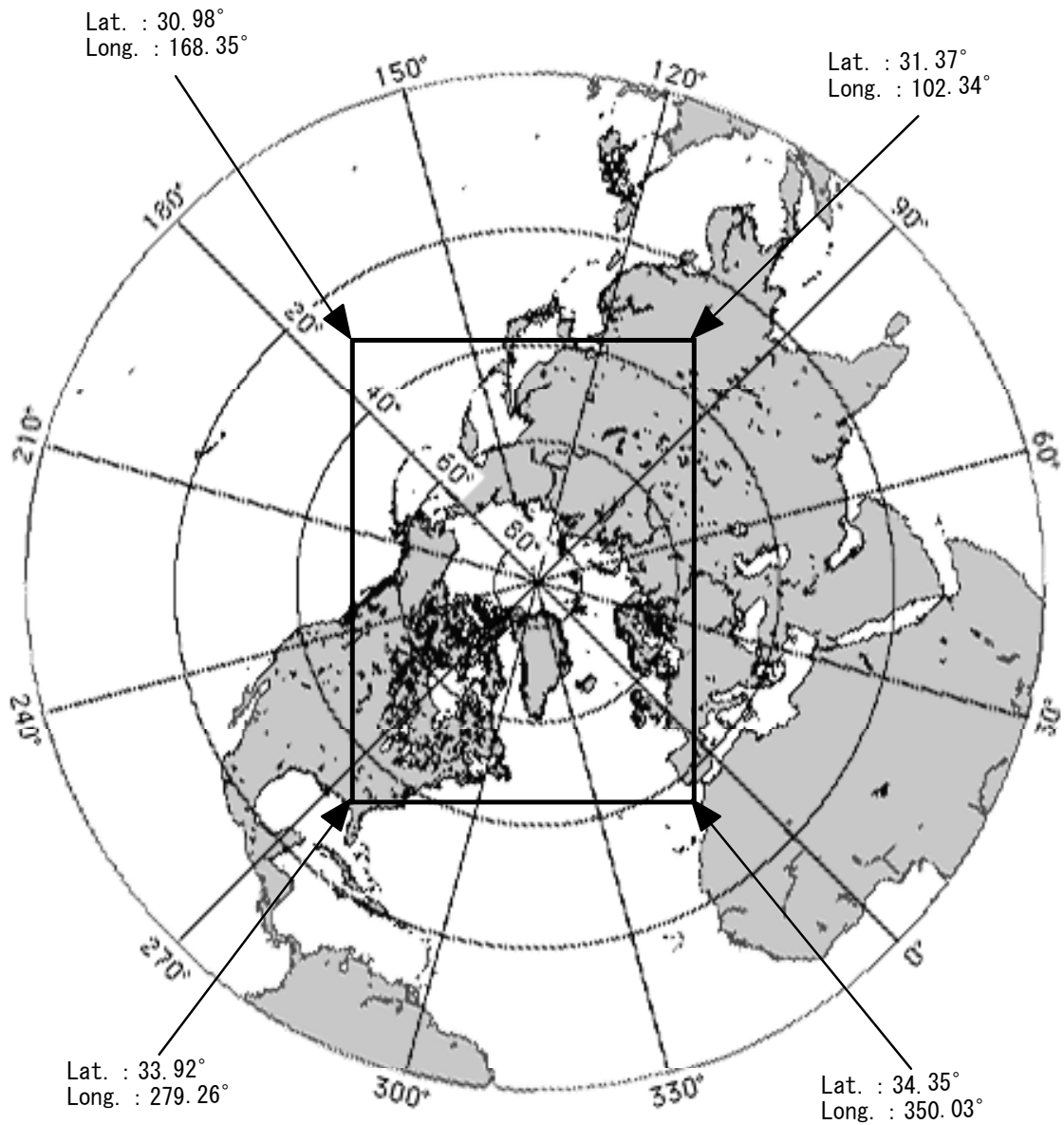


Figure 5.2-1 The definition of projection area by polar stereo  
(Northern hemisphere, TB/IC)

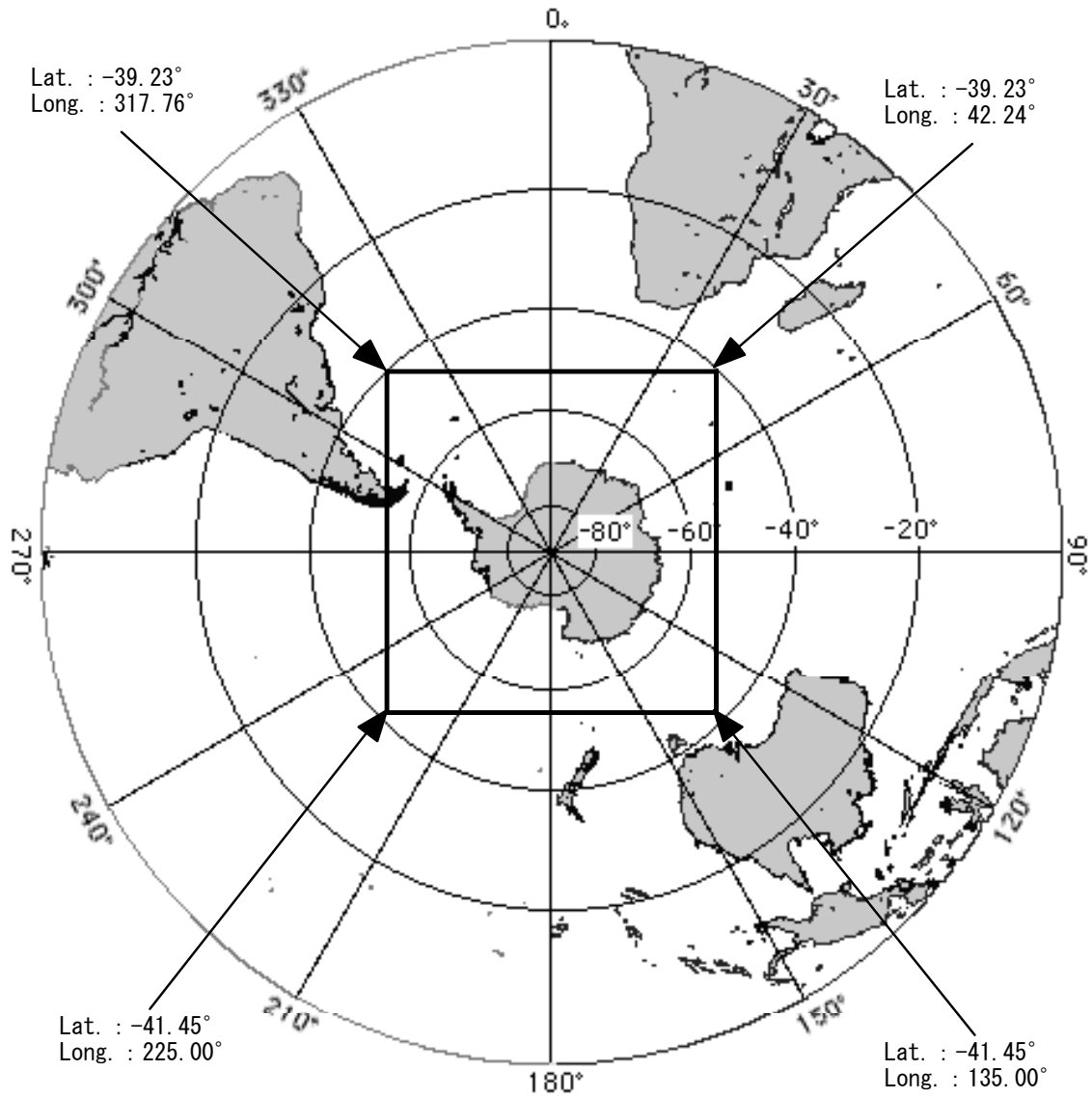


Figure 5.2-2 The definition of projection area by polar stereo  
(Southern hemisphere, TB/IC)

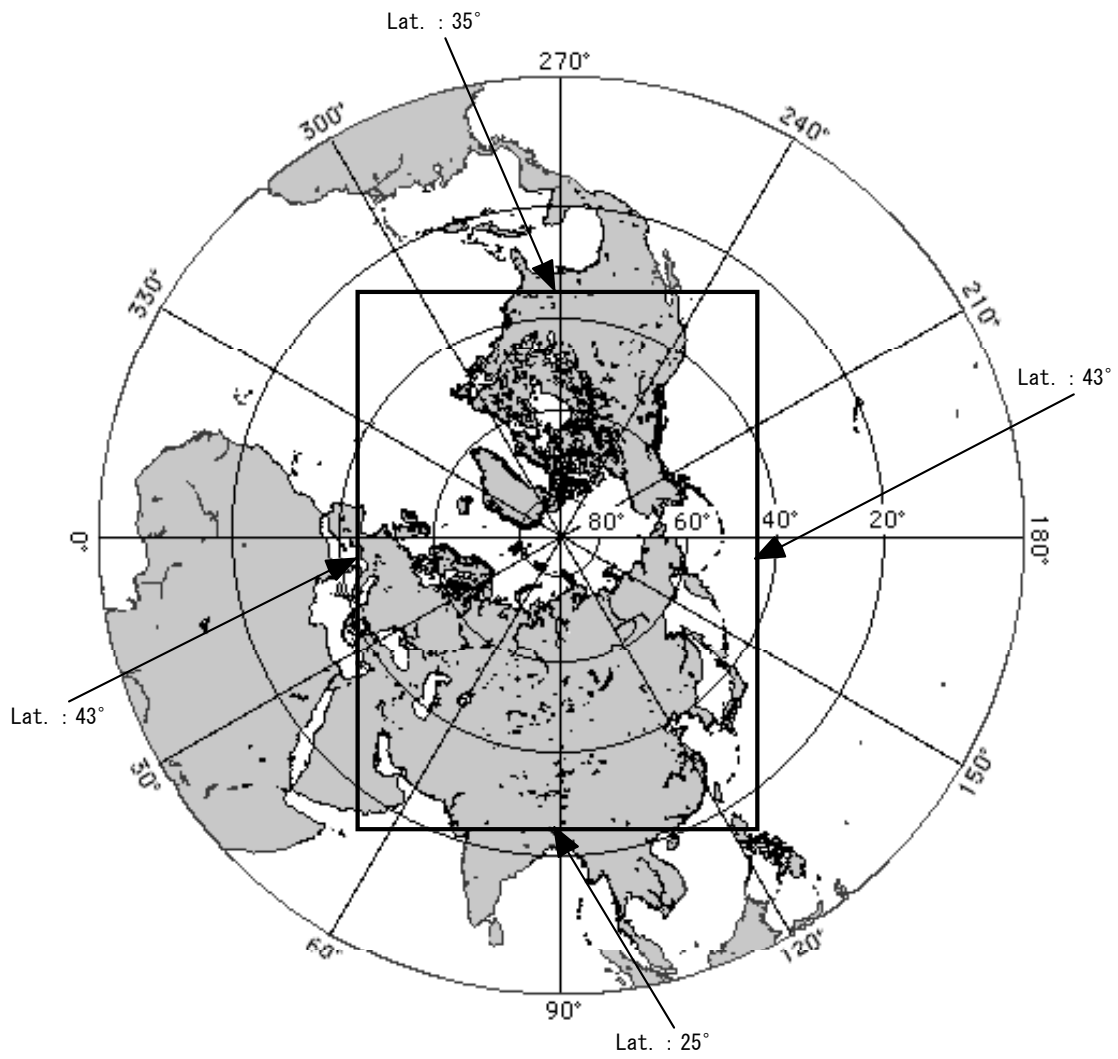


Figure 5.2-3 The definition of projection area by polar stereo  
(Northern hemisphere, SWE)



### 5.3. Dummy data

The dummy data (data other than the amount of geophysics) in level 2Map is as follows.

\* -9999 : When there is no geophysical data within observation swath

This value is set up when computing neither the case where the amount of geophysics is incomputable (a packet loss, the abnormalities in brightness temperature of level 1B, the amount calculation error of geophysics, etc.) , nor the amount of geophysics (This case is based on conditions peculiar to the amount of physics. For example, in the case of the amount of geophysics for marine [ , such as SST, ], the area of land does not compute the amount of geophysics.).

\* -8888 : The area besides observation swath

The example of a picture image of Sea ice concentration level 3 is shown in Figure 5.3-1.

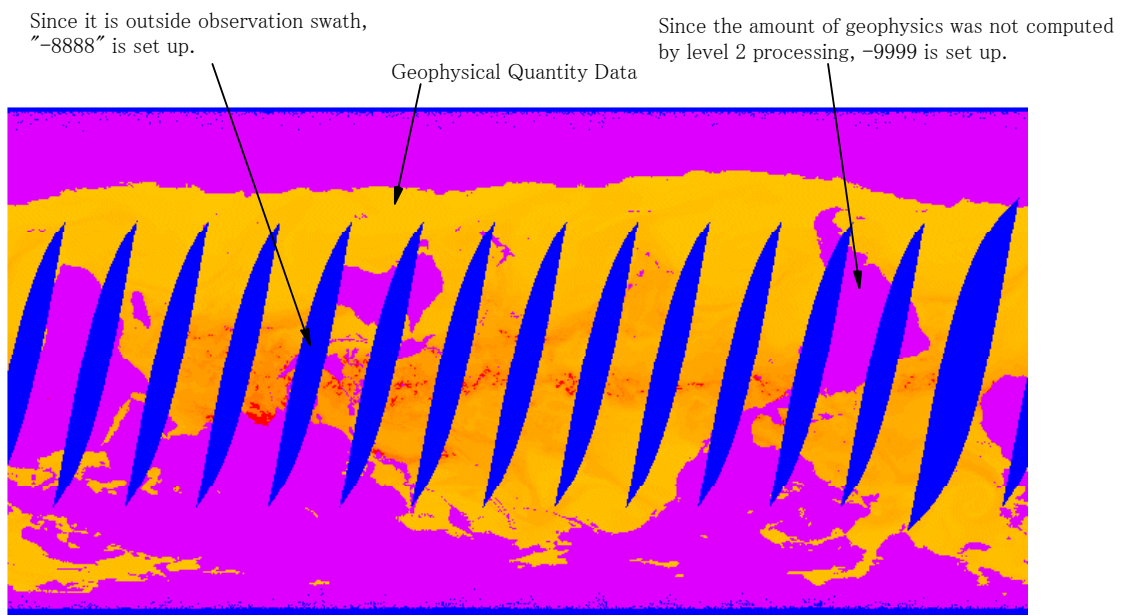


Figure 5.3-1 The example of a picture image of SST level 3

## 6. Explanation about data

Explanation for each data is shown in next section. Each item in its explanation is described the followings.

HDF\_MODEL : HDF model to put each data in the file. In the case of standard product, the data has "scientific data sets", "Vdata" and "global attribute". Most of data elements are set as scientific data sets in it.

ARRAY\_DIMENSION : Data size of each dimension if data type is array dimension(in the case of nominal).

STORAGE\_TYPE : Type of data element. There are "int 8", "int16", "int32", "unsigned integer8", "unsigned integer32", "float32", "float64".

NUMBER\_OF\_BYTE : Number of byte to preserve the data element.

UNIT : Data unit. For example, there are "deg", "count2", "Kelvin", and so on.

MINIMUM\_VALUE : Minimum value of data element.

MAXIMUM\_VALUE : Maximum value of data element.

SCALE\_FACTOR : Standard product has some elements which is changed float into integer for interchangeable among the machines and preserved(for example, geophysical quantity etc.). That's why it is necessary to multiply the stored data by scale\_factor for use. The scale\_factor is used when the data, which is changed float into integer is put it back.

(For example, when the sea surface temperature is 18.36°C, it is stored as 1836 and scale\_factor becomes 0.01.)

## 6.1. Explanation for each data

Explanations for each data are as follows.

### ( 1 ) 6GHz-V Mean for Brightness Temperature

The average of brightness temperature for 6GHz-V.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

### ( 2 ) 6GHz-H Mean for Brightness Temperature

The average of brightness temperature for 6GHz-H.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 3 ) 10.65GHz-V Mean for Brightness Temperature

The average of brightness temperature for 10.65GHz-V.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 4 ) 10.65GHz-H Mean for Brightness Temperature

The average of brightness temperature for 10.65GHz-H.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 5 ) 18.7GHz-V Mean for Brightness Temperature

The average of brightness temperature for 18.7GHz-V.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 6 ) 18.7GHz-H Mean for Brightness Temperature

The average of brightness temperature for 18.7GHz-H.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 7 ) 23.8GHz-V Mean for Brightness Temperature

The average of brightness temperature for 23.8GHz-V.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 8 ) 23.8GHz-H Mean for Brightness Temperature

The average of brightness temperature for 23.8GHz-H.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 9 ) 36.5GHz-V Mean for Brightness Temperature

The average of brightness temperature for 36.5GHz-V.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 1 0 ) 36.5GHz-H Mean for Brightness Temperature

The average of brightness temperature for 36.5GHz-H.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 1 1 ) 89.0GHz-V Mean for Brightness Temperature

The average of brightness temperature for 89.0GHz-V.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1

( 1 2 ) 89.0GHz-H Mean for Brightness Temperature

The average of brightness temperature for 89.0GHz-H.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)  
304×448 (Northern Hemisphere of Polar Stereo map projection)  
316×332 (Southern Hemisphere of Polar Stereo map projection)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : KELVIN

MINIMUM\_VALUE : 0

MAXIMUM\_VALUE : 350

SCALE\_FACTOR : 0.1



( 1 3 ) Mean for Geophysical Data

The average of the geophysical quantity except for brightness temperature.

HDF\_MODEL : SDS

ARRAY\_DIMENSION : 1440×721 (Longitude/Latitude equivalent map projection)

304×448

(Northern Hemisphere of Polar Stereo map projection for IC)

316×332

(Southern Hemisphere of Polar Stereo map projection for IC)

431×573

(Northern Hemisphere of Polar Stereo map projection for SWE)

STORAGE\_TYPE : signed int 16

NUMBER\_OF\_BYTE : 2

UNIT : kg/m<sup>2</sup> (WV,CLW) / mm/h (AP) / mm (SWE) / m/s (SSW)

°C (SST) / % (IC) / g/cm<sup>3</sup> (SM)

MINIMUM\_VALUE : 0 (WV) / 0 (CLW) / 0 (AP) / 0 (SSW) / -2 (SST)

0 (IC) / 0 (SM) / 0 (SWE)

MAXIMUM\_VALUE : 70 (WV) / 1.0 (CLW) / 100 (AP) / 30 (SSW) / 35 (SST)

100 (IC) / TBD (SM) / 10000 (SWE)

SCALE\_FACTOR : 0.1 (WV) / 0.001 (CLW) / 0.1 (AP) / 0.1 (SSW) / 0.1 (SST)

1 (IC) / 0.001 (SM) / 1.0 (SWE)

## 7. Abbreviation

Abbreviation	Formula name
ADA	Antenna Drive Assembly
ADA ROT	Antenna Drive Assembly Rotor
ADE	Antenna Drive Electronics
AP	Amount of Precipitation
CLW	Cloud Liquid Water
CSM	Cold Sky Mirror
HTS	Hot Temperature Noise Source
IC	Ice Concentration
LNA	Low Noise Amplifier
MREF	Main Reflector
MWA	Momentum Wheel Assembly
PDUC	Power Distributor Unit Control Unit
PDUS	Power Distributor Unit Sensor Unit
RX	Receiver
SM	Soil Moisture
SPC	Signal Processor Control Unit
STR	Structure
SPS	Signal Processor Sensor Unit
SST	Sea Surface Temperature
SSW	Sea Surface Wind Speed
SWE	Snow Water Equivalence
TCC	Thermal Controller Control Unit
TCS	Thermal Controller Sensor Unit
WV	Water Vapor