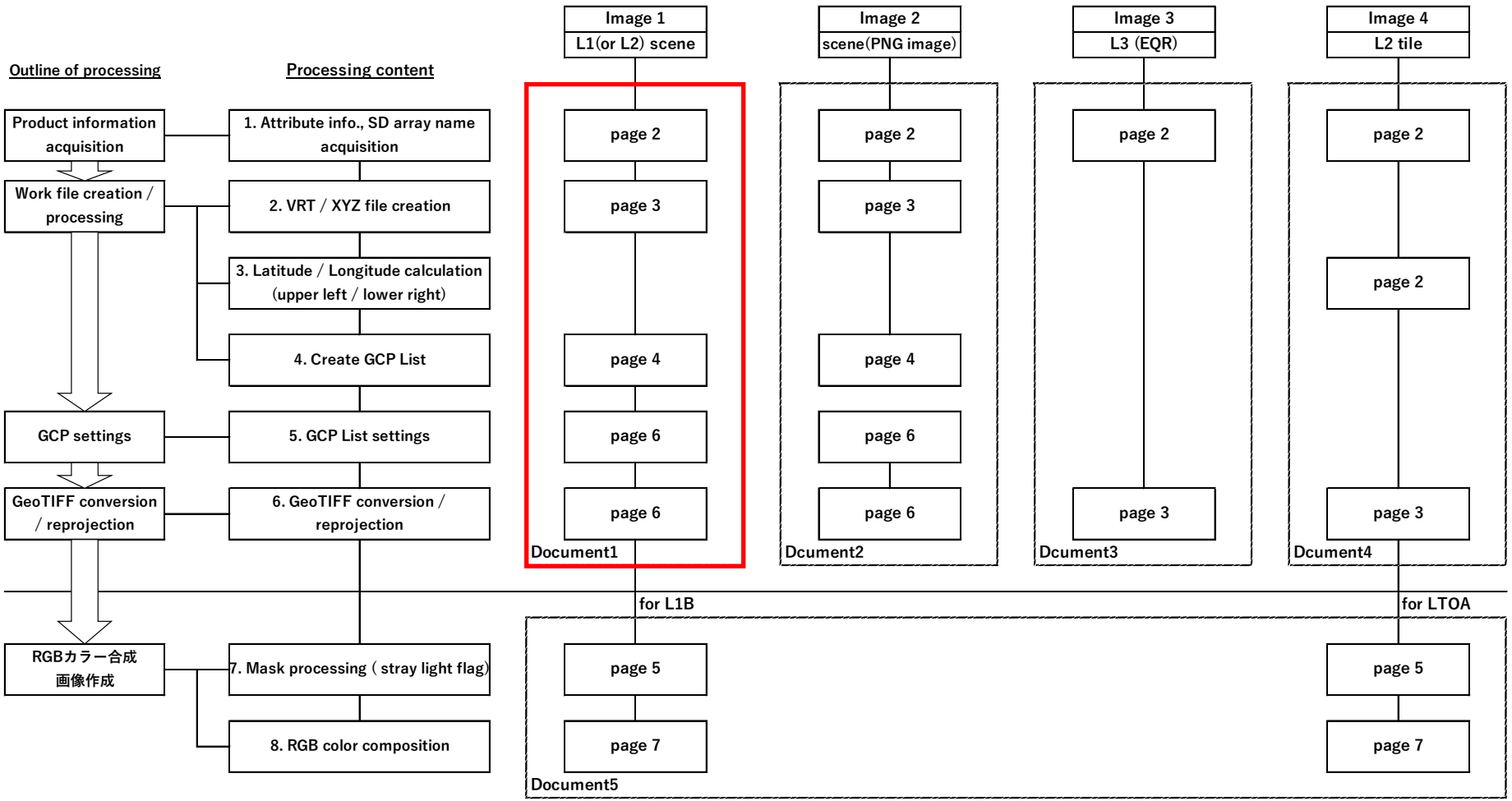
How to convert to GeoTIFF for Shikisai products

February 5, 2021 E

【Image 1】 Conversion of L2 IWPR (Chlorophyll-a concentration etc.) (Sensor Hardware Coordinate)

Here is an example of GeoTIFF conversion of L2 scene images.

GeoTIFF conversion flow



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Product information acquisition

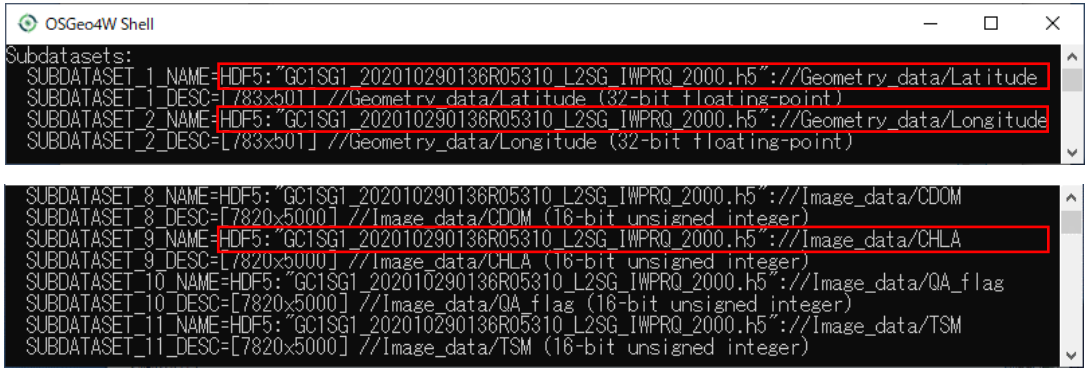
1） SD array name acquisition

The following is an example using OSGeo4W Shell which is installed when QGIS is installed on Windows.

Go to the directory where the image data is saved and enter the file name after the gdalinfo command as shown below to get the SD array name.

On Linux, it can be used in terminal applications, but GDAL must be installed.

Use the information in the red frame of SUBDATASET_1_NAME, SUBDATASET_2_NAME, and SUBDATASET_9_NAME at the bottom of the displayed information.



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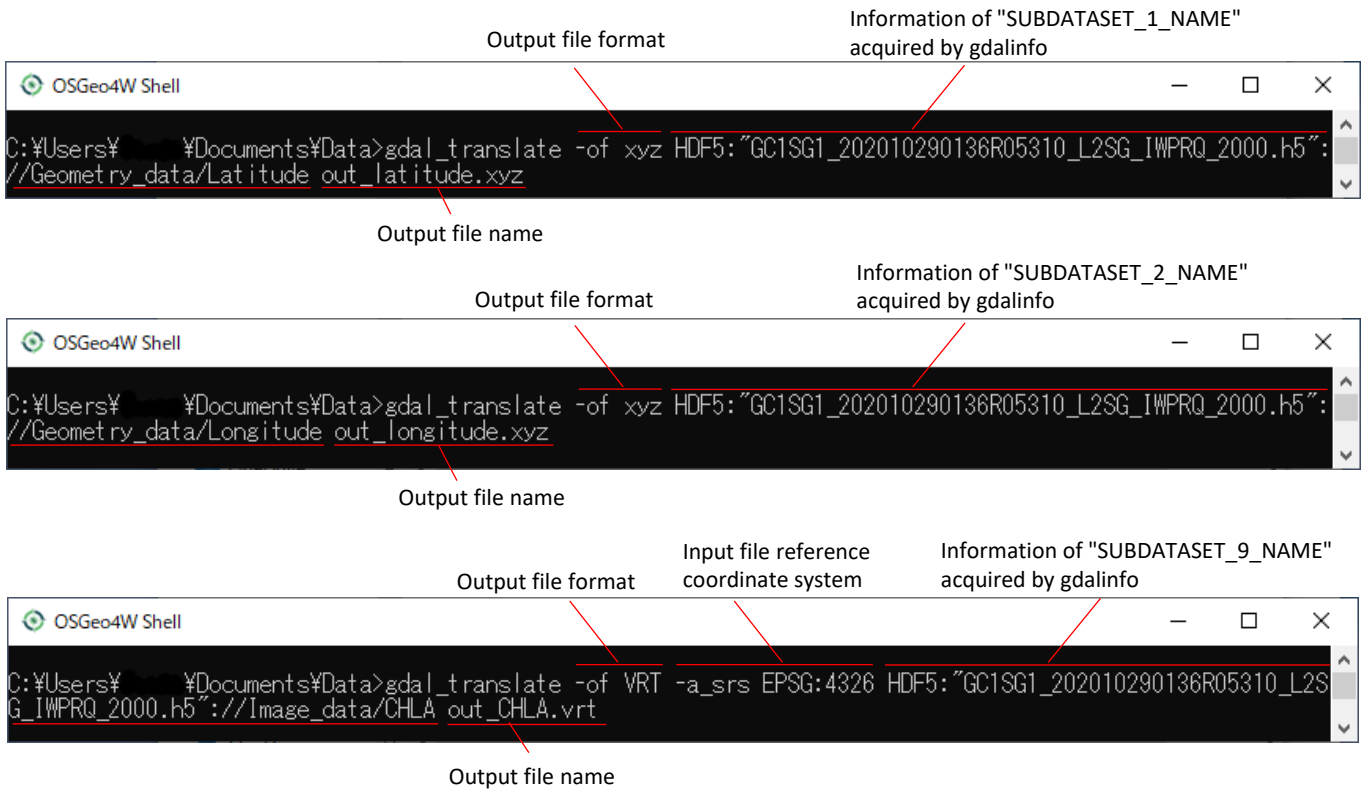
Work file creation / processing

2） VRT / XYZ file creation

Create an ASCII Gridded XYZ file for latitude (Latitude) and longitude (longitude), and a VRT file for chlorophyll-a concentration (CHLA).



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Work file creation / processing

3） Create GCP List

GDAL has a limit on the number of GCPs you can use. Create a GCP List (thinned data) to be used in the VRT file from the ASCII Gridded XYZ files of latitude and longitude.

※With 100 pixels thinned out for the scene, the latitude and longitude are linear and an error of about 0.01 ° occurs.

a） Combine latitude and longitude files into one file using Excel etc.

Longitude file (ASCII Gridded XYZ)

	A	B	C	D
1	0.5	0.5	118.0549	
2	1.5	0.5	118.1267	
3	2.5	0.5	118.1979	
4	3.5	0.5	118.2686	
5	4.5	0.5	118.3386	

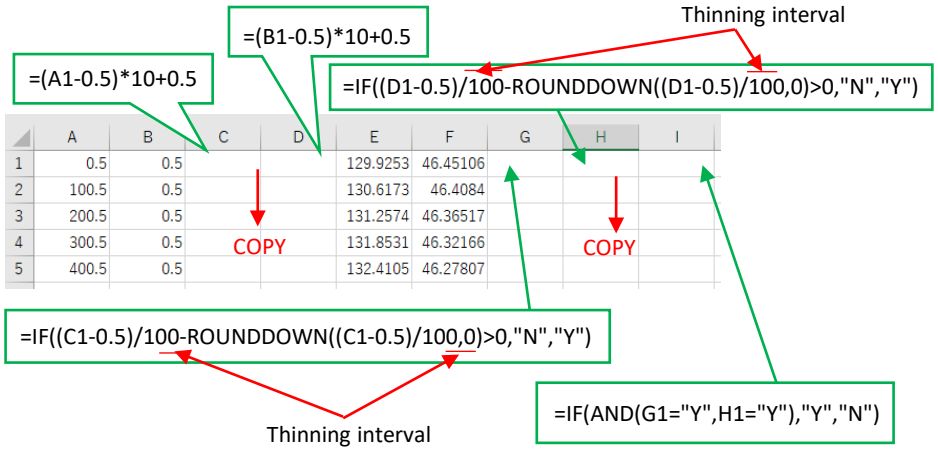
Latitude file (ASCII Gridded XYZ)

	A	B	C	D
1	0.5	0.5	46.45106	
2	1.5	0.5	46.44683	
3	2.5	0.5	46.44259	
4	3.5	0.5	46.43835	
5	4.5	0.5	46.43409	

	A	B	C	D	E
1	0.5	0.5	118.0549	46.45106	
2	1.5	0.5	118.1267	46.44683	
3	2.5	0.5	118.1979	46.44259	
4	3.5	0.5	118.2686	46.43835	
5	4.5	0.5	118.3386	46.43409	

b） Create GCP thinned data.

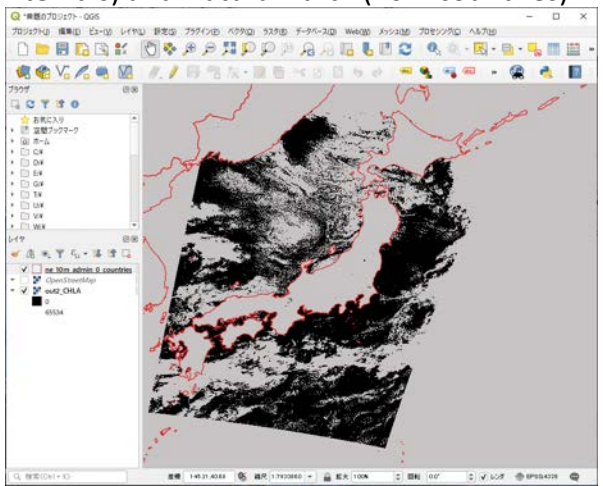
The following is an example of an Excel function.



	A	B	C	D	E	F	G	H	I
1	0.5	0.5			129.9253	46.45106			
2	100.5	0.5			130.6173	46.4084			
3	200.5	0.5			131.2574	46.36517			
4	300.5	0.5			131.8531	46.32166			
5	400.5	0.5			132.4105	46.27807			

Reference:

Superposition of images processed by thinning (100 pixel intervals) and Natural Earth (10m countries)



The table is as follows.

Pixel direction output classification

Line direction output classification

Output classification

	A	B	C	D	E	F	G	H	I
1	0.5	0.5	0.5	0.5	129.9253	46.45106	Y	Y	Y
2	1.5	0.5	10.5	0.5	129.9971	46.44683	N	Y	N
3	2.5	0.5	20.5	0.5	130.0683	46.44259	N	Y	N
4	3.5	0.5	30.5	0.5	130.1389	46.43835	N	Y	N
5	4.5	0.5	40.5	0.5	130.2089	46.43409	N	Y	N

Use the filter function to set the value in column I to "Y" only.

	A	B	C	D	E	F	G	H	I
1	0	0	0	0	129.92	46.451	Y	Y	Y
11	10.5	0.5	100.5	0.5	130.6173	46.4084	Y	Y	Y
21	20.5	0.5	200.5	0.5	131.2574	46.36517	Y	Y	Y
31	30.5	0.5	300.5	0.5	131.8531	46.32166	Y	Y	Y
41	40.5	0.5	400.5	0.5	132.4105	46.27807	Y	Y	Y

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3） Create GCP List

Copy the filtered values from column C to column F on a separate sheet.

	A	B	C	D
1	0.5	0.5	129.9253	46.45106
2	100.5	0.5	130.6173	46.4084
3	200.5	0.5	131.2574	46.36517
4	300.5	0.5	131.8531	46.32166

c） b) Add the following columns A, B, D, F, H, and J to the thinned data and save it as a CSV file.

	A	B	C	D	E	F	G	H	I	J
1	<GCP Id=""	Pixel=	0.5	Line=	0.5	X=	129.9253235	Y=	46.45106125	/>
2	<GCP Id=""	Pixel=	100.5	Line=	0.5	X=	130.6173401	Y=	46.40840149	/>
3	<GCP Id=""	Pixel=	200.5	Line=	0.5	X=	131.2574005	Y=	46.36516571	/>
4	<GCP Id=""	Pixel=	300.5	Line=	0.5	X=	131.8530731	Y=	46.32165527	/>
5	<GCP Id=""	Pixel=	400.5	Line=	0.5	X=	132.4105225	Y=	46.27806854	/>

Column A： <GCP Id=“”
Column B： Pixel=
Column D： Line=
Column F： X=
Column H： Y=
Column J： />

Open the saved csv file with a text editor such as Notepad.

```
"<GCP Id="""",Pixel=,0.5,Line=,0.5,X=,129.9253235,Y=,46.45106125,/>
"<GCP Id="""",Pixel=,100.5,Line=,0.5,X=,130.6173401,Y=,46.40840149,/>
"<GCP Id="""",Pixel=,200.5,Line=,0.5,X=,131.2574005,Y=,46.36516571,/>
"<GCP Id="""",Pixel=,300.5,Line=,0.5,X=,131.8530731,Y=,46.32165527,/>
"<GCP Id="""",Pixel=,400.5,Line=,0.5,X=,132.4105225,Y=,46.27806854,/>
"<GCP Id="""",Pixel=,500.5,Line=,0.5,X=,132.9347992,Y=,46.23453522,/>
"<GCP Id="""",Pixel=,600.5,Line=,0.5,X=,133.4301453,Y=,46.19113541,/>
```

- 「“<」 → 「<」
- 「“”””,」 → 「””□」　　□：space
- 「=,」 → 「=“」
- 「,」 → 「”□」

Use "Replace" to convert as shown on the right.

The GCP list is complete.

```
<GCP Id="" Pixel="0.5" Line="0.5" X="129.9253235" Y="46.45106125" />
<GCP Id="" Pixel="100.5" Line="0.5" X="130.6173401" Y="46.40840149" />
<GCP Id="" Pixel="200.5" Line="0.5" X="131.2574005" Y="46.36516571" />
<GCP Id="" Pixel="300.5" Line="0.5" X="131.8530731" Y="46.32165527" />
<GCP Id="" Pixel="400.5" Line="0.5" X="132.4105225" Y="46.27806854" />
<GCP Id="" Pixel="500.5" Line="0.5" X="132.9347992" Y="46.23453522" />
<GCP Id="" Pixel="600.5" Line="0.5" X="133.4301453" Y="46.19113541" />
```

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GCP settings

4） GCP List settings

After adding information such as latitude / longitude file to the VRT file of chlorophyll-a concentration (CHLA) converted in 2) with Notepad etc., overwrite and save it.

< Before addition >

```
<MDI key="Processing_attributes_Input_files">GC1SG1_202010290136R05310_L2SG_NWLRQ_
<MDI key="Processing_attributes_Processing_organization">JAXA/GCOM-C science proje
<MDI key="Processing_attributes_Processing_result">Good</MDI>
<MDI key="Processing_attributes_Processing_UT">20201029 17:55:46</MDI>
</Metadata>
<VRTRasterBand dataType="UInt16" band="1">
  <Metadata>
    <MDI key="Image_data_CHLA_Data_description">Chllorophyll-a concentration (CHLA)
    <MDI key="Image_data_CHLA_Dim0">Line grids</MDI>
    <MDI key="Image_data_CHLA_Dim1">Pixel grids</MDI>
    <MDI key="Image_data_CHLA_Error_DN">65535 </MDI>
```

< After addition >

Added <GCPList>, </ GCPList> tags (3) c.)

```
<MDI key="Processing_attributes_Input_files">GC1SG1_202010290136R05310_L2SG_N
<MDI key="Processing_attributes_Processing_organization">JAXA/GCOM-C science
<MDI key="Processing_attributes_Processing_result">Good</MDI>
<MDI key="Processing_attributes_Processing_UT">20201029 17:55:46</MDI>
</Metadata>
<GCPList>
<GCP Id="" Pixel="0.5" Line="0.5" X="129.9253235" Y="46.45106125" />
<GCP Id="" Pixel="100.5" Line="0.5" X="130.6173401" Y="46.40840149" />
<GCP Id="" Pixel="200.5" Line="0.5" X="131.2574005" Y="46.36516571" />
<GCP Id="" Pixel="300.5" Line="0.5" X="131.8530731" Y="46.32165527" />
                    :
                    :
<GCP Id="" Pixel="4800.5" Line="7800.5" X="141.9359589" Y="27.31313896" />
<GCP Id="" Pixel="4900.5" Line="7800.5" X="142.4193878" Y="27.21240425" />
<GCP Id="" Pixel="5000.5" Line="7800.5" X="142.9401398" Y="27.10183144" />
</GCPList>
<VRTRasterBand dataType="UInt16" band="1">
  <Metadata>
    <MDI key="Image_data_CHLA_Data_description">Chllorophyll-a concentration (CHLA) =
    <MDI key="Image_data_CHLA_Dim0">Line grids</MDI>
    <MDI key="Image_data_CHLA_Dim1">Pixel grids</MDI>
    <MDI key="Image_data_CHLA_Error_DN">65535 </MDI>
```

GeoTIFF conversion / reprojection

5） GeoTIFF conversion / reprojection

Use the GDALWARP command to convert the VRT file edited in 4) to GeoTIFF and reproject it to EPSG: 4326.

Output file format / output file reference coordinate system / Margins due to projection (nodata)

```
OSGeo4W Shell
C:¥Users¥     ¥Documents¥Data>gdalwarp -of GTiff -t_srs EPSG:4326 -tps -dstnodata 65535
out_CHLA.vrt out2_CHLA.tif
```

Input file name / Output file name / Applying GCP List

< Output file display example in QGIS >