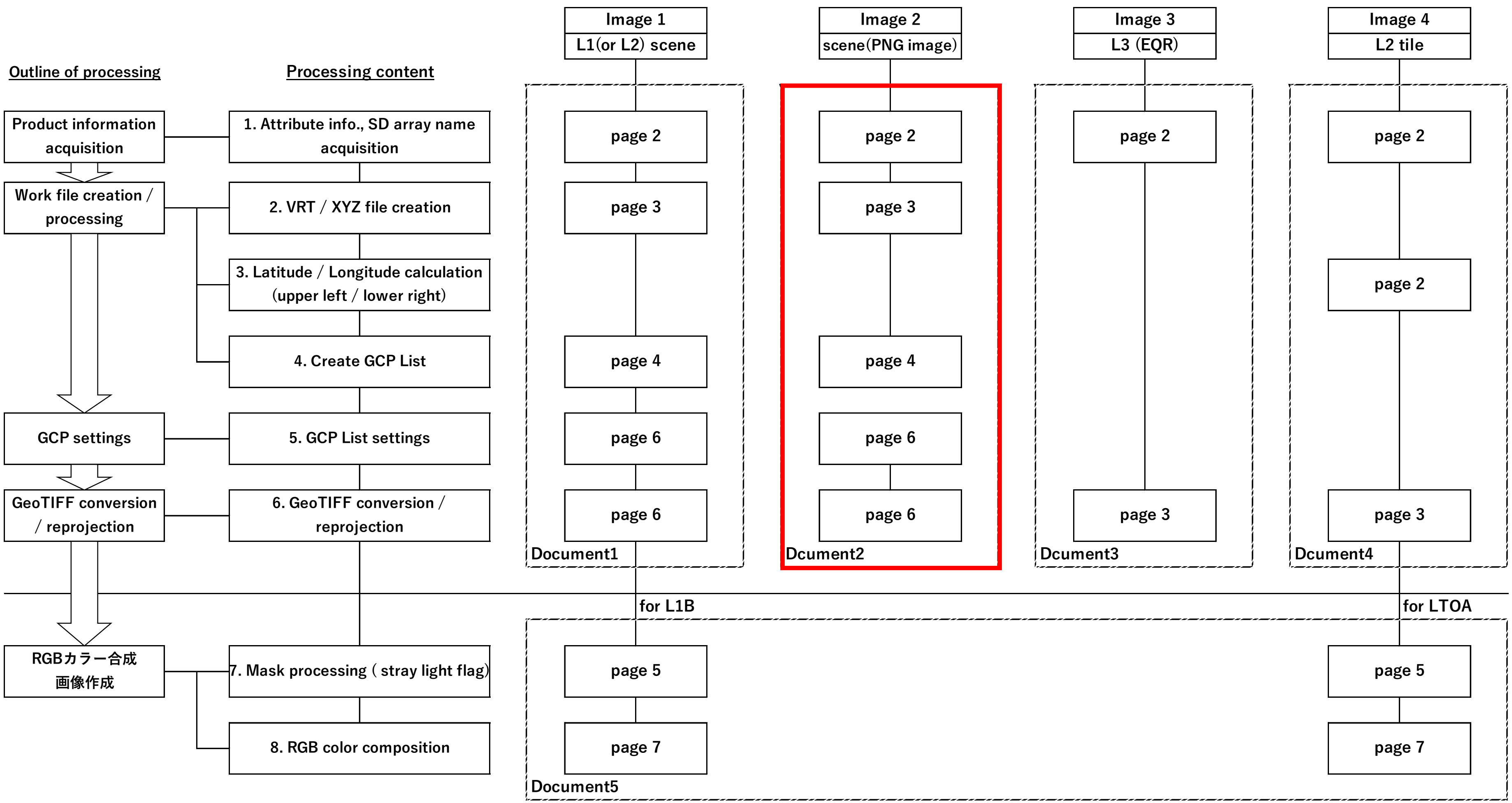
How to convert to GeoTIFF for Shikisai products

February 5, 2021 E

【Image 2】 Conversion of L2 SST (Sea surface Temperature) image by HDFView (Sensor Hardware Coordinate)

Here is an example of GeoTIFF conversion of a PNG image of L2 SST (scene) output by HDF View.

GeoTIFF conversion flow



【Image 2】 Conversion of L2 SST (Sea surface Temperature) image by HDFView (Sensor Hardware Coordinate)

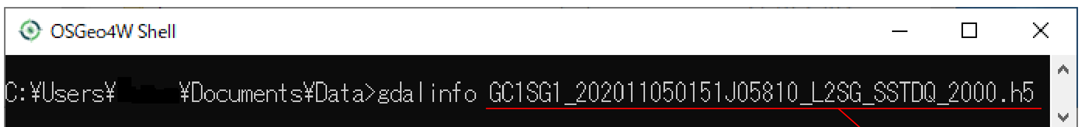
Product information acquisition

1） SD array name acquisition

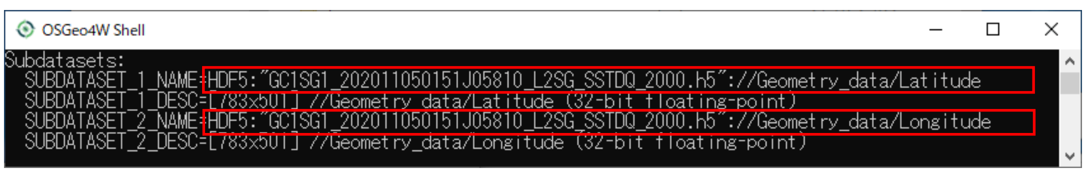
The following is an example using OSGeo4W Shell which is installed when QGIS is installed on Windows.

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 and SUBDATASET_2_NAME at the bottom of the displayed information.



【Image 2】 Conversion of L2 SST (Sea surface Temperature) image by HDFView (Sensor Hardware Coordinate)

Work file creation / processing

2） VRT / XYZ file creation

Create an ASCII Gridded XYZ file for latitude and longitude, and a VRT file for SST PNG images created with HDFView.

OSGeo4W Shell

```
C:¥Users¥[redacted]¥Documents¥Data>gdal_translate -of xyz HDF5:"GC1SG1_202011050151J05810_L2SG_SSTDQ_2000.h5"://Geometry_data/Latitude out_latitude.xyz
```

- Output file format
- Information of "SUBDATASET_1_NAME" acquired by gdalinfo
- Output file name

OSGeo4W Shell

```
C:¥Users¥[redacted]¥Documents¥Data>gdal_translate -of xyz HDF5:"GC1SG1_202011050151J05810_L2SG_SSTDQ_2000.h5"://Geometry_data/Longitude out_longitude.xyz
```

- Output file format
- Information of "SUBDATASET_2_NAME" acquired by gdalinfo
- Output file name

OSGeo4W Shell

```
C:¥Users¥[redacted]¥Documents¥Data>gdal_translate -of VRT -a_srs EPSG:4326 SST.png SST.vrt
```

- Output file format
- Input file reference coordinate system
- PNG image output by HDF View etc.
- Output file name

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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.

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.

=(A1-0.5)*10+0.5

=(B1-0.5)*10+0.5

=IF((D1-0.5)/100-ROUNDDOWN((D1-0.5)/100,0)>0,"N","Y")

Thinning interval

	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	COPY		131.2574	46.36517		COPY	
4	300.5	0.5			131.8531	46.32166			
5	400.5	0.5			132.4105	46.27807			

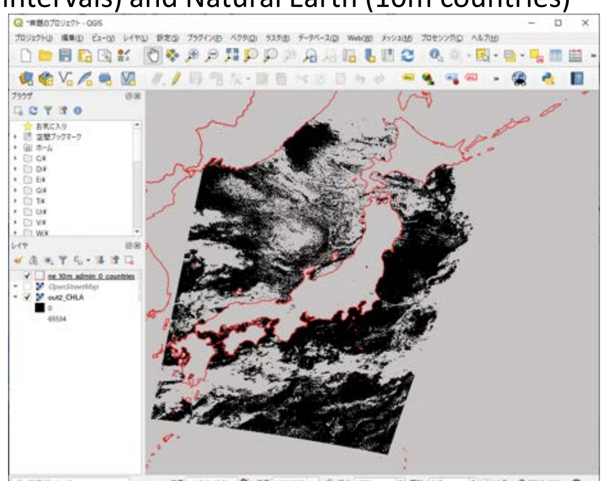
=IF((C1-0.5)/100-ROUNDDOWN((C1-0.5)/100,0)>0,"N","Y")

Thinning interval

=IF(AND(G1="Y",H1="Y"),"Y","N")

Reference:

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



The table is as follows.

Pixel direction output classification (G) / Line direction output classification (H) / Output classification (I)

	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 the SST PNG image output by HDFView converted in 2) with Notepad etc., overwrite and save it.

< Before addition >

```
<VRTDataset rasterXSize="5000" rasterYSize="7820">
  <SRS dataAxisToSRSAxisMapping="2,1">GEOGCS["WGS 84",DATUM["WGS_1984",SPHEROID["WGS 84"
  <Metadata domain="IMAGE_STRUCTURE">
    <MDI key="INTERLEAVE">PIXEL</MDI>
  </Metadata>

  <VRTRasterBand dataType="Byte" band="1">
    <ColorInterp>Red</ColorInterp>
    <SimpleSource>
      <SourceFilename relativeToVRT="1">SST.png</SourceFilename>
```

< After addition >

```
<VRTDataset rasterXSize="5000" rasterYSize="7820">
  <SRS dataAxisToSRSAxisMapping="2,1">GEOGCS["WGS 84",DATUM["WGS_1984",SPHEROID["WGS 84"
  <Metadata domain="IMAGE_STRUCTURE">
    <MDI key="INTERLEAVE">PIXEL</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="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="Byte" band="1">
    <ColorInterp>Red</ColorInterp>
    <SimpleSource>
      <SourceFilename relativeToVRT="1">SST.png</SourceFilename>
```

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

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.

OSGeo4W Shell

```
C:¥Users¥[redacted]¥Documents¥Data>gdalwarp -of GTiff -t_srs EPSG:4326 -tps SST.vrt SST.tif
```

- -of GTiff: Output file format
- -t_srs EPSG:4326: output file reference coordinate system
- -tps: Applying GCP List
- SST.vrt: Input file name
- SST.tif: Output file name

< Output file display example in QGIS >