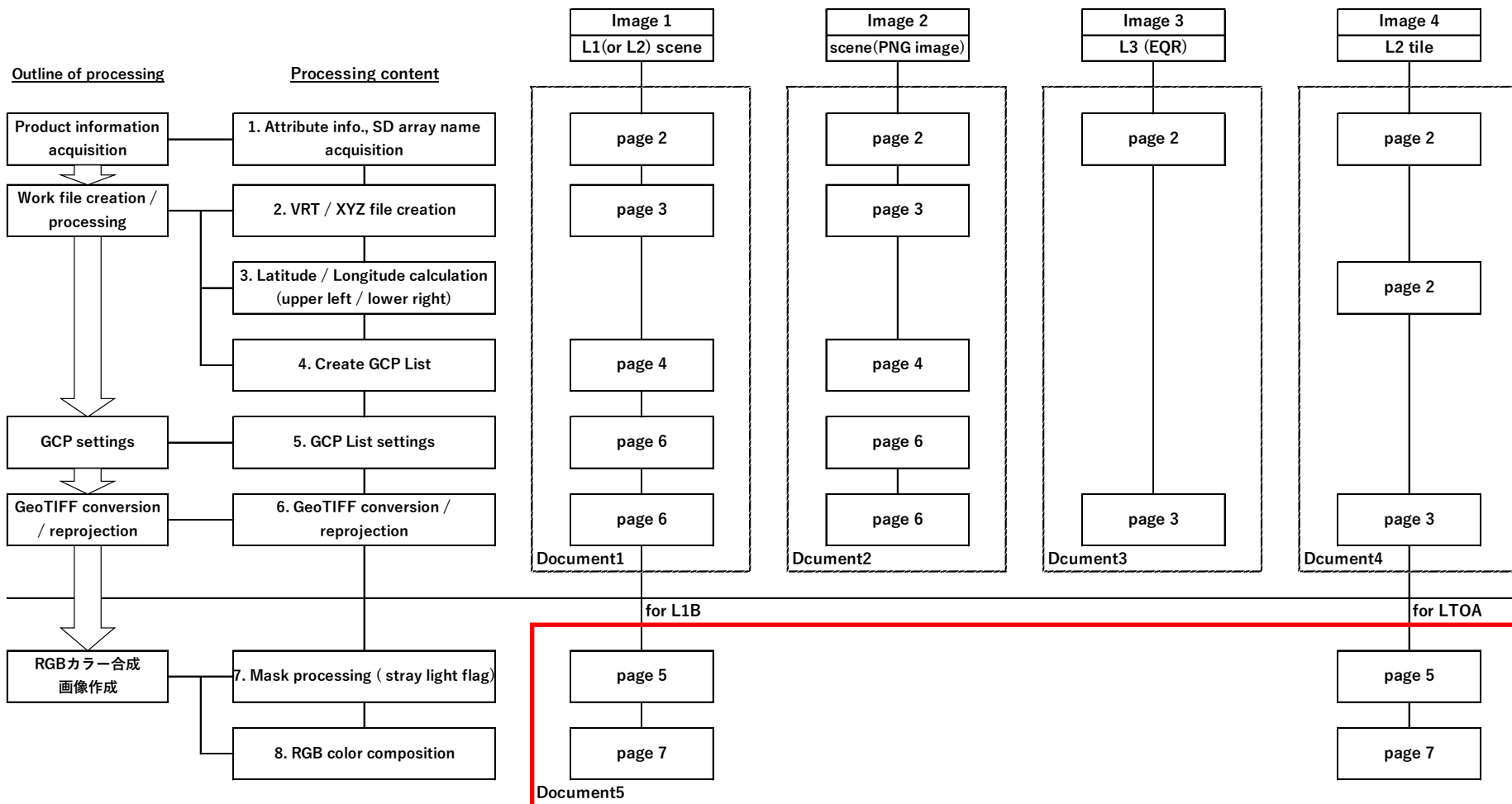# Color composite image creation of "Shikisai image" by QGIS

Introducing the creation of RGB color composite images using QGIS from "Shikisai" L2 LTOA tile images.L1B VNR can be processed in the same way.

GeoTIFF conversion flow

Outline of processing | Processing content

- Product information acquisition
- Work file creation / processing
- GCP settings
- GeoTIFF conversion / reprojection
- RGBカラー合成画像作成

Processing content:
1. Attribute info., SD array name acquisition
2. VRT / XYZ file creation
3. Latitude / Longitude calculation (upper left / lower right)
4. Create GCP List
5. GCP List settings
6. GeoTIFF conversion / reprojection
7. Mask processing (stray light flag)
8. RGB color composition

Image 1 — L1(or L2) scene — Document1: page 2, page 3, page 4, page 6, page 6, page 6

Image 2 — scene(PNG image) — Dcument2: page 2, page 3, page 4, page 6, page 6

Image 3 — L3 (EQR) — Dcument3: page 2, page 3

Image 4 — L2 tile — Dcument4: page 2, page 2, page 3

for L1B — Document5: page 5, page 7

for LTOA: page 5, page 7

Color composite image creation of "Shikisai image" by QGIS

If you do not have QGIS installed, please download it below.
The Windows version of the "QGIS Standalone Installer" will install QGIS and GDAL.
The following G-portal site links to the official Quantum-GIS site.
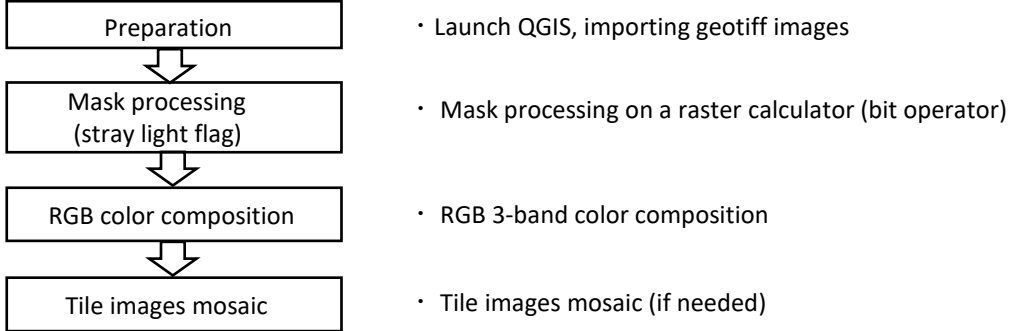(https://gportal.jaxa.jp/gpr/information/tool)
Tool / Documents > General > Download the Tool "Quantum GIS"

If you are using Linux, Mac OS X, etc., please check the "QGOS installer" page on the official website below.

https://qgis.org/en/site/forusers/alldownloads.html

Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))

Here, we will introduce the creation of an RGB color composite image in which the stray light flag is masked on the L2 LTOA tile image. L1B VNR images with a stray light flag in the high-order bits can be processed in the same way.
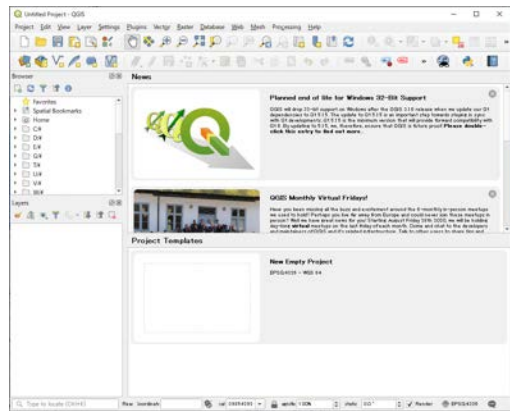
| Preparation | · Launch QGIS, importing geotiff images |

⇩

| Mask processing (stray light flag) | · Mask processing on a raster calculator (bit operator) |

⇩

| RGB color composition | · RGB 3-band color composition |

⇩

| Tile images mosaic | · Tile images mosaic (if needed) |

| Preparation |

1） Launch QGIS

Introduced in QGIS for Windows.

For Windows, open "QGIS X.XX (X.XX: Version)" on your desktop and double-click "QGIS Desktop X.XX.XX (X.XX.XX: Version)" to launch it.

Alternatively, in the Start menu, click QGIS X (X: Version) to launch it.

The following QGIS initial screen will be displayed.

Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))
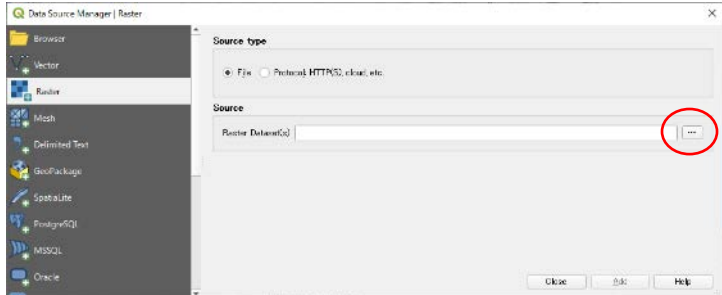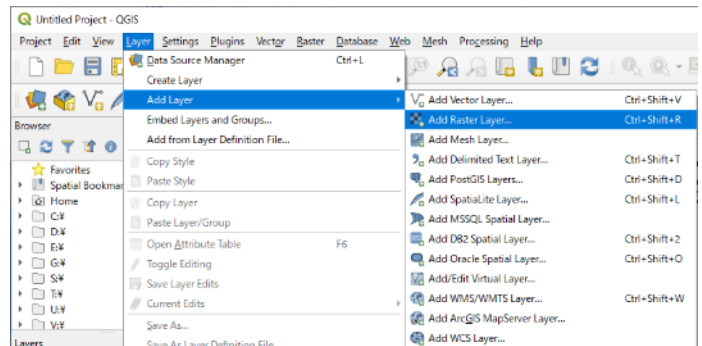

Preparation

2） importing geotiff images

Select "Add Raster Layer" from the toolbar as shown on the right.

Layer > Add Layer > Add Raster Layer

The "Data Source Manager | Raster" screen is displayed as shown on the right.
Click the button in the red circle.

Add 3 bands for RGB color composition.
The full path of the tile image is entered as shown in the red frame in the figure on the right.
If you select all three, they will be entered separated by "".
Confirm the selected file name and click the "Add" button in the red circle at the bottom.
Depending on the system environment and tile image, it may be displayed in black, but this is not a problem at this stage.
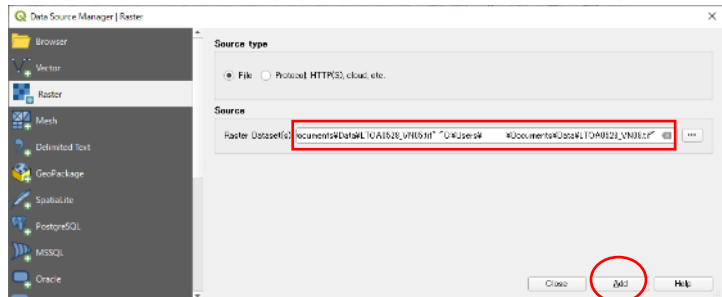
Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))

Mask processing

2） Mask processing (stray light flag)

In the LTOA tile image data, the upper 2 bits of the 16-bit data are used for the stray light flag. Mask this stray light flag for imaging.

Select "Toolbox" from the toolbar to display it, as shown on the right.
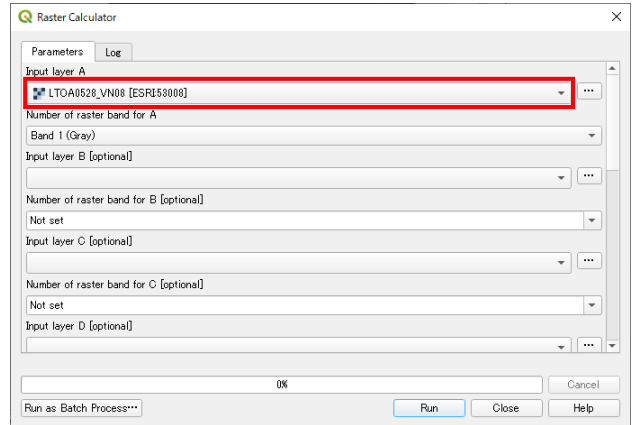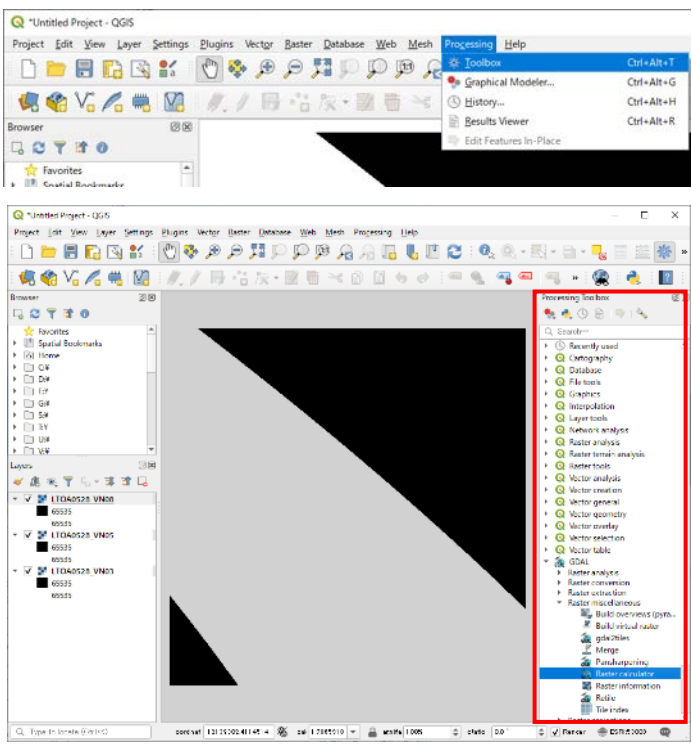
Processing > Toolbox

The "Toolbox" is displayed as shown in the red frame on the right.

Double-click "Raster Calculator" at the bottom of the toolbox.

GDAL > Raster miscellaneous > Raster calculator

The "Raster Calculator" shown on the right is displayed.
Select the file to be masked from the pull-down menu of the input layer A in the red frame.

Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))

<div style="border:1px solid black; display:inline-block; padding:8px;">

Mask processing

</div>

2） Mask processing (stray light flag) (continued)

Fill in the following items at the bottom of "Raster Calculator".

・Calculation in gdalnumeric syntax → Set the mask value with the bit operator
using +-/* or any numpy array Set "16383" for LTOA tiles and L1B VNR
functions bitwise_and(A, 16383)
(Attribute image_data_xxxxx_Mask value)

・Set output nodata value → Set "16383"

・Calculated → Enter the output destination and output file
name from the red circle button
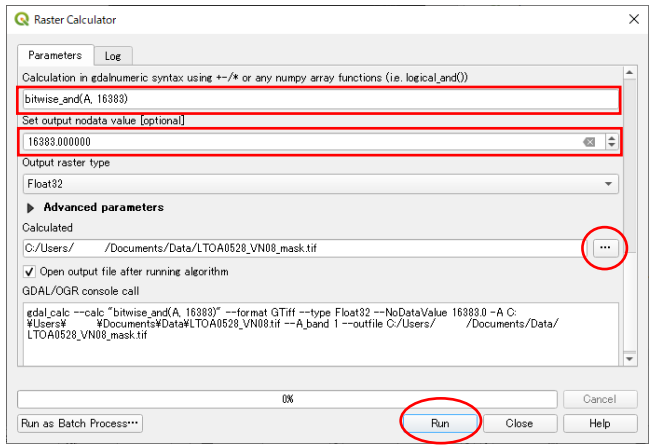
Click the "Run" button at the bottom.
Continue to process the remaining two bands in the same way.

The result of masking is displayed.
The tile number for this observation date is an image with data in
the upper right and lower left.
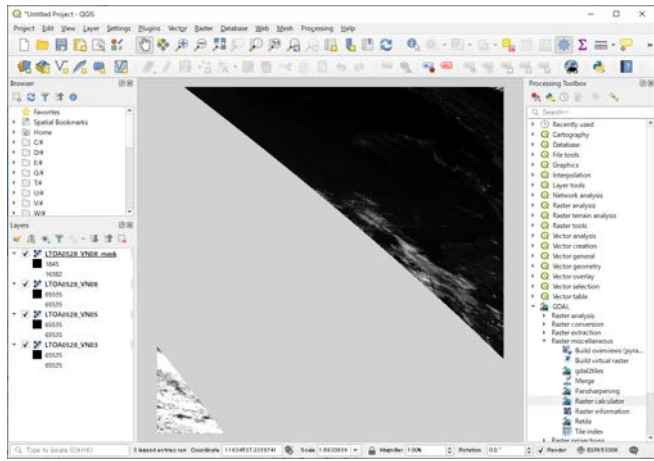
Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))
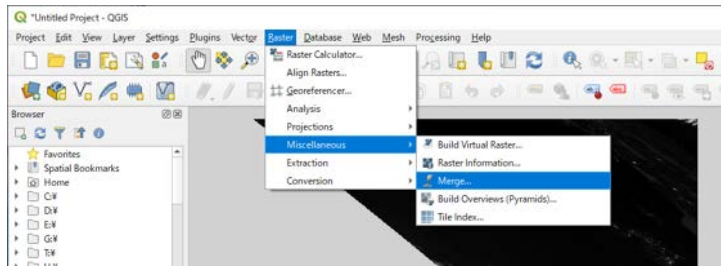
RGB color composition
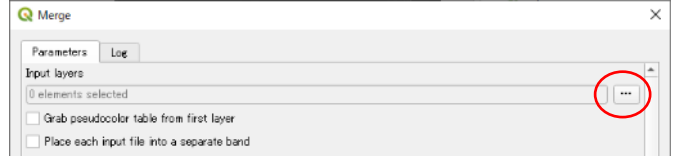
4）RGB color composition

Create an RGB color composite image using the masked image.

Select "Merge" from the toolbar to display it, as shown on the right.

Raster > Miscellaneous > Merge

The "Merge" screen is displayed as shown on the right.
Click the red circle button to the right of the item "Input Raster".

As shown in the figure on the right, the "Multiple selection"
screen is displayed.
Select the masked images in the order in which they are assigned
to R, G, and B, and replace them by dragging.
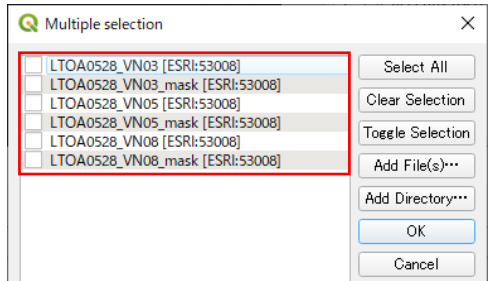
Check the check box on the left.

Click the "OK" button on the right to return to the "Merge" screen.
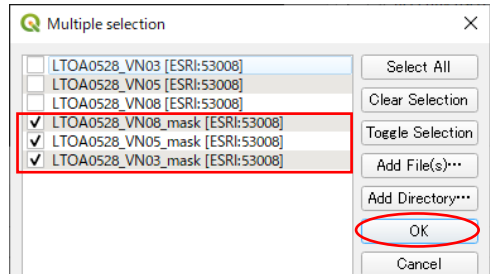
Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))

RGB color composition

4） RGB color composition (continued)

"3 elements selected" is displayed in the input raster item.
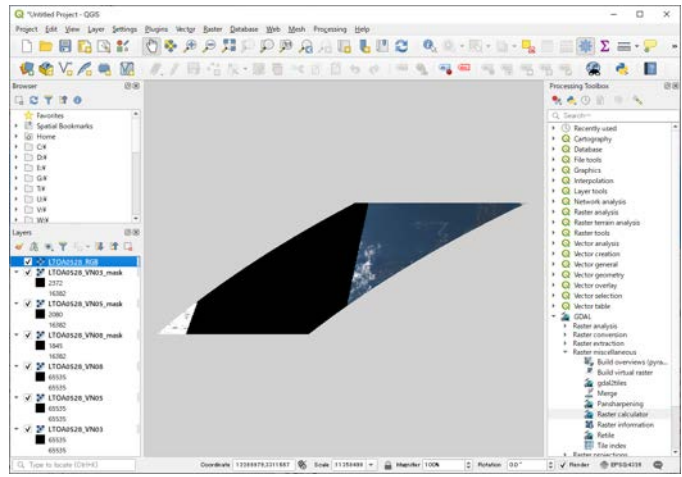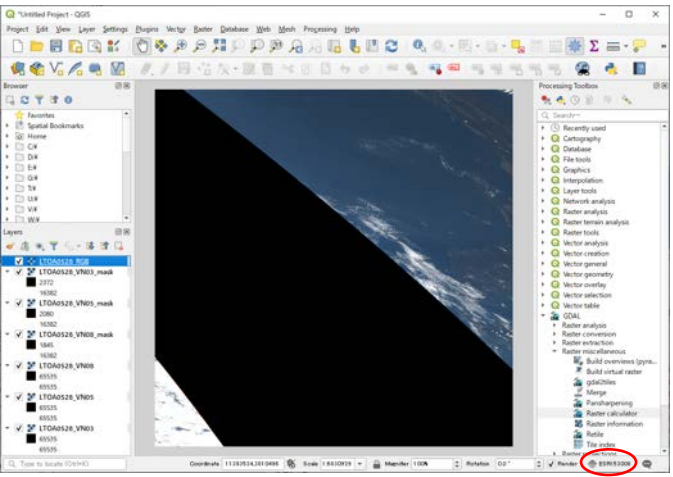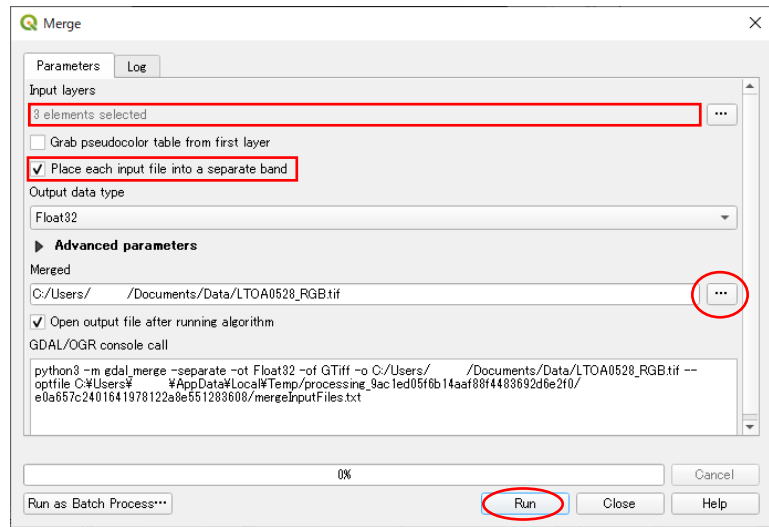Check "Place each input file into a separate band".

From the red circle button on the right side of the item "Merged",
enter the output destination and output file name.

Click the "Run" button at the bottom.

The RGB color composite image of the LTOA tile image is completed.

QGIS allows you to change and display the coordinate reference system (CRS).

Click the red circle in the figure below and select from "Predefined Coordinate Reference Sysyems".

The figure on the right is an example of EPSG: 4326.

If you saved the file with EPSG: 4326, see the next page as well.

Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))

RGB color composition
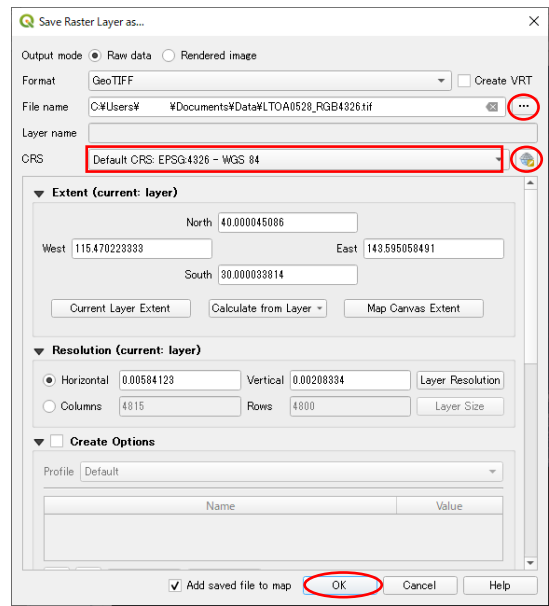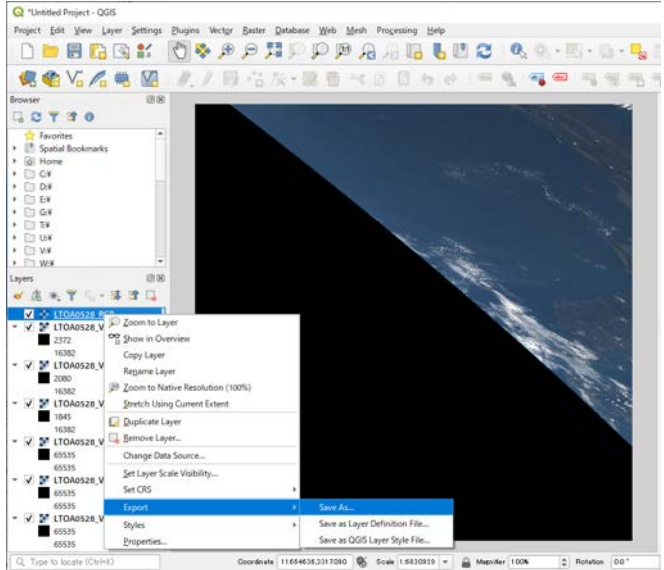
4） RGB color composition (continued)

If you want to save the file in another coordinate reference system (CRS), Select the target layer as shown on the right, right-click and select "Save As".

Export > Save As

The "Save Raster Layer as" screen shown on the right is displayed.
From the red circle button on the right side of the item "File name", enter the output destination and output file name.

In the item "CRS", select the CRS to be output from the pull-down or red circle button.

Click the "OK" button at the bottom of the screen.
CRS conversion is complete.

Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))
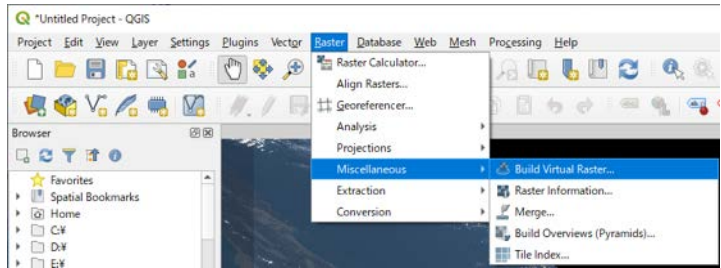
Tile images mosaic

Reference : Mosaic (joining) of RGB color composite images

We will introduce the case of joining adjacent tiles.

Select "Build Virtual Raster)" from the toolbar to display it, as shown on the right.
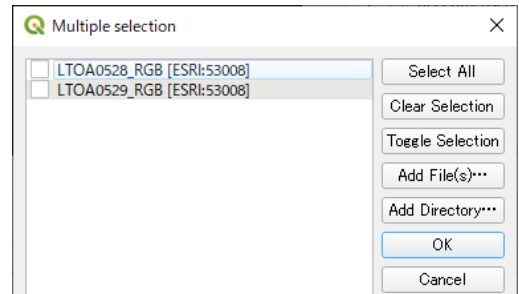
Raster > Miscellaneous > Build Virtual Raster

The "Build Virtual Raster" screen is displayed as shown on the right.
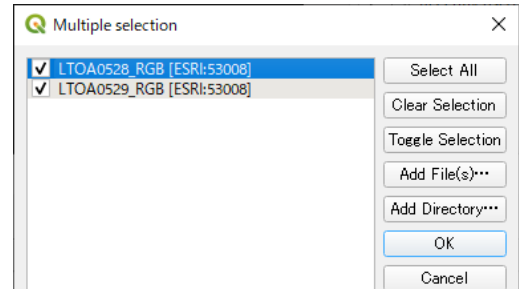Click the red circle button to the right of the item "Inpu layers".

As shown in the figure on the right, the "Multiple selection" screen will be displayed.
Check the check box on the left side of the image to be mosaicked.

Click the "OK" button on the right to return to the "Build Virtual Raster" screen.

Ex.) RGB color composition of L2 LTOA(TOA radiance) tile image (Equal Area Coordinate (EQA))

Tile images mosaic

"2 elements selected" is displayed in the input raster item.
Uncheck "Place each input file into a separate band".

From the red circle button on the right side of the item "Virtual Raster", enter the output destination and output file name (extension is VRT only).

Click the "Run" button at the bottom.
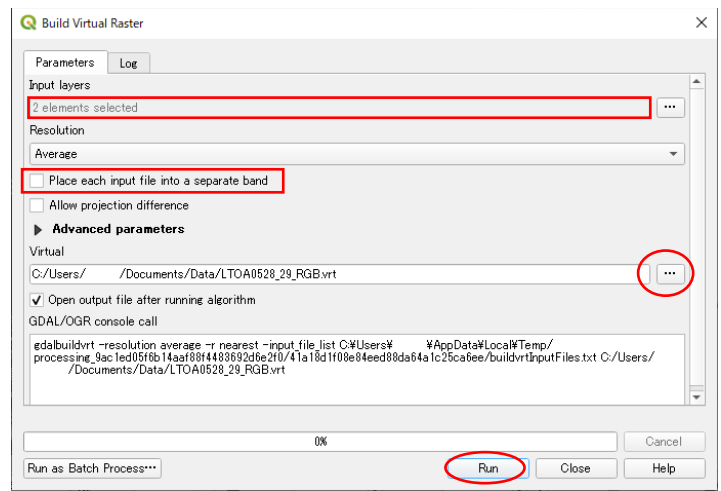
The LTOA tile RGB color composite mosaic image is complete.

QGIS allows you to change and display the coordinate reference system (CRS).
Click the red circle in the figure below and select from "Predefined Coordinate Reference Systems".
The figure on the right is an example of EPSG: 4326.