Format Conversion Tool for JERS-1

Operation Manual for Users

15/2/2017

Changes and status paragraphs

Revision	Date	Reason for change	Modified or added paragraphs
1.0	15/2/2017	Creation	-

1. Introduction

This document is written for users who use Format Conversion Tool for JERS-1.

JERS-1 dataset can be converted into GeoTIFF file format and KMZ file fomat by using this format conversion tool.

JERS-1 dataset is made as CEOS file format. CEOS File format is restricted to use with GIS software.

Moreover there is few GIS software to use CEOS file format in the world. (Fig. 1)

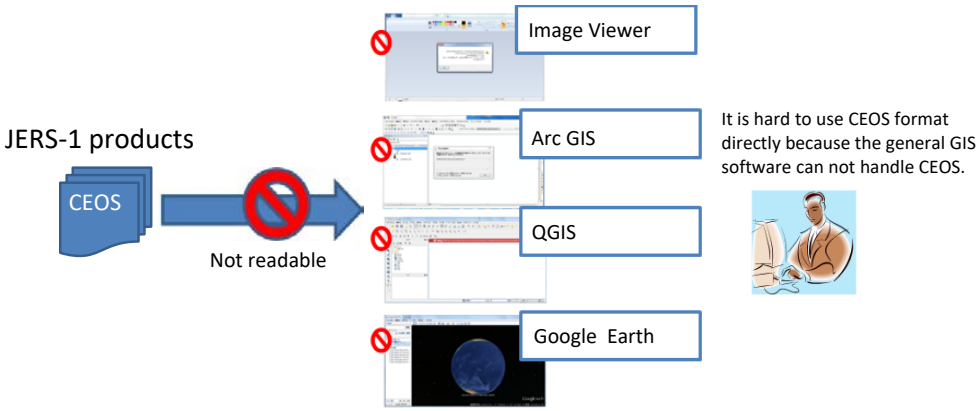


Fig. 1 CEOS Data Handling without Format Conversion Tool for JERS-1

By using this format conversion tool, JERS-1 dataset is able to convert into GeoTIFF file format and KMZ file format more easily.

So, JERS-1 data can be used with various softwares such as Arc GIS, QGIS, and Google Earth.

We hope to increase the ways to us JERS-1 dataset by using this tool. (Fig. 2)

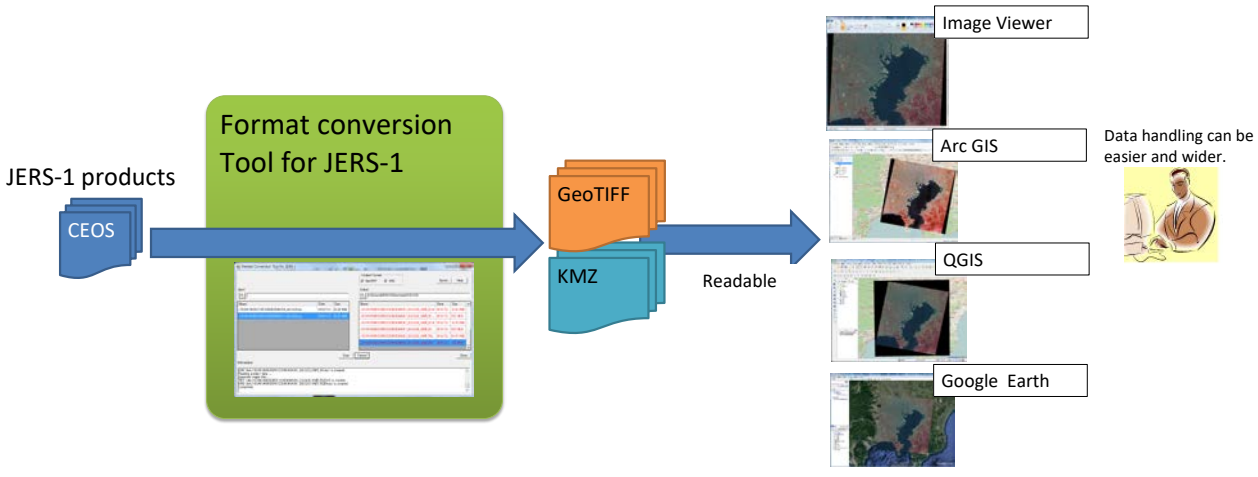


Fig. 2 Expanding Data Utilization after Format Conversion Tool for JERS-1

2. Conversion target products

The conversion target products are listed in Table 1.

Table 1 List of conversion target products

Target products	Product type	Input format	Output format
JERS-1 products	SAR Level 2.1	CEOS	GeoTIFF
			KMZ
	OPS VNIR Level 2		GeoTIFF
			KMZ
	OPS SWIR Level 2		GeoTIFF
			KMZ

3. Supported operating systems (OSs)

The OSs supported by the Format Conversion Tool are listed below.

- Windows 7
- Windows 8
- Windows 10

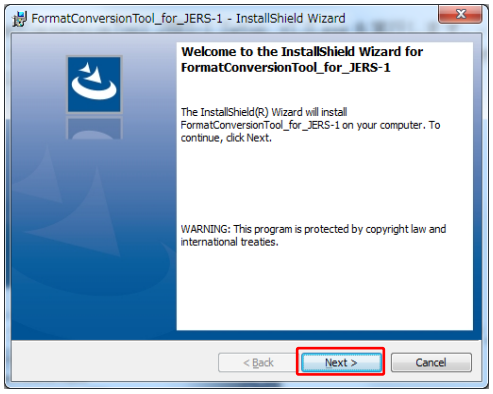
4. Operation description

The basic procedures of the Format Conversion Tool are listed in “4.1” quick explanation of Format conversion process(basic) are listed in “4.2” and detailed explanations of each screen are listed in “4.3–4.6”

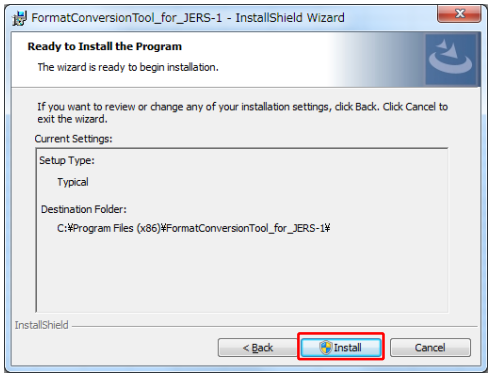
4.1 Basic procedures of the Format Conversion Tool for JERS-1

① Execute FormatConversionTool_JERS-1_Setup v1.0.exe

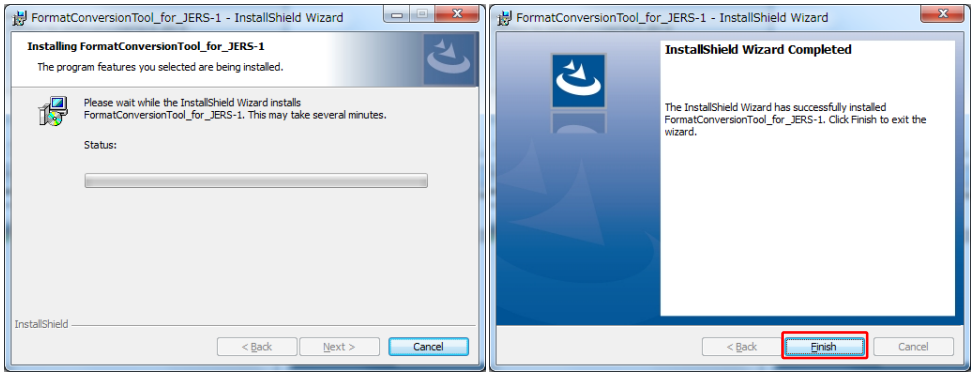
② Click “Next” button on Installer page.



③ Click “Install” button on Installer Preparation page.



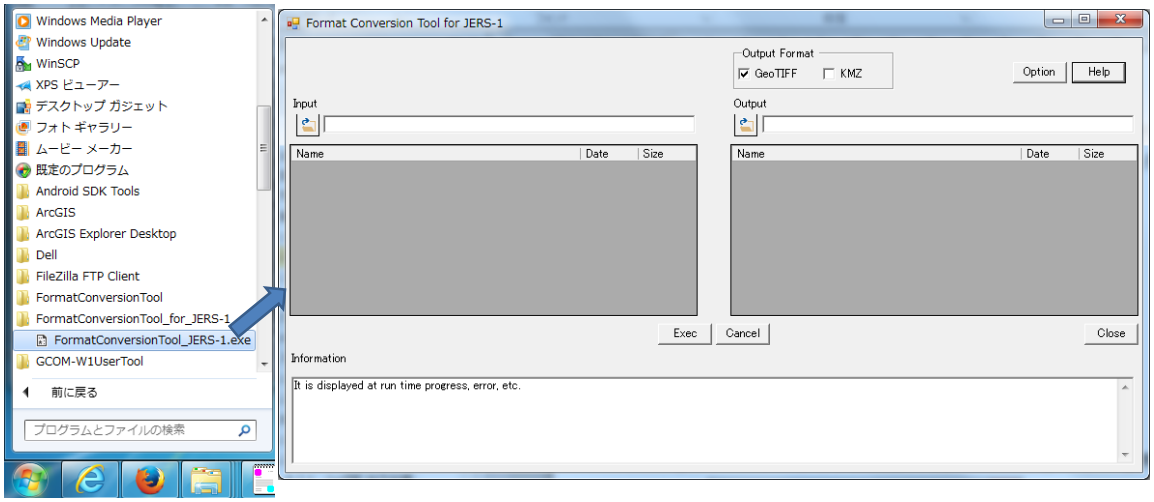
④ Click “Finish” button on Install completed page.



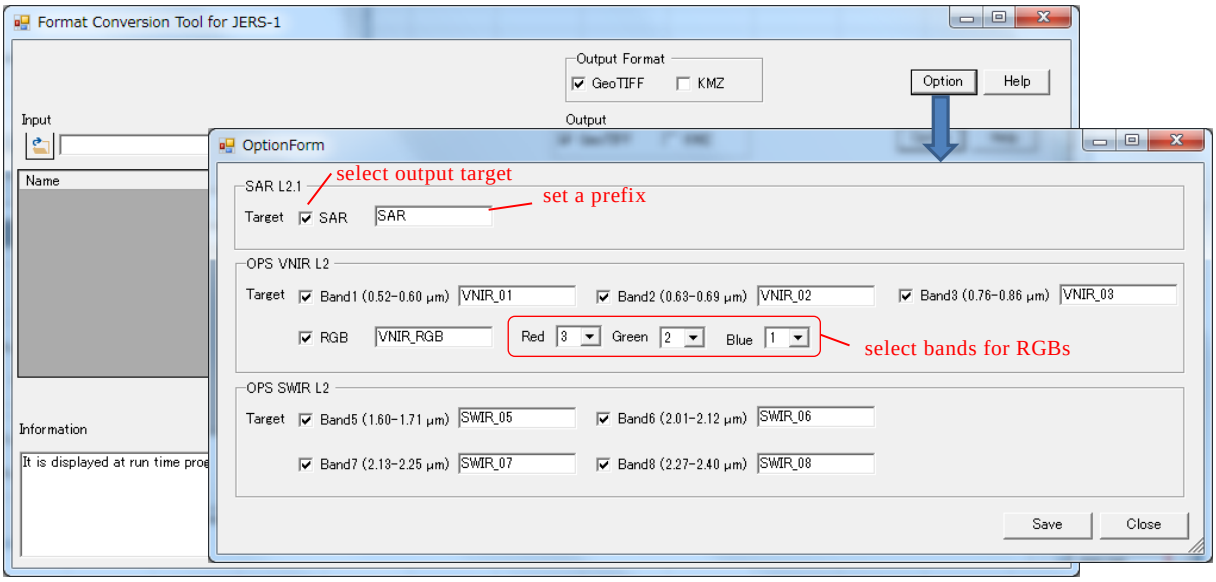
* If you execute FormatConversionTool_JERS-1_Setup v1.0.exe on the computer not installed .NET Framework, .NET Framework will be installed at first.

4.2 Format conversion process (basic)

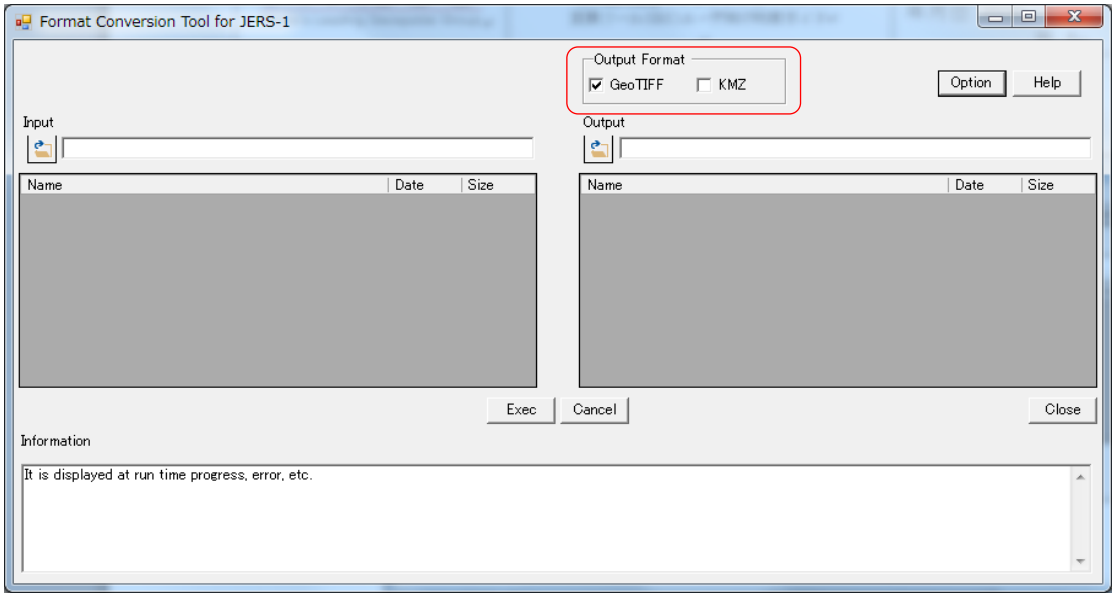
① Run FormatConversionTOOL_JERS-1.exe and launch this tool.



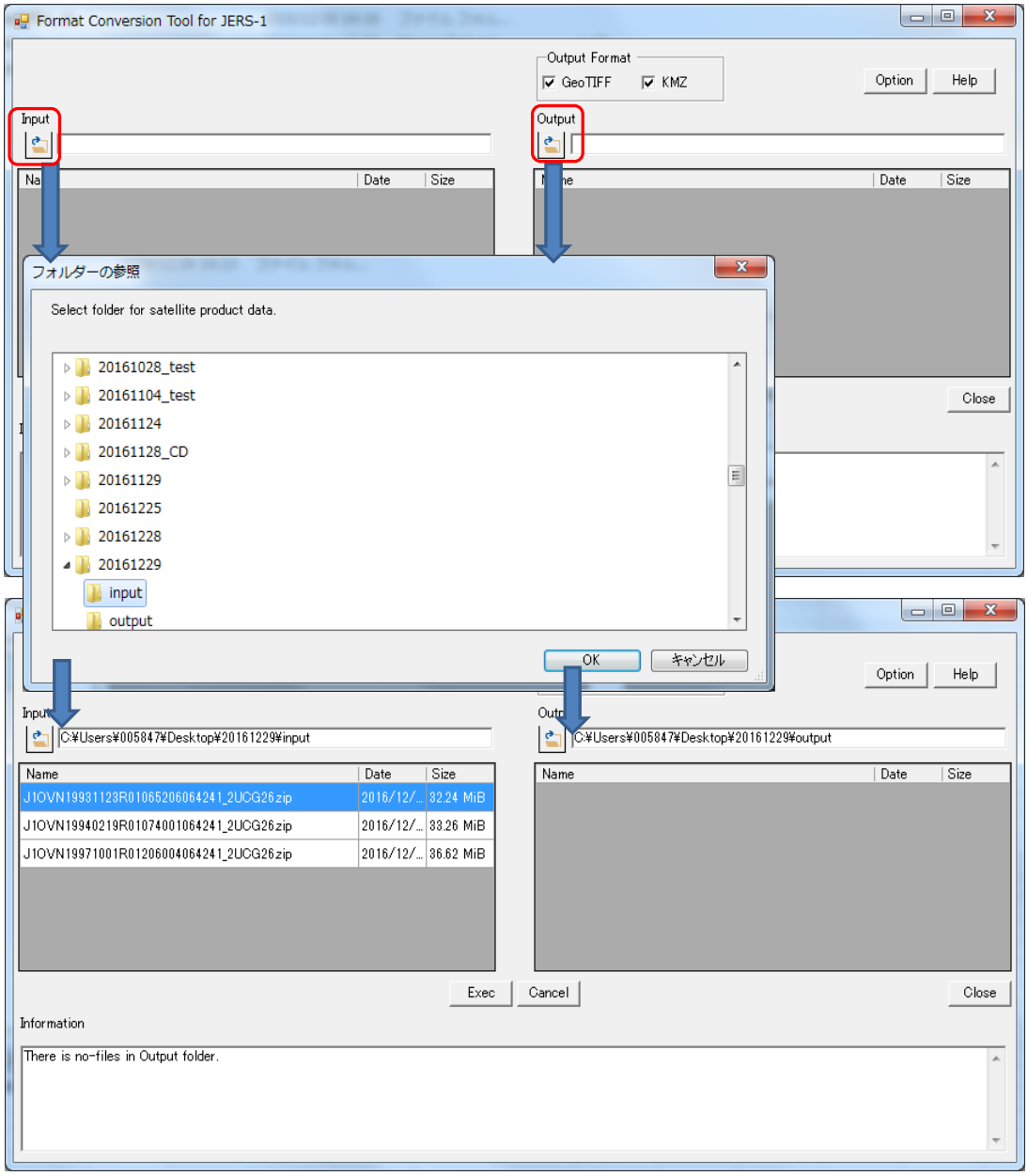
② Click “Option” button in Main screen, and set a prefix of target file to output and a prefix of output file in Option screen. (This operation can be skipped.)



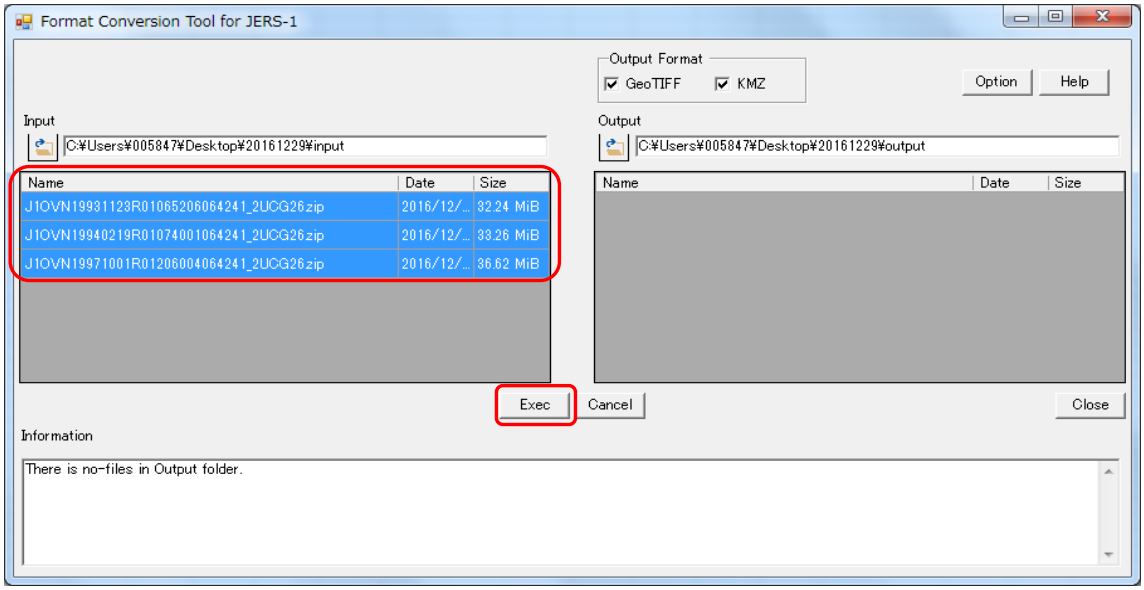
③ In the main screen, select the output format (GeoTIFF, KMZ).



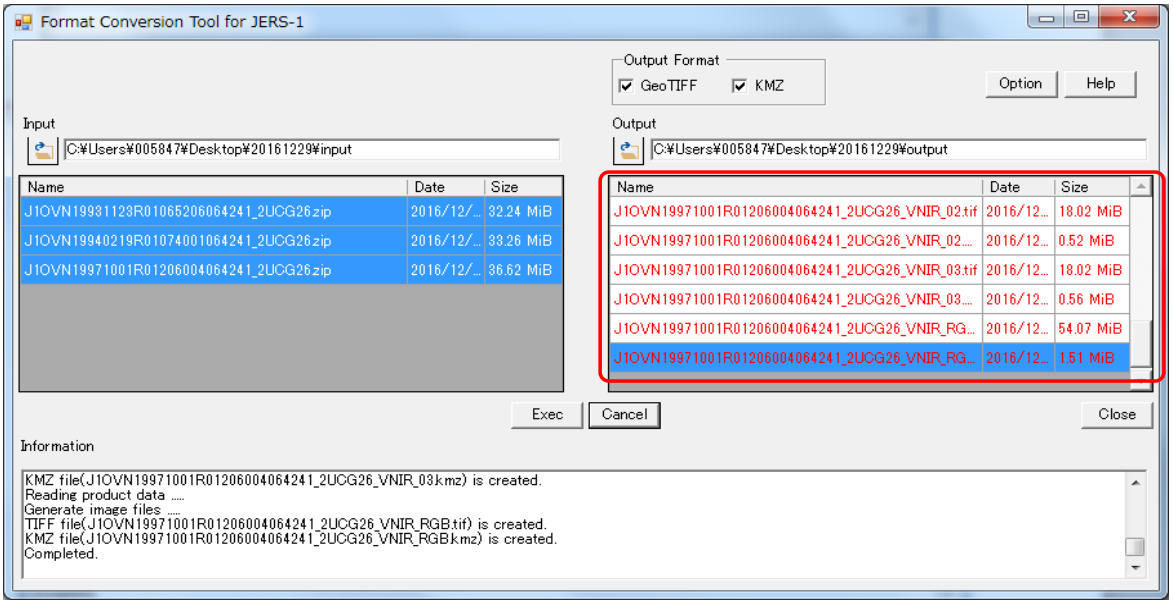
④ In the main screen, select the input/output folders.



⑤ Select conversion target file(s) from the main screen input file list and click “Exec”.



⑥ The converted format files will be output to the output folder. (Complete)



4.3 Main screen

This is the screen for executing format conversions according to the selected mode.

Select the input file, the output format, and the output folder and pressing the Exec button. The converted format file will be output to the output folder.

A screenshot of the main screen is shown in Fig. 3, and descriptions of screen elements are listed in Table 2.

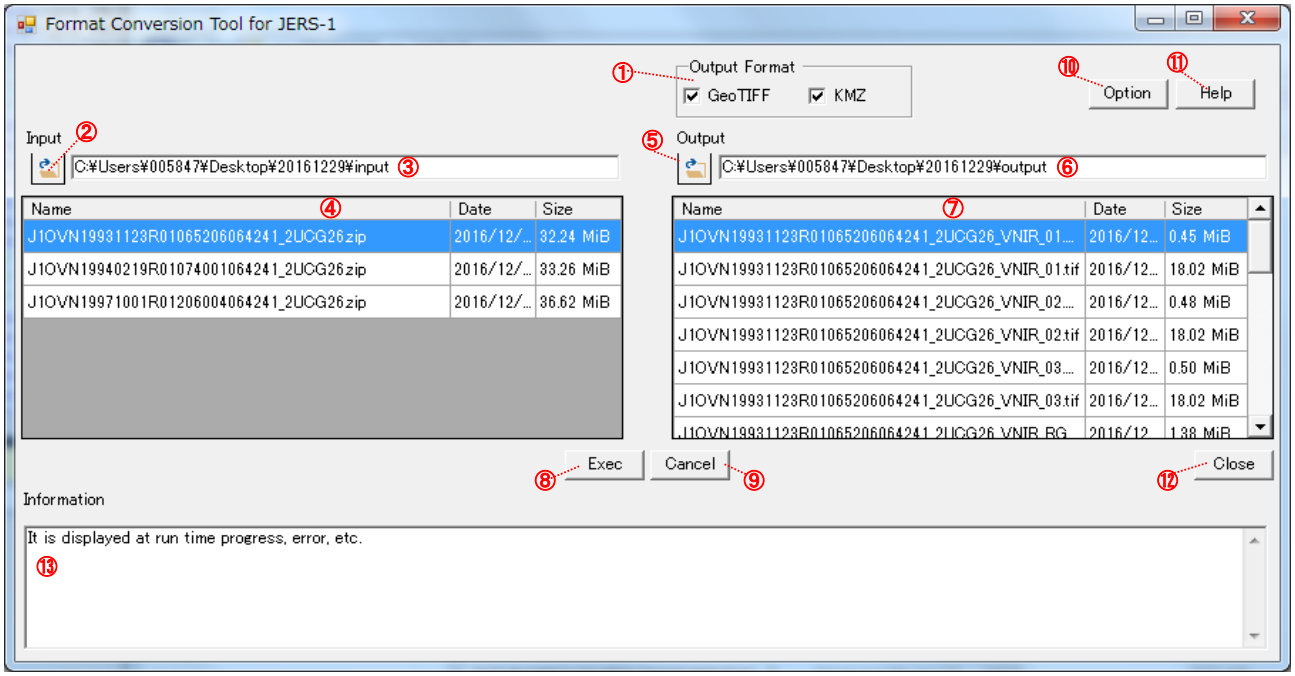


Fig. 3 Screenshot of the main screen

Table 2 Main screen elements

No.	Name	Description
1	Output format selection checkbox	Selects the output file format (GeoTIFF, KMZ).
2	Input folder selection button	Opens the folder selection screen.
3	Input folder box	Displays the folder path selected in the folder selection screen.
4	Input file list	It is possible to add to the list by dragging and dropping. Multiple files can also be selected using Shift and Ctrl. Displays a list of files in the selected folder path.
5	Output folder selection button	Opens the folder selection screen.
6	Output folder box	Displays the folder path selected in the folder selection screen.
7	Output file list	It is possible to perform conversions by dragging and dropping from the list of input files. It is possible to change file name by choosing file. Displays a list of files in the selected folder. (Black) Displays the output files created after conversion. (Red)
8	Run button	Runs the conversion process. Outputs converted files to the output folder based on the input file and output format.
9	Cancel button	Stops the conversion process.
10	Options button	Opens the options screen.
11	Help button	Displays the help screen.
12	Close button	Exits tool.
13	Information box	Displays the activity log and errors.

4.4 Folder selection screen

This is the screen for selecting folders. The selected folder will be reflected in the main screen's input folder and output folder.

A screenshot of the folder selection screen is shown in Fig. 4, and descriptions of screen elements are listed in Table 3.

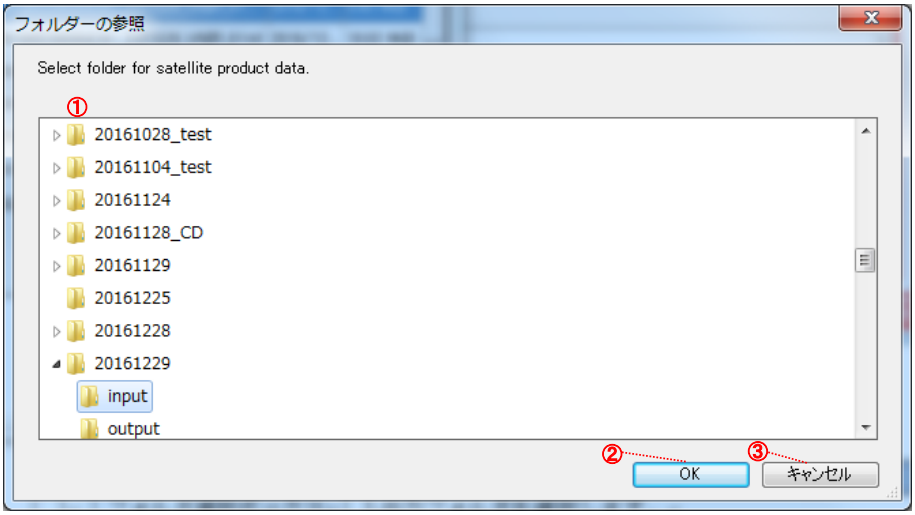


Fig. 4 A screenshot of the folder selection screen

Table 3 Folder selection screen elements

No.	Name	Description
1	Folder selection box	Selects the output folder.
2	OK button	Closes the folder selection screen. Select the main screen input/output folder box to display the folder path, and all files contained in that path will be displayed as a list of input/output files.
3	Cancel button	Closes the folder selection screen.

4.5 Options screen

You can set the target to output and prefix of outputted file (end of outputted file name) in this screen. If you set it in this screen, format conversion will be done according to your setting.

Screenshot is shown in Fig. 5, explanation of elements is shown in Table 4.

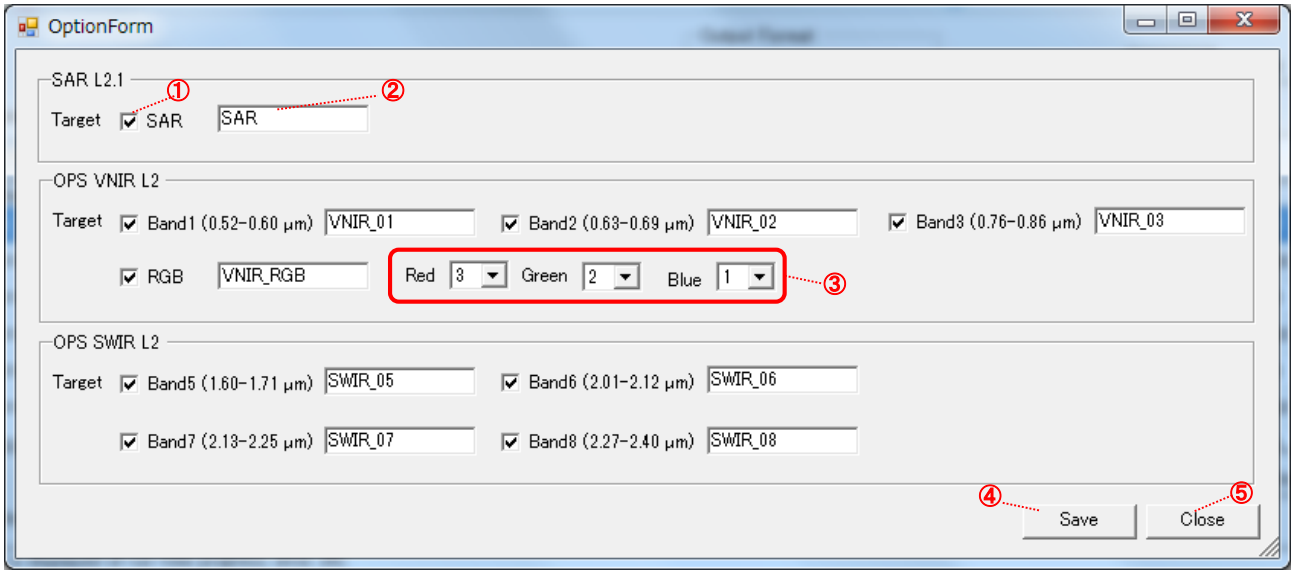


Fig. 5 Screenshot of options screen

Table 4 Options screen elements

No.	Name	Description
1	Check box of target file to output	Select the band(s) of target file to output.
2	Prefix of output file	Input prefix of every output file. Output file name is determined by using inputted prefix in this phase. Output file name: input file (no extension) + prefix +.tif OR .kmz
3	Selecter of the band to apply to RGB parameteres	Select the band to apply to RGB parameters (red, green and blue). If you want to use False color, please apply Band3 to Red color, Band2 to Green color, and Band1 to Blue color. False color displays vegetation such as trees and grasses as Red color. It is used to watch the condition of forests and fields on earth. If you want to use Natural color, please apply Band2 to Red color, Band3 to Green color, and Band1 to Blue color. Natural color displays vegetation such as trees and grasses as Green color. It looks like natural image for human being.
4	Save button	Save the parameter you inputed in option screen and close the screen.
5	Close button	Closes the screen.

4.6 Help screen

This screen explains basic operation procedures for this tool.
A screenshot of the help screen is show in Fig. 6.

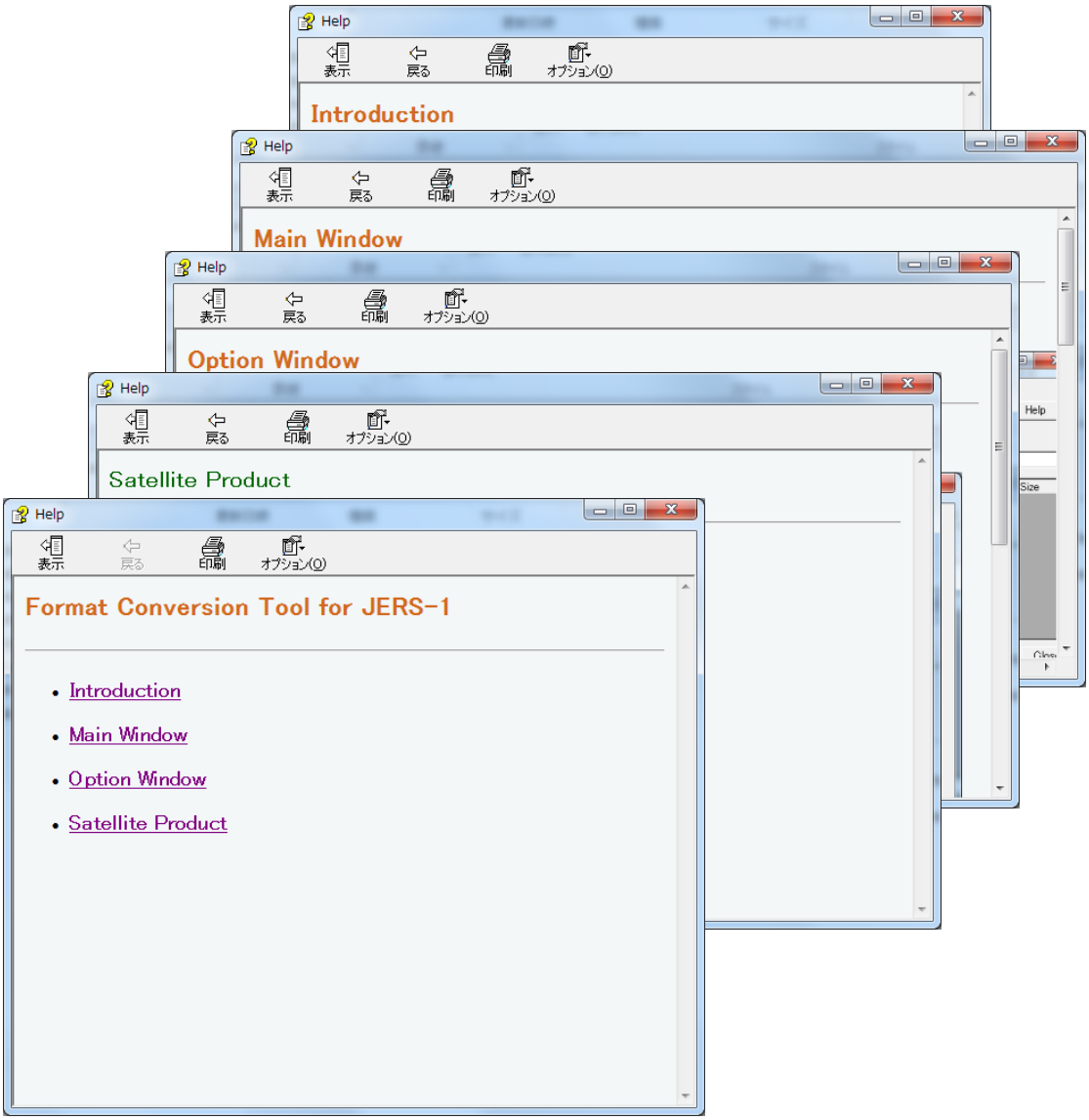


Fig. 6 A screenshot of the help screen

5. Input file

5.1 List of URL to get input files

- JERS-1 Product
  G-Portal: https://www.gportal.jaxa.jp/gp/top.html

5.2 List of URL written about input file format

- JERS-1 Product
  SAR
  http://www.eorc.jaxa.jp/hatoyama/satellite/list/format/format_sar_j.pdf
  OPS
  http://www.eorc.jaxa.jp/hatoyama/satellite/list/format/format_ops_j.pdf

6. Output file

6.1 Output file name

The following is displayed concerning the naming conventions for output file names.

- GeoTIFF
  (Input file name [not extension])_(Output prefix).tif

- KMZ
  (Input file name [not extension])_(Output prefix).kmz

* Output prefix : it is inputted parameters on Options screen (reference to Fig. 5 ②).

6.2 GeoTIFF Output Specification

6.2.1 GeoTIFF header part output specification

A) JERS-1 product (WGS84 UTM)

Tag names and parameters about GeoTIFF Header part of JERS-1 product are written on Table 5.

Table 5 List of tag names and parameters about GeoTIFF header part of JERS-1 product (WGS84 UTM)

No.	Tag name	Parameter
1	TIFFTAG_ImageWidth	Pixel
2	TIFFTAG_ImageLength	Line
3	TIFFTAG_BitsPerSample	SAR : 16 OPS : 8 OPS RGB : 8,8,8
4	TIFFTAG_Compression	Uncompressed
5	TIFFTAG_PhotometricInterpretation	SAR/OPS : BlackIsZero OPS RGB : RGB
	TIFFTAG_StripOffsets	8

No.	Tag name	Parameter
6	TIFFTAG_SamplesPerPixel	SAR/OPS：1 OPS RGB：3
7	TIFFTAG_SampleFormat	SAR/OPS：Unsigned Integer OPS RGB：Unsigned Integer, Unsigned Integer, Unsigned Integer
8	Metadata.ModelTransformationTag	Tag to convert pixel and line coordinates into map coordinates.
9	Metadata.GeoKeyDirectory. GTModelTypeGeoKey	ModelTypeProjected
10	Metadata.GeoKeyDirectory. GTRasterTypeGeoKey	RasterPixelIsArea
11	Metadata.GeoKeyDirectory. ProjectedCSTypeGeoKey	PCS_WGS84_UTM_zone_(Zone of conversion file)N
12	Metadata.GeoKeyDirectory. ProjLinearUnitsGeoKey	Linear_Meter

B) JERS-1 product (Porar Stereo)

Tag names and parameters about GeoTIFF Header part of JERS-1 product are written on Table 6.

Table 6 List of tag names and parameters about GeoTIFF header part of JERS-1 product (Porar Stereo)

No.	Tag name	Parameter
1	TIFFTAG_ImageWidth	Pixel
2	TIFFTAG_ImageLength	Line
3	TIFFTAG_BitsPerSample	OPS　　：8 OPS RGB：8,8,8
4	TIFFTAG_Compression	Uncompressed
5	TIFFTAG_PhotometricInterpretation	OPS　　：BlackIsZero OPS RGB：RGB
6	TIFFTAG_StripOffsets	8
7	TIFFTAG_SamplesPerPixel	OPS　　：1 OPS RGB：3
8	TIFFTAG_SampleFormat	OPS　　：Unsigned Integer OPS RGB：Unsigned Integer, Unsigned Integer, Unsigned Integer
9	Metadata.ModelTransformationTag	Tag to convert pixel and line coordinates into map coordinates.
10	Metadata.GeoKeyDirectory. GTModelTypeGeoKey	ModelTypeProjected
11	Metadata.GeoKeyDirectory. GTRasterTypeGeoKey	RasterPixelIsArea
12	Metadata.GeoKeyDirectory. ProjLinearUnitsGeoKey	Linear_Meter
13	ProjOriginLatGeoKey	60.0
14	ProjFalseEastingGeoKey	0.0
15	ProjFalseNorthingGeoKey	0.0
16	ProjScaleAtOriginGeoKey	1.0
17	ProjStraightVertPoleLongGeoKey	139.0

6.2.2 GeoTIFF data part output specification

The Setting parameters of data parts are the same values as original image data.

6.3 KMZ output specification

KMZ file is consisted of KML file and TIFF file.

6.3.1 KML output specification

Tag names and Parameters about JERS-1 product's KML file are written on Table 7.

Table 7 List of tag names and parameters about JERS-1 product's KML file

No.	Tag name	Parameter
1	kml- GroundOverlay-name	TIFF file name (Not extension)
2	kml- GroundOverlay-Icon-href	TIFF file path
3	kml- GroundOverlay-LatLonBox-north	Northernmost coordinate
4	kml- GroundOverlay-LatLonBox-south	Southernmost coordinate
5	kml- GroundOverlay-LatLonBox-east	Easternmost coordinate
6	kml- GroundOverlay-LatLonBox-west	Westernmost coordinate

6.3.2 TIFF Output specification

The Setting parameters of data parts are the same values as original image data.

7. Examples of using Format Conversion Tool

7.1 Use by GIS Software

GeoTIFF format data is readable as image data by popular viewers such as the Paint and the photo viewer. This image data is easy for editing itself and uploading SNS.

- Use case of viewing and editing JERS-1 product

Fig. 7 Example of viewing and editing JERS-1 Data by Viewers

7.2 Use by GIS Software

It is easily to refer the GeoTIFF and KMZ data by mapping on world map, analyze, and edit values of data.

KMZ format file is used for Google Earth.

- Reference of JERS-1 product

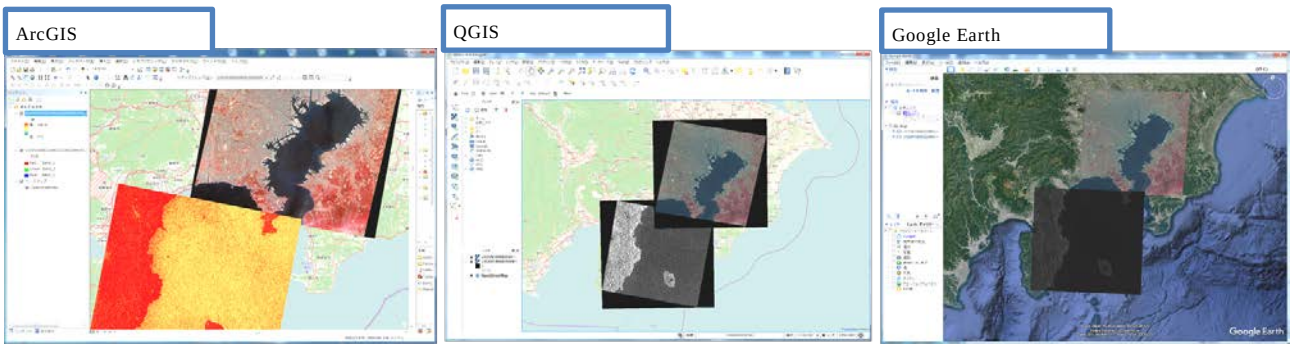


Fig. 8 JERS-1 product using by GIS software

- Use GIS software to analyze and edit JERS-1 product

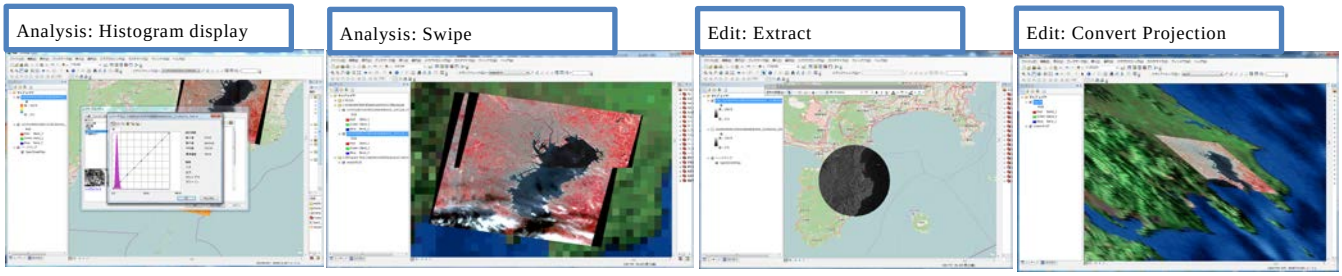


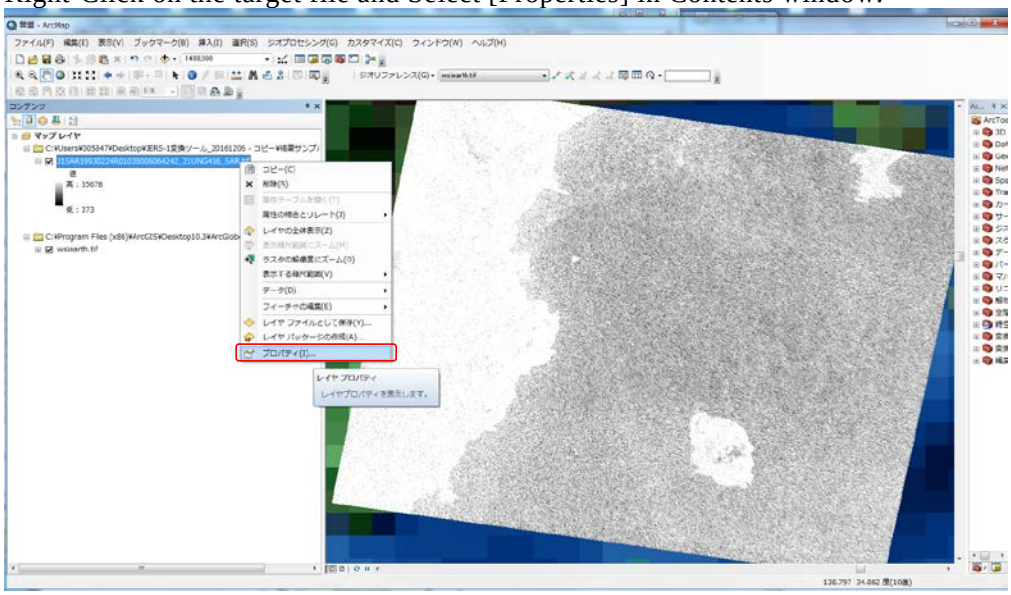
Fig. 9 Case of analyzing and editing JERS-1 product by using GIS software

7.3 How to edit and analyze with GIS Software (ArcMap)

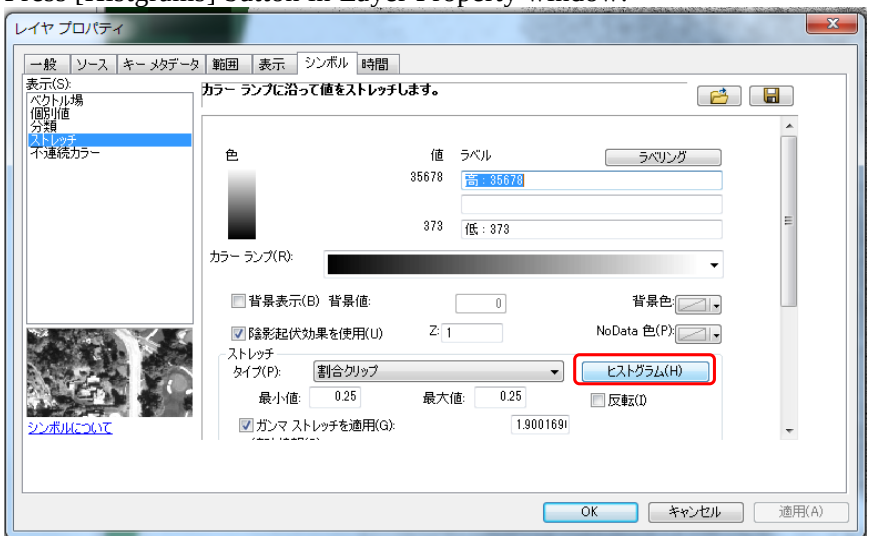
The examples of how to use edit and analyze the JERS-1 dataset with GIS Software (ArcMap 10.3,10.4) written in Chapter 7.2 Fig. 9. are shown below.

- How to display histogram

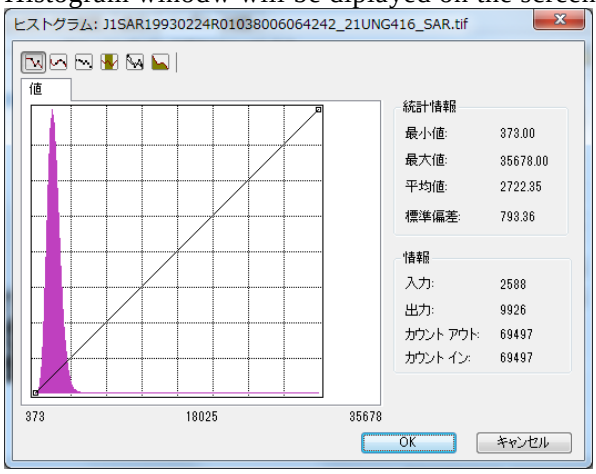
① Right-Click on the target file and Select [Properties] in Contents window.



② Press [Histgrams] button in Layer Property window.

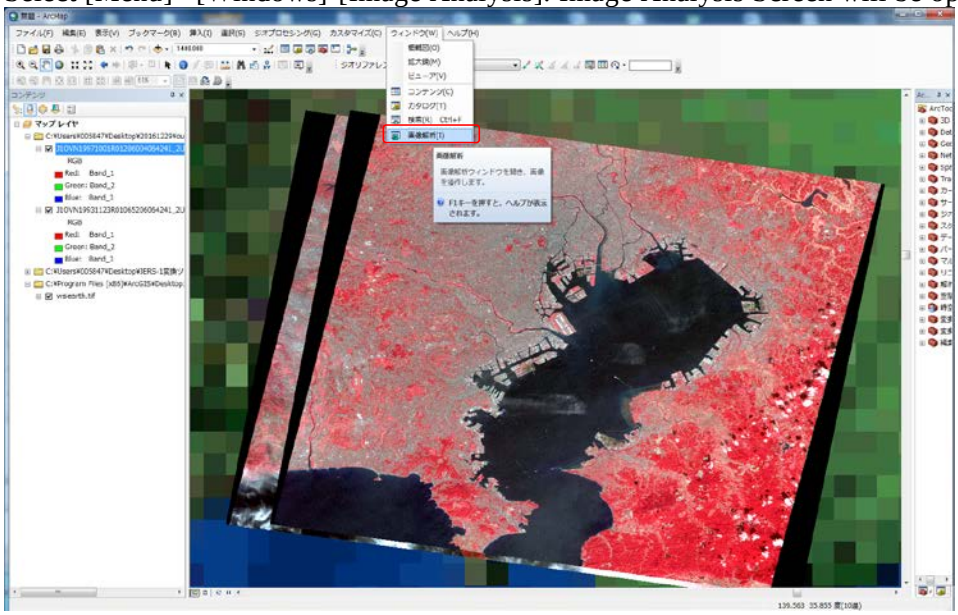


③ Histogram winodw will be diplayed on the screen.

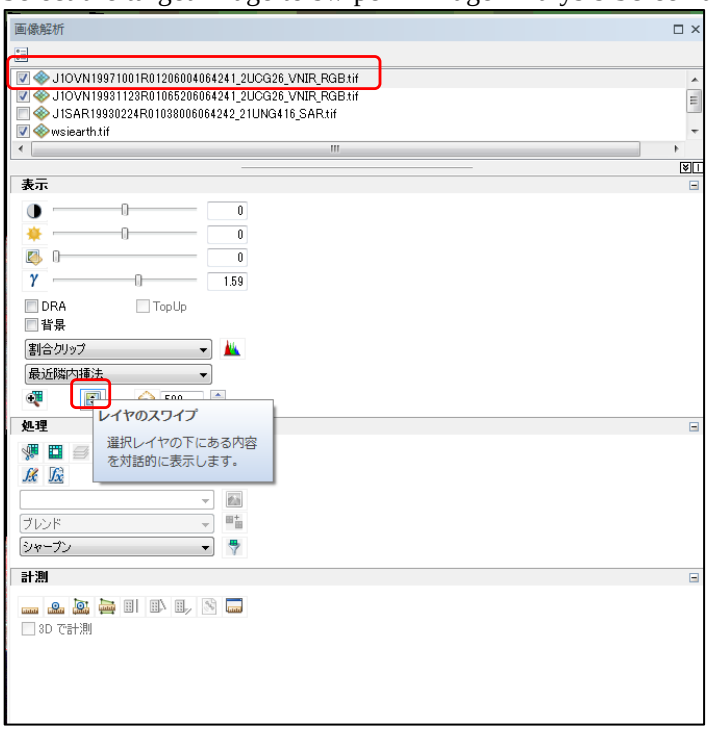


➢ How to use display swipe.

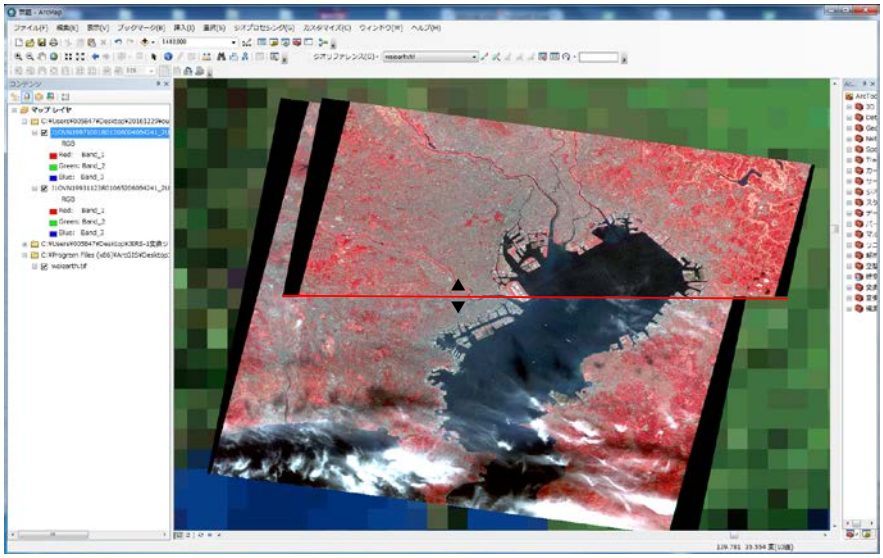
① Select [Menu] –[Windows]-[Image Analysis]. Image Analysis Screen will be opened.



② Select the target image to swipe in Image Analysis Screen and Press [Swipe layer] button.

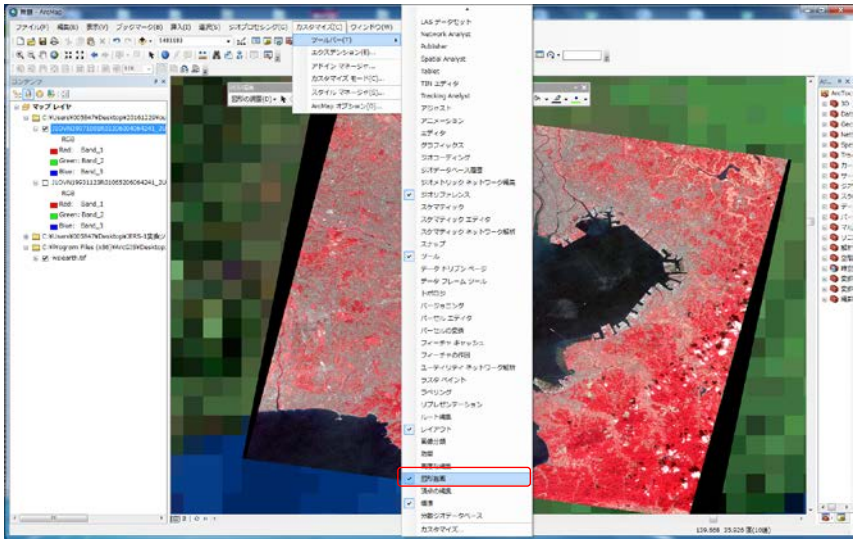


③ You can swipe the image on the layer by using Left-Clicking and moving cursor.

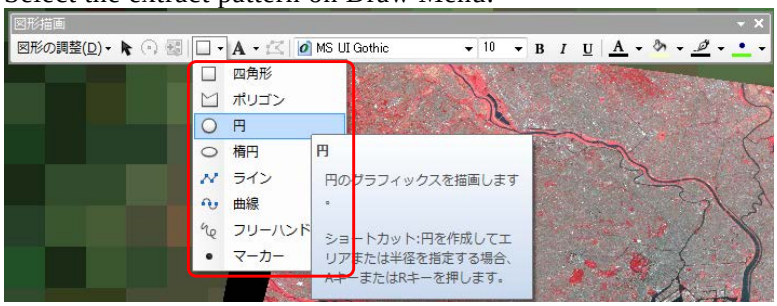


➢ How to use extract

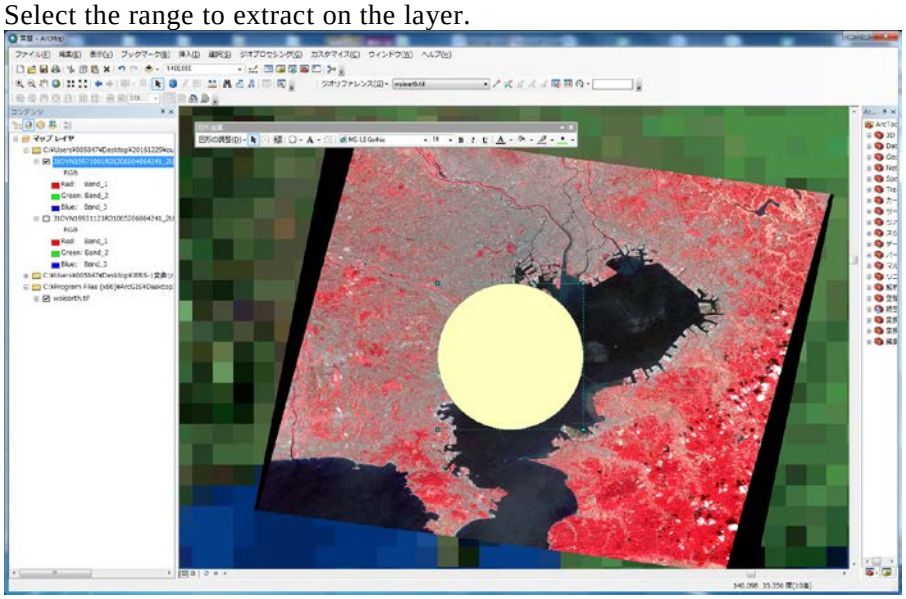
① Select [Cusotmize]-[Toolbars]-[Draw]. Draw Menu will be displayed.



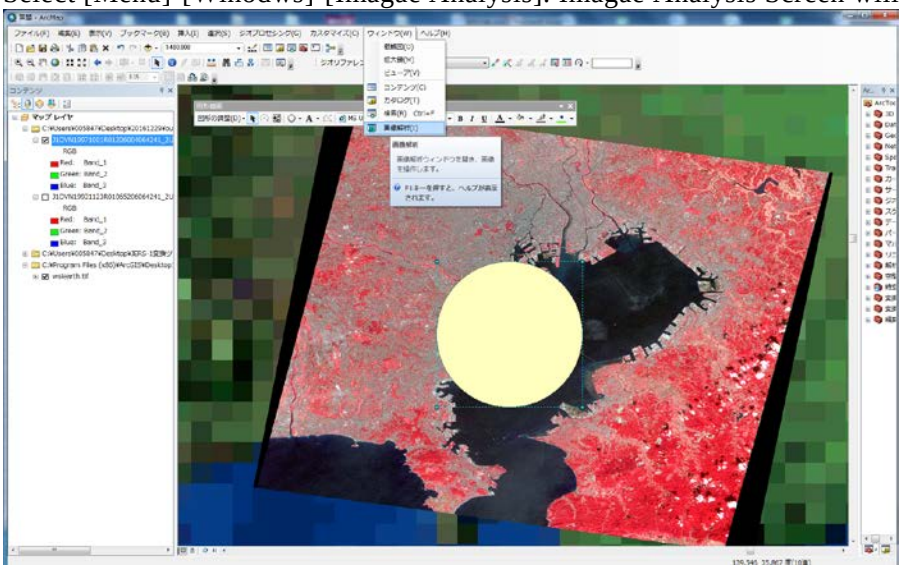
② Select the extract pattern on Draw Menu.



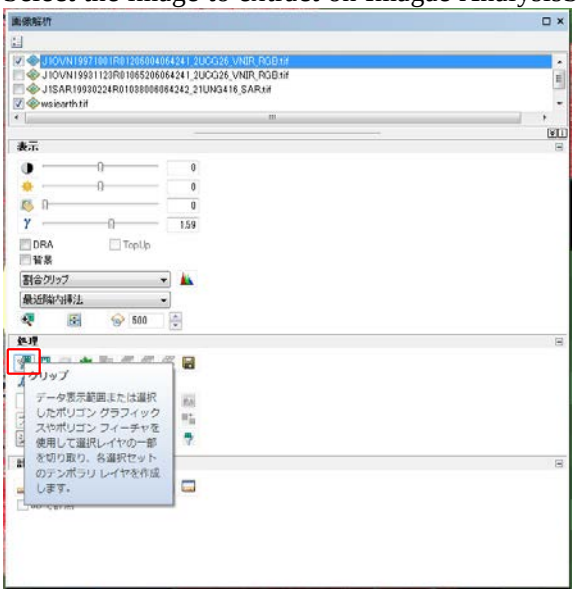
③ Select the range to extract on the layer.



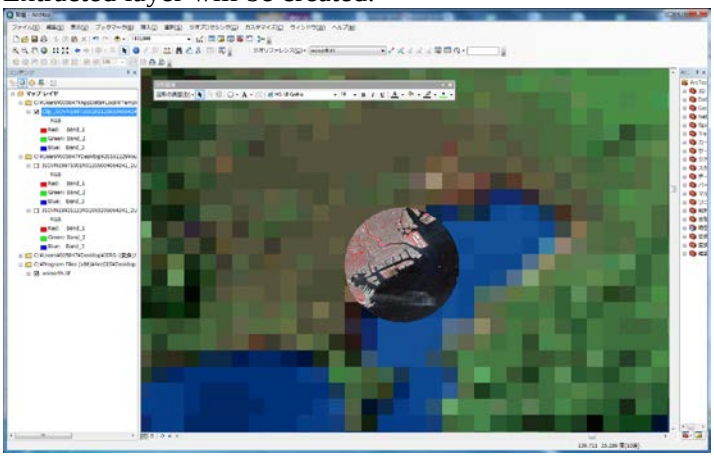
④ Select [Menu]-[Winodws]-[Imagae Analysis]. Imagae Analysis Screen will be opened.



⑤ Select the image to extract on Imagae AnalysisScreen, and press the [Clip] button.

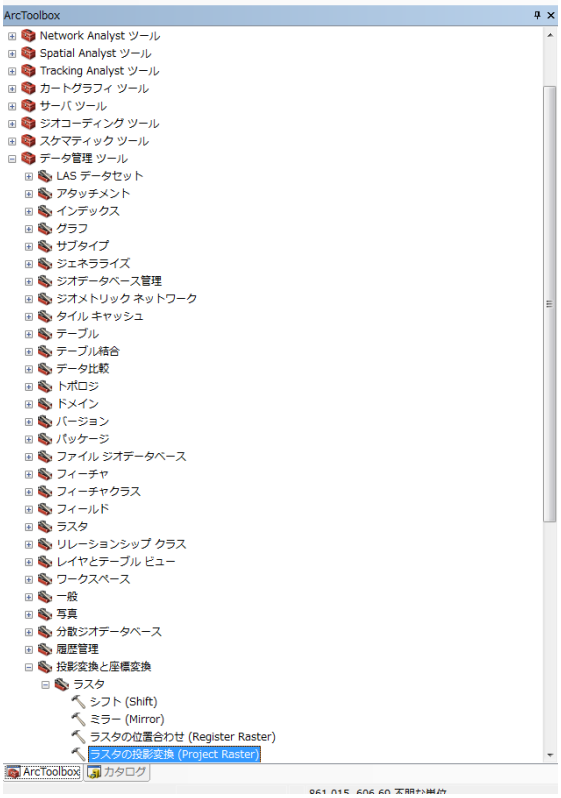


⑥ Extracted layer will be created.

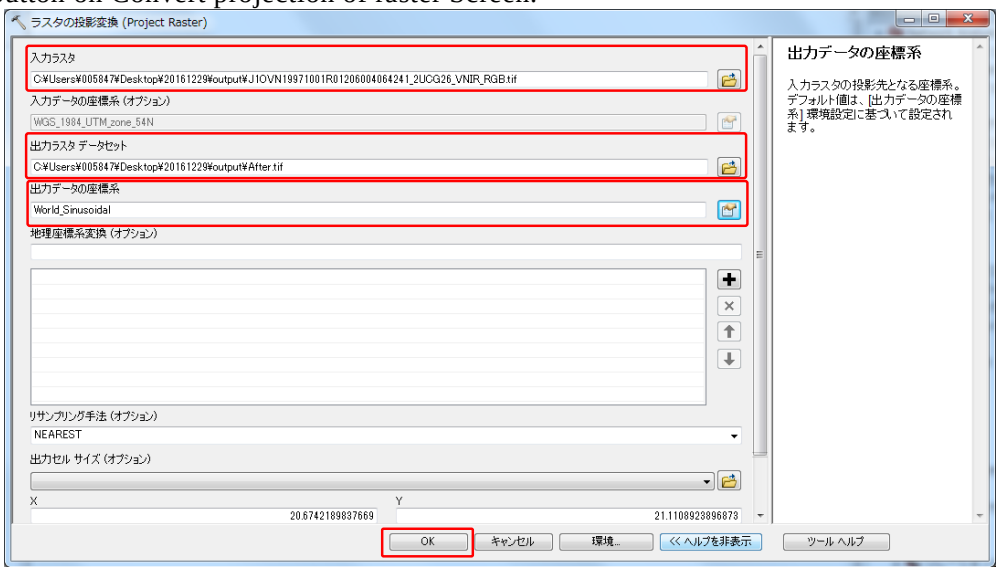


➢ How to convert projection

① Double-click [ArcToolBox] - [Data Management Tools] - [Projections and Transformations] - [Raster] - [Project Raster]. Convert projection of raster Screen will be opened.



② Set inputted raster dataset, outputted raster dataset, and outputted raster coordinate, press the [OK] button on Convert projection of raster Screen.



③ Projection of raster image you inputted will be conveted and outputted.