

GOSAT Tools

Installation and Operation Manual

March 2022

NIES GOSAT Project

Revision history

Revised on	Page	Description
24 Mar. 2017	-	First edition
1 Jul. 2019	1,3,4	Stop releasing the JRE bundle version of programs.
7 Oct. 2019	3	Add the Note of usage of 64-bit version of programs.
1 Mar. 2022	1,3,9	Adopt new program packages using the Open Java JDK, instead of Oracle JRE or JDK.

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1. Introduction

Until December 28, 2016, GOSAT data had been provided through GUIG (GOSAT User Interface Gateway), the on-demand data producing system. According to the termination of GUIG, we started the new service, GDAS (GOSAT Data Archive Service, available at <https://data2.gosat.nies.go.jp/>), to provide all produced GOSAT data as archived files to registered users on December 1, 2016. All GOSAT data users now need to select data from the already downloaded GOSAT data at GDAS.

The GOSAT Tools are designed for GOSAT data users to select CAI products and to extract datasets from FTS products already downloaded to each user's computer. GOSAT Tools contain two programs written in Java: CAI Copier and FTS Exporter. To utilize GOSAT Tools, Java Development Kit (JDK) must be installed in advance. Depending on the type of computer operating system (Mac or Windows) and the architecture (64-bit) of JDK installed on each user's computer, two kinds of packages of GOSAT Tools are available.

1.1 Overview

GOSAT Tools contain CAI Copier and FTS Exporter.

- CAI Copier

If you specify the search conditions (observation period, path, and area), and input/output directories on your computer, CAI Copier copies the CAI product files matching the search condition from the input directory, which contains already downloaded CAI products, to the output directory.

Available types of product are CAI Level 1B/1B+ (L1B/L1B+), and Level 2 (L2).

- FTS Exporter

If you specify the search conditions (observation period, path, and area), product (type and dataset), and input directory/output file on your computer, FTS exporter exports the datasets from already downloaded FTS products in the input directory to the output file in CSV format.

Available types of product are FTS Level 2 (L2).

1.2 System Requirements

GOSAT Tools including CAI Copier and FTS Exporter are both written in Java.

To utilize GOSAT Tools, Java Development Kit (JDK) must be installed on your computer. Please select one package of GOSAT Tools from the followings depending on the computer operating system (Windows or Mac) and the architecture (64-bit) of JDK installed on your computer:

- GOSAT Tools for Windows and 64-bit JDK
- GOSAT Tools for Mac and 64-bit JDK

Note: “GOSAT Tools for Windows/Mac and 64-bit JDK” can be selected only when 64-bit OS and 64-bit JDK is installed on your computer.

The system requirements for GOSAT Tools are shown in Table 1.2-1.

Table 1.2-1 System requirements.

Items	Supported platforms and other system requirements
OS	Windows 10 (64-bit) Mac OS X 10.7.3 or later
CPU	64-bit
Memory	512 MB (minimum)
Java	Java Development KIT (JDK) 8,11
Required Disk Space	40 MB or more

2. Installing

After decompressing the proper GOSAT Tools package on your computer, you can find some directories, XML files, two batch or shell files, and one JAR file in your GOSAT Tools directory.

To invoke CAI Copier or FTS Exporter, please click these batch or shell files.

You can customize some information related to the search function and background of the map. Its details are written in the Sections 2.1 and 2.2.

- CaiCopierWin**.bat or CaiCopierMac**.sh
Batch or shell file to invoke CAI Copier
- FtsExporterWin**.bat or FtsExporterMac**.sh
Batch or shell file to invoke FTS Exporter
- “map” directory
There are two CSV files in this directory. You may edit the contents of these files. Its details are written in the Section 2.1. You may not modify other files in this directory.
- “CAIMonthImage” directory
There are four PNG files in this directory. If you want to use other image file as a background image of the map, please put it into this directory. Its details are written in the Section 2.2.
- “manual” directory
There are some text files for the instructions of mouse operation in a pop-up window. This manual is also saved in this directory.

2.1 Location Data of Validation Site and Major City

The location data of validation sites used in the GOSAT Project and major cities are stored as text files in “map” directory. If you put a city name or a site name in “Loc” field in the Parameter Setting Area of CAI Copier or FTS Exporter and click “Search” button, each tool accesses to these location data and the center of the map automatically moves to the location.

- sites.csv Location data of validation sites
- cities.csv Location data of major cities

The file format is CSV and its details are shown in Table 2.1-1. The contents of the pre-installed validation site data and city data are shown in Figs. 2.1-1 and 2.1-2.

Table 2.1-1 Validation site and city data file format.

Column	Type	Contents
1	string	Name of the site or city Space and special characters except comma are available.
2	float	Latitude in degree between -90.0 and 90.0
3	float	Longitude in degree between -180.0 and 180.0

Note: LF (line feed, %x0A), CR (carriage return, %x0D) and CR+LF are handled as a line break. If the first character of a line is #, it is handled as a comment line.

	A	B	C	D
1	# name	latitude	longitude	
2	NIES	36.051	140.122	
3	Sakai	34.583	135.518	
4	Suzuka	34.864	136.55	
5	Vancouver(YVR)	49.219	-123.1	
6	Jakarta(CGK)	-6.185	106.777	
7	Fukuoka(FUK)	33.583	130.452	
8	Gimhae(PUS)	35.179	128.938	
9	Heathrow(LHR)	51.506	-0.41	
10	Changi(SIN)	1.346	103.889	
11	Sydney	-33.811	151.000	

Fig. 2.1-1 Pre-installed validation site data.

	A	B	C	D
1	# name	latitude	longitude	
2	Murmansk	68.976167	33.094409	
3	Arkhangelsk	64.538518	40.521056	
4	Saint Petersburg	59.90802	30.409998	
5	Magadan	59.568324	150.808918	
6	Perm'	58.001985	56.257287	
7	Yekaterinburg	56.839196	60.62595	
8	Nizhniy Novgorod	56.29274	43.926745	
9	Glasgow	55.864237	-4.251806	
10	Kazan'	55.824874	49.086087	
11	Chelyabinsk	55.152009	61.40857	
12	Omsk	54.99118	73.370253	
13	Novosibirsk	55.018804	82.933949	
14	Ufa	54.809866	56.093911	
15	Vilnius	54.687155	25.279651	

Fig. 2.1-2 Pre-installed city data.

2.2 Background Image of Map

There are four monthly global radiance image files in “CAIMonthImage” directory. These images are produced from CAI Level 3 (L3) global radiance distribution products. You can put your own CAI L3 image (Clear-sky) as a background map of CAI Copier or FTS Exporter. Please store your CAI L3 image (Clear-sky) in “CAIMonthImage” directory according to the following rules.

- Name of CAI L3 image file

GOSATTCAIYYYYMMDDyyyymmdd_03TRCFVnnnn.png

YYYYMMDDyyyymmdd: Start date and end date

Vnnnn: Processing version number

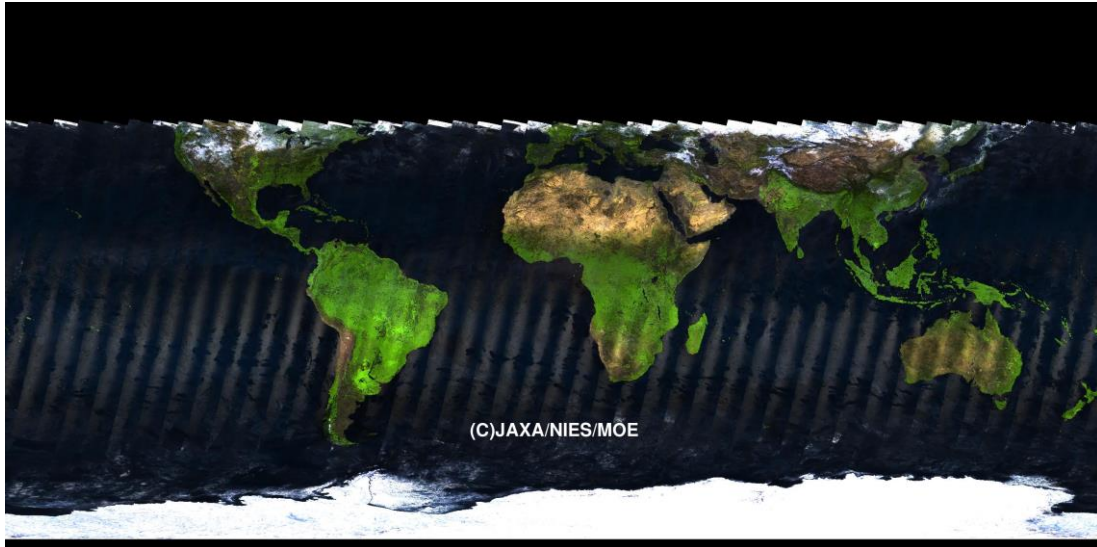
- Image size ratio 2:1 for width and height
- Image format PNG

Two of pre-installed CAI L3 images (Clear-sky) are shown in Fig. 2.2-1. Its size is 2880 × 1440 pixels.

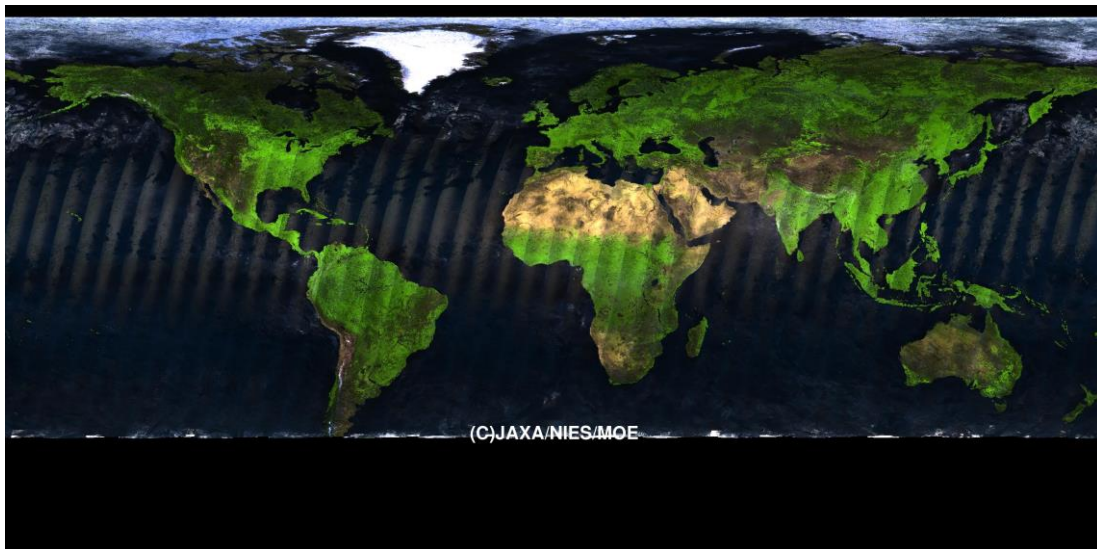
You can make such CAI L3 images from CAI L3 global reflectance distribution products or CAI L3 global radiance distribution products by yourself. A CAI L3 global reflectance distribution product is produced from the accumulated CAI images for continuous 30 days to make a clear sky image. On the other hand, a CAI L3 global radiance distribution product is produced from 3 day-accumulated CAI images.

Please access to GDAS and download monthly archived CAI L3 global reflectance or radiance products and put them into “CAIMonthImage” directory.

Please note that you need to read the product with ENVI and save its color composite image in PNG format.



File name: GOSATTCAI2009050120090531_03TRCFV0090.png



File name: GOSATTCAI2016070220160731_03TRCFV0100.png

Fig. 2.2-1 Pre-installed CAI L3 images (Clear-sky).

3. Starting Tool

Please invoke a suitable batch or a shell file for your computer's operating system to start CAI Copier or FTS Exporter. After several seconds, CAI Copier or FTS Exporter starts up. The start up images of CAI Copier and FTS Exporter are shown in Figs. 4-1 and 4-2.

- CaiCopierWin64.bat CAI Copier for Windows and 64-bit JDK
- CaiCopierMac64.sh CAI Copier for Mac and 64-bit JDK
- FtsExporterWin64.bat FTS Exporter for Windows and 64-bit JDK
- FtsExporterMac64.sh FTS Exporter for Mac and 64-bit JDK

[NOTICE] You may once edit the batch file (for Windows) or shell script (for Macintosh) and set the environment parameter "JAVA_HOME" to the path of JDK installed on your computer.

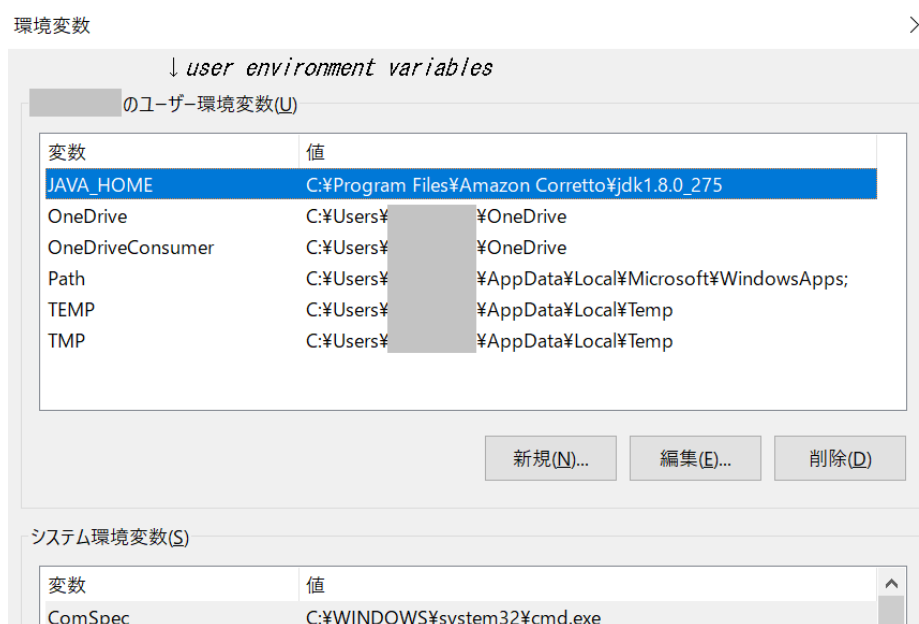
- Example for Windows batch files (FtsExporterWin64.bat, CaiCopierWin64.bat)

```
rem for Amazon Corretto8
set JAVA_HOME="C:\Program Files\Amazon Corretto\jdk1.8.0_275"
```

- Example for Macintosh shell script files (FtsExporterMac64.sh, CaiCopierMac64.sh)

```
# for Amazon Corretto8
export JAVA_HOME=./amazon-corretto-8.jdk/Contents/Home
```

Windows user may set "JAVA_HOME" as an environment variable of your Windows system instead of editing the windows batch file.



4. Basic Operation

There are three major operational areas in the main window of CAI Copier and FTS Exporter.

- Map Area (right)
 - Interactive map operation with mouse and button
- Parameter Setting Area (upper left)
 - Search conditions and drawing options for the map
- Directory Specifying Area (lower left)
 - Specifying input and output directories

These major operational areas are shown in Figs. 4-1 and 4-2.

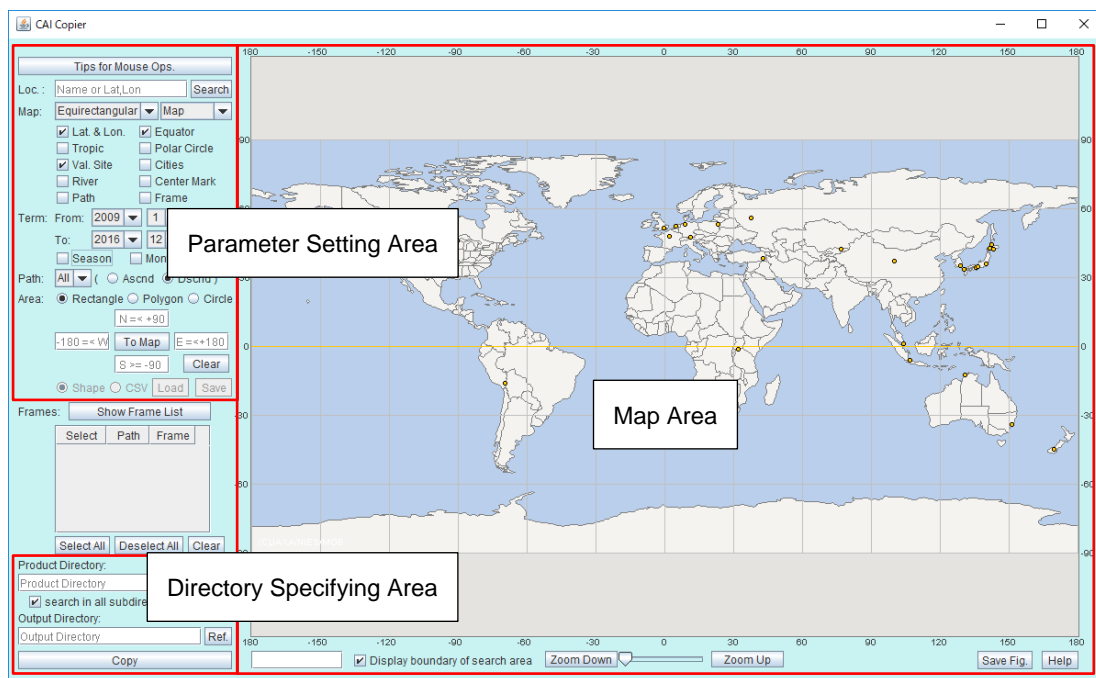


Fig. 4-1 Basic operational areas of CAI Copier.

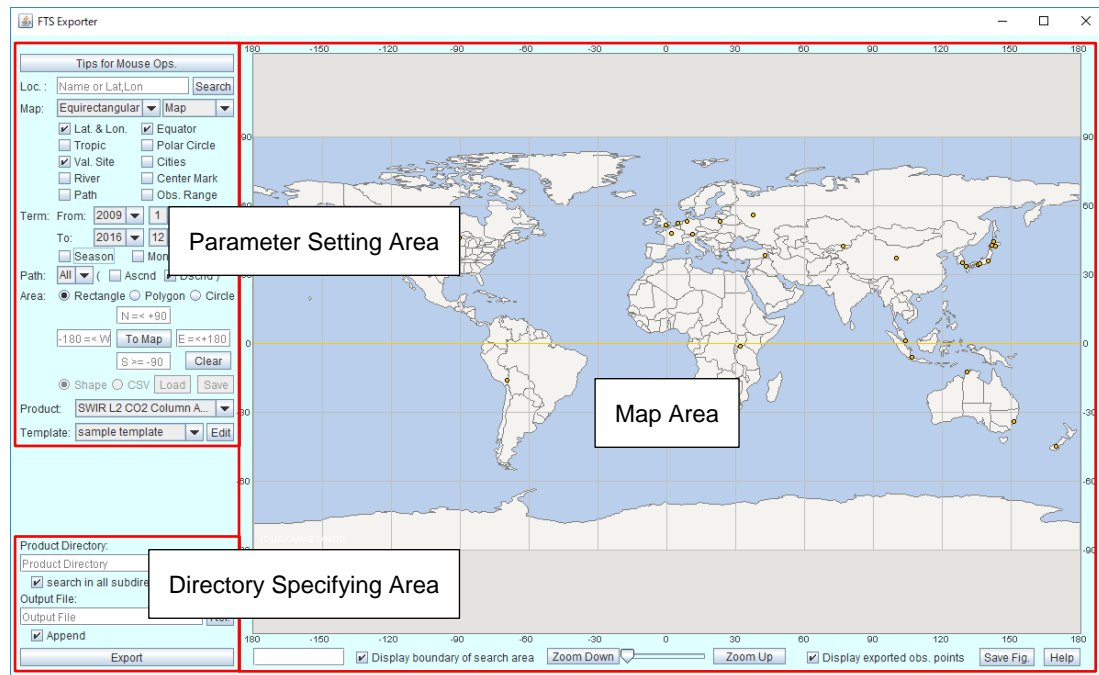


Fig. 4-2 Basic operational areas of FTS Exporter.

Common operational functions for CAI Copier and FTS Exporter are listed below.

- Moving center location of map
- Zooming up and down
- Drawing lines, names, and marks
- Map projection
- Background image of map
- Jumping to location
- Drawing path, frame, and observation range
- Specifying observation period
- Specifying search area
- Saving map image
- Showing manual
- Terminating tool

4.1 Moving Center Location of Map

Windows user can move the shown area with your left mouse button holding down and move your mouse to your concerning area. Mac user can move the shown area with your mouse button holding down and move to your concerning area.

If you click “Tips of Mouse Ops.” button at the top left of the window, some basic mouse operations are shown in a pop-up dialog.

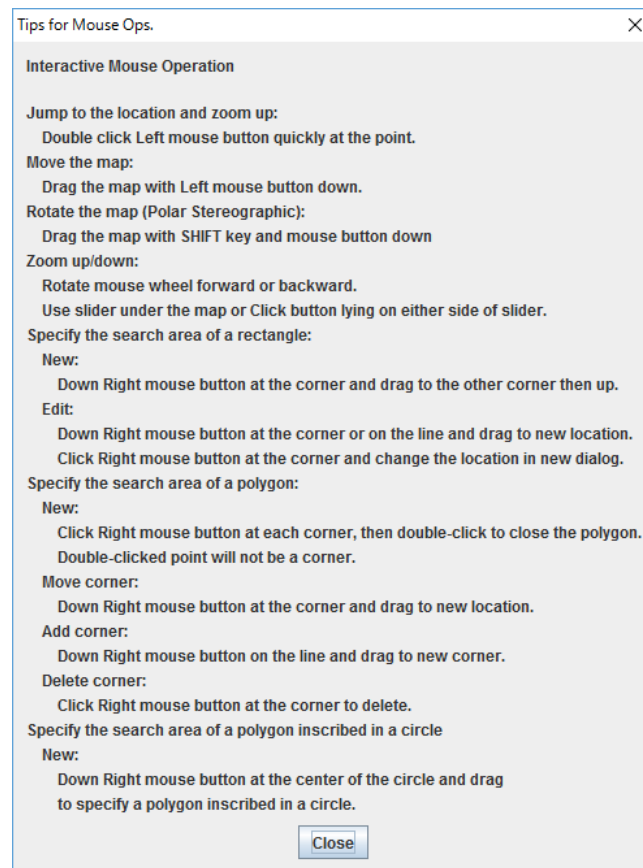


Fig. 4.1-1 Pop-up dialog by “Tips of Mouse Ops.” button.

Mac user can also use right click (Secondary) function to move the shown area. There are three ways to use right click function.

- 1) In the case of track pad, tap or click with two fingers and drag to your concerning area. (This is a native function of the operating system. No need to install a software for this function.)
- 2) Click mouse button with CNTL key down.
- 3) Use two button mouse which is for Windows machine.

4.2 Zooming Up and Down

Zooming up/down is available with a slider and, “Zoom Up” and “Zoom Down” buttons placed under the map shown.

If you use a wheel mouse, you can continuously zoom up and down with its wheel rotation. With one click of “Zoom Up”/“Zoom Down” button, the map size is increased/decreased about twofold (1 level up/down). With one double-click of left mouse button at the specific location on the map, the map size is increased by four levels at a time, up to the level 12 at the clicked location. Please note that the rate of map size-increase (decrease) is not exactly uniform.

- Slider Move the slider right/left to zoom up/down.
- Zoom Up Click “Zoom Up” button to zoom up for twice resolution.
 Rotate the wheel of mouse forward.
 Double-clicks of left mouse button at the point on the map.
- Zoom Down Click “Zoom Down” button to zoom down as a half resolution.
 Rotate the wheel of mouse backward.

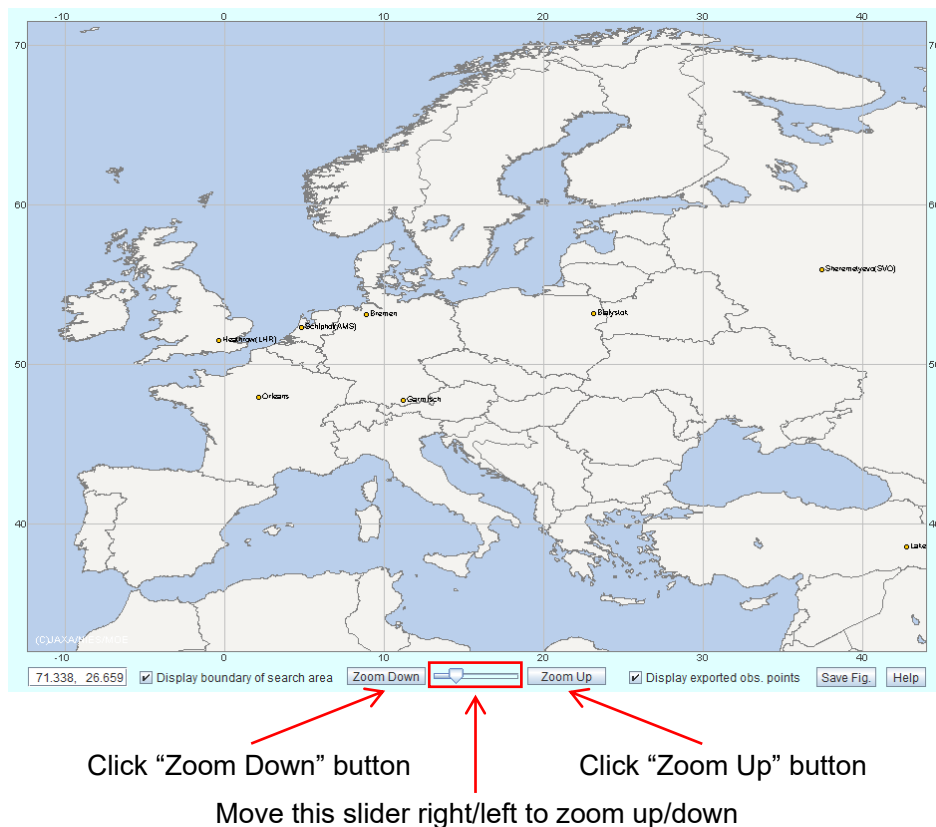


Fig. 4.2-1 Slider and zoom buttons.

4.3 Drawing Line, Name, and Mark

There are some check box options to draw lines and add names on the map.

- | | |
|----------------------------|--|
| ➤ Lat & Lon (Check box) | Draw latitude and longitude lines. |
| ➤ Equator (Check box) | Draw the equator line. |
| ➤ Tropic (Check box) | Draw the tropic of cancer lines. |
| ➤ Polar Circle (Check box) | Draw the polar circle lines. |
| ➤ Val. Site (Check box) | Draw marks at the validation sites with names. |
| ➤ Cities (Check box) | Draw marks at the major cities with names. |
| ➤ River (Check box) | Draw major rivers and lakes without names |
| ➤ Center Mark (Check box) | Draw a hairline cursor at the map center. |

In the case of some small zoom scales, validation sites, cities, and rivers are dismissed on the map.

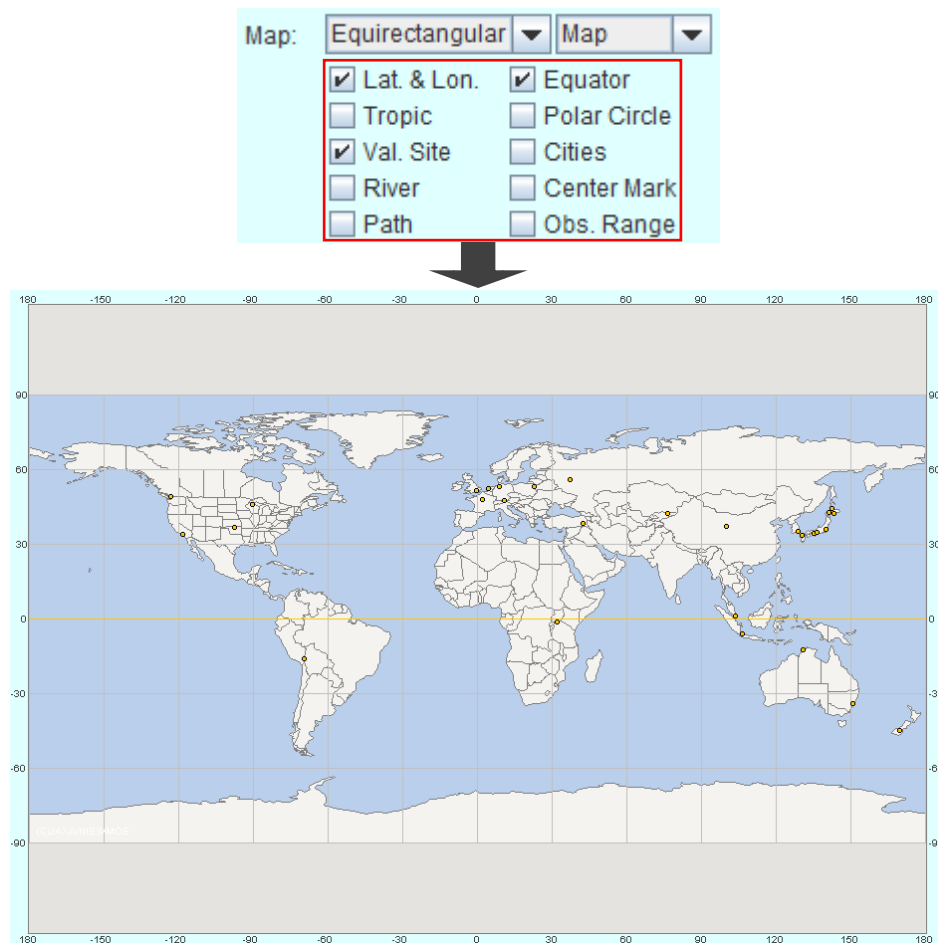


Fig. 4.3-1 Default draw options at the start.

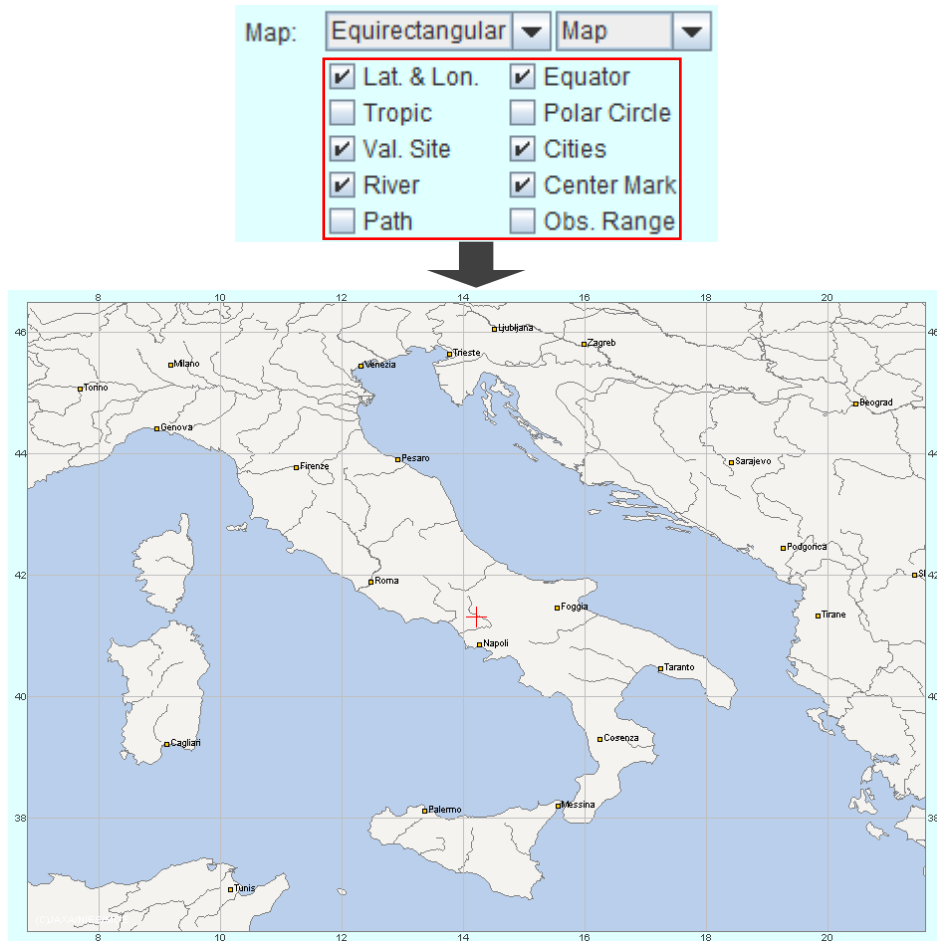


Fig. 4.3-2 Draw lines and validation sites, cities, rivers, and center mark.

4.4 Map Projection

There are two options for specifying the map projection.

- Auto Change

Polar stereo mapping is automatically selected to draw the map for higher latitude area. If the center latitude of the drawing area is greater than 60 degrees or less than -60 degrees, polar stereo projection is applied. Otherwise, equirectangular (or equidistant cylindrical) projection is applied.

- Equirectangular (Equidistant cylindrical)

Draw the map with "Equirectangular" for any region.

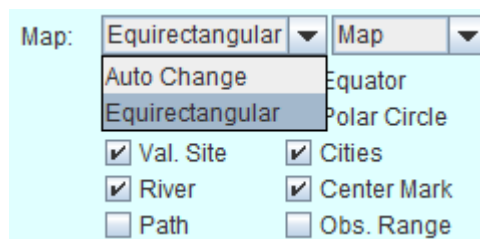


Fig. 4.4-1 Change map projection.

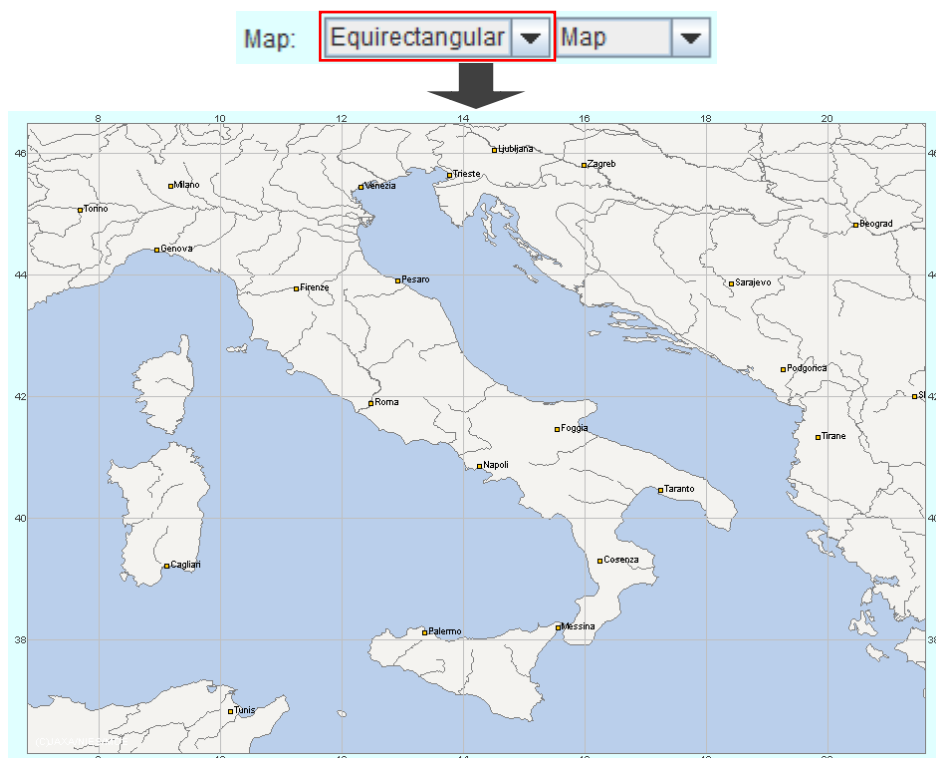


Fig. 4.4-2 Equirectangular projection.

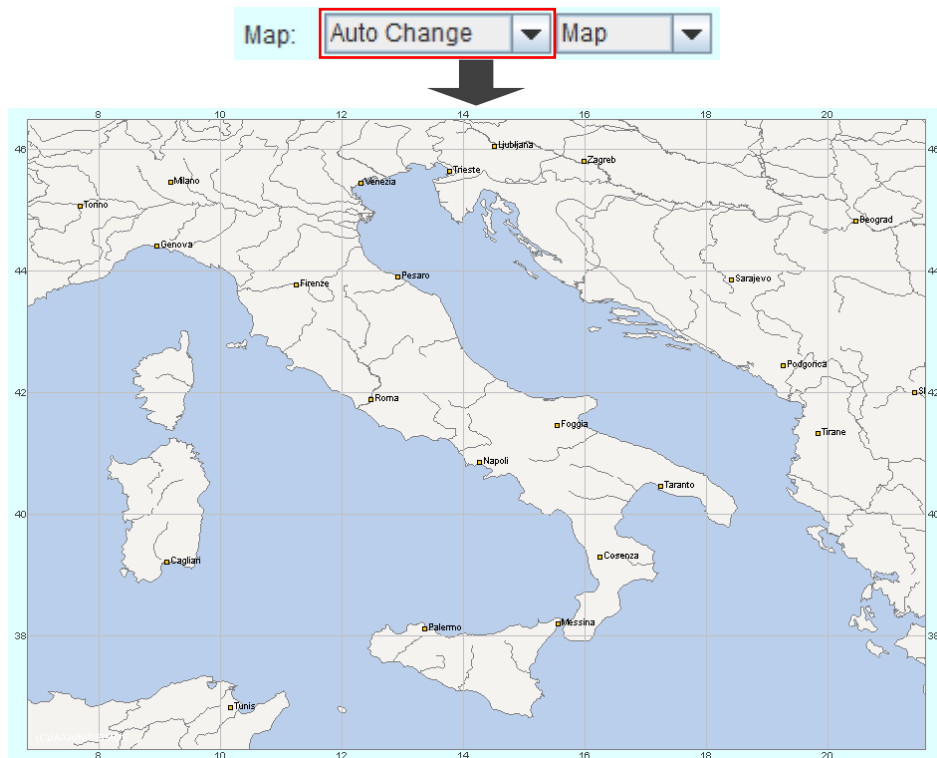


Fig. 4.4-3 “Auto Change” in a lower latitude area.

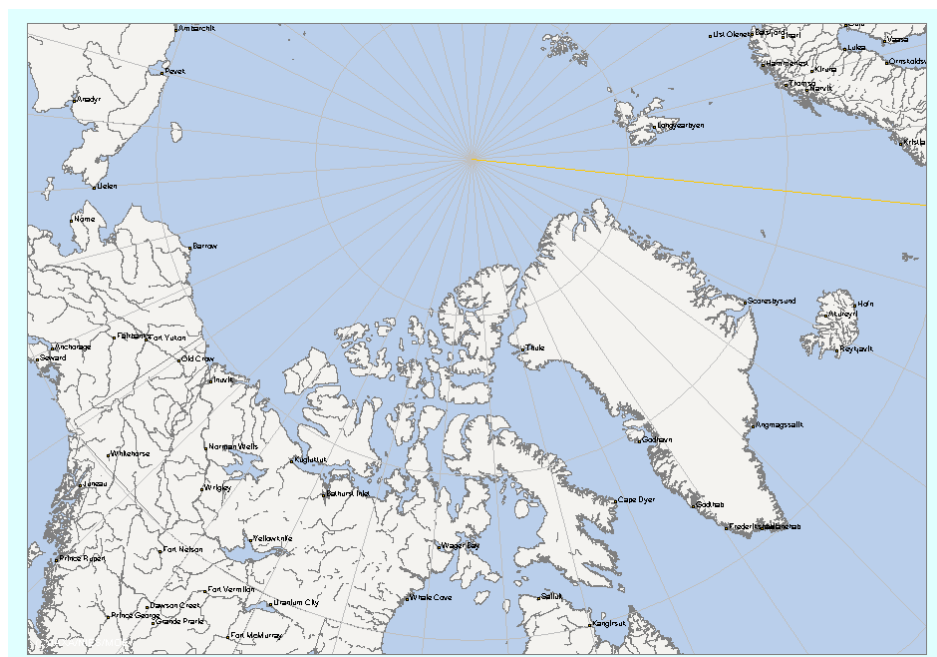


Fig. 4.4-4 “Auto Change” in a higher latitude area.

4.5 Background Image of Map

There are two types of background image for the map.

- Map (default)

Draw the coast lines with gray and fill the ocean with light blue.

- CAI Image

CAI L3 image (Clear-sky) is used as the background map.

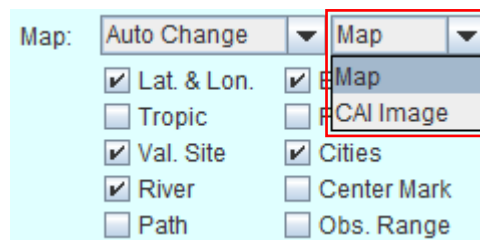


Fig. 4.5-1 Pull-down list for background image.

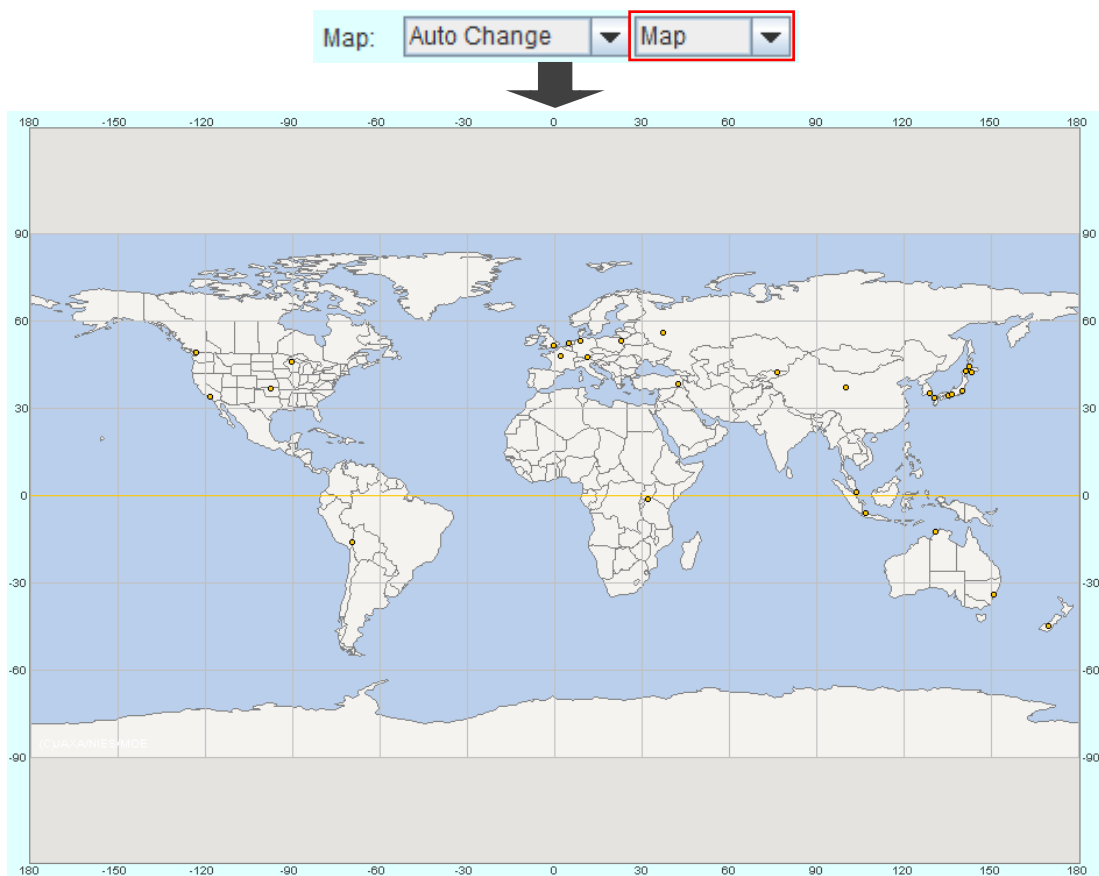


Fig. 4.5-2 Map background.

Map: Auto Change ▾ Map ▾

<input checked="" type="checkbox"/> Lat. & Lon.	<input checked="" type="checkbox"/> Map
<input type="checkbox"/> Tropic	<input type="checkbox"/> CAI Image
<input checked="" type="checkbox"/> Val. Site	<input checked="" type="checkbox"/> Cities
<input checked="" type="checkbox"/> River	<input type="checkbox"/> Center Mark
<input type="checkbox"/> Path	<input type="checkbox"/> Obs. Range

Select "CAI Image".

Select Image File X

2016/04/03 - 2016/05/02 ▾

OK Cancel

Then select an observation period from the pull-down list and click "OK" button.

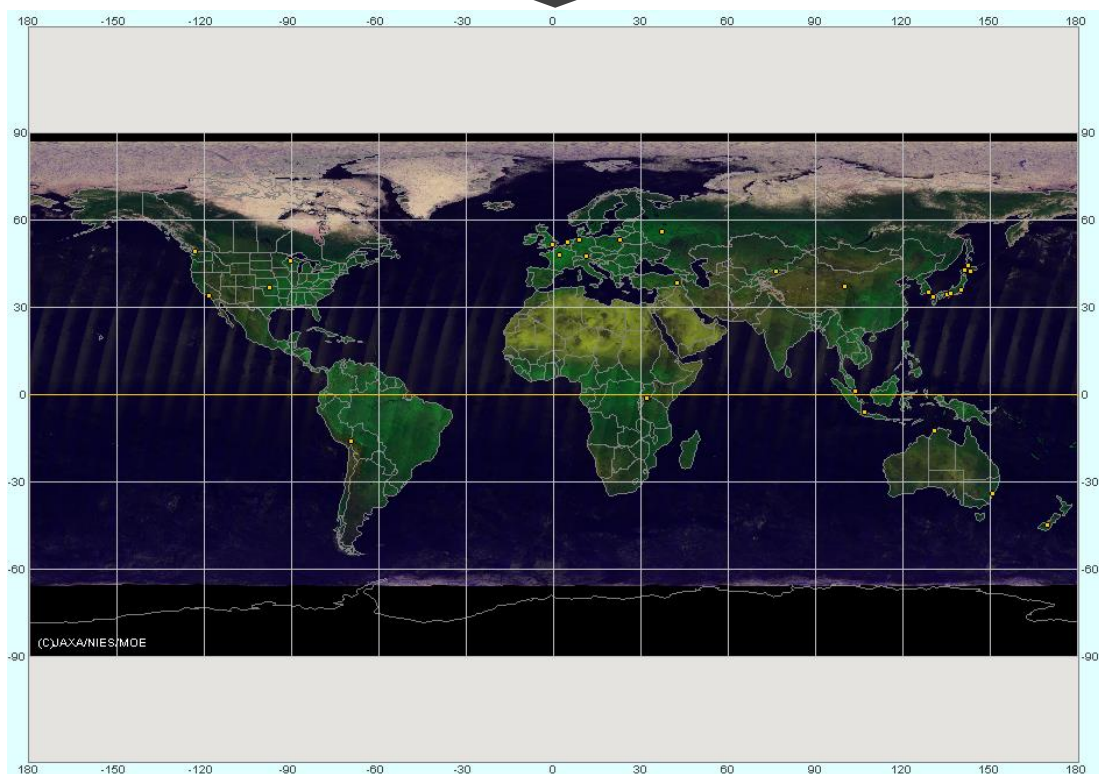


Fig. 4.5-3 CAI L3 image as the background map.

4.6 Jumping to Location

Search by name and select a location from the hit list or input geolocation (latitude and longitude), then the center of the map is moved to the location and zoomed up. The word search function is not case sensitive and returns first partial match.

4.6.1 Jumping to Validation Site and City

Enter the name of a validation site or a city and click “Search” button. The center of the map is automatically moved to the location and zoomed up to the level 4 size at a time.

- Only one hit result The center of the map is moved to the found location and zoomed up.
- Some hit results “Select Location” dialog will pop up, please select your concerning city from the pull-down list.
The center of the map is moved to your selected location and zoomed up.

Loc.:

Type “fire” in the text field and click “Search” button.



Only one location is matched with “fire”.

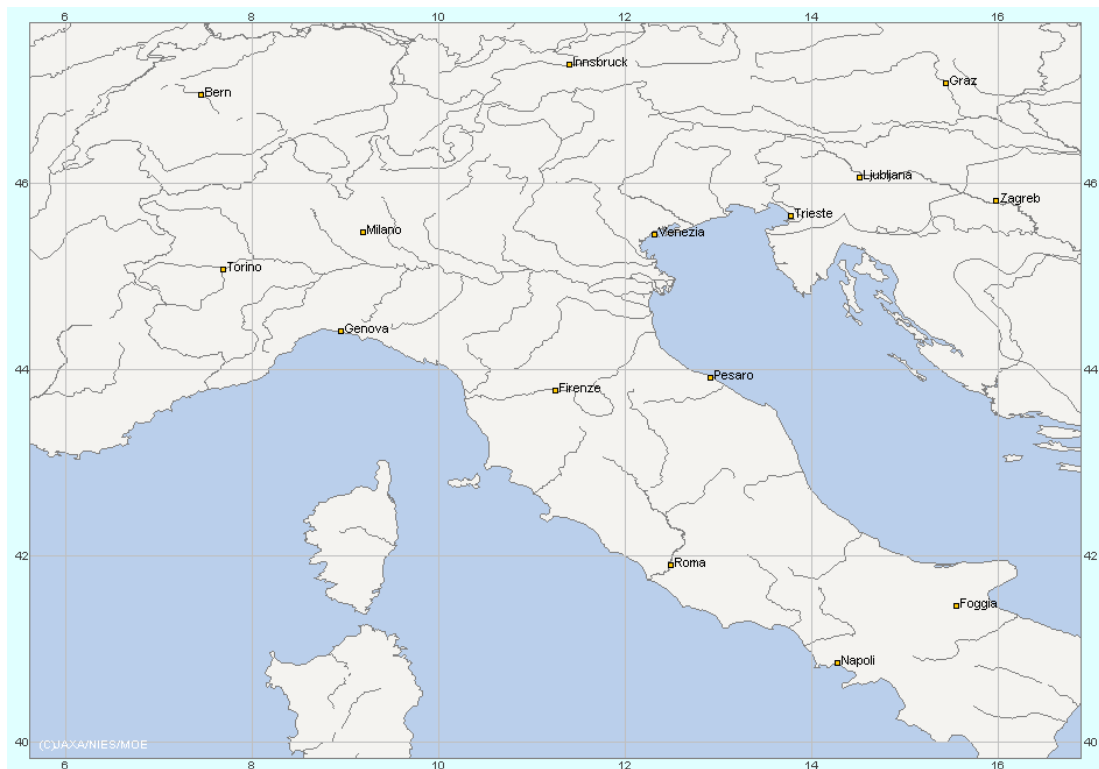


Fig. 4.6.1-1 One location found by the text.

4.6.2 Jumping to Location with Geolocation

Enter the signed floating values of latitude and longitude separated by a comma and click “Search” button. The expression of degree for latitude and longitude may not use the style of “degrees, minutes, seconds” and “east, west, north, south”. The center of the map is automatically moved to the location and zoomed up to the level 4 size.

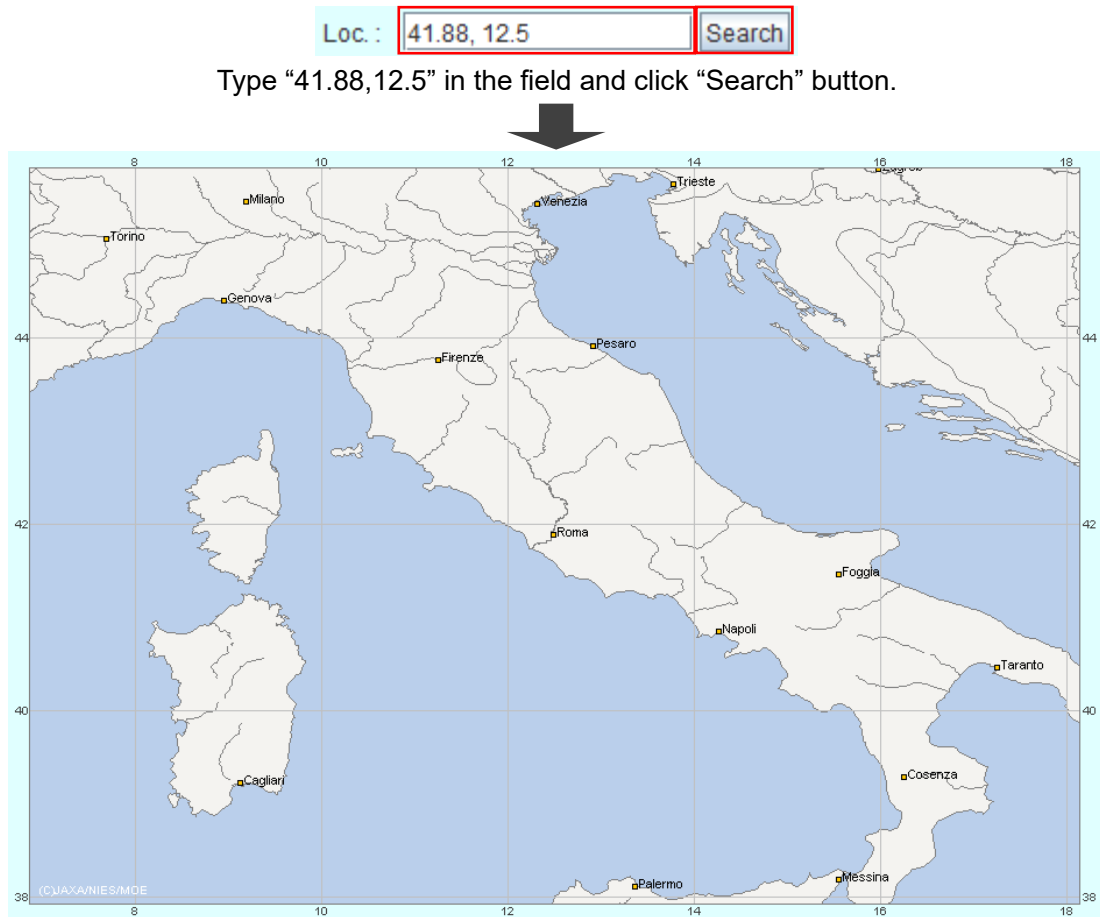


Fig. 4.6.2-1 Jump to the specified location and zoom up at the point.

4.7 Drawing Path, Frame, and Observation Range

GOSAT orbital path(s), CAI frames, or FTS observation range can be shown on the map.

4.7.1 Drawing Path and Frame in CAI Copier

In the case of the CAI Copier, GOSAT orbital path(s) and CAI frames can be shown on the map.

- Path (Check box) Check to draw the path(s).
- Frame (Check box) Check to draw frames of selected path(s).
- Path (Pull-down) Select "All" to draw all paths or select a path number from the pull-down list.
- Ascnd/Dscnd (Radio button) Select a flight direction from ascending (Ascnd) or descending (Dscnd).

Note: The default is descending (Dscnd) which refers to the direction from North to South and ascending (Ascnd) refers to the opposite direction.

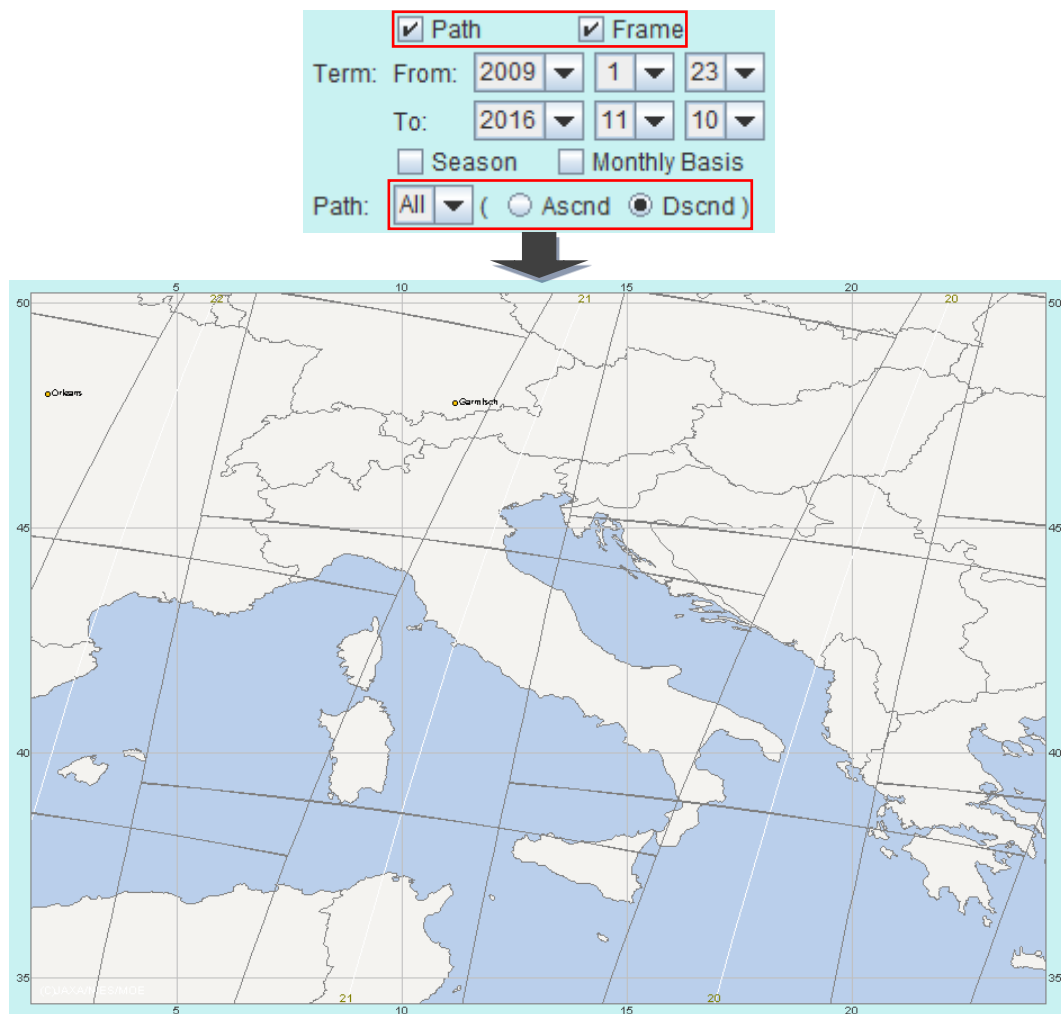


Fig. 4.7.1-1 Draw path and frames for all descending paths.

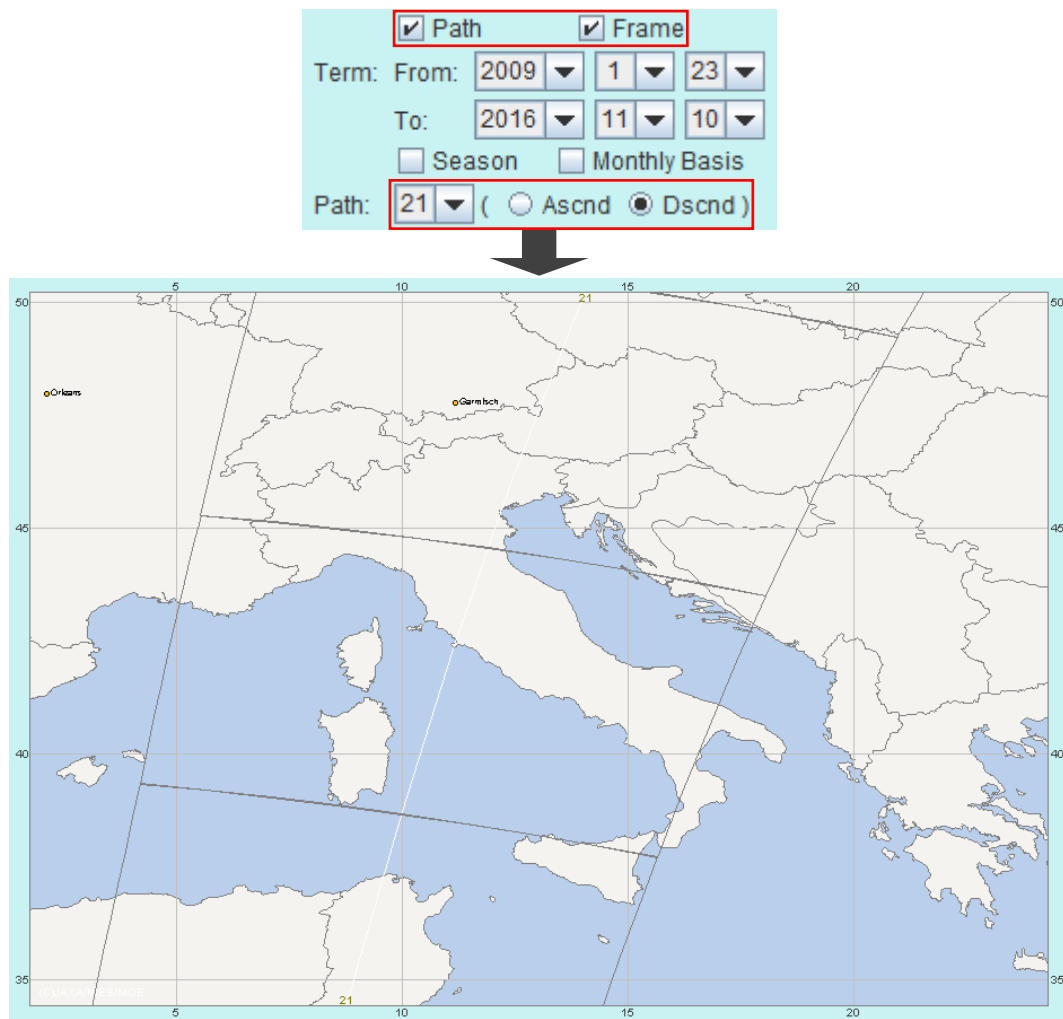


Fig. 4.7.1-2 Draw path and frames for 21st descending path.

4.7.2 Drawing Path and Observation Range in FTS Exporter

In the case of FTS Exporter, GOSAT orbital path(s) and FTS observation range can be shown on the map.

- Path (Check box) Check to draw the path(s).
- Obs. Range (Check box) Check to draw the available observation area from selected path(s).
- Path (Pull-down) Select "All" to draw all paths or draw a selected path number from the pull-down list.
- Ascnd/Dscnd (Check box) Set the flight direction(s) from ascending (Ascnd) and descending (Dscnd).

Note: The default is descending (Dscnd) which refers to the direction from North to South and ascending (Ascnd) refers to the opposite direction.

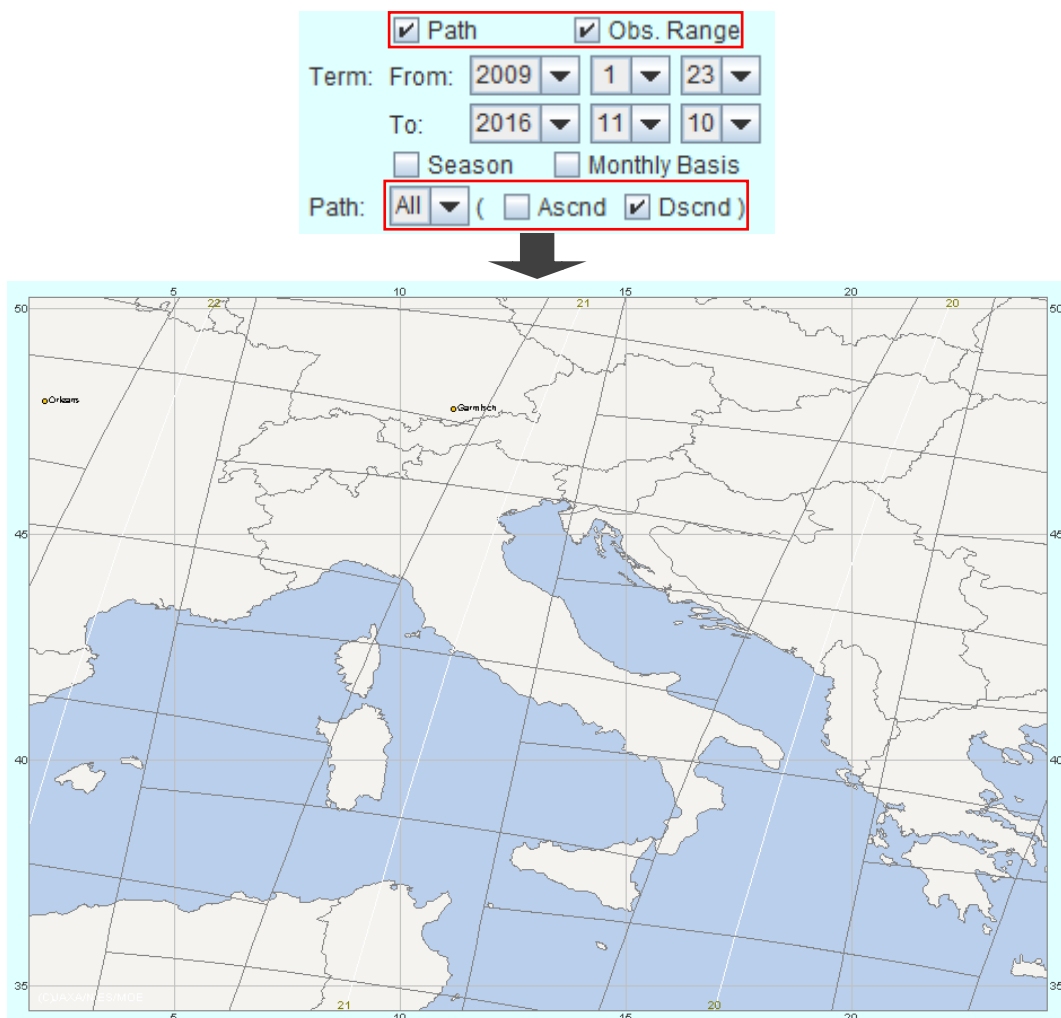


Fig. 4.7.2-1 Draw path and observation range for all descending paths.

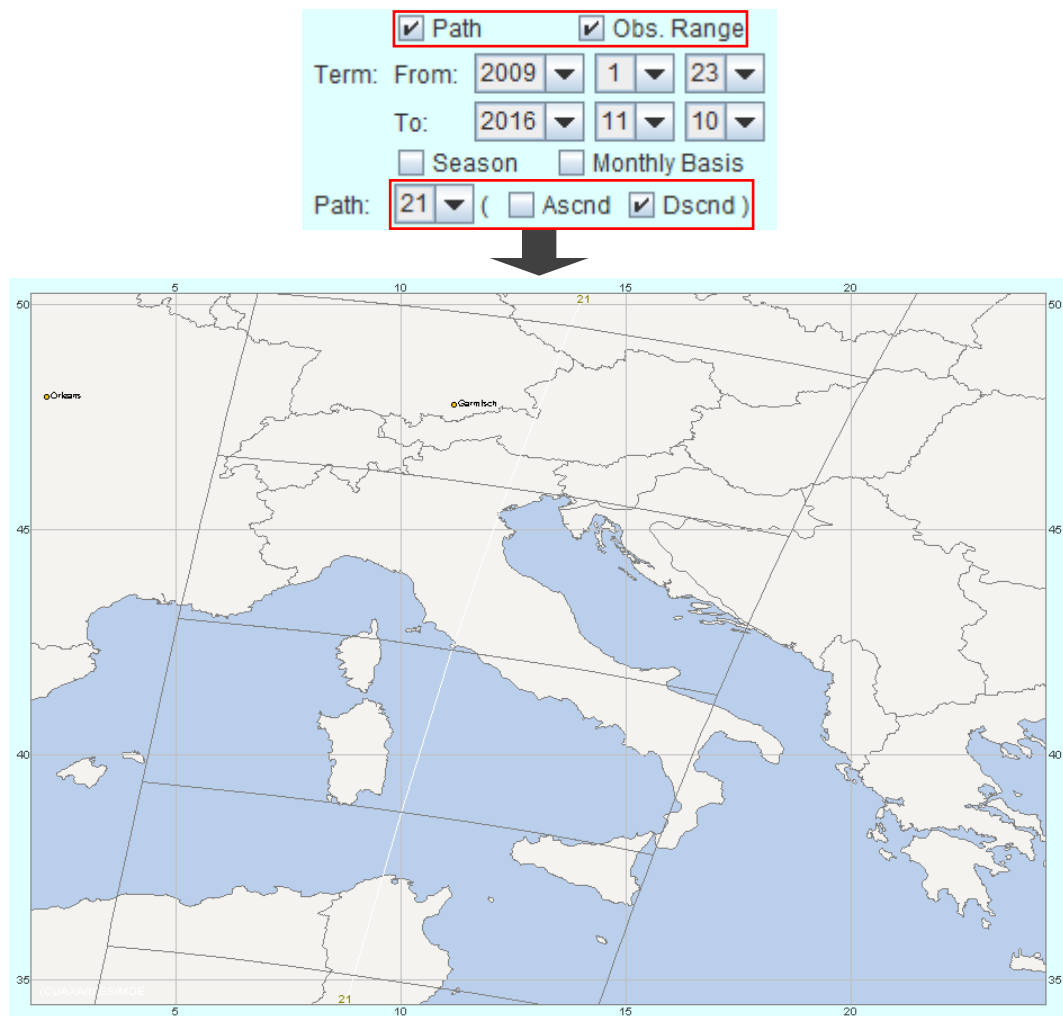


Fig. 4.7.2-2 Draw path and observation range for 21st descending path.

4.8 Specifying Observation Period

When specifying your concerning observation period for CAI Copier and FTS Exporter, there are two additional options, “Season” and “Monthly Basis”. If you don’t turn on these options, the start and end date of the concerning period are defined with “From” and “To” in “Term” field (Fig. 4.8-1). “Season” is an option to repeat the period of between the data of “From” and “To” for the corresponding years (Fig. 4.8-2). When you turn on “Monthly Basis”, you can specify year and month. Your concerning observation period is defined as months between the month of “From” and “To” for the corresponding years (Fig 4.8-3).

- From Select start date of the observation period.
- To Select end date of the observation period.
- Season (Check box) Search the specified period of month and date for the specified years.
- Monthly Basis (Check box) Search on a monthly basis for the specified years.



Term: From: 2009 11 23
To: 2013 3 7
☐ Season ☐ Monthly Basis

Between 2009/11/23 and 2013/03/07

Fig. 4.8-1 Specify start and end date for search period.



Term: From: 2009 11 23
To: 2013 3 7
☒ Season ☐ Monthly Basis

2009/11/23 – 2010/03/07, 2010/11/23 – 2011/03/07,
2011/11/23 – 2012/03/07, 2012/11/23 – 2013/03/07

Fig. 4.8-2 Season is selected.



Term: From: 2009 11 23
To: 2013 3 7
☒ Season ☒ Monthly Basis

2009/11/01 – 2010/03/31, 2010/11/01 – 2011/03/31
2011/11/01 – 2012/03/31, 2012/11/01 – 2013/03/31

Fig. 4.8-3 Season and monthly basis are selected.

4.9 Specifying Search Area

Each user can specify a search area with a rectangle, polygon or circle.

A circle is approximated with a polygon in CAI Copier and FTS Exporter.

4.9.1 Specifying Search Area with Rectangle

If “Rectangle” radio button is selected, you can specify your search area with a rectangle on the map. Its operational procedure is as follows:

Select “Rectangle” radio button of “Area” field in the Parameter

Setting Area.

Area: ☒ Rectangle ☐ Polygon ☐ Circle

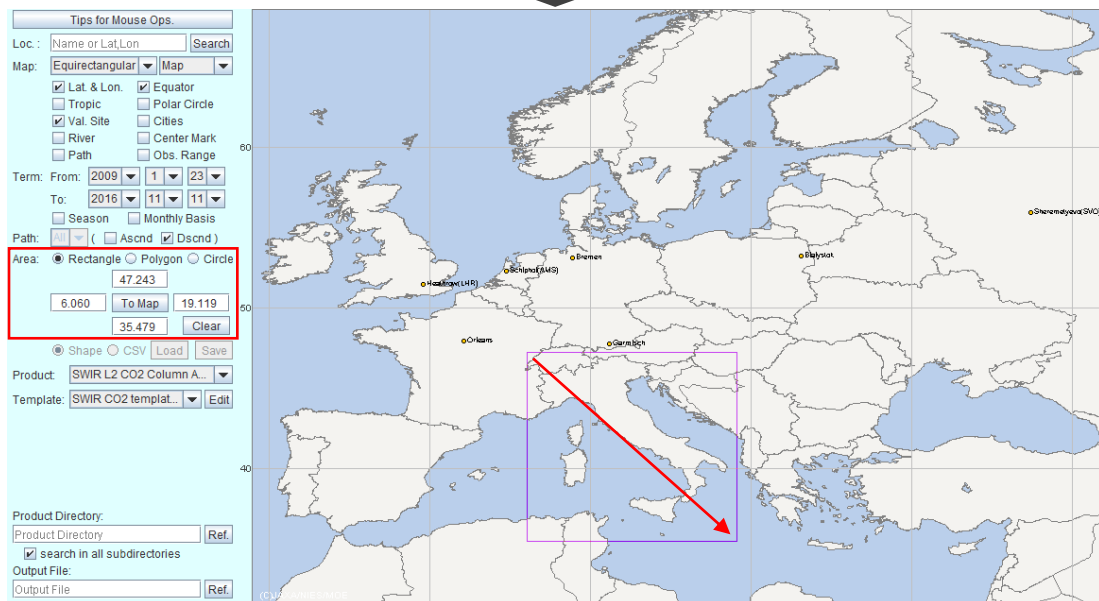
N <= +90

-180 <= W To Map E <= +180

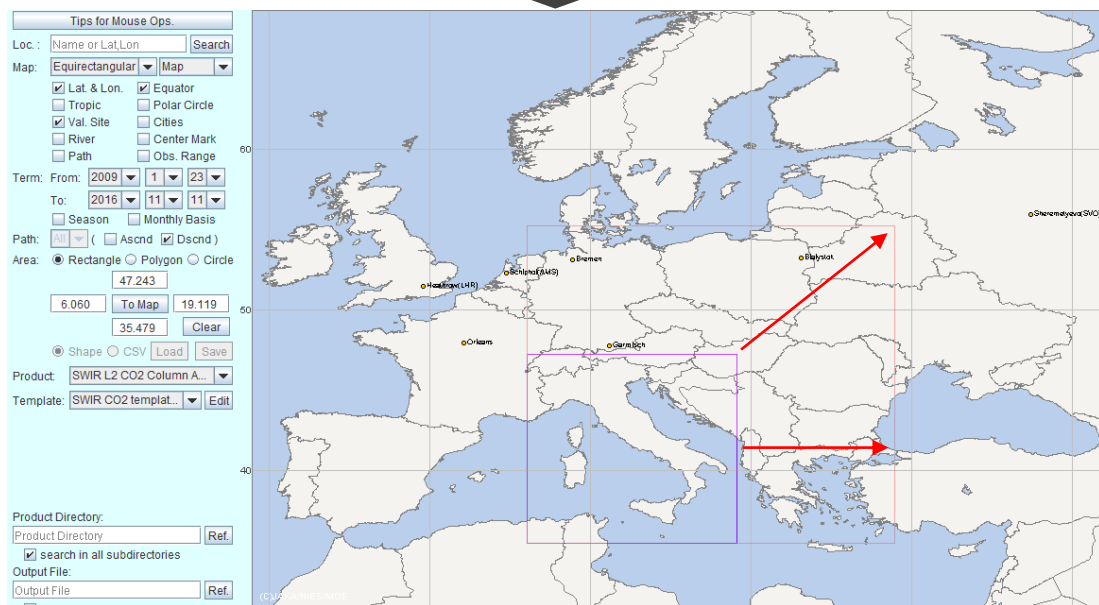
S >= -90 Clear

☒ Shape ☐ CSV Load Save

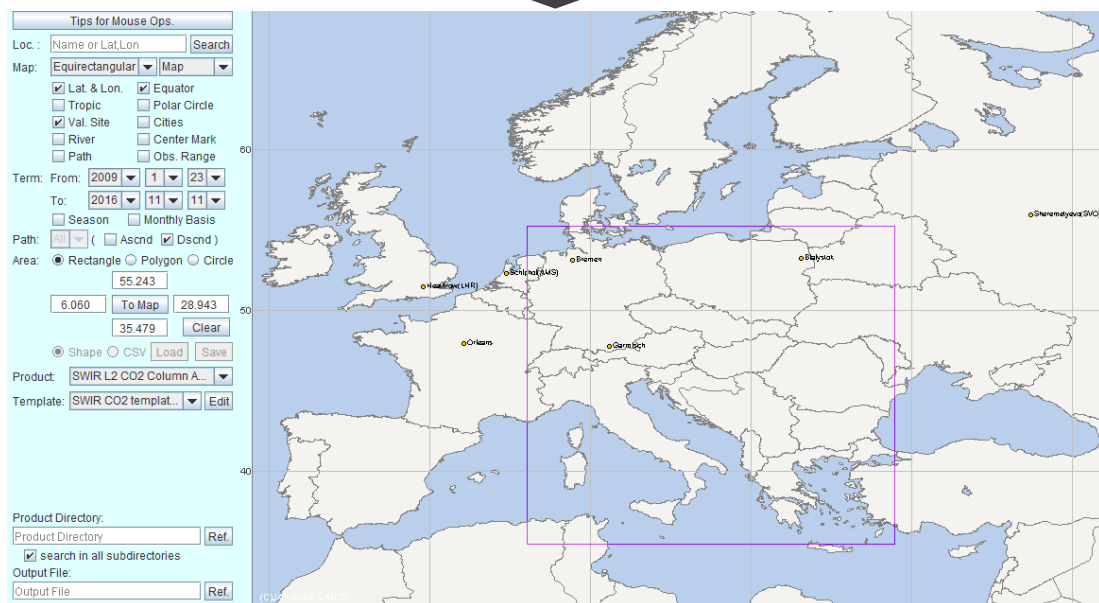
Click right mouse button down at a corner, then hold it down and drag your mouse to the other corner, then release mouse button up. New rectangle is specified. Four values are stored on the fields.



If you want to adjust the boundary or corner point, click your right mouse button down on the line or at a corner and hold it down, then drag your mouse to new location.



The shape of rectangle is changed.



Click your right mouse button at the corner, then “Change Lat./Lon.”
dialog for inputting the values of latitude and longitude pops up.

Change Lat./Lon. X

Lat. ☒ N(+) ☐ S(-)

Lon. ☒ E(+) ☐ W(-)

OK Cancel

Modify these values.

Change Lat./Lon. X

Lat. ☒ N(+) ☐ S(-)

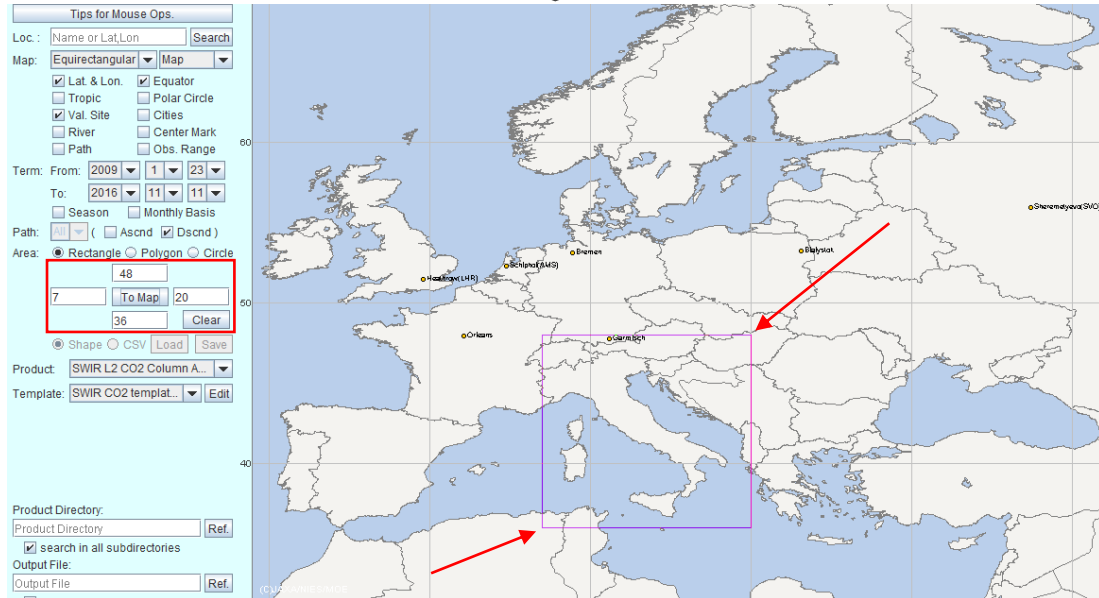
Lon. ☒ E(+) ☐ W(-)

OK Cancel

Click "OK" button, then the shape of rectangle is changed.



Enter new north/south boundary and/or west/east boundary in the text fields. Click “To Map” button, the shape of rectangle is changed.



If you click “Clear” button, your specified rectangle area data is deleted. Then the shape of rectangle disappears from the map.



Fig. 4.9.1-1 Specify search area with rectangle.

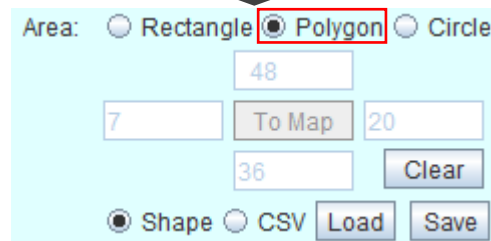
4.9.2 Specifying Search Area with Polygon

By selecting “Polygon” radio button in the Parameter Setting Area, you can specify your search area with a polygon.

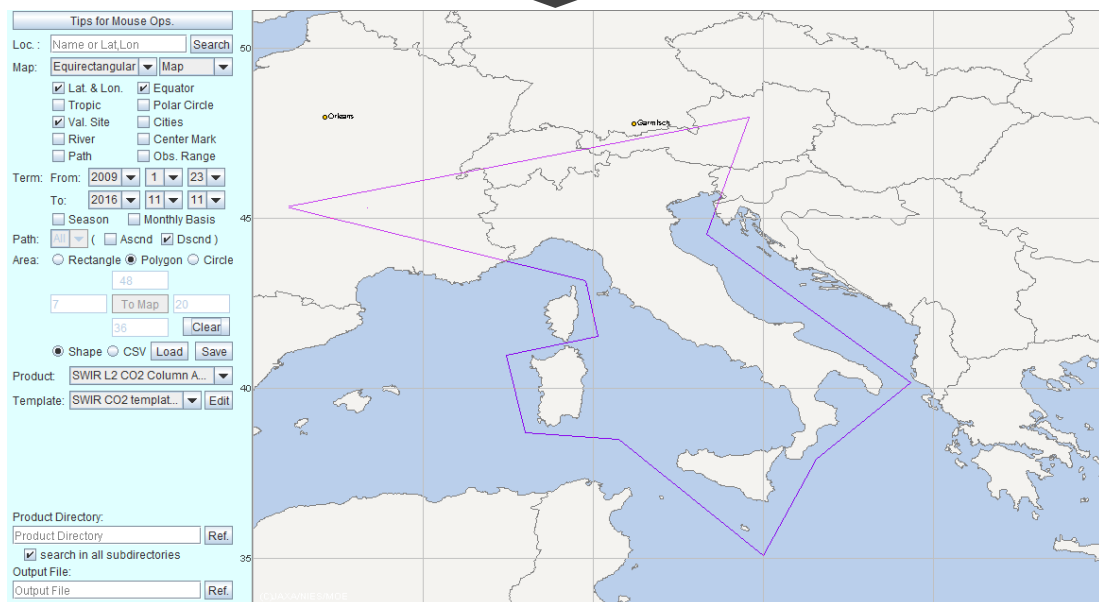
Its operational procedure is as follows:

Select “Polygon” radio button of “Area” field in the Parameter Setting

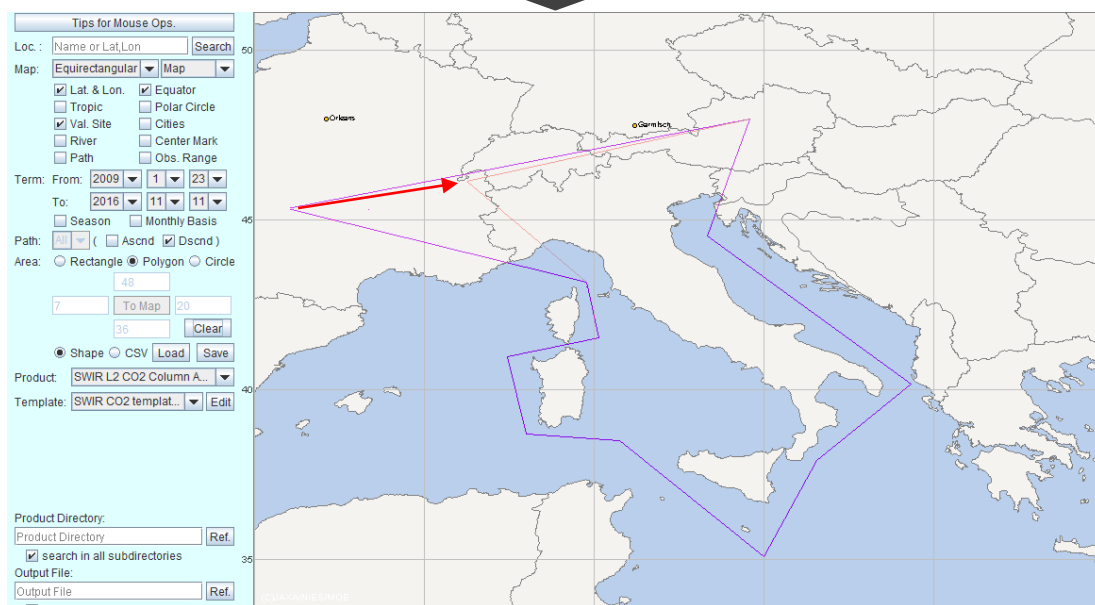
Area.



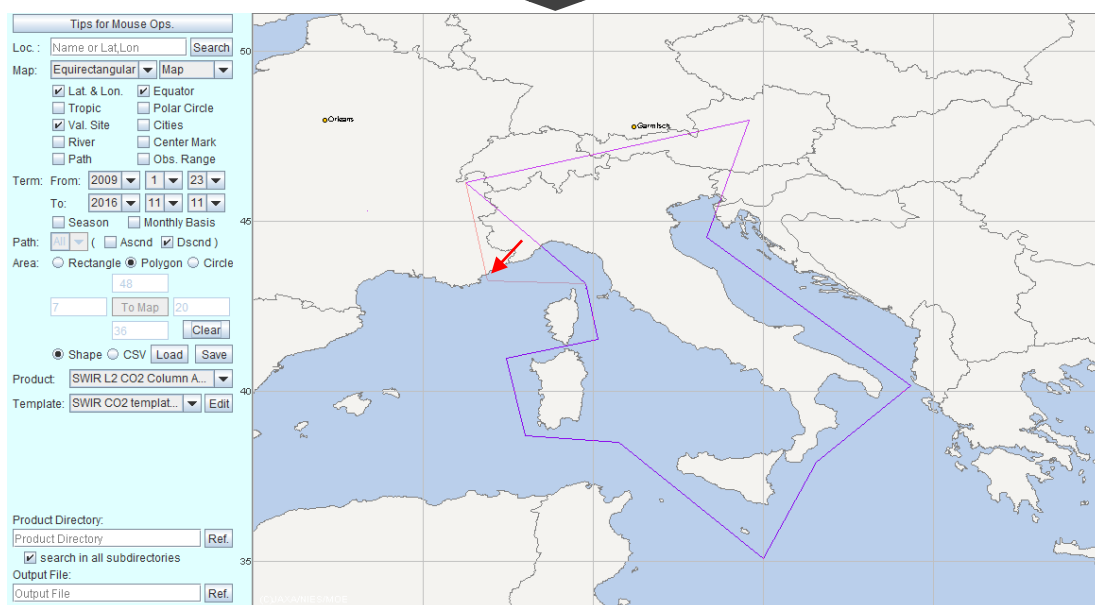
Click right mouse button at each vertex and double-click to close the polygon. As double-clicking is considered as a command to close the polygon, the double-clicked point does not become a vertex of the polygon.



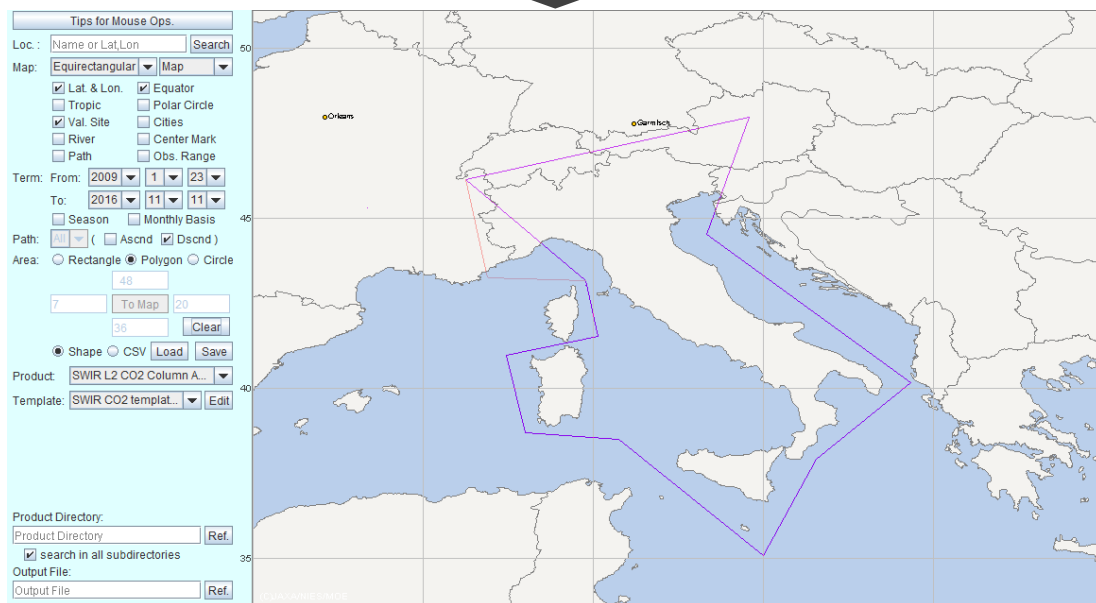
When you click the right mouse button at a vertex and hold it to move, you can move it to the new location.



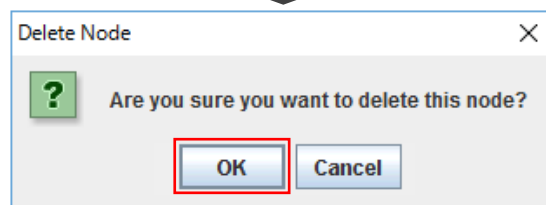
If you click the right mouse button at any point on a line and hold it to move, your selected point becomes a new vertex.



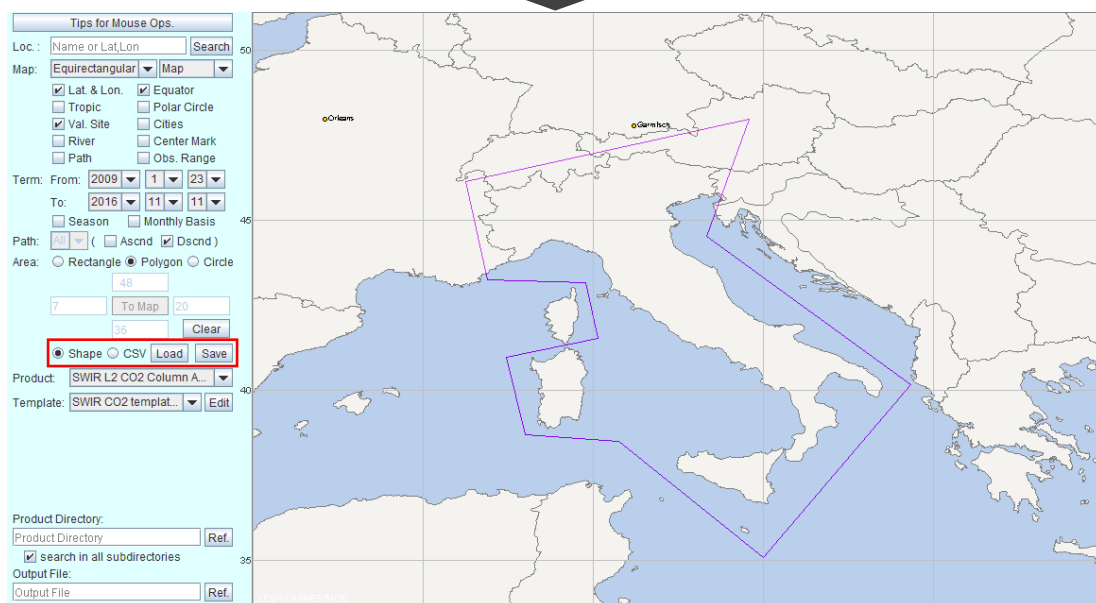
The shape of polygon is changed.



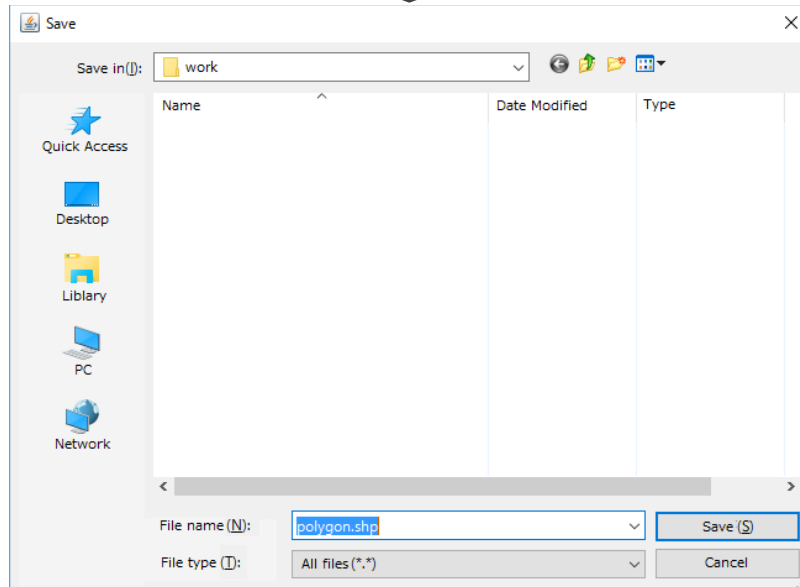
If you click the right mouse button at a vertex, “Delete Node” dialog for ensuring delete operation pops up.



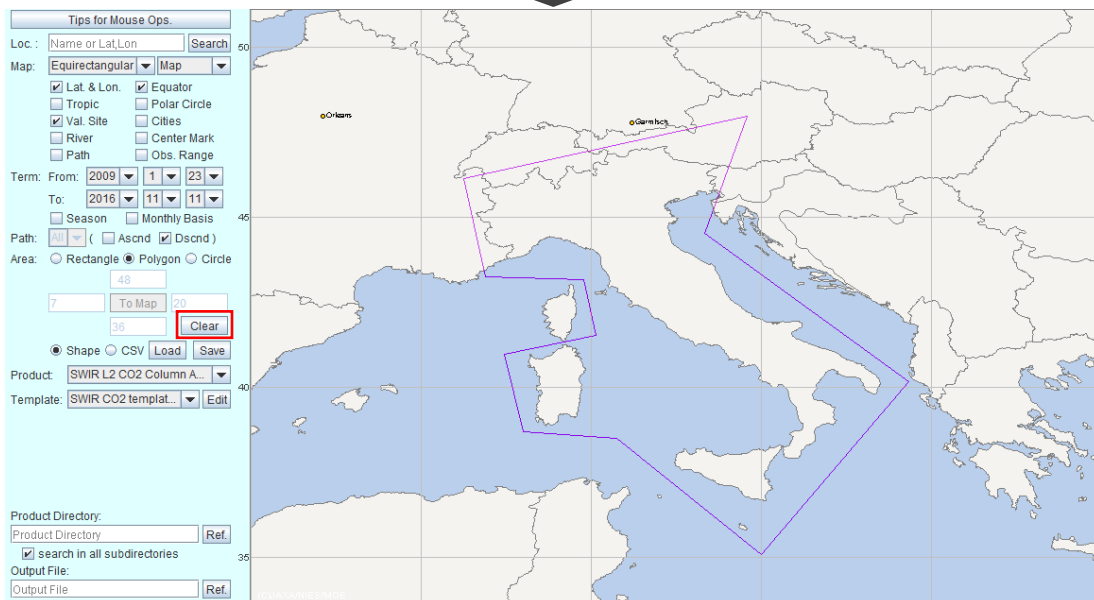
If you click “OK” button, the shape of polygon is changed.



You can save this polygon data in “Shape” or “CSV” format. Select “Shape” or “CSV” radio button and click “Save” button, then “Save” dialog for saving pops up.



Save it to an appropriate directory.



If you click “Clear” button, your specified polygon data is deleted.

Then the shape of polygon disappears from the map.

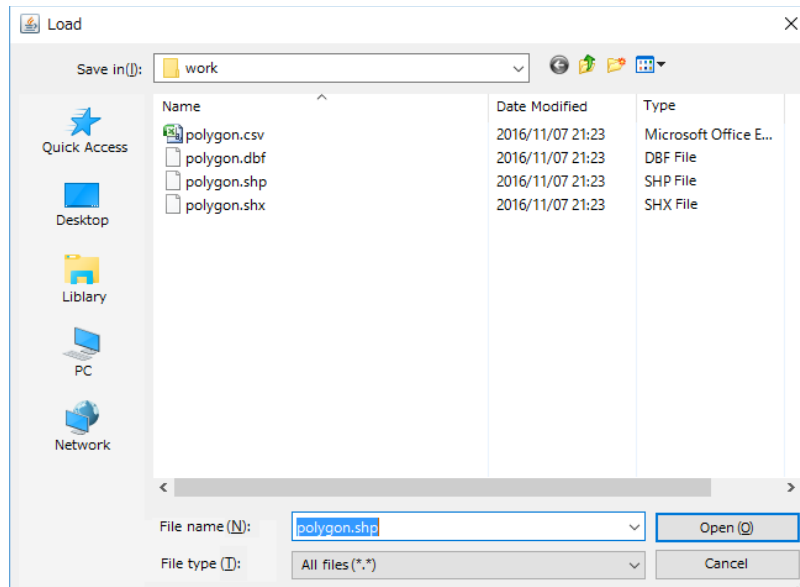


Upload your polygon data as a search area.



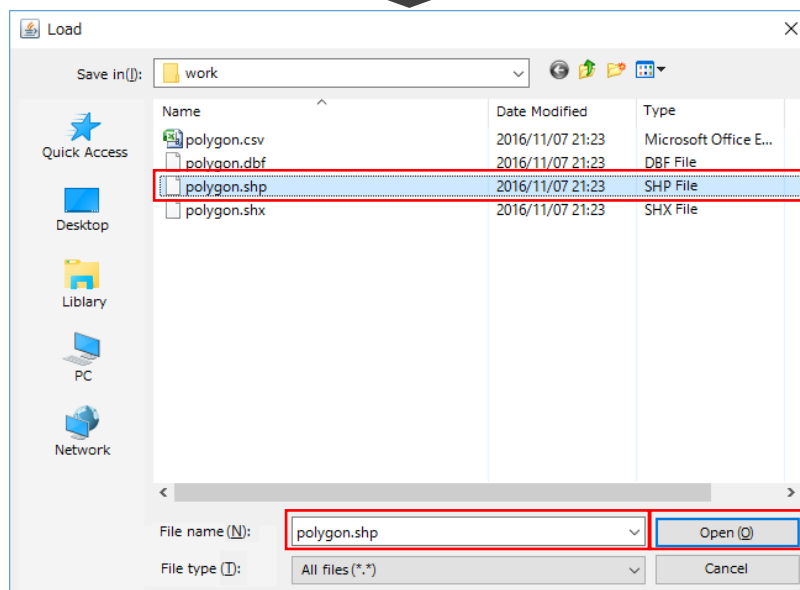
↓

Select “Shape” or “CSV” radio button and click “Load” button, then
“Load” dialog for loading pops up.



Select Shape (.shp) or CSV file in file list.

↓



↓

Click “OK” button, then your selected file is loaded, and a polygon is
drawn on the map.

↓



Fig. 4.9.2-1 Specify search area with polygon.

In the shape file format, the vertices information is stored in counterclockwise from the most western vertex.

CSV file format is shown in Table 4.9.2-1.

Table 4.9.2-1 Polygon File Format (CSV file type).

Column	Type	Contents
1	int	Number of vertices
2	float	Latitude (degree)
3	float	Longitude (degree)

Note: Starting from the most western vertex, the geolocation data of vertices are stored in counterclockwise. LF (%x0A), CR (%x0D) and CR+LF are handled as a line break. If '#' is the first character of a line, it is handled as a comment.

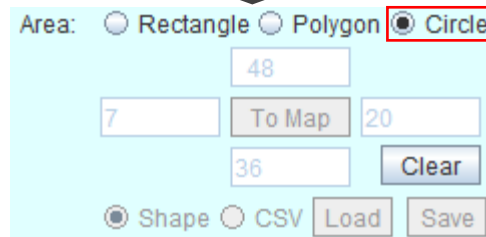
4.9.3 Specifying Search Area with Circle

If “Circle” radio button is selected, you may specify your search area with a circle.

Its operational procedure is as follows:

Select “Circle” radio button of “Area” field in the Parameter Setting

Area.



Click right mouse button down at a point, which is the center of the circle, and hold it down to move, then a circle is shown on the map.

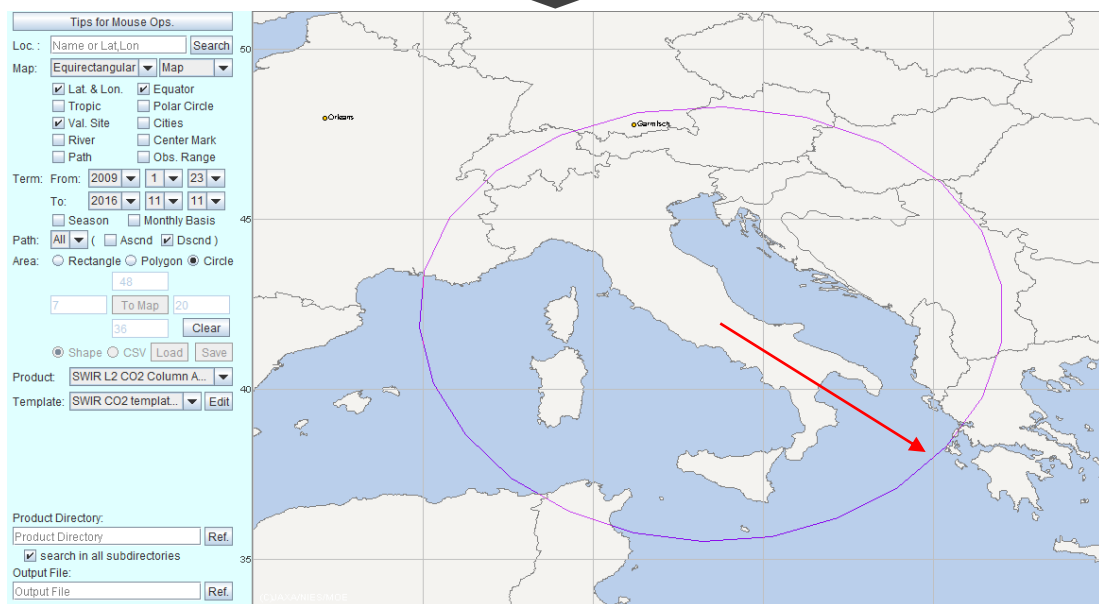


Fig. 4.9.3-1 Specify search area with circle.

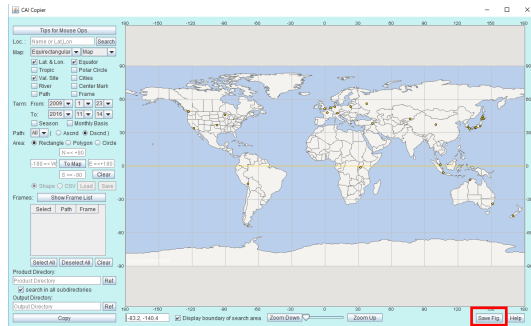
The circle is drawn as a polygon. When you zoom up, you can recognize their vertices.

Once a circle is drawn on the map, it is handled as a polygon and you may modify or delete its shape as explained in the previous sub-section.

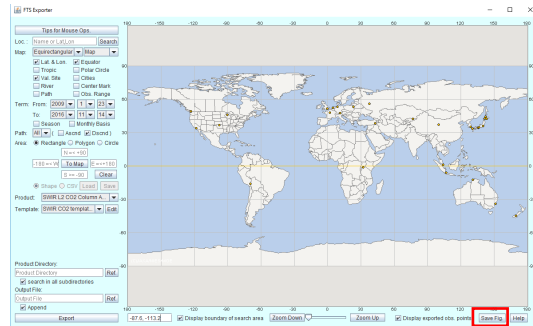
If you want to specify a circle once again, click “Clear” button and specify a circle again.

4.10 Saving Map Image

The shown map can be saved as an image file in PNG format.

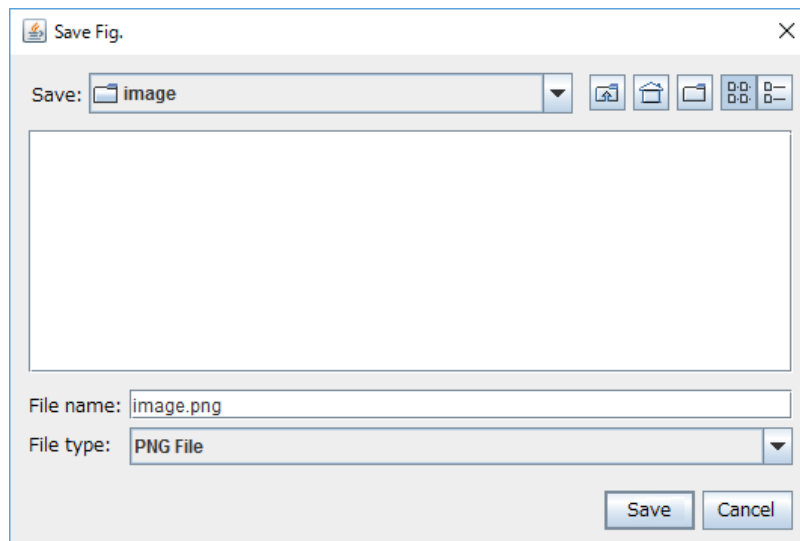


CAI Copier



FTS Exporter

Click “Save Fig.” button, then “Save Fig.” dialog for saving an image file pops up.

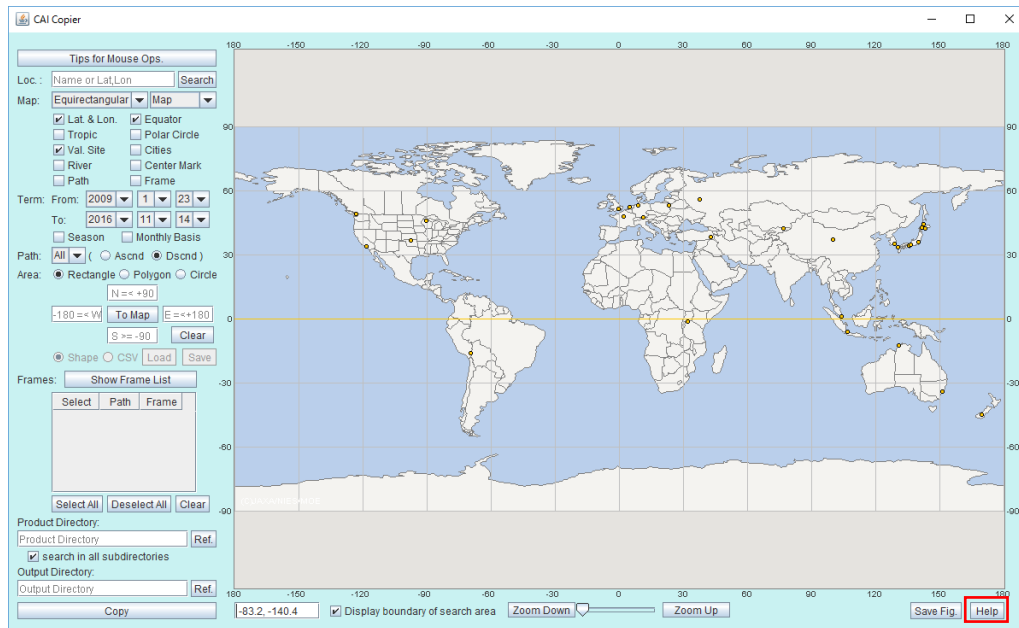


Save the map image as a PNG file.

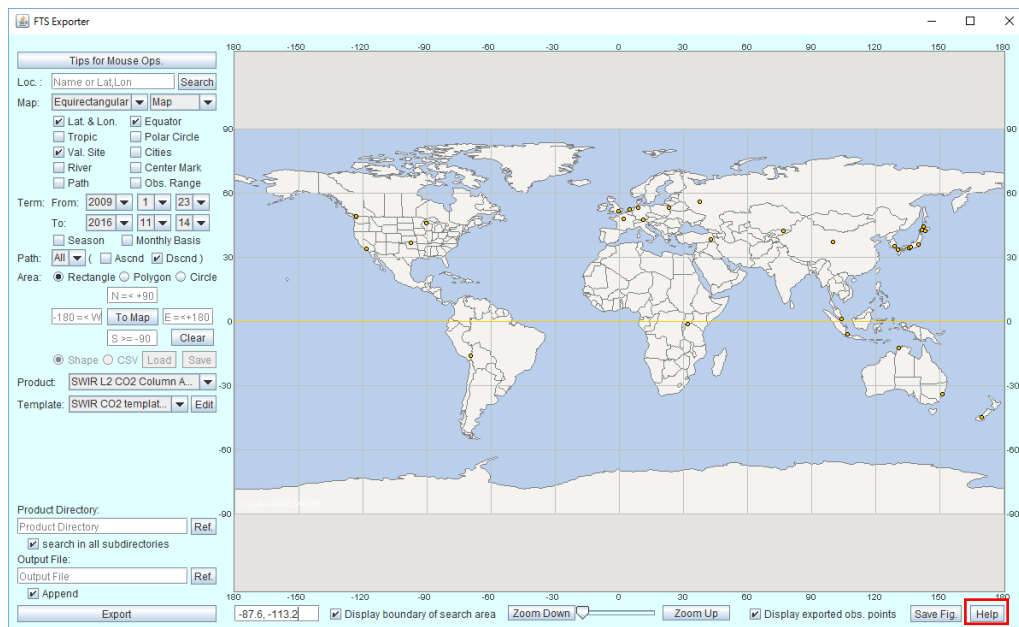
Fig. 4.10-1 Save map image.

4.11 Showing Manual

Click “Help” button at the bottom right of the main window of CAI Copier or FTS Exporter. Then this manual in PDF, saved in the “manual” directory, opens with your specified PDF viewer.



CAI Copier

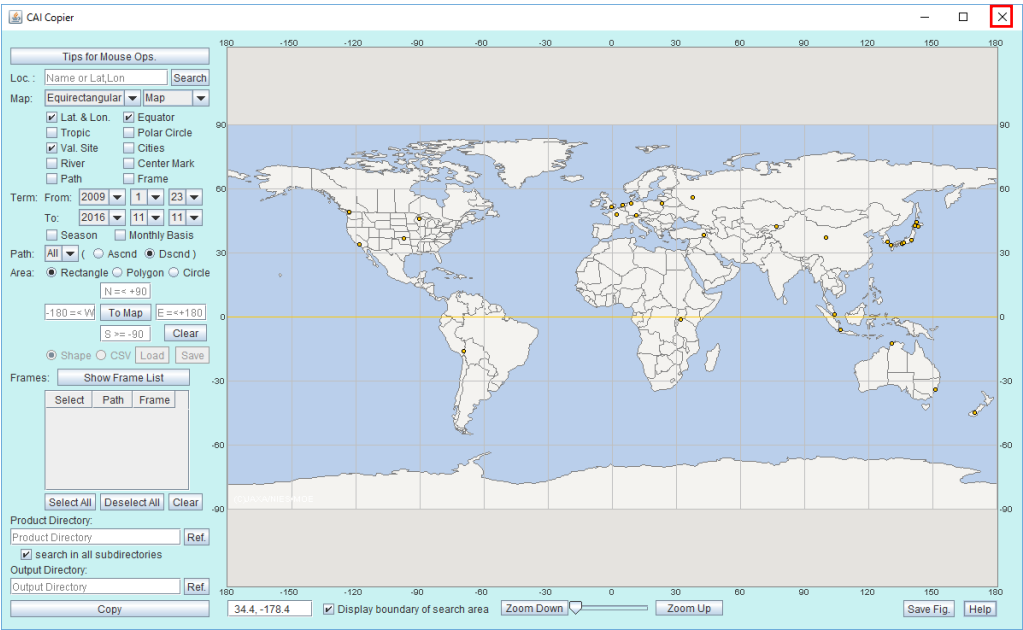


FTS Exporter

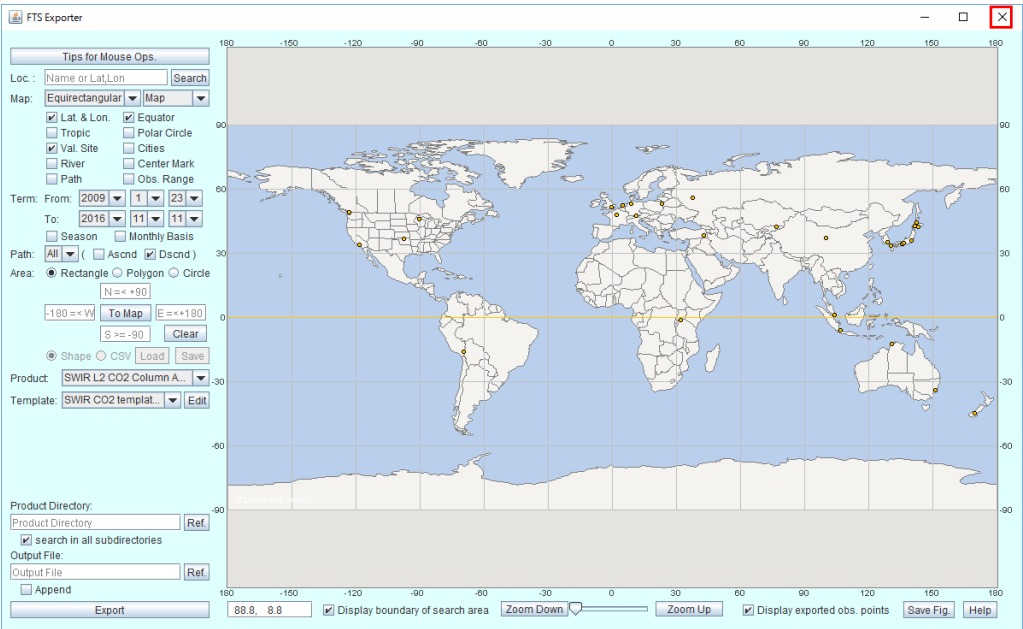
Fig. 4.11-1 Show manual.

4.12 Terminating Tool

Click “X” button at the top right of the main window of CAI Copier or FTS Exporter to terminate the tool. When you terminate CAI Copier or FTS Exporter, the action results of “copy” or “export” are saved in a text file in the “log” directory.



CAI Copier



FTS Exporter

Fig. 4.12-1 Terminate tool.

5. CAI Copier

After specifying the search conditions in the Parameter Setting Area, please also specify the following parameters to copy CAI product(s).

- [Selecting CAI frame](#)
- [Specifying product directory](#)
- [Specifying output directory](#)
- [Starting to copy CAI product file](#)

5.1 Selecting CAI Frame

A CAI frame is the minimum unit of archived CAI products. After you complete specifying your search area with a rectangle, polygon or circle, please click “Show Frame List” button. Then a list of CAI frame(s) which cover your specified search area is shown in the table and the listed frames are drawn with red line on the map. If necessary, you may cancel any check mark(s) of frame(s) on the list; the canceled frame(s) is drawn in gray on the map.

Specify a search area and click “Show Frame List” button.

The screenshot shows a web application for selecting CAI frames. On the left, there is a sidebar with search parameters. The 'Frames' table is as follows:

Select	Path	Frame
<input checked="" type="checkbox"/>	20	22
<input checked="" type="checkbox"/>	20	23
<input checked="" type="checkbox"/>	20	24
<input checked="" type="checkbox"/>	20	25
<input checked="" type="checkbox"/>	21	22
<input checked="" type="checkbox"/>	21	23

Below the table are buttons: 'Select All', 'Deselect All', and 'Clear'. The 'Show Frame List' button is highlighted with a red box. The map on the right shows a red rectangular search area over Europe.

All CAI frames which cover the specified search area are listed in the table and the frames are drawn in red (checked) or gray (unchecked) on the map. Previous status of “Select” check box is kept.

Unchecked CAI frames in the table are drawn in gray on the map.
Narrow down CAI frames by checking “Select” check box in the table.

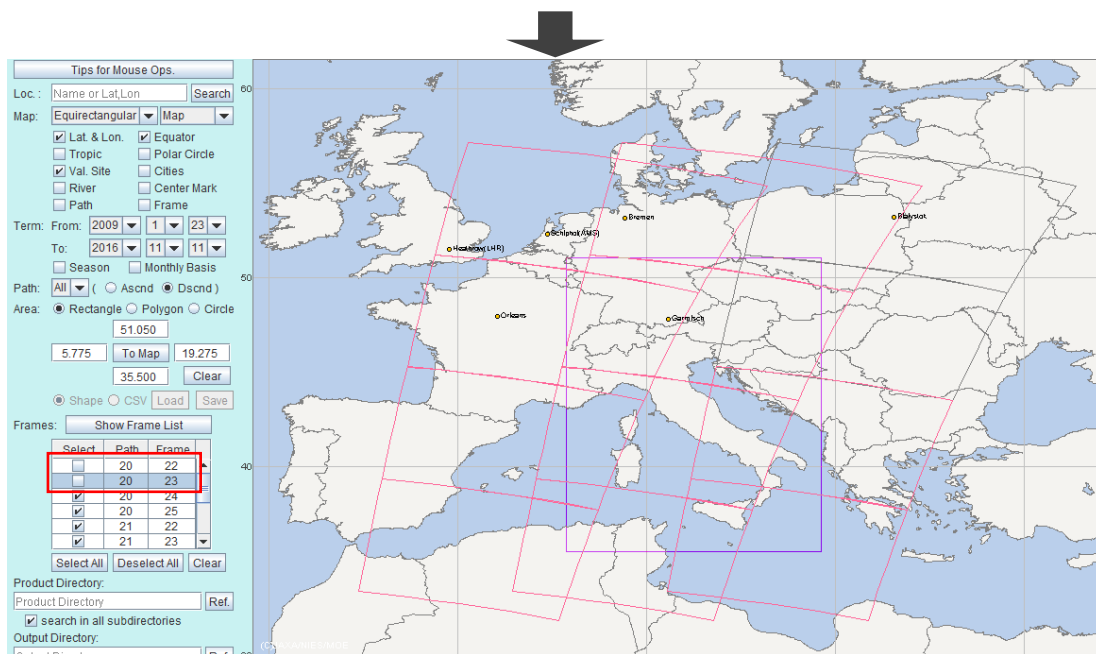


Fig. 5.1-1 Select CAI frames for the search conditions.

Click “Select All” button, then all CAI frames in the table are checked.

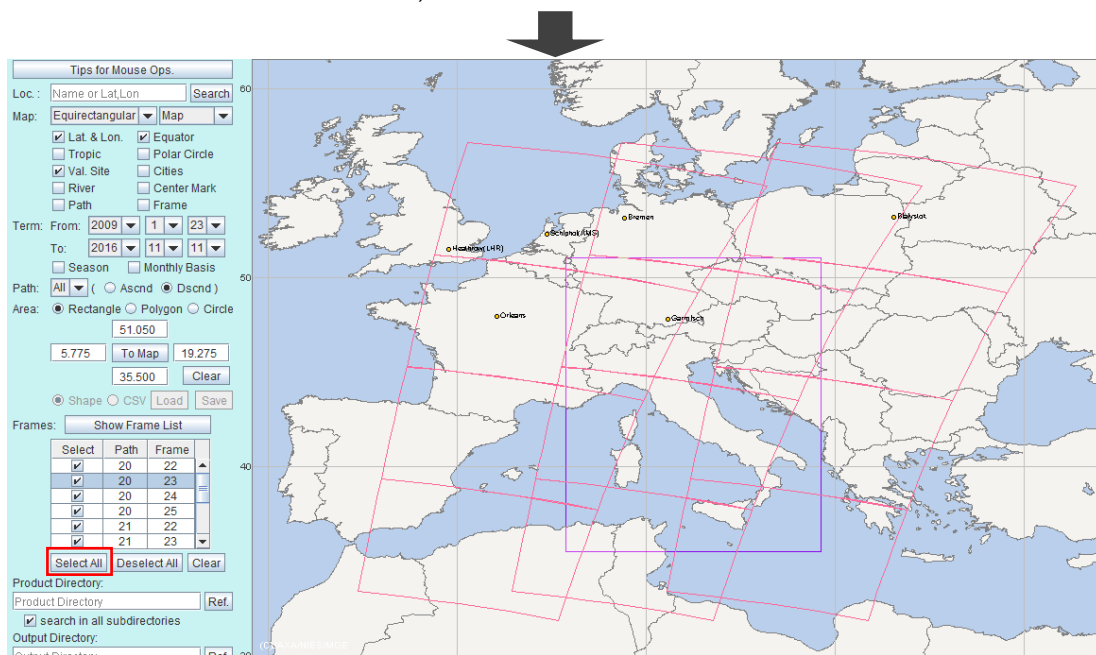


Fig. 5.1-2 Select all CAI frames in the table.

Click “Deselect All” button, then all frames in the table are unchecked.

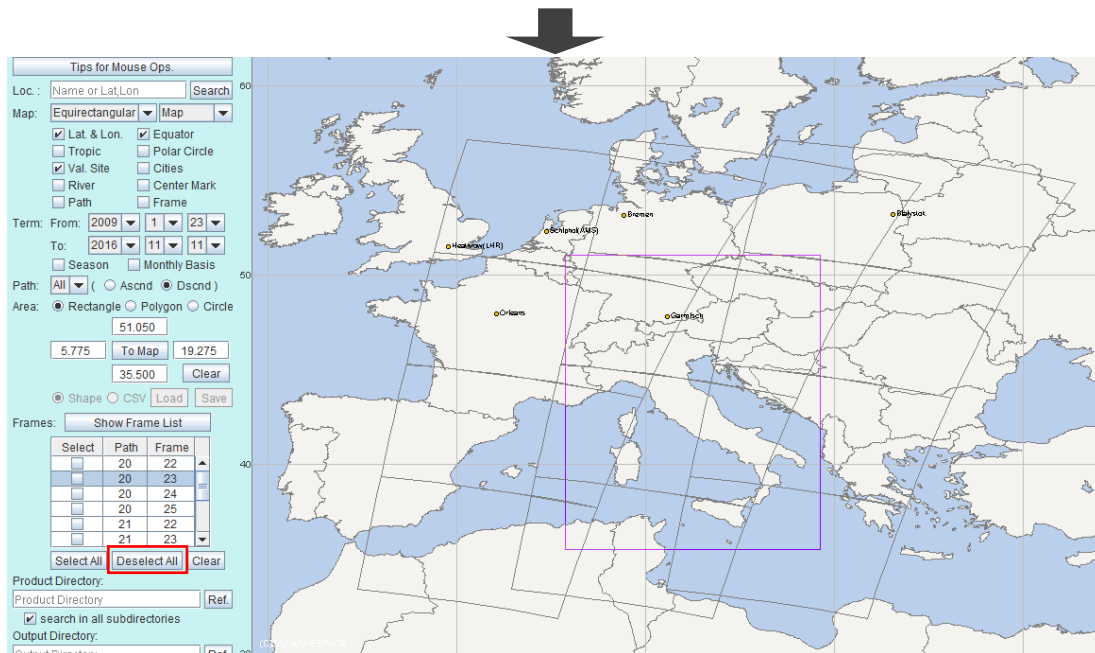


Fig. 5.1-3 Deselect all CAI frames in the table.

Click “Clear” button, then all frames are deleted from the table.

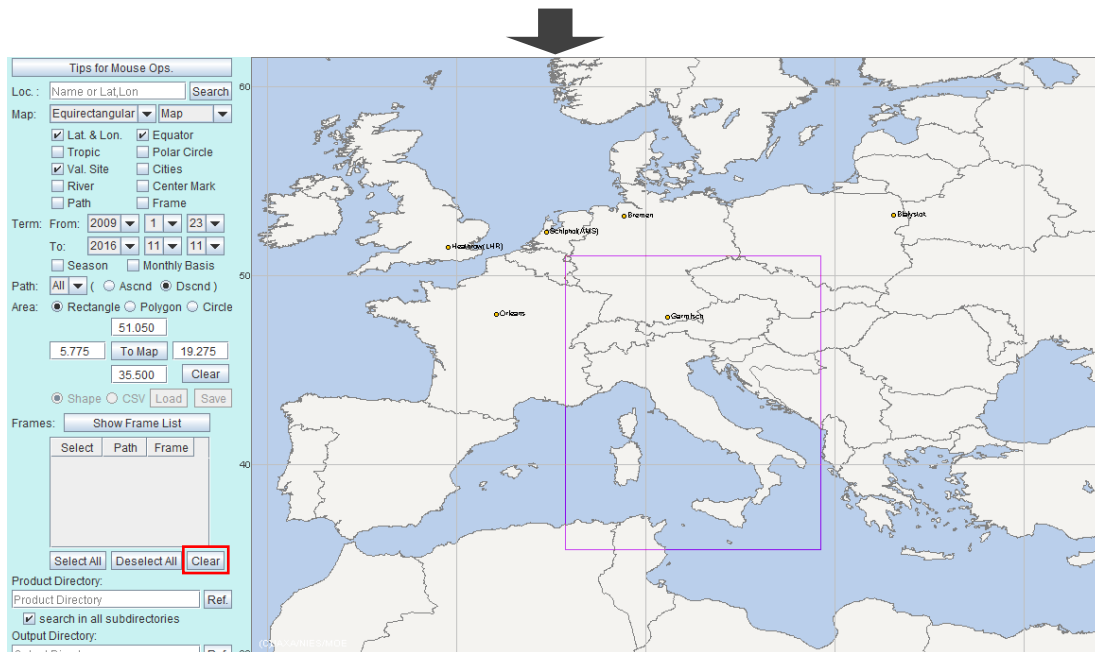


Fig. 5.1-4 Clear CAI frame from the table.

5.2 Specifying Product Directory

Please specify the directory in which the original CAI products are stored. CAI Copier search the CAI product files from this directory according to the search conditions specified in the Parameter Setting Area.

The typical operational procedure is as follows:

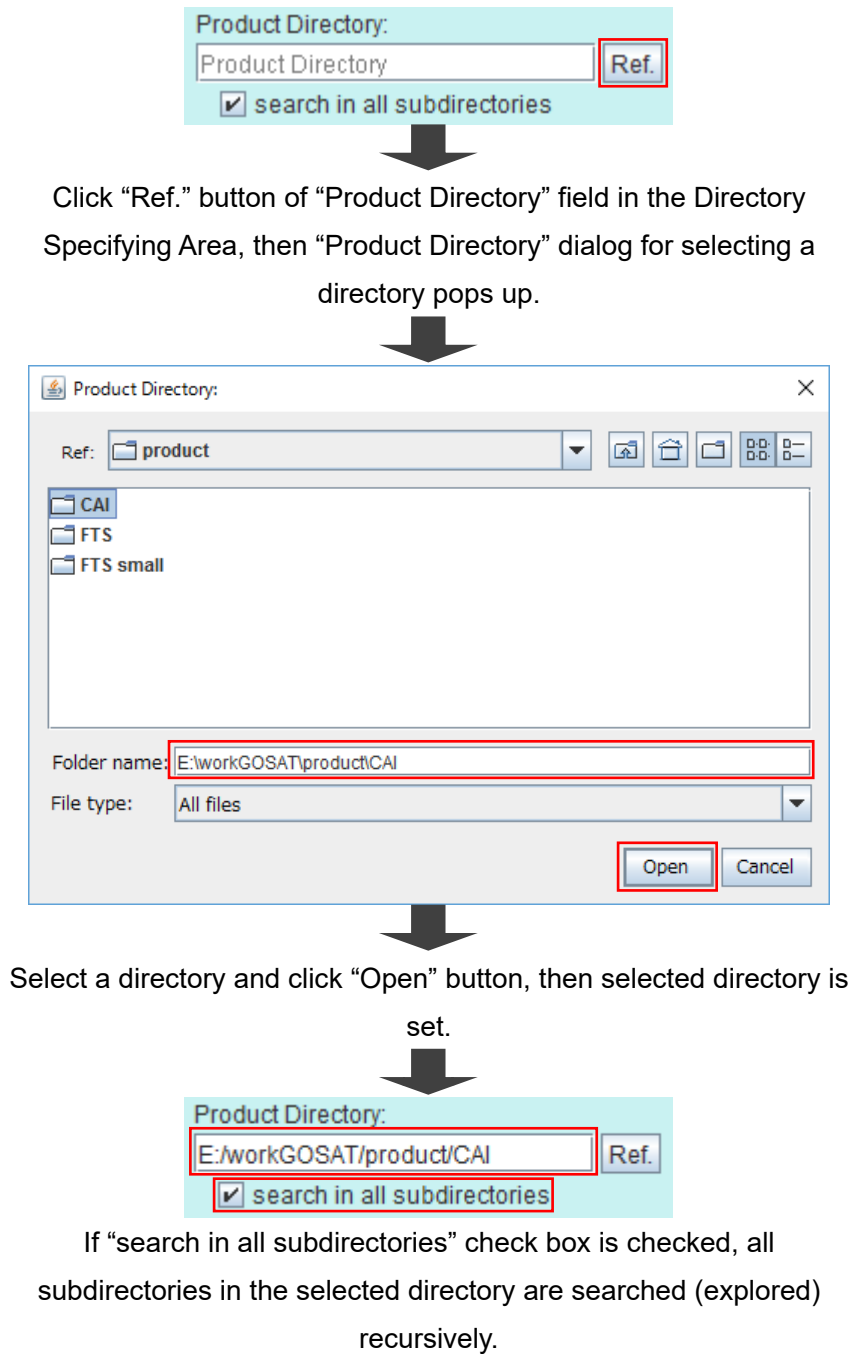


Fig. 5.2-1 Specify product directory.

5.3 Specifying Output Directory

Specify the copy destination directory.

The typical operational procedure is as follows:

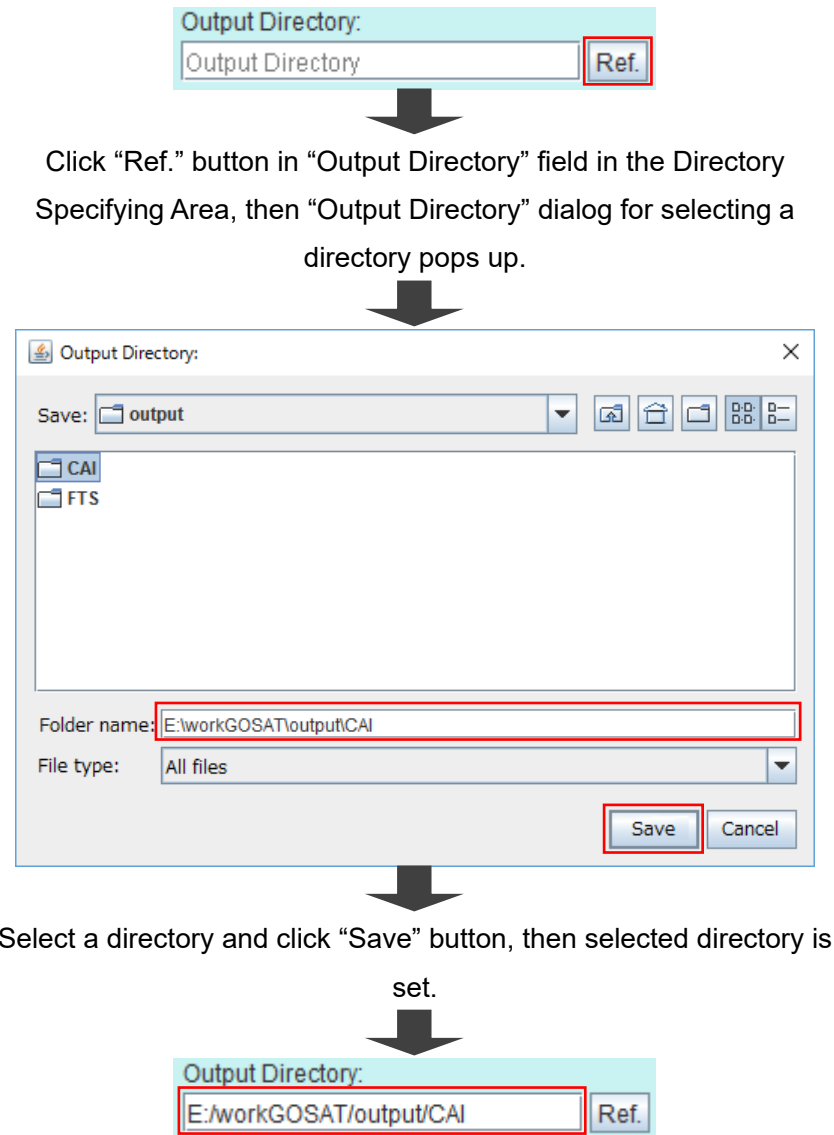


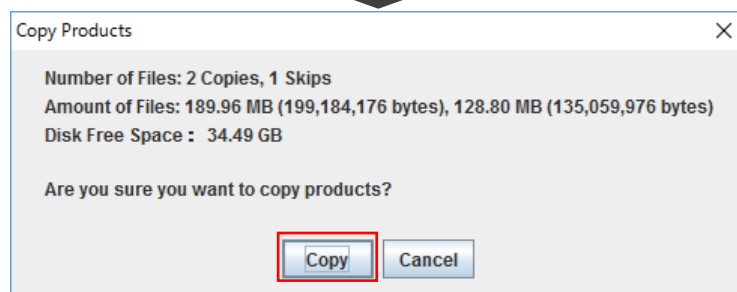
Fig. 5.3-1 Specify output directory.

5.4 Starting to Copy CAI Product File

When you click “Copy” button at the bottom in the Directory Specifying Area, CAI Copier search all product files based on the search conditions specified in the Parameter Setting Area. Before starting copying the matched CAI product files based on the search conditions, CAI Copier calculates the required disk space to copy all matched data into the output directory.

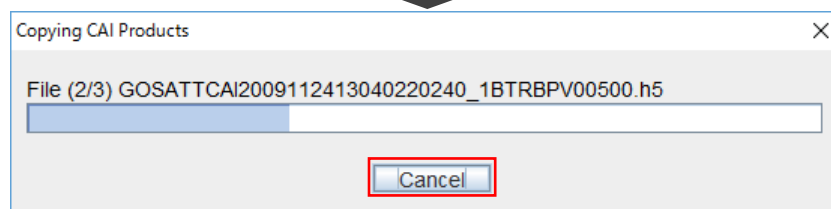
The typical operational procedure is as follows:

Click “Copy” button at the bottom in the Directory Specifying Area, then “Copy Products” dialog for confirmation pops up in which the matched results for the specified search conditions are shown.



- **Number of Files** Number of product files to be copied and number of skipped files. (In cases when the same named files already exist in the target directory.)
- **Amount of Files** Data amount of product files to be copied and data amount of the skipped files.
- **Disk Free Space** Free space of the destination disk.

Click “Copy” button to start copying and “Copying CAI Products” dialog for progressing pops up.



↓

If “Cancel” button is clicked, copying stops and “Canceled Copy” dialog for cancellation pops up. However, CAI Copier doesn’t delete the files in the output directory which have already been copied before the cancellation.

↓

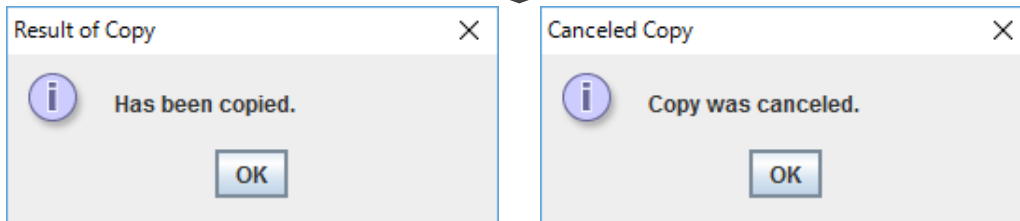


Fig. 5.4-1 Execution of CAI Copier.

The execution results of copy are written on a text file (file_list.txt) in the output directory. Its file format is shown in the Table 5.4-1.

Table 5.4-1 Copy Result File Format (Separated by Tab).

Column	Type	Contents
1	string	Product file name (full path)
2	string	Result of copy Copied: Normal End Skipped: The file already exists. CAI Copier doesn't over write the existing files in the output directory. Error: Error happened during the copy.

Note: LF (%x0A), CR (%x0D), and CR+LF are handled as a line break.

6. FTS Exporter

After specifying the search conditions in the Parameter Setting Area, please specify the following parameters to export FTS dataset(s).

- [Selecting FTS product type](#)
- [Specifying product directory](#)
- [Specifying output file and directory](#)
- [Starting to export FTS dataset](#)
- [Customizing template to export FTS dataset](#)

6.1 Selecting FTS Product Type

FTS Exporter can export specific dataset(s) from the following FTS products.

- SWIR L2 CO2 Column Amount
- SWIR L2 CH4 Column Amount
- SWIR L2 H2O Column Amount
- TIR CO2 Profile
- TIR CH4 Profile

Select a product type from the pull-down list.

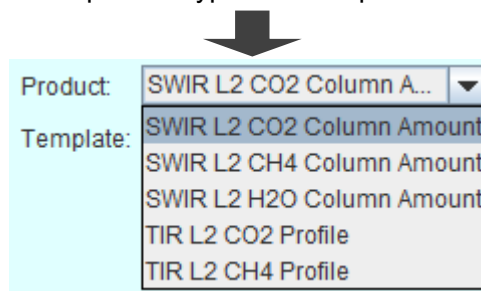


Fig. 6.1-1 Select FTS product type.

6.2 Specifying Product Directory

Please specify the directory in which the original FTS products are stored.

The typical operational procedure is as follows:

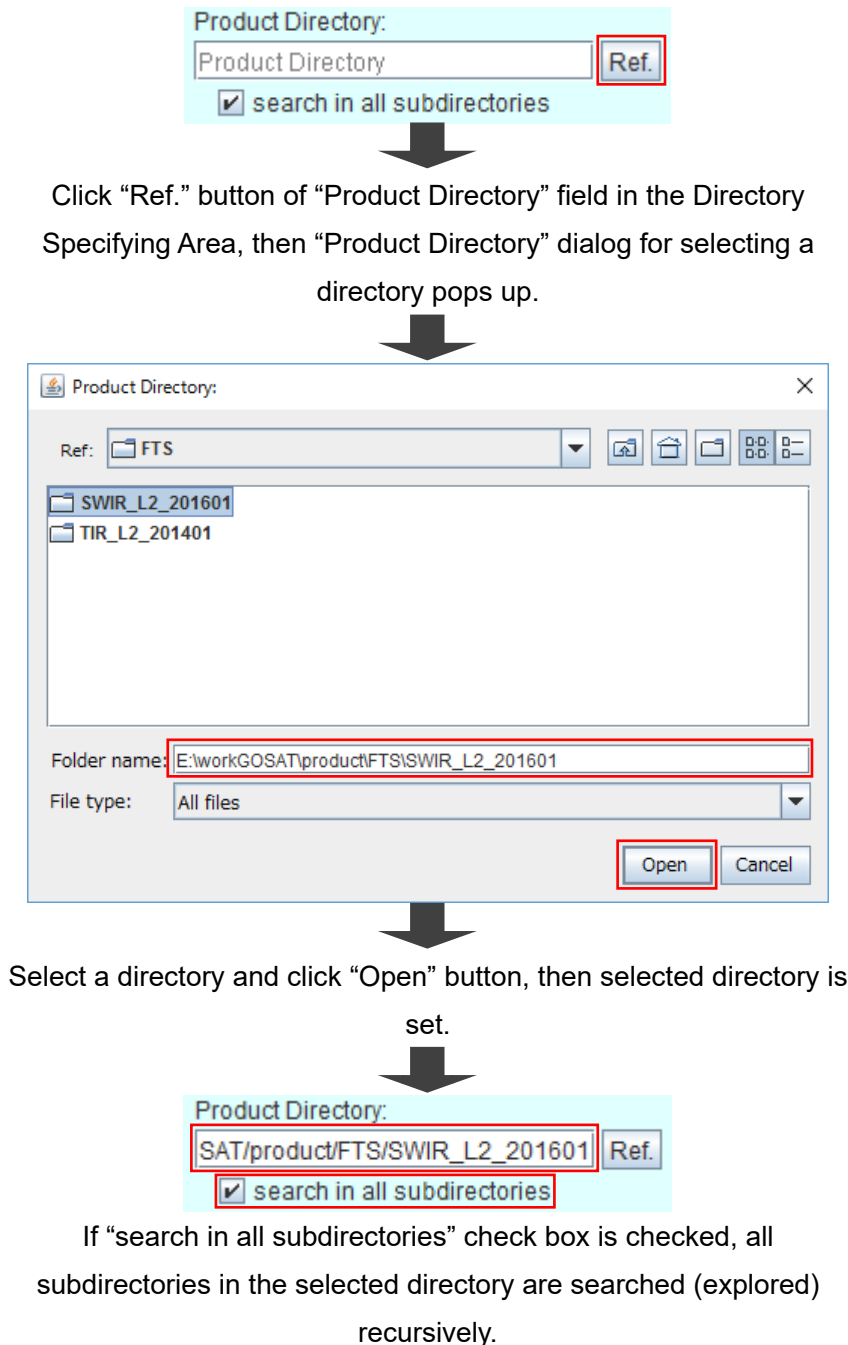
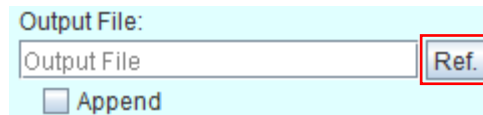


Fig. 6.2-1 Specify product directory.

6.3 Specifying Output File and Directory

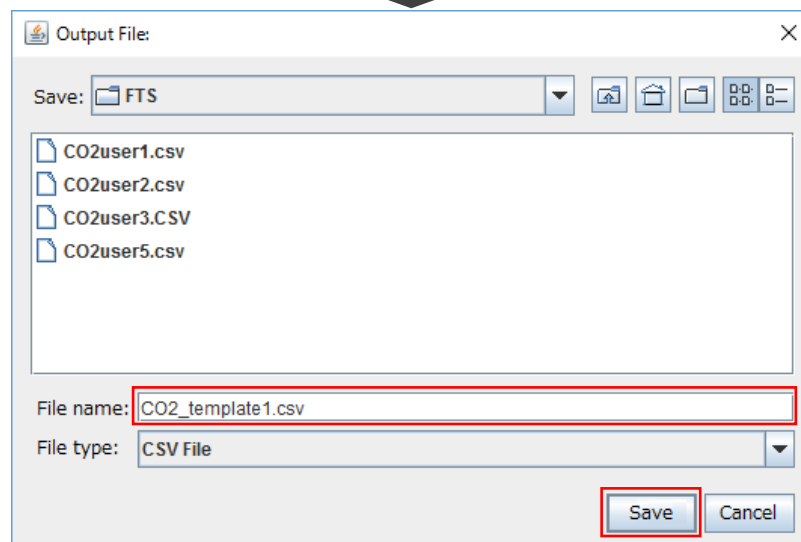
Please specify the output file name and its directory. If “Append” check box is checked, the hit results are added in the existing file.

The typical operational procedure is as follows:



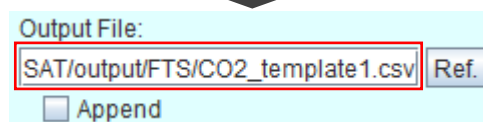
The initial 'Output File' dialog box is shown. It has a text field labeled 'Output File' containing the text 'Output File'. To the right of the text field is a button labeled 'Ref.'. Below the text field is a checkbox labeled 'Append' which is currently unchecked.

Click “Ref.” button of “Output File” field in the Directory Specifying Area, then “Output File” dialog for selecting a file name pops up.



The 'Output File' dialog box for selecting a file is shown. It has a 'Save:' dropdown menu set to 'FTS'. Below this is a list of files: 'CO2user1.csv', 'CO2user2.csv', 'CO2user3.CSV', and 'CO2user5.csv'. At the bottom, there is a 'File name:' text field containing 'CO2_template1.csv' and a 'File type:' dropdown menu set to 'CSV File'. There are 'Save' and 'Cancel' buttons at the bottom right.

Select a file or enter file name and click “Save” button, then selected file or entered file name is set.



The 'Output File' dialog box is shown after the file selection. The text field now contains the full path 'SAT/output/FTS/CO2_template1.csv'. The 'Ref.' button is still present to the right, and the 'Append' checkbox remains unchecked.

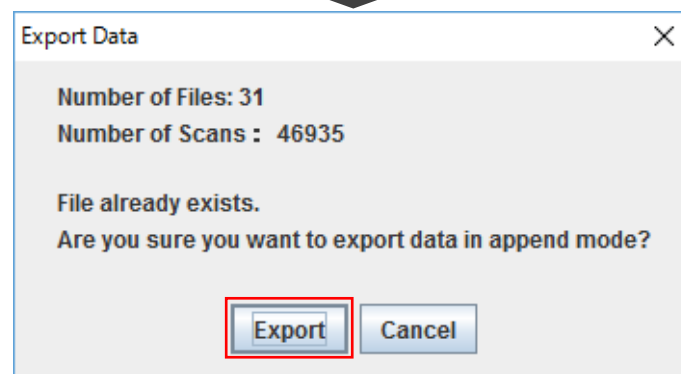
If “Append” check box is checked, data are appended to the existed file or output to new file.

Fig. 6.3-1 Specify output file and directory.

6.4 Starting to Export FTS Dataset

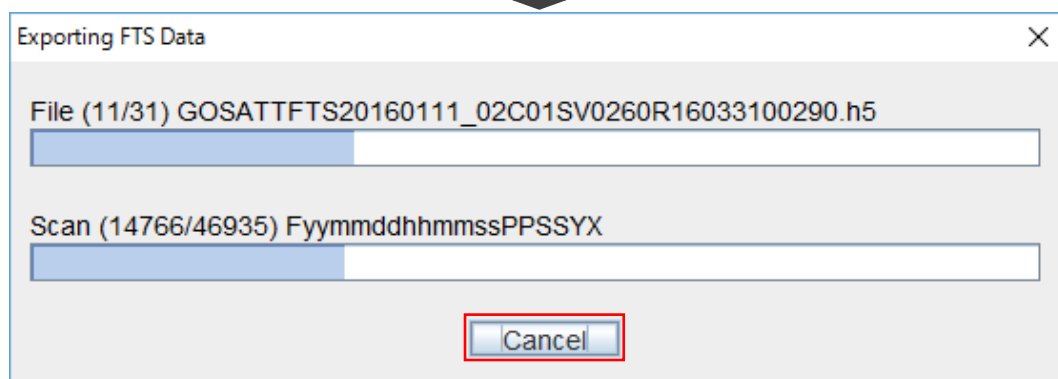
FTS Exporter search the all files in the product directory based on the search conditions specified in the Parameter Setting Area. Its hit results are shown in the pop-up dialog. If you set “Append” check box option, the extracted FTS dataset(s) are added to the existing file. The typical operational procedure is as follows:

Click “Export” button at the bottom left in the Directory Specifying Area,
then FTS Exporter scans all FTS product files. The number of
matched FTS scans based on the search conditions is shown in
“Export Data” dialog for confirmation.

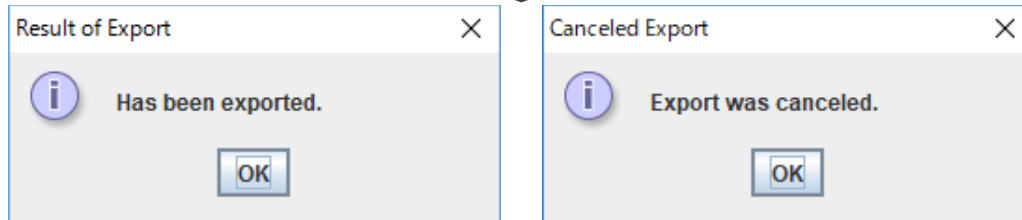


- Number of Files Number of FTS product files.
- Number of Scans Number of matched FTS scans.

Click “Export” button, then “Exporting FTS Data” dialog for
progressing pops up.



If “Cancel” button is clicked, exporting stops and “Canceled Export” dialog for cancellation pops up. However, already exported output data remains (not deleted) in the output file.



Click “OK” button, once FTS Exporter completes the task, then the observation points of the exported data are shown on the map.

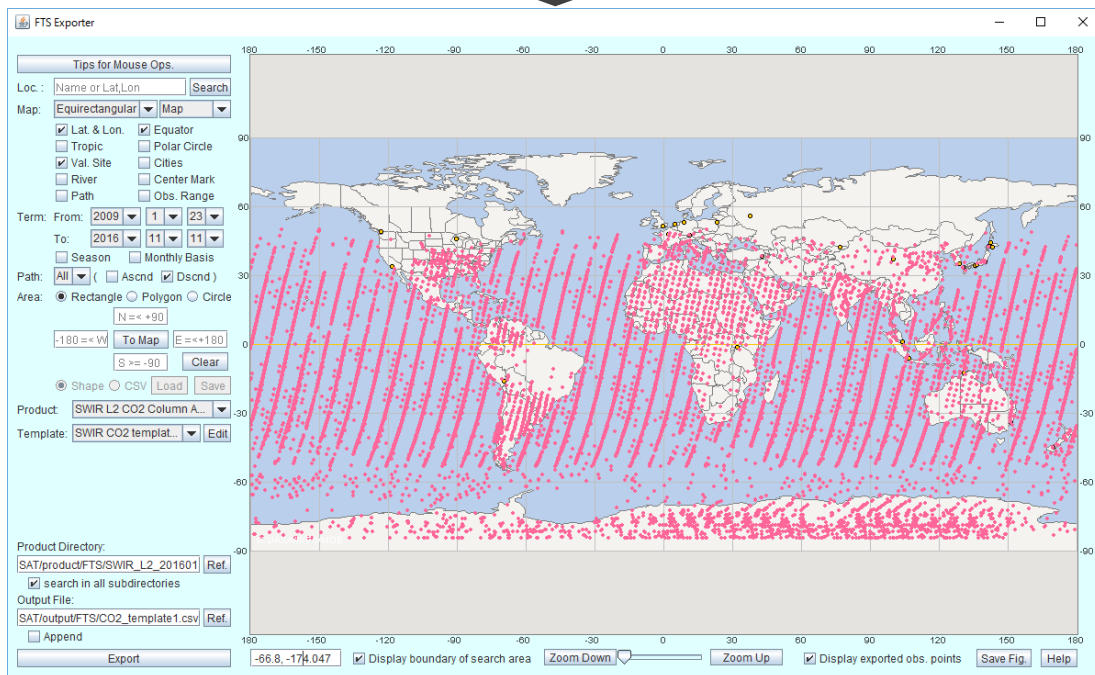


Fig. 6.4-1 Execution of FTS Exporter.

Values of data are exported to the specified output file and log information is saved to the file with the extension “.log”, which the file name corresponds to the specified output file. File format of export data is shown in Table 6.4-1 and log file format is shown in the Table 6.4-2.

Table 6.4-1 Export Data File Format (CSV file type).

Column	Type	Contents
1	string	1st record: Title of export data
2	string	2nd record and after: Values of export data

Note: LF (%x0A) is handles as a line brake.

Table 6.4-2 Log File Format (Separated by Tab).

Column	Type	Contents
1	string	Product file name (full path)
2	string	Result of export, OK: Normal end, NG: Error occurred
3	string	Number of exported scans

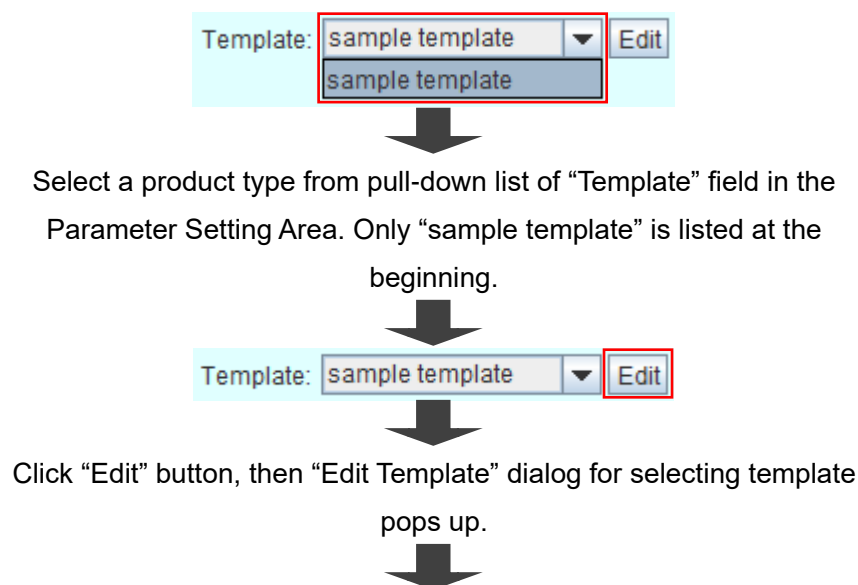
Note: LF (%x0A) is handles as a line brake.

6.5 Customizing Template to Export FTS Dataset

There are pre-installed 5 templates for exporting FTS dataset(s). If you want to customize the template to export additional dataset(s), which are not listed in the basic template, from the specific FTS product, please select “sample template” from the pull-down menu in the “Template” field. If you click “Edit” button at the right of the field, a dialog named “Edit Template” pops up. Contents List shows the data structure of your selected FTS product. If you double-click a folder icon, its contents are shown. You can select a dataset(s) and insert it to the exporting list in the right with “>> Insert” button. If you want to change the title name of the exporting data, please click the field of “Title(Unit)” column on the right list and change the word for your own. The parameters (templates) are listed vertically from top to bottom; however, the exported data are listed from left to right in a horizontal line in the exporting CSV file.

Once you have completed to customize the template, please click “Save as New” button for preventing to lose the original template for the FTS product. But you can’t save your customized template as “sample template” or delete “sample template”.

The typical operational procedure is as follows:



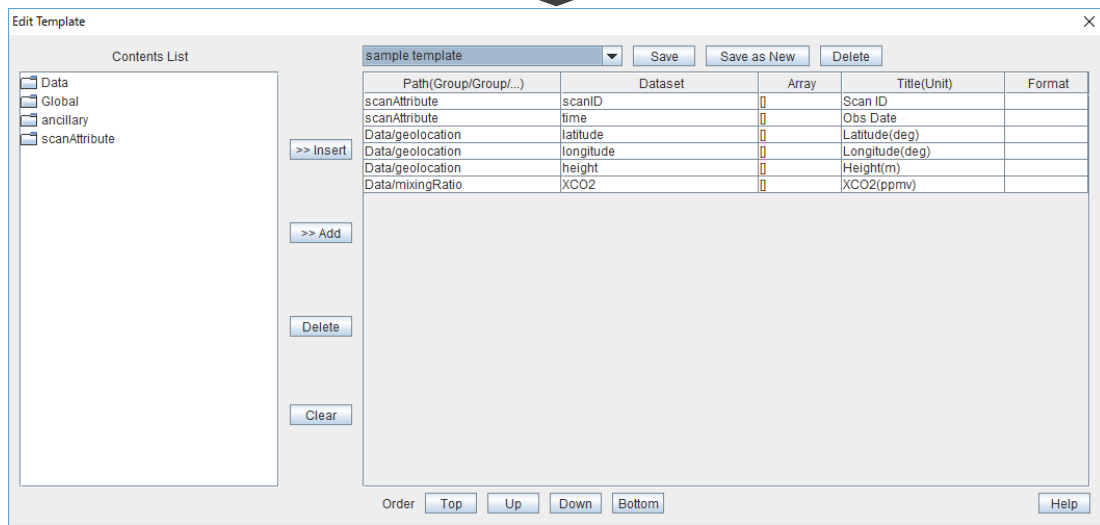


Fig. 6.5-1 Select template, displaying “Edit Template” dialog.

Following basic operations are available in “Edit Template” dialog.

- Showing contents of product
- Inserting, adding, and deleting dataset in export data list
- Specifying order of export data in output file
- Specifying array element, title, and output format
- Saving, deleting, and selecting template
- Showing manual
- Terminating template customization

6.5.1 Showing Contents of Product

The structures and details of FTS product are shown in the Contents List.

Double-click left mouse button to change status of showing lower level data.

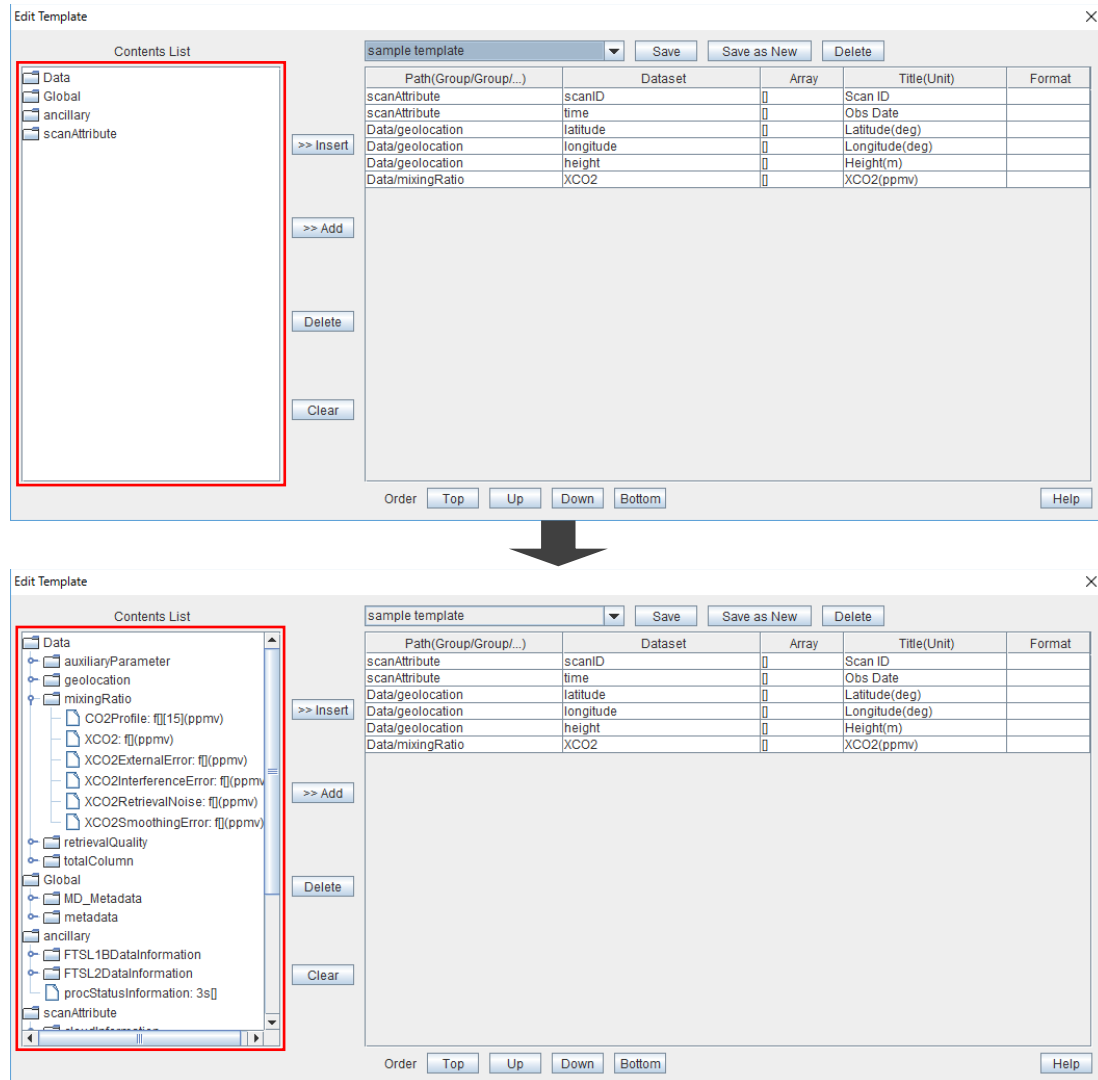
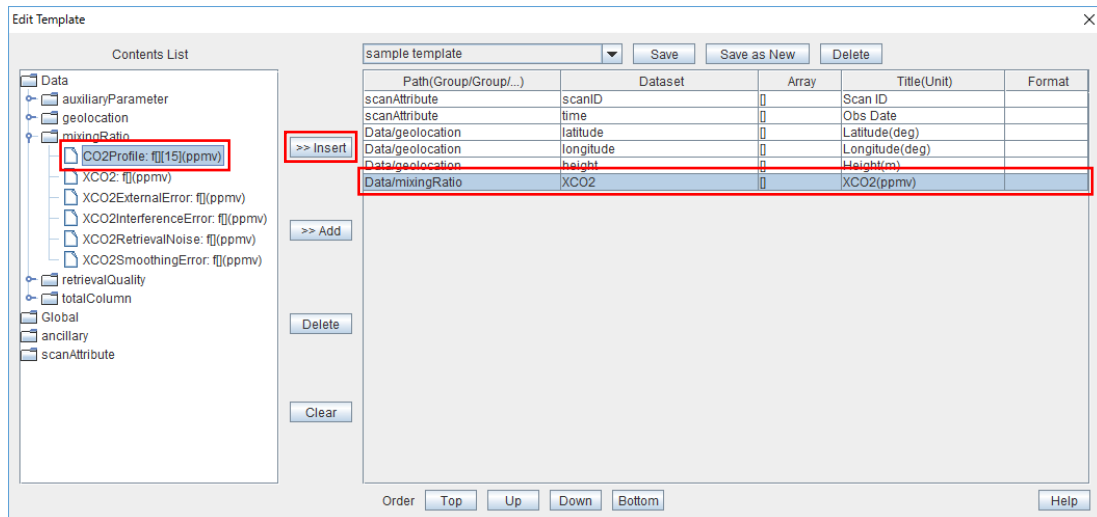


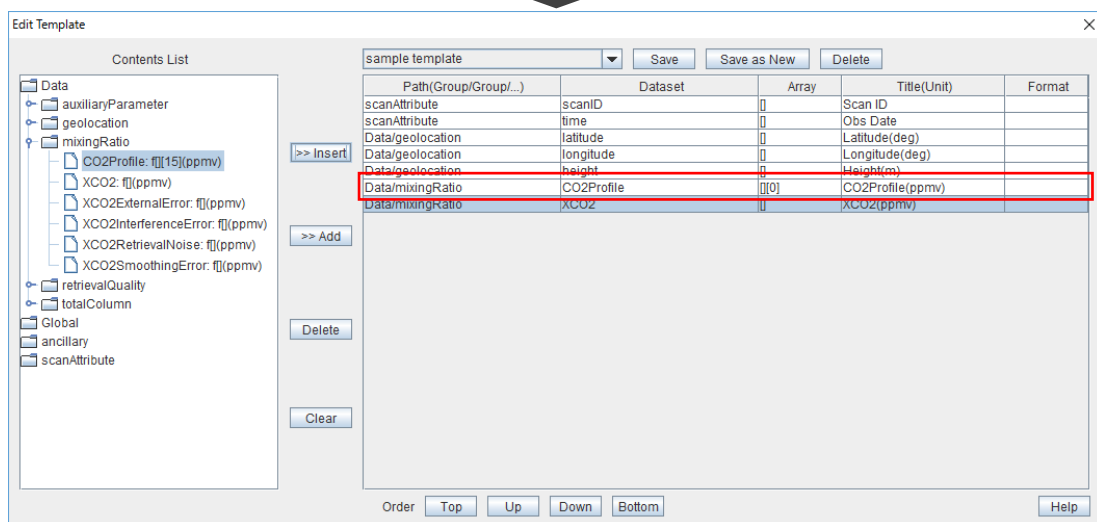
Fig. 6.5.1-1 Show contents of product.

6.5.2 Inserting, Adding, and Deleting Dataset in Export Data List

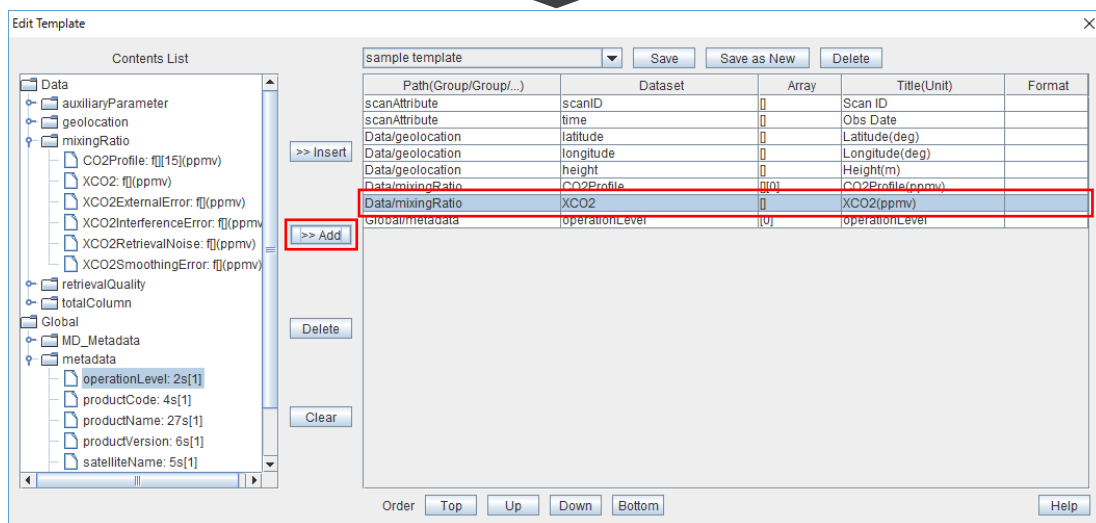
Exporting data are listed on the right (export data list). To add data, select it from the Contents List on the left and ">> Insert" or ">> Add" button. To delete data, select it from the export data list and "Delete" button. The export data list is cleared with "Clear" button.



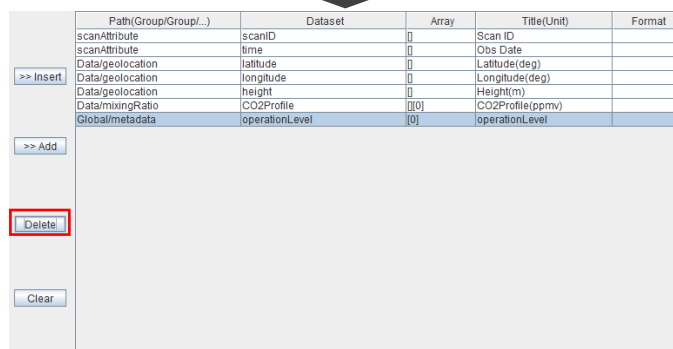
Select "Data/mixingRatio/CO2Profile" in the Contents List and "XCO2" dataset in the export data list, and click ">> Insert" button, then "CO2Profile" dataset is inserted before "XCO2" dataset.



Select "Global/operationLevel" in the Contents List and click ">> Add" button, then "operationLevel" dataset is appended to the export data list.



Select "XCO2" dataset in the export data list and click "Delete" button, then "XCO2" dataset is deleted from the export data list and "operationLevel" dataset is selected.



Click "Clear" button, then all of export data are deleted from the export data list.

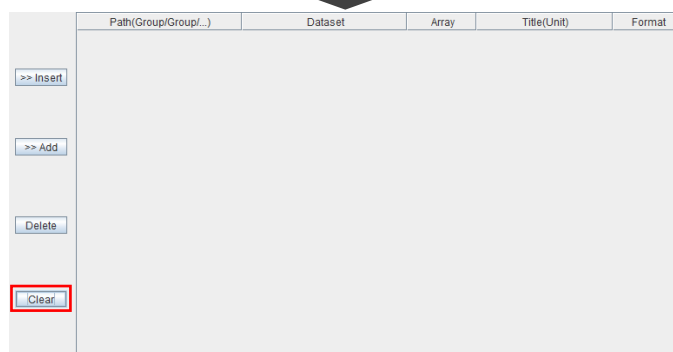


Fig. 6.5.2-1 Insert, add, and delete dataset in export data list.

6.5.3 Specifying Order of Export Data in Output File

Values of export data are exported in the sequential order of registration which is on the export data list (shown).

The order of export data is changed by clicking “Top”, “Up”, “Down”, or “Bottom” buttons.

Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
scanAttribute	scanID	[]	Scan ID	
scanAttribute	time	[]	Obs Date	
Data/geolocation	latitude	[]	Latitude(deg)	
Data/geolocation	longitude	[]	Longitude(deg)	
Data/geolocation	height	[]	Height(m)	
Data/mixingRatio	CO2Profile	[[0]	CO2Profile(ppmv)	
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	
Global/metadata	operationLevel	[0]	operationLevel	

Order Top Up Down Bottom Help

Select “operationLevel” dataset and click “Top” button, then it moves to top of the list.

Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
Global/metadata	operationLevel	[0]	operationLevel	
scanAttribute	scanID	[]	Scan ID	
scanAttribute	time	[]	Obs Date	
Data/geolocation	latitude	[]	Latitude(deg)	
Data/geolocation	longitude	[]	Longitude(deg)	
Data/geolocation	height	[]	Height(m)	
Data/mixingRatio	CO2Profile	[[0]	CO2Profile(ppmv)	
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	

Order Top Up Down Bottom Help

Select "XCO2" dataset and click "Up" button, then it moves up in the list.

Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
Global/metadata	operationLevel	[0]	operationLevel	
scanAttribute	scanID	[]	Scan ID	
scanAttribute	time	[]	Obs Date	
Data/geolocation	latitude	[]	Latitude(deg)	
Data/geolocation	longitude	[]	Longitude(deg)	
Data/geolocation	height	[]	Height(m)	
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	
Data/mixingRatio	CO2Profile	[[0]]	CO2Profile(ppmv)	

Order

Select "operationLevel" dataset and click "Down" button, then it moves down in the list.

Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
scanAttribute	scanID	[]	Scan ID	
Global/metadata	operationLevel	[0]	operationLevel	
scanAttribute	time	[]	Obs Date	
Data/geolocation	latitude	[]	Latitude(deg)	
Data/geolocation	longitude	[]	Longitude(deg)	
Data/geolocation	height	[]	Height(m)	
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	
Data/mixingRatio	CO2Profile	[[0]]	CO2Profile(ppmv)	

Order

↓

Select “operationLevel” dataset and click “Bottom” button, then it
moves to the end of the list.

↓

Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
scanAttribute	scanID	<input type="checkbox"/>	Scan ID	
scanAttribute	time	<input type="checkbox"/>	Obs Date	
Data/geolocation	latitude	<input type="checkbox"/>	Latitude(deg)	
Data/geolocation	longitude	<input type="checkbox"/>	Longitude(deg)	
Data/geolocation	height	<input type="checkbox"/>	Height(m)	
Data/mixingRatio	XCO2	<input type="checkbox"/>	XCO2(ppmv)	
Data/mixingRatio	CO2Profile	<input type="checkbox"/> [0]	CO2Profile(ppmv)	
Global/metadata	operationLevel	<input type="checkbox"/> [0]	operationLevel	

Order

Fig. 6.5.3-1 Specify order of export data in output file.

6.5.4 Specifying Array Element, Title, and Output Format

If you select a dataset from the Contents List shown in the left and click ">> Insert" or ">> Add" button, its characteristics are shown in the right as the export data list.

➤ Path (Group/Group/...)

Path of the export data in the product file is shown; a "/" is placed between data groups.

You can't change the path.

➤ Dataset

Dataset name of the export data in the product file is shown.

You can't change the dataset.

➤ Array

Array elements to be exported are specified by syntax; '[', element number (from 0) and ']'.
Dimension missed element number is handled as a dimension of scans.

All elements of the dimension set '*' as element number are output.

Each of missing element number and '*' as element number is used only once.

Ex) Number of dimensions of data is 3 and dimension number of scans is 1st:

- | | | |
|-----------|---|--|
| [0][1][2] | → | Independently of scans, fixed value of [0][1][2] is exported. |
| [][1][2] | → | Value of elements [1][2] of each scan is exported. |
| [][1][*] | → | Values of elements from [1][0] to [1][number of elements-1] of each scan are exported. |
| [][*][2] | → | Values of elements from [0][2] to [number of elements-1][2] of each scan are exported. |
| [*][1][2] | → | Error. Dimension set '*' is the dimension of scans. |

➤ Title(Unit)

Titles and units of the export data are specified.

In case of setting '*', string of '[', element number and ']' is appended.

➤ Format

The detailed output format can be specified.

In case of blank, its format is same as the original saved in the FTS product.

The format description is same style as the format of String class of Java.

- | | | | |
|-----|----------------|------|---------------------------------------|
| Ex) | Obs. Date | %s | string (not specified in this sample) |
| | Latitude(deg) | %.3f | floating point, 3 places of decimals |
| | Longitude(deg) | %.3f | floating point, 3 places of decimals |
| | Height(m) | %d | integer |
| | XCO2(ppmv) | %.0f | floating point, 0 place of decimal |

Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
scanAttribute	scanID	[]	Scan ID	
scanAttribute	time	[]	Obs Date	
Data/geolocation	latitude	[]	Latitude(deg)	%.3f
Data/geolocation	longitude	[]	Longitude(deg)	%.3f
Data/geolocation	height	[]	Height(m)	%d
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	%.0f
Data/mixingRatio	CO2Profile	[][*]	CO2Profile(ppmv)	
Global/metadata	operationLevel	[0]	operationLevel	

Fig. 6.5.4-1 Specify array element, title, and output format.

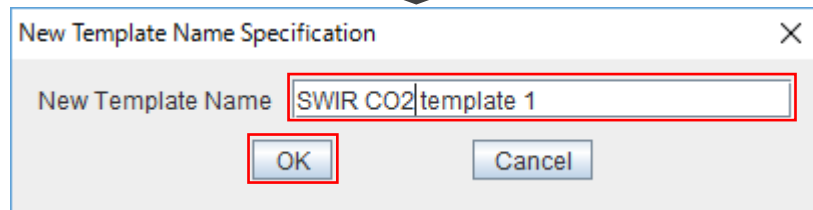
6.5.5 Saving, Deleting, and Selecting Template

Following operations are available for the template:

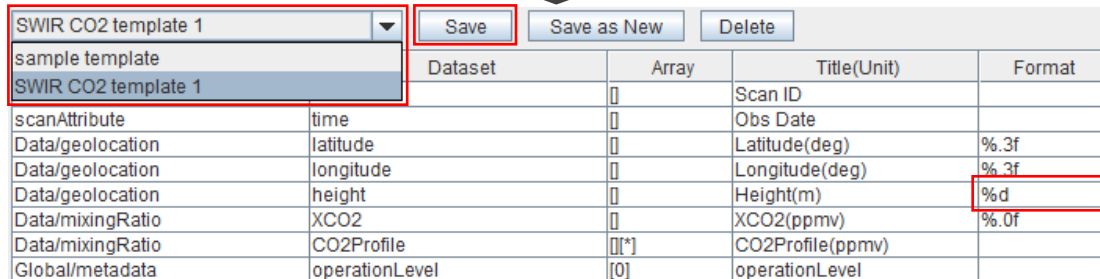
- Saving Save the template.
- Saving as New Save as a new template.
- Deleting Delete the template.
- Selecting Select the template.



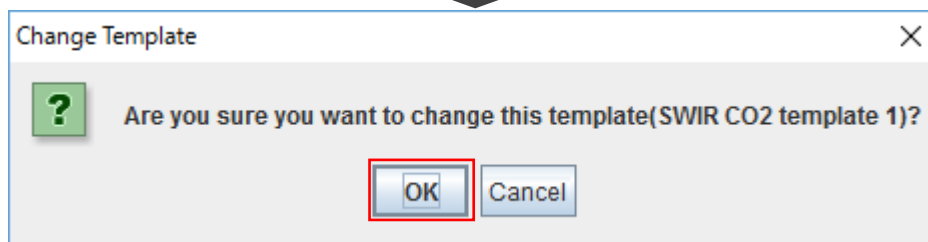
Click “Save as New”, then “New Template Name Specification” dialog for entering new template name pops up.



Enter new template name and click “OK” button, then the new template is appended to the pull-down list for selecting template.



Delete format of “height” dataset and click “Save” button, then “Change Template” dialog for confirmation pops up.



Click "OK" button, then "SWIR CO2 template 1" template is updated.

SWIR CO2 template 1		Save	Save as New	Delete
Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
scanAttribute	scanID	[]	Scan ID	
scanAttribute	time	[]	Obs Date	
Data/geolocation	latitude	[]	Latitude(deg)	% .3f
Data/geolocation	longitude	[]	Longitude(deg)	% .3f
Data/geolocation	height	[]	Height(m)	
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	% .0f
Data/mixingRatio	CO2Profile	[*]	CO2Profile(ppmv)	
Global/metadata	operationLevel	[0]	operationLevel	

For confirmation of updating "SWIR CO2 template 1" template, select "sample template" template and then select "SWIR CO2 template 1" template once again.

sample template		Save	Save as New	Delete
Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
scanAttribute	scanID	0	Scan ID	
scanAttribute	time	0	Obs Date	
Data/geolocation	latitude	0	Latitude(deg)	
Data/geolocation	longitude	0	Longitude(deg)	
Data/geolocation	height	0	Height(m)	
Data/mixingRatio	XCO2	0	XCO2(ppmv)	

SWIR CO2 template 1		Save	Save as New	Delete
Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
scanAttribute	scanID	[]	Scan ID	
scanAttribute	time	[]	Obs Date	
Data/geolocation	latitude	[]	Latitude(deg)	% .3f
Data/geolocation	longitude	[]	Longitude(deg)	% .3f
Data/geolocation	height	[]	Height(m)	
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	% .0f
Data/mixingRatio	CO2Profile	[][*]	CO2Profile(ppmv)	
Global/metadata	operationLevel	[0]	operationLevel	

Delete “operationLevel” dataset and then save as a new template named “SWIR CO2 template 2”.

Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
scanAttribute	scanID	[]	Scan ID	
scanAttribute	time	[]	Obs Date	
Data/geolocation	latitude	[]	Latitude(deg)	%3f
Data/geolocation	longitude	[]	Longitude(deg)	%3f
Data/geolocation	height	[]	Height(m)	
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	%0f
Data/mixingRatio	CO2Profile	[]*	CO2Profile(ppmv)	
Global/metadata	operationLevel	[0]	operationLevel	

Path(Group/Group/...)	Dataset	Array	Title(Unit)	Format
sample template				
SWIR CO2 template 1				
SWIR CO2 template 2				
Data/geolocation	latitude	[]	Latitude(deg)	%3f
Data/geolocation	longitude	[]	Longitude(deg)	%3f
Data/geolocation	height	[]	Height(m)	
Data/mixingRatio	XCO2	[]	XCO2(ppmv)	%0f
Data/mixingRatio	CO2Profile	[]*	CO2Profile(ppmv)	

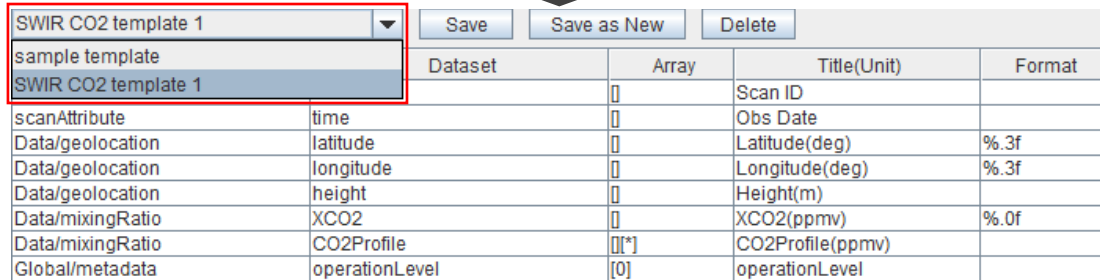
Select “SWIR CO2 template 2” template and click “Delete” button, then “Delete Template” dialog for confirmation pops up.

Delete Template

Are you sure you want to delete this template(SWIR CO2 template 2)?

OK Cancel

Click “OK” button, then “SWIR CO2 template 2” template is deleted
and “SWIR CO2 template 1” template is selected in the pull-down list.



		Save	Save as New	Delete	
		Dataset	Array	Title(Unit)	Format
SWIR CO2 template 1				Scan ID	
sample template					
SWIR CO2 template 1					
scanAttribute	time			Obs Date	
Data/geolocation	latitude			Latitude(deg)	%.3f
Data/geolocation	longitude			Longitude(deg)	%.3f
Data/geolocation	height			Height(m)	
Data/mixingRatio	XCO2			XCO2(ppmv)	%.0f
Data/mixingRatio	CO2Profile		[*]	CO2Profile(ppmv)	
Global/metadata	operationLevel		[0]	operationLevel	

Fig. 6.5.5-1 Save, delete, and select template.

6.5.6 Showing Manual

Click “Help” button at the bottom right of “Edit Template” dialog for showing this manual.

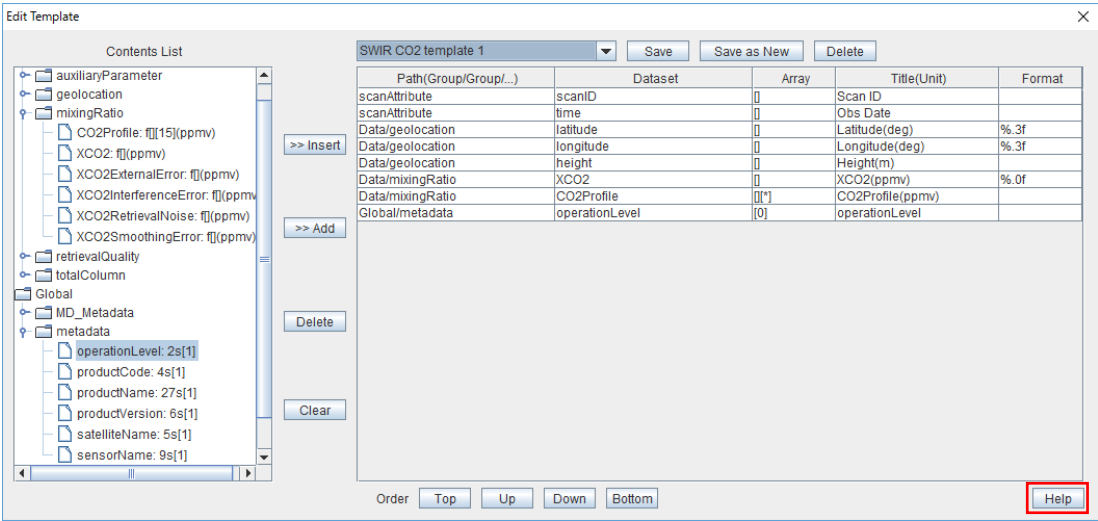


Fig. 6.5.6-1 Show manual.

6.5.7 Terminating Template Customization

Click “X” button at the upper right of “Edit Template” dialog for terminating the template customization.

Selected template name at the termination is set on the main window of FTS Exporter.

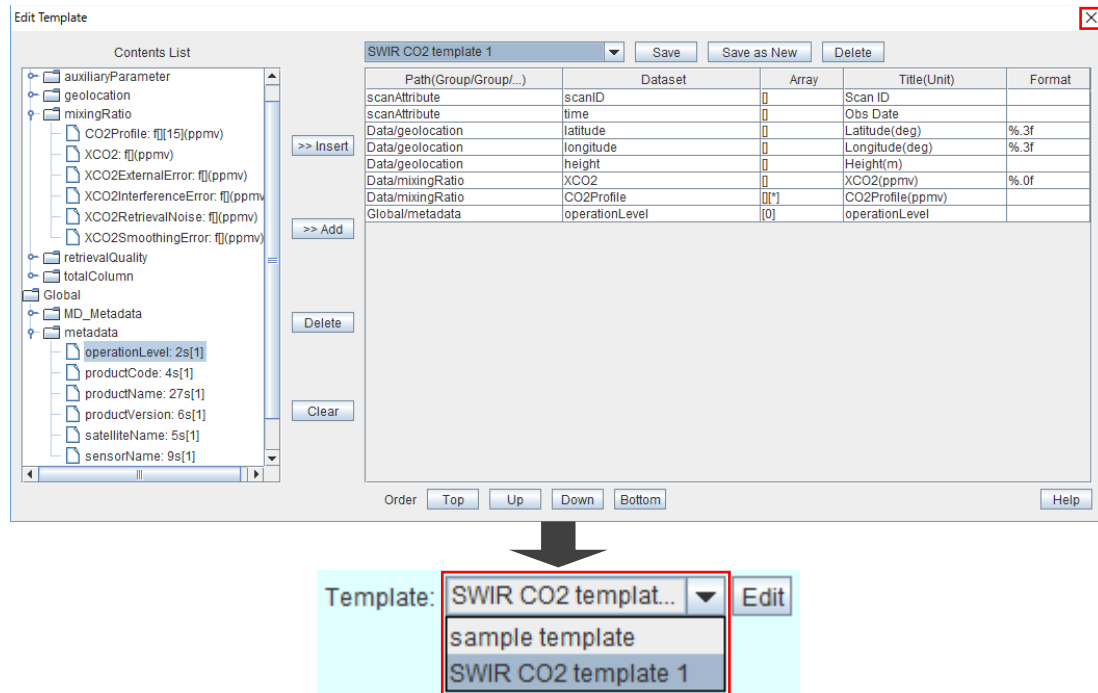


Fig. 6.5.7-1 Terminate template customization.