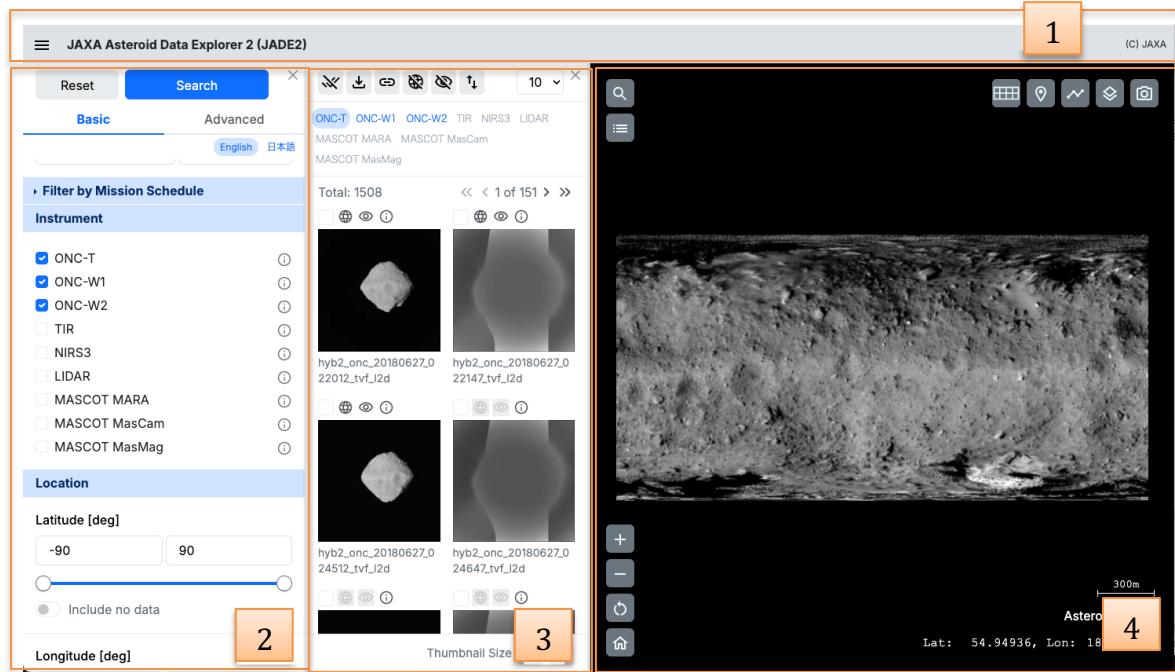


**JADE2 (JAXA Asteroid Data Explorer 2)**

**User Manual**

## 1. Windows of JADE2



### 1. Header

- Term of use of JADE2 and link to Hayabusa2 project and data archive websites are shown from the Menu button (left side of the header).

### 2. Search criteria widow

- Search criteria can be set in this window.

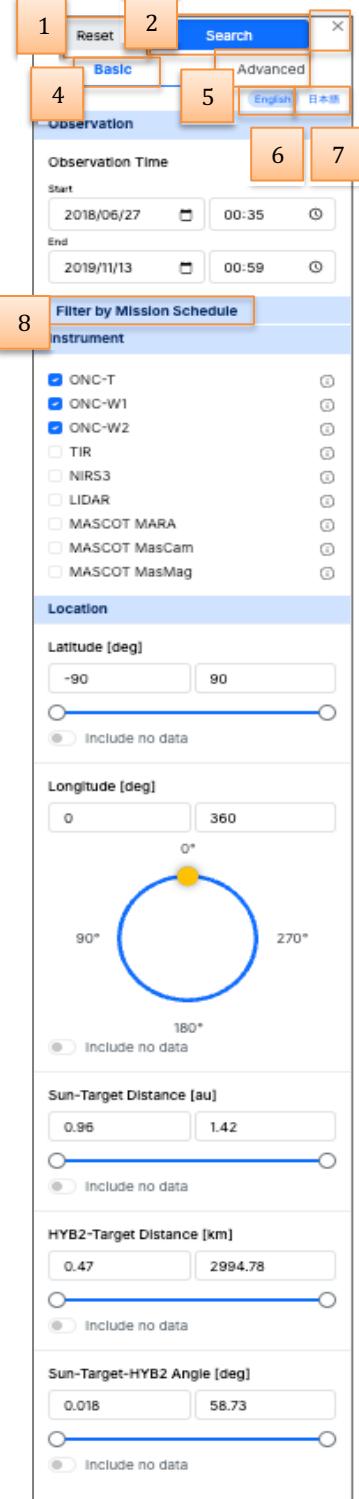
### 3. Search result window

- Found data by input search criteria are shown.

### 4. Basemap window

- Selected data can be displayed on the Ryugu basemap. Data can be also searched from the area of the map using polygons or longitude/latitude.

## 2. About search window



The search window interface includes the following elements:

- 1. Reset**: A button to return to the default setting.
- 2. Search**: A main search button.
- 3. X(Close)**: A button to close the search window.
- 4. Basic**: A tab for basic search criteria.
- 5. Advanced**: A tab for detailed search criteria.
- 6. English**: A button to change the display to English.
- 7. 日本語 (Japanese)**: A button to change the display to Japanese.
- 8. Filter by Mission Schedule**: A button to filter data by mission schedule.

**Instrument** section (under Advanced tab):

- ONC-T, ONC-W1, ONC-W2 (checked)
- TIR, NIRS3, LIDAR (unchecked)
- MASCOT MARA, MASCOT MasCam, MASCOT MasMag (unchecked)

**Location** section (under Advanced tab):

- Latitude [deg]**: Range from -90 to 90. Includes radio buttons for "Include" and "Exclude" data.
- Longitude [deg]**: Range from 0 to 360. Includes radio buttons for "Include" and "Exclude" data. A circular map shows the range from 0° to 360°.
- Sun-Target Distance [au]**: Range from 0.96 to 1.42. Includes radio buttons for "Include" and "Exclude" data.
- HYB2-Target Distance [km]**: Range from 0.47 to 2994.78. Includes radio buttons for "Include" and "Exclude" data.
- Sun-Target-HYB2 Angle [deg]**: Range from 0.018 to 56.73. Includes radio buttons for "Include" and "Exclude" data.

**1. Reset**

- Return to the default setting.

**2. Search**

- Search for data by clicking.

**3. X(Close)**

- Hide the search window.

**4. Basic**

- Search for data by basic criteria.

**5. Advanced**

- Search for data by detailed criteria.

**6. English**

Change the display to English.

**7. 日本語 (Japanese)**

- Change the display to Japanese.

**8. Filter by Mission Schedule**

- Constrain data by mission schedule as follows.

**- Filter by Mission Schedule**

**Mission Phase**: Asteroid Proximity

**Ope. Type**:

- 1: Any
- 2: Any
- 3: Any

## (a) Basic mode

Basic mode searches for data using common criteria through all instruments. To set criteria for each instrument, please use “Advance mode”.

Reset Search

**Basic** Advanced

Observation

Observation Time

Start  End

End

Filter by Mission Schedule

Instrument

ONC-T  
 ONC-W1  
 ONC-W2  
 TIR  
 NIR53  
 LIDAR  
 MASCOT MARA  
 MASCOT MasCam  
 MASCOT MasMag

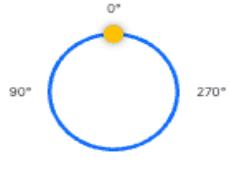
Location

Latitude [deg]

Include no data

Longitude [deg]

Include no data



Include no data

Sun-Target Distance [au]

Include no data

HYB2-Target Distance [km]

Include no data

Sun-Target-HYB2 Angle [deg]

Include no data

Filter by Mission Schedule

Mission Phase

Asteroid Proximity

Ope.Type

1 Any  
2 Any  
3 Any

No	Criteria	Format	Default setting (min/max)
1	Observation Time	Input Date and Time	2014/12/03 00:00   2019/11/19 23:59
2	Mission Phase	Selection	Any Commissioning EDVEGA Earth Swingby Transfer Approach Asteroid Proximity Return
3	Ope. Type1	Selection	Operation list based on the selected Mission Phase Example : Rovers
4	Ope. Type2	Selection	Operation list based on the selected Ope. Type 1 Example : MASCOT (>51m)
5	Ope. Type3	Selection	Operation list based on the selected Ope. Type 2 Example : Descent
6	Latitude	Slide	-90.00   90.00
7	Longitude	Circular slide	0.00   360.00
8	Instrument	Selection (multiple selection)	ONC-W1 ONC-W2 ONC-T TIR NIR53 LIDAR MASCOT MARA MASCOT MASCam MASCOT MasMag
9	Sun-Target Distance [au]	Slide	0.96   1.42
10	HYB2-Target Distance [km]	Slide	0.47   2994.78
11	Sun-Target-HYB2 Angle [deg]	Slide	0.018   58.73

Product level searched in the basic mode is as follows. To search for different product levels, please use “Advanced mode”.

Instrument	Default product level for “Basic mode”
ONC-T	L2d: data_iof
ONC-W1	L2d: data_iof
ONC-W2	L2d: data_iof
TIR	L2: Calibrated Brightness Temperature
NIRS3	L2C: data_calibrated
LIDAR	L2: data_derived
MASCOT MARA	L2B: data_calibrated
MASCOT Mas Cam	Data_calibrated
MASCOT MasMag	Data_sci_calibrated

## (b) About Advanced mode

Advanced mode can search for data using detailed criteria of each instrument. Contrast to “Basic mode”, criteria can be set for each instrument.

Reset
Search

Basic
Advanced

**Search Filter for each Instrument**

- ONC-T
- ONC-W1
- ONC-W2
- TIR
- NIR3
- LIDAR
- MASCOT MARA
- MASCOT MasCam
- MASCOT MasMag

ONC-T

Observation Time

Start: 2018/06/27 00:35

End: 2019/11/13 00:59

Mission Phase

Asteroid Proximity

Ope.Type

1: Any

2: Any

3: Any

Sun-Target Distance [au]

0.96 1.42

Include no data

HYB2-Target Distance [km]

0.47 2994.78

Include no data

Sun-Target-HYB2 Angle [deg]

0.018 58.73

Include no data

Product Level

L2d: data\_l2f

Camera Band

Resolution [m/pixel]

Latitude [deg]

-90 90

Include no data

Longitude [deg]

0 360

0°

90°

180°

270°

Include no data

Phase Angle [deg]

Slant Distance [m]

Compression

Stray Light Flag for ONC-T

Binning Pixel Size

Region-of-Interest Cutout

Number of Subimages

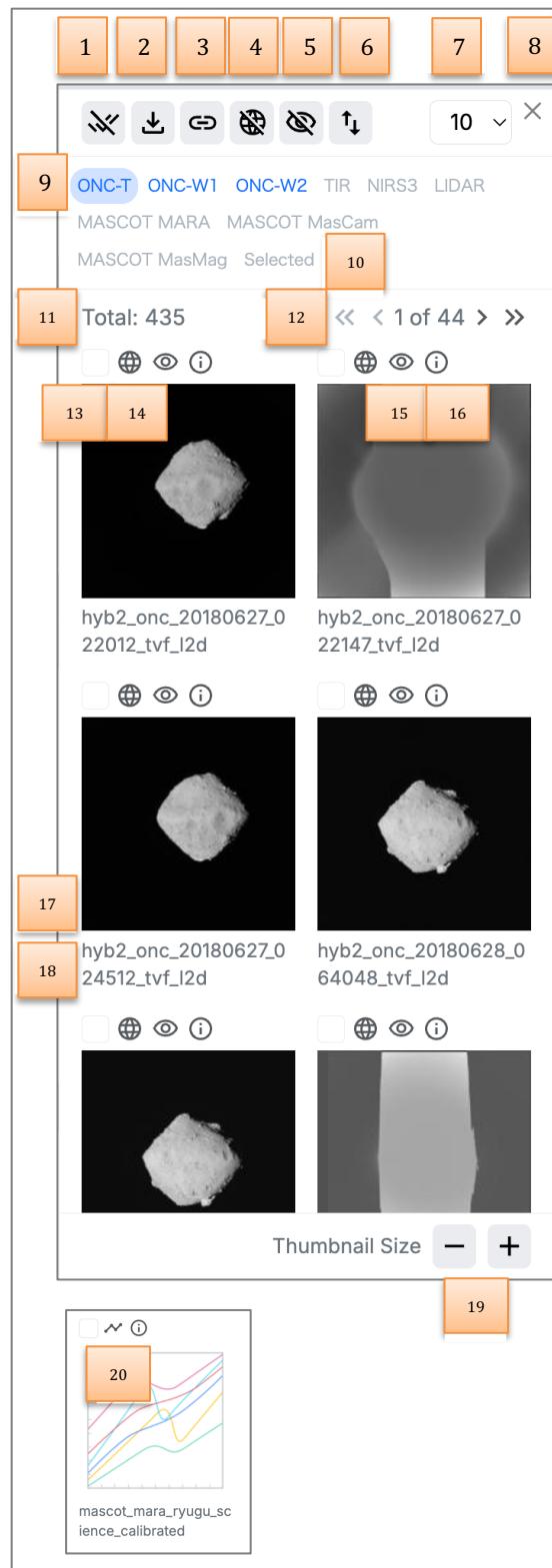
Select instruments to be searched for data.

Select criteria for data search.

Criteria can be canceled by removing  .

Criteria are shown by clicking the arrow.

### 3. Search result window

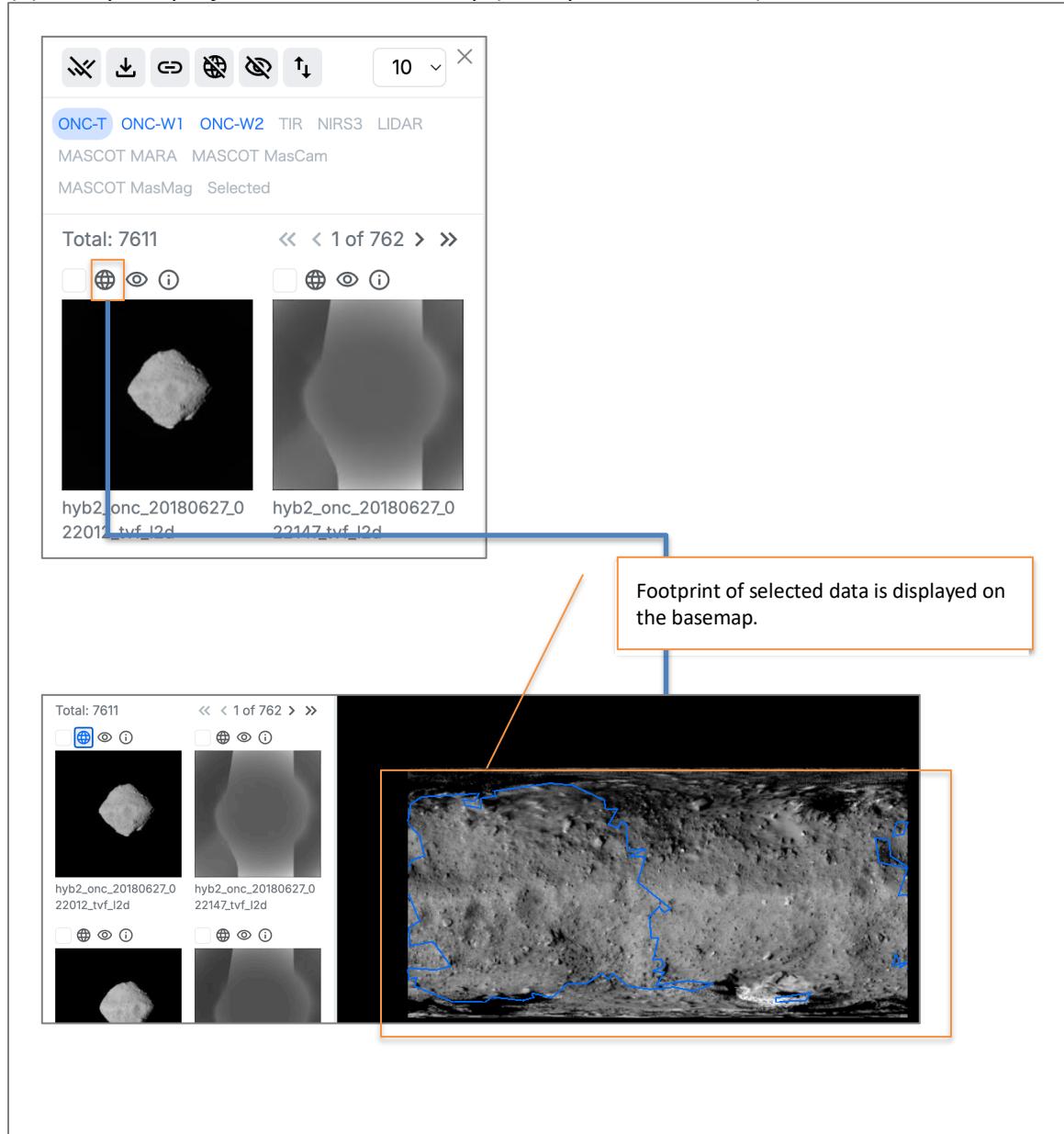


The screenshot shows a search result window with the following components:

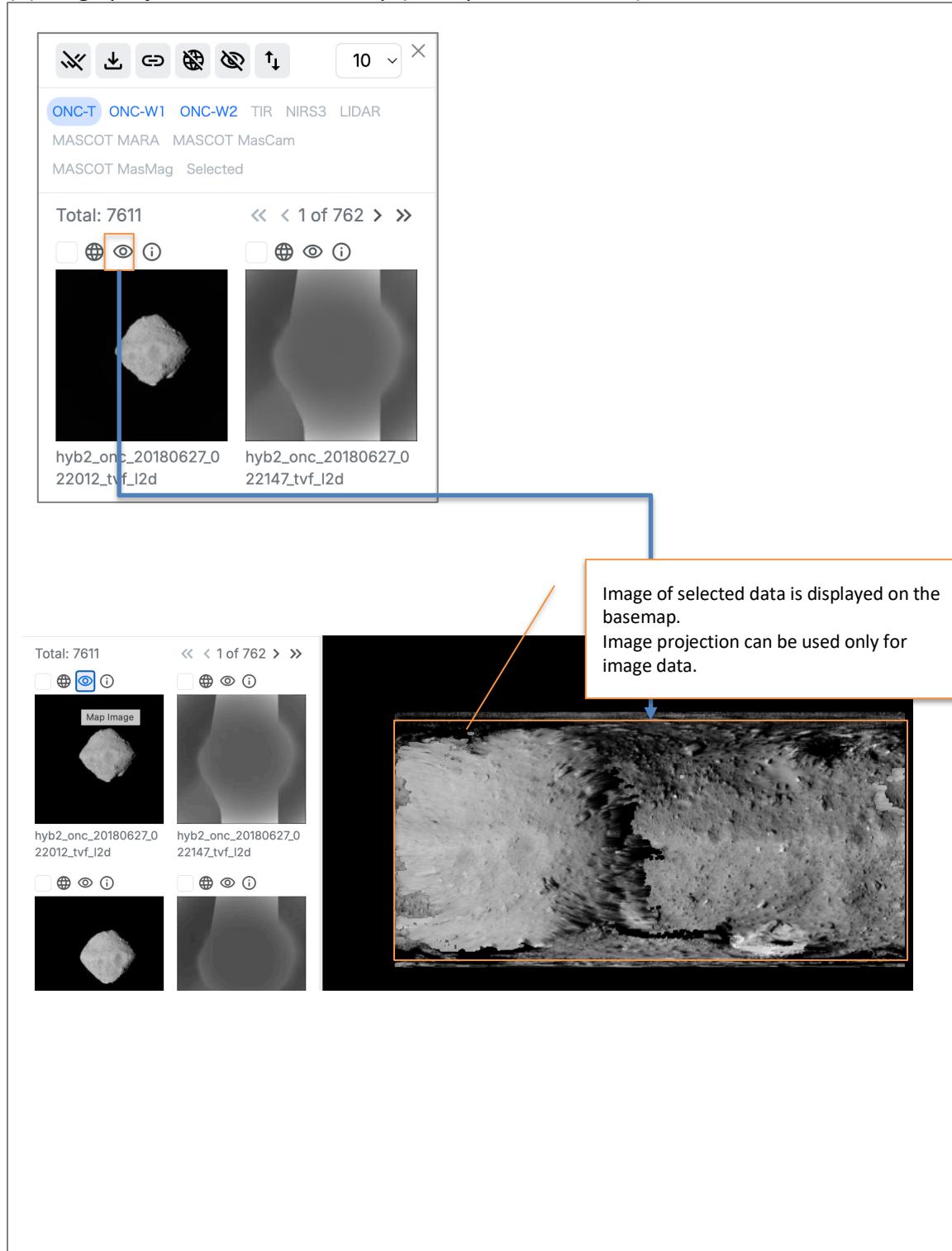
- Top Bar:** Numbered 1-8. Contains icons for search, download, link, and zoom, followed by a page number (10) and a close button.
- Instrument Tabs:** ONC-T (selected), ONC-W1, ONC-W2, TIR, NIRS3, LIDAR, MASCOT MARA, MASCOT MasCam, MASCOT MasMag.
- Search Summary:** Total: 435, Selected: 10, Page: 1 of 44.
- Thumbnail Grid:** A 4x5 grid of thumbnails. The first four rows have 5 thumbnails each, and the last row has 4 thumbnails. Each thumbnail has a number (13-17, 18, 19, 20) and a set of three icons (globe, eye, info).
- Thumbnail Size:** A slider with a minus sign and a plus sign.
- Legend:** A box with a legend entry for 'mascot\_mara\_ryugu\_science\_calibrated'.

1. Clear selected
  - Clear all checks of selected data.
2. Download
  - Download checked data.
3. Get permanent link
  - Generate URL link to reproduce current search results.
4. Clear footprint
  - Clear all footprints drawn on the basemap.
5. Clear all projected images
  - Clear all images projected on the basemap.
6. Change result order
  - Change order of search results.
7. Change number of displays
  - Change the number of displays of search results.
8. Close
  - Close the window of search result.
9. Instrument tubs
  - Shows search results of selected instrument.
  - Not selected for not-used instrument in data search.
10. Selected tub
  - Show all selected data by "check box" (button 13).
11. Total number
  - The number of searched data.
12. Page number
  - Current page of search result.
13. Check box
  - When checked, each data can be downloaded.
  - When checked, the data is shown in "selected tub".
14. Show footprint
  - Show footprint on the basemap.
  - If there is no data to represent position, this button cannot be checked.
15. Show image
  - When checked, the image is projected on the basemap (ONC, TIR).
  - For non-image data, this button cannot be checked.
  - If there is no data to represent position, this button cannot be checked.
16. Information
  - Show information.
17. Thumbnail
  - Show thumbnail.
18. File name
  - File name of data at database.
19. Thumbnail size
  - Change the size of each thumbnail.
20. Show graph
  - Show plot of the searched data (for non-image data).
  - For non-signal data, this button cannot be checked.

(a) Footprint projection of the basemap (Example of ONC data)

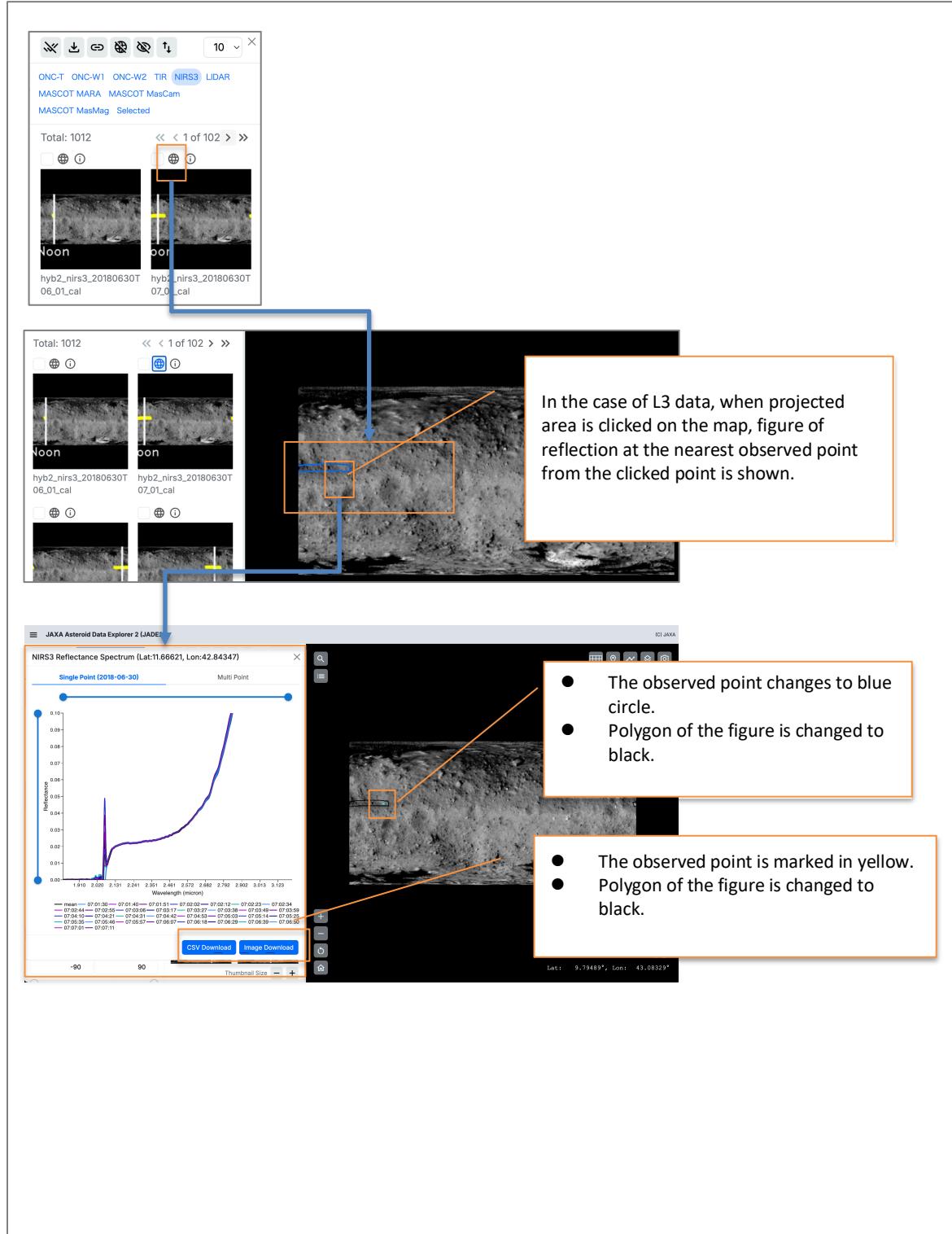


**(b) Image projection of the basemap (Example of ONC data)**

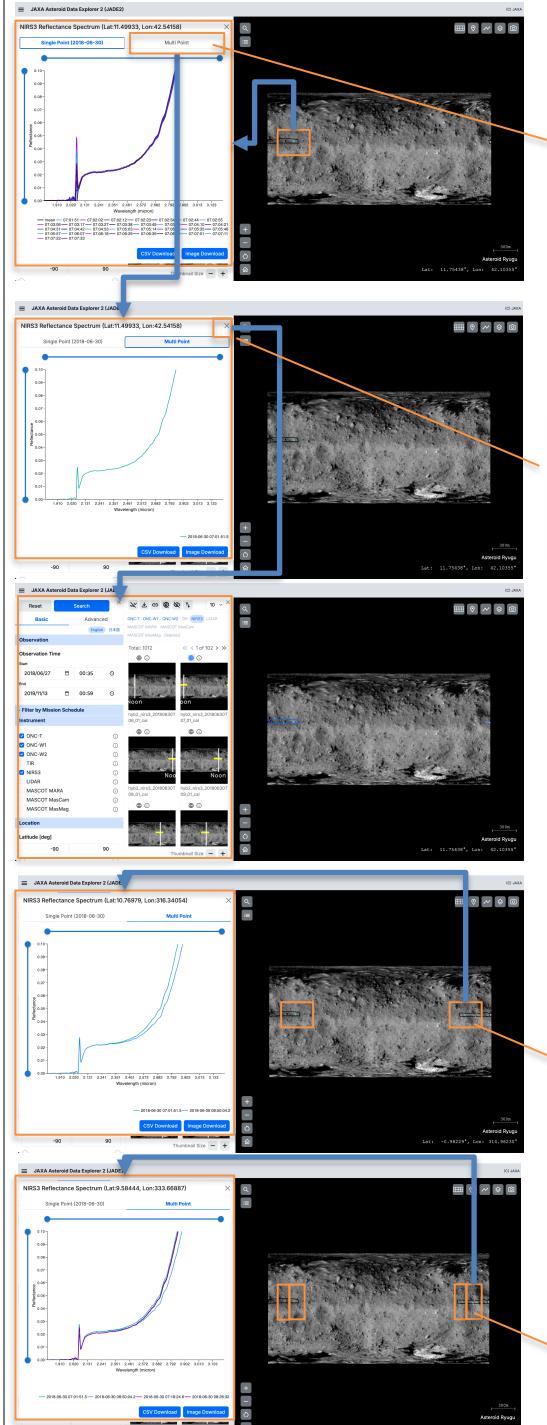


(c) Graph plot (Example of NIR3 data)

(i) Single point mode



## (ii) Multi point mode



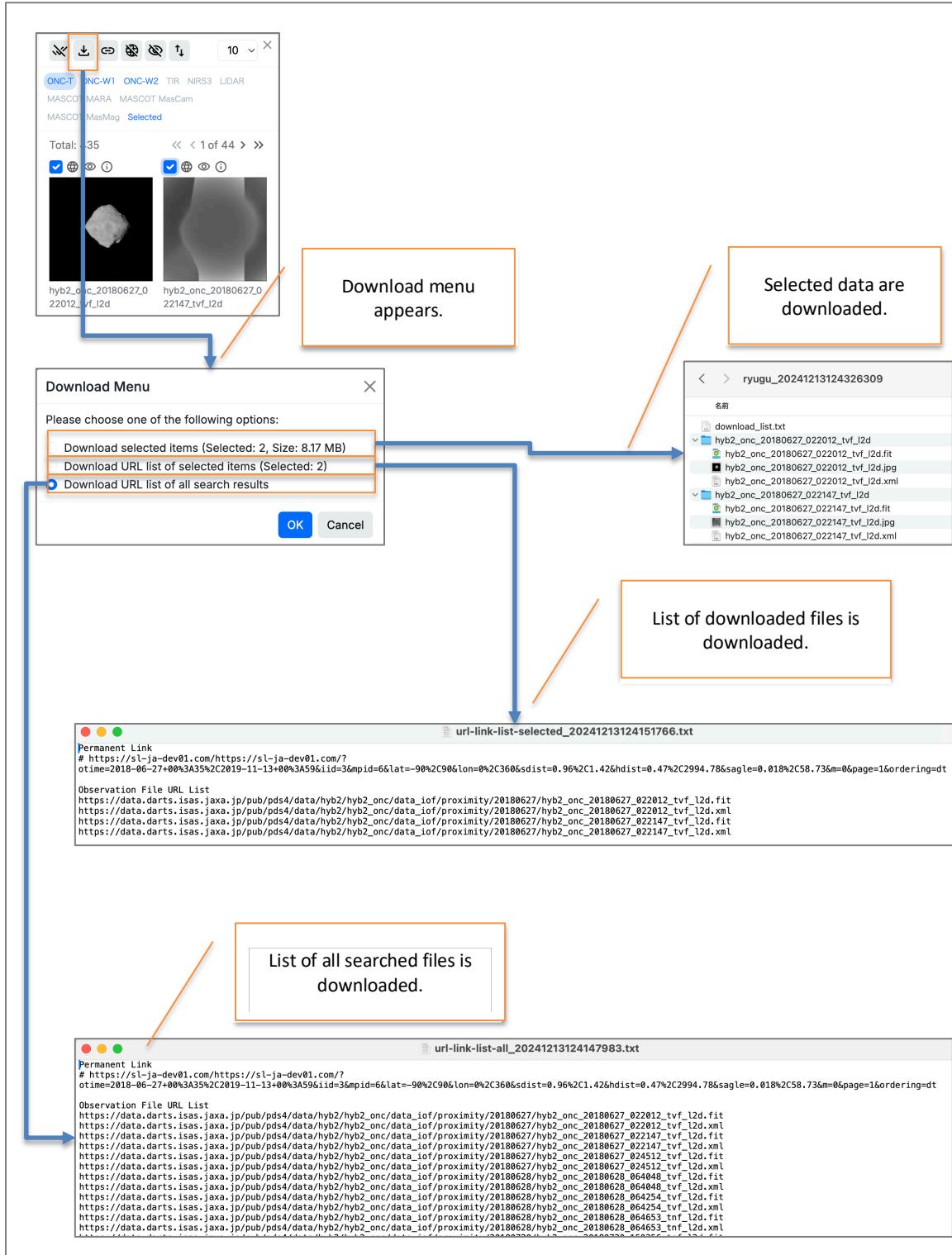
At “Multi point” mode, figure of mean reflections at each position is shown. Mean reflection is the averaged reflection of overlapped observation data.

To plot data of multiple points, please close the figure once.

Then, click another point on the map.

In “Multi Point” mode, multiple plots from the same observation data are also possible.

(d) Download of data



## (e) Permanent link function

URL link of search result using the current criteria is generated.

Permanent Link

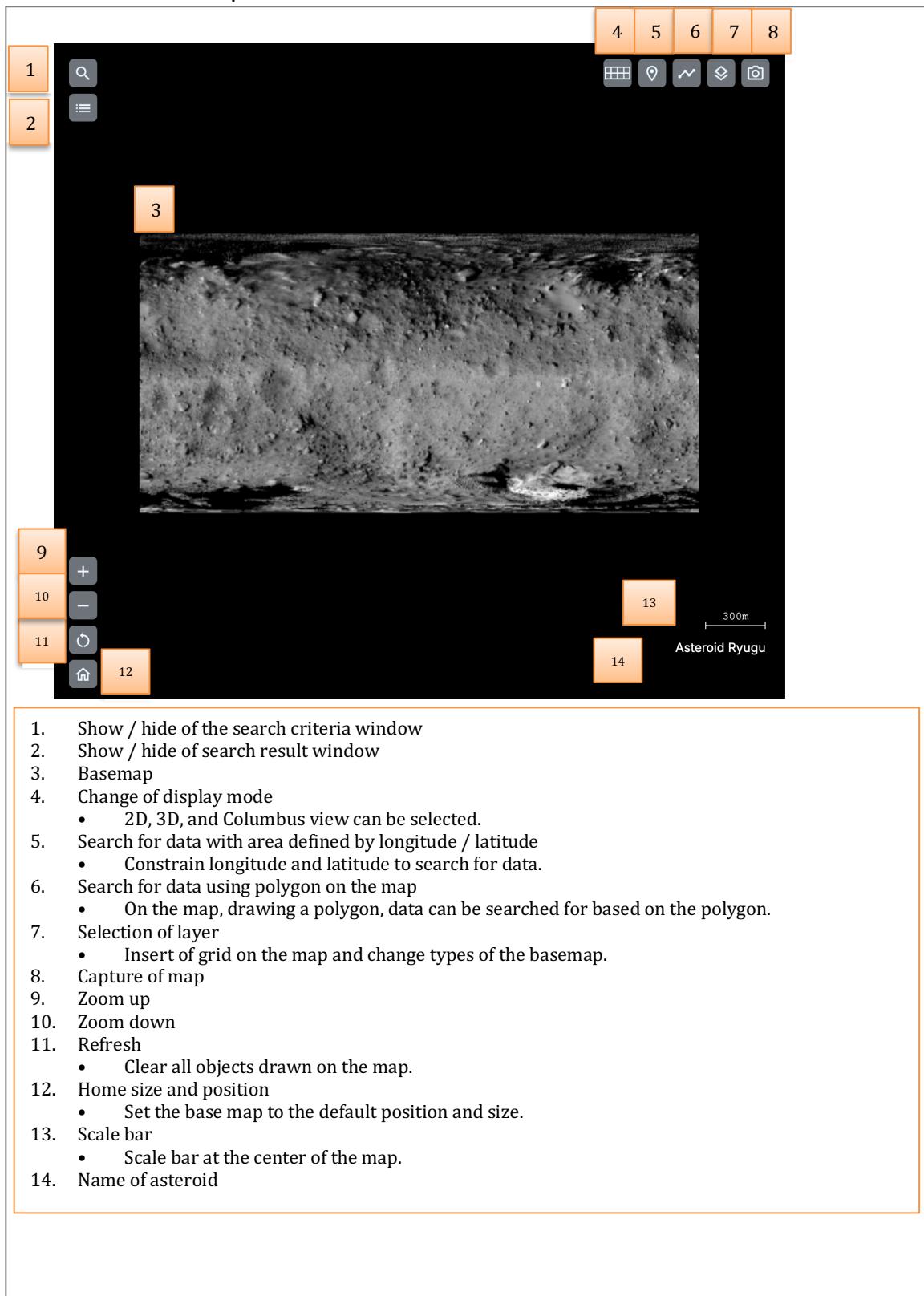
https://sl-ja-dev01.com/?search\_key=d15831865d221a2ade0a8964aa7145215bde463e85f0f865b3d61c334a7b62b1

Copy

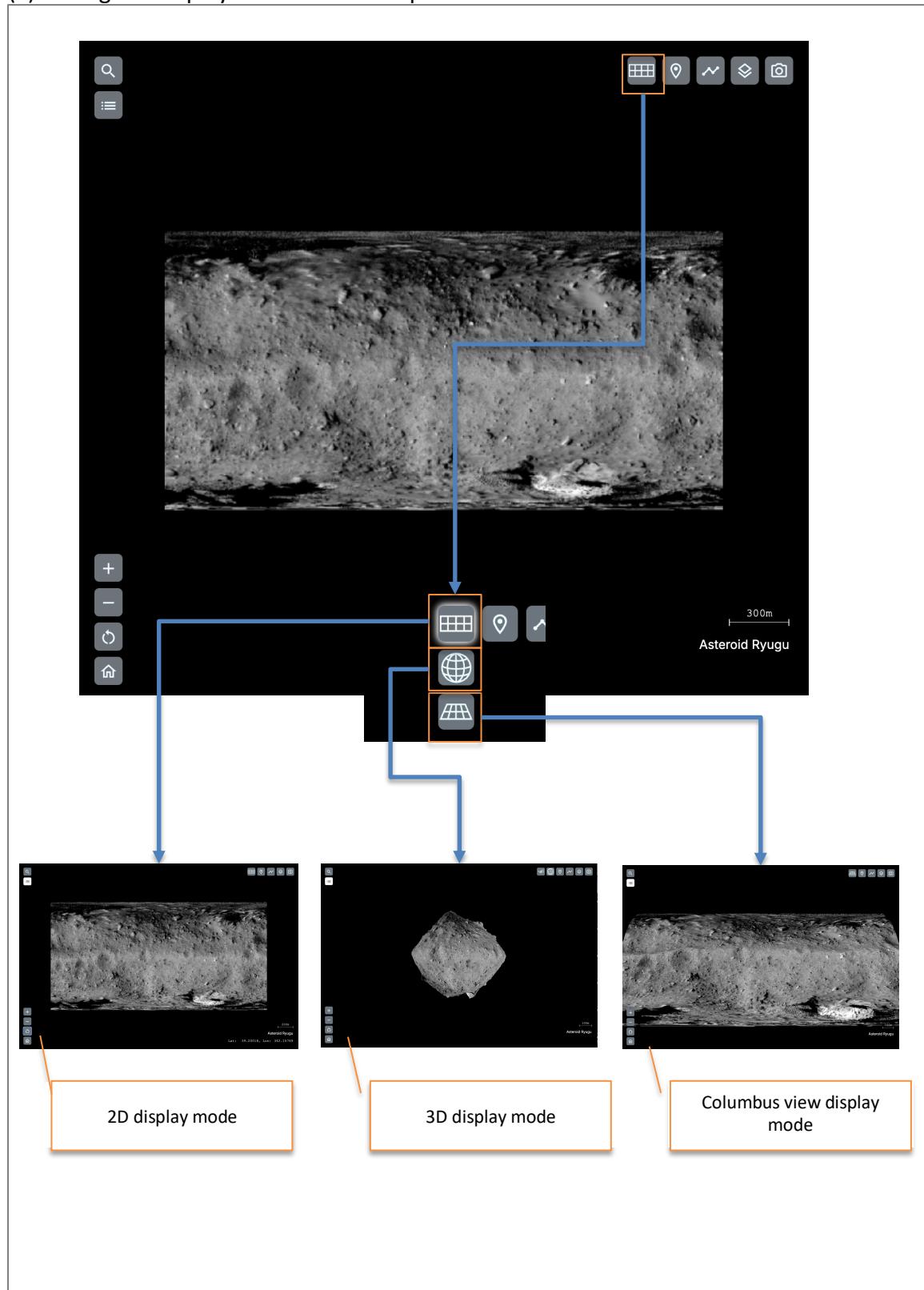
https://sl-ja-dev01.com/?search\_key=d15831865d221a2ade0a8964aa7145215bde463e85f0f865b3d61c334a7b62b1

We can reproduce current search condition using the generated URL link.

#### 4. About base map window



(a) Change of display mode of basemap



(b) Searching with a polygon on the basemap

The figure consists of three vertically stacked screenshots of the JAXA Asteroid Data Explorer 2 (JADE2) software interface, showing the search process for data on the asteroid Ryugu.

**Top Screenshot:** Shows the initial state where a polygon is drawn on the basemap. A blue arrow points from the search bar at the top to the basemap, indicating the search operation.

**Middle Screenshot:** Shows the results of the search. A yellow box highlights a polygon drawn on the basemap, and a text box states: "When data are already searched, this polygon can constrain area of the searched data."

**Bottom Screenshot:** Shows the results of the search with a yellow box highlighting the polygon on the basemap. A text box states: "When we draw a polygon, edge is added by clicking the base map. Then, by double clicking, the polygon is enclosed. After that data is searched for."

**Common Interface Elements:**

- Search Bar:** Located at the top of each screenshot.
- Instrument Selection:** Under "Instrument", checkboxes are selected for ONC-T, ONC-W1, ONC-W2, TIR, NIRS3, LIDAR, MASCOT MARA, MASCOT MasCam, and MASCOT MasMag.
- Location:** Under "Location", the latitude is set to -90 to 90 degrees.
- Basemap:** Shows the surface of asteroid Ryugu with a scale bar of 300m and coordinates (Lat: 88.74724, Lon: 97.15231).
- Thumbnail View:** On the left, a grid of thumbnail images representing different observation data.

(c) Constraint of area by bounding box

The figure illustrates the process of constraining search results using a bounding box on the JAXA Asteroid Data Explorer 2 (JADE2) interface. The interface is divided into three main sections: a search panel on the left, a map view in the center, and a detailed view on the right.

**Search Panel (Left):**

- Observation:** Set to "Basic" mode. Observation Time: Start 2018/06/27 00:35, End 2019/11/13 00:59. Total: 7611 images.
- Instrument:** ONC-T, ONC-W1, ONC-W2, TIR, NIR3, LIDAR, MASCOT MARA, MASCOT MacCam, MASCOT MasMag. ONC-T is selected.
- Location:** Latitude [deg] from -90 to 90. Set to 90.

**Map View (Center):**

The map shows the surface of Asteroid Ryugu. A blue polygon is drawn on the map, representing the search area. The map includes a scale bar (300m) and coordinates (Lat: 88.74724, Lon: 97.15231).

**Area Select Dialogs (Bottom):**

The "Area Select" dialog is used to define the bounding box coordinates:

- First Dialog:** Shows "BoundingBox" tab with input fields for Min Latitude (50), Max Latitude (310), Min Longitude (50), and Max Longitude (-50). Buttons: Save, Clear.
- Second Dialog:** Shows the same input fields with values 50, 310, 50, and -50. Buttons: Save, Clear.

**Result View (Bottom):**

The search results are updated to show only the images within the specified bounding box. The total count is now 7412. The map view shows the yellow bounding box on the asteroid's surface.

**Text Callout:**

By setting latitude and longitude, a polygon is shown on the basemap. When data are already searched for, further constraint of the searched data is possible using the input latitude and longitude.

(d) Searching from feature collection

Polygons of features such as crater can be represented on the basemap. When data are already searched for, further constraint of the searched data is possible using the input feature.

(e) Display of additional layers

The figure consists of three vertically stacked screenshots of the JAXA Asteroid Data Explorer 2 (JADE2) software interface. Each screenshot shows a grayscale image of the asteroid Ryugu on the right, with a navigation bar at the top and a search/filter panel on the left.

**Top Screenshot:** The image shows a blue rectangular box highlighting a specific area on the asteroid's surface. The navigation bar at the top right includes icons for calendar, location, and camera.

**Middle Screenshot:** The image shows a grid overlay on the asteroid's surface. The navigation bar at the top right includes icons for calendar, location, and camera. A callout box on the right side of the interface states: "Grid and points of interest (POI) can be added on the basemap."

**Bottom Screenshot:** The image shows various green circles and yellow lines overlaid on the asteroid's surface, representing specific points of interest (POI) and a trajectory or path. The navigation bar at the top right includes icons for calendar, location, and camera.

The figure displays four screenshots of the JAXA Asteroid Data Explorer 2 (JADE2) software interface, showing the process of adding maps to a basemap of the asteroid Ryugu. The screenshots are arranged in a 2x2 grid.

**Screenshot 1 (Top Left):** Shows the basic search interface with the 'Basic' tab selected. The search bar contains 'ONC1 ONC-W1 ONC-W2 TIR NIR3 LIDAR MASCOT MARA MASCOT MacCam MASCOT MassMag'. The 'Layer' dropdown is set to 'Base map'. The main view shows a grayscale image of the asteroid surface with a small orange box highlighting the top right corner.

**Screenshot 2 (Top Right):** Shows the same interface as Screenshot 1, but with a different map layer selected. The 'Layer' dropdown is now set to 'High resolution map'. The main view shows a more detailed grayscale map of the asteroid's surface.

**Screenshot 3 (Bottom Left):** Shows the interface with the 'Advanced' tab selected. The 'Layer' dropdown is set to 'Normal albedo RGB map'. The main view shows a color map of the asteroid's surface.

**Screenshot 4 (Bottom Right):** Shows the interface with the 'Advanced' tab selected. The 'Layer' dropdown is set to 'Base Map b-x slope red-blue'. The main view shows a map with red and blue color coding representing surface slope.

**Callout Box:** An orange callout box points from the text below to the 'Advanced' tab in the top-right screenshot.

**Text:** On the basemap, the additional maps shown below can be added.

- High resolution map
- Normal albedo RGB map
- Base Map b-x slope red-blue
- Base map (Default)

(f) Display of Hayabusa2 orbit

