T13 15:10~16:40 (90')
Training lecture from JMA

- We will use the following data in this lecture. Are they available on your PC? If not, please let us know!

1. GMSLPD
2. T2302_MAWAR_20230525_26
3. sheveluch
4. QuickGuide_to_SATAID.pdf

Practical Training on the Utilization of Himawari-9 Imagery Using SATAID

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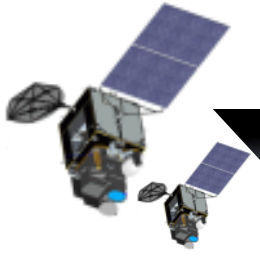
Meteorological Satellite Center / Japan Meteorological Agency

04 November 2023



2014 Himawari-8
2016 Himawari-9

Contents

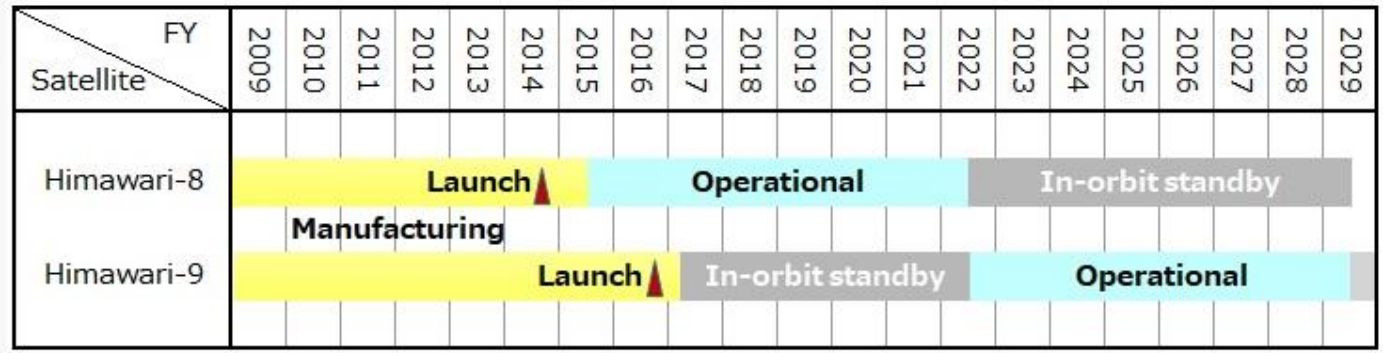
- **Overview of Himawari-9 and introduction to SATAID and RGB image**
- **Hands-on training on basic SATAID functions and displaying RGBs**
  - Introduction of basic operations of SATAID

➢ Break (10minutes)

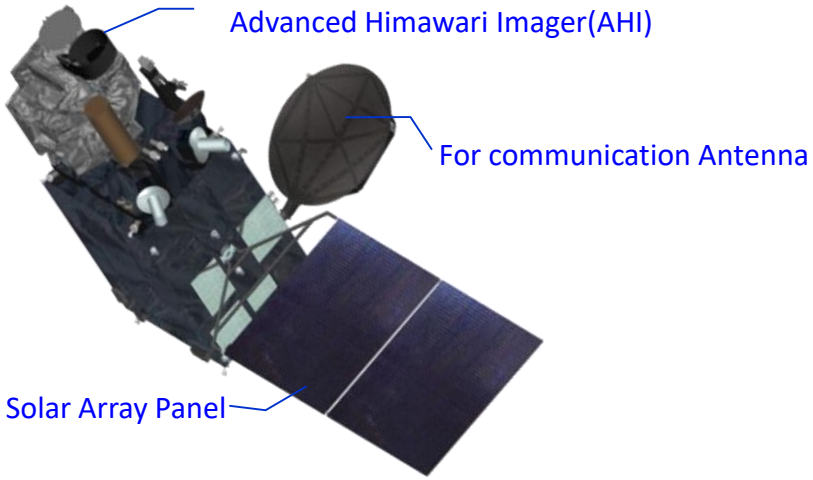
  - Case1 : Typhoon MAWAR (T2302) approaching Pacific Islands
  - Case2 : Volcanic eruption of Sheveluch, Russia

Overview of Himawari-8, 9

★Himawari-8, 9 Operation Plan



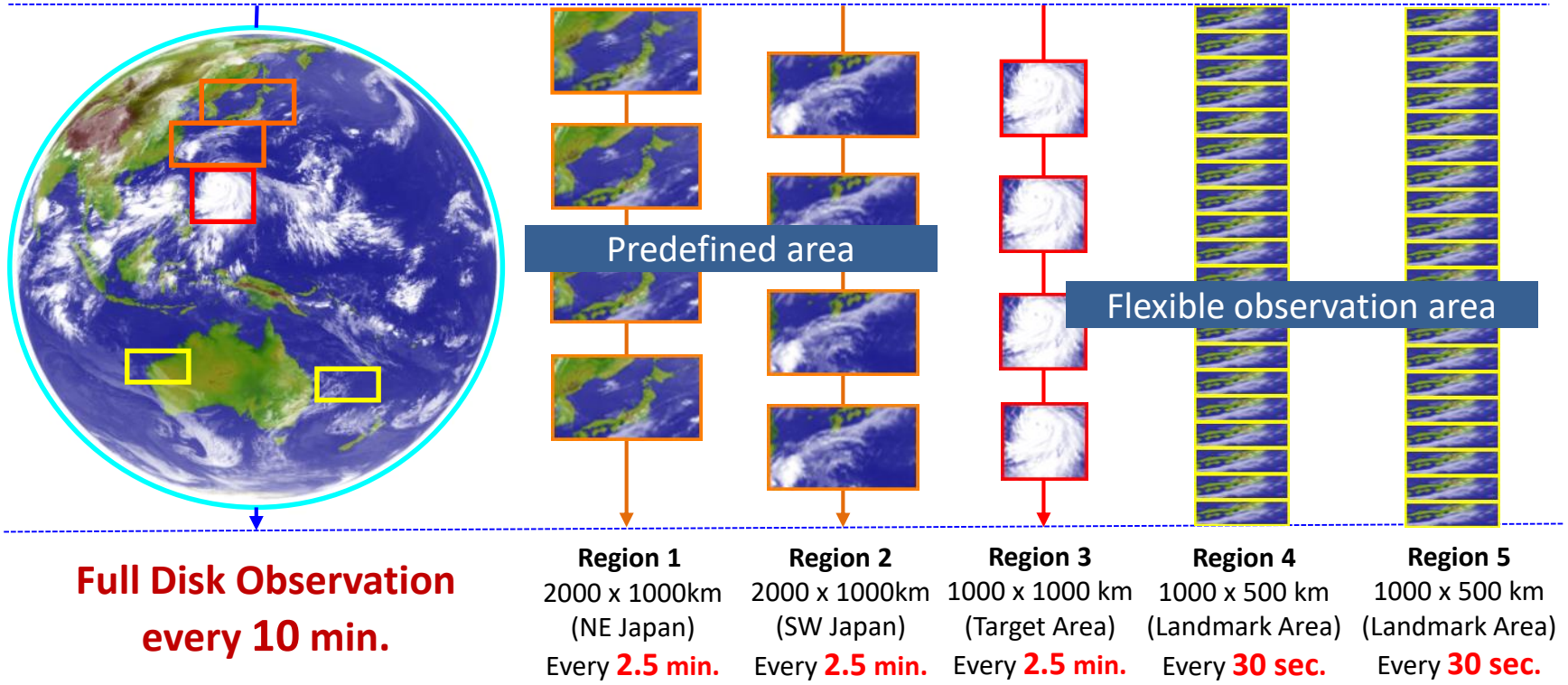
★Satellite conceptual diagram



★Satellite spec

Total length	Approx. 8m
Weight	Approx. 3,500kg (including fuel) Approx. 1,300kg (only main unit)
Initial generated power	Approx. 2.6kW
Design lifetime	Over 15 years (main unit) Over 8 years (observation functions)

Overview of the Himawari-9 observation (10 minutes Repeat Cycle)



- AHI (Advanced Himawari Imager) on Himawari-9 has the ability of various scans during 10 minutes Full Disk observation.
- AHI can flexibly change the scan area of "Target Area" for observation of phenomena such as **typhoons** and active volcanoes.

AHI Spectral Bands

Himawari-8/9 Imager (AHI; Advanced Himawari Imager)

cf. MTSAT-2 Bands

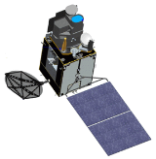
VIS 0.68 μm

IR4 3.7 μm

IR3 6.8 μm

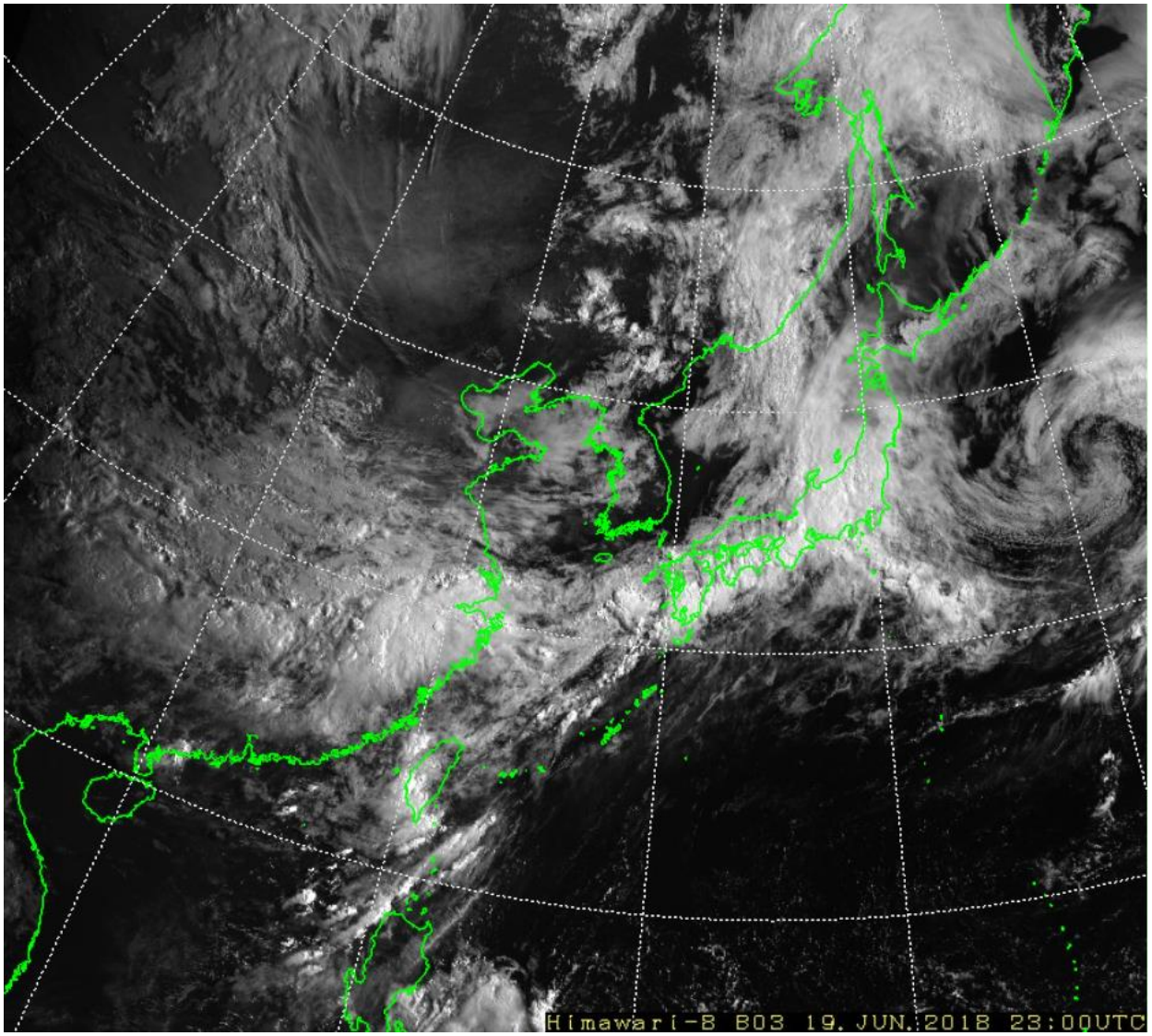
IR1 10.8 μm

IR2 12.0 μm



Band		Spatial Resolution	Central Wavelength	Physical Properties	
1	Visible (VIS)	1 km	0.47 μm	vegetation, aerosol	3 Visible Bands
2			0.51 μm	vegetation, aerosol	
3		0.5 km	0.64 μm	Vegetation, low cloud, fog	
4	Near Infrared (NIR)	1 km	0.86 μm	vegetation, aerosol	NIR Bands
5		2 km	1.6 μm	cloud phase/particle size	
6			2.3 μm	cloud particle size	
7	Infrared (IR)	2 km	3.9 μm	low cloud, fog, forest fire	
8			6.2 μm	upper-level moisture	WV Bands
9			6.9 μm	mid- and upper-level moisture	
10			7.3 μm	mid-level moisture	
11			8.6 μm	cloud phase, SO_2	TIR Bands
12			9.6 μm	Ozone content	
13			10.4 μm	cloud imagery, information of cloud top	
14			11.2 μm	cloud imagery, sea surface temperature	
15			12.4 μm	cloud imagery, sea surface temperature	
16			13.3 μm	cloud top height	

Visible band (B03, 0.64 μm)



Reflection Strong

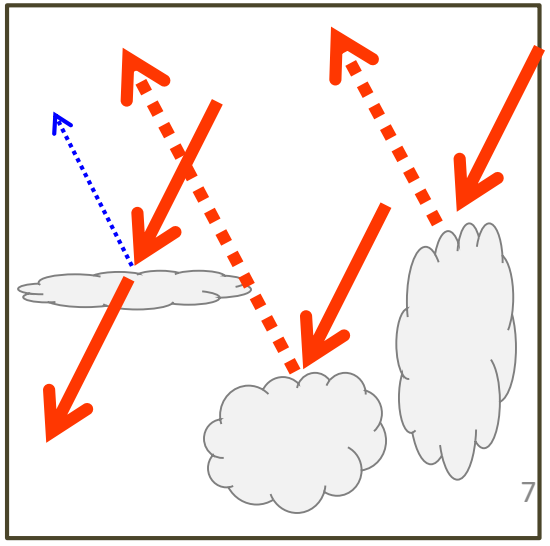
Thick cloud

Thin cloud

Sea surface

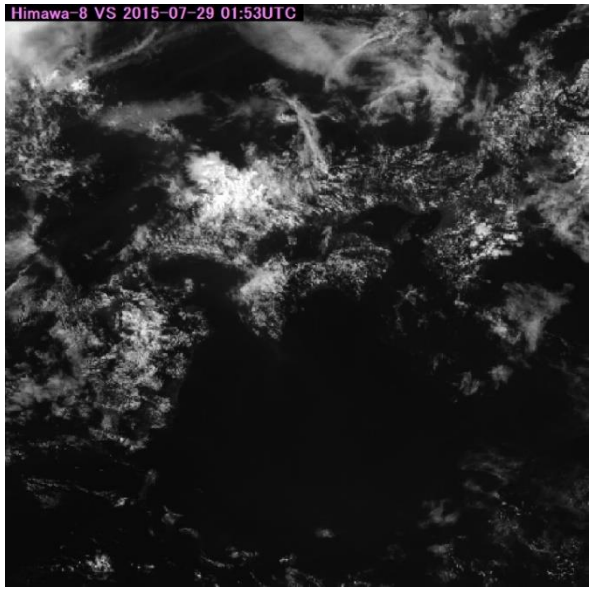
Weak

sunlight

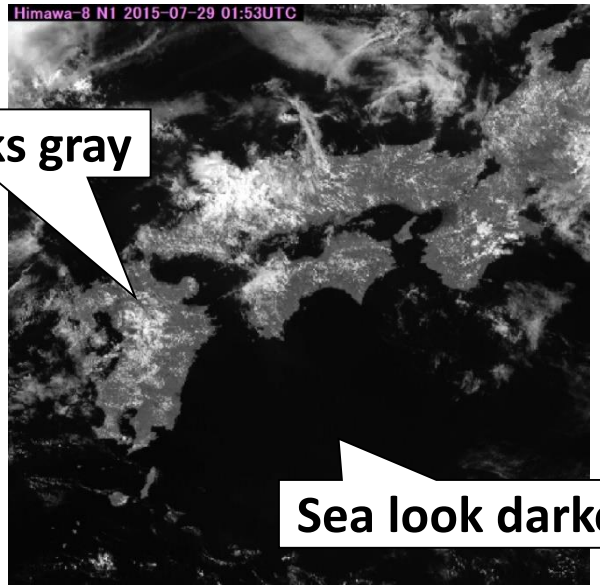


Near-Infrared band (B04, 0.86 μm)

Visible band（B03, 0.64 μm）



Near-Infrared band (B04, 0.86 μm)

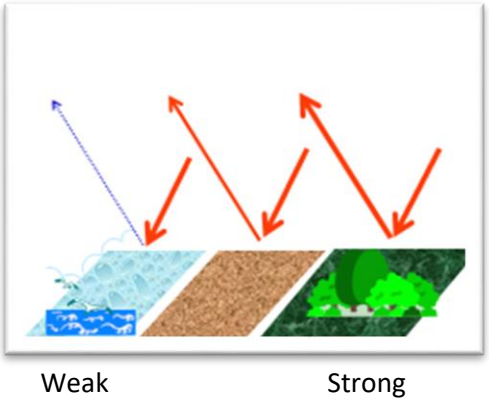


B03

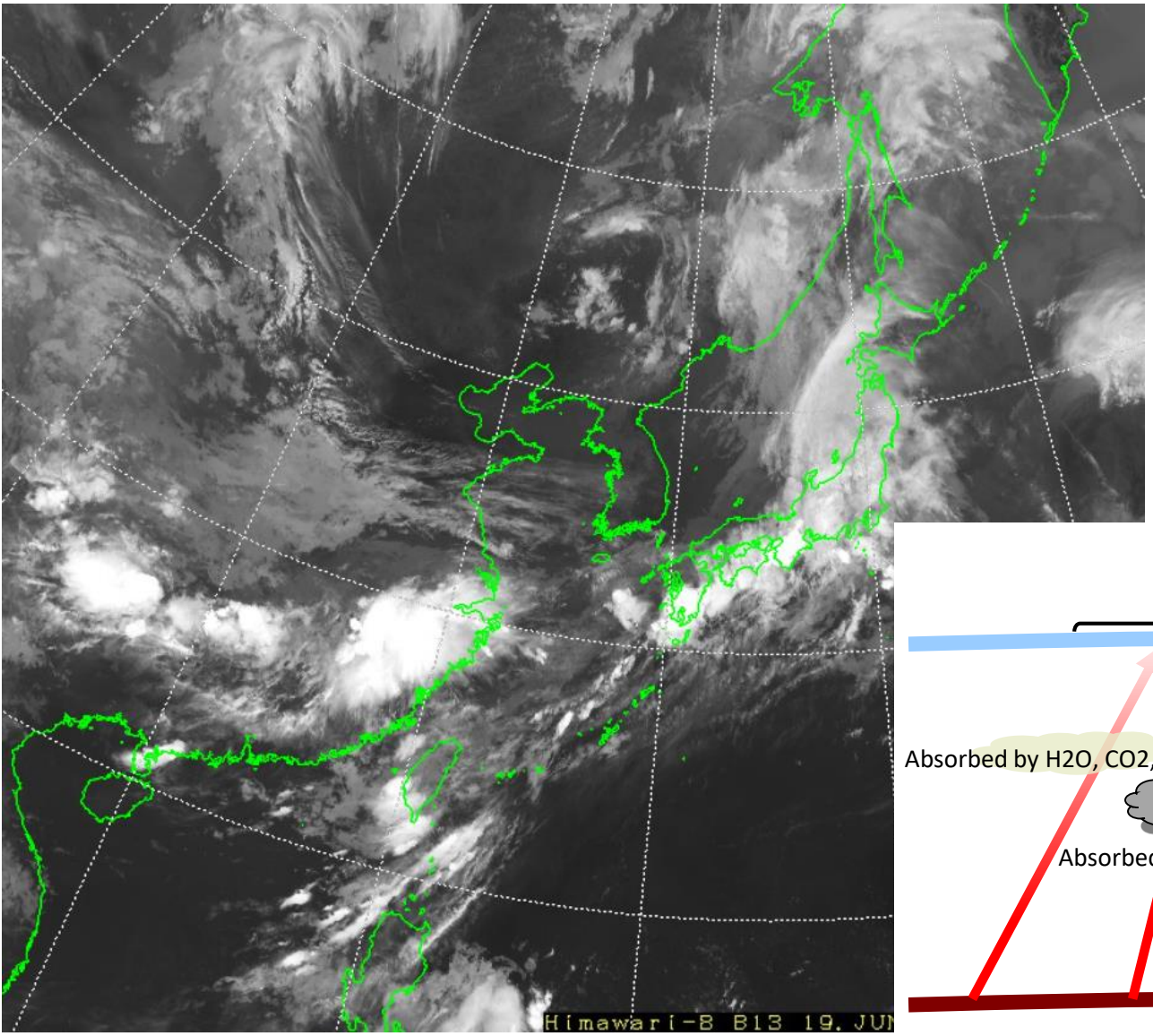
There is no significant difference in reflectance among vegetation, soil, and water surface.

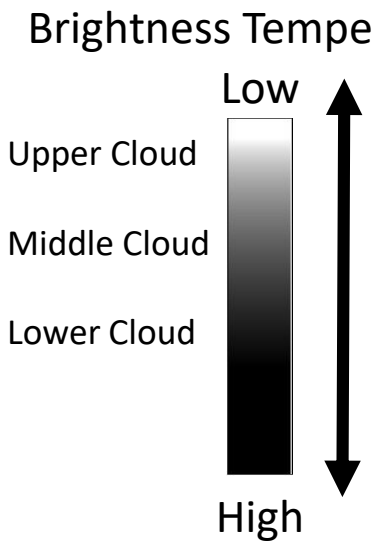
B04

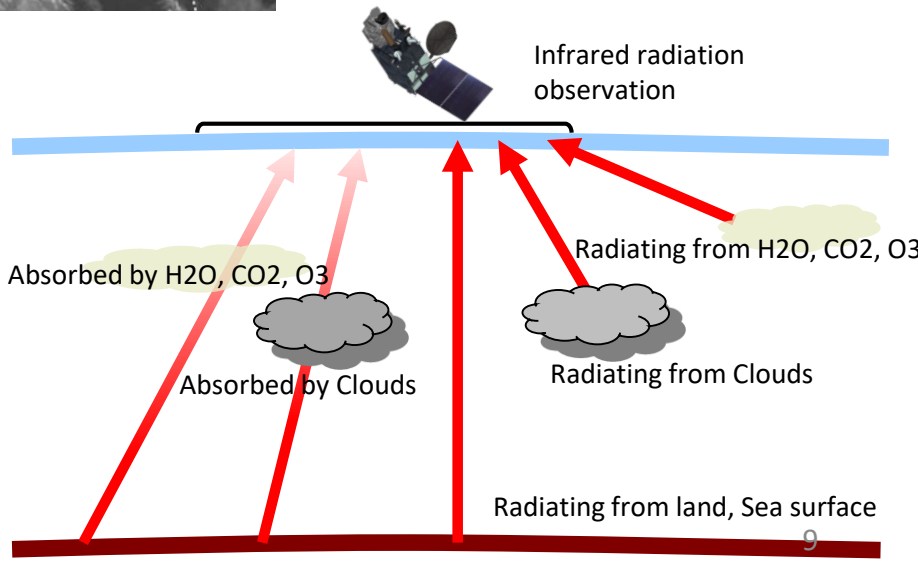
Reflectance of soil and vegetation is larger than that of water surface.



Infrared band (B13, 10.4 μm)

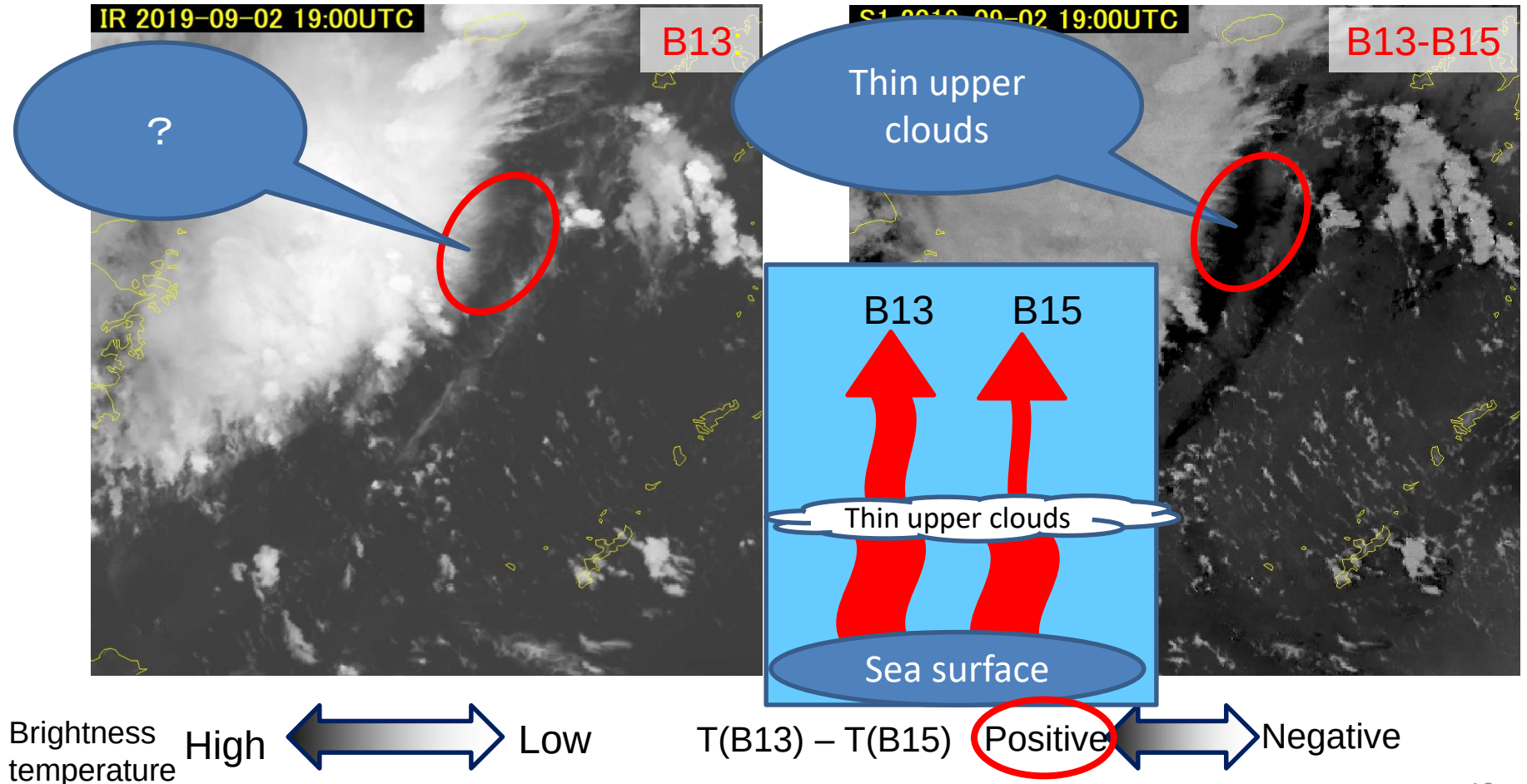






Differential imagery of B13 – B15

- Subtract the brightness temperatures of B15 from B13.

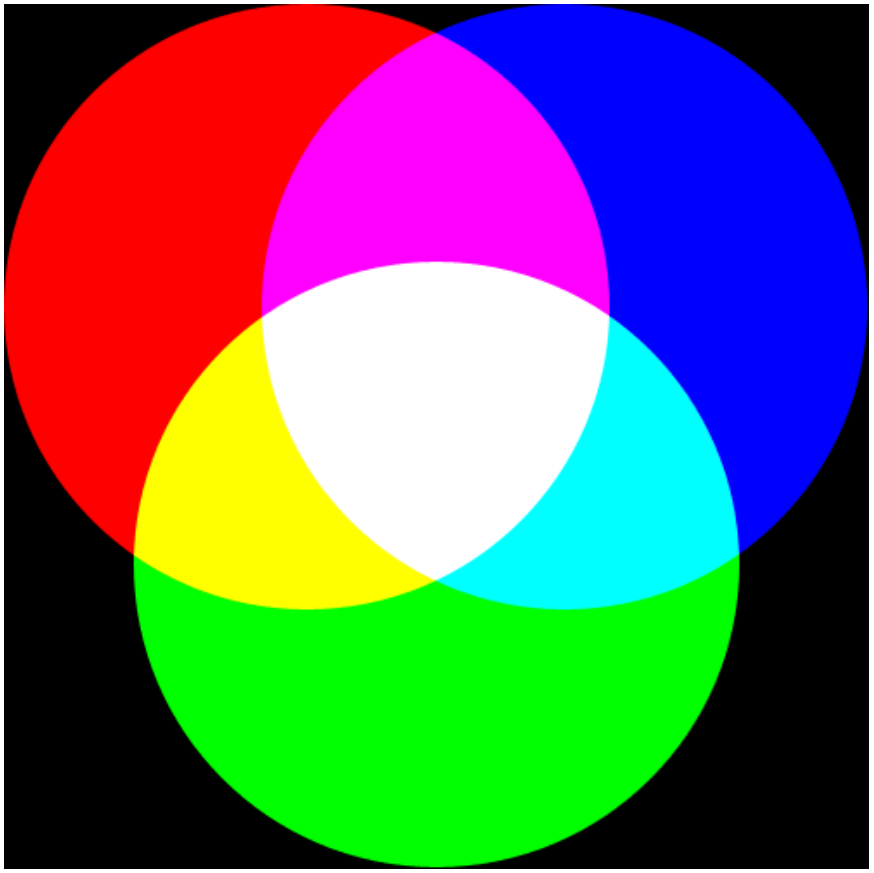


Too many bands!

- 16 bands' images contain a lot of information about
  - Cloud thickness, top temperature
  - Cloud particle size, cloud phase (ice/liquid)
  - Humidity
  - Volcanic ash
  - Vegetation
  - etc.
- **Solution -> RGB image**
  - Can illustrate multiple information on one image.
  - Can be composed by simple process.
  - "SATAID" can compose RGB image easily.

What's RGB?

- Red (R), green (G) and blue (B), which are the three primary colors of light, constitute color space expressing additive color composite
- RGB compositing is a technique to display a color using this property of the three primary colors of light

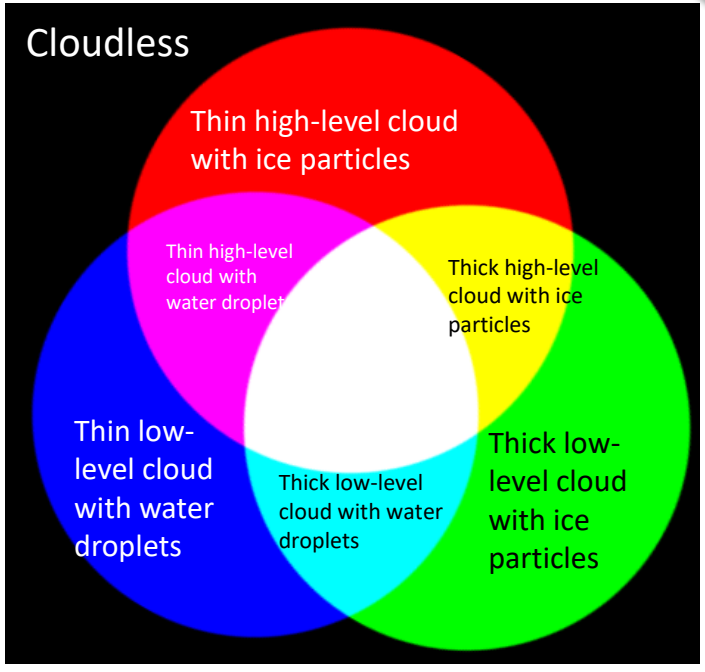


three primary colors RGB

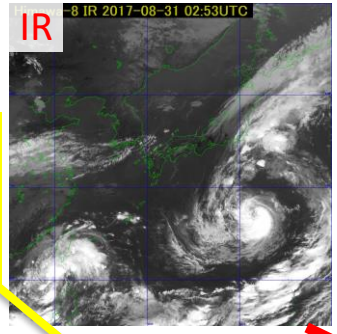
Application to Satellite Imageries

RGB composite

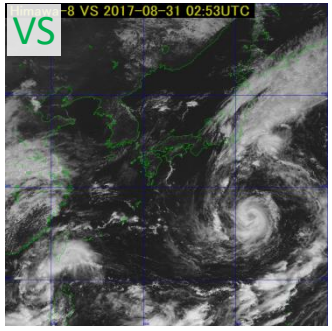
Thick and high cloud (Cb) areas appear yellow!



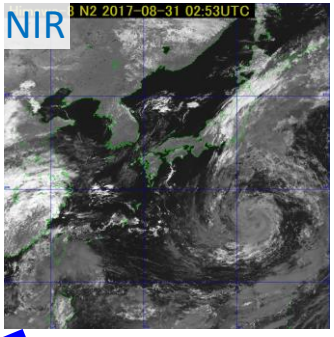
"High" cloud

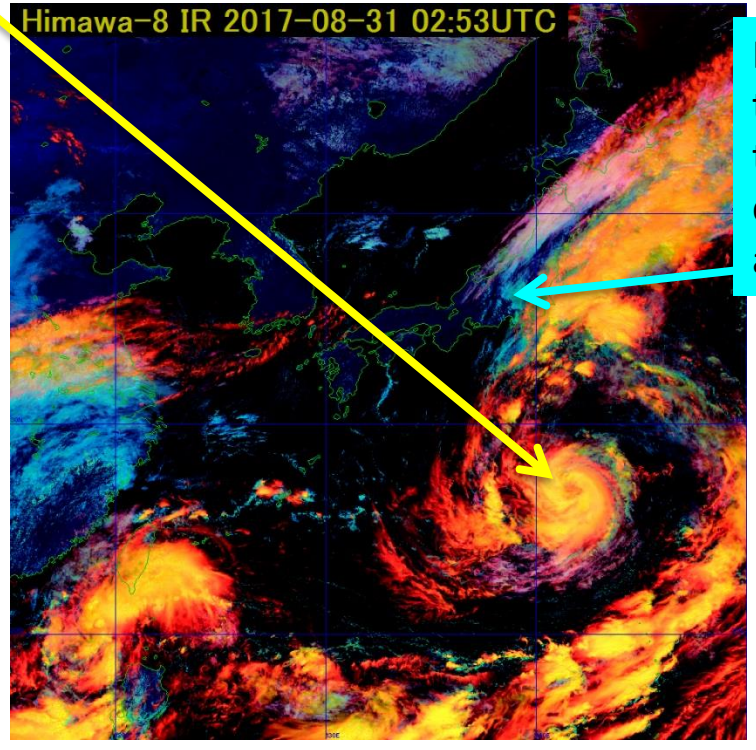


"Thick" cloud



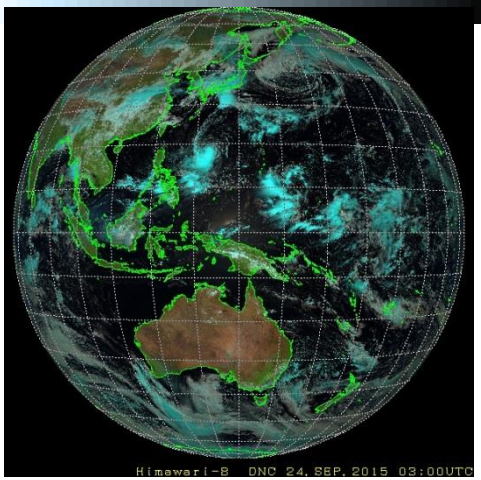
"Ice" cloud



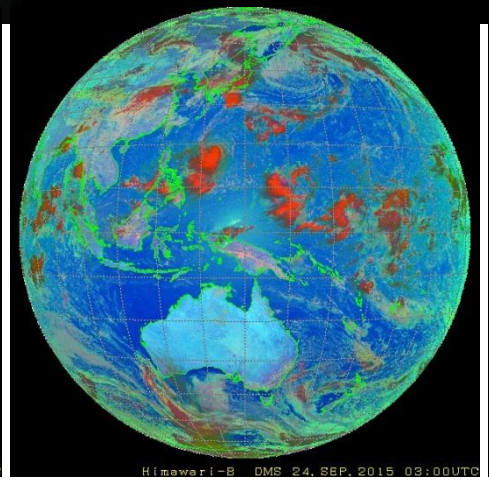


If you want to focus on the low level clouds, look at cyan area.

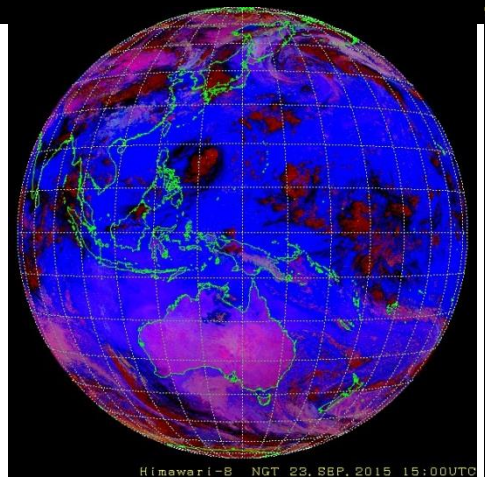
Well-known RGBs from Himawari-9



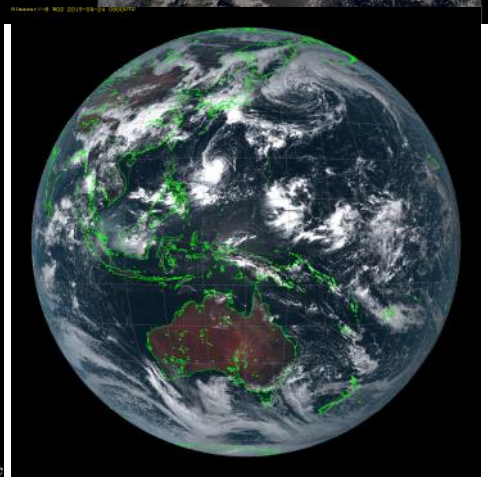
Day Natural Colors



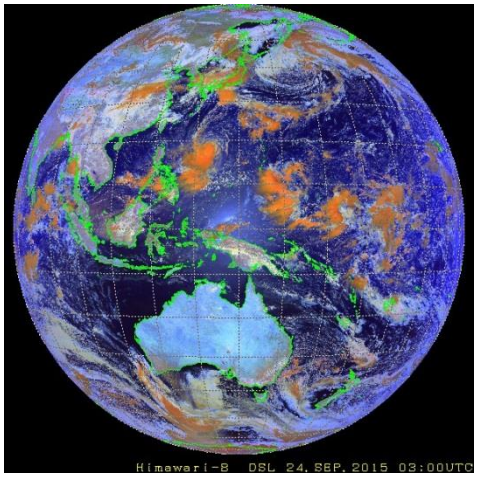
Day Microphysics



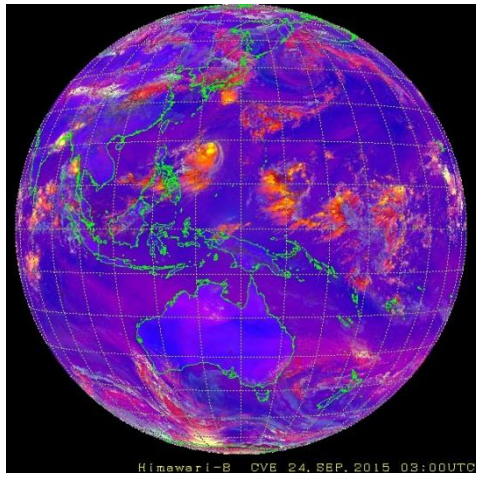
Night Microphysics



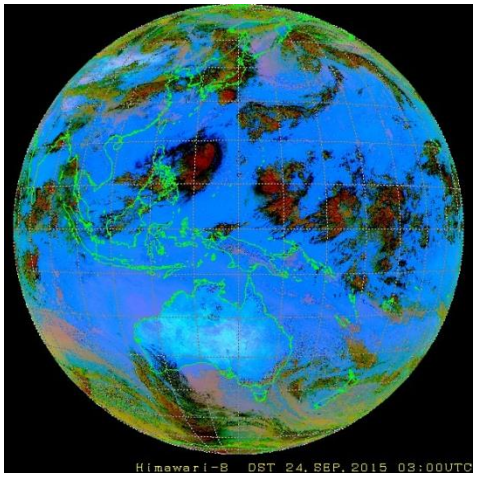
True Color



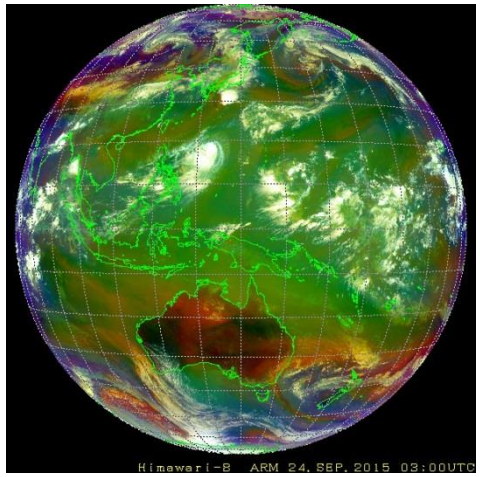
Day Snow-Fog



Day Convective Storm



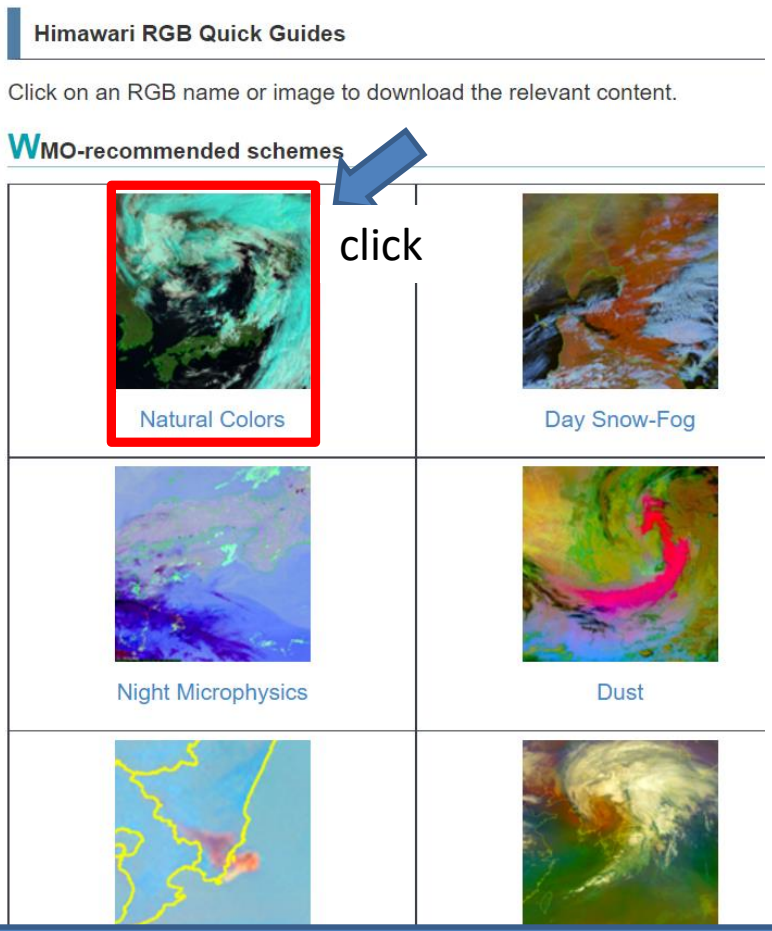
Dust



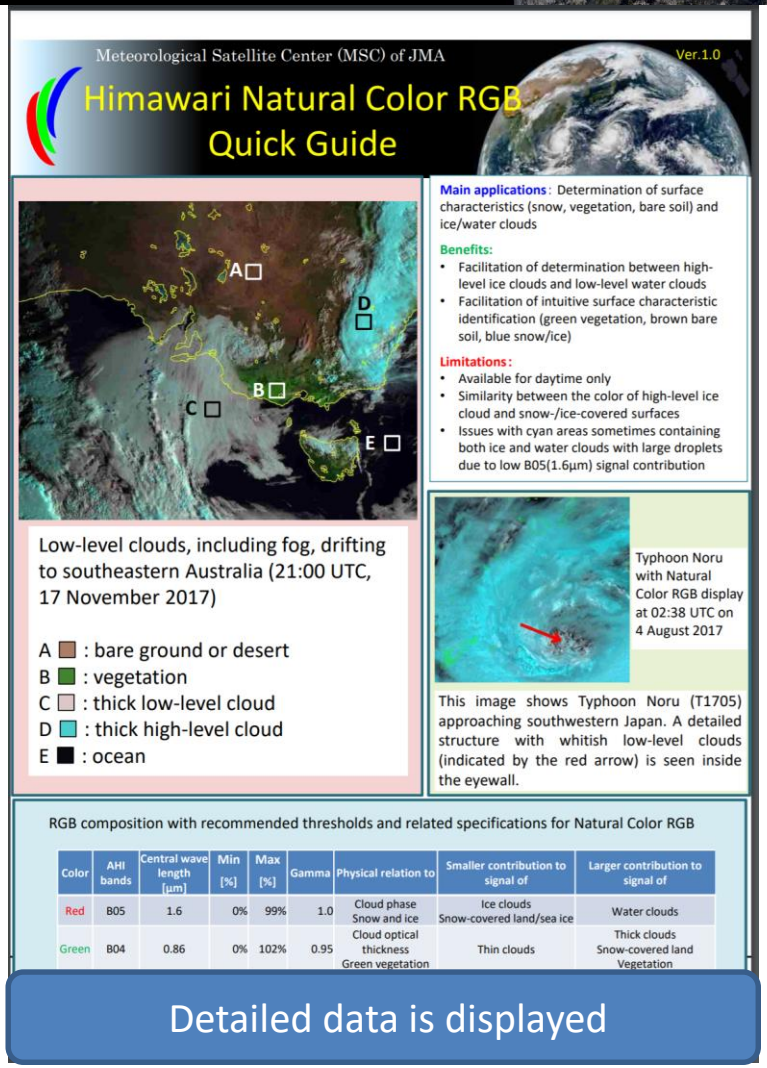
Airmass

https://www.data.jma.go.jp/mscweb/data/himawari/sat_img.php?area=fd_

RGB Quick Guides



RGB Quick Guide Web page in MSC Website

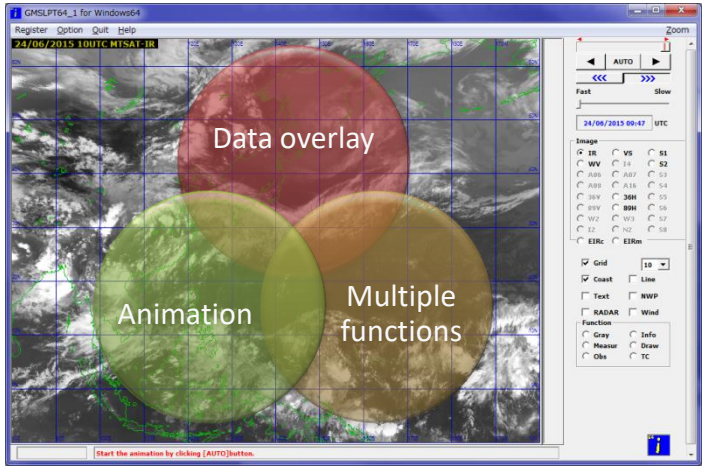


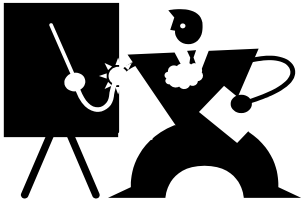
Detailed data is displayed

https://www.jma.go.jp/jma/jma-eng/satellite/VLab/RGB_QG.html

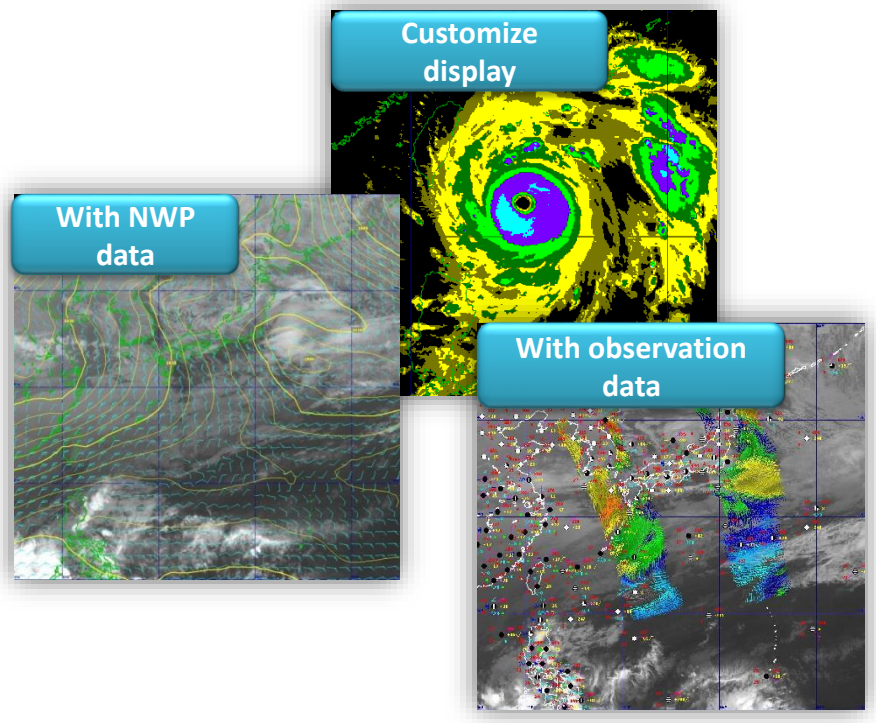
What is SATAID?

SATAID (**SAT**ellite **A**nimation and **I**nteractive **D**iagnosis) is a sophisticated display software visualizing meteorological information **in multiple dimensions (spatial and temporal)**, which assists forecasters to analyze and monitor continually weather parameters and phenomena for better meteorological services.





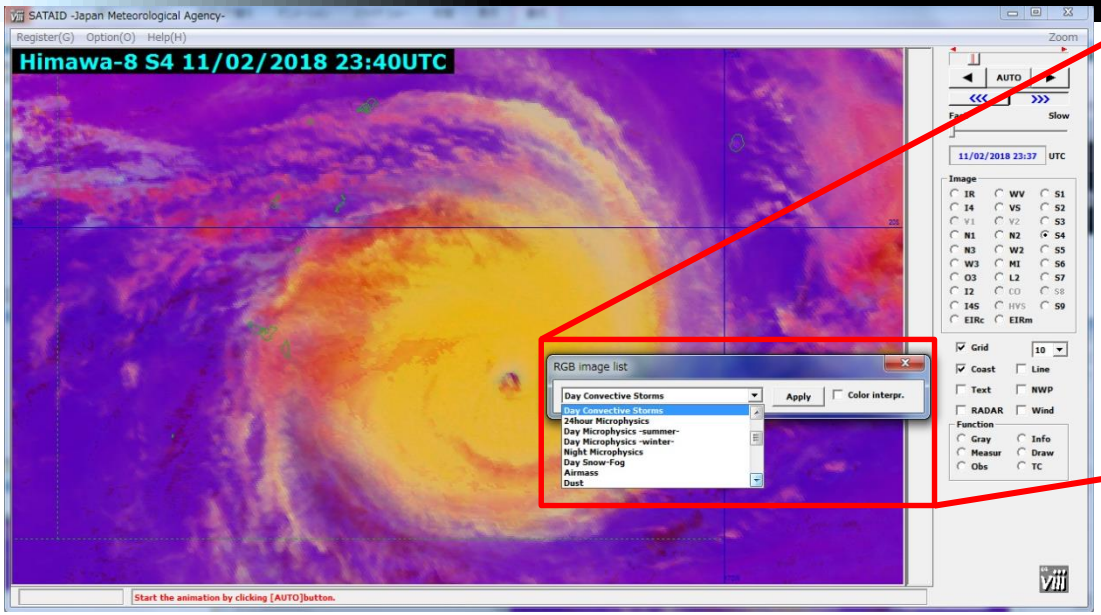
More efficiently and accurately!

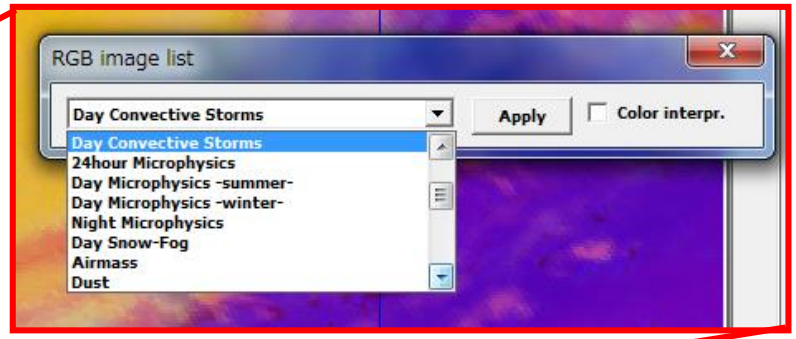


What can we do by using SATAID?

- With SATAID, you can …
  - **Display (and overlay) satellite imagery and NWP data**
    (and various observations i.e. SYNOP, SHIP, TEMP, Radar, Wind Profiler, ASCAT etc. if its format prepared)
  - **Use many functions**
    vertical cross-sectional chart, time-series chart, digital data output to CSV file.....
  - **Save as a file including a package of all data**
    your drawings and comments, which will be useful for trainings and case study archives
  - **Analyze position and intensity of tropical cyclones**

RGB composite imagery on SATAID





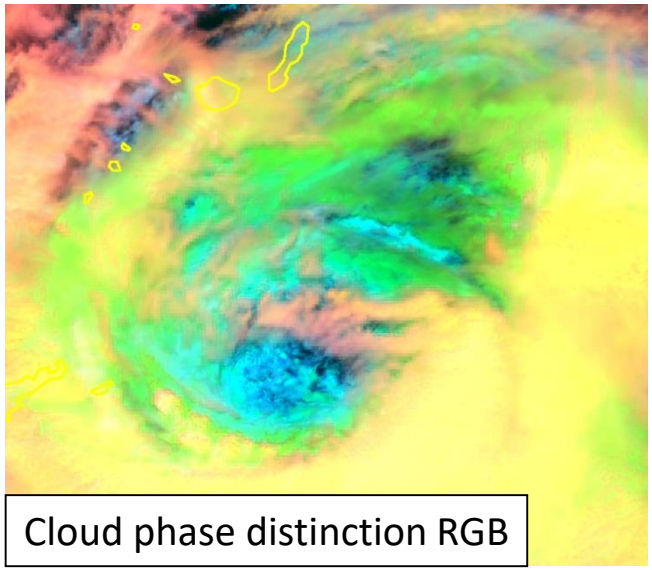
RGB recipe data

Pick | Modify | Insert | Delete | Save | Save As | Regsiter | Close

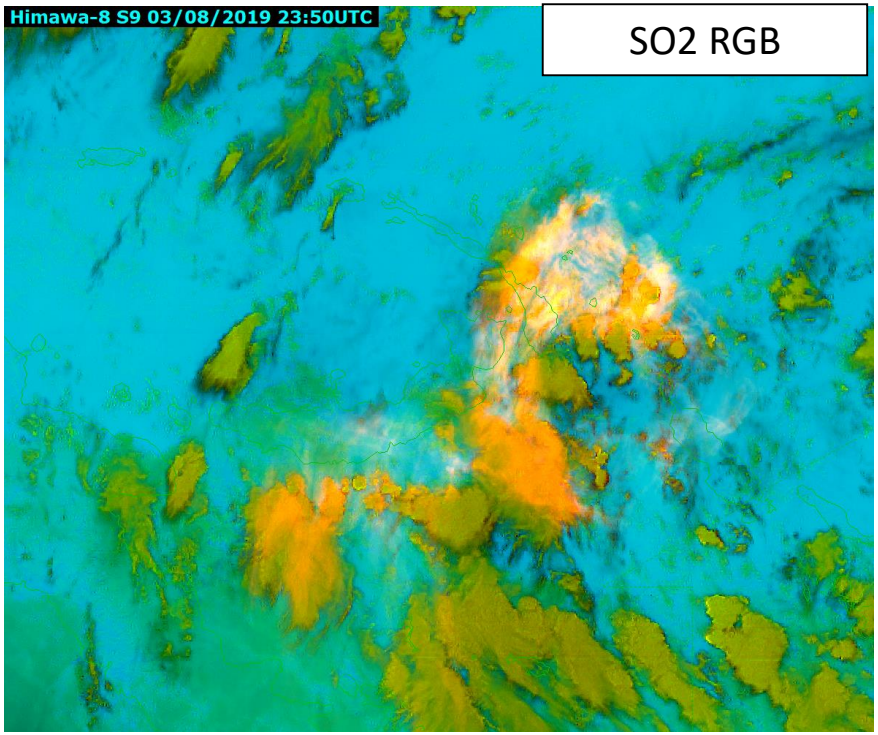
Title	ImageR	ImageG	ImageB	MinR	MaxR	MinG	MaxG	MinB	MaxB	GammaR	GammaG	GammaB
Tropical Day Convecti...	S4(W3-...	S2(I4-I...	S7(N2-...	-5.0	36.0	-1.0	76.0	-0.8	0.25	1.0	0.33	0.95
Tropical Airmass	S3(IR-...	S6(IR-...	WV	-4.7	25.8	-25.5	31.2	190.2	242.6	1.0	0.5	1.0
Tropical Night Microp...	S1(IR-I2)	S2(I4-IR)	IR-	-3.0	7.5	-2.2	2.9	273.3	300.1	1.0	1.3	1.0
True Color	VS	V2	V1	0	1	0	1	0	1	1.0	1.0	1.0
Day Natural Colors	N2	N1	VS	0	0.99	0	1.02	0	1	1.0	0.95	1.0
Day Convective Storms	S4(W3-...	S2(I4-I...	S7(N2-...	-5.0	36.0	-1.0	61.0	-0.75	0.25	1.0	0.5	1.0
24hour Microphysics	S1(IR-I2)	S5(IR-...	IR-	-3.0	7.5	0.8	5.8	248.6	303.2	1.0	1.3	1.0
Day Microphysics -su...	N1	I4S	IR-	0	1.02	0.02	0.82	203.5	303.2	0.95	2.6	1.0
Day Microphysics -wi...	N1	I4S	IR-	0	1.02	0.02	0.38	203.5	303.2	0.95	1.8	1.0
Night Microphysics	S1(IR-I2)	S2(I4-IR)	IR-	-3.0	7.5	-7.0	2.9	243.7	293.2	1.0	1.0	1.0
Day Snow-Fog	N1	N2	I4S	0	1.02	0	0.68	0.02	0.45	1.6	1.7	1.95
Airmass	S4(W3-...	S6(IR-...	WV	0	25.8	-4.3	41.5	208	242.6	1.0	1.0	1.0
Dust	S1(IR-I2)	S5(IR-...	IR-	-3.0	7.5	0.9	12.5	261.5	289.2	1.0	2.5	1.0
Ash	S1(IR-I2)	S5(IR-...	IR-	-3.0	7.5	-1.6	4.9	243.6	303.2	1.0	1.2	1.0
[new]Simple Water ...	IR	WV	W3	202.29	278.96	214.66	242.67	245.12	261.03	10	5.5	5.5
[new]Differential W...	S4(W3-...	W3	WV	-3	30	213.15	278.15	208.50	243.90	3.5	2.5	2.5
[new]Cloud Phase Di...	IR	VS	N2	219.619	280.6707	-0.0346	0.7792	0.0119	0.5932	1.0	1.0	1.0
[new]Day Cloud Phase	N2	N3	VS	0.0	0.5	0.0	0.5	0.0	1.0	1.0	1.0	1.0
[new]New Day Micro...	N1	N3	IR-	0.0	1.0	0.0	0.5	200	300	1.0	1.0	1.0
[new]Fire Detection	V1	N3	L2	0.1	0.95	0.0	0.5	158.15	323.15	1.0	1.0	1.0
[new]Fire Power/Te...	I4-	N3	N2	273	350	0.0	0.5	0.0	0.5	1.0	1.0	1.0
[new]NaturalFireColor	I4-	N1	VS	287.02	425.26	0.0	1.0	0.0	1.0	1.0	1.0	1.0
[new]CIRA's Natural...	N3	N1	VS	0.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0
[new]Simple Fire & S...	I4-	VS	IR	287.02	425.26	0.05	0.70	230.30	302.71	1.0	1.0	1.0
[new]SO2	S9(W2-...	S5(IR-...	IR-	-6	5	-4	5	243	303	1.0	1.2	1.0
[new]Deep Clouds/D...	S3(IR-...	VS	IR-	-5	35	0.7	1.0	243.6	292.6	1.0	1.0	1.0

- SATAID can show RGB imagery easily by using RGB image list dropdown menu.
- Select the name of RGB imagery -> Apply
- You can edit the RGB list file and add new RGB recipe.

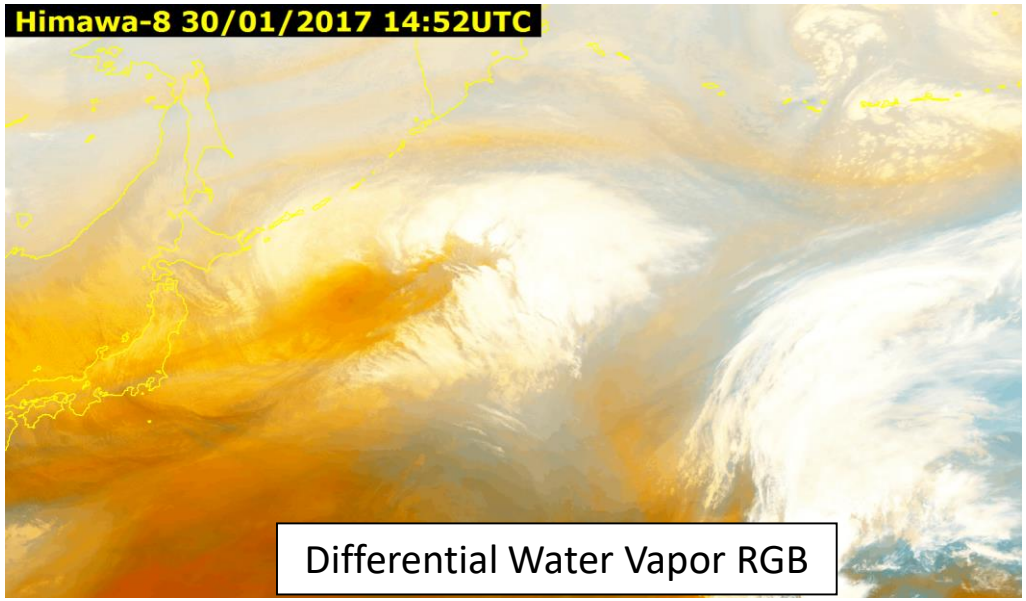
RGB Recipes Developed by JMA



Cloud phase distinction RGB



SO2 RGB



Differential Water Vapor RGB

- RGB list file for SATAID includes some RGB recipes developed by JMA

How can we get SATAID?

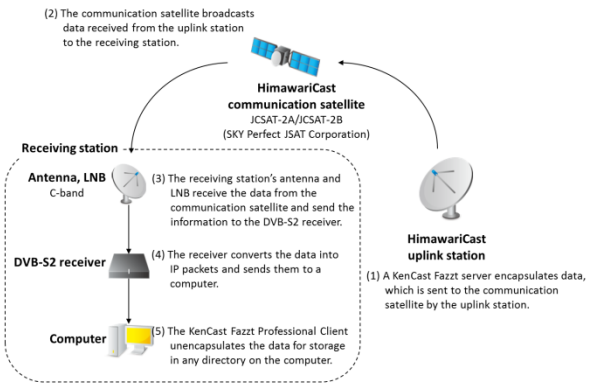
WIS Website

https://www.wis-jma.go.jp/cms/sataid/

- Internet Environment is required
- 5 channels are available every 10 minutes
- ID and Password are required
  (*wis-jma at met.kishou.go.jp*)

Himawari-Cast

https://www.data.jma.go.jp/mscweb/en/himawari89/himawari_cast/himawari_cast.php



- Dedicated antenna and computers are required
- 14 channels are available every 10 minutes

Summary so far

- **Himawari-8, 9 Overview**

Himawari-8, 9 make Full Disk observation every 10 minutes and Region observation every 2 and a half minutes. The number of observed bands is 16, and a variety of information can be obtained. These are useful for disaster prevention and so on.

- **RGB Composite**

To get important information efficiently, RGB composites were developed. RGB images can be created by a simple process of image compositing. Various information is derivable by one RGB image.

- **SATAID**

SATAID has a variety of functions and easily display satellite images, RGB composites and other meteorological data.

Hands-on training on basic SATAID functions and displaying RGBs

It’s time to practice using main SATAID functions in order to get used to its basic operations!

- Introduction of basic operations of SATAID

- Case studies
  1. Typhoon Mawar (T2302) approaching Pacific Islands
     - 25 May, 2023 12:00 UTC – 26 May, 2023 12:30 UTC

  2. Volcanic eruption of Sheveluch, Russia
     - 10 April, 2023 12:00 UTC – 11 April, 2023 18:30 UTC

Running SATAID and Opening Files

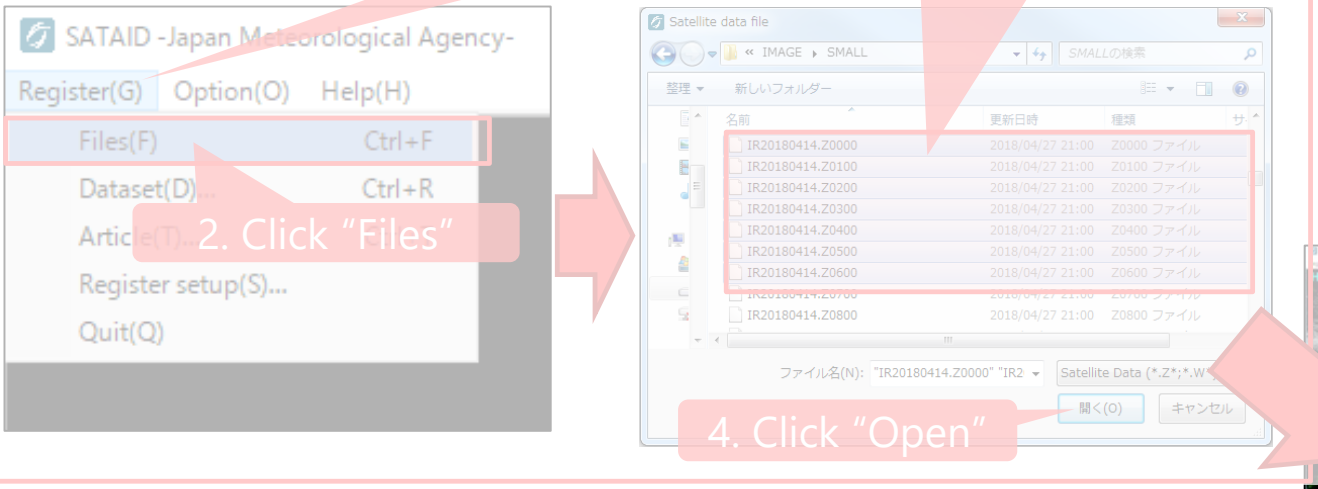
Method 1

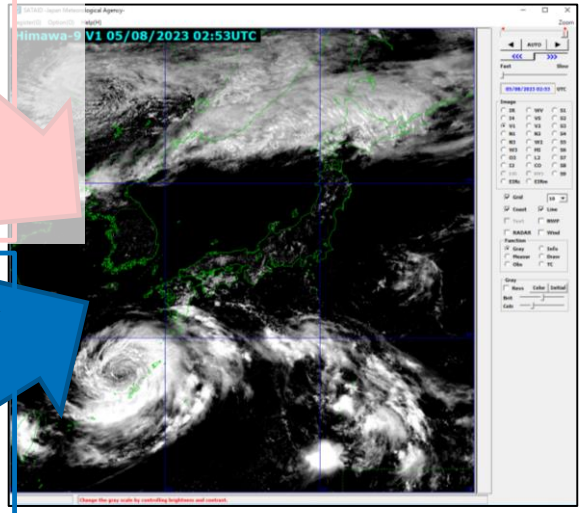
1. Select "Register"

2. Click "Files"

3. Select SATAID files

4. Click "Open"

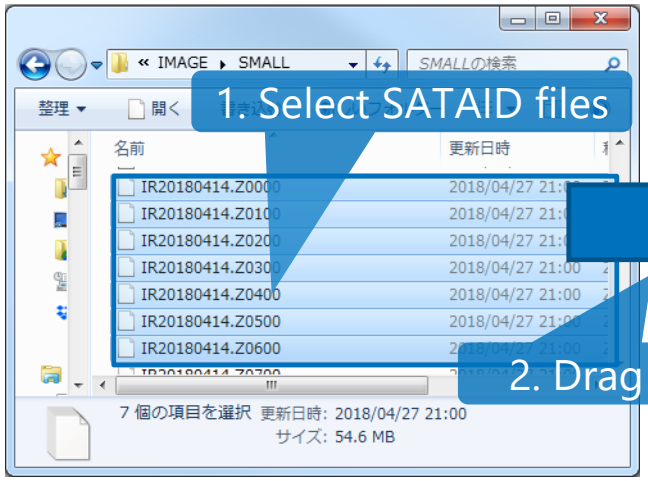


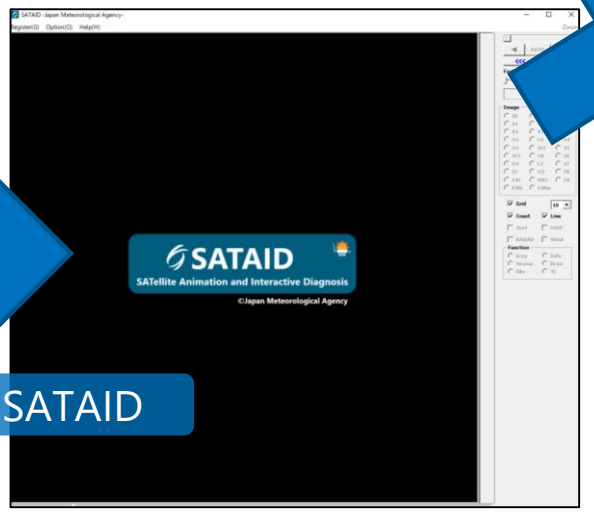


Method 2

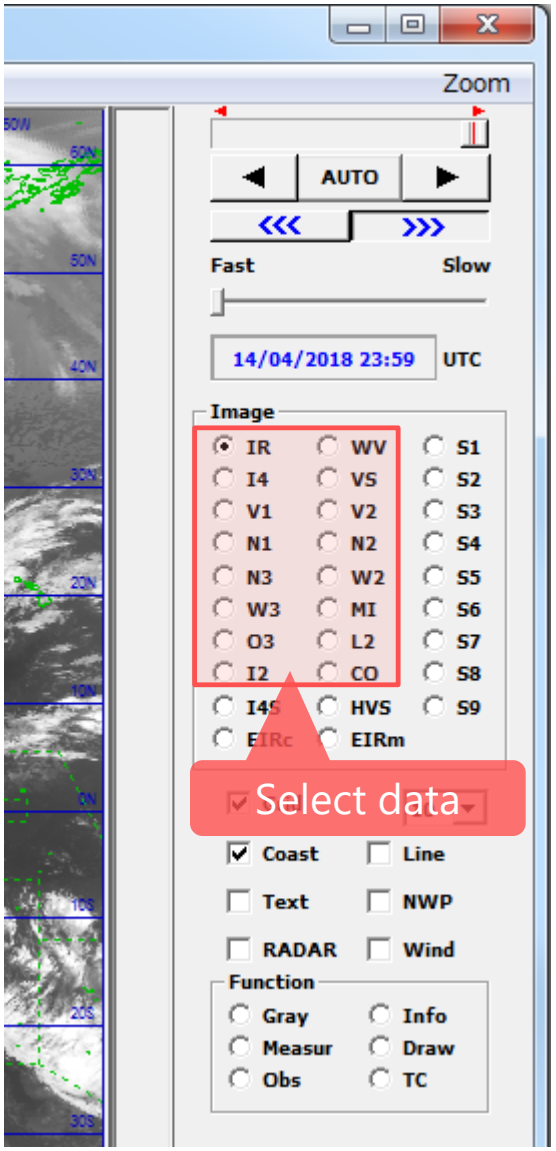
1. Select SATAID files

2. Drag to SATAID





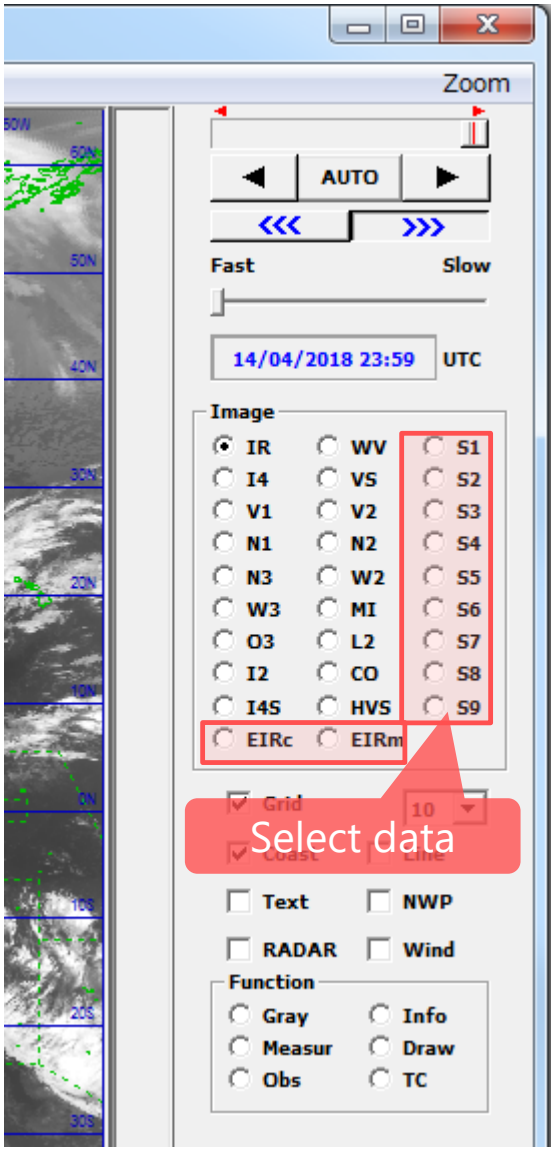
Selecting Satellite Images



Band		Wavelength [μm]	Himawari Cloud*	Himawari Cast*	WIS*
V1	Visible	0.46	○ (1 km)		
V2		0.51	○ (1 km)		
VS		0.64	○ (0.5 km)	○ (1 km)	○ (4 km)
N1	Near Infrared	0.86	○ (1 km)	○ (4 km)	
N2		1.6	○ (2 km)	○ (4 km)	
N3		2.3	○ (2 km)	○ (4 km)	
I4	Infrared	3.9	○ (2 km)	○ (2 or 4 km)	○ (4 km)
WV		6.2	○ (2 km)	○ (4 km)	○ (4 km)
W2		7.0	○ (2 km)	○ (4 km)	
W3		7.3	○ (2 km)	○ (4 km)	
MI		8.6	○ (2 km)	○ (4 km)	
O3		9.6	○ (2 km)	○ (4 km)	
IR		10.4	○ (2 km)	○ (4 km)	○ (4 km)
L2		11.2	○ (2 km)	○ (4 km)	
I2		12.3	○ (2 km)	○ (4 km)	○ (4 km)
CO		13.3	○ (2 km)	○ (4 km)	

*(): spatial resolution

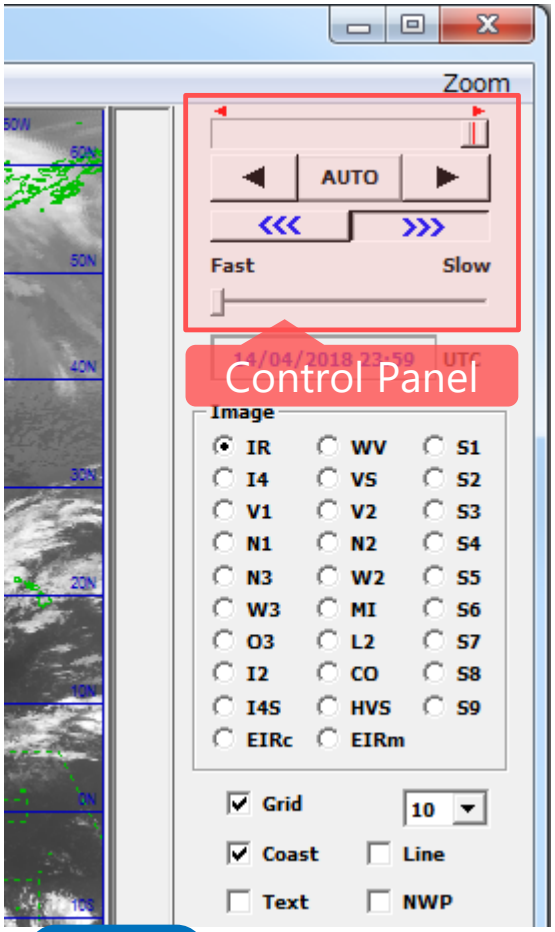
Selecting Satellite Images

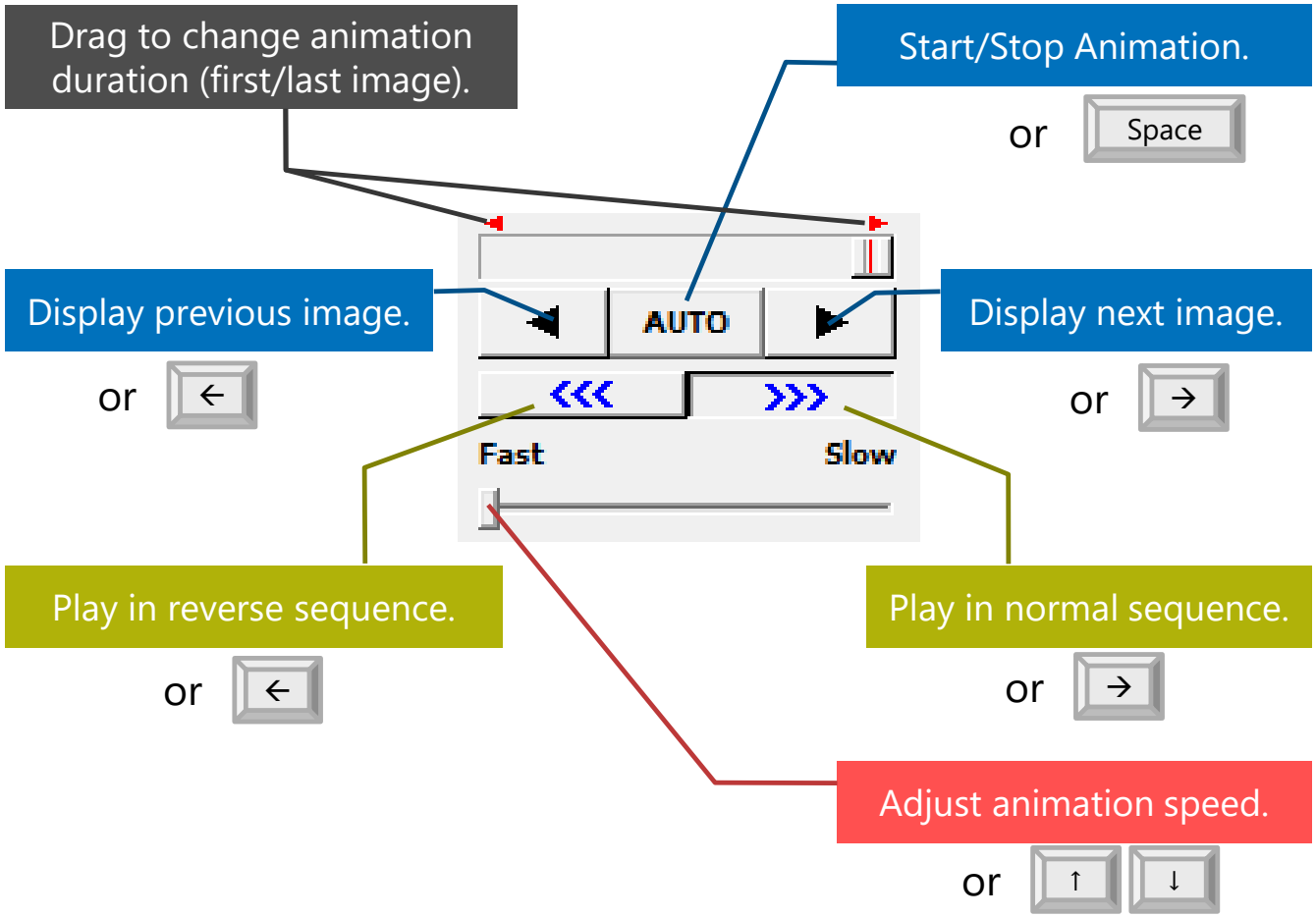


◆**Differential Images**
- **S1: Differential images 1 (IR – I2)**
- **S2: Differential images 2 (I4 – IR)**
- **S3: Differential images 3 (IR-WV)**
- **etc…**

◆**Enhanced Images**
- **EIRc: Colored enhanced infrared images**
- **EIRm: Monochrome enhanced infrared images**

Controlling animation



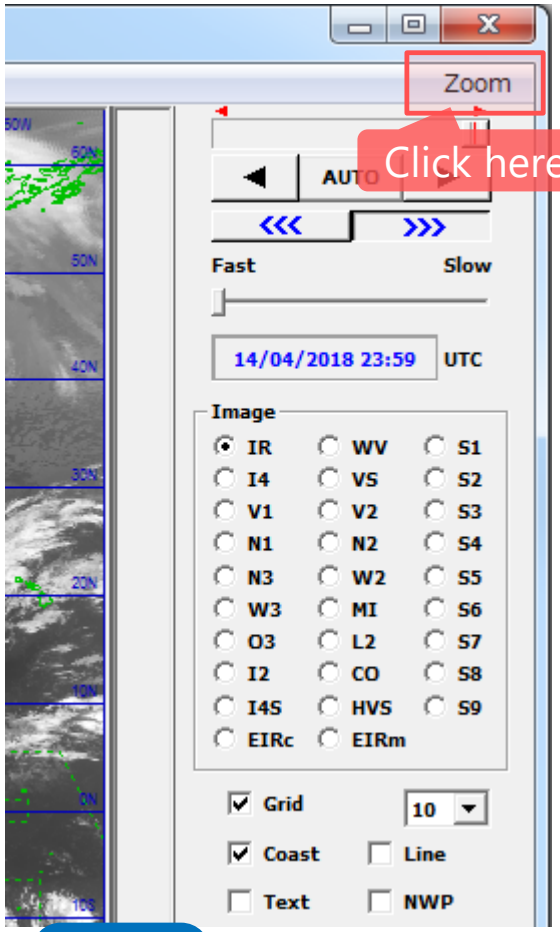


Tips

"Ctrl" + ◀ or ▶

: Specify current image as the first/last image of animation.

Zooming In/Out



◆Method 1

- **Display enlarged area.**
  Click [Zoom] button and drag area.
- **Return to whole image.**
  Click [Normal] button.

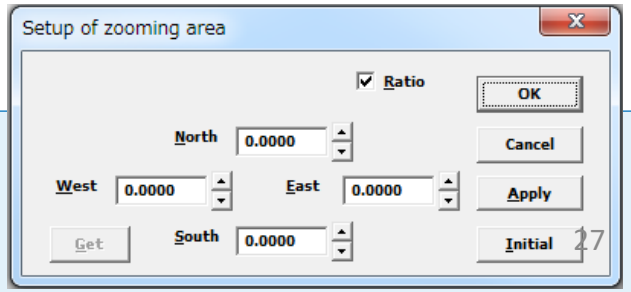
◆Method 2

- **Zoom in:** Ctrl + Shift + **Left-Click**
- **Zoom out:** Ctrl + Shift + **Right-Click**

Tips

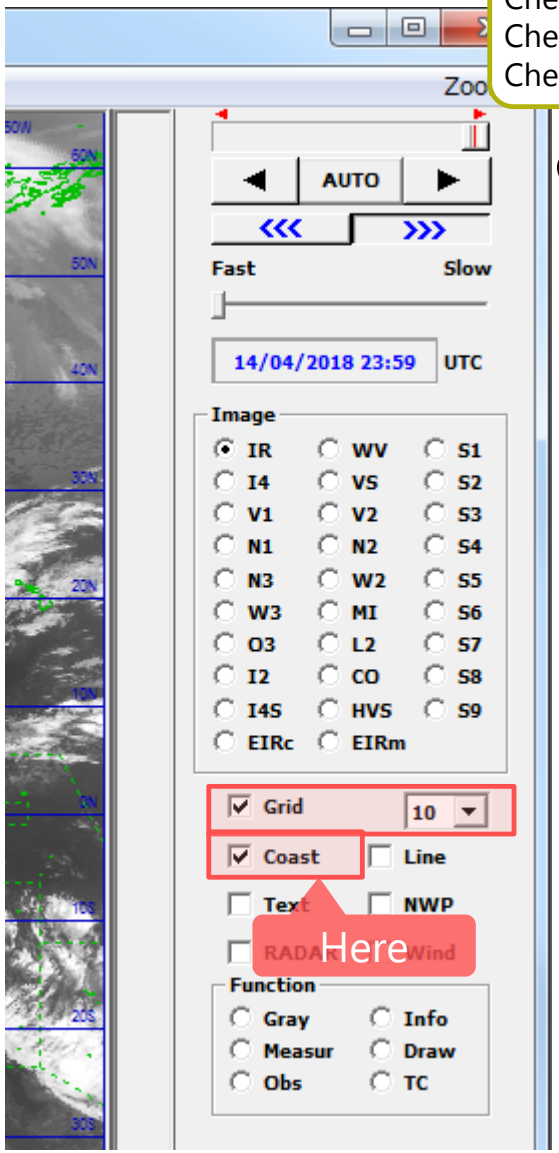
Areas can be digitally designated with longitude/latitude information.

Ctrl + Shift + [Zoom]



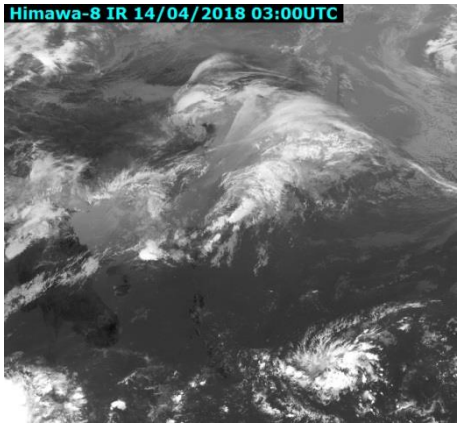
Displaying Coast/Grid Lines

Checkbox activation with [Ctrl] pressed: **larger font for latitude/longitude figures**
Checkbox activation with [Shift] pressed: **with background color for latitude/longitude figures**
Checkbox activation with [Ctrl] + [Shift] pressed: **larger font with background color**

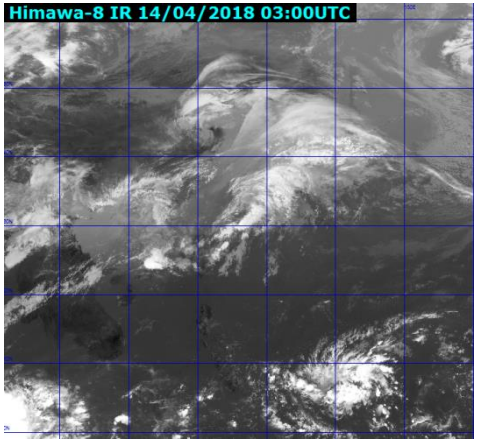


Check!

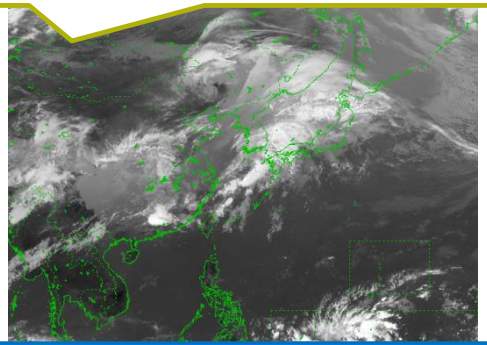
Select latitude/longitude intervals.



Check!

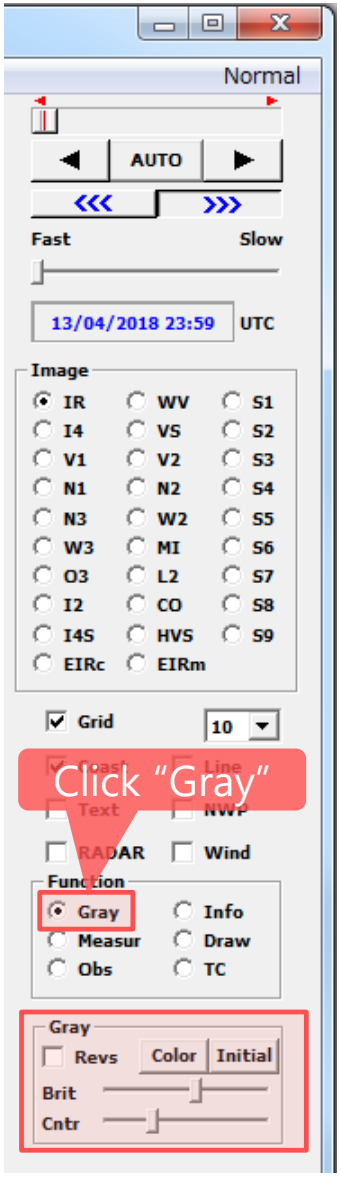


[Map element] can be selected from the [Option] menu to add rivers/lakes/borders, etc.

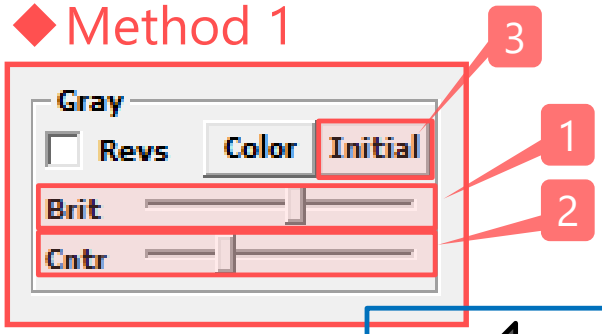


The colors of these lines can be changed using [Line color] in the [Option] menu.

Adjusting Gradation

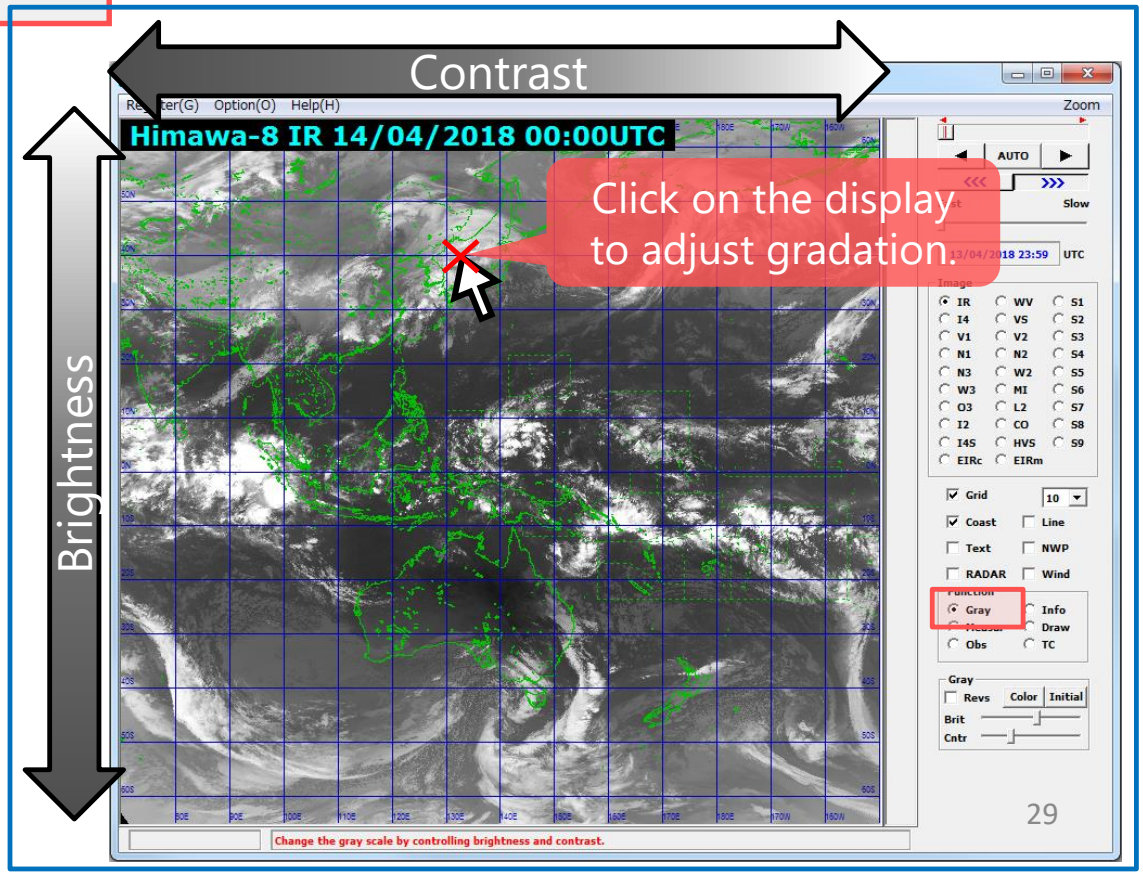


◆Method 1



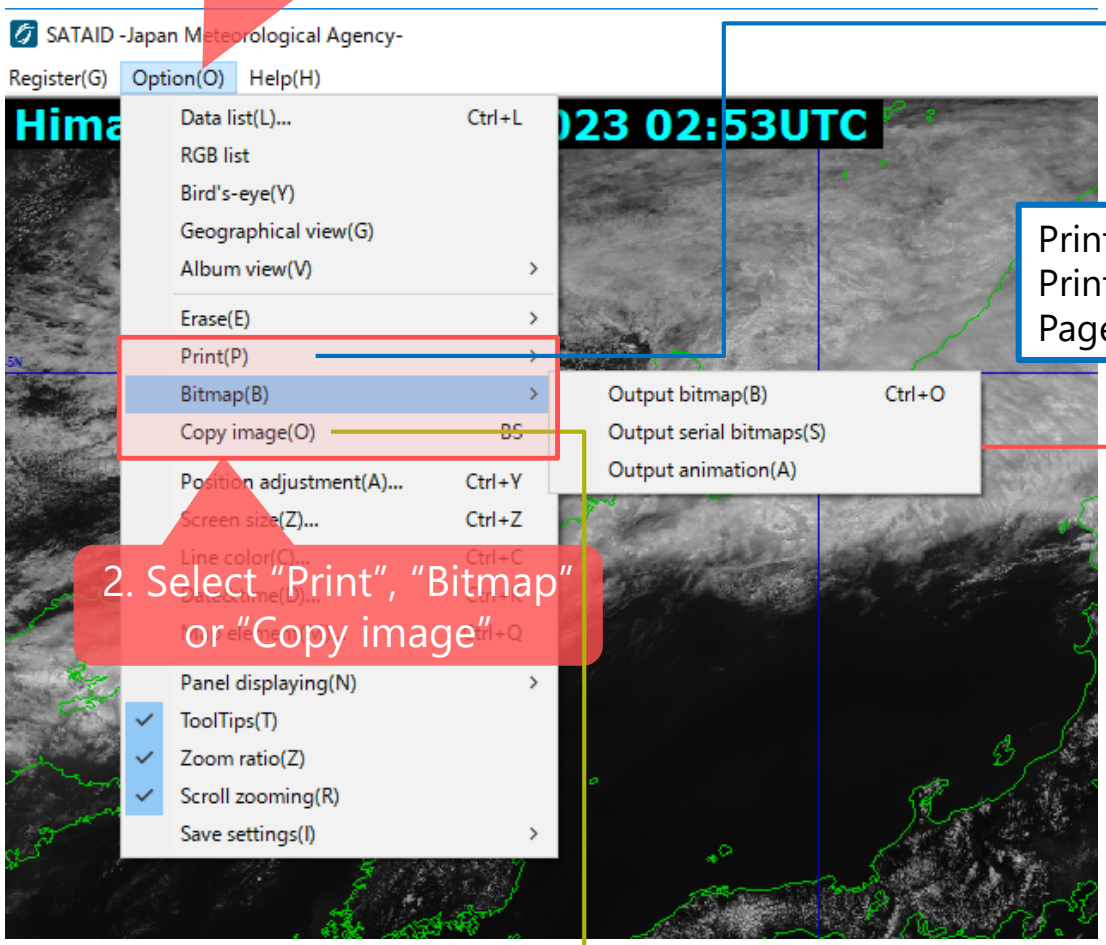
1. Adjust brightness.
2. Change contrast.
3. Reset grayscale.

◆Method 2



Outputting Images

1. Select “Option”



2. Select “Print”, “Bitmap” or “Copy image”

Print image(P) Ctrl+P
Print screen(S) Ctrl+H
Page setup(U)... Ctrl+U

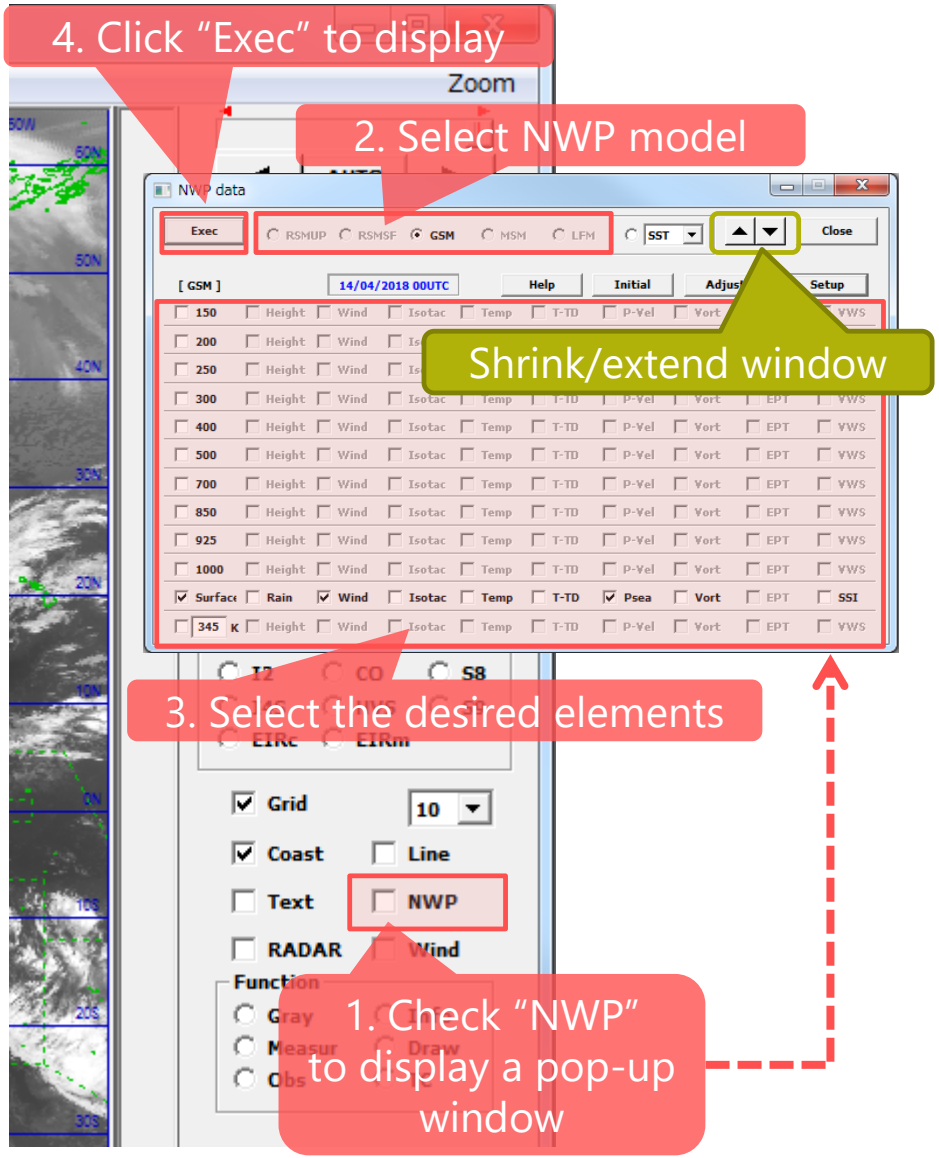
Print image: Output the current image to a printer
Print screen: Output the entire screen to a printer
Page setup: Set the margins of the printing paper

Output bitmap(B) Ctrl+O
Output serial bitmaps(S)
Output animation(A)

Output bitmap: Output the current image as a bitmap file etc.
Output serial bitmaps: Output all images as bitmap files
Output animation: Output images as a Gif animation etc.

Copy the current image to the clipboard

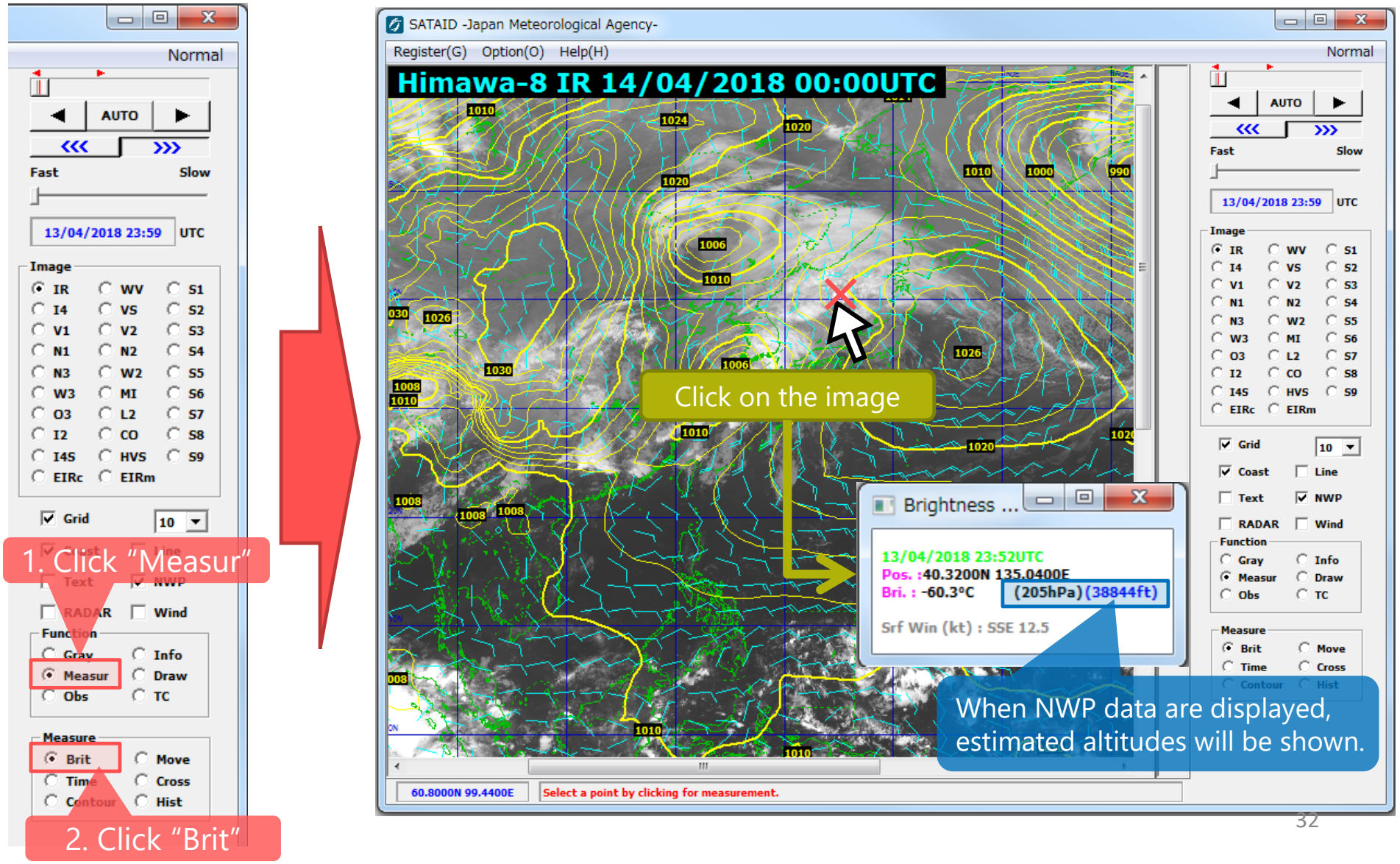
Displaying NWP data



Available NWP data

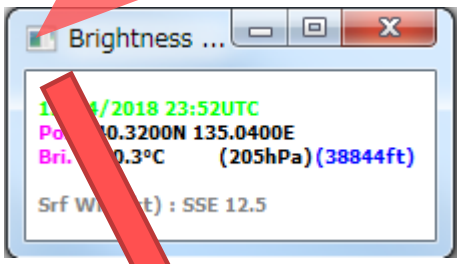
Symbol	Content	Unit
Height	Altitude	gpm
Wind	Wind barb	kt
Isotac	Isotach	kt
Temp	Air temperature	℃
T-TD	Dew-point depression	℃
P-Vel	Vertical p-velocity	hPa/h
Vort	Relative vorticity	10^{-6}/s
EPT	Equivalent potential temperature	K
VWS	Vertical wind shear	kt/1000ft
Rain	Precipitation (3 hours)	mm/3h
Psea	Sea level pressure	hPa
SSI	Showalter stability index	℃
RH	Relative humidity	%
Div	Horizontal divergency	10^{-6}/s
POT	Potential temperature	K
RiN	Richardson number	–
CAPE	Convective available potential energy	J/kg
PV	Potential vorticity	0.1PVU
Avor	Absolute vorticity	10^{-6}/s
Advc	Temperature advection	10^{-6}/s/h
Vadv	Relative vorticity advection	0.1℃/h
SH	Specific humidity	0/1g/kg
EXT	Extra element (diff. between levels)	undefined

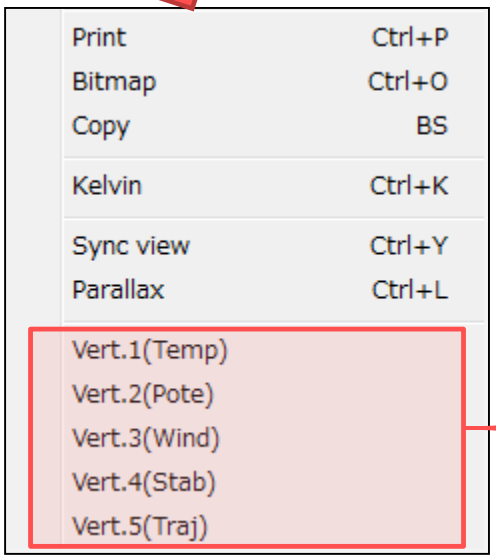
Evaluation of brightness temperature



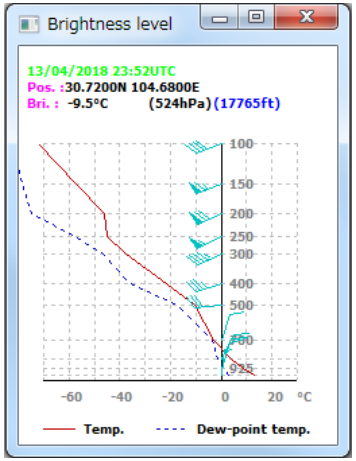
Display of NWP data

Click the upper-left of the window when NWP data are displayed



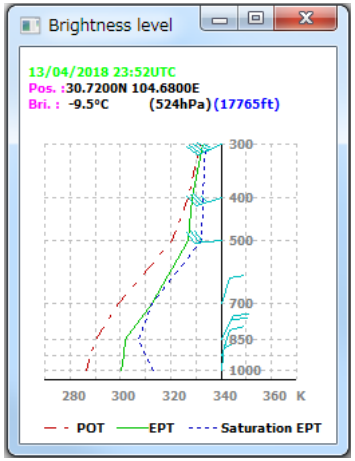


Vert.1 (Air temp.)



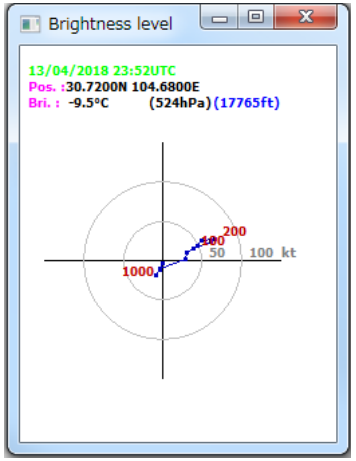
Wind, temperature and dew-point temperature

Vert.2 (Potential temp.)



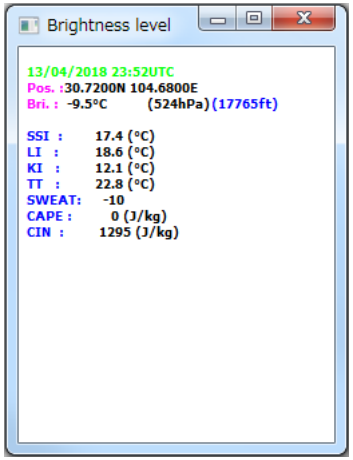
Wind, potential temperature, equivalent potential temperature and saturated equivalent potential temperature

Vert.3 (wind)



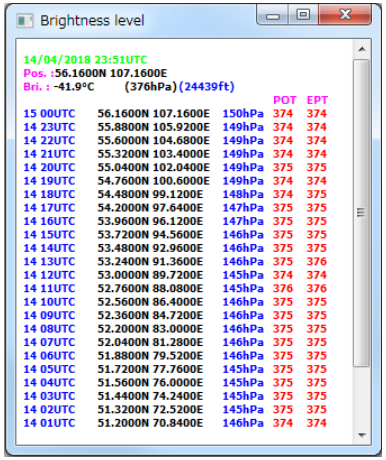
Wind hodograph or scorer number

Vert.4 (Stability)



SSI, KI, CAPE and CIN

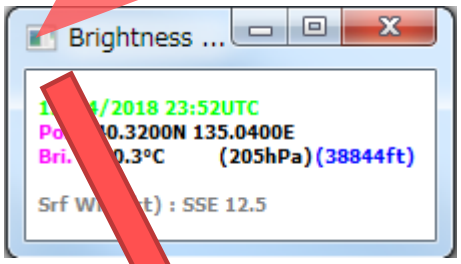
Vert.5 (Trajectory)

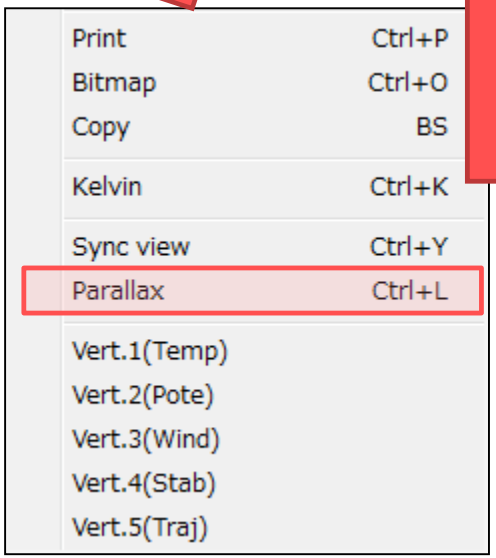


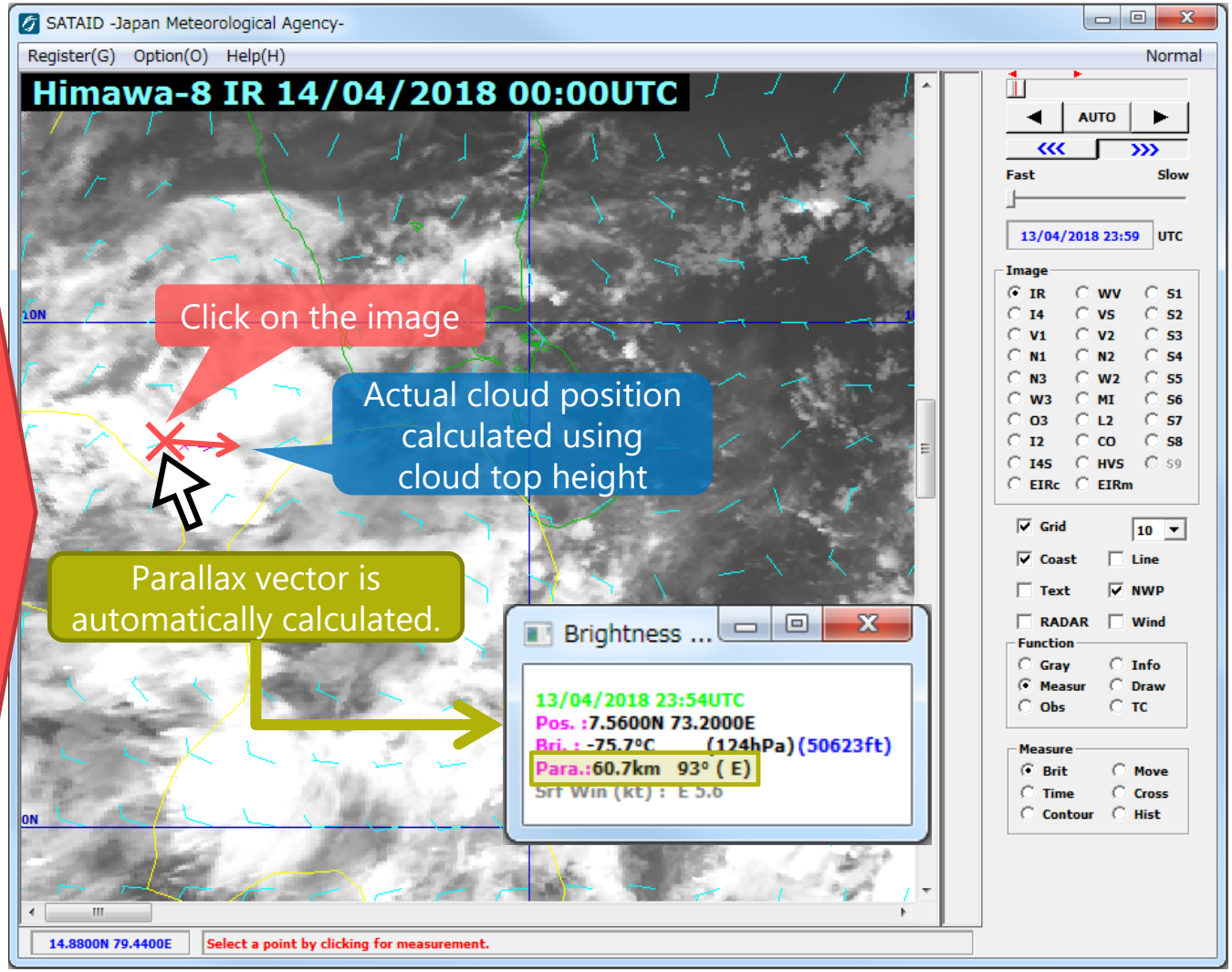
Trajectories with positions, altitudes, potential temperature and equivalent potential temperature changed over time when all heights in “NWP data” window are checked.

Parallax

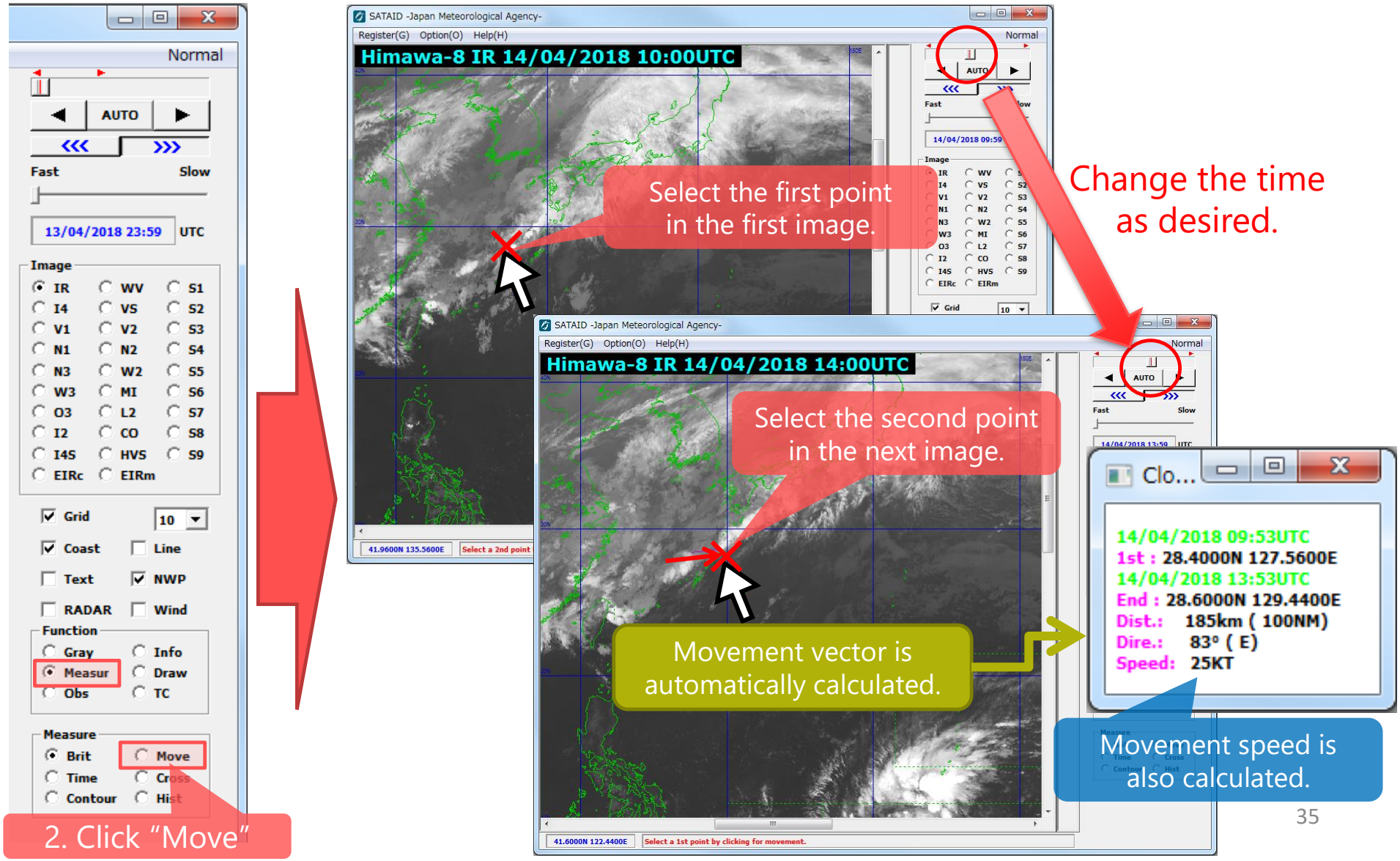
Click the upper-left of the window when NWP data are displayed



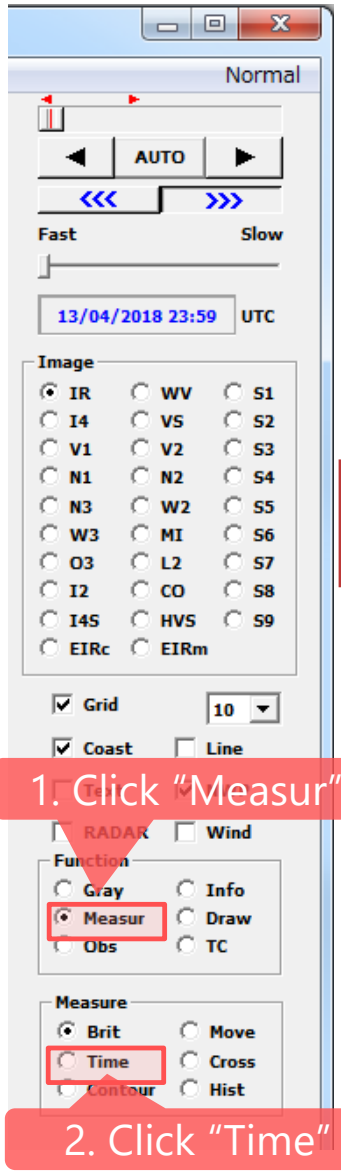




Evaluation of Movement (Vector)

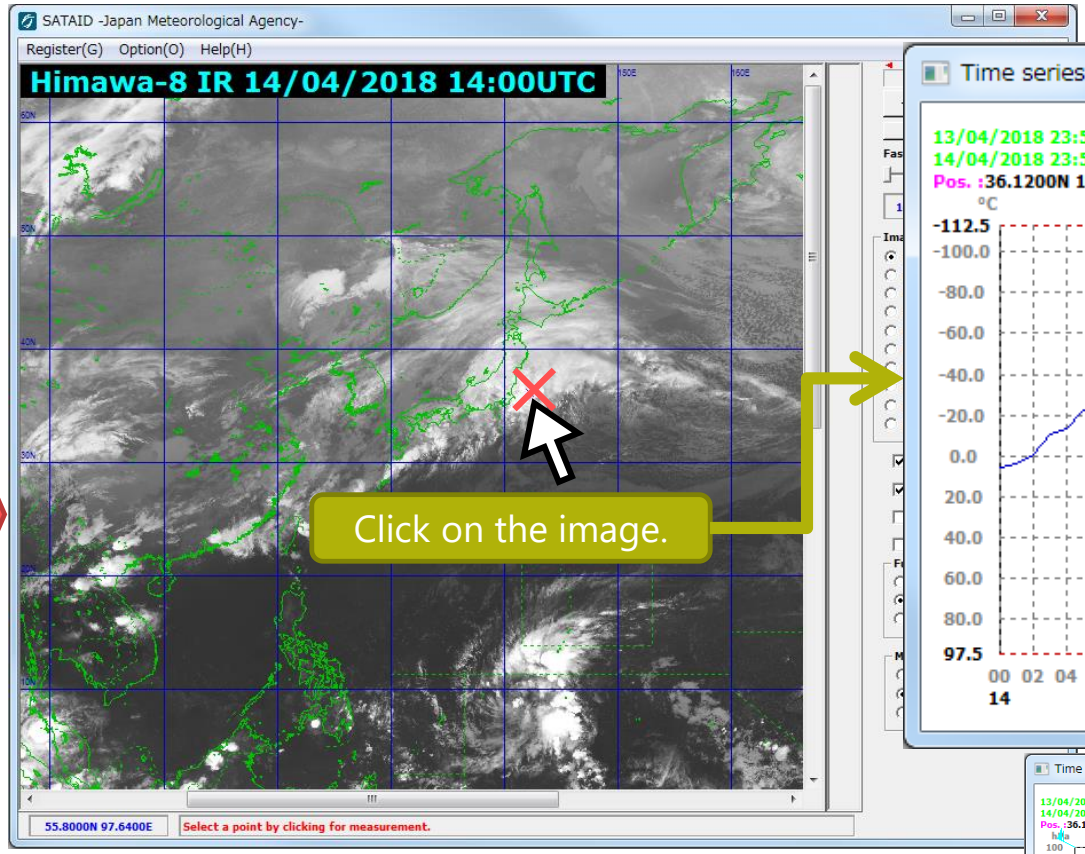


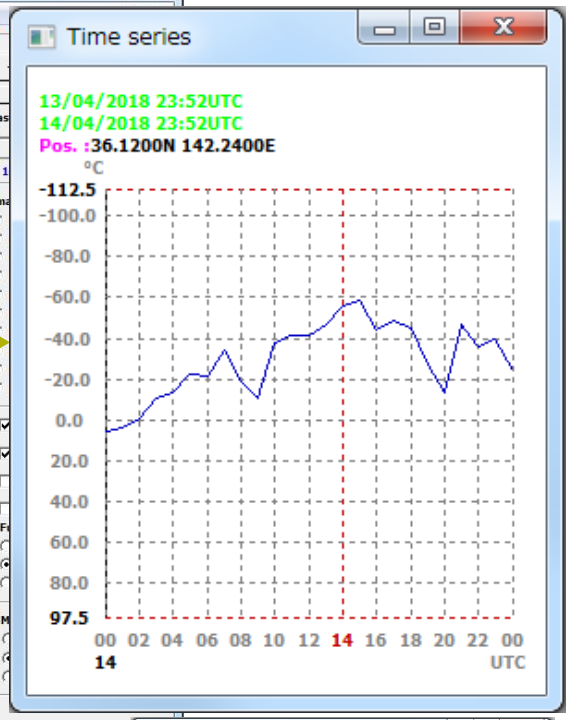
Time-series of brightness temperature with NWP

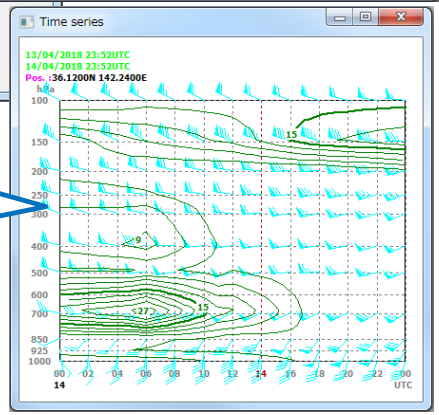


1. Click “Measur”

2. Click “Time”

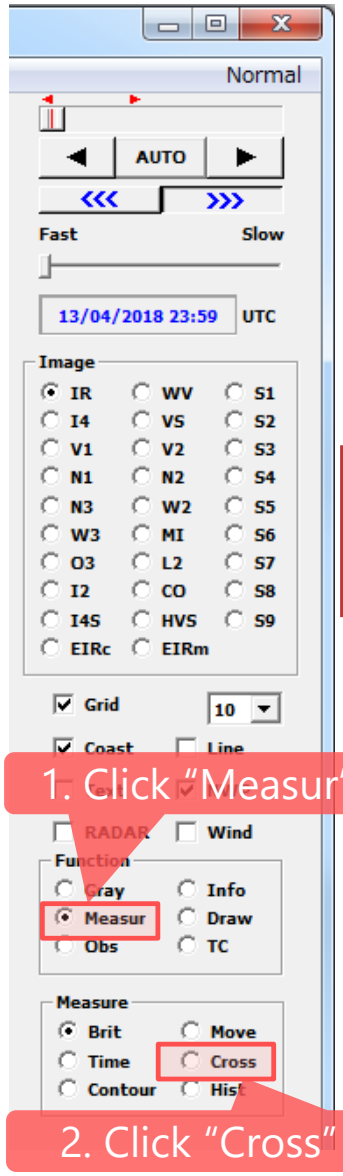


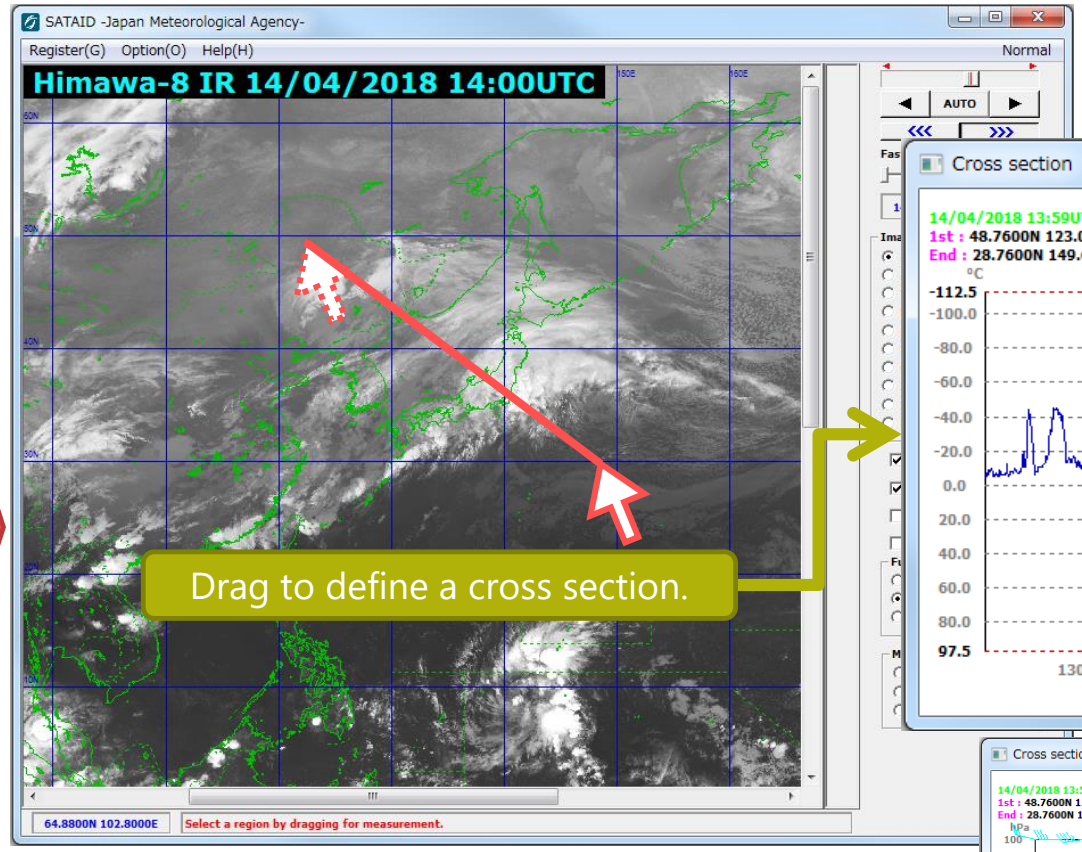


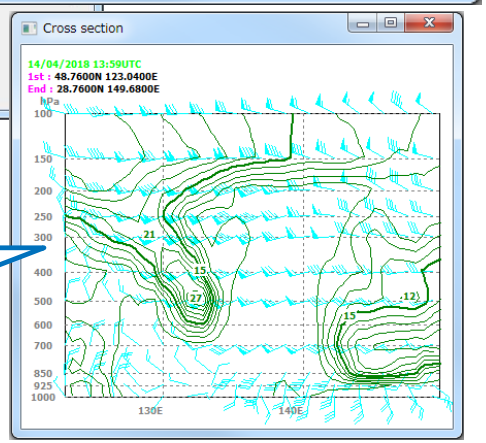


When NWP data are displayed, a time-series graph of NWP data for the selected point will be shown.

Cross-sectional Evaluation

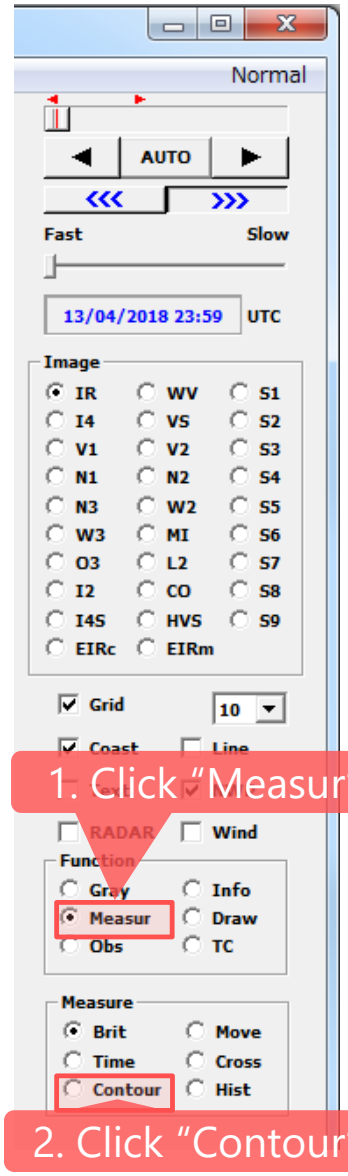


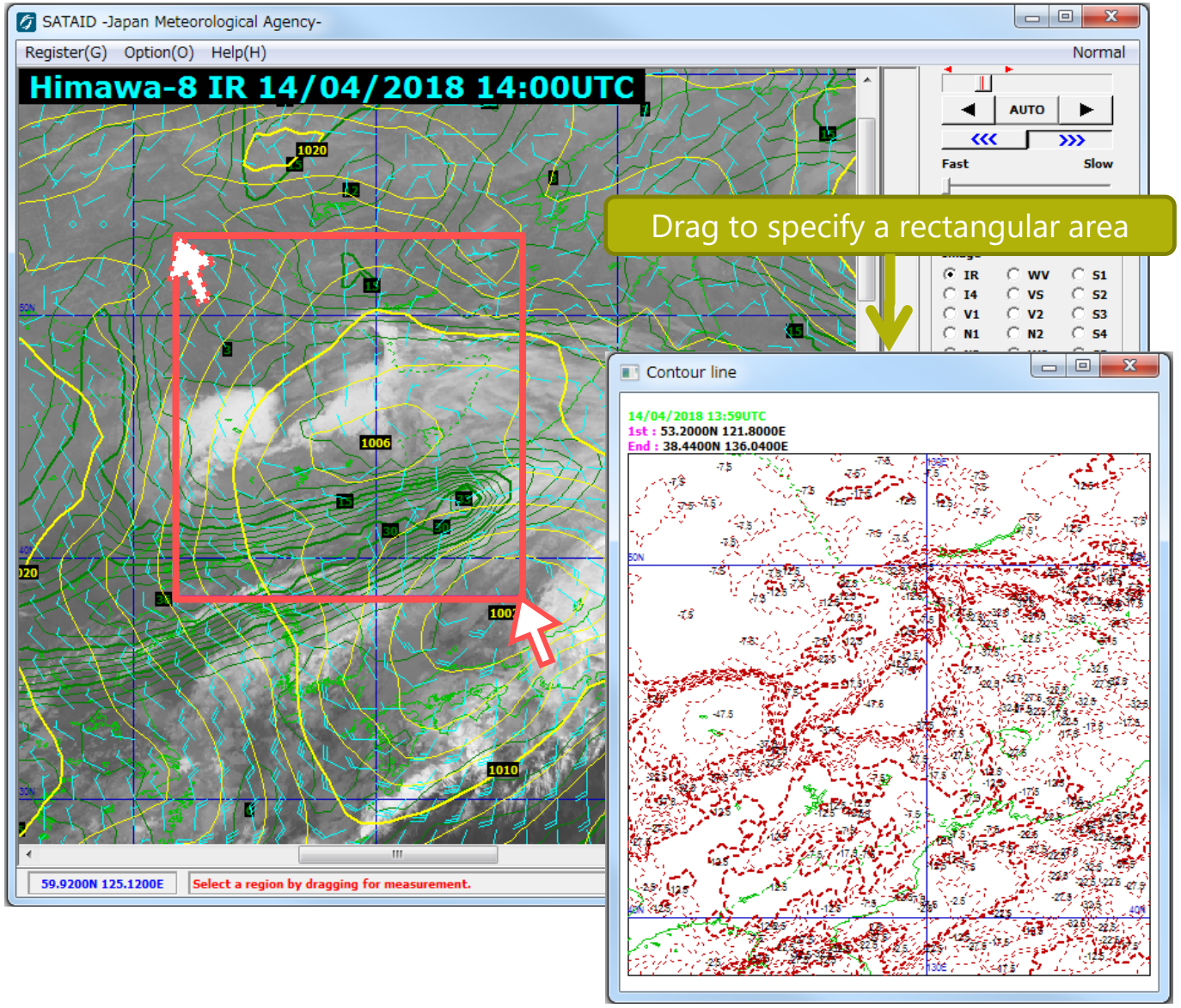




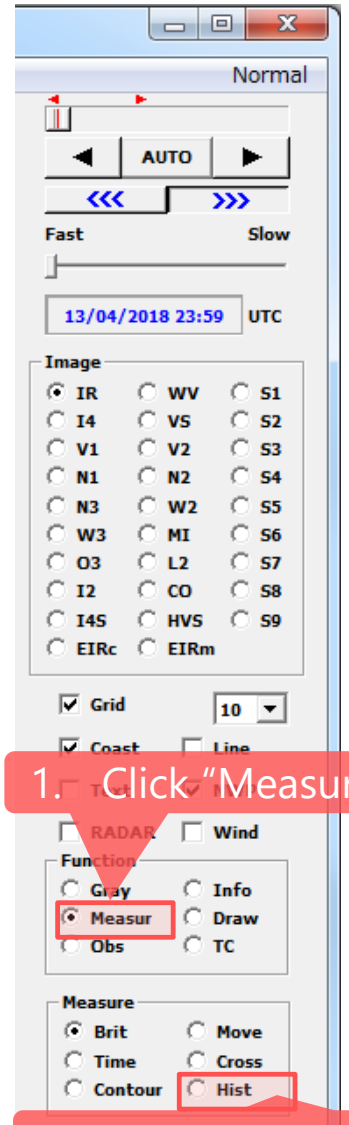
When NWP data is displayed, a cross-sectional graph of NWP data for the selected point will be shown.

Isolines (Contours)



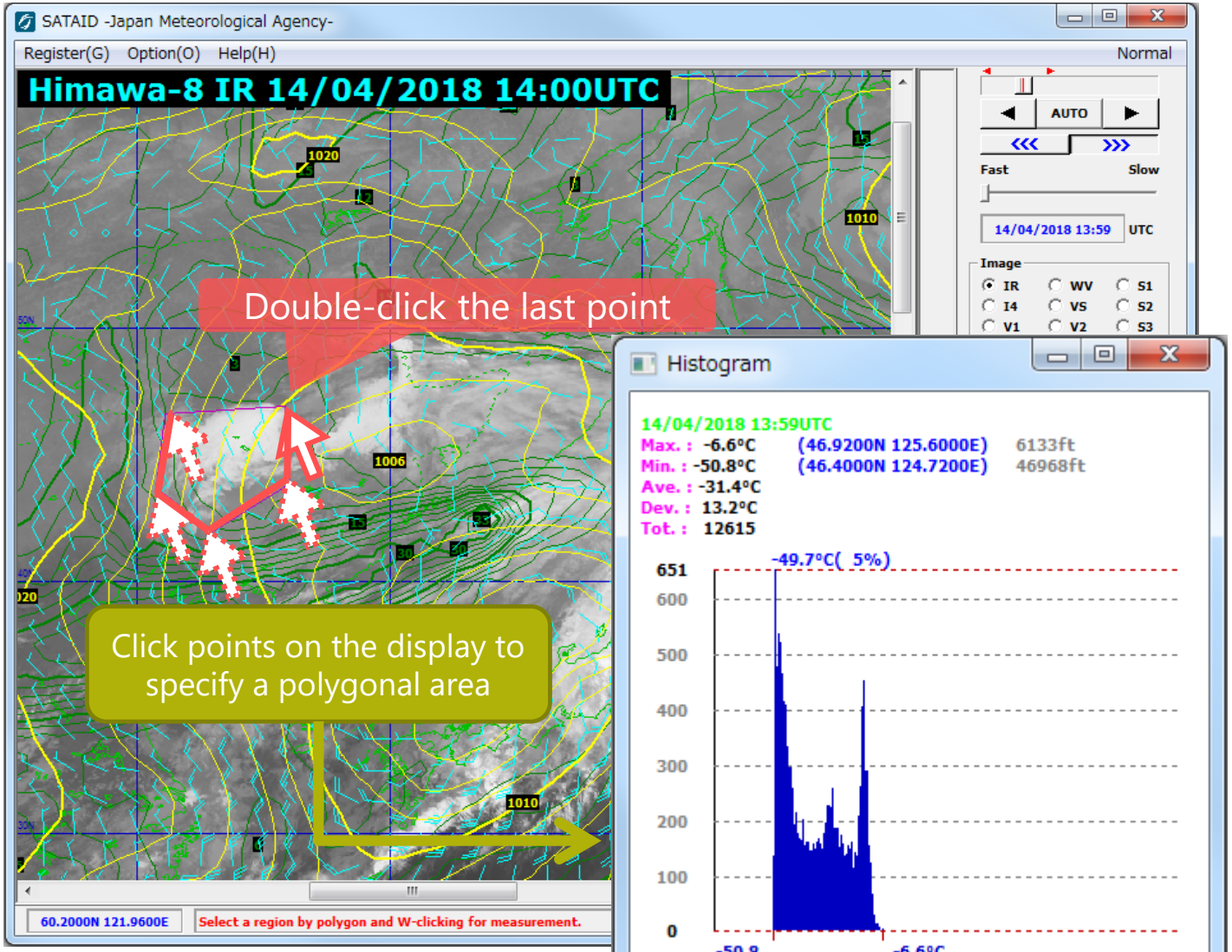


Histograms



1. Click "Measur"

2. Click "Hist"



Break (10minutes)

Hands-on training on basic SATAID functions and displaying RGBs

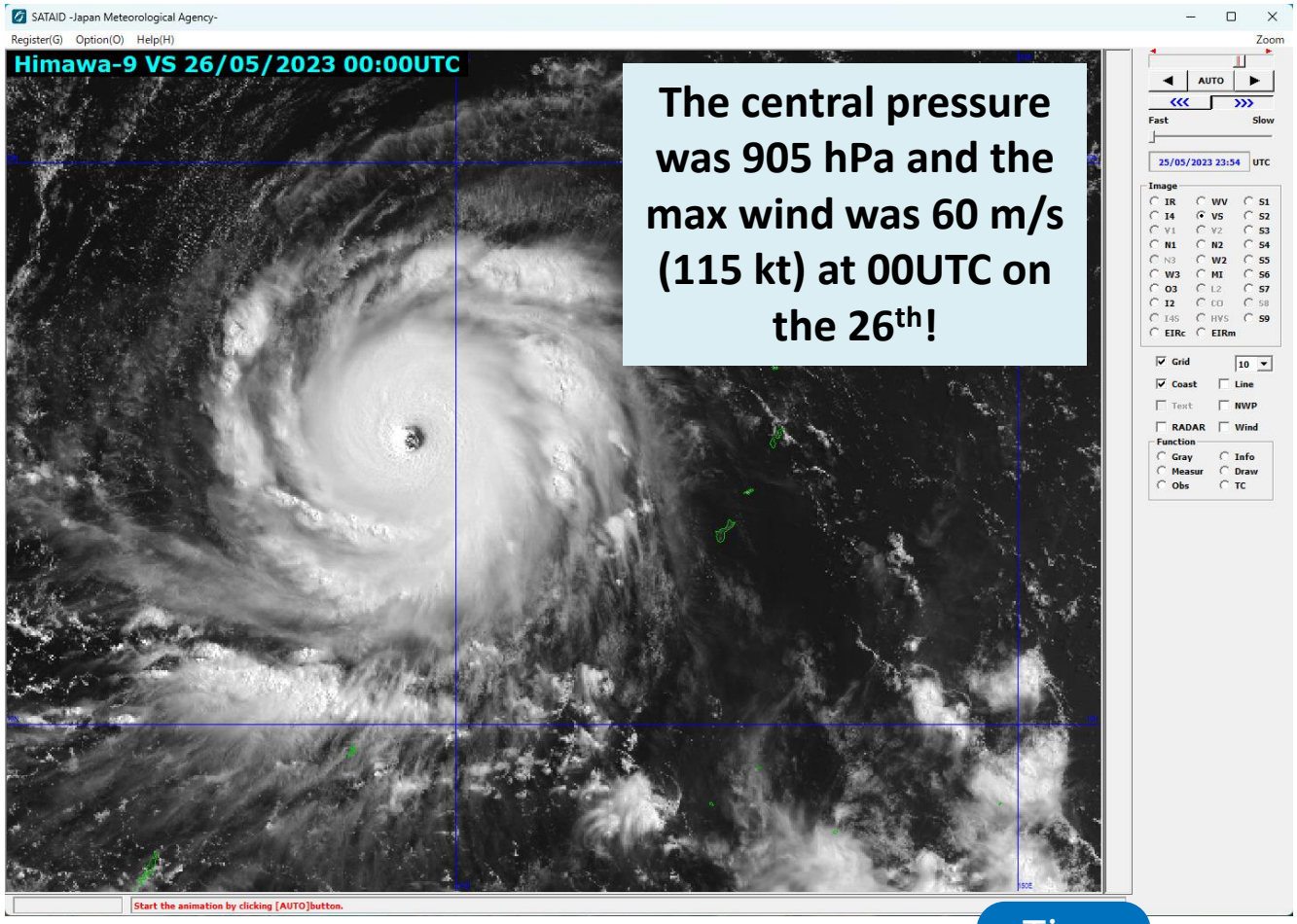
It’s time to practice using main SATAID functions in order to get used to its basic operations!

- Introduction of basic operations of SATAID

- Case studies
  1. Typhoon Mawar (T2302) approaching Pacific Islands
     - 25 May, 2023 12:00 UTC – 26 May, 2023 12:30 UTC

  2. Volcanic eruption of Sheveluch, Russia
     - 10 April, 2023 12:00 UTC – 11 April, 2023 18:30 UTC

Overview of Case 1
Typhoon Mawar (T2302) approaching Pacific Islands



Typhoon Mawar formed in the Caroline Islands at 06UTC on 20th May 2023.

This typhoon progressed northwestward while developing over the Mariana Islands and passed near Guam on the 24th.

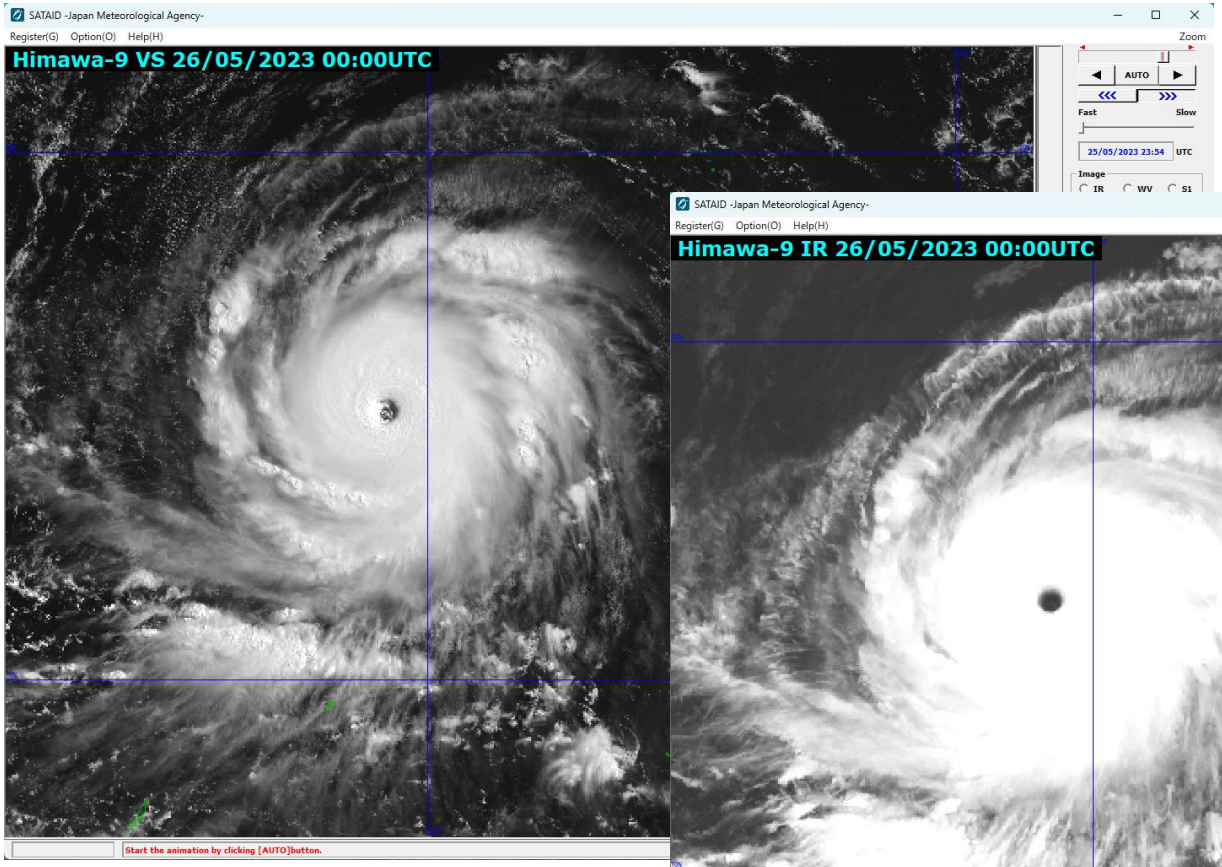
Then this typhoon progressed westward east of the Philippines and approached Japan.

Let's have a familiarity with the SATAID basic operations!

Tips

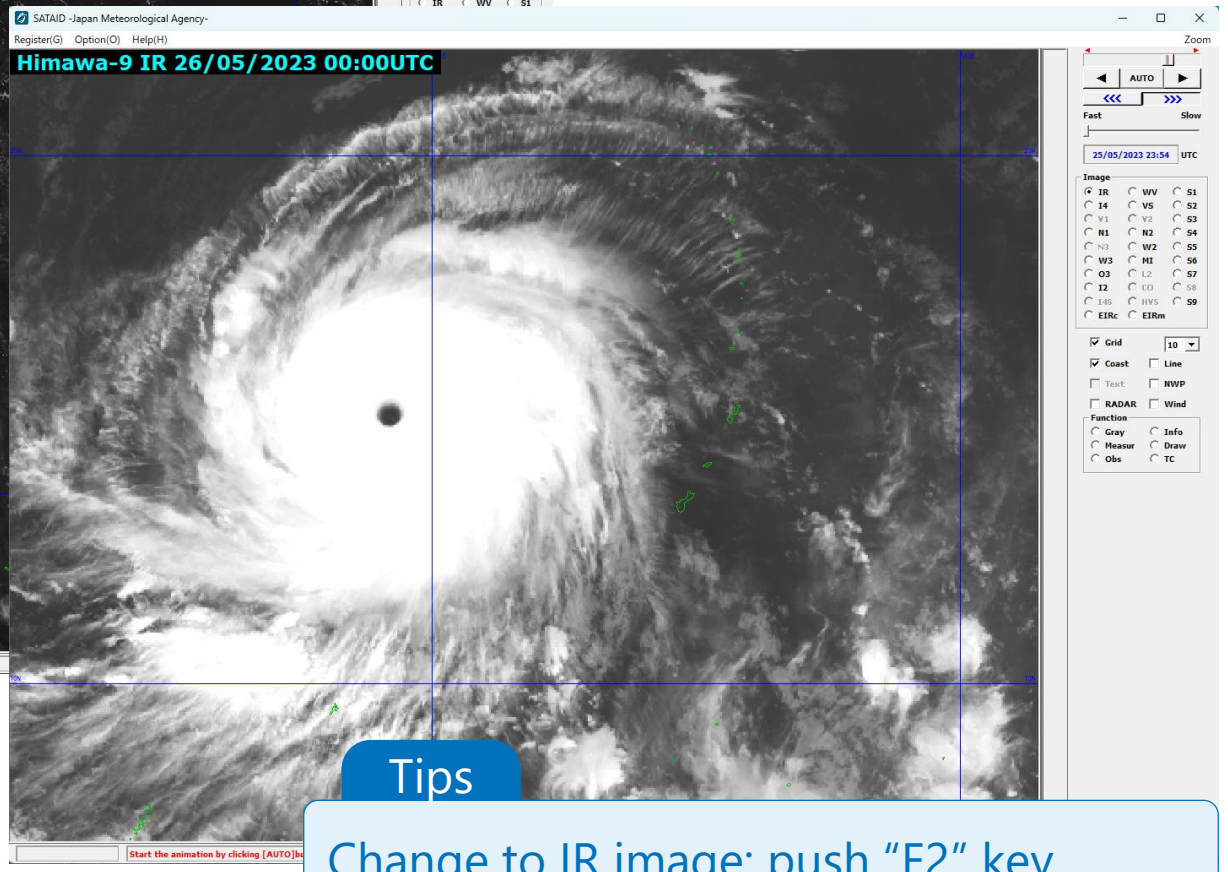
Click "AUTO" button or push Space key to start animation.

Selecting Satellite Images



↑ Displaying VS image

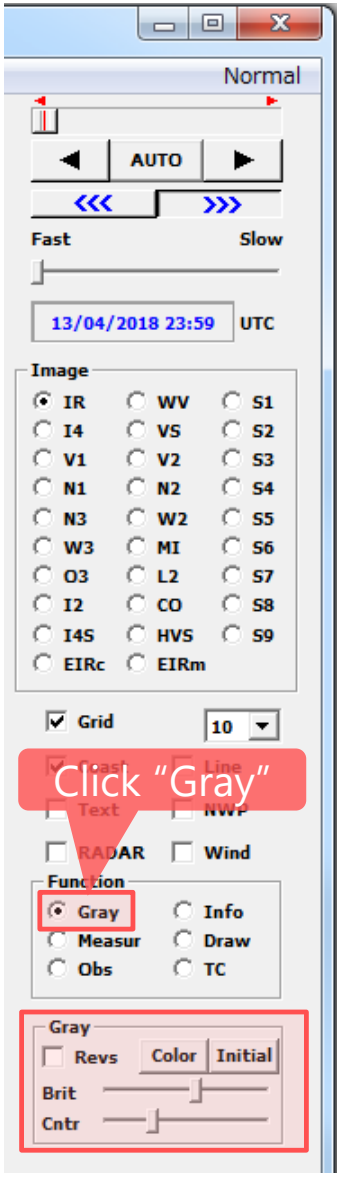
↓ Displaying IR image

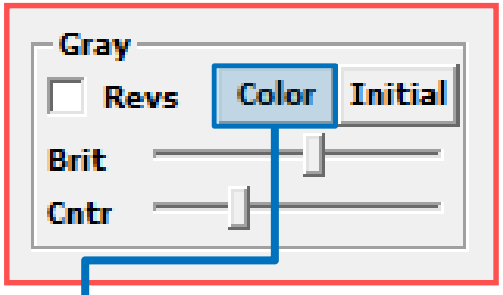


Tips

Change to IR image: push “F2” key
Change to VS image: push “F5” key

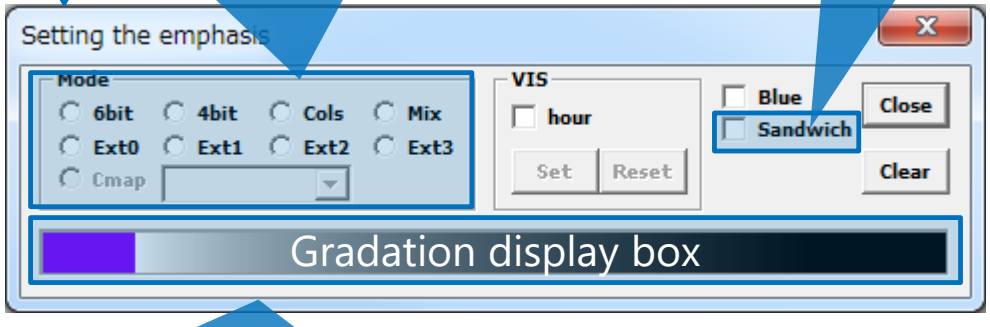
Enhancing Color

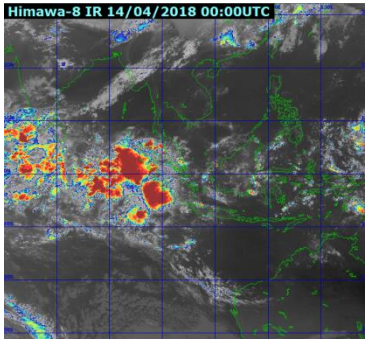




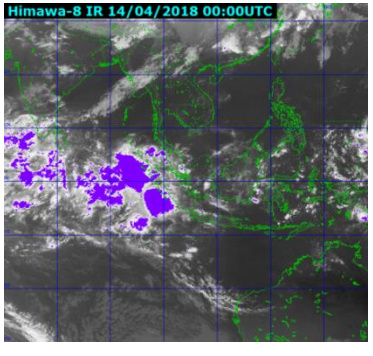
Select a radio button to change the grayscale setting.

Check "Sandwich" to display sandwich image.



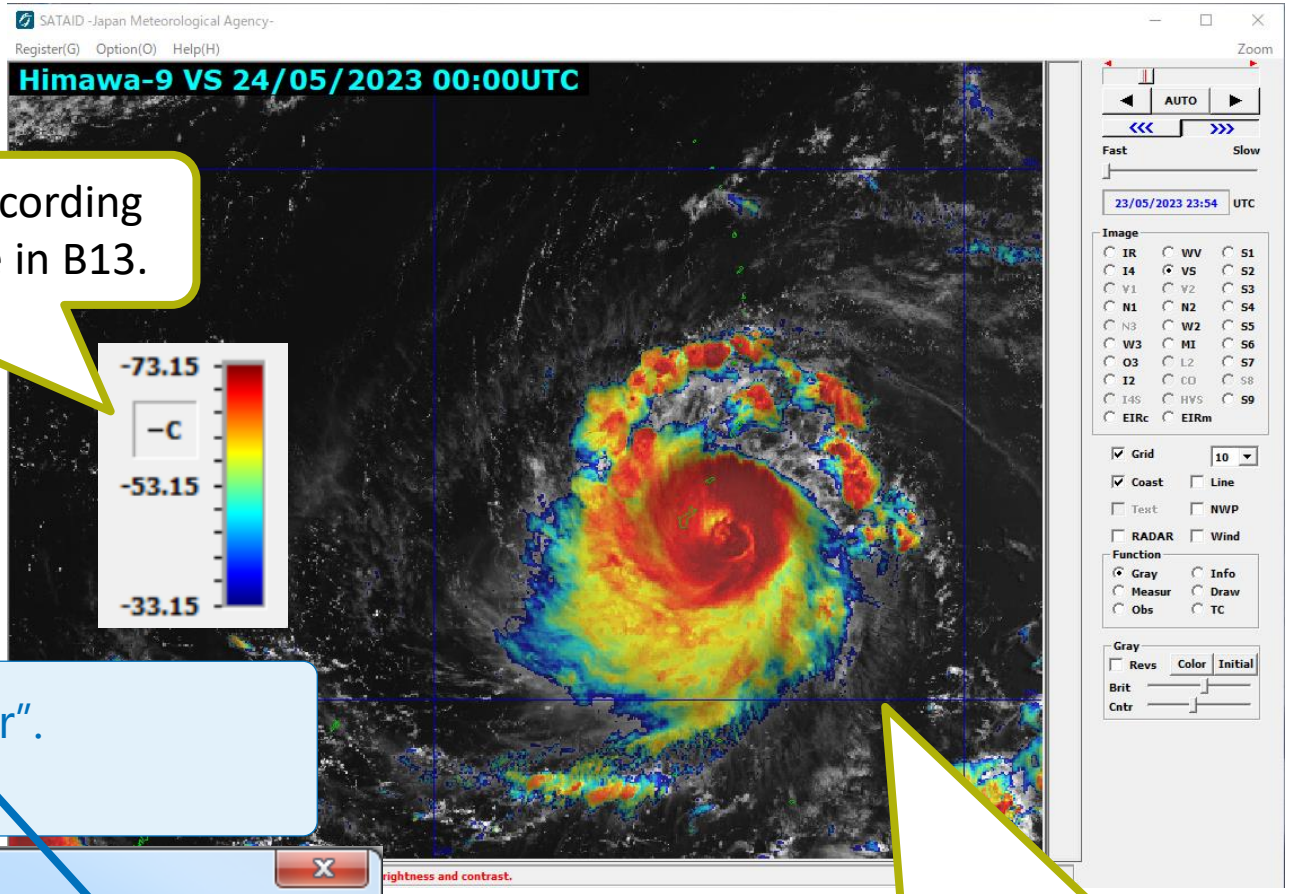


- To select a range to be emphasized:
  Click on two arbitrary points
- To clear the range to be emphasized:
Right-click on the first point and left-click on the second.



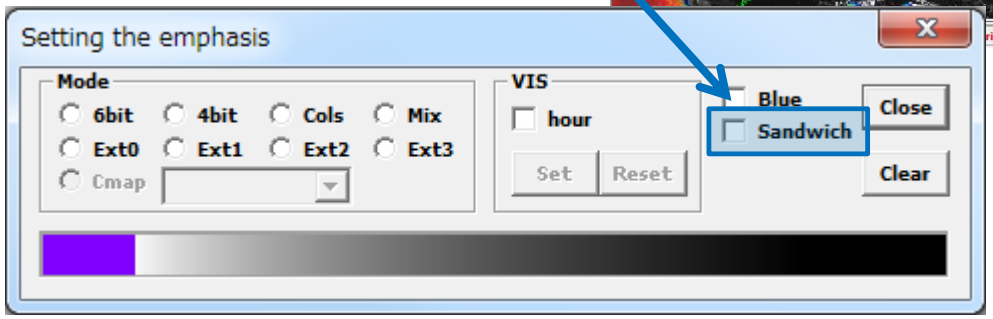
Displaying Sandwich Images

Sandwich image is colored according to the cloud-top temperature in B13.



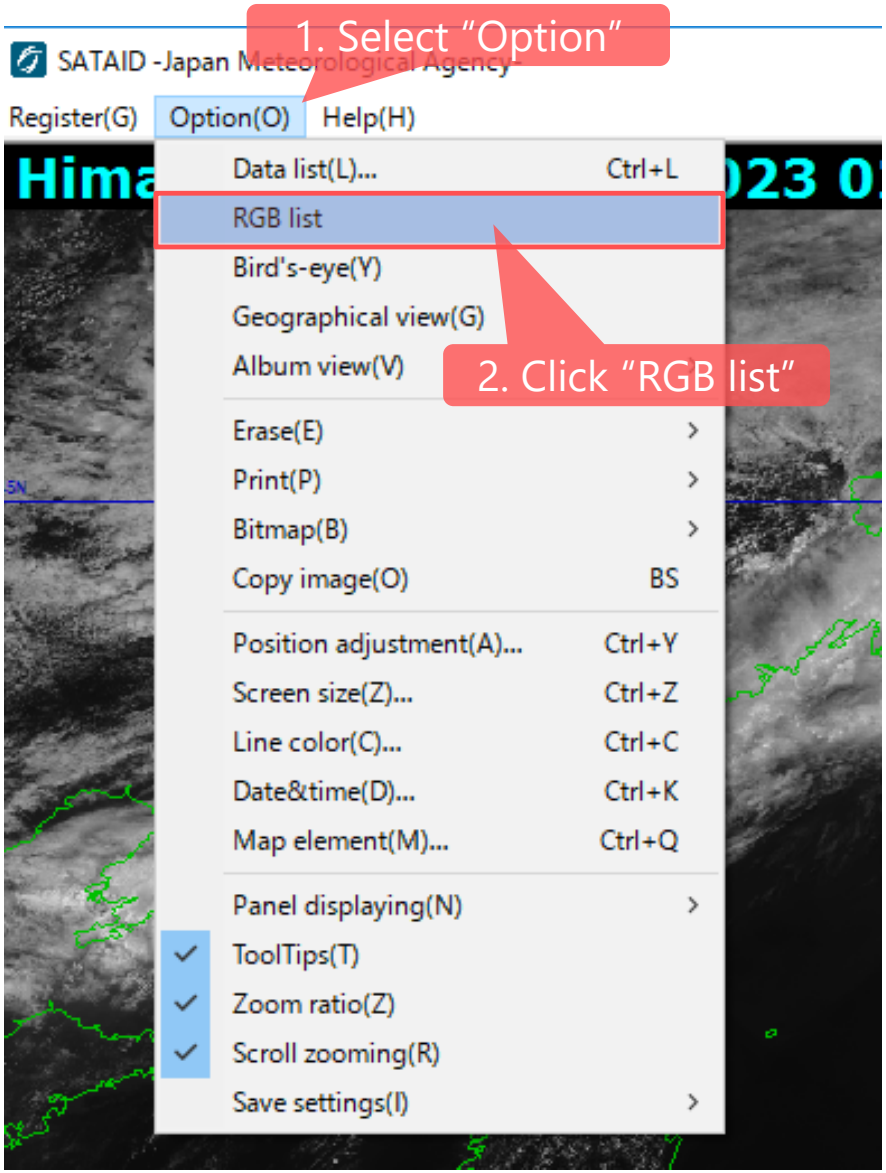
Tips

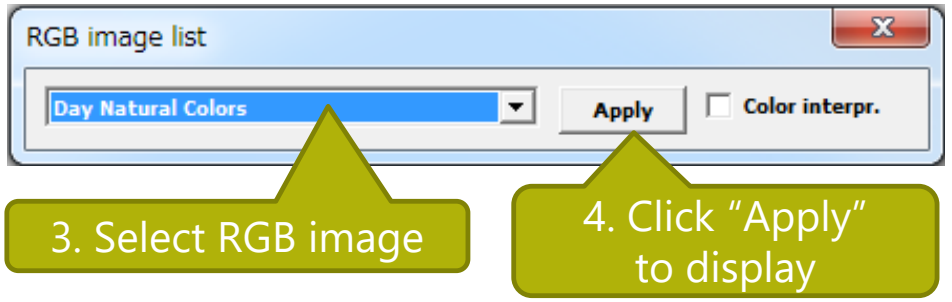
Click “Gray” and click “Color”.
Finally check “Sandwich”.

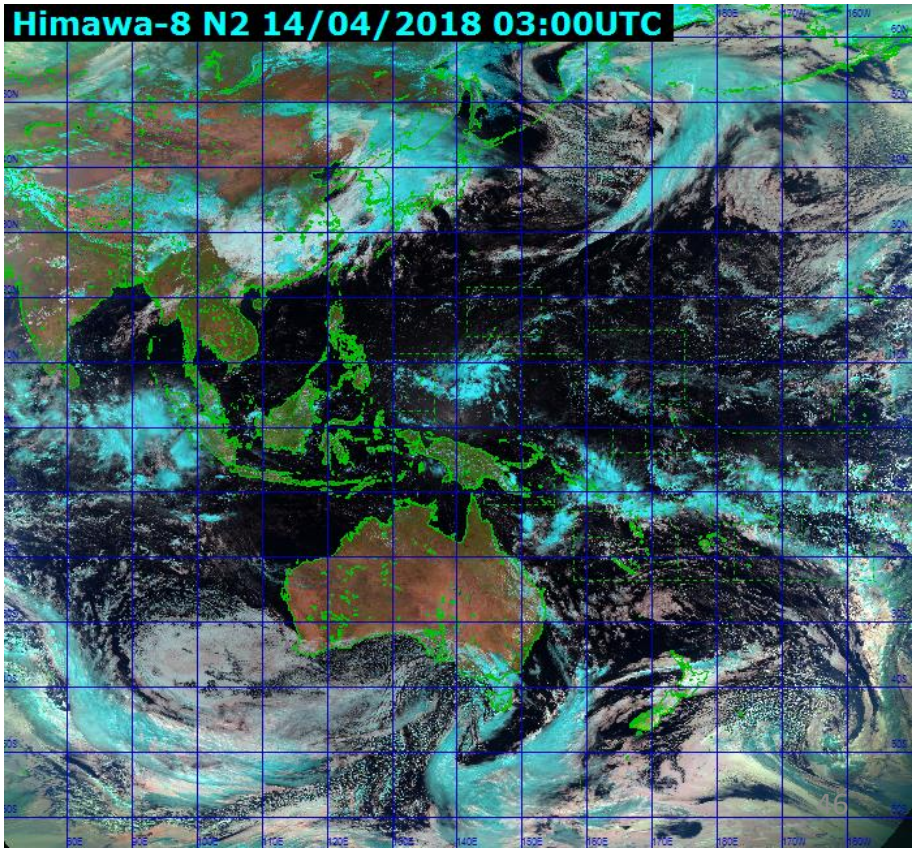


Reddish areas indicate that the area may contain cumulonimbus.

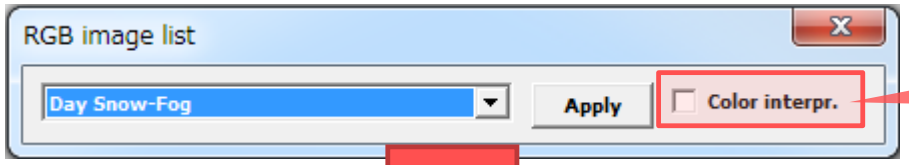
Displaying RGB Images



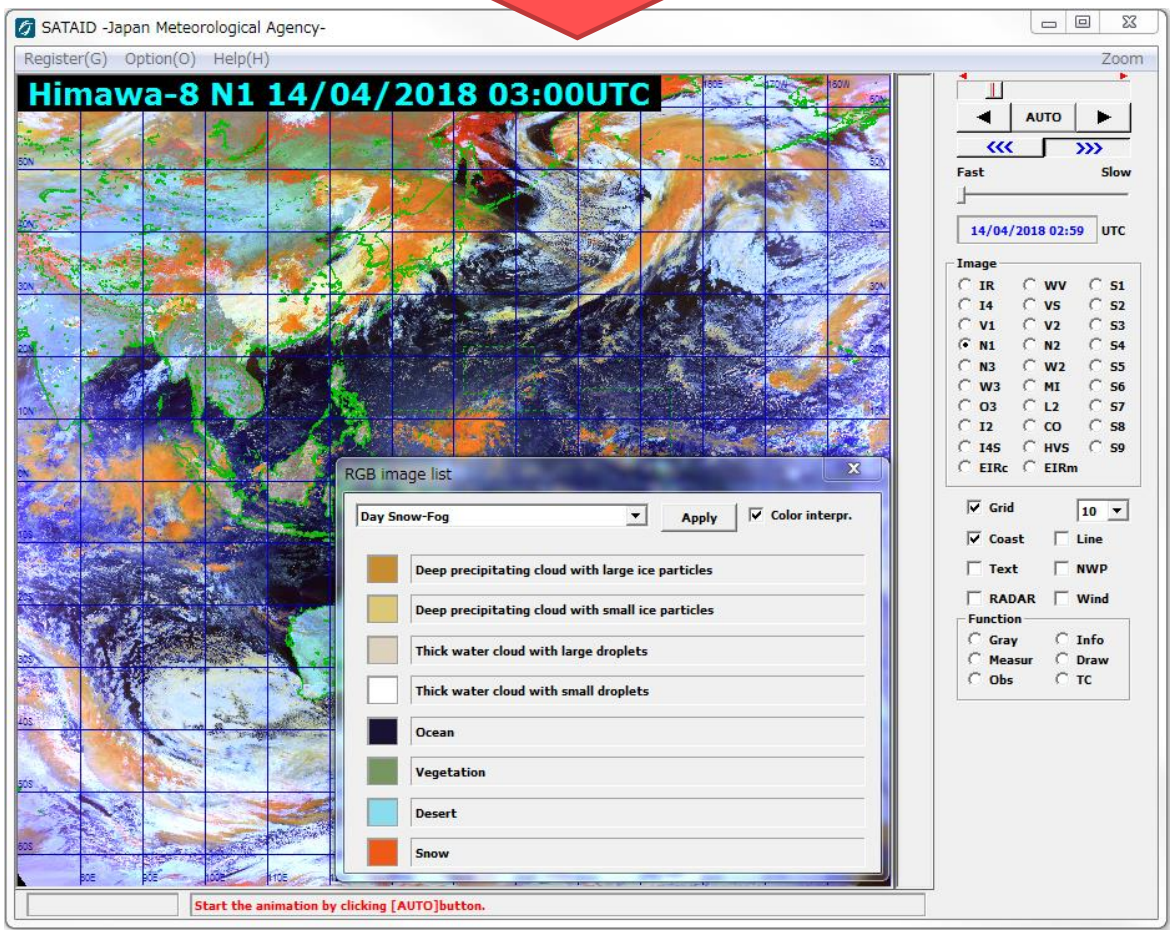




Displaying color legends

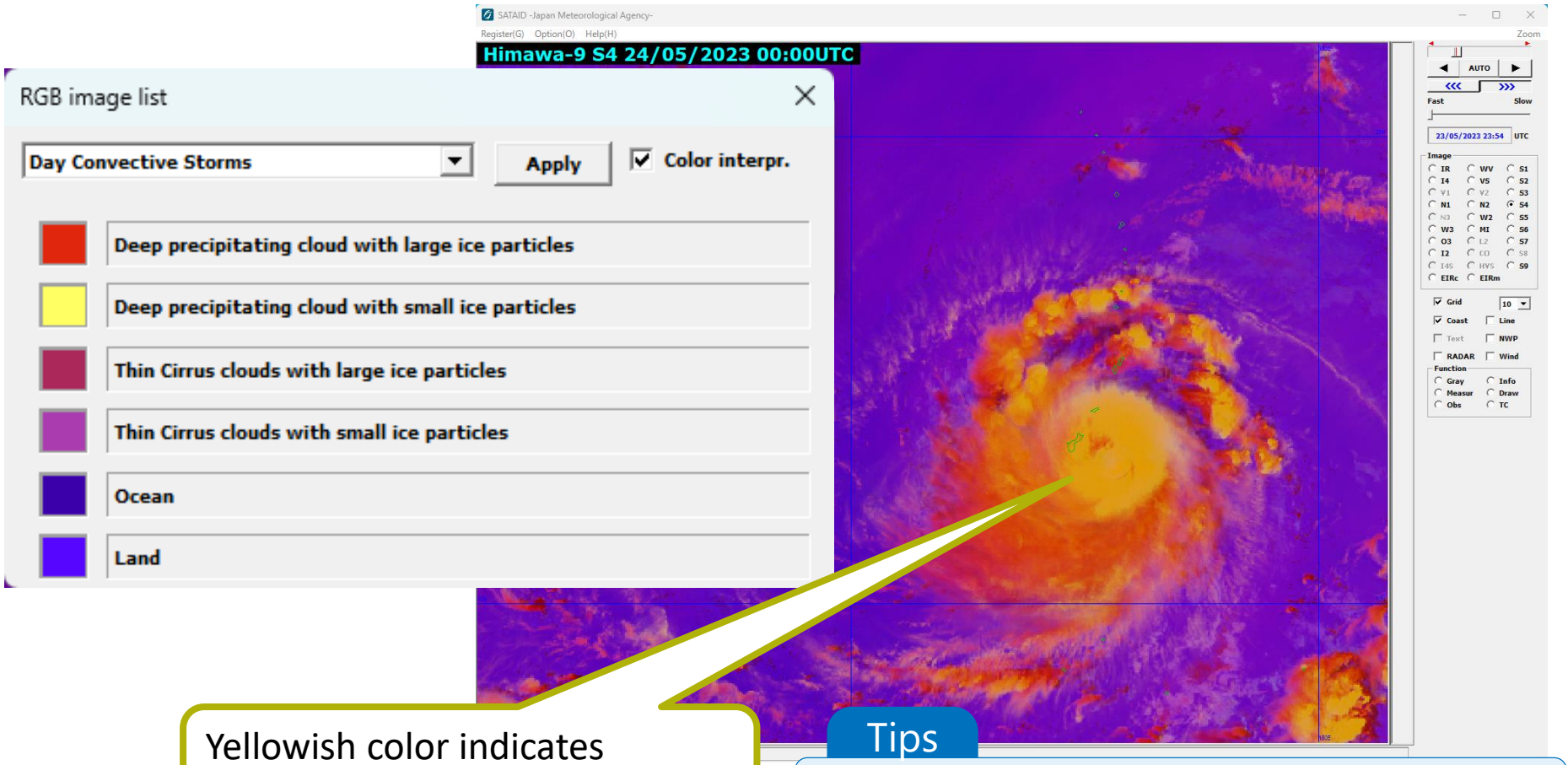


Activate this checkbox.



Displaying RGB Images

Day Convective Storms RGB

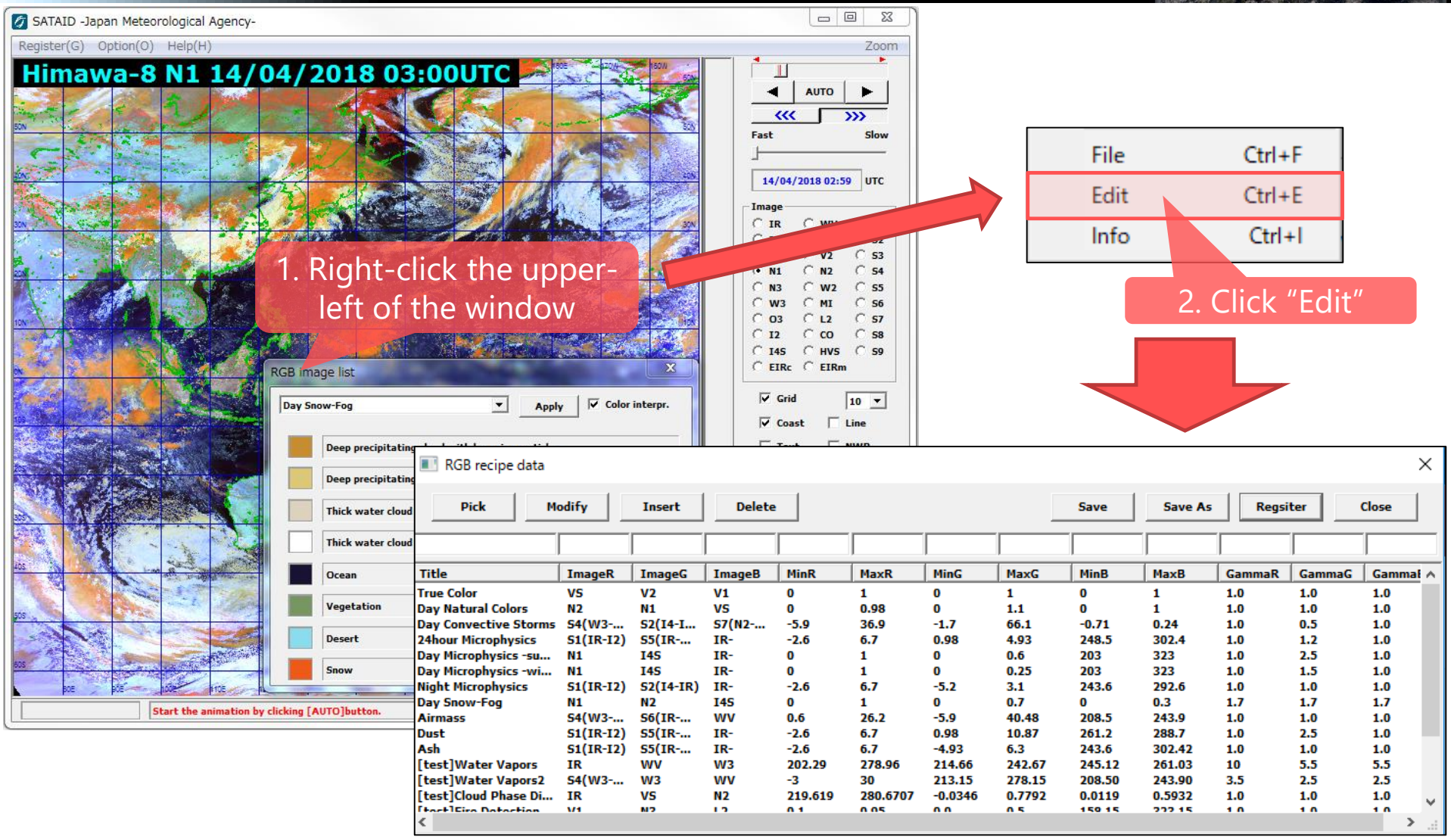


Yellowish color indicates convection with strong updraft

Tips

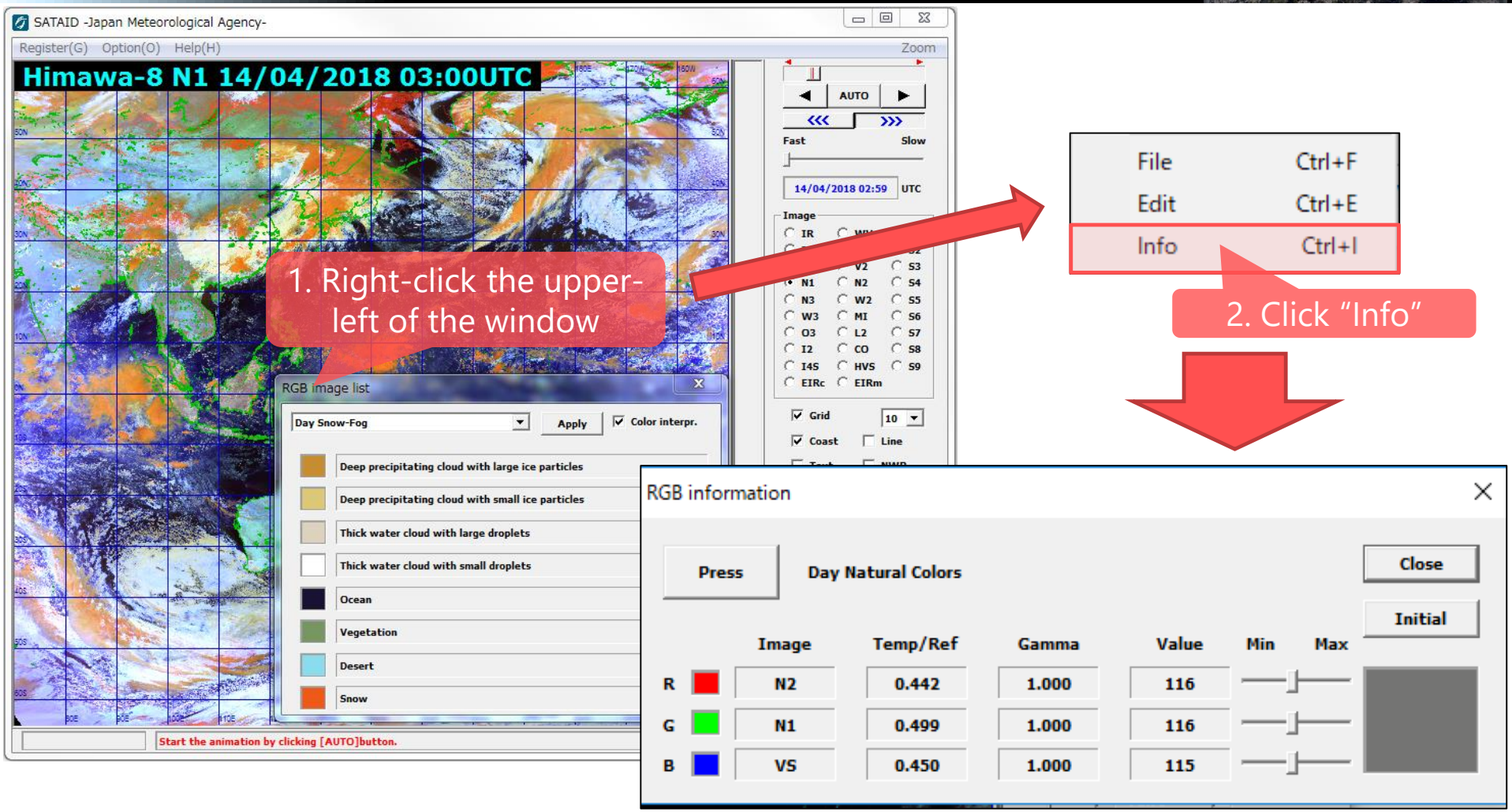
Select “Option” and click “RGB list”.

Creating New RGB Recipes

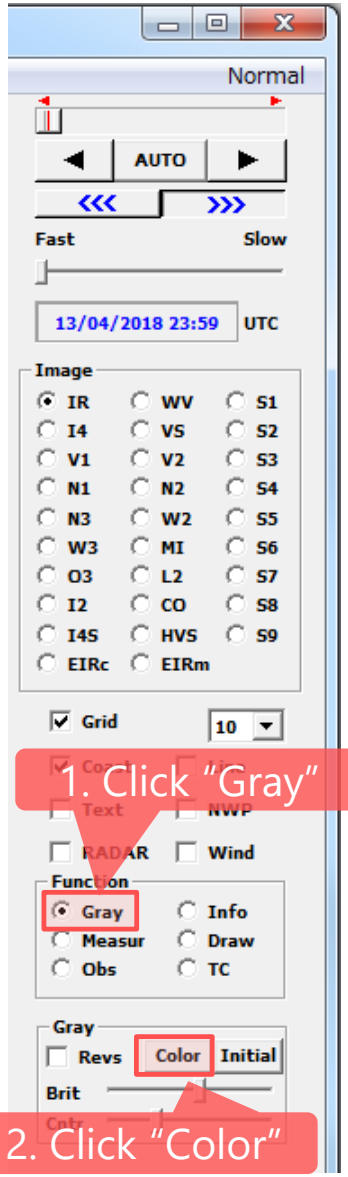


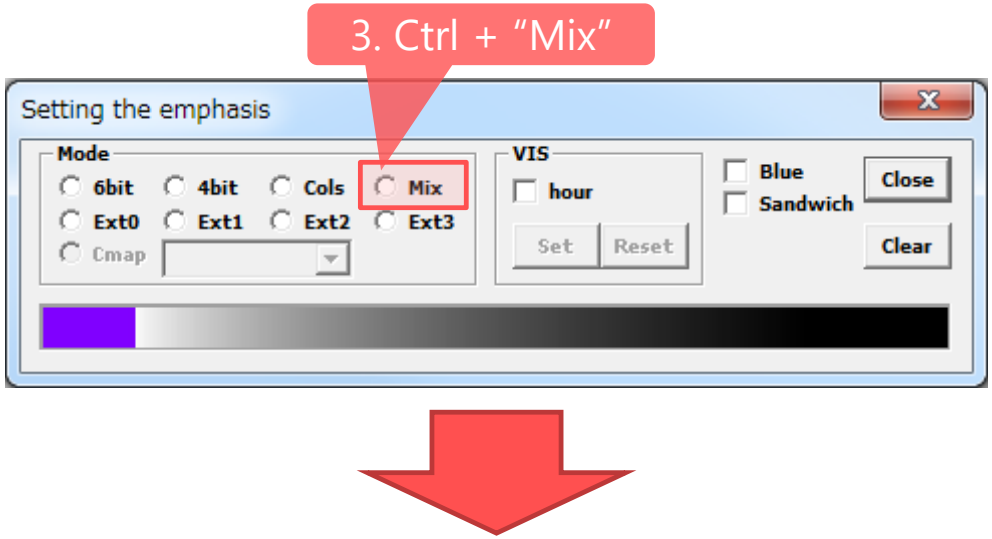
Title	ImageR	ImageG	ImageB	MinR	MaxR	MinG	MaxG	MinB	MaxB	GammaR	GammaG	Gammal
True Color	VS	V2	V1	0	1	0	1	0	1	1.0	1.0	1.0
Day Natural Colors	N2	N1	VS	0	0.98	0	1.1	0	1	1.0	1.0	1.0
Day Convective Storms	S4(W3-...	S2(I4-I...	S7(N2-...	-5.9	36.9	-1.7	66.1	-0.71	0.24	1.0	0.5	1.0
24hour Microphysics	S1(IR-I2)	S5(IR-...	IR-	-2.6	6.7	0.98	4.93	248.5	302.4	1.0	1.2	1.0
Day Microphysics -su...	N1	I4S	IR-	0	1	0	0.6	203	323	1.0	2.5	1.0
Day Microphysics -wi...	N1	I4S	IR-	0	1	0	0.25	203	323	1.0	1.5	1.0
Night Microphysics	S1(IR-I2)	S2(I4-IR)	IR-	-2.6	6.7	-5.2	3.1	243.6	292.6	1.0	1.0	1.0
Day Snow-Fog	N1	N2	I4S	0	1	0	0.7	0	0.3	1.7	1.7	1.7
Airmass	S4(W3-...	S6(IR-...	WV	0.6	26.2	-5.9	40.48	208.5	243.9	1.0	1.0	1.0
Dust	S1(IR-I2)	S5(IR-...	IR-	-2.6	6.7	0.98	10.87	261.2	288.7	1.0	2.5	1.0
Ash	S1(IR-I2)	S5(IR-...	IR-	-2.6	6.7	-4.93	6.3	243.6	302.42	1.0	1.0	1.0
[test]Water Vapors	IR	WV	W3	202.29	278.96	214.66	242.67	245.12	261.03	10	5.5	5.5
[test]Water Vapors2	S4(W3-...	W3	WV	-3	30	213.15	278.15	208.50	243.90	3.5	2.5	2.5
[test]Cloud Phase Di...	IR	VS	N2	219.619	280.6707	-0.0346	0.7792	0.0119	0.5932	1.0	1.0	1.0

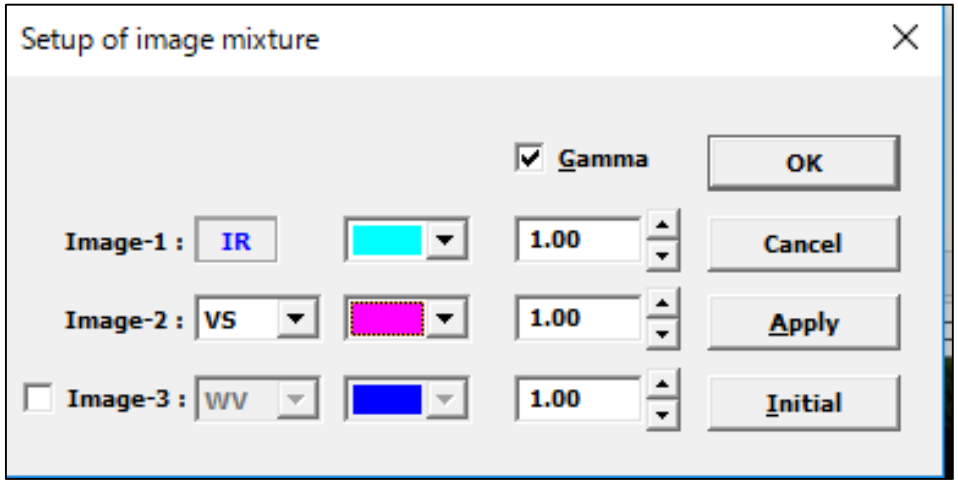
Comparison with RGB values



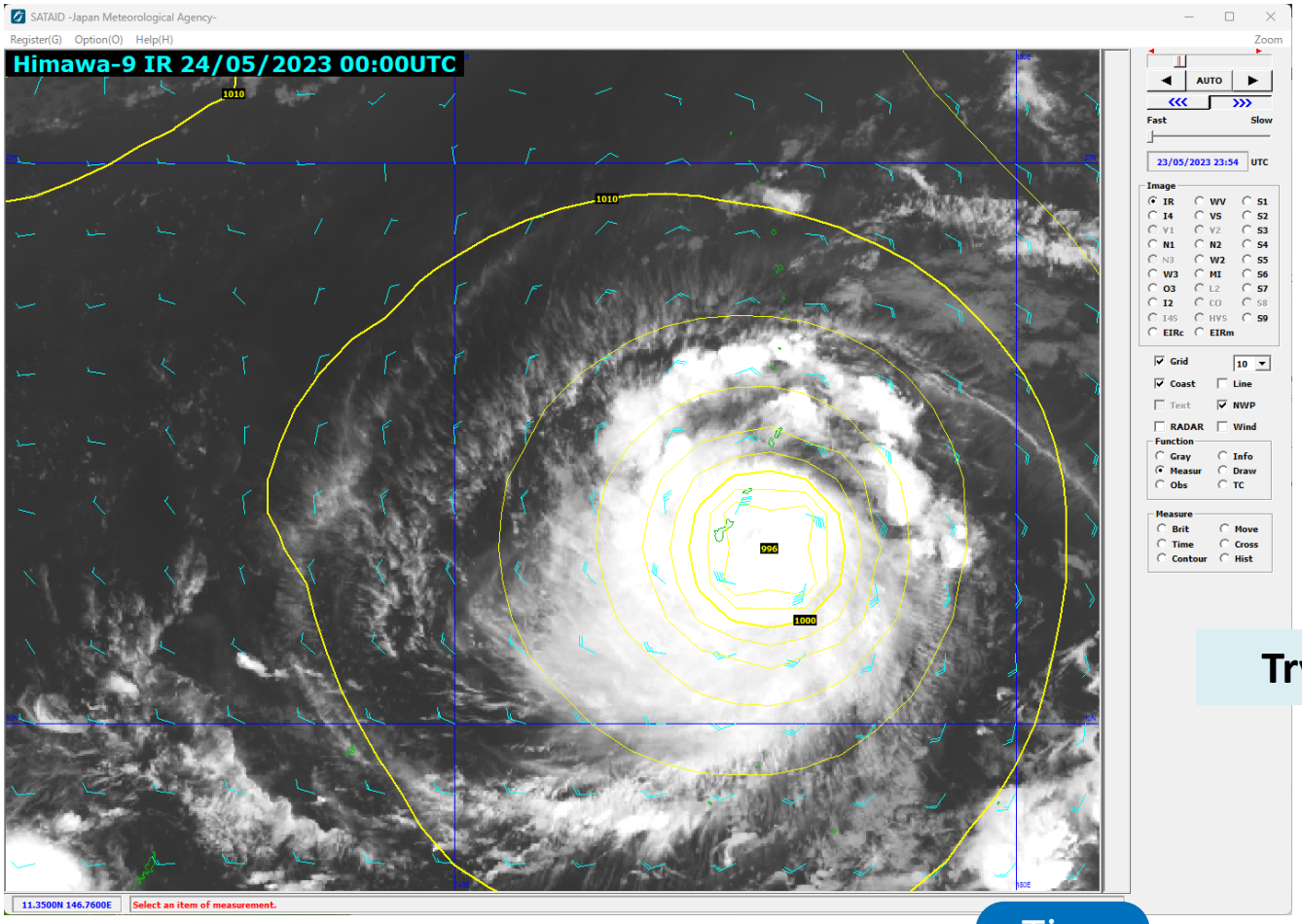
RGB Images by “Mix” Function







Overlaying NWP data



↑ Overlaying Surface “Wind” and “Psea” on IR imagery.

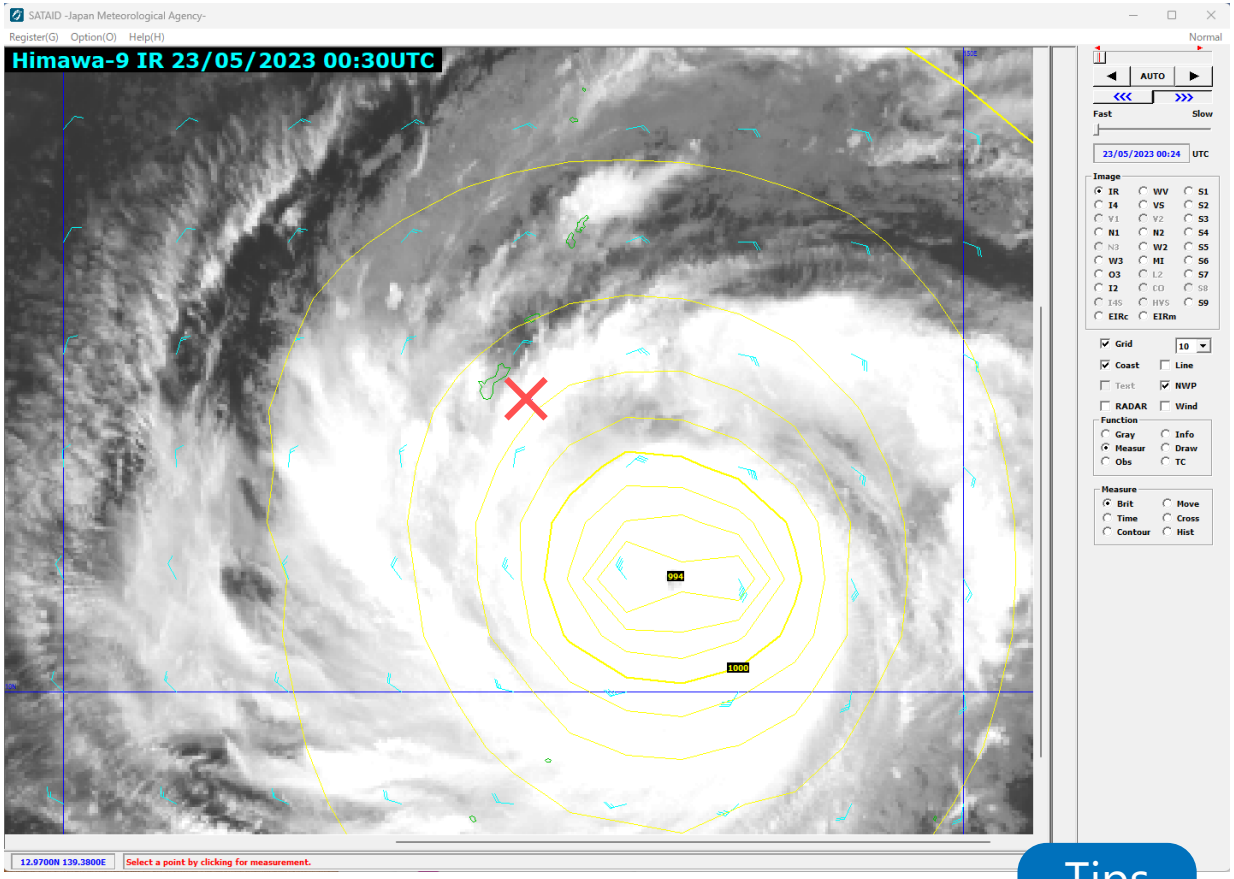
Try various data overlays!

Tips

Check “NWP” and select “GSM”.

Data Evaluation

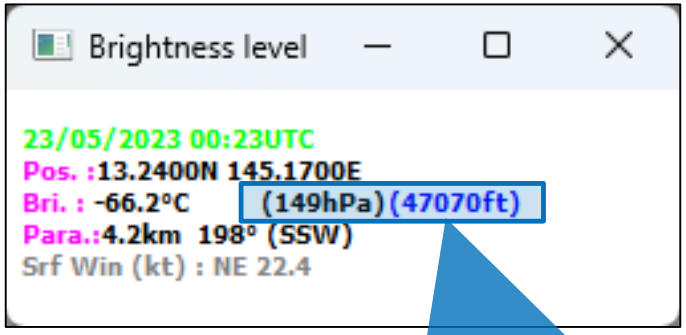
Evaluation of brightness temperature



Let's look at brightness temperature and altitude of cloud top of the cloud bands approaching Guam.

Tips

Click "Measur" and click "Brit". Finally click on the image.



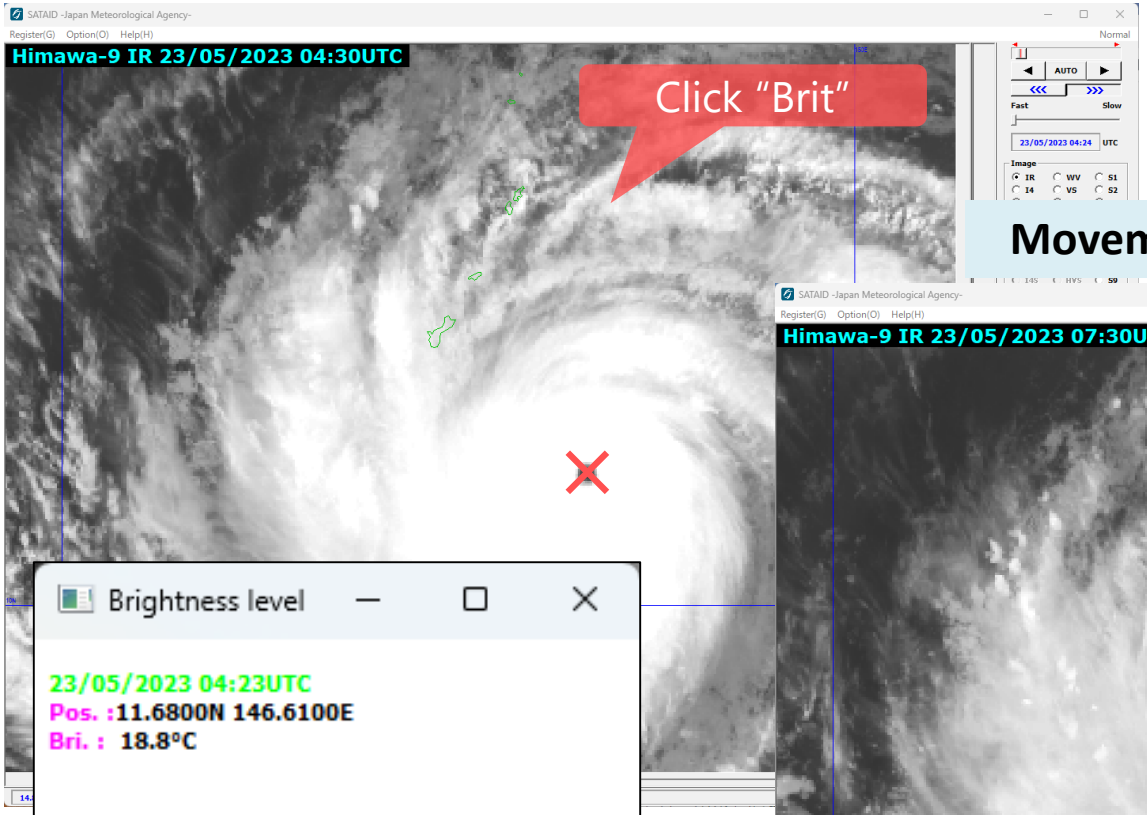
When NWP data are displayed, estimated altitudes will be shown.

Tips

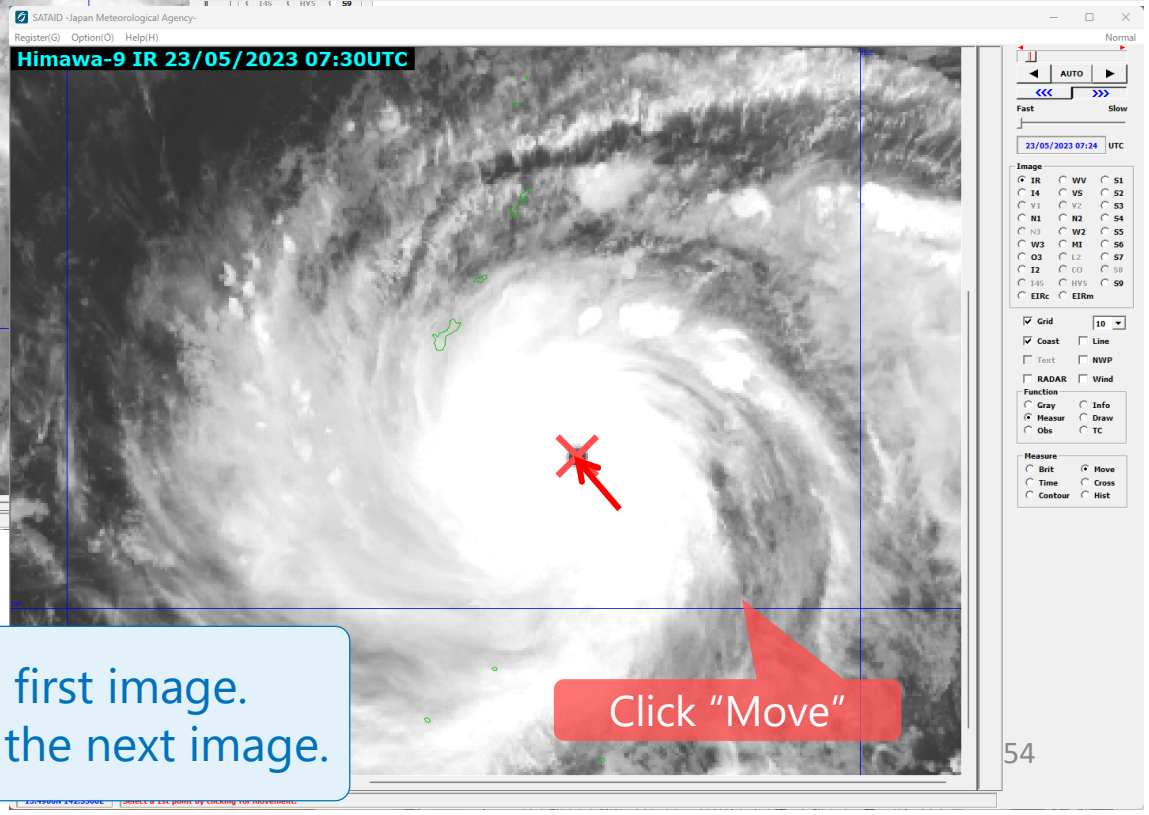
Zoom in: Ctrl + Shift + Left-Click
Zoom our: Ctrl + Shift + Right-Click

Data Evaluation

Approximate center position of typhoon



Movement direction and speed of typhoon

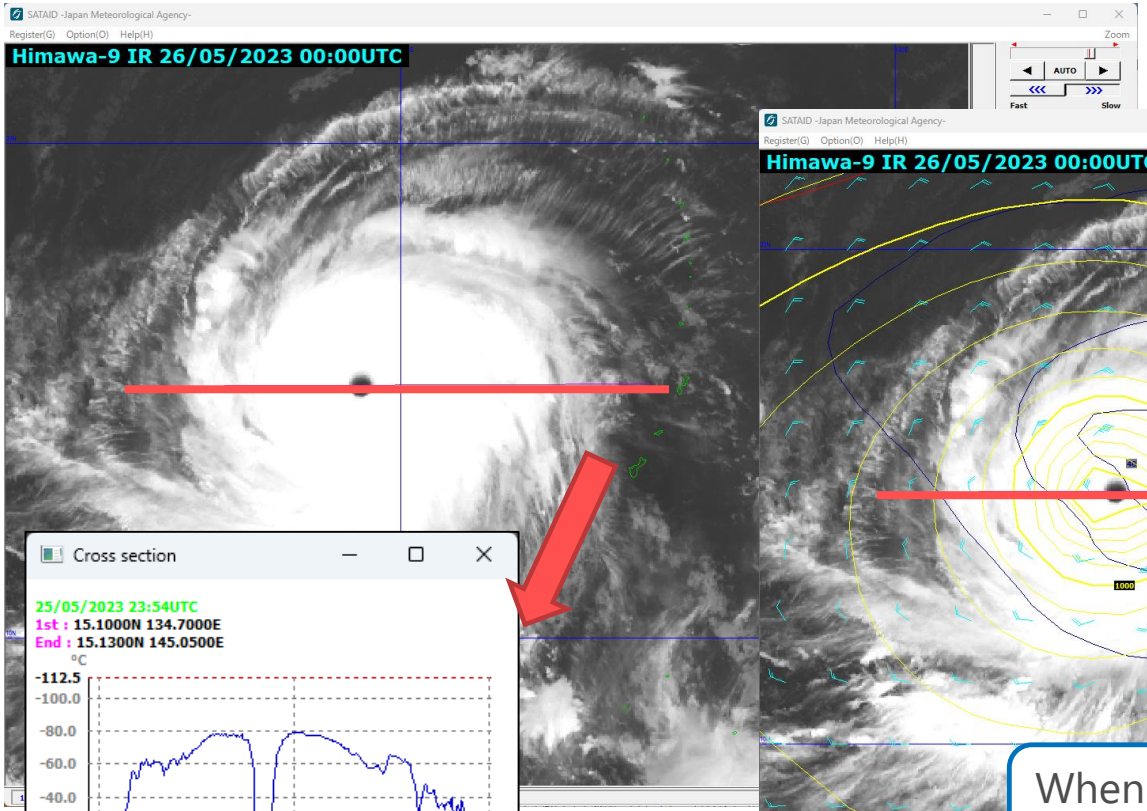


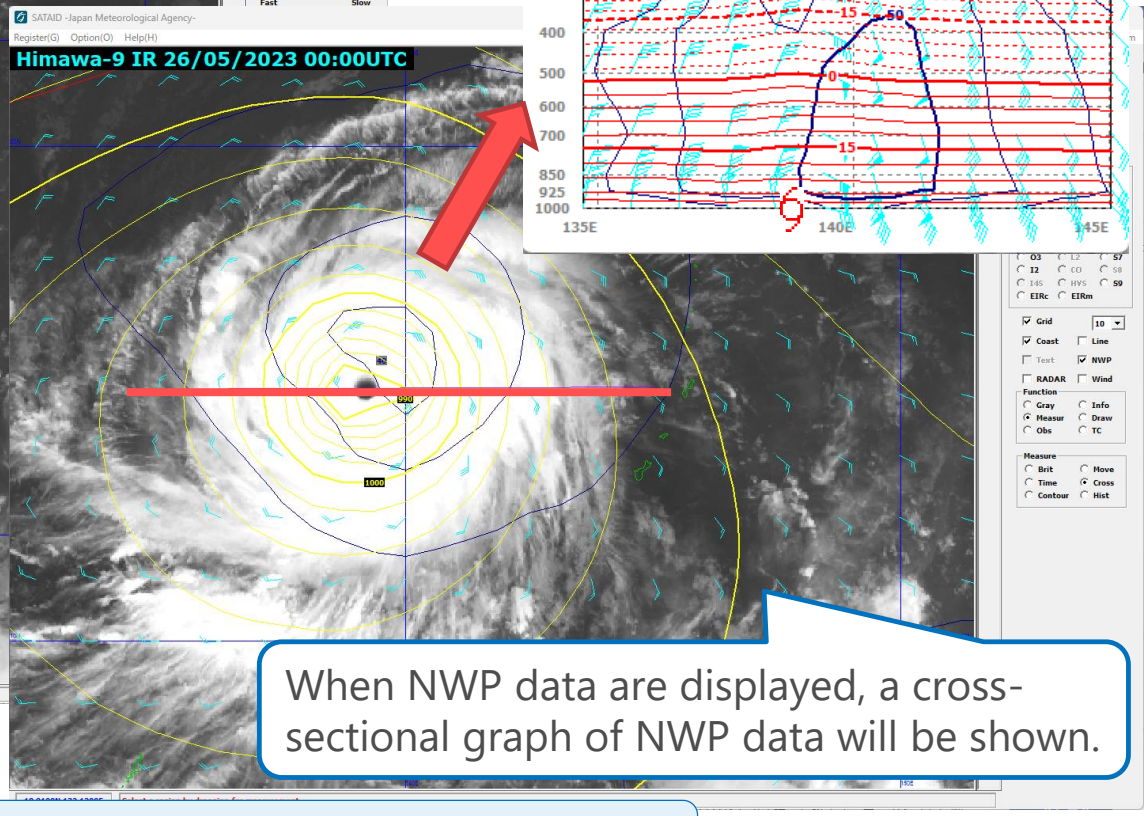
Tips

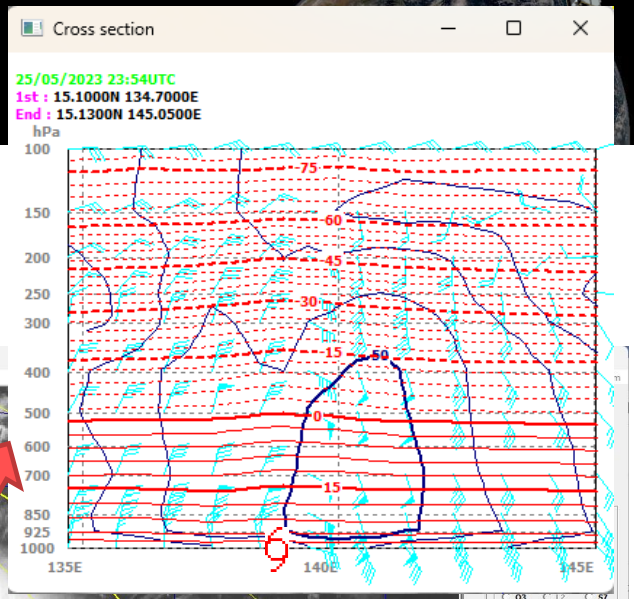
Select the first point in the first image.
Select the second point in the next image.

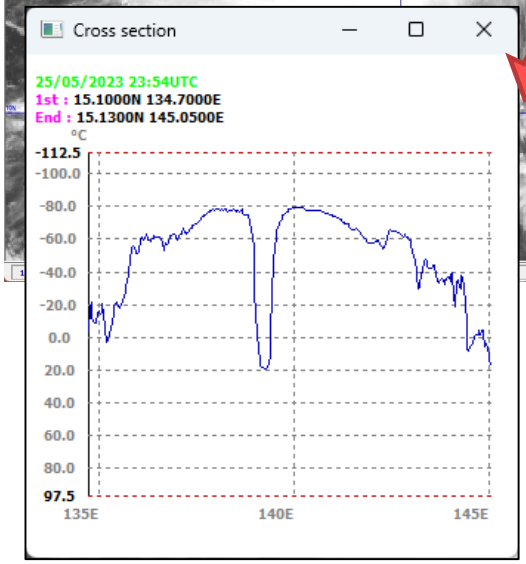
Data Evaluation

Evaluation of cross section







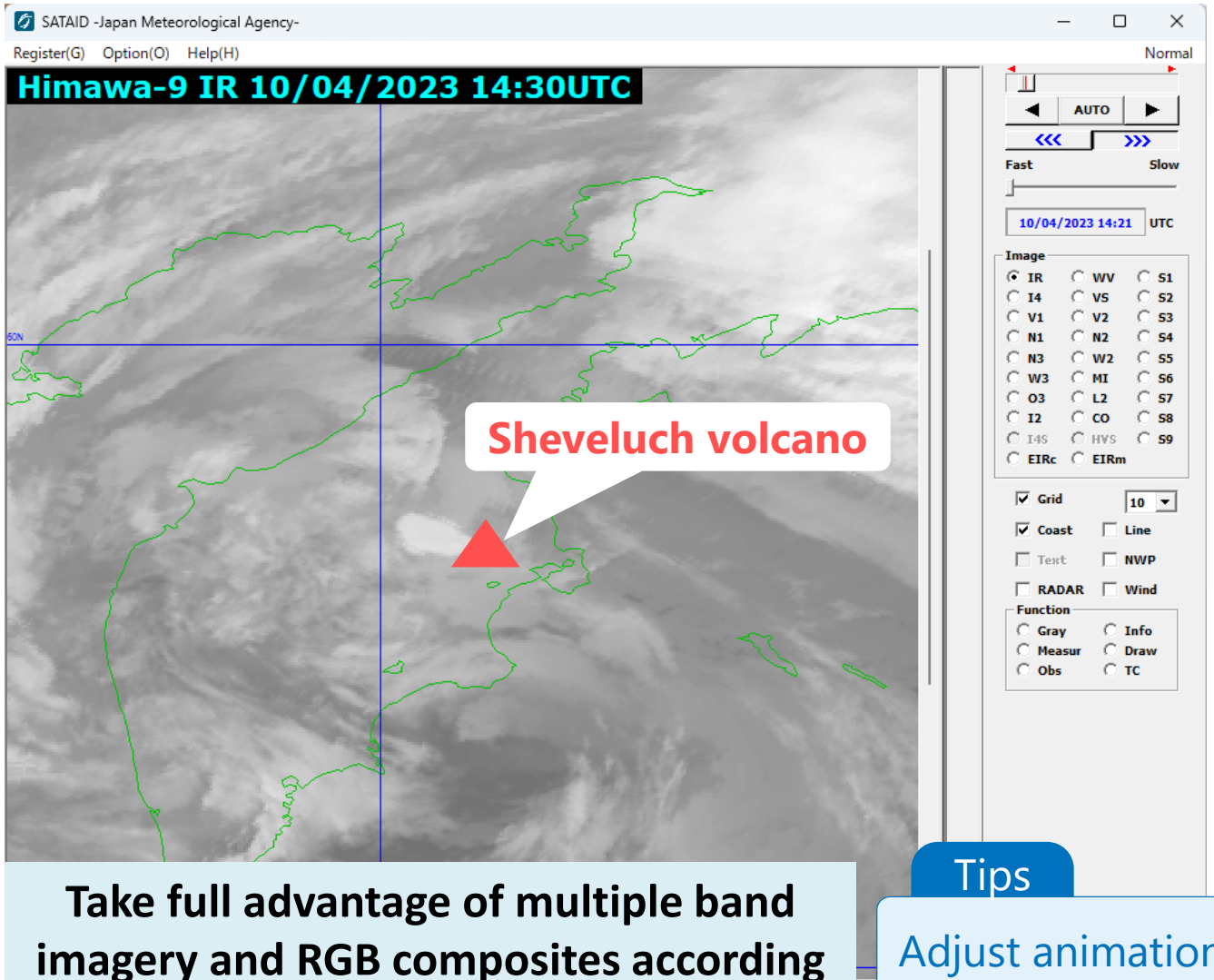


When NWP data are displayed, a cross-sectional graph of NWP data will be shown.

Tips

Click “Measur” and click “Cross”.
Finally drag on image.

Overview of Case 2
Volcanic eruption of Sheveluch, Russia



Sheveluch volcano in the Kamchatka Peninsula, Russia erupted at around 13UTC on the night of 10th April 2023.

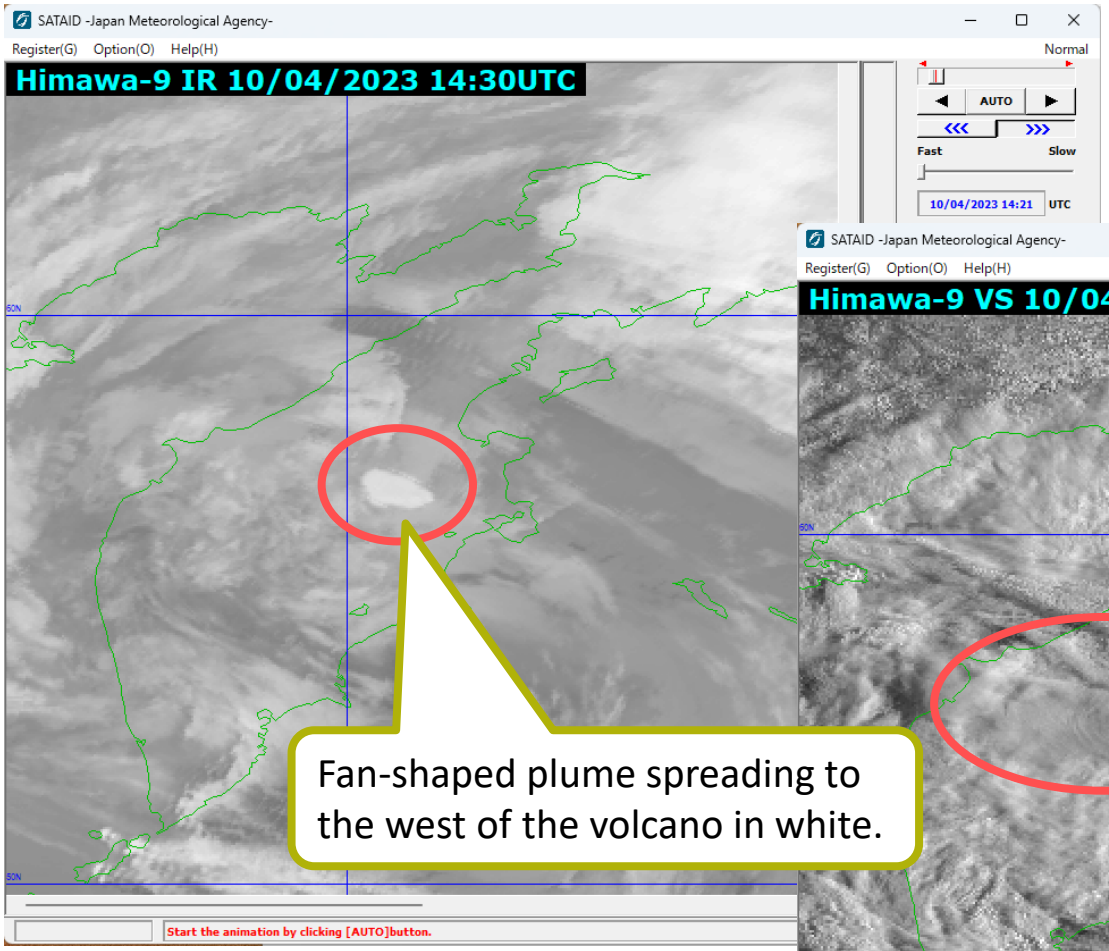
The height of the volcanic plume was estimated to reach about 16 km!

Take full advantage of multiple band imagery and RGB composites according to the purpose.

Tips

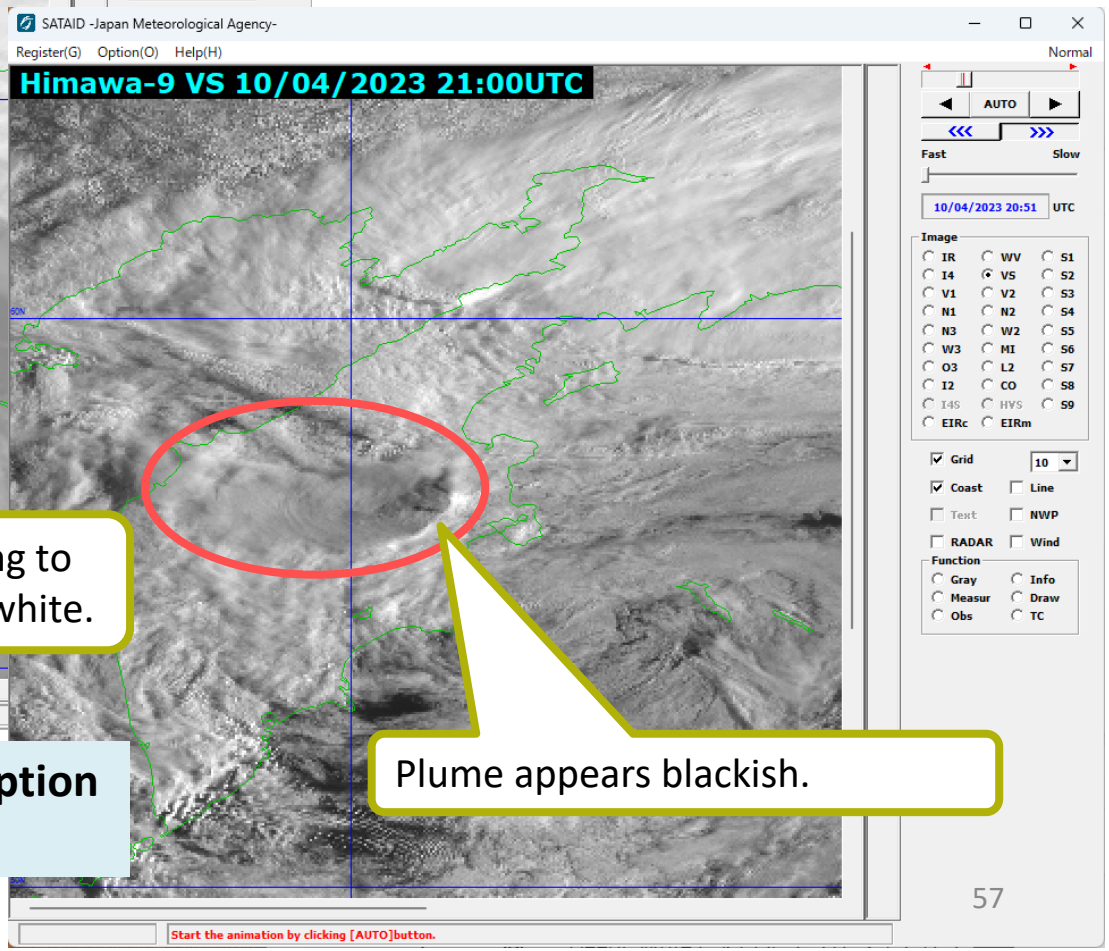
Adjust animation speed: First-Slow scrollbar or up key and down key

Selecting Satellite Images



↑ IR image immediately after the eruption (14:30UTC 10th April)

↓ VS image of the next day (21:00UTC 10th April)

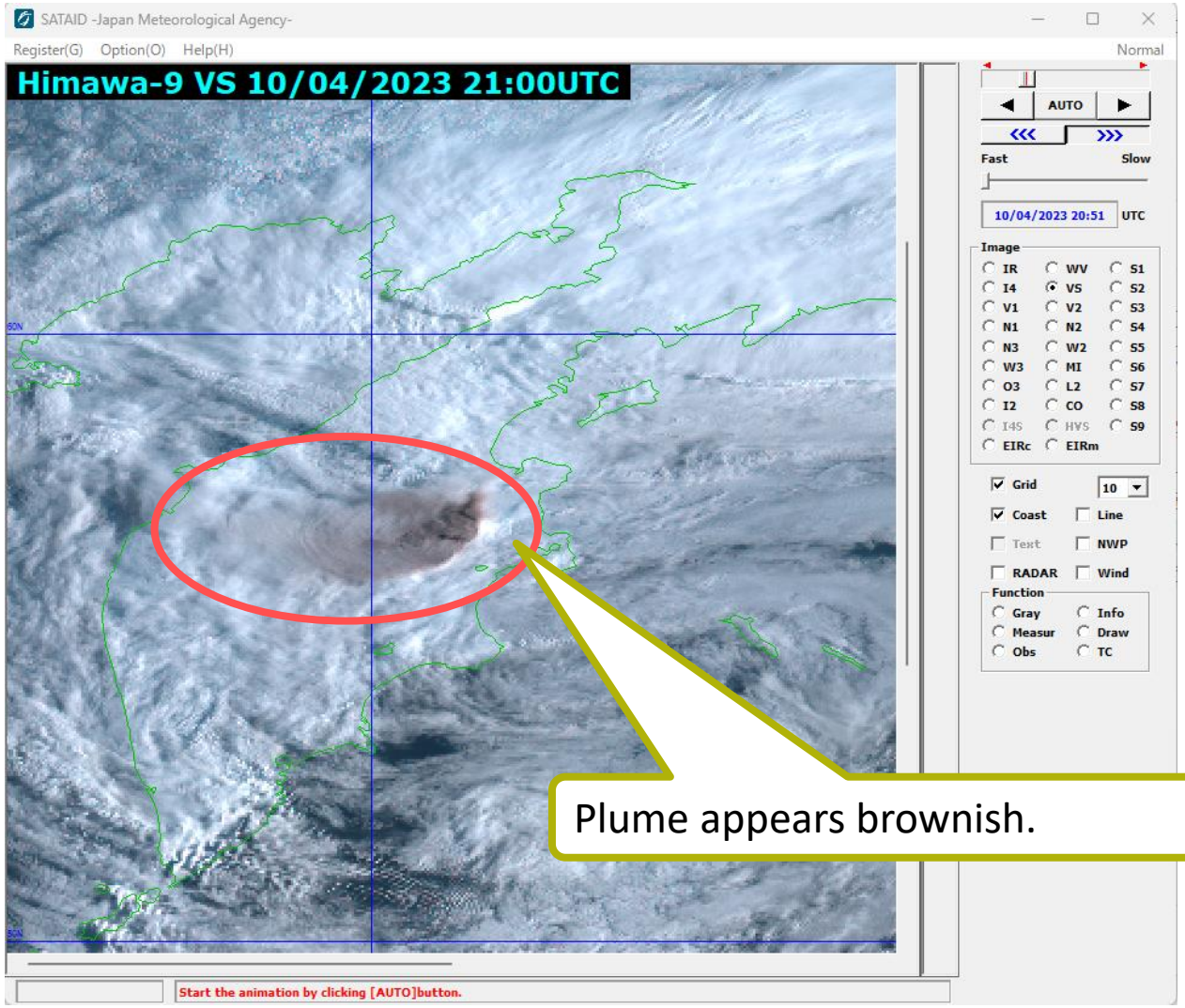


Fan-shaped plume spreading to the west of the volcano in white.

Plume appears blackish.

Displaying RGB Images

True Color RGB



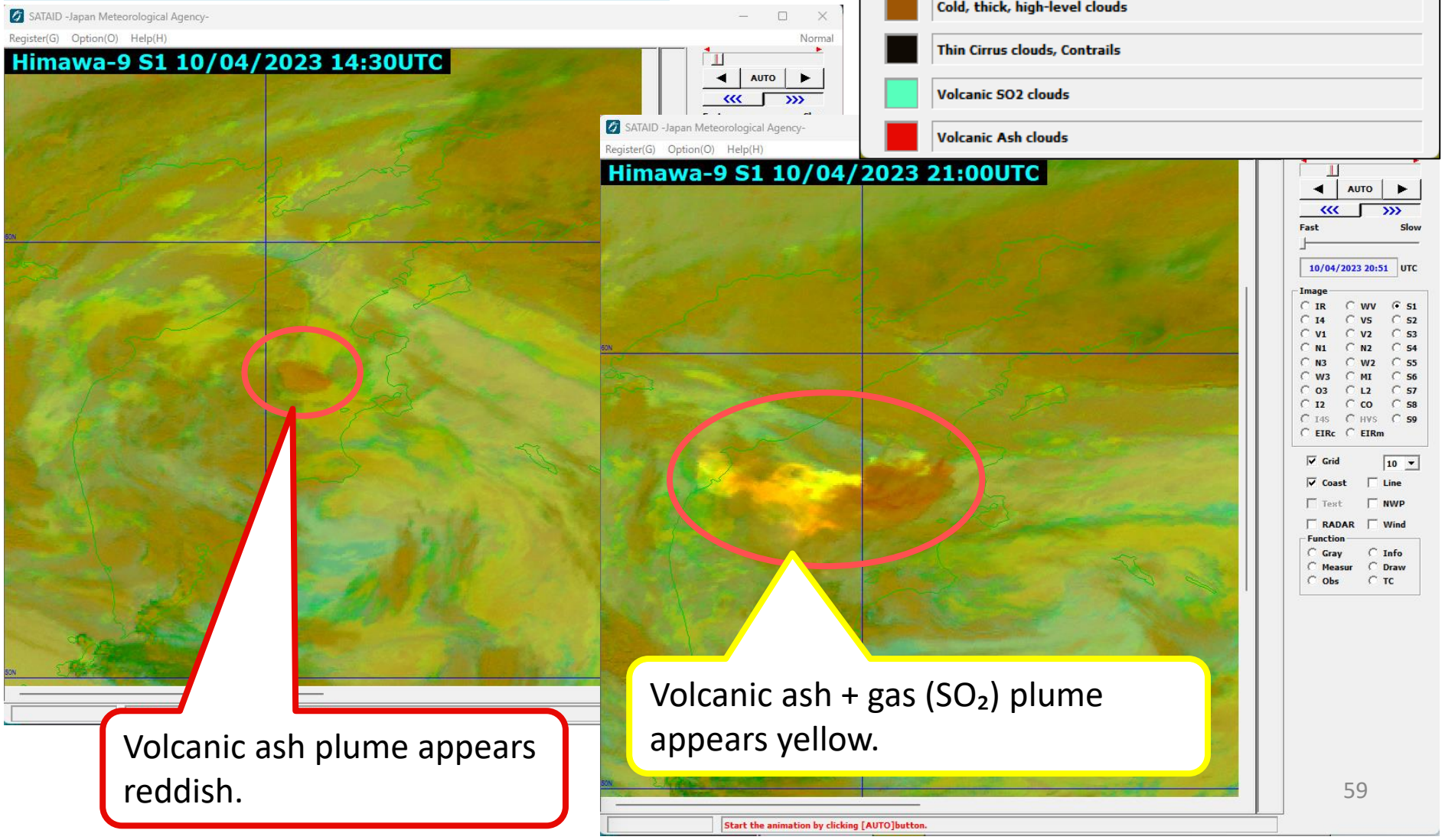
Plume appears brownish.

Tips

Select “Option” and click “RGB list”.

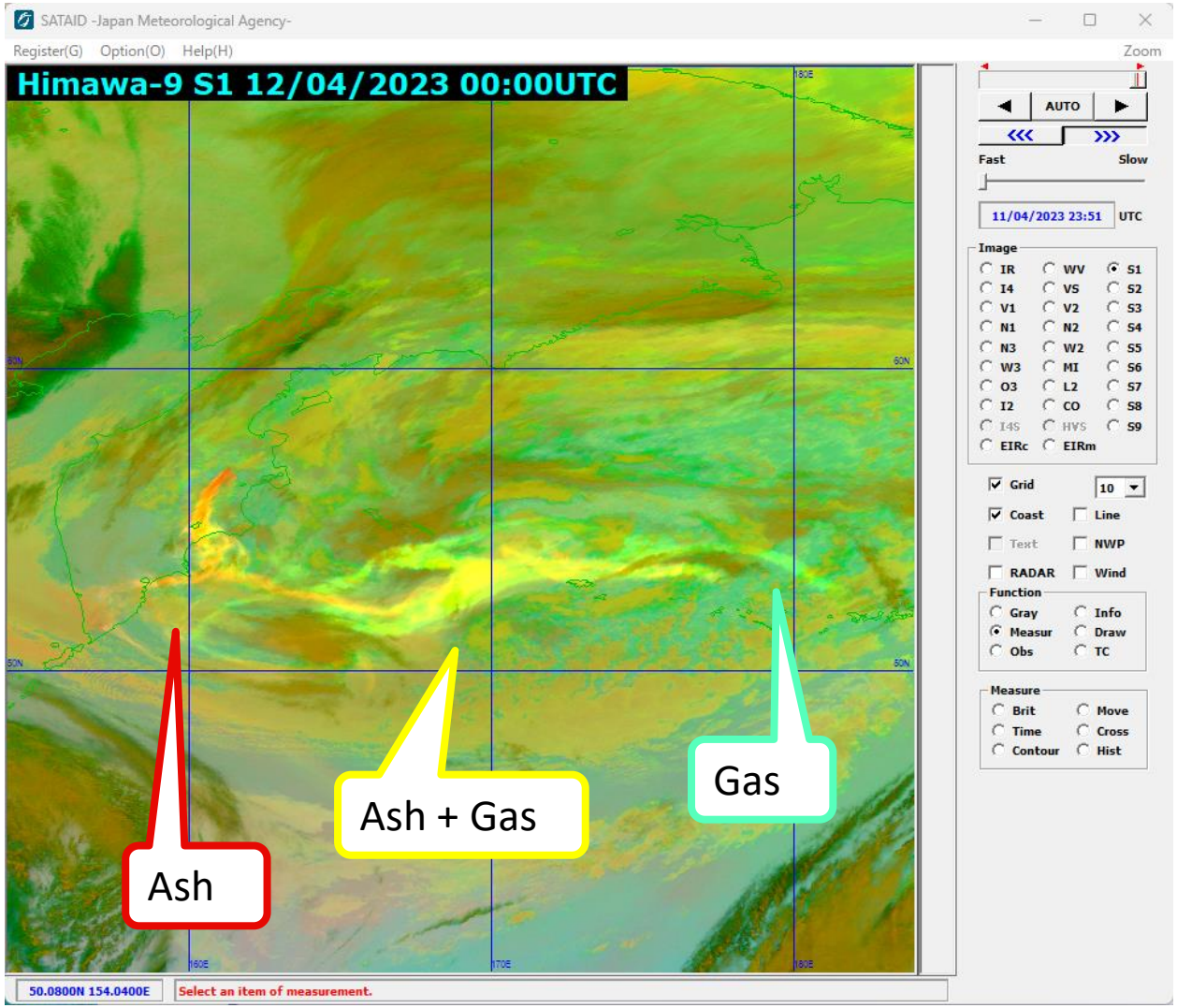
Displaying RGB Images

Ash RGB



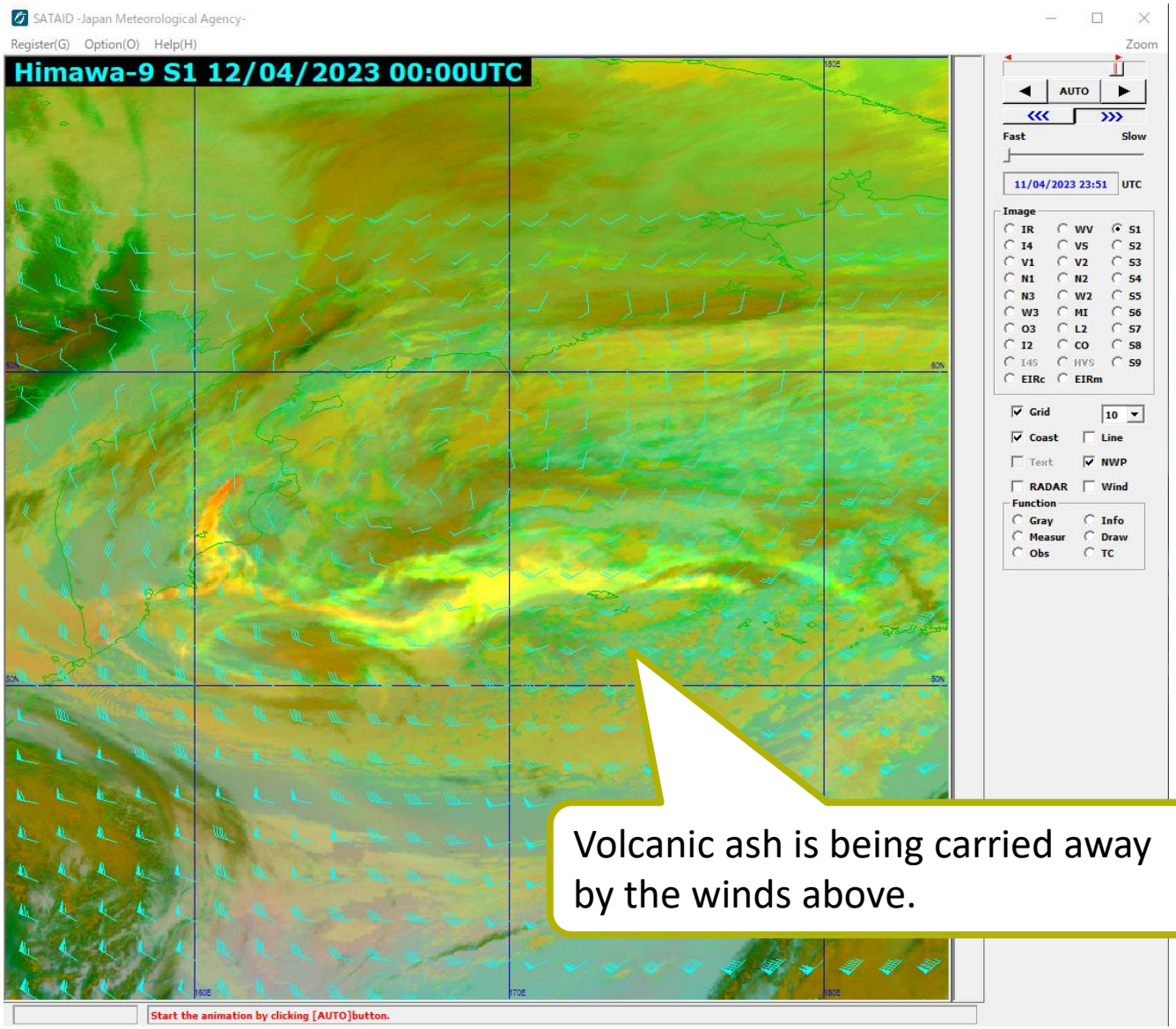
Displaying RGB Images

Ash RGB



The volcanic ash is seen in red to yellow as it flows counterclockwise to the southeast of the volcano.

Overlaying NWP data



Volcanic ash is being carried away by the winds above.

Tips

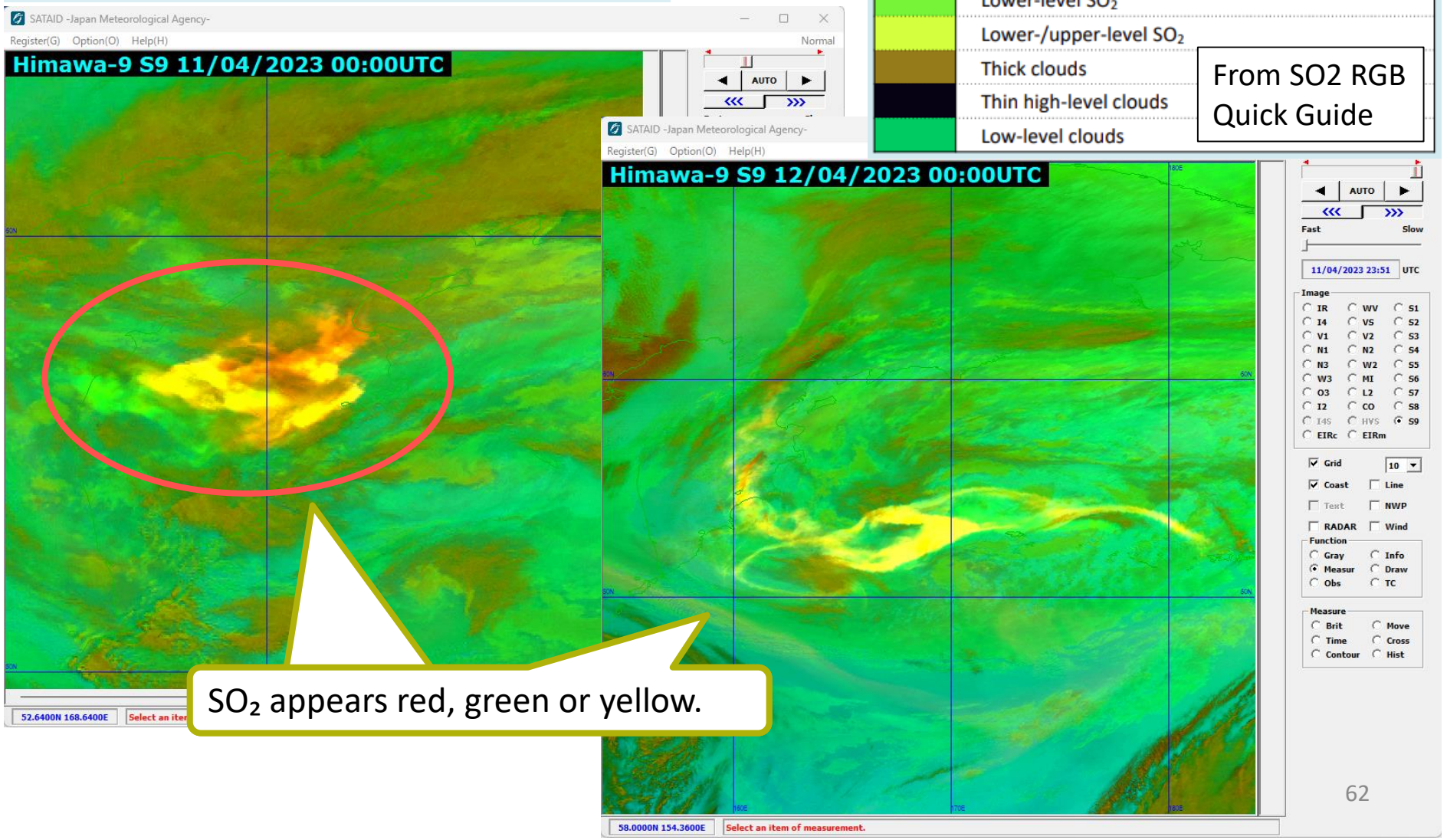
Check “NWP” and select “GSM”.

Displaying RGB Images

SO2 RGB

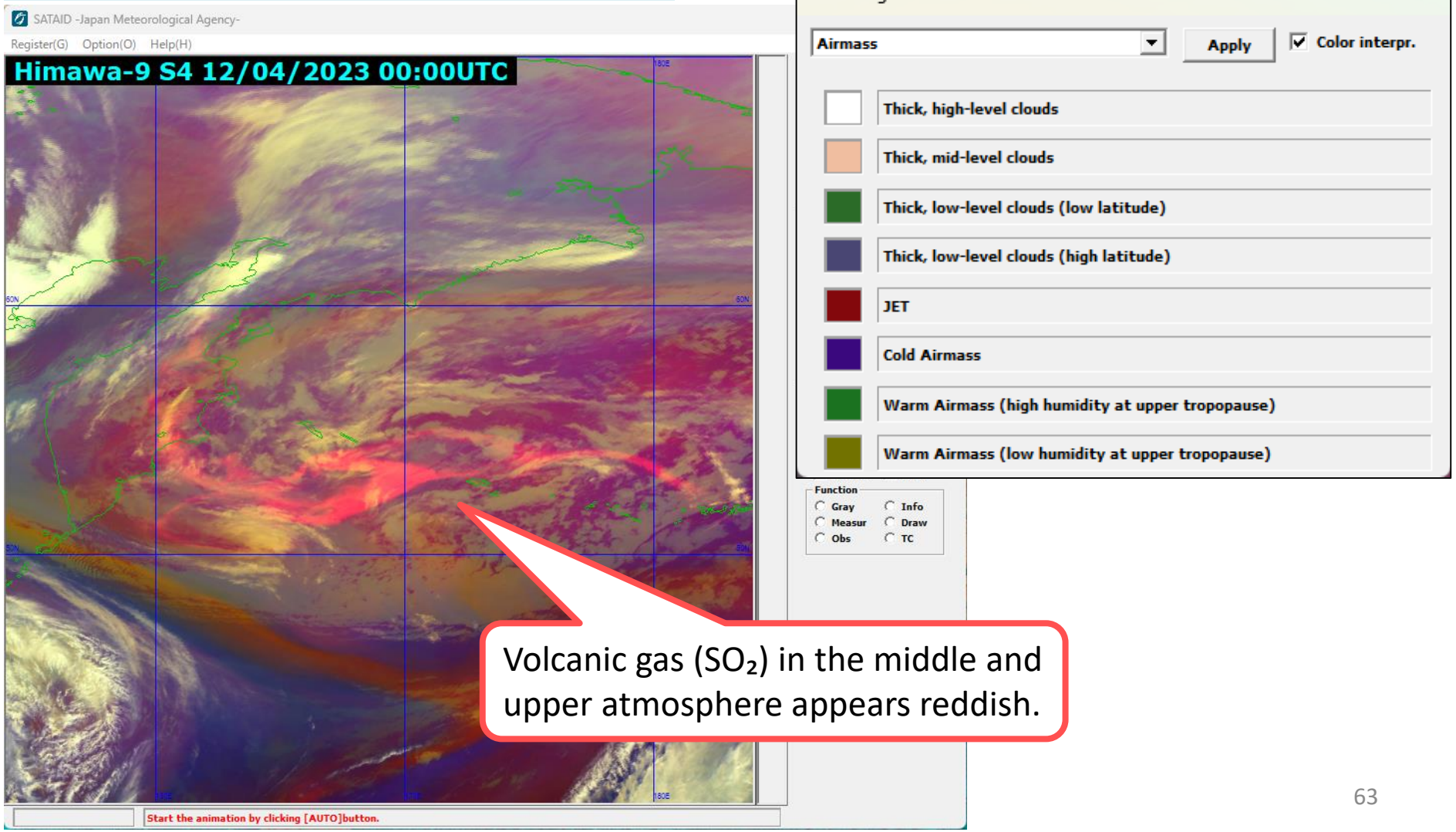
Color interpretation for SO2 RGB	
Color	Interpretation
	Upper-level SO_2
	Lower-level SO_2
	Lower-/upper-level SO_2
	Thick clouds
	Thin high-level clouds
	Low-level clouds

From SO2 RGB Quick Guide



Displaying RGB Images

Airmass RGB



Volcanic gas (SO_2) in the middle and upper atmosphere appears reddish.

Summary

- We accomplished hands-on practical training of RGB case studies by using SATAID in this presentation.
- SATAID can display superimposed satellite imagery and NWP data.
- SATAID can display RGB imagery by simple operation.
- There are more uses, so please also try using it after this presentation.

Thank you
for your participation!

Introduction to SATAID

For more information on SATAID, please see Introduction Guide for SATAID.

https://www.wis-jma.go.jp/cms/sataid/file/QuickGuide_to_SATAID.pdf