# JMA Practical Training (Part1)

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# Goal of this training

- **Use of Himawari-8 data**
  - How can we use the data in operation?
  - What can we do using the data?

- **Do Exercise with SATAID!**
  - What is ‘SATAID’ software?
  - Do exercise to deepen the understanding

# Contents

1. Preparation
2. Introduction
3. Basic Functions of SATAID
4. Exercise
   - Cloud Analysis
   - Detect Various Phenomenon

Try it out and become familiar!!

# Open the folder

Preparation

1. Open **“C Drive” folder** from “Computer”
2. Open **“JMA_Practical_Training(Part1)” folder**

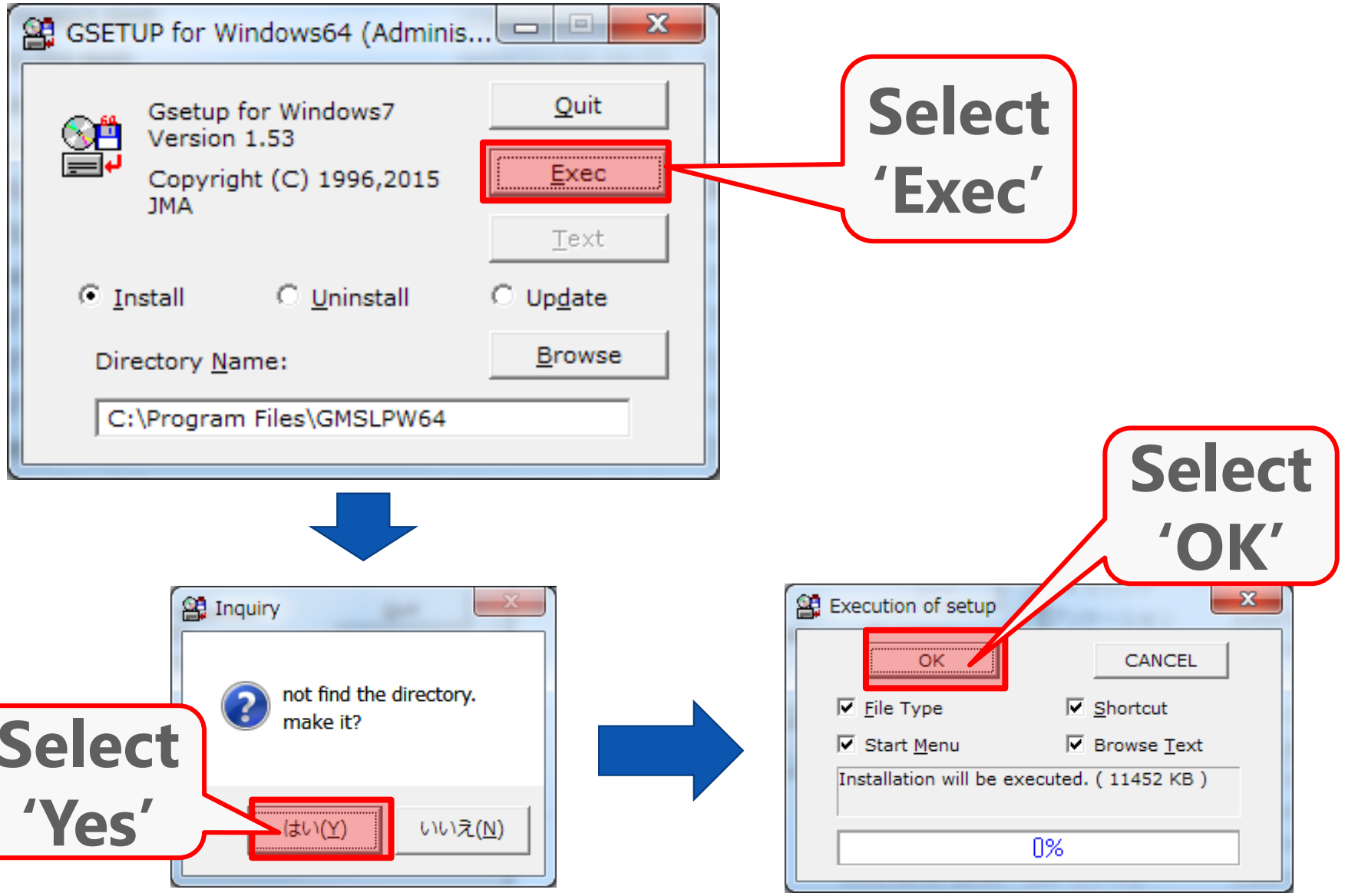
- Do not open it in USB memory.
- It takes too long time to read it from USB.

# Install SATAID program

Preparation

1. Open **“Gmslpd” folder**
2. Double-click **“Gsetup64.exe”**

- If OS type of your PC is 32 bit windows, open “Gsetup.exe”.
- The PCs we prepared is 64 bit windows.


GSETUP for Windows64 (Adminis...
Gsetup for Windows7
Version 1.53
Copyright (C) 1996,2015
JMA
Quit
Exec
Text
Install
Uninstall
Update
Directory Name:
Browse
C:\Program Files\GMSLPW64
Select
'Exec'
Inquiry
not find the directory.
make it?
はい(Y)
いいえ(N)
Select
'Yes'
Execution of setup
OK
CANCEL
File Type
Shortcut
Start Menu
Browse Text
Installation will be executed. ( 11452 KB )
0%
Select
'OK'

# Start SATAID

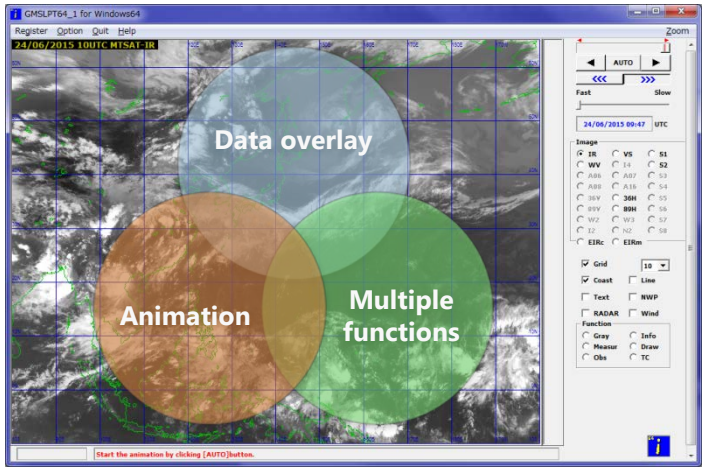
Preparation

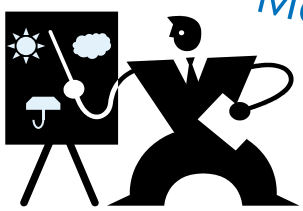
- Go back to **the “JMA_Practical_Training(Part1)” folder**
- Double-click **“1_Demonstration.atc”**

# What is SATAID?

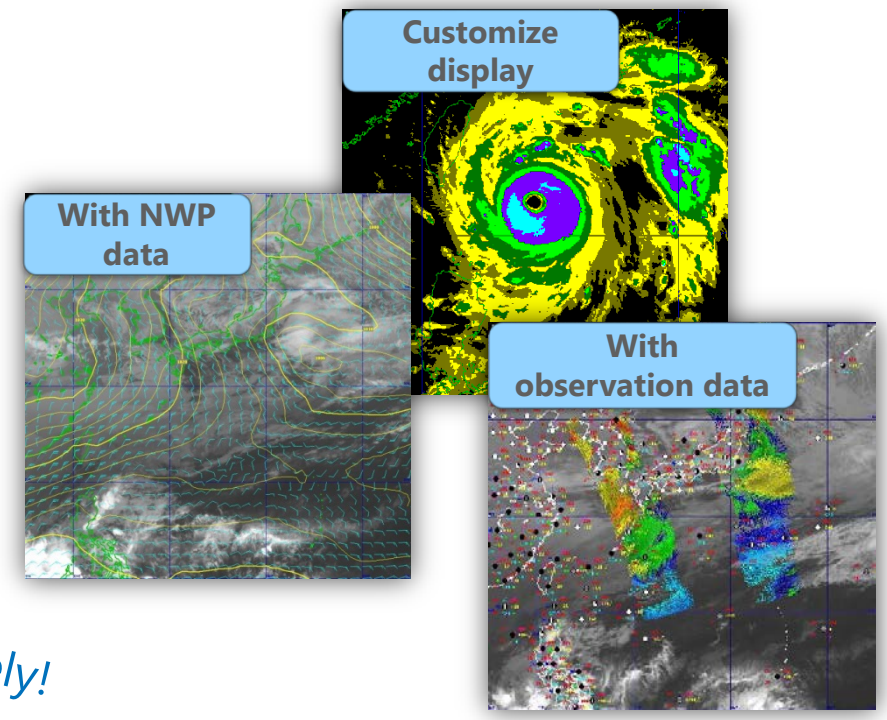
Introduction

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!



# How do we get it?



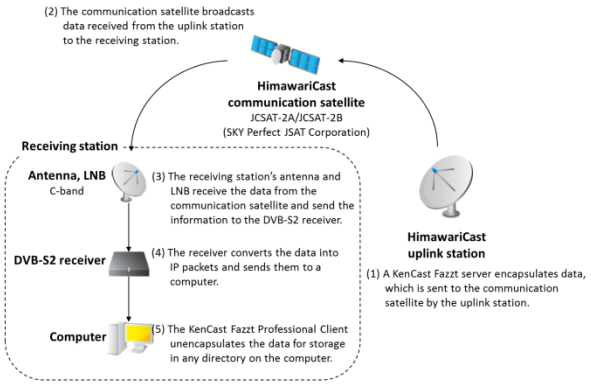
## WIS Website

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


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

## Himawari-Cast

http://www.data.jma.go.jp/mscweb/en/himawari89/himawari_cast/himawari_cast.html




- You need dedicated antenna and computers
- 14 channels are available every 10 minutes

# Data for Demonstration

- 16 Channels
- Every-10-minute images
- Spatial resolution:
  - 1km for Visible (0.64μm)
  - 4km for others

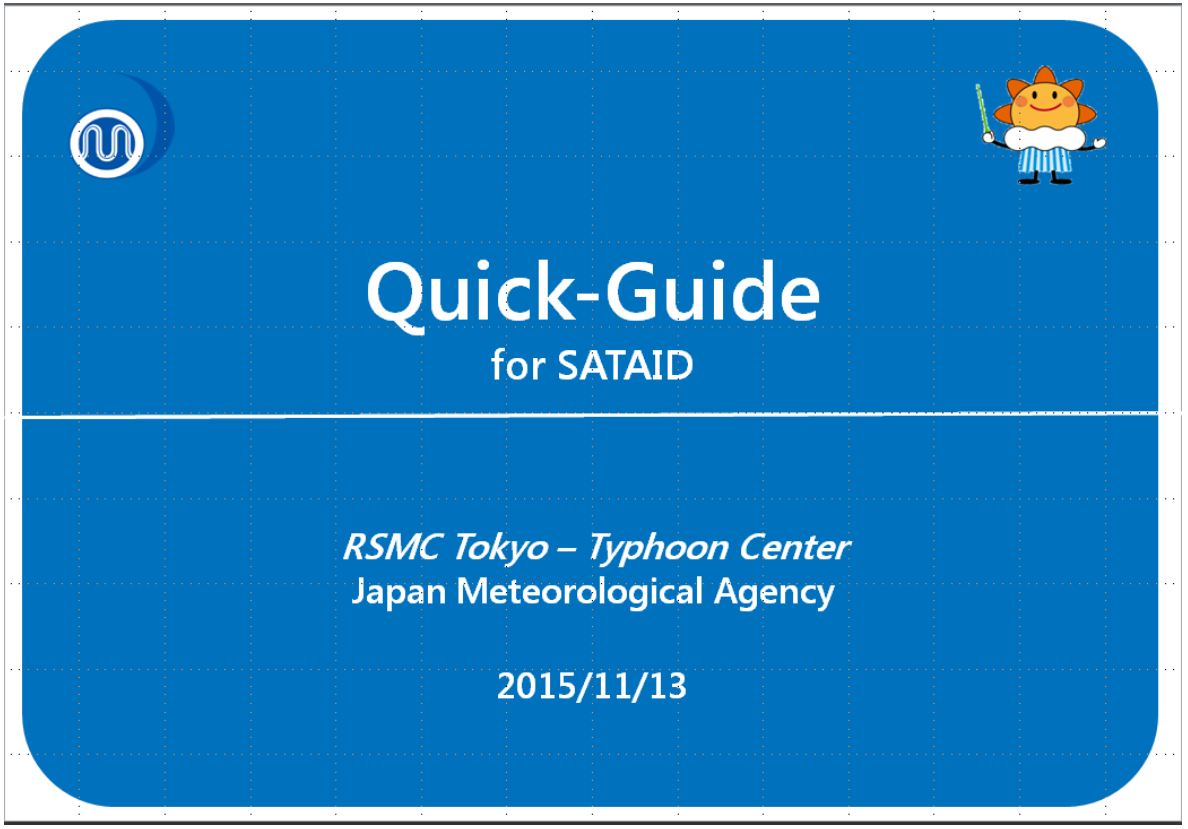
    (Original Data is 2km for IR and 0.5 or 1km for VS)

# 16 Bands of AHI (Advanced Himawari Imager)

| MTSAT Channels | Band | | | Wavelength [μm] | Spatial Resolution | |
|---|---|---|---|---|---|---|
| VIS | 1 | V1 | Visible | 0.46 | 1Km | RGB band Composited |
| | 2 | V2 | | 0.51 | 1Km | |
| | 3 | VS | | 0.64 | 0.5Km | |
| | 4 | N1 | Near Infrared | 0.86 | 1Km | Aerosol |
| | 5 | N2 | | 1.6 | 2Km | Water cloud and Ice cloud |
| | 6 | N3 | | 2.3 | 2Km | Size of the cloud droplet |
| IR4 | 7 | I4 | Infrared | 3.9 | 2Km | Fog , Hot spot(Forest fire) |
| IR3(WV) | 8 | WV | | 6.2 | 2Km | Water vapor |
| | 9 | W2 | | 7.0 | 2Km | |
| | 10 | W3 | | 7.3 | 2Km | |
| | 11 | MI | | 8.6 | 2Km | $SO_2$(Sulfur dioxide) |
| | 12 | O3 | | 9.6 | 2Km | $O_3$(Ozone) |
| IR1 | 13 | IR | | 10.4 | 2Km | Atmospheric Windows |
| IR2 | 14 | L2 | | 11.2 | 2Km | |
| | 15 | I2 | | 12.3 | 2Km | |
| | 16 | CO | | 13.3 | 2Km | $CO_2$(Carbon dioxide) |

# Introduction to SATAID

## Please look at the ‘Quick-Guide’ (handout)

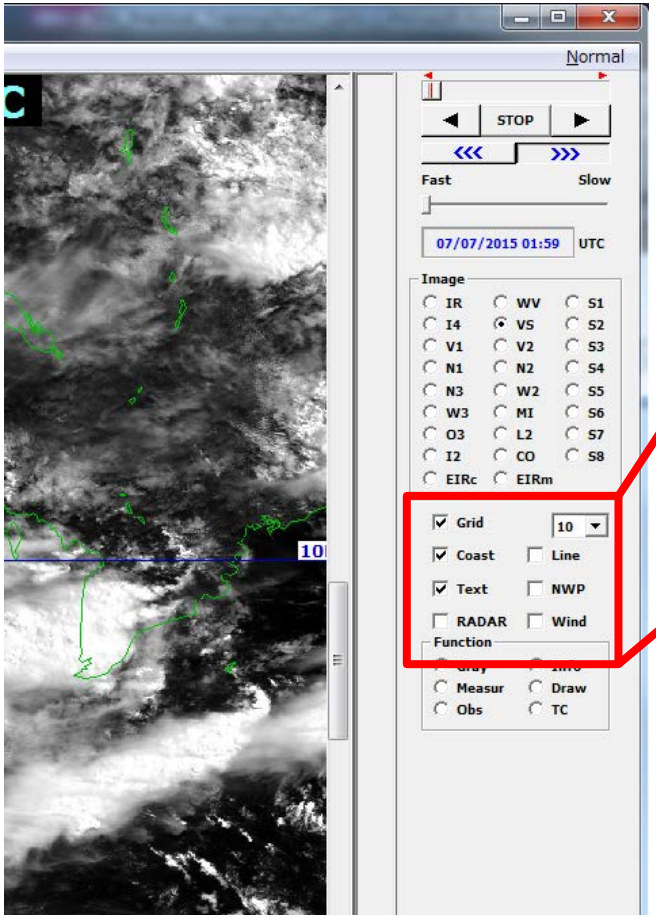


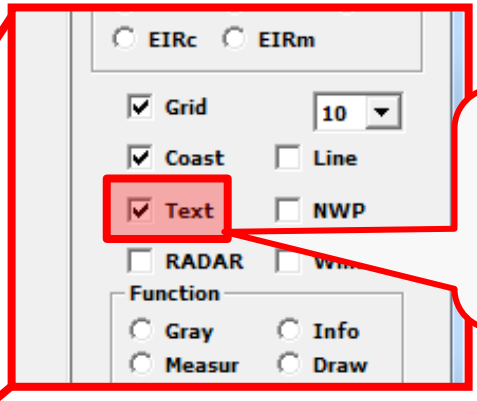
# Exercise1

**You will find;**

1. **Fog / Stratiform Cloud**
2. **Cb / Cg**
3. **Transverse Line**
4. **Upper level flow**
5. **Jet stream, upper level vortex…**
6. **Lower level flow**
7. **Tropical Cyclone**

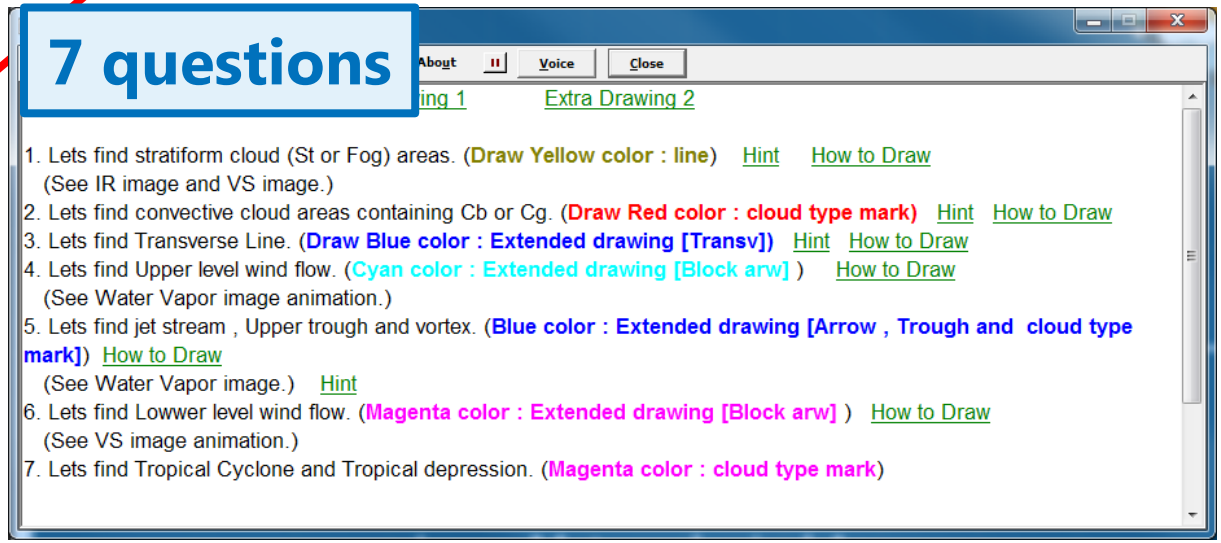
# Answer the questions



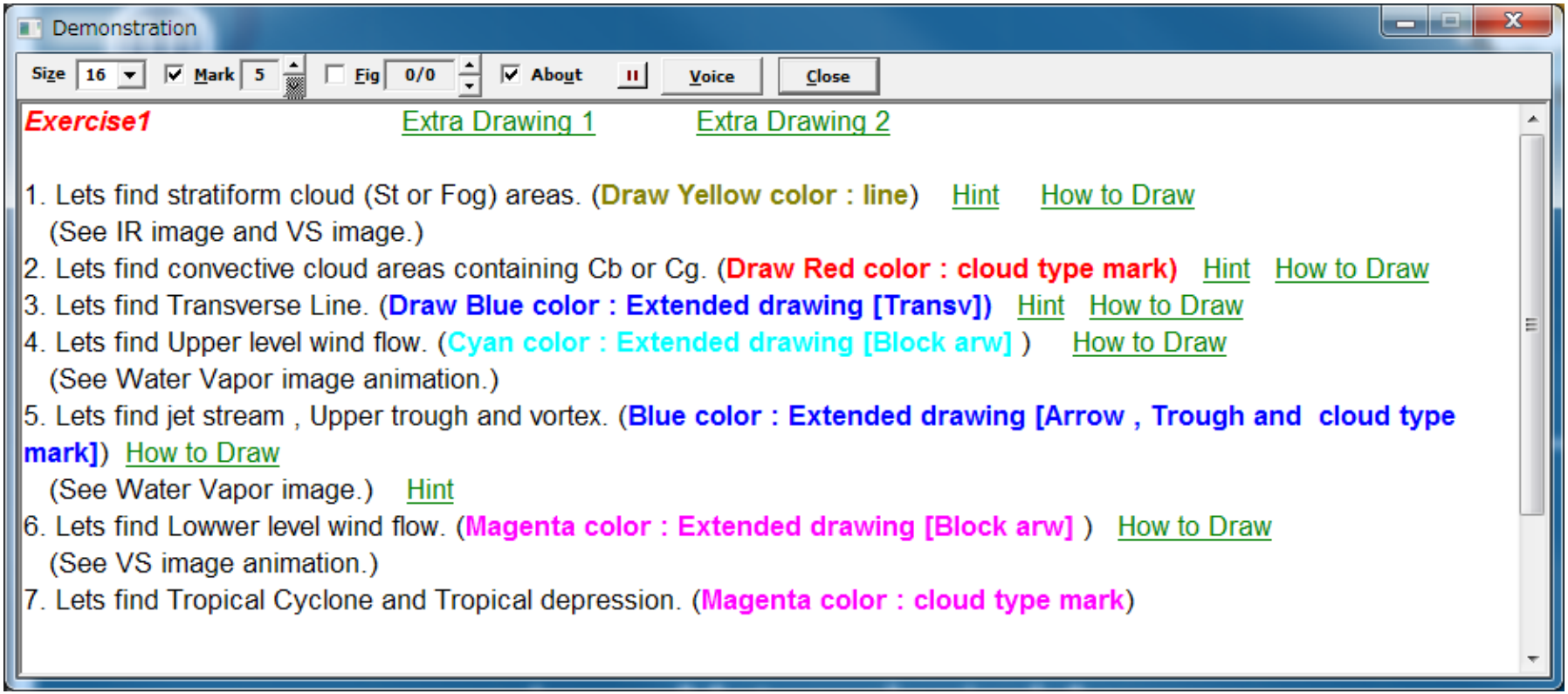

Check 'Text'

7 questions



# 7 Questions

**7 questions**



# Fog / Stratiform Cloud (Question 1)

# Visible and Infrared Imagery

## Visible Image

- Measure intensity of reflected solar radiation
- Estimate the **optical thickness** of cloud

**Thin**
**Darker**

**Thick ( or dense)**
**Brighter**

## Infrared Image

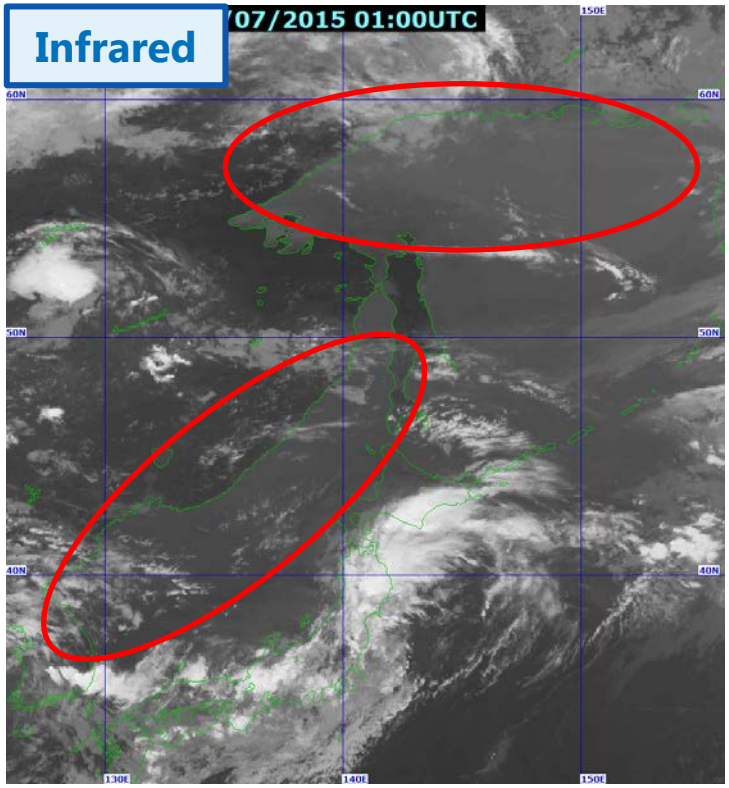
- Measure brightness temperature emitted from target object
- Estimate the **height** of cloud

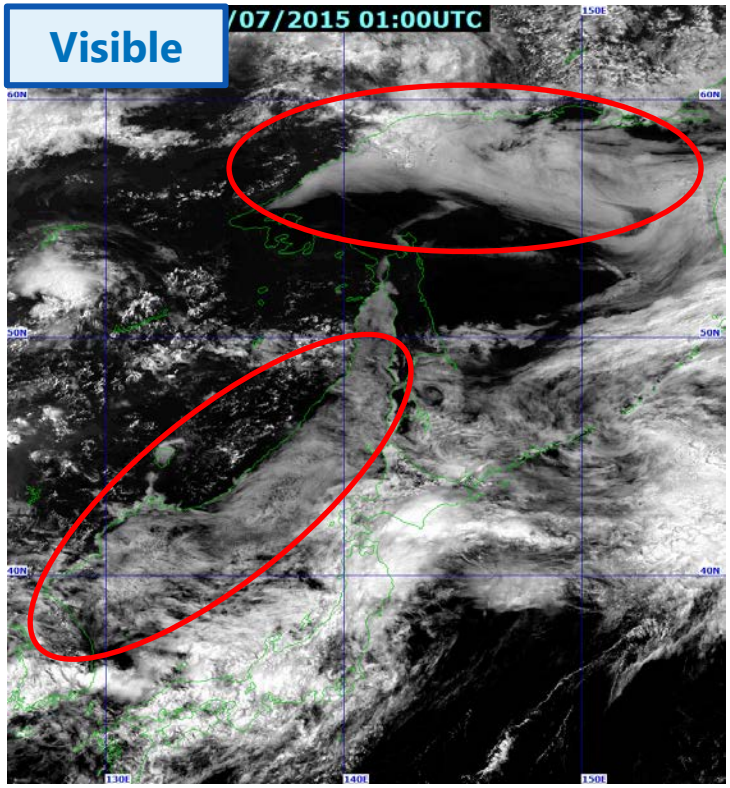
**Low Level**
**Darker**

**High Level**
**Brighter**

# Detect Fog/Stratiform cloud

- Fog / Stratiform cloud is dense cloud in very low level.
- This means that it looks **darker in Infrared image** and **brighter in Visible image**.
- Also, **the surface of the fog area is smooth** in Visible image because it's just under stable layer



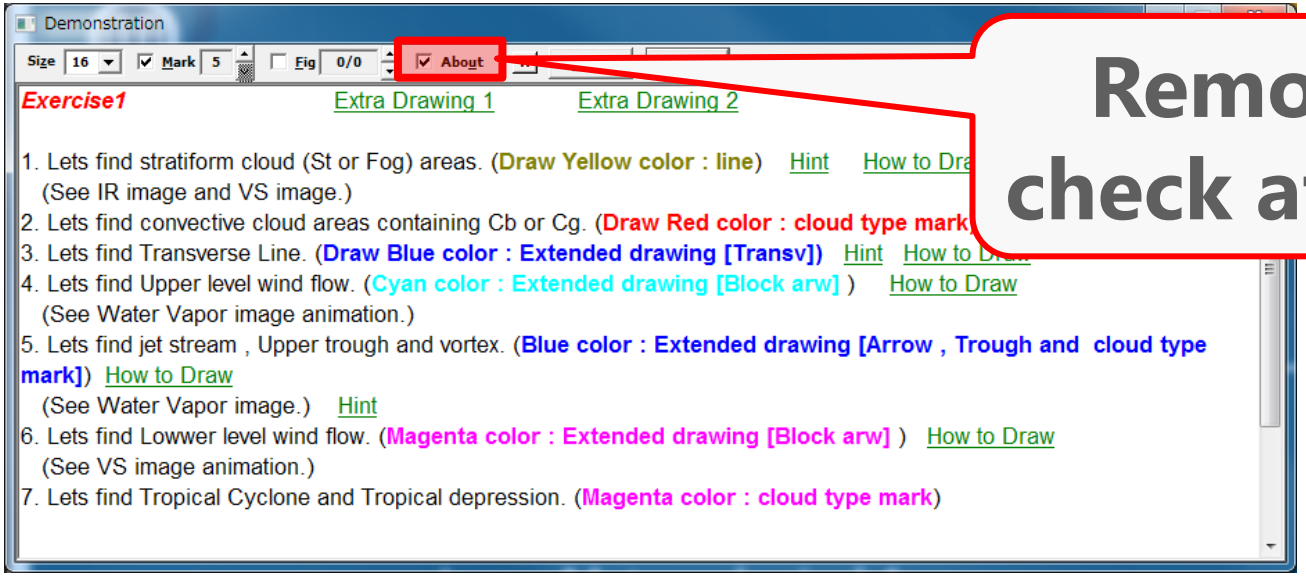
# Find Fog/Stratiform Cloud Area!

1. **Compare visible image with infrared image** (Change image type)

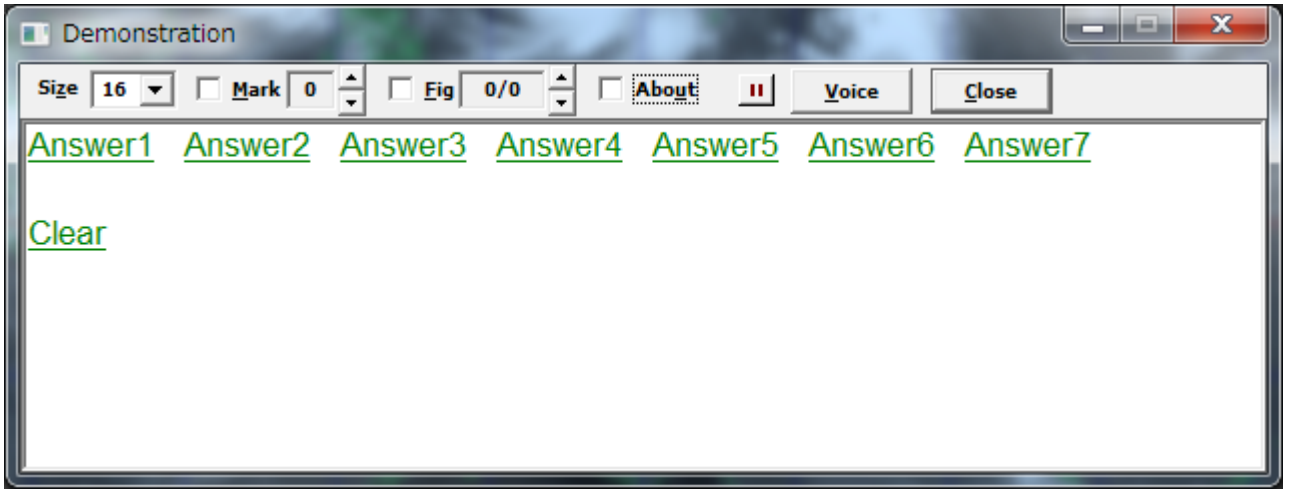
2. **Check the surface of the area. Is it smooth?** (Zoom in the area)

3. **Mark the area with drawing function** (See 'How to draw')

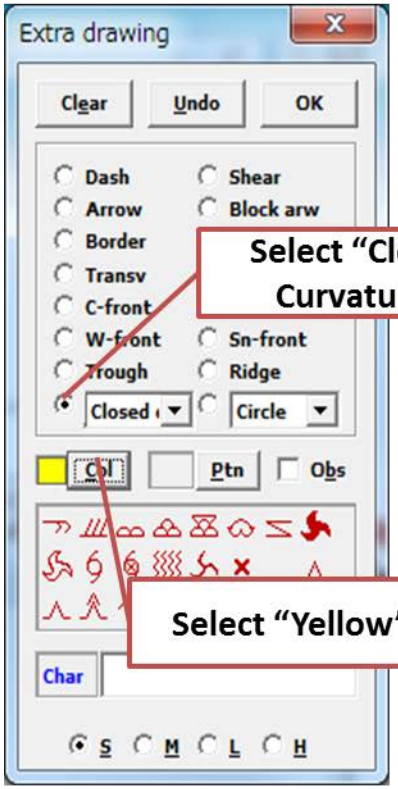
# How to see the answers




**Remove the check at 'About'**

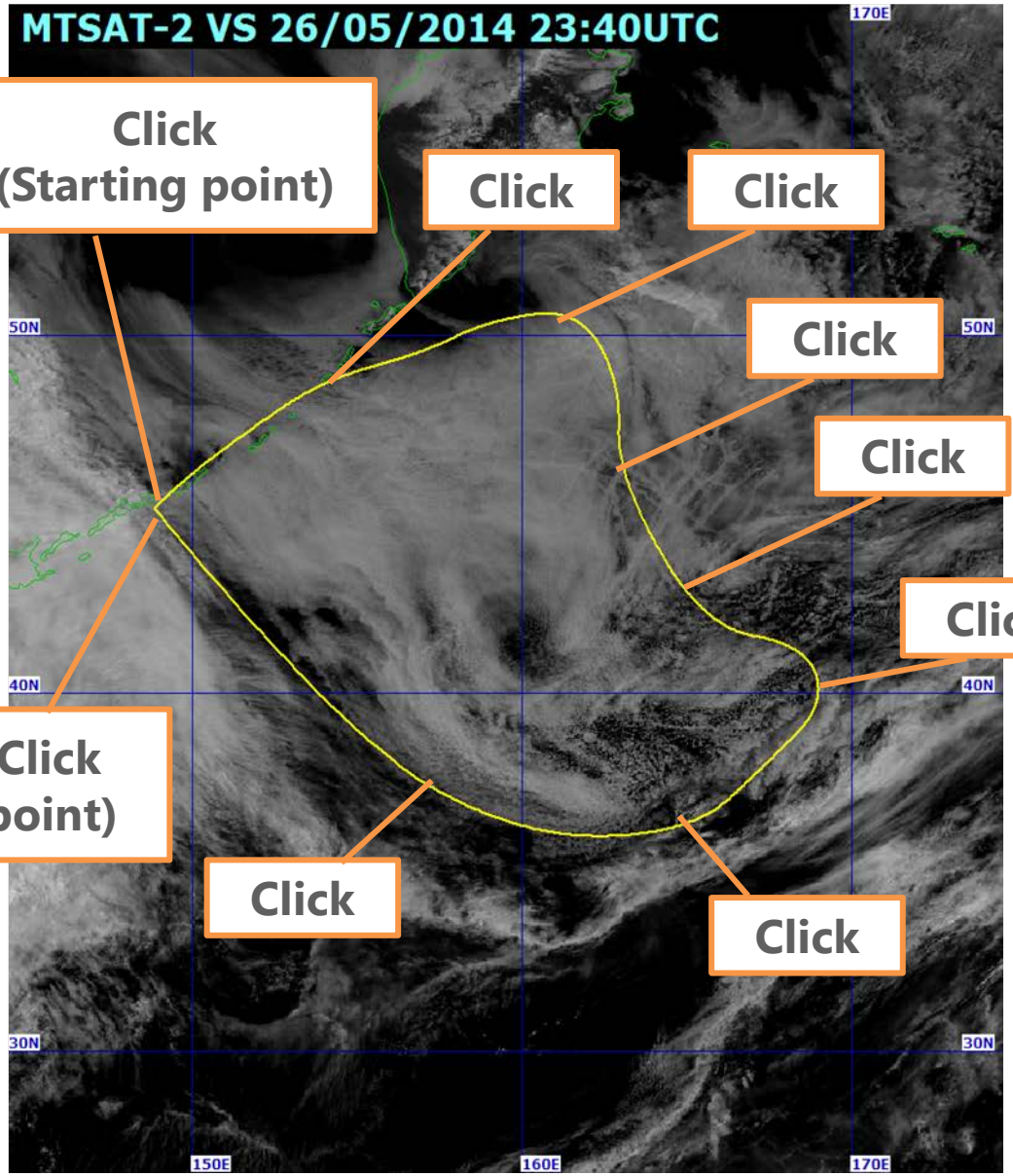


# Example




Select "Closed Curvature"

Select "Yellow"




Click (Starting point)

Click

Click

Click

Click

Click

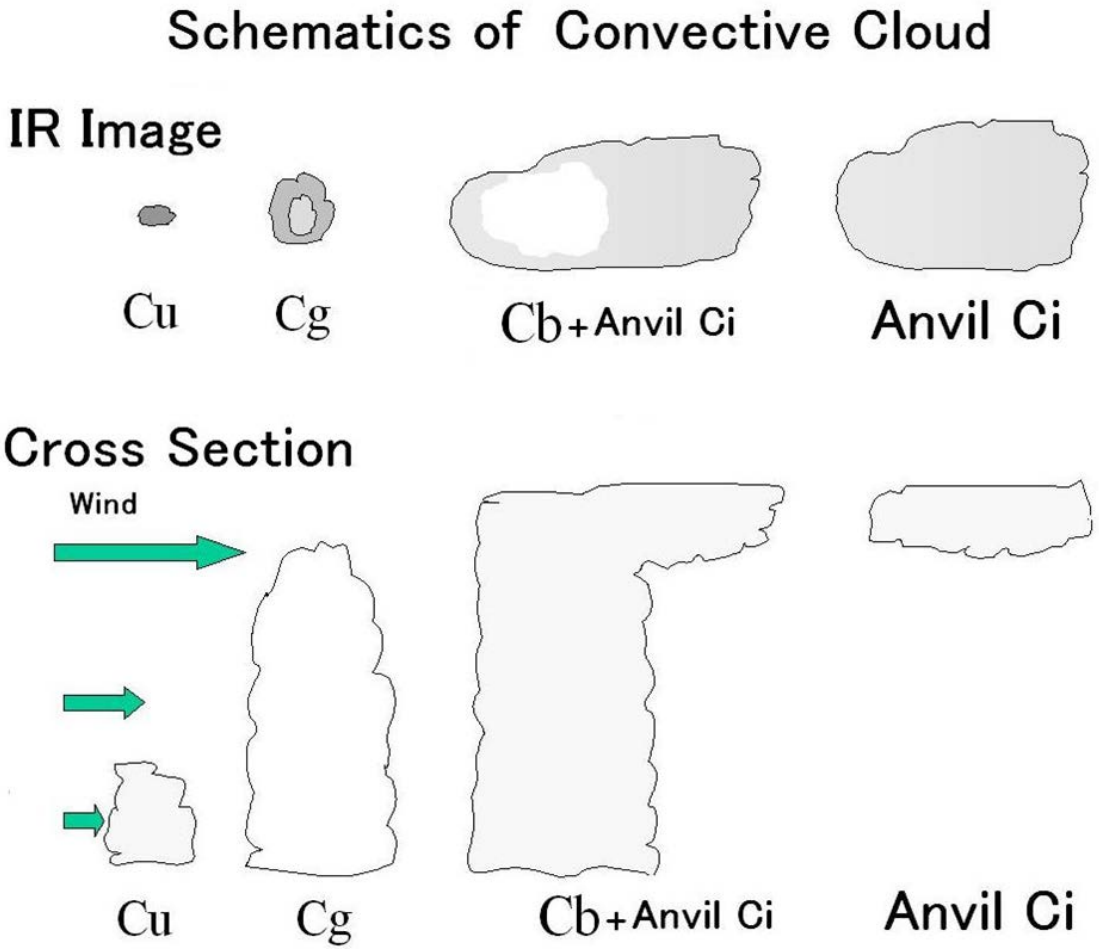
Double-Click (ending point)

Click

Click

# Cb / Cg
# (Question 2)

# How to differentiate Cb and Cg




**Cb**

- Looks whiter than Cg in Infrared image
- Accompanied with anvil Ci

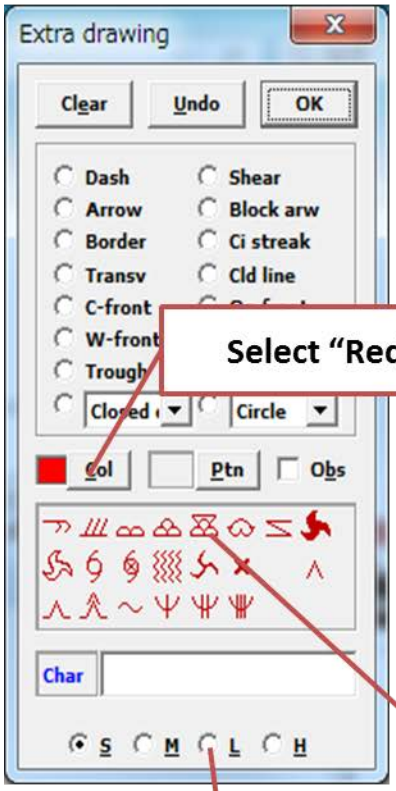
**Cg**

- Looks like dots

**Anvil Ci**

- Use animation to see the movement

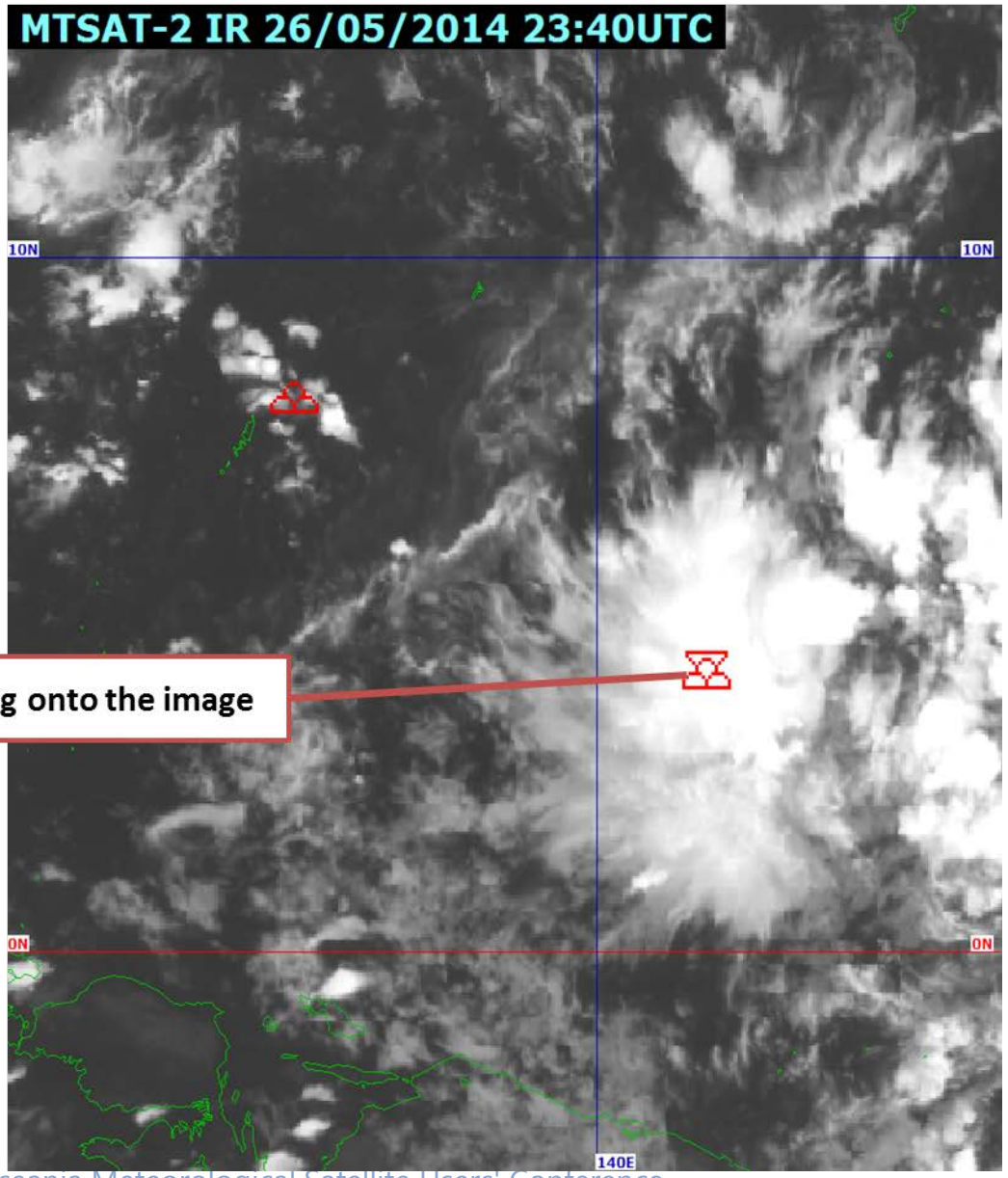
# Example




Select “Red”

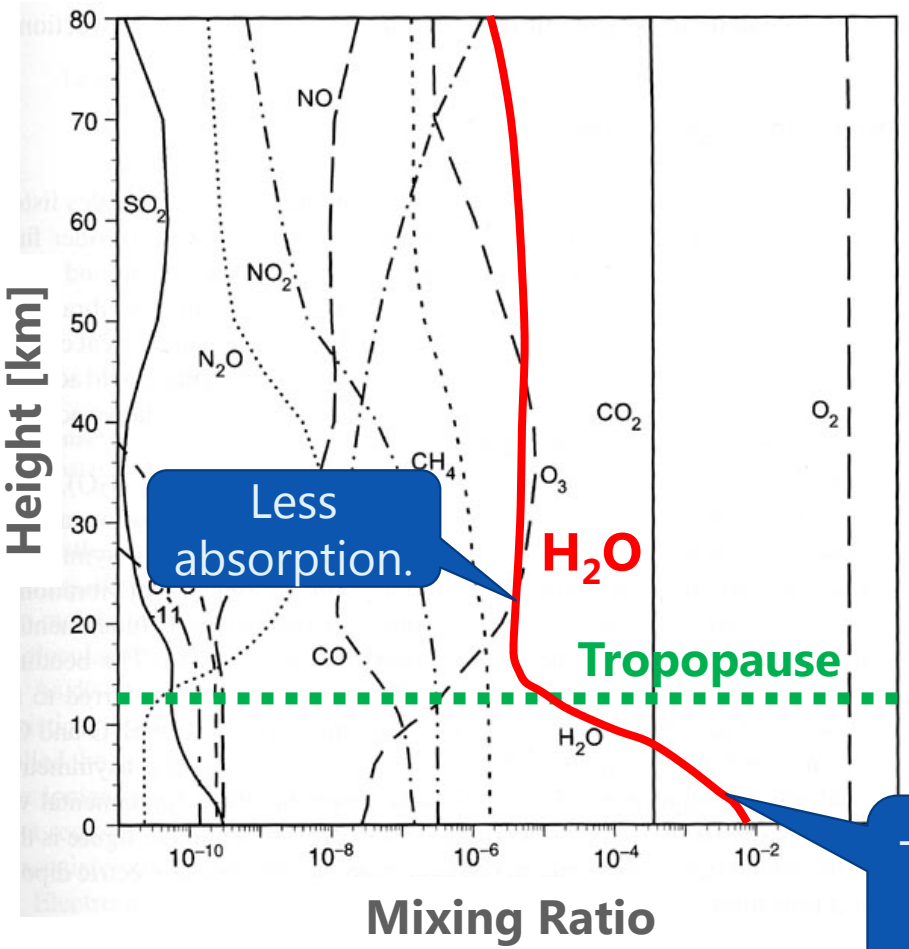
Drag onto the image

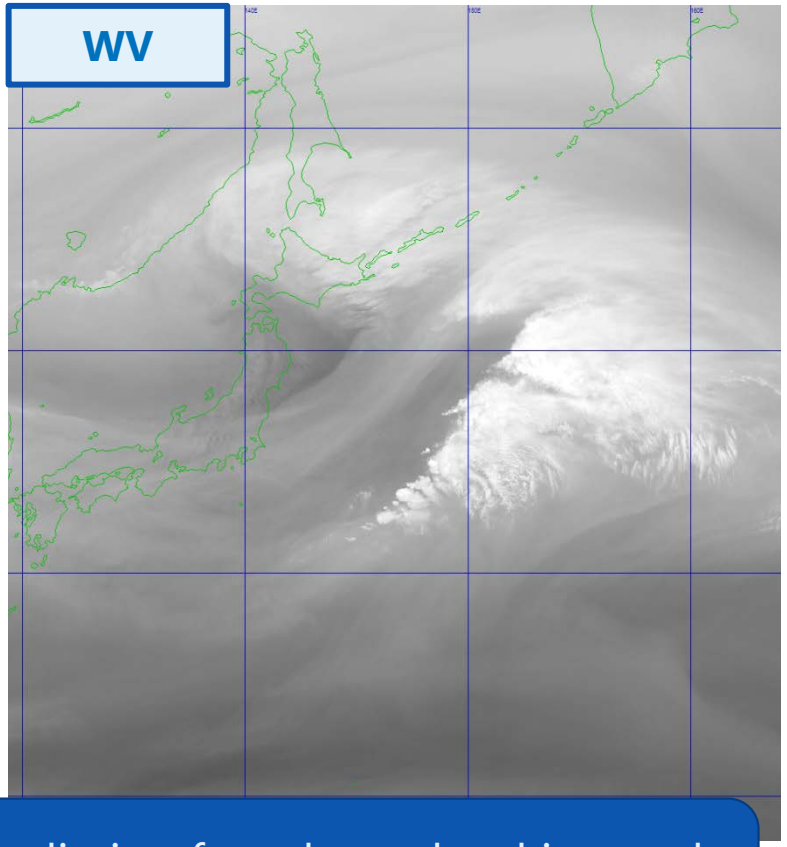
Select “L”



# Upper level phenomenon (Question 4&5 )

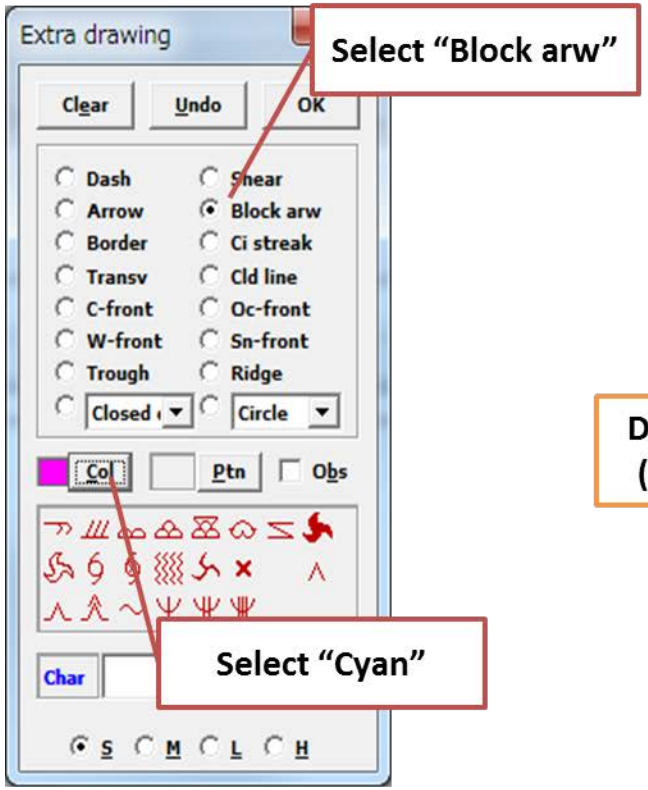
# Use Water Vapor Imagery

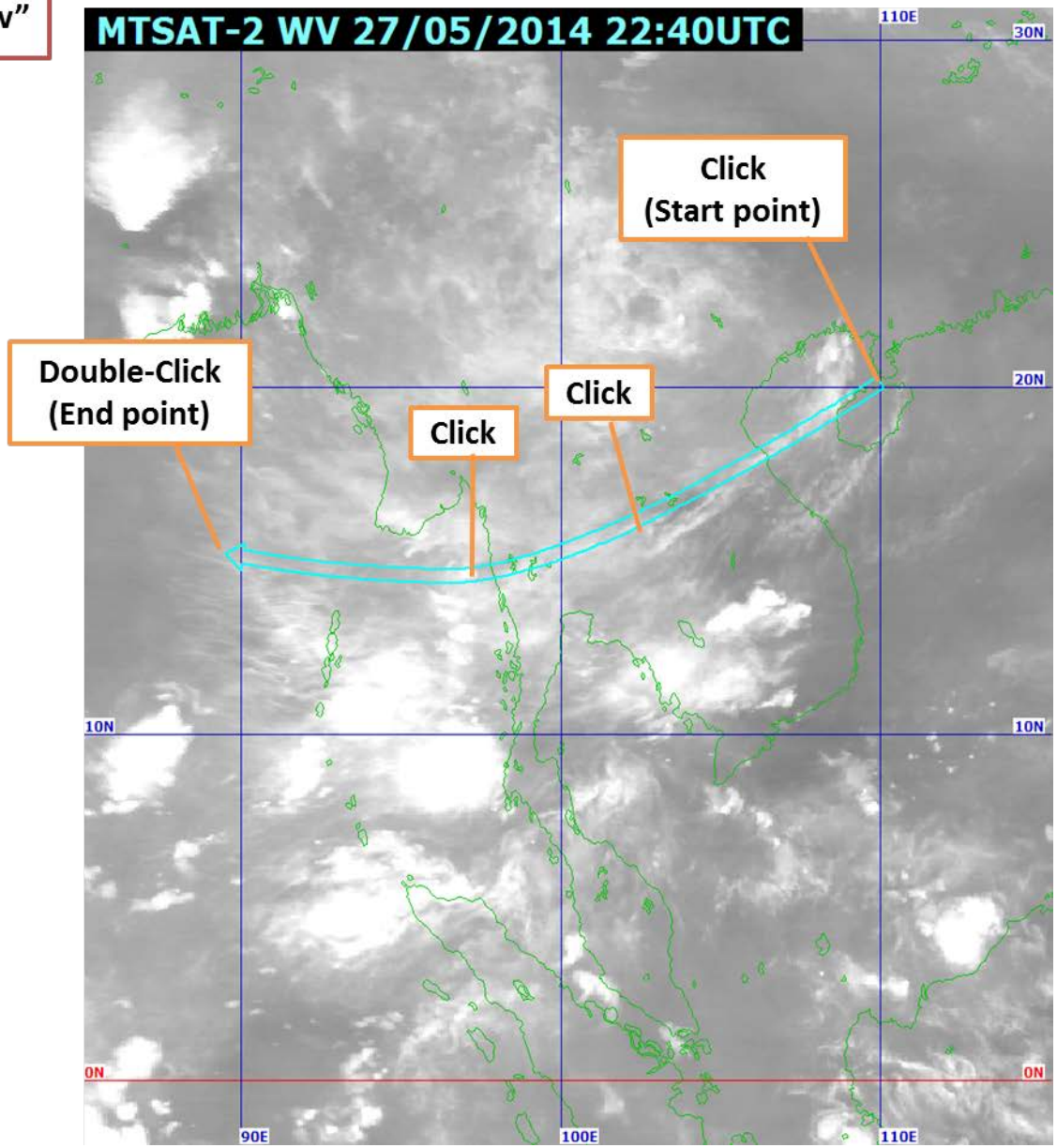


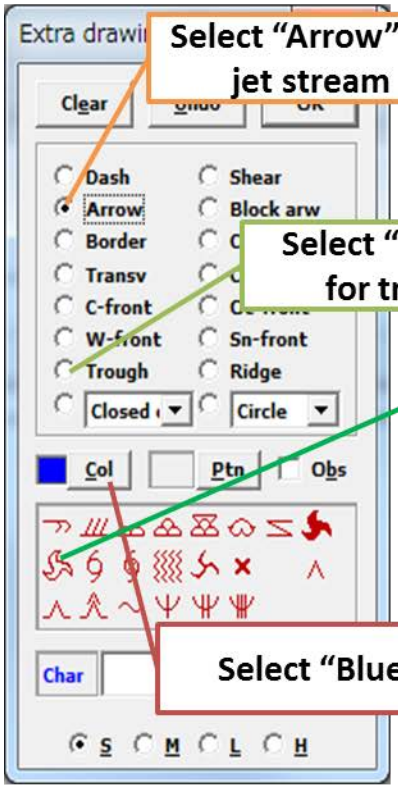

The radiation from lower level is mostly absorbed by middle level water vapor.

# Example


Extra drawing
Clear
Undo
OK
Dash
Arrow
Border
Transv
C-front
W-front
Trough
Shear
Block arw
Ci streak
Cld line
Oc-front
Sn-front
Ridge
Closed
Circle
Col
Ptn
Obs
Char
S
M
L
H
Select "Block arw"
Select "Cyan"


MTSAT-2 WV 27/05/2014 22:40UTC
Click
(Start point)
Double-Click
(End point)
Click
Click
110E
30N
20N
10N
0N
90E
100E
110E

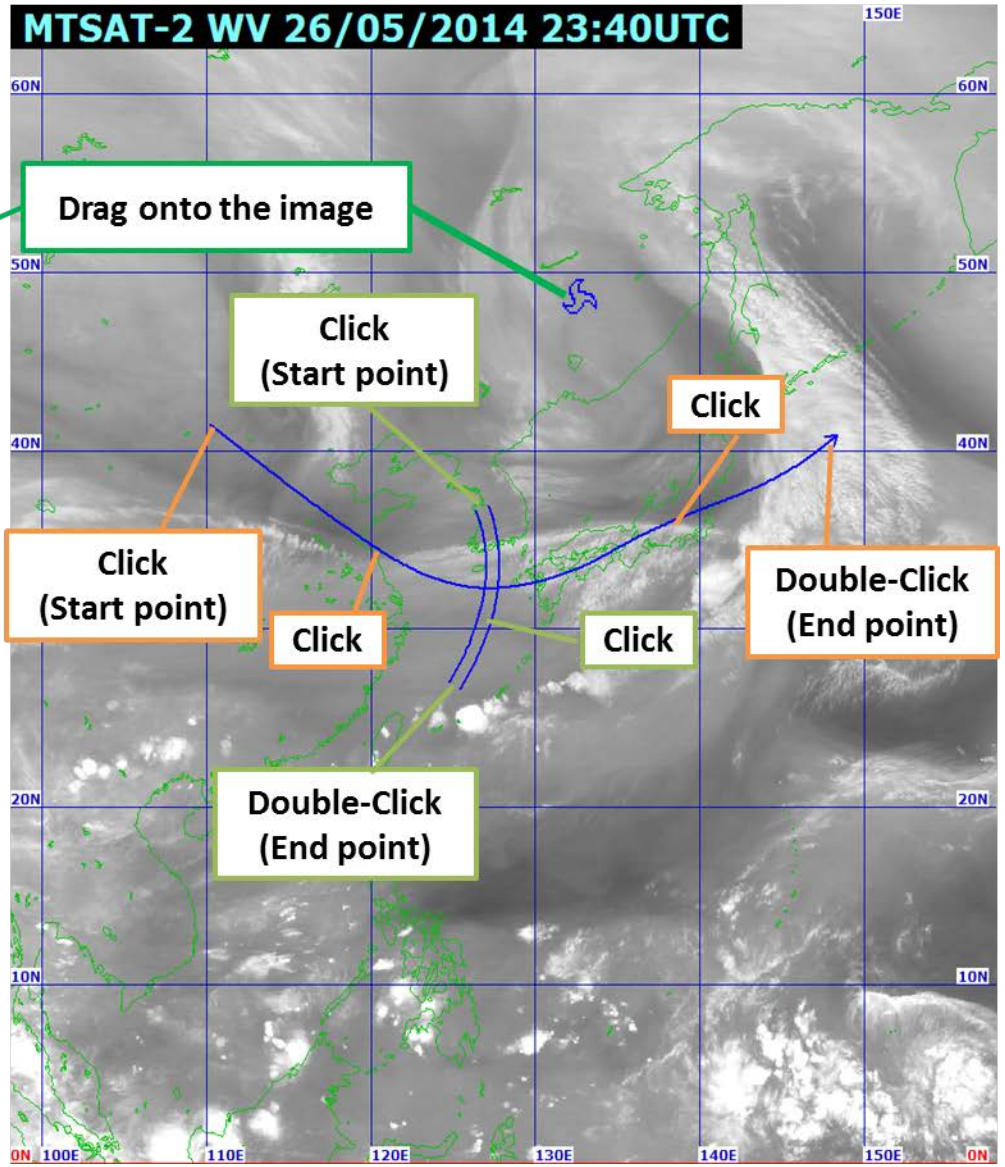
# Example




Select “Arrow” for jet stream

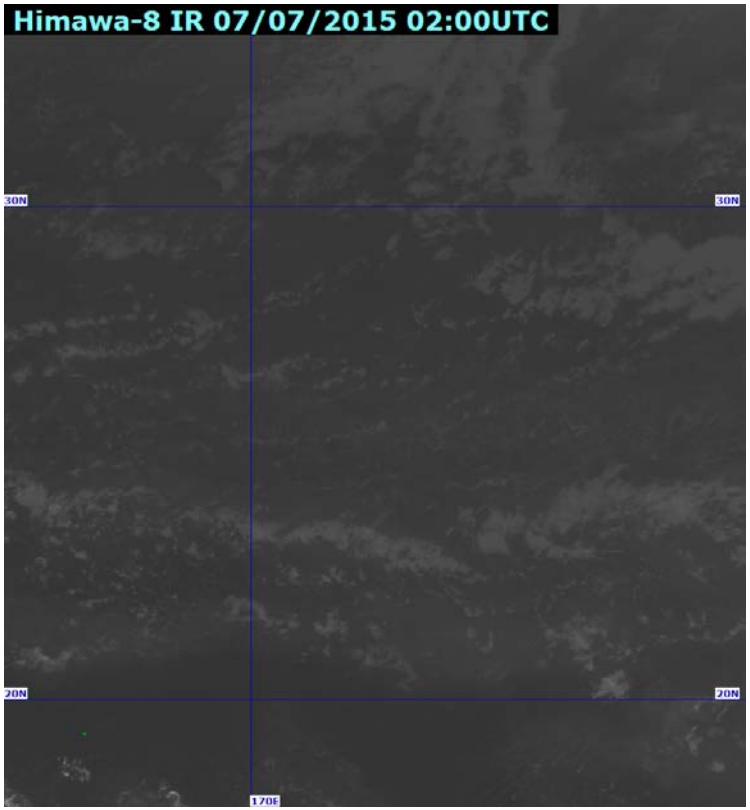
Select “Trough” for trough

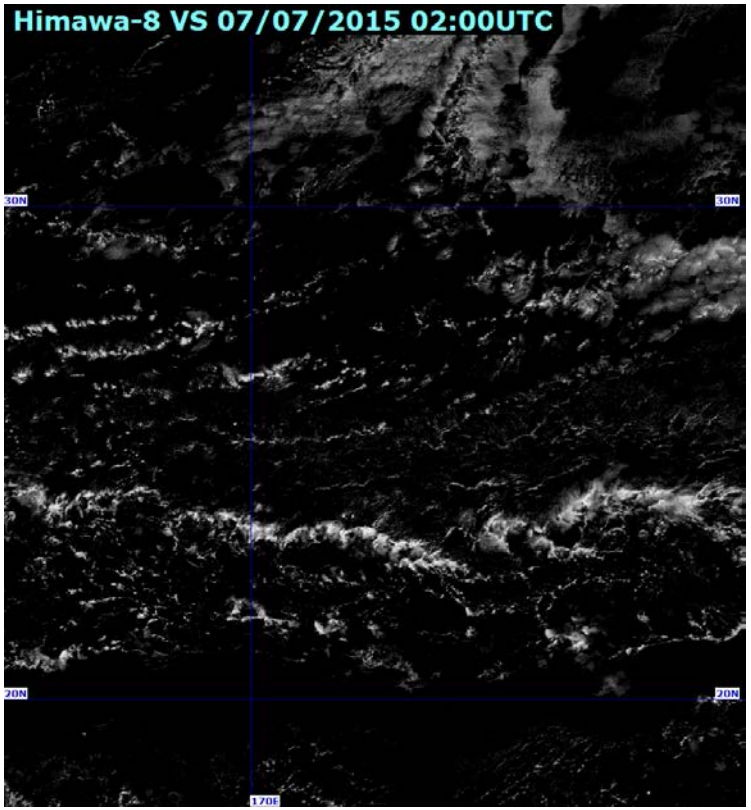
Select “Blue”



# Low level flow (Question 6)

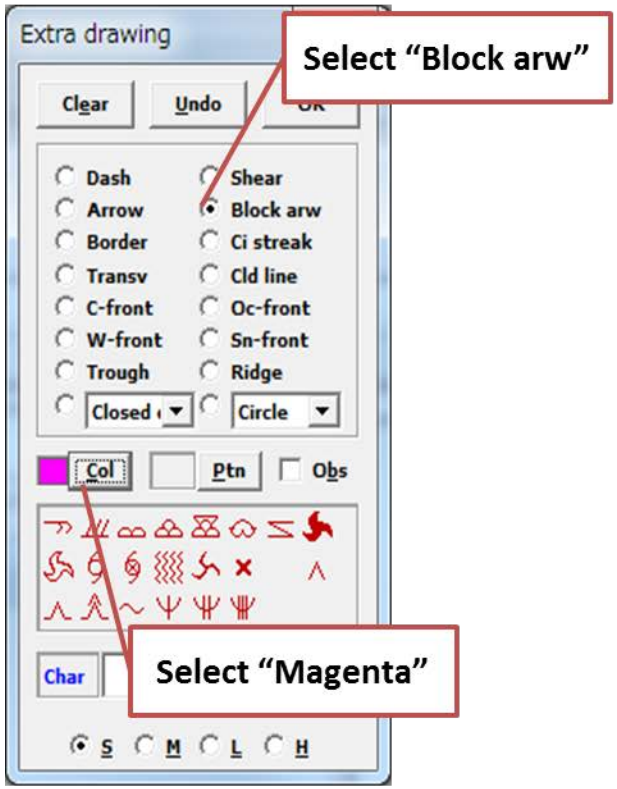
# Compare Visible with Infrared

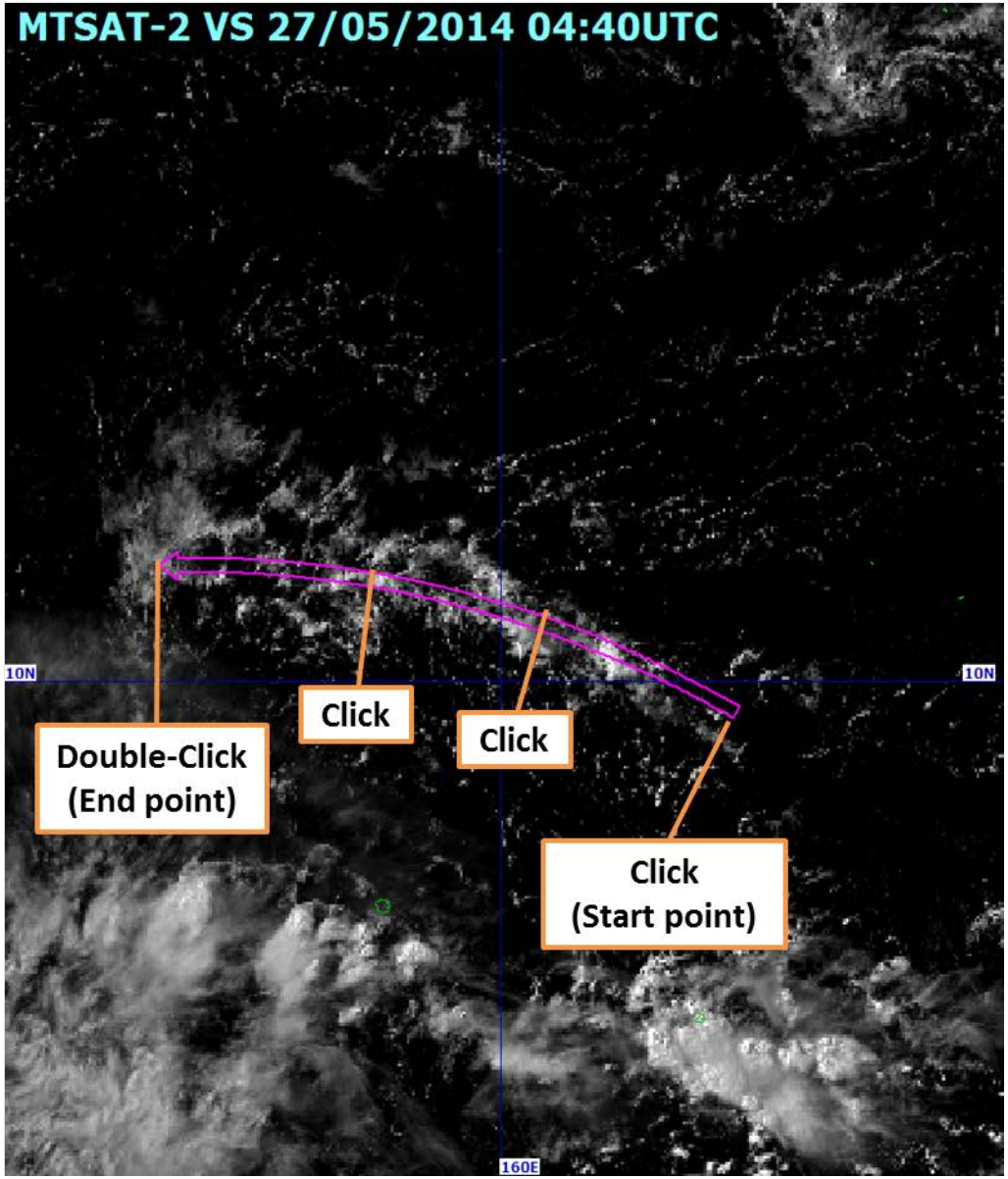



**Low level = Darker in Infrared image**
**Middle density = Relatively bright in Visible image**

# Example


Extra drawing
Clear
Undo
Dash
Arrow
Border
Transv
C-front
W-front
Trough
Shear
Block arw
Ci streak
Cld line
Oc-front
Sn-front
Ridge
Closed
Circle
Col
Ptn
Obs
Char
S
M
L
H
Select “Block arw”
Select “Magenta”

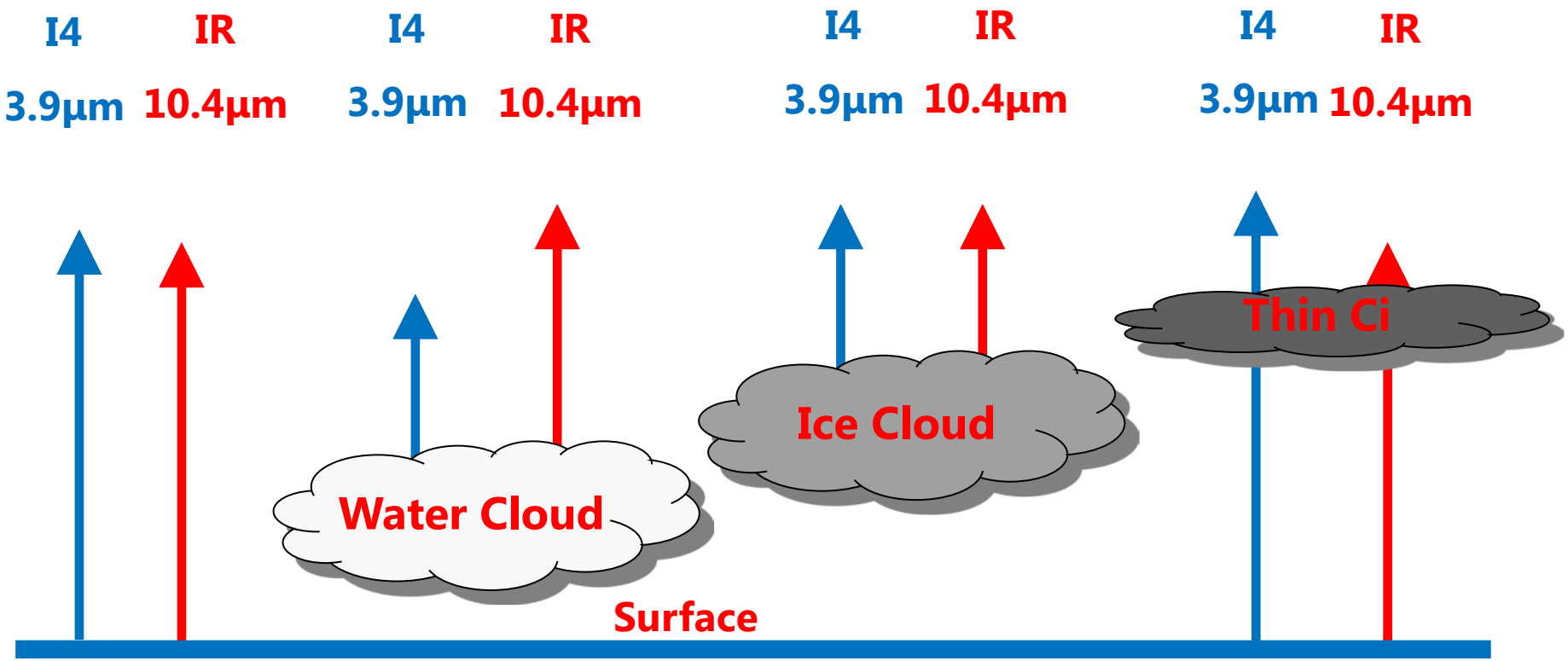

MTSAT-2 VS 27/05/2014 04:40UTC
10N
10N
160E
Double-Click
(End point)
Click
Click
Click
(Start point)

# Exercise2

- **Night Fog**
- **Volcanic Ash**
- **Forest fires**
- **Yellow sand**

# Night Fog

# Difference between I4 and IR : Nighttime

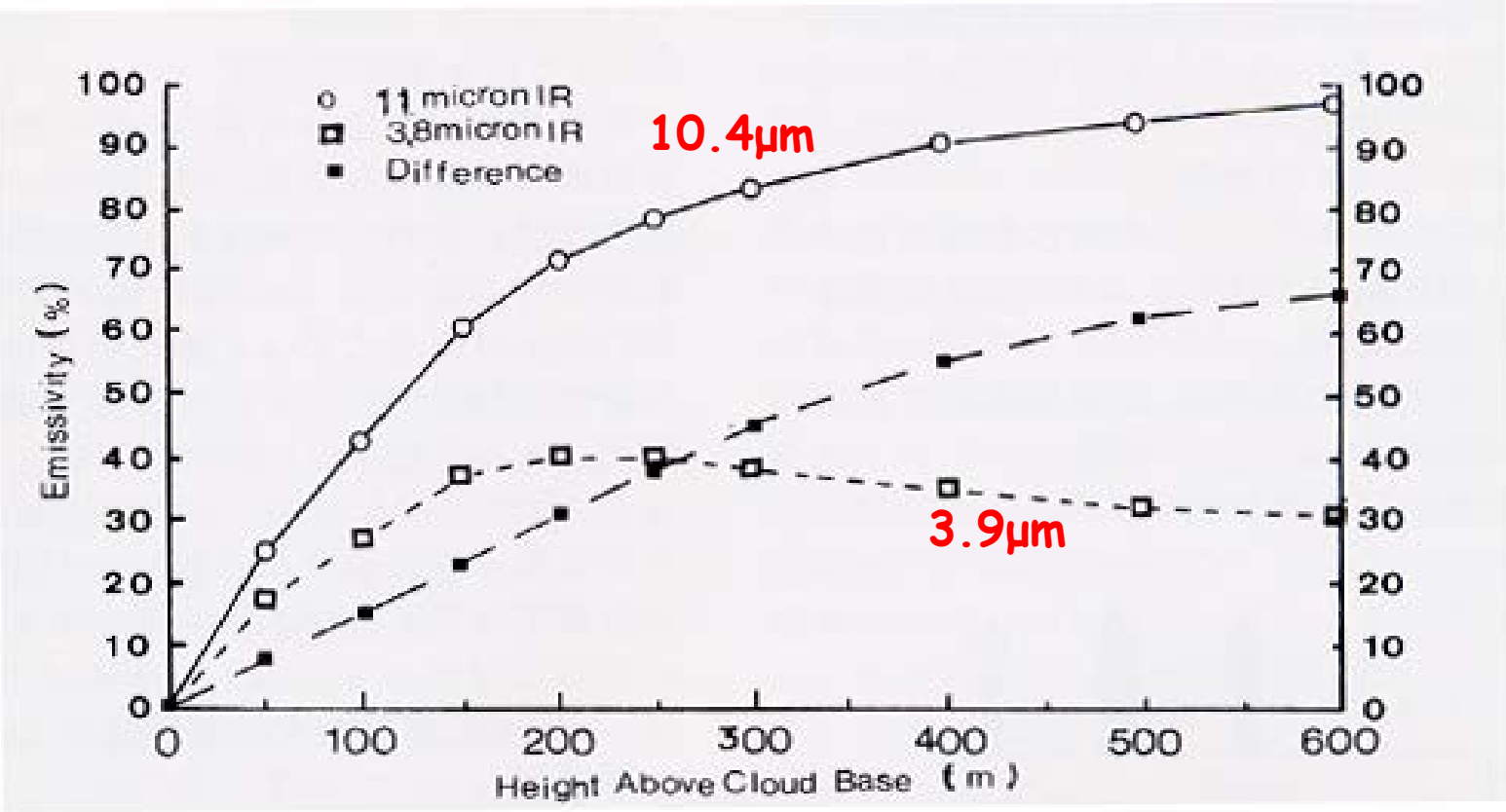



**Infrared Difference Imagery S2:I4 (3.9μm)–IR(10.4μm)**

| ≃0 | <0 | =0 | >0 |
|---|---|---|---|
| Gray | White | Gray | Black |

# Emissivity of I4 (3.9µm)

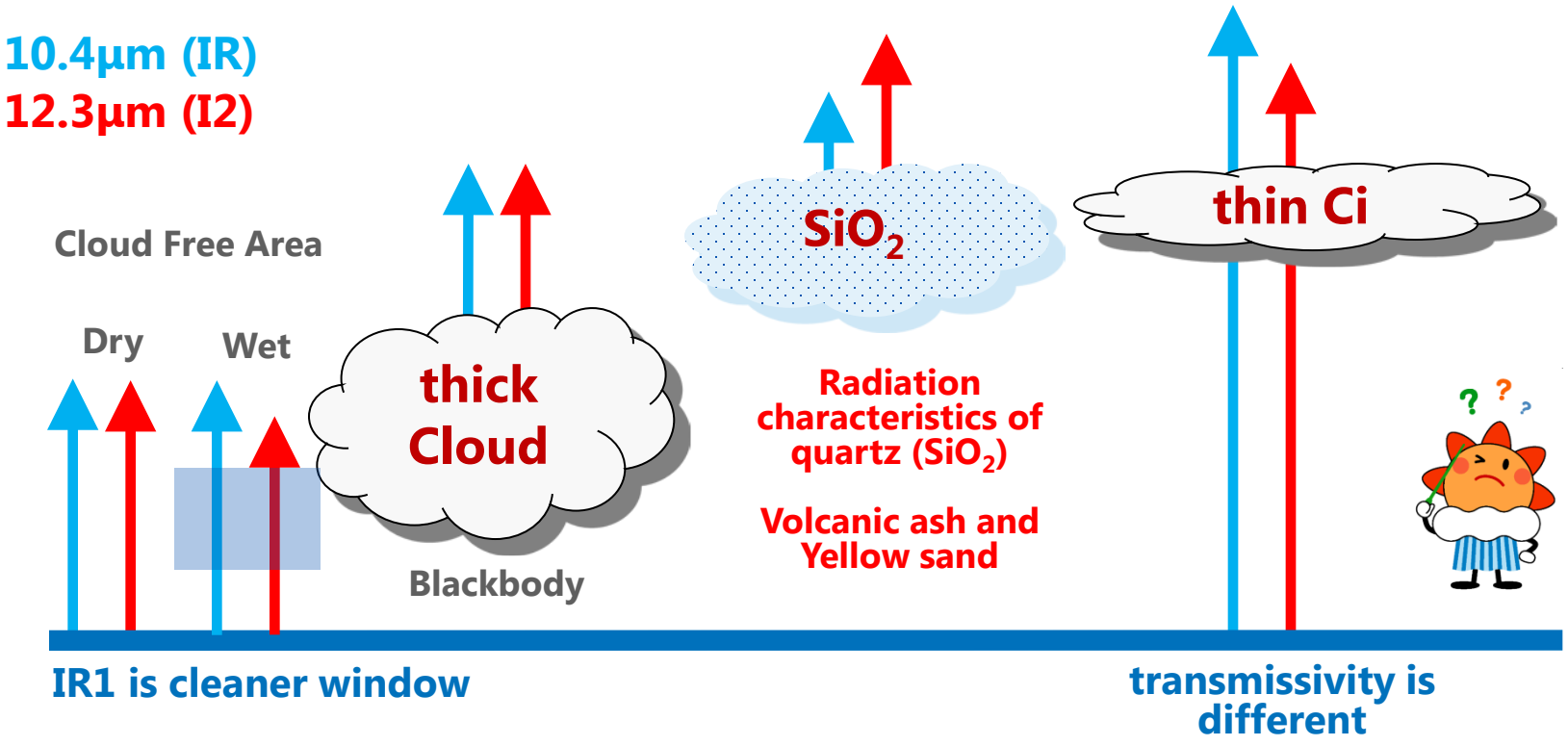
**3.9µm channel:**
**Lower emissivity of water cloud → apparently looks colder!!**




Emissivity of Sc (cloud water content: 0.1g/m$^3$) (Ellrod, 1995)

# Volcanic Ash

# Infrared Difference Imagery (IR – I2) SP1

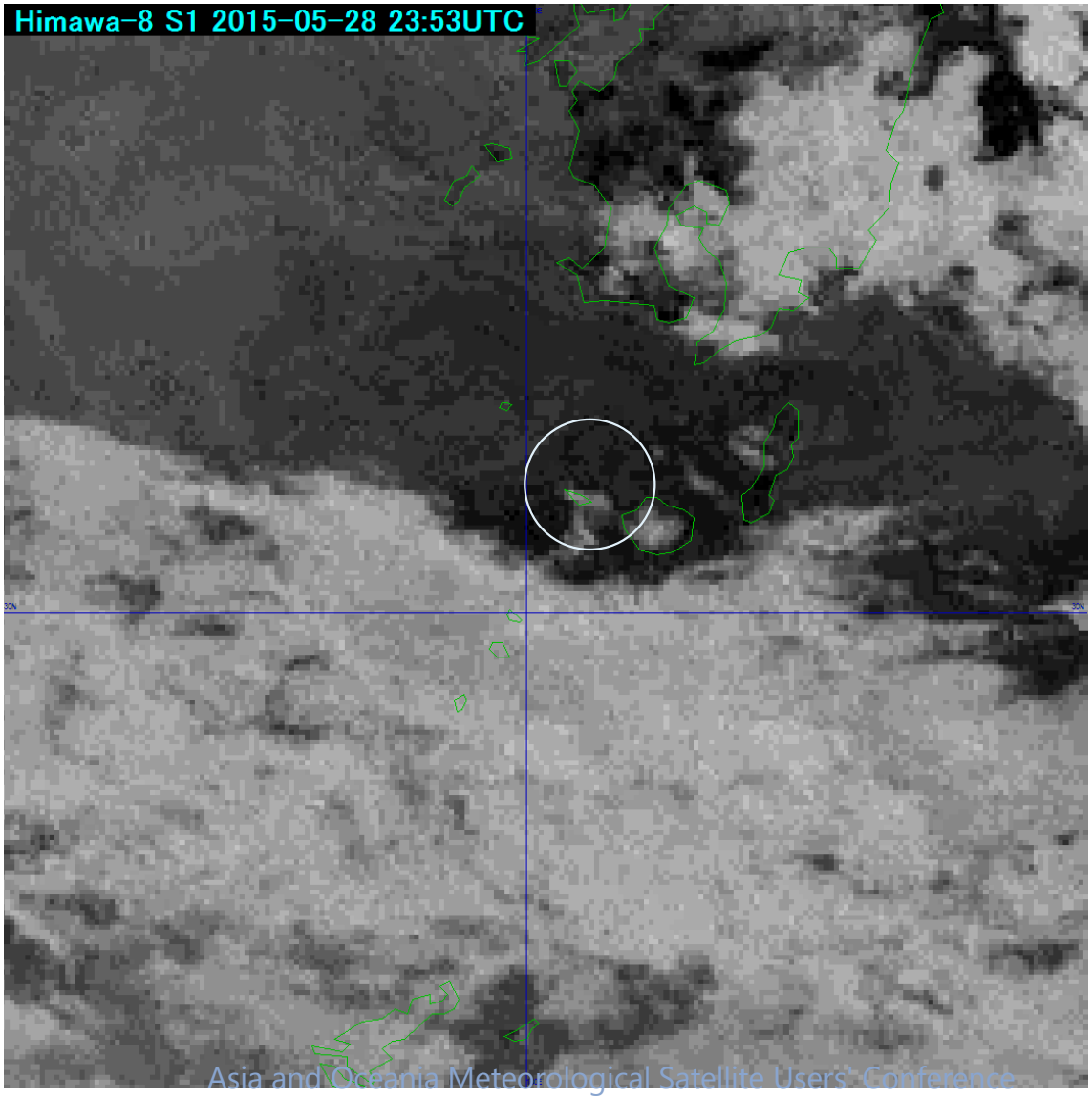



IR-I2 (10.4–12.3μm) is

| ≃0 | positive | =0 | negative | positive |
|---|---|---|---|---|
| ( gray | black | light gray | white | black ) |

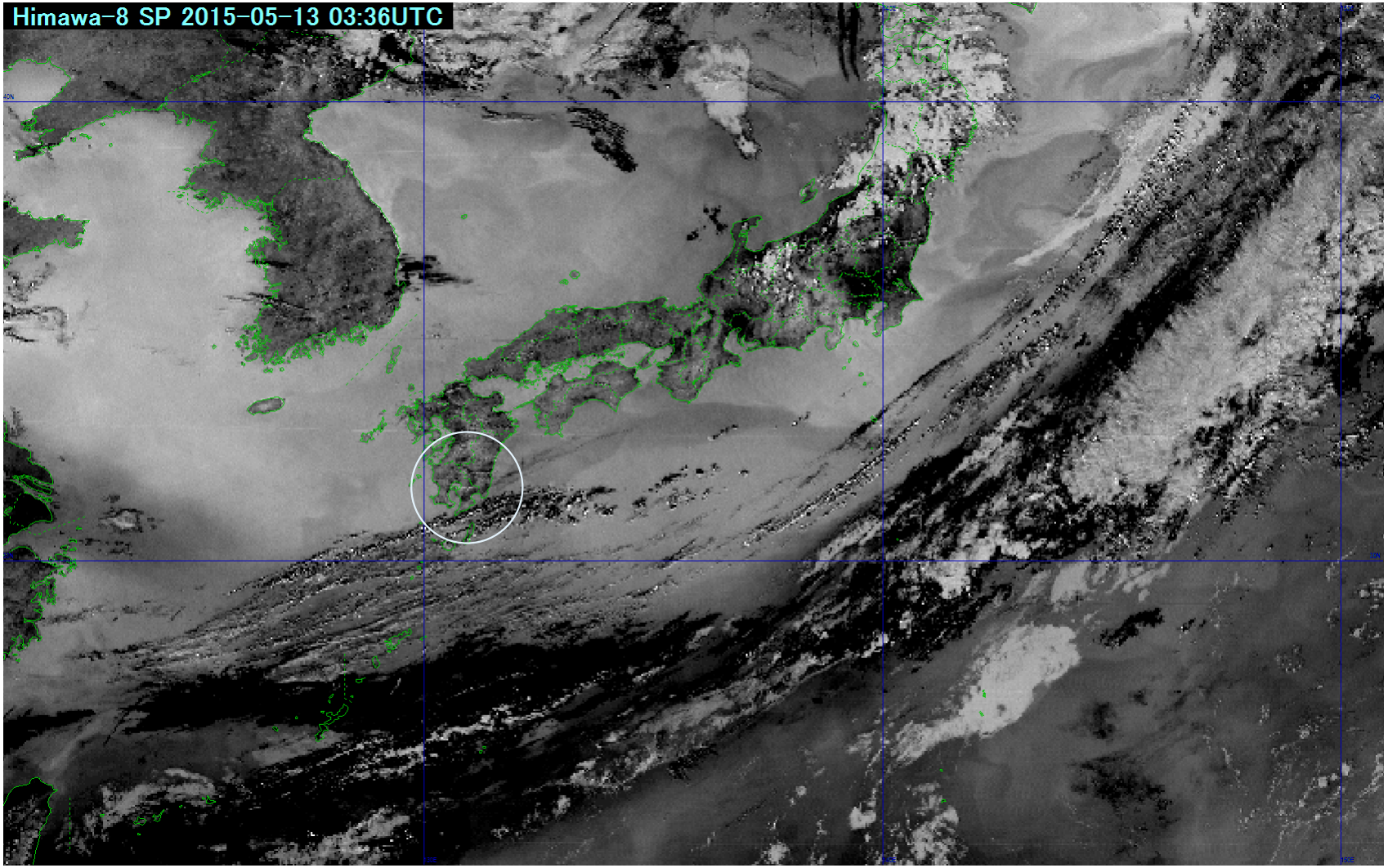
# Volcanic Ash of Kuchinoerabujima

## Difference images (10.4μm – 12.3μm images )



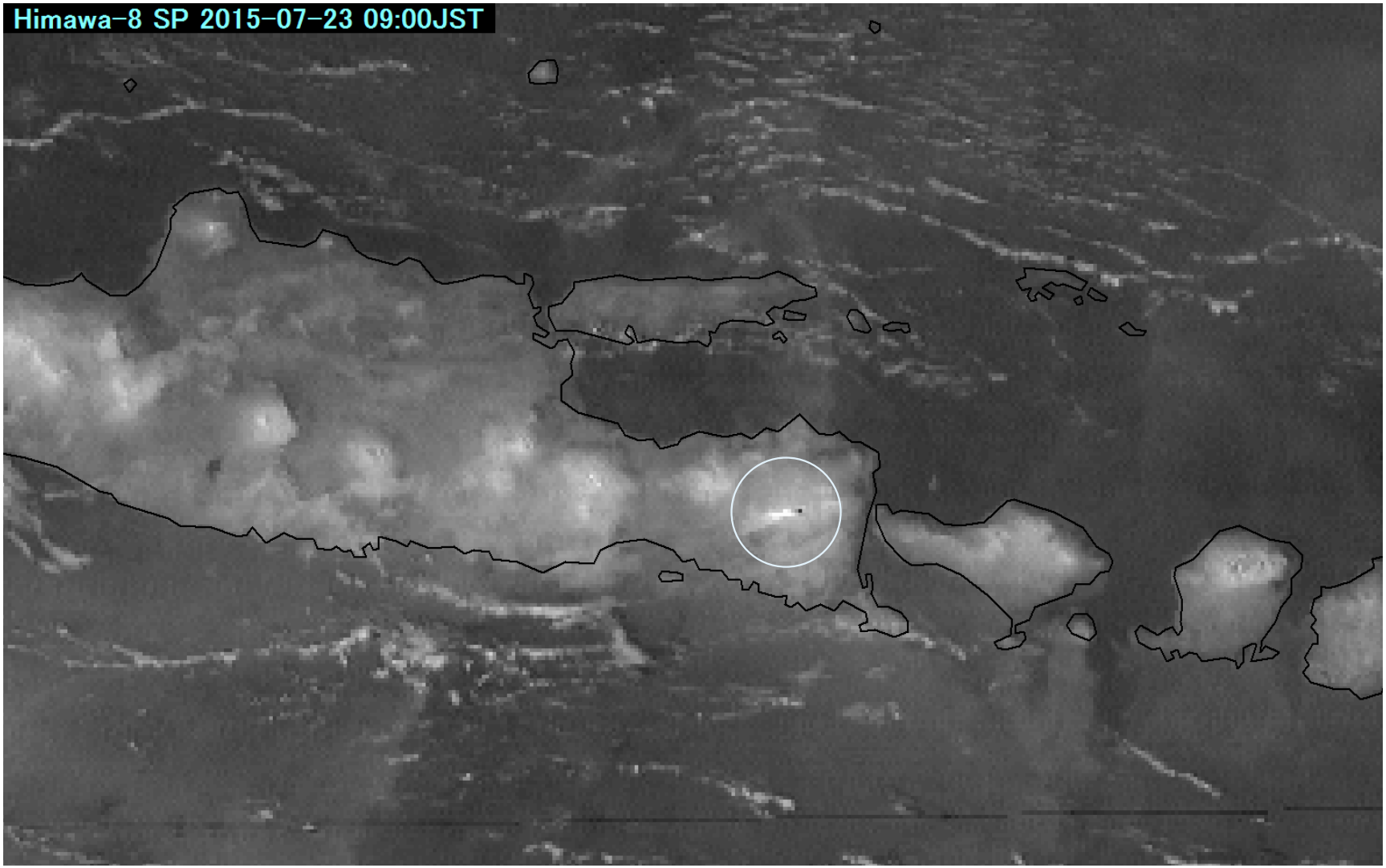
# Volcanic Ash of Sakurajima

## Difference images (10.4μm – 12.3μm images )

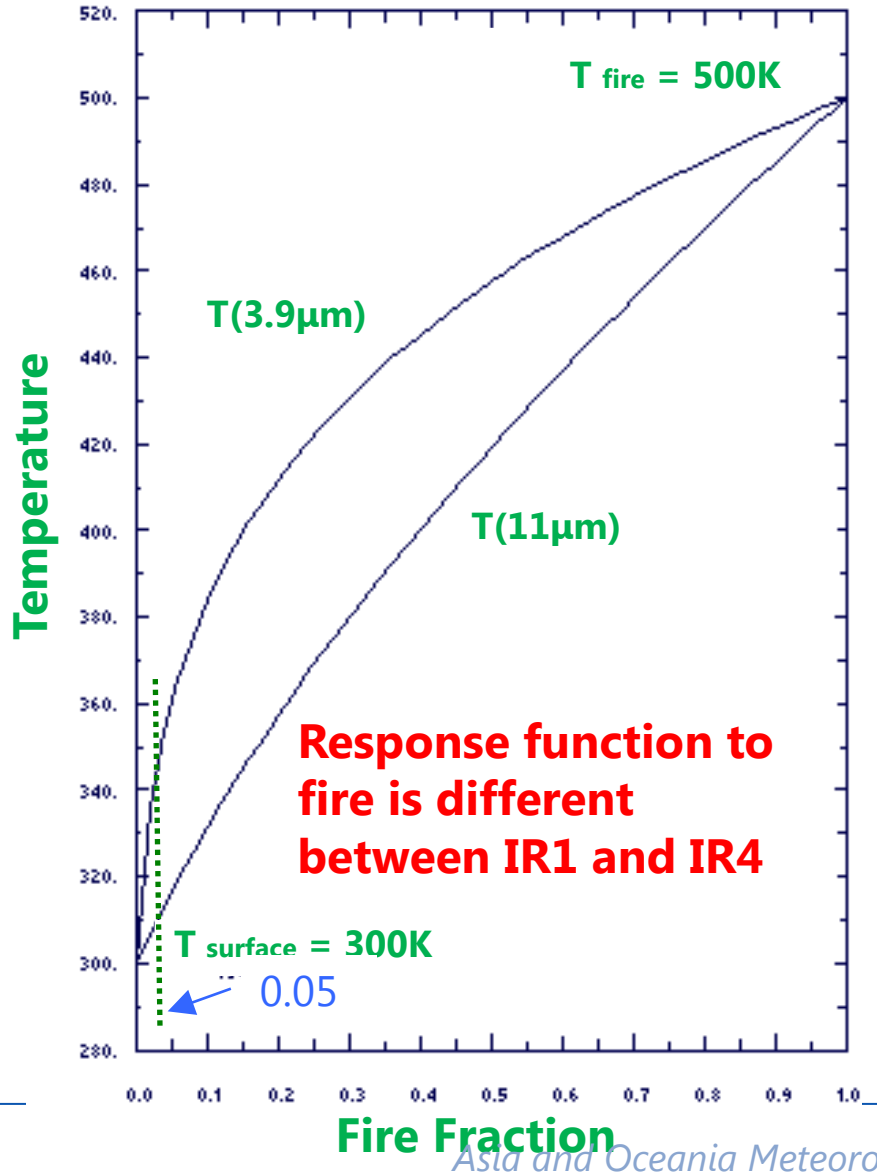


# Volcanic Ash of Mt. Merapi Indonesia

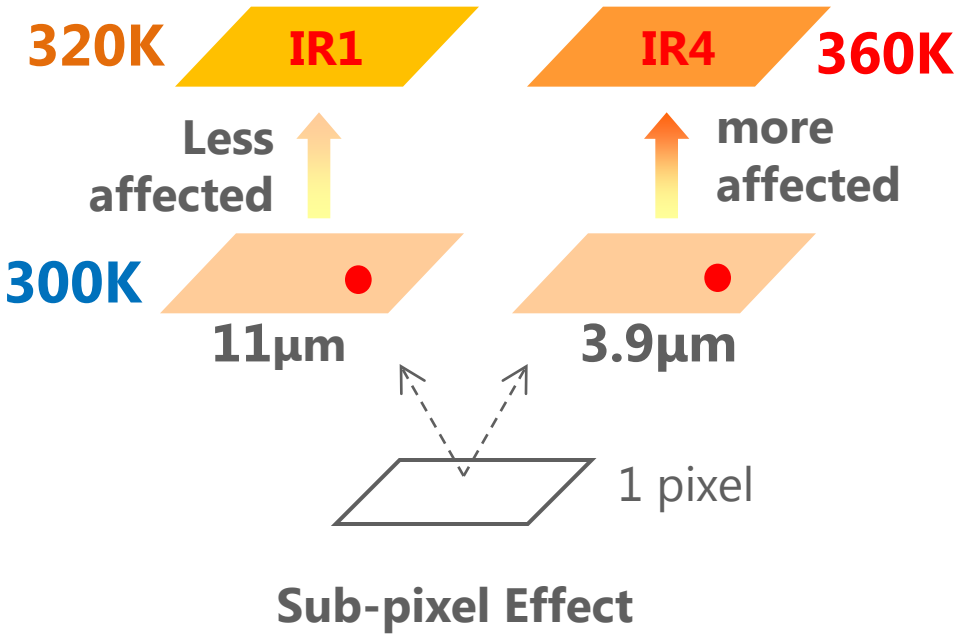
## Difference images (10.4μm – 12.3μm images )



# Fire Detection with I4 (3.9µm)



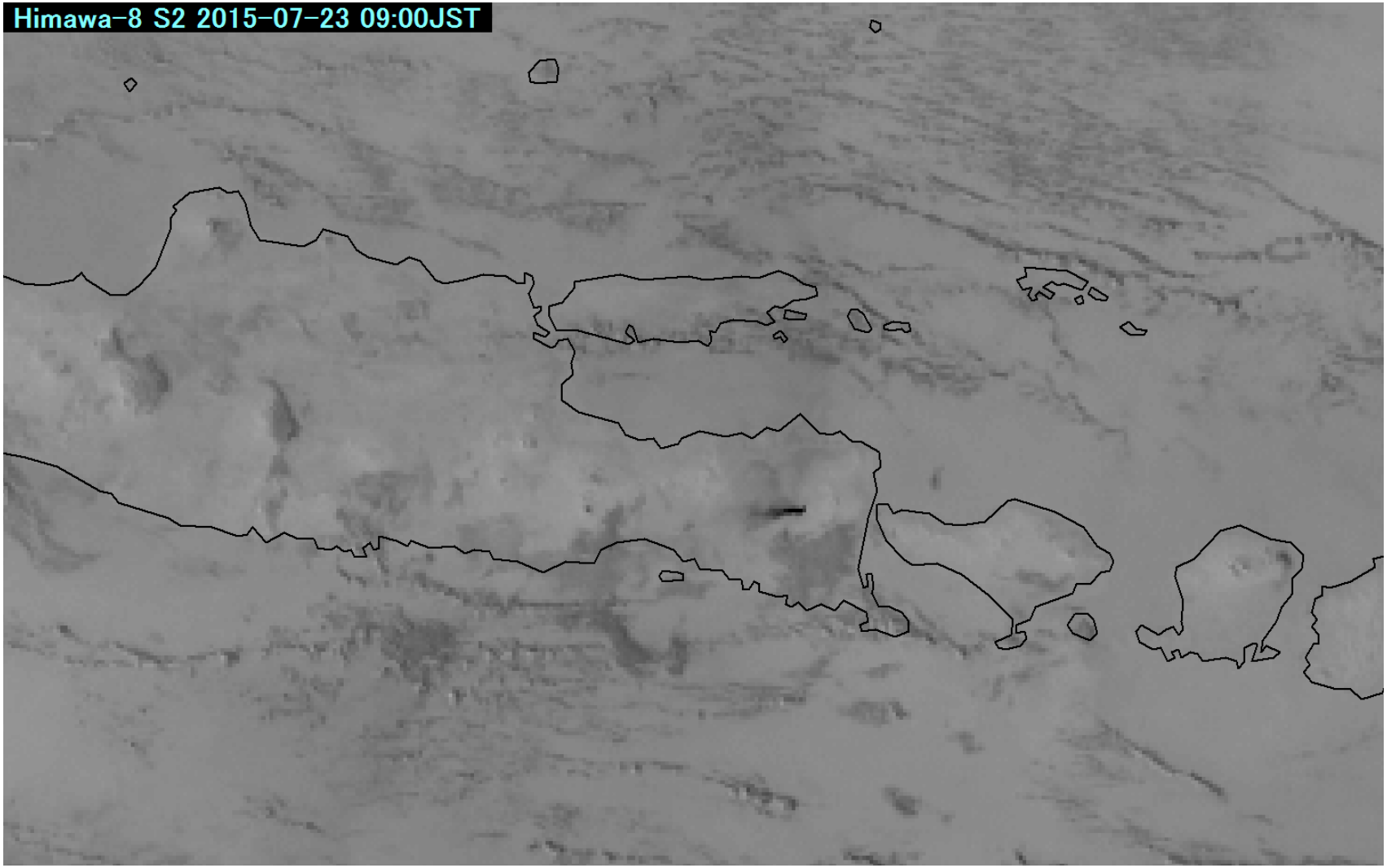

**If only 5% of the pixel is 500K**
- **11µm looks about 320 K**
- **3.9µm looks about 360 K**



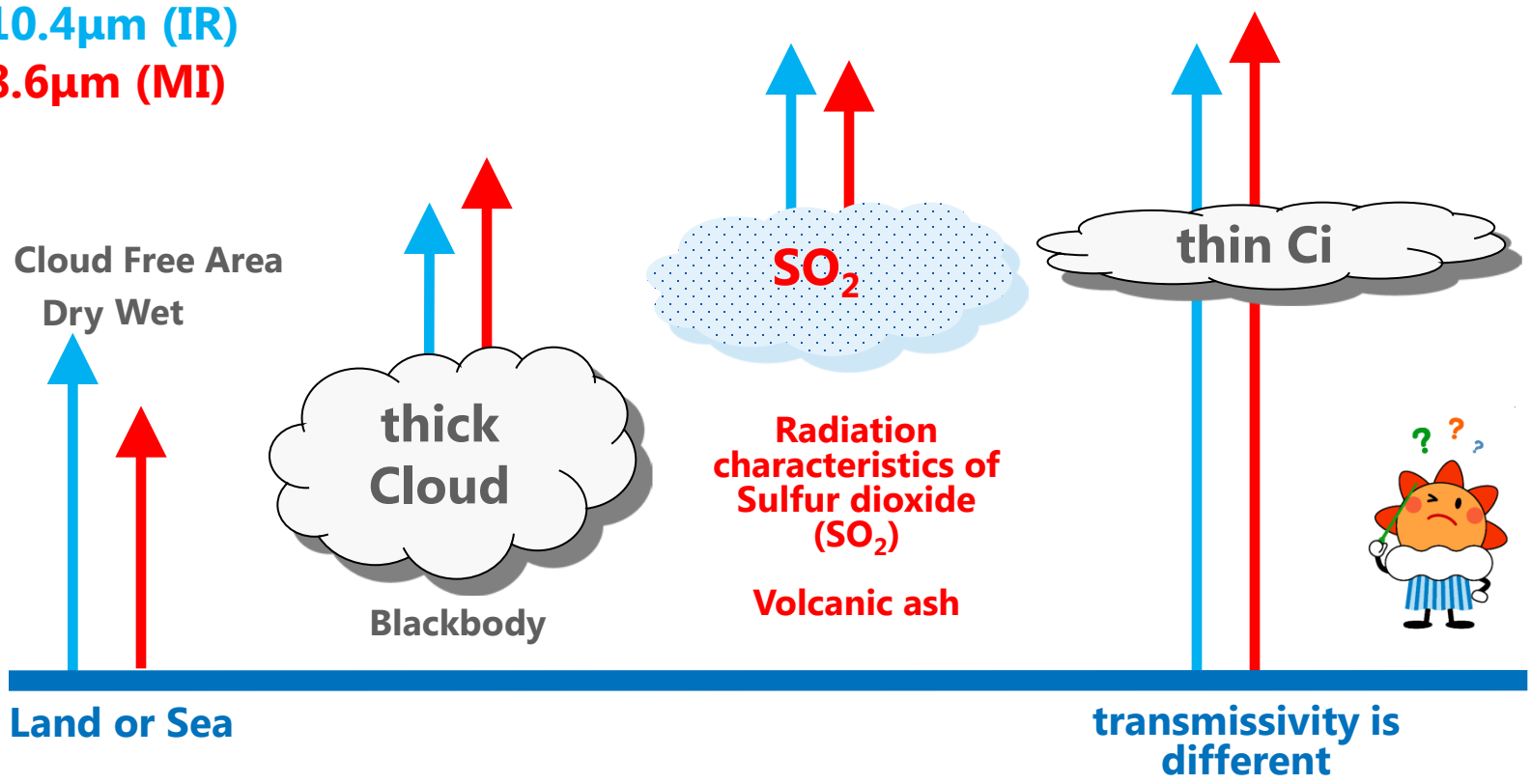

**Sub-pixel Effect**

# Volcanic Ash of Merapi Mt. Indonesia

## Difference images (3.9μm – 10.4μm images )



# Infrared Difference Imagery (IR – MI) SP5




IR-MI (10.4–8.6μm) is

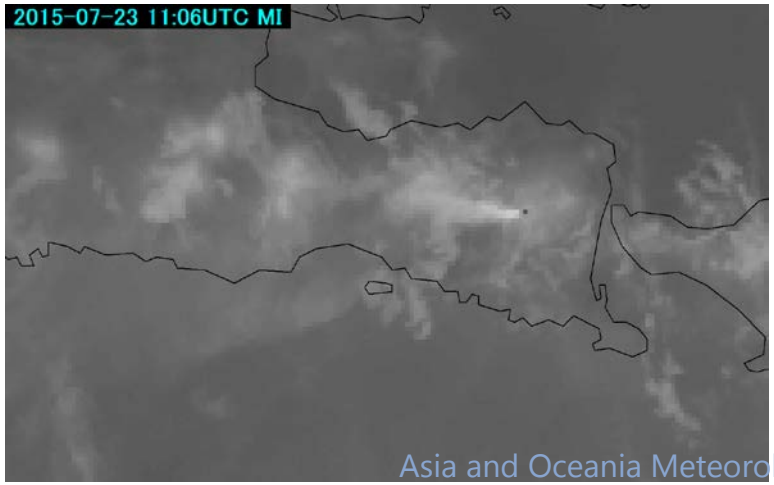
| positive | negative | 0~Positive | negative |
|---|---|---|---|
| ( black | white | light gray | white ) |

# Volcanic Ash of Merapi Mt. Indonesia

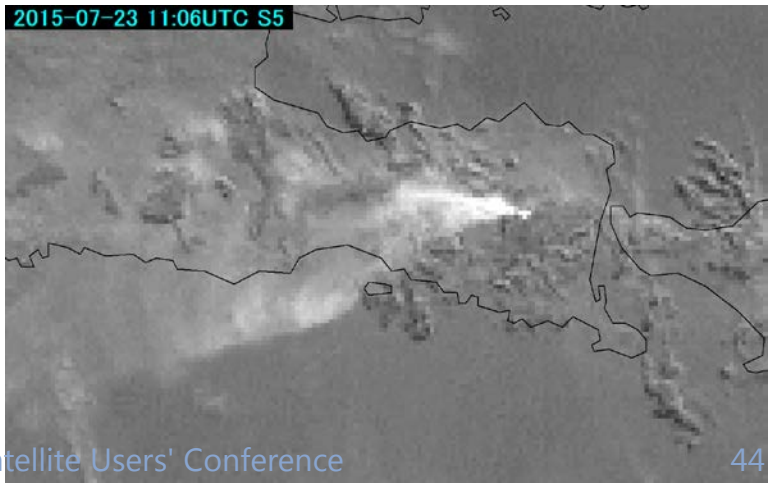
## (July 23th 2015)

- MI is more absorbed by $SO_2$ than other channels.
- Volcanic ash can be detected using MI because they contain $SO_2$.
- You can detect volcanic ash more clear by using difference image (IR-MI).

8.6μm(MI)

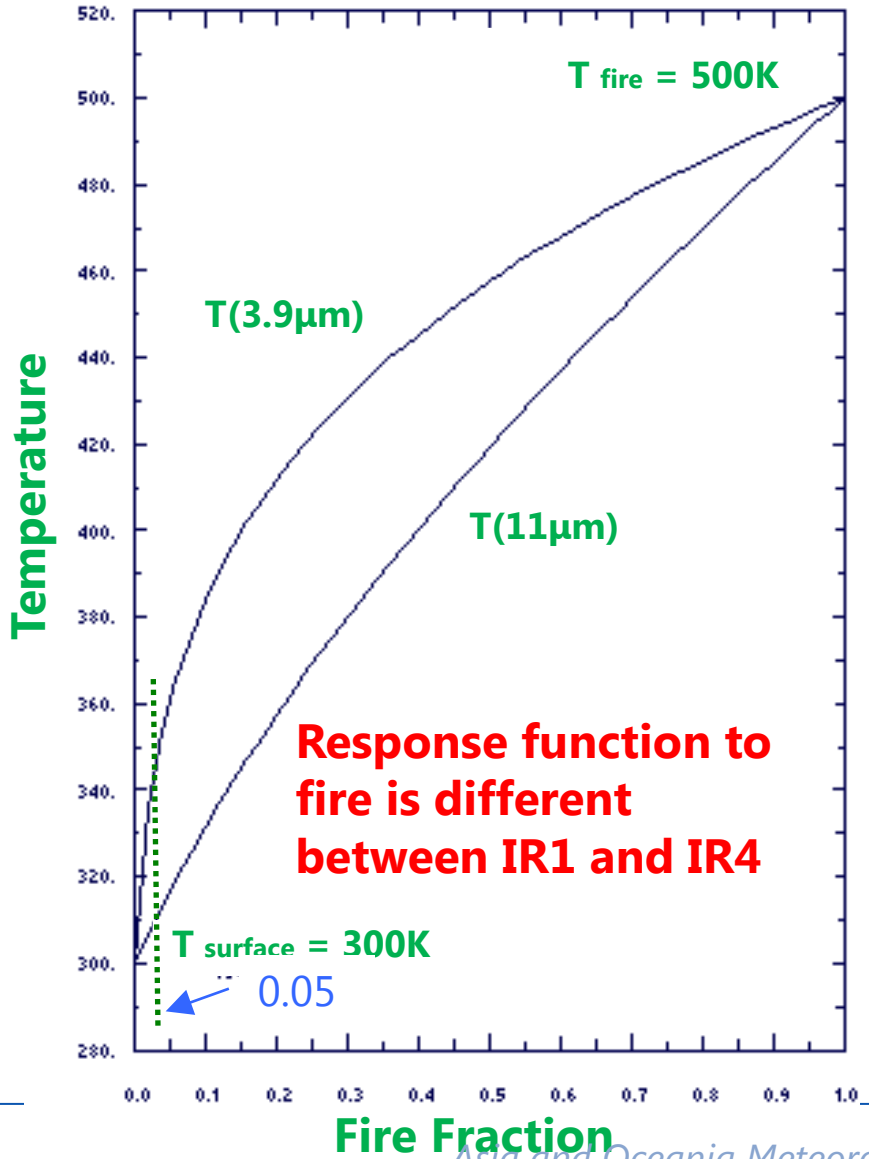



10.4μm (IR)-8.6μm (MI) difference image

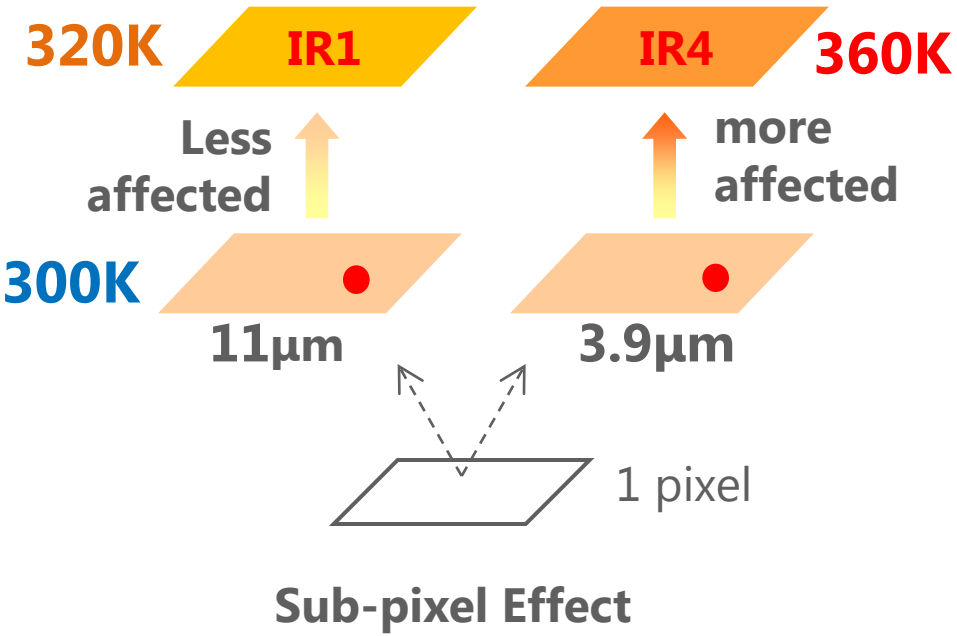


# Forest Fire

# Fire Detection with I4 (3.9µm)



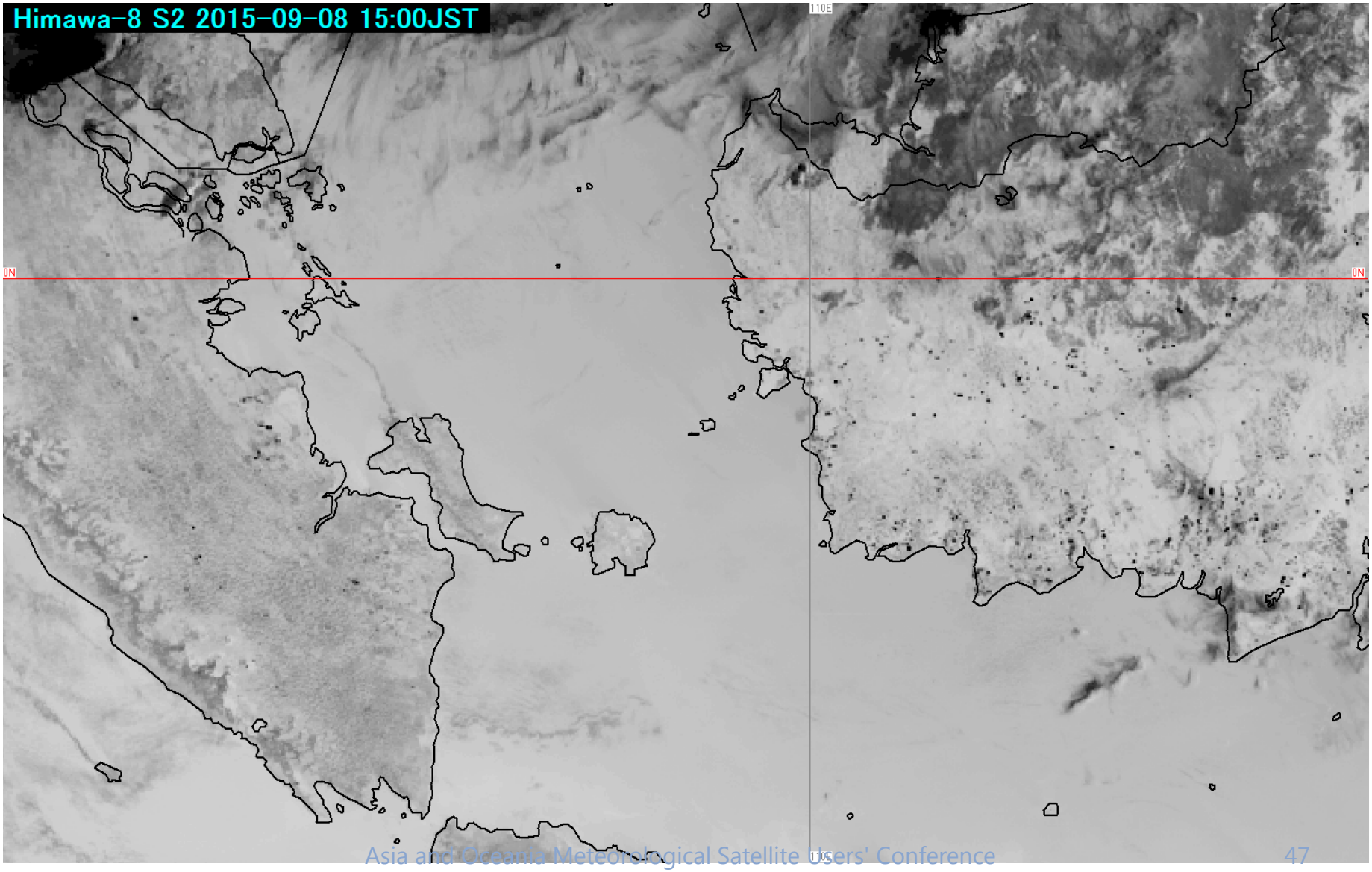

**If only 5% of the pixel is 500K**
- **11µm looks about 320 K**
- **3.9µm looks about 360 K**




**Sub-pixel Effect**

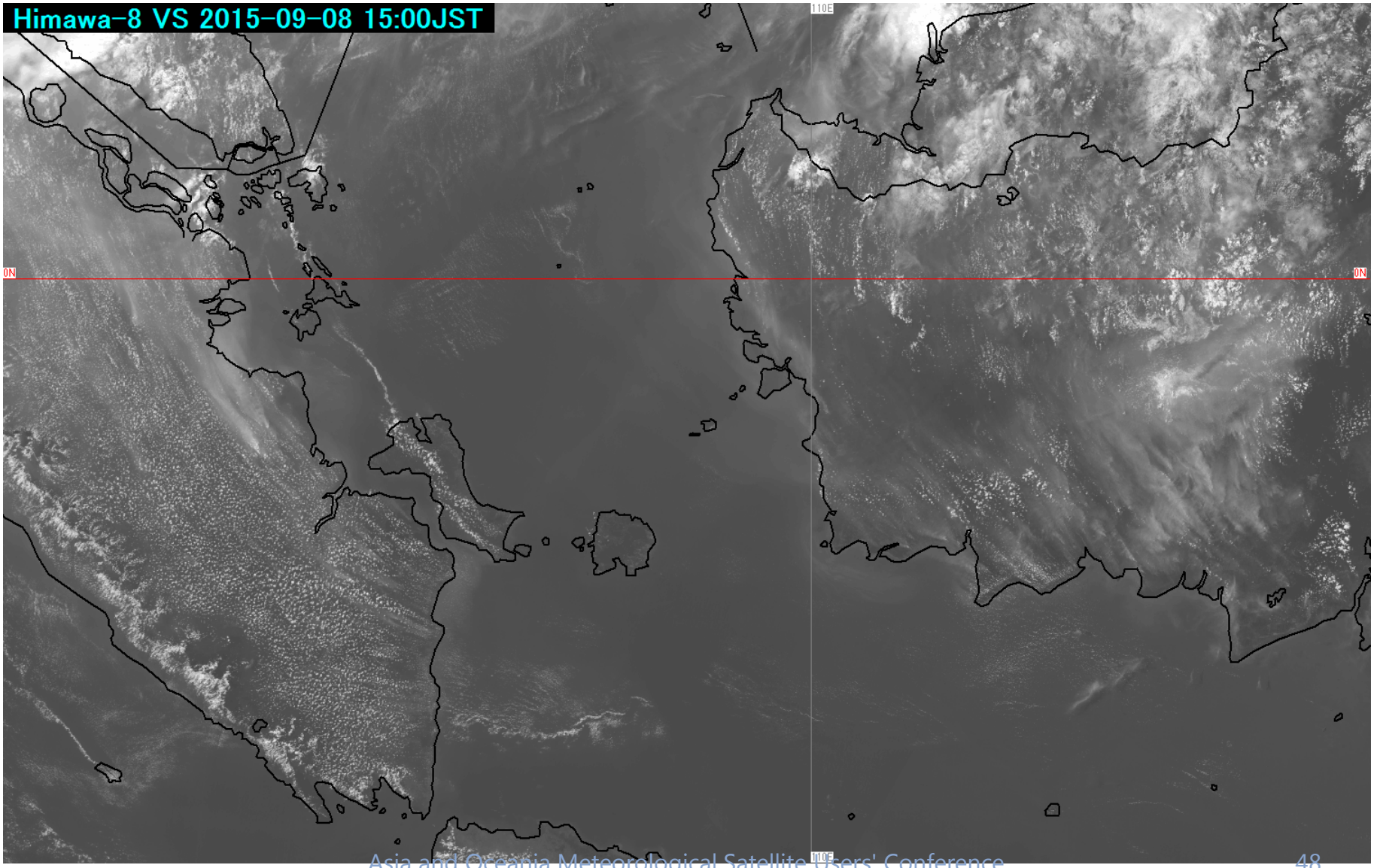
# Forest fire hot spot in Indonesia

## Difference images (3.9μm – 10.4μm images )



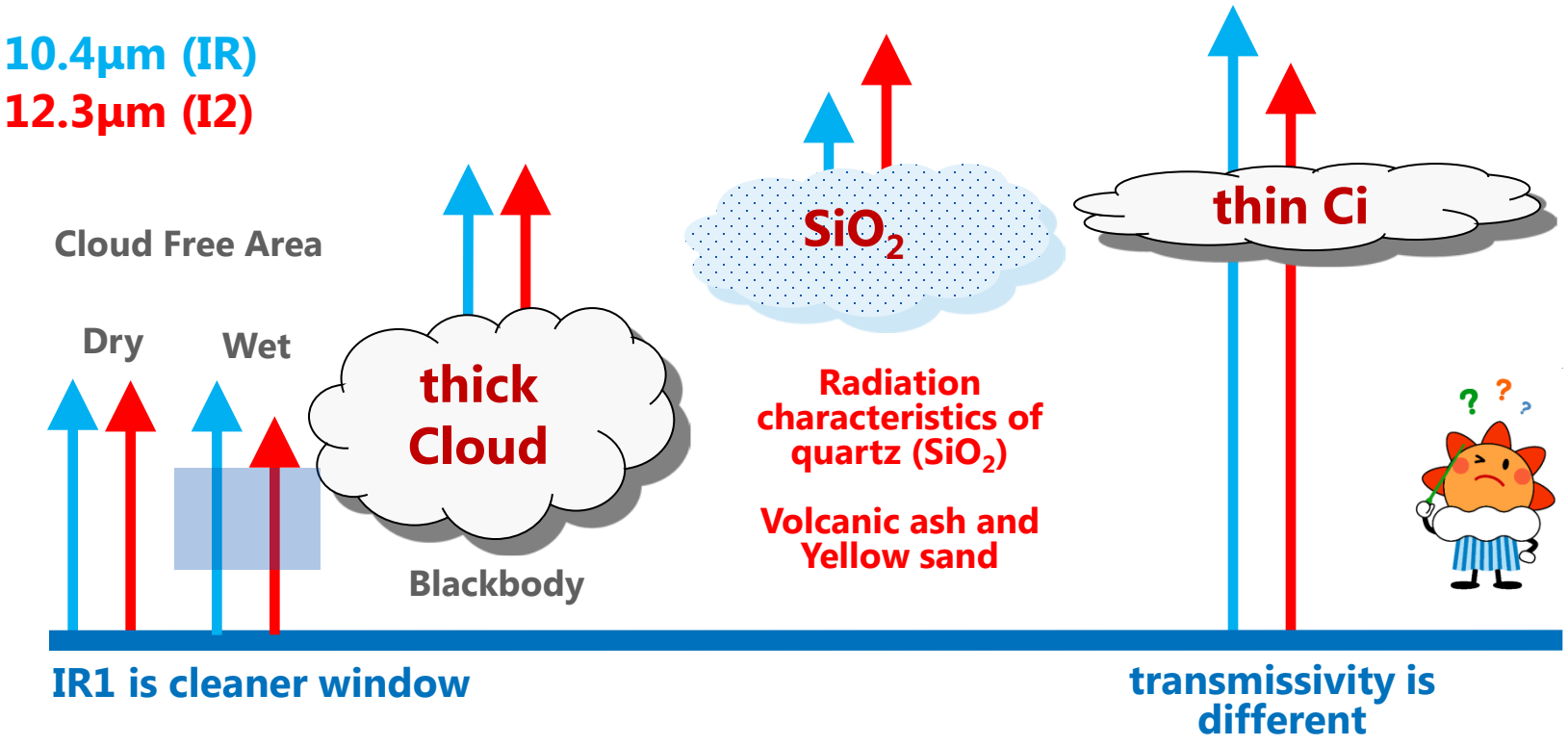
# Forest fires and smoke in Indonesia

## VS images



# Yellow Sand

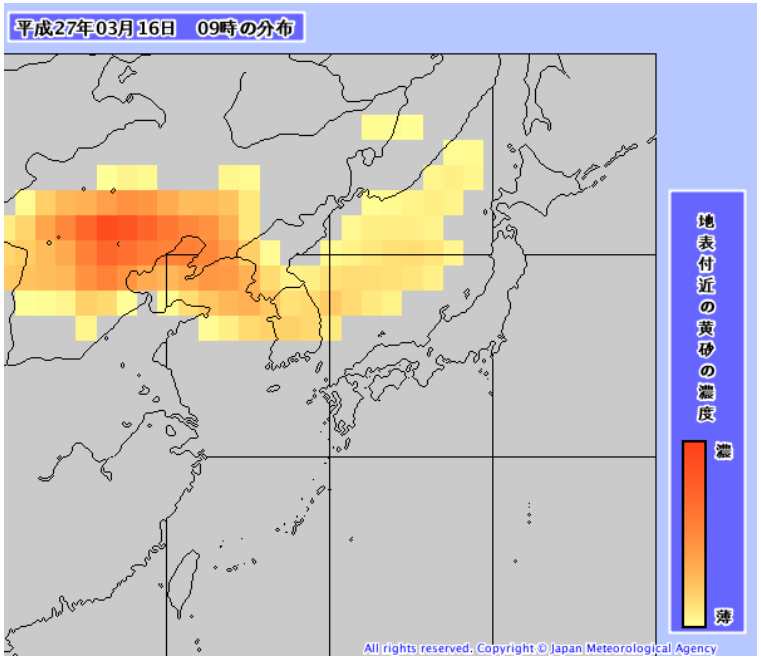
# Infrared Difference Imagery (IR – I2) SP1




IR-I2 (10.4–12.3μm) is

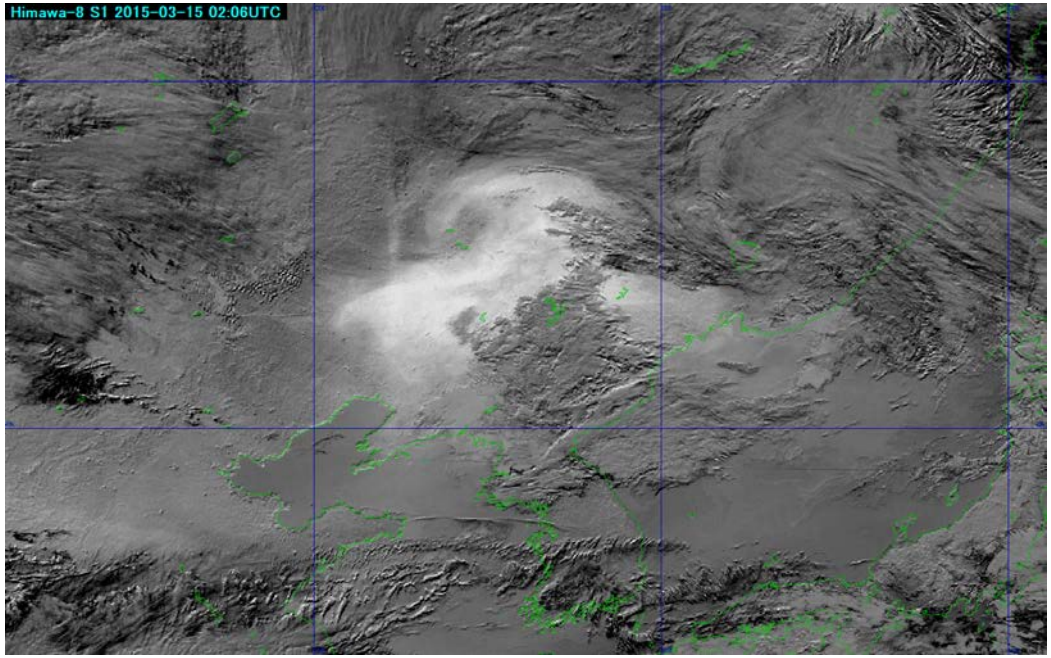
| ≃0 | positive | =0 | negative | positive |
|---|---|---|---|---|
| ( gray | black | light gray | white | black ) |

# Yellow sand (Difference image)




Yellow sand forecast

10.5μm（IR）-12.3μm（I2）



# Quick-Guide

## for SATAID

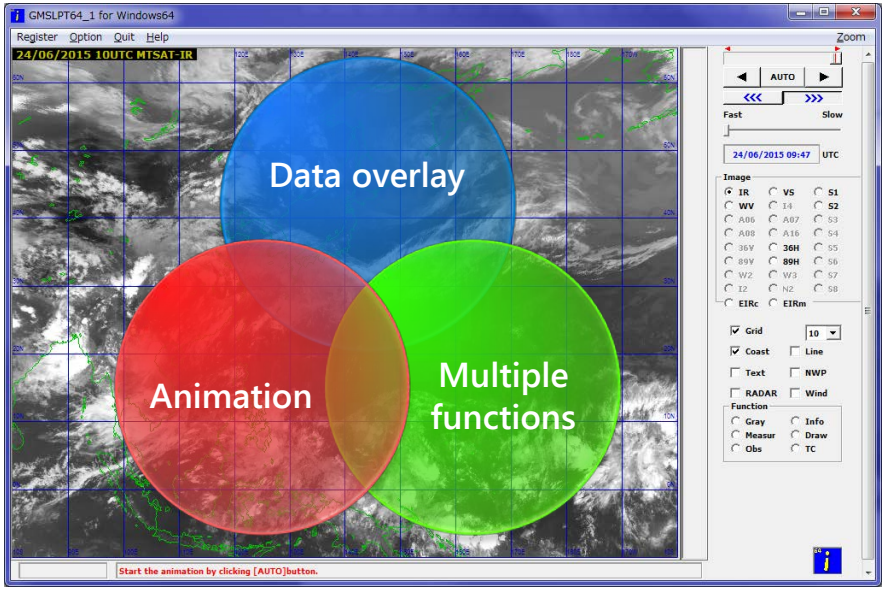
*RSMC Tokyo – Typhoon Center*

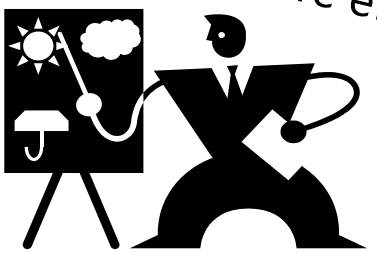
Japan Meteorological Agency

2015/11/13

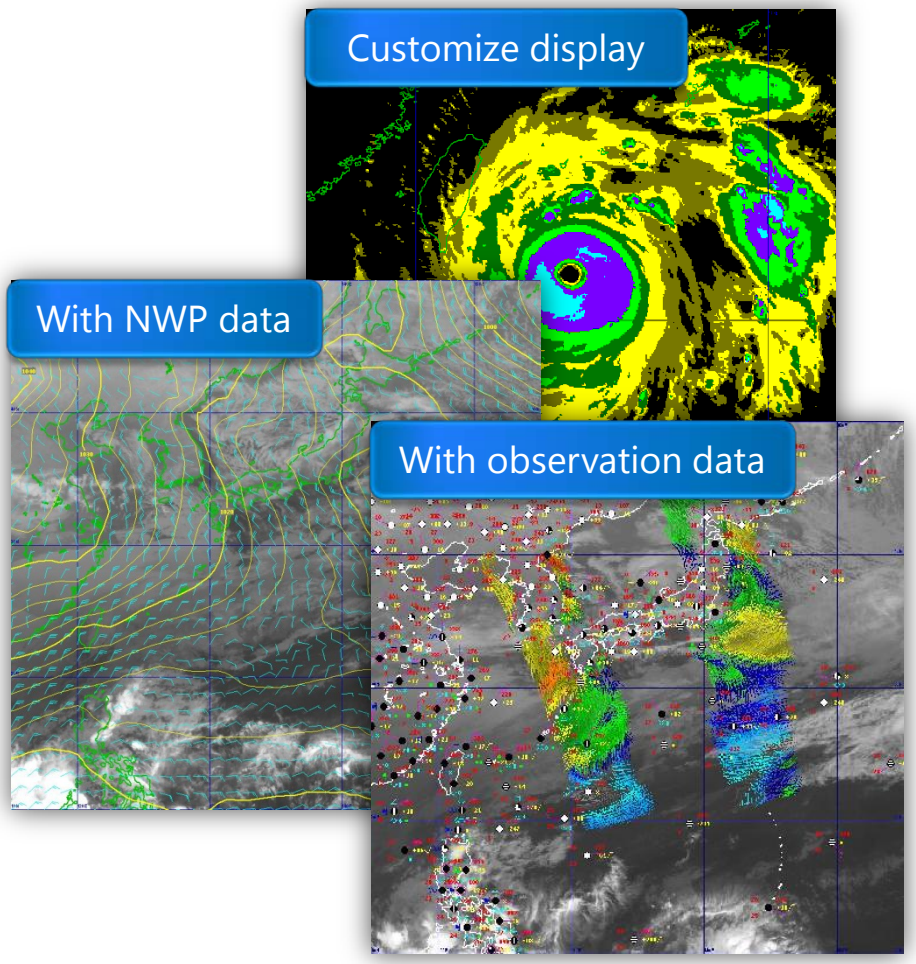
# What's SATAID?

SATAID (SATellite Animation and Interactive Diagnosis) 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!



# Contents

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- ✓ Display coast/grid line

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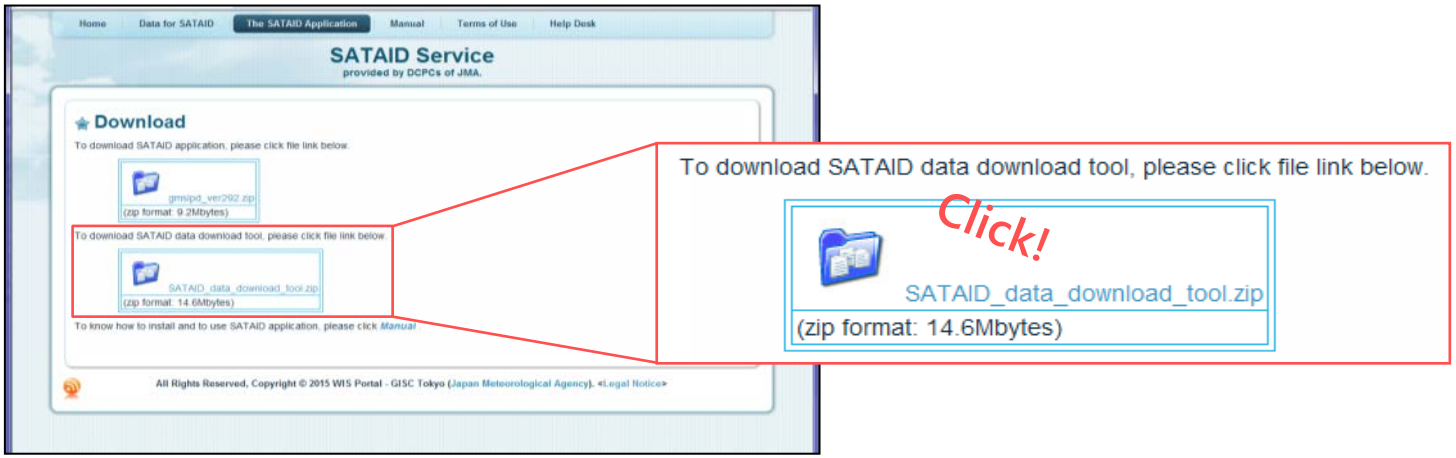
- ✓ Drawings
- ✓ Output images
- ✓ Save new setting

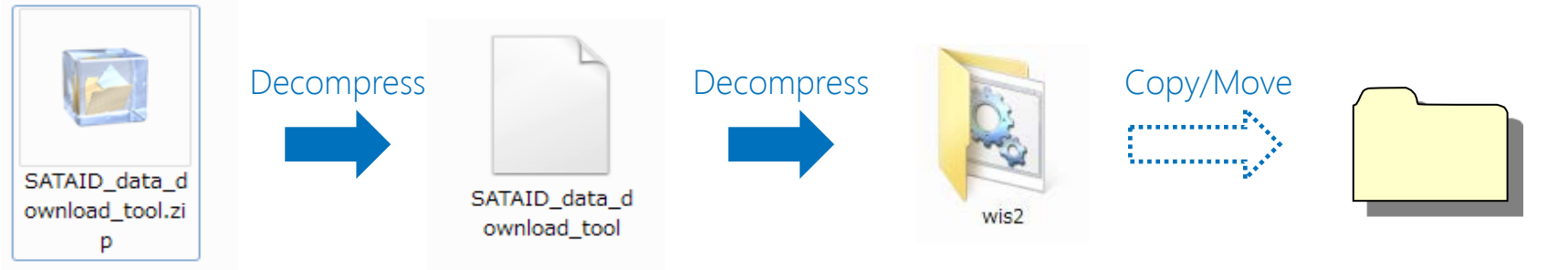
# 1. Install SATAID and Download Data

# Install SATAID

① Download "**SATAID_data_download_tool.zip**" from SATAID Service website (ID/Password will be required)
http://www.wis-jma.go.jp/cms/sataid/app/download/




② Decompress the zip file and copy/move the folder into your choice of folder



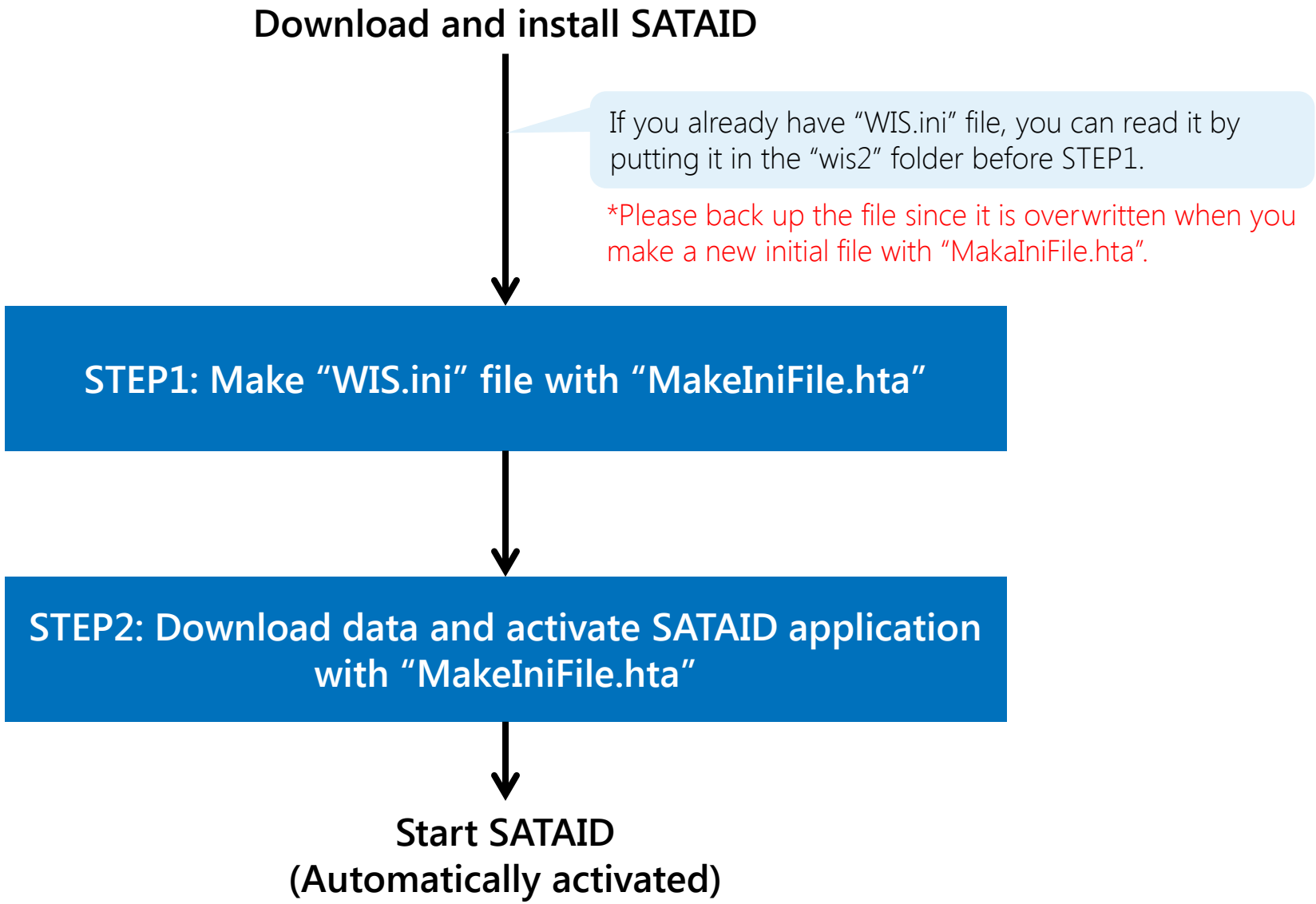

Zip file

Zip file without extension

Main folder after decompressed

Folder for SATAID

# Download data with “WIS Downloader”

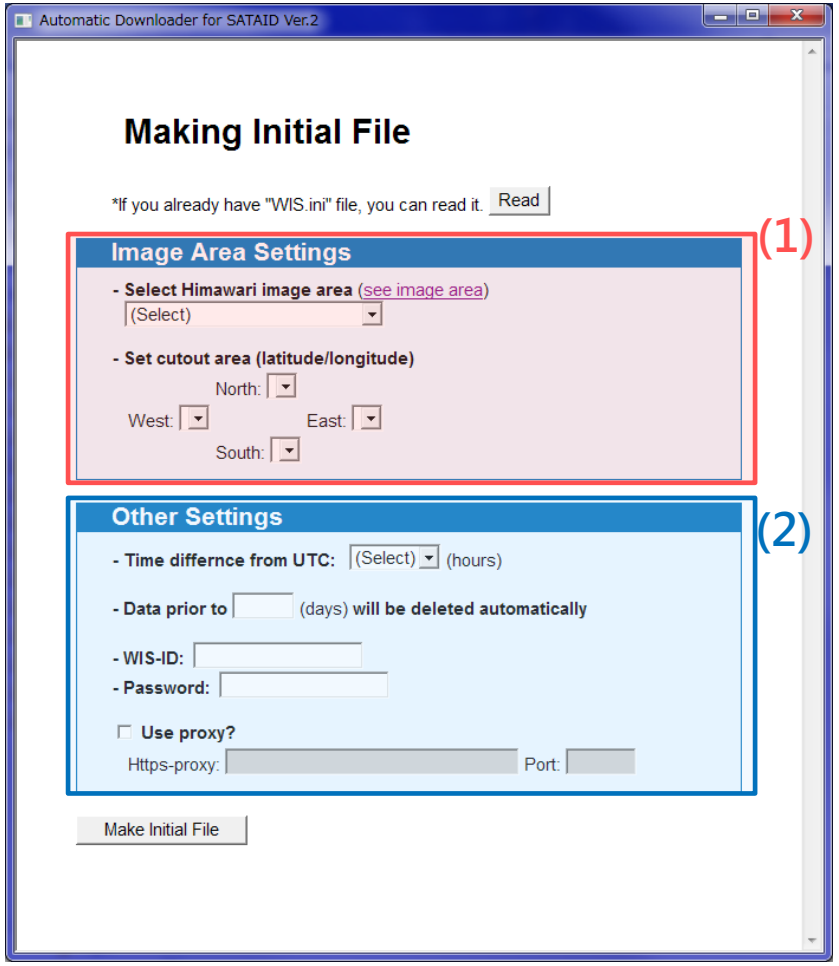


# Download data with “WIS Downloader”

① Make an initial file for WIS Downloader

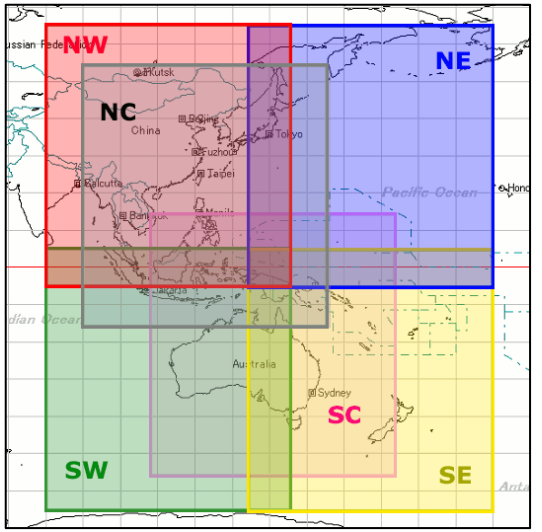
* If you already have “WIS.ini” file, you can read it by clicking “Read” button.

**“MakeIniFile.hta” file**




## (1) Image Area Settings

- ✓ Select Himawari image area
- ✓ Select cutout area with Lat/Lon



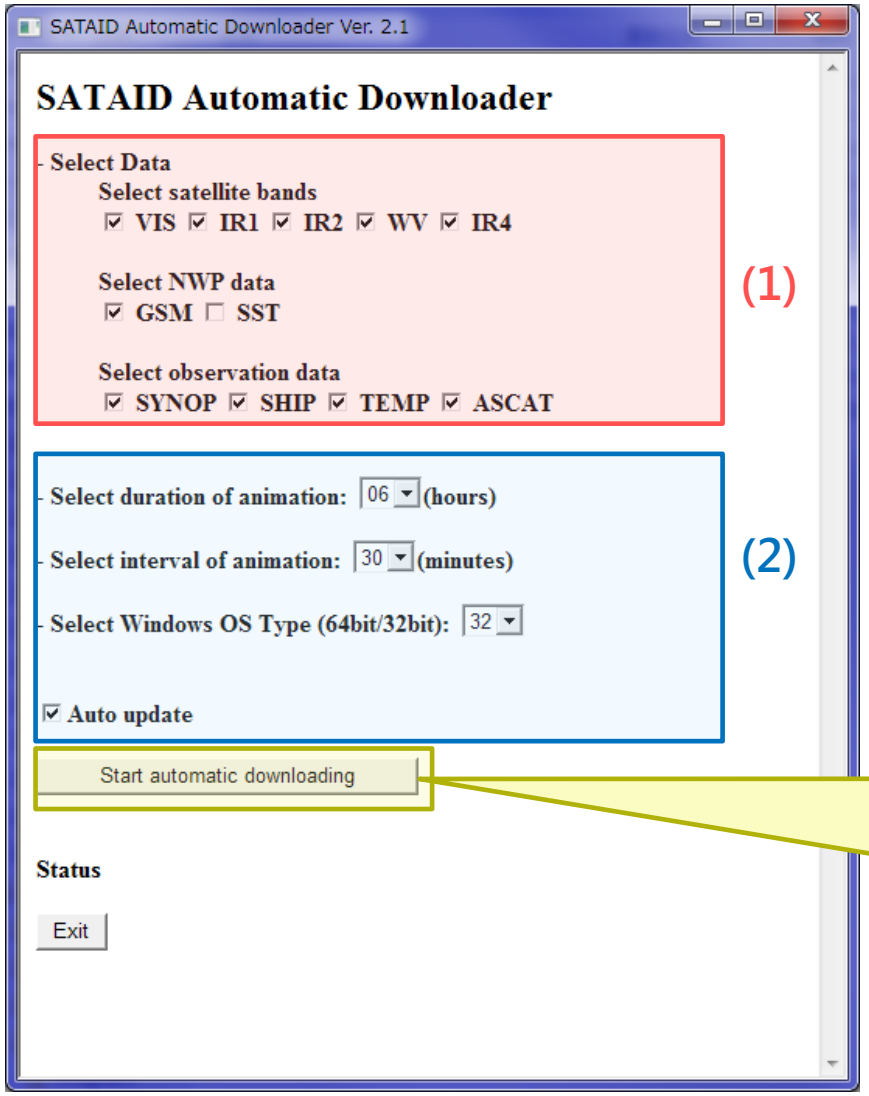

## (2) Other Settings

- ✓ Time difference from UTC
- ✓ Duration of file deleting
- ✓ WIS-ID, Password
- ✓ Proxy

# Download data with “WIS Downloader”

② Download data from WIS server

* Please close SATAID program (GMSLPD) before using SATAID Automatic Downloader.




## (1) Select Data

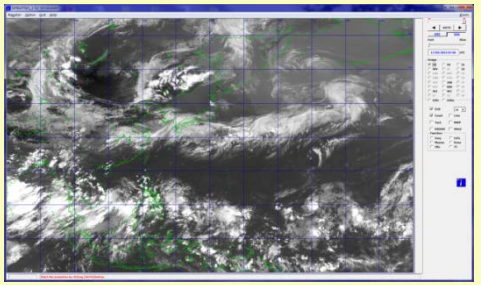
- ✓ Himawari-8 bands
- ✓ NWP data
- ✓ Other observation data

## (2) Set up details

- ✓ Duration of animation time
- ✓ Interval of animation time*
- ✓ OS type (32/64bit)
- ✓ Auto-update function

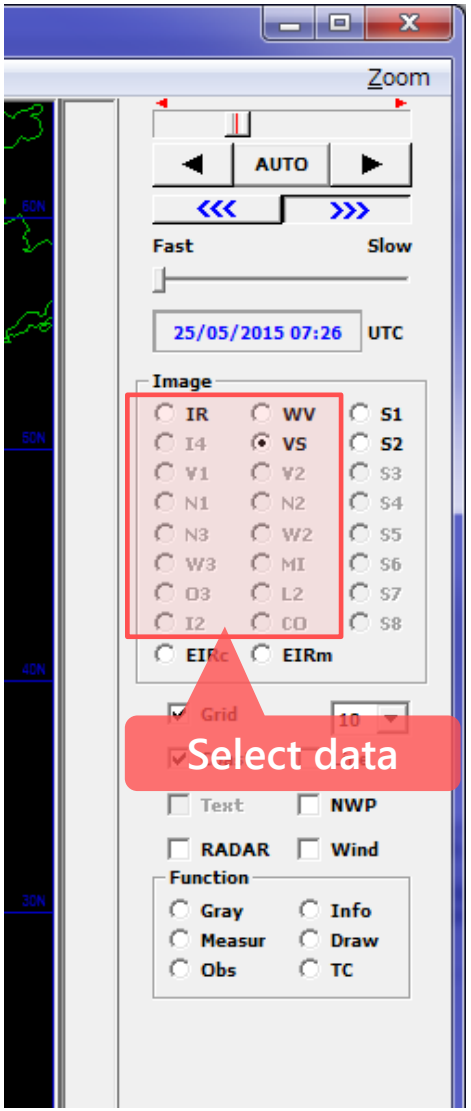
* You may need to select short animation time if you select 10-min intervals depending on your PC memory capacity.

After downloading data, SATAID will be automatically activated.



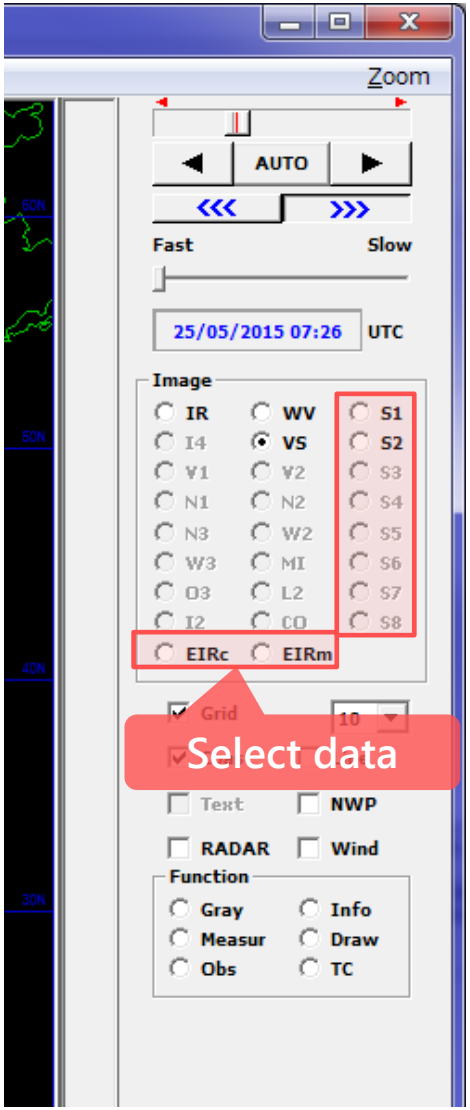
# 2. Display and Control Satellite Images

# Select satellite images




| Band | | Wavelength [μm] | Spatial Resolution |
|---|---|---|---|
| V1 | Visible | 0.46 | 1Km |
| V2 | | 0.51 | 1Km |
| VS | | 0.64 | 0.5Km |
| N1 | Near Infrared | 0.86 | 1Km |
| N2 | | 1.6 | 2Km |
| N3 | | 2.3 | 2Km |
| I4 | Infrared | 3.9 | 2Km |
| WV | | 6.2 | 2Km |
| W2 | | 7.0 | 2Km |
| W3 | | 7.3 | 2Km |
| MI | | 8.6 | 2Km |
| O3 | | 9.6 | 2Km |
| IR | | 10.4 | 2Km |
| L2 | | 11.2 | 2Km |
| I2 | | 12.3 | 2Km |
| CO | | 13.3 | 2Km |

# Select satellite images



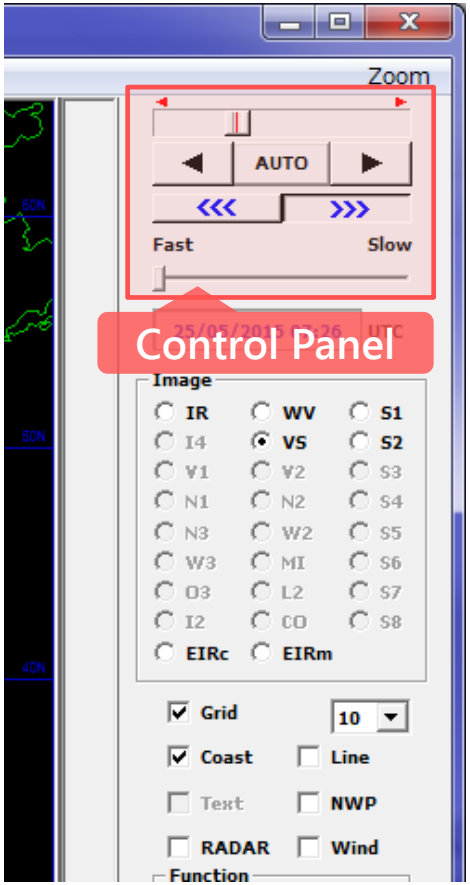

## ◆Calculated Images

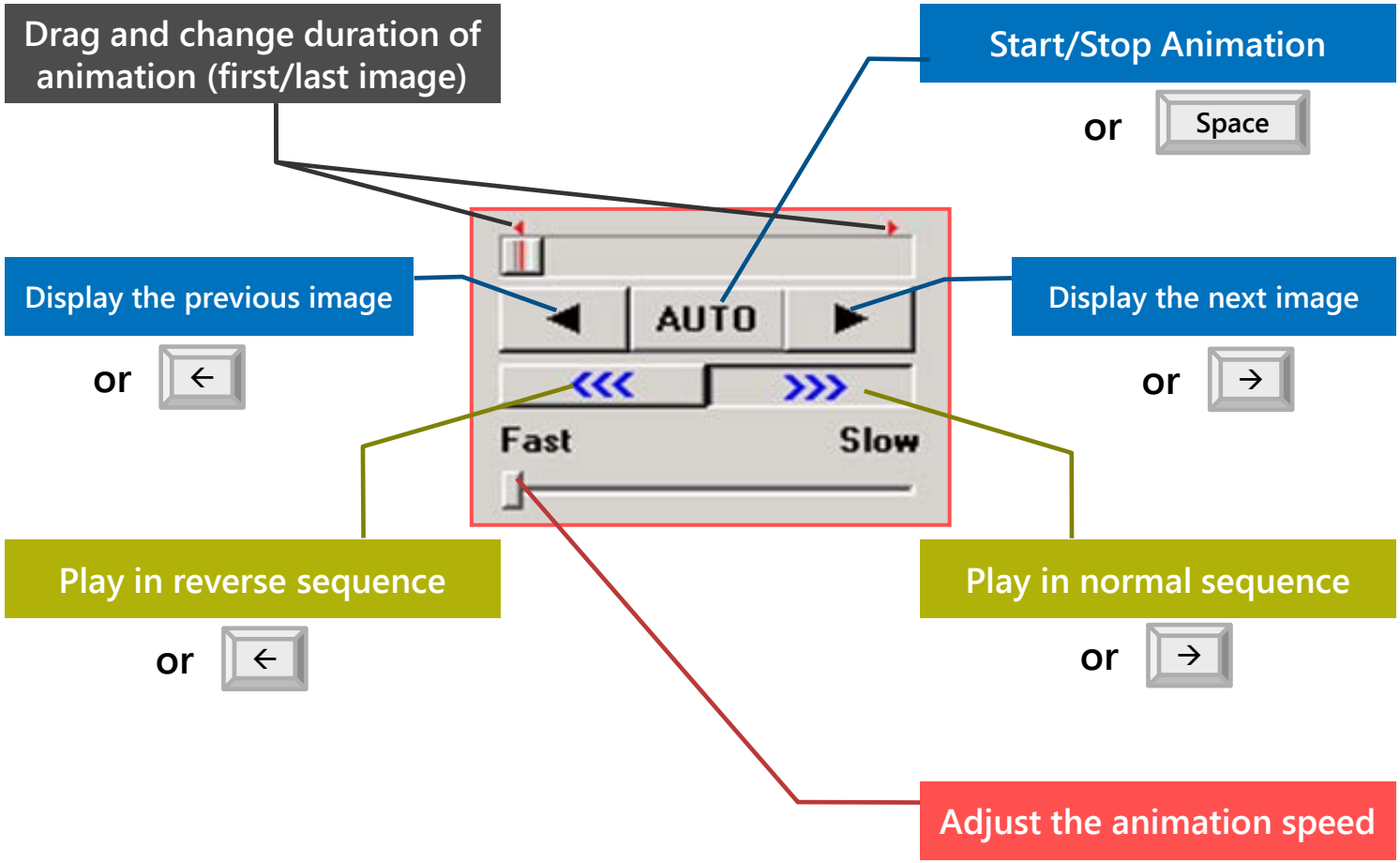
- "S1": Differential images 1 (IR – I2)
- "S2": Differential images 2 (I4 – IR)

## ◆Colored Images

- "EIRc": Colored enhanced infrared images
- "EIRm": Monochrome enhanced infrared images

# Control animation



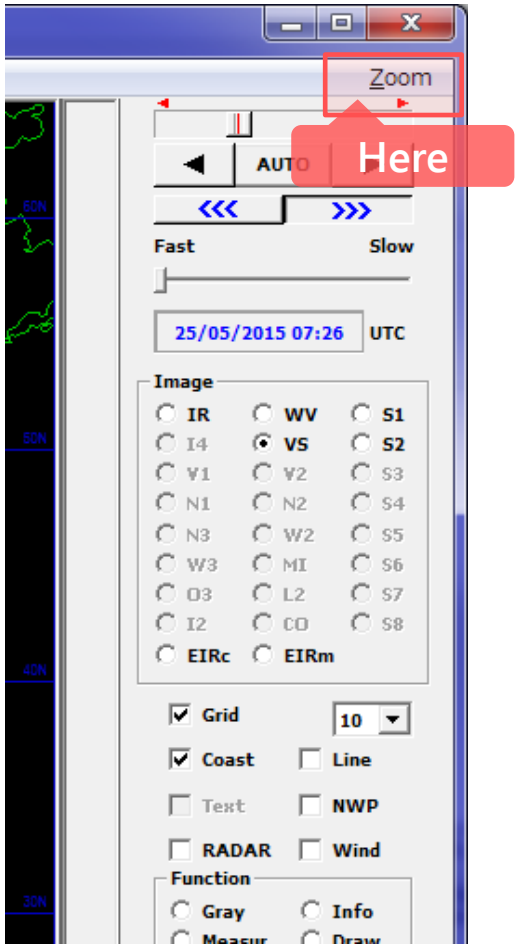




## Tips

"Ctrl" + ◀ or ▶

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

# Zoom in/out




## ◆Method 1

- Display enlarged area
  Click [Zoom] button and drag area
- Back to whole image
  Click [Normal] button

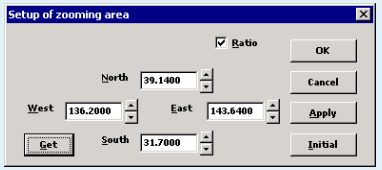
## ◆Method 2

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

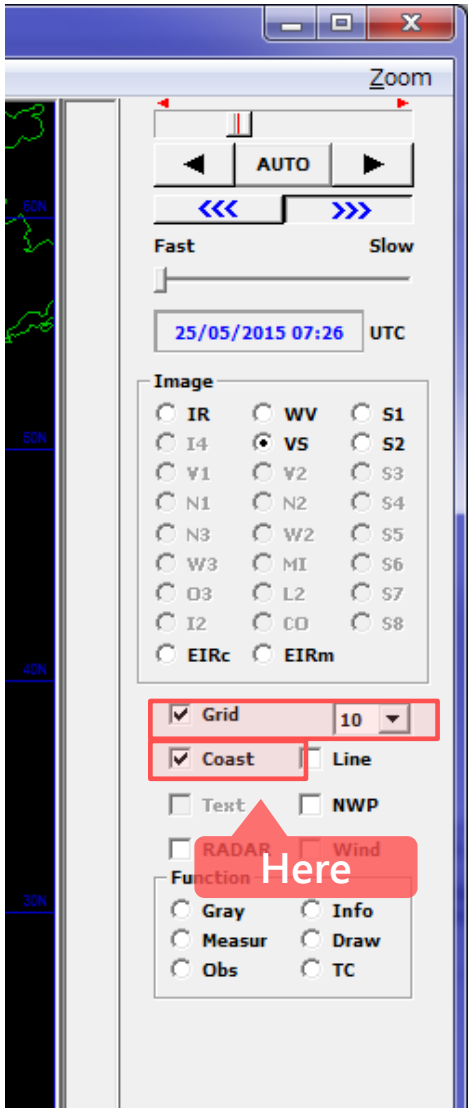
## Tips

You can digitally designate area with longitude/latitude information

" Ctrl " + " Shift " + [Zoom]



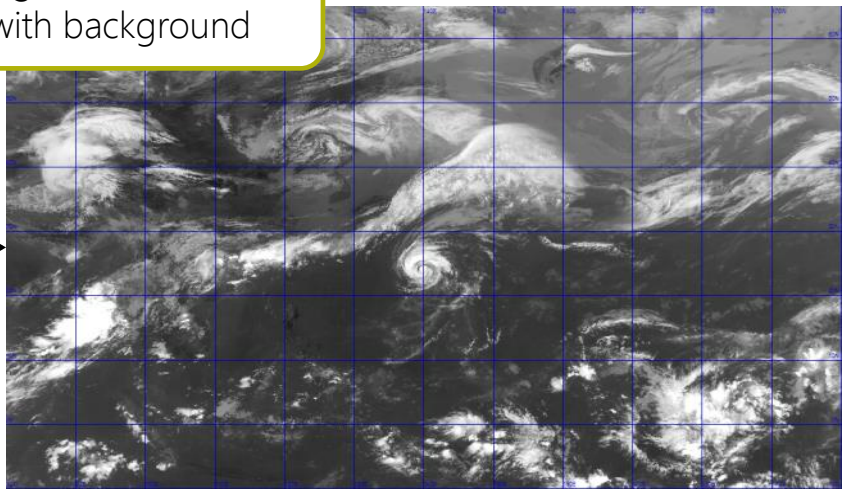
# Display coast/grid line

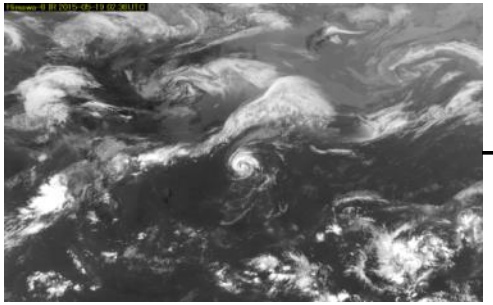


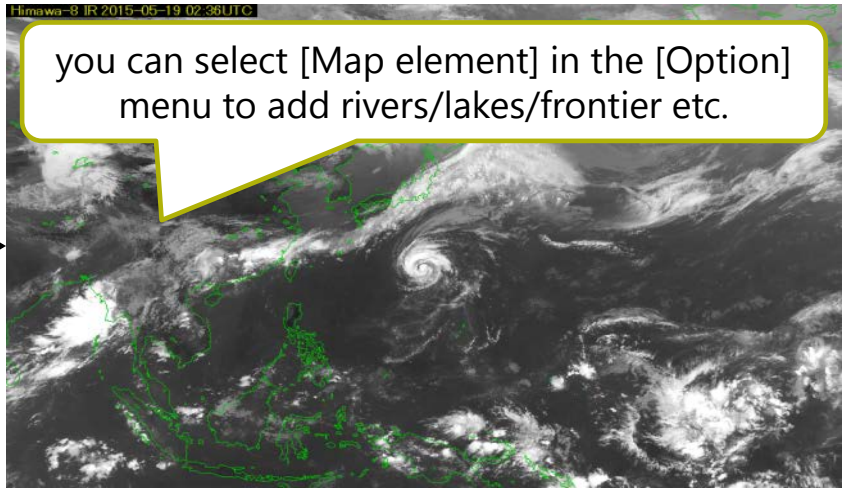

Check with [Ctrl] key: larger fonts
Check with [Shift] key: with background

Check!


Select intervals of latitude/longitude







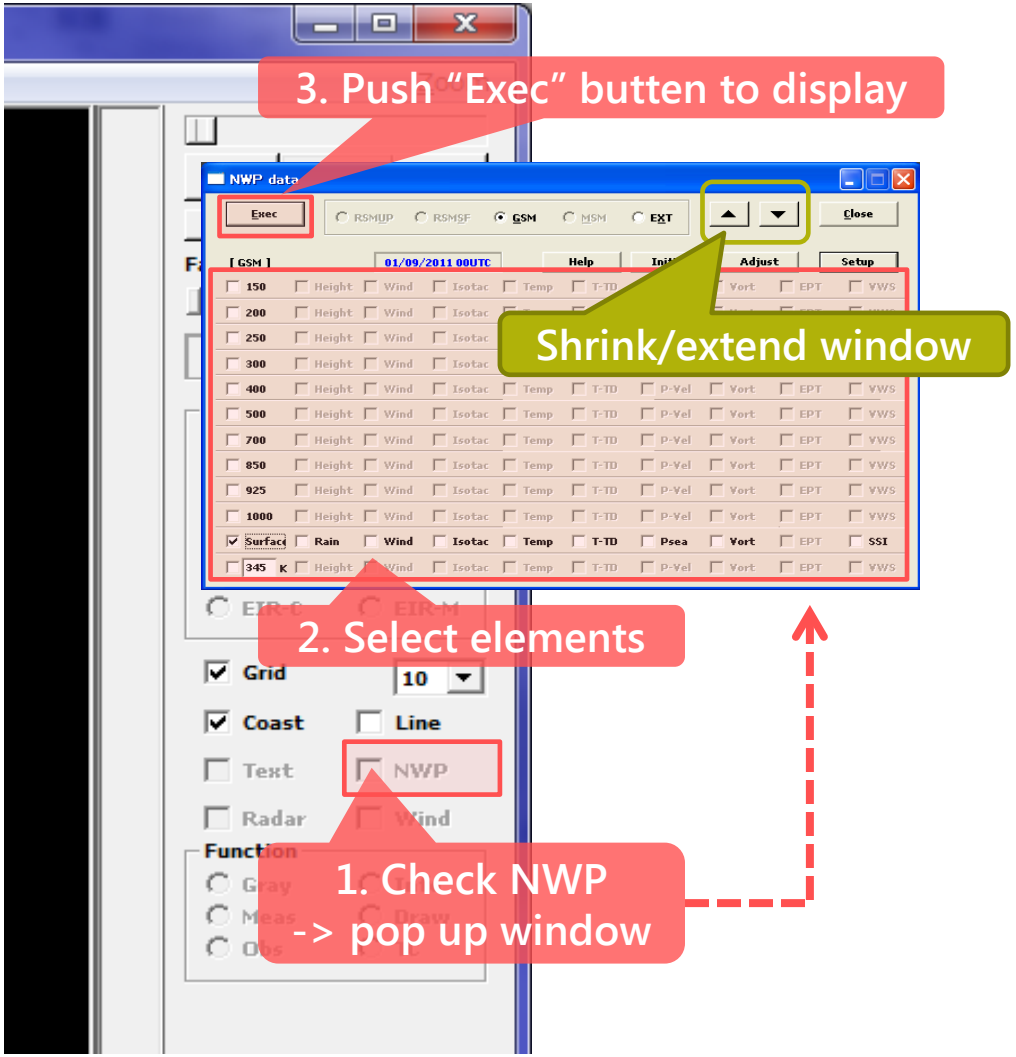

you can select [Map element] in the [Option] menu to add rivers/lakes/frontier etc.

Check!


You can change colors of these lines by selecting [Line color] in the [Option] menu

# 3.Display NWP Data

# Display NWP data

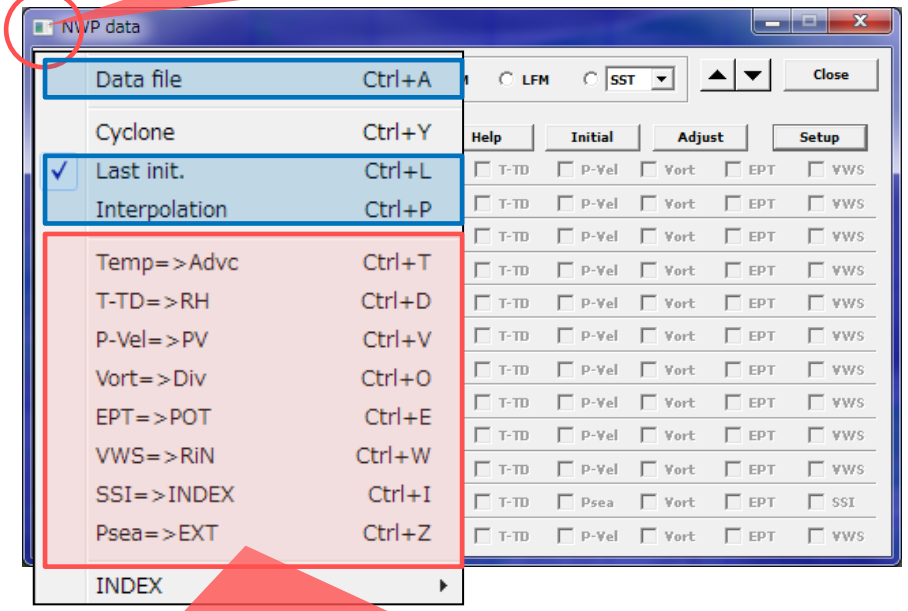



## Available NWP data

| 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 |

# Change elements

1. Click upper-left corner of the window
-> Pop up the menu



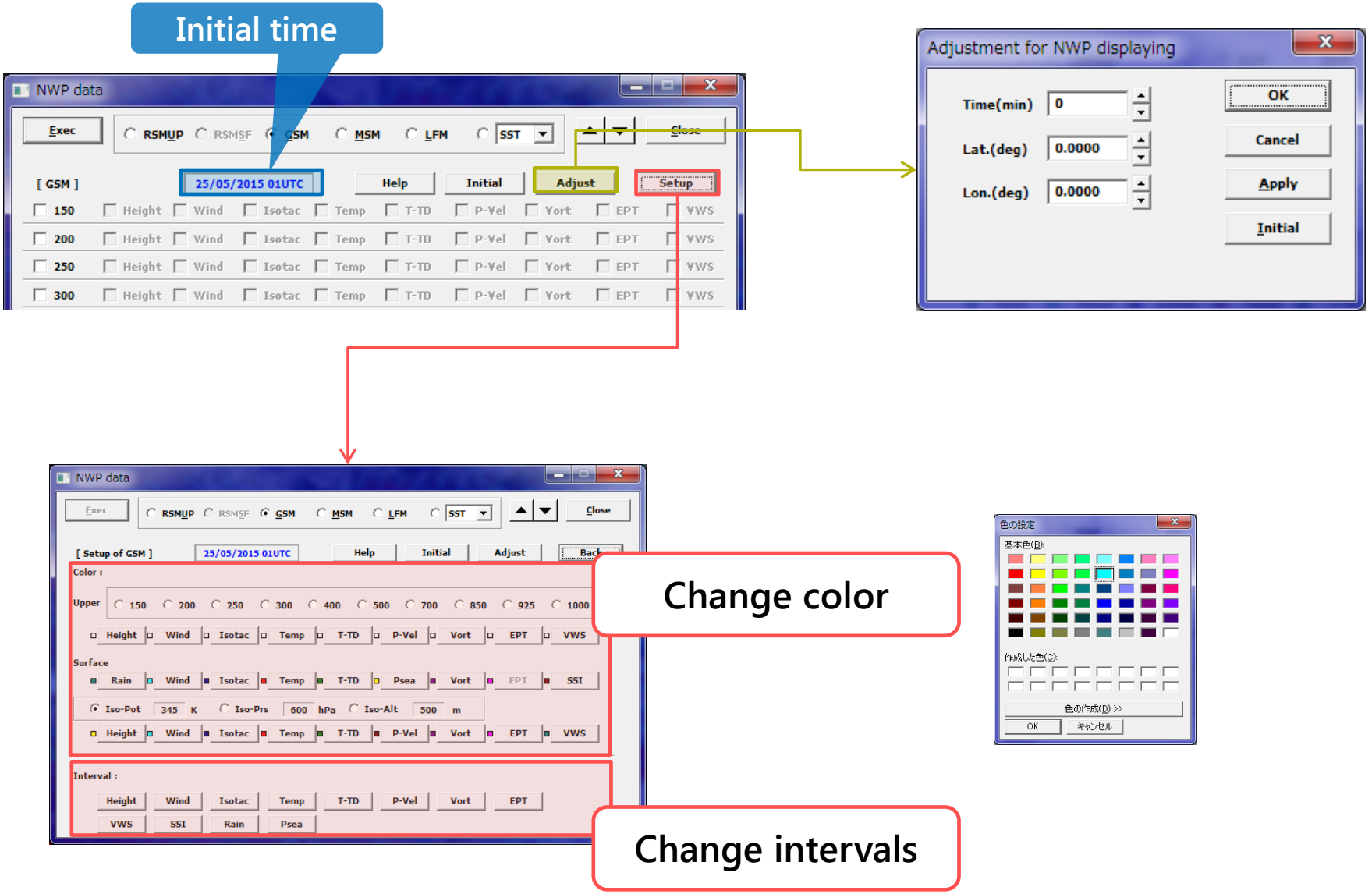

2. You can change elements in the panel

| Symbol | Content | Unit |
|---|---|---|
| Height | Altitude | gpm |
| Wind | Wind barb | kt |
| Isotac | Isotach | kt |
| Temp | Air temperature | °C |
| T-TD | Dew-point depression | °C |
| 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 | °C |
| 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°C/h |
| SH | Specific humidity | 0/1g/kg |
| EXT | Extra element (diff. between levels) | undefined |

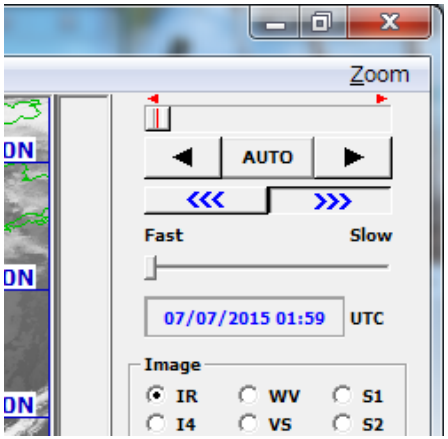
## Tips

- When the **[Data file]** is clicked, CSV file of selected NWP elements is output.
- When the **[Last init.]** is NOT selected, the earliest initial NWP data is displayed.
- When the **[Interpolation]** is selected, forecast fields between forecast time can be interpolated and displayed (i.e. if Interpolation is NOT selected, NWP data is shown only every 6 hours).

# Change color/line-type/hatch-pattern

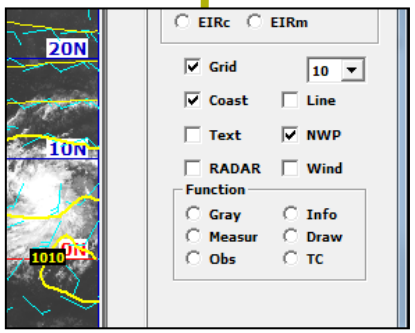


# Display forecast value

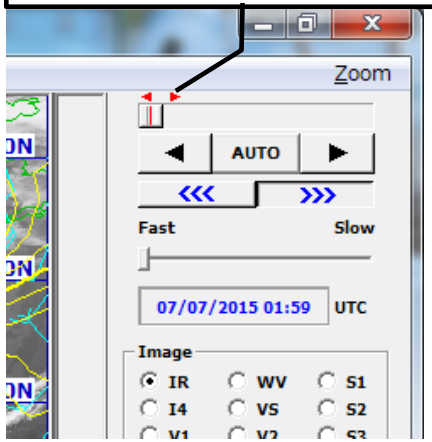



Before

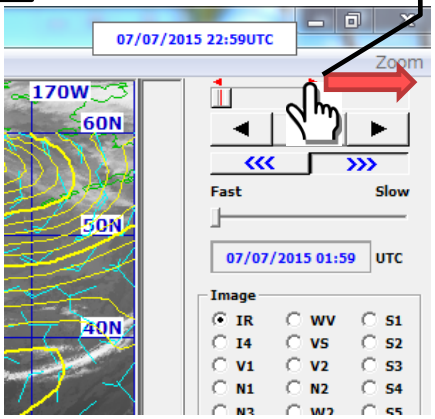
Open NWP menu



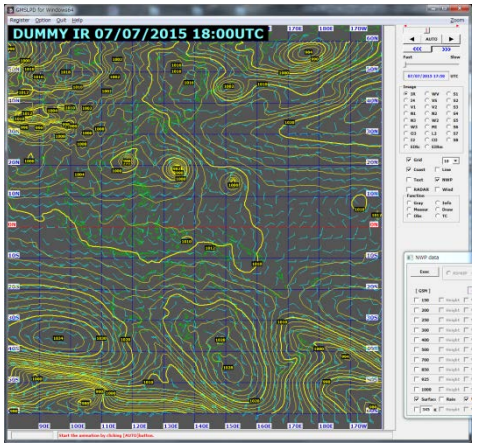

The red arrow becomes shorter




If you drag the red arrow to the right side, forecast-time becomes selectable.

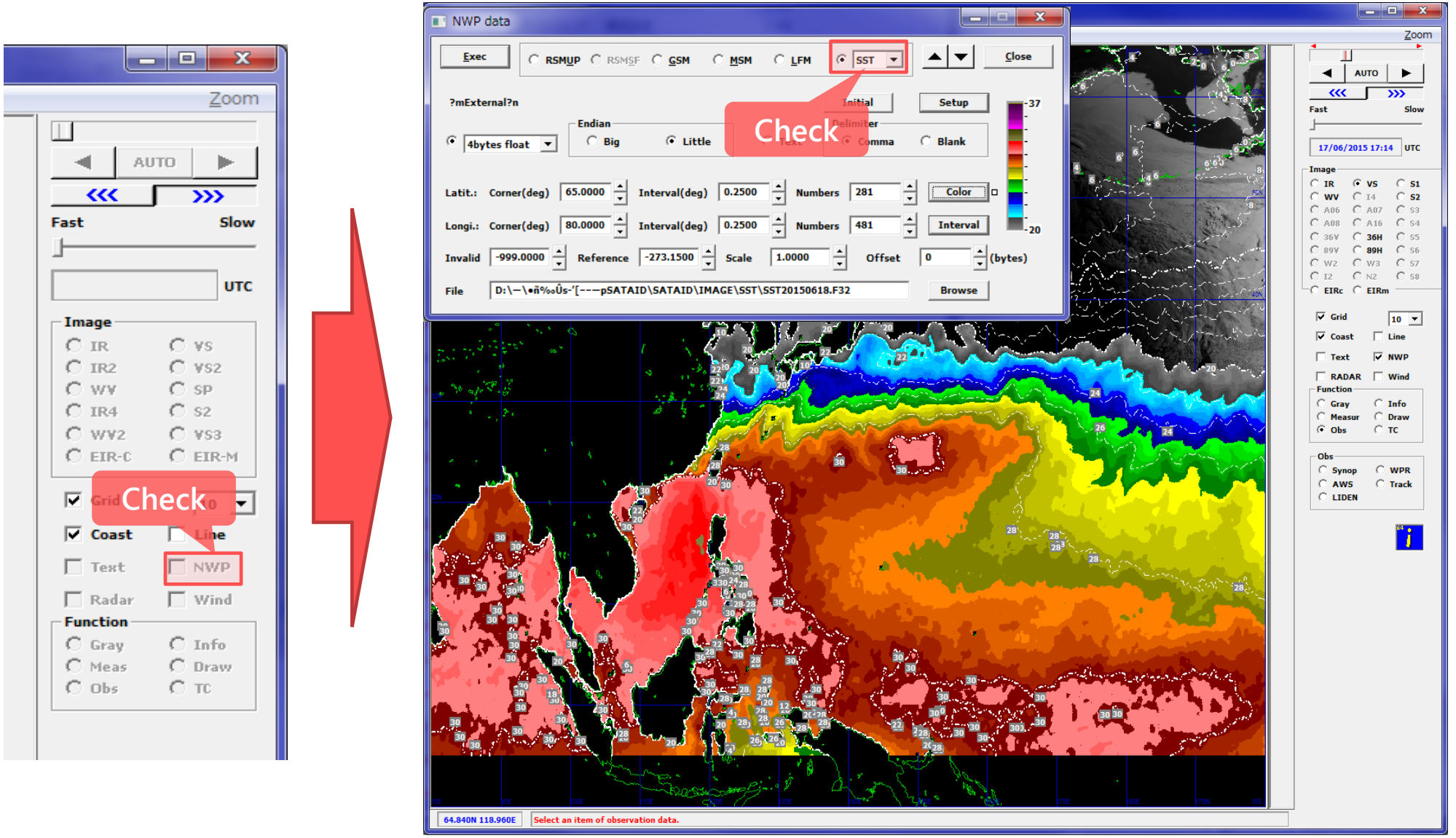



After



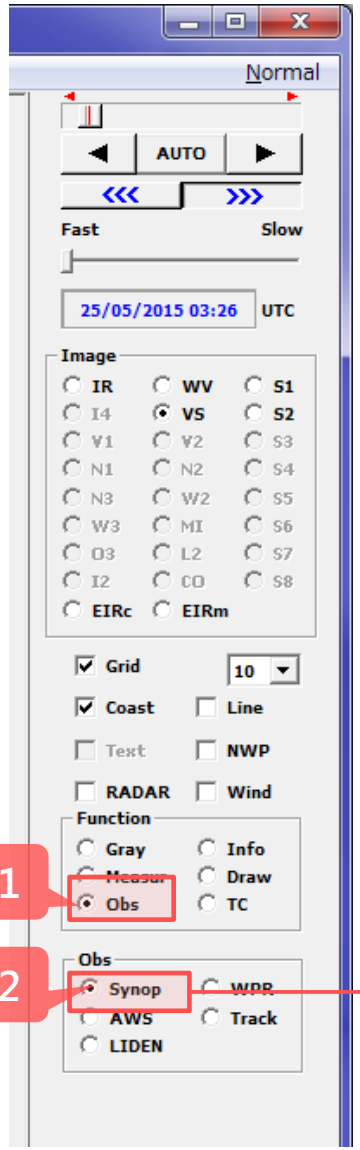

During displaying forecast time data, satellite image isn't displayed.

# Display SST data

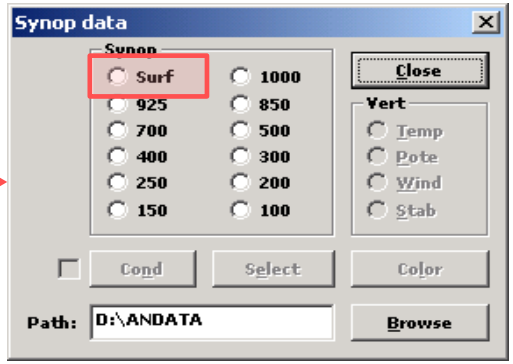


# 4. Display Observation Data

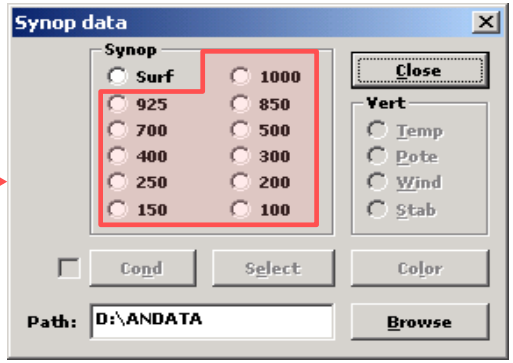
# Display SYNOP/SHIP/TEMP data



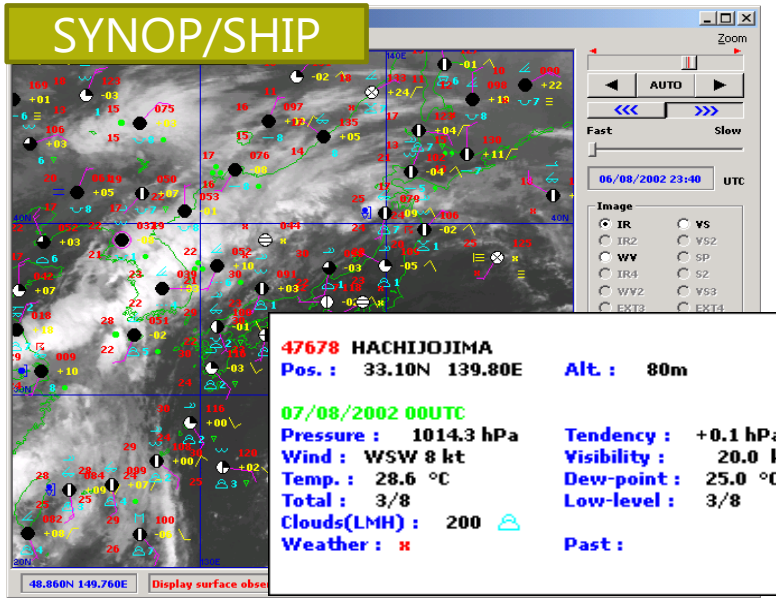

Select "Surf"



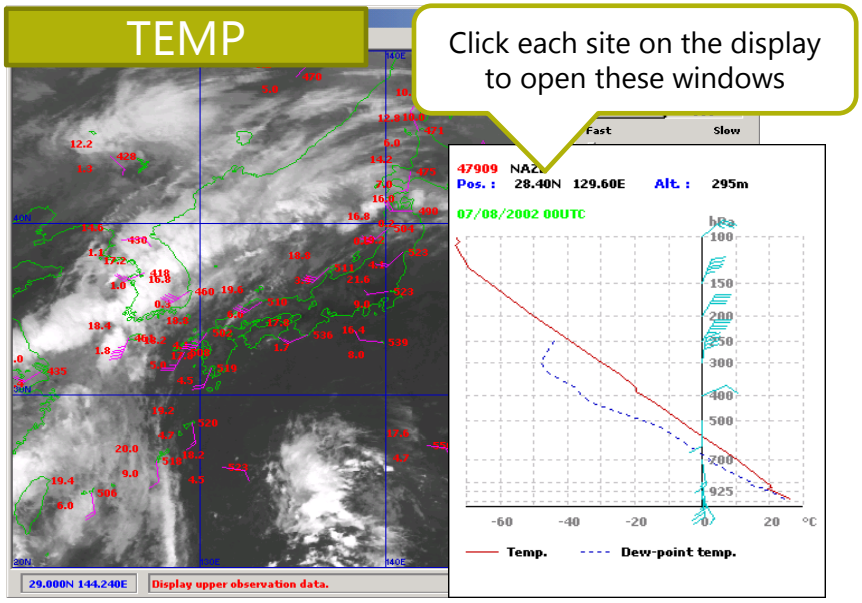

Select "1000"-"100"




SYNOP/SHIP

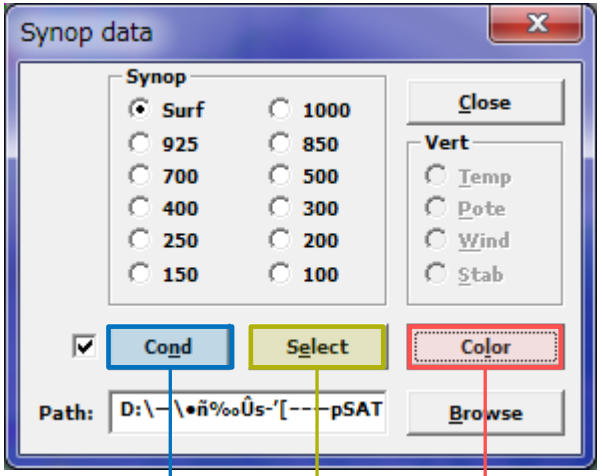



TEMP

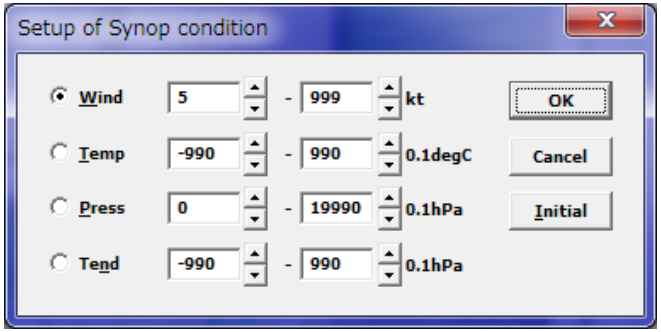



Click each site on the display to open these windows

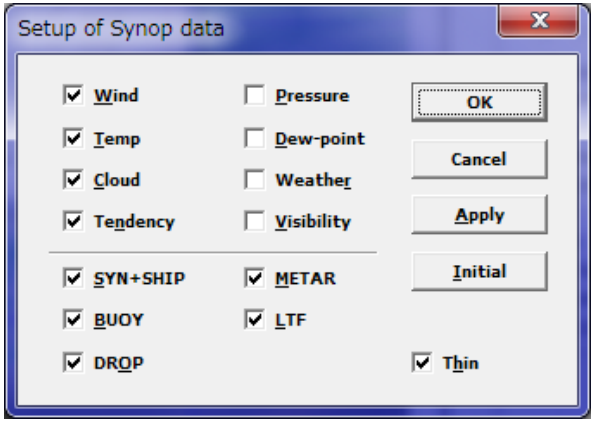
# Display SYNOP/SHIP/TEMP data



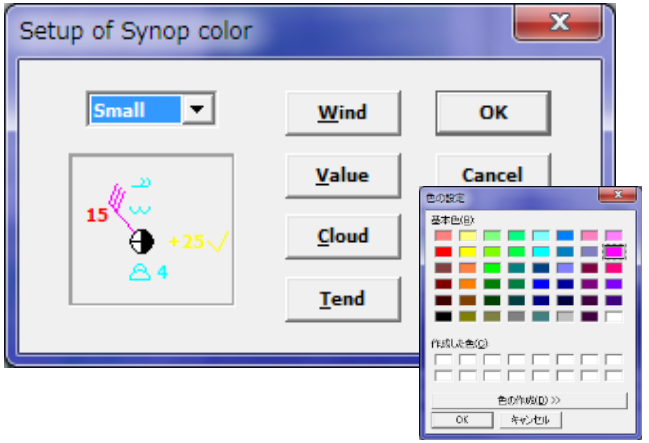

**Set threshold for display data**



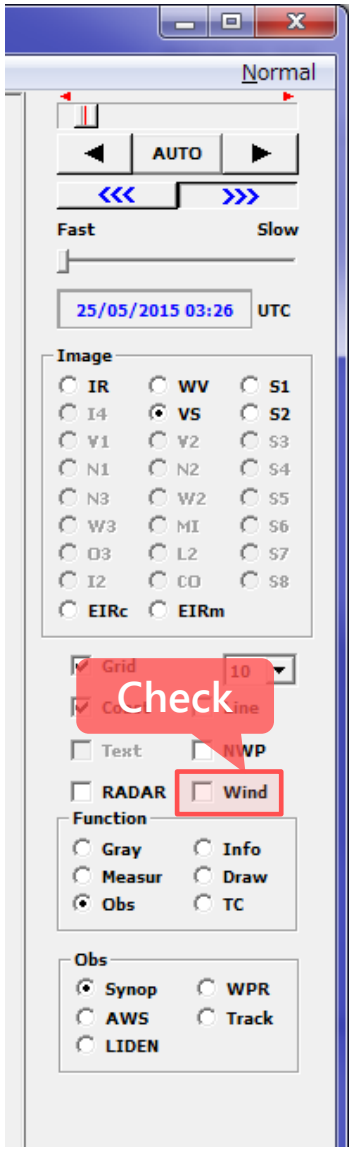

**Select displayed element**

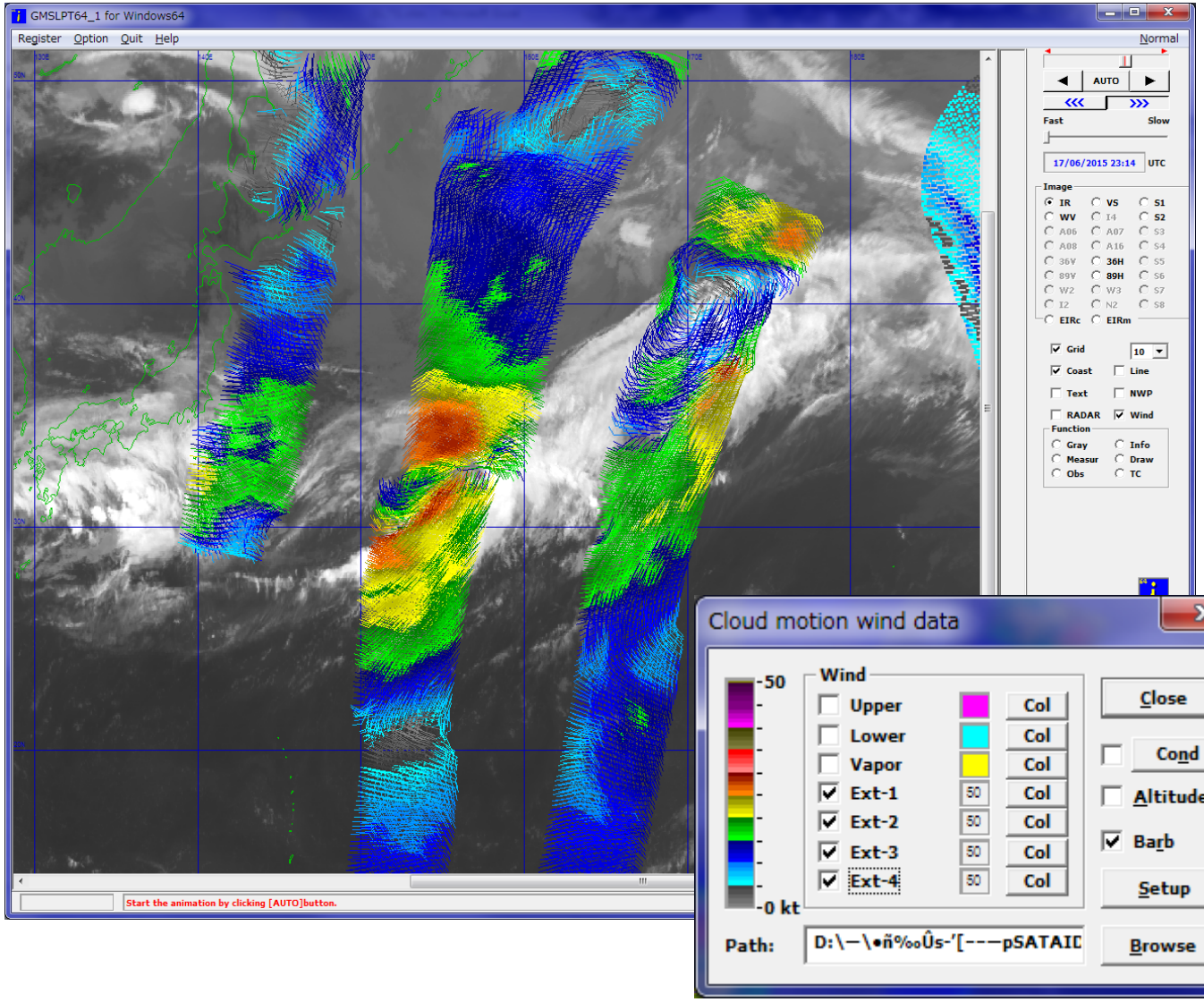



**Set symbol color**



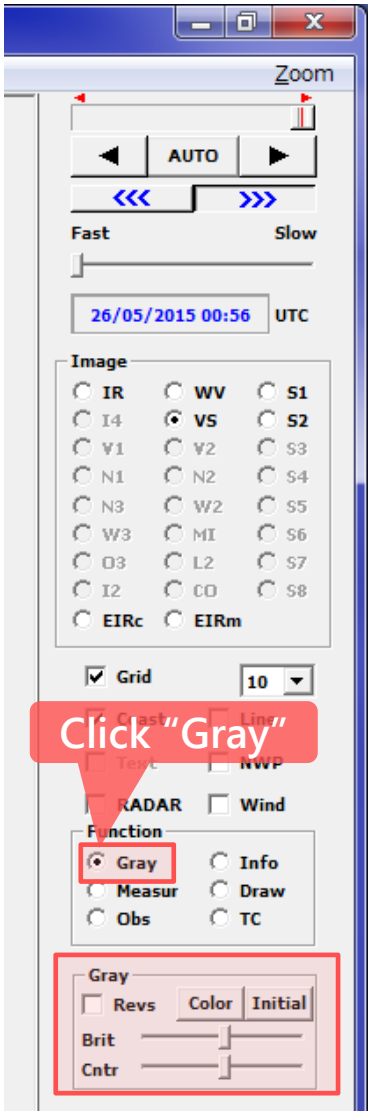
# Display ASCAT data

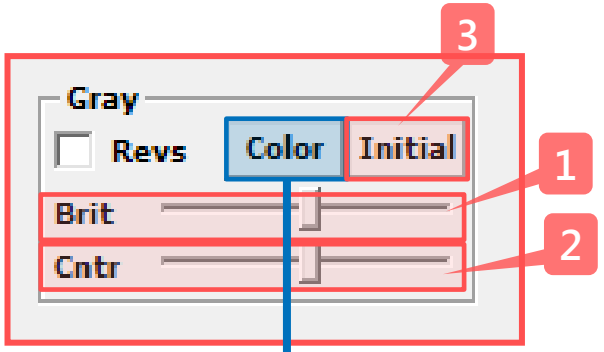


# 5. Customize Display

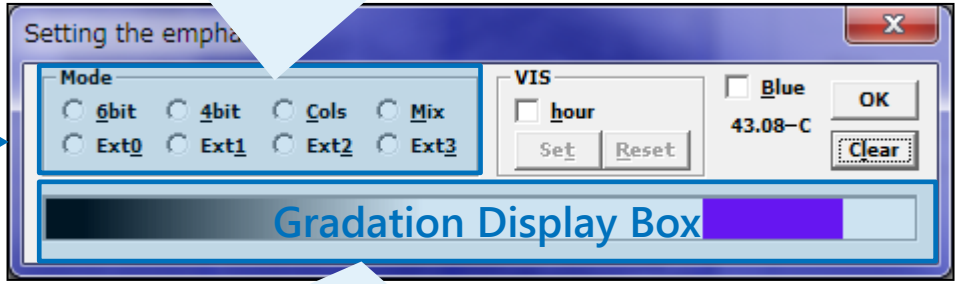
# Adjust gradation and color enhancement




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

**Select radio button and change the grayscale**

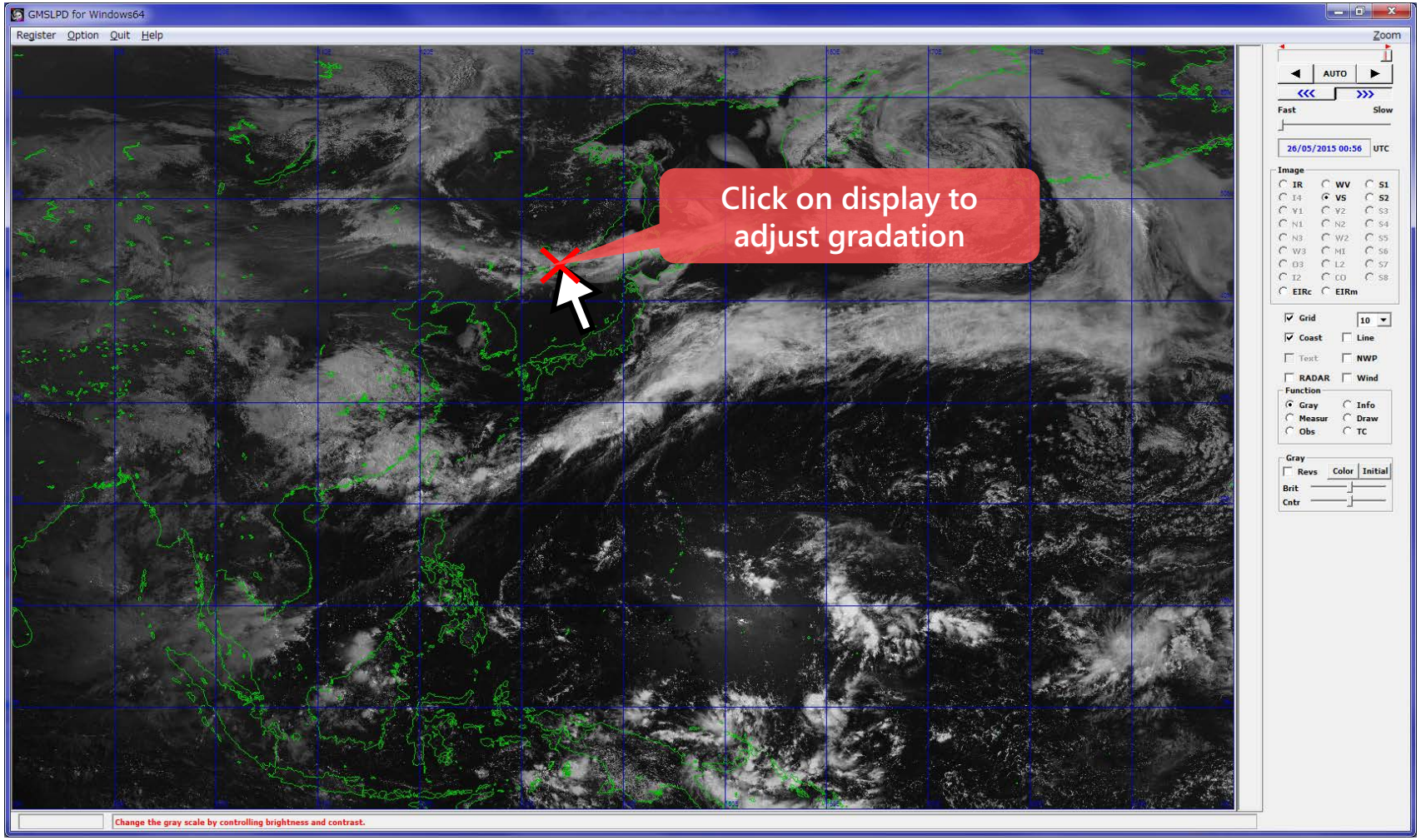



- **Select emphasized range**
  click two points
- **Clear emphasized range**
  Right-clicking on 1st point and left-clicking on 2nd to clear the emphasized area.

# Adjust Gradation

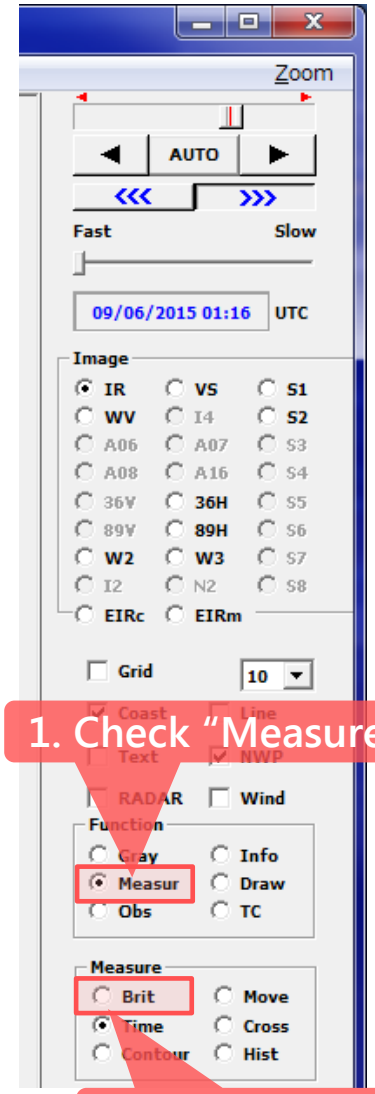
Contrast

Brightness



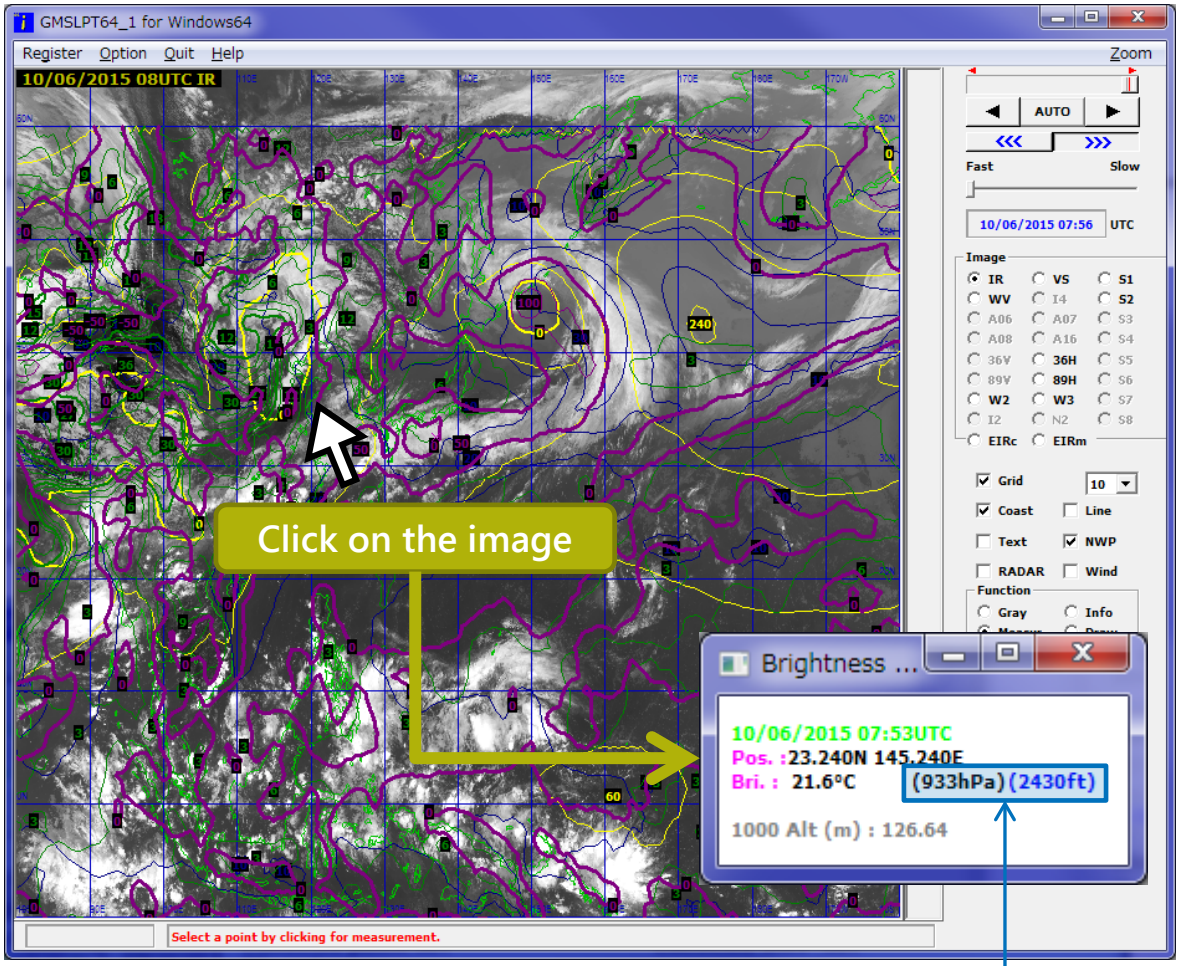
# 6. Data Measurement

# Brightness measurement




1. Check “Measure”

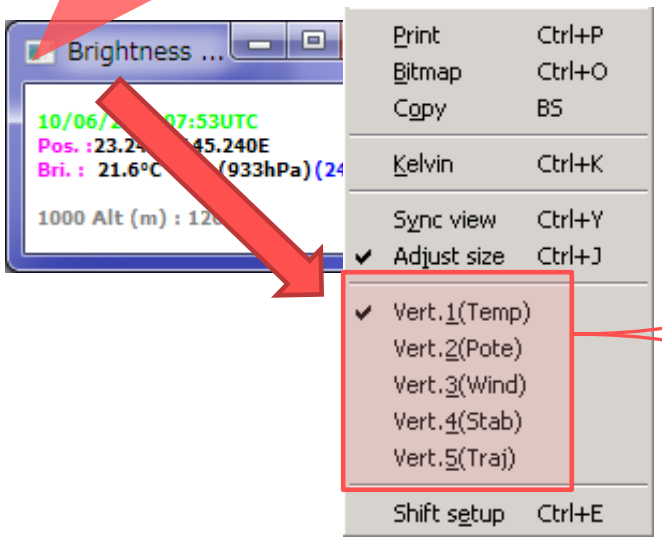
2. Check “Brit”



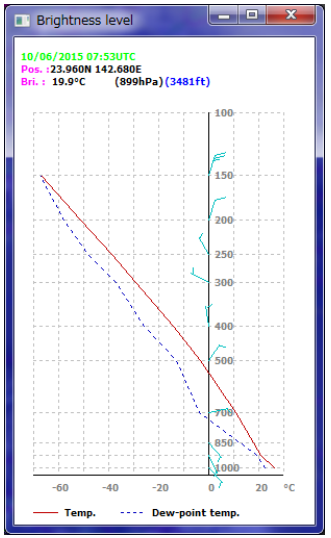

When NWP data is displayed, estimated altitude is displayed

# Brightness measurement

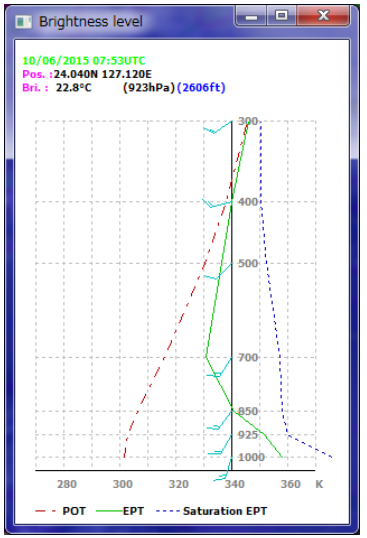
Click upper-left of window



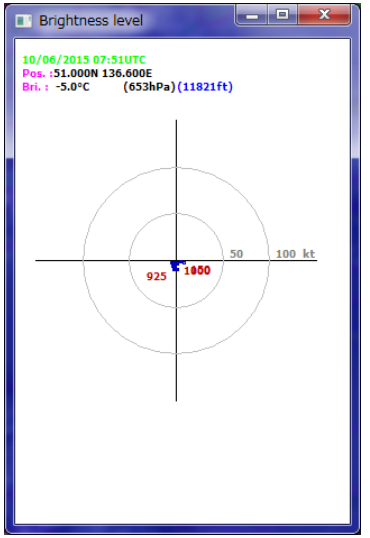

Vert.1 (Air temp.)



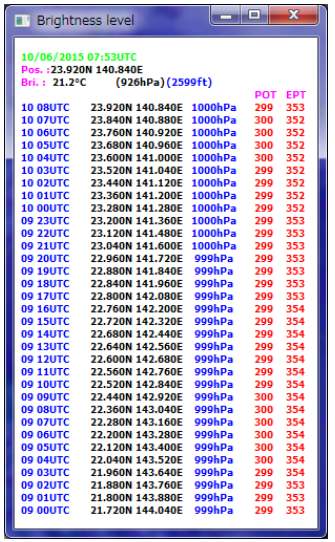

Vert.2 (Potential temp.)



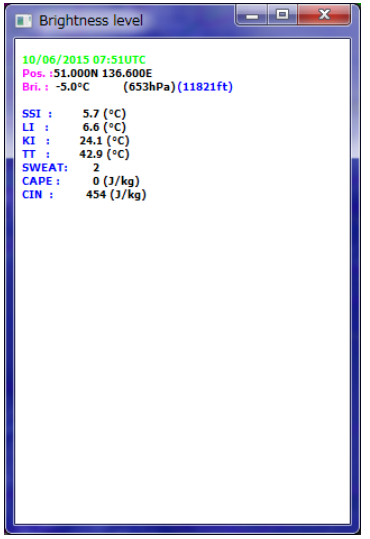

Vert.3 (wind)



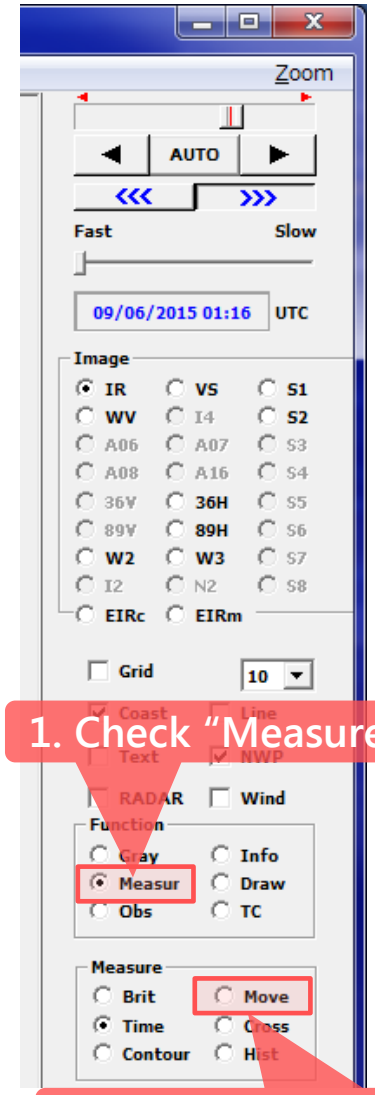

Vert.4 (Stability)




Vert.5 (Trajectory)

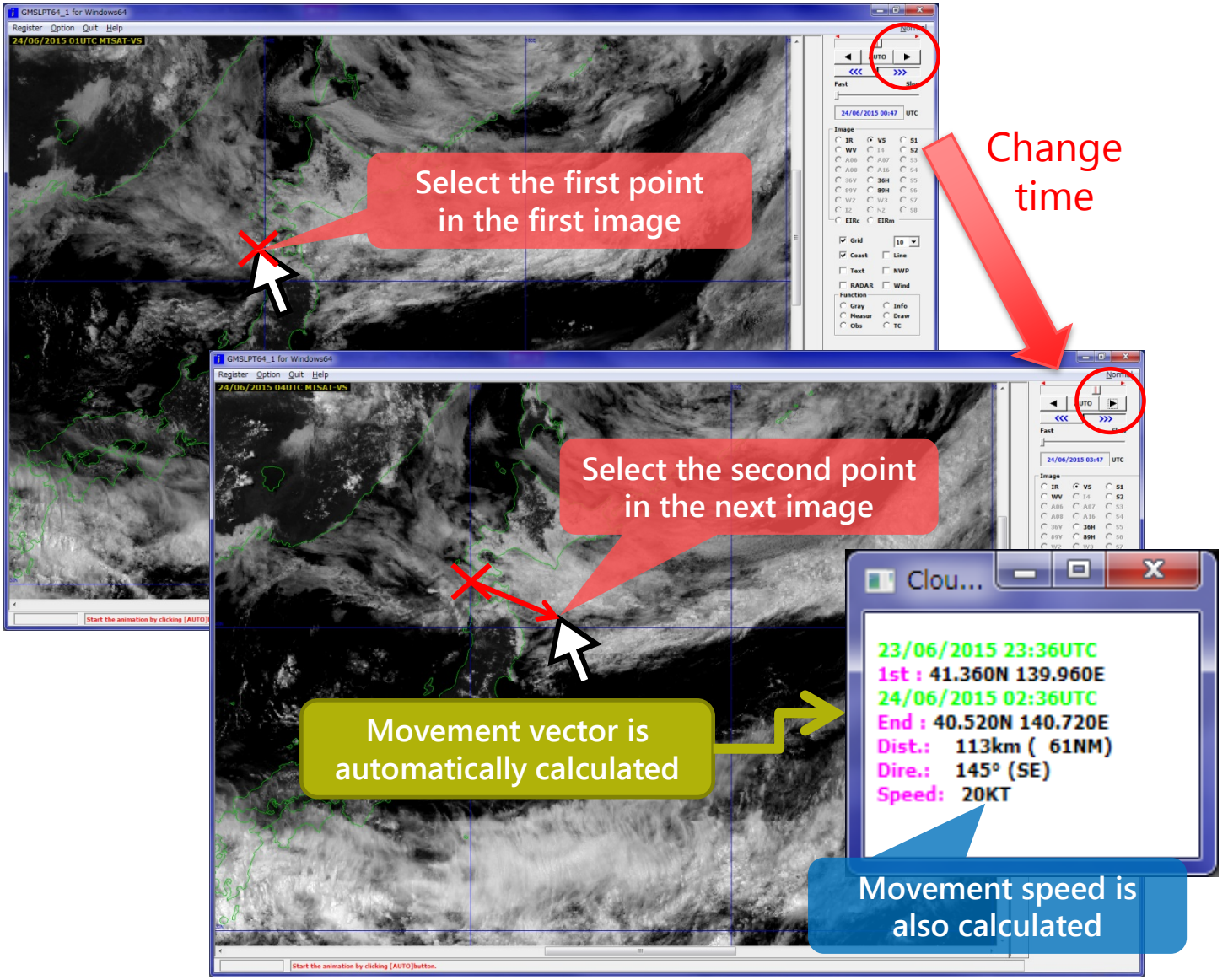


# Movement (vector) measurement

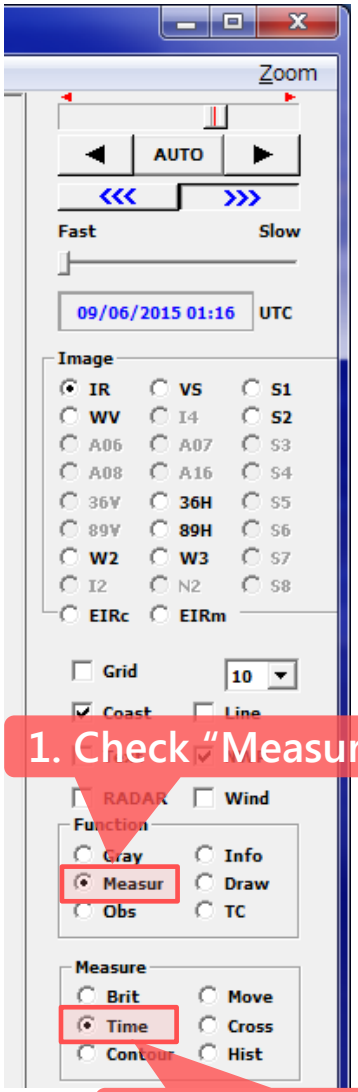



1. Check "Measure"

2. Check "Move"

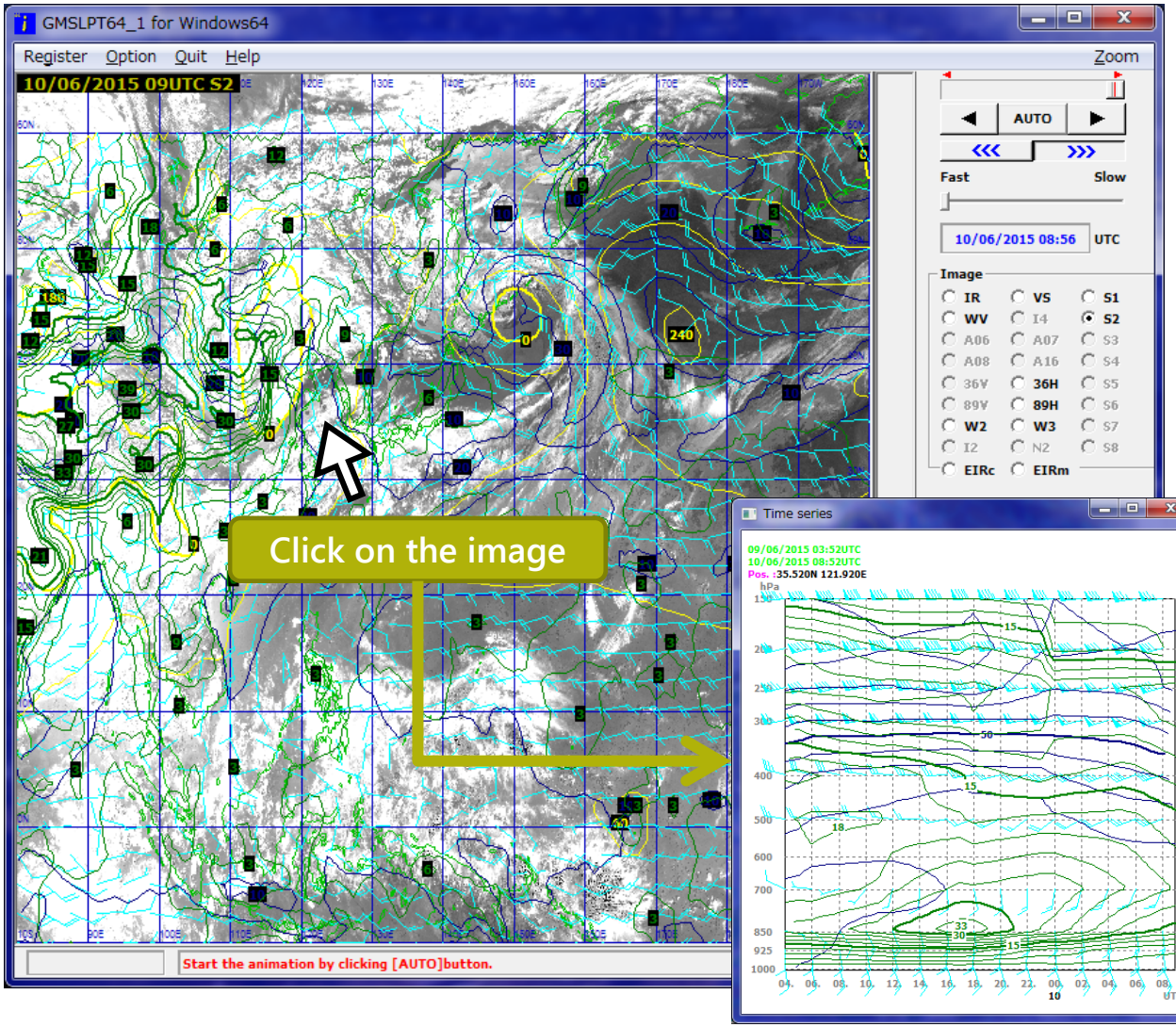


# Time-series measurement

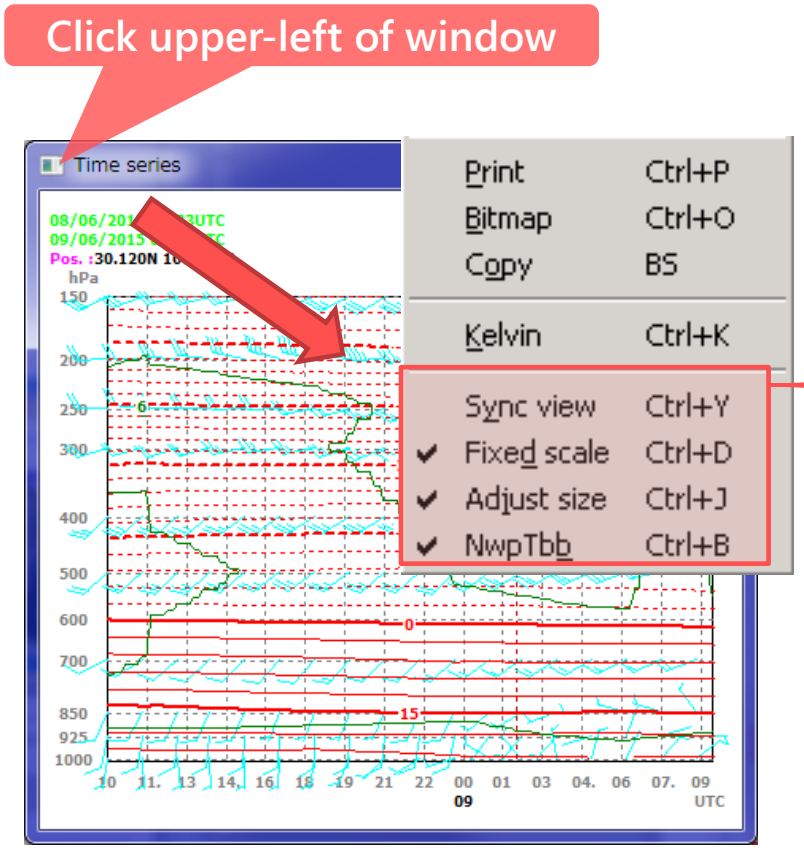



1. Check “Measure”

2. Check “Time”



# Time-series measurement




**Sync view:**

Data in the graph are updated in sync with animation.

**Fixed scale:**

Upper- and lower-limit values on the scale are fixed, and can be changed in "Scale setup". If this is left unchecked, actual maximum and minimum brightness values are shown.

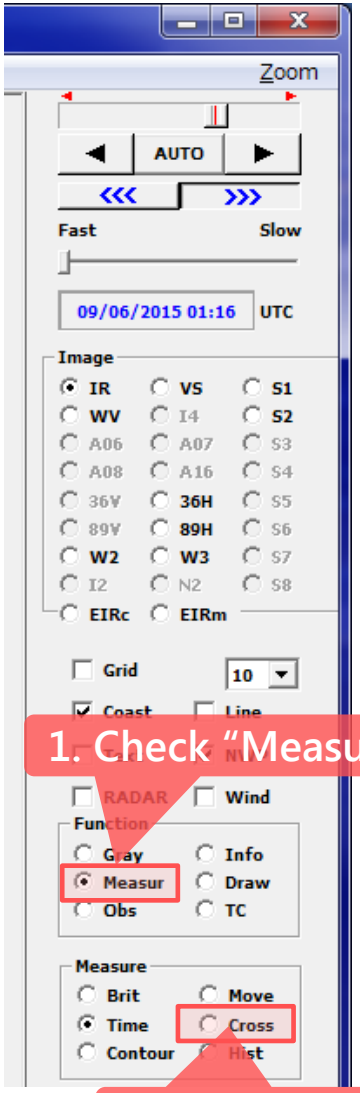
**Adjust size:**

Graph sizes change in proportion to the window size.

**NwpTbb:**

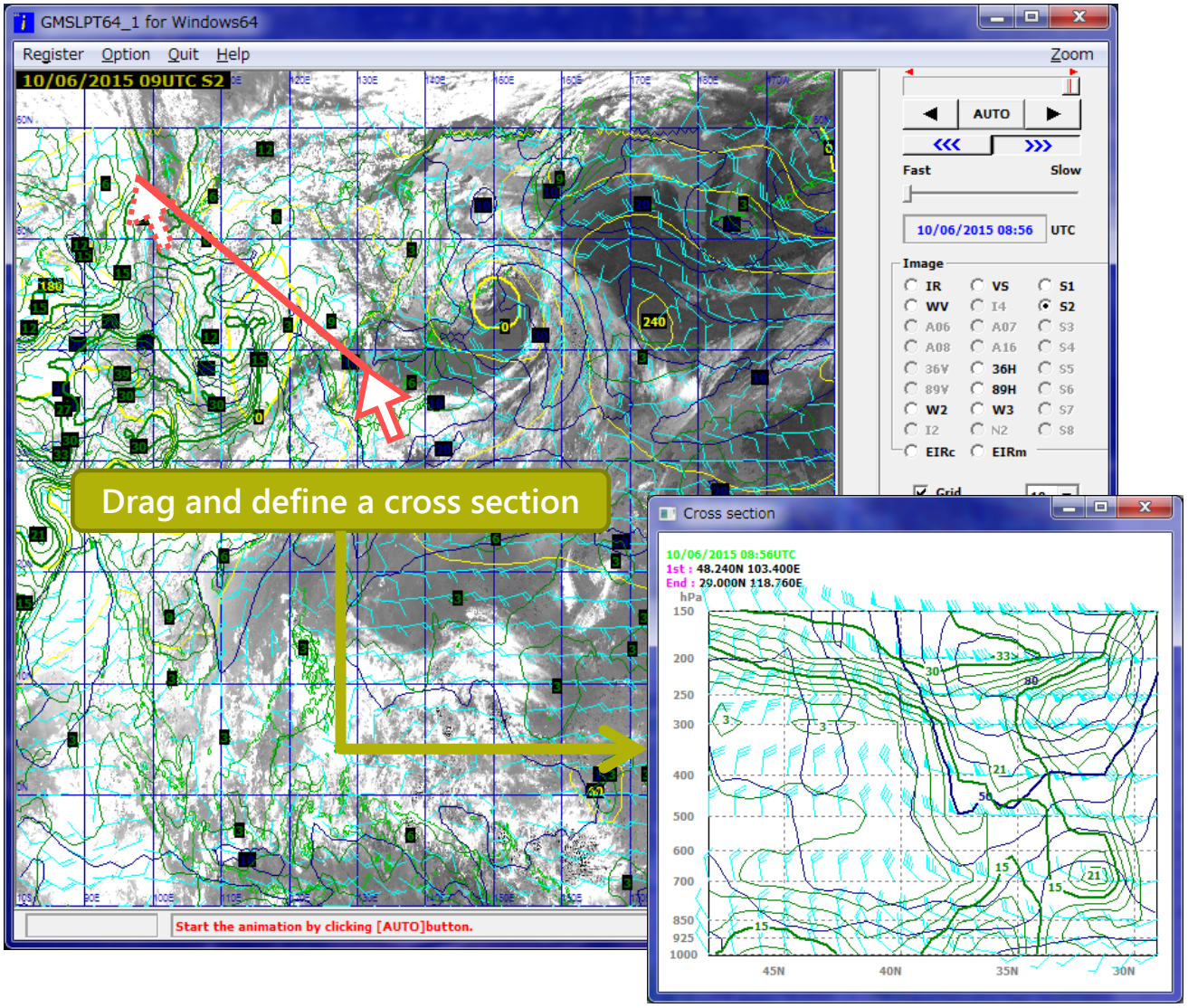
If this is left unchecked, no brightness temperature graph is shown on the screen. Only NWP is shown.

# Cross-sectional measurement

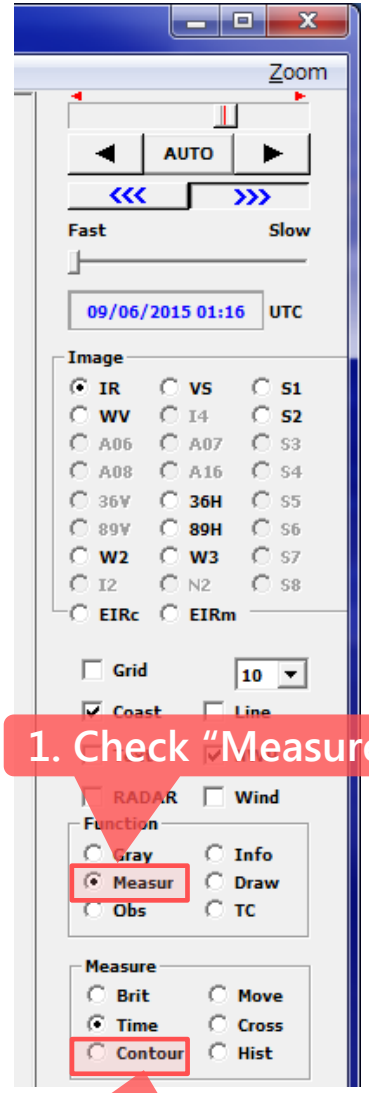



1. Check “Measure”

2. Check “Cross”

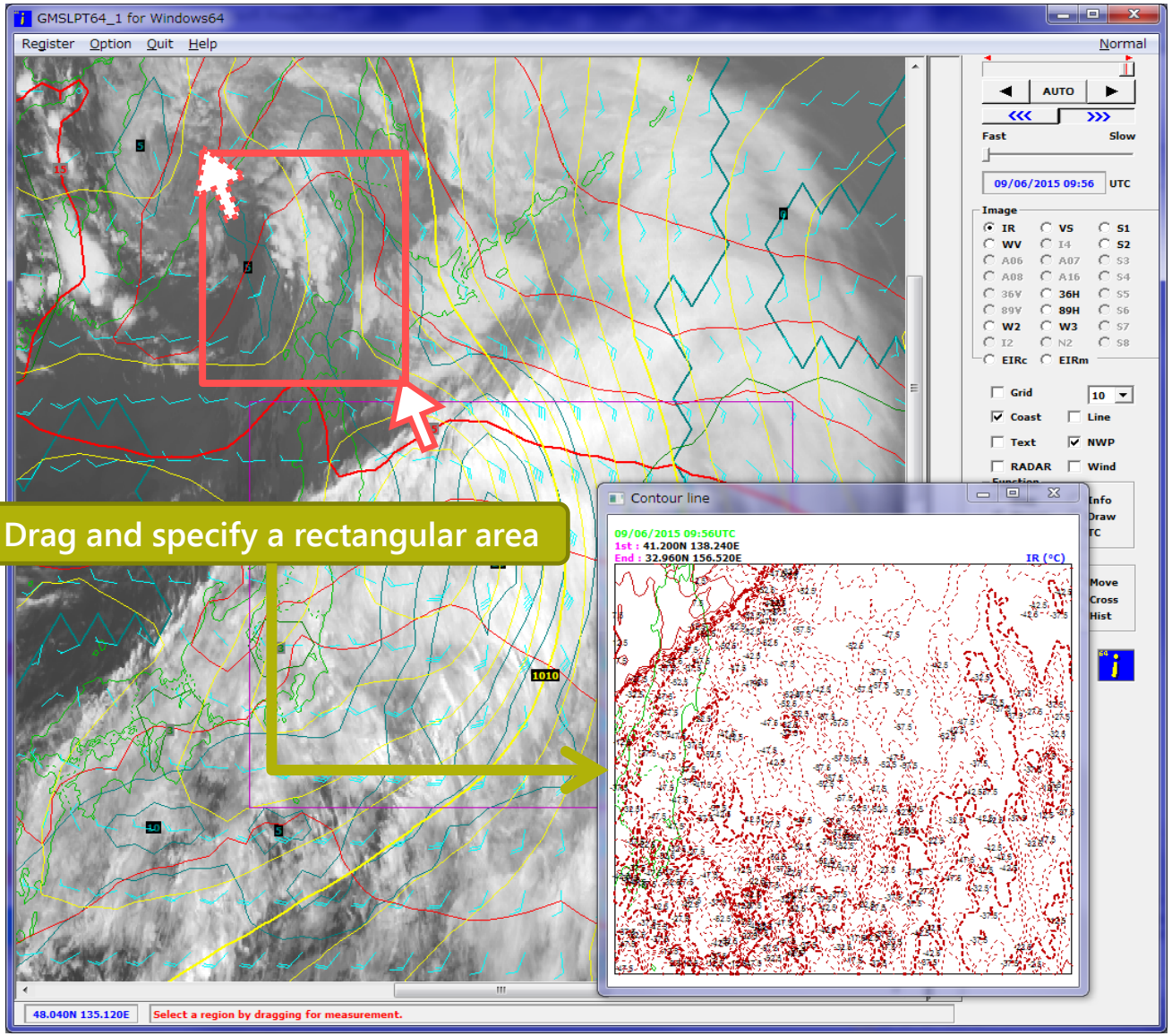


# Isoline (contour)

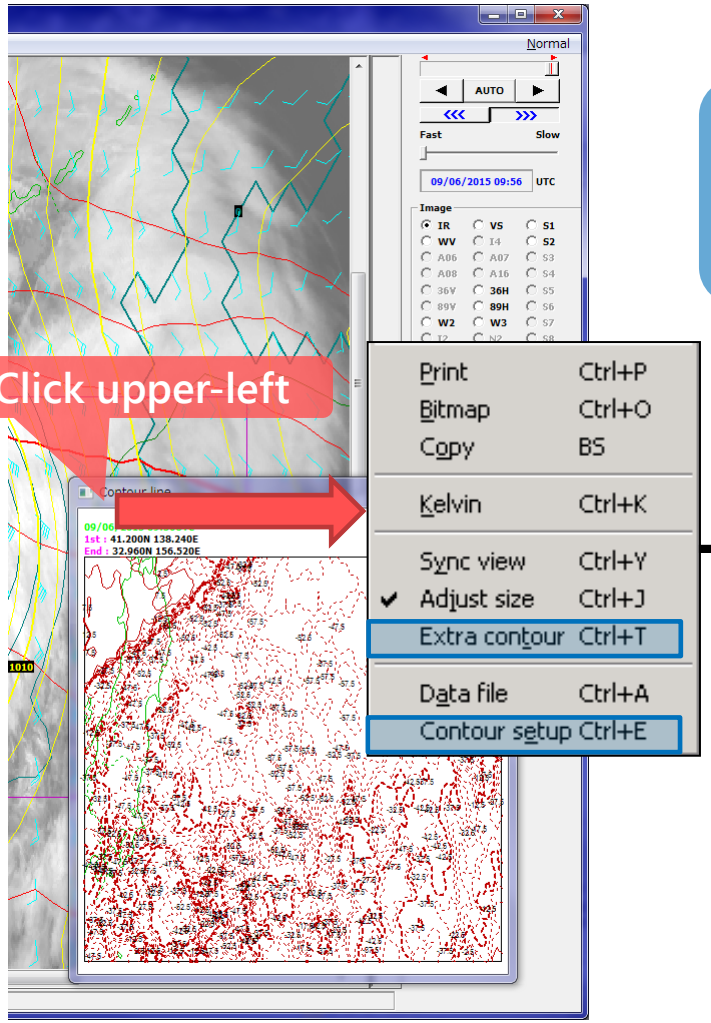



1. Check “Measure”

2. Check “Contour”

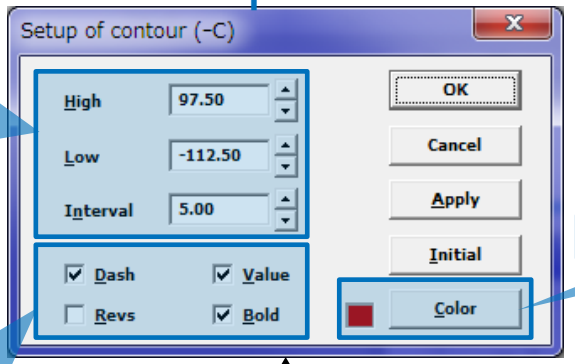


# Isoline (contour)




Click upper-left

## Set up counter




Select upper/lower value and interval

Select line type

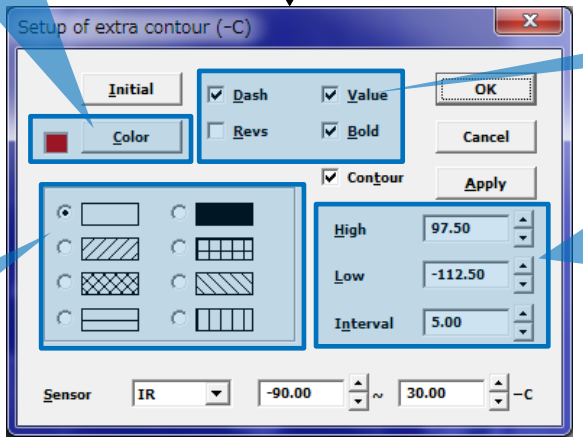
Select color

NO ( = without hatch pattern)

Checked
"Extra contour"?

YES ( = with hatch pattern)

Select color

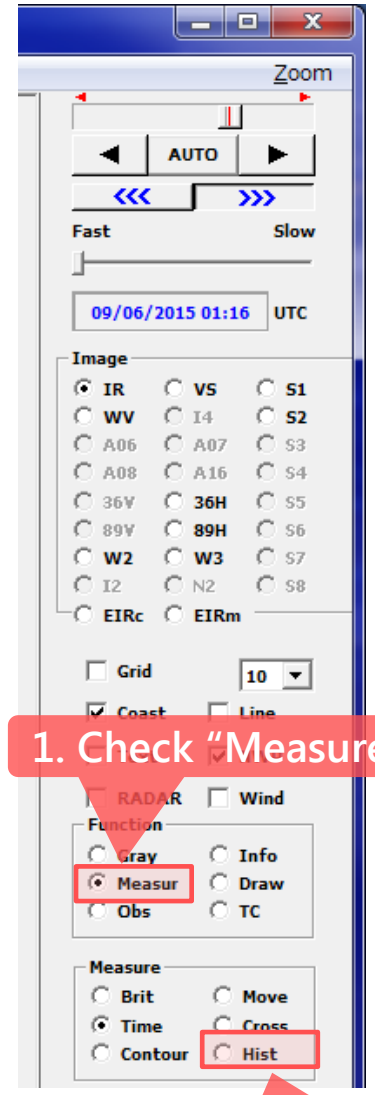



Select line type

Select upper/lower value and interval

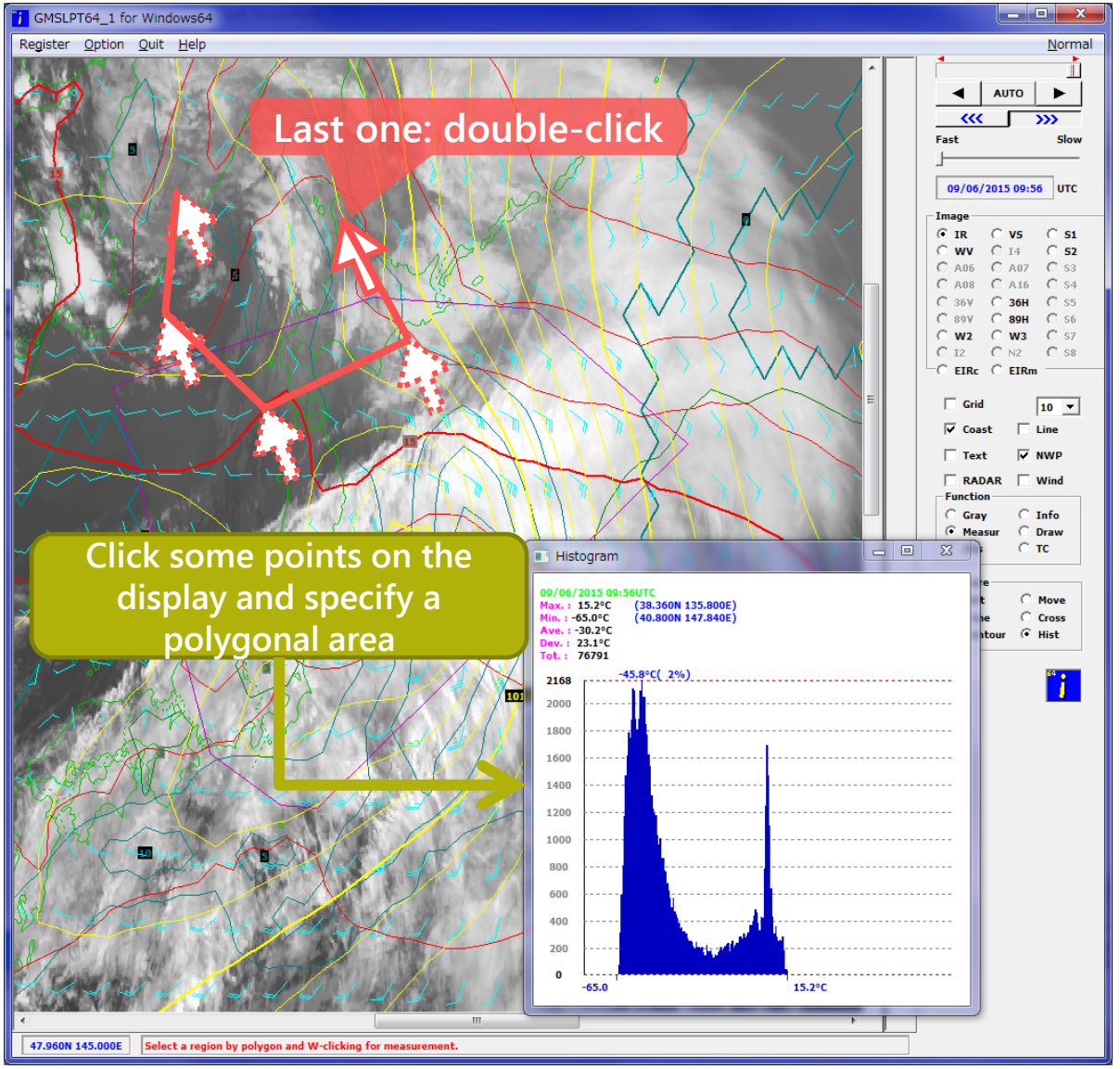
Select hatch pattern

# Histogram



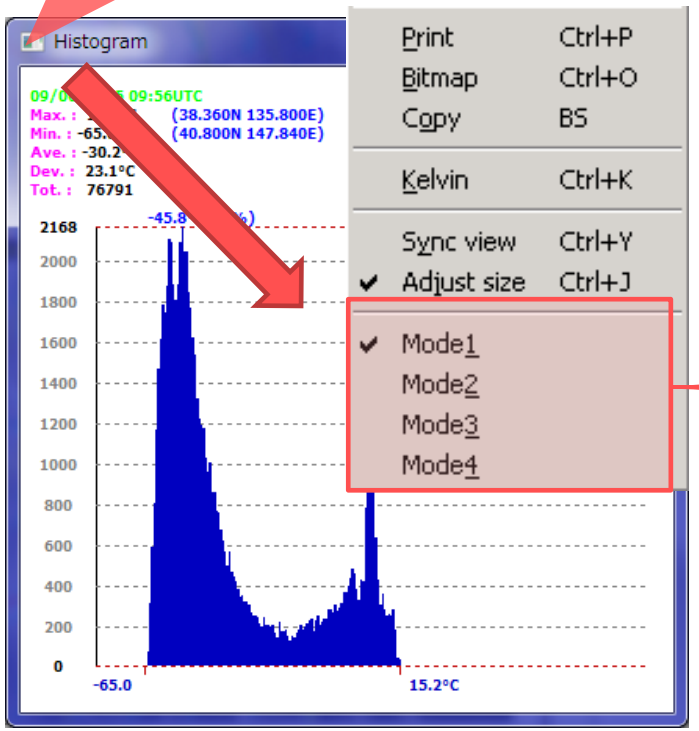

1. Check “Measure”

2. Check “Hist”

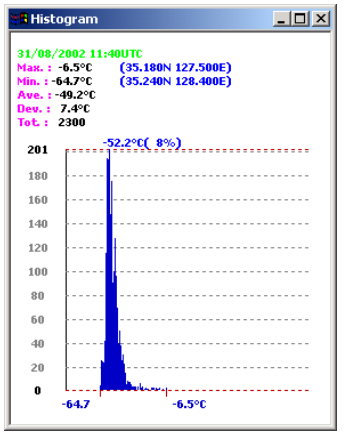


# Histogram

Click upper-left of window

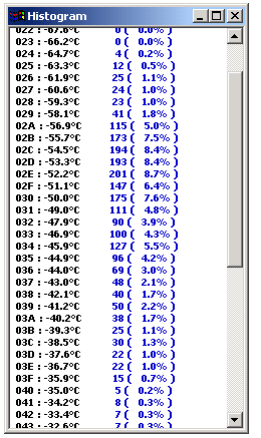



## Mode1



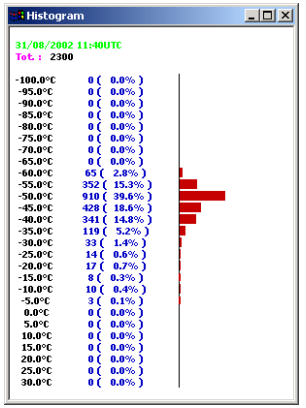

Statistical values and a histogram are shown.

## Mode2



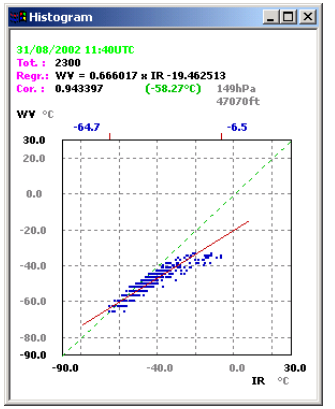

Brightness degrees (temp. for IR and reflectivity for VIS channel) are shown as numerical values.

## Mode3




Frequency distribution of brightness degrees is shown (the interval can be changed on the histogram setup menu).

## Mode4

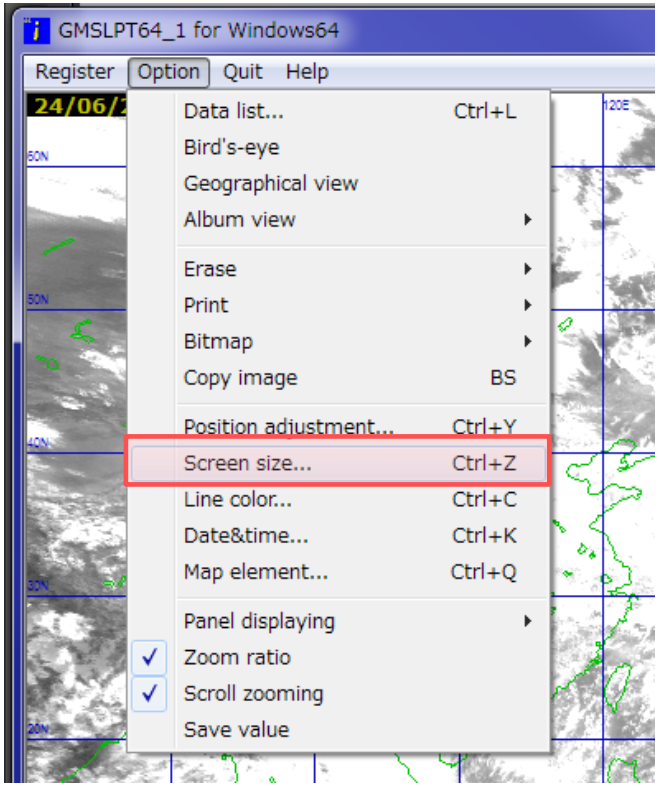



Scatter diagram of brightness temp. or reflectivity together with regression lines are shown for two different image types at the same time.

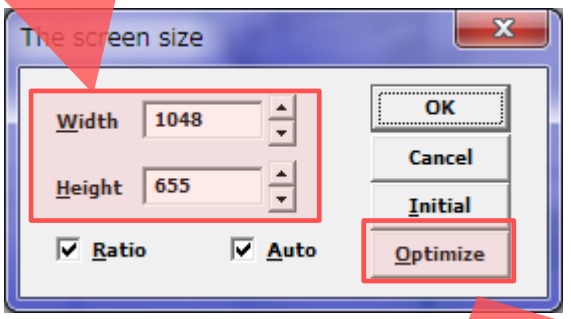
# 7. Other Functions

# Change window size

You can open “The screen size” window to change the size of the SATAID window by clicking on [Screen size] in the [Option] menu.

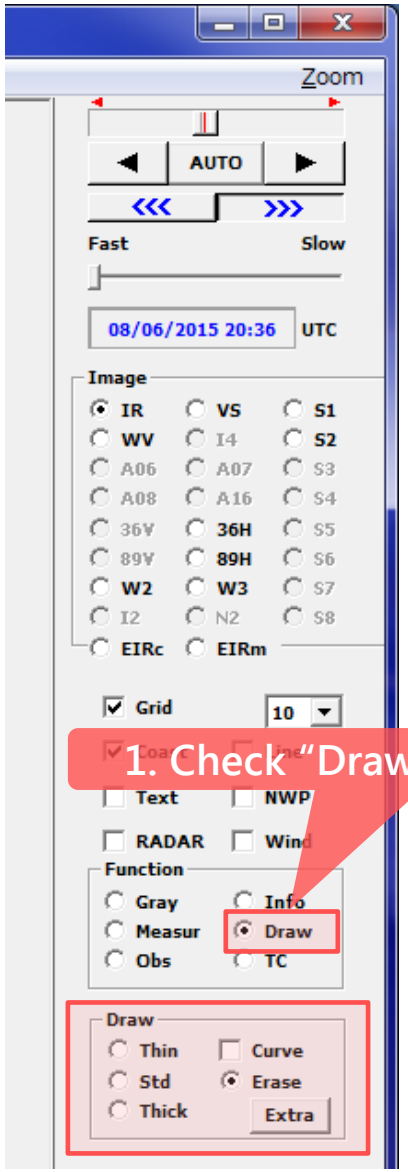



You can adjust the window size with the width and height (pixel)




The window size is automatically adjusted to fit your display.

# Drawings




1. Check "Draw"

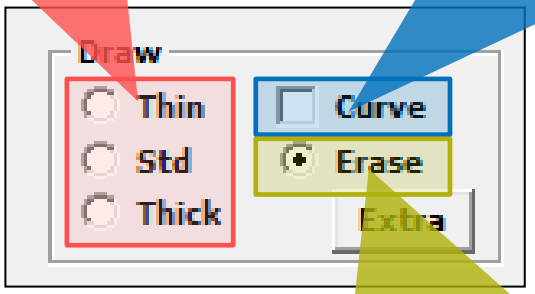
## Freehand drawing

Select width of line

* Deselect the [curve] checkbox

## Spline drawing

- Select width of line and the [Curve] checkbox
- Click on two or more points on the displayed image and double-click on the end point



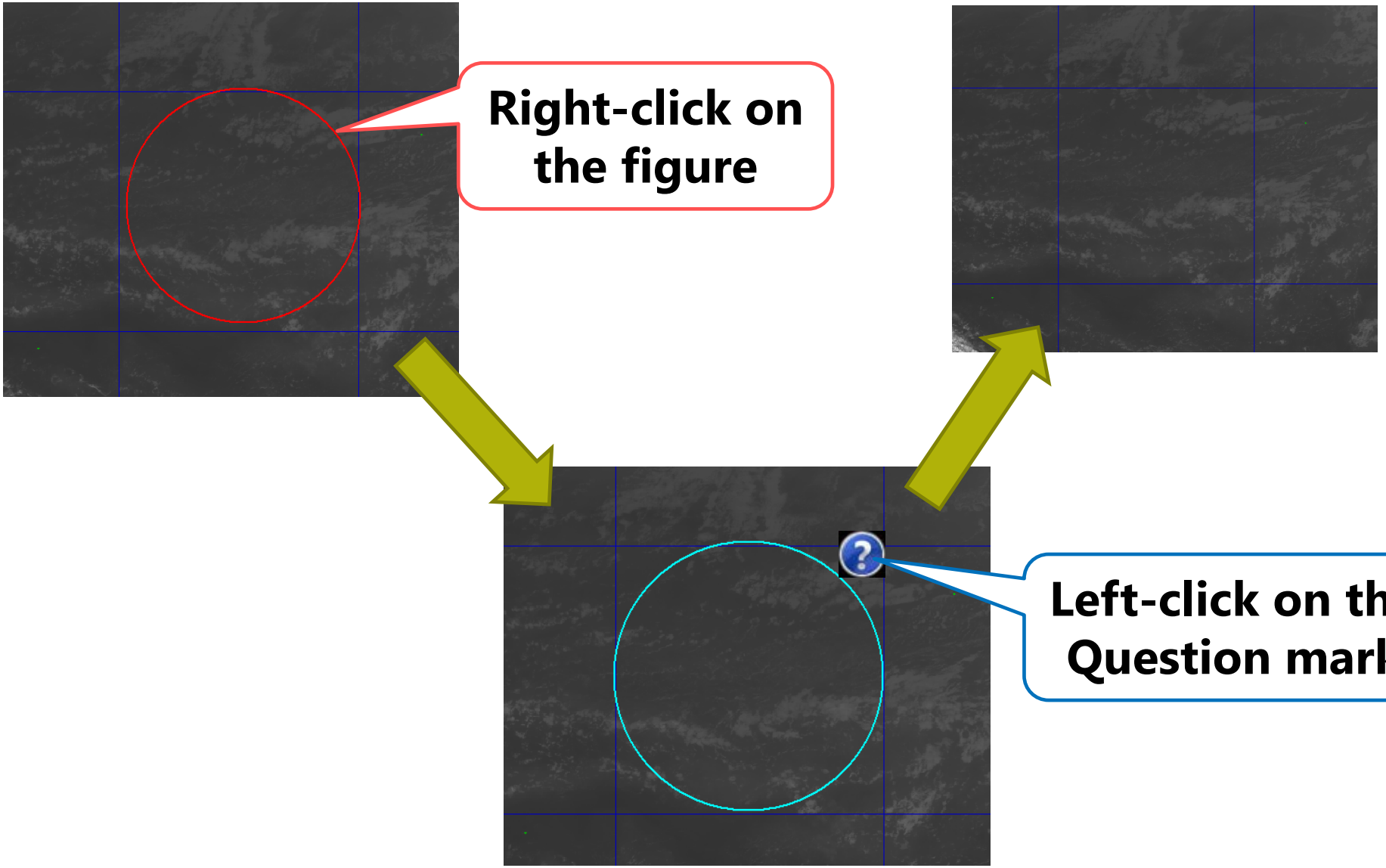

## Partial erasing

- Select the [Erase] checkbox
- Click a line or a character string, etc. in the current image to erase. Then, it will be displayed in a reversal color, and it will be erased if it clicks again.

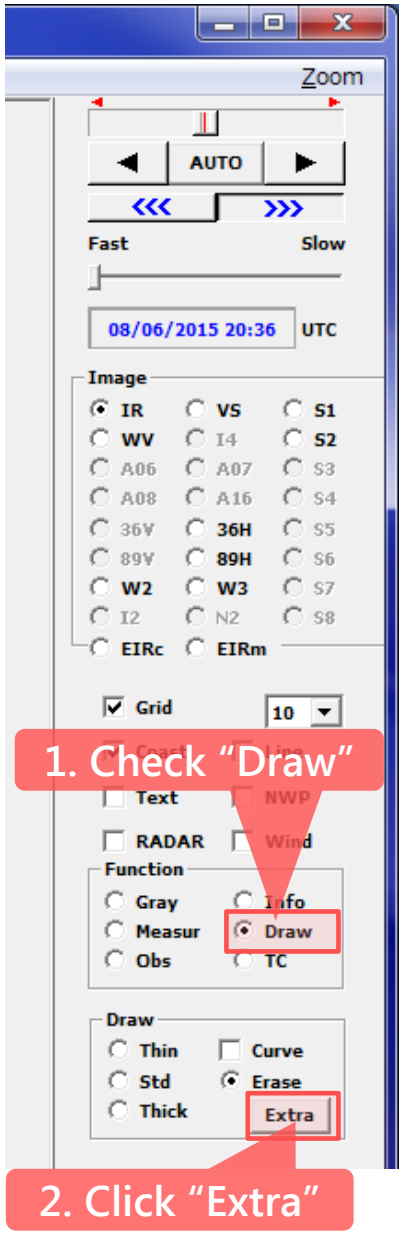
**Tips**

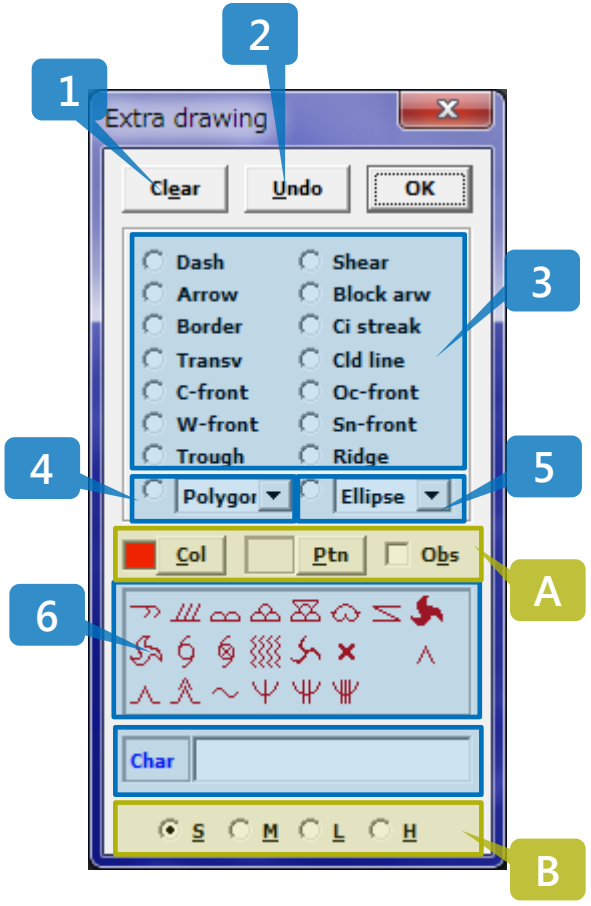
When neither [Curve] nor [Erase] is selected, freehand draiwing is available.

# How to Delete the drawn figure



# Drawings

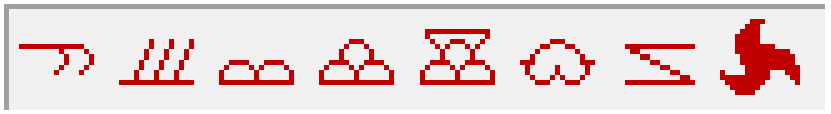


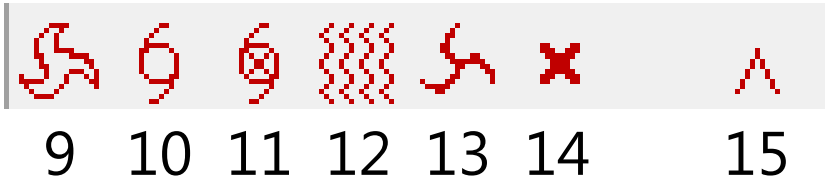




A: Change color and hatch pattern
B: Change symbol size

1. Delete all drawings ([Clear] button)
2. Cancel the previous drawing operation ([Undo] button)
3. Draw lines and arrows (fronts, troughs, or ridges), which can be drawn in the same way as spline drawings.
   *You can click the [Sn-front] button while holding down the [Ctrl] key to draw a stationary front in red and blue.
4. Draw polygons, closed curves, or cloud rims, which can be drawn in the same way as spline drawings. These figures can be changed the color and filled with a hatched pattern.
5. Draw ellipses, circles, or flex oval. You can change the color and fill with a hatched pattern.
6. Paste cloud form symbols or vortex center symbols (Drag a symbol to a point where it is to be pasted. The symbol size can be changed and the symbol can be reversed left to right by dropping the symbol with pressing the [Ctrl] key)
7. Paste character strings (Drag [Char] to a point where it is to be pasted. The character size can be changed)
8. Paste wind barbs (Drag [Char] to a point where it is to be pasted after inputting "WIND ddd(direction in 360 deg.),fff(velocity)". The wind barb size can be changed)

# Drawings

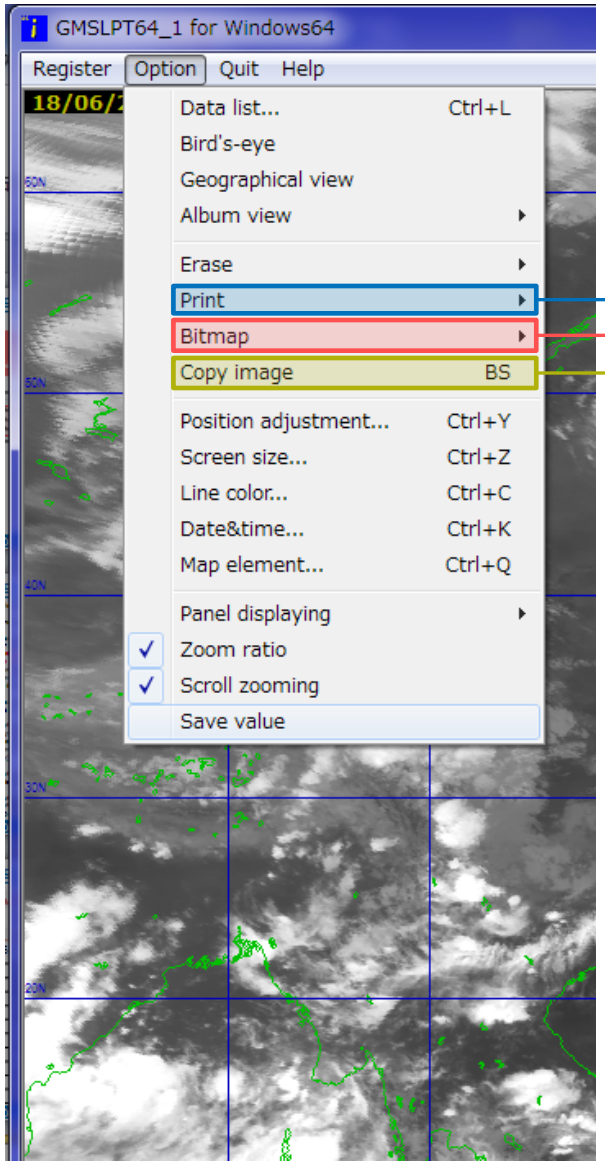



| | |
|---|---|
| 1 | High-level cloud (Ci) |
| 2 | Middle-level cloud (Cm) |
| 3 | Cumulus (Cu) |
| 4 | Cumulus Congestus (Cg) |
| 5 | Cumulonimbus (Cb) |
| 6 | Stratus |
| 7 | Stratus or Fog |
| 8 | Low-level vortex |
| 9 | Upper-level vortex |
| 10 | Center of typhoon with eye |
| 11 | Center of typhoon without eye |

| | |
|---|---|
| 12 | Waved cloud (Mountain wave) |
| 13 | Low-level vortex (Meso β-scale ) |
| 14 | (Cross mark) |
| 15 | Light turbulence |
| 16 | Moderate turbulence |
| 17 | Severe turbulence |
| 18 | (Tilde mark) |
| 19 | Light icing |
| 20 | Moderate icing |
| 21 | Severe icing |

# Output images




Print image Ctrl+P
Print screen Ctrl+H
Page setup... Ctrl+U

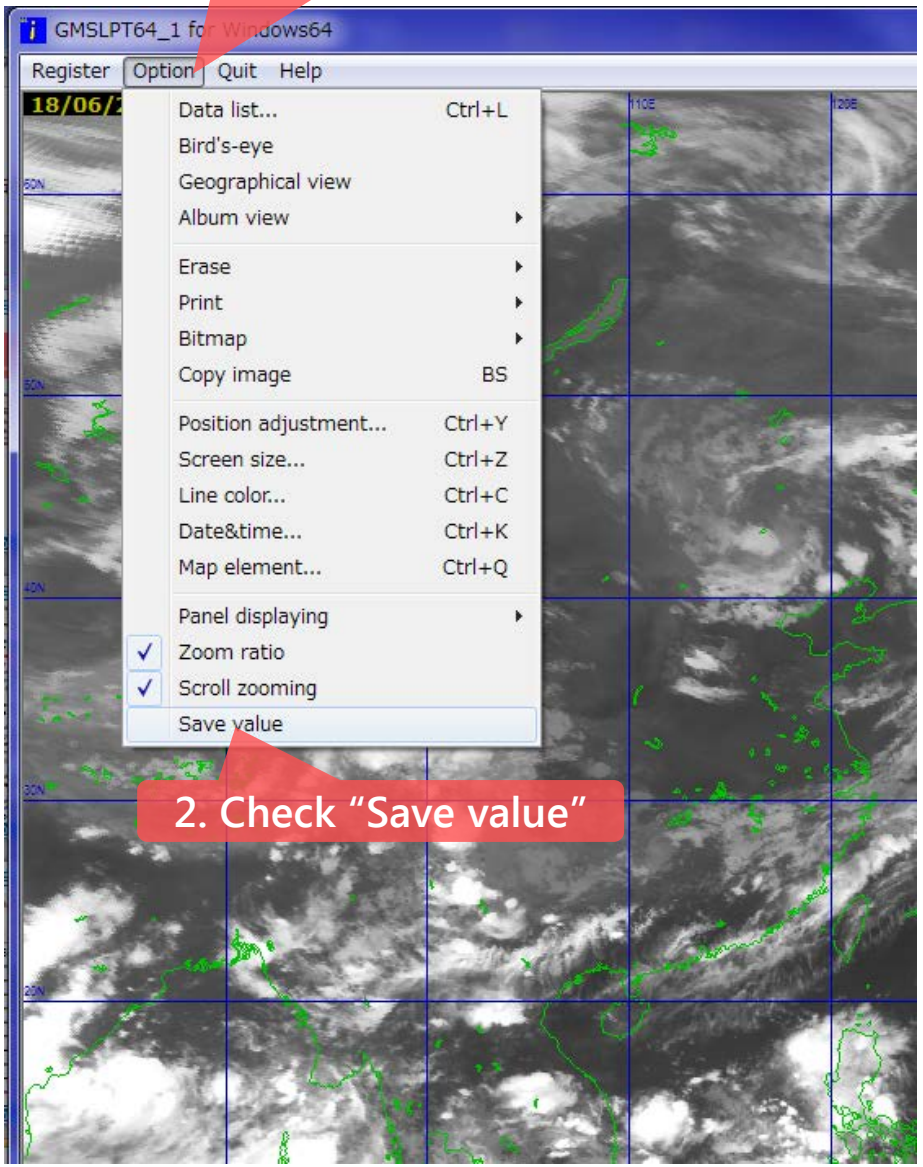
Print image: Output the current image to a printer
Print screen: Output the entire screen to a printer
Page setup: Set the margins of printing paper

Output bitmap Ctrl+O
Output serial bitmaps
Output animated GIF

Output bitmap: Output the current image as a bitmap file
Output serial bitmaps: Output the images as a bitmap file
Output animated GIF: Output the images as a Gif animation

Copy the current image to the clipboard

# Save your settings




If you check “save value”, your various settings will be saved in the initial value file found in the directory same as the program when you terminate the program.
These settings will be used as the initial values at the next startup.

Various settings to be saved include

- Animation speed
- Shows/hides latitude/longitude lines
- Intervals at which latitude/longitude lines are displayed
- Shows/hides coastlines
- Shows/hides drawings
- Screen size
- Line colors
- Grayscales set separately for image types

...etc.