How to display RGB imagery by SATAID

Akihiro SHIMIZU
Meteorological Satellite Center (MSC),
Japan Meteorological Agency (JMA)

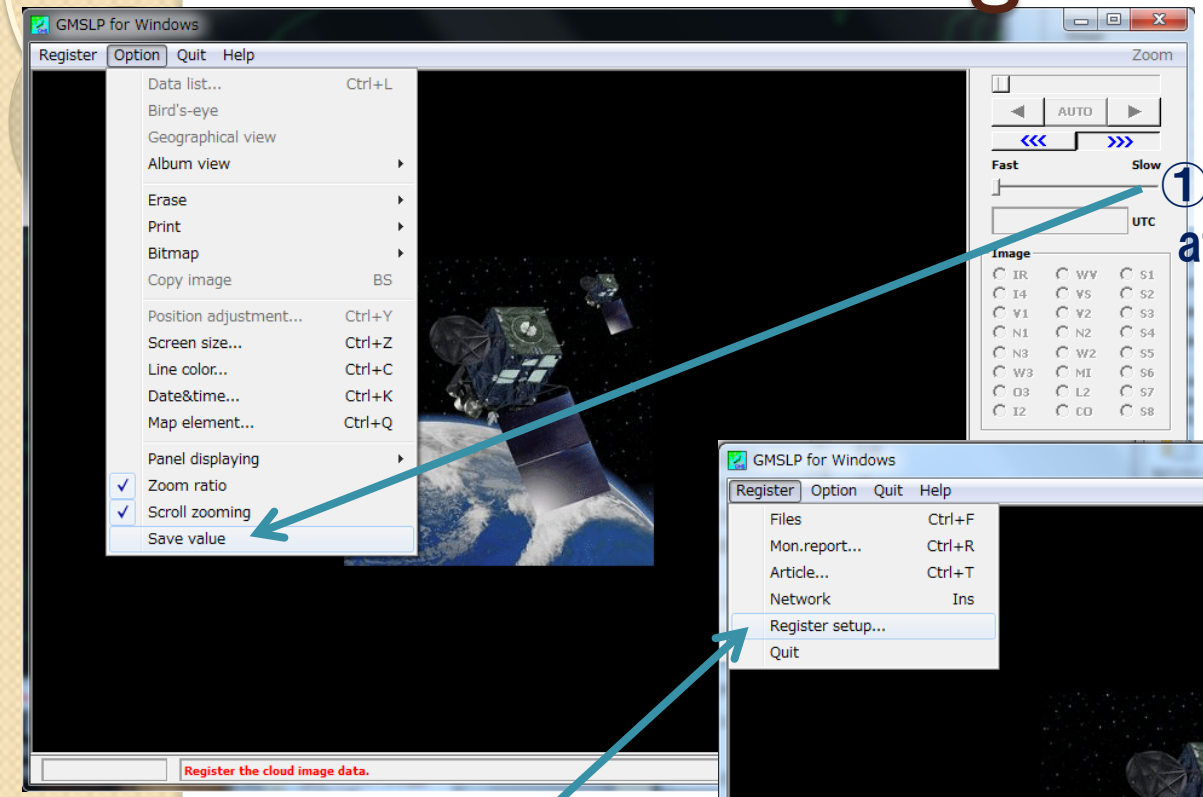
Ver. 2015110500

RGB imagery on SATAID

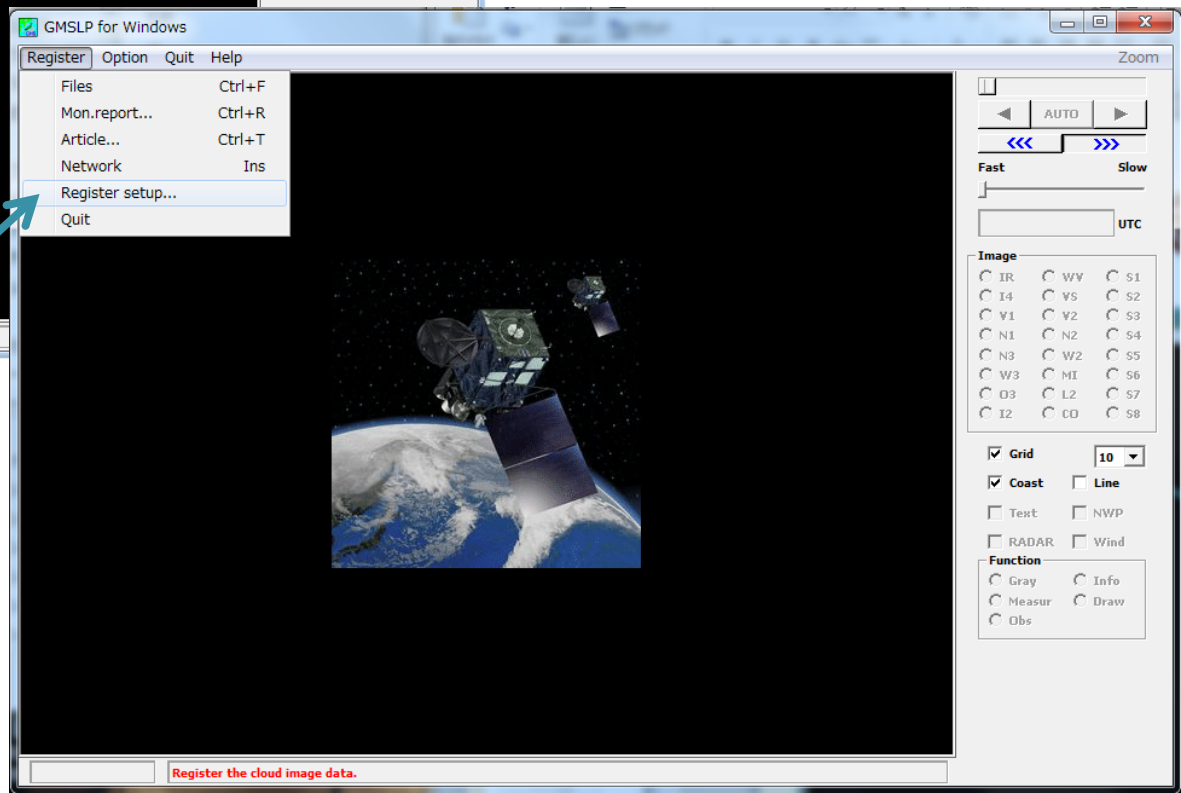
- SATAID software has a function of overlapping colored satellite images.
- The function including RGB imagery has enhanced in latest version.

- Note that difference images for composite and appropriate configuration settings are required to display RGB imagery on SATAID.

Initial Configuration

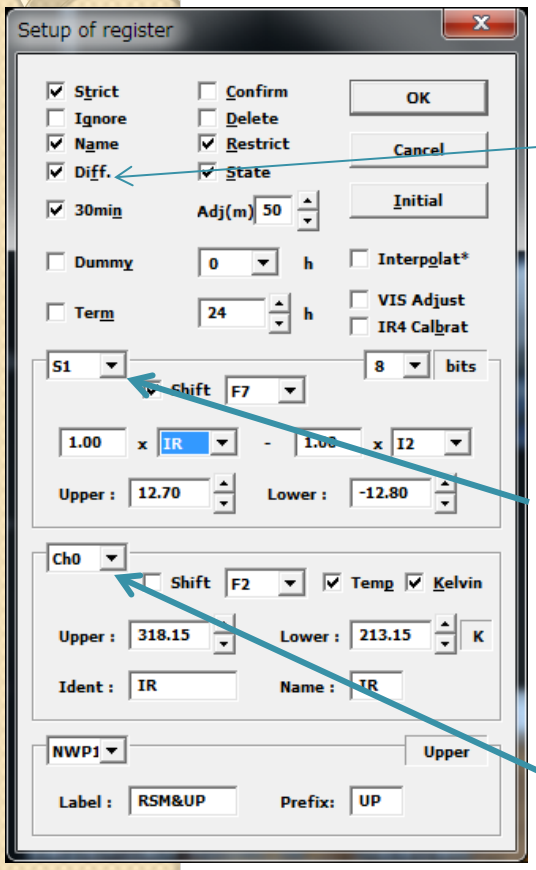


① Make sure of the check mark at "Save value" of option.



② Hold down Ctrl key and select "Register setup".

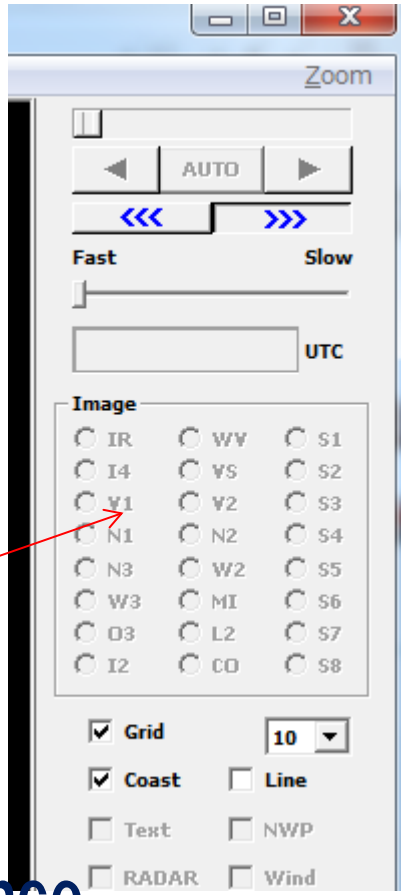
Initial Configuration



Make sure of the check mark at “Diff”.
If no check mark, the difference images don’t create by SATAID.

•Settings of difference images(S1 ~ S8)
Settings of upper and lower ranges
(kelvin or albedo)

•Settings of loading images
Settings of upper and lower ranges
Images of respective bands are identified by two-character short-name. (IR, N1, W2 etc.)

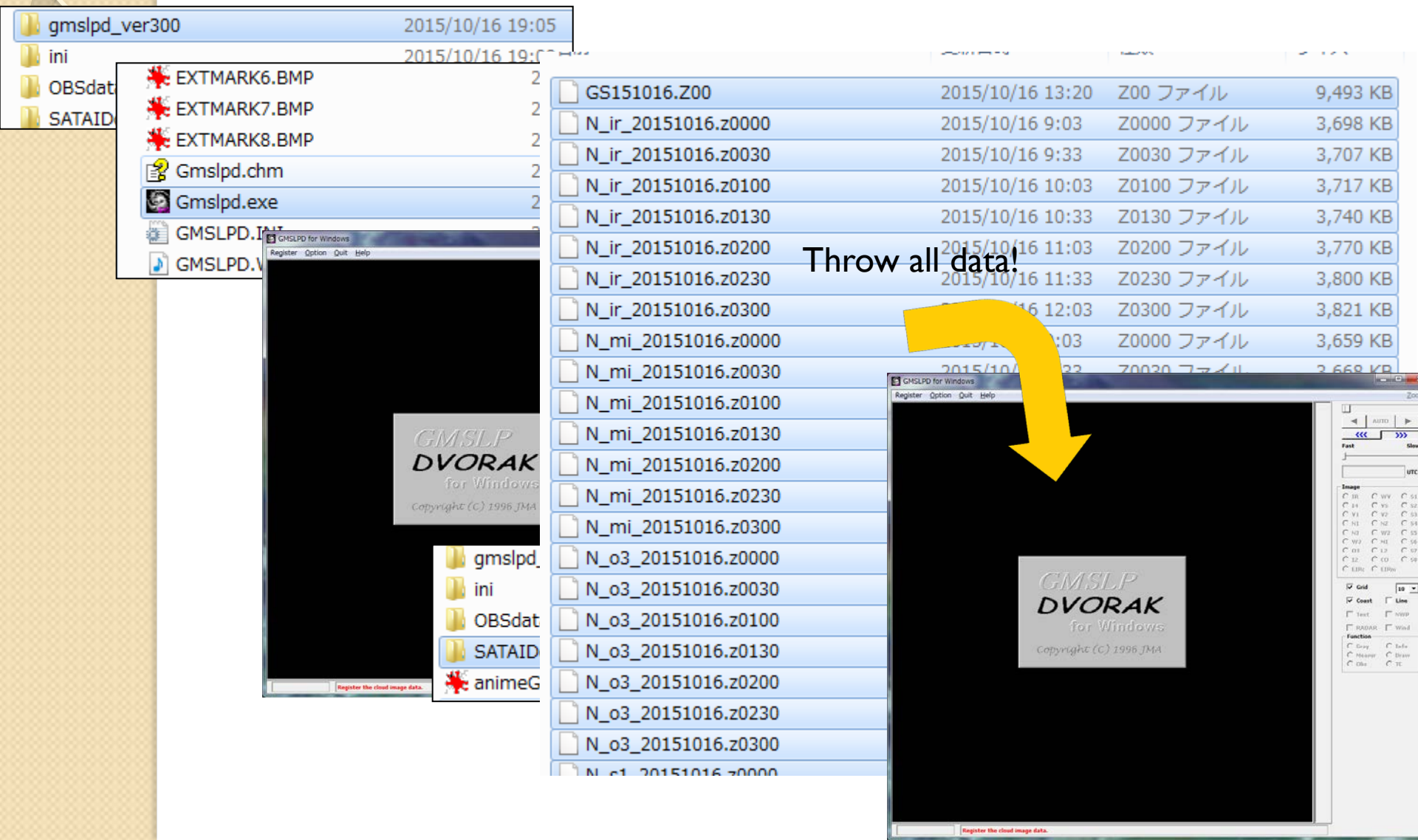


After doing above settings, close SATAID once.

Reference: Abbreviations on SATAID(for Himawari-8)

	Short name	Long name	Band number	Wave length	
Band01	V1	VIS1	B01	0.46 μm	"First" visible
Band02	V2	VIS2	B02	0.51 μm	"Second" visible
Band03	VS	VIS3	B03	0.64 μm	"Third" and "traditional" visible
Band04	N1	NIR1	B04	0.86 μm	"First" near infrared
Band05	N2	NIR2	B05	1.6 μm	"Second" near infrared
Band06	N3	NIR3	B06	2.3 μm	"Third" near infrared
Band07	I4	SWIR	B07	3.9 μm	Short wave IR
Band08	WV	WV1	B08	6.2 μm	"First" and "traditional" water vapor
Band09	W2	WV2	B09	6.9 μm	"Second" water vapor
Band10	W3	WV3	B10	7.3 μm	"Third" water vapor
Band11	MI	MWIR	B11	8.6 μm	Medium wave IR
Band12	O3	O3	B12	9.6 μm	Ozone
Band13	IR	LWIR1	B13	10.4 μm	"First" long wave IR or "traditional" IR
Band14	L2	LWIR2	B14	11.2 μm	"Second" long wave IR
Band15	I2	LWIR3	B15	12.4 μm	"Third" long wave IR or "traditional second" IR
Band16	CO	CO2	B16	13.3 μm	CO2

Throw the data into SATAID!



How to display RGB (Airmass)

- Airmass RGB recipe by EUMETSAT

R : WV(6.2) – W3(7.3) -25.0 ~ 0.0 [K] Gamma = 1.0

G : O3(9.6) – IR(10.8) -40.0 ~ 5.0 [K] Gamma= 1.0

B : WV(6.2) 243 ~ 208 [K] Gamma = 1.0

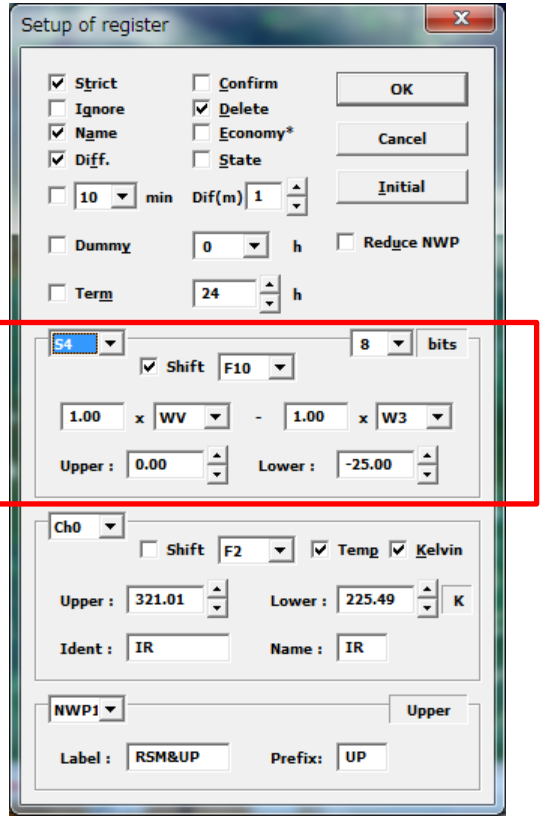
Let's try to make Airmass RGB on SATAID!

How to display RGB (Airmass)

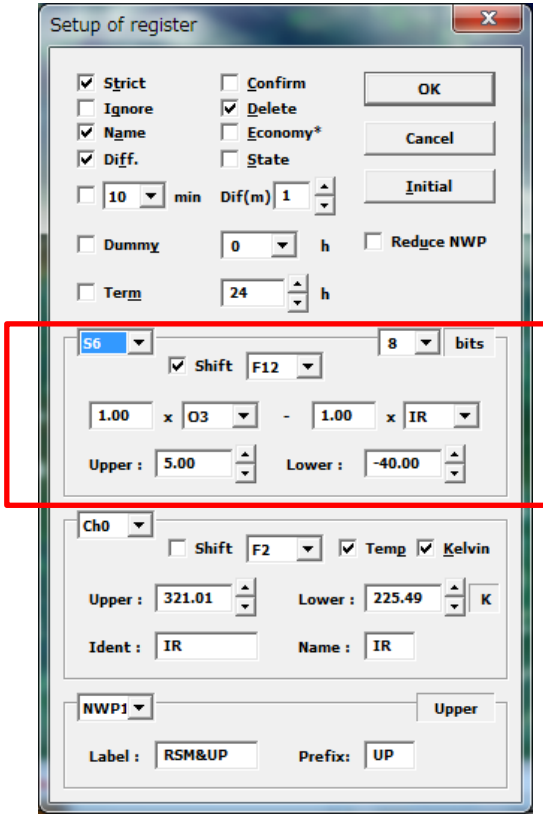
- Set up the difference images by “Register setup”.

(In this example, S4 and S6 are assigned to WV-W3 and O3-IR respectively.)

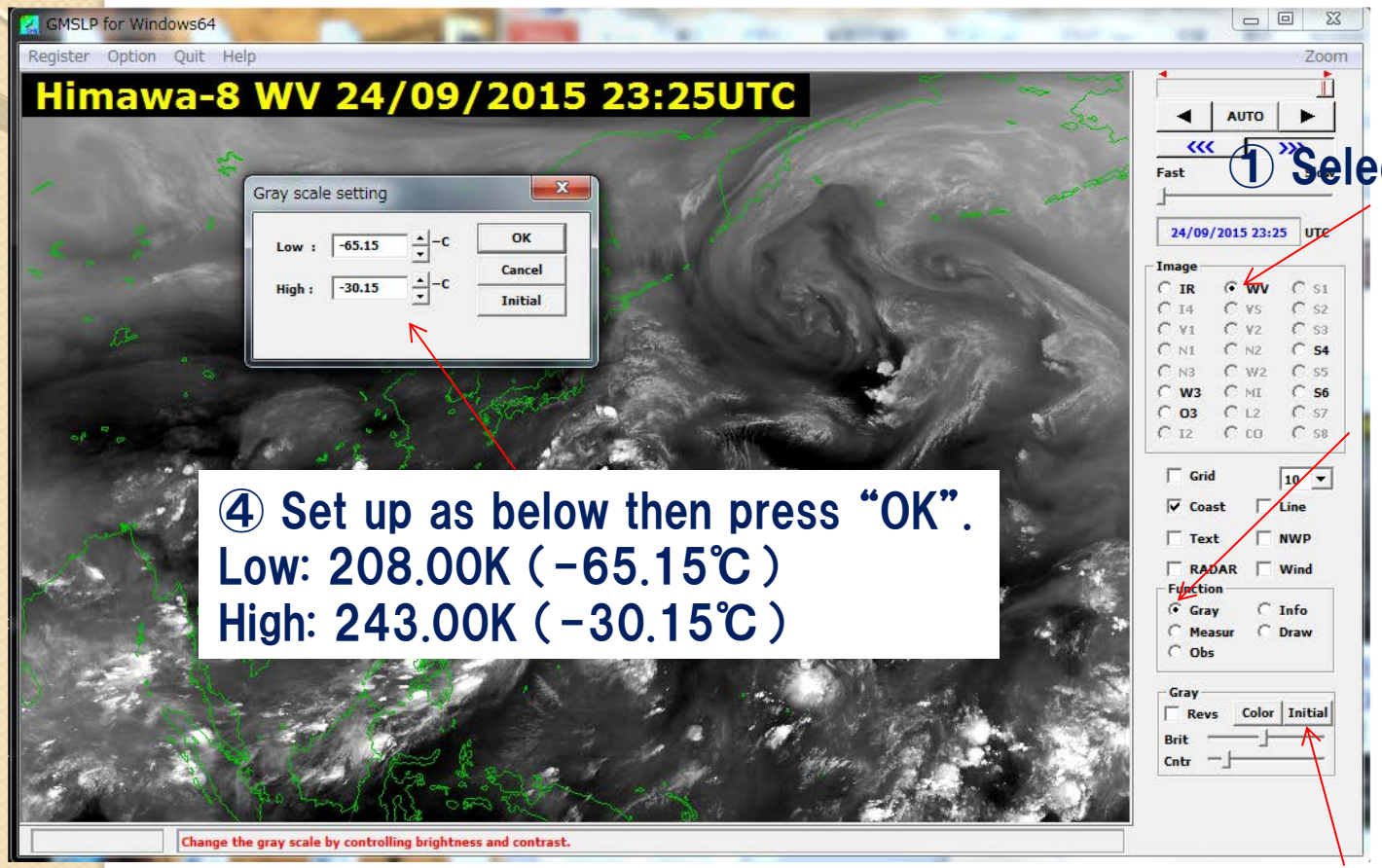
S4 : WV-W3 (B08 - B10)
Upper : 0.0 Lower : -25.0



S6 : O3-IR (B12 - B13)
Upper : 5.0 Lower : -40.0



How to display RGB (Airmass)



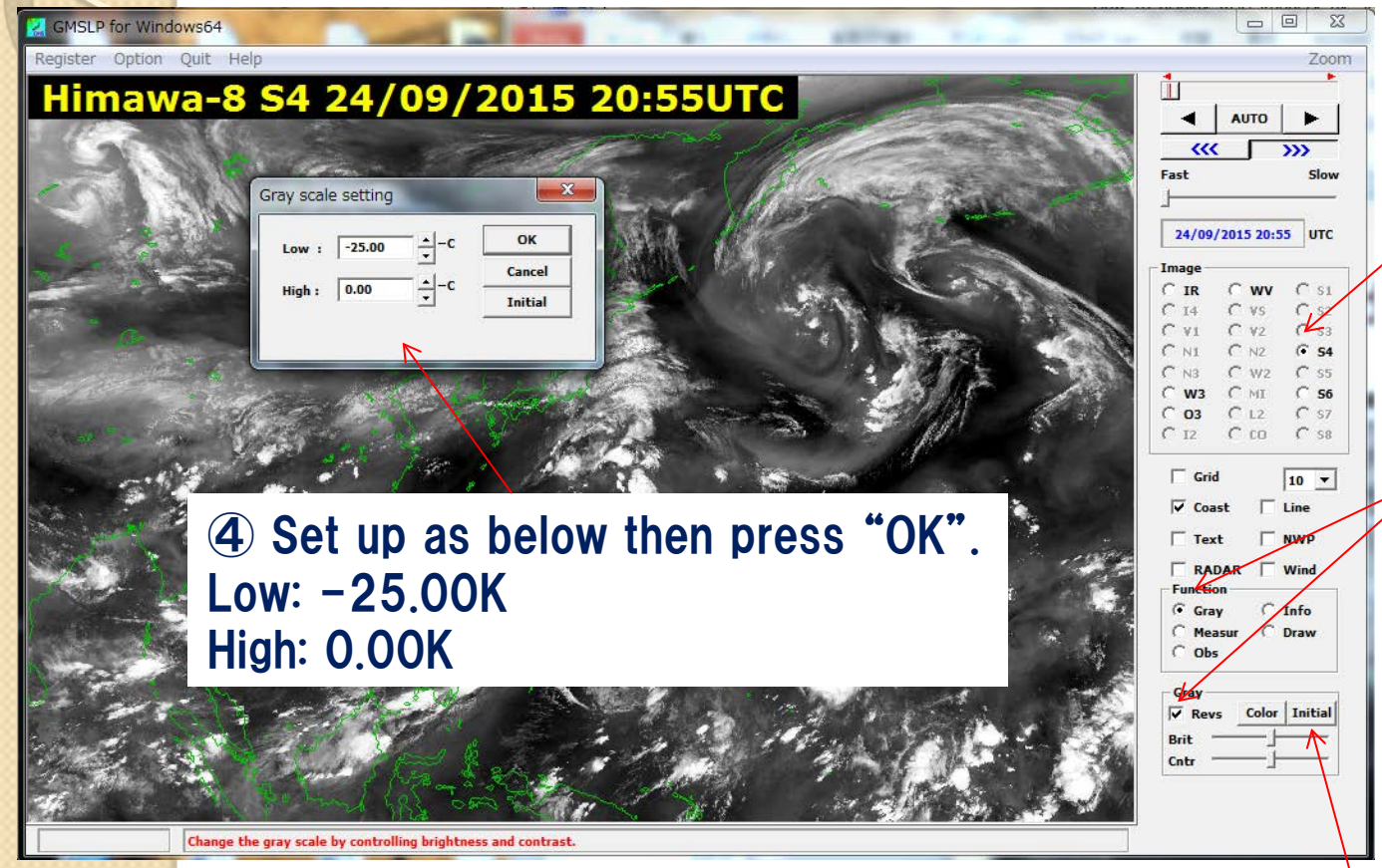
① Select “WV (Band08)”

② Select “Gray”

④ Set up as below then press “OK”.
Low: 208.00K (-65.15℃)
High: 243.00K (-30.15℃)

③ Hold down Ctrl key and press “Initial”.

How to display RGB (Airmass)



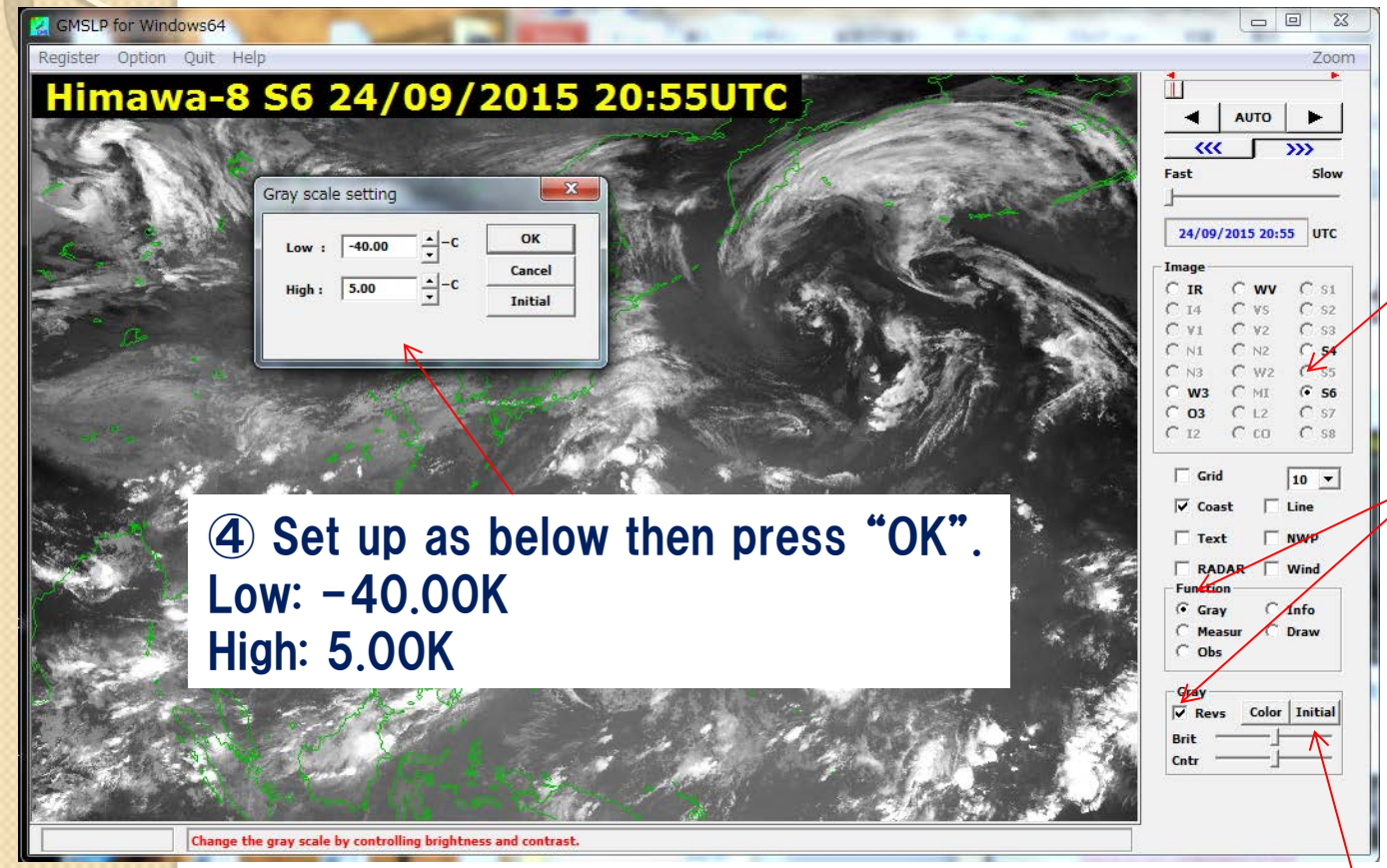
④ Set up as below then press “OK”.
Low: −25.00K
High: 0.00K

① Select S4

② Select “Gray” and check “Revs”

③ Hold down Ctrl key and press “Initial”.

How to display RGB (Airmass)



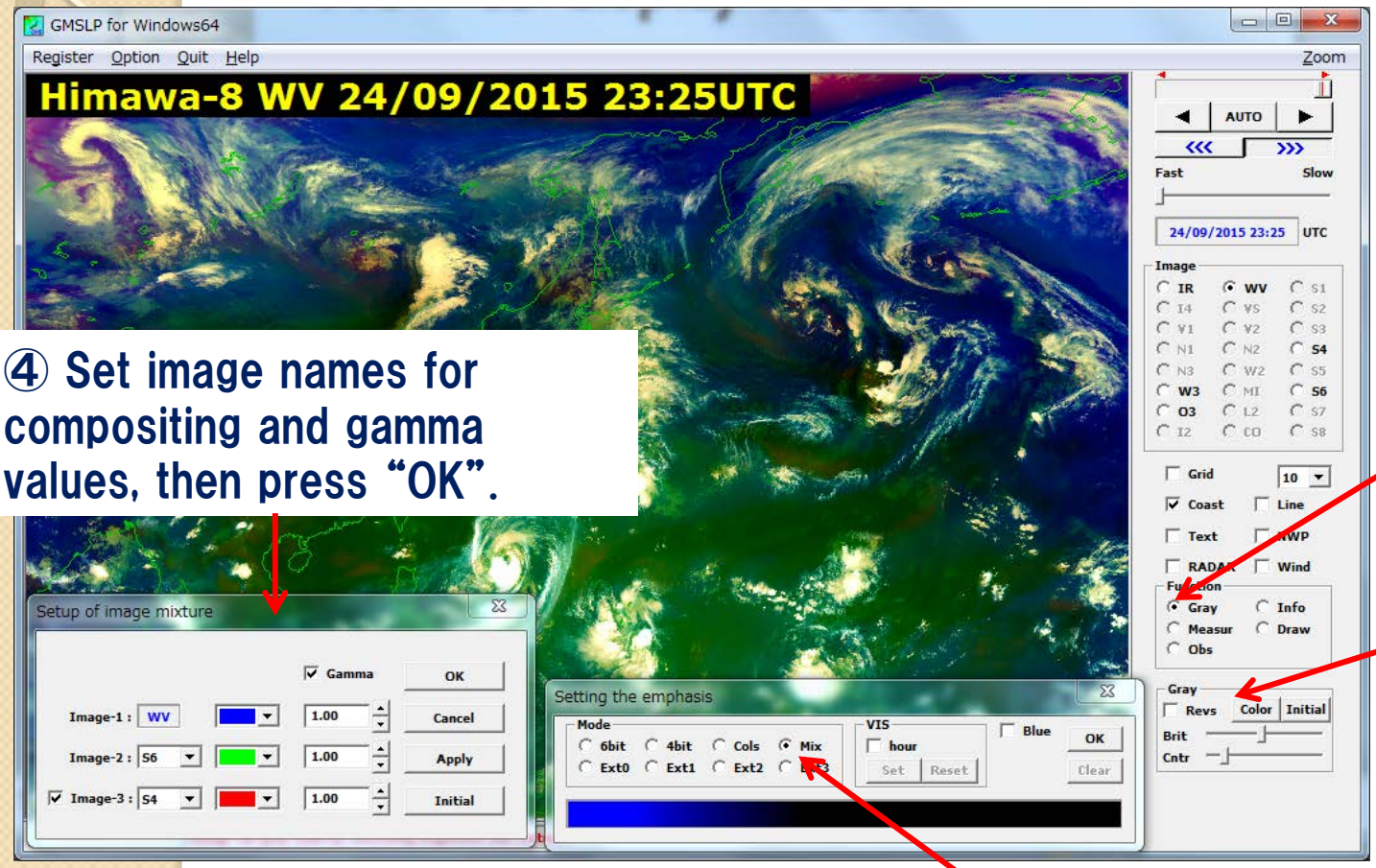
① Select S6

② Select “Gray” and check “Revs”

③ Hold down Ctrl key and press “Initial”.

④ Set up as below then press “OK”.
Low: −40.00K
High: 5.00K

How to display RGBs



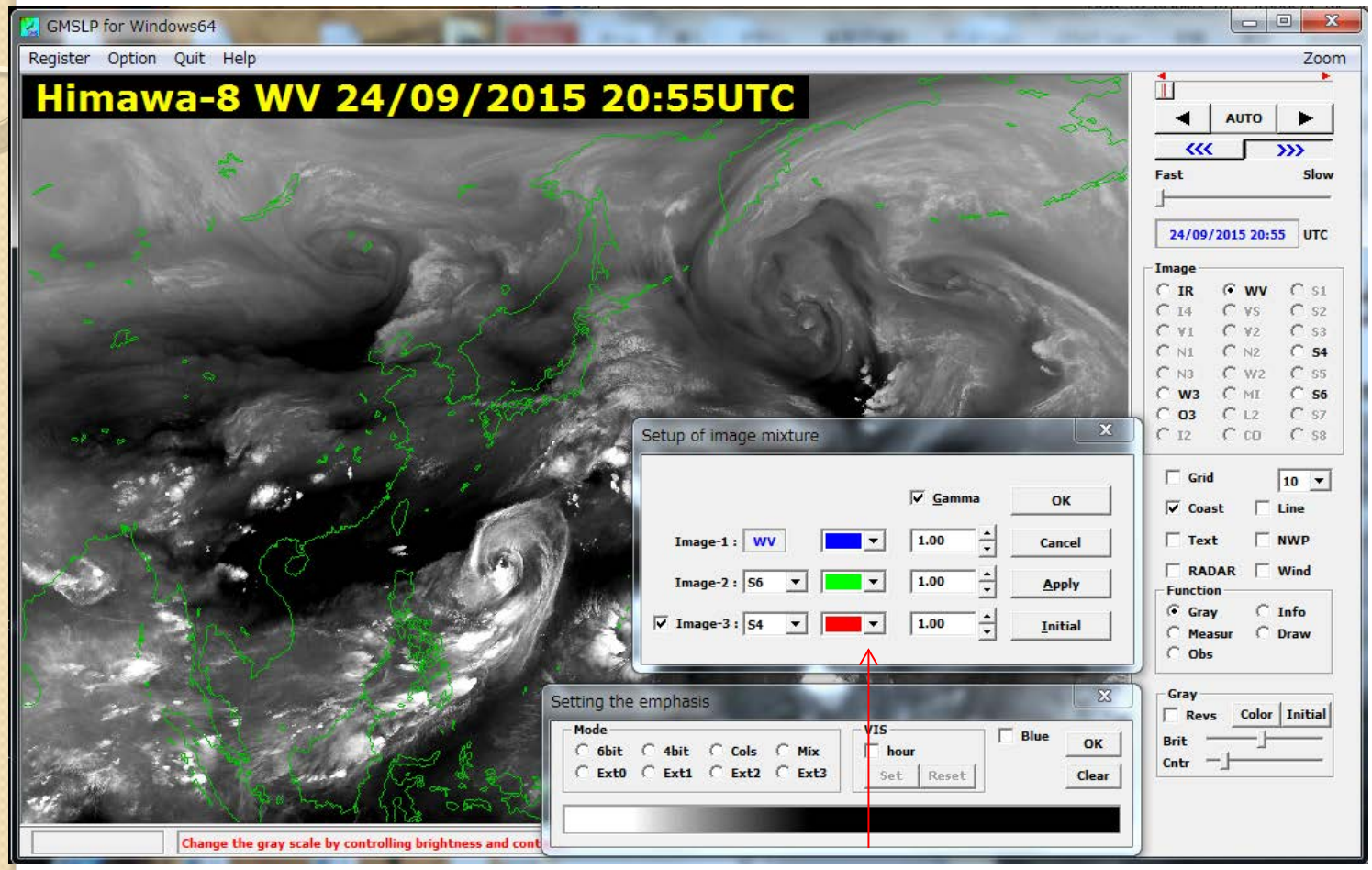
④ Set image names for compositing and gamma values, then press “OK”.

① Select “Gray”.

② Press “Color”.

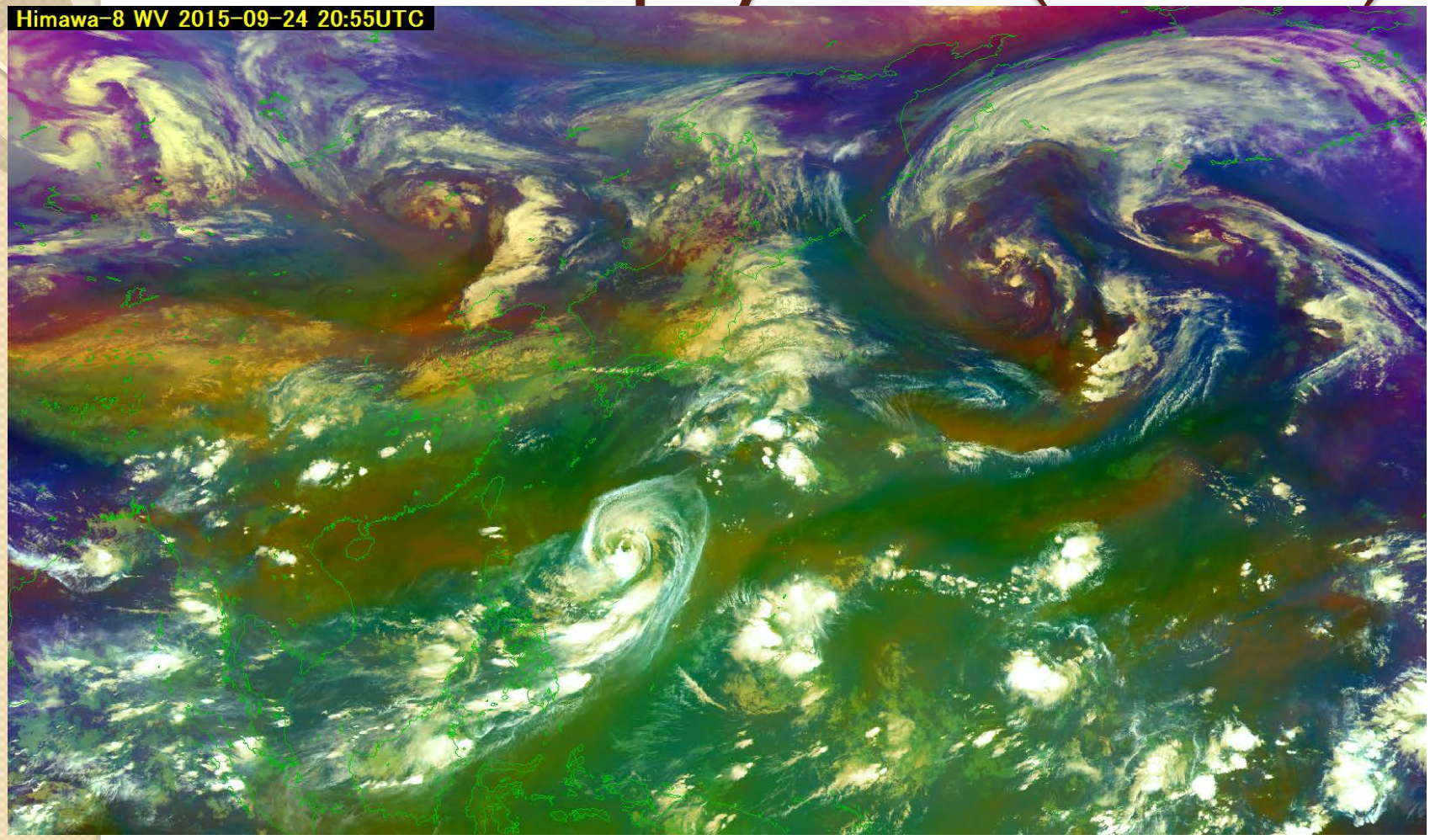
③ Hold down Ctrl key and select “Mix”.

How to display RGB (Airmass)



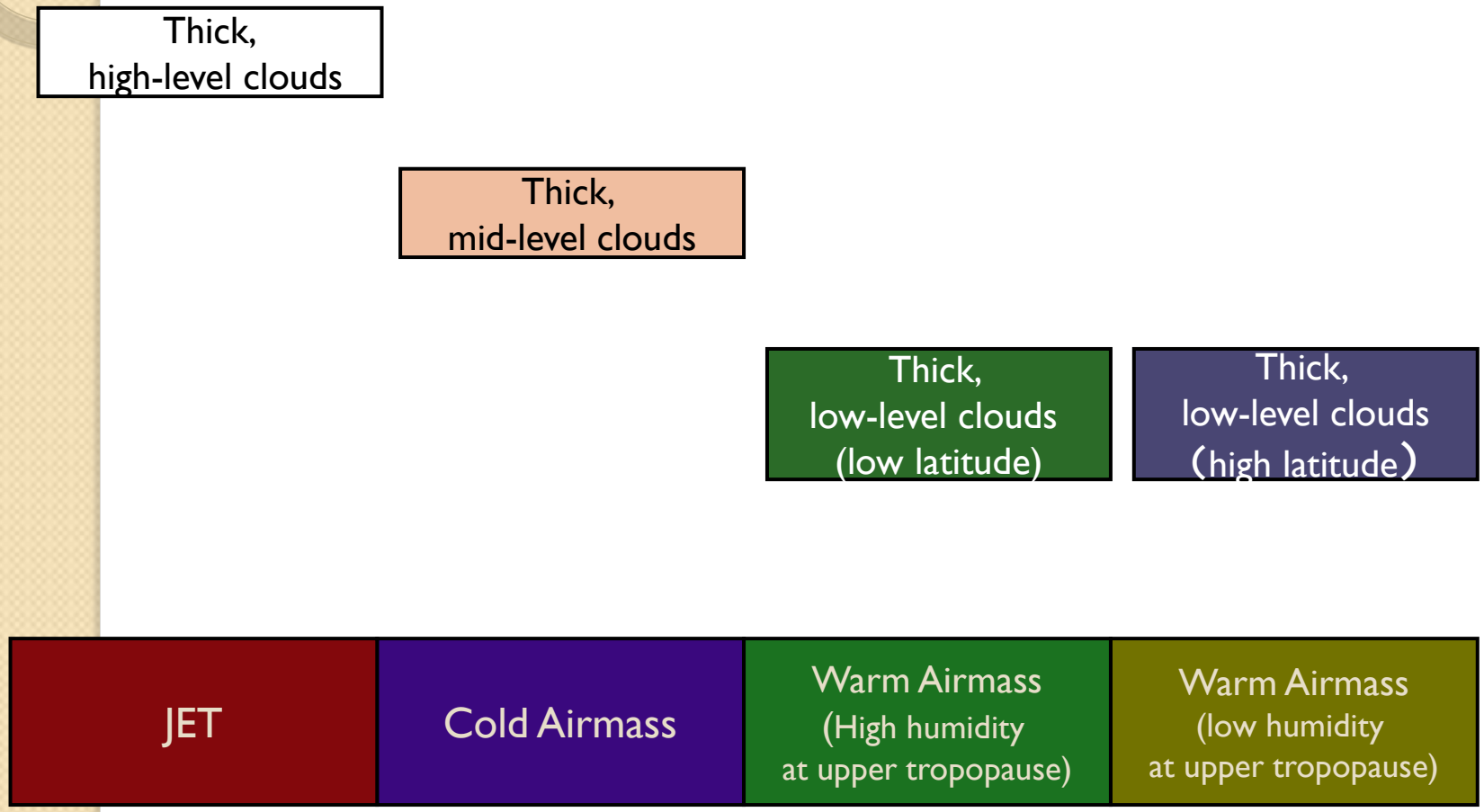
Overlap images
S4 as red, S6 as green and WV as blue
All gamma values: 1.0

How to display RGB (Airmass)



Airmass image by SATAID!
Are you OK?

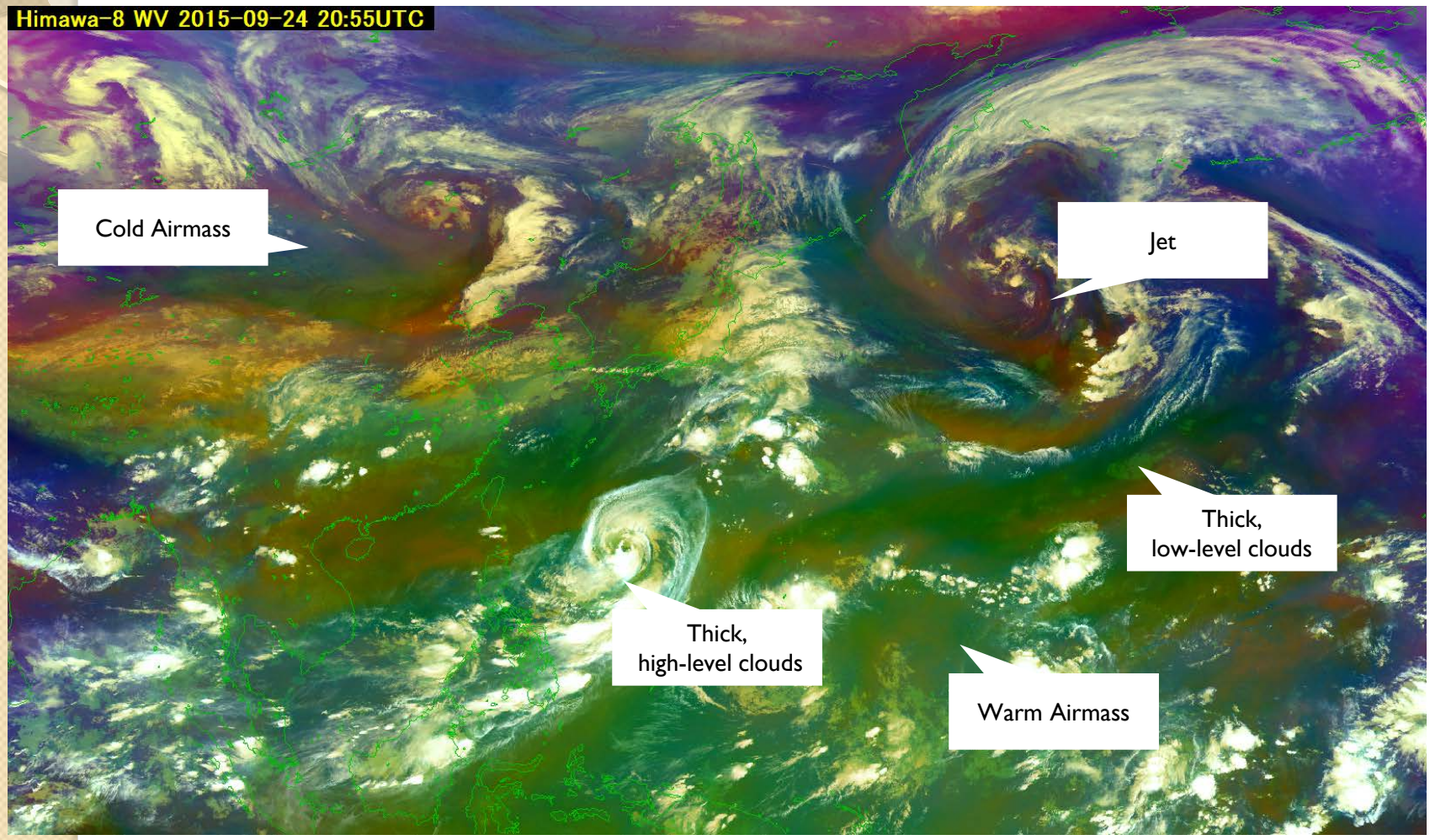
Reference: Interpretation of Colors for "Airmass"



Note: Based on SEVIRI/EUMETSAT interpretation

Example of interpretation

For details, MSC/JMA VLab support site: Himawari RGB Training Library
http://www.data.jma.go.jp/mscweb/en/VRL/VLab_RGB/RGBimage.html



Thick, high-level clouds	Thick, mid-level clouds	Thick, low-level clouds (low latitude)	Thick, low-level clouds (high latitude)
JET	Cold Airmass	Warm Airmass (High humidity at upper tropopause)	Warm Airmass (low humidity at upper tropopause)

How to display RGB (Dust)

- Dust RGB recipe by EUMETSAT

R : I2(12.0) – IR(10.8)	-4.0 ~ 2.0 [K]	Gamma = 1.0
G : IR(10.8) – MI(8.6)	0.0 ~ 15.0 [K]	Gamma= 2.5
B : IR(10.8)	261 ~ 289 [K]	Gamma = 1.0

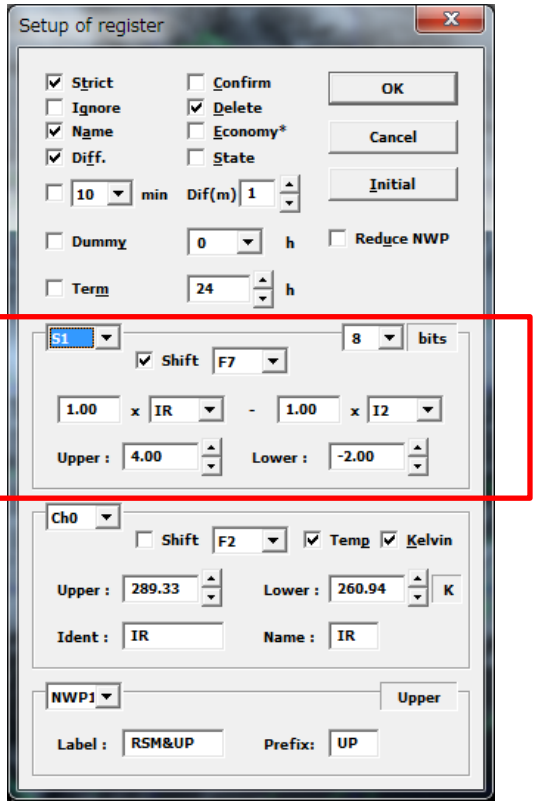
Let's try to make Dust RGB on SATAID!

How to display RGB (Dust)

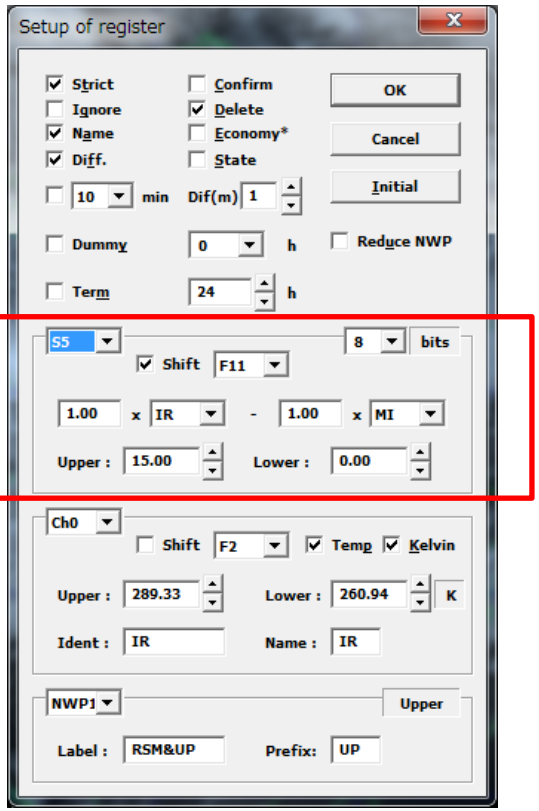
- Set up the difference images by “Register setup”.

(In this example, S1 and S5 are assigned to IR-I2 and IR-MI respectively.)

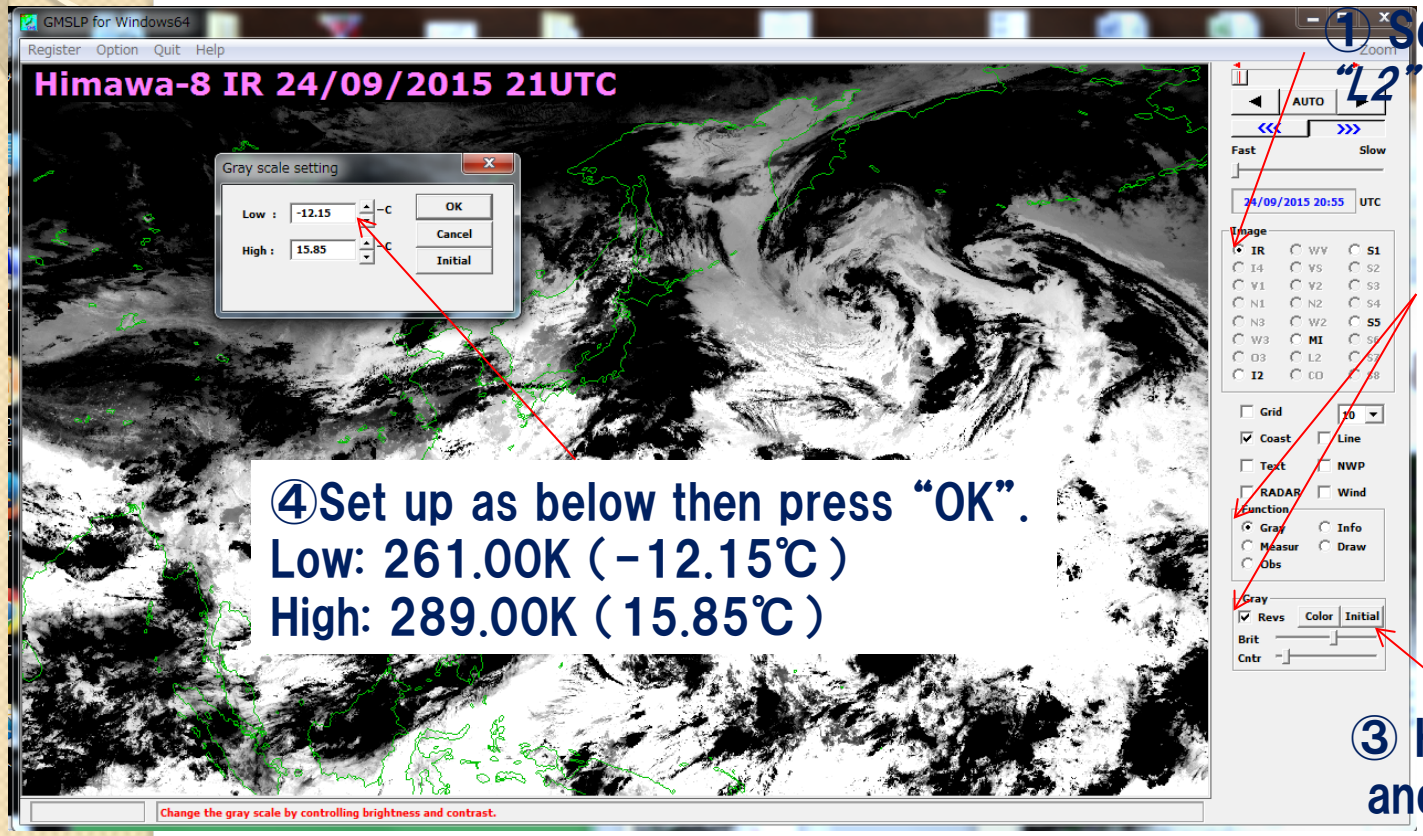
S1 : IR-I2 (B15 - B13)
Upper : 2.0 Lower : -4.0



S5 : IR-MI (B13 - B11)
Upper : 15.0 Lower : 0.0



How to display RGB (Dust)

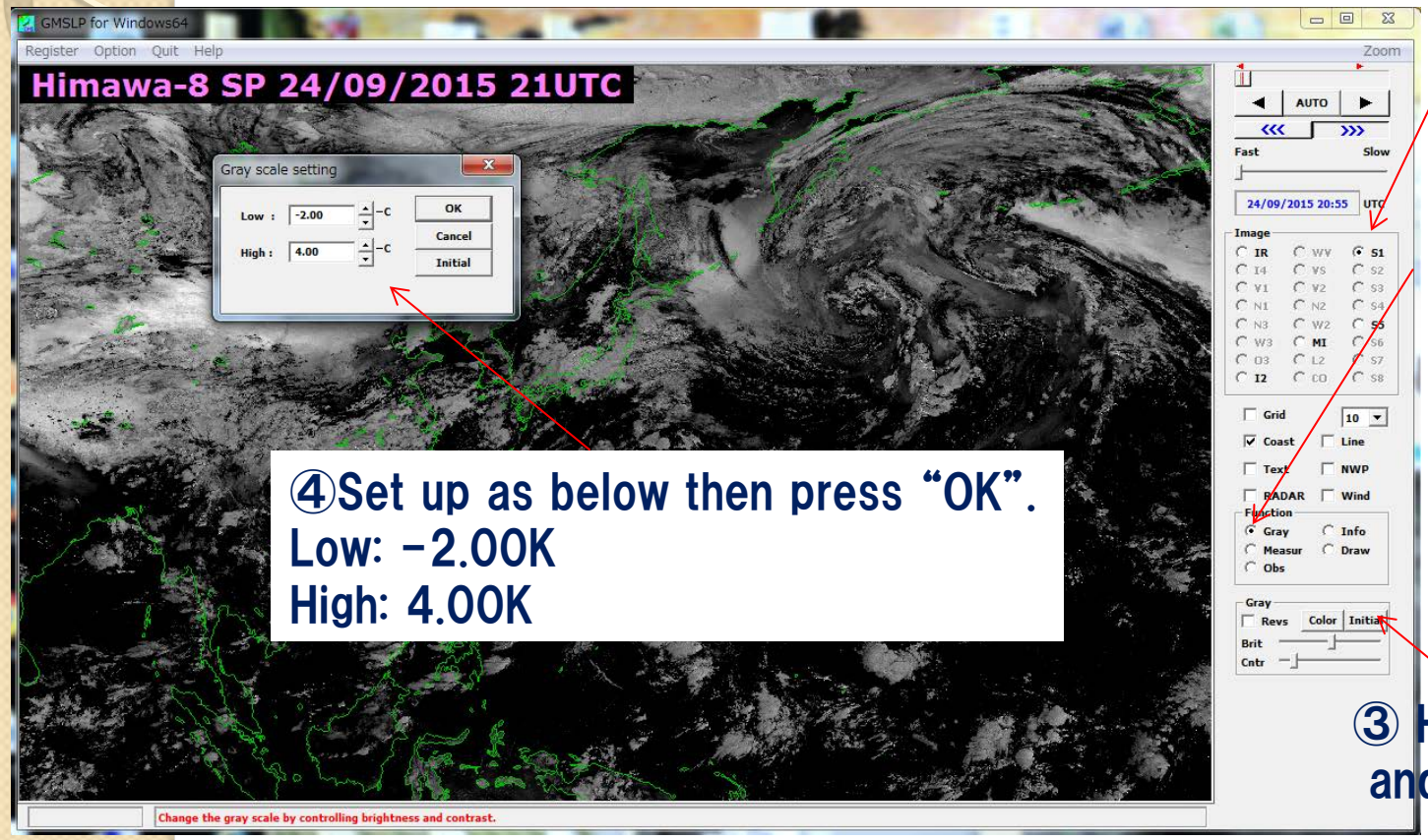


① Select “IR” (Band13)
“L2” (Band14) is also OK

② Select “Gray” and check “Revs”

③ Hold down Ctrl key and press “Initial”.

How to display RGB (Dust)



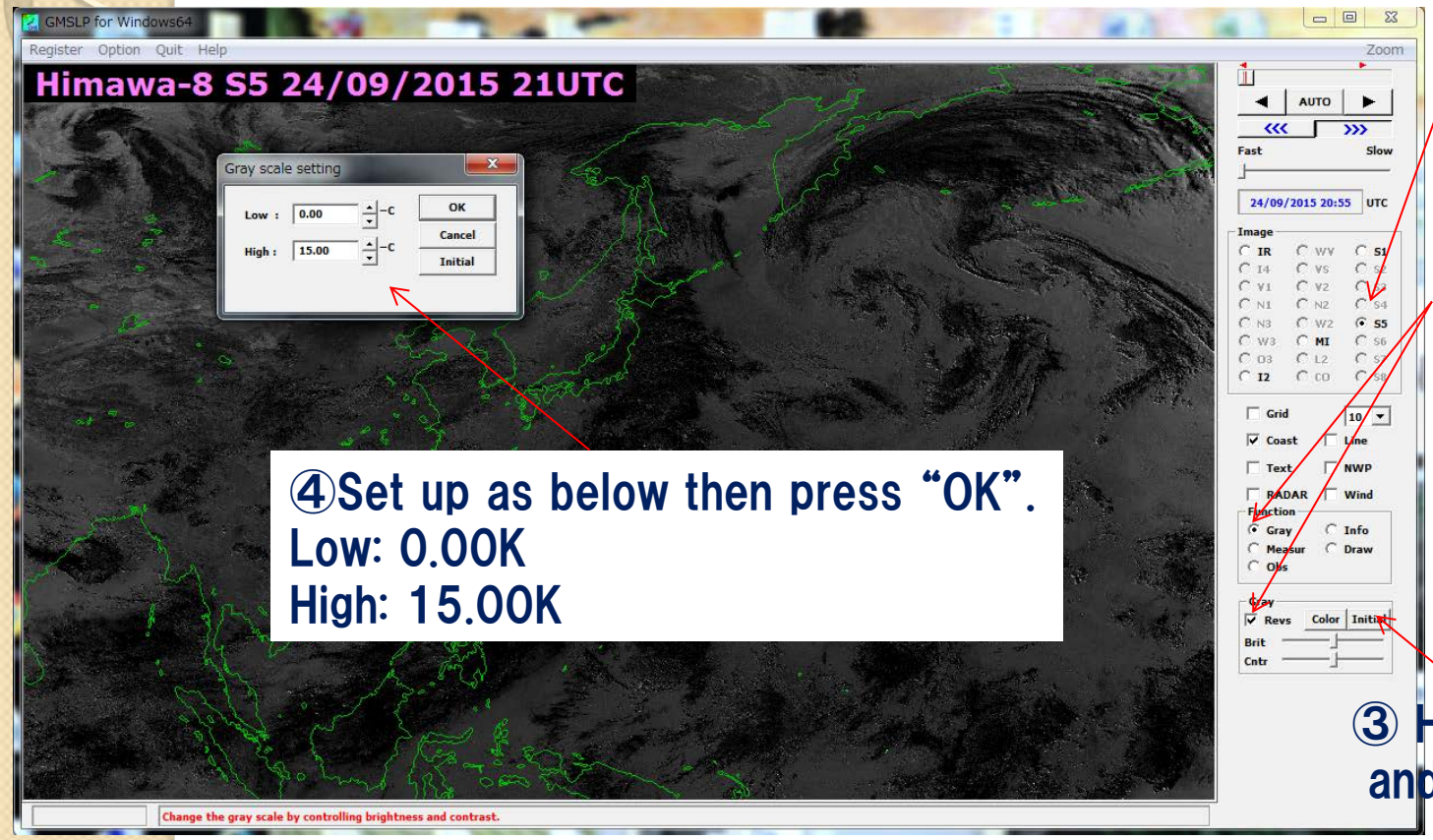
④Set up as below then press “OK”.
Low: −2.00K
High: 4.00K

① Select “S1”

② Select “Gray”

③ Hold down Ctrl key and press “Initial”.

How to display RGB (Dust)



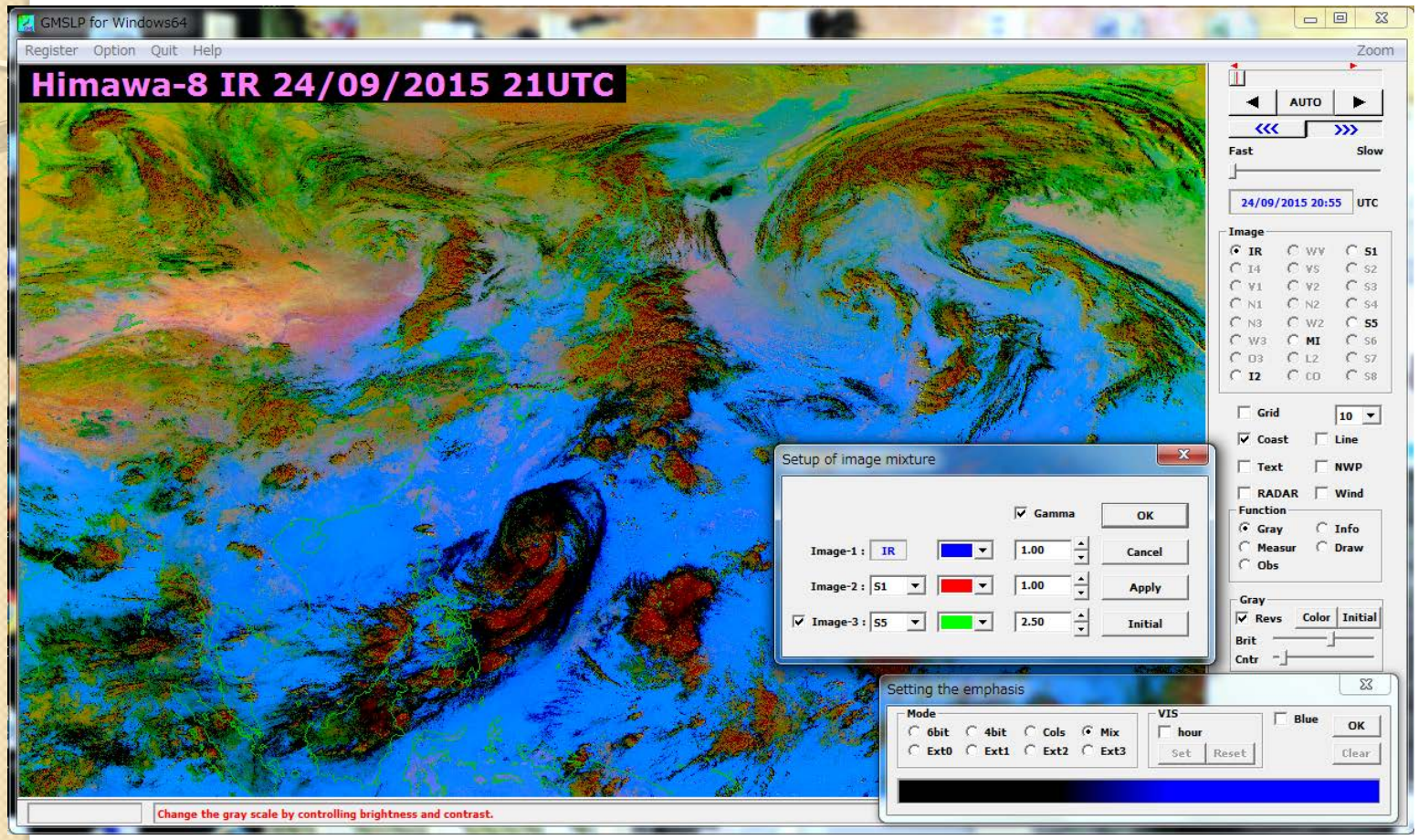
④Set up as below then press “OK”.
Low: 0.00K
High: 15.00K

① Select “S5”

② Select “Gray” and check “Revs”

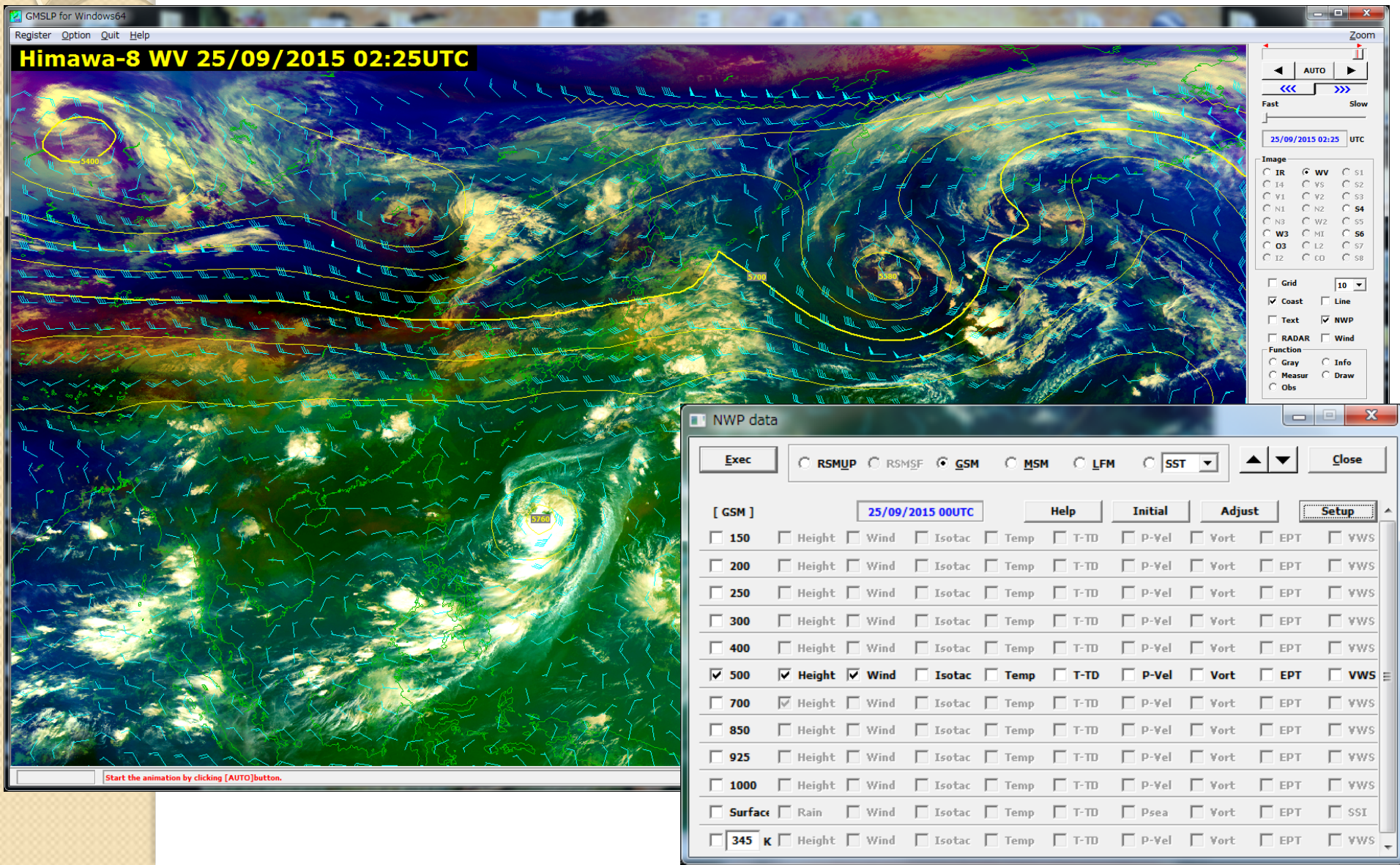
③ Hold down Ctrl key and select “Initial”.

How to display RGB (Dust)

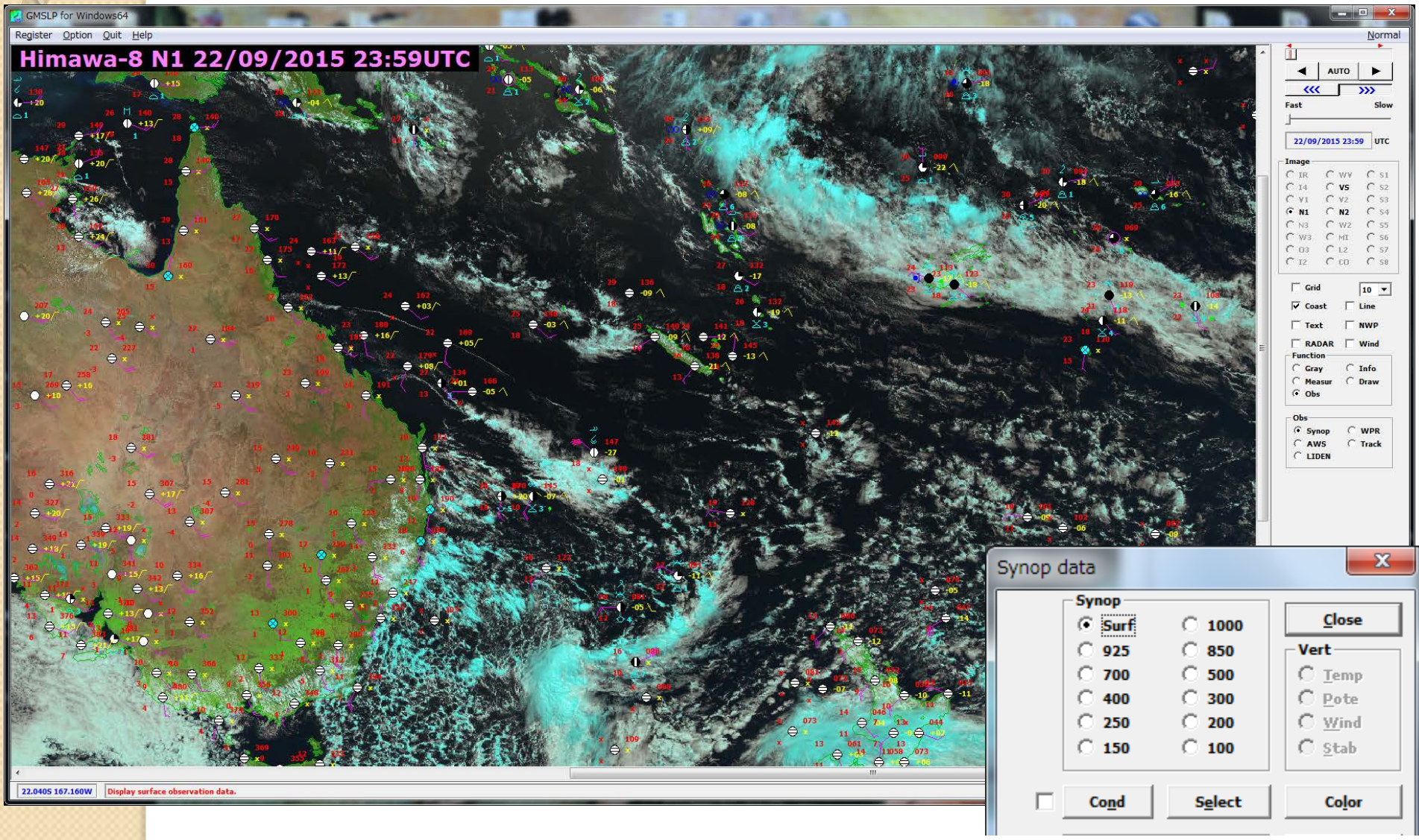


Overlap images
S1 as red, S5 as green and IR as blue
Gamma values for red and blue: 1.0, green:2.5

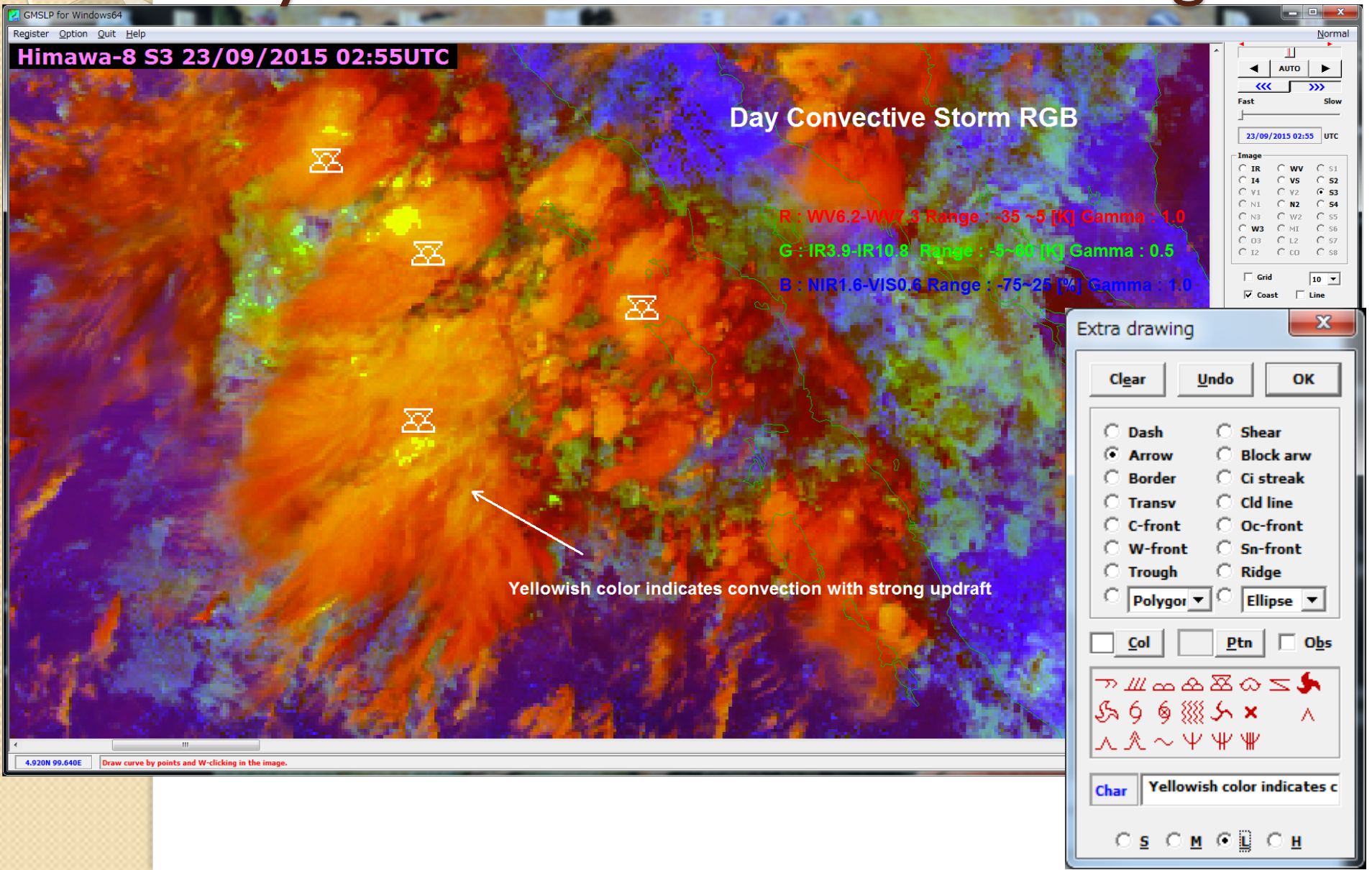
Display example : Airmass + NWP



Display example : Natural colors + SYNOP

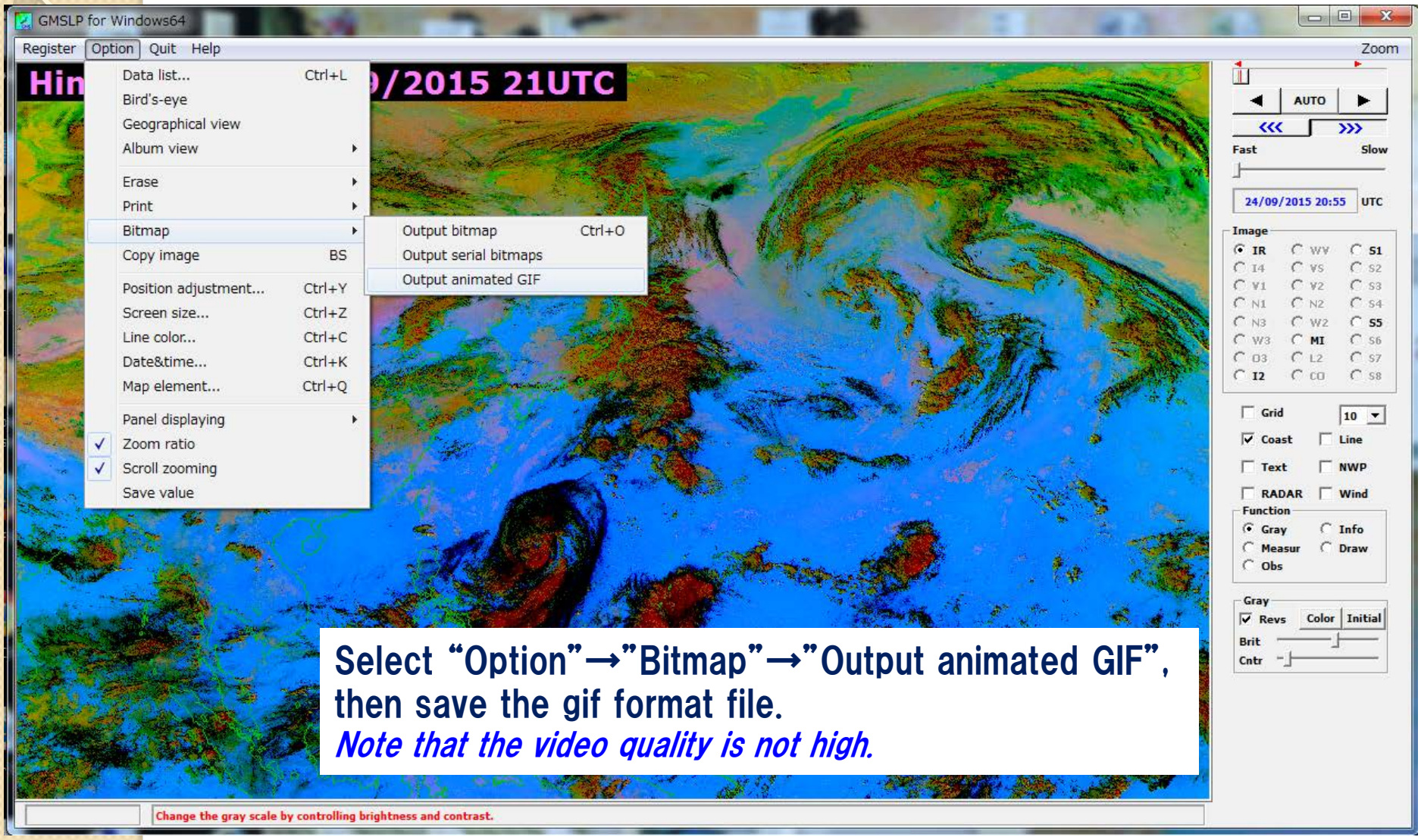


Display example :
Day convective storms + drawing



Reference:
How to create animated GIF by SATAID

Sample gif anime >>



Select “Option”→”Bitmap”→”Output animated GIF”, then save the gif format file.

Note that the video quality is not high.

All you can do is practice!

Thank you!

RGB color interpretations

Night Microphysics

Cold, thick, high-level cloud

Very cold (< -50° C), thick, high-level cloud

Thin Cirrus cloud

Thick, mid-level cloud

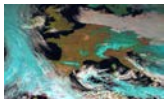
Thin, mid-level cloud

Low-level cloud (high latitudes)

Low-level cloud (low latitudes)

Ocean | Land

Natural Colors

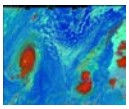


High-level ice clouds

Low-level water clouds

Ocean | Vegetation | Desert | Snow

Day Microphysics #1



Deep precipitating cloud (precip. not necessarily reaching the ground)
- Bright, thick
- Large ice particles
- Cold cloud

Deep precipitating cloud (Cb cloud with strong updrafts and severe weather)*
- Bright, thick
- Small ice particles
- Cold cloud

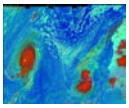
*or thick, high-level lee cloudiness with small ice particles

Thin Cirrus cloud (Large ice particles)

Thin Cirrus cloud (Small ice particles)

Ocean | Vegetation | Fires(Hot Spot)/Desert | Snow

Day Microphysics #2



Supercooled, thick water cloud
- Bright, thick
- Large droplets

Supercooled, thick water cloud
- Bright, thick
- Small droplets

Supercooled thin water cloud
- Large droplets

Supercooled, thin water cloud
- Small droplets

Thick water cloud (warm rain cloud)
- Bright, thick
- Large droplets

Thick water cloud (no precipitation)
- Bright, thick
- Small droplets

Thin water cloud
- Large droplets

Thin water cloud
- Small droplets

Ocean | Vegetation | Fires(Hot Spot)/Desert | Snow

Day Snow-Fog

Deep precipitating cloud (precip. not necessarily reaching the ground)
- Bright, thick
- Large ice particles

Deep precipitating cloud*
- Bright, thick
- Small ice particles

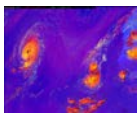
*or thick, high-level lee cloudiness with small ice particles

Thick water cloud
- Large droplets

Thick water cloud
- Small droplets

Ocean | Vegetation | Desert | Snow

Day Convective Storms (Day Convection)



Deep precipitating cloud (precip. not necessarily reaching the ground)
- High level Cloud
- Large ice particles

Deep precipitating cloud (Cb cloud with strong updrafts and severe weather)*
- High level Cloud
- Small ice particles

*or thick, high-level lee cloudiness with small ice particles

Thin Cirrus cloud
- Large ice particles

Thin Cirrus cloud
- Small ice particles

Ocean | Land

Dust

Cold, thick, high-level clouds

Thin Cirrus clouds Contrails

Thick, mid-level cloud

Thin, mid-level cloud

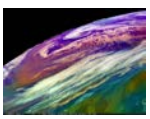
Low-level cloud (cold atmosphere, High latitude)

Low-level cloud (warm atmosphere, Low latitude)

Dust/Yellow sand

Ocean | Warm Desert | Cold Desert | Warm Land | Cold Land

Airmass



Thick, high-level clouds

Thick, mid-level clouds

Thick, low-level clouds (low latitude)

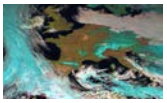
Thick, low-level clouds (high latitude)

JET | Cold Airmass | Warm Airmass (High humidity at upper tropopause) | Warm Airmass (low humidity at upper tropopause)

RGB recipes (EUMETSAT recipes)

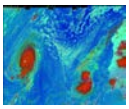
Night Microphysics

R : IR12.0 – IR10.8 (default S1 on SATAID)
Range : -4～2 [K] Gamma : 1.0
G : IR10.8 – IR3.9 (default S2 on SATAID)
Range : 0～10[K] Gamma : 1.0
B : IR10.8 (reverse on SATAID)
Range : 243～293[K] Gamma : 1.0



Natural Colors

R : NIR1.6
Range : 0～100 [%] Gamma : 1.0
G : VIS0.8
Range : 0～100 [%] Gamma : 1.0
B : VIS0.6
Range : 0～100 [%] Gamma : 1.0

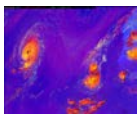


Day Microphysics

R : VIS0.8
Range : 0～100 [%] Gamma : 1.0
G : IR3.9 Solar reflectance component (reverse on SATAID)
Range : 0～60[%] Gamma : 2.5 （summer）
Range : 0～25[%] Gamma : 1.5 （winter）
B : IR10.8 (reverse on SATAID)
Range : 203～323[K] Gamma : 1.0

Day Snow-Fog

R : VIS0.8
Range : 0～100 [%] Gamma : 1.7
G : NIR1.6
Range : 0～70 [%] Gamma : 1.7
B : IR3.9 Solar reflectance component (reverse on SATAID)
Range : 0～30 [%] Gamma : 1.7

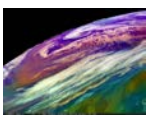


Day Convective Storms (Day Convection)

R : WV6.2-WV7.3
Range : -35～5 [K] Gamma : 1.0
G : IR3.9-IR10.8 (reverse on SATAID)
Range : -5～60 [K] Gamma : 0.5
B : NIR1.6-VIS0.6 (reverse on SATAID)
Range : -75～25 [%] Gamma : 1.0

Dust

R : IR12.0-IR10.8 (default S1 on SATAID)
Range : -4～2 [K] Gamma : 1.0
G : IR10.8-IR8.7 (reverse on SATAID)
Range : 0～15 [K] Gamma : 2.5
B : IR10.8 (reverse on SATAID)
Range : 261～289 [K] Gamma : 1.0



Airmass

R : WV6.2-WV7.3 (reverse on SATAID)
Range : -25～0 [K] Gamma : 1.0
G : IR9.7-IR10.8 (reverse on SATAID)
Range : -40～5 [K] Gamma : 1.0
B : WV6.2
Range : 243～208 [K] Gamma : 1.0

List of multi-spectral bands

Channel	Himawari-8/ -9	MTSAT-1R/-2	MSG	Physical Properties	
1	0.46 µm/B01/V1			vegetation, aerosol B	Visible
2	0.51 µm/B02/V2			vegetation, aerosol G	
3	0.64 µm/B03/VS	0.68 µm	0.635 µm	low cloud, fog R	
4	0.86 µm/B04/N1		0.81 µm	vegetation, aerosol	Near Infrared
5	1.6 µm/B05/N2		1.64 µm	cloud phase	
6	2.3 µm/B06/N3			particle size	
7	3.9 µm/B07/I4	3.7 µm	3.92 µm	low cloud, fog, forest fire	Infrared
8	6.2 µm/B08/WV	6.8 µm	6.25 µm	mid- and upper level moisture	
9	6.9 µm/B09/W1			mid- level moisture	
10	7.3 µm/B10/W3		7.35 µm	mid- and upper level moisture	
11	8.6 µm/B11/MI		8.70 µm	cloud phase, SO2	
12	9.6 µm/B12/O3		9.66 µm	ozone content	
13	10.4 µm/B13/IR	10.8 µm	10.8 µm	cloud imagery, information of cloud top	
14	11.2 µm/B14/L2			cloud imagery, sea surface temperature	
15	12.4 µm/B15/I2	12.0 µm	12.0 µm	cloud imagery, sea surface temperature	
16	13.3 µm/B16/CO		13.4 µm	cloud top height	

Note: List of Himawari-8/ -9 indicates
central wavelengths/ band number/ short name on SATAID