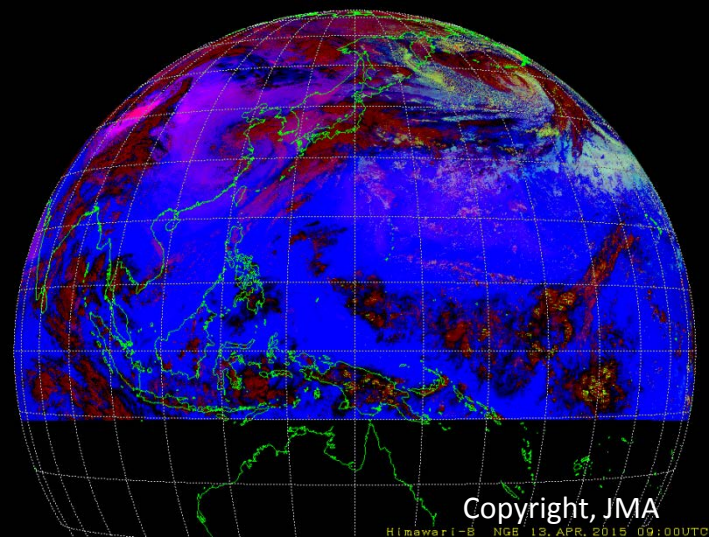
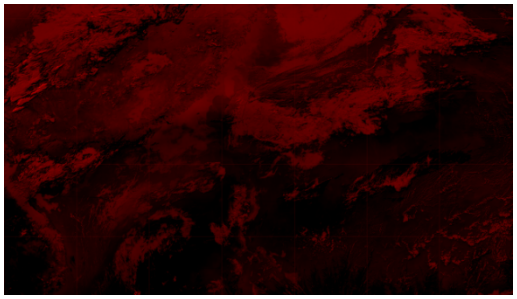


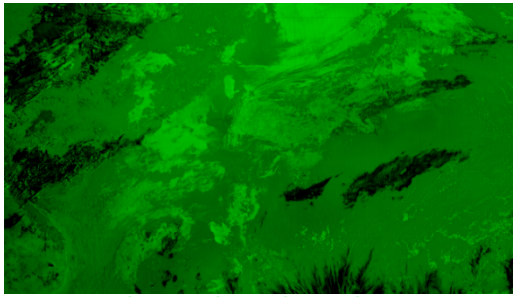
Night Microphysics RGB Nephanalysis in night time

Meteorological Satellite Center, JMA

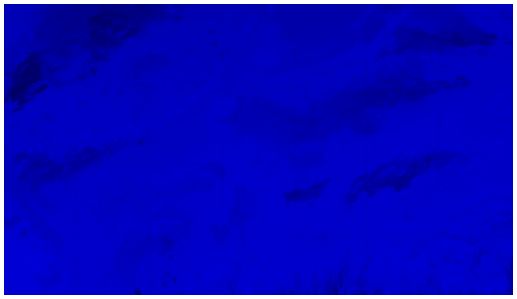
What's Night Microphysics RGB?



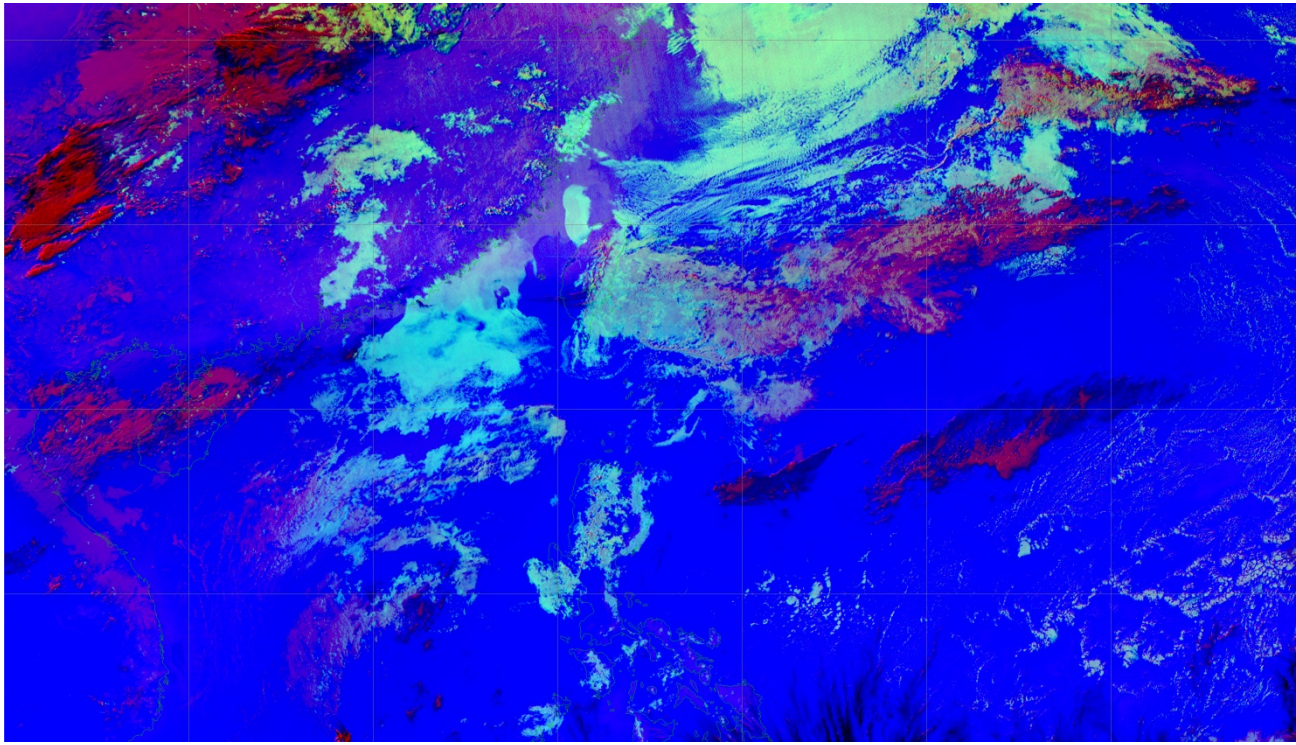
R : B15(I2 12.3)-B13(IR 10.4)
Range : -4～2 [K]　Gamma : 1.0



G : B13(IR 10.4)-B07(I4 3.9)
Range : 0～10 [K]　Gamma : 1.0



B : B13(IR 10.4)（Reverse）
Range : 243～293 [K]　Gamma : 1.0



2015-02-16 10UTC

Components of " Night Microphysics" RGB scheme

Channel	Himawari-8/ -9	MTSAT-1R/-2	MSG	Physical Properties	
1	0.46 μm			vegetation, aerosol B	Visible
2	0.51 μm			vegetation, aerosol G	
3	0.64 μm	0.68 μm	0.635 μm	**low cloud, fog** R	
4	0.86 μm		0.81 μm	**vegetation, aerosol**	Near Infrared
5	1.6 μm		1.64 μm	**cloud phase**	
6	2.3 μm			particle size	
7	3.9 μm	3.7 μm	3.92 μm	low cloud, fog, forest fire	Infrared
8	6.2 μm	6.8 μm	6.25 μm	mid- and upper level moisture	
9	6.9 μm			mid- level moisture	
10	7.3 μm		7.35 μm	mid- and upper level moisture	
11	8.6 μm		8.70 μm	cloud phase, SO2	
12	9.6 μm		9.66 μm	ozone content	
13	10.4 μm	10.8 μm	10.8 μm	cloud imagery, information of cloud top	
14	11.2 μm			cloud imagery, sea surface temperature	
15	12.4 μm	12.0 μm	12.0 μm	cloud imagery, sea surface temperature	
16	13.3 μm		13.4 μm	cloud top height	

This scheme is displayed by compositing two difference images (B15(I2 12.3)-B13(IR 10.4), B13(IR 10.4)-B07(I4 3.9))) and (traditional) infrared channel (B13(IR 10.4)).

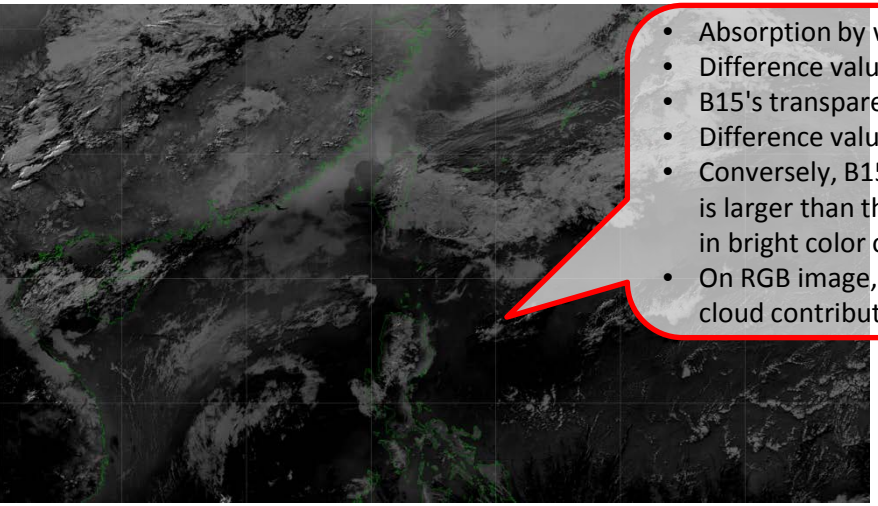
This scheme is available for previous meteorological satellite, MTSAT series.

This RGB is effective to distinguish clouds with high cloud top (such as Cb) and fog or low-level clouds because the difference of 3.9 micron is included in this scheme.

A set of RGB "Night Microphysics" scheme
(RGB: B15-B13 /B13-B07/B13)

R : B15(I2 12.3)-B13(IR 10.4)
Range: -4～2 [K] Gamma : 1.0
G : B13(IR 10.4)-B07(I4 3.9)
Range : 0～10 [K] Gamma : 1.0
B : B13(IR 10.4)
Range : 243～293 [K] Gamma : 1.0

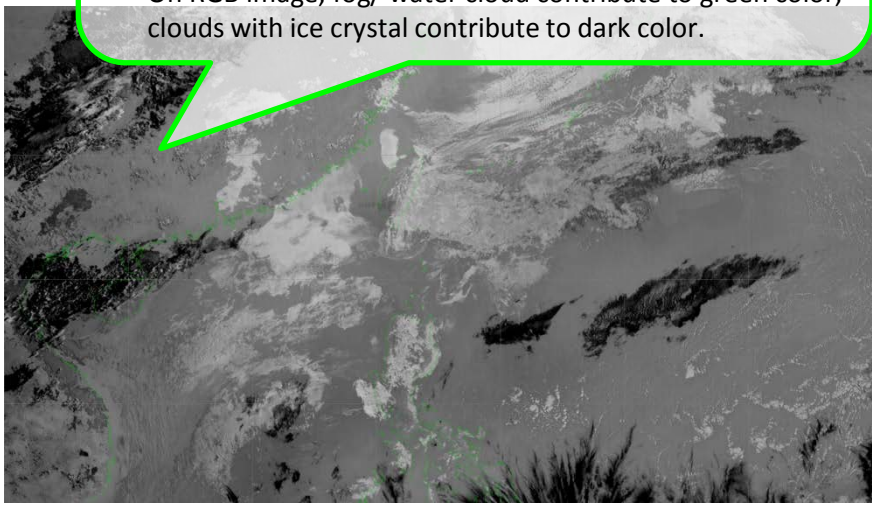
Characteristics and Basis of Three Components



- Absorption by water vapor of B15 is slightly larger than that of B13.
- Difference value for low-level cloud is almost zero, it appears in gray color on the image.
- B15's transparency through high-level cloud consisting of ice crystals is smaller than that of B13.
- Difference value for high-level cloud is positive, it appears in black color on the image.
- Conversely, B15's transparency through volcanic ash or yellow sand (Asian dust) containing silicon is larger than that of B13. Difference value for volcanic ash or yellow sand is negative, it appears in bright color on the image.
- On RGB image, thick cloud and low-level cloud contribute to rather dark red color, high-level cloud contributes black color, and volcanic ash and yellow sand contribute to red color.

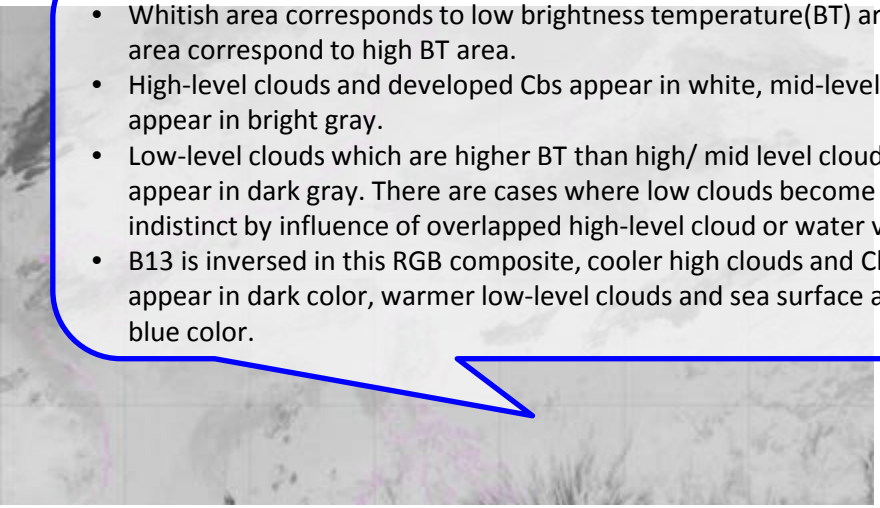
R : B15(I2 12.3)-B13(IR 10.4) Range : -4～2 [K] Gamma : 1.0

- Available for night time
- Brightness temperature of B07 is observed lower for fog or water clouds, while they appear in white color in the difference image.
- Clouds with ice crystals appear in darker color.
- On RGB image, fog/ water cloud contribute to green color, clouds with ice crystal contribute to dark color.



G : B13(IR 10.4)-B07(I4 3.9) Range : 0～10 [K] Gamma : 1.0

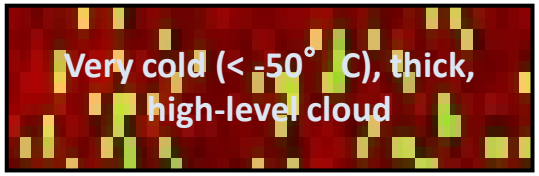
- Atmospheric window band, available for 24 hours.
- Whitish area corresponds to low brightness temperature(BT) area, dark area correspond to high BT area.
- High-level clouds and developed Cbs appear in white, mid-level clouds appear in bright gray.
- Low-level clouds which are higher BT than high/ mid level clouds appear in dark gray. There are cases where low clouds become indistinct by influence of overlapped high-level cloud or water vapor .
- B13 is inversed in this RGB composite, cooler high clouds and Cbs appear in dark color, warmer low-level clouds and sea surface appear in blue color.



B : B13(IR 10.4) Range : 243～293 [K] Gamma : 1.0

Interpretation of Colors for "Night Microphysics"

Cold, thick, high-level cloud



Thin Cirrus cloud

Thick, mid-level cloud

Thin, mid-level cloud

Low-level cloud
(high latitudes)

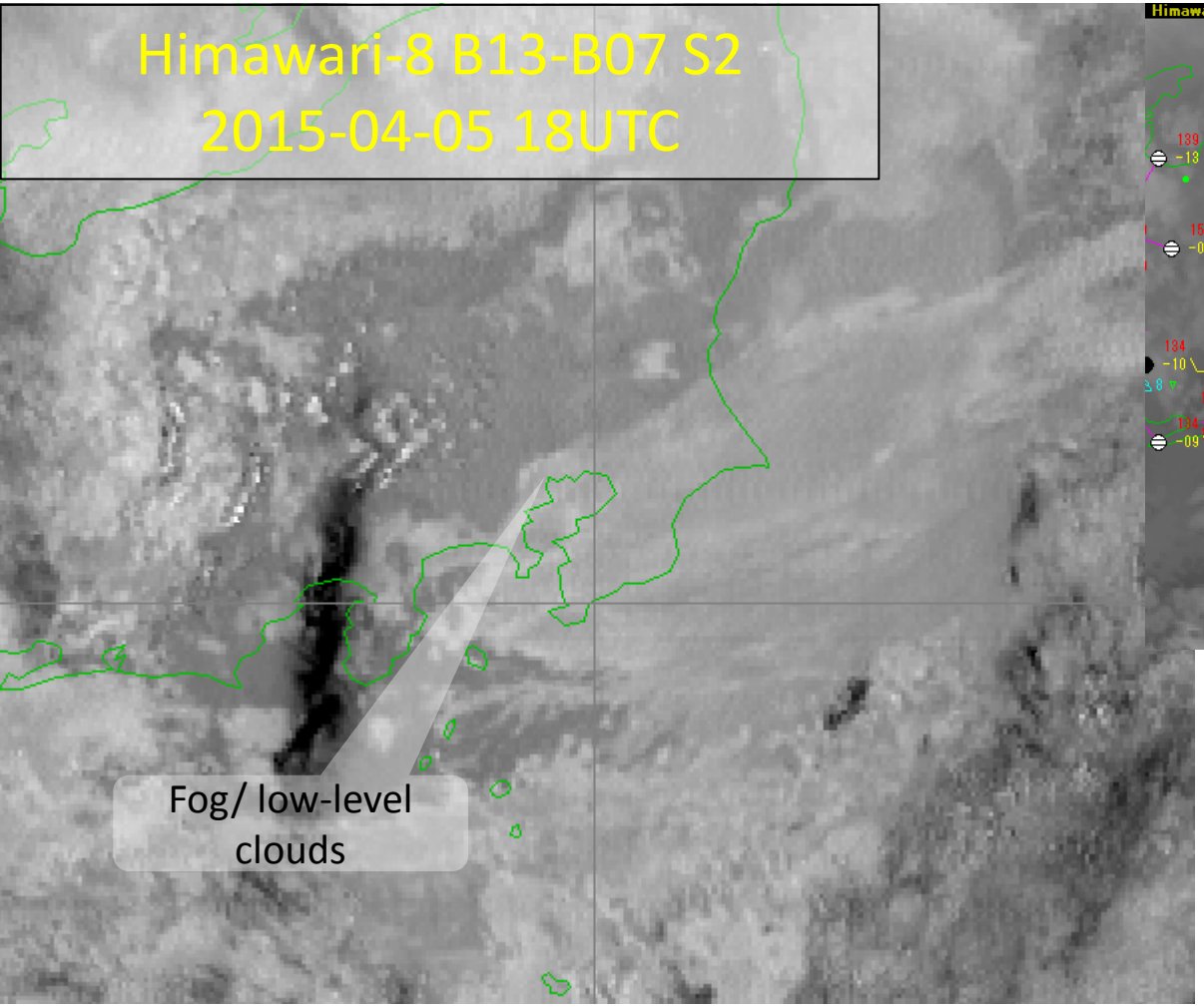
Low-level cloud
(low latitudes)

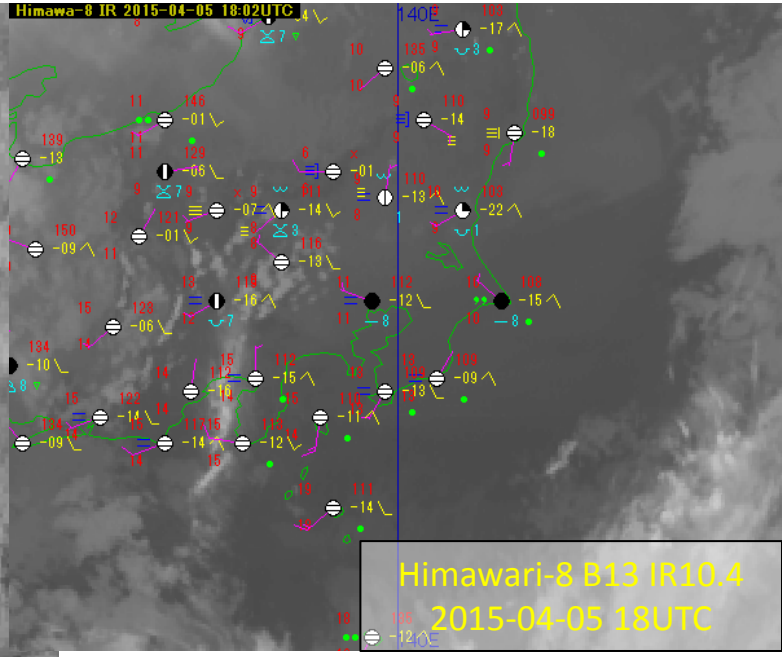
Ocean | Land

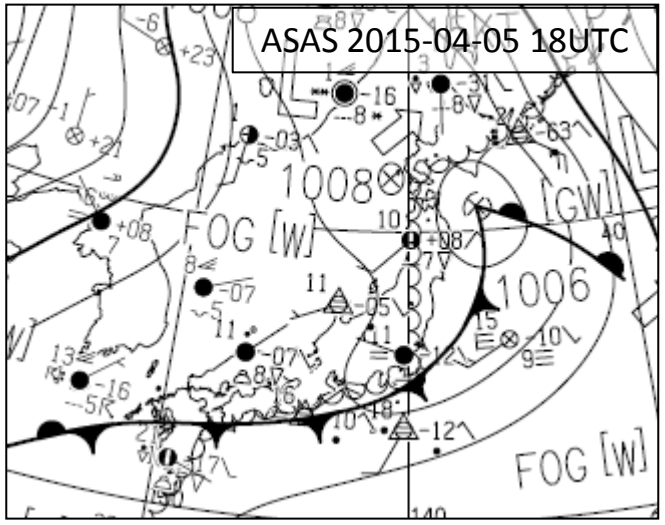
Note: Based on SEVIRI/EUMETSAT interpretation

Example of Night Microphysics RGB

Fog/ low-level clouds after the rainfall in Kanto Plain, Japan



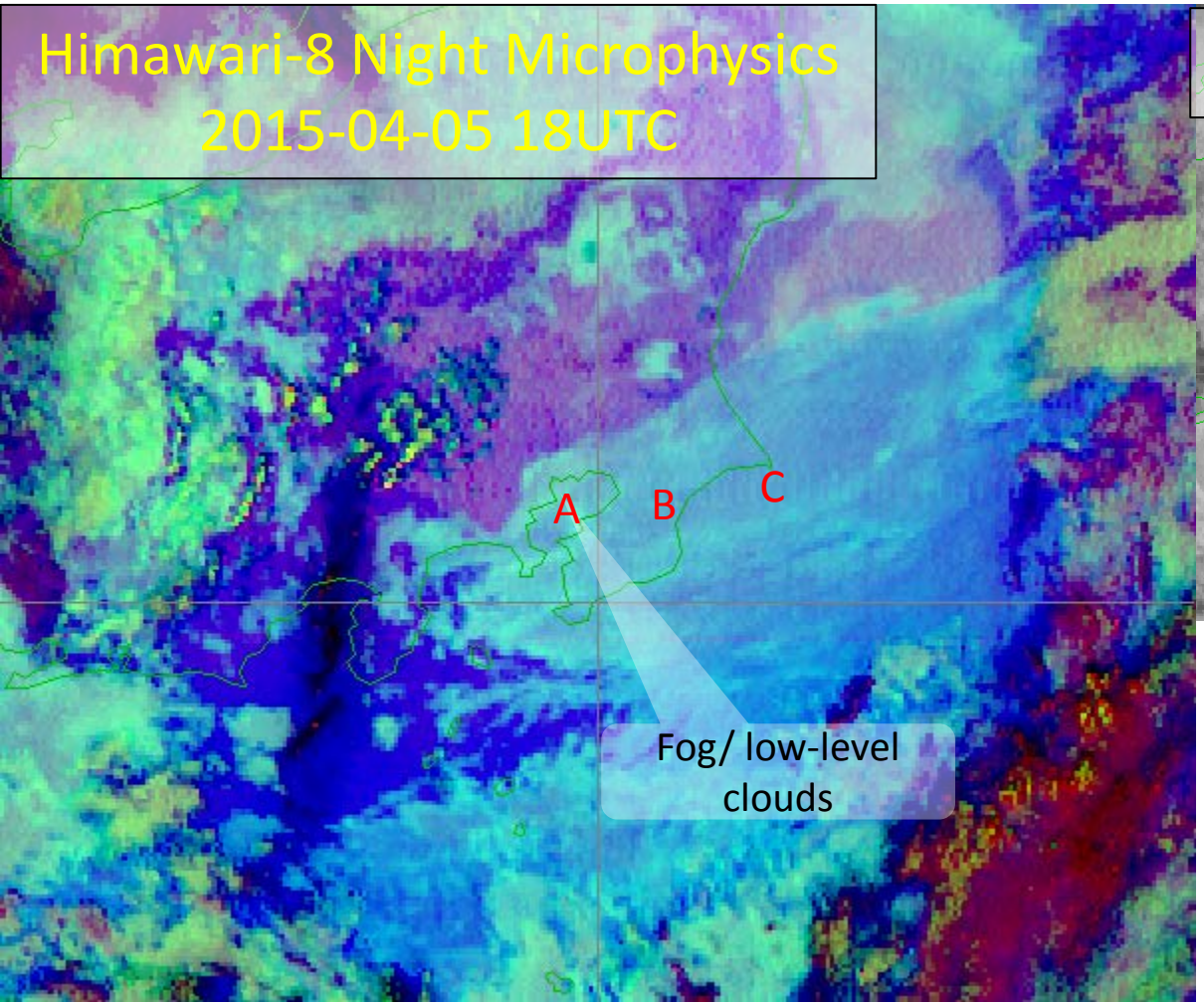


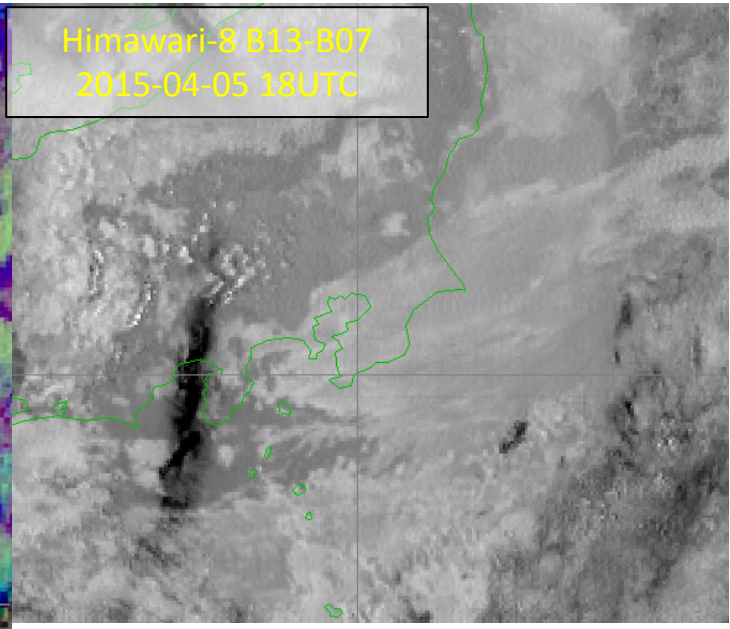


(Upper image) Smooth, whitish area correspond to fog or low-clouds in B07(I4 3.9) image.
(Upper right image) B13(IR 10.4) image overlapped ground observations. The fog was observed at some stations.
The fog or low-clouds are not distinct in B13(IR 10.4) image.

Example of Night Microphysics RGB

Fog/ low-level clouds after the rainfall in Kanto Plain, Japan





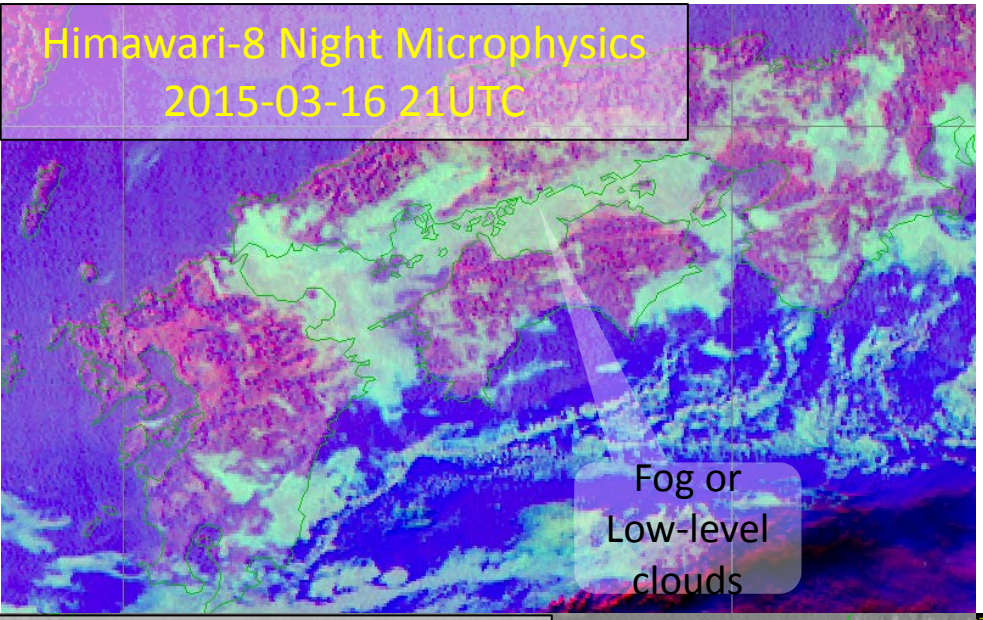
Low-level cloud (high latitudes)

Low-level cloud (low latitudes)

Smooth, greenish white area corresponds to fog or low-level clouds extended to Tokyo Bay(A), Bo-so Peninsula(B) and Pacific Ocean(C).

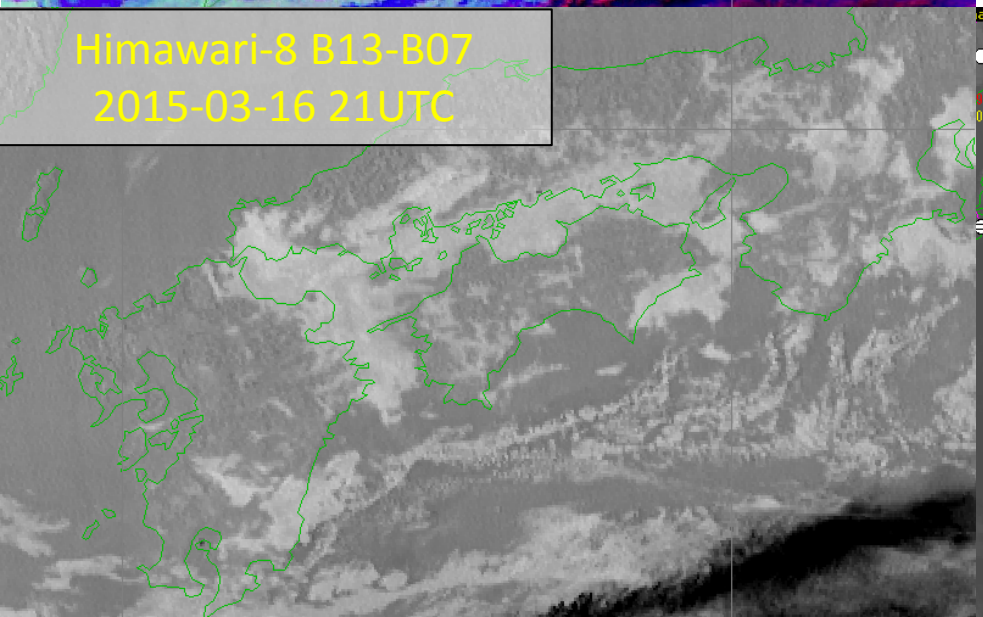
Example of Night Microphysics RGB

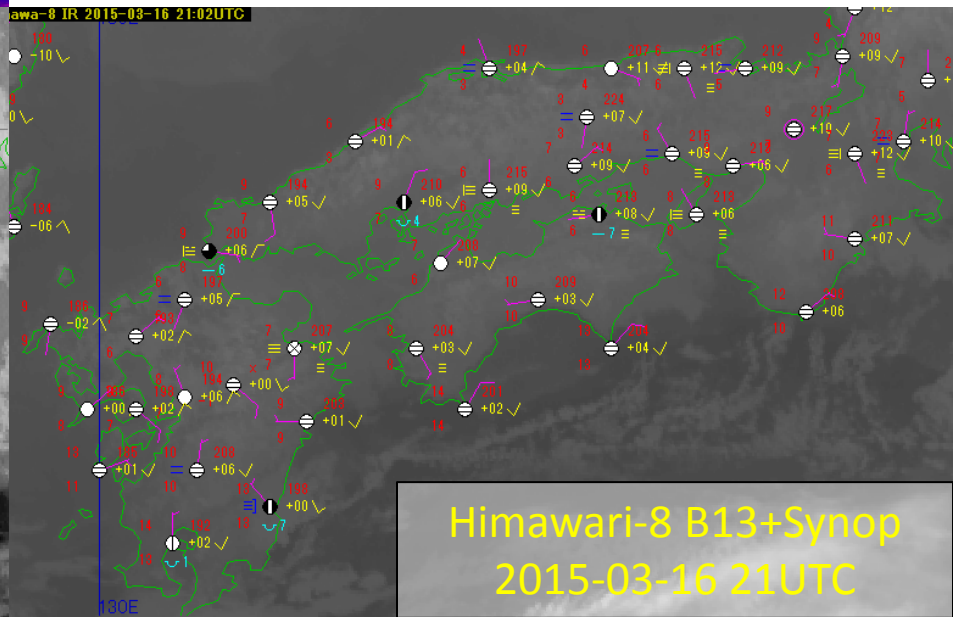
Fog/Low-level Clouds of “Setonai-kai (Inland Sea of Japan)”



(Lower right) Fog/ low-level clouds were observed at some stations (around red oval). However, fog/ low-level clouds are not clear in the IR image.

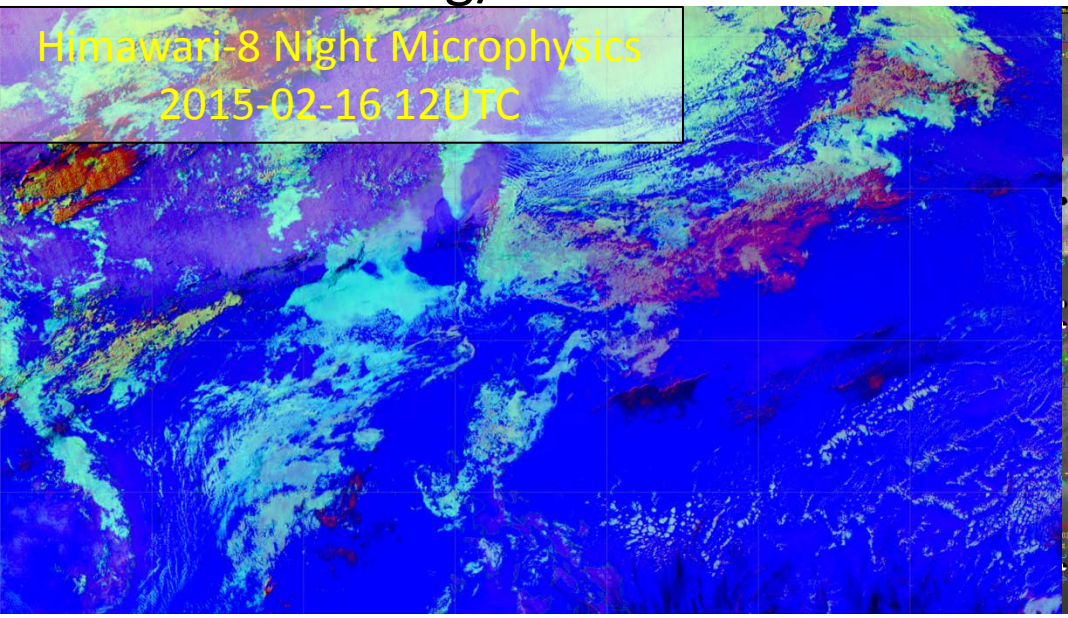
(Upper and lower left) Smooth, greenish white areas in Day Microphysics RGB correspond to whitish fog/ low-level clouds in B13-B07 differential image.

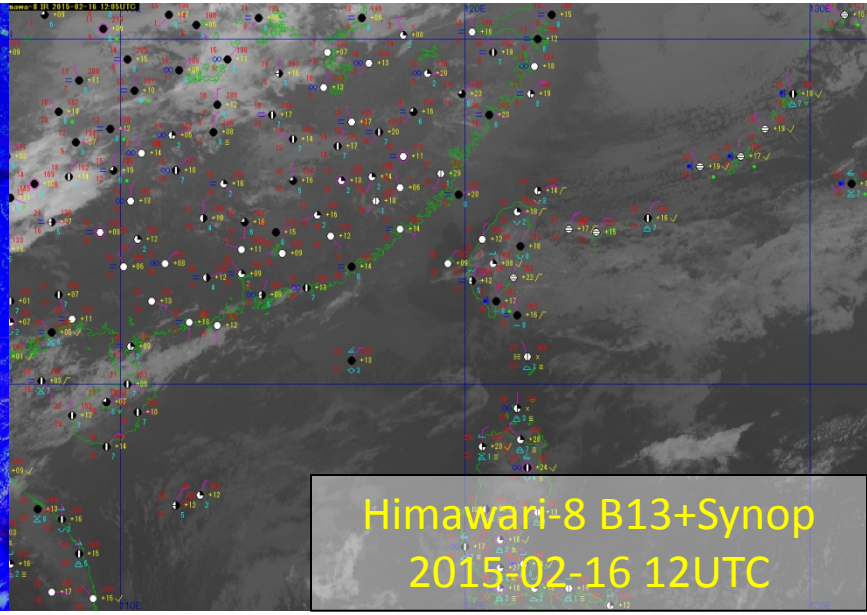


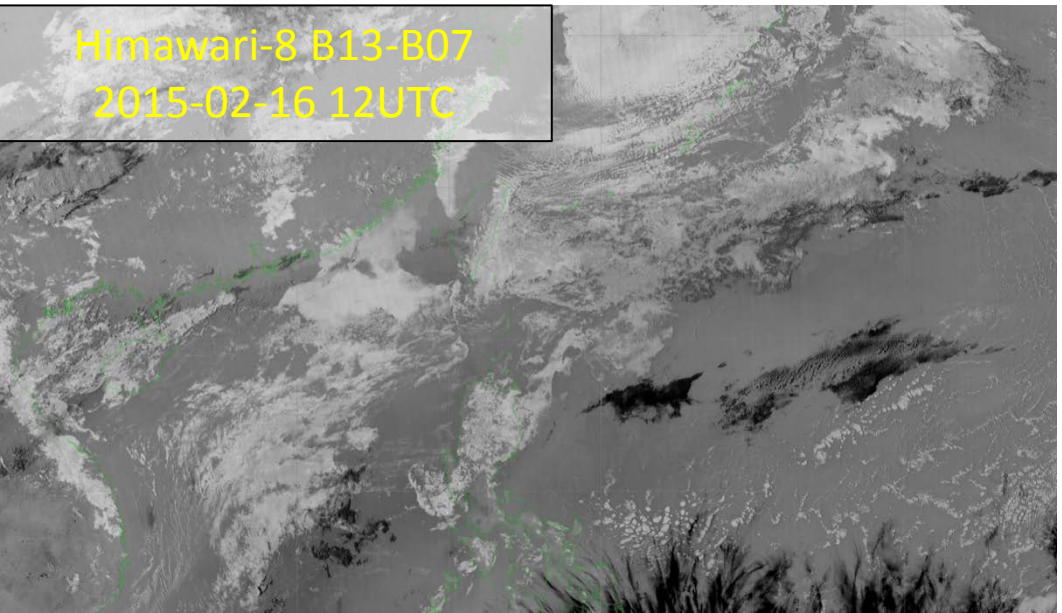


Example of Night Microphysics RGB

Fog/ low-level clouds around South China Sea





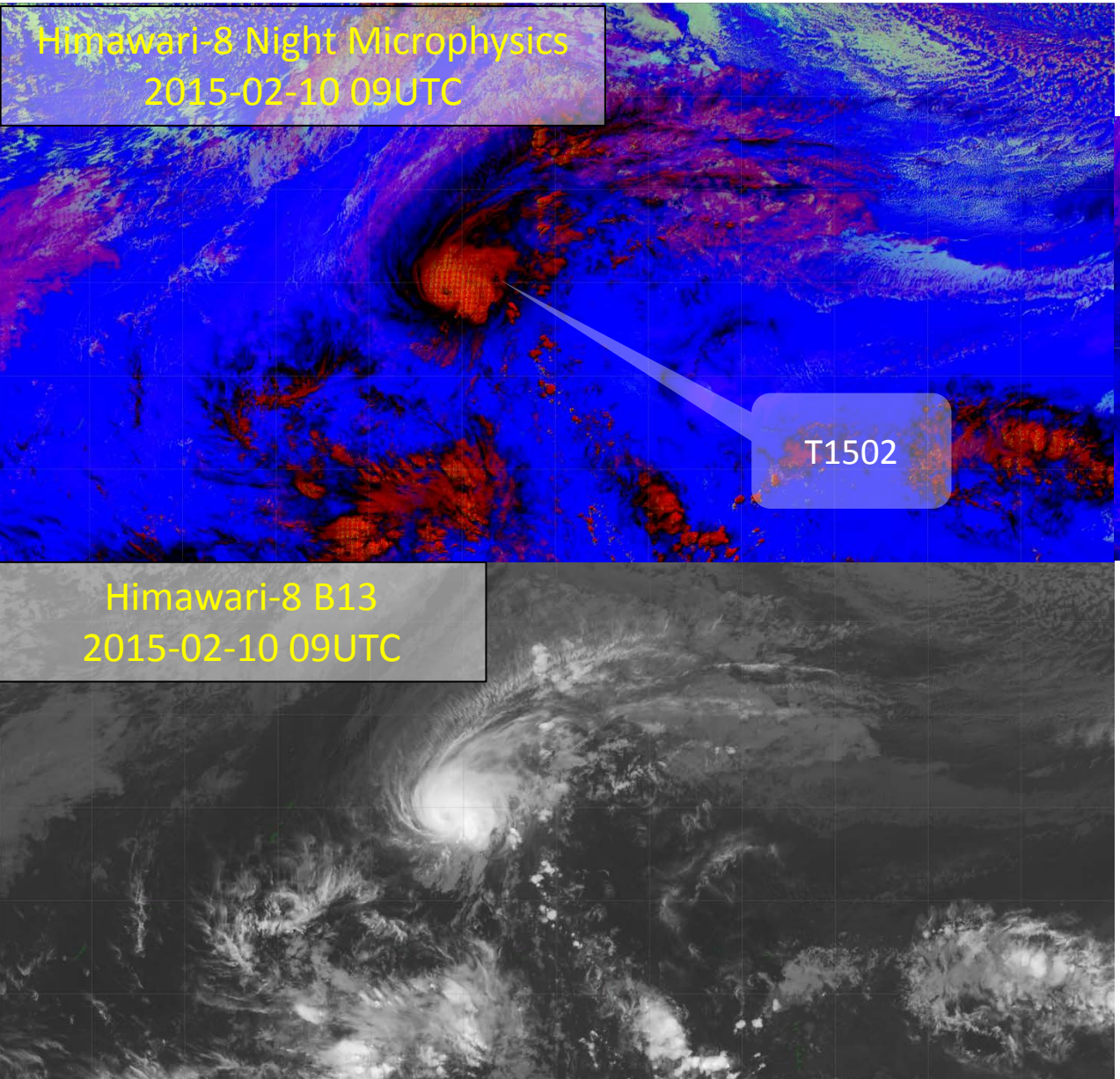


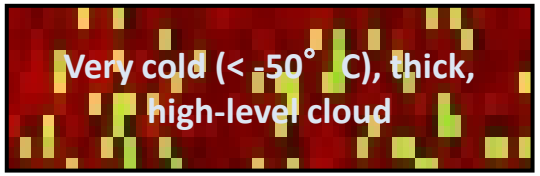
(Upper right) Many stations observed fog around South China Sea.

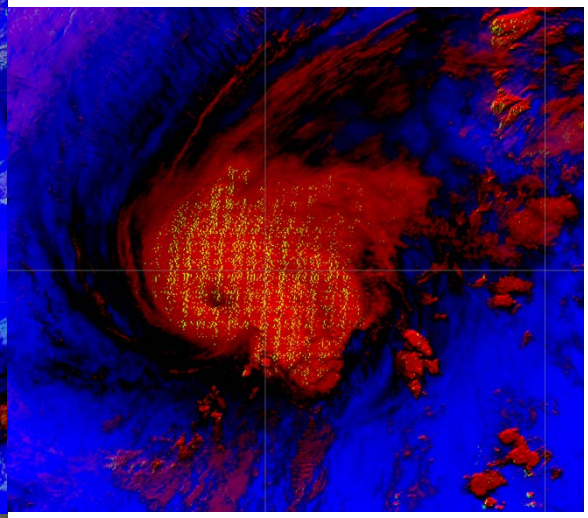
(Upper and lower left) Smooth, greenish white area corresponds to fog or low-level clouds.
It corresponds to whitish area in B13-B07 differential image.
Mid-level clouds are not clear in the RGB image.

Example of Night Microphysics RGB

ITCZ and Typhoon







(Upper left and right) In the RGB images, it is easy to distinguish thick clouds (red) of typhoon and Cbs from high-level clouds (blackish color). Very cold, thick, developed cloud appears as yellow dotted area in reddish thick cloud.

(Lower left) Infrared image (B13 10.4) for comparison.

Night Microphysics RGB
Nephanalysis in night time
(summary)

This RGB scheme is …

- effective for low cloud distinction in night time (especially St/Fog)
- effective for thick Cb cloud distinction in night time
- available for previous meteorological satellite, MTSAT series
- viewable by SATAID