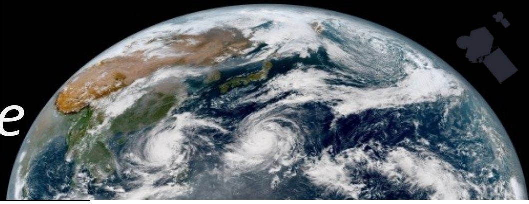


Technical Interchange Teleconference between NOAA, BOM and JMA

Himawari RGB Quick Guides and examining RGBs containing near-infrared imagery

- heading towards more effective use of RGB composite imagery -

Meteorological Satellite Center

Japan Meteorological Agency

Akihiro SHIMIZU

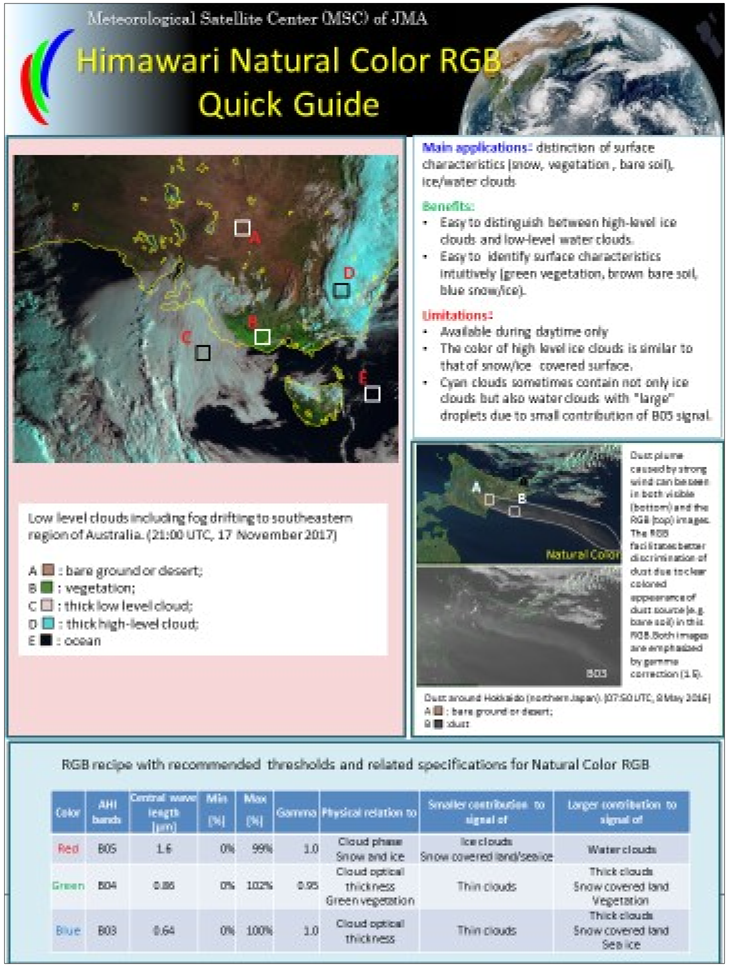
Contents

- Himawari RGB Quick Guides
  - ✓Quick guide features
  - ✓Background
  - ✓Future plan
- Examining RGBs containing near-infrared imagery

  \- based on Himawari RGB Quick Guide contents -

  - ✓Fire Temperature RGB
  - ✓Cloud Phase Distinction RGB
- Summary

Himawari RGB Quick Guides



Meteorological Satellite Center (MSC) of JMA

Himawari Natural Color RGB Quick Guide

Low level clouds including fog drifting to southeastern region of Australia. (21:00 UTC, 17 November 2017)

A : bare ground or desert;
B : vegetation;
C : thick low level cloud;
D : thick high-level cloud;
E : ocean

Main applications: distinction of surface characteristics (snow, vegetation , bare soil), ice/water clouds

Benefits:

- Easy to distinguish between high-level ice clouds and low-level water clouds.
- Easy to identify surface characteristics intuitively (green vegetation, brown bare soil, blue snow/ice).

Limitations:

- Available during daytime only
- The color of high level ice clouds is similar to that of snow/ice covered surface.
- Cyan clouds sometimes contain not only ice clouds but also water clouds with "large" droplets due to small contribution of B05 signal.

Dust plume caused by strong wind can be seen in both visible (bottom) and the RGB (top) images. The RGB facilitates better discrimination of dust due to clear colored appearance of dust source (e.g. bare soil) in this RGB. Both images are emphasized by gamma correction (1.5).

Dust around Hokkaido (northern Japan). (07:50 UTC, 8 May 2016)
A : bare ground or desert;
B : dust

RGB recipe with recommended thresholds and related specifications for Natural Color RGB

Color	AHI bands	Central wave length [μm]	Min [%]	Max [%]	Gamma	Physical relation to	Smaller contribution to signal of	Larger contribution to signal of
Red	B05	1.6	0%	99%	1.0	Cloud phase Snow and ice	Ice clouds Snow covered land/sea ice	Water clouds
Green	B04	0.86	0%	102%	0.95	Cloud optical thickness Green vegetation	Thin clouds	Thick clouds Snow covered land Vegetation
Blue	B03	0.64	0%	100%	1.0	Cloud optical thickness	Thin clouds	Thick clouds Snow covered land Sea ice

Quick Guide features
What is RGB Quick Guide?

- Simple material which summarizes how to use respective RGB composite imagery.
- Quick Guides are composed of a pair of surface and reverse side (two-slides), therefore you can use them by inserting printed Quick Guides in plastic clear file folders.
- The essential contents allow users to easily use in daily shift work.
- The contents are as follows.
  - ✓Main application(s), benefits and limitations
  - ✓Typical cases
  - ✓Color interpretation
  - ✓RGB recipe (combinations of imagery assigned to the three primary colors with recommended thresholds) and related specifications
- Himawari Quick Guides for RGB composites which are available on SATAID software (18 types) are in preparation.

Appearance and structure of RGB Quick Guide

Surface

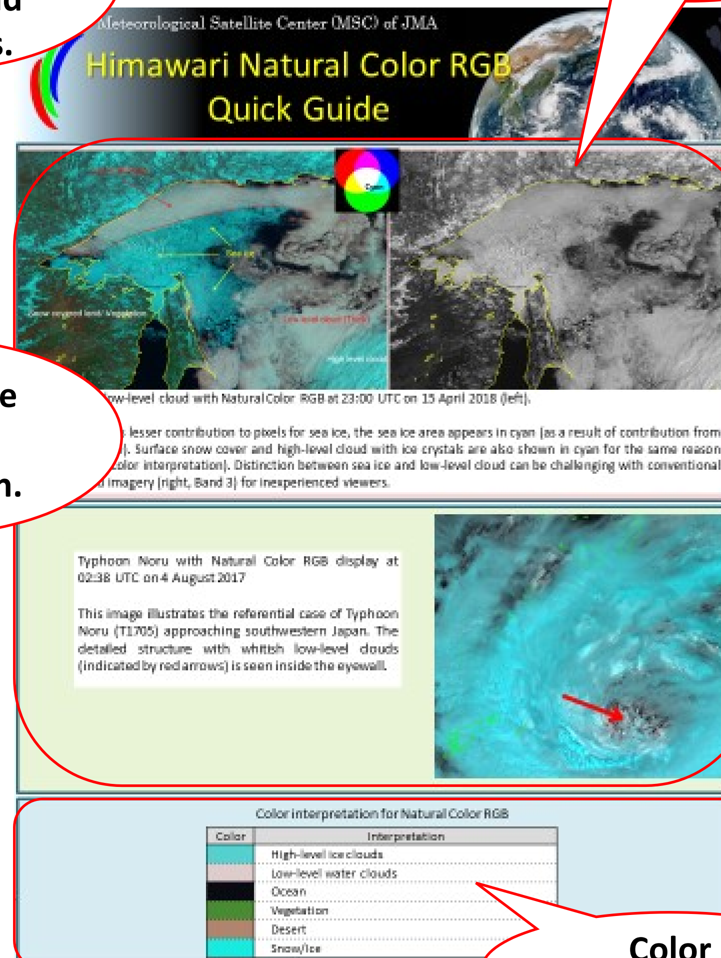
Typical case and its explanation.

Main application(s), benefits and limitations.

Typical case and its explanation.

RGB recipe with recommended thresholds and related specifications.

Reverse

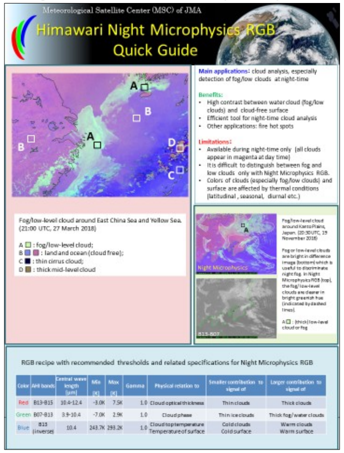


Typical cases and their explanations.

Color interpretation.

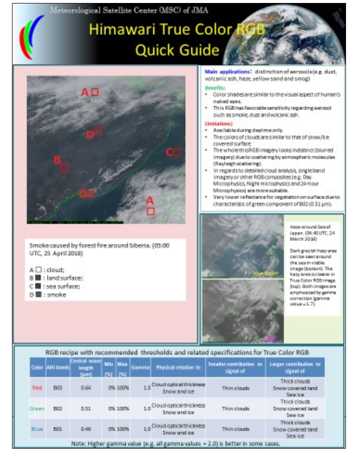
Himawari RGB Quick Guides for WMO Standard RGBs

Night Microphysics

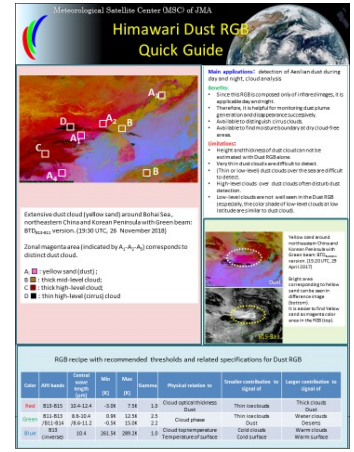


Natural Colors

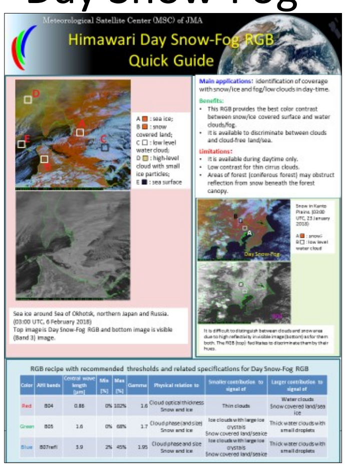
True Color



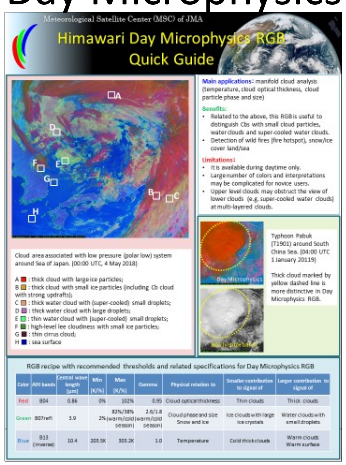
Dust



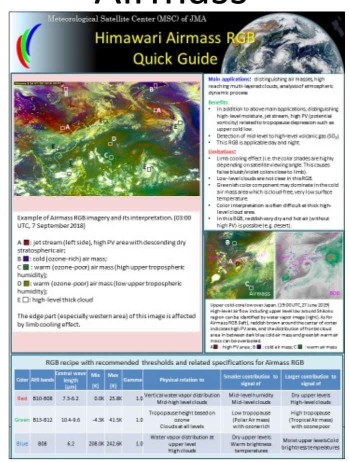
Day Snow-Fog



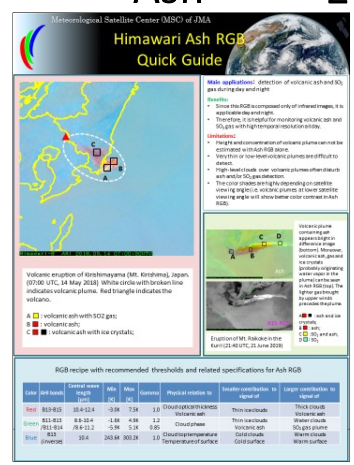
Day Microphysics



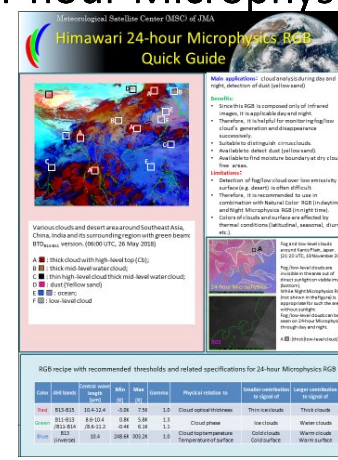
Airmass



Ash

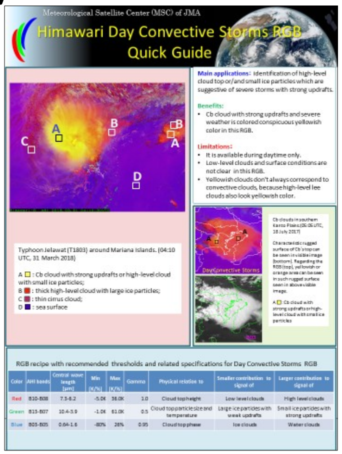


24-hour Microphysics

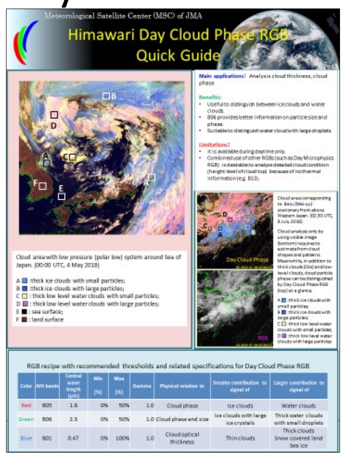


Himawari RGB Quick Guides for well-known RGBs and polar-orbit satellites origin RGBs

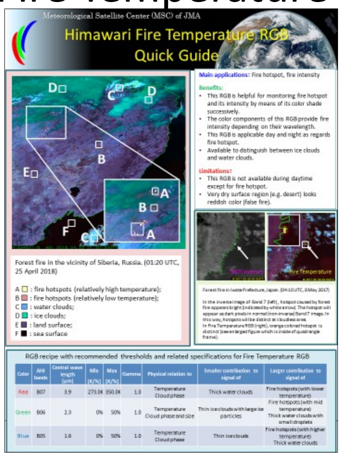
Day Convective Storms



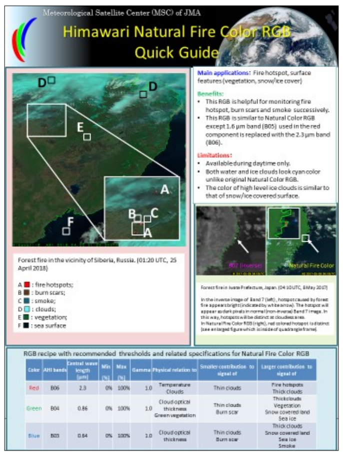
Day Cloud Phase



Fire Temperature

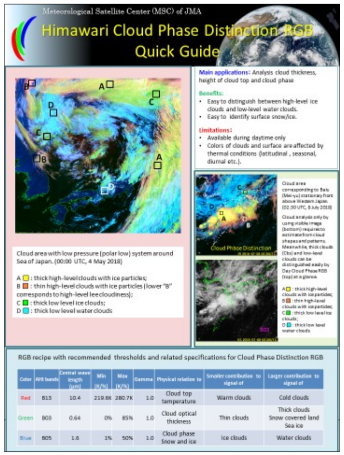


Natural Fire Color

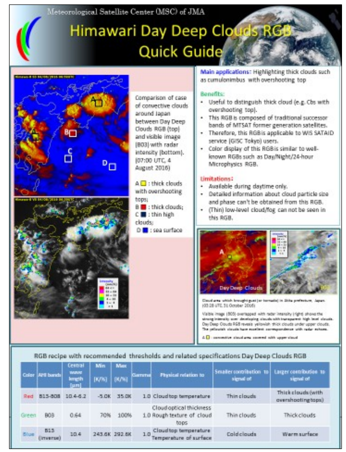


Himawari RGB Quick Guides for RGBs developed by JMA

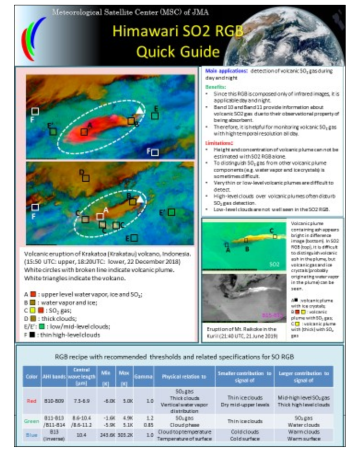
Cloud Phase Distinction



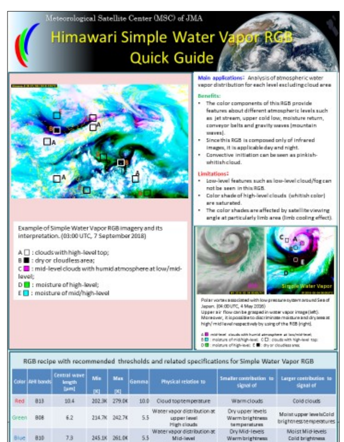
Day Deep Clouds



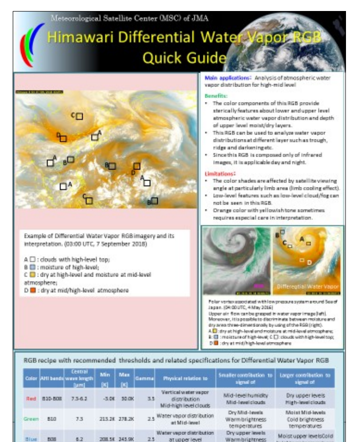
SO2



Simple Water Vapor



Differential Water Vapor



Back ground

- Use of RGB composite imagery has become widespread among Himawari image users.
- There were requests from users to make simple, quick-look materials (including color interpretations and AHI band characteristics).
- Other meteorological satellite training centers such as EUMeTrain and SPoRT (NOAA/NASA) have been already providing very useful “RGB Quick Guides”.
- The Japanese language version have been created for JMA’s related staffs beforehand.
- The contents are based on JMA’s “Meteorological Satellite Center Technical Note” written by A. Shimizu (the report will be available on the website in near future.) and existing Quick Guides of EUMeTrain and SPoRT.

Reference: RGB Quick Guide by EUMeTrain

RGB Quick Guides for Meteosat (MSG) users.
Good references for making Himawari version.

http://eumetrain.org/rgb_quick_guides/index.html

Reference: Natural Colour RGB Quick Guide by EUMeTrain

EUMETRAIN

SEVIRI Natural Colour RGB Quick Guide

Primary aim: Display **surface characteristics** (e.g. snow/vegetation/bare soil). Similar to a True Colour image except for ice, ice clouds and snow.
Secondary aim: Distinguishing **ice from water phase** (water clouds from ice clouds or from cloud-free snow).
Time period and area of its main application: Daytime, throughout the year. Restrictions during winter for higher latitudes.
Guidelines: The Natural Colour RGB is tuned to provide a satellite image which provides **surface vegetation information** and which resembles a colour photograph of the Earth. The three daylight channels provide similar colours to a True Colour image of the Earth, except for ice crystals (ice clouds, snow and ice) which are depicted in cyan. This RGB is sensitive to photosynthetically active vegetation while deserts, bare soils and dry vegetation show in a different colour.
Snow on the ground can be distinguished from ice clouds, not so much by its hue than by its structure.

SEVIRI Natural Colour RGB, 15 July 2016, 12:00 UTC

Background

The table below lists the channels used in the Natural Colour RGB. The SEVIRI channel (VIS0.6) scans the Earth in the orange visible spectrum. As this channel is the one nearest to the blue spectrum it is used for the blue colour beam of the Natural Colour RGB. The green colour beam (VIS0.8) is already in the IR spectrum and, therefore, not visible to the human eye. However, plants strongly reflect solar radiation at this wavelength when they are photosynthetically active (see example above). The NIR1.6 channel used for the red colour beam is primarily sensitive to the ice and water phase of clouds. At 1.6 µm, **ice clouds** usually have a low reflectivity (~30%), while **water clouds** strongly reflect (~60-70%) the incoming radiation. Therefore, ice clouds are usually darker than water clouds in the NIR1.6 image. Additionally, there is a less pronounced dependency upon cloud particle size at 1.6 µm. Ice clouds with very small ice crystals may be as bright as water clouds, and water clouds with very large droplets may be as dark as ice clouds.

Colour	Channel [µm]	Physically relates to	Smaller contribution to the signal of	Larger contribution to the signal of
Red	NIR1.6	Cloud phase Snow cover	Ice clouds Snow covered land/sea ice	Water clouds
Green	VIS0.8	Cloud optical thickness Green vegetation	Thin clouds	Thick clouds Snow covered land Vegetation
Blue	VIS0.6	Cloud optical thickness Green vegetation	Thin clouds Vegetation	Thick clouds Snow covered land Sea ice

Notation: NIR: near-infrared, VIS: visible; channel number: central wavelength of the channel in micrometer.

Benefits

- Easy to interpret because most of the colours of the image are very similar to a True Colour image of the Earth.
- Reflects surface characteristics like vegetation, rocky soils and deserts.
- Ice clouds can be distinguished from water clouds.
- Snow on the ground, as well as frozen sea ice, can be detected.
- There is a high colour contrast between snow and fog/water clouds.

Limitations

- Available during the day only.
- Pixel colour fades during dawn/dusk when the sun angle is low.
- Not applicable for higher latitudes during winter season.
- Snow-covered land might have similar colour as high clouds with large ice crystals.
- Very small ice crystals in cirrus clouds appear whitish instead of cyan.
- The cyan colour as indication for ice phase clouds can be misleading in the case of large water droplets. The latter absorb shortwave solar radiation at 1.6 µm the same way small ice crystals do.
- Thin cirrus clouds are not seen in the Natural Colour RGB.

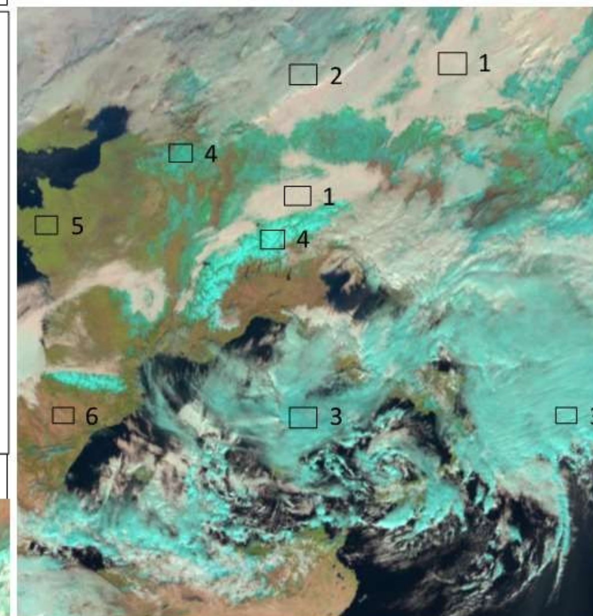
EUMETRAIN

SEVIRI Natural Colour RGB Quick Guide

Colour Interpretation

1	Water clouds (fog or stratus)
2	Mixed phase clouds or clouds with a cirrus veil on top
3	Thick ice clouds with large ice crystals in higher levels
4	Snow and ice on the ground
5	Ground covered by photo-synthetically active vegetation
6	Sandy deserts, bare soils or arid vegetation
7	Sea ice not covered by snow
8	Oceans and lakes.

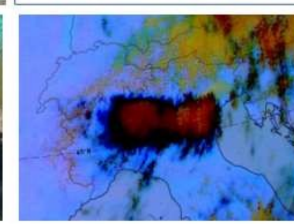
SEVIRI Natural Colour RGB, 18 January 2017, 12:00 UTC



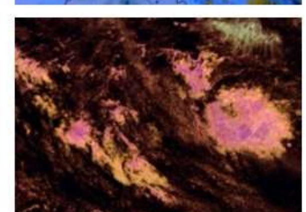
Natural Colour RGB, 17 February 2017, 12:00 UTC

Sea ice and snow covered land (item 4 and 7) can vary in the colour shade depending on the compactness of sea ice and of the snow cover on the ground. Extended snow fields on mountain tops will show brighter cyan colour than snow cover in urban areas or forests.

Limitations



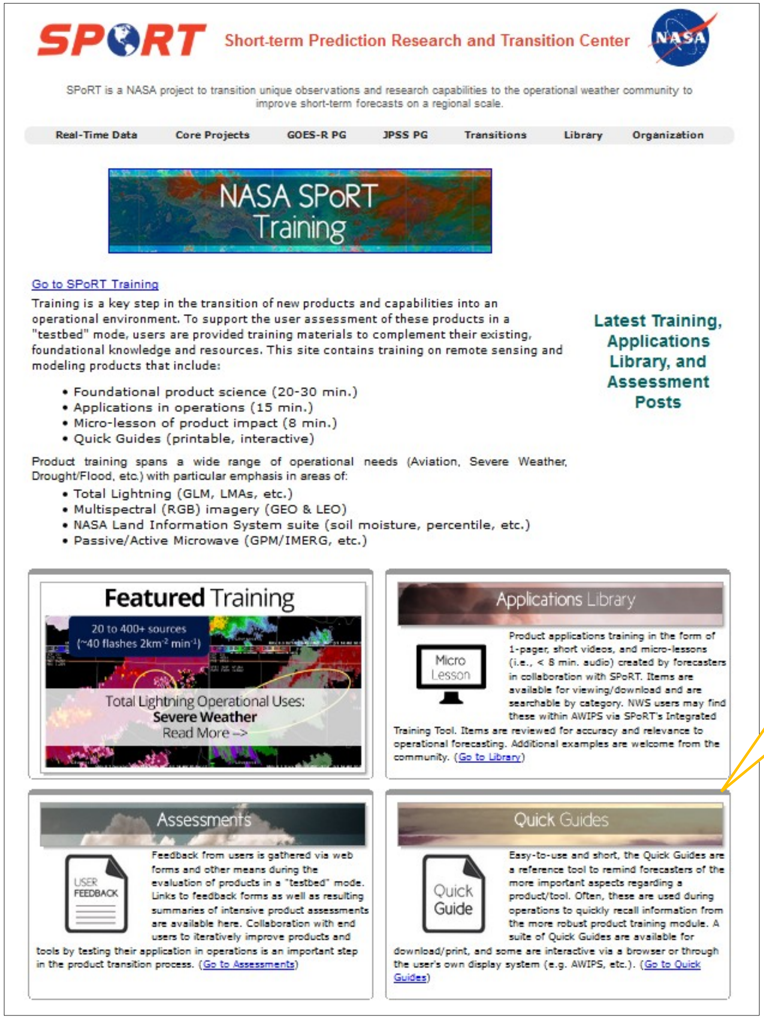
In the case of **very small ice particles** (e.g. orographic clouds) as shown in the left image over northern Italy on 7 April 2017 at 12:00 UTC, the colour of the ice cloud becomes whitish. The **Dust RGB** (right image) of the same date shows a compact ice cloud.



If water droplets reach bigger sizes, the Natural Colour RGB will depict them in cyan hues as shown in this example over the Tropical Sea (left image).
A comparison to the **Cloud Phase RGB** (right image) shows that most clouds are water clouds (magenta to yellow), and only the cloud in the upper right image corner is an ice cloud.

More about RGBs on eumetrain.org

Reference: RGB Quick Guide by NASA SPoRT



RGB Quick Guides for GOES users. Some Himawari versions are also available!

https://nasasporttraining.wordpress.com/quick-guides/

Reference: Day Snow-Fog RGB Quick Guide by SPoRT

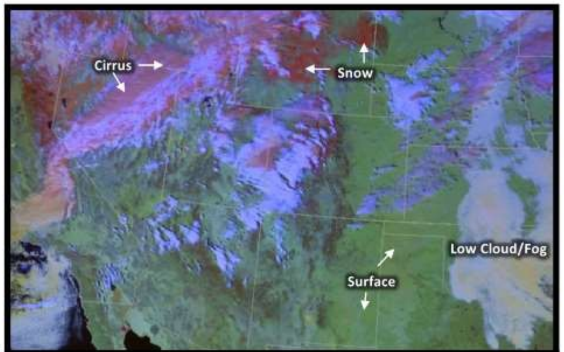
Day Snow-Fog RGB

*interpretation still under investigation

Quick Guide

Why is the Day Snow-Fog RGB Important?

On heritage GOES, it was difficult to distinguish white "reflective" snow from white "reflective" clouds on visible imagery. On the GOES-R series, the reflectance of snow, water, and ice clouds varies across the visible, near infrared, and infrared. The channels which bring out the distinguishing differences are combined in the Day Snow-Fog RGB to show greater contrast between snow and cloud than is generally possible with a single channel.



Day Snow-Fog RGB from GOES-16 ABI at 1735 UTC, 04 January 2018

Day Snow-Fog RGB Recipe

Color	Band / Band Diff. (µm)	Min to Max Gamma	Physically Relates to...	Small contribution to pixel indicates...	Large Contribution to pixel indicates...
Red	0.86 (Ch. 3)	0 to 100 % albedo 1.7	Reflectance of clouds and surfaces	Water, thin cirrus	Thick clouds, snow, sea ice
Green	1.6 (Ch. 5)	0 to 70 % albedo 1.7	Reflectance of clouds and surfaces	Water, snow	Vegetated land, thick water clouds
Blue	3.9 - 10.3 (Ch. 7 – Ch. 13)	0 to 30 °C 1.7	Proxy for 3.9 µm reflected solar radiance	Water, snow	Thick clouds

Impact on Operations

Primary Application

Distinguish snow and clear ground from clouds: The Near IR 1.6 and IR 3.9 wavelengths are useful for distinguishing non-reflective (dark) snow from reflective (bright) low-level water cloud. Low level cloud layers can be distinguished when thin middle or upper level clouds are present, particularly in an animation.

Cloud phase: Provides information on water versus ice cloud phase.

Limitations

Daytime only application: The 0.86 µm, 1.6 µm, and 3.9 µm bands detect reflected visible solar radiation.

Solar angle: Low solar angles at sunrise and sunset change the color interpretation, as well as limited application for high latitudes during winter.

Cirrus clouds: Limited ability to detect thin cirrus clouds due to low contrast with background features. This can be mitigated somewhat by animation.

Coniferous forest: Areas of coniferous forest mask snow signature beneath the canopy.

Channel difference for blue component: The temperature difference does not capture the reflected solar component as intended by JMA or EUMETSAT, but is an adequate proxy.

Contributors: Bernie Connell, Erin Dagg CSU/CIRA https://www.cira.colostate.edu/

Day Snow-Fog RGB

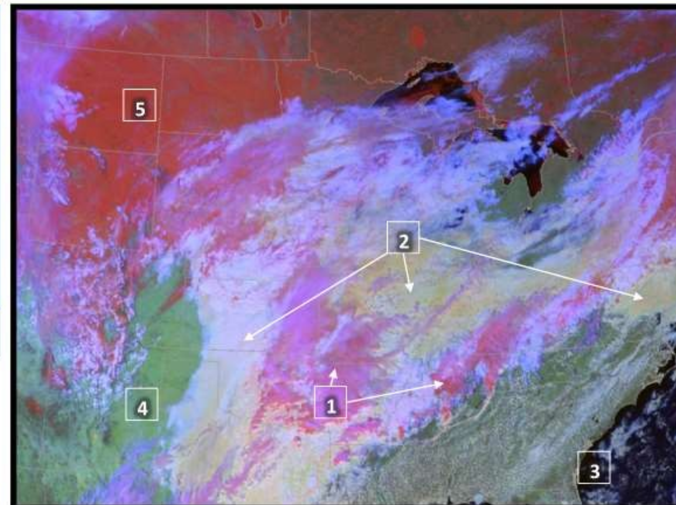
*interpretation still under investigation

Quick Guide

RGB Interpretation

1. Ice clouds, cirrus *(shades of pink)*
2. Water clouds, fog *(shades of yellow)*
3. Ocean *(black)*
4. Vegetation *(green)*
5. Snow *(red-orange)*

Note: colors may vary diurnally, seasonally, and latitudinally

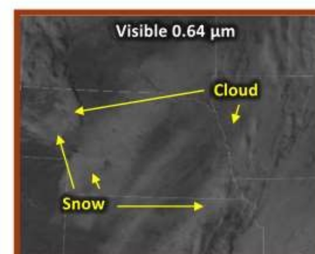


Day Snow-Fog RGB from GOES-16 ABI at 1922 UTC, 20 December 2017.

RGB Color Guide

Comparison to visible imagery:

The colors of the Day Snow-Fog RGB make it easier to distinguish between low clouds and snow/ice compared to visible imagery, as seen in the images from 11 January 2018 (below). It also provides better identification of the thickness of low-level clouds.



Resources

JMA*
Day Snow-Fog RGB

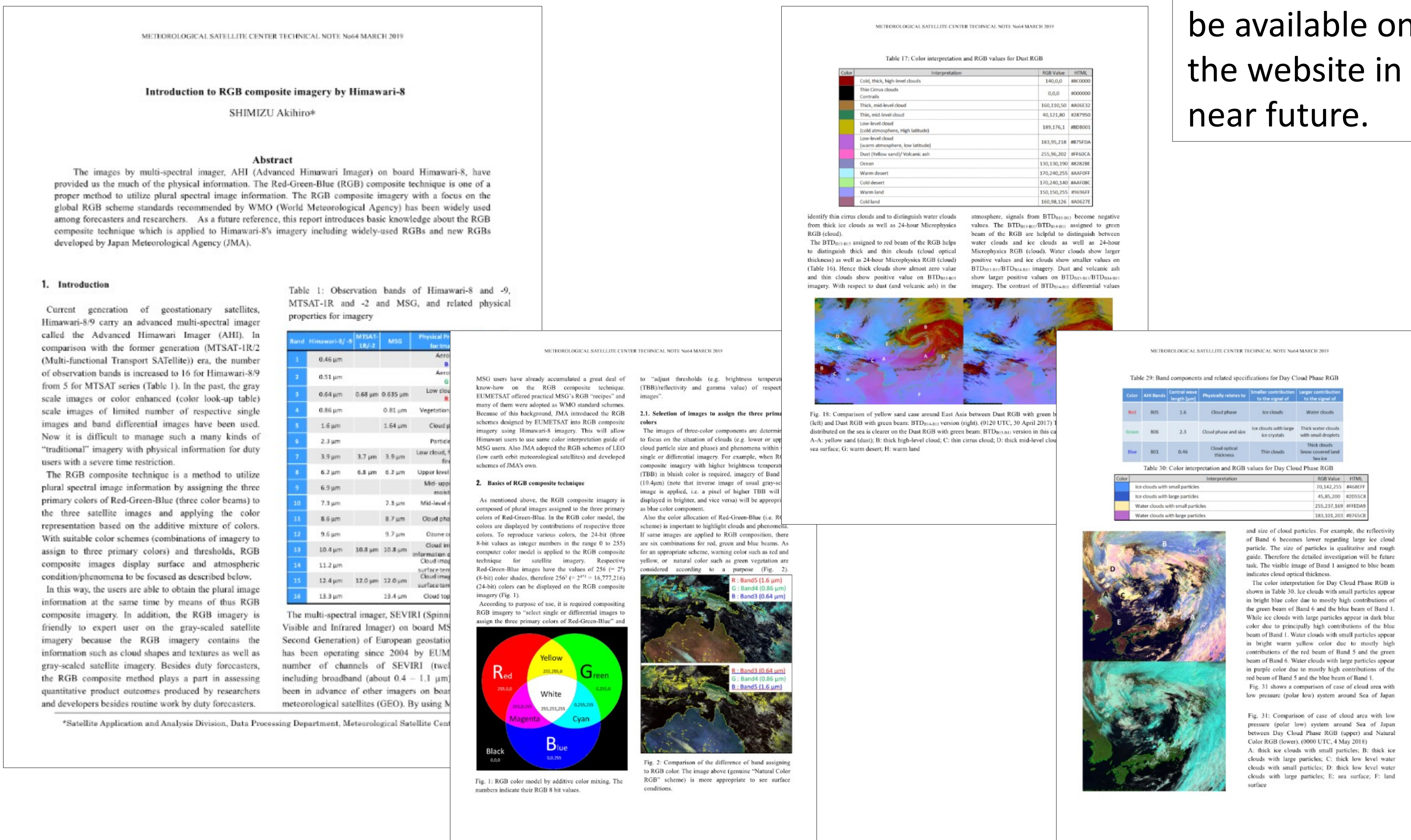
EUMeTrain*
RGB Colour Interpretation Guide ('Snow RGB' formerly 'Day Solar RGB')

*Note: color interpretation is slightly different from these products as the 3.9 µm reflected solar component is used for blue

Hyperlinks not available when viewing material in AIR Tool

JMA's Meteorological Satellite Center Technical Note
"Introduction to RGB composite imagery by Himawari-8" (A. Shimizu)

The report will be available on the website in near future.


METEOROLOGICAL SATELLITE CENTER TECHNICAL NOTE No64 MARCH 2019

Introduction to RGB composite imagery by Himawari-8

SHIMIZU Akihiro*

Abstract

The images by multi-spectral imager, AHI (Advanced Himawari Imager) on board Himawari-8, have provided us the much of the physical information. The Red-Green-Blue (RGB) composite technique is one of a proper method to utilize plural spectral image information. The RGB composite imagery with a focus on the global RGB scheme standards recommended by WMO (World Meteorological Agency) has been widely used among forecasters and researchers. As a future reference, this report introduces basic knowledge about the RGB composite technique which is applied to Himawari-8's imagery including widely-used RGBs and new RGBs developed by Japan Meteorological Agency (JMA).

1. Introduction

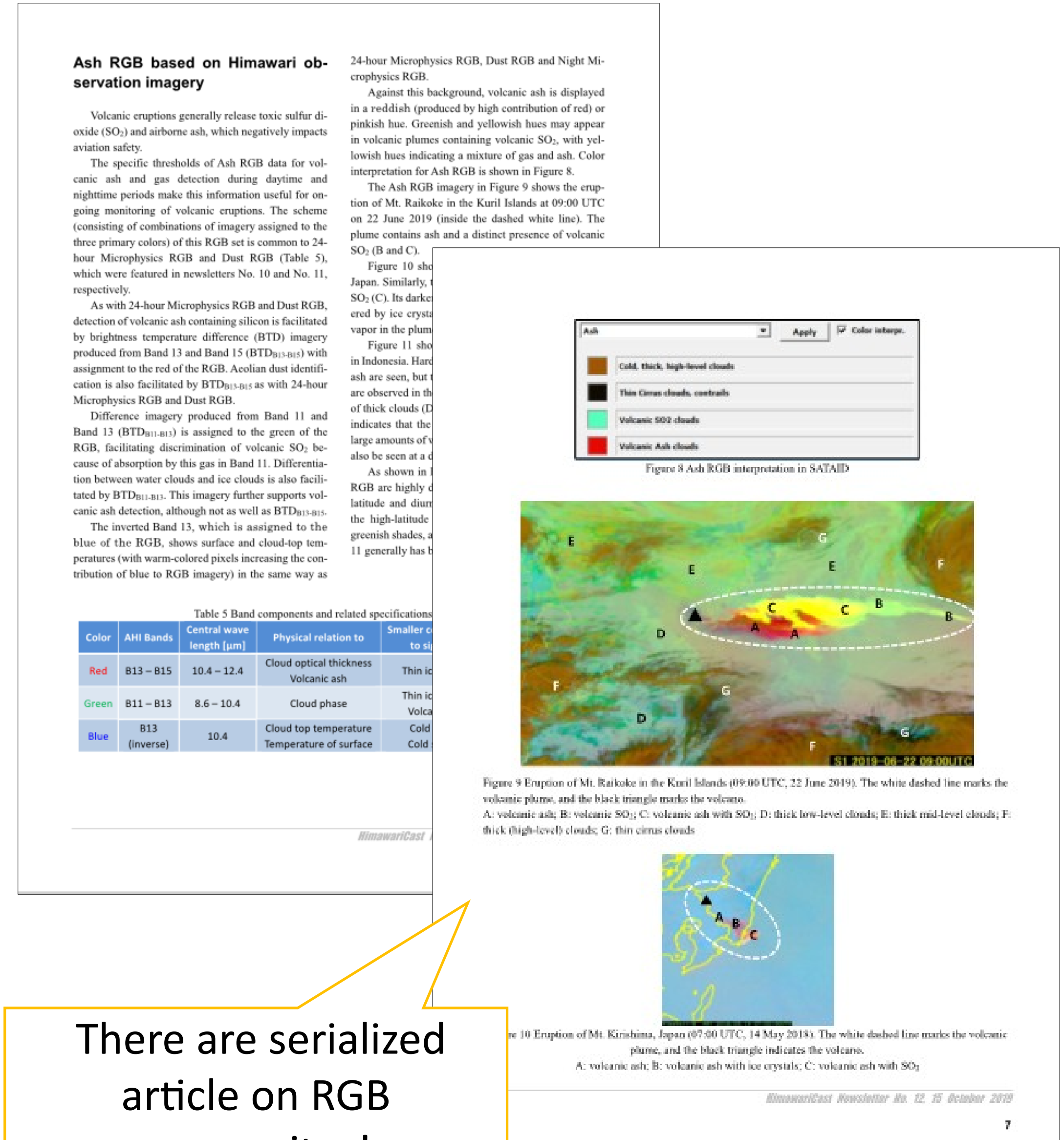
Current generation of geostationary satellites, Himawari-8/9 carry an advanced multi-spectral imager called the Advanced Himawari Imager (AHI). In comparison with the former generation (MTSAT-1R/2 (Multi-functional Transport SATellite)) era, the number of observation bands is increased to 16 for Himawari-8/9 from 5 for MTSAT series (Table 1). In the past, the gray scale images or color enhanced (color look-up table) scale images of limited number of respective single images and band differential images have been used. Now it is difficult to manage such a many kinds of "traditional" imagery with physical information for duty users with a severe time restriction.

The RGB composite technique is a method to utilize plural spectral image information by assigning the three primary colors of Red-Green-Blue (three color beams) to the three satellite images and applying the color representation based on the additive mixture of colors. With suitable color schemes (combinations of imagery to assign to three primary colors) and thresholds, RGB composite images display surface and atmospheric condition/phenomena to be focused as described below.

In this way, the users are able to obtain the plural image information at the same time by means of thus RGB composite imagery. In addition, the RGB imagery is friendly to expert user on the gray-scaled satellite imagery because the RGB imagery contains the information such as cloud shapes and textures as well as gray-scaled satellite imagery. Besides duty forecasters, the RGB composite method plays a part in assessing quantitative product outcomes produced by researchers and developers besides routine work by duty forecasters.

Table 1: Observation bands of Himawari-8 and -9, MTSAT-1R and -2 and MSG, and related physical properties for imagery

Reference: HimawariCast Newsletter


Ash RGB based on Himawari observation imagery

Volcanic eruptions generally release toxic sulfur dioxide (SO_2) and airborne ash, which negatively impacts aviation safety.

The specific thresholds of Ash RGB data for volcanic ash and gas detection during daytime and nighttime periods make this information useful for ongoing monitoring of volcanic eruptions. The scheme (consisting of combinations of imagery assigned to the three primary colors) of this RGB set is common to 24-hour Microphysics RGB and Dust RGB (Table 5), which were featured in newsletters No. 10 and No. 11, respectively.

As with 24-hour Microphysics RGB and Dust RGB, detection of volcanic ash containing silicon is facilitated by brightness temperature difference (BTD) imagery produced from Band 13 and Band 15 ($BTD_{B13-B15}$) with assignment to the red of the RGB. Aeolian dust identification is also facilitated by $BTD_{B13-B15}$ as with 24-hour Microphysics RGB and Dust RGB.

Difference imagery produced from Band 11 and Band 13 ($BTD_{B11-B13}$) is assigned to the green of the RGB, facilitating discrimination of volcanic SO_2 because of absorption by this gas in Band 11. Differentiation between water clouds and ice clouds is also facilitated by $BTD_{B11-B13}$. This imagery further supports volcanic ash detection, although not as well as $BTD_{B13-B15}$.

The inverted Band 13, which is assigned to the blue of the RGB, shows surface and cloud-top temperatures (with warm-colored pixels increasing the contribution of blue to RGB imagery) in the same way as 24-hour Microphysics RGB, Dust RGB and Night Microphysics RGB.

Against this background, volcanic ash is displayed in a reddish (produced by high contribution of red) or pinkish hue. Greenish and yellowish hues may appear in volcanic plumes containing volcanic SO_2, with yellowish hues indicating a mixture of gas and ash. Color interpretation for Ash RGB is shown in Figure 8.

The Ash RGB imagery in Figure 9 shows the eruption of Mt. Raikoke in the Kuril Islands at 09:00 UTC on 22 June 2019 (inside the dashed white line). The plume contains ash and a distinct presence of volcanic SO_2 (B and C).

Table 5 Band components and related specifications

Color	AHI Bands	Central wave length [μm]	Physical relation to	Smaller c… to si…
Red	B13 – B15	10.4 – 12.4	Cloud optical thickness Volcanic ash	Thin ic…
Green	B11 – B13	8.6 – 10.4	Cloud phase	Thin ic… Volca…
Blue	B13 (inverse)	10.4	Cloud top temperature Temperature of surface	Cold… Cold…

Figure 8 Ash RGB interpretation in SATAID

Figure 9 Eruption of Mt. Raikoke in the Kuril Islands (09:00 UTC, 22 June 2019). The white dashed line marks the volcanic plume, and the black triangle marks the volcano.
A: volcanic ash; B: volcanic SO_2; C: volcanic ash with SO_2; D: thick low-level clouds; E: thick mid-level clouds; F: thick (high-level) clouds; G: thin cirrus clouds

…re 10 Eruption of Mt. Kirishima, Japan (07:00 UTC, 14 May 2018). The white dashed line marks the volcanic plume, and the black triangle indicates the volcano.
A: volcanic ash; B: volcanic ash with ice crystals; C: volcanic ash with SO_2

HimawariCast Newsletter No. 12 15 October 2019

7

There are serialized article on RGB composites!

- HimawariCast Newsletters have been established in consideration of the current situation to enable sharing of important information and expertise on satellite imagery analysis.
- Their contents include important information relating to the operation of HimawariCast receiving systems, examples of satellite imagery analysis techniques and tips on using JMA's SATAID display and analysis program.

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

Future plan

- Currently, the details of the contents are being examined.
- There is a plan to publish the Himawari RGB Quick Guides on the Meteorological Satellite Center/JMA website.
- The detailed report related to the RGB composite introduction will be also published on the website.
- Additional quick guide for other useful imagery products (e.g. sandwich product) will be considered in the future.

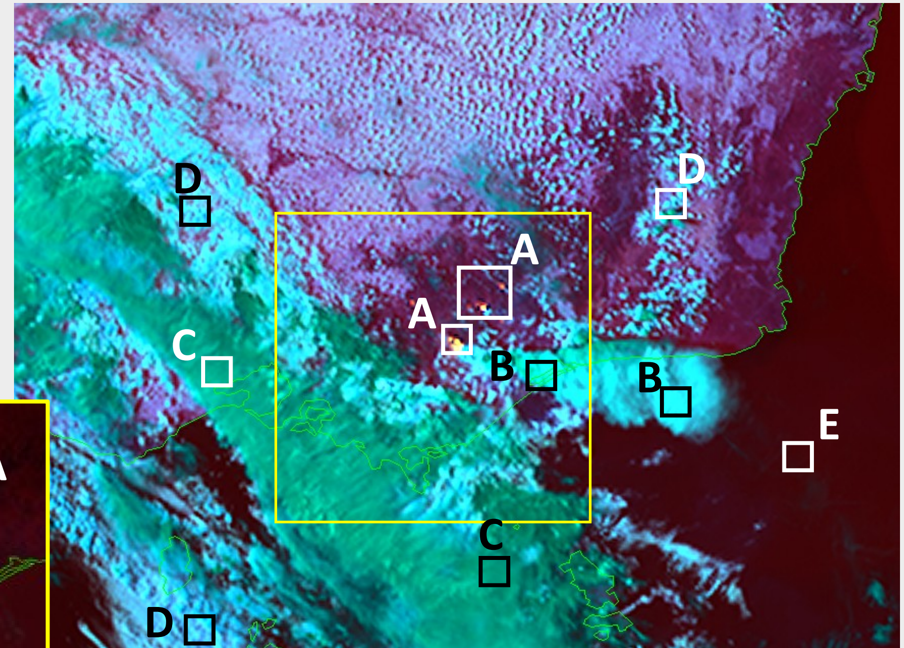
Examining RGBs containing near-infrared imagery

- based on Himawari RGB Quick Guide contents -

Fire Temperature RGB
Cloud Phase Distinction RGB

Fire Temperature RGB

(Right) Large scale fires in Victoria, Australia. (05:30 UTC, 3 March 2019)
Cloud marked “B” corresponds to fire cloud (including pyrocumulus cloud) caused by bush fire (marked “A”).
(Bottom) Fire hotspots before daylight time (20:00 UTC, 2 March 2019)



A : fire hotspots;
B : fire clouds (pyrocumulus cloud) with ice droplets;
C : ice clouds;
D : water clouds;
E : sea surface

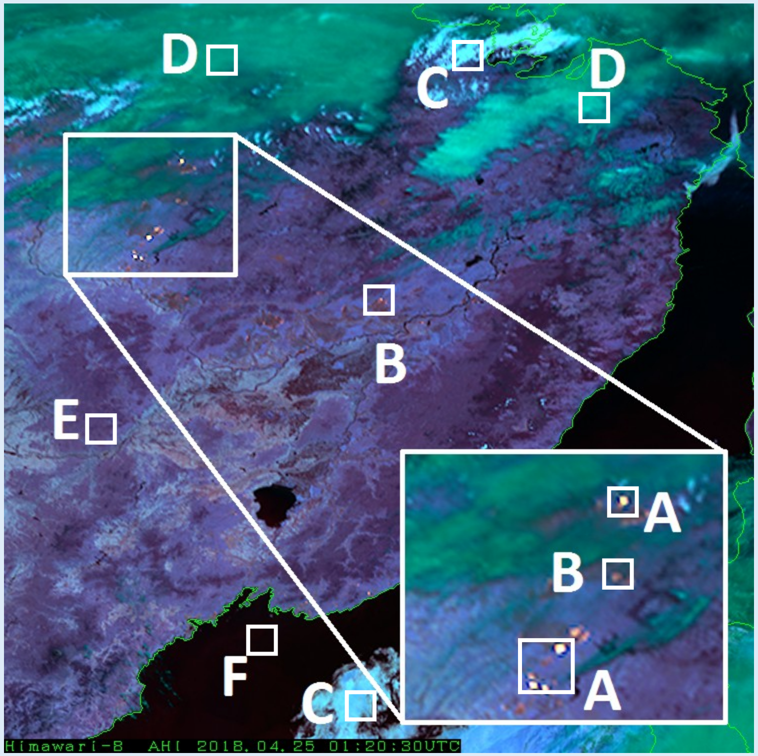
RGB recipe with recommended thresholds and related specifications for Fire Temperature RGB

Color	AHI bands	Central wave length [μm]	Min [K/%]	Max [K/%]	Gamma	Physical relation to	Smaller contribution to signal of	Larger contribution to signal of
Red	B07	3.9	273.0K	350.0K	1.0	Temperature Cloud phase	Thick water clouds	Fire hotspots (with lower temperature)
Green	B06	2.3	0%	50%	1.0	Temperature Cloud phase and size	Thin ice clouds with large ice particles	Fire hotspots (with mid temperature) Thick water clouds with small droplets
Blue	B05	1.6	0%	50%	1.0	Temperature Cloud phase	Thin ice clouds	Fire hotspots (with higher temperature) Thick water clouds

Color interpretation for Fire Temperature RGB

Color	Interpretation
	Low temperature hotspots
	Medium temperature hotspots
	High temperature hotspots
	Water clouds
	Ice clouds

Fire Temperature RGB



Forest fire in the vicinity of Siberia, Russia. (01:20 UTC, 25 April 2018)

A : fire hotspots (relatively high temperature);
B : fire hotspots (relatively low temperature);
C : water clouds;
D : ice clouds;
E : land surface;
F : sea surface

Main applications : Fire hotspot, fire intensity

Benefits:

- This RGB is helpful for monitoring fire hotspot and its intensity by means of its color shade successively.
- The color components of this RGB provide fire intensity depending on their wavelength.
- This RGB is applicable day and night as regards fire hotspot.
- Available to distinguish between ice clouds and water clouds.

Limitations :

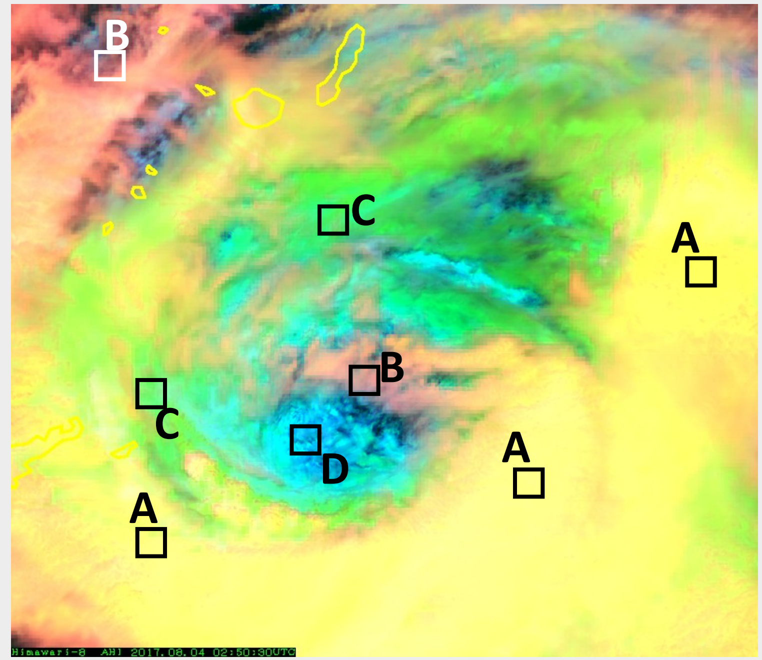
- This RGB is not available during daytime except for fire hotspot.
- Very dry surface region (e.g. desert) looks reddish color (false fire).

Cloud Phase Distinction RGB

Typhoon (Noru) by Cloud Phase Distinction RGB. (02:50UTC, 4 August 2017)

The detailed structure consisting of blueish low level clouds (marked "D") can be seen inside eyewall.

A : thick high-level clouds with ice particles;
B : thin high-level clouds with ice particles;
C : thick low level ice clouds;
D : thick low level water clouds



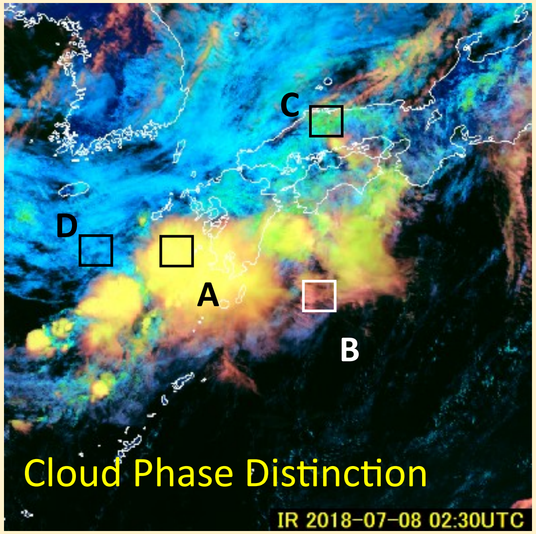
Color interpretation for
Cloud Phase Distinction RGB

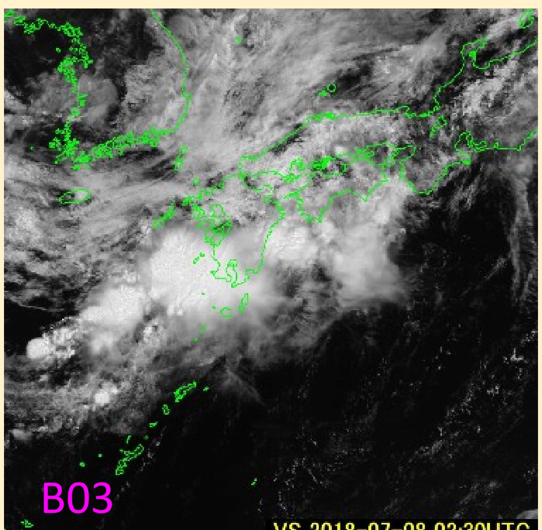
Color	Interpretation
	Thick high level clouds with ice particles, Cb
	Thin high level clouds with ice particles
	Thick low level ice clouds Snow/ice covered area
	Thick low level water clouds

RGB recipe with recommended thresholds and related specifications for Cloud Phase Distinction RGB

Color	AHI bands	Central wave length [μm]	Min [K/%]	Max [K/%]	Gamma	Physical relation to	Smaller contribution to signal of	Larger contribution to signal of
Red	B13	10.4	219.6K	280.7K	1.0	Cloud top temperature	Warm clouds	Cold clouds
Green	B03	0.64	0%	85%	1.0	Cloud optical thickness	Thin clouds	Thick clouds Snow covered land Sea ice
Blue	B05	1.6	1%	50%	1.0	Cloud phase Snow and ice	Ice clouds	Water clouds

Cloud Phase Distinction RGB





Cloud area corresponding to Baiu (Mei-yu) stationary front above Western Japan. (02:30 UTC, 8 July 2018)

Cloud analysis only by using visible image (bottom) requires to estimate from cloud shapes and patterns. Meanwhile, thick clouds (Cbs) and low-level clouds can be distinguished easily by Day Cloud Phase RGB (top) at a glance.

A : thick high-level clouds with ice particles;
B : thin high-level clouds with ice particles;
C : thick low level ice clouds;
D : thick low level water clouds

Main applications: Analysis cloud thickness, height of cloud top and cloud phase

Benefits:

- Easy to distinguish between high-level ice clouds and low-level water clouds.
- Easy to identify surface snow/ice.

Limitations:

- Available during daytime only
- Colors of clouds and surface are affected by thermal conditions (latitudinal , seasonal, diurnal etc.).

Summary

- JMA is planning to provide RGB Quick Guides to Himawari imagery users on JMA/MSC website.
- The detailed report related to the RGB composite introduction will be also published on the website.
- The RGB composites which are not so familiar to users (e.g. RGBs developed by JMA) are also useful.
- As examples of such RGBs, "Fire Temperature RGB" and "Cloud Phase Distinction RGB" were introduced by using Himawari RGB Quick Guide contents.


Thank you !
Himawari-8 AHI 2018.07.07 03:00:30UTC

Samples of Himawari RGB Quick Guides

- 24hourMicrophysics
- Airmass
- Natural Color
- Cloud Phase Distinction
- Fire Temperature
- Day Deep Clouds