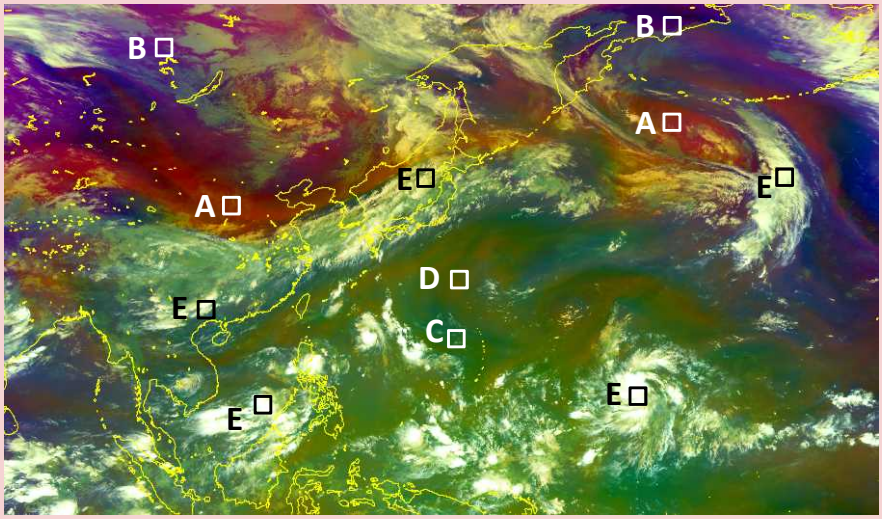
Meteorological Satellite Center (MSC) of JMA

Ver.1.0

Himawari Airmass RGB Quick Guide



Airmass RGB imagery and related interpretation (03:00 UTC, 7 September 2018)

A ■ : jet stream (left), high-PV area with descending dry stratospheric air
B ■ : cold (ozone-rich) air mass
C ■ : warm (ozone-poor) air mass (high upper-tropospheric humidity)
D ■ : warm (ozone-poor) air mass (low upper-tropospheric humidity)
E □ : high-level thick cloud

The edge (especially the western area) of this image exhibits the limb cooling effect.

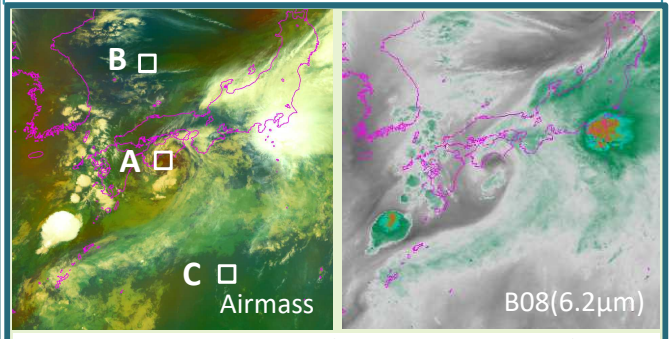
Main applications: Identification of air masses/high-reaching multi-layered clouds and analysis of atmospheric dynamic processes

Benefits:

- In addition to the above, identification of high-level moisture, jet streams and high PV (potential vorticity) related to tropopause depression characteristics such as upper-cold lows
- Identification of mid-to-high-level volcanic gas (SO2)
- RGB applicability day and night

Limitations:

- Limb cooling effect with color shading highly dependent on the satellite viewing angle, causing false bluish/violet colors close to the limb
- Lack of clarity in low-level clouds
- Possible dominance of a greenish component in cloud-free cold-air mass areas with very low surface temperature
- Problems with color interpretation for thick high-level cloud areas
- Possible reddish appearance of very dry and hot air (without high PV; e.g., in desert areas)



Upper cold-core low over Japan (19:00 UTC, 27 June 2019)
High-level air flow with an upper-level low around the Shikoku region can be identified in the water vapor image (right). In the Airmass RGB (left), the reddish-brown around the center of the vortex indicates a high-PV area, and the distribution of the frontal cloud area between the dark-blue cold-air mass and the greenish warm air mass can be overlooked.
A ■ : high PV area; B ■ : cold air mass; C ■ : warm air mass

RGB composition with recommended thresholds and related specifications for Airmass 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	B10-B08	7.3-6.2	0.0K	25.8K	1.0	Vertical water vapor distribution Mid-high level clouds	Mid-level humidity Mid-level clouds	Dry upper levels High-level clouds
Green	B13-B12	10.4-9.6	-4.3K	41.5K	1.0	Tropopause height based on ozone Clouds at all levels	Low tropopause (polar air mass) with ozone-rich content	High tropopause (tropical air mass) with low ozone content
Blue	B08	6.2	208.0K	242.6K	1.0	Water vapor distribution in upper-level High clouds	Dry upper-levels warm brightness temperature	Moist upper-level cold brightness temperature

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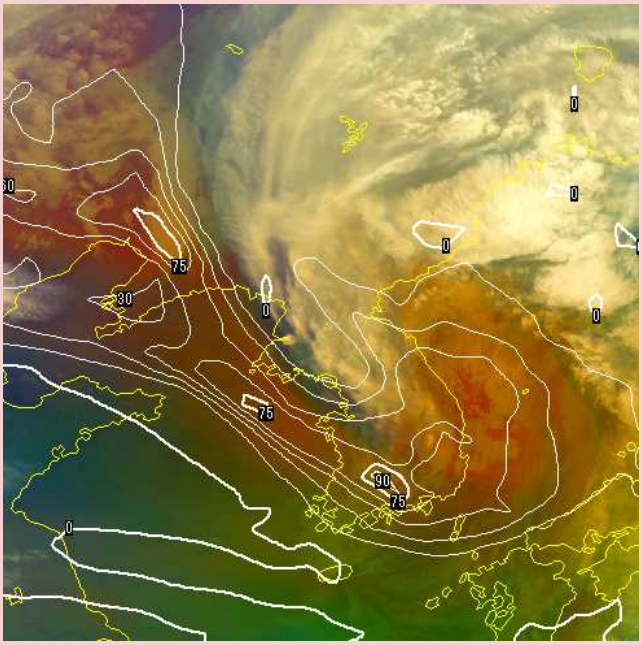
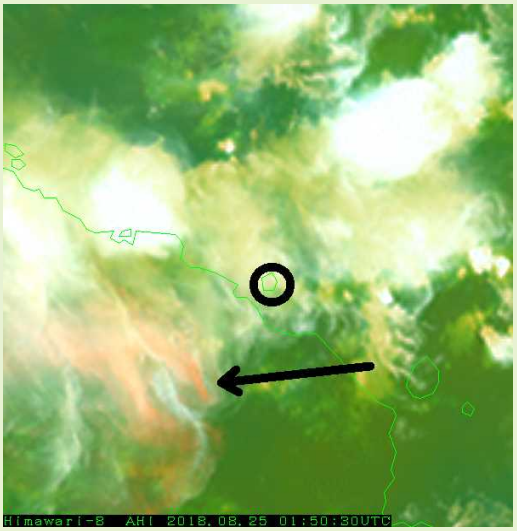
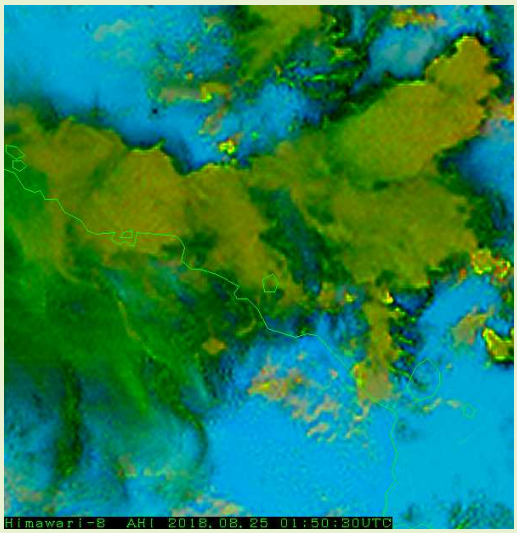


Developing low around Korean Peninsula

White lines indicate PV (0.1 PV Unit) at 300 hPa by numerical weather prediction over Airmass RGB (21:00 UTC, 16 April 2016)

Reddish area shows good correspondence to high PV area.





Comparison of volcanic eruption (Manam volcano, Papua New Guinea) between Airmass RGB (left) and Ash RGB with green beam - $BTD_{B11-B14}$ version (right) (01:50 UTC, 25 August 2018)

(Left) Black circle and arrow indicate Manam volcano and volcanic plume with SO_2 gas (reddish area) respectively.

Color interpretation for Airmass RGB

Color	Interpretation
	Thick, high-level clouds
	Thick, mid-level clouds
	Thick, low-level clouds (warm air mass)
	Thick, low-level clouds (cold air mass)
	Jet (high PV, descending dry stratospheric air)
	Cold air mass
	Warm air mass (high upper tropospheric humidity)
	Warm air mass (low upper tropospheric humidity)