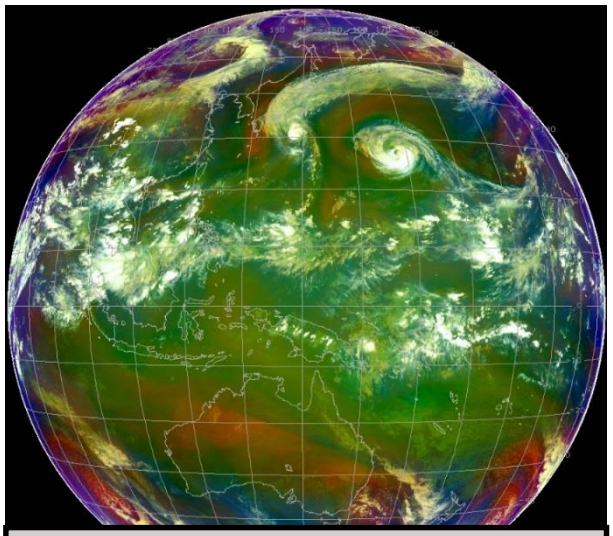
Air Mass RGB

Quick Guide

Why is the Air Mass RGB imagery important?

The Air Mass RGB is used to diagnose the environment surrounding synoptic systems by enhancing temperature and moisture characteristics of air masses. Cyclogenesis can be inferred by the identification of warm, dry, ozone-rich descending stratospheric air associated with jet streams and potential vorticity (PV) anomalies. The RGB can be used to validate the location of PV anomalies in model data. Additionally, this RGB can distinguish between polar and tropical air masses, especially along frontal boundaries and identify high-, mid-, and low-level clouds.



Air Mass RGB from Himawari-8 AHI at 1000 UTC, 8 September 2015.

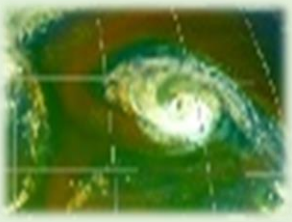
Air Mass RGB Recipe

Color	Band / Band Diff. (µm)	Physically Relates to…	Small contribution to pixel indicates…	Large contribution to pixel indicates…
Red	6.2 – 7.3	Vertical water vapor difference	Moist upper levels	Dry upper levels
Green	9.6 – 10.4	Tropopause height based on ozone	Low tropopause and high ozone	High tropopause and low ozone
Blue	6.2	Water vapor in ~200-500 mb layer	Dry upper levels or warm brightness temperatures	Moist upper levels or cold brightness temperatures

Impact on Operations

Primary Application

Identifying air masses: Polar and tropical air masses and the frontal boundary between them are readily seen in the RGB imagery.

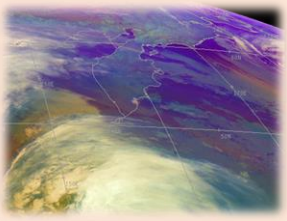


Inferring cyclogenesis: It is relatively easy to see jet streams and stratospheric air intrusions with high PV, and the cyclonic activity created by these dynamics.

Secondary Applications:

Moisture boundaries, distinguishing between warm air masses with high and relatively low moisture, distinguishing between high clouds and mid-level clouds

Limitations



Limb effects: The use of longer wavelength channels results in more atmospheric absorption at large viewing angles. As a result of the greater absorption, cooler brightness temperatures are measured. This limb cooling causes false blue and violet colors along the entire limb.

Upper troposphere only: Conditions in the mid- to upper troposphere can be detected but surface conditions cannot be directly observed.

Cloud cover: High cloud cover can obscure air masses and make interpretation more difficult.

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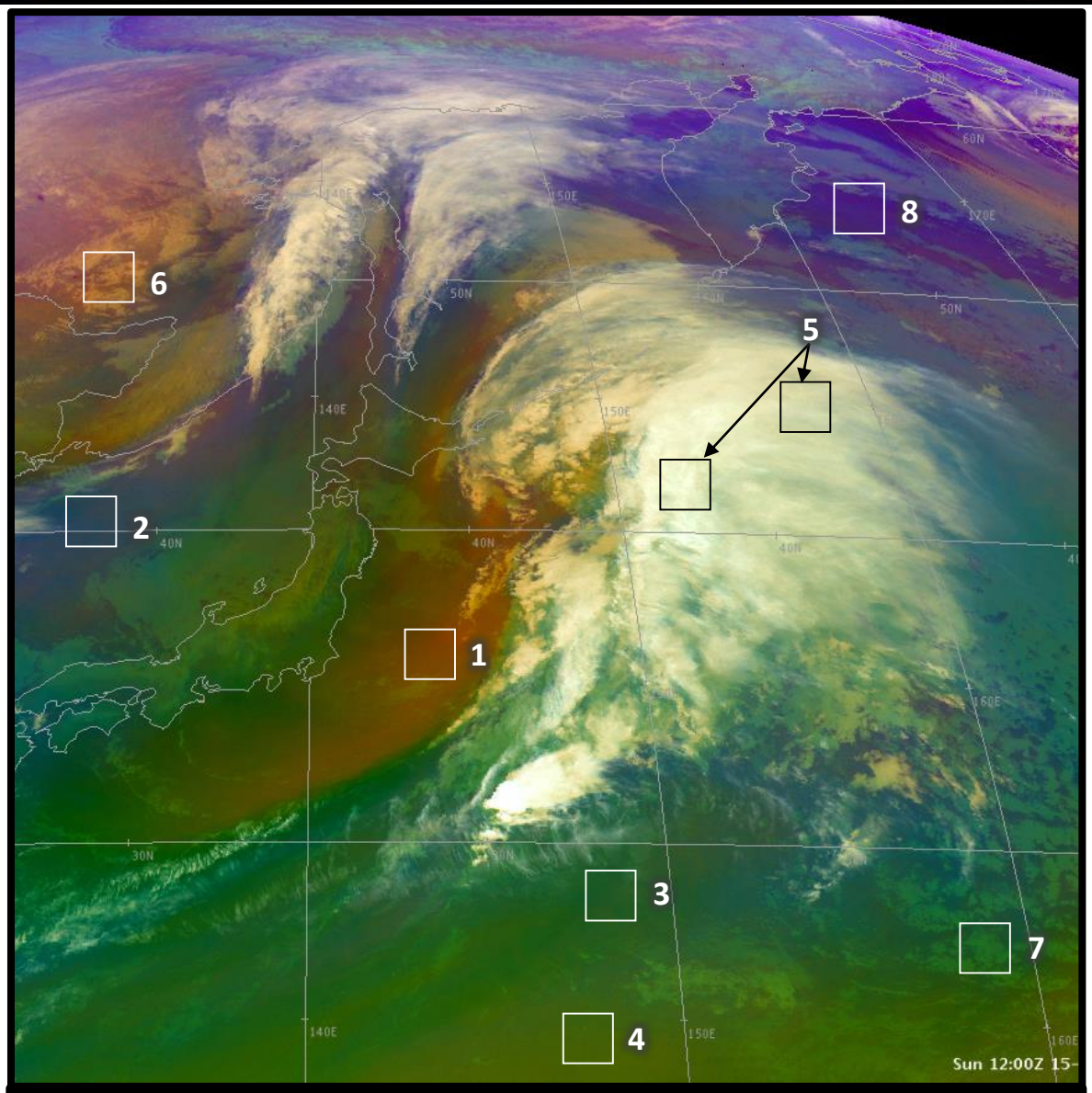
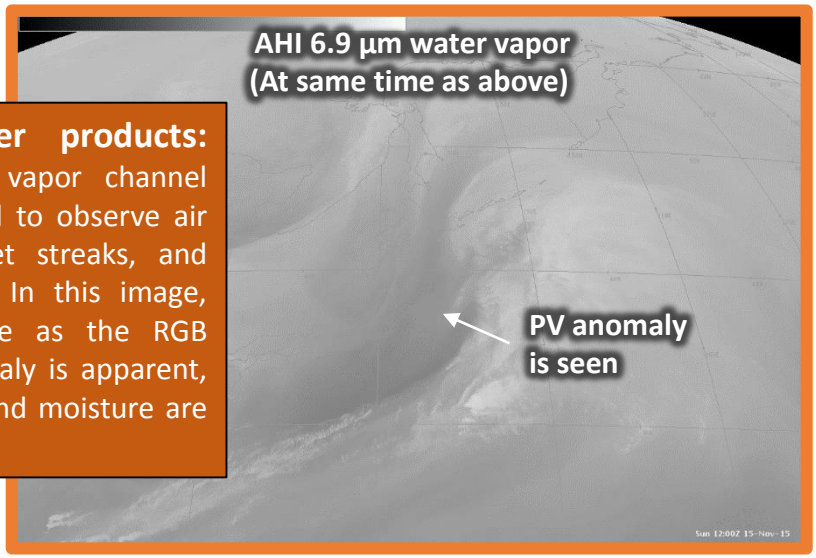
RGB Interpretation

- **1** **Jet stream / PV / deformation zones / dry upper level** *(dark red/orange)*
- **2** **Cold air mass** *(dark blue/purple)*
- **3** **Warm air mass** *(green)*
- **4** **Warm air mass, less moisture** *(dull green)*
- **5** **High thick cloud** *(white)*
- **6** **Mid-level cloud** *(tan/salmon)*
- **7** **Low-level cloud** *(green, dark blue)*
- **8** **Limb effects** *(purple/blue)*

Note:, colors may vary diurnally, seasonally, and latitudinally



Air Mass RGB from Himawari-8 AHI at 1200 UTC, 15 November 2015.



Usage with other products: The 6.9 µm water vapor channel (right) can be applied to observe air mass interactions, jet streaks, and deformation zones. In this image, from the same time as the RGB above, the PV anomaly is apparent, but air mass temps and moisture are not.

Resources

UCAR/COMET
Multispectral Satellite Applications: RGB Products Explained.

NASA/SPoRT
Aviation Forecasting RGB Products

EUMETrain
RGB Interpretation Guide