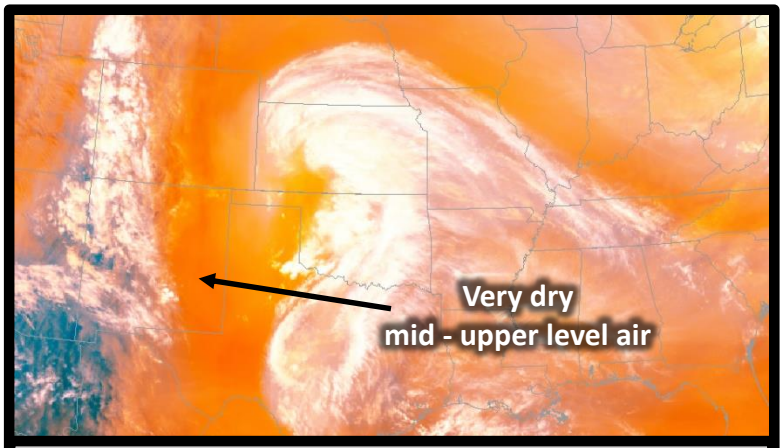
Differential Water Vapor RGB

Quick Guide

Why is the Differential Water Vapor RGB Imagery Important?

The Differential Water Vapor RGB was designed to analyze water vapor distribution. It can be used to identify upper level moisture boundaries, trough/ridge patterns, potential vorticity (PV) anomalies, and the influences of PV anomalies and stratospheric air on rapid cyclogenesis and tropopause fold-driven high-impact wind events. Analysis of moist/dry layers is also important for predicting changes in hurricane intensity and extratropical transition.



Differential Water Vapor RGB from GOES-16 ABI at 2022 UTC, 13 April 2017

Differential Water Vapor RGB Recipe

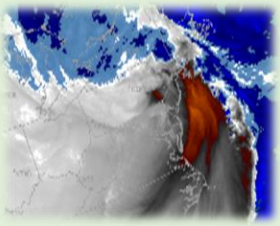
**when cloud free*

Color	Band / Band Diff. (µm)	Min – Max Gamma	Physically Relates to…	*Small contribution to pixel indicates…	*Large Contribution to pixel indicates…
Red	7.3 – 6.2 (inv)	30 to -3 C 0.2587	Vertical water vapor difference	Moist upper levels	Dry upper levels
Green	7.3 (inv)	5 to -60 C 0.4	Low level water vapor	Dry low levels	Moist lower levels
Blue	6.2 (inv)	-29.25 to -64.65 C 0.4	Upper level water vapor	Dry upper levels	Moist upper levels

Impact on Operations

Primary Application

Identify depth of upper-level moisture: Use of the lower level and upper level water vapor bands means the depth of moist/dry layers can be assessed.

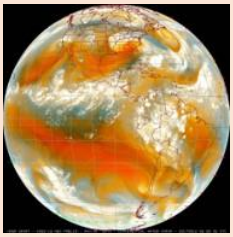


Very dry air is bright orange: the brightest orange represents deep layer dry air, important for assessing stratospheric influence on changes in storm intensity.

Trough and Ridge Patterns: features typically identified in water vapor imagery are easily identified with added dimension.

Limitations

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



Range of Colors: the orange tones may make it hard to distinguish moisture layers at first glance. Take extra care when interpreting the product to determine the proper understanding.

Cloud features are not distinct: only mid and high clouds can be identified and low contrast limits the cloud details/features.

Contributor: Dr. Emily Berndt NASA SPoRT https://weather.msfc.nasa.gov/sport/

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RGB Interpretation

1 **Very dry mid-upper level** *(bright orange)*

2 **Dry mid-upper level** *(orange)*

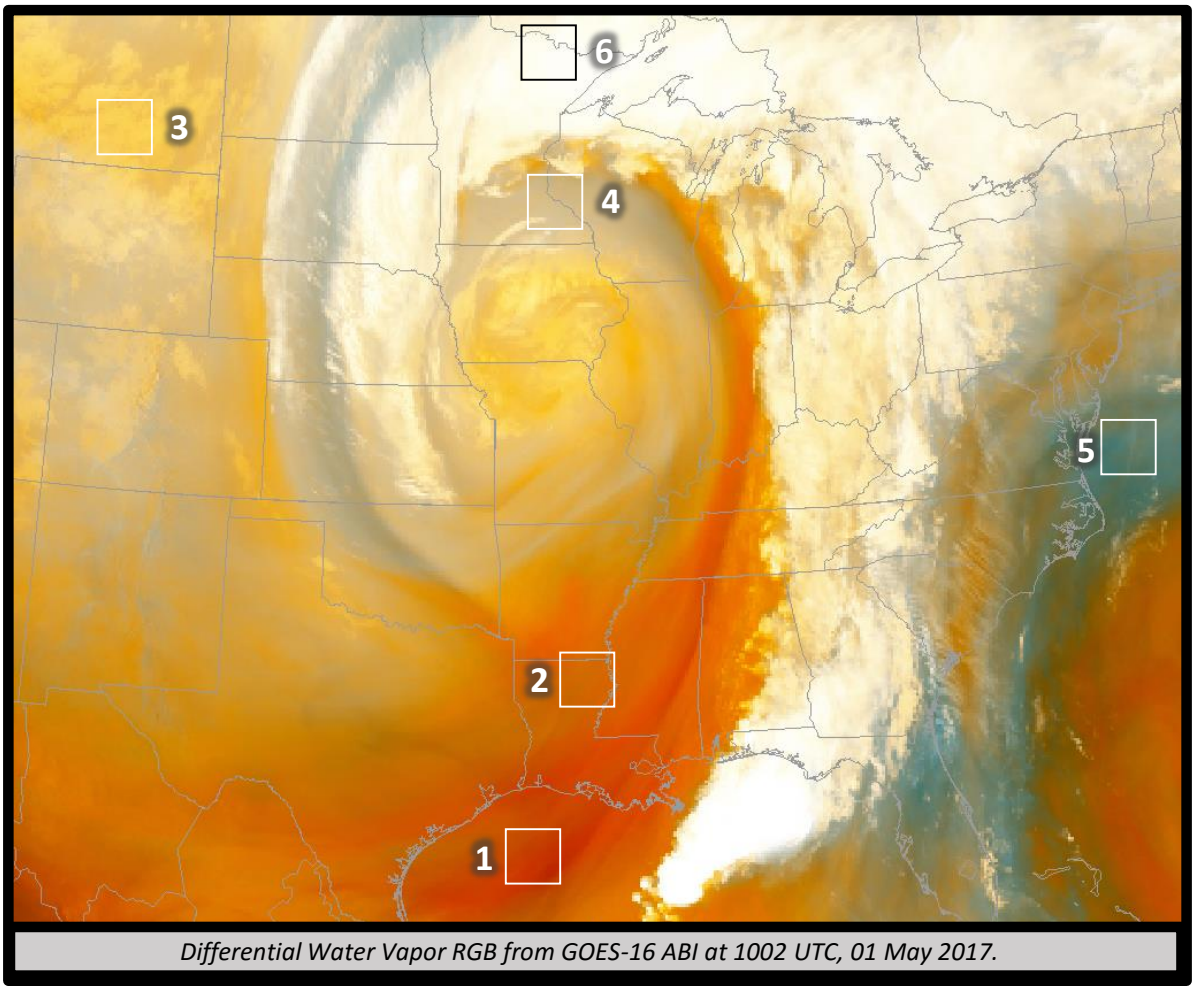
3 **Dry upper level, Moist mid level; Mid level cloud** *(gold)*

4 **Moderate moisture mid-upper level** *(gray)*

5 **Moist upper level** *(light teal)*

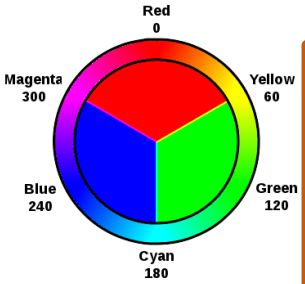
6 **Thick, high clouds** *(white)*

Note: colors may vary diurnally, seasonally, and latitudinally

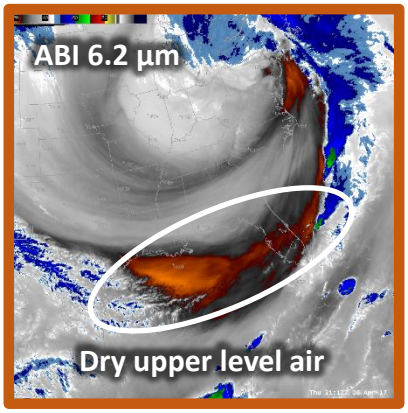


Differential Water Vapor RGB from GOES-16 ABI at 1002 UTC, 01 May 2017.

RGB Color Guide



Comparison to other products:
The 6.2 µm water vapor band is used to identify upper level moisture characteristics. The depth of the moist/dry layer can be assessed in the RGB in a single image. Note the RGB provides more information about the dry air below with a depth through the mid and upper levels.



Resources

UCAR/COMET
Multispectral Satellite Applications: RGB Products Explained

JMA
New RGB recipes of Himawari-8

EUMETrain
RGB Interpretation Guide

Hyperlinks not available when viewing material in AIR Tool