RGB Air Mass Quick Guide by NASA / SPoRT

Why is the Air Mass RGB imagery important?

There are numerous single channel imagery that provide information to assist the diagnosis and monitoring of synoptic and mesoscale features. The RGB Air Mass product is able to identify temperature and moisture characteristics of the air mass surrounding these features, allowing the user to infer some of the physical processes taking place.
Application: Comparison of the Air Mass RGB to NWP model short-term forecasts, allows forecasters to evaluate how well the model is forecasting the event, especially in rapid cyclogenesis cases.

RGB Air Mass Product - What is used in the combine and what does each color represent?

Color	Band / Band Diff.	Physically Relates to….	Little contribution to composite indicates…..	Large contribution to composite indicates …..
Red	**6.7 – 7.3**	Vertical water vapor difference	Moist conditions high levels	Dry conditions at high levels
Green	**9.7- 10.7**	Estimate of tropopause height based on ozone. Polar (tropical) air has higher (lower) ozone concentrations	Tropopause height is low. Typically indicates a polar air mass, where 9.7 has very cold brightness temperature compared to 10.7	Tropopause height is high. Likely a tropical air mass where the two channels will have similar brightness temperature values
Blue	**6.7**	Water Vapor in layer from ~200 – 500 mb	Dry at upper levels Warm brightness temperatures have little blue	Moist at upper levels Cold brightness temperatures result in lots of blue

What should I be looking for in the imagery?

The Air Mass RGB identifies jet streaks and areas of high potential vorticity with red colors.

Vorticity / Jet Streak

The stratospheric intrusions associated with these features have dry, ozone rich air resulting in mostly red and little to no green or blue. Red colors result from very dry upper levels compared to mid-levels. Little green in this area occurs because the 9.7 channel brightness temperature is much colder than the 10.7 channel due to the increased ozone concentration and lowering (warming) of the tropopause height from the stratospheric intrusion. The blue scale is inverted so that warm brightness temperatures result in less blue (i.e. dry at ~400mb)

Warm air with moisture at upper levels tend to have green coloring while this same air with moisture at mid-levels tends to have an olive color (nearly equal red and green contributions). Cold air with higher concentrations of ozone is more blue and purple.

Warm, mid moisture | Warm, high moisture

Thick, high-level clouds have high intensity values of each color and therefore appear white while other mid-level clouds have light pink colors depending on their characteristics.

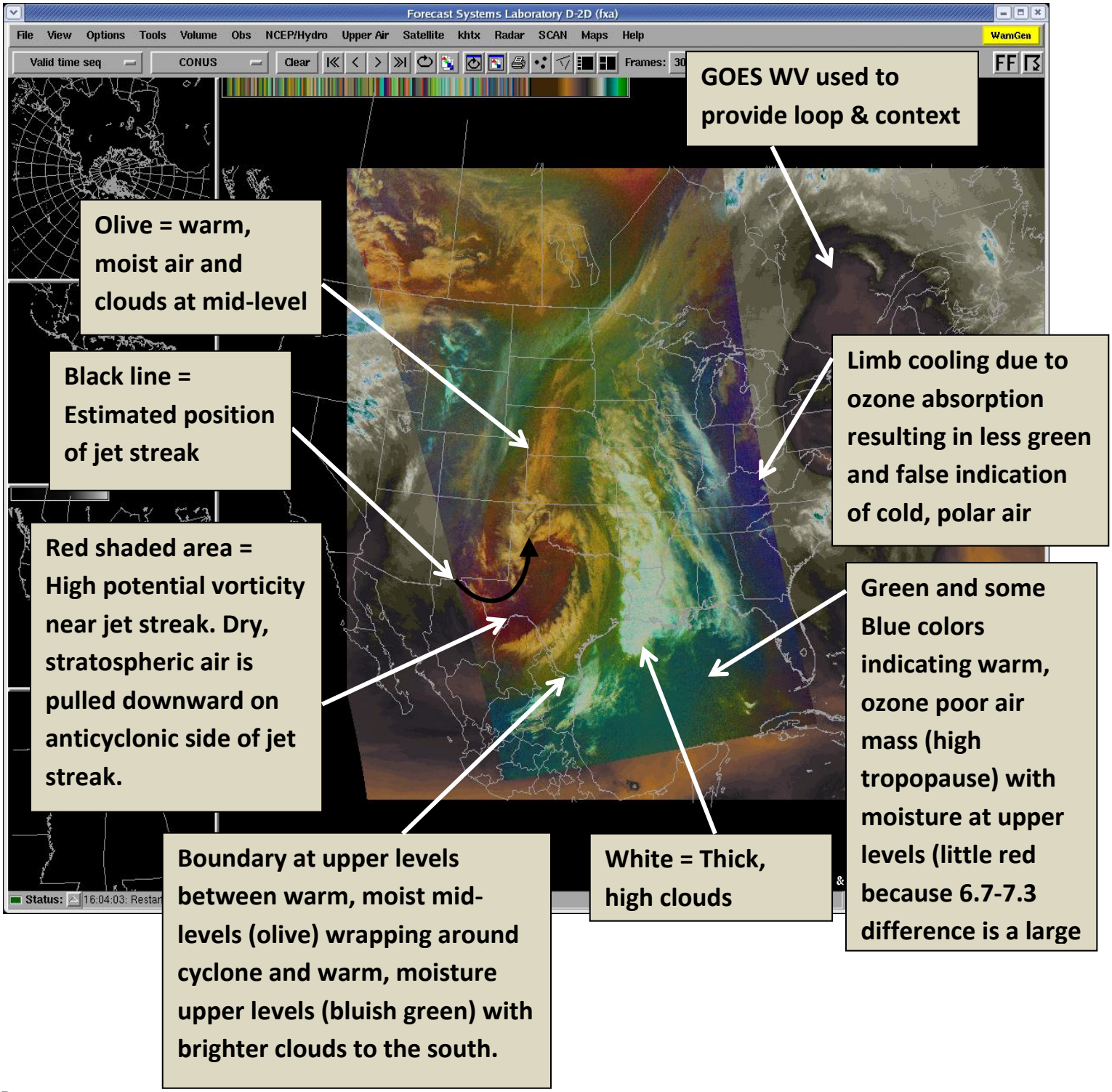
What are the things to watch out for?

The edges of the MODIS swath tend to have less green due to limb cooling of the 9.7 ozone channel, resulting in false influence of the red and blue colors near the edge.

When is it available?

A hybrid style with the GOES water vapor channel is used to provide context every 15 minutes. The MODIS swath showing the actual Air Mass RGB is inserted as available ~4-6 times per day.

Example of RGB Air Mass Imagery from MODIS with GOES Water Vapor



Resources:

This guide provides a highlight of the Air Mass RGB product as quick reference. Operational applications of RGB imagery can be seen on SPoRT's blog site (http://nasasport.wordpress.com/). A primer of the RGB imagery concept can be found at the UCAR/COMET MetEd website (https://www.meted.ucar.edu).More in depth information can be found at EUMETRAIN's website (http://eumetrain.org/).

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