

RGB Activities for the GOES-R Proving Ground

Gary Jedlovec, NASA / MSFC / SPoRT
Mark DeMaria NOAA / NESDIS / STAR
Tim Schmit NOAA / NESDIS / CIMSS

and contributions from staff at
SPoRT, CIRA, and CIMSS

Background

- Image combinations very useful for current GOES
 - fog, fire hot spots, surface skin temperature, etc
- 5 channel GOES Imager → 10 image pairs
- 16 channel ABI → 120 image pairs
- Viewing image pairs or even 16 individual ABI channels will not be practical in real time
- EUMETSAT RGB products tailored to specific phenomena tested in 2010 NHC Proving Ground
 - results very positive
 - need them in user decision support system

GOES-R PG RGB Initiative

At the 2011 GOES-R PG Annual Meeting, the Executive Committee encouraged participants from CIMSS, CIRA, and SPoRT to collaborate on a joint effort to demonstrate the utility of RGB products from the ABI on weather forecasting activities in the NWS.

SPoRT, CIRA, and CIMSS developed a collaborative plan to address the pertinent issues relating the creation, display and use of RGB products from ABI.

Focus on standard EUMETSAT SEVIRI “recipes” for RGB products. Demonstrate initial capabilities in AWIPS and future capabilities in AWIPS II.

These collaborative partners have been working over the last year on this effort.

Proving Ground RGB Tasks

- Demonstrate RGB products using SEVIRI data as a proxy for ABI
- Use GOES Sounder data and simulated GOES-R ABI to produce geostationary RGB products over CONUS
- Use MODIS RGB products to further show utility of RGB products over CONUS
- Develop and explore appropriate display capabilities for RGB products in AWIPS / NAWIPS and advanced capabilities in the AWIPS II environment
- Bring together and develop appropriate training for RGB products
- Conduct assessments on the utility of proxy ABI RGB products for weather forecast applications including suggested improvements in product utility and display capabilities.

Available RGB Products

RGB Product	Formula Wavelengths	MODIS Channels	VIIRS Channels	ABI Channels	SEVIRI Channels	Application
Air Mass	6.7-7.3 (WV) 9.6-10.8 (O3-win) 6.7 (WV)	27-28 30-31 27 (inverted)	Cx-Cy* Cz-M15 Cx (inverted)	8-10, 12-14, 8 (inverted)	6-7 9-10 6(inverted)	Jet Streaks, PV Analysis
Dust	12.0-10.8 (split win) 10.8-3.9 (l/w win) 10.8 (lw win)	32-31 31-29 31	M16-M15 M15-M14 M15	15-14, 14-11, 14	11-10 10-8 10	Differential Dust from Cloud
Night Microphysic	12.0-10.8 (split win) 10.8-3.9 (lw – sw win) 10.8 (win)	32-31 31-20 31	M16-M15 M15-I4 M15	15-14, 14-7, 14	11-10 10- 5 10	Fog/Low Stratus, Thin Cirrus
Day Microphysic	.86 (refl n-ir) 3.7 (sw win) 10.8 (lw win)	2 20 (solar) 31	I2 I4 (solar) I5(M15)	3, 7 (solar), 14	3 5(solar) 10	Convective, Fog , Fire
True Color	.65 (red) .55 (green) .45 (blue)	1 4 3	M5 M4 M3 (or M2)	2, SG*, 1 * synthetic green	HRV	Smoke, Land Surface Changes
Natural Color (Land Cover)	1.6 (refl n-ir) .86 (refl n-ir) .65 (red)	6 2 1	I3 I2 I1	5, 3, 2	4 3 2	Ice/Water Cloud, Vegetation
Day Snow-Fog	.86 (refl n-ir) 1.6 (refl n-ir) 3.7 (sw win)	2 6 20 (solar)	I2, I3 I4 (solar)	3, 5, 7 (solar)	3 4 5	Snow Melt, Ice Jams
Day Convective Storms	6.7-7.3 (WV) 3.7-10.8 (sw- lw win) 1.6 – 6.5) (refl n-ir – red))	27-28 20-31 6-1	Cx-Cy* I4-I5(M15) I3-I1	8-10, 7-14, 5-2	6-7 5-10 4-2	Severe Weather, Water Vapor In/Outflow

Cx, Cy, Cz are corresponding channels from CrIS

ABI imagery simulated from high resolution model forecasts

A pseudo Air Mass product can also be generated from GOES Sounder imagery

Issues / End Users

MSG SEVIRI only geostationary satellite with spectral bands to produce RGB products but coverage does not extend to CONUS

- use MODIS, GOES Sounder, and VIIRS for CONUS applications
- use simulated radiances
- include HPC/OPC/NHC as end users for SEVIRI RGB products

Current AWIPS / NAWIPS limited display of colors (but still quite useful) – many examples

AWIPS II capabilities – hardware capable, software being developed

- insufficient data (appropriate channels) in AWIPS II
- bandwidth issues



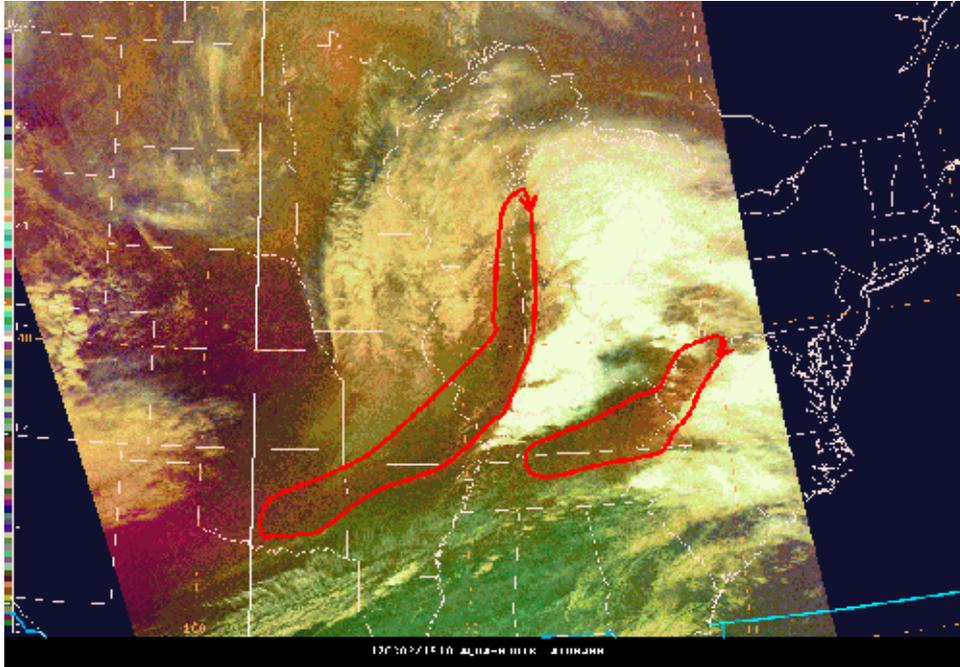
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Air Mass Product

Dynamical structure of the atmosphere, jet streaks, origin of dry air.

3/2/2012, 1910UTC (MODIS)



*From the Wide World of SPoRT blog
(<http://nasasport.wordpress.com>)*

Figure 2: This MODIS (Aqua) RGB Airmass image is two hours earlier (1910z on 03/02/12) and shows greater detail in regards to the drying behind the frontal band. This dry air looks to be part of a larger dry punch that originates from lower in the atmosphere, but may also contain some dry stratospheric air (highlighted in the larger red area). Note the extra dry surge that precedes the frontal band (smaller red area) that was associated with earlier supercells that caused significant tornado damage in parts of southern TN and northern AL. Although we only get a few MODIS passes a day, this product is definitely showing much more detail than the GOES-Sounder product.

Status

- Subset of SEVIRI RGB products produced, disseminated, and used at OPC, HPC, NHC in NAWIPS.
- GOES Sounder AIR Mass RGB generated and used.
- Suite of MODIS RGB products generated, disseminated, and used at collaborative CONUS WFOs and National Centers.
- VIIRS RGBs being introduced to forecasters as well.
- End user involvement /feedback has been outstanding.
- RGB products currently produced external to AWIPS and formatted for AWIPS (254 colors), NAWIPS (95 colors), and AWIPS II (254 colors).
- Internal RGB generation and display capabilities being examined for AWIPS II.

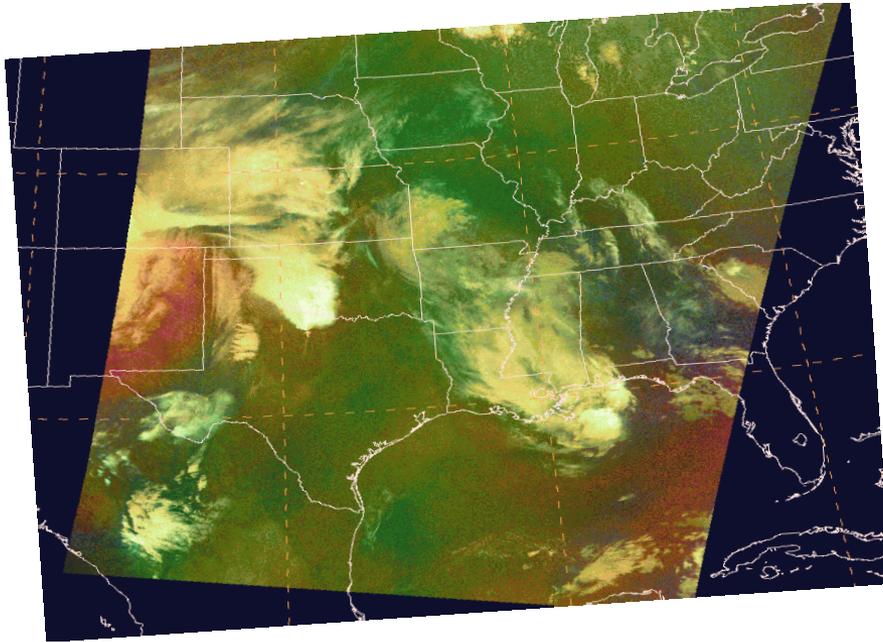


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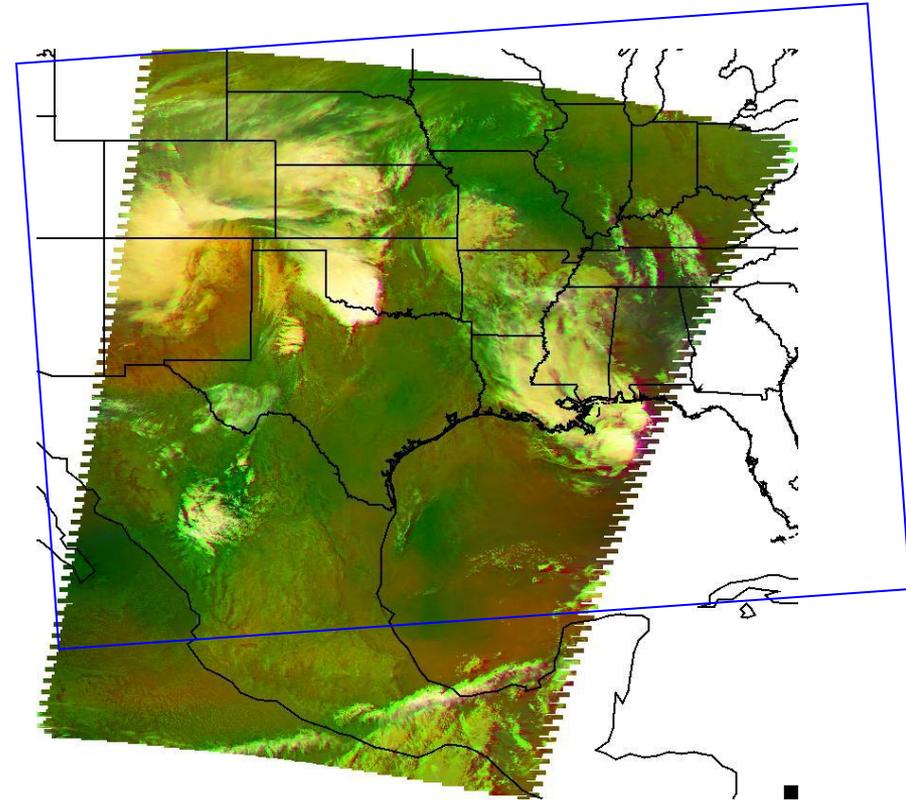


VIIRS / CrIS Air Mass RGB Products

MODIS -- AIR MASS RGB



VIIRS / CrIS -- AIR MASS RGB



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Presentations

RGB applications at National Centers – Michael Brennan, Satellite Champion at NHC and Michael Folmer, Satellite Champion at HPC/OPC/SAB

RGBs in AWIPS /AWIPS II at WFOs – Kevin Fuell, Satellite Liaison at SPoRT

Raytheon AWIPS II solution for RGBs – Jordan Gerth, Satellite / AWIPS II focal point at CIMSS

Discussion