Infrastructure Enhancements to Support Educational Use of GOES-16

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Introduction

The Meteorology Program at Embry-Riddle Aeronautical University (ERAU) in Daytona Beach, Florida was a recipient of the 2017 Unidata equipment grants with a goal of upgrading existing infrastructure to support some of the new challenges associated with the GOES-R family of satellites that has begun with the operational implementation of GOES-16. The infrastructure improvements will certainly benefit the students of ERAU in their educational experiences but will also allow ERAU to share the GOES-R data with the Internet community via protocols made possible with Unidata software (such as the ADDE service). Internal to the ERAU, the impact will be significant. Approximately 20-25% of the ERAU student body takes a meteorology course every year. Most of these students are in the Aeronautical Science, Air Traffic Management and Commercial Space Operations degree programs. In an era where satellite data are at a resolution that is comparable to NEXRAD data in spatial dimensions and at a higher resolution in temporal frequency, becoming familiar with these data can be an important experience to promote safety in these industries.

Hardware Upgrades

A number of upgrades were made to existing hardware in our infrastructure. Unidata funds provided hard disks for a new 26 TB disk array, as well as memory upgrades to four of our systems, allowing us to significantly increase our LDM product queue size, as well as provide for a RAM disk to use for scratch space for the stitching of GOES tiles received through our two NOAAPort Receiving Systems (NRS). Additionally, the ERAU Information Technology Department provided the necessary hardware for us to have a 10 Gbps communication pathway between our servers and to our classroom and laboratory computers. A summary of the hardware changes are provided in the following section.

Hurricane.db.erau.edu
Model: HP ProLiant DL380 Gen9
Processor: 2x Intel(R) Xeon(R) CPU E5-2620 v3 @ 2.40GHz, 6 cores (12 total cores), 24 total threads
Memory: 96GB 1866 MHz DDR4 ECC

- Added one (1) dual port 10Gbps network card
    - Provided by ERAU Information Technology
- Removed original ten (10) 900GB hard drive array
- Used two (2) 900GB hard drives to create a Virtual Machine storage array
    - 838 gigabytes (formatted)
    - RAID 1
- Used four (4) 900GB hard drives to create an AWIPS II storage array
    - 1.7 terabytes (formatted)
    - RAID 5
- Added sixteen (16) 2TB hard drives

    - 26 terabytes (formatted)
    - RAID 5, one hot spare
    - Funding provided by UNIDATA
- Added four (4) 8GB memory sticks
    - System memory increased to 96 gigabytes
    - Funding provided by UNIDATA

Gale.db.erau.edu
Model: HP ProLiant DL380 Gen9
Processor: 2x Intel(R) Xeon(R) CPU E5-2620 v3 @ 2.40GHz, 6 cores (12 total cores), 24 total threads
Memory: 96GB 1866 MHz DDR4 ECC

- Added one (1) dual port 10Gbps network card
    - Provided by ERAU Information Technology
- Used two (2) 900GB hard drives from hurricane to create a Virtual Machine storage array
    - 838 gigabytes (formatted)
    - RAID 1
- Added two (2) 900GB hard drives from hurricane to storage array
    - 8.2 terabytes (formatted)
    - RAID 5, one hot spare
- Added four (4) 8GB memory sticks
    - System memory increased to 96 gigabytes
    - Funding provided by UNIDATA

Wxnport1.db.erau.edu

- Added four (4) 4GB memory sticks
    - System memory increased to 24 gigabytes
    - Funding provided by UNIDATA

Wxnport2.db.erau.edu

- Added four (4) 4GB memory sticks
    - System memory increased to 24 gigabytes
    - Funding provided by UNIDATA

Downburst.db.erau.edu

- Added one (1) dual port 10Gbps network card
    - Provided by ERAU Information Technology

Microburst.db.erau.edu

- Added one (1) dual port 10Gbps network card
    - Provided by ERAU Information Technology

New hardware installed:

- Cisco 24-port 10Gbps network switch
- Provided by ERAU Information Technology

Data Processing

Data are received via our NRS and are then pushed using the Unidata LDM software to a virtual machine that has been configured to receive the GOES R – East (GRE) products from our two receivers. The virtual machine uses the LDM-alchemy tool called “goes-restitch.py” (available from https://github.com/Unidata/ldm-alchemy) to construct mosaic data from the tiles that are broadcasted over

NOAAPort. (Details of the NOAAPort distribution of GOES-R data can be found at: http://www.nws.noaa.gov/noaaport/html/GOES_R.shtml.) The stitched images are then filed on the 26 TB disk array located on the server.

A complimentary effort for data processing is made using data that are received by the Unidata GOES downlink servers, using the Unidata McIDAS X software and ADDE data distribution service. We use these data to provide a number of multi-channel / multi-satellite data products. These products are available as web server images, as described in the next section. We also provide users access to these products via the ADDE service using the Unidata McIDAS X software.

Available Products

Images are made from two different GOES sources, the CONUS domain and the full disk imagery. The CONUS imagery is on a scheduler that provides new imagery roughly every five minutes, while the full disk imagery is every fifteen (for GOES-16/GOES East). The GOES-15 (GOES West) data are still on the old scanning schedule. For each of these two input datasets there are a variety of products, and regional views, that are provided in image format.

CONUS Image Products

Day / Night Visible

The day/night visible satellite images are full color images constructed to provide easily interpreted information on clouds during both day and night. While satellite images are very useful for a wide variety of users, they are particularly helpful in identifying areas of clouds and fog for general aviation pilots who must fly within sight of ground (VFR Rules). The goal of this product is to generate satellite images that appear similar in both day and night. During the daytime, a three-channel color image is generated. The clouds above 18,000 feet are tinted light blue to distinguish the high clouds from the lower clouds. At night, an image is derived from multiple infrared channels to generate an image that has an appearance that is similar to the daytime visible image.

During the day the color images are generated from channels 1 (blue), 2 (red), and 3 (vegetation) on the GOES-16 satellite. The GOES satellite does not have a true green channel, so the 0.8-micrometer vegetation channel is used as a substitute green channel. To distinguish the high clouds (above 18,000 feet) from the low clouds a corrected infrared temperature is converted to cloud top height. A multi-channel technique is used to distinguish cirrus clouds from lower cloud tops, as cirrus clouds tend to have a warmer apparent cloud top due to transmission from below. The conversion of temperature to height is done using climatological standard atmospheres varying for season and latitude. The portion of the image that is covered by GOES-15 (GOES West) does not have all of the channels used for the eastern region, so pseudo-data are created for these pixels. More specific details of how all of this is done (for both eastern and western regions) are available at our web site.

The following image is the first of a series of example products that are all (or mostly) from the same time. The sequence of images provided are from June 22, 2018 at 0102 UTC. This time is roughly equal to the northern hemisphere summer solstice, so the terminator (separating day from night) is oriented at an angle of approximately 23.5° to lines of longitude, extending from the southwest to the northeast, such that day is located to the northwest of this line and night to the southeast in these figures. This time was chosen to highlight the strengths, and weaknesses, of the different products we are providing with respect to day-night characteristics.

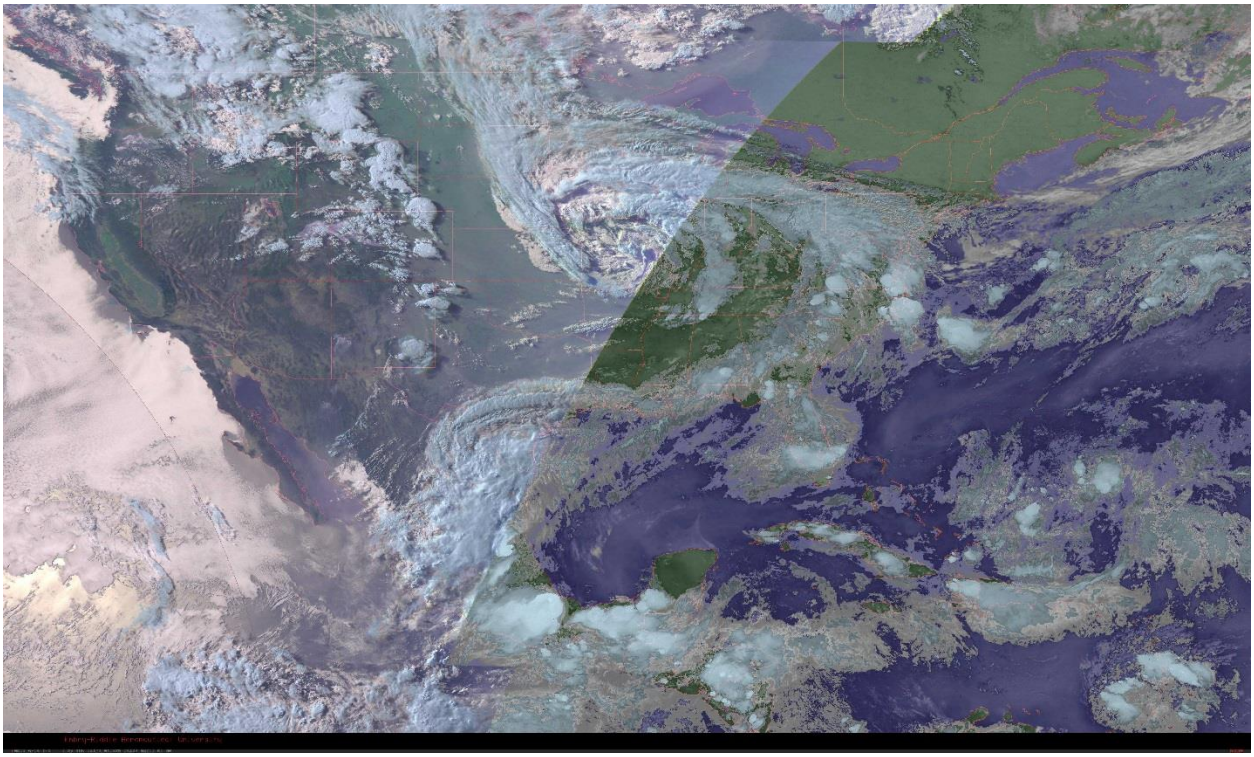

Figure 1. Sample VISFOG/VIS++ image from 2018 06 22 at 0102 UTC - Note the terminator separating day (West) from night (East)

Daytime Visible

This product uses the visible channel (GOES-16 channel 2) from the two satellites. It is possible to detect the seam between the two satellites, just west of the Baja Peninsula.

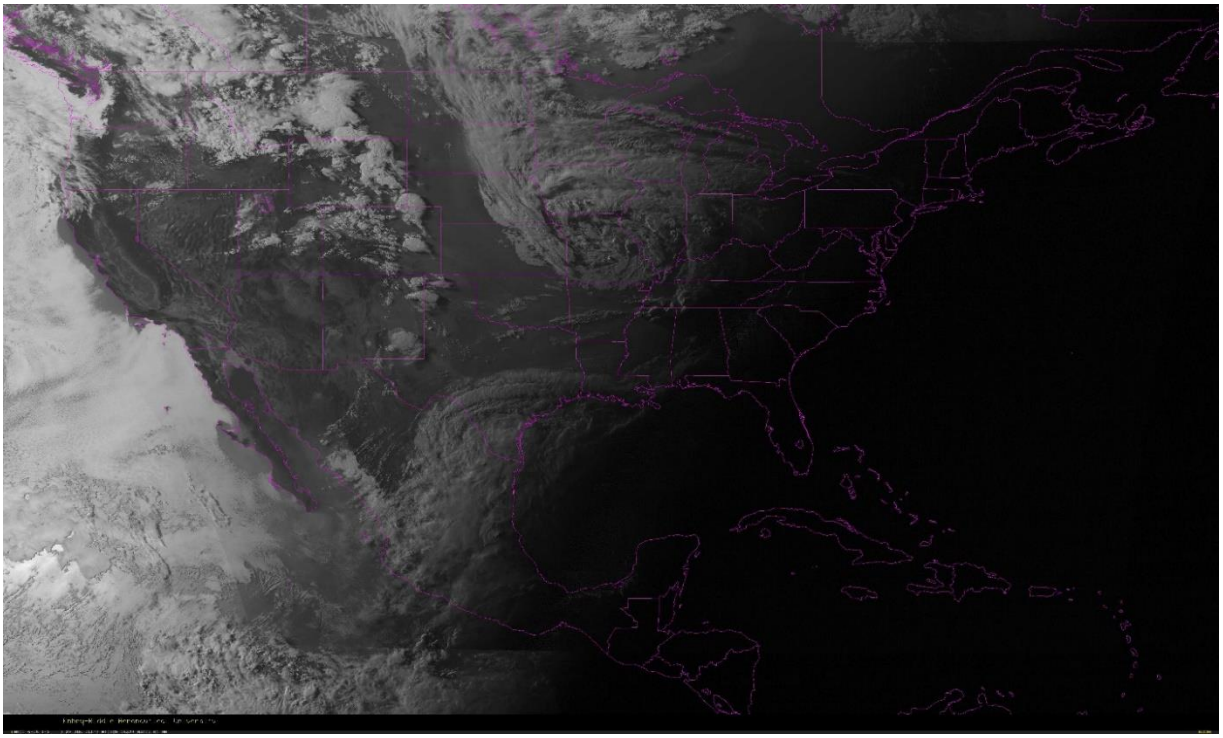

Figure 2. Sample Visible (VIS) image from 2018 06 22 at 0102 UTC - Note the natural terminator separating day (West) from night (East)

Infrared

The IR product uses the thermal IR channels from the two satellites (GOES-16 channel 13) for its composite.

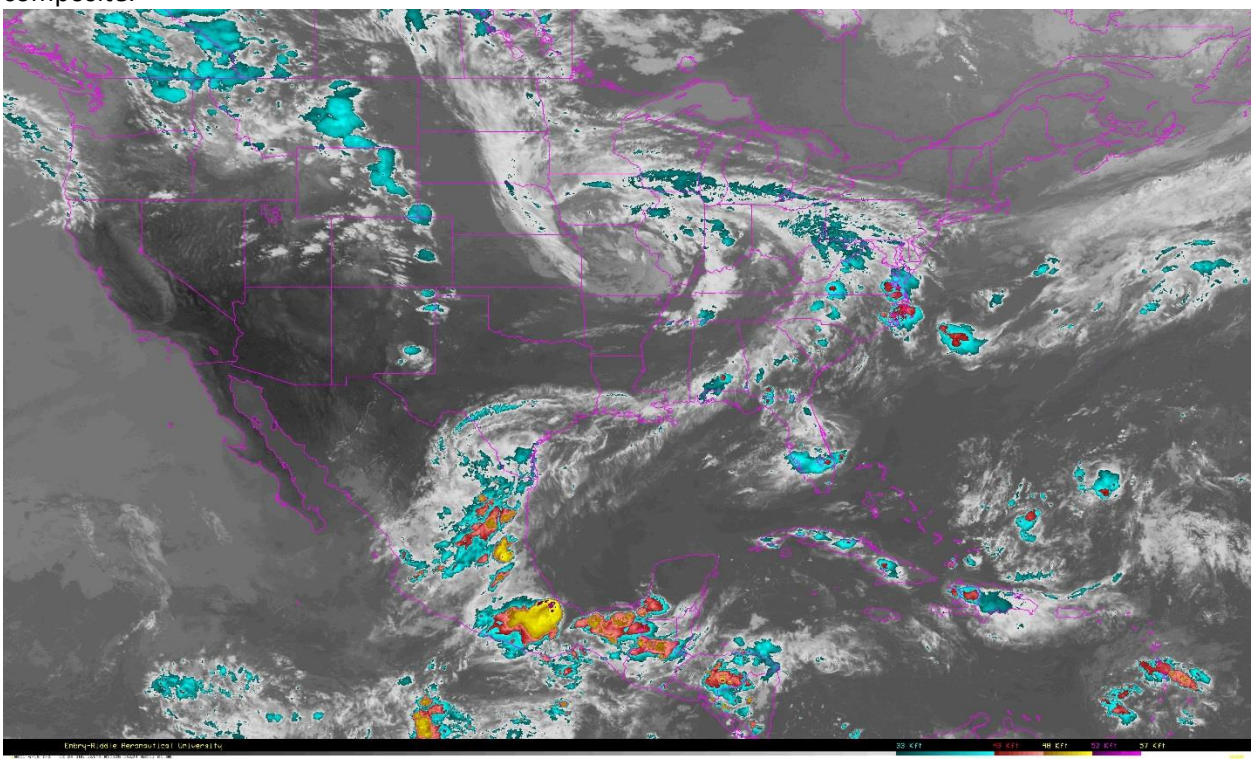

Figure 3. Sample IR image from 2018 06 22 at 0102 UTC

Water Vapor

Our "traditional" water vapor product uses the water vapor channel from the two satellites (GOES-16 channel 9).

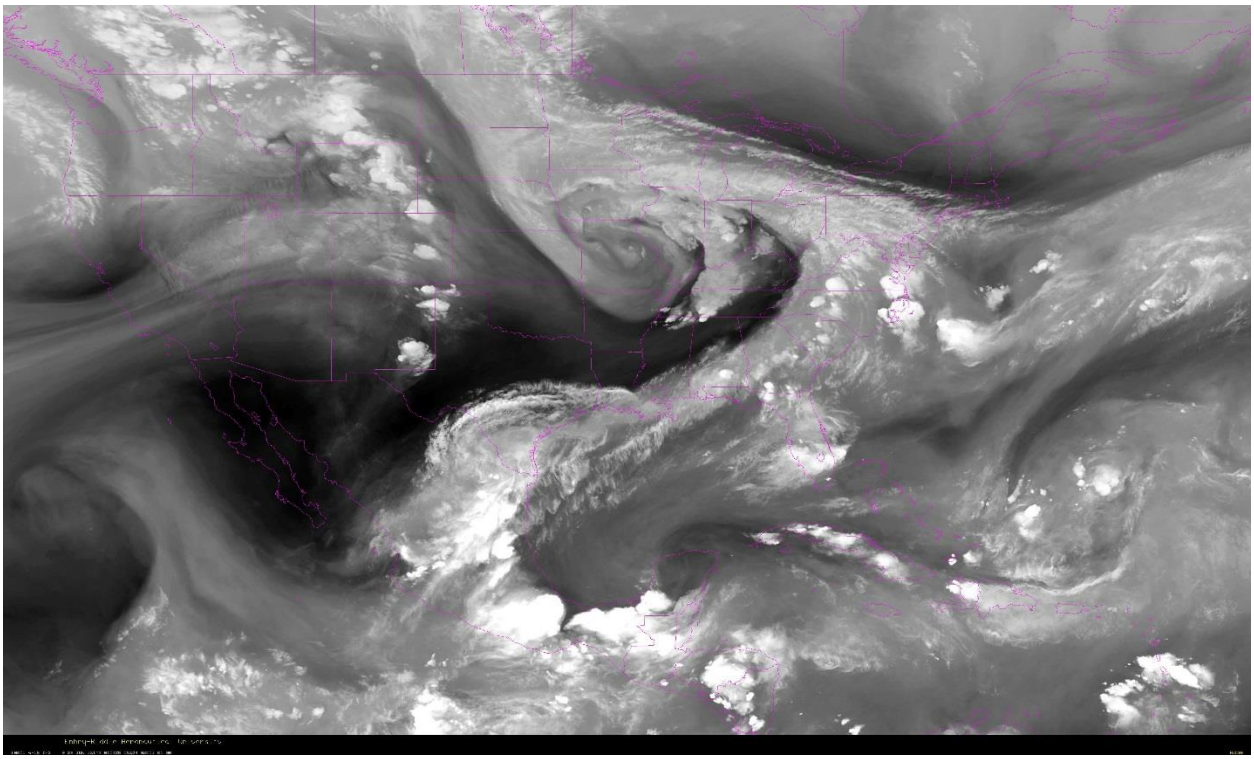

Figure 4. Sample water vapor image from 2018 06 22 at 0102 UTC

Water Vapor (3 channel)

Our three-channel water vapor product allows for some assessment of the vertical moisture profile. A three-channel color image is generated by sending each of the channels to the red, green, or blue components of each pixel. For the color water vapor image, the channel 8 image is sent to the blue component, the channel 9 to the green component, and the channel 10 to the red component. Where all three channels have the same brightness, the blue, green, and red components combine to show shades of gray or white. These are the cirrus clouds. Where the channel 8 is brighter than channels 9 and 10, the image looks a dark blue showing that the upper atmosphere is rather dry. Where channels 8 and 9 are equally bright and channel 10 is darker, the blue and green make the cyan color in the image. This shows there is a deep layer of water vapor in the upper part of the atmosphere.

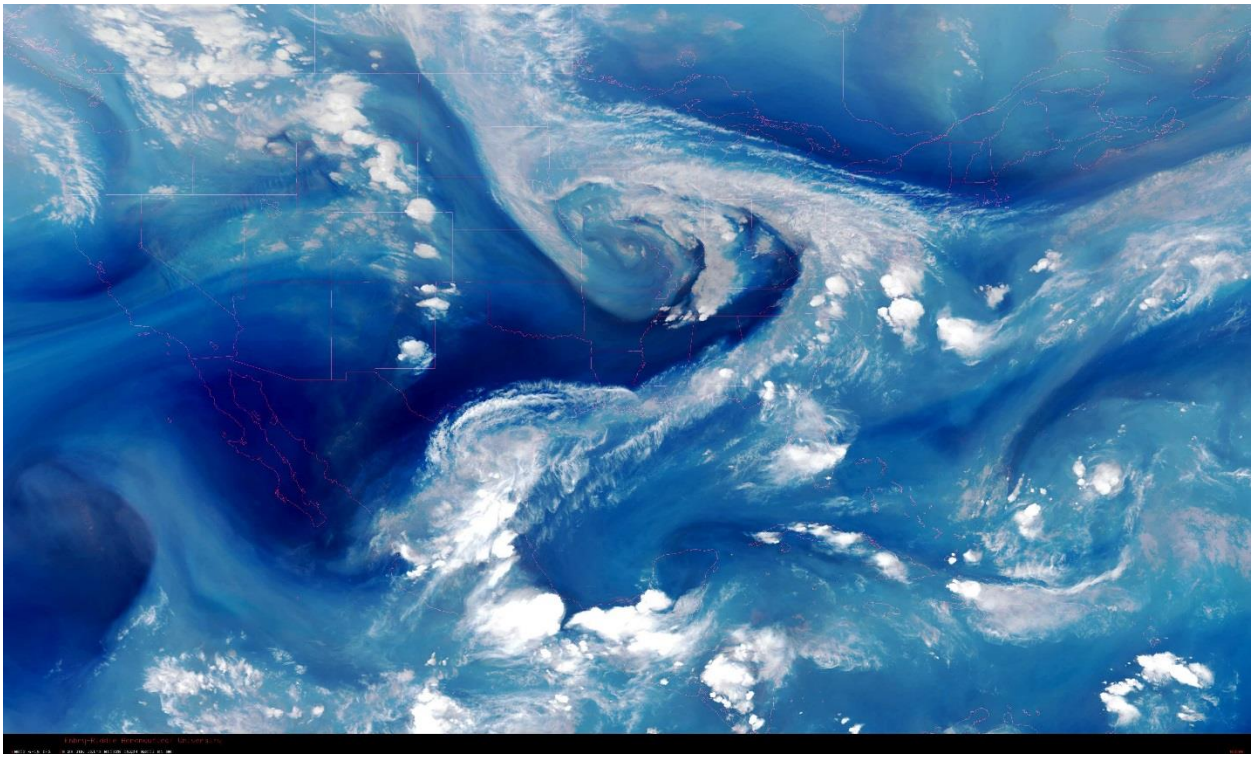

Figure 5. Sample multi-channel water vapor image from 2018 06 22 at 0102 UTC

Smoke Detection

The smoke detection product is generated by displaying the channel 3 (.8 micron near infrared vegetation channel) in the red pixels of the display and the channel 1 (blue) image in the blue and green pixels. The smoke particles are small and do not reflect much sunlight in the channel 3, but do reflect the sunlight in the blue channel. The resultant image has the clouds being white, land being a red color, and the smoke being a cyan blue color. Since the algorithm is based on reflected sunlight, it does not work at night. The forest fires generate more smoke in the afternoon when the wind picks up. The smoke tends to be easier to detect when viewing an animation of a regional view containing fires.

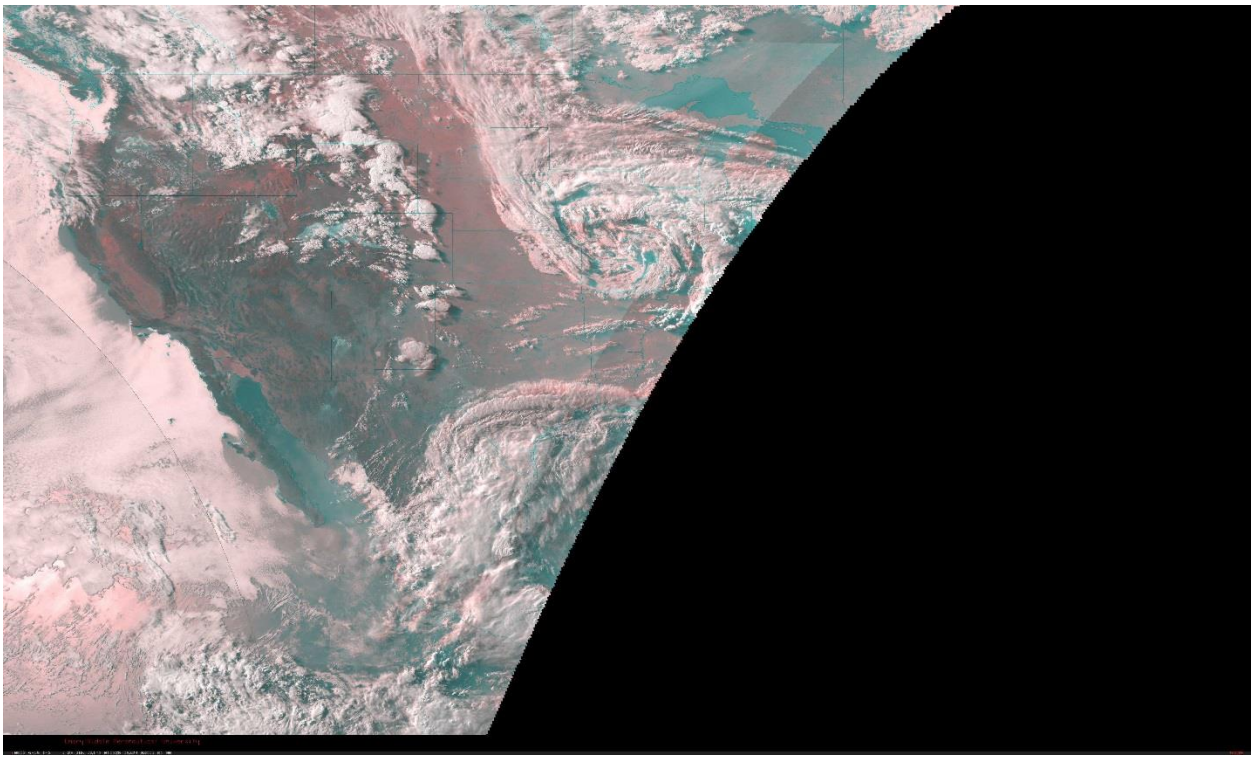

Figure 6. Sample multi-channel Smoke Detection image from 2018 06 22 at 0102 UTC

Hemispheric Image Products

The hemispheric images are all selected from a common time, valid June 24, 2018 at 1200 UTC. This is a time where it is daytime in the northeastern part of the image and nighttime in the southwestern part.

Day / Night Visible

These images are processed the same as for the CONUS region, except they come from the 15-minute hemispheric data. In addition, a "Western Hemisphere" product uses both of the GOES satellites. (Not shown here, except for the Convective Diagnostic product below.)

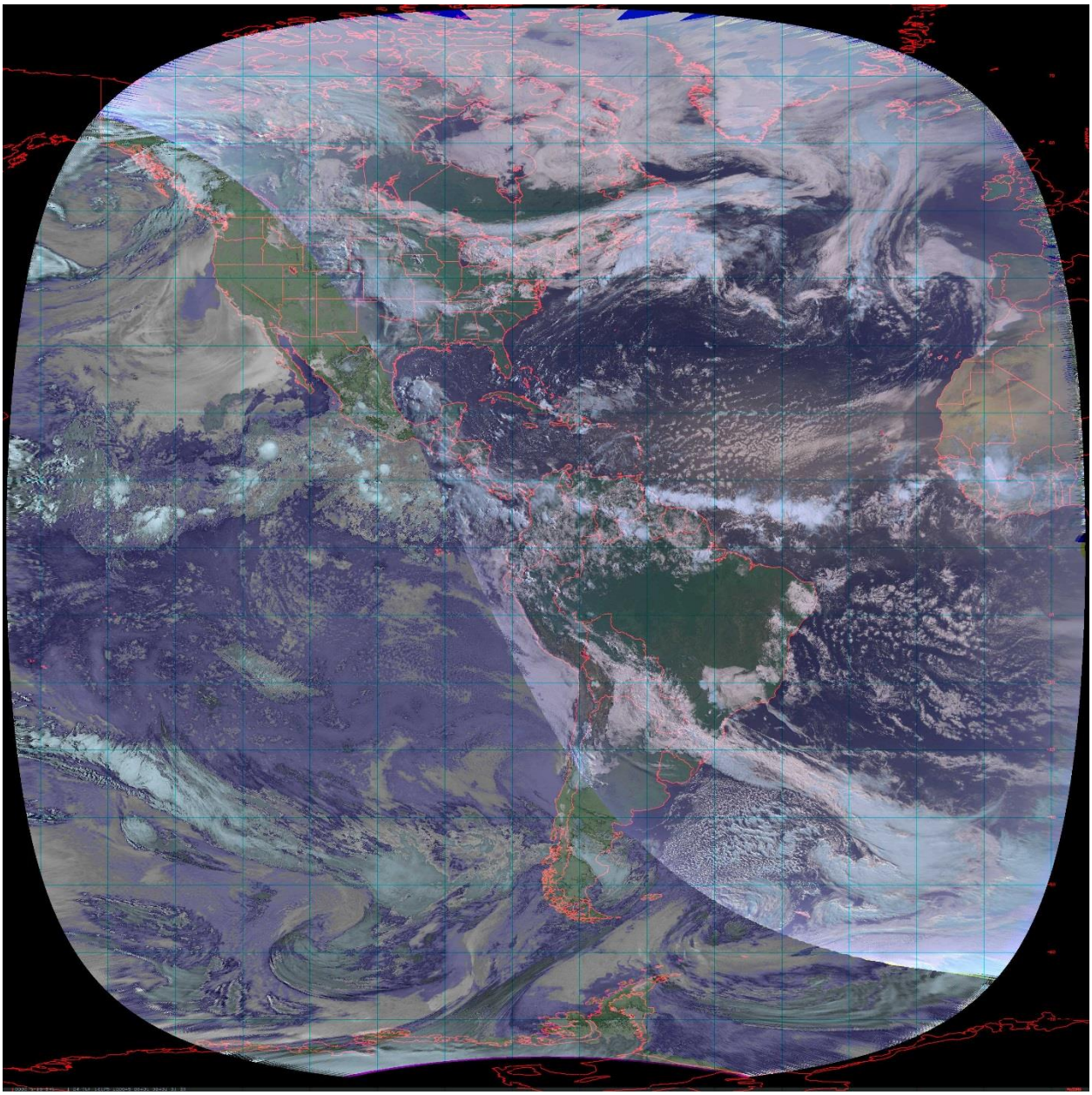

Figure 7. Sample VISFOG/VIS++ image from 2018 06 24 at 1200 UTC

Infrared

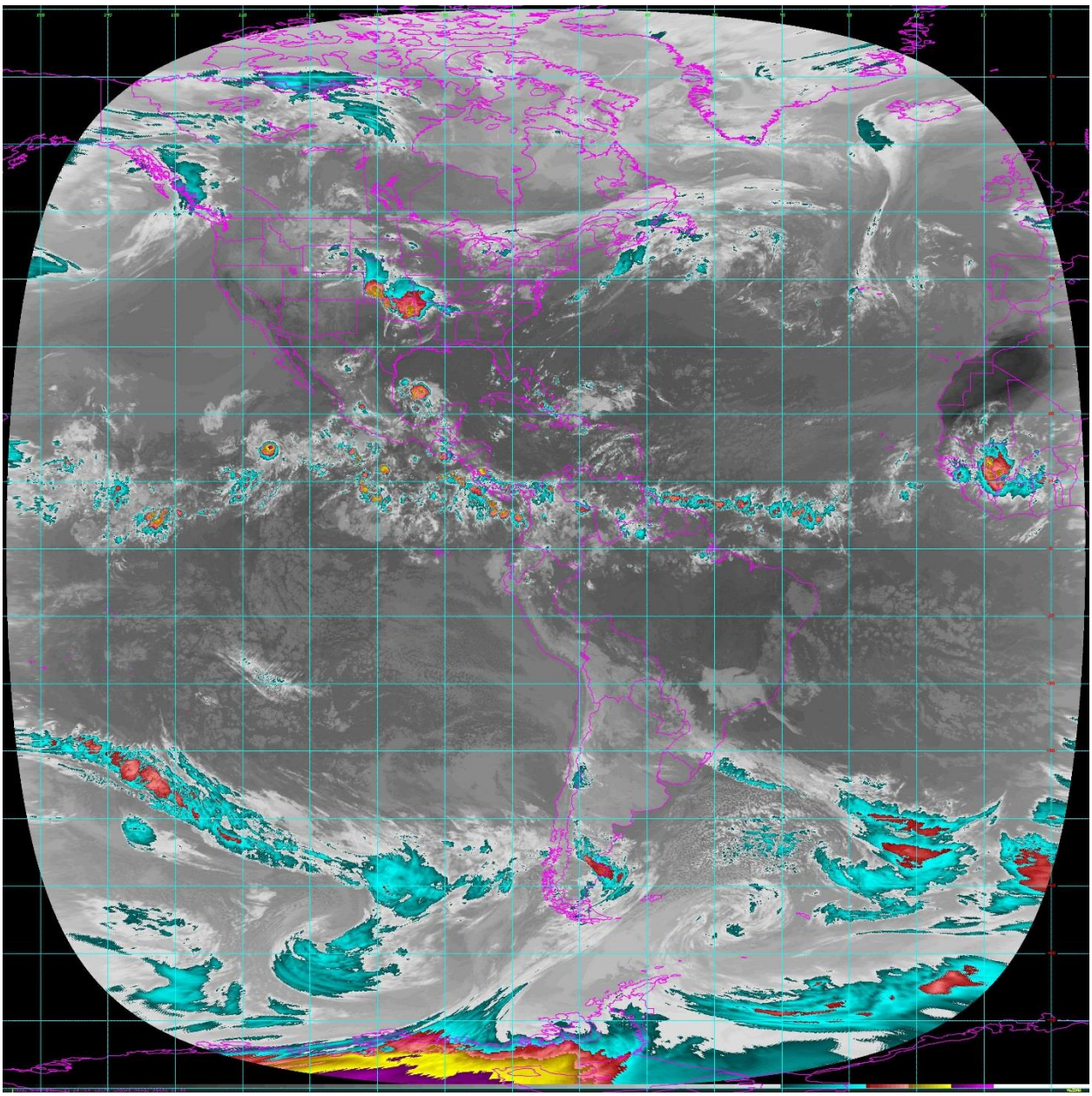

Figure 8. Sample IR image from 2018 06 24 at 1200 UTC

Water Vapor

The multi-channel water vapor image is created using the same technique as for the CONUS data, but uses the 15-minute hemispheric data for inputs.

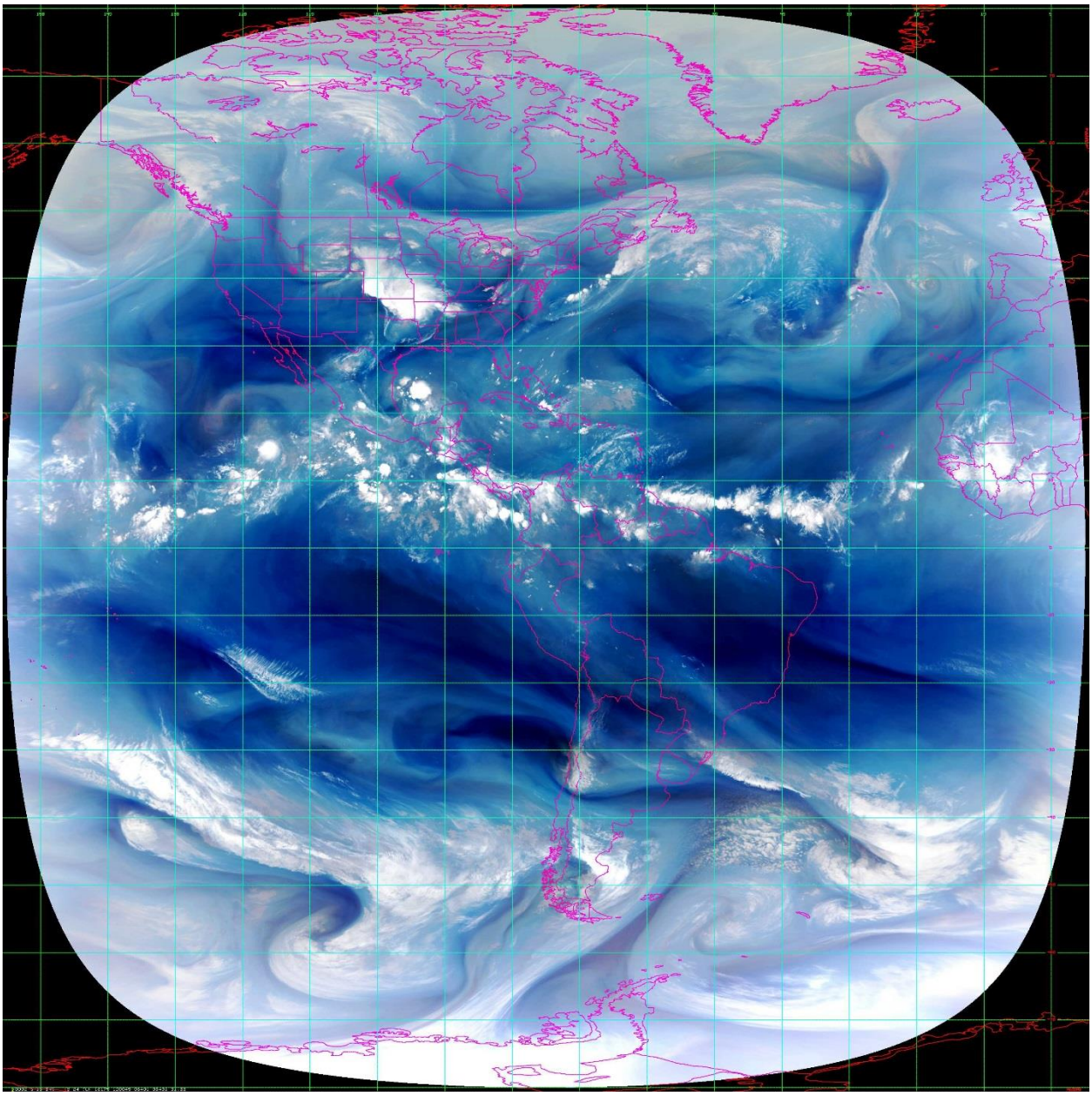

Figure 9. Sample Multi-channel water vapor image from 2018 06 24 at 1200 UTC

Convective Diagnostic

This new product for GOES-16 is a display of 15 minutes of lightning flash data from the GOES Lightning Mapper (GLM) (small blue crosses) overlaid on a satellite image. The satellite image is the difference between the 10.5-micrometer IR channel (channel 13) and the 9.6-micrometer ozone channel (channel 12) with a high pass filter applied to enhance cloud top texture. This is the same image product as the nighttime high clouds used in the day/night visible images. The areas covered by the GOES-west satellite are still the old algorithm of the difference between the IR and water vapor channels, which shows where there are thick, high clouds (in red).

The new GLM instrument detects lightning with a field of service around 50 degrees from the sub-satellite point. The lightning data range extends from southern Canada just north of the US border down to almost the tip of South America. It extends from the west coast of California almost to the coast of Africa. The GOES imager has a field of service around 70 degrees, so there is a gap of no lightning data over most of Canada and the north Atlantic.

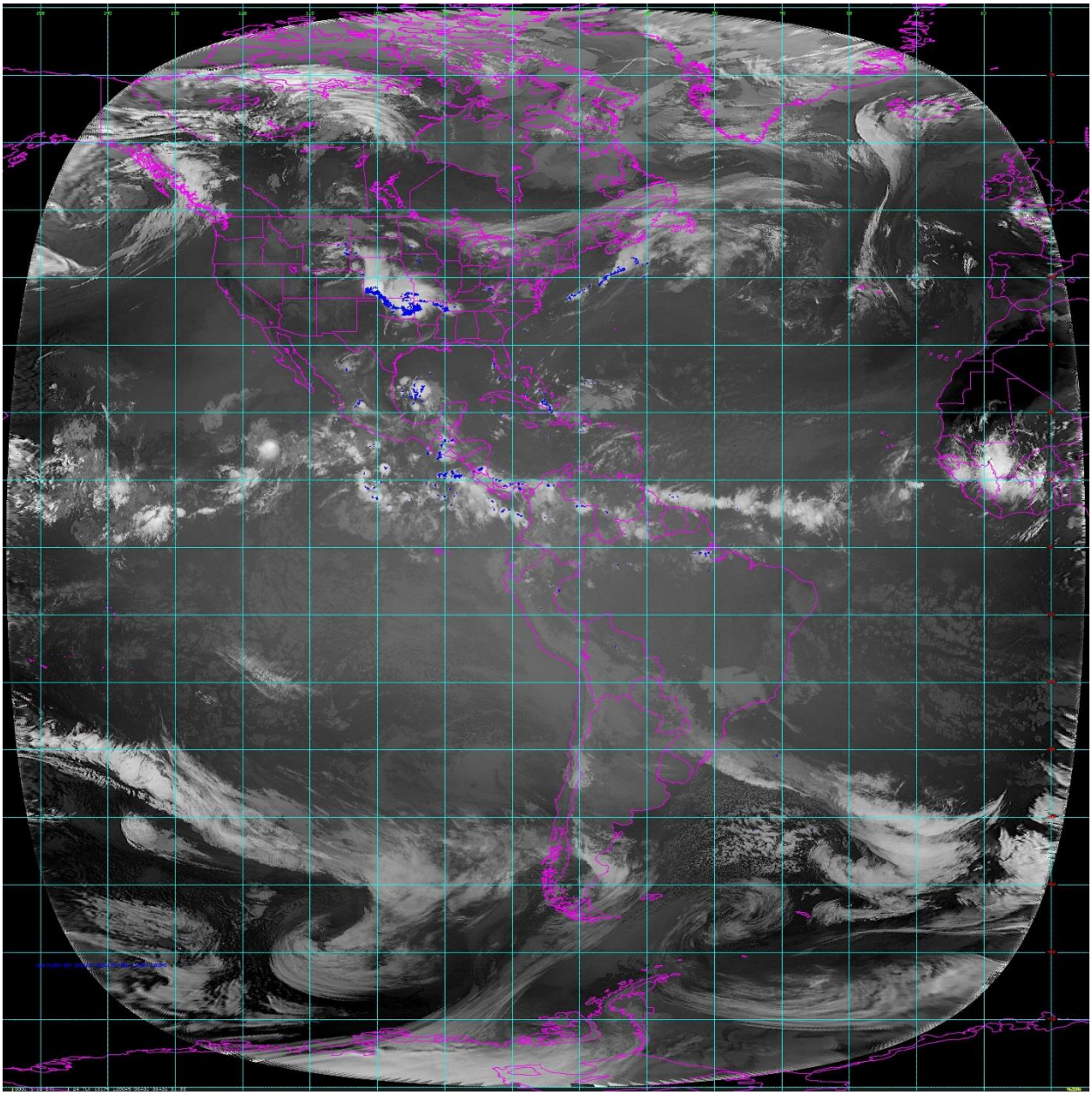

Figure 10. Sample Multi-channel Convective Diagnostic image with GLM overlay from 2018 06 24 at 1200 UTC

The multi-satellite Convective Diagnostic uses a simple idea to define convective regions. If the radiative temperature of the WV channel is similar to the radiative temperature of the IR channel then this is an indicator of a strong updraft bringing a lot of water to the top of the cloud layer. Regions of similar radiative temperatures are colored red in these images. Issues near the limb of the satellite view are being addressed, but the areas of convection closer to the satellite nadir point show good skill for diagnosing areas of convection.

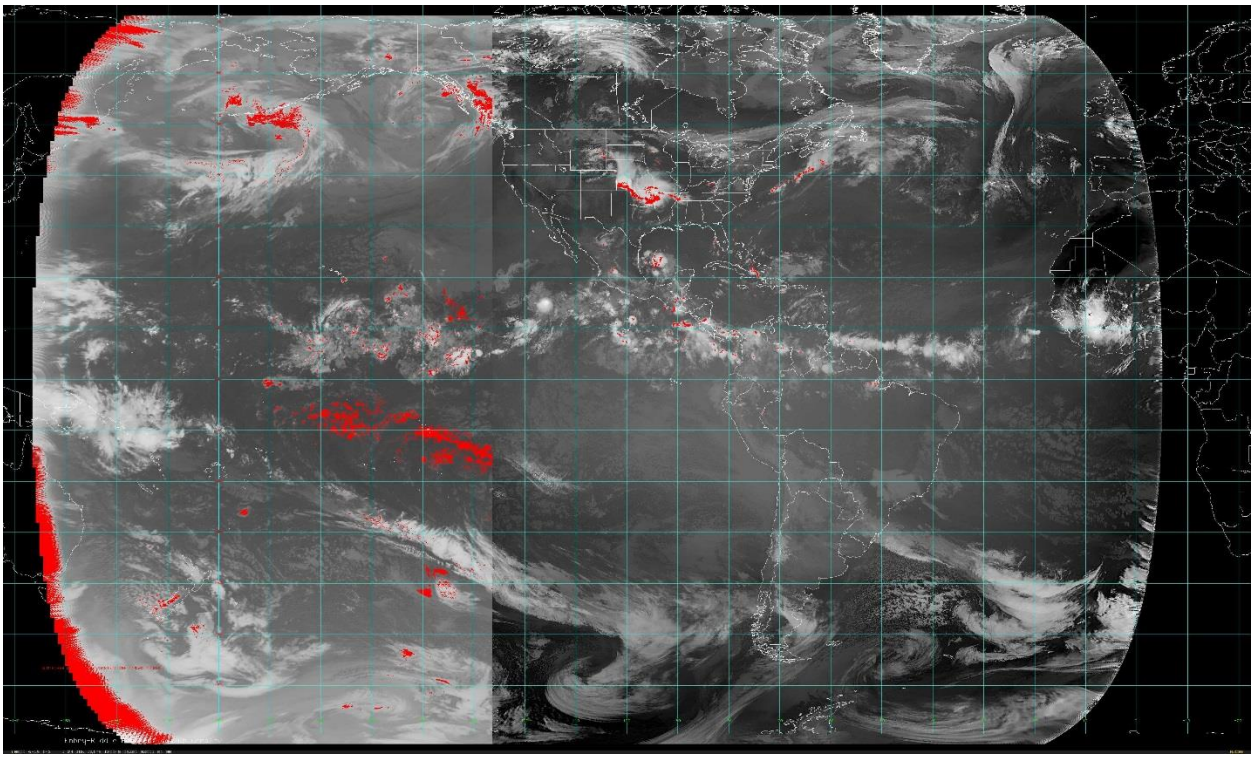

Figure 11. Sample Multi-channel and Multi-Satellite Convective Diagnostic image from 2018 06 24 at 1200 UTC

Volcanic Ash and Dust

Our volcanic ash and dust product is still under development given the new breadth of channels available with GOES-16. Our Western Hemisphere product relies on channels available in both the older and newer satellite platforms. We will have the details of how this product is made posted on our web site.

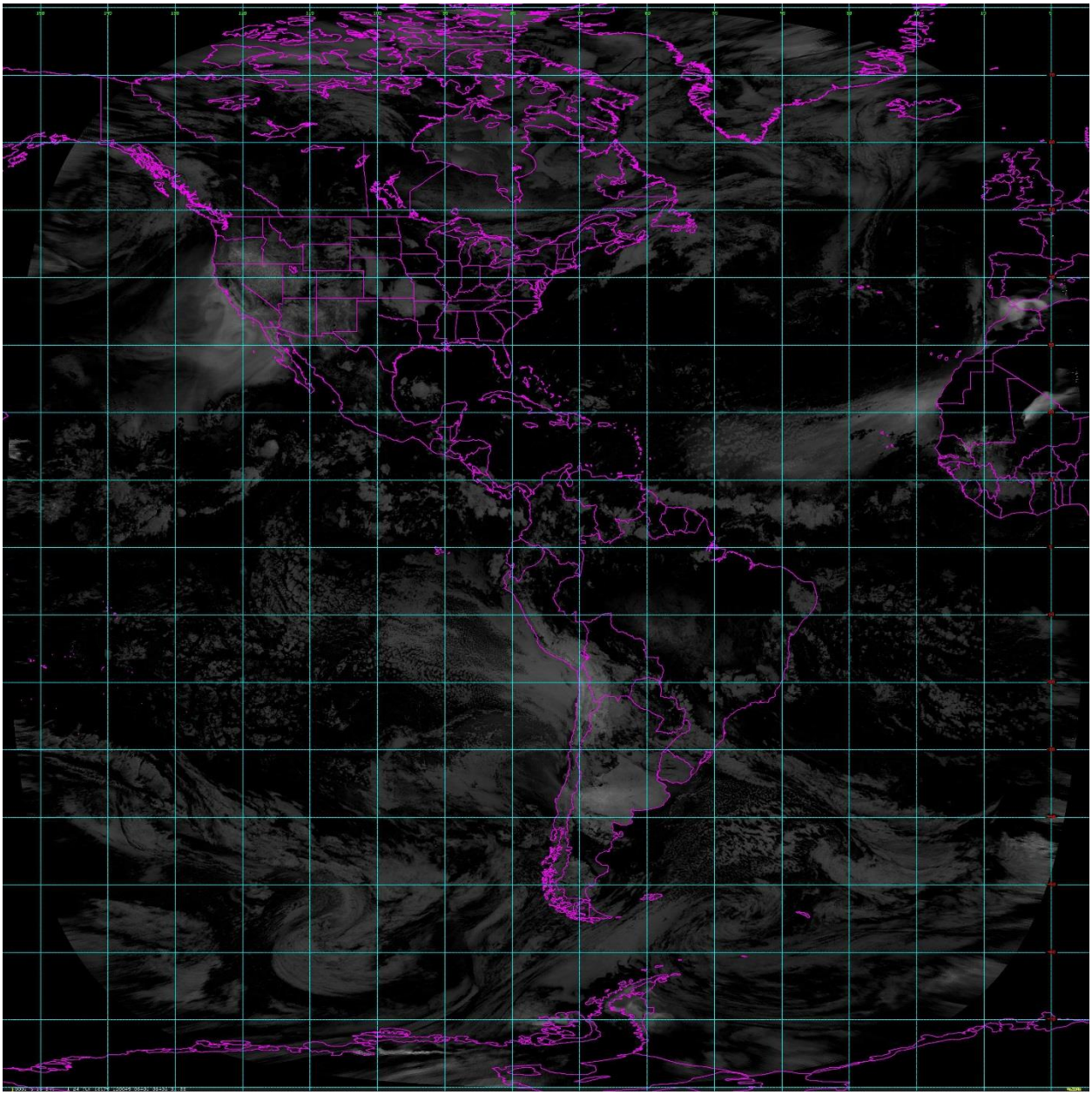

Figure 12. Sample Multi-channel Volcanic Ash and Dust image from 2018 06 24 at 1200 UTC

All of the products described here (and for many regions not shown), as well as some products for Europe and Asia available at synoptic periods, and some images made to promote 3-dimensional viewing are available at our web site at: http://wx.erau.edu/erau_sat/.

At this site you will find images for many different sectors, our new live-image selector maps, documentation related to these resources, and a link to our old (circa 2000) clickable image map for viewing the images. Our old selector maps show some of the sectors that we make.

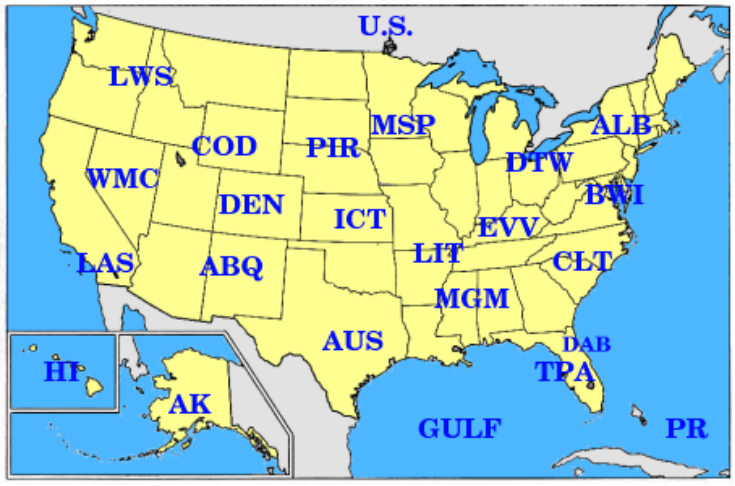

Figure 13. Our old selector map showing the sectors available from the GOES-16 CONUS data

Figure 14. Our old selector map for sectors that come from the GOES-15 scans and the GOES-16 Hemispheric data.

Data via ADDE

Many products are available from ERAU through our newly commissioned ADDE server, named wxdata.db.erau.edu. On this server you will find the products described previously in the imagery section, as well as several products that are available from other ADDE servers due to products being distributed via NOAAPort or the Unidata sponsored IDD system.

Group Name	Product	Description / Comment
ERAU	CONUS_VISPP	ERAU CONUS VIS_Fog images
ERAU	CONUS_IR	ERAU CONUS IR images
ERAU	CONUS_WV	ERAU CONUS WV images
ERAU	WHEM_VISPP	ERAU Western Hemi. Vis_Fog images
ERAU	WHEM_IR	ERAU Western Hemi. IR images
ERAU	WHEM_WV	ERAU Western Hemi. WV images

Group Name	Product	Description / Comment
GOES16	CONUSC01	NOAAPort GOES-16 CONUS 0.47 um VIS aerosol-over-land
GOES16	CONUSC02	NOAAPort GOES-16 CONUS 0.64 um VIS clouds fog/insol/wind
GOES16	CONUSC03	NOAAPort GOES-16 CONUS 0.86 um Near IR veg/burn scar/aerosol
GOES16	CONUSC04	NOAAPort GOES-16 CONUS 1.37 um Near IR cirrus cloud
GOES16	CONUSC05	NOAAPort GOES-16 CONUS 1.61 um Near IR cloud phase/snow
GOES16	CONUSC06	NOAAPort GOES-16 CONUS 2.24 um Near IR land/cloud vege/snow
GOES16	CONUSC07	NOAAPort GOES-16 CONUS 3.89 um IR Sfc/cloud/fog/fire/winds
GOES16	CONUSC08	NOAAPort GOES-16 CONUS 6.17 um IR High-level WV/winds/rainfall
GOES16	CONUSC09	NOAAPort GOES-16 CONUS 6.93 um IR Mid-level WV/winds/rainfall
GOES16	CONUSC10	NOAAPort GOES-16 CONUS 7.34 um IR Lower-level WV/winds & SO2
GOES16	CONUSC11	NOAAPort GOES-16 CONUS 8.44 um IR Total WV cloud phase/dust
GOES16	CONUSC12	NOAAPort GOES-16 CONUS 9.61 um IR Total ozone/turbulence/wind
GOES16	CONUSC13	NOAAPort GOES-16 CONUS 10.3 um IR Surface & cloud
GOES16	CONUSC14	NOAAPort GOES-16 CONUS 11.2 um IR Imagery/SST/clouds/rainfall
GOES16	CONUSC15	NOAAPort GOES-16 CONUS 12.3 um IR Total water/ash and SST
GOES16	CONUSC16	NOAAPort GOES-16 CONUS 13.3 um IR Air temp/cloud hgt and amt

Group Name	Product	Description / Comment
GOES16	FDC01	NOAAPort GOES-16 Full Disk 0.47 um VIS aerosol-over-land
GOES16	FDC02	NOAAPort GOES-16 Full Disk 0.64 um VIS clouds fog/insol/wind
GOES16	FDC03	NOAAPort GOES-16 Full Disk 0.86 um Near IR veg/burn scar/aerosol
GOES16	FDC04	NOAAPort GOES-16 Full Disk 1.37 um Near IR cirrus cloud
GOES16	FDC05	NOAAPort GOES-16 Full Disk 1.61 um Near IR cloud phase/snow
GOES16	FDC06	NOAAPort GOES-16 Full Disk 2.24 um Near IR land/cloud vege/snow
GOES16	FDC07	NOAAPort GOES-16 Full Disk 3.89 um IR Sfc/cloud/fog/fire/winds
GOES16	FDC08	NOAAPort GOES-16 Full Disk 6.17 um IR High-level WV/winds/rainfall
GOES16	FDC09	NOAAPort GOES-16 Full Disk 6.93 um IR Mid-level WV/winds/rainfall
GOES16	FDC10	NOAAPort GOES-16 Full Disk 7.34 um IR Lower-level WV/winds & SO2
GOES16	FDC11	NOAAPort GOES-16 Full Disk 8.44 um IR Total WV cloud phase/dust
GOES16	FDC12	NOAAPort GOES-16 Full Disk 9.61 um IR Total ozone/turbulence/wind
GOES16	FDC13	NOAAPort GOES-16 Full Disk 10.3 um IR Surface & cloud
GOES16	FDC14	NOAAPort GOES-16 Full Disk 11.2 um IR Imagery/SST/clouds/rainfall
GOES16	FDC15	NOAAPort GOES-16 Full Disk 12.3 um IR Total water/ash and SST
GOES16	FDC16	NOAAPort GOES-16 Full Disk 13.3 um IR Air temp/cloud hgt and amt

Group Name	Product	Description / Comment
GOES16	PRC01	NOAAPort GOES-16 Puerto Rico 0.47 um VIS aerosol-over-land
GOES16	PRC02	NOAAPort GOES-16 Puerto Rico 0.64 um VIS clouds fog/insol/wind
GOES16	PRC03	NOAAPort GOES-16 Puerto Rico 0.86 um Near IR veg/burn scar/aerosol

GOES16	PRC04	NOAAPort GOES-16 Puerto Rico 1.37 um Near IR cirrus cloud
GOES16	PRC05	NOAAPort GOES-16 Puerto Rico 1.61 um Near IR cloud phase/snow
GOES16	PRC06	NOAAPort GOES-16 Puerto Rico 2.24 um Near IR land/cloud vege/snow
GOES16	PRC07	NOAAPort GOES-16 Puerto Rico 3.89 um IR Sfc/cloud/fog/fire/winds
GOES16	PRC08	NOAAPort GOES-16 Puerto Rico 6.17 um IR High-level WV/winds/rainfall
GOES16	PRC09	NOAAPort GOES-16 Puerto Rico 6.93 um IR Mid-level WV/winds/rainfall
GOES16	PRC10	NOAAPort GOES-16 Puerto Rico 7.34 um IR Lower-level WV/winds & SO2
GOES16	PRC11	NOAAPort GOES-16 Puerto Rico 8.44 um IR Total WV cloud phase/dust
GOES16	PRC12	NOAAPort GOES-16 Puerto Rico 9.61 um IR Total ozone/turbulence/wind
GOES16	PRC13	NOAAPort GOES-16 Puerto Rico 10.3 um IR Surface & cloud
GOES16	PRC14	NOAAPort GOES-16 Puerto Rico 11.2 um IR Imagery/SST/clouds/rainfall
GOES16	PRC15	NOAAPort GOES-16 Puerto Rico 12.3 um IR Total water/ash and SST
GOES16	PRC16	NOAAPort GOES-16 Puerto Rico 13.3 um IR Air temp/cloud hgt and amt

Group Name	**Product**	**Description / Comment**
GOES16	MESO1C01	NOAAPort GOES-16 Mesoscale-1 0.47 um VIS aerosol-over-land
GOES16	MESO1C02	NOAAPort GOES-16 Mesoscale-1 0.64 um VIS clouds fog/insol/wind
GOES16	MESO1C03	NOAAPort GOES-16 Mesoscale-1 0.86 um Near IR veg/burn scar/aerosol
GOES16	MESO1C04	NOAAPort GOES-16 Mesoscale-1 1.37 um Near IR cirrus cloud
GOES16	MESO1C05	NOAAPort GOES-16 Mesoscale-1 1.61 um Near IR cloud phase/snow
GOES16	MESO1C06	NOAAPort GOES-16 Mesoscale-1 2.24 um Near IR land/cloud vege/snow
GOES16	MESO1C07	NOAAPort GOES-16 Mesoscale-1 3.89 um IR Sfc/cloud/fog/fire/winds
GOES16	MESO1C08	NOAAPort GOES-16 Mesoscale-1 6.17 um IR High-level WV/winds/rainfall
GOES16	MESO1C09	NOAAPort GOES-16 Mesoscale-1 6.93 um IR Mid-level WV/winds/rainfall
GOES16	MESO1C10	NOAAPort GOES-16 Mesoscale-1 7.34 um IR Lower-level WV/winds & SO2
GOES16	MESO1C11	NOAAPort GOES-16 Mesoscale-1 8.44 um IR Total WV cloud phase/dust
GOES16	MESO1C12	NOAAPort GOES-16 Mesoscale-1 9.61 um IR Total ozone/turbulence/wind
GOES16	MESO1C13	NOAAPort GOES-16 Mesoscale-1 10.3 um IR Surface & cloud
GOES16	MESO1C14	NOAAPort GOES-16 Mesoscale-1 11.2 um IR Imagery/SST/clouds/rainfall
GOES16	MESO1C15	NOAAPort GOES-16 Mesoscale-1 12.3 um IR Total water/ash and SST
GOES16	MESO1C16	NOAAPort GOES-16 Mesoscale-1 13.3 um IR Air temp/cloud hgt and amt

Group Name	**Product**	**Description / Comment**
GOES16	MESO2C01	NOAAPort GOES-16 Mesoscale-2 0.47 um VIS aerosol-over-land
GOES16	MESO2C02	NOAAPort GOES-16 Mesoscale-2 0.64 um VIS clouds fog/insol/wind
GOES16	MESO2C03	NOAAPort GOES-16 Mesoscale-2 0.86 um Near IR veg/burn scar/aerosol
GOES16	MESO2C04	NOAAPort GOES-16 Mesoscale-2 1.37 um Near IR cirrus cloud
GOES16	MESO2C05	NOAAPort GOES-16 Mesoscale-2 1.61 um Near IR cloud phase/snow
GOES16	MESO2C06	NOAAPort GOES-16 Mesoscale-2 2.24 um Near IR land/cloud vege/snow
GOES16	MESO2C07	NOAAPort GOES-16 Mesoscale-2 3.89 um IR Sfc/cloud/fog/fire/winds
GOES16	MESO2C08	NOAAPort GOES-16 Mesoscale-2 6.17 um IR High-level WV/winds/rainfall
GOES16	MESO2C09	NOAAPort GOES-16 Mesoscale-2 6.93 um IR Mid-level WV/winds/rainfall

GOES16	MESO2C10	NOAAPort GOES-16 Mesoscale-2 7.34 um IR Lower-level WV/winds & SO2
GOES16	MESO2C11	NOAAPort GOES-16 Mesoscale-2 8.44 um IR Total WV cloud phase/dust
GOES16	MESO2C12	NOAAPort GOES-16 Mesoscale-2 9.61 um IR Total ozone/turbulence/wind
GOES16	MESO2C13	NOAAPort GOES-16 Mesoscale-2 10.3 um IR Surface & cloud
GOES16	MESO2C14	NOAAPort GOES-16 Mesoscale-2 11.2 um IR Imagery/SST/clouds/rainfall
GOES16	MESO2C15	NOAAPort GOES-16 Mesoscale-2 12.3 um IR Total water/ash and SST
GOES16	MESO2C16	NOAAPort GOES-16 Mesoscale-2 13.3 um IR Air temp/cloud hgt and amt

Group Name	**Product**	**Description / Comment**
GINIWEST	VIS	GOES West VIS images
GINIWEST	IR	GOES West IR images
GINIWEST	WV	GOES West WV images
GINIWEST	3.9IR	GOES West 3.9 near IR images
GINIWEST	13.3IR	GOES West 13.3 IR images

Group Name	**Product**	**Description / Comment**
RTIMAGES	VIS	GOES East 1km VIS images
RTIMAGES	VIS4km	GOES East 4km VIS images
RTIMAGES	13.3IR	GOES East 4km 13.3 images
RTIMAGES	3.9IR	GOES East 4km 3.9 images
RTIMAGES	IR	GOES East 4km IR images
RTIMAGES	WV	GOES East 4km WV images
RTIMAGES	VIS4km	GOES West 4km VIS images
RTIMAGES	13.3IR	GOES West 4km 13.3 images
RTIMAGES	3.9IR	GOES West 4km 3.9 images
RTIMAGES	IR	GOES West 4km IR images
RTIMAGES	WV	GOES West 4km WV images

We anticipate changes to our ADDE offerings in the near future; this is especially true if GOES-17 becomes operational later this year. Our web site will have the information about our ADDE products at http://wx.erau.edu/sat_erau/about.php

Future Efforts

Our plans are to create a repository of imagery that will allow a user to go back in time to assess the weather for a particular date, and to a lesser degree at a specific time. We have made some initial tests of ways to accomplish this, and we are expecting to add a THREDDS catalog service to the wxdata.db.erau.edu server in the coming weeks. As the data continues to fill the disk array, we anticipate establishing a temporal thinning strategy. This will allow us to provide a longer time series to the user without a concern of filling the disk array. Users that identify an historical day of interest could then use the NOAA CLASS server (http://www.class.noaa.gov/) to retrieve all of the available imagery for their day(s) of interest.

We have additional plans to provide more information about the multi-channel/multi-satellite products that we create. These documents are already in preparation here at ERAU and will be posted to our "About" page as they are ready.

Finally, ERAU is working with colleagues at the College of DuPage, NOAA CIMMS, SSEC at Wisconsin and Unidata on a manuscript that we will submit to the AMS for publication on the various GOES-16 resources that are available to the community. The various teams are preparing their sections of the first draft for this manuscript, with plans to have a publication draft later this summer.