GOES: Current (10/12/11/N/O/P) to Future (GOES-R+)

Timothy J. Schmit

NOAA/NESDIS/STAR

Advanced Satellite Products Branch (ASPP)

Madison, WI

and many others

STAR Seminar
March 17th, 2006

UW-Madison

Many others to be acknowledged…

Tom Wrublewski
Steve Kirkner
Mat Gunshor
Scott Bachmeier
Ed Miller
Mike Weinreb
Sandy Ashton
Fred Wu
Tim Walsh
Don Hillger
Tony Schreiner
GOES-N,O,P Booklet
Jun Li
Paul Menzel

Fred Prata
Jim Gurka
Roger Heymann
Rick Kohrs
Wayne Feltz
Jaime Daniels
Eric Chipman
SSEC Data Center
Tony Wimmers
….

and…

Achtor, Tom; Ackerman, Steve; Antonelli, Paolo; Aune, Bob; Bachmeier, Scott; Baggett, Kevin; Baum, Bryan; Flanagan, Dan; Ellrod, Gary; Feltz, Joleen; Feltz, Wayne; Frey, Rich; Griffin, Michael K.; Gumley, Liam; Gunshor, Mat; Gurka, James J.; Hillger, Don; Huang, Allen; Key, Jeff; Knuteson, Bob; Karnauskas, Kristopher; Li, Jun; Mecikalski, John; Menzel, Paul; Moeller, Chris; Mosher, Fred; Nelson, James; Nasiri, Shaima; Olander, Tim; Plokhenko, Youri; Prins, Elaine; Purdom, Jim; Rabin, Bob; Revercomb, Hank; Schmidt, Chris; Schreiner, Tony; Seemann-Wetzel, Suzanne; Sieglaff, Justin; Strabala, Kathy; Sun, Fengying; Tobin, Dave; Uhlenbrock, Nate; Velden, Chris; Wade, Gary; Whittaker, Tom; and Woolf, Hal, Heymann, Roger, …

Topics

GOES-12/11/10

GOES-N
GOES-O/P

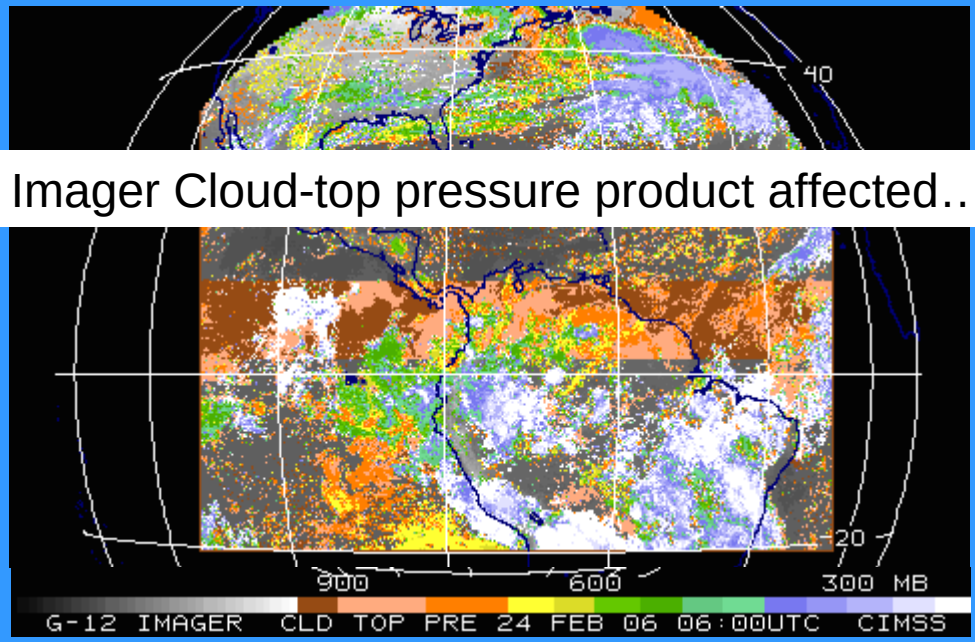
GOES-R+
- **ABI**
- **HES**
- **Data Compression**
- **GUC-IV**
- **etc.**

GIFTS

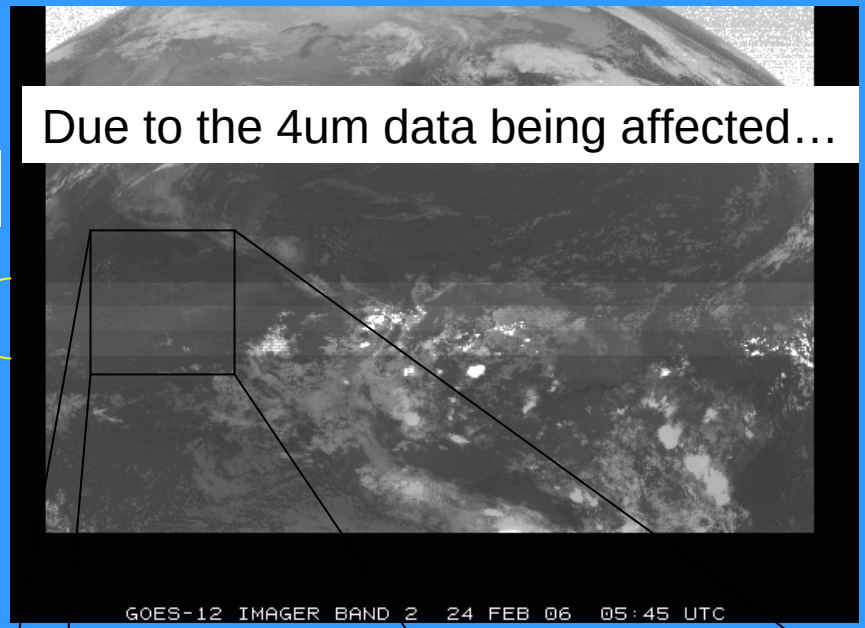
More information

Current GOES

GOES-12 Imager 4 um band just before eclipse

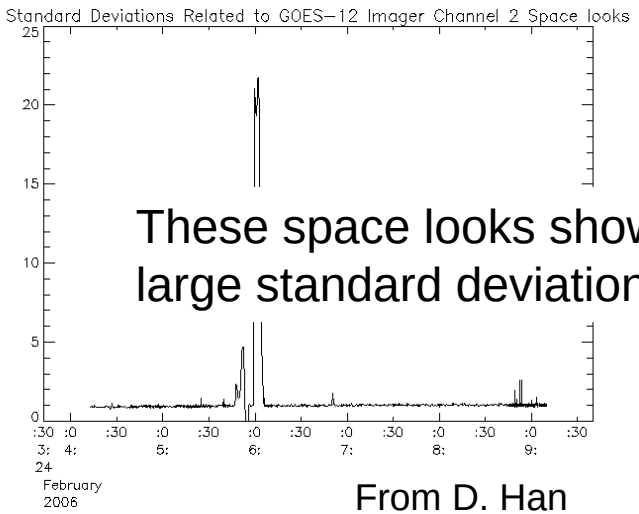


Imager Cloud-top pressure product affected…



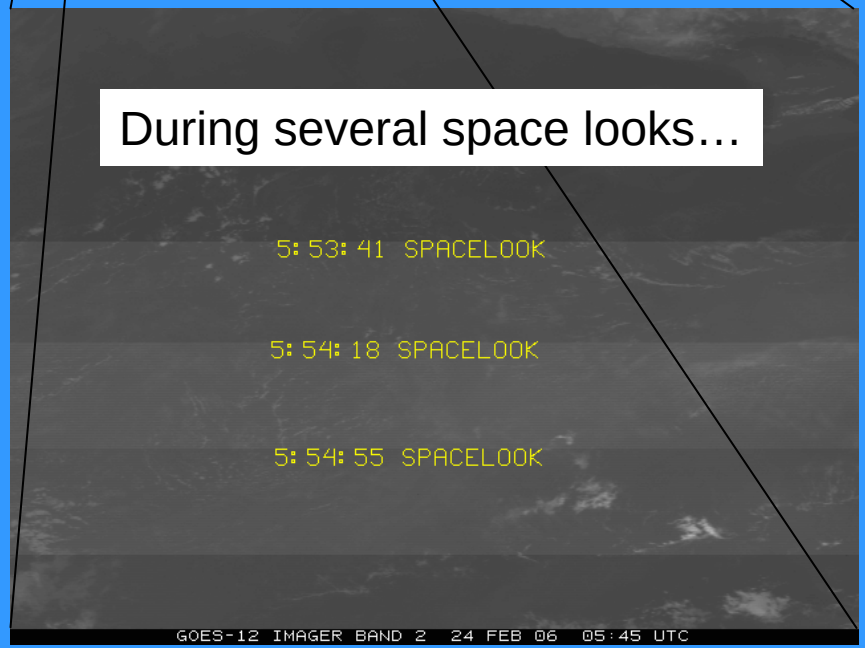
Due to the 4um data being affected…

A GOES (Geostationary Operational Environmental Satellite) Incident Report (GIR) was submitted.



These space looks showed large standard deviations.

From D. Han



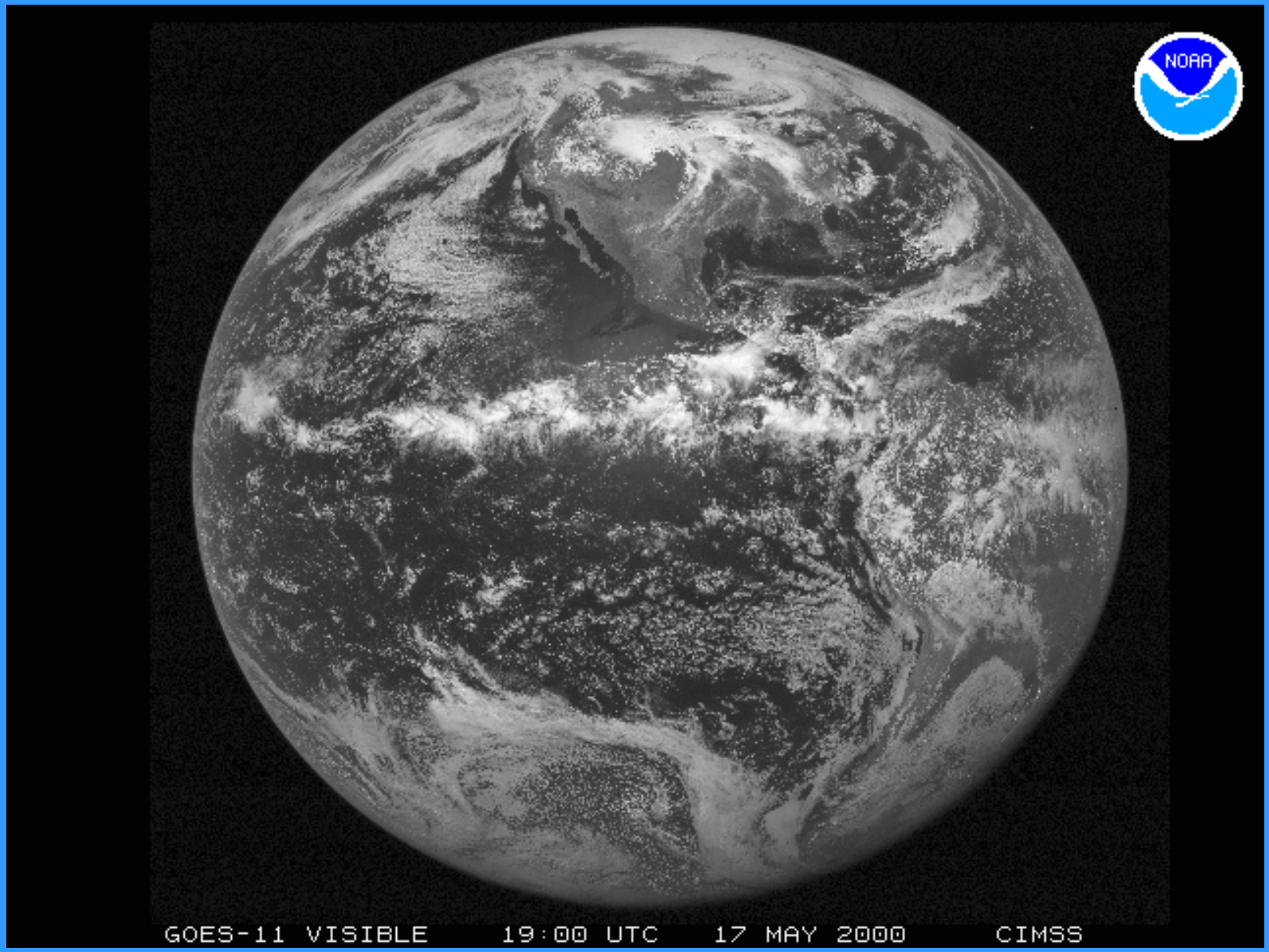
During several space looks…

GOES-11

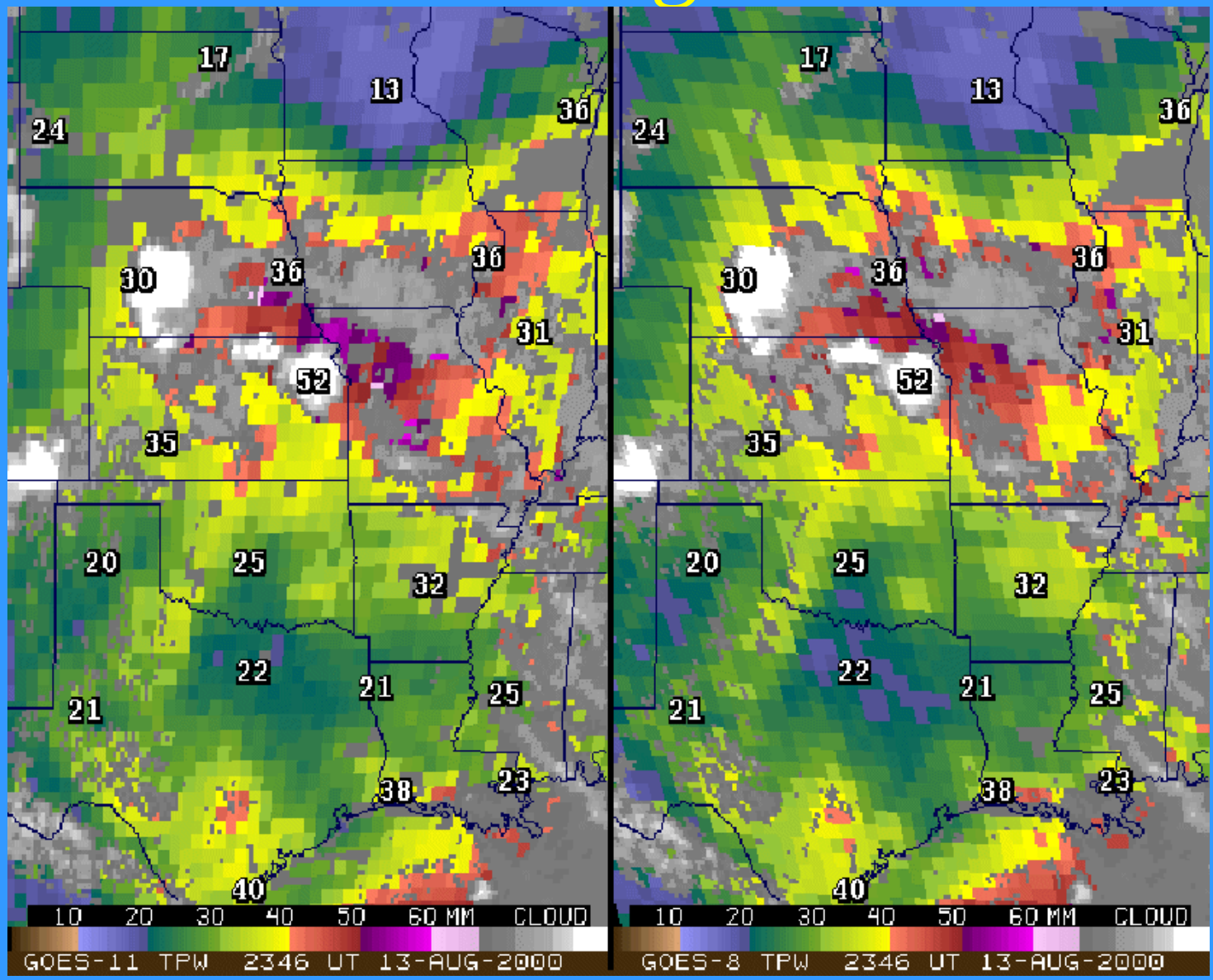
- The current plan is for GOES-11 to come out of storage in mid-June of 2006 and replace GOES-10 approximately on the **20th of July, 2006**.

- Plan to transmit GVAR during the move to 135 West

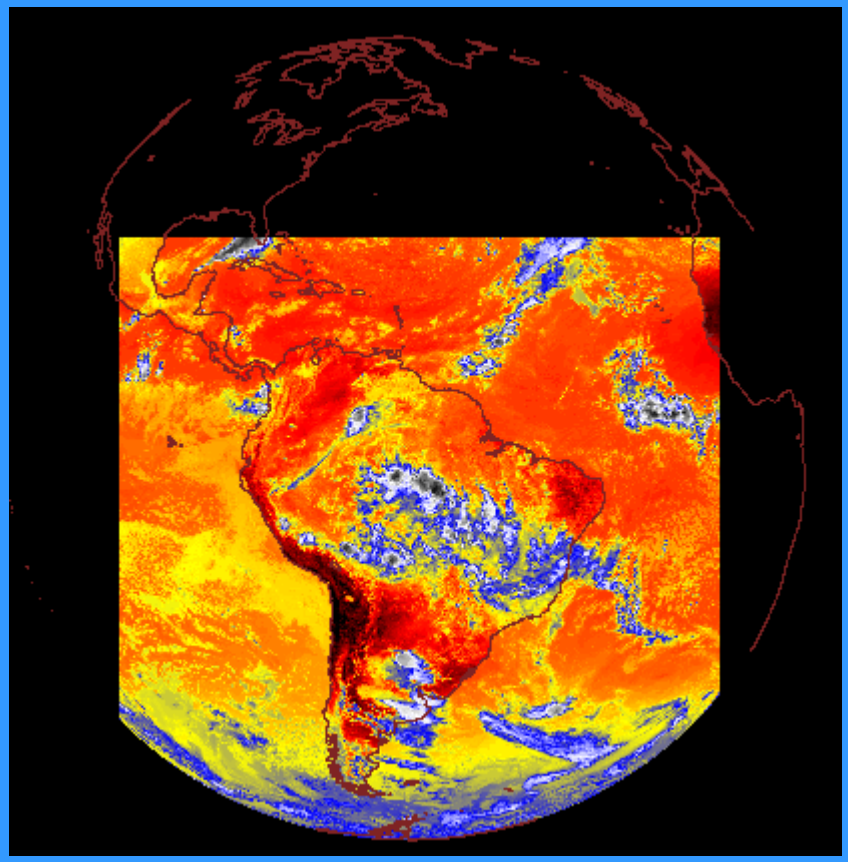
Sample from GOES-11 view from 105 West



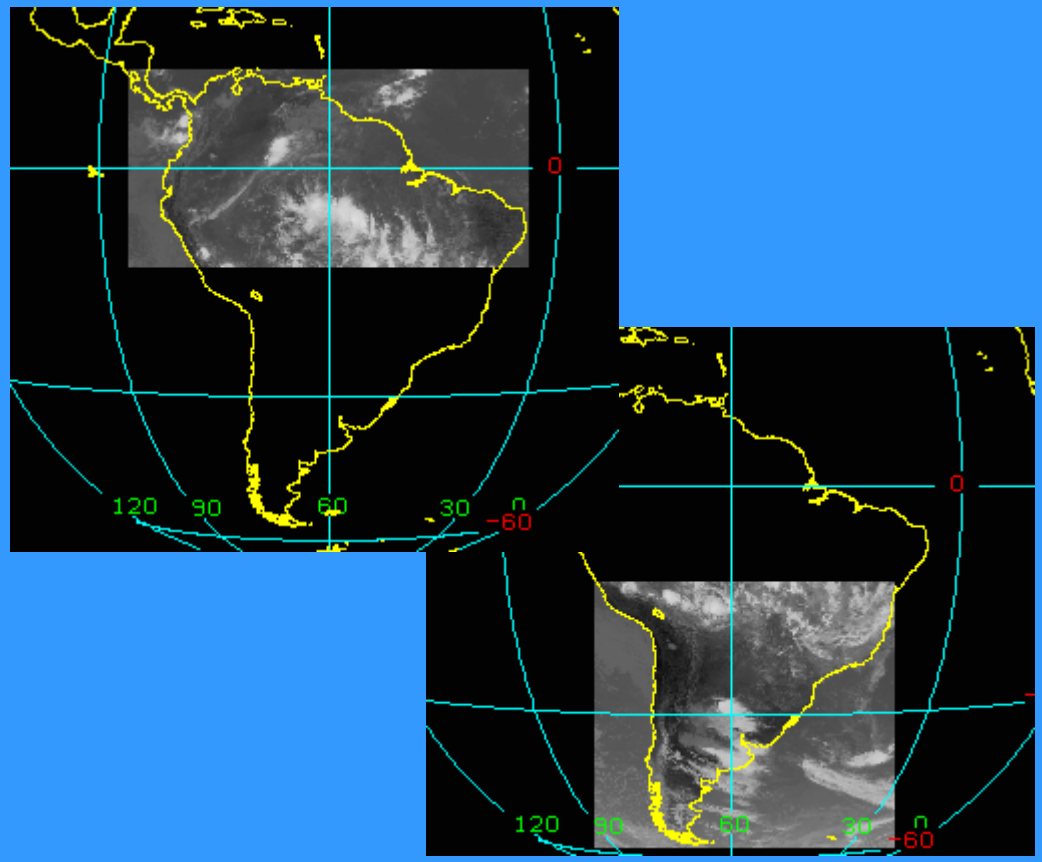
GOES-11 During PLT in 2000



GOES-10 at 60 West



Imager – 15 minute scans?



Sounder – hourly scans?

Late 2006 or early 2007

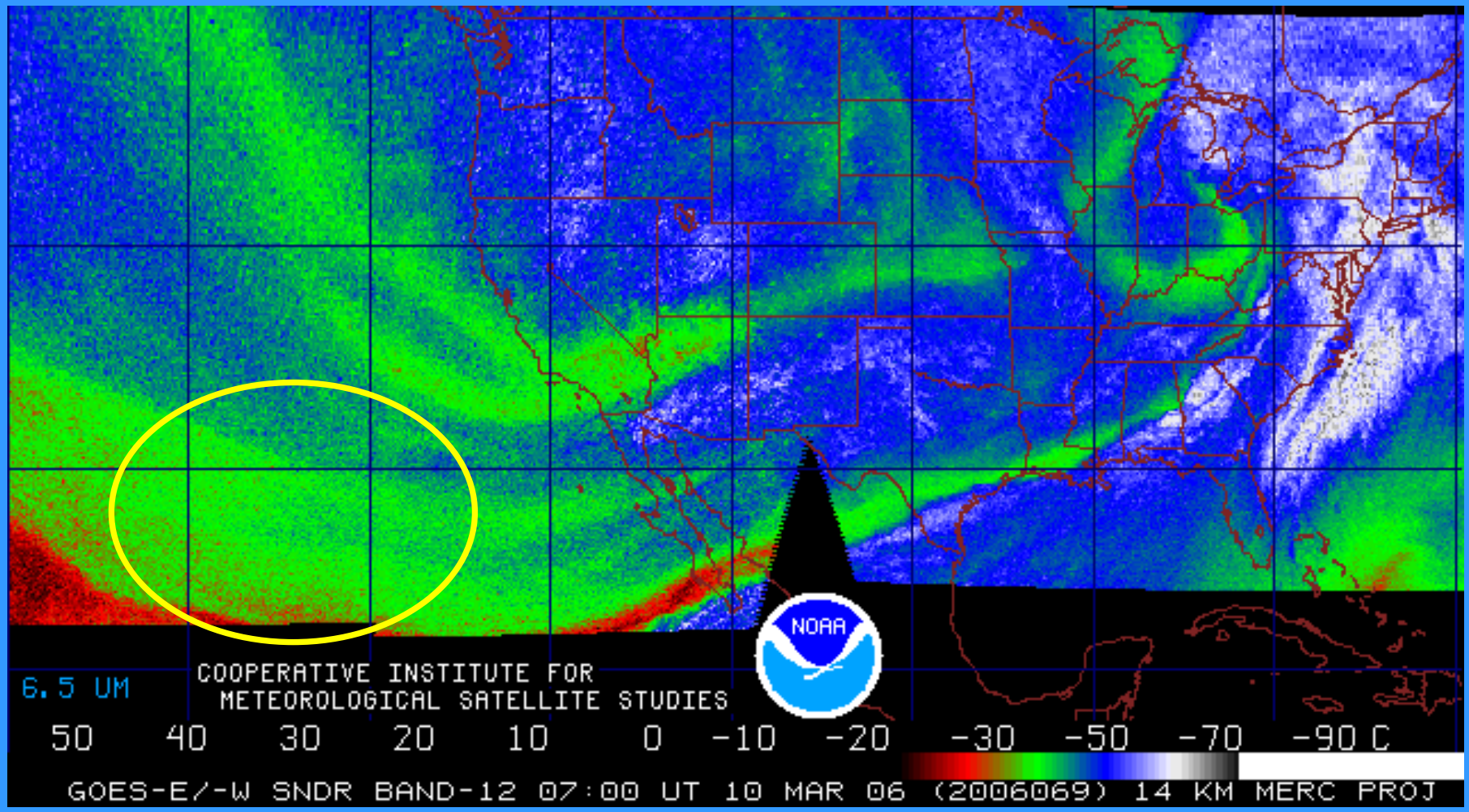
GOES-10 at 60W

- Need to deal with a Large inclination
  - via on-ground remapping
  - Will be GVAR changes (to be announced)

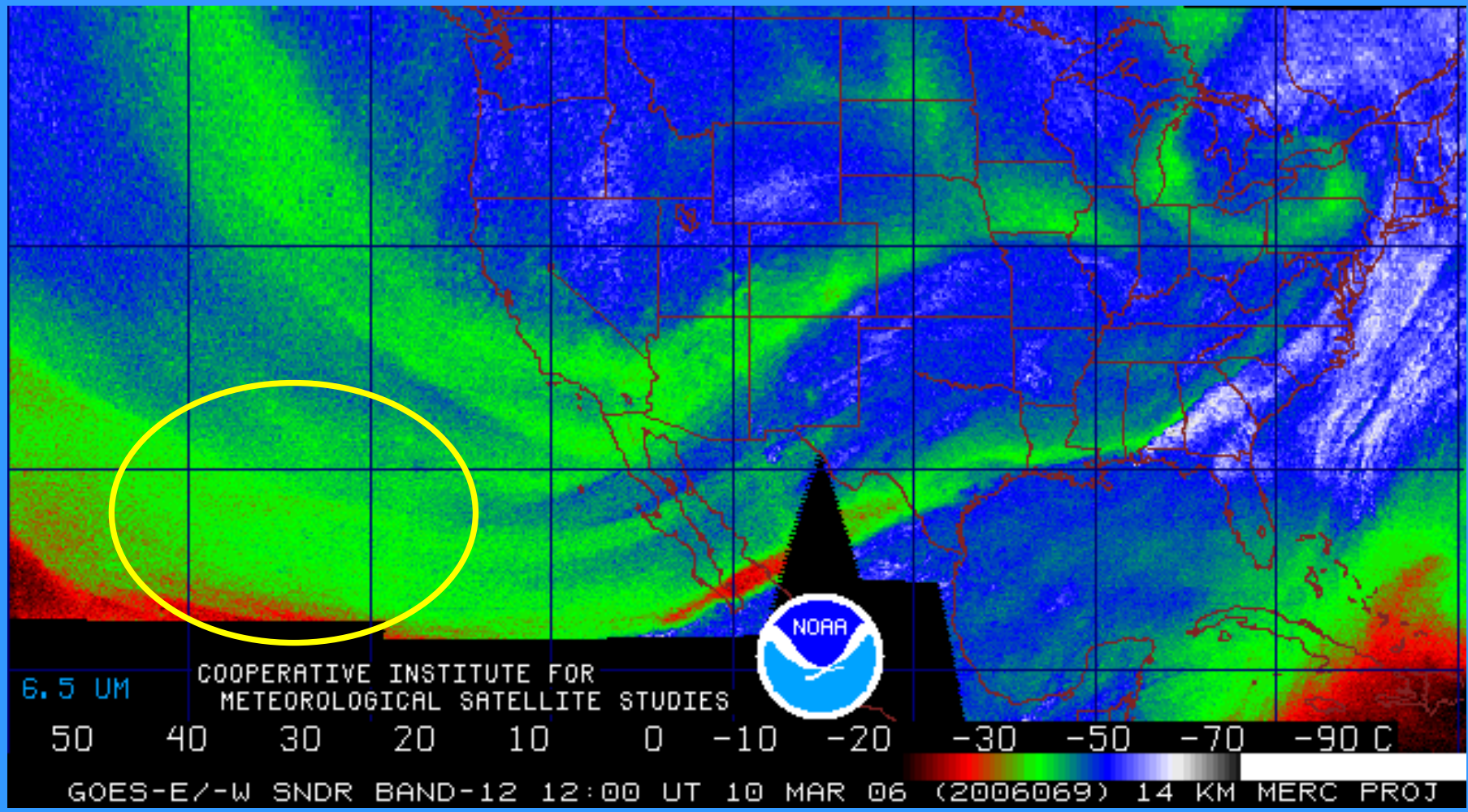
GOES-10 Patch Temperature

On March 10, 2006 (DOY 69), SOCC Engineers changed the GOES-10 Sounder patch temperature from its MID setpoint (100.1 K) to its MID setpoint (92.5 K) at about 8:22 z (3:22 ET). The change was done during keep out zone time and prior to eclipse to minimize the impact on users. The temperature transition will take approximately 4 hours. The users may see slight data degradation (venetian blinding) in the first few frame after the eclipse (11:01:50 CONUS) until the patch temperature stabilizes at its new setpoint. The signal to noise ratio will improve as a result of operation at a lower patch (detector) temperature. The patch will be controlled at this temperature (92.5 K)until October 2006 when it will be switched back to MID setting during the autumn eclipse/KOZ season.

Patch Temperature 100K

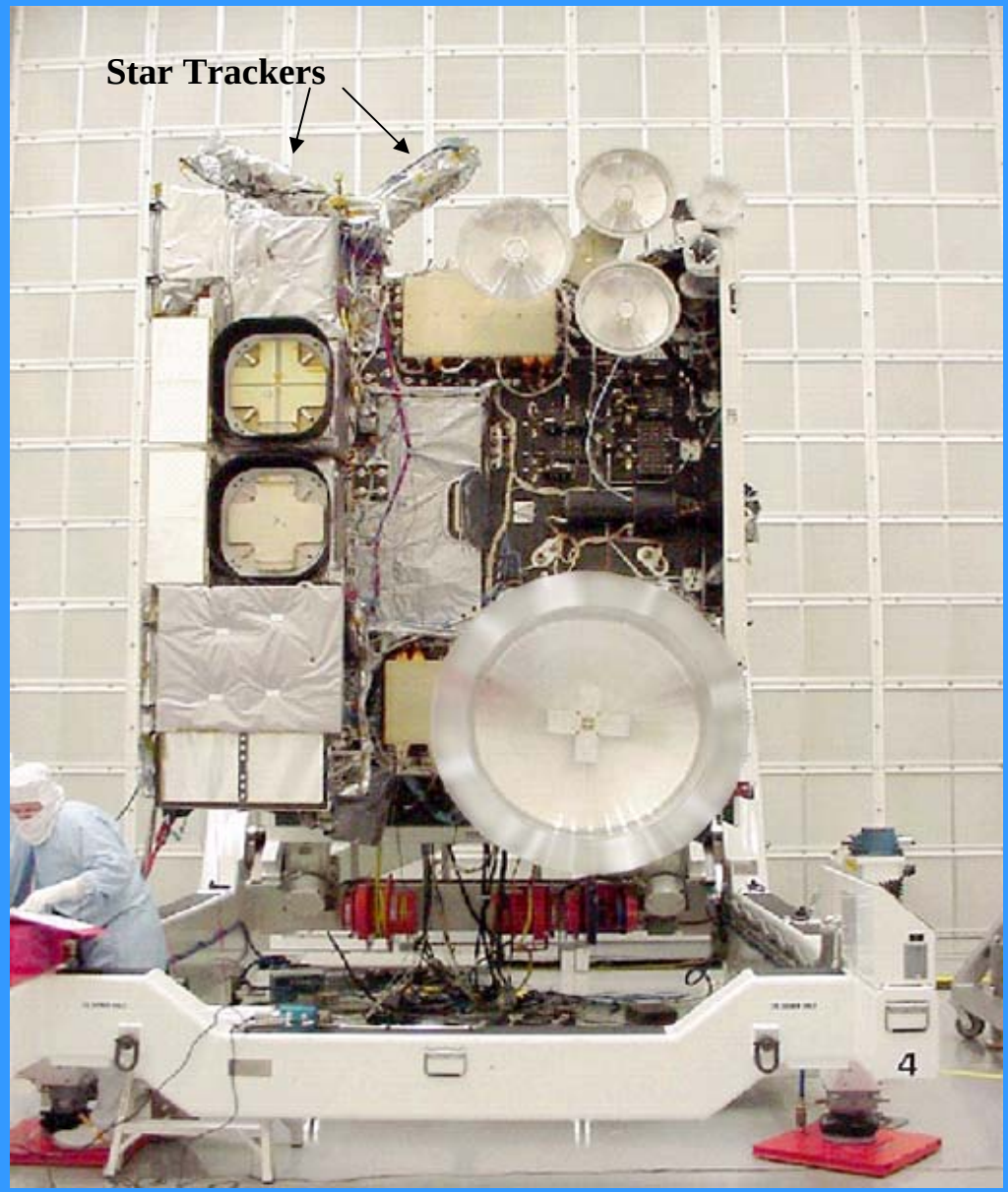


Patch Temperature 92K



Near-term GOES

GOES-N Spacecraft



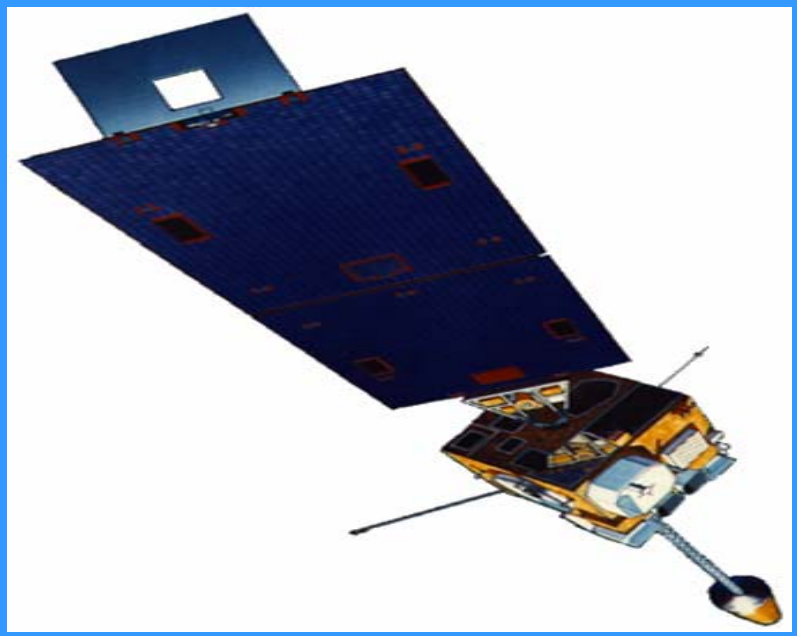
Images from NASA

GOES Schedules

- GOES-N is slated to be launched no earlier than **early May 2006** and operational in mid-2008. GOES-N will be called GOES-13 when it reaches geostationary orbit.

- GOES-O is slated to be launched in 2007 and operational in late 2009.

GOES-8/12



GOES-N/O/P will have similar instruments to GOES-8-12, but will be on a different spacecraft bus. The new bus will allow improvements both to the navigation and registration, as well as the radiometrics.

GOES-N/P

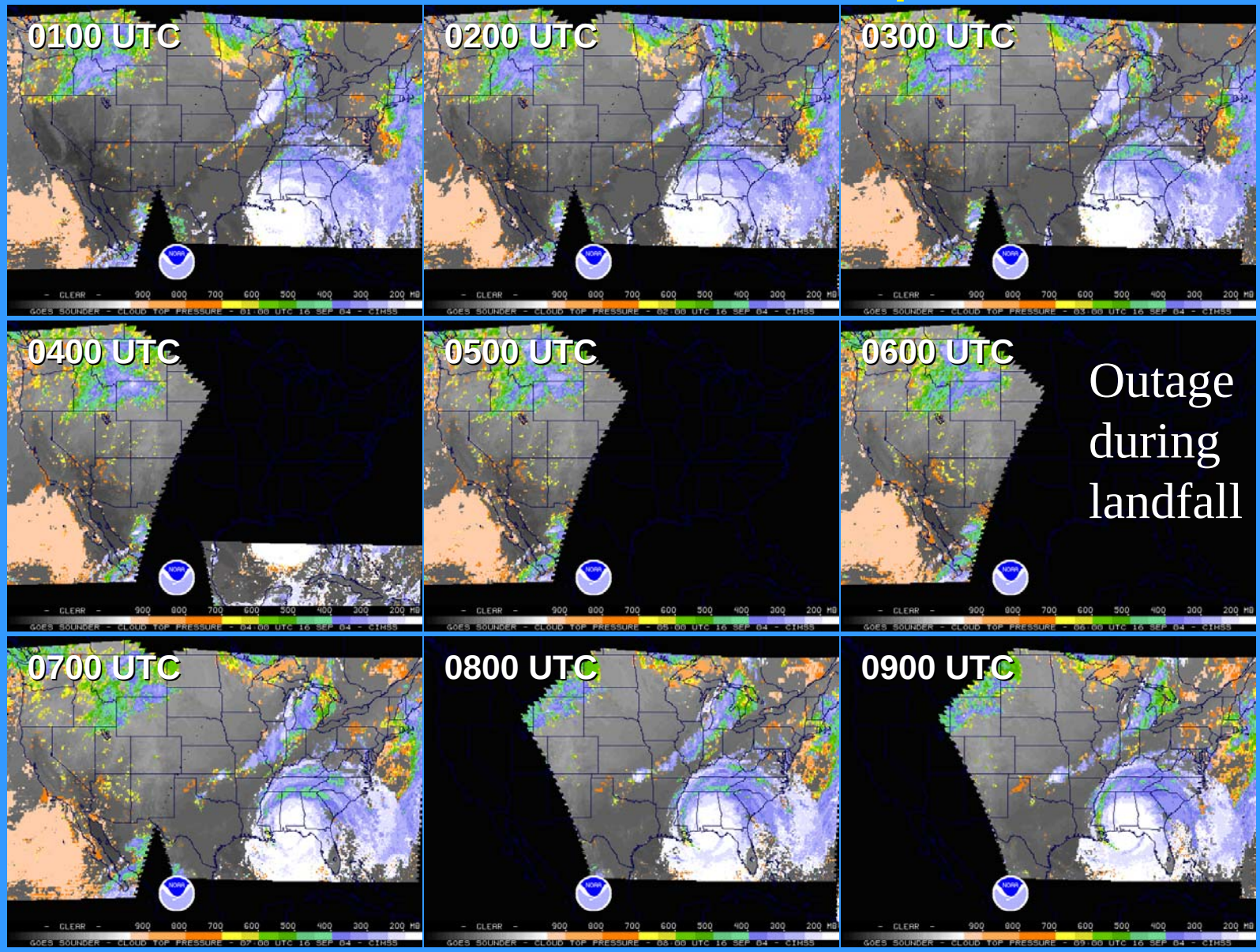
Position of the boom allows for colder detectors and hence less instrument noise

Limitations of Current GOES Imagers

- Regional/Hemispheric scan conflicts
- Low spatial resolution
- Missing spectral bands
- **Eclipse and related outages**

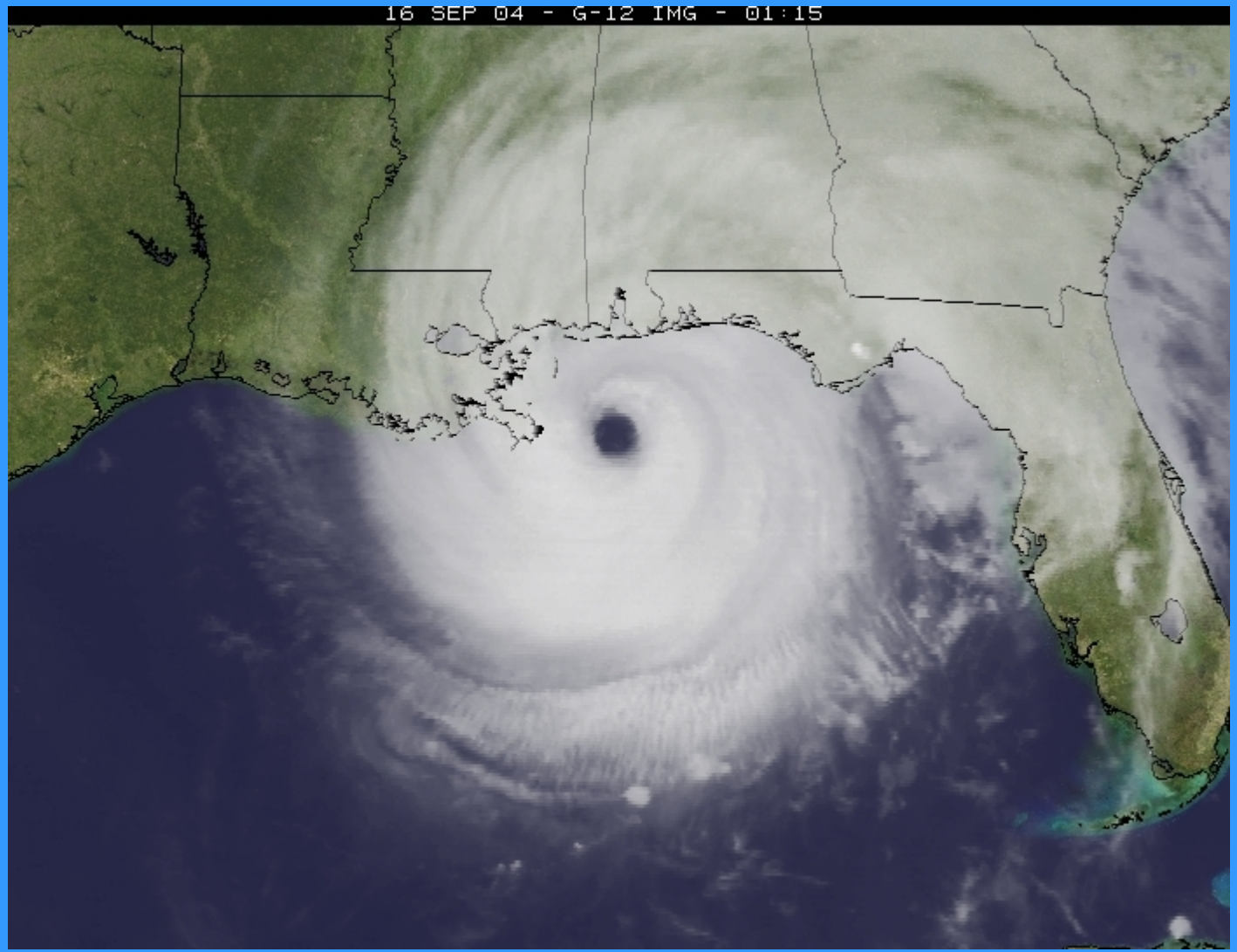
GOES-R (2012+) addresses the first 3 limitations, but GOES-N addresses the data outage issues!

The Onset Of Hurricane Ivan: 16 September 2004



GOES-10 & -12 Sounder Cloud Top Pressure Coverage

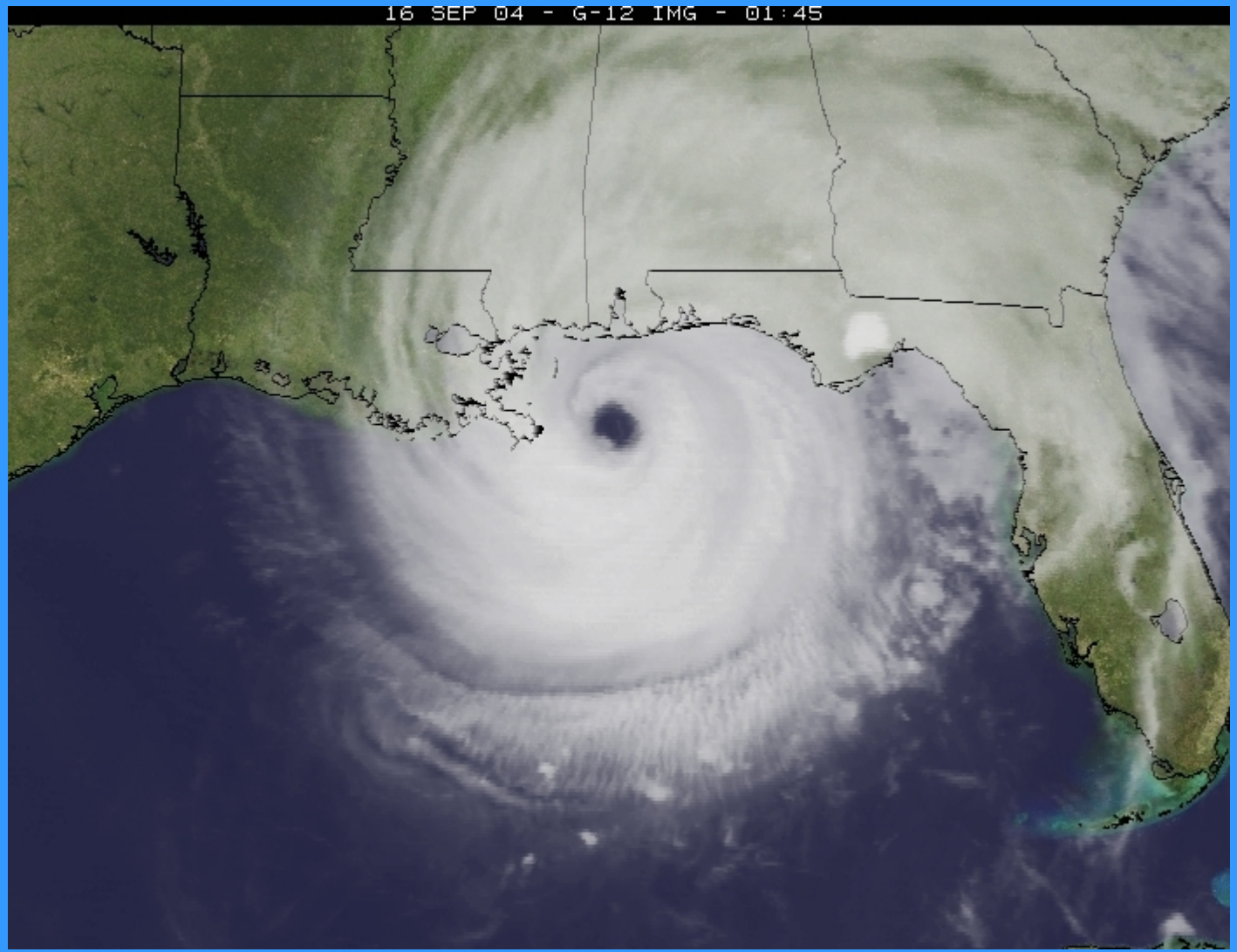
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

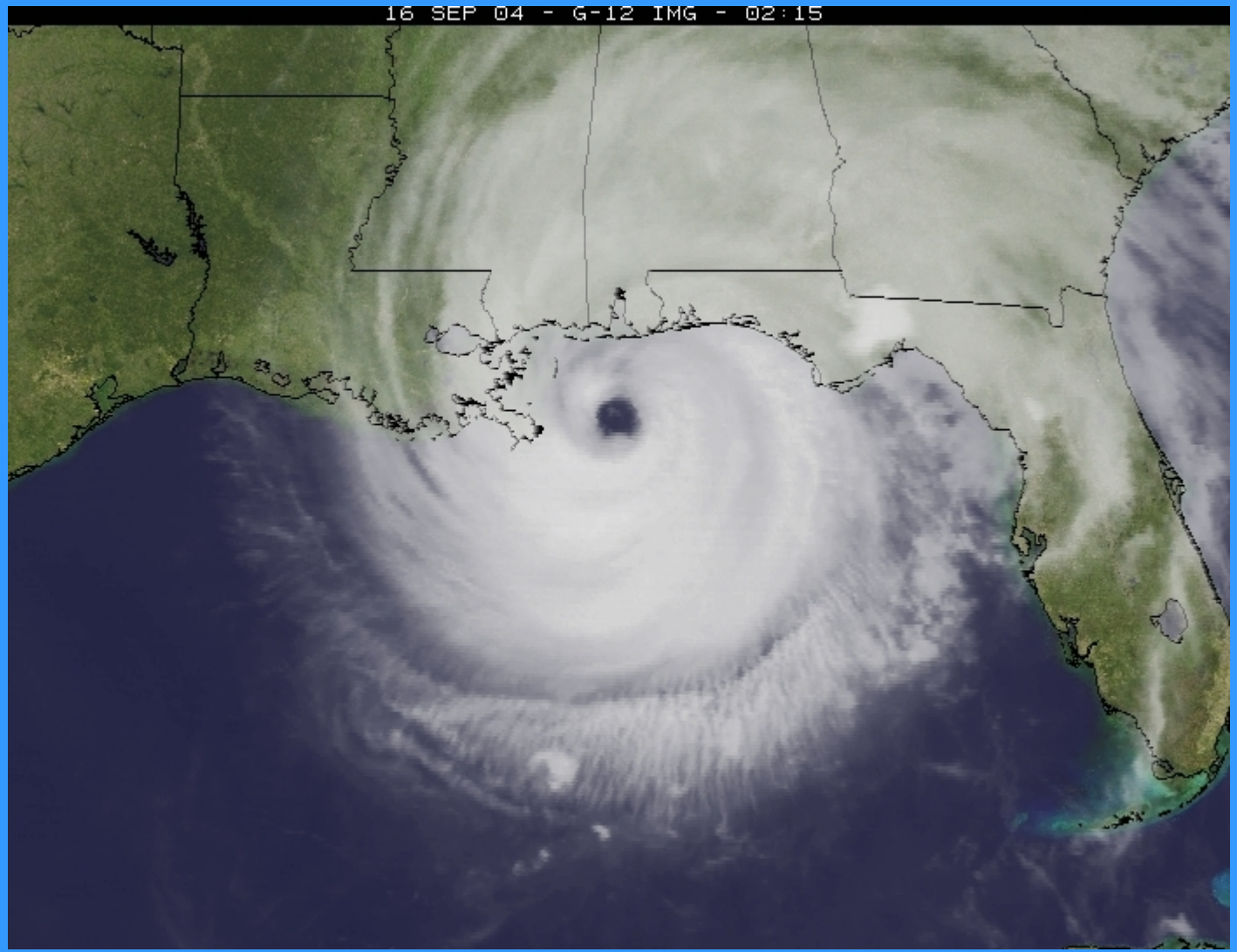
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

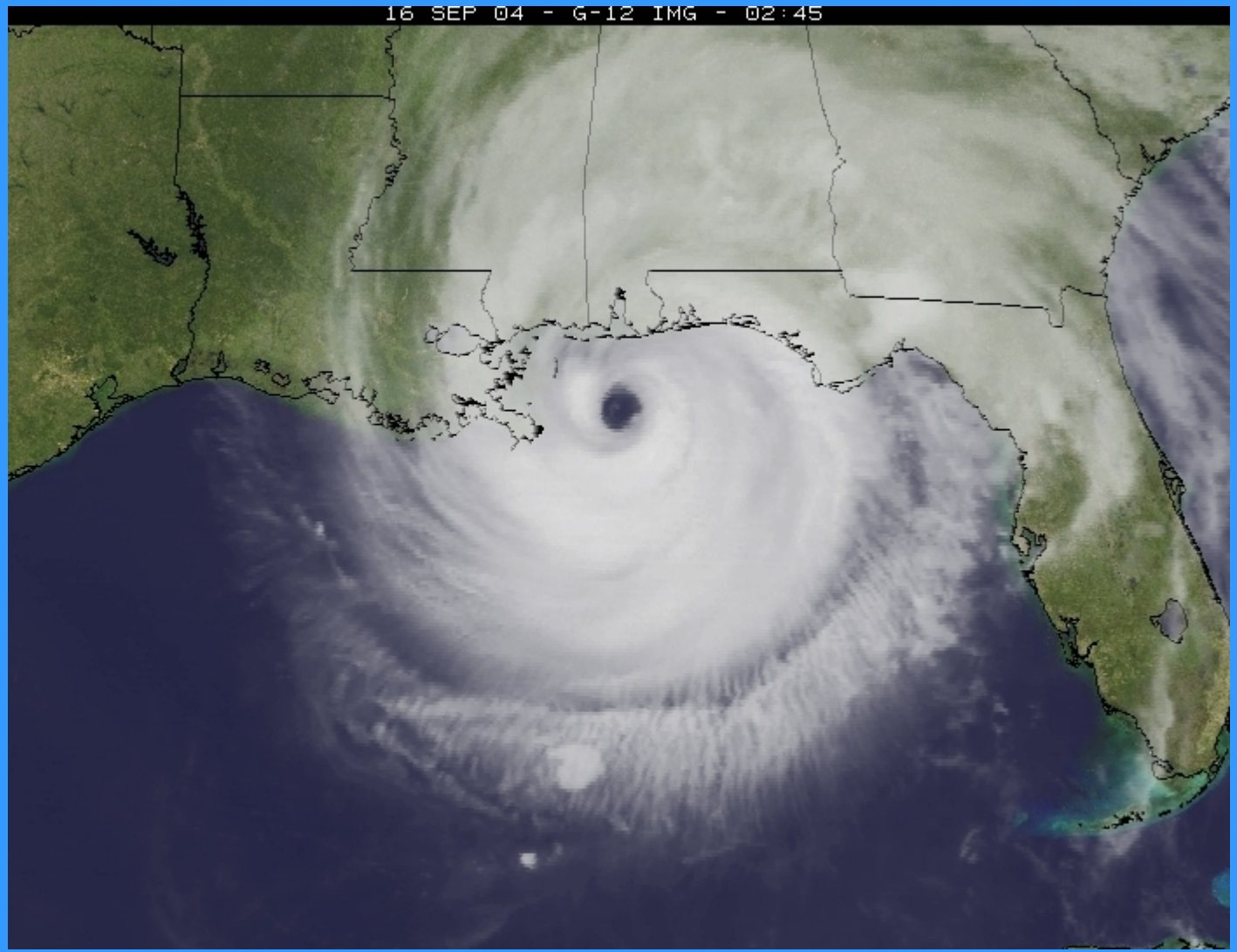
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

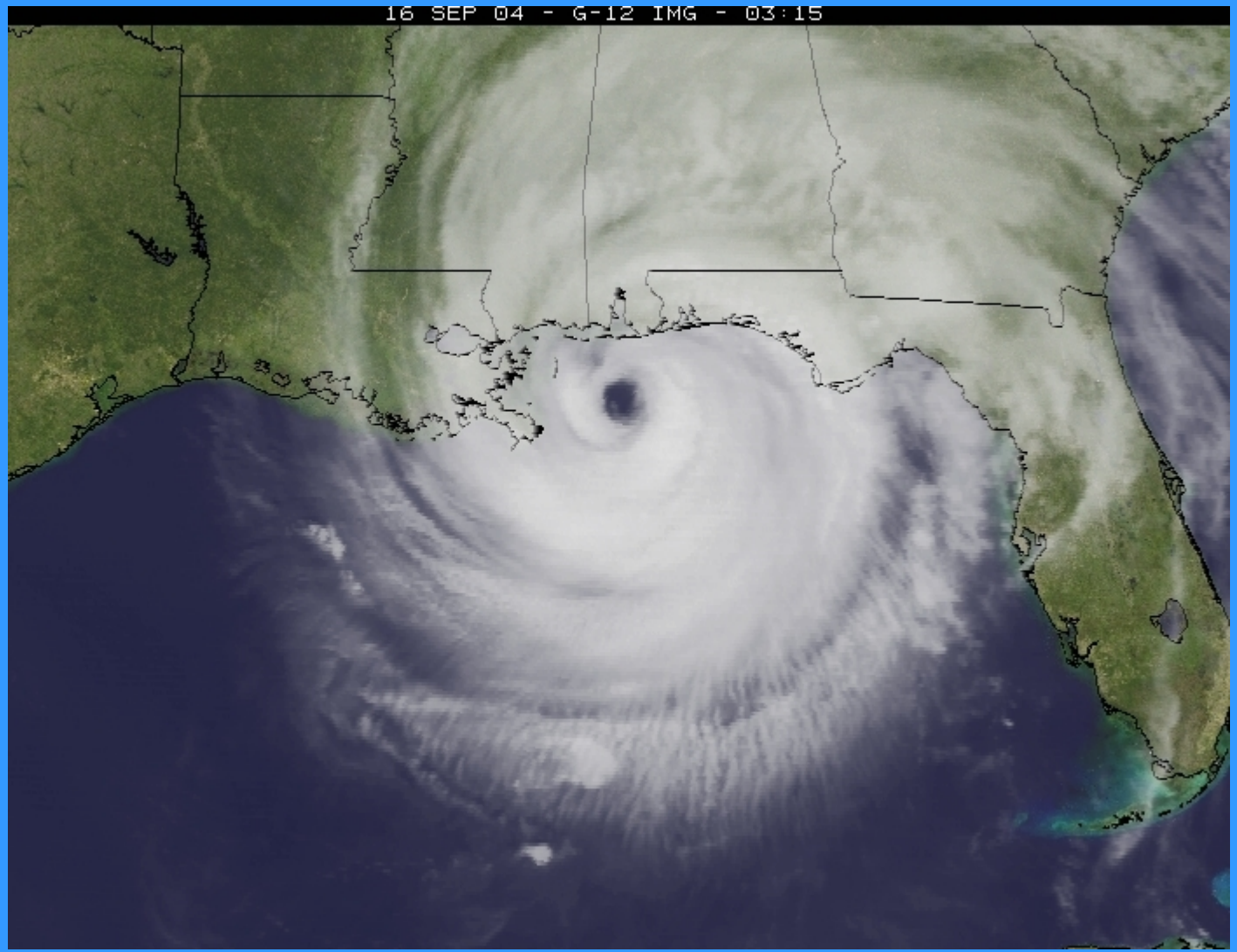
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

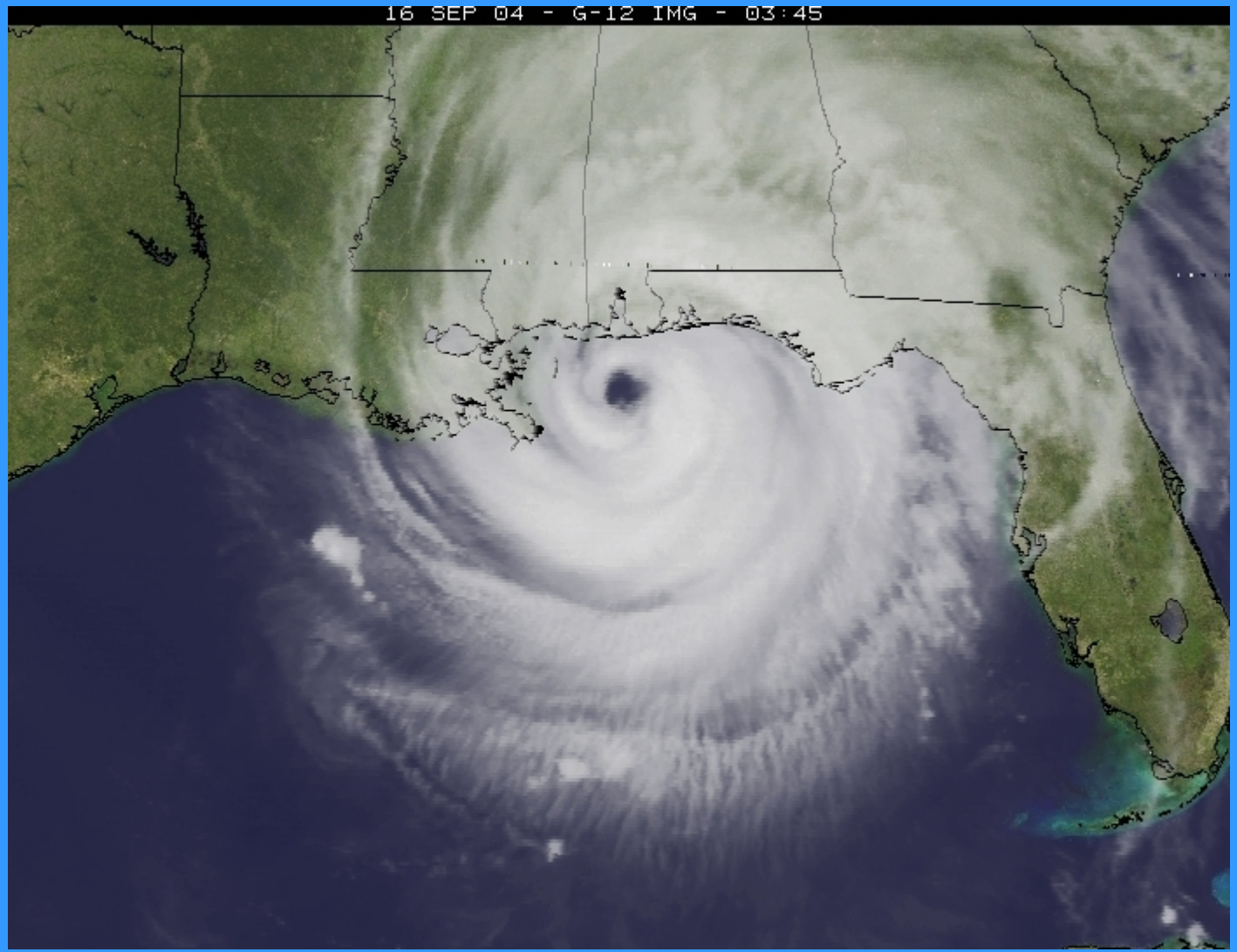
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

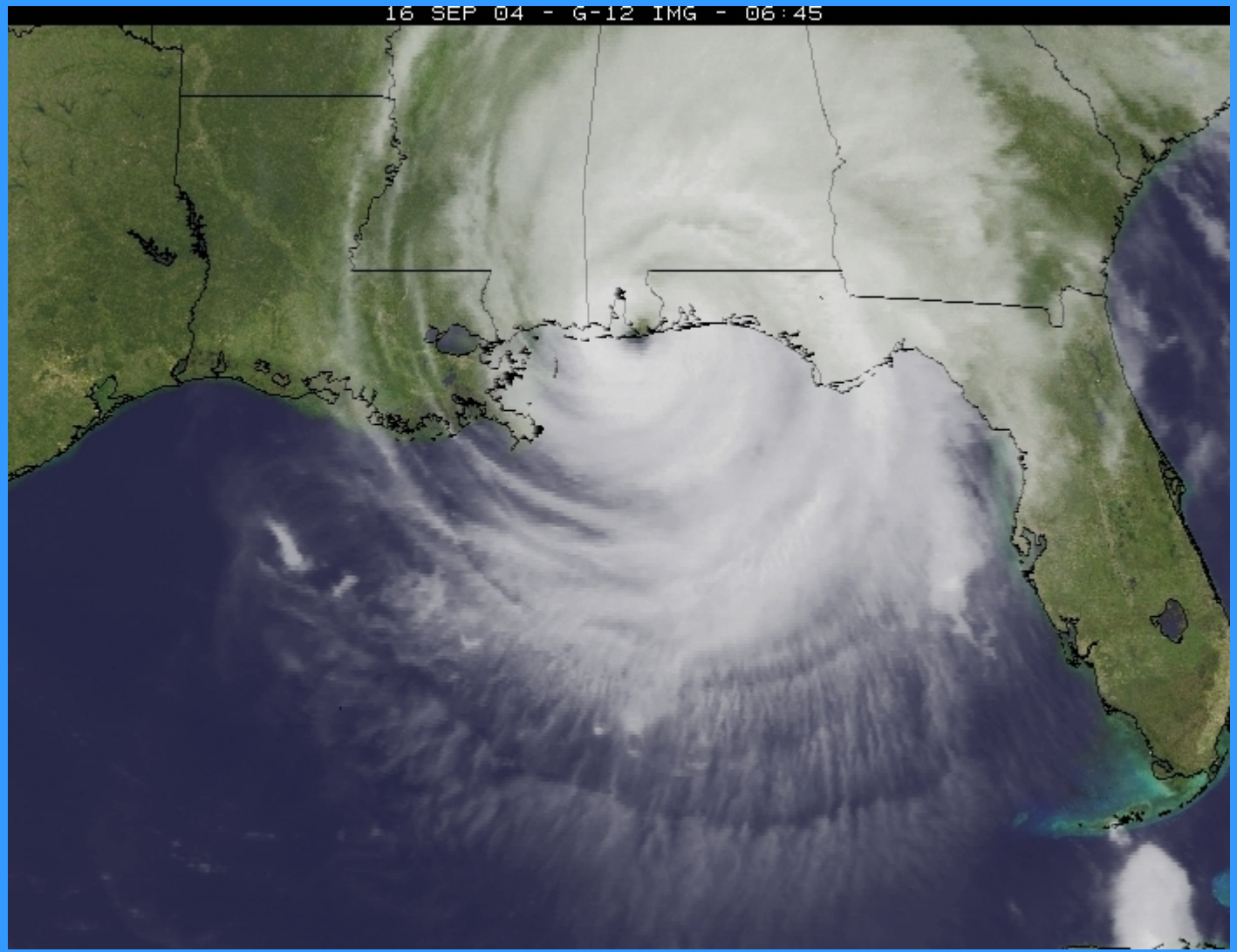
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

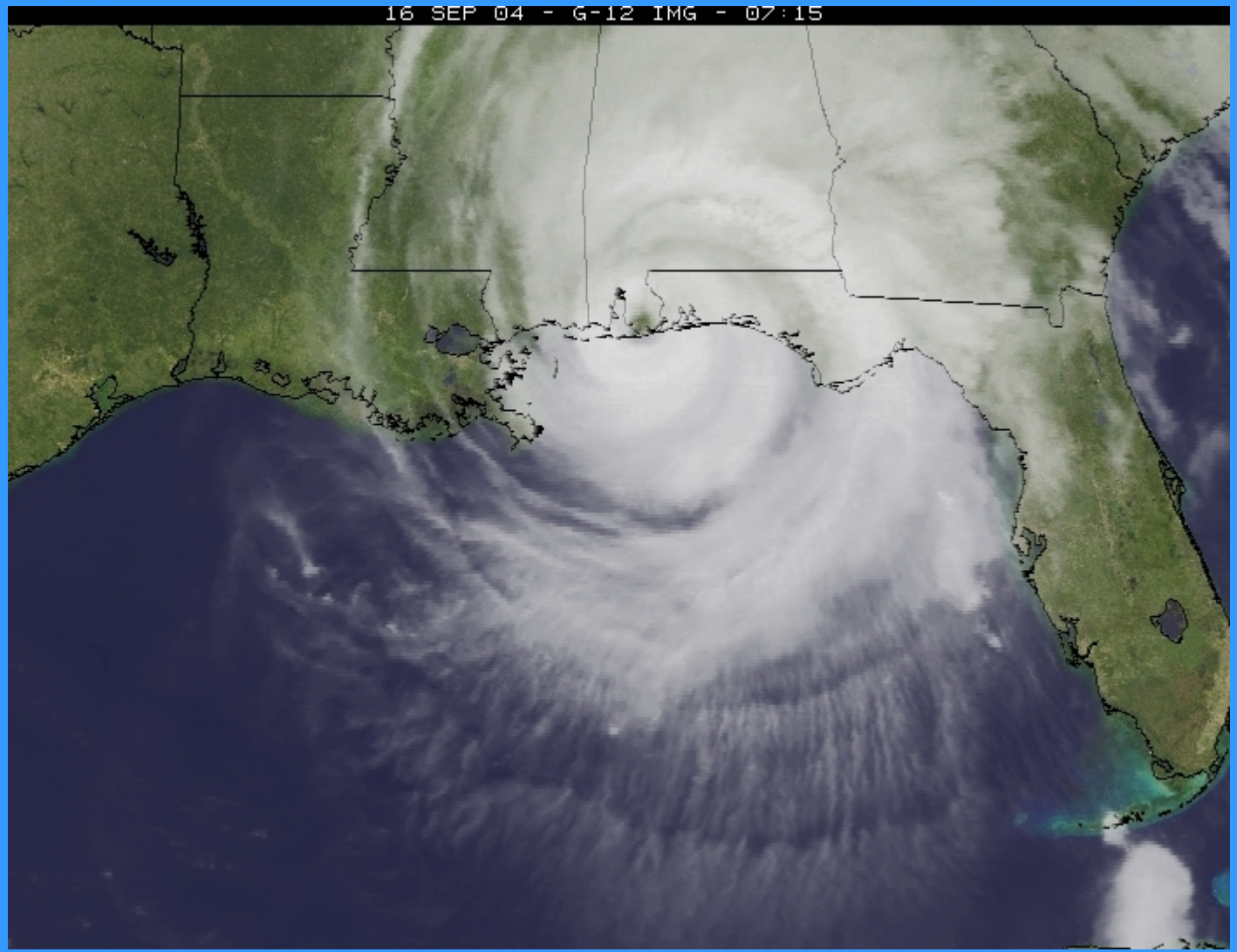
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

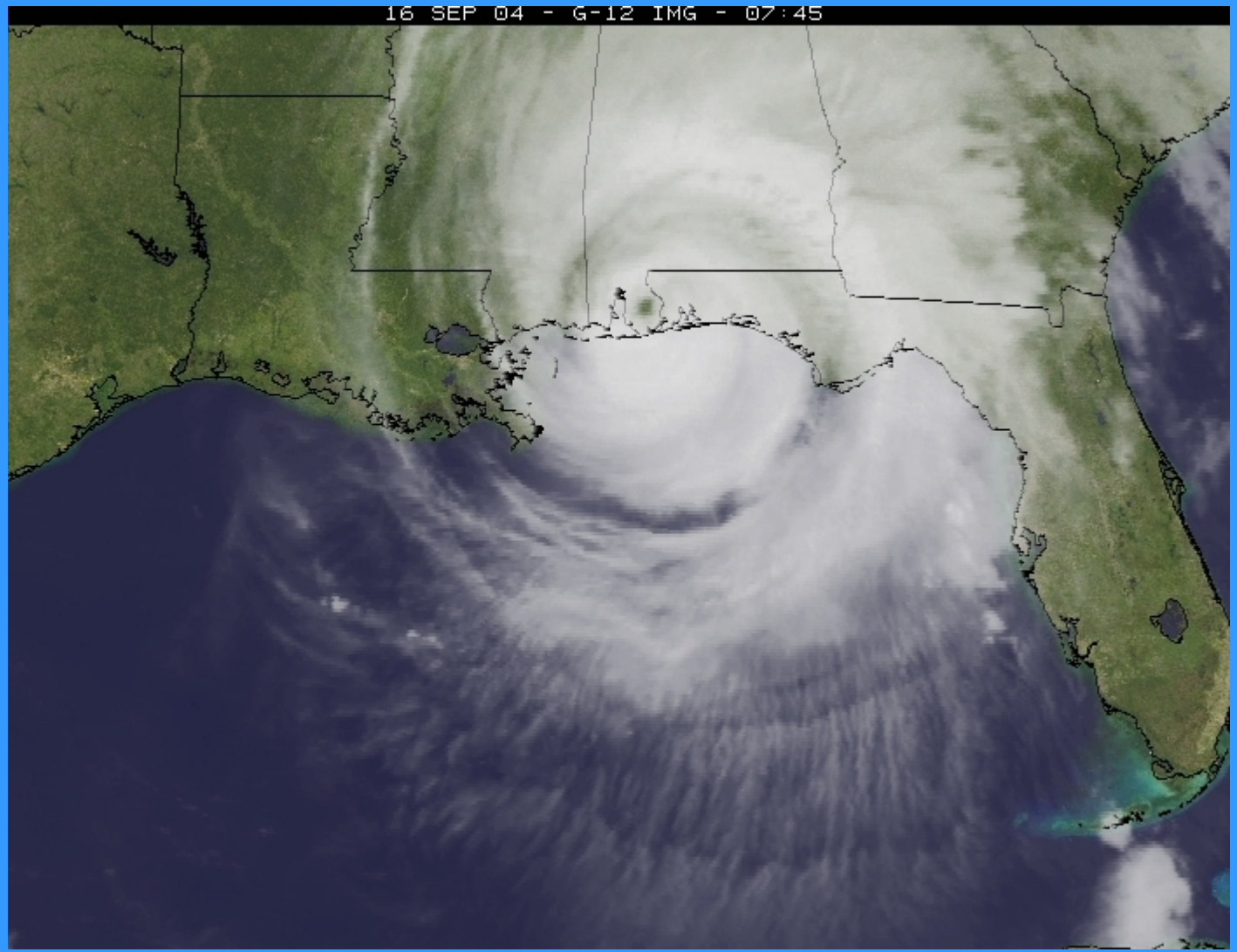
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

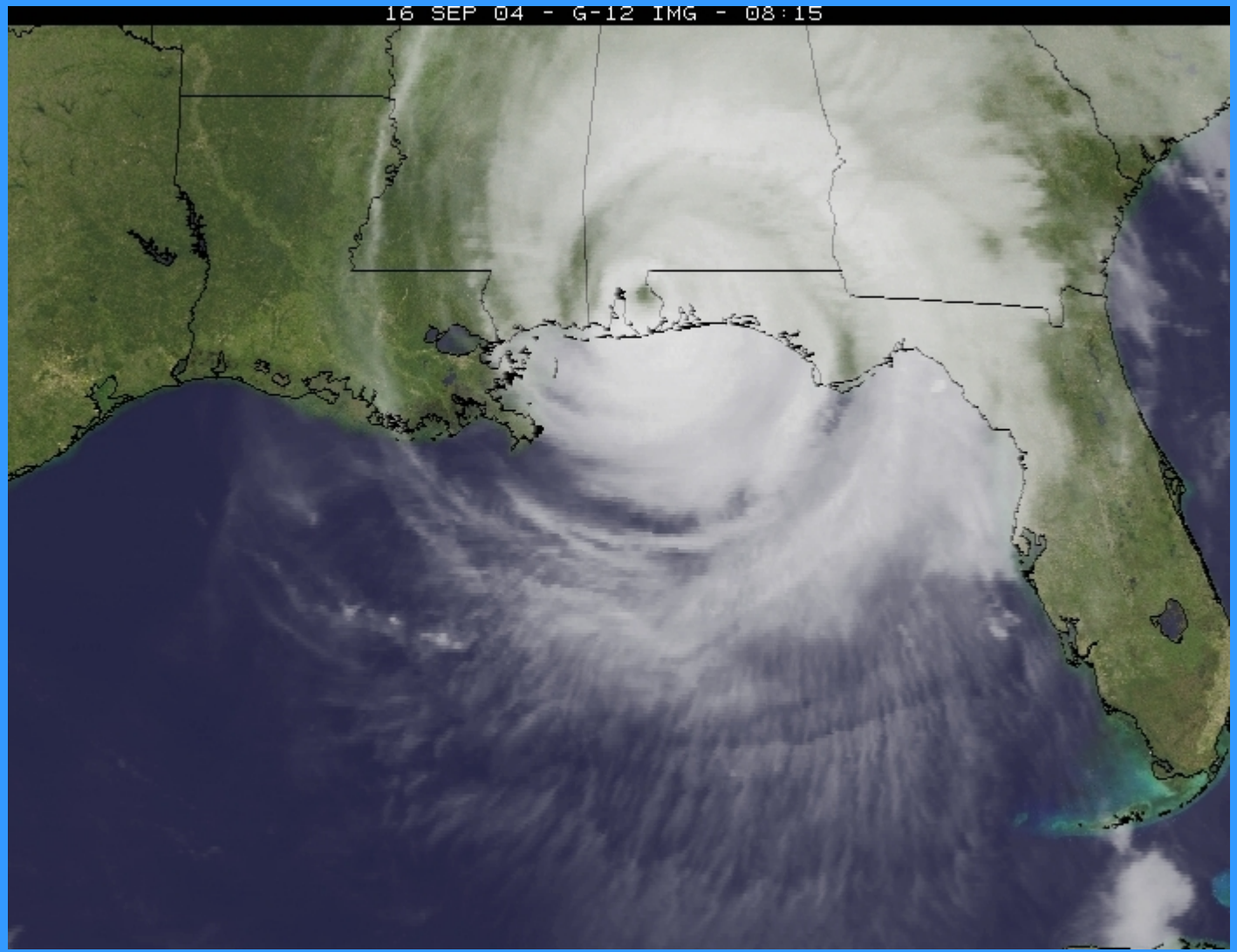
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

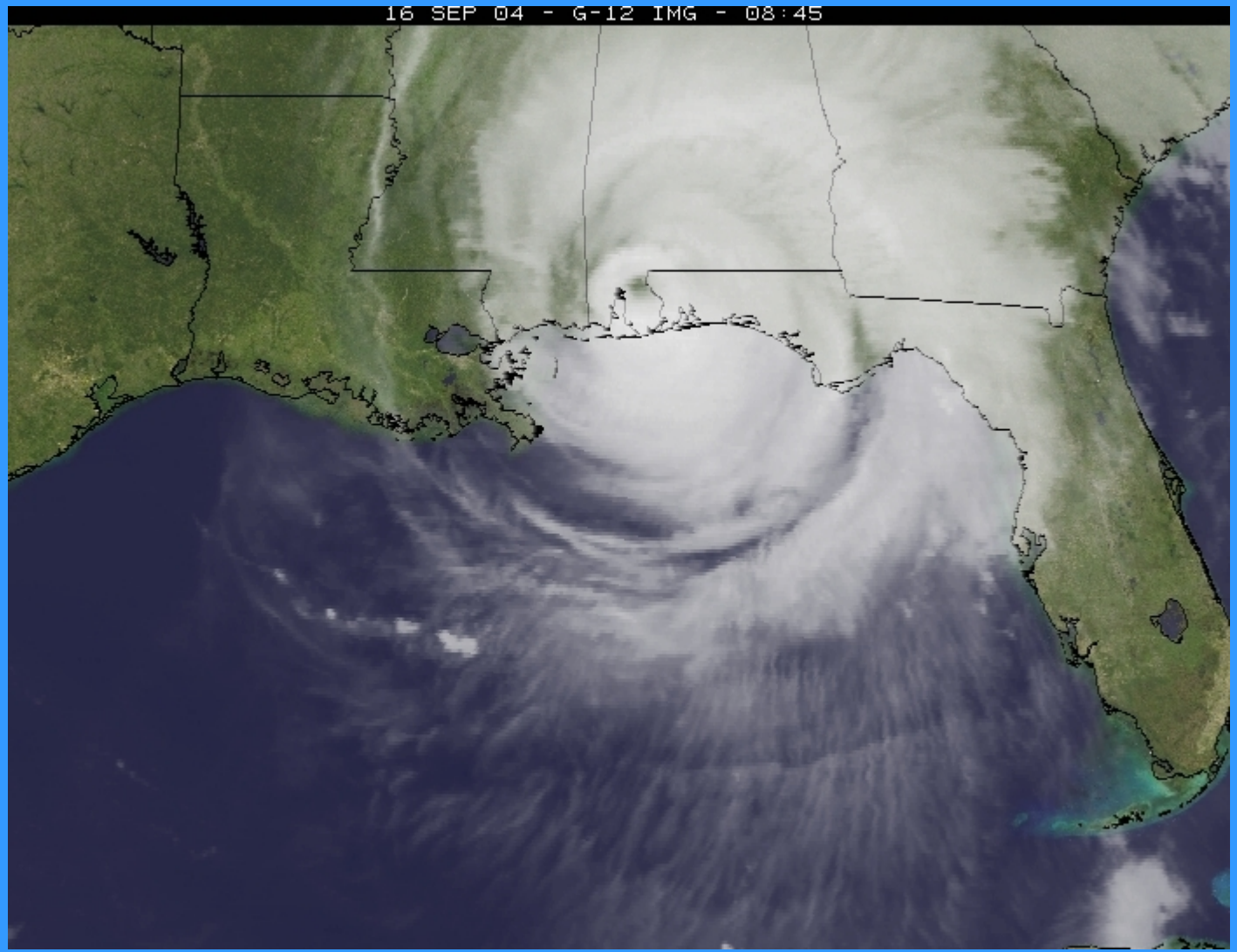
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

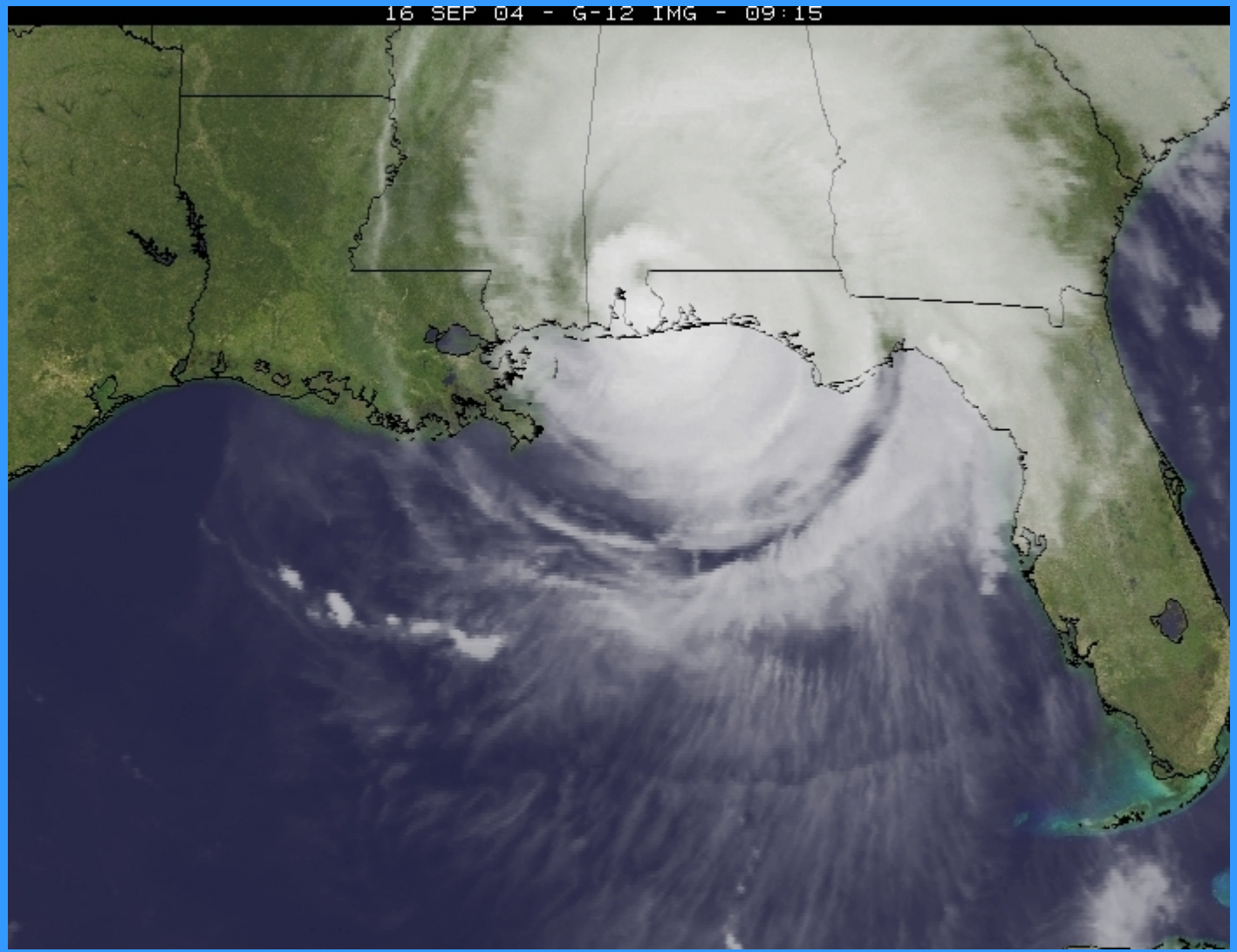
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

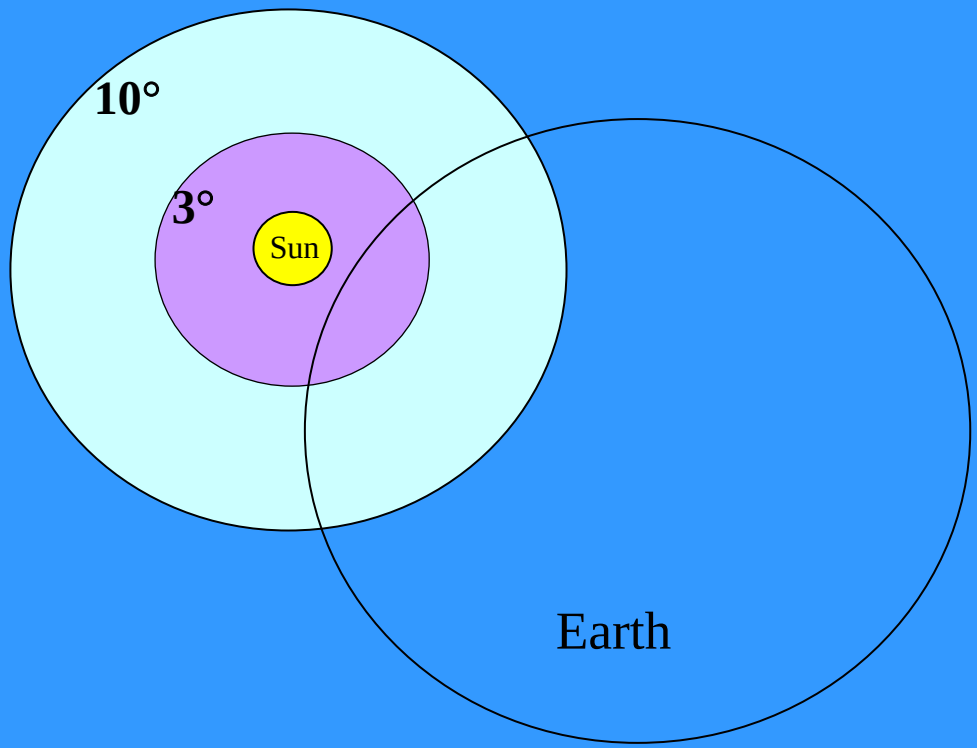
Note satellite outage during landfall



Note: GOES-10 was taking images during this time.

GOES satellite loop: http://www.ssec.wisc.edu/~rickk/eclipseivan.html

Reduced KOZ



The values have not yet been defined for GOES-N operations

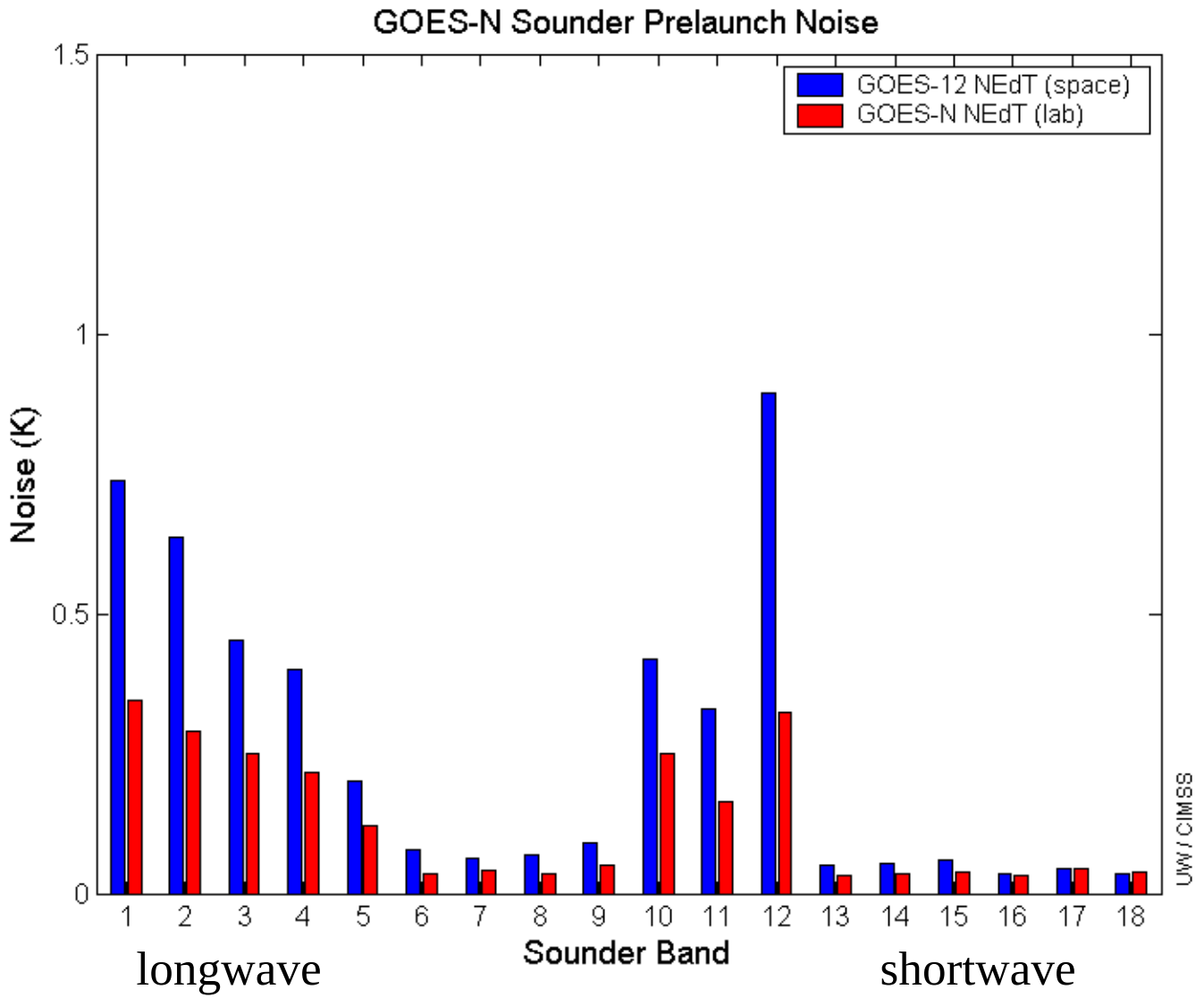
Improved **radiometrics** on GOES-N+

The **GOES-N+ instruments will be less noisy.**

Lower (colder) patch (detector) temperature is the main driver.

Other modifications have been made to improve the noise performance on both instruments.

Improved GOES-N (Sounder) noise compared to GOES-12

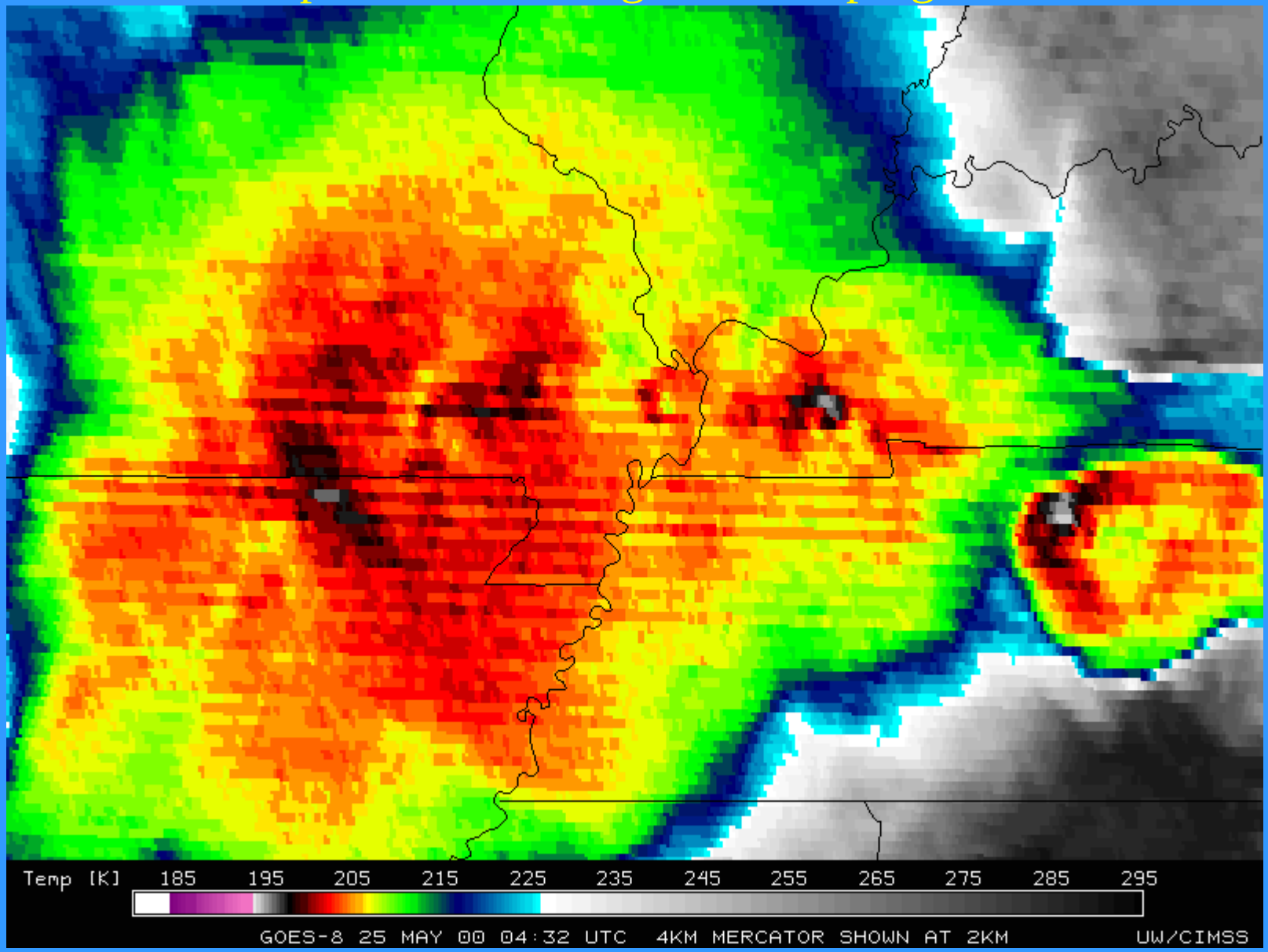


Improved **calibration** on GOES-N+

Reduction in striping to be achieved through increasing the Imager's scan-mirror's dwell time on the blackbody from 0.2 sec to 2 sec.

The more accurate blackbody characterization improves the calibration of the infrared detectors.

Example infrared image with striping:



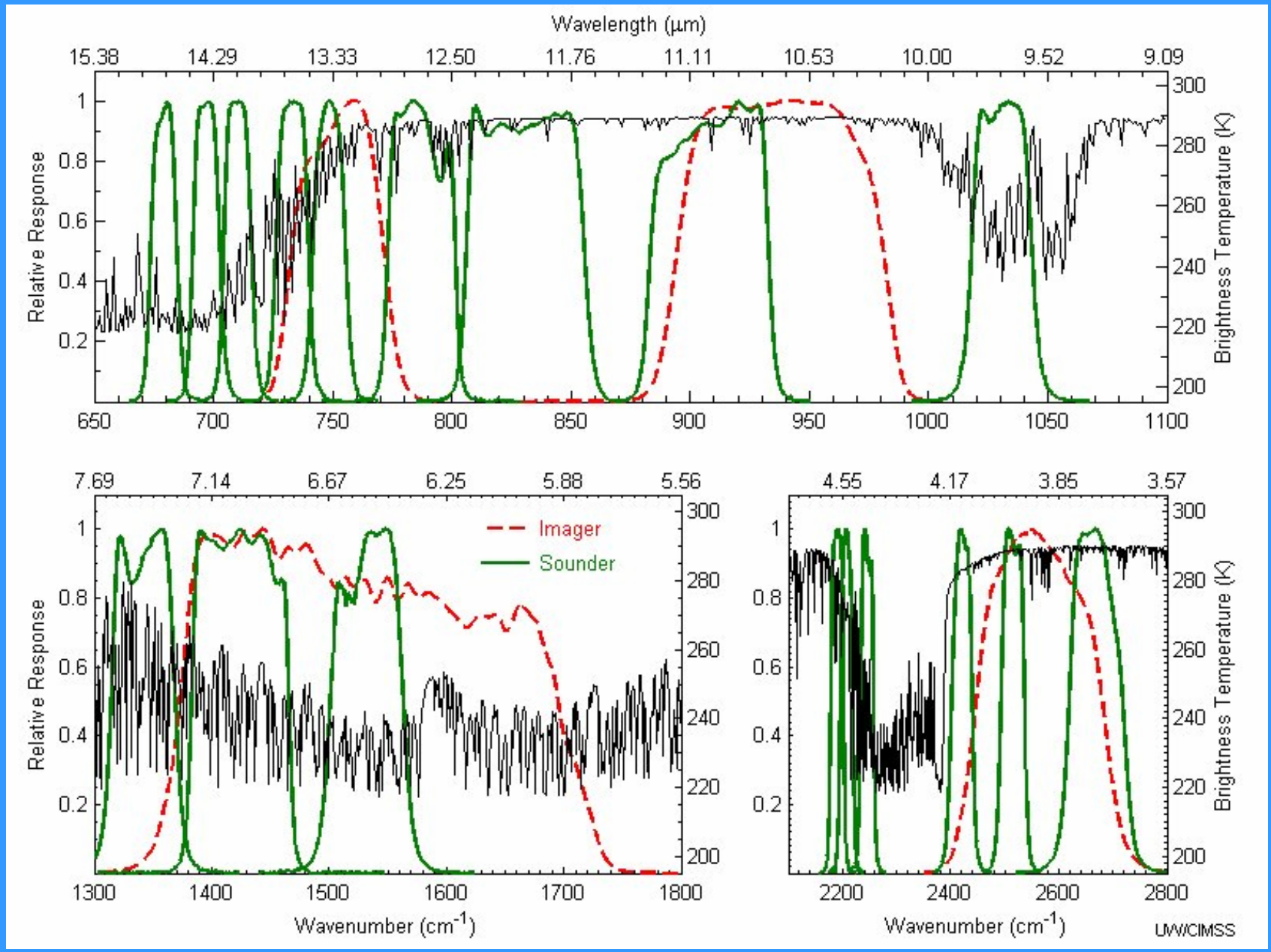
Improved **navigation** on GOES-N+

- The GOES-N navigation will be improved
  - New spacecraft bus
  - Use of star trackers
- GOES-N performance will be verified on-orbit

GOES-I/M Performance & GOES-N Expected Performance

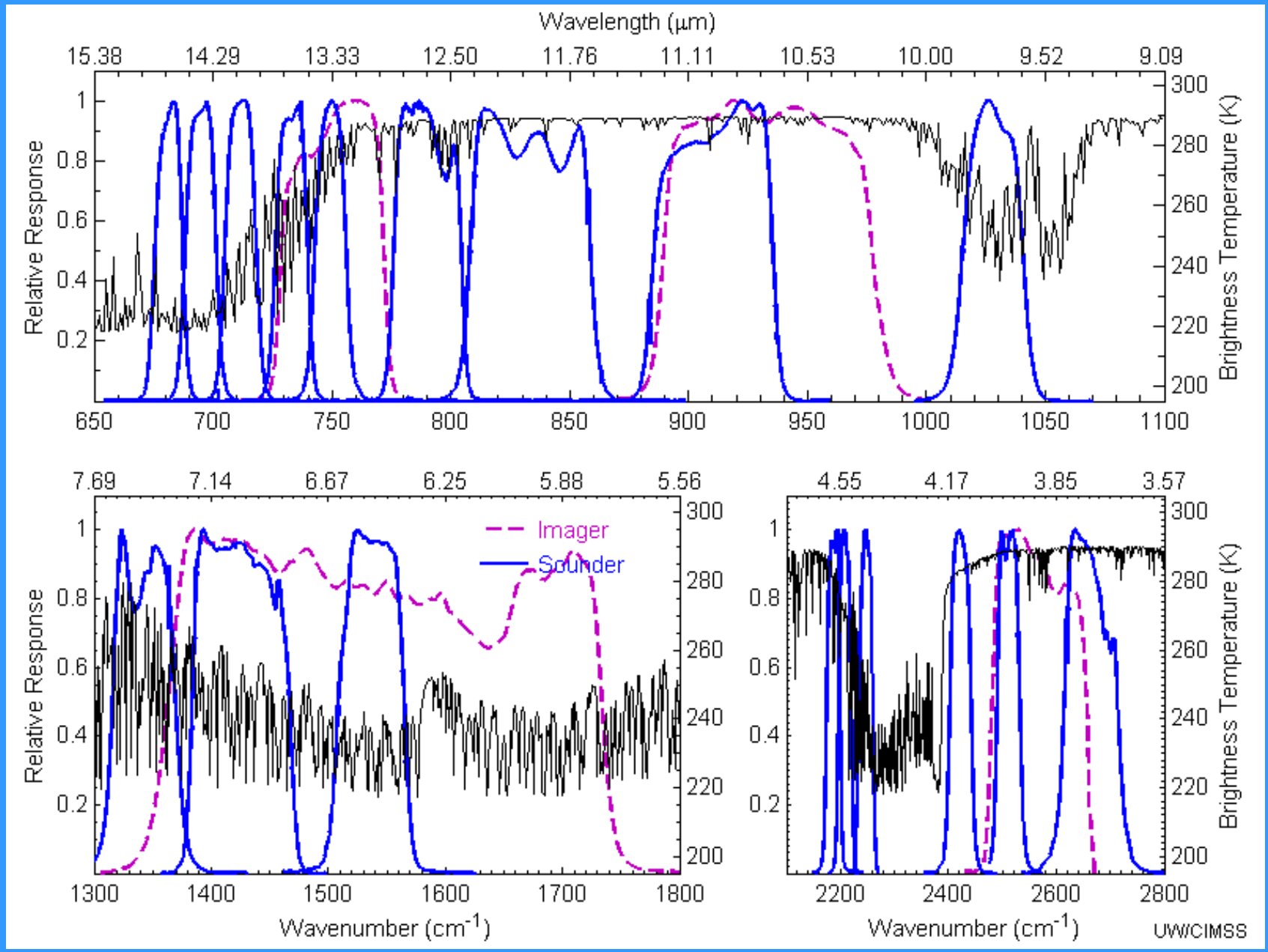
Navigation at Nadir	GOES-I/M	GOES-N+
Daytime (Visible)	112 urad = 4 km	53 urad (<2 km)
Nighttime (IR)	168 urad = 6 km	85 urad (~3 km)

GOES-N Imager and Sounder spectral response functions.



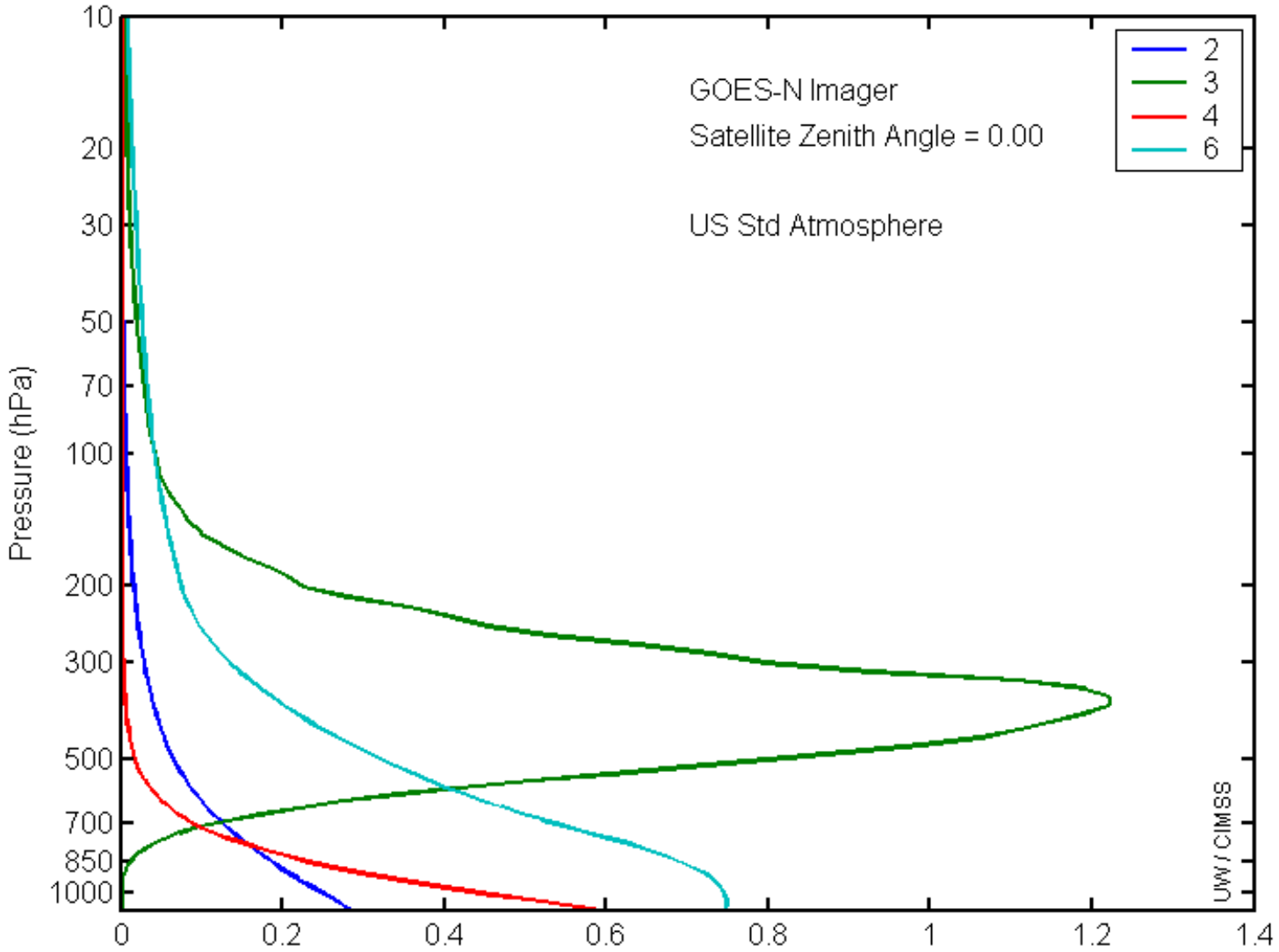
Note the imager band selection is similar to GOES-12.

GOES-12 Imager and Sounder spectral response functions.

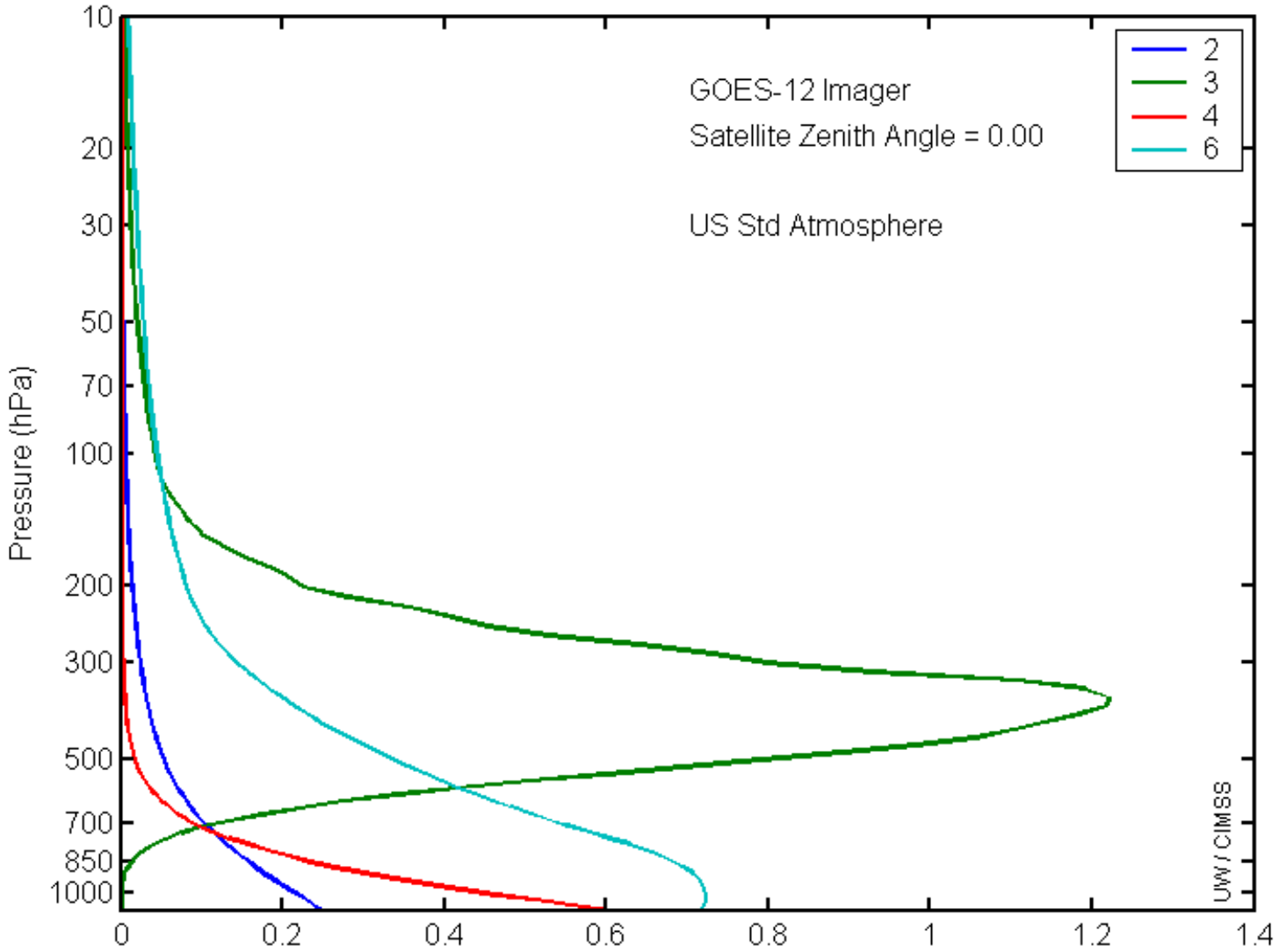


Note the imager band selection is similar to GOES-12.

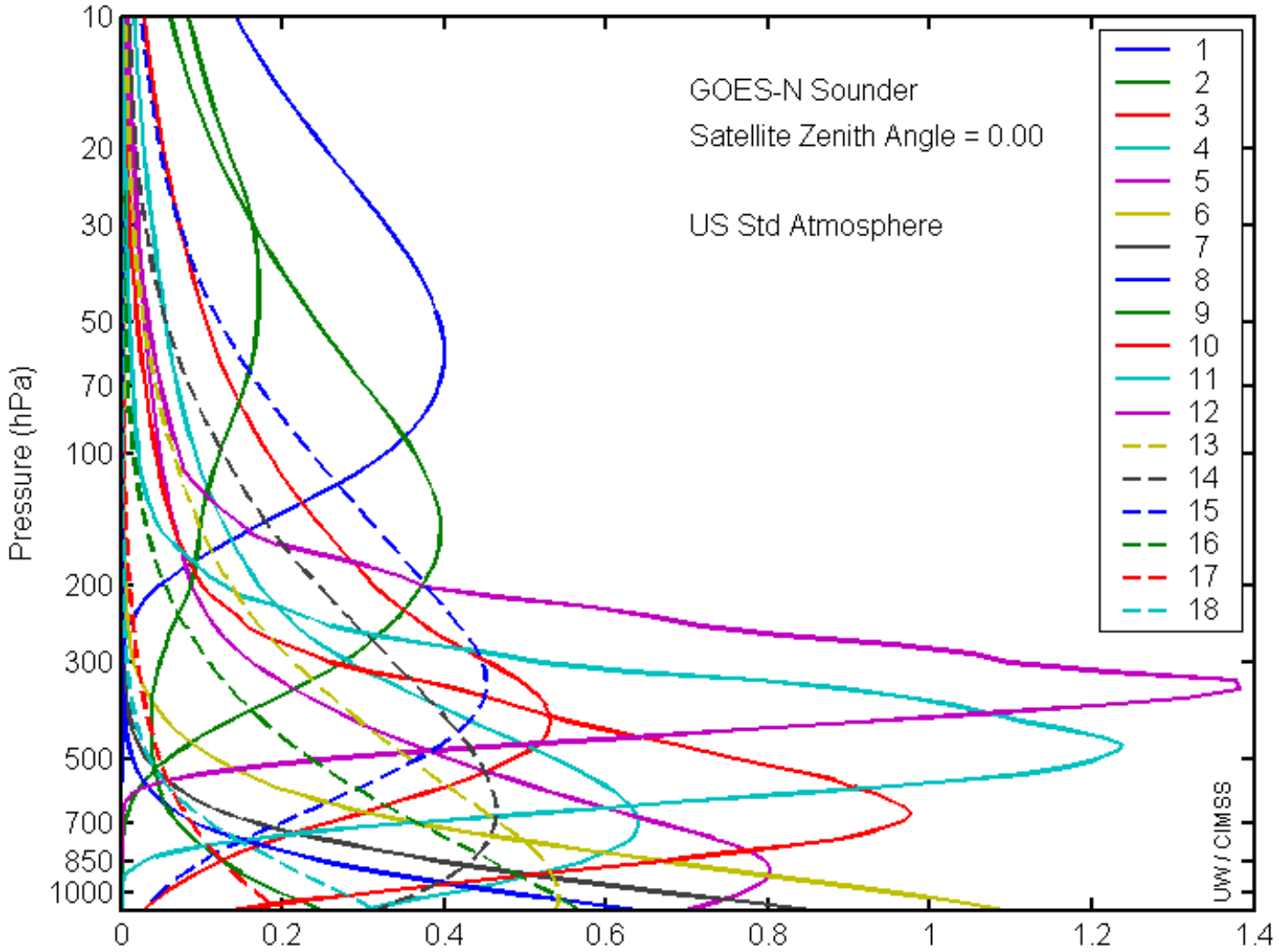
GOES-N **Imager** Weighting Functions



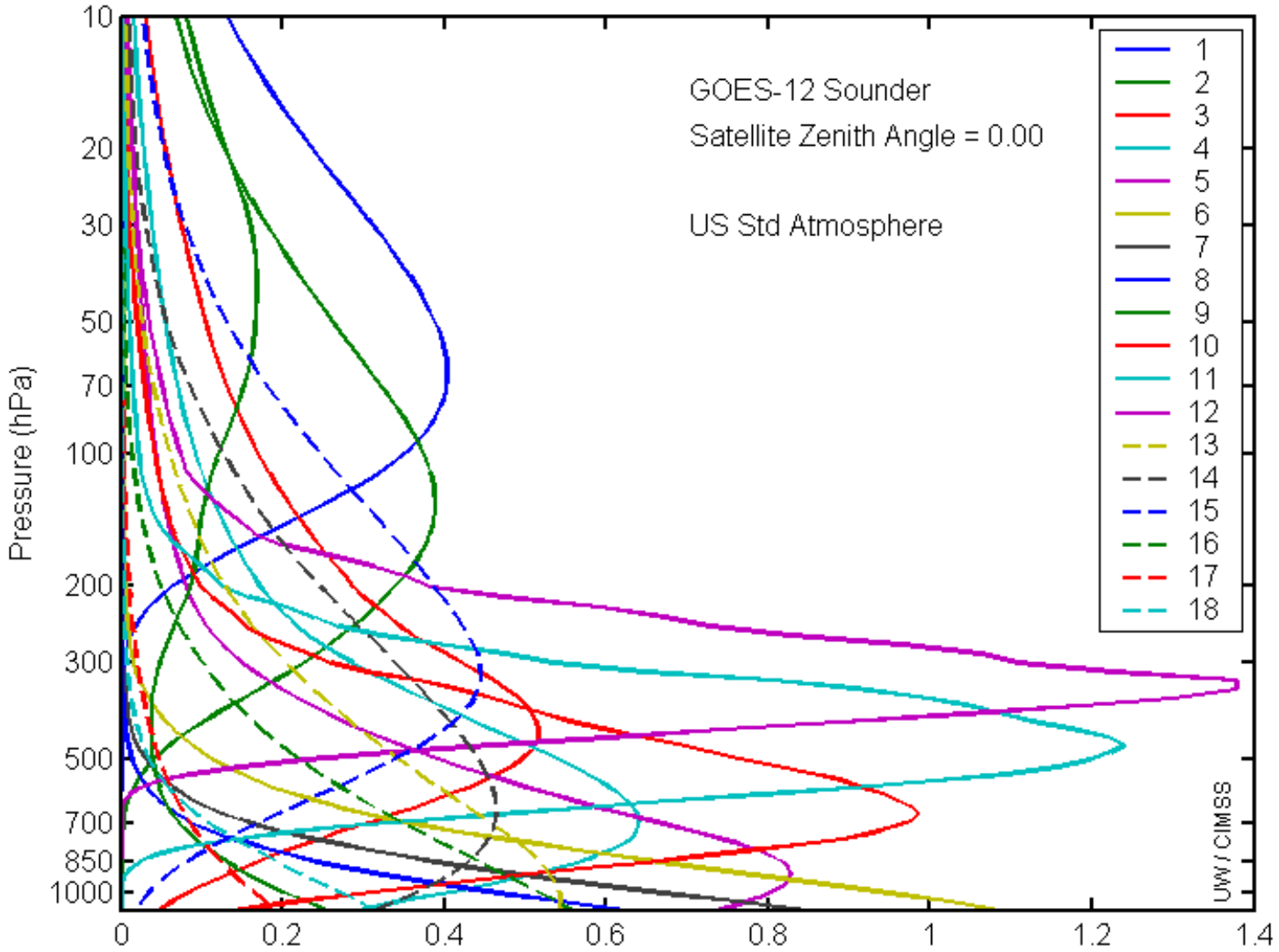
GOES-12 **Imager** Weighting Functions



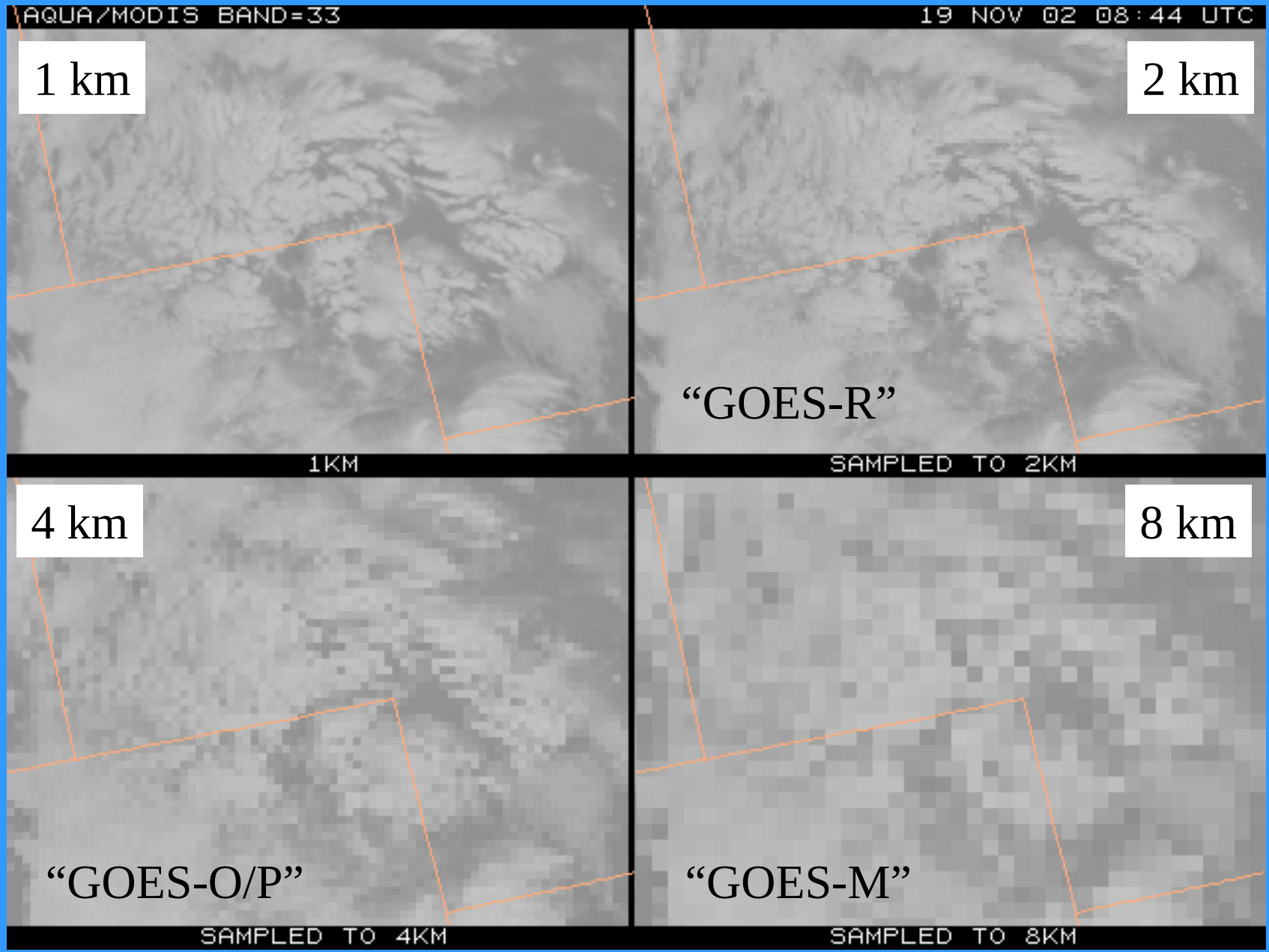
GOES-N **Sounder** Weighting Functions



GOES-12 **Sounder** Weighting Functions



GOES-O – improved spatial resolution of the 13.3 um band.



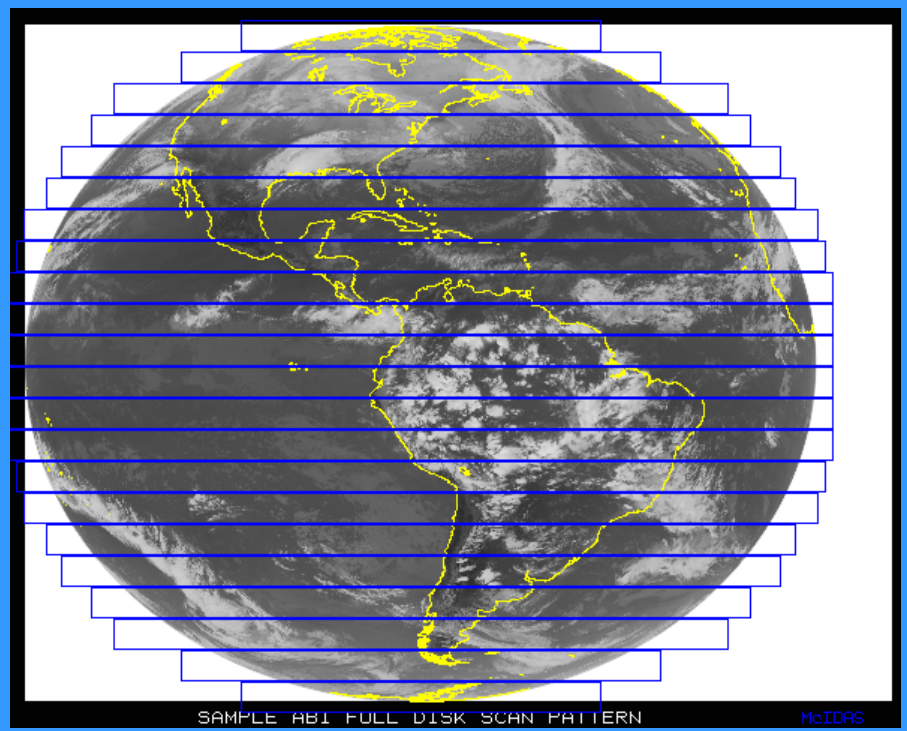
Future GOES

GOES R Baseline Instruments

- **Advanced Baseline Imager (ABI)**
- **Hyperspectral Environmental Suite (HES)**
  - Disk Sounding
  - Severe Weather Mesoscale
  - Coastal Waters
- Geostationary Lightning Mapper (GLM)
- Solar Instrument Suite (SIS)
- Space Environment In Situ Suite (SEISS)
- Auxiliary Services

Advanced Baseline Imager (ABI)

- ITT Industries has been selected to build the ABIs
- Completed a successful System Preliminary Design Review (December 2005)



Full Disk with stepped-edge

The Advanced Baseline Imager:

	ABI	Current
Spectral Coverage		
	16 bands	5 bands
Spatial resolution		
0.64 μm Visible	0.5 km	Approx. 1 km
Other Visible/near-IR	1.0 km	n/a
Bands (>2 μm)	2 km	Approx. 4 km
Spatial coverage		
Full disk	4 per hour	Every 3 hours
CONUS	12 per hour	~4 per hour
Mesoscale	Every 30 sec	n/a
Visible (reflective bands)		
On-orbit calibration	Yes	No

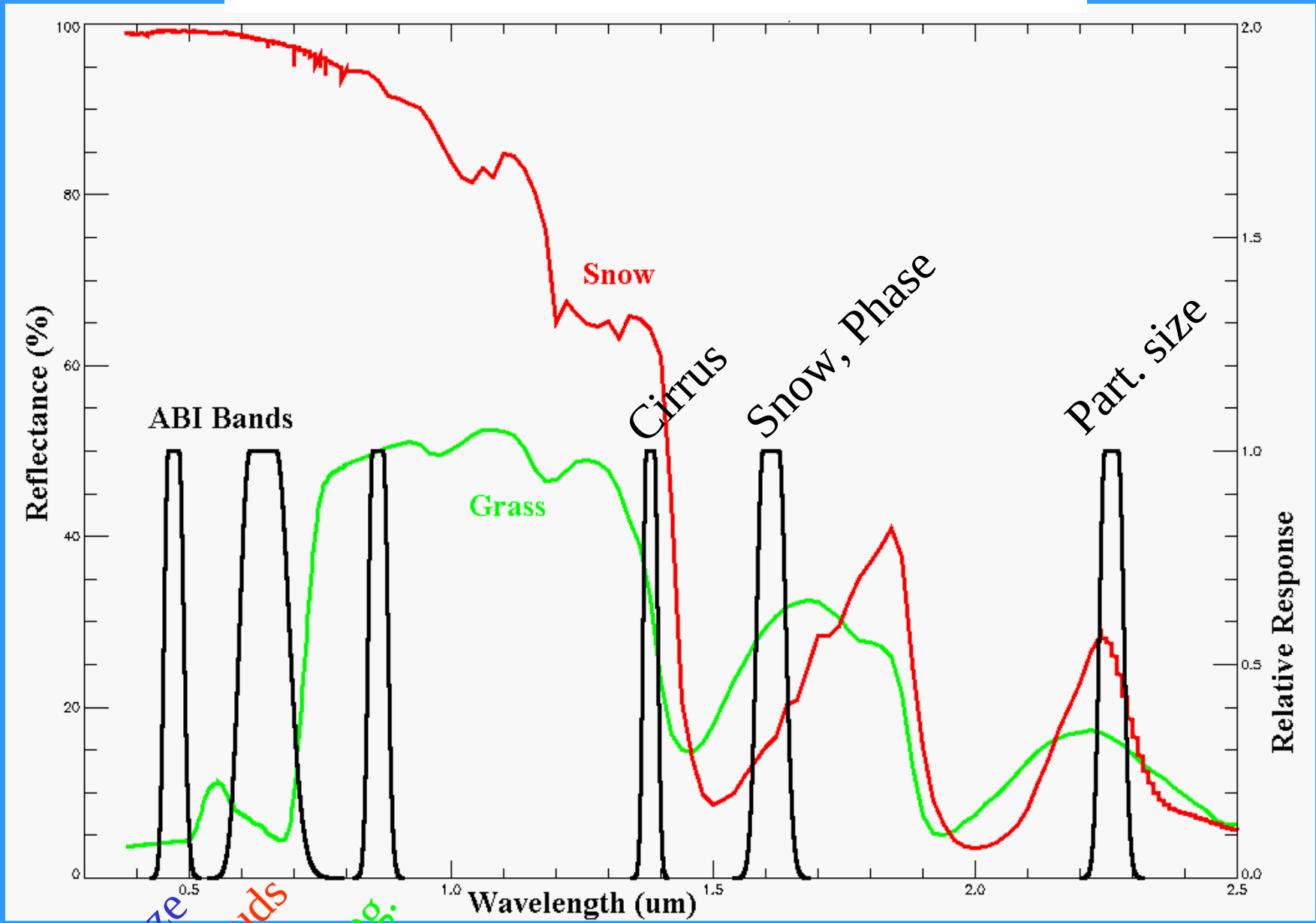
ABI Visible/Near-IR Bands

Future GOES imager (ABI) band	Wavelength range (μm)	Central wavelength (μm)	Nominal subsatellite IGFOV (km)	Sample use
1	0.45–0.49	0.47	1	Daytime aerosol over land, coastal water mapping
2	0.59–0.69	0.64	0.5	Daytime clouds fog, inso-lation, winds
3	0.846–0.885	0.865	1	Daytime vegetation/burn scar and aerosol over water, winds
4	1.371–1.386	1.378	2	Daytime cirrus cloud
5	1.58–1.64	1.61	1	Daytime cloud-top phase and particle size, snow
6	2.225–2.275	2.25	2	Daytime land/cloud properties, particle size, vegetation, snow

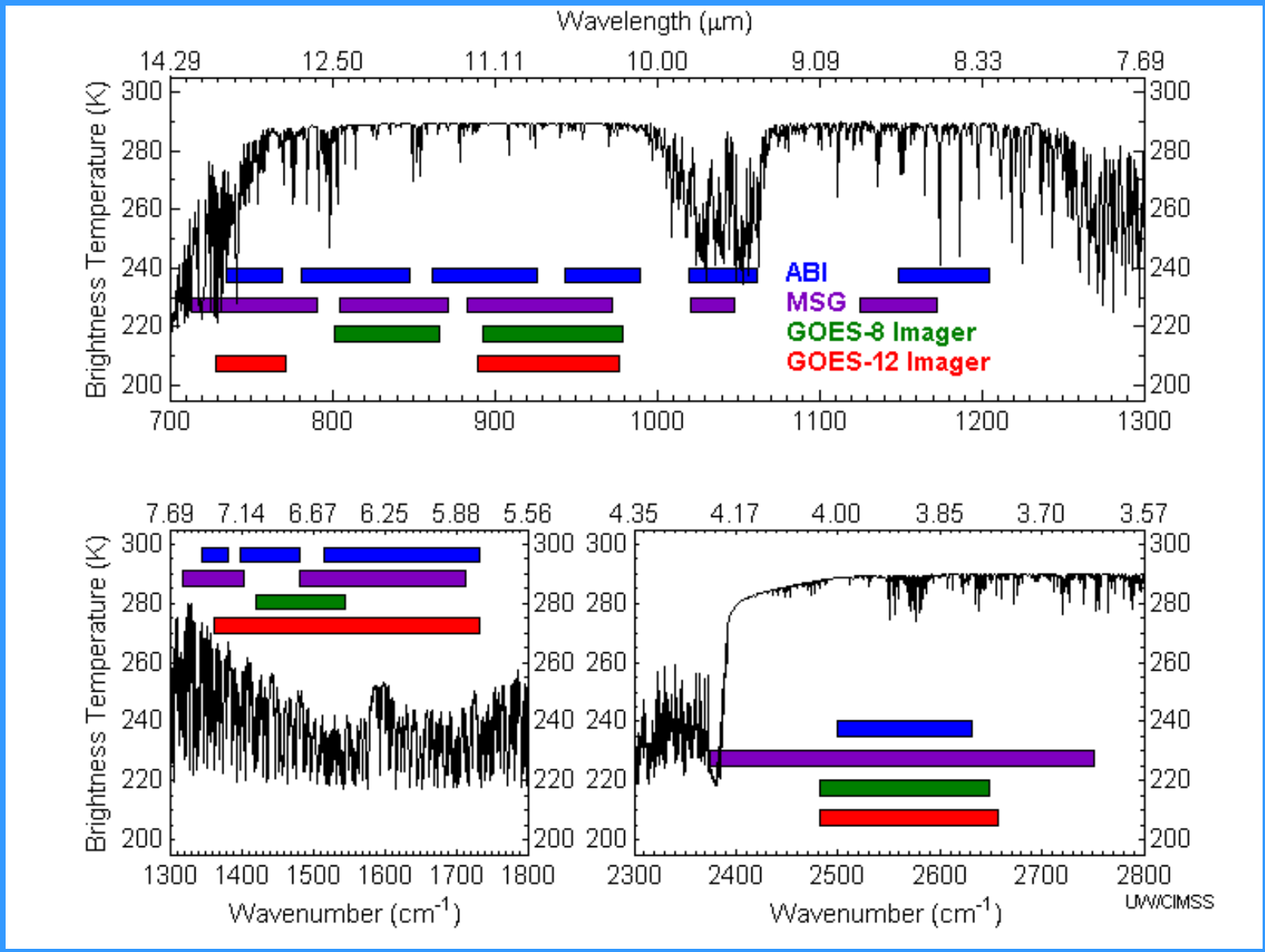
ABI IR Bands

7	3.80–4.00	3.90	2	Surface and cloud, fog at night, fire, winds
8	5.77–6.6	6.19	2	High-level atmospheric water vapor, winds, rainfall
9	6.75–7.15	6.95	2	Midlevel atmospheric water vapor, winds, rainfall
10	7.24–7.44	7.34	2	Lower-level water vapor, winds, and SO_2
11	8.3–8.7	8.5	2	Total water for stability, cloud phase, dust, SO_2 rainfall
12	9.42–9.8	9.61	2	Total ozone, turbulence, and winds
13	10.1–10.6	10.35	2	Surface and cloud
14	10.8–11.6	11.2	2	Imagery, SST, clouds, rainfall
15	11.8–12.8	12.3	2	Total water, ash, and SST
16	13.0–13.6	13.3	2	Air temperature, cloud heights and amounts

Visible and near-IR channels on the ABI

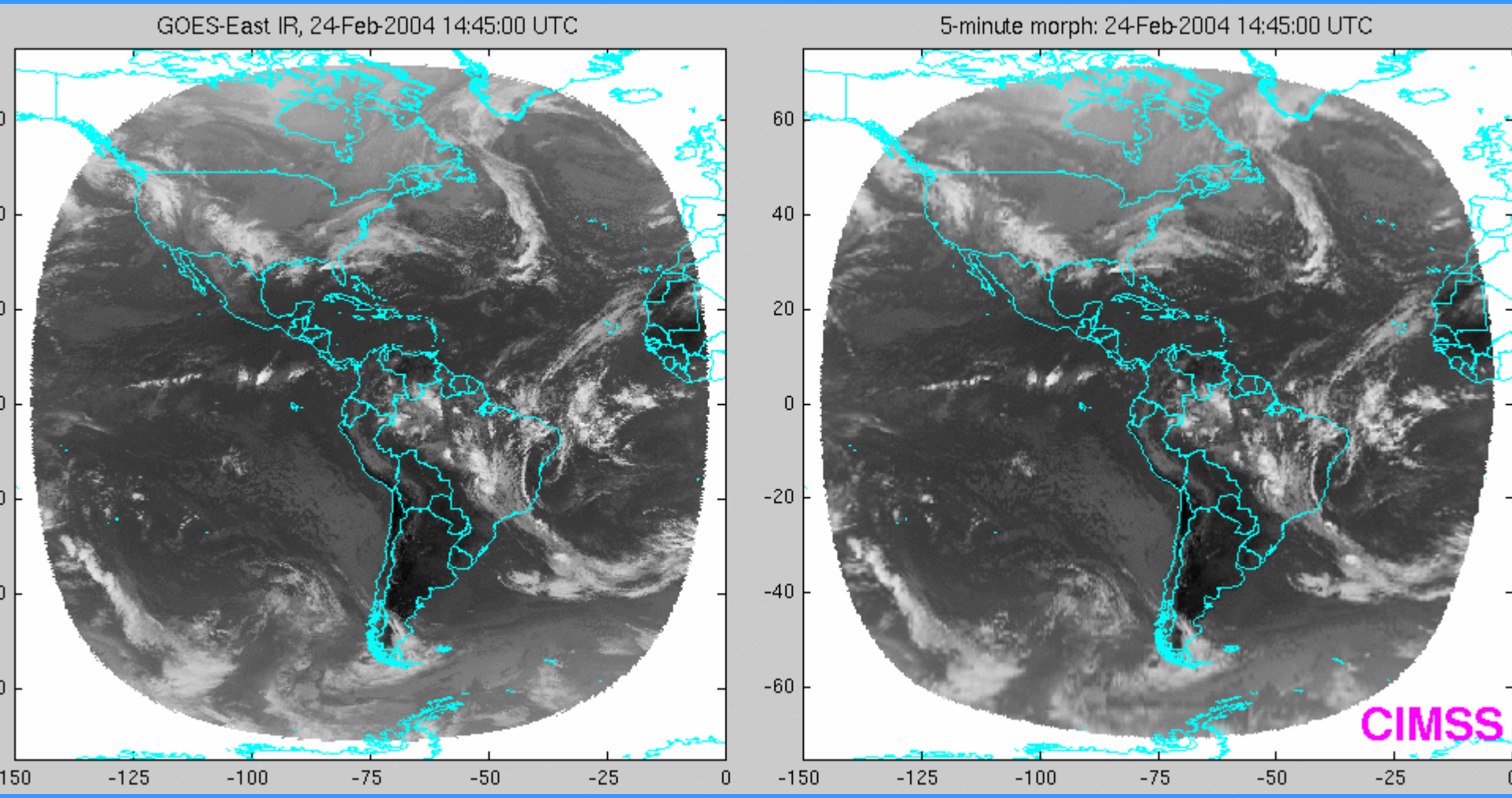


The ABI visible and near-IR bands have many uses.

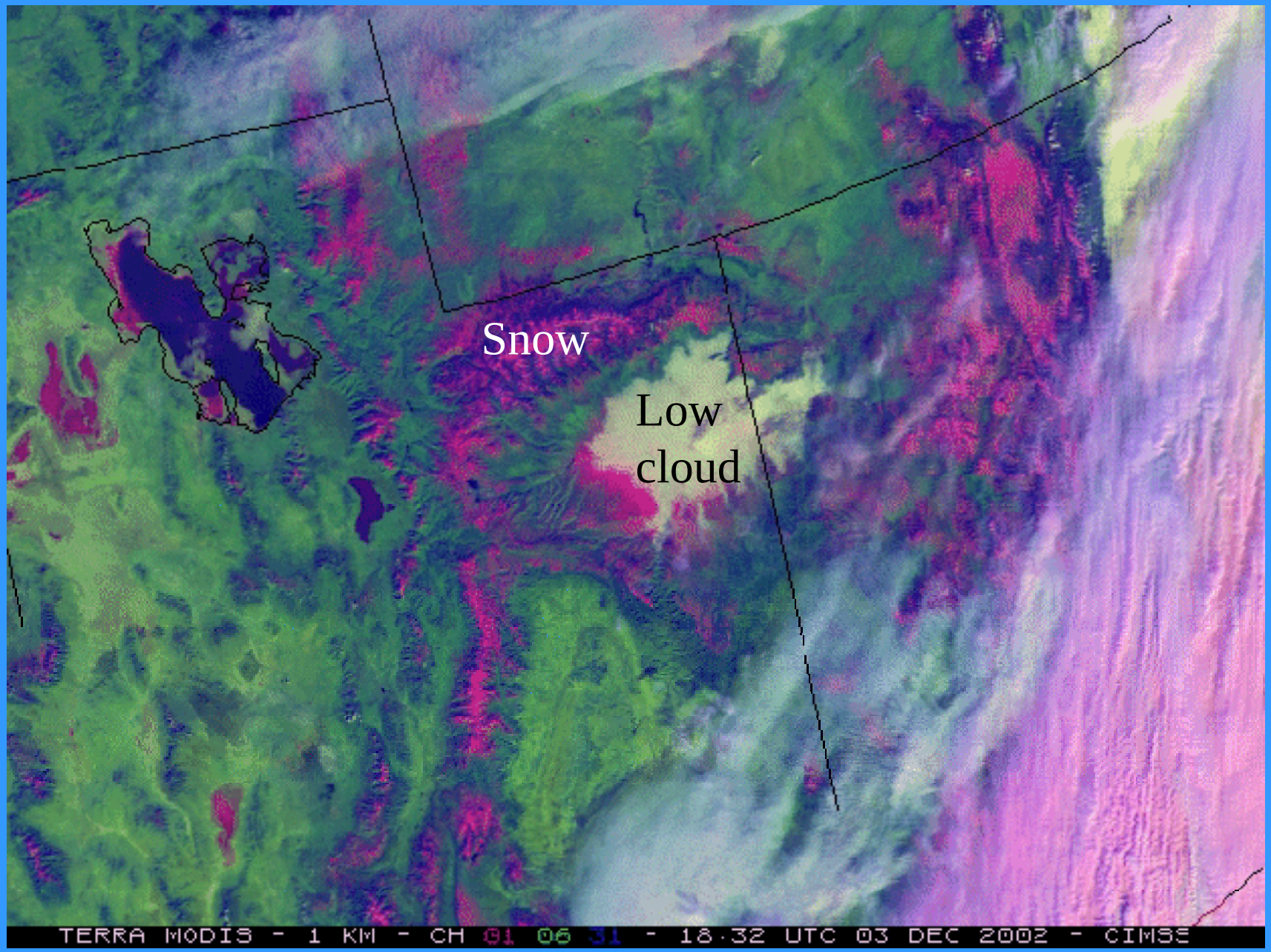


While there are differences, there are also many similarities for the spectral bands on MET-8 and the Advanced Baseline Imager (ABI). Both the MET-8 and ABI have many more bands than the current operational imagers.

Simulating 5-minute full-disk IR imagery

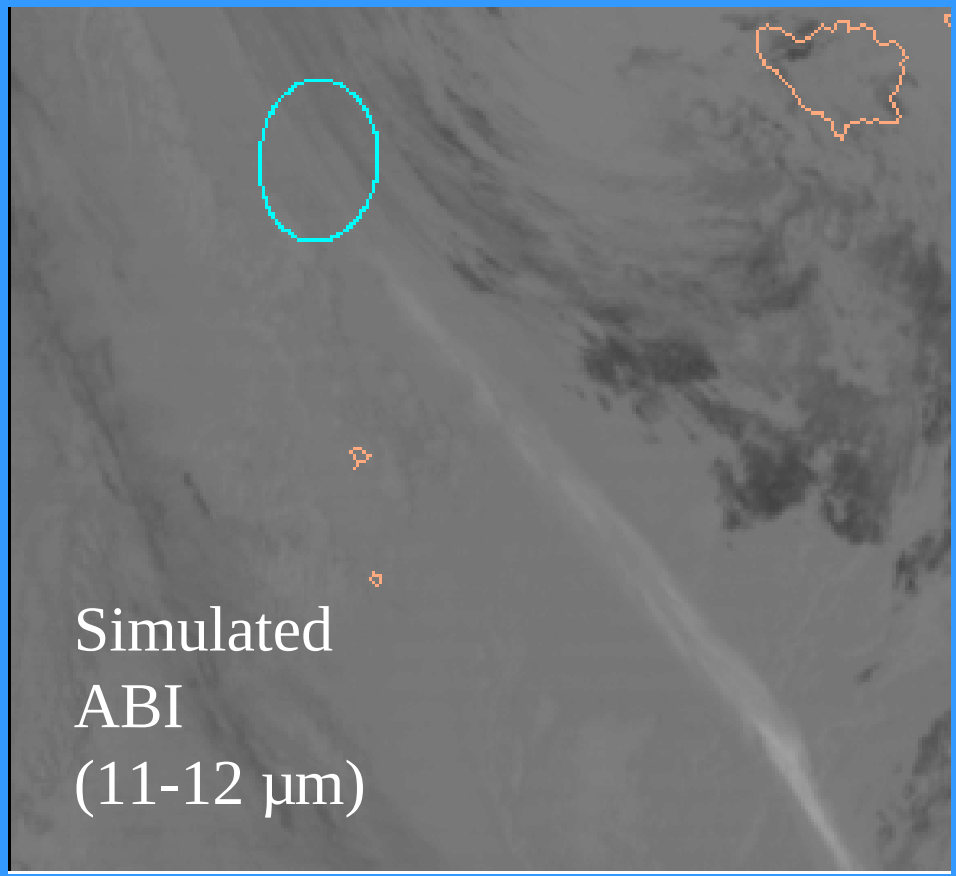


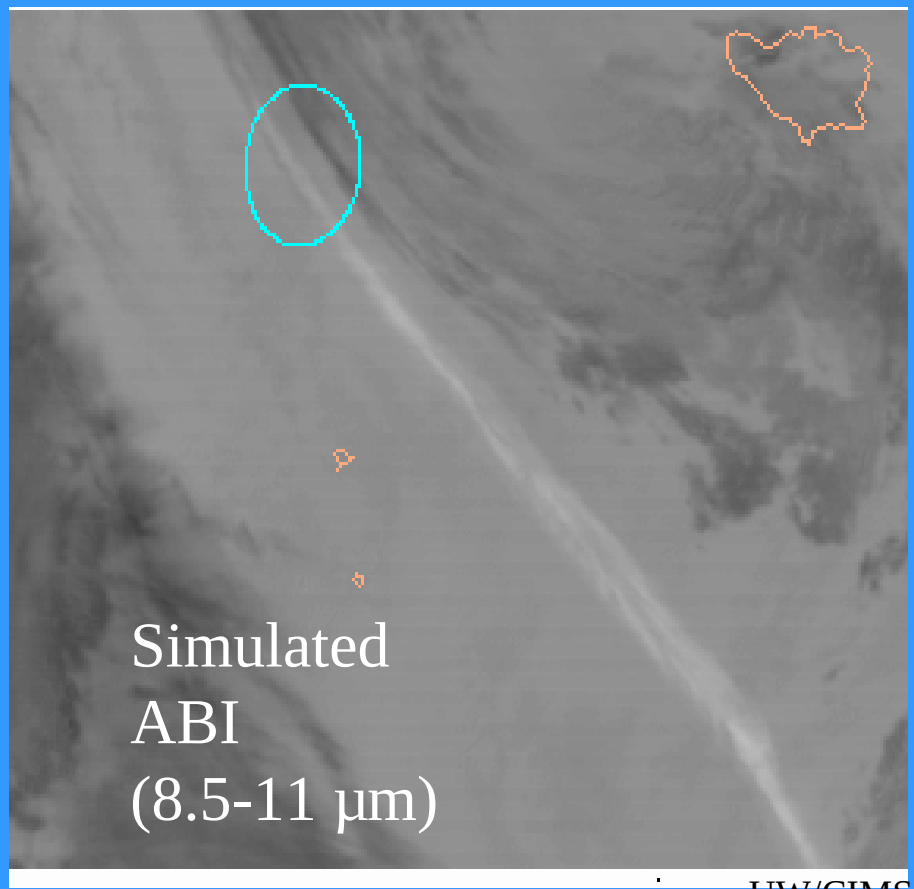
Three-color composite (0.64, 1.6 and 11 μm) shows the low cloud over the snow and the water versus ice clouds.



Volcanic Ash Plume: 11-12 and 8.5-11 µm images

One day after the Mt. Cleveland eruption
20 February 2001, 8:45 UTC





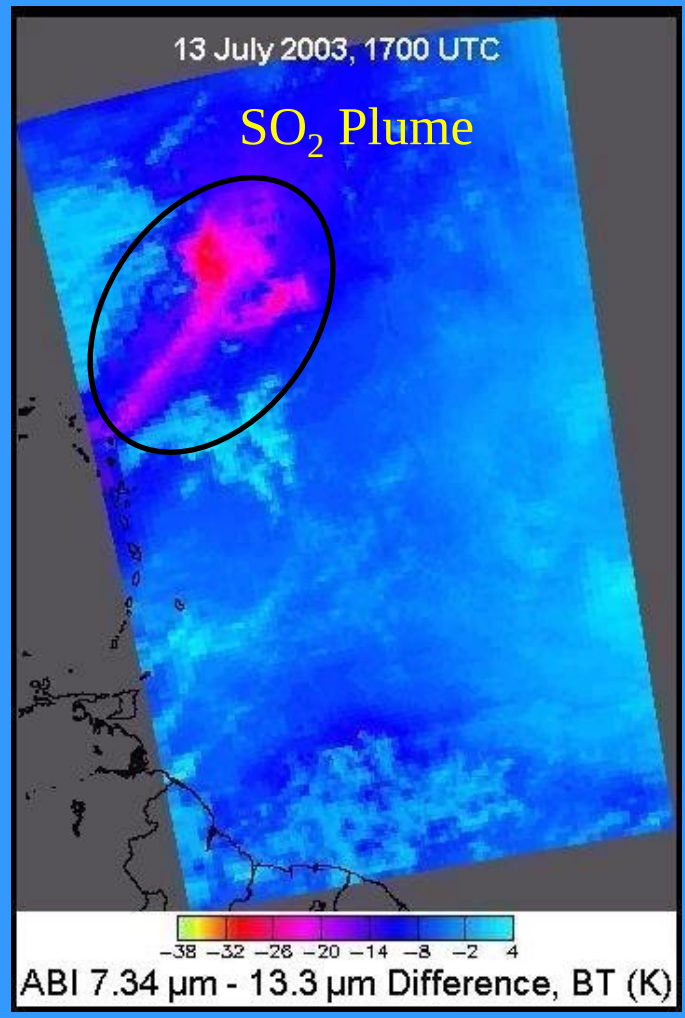
UW/CIMSS

GOES-R ABI will detect SO2 plumes

Water Vapor Band Difference convolved from AIRS data sees SO_2 plume from Montserrat Island, West Indies

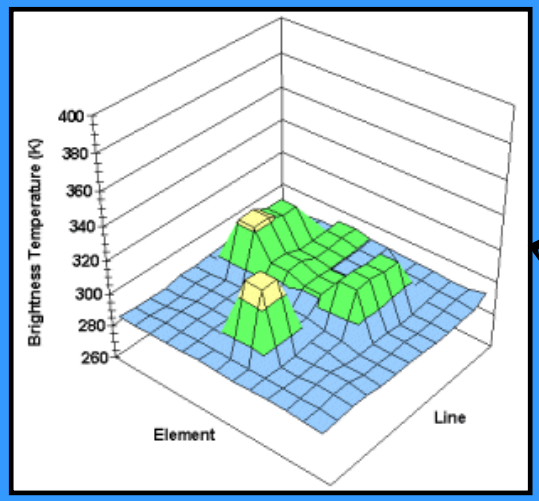
Current GOES Imager
No skill in monitoring

Current GOES Imager can not detect SO_2

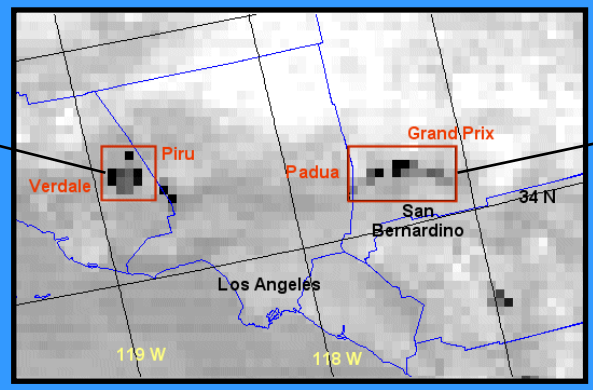


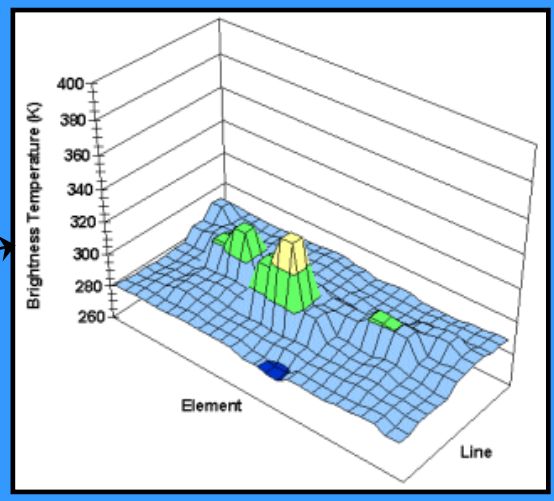
ABI 7.34 µm – 13.3 µm

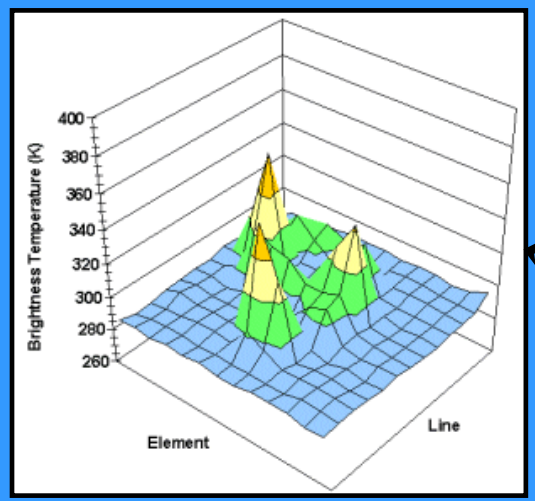
GOES-R and GOES-I/M Simulations of Southern California Fires



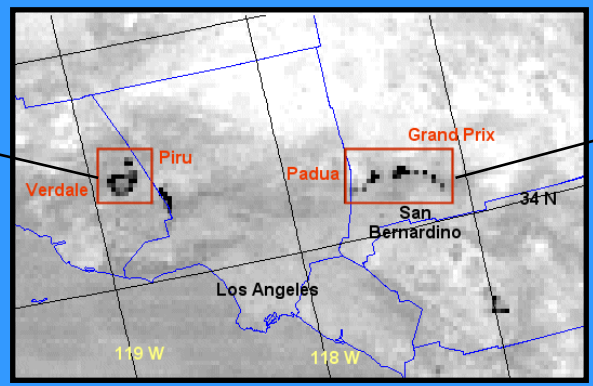
GOES-12 Simulated 3.9 micron Data
Padua/Grand Prix Fires
Date: 27-Oct-03 Time: 09:50 UTC

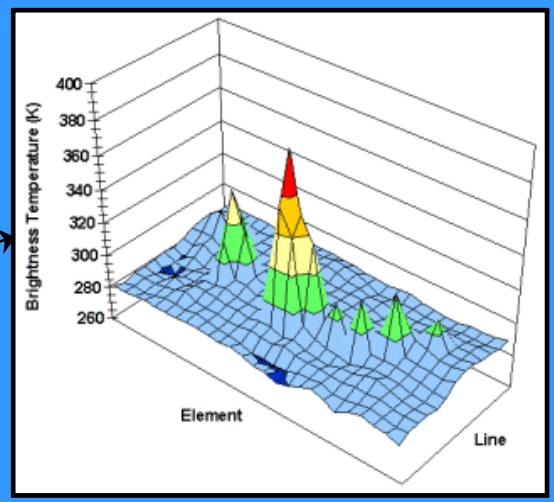






GOES-R Simulated 3.9 micron Data
Padua/Grand Prix Fires
Date: 27-Oct-03 Time: 09:50 UTC



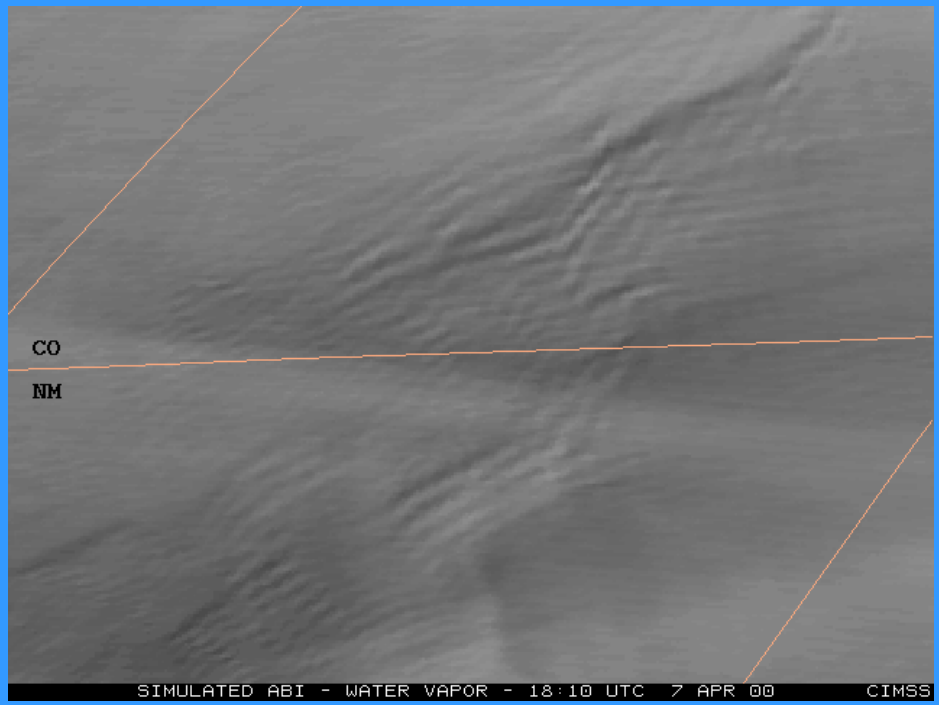


Brightness Temperature (K)

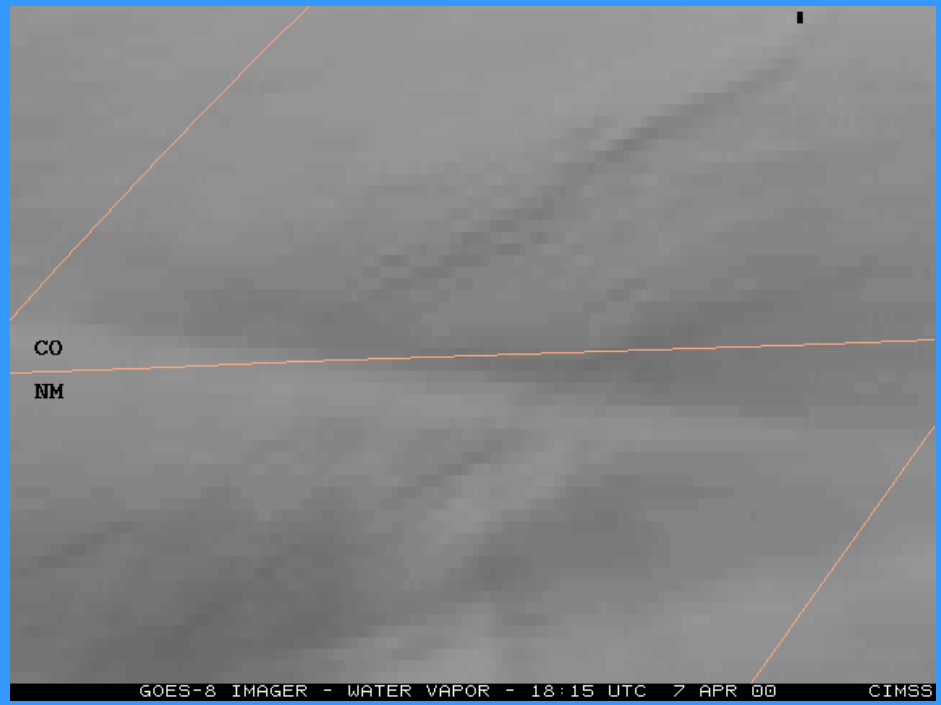
260-280 | 280-300 | 300-320 | 320-340 | 340-360 | 360-380 | 380-400

Mountain Waves in WV channel (6.7 µm)
7 April 2000, 1815 UTC

Simulated ABI



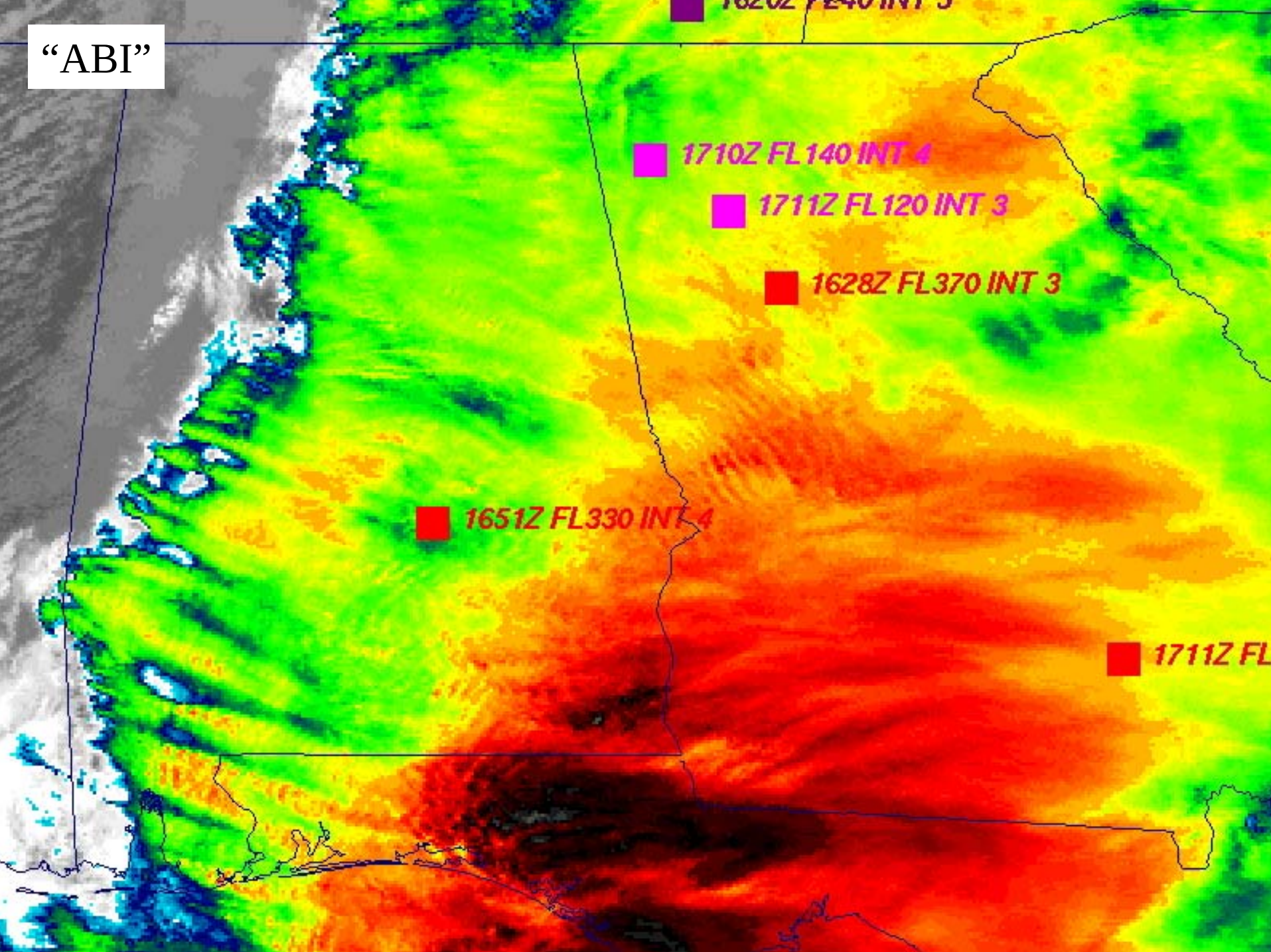
Actual GOES-8

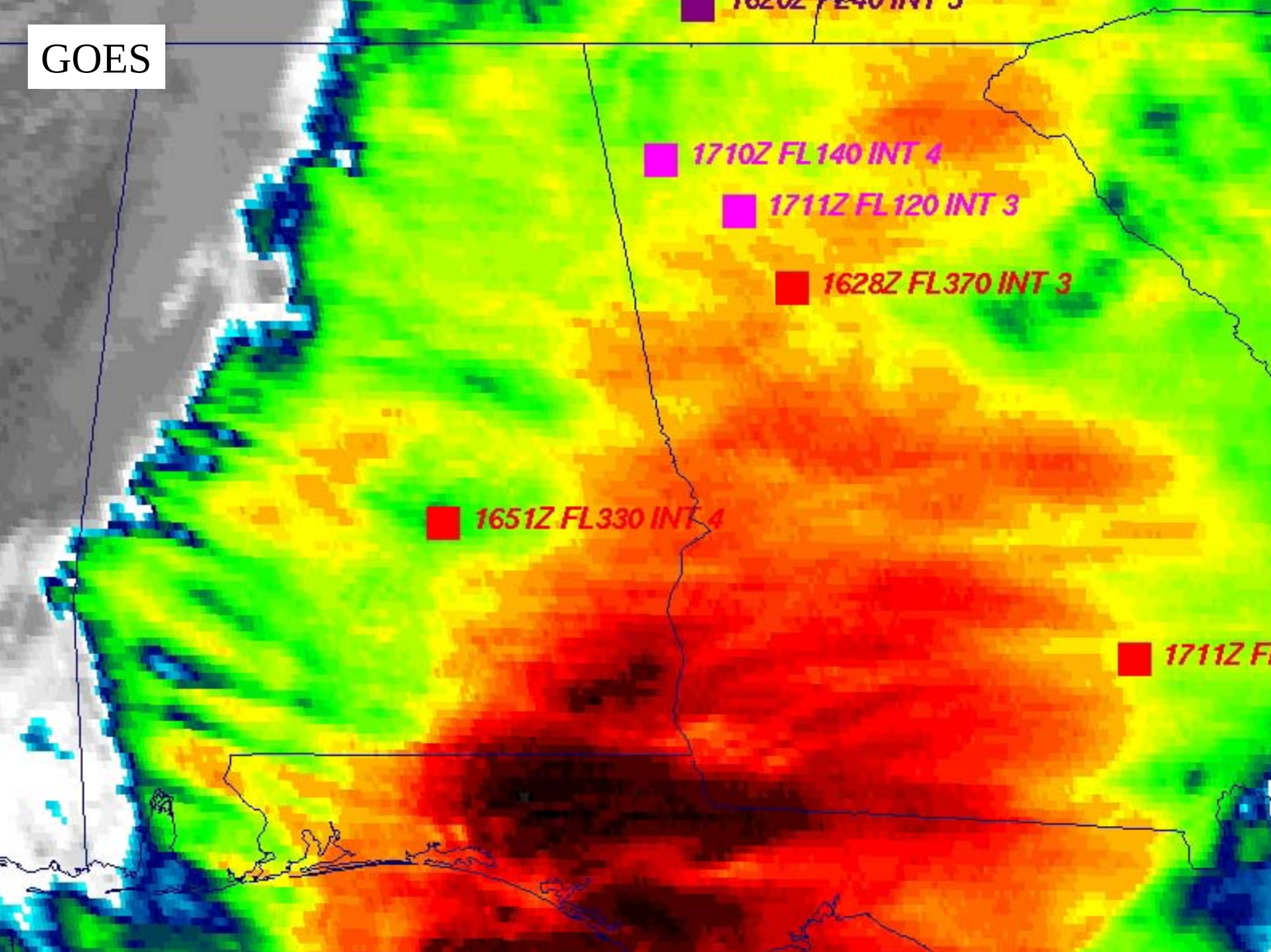


Mountain waves over Colorado and New Mexico were induced by strong northwesterly flow associated with a pair of upper-tropospheric jet streaks moving across the elevated terrain of the southern and central Rocky Mountains. The mountain waves appear more well-defined over Colorado; in fact, several aircraft reported moderate to severe turbulence over that region.

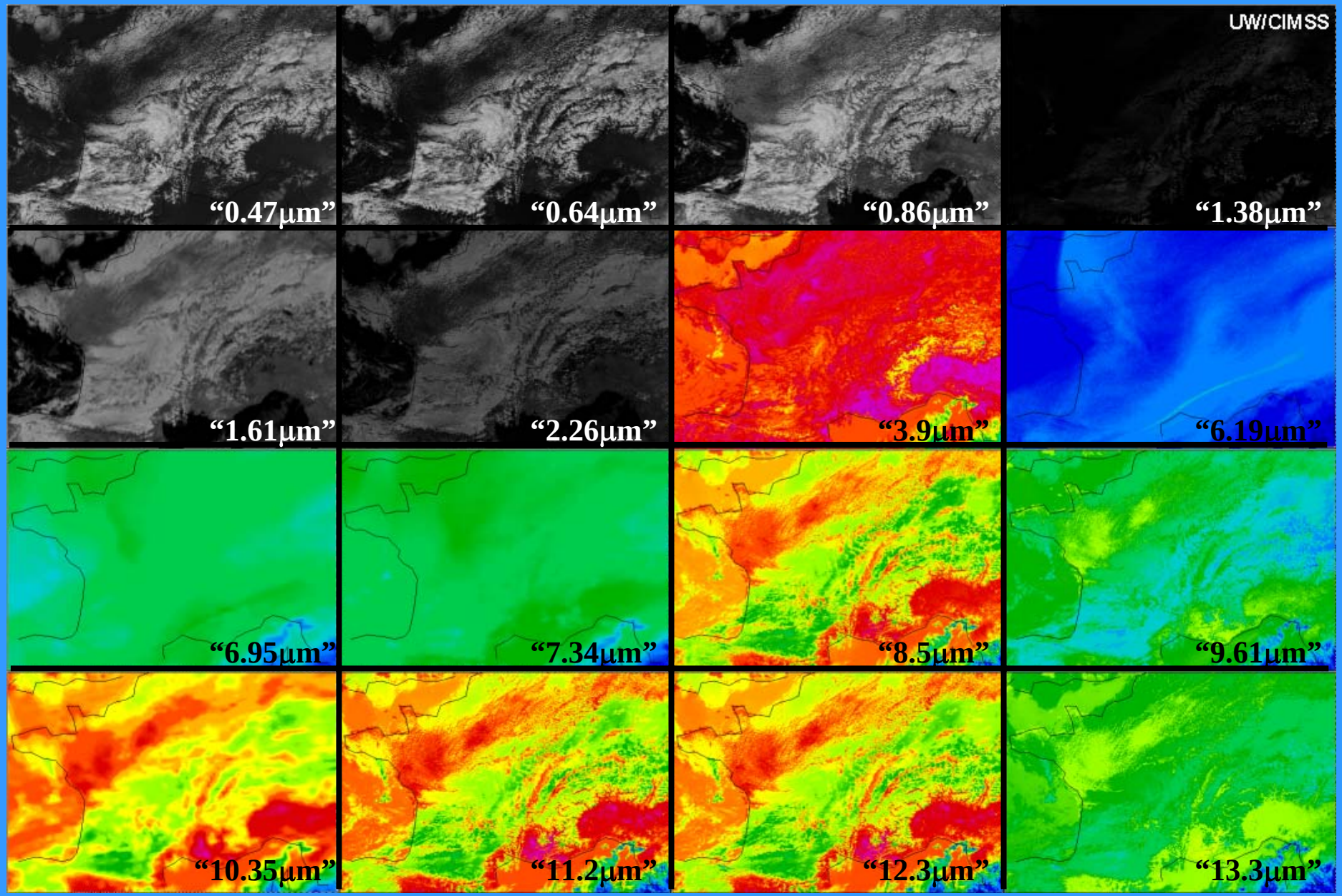
Both images are shown in GOES projection.

UW/CIMSS

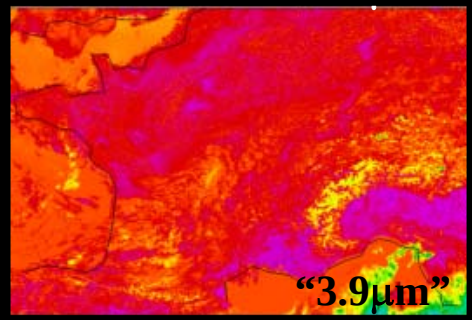

“ABI”
1710Z FL140 INT 4
1711Z FL120 INT 3
1628Z FL370 INT 3
1651Z FL330 INT 4
1711Z FL

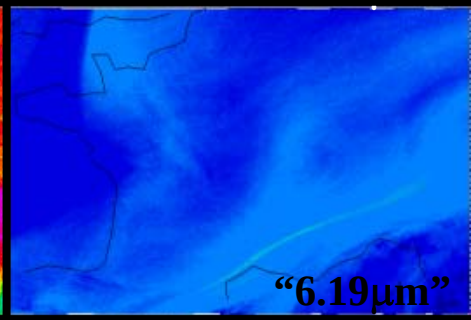

GOES
1710Z FL140 INT 4
1711Z FL120 INT 3
1628Z FL370 INT 3
1651Z FL330 INT 4
1711Z F

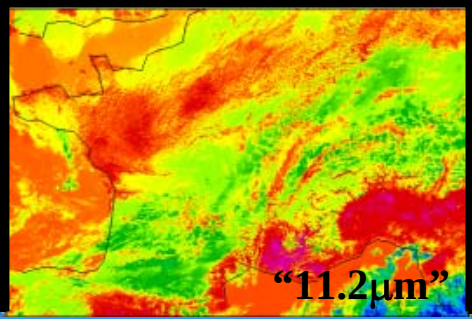
Using MODIS, MET-8 and AIRS to simulate the spectral bands on the Advanced Baseline Imager (ABI)

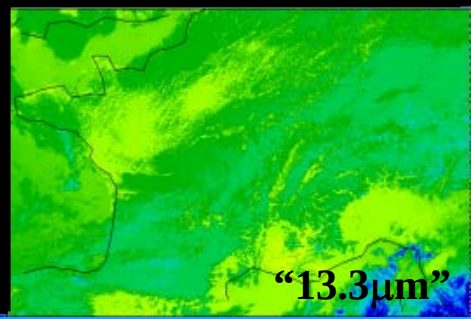


Similar bands on the GOES-12 Imager

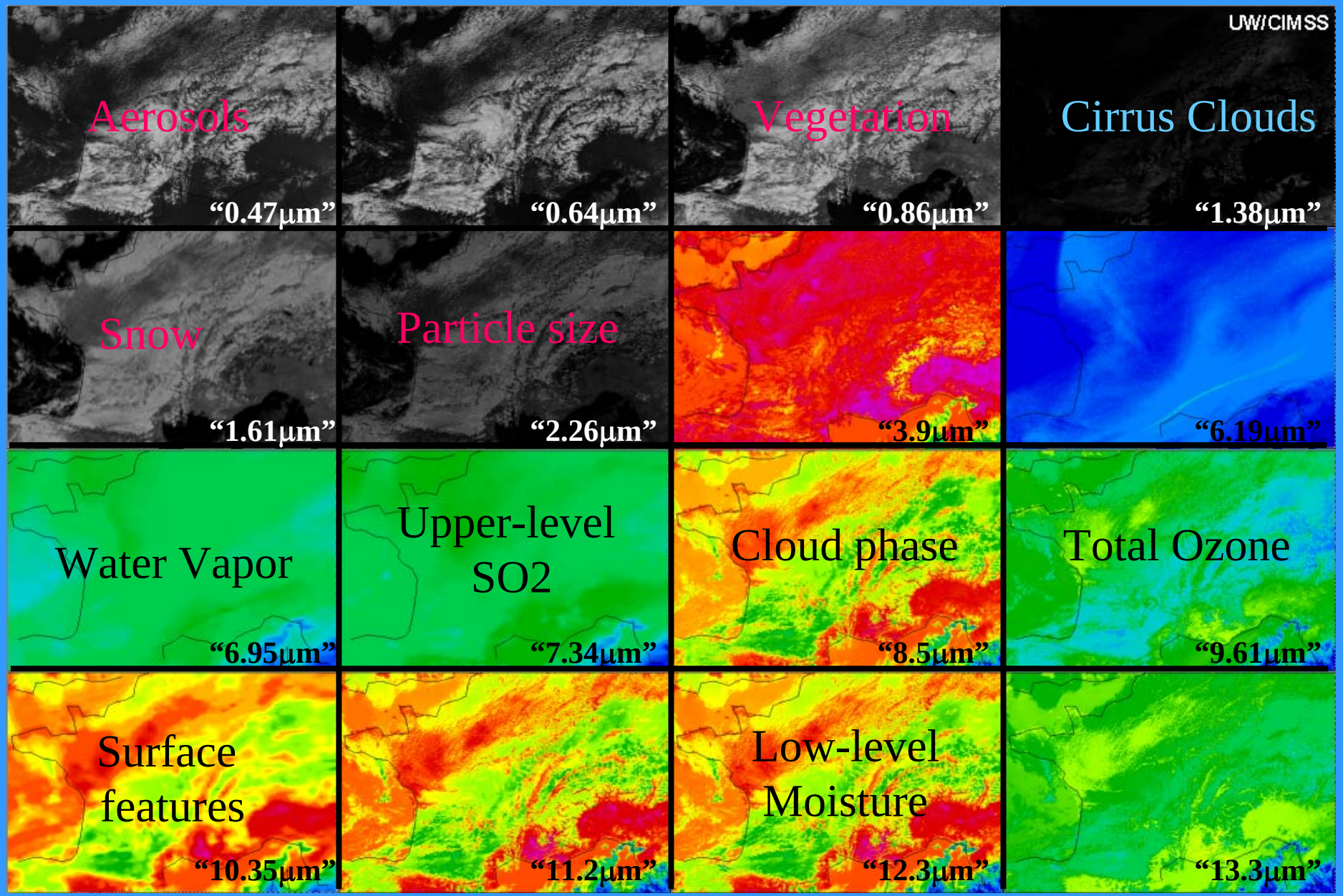






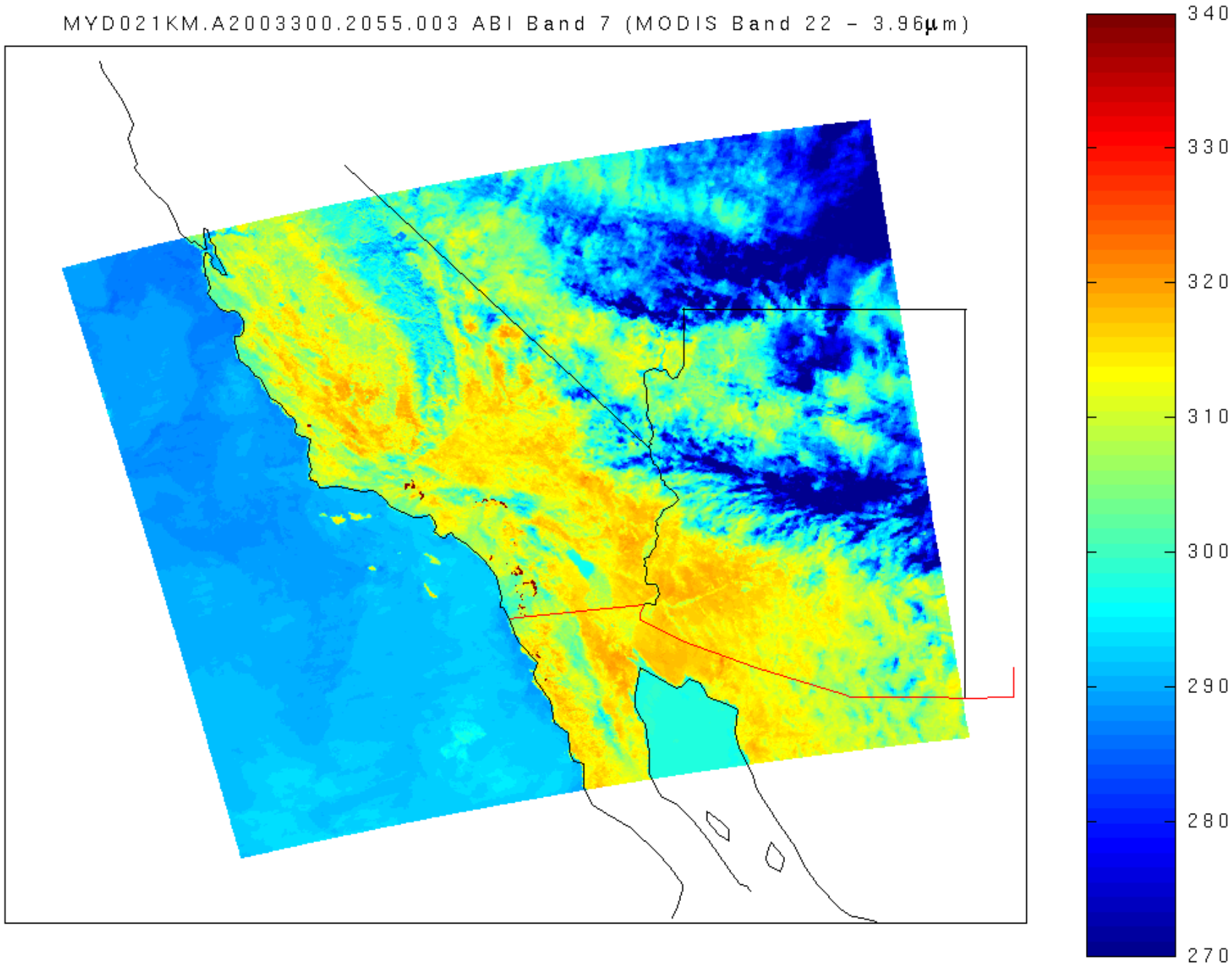


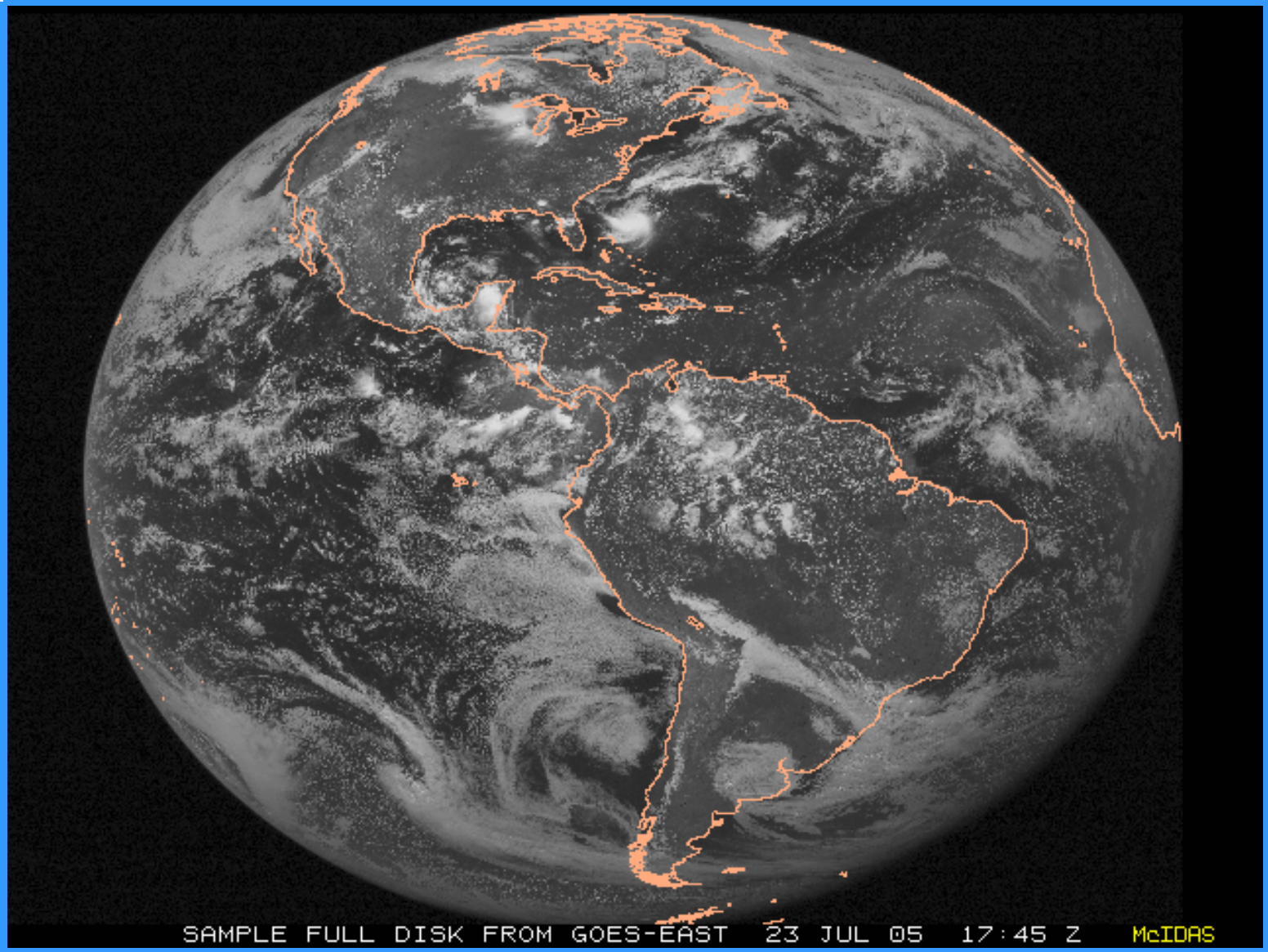
Using MODIS, MET-8 and AIRS to simulate the spectral bands on the Advanced Baseline Imager (ABI)



“ABI” data for Data Compression

- Sample MODIS/ABI datasets have been developed by CIMSS for a range of phenomena.
- Some of the processing steps include:
  - Case selection
  - De-striping
  - Averaging to ABI spatial resolution
  - Stretch over expected bit depth range
  - Output as scaled radiances


MYD021KM.A2003300.2055.003 ABI Band 7 (MODIS Band 22 – 3.96μm)
340
330
320
310
300
290
280
270

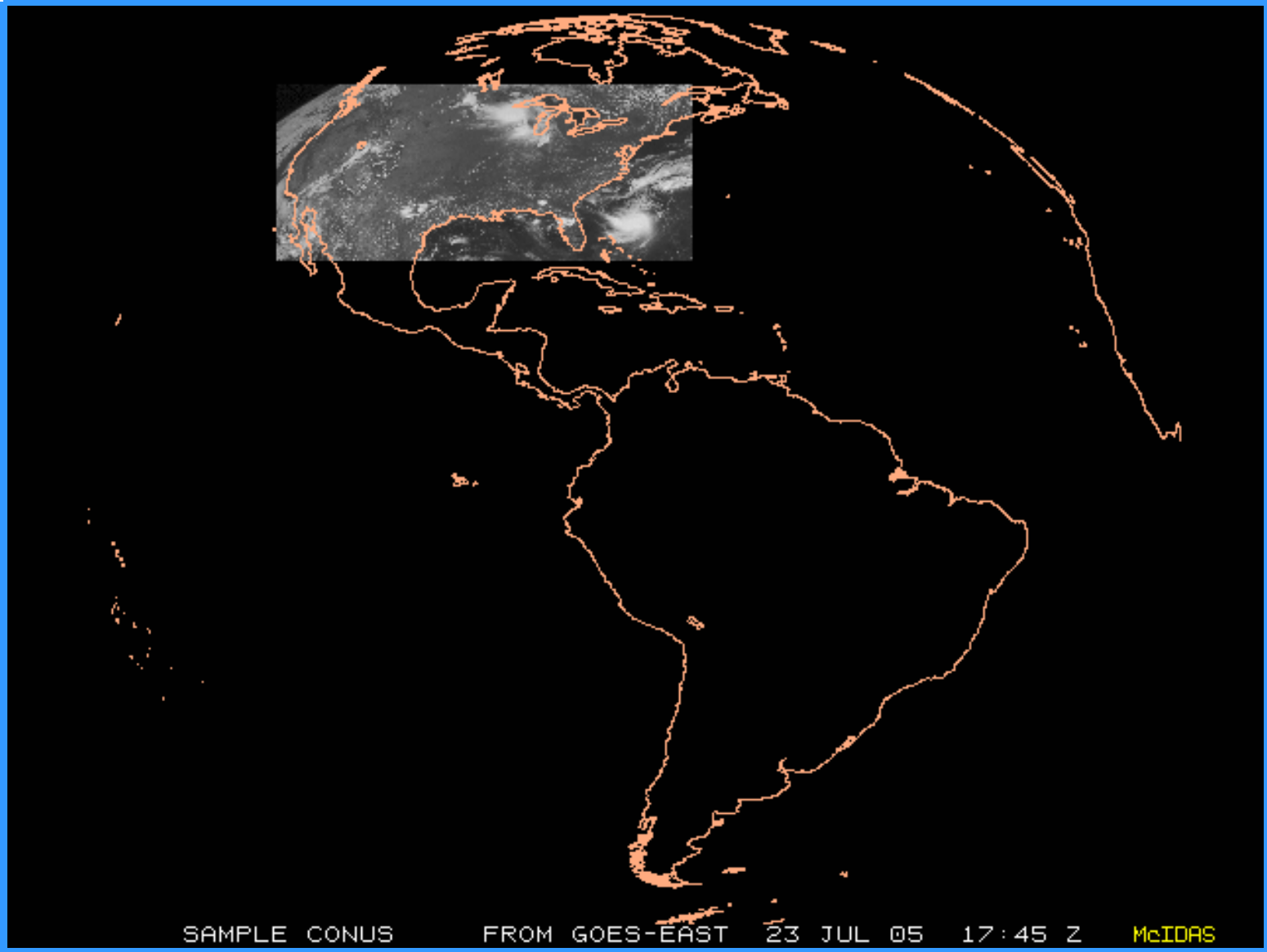


Current GOES scans 5 times slower than the ABI

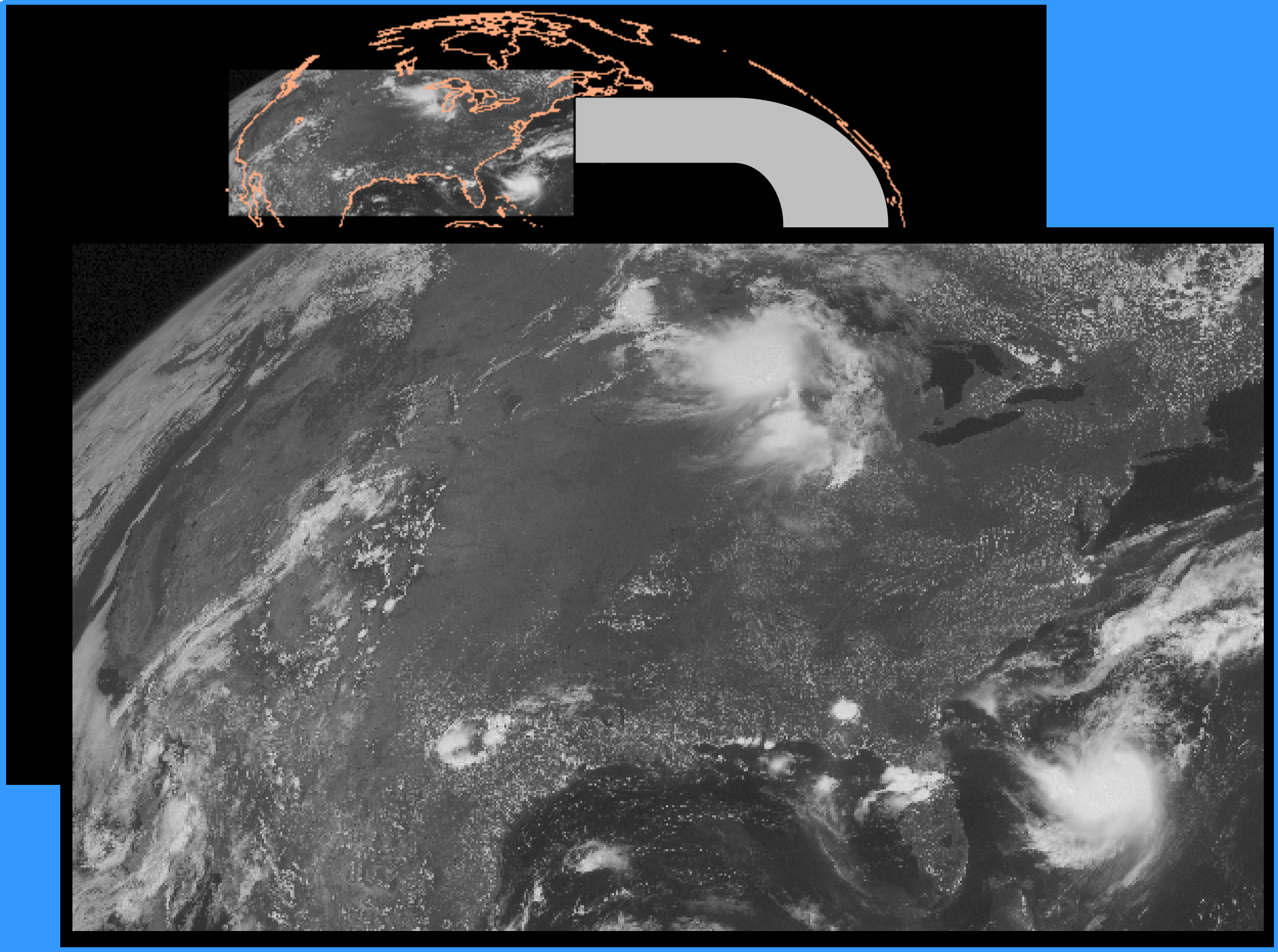
There are two anticipated scan modes for the ABI:

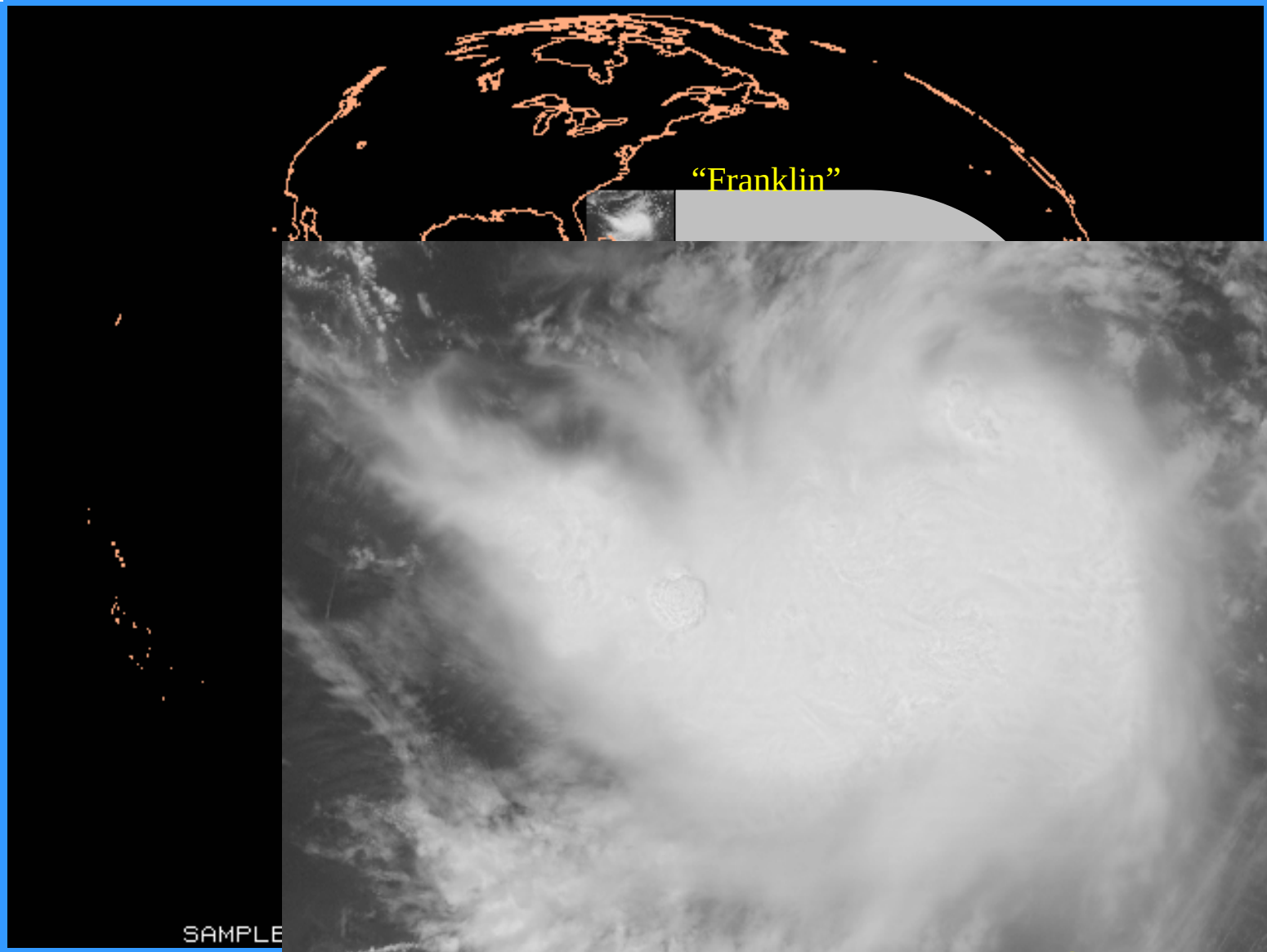
- Full disk images every 15 minutes + CONUS images every 5 minutes + mesoscale.

or - Full disk every 5 minutes.



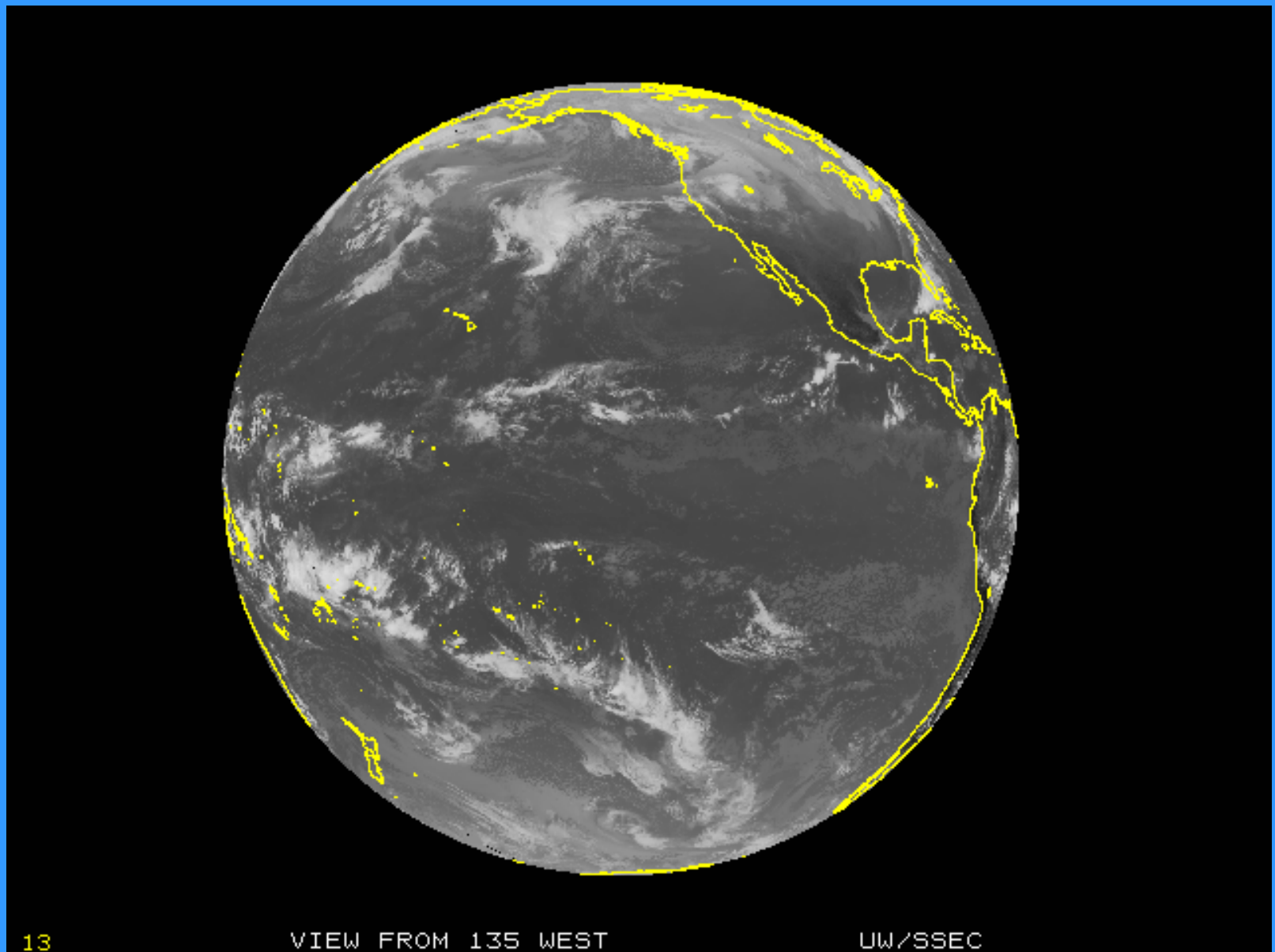
ABI can offer Continental US images every 5 minutes for routine monitoring of a wide range of events (storms, dust, volcanoes, fires, hurricanes, etc). This is only every 15 or 30 minutes with the current GOES the routine mode.



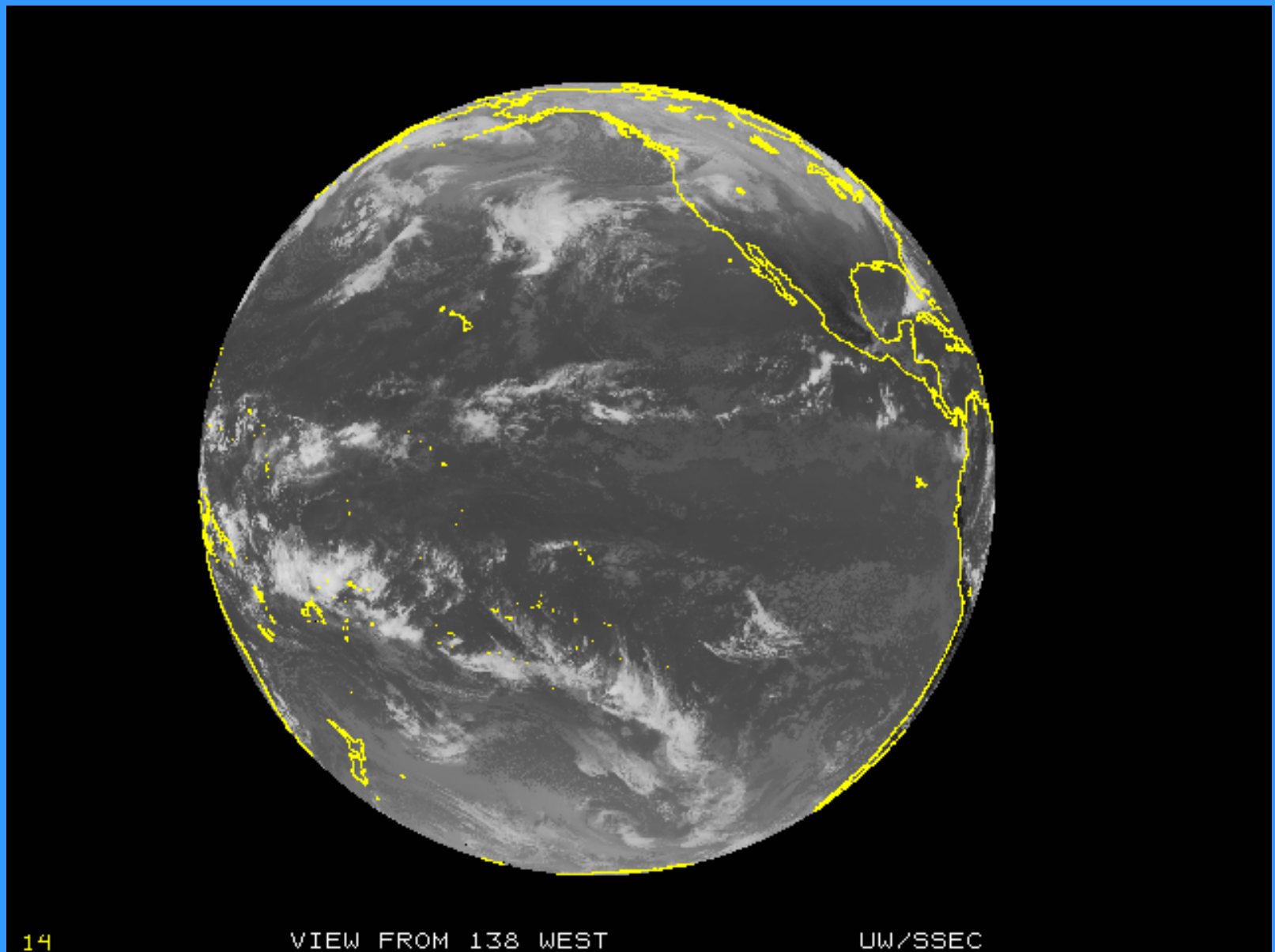


Mesoscale images every 30 seconds for rapidly changing phenomena (thunderstorms, hurricanes, fires, etc). Current GOES can not offer these rapid scans while still scanning other important regions

GOES-West view from 135



GOES-West view from 138

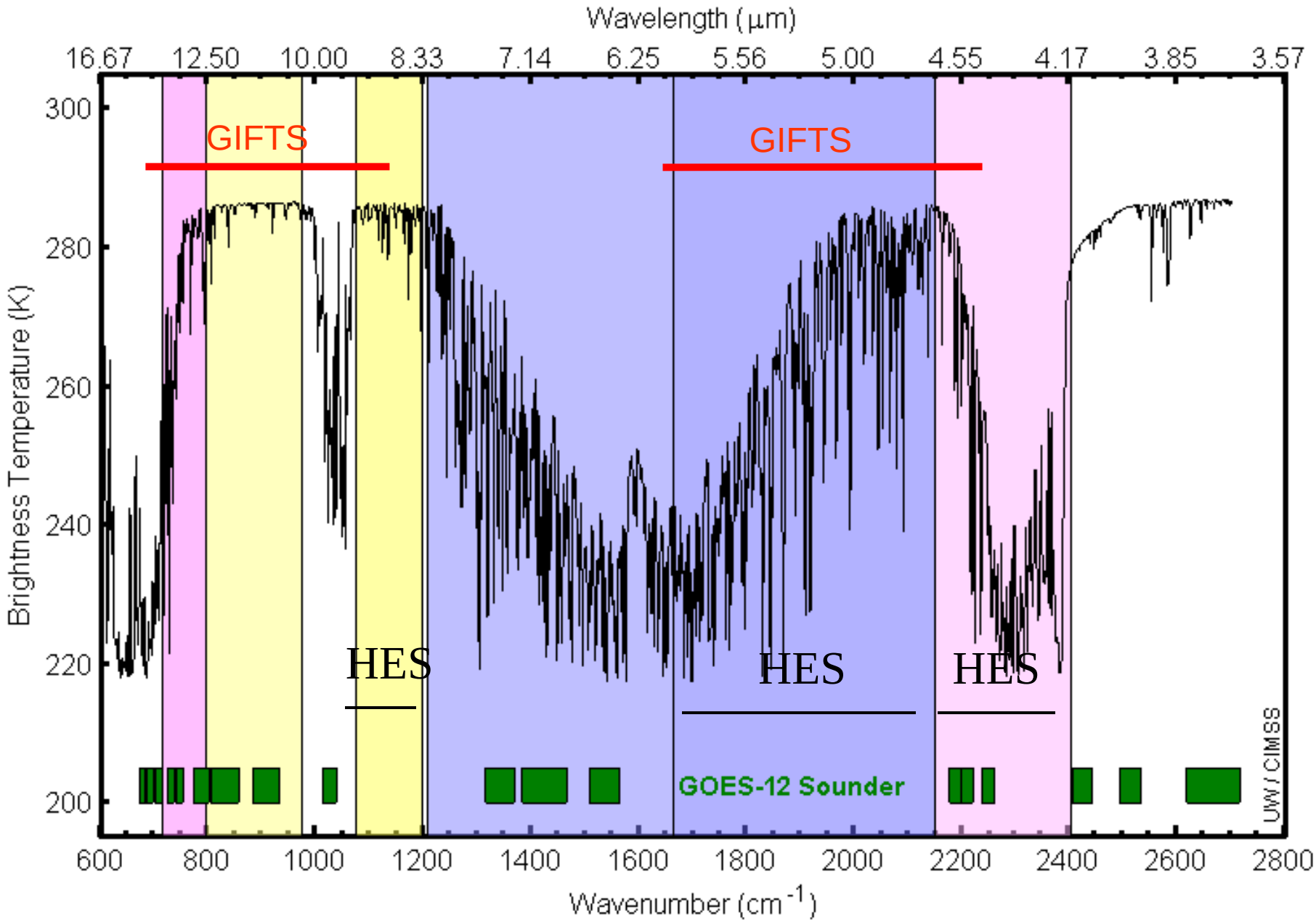


Fixed Grid Format

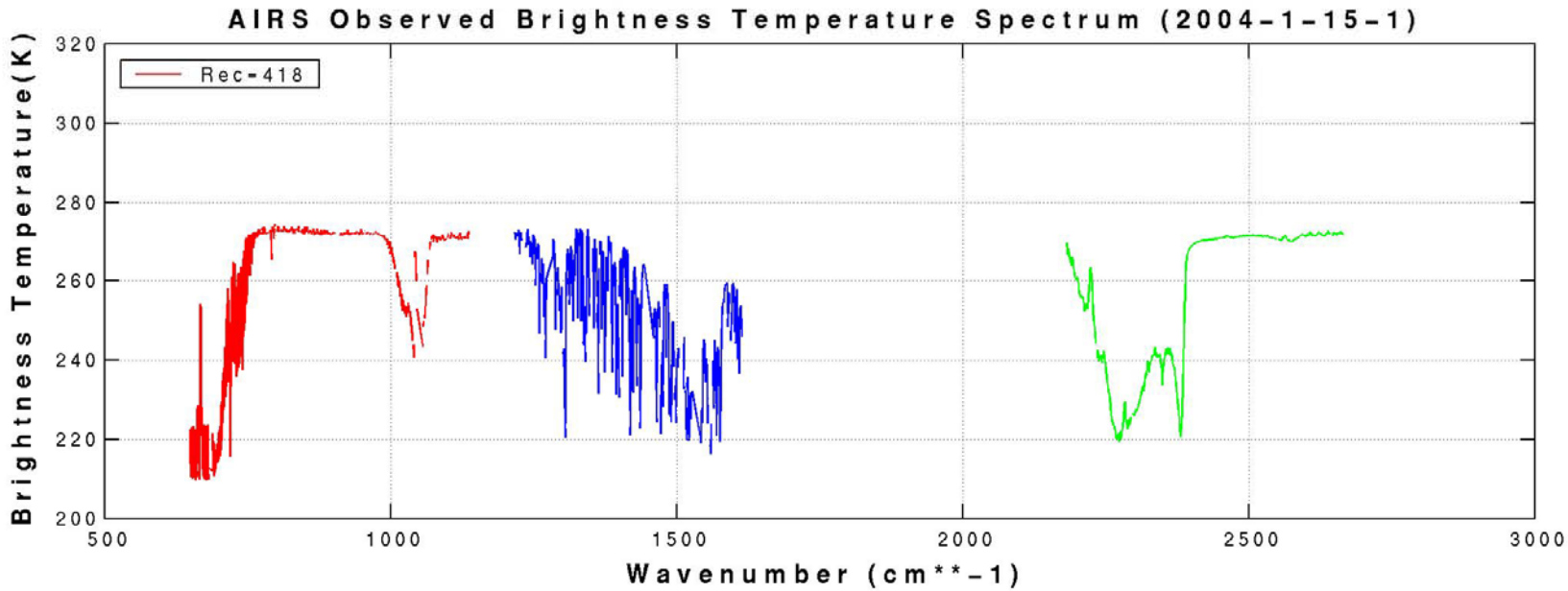
- The distributed, calibrated and navigationally corrected **image data will be rectified [re-grid] to a fixed grid**. The grid is defined relative to an ideal geostationary satellite viewpoint centered and fixed above the equator. The image pixels will have an angular separation in both the East/West and North/South directions of:
  - 14 microradians (0.5 km) in the 0.64 micron channel,
  - 28 microradians (1 km) in the 0.47, 0.86 and 1.61 um channel,
  - 56 microradians (2 km) in all other channels.

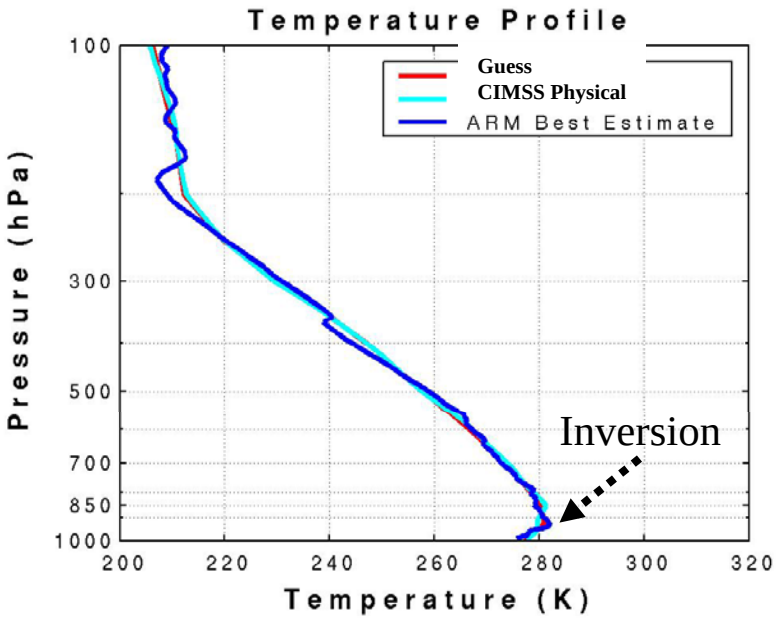
HES

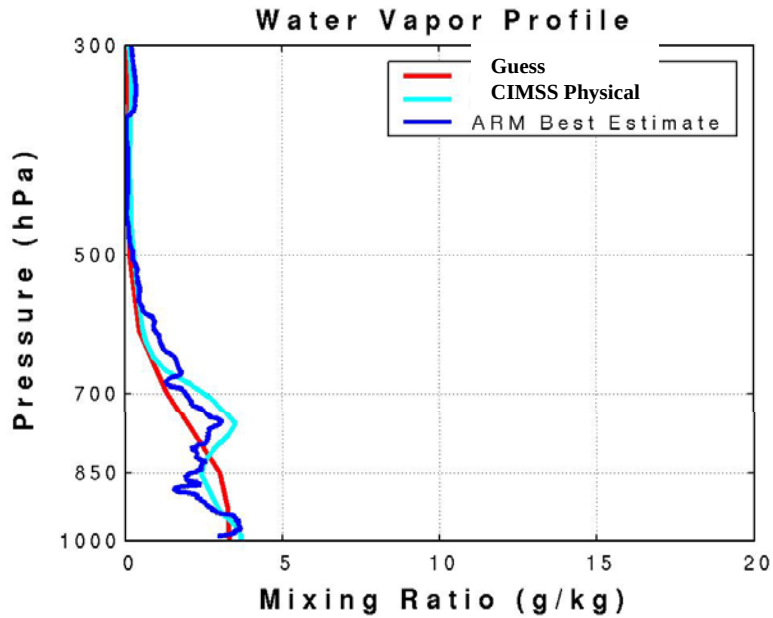
- The Hyperspectral Environmental Suite (HES) will be located on a geostationary platform.
  - Late 2012
  - NOAA operational
  - Currently in formulation phase
- Two modes
  - Full Disk (10km)
  - Severe Weather/Mesoscale (4km)
- HES is an outgrowth of earlier ABS efforts
  - HES includes the functionality of the old Advanced Baseline Sounder (ABS)

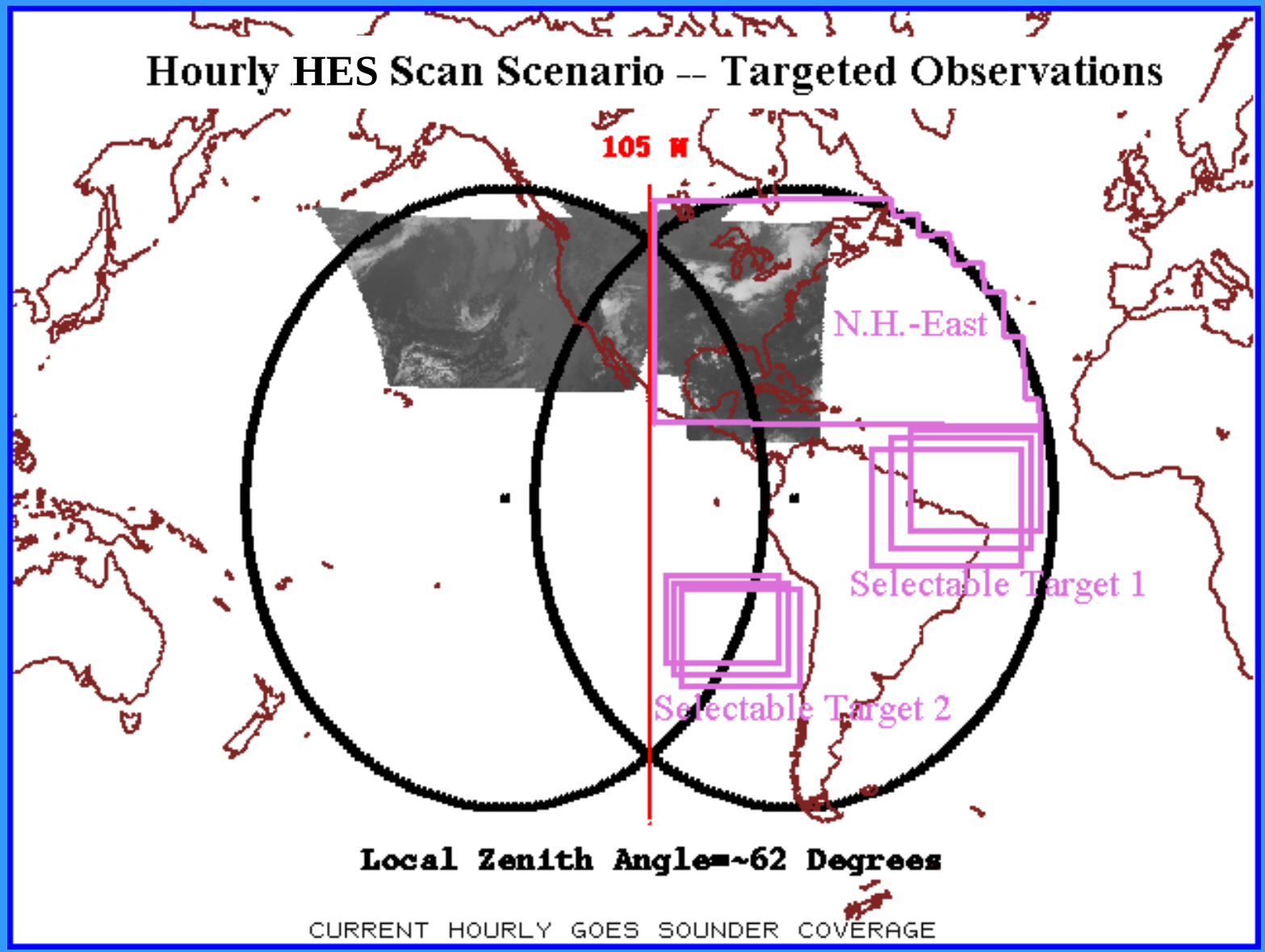


Spectral coverage details are not yet fully defined.


AIRS Observed Brightness Temperature Spectrum (2004-1-15-1)
Rec-418
Brightness Temperature(K)
320
300
280
260
240
220
200
500
1000
1500
2000
2500
3000
Wavenumber (cm**-1)


Temperature Profile
Guess
CIMSS Physical
ARM Best Estimate
Pressure (hPa)
100
300
500
700
850
1000
Inversion
200
220
240
260
280
300
320
Temperature (K)


Water Vapor Profile
Guess
CIMSS Physical
ARM Best Estimate
Pressure (hPa)
300
500
700
850
1000
0
5
10
15
20
Mixing Ratio (g/kg)



Targeted observations -- look where we need the information

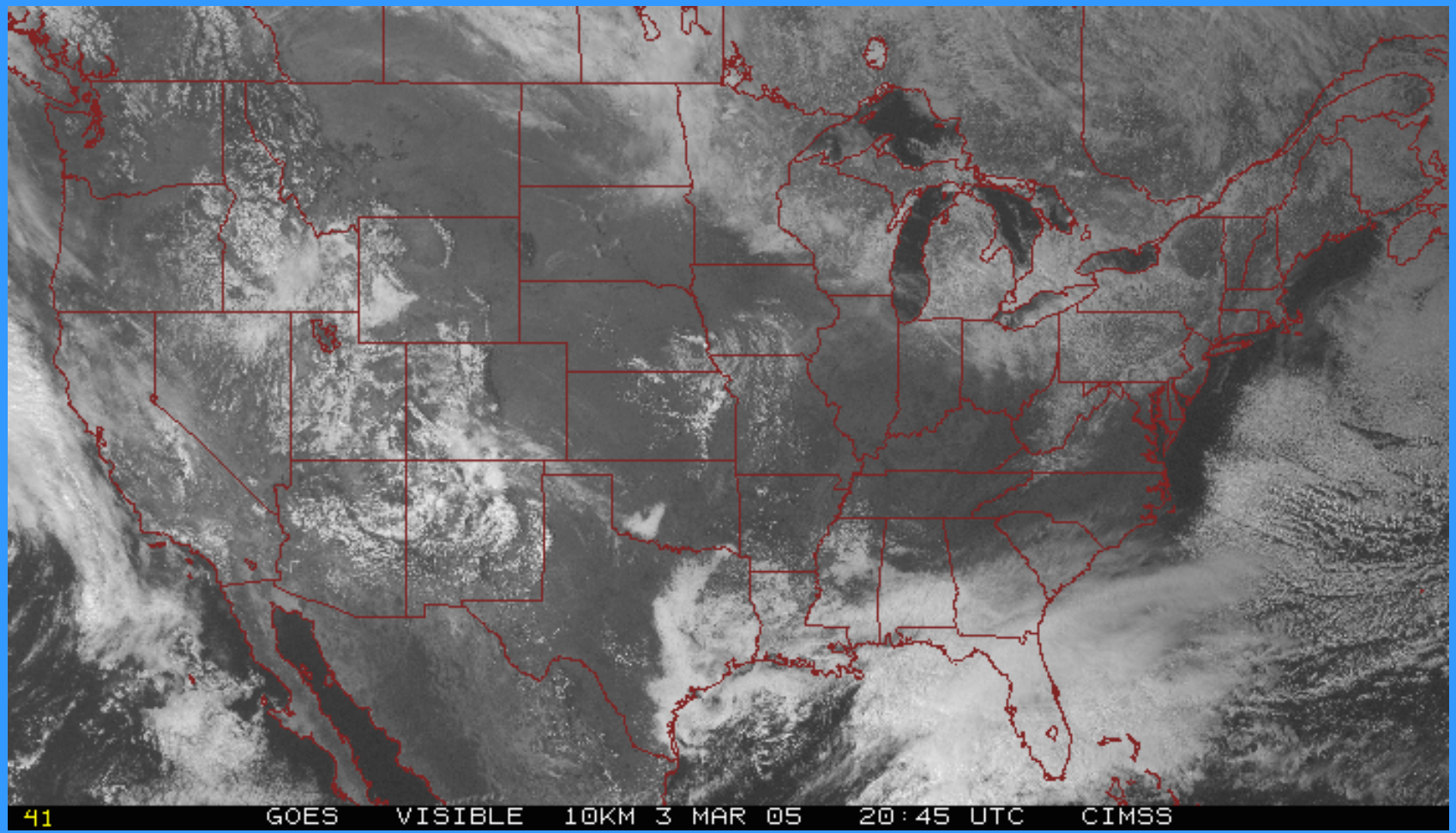
Sample GOES-R 3-hour schedule for the ABI and (1 telescope design) HES

Draft!

MSS = Mesoscale Scans from the ABI
MS = HES-Sounder mesoscale mode
FD = Full imaging disk scan
FSD = Full "sounding" disk scan

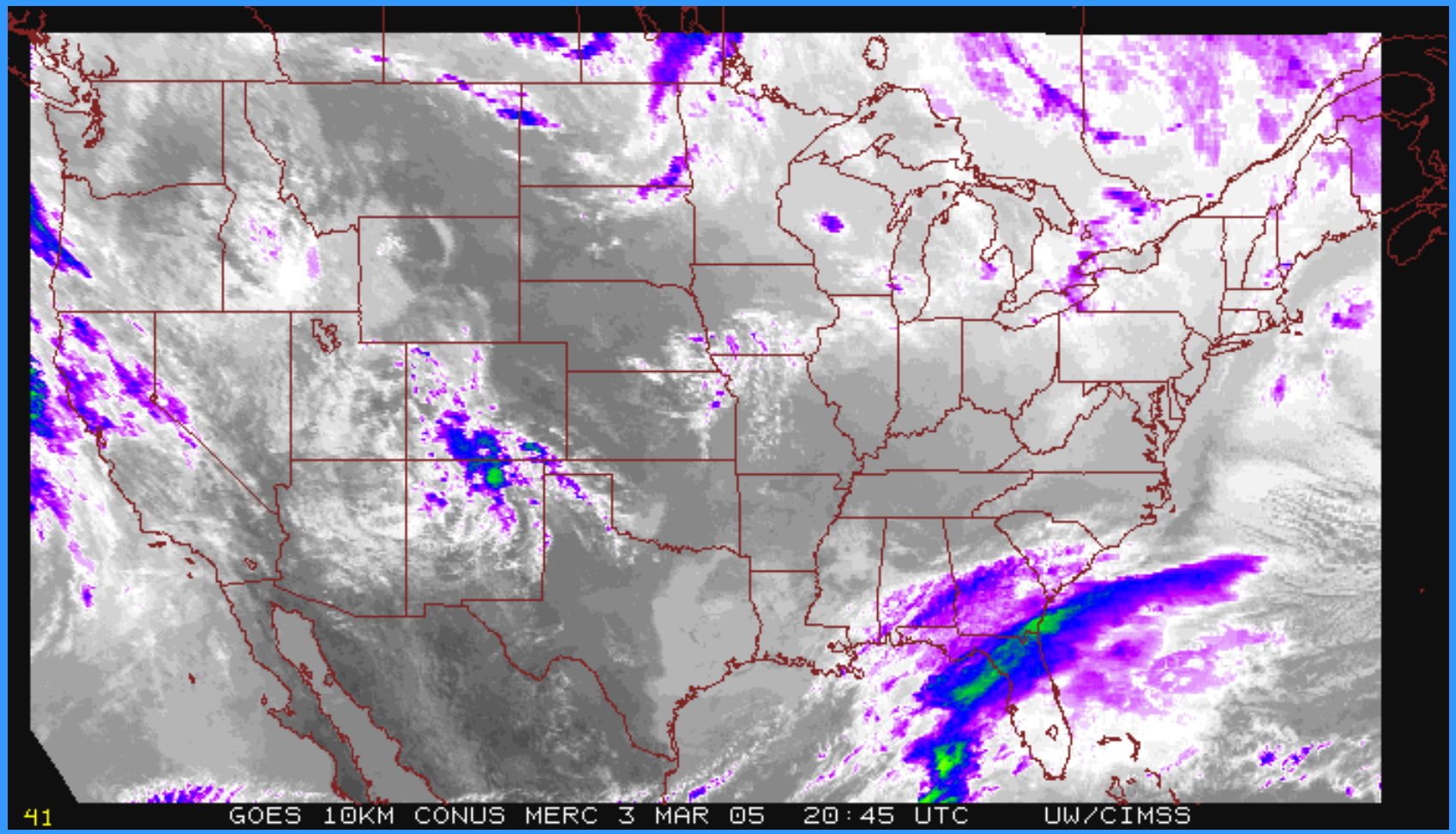
Time (UTC)	ABI	HES-Sounder	HES-CW
12:45	FD	10km-CONUS	
12:50	FD		
12:55	FD		CW area
13:00	CONUS+MSS	4km-MS	
13:05	CONUS+MSS		CW area
13:10	CONUS+MSS	4km-MS	
13:15	FD		CW area
13:20	CONUS+MSS	4km-MS	
13:25	CONUS+MSS		CW area
13:30	FD	4km-MS	
13:35	CONUS+MSS		CW area
13:40	CONUS+MSS	4km-MS	
13:45	FD	10km-CONUS	
13:50	FD		
13:55	FD		CW area
14:00	CONUS+MSS	4km-MS	
14:05	CONUS+MSS		CW area
14:10	CONUS+MSS	4km-MS	
14:15	FD		CW area
14:20	CONUS+MSS	4km-MS	
14:25	CONUS+MSS		CW area
14:30	FD	4km-MS	
14:35	CONUS+MSS		CW area
14:40	CONUS+MSS	4km-MS	
14:45	FD	10km-CONUS	
14:50	FD		
14:55	FD		CW area
15:00	CONUS+MSS	4km-MS	
15:05	CONUS+MSS		CW area
15:10	CONUS+MSS	4km-MS	
15:15	FD		CW area
15:20	CONUS+MSS	4km-MS	
15:25	CONUS+MSS		CW area
15:30	FD	4km-MS	
15:35	CONUS+MSS		CW area
15:40	CONUS+MSS	4km-MS	
15:45	FD	10km-CONUS	
15:50	FD		
15:55	FD	4km-MS	
16:00	CONUS+MSS		Land mode (1200kmx1200km)

Visible image example



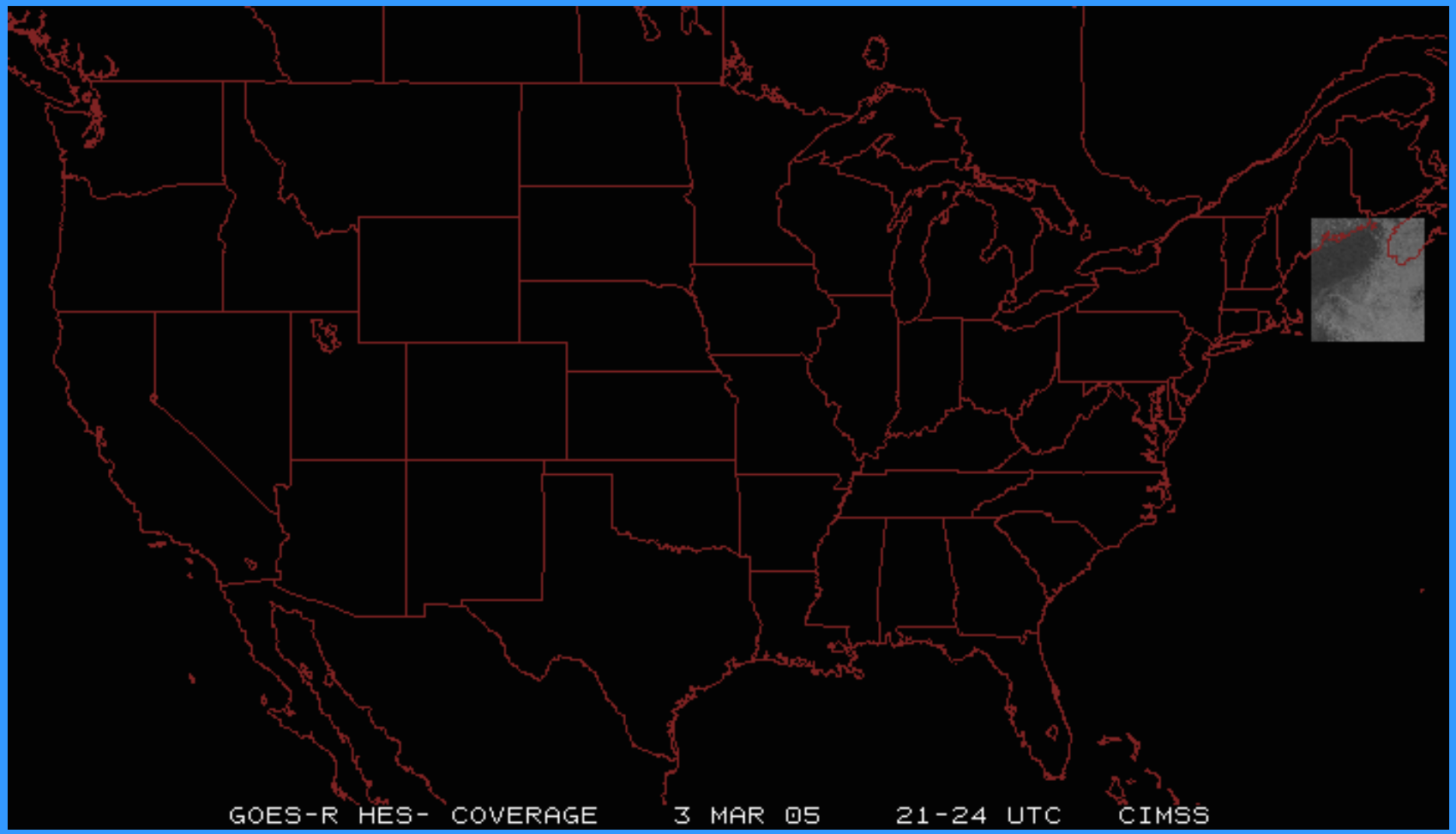
- Visible image to show the cloud cover (GOES-East Example).
- What follows is a HES example coverage loop.

HES-Sounding simulation at 10 km



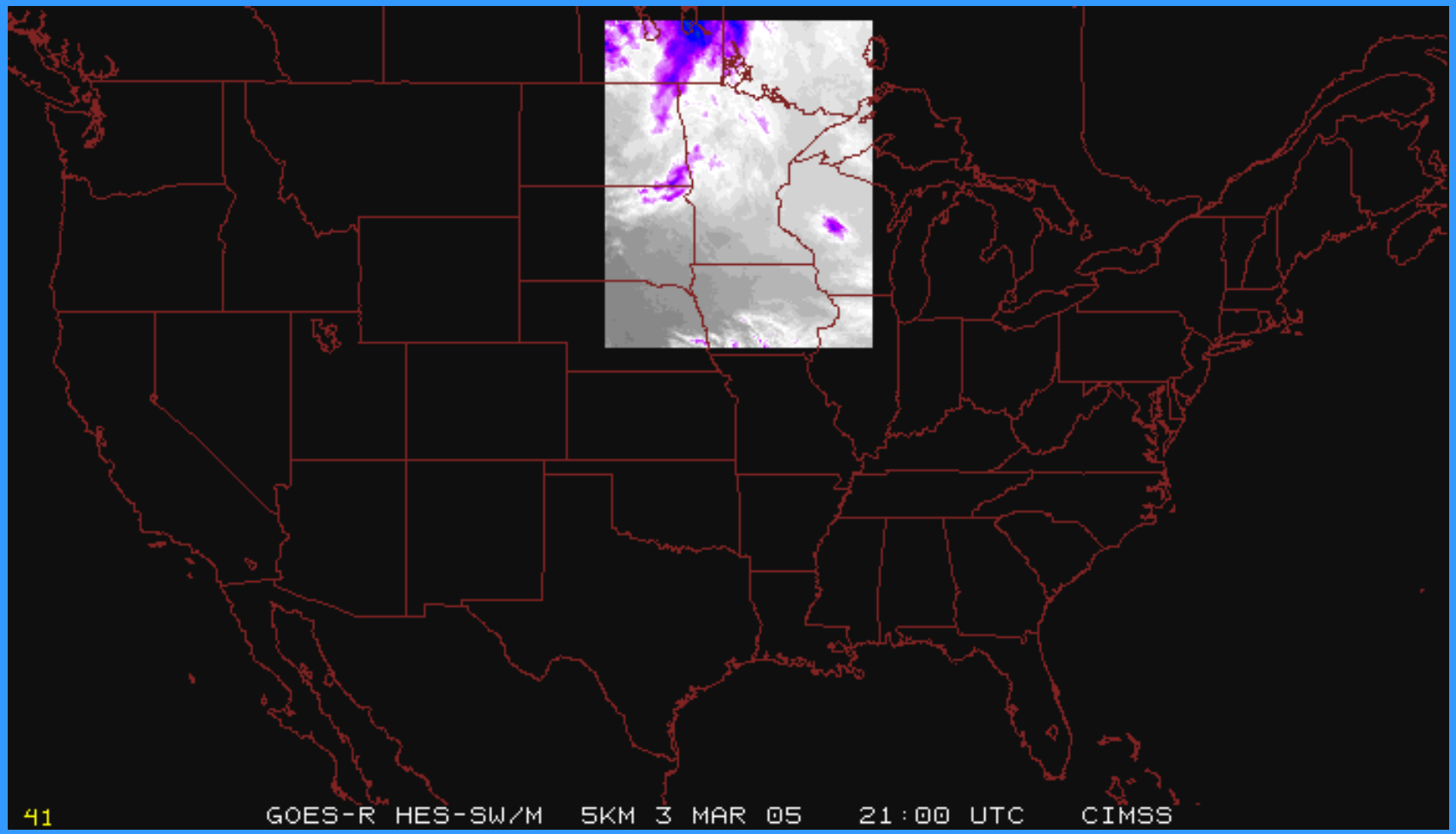
20:45 UTC

HES-Coastal Waters



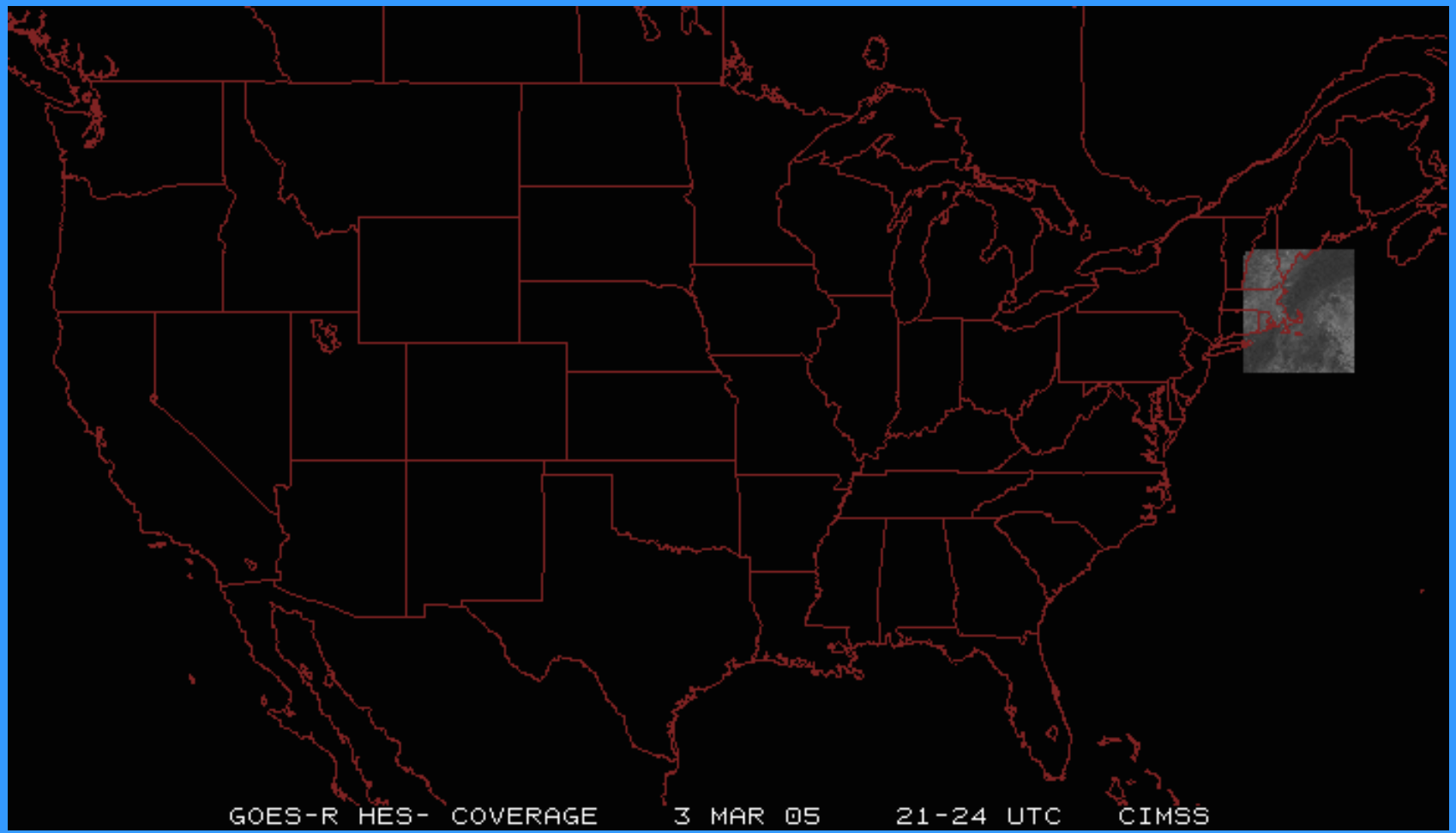
20:55 UTC

HES-Sounding at 4 km



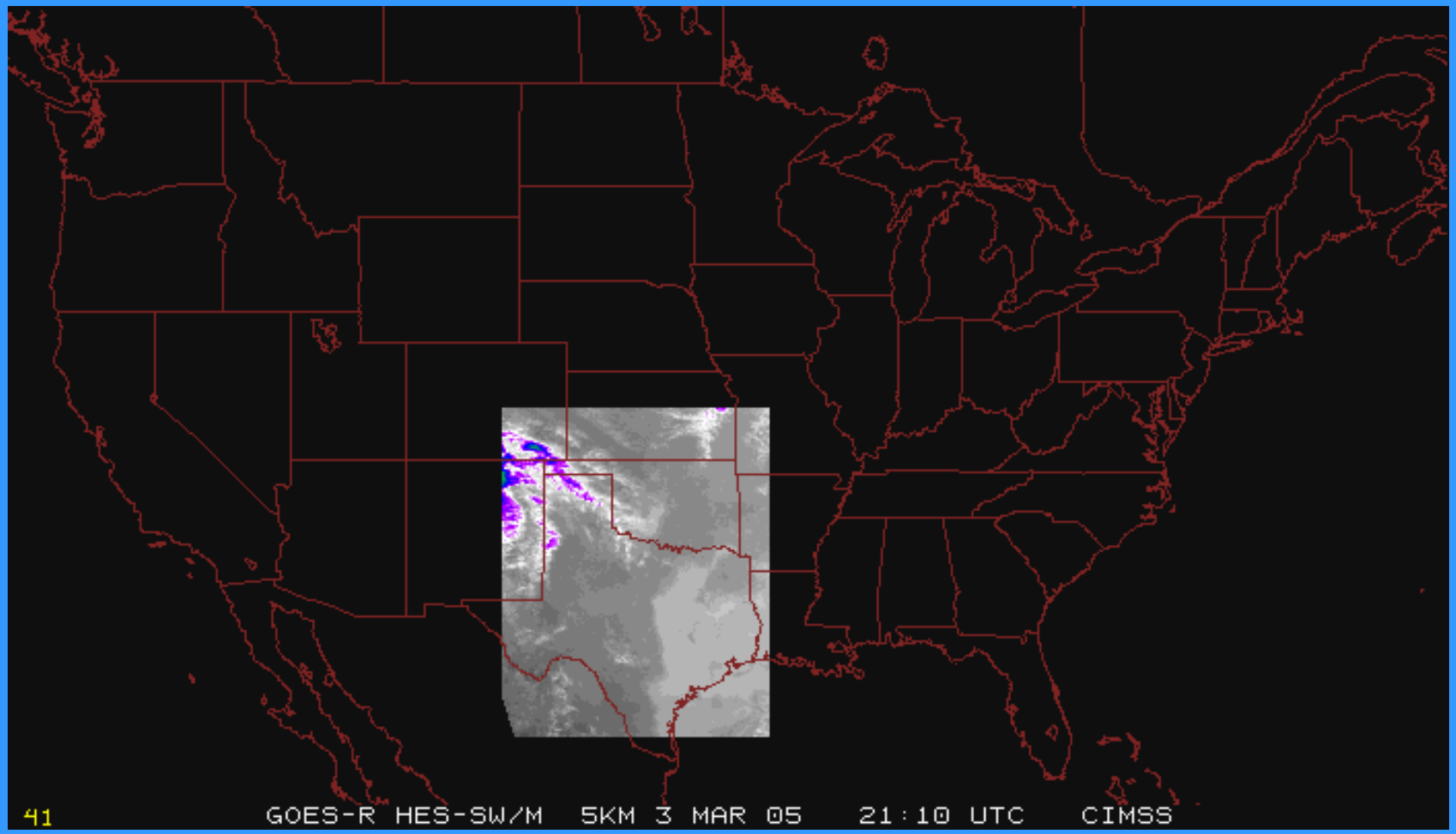
21:00 UTC

HES-Coastal Waters



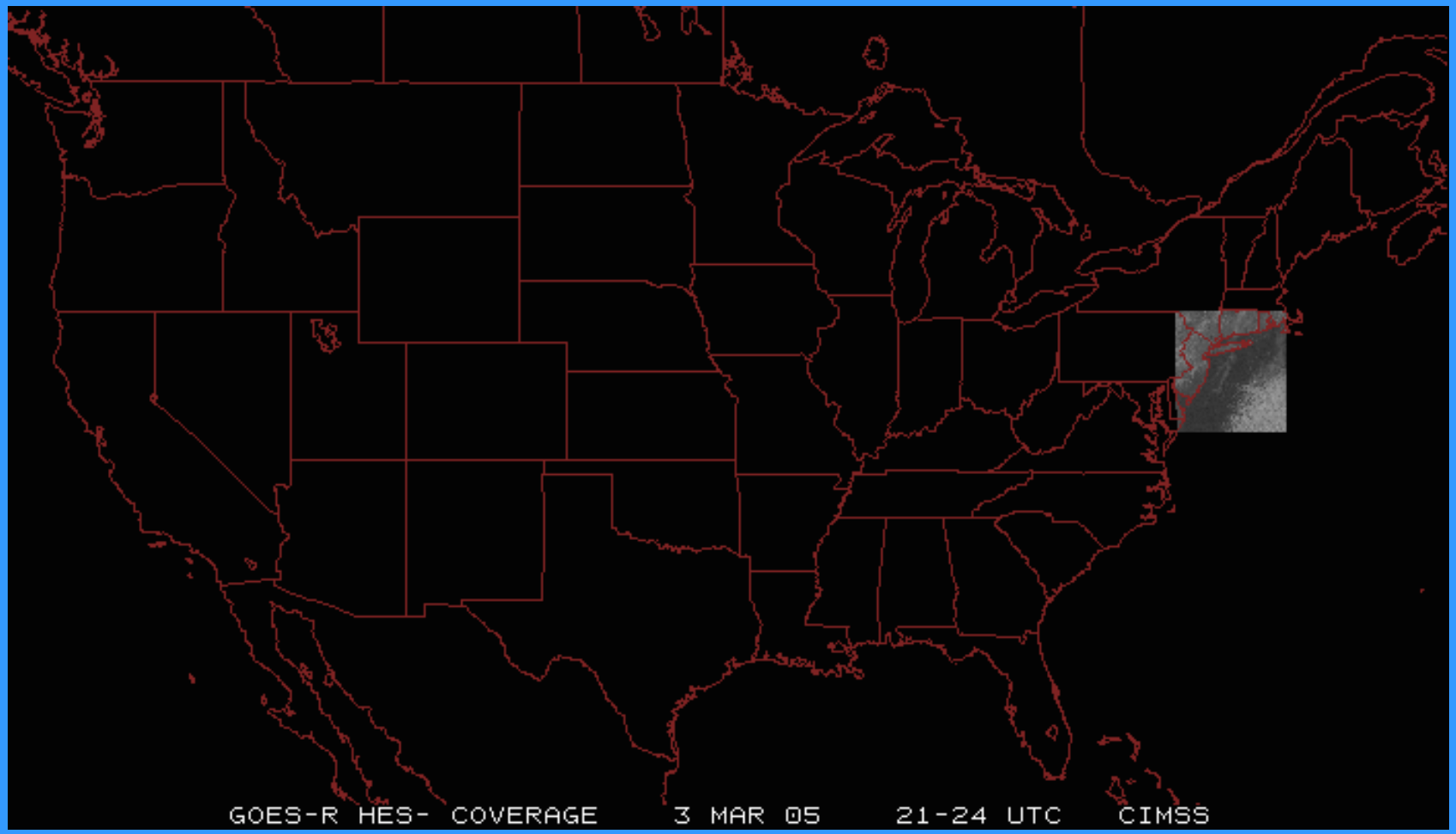
21:05 UTC

HES-Sounding 4 km



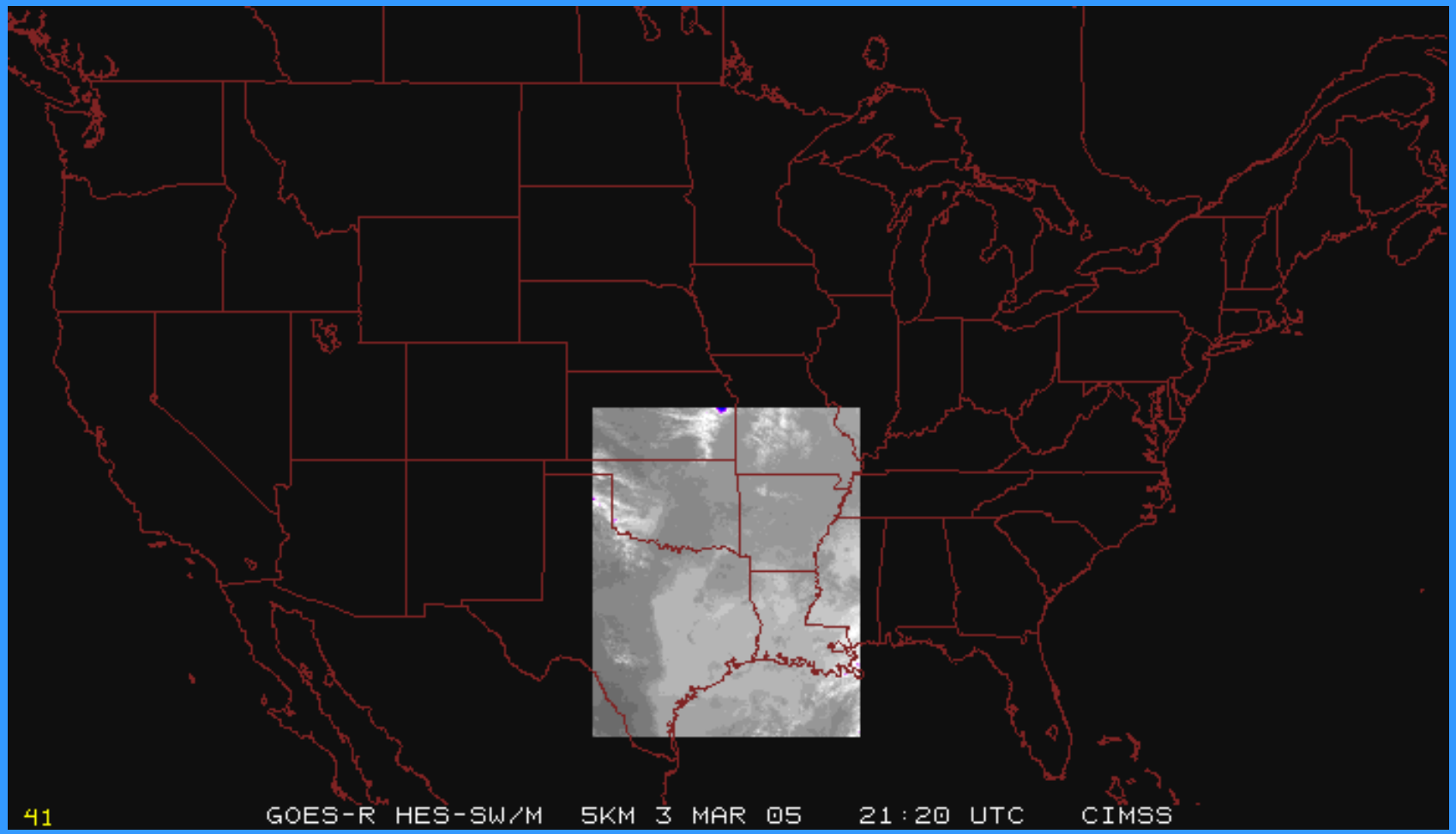
21:10 UTC

HES-Coastal Waters



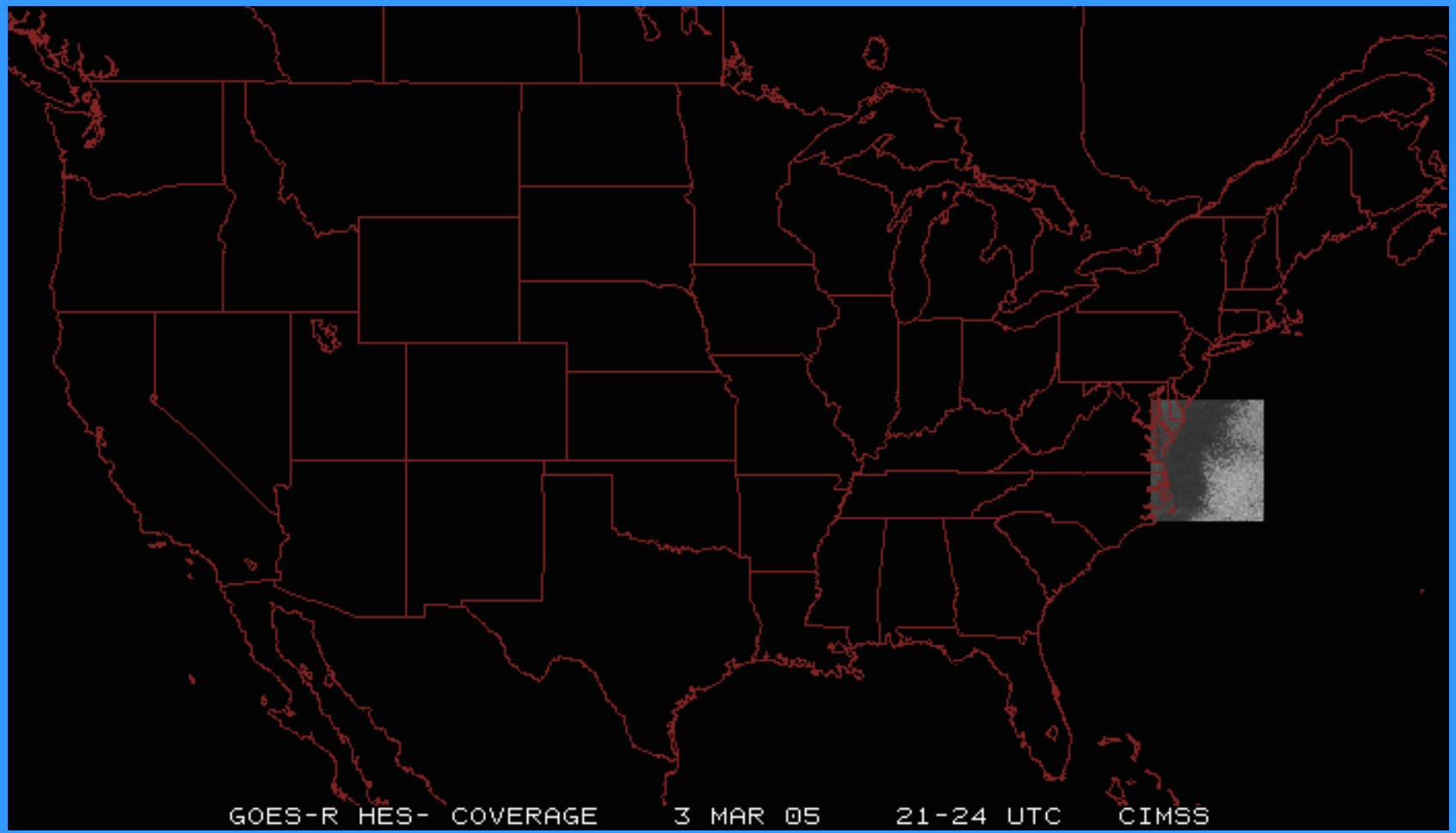
21:15 UTC

HES-Sounding 4 km



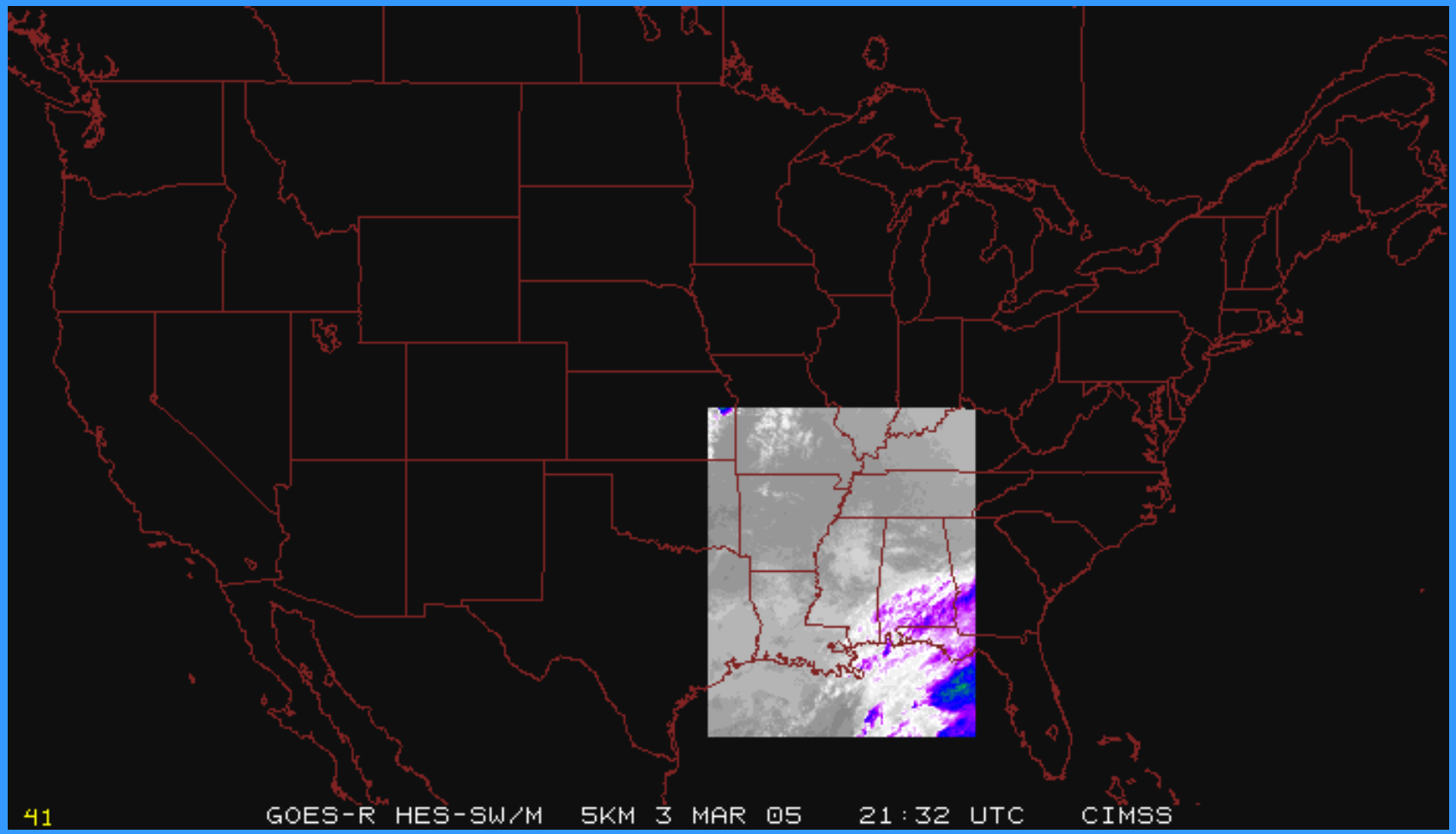
21:20 UTC

HES-Coastal Waters



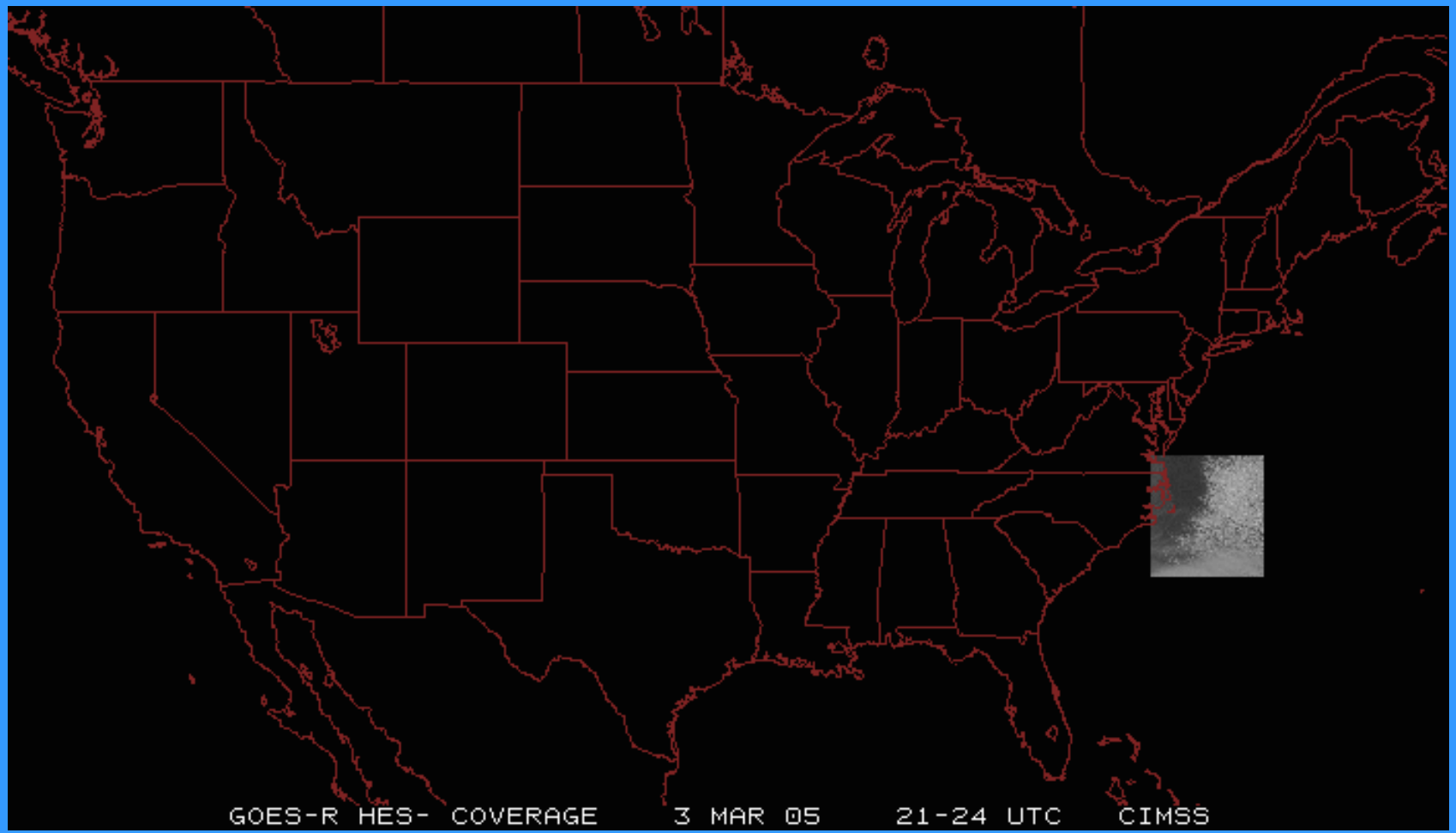
21:25 UTC

HES-Sounding 4 km



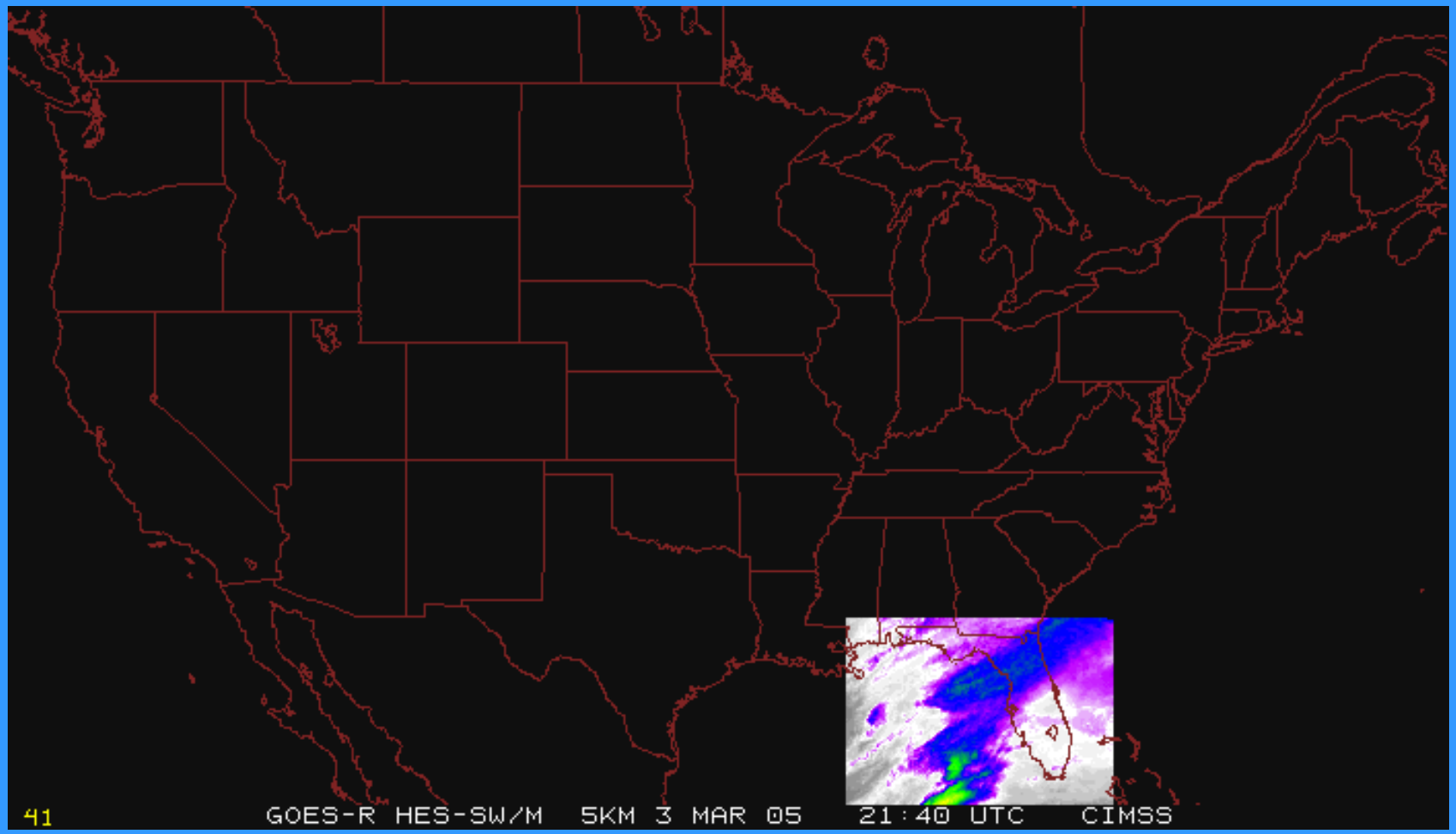
21:30 UTC

HES-Coastal Waters



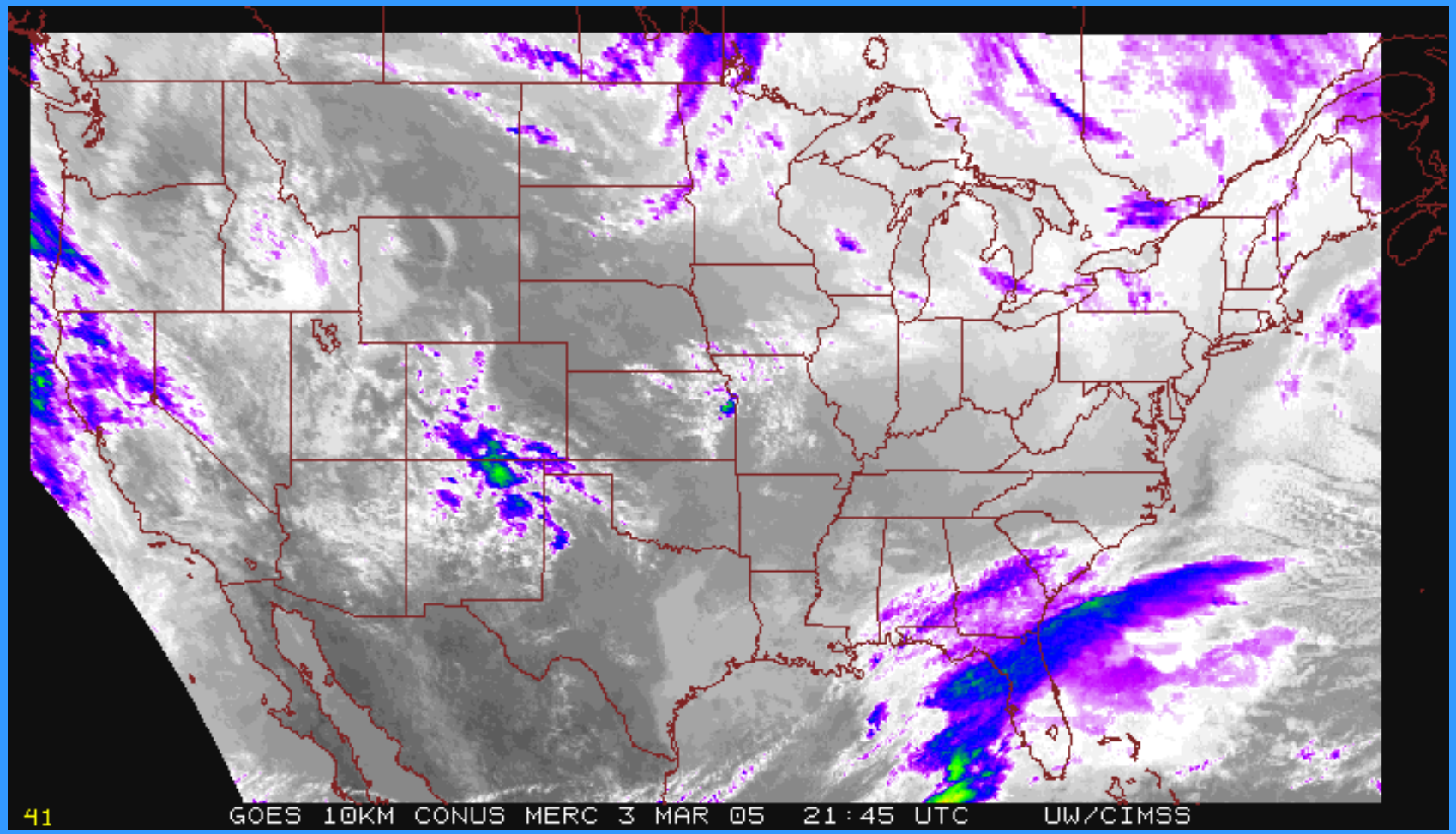
21:35 UTC

HES-Sounding 4 km



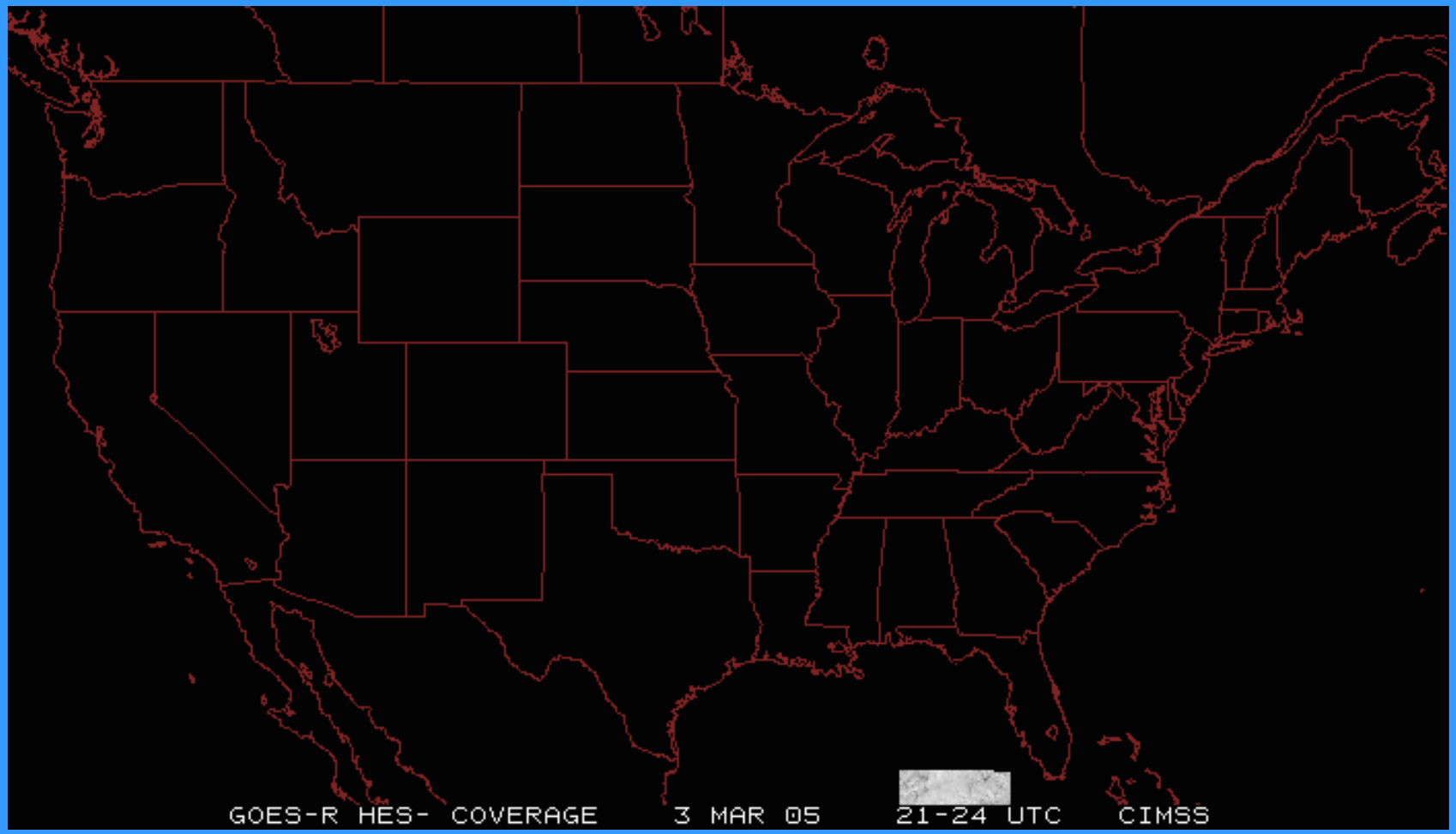
21:40 UTC

HES-Sounding 10 km



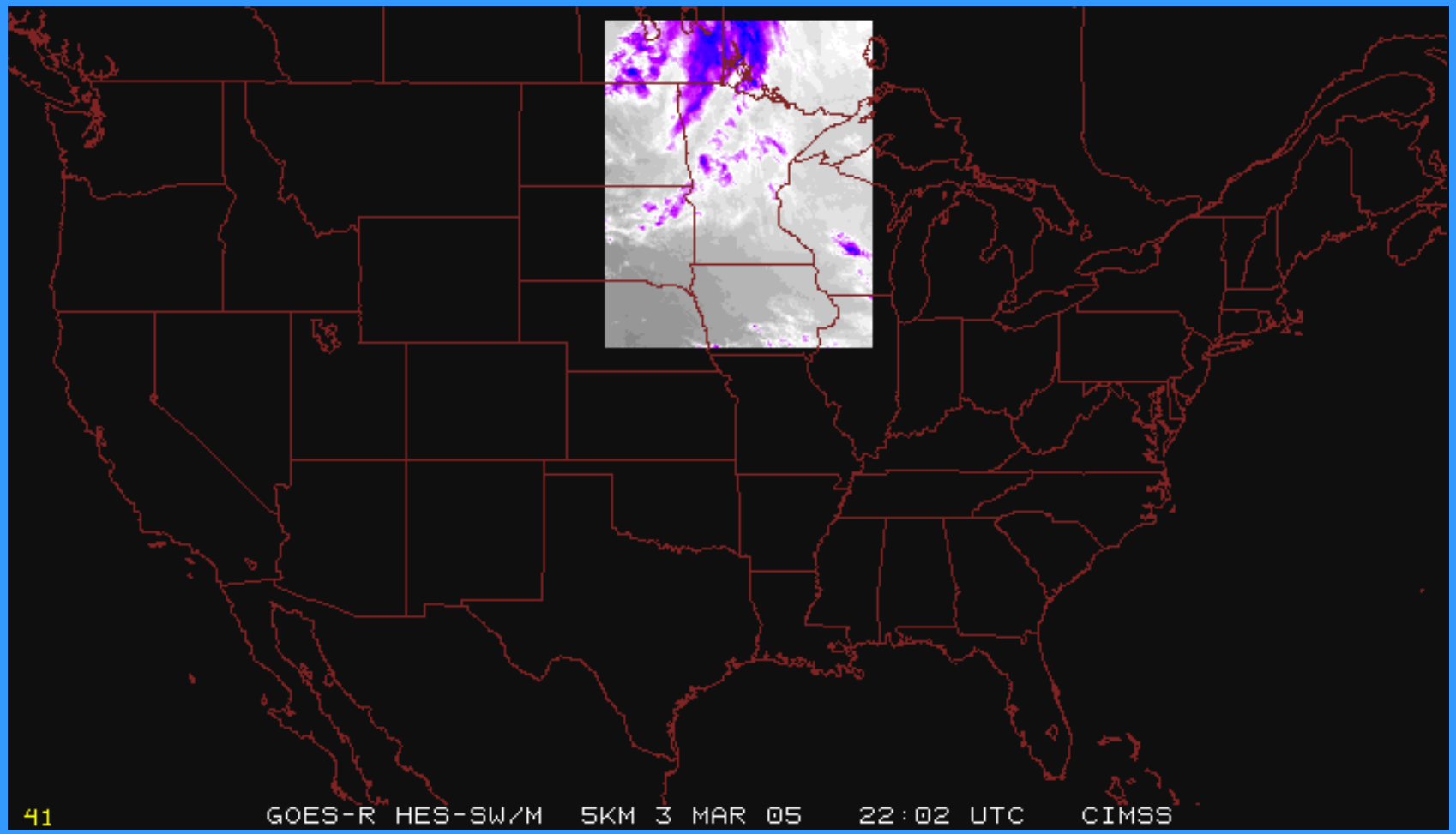
21:45 UTC

HES-Coastal Waters



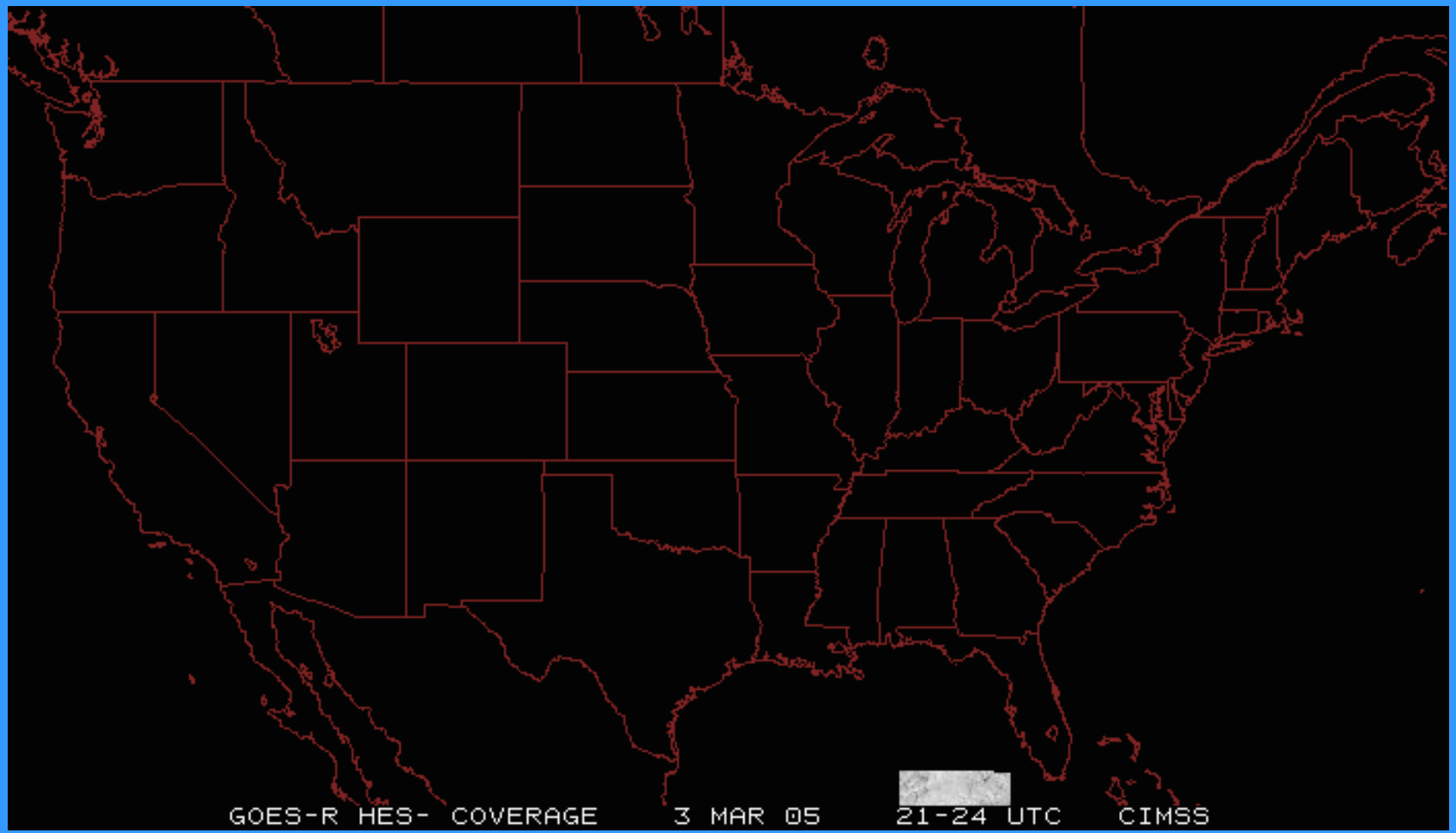
21:55 UTC

HES-Sounding 4 km



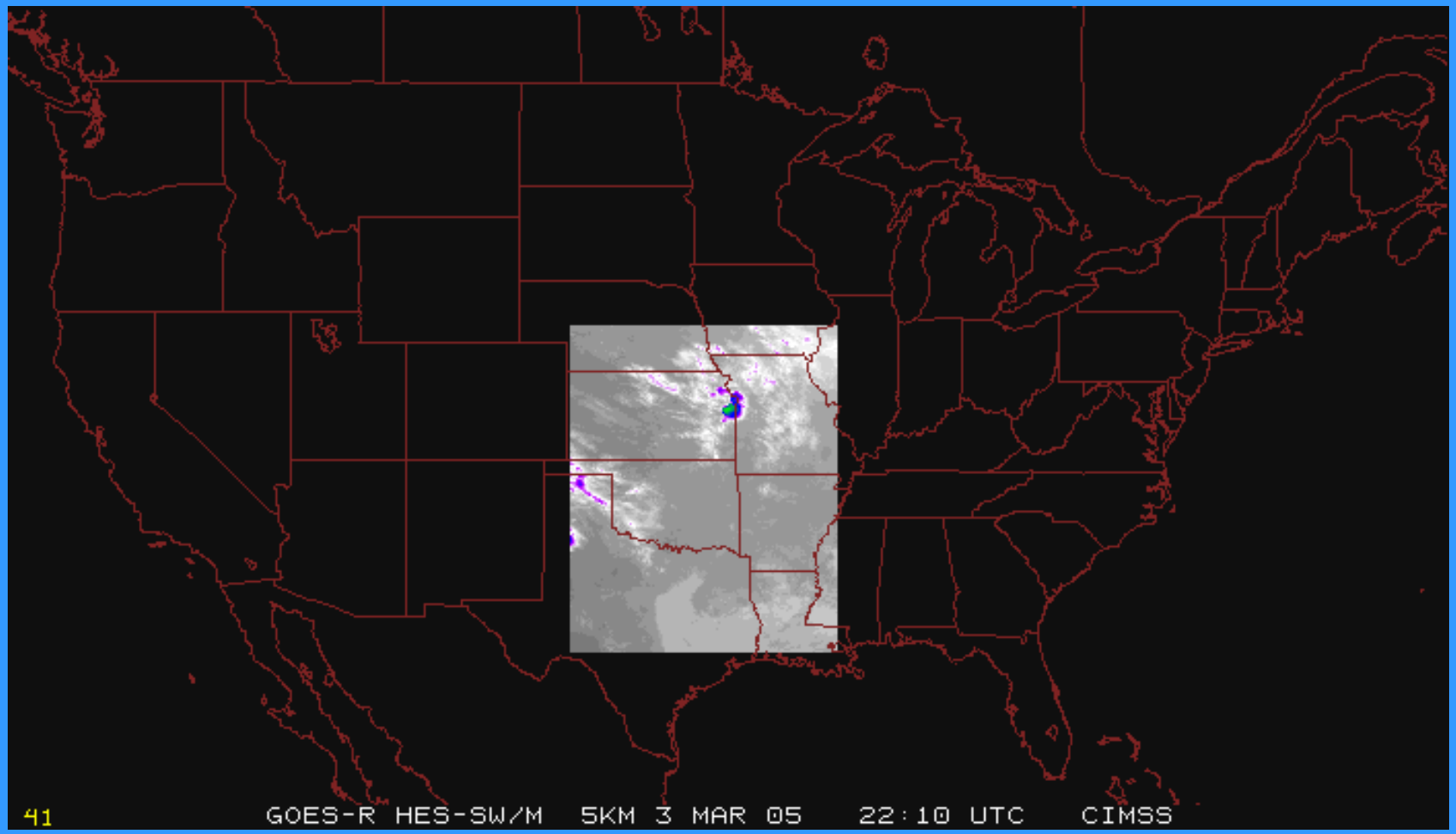
22:00 UTC

HES-Coastal Waters



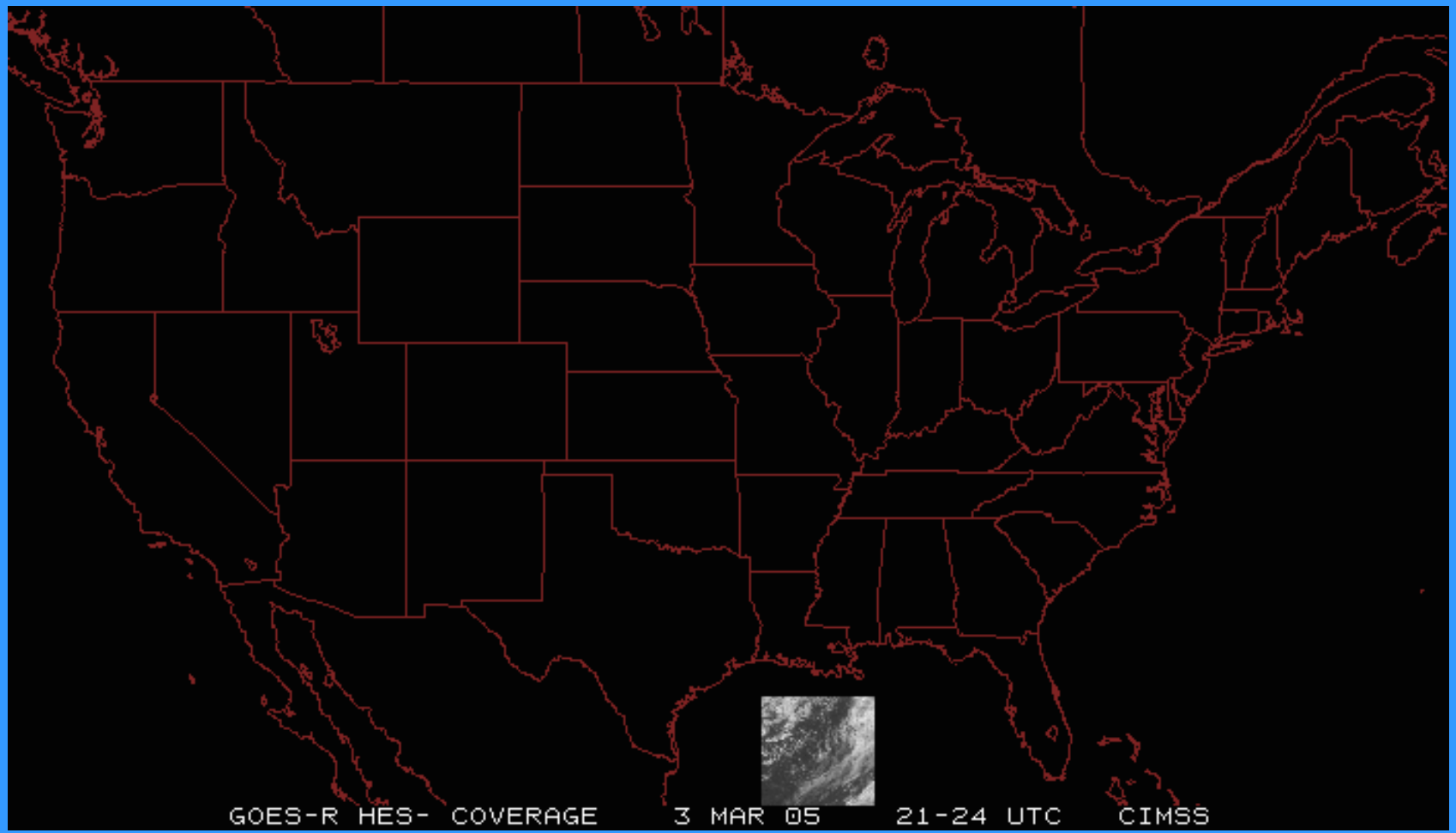
22:05 UTC

HES-Sounding 4 km



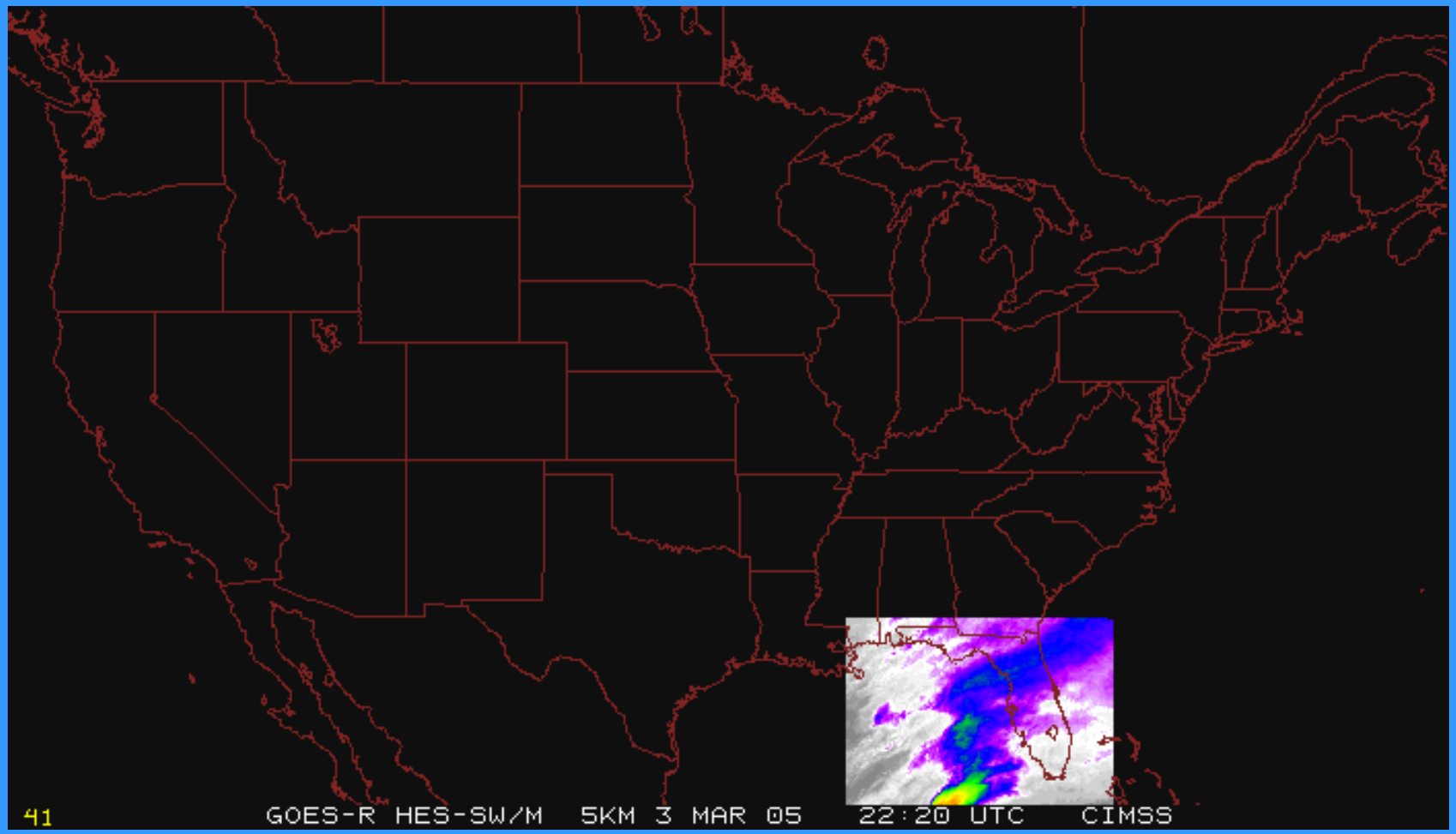
22:10 UTC

HES-Coastal Waters



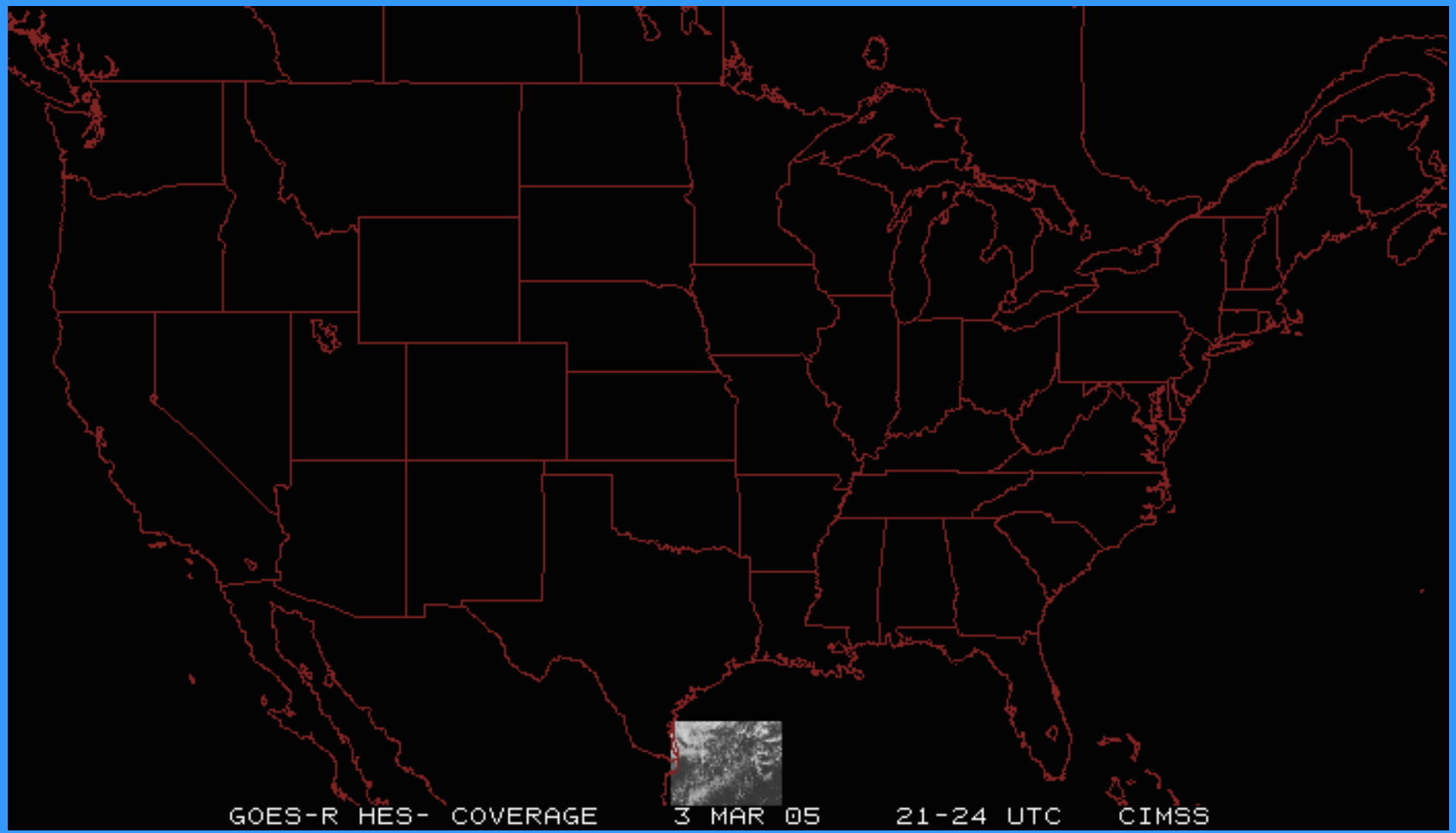
22:15 UTC

HES-Sounding 4 km



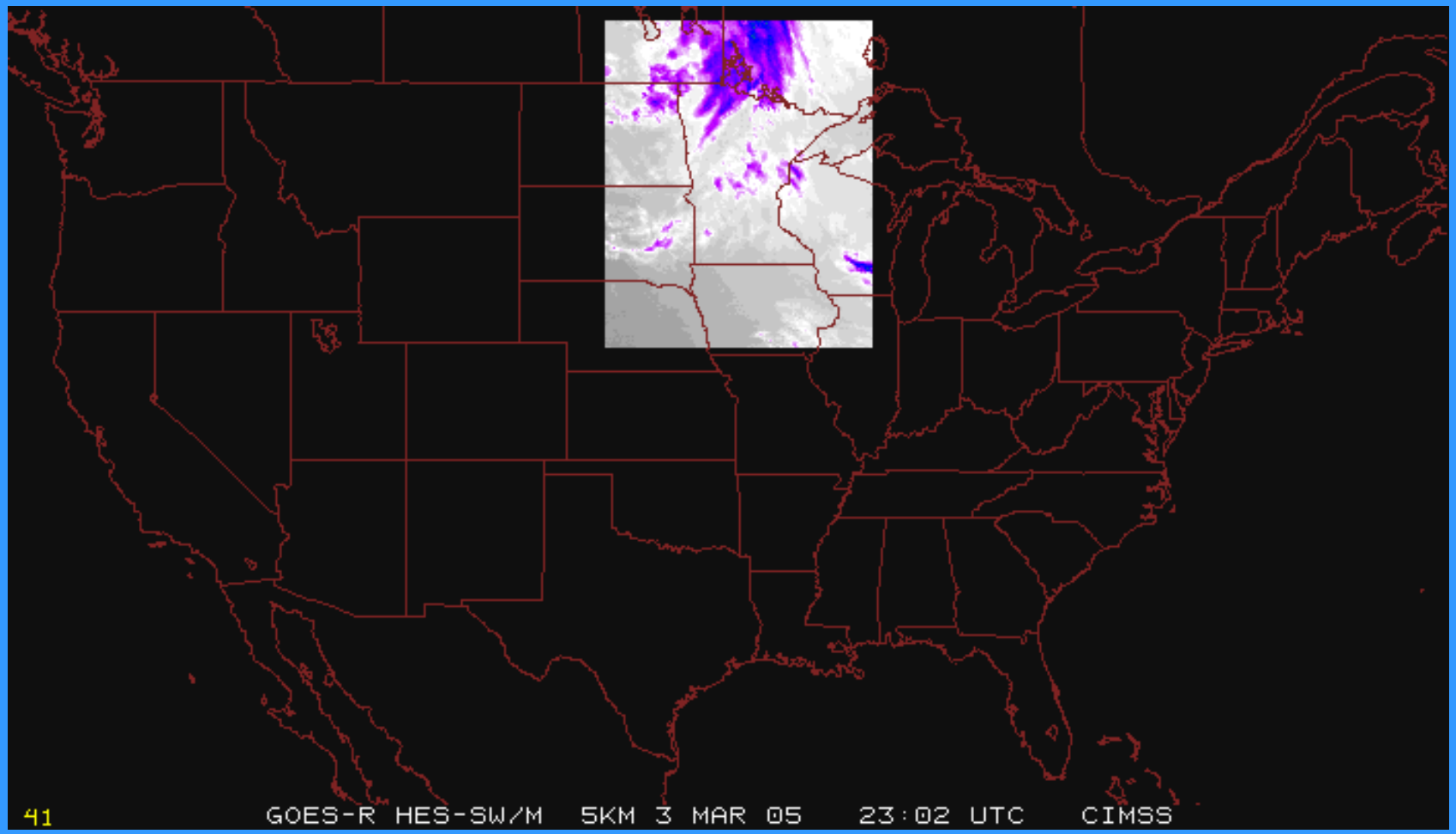
22:20 UTC

HES-Coastal Waters



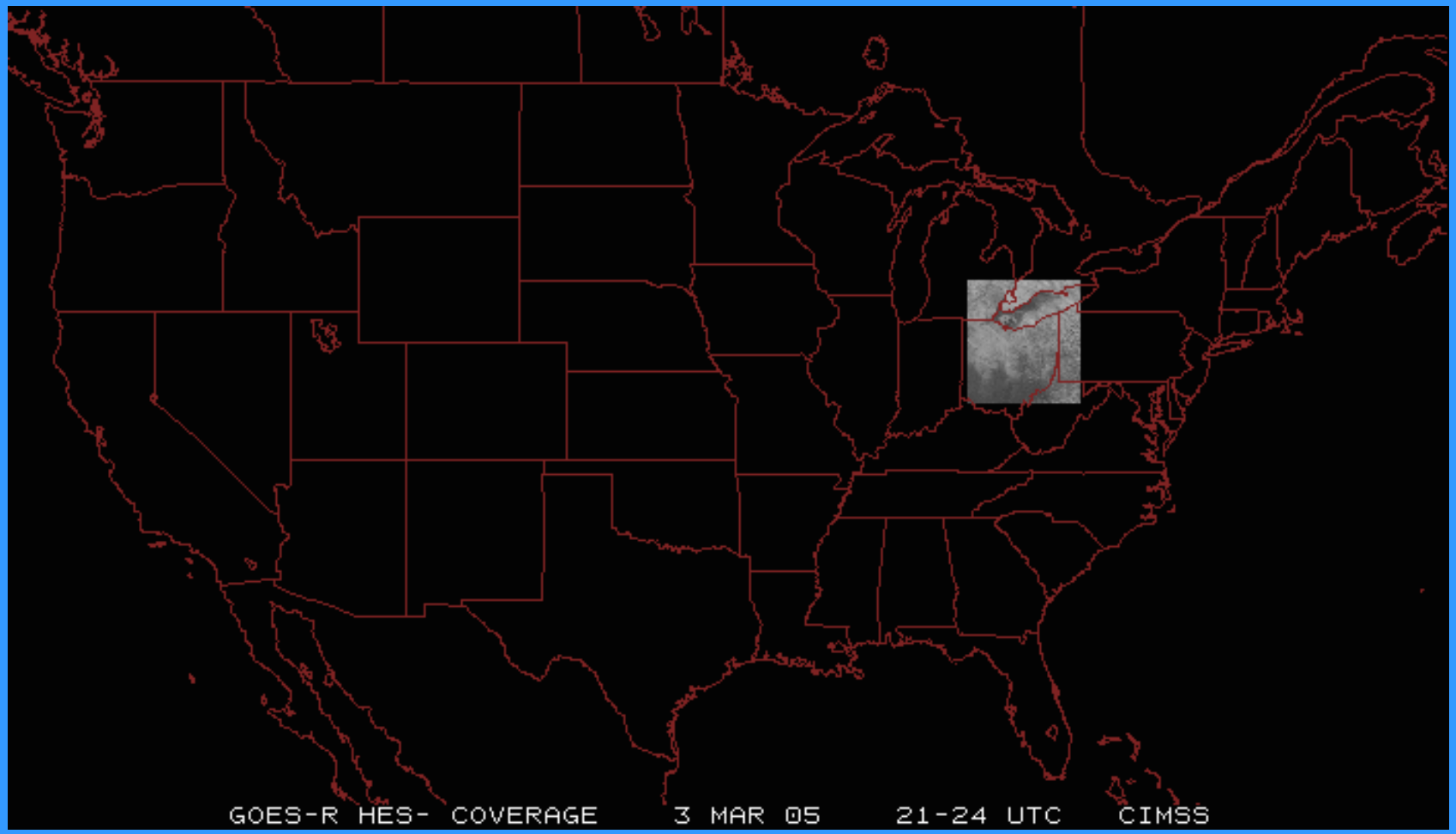
22:25 UTC

HES-Sounding 4 km



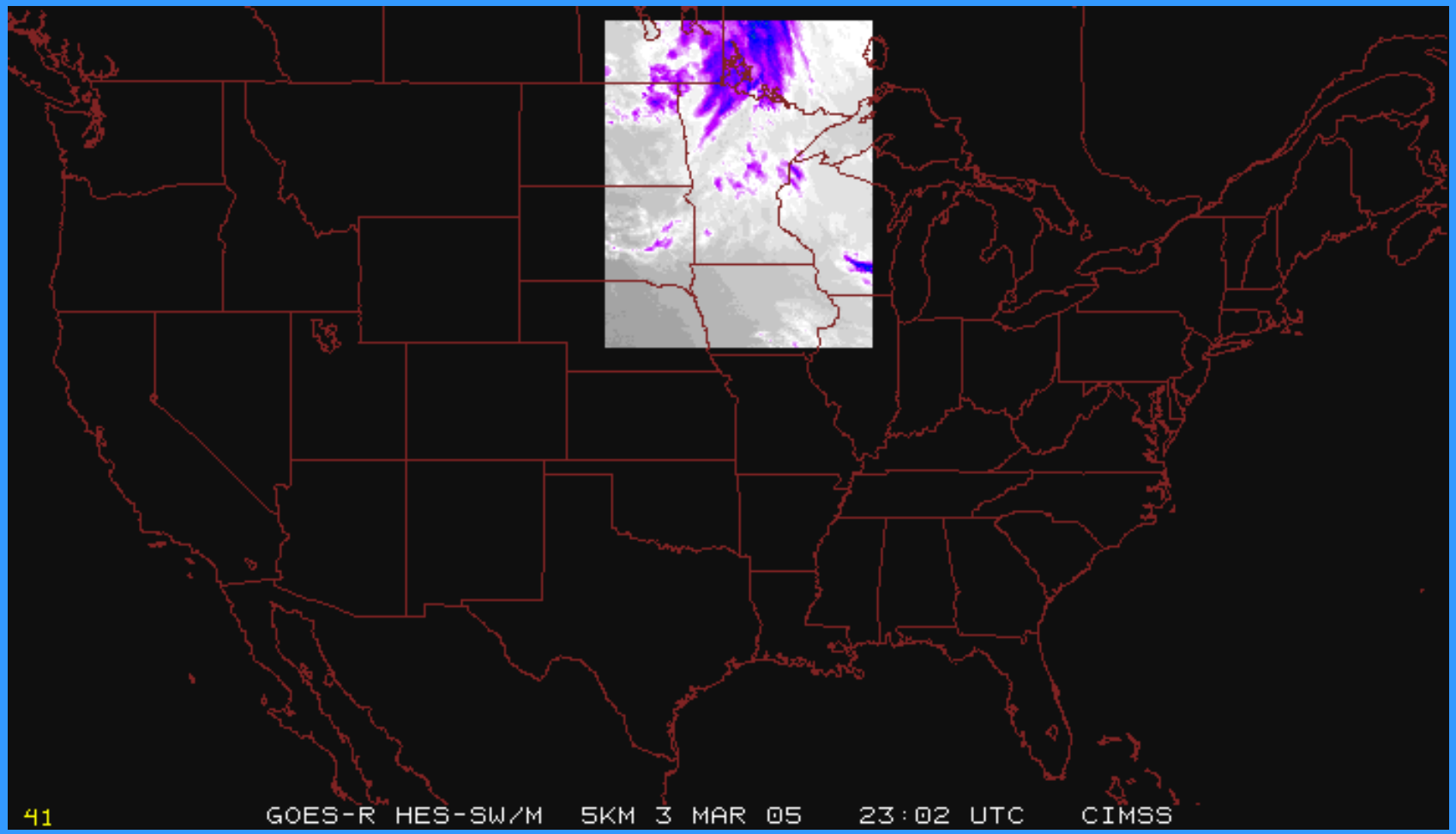
22:30 UTC

HES-Coastal Waters



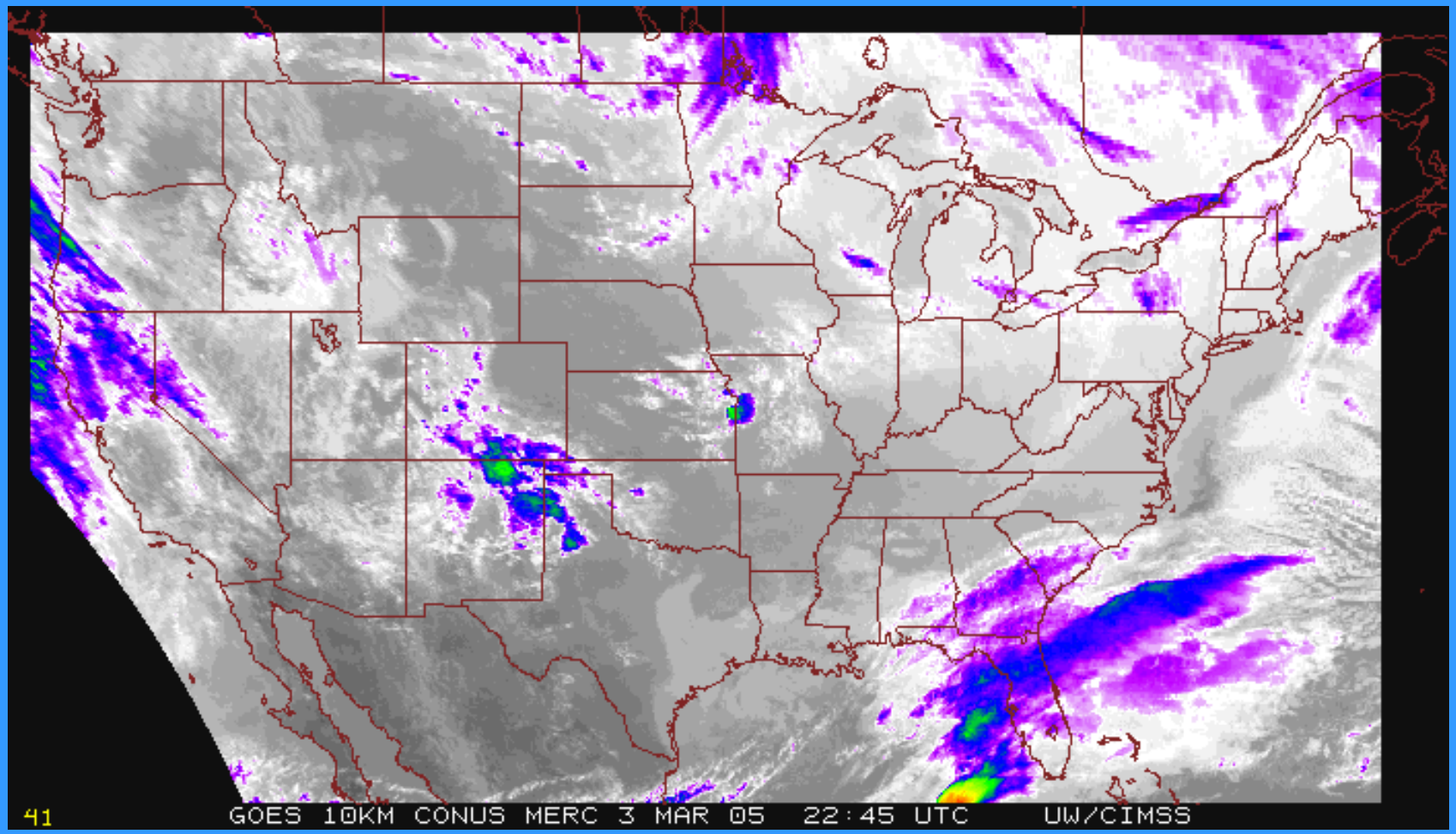
22:35 UTC

HES-Sounding 4 km



22:40 UTC

HES-Sounding 10 km

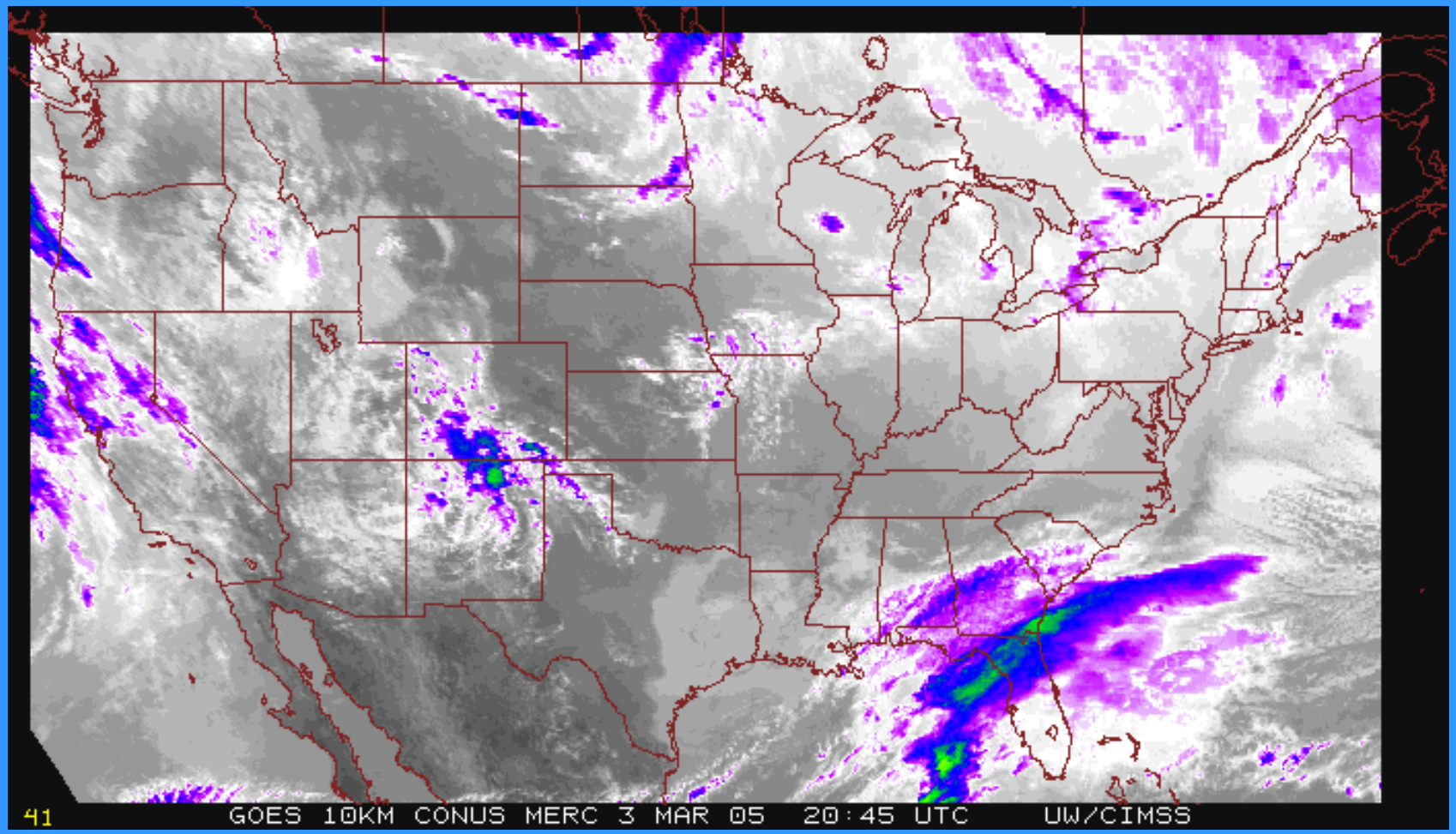


22:45 UTC

What follows represents today’s coverage:

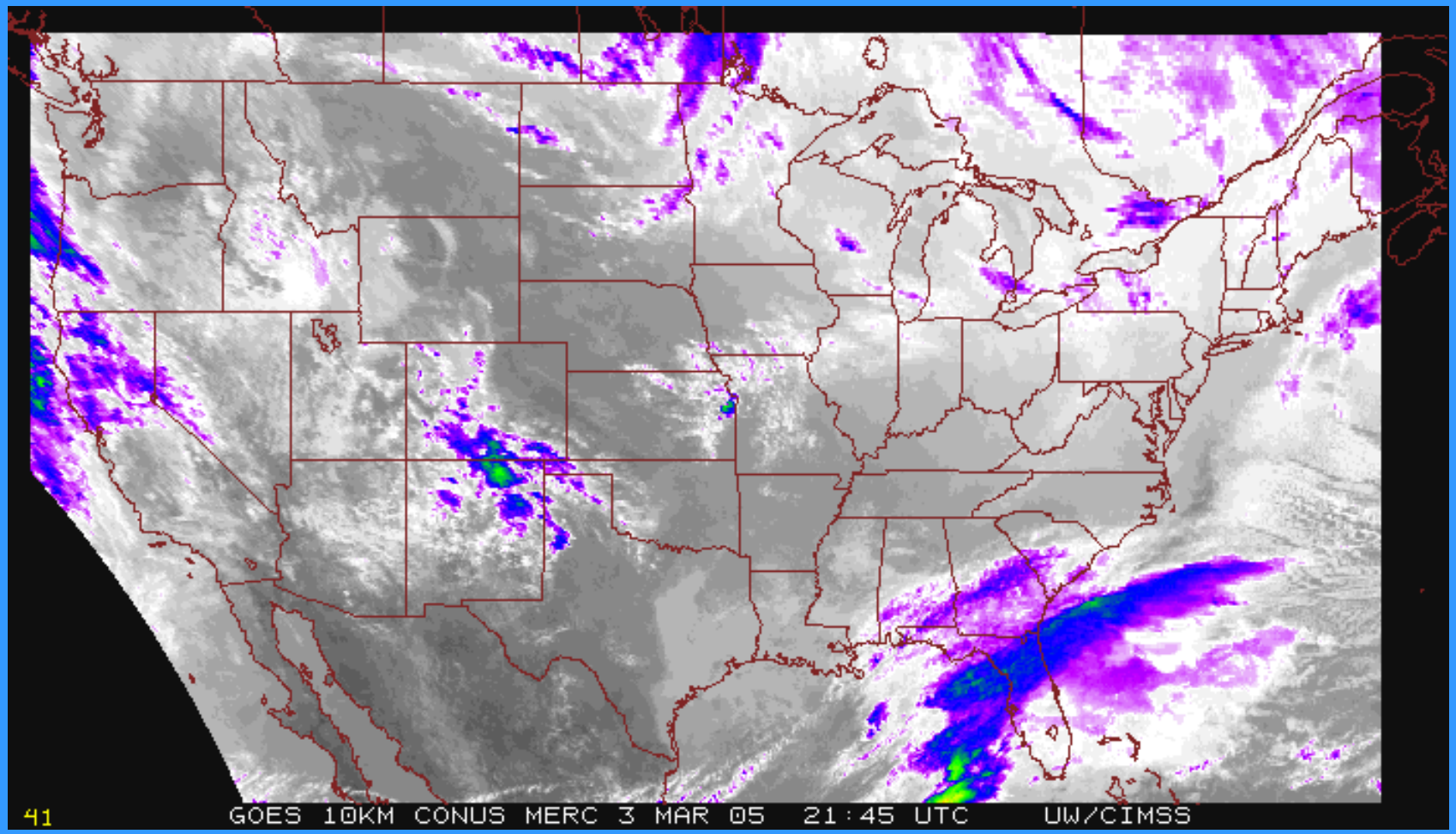
- no IR hyperspectral data;
- no coastal waters task;
- no higher spatial resolution mesoscale task.

Low spectral resolution – Current GOES Sounder 10 km



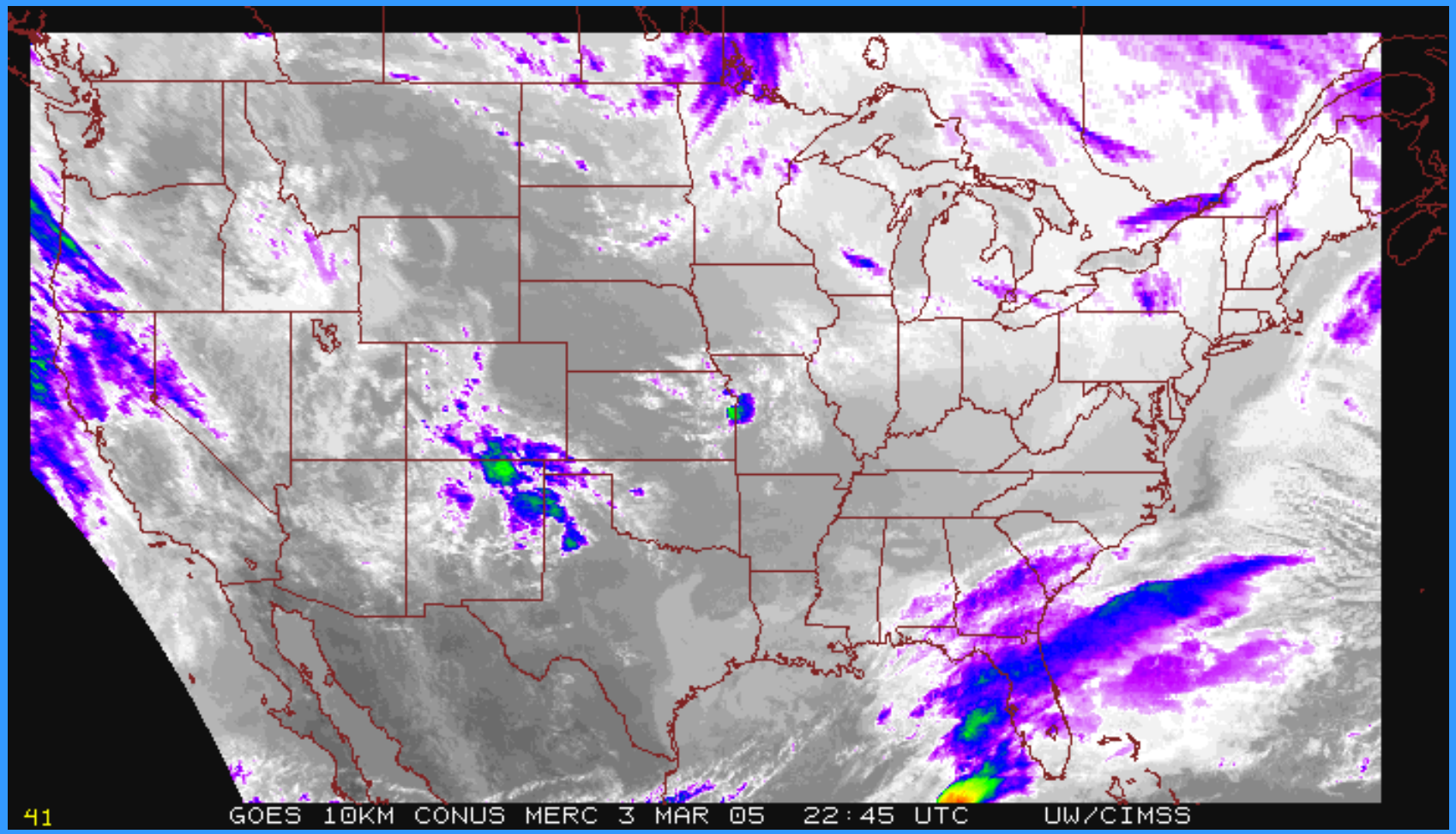
20:45 UTC

Low spectral resolution – Current GOES Sounder 10 km



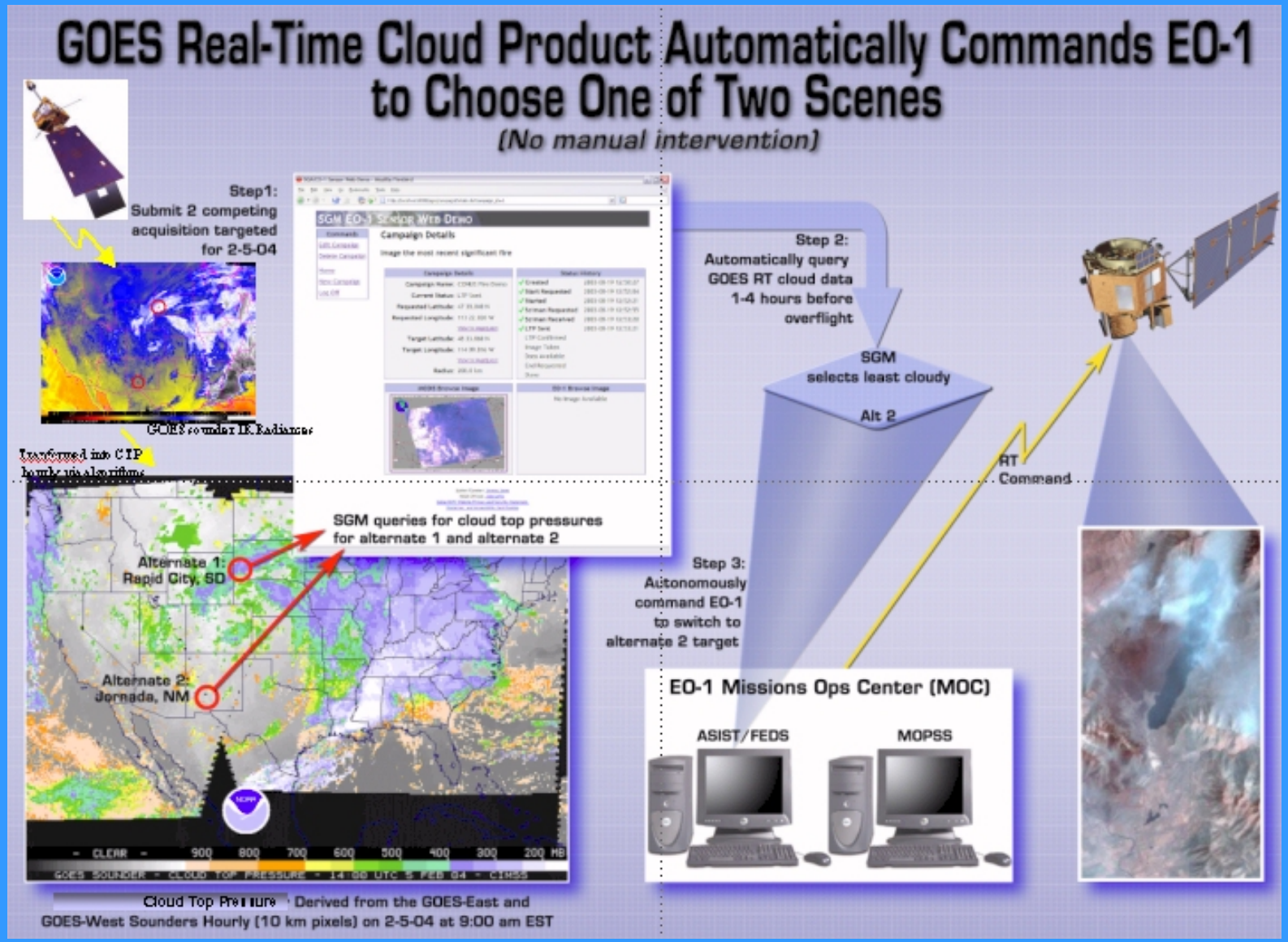
21:45 UTC

Low spectral resolution – Current GOES Sounder 10 km



22:45 UTC

Real-time, autonomous test on February 5th



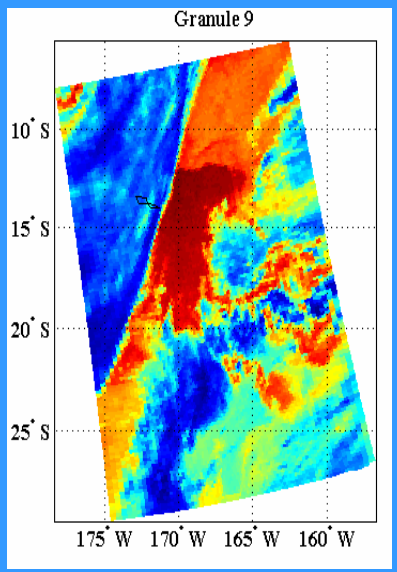
From Dan Mandl, NASA

Hyperspectral Data Compression

Co-lead (with Roger Heymann of OSD) a data compression project.

Project was begun in January of 2002. Built two data compression teams (CIMSS and CREST) and others. First focused on high spectral resolution data. Beginning ABI data compression.

GOES R series large data volumes at 80-200Mbps exceed ability for low cost distribution. Data compression can reduce data volume and hence allow all or nearly all information to be distributed at low cost.



Granule	JPEG2000	FPVQ
9	2.378	3.351
16	2.440	3.359
60	2.294	3.304
82	2.525	3.382
120	2.401	3.308
126	2.291	3.293
129	2.518	3.382
151	2.335	3.258
182	2.251	3.219
193	2.302	3.276
Average	**2.374**	**3.313**

Research (with AIRS data) has developed new mathematical approaches that far exceed lossless compression ratios from current standards.

Fourth GOES-R Users' Conference:

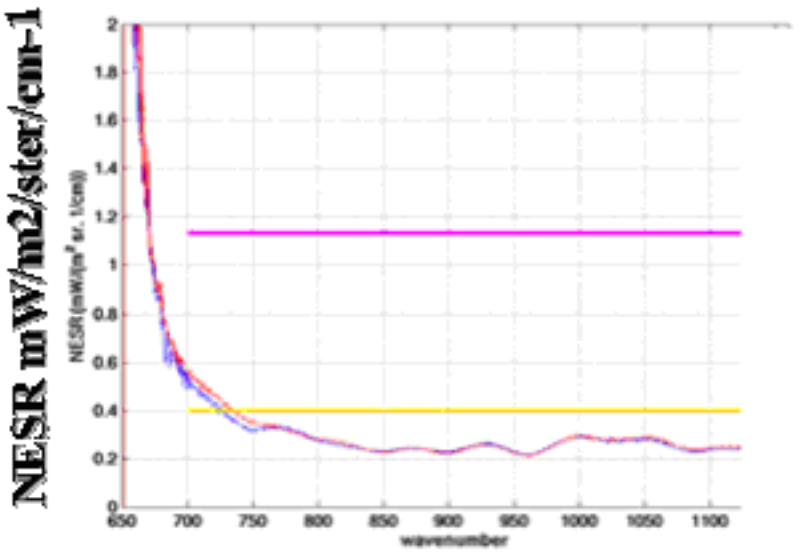
- May 1-3, 2006:
  - Location: Broomfield CO
  - Will focus on User Readiness

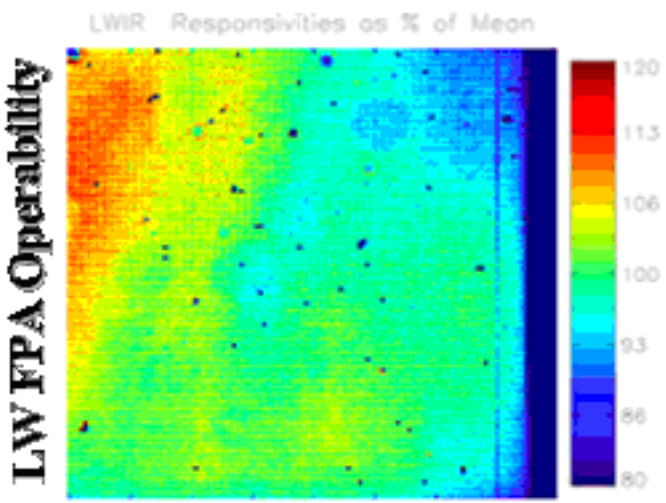
For more info:

- *http://www.osd.noaa.gov/announcement/index.htm*

- *There will be a poster session, abstracts due March 31st.*

GIFTS





Pixels with responsivity in range 80%-120% of mean	98.2%
Pixels with noise less than 3X mean noise	96.3%
Active pixels (those that meet both responsivity & noise criteria)	95.9%

- GIFTS longwave signal to noise and focal plane detector operability performance summary from December 2005 thermal vacuum tests performed at Space Dynamics Laboratory in Logan, Utah. In both performance areas GIFTS is exceeding specification.

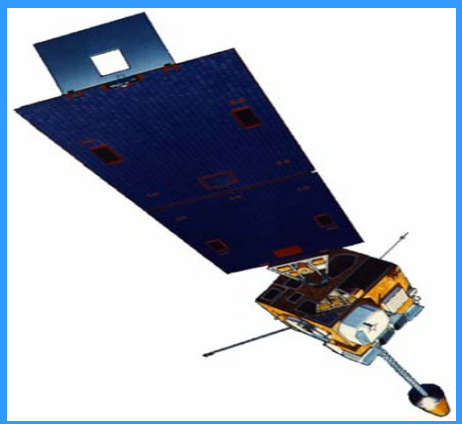
Summary:

GOES-N/O/P instrument changes

- **GOES-N post-launch check-out is upcoming**
- **better calibration (longer BlackBody looks)**
- **better resolution of the 13.3 um on GOES-O/P**

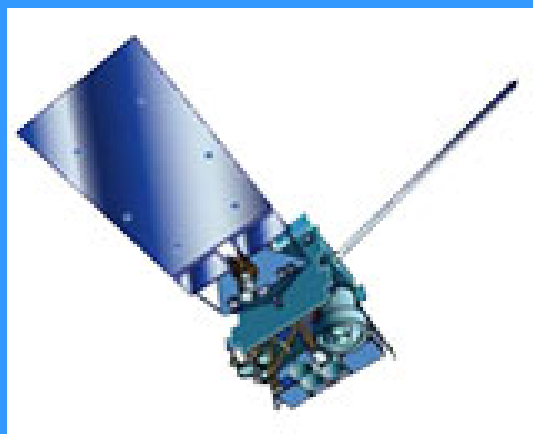
GOES-N/O/P bus change

- **no spring and fall eclipse outages**
- **reduced Keep-Out-Zone outages**
- **better calibration (colder detectors)**
- **better navigation (earth sensor -> star tracker)**

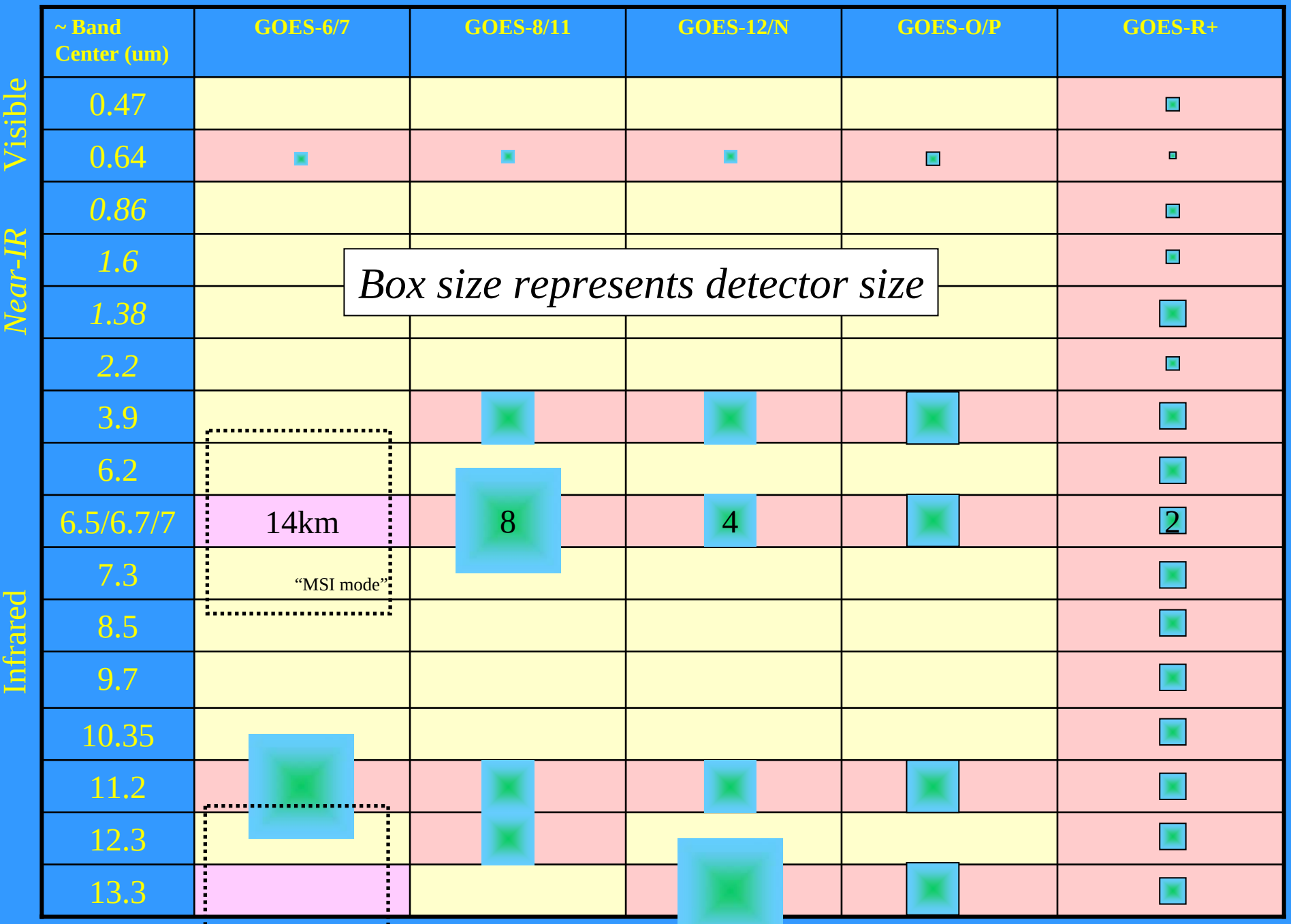


GOES-8/12

GOES-N/P



Approximate spectral and spatial resolutions of US GOES Imagers



Summary

The **great amount of information** from the GOES-R will offer a **continuation of current products and services.**

These products, based on validated requirements, will cover a **wide range of phenomena**. This includes applications relating to: weather, ocean, land, climate, and hazards.

The ABI improves over the current GOES Imager the **spectral, temporal, spatial and radiometric** performance.

The Advanced Baseline Imager (ABI), along with the Hyperspectral Environmental Suite (HES), and the Geostationary Lightning Mapper (GLM) on GOES-R will enable **much improved monitoring** compared to current capabilities.

More information

- GOES-11 PLT NOAA Tech Memo
- GOES-I/M Databook
- http://www.osd.noaa.gov/GOES/GOES_NQ Booklet.pdf
- GOES-N Databook

More information

AMS ABI BAMS article by Schmit et al.* from *August 2005

ABI Research Home page:

- http://cimss.ssec.wisc.edu/goes/abi/

NOAA GOES-R page:

- https://osd.goes.noaa.gov/

GOES and MODIS Galleries:

- http://cimss.ssec.wisc.edu/goes/misc/interesting_images.html
- http://www.ssec.wisc.edu/~gumley/modis_gallery/

ABI Documentation from NASA:

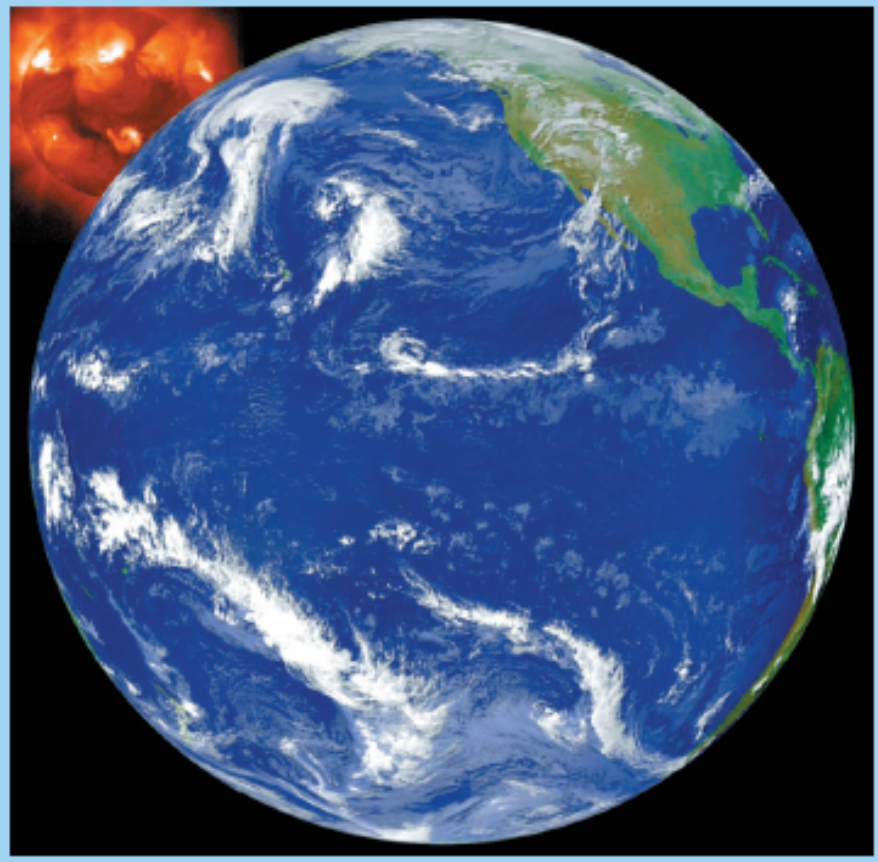
- http://goespoes.gsfc.nasa.gov/abihome.htm

ABI Simulated Spectral Response functions:

- ftp://ftp.ssec.wisc.edu/ABI/SRF

http://www.osd.noaa.gov/GOES/GOES_NQBooklet.pdf

GOES-N,O,P — The Next Generation



National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

U.S. Department of Commerce
National Oceanic and
Atmospheric Administration
National Environmental Satelite,
Data, and Information Service
Suitland, Maryland

Disclaimer

The views, opinions, and findings contained in this report are those of the author and should not be construed as an official National Oceanic and Atmospheric Administration or U.S. Government position, policy, or decision.