

The GOES-10 Overview

Tim Schmit and Gary Wade

Research Satellite Meteorologist

NOAA/NESDIS/ORR(STAR)

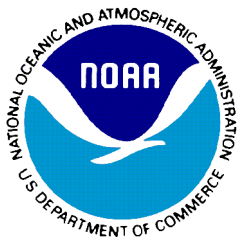
Advanced Satellite Products Branch (ASPB)

Madison, WI

and many, many others (eg, Cynthia Hampton, OSO)

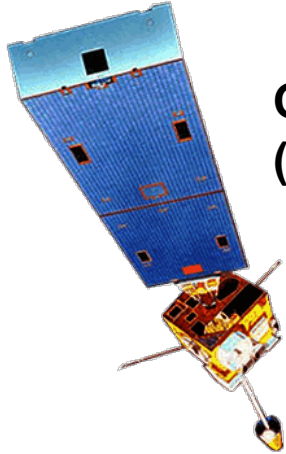
Cachoeira Paulista - São Paulo

November, 2007

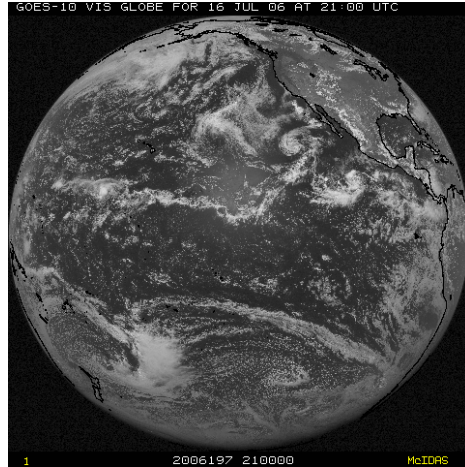


GOES Constellation

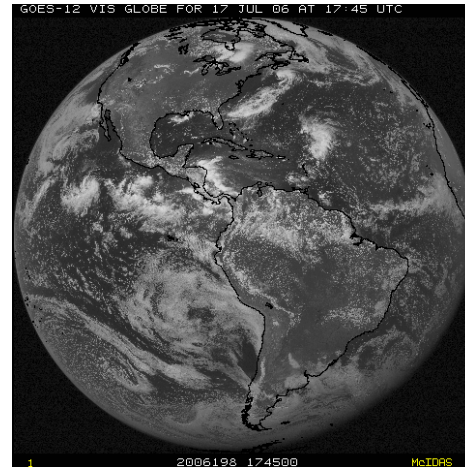
Operational



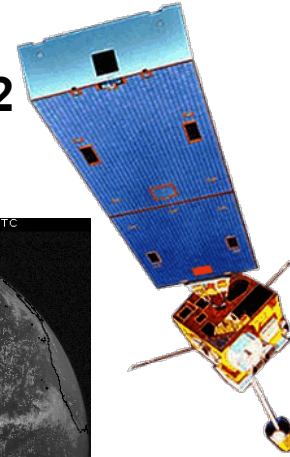
**GOES-11
(135W)**



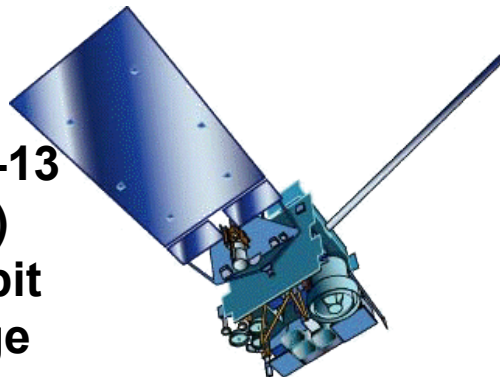
**GOES-12
(75W)**



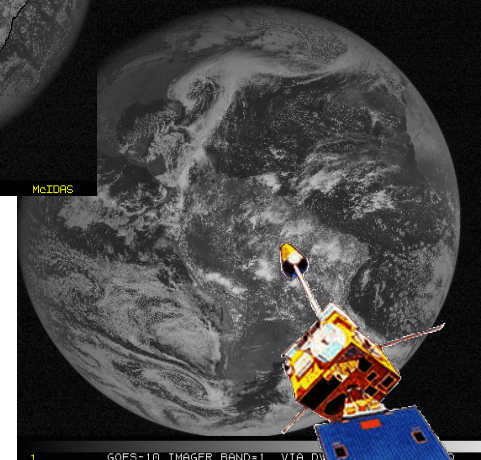
Operational



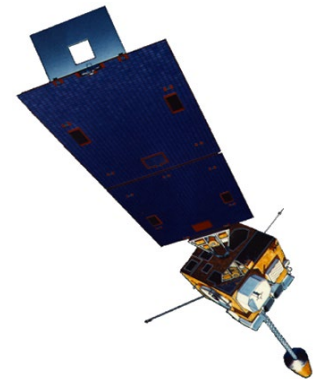
**GOES-13
(105W)
On-orbit
Storage**



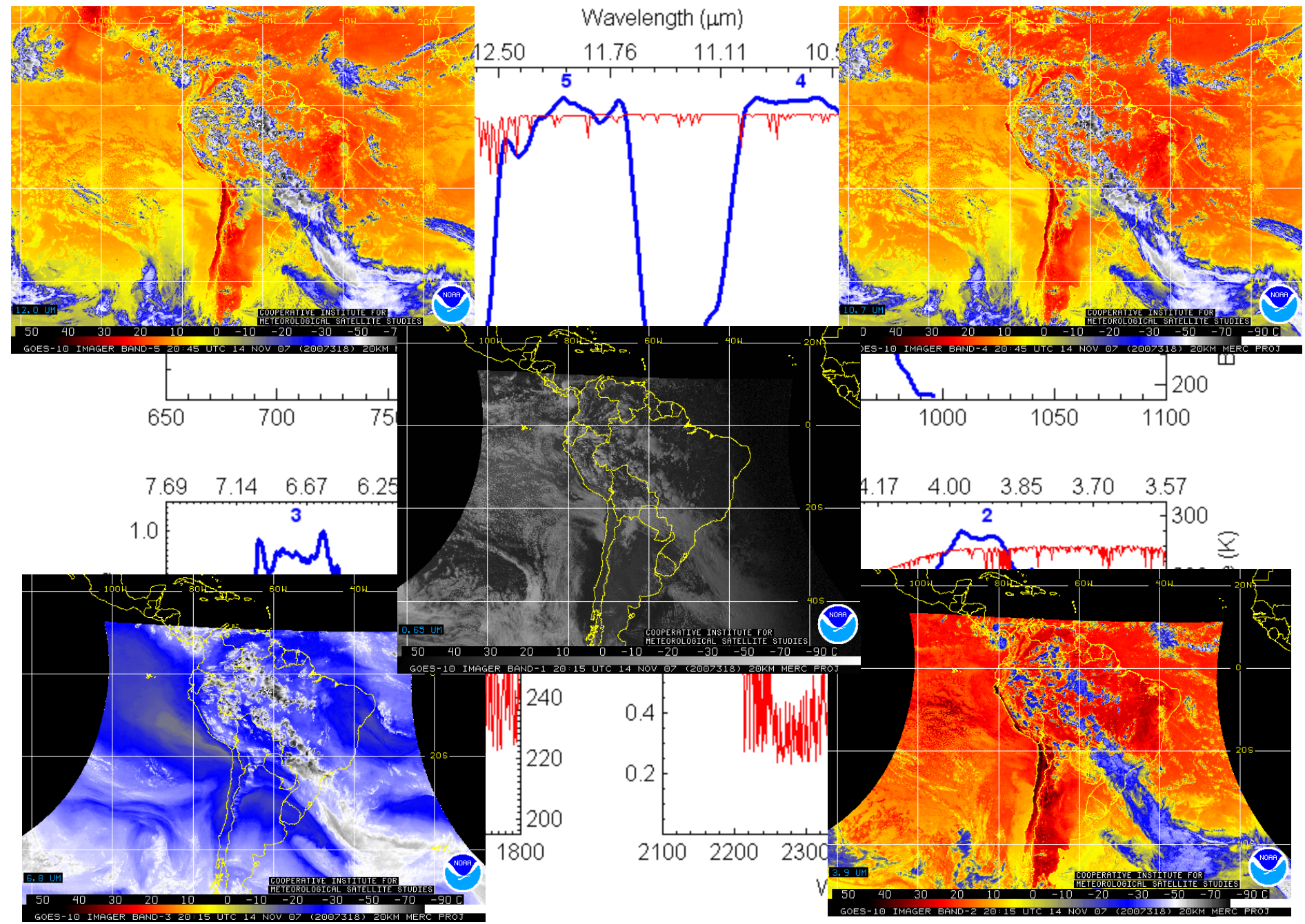
**GOES-10
(60W)
South America**



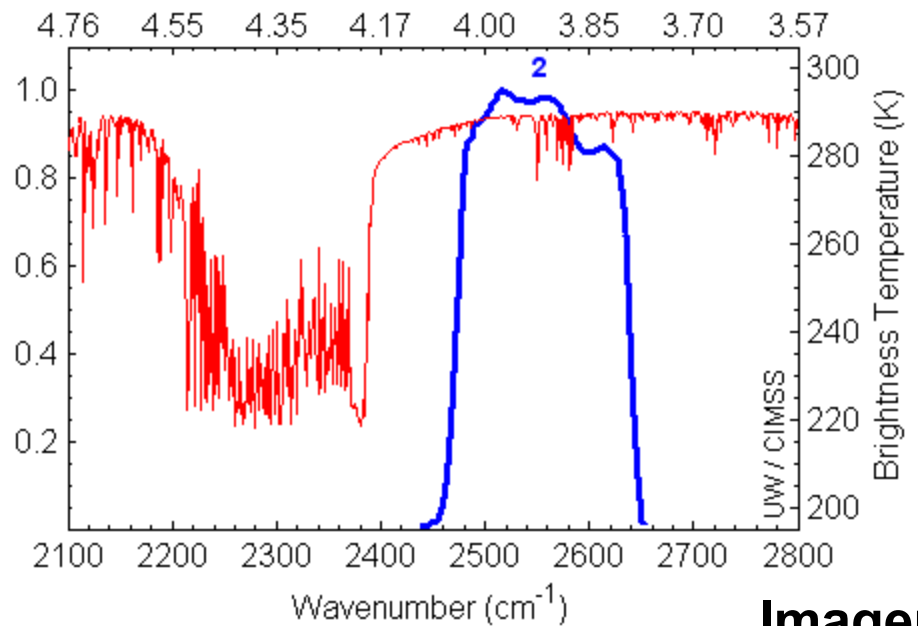
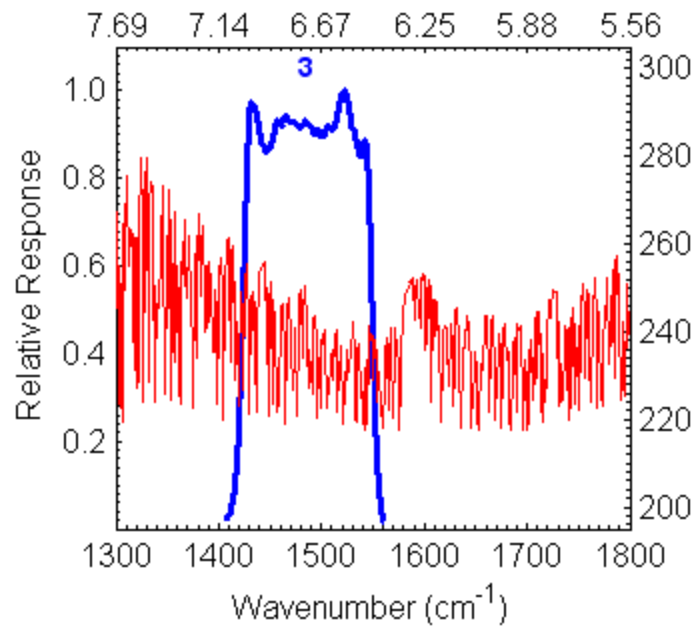
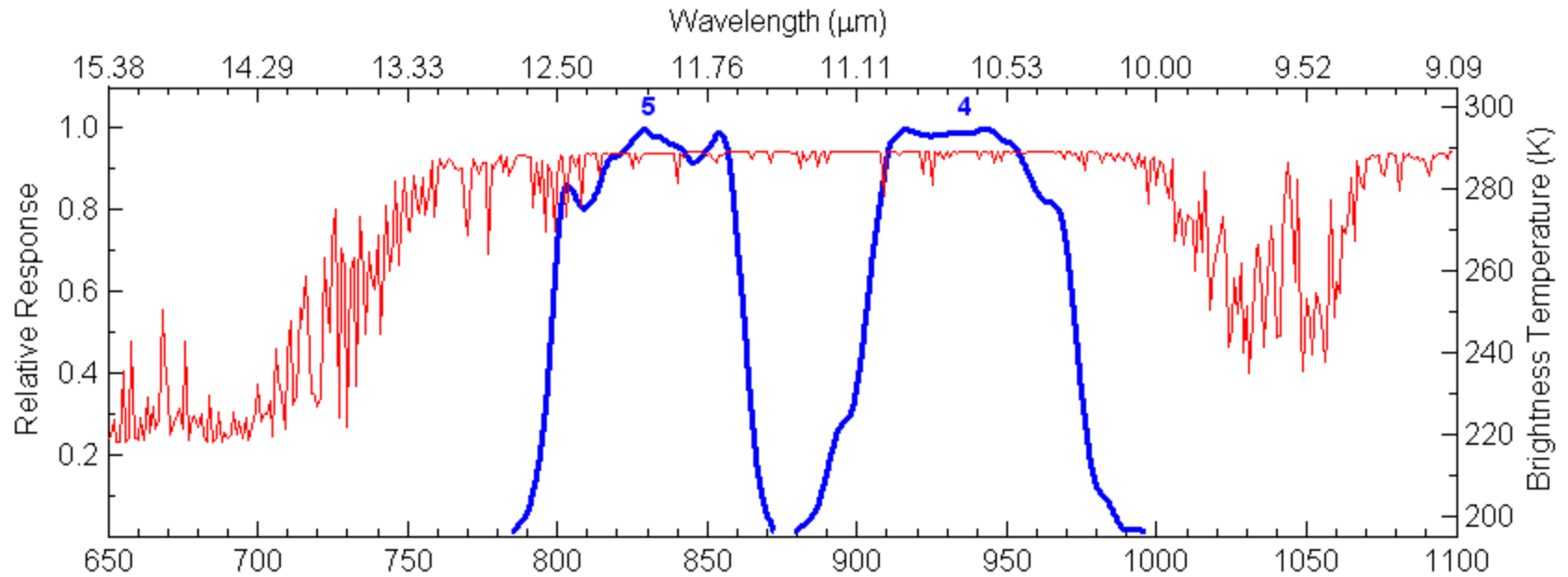
Geostationary
Operational
Environmental
Satellite



GOES-10 Imager SRFs & US Std Atms Brightness Temperature Spectrum

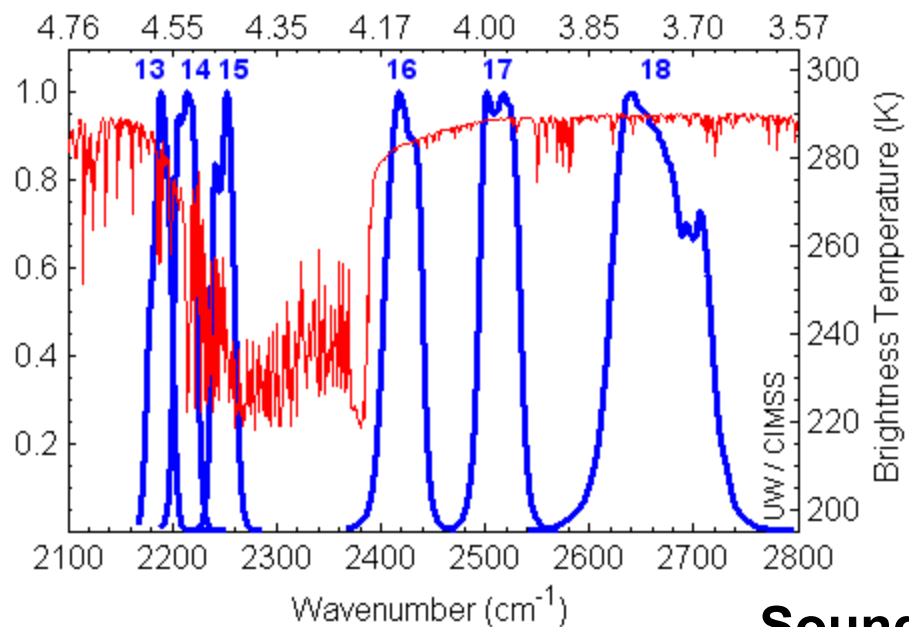
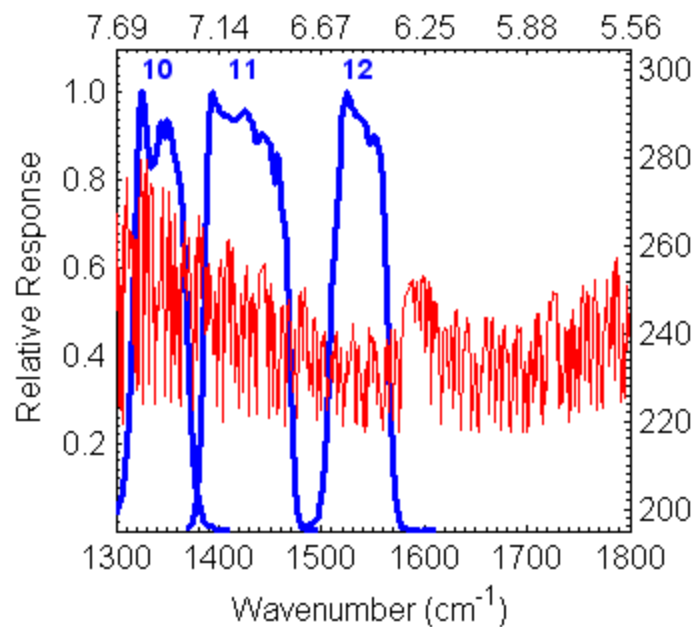
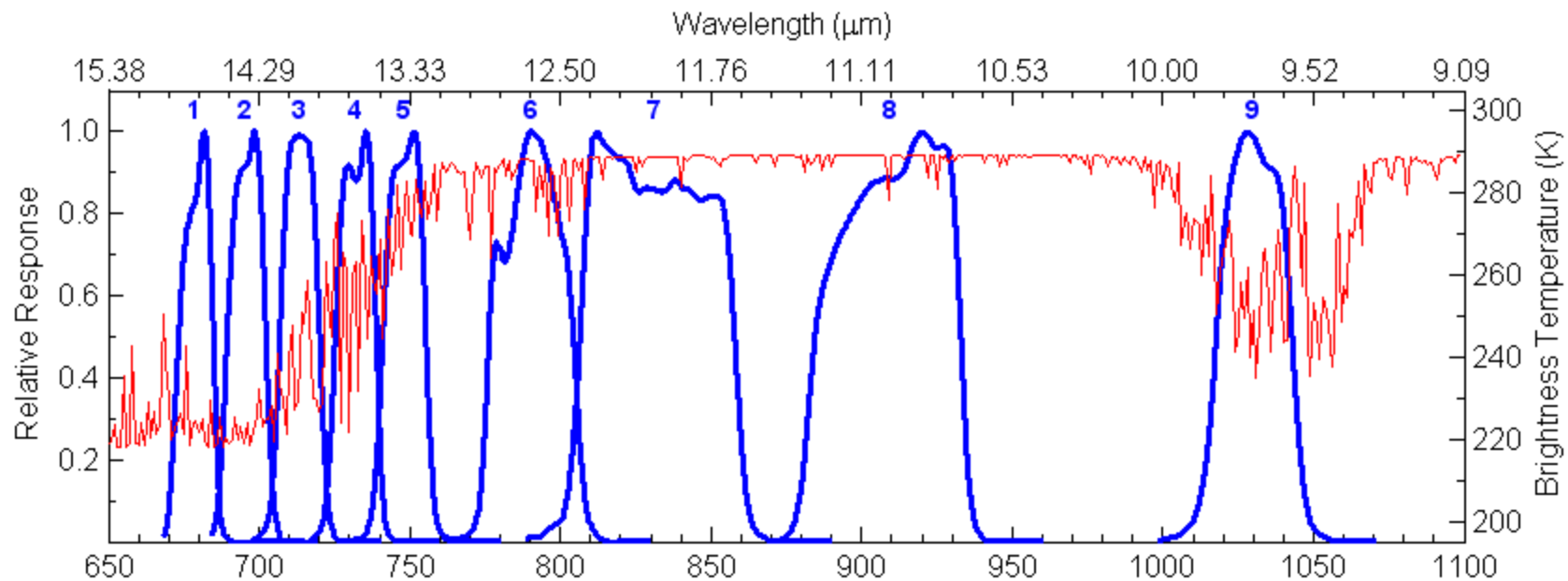


GOES-10 Imager SRFs & US Std Atms Brightness Temperature Spectrum



Imager

GOES-10 Sounder SRFs & US Std Atms Brightness Temperature Spectrum

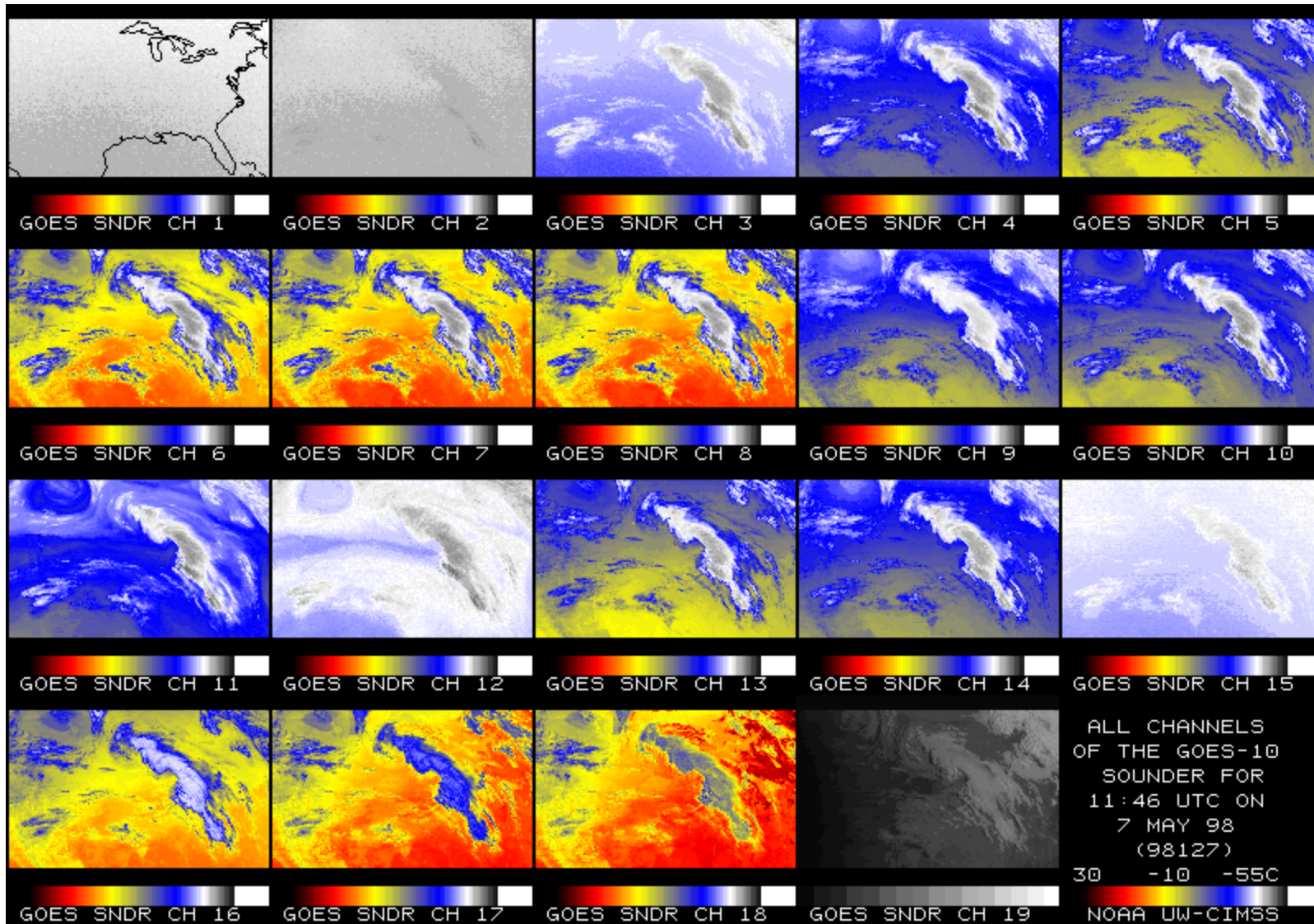


Sounder

GOES-10 Sounder

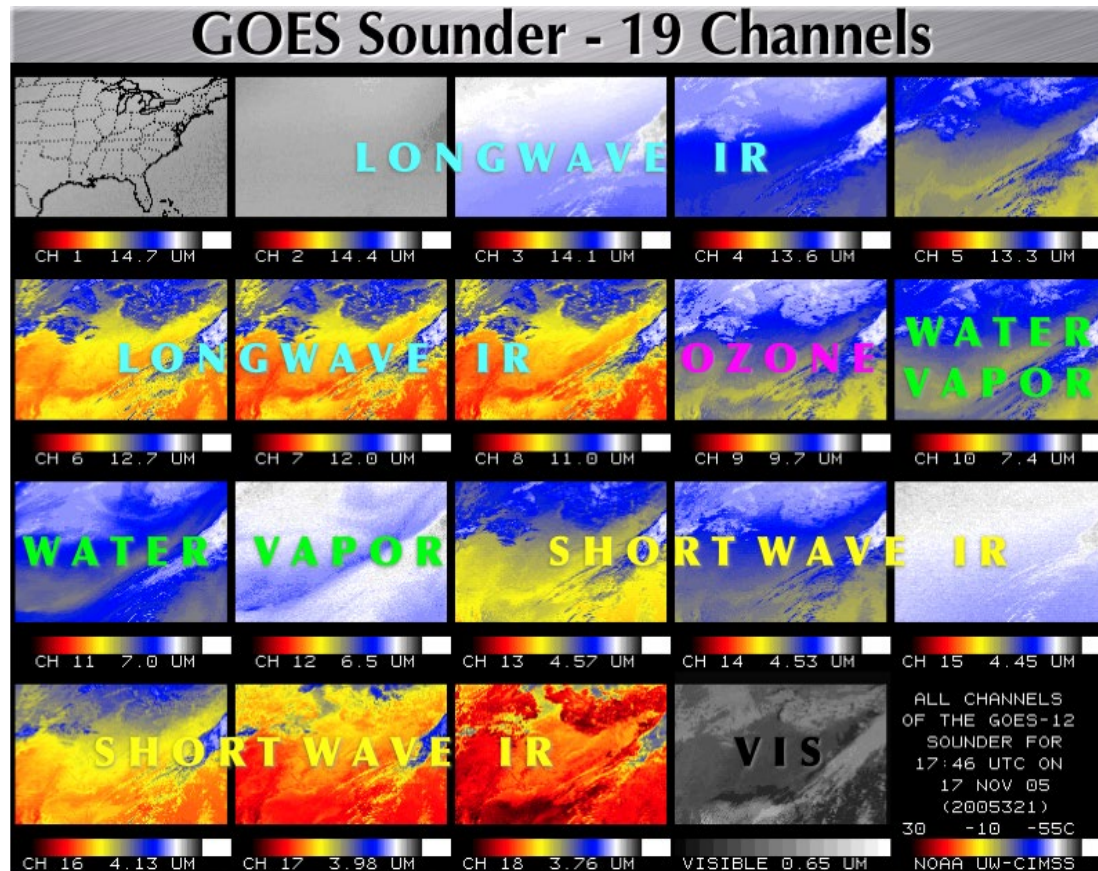
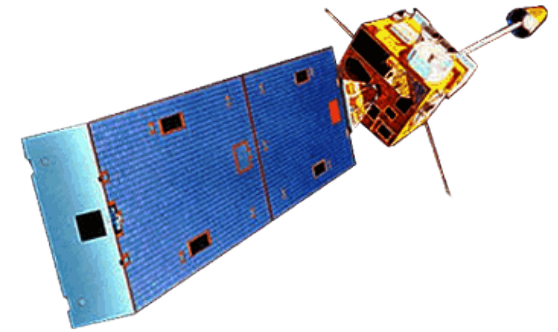
- Launched April 25, 1997
- July 27, 1998: Operational (replaced GOES-9)
- June 21, 2006 (replaced by GOES-11 as the operational western satellite)
- Summer of 2006 (1-min Imager data) during the satellite transit
- December 2006 (arrived at 60 West longitude)

GOES-10 Sounder -- 1998



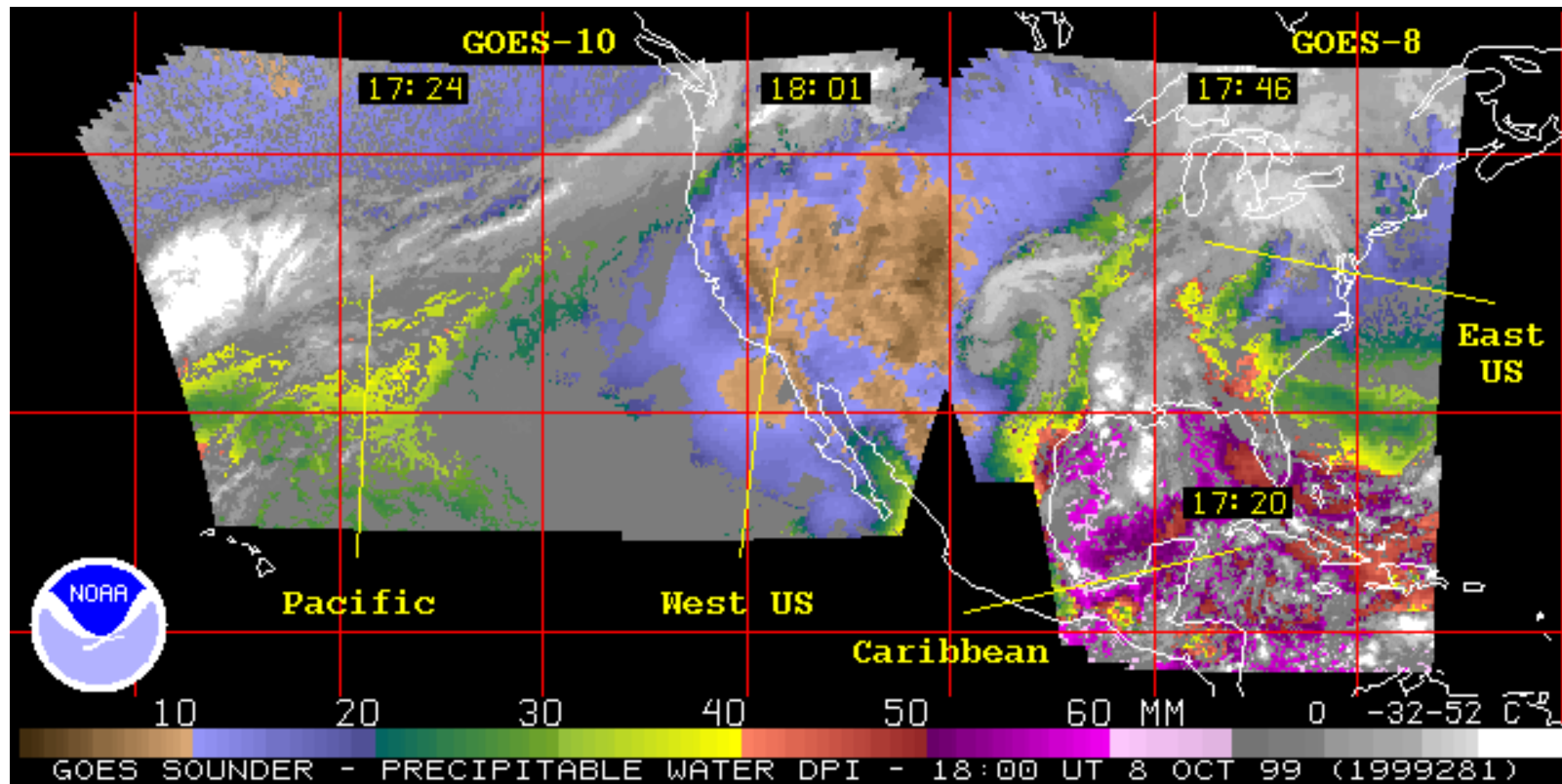
Description: GOES-8/P Sounders

- 19 channels (18 Infrared; 1 Visible)
- Spatial resolution: ~ 10km
- Products include standard imagery and derived, Level-2 products



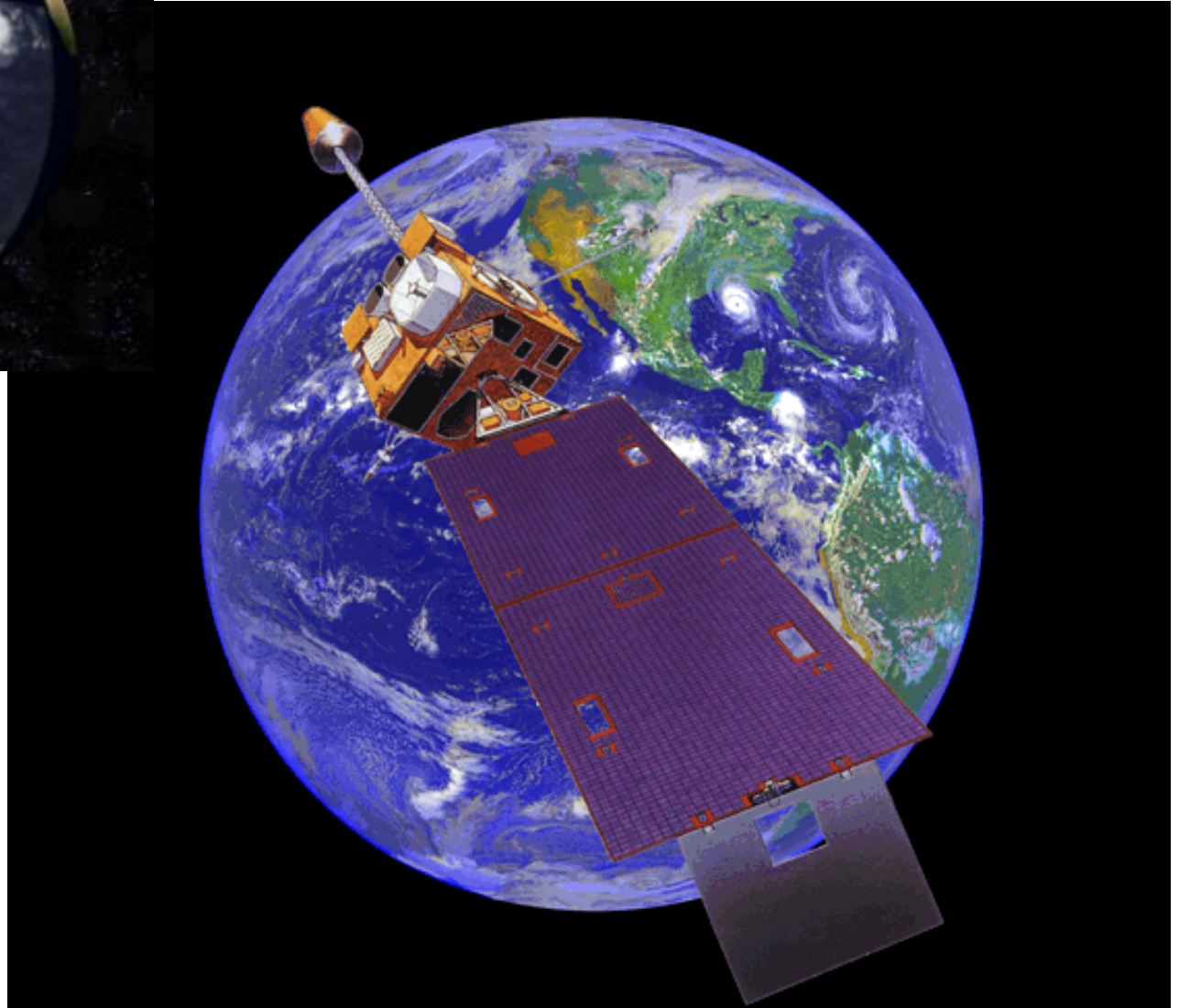
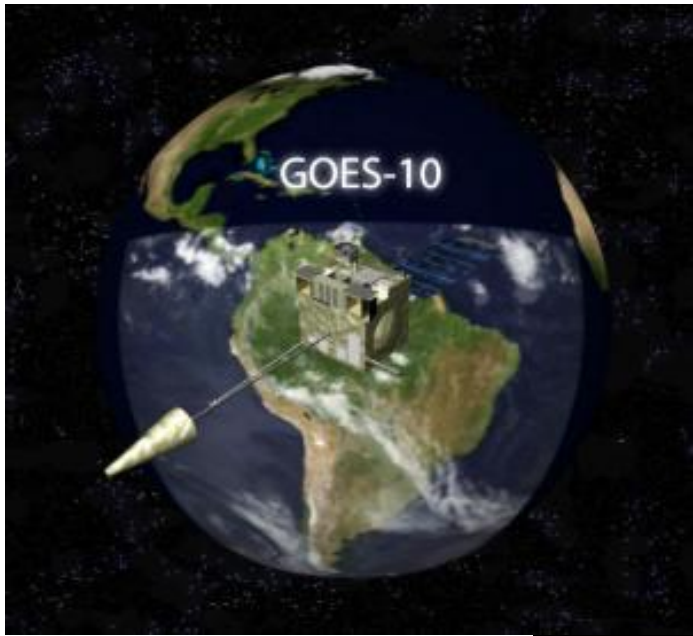
<i>GOES Sounder Product</i>	<i>Operational Use within the NWS</i>
Clear-sky Radiances	Assimilation into NCEP operational regional & global NWP models over water
Layer & Total Precipitable Water	Assimilation into NCEP operational regional & global NWP models; display and animation within NWS AWIPS for use by forecasters at NWS WFOs & National Centers in forecasting precipitation and severe weather
Cloud-top retrievals (pressure, temperature, cloud amount)	Assimilation into NCEP operational regional NWP models; display and animation within NWS AWIPS for use by forecasters at NWS WFOs; supplement to NWS/ASOS cloud measurements for generation of total cloud cover product at NWS/ASOS sites
Surface skin temperature	Image display and animation within NWS AWIPS for use by forecasters at NWS WFOs
Profiles of temp & moisture	Display (SKEW-Ts) within NWS AWIPS for use by forecasters at NWS WFOs in forecasting precipitation and severe weather
Atmospheric stability indices	Image display and animation within NWS AWIPS for use by forecasters at NWS WFOs in forecasting precipitation and severe weather
Water Vapor Winds	Image display and animation within NWS AWIPS for use by forecasters at NWS WFOs

GOES-11/12 Spatial Coverage

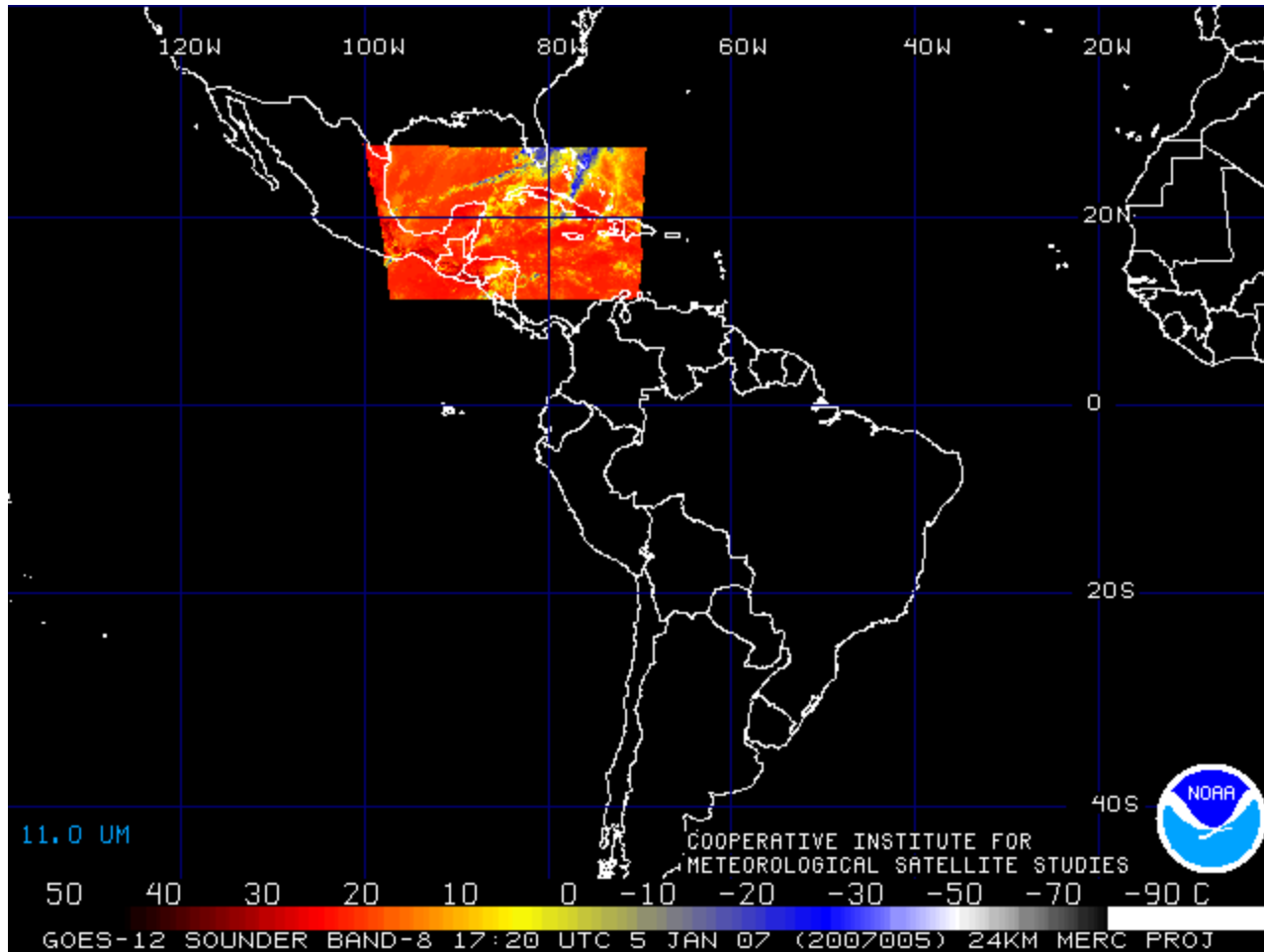


No routine Southern Hemispheric support from GOES-East or West

GOES-10 Overview

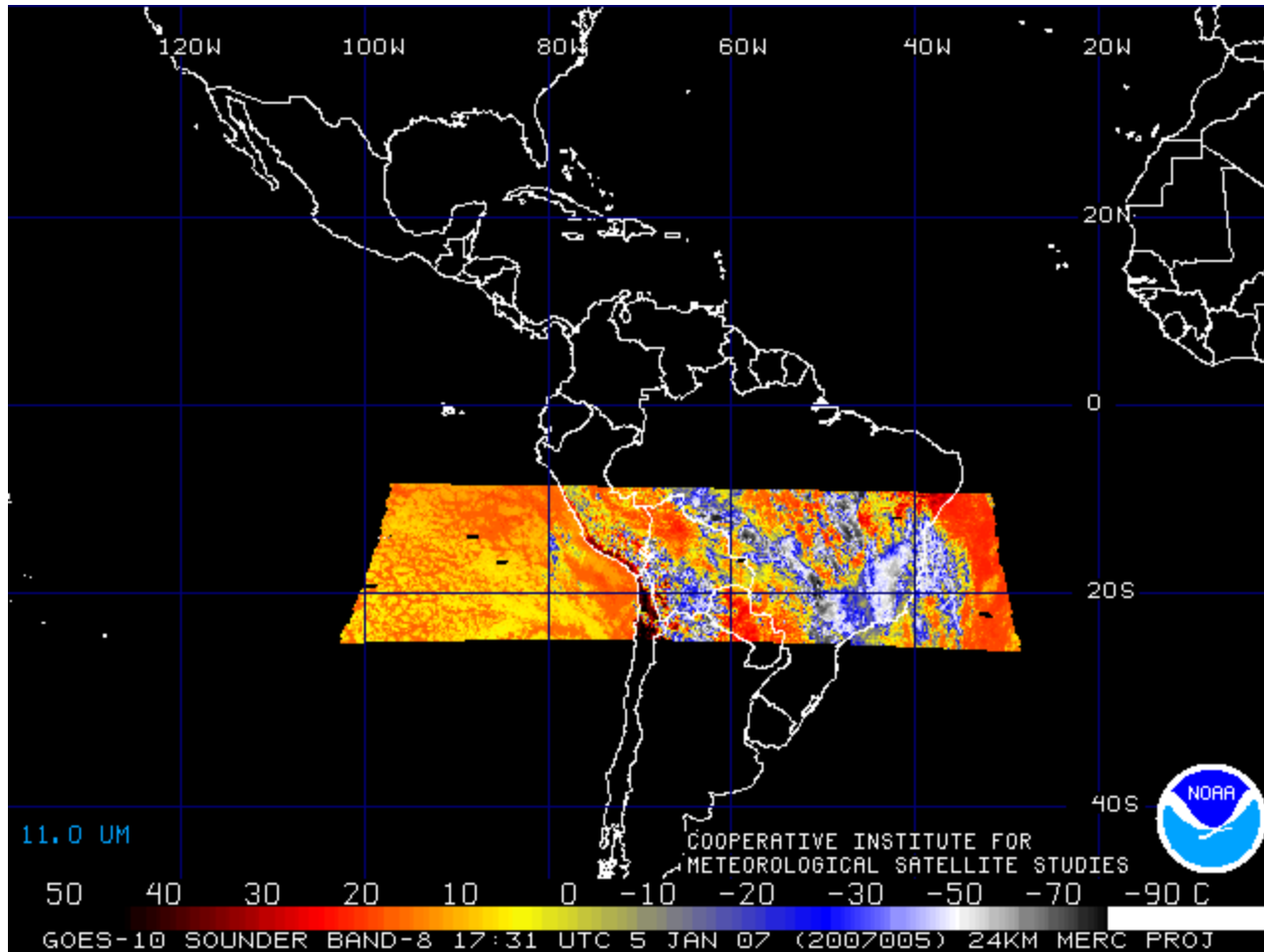


GOES-12 Sounder



The GOES-12 Sounder routinely scans Continental US and adjacent areas. This animation runs from 17:20 UTC to 23:20 UTC on January 5, 2007.

GOES-10 Sounder



The GOES-10 Sounder scans parts of the Southern Hemisphere. This animation runs from 17:31 UTC to 23:30 UTC on January 5, 2007.

GOES-10 Status

- Spacecraft is operating nominally
- Operating at 60° W +/- 0.5°
- Imager and Sounder performance is nominal
- Engineers are closely monitoring spacecraft battery performance.
 - Weaken battery cells in older spacecraft
- Spacecraft Status:

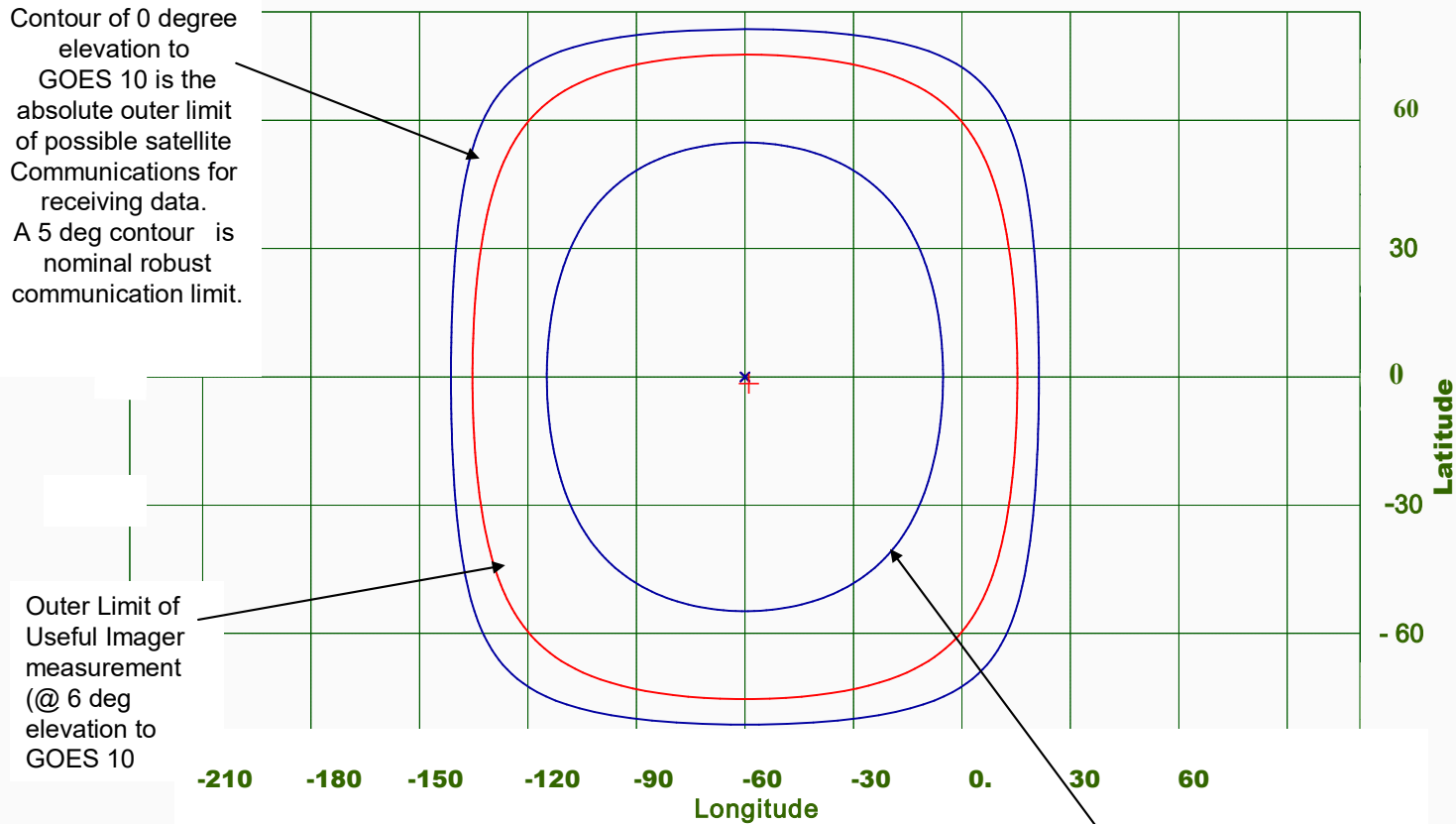
<http://www.oso.noaa.gov/goesstatus/>

GOES-10 Status

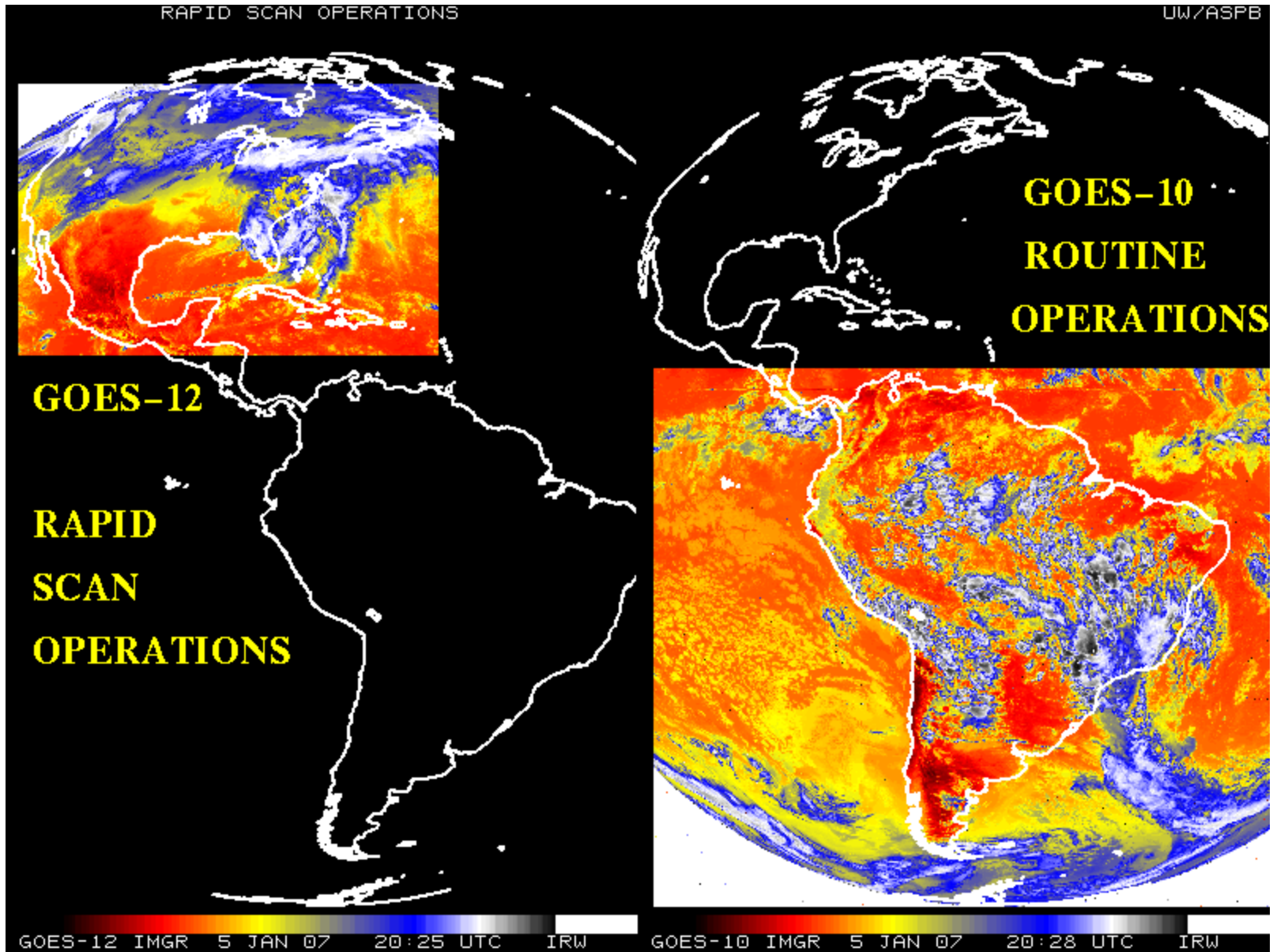
- Spacecraft no longer has fuel to maintain inclination
 - Spacecraft inclination increases approximately 1° per year
 - Spacecraft is currently at 1.75° inclination
 - Image navigation can no longer be controlled on board the spacecraft above 2° inclination ~ September 2007

Field of View

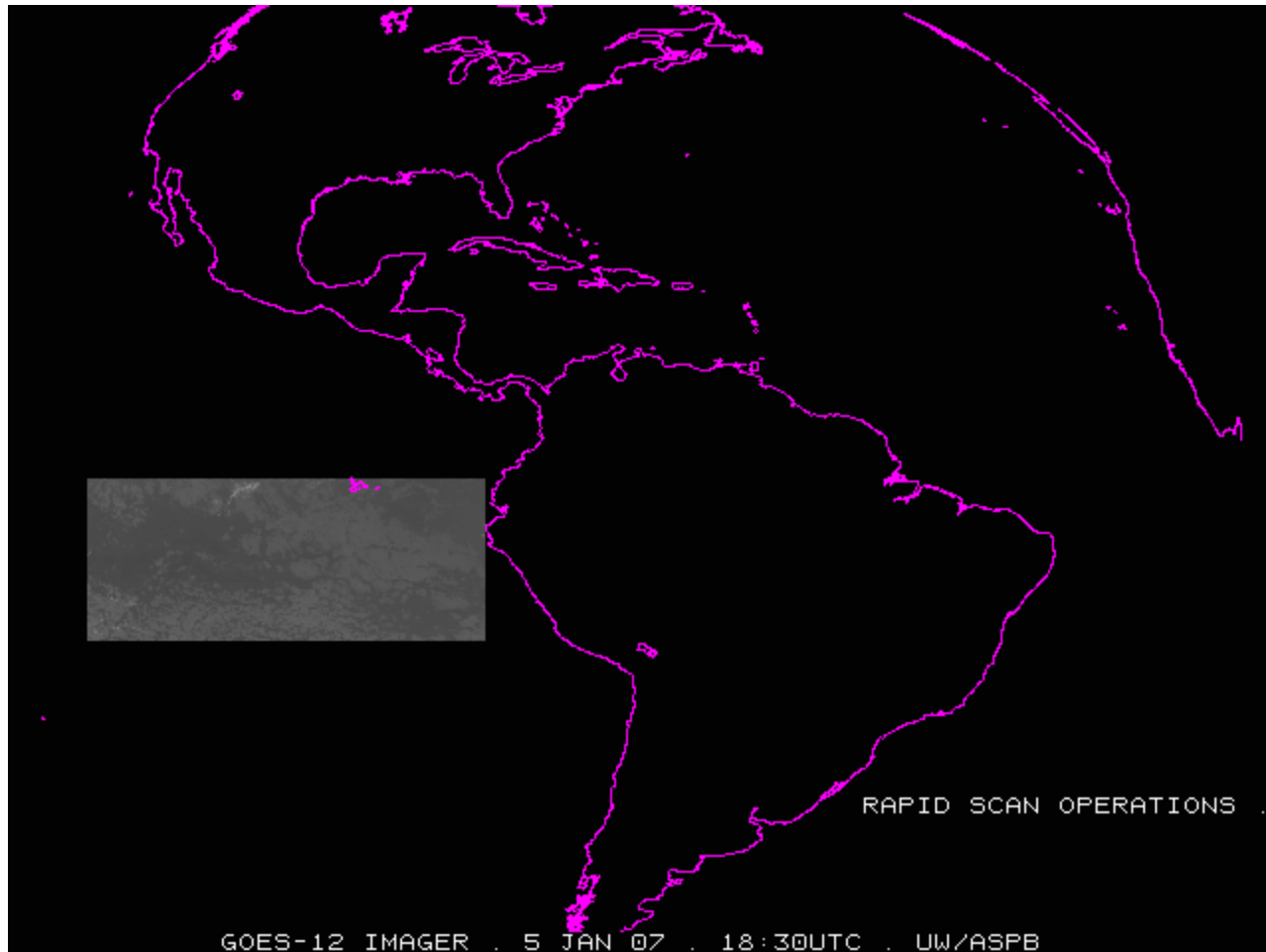
60 deg longitude location of GOES - on Move of GOES 10 for Use over South America – Imager, Sounder, and Communications contour limits



GOES-12 and GOES-10

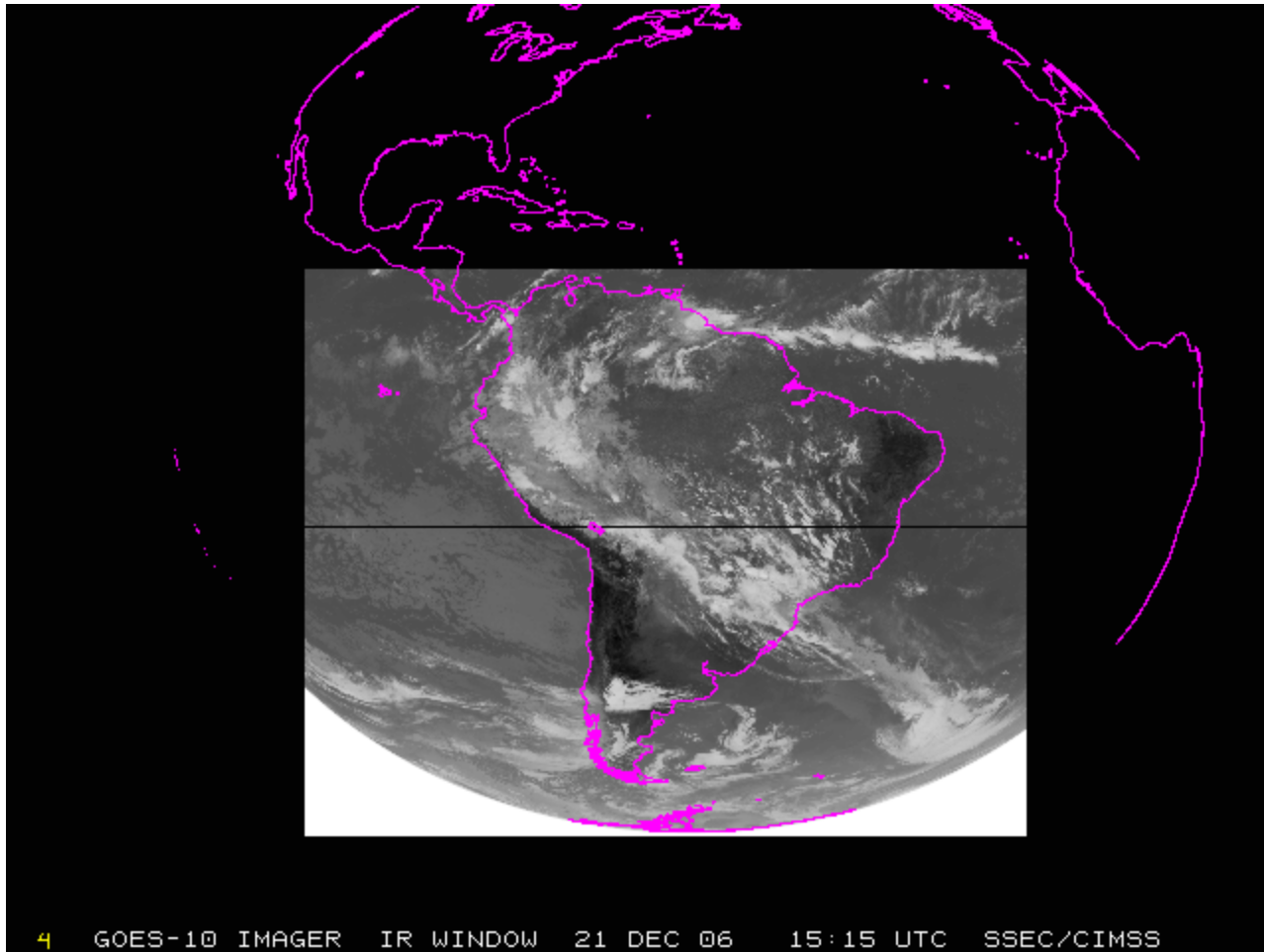


GOES-12 Imager during RSO



When the GOES-12 Imager is in Rapid Scan Operations, the region over South America is only scanned every 3 hours. This animation runs from 18:30 UTC to 23:02 UTC on January 5, 2007.

GOES-10 Imager – Sample coverage (animation)



More information at:

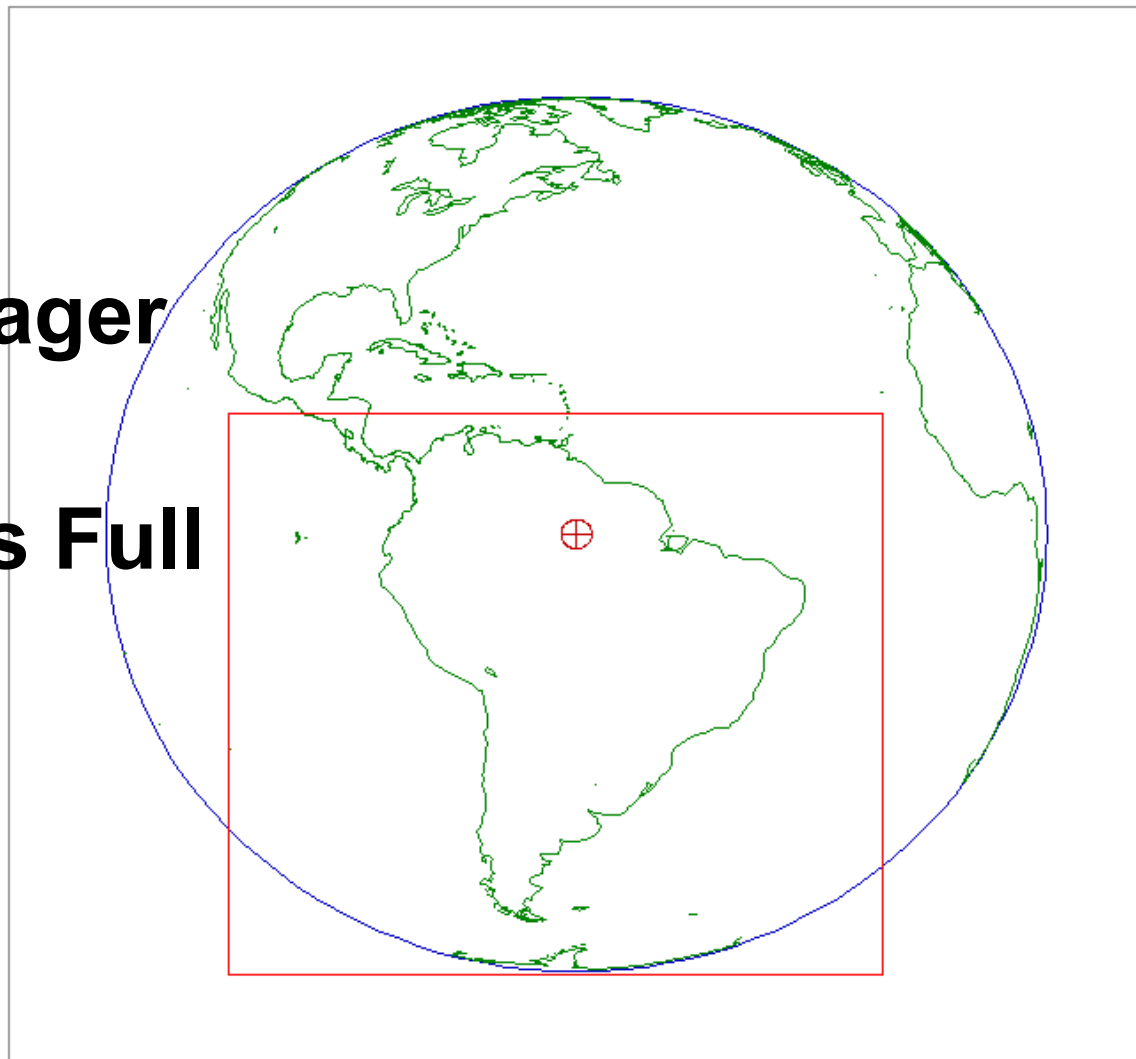
<http://cimss.ssec.wisc.edu/goes/blog/2006/12/21/goes-10-southern-hemisphere-coverage>

Data from SSEC Data Center

Image Schedule

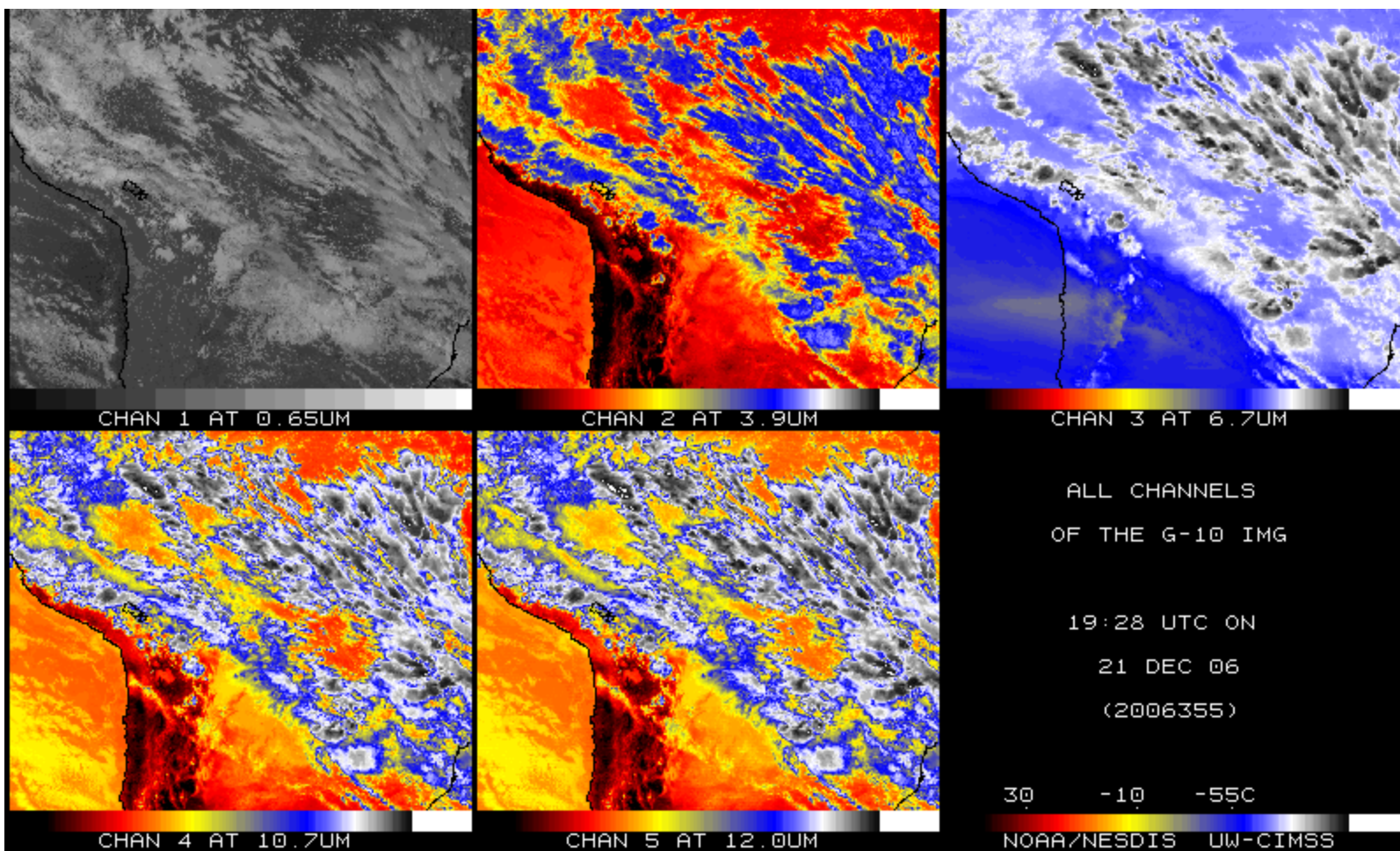
Imager:

- **15-Minute Imager Frame**
- **Every 3 hours Full Disk**



<http://www.ssd.noaa.gov/ps/sats/goes/ten>

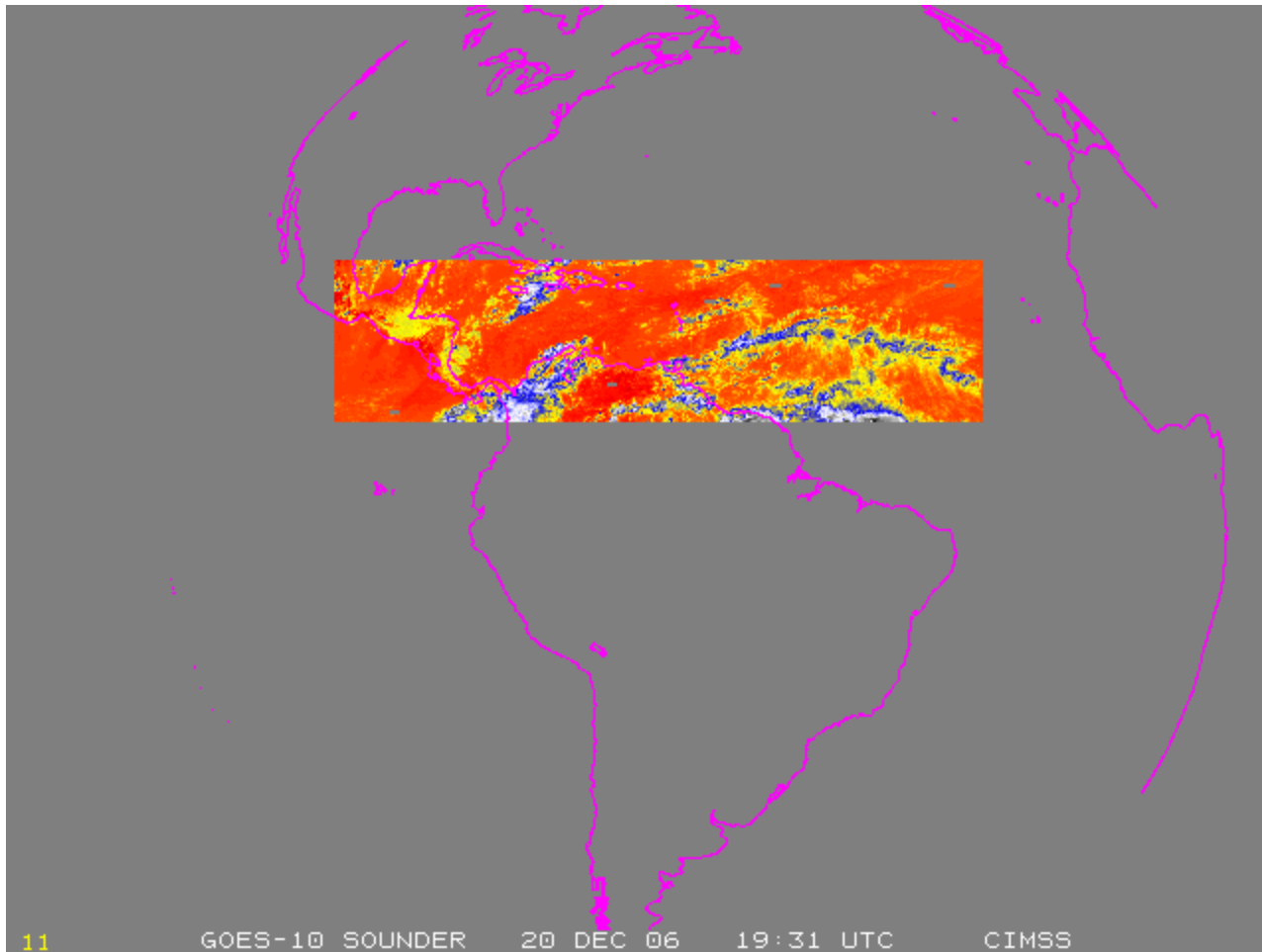
GOES-10 Imager – Multi-band example



GOES Imager Bands

GOES Imager Band	Wavelength Range (μm)	Central Wavelength (μm)	Meteorological Objective
1	0.55 to 0.75	0.65	Cloud cover and surface features during the day
2	3.8 to 4.0	3.9	Low cloud/fog and fire detection
3	6.5 to 7.0 5.8 to 7.3	6.75 (GOES-8/11) 6.48 (GOES-12/13)	Upper-level water vapor
4	10.2 to 11.2	10.7	Surface or cloud top temperature
5	11.5 to 12.5	12.0 (GOES-8/11)	Surface or cloud top temperature and low-level water vapor
6	12.9 to 13.7	13.3 (GOES-12/13)	CO ₂ band: Cloud detection

GOES-10 Sounder – Sample coverage (animation)

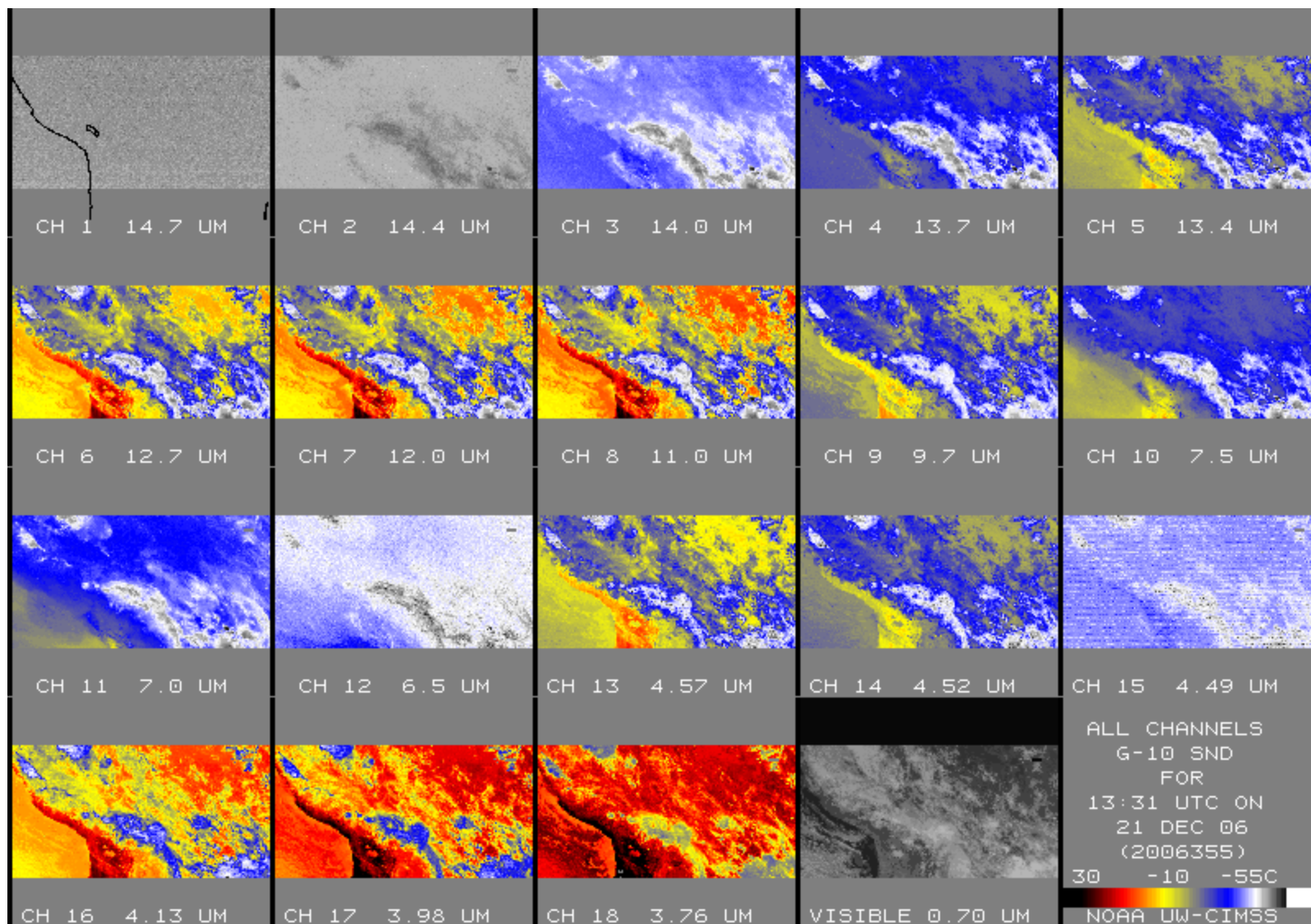


More information at:

<http://cimss.ssec.wisc.edu/goes/blog/2006/12/21/goes-10-southern-hemisphere-coverage>

Data from SSEC Data Center

GOES-10 Sounder – Multi-band example



GOES Sounder

Sounder Band	Central Wavelength (μm)	GOES-13	GOES-12	GOES-11	GOES-10	GOES-9	GOES-8	SPEC
		(mW/(m ² ·sr·cm ⁻¹))						
1	14.70	0.32	0.77	0.67	0.71	1.16	1.76	0.66
2	14.40	0.25	0.61	0.51	0.51	0.80	1.21	0.58
3	14.10	0.23	0.45	0.37	0.41	0.56	0.98	0.54
4	13.90	0.18	0.39	0.36	0.41	0.46	0.74	0.45
5	13.40	0.18	0.34	0.34	0.36	0.45	0.68	0.44
6	12.70	0.095	0.14	0.17	0.16	0.19	0.32	0.25
7	12.00	0.086	0.11	0.11	0.09	0.13	0.20	0.16
8	11.00	0.10	0.11	0.14	0.12	0.09	0.13	0.16
9	9.70	0.11	0.14	0.13	0.10	0.11	0.16	0.33
10	7.40	0.081	0.099	0.09	0.07	0.08	0.08	0.16
11	7.00	0.046	0.059	0.06	0.04	0.05	0.07	0.12
12	6.50	0.063	0.11	0.11	0.07	0.09	0.11	0.15
13	4.57	0.0061	0.0062	0.006	0.007	0.008	0.012	0.013
14	4.52	0.0064	0.0062	0.007	0.005	0.007	0.010	0.013
15	4.45	0.0055	0.0066	0.006	0.005	0.006	0.009	0.013
16	4.13	0.0030	0.0024	0.003	0.003	0.003	0.004	0.008
17	3.98	0.0026	0.0022	0.003	0.002	0.003	0.004	0.008
18	3.70	0.0011	0.00094	0.001	0.001	0.001	0.002	0.004

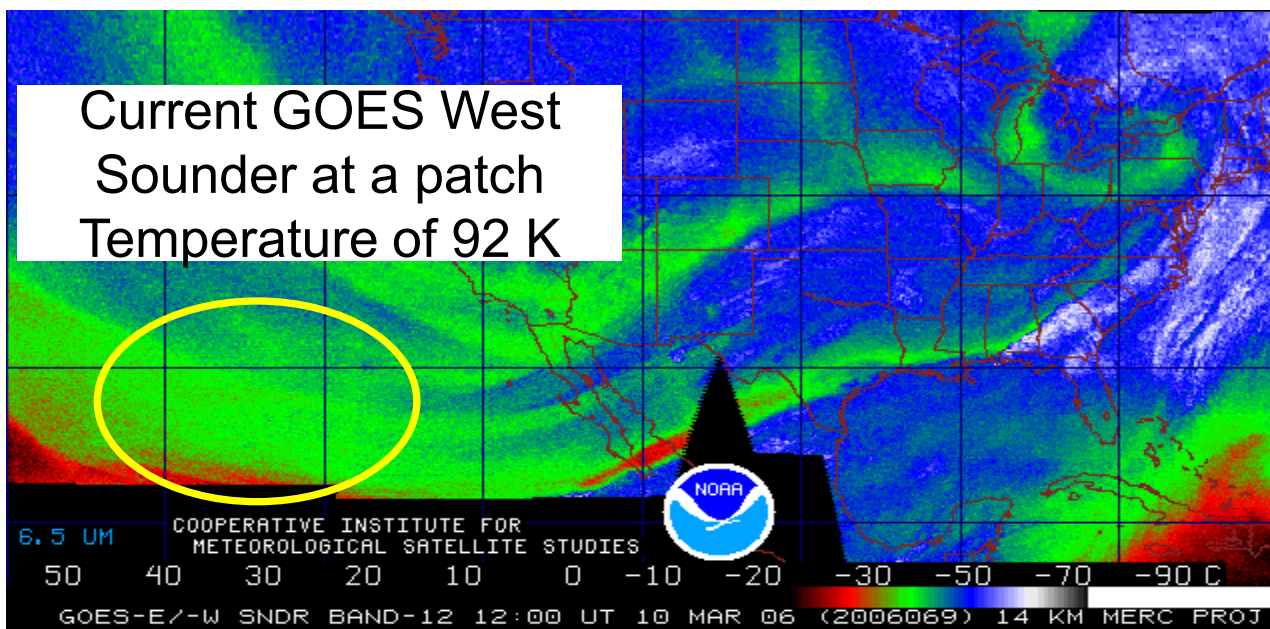
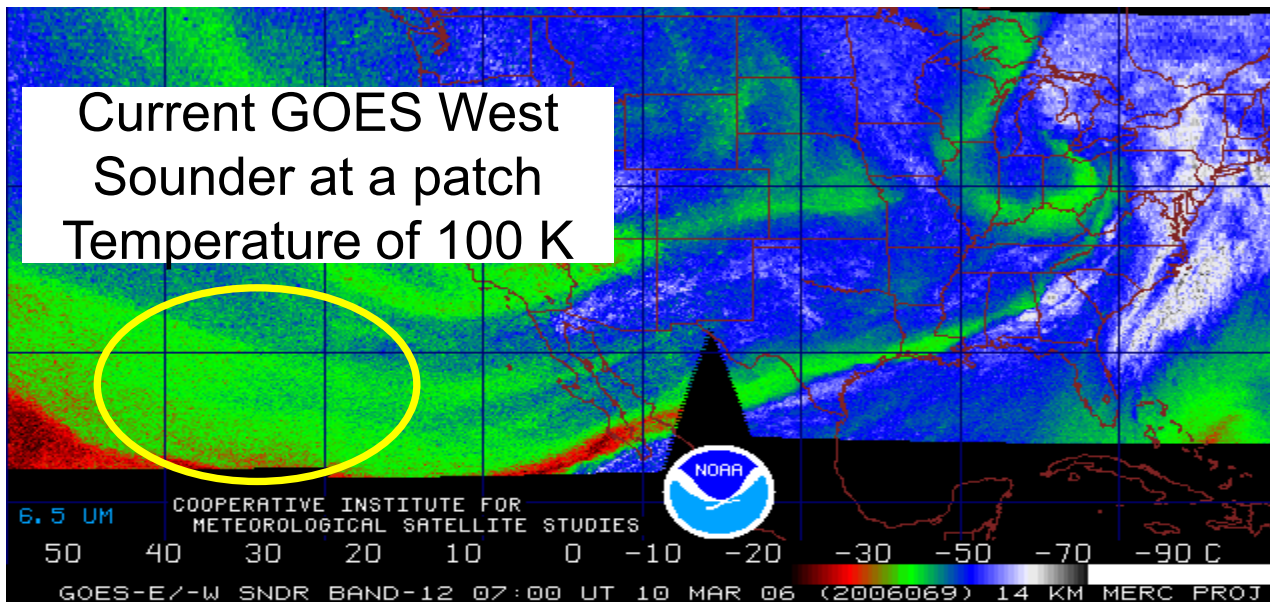
Special Operations

- Station Keeping Maneuvers
 - East/West Maneuvers to keep spacecraft at longitudinal position 59.5 to 60.5 deg W
 - Maneuvers are performed approximately four times per year
 - Instruments have to be turned off to protect them from contamination
 - Maneuver and recovery operations takes approximately 6 hours.

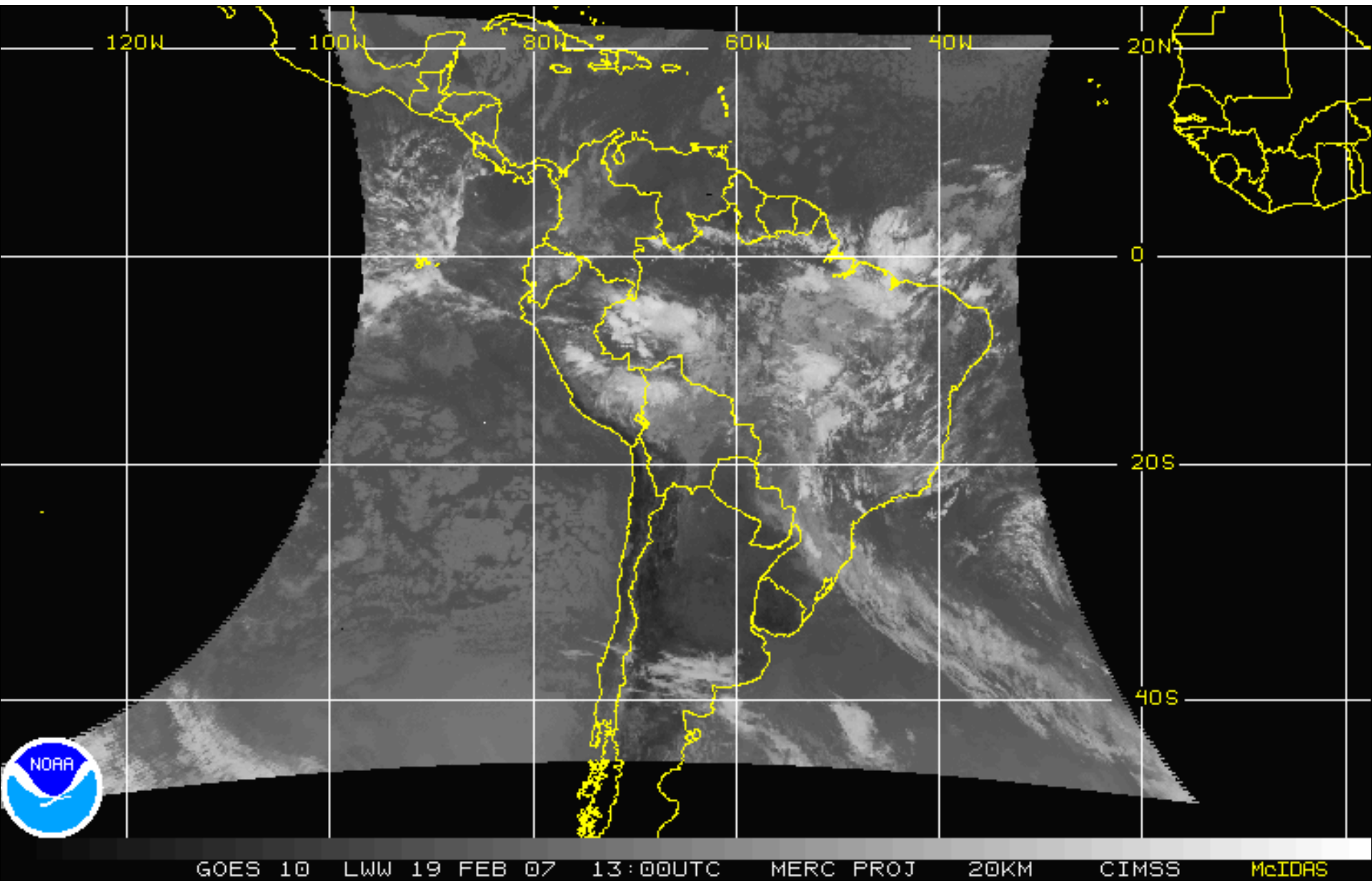
Special Operations

- Eclipse Season
 - Twice per year for 45 days: Centered on Equinox
 - Spacecraft design requires the turn off of instruments during daily eclipse period
 - No maneuvers are scheduled during this period
- Keep out Zone (KOZ)
 - Similar time period as Eclipse Season
 - Protects instruments from incident solar radiation on the detectors

Patch Temperature

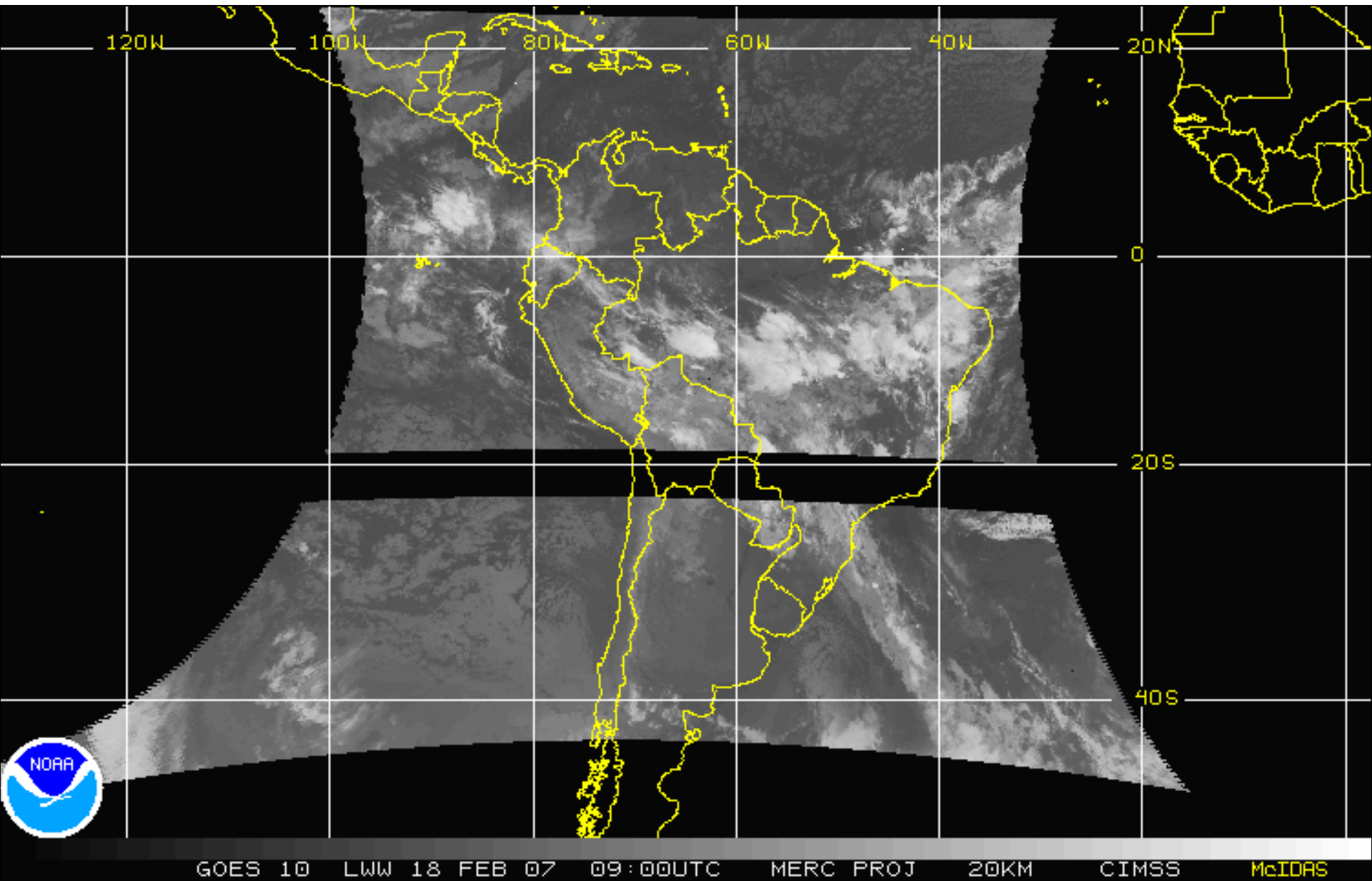


GOES-10 Sounder (4 hour time window)



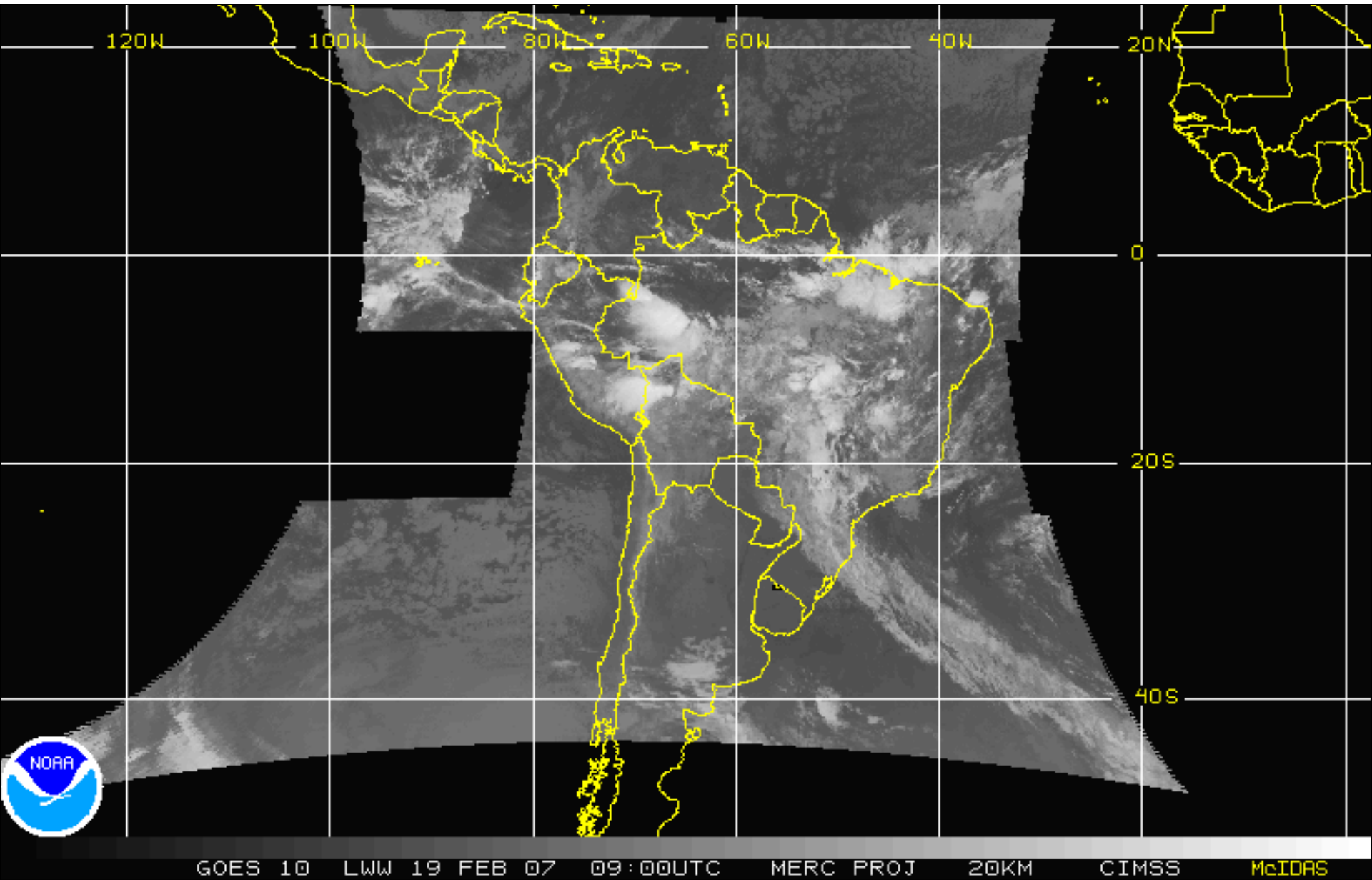
Time period with no house-keeping outages

GOES-10 Sounder (4 hour time window)



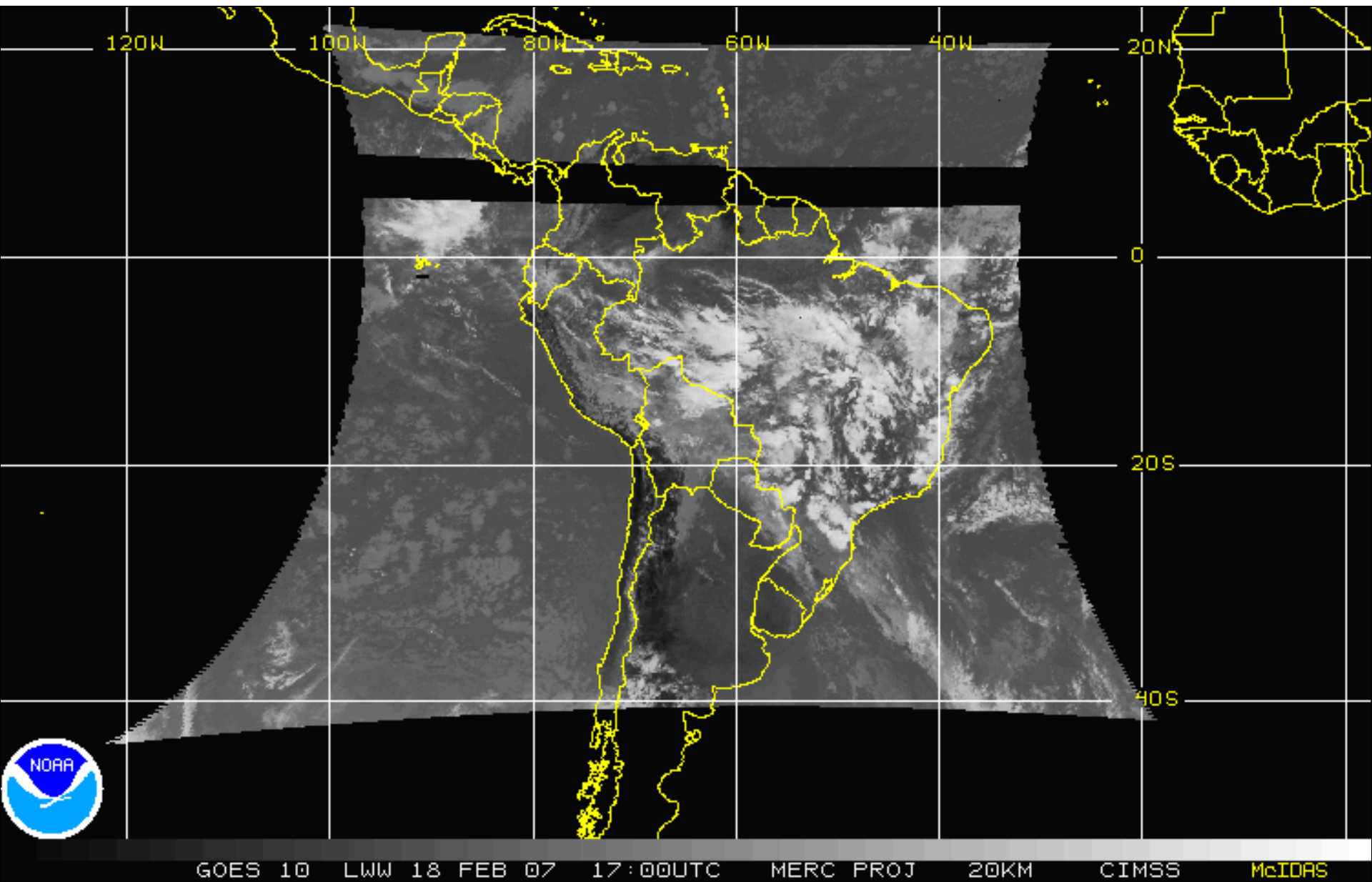
Time period with house-keeping outages—*before* schedule change

GOES-10 Sounder (4 hour time window)



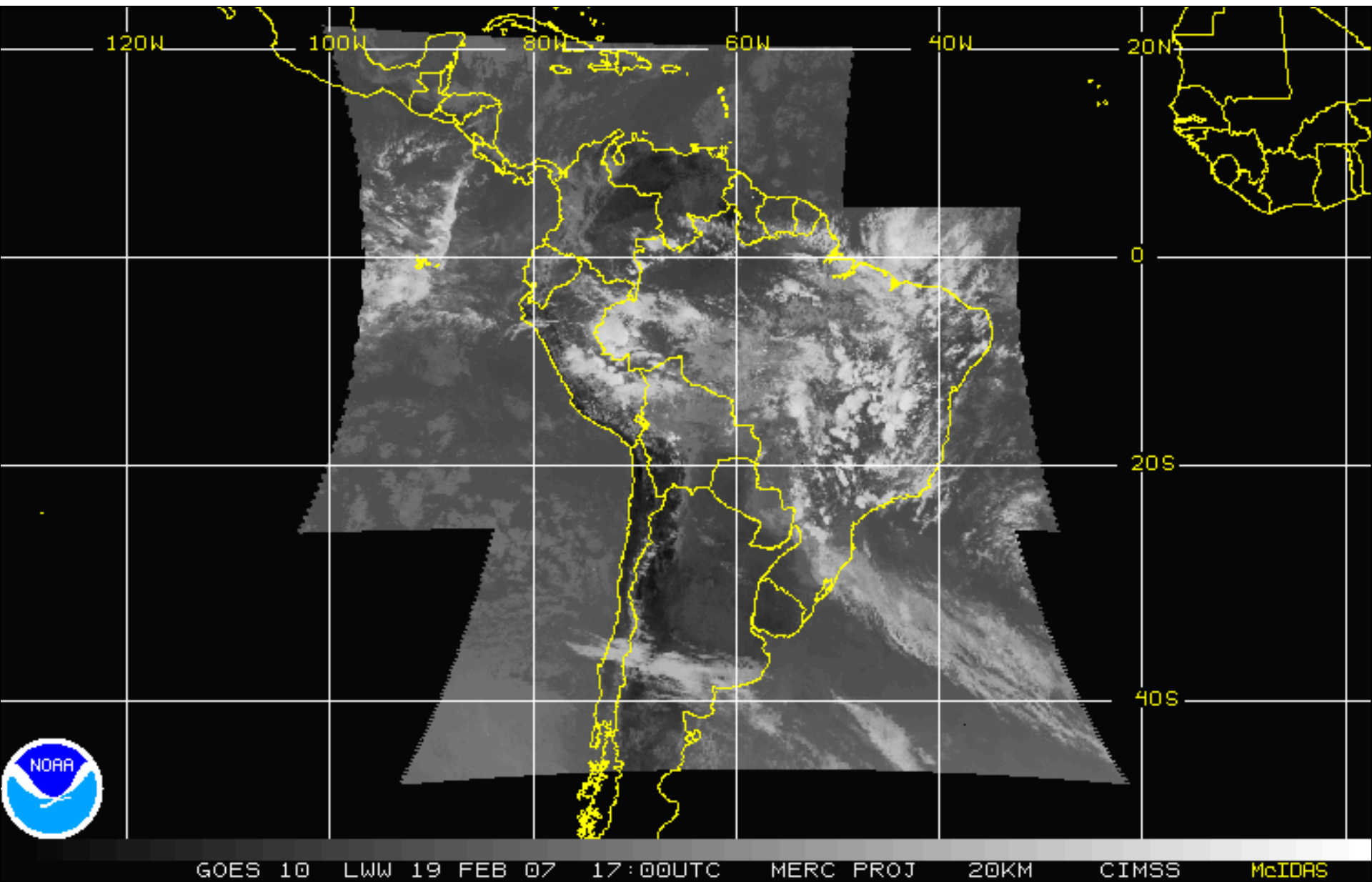
Time period with house-keeping outages—*after* schedule change

GOES-10 Sounder (4 hour time window)



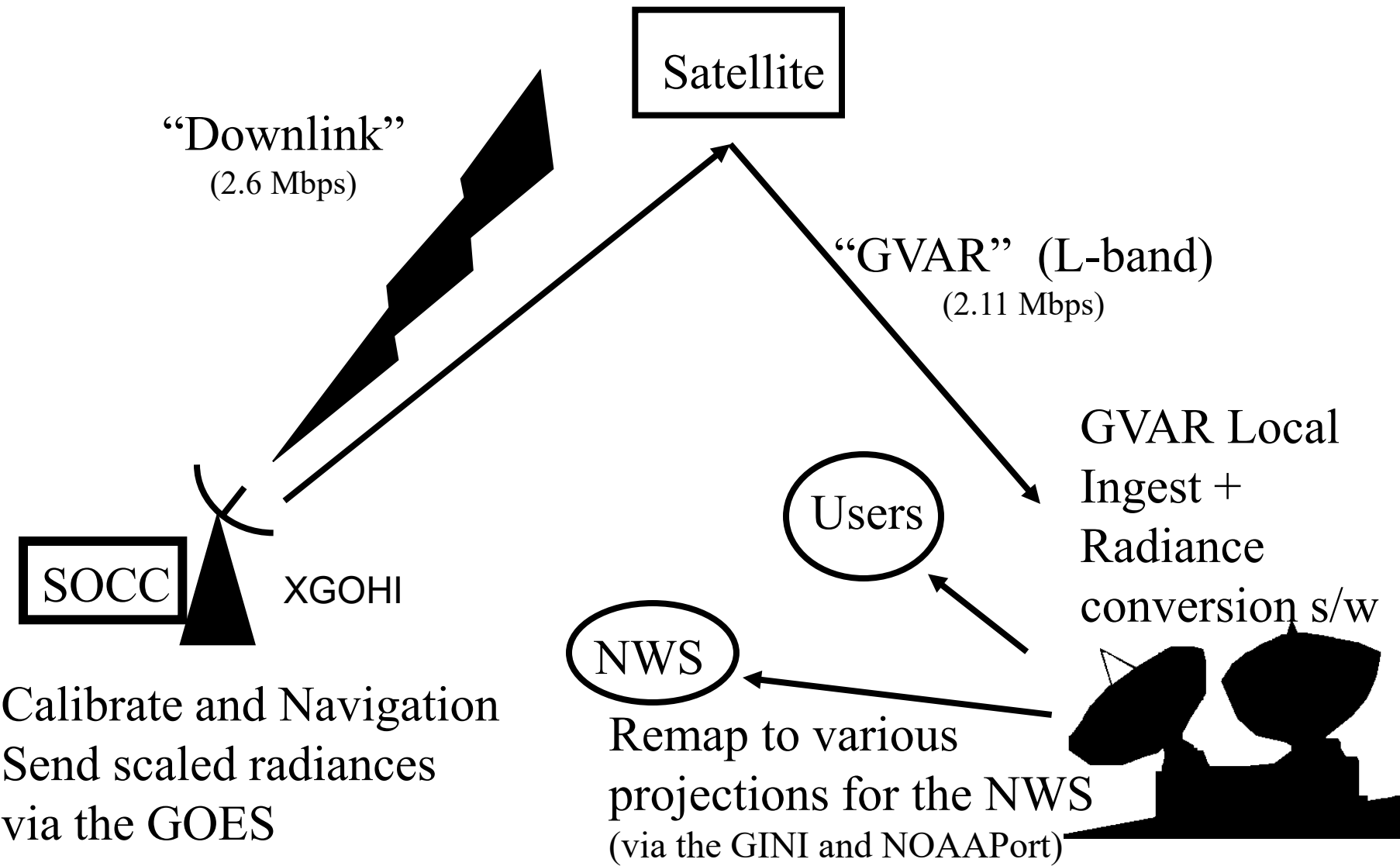
Time period with house-keeping outages—*before* schedule change

GOES-10 Sounder (4 hour time window)



Time period with house-keeping outages—*after* schedule change

GVAR SYSTEM



OPS Committee

- Committee to discuss GOES-10 operational changes
 - Participants from all communities make operational decisions (scheduling changes, notifications, product dissemination)
- Send information via email
- Meet via telecon at minimum twice/yr
- Information posted at:
 - *<http://www.ssd.noaa.gov/PS/SATS/GOES/TEN/>*

GOES-10 OPERATIONS COMMITTEE

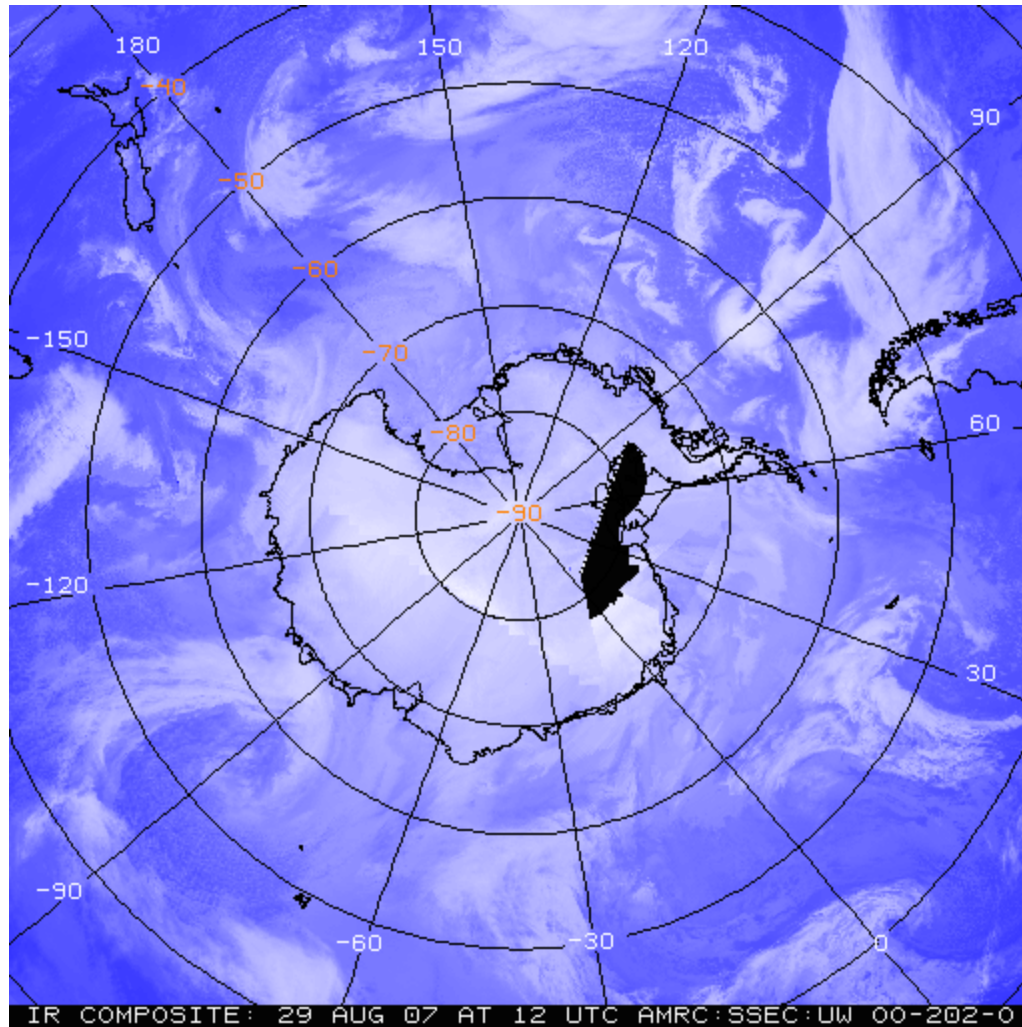
CONTACT LIST

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~ El Salvador does not use GOES-10 data, but would like to be on the distribution list.

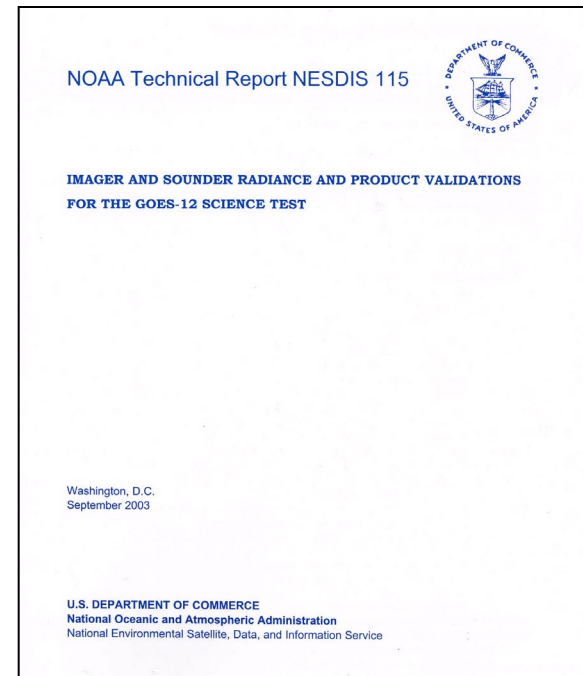
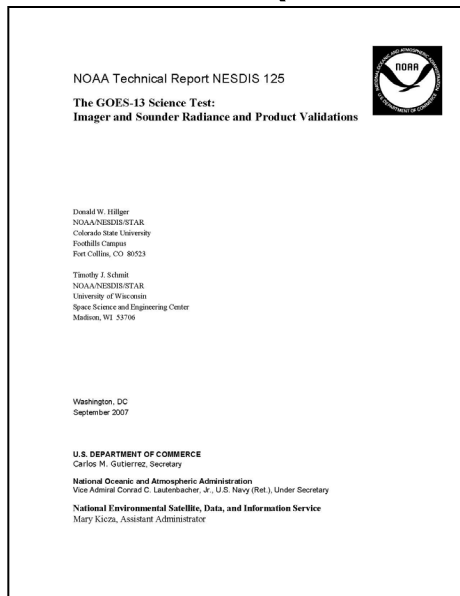
**Nicaragua prefers written participation; no English-speakers (verbal) on staff

OPS_COMMITTEE_GOES_10@NOAA.GOV



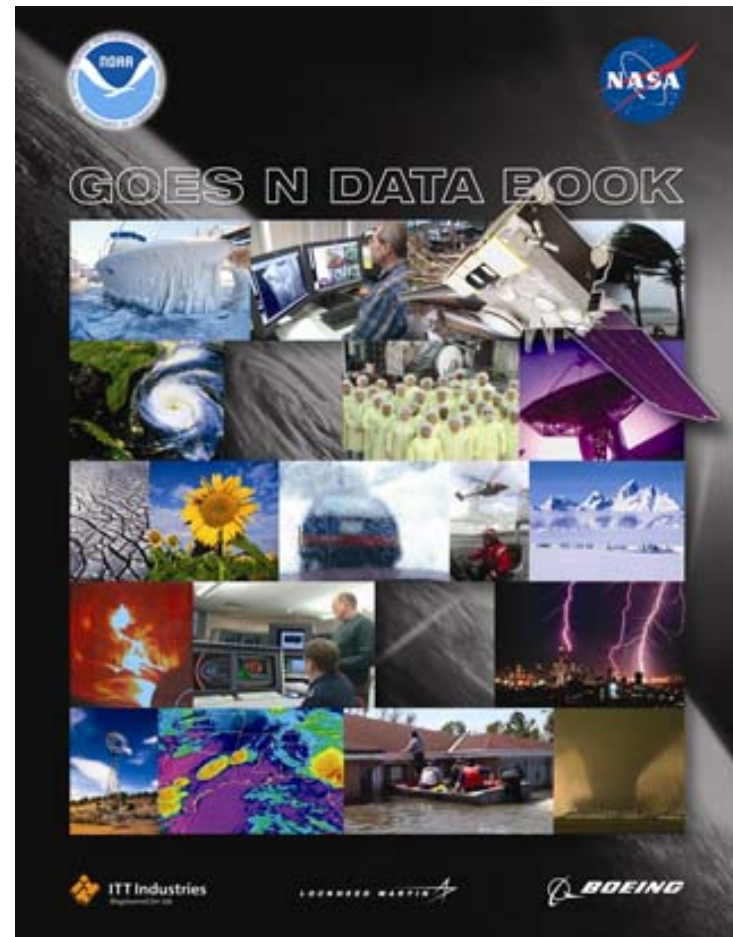
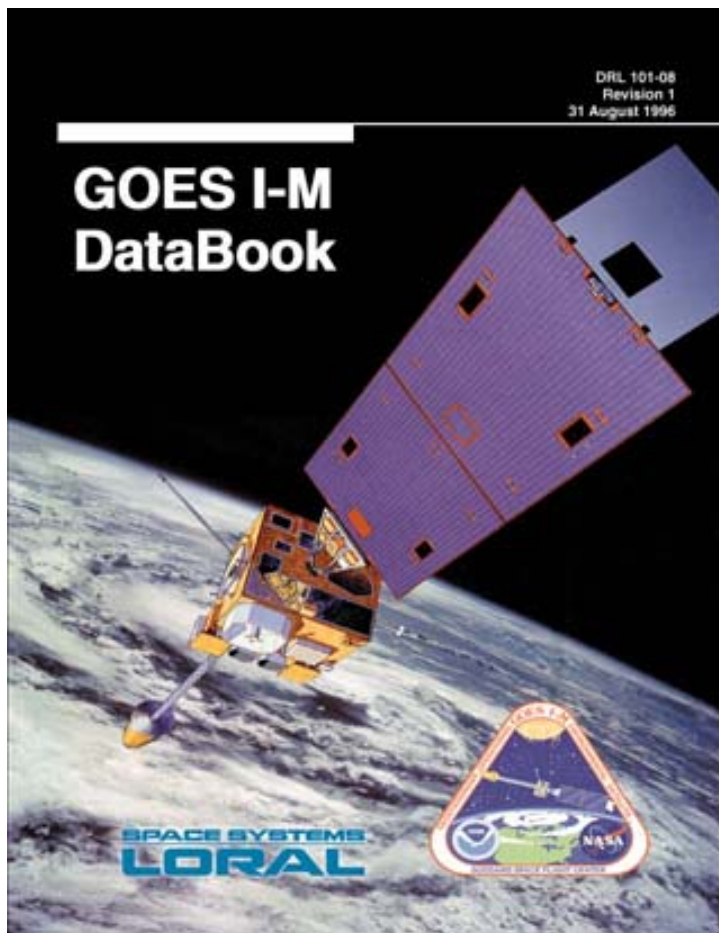
NOAA Tech Memos

- GOES-11
- GOES-12
 - http://rammb.cira.colostate.edu/research/calibration/goes_12_science_test_report.asp
- GOES-13 (#125)



GOES Databooks

- <http://goes.gsfc.nasa.gov/text/goes.databook.html>
- <http://goes.gsfc.nasa.gov/text/goes.databookn.html>





Half-size model of the GOES in the Air and Space Museum in Washington, DC

GOES-10 Overview

