GOES-R Proving Ground OCONUS Status Meeting University of Wisconsin – CIMSS

Wayne F. Feltz, Michael Pavolonis, Andrew Heidinger, Tim Schmit, Jordan Gerth, Scott Bachmeier, Justin Sieglaff, Lee Cronce, Cory Calvert, Kaba Bah, Kathy Strabala, and numerous other UW-CIMSS contributors

GOES-R Aviation AWG Co-Chair and UW-CIMSS GOES-R PG PI

GOES-R PG OCONUS Review 2011

Juneau, Alaska

UW-CIMSS and ASPB GOES-R Products Baseline & Option 2

Clouds (Chair: Andy Heidinger, NOAA)		
Product	**Lead Developer**	**Testbed**
Cloud Mask	Andy Heidinger (NOAA)	AAWU/HLT
Cloud Layers/Heights and Thickness/Temp	Andy Heidinger (NOAA)	AAWU/HLT/OPC
Cloud Phase and Type	Mike Pavolonis (NOAA)	AAWU/HLT/OPC
Land (Chair: Bob Yu, NOAA)		
Product	**Lead Developer**	
Fire	Chris Schmidt (CIMSS)	HWT
Soundings (Chair: Tim Schmit, NOAA)		
Product	**Lead Developer**	
Moisture/Temperature Profile/TPW	Jun Li (CIMSS)	HWT/PR
Winds (Chair: Jaime Daniels, NOAA)		
Product	**Lead Developer**	
Hurricane Intensity	Tim Olander (CIMSS) and Chris Velden (CIMSS	NHC/PR
Aviation (Chairs: Ken Pryor, NOAA and Wayne Feltz, CIMSS)		
Product	**Lead Developer**	
Volcanic Ash	Mike Pavolonis (NOAA)	AWC/AAWU/HLT/PR
Turbulence	Tony Wimmers (CIMSS)	AWC
Low Cloud and Fog	Mike Pavolonis (NOAA)	AWC/AAWU/HLT
SO2 Detection	Mike Pavolonis (NOAA)	AWC/AAWU/HLT/PR
Icing	Bill Smith Jr (NASA) - CIMSS provide N-AWIPS	AWC/HLT/AAWU
Convective Initiation	John Mecikalski (UAH), UWCI (CIMSS) used u	HWT/AWC/PR/AAWU
Overshooting Top Detection	Kris Bedka (NASA contractor)/Jason Brunner (	OPC/HWT/NHC
Imagery (Chair: Tim Schmit, NOAA)		
Product	**Lead Developer**	
Imagery	Tim Schmit (NOAA)	HWT/OPC/HPC

(11 GOES-R Proxy datasets of 34 UW-CIMSS AWG algorithms being demonstrated)

GOES-R Proving Ground

» Home » GOES-R Proving Ground

Resources

- Proving Ground Products List (Table)
  - CIMSS NOAA Testbed Support Products
  - CIRA Products
  - SPoRT
  - Air Quality (UMBC)
- Meetings and Presentations
- Teleconferences
- Proving Ground Partners
- GOES-R Advanced Baseline Imager (ABI) Bands
- GOES-R ABI Sample Product Table
- GOES-R ABI Weighting Function Examples

UW/CIMSS NOAA Proving Ground Testbed Decision Support Products

Description	Contact	Training	Quicklooks	Validation	Satellite Platform	Testbed	Forecaster Comments	Product Type	AWIPS Setup
Convective Initiation(UWCI)	Wayne Feltz	UWCI (Visit) UWCI (ppt)	Convective Decision Support	Convective Initiation Products	GOES Imager	HWT, AWC, PR	Link	Product Variant	Instructions
Overshooting Top (OTTC) and Enhanced-V	Wayne Feltz Kris Bedka	OTTC (PPT) OTTC and Enhanced-V (Visit)			GOES Imager, MODIS/AVHRR	HWT, HLT	Link	AWG Proxy	
WRF Simulated Radiances (ABI Simulated Radiances)	Justin Sieglaff	WRF (PDF)	WRF			HWT		Risk Reduction	
WildFire ABBA (WFABBA)	Chris Schmidt				GOES Imager	HWT		AWG Proxy	
NearCast	Ralph Petersen	UW NearCasting (VISIT)	NearCast		GOES Imager, GOES Sounder	HWT	Link	Risk Reduction	Instructions
Volcanic Ash	Mike Pavolonis	Ash (ppt) Ash (Visit)			MODIS, SEVIRI	AAWU, AWC, HLT, PR		AWG Proxy	Instructions
Low Clouds/Fog	Mike Pavolonis	Fog(Training) Quick Facts			MODIS-Alaska, GOES-CONUS	AAWU, AWC, HLT		AWG Proxy	
Cloud Type	Mike Pavolonis	TBD			MODIS-Alaska, GOES-CONUS	AAWU, HLT, OPC		AWG Proxy	See Contact
SO_2	Mike Pavolonis	TBD			MODIS	AAWU, AWC		AWG Proxy	See Contact

Testbed Legend

http://cimss.ssec.wisc.edu/goes_r/proving-ground/SPC/SPC.html

UW/CIMSS Tropical Proving Ground Decision Support Products for the National Hurricane Center

Description	Contact	Training	Data Page	Validation	Satellite Platform	Product Type
Tropical Overshooting Tops	Sarah Monette	TOT	Tropical Overshooting Tops		SEVIRI	AWG Proxy
Hurricane Intensity Estimation (HIE)	Tim Olander		HIE		SEVIRI	AWG Proxy

UW-CIMSS OCONUS GOES-R PG Plan Decision Support Status

- Baseline Products :
  - **Cloud and Moisture Imagery (Alaska, HLT) - Feltz**
  - **Total Precipitable Water (PR, Hawaii NWS) - Feltz**
  - **Volcanic Ash: detection & Height (Alaska, HLT, PR, Hawaii NWS) - Pavolonis**
  - **Cloud Typing (Alaska, HLT) - Pavolonis**
  - **Cloud Height (Alaska, HLT) - Heidinger**
- Option 2 Products:
  - **Convective Initiation (PR, Hawaii NWS) - Feltz**
  - **Low Cloud and Fog (Alaska, HLT) - Pavolonis**
  - **SO_2 Detection (Alaska, HLT, PR, Hawaii NWS) - Pavolonis**

Imagery

- Remapped imagery; on a CIMSS Satellite blog
http://cimss.ssec.wisc.edu/goes/blog/archives/7527

- GOES-R ABI WES

- GOES-15 transition

- GOES-R Scan strategy?

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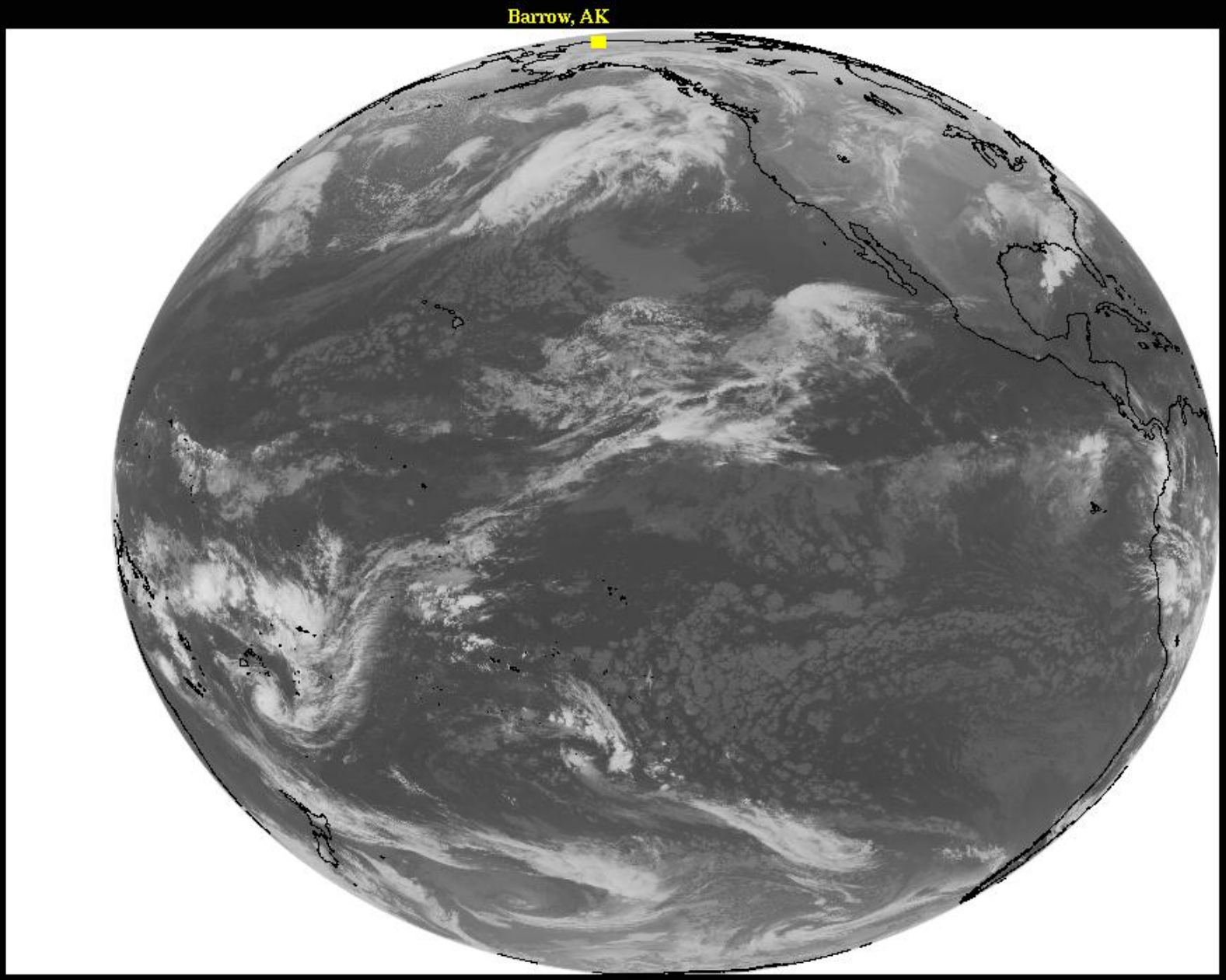
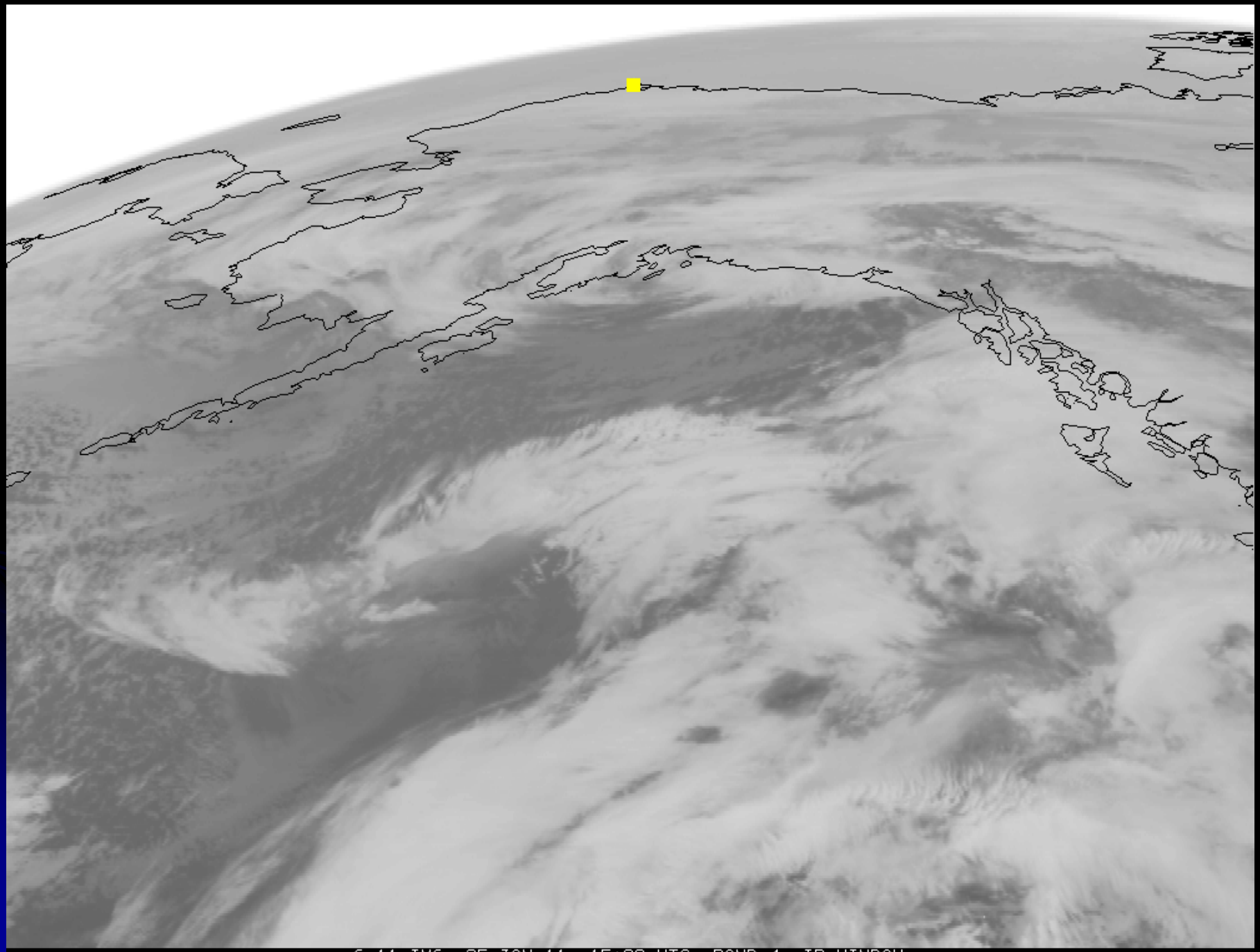


G-11 IMG 25 JAN 11 15:00 UTC BAND=4 IR-WINDOW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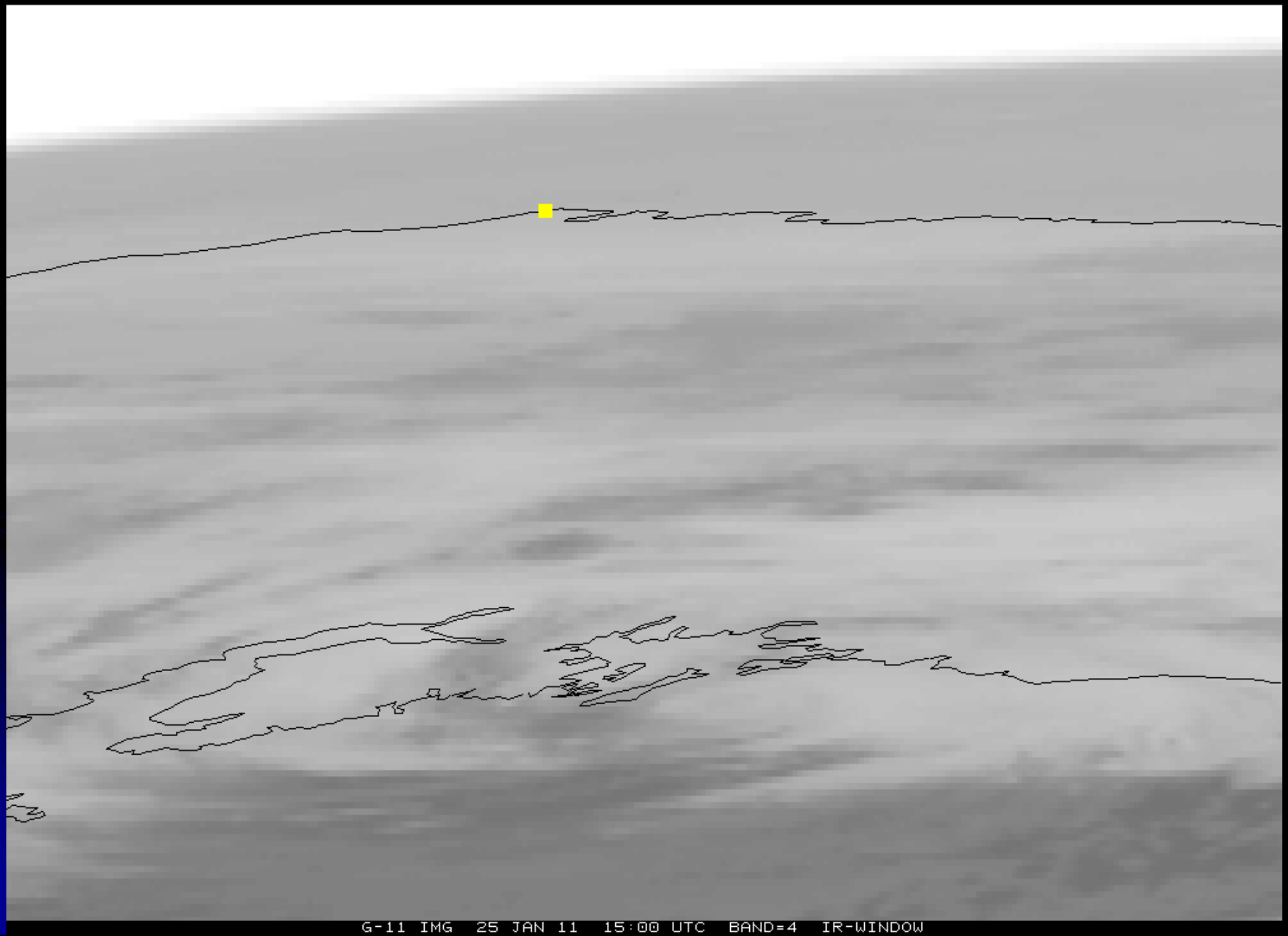
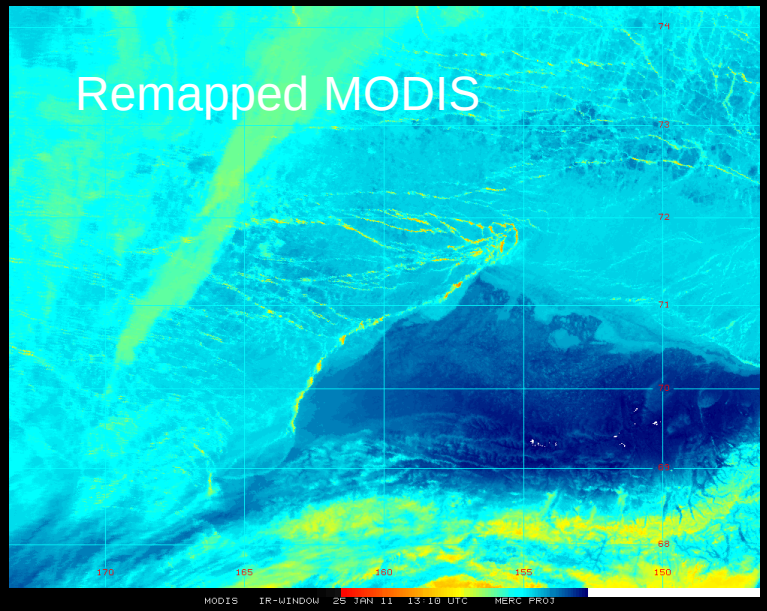
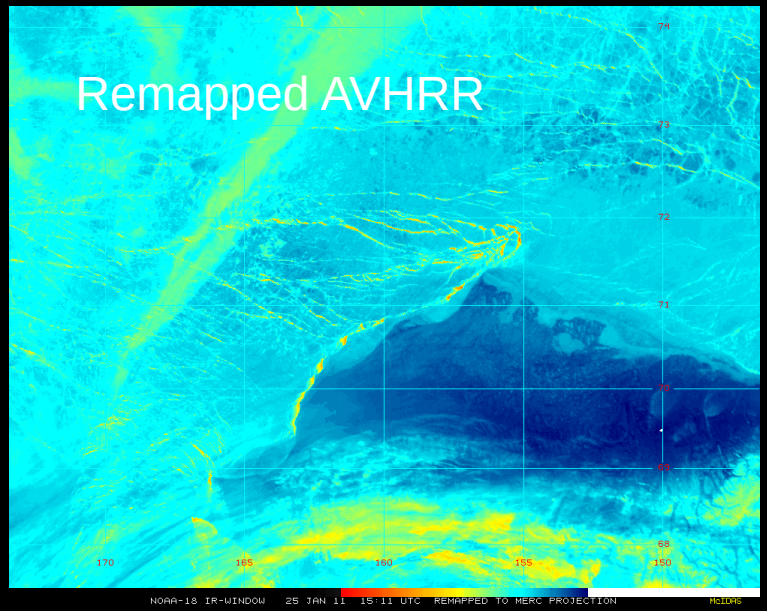
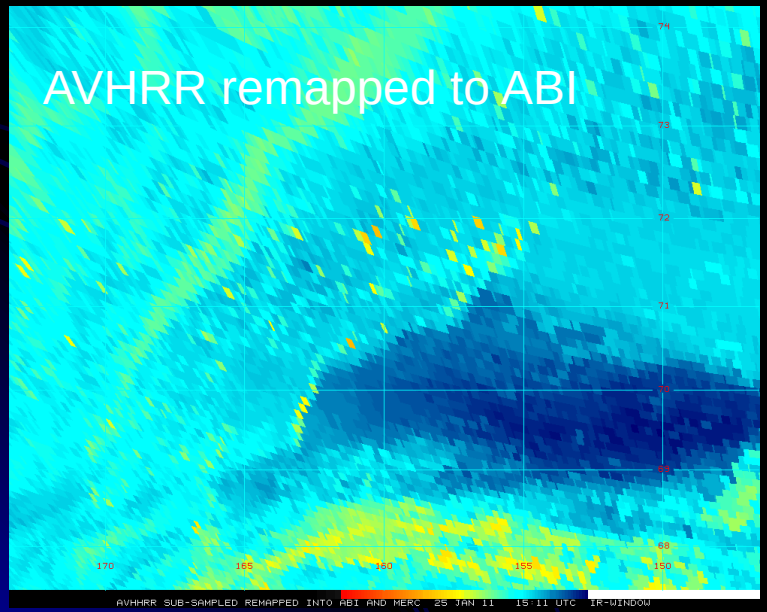
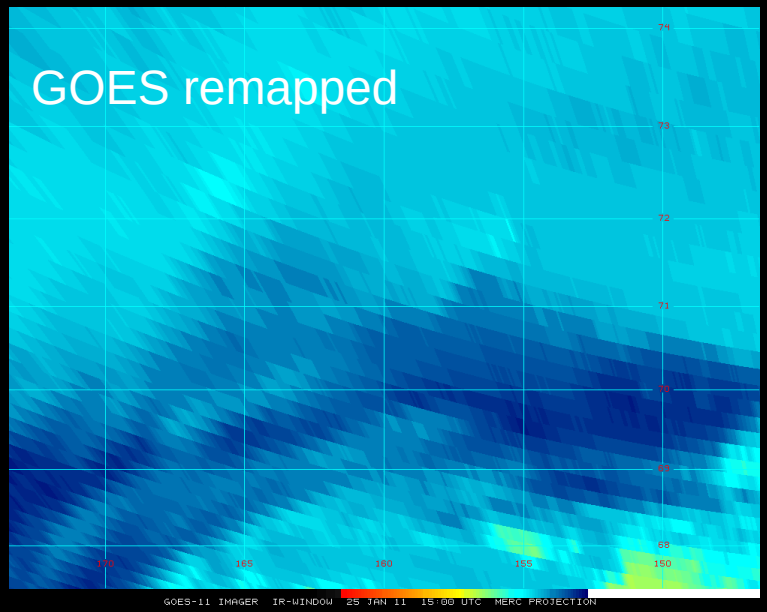

G-11 IMG 25 JAN 11 15:00 UTC BAND=4 IR-WINDOW

Imagery near Barrow, AK









http://cimss.ssec.wisc.edu/goes/blog/archives/7527

Imagery

- Remapped imagery; on a CIMSS Satellite blog
http://cimss.ssec.wisc.edu/goes/blog/archives/7527

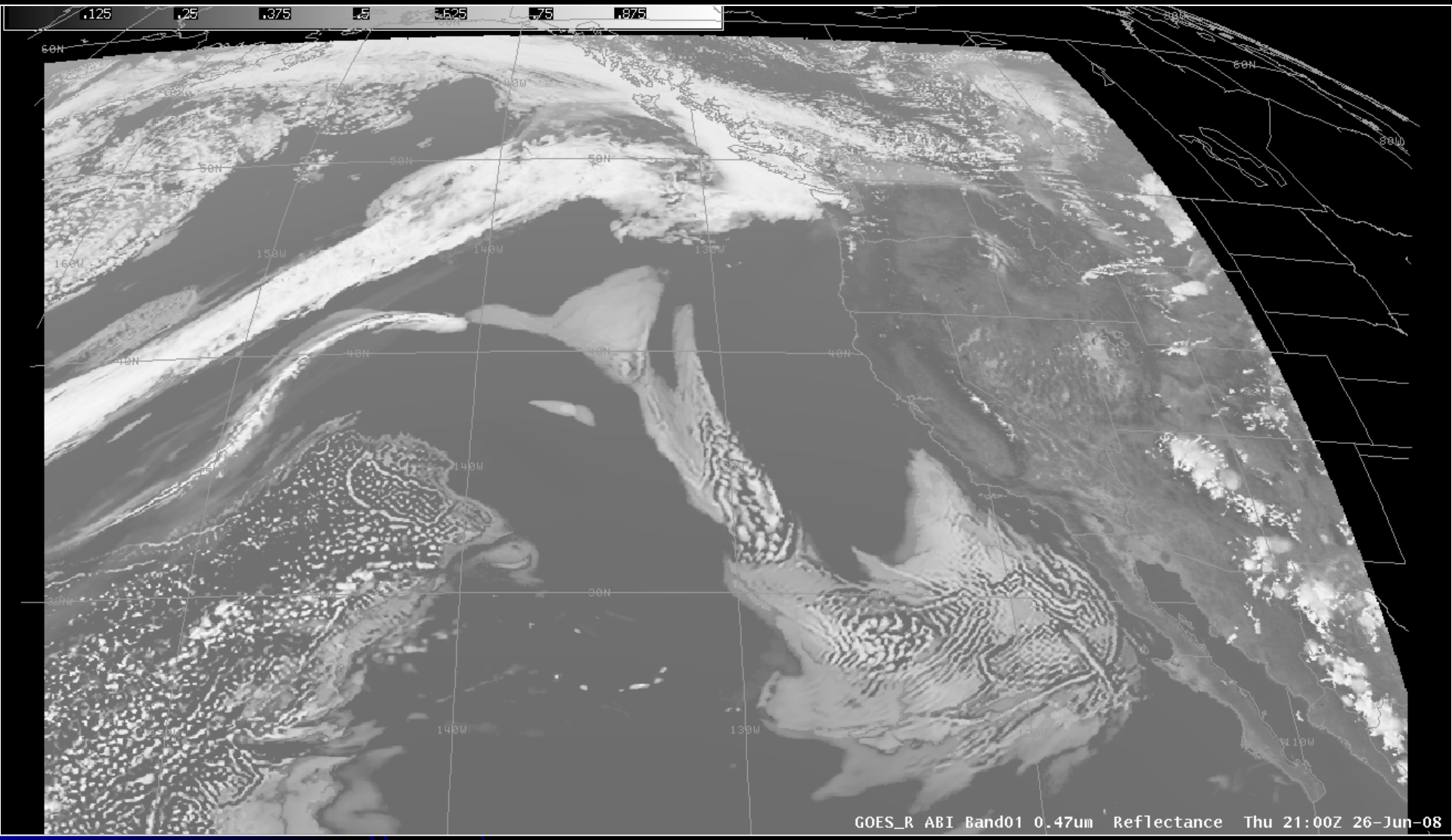
- GOES-R ABI WES

- GOES-15 transition

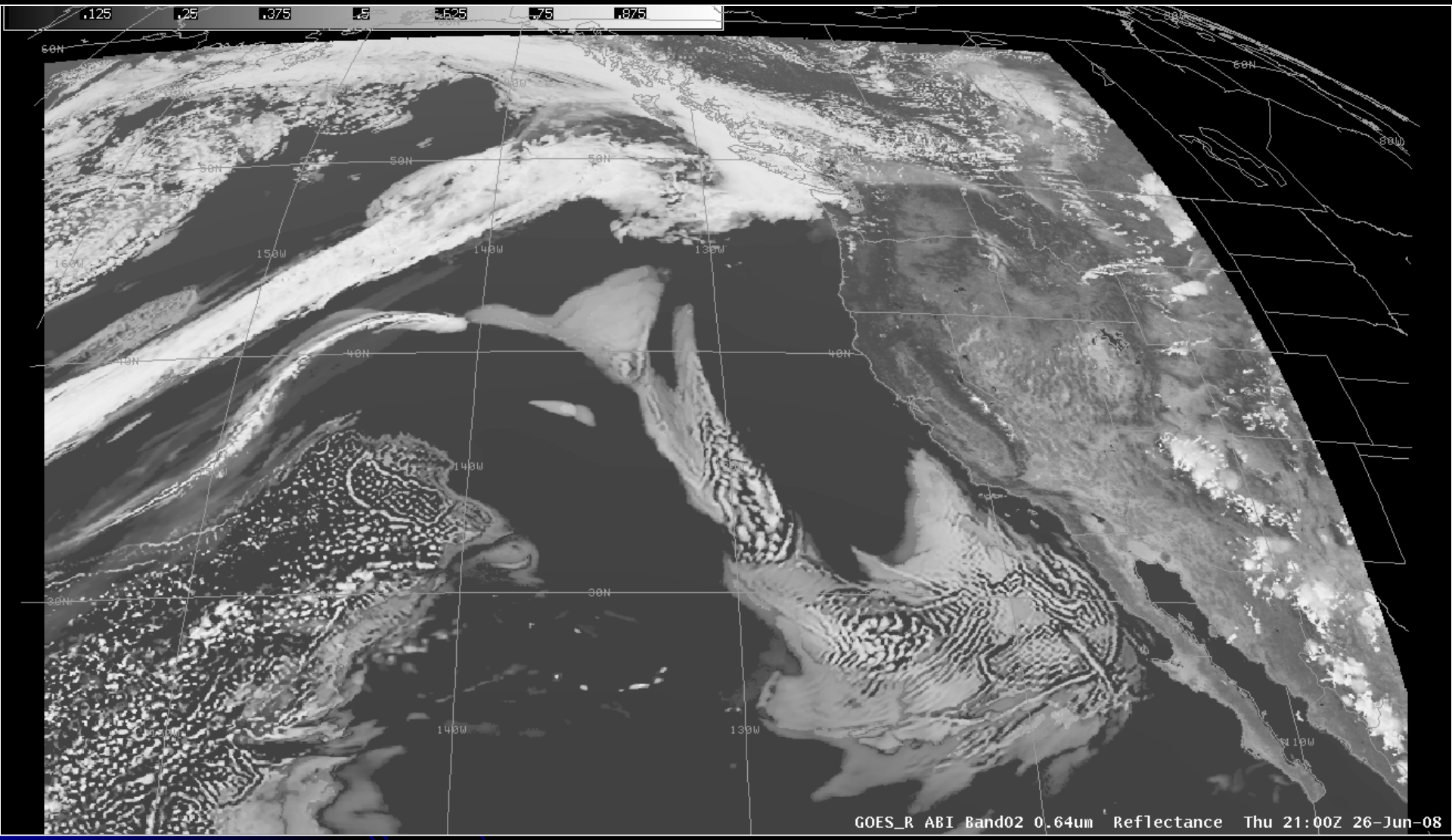
- GOES-R Scan strategy?

GOES-R ABI WES Case

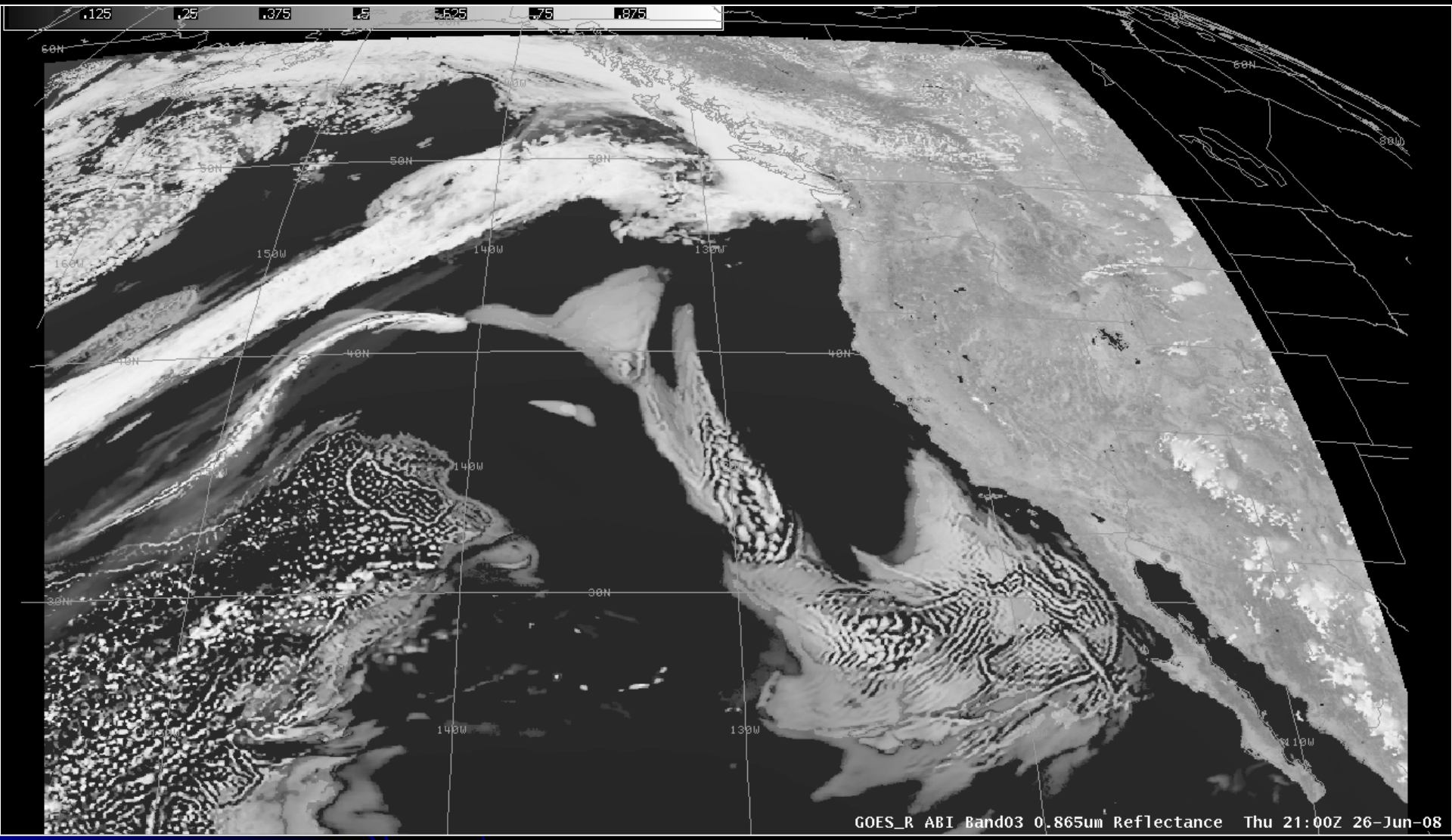
- A version is available with simulated ABI data
- Added simulated data over the Pacific Ocean.
- Updated WES guide
- Have inquired about eventual steps for converting case into AWIPS II compliant format.



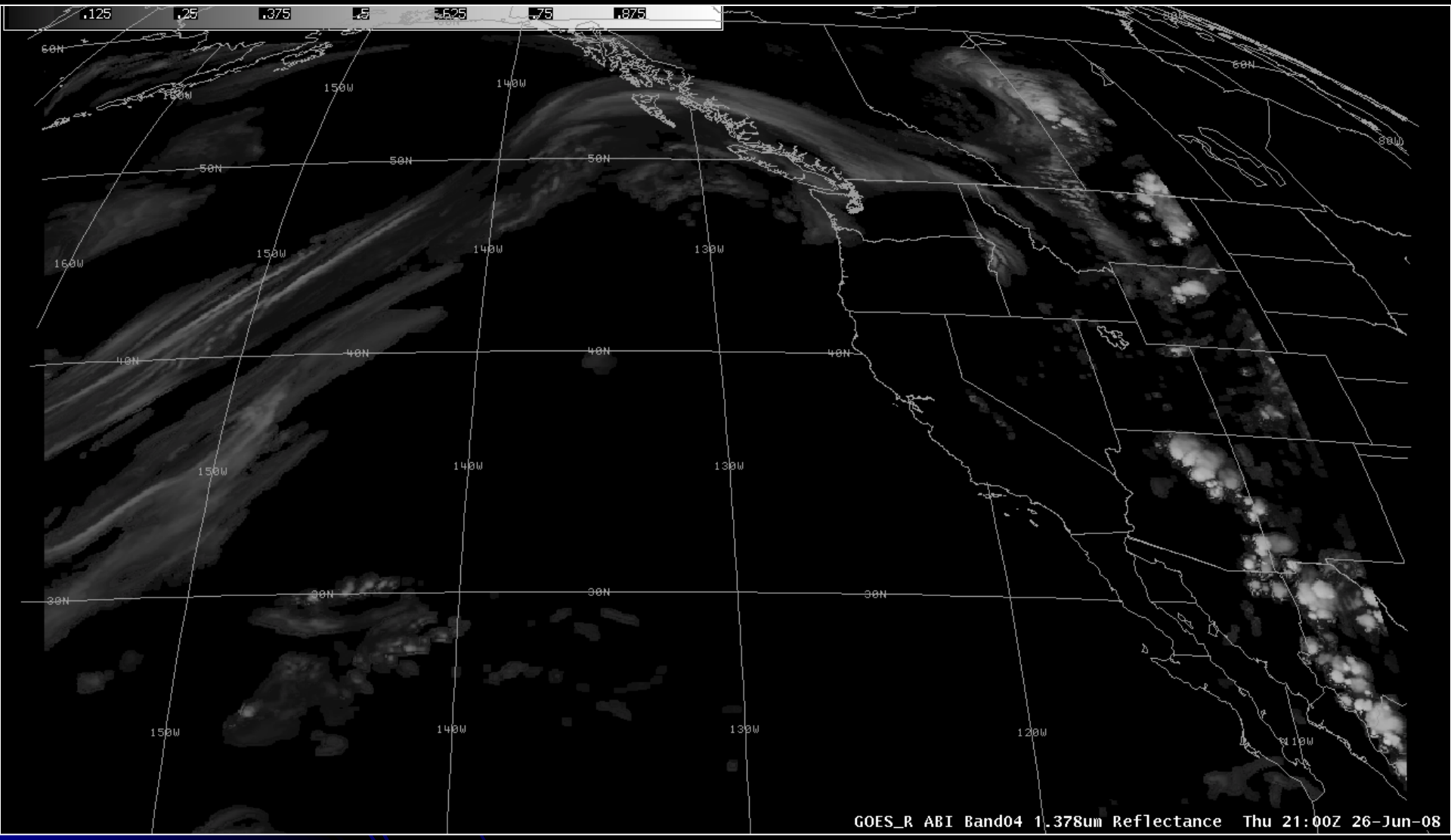
ABI Band 1 (0.47 um)



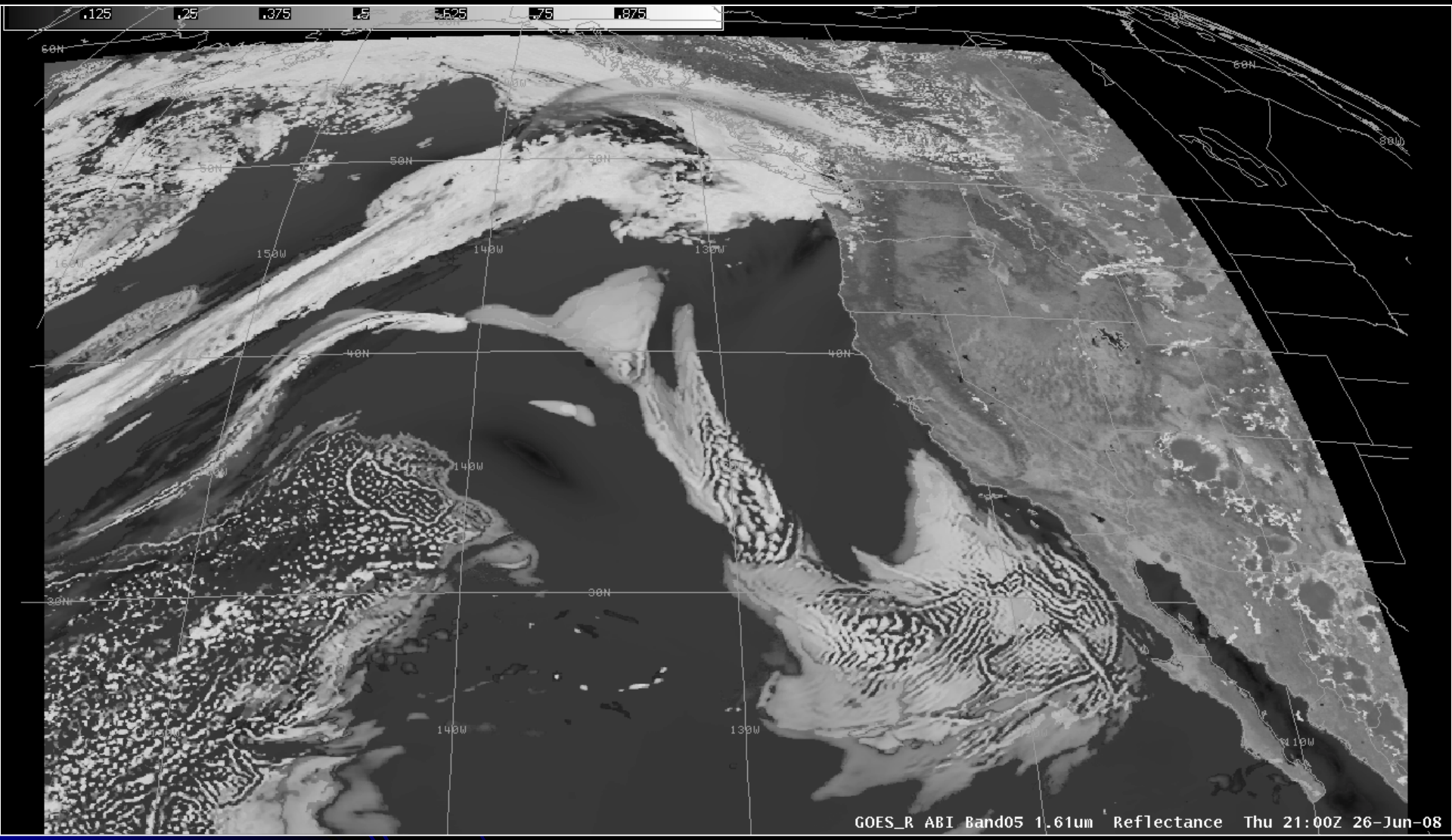
ABI Band 2 (0.64 um)



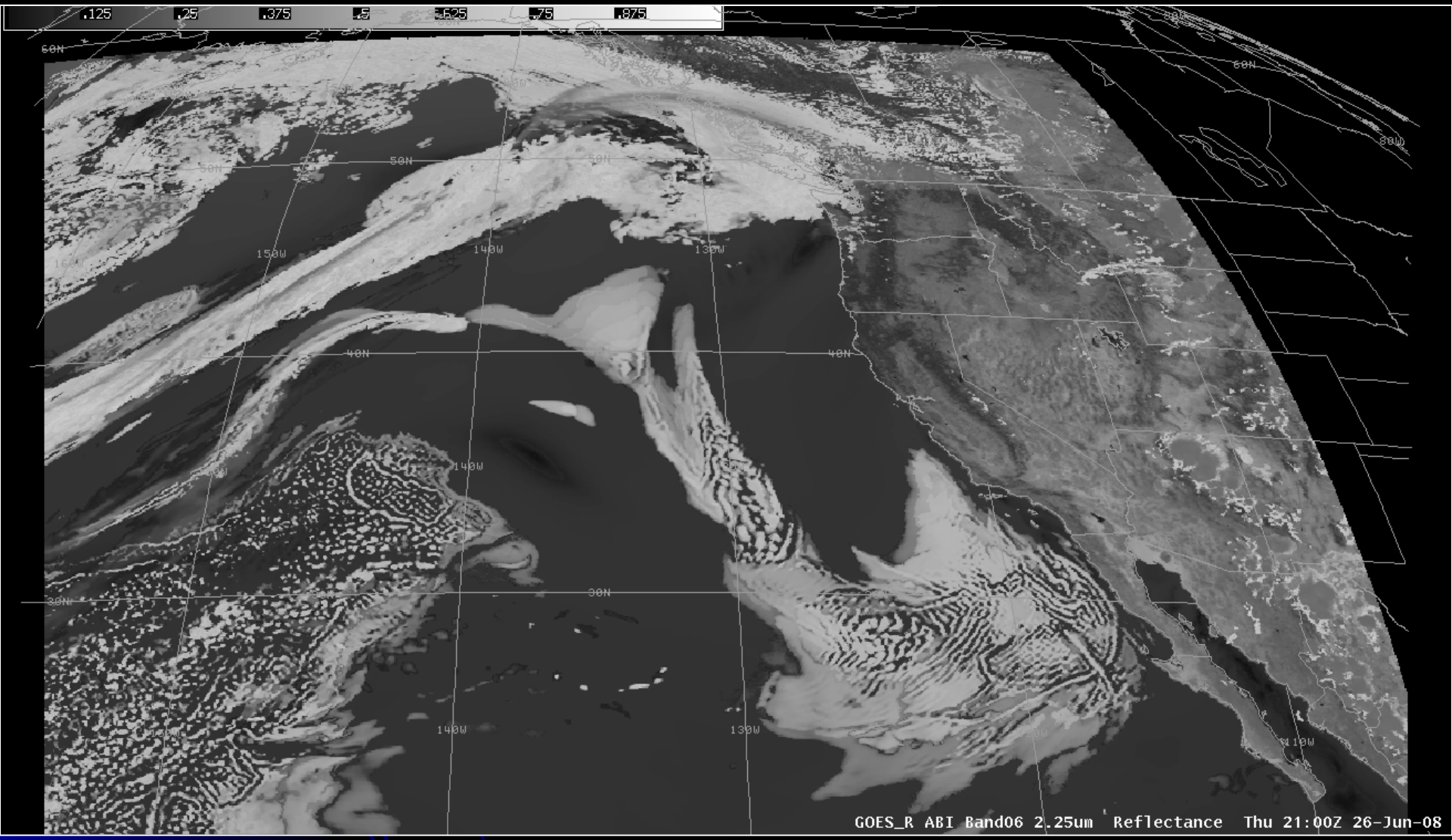
ABI Band 3 (0.86 um)



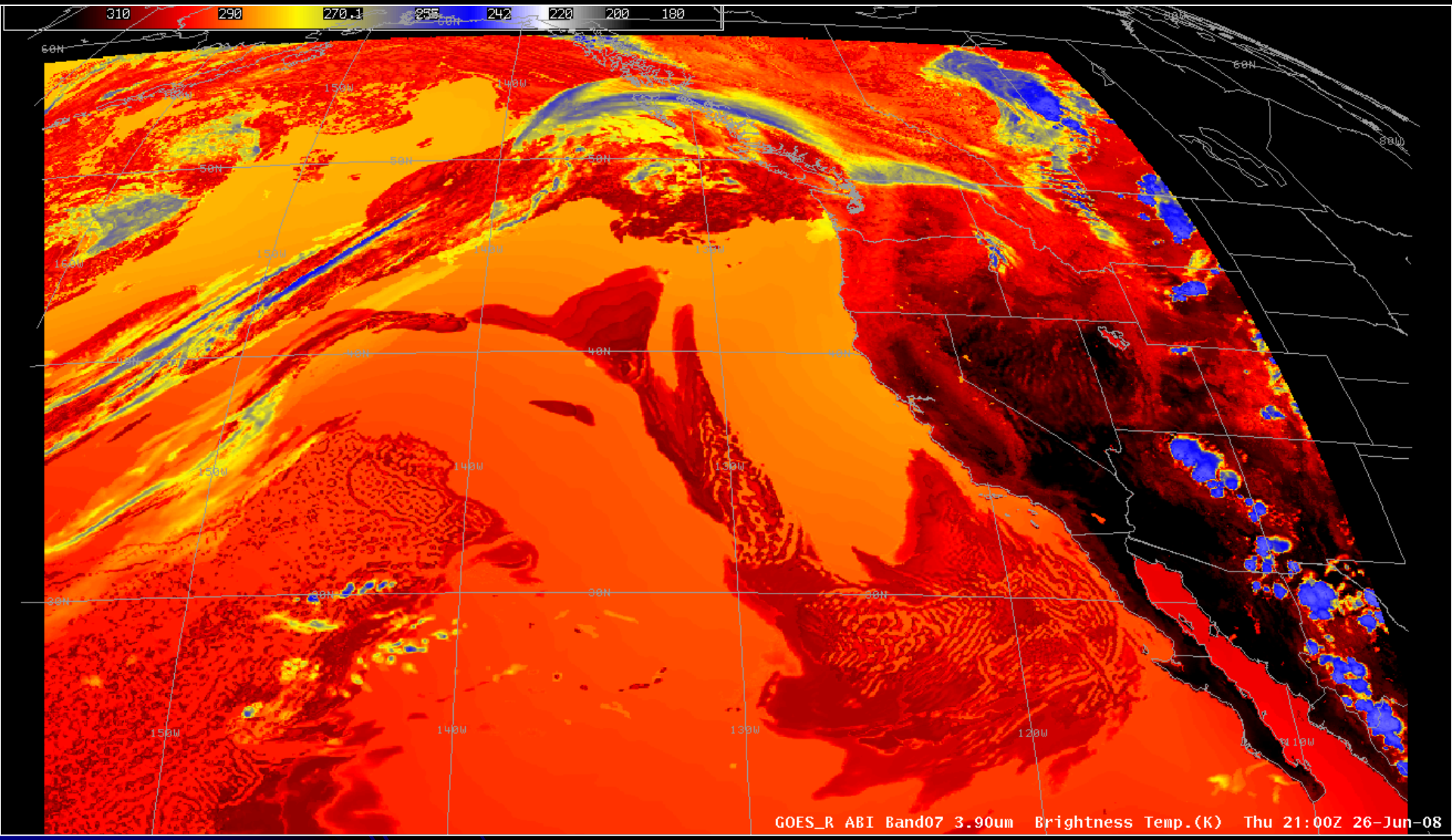
ABI Band 4 (1.38 um)



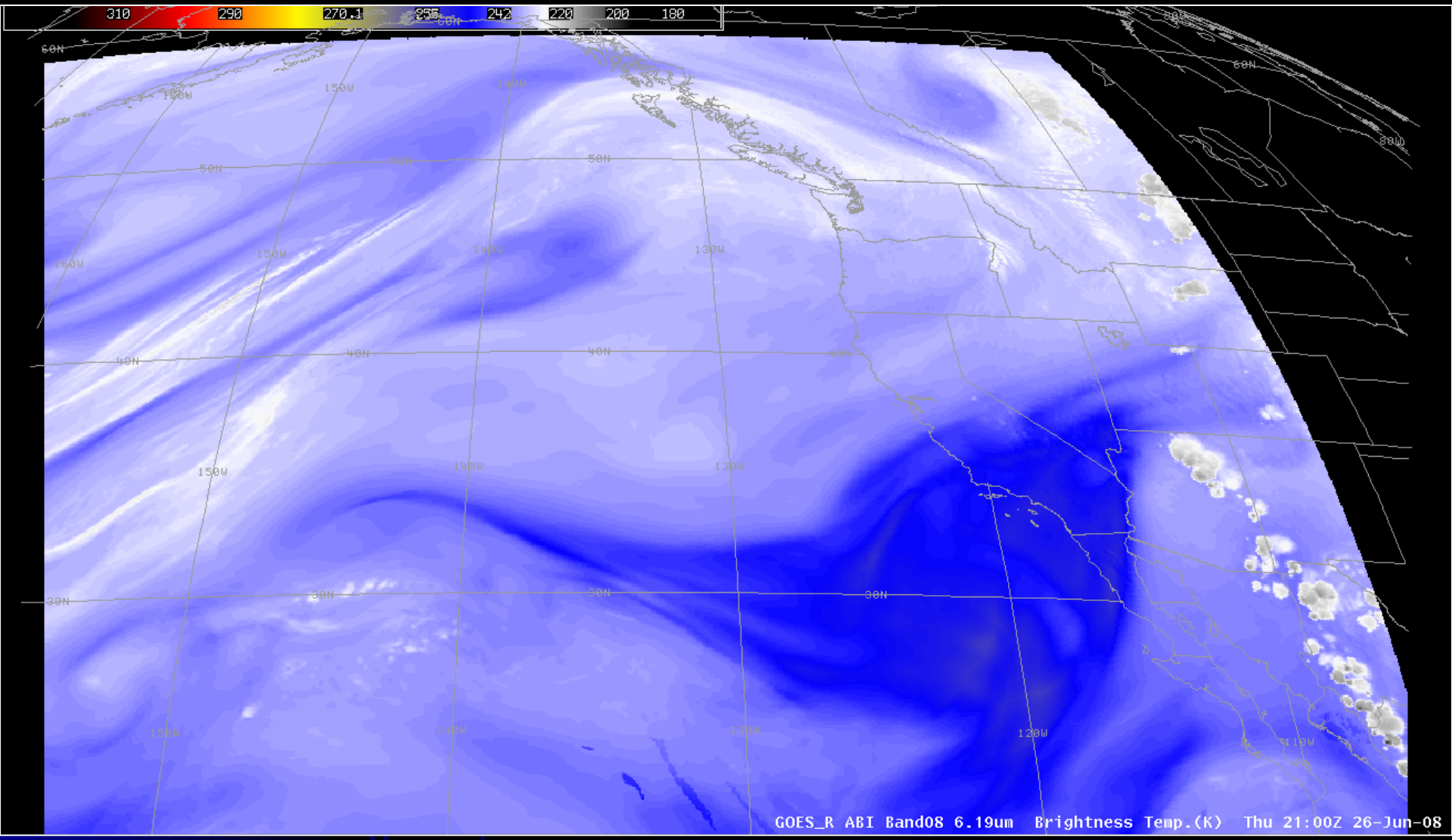
ABI Band 5 (1.6 um)



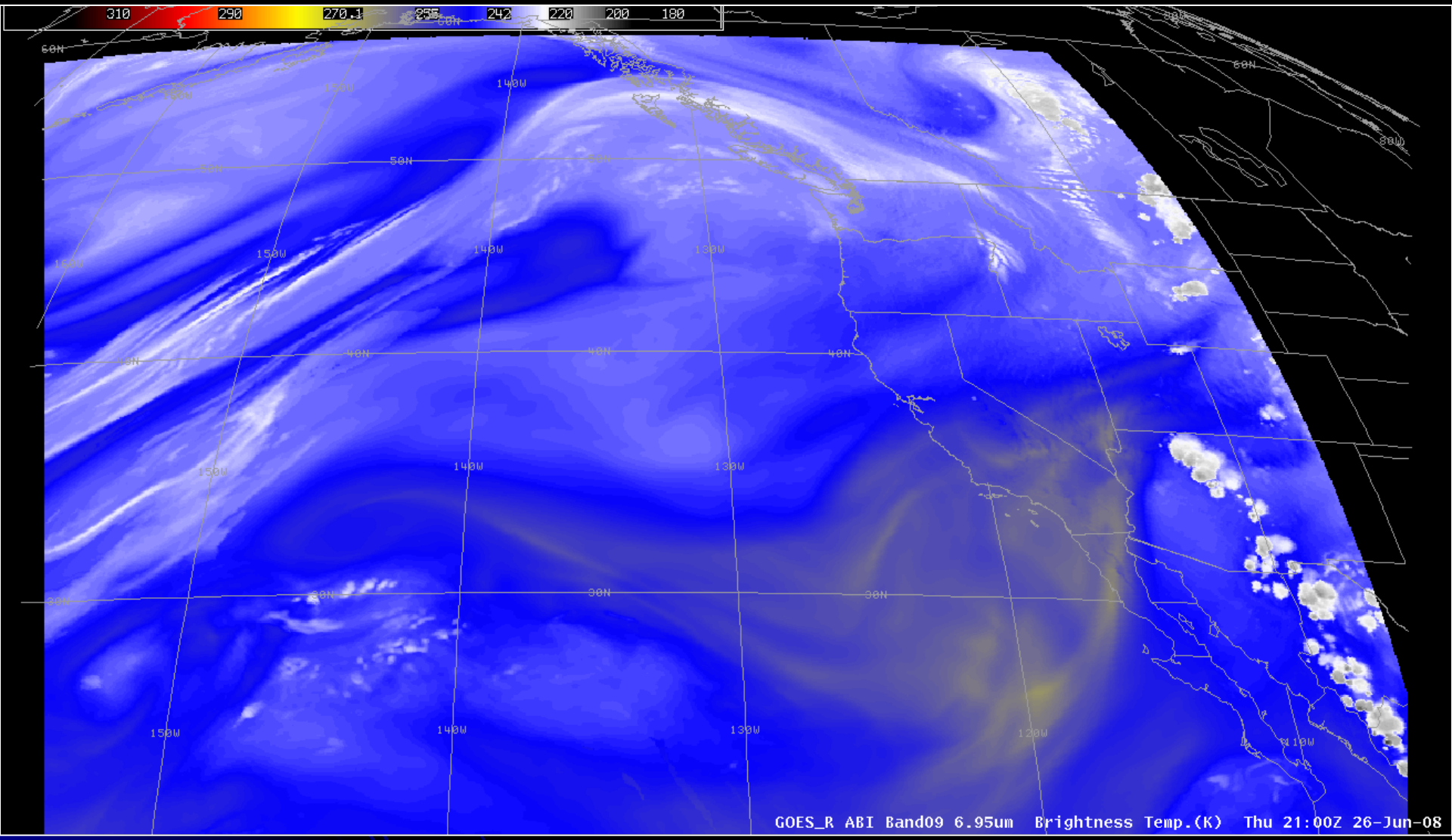
ABI Band 6 (2.25 um)



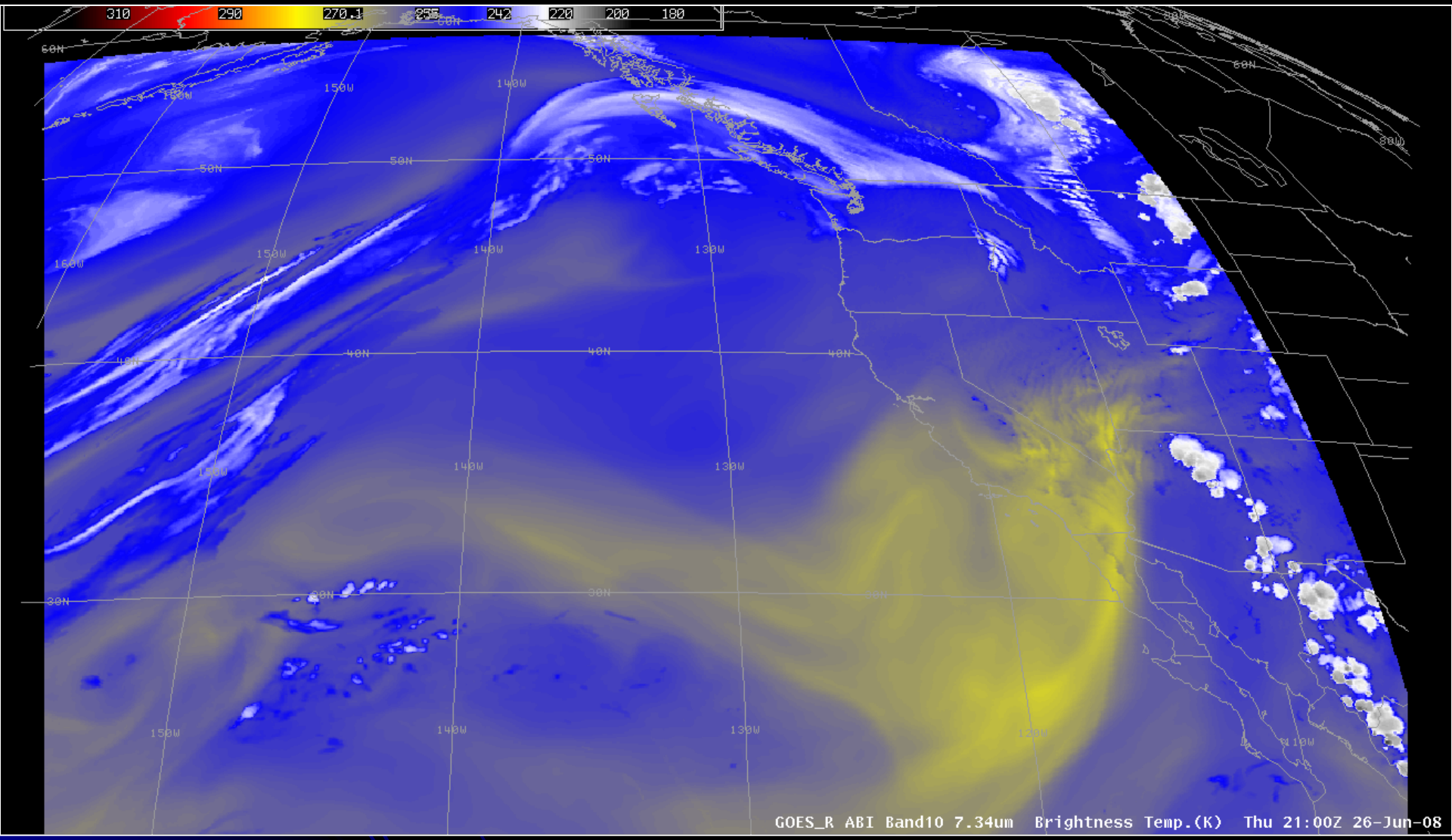
ABI Band 7 (3.9 um)



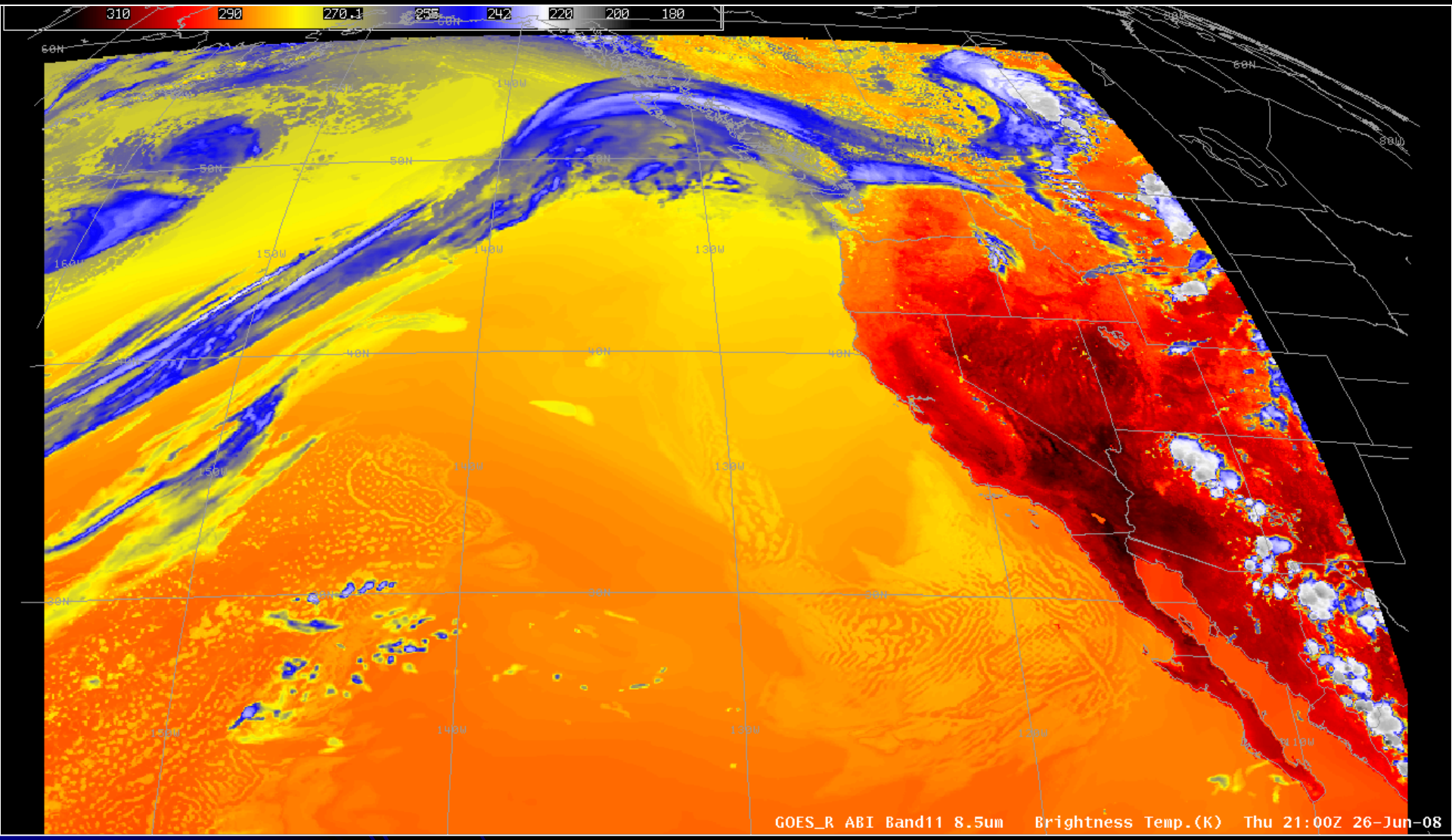
ABI Band 8 (6.2 um)



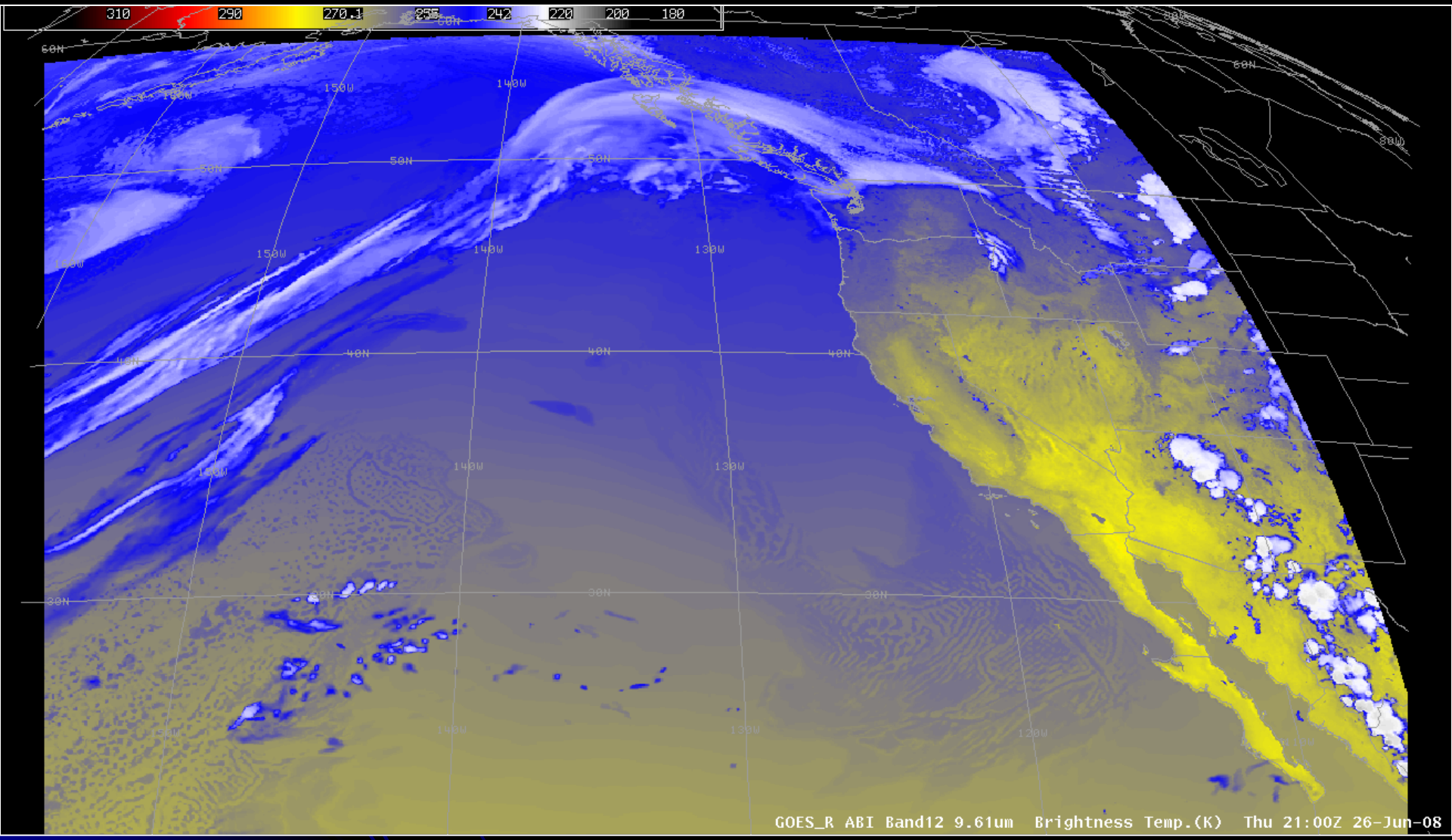
ABI Band 9 (7.0 um)



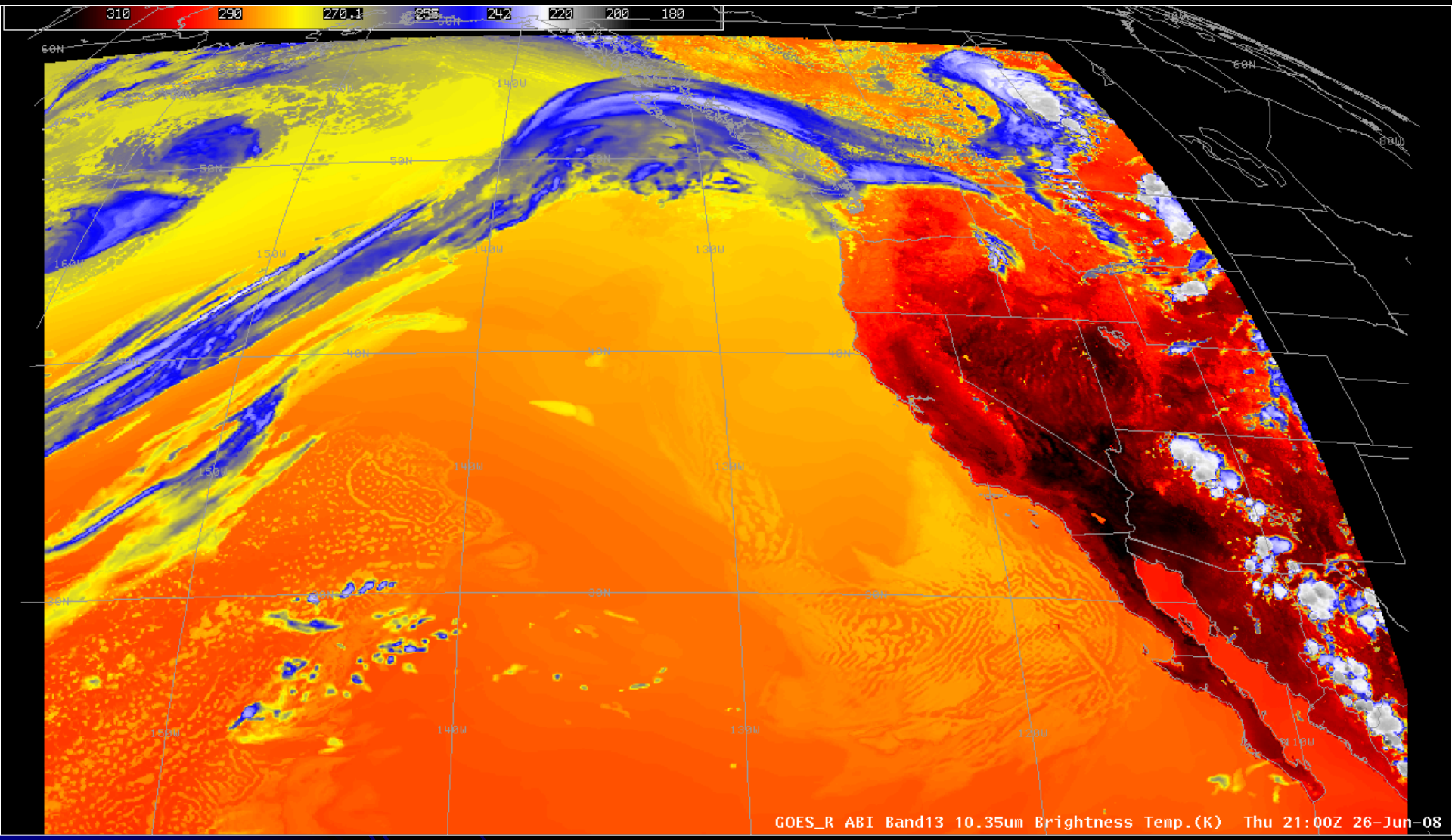
ABI Band 10 (7.34 um)



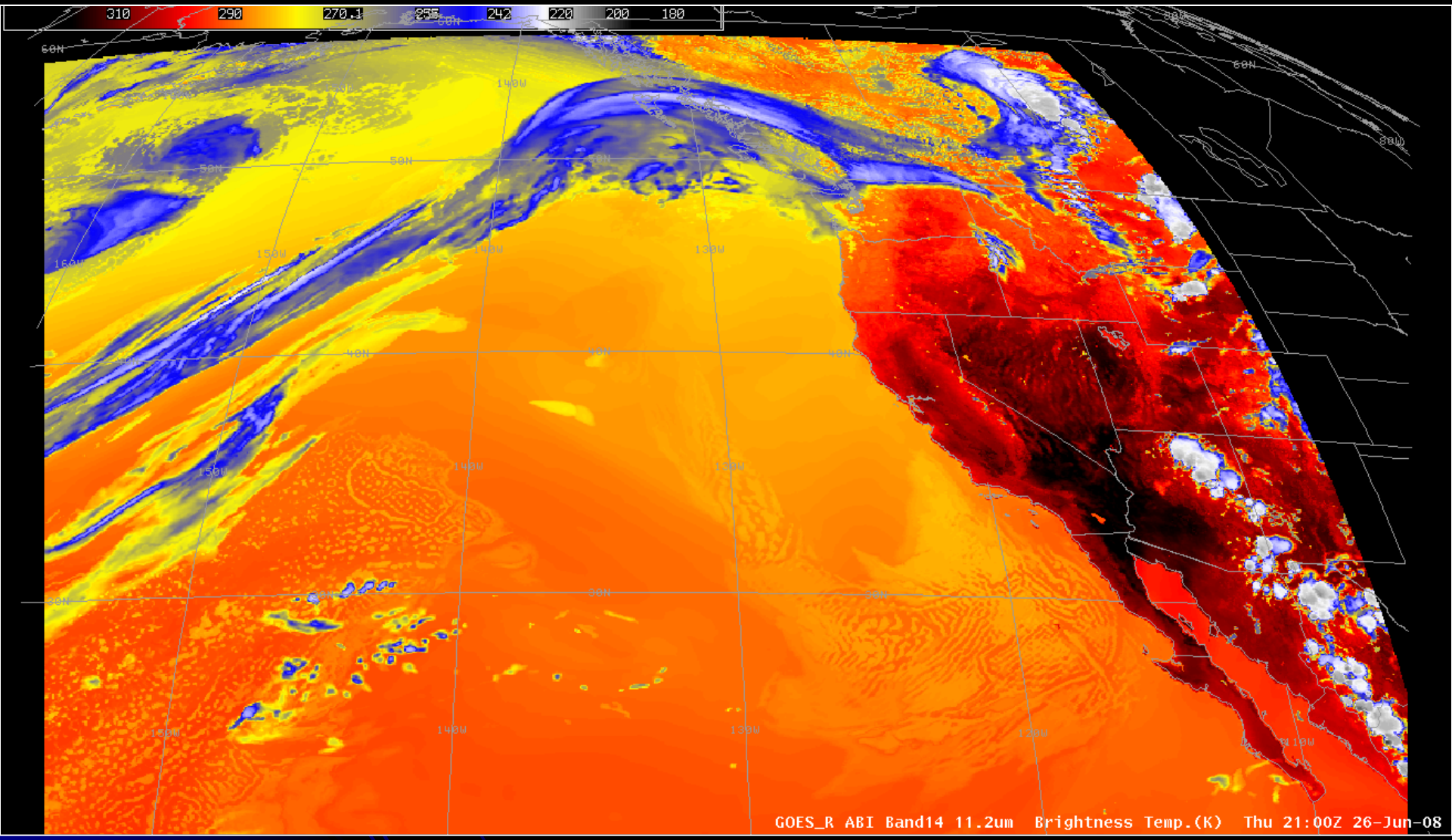
ABI Band 11 (8.5 um)



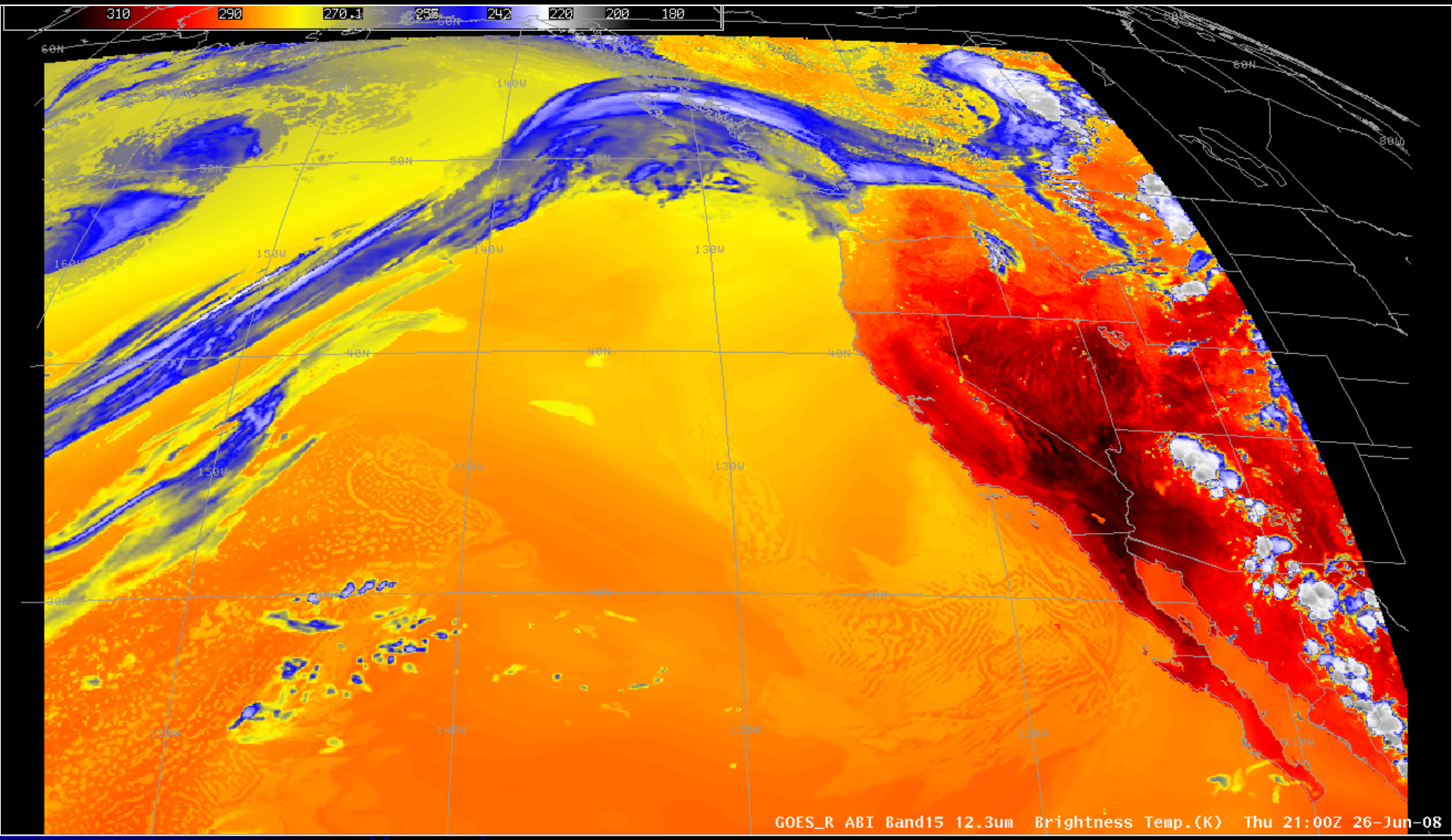
ABI Band 12 (9.6 um)



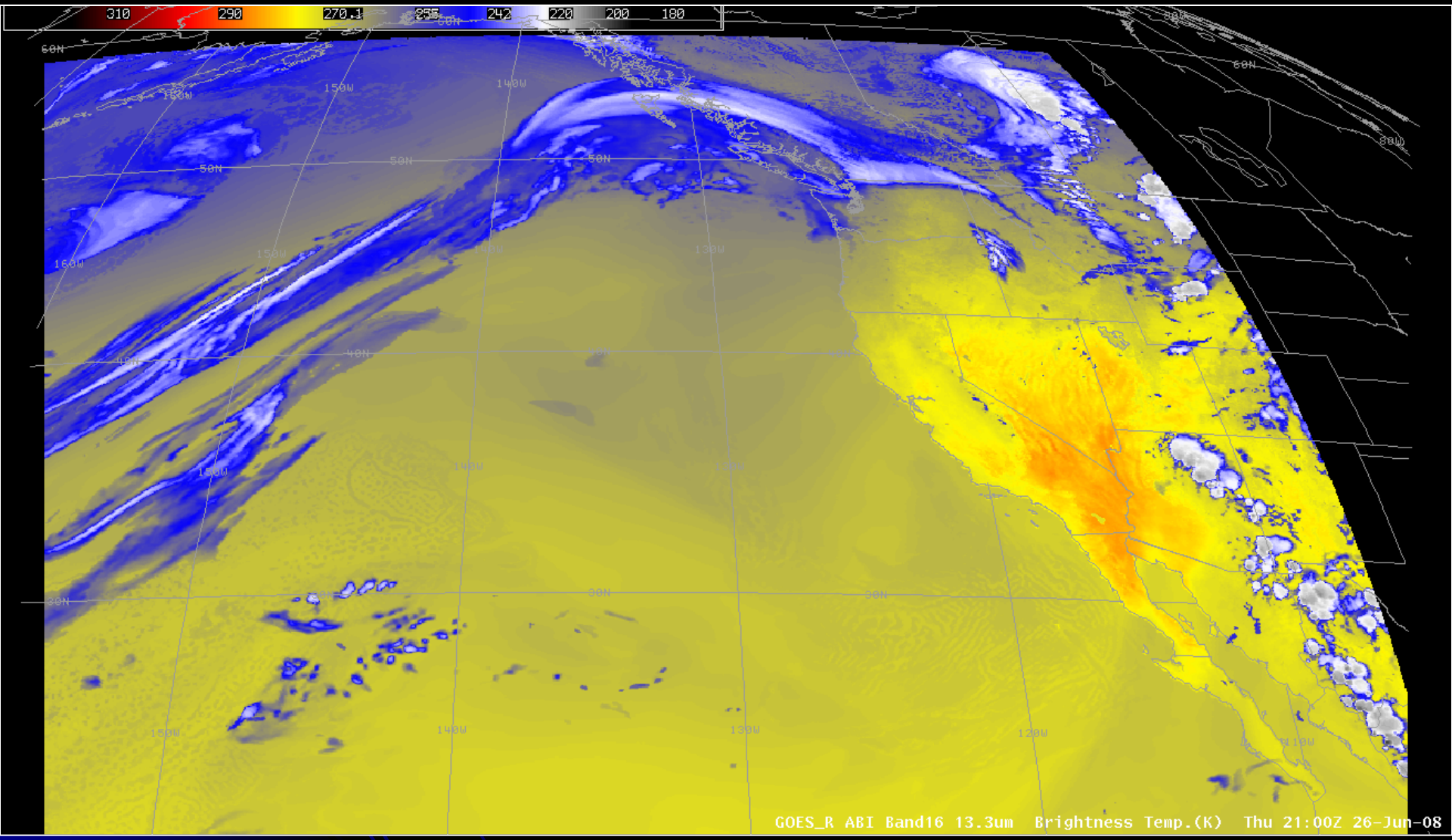
ABI Band 13 (10.35 um)



ABI Band 14 (11.2 um)



ABI Band 15 (12.3 um)



ABI Band 16 (13.3 um)

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, insolation, 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

Schmit et al, 2005

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

Schmit et al, 2005

Imagery

- Remapped imagery; on a CIMSS Satellite blog
http://cimss.ssec.wisc.edu/goes/blog/archives/7527

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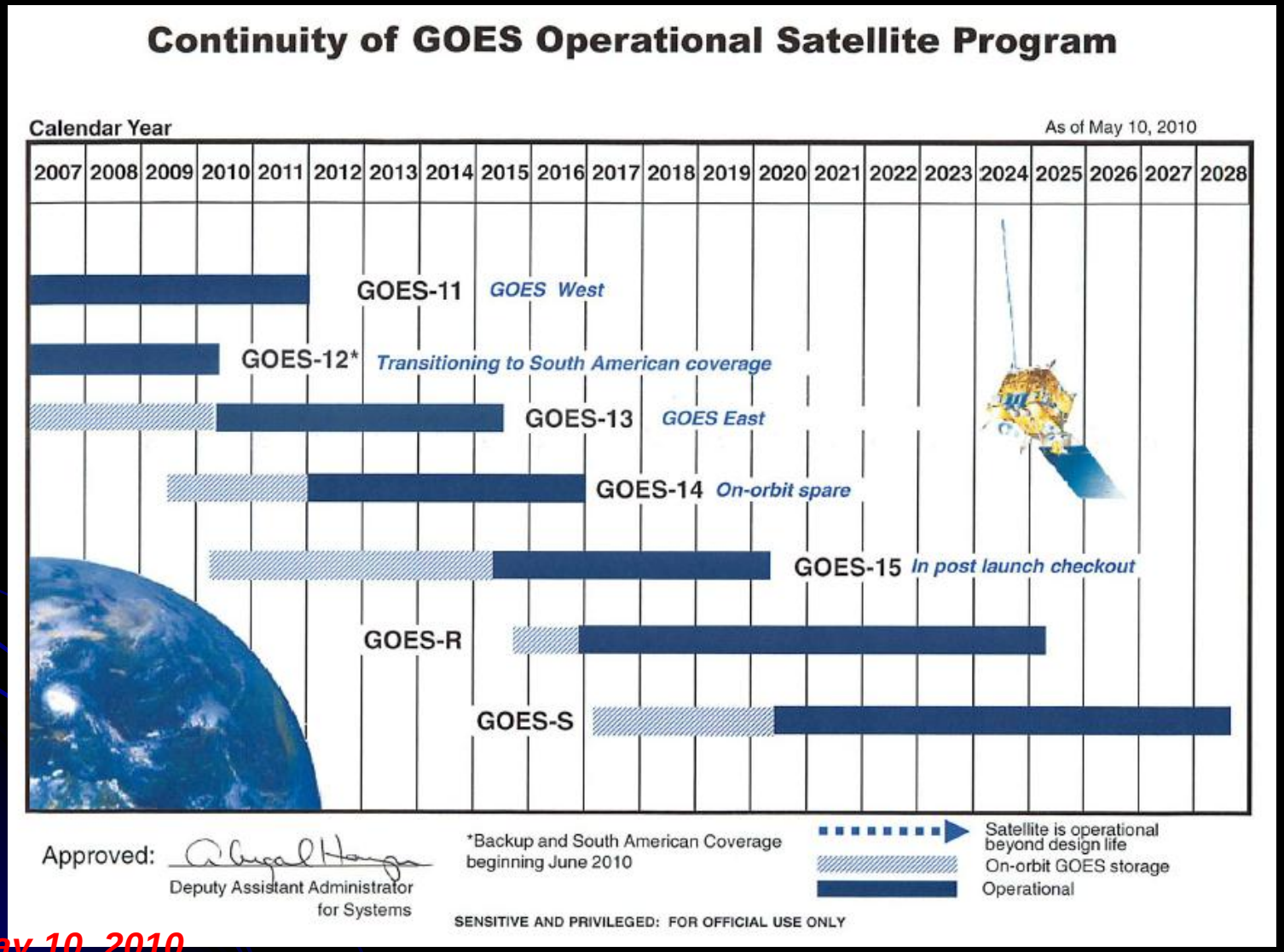
- GOES-R Scan strategy?

Operational GOES Updates

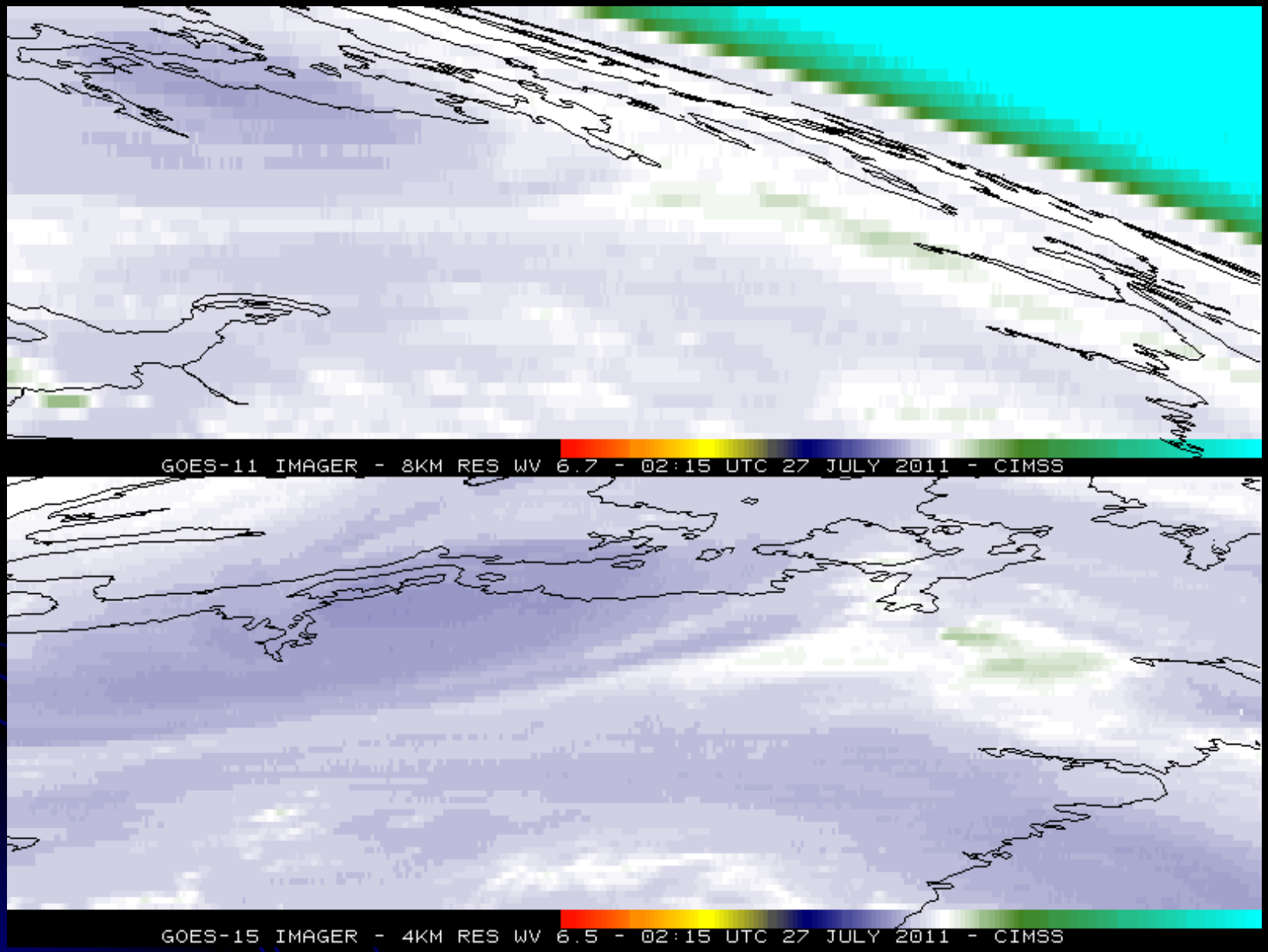


As of May 10, 2010

http://

GOES-11 to GOES-15

- Newer spacecraft design
- Less noisy data
- Spectrally modified imager band 3
  - ‘water vapor’
- Improved imager band 6 (13.3 um) spatial resolution
  - Modified GVAR format
- No 12 um band on Imager
- Improved INR and Operation thru eclipse
- Tentatively scheduled for December 2011



Improved spatial resolution of GOES-15 Imager band 6
(Loop from Today)

Imagery

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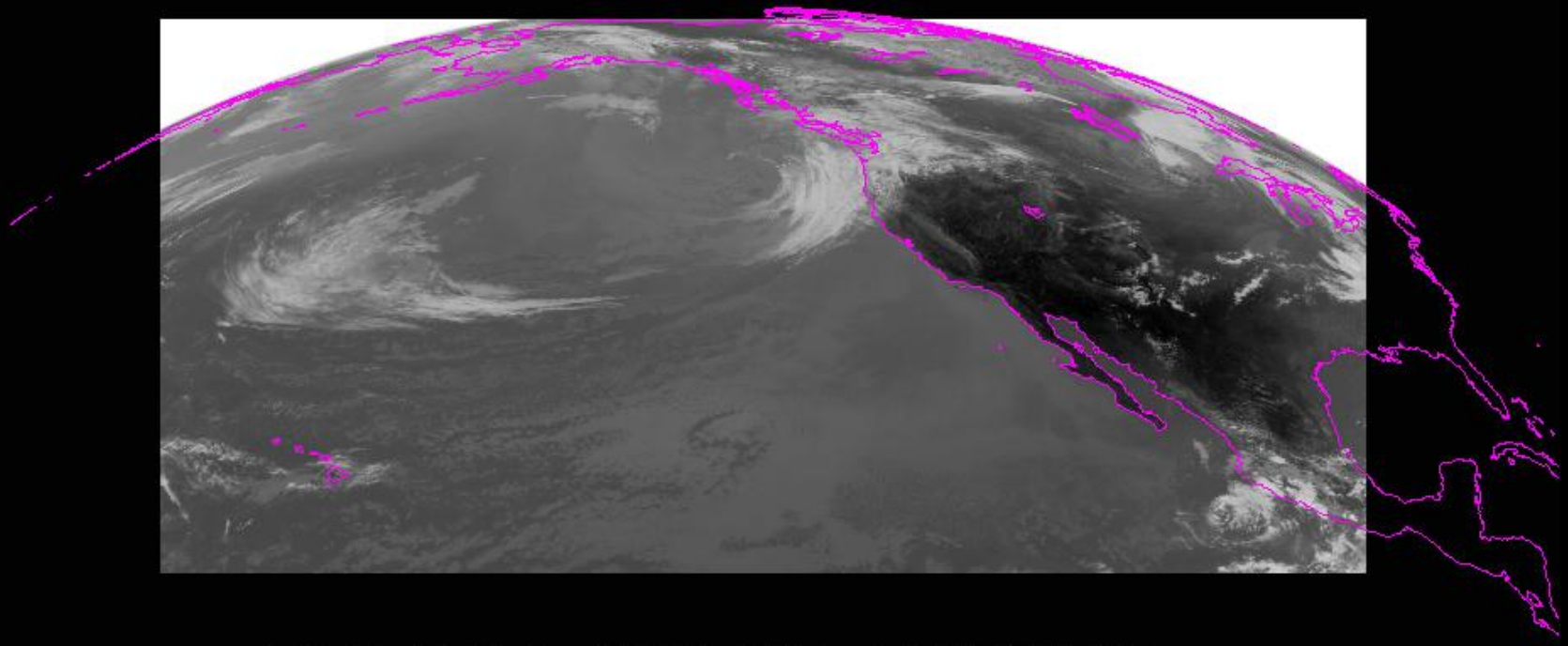
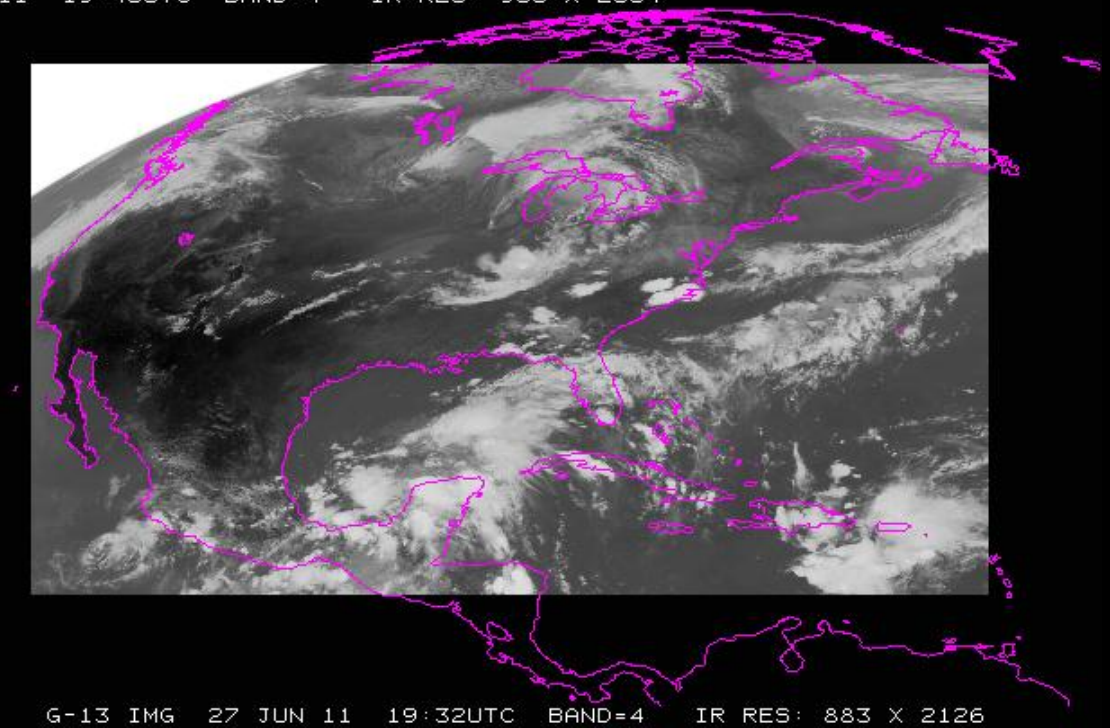
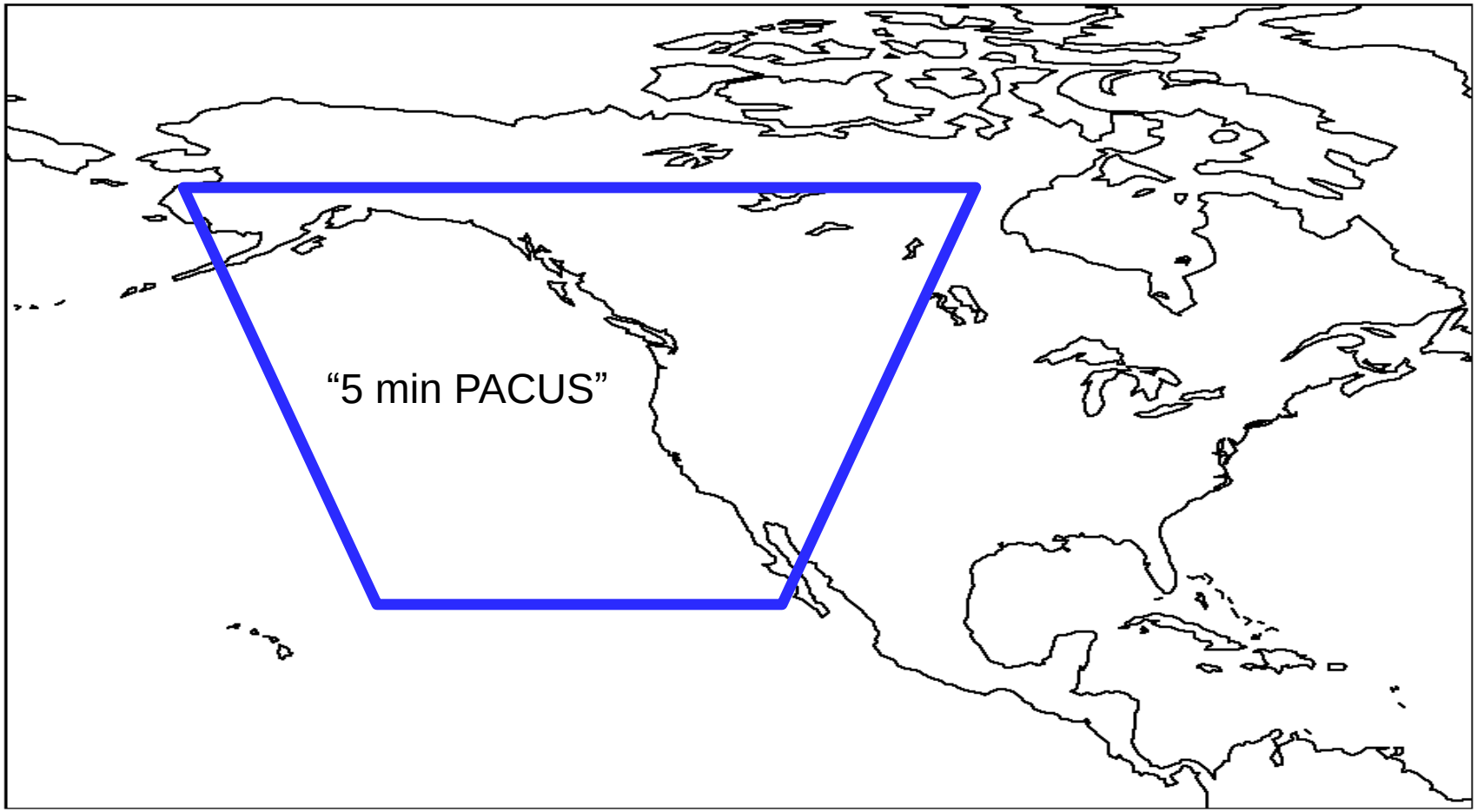


Current GOES Imager scans: PACUS and CONUS (note that PACUS is one-third larger). These regions are sub-selected for AWIPS.



Proposed –Shifted "5 min PACUS"



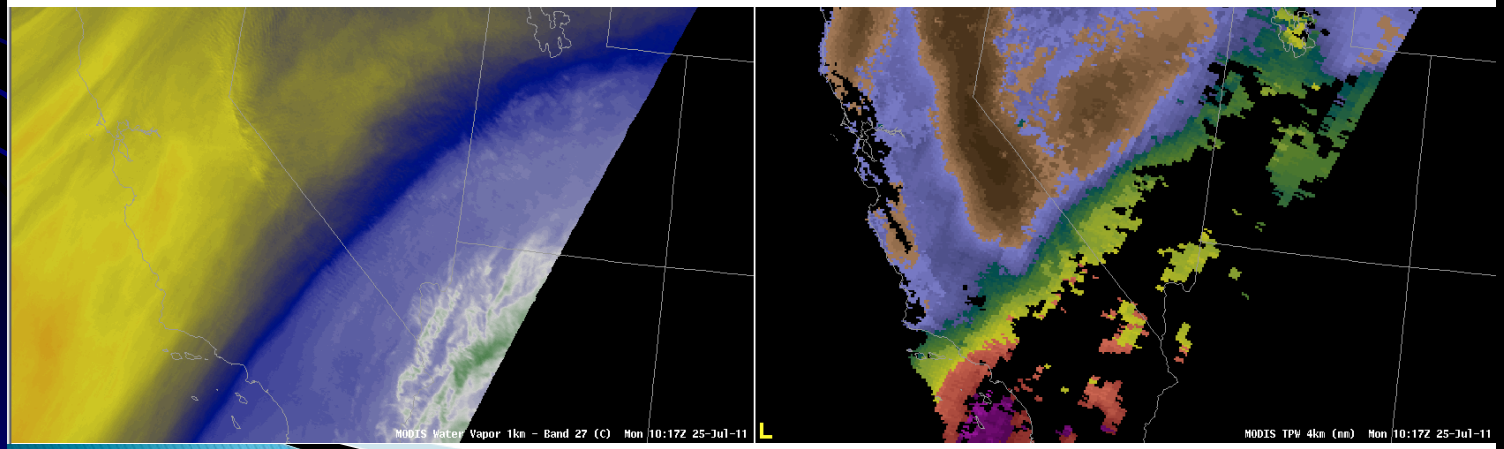
Proposed "shifted" "PACUS" would give a 5 min scan of AK and western CONUS. This would mean that HI would need to be covered with one of the meso-scales (and 15 min FD); if in 'flex mode (3)'. Note that the positions are approximate.

MODIS Imagery/Products WFO Usage

Support for Fire Weather Forecasts

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SALT LAKE CITY UT
1024 AM MDT MON JUL 25 2011

.FIRE WEATHER...MODIS WATER VAPOR IMAGERY INDICATES THAT PRECIPITABLE WATER VALUES APPROACHING ONE INCH HAVE PUSHED AS FAR NORTH AS THE SOUTHERN WASATCH FRONT THIS MORNING. THIS SURGE OF MOISTURE IS ALSO BRINGING EXTENSIVE CLOUD COVER TO CENTRAL AND NORTHERN UTAH THIS MORNING....WITH DEEP MOISTURE MOVING NORTH BELIEVE THAT RISK FOR DRY THUNDERSTORMS IS LIMITED PRIMARILY TO THE LEADING EDGE OF THE MOISTURE SURGE ACROSS NORTHERN UTAH...ALTHOUGH FEEL COVERAGE OF POTENTIAL DRY STORMS WOULD BE LIMITED



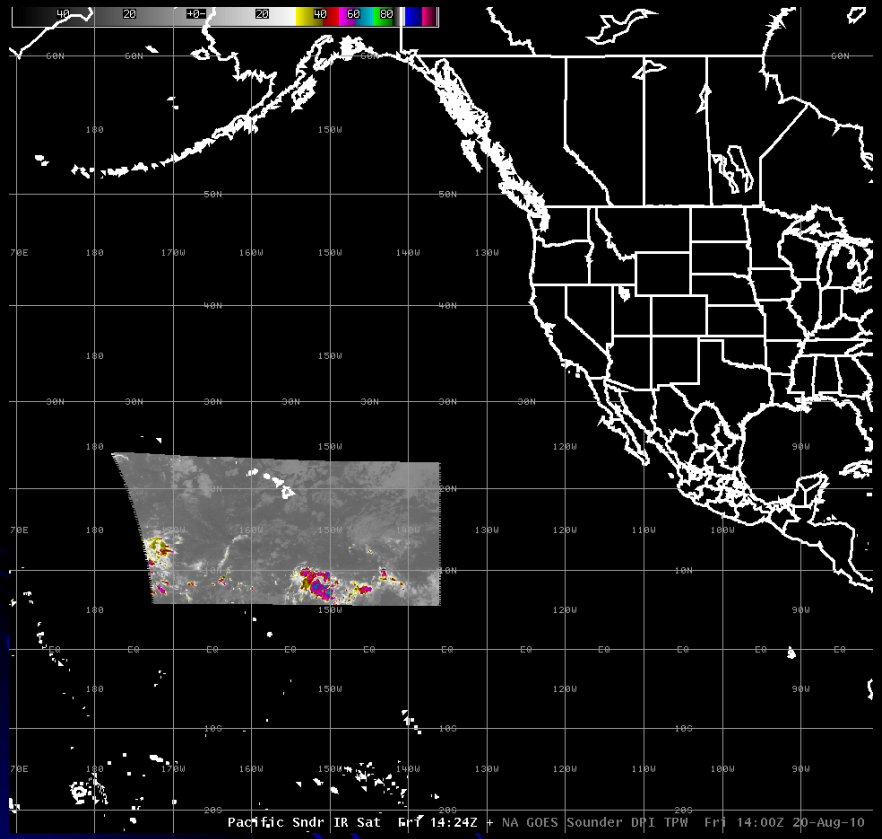
MODIS Imagery from UW SSEC Antenna 10:17 UTC 25 July 2011

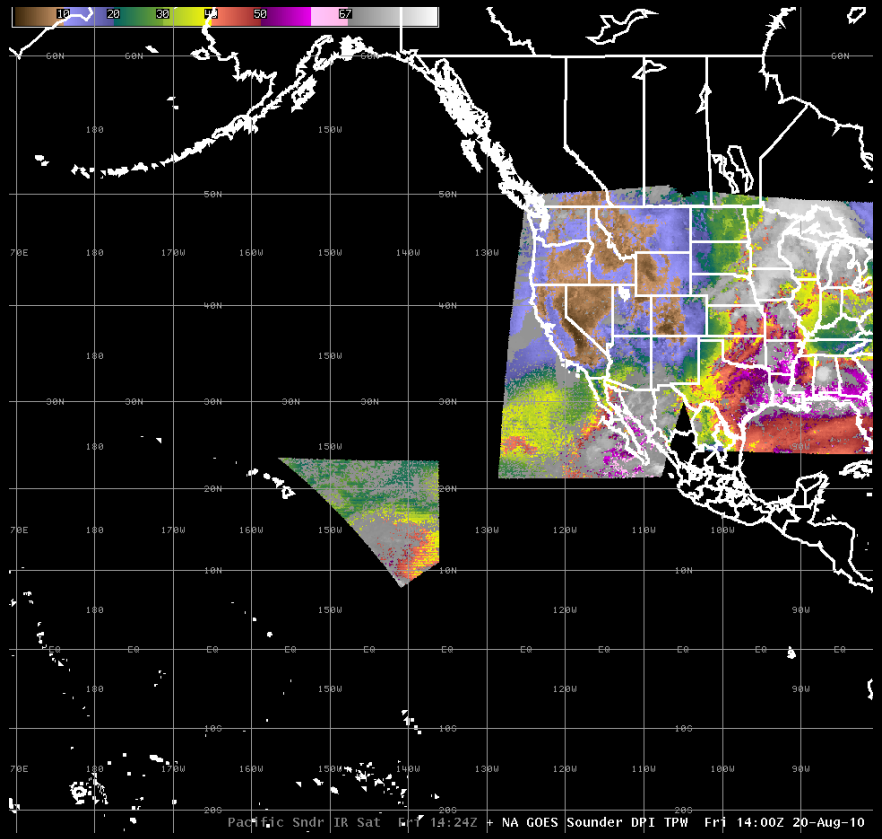
Total Precipitable Water

- GOES Sounder Single Field of View will not be available until 2012 for Hawaii
  - Discussions held with the NWS
  - Headers available (per Jim Heil email)
  - NOAA/NESDIS OSPO freeze lifted
  - NWS could give NESDIS an official request for changing the sector coverage

- CIMSS MIMIC TPW is viable oceanic candidate especially with JPSS PG start
  - Microwave based
  - available in AWIPS

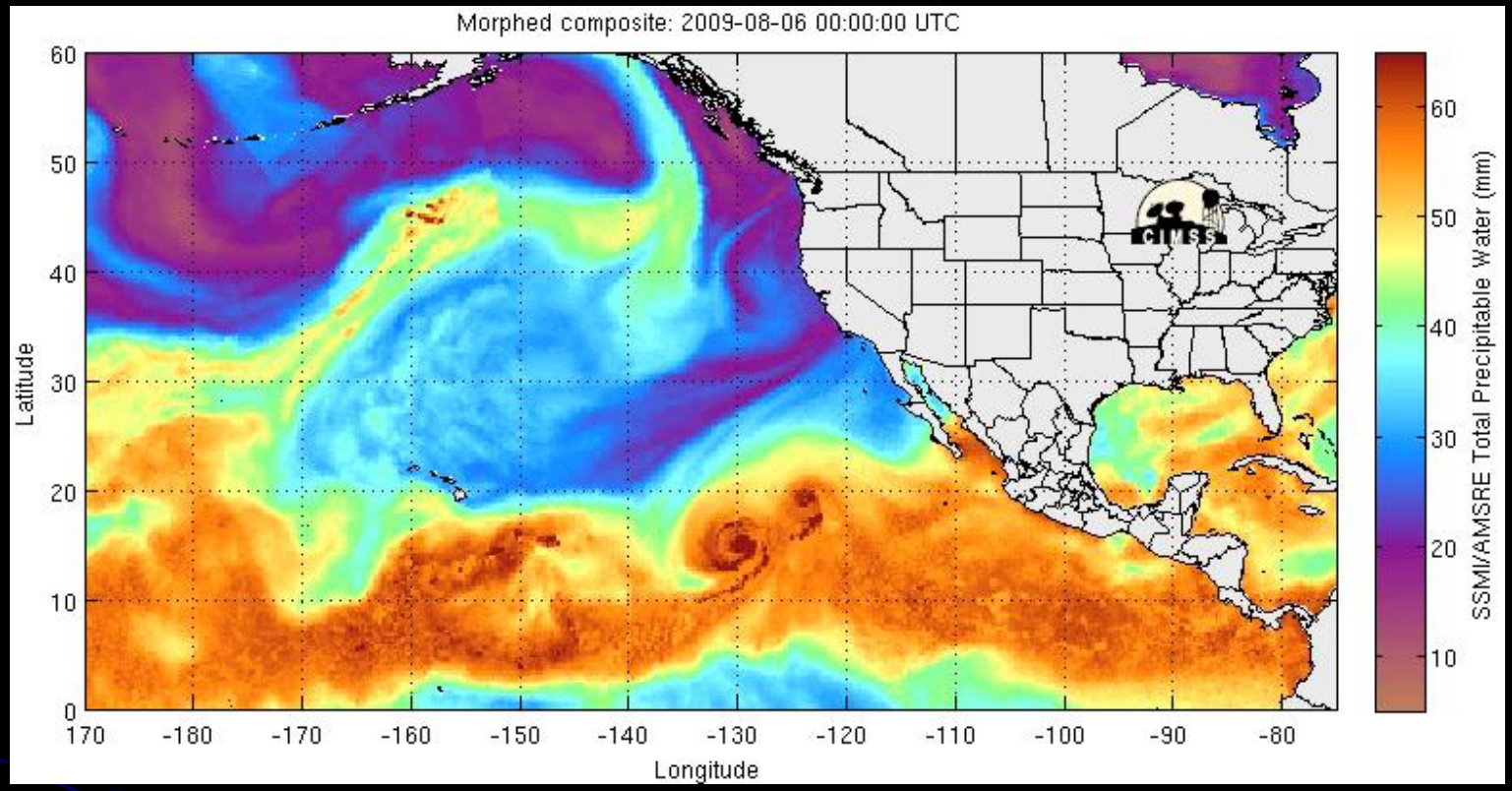
Total Precipitable Water





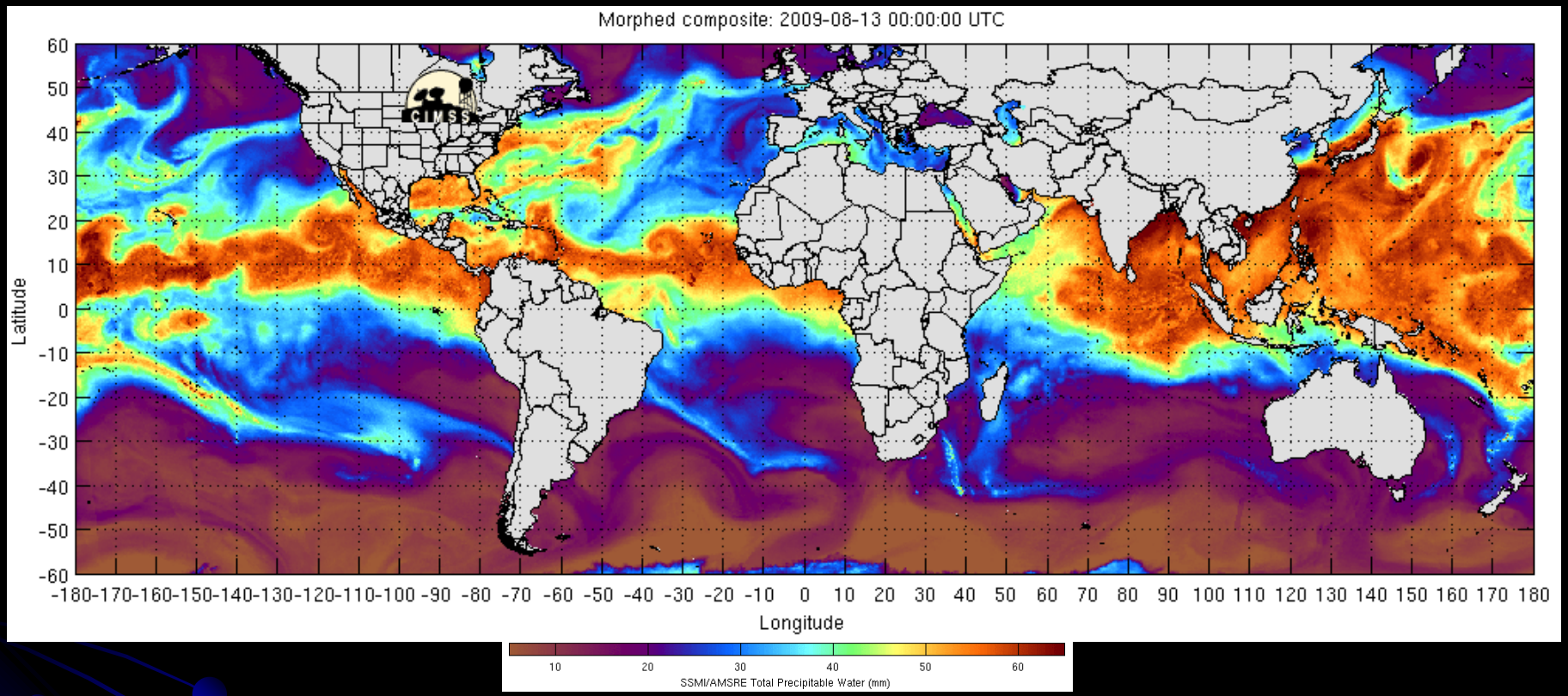
There are GOES Sounder scans that cover Hawaii and the surrounding area. On the left is one example for the longwave IR window band on the Sounder. The products are operationally calculated for all of the sector. This information is sent out on a grid that does NOT cover Hawaii (right panel). Note the cut-off to the east of Hawaii.

MIMIC-TPW

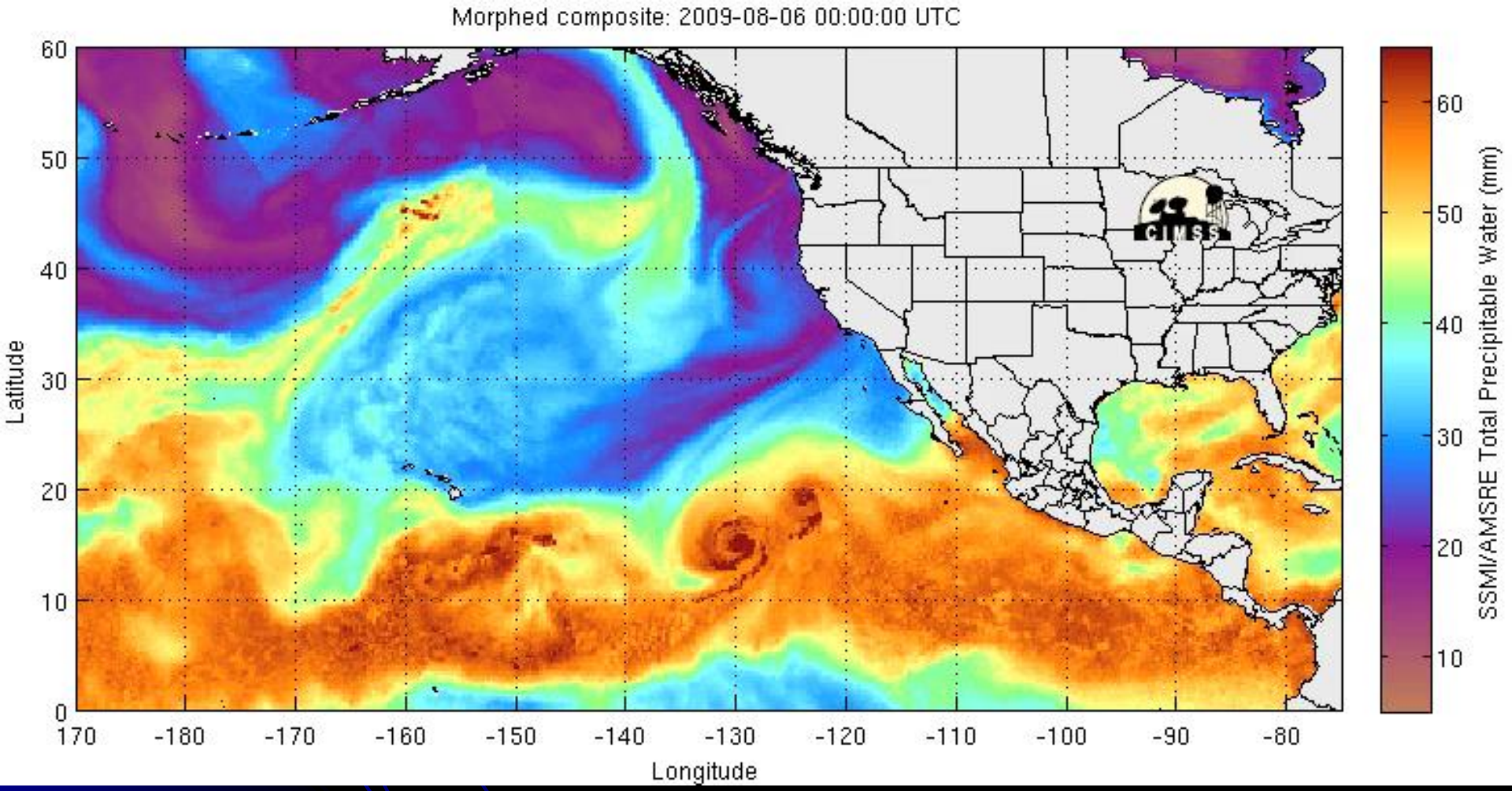


- 'MIMIC': Morphed Integrated Microwave Imagery at CIMSS
- TPW: Total Precipitable Water vapor
- Blended data from SSMI, SSMIS (F-13, -16, -17), Aqua AMSRE
- Advected with model winds to make hourly images
- Emphasis on fidelity to original data, resolution, timeliness, seamless blending (in contrast to model-based analyses or daily satellite composites)

Applications



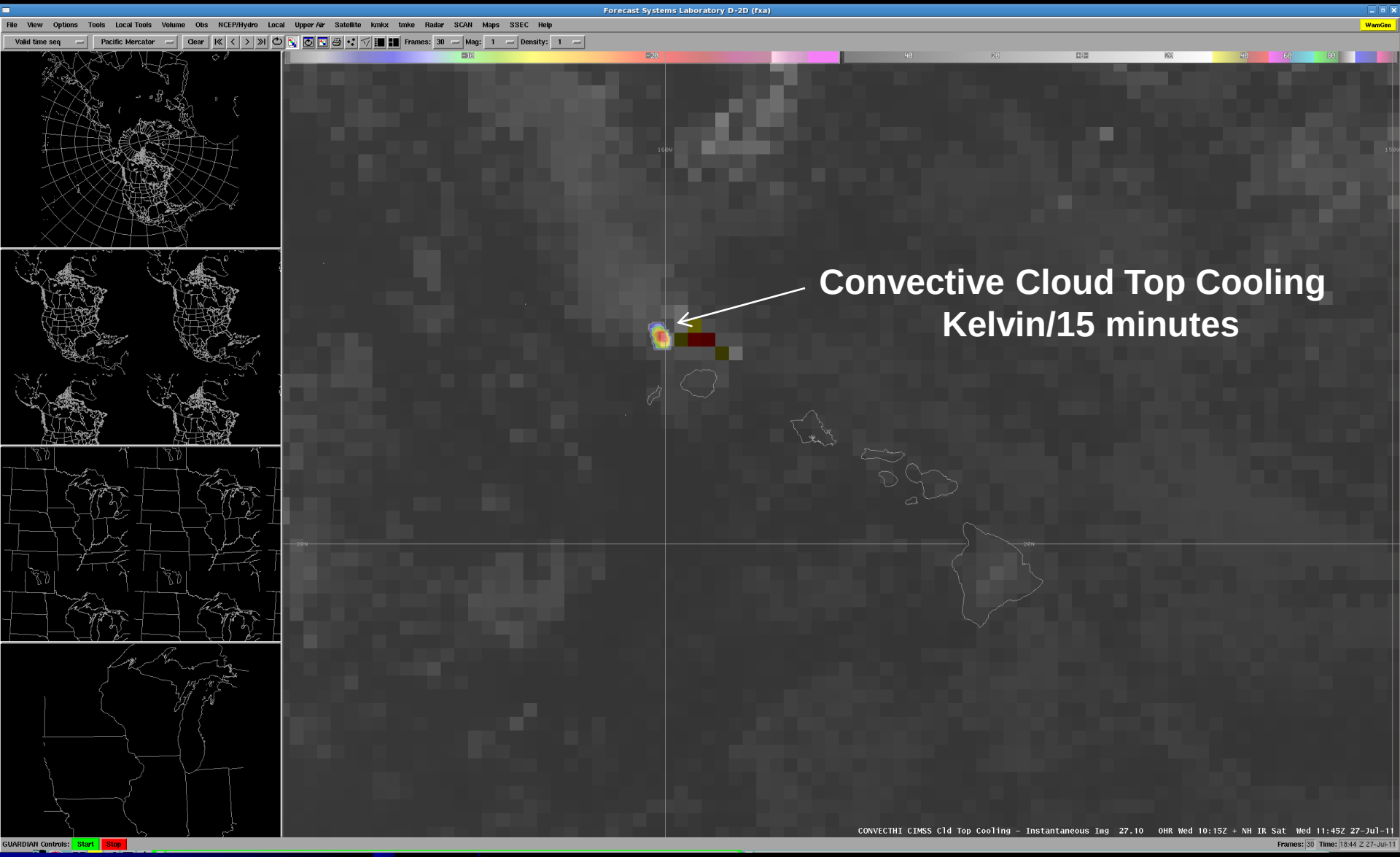
- Analyzing the environment for tropical cyclone development and ITCZ evolution
- Tracking the Saharan Aerosol Layer
- Coastal forecasting, tracking atmospheric rivers
- (Available in experimental mode in AWIPS)



http://tropic.ssec.wisc.edu/real-time/mimic-tpw/epac/main.html

University of Wisconsin Convective Initiation

- Available for Hawaii domain in AWIPS as of April 2011
- Ice mask added to show where GOES imager is unable to detect cloud typing transitions for successful CI indication

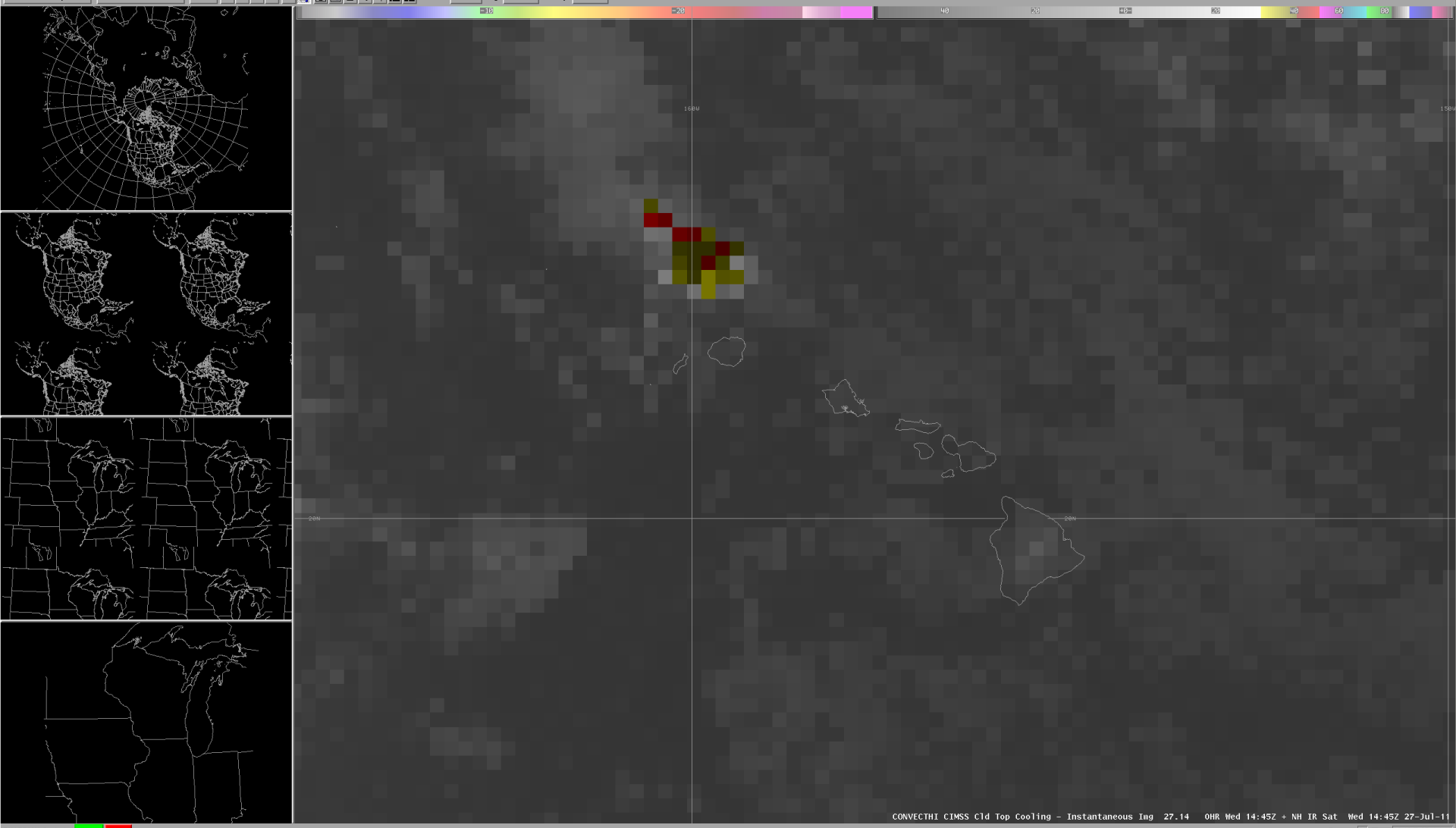

Forecast Systems Laboratory D-2D (fxa)
File View Options Tools Local Tools Volume Obs NCEP/Hydro Local Upper Air Satellite kmkx tmke Radar SCAN Maps SSEC Help
WamGen
Valid time seq
Pacific Mercator
Clear
Frames: 30
Mag: 1
Density: 1
Convective Cloud Top Cooling
Kelvin/15 minutes
CONVECTHI CIMSS Cld Top Cooling - Instantaneous Ing 27.10 OHR Wed 10:15Z + NH IR Sat Wed 11:45Z 27-Jul-11
GUARDIAN Controls: Start Stop
Frames: 30 Time: 18:44 Z 27-Jul-11

Forecast Systems Laboratory D-2D (fxa)

File View Options Tools Local Tools Volume Obs NCEP/Hydro Local Upper Air Satellite kmkx tmke Radar SCAN Maps SSEC Help

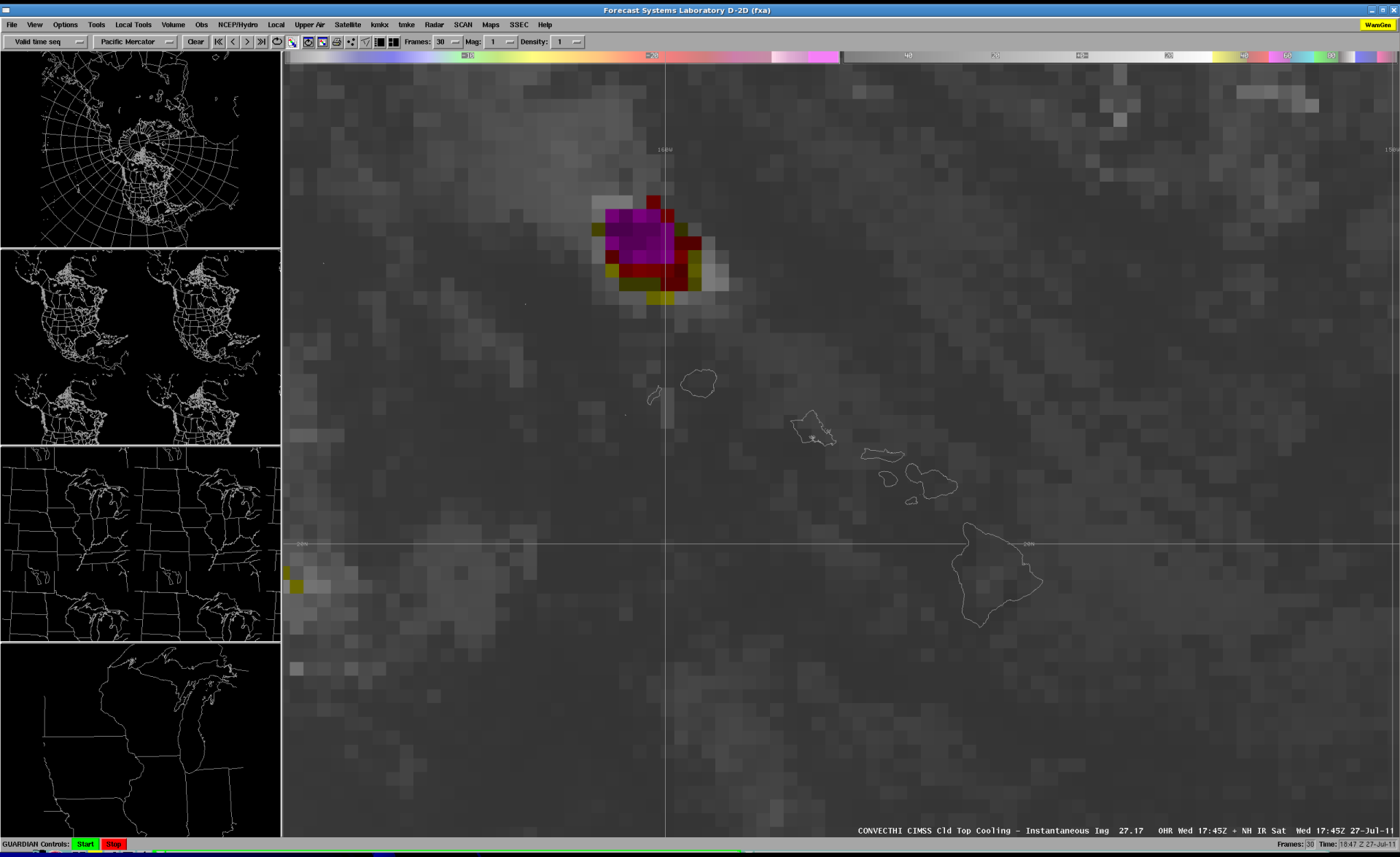
WamGen

Valid time seq | Pacific Mercator | Clear | Frames: 30 | Mag: 1 | Density: 1



GUARDIAN Controls: Start Stop

Frames: 30 Time: 18:46 Z 27-Jul-11


Forecast Systems Laboratory D-2D (fxa)
File View Options Tools Local Tools Volume Obs NCEP/Hydro Local Upper Air Satellite kmkx tmke Radar SCAN Maps SSEC Help
WamGen
Valid time seq
Pacific Mercator
Clear
Frames: 30
Mag: 1
Density: 1
160W
150W
20N
CONVECTHI CIMSS Cld Top Cooling - Instantaneous Ing 27.17 OHR Wed 17:45Z + NH IR Sat Wed 17:45Z 27-Jul-11
GUARDIAN Controls: Start Stop
Frames: 30 Time: 18:47 Z 27-Jul-11

Imagery, TPW, CI Proxy Issues

- Need to coordinate CIMSS subject matter expert visits to Hawaii with UH and NWS
  - Discussion ongoing with UH and CIRA
- Jordan Gerth will visit Hawaii first to make sure UWCI, MIMIC, and MODIS imagery flow into AWIPS is streamlined
- Alaska WES case needs relevant WRF case study files so we can process imagery with forward model and develop