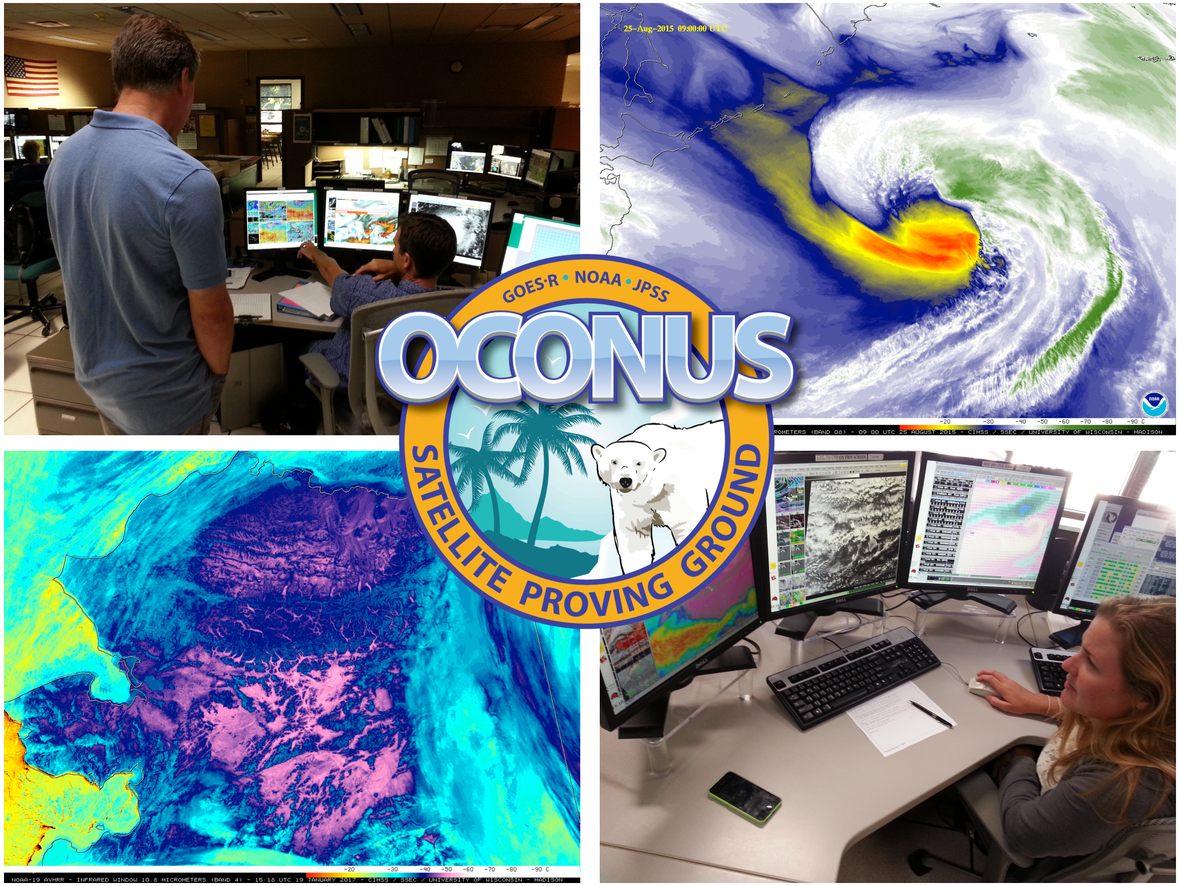

New capabilities, opportunities, and challenges using GOES-17 in Alaska

Jordan Gerth
Cooperative Institute for Meteorological Satellite Studies (CIMSS), University of Wisconsin

Webinar, 16 May 2018
Virtual Alaska Weather Symposia, Alaska Center for Climate Assessment and Policy (ACCAP)

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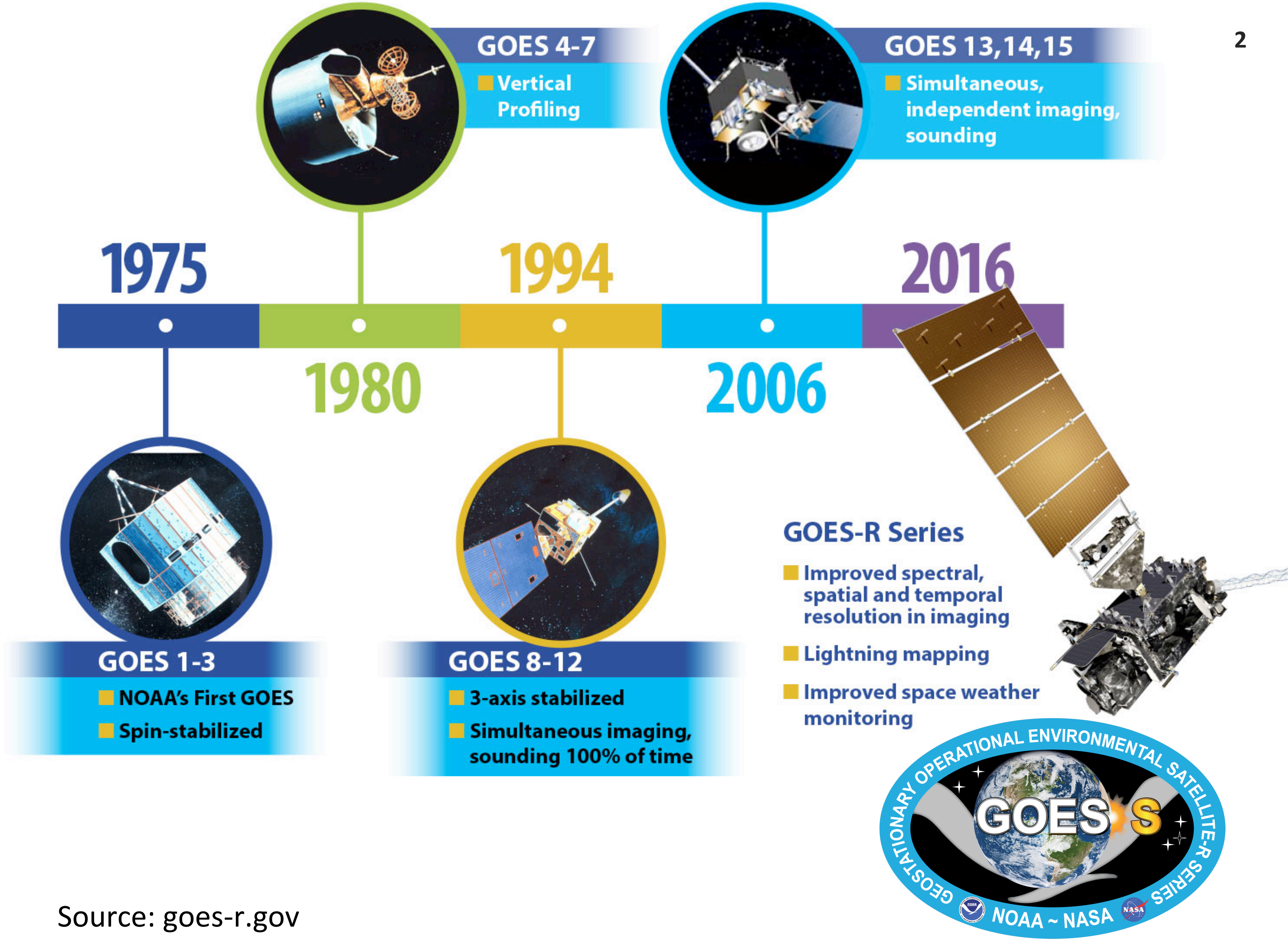
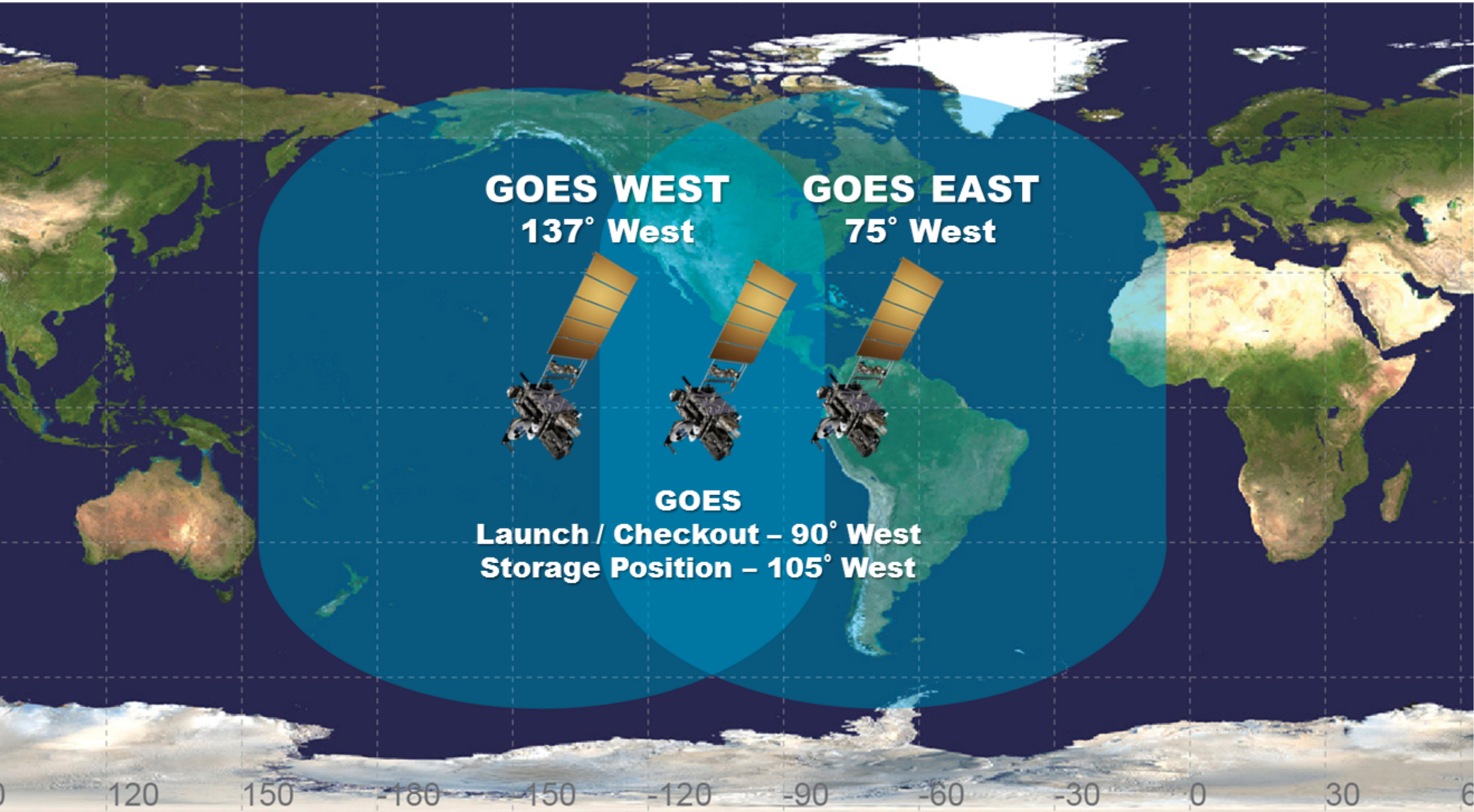
Twitter: @jjgerth

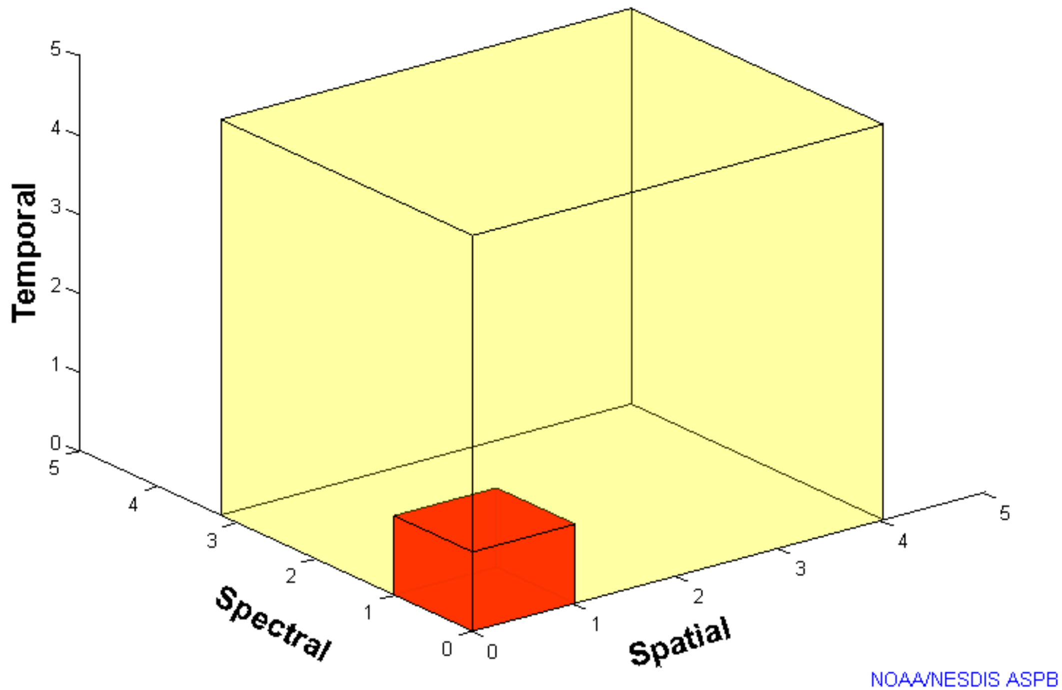


Source: goes-r.gov

Future GOES-R/S constellation



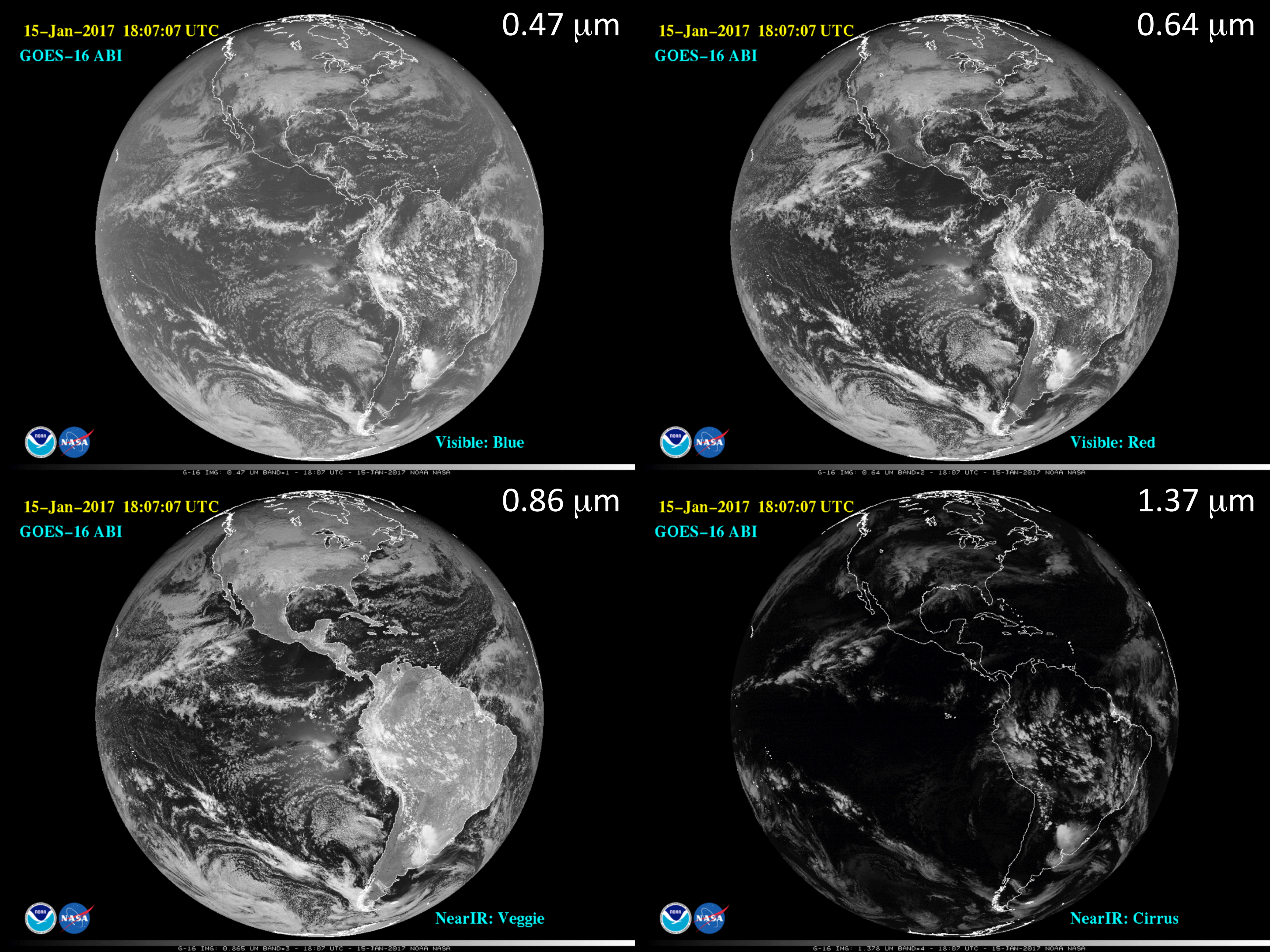
Advanced Baseline Imager (ABI)

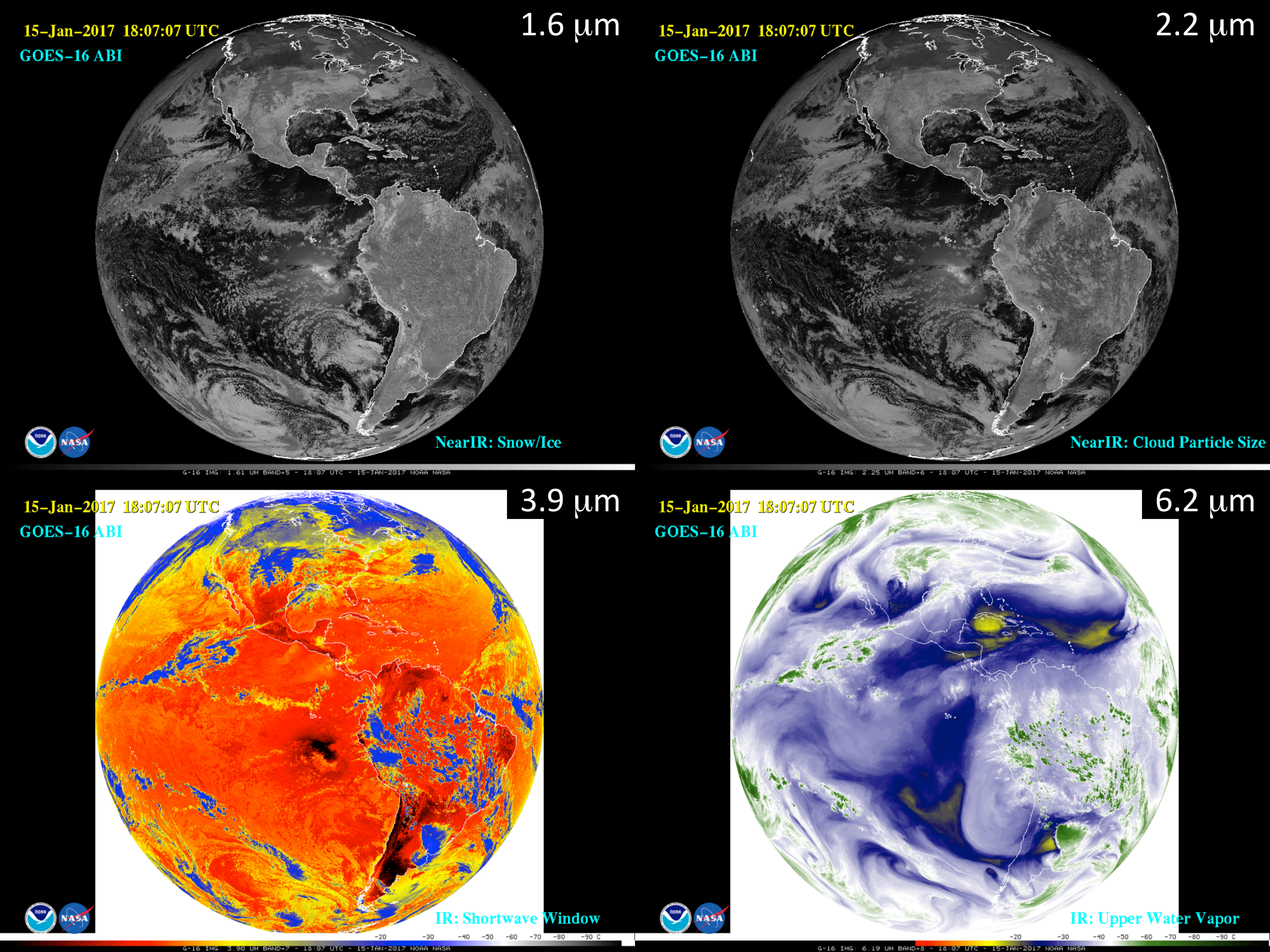


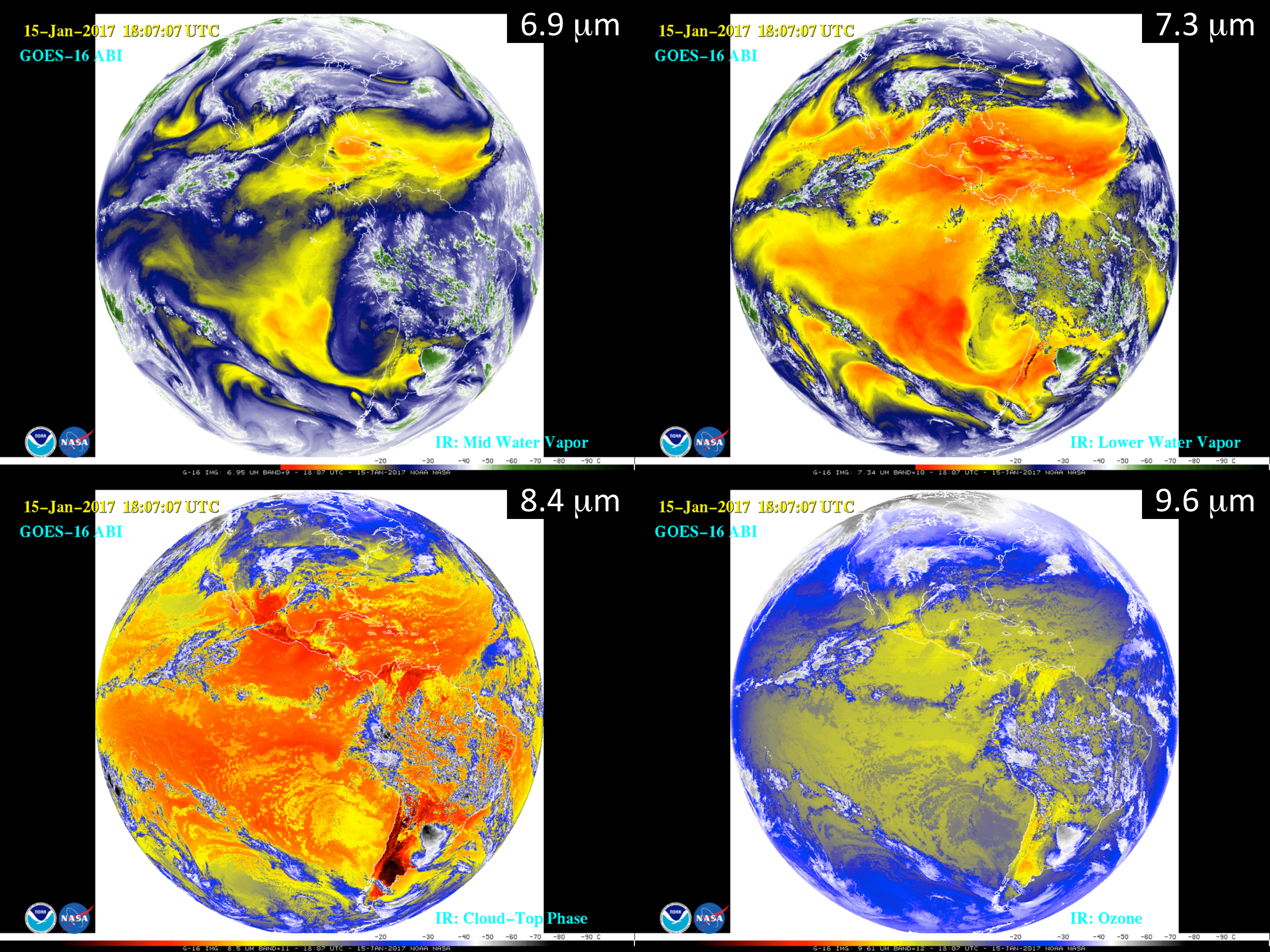
5X Faster scanning (5-minute full disk vs. 25-minute)

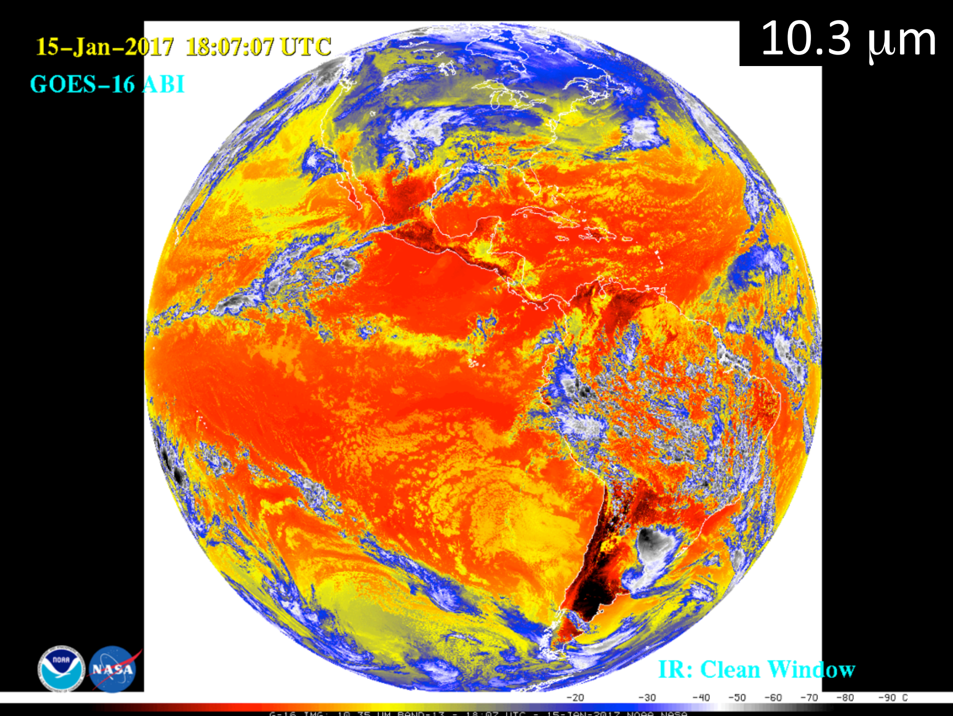
4X Improved spatial resolution (2 km IR vs. 4 km)

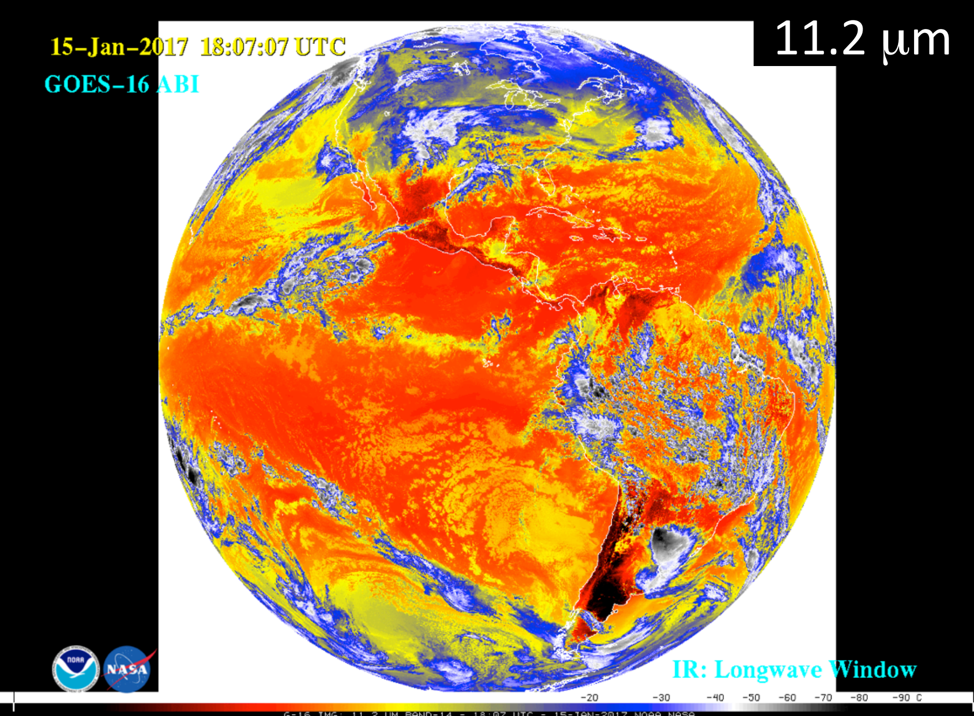
3X More spectral bands (16 on ABI vs. 5)

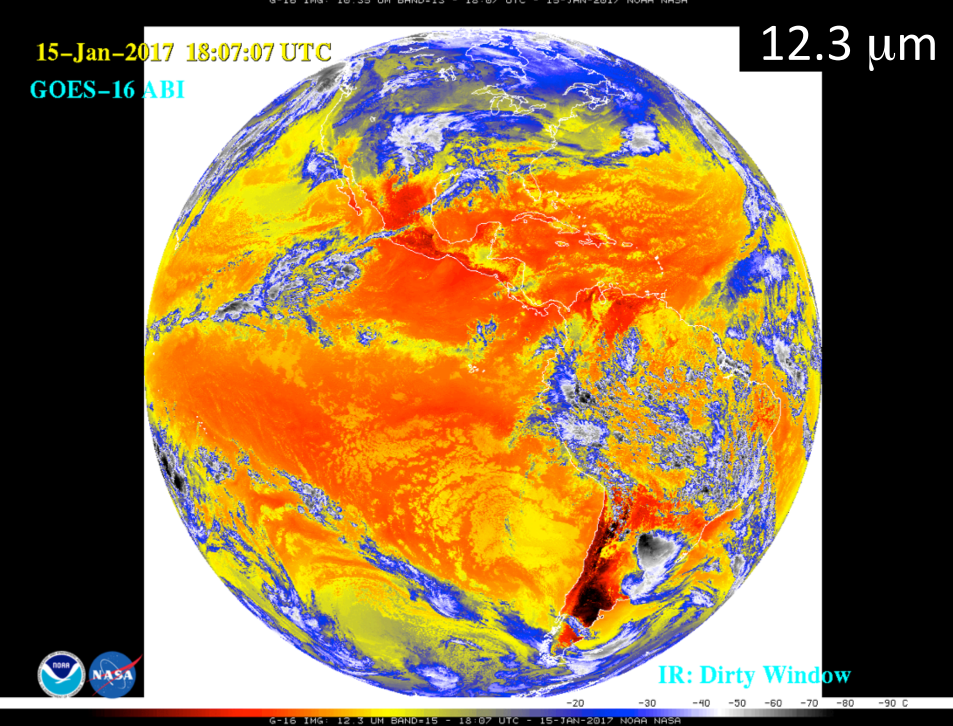

15-Jan-2017 18:07:07 UTC
GOES-16 ABI
0.47 μm
Visible: Blue
G-16 IMG: 0.47 UM BAND=1 - 18:07 UTC - 15-JAN-2017 NOAA NASA
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
0.64 μm
Visible: Red
G-16 IMG: 0.64 UM BAND=2 - 18:07 UTC - 15-JAN-2017 NOAA NASA
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
0.86 μm
NearIR: Veggie
G-16 IMG: 0.865 UM BAND=3 - 18:07 UTC - 15-JAN-2017 NOAA NASA
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
1.37 μm
NearIR: Cirrus
G-16 IMG: 1.378 UM BAND=4 - 18:07 UTC - 15-JAN-2017 NOAA NASA

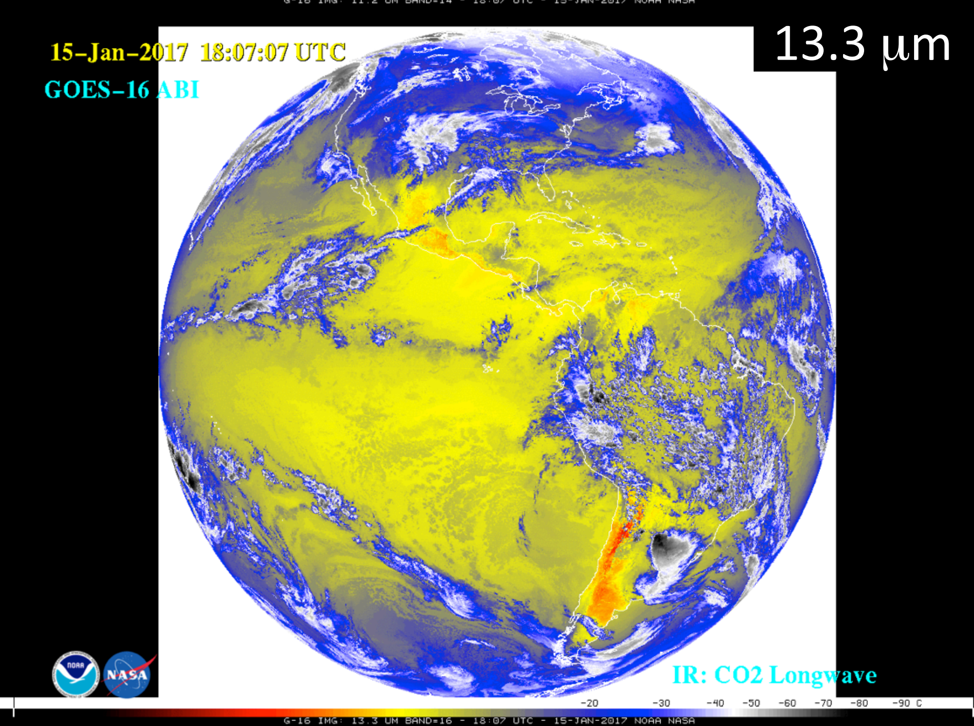

15-Jan-2017 18:07:07 UTC
GOES-16 ABI
1.6 µm
NearIR: Snow/Ice
G-16 IMG: 1.61 UM BAND=5 - 18:07 UTC - 15-JAN-2017 NOAA NASA
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
2.2 µm
NearIR: Cloud Particle Size
G-16 IMG: 2.25 UM BAND=6 - 18:07 UTC - 15-JAN-2017 NOAA NASA
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
3.9 µm
IR: Shortwave Window
-20 -30 -40 -50 -60 -70 -80 -90 C
G-16 IMG: 3.90 UM BAND=7 - 18:07 UTC - 15-JAN-2017 NOAA NASA
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
6.2 µm
IR: Upper Water Vapor
-20 -30 -40 -50 -60 -70 -80 -90 C
G-16 IMG: 6.19 UM BAND=8 - 18:07 UTC - 15-JAN-2017 NOAA NASA

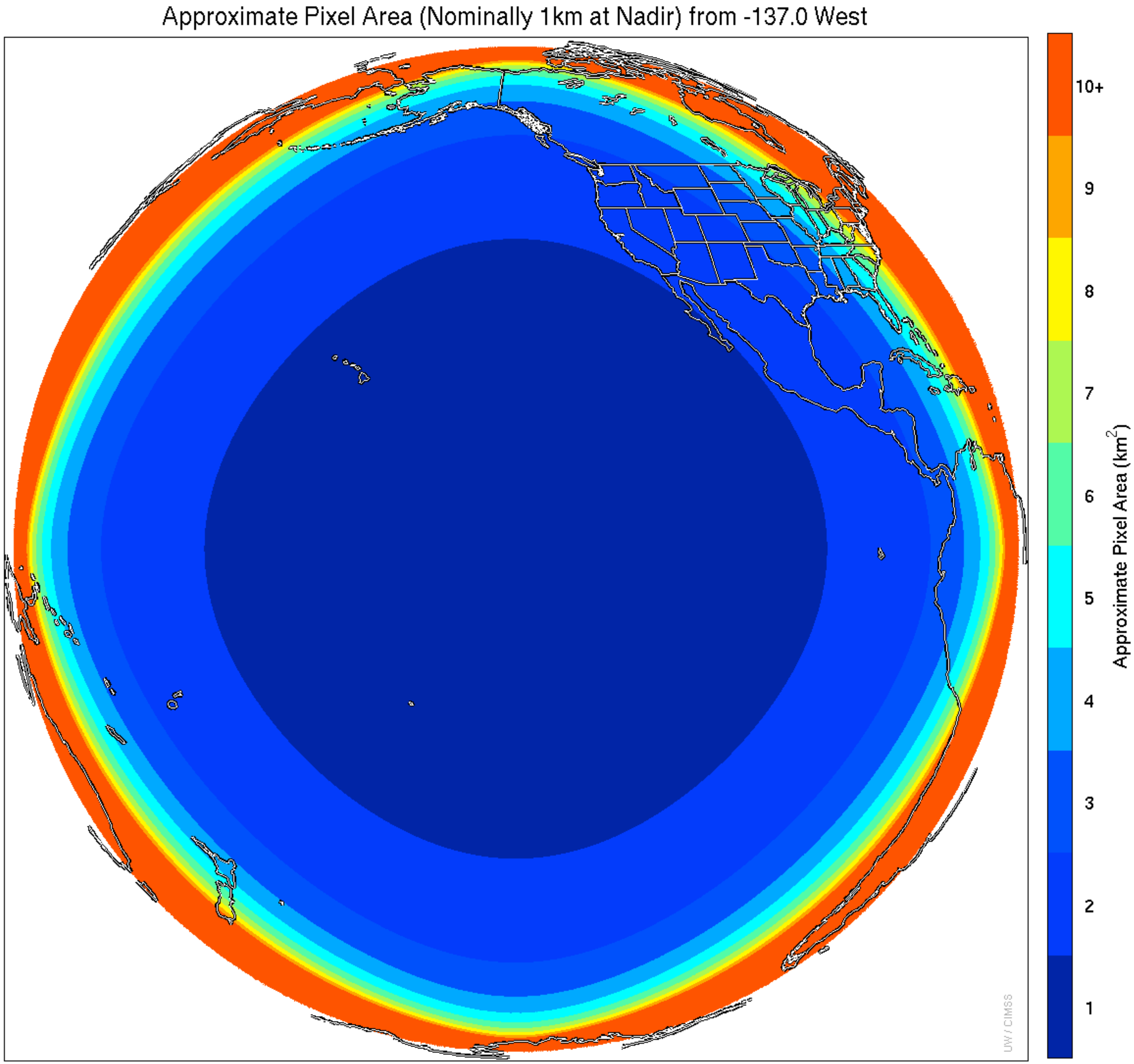

6.9 µm
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
IR: Mid Water Vapor
7.3 µm
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
IR: Lower Water Vapor
8.4 µm
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
IR: Cloud-Top Phase
9.6 µm
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
IR: Ozone


10.3 µm
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
IR: Clean Window
-20 -30 -40 -50 -60 -70 -80 -90 C
G-16 IMG: 10.35 UM BAND=13 - 18:07 UTC - 15-JAN-2017 NOAA NASA


11.2 µm
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
IR: Longwave Window
-20 -30 -40 -50 -60 -70 -80 -90 C
G-16 IMG: 11.2 UM BAND=14 - 18:07 UTC - 15-JAN-2017 NOAA NASA


12.3 µm
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
IR: Dirty Window
-20 -30 -40 -50 -60 -70 -80 -90 C
G-16 IMG: 12.3 UM BAND=15 - 18:07 UTC - 15-JAN-2017 NOAA NASA


13.3 µm
15-Jan-2017 18:07:07 UTC
GOES-16 ABI
IR: CO2 Longwave
-20 -30 -40 -50 -60 -70 -80 -90 C
G-16 IMG: 13.3 UM BAND=16 - 18:07 UTC - 15-JAN-2017 NOAA NASA


Approximate Pixel Area (Nominally 1km at Nadir) from -137.0 West
10+
9
8
7
6
5
4
3
2
1
Approximate Pixel Area (km^2)
UW / CIMSS

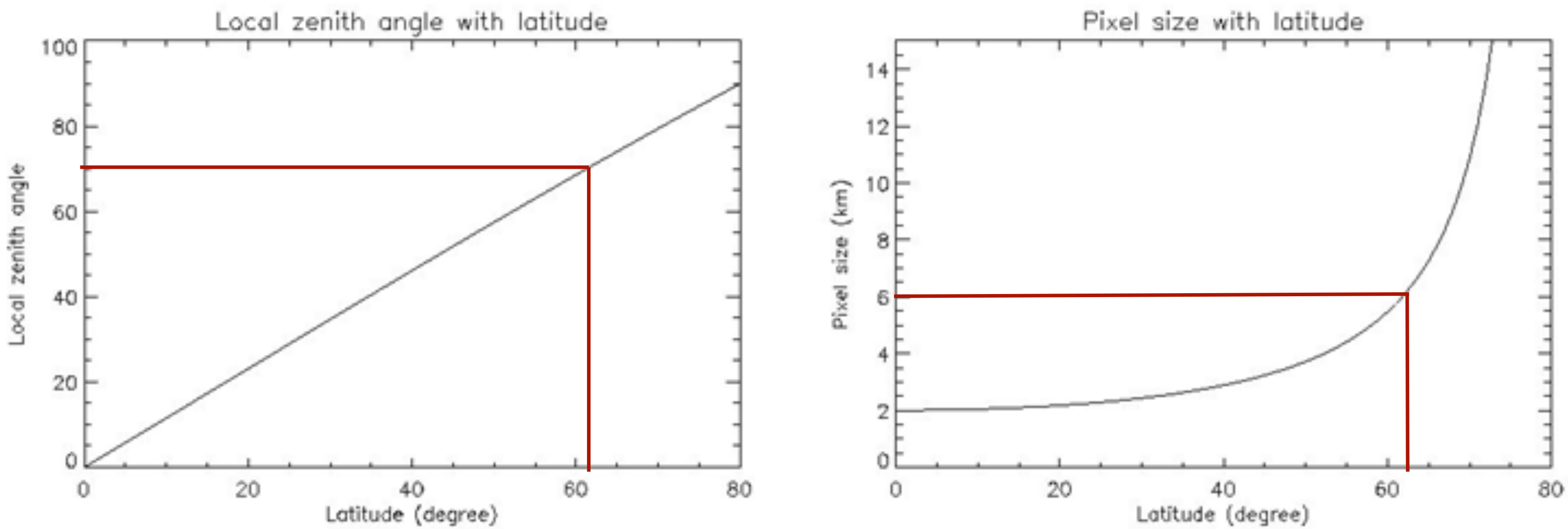
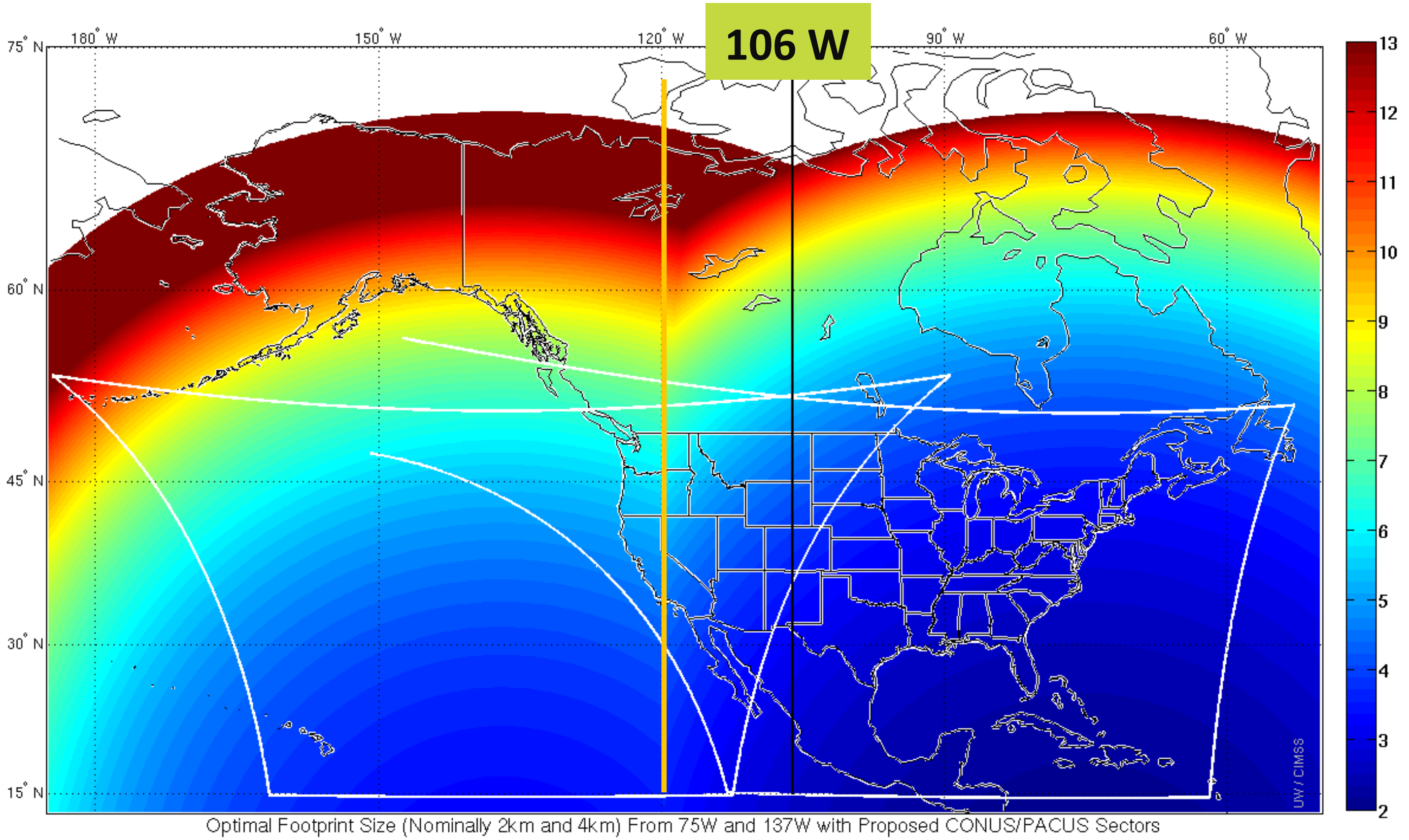


Fig. 3. Left: LZA by latitude. Right: pixel size by latitude along the longitude line of satellite nadir.

	Approximate 0.64 µm Resolution	Approximate 10.3 µm Resolution
Anchorage, AK	2 km	7 km
Fairbanks, AK	2 km	8 km
Juneau, AK	1.5 km	5 km

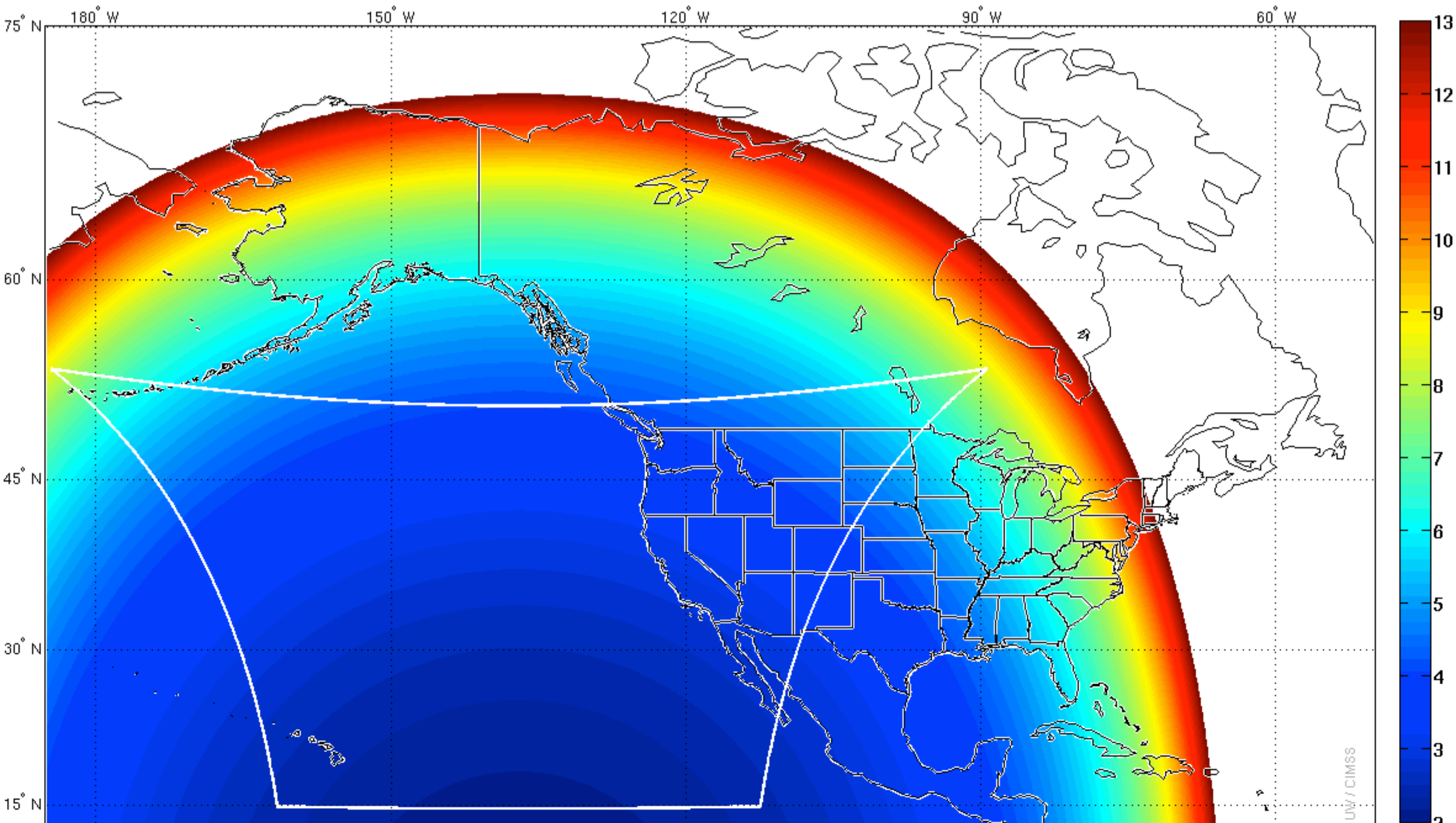
Figure from J. Key, ASPB

GOES-R (16) as GOES-East
GOES-15 as GOES-West



The spatial resolution from the GOES-R ABI is better than current GOES for Puerto Rico and the eastern contiguous United States to 120 degrees West.

GOES-S (17) as GOES-West



GOES-West (137W) Proposed CONUS (Centered at 30N,137W)

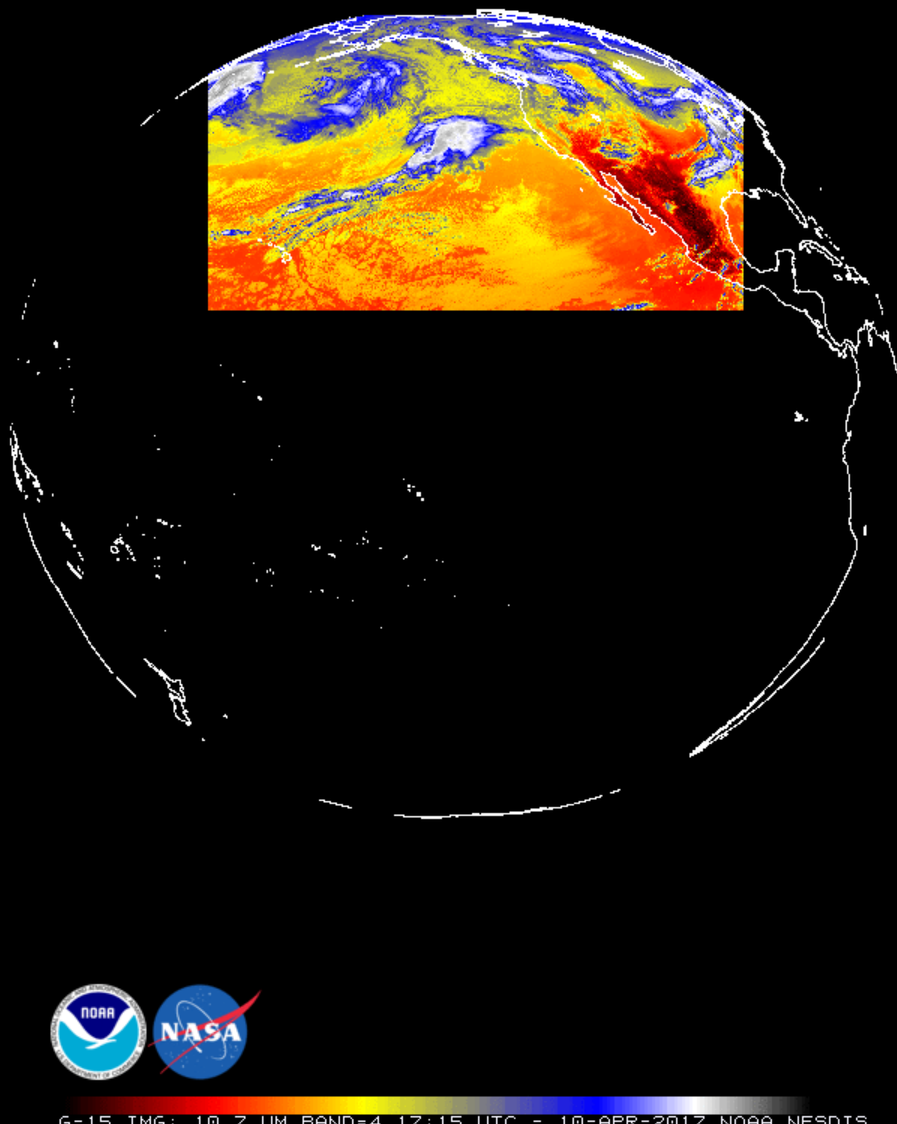
Alaska Benefits of GOES-17

- Higher spatial resolution compared to legacy GOES (GOES-15)
- More spectral bands (from 5 to 16)
- Consistent fifteen-minute full disk ABI imagery (at least) will include Alaska and adjacent areas
- Potential for one-minute imagery with configurable mesoscale sectors (generally NWS only)
- Position of satellite at 137 W is ideal for Alaska

10–Apr–2017 17:15:00 UTC

GOES–15 Imager

Infrared Window



10–Apr–2017 17:15:26 UTC

GOES–16 ABI

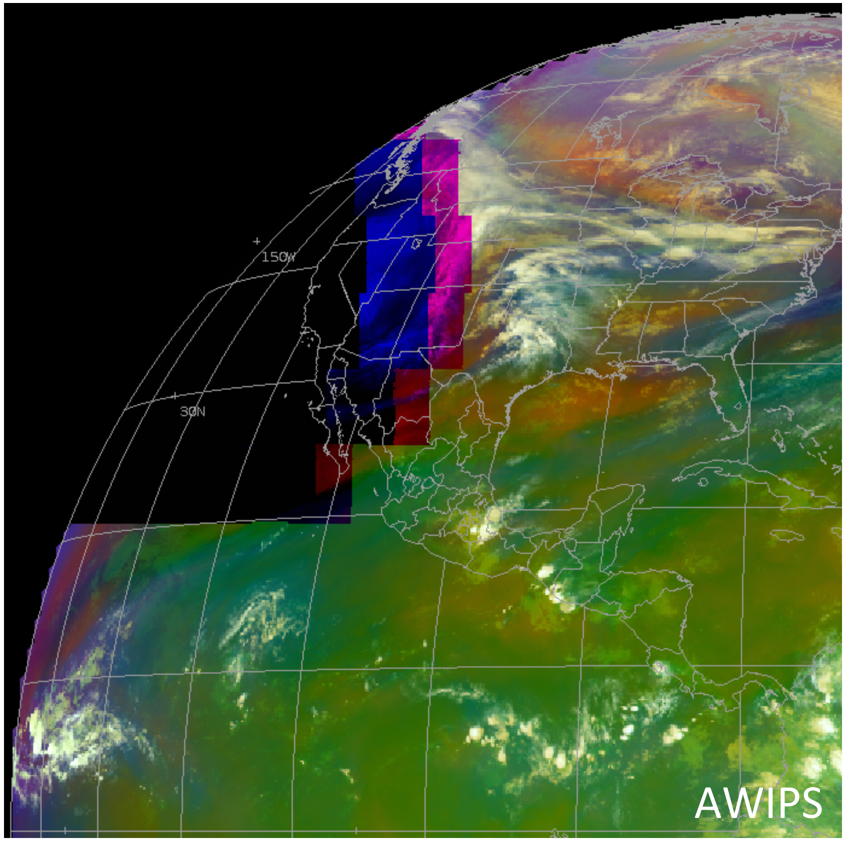
Infrared Window

Alaska Challenges for GOES-17

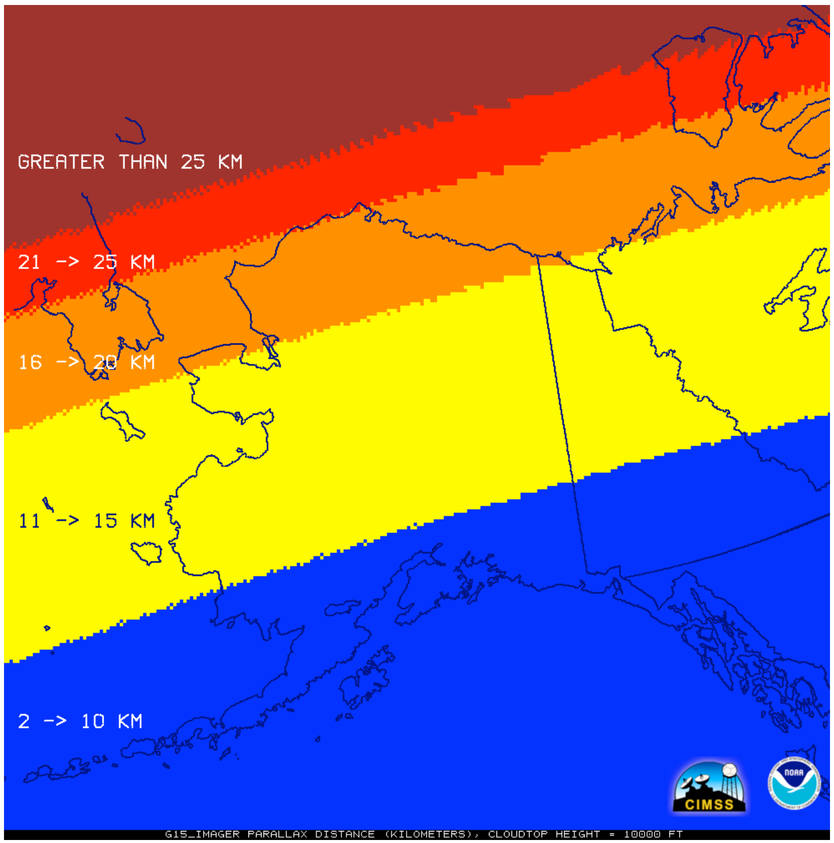
- Significant parallax, high zenith angles
- No Geostationary Lightning Mapper (GLM) coverage of Alaska (south of 52 N only)
- No five-minute "CONUS" coverage from ABI
- Solar avoidance zones
- Limited coverage from most ABI derived products
- Limited use of visible and near-infrared bands during winter months due to solar illumination

Solar Avoidance Zone

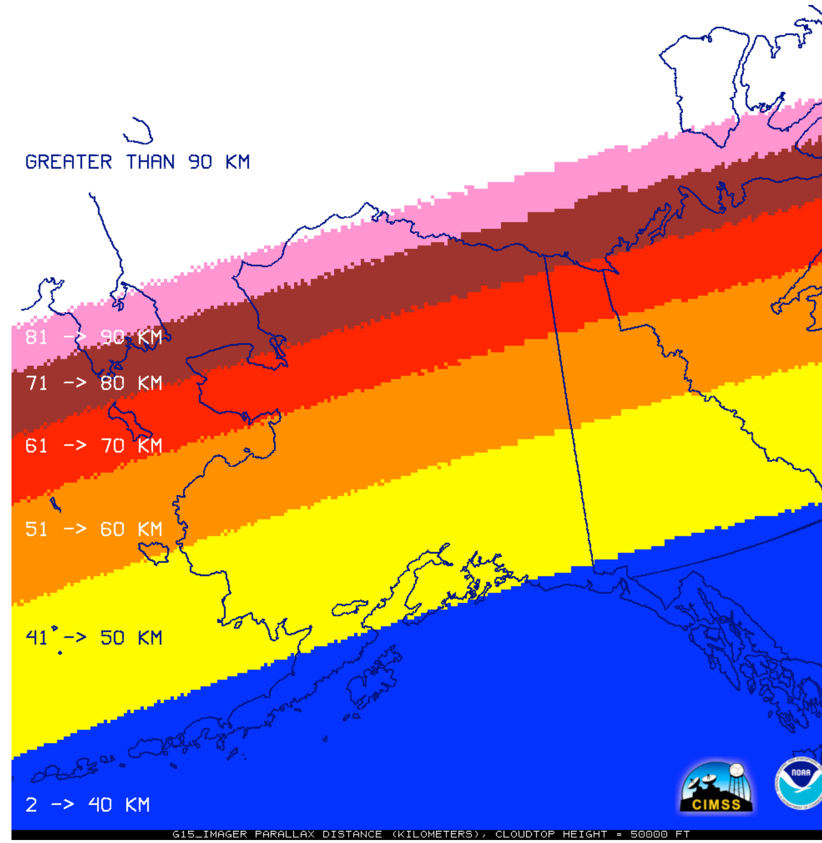
- Lost imagery due to solar contamination.
- Previously known as "Keep Out Zone", occurs when satellite is in Earth's shadow.
- Current ABI processing causes downstream users to see unusual imagery artifacts when data from one or more spectral bands are missing.



Parallax in Alaska



Parallax distance of 10000-foot clouds

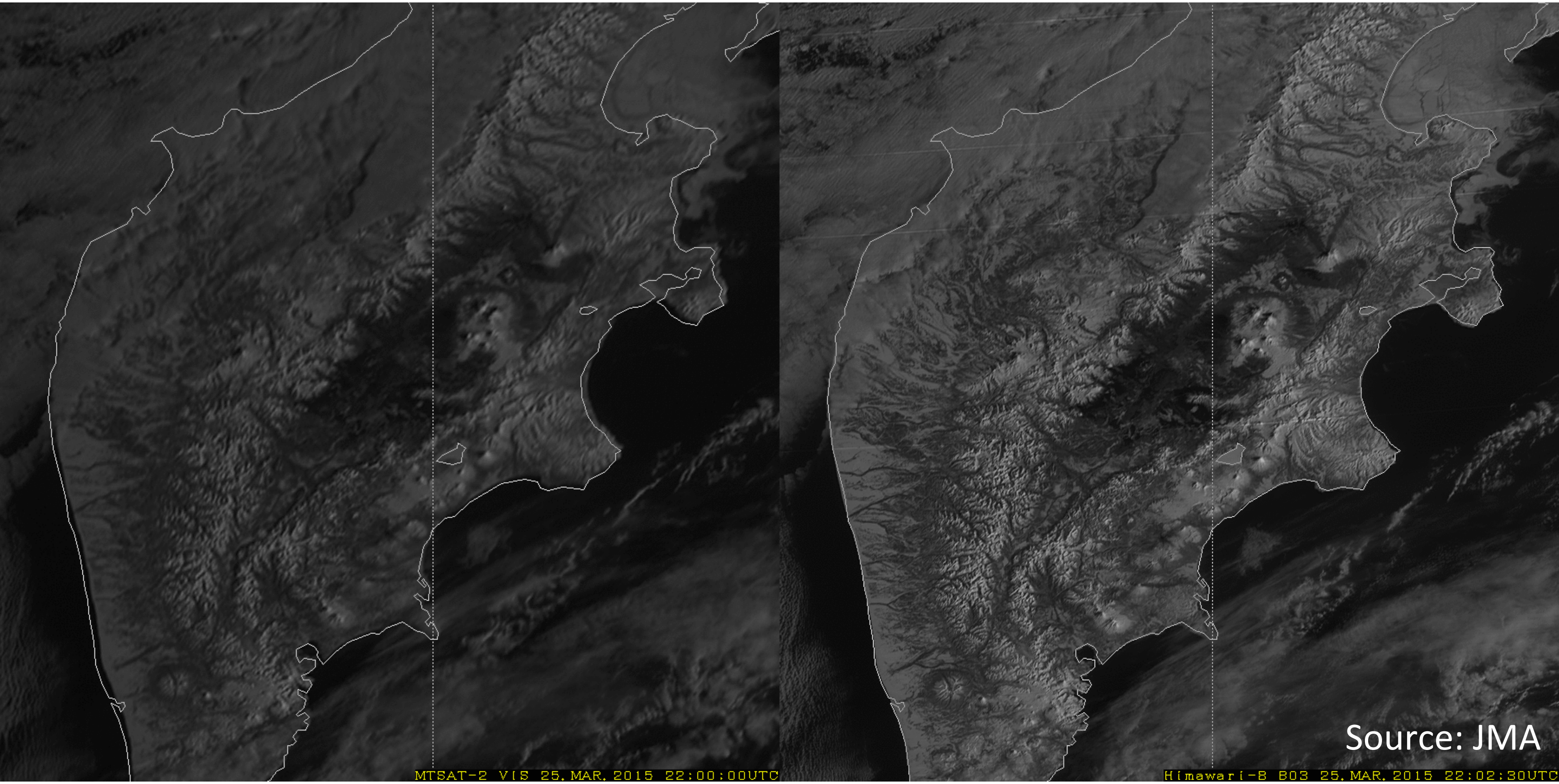


Parallax distance of 50000-foot clouds

Correspondence between colors and distance is different between the two images

MTSAT vs. Himawari-8 Visible

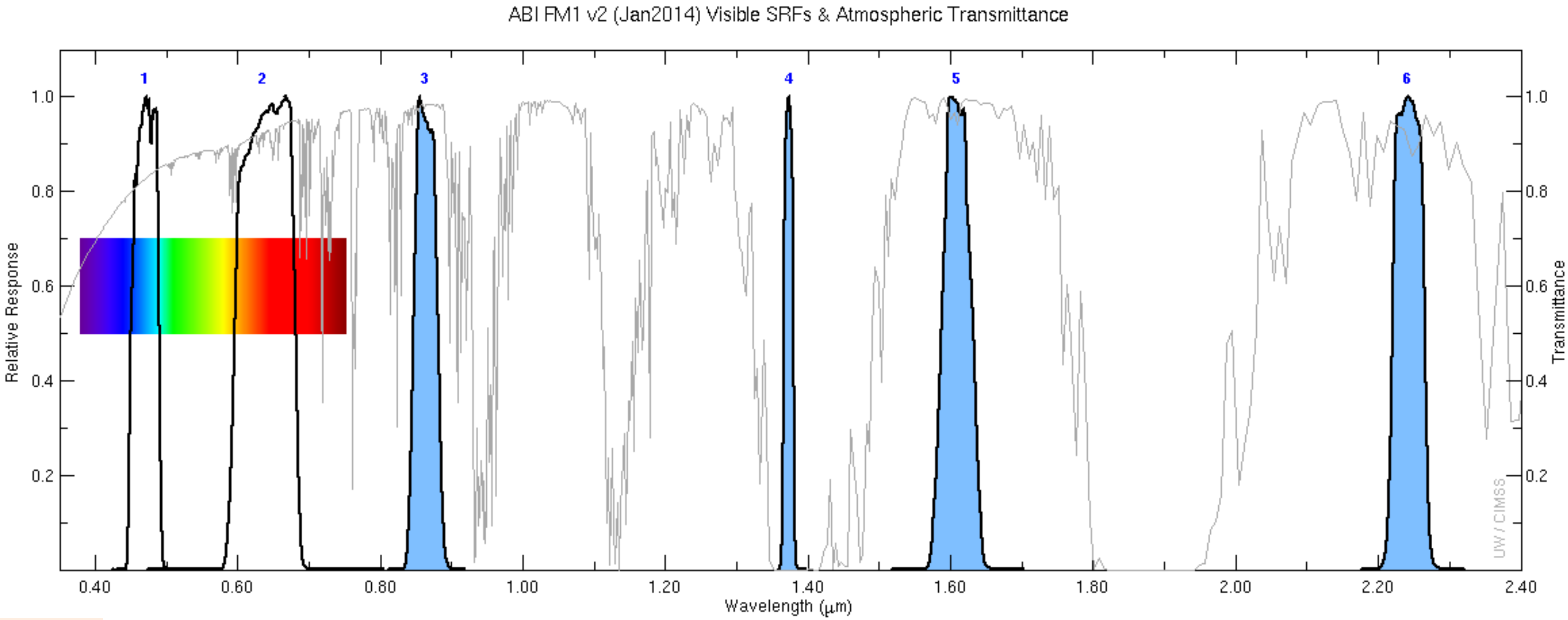
30-minute refresh vs. 2.5-minute refresh over Kamchatka Peninsula, 25 March 2015



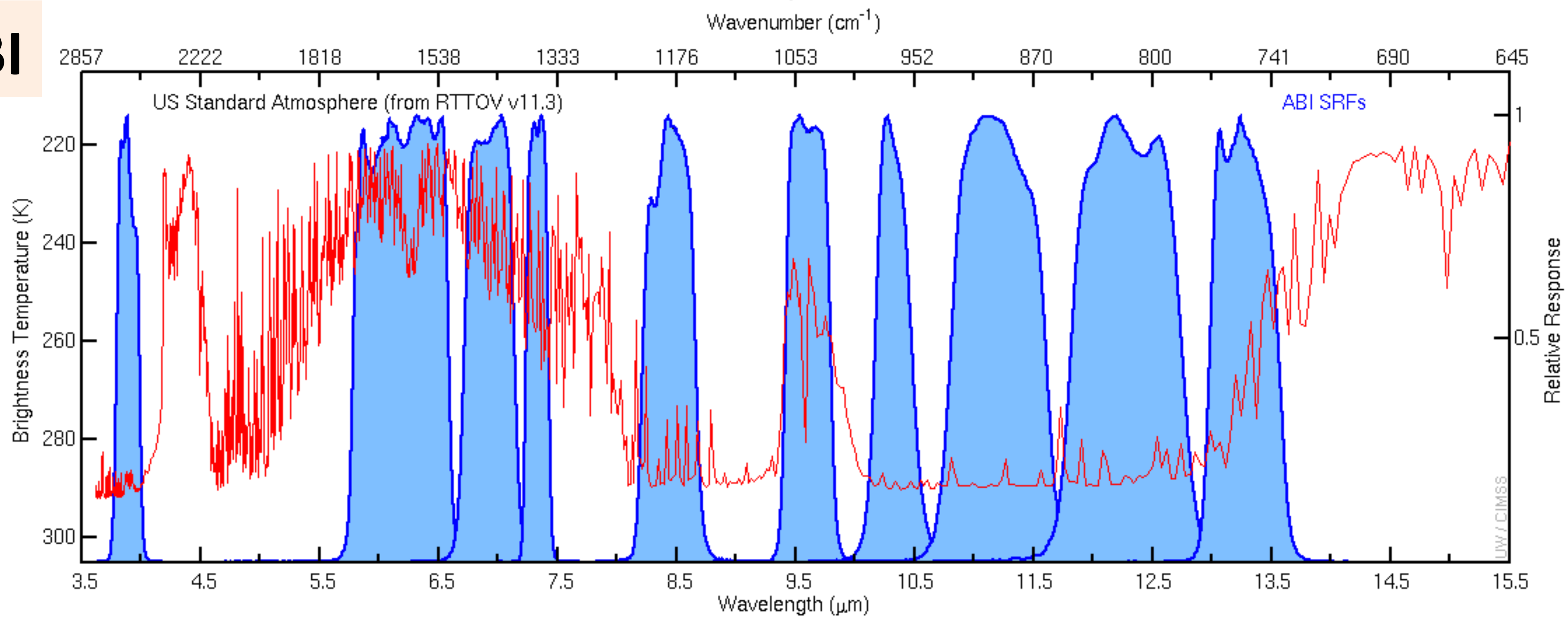
Advanced Baseline Imager Spectral Bands

Approx. Central Wavelength (µm)	Band	Type	Nickname	Best Spatial Res.	AWIPS Min	AWIPS (/ ABI) Max*	Bit Depth	Scale Factor	Worst SNR or NEdT (300 K)
0.47	1	Visible	Blue	1	0	1.3	12	2.4x10^{-4}	0.0010
0.64	**2**	**Visible**	**Red**	**0.5**	**0**	**1.3**	**12**	**2.4x10^{-4}**	**0.0022**
0.86	3	Near-Infrared	Veggie	1	0	1.3	12	2.4x10^{-4}	0.0015
1.4	4	Near-Infrared	Cirrus	2	0	0.5/1.3	12	2.4x10^{-4}	0.0010
1.6	5	Near-Infrared	F Snow/Ice	1	0	1.3	12	2.4x10^{-4}	0.0017
2.2	6	Near-Infrared	I R Cloud Particle Size	2	0	1.3	12	2.4x10^{-4}	0.0009
3.9	**7**	**Infrared**	**E Shortwave Window**	**2**	**-100 °C**	**127 °C/138 °C**	**14**	**0.0138**	**0.064**
6.2	**8**	**Infrared**	**Upper-level Water Vapor**	**2**	**-100 °C**	**61/38 °C**	**12**	**0.0393**	**0.016**
6.9	9	Infrared	Mid-level Water Vapor	2	-100 °C	61/38 °C	12	0.0393	0.015
7.3	10	Infrared	Lower-level Water Vapor	2	-100 °C	61/58 °C	12	0.0393	0.023
8.4	11	Infrared	Cloud-Top Phase	2	-100 °C	61/68 °C	12	0.0393	0.022
9.6	12	Infrared	Ozone	2	-100 °C	61/38 °C	12	0.0393	0.021
10.3	13	Infrared	"Clean" Longwave Window	2	-100 °C	61/68 °C	12	0.0393	0.032
11.2	**14**	**Infrared**	**Longwave Window**	**2**	**-100 °C**	**61/68 °C**	**12**	**0.0393**	**0.022**
12.3	15	Infrared	"Dirty" Longwave Window	2	-100 °C	61/68 °C	12	0.0393	0.031
13.3	**16**	**Infrared**	**CO_2 Longwave**	**2**	**-100 °C**	**61/45 °C**	**12**	**0.0393**	**0.068**

Rows in bold are similar bands to current GOES

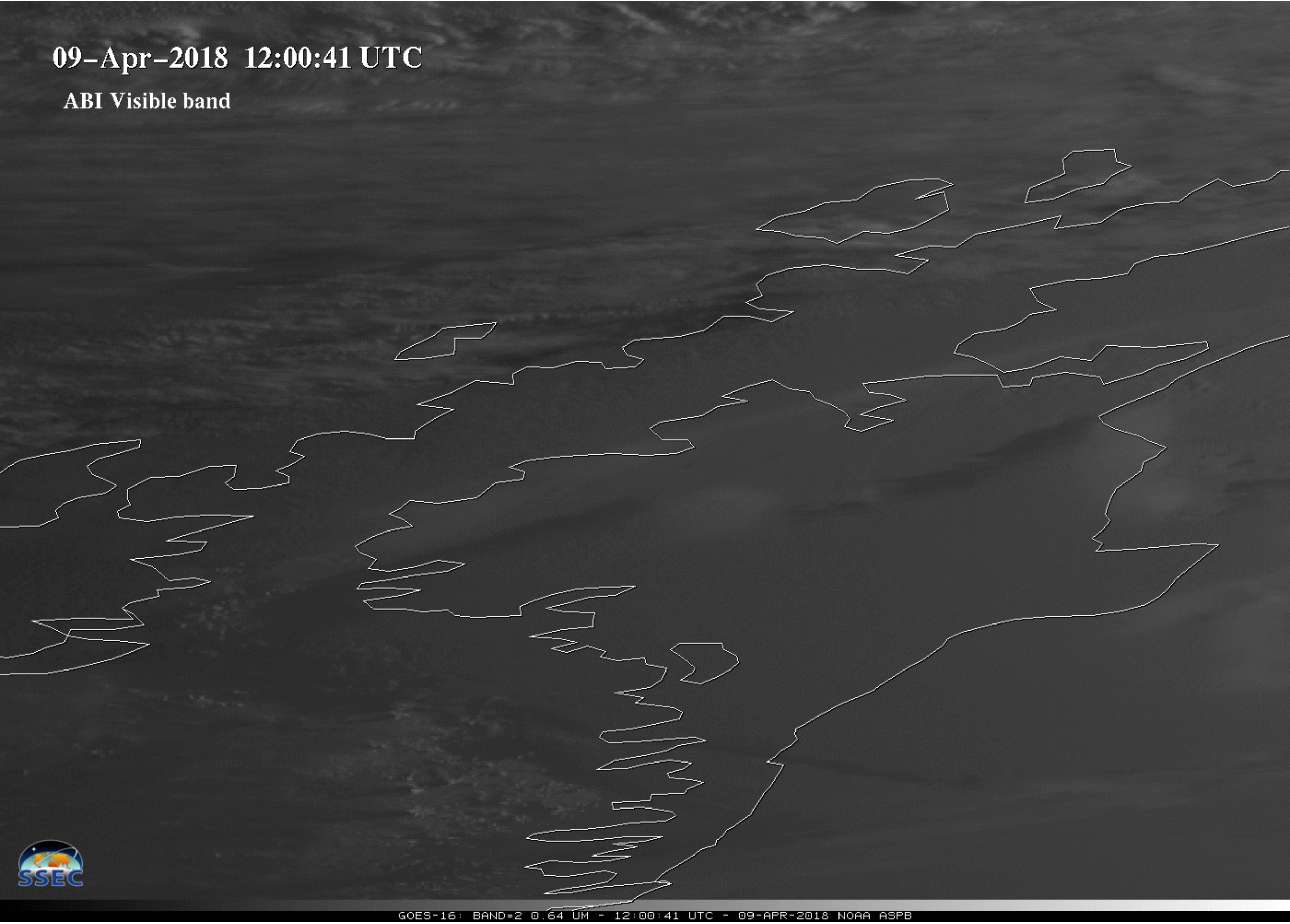

ABI FM1 v2 (Jan2014) Visible SRFs & Atmospheric Transmittance
1
2
3
4
5
6
Relative Response
Transmittance
Wavelength (μm)
0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.20 2.40
0.2 0.4 0.6 0.8 1.0
UW / CIMSS

ABI


Wavenumber (cm-1)
2857 2222 1818 1538 1333 1176 1053 952 870 800 741 690 645
US Standard Atmosphere (from RTTOV v11.3)
ABI SRFs
Brightness Temperature (K)
220 240 260 280 300
Relative Response
1
0.5
Wavelength (μm)
3.5 4.5 5.5 6.5 7.5 8.5 9.5 10.5 11.5 12.5 13.5 14.5 15.5
UW / CIMSS

ABI Visible Bands

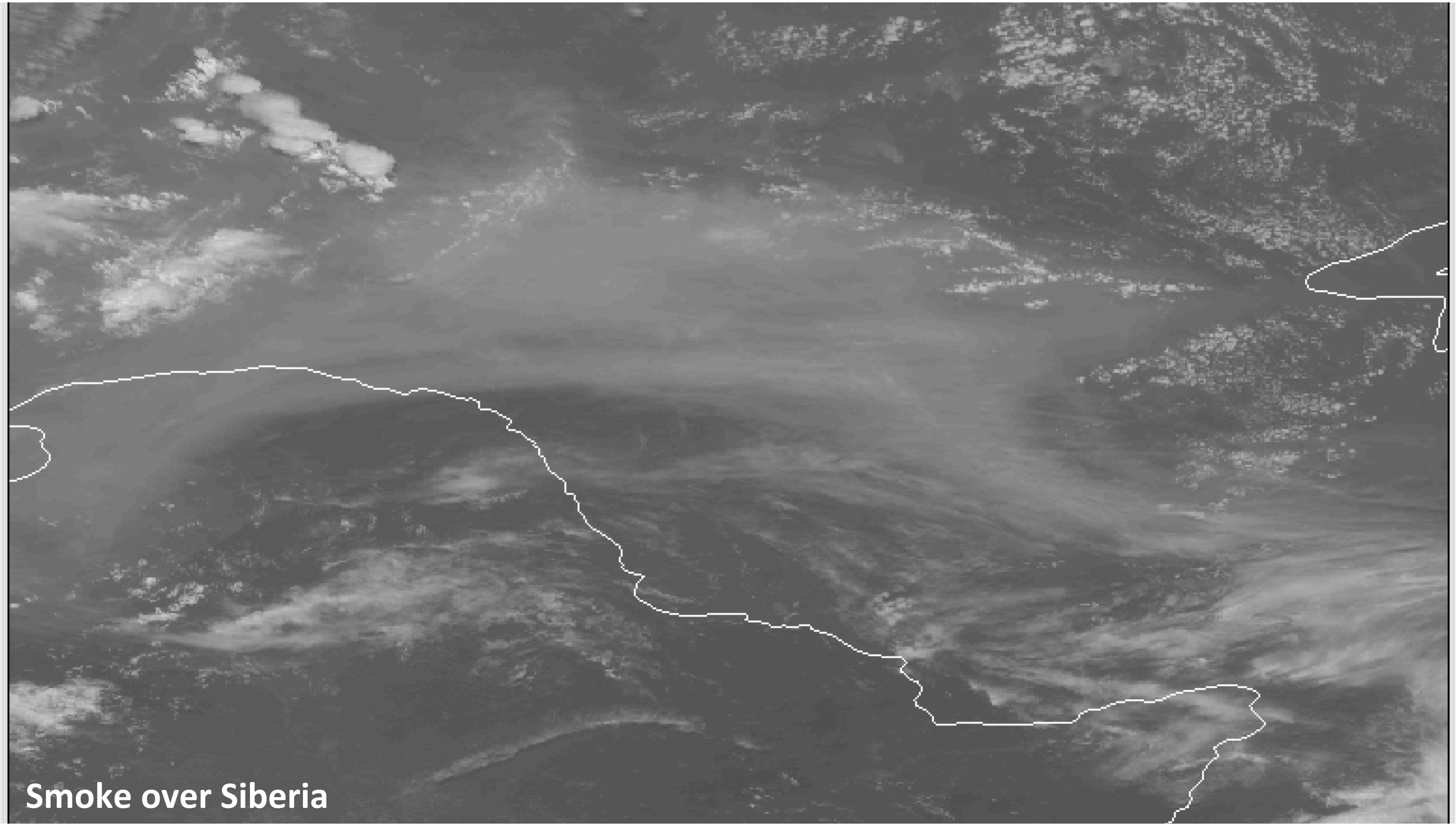
- Current GOES imager: one band at 1 km resolution
- GOES-R ABI: one band at 0.5 km resolution, one band at 1 km resolution
- Benefits to the operational meteorologist:
  - Better resolution of cloud features and cloud-enhanced boundaries
  - Easier monitoring of smoke and aerosols
  - Ability to produce pseudo-true color imagery



Antarctica, Local Zenith Angle ≅ 75 degrees, similar to interior Alaska from GOES-17

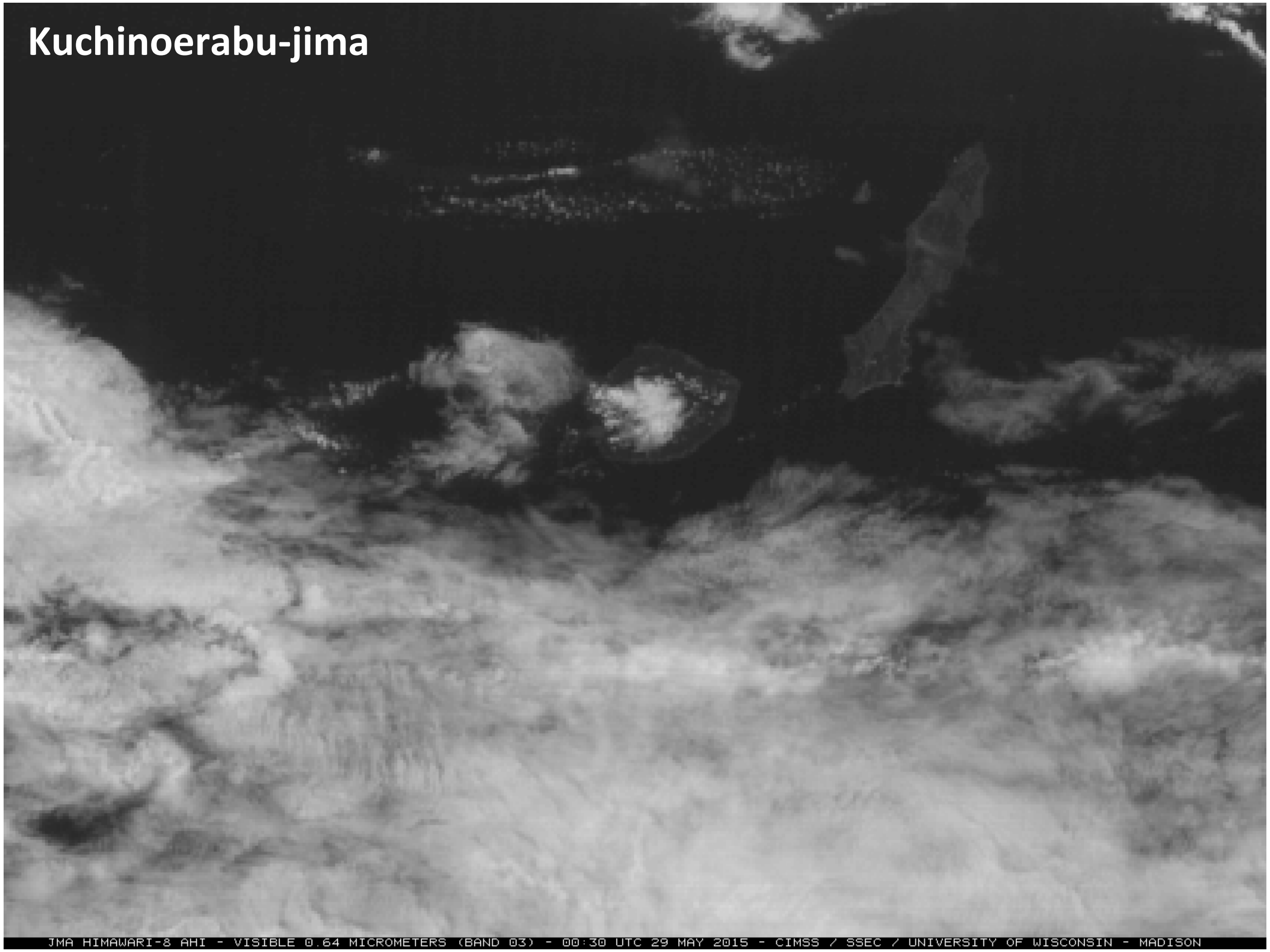
ABI/AHI Band 1 (0.47 µm)

Example from the Advanced Himawari Imager



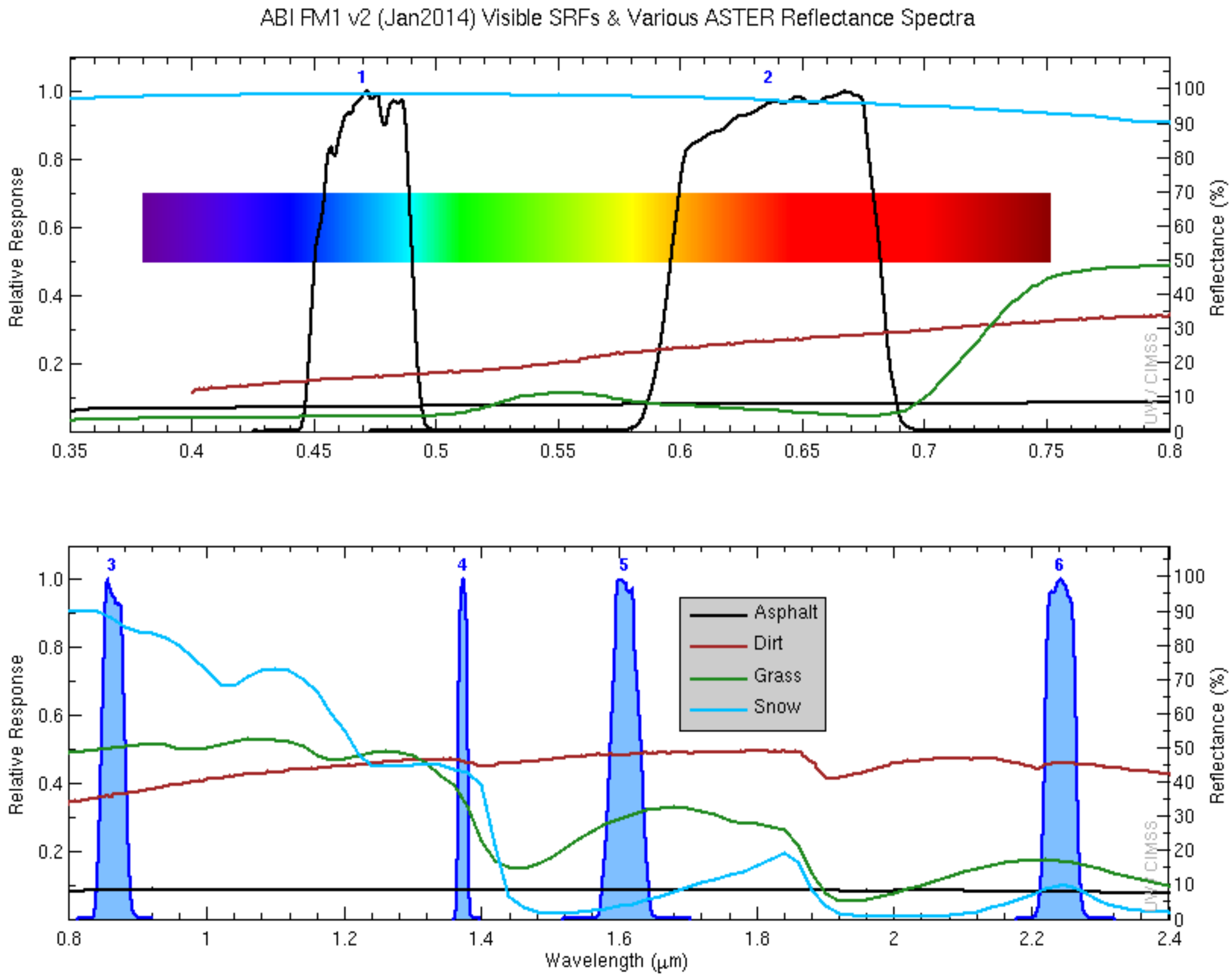
ABI Band 2 (0.64 µm)

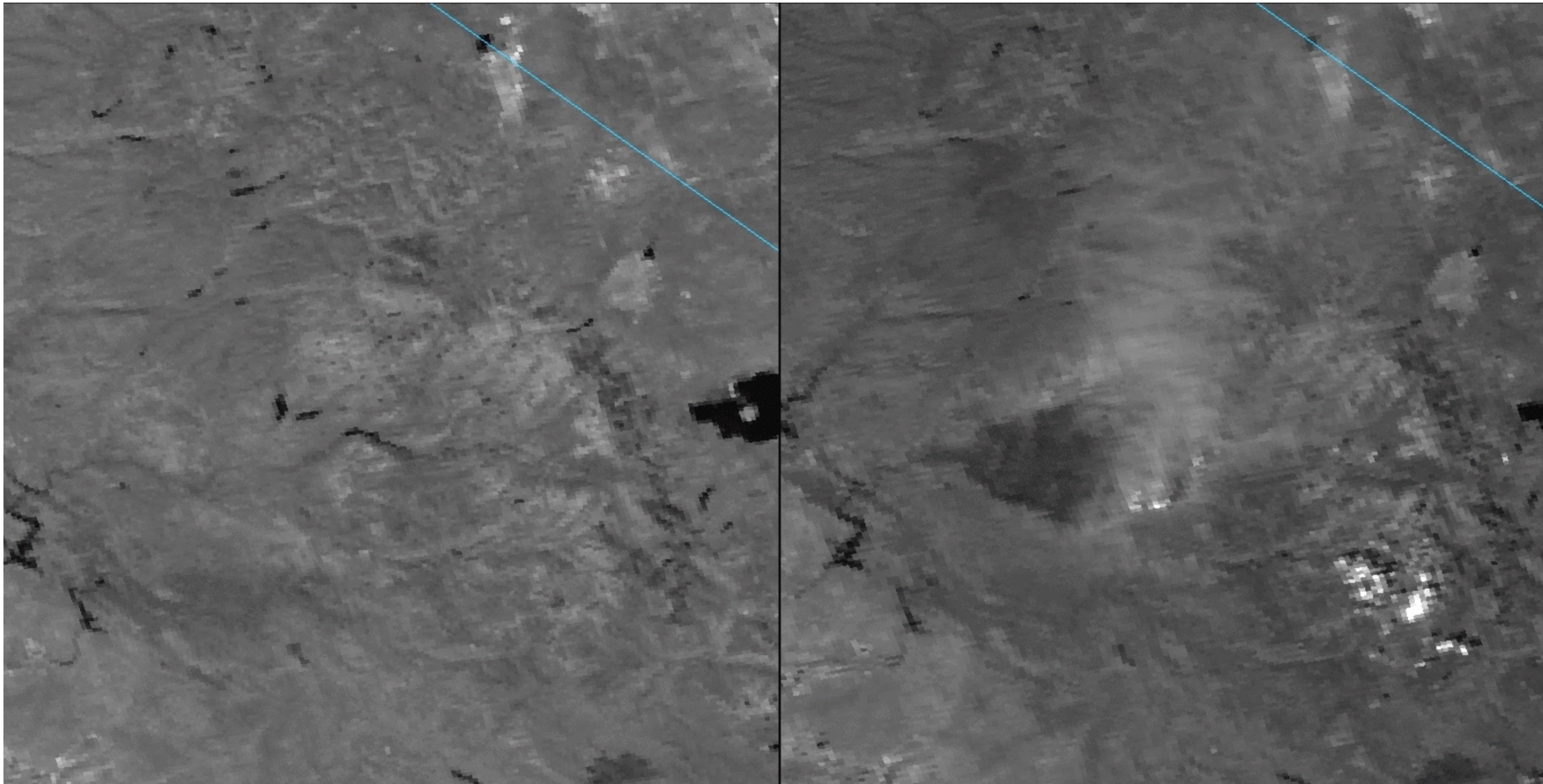
Example from the Advanced Himawari Imager (AHI)



ABI Near-Infrared Bands

- Current GOES imager: No near-infrared bands
- GOES-R ABI: Four near-infrared bands, two at 1 km resolution, two at 2 km resolution
- Benefits to the operational meteorologist:
  - Depiction of vegetation health/coverage
  - Sharper coastlines and easier detection of inland river flooding
  - Easier cirrus cloud and cloud-phase discrimination
  - Nocturnal fire detection


ABI FM1 v2 (Jan2014) Visible SRFs & Various ASTER Reflectance Spectra
Relative Response
Reflectance (%)
1
2
3
4
5
6
Asphalt
Dirt
Grass
Snow
Wavelength (μm)
UW / CIMSS

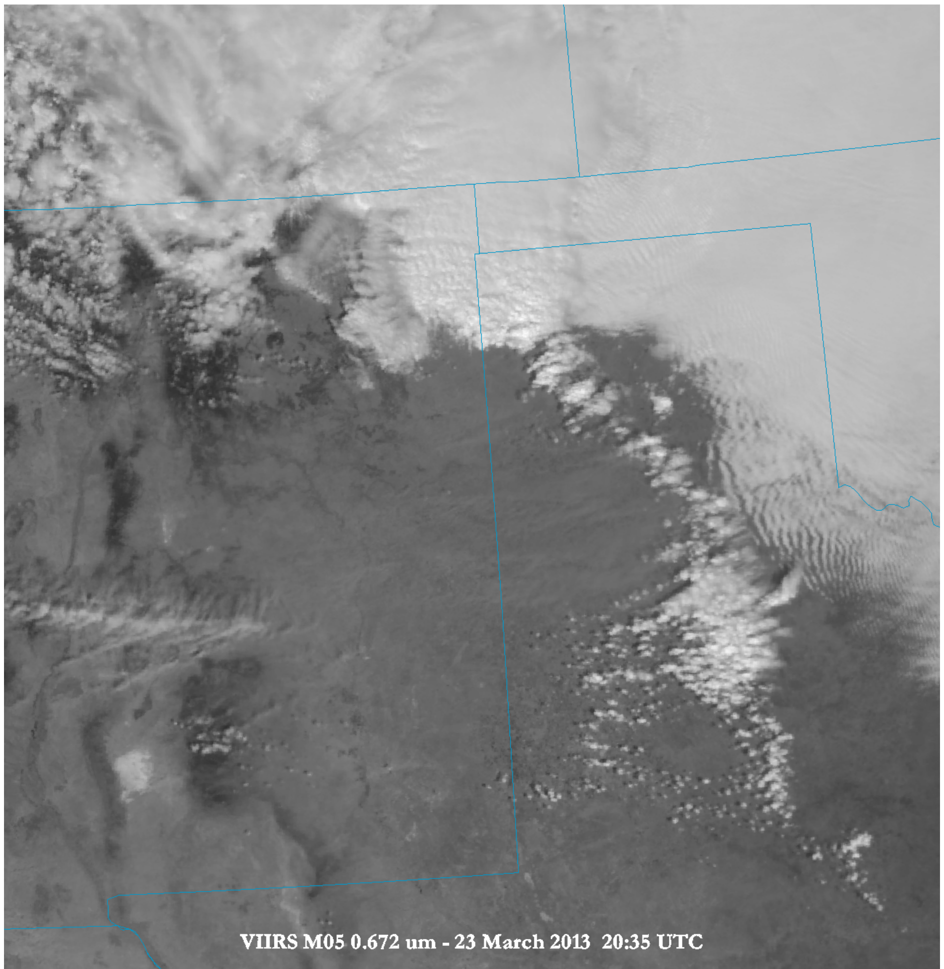


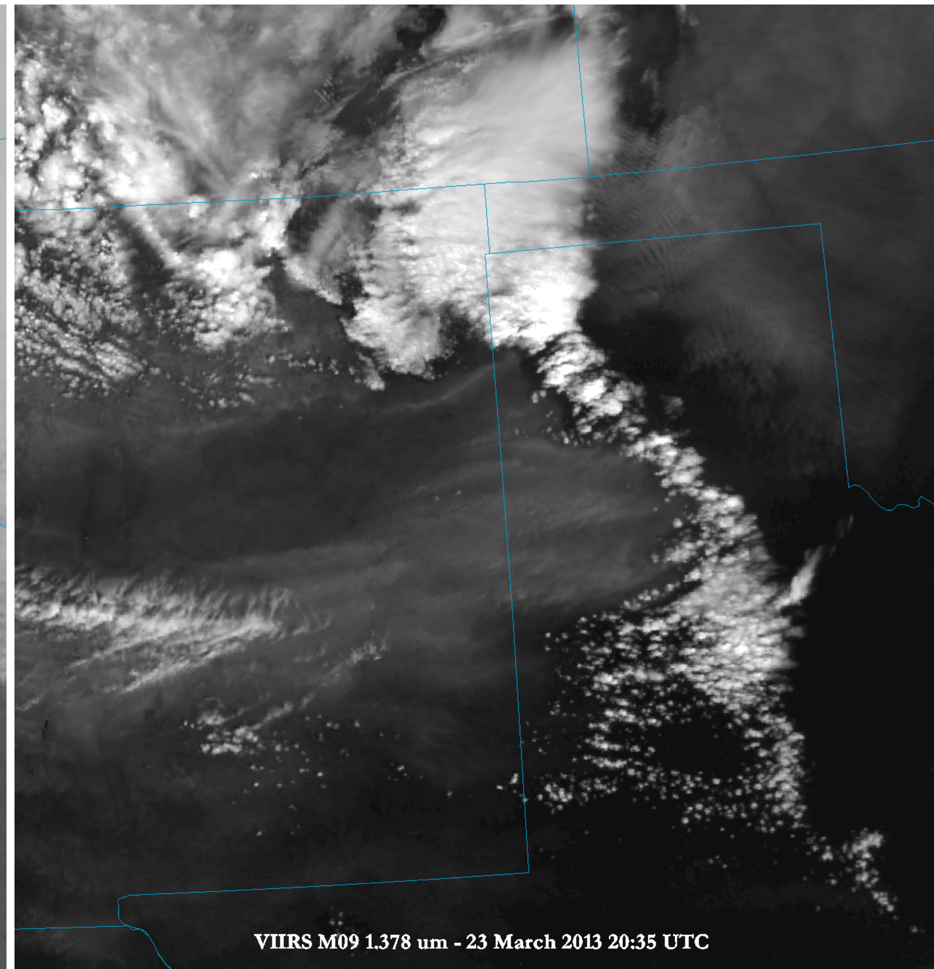
California Rim Fire

VIIRS M7 band (0.865 µm) on 13 August 2013 (left) compared to 30 August 2013 (right)
Similar imagery will be provided from ABI Band 3 (0.86 µm)

ABI Band 4 (1.4 μm)

Example from the Visible Infrared Imaging Radiometer Suite (VIIRS)

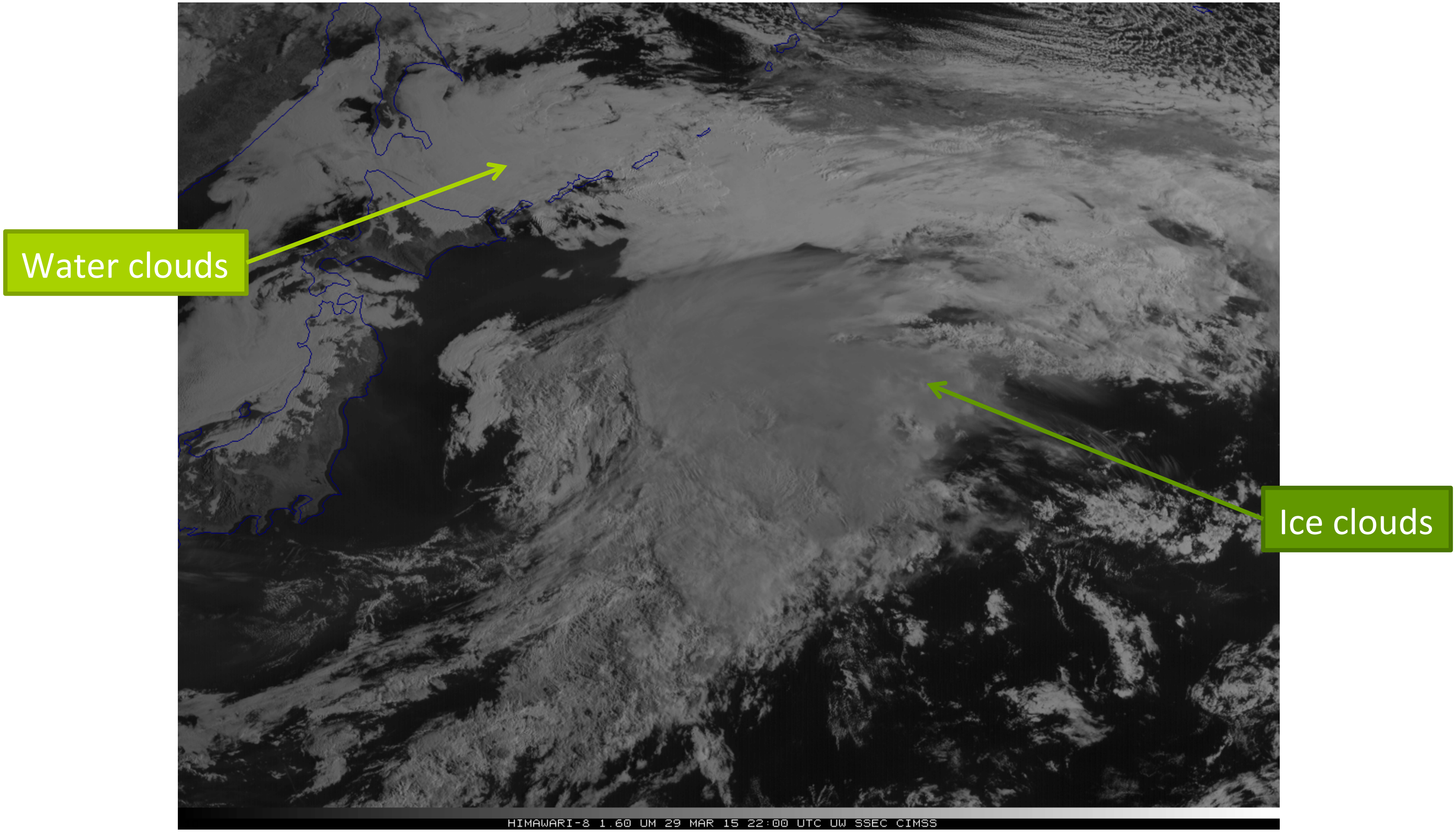




In dry environments, the ABI Band 4 is useful for identifying areas of dust, compared to traditional visible imagery.

ABI/AHI Band 5 (1.6 µm)

Example from the Advanced Himawari Imager



MODIS 0.65 μm

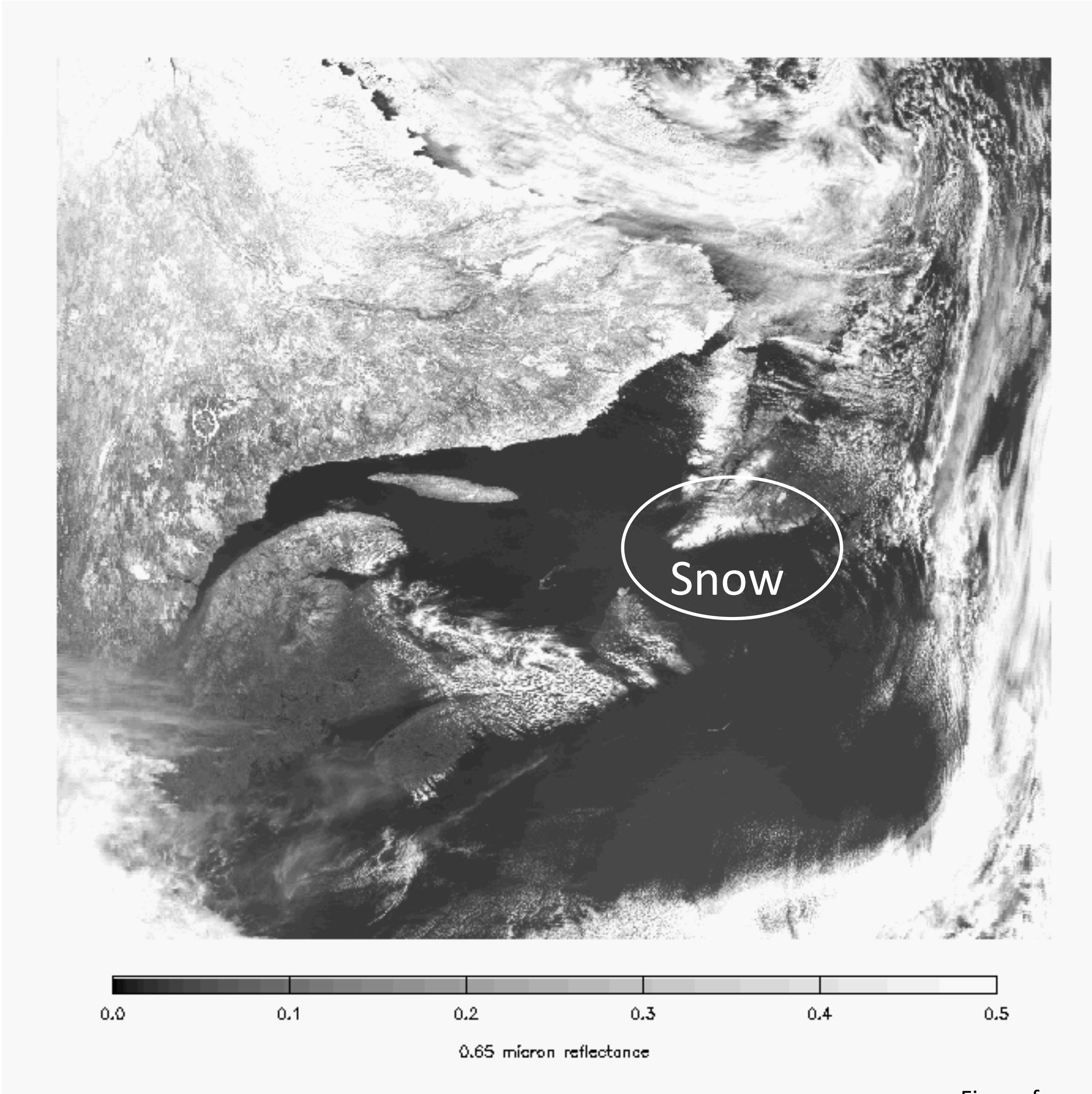


Figure from A. Heidinger, ASPB

MODIS 1.6 µm

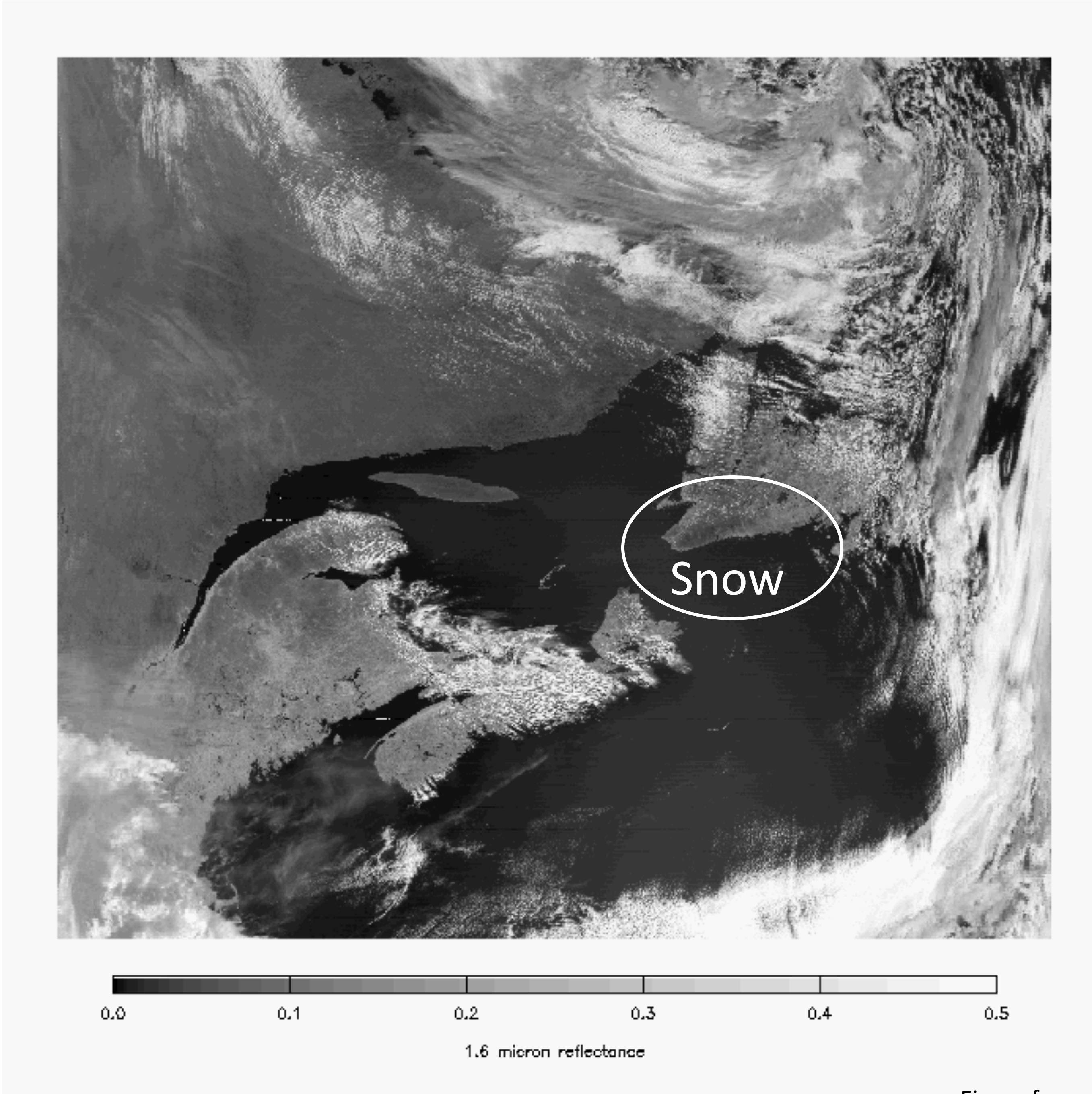
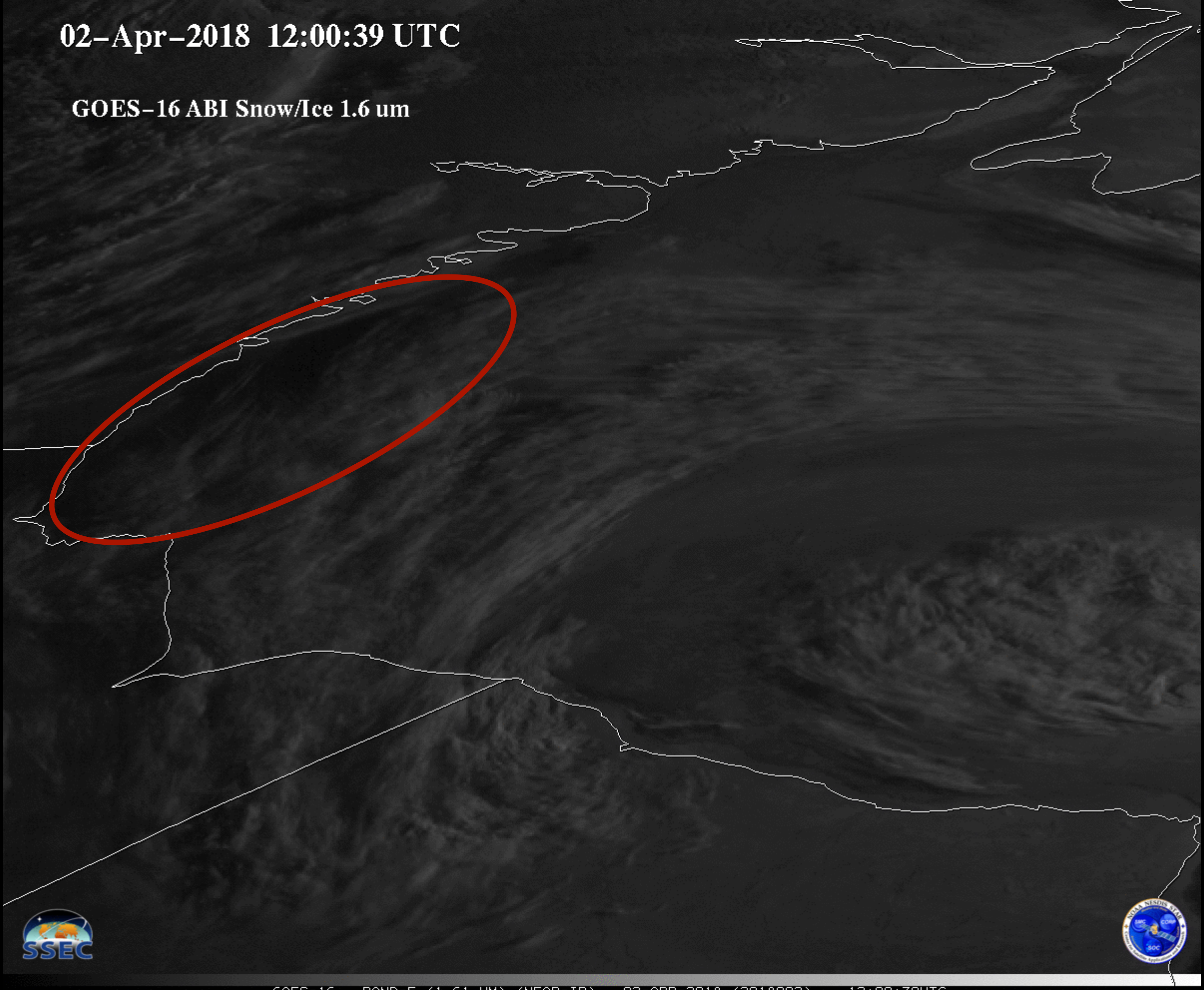
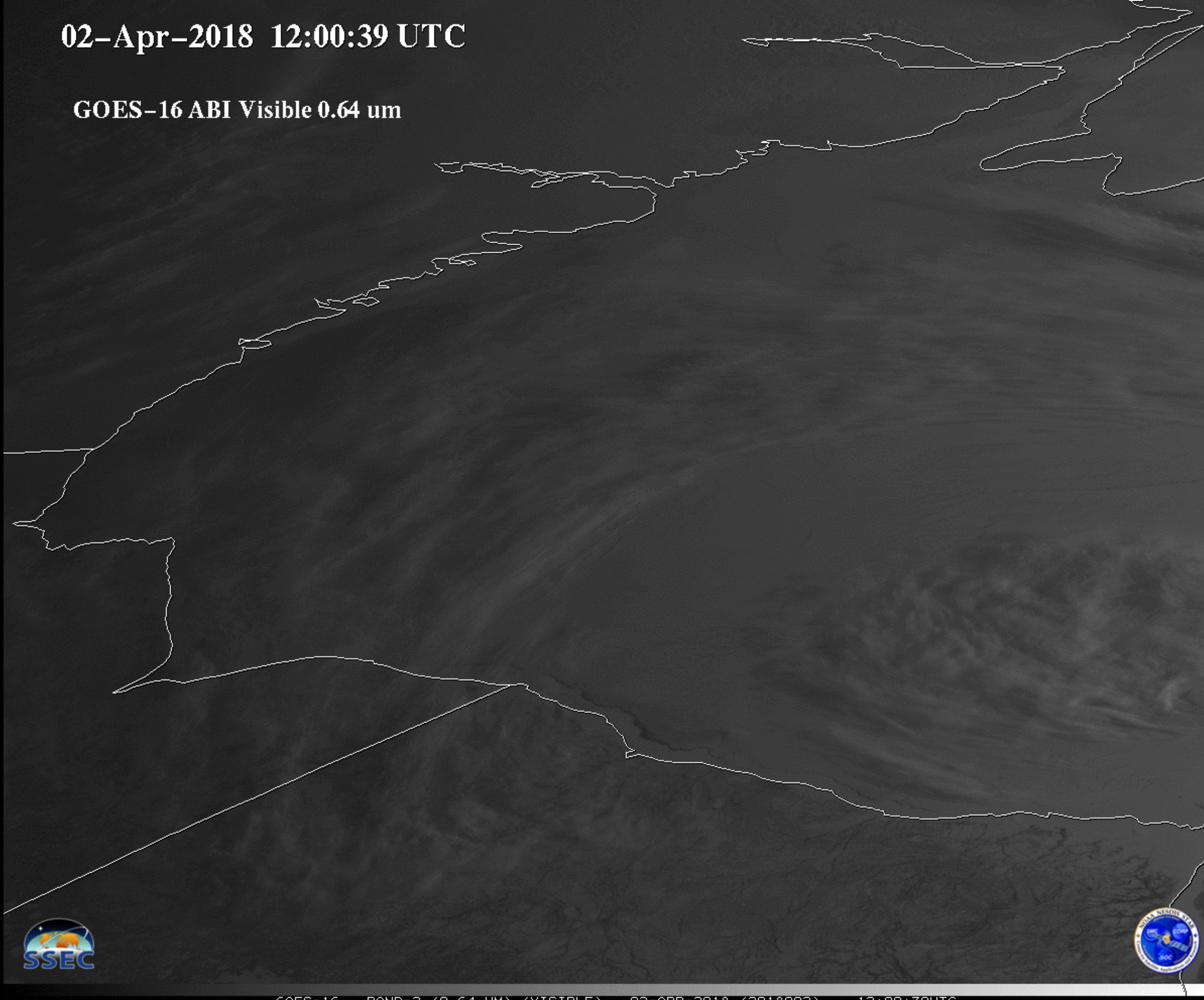
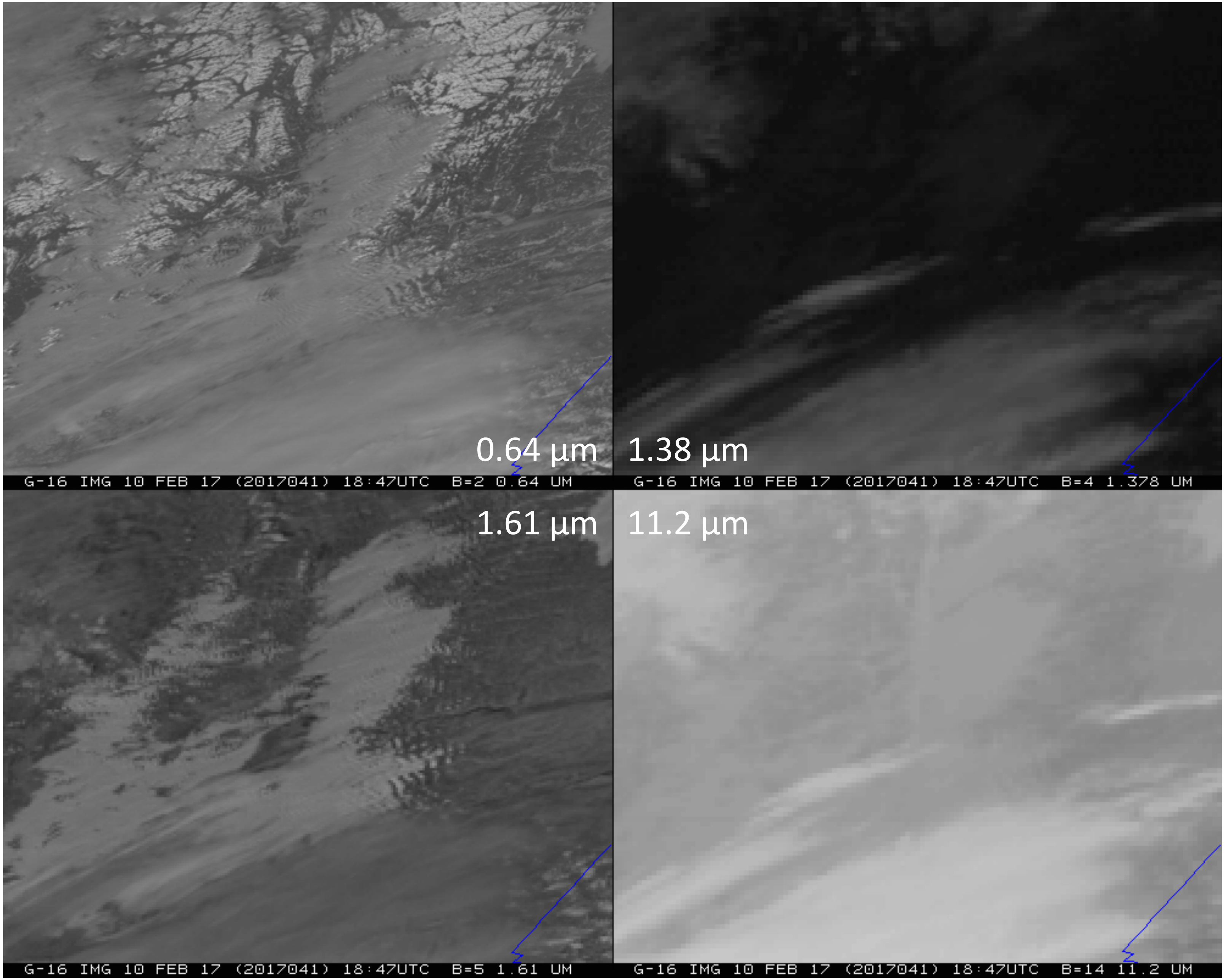


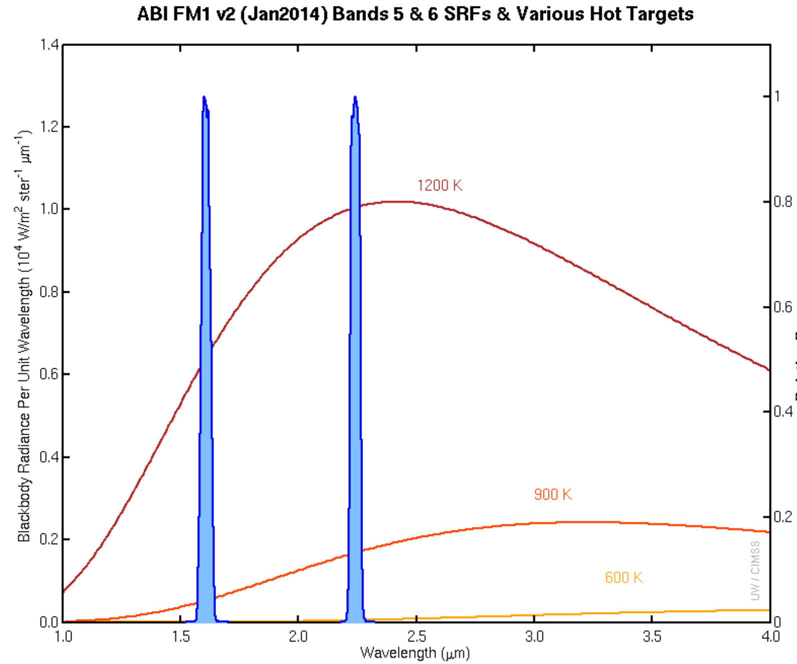
Figure from A. Heidinger, ASPB

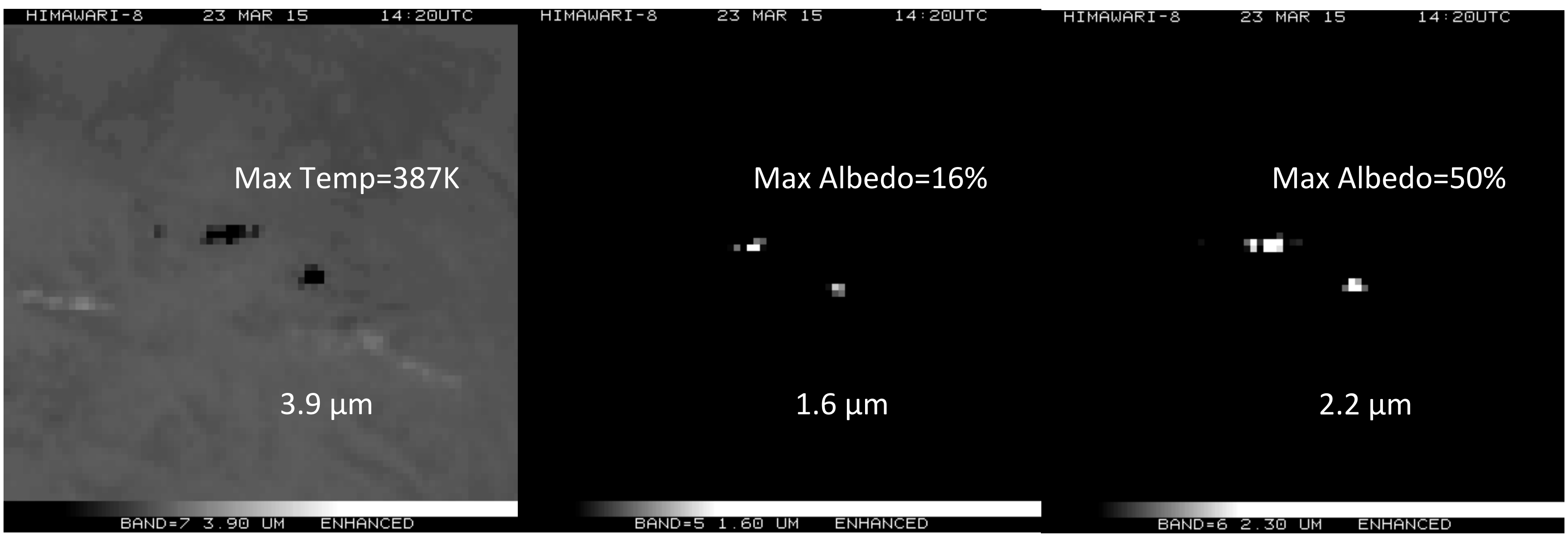

02–Apr–2018 12:00:39 UTC
GOES–16 ABI Snow/Ice 1.6 um
SSEC
GOES-16 BAND=5 (1.61 UM) (NEAR-IR) 02-APR-2018 (2018092) 12:00:39UTC


02-Apr-2018 12:00:39 UTC
GOES-16 ABI Visible 0.64 um
SSEC
GOES-16 BAND=2 (0.64 UM) (VISIBLE) 02-APR-2018 (2018092) 12:00:39UTC


0.64 µm
G-16 IMG 10 FEB 17 (2017041) 18:47UTC B=2 0.64 UM
1.38 µm
G-16 IMG 10 FEB 17 (2017041) 18:47UTC B=4 1.378 UM
1.61 µm
G-16 IMG 10 FEB 17 (2017041) 18:47UTC B=5 1.61 UM
11.2 µm
G-16 IMG 10 FEB 17 (2017041) 18:47UTC B=14 11.2 UM

Why can we observe hot fires in the near-infrared bands?

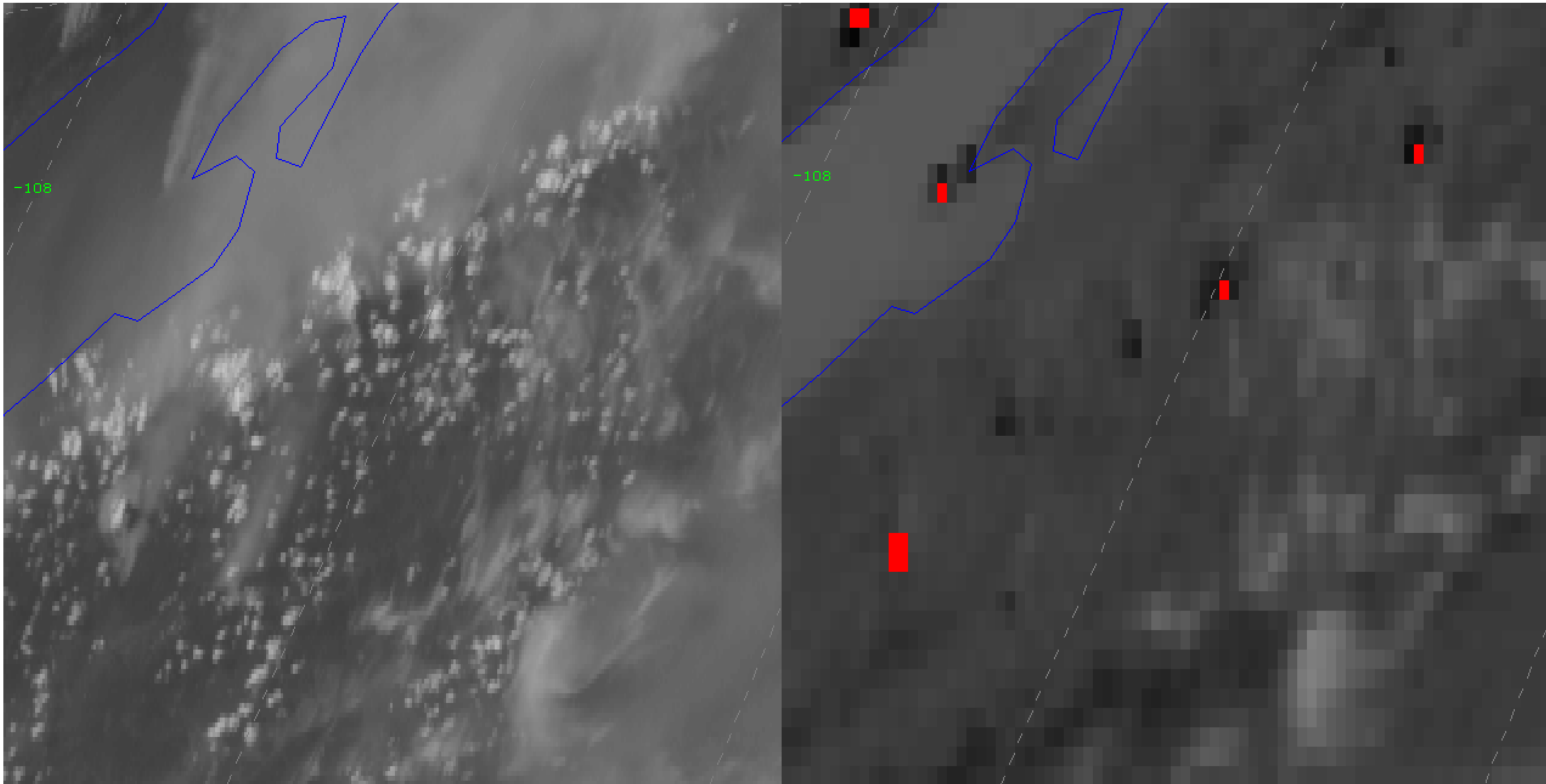




Himawari images over Australia on 23 March 2015 of bands 3.9 µm, 1.6 µm, and 2.2 µm depict “hot spot” fires. **The AHI 1.6 µm is nominally 2 km, while that ABI band is 1 km.**

ABI Infrared Bands

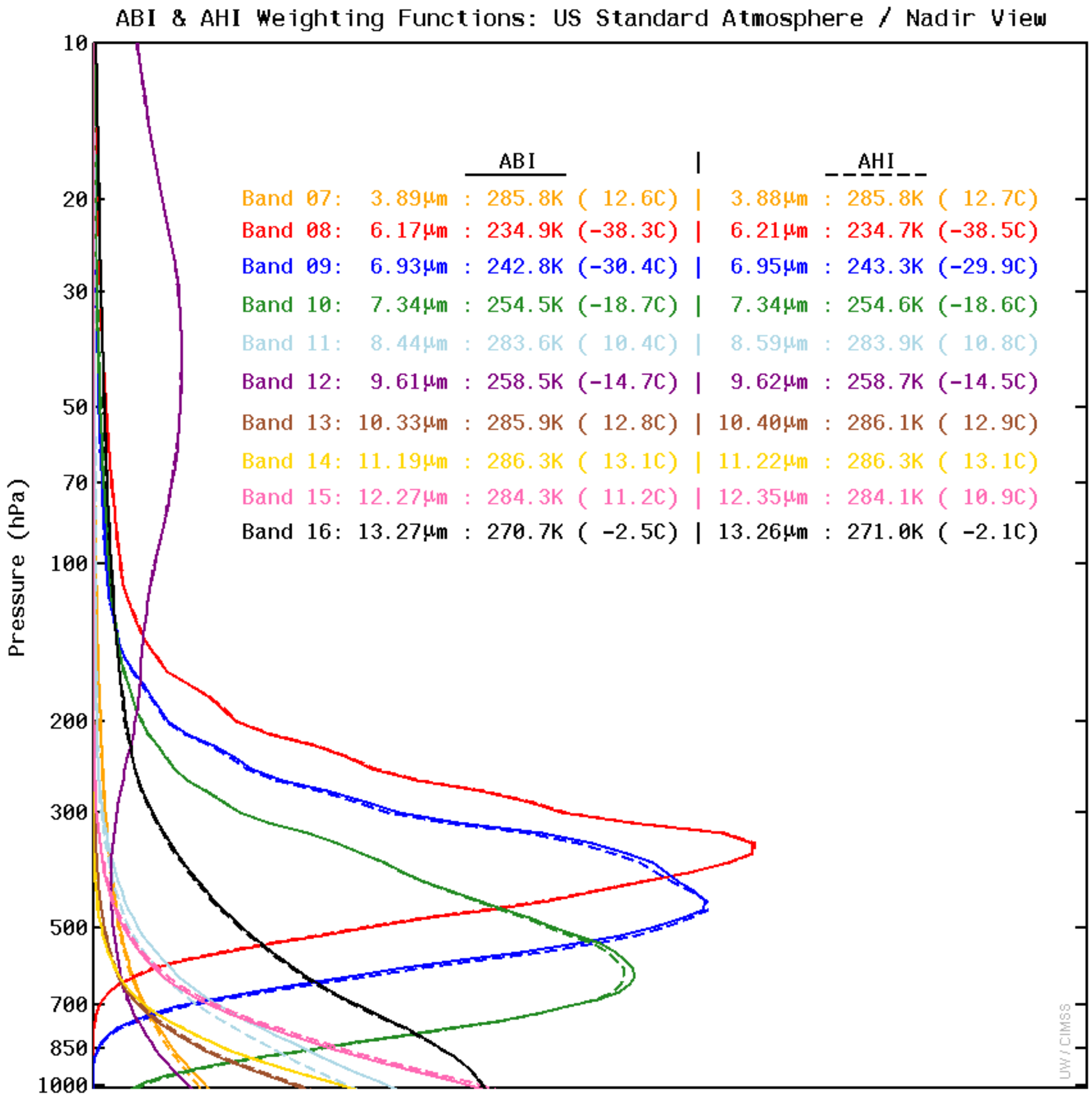
- Current GOES imager: four bands at 4 km resolution
- GOES-R ABI: ten bands at 2 km resolution
- Benefits to the operational meteorologist:
  - Fire detection with better thermal signal
  - Resolution of middle and upper tropospheric water vapor features
  - Detection of sulfur dioxide and upper-atmosphere ozone
  - Several window channels for discerning low-level water vapor gradients

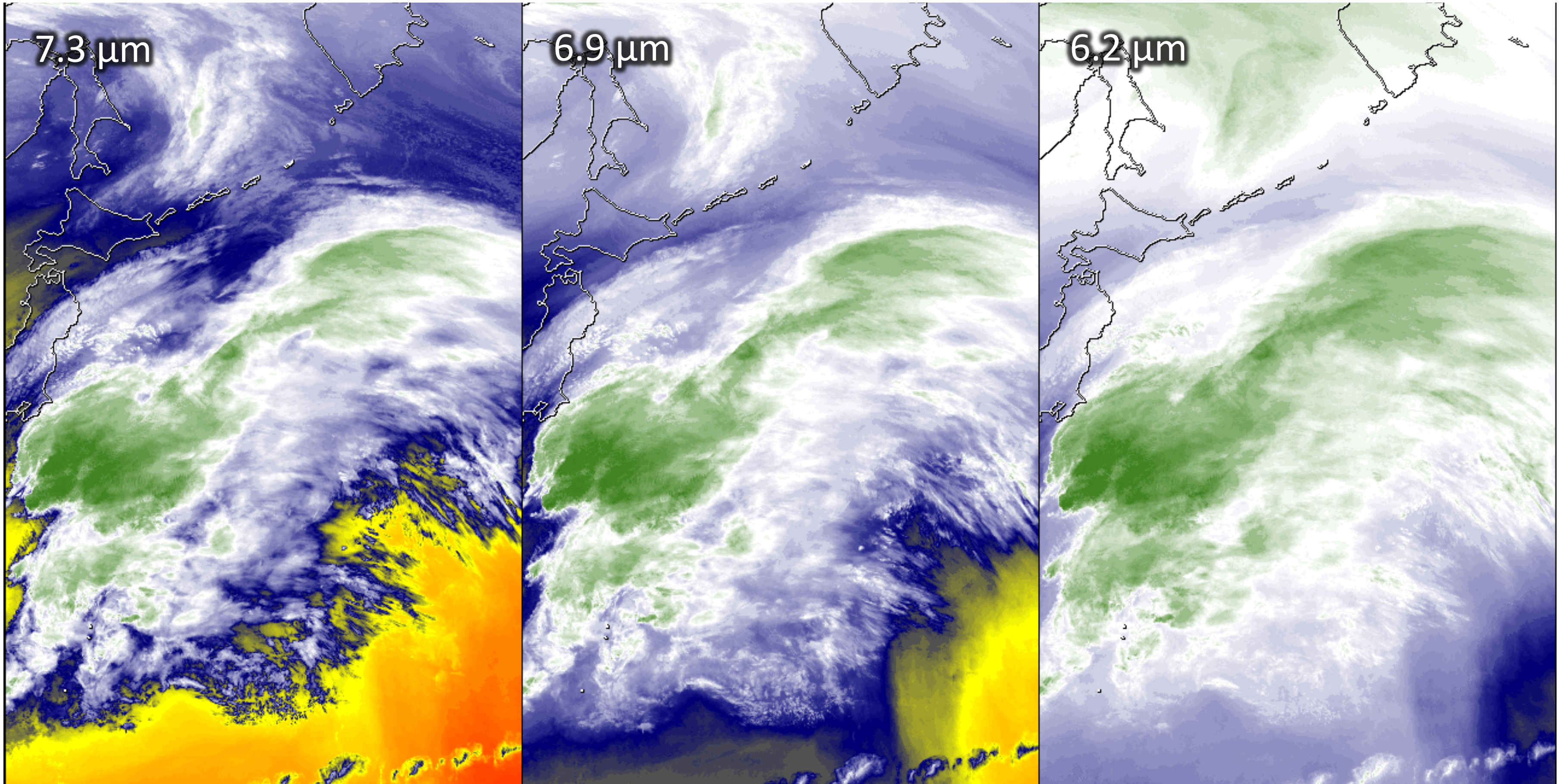


Pyrocumulonimbus near Lake Baikal (southern Russia)

15 July 2015

Local zenith angle ≅ 70 degrees from Himawari-8/9, similar to southern Alaska from GOES-17

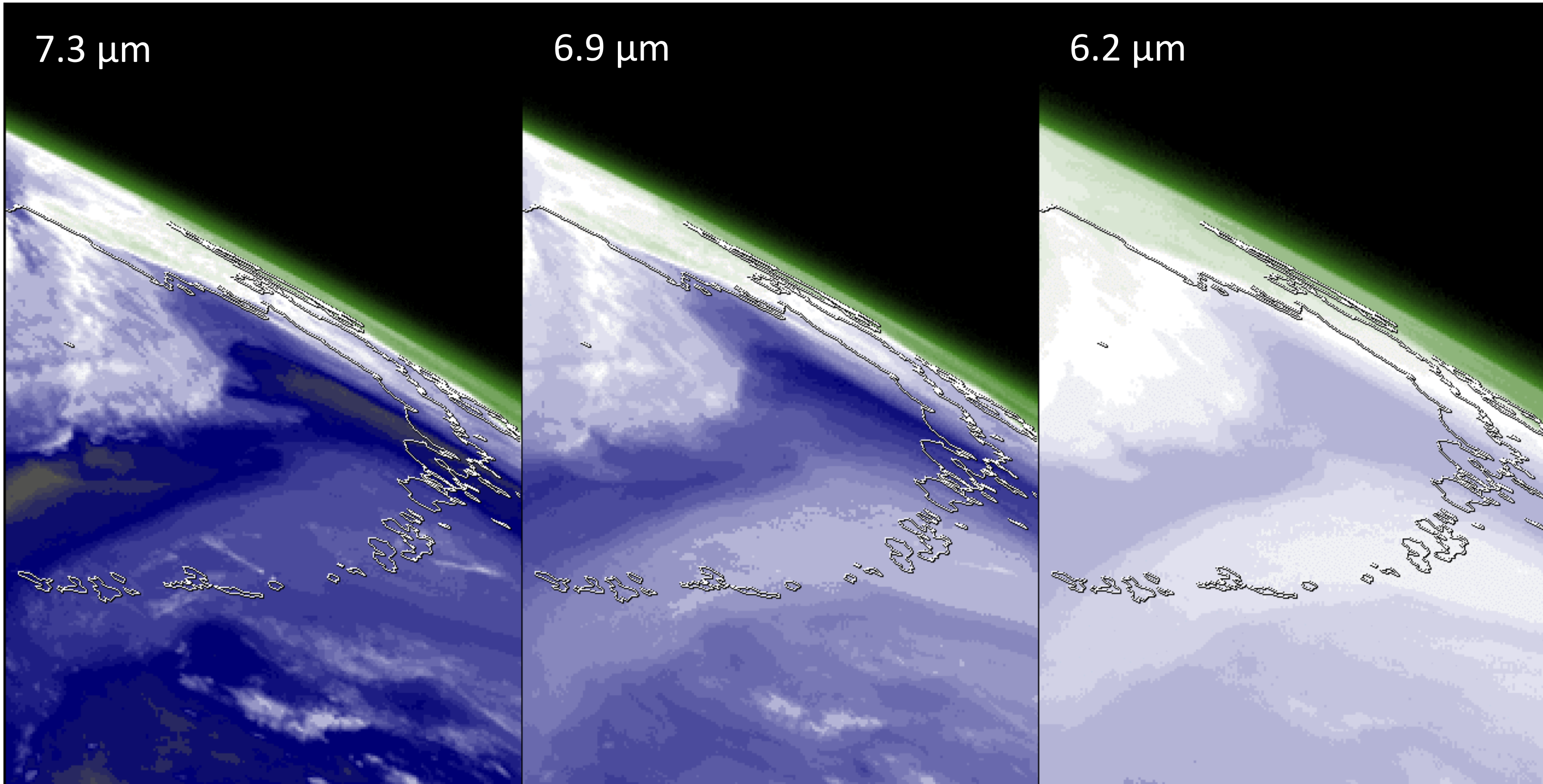

ABI & AHI Weighting Functions: US Standard Atmosphere / Nadir View
ABI | AHI
Band 07: 3.89µm : 285.8K (12.6C) | 3.88µm : 285.8K (12.7C)
Band 08: 6.17µm : 234.9K (-38.3C) | 6.21µm : 234.7K (-38.5C)
Band 09: 6.93µm : 242.8K (-30.4C) | 6.95µm : 243.3K (-29.9C)
Band 10: 7.34µm : 254.5K (-18.7C) | 7.34µm : 254.6K (-18.6C)
Band 11: 8.44µm : 283.6K (10.4C) | 8.59µm : 283.9K (10.8C)
Band 12: 9.61µm : 258.5K (-14.7C) | 9.62µm : 258.7K (-14.5C)
Band 13: 10.33µm : 285.9K (12.8C) | 10.40µm : 286.1K (12.9C)
Band 14: 11.19µm : 286.3K (13.1C) | 11.22µm : 286.3K (13.1C)
Band 15: 12.27µm : 284.3K (11.2C) | 12.35µm : 284.1K (10.9C)
Band 16: 13.27µm : 270.7K (-2.5C) | 13.26µm : 271.0K (-2.1C)
Pressure (hPa)
10
20
30
50
70
100
200
300
500
700
850
1000
UW / CIMSS



Himawari-8 view of transiting mid-latitude cyclones

East of Japan, 14 March 2016, Starting 12:00 UTC

Source: CIMSS Satellite Blog (http://cimss.ssec.wisc.edu/goes/blog/)



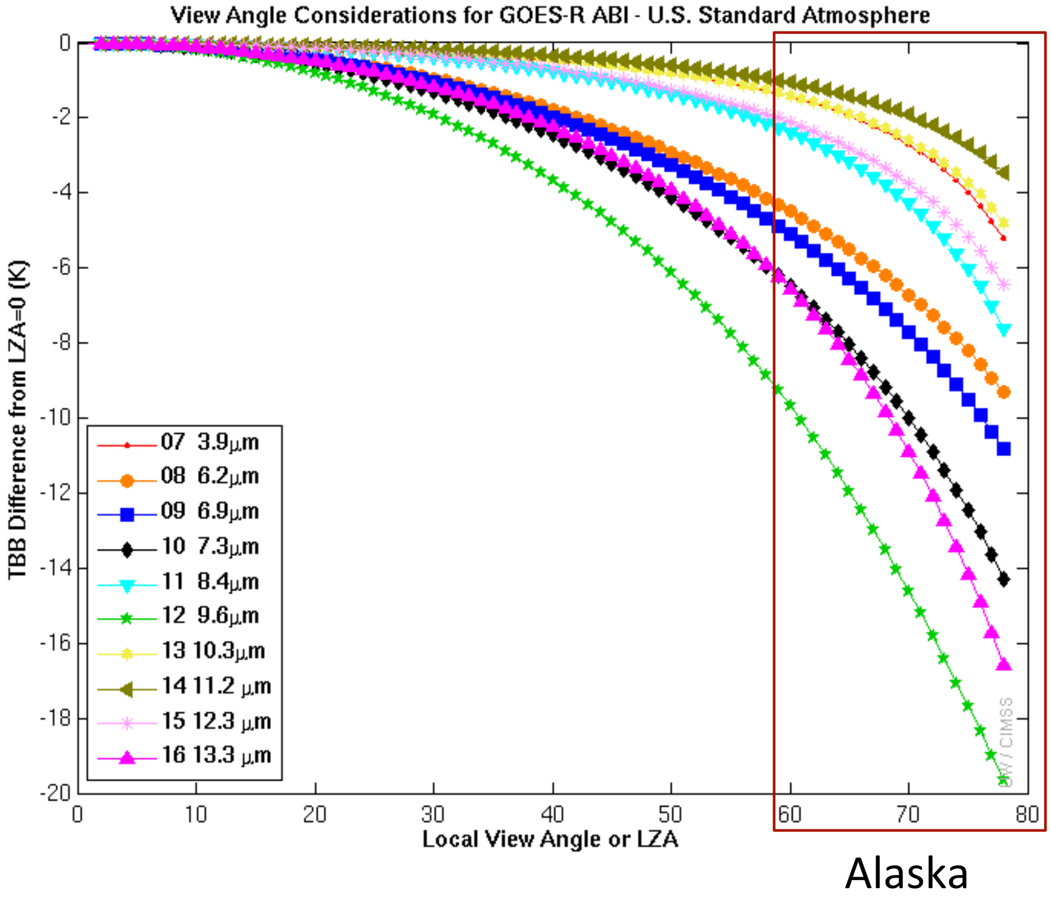
Himawari-8 view of Mount Pavlof eruption

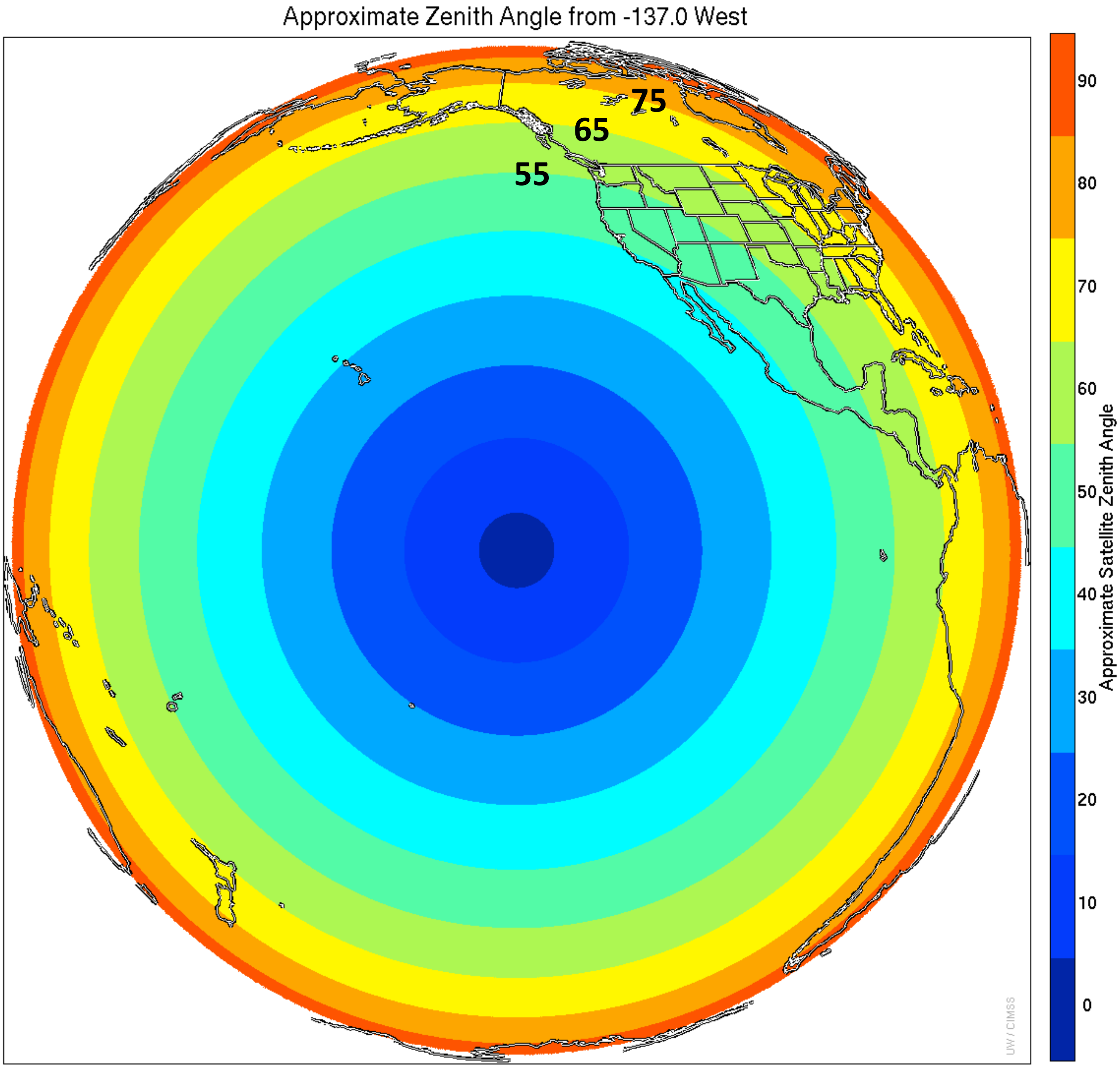
Alaska Peninsula, 28 March 2016, Starting 0:00 UTC

Source: CIMSS Satellite Blog (http://cimss.ssec.wisc.edu/goes/blog/)

View Angle Considerations

Depends on the absorptive molecular species in each band




Approximate Zenith Angle from -137.0 West
75
65
55
90
80
70
60
50
40
30
20
10
0
Approximate Satellite Zenith Angle
UW / CIMSS

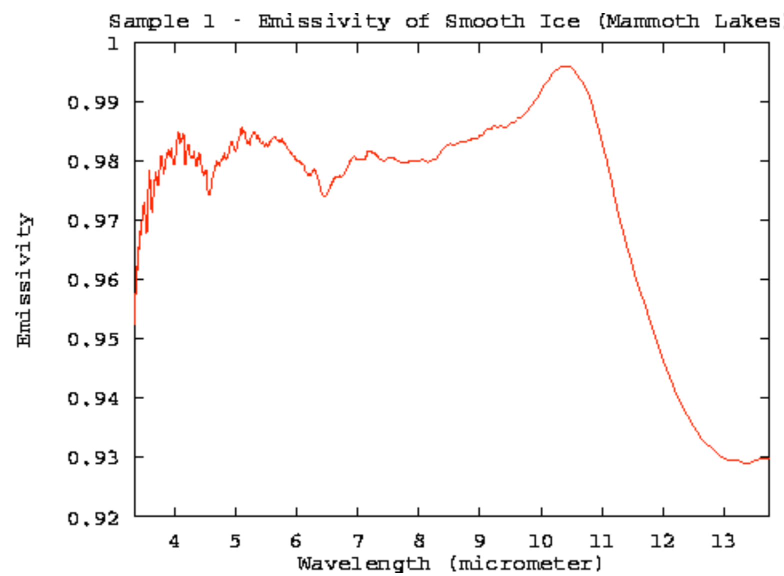
ABI Bands of Interest

to Marine and Arctic Weather Community

- Reflectance:
  ABI Bands 2 (0.64 µm), 3 (0.86 µm), and 5 (1.6 µm)

- Brightness Temperature:
  ABI Bands 13 (10.3 µm), 14 (11.2 µm), and 15 (12.3 µm)

New ABI bands collectively enable better discrimination between land, sea, ice, water cloud, and ice cloud.



Source: http://www.icess.ucsb.edu/modis/EMIS/html/em.html

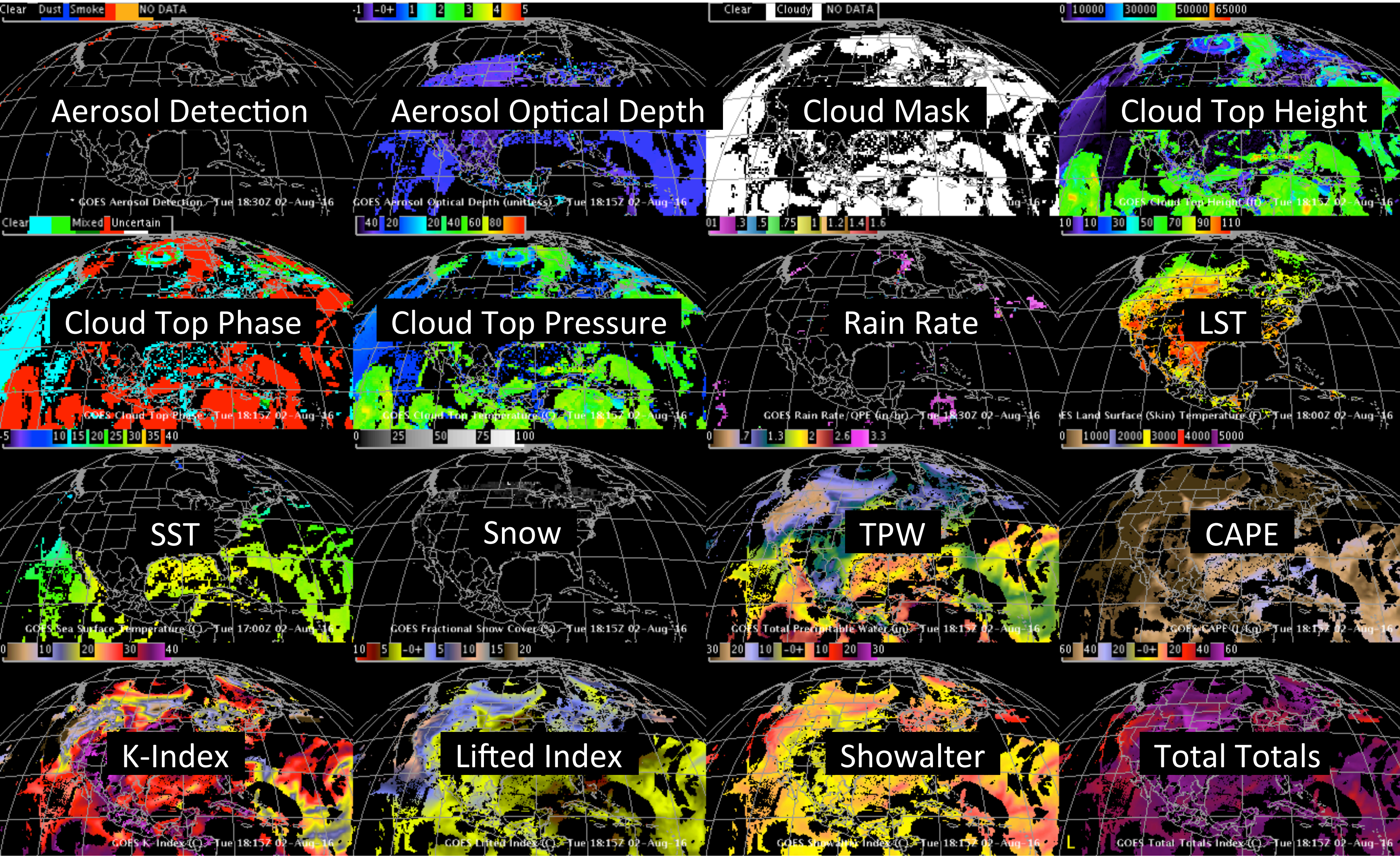
Advanced Baseline Imager Spectral Bands

AHI Band	AHI Approximate Central Wavelength (µm)		ABI Approximate Central Wavelength (µm)	ABI Band	Type	Nickname
1	0.47		0.47	1	Visible	Blue
2	0.51				Visible	Green
3	**0.64**		**0.64**	**2**	**Visible**	**Red**
4	0.86		0.86	3	Near-Infrared	Veggie
			1.4	4	Near-Infrared	Cirrus
5	1.6	**F**	1.6	5	Near-Infrared	Snow/Ice
6	2.3	**I R**	2.2	6	Near-Infrared	Cloud Particle Size
7	**3.9**	**E**	**3.9**	**7**	**Infrared**	**Shortwave Window**
8	**6.2**		**6.2**	**8**	**Infrared**	**Upper-level Water Vapor**
9	6.9		6.9	9	Infrared	Mid-level Water Vapor
10	7.3		7.3	10	Infrared	Lower-level Water Vapor
11	8.6		8.4	11	Infrared	Cloud-Top Phase
12	9.6		9.6	12	Infrared	Ozone
13	10.4		10.3	13	Infrared	"Clean" Longwave Window
14	**11.2**		**11.2**	**14**	**Infrared**	**Longwave Window**
15	12.4		12.3	15	Infrared	"Dirty" Longwave Window
16	**13.3**		**13.3**	**16**	**Infrared**	**CO_2 Longwave**

Rows in bold are similar bands to current GOES

Imagery Bit Depths

- Bit depth establishes the precision of the data. The higher the bit depth, the higher the precision.
- Previously, all imagery was displayed in AWIPS as eight bits (2^8 = 256 discrete values).
- New imagery is primarily 12 bits:
  - 14 bits (16,384 discrete values)
    - Band 7 (for fires, greater range)
  - 12 bits (4,096 discrete values)
    - All other bands
- Be aware of observable minimum and maximum values.



DOE-4 Simulated ABI Derived/Baseline Products in AWIPS II

Only certain baseline products are shown. This is not the complete set. Credit: CIMSS/ASPB

Defined Extent of Derived Products

No Alaska Coverage (Max LZA < 65 degrees only)	Portion of southeastern Alaska Only (65 ≤ Max LZA < 70 degrees)	Southeastern Alaska and Partial Aleutian Arc (Max LZA = 70 degrees)
• Aerosol Detection • Aerosol Optical Depth • Volcanic Ash: Detection and Height • Cloud Top Height • Cloud Top Pressure • Atmospheric Profiles • Derived Stability Indices • Total Precipitable Water • Derived Motion Winds • Snow Cover	• Cloud Optical Depth Cloud Particle Size Distribution • Cloud Top Phase • Cloud Top Temperature • Fire / Hot Spot Characterization • Sea Surface Temperature	• Rainfall Rate/QPE • Clear Sky Masks • Land Surface Temperature

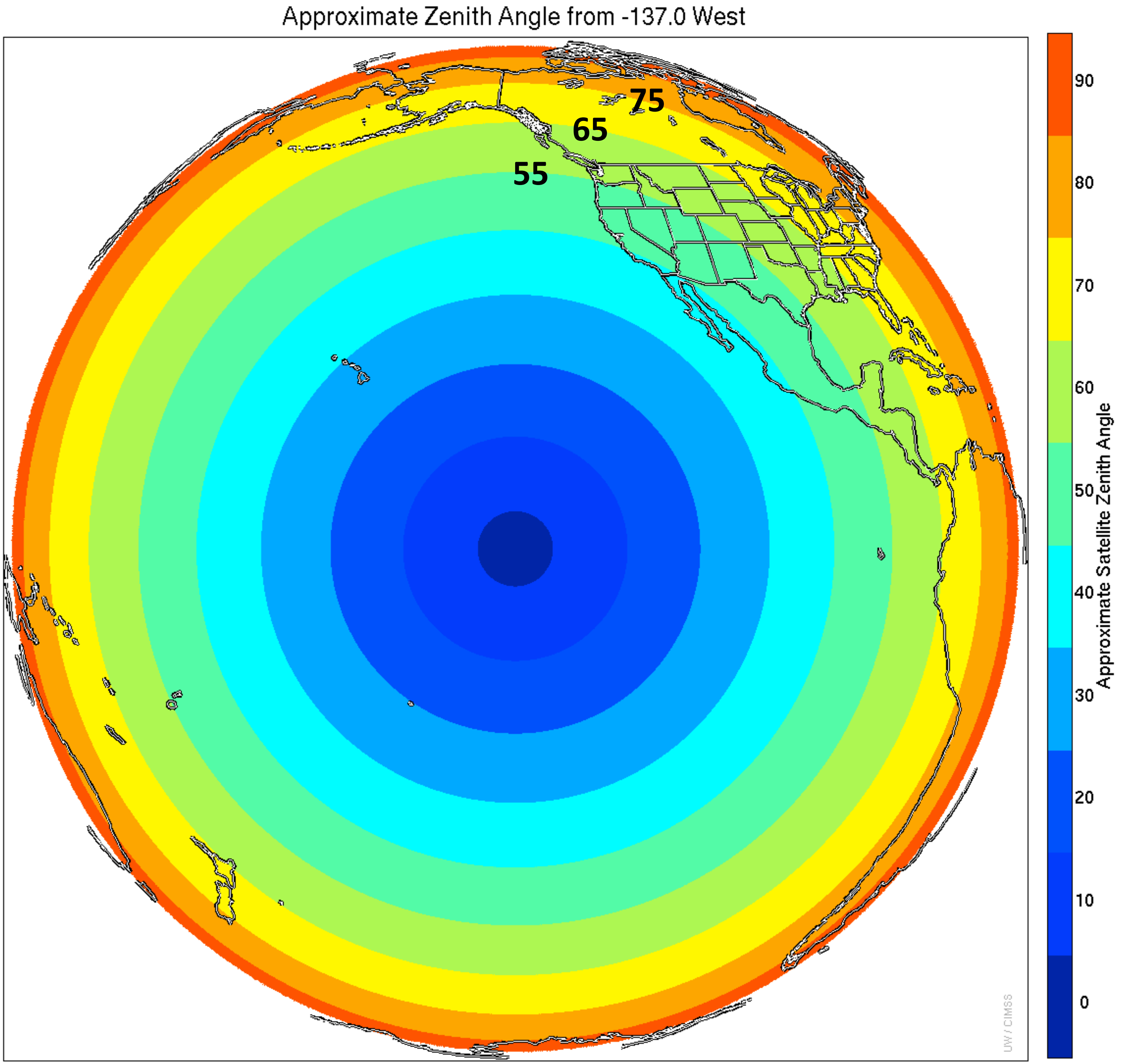
Source: GOES-R F&PS

Probable Extent of Derived Products

Portion of southeastern Alaska Only (Max LZA < 70 degrees)	Southeastern Alaska and Partial Aleutian Arc (Max LZA = 70 degrees)	Most of Alaska (Max LZA = 80 degrees)
• Cloud Optical Depth • Cloud Particle Size Distribution • Sea Surface Temperature	• Cloud Top Height • Cloud Top Pressure • Cloud Top Temperature • Clear Sky Masks • Rainfall Rate / QPE • Land Surface Temperature • Derived Stability Indices • Total Precipitable Water	• Aerosol Detection • Volcanic Ash: Detection and Height • Cloud Top Phase • Fire / Hot Spot Characterization (Fire Power only)

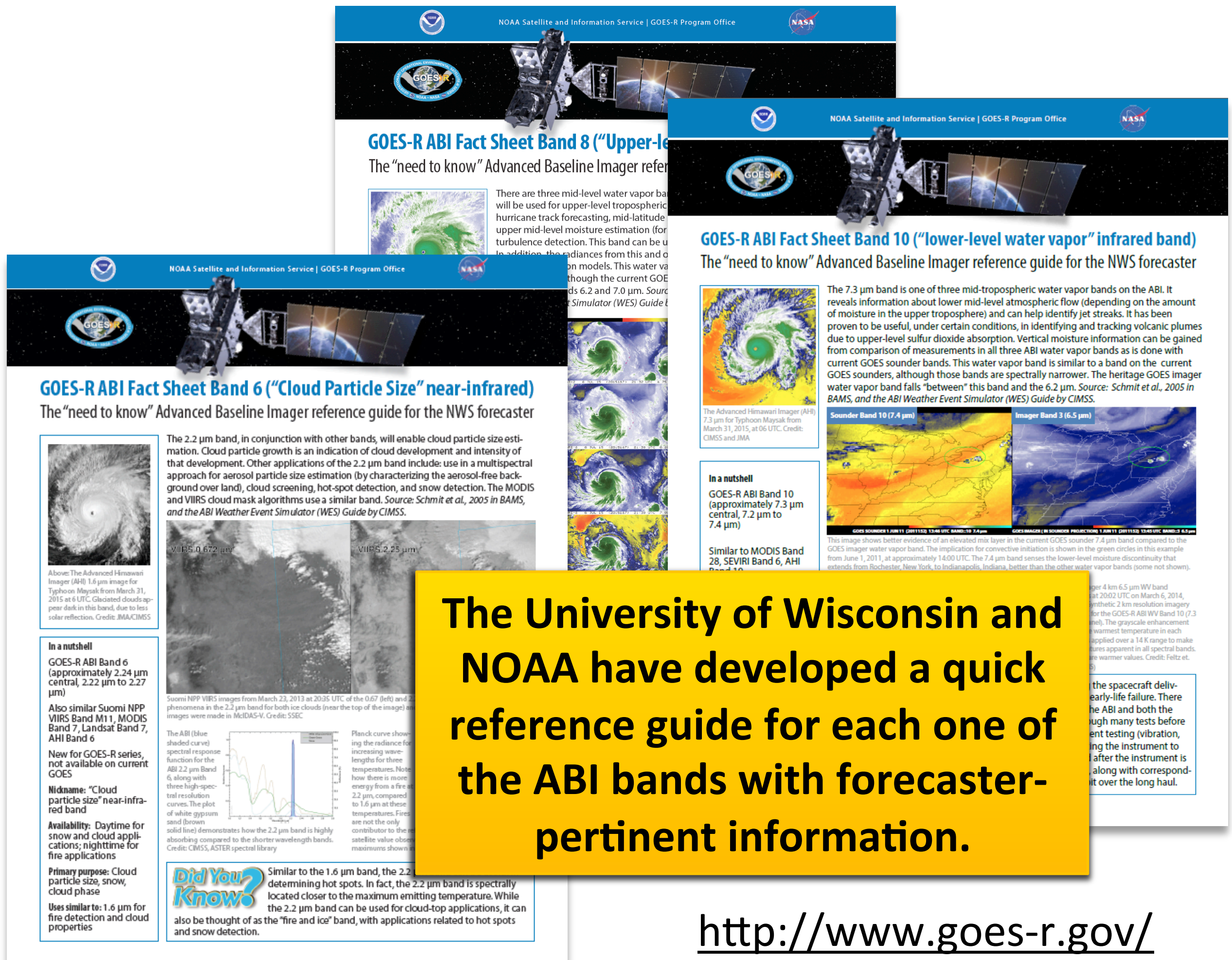
No Alaska Coverage (Max LZA < 65 degrees only): Aerosol Optical Depth
Unknown: Atmospheric Profiles, Derived Motion Winds, Snow Cover

Source: AWIPS


Approximate Zenith Angle from -137.0 West
75
65
55
90
80
70
60
50
40
30
20
10
0
Approximate Satellite Zenith Angle
UW / CIMSS

ABI Quick Reference Guides

Also available on AWIPS



The University of Wisconsin and NOAA have developed a quick reference guide for each one of the ABI bands with forecaster-pertinent information.

http://www.goes-r.gov/

Band Central Wavelength (µm)	Band Number	Type (Vis/NIR/IR)	Band Nickname	Burn scars	Cirrus and contrails	Cloud heights	Cloud phase	Clouds (water) over ice	Clouds over land	Clouds over water	Convection - MCS decay	Convection - New cells	Dust	Extratropical cyclone	Fires	Flooding	Fog	Ice cover	Saturated soils	Skin temperature	Smoke	Snow cover	Tropical cyclone	Tropopause fold	Turbulence	Volcanic eruption (emiss.)	Water Vapor - Low trop	Water Vapor - Mid trop	Water Vapor - Upper trop
0.47	1	Visible	Blue																		X								
0.64	**2**	**Visible**	**Red**						X			X	X								X	X				X			
0.86	3	Near-Infrared	Veggie	X						X		X				X													
1.4	4	Near-Infrared	Cirrus		X	X							X																
1.6	5	Near-Infrared	Snow/Ice				X	X							X							X							
2.2	6	Near-Infrared	Cloud Particle Size				X	X							X														
3.9	**7**	**Infrared**	**Shortwave Window**												**X**		**X**												
6.2	**8**	**Infrared**	**Upper-level Water Vapor**											**X**										**X**	**X**			**X**	**X**
6.9	9	Infrared	Mid-level Water Vapor																						X			X	X
7.3	10	Infrared	Lower-level Water Vapor			X								X										X	X	X	X	X	
8.4	11	Infrared	Cloud-Top Phase										X													X			
9.6	12	Infrared	Ozone																					?	?				
10.3	13	Infrared	"Clean" Longwave Window				X	X		X	X	X	X	X			X	X	X	X			X				X		
11.2	**14**	**Infrared**	**Longwave Window**				↑	↑		↑	↑	↑	↑	↑			↑	↑	↑	↑			↑				↑		
12.3	15	Infrared	"Dirty" Longwave Window				X						X					X									X		
13.3	**16**	**Infrared**	**CO_2 Longwave**		**X**	**X**																							

Satellite Information Familiarization Tool (SIFT)

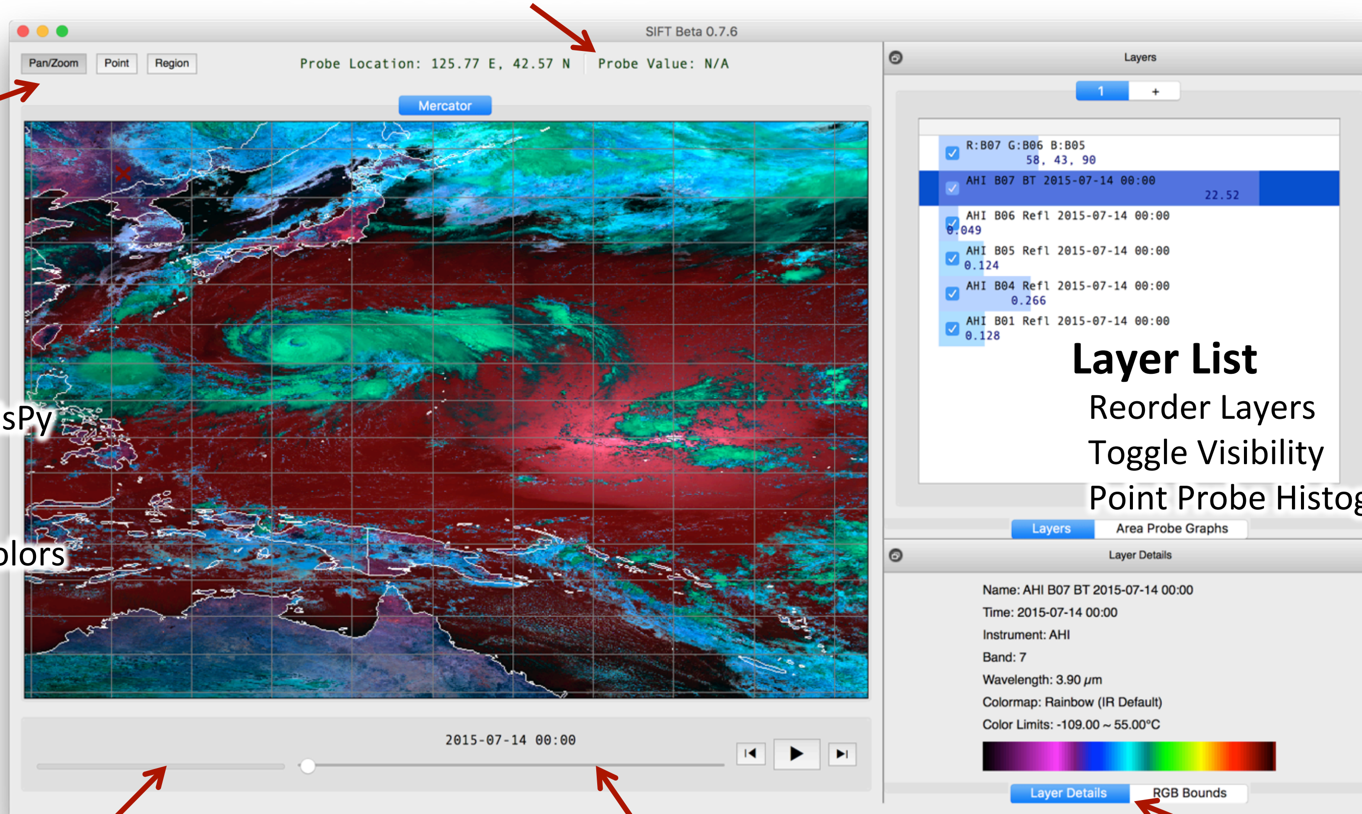
Open Source Software from the Cooperative Institute for Meteorological Satellite Studies

- Free downloads and installers available for Windows, Mac, and Linux operating systems
- Can display imagery from ABI (downloadable from CLASS) and AHI
- Creates differences and RGBs
- Supports training for the NWS currently, with increasing international interest
- Accolades from early users
- https://sift.ssec.wisc.edu/

SIFT Features and Functions

Point Probe Results

Tools
- Pan/Zoom
- Point Probe
- Area Selector



Map Display
- Powered by OpenGL/VisPy
- Panning and Zooming
- Dynamic Resolution
- Configurable Outline Colors

Layer List
- Reorder Layers
- Toggle Visibility
- Point Probe Histogram

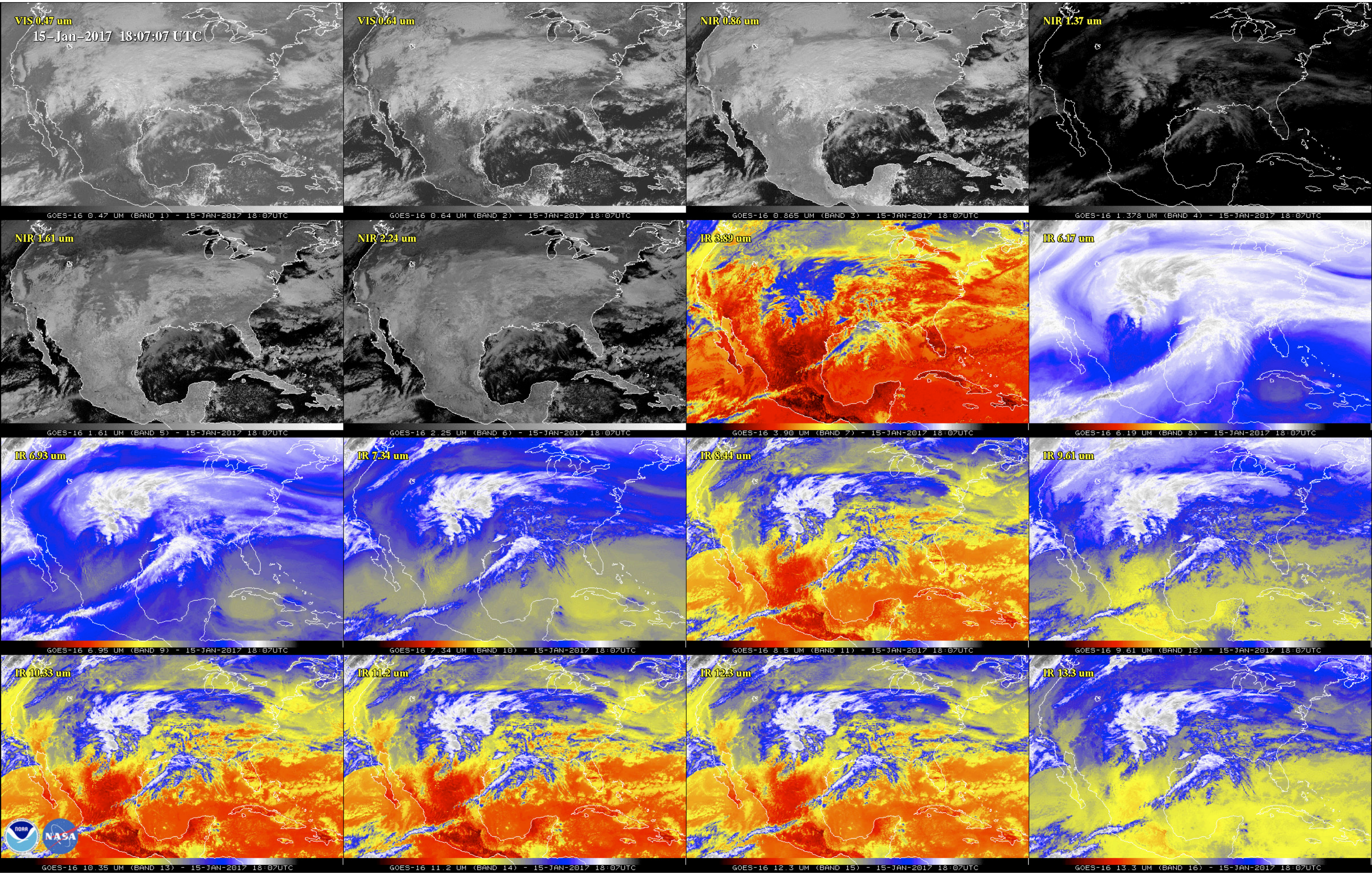
Background Task Status

Animation Control
- Step-through or Autoplay
- Adjustable Speed Control

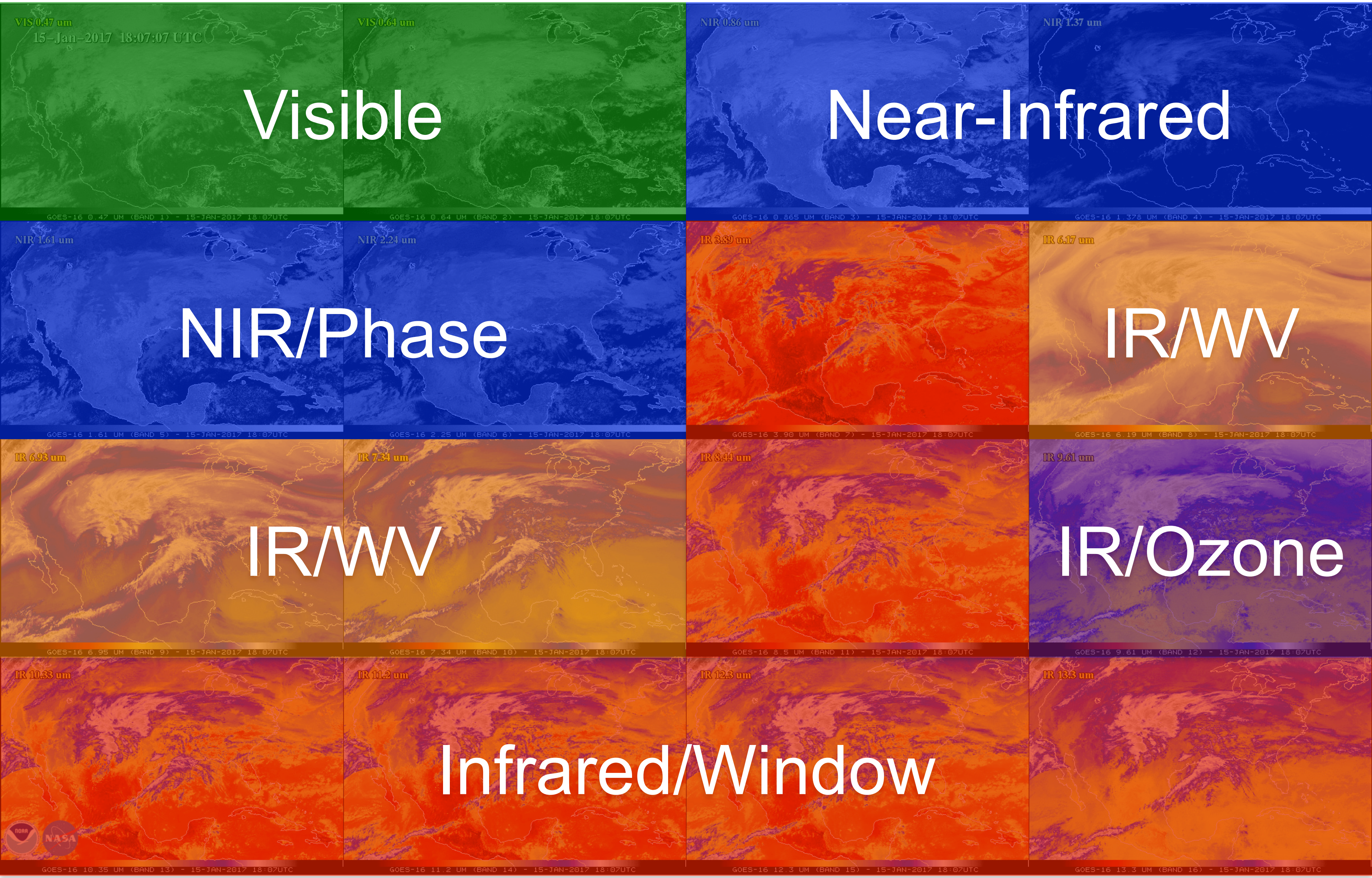
Layer Metadata
- Band Information
- Color Bar and Limits

Concluding Remarks

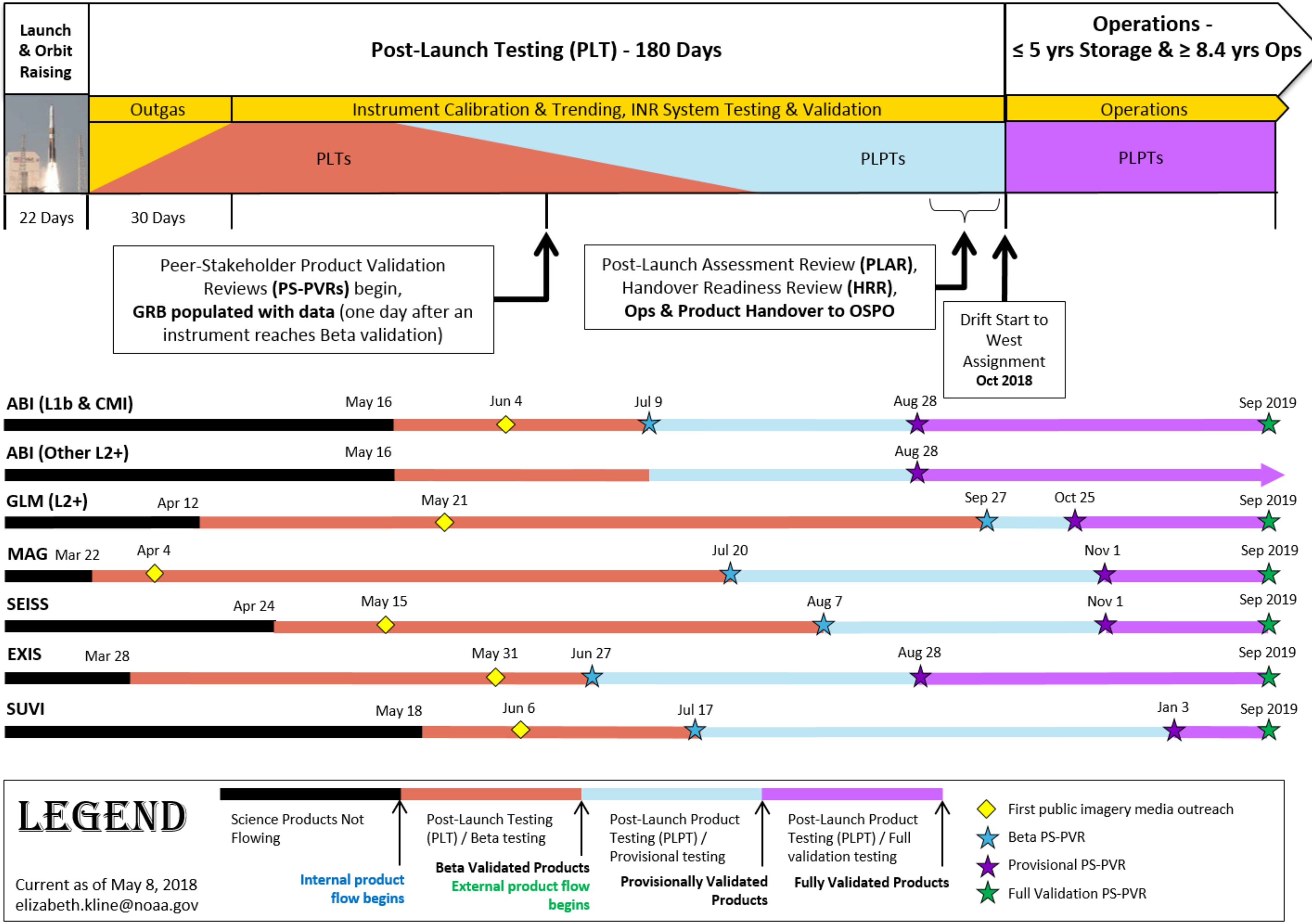
- GOES-17 should reach "West" position by November 2018. Length of the transition period is unknown.
- **Beginning:** Improvements to imagery are only the start.
- **Continuity:** The same visible and infrared window imagery that has been a staple of the short-term weather analysis will remain predominant in use.
- **Opportunity:** Use specialized knowledge to apply the remaining bands in an as-needed basis based on local analysis/forecast challenges and decision support needs.
  - Fires, ice, and volcanoes



GOES-R ABI “First Light”


VIS 0.47 um
15-Jan-2017 18:07:07 UTC
VIS 0.64 um
Visible
NIR 0.86 um
NIR 1.37 um
Near-Infrared
NIR 1.61 um
NIR 2.24 um
NIR/Phase
IR 3.89 um
IR 6.17 um
IR/WV
IR 6.93 um
IR 7.34 um
IR/WV
IR 8.44 um
IR 9.61 um
IR/Ozone
IR 10.33 um
IR 11.2 um
IR 12.3 um
IR 13.3 um
Infrared/Window

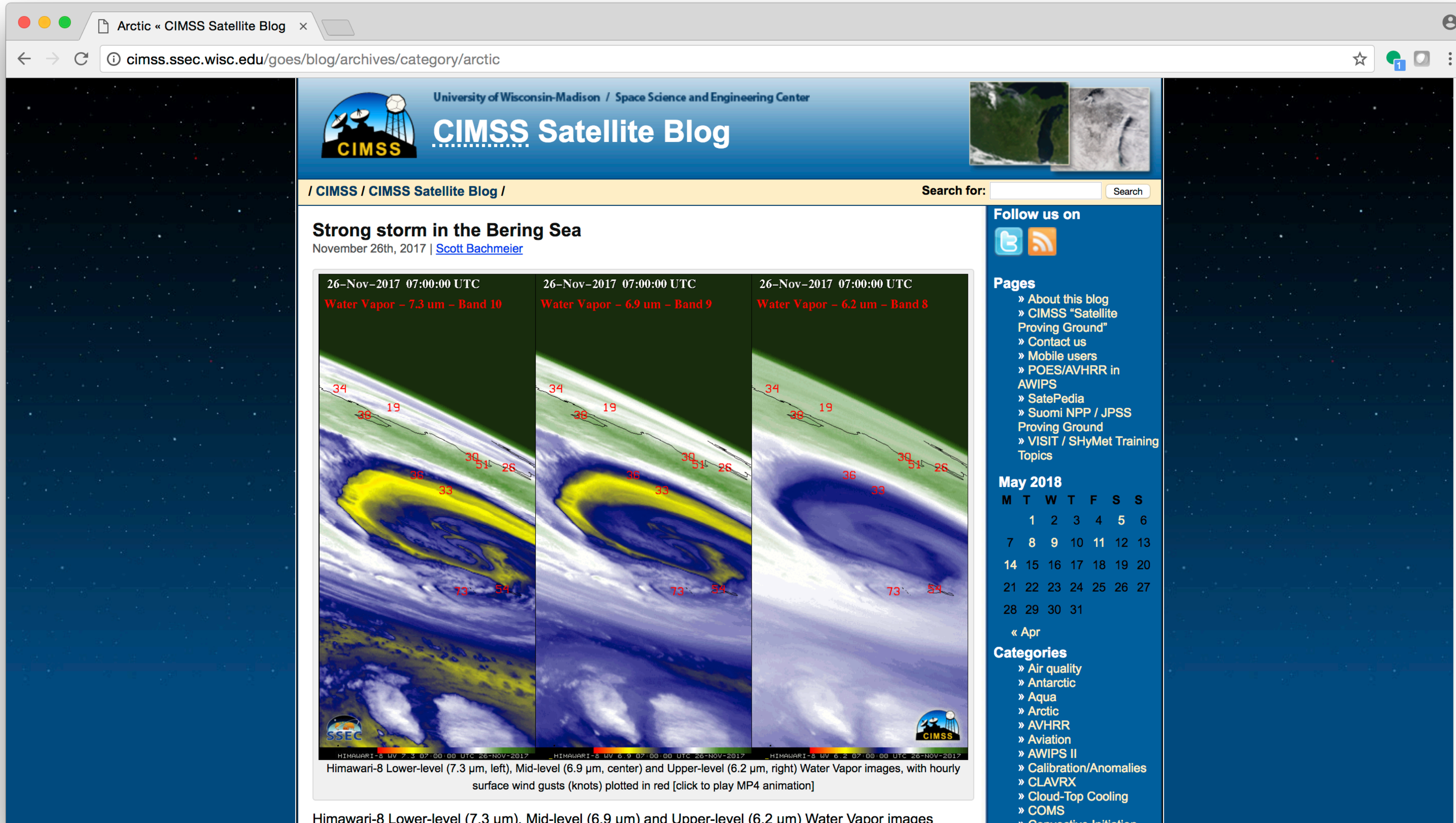
GOES-17 Post-Launch Science Product Validation Schedule



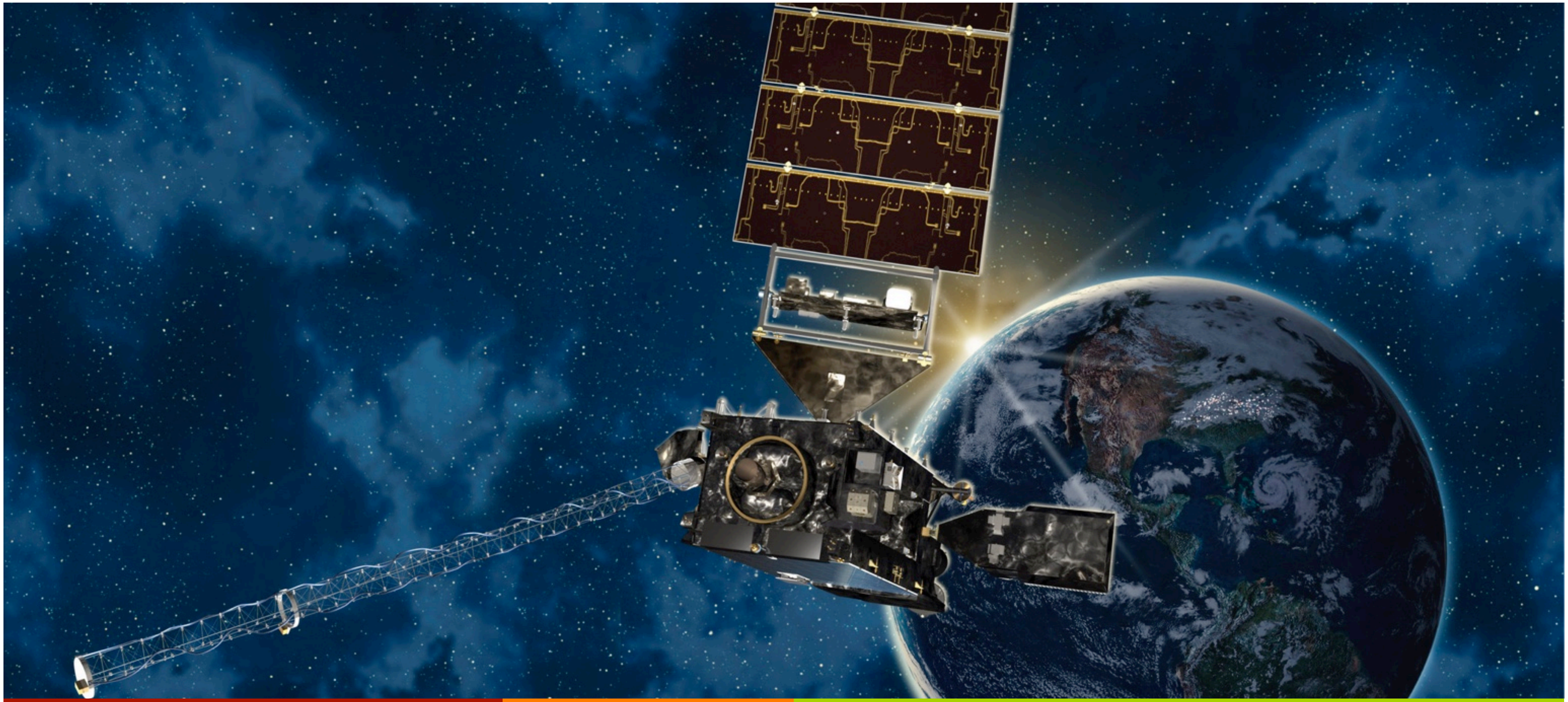
Note: All dates are coordinated with Flight/MOST PLT SOE group and are subject to change.

Contributors

- Tim Schmit
  - NOAA Advanced Satellite Products Branch
- Mat Gunshor
  - Cooperative Institute for Meteorological Satellite Studies
- James Nelson III
  - Cooperative Institute for Meteorological Satellite Studies
- Others



CIMSS Satellite Blog: http://cimss.ssec.wisc.edu/goes/blog/



Questions? Comments?

Send me an e-mail:

Jordan.Gerth@noaa.gov

SSEC CIMSS