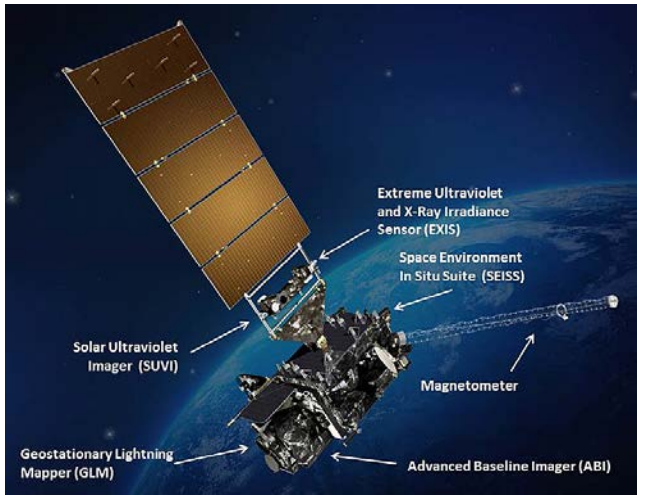

Very Quick Overview of the 16 Bands on the GOES-16 Advanced Baseline Imager (ABI)

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National Air Quality Conference

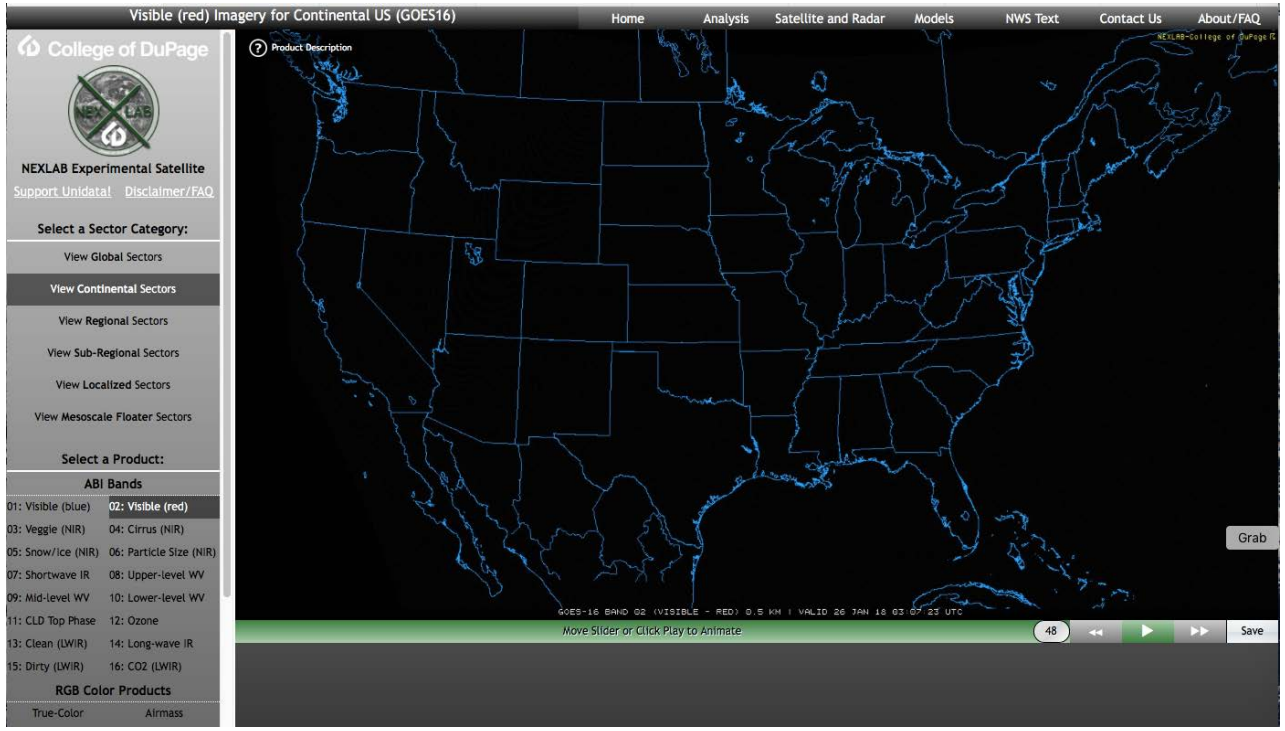
January 26, 2018

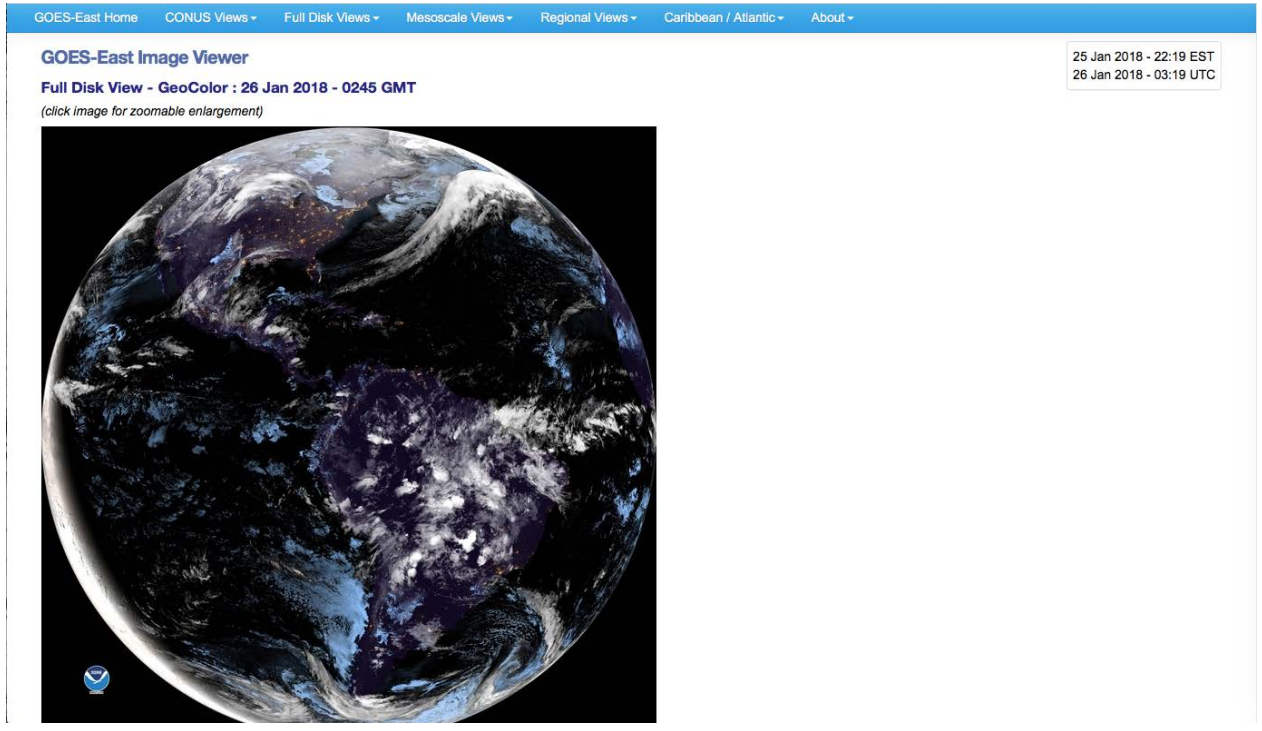
Where to Go for More Information

- We are just going to scratch the surface today! Please spend some time learning about the ABI's products:
  - Direct observations from each band
  - Derived products from combinations of bands
- 2-page fact sheets from the GOES-R program and CIRA for each band (extremely useful)
- Links to imagery, band info, calibration (everything you could possibly want) from CIMSS
- BAMS article on ABI (April 2017)

Places to Start Viewing Actual ABI Imagery

- College of DuPage Experimental GOES-16 Viewer (CONUS and full disk)
  - Also has product description for each band
  - This is the site I use for GOES imagery! (It's great!)
- NOAA'S GOES-East Image Viewer (CONUS and full disk)





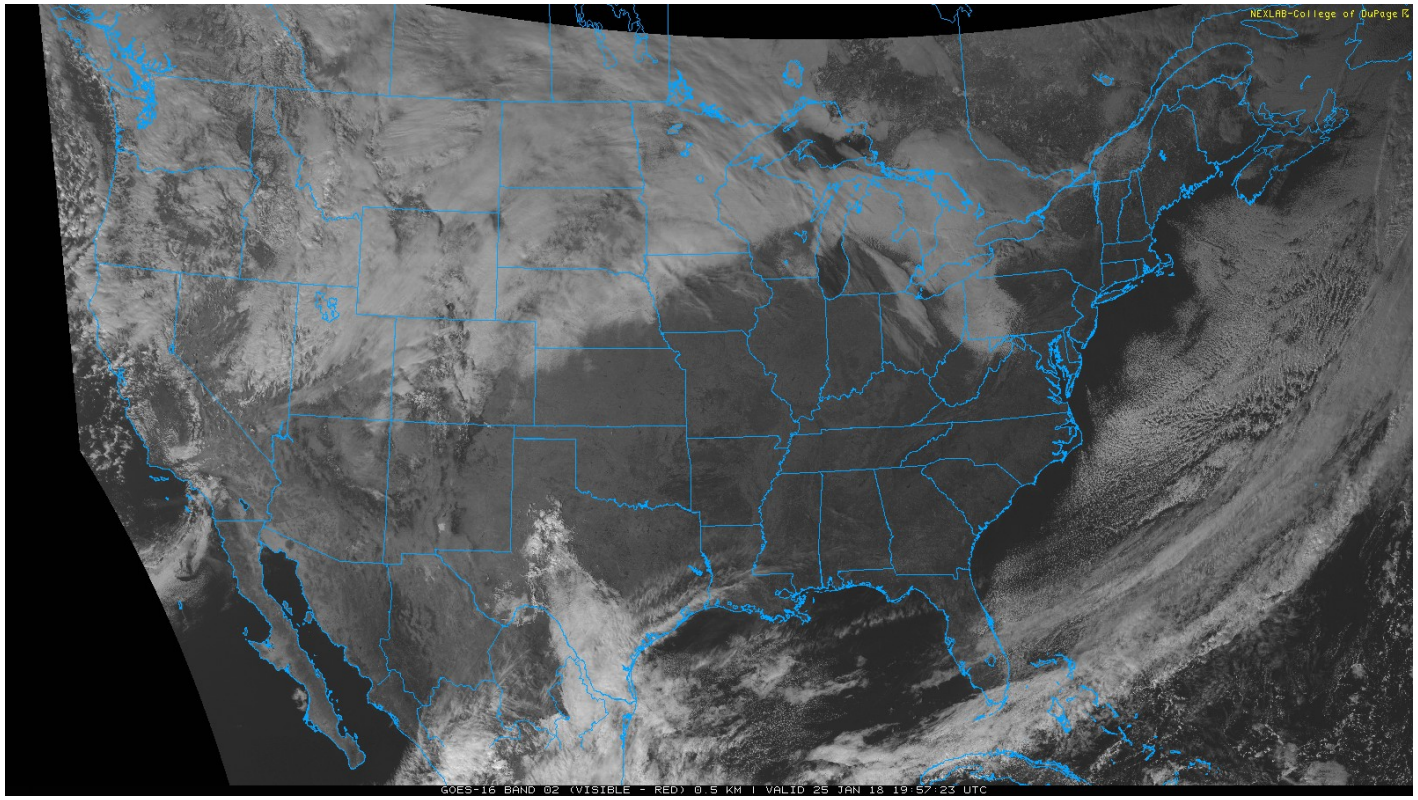
ABI Gives You What You Are Used To – At Higher Resolution!

Imager Band Number	Imager Band Name	Wavelength Range (μm)	Spatial Resolution (km)	Corresponding ABI Band(s)	ABI Band Spatial Resolution (km)
1	Visible	0.55-0.75	1	2 (red)	0.5
2	Shortwave IR	3.8-4.0	4	7 (shortwave IR)	2
3	Water Vapor	5.5-7.0	8	8, 9, 10 (upper-, mid-, low- level water vapor)	2
4	Longwave IR 1	10.2-11.2	4	13, 14 (clean longwave IR, longwave IR)	2
5	Longwave IR 2	11.5-12.5	4	15 (dirty longwave IR)	2

ABI Bands (Probably) Most Useful for Everyday Forecasting

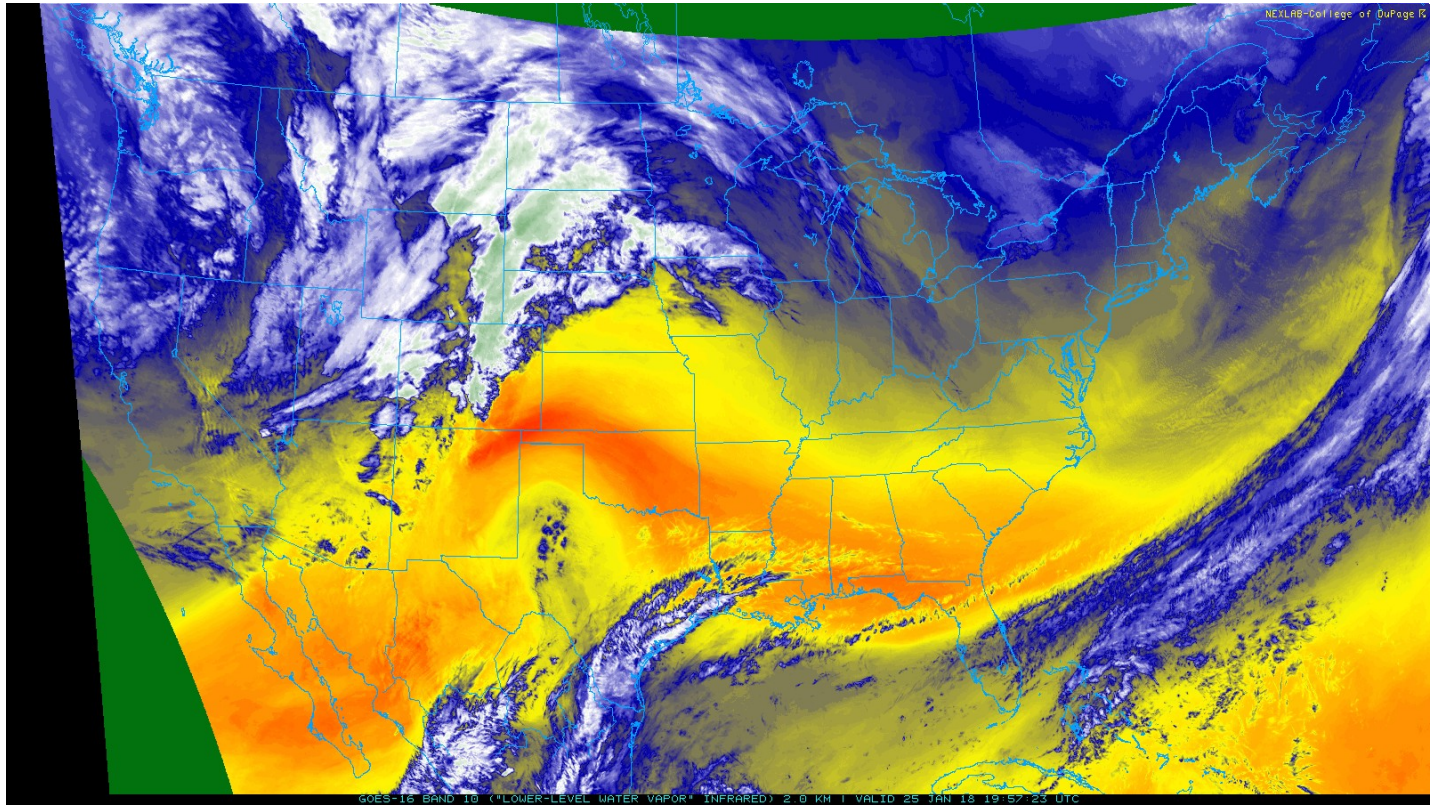
ABI Band 2: Visible (Red)

- Highest spatial resolution (0.5 km) of all the ABI bands
- 0.64 μm
- Only available in the daytime!
- Use it in the same way you are used to using the Imager visible channel 1
  - Clouds, fog, snow on ground
  - Convective development
  - Location of storms, fronts



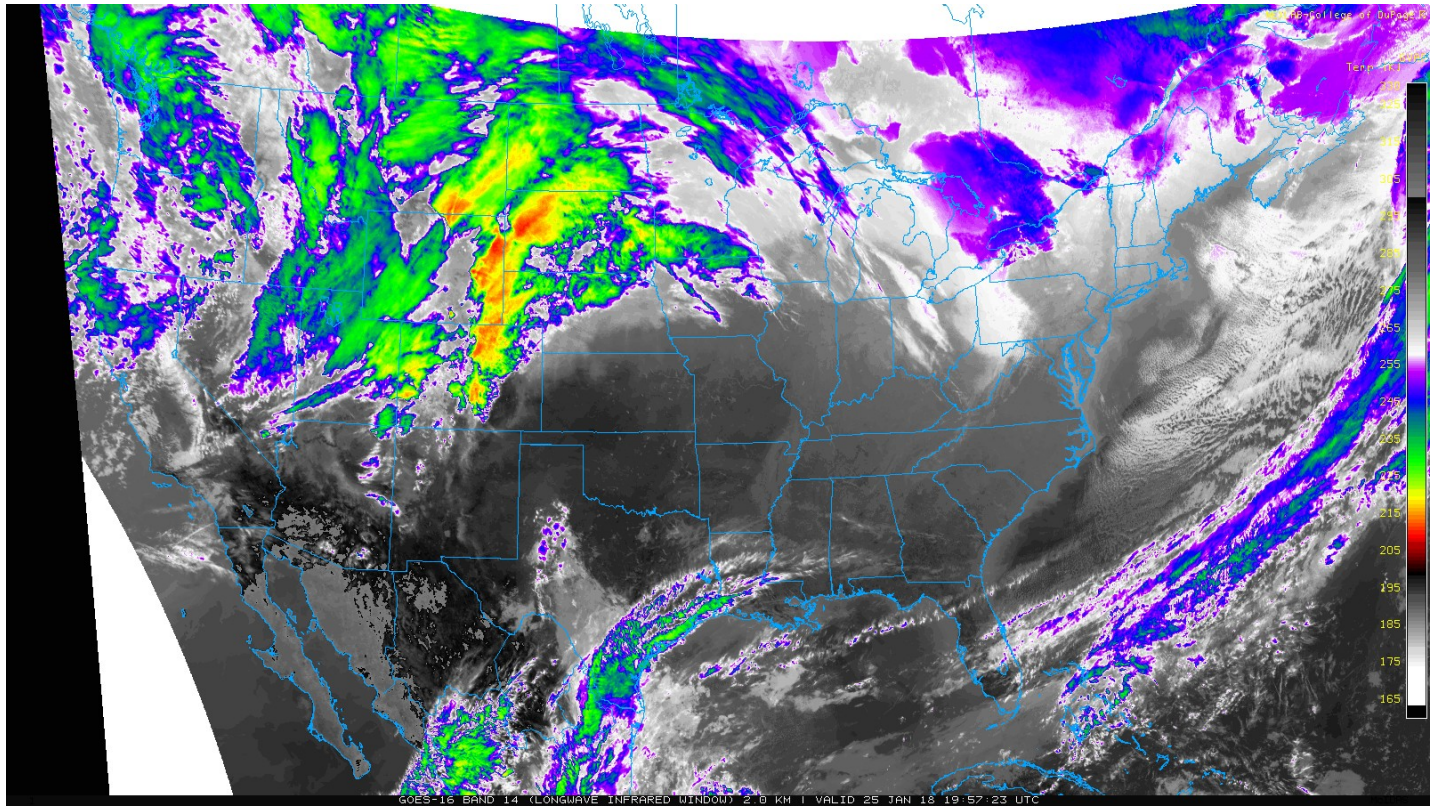
ABI Bands 8, 9, 10: Water Vapor

- Instead of one broad water vapor band, ABI gives you three!
  - 8: Upper-level (6.2 μm)
  - 9: Mid-level (6.9 μm)
  - 10: Low-level (7.3 μm)
- Available during the day and night
- Use the same way you are used to using the Imager water vapor channel 3
  - Location of jet stream
  - Troughs/ridges



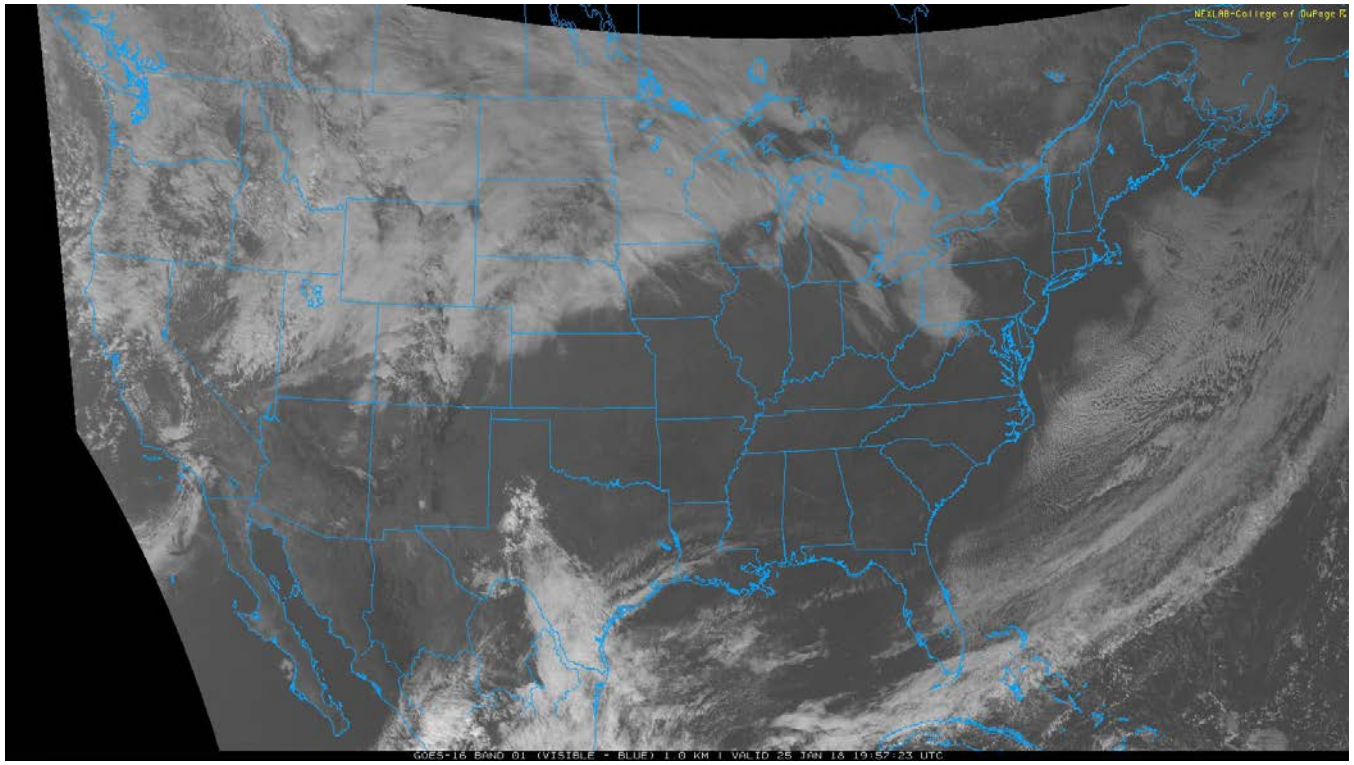
ABI Bands 13, 14: Longwave IR

- ABI has two longwave IR bands that correspond to Imager IR channel 4
  - 13: “clean” LWIR (10.3 μm)
  - 14: LWIR (11.2 μm)
- Available during the day and night
- Use these bands the same way you are used to using the Imager IR channel 4
  - Clouds at night



GeoColor (Derived from ABI Band 1 – Blue)

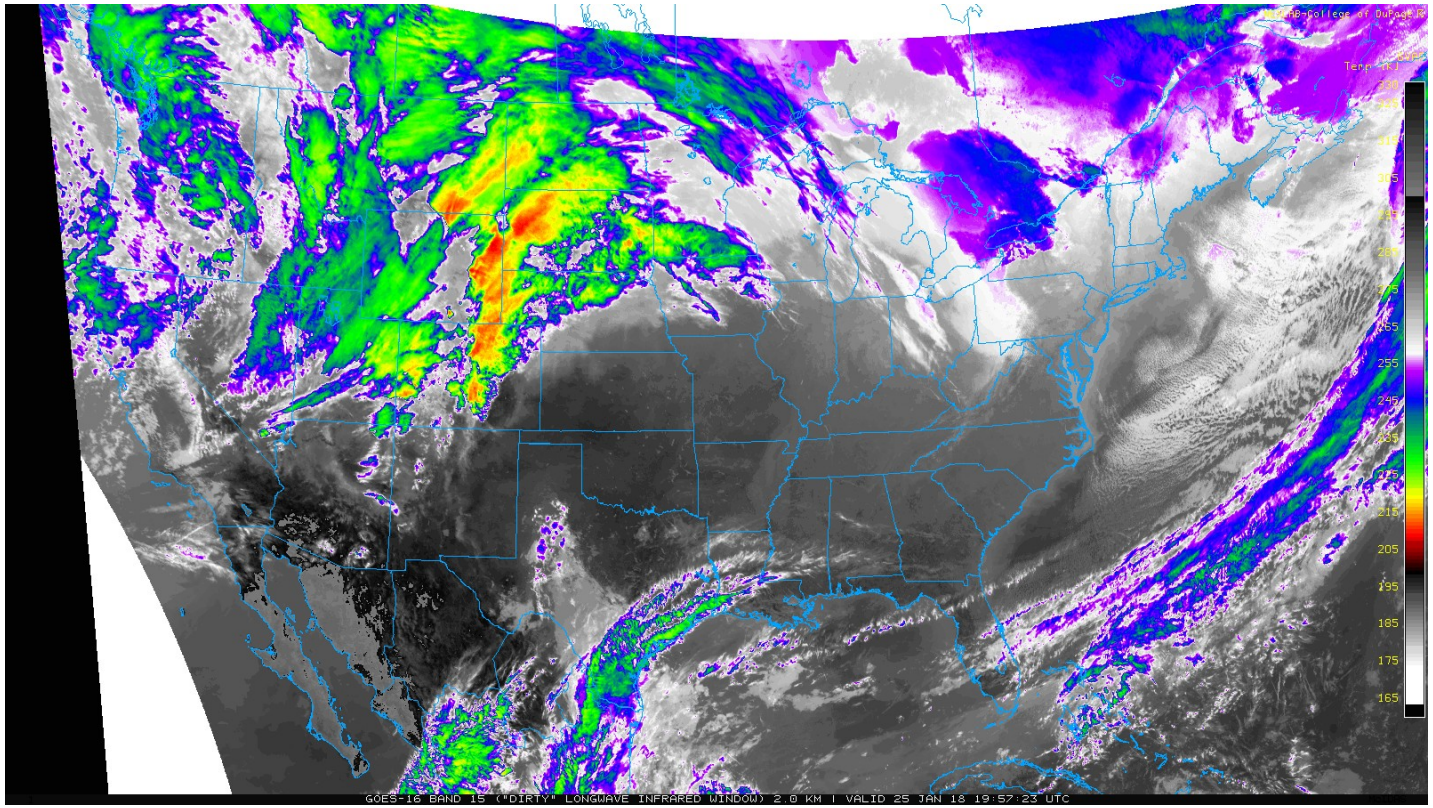
- ABI has two visible bands: red (band 2) and blue (band 1, 0.47 μm)
  - Official use of blue band is for aerosols, but GeoColor is much more user-friendly
  - GeoColor is combination of red, blue, and synthetic green
  - Blue band is black/white, lower spatial resolution (1 km) than red band
    - Difficult for average user to pick out aerosol plumes
    - Much easier to see smoke, dust, haze in GeoColor (since it's in color not B/W)
- GeoColor is available from NOAA's GOES-16 image viewer
- COD has a "true color" but it's NOT the GeoColor product



ABI Bands (Probably) Less Useful for Everyday Forecasting (More for Specialized Applications)

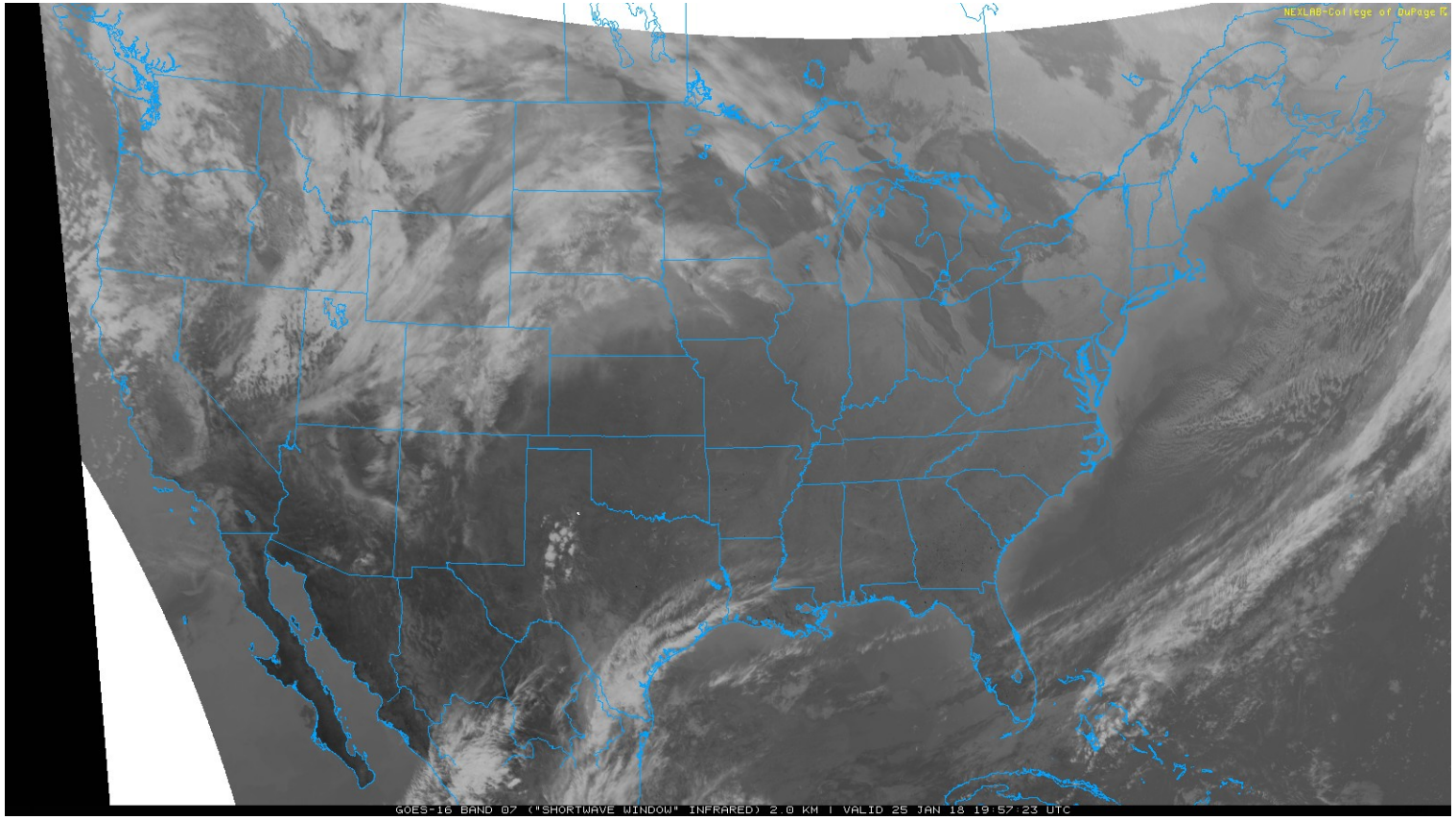
ABI Band 15: Longwave IR

- ABI has a longwave IR band that corresponds to Imager IR channel 5
  - 15: “dirty” LWIR (12.3 μm)
- “Dirty” refers to interference from water vapor absorption
- Available during the day and night
- Not really used on its own, but in conjunction with the a “cleaner” IR channel (like band 13) and as part of derived cloud products



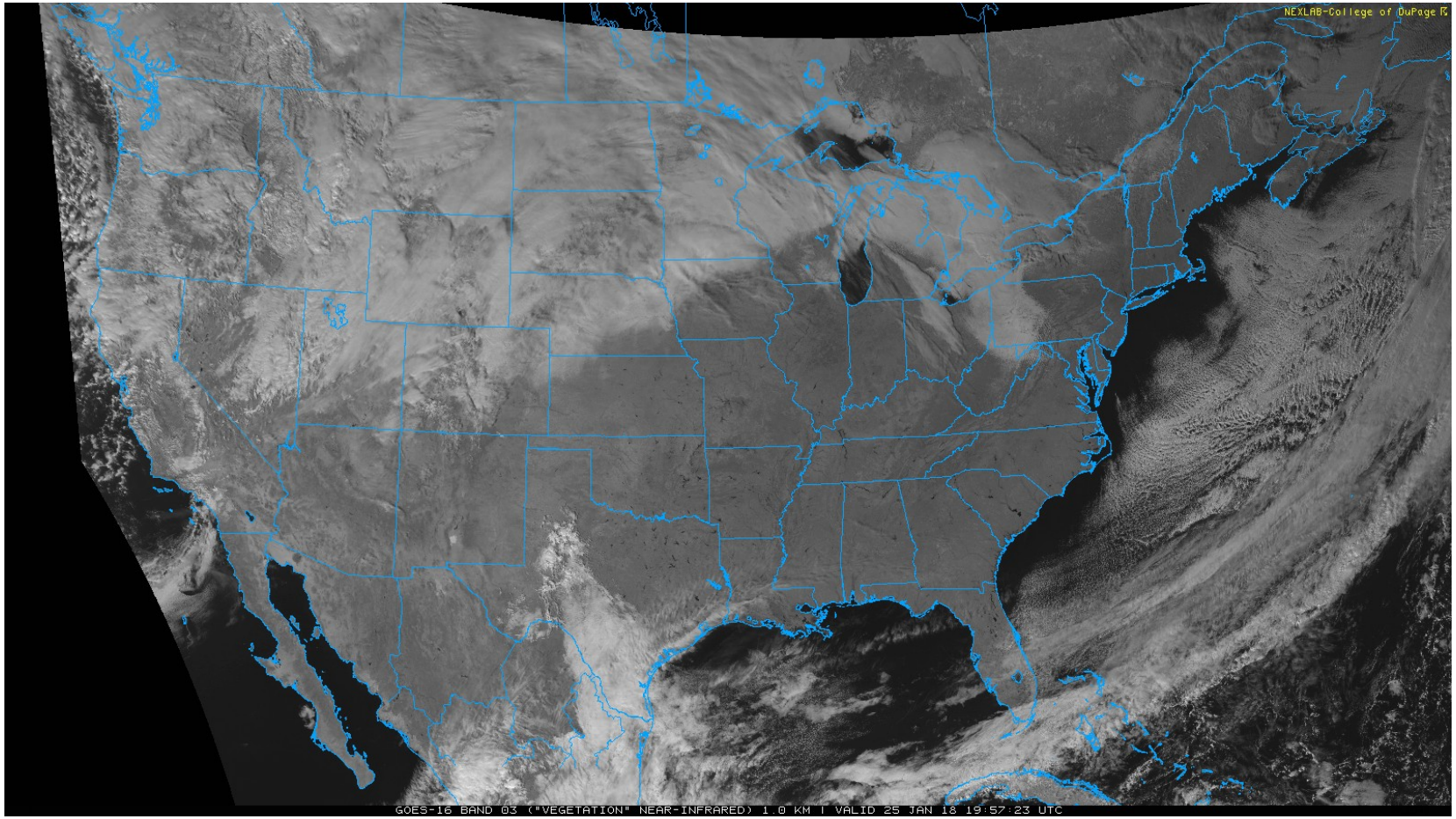
ABI Band 7: Shortwave IR

- Similar to Imager shortwave IR channel 2 but with higher resolution
- 3.9 μm
- Available during the day and night
- Same uses as the Imager shortwave IR channel 2:
  - Fog/low clouds at night
  - Fires (hotspots)
  - Volcanic eruptions
  - Snow and ice



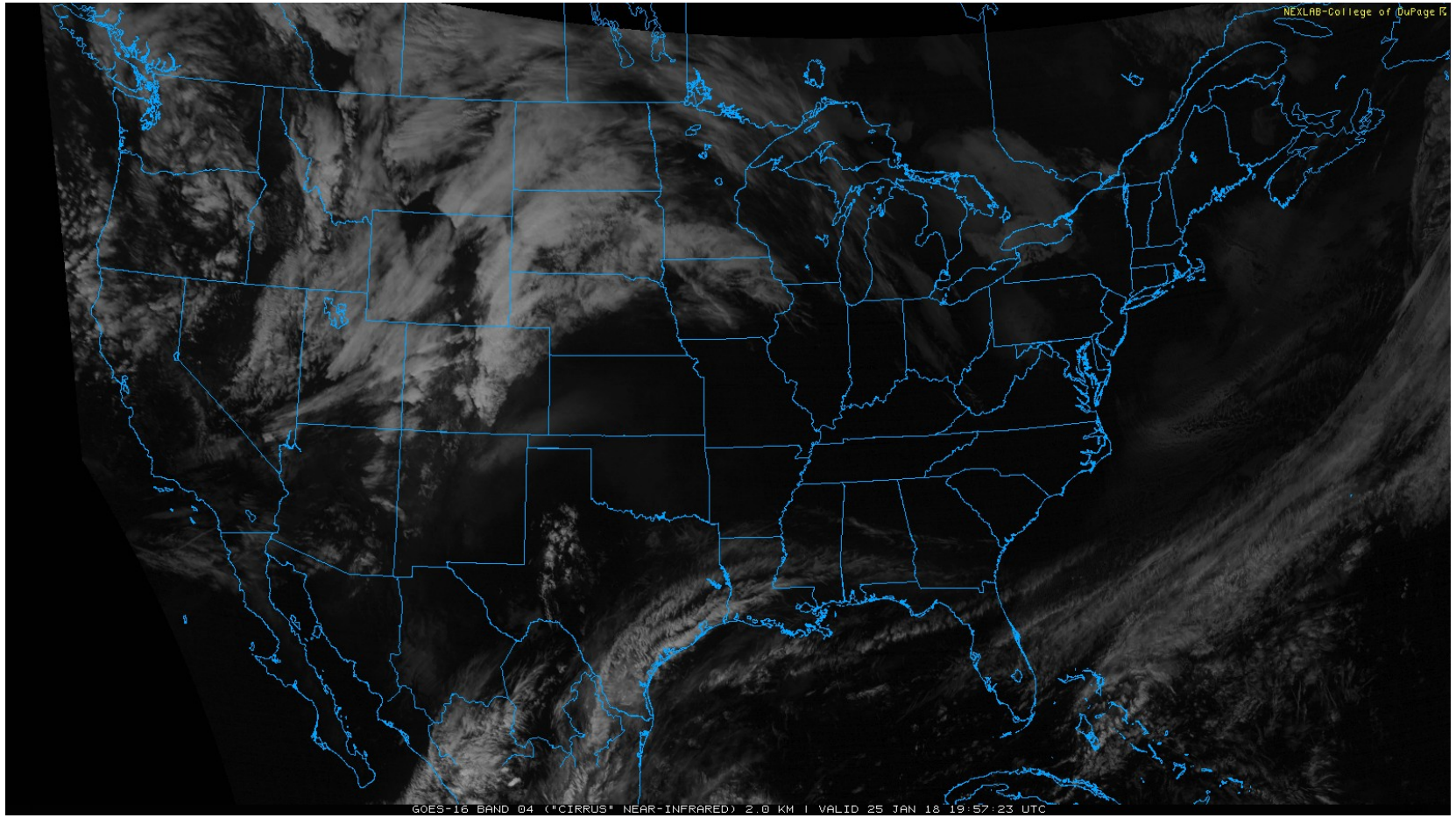
ABI Band 3: Veggie (near IR)

- New band (not on Imager)
- 0.86 μm
- Only available in the daytime!
- Main applications:
  - Burn scars
  - Vegetated land



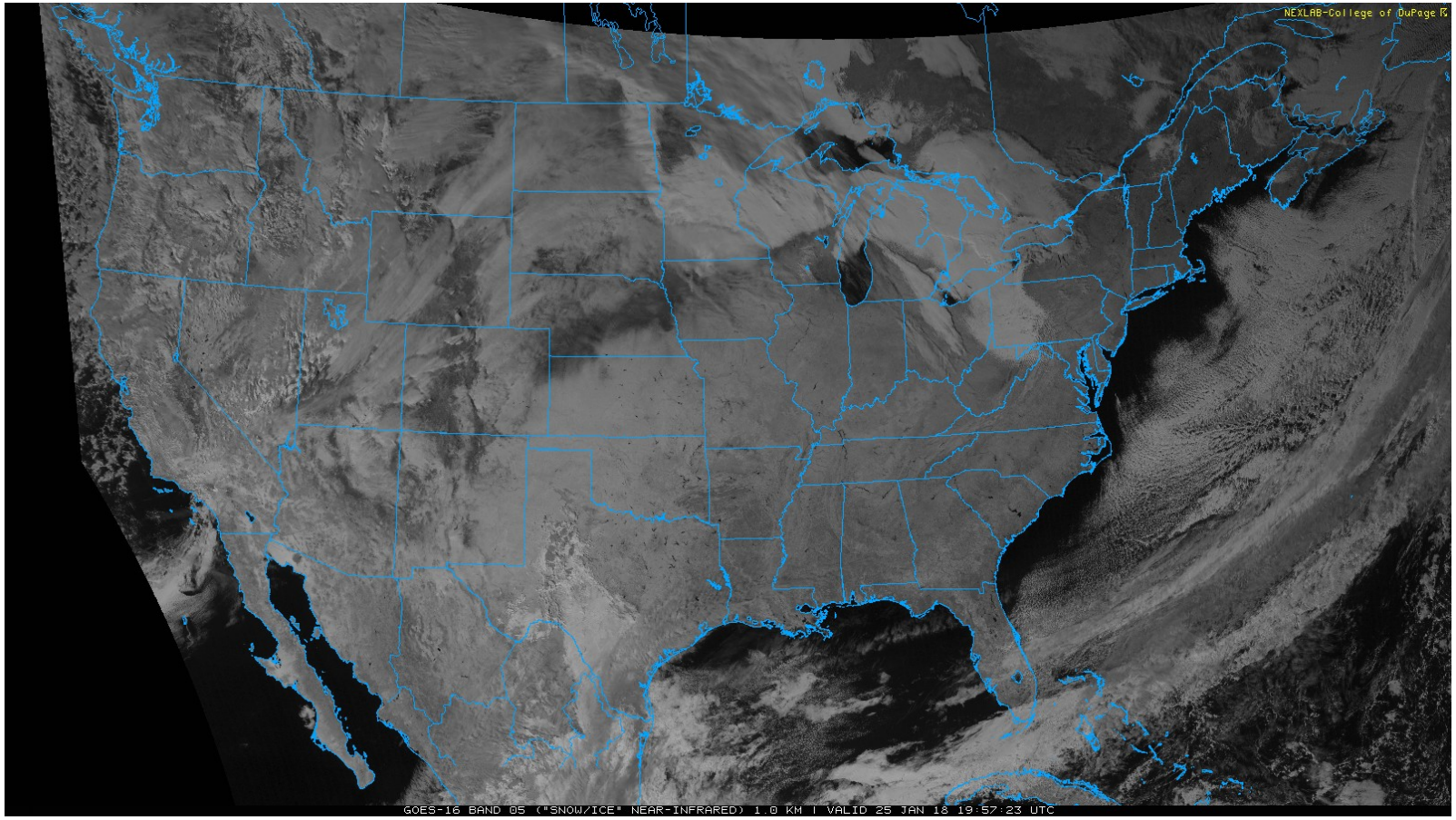
ABI Band 4: Cirrus Clouds (near IR)

- New band (not on Imager)
- 1.37 μm
- Only available in the daytime!
- Main applications:
  - High, thin clouds during the daytime



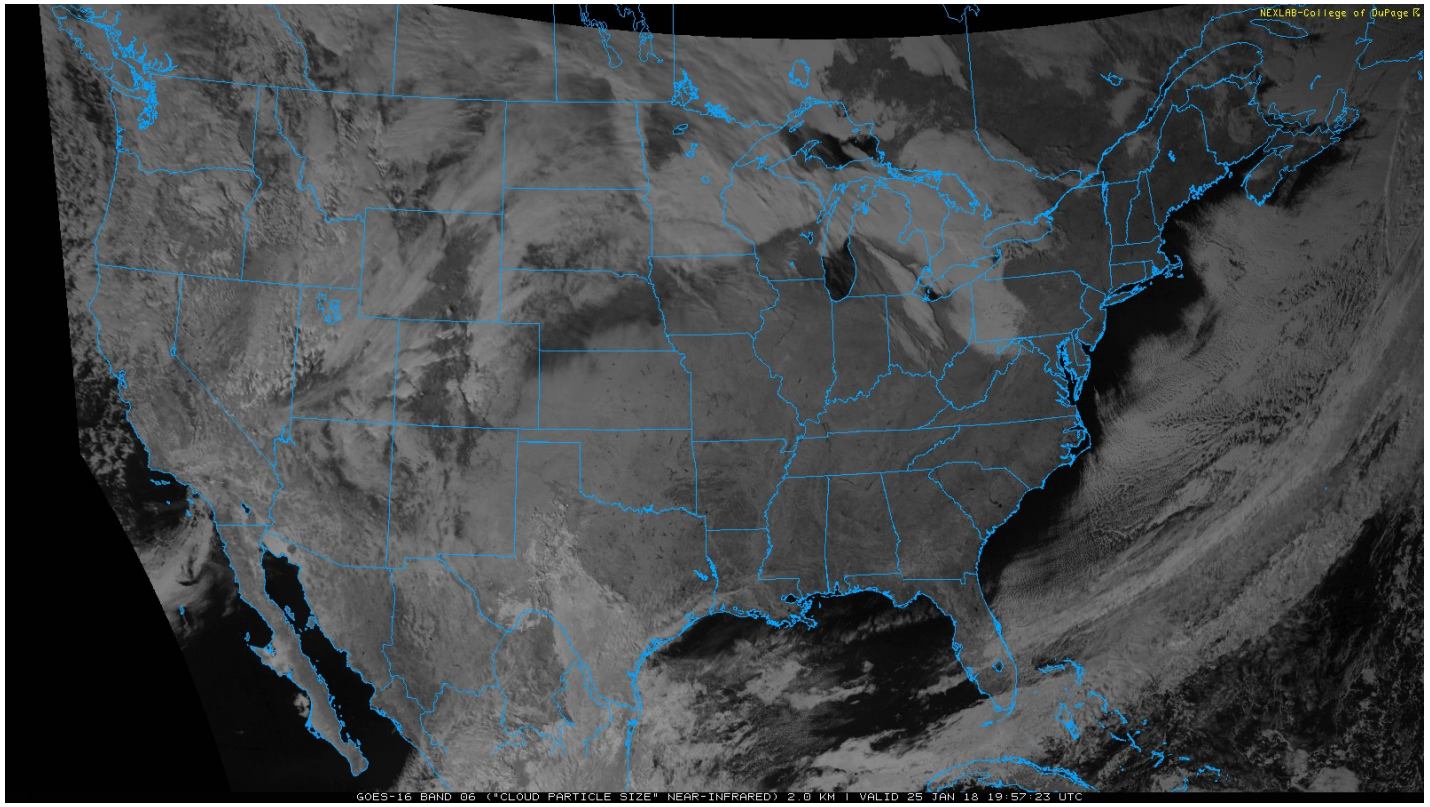
ABI Band 5: Snow/Ice (near IR)

- New band (not on Imager)
- 1.6 μm
- Main applications:
  - Water clouds (bright) vs. ice clouds (dark) during the day
  - Fire hotspots at night



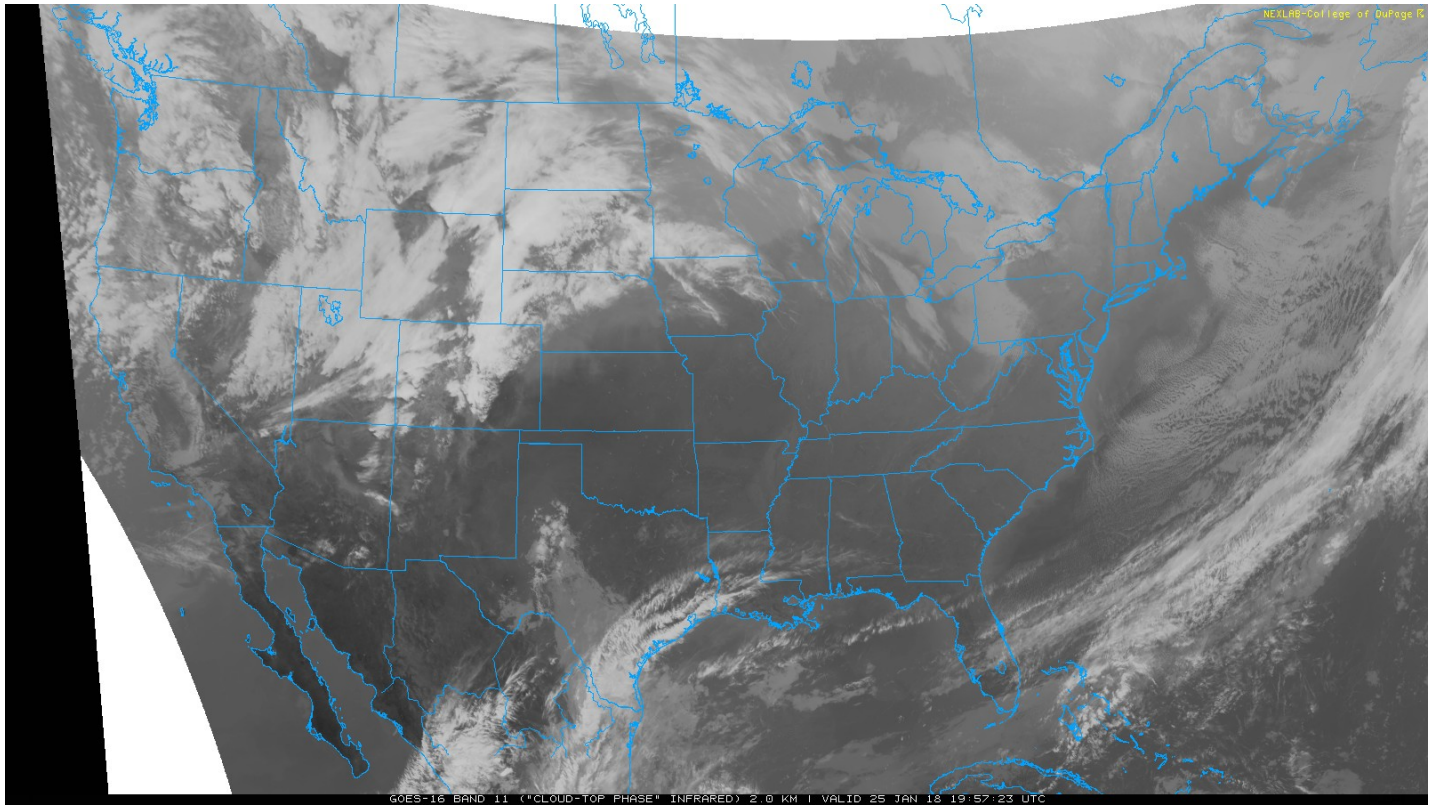
ABI Band 6: Cloud Particle Size (near IR)

- New band (not on Imager)
- 2.2 μm
- Not really used on its own, but in conjunction with other bands as part of derived cloud products (cloud particle size, cloud mask, AOD)
- Fire hotspots at night



ABI Band 11: Cloud Top Phase (IR)

- New band (not on Imager)
- 8.4 μm
- Not really used on its own, but in conjunction with bands 14 and 15 to derive cloud top phase and type products
- SO_2 plumes from volcanic eruptions



ABI Band 12: Ozone (IR)

- Sort of a new band (not on Imager but on Sounder)
- 9.6 μm
- Primary use is in derived products for dynamics near the Tropopause
- Also component in derived total column ozone product
- Everyone asks me if we can use band 12 for ground-level O_3! (We can't)
  - 90% of O_3 is in the Stratosphere, so ABI can't "see" O_3 in Troposphere
  - Also, interference from water vapor absorption at 9.6 μm
  - Not even useful for identifying Stratospheric inversions
    - Use difference b/w ABI bands 8 and 10 (upper- and low-level water vapor) instead

ABI Band 16: CO_2 (IR)

- 13.3 μm
- Used in many derived products:
  - Cloud mask
  - Cloud-top height
  - Tropopause deliniation