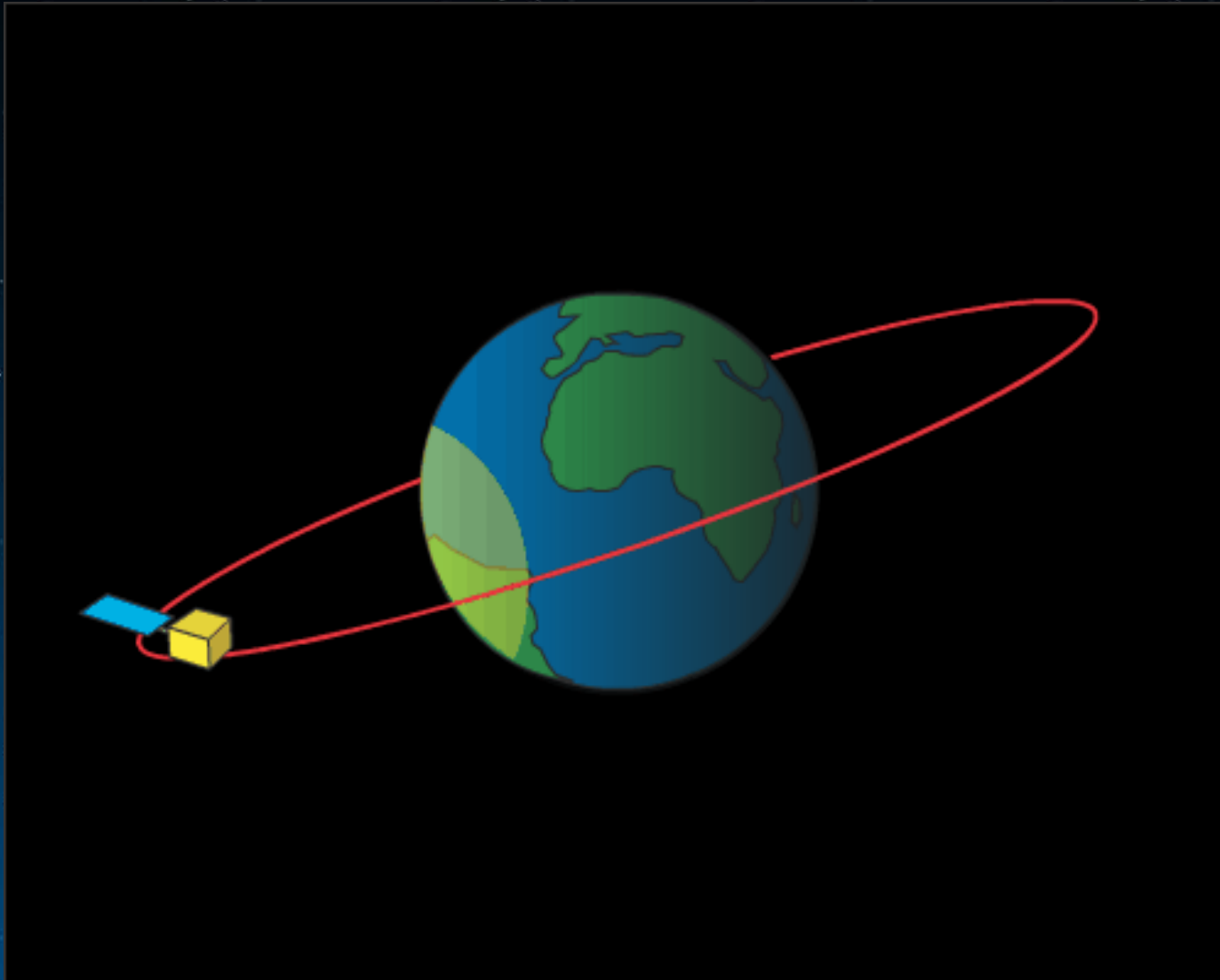


GEOSTATIONARY VS POLAR ORBIT SATELLITE DATA: MAKING THE CASE FOR BOTH!

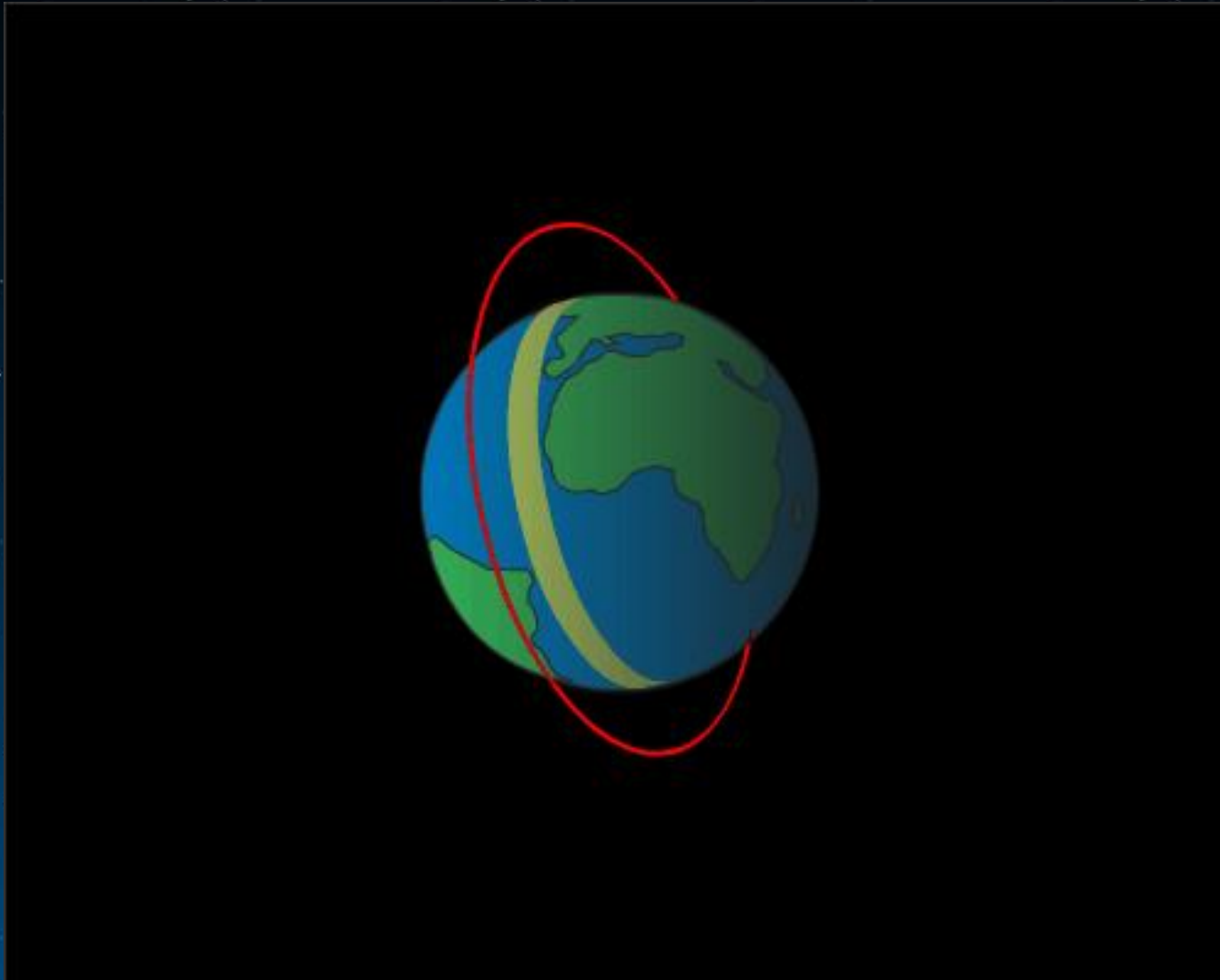
Jessica Braun, UW-Madison
Cooperative Institute for Meteorological
Satellite Studies



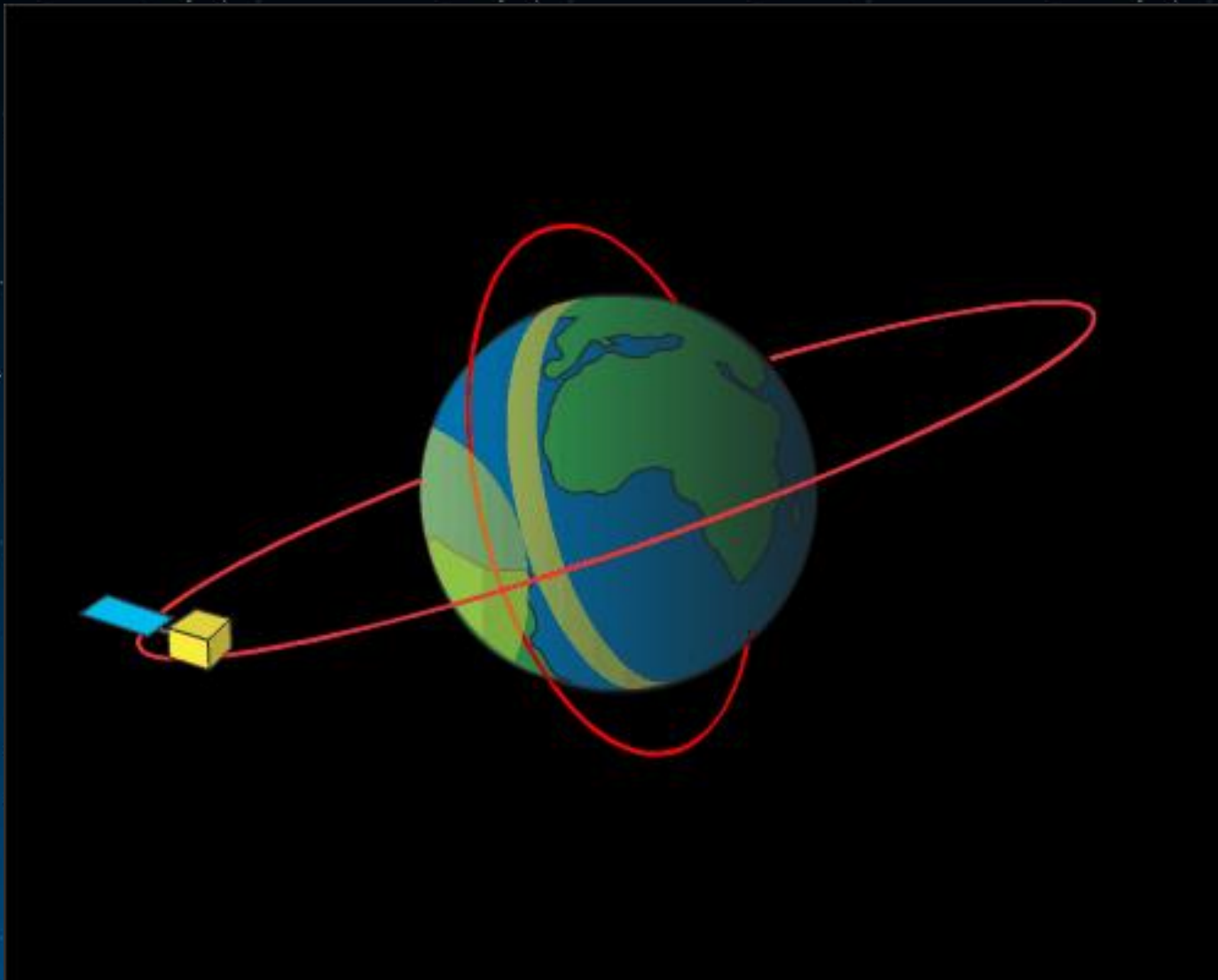
Geostationary Satellite Orbit



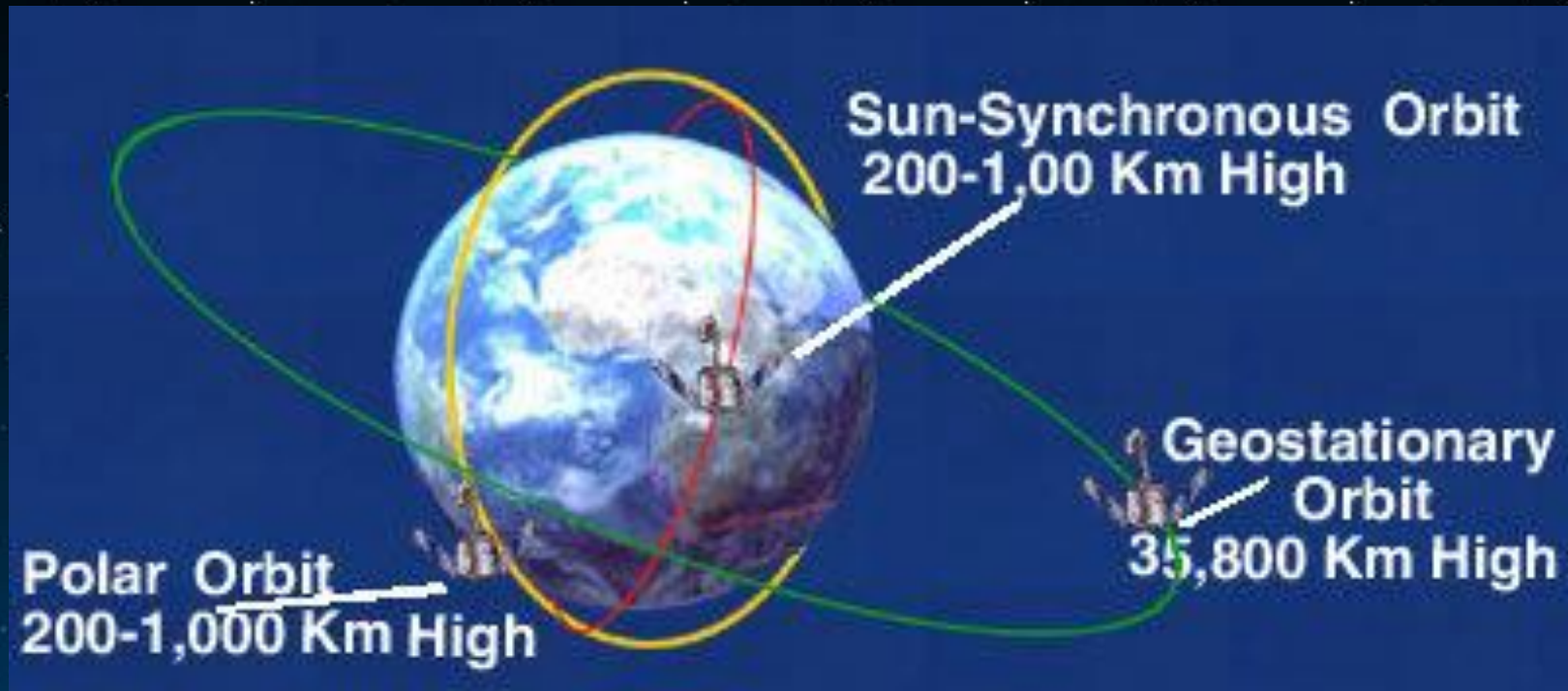
Polar Satellite Orbit



Geo vs Polar Orbit Comparison



Geo vs Polar Orbit Comparison



A Sun-synchronous orbit is one where the satellite passes over any given point of the planet's surface at the same local solar time.

Geo vs Leo Satellites

Geo

- High Spatial Resolution
 - AHI: 0.5 km – 2 km
 - GOES-R: 0.5 km – 2km
- Moderate Spectral Resolution
- Well Calibrated
- High Temporal Coverage
- Hemispheric Observations
- No Microwave
- Most – no IR sounders (for now)

Leo

- Higher Spatial Resolution
 - VIIRS 350m – 1km
- Moderate Spectral Resolution with some Unique Bands
- Very Well Calibrated
- Low Temporal Coverage (getting better)
- Global Observations
- Microwave Sounders
- Hyperspectral IR Sounders

AHI Instrument Characteristics

AHI Band	AHI Approximate Central Wavelength (μm)	Type	AHI Resolution (km)	Nickname	MTSAT Resolution (km)
1	0.47	Visible	1	Blue	
2	0.51	Visible	1	Green	
3	0.64	Visible	0.5	Red	1
4	0.86	Near-Infrared	1	Veggie	
5	1.6	Near-Infrared	2	Snow/Ice	
6	2.3	Near-Infrared	2	Cloud Particle Size	
7	3.9	Infrared	2	Shortwave Window	4
8	6.2	Infrared	2	Upper-level Water Vapor	4
9	6.9	Infrared	2	Mid-level Water Vapor	
10	7.3	Infrared	2	Lower-level Water Vapor	
11	8.6	Infrared	2	Cloud-Top Phase	
12	9.6	Infrared	2	Ozone	
13	10.4	Infrared	2	"Clean" Longwave Window	4
14	11.2	Infrared	2	Longwave Window	
15	12.4	Infrared	2	"Dirty" Longwave Window	4
16	13.3	Infrared	2	CO ₂ Longwave	

Source: http://www.data.jma.go.jp/mscweb/en/himawari89/space_segment/spsg_ahi.html

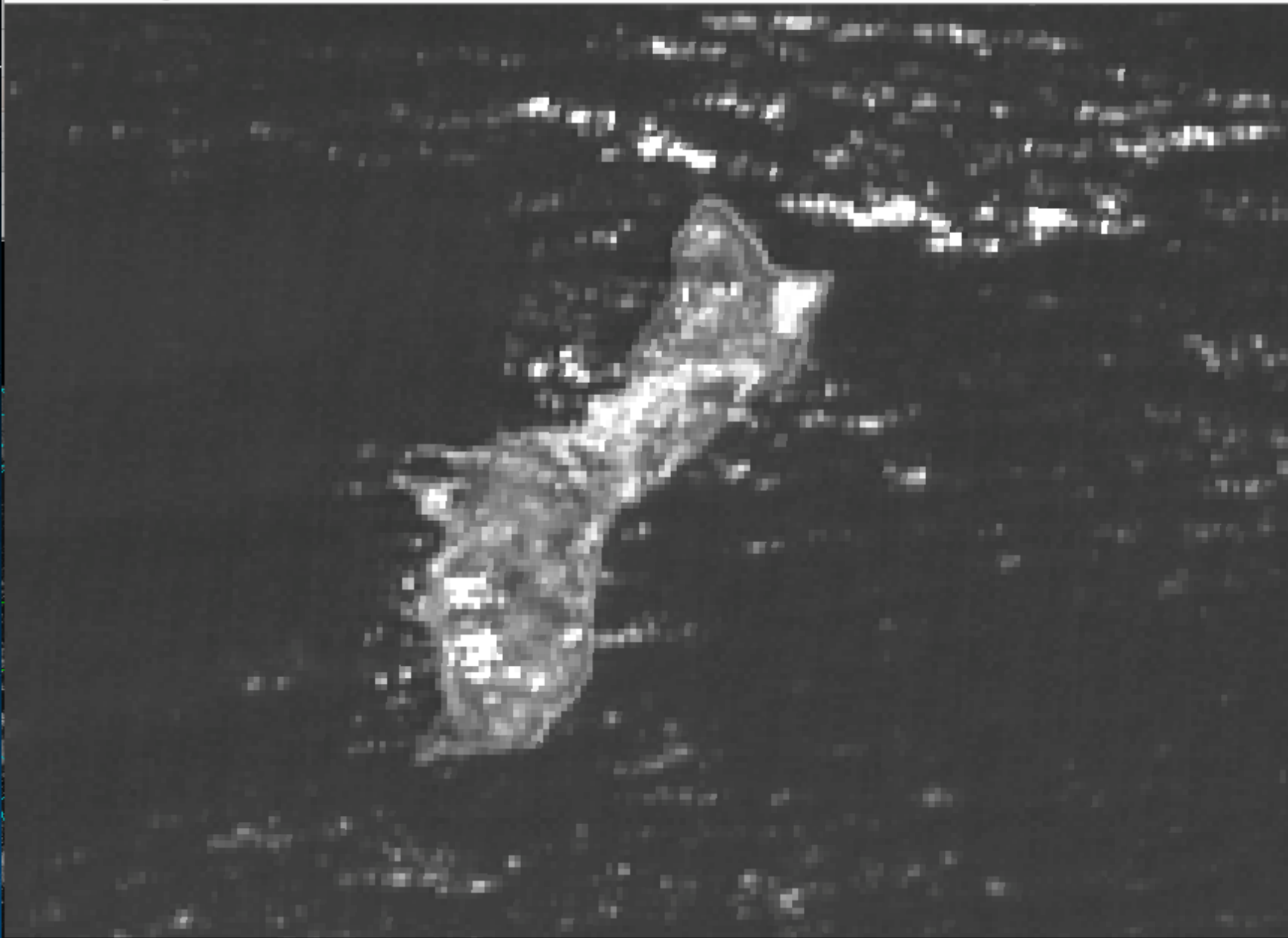


VIIRS Instrument Characteristics

	Band No.	Wave-length (μm)	Horiz Sample Interval (km Downtrack x Crosstrack)		Driving EDRs	Radiance Range	Ltyp or Ttyp	Signal to Noise Ratio (dimensionless) or NEΔT (Kelvins)		
			Nadir	End of Scan				Required	Predicted	Margin
VIS/NIR FPA Silicon PIN Diodes	M1	0.412	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols	Low High	44.9 155	352 316	441 807	25% 155%
	M2	0.445	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols	Low High	40 146	380 409	524 926	38% 126%
	M3	0.488	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols	Low High	32 123	416 414	542 730	30% 76%
	M4	0.555	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols	Low High	21 90	362 315	455 638	26% 102%
	I1	0.640	0.371 x 0.387	0.80 x 0.789	Imagery	Single	22	119	146	23%
	M5	0.672	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols	Low High	10 68	242 360	298 522	23% 45%
	M6	0.746	0.742 x 0.776	1.60 x 1.58	Atmospheric Corr'n	Single	9.6	199	239	20%
	I2	0.865	0.371 x 0.387	0.80 x 0.789	NDVI	Single	25	150	225	50%
	M7	0.865	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols	Low High	6.4 33.4	215 340	388 494	81% 45%
CCD	DNB	0.7	0.742 x 0.742	0.742 x 0.742	Imagery	Var.	6.70E-05	6	5.7	-5%
S/MWIR PV HgCdTe (HCT)	M8	1.24	0.742 x 0.776	1.60 x 1.58	Cloud Particle Size	Single	5.4	74	98	32%
	M9	1.378	0.742 x 0.776	1.60 x 1.58	Cirrus/Cloud Cover	Single	6	83	155	88%
	I3	1.61	0.371 x 0.387	0.80 x 0.789	Binary Snow Map	Single	7.3	6.0	97	1523%
	M10	1.61	0.742 x 0.776	1.60 x 1.58	Snow Fraction	Single	7.3	342	439	28%
	M11	2.25	0.742 x 0.776	1.60 x 1.58	Clouds	Single	0.12	10	17	66%
	I4	3.74	0.371 x 0.387	0.80 x 0.789	Imagery Clouds	Single	270 K	2.500	0.486	415%
	M12	3.70	0.742 x 0.776	1.60 x 1.58	SST	Single	270 K	0.396	0.218	82%
	M13	4.05	0.742 x 0.259	1.60 x 1.58	SST Fires	Low High	300 K 380 K	0.107 0.423	0.063 0.334	69% 27%
LWIR PV HCT	M14	8.55	0.742 x 0.776	1.60 x 1.58	Cloud Top Properties	Single	270 K	0.091	0.075	22%
	M15	10.763	0.742 x 0.776	1.60 x 1.58	SST	Single	300 K	0.070	0.038	85%
	I5	11.450	0.371 x 0.387	0.80 x 0.789	Cloud Imagery	Single	210 K	1.500	0.789	90%
	M16	12.013	0.742 x 0.776	1.60 x 1.58	SST	Single	300 K	0.072	0.051	42%

Visible Band Comparison





Lon: 148.40 Lat: 11.30 Val: 0.05, H08 AH1 2018-03-26 03:40



1:C03



2:11



AHI Band 3 (.64 μm) Reflectances (500 m)



Lon: 148.40 Lat: 11.30 Val: 0.05, NPP VIIRS 2018-03-26 03:35



1:C03



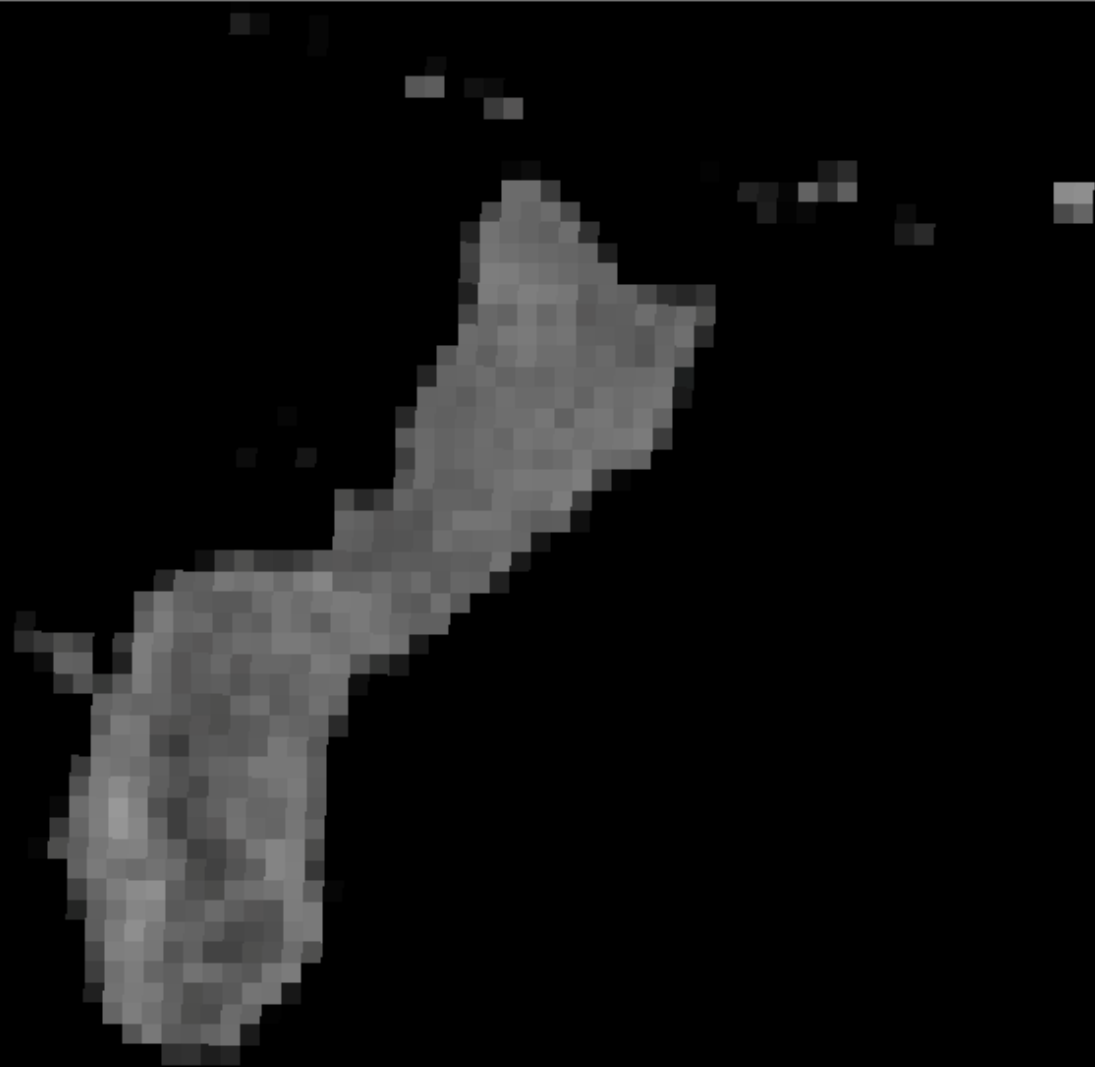
2:11



VIIRS I-Band 1 (.64 μm) Reflectances (375 m)

Near Infrared Band Comparison





AHI Band 4 (.86 μm) Reflectances (1 km)

Lon: 148.40 Lat: 11.30 Val: 0.03, H08 AHI 2018-03-26 03:40

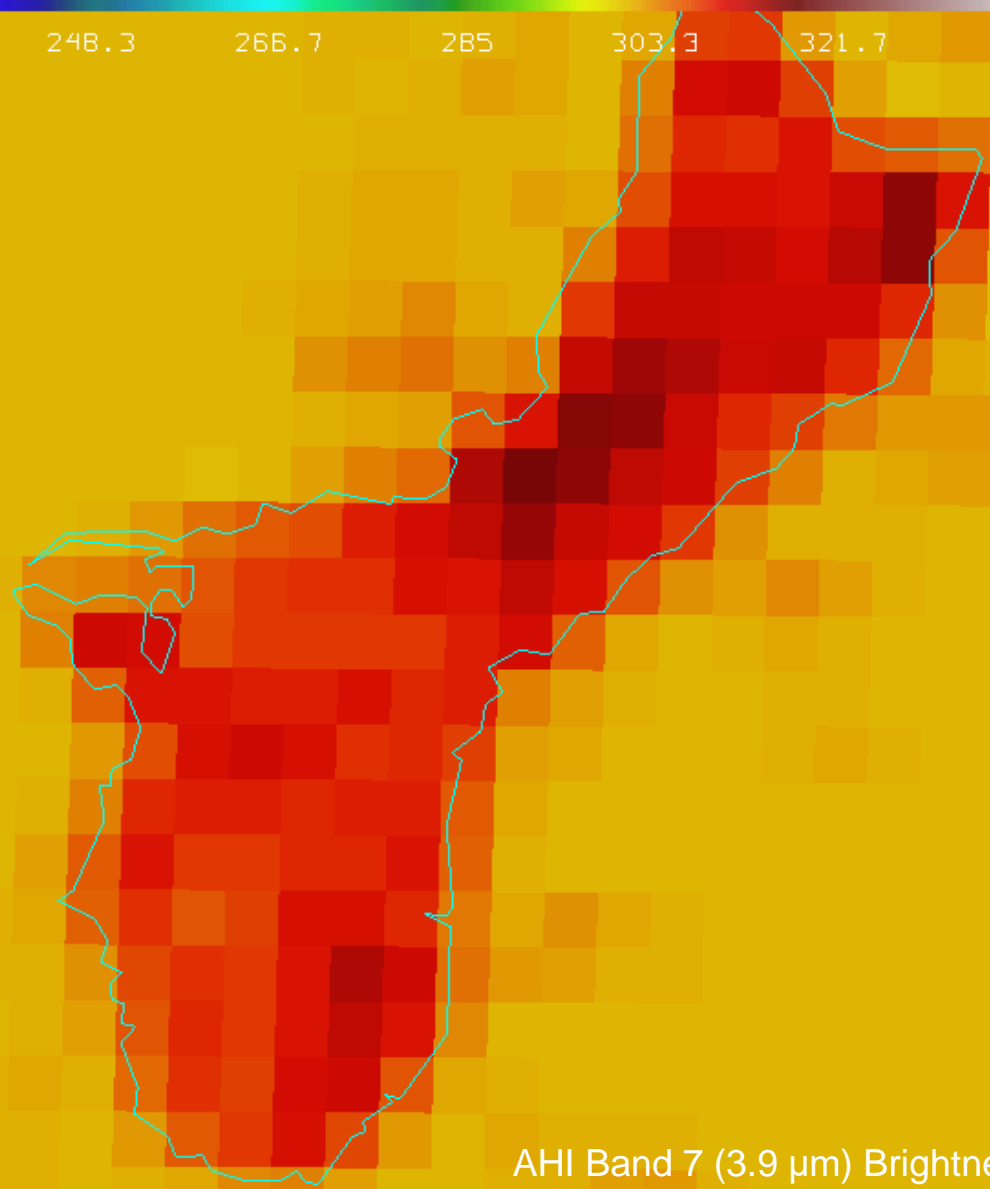


VIIRS I-Band 2 (.86 μm) Reflectances (375 m)

Lon: 148.40 Lat: 11.30 Val: 0.03, NPP VIIRS 2018-03-26 03:35

Infrared Band Comparison

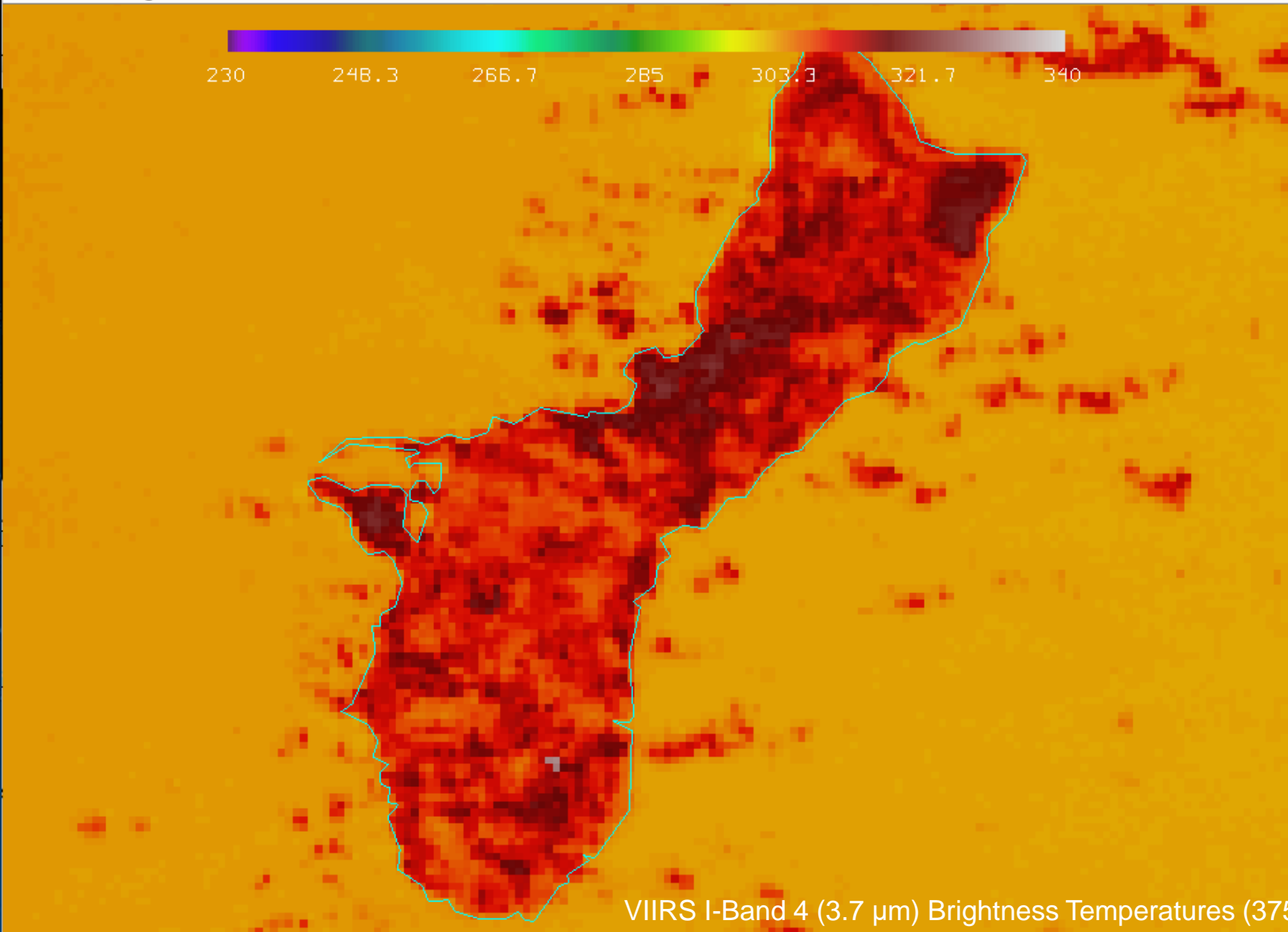




AHI Band 7 (3.9 μm) Brightness Temperatures (2 km)

Lon: 145.00 Lat: 13.21 Val: 300.18, H08 AHI 2018-03-26 03:40

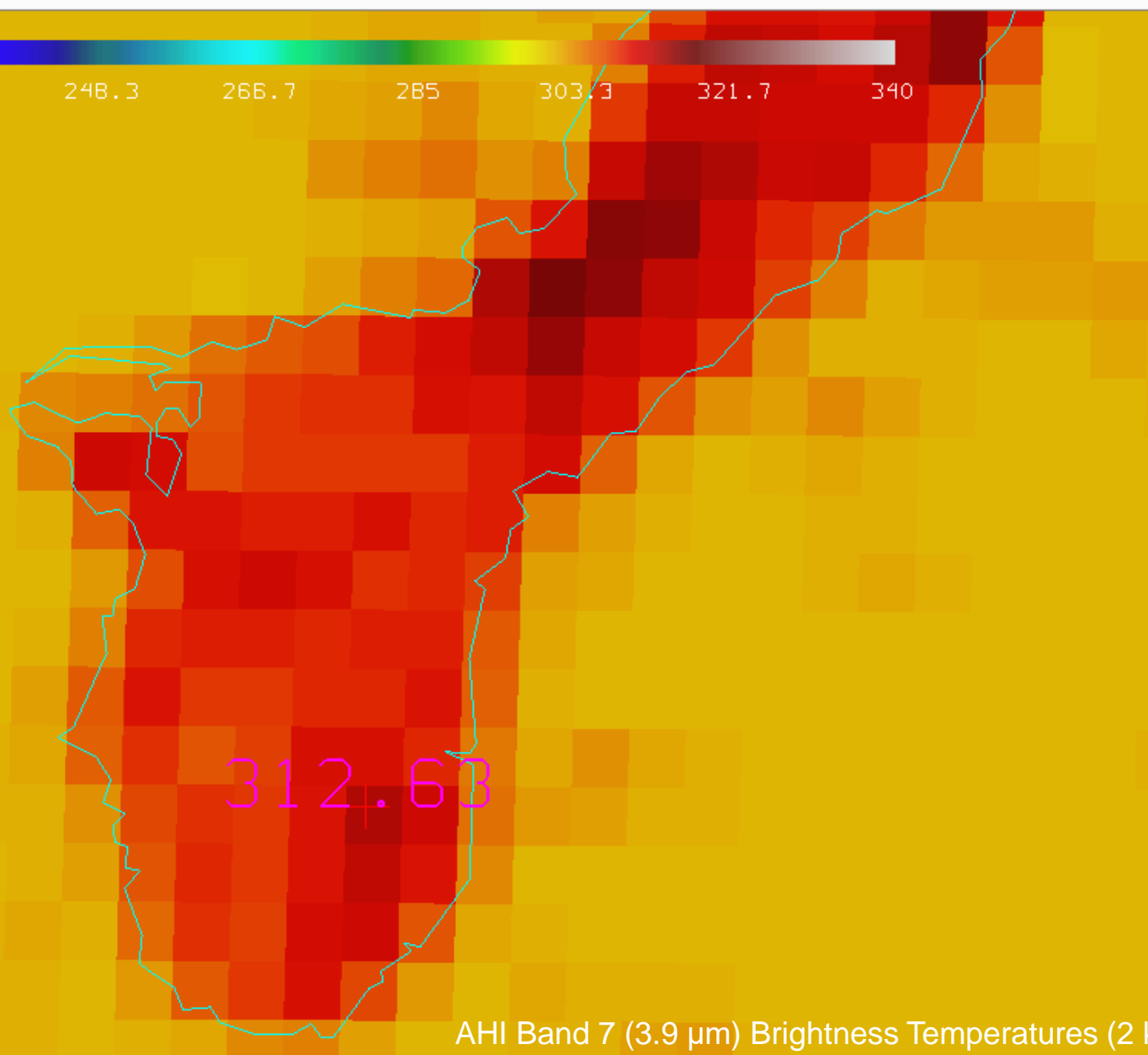
Navigation and control interface for the satellite data viewer. It includes a home icon, a refresh icon, a checked checkbox next to '1:C07', a checked checkbox next to '2:14', an unchecked checkbox next to '1:C04', an unchecked checkbox next to '2:12', an unchecked checkbox next to '1:C03', and an unchecked checkbox next to '2:11'. There are also left and right arrow navigation buttons.



VIIRS I-Band 4 (3.7 μm) Brightness Temperatures (375 m)

Lon: 145.00 Lat: 13.21 Val: 301.34, NPP VIIRS 2018-03-26 03:35

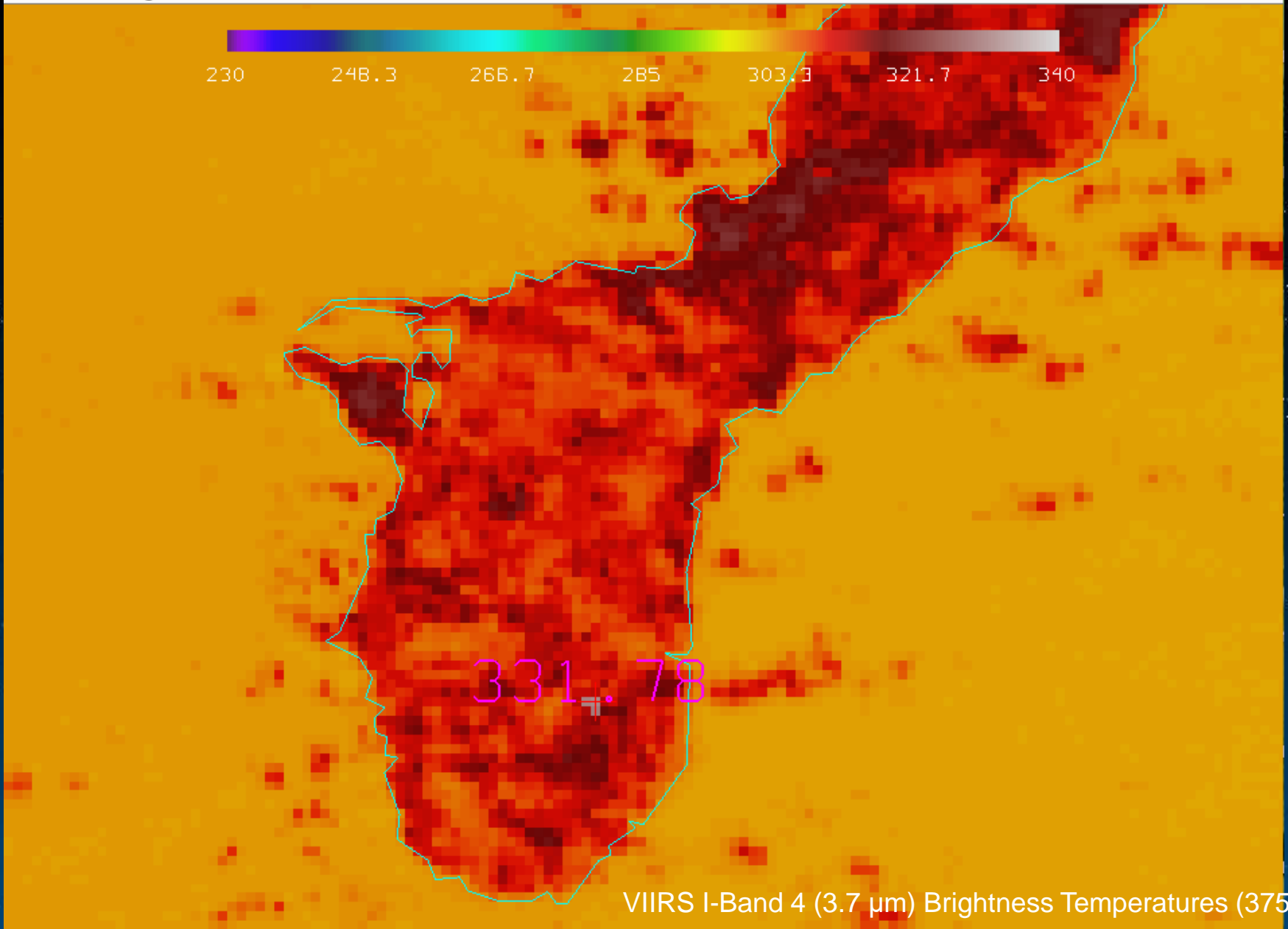
Navigation and control interface at the bottom of the screen. It includes a home icon, a refresh icon, a checked checkbox, a dropdown menu showing '1:C07', a checked checkbox, a dropdown menu showing '2:14', an unchecked checkbox, a dropdown menu showing '1:C04', an unchecked checkbox, a dropdown menu showing '2:12', an unchecked checkbox, a dropdown menu showing '1:C03', an unchecked checkbox, a dropdown menu showing '2:11', and left and right arrow navigation buttons.



AHI Band 7 (3.9 μm) Brightness Temperatures (2 km)

Lon: 144.74 Lat: 13.32 Val: 312.63, H08 AHI 2018-03-26 03:40

Navigation and control icons including a home icon, a globe icon, a checked checkbox, and several channel selection buttons labeled 1:C07, 2:14, 1:C04, 2:12, 1:C03, and 2:11. There are also left and right arrow icons.



VIIRS I-Band 4 (3.7 μm) Brightness Temperatures (375 m)

Lon: 144.74 Lat: 13.32 Val: 331.78, NPP VIIRS 2018-03-26 03:35

Navigation and layer control icons: Home, Layers, Checkmark, 1:C07, 2:14, 1:C04, 2:12, 1:C03, 2:11, and navigation arrows.

Slido Question

- Which of the following would be useful to you in your job?
 - Polar visible band imagery?
 - Polar near infrared imagery?
 - Polar infrared imagery?
 - None of the above?
-
- Why?
 - This demonstrates a couple of uses for the higher spatial resolution data that compliments GEO data. Can you think of any others?

Slido Question

- How would you look at smoke or fog at night?
 - IR imagery
 - RGBs
 - Level 2 Product
 - Other (please note in Q&A)

VIIRS Day/Night Band

- Visible wavelength available at night!
 - 735 m spatial resolution centered at about .7 microns
- What can now be seen at night?
 - Cities
 - Smoke, Dust, Ash
 - Low Clouds/Fog
 - Fires, Volcanoes (Lava)
 - Auroras
 - Lightning
- How much can be seen depends heavily on lunar illumination – Phase of moon, and rising/setting times

VIIRS Day/Night Band

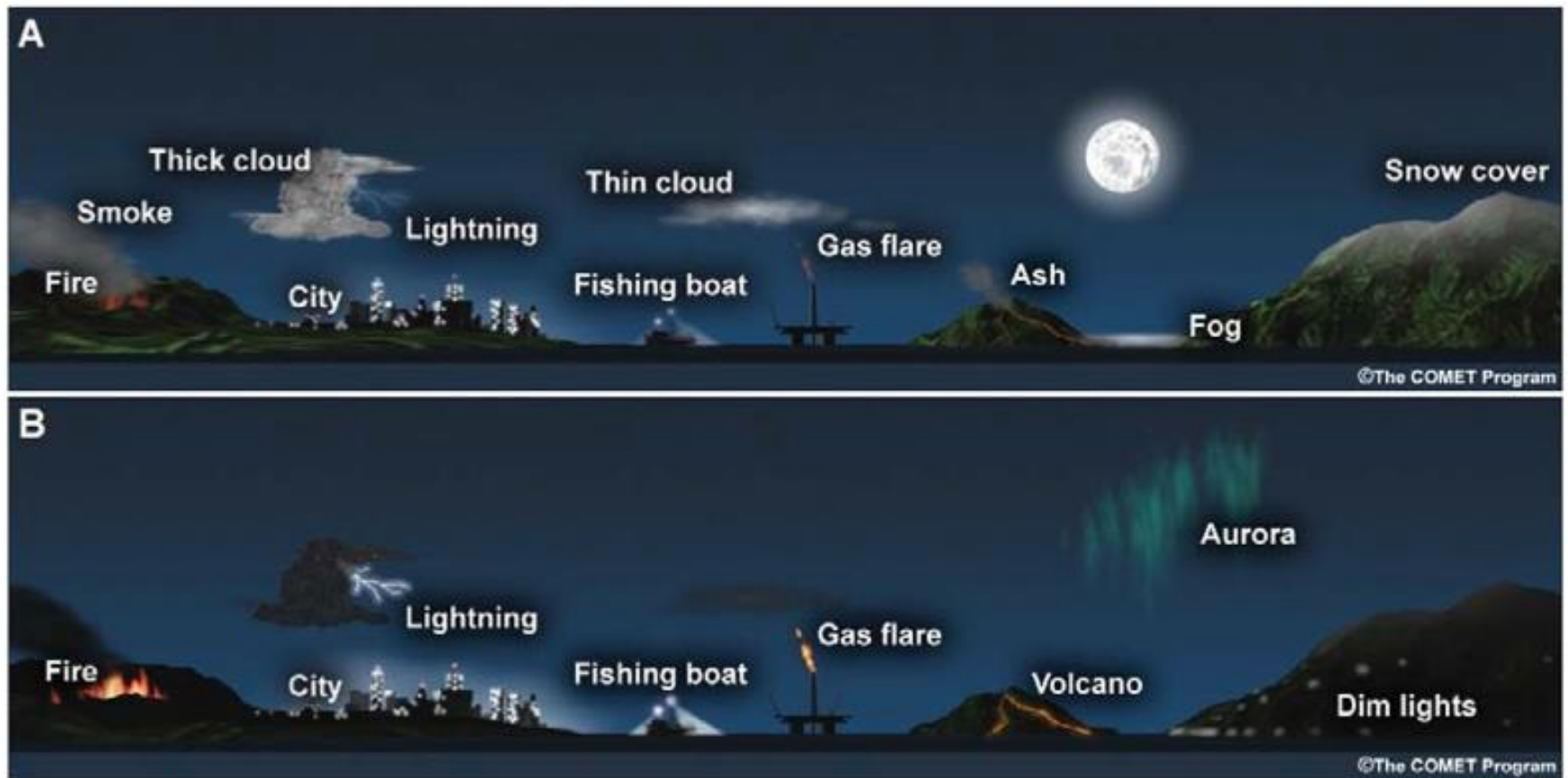
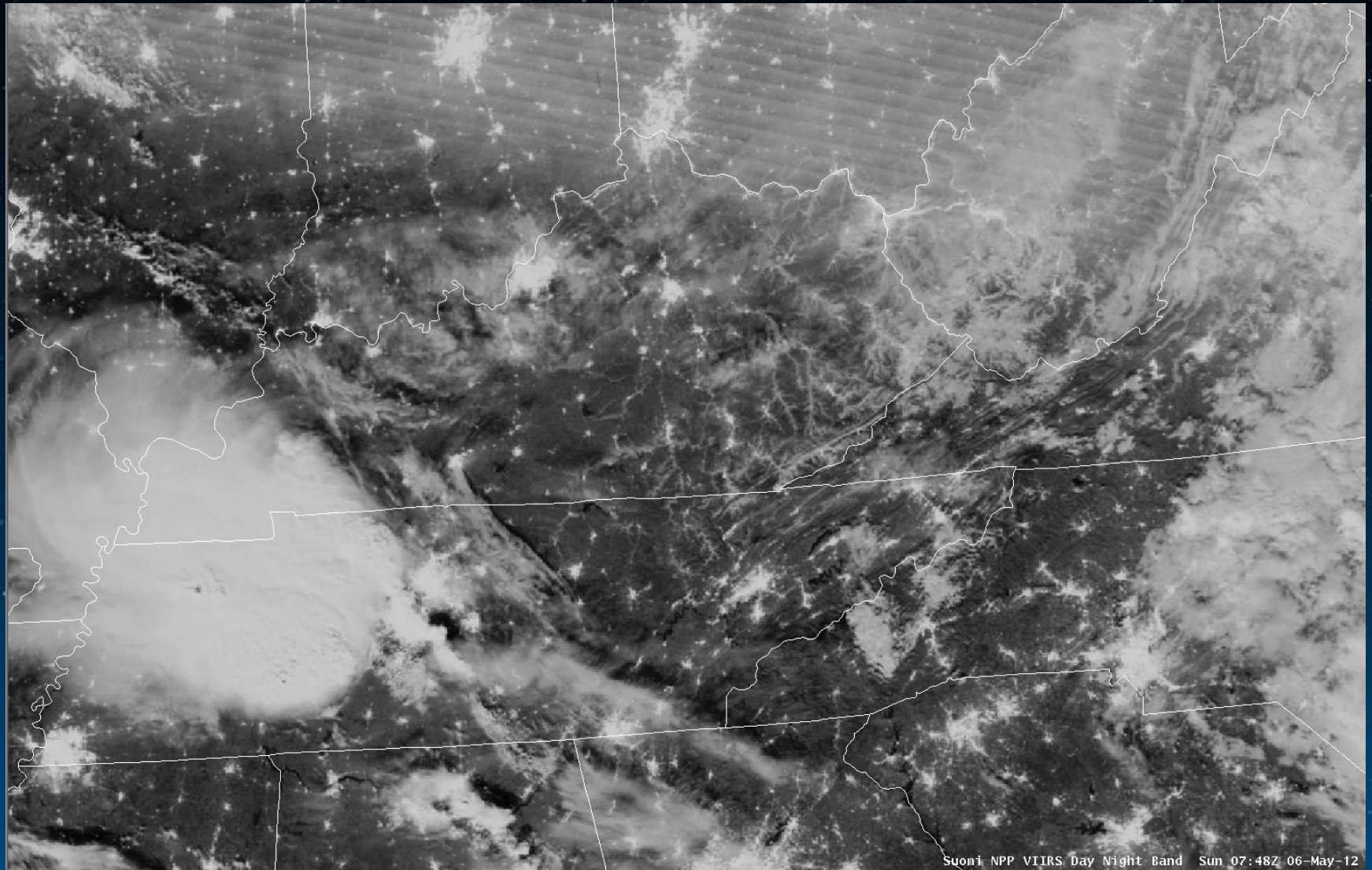


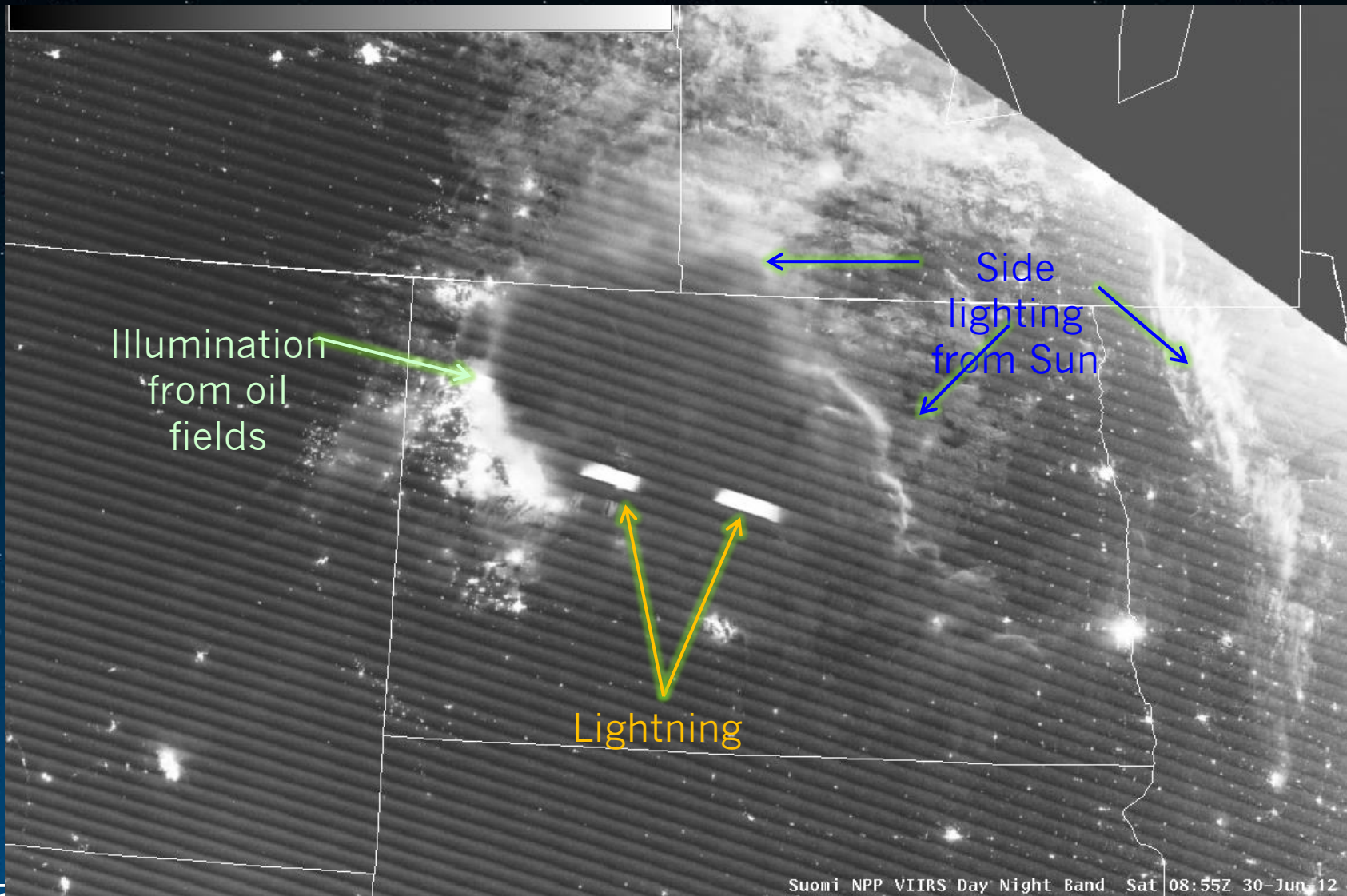
FIG. 1. Nighttime visible detection capabilities (a) with and (b) without lunar illumination.

Taken from: T. Miller, S. D., Turk, F. J., Schueler, C., Jullian, R., Deyo, S., Dills, P., and Wang, S., 2006: The NPOESS VIIRS Day/Night Visible Sensor, Bulletin Am. Met. Society, DOI:10.1175/BAMS-87-2-191, p. 191-199.

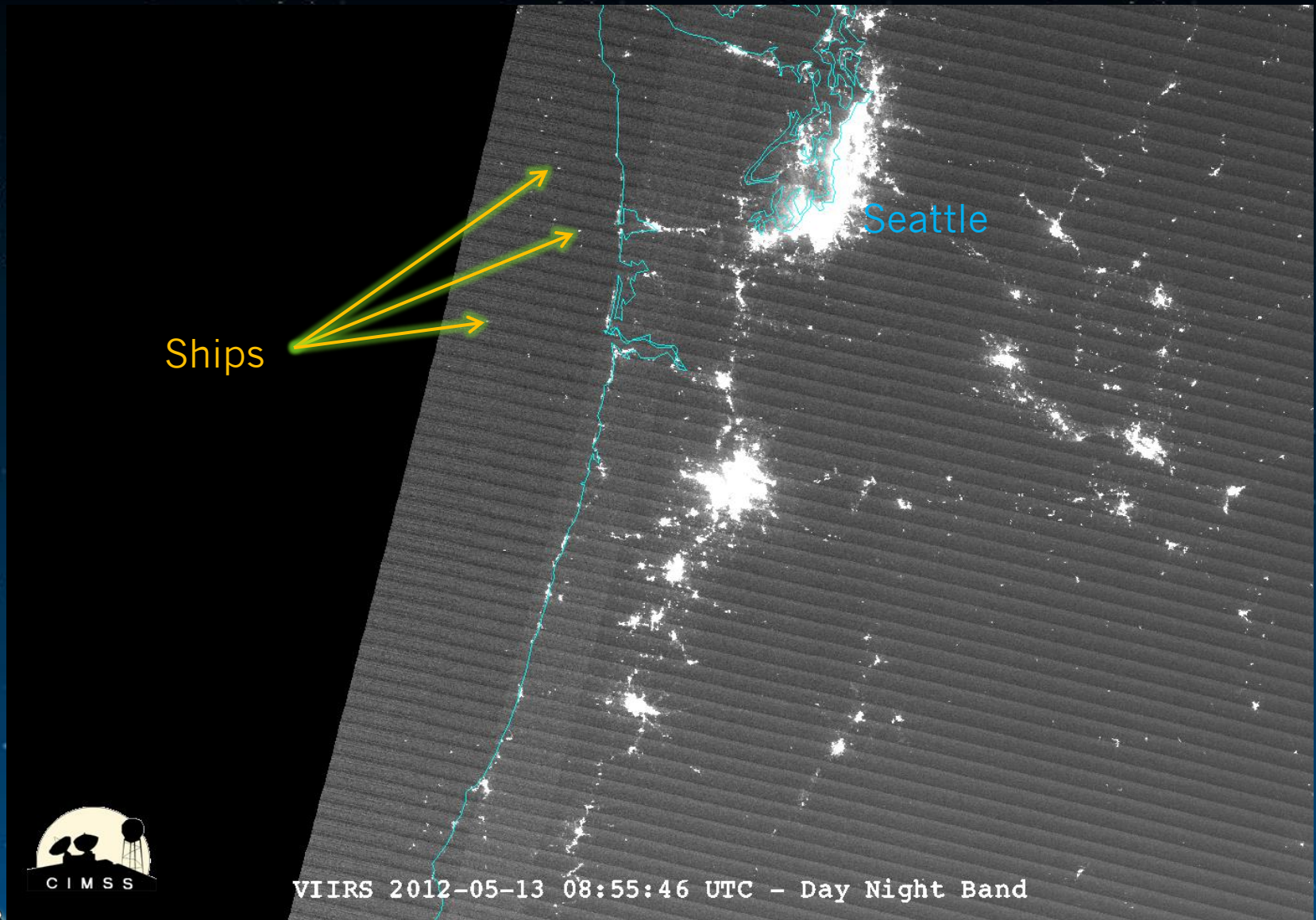
VIIRS Fog Detection Capability Day/Night Band 6 May 2012



VIIRS Day/Night Band Lightning Detection 30 June 2012



Ships seen in the VIIRS Day/Night Band

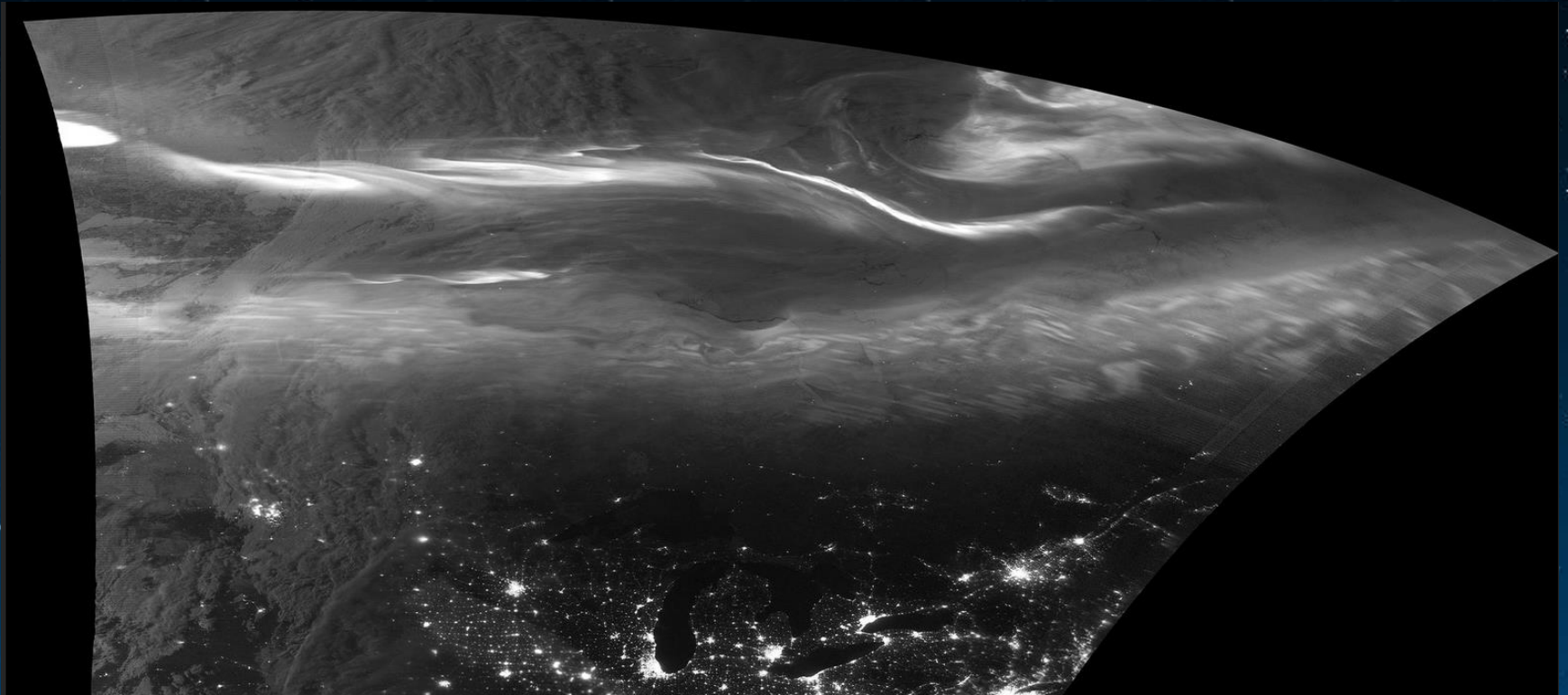


VIIRS 2012-05-13 08:55:46 UTC - Day Night Band



Aurora Borealis

S-NPP VIIRS 25 March 2018



VIIRS Day/Night Band Smoke Detection 8 April 2012



Timeline Photos

[Back to Album](#) · [US National Weather Service San Francisco Bay Area/Monterey California's Photos](#) · [US National Weather Service San Francisco Bay Area/Monterey California's Page](#)

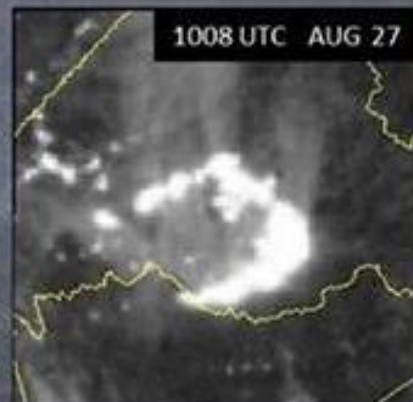
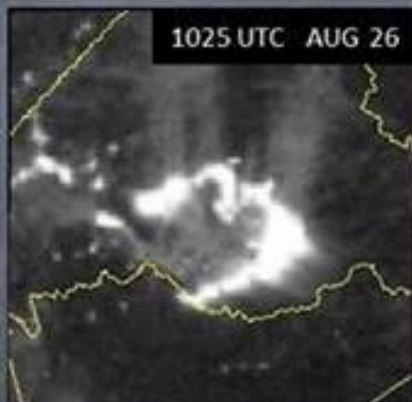
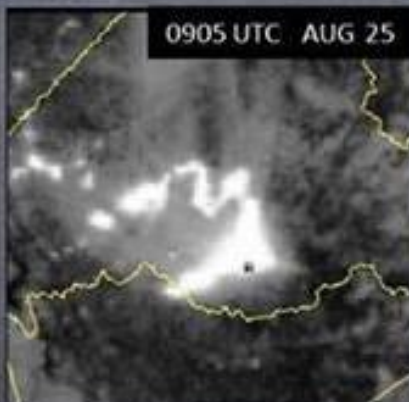
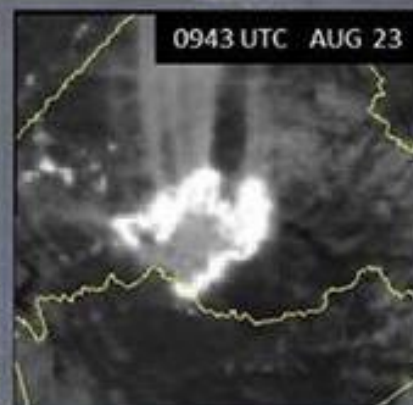
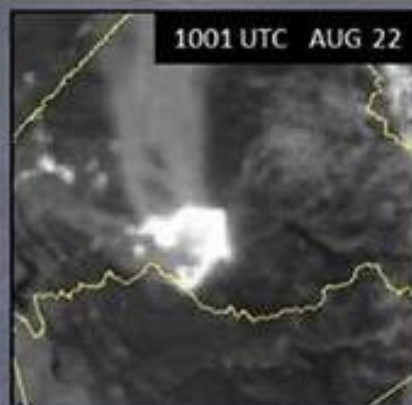
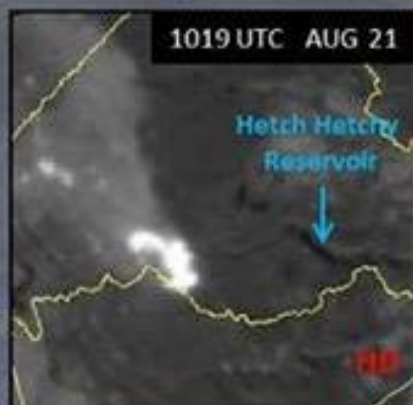
[Previous](#) · [Next](#)

500 Snippet



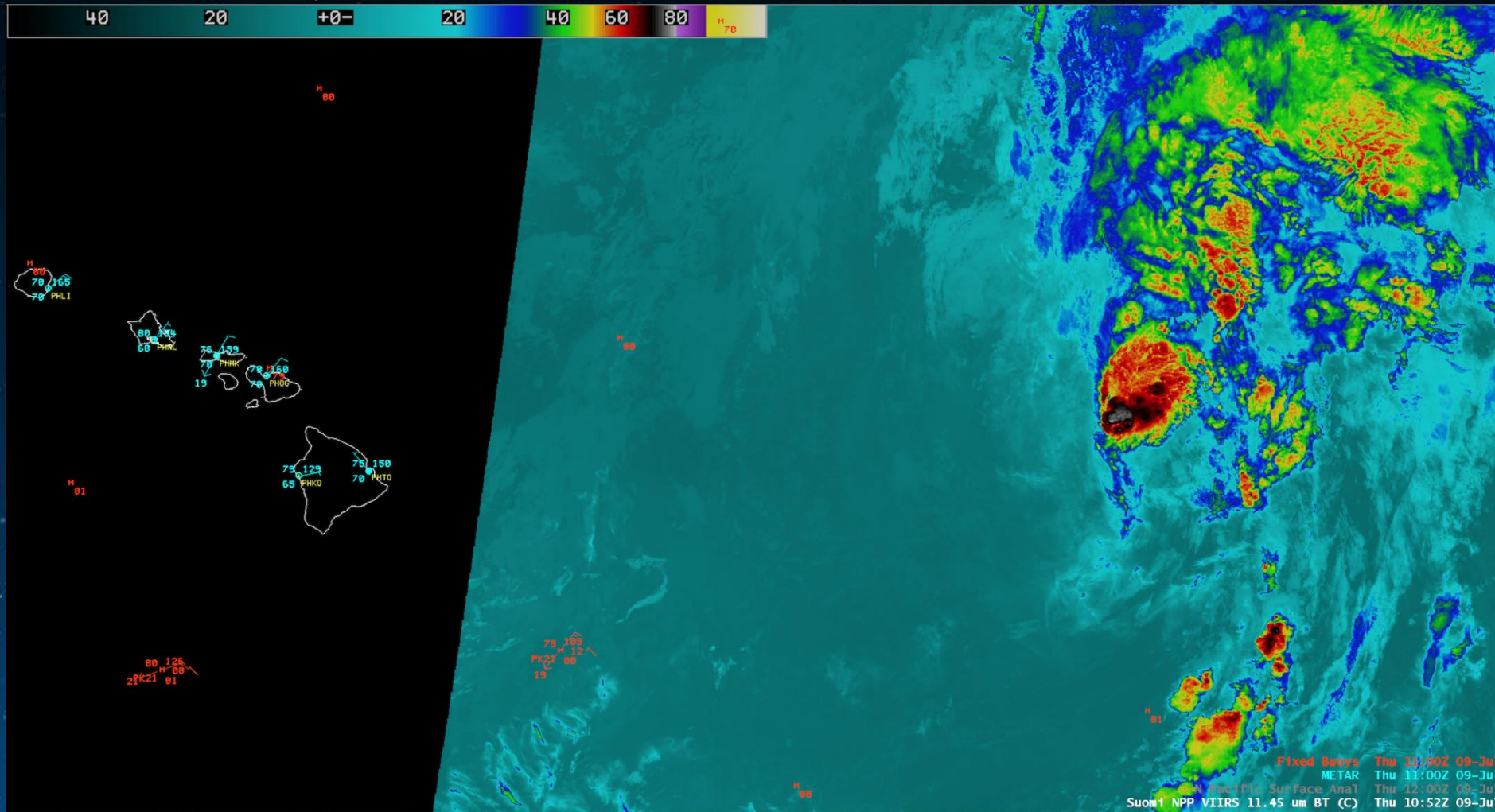
By Dr Warren Blier
Science and Operations
Officer (500)

The March of the Rim Fire



Tropical Storm Ela in the Pacific

Low Level Circulation Center (LLCC) Located to the Southwest of the Deep Convection associated with the system as seen by the VIIRS Day/Night Band



VIIRS Infrared 11 micron Imagery in AWIPS-II 11:00 UTC 9 July 2015

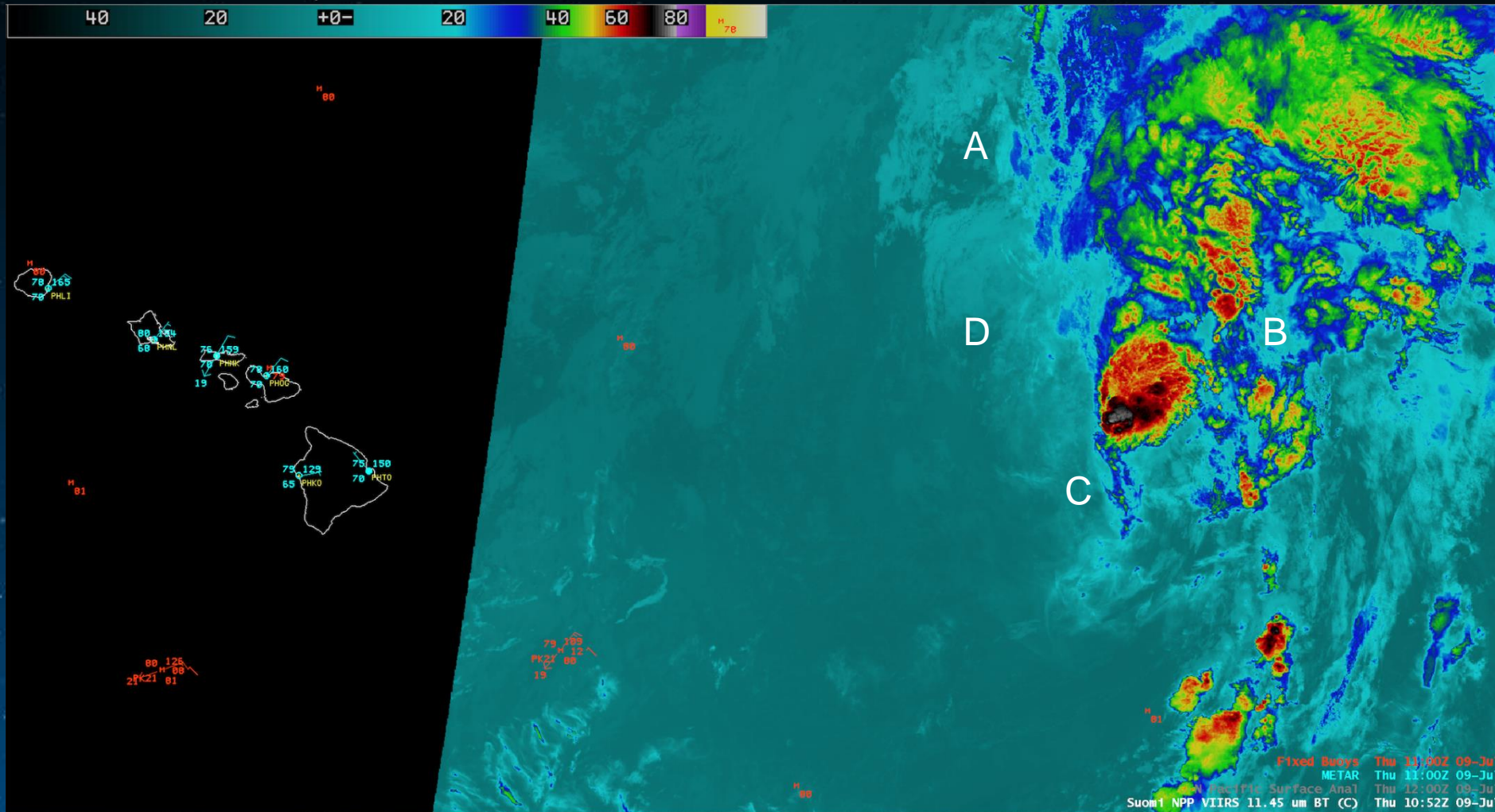


Slido Question

- Where is the center of the Tropical Storm Ela?
 - A
 - B
 - C
 - D
 - I need more information.

Tropical Storm Ela in the Pacific

Low Level Circulation Center (LLCC) Located to the Southwest of the Deep Convection associated with the system as seen by the VIIRS Day/Night Band

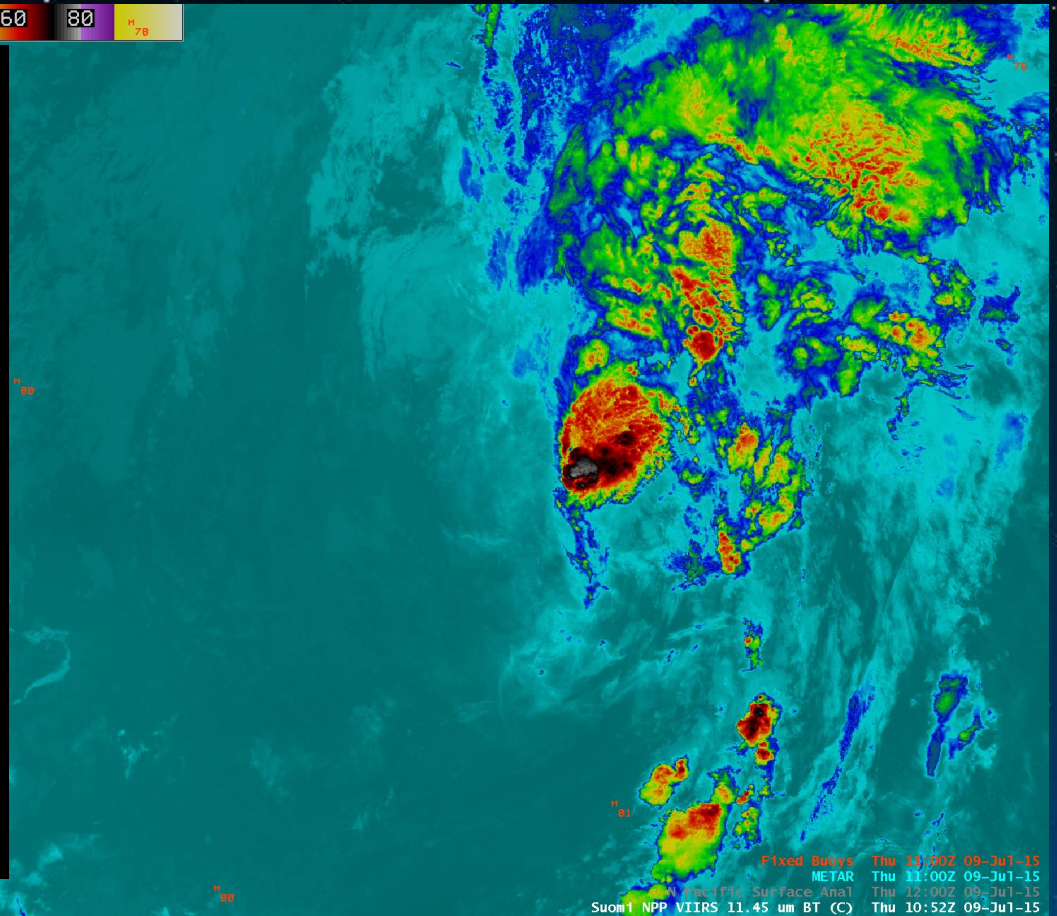


VIIRS Infrared 11 micron Imagery in AWIPS-II 11:00 UTC 9 July 2015



Tropical Storm Ela in the Pacific

TROPICAL STORM ELA
DISCUSSION NUMBER 7
NWS CENTRAL PACIFIC
HURRICANE CENTER
HONOLULU HI EP042015
500 AM HST THU JUL 09
2015
A 1052Z VIIRS DAY/NIGHT
BAND IMAGE WAS
INSTRUMENTAL IN
HELPING TO LOCATE THE
PARTIALLY EXPOSED
CENTER OF ELA THIS
MORNING.

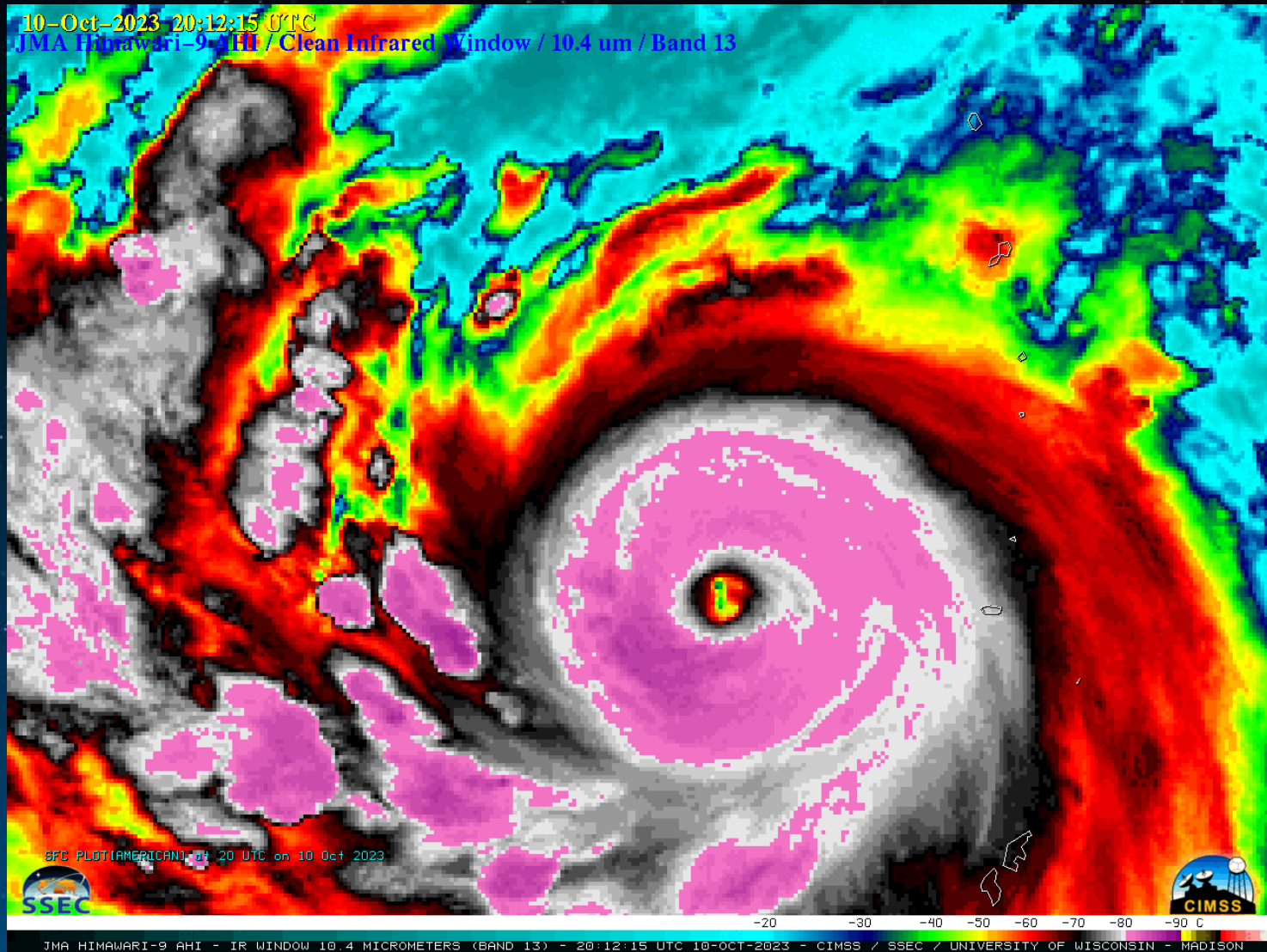


Super Typhoon Bolaven

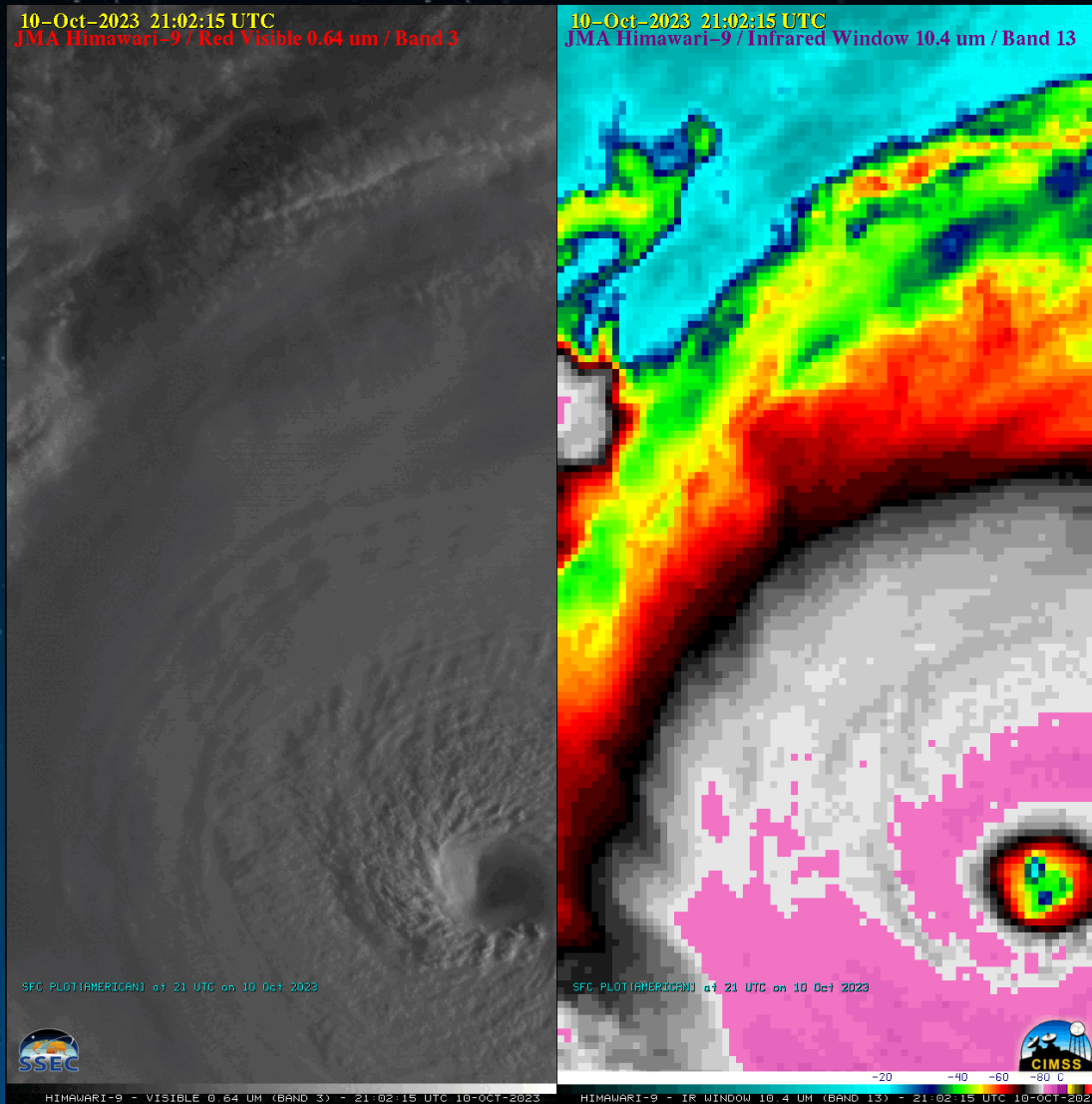
10-Oct-2023 20:12:15 UTC
JMA Himawari-9 AHI / Red Visible / 0.64 um / Band 3



Super Typhoon Bolaven



Super Typhoon Bolaven

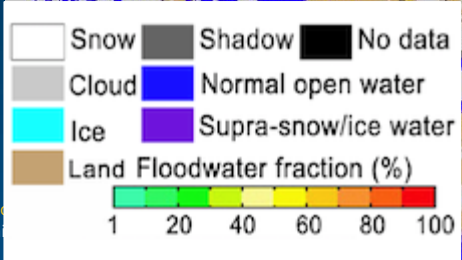
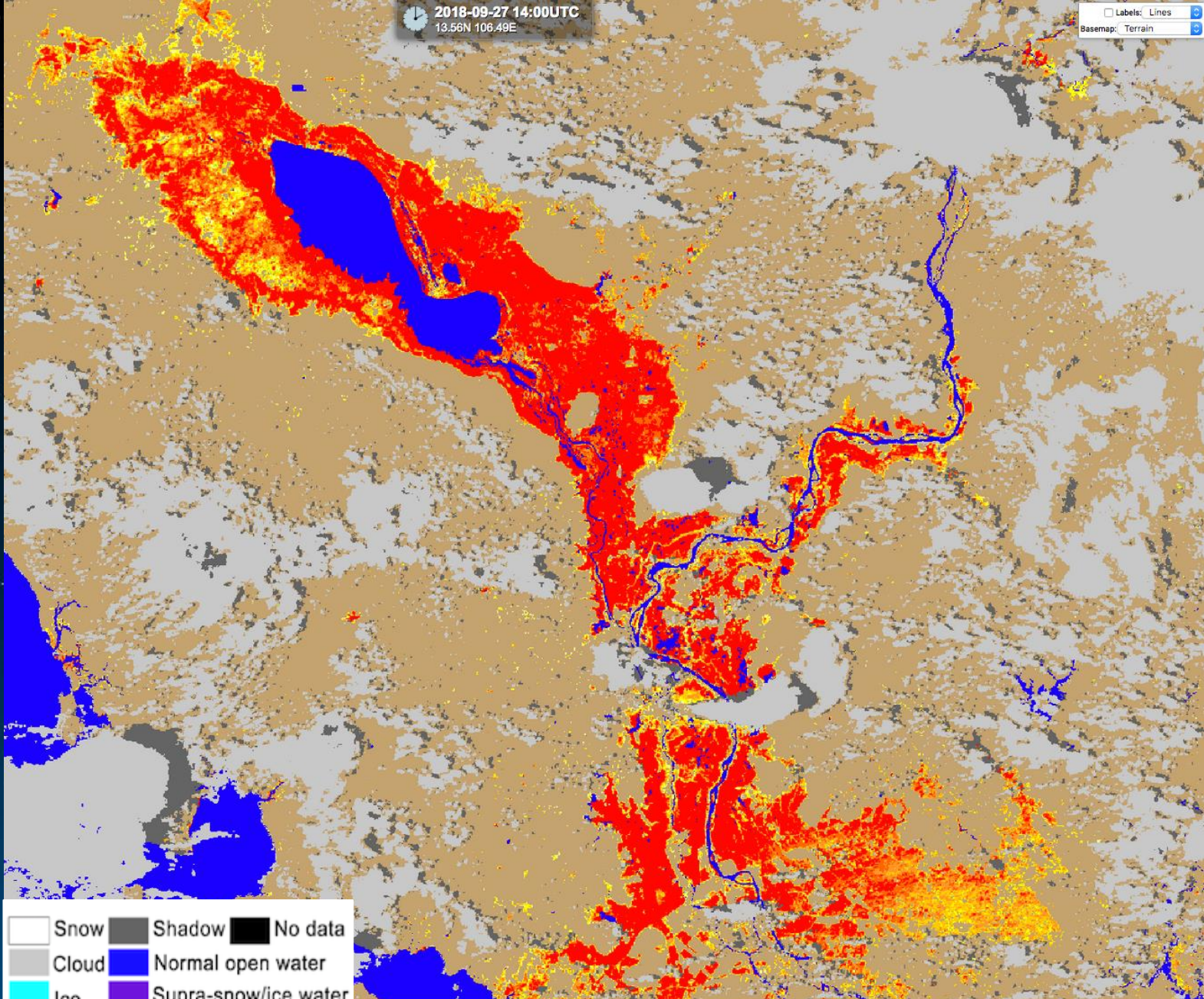


Super Typhoon Bolaven



Level 2 Products

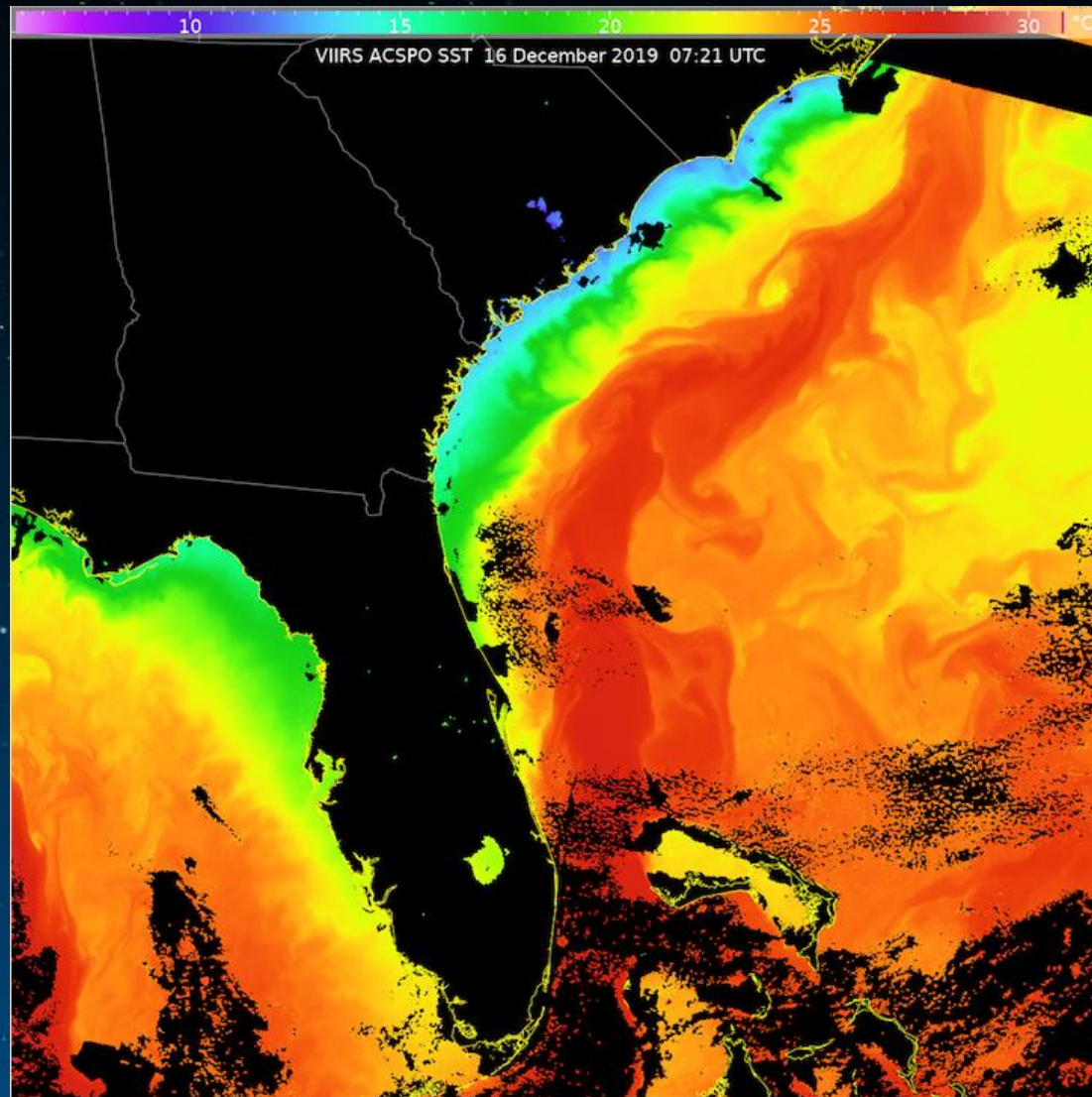
- Why use them?



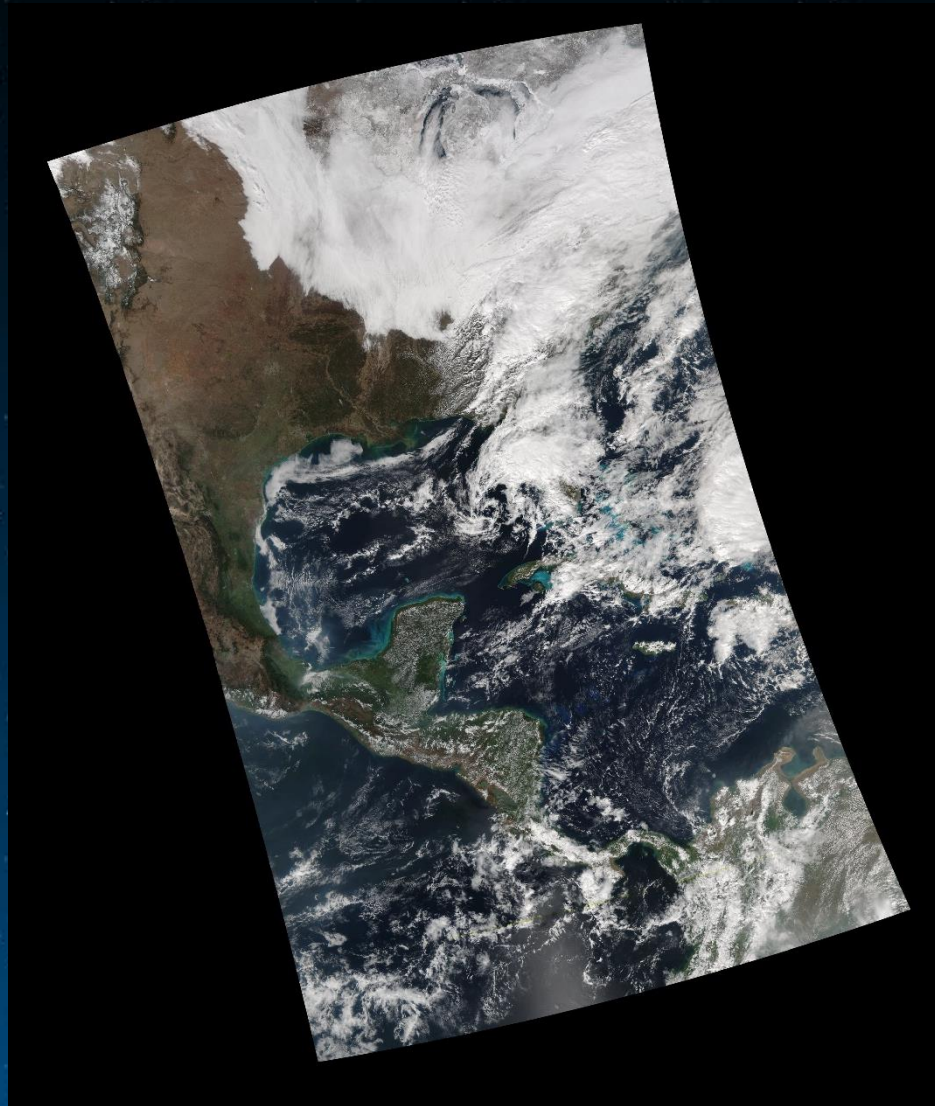
S-NPP VIIRS Flood Product
27 September 2018

VIIRS ACSPO

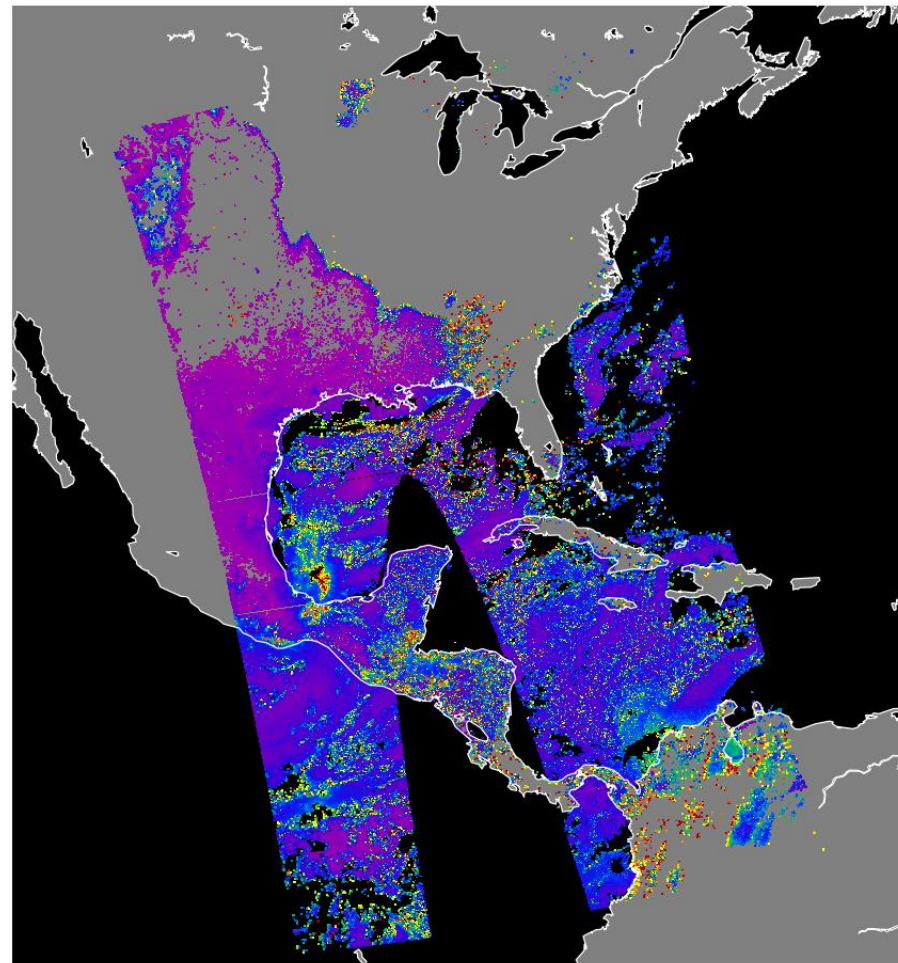
Advanced Clear-Sky Processor for Ocean



VIIRS True Color Image 9 February 2015 18:53 UTC

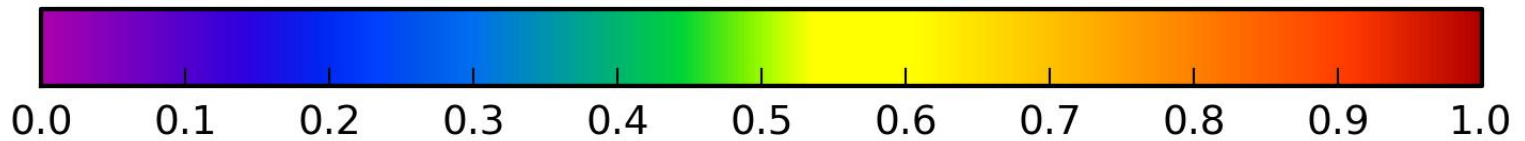


VIIRS Aerosol Optical Thickness 9 February 2015 18:53 UTC

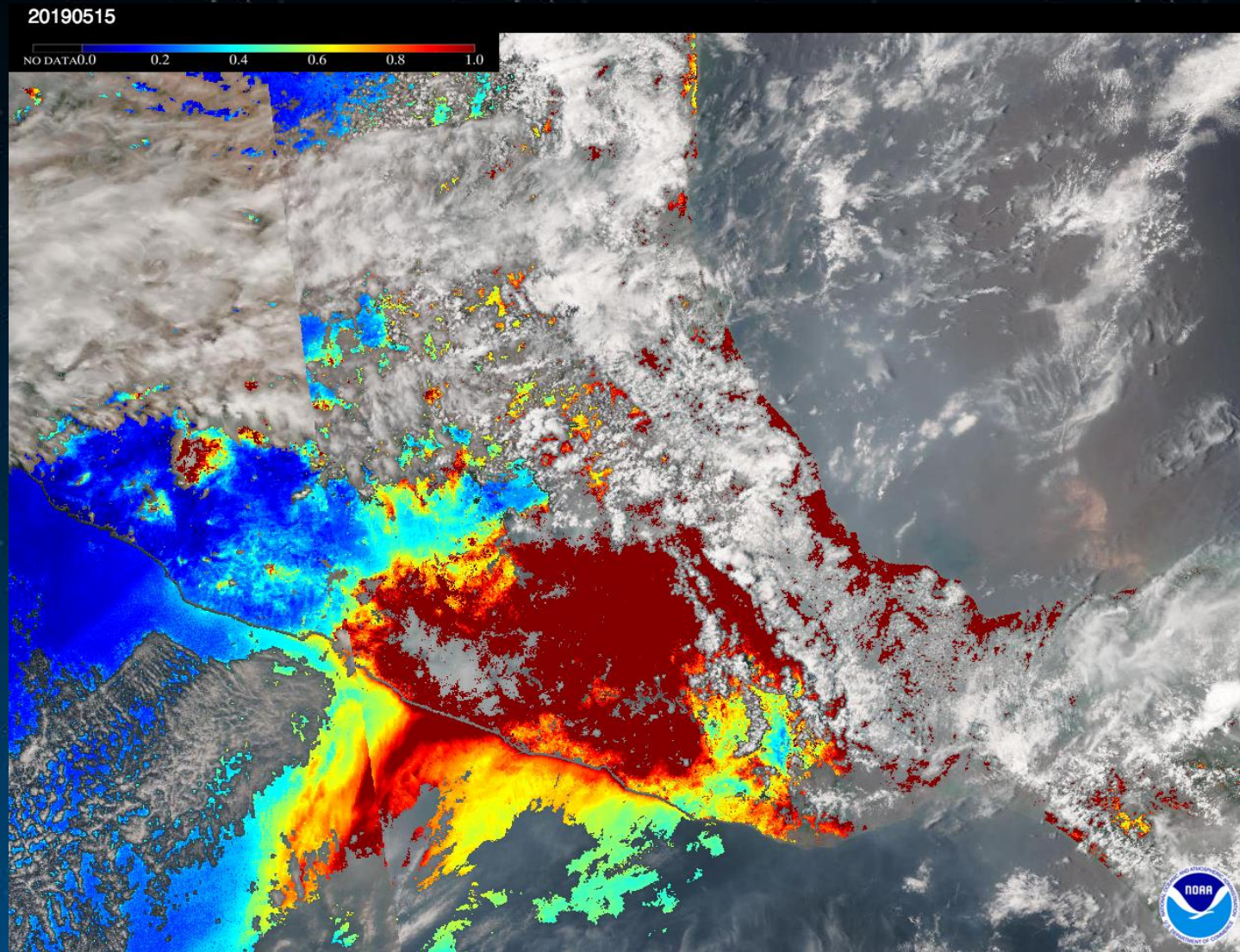


AOT

AOT

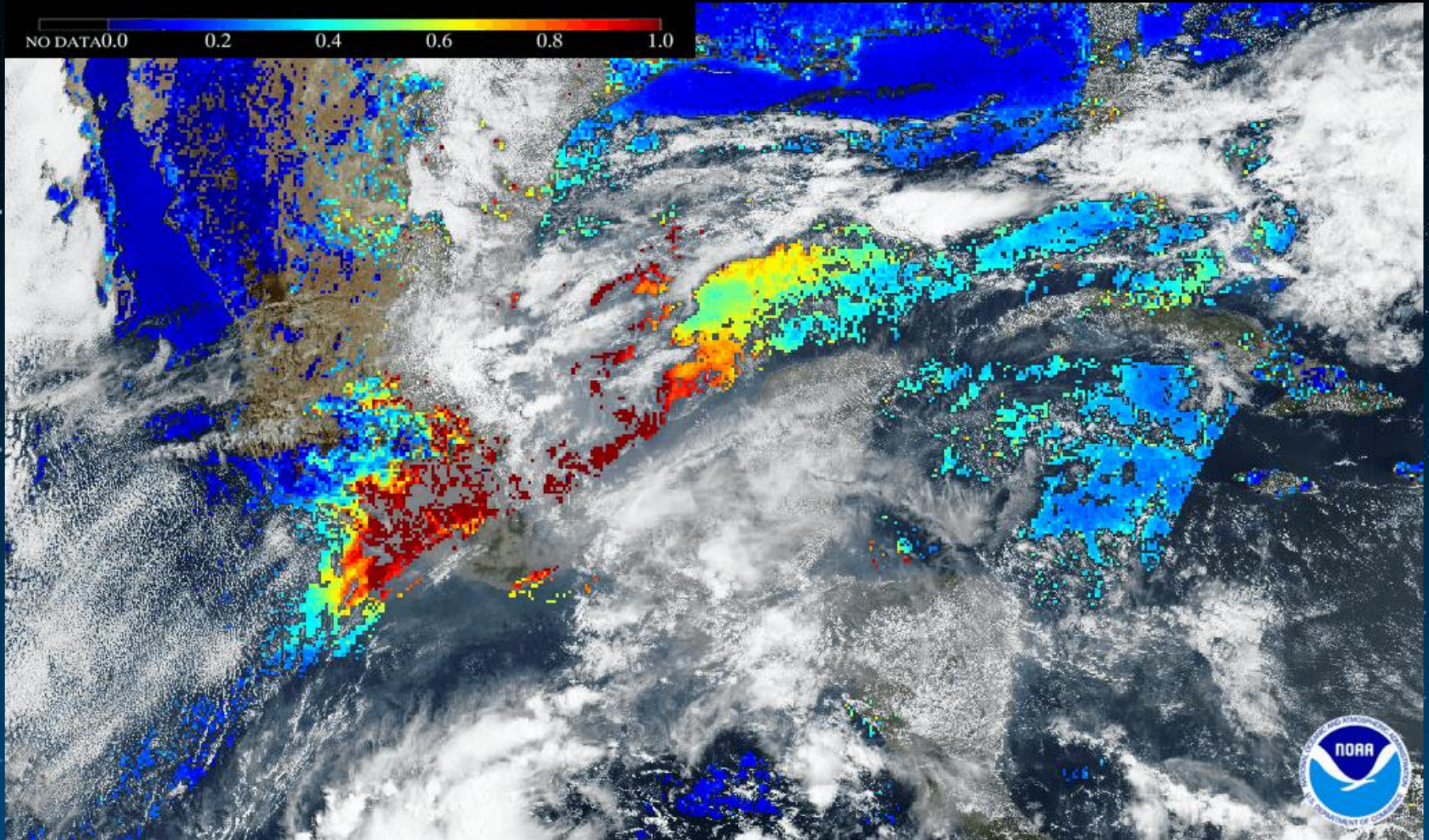


VIIRS Aerosol Optical Depth



ABI Aerosol Optical Depth Animation

20190515 1500



How do I make these products?



CSPP Leo Software

Community Satellite Processing Package

Home | Download | Applications | History | Credits | Forum | Meetings

The Community Satellite Processing Package (CSPP) supports the Direct Broadcast (DB) meteorological and environmental satellite community through the packaging and distribution of open source science software. CSPP supports DB users of both polar orbiting and geostationary satellite data processing and regional real-time applications through distribution of free open source software, and through training in local product applications. CSPP is funded through [NOAA JPSS](#).

Joint Polar Satellite System (JPSS) Products

CSPP software in support of the JPSS mission:

- [VIIRS](#), [ATMS](#), [CrIS](#) and [OMPS](#) calibration and geolocation software (Raw Data Records (RDRs) to Sensor Data Records (SDRs)) supporting S-NPP and NOAA-21 satellites; [Learn more ...](#)
- [VIIRS](#) Environmental Data Records (EDRs), including a subset of Land, Ocean and Atmosphere Products; [Learn more about VIIRS Aerosol, Snow/Ice, Volcanic Ash and Land Environmental Data Records ...](#) [Learn more about Surface Reflectances ...](#)
- Reprojection software for the creation of high quality [VIIRS](#), [MODIS](#), [AVHRR](#) and [EDR](#) images in a variety of output formats including GeoTIFF, AWIPS NetCDF and KMZ. [Learn more ...](#)
- NOAA/NESDIS/STAR [NOAA Unique Combined Atmospheric Processing System \(NUCAPS\)](#) Hyperspectral Sounding Retrieval Software packaged now the Hyper-Spectral Enterprise Algorithm Package (HEAP). [Learn more ...](#)
- [CrIS](#), [AIRS](#) and [IASI](#) University of Wisconsin dual regression single Field-of-View (FOV) Temperature, Moisture, Surface and Cloud Retrieval Environmental Data Record (EDR); [Learn more ...](#)
- [VIIRS](#), [ATMS](#), [CrIS](#) and [EOS Aqua](#) and [Terra HYDRA2](#) multispectral data analysis toolkit; [Learn more ...](#)
- NOAA/NESDIS/STAR [Microwave Integrated Retrieval System \(MIRS\)](#) supporting S-NPP [ATMS](#), NOAA-18, 19 and Metop-A, B, C [AMSU-A](#) and [MHS](#) instruments; [Learn more ...](#)
- [VIIRS](#), [MODIS](#) and [AVHRR](#) (POES and Metop) Cloud and Land Surface Retrievals from [CLAIR-x](#). [Learn more ...](#)
- International ATOVS Processing Package (IAPP) Retrieval Software, supporting POES and Metop HIRS, AMSU-A and MHS [ATOVS](#) Instruments. [Learn more ...](#)
- NOAA/NESDIS/STAR [ACSPO](#) Advanced Clear-Sky Processor for Oceans software supporting [VIIRS](#), [AVHRR](#) and [MODIS](#) imagers. [Learn more ...](#)
- NOAA/NESDIS/STAR [Active Fire Software](#) supporting the [VIIRS](#) imager. [Learn more ...](#)
- Sounder Quicklook Software for display of NUCAPS, HSRTV, MIRS and IAPP Atmospheric Retrievals. [Learn more ...](#)

What's New

- [VIIRS Active Fire Retrieval Software v2.1](#)
- [CSPP GCOM-W AMSR2 GAASP Level 2 Software Patch Version 1.0.2](#)
- [Polar2Grid Reprojection Software v3.0](#)
- [MIRS Microwave Retrieval Software v3.0](#)
- [VIIRS Aerosol, Snow, Cloud, Ice \(ASCI\) and Land EDR v1.2](#)
- [VIIRS Surface Reflectance v1.1](#)
- [HEAP NUCAPS Sounder Retrieval Software v2.0](#)
- [ACSPO Imager SST v2.0](#)

- Free software for generating geophysical products from polar orbiting data.

- Supports:

- S-NPP, NOAA-20
 - VIIRS (Imager)
 - CrIS (Infrared Sounder)
 - ATMS (Microwave Sounder)
 - OMPS (Ozone Mapping and Profiler Suite).
- Metop-B/C, NOAA-18/19, and many more!

<https://cimss.ssec.wisc.edu/cspp/>

CSPP Leo Software

CSPP Package	Product Description
Sensor Data Records	VIIRS, CrIS, and ATMS geolocated and calibrated earth observations (NOAA algorithm).
Polar2Grid	Reprojected imagery (single and multi-band) in GeoTIFF and AWIPS formats.
VIIRS ASCII	VIIRS imager aerosol optical depth, cloud properties, sea ice, and volcanic ash (NOAA algorithm).
VIIRS Active Fires	VIIRS imager wildfire detection (NOAA algorithm).
VIIRS Flood Detection	VIIRS imager flood detection (NOAA algorithm).
VIIRS Surface Reflectance	VIIRS imager surface reflectance, NDVI, and EVI (NOAA algorithm).
HSRTV	Hyperspectral infrared sounder retrievals of temperature and moisture profiles, cloud properties, total ozone, and surface properties.
MIRS	Microwave sounder retrievals of temperature and moisture profiles; surface properties; snow and ice cover; rain rate; and cloud/rain water paths (NOAA algorithm).
CLAVR-x	Multispectral imager retrievals of cloud properties; aerosol optical depth; surface properties; ocean properties (NOAA algorithm).
HEAP	Combined hyperspectral infrared sounder and microwave sounder retrievals of temperature and moisture profiles, cloud cleared radiances, and trace gases (NOAA algorithm).
IAPP	Combined infrared sounder and microwave sounder retrievals of temperature and moisture profiles, water vapor, total ozone, and cloud properties.
ACSPO	Multispectral imager retrievals of sea surface temperature (NOAA algorithm).
GAASP	Microwave retrievals of ocean, precipitation, soil, and cryosphere properties (NOAA algorithm).
Sounder Quicklook	Projected 2D maps of temperature and water vapor retrievals, and Skew-T profiles for individual atmospheric profiles.

CSPP Leo Software

CSPP Software Package	SNPP, NOAA-20	Metop-B Metop-C	NOAA-18 NOAA-19	Terra	Aqua	GCOM-W1
Sensor Data Records / Level 1	VIIRS, CrIS, ATMS	Provided by AAPP & OPS-LRS	Provided by AAPP	Provided by SeaDAS	Provided by SeaDAS	Provided by NOAA
Polar2Grid	VIIRS, CrIS, ATMS	AVHRR, AMSU, MHS	AVHRR, AMSU, MHS	MODIS	MODIS, AIRS	
VIIRS ASCI	VIIRS					
VIIRS Active Fires	VIIRS					
VIIRS Flood Detection	VIIRS					
VIIRS Surface Reflectance	VIIRS					
HSRTV	CrIS	IASI			AIRS	
MIRS	ATMS	AMSU, MHS	AMSU, MHS			
CLAVR-x	VIIRS	AVHRR	AVHRR	MODIS	MODIS	
HEAP	CrIS, ATMS	IASI, AMSU				
IAPP		HIRS, AMSU, MHS	HIRS, AMSU, MHS			
ACSPO	VIIRS	AVHRR	AVHRR	MODIS	MODIS	
GAASP						AMSR-2
Sounder Quicklook	CrIS, ATMS	IASI, AMSU, MHS	AMSU, MHS		AIRS	

CSPP Geo Software

Community Satellite Processing Package for Geostationary Data

The CSPP Geo project serves the direct broadcast community by providing software to generate geophysical products from geostationary satellite data.

All CSPP Geo software is:

- free to download and use
- compatible with 64-bit CentOS Linux platforms
- distributed as binary tarballs that are easy to install and run
- packaged with all required third-party software included
- released with an optional test data package
- capable of generating "quicklook" images from products.

Supported instruments include the Advanced Baseline Imager (ABI), Geostationary Lightning Mapper (GLM) and space weather instruments onboard the GOES-R Series of satellites; the Japanese Advanced Himawari Imager (AHI) on Himawari-8 and Himawari-9; the Korean Advanced Meteorological Imager (AMI) on GK-2A, and the Chinese Advanced Geostationary Radiation Imager (AGRI) on FY-4A and FY-4B.

Software packages are currently offered to process data acquired from a variety of satellite instruments to generate retrieved geophysical products and high quality imagery, and to process the raw direct broadcast data stream as received from GOES-R series satellites.

Hardware requirements vary by software package and by the type and volume of data being processed. Refer to the individual package descriptions for more information. Note that the stated hardware requirements are for data processing, and do not include routine quicklook image generation.

Capabilities: The software is capable of processing GOES Rebroadcast (GRB) data received from the new generation GOES-16, GOES-17, and GOES-18 satellites that launched in 2016, 2018, and 2022 respectively. Level 2 ABI products are generated by reference implementations of the baseline GOES-R product algorithms which have been adapted for direct broadcast use.

We also developed Level 2 product generation software for Himawari AHI data, using algorithms developed for GOES-R which were updated and adapted by the original science teams. This gave users an early look at the GOES-R products and also provides products that are useful for

What's New

- 9 Oct 2023
[New! GRB Software Package Patch Released \(v1.0.28\)](#)
- 20 Dec 2022
[Gridded GLM Version 1.0 Software Package Released \(v1.0\)](#)
- 12 Dec 2022
[Geo2Grid Image Creation Software Package Released \(v1.1\)](#)
- 9 Dec 2022
[GEOCAT Version 1.1 Beta Software Package Released \(v1.1beta1\)](#)
- 25 Oct 2022
[GRB Software Package Patch Released \(v1.0.27\)](#)
- 19 Jul 2022
[AIT Framework Version 2.1 Beta Software Package Released \(v2.1beta1\)](#)
- 13 Jan 2022
[AIT Framework Version 2.0 Beta Software Package Released \(v2.0beta4\)](#)
- 11 Aug 2021
[GRB Software Package Patch Released \(v1.0.26\)](#)
- 1 Jul 2021

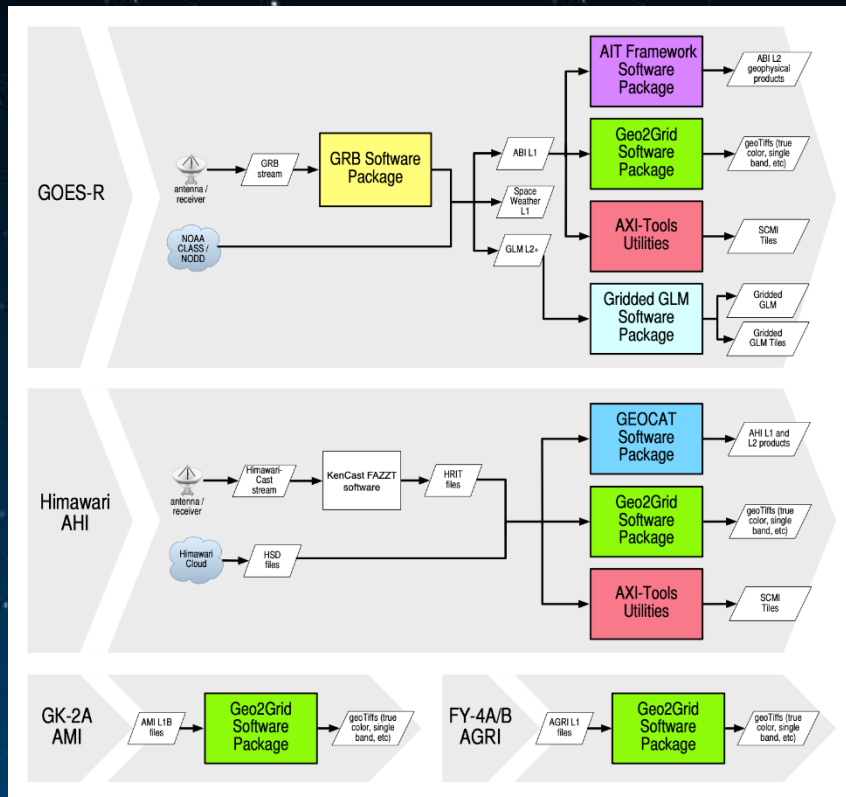
- Free software for generating geophysical products from geostationary satellite data.

- Supports:

- AHI (Himawari-8, -9)
- ABI (GOES-16, -17, -18)
- AMI (GK-2A)
- AGRI (FY-4A, -4B)

<https://cimss.ssec.wisc.edu/csppgeo/>

CSPP Geo



CSPP Geo Software Packages

Software Package	Supported Instruments	Description
GRB	All GOES-16, GOES-17, and GOES-18 instruments	The GRB software processes the raw GOES Rebroadcast (GRB) data stream, generating products in real-time for all of the new generation GOES-R series instruments. More >>
AIT Framework	GOES-16, GOES-17 and provisionally GOES-18 ABI	The AIT Framework software generates Level 2 products using reference implementations of the baseline GOES-R algorithms. More >>
GEOCAT	Himawari-8 AHI, Himawari-9 AHI	The GEOCAT software will generate Level 2 products using modified versions of algorithms that were developed for GOES-R. More >>
Geo2Grid	GOES-16, GOES-17, GOES-18 ABI, Himawari-8, Himawari-9 AHI, GEO-KOMPSAT AMI, FY-4A, FY-4B AGRI	The Geo2Grid software provides an easy way to efficiently create high quality images from Geostationary Imager data. More >>
Gridded GLM	GOES-16, GOES-17, GOES-18 GLM	The Gridded GLM software creates Gridded Geostationary Lightning Mapper products mapped to the ABI grid. More >>
AXI Tools	GOES-16, GOES-17, provisionally GOES-18 ABI, and Himawari-8 AHI	AXI-Tools is a binary utility package that converts AHI and ABI reflectance and brightness temperatures into SCMI format. More >>
GVAR	GOES-13 and GOES-15 Imager	<i>Legacy Package</i> The GVAR package processes data from the current GOES Imager received via the GVAR data stream. More >>

Slido Question

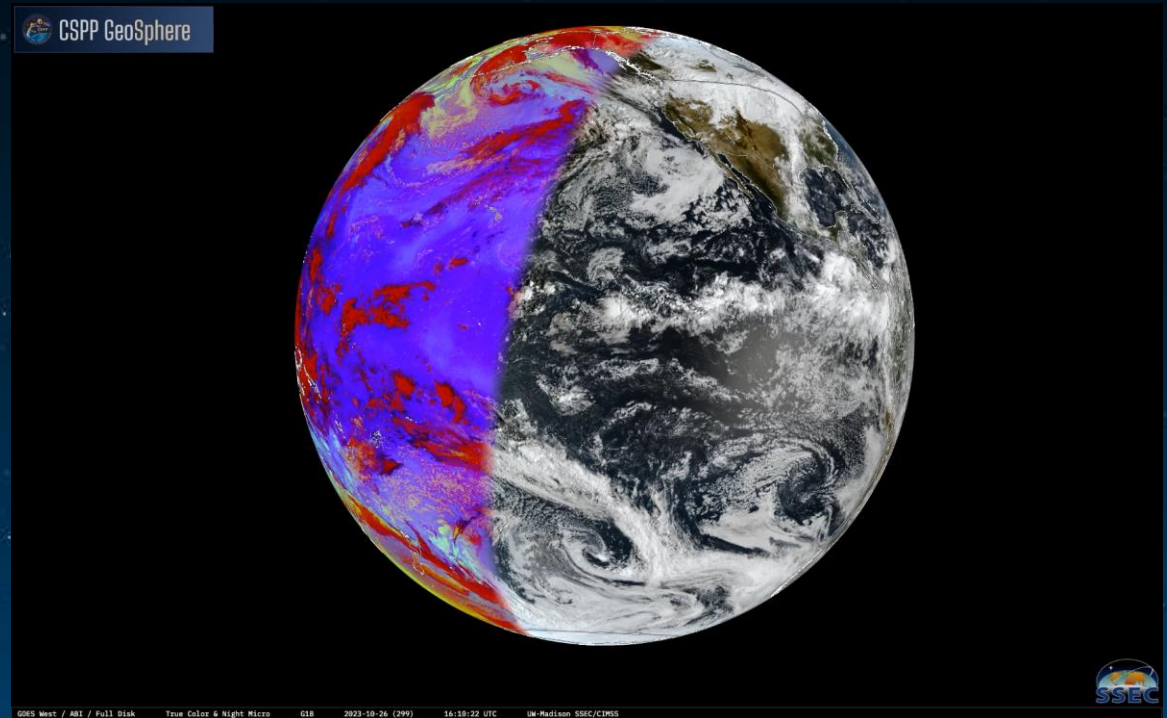
- **How do you receive satellite data?**
 - Satellite Antenna – Process on site.
 - Internet – Satellite data (netCDF, HSD, Hcast, other)
 - Internet – Images (GeoTIFF, PNG, GIF, JPEG)
 - Other (please describe in comment)

What if I am unable to create Level 2 products own my own?



CSPP GeoSphere

- Data acquired in real-time from the GOES-R series of satellites on an antenna located at UW-Madison.
- Free to access!
- Currently supports GOES-18 and GOES-16 ABI Imager.
- Contains all sectors (FD, CONUS, Meso1, Meso2)
- Currently supports single band imagery and "True Color and Night Micro"
- *****Future improvements include Level 2 products (Cloud Properties, for example)****



<https://geosphere.ssec.wisc.edu/>

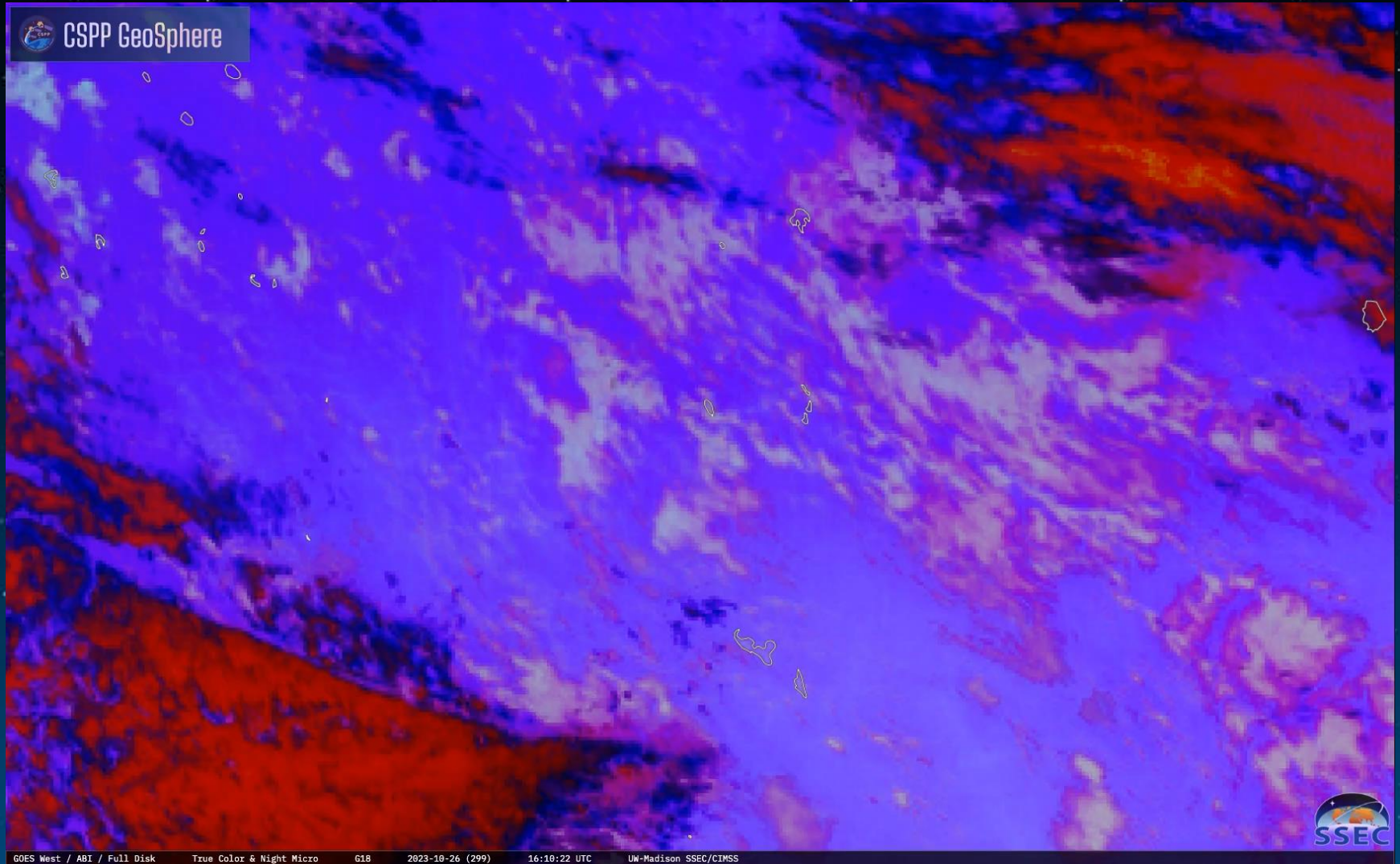
CSPP GeoSphere

The screenshot displays the CSPP GeoSphere web application interface. The main view is a satellite image of Earth, showing a large cloud system over the Pacific Ocean. A search box at the top center contains the text "Tonga", with a grey arrow pointing to the location of the islands. On the left side, there is a vertical control panel with the following sections:

- SATELLITE:** GOES West
- INSTRUMENT:** ABI
- COVERAGE:** Full Disk
- PRODUCT:** True Color & Night
- AUTO RELOAD:** ON (selected), OFF
- MAP COASTLINES:** ON (selected), OFF
- GRID LINES:** ON, OFF (selected)

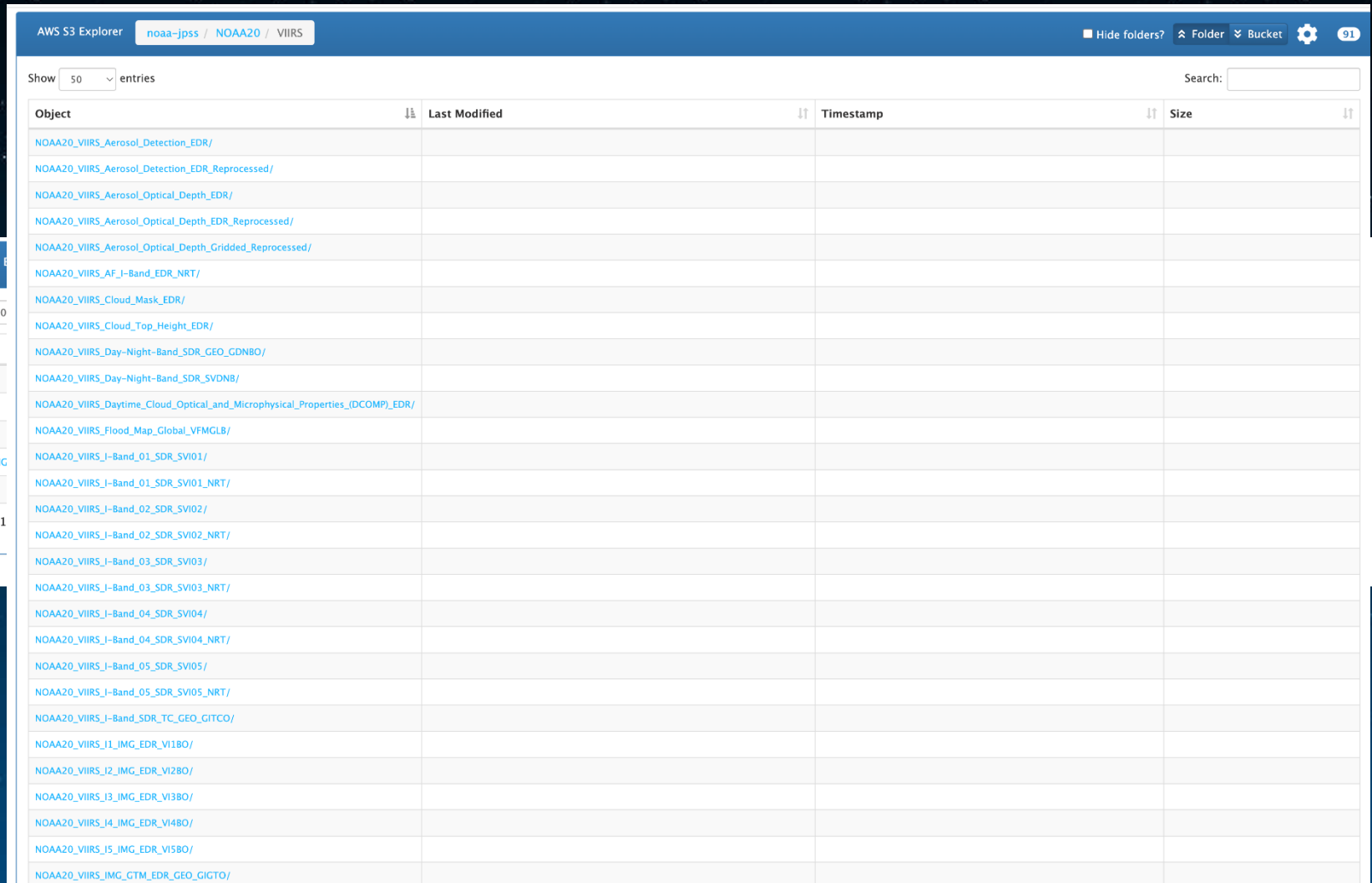
At the bottom of the interface, there is a playback control bar with buttons for "Select Frames", "Share", "10 FPS", "Forward", and "Play". A progress bar is visible below these buttons. In the top right corner, the text "G18 2023-10-26 18:00:22" is displayed. A text overlay on the right side of the image reads "Search box to locate desired location".

CSPP GeoSphere – Tonga Search Results



NOAA-20 and SNPP Data Access

<https://noaa-jpss.s3.amazonaws.com/index.html>



The screenshot displays the AWS S3 Explorer interface for the bucket 'noaa-jpss / NOAA20 / VIIRS'. The table lists various data objects with columns for Object, Last Modified, Timestamp, and Size. A search bar is located at the top right. On the left side, there is a sidebar with a 'Show' dropdown set to 50, a list of categories (Object, ATMS, CrIS, OMPFS, SOUNDING, VIIRS), and a 'Showing 1' indicator.

Object	Last Modified	Timestamp	Size
NOAA20_VIIRS_Aerosol_Detection_EDR/			
NOAA20_VIIRS_Aerosol_Detection_EDR_Reprocessed/			
NOAA20_VIIRS_Aerosol_Optical_Depth_EDR/			
NOAA20_VIIRS_Aerosol_Optical_Depth_EDR_Reprocessed/			
NOAA20_VIIRS_Aerosol_Optical_Depth_Gridded_Reprocessed/			
NOAA20_VIIRS_AF_I-Band_EDR_NRT/			
NOAA20_VIIRS_Cloud_Mask_EDR/			
NOAA20_VIIRS_Cloud_Top_Height_EDR/			
NOAA20_VIIRS_Day-Night-Band_SDR_GEO_GDNBO/			
NOAA20_VIIRS_Day-Night-Band_SDR_SVDNB/			
NOAA20_VIIRS_Daytime_Cloud_Optical_and_Microphysical_Properties_(DCOMP)_EDR/			
NOAA20_VIIRS_Flood_Map_Global_VFMGLB/			
NOAA20_VIIRS_I-Band_01_SDR_SVI01/			
NOAA20_VIIRS_I-Band_01_SDR_SVI01_NRT/			
NOAA20_VIIRS_I-Band_02_SDR_SVI02/			
NOAA20_VIIRS_I-Band_02_SDR_SVI02_NRT/			
NOAA20_VIIRS_I-Band_03_SDR_SVI03/			
NOAA20_VIIRS_I-Band_03_SDR_SVI03_NRT/			
NOAA20_VIIRS_I-Band_04_SDR_SVI04/			
NOAA20_VIIRS_I-Band_04_SDR_SVI04_NRT/			
NOAA20_VIIRS_I-Band_05_SDR_SVI05/			
NOAA20_VIIRS_I-Band_05_SDR_SVI05_NRT/			
NOAA20_VIIRS_I-Band_SDR_TC_GEO_GITCO/			
NOAA20_VIIRS_I1_IMG_EDR_VI1BO/			
NOAA20_VIIRS_I2_IMG_EDR_VI2BO/			
NOAA20_VIIRS_I3_IMG_EDR_VI3BO/			
NOAA20_VIIRS_I4_IMG_EDR_VI4BO/			
NOAA20_VIIRS_I5_IMG_EDR_VI5BO/			
NOAA20_VIIRS_Img_CTM_EDR_GEO_GIGTO/			

NASA Worldview – Free!

The screenshot displays the NASA Worldview web application interface. At the top left, the NASA logo and "WORLDVIEW" text are visible. Below this is a navigation bar with "Layers", "Events", and "Data" options. A search bar at the top right contains the text "Search for places or enter coordinates". The main area shows a satellite view of Earth with various data layers overlaid. A left-hand sidebar lists several layers under "REFERENCE" and "BASE LAYERS". The "BASE LAYERS" section includes "Corrected Reflectance (True Color)" from NOAA-20 / VIIRS, Suomi NPP / VIIRS (marked "v2 NRT"), Aqua / MODIS, and Terra / MODIS. A "Group Similar Layers" option is checked. At the bottom of the sidebar are buttons for "+ Add Layers" and "Start Comparison". The bottom of the interface features a timeline for "1 DAY" starting on "2023 OCT 29", with navigation arrows and a home button. A scale bar at the bottom right shows "2000 km" and "1000 mi". The coordinates "-53.6936°, -70.6331°" and the projection "EPSG:4326" are also displayed.

<https://worldview.earthdata.nasa.gov/>



NASA Worldview

NASA WORLDVIEW

Layers Events Data

REFERENCE

- Place Labels
© OpenStreetMap contributors, Natural Earth
- Coastlines / Borders / Roads
© OpenStreetMap contributors
- Coastlines
© OpenStreetMap contributors

BASE LAYERS

- Corrected Reflectance (True Color)
NOAA-20 / VIIRS
- Corrected Reflectance (True Color)
Suomi NPP / VIIRS **v2 NRT**
- Corrected Reflectance (True Color)
Aqua / MODIS
- Corrected Reflectance (True Color)
Terra / MODIS

Group Similar Layers

+ Add Layers **Start Comparison**

Search enter coordinates

Hazards And Disasters Science Disciplines Featured Recent

All Aboveground Biomass Absolute Dynamic Topography Aerosol Index Aerosol Optical Depth Aerosol Albedo Aerosol Type ...	Air Quality Aerosol Index Aerosol Optical Depth Aerosol Type Carbon Monoxide Corrected Reflectance Dust ...	Ash Plumes Aerosol Index Aerosol Optical Depth Corrected Reflectance Fires and Thermal Anomalies Human Built-up And Settlement Extent Land Surface Reflectance ...
Drought Corrected Reflectance Dams Drought Hazard Human Built-up And Settlement Extent Land Surface Reflectance Land Surface Temperature ...	Dust Storms Aerosol Index Aerosol Optical Depth Aerosol Type Dust Corrected Reflectance Human Built-up And Settlement Extent ...	Fires Aerosol Index Aerosol Optical Depth Aerosol Type Fires and Thermal Anomalies Carbon Monoxide Corrected Reflectance ...
Floods Flood Flood Hazard Corrected Reflectance Land Surface Reflectance Precipitation Estimate Precipitation Rate ...	Severe Storms Corrected Reflectance Cloud Fraction Cloud Multi Layer Flag Cloud Phase Cloud Pressure Cloud Effective Radius ...	Shipping Corrected Reflectance Brightness Temperature Land Surface Reflectance Radiance Sea Ice Sea Ice Brightness Temperature ...
Smoke Plumes Aerosol Index Aerosol Optical Depth Aerosol Type Carbon Monoxide Corrected Reflectance Fires and Thermal Anomalies	Vegetation Aboveground Biomass Corrected Reflectance Canopy Characteristics Forests, Mangrove Freeze/Thaw Fraction of Photosynthetically Active Radiati...	Other Areas of No Data (mask) Blue Marble Brightness Temperature Cirrus Reflectance Chlorophyll a Dams

2000 km
1000 mi

51.1373°, -93.5768° EPSG:4326

2023 OCT 29 **1 DAY**

SEP 2023 | OCT 2023

NASA Worldview

The screenshot displays the NASA Worldview web application interface. At the top, the search bar contains the term 'aerosol', and the results show 37 out of 1070 items. The left sidebar contains navigation and layer management options, including 'Layers', 'Events', and 'Data'. The main panel is divided into two columns: a filter menu on the left and a list of search results on the right. The filter menu includes sections for COVERAGE, CATEGORY, MEASUREMENTS, SOURCE, PERIOD, DAY/NIGHT, and DAAC/SIPS. The search results list various aerosol-related layers, such as 'Deep Blue Aerosol Type', 'Dark Target Aerosol Angstrom Exponent', and 'Aerosol Optical Depth'. A large white box in the center of the main panel displays a globe icon and the text 'No layer selected. Select a layer to view details here!'. The bottom of the interface features a timeline with the date '2023 OCT 29' and a scale of '1 DAY'. The bottom right corner shows a scale bar for 2000 km and 1000 mi, along with coordinates '51.1373°, -93.5768°' and the projection 'EPSG:4326'.

NASA Worldview

NASA WORLDVIEW


Layers Events Data

REFERENCE

- Place Labels
© OpenStreetMap contributors, Natural Earth
- Coastlines / Borders / Roads
© OpenStreetMap contributors
- Coastlines
© OpenStreetMap contributors


AEROSOL OPTICAL DEPTH

Deep Blue Aerosol Angstrom Exponent (Land and Ocean)
Suomi NPP / VIIRS



< 0.0 ≥ 2.5

Deep Blue Aerosol Optical Thickness (Land and Ocean)
Suomi NPP / VIIRS v1.1 NRT



< 0.0 5.0

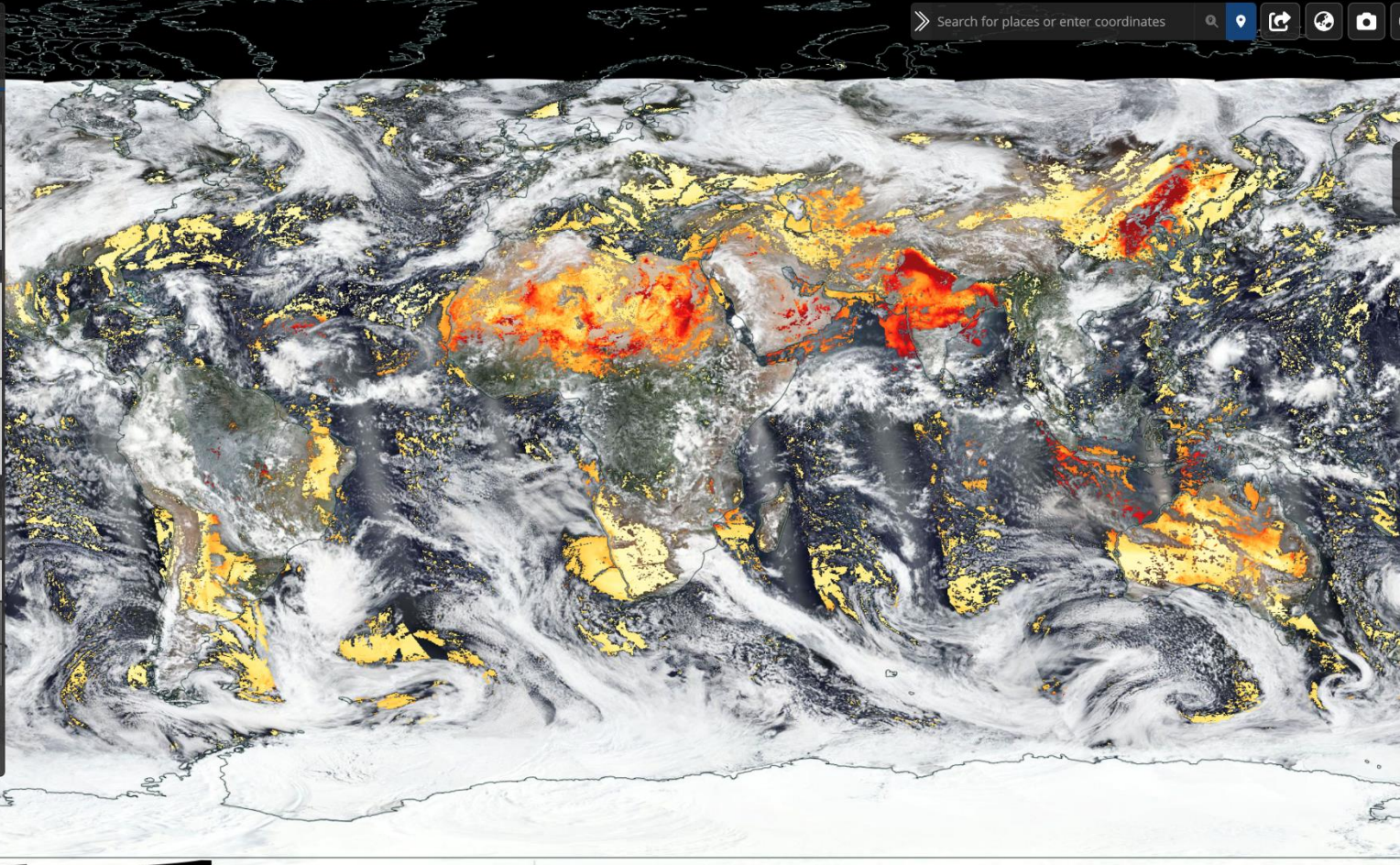
BASE LAYERS

- Corrected Reflectance (True Color)
NOAA-20 / VIIRS
- Corrected Reflectance (True Color)
Suomi NPP / VIIRS v2 NRT
- Corrected Reflectance (True Color)
Aqua / MODIS
- Corrected Reflectance (True Color)
Terra / MODIS

Group Similar Layers

+ Add Layers Start Comparison

Search for places or enter coordinates



2000 km
1000 mi

82.9915°, -159.6430° EPSG:4326

2023 OCT 29 1 DAY

SEP 2023 OCT 2023

DAY

NASA Worldview

NASA WORLDVIEW

Layers Events Data

Click to Reset Worldview to Defaults

Downloading data will be performed using NASA's Earthdata Search application.

Why are some layers not available?

Deep Blue Aerosol Angstrom Exponent (Land and Ocean)
Suomi NPP / VIIRS

- Near Real-Time - v1.1 ⓘ
- Standard - v1.1 ⓘ

Deep Blue Aerosol Optical Thickness (Land and Ocean)
Suomi NPP / VIIRS

- Near Real-Time - v1.1 ⓘ
- Standard - v1.1 ⓘ

Corrected Reflectance (True Color)
NOAA-20 / VIIRS

- Near Real-Time - v2.1 ⓘ
- Near Real-Time - v2.1 ⓘ
- Near Real-Time - v2.1 ⓘ
- Near Real-Time - v2.1 ⓘ

Corrected Reflectance (True Color)
Suomi NPP / VIIRS

- Near Real-Time - v2 ⓘ
- Near Real-Time - v2 ⓘ
- Near Real-Time - v2 ⓘ
- Near Real-Time - v2 ⓘ

DOWNLOAD VIA EARTHDATA SEARCH

Free to download data – just requires a Free NASA Earthdata Account.

2023 OCT 29

1 DAY

https://worldview.earthdata.nasa.gov

SEP 2023

OCT 2023

500 km
200 mi

43.3498°, 89.4239° EPSG:4326

Thank you!

- Questions?

jessica.braun@ssec.wisc.edu

