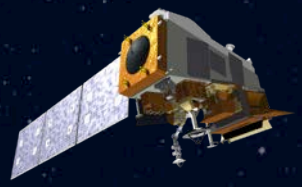
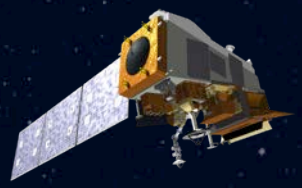


JPSS Science and Applications

Mitch Goldberg, Program Scientist
Joint Polar Satellite System
National Environmental Satellite, Data, and Information Service
National Oceanic and Atmospheric Administration

2015 CSPP/IMAPP Users Meeting
April 2015

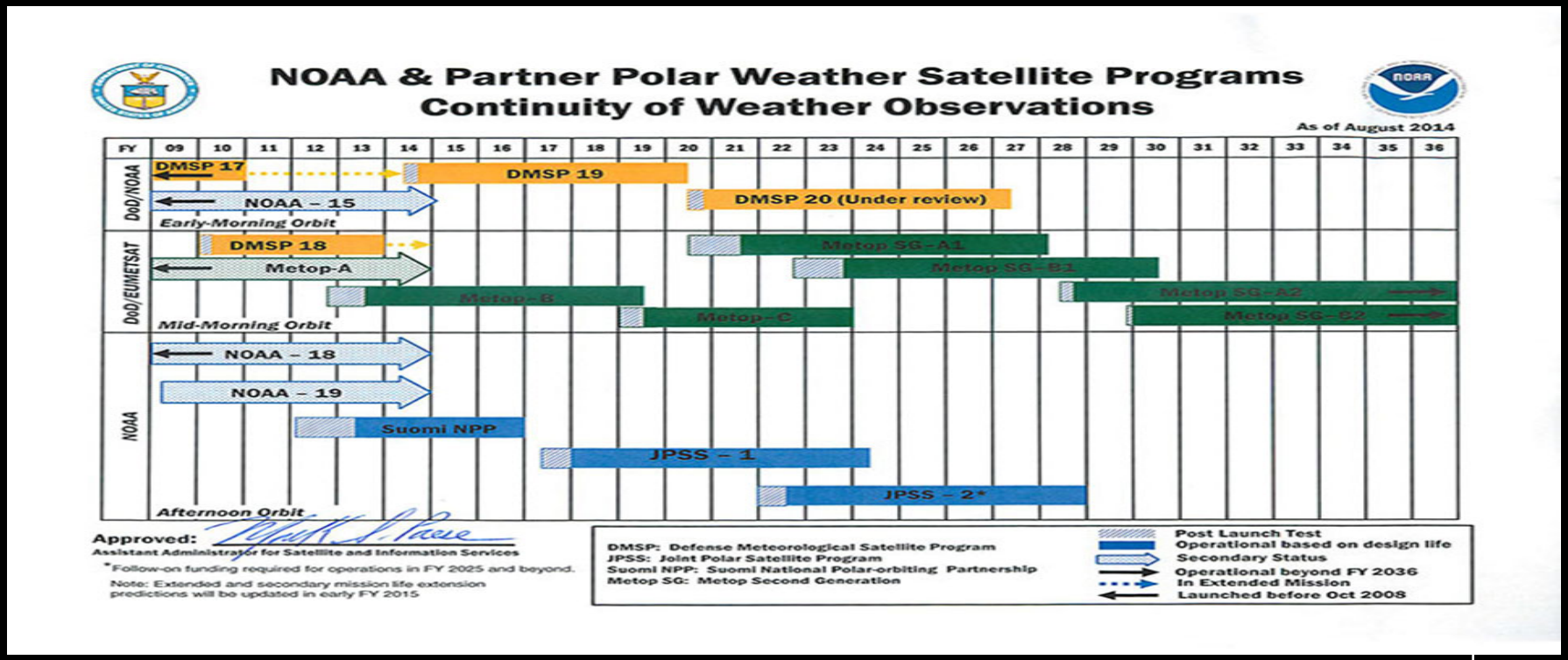


Topics

- Overview of JPSS
- Direct Readout Applications
- Summary

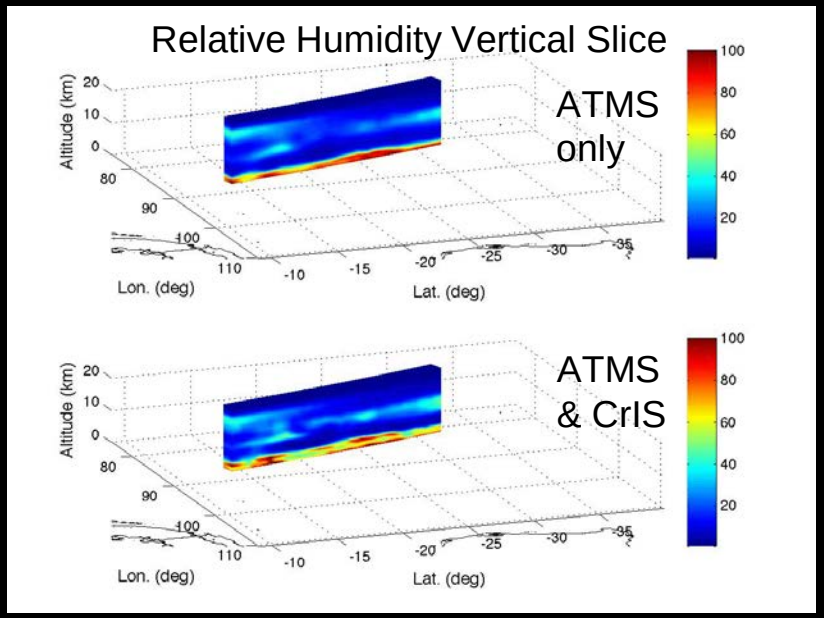
JPSS Overview

- JPSS consists of three satellites (Suomi NPP, JPSS-1, JPSS-2), ground system and operations through 2025
  - SNPP is now NOAA's primary weather polar orbiting satellite providing global data.

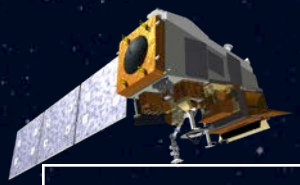


NOAA / NASA Suomi-NPP

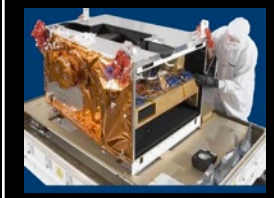
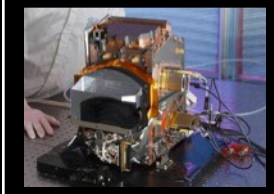
- Launched on October 28, 2011, bridge from legacy POES/EOS to JPSS
- 3rd Anniversary On October 28, 2014,
- In three years - 15,550 orbits, more than 31.719 petabytes of data = to 266,076,160 (16GB) smartphones.
- Observations are exceeding expectation with high data availability.
- Named NOAA's primary polar-orbiting weather satellite on May 1, 2014



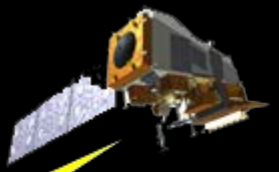
This animation depicts vertical resolution enhancement by using CrIS with ATMS



Technology

JPSS Instrument		Measurement
	**ATMS** - Advanced Technology Microwave Sounder	ATMS and CrIS together provide high vertical resolution **temperature** and **water vapor information needed to maintain and improve forecast skill** out to 5 to 7 days in advance for extreme weather events, including hurricanes and severe weather outbreaks
	**CrIS** - Cross-track Infrared Sounder	
	**VIIRS** – Visible Infrared Imaging Radiometer Suite	VIIRS provides many **critical imagery products** including snow/ice cover, clouds, fog, aerosols, fire, smoke plumes, vegetation health, phytoplankton abundance/chlorophyll
	**OMPS** - Ozone Mapping and Profiler Suite	Ozone spectrometers for **monitoring ozone** hole and recovery of stratospheric ozone and for UV index forecasts
	**CERES** - Clouds and the Earth's Radiant Energy System	Scanning radiometer which supports studies of Earth Radiation Budget

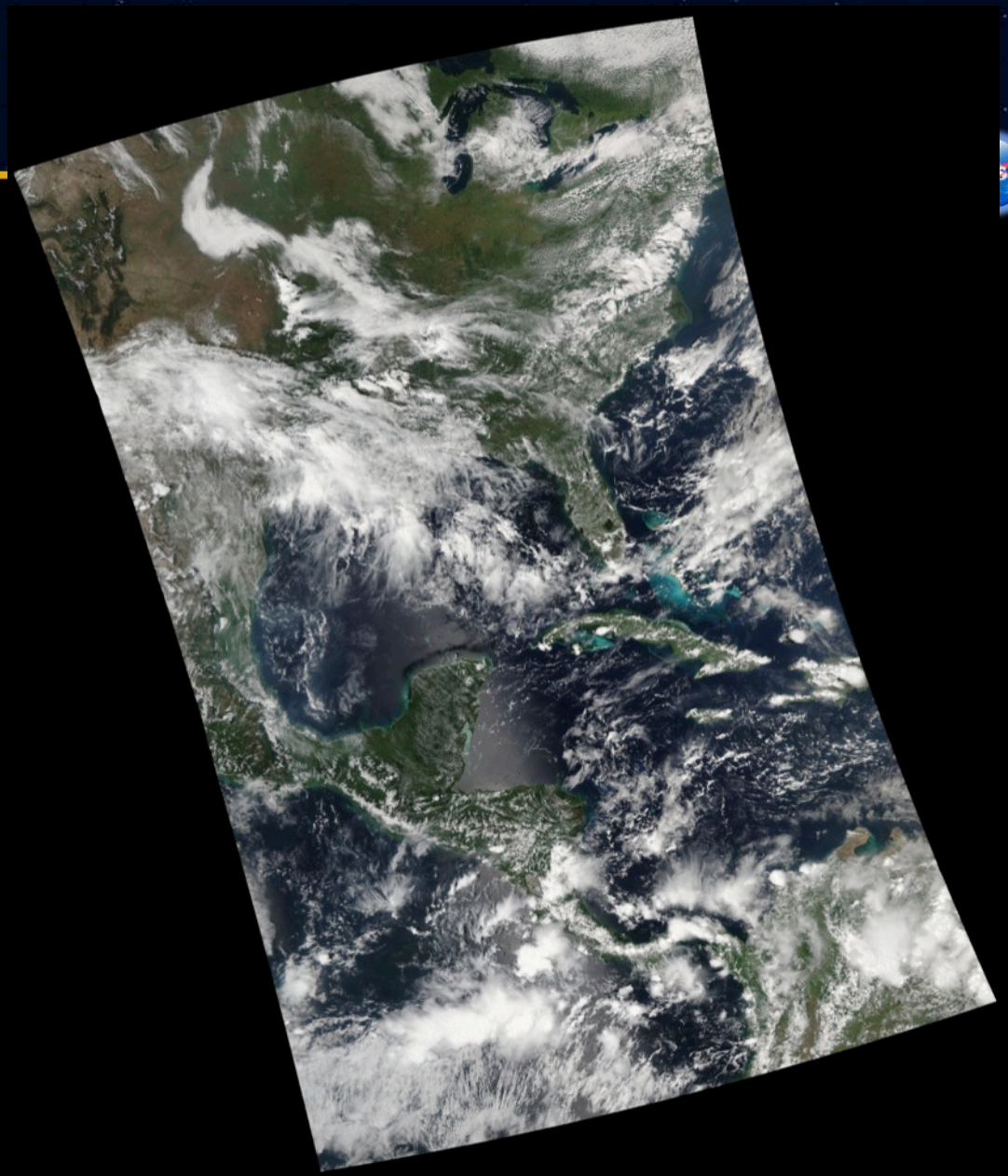
JPSS System Architecture



JPSS-1

Suomi NPP

- Svalbard, Norway
- Fairbanks, Alaska
- TDRS-Tracking and Data Relay Service, New Mexico
- McMurdo- U.S. Antarctic Research Station
- NSOF-NOAA Satellite Operations Facility
- NWS – National Weather Service
- NOS – National Ocean Service



- First VIIRS true color imagery from the new direct readout station at AOML in Miami
- September 18, 2014

JPSS Direct Broadcast Requirements

- JPSS shall provide the DR community with software, documentation, and periodic updates to enable them to produce data products from JPSS, using their own hardware to receive the JPSS HRD broadcasts

- NOAA provides DR software packages under the JPSS Program Science. The software is called the Community Satellite

Community Satellite Processing Package

Home | Download | Applications | History | Credits | Forum

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.

Suomi National Polar-orbiting Partnership (NPP) Products

CSPP software to support Suomi NPP:

- VIIRS, ATMS and CrIS calibration and geolocation software (Raw Data Records (RDRs) to Sensor Data Records (SDRs));
  Learn more ...
- VIIRS Environmental Data Records (EDRs), including a subset of Land, Ocean and Atmosphere Products;
  Learn more ...
- VIIRS SDR reprojection software for the creation of GeoTIFFs and/or AWIPS NetCDF files;
  Learn more ...
- NOAA/NESDIS/STAR NOAA Unique CrIS/ATMS Processing System (NUCAPS) EDR Hyperspectral Sounding Retrieval Software;
  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 ...
- S-NPP 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 AMSU-A and MHS instruments;
  Learn more ...
- VIIRS Imagery Environmental Data Records (EDRs).
  Learn more ...
- VIIRS, MODIS and AVHRR (POES and Metop) Cloud and Land Surface Retrievals from CLAVR-x.
  Learn more ...
- International ATOVS Processing Package (IAPP) Retrieval Software, supporting POES and Metop HIRS, AMSU-A and MHS Instruments.
  Learn more ...
- NOAA/NESDIS/STAR ACSPO Advanced Clear-Sky Processor for Oceans software supporting VIIRS, AVHRR and MODIS imagers.
  Learn more ...

Coming Soon:

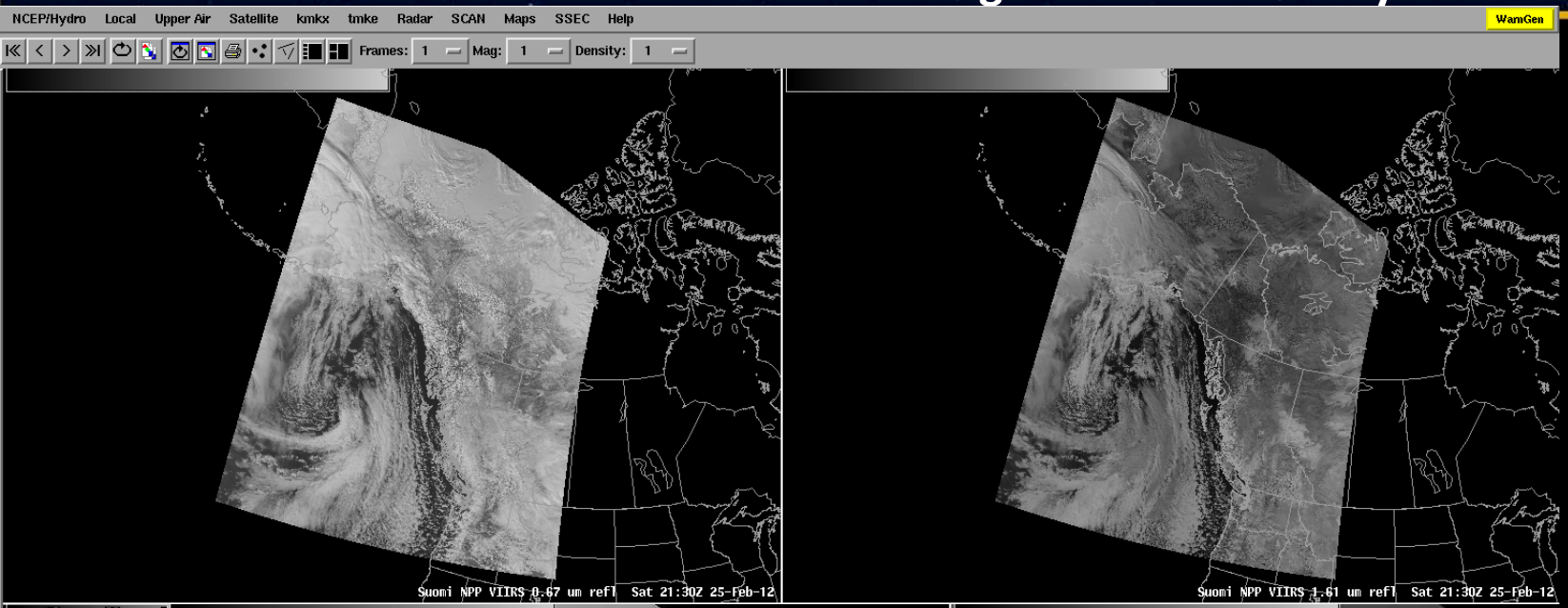
- CLAVR-x Update to the Cloud and Land Surface Retrieval (CLAVR-x) software.

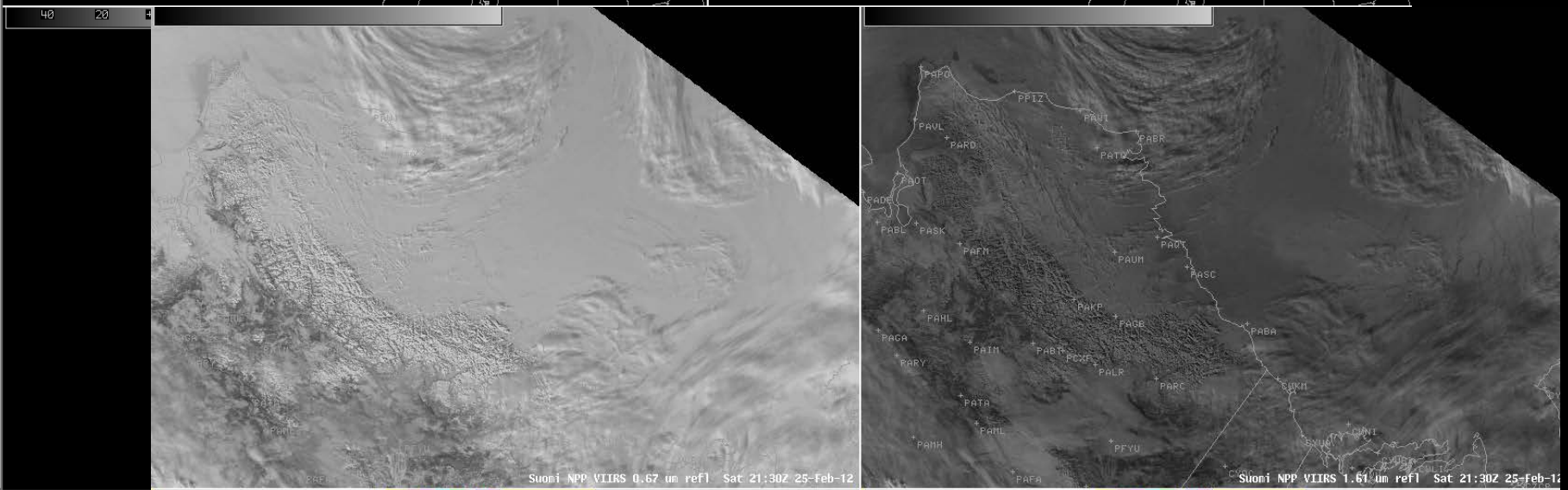
What's New

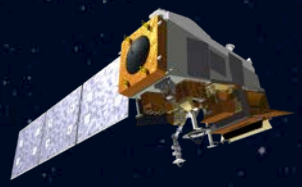
- ACSPO SST Retrieval Software v1.0
- IAPP Retrieval Software v1.0
- NUCAPS CrIS/ATMS EDR Retrieval Software v1.0
- VIIRS, ATMS, CrIS SDR Software v2.1
- VIIRS EDR Software v2.0
- VIIRS Imagery EDR Software v2.0
- CLAVRx VIIRS, MODIS and AVHRR Cloud Retrieval Package v1.0
- MIRS Microwave Retrieval Software v1.0

March 2012

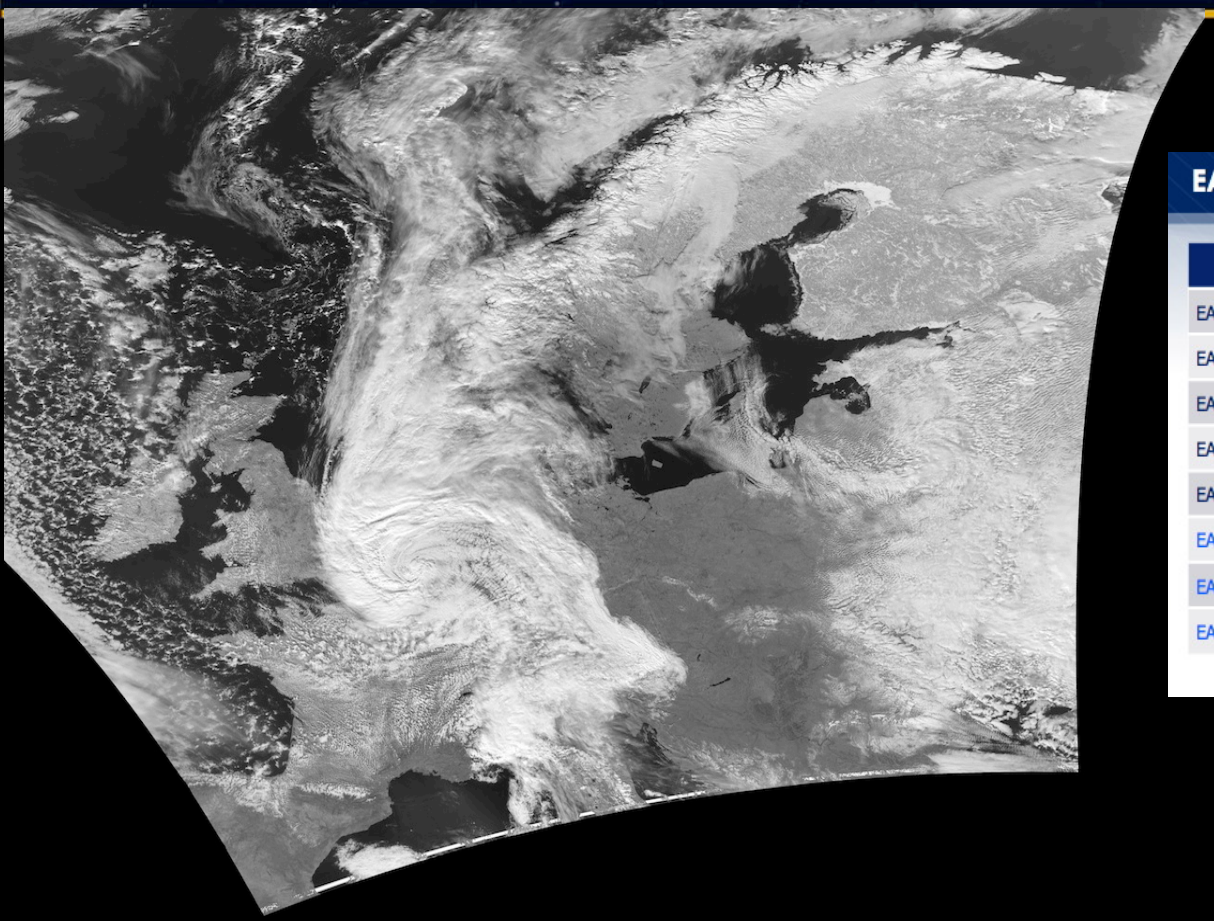
VIIRS imagery from direct broadcast using the Community Satellite Processing Package (CSPP) and reformatted for AWIPS - in support of the Alaska JPSS Proving Ground –Courtesy of CIMSS







April 2012
First International Direct Broadcast Suomi NPP User
Finnish (Suomi) Meteorological Institute, 2012/03/05



EARS – New Regional Suomi NPP Services

Services	
EARS-ATOVS	L1
EARS-ASCAT	L2 Winds
EARS-AVHRR	L0
EARS-IASI	L1C
EARS-NWC	L2 Clouds
EARS-ATMS	SDR (L1)
EARS-CrIS	SDR (L1)
EARS-VIIRS	SDR (L1)

Initial Suomi NPP Coverage

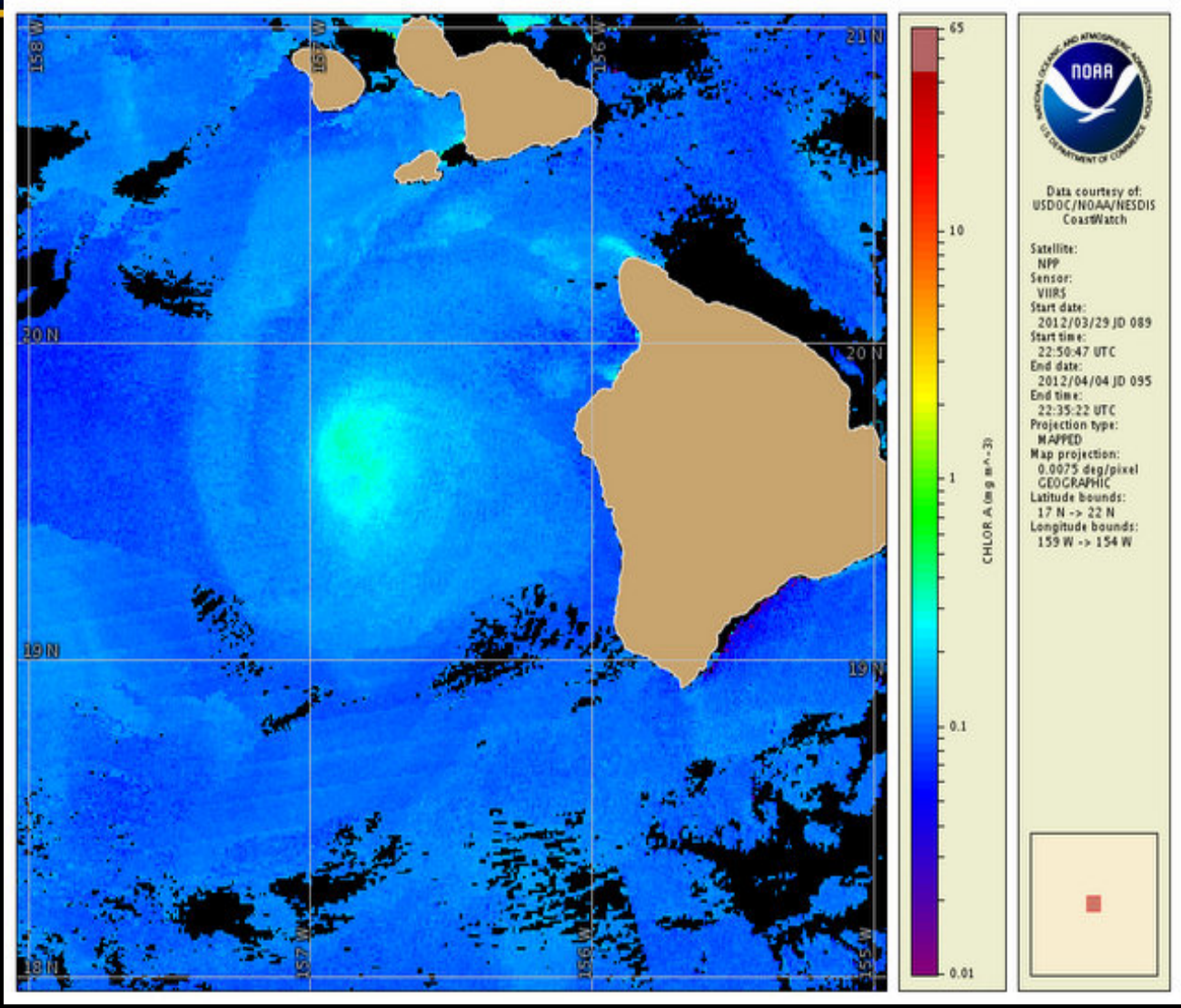
Satellites: NOAA POES
Metop
Suomi NPP

EUMETSAT

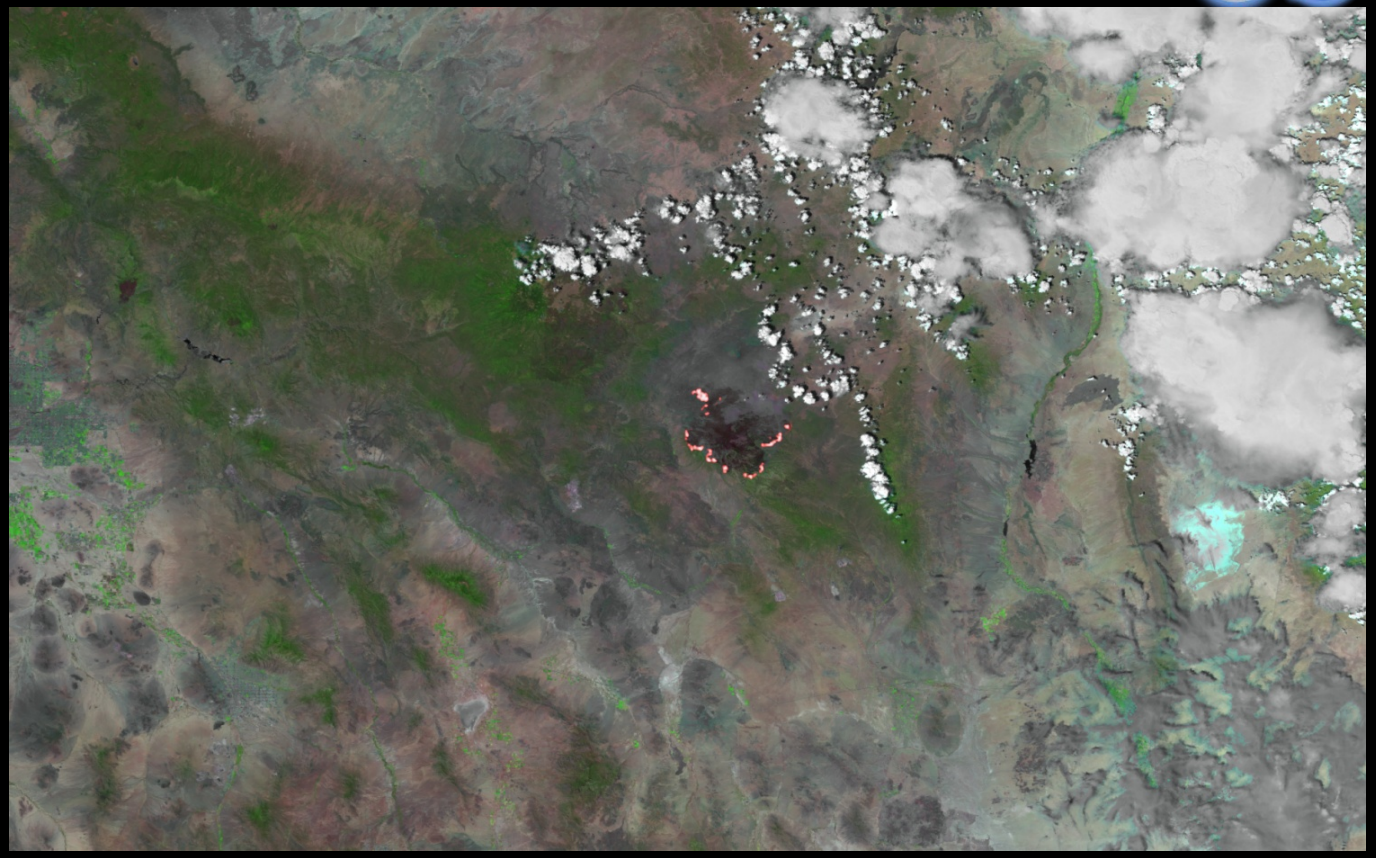
EUMETSAT to provide NPP within 30 minute to European Met Services using Community Satellite Processing Package (CSPP)

May 2012
VIIRS Eddy-induced Chlorophyll Maximum

shows the biological enhancement from a cyclonic (cold core) eddy that is generated by strong trades interacting with the topography of the Island of Hawaii. The cyclonic spin of the eddy causes the nutricline at its core to shoal, bringing deep nutrients to surface waters resulting in increased phytoplankton. These eddies appear to create food webs resulting in foraging habitat for apex species including tunas and cetaceans off the coast of Hawaii.



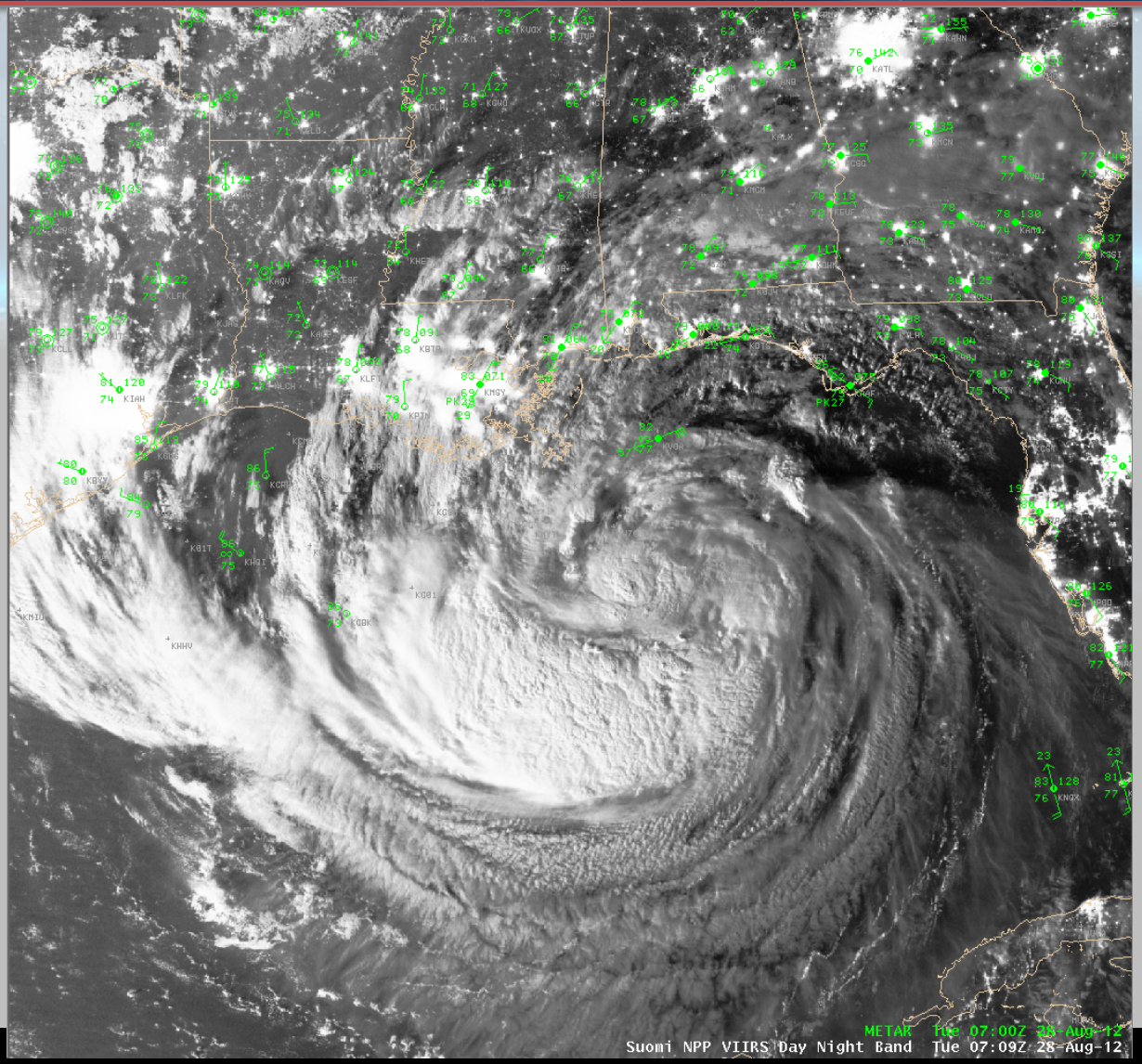
June 2012
VIIRS Fire Imagery



Whitewater-Baldy Complex fire, New Mexico is up to 259,025 acres burned. This image was taken by the VIIRS instrument aboard the Suomi NPP spacecraft at 2015Z on June 4, 2012. The image combines high resolution bands 3, 2 and 1 to make the colored land areas and clouds. Bands 3 and 2 were also combined to highlight the burn scar in dark maroon, and moderate resolution channel 13 provided the data for the hotspots, shown in red and white on the periphery of the burn scars.

Image produced by the NOAA Vislab

September 2012
VIIRS Day/Night Band
Tropical Storm Isaac in AWIPS



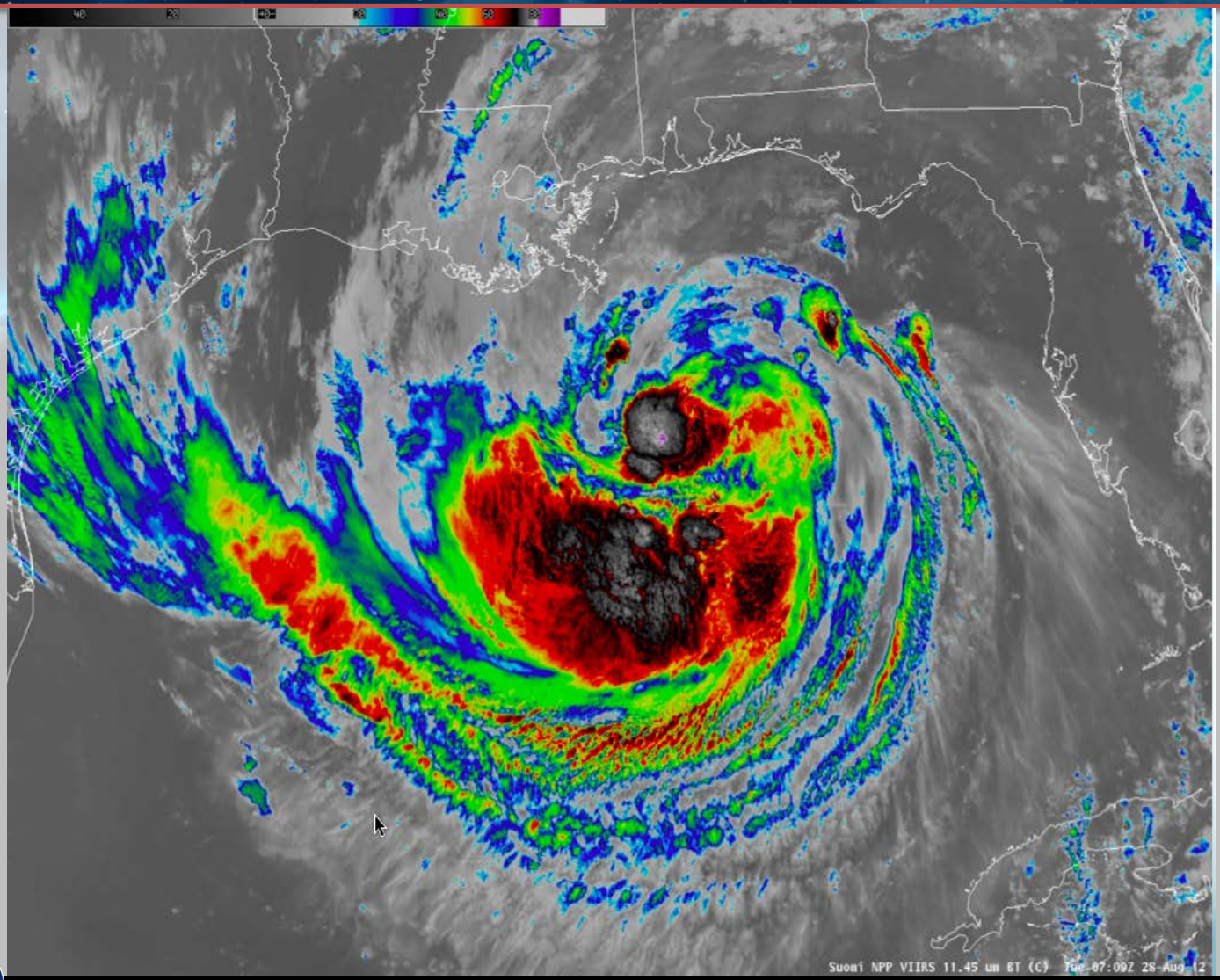
An unique visible look at a Tropical Storm at night

07:09 UTC
28 Aug 2012

Data captured and processed in real-time at the University of Wisconsin-Madison Space Science and Engineering Center using CSPP Software

SSEC

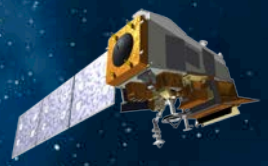
September 2012
VIIRS Day/Night Band
Tropical Storm Isaac in AWIPS



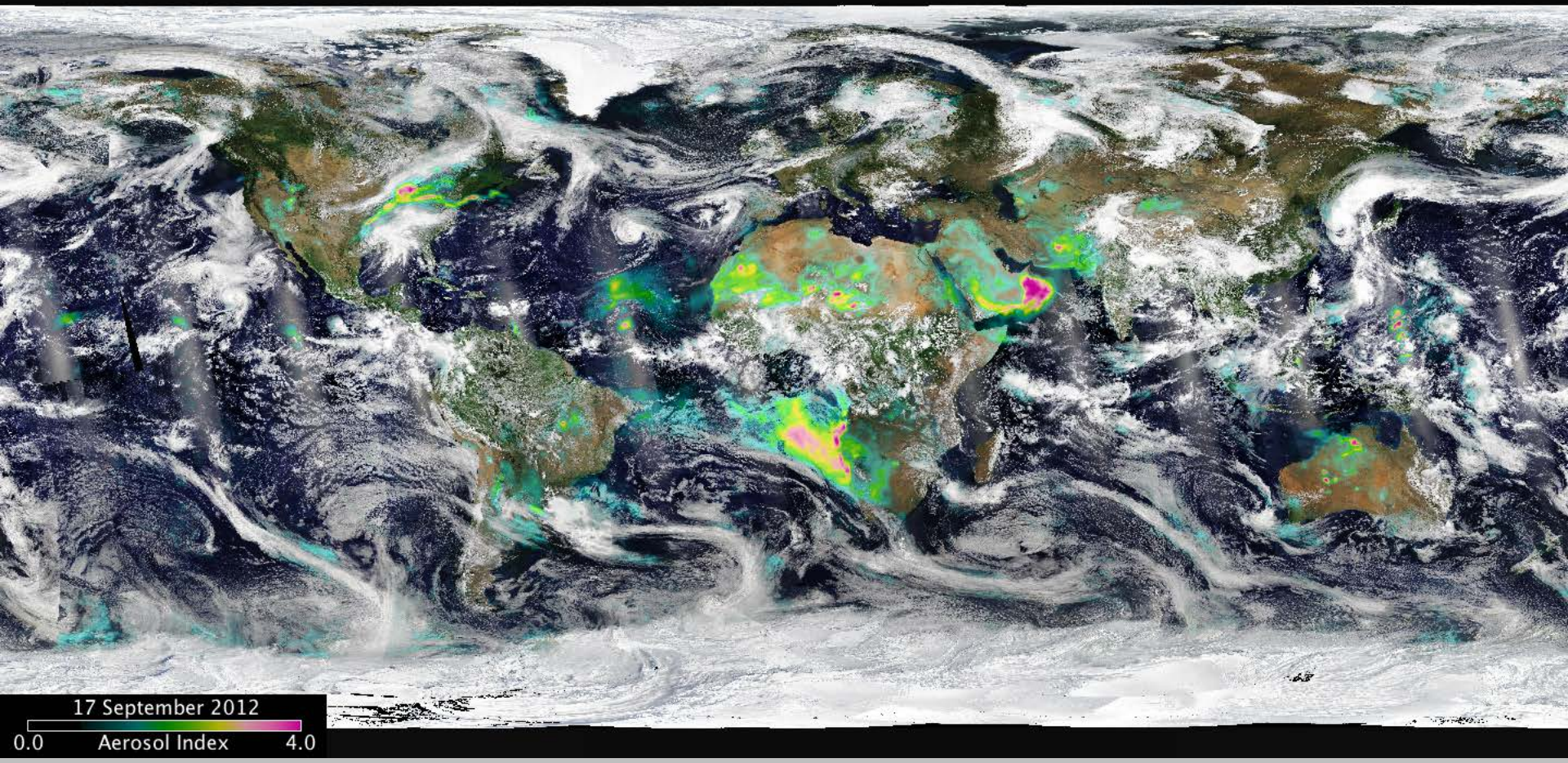
An infrared look at a Tropical Storm at night

07:09 UTC
28 Aug 2012

Data captured and processed in real-time at the University of Wisconsin-Madison Space Science and Engineering Center using CSPP Software



October 2012
Suomi NPP VIIRS and OMPS



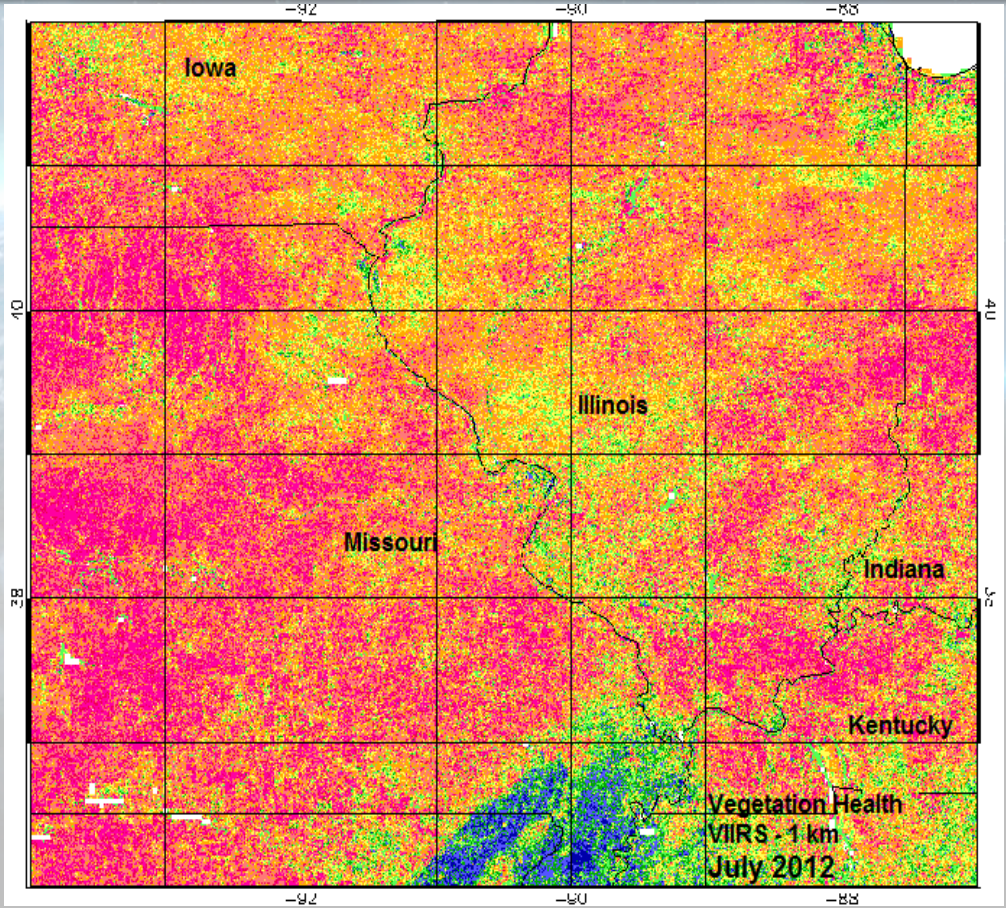
This image is a combination of a S-NPP VIIRS RGB image with OMPS aerosol index data for September 17, 2012, which shows the smoke over the U.S. moving over the Midwest and stretching all the way to the Mid-Atlantic, with additional smoke appearing over Australia due to may wildfires burning there.

December 2013
VIIRS Vegetation Health Product for Drought Assessments

VIIRS drought product (vegetation health) shows large regions of central US under stressed vegetation Conditions – July 2012 (1 km resolution)

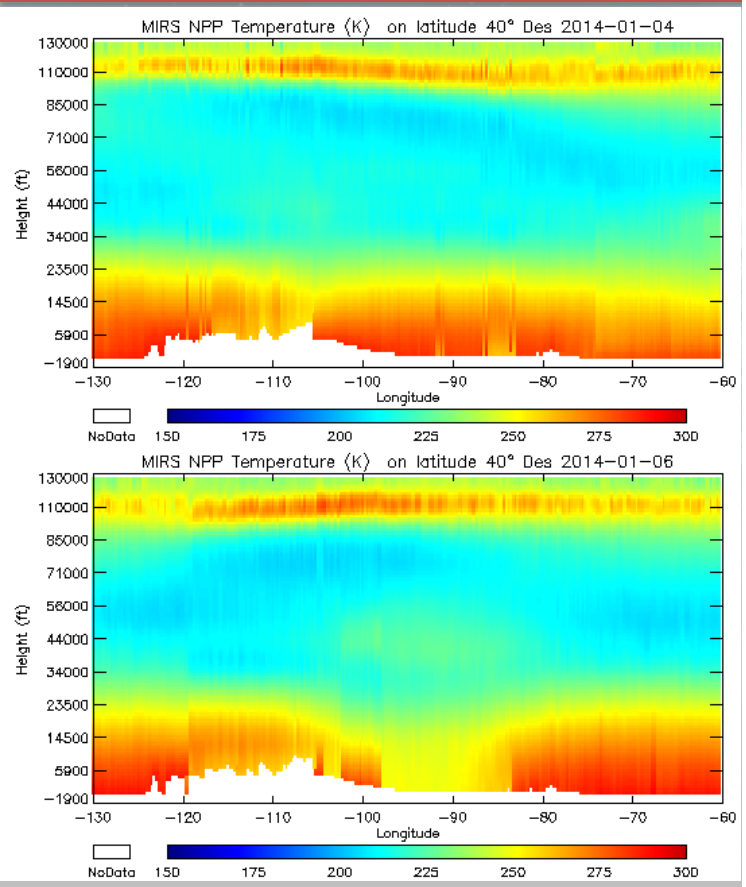
VIIRS high spatial resolution and excellent geolocation permits vegetation health monitoring

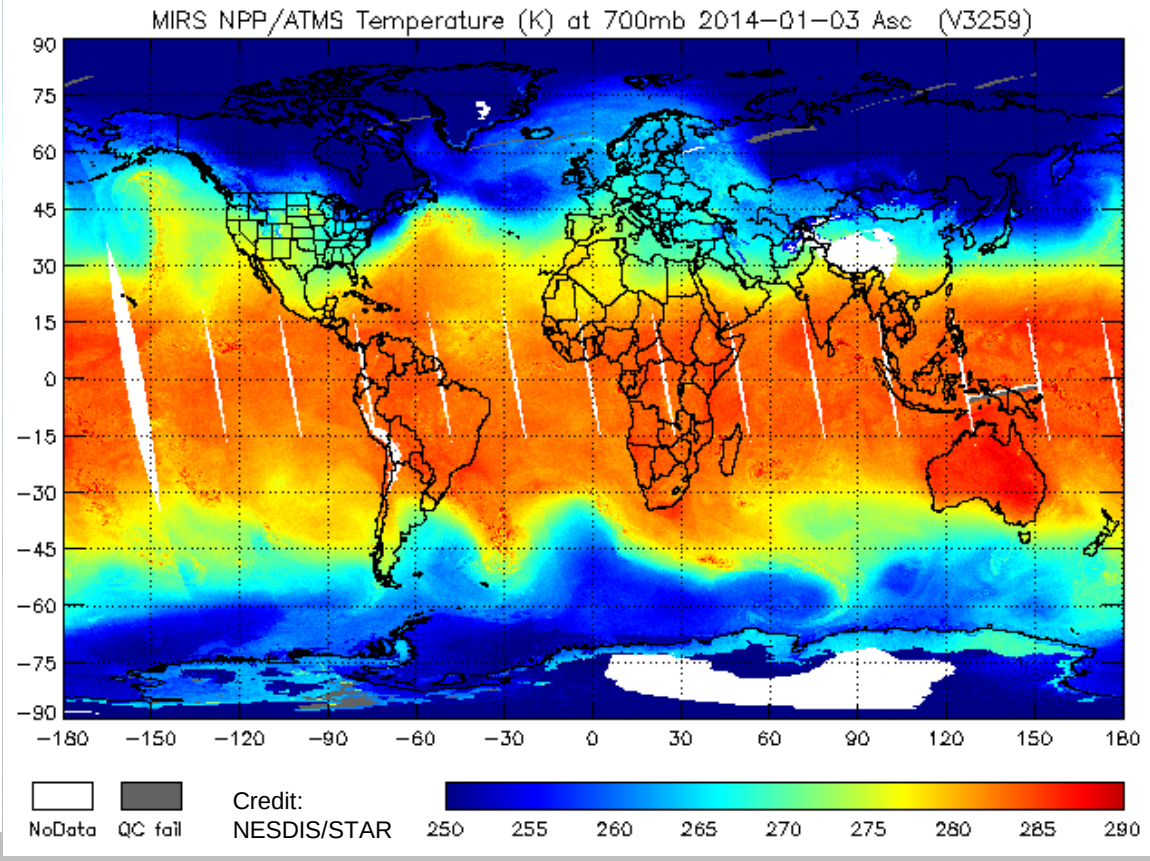
Important for agricultural assessments and relief efforts (Globally)



Credit: NESDIS/STAR Felix Kogan

January 2014

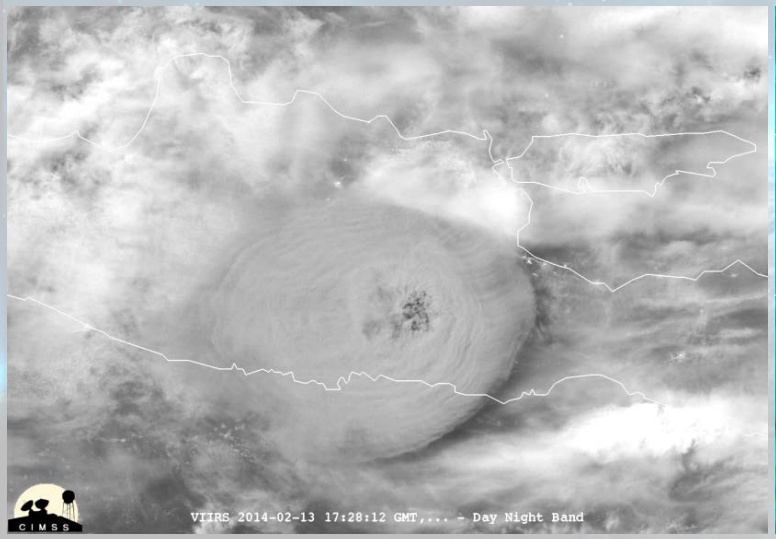




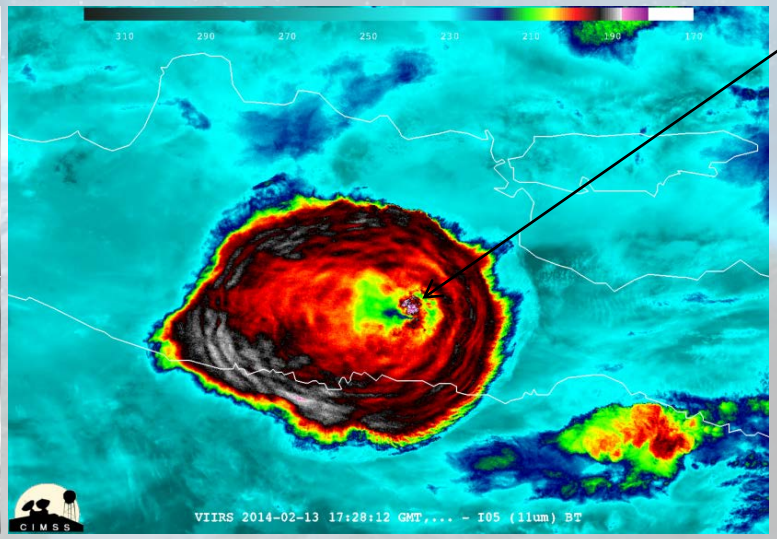
ATMS penetration of clouds reveals the transport of the Polar Vortex that impacted the US with large swath of record cold temperatures. The peak for DC area was 1/7/14. Above left are vertical cross-sections of temperature comparing January 4 with January 6, showing normal air temperature at ~ 23000 feet (-45 to -10 F, Winter) reached the surface on 1/6/14.

February 2014
Kelud Volcano Eruption in Indonesia as observed from VIIRS and other sensors

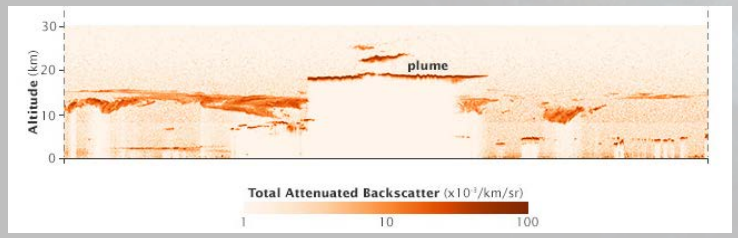
VIIRS Day Night Band



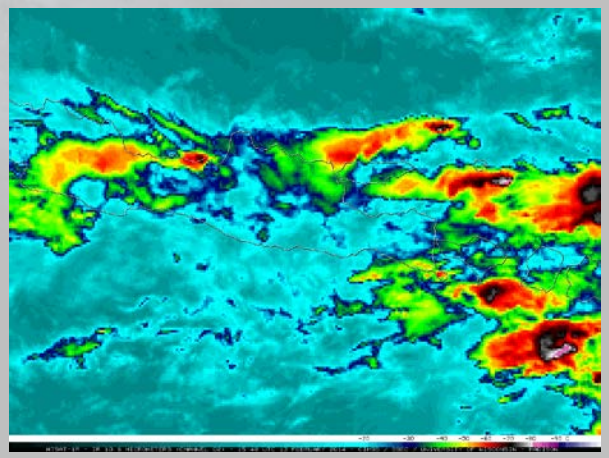
VIIRS Infrared Window



185 K ~ 19 KM based on tropical atmosphere



Caliope Lidar

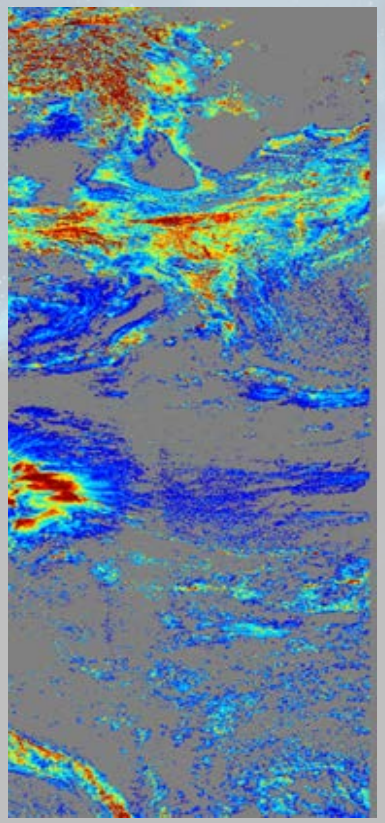


JMA's MTSAT

Kelud erupted on February 13, 2014.The eruption occurred at 22:50 local time (UT+7). The eruption sent volcanic ash covering an area of about 500 kilometers (310 mi) in diameter. The eruption prompted about 76.000 inhabitants to evacuate from their homes. Seven airports in Central Java, Yogyakarta and East Java are closed. Two people were reported dead after their houses collapsed from the weight of ash.

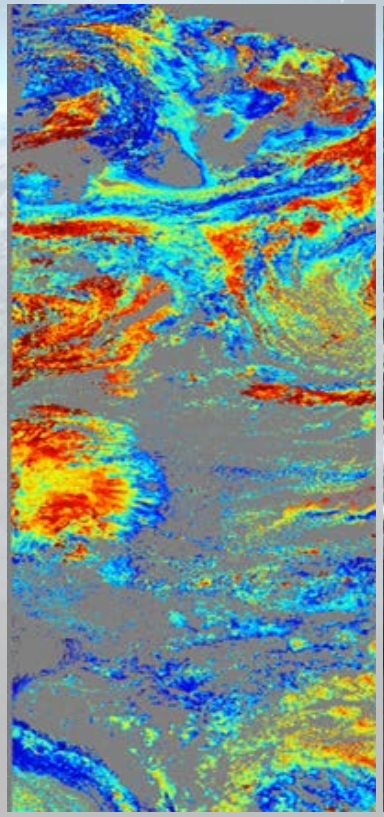
November 2014
JPSS Proving Ground AWIPS User Workshop, 11/4/2014

Cloud Optical Depth

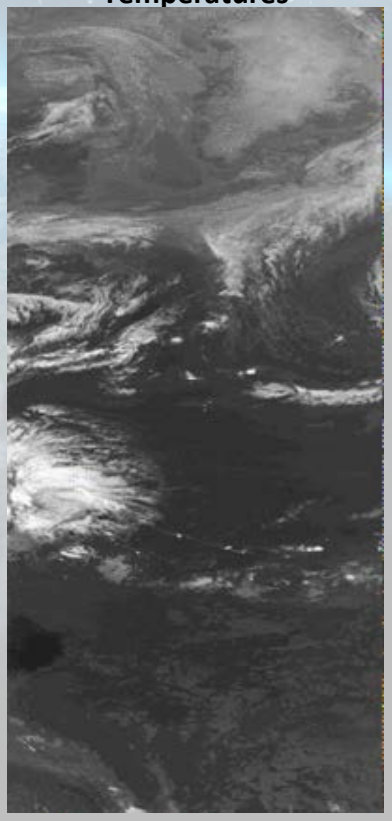


0.65 µm Reflectance

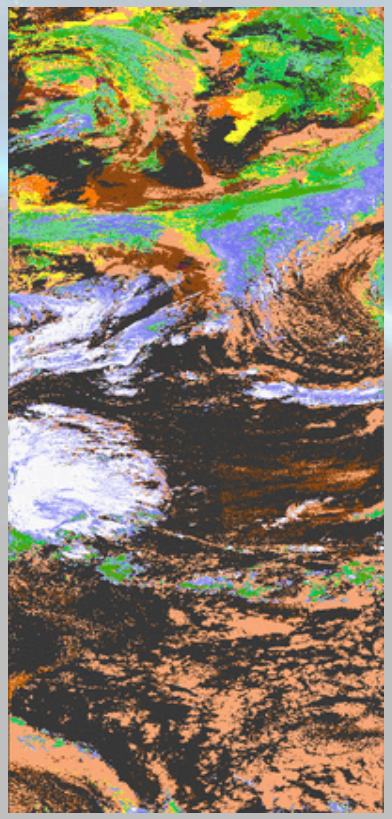
Cloud Effective Radius



11 µm Brightness Temperatures



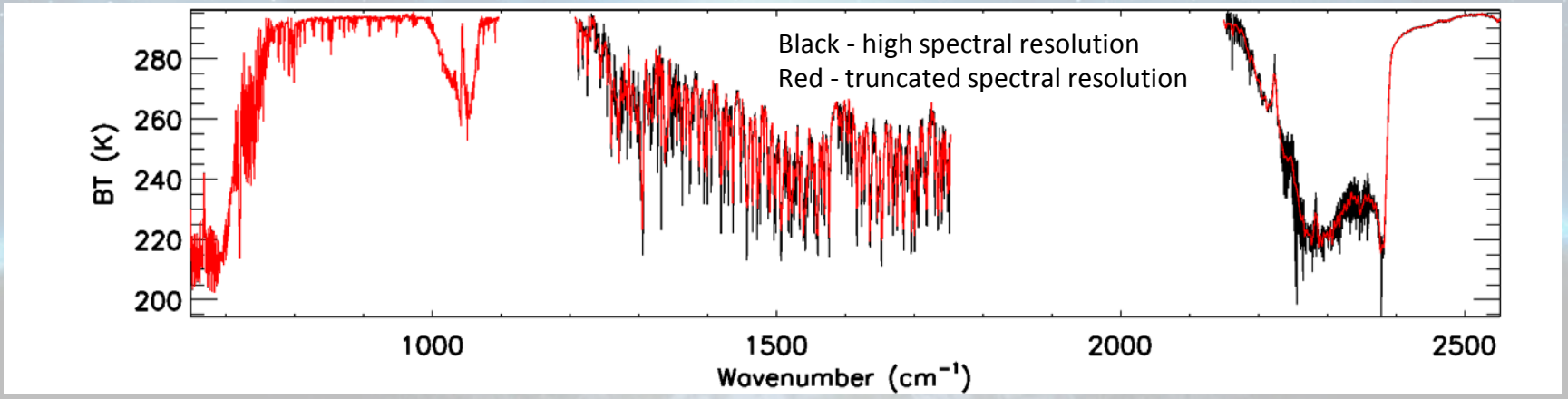
Cloud Top Height



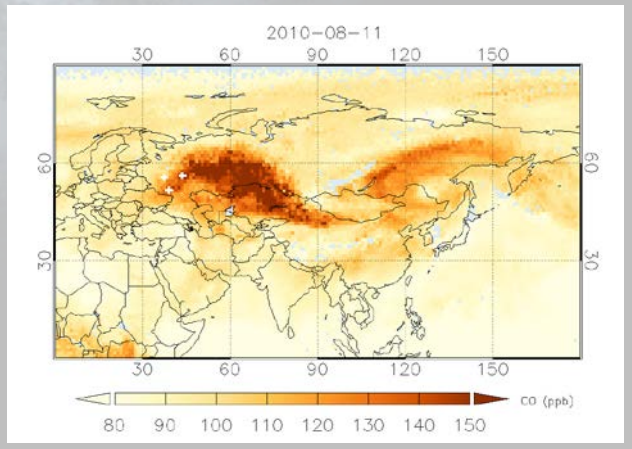
The objective of the workshop was to status the National Weather Service (NWS) on JPSS Ground Segment and Proving Ground activities supporting delivery of products into Advanced Weather Interactive Processing System (AWIPS) and to demonstrate new capabilities such as the derived cloud products shown above. The NWS provided user feedback and product prioritization to JPSS.

December 2014
CrIS Full Spectral Resolution

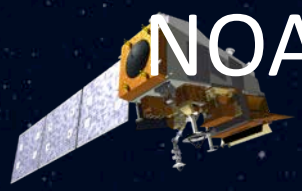
On 12/4/15 – full interferograms are now being transmitted from the SNPP instead of them being truncated on the spacecraft



Benefit: higher spectral resolution in the water vapor IR band and in the shortwave IR band. CO requirements cannot be met without high spectral resolution. Higher spectral resolution water vapor spectral lines will improve water vapor soundings in upper troposphere.



AIRS CO for 2010 Russian Fire, CRIS CO will have the same performance



NOAA Direct Broadcast Real-Time Network (DBRTN)

The goal of the NOAA dual X-L band antenna network is to provide low-latency hyperspectral infrared and microwave sounder data for NOAA NCEP numerical weather prediction.

It is funded through the Sandy Supplemental to mitigate partially a gap between SNPP and JPSS-1 by providing all existing sounder data with significantly improved latency.

NOAA-CIMSS will collect data from NOAA funded direct readout sites and volunteer sites and process the data into BUFR files and provide to NCEP and proposed to send to EUMETSAT. Proposed EUMETSAT will add data to the GTS.

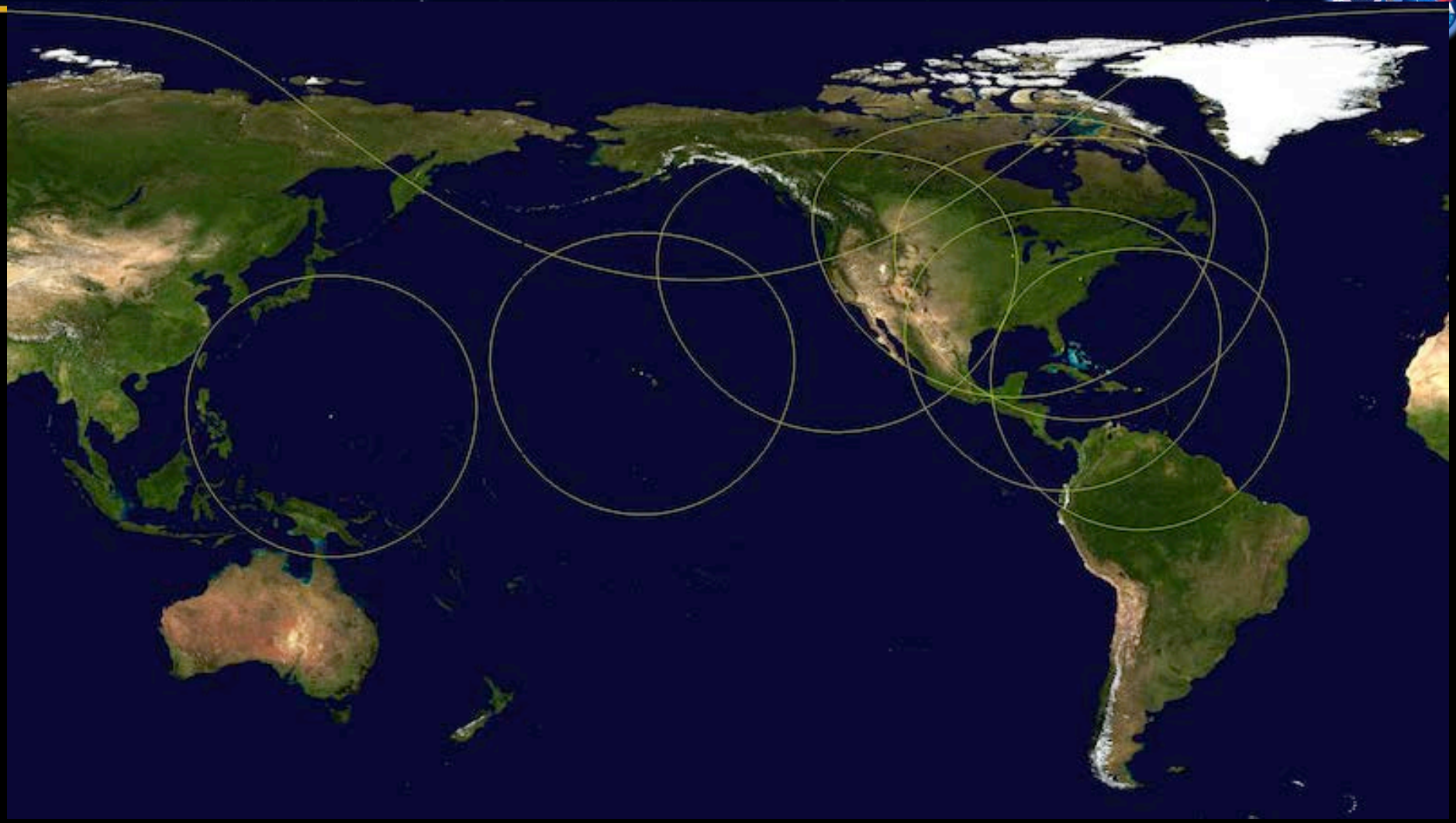
Sounder data includes all POES, SNPP, future JPSS-1, all METOPs and NASA AIRS

Status: System is running, BUFR files are being created and on FTP server. Current sites: Hawaii, Monterey CA, Madison WI, Greenbelt, MD, Miami, Florida, Fairbanks, Alaska.

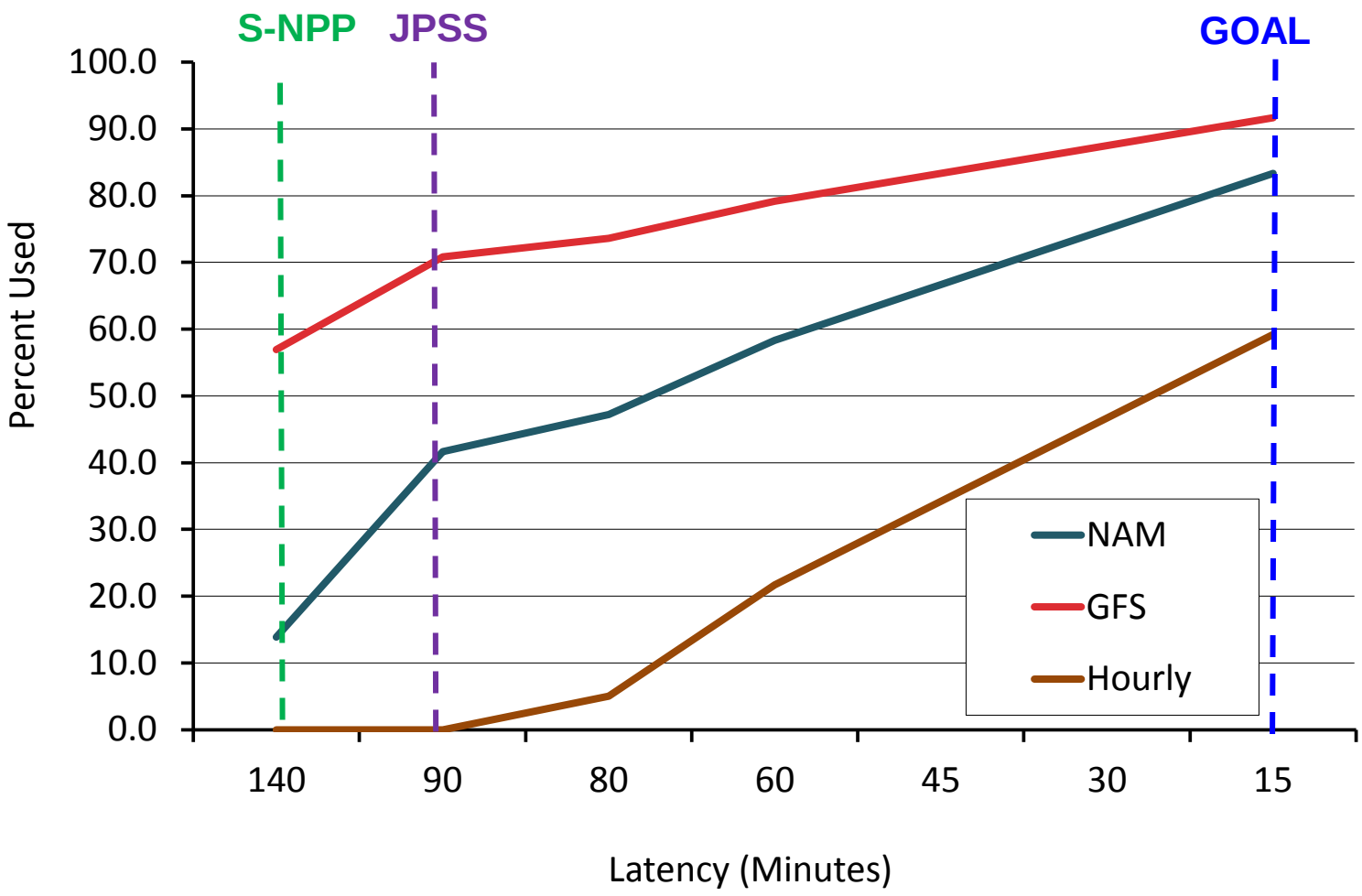
Future sites: Mayaquez PR and Guam

The NOAA network also supports local applications and testing of new science. Full data access and latency are important

NOAA DBRTN Sites (DEMO)

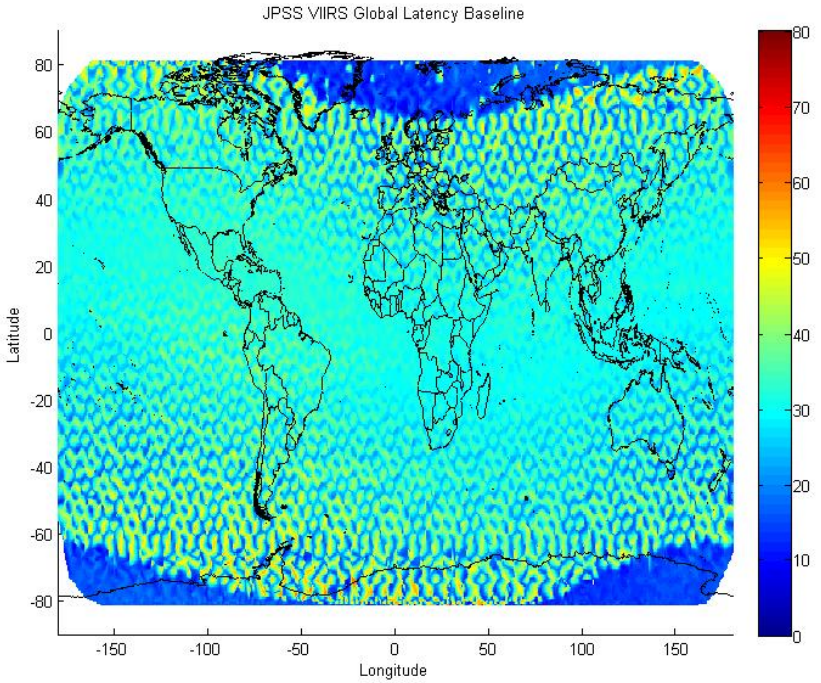


Percentage of LEO sounder data used as a function of latency

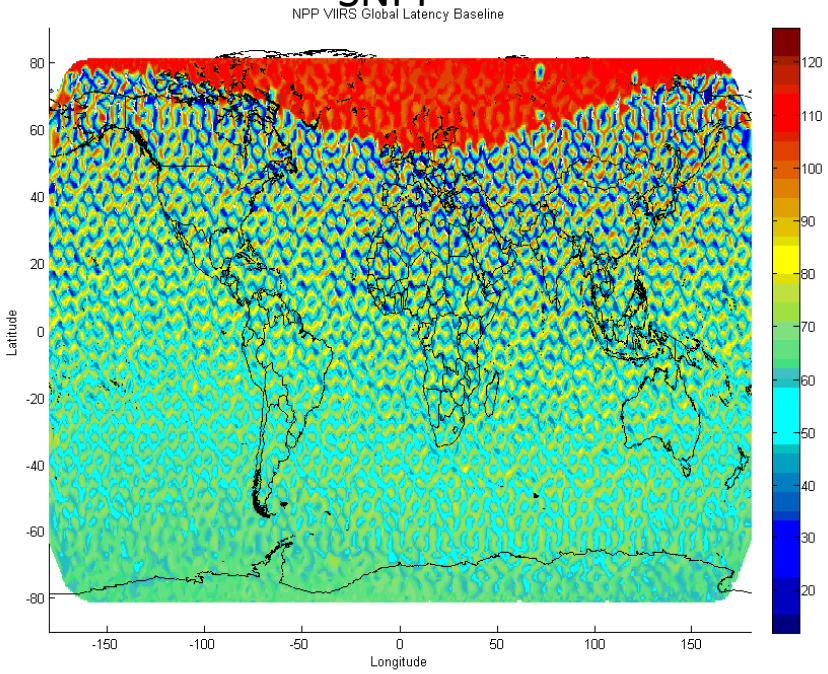


Much improved latency starting with JPSS-1

JPSS



SNPP



Polar region latency improved from 2 hours to 10 minutes

95% of the data is within 50 minutes (taking into account BUFR conversion, etc)

Between +- 50 degrees latitude ~ 30 minutes

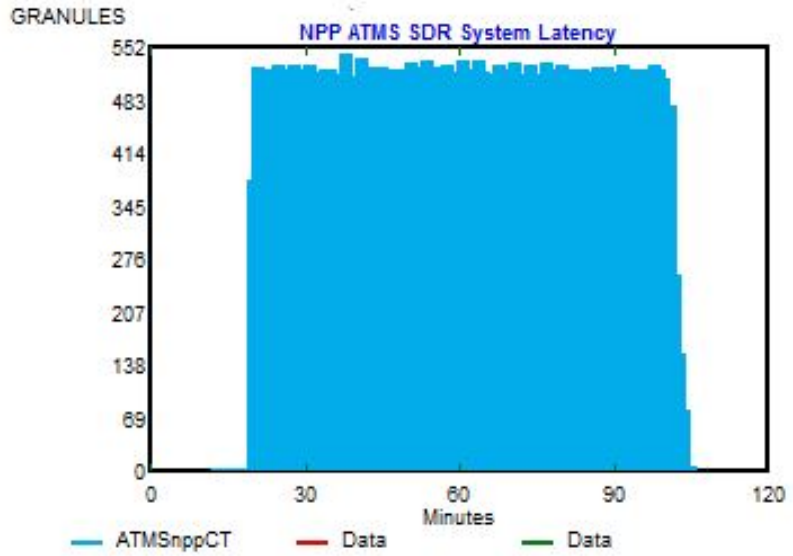
Actual performance will be 50% better than specification

JPSS-1 uses real-time playback of data at least while still in view of the ground station, which reduces the minimum latency number, while SNPP plays back first the oldest data of the entire orbit

NPP SDR System Latency

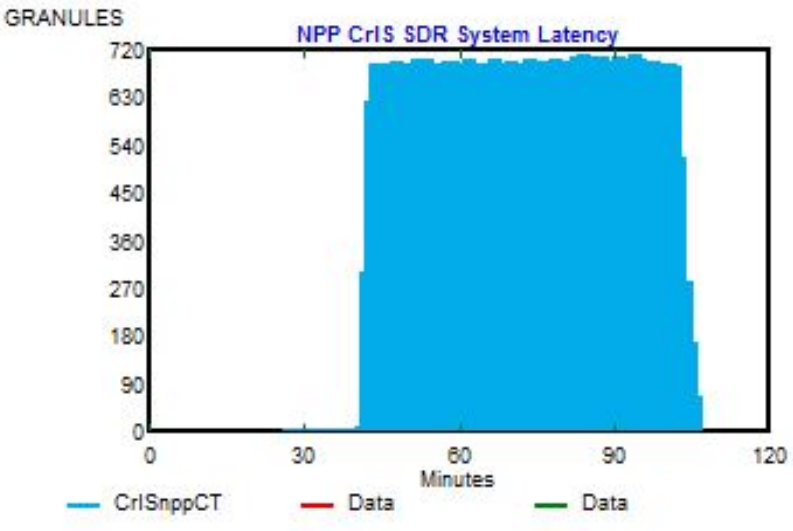
NPP ATMS SDRs/TDRs

- Min: 13.4 minutes
- Mean: 61.5 minutes
- 95%-tile: 98.7 minutes (140)
- Max: 105.2 minutes



NPP CrIS SDRs

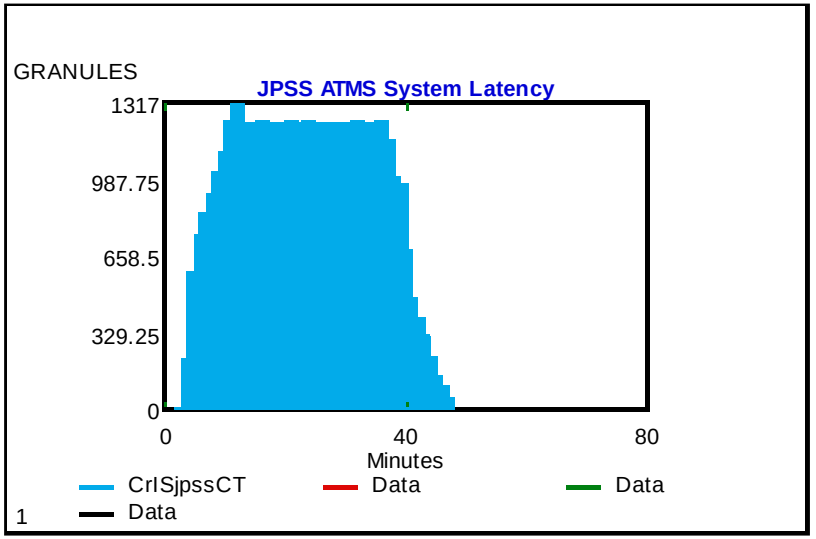
- Min: 27.0 minutes
- Mean: 73.6 minutes
- 95%-tile: 101.4 minutes (140)
- Max: 107.0 minutes



JPSS-1 SDR System Latency

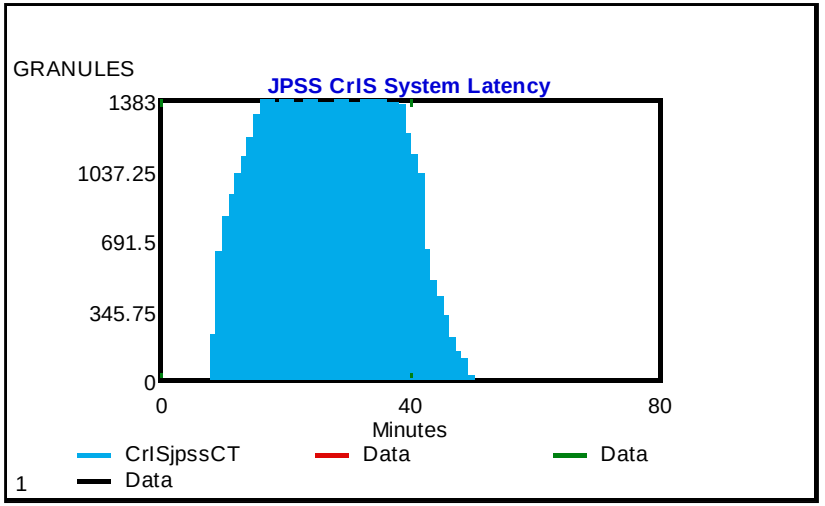
JPSS ATMS SDRs/TDRs

- Min: 3.6 minutes
- Mean: 24.1 minutes
- 95%-tile: 39.4 minutes (96)
- Max: 47.8 minutes

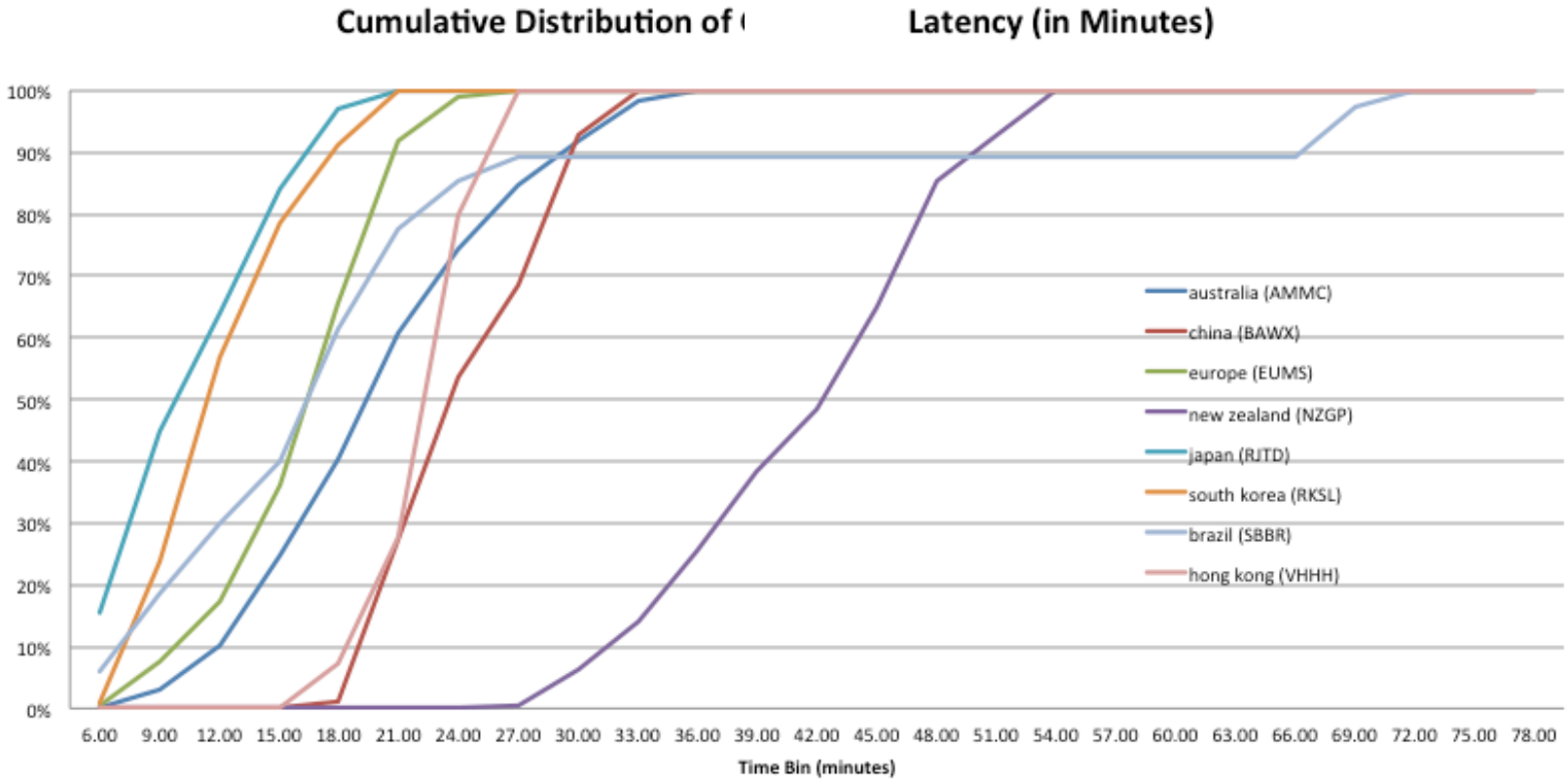


JPSS CrIS SDRs

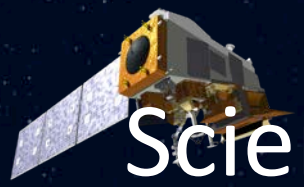
- Min: 8.8 minutes
- Mean: 27.5 minutes
- 95%-tile: 41.3 minutes (96)
- Max: 49.4 minutes



February 9, 2015 - RARS AMSU-A BUFR received by NCEP



ammc	bawx	eums	nzgp	rjtd	rksl	sbbr	vhhh	Site
21933	2970	49687	7050	6120	6510	6092	2520	Number
6.156	17.652	5.322	26.49	3.246	5.352	5.178	16.776	Min. Minutes
34.344	31.92	26.256	53.052	18.678	20.874	69.678	25.92	Max. Minutes

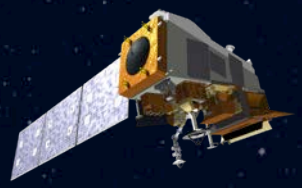


Science and Implementation Strategy

- Test new science algorithms using direct readout.
- Allows comparison of new algorithms with operational algorithms – provides a testbed.
- Direct readout will be used for high resolution rapid refresh model (~ 3km res., hourly)
- Direct readout will be used to demonstrate applications
- Resolves bandwidth issues from a central processing site.

Direct Readout Benefits beyond general weather forecast data assimilation

- Local applications and testing of new science algorithms and applications without impacting the global satellite data ground segment
- Critical applications impacts different sectors of the economy
  - Sectors: Agriculture, Energy, Health, Water Management, Tourism, Aviation, Insurance, Health, Transportation, Tourism
- Vision: Direct Readout community to share development of software for products and applications (P&As) and to provide access of local P&As to the global community via the internet.



Applications

- Weather nowcasting & precipitation
- Floods
- Power outages
- Fire and Smoke
- Air Quality
- Volcanic eruptions
- Ice monitoring
- Ocean & coastal ecosystems

S-NPP and JPSS Data Products From NOAA available in real-time

VIIRS (24)

ALBEDO (SURFACE)
CLOUD BASE HEIGHT
CLOUD COVER/LAYERS
CLOUD EFFECTIVE PART SIZE
CLOUD OPTICAL THICKNESS
CLOUD TOP HEIGHT
CLOUD TOP PRESSURE
CLOUD TOP TEMPERATURE
ICE SURFACE TEMPERATURE
OCEAN COLOR/CHLOROPHYLL
SUSPENDED MATTER
VEGETATION INDEX, FRACTION, HEALTH
AEROSOL OPTICAL THICKNESS
AEROSOL PARTICLE SIZE
ACTIVE FIRES
POLAR WINDS
IMAGERY
SEA ICE CHARACTERIZATION
SNOW COVER
SEA SURFACE TEMPERATURE
LAND SURFACE TEMP
SURFACE TYPE

CrIS/ATMS (3)

ATM VERT MOIST PROFILE
ATM VERT TEMP PROFILE
CARBON (CO2, CH4, CO)

OMPS (2)

O_3 TOTAL COLUMN
O_3 NADIR PROFILE
SO2 and Aerosol Index

ATMS (11)

CLOUD LIQUID WATER
PRECIPITATION RATE
PRECIPITABLE WATER
LAND SURFACE EMISSIVITY
ICE WATER PATH
LAND SURFACE TEMPERATURE
SEA ICE CONCENTRATION
SNOW COVER
SNOW WATER EQUIVALENT
ATM TEMPERATURE PROFILE
ATM MOISTURE PROFILE

GCOM AMSR-2 (11)

CLOUD LIQUID WATER
PRECIPITATION TYPE/RATE
PRECIPITABLE WATER
SEA SURFACE WINDS SPEED
SOIL MOISTURE
SNOW WATER EQUIVALENT
IMAGERY
SEA ICE CHARACTERIZATION
SNOW COVER/DEPTH
SEA SURFACE TEMPERATURE
SURFACE TYPE

S-NPP and JPSS Data Products From NOAA available in real-time

VIIRS (24)

ALBEDO (SURFACE)
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ATM MOISTURE PROFILE

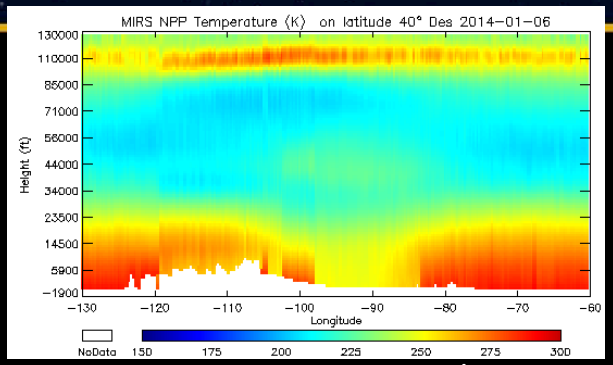
GCOM AMSR-2 (11)

CLOUD LIQUID WATER
PRECIPITATION TYPE/RATE
PRECIPITABLE WATER
SEA SURFACE WINDS SPEED
SOIL MOISTURE
SNOW WATER EQUIVALENT
IMAGERY
SEA ICE CHARACTERIZATION
SNOW COVER/DEPTH
SEA SURFACE TEMPERATURE
SURFACE TYPE

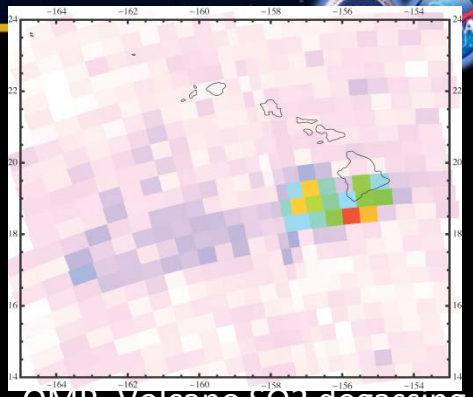
Blue - currently available in CSPP

JPSS provides a wide range of capabilities

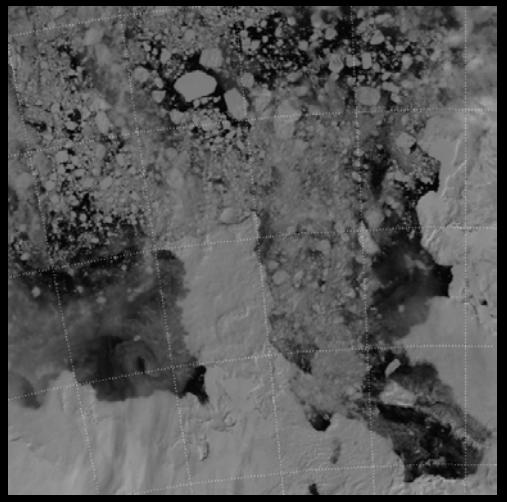
- Microwave – provides temperature and moisture soundings in cloudy conditions and rainfall rates, sea ice, snow, surface temperature
- Infrared – provides high vertical resolution temperature and moisture soundings in clear and cloud corrected regions; atmospheric chemistry - CO, CH4, SO2, … and cloud products
- Visible (day & night) and Infrared Imagery (including deep blue channels) – chlorophyll, cloud imagery, cloud products, SST, Active Fires, Smoke, Aerosols, land products, Snow, Ice, oil spills… at exceptional resolution/global coverage
- UV - ozone - Aerosols over bright surfaces, SO2 plumes, NOx (air quality)…

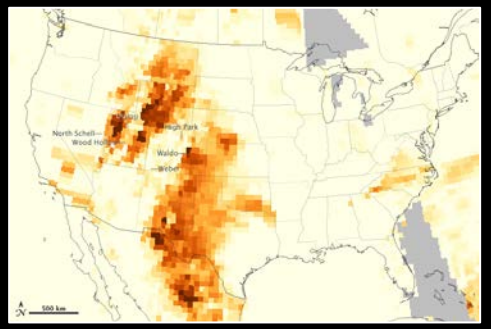


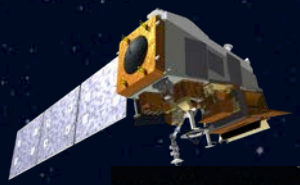
Temperature X-Section Polar Vortex


OMP- Volcano SO2 degassing

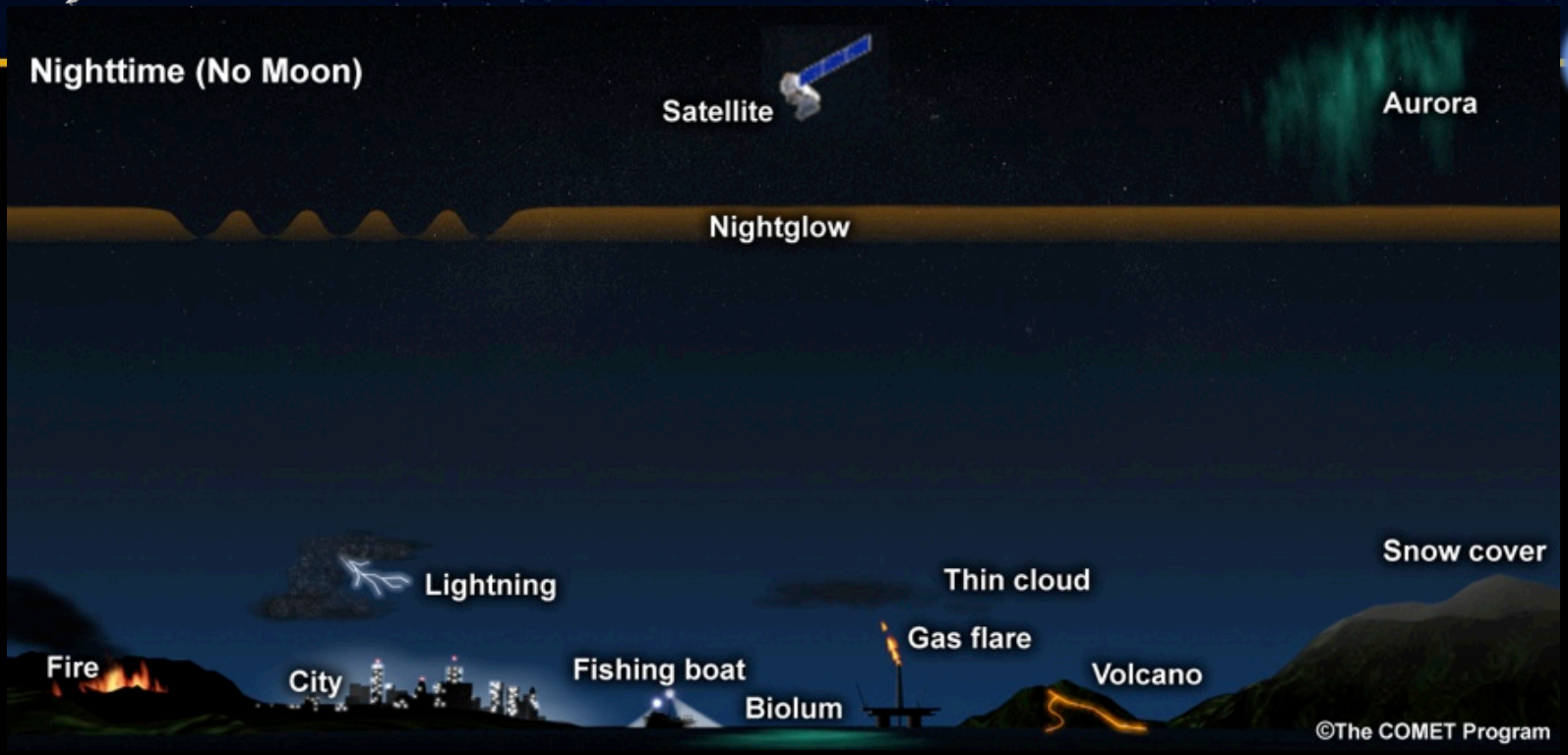

Algae in Lake Erie


DNB Ice detection


OMPS Aerosols from Fires



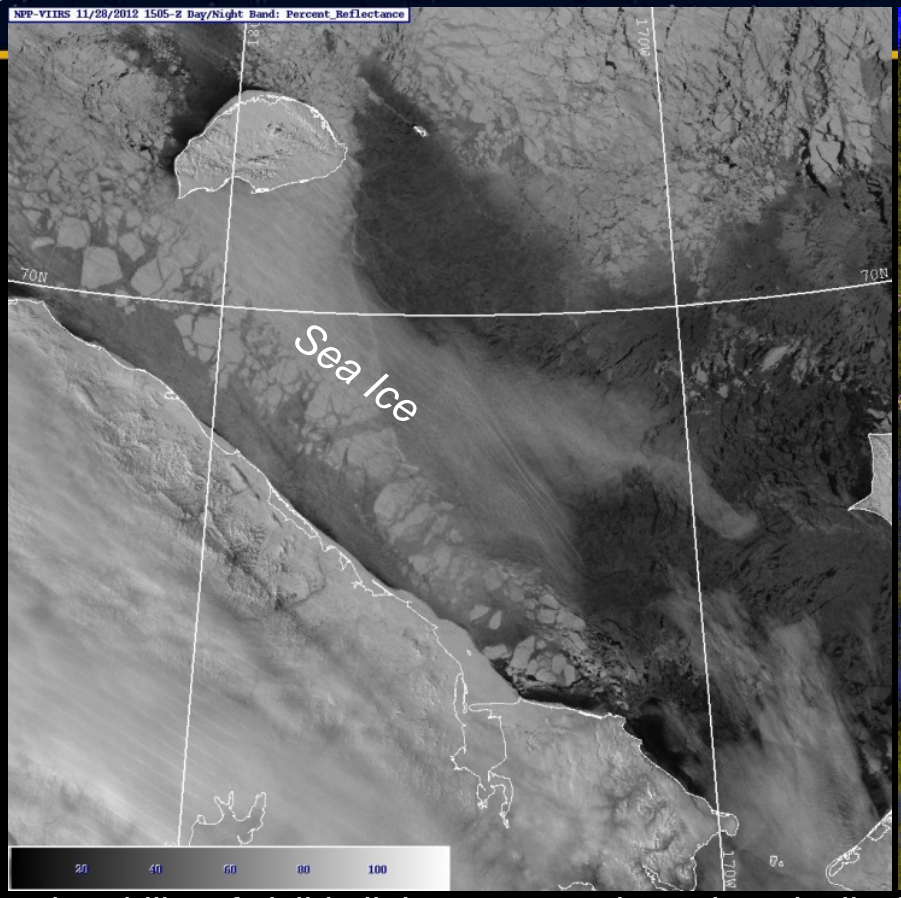
The Not-So-Dark Night… (Credit: Steve Miller, CIRA)

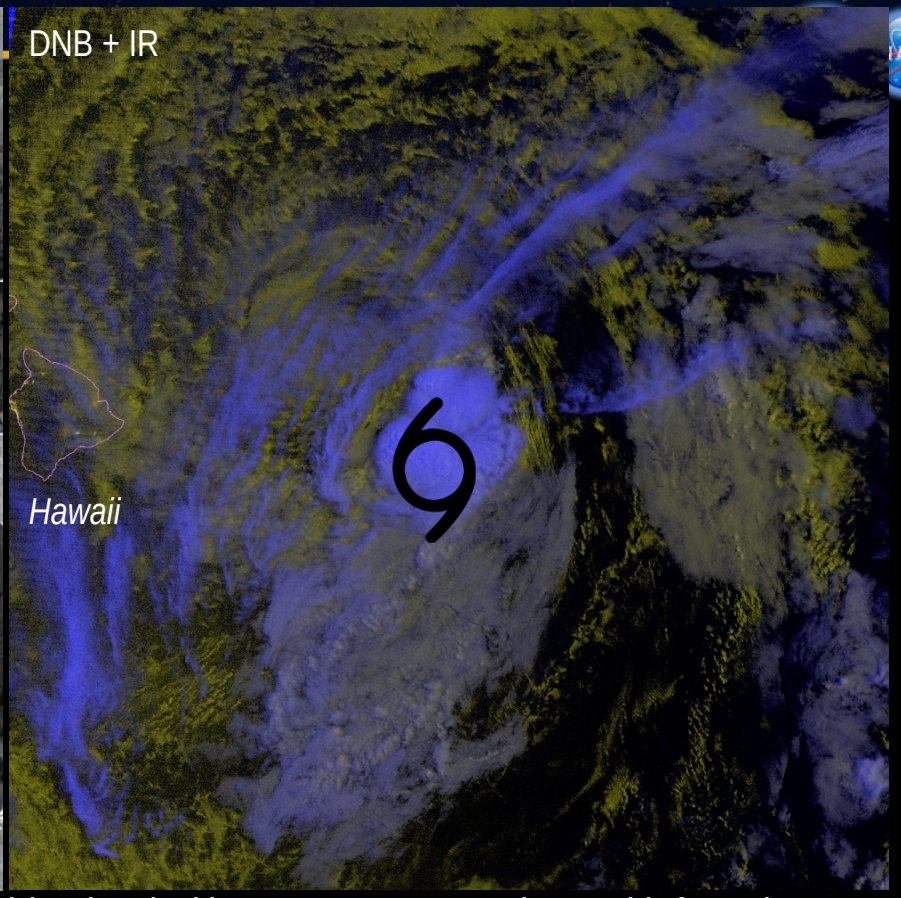


Night Band (DNB) Attributes

- Spatial Resolution: 742 m (constant across swath via 64 aggregation modes)
- Sensitivity: 3.0 e-5 W m^{-2} μm^{-1} (L_{min}; signal to noise ratio ~10)
- Radiometric Calibration Accuracy ~ 13% (High Gain Stage)

The Benefits of Scattering

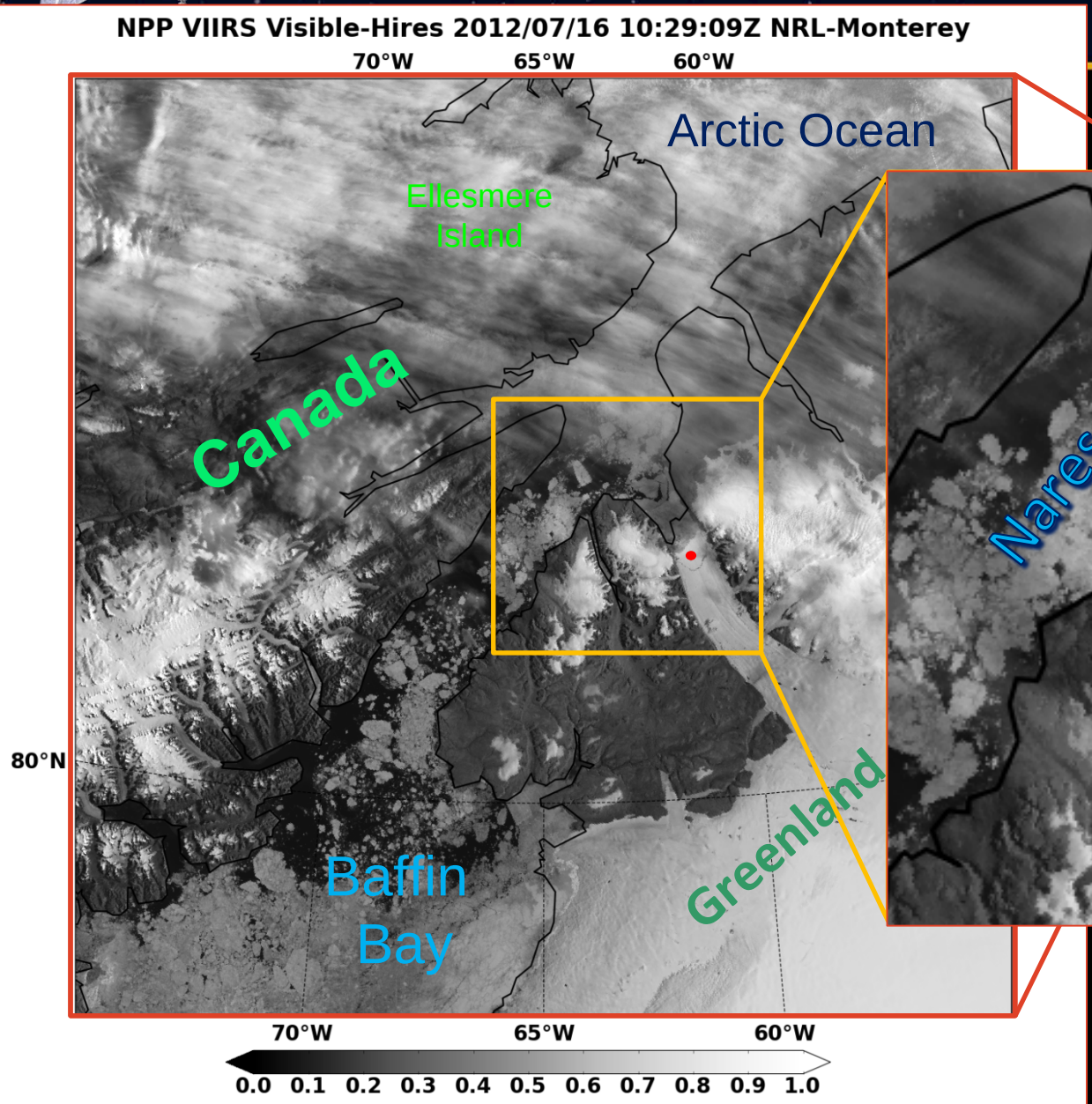


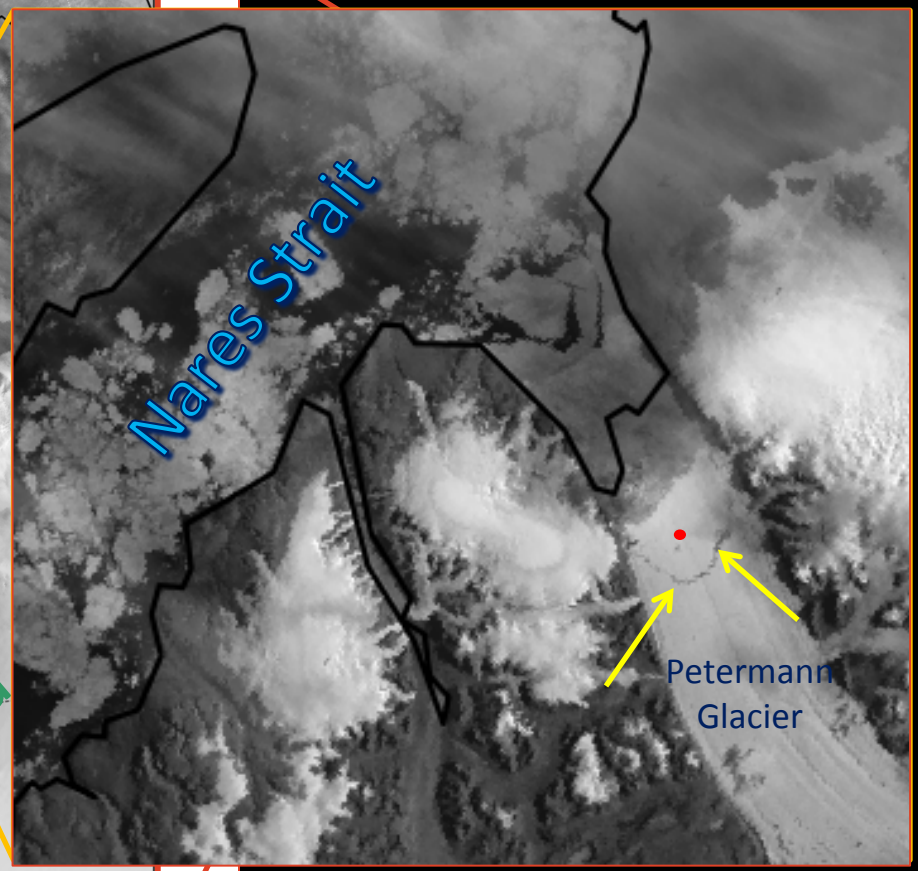


The ability of visible light to scatter through optically thin clouds (that are opaque at thermal infrared bands) enables the DNB to capture information about the lower atmosphere and surface that would otherwise be unavailable.

VIIRS Daytime Visible Iceberg Monitoring

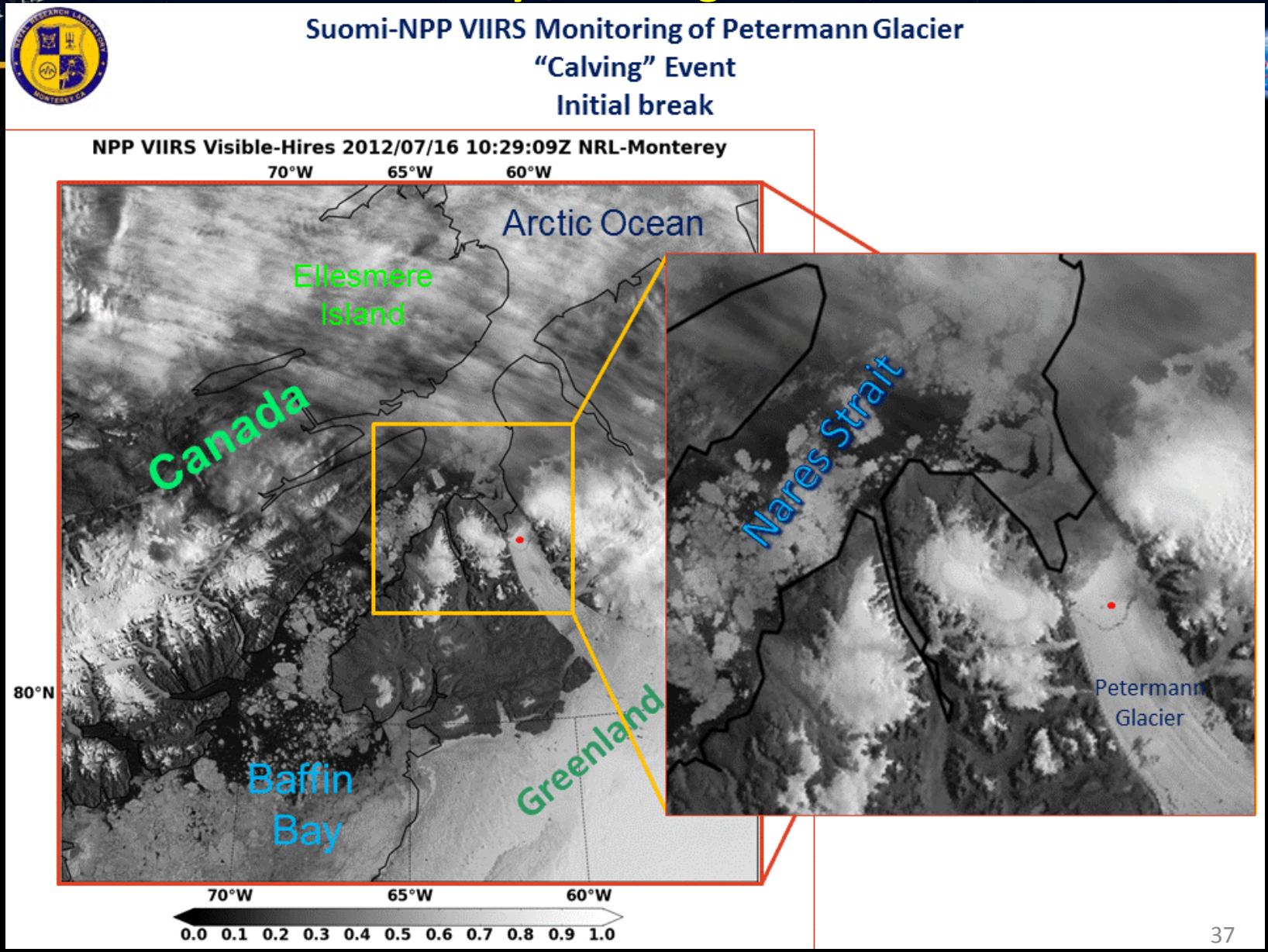
16 July – 15 August 2012



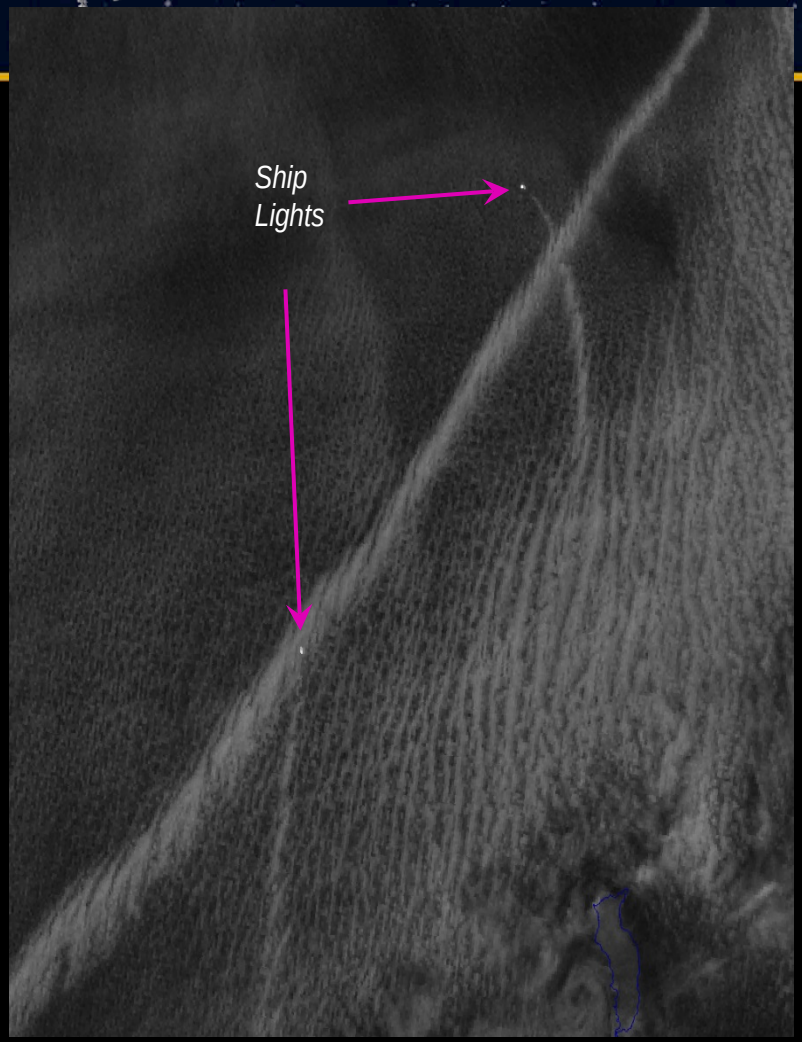


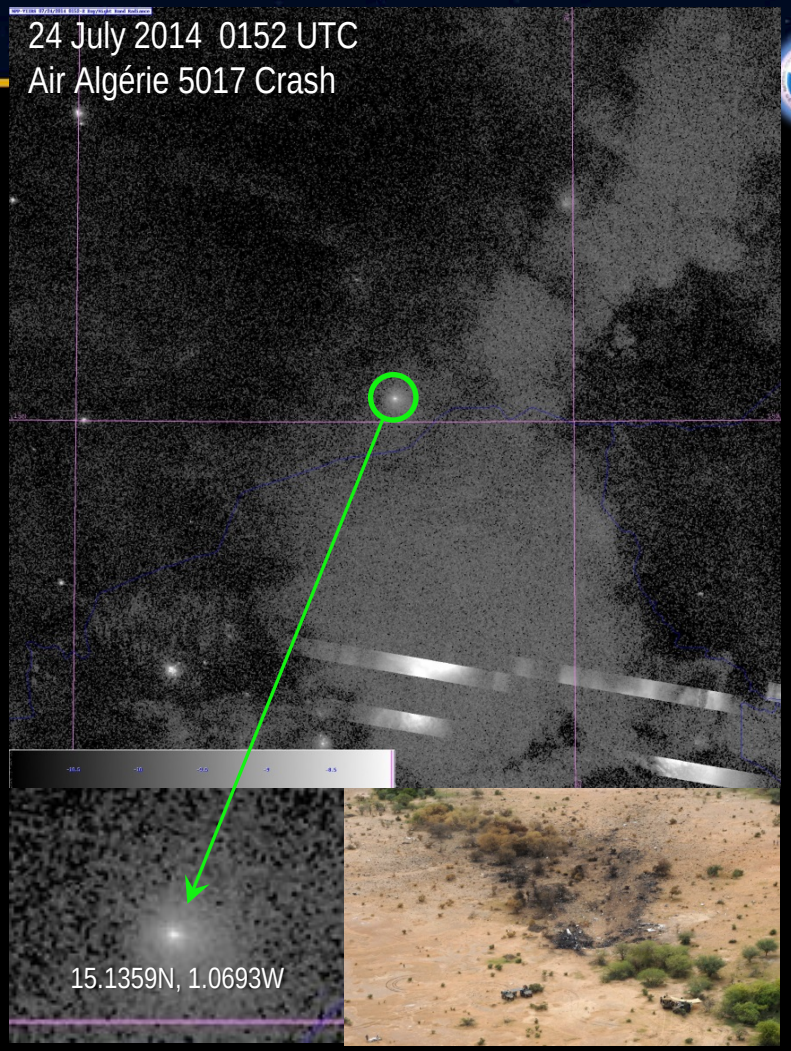
VIIRS Daytime Visible Iceberg Monitoring

16 July – 15 August 2012



A Unique Perspective on the Human Footprint: Anthropogenic Lights

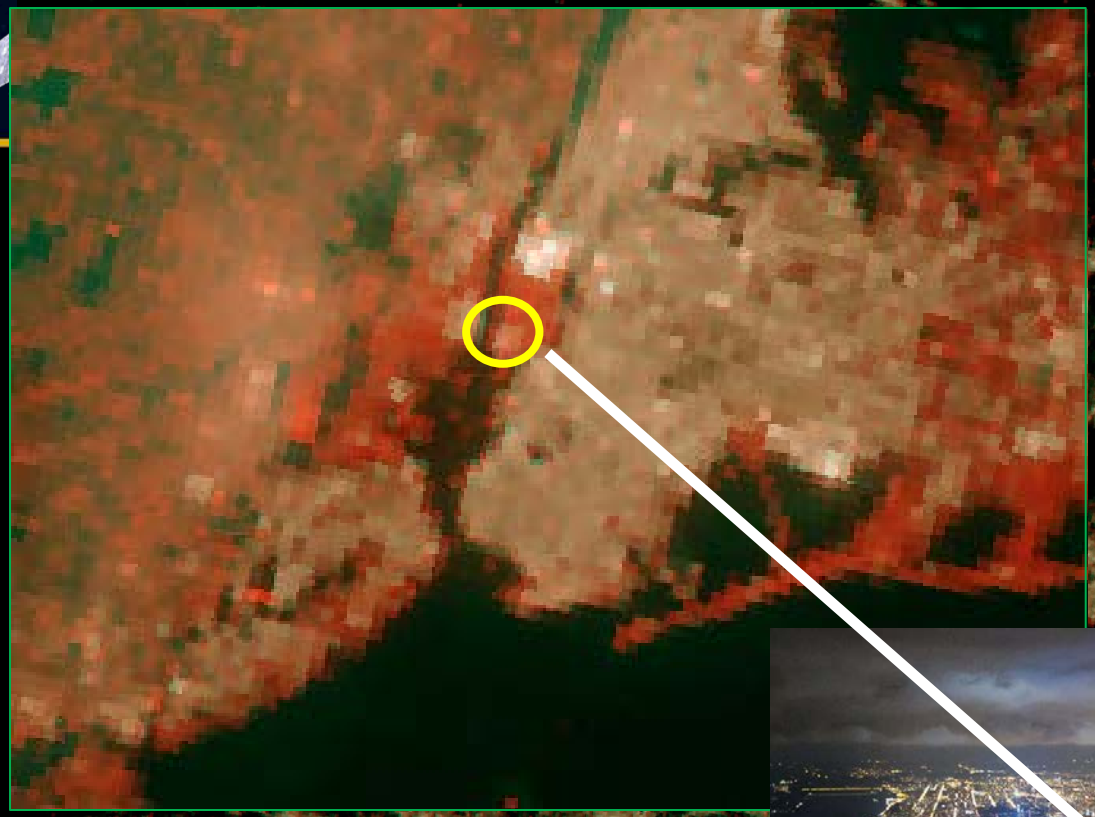




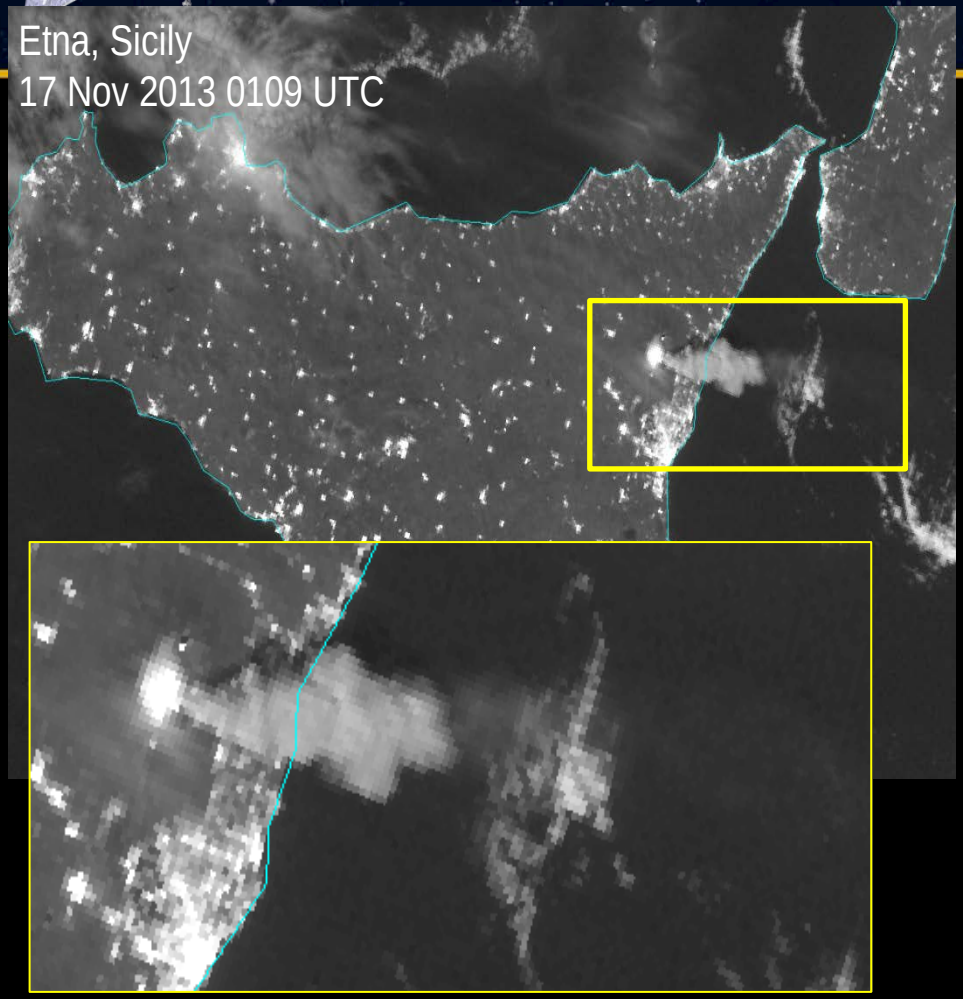
Also, power outages, energy consumption, light pollution, and CO_2 emission modeling.

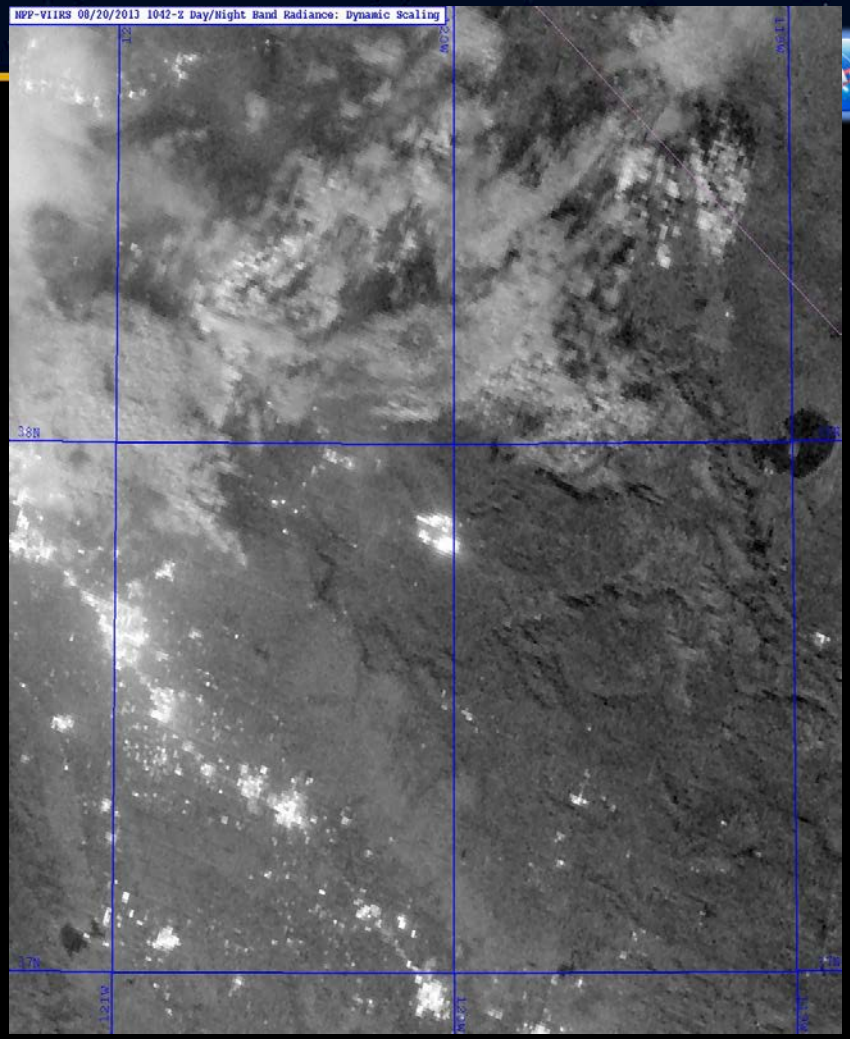
Nov 9, 2012

Super Storm Sandy



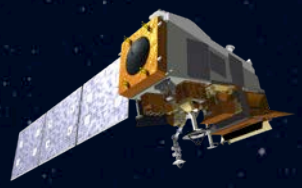
The ‘Pyrosphere’ and its Atmospheric Effluents



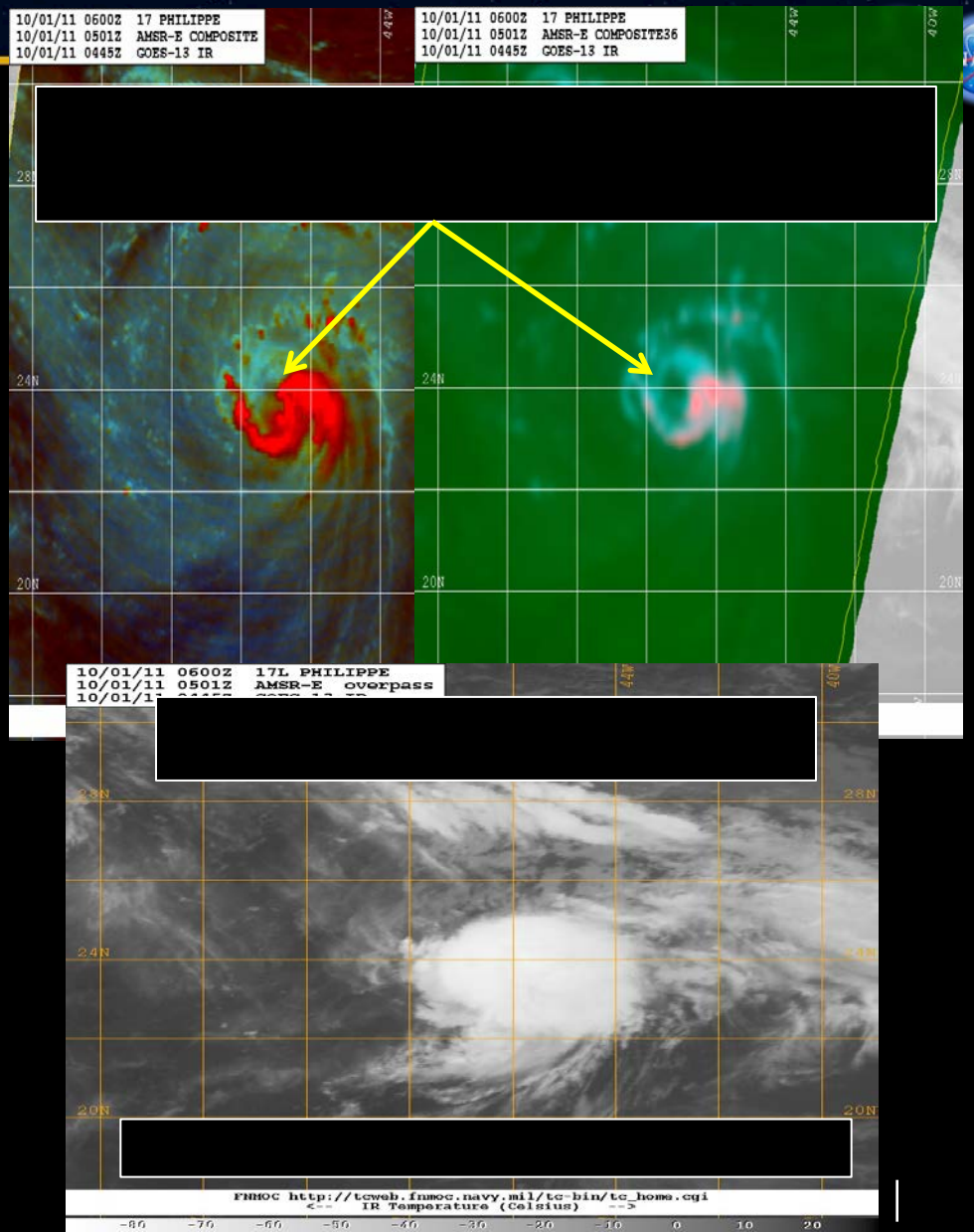


Complementary information on ash/smoke particles having weak IR signatures.

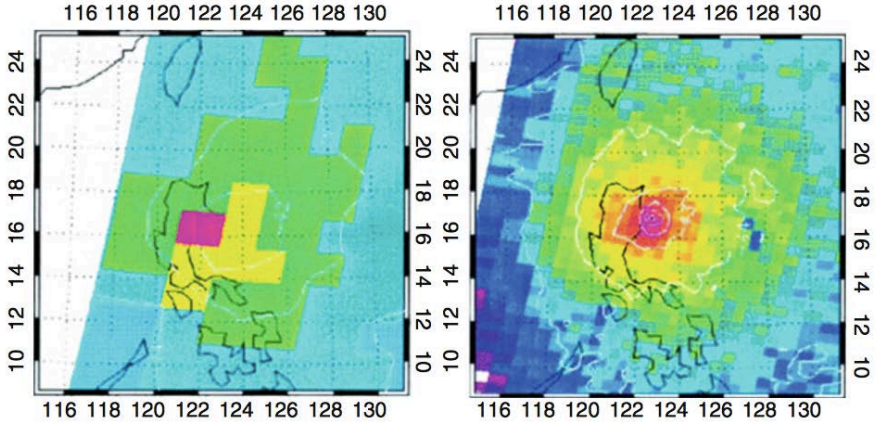
Uses of Microwave Imagery



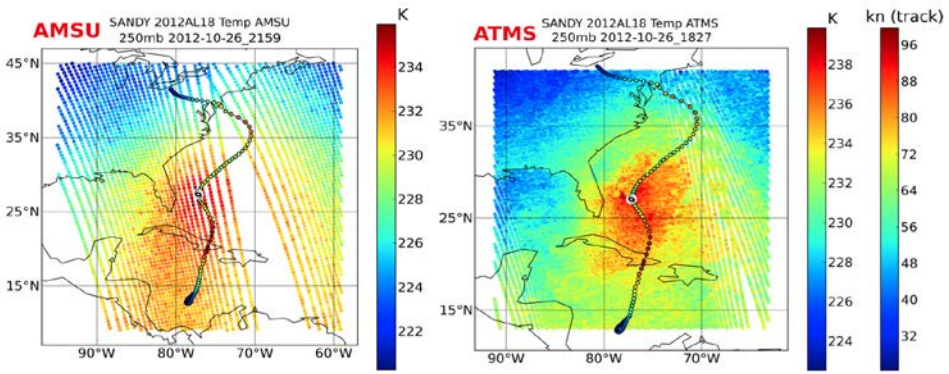
- Determining if a formative system has a well-defined center, a requirement to initiate advisories
- Locating the center of TCs when the center is not apparent in conventional visible or infrared imagery, especially for weaker systems at night
- Assessing trends in TC structure and intensity, such as eyewall formation and eyewall replacement cycles



Improved microwave sounding resolution for warm core anomalies



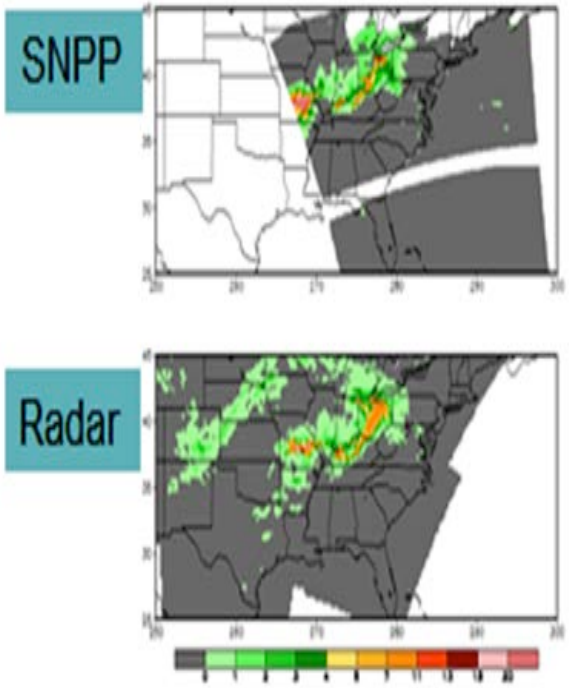
Resolution: ATMS vs AMSU

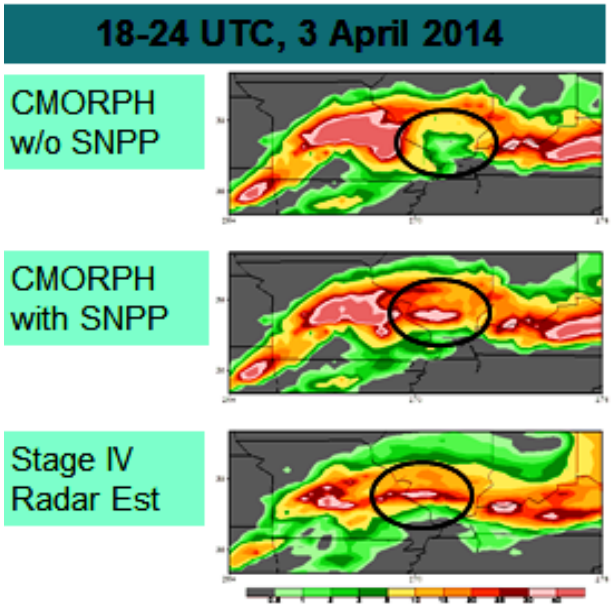


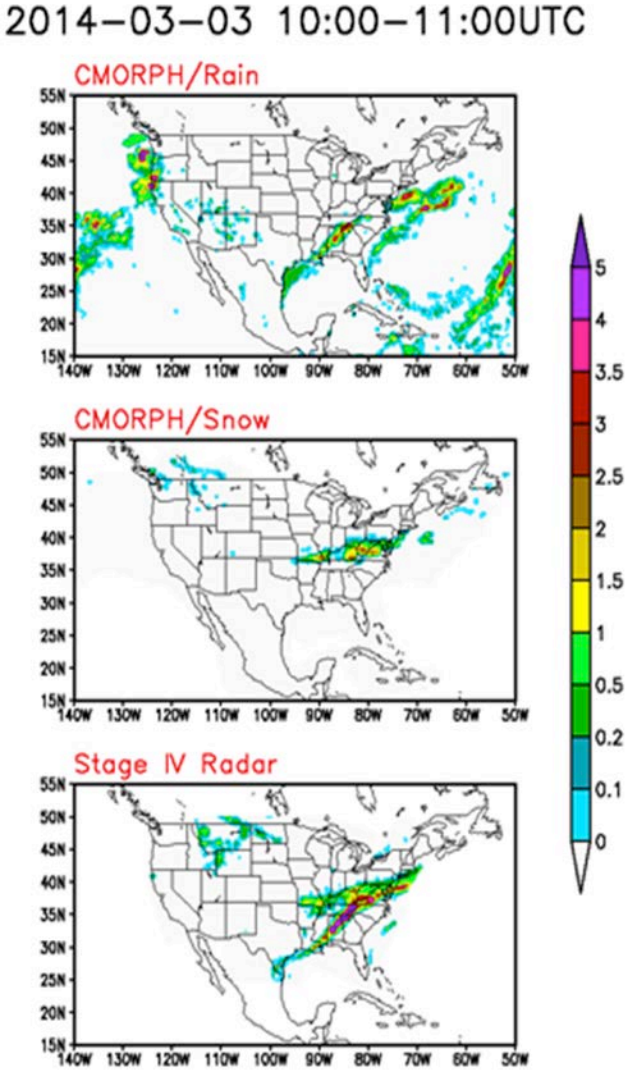
ATMS:

- higher resolution
- wider swath
- much smaller gaps between passes

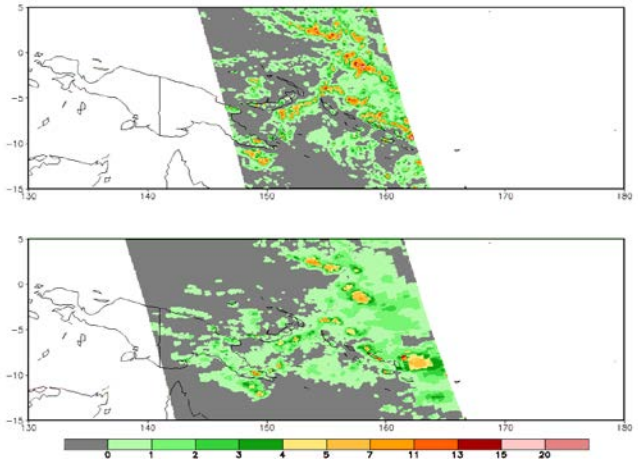
Precipitation examples



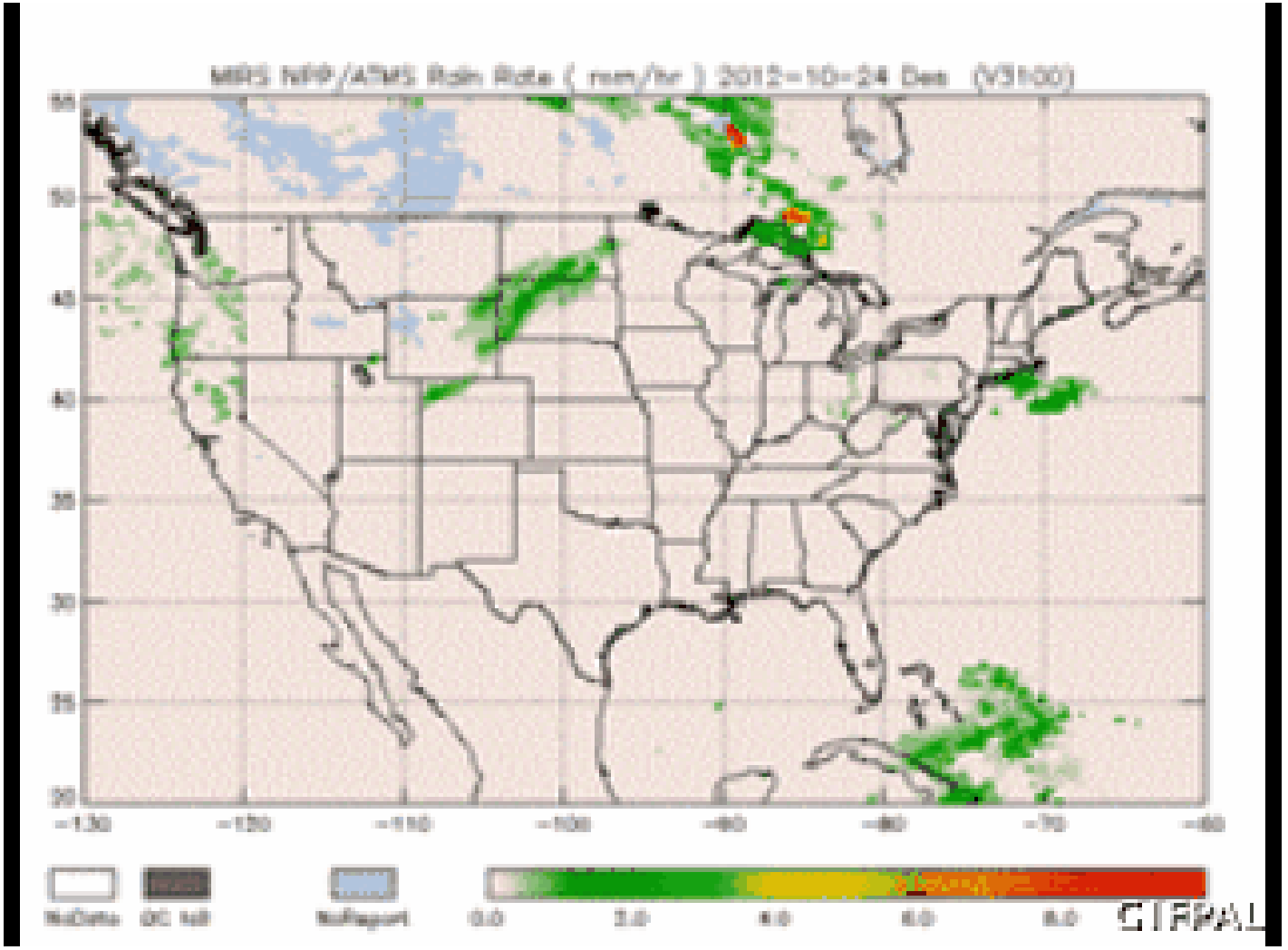




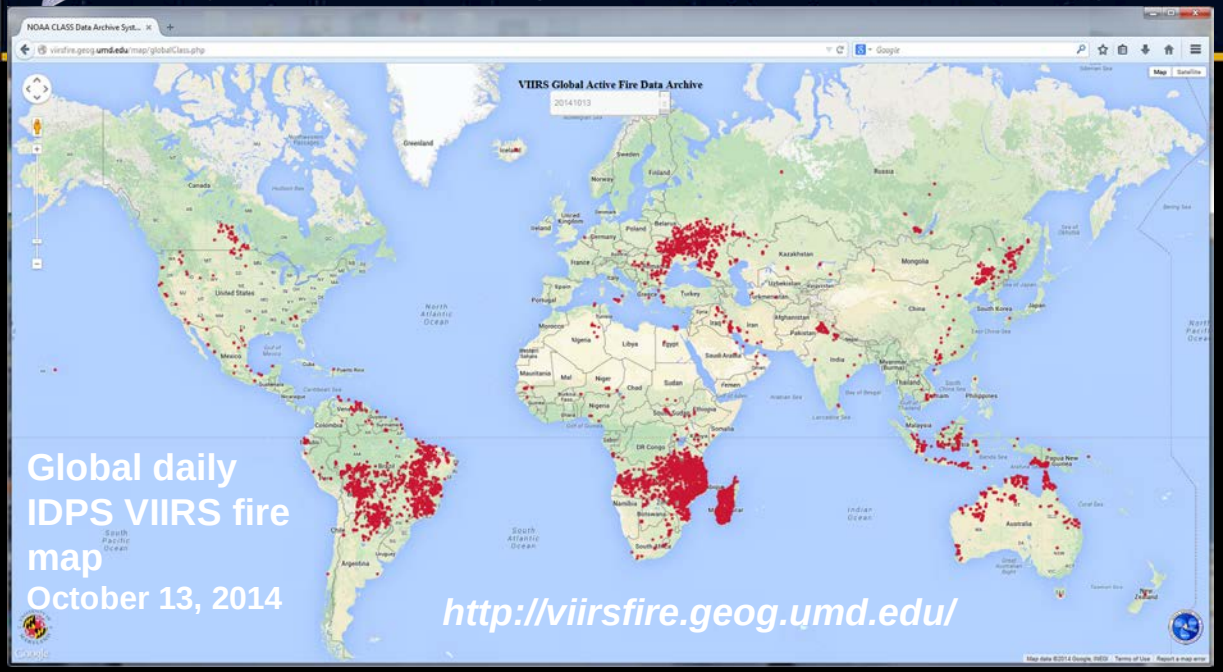
Comparisons between AMSR2 And ATMS precipitation

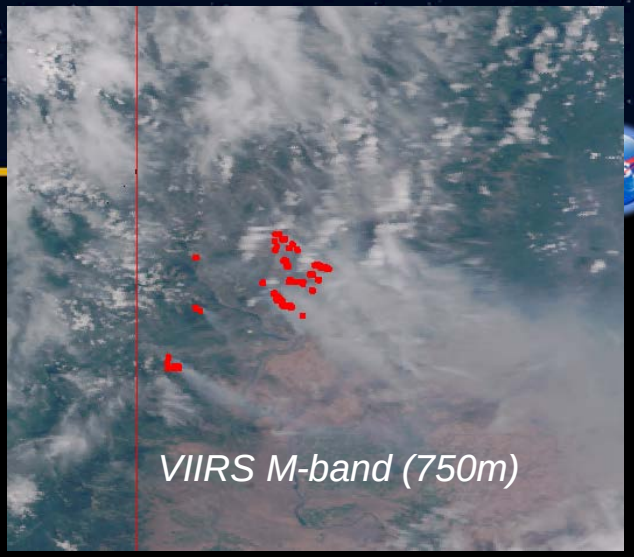


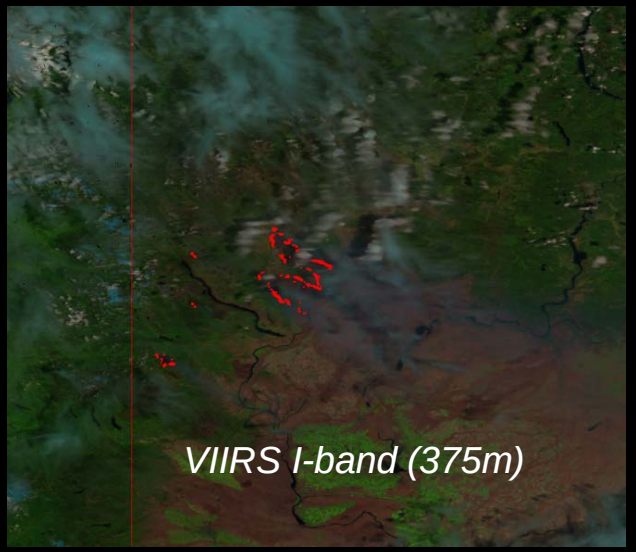
Hurricane Sandy ATMS rainrates



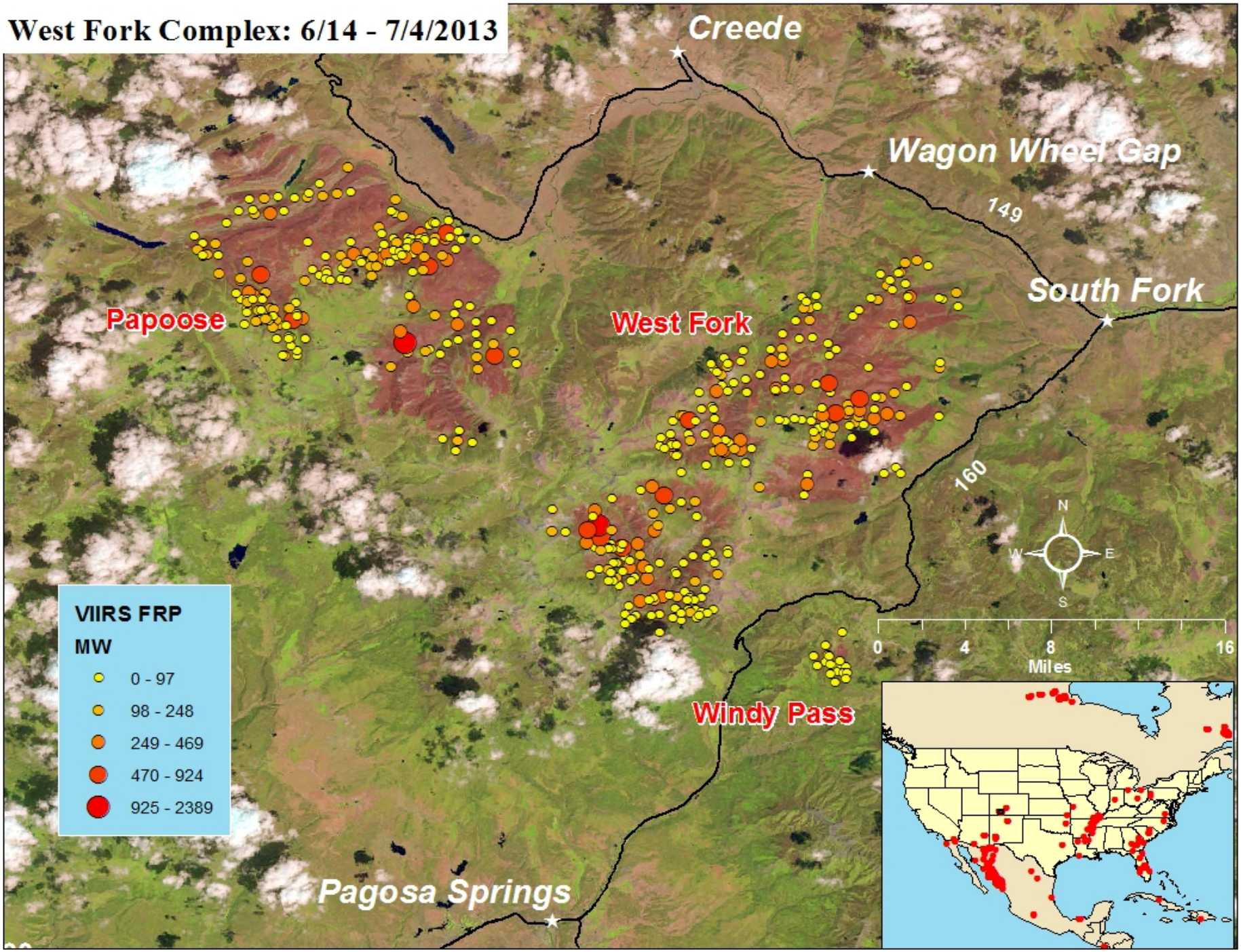
VIIRS Active Fire



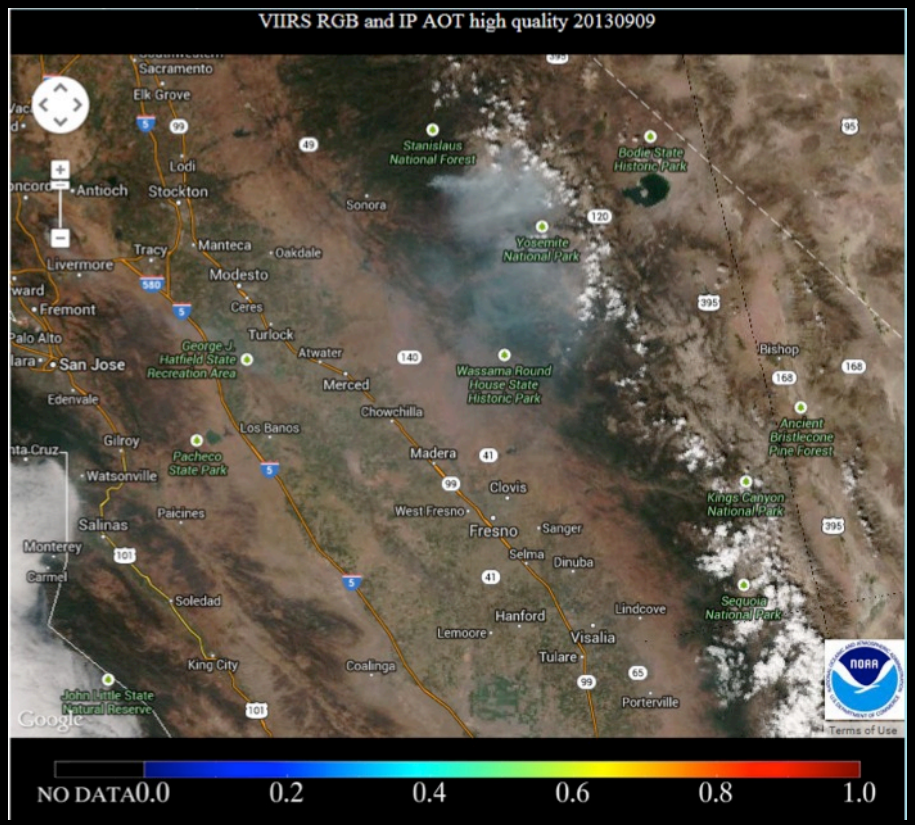


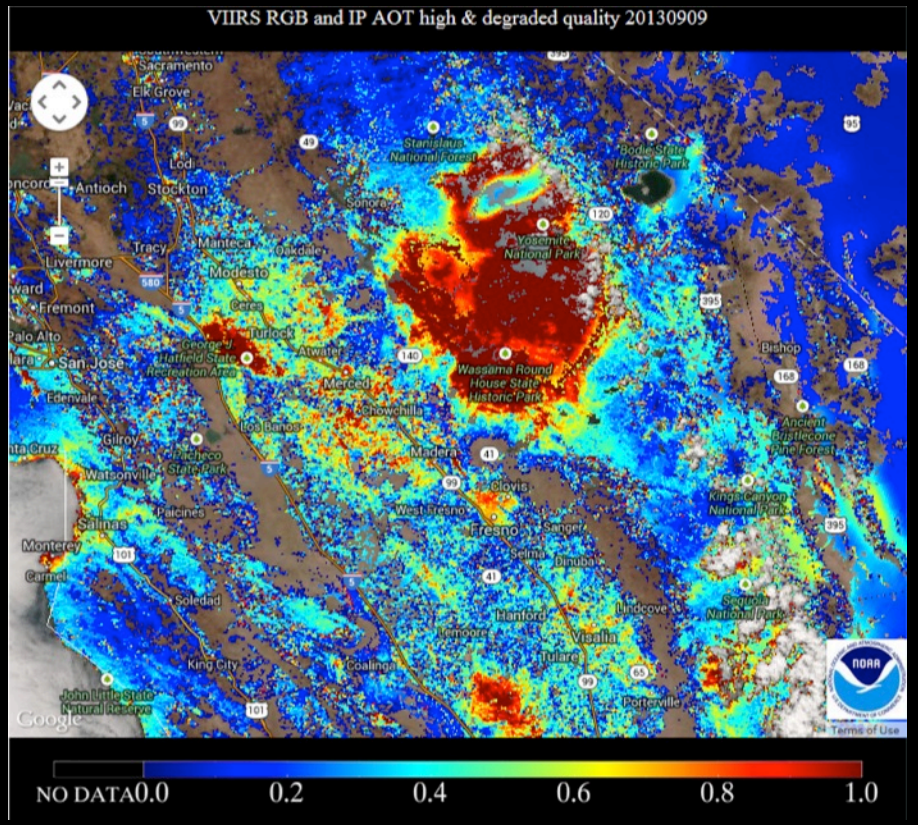


- **Baseline operational 750m product: fire locations**
- **MODIS heritage 750m product: global fire mask, fire radiative power**
- **375m experimental product: global fire mask**
- The baseline 750m product is available, starting on Apr. 3, 2012, from CLASS: www.class.noaa.gov

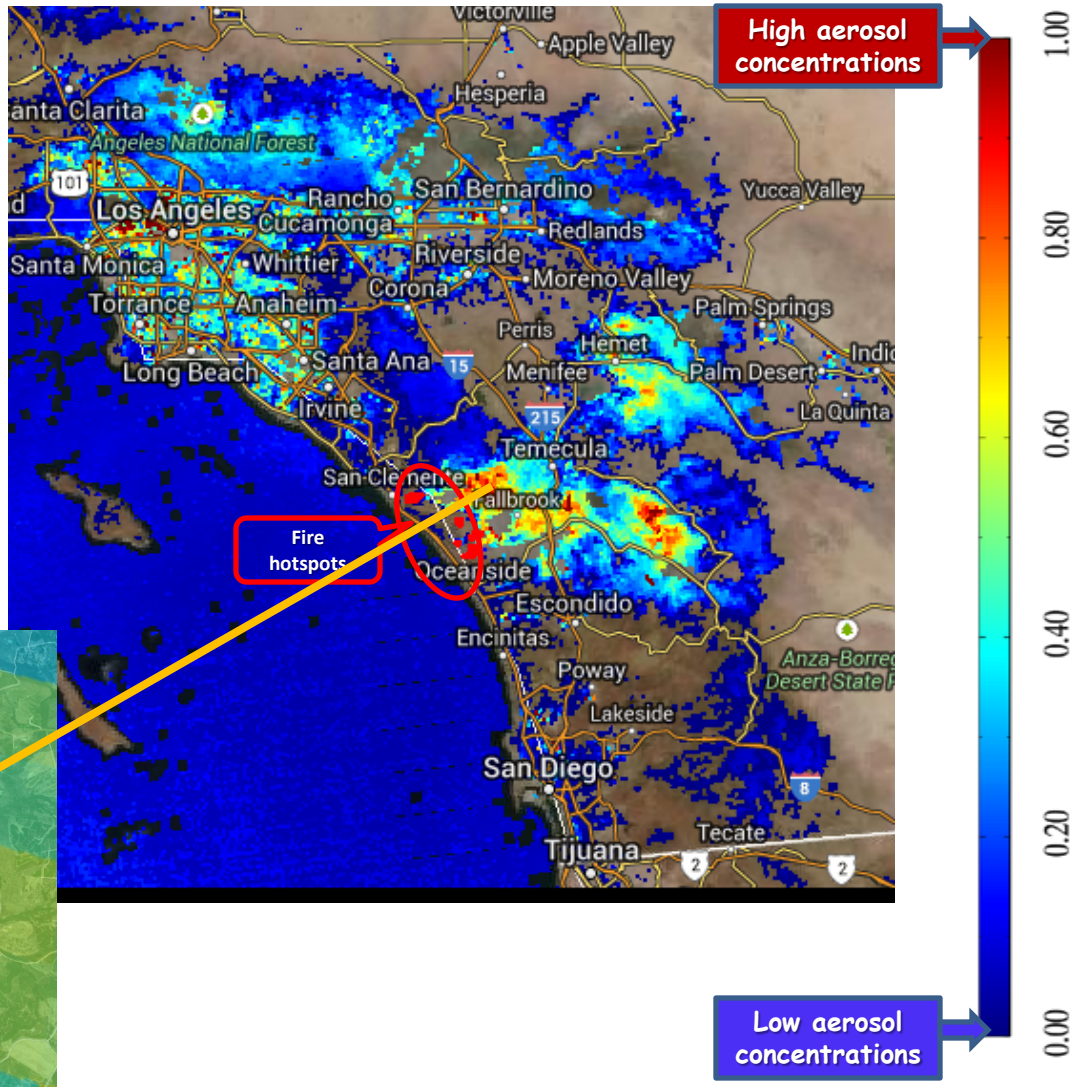

West Fork Complex: 6/14 - 7/4/2013
Creede
Wagon Wheel Gap
149
South Fork
Papoose
West Fork
160
Windy Pass
Pagosa Springs
N
W
E
S
0
4
8
16
Miles
VIIRS FRP
MW
0 - 97
98 - 248
249 - 469
470 - 924
925 - 2389

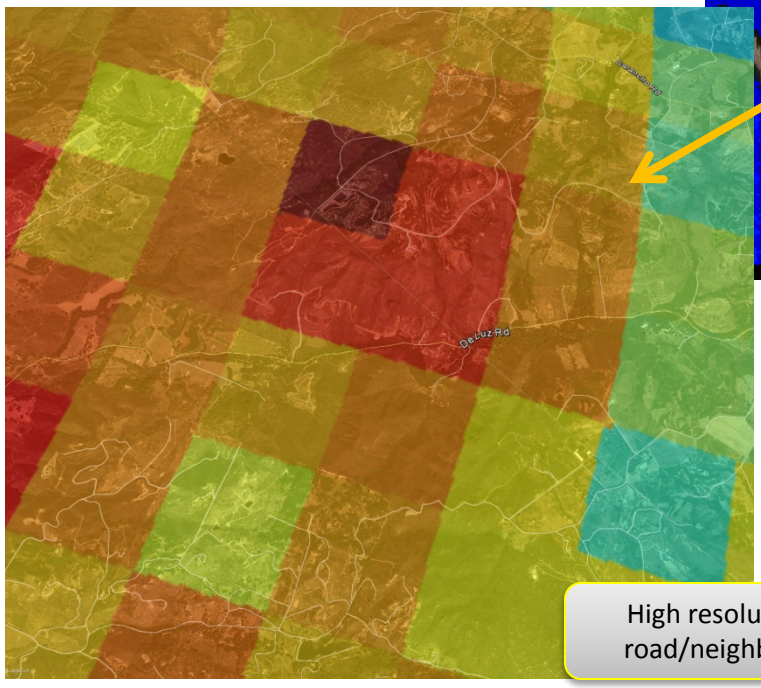
Where there is fire, there is smoke , but how much smoke or particulates (optical depth)





San Diego fires





High resolution display of AOD pixels at city road/neighborhood (**750 m to 1.2 km**) scale

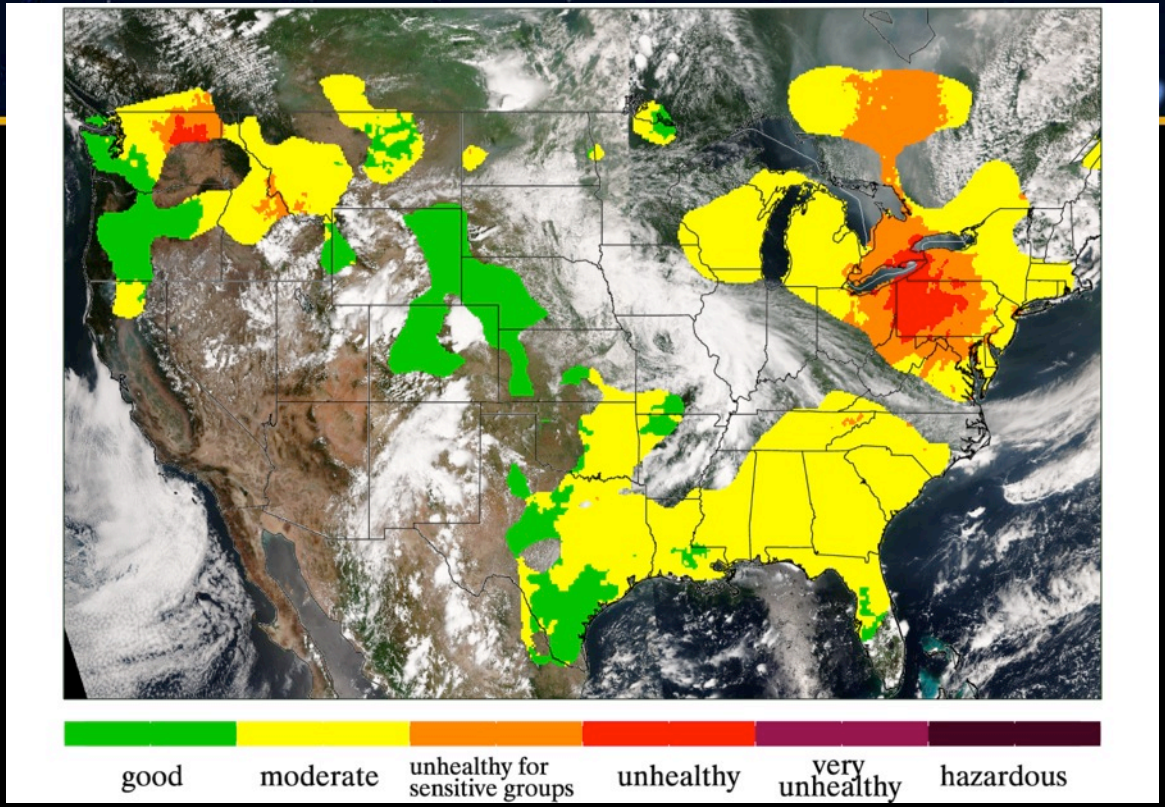
Air Quality and Public Health

Aerosols from natural (fires, volcanic eruptions, dust storms) and man-made (cars, industry) sources are harmful to human health. **More than 3 million premature deaths globally*.**

EPA ground monitors not dense enough to provide monitoring and warnings for 40 million people living in rural areas in the US.

Satellite data help fill the spatial gaps

Air Quality Index (AQI) for August 7, 2014 from SNPP VIIRS

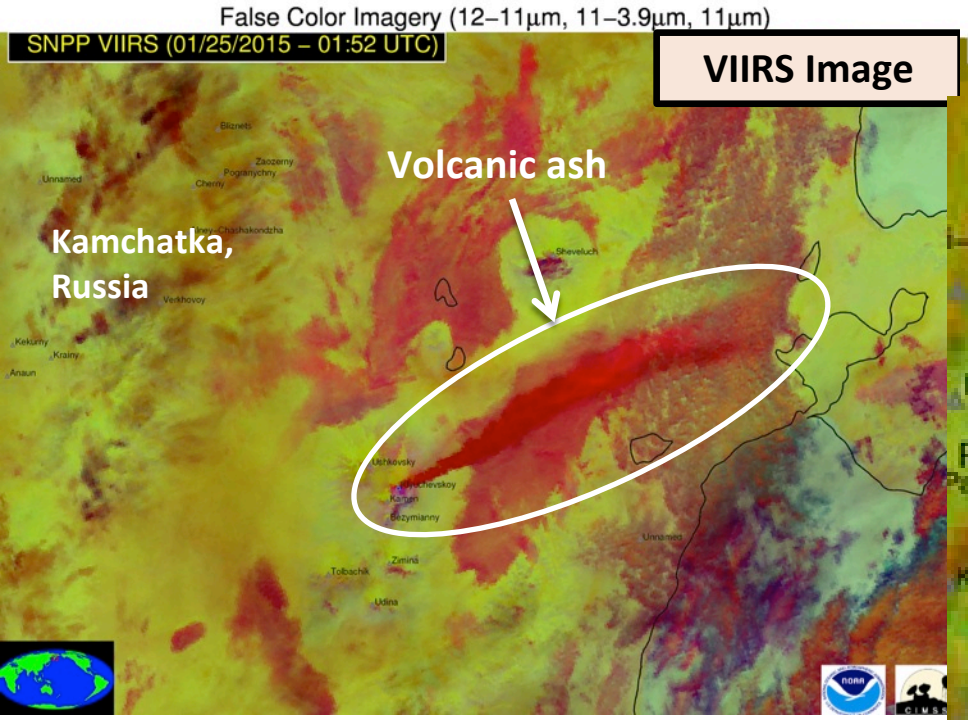


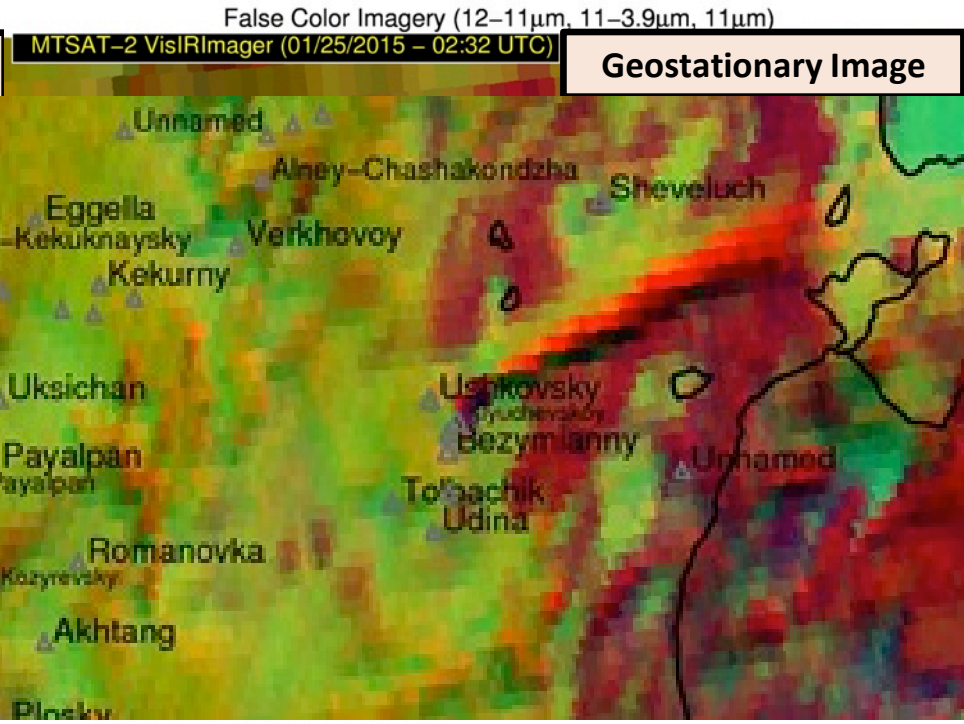
NESDIS satellite-derived air quality products used in Environmental Protection Agency (EPA) Air Quality Index (AQI) forecasts. Currently using Aqua/Terra MODIS with plans to transition to SNPP VIIRS. *AQI derived for August 7, 2014 using **SNPP VIIRS** aerosol optical thickness is shown above as an example.*

Courtesy of S. Kondragunta (STAR) and H. Zhang (IMSG)

*Global Disease Burden project by Lim et al., The Lancet, 2012

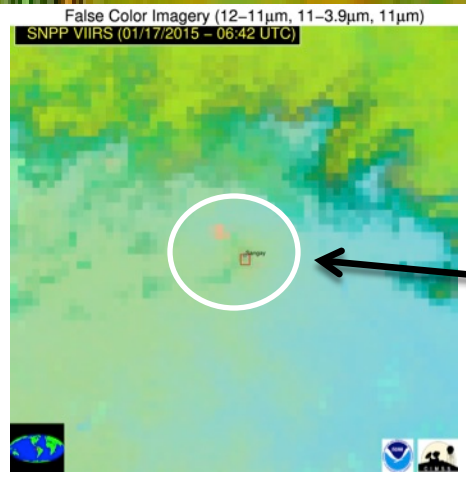
VIIRS is Critical for Mitigating Volcanic Related Aviation Hazards: Direct and indirect benefits





Direct Benefit: Nearly everyday VIIRS identifies volcanic activity that is not unambiguously identifiable using any other meteorological satellite sensor.

Indirect Benefit: The VIIRS images are used to identify subtle volcanic ash cloud features from geostationary imagery, thereby allowing the clouds to be tracked in time.

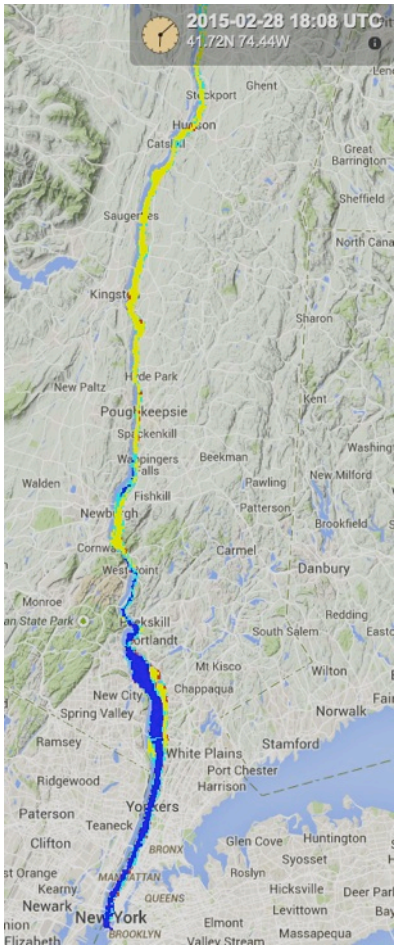


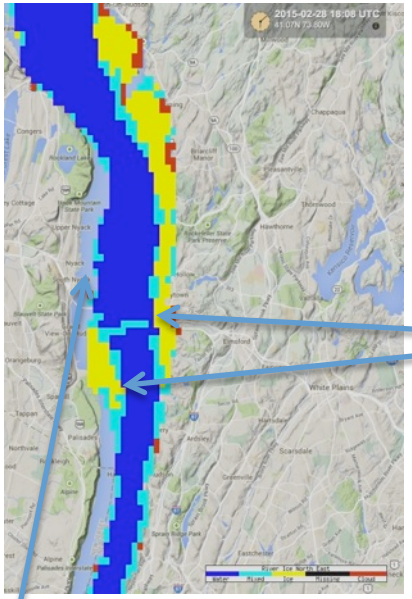
Recently, VIIRS was the first space sensor to detect renewed activity at Sangay Volcano in Ecuador (lava and ash emissions)

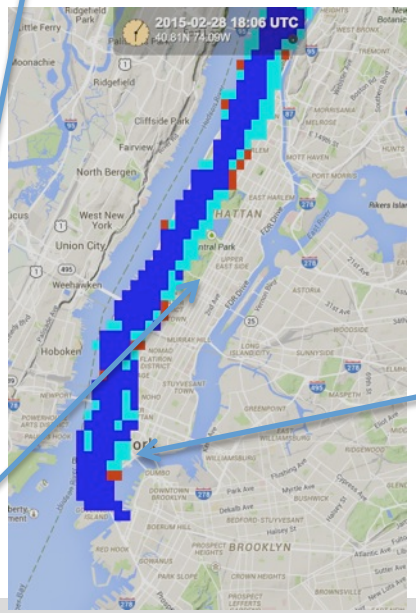
PI: Mike Pavolonis, NESDIS Center for SaTellite Applications and Research (STAR)

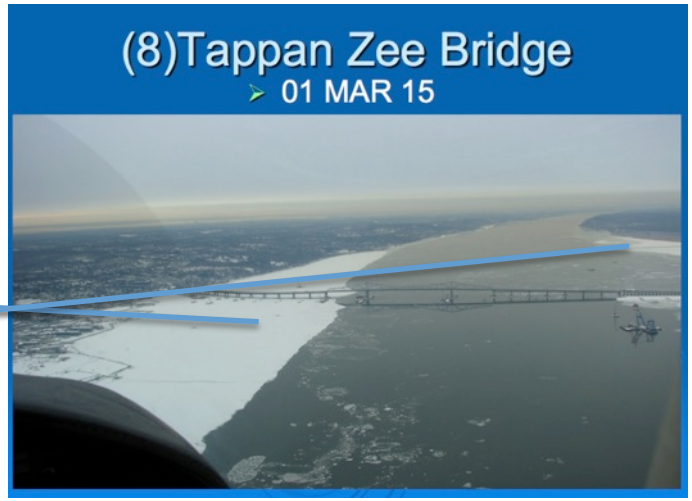
River Ice and Melting/Flooding Season is now open:
Testing VIIRS Ice Mapping Product with NWS River Forecast Centers

Yellow is ice
Blue is water
Cyan is mixed (broken ice)
Red is cloudy (no data)





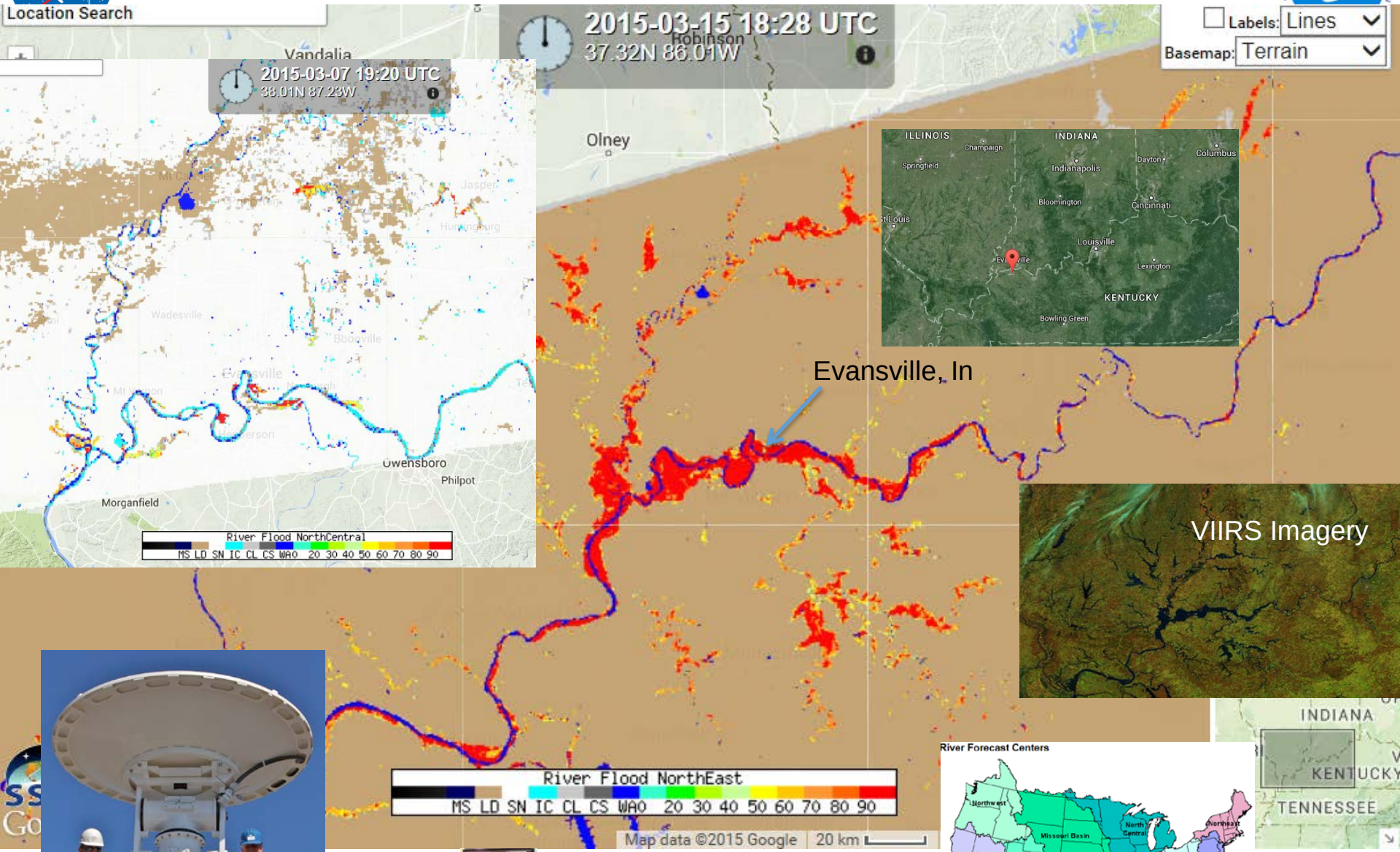


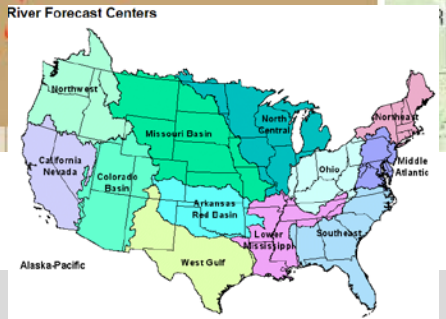


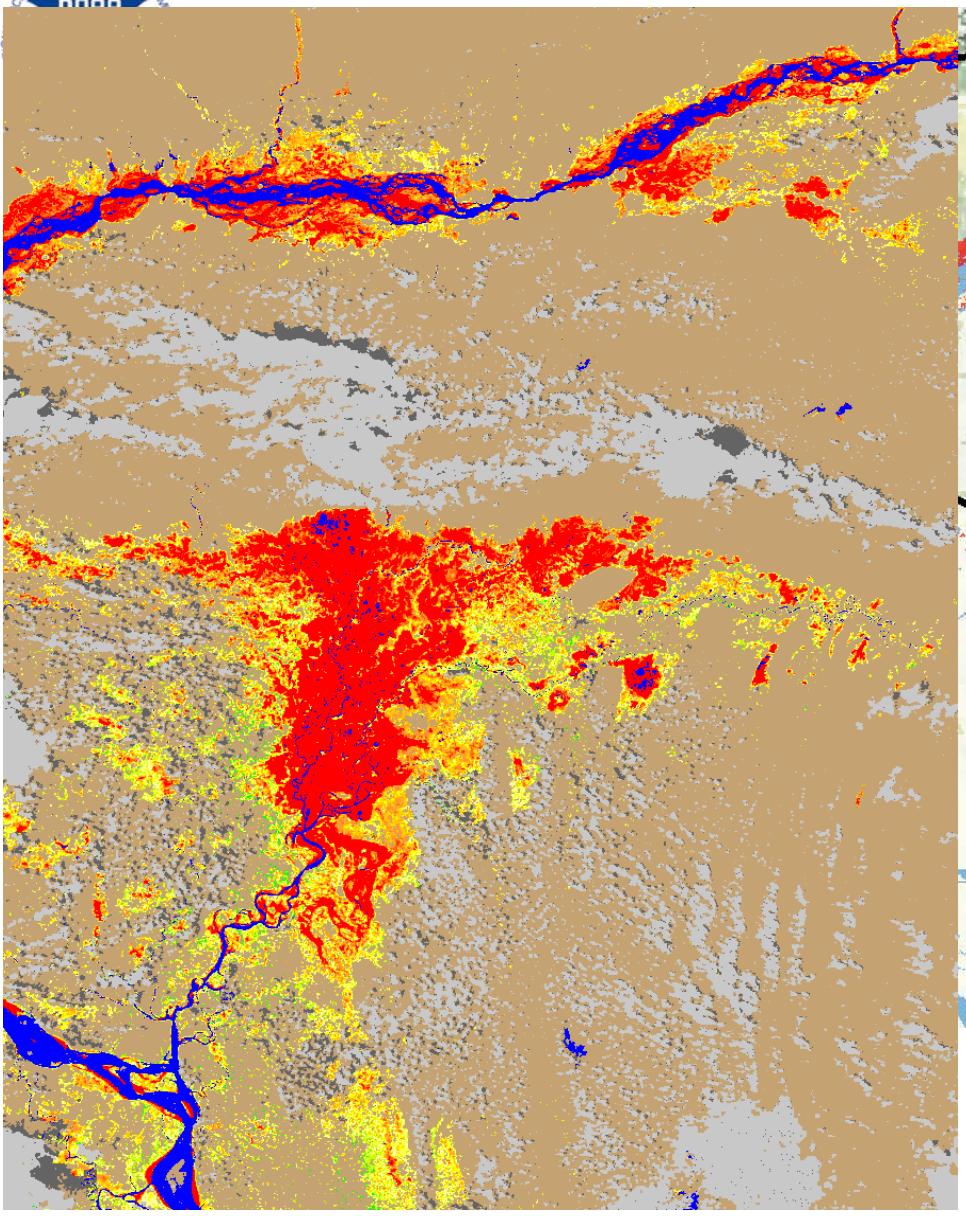
Will fix mapping issue

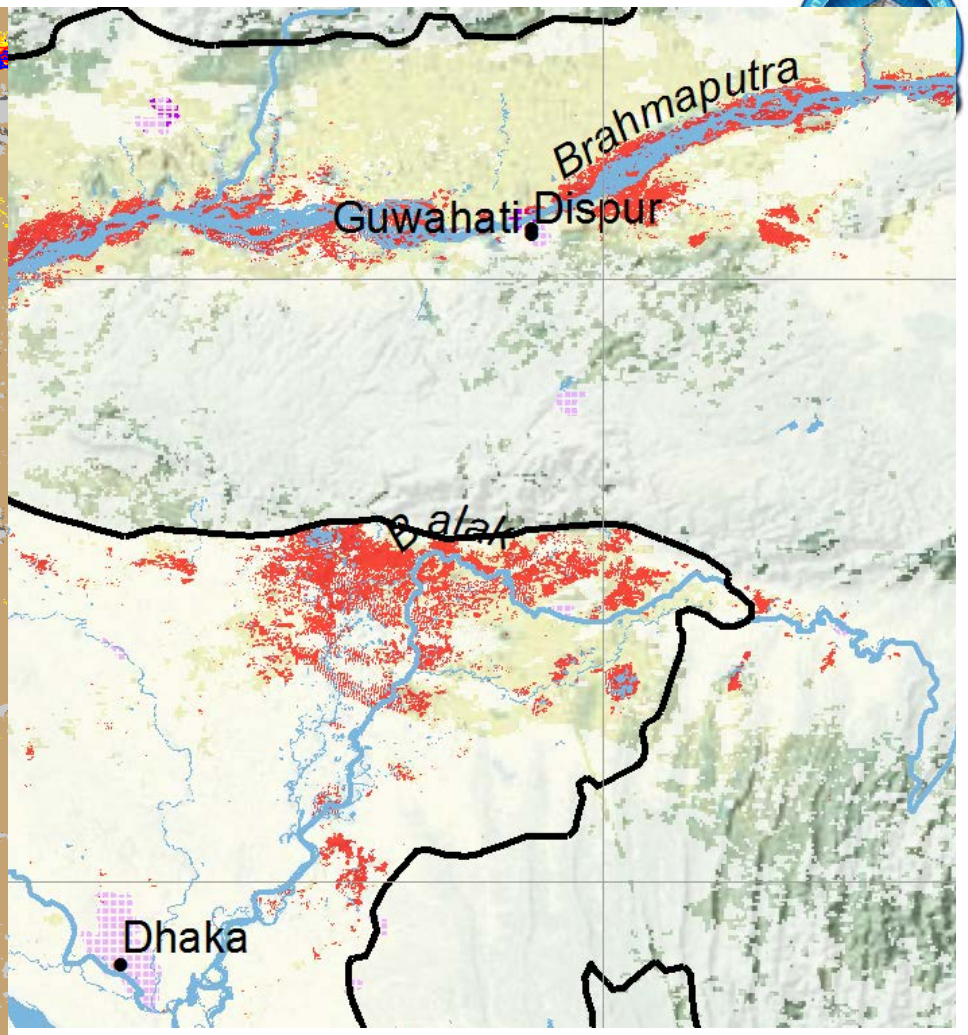
-VIIRS 375m high spatial resolution allows discrimination of open water and ice along the river banks. Compares well with aircraft imagery. Product is very important in remote areas with no or minimal aircraft surveillance. New York is prime location for validation sources.

JPSS Proving Ground Delivering Experimental River Ice and Flood Products to NWS River Forecast Centers





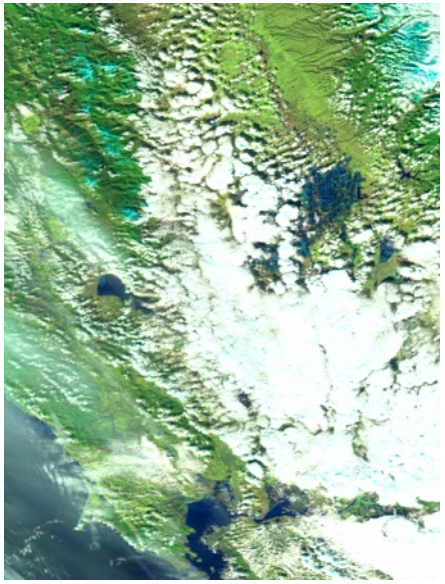


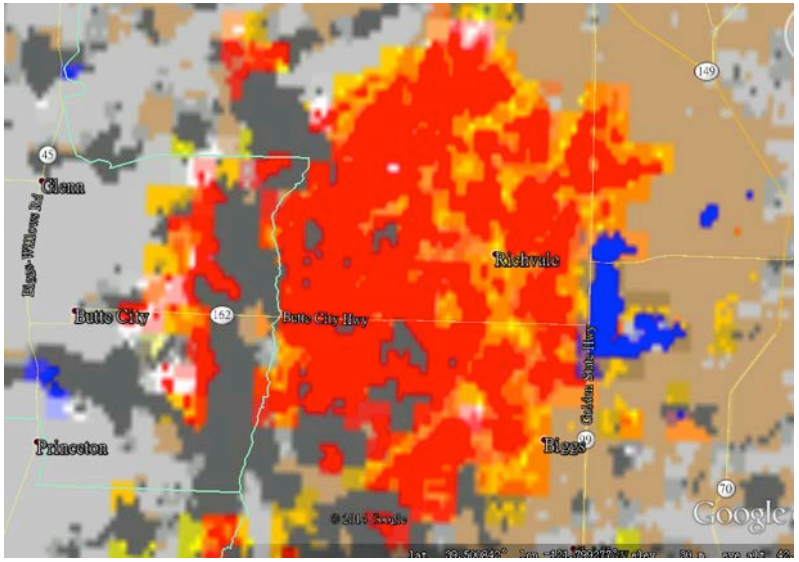


Higher spatial resolution VIIRS and better handling of cloud shadows provides better coverage than MODIS

Bangladesh, August 29, 2014,
Left: VIIRS, right: MODIS

California Floods: Dec. 11-13, 2014





Legend

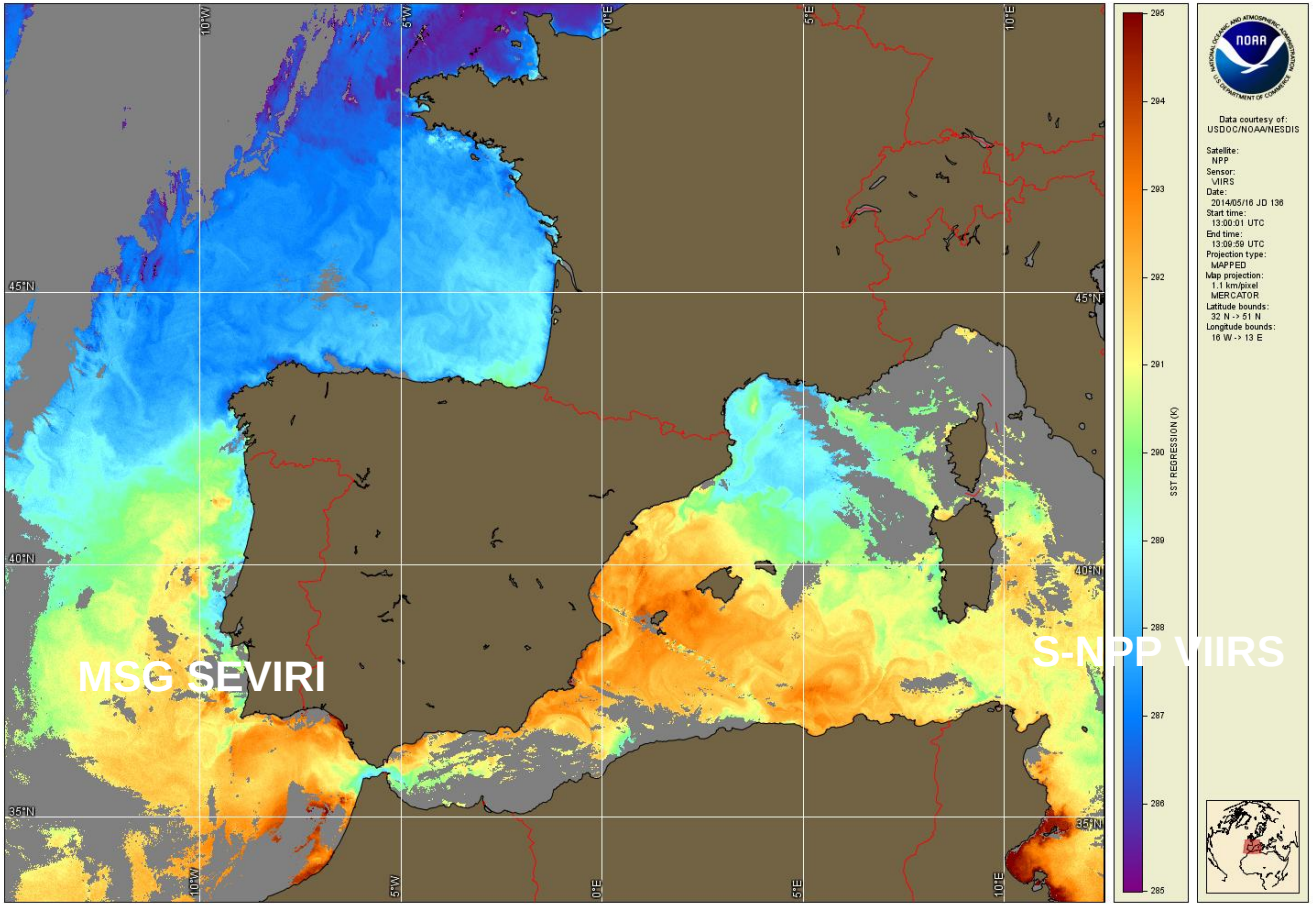
Snow Ice Normal Water

Cloud Cloud shadow

Flooding Water Fraction (%)

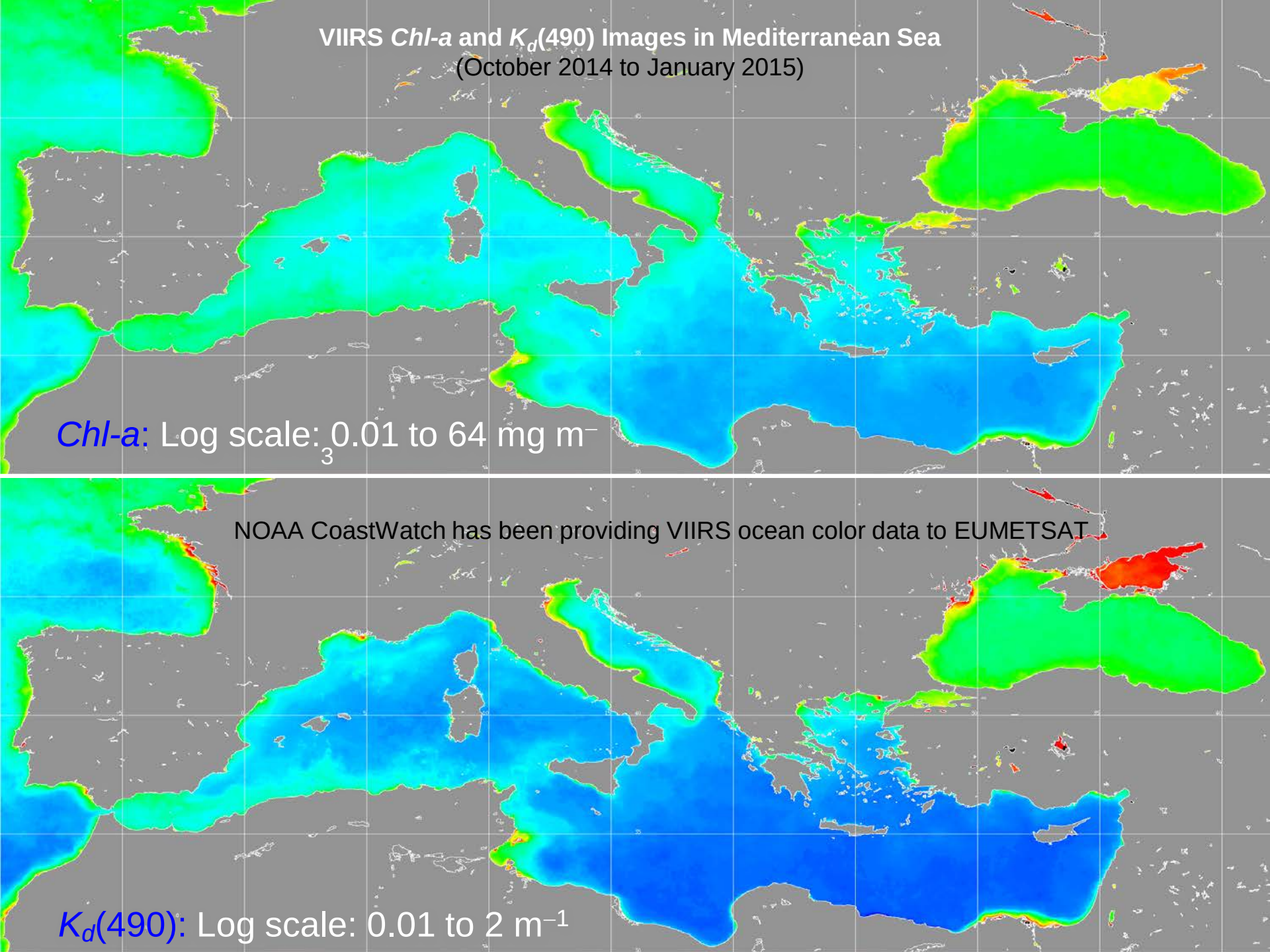
1 20 40 60 80 100

VIIRS Sea Surface Temperature



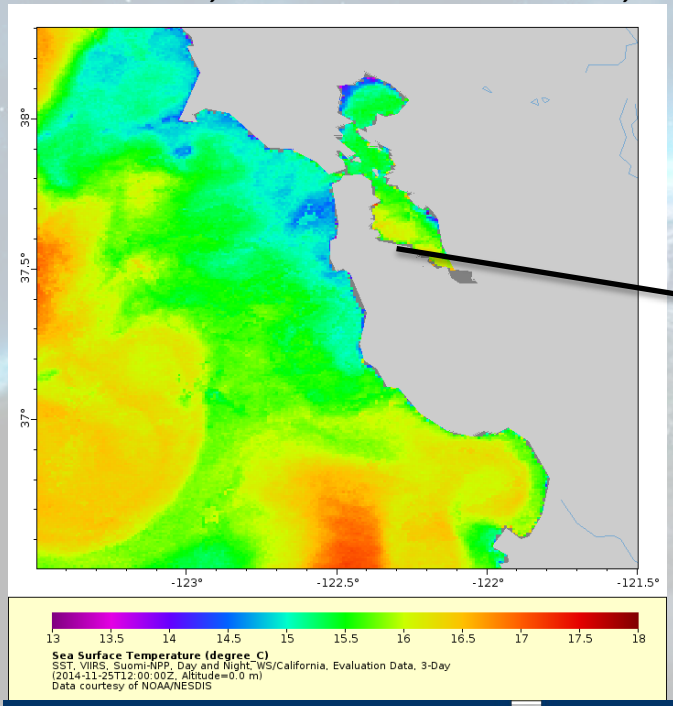
VIIRS/ABI resolution & quality is unique, and allows exploration of new techniques for monitoring influence of SST gradients for local weather, water quality, and fishing

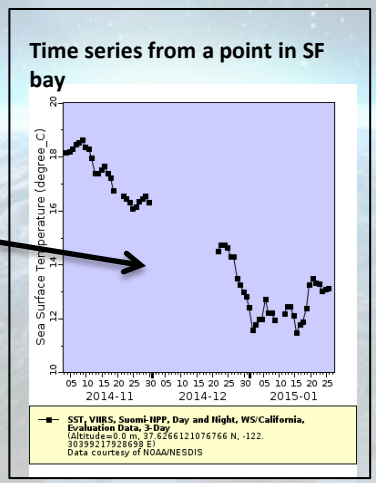
55

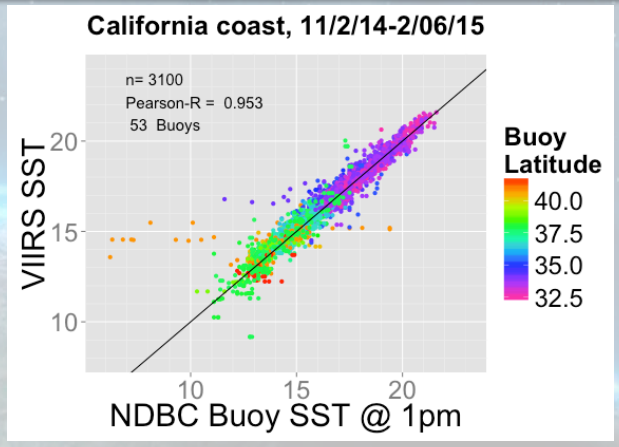

VIIRS Chl-a and K_d(490) Images in Mediterranean Sea
(October 2014 to January 2015)
Chl-a: Log scale: 0.01 to 64 mg m^{-3}
NOAA CoastWatch has been providing VIIRS ocean color data to EUMETSAT
K_d(490): Log scale: 0.01 to 2 m^{-1}

VIIRS Sea Surface Temperature (SST) now at NMFS' ERDDAP: enabling applied research in support of NOAA's ocean mission

PI: Cara Wilson, Environmental Research Division, NMFS Southwest Fisheries Science Center

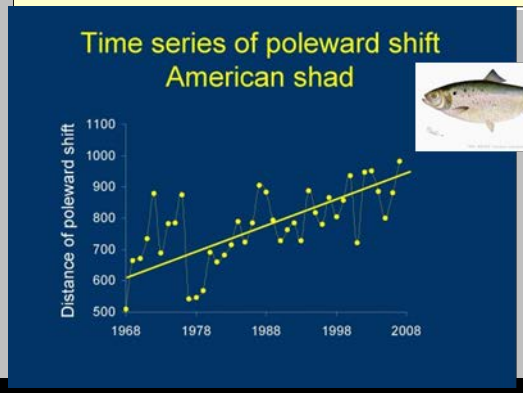


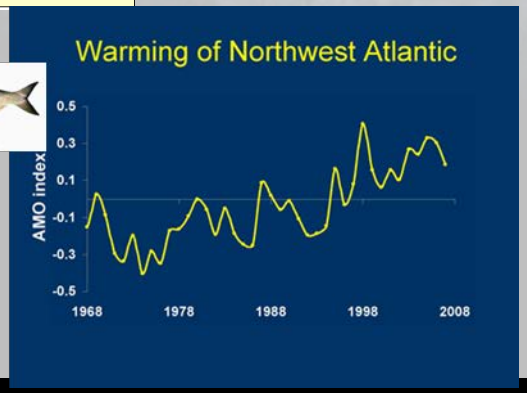




ERDDAP is a data server providing subsets of gridded and tabular scientific datasets in common file formats to enable assessment of ocean and coastal environmental parameters and species.

http://coastwatch.pfeg.noaa.gov/erddap/index.html





VIIRS currently provides the most accurate SST, with the best combination of spatial resolution and global coverage.

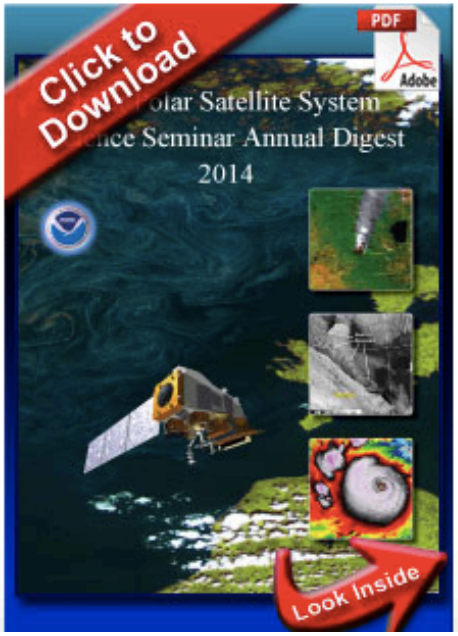
Science Seminar Annual Digest

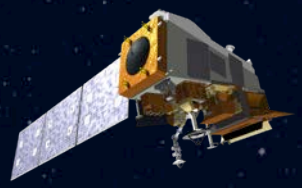
On behalf of the Joint Polar Satellite System (JPSS) Program Science, it is my pleasure to share with you our science digests, which are a collection of technical articles generated from a series of monthly science seminars. The digests capture the importance of the close collaborative efforts between product developers and key users to conceptualize and develop new products that help improve the use of JPSS data to enhance key services, such as forecasting of severe weather events and environmental monitoring of land, ocean and the cryosphere. I would like to thank our federal staff, private sector support staff, and university partners whose contributions and dedicated efforts have made JPSS a big success.

The JPSS program is committed to ensuring that its user community is prepared to utilize the satellite imagery and data available from JPSS – the United States' next generation polar-orbiting operational environmental satellite system. JPSS provides environmental observations which are used in a wide range of application areas that include severe weather, hazards, aviation, ocean, coastal, land, imagery and data assimilation.

2013

2014





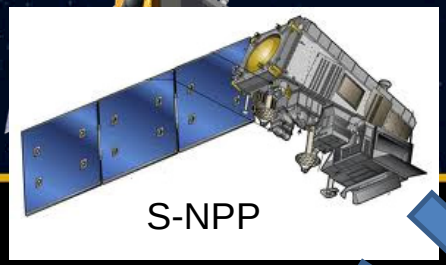
Summary

- Great opportunity of collaboration within the direct readout community
- A global network with internet access of level 2 products as well as applications should be considered via direct readout.
- A Community Direct Readout Applications Library should be considered to foster global environmental monitoring

Innovative Satellite Enhanced Exploration (ISEE)

ISEE is an innovative system that would support real-time identification and notification of environmental conditions observed by S-NPP/JPSS and displayed in web browsers and mobile devices. It would support priority areas for JPSS/PGRR such as fire and smoke, river ice and flooding, precipitation, atmospheric chemistry, and it especially addresses the need for innovative “out-of-the-box” ideas & concepts.

ISEE Synopsis
1st Gen



"I See!"