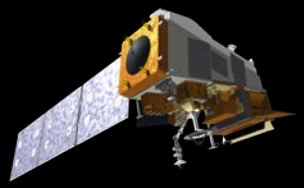
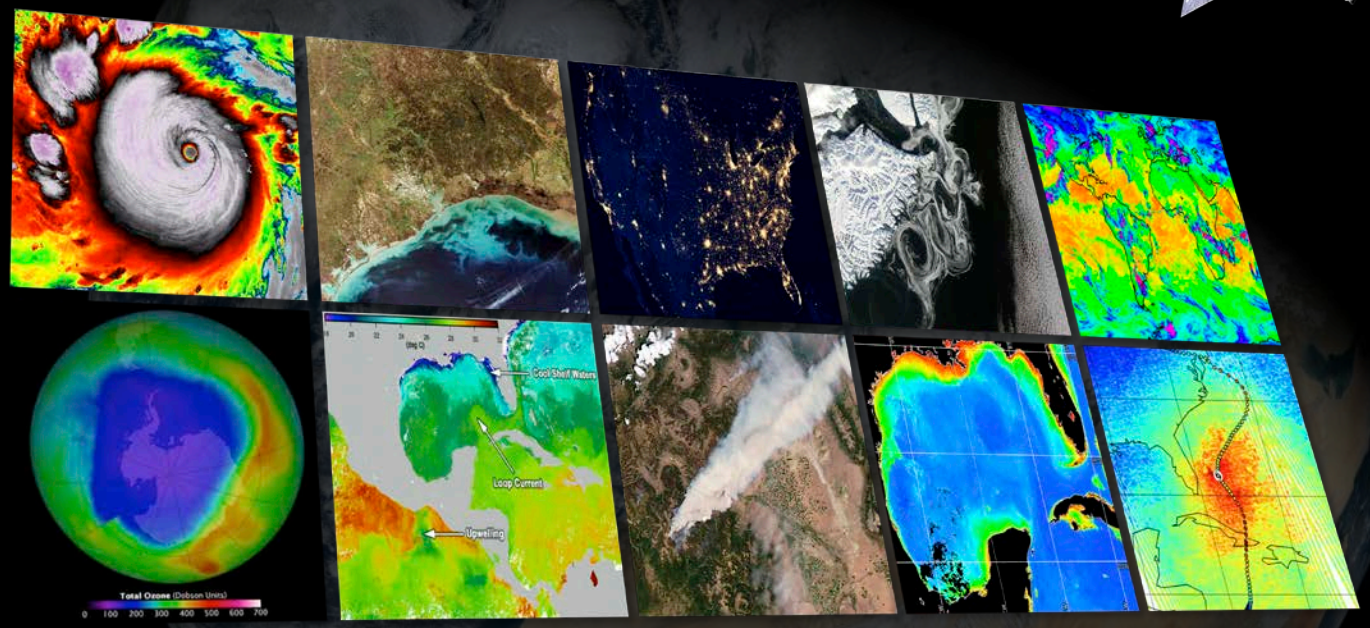
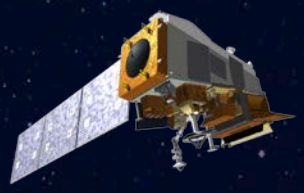
JPSS PROVING GROUND AND APPLICATIONS





Mitch Goldberg, Program Scientist
Joint Polar Satellite System
National Environmental Satellite, Data, and Information Service
National Oceanic and Atmospheric Administration
IGARSS-14
July 15, 2014



What is the Proving Ground & Risk Reduction Program for JPSS?

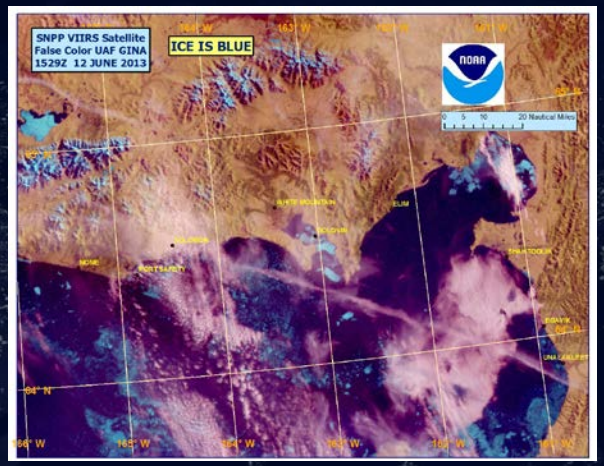
The JPSS Proving Ground and Risk Reduction program's primary objective is to maximize the benefits and performance of NPP/JPSS data, algorithms, and products for downstream operational and research users (gateways to the public) through:

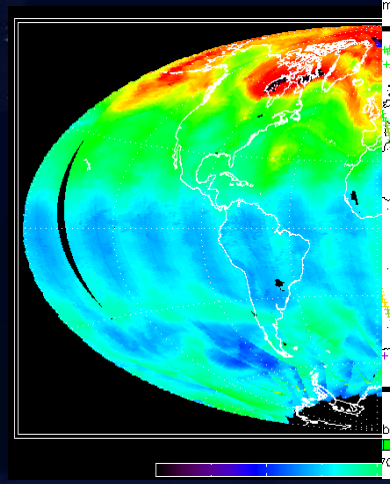
- Engaging users to enhance/improve their applications through the optimal utilization of JPSS data.
- Education, Training and Outreach
- Facilitating transition of improved algorithms to operations.
- Detailed characterization of data attributes such as uncertainty (accuracy and precision) and long-term stability
- Provides user feedback to the cal/val program

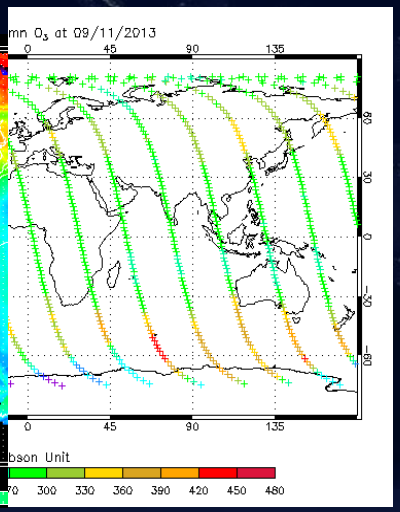
Operational Use of S-NPP Data

S-NPP is now NOAA's Primary Satellite

- May 1, 2012, VIIRS imagery used to support local warning and forecast operations throughout the NWS Alaska Region.
- May 22, 2012, the Advanced Technology Microwave Sounder (ATMS) radiances were operationally assimilated in the National Centers for Environmental Prediction's (NCEP)/ NWS Global Forecast System (GFS).
- September 25, 2012, ATMS data was assimilated operationally into the European Centre for Medium-Range Weather Forecasts (ECMWF) weather forecast models.
- April 2013, the United Kingdom Meteorology Office began assimilating operational data from the Cross-track Imaging Radiometer Suite (CrIS) and ATMS into its weather forecast models.
- August 20, 2013, NCEP began incorporating S-NPP CrIS satellite data operationally into the GFS.
- October 31, 2013, NCEP/CPC started to use OMPS Ozone operationally
- November, 2013, NRL started to use ATMS operationally in their global forecast model.



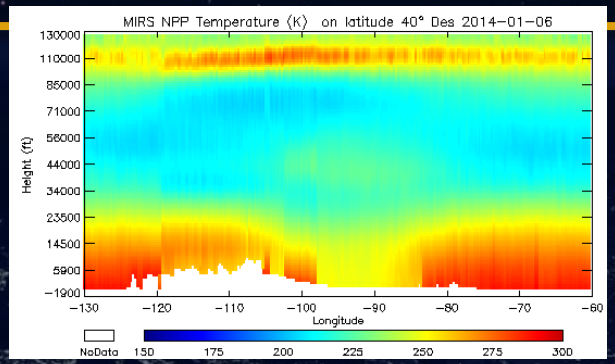




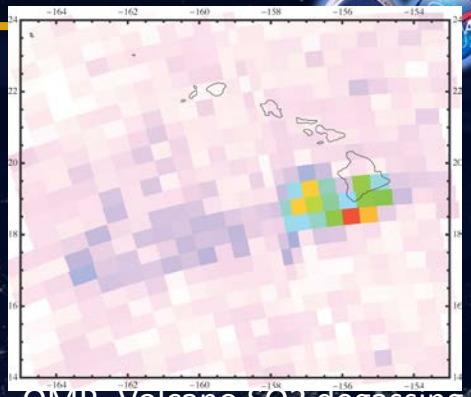
JPSS provides a wide range of capabilities

- 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,

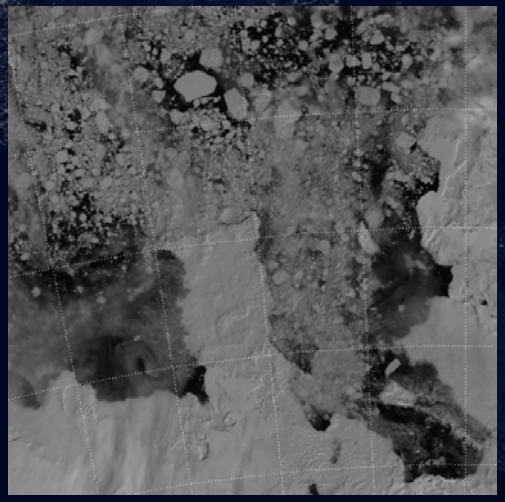
  oil spills… at exceptional resolution/global coverage
- UV - ozone - Aerosols over bright surfaces, SO2 plumes, NOx (air quality)…

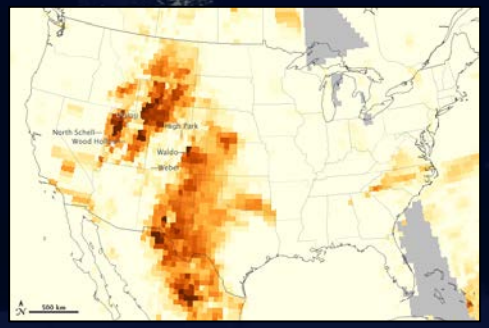


Temperature X-Section Polar Vortex


OMP- Volcano SO2 degassing

Algae in Lake Erie


DNB Ice detection


OMPS Aerosols from Fires

Proving Ground Includes Risk Reduction

- Proving Ground
  - Demonstration and utilization of data products by the end-user operational unit, such as a NWS Weather Forecast Office , Modeling Center and National Ocean Service….
  - Promote outreach and coordination of new products with the end users, incorporating their feedback for product improvements
- Risk Reduction
  - Development of new research and applications to maximize the benefits of JPSS satellite data
    - Example - use of Day Night Band for improved fog and low visibility products at night, benefiting transportation industry.
  - Encourages fusion of data/information from multiple satellite, models and in-situ data
  - Address potential risk in algorithms and data products by testing alternative algorithms.

JPSS Proving Ground and Risk Reduction Application Areas

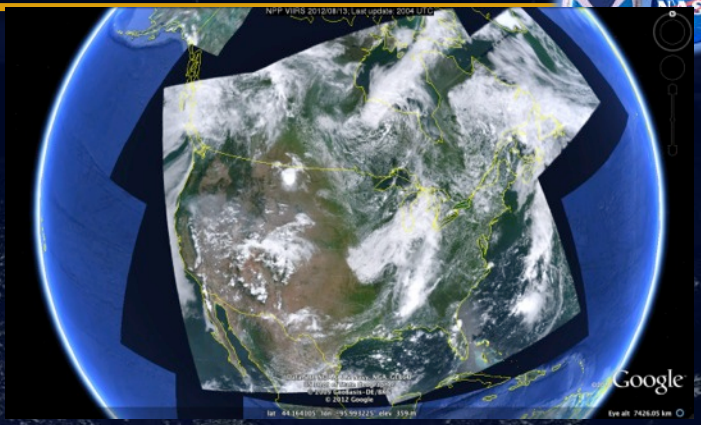
- *Weather Forecasting* - Improving Global, Regional forecasts
  - Tropical Cyclones
  - Severe Weather (Nowcasting)
- *Ocean/Coastal* - Coral Bleaching, Harmful Algal Bloom alerts
- *Land* - Droughts, Agriculture
- *Hazards* - Smoke, Fire, Volcanic Ash, Air Quality
- *Hydrological* - Precipitation, Floods, Soil Moisture, Snow/Ice, River Ice
- *Climate* - Integrated products, real-time anomaly products
- *Education and Training*
- *Infrastructure* - Direct Readout + Software (CSPP), Airborne campaigns

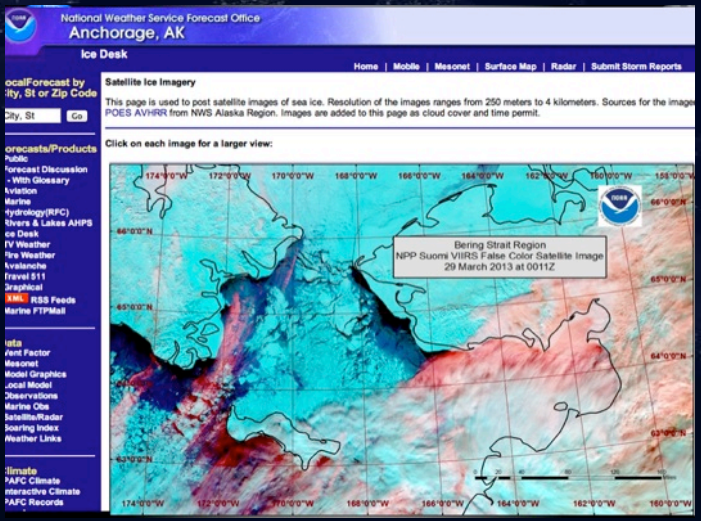
JPSS Proving Ground Partners :

NWS, NOS, NMFS, OAR, NESDIS, NOAA Cooperative Institutes, NASA, and NRL

Some major PGRR Achievements

- S-NPP Direct Broadcast for Alaska, Hawaii, Continental US, and World Wide Users
- Routine use of VIIRS Imagery by forecast offices (significant use by Alaska)
- VIIRS Active Fire, Air Quality, and Ocean Color imagery and data portals
- Tropical Cyclone Forecasting Improvements using ATMS and CrIS
- Global Data Assimilation Experiments of ATMS and CriS (ATMS and CrIS are used operationally)
- Education and Training (New COMET VIIRS Day Night Module)
- First Airborne Validation Campaign via NASA ER2





The JPSS PGRR Portfolio

Joint Polar Satellite System (JPSS) Proving Ground and Risk Reduction Projects Portfolio

Supporting the NOAA Mission through Applications and Research

Edited by:
Mitch Goldberg, Julie Price, Bill Sjoberg, John Furgerson, Ingrid Guch, Ralph Ferraro and Kathryn Shontz

The contents of this portfolio were current as of March 2014. The status of the projects described herein are subject to change at any time. An updated version of this portfolio is expected to be published at a later date.
JPSS PG Portfolio FY 2013 ver1
Date revised 3/05/2014

Ocean and Coastal Applications **46**

Application of SNPP and JPSS for High-Resolution SST and Coral Bleaching Products for Resource Management 47

Global VIIRS Ocean Color Operational User Expansion, User Specified Independent Quality Assessment, Product Development/Support, and Next Generation Distribution Portal Deployment 49

Development of Neural Network (NN) Algorithms for Retrieval of Chlorophyll-A in the Chesapeake Bay and Other Coastal Waters Based on JPSS-VIIRS Bands 51

Assimilation of VIIRS SSTs and Radiances into Level 4 Analyses 53

Comparison of 4DVAR and LETKF in Assimilating JPSS-derived Sea-surface Temperature in the Chesapeake Bay Operational Forecasting System 56

Climate Applications **58**

Development, Generation, and Demonstration of New JPSS Ice Products in Support of a National Ice Center JPSS Proving Ground and Risk Reduction Activity 59

Infusing JPSS PMW Retrievals to CMORPH Precipitation Estimates for Improved Weather, Climate, and Water Applications 61

Special Applications **63**

'Seeing the Light': Exploiting VIIRS Day/Night Band Low Light Visible Measurements in the Arctic. 64

Estimating flared gas volumes and CO_2 emissions with VIIRS data 66

Advancing Nighttime VIIRS Cloud Products with the Day/Night Band 68

End User Applications **71**

Facilitating end-user access to VIIRS data 72

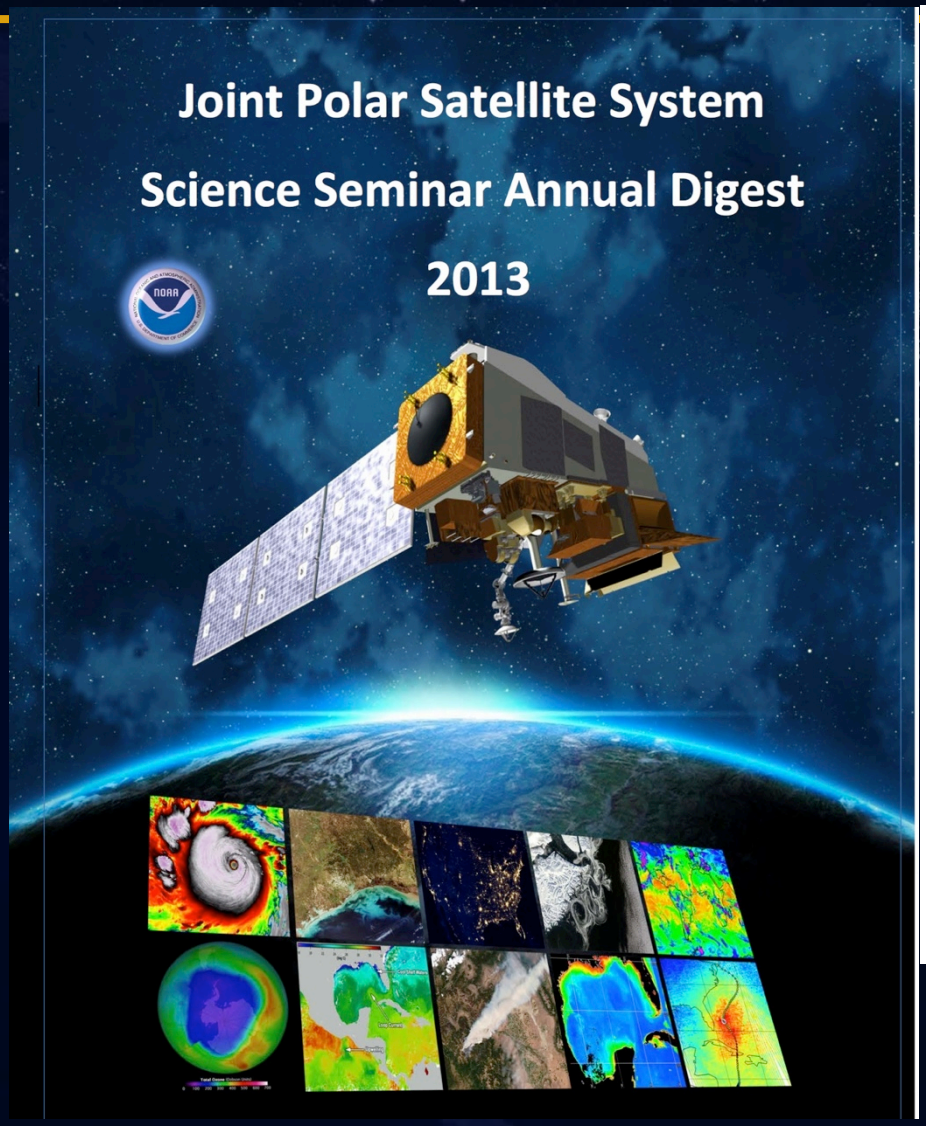
Using the Next Generation Satellite (NexSat) Webpage to Demonstrate and Apply SNPP Sensor Products During the SNPP/JPSS Missions 74

The Development of a Community Satellite Processing Package (CSPP) in support of NPP/JPSS Real Time Regional (RTR) Applications 76

High Latitude Proving Ground – SNPP/JPSS Data in Support of Operational Forecasters 79

Uniform Multi-Sensor Algorithms for Consistent Products 81

Monthly Science Seminars to discuss PGRR topic areas



Contents

From the Senior Program Scientist .....

From the Director .....

Section 1: The JPSS Fire Weather Proving Ground: Improving Decision Support Tools for Detection, Monitoring, Predicting and Mitigating Fire Events 1

Section 2: Using the Community Satellite Processing Package to Transform Raw Satellite Observations into Data Products and Images within Minutes 8

Section 3: Using SNPP Data to Support Alaska Missions 15

Section 4: NASA/Short-term Prediction Research and Transition (SPoRT) Activities for the JPSS Proving Ground 22

Section 5: Using Suomi NPP Sounder Observations to Improve Hurricane Structure Monitoring and Intensity Forecasts 29

Section 6: Introducing New Polar-orbiting Data into Operations at NOAA's National Centers for Environmental Prediction (NCEP) 37

Section 7: Applications of Suomi NPP data in the Joint Center for Satellite Data Assimilation (JCSDA) Operations to Research/Research to Operations (O2R/R2O) capabilities 43

Section 8: NOAA CoastWatch User Engagement, Quality Assessment, Product Development, Data Distribution Portal, and Chesapeake Bay Ecosystem Modeling 52

Section 9: JPSS Proving Ground Hyperspectral Sounder Applications: Enhancing Real-Time Applications and Decision Making 61

Section 10: Suomi NPP VIIRS Day/Night Band: A New Dawn to Nocturnal Remote Sensing 68

Section 11: The JPSS Proving Grounds: Advancing the Visible Infrared Imaging Radiometer Suite (VIIRS) Nightfire and Nighttime Lights 79

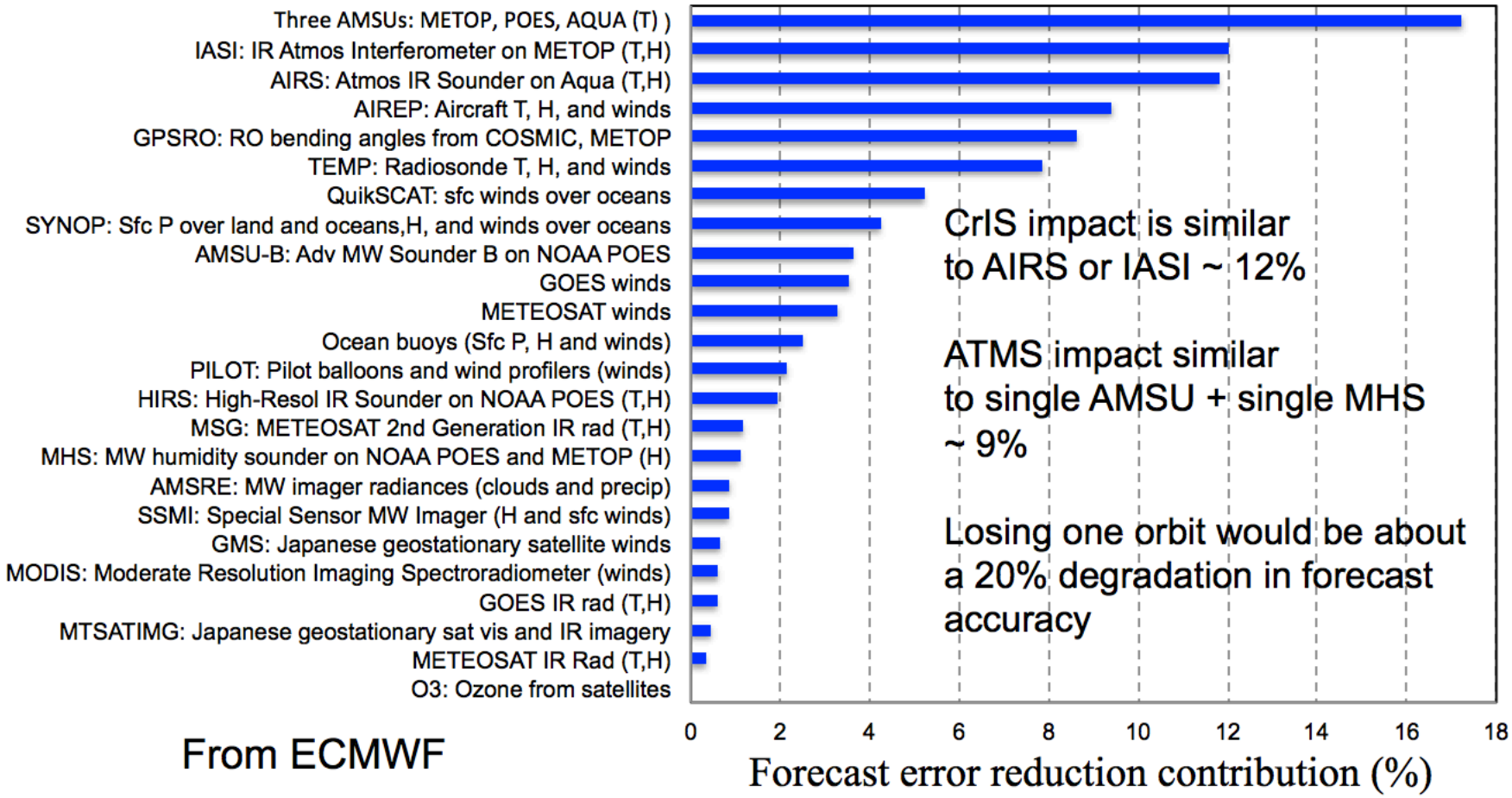
Section 12: An Eye in the Sky for the Boots on the Ground 86

Section 13: VIIRS -- Making the Difference for the NOAA Ocean Mission 93

www.noaa.jpss.gov

CrIS and ATMS provides continuity of essential atmospheric sounding information for weather forecasting

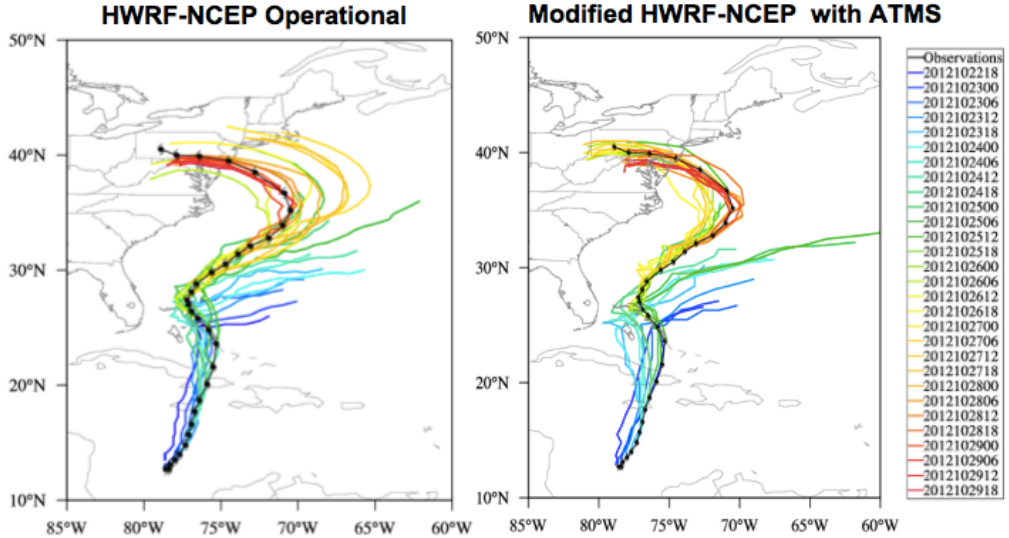
Hyperspectral Infrared Sounders (.e.g. CrIS) and Advanced Microwave Sounders (e.g. ATMS) are the top two contributors for reducing forecast errors

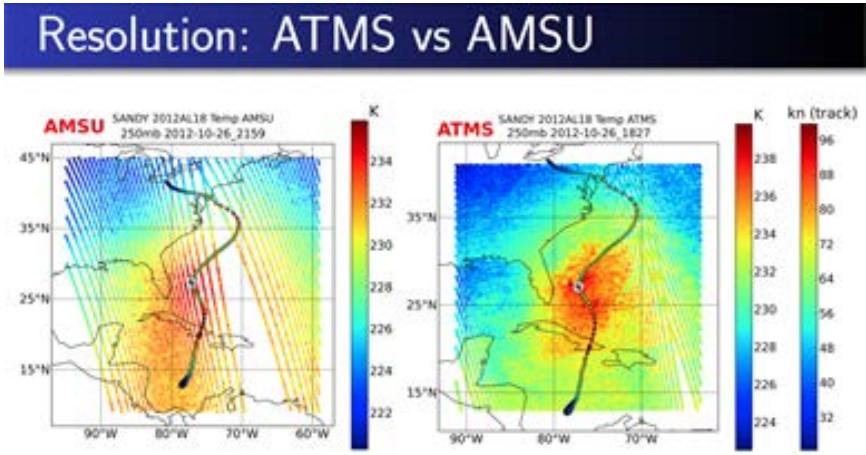


From ECMWF

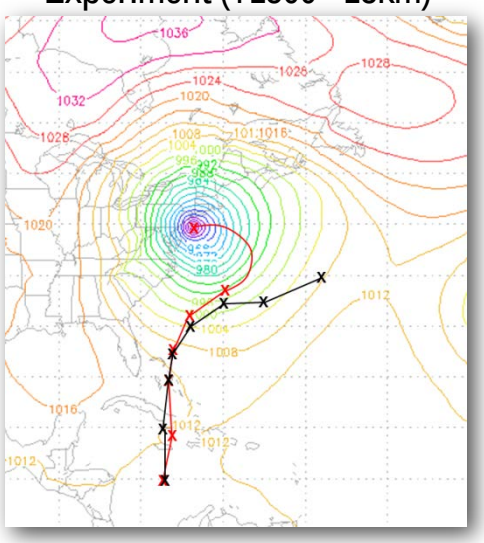
Sandy Simulation Experiments

Experimental results showing improvements in Sandy track forecasts from Hurricane Weather Research Forecast model with ATMS

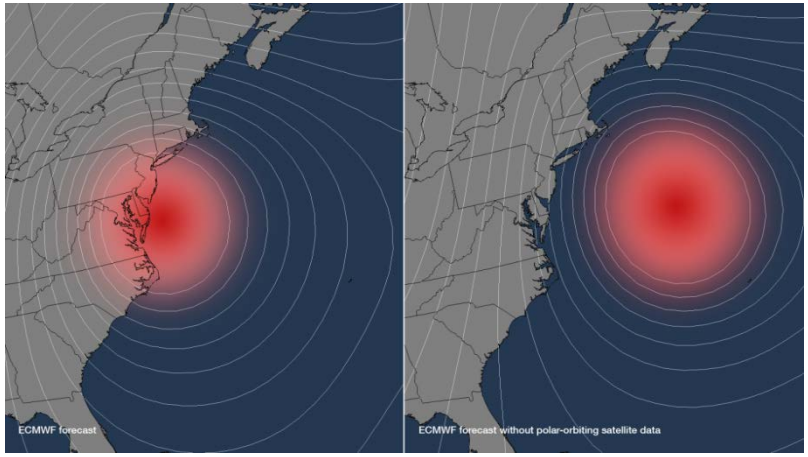




Experiment (T1500~ 13km)

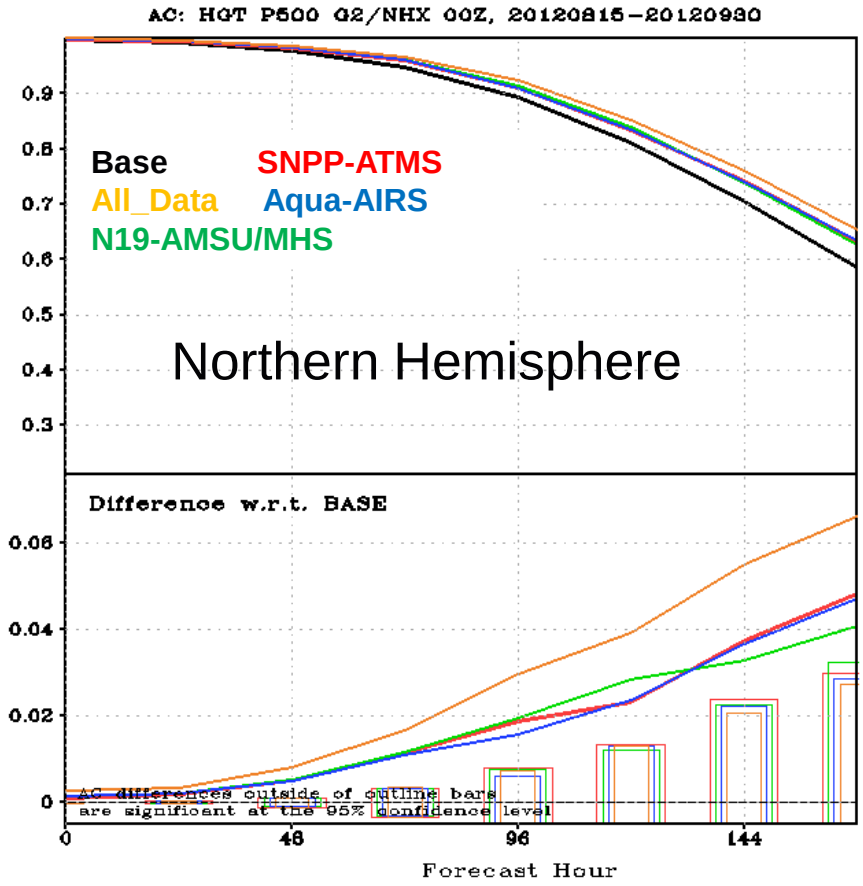


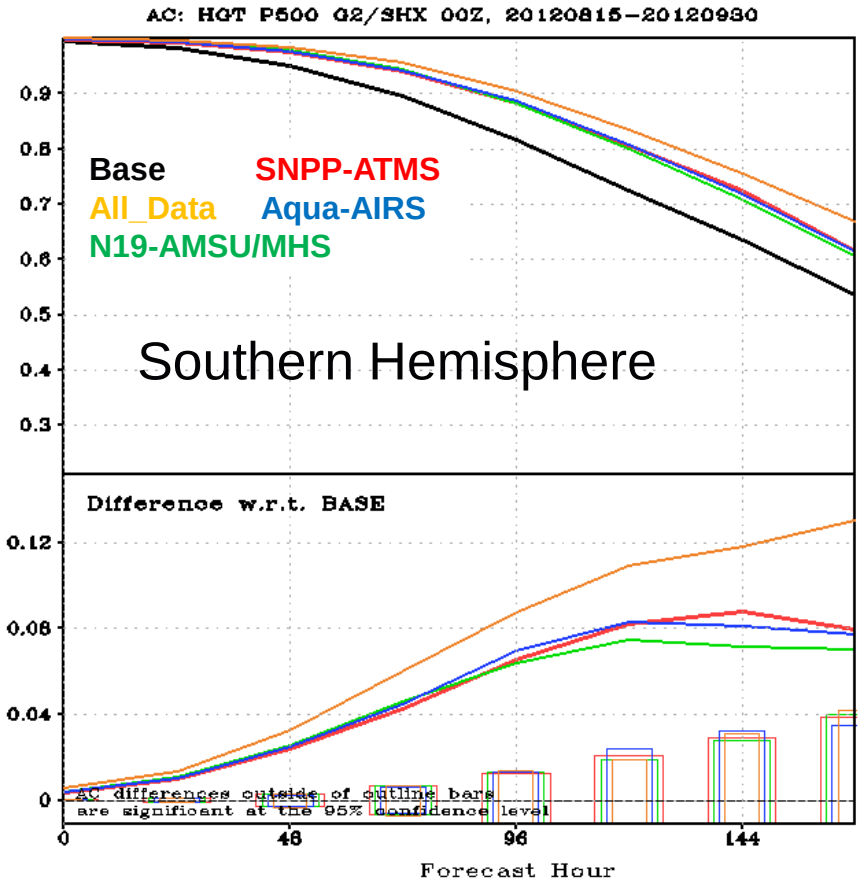
Experiment: Is the 7 day forecast of Sandy improved by increasing model resolution from 27 km (black) to 13 km (red)?
Hypothesis: Increased horizontal resolution resolves complicated Atlantic blocking pattern, slows simulated hurricane, and allows it to curve toward the East Coast.



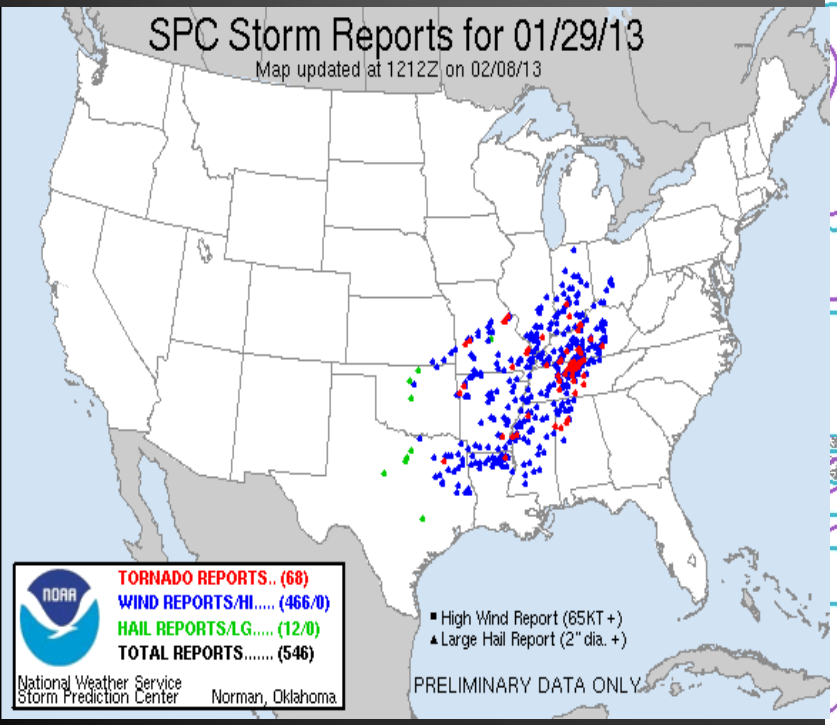
ECMWF with and without polar-orbiting satellite data

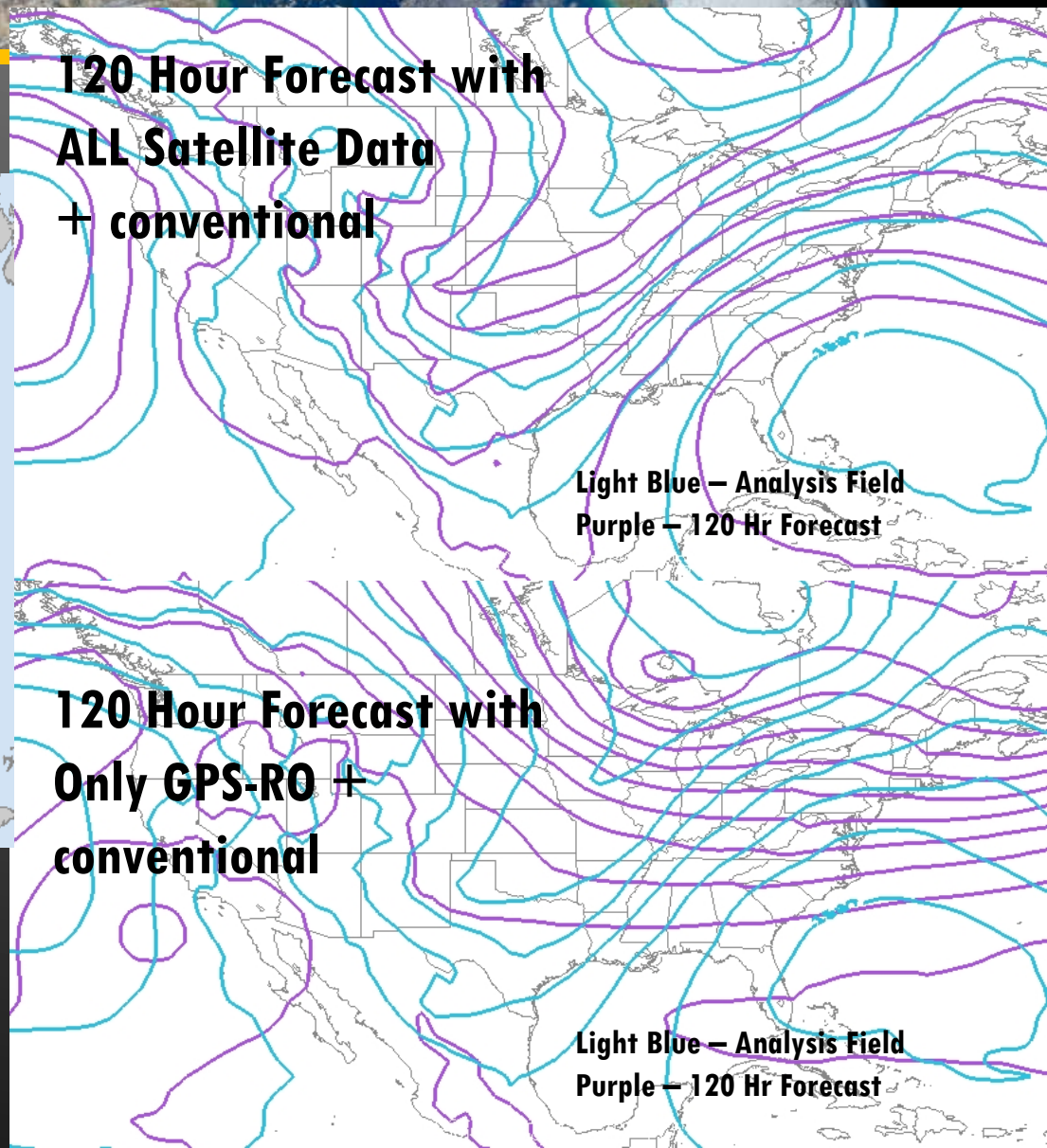
Single Sensor Impacts
500 hPa AC scores for
00Z 20120815-20120930 (Jim Jung)



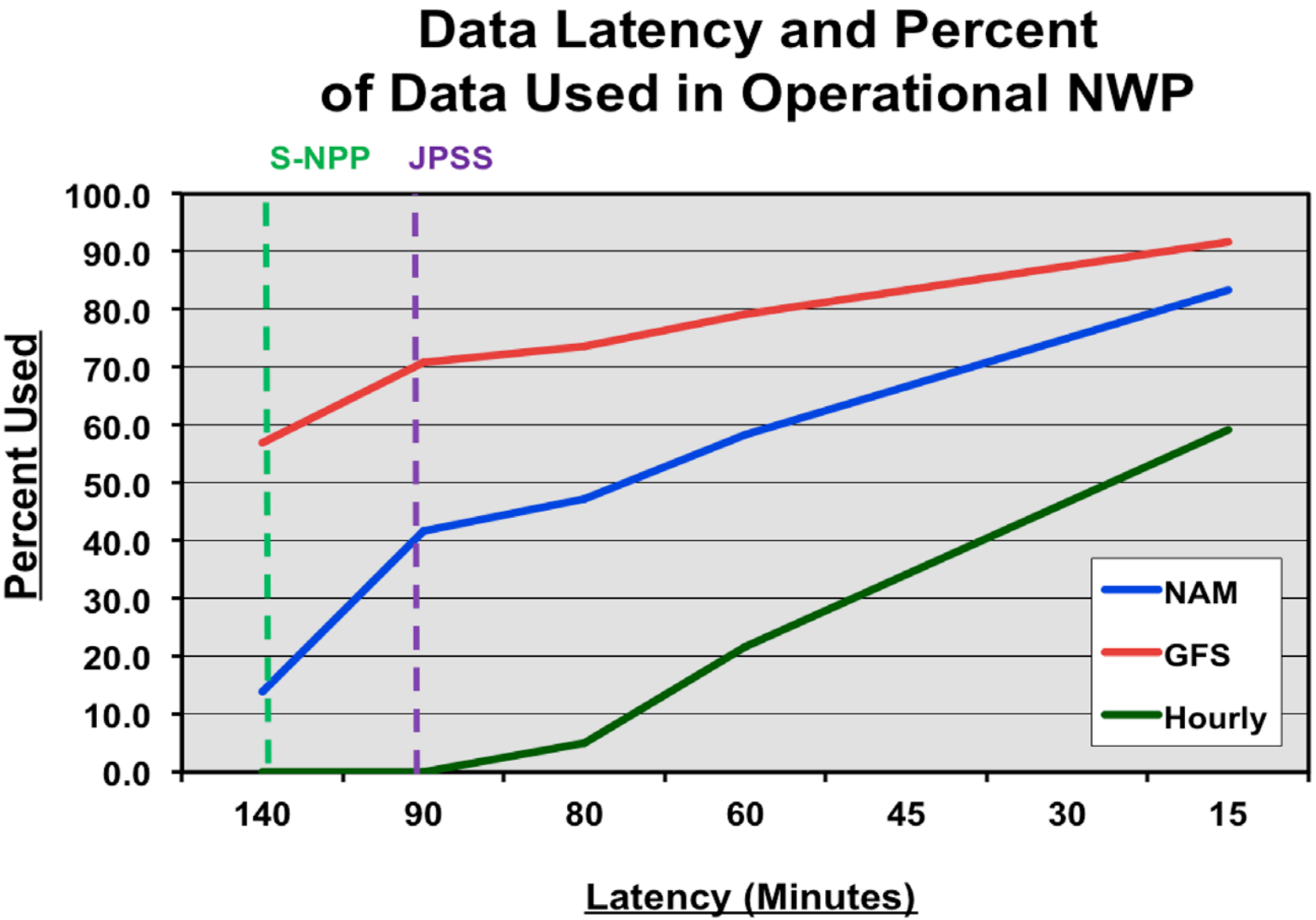


Analysis Field vs 120 Hr GFS Forecast 850 hPa
29 January 2013





Direct Readout Network Demonstration



II,
AK,
CA,
I,
MD,

PR

S

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 Science 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 ...
- 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 ...

Coming Soon:

- VIIRS, ATMS and CrIS calibration and geolocation software (Raw Data Records (RDRs) to Science Data Records (SDRs)) Mx8 update.

What's New

- CLAVRx VIIRS, MODIS and AVHRR Cloud Retrieval Package v1.0
- CrIS, AIRS and IASI Hyperspectral Sounder Retrieval Package v1.3
- VIIRS Imagery EDR Software v1.1
- MIRS Microwave Retrieval Software v1.0
- S-NPP HYDRA2 Data Analysis Tool v1.0

LocalForecast by City, St or Zip Code
City, St Go

Forecasts/Products
Public
Forecast Discussion
- With Glossary
Aviation
Marine
Hydrology(RFC)
Rivers & Lakes AHPS
Ice Desk
TV Weather
Fire Weather
Avalanche
Travel 511
Graphical
XML RSS Feeds
Marine FTPMail

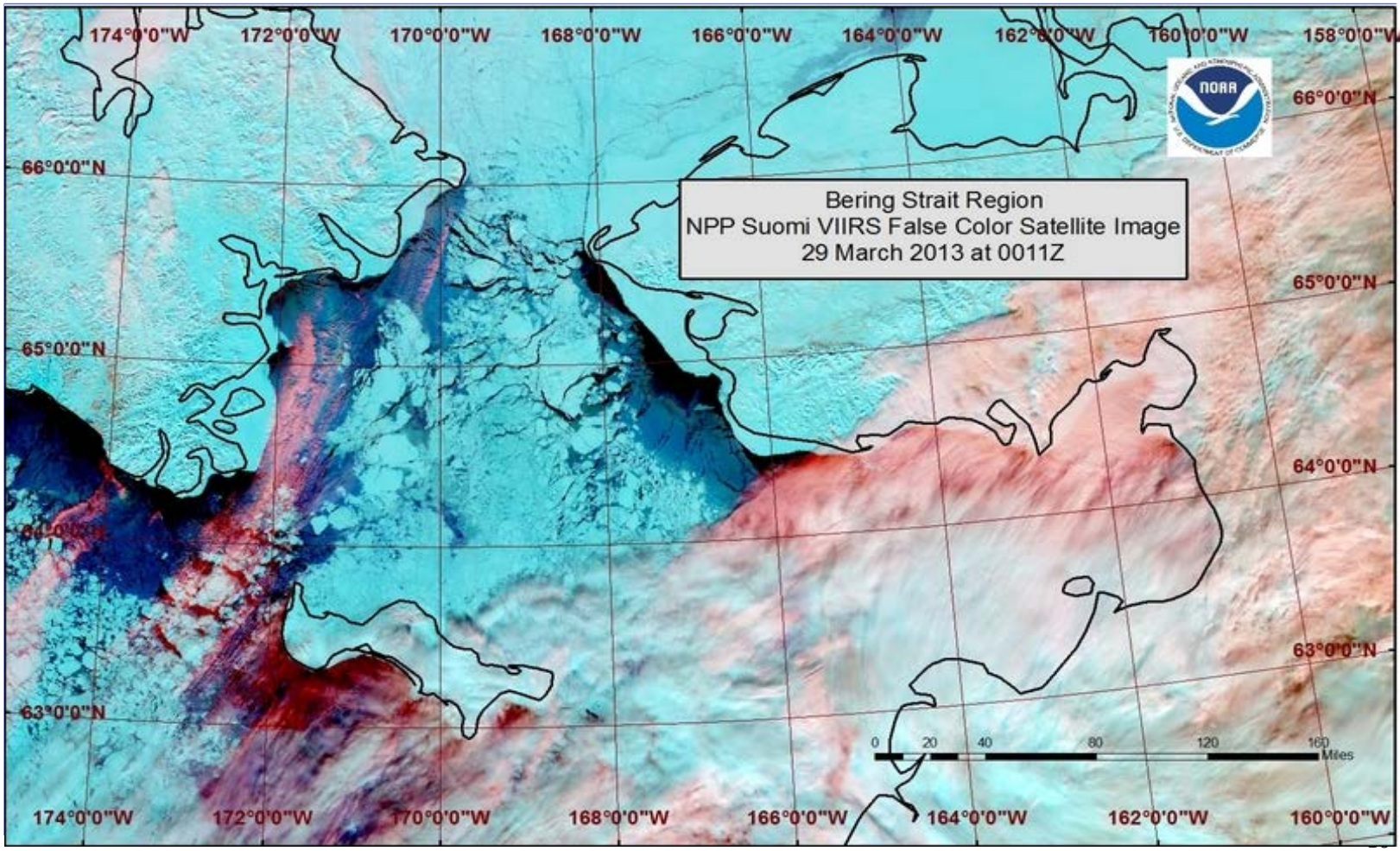
Data
Vent Factor
Mesonet
Model Graphics
Local Model
Observations
Marine Obs
Satellite/Radar
Soaring Index
Weather Links

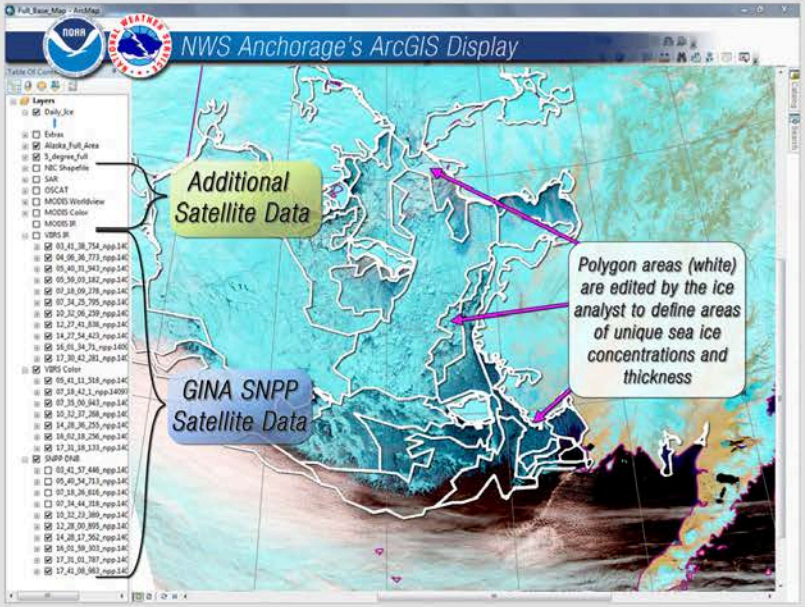
Climate
PAFC Climate
Interactive Climate
PAFC Records

Satellite Ice Imagery

This page is used to post satellite images of sea ice. Resolution of the images ranges from 250 meters to 4 kilometers. Sources for the imager
POES AVHRR from NWS Alaska Region. Images are added to this page as cloud cover and time permit.

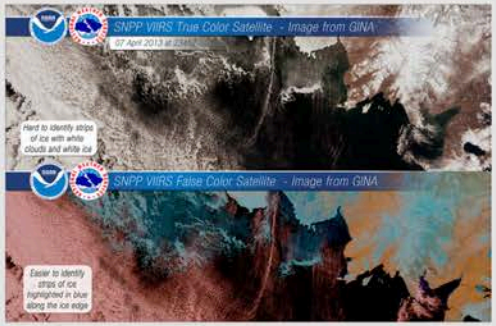
Click on each image for a larger view:





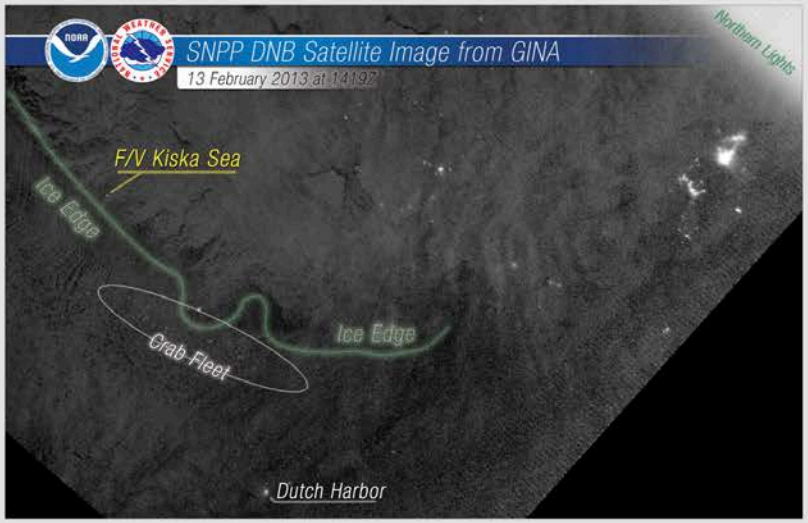
http://pafc.arh.noaa.gov/ice.php

The NWS Sea Ice Program in Anchorage, AK utilizes ArcGIS 10.2 to bring in data from numerous sources including GINA. After data is ingested into the program the sea ice analyst turns on recent satellite images to discern areas of unique sea ice thickness and concentration. These areas are then outlined in polygon shapes and the attributes of each shape are determined to label the areas ice characteristics. Once the analysis has been completed the ice analyst creates analysis image graphics and ArcGIS shapefiles that are posted to the webpage every Monday, Wednesday, and Friday.



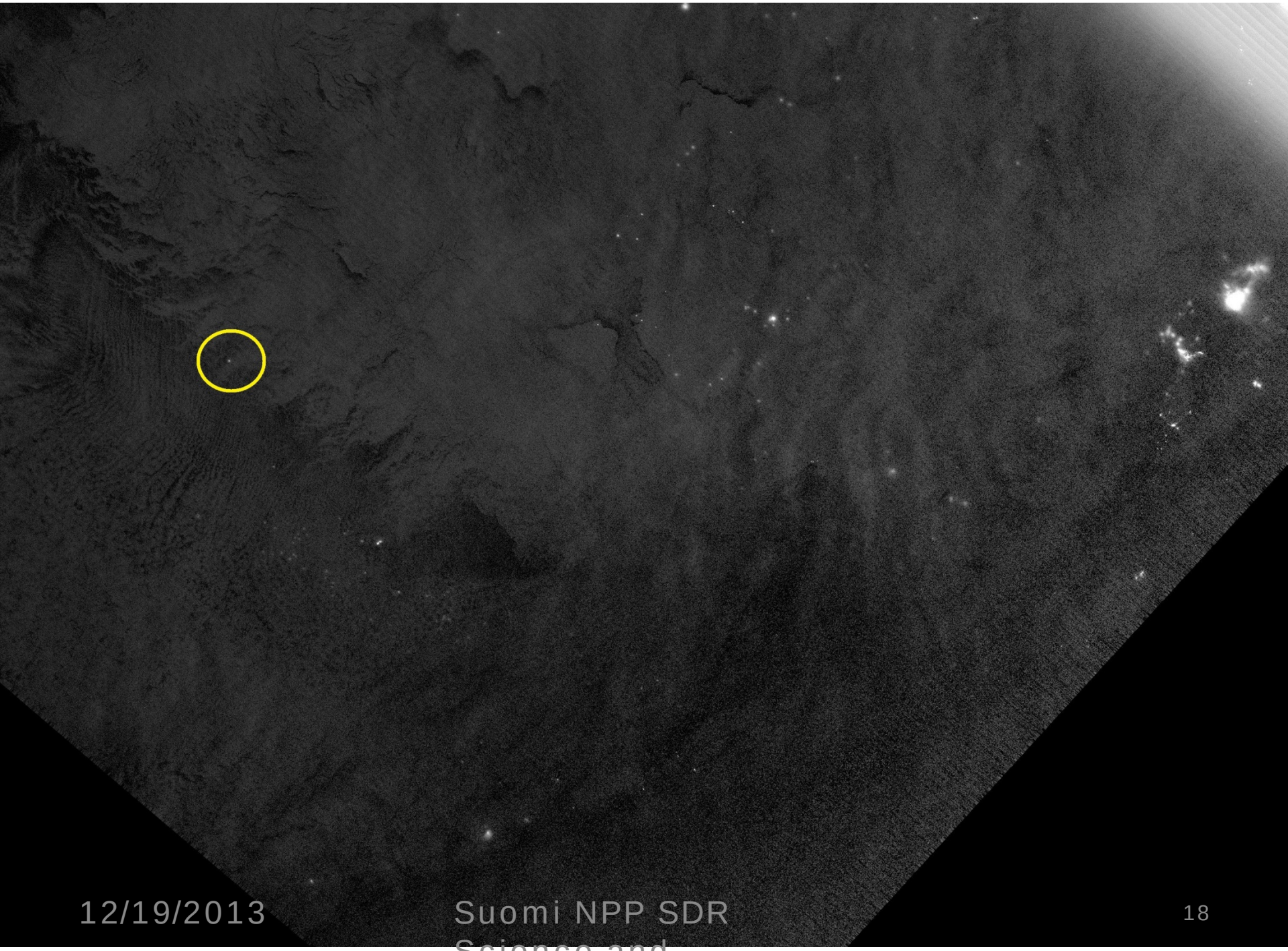
(far left) NWS sea ice charts and forecast are created in ArcGIS using satellite imagery from GINA Puffin Feeder and other sources.

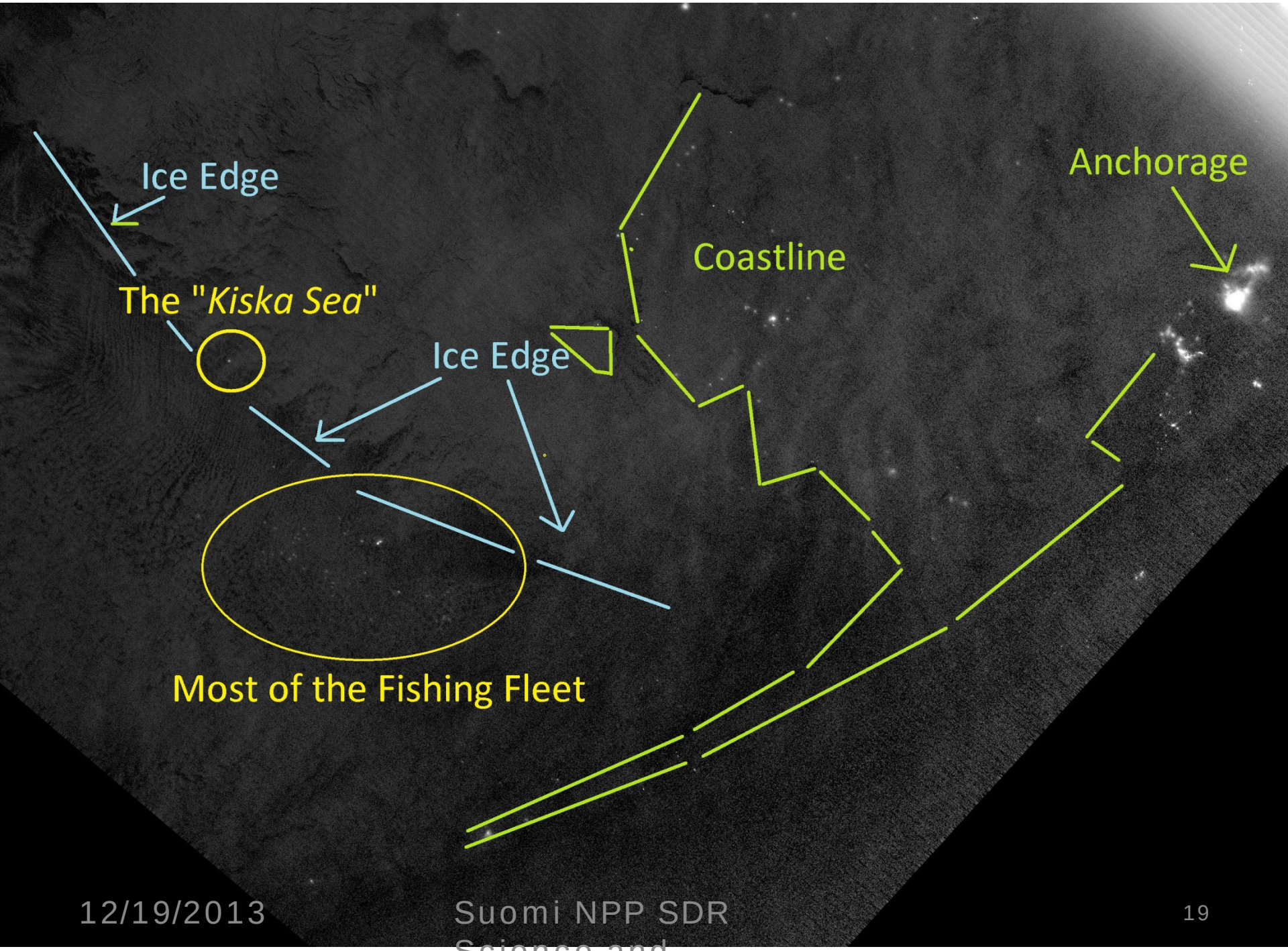
Crabbing Vessel Calls on the NWS Sea Ice Program for Navigation Help



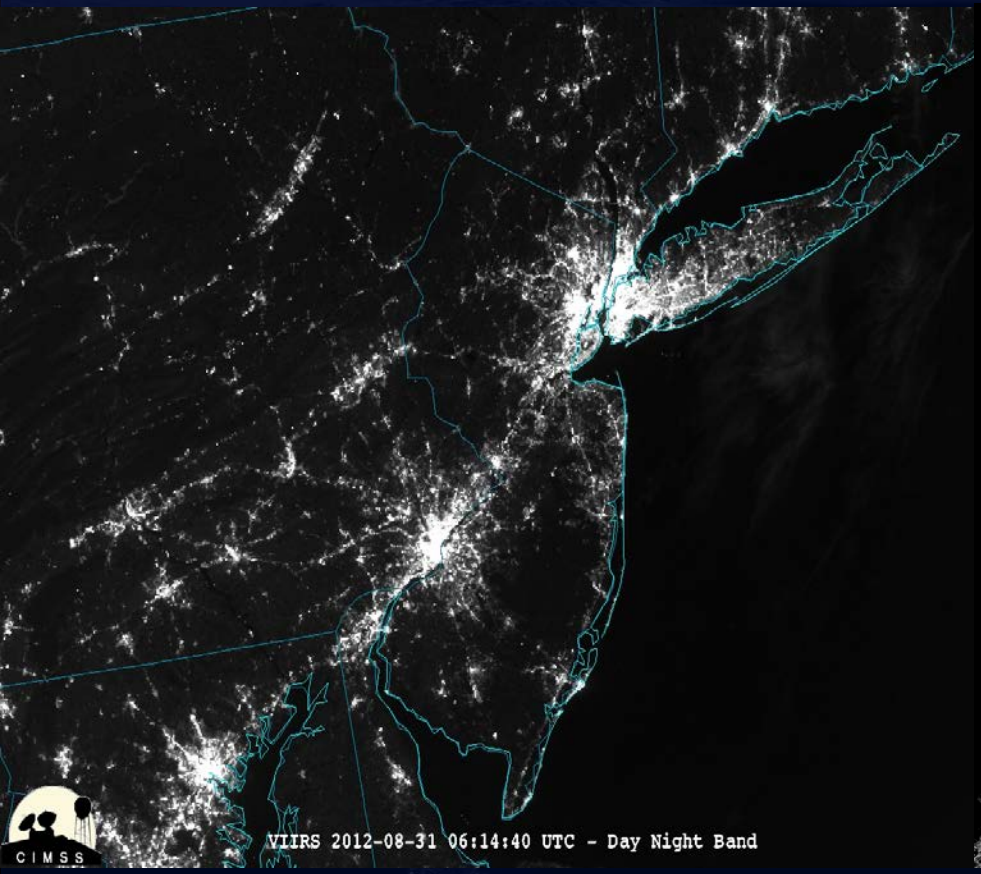
The northern most vessel in the Bering Sea Crab fleet, the Kiska Sea, contacted the NWS Sea Ice Program on February 10, 2013 asking if their crab pots were in danger of being overrun by sea ice. Calls between the Kiska Sea and the Sea Ice Program over the next three days continued the exchange of ice information, assisting the captain in finding his lost gear through the increasing ice field. On February 13 the vessel was surrounded by sea ice, some in excess of three feet thick. DNB images from the previous night clearly showed the lights from Kiska Sea and the ice pack around the vessel. NWS Sea Ice personnel were able to assist the captain to plot a track out of the ice pack, avoiding areas of thicker and higher concentrations sea ice. The timeliness of the DNB images provided an essential tool for this vessel assist.

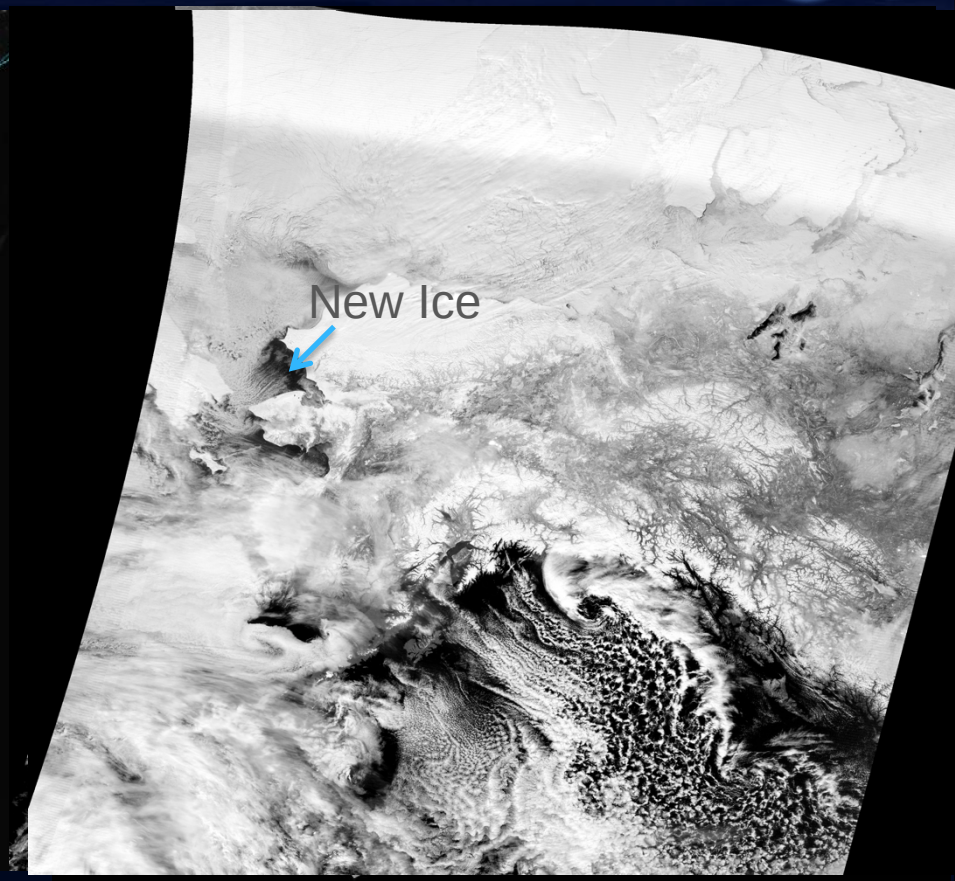
(left) Experts at the NWS Sea Ice Program were able to use GINA satellite imagery to help a lost crab boat get out of sea ice.




Ice Edge
The "*Kiska Sea*"
Ice Edge
Coastline
Anchorage
Most of the Fishing Fleet

Day Night Band offers new applications

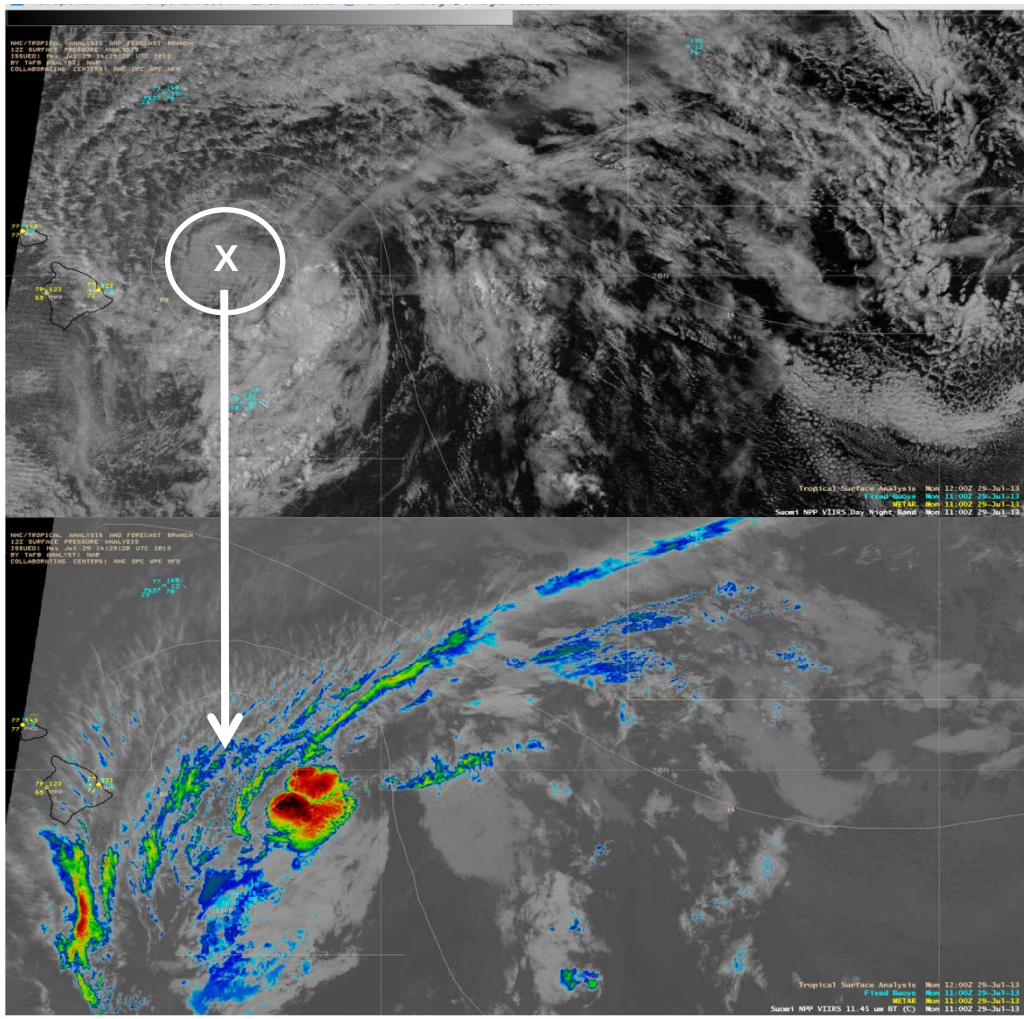




Tropical Storm Flossie: July 29. 2013

Center is further north than expected

VIIRS is valuable in areas where geostationary is primary



11.45 µm IR

Day Night Band

Central Pacific Hurricane Center Forecast Discussion

WTPA41 PHFO 291511 TCDCP1

TROPICAL STORM FLOSSIE DISCUSSION NUMBER 19

NWS CENTRAL PACIFIC HURRICANE CENTER HONOLULU HI EP062013

500 AM HST MON JUL 29 2013

THE CENTER OF FLOSSIE WAS HIDDEN BY HIGH CLOUDS MOST OF THE NIGHT BEFORE VIRS NIGHTTIME VISUAL SATELLITE IMAGERY REVEALED AN EXPOSED LOW LEVEL CIRCULATION CENTER FARTHER NORTH THAN EXPECTED. WE RE-BESTED THE 0600 UTC POSITION BASED ON THE VISIBLE DATA. SUBJECTIVE DVORAK ANALYSES CONTINUED SHOW CURRENT INTENSITIES OF 3.0 BUT SATELLITE LOOPS SUGGEST A RAPID WEAKENING TREND WITH THE LOW LEVEL CENTER PULLING AWAY FROM A SMALL AREA OF CONVECTION SOUTHEAST OF THE CENTER. IT IS LIKELY THAT CONTINUED NORTHWEST SHEAR WILL MAINTAIN THIS WEAKENING TREND.

THE TRACK HAS BEEN SHIFTED NORTH TO REFLECT THE RE-LOCATED CENTER. THE TRACK GUIDANCE SHIFTED FOLLOWING THE TRACK CHANGE AND WAS CONSISTENT WITH A NEW TRACK FARTHER TO THE NORTH. THE TRACK NOW SHOWS FLOSSIE PASSING OVER MAUI TODAY...OVER OAHU TONIGHT...THEN PASSING SOUTH OF KAUAI EARLY TUESDAY MORNING. WE EXPECT FLOSSIE TO WEAKEN STEADILY AS IT TRACKS WEST NORTHWEST AND DISSPATE WITHIN 96 HOURS.

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)
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)

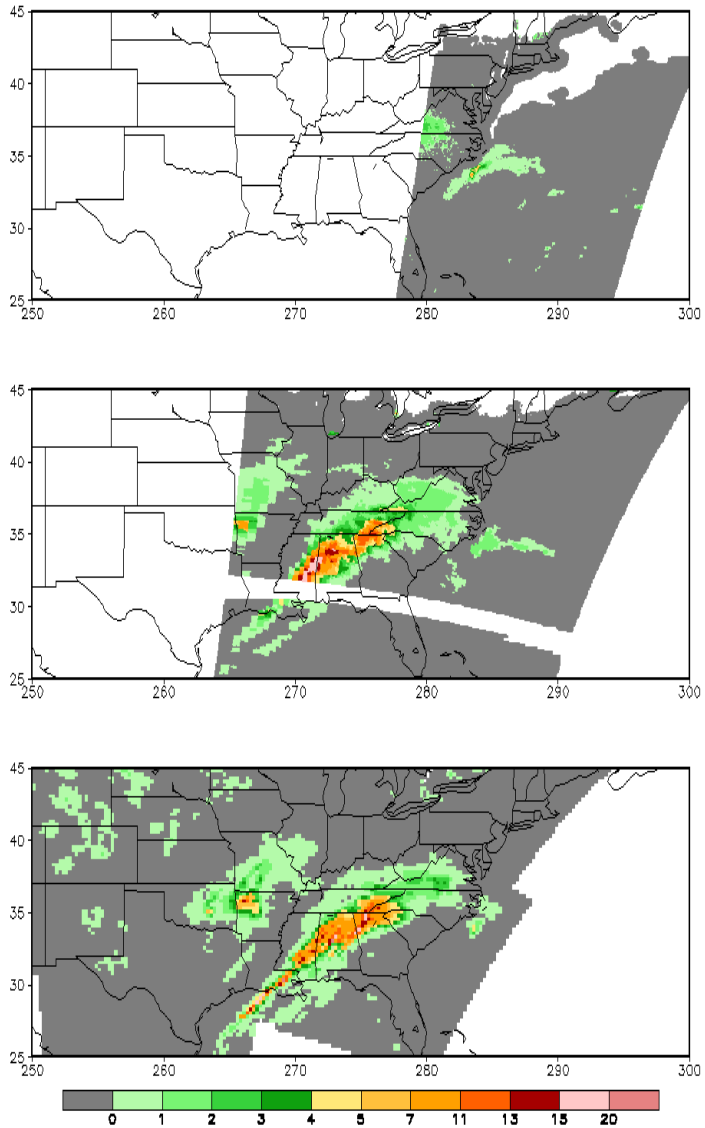
CLOUD LIQUID WATER
PRECIPITATION RATE
PRECIPITABLE WATER
LAND SURFACE EMISSIVITY
ICE WATER PATH
LAND SURFACE TEMPERATURE
SEA ICE CONCENTRATION
SNOW COVER
SNOW WATER EQUIVALENT
ATM TEMPERATURE PROFILE
ATM MOISTURE PROFILE

GCOM AMSR-2 (11)

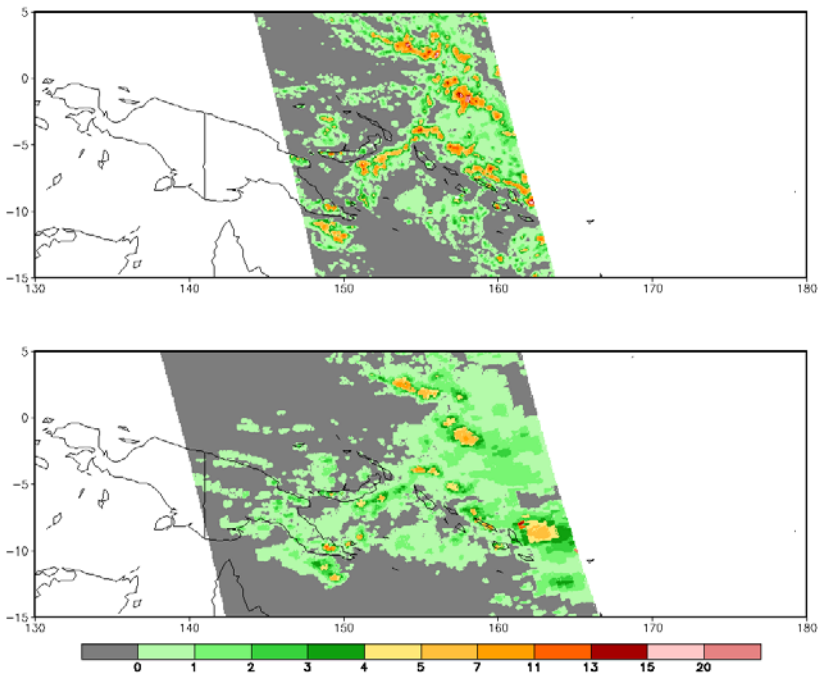
CLOUD LIQUID WATER
PRECIPITATION TYPE/RATE
PRECIPITABLE WATER
SEA SURFACE WINDS SPEED
SOIL MOISTURE
SNOW WATER EQUIVALENT
IMAGERY
SEA ICE CHARACTERIZATION
SNOW COVER/DEPTH
SEA SURFACE TEMPERATURE
SURFACE TYPE

Blue - currently available in CSPP

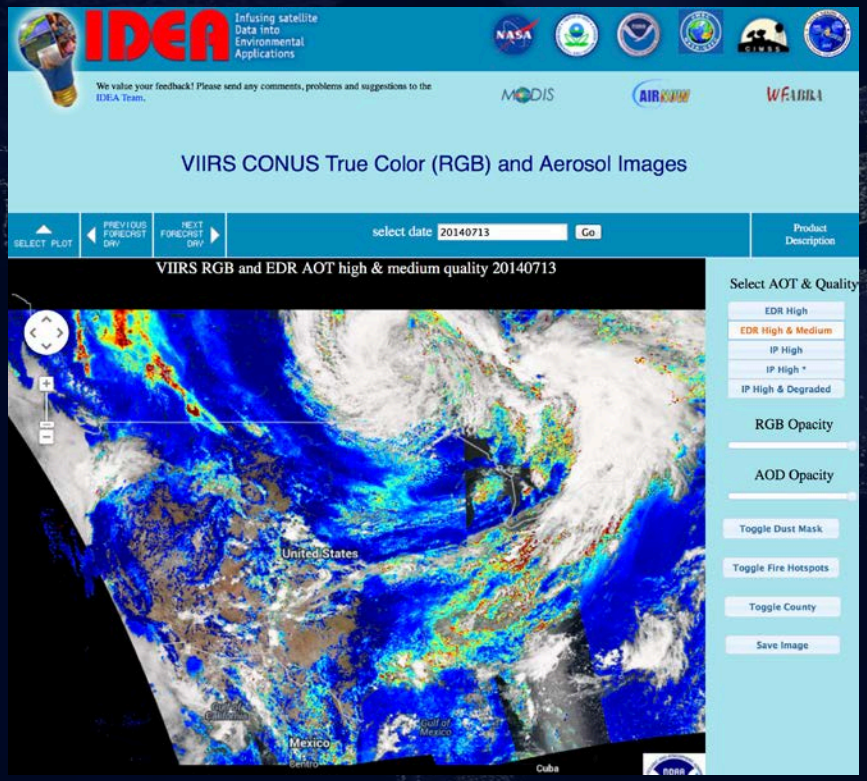
Comparisons between AMSR2 And ATMS precipitation

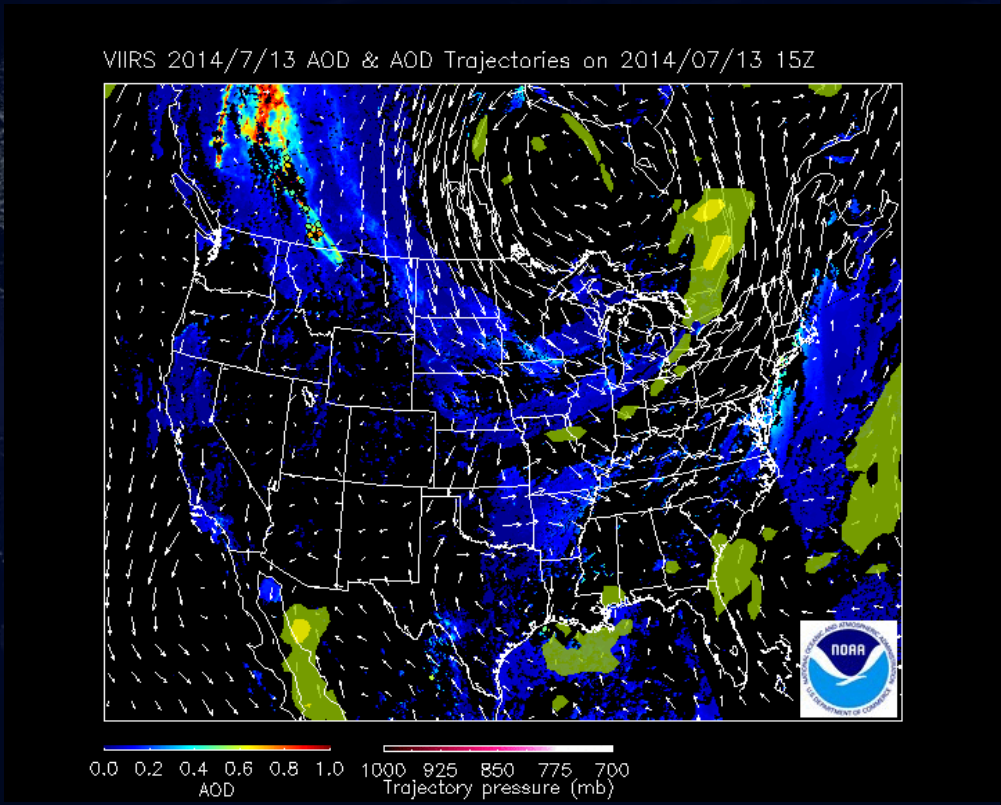


GCOM-W1 AMSR-2 (top), S-NPP ATMS (middle), Stage IV (bottom) [mm/hr]
06:30-07:00 UTC 7 April 2014



PGRR Air Quality Portal

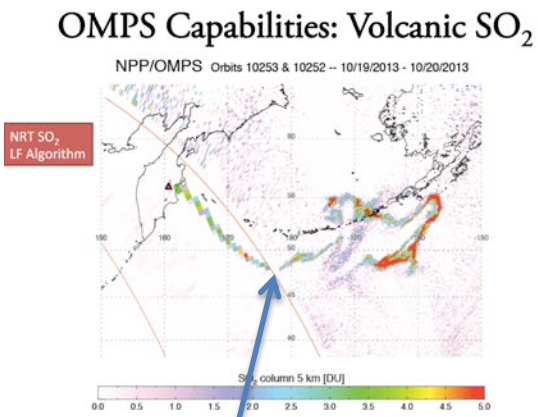


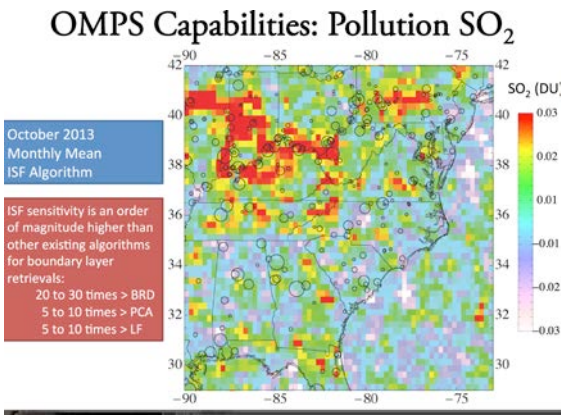


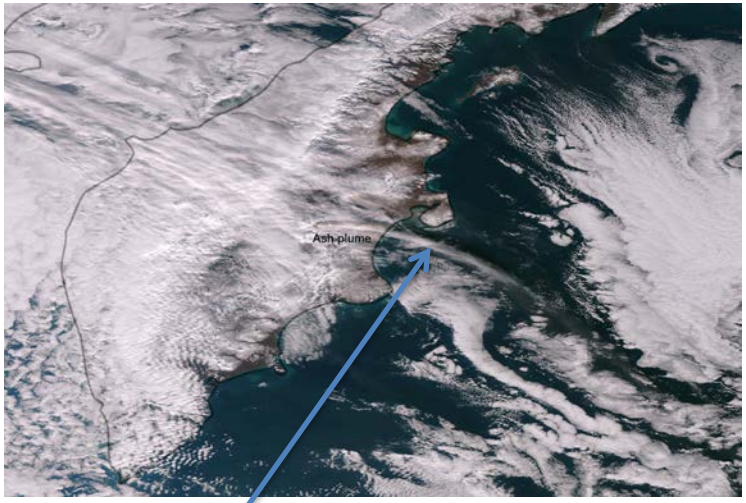
http://www.star.nesdis.noaa.gov/smcd/spb/aq/

OMPS improved spatial resolution for better monitoring of aerosols and SO2.

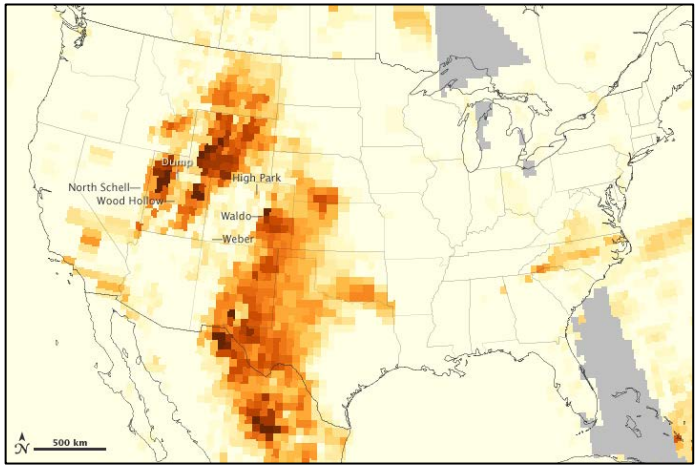
- Current OMPS nadir resolution is at 50 km, but the instrument is capable of 10 km resolution.
- Users for monitoring volcanic ash and SO2 plumes have requested higher spatial resolution (USGS and NOAA and CEOS/CGMS/WMO)
- Volcano SO2 alerts for air quality (big issue for Hawaii)
- EPA monitors industrial SO2
- 50 km resolution is simply too coarse
- OMPS aerosols better than VIIRS over bright surfaces (deserts)



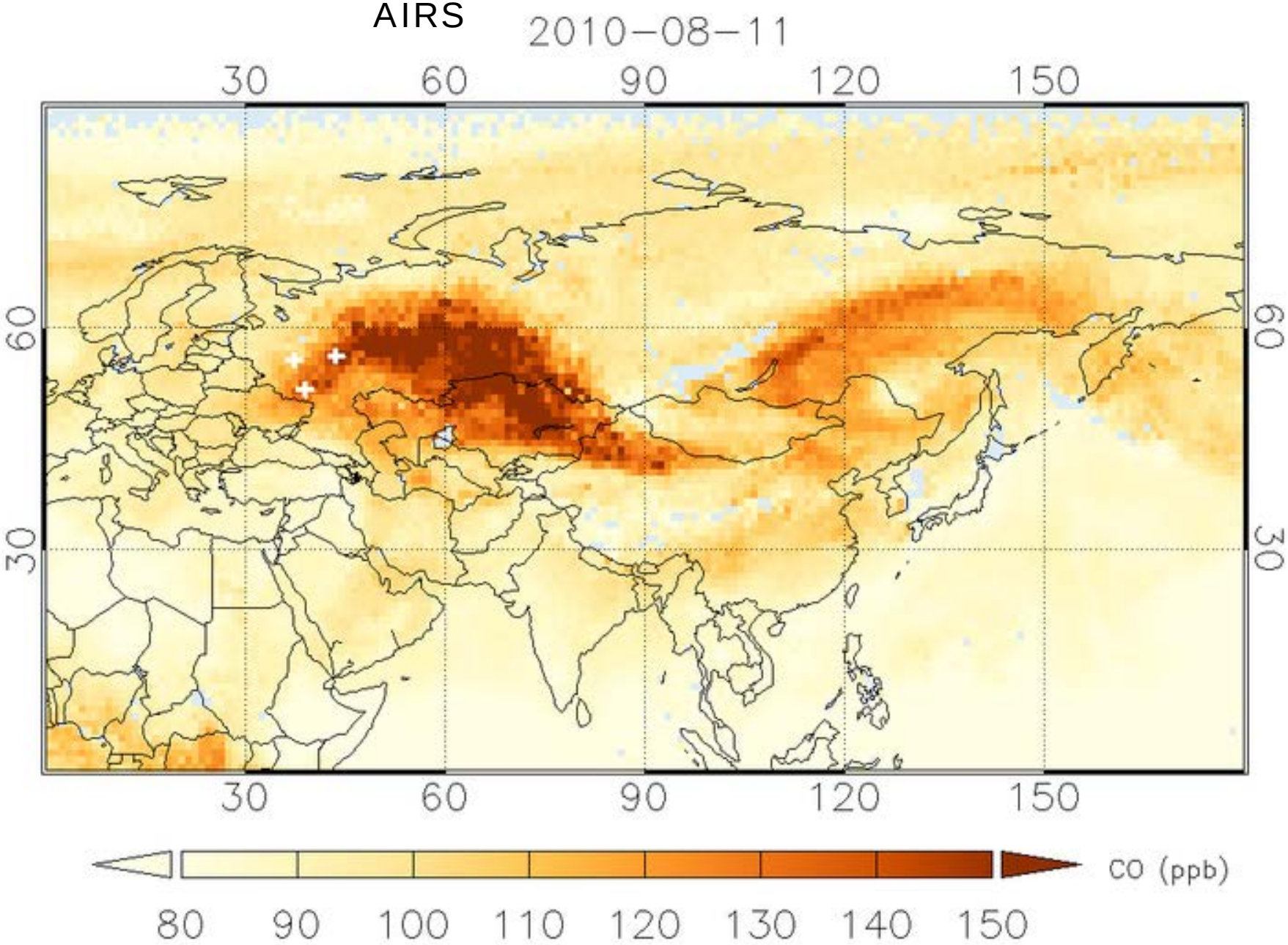




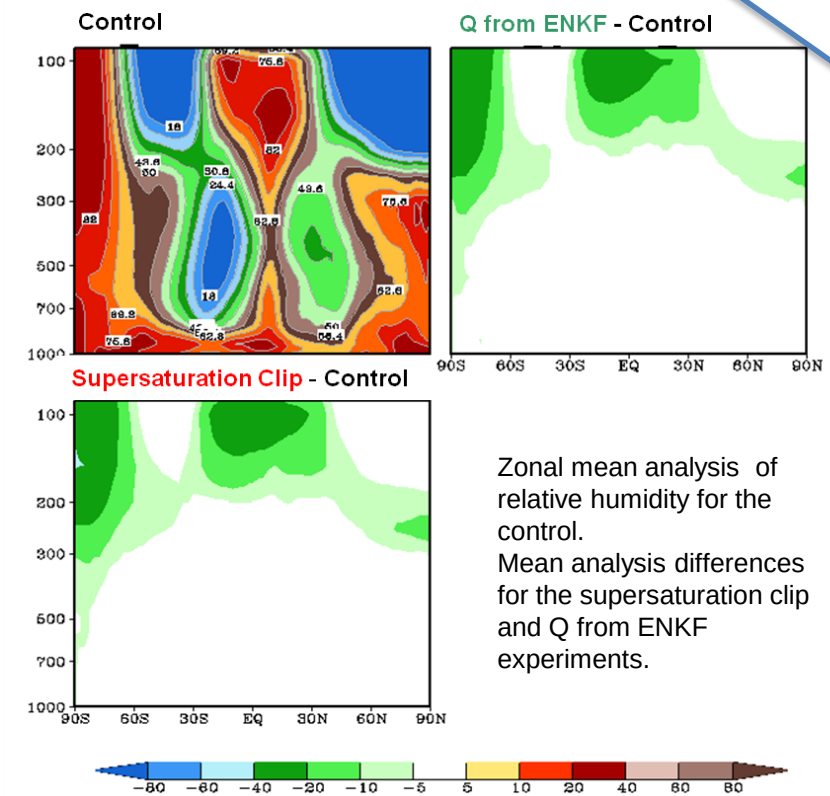
VIIRS sees the ash, but OMPS sees the SO2



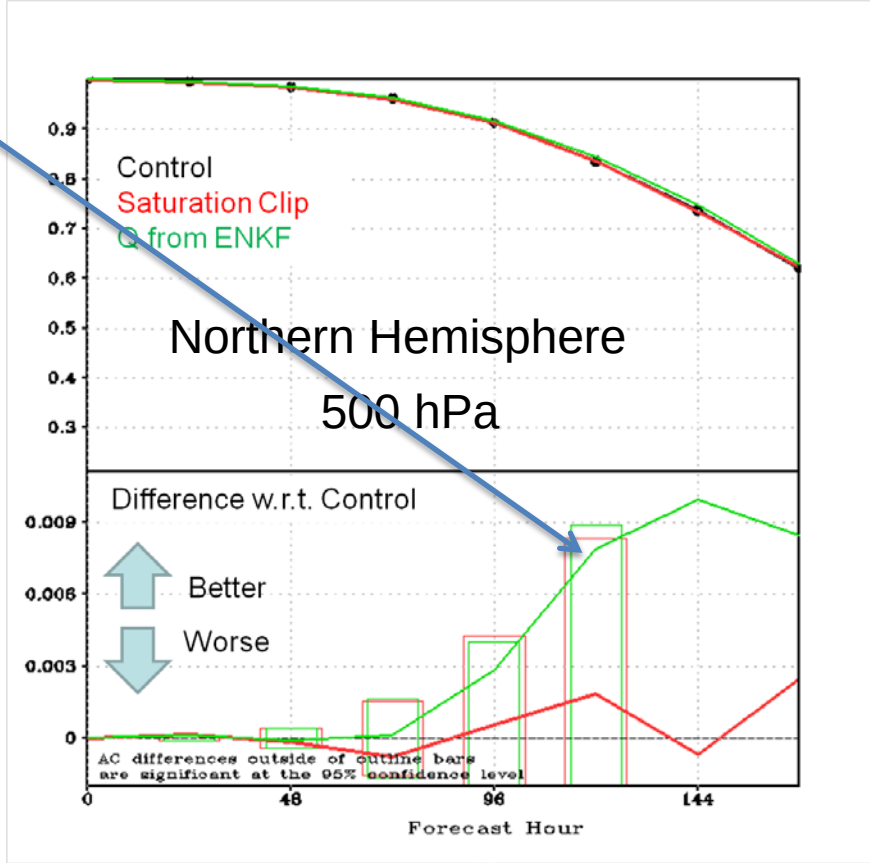
OMPS aerosols over generally bright surfaces from fires


AIRS
2010-08-11
30
60
90
120
150
60
30
CO (ppb)
80
90
100
110
120
130
140
150

Improved Water Vapor using higher spectral resolution IASI water vapor channels - statistically significant - larger improvements expected with further research being sponsored by the JPSS Proving Ground



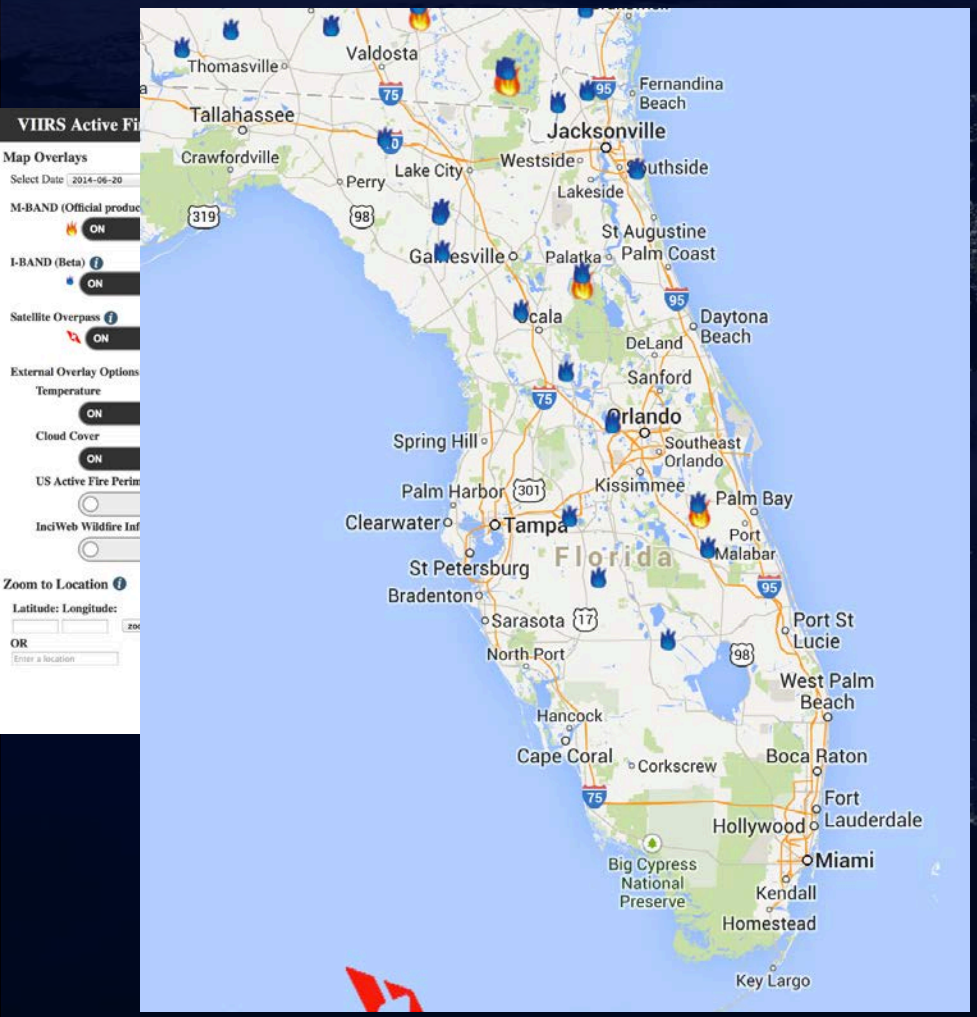
Zonal mean analysis of relative humidity for the control.
Mean analysis differences for the supersaturation clip and Q from ENKF experiments.

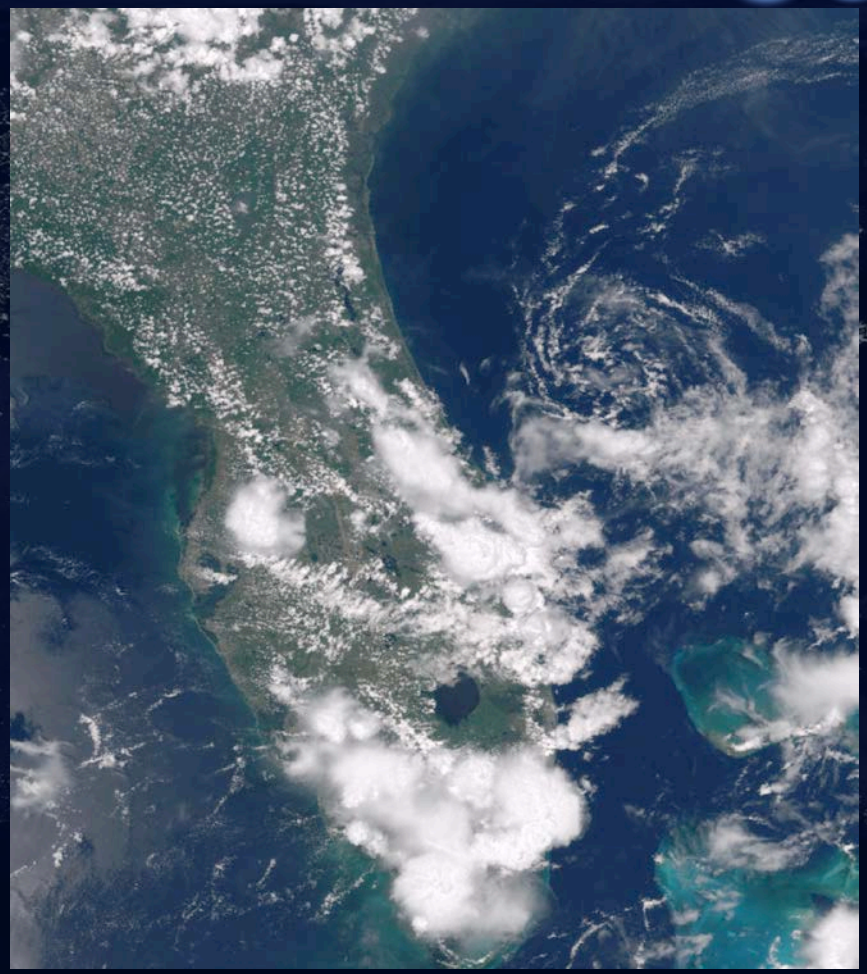


Analysis is drier, especially in the mid and upper troposphere and less clouds for Supersaturation Clip. Minor differences for Supersaturation Clip + Q from ENKF

Most statistics are neutral for Supersaturation Clip and better for Supersaturation Clip + Q from ENKF

PGRR Active Fire Portal

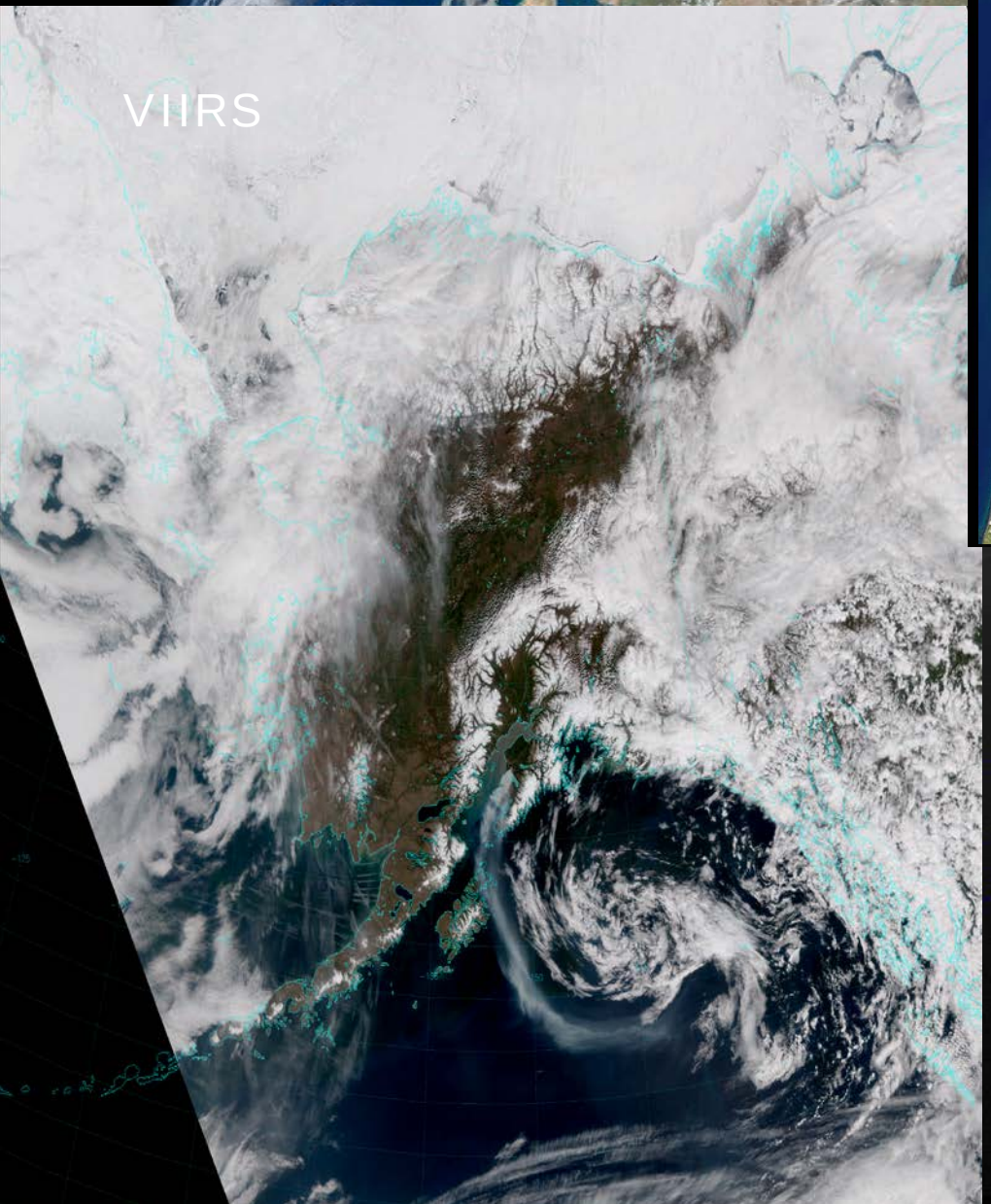


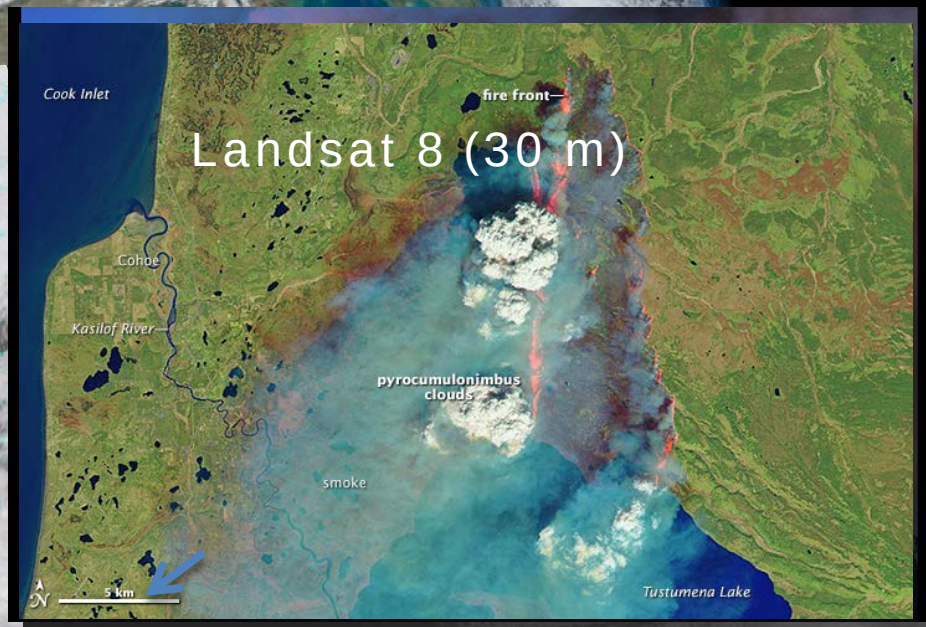


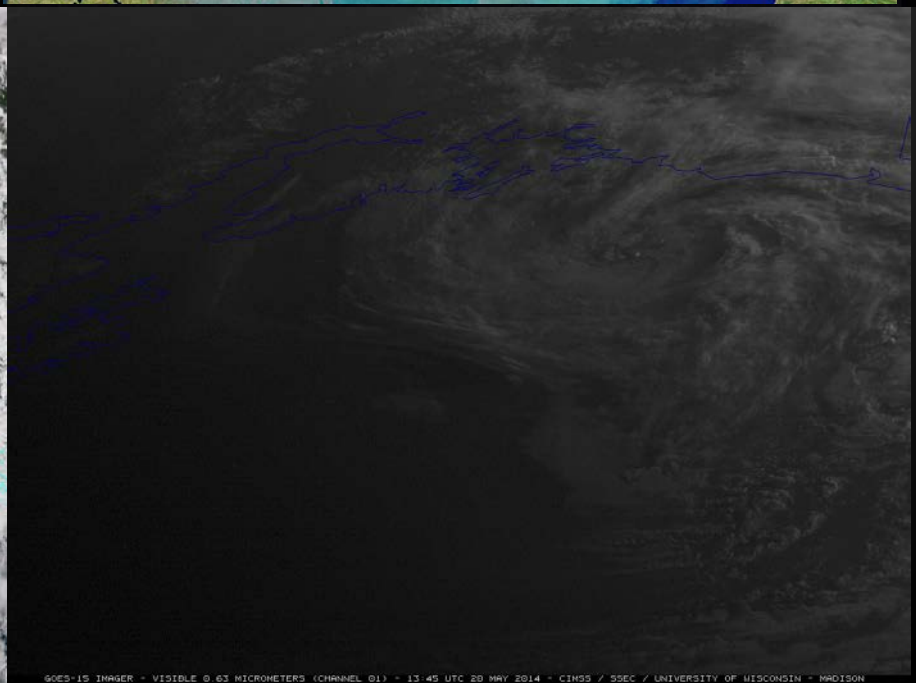
http://http://viirsfire.geog.umd.edu

Integrating various satellite data is well recognized and emphasized

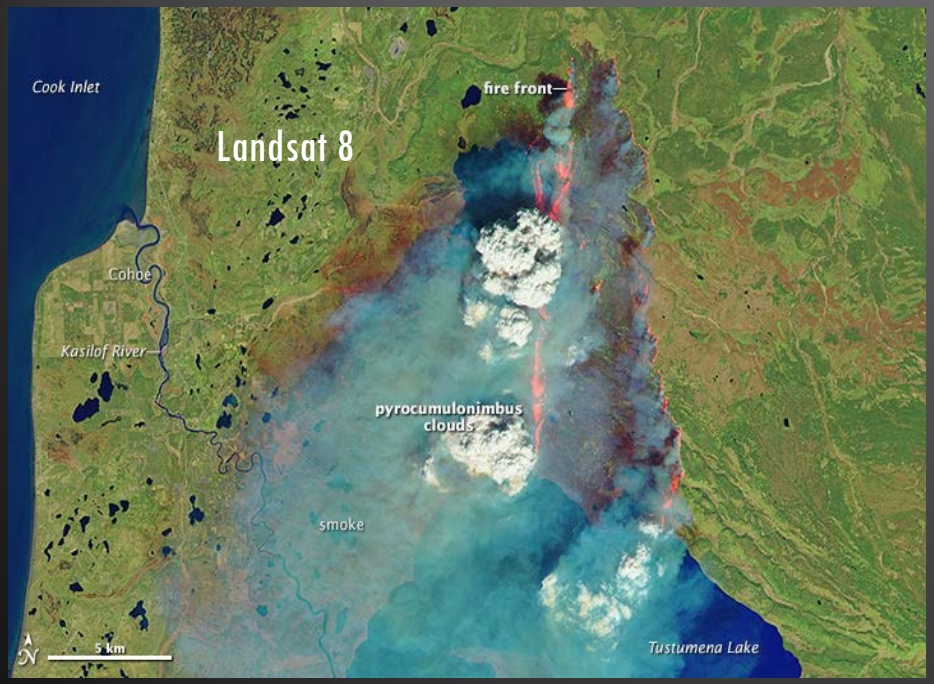
Funny River Fire – Alaska - May 20, 2014





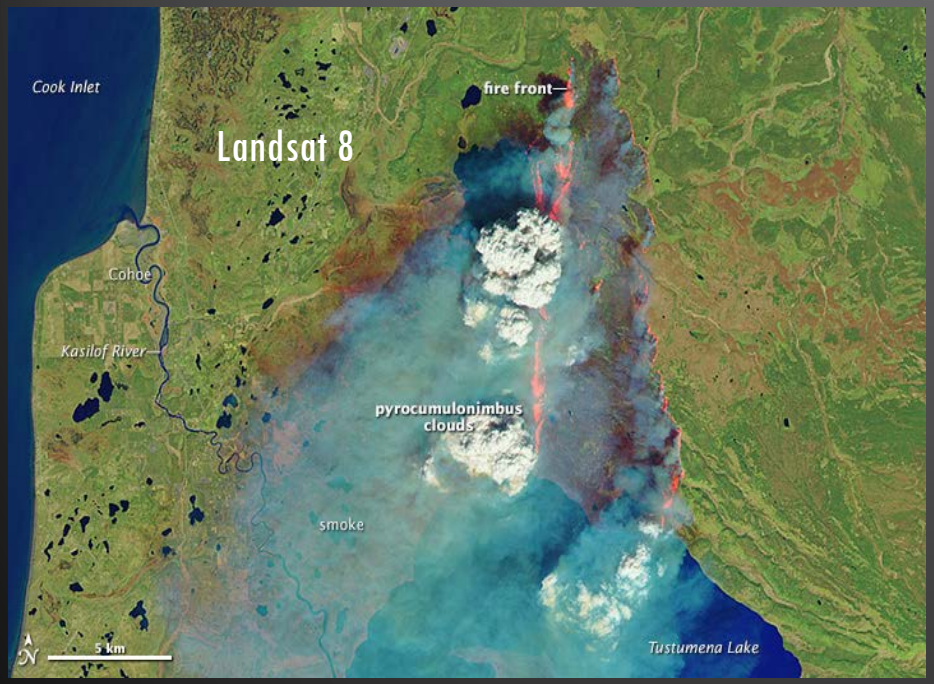


LANDSAT 8 (30 meter resolution vs VIIRS 375 meter resolution)



But Landsat has a 16 day repeat cycle –
it will not observe this location for another 16 days

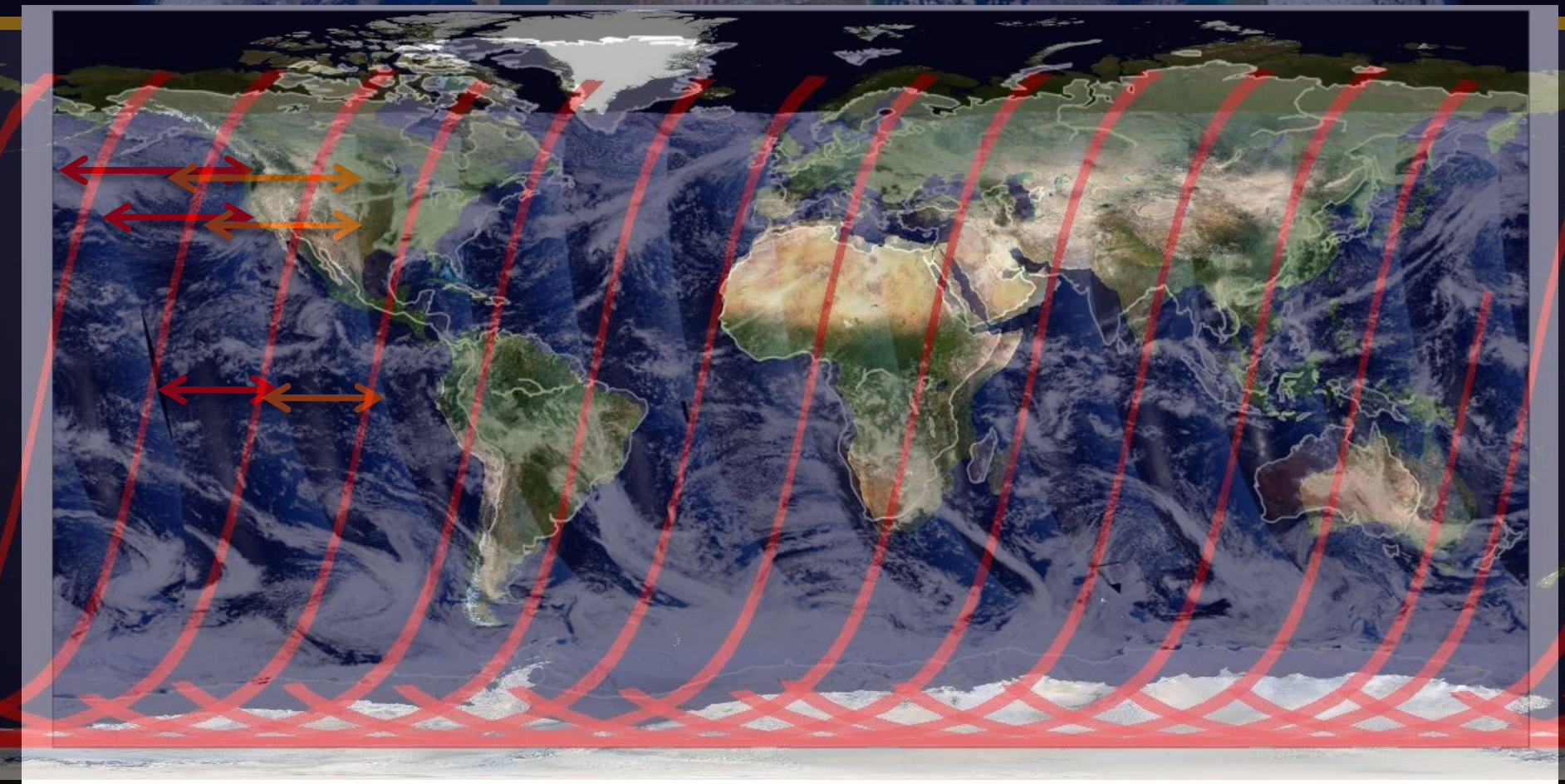
LANDSAT 8 (30 meter resolution vs VIIRS (375 meter resolution)



But Landsat has a 16 day repeat cycle – it will not observe this location for another 16 days

VIIRSS 375 meter resolution is adequate for fire behavior modeling – predicting fire movement and smoke direction and speed. GOES-R will tell you where the smoke came from, but difficult to predict because of spatial resolution (need < 500 meter resolution)

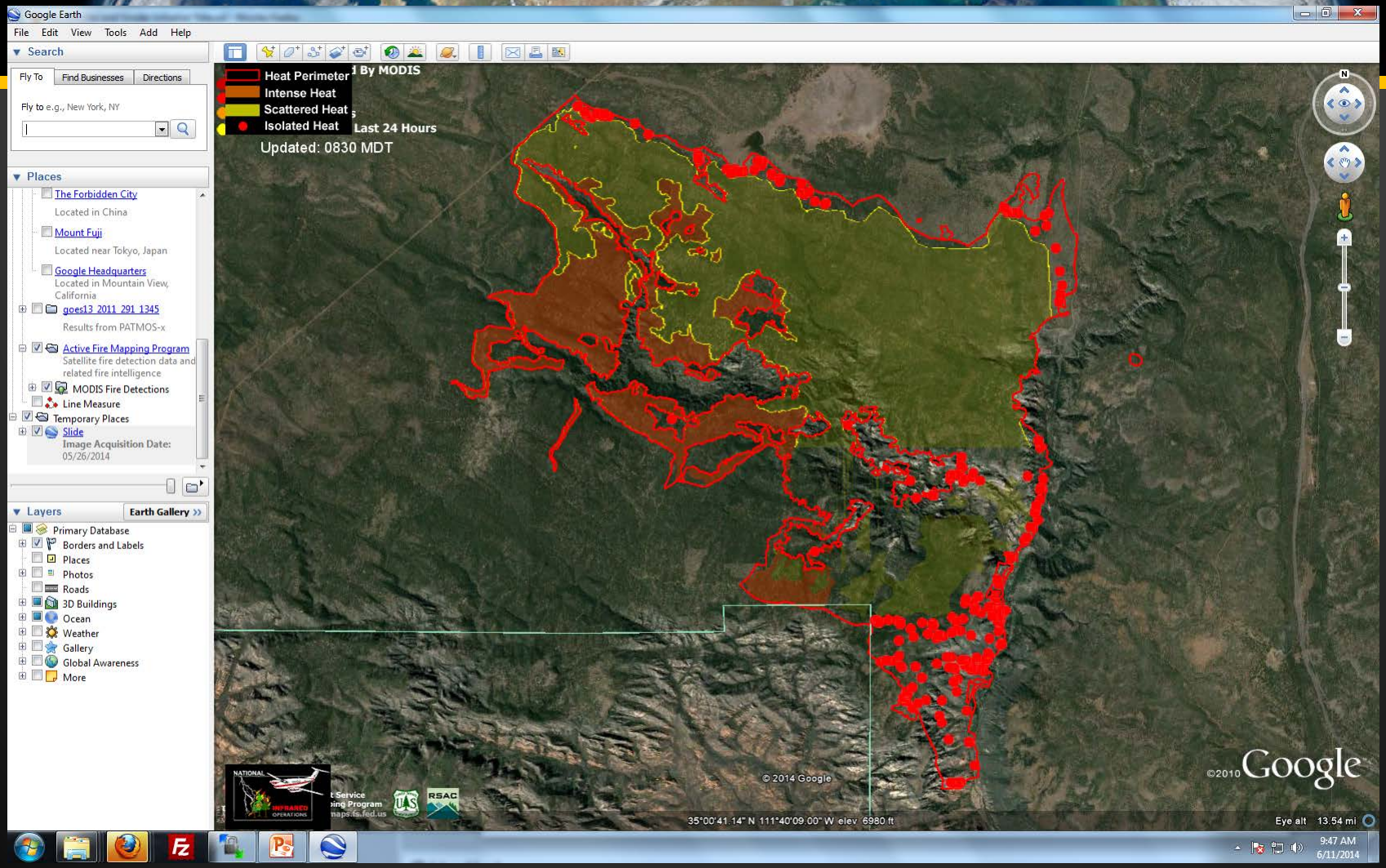
VIIRS – the work horse for environmental assessments



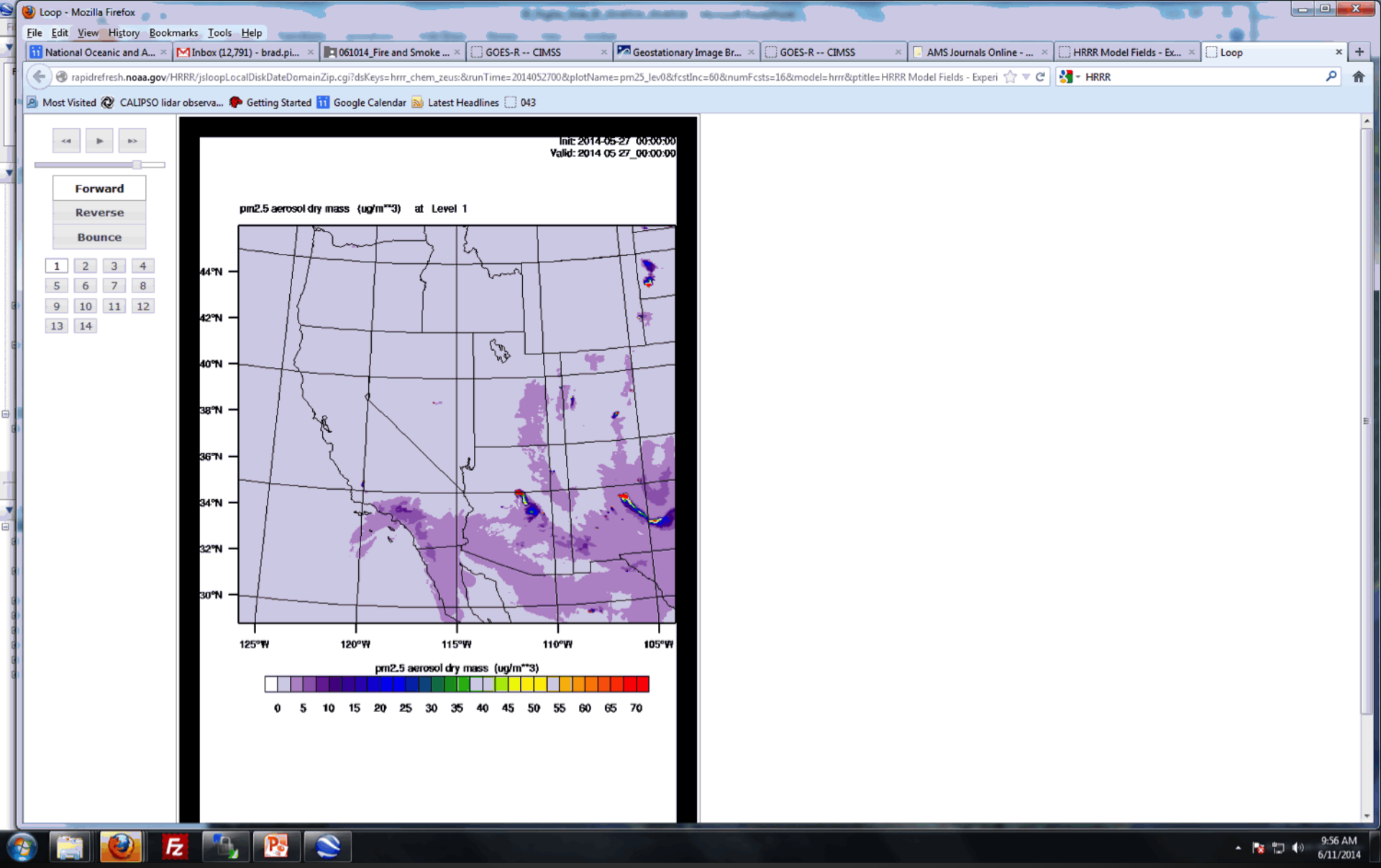
VIIRS RGB (True Color), 20111122

R : M05 (0.672 μm); G : M04 (0.555 μm); B : M02 (0.445 μm)

Creation date: 2011-11-26 07:19:26 Z



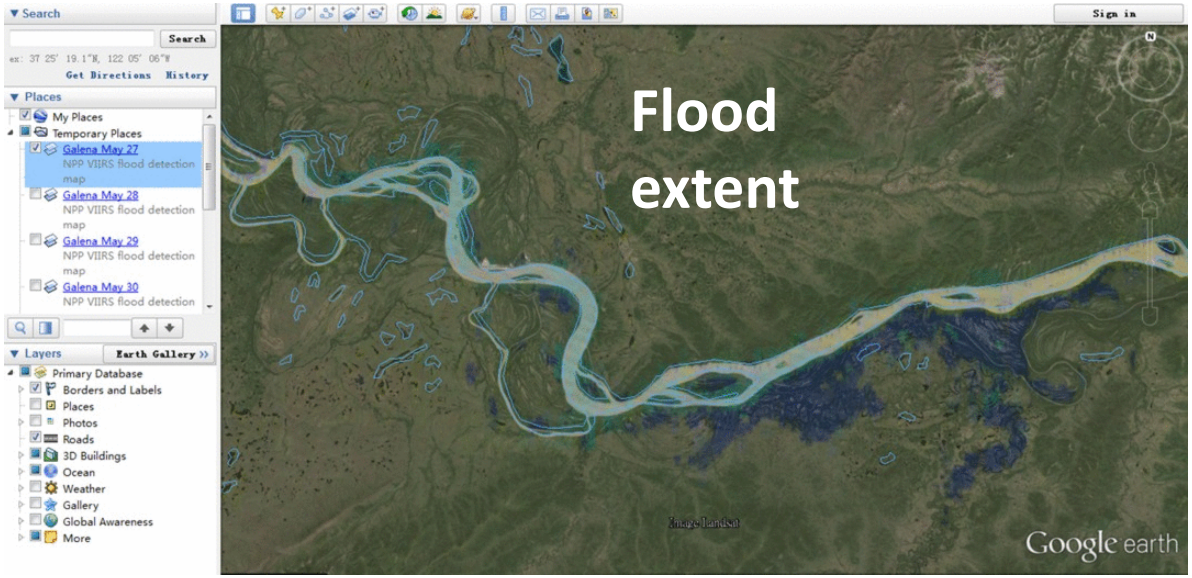
20140526_Slide_IR_KMZ_file_new



http://rapidrefresh.noaa.gov/HRRR/Welcome.cgi?dsKey=hrrr_chem_zeus&domain=full&run_time=27+May+2014+-+00Z

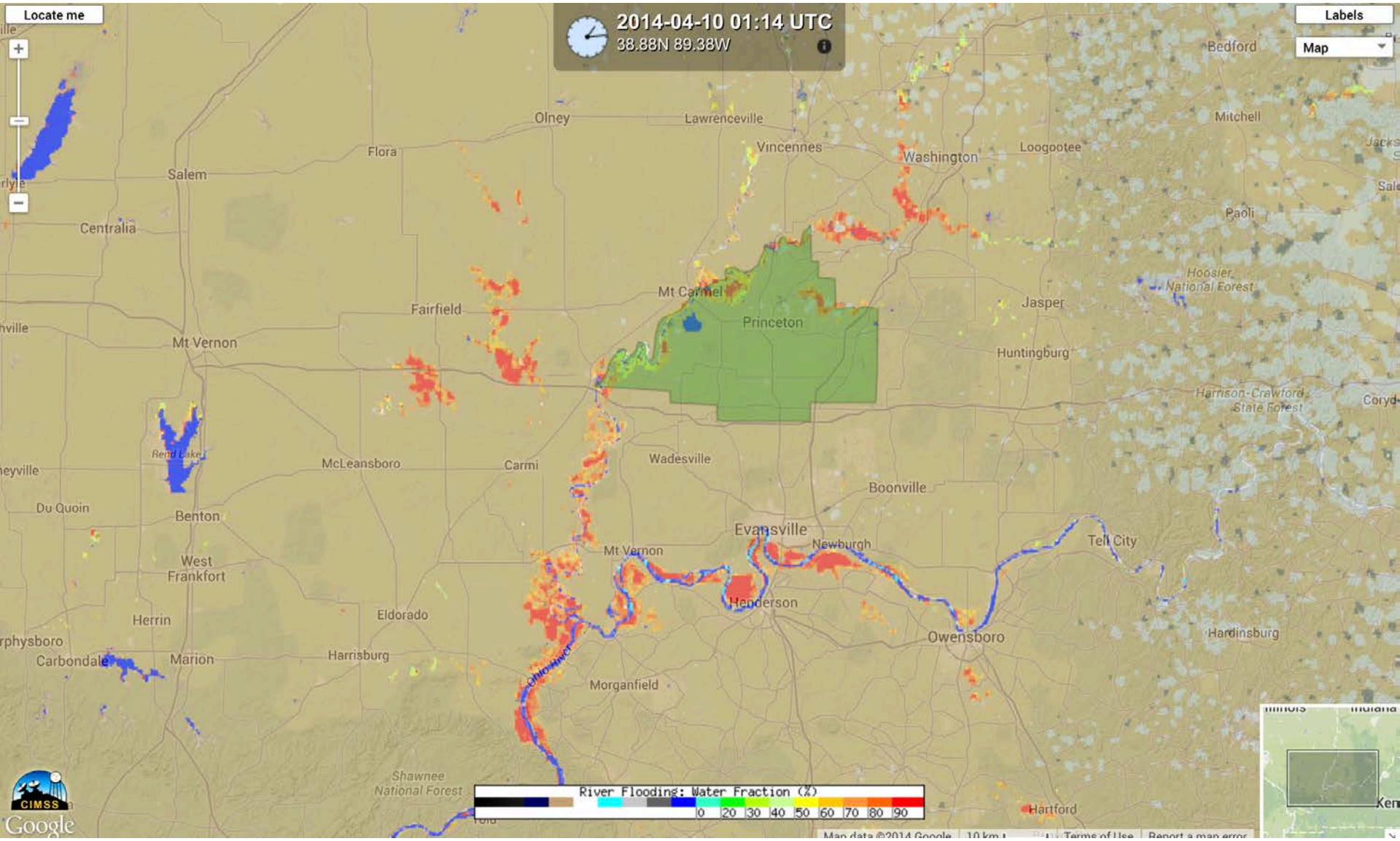
VIIRS River Ice and Flood Products

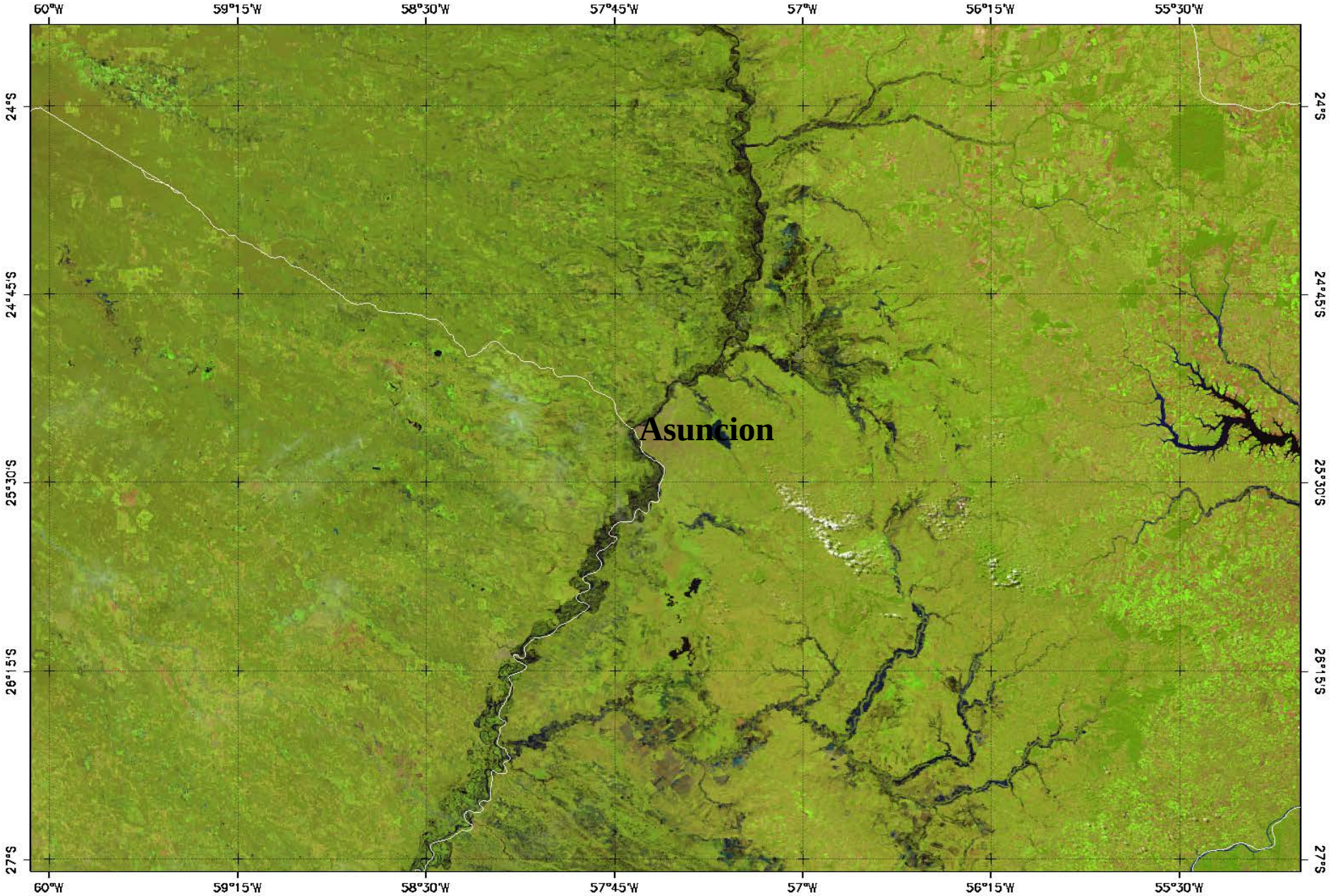
- **VIIRS can identify river ice jams which can lead to large flood events**
- **Flooding from ice jams can occur in a very short time**



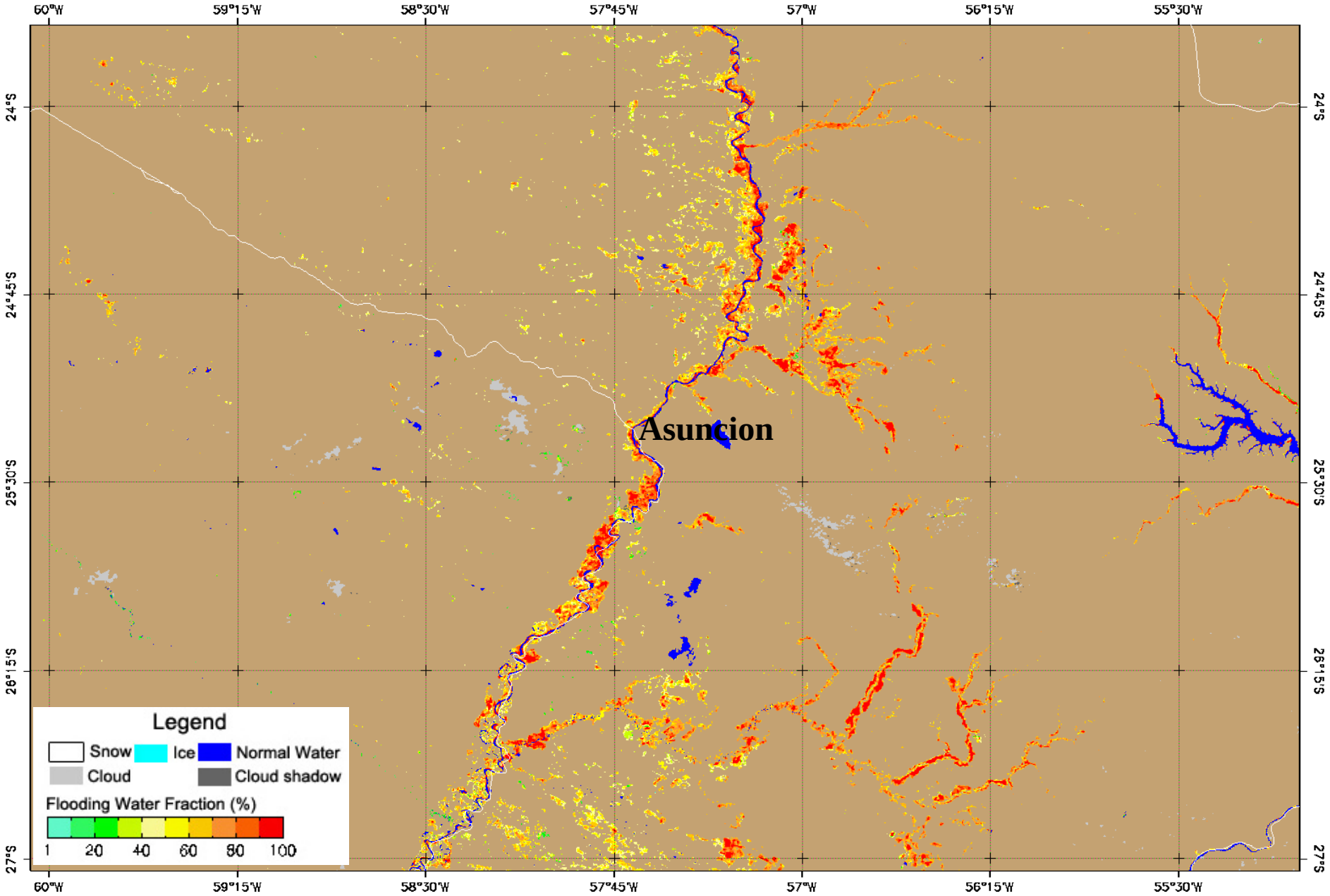
Galena, Alaska on May 28, 2013

SNPP > CSPP > Browse Flood/Ice Products





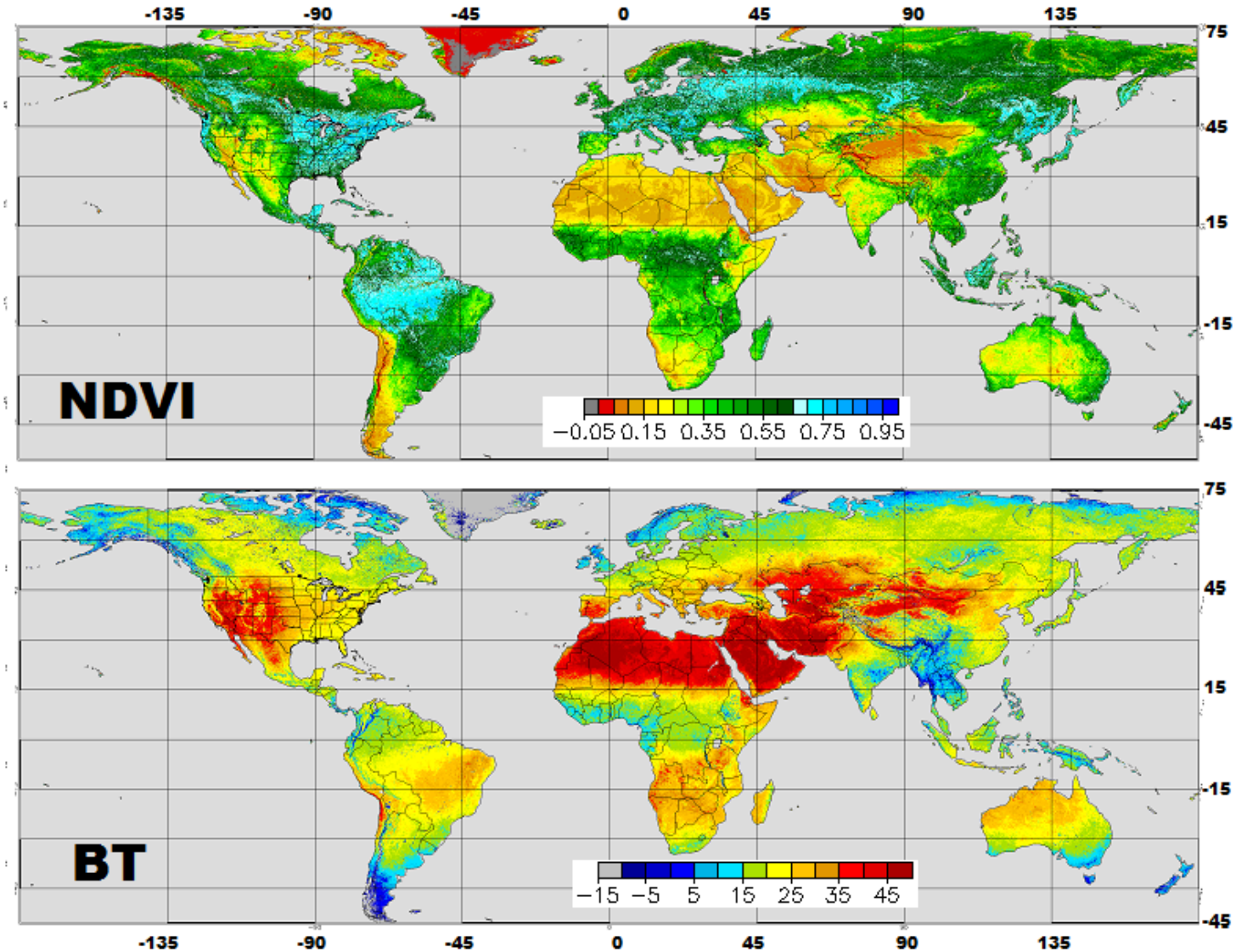
SNPP/VIIRS false-color image (composited by Imager bands 3, 2, 1) June 30, 2014 17:02 (UTC) around Asuncion, Paraguay



SNPP/VIIRS flood detection map June 30, 2014 17:02 (UTC) around Asuncion, Paraguay

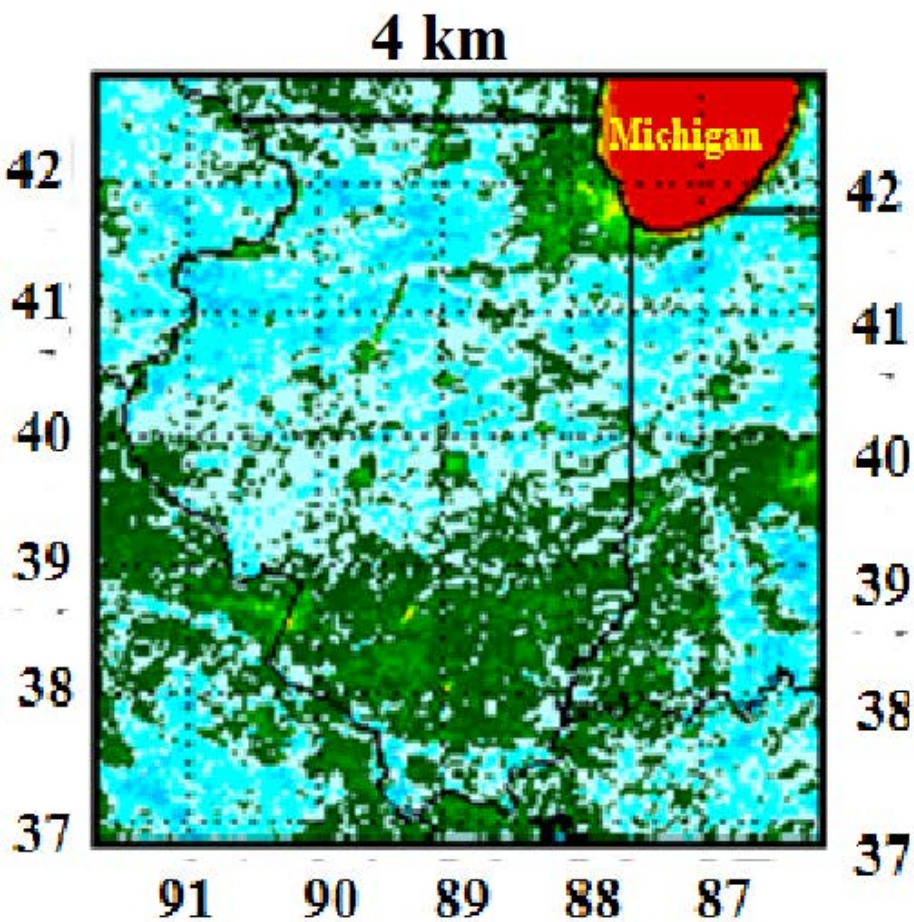
Sanmei Li (GMU)

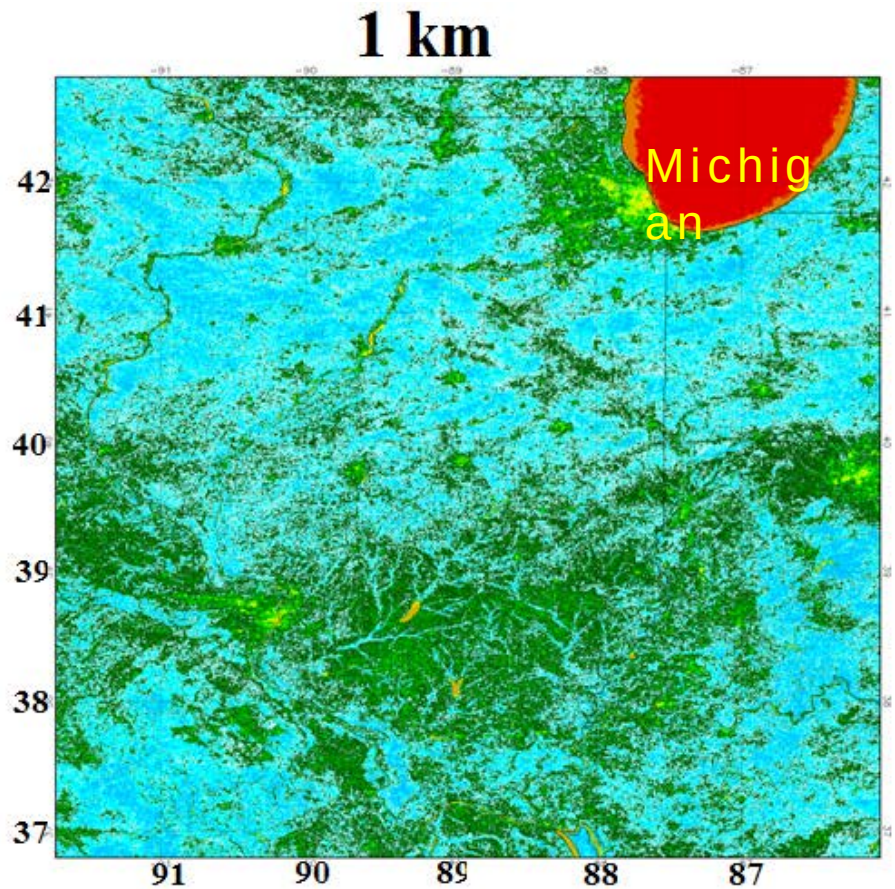
Weekly composite of VIIRS Vegetation Index and Surface Temperature (Window BT)
July 8 – 14, 2013



VIIRS NDVI, Jul 28, 2012

NDVI is used as a base for Vegetation fraction and Ecosystem classes used in NWS modeling

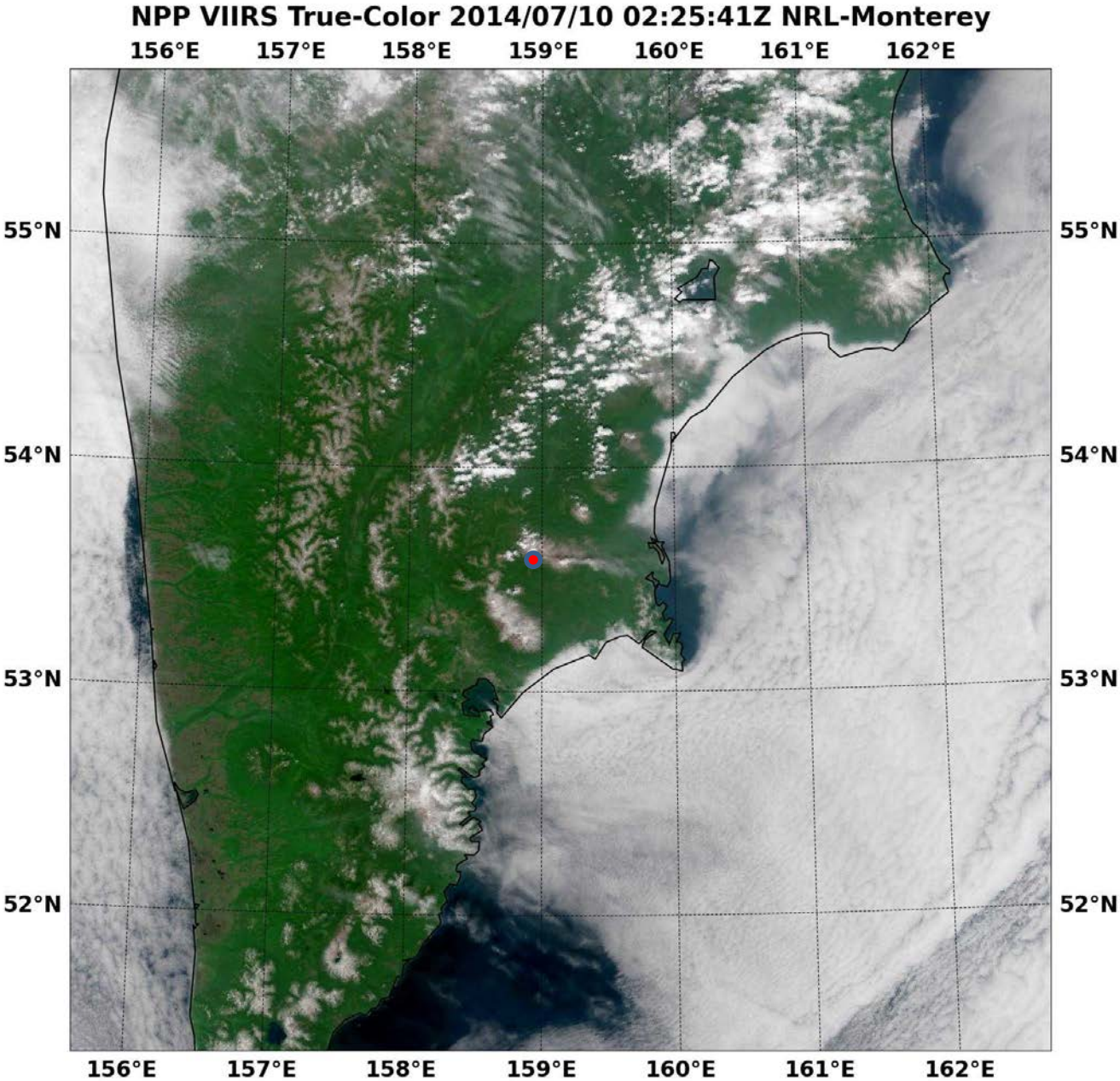




1 km resolution NDVI shows many features which is hard to see with 4 km data:

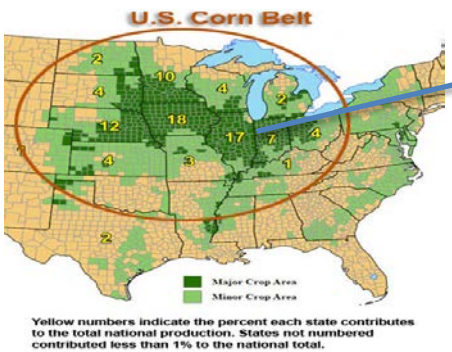
small lakes & reservoirs
river valleys;
forest

Comparing MODIS (250m) to VIIRS (375m) Edge of Scan



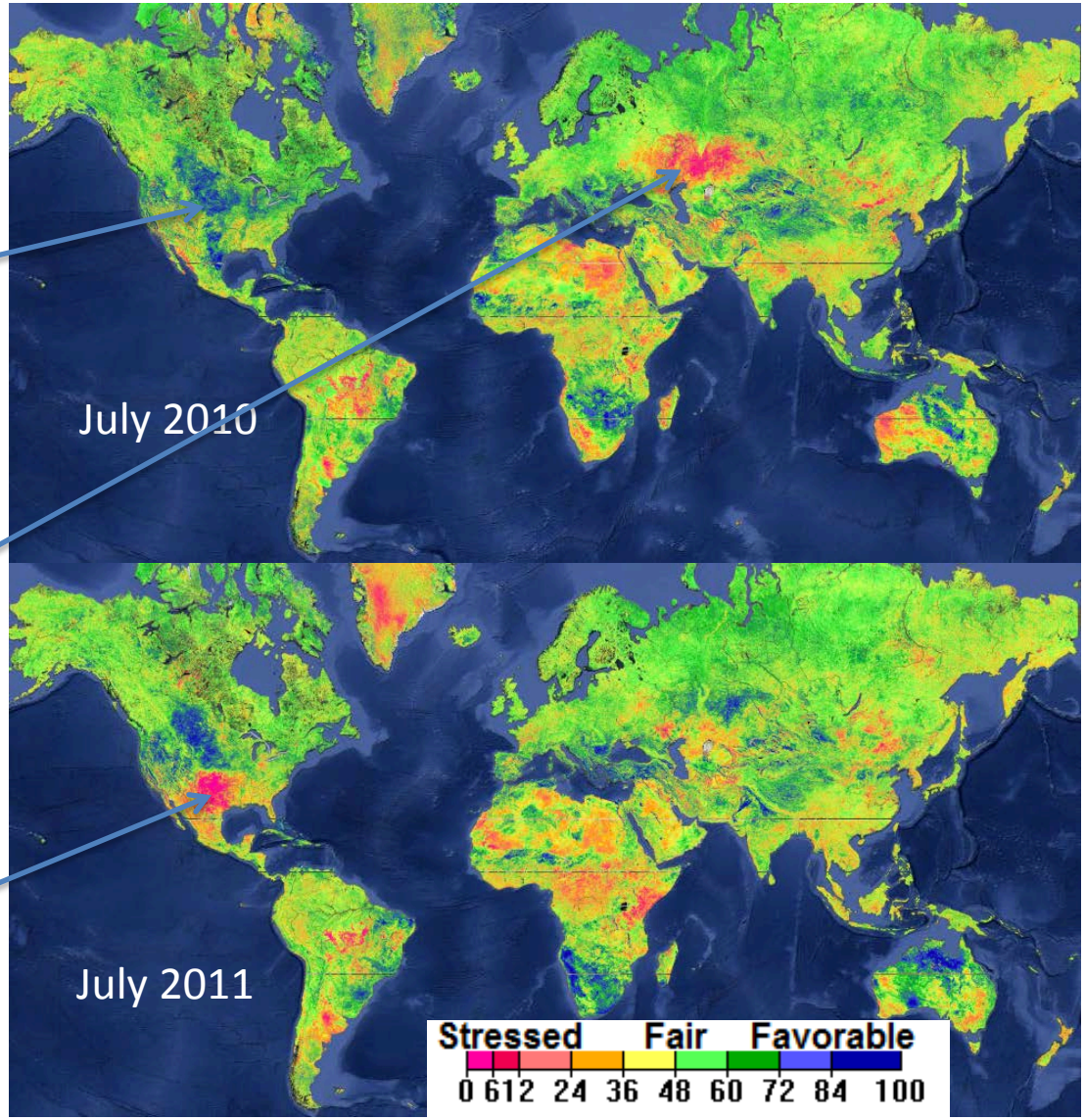
Vegetation Health from AVHRR

IMPACTS:
U.S. corn production in 2010
Hit a record high.

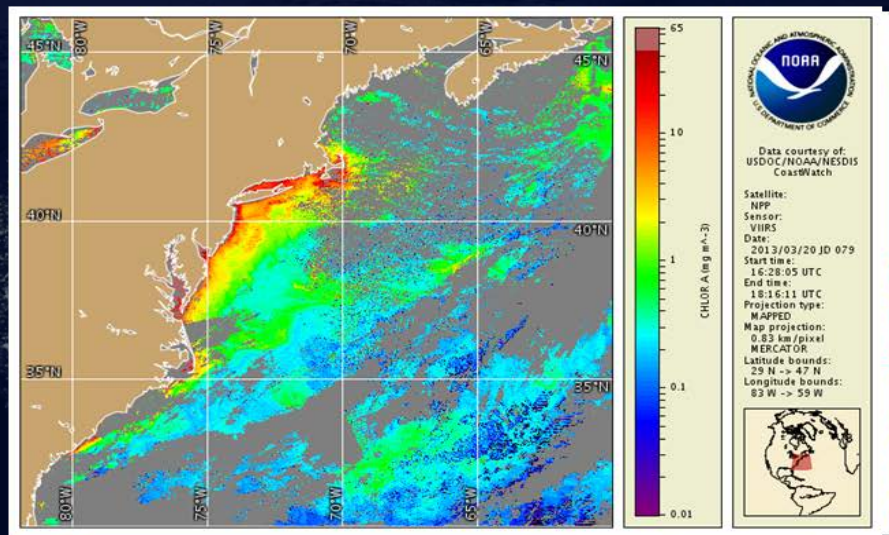


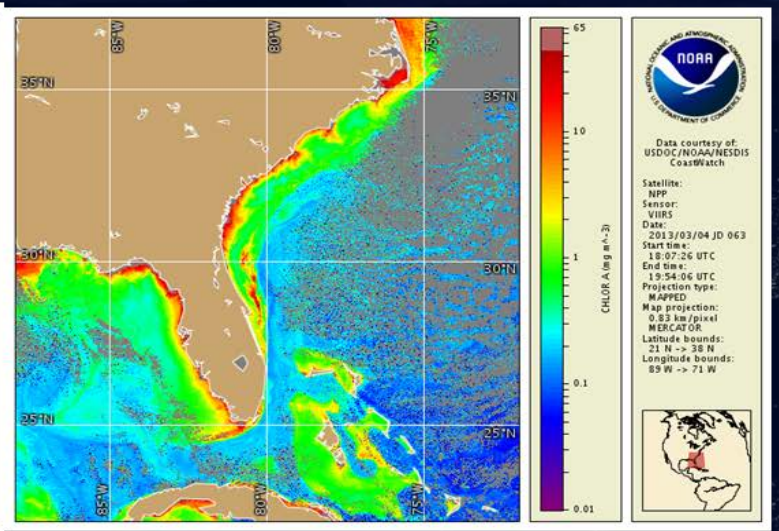
Wheat was down 27% in **Russia**, 32% in **Kazakhstan**, and 19% in the **Ukraine**.

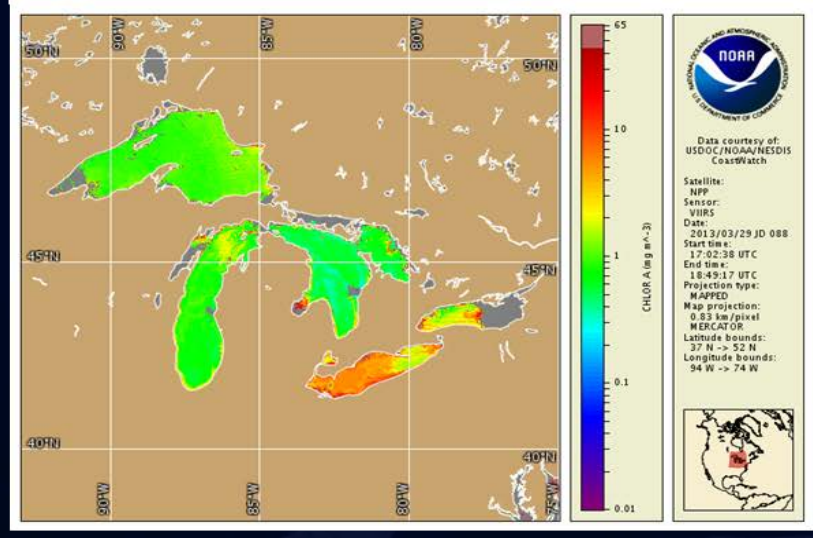
Texas cotton production fell by more than half, from 7.84 million bales in 2010 to 3.5 million in 2011.

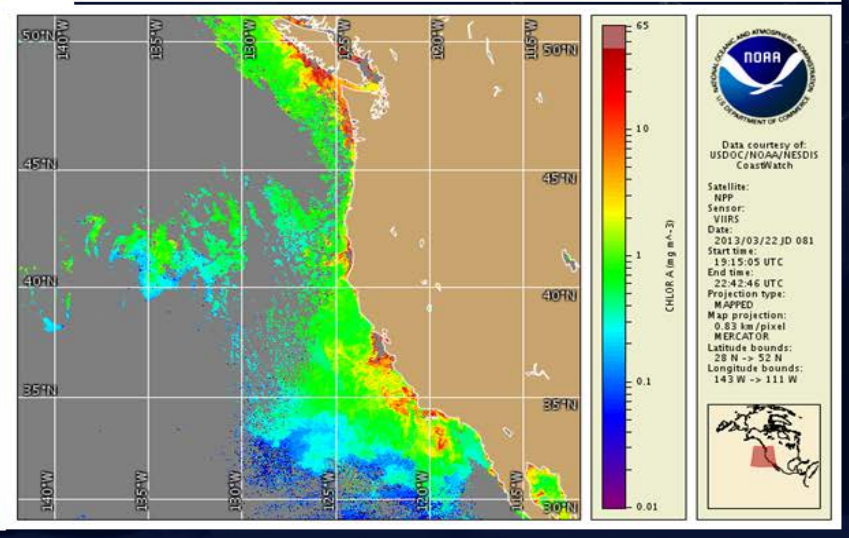


Ocean color portal through NOAA Coastwatch









NOAA CoastWatch

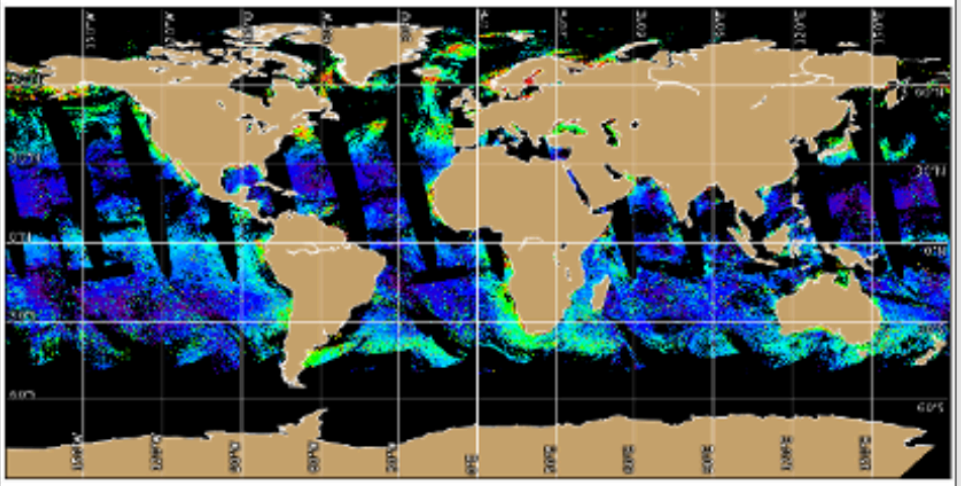
- Home
- History
- Regional Nodes
- Data Access
- Data Products
- Applications
- Science
- Image Gallery
- OceanWatch
- Reports
- Resources

Search

CoastWatch NOAA

NOAA CoastWatch
NCWCP E/RA3
College Park, MD 20740
301.683.3335
coastwatch.info@noaa.gov

Central Operations & Regional Nodes



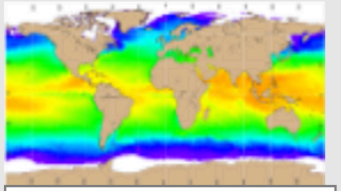
VIIRS ocean color data products are being processed by NOAA CoastWatch on an Experimental basis. Global 4km chlorophyll-a (single file) and 750m (24 sector tiles) and CONUS (CoastWatch regions) are produced daily. CONUS 750m products are available through the CoastWatch Data Access Search by selecting a CoastWatch region. Global 4km VIIRS products are also available through the interface by selecting 'global' region. Global 750m sectors via THREDDS.

VIIRS ocean color IDPS EDRs are available by using the VIIRS Granule Locator. This near real-time tool uses interactive Google Maps to depict granule locations and quasi-true color image previews with download links to the corresponding dataset.

Sentinel-3

NOAA OceanWatch and other US partners are in discussions with EUMETSAT to develop pre-operational support for Sentinel-3 data and products. [more]

Featured Image



Global daily 5km SST product is now available. More Information

Applications

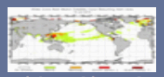
News

MODIS ~250m True Color and GOES SST products are now available on ftpcoastwatch.noaa.gov. [FEB 2014]

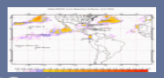
CRW Home

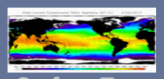
Product Overview

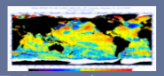
Near-Real-Time Data


Bleaching Alert Area

Degree Heating Weeks


HotSpots


Sea Surface Temperature


SST Anomaly

Virtual Stations

Analyses/Guidance

Composite Products

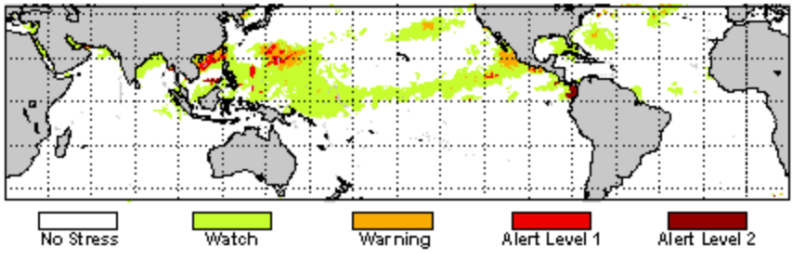
Datasets
HDF datafiles
Google Earth

Experimental Products

Research Activities

Coral Reef Watch Satellite Monitoring

NOAA/NESDIS Bleaching Alert Area, 7/14/2014



Alerts | HotSpot | DHW | SST | Anomaly | Outlook | Doldrums | Virtual Stations

NOAA's Coral Reef Watch Program's satellite data provide current reef environmental conditions to quickly identify areas at risk for coral bleaching, where corals lose the symbiotic algae that give them their distinctive colors. If a coral is severely bleached, disease and partial mortality become likely, and the entire colony may die.

Continuous monitoring of sea surface temperature at global scales provides researchers and stakeholders with tools to understand and better manage the complex interactions leading to coral bleaching. When bleaching conditions occur, these tools can be used to trigger bleaching response plans and support appropriate management decisions.

The Coral Reef Watch mission is to utilize remote sensing and *in situ* tools for near-real-time and long term monitoring, modeling and reporting of physical environmental conditions of coral reef ecosystems.

Coral Reef Watch is part of the NOAA Coral Reef Conservation Program (CRCP) and the National Environmental Satellite Data and Information Service (NESDIS). A brief history of Coral Reef Watch's early years is featured in "NOAA Celebrates 200 Years of Science, Service, and Stewardship."

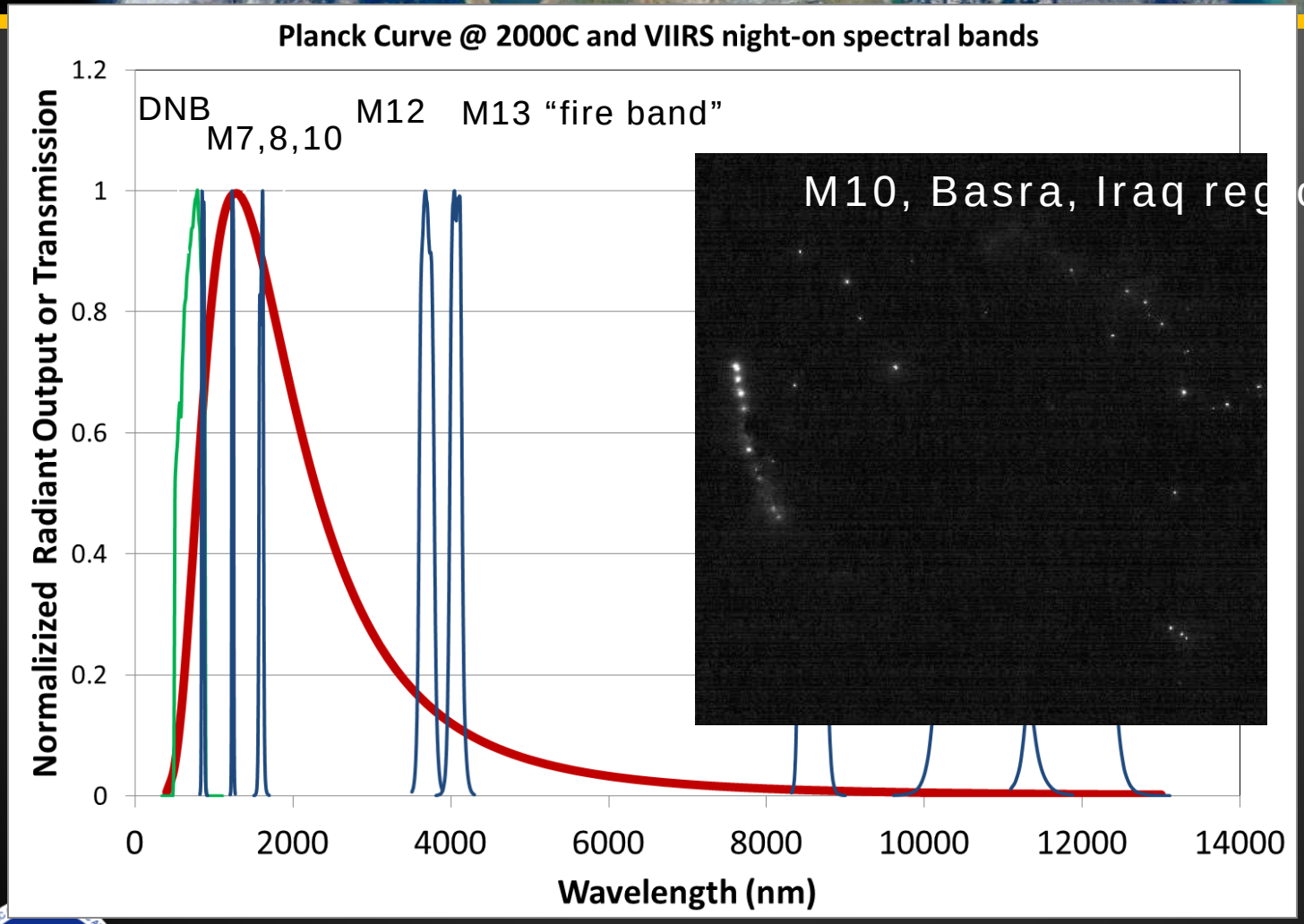
Announcements

May 9, 2014:
NEW RELEASE: Version 2 experimental daily global 5 km coral bleaching thermal stress monitoring product suite.

May 7, 2014:
New ENSO bleaching patterns web page helps managers prepare for potential significant El Niño event in 2014-2015.

April 3, 2014:
Three new studies discuss recent NOAA considerations of corals proposed for listing under the Endangered Species Act

What makes nighttime VIIRS data so great for gas flares?



The M7,8,10 spectral bands are well placed to record the peak radiant emissions from flares. During daylight hours the signal is overwhelmed by sunlight. At night combustion sources stand out clearly against the noise background.

Iraq gas flare detection from September 11, 2013

Combustion parameters:

Source ID=SVM10_npp_d20130911_t2226433_e2232237_IR_source_232

Lat=30.747845 Lon=48.279762 deg.

Temperature=1666 deg. K

Radiant heat intensity=84.57 W/m2

Radiant heat=51.13 MW

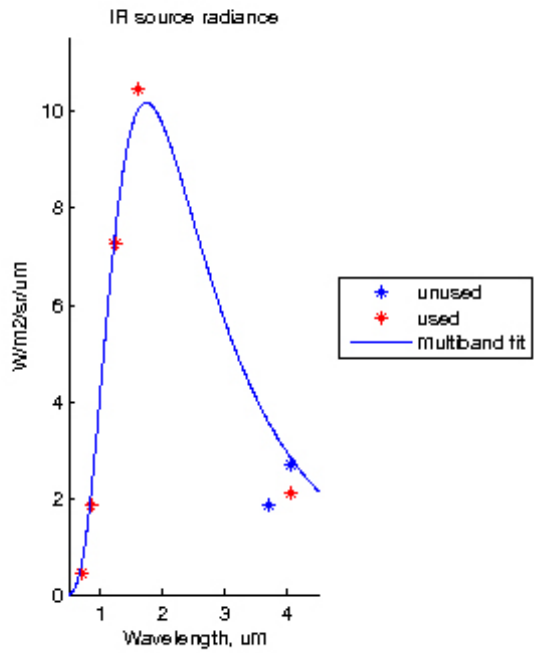
Source footprint=117.01 m2

Methane equivalent=1.381 m3/s

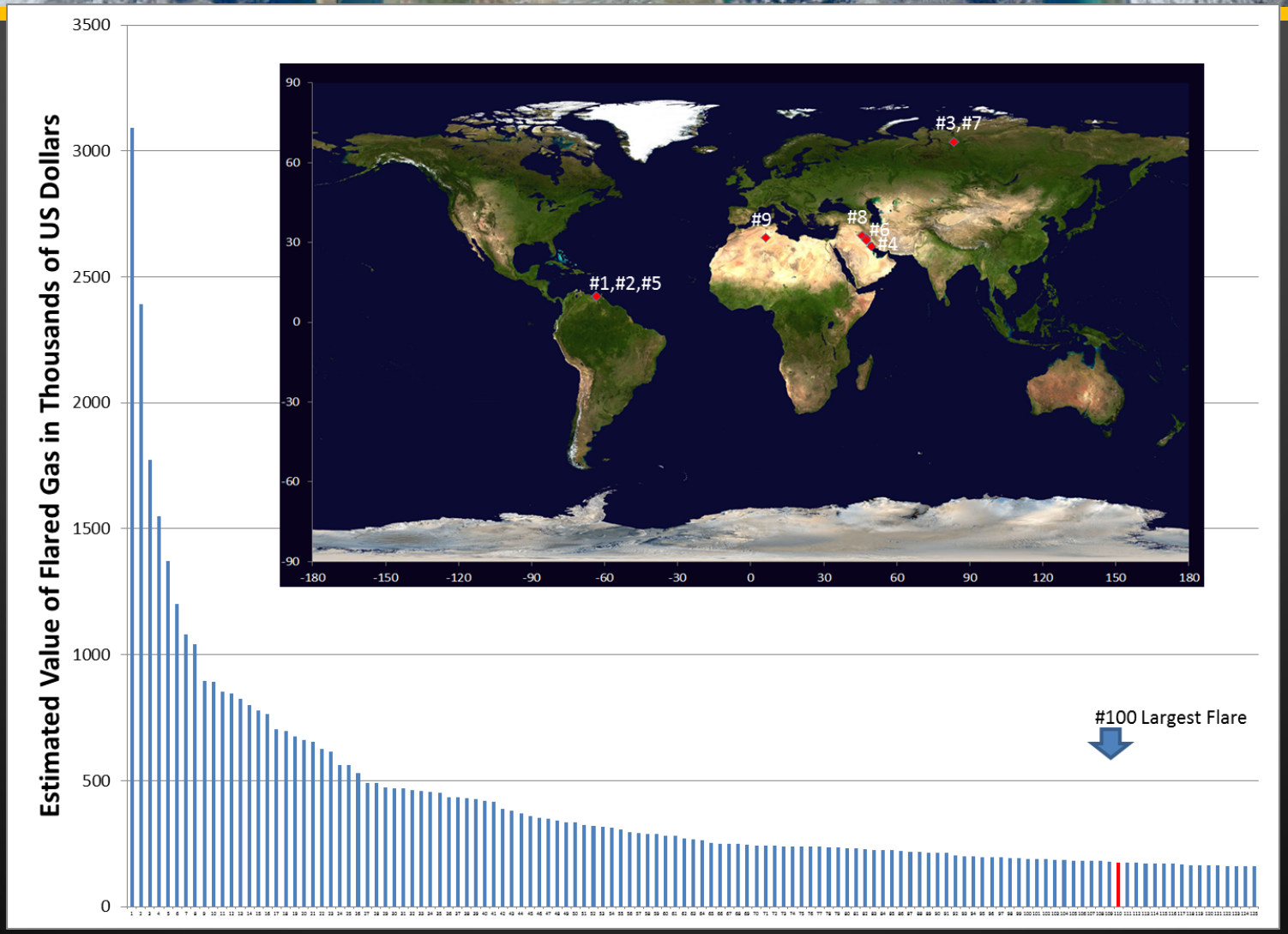
CO2 equivalent=2528.750 g/s

Cloud state=clear

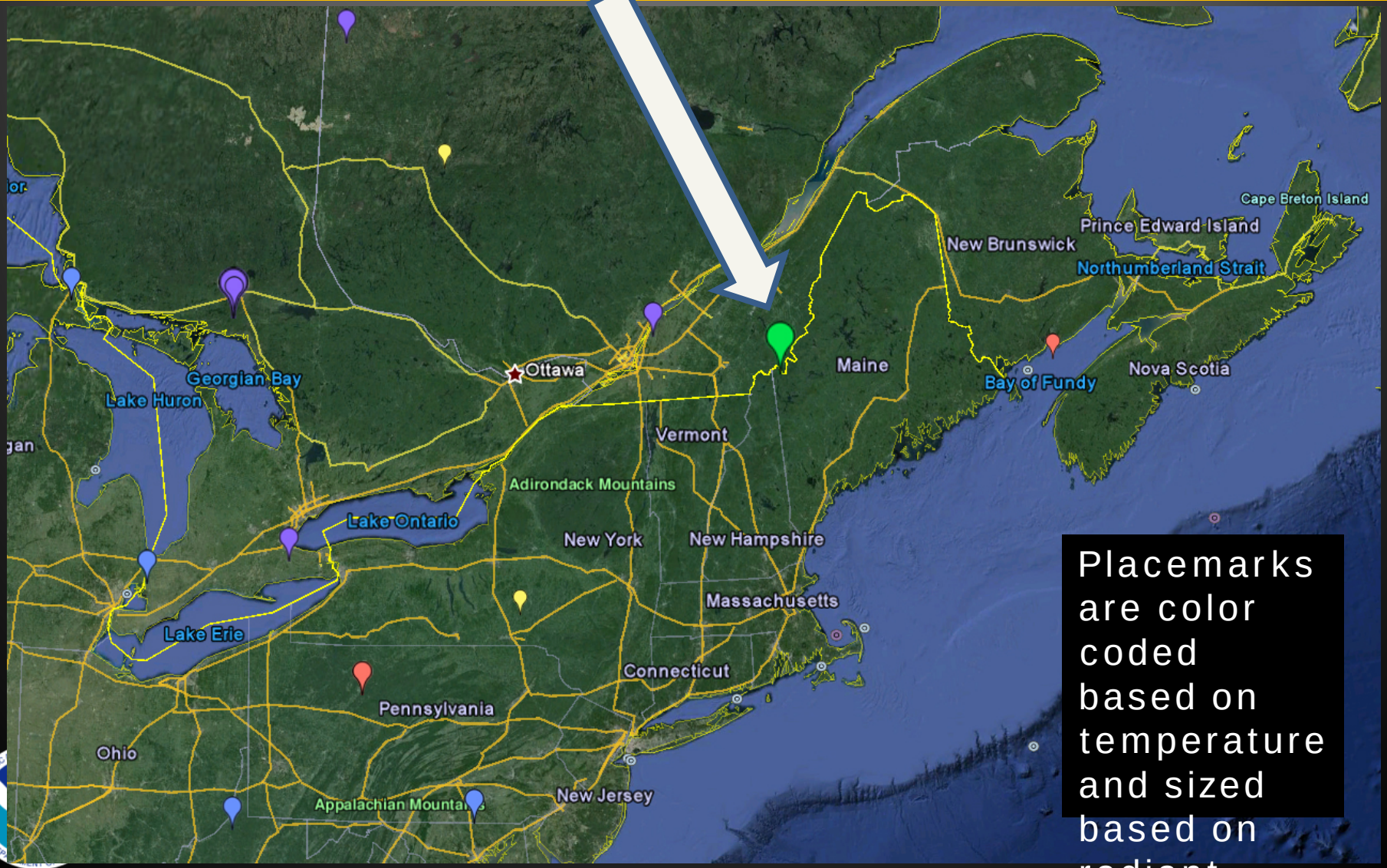
Time=11-Sep-2013 22:27:57



Top 100 Gas Flares From January 2013

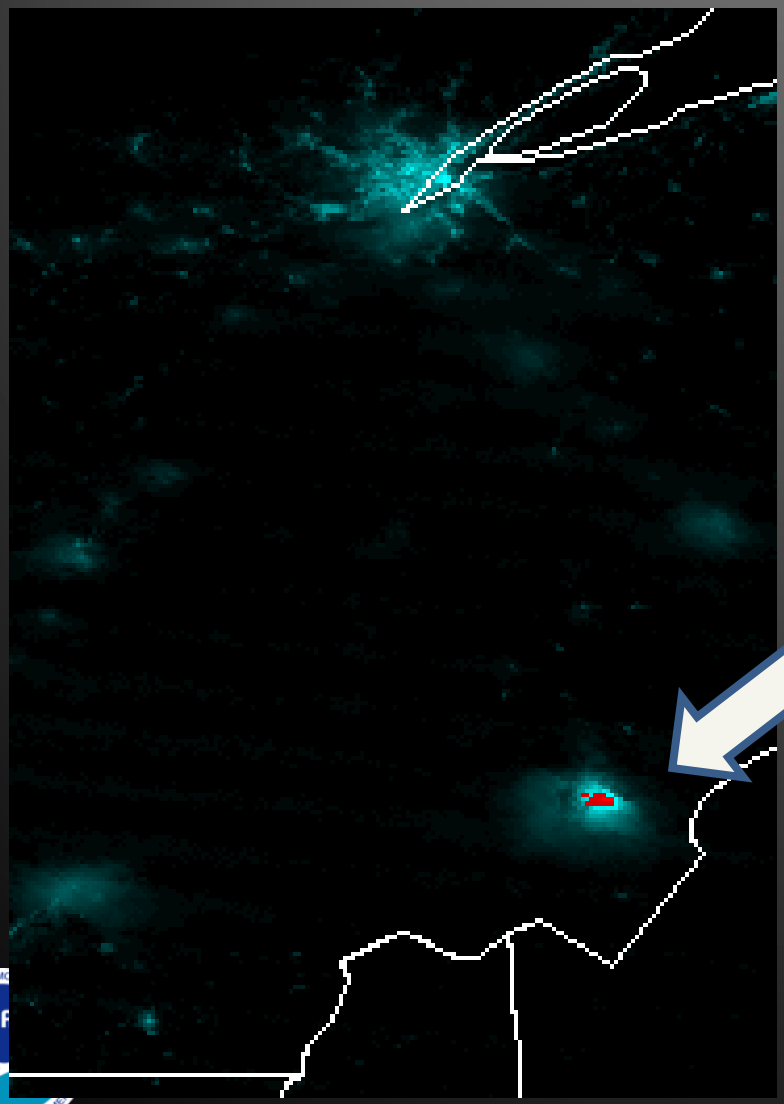


Lac-Megantic, Quebec Fire Detected by VIIRS Nightfire, July 6, 2013



Placemarks are color coded based on temperature and sized based on radiant

Lac-Megantic, Quebec Fire Detected by VIIRS at Night



Combustion parameters:

Source ID=SVM10_npp_d20130706_t0619460

Lat=45.575085 Lon=-70.879578 deg.

Temperature=1274 deg. K

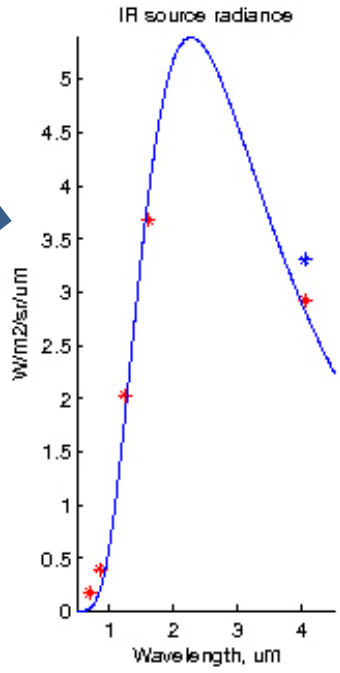
Radiant heat intensity=58.64 W/m2

Radiant heat=47.19 MW

Source footprint=315.91 m2

Cloud state=clear

Time=06-Jul-2013 06:24:48



NGDC's VIIRS Nightfire product provides temperature, source size and radiant heat worldwide on a nightly basis

Summary

JPSS is a major contributor to the global observing system.

Suomi NPP instruments are performing exceptionally well!!

JPSS has a Proving Ground and Risk Reduction program to improve applications

International partnerships are essential.

Observations coupled with modeling, data fusion, with the underpinning research, are essential for transforming observations to the products, applications, and services needed to address environmental impacts on society.

I can be contacted at Mitch.Goldberg@noaa.gov