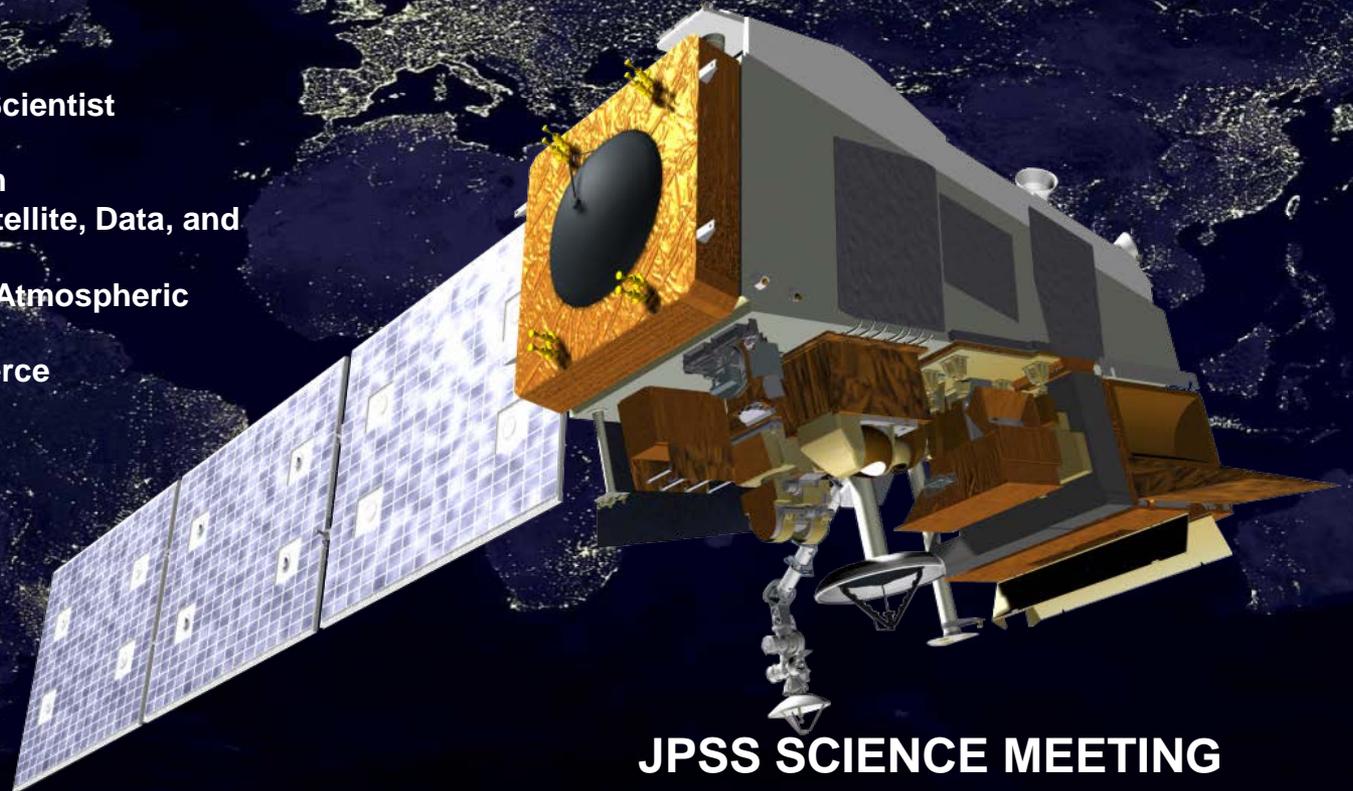


Joint Polar Satellite System (JPSS)

The NOAA JPSS Program and Applications

Mitch Goldberg, Program Scientist

Joint Polar Satellite System
National Environmental Satellite, Data, and
Information Service
U.S. National Oceanic and Atmospheric
Administration
U.S. Department of Commerce



JPSS SCIENCE MEETING
August 2016

www.jpss.noaa.gov



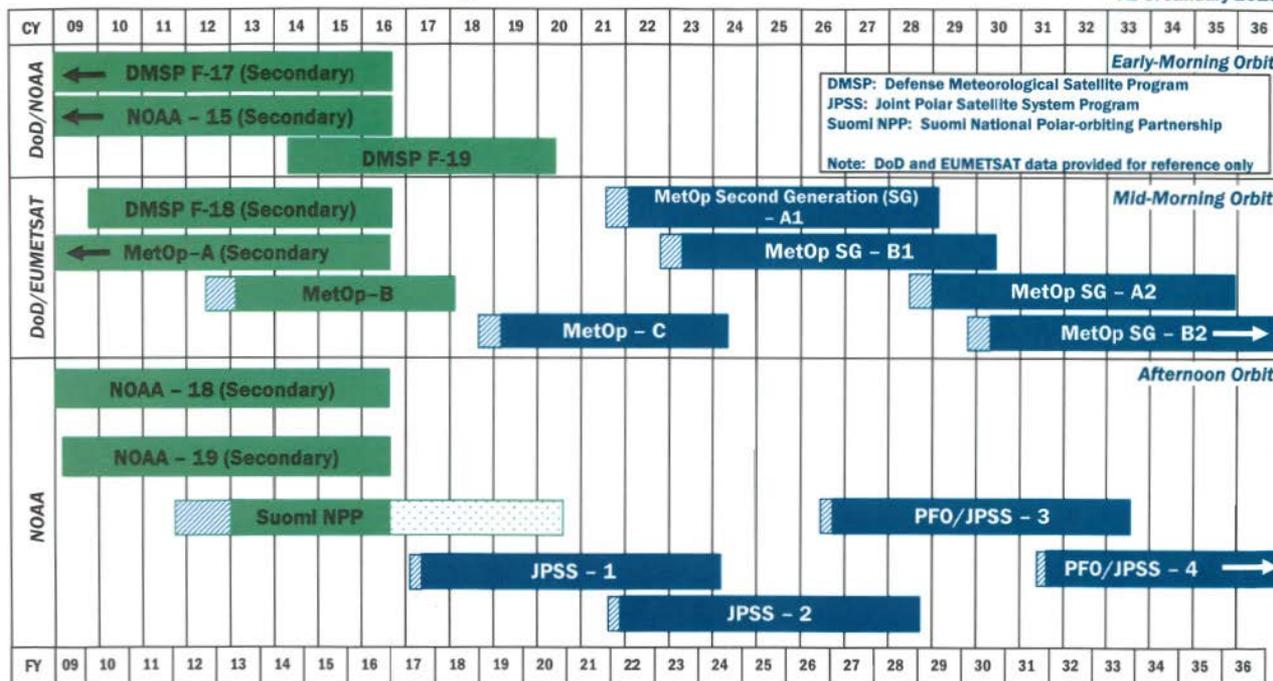
Polar Flyout Chart



NOAA & Partner Polar Satellite Programs Continuity of Weather Observations



As of January 2016



DMSP: Defense Meteorological Satellite Program
 JPSS: Joint Polar Satellite System Program
 Suomi NPP: Suomi National Polar-orbiting Partnership
 Note: DoD and EUMETSAT data provided for reference only

Approved:
 Assistant Administrator for Satellite and Information Services

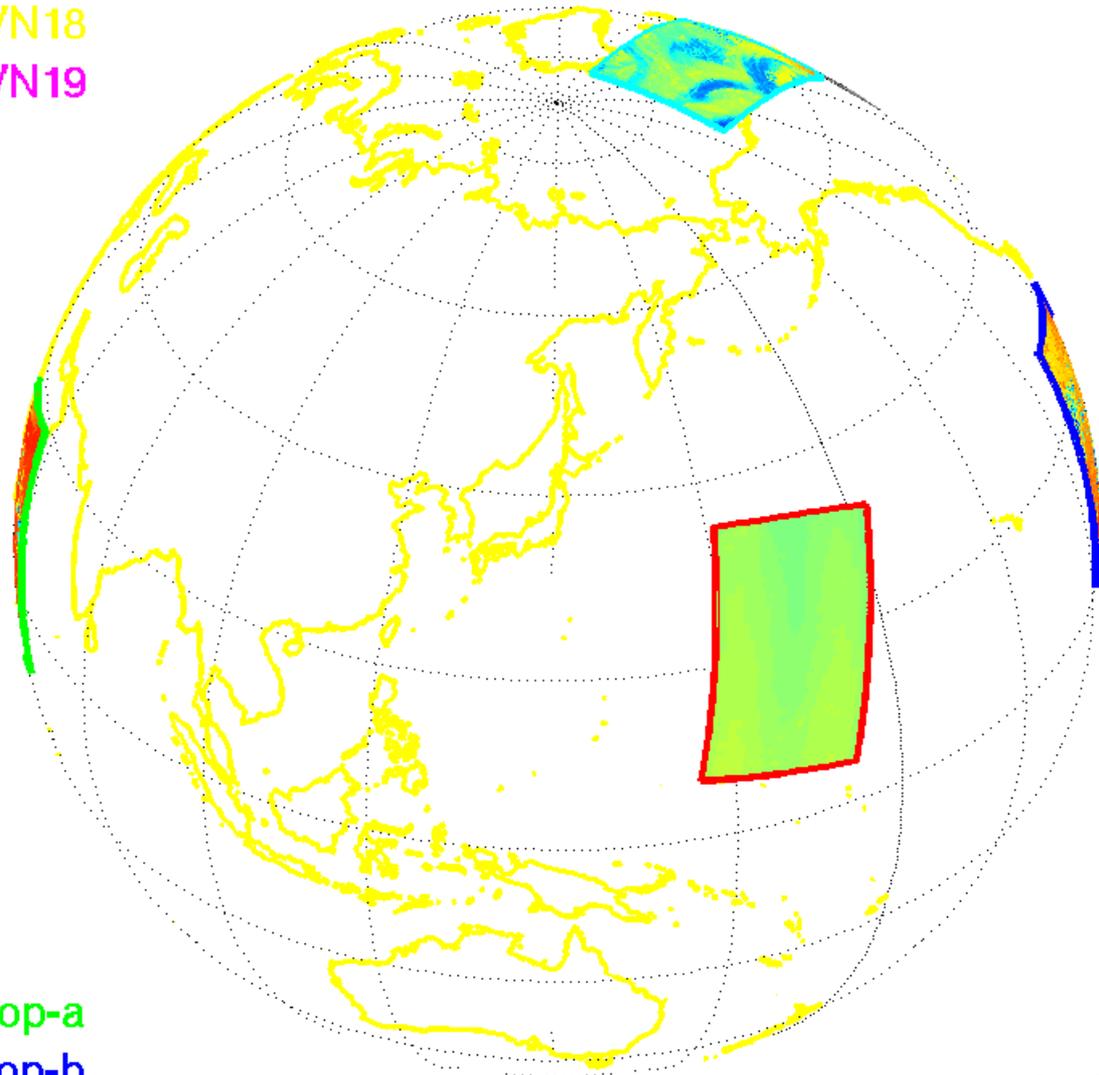
Note: Extended operations are reflected through the current FY, based on current operating health.

	In orbit		Post Launch Test
	Fuel-Limited Lifetime Estimate		Planned Mission Life, from Launch Readiness Date
	Launched before Oct 2008		Operational beyond Dec 2036

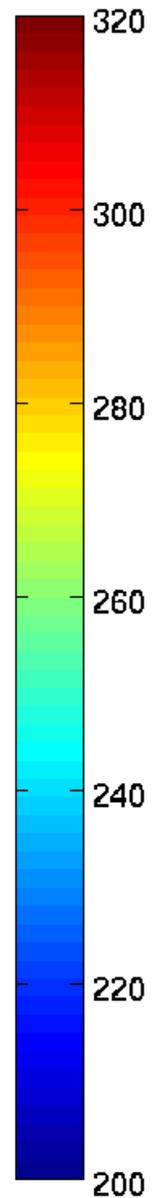
Tb (K) at 10.9 μm or 52.8 GHz

AMSU-A/N15
AMSU-A/N18
AMSU-A/N19

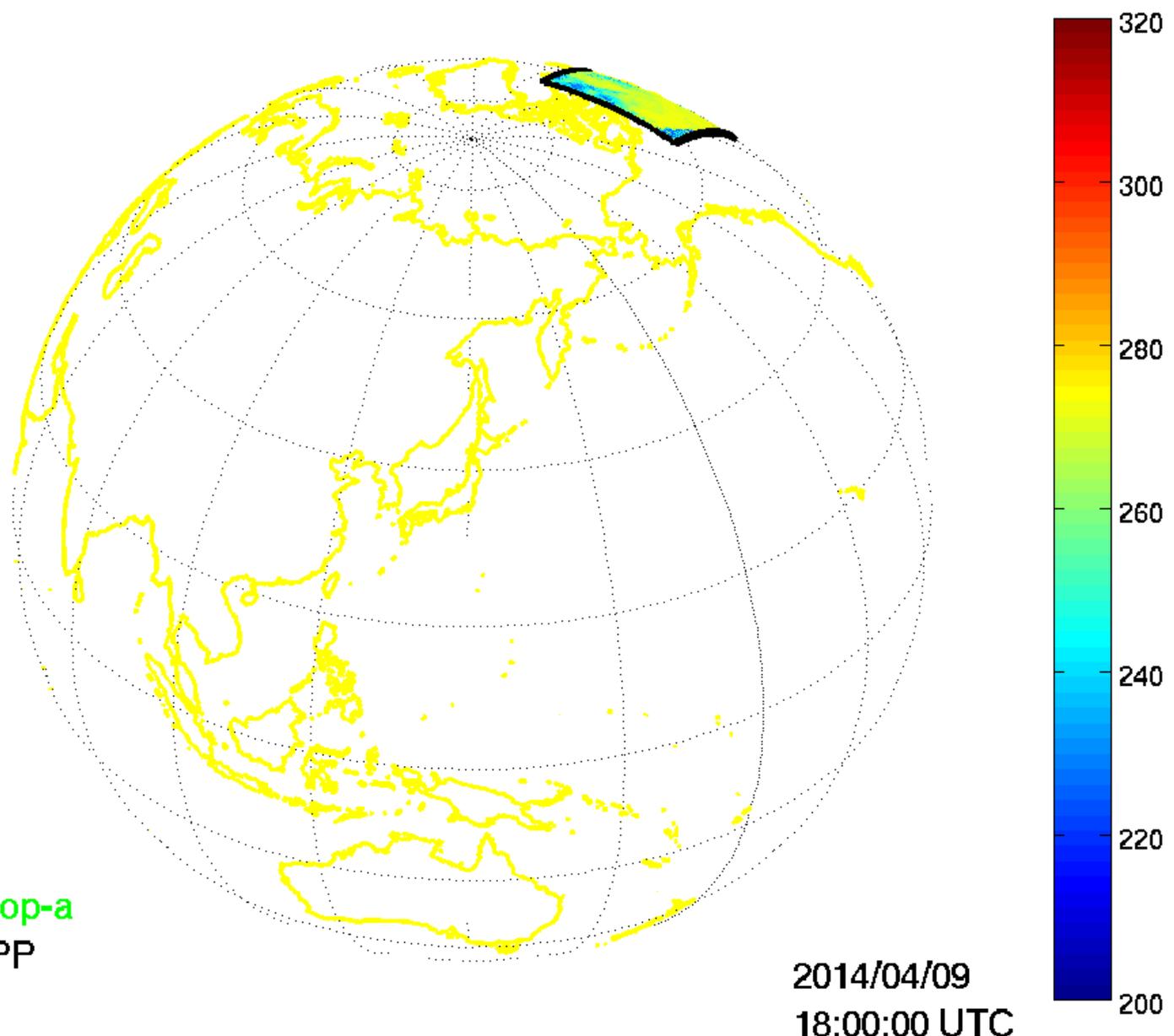
IASI/Metop-a
IASI/Metop-b
CrIS/SNPP
AIRS/Aqua



2014/04/30
18:00:00 UTC



Tb (K) at 10.9 μm or 52.8 GHz



IASI/Metop-a
CrIS/SNPP

2014/04/09
18:00:00 UTC



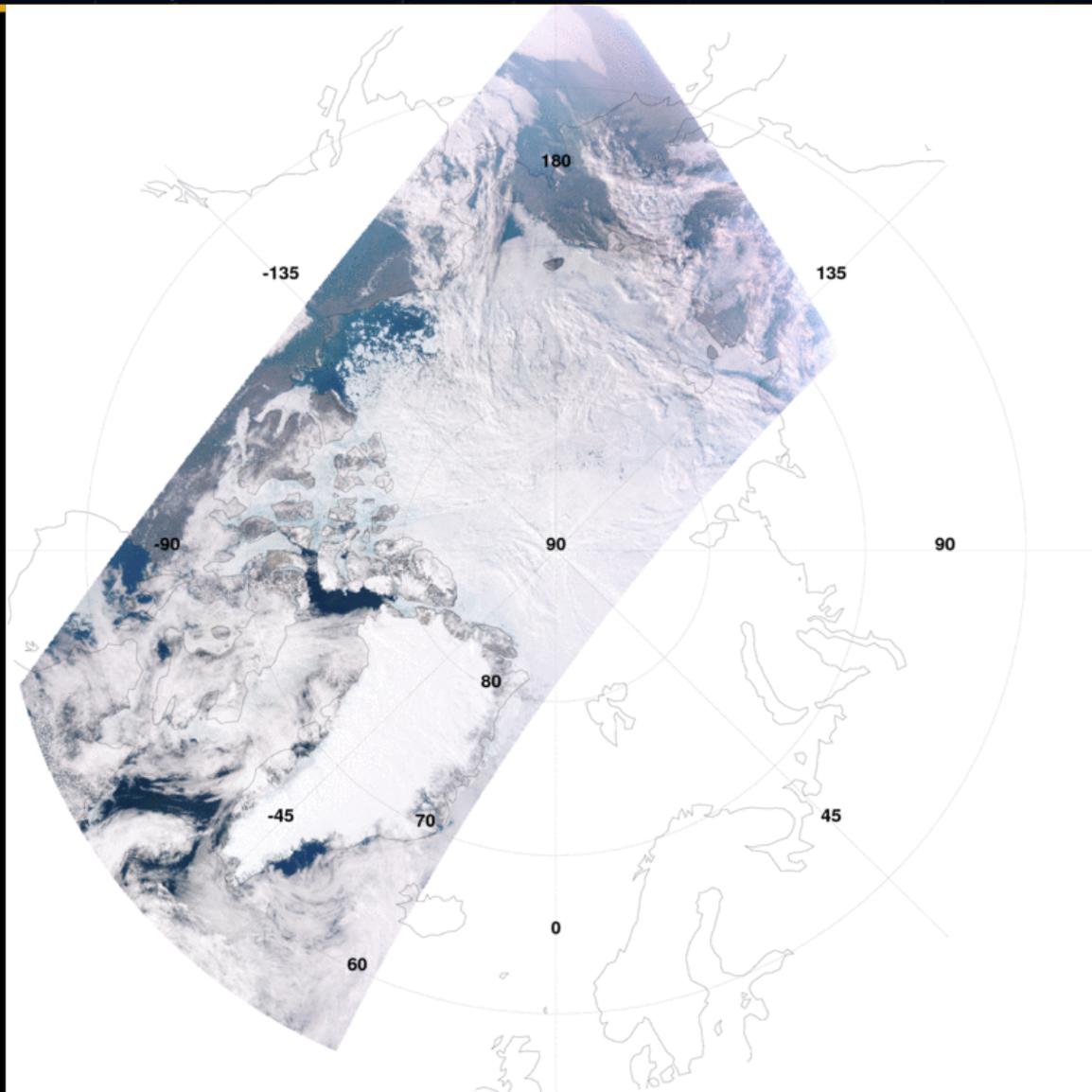
Microwave “high temporal”





Perched above the poles

North Pole, 2016-06-24 15:46 - 2016-06-24 16:04 UTC, Orbit: 24137





End-to-End Science Approach



- User requirements and prioritization
 - Determining and prioritizing products user needs - Critical, Supplemental High, Supplement Low(subset of critical becomes Key Performance Parameters (KPP) via LORWG, TPIO, NOSC
 - User input gathered via the LORWG, chaired by Program Scientist.
 - User workshops/conferences to reach broader community
 - Assessing solutions to meet requirements, does the proposed system satisfy the need?.
- Algorithms and Cal/Val
 - Develop algorithms to generate products- meeting requirements (accuracy, precision, latency)
 - Develop tools to visualize /validate the products
 - Generate validation reports, understanding and correcting outliers
 - Provide science and R2O maturity artifacts (Enterprise Life Cycle)
 - ATBDS, Cal/Val Plans, User manuals, Preliminary and Critical Design Reviews, Algorithm and Operational Readiness Reviews
 - Reprocess mission data to maintain consistency of products after algorithms errors are corrected or improvements are made to the algorithm, and deliver reprocessed data to NCEI
 - Delivery of software packages to operations & CSPP (Direct Broadcast package)



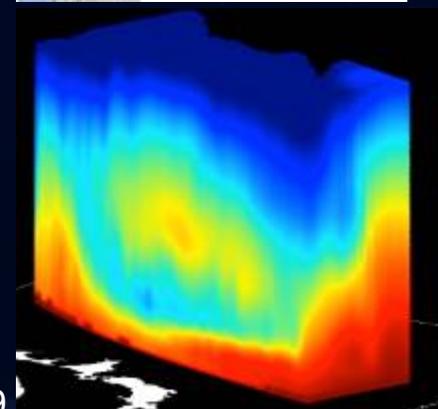
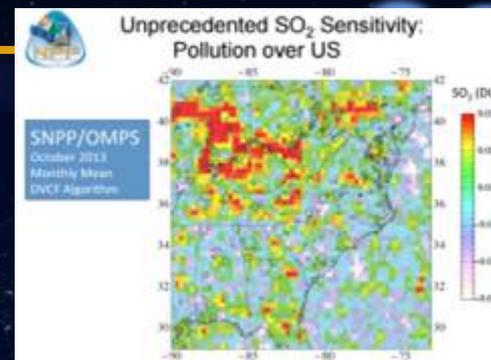
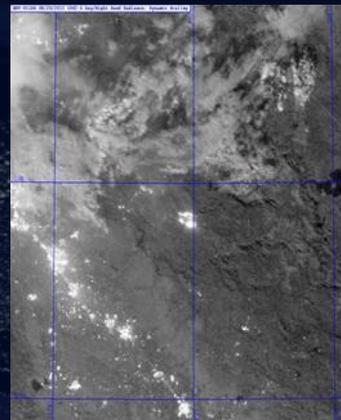
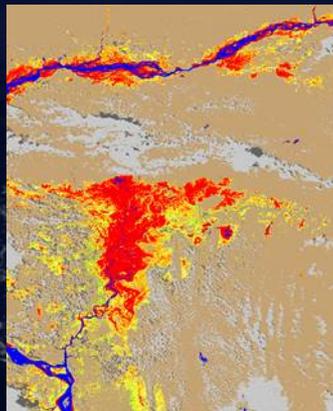
End-to-End Science Approach



- **User Readiness (Proving Ground)**
 - User engagement and priorities through JPSS Proving Ground Executive Board and Satellite Development Executive Board and Proving Ground and User Readiness Meeting.
 - Projects to improve NOAA products and services throughout NOAA LOs via infusion of JPSS data into applications (prioritized by PGED/SDEB).
 - Proving Ground Initiative Process for improved user interactions
 - Training for better understanding of how to best use our products in key applications
- **New Science (Risk Reduction)**
 - To meet user needs (e.g. flood mapping and river ice, improved data fusion of multiple data source)
 - User of Direct Readout to test new algorithms or to further reduce latency.



Climb the Application Pyramid



Decisions

Warnings

Impact Assessments

Specialty Forecasts – e.g.,
floods

Weather Forecasts e.g., 3-5 days

Baseline of Robust and Accurate
Observations

Addressing Needs Across NOAA

WEATHER READY NATION

1. Aviation Weather and Volcanic Ash
2. Fire Weather
3. Hydrology and Water Resources
4. Marine Weather and Coastal Events
5. Hurricane/Tropical Storms
6. Routine Weather
7. Severe Weather
8. Space Weather
9. Tsunami
10. Winter Weather
11. Environmental Modeling Prediction
12. Science, Services and Stewardship

National Weather Service

HEALTHY OCEANS

1. Ecosystem Monitoring, Assessment and Forecast
2. Fisheries Monitoring, Assessment and Forecast
3. Habitat Monitoring and Assessment
4. Protected Species Monitoring
5. Science, Services and Stewardship

National Marine Fisheries Service

RESILIENT COASTS

1. Coastal Water Quality
2. Marine Transportation
3. Planning and Management
4. Resilience to Coastal Hazards and Climate Change
5. Science, Services and Stewardship

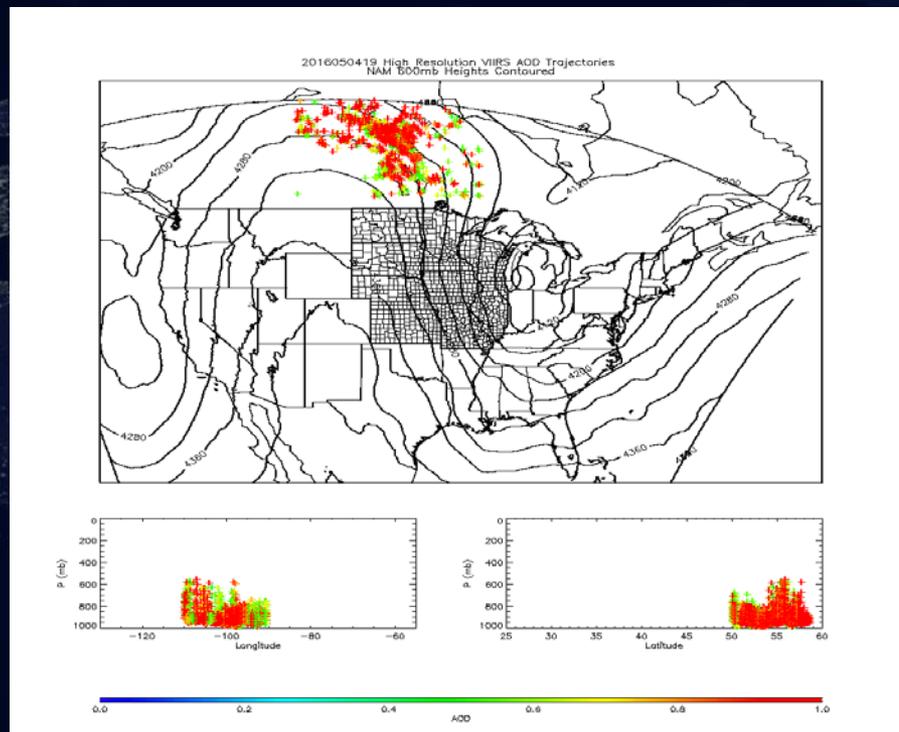
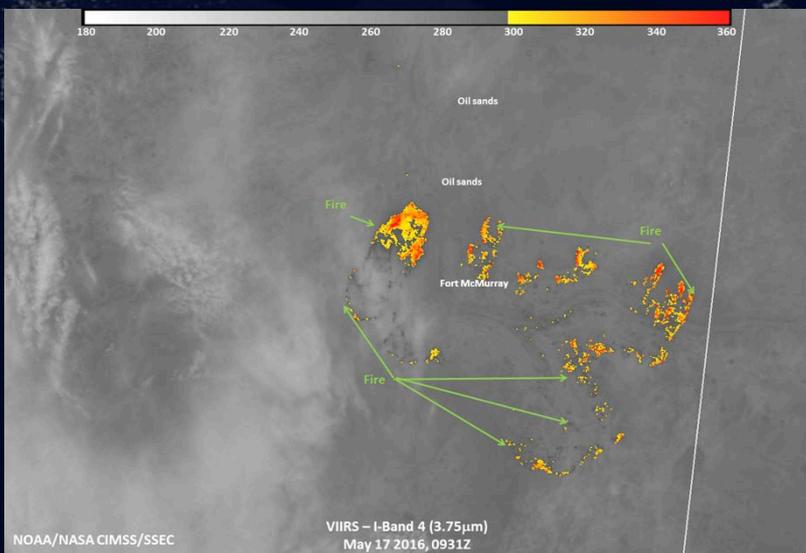
National Ocean Service

CLIMATE

1. Assessments of Climate Changes and Its Impacts
2. Climate Mitigation and Adaptation Strategies
3. Climate Science and Improved Understanding
4. Climate Prediction and Projections

Office of Oceanic and Atmospheric Research

Improved smoke air quality forecasting

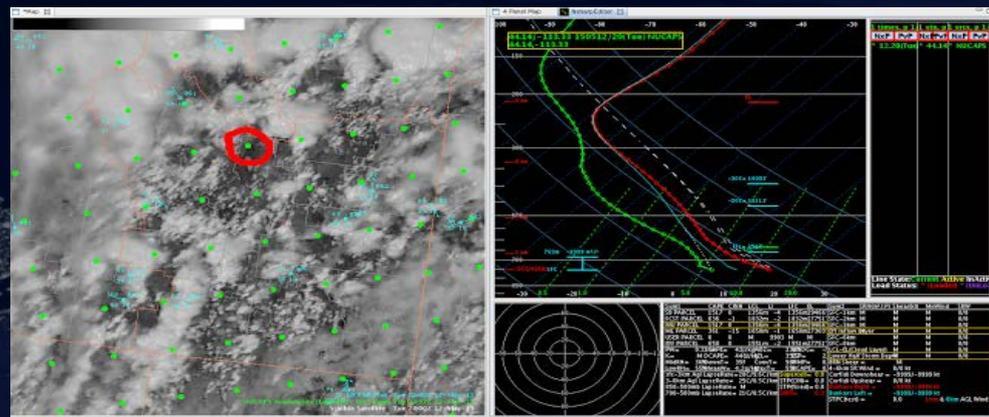


High resolution (NAM 3km) trajectory forecast
Fort McMurray Wildfire May 04, 2016

JPSS Applications Advancements

Sounding Products

- On AWIPS and AWIPS Thin Client
- Demonstrations with operational forecasters at 2015 & 2016 Spring Experiment
- Support storm watches and warnings



Day Night Band

- NCC/DNB now on AWIPS
- Sea Ice
- Storm tracking at night
- Ground Fog
- Active fires and smoke
- Socio / Economic / Impact assessment

The figure shows a Google Maps satellite view of a mountainous region in Montana. A text overlay on the right side of the map provides a forecast discussion for Missoula, MT.

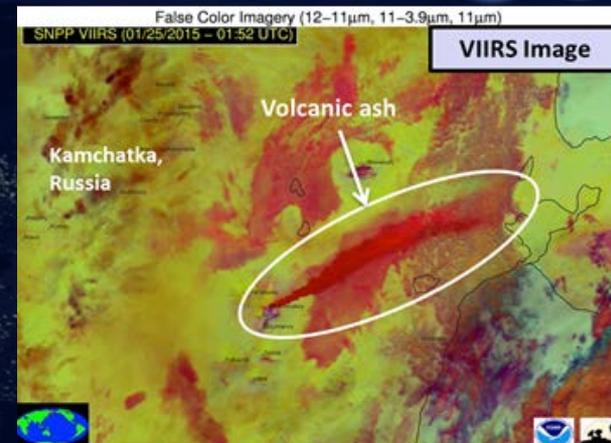
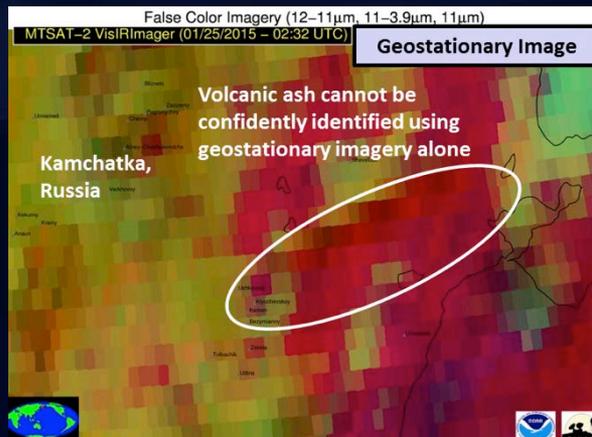
**Area Forecast Discussion
National Weather Service
Missoula MT
334 AM MST SAT NOV 8
2014**

...
.AVIATION...Moderate high pressure situated over the area will bring a chance for fog to develop at KGPI, KMSO and KSMN. *The VIIRS night-time visible satellite image at 08/20z revealed some valley fog across Clearwater County, Idaho and also north across the Idaho Panhandle.* Any fog that develops near the aforementioned terminals will dissipate by noon. Expect light and variable surface winds at all the terminals.

JPSS Applications Advancements

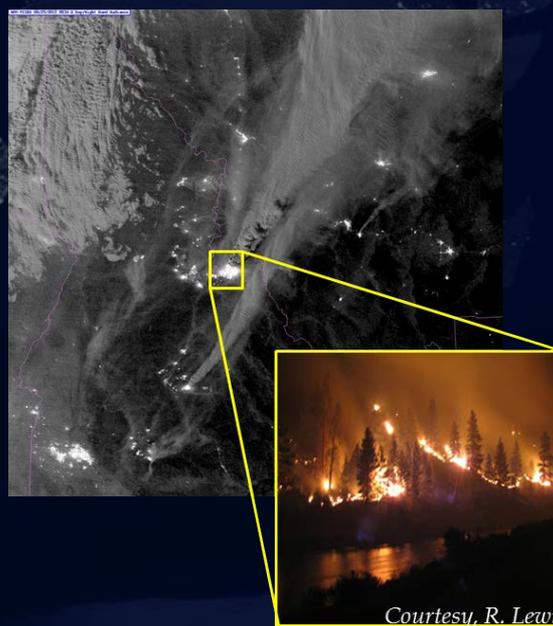
Volcanic Ash

- Wide swath, near constant resolution
- More detections, better plume monitoring / predictions



Active Fires

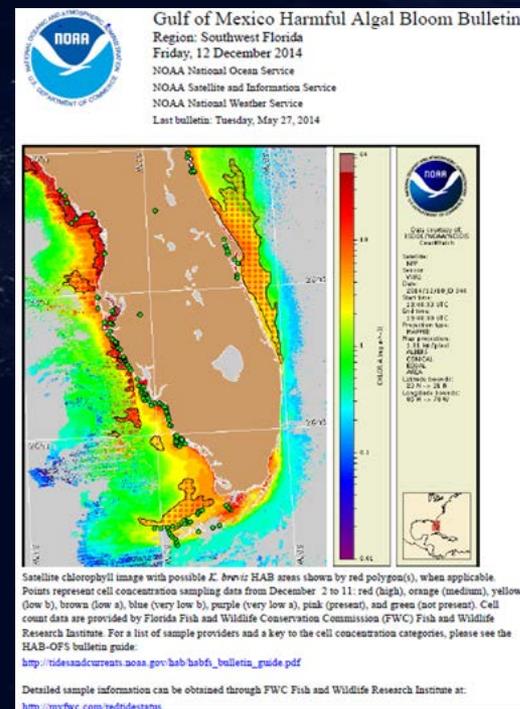
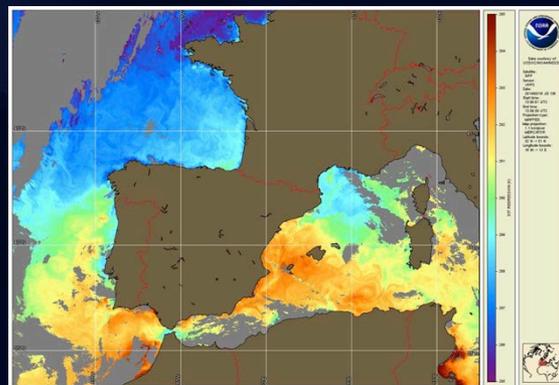
- Fire radiative power
- DNB tracking
- Improved visible resolution/ swath
- Successful field studies



JPSS Applications Advancements

Oceanography

- Improved sea surface temperature
- Highly calibrated global ocean color



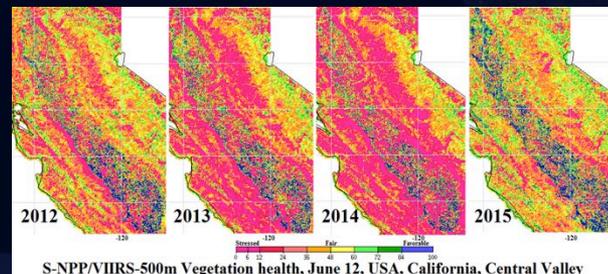
Hydrology

- Ice blockage
- Flood prediction / monitoring



Land

- Green Vegetation Fraction
- Vegetation Stress

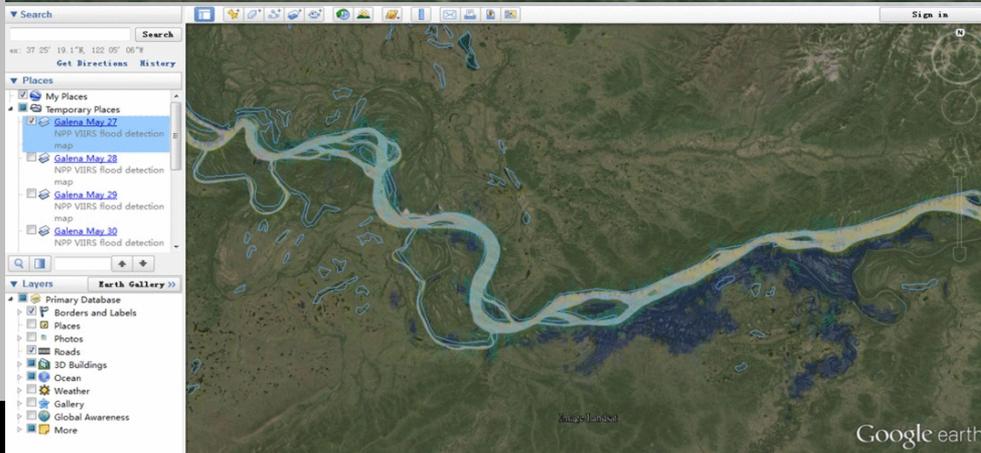




Successful demonstration of VIIRS flood mapping and river ice products with NWS River Forecast Centers (RFCs) (Alaska Pacific, North Central and Ohio River)

JPSS Proving Ground presented flood map and river ice examples to RFC's and received strong user support for further evaluation.

- JPSS PG established an operational demonstration work plan with the RFCs which included implementation of algorithm in CSPP (direct readout), experimental products in AWIPS and assessment from users (RFCs) including validation with airborne imagery.



- VIIRS can identify river ice jams which can lead to large flood events
- Flooding from ice jams can occur in a very short time
- Flooding can occur from snow melt and heavy rains

April 15, 2014

Red River Flooding from snow melt

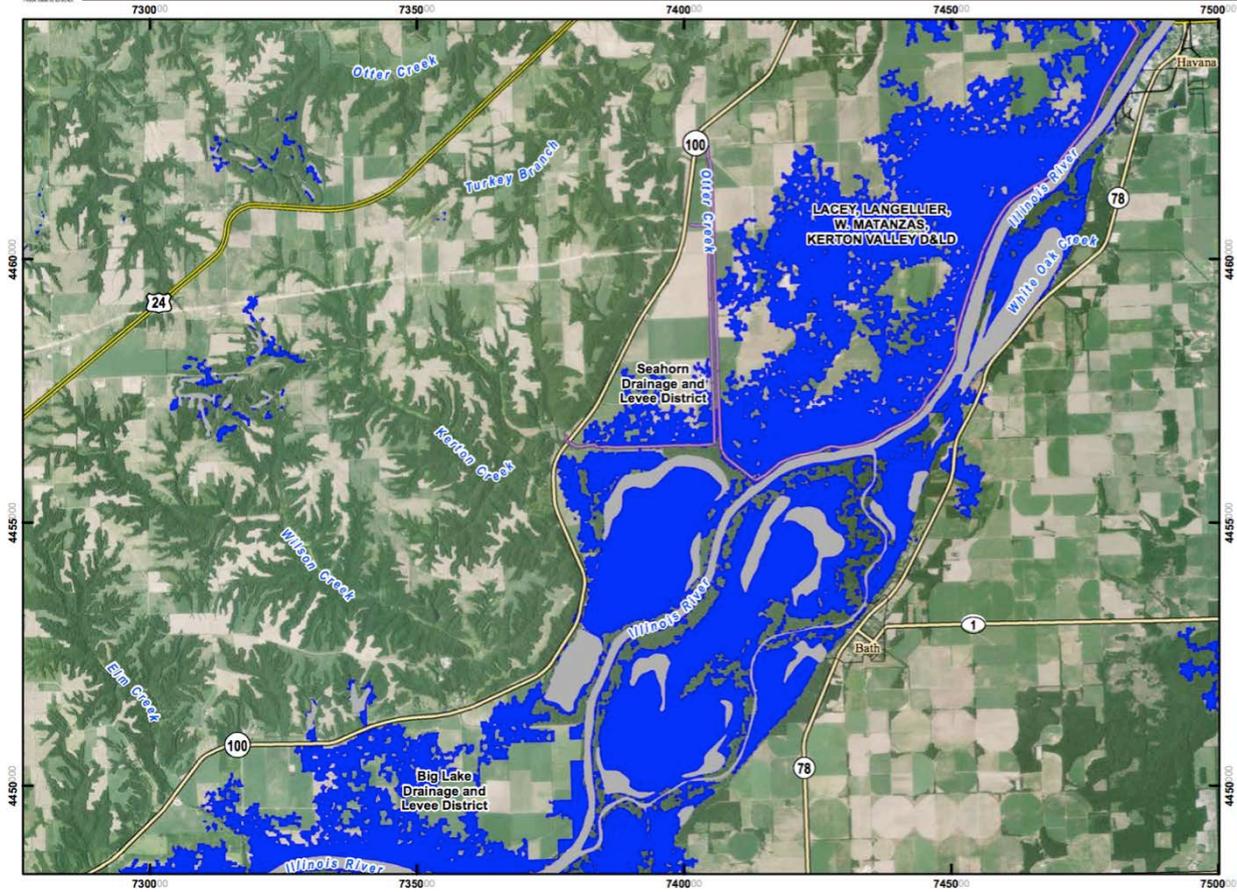


Feedback from the RFCs

- *“River ice vs no ice detection appears excellent”*
- *“Prove useful delineating area of active snowmelt at multiple basin scales”*
- *“All RFCs identified significant value and future potential for river forecasting applications”*
- *“Color coded products with overlays are easily interpreted by forecasters”*
- *“Will formally request product to become operational”*



VIIRS flood product being used by Army Corp of Engineers



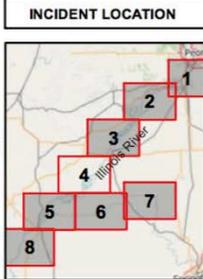
LEGEND

- VIIRS Detected Surface Water
- Normal (non-flood) Surface Water
- Levee Centerline
- Leveed Area
- US Highways
- Streets
- Railroads
- Surface Water

0 3,300 6,600 FT

Coordinate System: NAD 1983 UTM Zone 18N
 Projection: Transverse Mercator
 Datum: North American 1983
 Units: Meter

DISCLAIMER: While the United States Army Corps of Engineers, District of Rock Island (DRI) has made a reasonable effort to ensure the accuracy of the maps and associated data, it should be explicitly noted that DRI/CDC makes no warranty, representation or guarantee, either express or implied, as to the content, accuracy, timeliness, completeness or any of the data provided herein.



Rock Island District
 Emergency Management
 28 DEC 2015

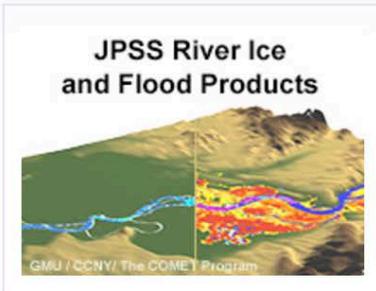
The background image is experimental satellite imagery collected by NOAA's Suomi NPP, using the Visible Infrared Imaging Radiometer Suite (VIIRS). It shows the extent of surface water as of 01 JAN 2016. It has been downsampled to 30 meter resolution and packaged into KML files by NOAA. MVR extracted the KML images for import into GIS on 02 JAN 2016.

NOTE: Surface water behind a levee should not be categorically interpreted as an overtopping. The surface water detected could be due to many situations including, but not limited to, levee seepage/boils, pre-existing surface water, or ponding due to precipitation.



Lesson/Resource Listing » Description

JPSS River Ice and Flood Products



Languages: English
Publish Date: 2016-03-16
Skill Level: 2
Completion Time: .75 - 1.00 h
Includes Audio: no
Required Plugins: none
Topics:
 Hydrology/Flooding, Satellite Meteorology

BEGIN LESSON

Add to Queue [Your Queue»](#)

Take the quiz?
 Begin Quiz

Reviews:
 ★★★★★ (1 review)
[Read or add reviews](#)

Share this resource:
 t f t + 0

- Description
- Objectives
- Keywords
- Media Gallery
- Reviews

- Describe the environmental hazards and impacts of river ice and flooding, and the need for river ice and flood water observations
- Describe the capabilities and advantages of the JPSS satellites for monitoring surface conditions
- Describe the role of the River Ice and Flooding Product Initiative in developing the JPSS river ice and flood mapping products
- Describe the new JPSS products for monitoring river ice and flooding, including their strengths and limitations and role in supplementing other types of observations
- Describe how the JPSS products are used to monitor the evolution of river ice and flooding



Want to learn more?



- 2013, 2014 and 2015 Annual Science Digests are available
- Join our monthly JPSS Science Seminars
<http://www.jpss.noaa.gov/science-seminars.html>
- Check out the JPSS Website
<http://www.jpss.noaa.gov/>

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