

NOAA Polar Orbiting Satellites

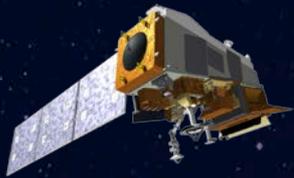


*From POES to JPSS:
New capabilities in satellite observations*

Overview of JPSS



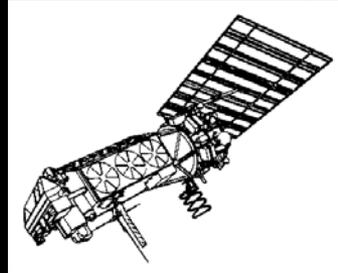
History of NOAA POES Weather Satellites



**TIROS-1-10/
ESSA 1-9/ITOS 1-8**
two cameras and (some)
radiometers



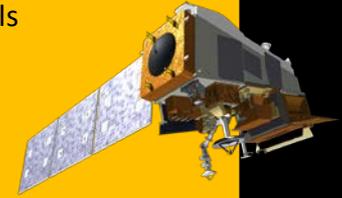
TIROS-N /NOAA 6-14
(TIROS-N LD - Oct 1978)
first to fly AVHRR and the three sounders
and a data collection system



JPSS

(S-NPP LD – Oct 2011)

- 5 new instruments
- 100x more channels
- Higher resolution
- Lower latency
- Wider swath
- 200X data



1960

1978

1998

2011

2017

NOAA-15

(LD – May 1998)

first to fly advanced microwave
sounding units, AVHRR flew
additional 1.6micron channel



NOAA-18

(LD – May 2005)

improved resolution for the HIRS
sounder

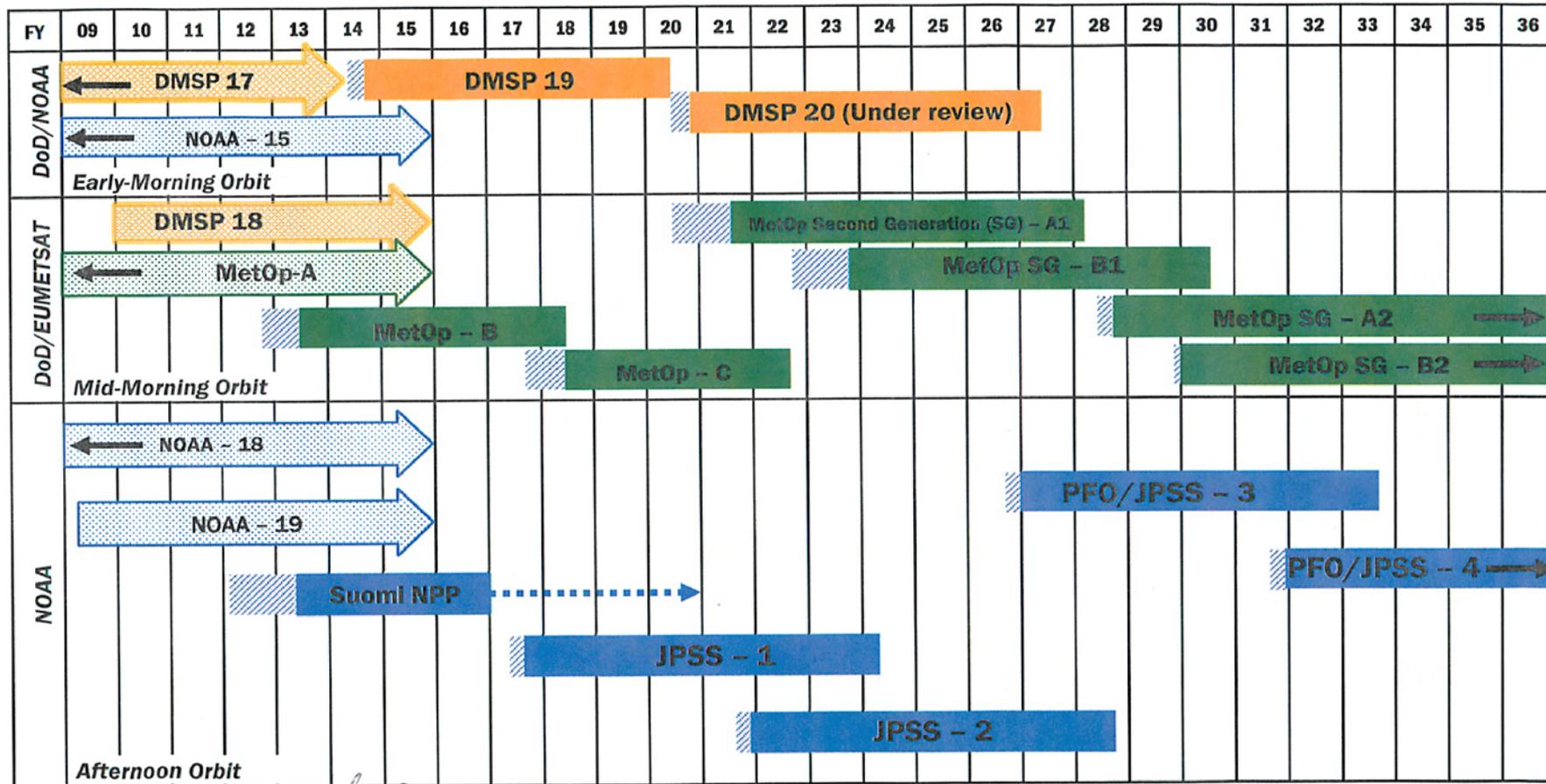


NOAA & Partner Polar Weather Satellite Programs

Continuity of Weather Observations



As of April 2015



Approved: *Mark S. Pese*
 Assistant Administrator for Satellite and Information Services

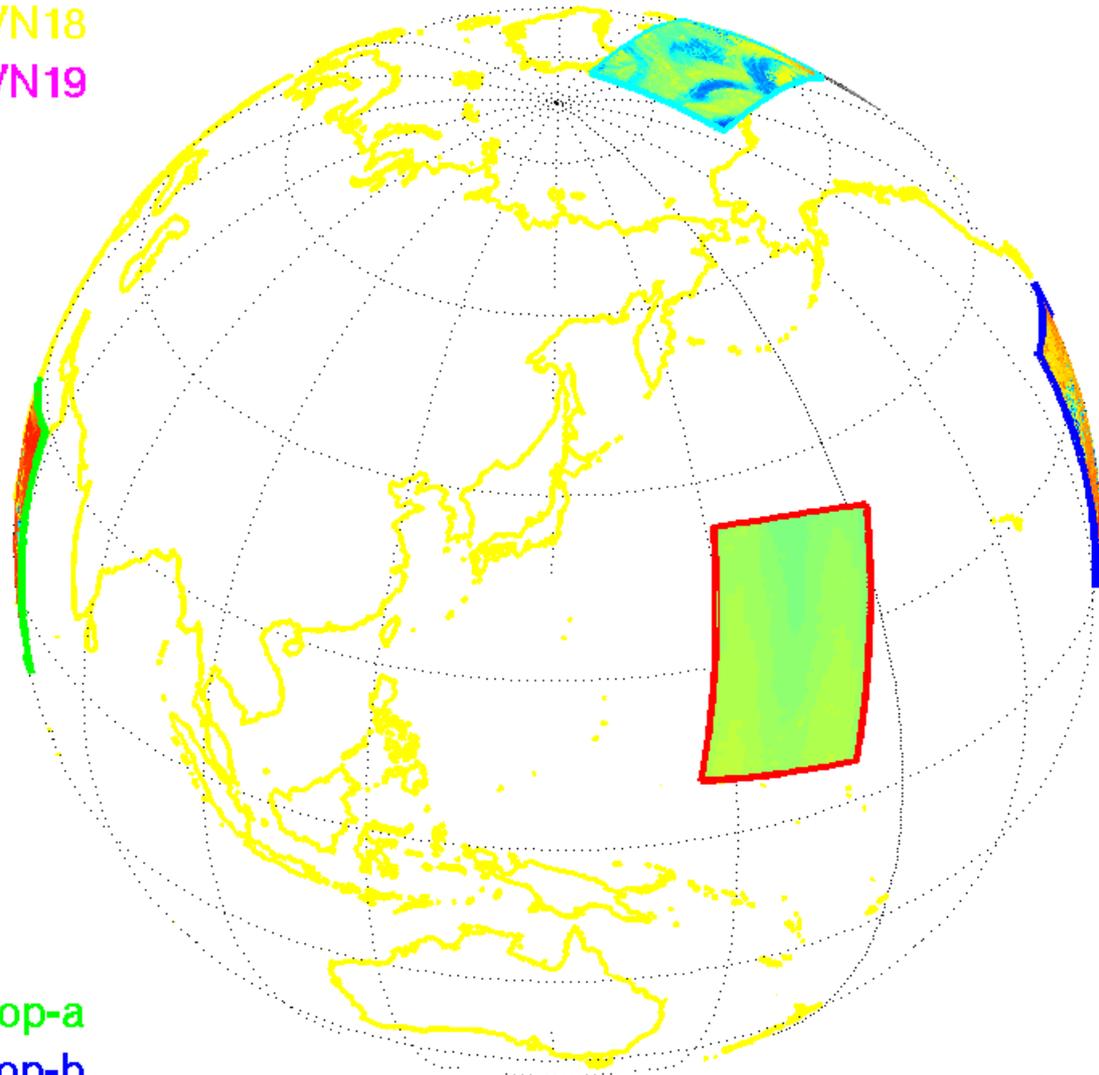
Note: Extended operations are reflected through the current FY, based on current operating health.

DMSP: Defense Meteorological Satellite Program		Post Launch Test
JPSS: Joint Polar Satellite System Program		Operational based on design life
Suomi NPP: Suomi National Polar-orbiting Partnership		Secondary
Note: DoD and EUMETSAT data provided for reference only		Operational beyond FY 2036
		Extended mission life
		Launched before Oct 2008

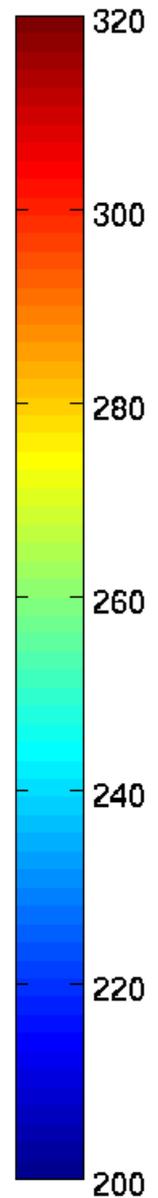
Tb (K) at 10.9 μm or 52.8 GHz

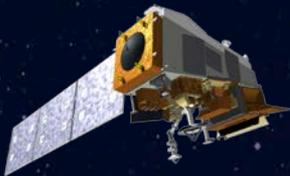
AMSU-A/N15
AMSU-A/N18
AMSU-A/N19

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



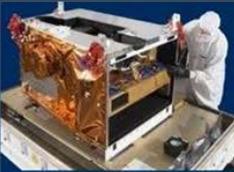
2014/04/30
18:00:00 UTC





JPSS Instruments

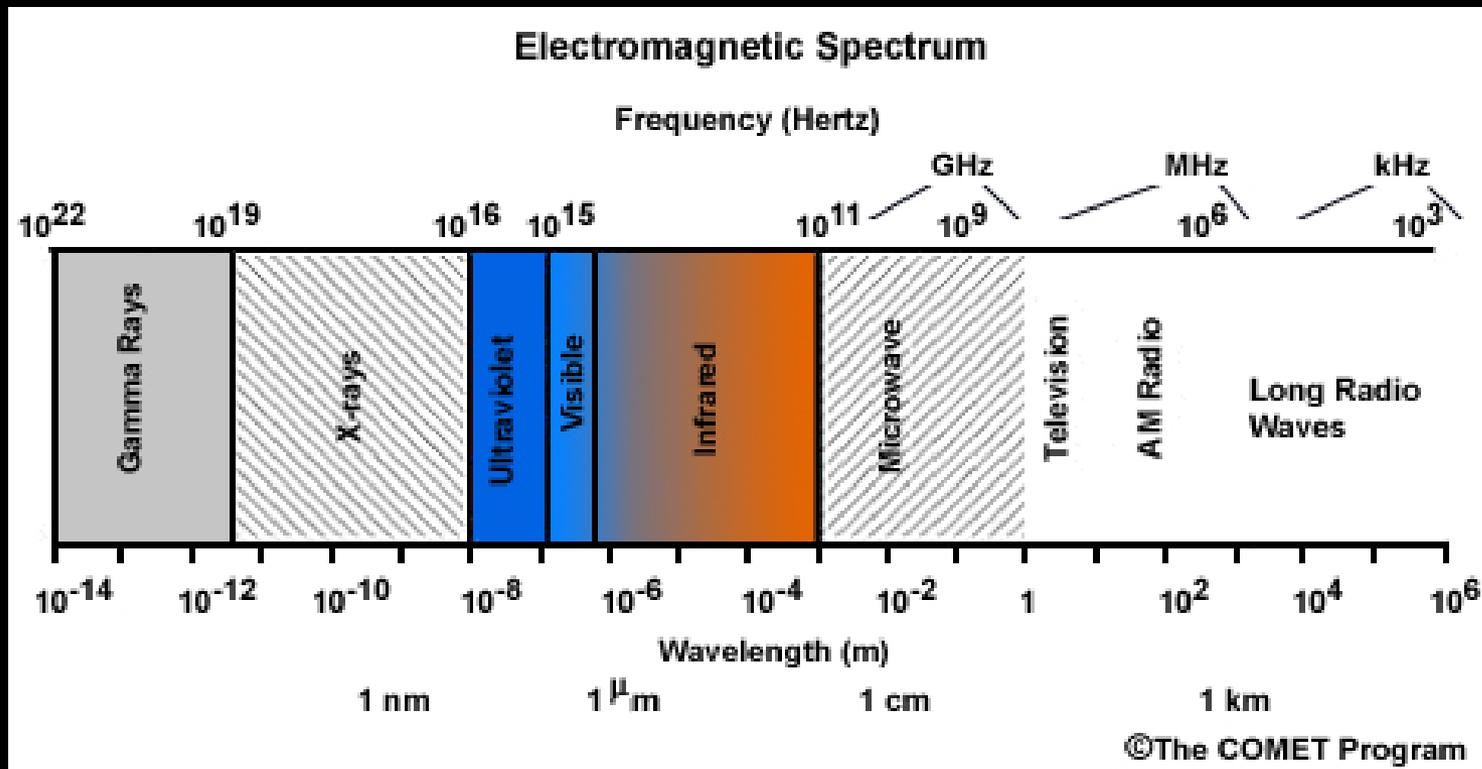
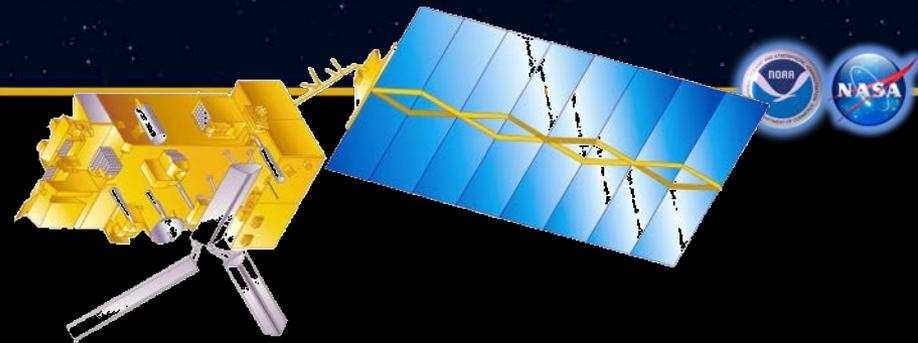


<i>JPSS Instruments</i>		<i>Measurements & Products</i>	<i>Contractor</i>
	ATMS - Advanced Technology Microwave Sounder	High vertical resolution temperature and water vapor information critical for forecasting extreme weather events, 5 to 7 days in advance	Northrup Grumman Electronic Systems
	CrIS - Cross-track Infrared Sounder		Exelis
	VIIRS – Visible Infrared Imaging Radiometer Suite	Critical imagery products, including snow/ice cover, clouds, fog, aerosols, fire, smoke plumes, vegetation health, phytoplankton abundance/chlorophyll	Raytheon Space and Airborne Systems
	OMPS - Ozone Mapping and Profiler Suite	Ozone spectrometers for monitoring ozone hole and recovery of stratospheric ozone and for UV index forecasts	Ball Aerospace and Technologies Corp.
	CERES – Clouds and the Earth’s Radiant Energy System (S-NPP and JPSS-1)	Scanning radiometer which supports studies of Earth Radiation Budget (ERB)	CERES - Northrup Grumman Aerospace Systems
	RBI – Radiation Budget Instrument (JPSS-2, 3, 4; provided by NASA)		RBI - Exelis

Electromagnetic Spectrum

Remote sensing uses radiant energy that is reflected and emitted from Earth at various “wavelengths” of the electromagnetic spectrum

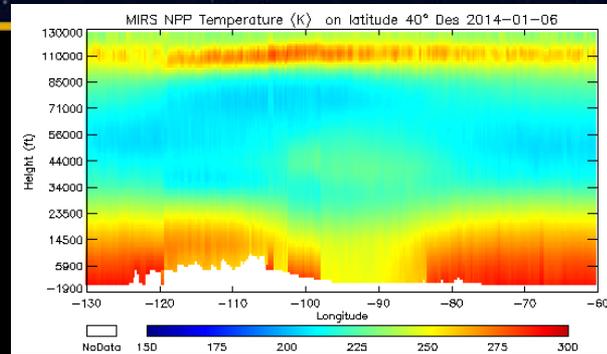
JPSS covers all 4 primary regions



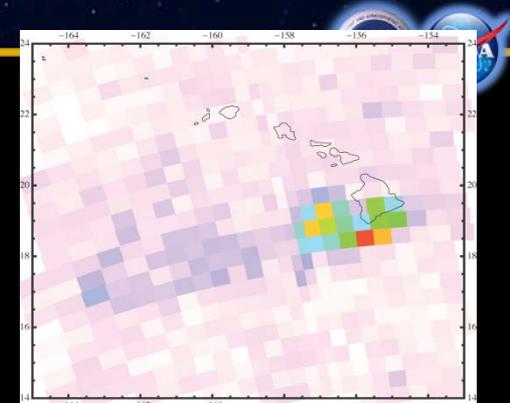


JPSS provides a wide range of capabilities

- Microwave – provides temperature and moisture soundings in cloudy conditions and rainfall rates, sea ice, snow, surface temperature **ATMS**
- Infrared – provides high vertical resolution temperature and moisture soundings in clear and cloud corrected regions; atmospheric chemistry - CO, CH₄, SO₂, ... and cloud products **CrIS**
- 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 **VIIRS**
- UV - ozone - Aerosols over bright surfaces, SO₂ plumes, NO_x (air quality)... **OMPS**



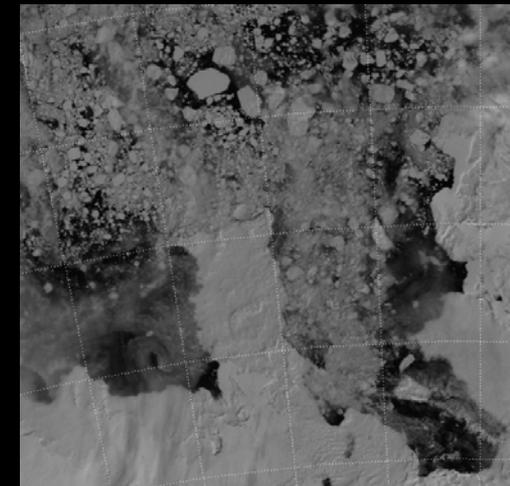
Temperature X-Section Polar Vortex



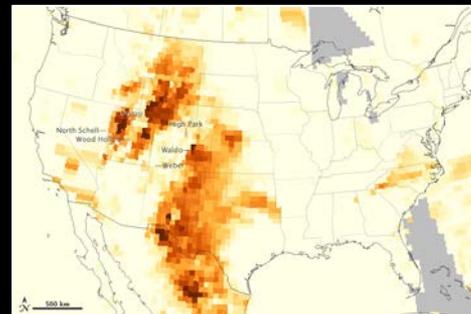
OMP-Volcano SO₂ degassing



Algae in Lake Erie



DNB Ice detection



OMPS Aerosols from Fires

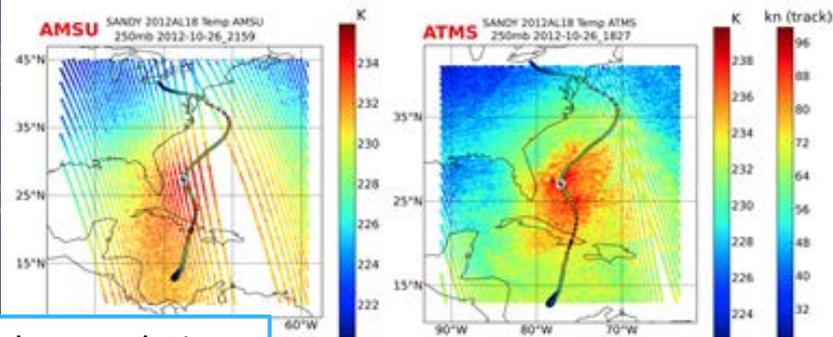
JPSS Next Generation Instruments



Advanced Technology Microwave Sounder

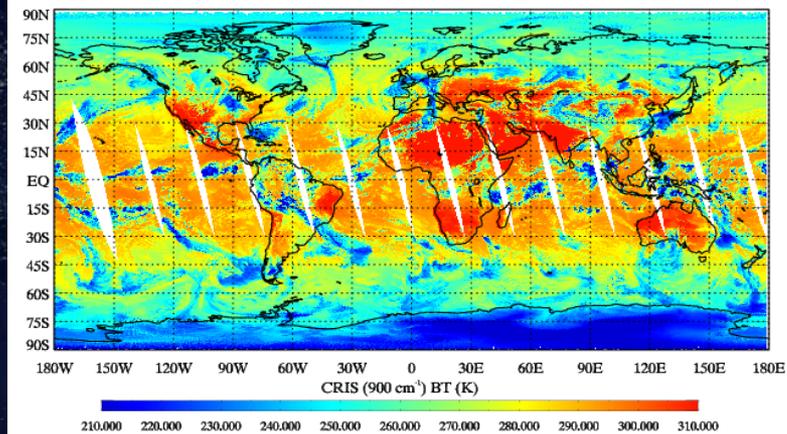
Cross-track Infrared Sounder

Resolution: ATMS vs AMSU



Higher resolution,
wider swath,
smaller gaps

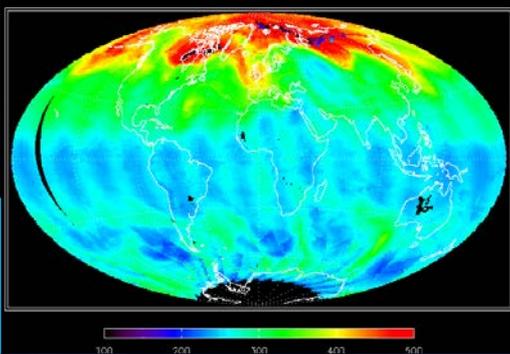
Ascending_orbits: CRIS (900 cm⁻¹) BT (K) Date: 2012-04-29



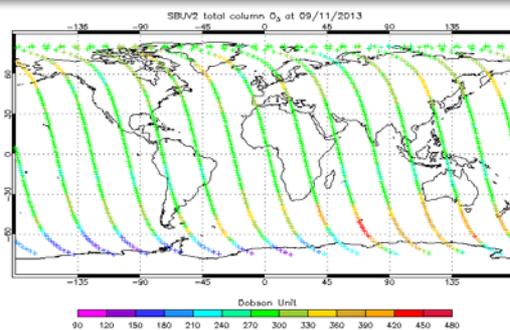
6x more vertical
resolving power

Ozone Mapping Profiler Suite

Resolution: OMPS vs SBUV/2

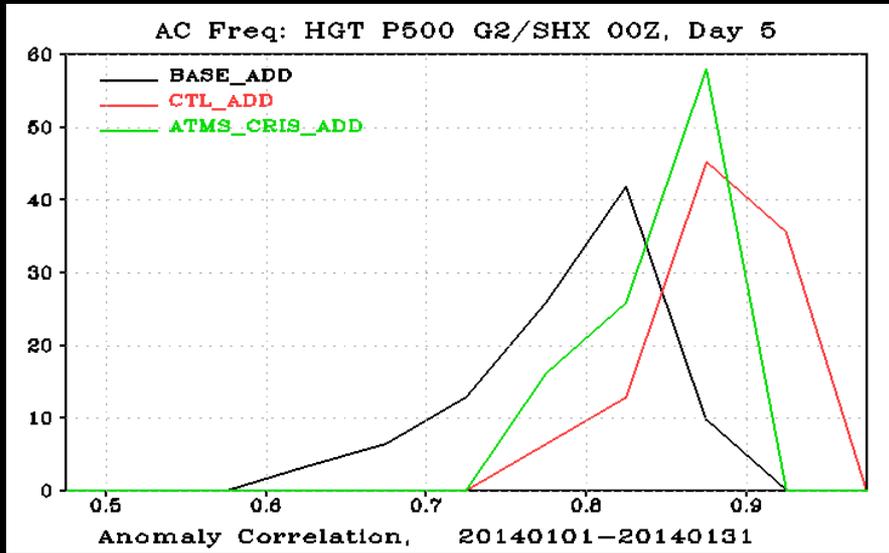
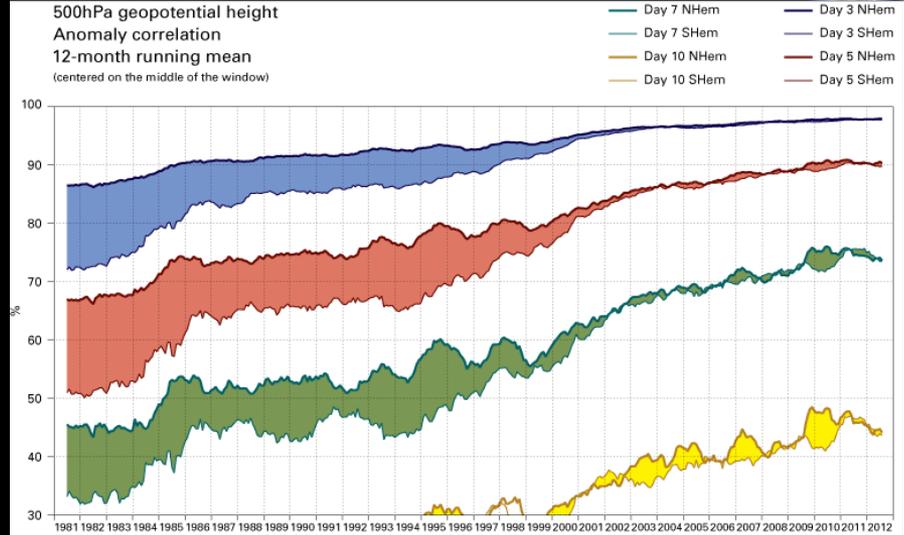
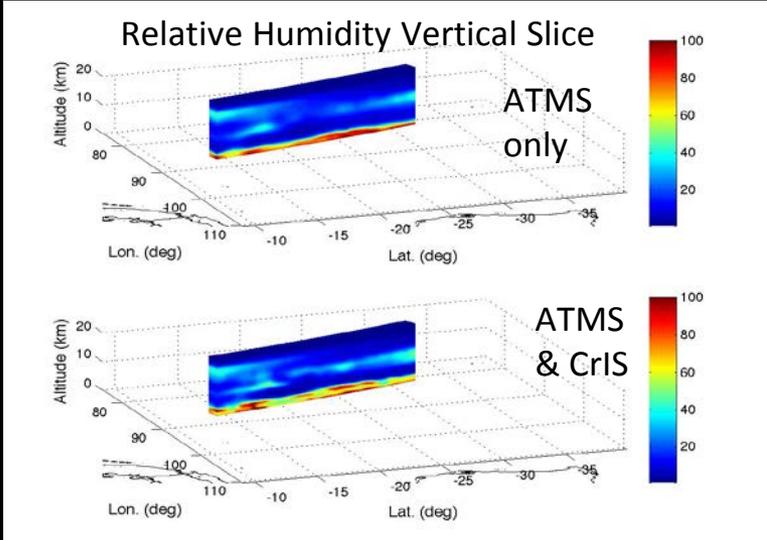


Provides global
coverage ozone
monitoring

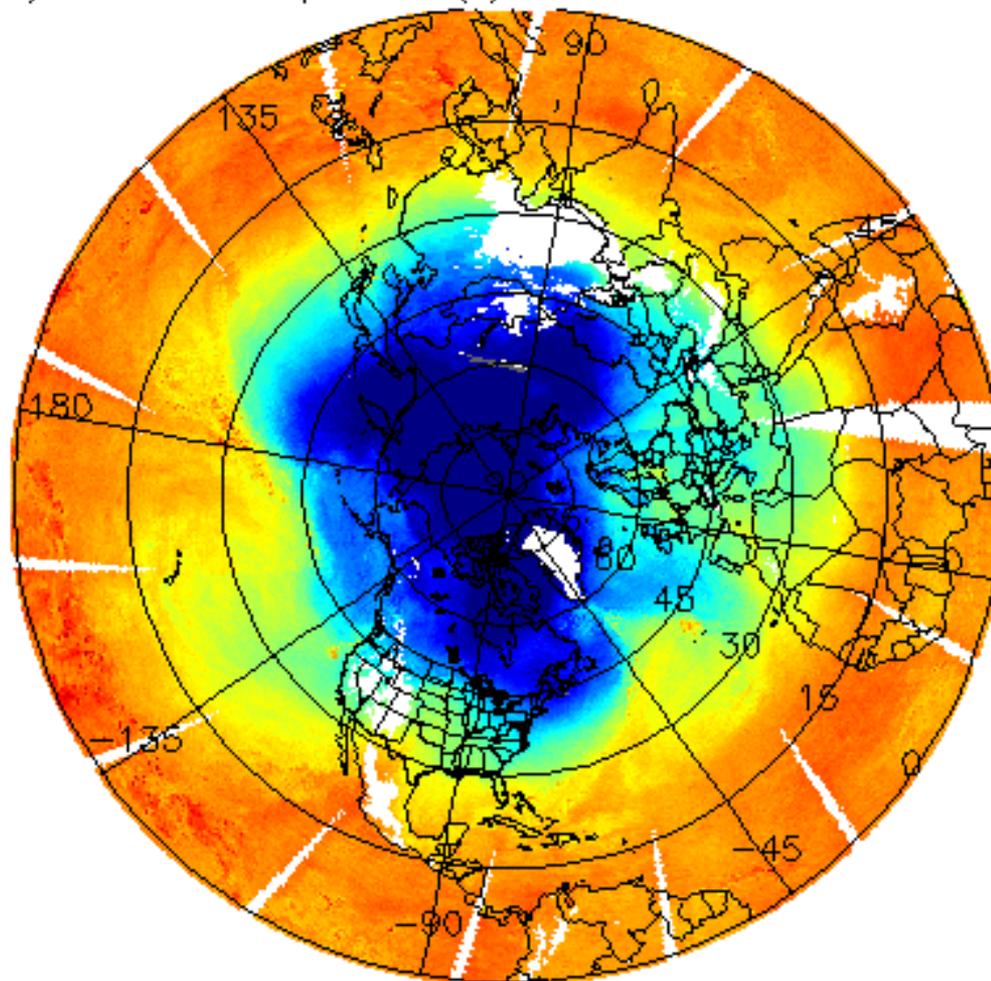




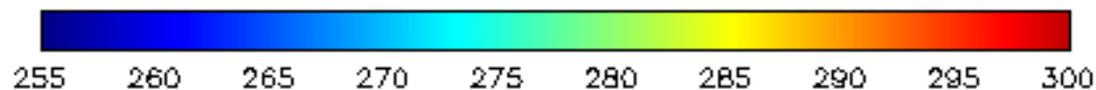
Top priority is supporting the 5 -7 day forecast SUCCESSFUL!!



MIRS NPP/ATMS N.H. Temperature (K) at 850mb 2015-12-20 Des (V3475)



NoData QC fail Land



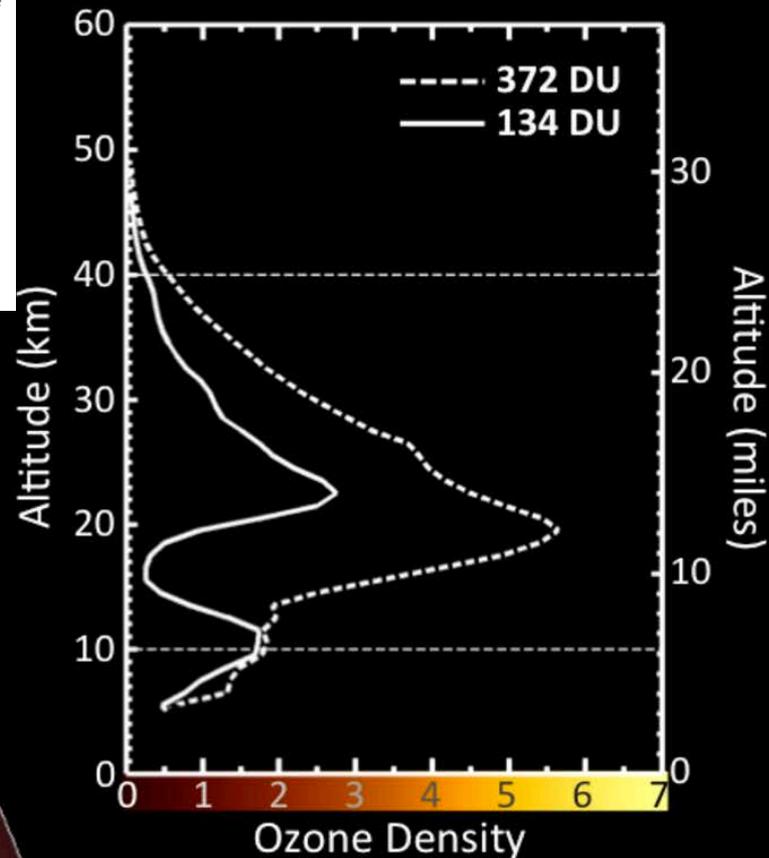
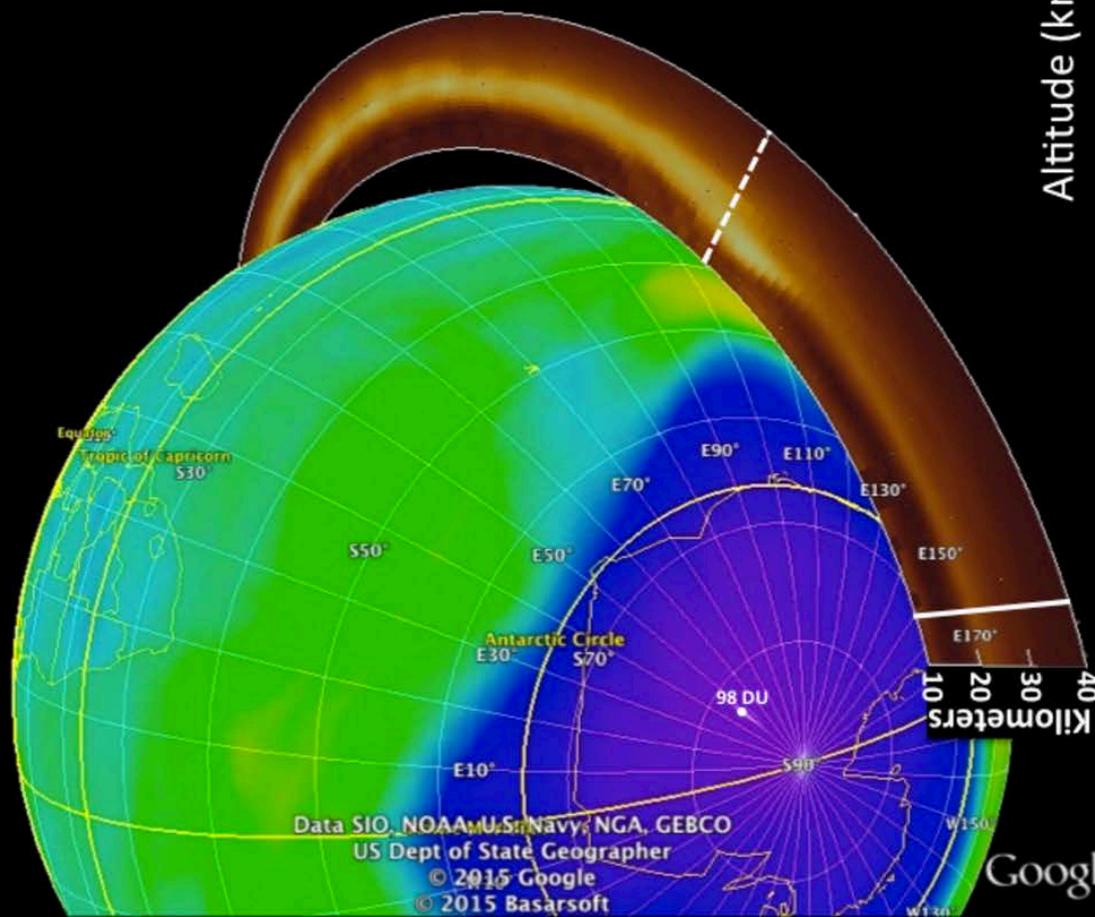


The [2015 Antarctic ozone hole area](#) was larger and formed later than in recent years, according to scientists from NOAA and NASA.

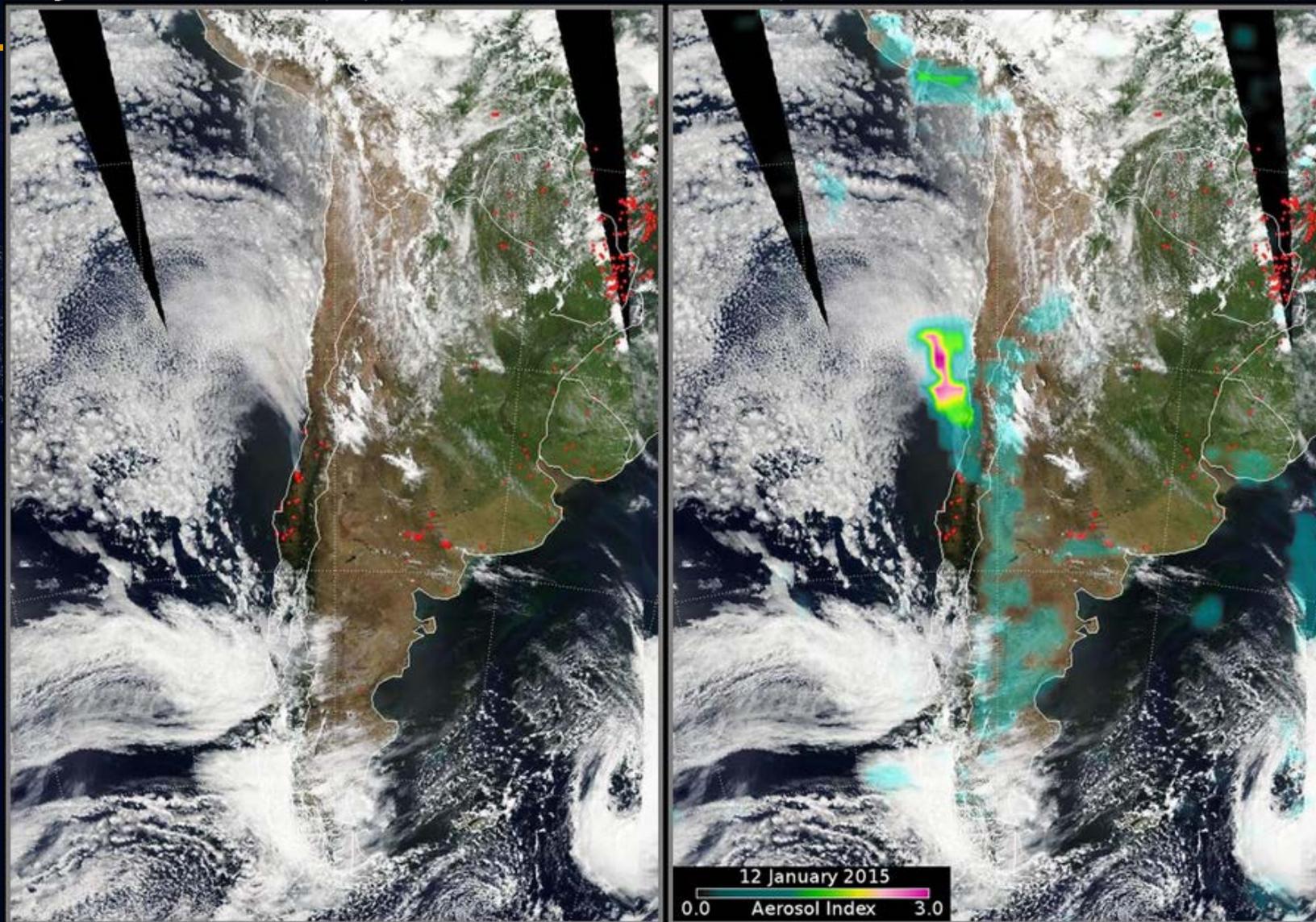
On Oct. 2, 2015, the ozone hole expanded to its peak of 28.2 million square kilometers (10.9 million square miles), an area larger than the continent of North America. Throughout October, the hole remained large and set many area daily records.

Cold temperatures fuel ozone loss

Unusually cold temperature and weak dynamics in the Antarctic stratosphere this year resulted in this larger ozone hole. In comparison, last year the ozone hole peaked at 24.1 million square kilometers (9.3 million square miles) on Sept. 11, 2014. Compared to the 1991-2014 period, the 2015 ozone hole average area was the fourth largest.



UV is more sensitive to smoke than visible



Credit Colin Seftor NASA

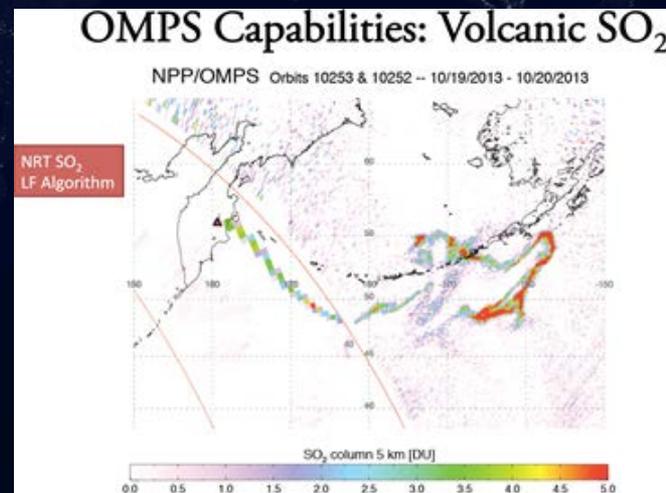
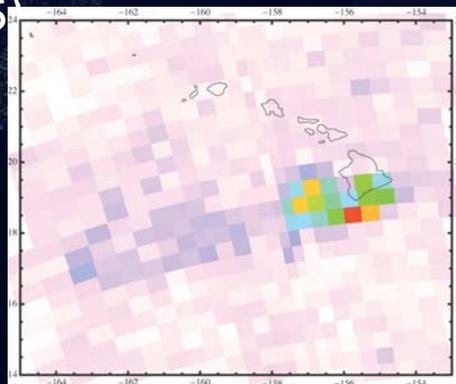
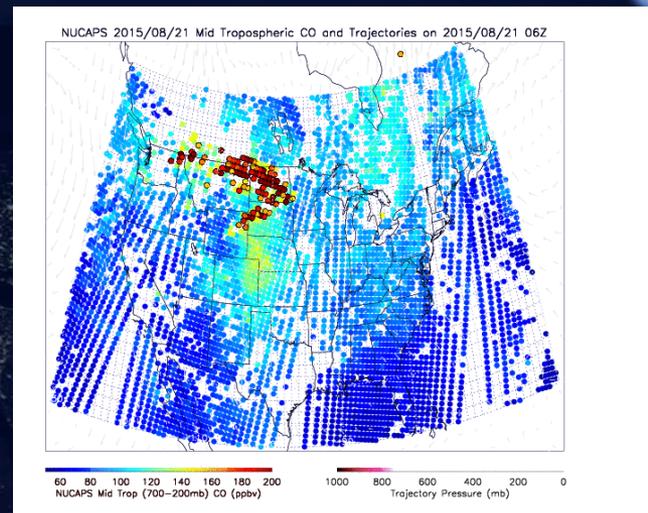


Two significant product improvements



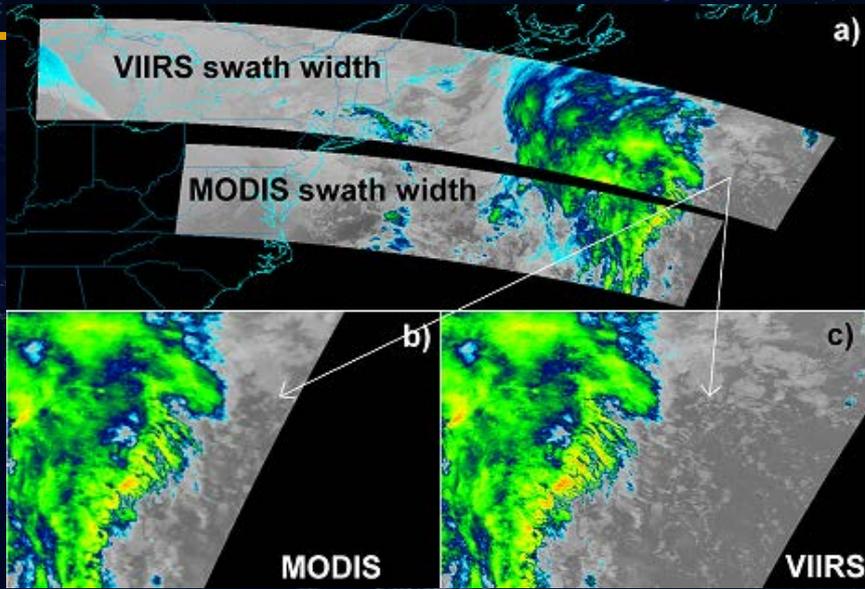
The full CrIS spectral resolution which will enable carbon monoxide products (SNPP/JPSS)

The improved OMPS spatial resolution providing total ozone at 17 km instead of 50 km, and ozone profiles at 50 km instead of 250 km (JPSS)

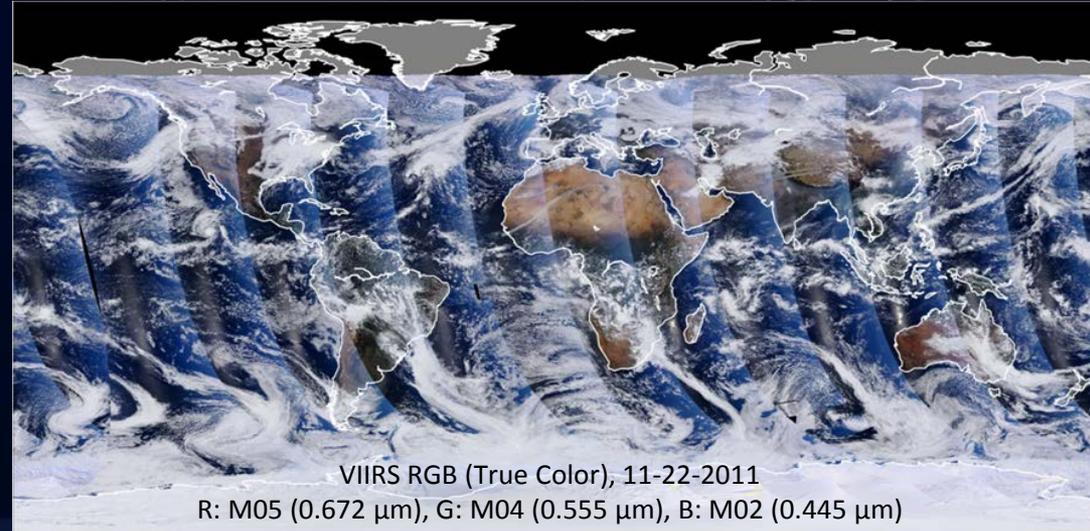
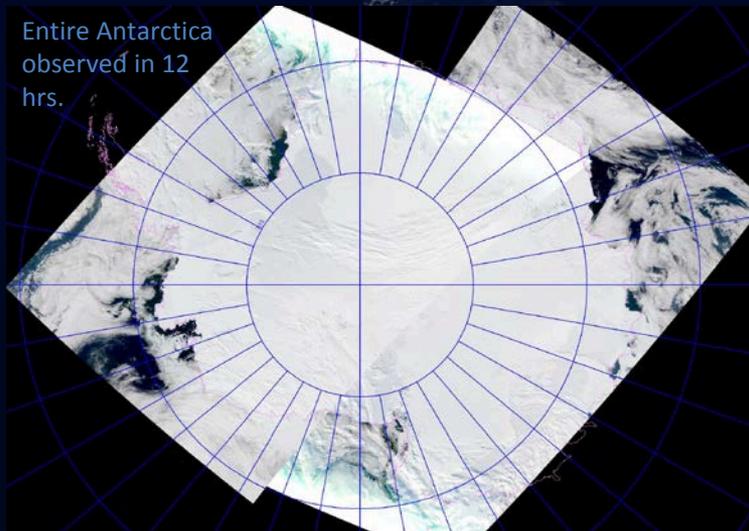
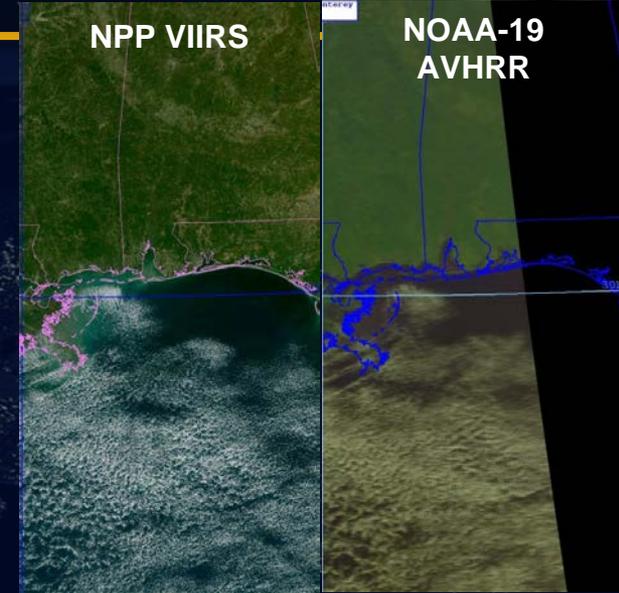


OMP- Volcano SO2 degassing @ 50 km

JPSS Next Generation Instruments



The Visible Infrared Imaging Radiometer Suite offers more spectral bands, higher resolution, wider swath and greater accuracy, resulting in a large number of products



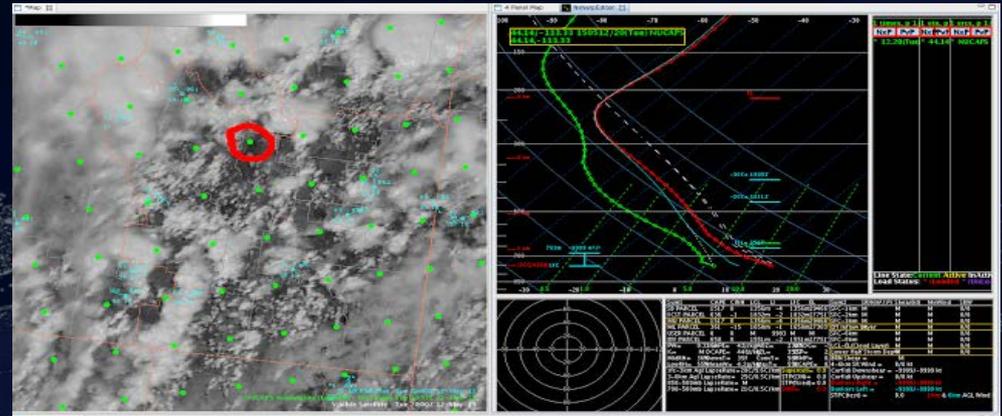


JPSS Applications Advancements



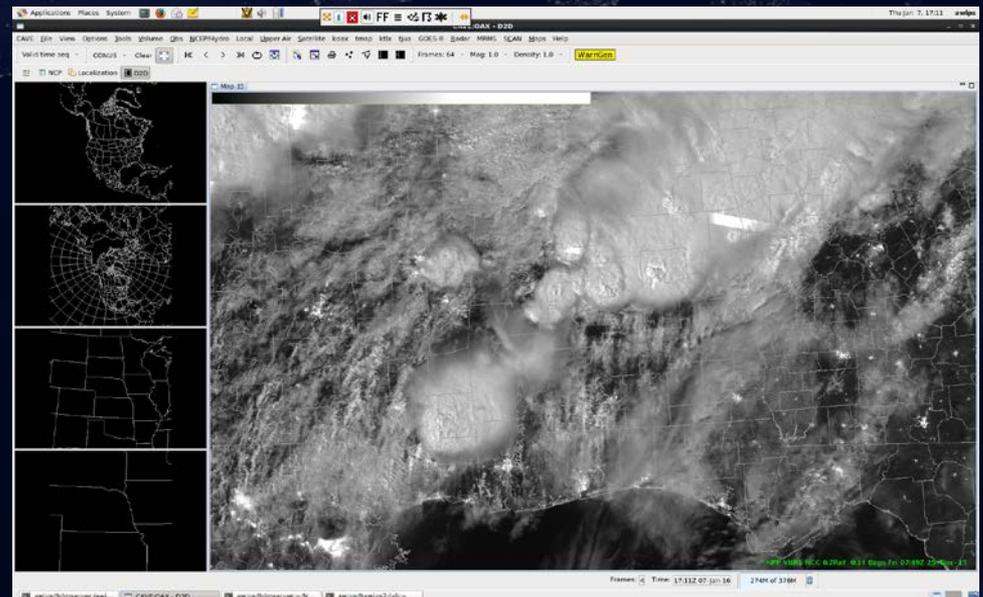
Sounding Products

- Demonstrations with operational forecasters
- Support storm watches and warnings
- CO product for tracking smoke emissions from forest fires



Day Night Band

- Sea Ice
- Storm tracking at night
- Ground Fog
- Active fires and smoke
- Socio / Economic / Impact assessment



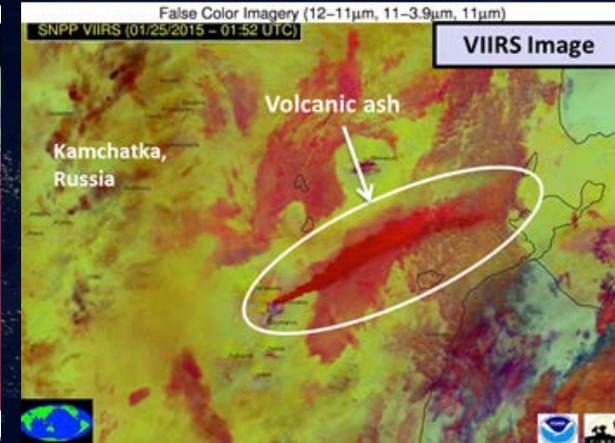
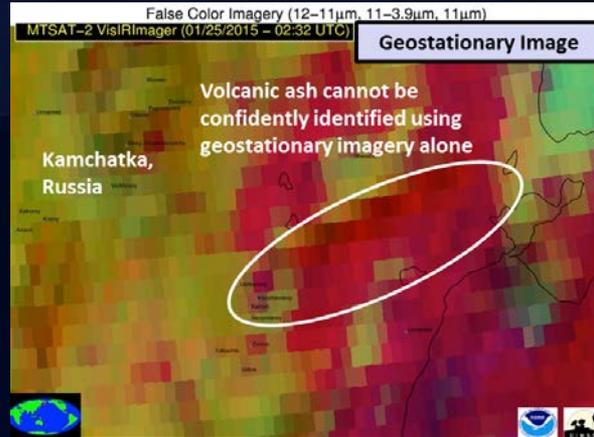


JPSS Applications Advancements



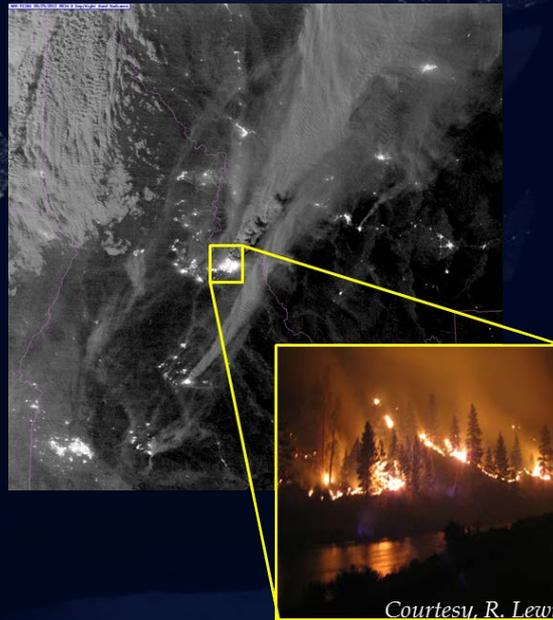
Volcanic Ash

- 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



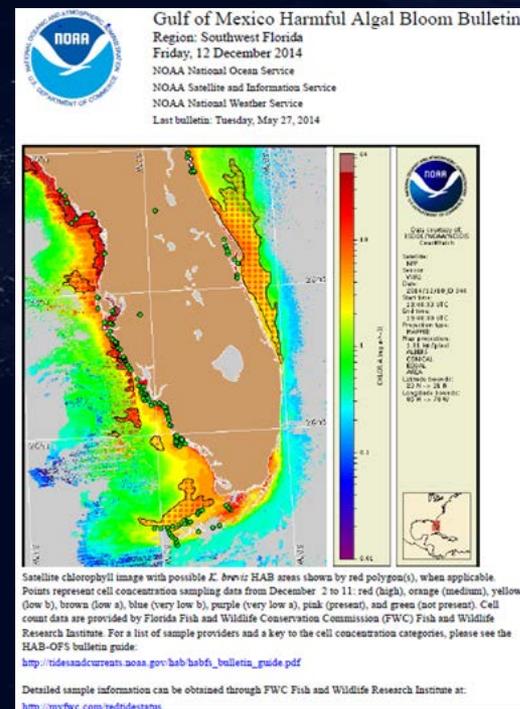
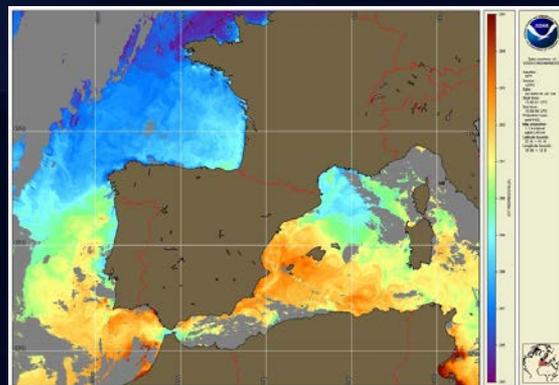


JPSS Applications Advancements



Oceanography

- Improved sea surface temperature
- Highly calibrated global ocean color



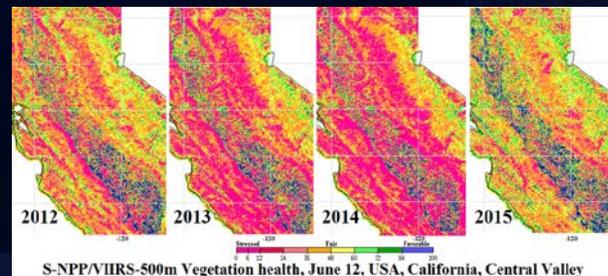
Hydrology

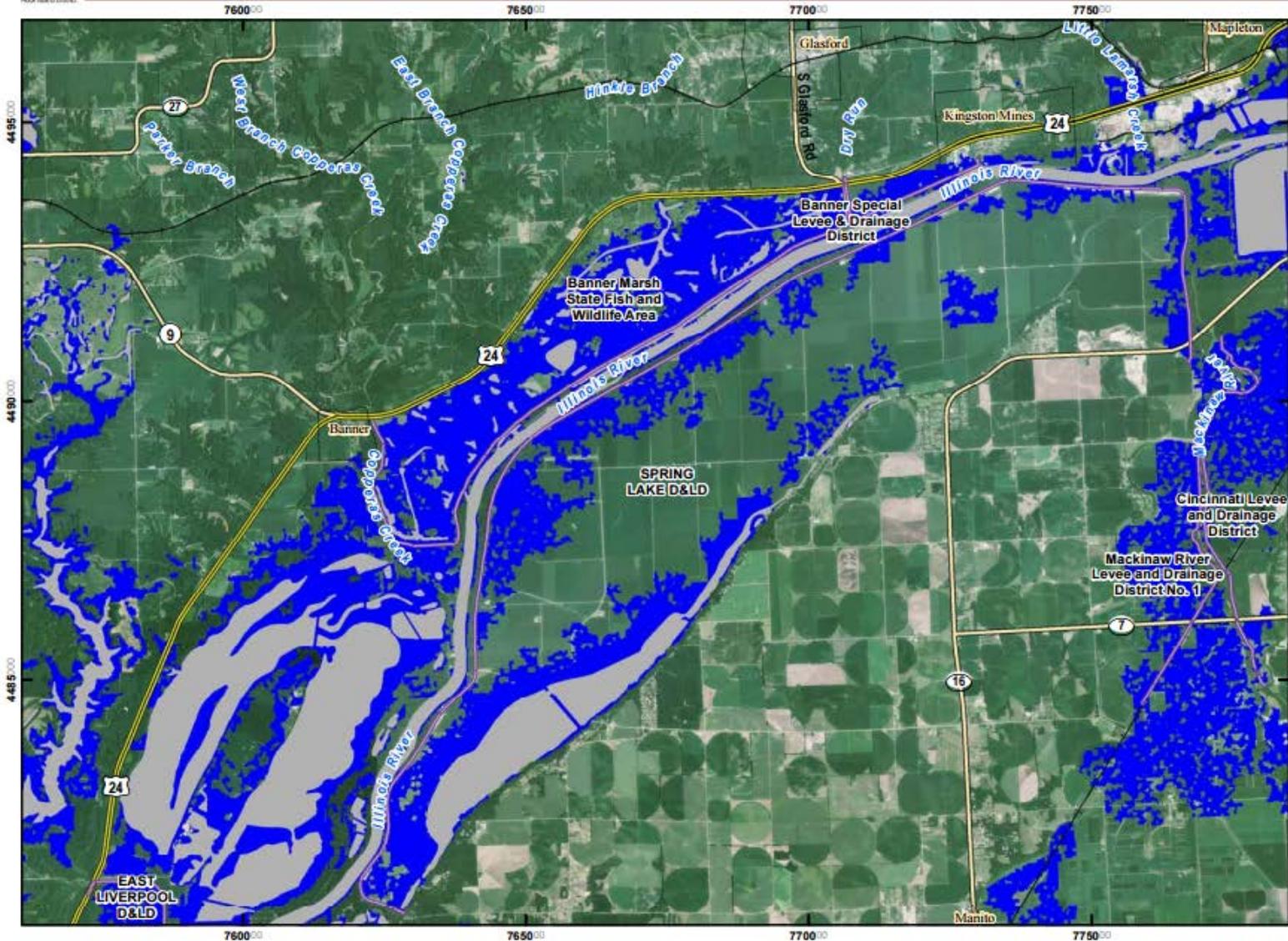
- Ice blockage
- Flood prediction / monitoring



Land

- Green Vegetation Fraction
- Vegetation Stress





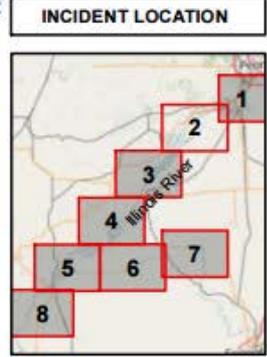
LEGEND

- 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 15N
Projection: Transverse Mercator
Datum: North American 1983
Units: Meter

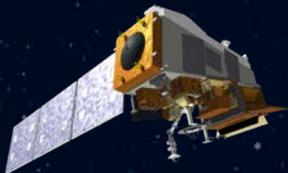
DISCLAIMER: While the United States Army Corps of Engineers, Rock Island District (USACE) has made a reasonable effort to ensure the accuracy of the maps and associated data, it should be explicitly noted that USACE makes no warranty, representation or guarantee, either express or implied, as to the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



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 downscaled 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.

Rock Island District
Emergency Management
28 DEC 2015



S-NPP and JPSS Data Products



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)
OUTGOING LONGWAVE RADIATION

OMPS (2)

O₃ TOTAL COLUMN
O₃ 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

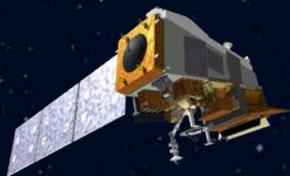
GCOM AMSR-2 (11)

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

CERES(1)

RDRs

Data available through PDA , CLASS, and Direct Readout



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- » Search Results
- » Shopping Cart
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- » Help

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- » User Profile
- » User Preferences

Advanced Options

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Release Info

- » Version 6.3.7.1
March 5, 2015

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- » NCDC
- » NGDC
- » NESDIS
- » NOAA
- » DOC

Please select a product to search

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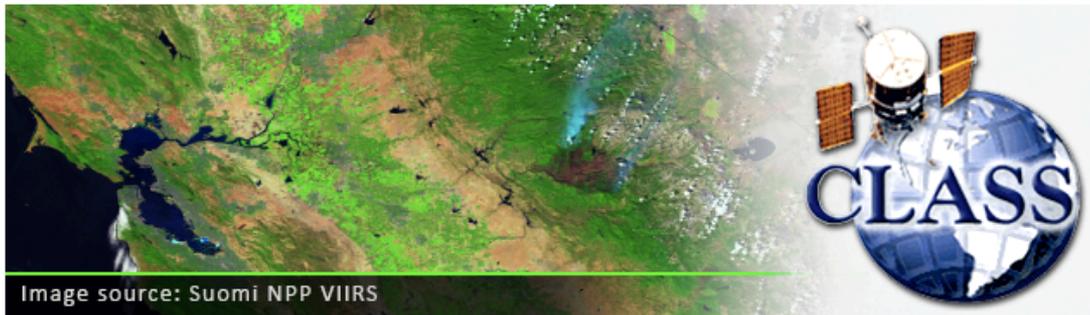


Image source: Suomi NPP VIIRS

NEWS

Attention CORS users (06/23/14):

Starting January 1, 2014, the National Geodetic Survey's CORS data archived at CLASS now includes GPS+GLONASS data for stations with GNSS-capable equipment. The GLONASS broadcast navigation file (BRDC) is also available for users at the same starting date. (GLO navigation file name example: brdc1680.14g.gz)

CORS data collections include RINEX since 1994 and raw GPS from selected CORS sites since 2004. The original at-sampling rate was retained except where there was only the 30-second decimated rate data. For more info see the CORS CLASS search page.

Attention Suomi NPP Users:

The most recent global NPP operational products are now available in daily tar files for quick and easy downloads at: <ftp://ftp-npp.class.ngdc.noaa.gov/>. Please see the [NPP help page](#) for instructions. Up to the most recent 85 days of data will be available for direct online access.

Suomi NPP data access status (11/25/14):

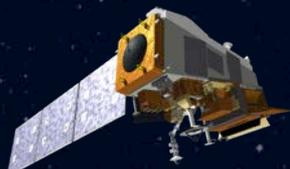
The majority of S-NPP products are now available and can be ordered through CLASS. The ones available to the public will show the begin dates after the product name on the search page. Also, a "quick look" of which products are at which maturity stages can be easily viewed at the [STAR Algorithm Product Maturity Matrix](#) website. Details of high priority issues related to the data quality are contained in the Readme files provided by the S-NPP Project Scientist. Many of these have recently been updated. Please read these before ordering and using the data.

SEARCH FOR DATA

- Environmental Data from Polar-orbiting Satellites
- Environmental Data from Geostationary Satellites
- Defense Meteorological Satellite Program (DMSP)
- Suomi National Polar-orbiting Partnership (NPP)
- Sea Surface Temperature data (SST)
- RADARSAT
- Altimetry / Sea Surface Height Data (JASON)
- Global Navigation Satellite Systems (GNSS)
- Other - Miscellaneous products in CLASS

SEARCH COLLECTION METADATA

» GO



Index of /

Name	Size	Date Modified
#readme.txt	340 B	3/4/13, 12:00:00 AM
20141215/		12/15/14, 1:03:00 PM
20141216/		12/17/14, 4:04:00 AM
20141217/		12/17/14, 1:03:00 PM
20141218/		12/18/14, 1:02:00 PM
20141219/		1/8/15, 1:07:00 PM
20141220/		1/9/15, 12:01:00 AM
20141221/		1/9/15, 5:00:00 AM
20141222/		1/9/15, 11:31:00 AM
20141223/		1/9/15, 5:39:00 PM
20141224/		1/10/15, 12:04:00 AM
20141225/		1/8/15, 10:21:00 AM
20141226/		1/8/15, 11:06:00 PM
20141227/		1/9/15, 5:32:00 AM

Index of /20141225/

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CRIS-SDR/		1/8/15, 4:41:00 AM
OMPS-EDR/		1/8/15, 10:21:00 AM
OMPS-IP/		1/8/15, 10:17:00 AM
OMPS-RDR/		1/8/15, 10:22:00 AM
OMPS-SDR/		1/8/15, 10:18:00 AM
VIIRS-EDR/		1/8/15, 10:32:00 AM
VIIRS-IPNG/		1/8/15, 10:27:00 AM
VIIRS-SDR/		1/8/15, 10:05:00 AM
VIIRSI-EDR/		1/8/15, 5:04:00 AM

Index of /20141225/VIIRS-EDR/

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VIIRS-Aerosol-Optical-Thickness-AOT-EDR/	
VIIRS-Cloud-Aggregated-EDR-Ellipsoid-Geo/	
VIIRS-Cloud-Base-Height-EDR/	
VIIRS-Cloud-Cover-Layers-EDR/	
VIIRS-Cloud-Effective-Particle-Size-EDR/	
VIIRS-Cloud-Optical-Thickness-EDR/	
VIIRS-Cloud-Top-Height-EDR/	
VIIRS-Cloud-Top-Pressure-EDR/	
VIIRS-Cloud-Top-Temperature-EDR/	
VIIRS-Ice-Surface-Temperature-EDR/	
VIIRS-Land-Surface-Temperature-EDR/	
VIIRS-Near-Constant-Contrast-Imagery-EDR/	
VIIRS-Near-Constant-Contrast-NCC-EDR-GTM-Geo/	
VIIRS-Ocean-Color-Chlorophyll-EDR/	
VIIRS-Sea-Ice-Characterization-EDR/	
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- 2013, 2014 and 2015 Annual Science Digests are available
- Join our monthly JPSS Science Seminars
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- Check out the JPSS Website
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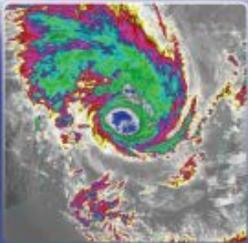


JPSS

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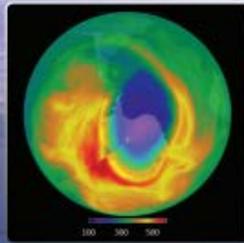
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