



JPSS Stored Mission Data and Environmental Satellite Processing Center Products

**Session 8: 2015 STAR JPSS Science Annual Review
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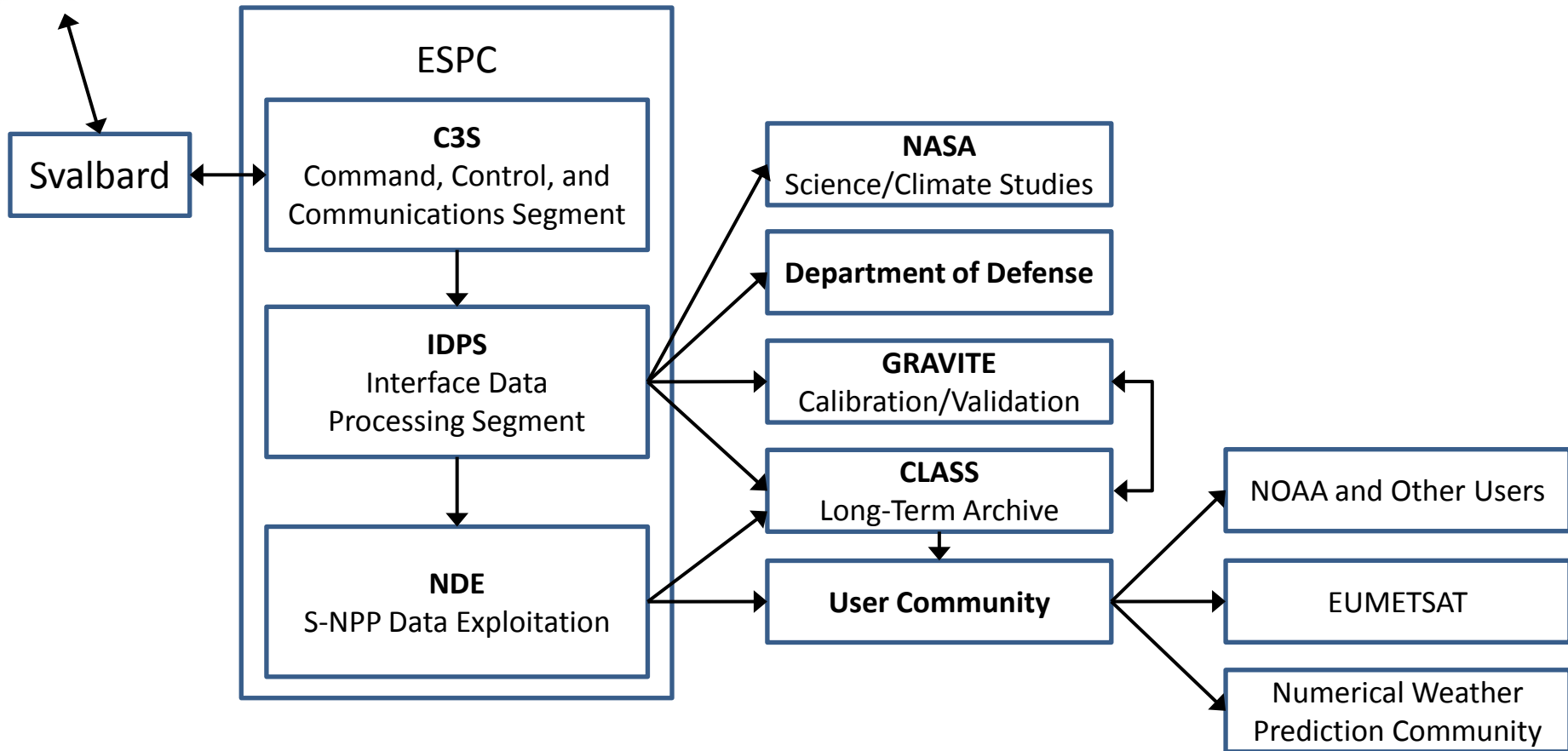
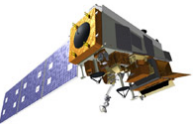
Outline



- **S-NPP Stored Mission Data (SMD) Flow**
- **S-NPP Data Access**
- **S-NPP Environmental Satellite Processing Center (ESPC) Data Products**
- **Data Product Tailoring**



S-NPP Stored Mission Data (SMD) Flow





S-NPP SMD Data Flow



- **ESPC Data Processing**

- S-NPP Application Packets (APs) are downlinked at Svalbard and relayed to the ESPC within the NOAA Satellite Operations Facility (NSOF) in Suitland, MD
- IDPS processes APs into Raw Data Records (RDRs), Sensor Data Records (SDRs), Environmental Data Records (EDRs), and Intermediate Products (IPs) [collectively known as xDRs]
- NDE process the SDRs and EDRs from IDPS and generates additional data records

- **ESPC Data Distribution**

- IDPS distributes xDRs to the Comprehensive Large Array-data Steward System (CLASS) for archive, Government Resource for Algorithm Verification, Independent Test, and Evaluation (GRAVITE) for calibration and validation, Department of Defense (DoD), and NASA Science Data Segment (SDS)
- NDE distributes xDRs to real time users: National Weather Service (NWS), Authorized NOAA and NASA users, DoD, and European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), other international partners



S-NPP Data Access

- **CLASS – Electronic library of NOAA environmental data**
 - xDRs, ancillary data, auxiliary data, and software release packages are archived
 - IPDS data delayed by 6 hours or more and normally made available to users within 24 hours
 - NDE generated data made available for archive when data is generated
 - Access: via Internet (<http://www.class.noaa.gov/>)
- **NOAA's S-NPP Data Exploitation Project**
 - Serves data to near real-time user community via [ftp-s](#)
 - Access: Submit NPP Data Access Request (DAR) form to NESDIS.Data.Access@noaa.gov
- **Global Telecommunications Service (GTS) via EUMETSAT**
 - GTS is used for operational international exchange of meteorological data between NWP users
- **EUMETCast via EUMETSAT**
 - EUMETCast is a satellite multicast system using Digital Video Broadcasting-Satellite (DVB-S) technology
 - Access: Register for access via EUMETSAT
- **Direct Readout (X-band)**
 - The Community Satellite Processing Package (CSPP) allows for access to S-NPP data in regional areas
 - Access: Register and download software: <https://cimss.ssec.wisc.edu/cspp/download/>
- **Product Distribution and Access (PDA)**
 - PDA is a future capability

S-NPP and GCOM-W1 Product Requirements

Critical

RDRs:

AMSR-2/3 ATMS CrIS VIIRS

TDRs:

AMSR-2/3 **ATMS**

SDRs:

AMSR-2/3 **ATMS CrIS VIIRS**

EDRs:

AMSR-2/3

Sea Surface Temperature

ATMS

Land Surface Emissivity

VIIRS

**Green Vegetation Fraction
Imagery**

Ocean Color/Chlorophyll

Polar Winds

Sea Surface Temperature

Blended

SST (with VIIRS)

SST (with AMSR-2)

Supplemental High

RDRs:

OMPS-N

SDRs:

OMPS-N

EDRs:

AMSR-2/3

Cloud Liquid Water

Imagery

Precipitation Type/Rate

Sea Ice Characterization

Sea Surface Wind Speed

Snow Cover/Depth

Snow Water Equivalent

Soil Moisture

Total Precipitable Water

ATMS

Cloud Liquid Water

Rainfall Rate

Sea Ice Concentration

Snow Cover

Snow Water Equivalent

Total Precipitable Water

CrIS/ATMS

Atmos. Moisture Profile

Atmos. Temperature Profile

CrIS

Infrared Ozone Profile

Outgoing Longwave Radiation

OMPS Nadir

Nadir Ozone Profile

Ozone Total Column

VIIRS

Active Fires

Cloud Cover/Layers

Cloud Effective Particle Size

Cloud Mask

Cloud Optical Thickness

Cloud Top Height

Sea Ice Characterization

Snow Cover

Suspended Matter

Blended

Biomass Burning (with VIIRS)

Rainfall Rate (with ATMS)

Rainfall Rate (with AMSR2)

Total Precipitable Water (with ATMS)

Total Precipitable Water (with AMSR2)

Ozone (with OMPS NP)

Ozone (with CrIS Ozone)

Snow Cover (with VIIRS)

Snow Cover (with AMSR2)

Soil Moisture (with AMSR2)

Supplemental Low

EDRs:

AMSR-2/3

Surface Type

ATMS

Imagery

Land Surface Temperature

Moisture Profile

Temperature Profile

CrIS

Greenhouse Gases (CO, CO2, CH4)

VIIRS

Aerosol Optical Thickness

Aerosol Particle Size Parameter

Albedo (Surface)

Cloud Base Height

Cloud Top Pressure

Cloud Top Temperature

Ice Surface Temperature

Land Surface Temperature

Quarterly Surface Type

Surface Type

Vegetation Health Product Suite

Vegetation Indices

Blended

Land Surface Temperature (with VIIRS)

Green text indicates product has been declared operational in ESPC

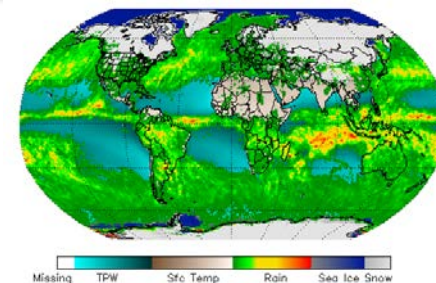


S-NPP ESPC Product Examples



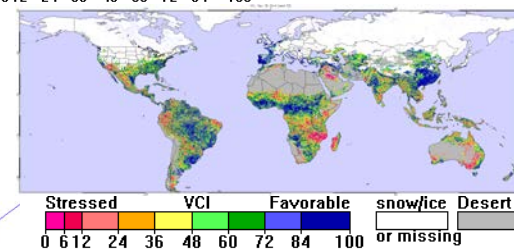
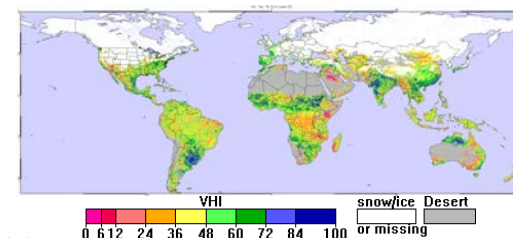
Microwave Integrated Retrieval System (MiRS)

- MiRS provides temperature and moisture profiles, land surface temperature, land surface emissivity, snow water equivalent, snow cover, sea ice concentration, cloud liquid water, total precipitable water, ice water path, instantaneous rain water path, and rain rate products from microwave instruments in all weather and all surface conditions.
- Formats: NetCDF4
- Coverage: Global



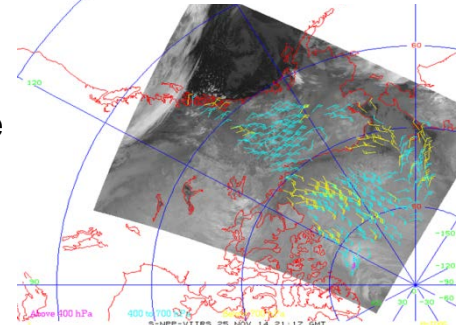
Vegetation Health Suite (VHS)

- VHS provides vegetation health index (VHI), vegetation condition index (VCI), and temperature condition index (TCI) products which are used for drought monitoring, in global climate impact assessments, and to determine global crop production, fire risk, disaster mitigation, and food security.
- Format: NetCDF4
- Coverage: Global



VIIRS Polar Winds (VPW)

- VPW provides wind speed, direction, and height at high latitudes to be assimilated in numerical weather prediction models to improve model forecasts and improve hurricane track forecasts.
- Formats: NetCDF4, BUFR
- Coverage: Poleward of 65 degrees





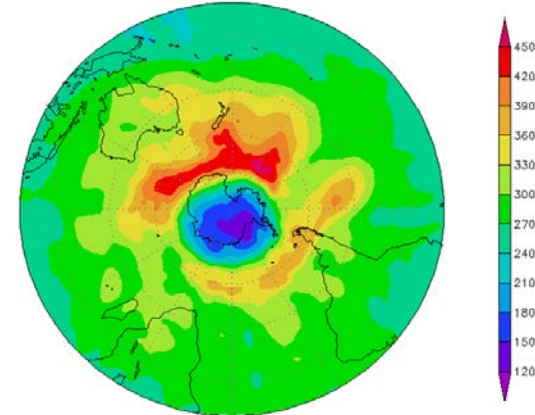
S-NPP ESPC Product Examples



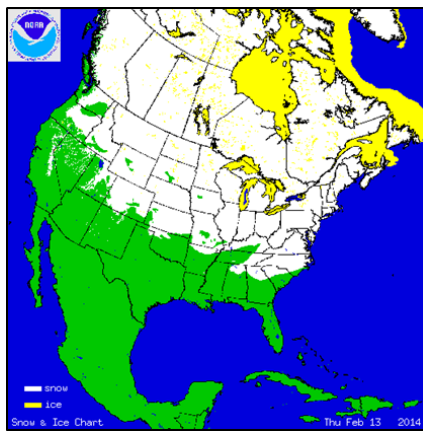
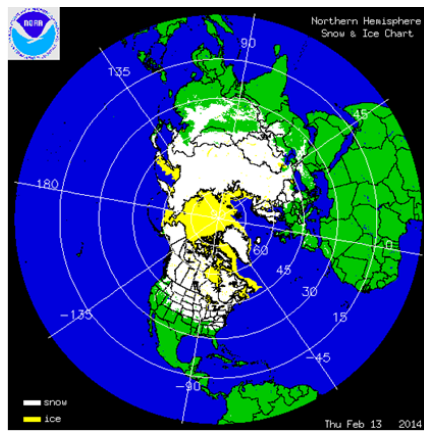
ESPC Blended Products

- Snow Cover (with VIIRS and AMSR-2)
- Rainfall Rate (with ATMS and AMSR-2)
- Total Precipitable Water (with ATMS and AMSR-2)
- Ozone (with OMPS Nadir Profile and CrIS)
- Soil Moisture (with AMSR-2)

Southern Hemisphere TOAST Analysis on 2014296
SBUV/2: N19 TOVS: M1

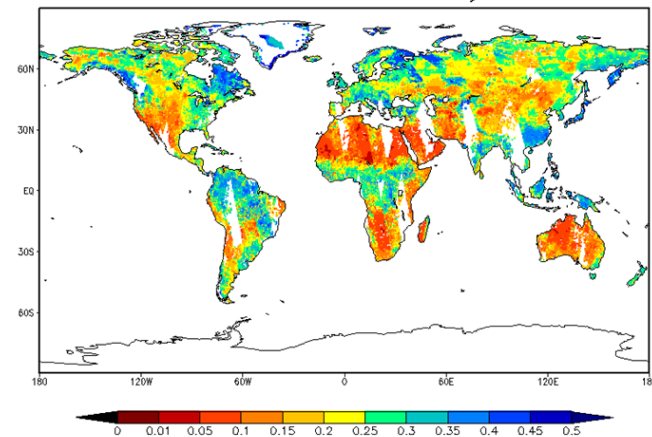


Blended Total Ozone over the Antarctic



Blended Snow and Ice Products

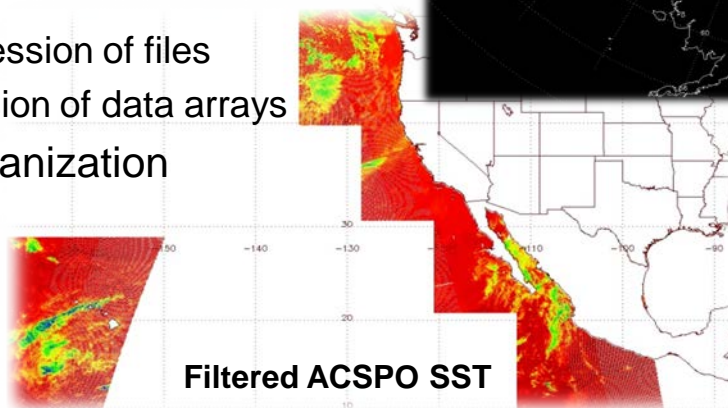
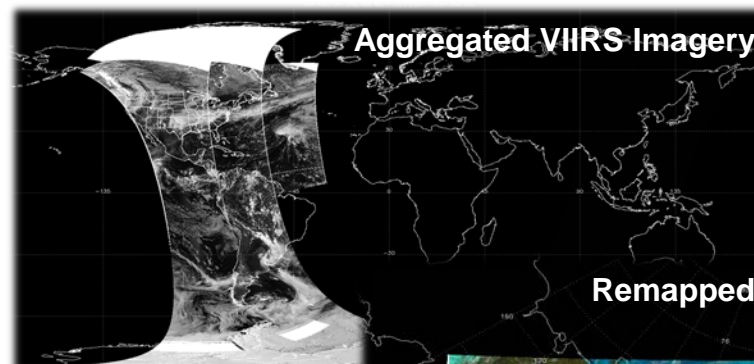
NOAA SMOPS Blended Soil Moisture: Daily - 20141029



Blended Soil Moisture

- **S-NPP data products can be tailored by NDE to meet user needs**
- **Tailoring options include the following:**

- Aggregating
- Reformatting
 - NetCDF4, GRIB2, BUFR, GeoTIFF
- Resampling
- Subsetting (i.e., thinning data files)
- Subsampling
- Remapping
- Filtering
- Compressing
 - GZIP, ZIP, ZLIB, and JPEG compression of files
 - Internal HDF5/netCDF-4 compression of data arrays
- Applying World Meteorological Organization (WMO) Headers





Summary

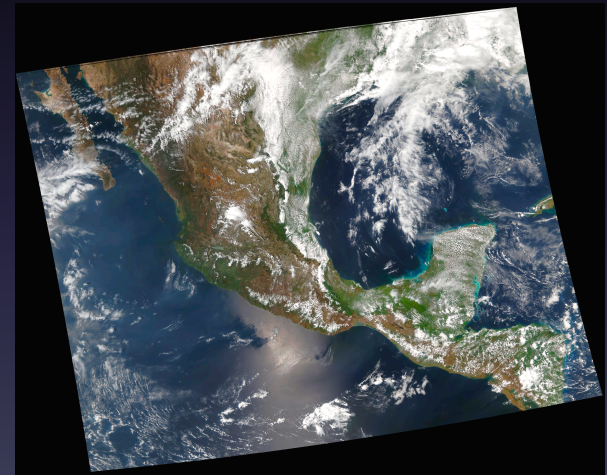


- **S-NPP SMD flows from Svalbard to the ESPC and is distributed to NOAA's long term archive and to various users/consumers**
- **S-NPP SMD data can be accessed from archive and in near real time**
- **S-NPP ESPC satellite data products include atmospheric, oceanic, land, and blended products**
- **S-NPP ESPC satellite data products can be tailored to suit user-applications/needs**

Community Satellite Processing Package (CSPP) Polar-Orbiting Satellite Software and Products

Liam Gumley, Allen Huang, Kathy Strabala, Scott Mindock, Ray Garcia, Graeme Martin, Geoff Cureton, Elisabeth Weisz, Nadia Smith, Nick Bearson, James Davies, Jessica Braun.
CIMSS/SSEC, University of Wisconsin-Madison.

JPSS STAR Science Team Meeting
NCWCP, 2015/08/28



What is CSPP?

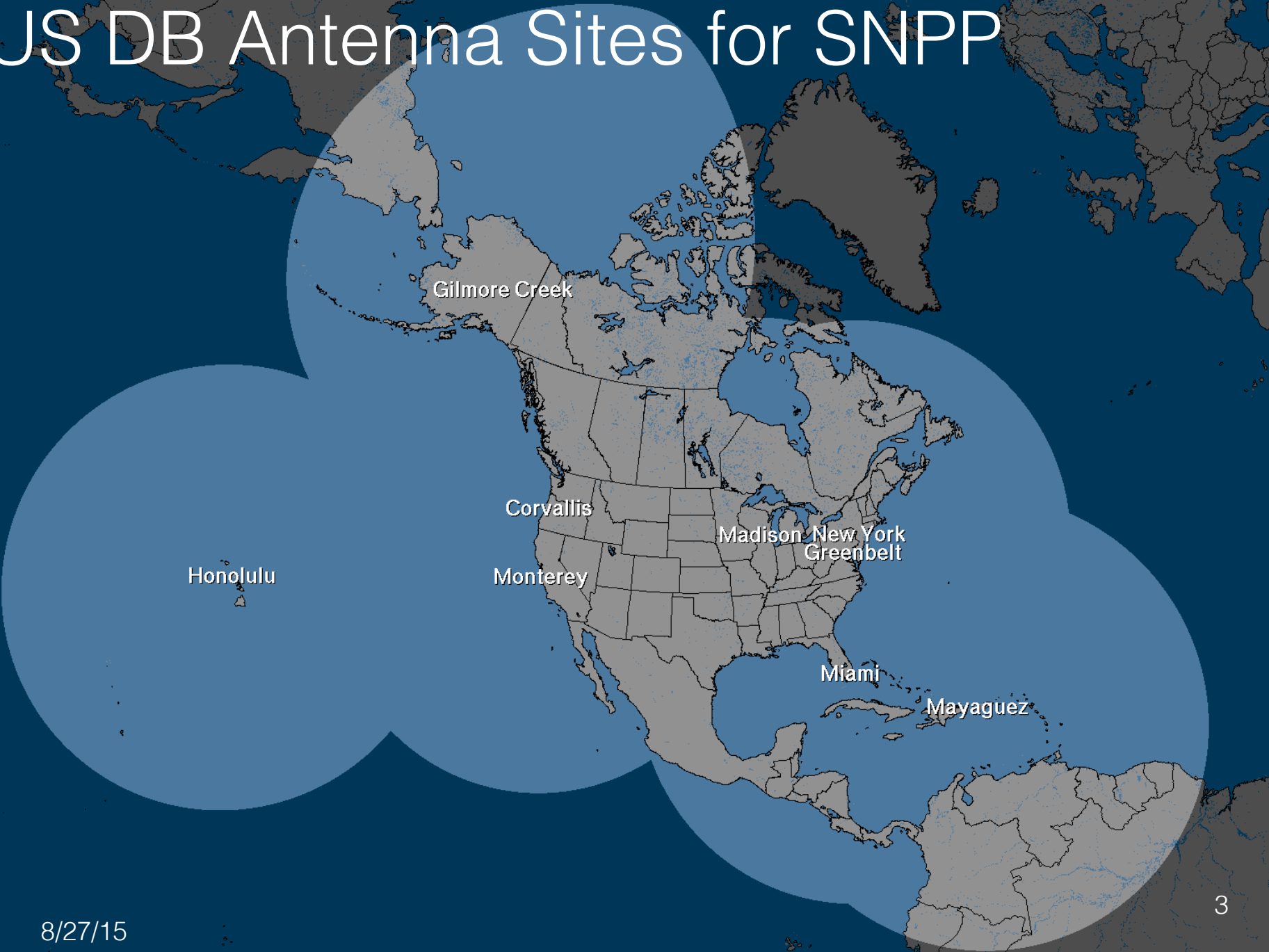
CSPP (Community Satellite Processing Package) is a collection of software systems for processing data from meteorological satellites.

The primary goal of CSPP is to support users who

- Receive satellite data via direct broadcast;
- Create Level 1B and higher level products and images in real time.

Funding is supplied by JPSS and NOAA.

US DB Antenna Sites for SNPP





DB Antenna Sites and Status

Station	Operator	Status	Satellites
Monterey	NOAA	Operational	SNPP, Metop, POES
Gilmore Creek	NOAA	Operational	SNPP, Metop, POES
Madison	NOAA/CIMSS	Operational	SNPP, Metop, POES
Honolulu	NOAA/CIMSS	Operational	SNPP, Metop, POES
Miami	NOAA/CIMSS	Operational	SNPP, Metop, POES
Mayaguez	NOAA/CIMSS	Oct 2015	SNPP, Metop, POES
Corvallis	Oregon State Univ.	Operational	SNPP
New York	City College	Operational	SNPP
Greenbelt	NASA	Operational	SNPP

DB Antenna Hardware



Honolulu



Miami



Madison

- NOAA antennas are Orbital Systems 2.4 or 3.0 meter dual X/L-band receiving SNPP, Metop, POES, Terra, Aqua, FY-3, and GCOM-W1.
- Other antennas are receiving SNPP, Aqua, and Terra.



CSPP Software Philosophy

The CSPP software

Creates useful products for the DB community,

Includes up-to-date algorithms,

Is pre-compiled for 64-bit Intel Linux (CentOS),

Is easy to install and operate,

Includes test data for verification,

Runs efficiently on modest hardware,

Has prompt user support.

CSPP by the numbers

Satellites supported: 7

Software packages: 10

Sensors supported: 25

Releases and updates: 29

Registered users: 913

Individual downloads: > 5000

CSPP Satellite/Sensor/Product Matrix



Satellite	Multispectral Imager	Infrared Sounder	Microwave Sounder
Suomi NPP	VIIRS <i>SDRs (Level 1B), Images, Visualization, Clouds, Aerosols, Land, Ocean</i>	CrIS <i>SDRs (Level 1B) Atmospheric Profiles, Clouds, Visualization</i>	ATMS <i>SDRs (Level 1B), Atmospheric Profiles, Precipitation, Visualization</i>
NOAA-18/19	AVHRR <i>Clouds, Aerosols, Land Surface, SST, Visualization</i>	HIRS <i>Atmospheric Profiles</i>	AMSU, MHS <i>Atmospheric Profiles, Precipitation</i>
Metop-A/B	AVHRR <i>Clouds, Aerosols, Land Surface, SST, Visualization</i>	IASI, HIRS <i>Atmospheric Profiles, Clouds, Visualization</i>	AMSU, MHS <i>Atmospheric Profiles, Precipitation</i>
Terra	MODIS <i>Images, Visualization</i>	N/A	N/A
Aqua	MODIS <i>Images, Visualization</i>	AIRS <i>Atmospheric Profiles, Clouds, Visualization</i>	AMSU <i>Atmospheric Profiles, Precipitation, Visualization</i>

CSPP Software Suite



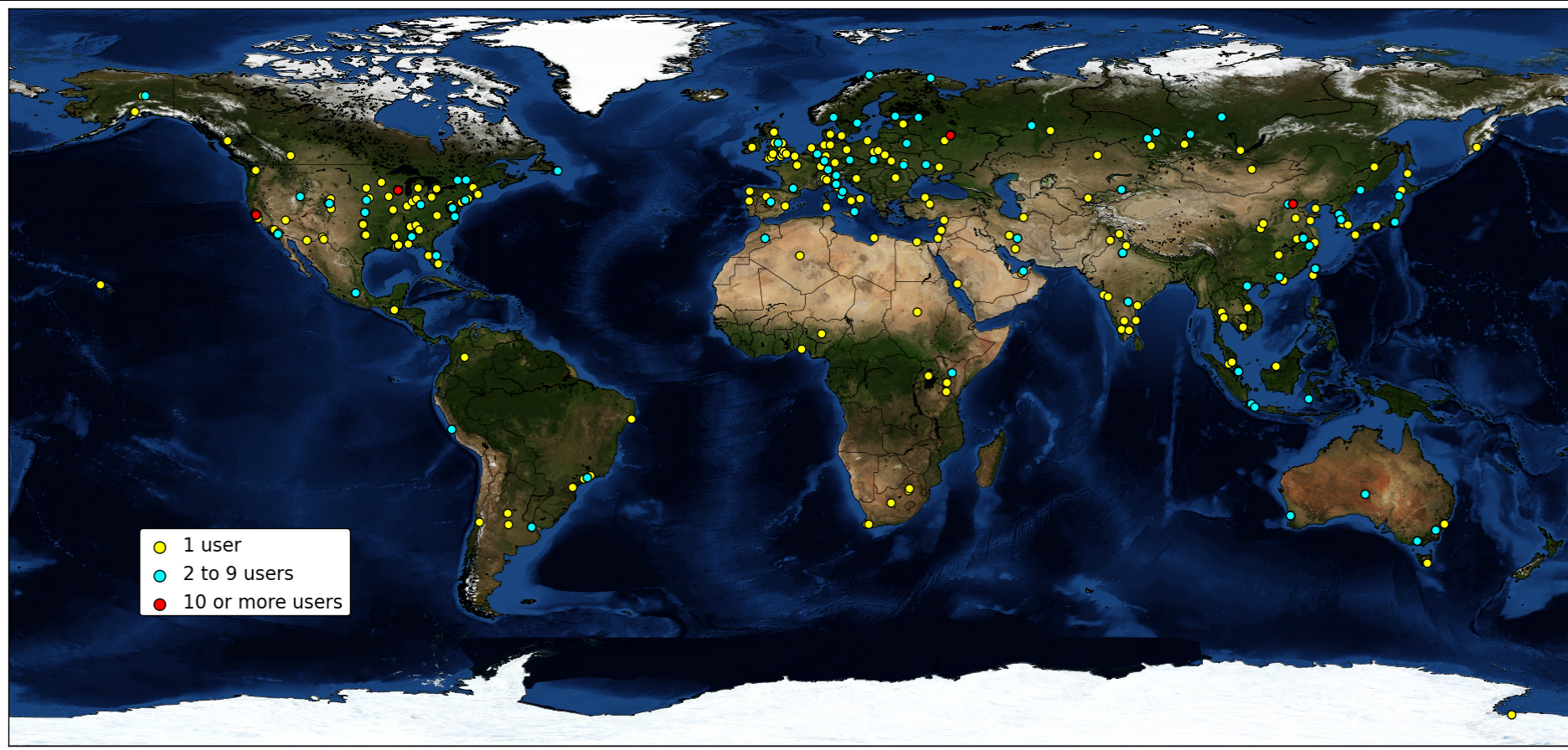
CSPP Software	Product Description
1. SDR	VIIRS, CrIS, and ATMS geolocated and calibrated earth observations.
2. VIIRS EDR	VIIRS imager cloud mask, active fires, surface reflectance, vegetation indices, sea surface temperature, land surface temperature, and aerosol optical depth.
3. HSRTV	Hyperspectral infrared sounder retrievals of temperature and moisture profiles, cloud properties, total ozone, and surface properties.
4. Polar2grid	Reprojected imagery (single and multi-band) in GeoTIFF and AWIPS formats.
5. Hydra	Interactive visualization and interrogation of multispectral imagery and hyper spectral soundings.
6. MIRS	Microwave sounder retrievals of temperature and moisture profiles; surface properties; snow and ice cover; rain rate; and cloud/rain water paths.
7. CLAVR-x	Multispectral imager retrievals of cloud properties; aerosol optical depth; surface properties; ocean properties.
8. NUCAPS	Combined hyperspectral infrared sounder and microwave sounder retrievals of temperature and moisture profiles, cloud cleared radiances, and trace gases.
9. IAPP	Combined infrared sounder and microwave sounder retrievals of temperature and moisture profiles, water vapor, total ozone, and cloud properties.
10. ACSPO	Multispectral imager retrievals of sea surface temperature.

CSPP Software/Satellite/Sensor Matrix



CSPP Software	Suomi NPP	NOAA-18/19	Metop-A/B	Terra	Aqua
1. SDR	VIIRS, CrIS, ATMS	Provided by AAPP	Provided by AAPP	Provided by SeaDAS	Provided by SeaDAS
2. VIIRS EDR	VIIRS	N/A	N/A	N/A	N/A
3. HSRTV	CrIS	N/A	IASI	N/A	AIRS
4. Polar2Grid	VIIRS, CrIS, IASI	Future version	Future version	MODIS	MODIS, AIRS
5. Hydra	VIIRS, CrIS, ATMS	AVHRR	AVHRR, IASI	MODIS	MODIS, AIRS
6. MIRS	ATMS	AMSU, MHS	AMSU, MHS	N/A	N/A
7. CLAVR-x	VIIRS	AVHRR	AVHRR	MODIS	MODIS
8. NUCAPS	CrIS, ATMS	N/A	Future version	N/A	Future version
9. IAPP	N/A	HIRS, AMSU, MHS	HIRS, AMSU, MHS	N/A	N/A
10. ACSPO	VIIRS	AVHRR	AVHRR	MODIS	MODIS

CSPP Registered User Locations



February, 2015

1. CSPP SDR



CSPP SDR (Sensor Data Record) creates calibrated and geolocated earth observation products (Level 1B).

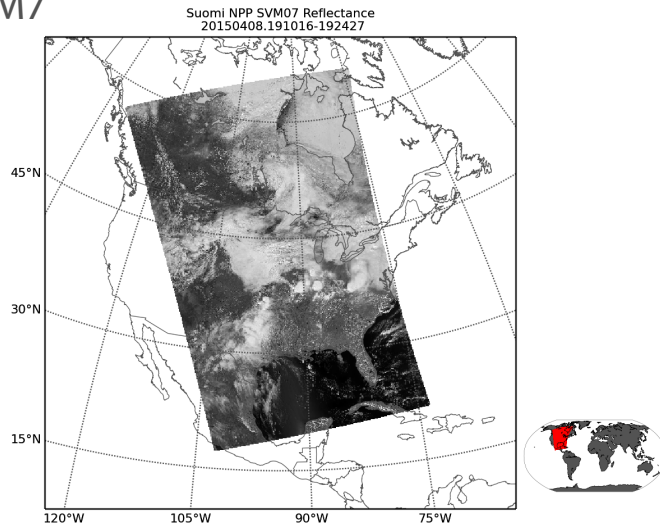
Heritage	Developed by Raytheon and released as part of Algorithm Development Library (ADL). Source code is available in ADL.
Satellites/Sensors	SNPP (VIIRS, CrIS, ATMS).
Products	VIIRS: M-band, I-band, and Day/Night Band SDR calibrated sensor data and geolocation files in HDF5 format. CrIS: Calibrated spectra and geolocation in HDF5 format. ATMS: Calibrated antenna temperatures and geolocation in HDF5 format.
Features	<ul style="list-style-type: none">• Multi-core support for faster processing.• Optional product aggregation and compression.• Automated download and installation of calibration LUTs.• Quicklook images

SDR Examples

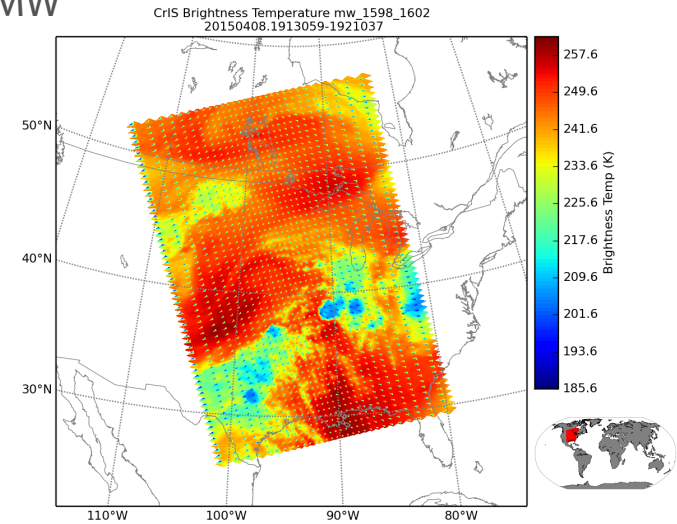
SNPP 2015/04/08 19:10 UTC



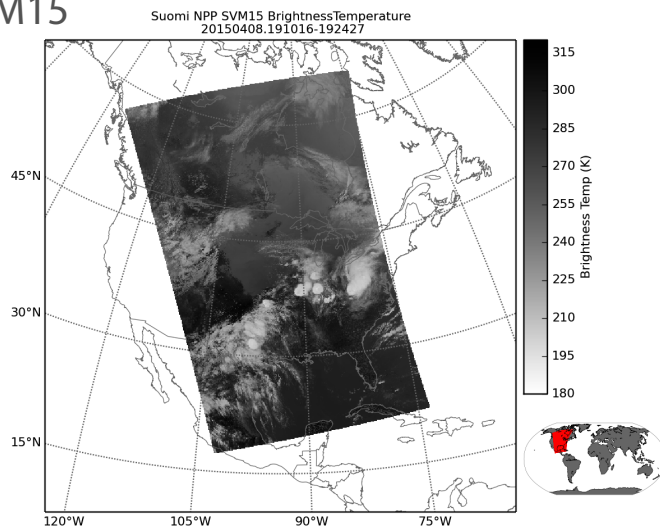
VIIRS M7



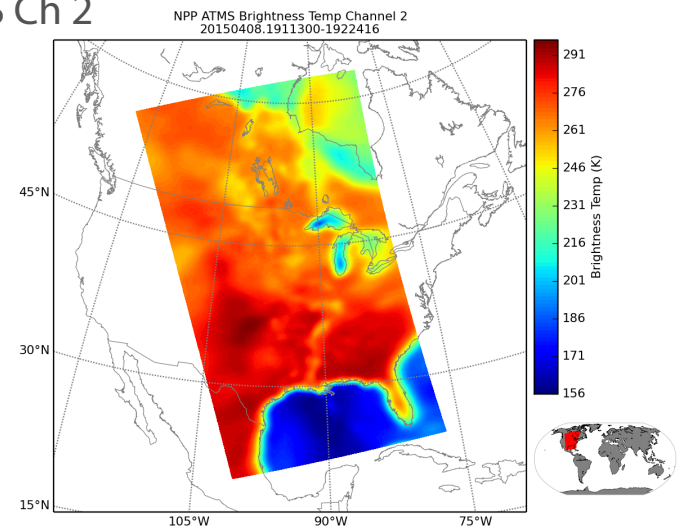
CrIS MW



VIIRS M15



ATMS Ch 2



2. CSPP EDR

CSPP EDR (Environmental Data Record) creates atmosphere, land, and ocean products.

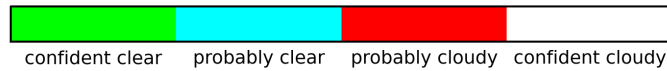
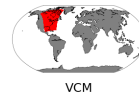
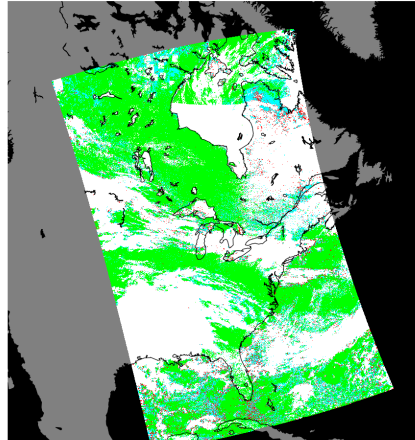
Heritage	Developed by Raytheon and released as part of Algorithm Development Library (ADL). Source code is available in ADL.
Satellites/Sensors	Suomi NPP VIIRS.
Products	Cloud Mask, Active Fires, Aerosol Optical Thickness, Suspended Matter, Sea Surface Temperature, Surface Reflectance, Normalized Difference Vegetation Index, Enhanced Vegetation Index, Surface Type, Land Surface Temperature, and Imagery in HDF5 format.
Features	<ul style="list-style-type: none">• Multi-core support for faster processing.• Optional product aggregation and compression.• Automated download and preparation of ancillary data.• Quicklook images.

EDR Examples

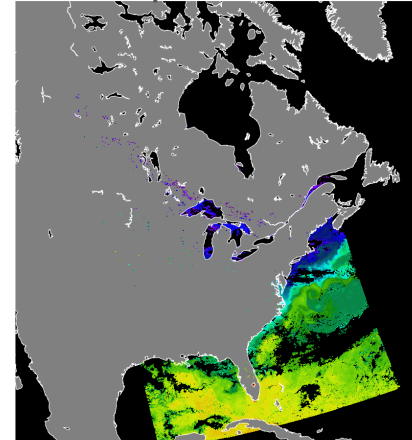
SNPP 2015/04/05 18:26 UTC



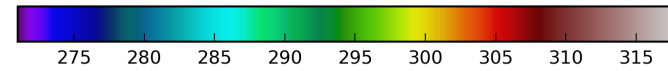
Cloud Mask



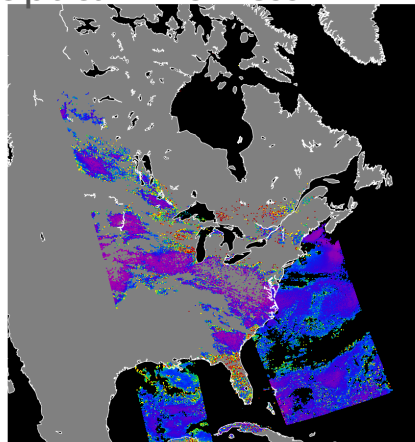
Sea Surface Temperature



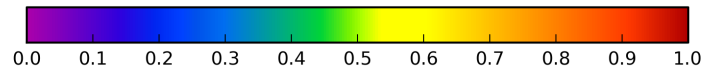
Sea Surface Temperature (K)



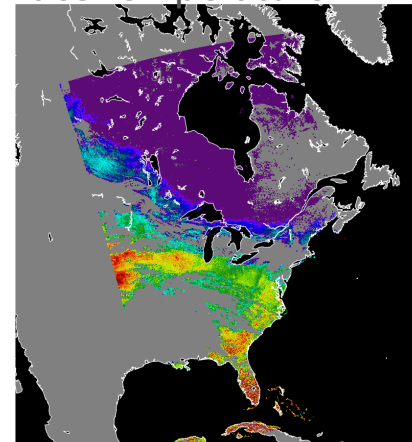
Aerosol Optical Thickness



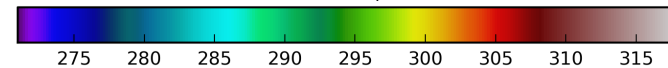
AOT



Land Surface Temperature



Land Surface Temperature (K)



3. HSRTV



HSRTV (High Spectral Resolution Retrieval) creates temperature, moisture, and trace gas profiles, and cloud products.

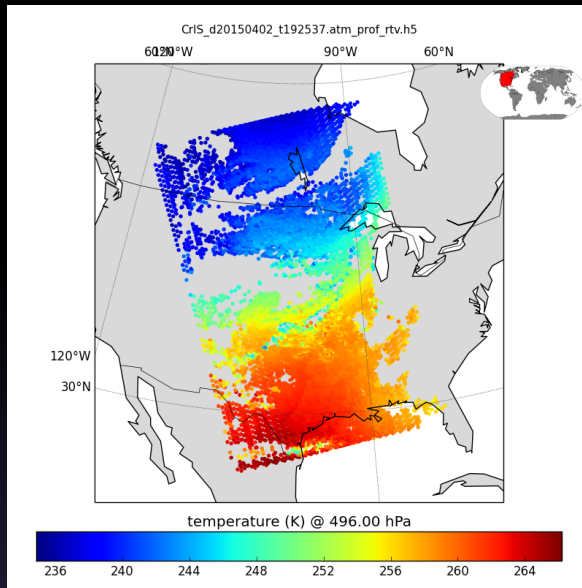
Heritage	Developed at CIMSS/SSEC by Bill Smith, Elisabeth Weisz, and Nadia Smith.
Satellites/Sensors	Suomi NPP CrIS; Metop-A/B IASI; Aqua AIRS.
Products	Temperature, moisture, and ozone at 101 pressure levels; surface skin temperature and emissivity; total column water vapor and ozone; CO ₂ amount; cloud mask; cloud top pressure and temperature; and cloud optical thickness in HDF5 format
Features	<ul style="list-style-type: none">• Common multi-sensor algorithm.• Single field of view retrievals.• Fast regression algorithm.

HSRTV Examples

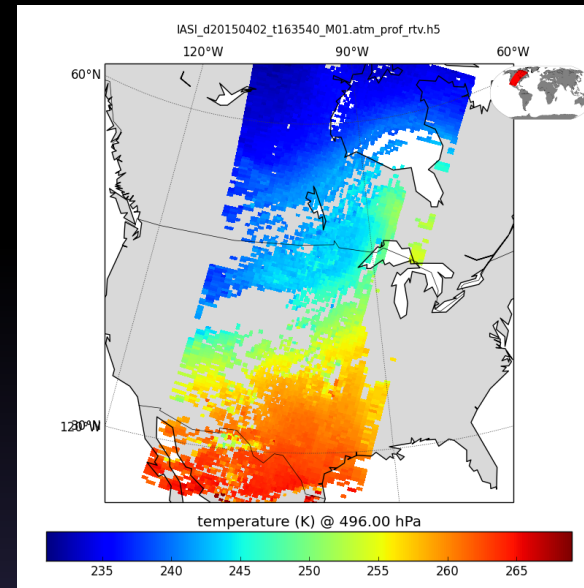
SNPP 2015/04/02 19:25 UTC
Metop-B 2015/04/02 16:35 UTC



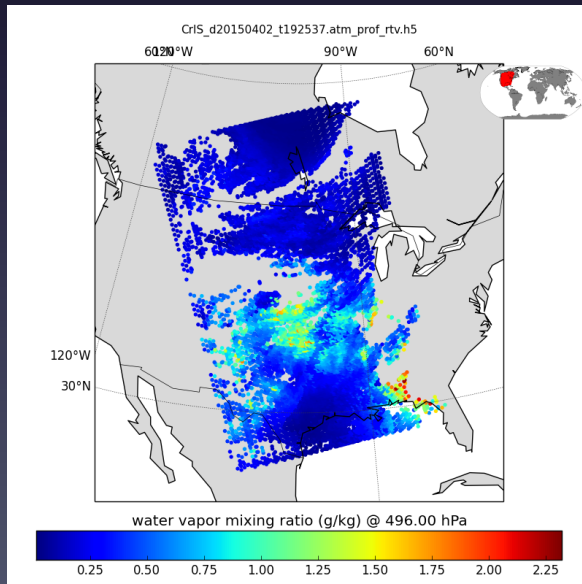
CrIS
Temperature
500 hPa



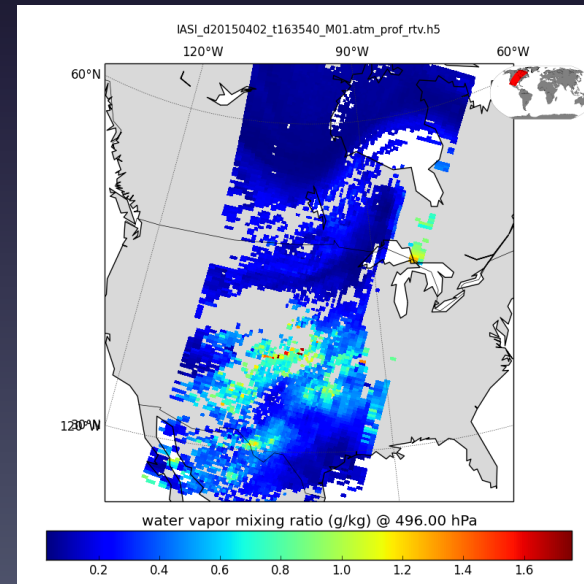
IASI
Temperature
500 hPa



CrIS
Mixing ratio
500 hPa



IASI
Mixing ratio
500 hPa



4. Polar2grid

Polar2grid creates reprojected imagery for single bands (grayscale) and band composites (RGB).

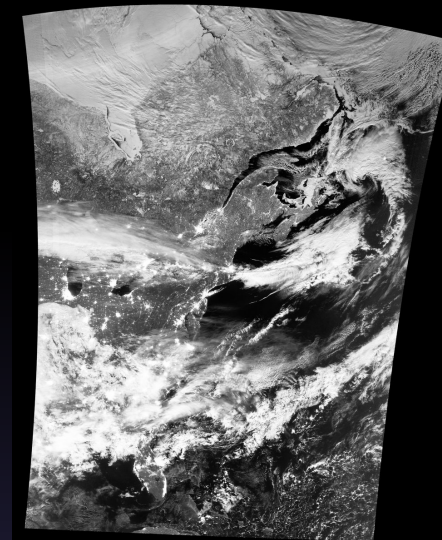
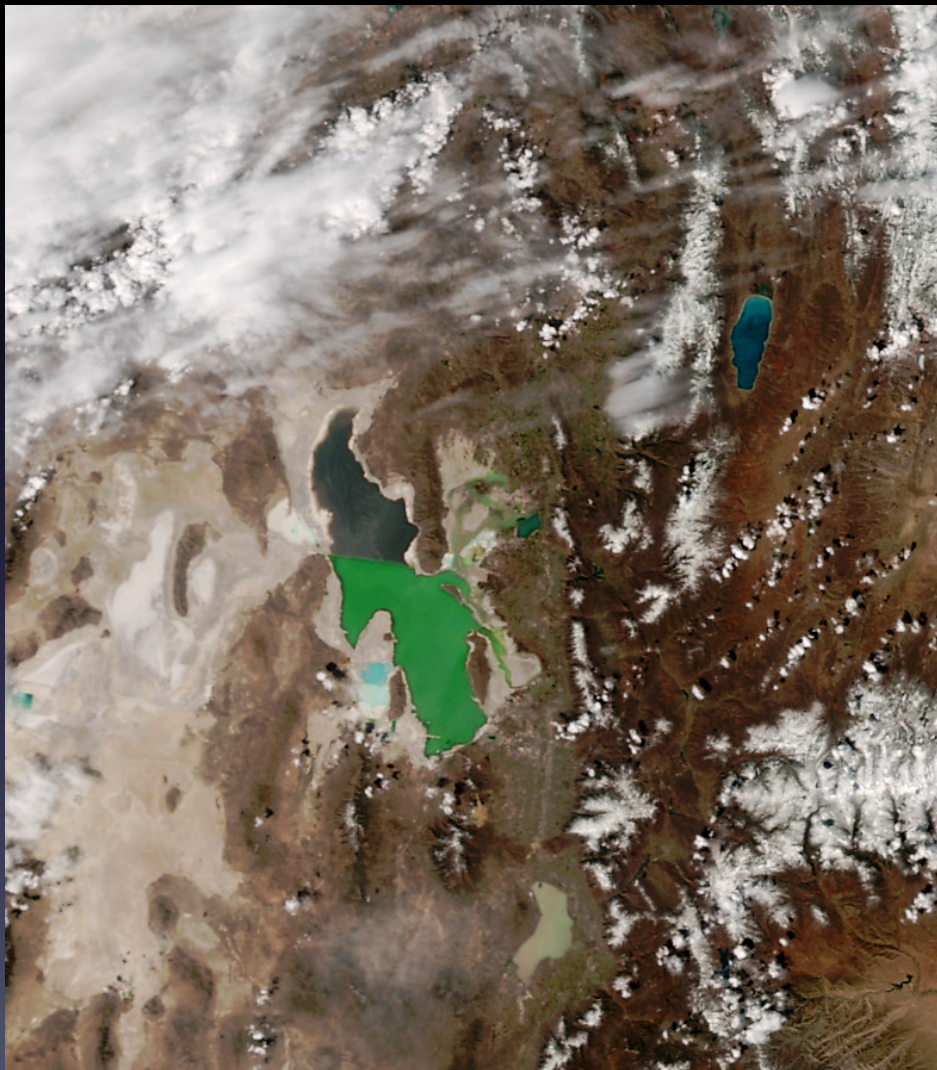
Heritage	Developed at CIMSS/SSEC by Dave Hoese.
Satellites/Sensors	Suomi NPP VIIRS; Terra/Aqua MODIS.
Products	Single band and multi-band images in GeoTIFF and netCDF formats (for AWIPS).
Features	<ul style="list-style-type: none">• Atmospherically corrected true color images.• Automatic adaptive enhancement for VIIRS Day/Night band.• User defined projection grids are supported.• Multiple input granules are composited on one output image.

Polar2grid Examples

SNPP 2015/04/06 06:44 UTC
SNPP 2015/04/06 20:07 UTC

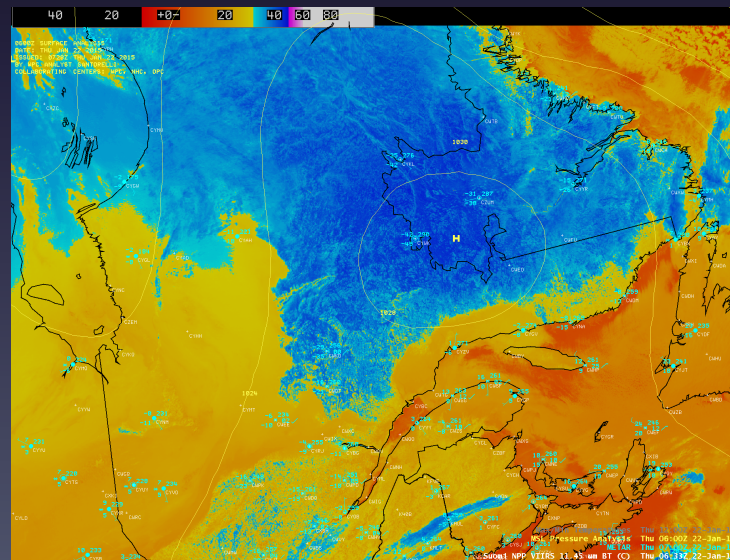


VIIRS True Color



VIIRS DNB

VIIRS M15 in AWIPS2



5. Hydra

Hydra is an interactive GUI application for exploring multispectral satellite data.

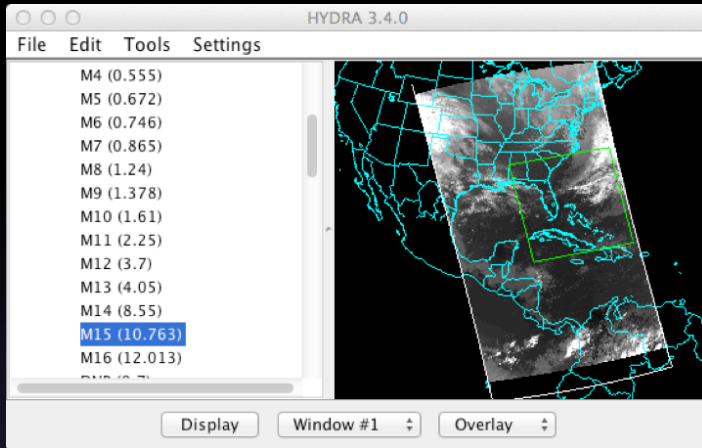
Heritage	Developed at CIMSS/SSEC by Tom Rink.
Satellites/Sensors	Suomi NPP VIIRS, CrIS, ATMS; Metop-A/B IASI; Terra/Aqua MODIS; Aqua AIRS.
Products	Images in JPEG and KML format.
Features	<ul style="list-style-type: none">• Supports Windows, OS X, and Linux platforms.• Simple to install and use for training/classroom environments.• Multi-sensor comparisons (e.g., MODIS/VIIRS) are supported.• User-defined band combinations, scatter plots, and transects.

Hydra Examples

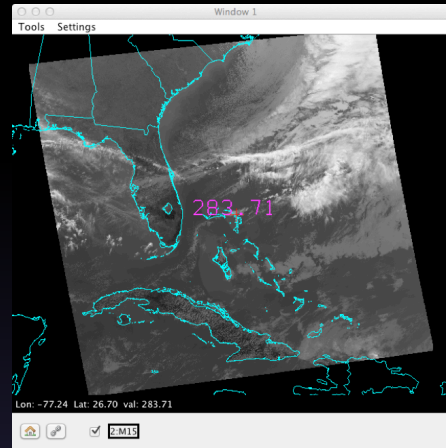
SNPP 2015/01/30 18:40 UTC
Terra 2014/06/19 06:05 UTC



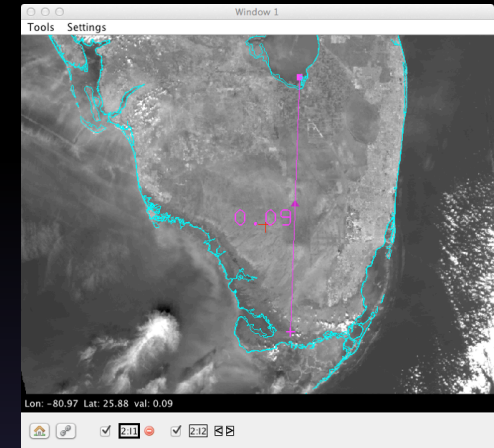
VIIRS Data Selector



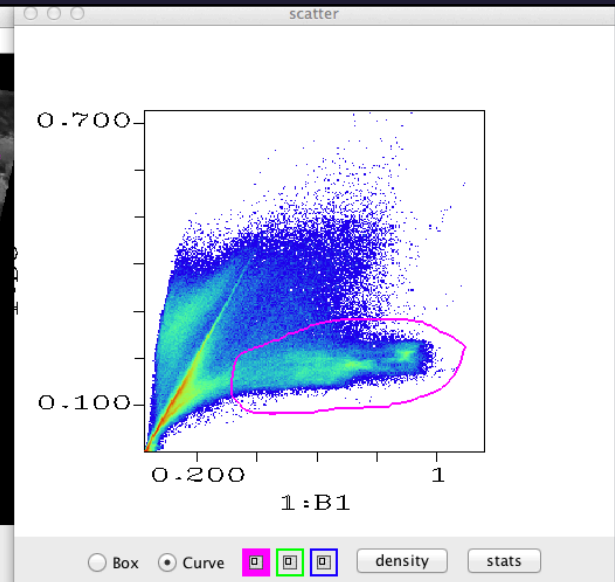
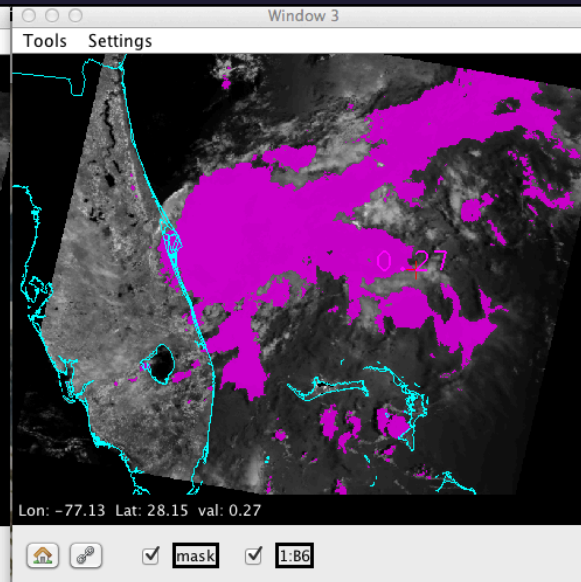
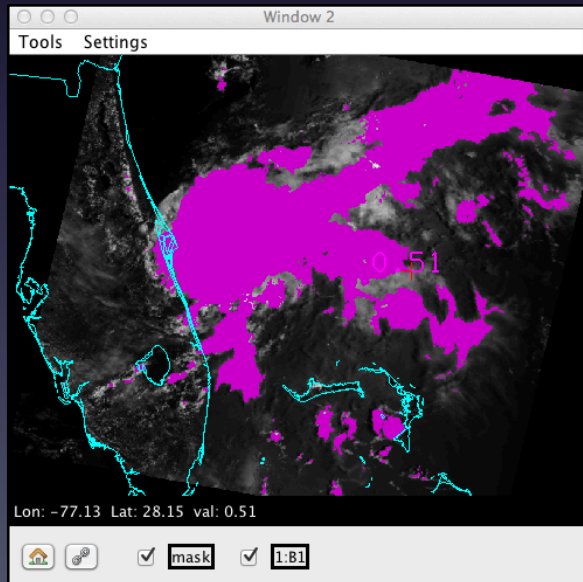
VIIRS M15 Image Window



VIIRS I1 Image Window



MODIS Band 6 vs. Band 1 Scatter Plot



6. MIRS



MIRS (Microwave Integrated Retrieval System) creates atmospheric profile, precipitation, and surface products from microwave sounder data.

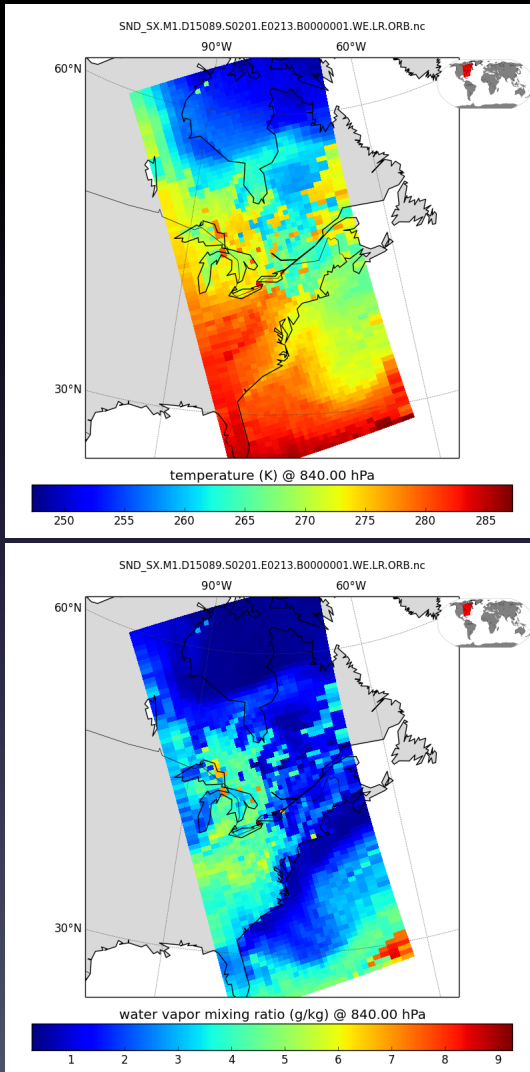
Heritage	Developed at NOAA/NESDIS by Sid Boukabara, Chris Grassotti, et al.
Satellites/Sensors	Suomi NPP ATMS; Metop-A/B AMSU, MHS; NOAA-18/19 AMSU, MHS.
Products	Temperature and moisture profiles, total precipitable water, surface skin temperature and emissivity, rain rate, cloud liquid water, rain water path, ice water path, liquid water path, sea ice concentration, snow water equivalent, and snow cover.
Features	<ul style="list-style-type: none">• Multi-sensor common algorithm.• Physics-based retrieval.• Retrieves land and ocean products in all sky conditions.• Extensively validated and documented.

MIRS Examples

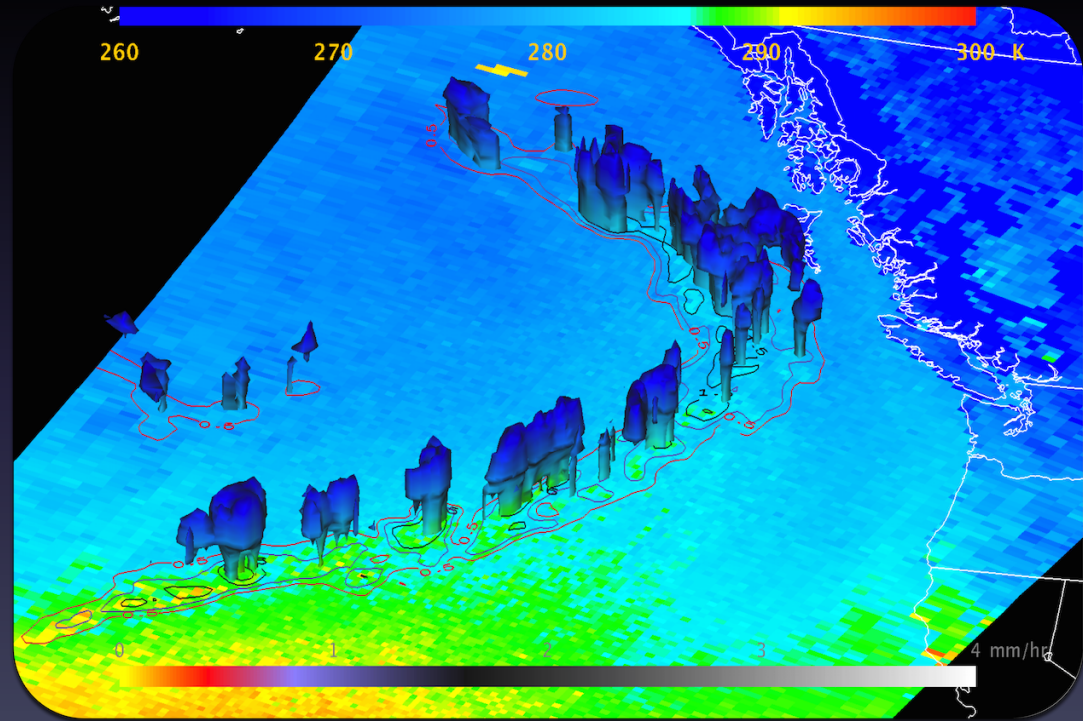
Metop-B 2015/03/30 02:01 UTC
SNPP 2015/03/18 11:03 UTC



Metop-B AMSU/MHS 840 hPa
temperature and water vapor



SNPP ATMS Surface Skin Temperature with Rain Rate
contours and isosurface of Rain Mass Profile



7. CLAVR-x



CLAVR-x (Clouds from AVHRR Extended) creates quantitative cloud, aerosol, and surface products from imager data.

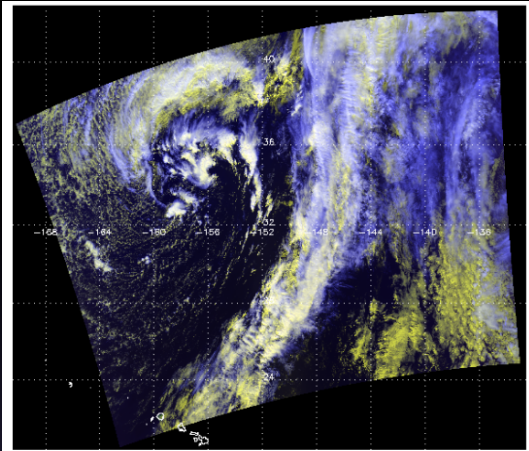
Heritage	Developed at NOAA/NESDIS/STAR and CIMSS/SSEC by Andy Heidinger, Andi Walther, Denis Botambekov, et al.
Satellites/Sensors	Suomi NPP VIIRS; Terra/Aqua MODIS; Metop-A/B AVHRR; NOAA-18/19 AVHRR.
Products	Cloud mask, type, fraction, and phase; cloud top height, pressure, temperature, and emissivity; cloud optical depth and effective radius; aerosol optical thickness; normalized difference vegetation index; sea surface temperature; all in HDF4 format.
Features	<ul style="list-style-type: none">• Multi-sensor common algorithm.• Product files include cloud and surface products, calibrated observations, and many ancillary data fields (user controlled).• CLAVR-x is the official NOAA cloud product for JPSS.

CLAIR-x Examples

SNPP 2013/03/10 23:00 UTC



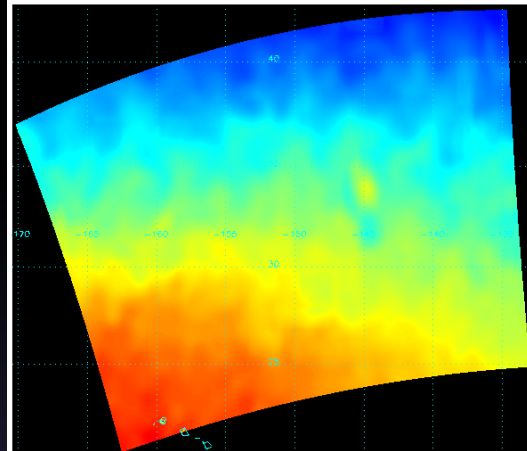
VIIRS False Color



False Color Image

Red = 0.65 μ m, Green = 0.86 μ m, Blue = 11 μ m (reversed)

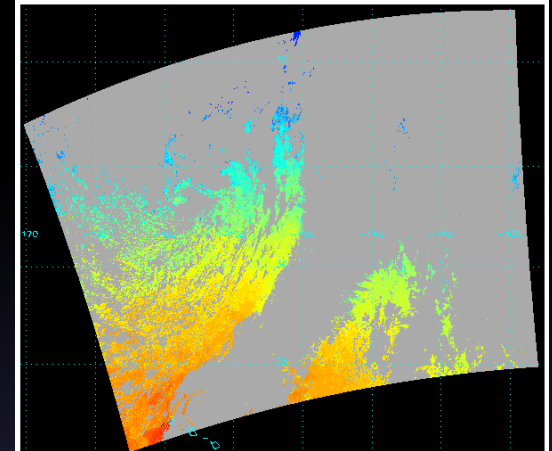
SST Ancillary Data



surface_temperature_background

280.00 284.00 288.00 292.00 296.00 300.00

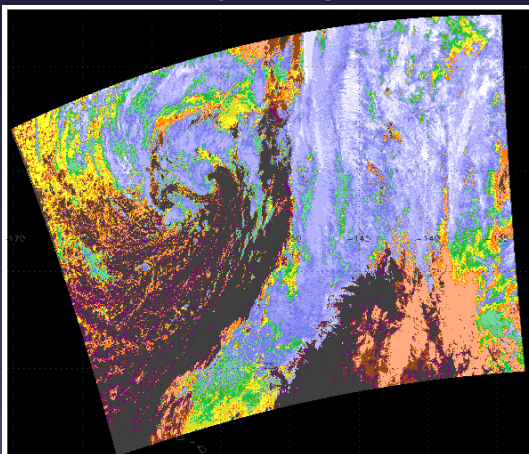
Cloud Masked SST



surface_temperature_retrieved

280.00 284.00 288.00 292.00 296.00 300.00

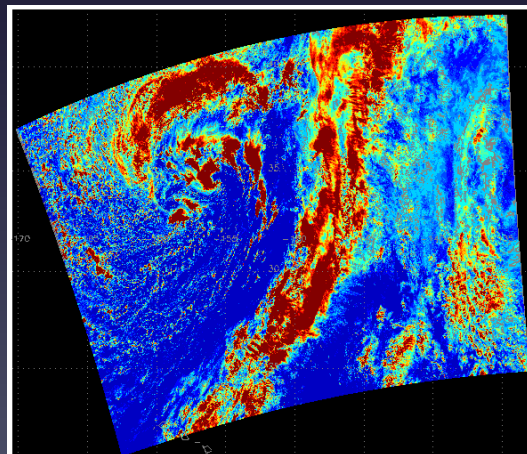
Cloud Top Temperature



Cloud-top Temperature (K)

300 290 280 275 270 265 260 255
250 245 240 235 230 220 210 0

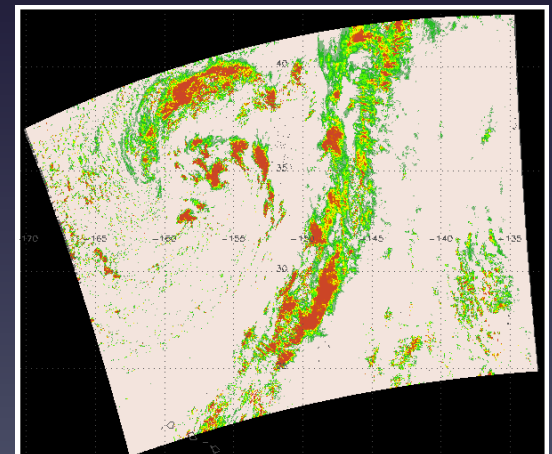
Cloud Water Path



Cloud Water Path (g/m²)

missing 0 10 20 30 40 50 60
100 120 140 160 180 200 250 300

Rain Rate



Rain Rate (mm/hr)

missing 0.00 0.10 0.20 0.50 1.00 2.00 4.00

8. NUCAPS

NUCAPS (NOAA Unique Cris/ATMS Processing System) retrieves atmospheric temperature, moisture, and trace gases from combined infrared and microwave observations.

Heritage	Developed at NOAA/NESDIS/STAR by Chris Barnet, Antonia Gambacorta, Walter Wolf, Mark Liu et al.
Satellites/Sensors	Suomi NPP CrIS/ATMS
Products	Temperature, water vapor, and ozone profiles; trace gas profiles including ozone, carbon monoxide, methane, carbon dioxide, nitrous oxide, sulphur dioxide; infrared and microwave surface emissivity; cloud cleared radiances.
Features	<ul style="list-style-type: none">• Multi-sensor common physical retrieval algorithm.• Future versions will support Metop-A/B IASI/AMSU/MHS and Aqua AIRS/AMSU.• NUCAPS is the official NOAA sounding product for JPSS.

NUCAPS Examples

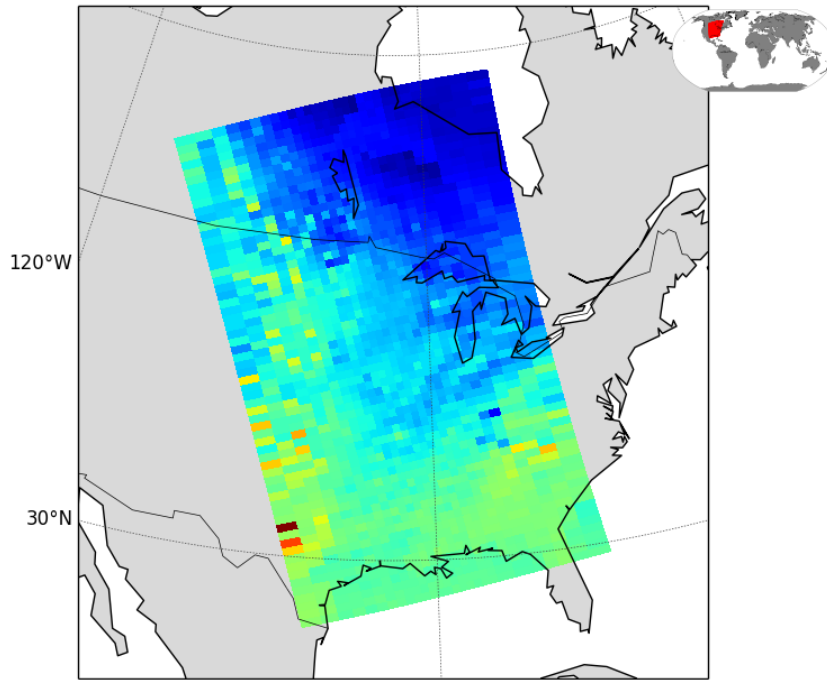
SNPP 2015/04/03 19:07 UTC



Temperature

NUCAPS-EDR_v1r0_npp_s201504031906499_e201504031907197_c201504032037040.nc

90°W



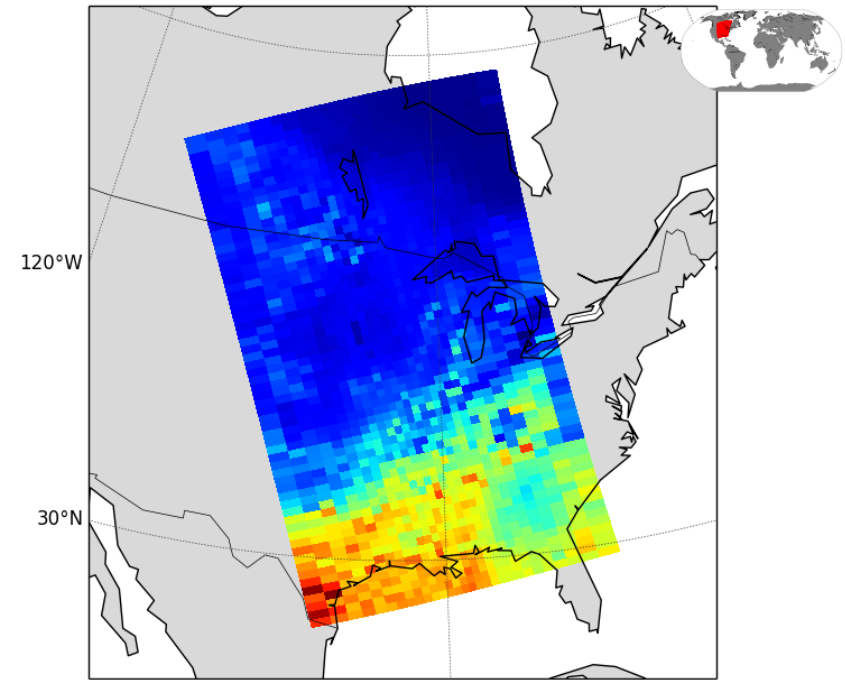
temperature (K) @ 986.00 hPa

260 270 280 290 300 310 320 330 340

Water Vapor Mixing Ratio

NUCAPS-EDR_v1r0_npp_s201504031906499_e201504031907197_c201504032037040.nc

90°W



water vapor mixing ratio (g/kg) @ 986.00 hPa

2 4 6 8 10 12 14 16

9. IAPP



IAPP (International ATOVS Processing Package) retrieves atmospheric temperature and moisture, total ozone, and cloud top properties from ATOVS sounder data.

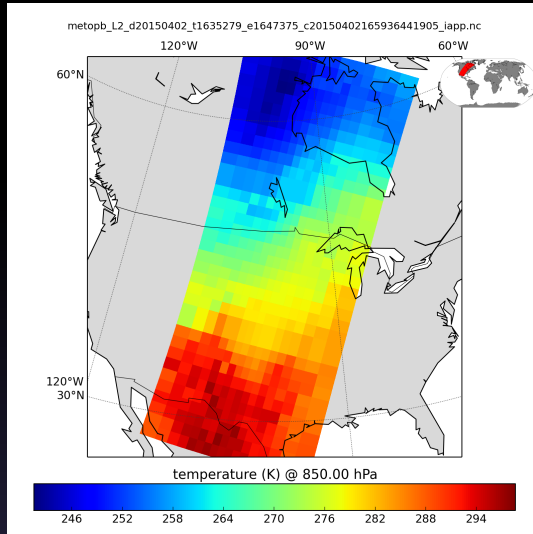
Heritage	Developed at CIMSS/SSEC by Hal Woolf, Jun Li, Chia Moeller, Tom Achtor et al.
Satellites/Sensors	NOAA-18/19 HIRS/AMSU/MHS; Metop-A/B HIRS/AMSU/MHS.
Products	Temperature and water vapor profiles; total column water vapor and ozone; cloud fraction; cloud top pressure and temperature; surface skin temperature and microwave emissivity.
Features	<ul style="list-style-type: none">• Fast regression first guess; iterative nonlinear physical retrieval.• Also supports NOAA-15/16 (non operational).

IAPP Examples

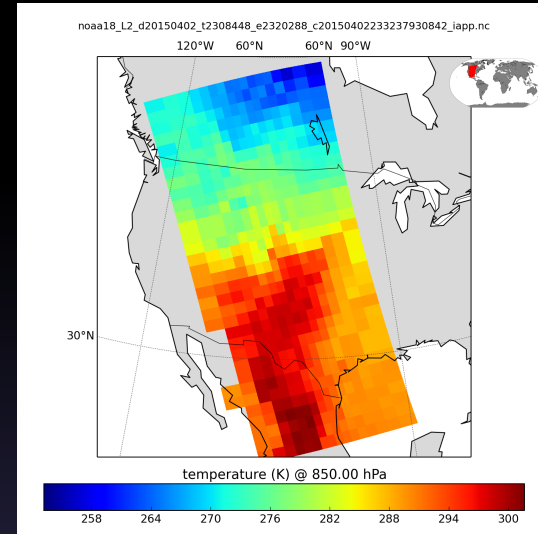
Metop-B 2015/04/02 16:35 UTC
NOAA-18 2015/04/02 23:08 UTC



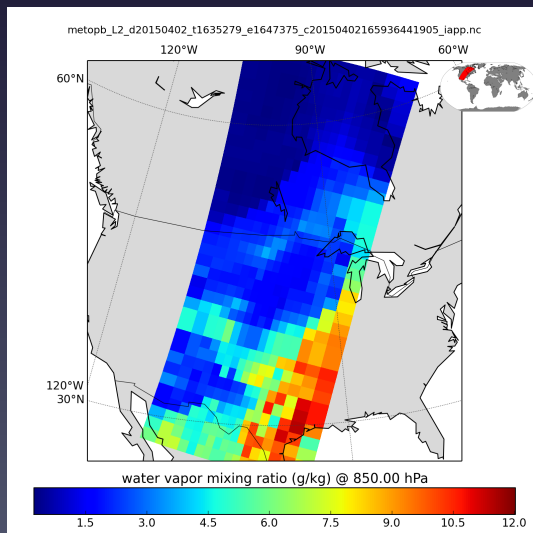
Metop-B Temperature at 850 hPa



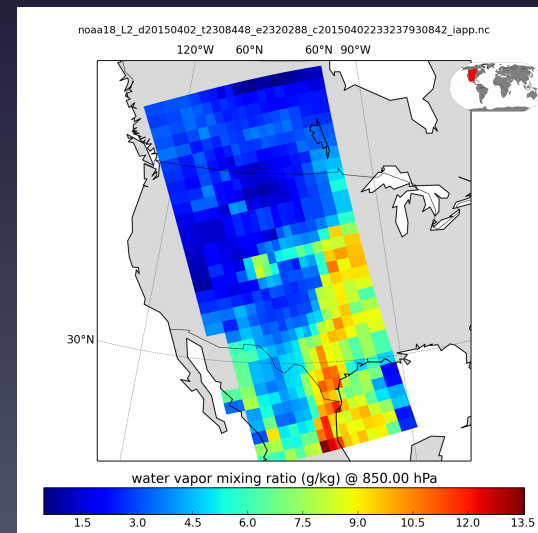
NOAA-18 Temperature at 850 hPa



Metop-B Water Vapor at 850 hPa



NOAA-18 Water Vapor at 850 hPa



10. ACSPO



ACSPO (Advanced Clear-Sky Processor for Oceans) retrieves sea surface temperature from multispectral imager observations.

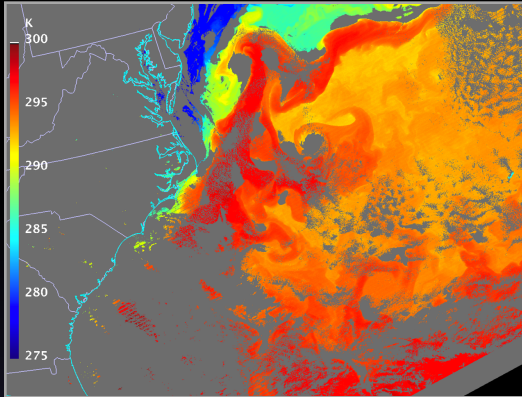
Heritage	Developed at NOAA/NESDIS/STAR by Alex Ignatov, John Sapper, John Stroup, and Yury Kihai.
Satellites/Sensors	Suomi NPP VIIRS; NOAA-18/19 AVHRR; Metop-A/B AVHRR; Terra/Aqua MODIS.
Products	Sea surface temperature, aerosol optical thickness; and clear-sky radiances.
Features	<ul style="list-style-type: none">• Multi-sensor common algorithm.• ACSPO is the official JPSS algorithm for SST.

ACSPPO Examples

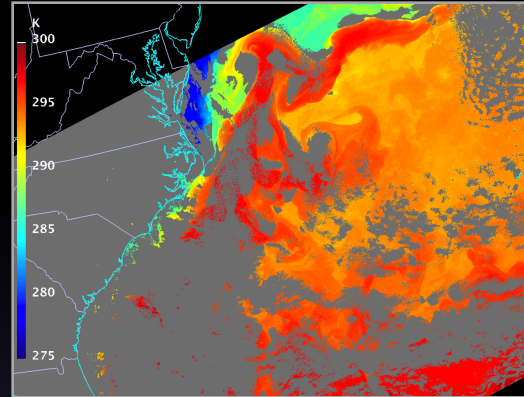
2015/04/02



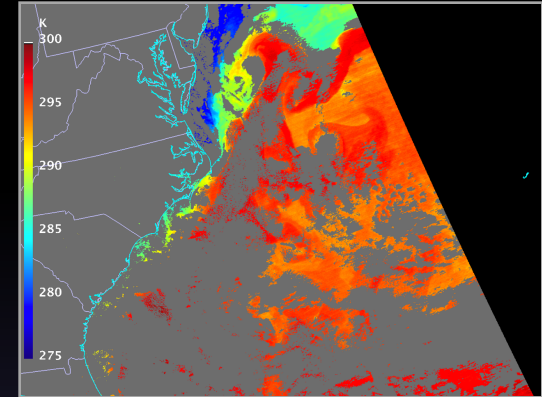
VIIRS SST 17:44 UTC



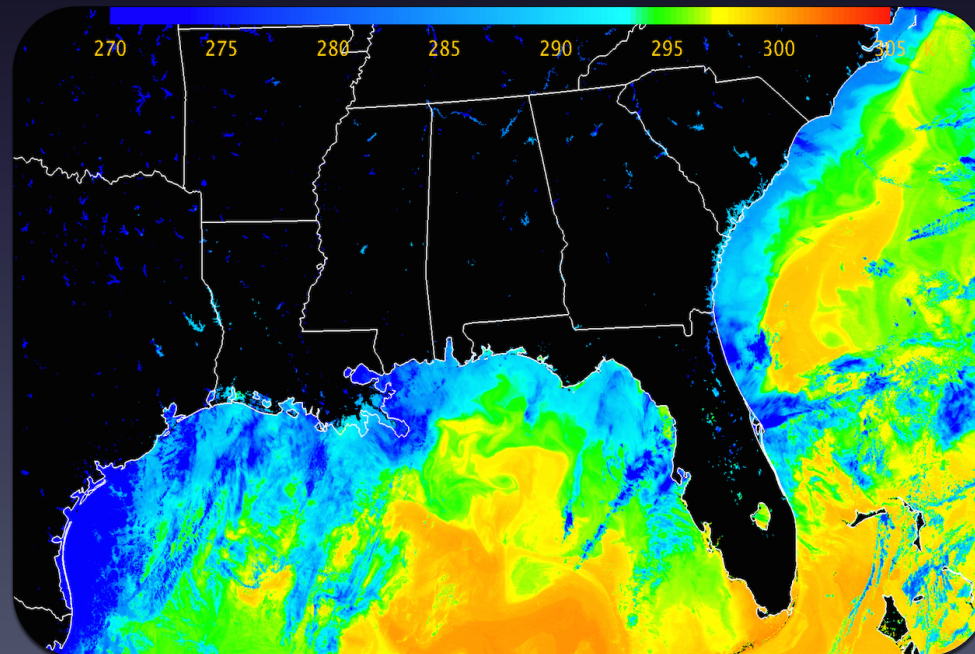
AVHRR SST 18:31 UTC



MODIS SST 18:35 UTC



VIIRS SST 2015/03/18 07:40 UTC



CSPP Summary

- CSPP continues to support the polar orbiting satellite DB community with a wide range of software and products supporting Suomi NPP, Metop, NOAA, and EOS satellites.
- CSPP GEO now supports geostationary satellites.
- We look forward to JPSS-1 in early 2017.

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



NOAA's National Centers for Environmental Information

CLASS Access

STAR JPSS 2015 Annual Science Team Meeting, August 24 - 28, 2015



NOAA Satellite and Information Service | National Centers for Environmental Information

Discussion Points

- CLASS's role verses NCEI's role
- What's in CLASS
- Access statistics and patterns
- Types of users accessing data
- Level of access services in CLASS
- Other access

CLASS Role vs. NCEI Role

- Comprehensive Large Array-data Stewardship System (CLASS) is managed by the NESDIS Office of Satellite Ground Services (OSGS). CLASS's current responsibilities include ingest, management, archival and access to its information holdings.
- NOAA's National Centers for Environmental Information (NCEI), in addition to providing similar services as CLASS, are responsible for data stewardship and user support of all information holdings in CLASS and in NCEI.

What JPSS Data can be Accessed?

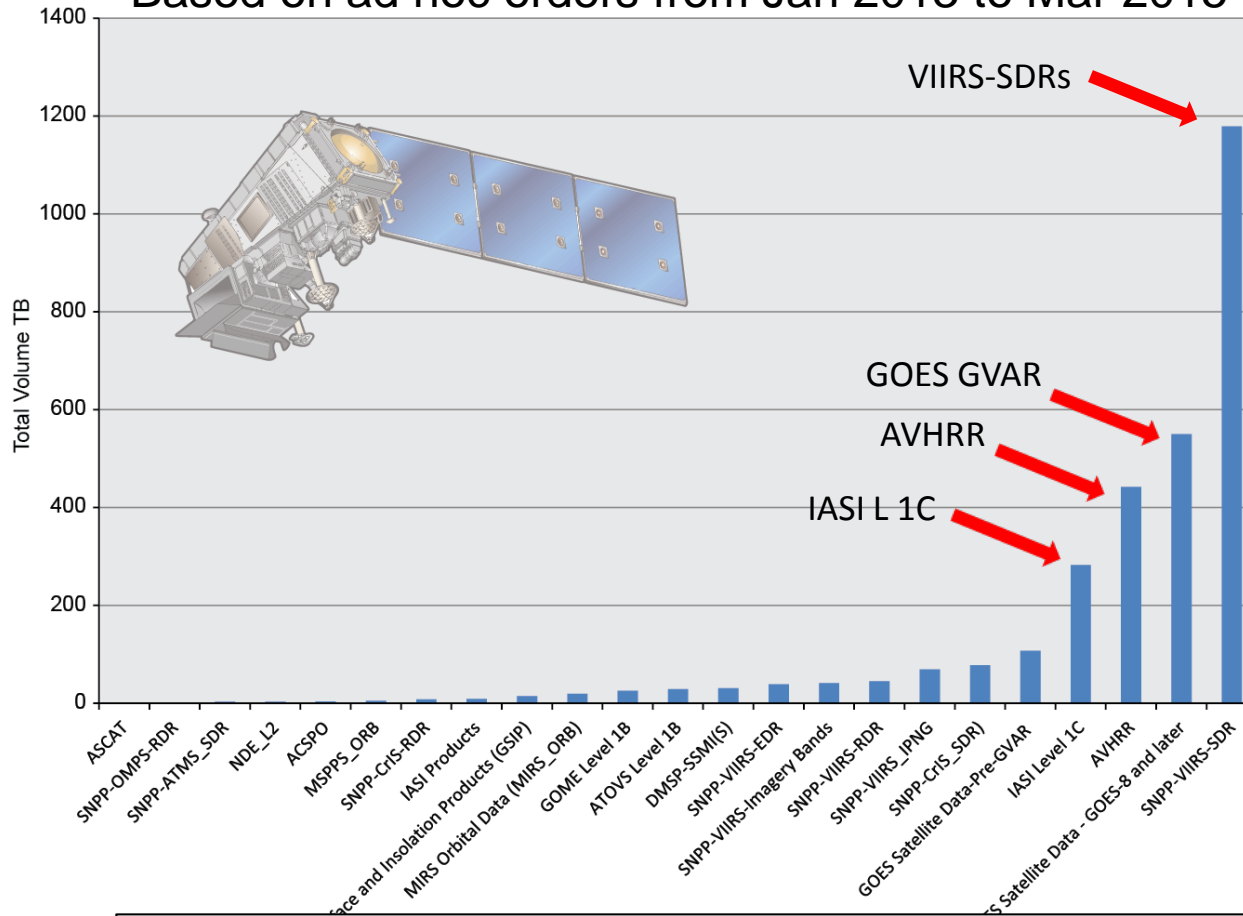
- There are 80 data families in CLASS.
 - 28 JPSS data families - ingest
 - 3 NDE data families listed under S-NPP
- Each family of data may contain many data types.
- Altogether there are close to 150 JPSS datasets in CLASS.
- The most popular are the SDR datasets.

Most Popular Datasets

Satellite/instruments	Period of record	Volume archived
S-NPP VIIRS xDRs	2012 to current	~4400 TB
GOES GVAR and pre-GVAR Imager datasets	1979 to current	~335 TB
POES/MetOp AVHRR and ATOVS Level 1b datasets	1978 to current	~116 TB
MetOp IASI datasets	2007 to current	~109 TB

Most Popular Datasets by Volume*

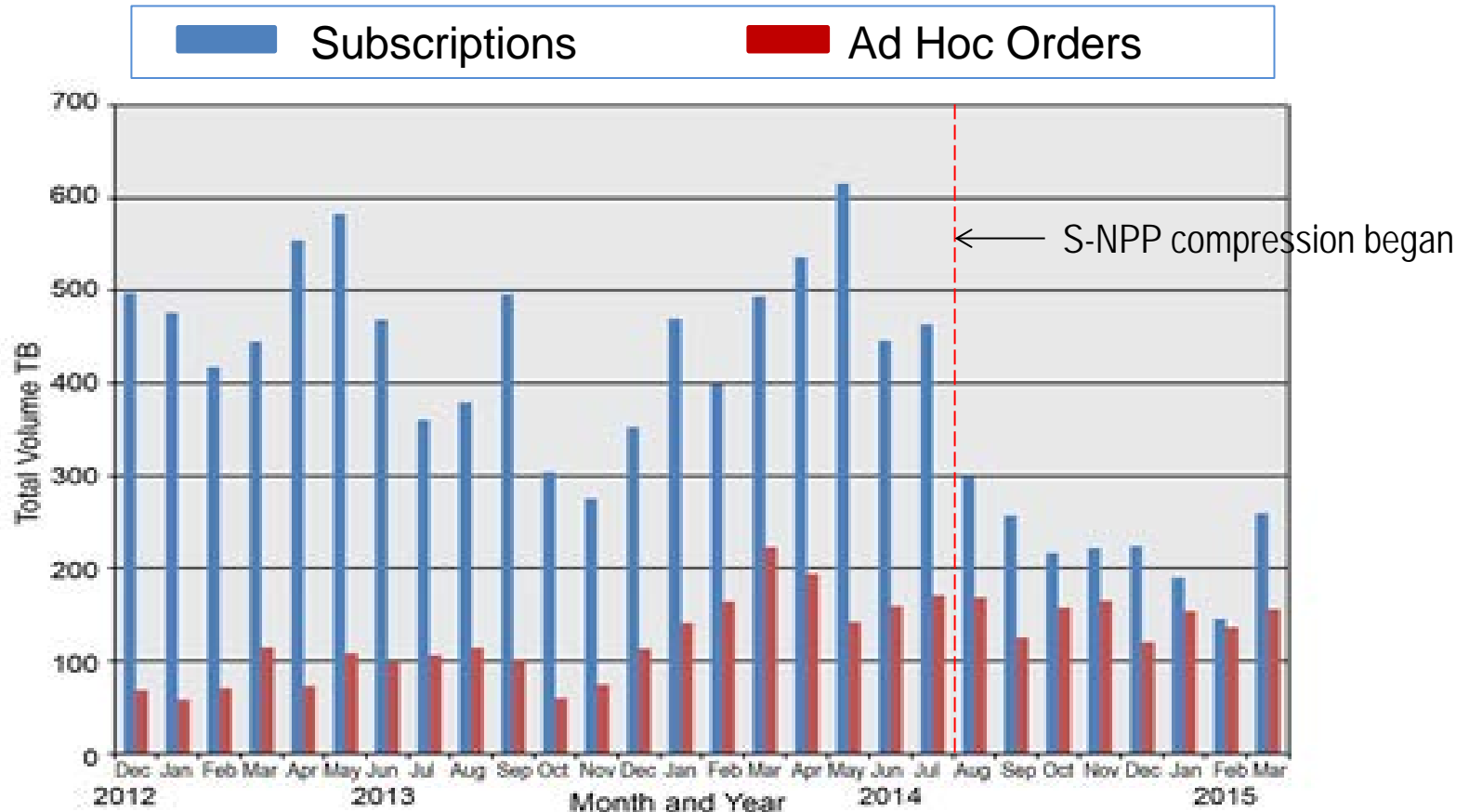
*Based on ad hoc orders from Jan 2013 to Mar 2015



23 CLASS data families with over 2 TB delivered

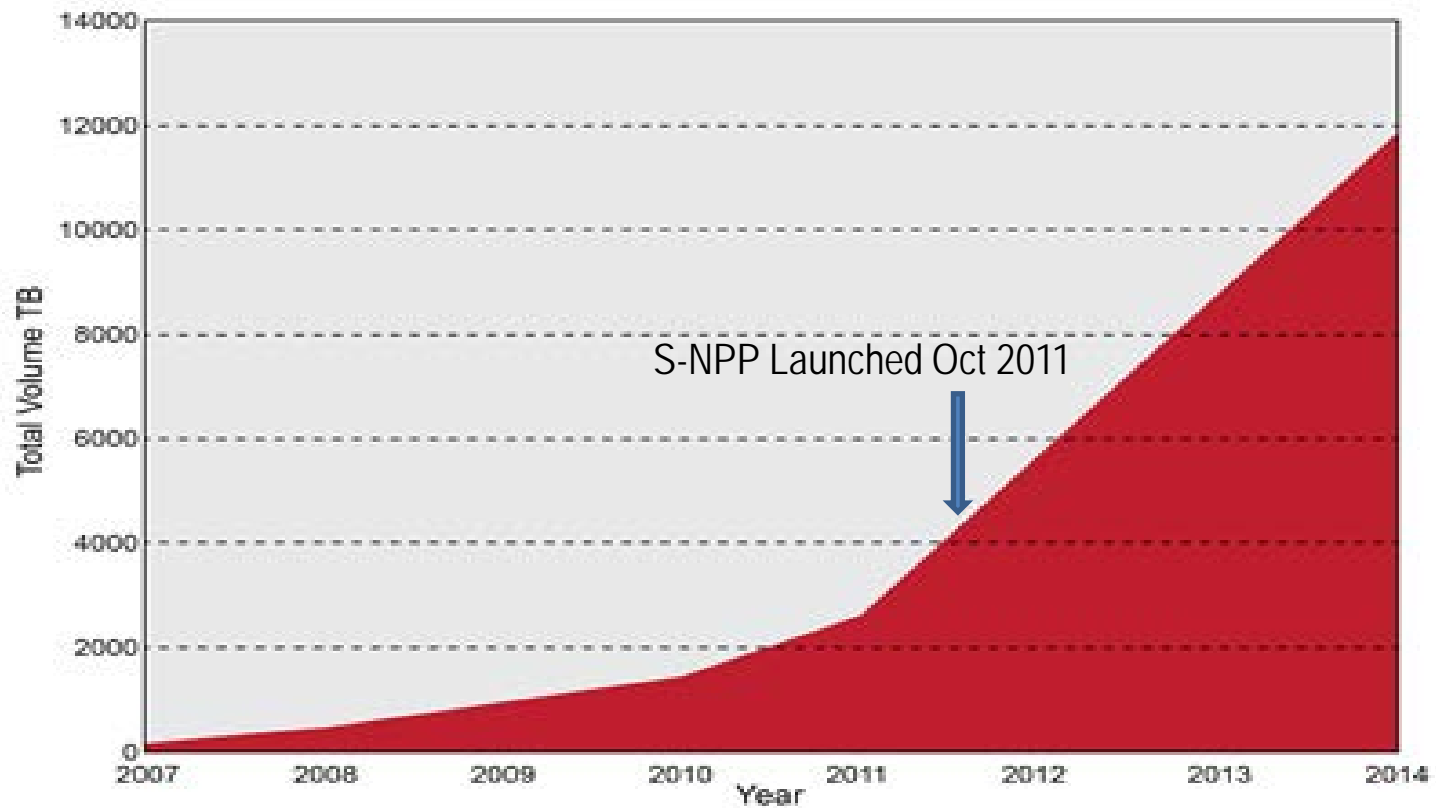


Monthly Totals (TB) Accessed

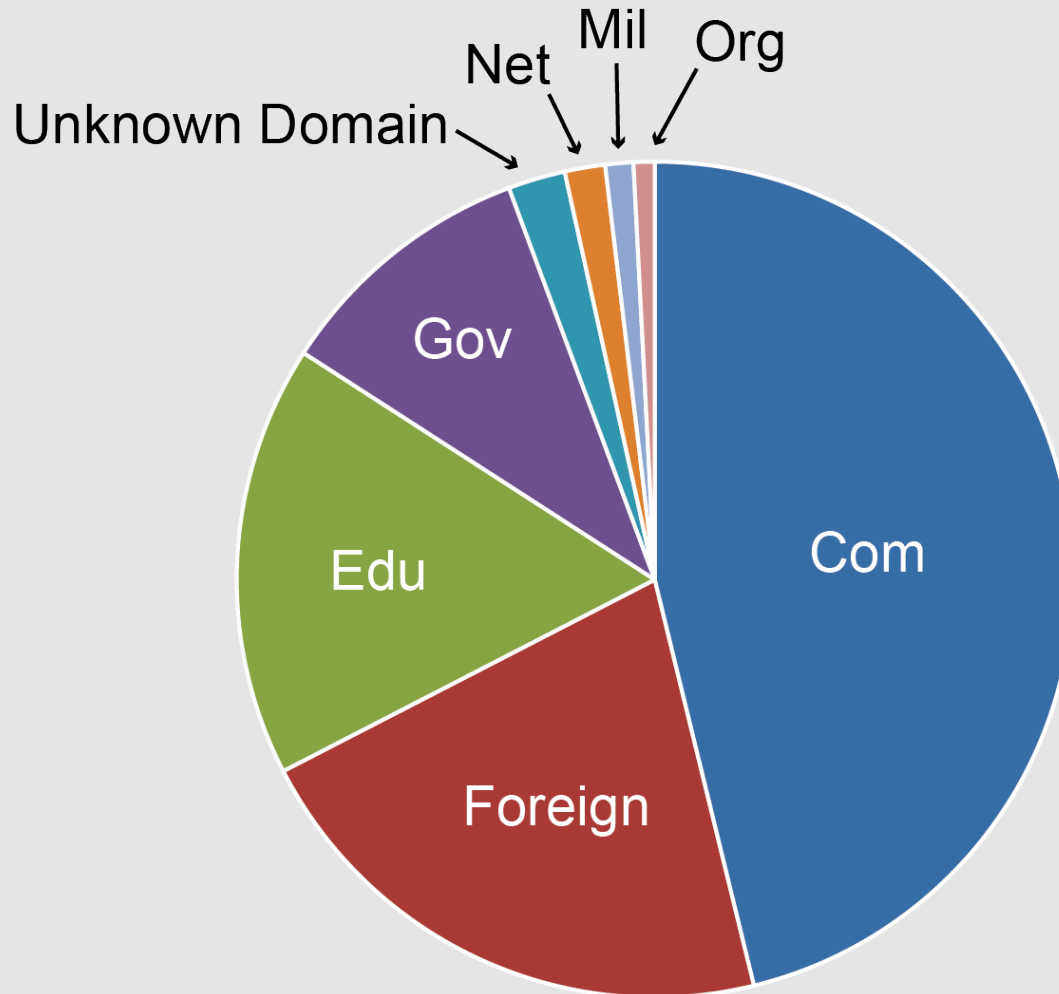


Total Archive Growth in CLASS

Total archive volume in CLASS is around 11.5 PB



Who are the users of CLASS?



How do I access data from CLASS?

Step 1: Register for a user id account at www.class.noaa.gov (minimal information: your name, e-mail address, a password)

Step 2: Select from the drop down product menu and highlight a dataset

Step 3: On the Search page make your selections (geographic region, start/end dates and times, and data types).

Step 4: Determine if you need greater access or a subscription

Note: Always provide your user ID when contacting the CLASS helpdesk



Levels of Access Services

CLASS order types:	Average completion time	Average File Limit	Contact the CLASS Help Desk?
Ad hoc orders (Use Search button to obtain inventory)	Usually within 12 to 24 hours	Up to 500 files	No
Large orders (use Quick Search button to skip inventory)	24 to 48 hours	1000	No
Block orders (use Quick Search button)	> 48 hours	3000	Yes
Subscription (standing orders)	< 6-7 hours	No limit	Yes

Proposed Access Increases to JPSS Data

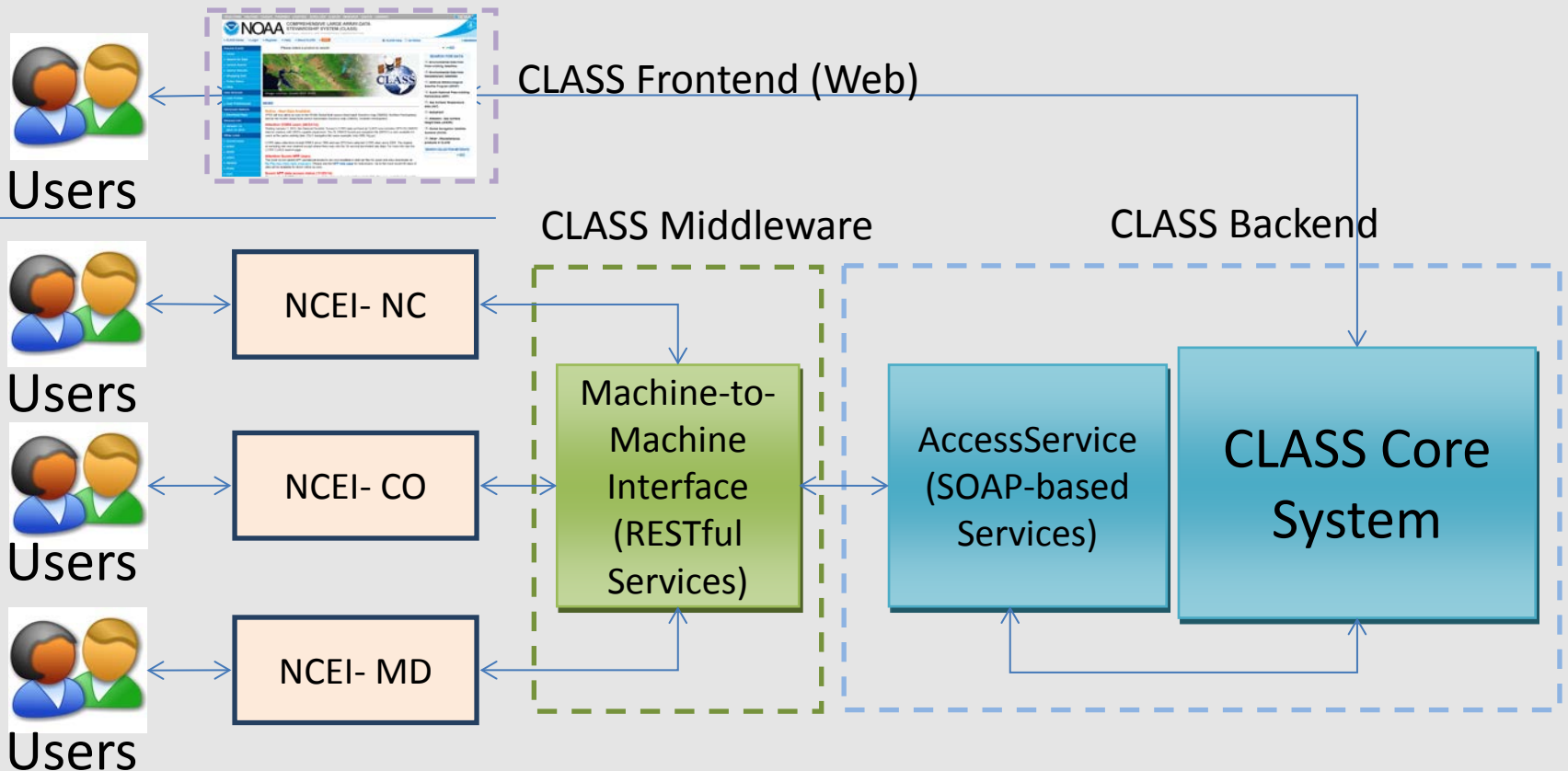
CLASS Data Family	Large Order File Limit	Proposed Limit	Block Order File Limit	Proposed Limit	Estimated Volume (GB) for Proposed Large Order (based on largest files within the group)
ATMS_RDR	1000	3000	3000	6000	<10 GB
ATMS_SDR	1000	3000	3000	6000	<14 GB
ATMS_TDR	1000	3000	3000	6000	<10 GB
CERES_RDR	1000	5000	3000	10000	<10 GB
CRIS_RDR	1000	2000	3000	5000	up to 270 GB
CRIS_SDR	1000	2000	3000	5000	up to 500 GB
CRIS_IP	1000	5000	3000	10000	~5.5 (restricted)
CRIMSS_EDR	1000	5000	3000	10000	<10 GB (product discontinued as of 9/8/2014)
CRIMSS_IP	1000	5000	3000	10000	<10 GB (restricted)
OMPS_RDR	1000	3000	3000	6000	up to 210 GB (orbital files)
OMPS_SDR	1000	2000	3000	4000	up to 750 GB
OMPS_IP	1000	3000	3000	6000	~60 GB
OMPS_EDR	1000	3000	3000	10000	up to 123 GB
VIIRS_RDR	1000	2000	2000	4000	up to 450 GB
VIIRS_SDR	1000	2000	2000	4000	up to 500 GB
VIIRS_I_EDR	1000	keep	2000	4000	up to 1000 GB
VIIRS_EDR	1000	keep	2000	4000	up to 750 GB
VIIRS_IPGD	1000	keep	3000	4000	up to 450 GB
VIIRS_IPNG	1000	keep	3000	4000	up to 725 GB

Levels of Access Services (2)

CLASS provides daily tar files containing publicly available S-NPP products for easy anonymous FTP download at: <ftp://ftp-npp.class.ngdc.noaa.gov/>

- Most recent 85 days
- 80 datatypes (including Geolocation files)
 - Newly added NDE_L2 NUCAPS and MIRS and NDE_Daily Polar Winds
- Data are compressed and “tar”-ed by datatype
- Sorted by Date (YYYYMMDD)/Data Family/Data Type
- Includes manifest files (xml format)
- No registration required for access

Other Access Under Development (Machine to Machine)



The M2M API implements a set of RESTful web services for searching, ordering, and order status querying of CLASS's information holdings.

Assistance and Support

For technical questions regarding access in CLASS:

class.help@noaa.gov
axel.graumann@noaa.gov

Tutorial on using CLASS:

CLASS Access tutorial - on CLASS Home Page in the News section





NOAA

COMPREHENSIVE LARGE ARRAY-DATA STEWARDSHIP SYSTEM (CLASS)

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



» CLASS Home » Logout » Help » About CLASS » **RSS**

CLASS Help All NOAA

» SEARCH

- Around CLASS**
- » Home
- » Subscriptions
- » Archive Manager
- » Search for Data
- » Upload Search
- » Search Results
- » Shopping Cart
- » Order Status
- » Help
- User Account**
- » User Profile
- » User Preferences
- Advanced Options**
- » Download Keys
- Release Info**
- » Version 7.0.2.0.1
August 13, 2015
- Other Links**
- » CLASS Home
- » NCEI
- » NESDIS
- » NOAA
- » DOC

Please select a product to search

» GO

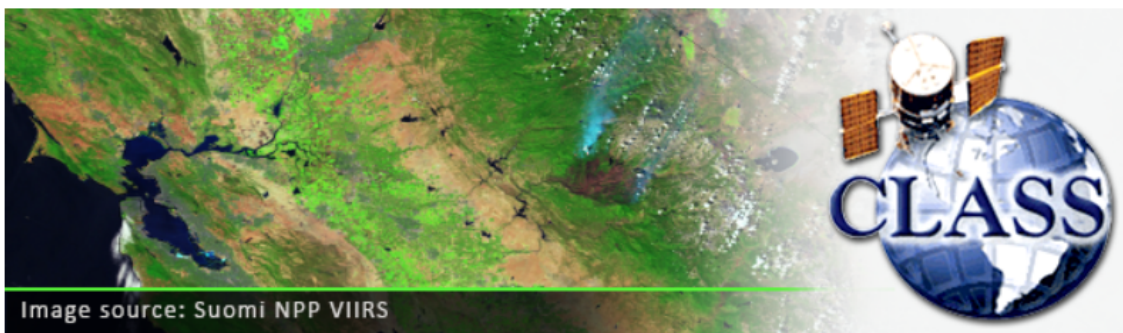


Image source: Suomi NPP VIIRS

NEWS

Attention S-NPP Users! (07/13/15):

NESDIS S-NPP Data Exploitation (NDE) Level 2 and Level 3 Products are now available for the most recent 90 days at <ftp://ftp-npp.class.ngdc.noaa.gov>. These products are tarred and gzip compressed for easier access. The products include NOAA-Unique CrIS-ATMS Processing System (NUCAPS) Cloud-Cleared Radiances (CCRs) and Environmental Data Records (EDRs) and daily Level 3 NH/SH Polar Winds and Green Vegetation Fraction (GVF) products.

New tutorial on how to search and order data in CLASS! (04/27/15):

A tutorial for searching and ordering data through CLASS can be found here: [CLASS Data Access Tutorial](#). The tutorial gives a step by step screen capture views of the searching and ordering process from registering with CLASS to checking on the status of your order. It also covers the various levels of access services offered from CLASS at this time. If you have any questions please email the [CLASS Help Desk](#).

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

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



Questions?





JPSS Ground Project



Overview of the JPSS GRAVITE System

Peyush Jain

DPES Development Manager
NASA GSFC Code 586

Gyanesh Chander

DPES Manager
NASA GSFC Code 586



GRAVITE



- GRAVITE stands for “Government Resources for Algorithm Verification, Independent Test and Evaluation”
- GRAVITE is the JPSS Ground System’s Calibration/Validation Node
 - Data center class hardware housed at the NOAA NSOF
- GRAVITE services facilitate:
 - Algorithm Integration and Checkout
 - Algorithm and Product Operational Tuning
 - Instrument Calibration
 - Product Validation
 - Algorithm Investigation
 - Data Quality Support and Monitoring
- Science algorithms are provided by NOAA STAR



GRAVITE Subsystems



- **Four subsystems:**
 - **IPS (Investigator-led Processing System)**
 - In-house developed. Production system, operator managed. Consists of Ingest, Automated Processing, and Distribution components. Runs PGEs (Product Generation Executable) for Cal/Val and Data Quality Monitoring
 - **G-ADA (GRAVITE Algorithm Development Area)**
 - Interface Data Processing Segment (IDPS) compliant development and testing platform for JPSS algorithms and Look-Up-Tables. After verification, proposed changes are sent to CGS as Algorithm Change Packages (ACP) for integration
 - **ICF (Investigator Computing Facility)**
 - Science tools and libraries, personal user space, access to data, and computing power are provided to run CPU and memory intensive applications. Provides access to subscribed data
 - **GIP (GRAVITE Information Portal)**
 - Coordination and knowledge sharing for GRAVITE projects through Blogs, Wikis, Action trackers, etc.



GRAVITE Purpose and Unique Features



GRAVITE provides a unique environment to support the Calibration/Validation and Data Quality Assessment of JPSS mission data products:

Category	Description	Unique Feature(s)
Distribution	Fast access to IDPS created data products (anticipated to be on the order of minutes in Block 2.0)	Direct interfaces to IDPS and STAR
Cal/Val tools	Automated and ad-hoc tools that cal/val users use for algorithm analysis and update	Product Generated Executables and Algorithm Support Functions
IDPS “Clone”	The G-ADA provides an instance of the IDPS available for algorithm change testing, science investigation, and data quality investigation	Installation of latest IDPS code in identical SW environment on similar hardware
Access to baselined data	Access to the latest baselined Processing Coefficient Tables (PCTs) and Look Up Tables (LUTs)	Access to ICF with the latest updated tables provided to IDPS
DQA offline	Data Quality Assurance Offline Tools	DQA offline in GRAVITE takes advantage of the performance features as well as proximity to near-real time data flows



GRAVITE Technical Specifications



Operations Environment

- 760 TB storage
- 3 IBM General Parallel File System (GPFS) clusters serving: ICF, IPS, G-ADA, G-ADA Block 2.0
- 35 IBM 787x series blades. Each blade has 12 or 16 CPU cores, 128 GB memory, 4 network interfaces
- 2 Dell R710s running VMware, hosting 11 virtual machines
- ICF and IPS use Red Hat Enterprise Linux 6.6, G-ADA uses AIX 6.1

Test/Development Environments

- 434 TB storage
- 1 IBM GPFS clusters serving: test, test2, test3
- 13 IBM 787x series blades. Each blade has 12 or 16 CPU cores, 128 GB memory, 4 network interfaces
- 4 IBM blades running VMware, hosting 17 virtual machines
- ICF and IPS use Red Hat Enterprise Linux 6.6

Network

- 12 IBM racks
- 10 GE Cisco Nexus switches, computing to storage
- 1/10 GE Cisco and IBM switches, computing to backbone
- 1/10 GE interfaces between Cisco ASA next-generation firewalls (558x series) and mission partners and internet

Data Flow

- 2.2 TB/day ingest from IDPS
- 0.7 TB/day ingest from CLASS
- 1.2 TB/day ingest from G-ADA
- 2.6 TB/day RIPs distribution to NASA SDS and CLASS
- 1.3 TB/day data distribution to Cal/Val community



Login




<https://gravite.ipss.noaa.gov/>



Search



GRAVITE		Search	Download Bag	Subscriptions
		<small>Last Updated @ 2015-08-26 17:24:21</small>		
<input type="checkbox"/> Collapse Search Criteria				
Granule Id	<input type="text" value="Granule Id"/>			
File Name	<input type="text" value="File Name"/> * = Wildcard			
Domain	<input type="text" value="ops"/>			
Mission	<input type="text" value="NPP"/>			
Instrument	<input type="text" value="ATMS"/>			
Product	<input type="text" value="RDR"/>			
Sub-Product	<input type="text" value=""/> Delete Sub-Products Selected - ATMS-SCIENCE-RDR			
Orbit	<input type="text" value="Orbit Number"/> <input type="text" value="Equals"/>			
Cloud Cover	<input type="text" value="Cloud Cover Percen"/> <input type="text" value="Equals"/>			
Day/Night	<input type="text" value=""/>			
Observed Time	From <input type="text" value="08/25/2015"/> <input type="text" value="12"/> <input type="text" value="3"/> : <input type="text" value="00"/> To <input type="text" value="08/25/2015"/> <input type="text" value="17"/> <input type="text" value="3"/> : <input type="text" value="02"/>			
Generic Group	<input type="text" value=""/>			
Usertype	<input type="text" value=""/>			
Granule Reference ID	<input type="text" value="Reference Id"/> * = Wildcard			
Spatial	<input type="text" value="Bounding Box: S, W, N, E"/> 			



Search Results



Order By:

[\(Refresh\)](#) Showing 1 to 5 of 5

<< < 1 > >>

<input type="checkbox"/>	file	<input type="checkbox"/>
<input type="checkbox"/>	RATMS-RNSCA_npp_d20150825_t0301517_e0302237_b19816_c20150825045746129706_noaa_ops.h5 Granule Id: NPP001211437000 NPP001211437200, NPP001211437400, NPP001211437137, Domain: ops Mission: NPP Instrument: SPACECRAFT, ATMS Product: RDR Sub-Product: SPACECRAFT-DIARY-RDR, ATMS-SCIENCE-RDR Filesize: 196 KB Observed Time: 2015-08-25 03:01:51 to 2015-08-25 03:02:23 Received Time: 2015-08-25 04:59:52 Expiration Time: 2070-05-28	<input type="checkbox"/>
<input type="checkbox"/>	RATMS-RNSCA_npp_d20150825_t0301197_e0301517_b19816_c20150825045701332550_noaa_ops.h5 Granule Id: NPP001211436817 NPP001211436800, NPP001211437000, Domain: ops Mission: NPP Instrument: ATMS, SPACECRAFT Product: RDR Sub-Product: ATMS-SCIENCE-RDR, SPACECRAFT-DIARY-RDR Filesize: 177.6 KB Observed Time: 2015-08-25 03:01:19 to 2015-08-25 03:01:51 Received Time: 2015-08-25 04:58:49 Expiration Time: 2070-05-28	<input type="checkbox"/>
<input type="checkbox"/>	RATMS-RNSCA_npp_d20150825_t0300477_e0301197_b19816_c20150825045643099910_noaa_ops.h5 Granule Id: NPP001211436497 NPP001211436600, NPP001211436800, NPP001211436400, Domain: ops Mission: NPP Instrument: ATMS, SPACECRAFT Product: RDR Sub-Product: ATMS-SCIENCE-RDR, SPACECRAFT-DIARY-RDR Filesize: 196 KB Observed Time: 2015-08-25 03:00:47 to 2015-08-25 03:01:19 Received Time: 2015-08-25 04:58:48 Expiration Time: 2070-05-28	<input type="checkbox"/>
<input type="checkbox"/>	RATMS-RNSCA_npp_d20150825_t0300157_e0300477_b19816_c20150825045607092293_noaa_ops.h5 Granule Id: NPP001211436400 NPP001211436200, NPP001211436000, NPP001211436177, Domain: ops Mission: NPP Instrument: SPACECRAFT, ATMS Product: RDR Sub-Product: SPACECRAFT-DIARY-RDR, ATMS-SCIENCE-RDR Filesize: 195.9 KB Observed Time: 2015-08-25 03:00:15 to 2015-08-25 03:00:47 Received Time: 2015-08-25 04:57:47 Expiration Time: 2070-05-28	<input type="checkbox"/>
<input type="checkbox"/>	RATMS-RNSCA_npp_d20150825_t0259437_e0300157_b19816_c20150825045540210622_noaa_ops.h5 Granule Id: NPP001211436200 NPP001211436000, NPP001211435800, NPP001211435857, Domain: ops Mission: NPP Instrument: SPACECRAFT, ATMS Product: RDR Sub-Product: SPACECRAFT-DIARY-RDR, ATMS-SCIENCE-RDR Filesize: 196 KB Observed Time: 2015-08-25 02:59:43 to 2015-08-25 03:00:15 Received Time: 2015-08-25 04:57:42 Expiration Time: 2070-05-28	<input type="checkbox"/>

Download Bag has 0 files

Add To Bag

Go To Bag

- Click on a file to download it immediately to your local machine
- Select multiple files and click *Add to Bag* to download multiple files



Download Bag



GRAVITE Search **Download Bag** Subscriptions

Last Updated @ 2015-08-26 17:29:09

<input type="checkbox"/>	File Name
<input type="checkbox"/>	RATMS-RNSCA_npp_d20150825_t0259437_e0300157_b19816_c20150825045540210622_noaa_ops.h5
<input type="checkbox"/>	RATMS-RNSCA_npp_d20150825_t0300157_e0300477_b19816_c20150825045607092293_noaa_ops.h5
<input type="checkbox"/>	RATMS-RNSCA_npp_d20150825_t0300477_e0301197_b19816_c20150825045643099910_noaa_ops.h5

Remove Selected

Zip	Download Location Local Machine	Download
------------	---	-----------------

Staging Zone	Staging Location /inv/data/subscriptions/pjain/ATMS_stage/	COMPLETED	ATMS_stage	Stage
---------------------	--	-----------	------------	--------------

- Files added via *Add To Bag* are available under *Download Bag* Tab
- Download files as a zip on your local machine
- Files staged on GRAVITE, accessible from ICF under:
/inv/data/subscriptions/<username>/<directory name>



Subscriptions



Collapse Search Criteria

Granule Id

File Name * = Wildcard

Domain

Mission

Instrument

Product

Sub-Product

Delete Sub-Products Selected

ATMS-SCIENCE-RDR

Orbit

Cloud Cover

Day/Night

Observed Time

From :

To :

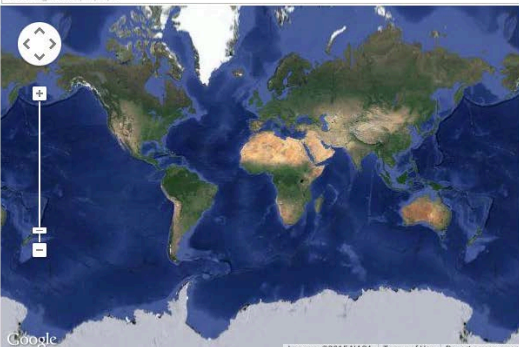
Generic Group

Usertype

Granule Reference ID * = Wildcard

Spatial

Bounding Box: S, W, N, E



Imagery ©2015 NASA | Terms of Use | Report a map error

Subscription **Subscription Name Requirements**
No special characters or spaces

GRAVITE					
Search Download Bag Subscriptions					
Last Updated @ 2015-08-27 18:38:47					
Subscription Name	Created	Last Updated	Total Files	Subscription Criteria	
<input type="checkbox"/> ATMS_SCI_RDR	2015-08-26 17:47:46	2015-08-27 11:29:15	1963900	Mission: NPP Instrument: ATMS Product: RDR Sub Product: ATMS-SCIENCE-RDR	
<input type="checkbox"/> CRIS_SDR	2015-08-26 17:48:20	2015-08-27 11:29:13	109676	Mission: NPP Instrument: CHS Product: SDR	

- Select subscription criteria and provide subscription name
- Review and manage subscriptions under *Subscriptions* Tab
- Files staged on GRAVITE, accessible from ICF under:
`/inv/data/subscriptions/<username>/<subscription name>`



Pull/Push Data



- Pull
 - Subscribed data can be pulled by connecting to gravite.jpss.noaa.gov via RSYNC, SFTP protocols
 - Data is available under `/subscriptions/<username>/<subscription name>`
- Push
 - Dedicated Line
 - Need Inter-Connection Security Agreement (ISA), Interface Control Document (ICD), Interface Requirements Document (IRD), Service Level Agreement (SLA)
 - 10G dedicated line established between GRAVITE and STAR. In case of STAR, ICD and IRD are approved. ISA and SLA are pending NOAA security signatures
 - Over internet
 - Need to add GRAVITE L4 requirement to ensure adequate resources are available
 - Work with GRAVITE operators to add a new push subscription or enable existing subscription for pushes



Prelaunch J1/NPP data



- Prelaunch J1/NPP data is obtained directly from the factory sites where the instruments are tested. GIP hosts this data under instrument projects
 - <https://gip.jpss.noaa.gov/projects/<project>>
 - J1 Projects: j1cris, j1omps, j1viirs, j1atms
 - NPP Projects: npp_cris, npp_omps, npp_viirs, npp_atms
- Instruments:
 - CrIS (pulled from Excelis)
 - OMPS (pulled from Ball Aerospace)
 - VIIRS (pushed from Raytheon)
 - ATMS (manually uploaded by test conductors)
- Access:
 - Download data from projects using RSYNC, SFTP by connecting to gdata.jpss.noaa.gov
 - From ICF, data is available under `/var/www/data/<project>`



System Status



GRAVITE IPS

- Ingest
 - Ingest Controller - <http://ingest01test.gravite.gov:9010>
 - ingest ingest-engine ingest01test10003 start:Mon Aug 24 20:41:06 UTC 2015 hb:Wed Aug 26 20:32:24 UTC 2015 IE on DB files:10 [10] in 9.971 s
 - ingest ingest-engine ingest01test10002 start:Mon Aug 24 20:41:06 UTC 2015 hb:Wed Aug 26 20:32:27 UTC 2015 IE on DB files:10 [10] in 18.932 s
 - ingest ingest-engine ingest01test10006 start:Wed Aug 26 06:11:51 UTC 2015 hb:Wed Aug 26 20:32:32 UTC 2015 IE on DB files:10 [10] in 10.553 s
 - ingest ingest-engine ingest01test10005 start:Mon Aug 24 20:41:06 UTC 2015 hb:Wed Aug 26 20:32:31 UTC 2015 IE on DB files:10 [10] in 11.212 s
 - ingest ingest-engine ingest01test10004 start:Mon Aug 24 20:41:06 UTC 2015 hb:Wed Aug 26 20:32:31 UTC 2015 IE on DB files:10 [10] in 22.667 s
 - Job Status - FileCollector:
 - Job Status Dir:/test/data/ingest/lz/pge_output Crawls:4935 Files:61406 Upd:Wed Aug 26 20:17:56 UTC 2015 Time:171442
 - Job Status Dir:/test/data/ingest/lz/user/h5 Crawls:5685 Files:0 Upd:Wed Aug 26 20:32:18 UTC 2015 Time:172305
 - Job Status Dir:/test/data/ingest/lz/ada Crawls:5709 Files:0 Upd:Wed Aug 26 20:32:22 UTC 2015 Time:172308
 - Job Status Dir:/test/data/ingest/lz/dps Crawls:4965 Files:128192 Upd:Wed Aug 26 20:31:59 UTC 2015 Time:172286
 - Job Status Dir:/test/data/ingest/lz/class Crawls:5327 Files:139202 Upd:Wed Aug 26 20:32:24 UTC 2015 Time:172310
 - Job Status Dir:/test/data/ingest/lz/user/nonh5 Crawls:5714 Files:0 Upd:Wed Aug 26 20:32:06 UTC 2015 Time:172292
 - Job Status Dir:/test/data/ingest/lz/ext_staging Crawls:5697 Files:0 Upd:Wed Aug 26 20:32:29 UTC 2015 Time:172315
 - Job Status - FileCollector:
 - Job Status Dir:/test/data/ingest/lz/block2_ldps/j01 Crawls:5582 Files:0 Upd:Wed Aug 26 20:32:04 UTC 2015 Time:172284
 - Job Status Dir:/test/data/ingest/lz/block2_ldps/npp Crawls:5582 Files:0 Upd:Wed Aug 26 20:31:56 UTC 2015 Time:172277
 - Job Status Dir:/test/data/ingest/lz/block2_ldps/j02 Crawls:5722 Files:0 Upd:Wed Aug 26 20:32:11 UTC 2015 Time:172291
 - Job Status Dir:/test/data/ingest/lz/block2_ldps/common Crawls:5577 Files:0 Upd:Wed Aug 26 20:32:04 UTC 2015 Time:172285
- Ingest Controller - <http://ingest02test.gravite.gov:9010>
 - ingest ingest-engine ingest02test10002 start:Mon Aug 24 20:45:41 UTC 2015 hb:Wed Aug 26 20:32:24 UTC 2015 IE on DB files:10 [10] in 18.373 s
 - ingest ingest-engine ingest02test10001 start:Mon Aug 24 20:43:30 UTC 2015 hb:Wed Aug 26 20:32:23 UTC 2015 IE on DB files:4 [4] in 9.162 s
 - ingest ingest-engine ingest02test10005 start:Mon Aug 24 20:45:41 UTC 2015 hb:Wed Aug 26 20:32:28 UTC 2015 IE on DB files:10 [10] in 9.585 s
 - ingest ingest-engine ingest02test10004 start:Mon Aug 24 20:45:41 UTC 2015 hb:Wed Aug 26 20:32:30 UTC 2015 IE on DB files:10 [10] in 21.141 s
 - ingest ingest-engine ingest02test10003 start:Mon Aug 24 20:45:41 UTC 2015 hb:Wed Aug 26 20:32:26 UTC 2015 IE on DB files:10 [10] in 10.566 s
- PGE
 - Workflow Manager <http://pgemgr01test.gravite.gov:9001> up 63 instances
 - Resource
 - Resource Manager <http://pgemgr01test.gravite.gov:9002> up 12 jobs in queue.
 - Resource Batch Stub <http://pge01test.gravite.gov:2001> up 12 load.
 - Resource Batch Stub <http://pge02test.gravite.gov:2001> up 11 load.
- Job Status
 - Job Status - <http://pgemgr01test.gravite.gov:8677>
 - Job Status Orbit Stats builder last run:Wed Aug 26 20:32:30 UTC 2015 avg: 0.282 i:0.294 r:366
 - Job Status Daily Stats last run:Wed Aug 26 20:30:33 UTC 2015 avg: 28.132 i:28.354 r:4
 - Job Status Obsolete User types deleted 0 rows, last run Wed Aug 26 17:30:09 UTC 2015 avg: 0.738 i:0.738 r:1
 - Job Status Delete old stats deleted 1 rows, last run Wed Aug 26 17:30:08 UTC 2015 avg: 0.751 i:0.751 r:1
 - Job Status PGE Cleanup last run:Wed Aug 26 20:31:56 UTC 2015 avg: 105.012 i:115.693 r:4
 - Job Status Stats Cleanup last run:Wed Aug 26 20:32:33 UTC 2015 avg: 0.120 i:0.068 r:366
 - Job Status Ingest Failures File Incinerator last run:Wed Aug 26 20:32:08 UTC 2015 deleted 0, (0 B) avg: 0.019 i:0.014 r:365
 - Job Status Subscription Dir Cleanup last run:Wed Aug 26 20:31:19 UTC 2015 avg: 148.972 i:126.202 r:73
 - Job Status Landing Zone Size worker last run:Wed Aug 26 19:52:19 UTC 2015 avg: 1278.775 i:1340.384 r:3
 - Job Status Gap Minder, Data spans:61508 bxFailures:0 lastRun:Wed Aug 26 20:32:08 UTC 2015 avg: 2.274 i:2.151 r:92
 - Job Status File Rover Monitor - /test/data/logs/ripserver/file_rovers_common_20150826.log [0] /test/data/logs/ripserver/file_rovers_j01_20150826.log [0] /test/data/logs/ripserver/file_rovers_npp_20150826.log [0] avg: 0.139 i:0.031 r:365
 - Job Status Stat Server last run:Wed Aug 26 20:32:27 UTC 2015 avg: 0.811 i:1.637 r:968
 - Job Status File Incinerator last run:Wed Aug 26 20:32:32 UTC 2015 deleted 0, (0 B) D:0 avg: 4.640 i:4.980 r:366
 - Job Status Stats near rollover last run:Wed Aug 26 20:32:31 UTC 2015 avg: 0.049 i:0.040 r:366
 - Job Status - <http://dist01test.gravite.gov:8677>
 - Job Status Link Maker avg: 0.000 i:0.000 r:5811
 - Job Status - Manager of Subscription FQ:53
 - Job Status Subscription Worker lastFin=Wed Aug 26 20:32:23 UTC 2015 lastNull=Wed Aug 26 20:32:23 UTC 2015 avg: 0.101 i:0.000 r:23440
 - Job Status Subscription Worker lastFin=Wed Aug 26 20:32:22 UTC 2015 lastNull=Wed Aug 26 20:32:22 UTC 2015 avg: 0.102 i:0.000 r:24384
 - Job Status Subscription Worker lastFin=Wed Aug 26 20:32:24 UTC 2015 lastNull=Wed Aug 26 20:32:24 UTC 2015 avg: 0.100 i:0.000 r:24594
 - Job Status Subscription Worker lastFin=Wed Aug 26 20:32:22 UTC 2015 lastNull=Wed Aug 26 20:32:22 UTC 2015 avg: 0.097 i:0.000 r:25420
 - Job Status Subscription Worker lastFin=Wed Aug 26 20:32:23 UTC 2015 lastNull=Wed Aug 26 20:32:23 UTC 2015 avg: 0.093 i:0.000 r:25523
 - Job Status Subscription Worker lastFin=Wed Aug 26 20:32:22 UTC 2015 lastNull=Wed Aug 26 20:32:22 UTC 2015 avg: 0.095 i:0.000 r:24458
 - Job Status Subscription Worker lastFin=Wed Aug 26 20:32:22 UTC 2015 lastNull=Wed Aug 26 20:32:22 UTC 2015 avg: 0.096 i:0.000 r:24748
 - Job Status Subscription Worker lastFin=Wed Aug 26 20:32:23 UTC 2015 lastNull=Wed Aug 26 20:32:23 UTC 2015 avg: 0.090 i:0.000 r:25850

- Job Status - <http://pgemgr01test.gravite.gov:8711>
 - Job Status - Product File Quality Analyzer FQ:0
 - Job Status ProductQA Worker lastFin=Wed Aug 26 20:33:36 UTC 2015 lastNull=Wed Aug 26 20:33:36 UTC 2015 failrate=0.0 avg: 0.383 i:0.000 r:40917
- Job Status - <http://dist01test.gravite.gov:8710>
 - Job Status - PushMaster 14 with 25 workers, 2184 files, 55294148791 bytes
 - Job Status PushSlave for dist0112 conn=true job=4/339886306 bc=0 Last:Wed Aug 26 20:33:02 UTC 2015 avg: 32.806 i:144.275 r:7
 - Job Status PushSlave for dist0112 conn=true job=8/362354799 bc=0 Last:Wed Aug 26 20:31:47 UTC 2015 avg: 17.189 i:69.271 r:9
 - Job Status PushSlave for dist0112 conn=true job=7/325859204 bc=0 Last:Wed Aug 26 20:31:47 UTC 2015 avg: 17.111 i:69.602 r:9
 - Job Status PushSlave for dist0112 conn=true job=6/261682908 bc=0 Last:Wed Aug 26 20:31:53 UTC 2015 avg: 22.785 i:76.215 r:7
 - Job Status PushSlave for dist0112 conn=true job=2/83657472 bc=0 Last:Wed Aug 26 20:33:02 UTC 2015 avg: 218.245 i:43.620 r:5
 - Job Status PushSlave for pgemgr0112 conn=true job=2/83657088 bc=0 Last:Wed Aug 26 20:33:02 UTC 2015 avg: 181.828 i:54.112 r:6
 - Job Status PushSlave for pgemgr0112 conn=true job=3/44390624 bc=0 Last:Wed Aug 26 20:33:03 UTC 2015 avg: 155.958 i:58.594 r:7
 - Job Status PushSlave for pgemgr0112 conn=true job=1/41831088 bc=0 Last:Wed Aug 26 20:33:16 UTC 2015 avg: 110.440 i:21.228 r:10
 - Job Status PushSlave for pgemgr0112 conn=true job=3/44390688 bc=0 Last:Wed Aug 26 20:33:02 UTC 2015 avg: 90.897 i:38.777 r:12
 - Job Status PushSlave for pgemgr0112 conn=true job=3/125485968 bc=0 Last:Wed Aug 26 20:32:56 UTC 2015 avg: 180.808 i:13.354 r:6
 - Job Status PushSlave for pgemgr0112 conn=true job=2/83656608 bc=0 Last:Wed Aug 26 20:33:02 UTC 2015 avg: 181.788 i:37.387 r:6
 - Job Status PushSlave for pgemgr0112 conn=true job=2/83656800 bc=0 Last:Wed Aug 26 20:33:05 UTC 2015 avg: 109.342 i:17.365 r:10
 - Job Status PushSlave for pgemgr0112 conn=true job=2/83656992 bc=0 Last:Wed Aug 26 20:33:08 UTC 2015 avg: 137.055 i:5.761 r:8
 - Job Status PushSlave for pgemgr0112 conn=true job=2/29593792 bc=0 Last:Wed Aug 26 20:33:08 UTC 2015 avg: 84.383 i:6.356 r:13
 - Job Status PushSlave for dist0113 conn=true job=4/1297882352 bc=0 Last:Wed Aug 26 20:30:30 UTC 2015 avg: 17.234 i:55.412 r:46
 - Job Status PushSlave for dist0113 conn=true job=5/118612108 bc=0 Last:Wed Aug 26 20:30:59 UTC 2015 avg: 17.872 i:61.202 r:46
 - Job Status PushSlave for dist0113 conn=true job=4/894891568 bc=0 Last:Wed Aug 26 20:31:30 UTC 2015 avg: 17.405 i:55.055 r:49
 - Job Status PushSlave for dist0113 conn=true job=3/973411764 bc=0 Last:Wed Aug 26 20:30:59 UTC 2015 avg: 16.770 i:154.327 r:4
 - Job Status PushSlave for dist0113 conn=true job=3/973411764 bc=0 Last:Wed Aug 26 20:31:16 UTC 2015 avg: 17.839 i:198.665 r:47
 - Job Status PushSlave for dist0113 conn=true job=5/118613932 bc=0 Last:Wed Aug 26 20:31:03 UTC 2015 avg: 18.609 i:61.224 r:46
 - Job Status PushSlave for dist0113 conn=true job=4/1297882352 bc=0 Last:Wed Aug 26 20:30:16 UTC 2015 avg: 16.929 i:138.677 r:46
 - Job Status PushSlave for dist0113 conn=true job=1/324470588 bc=0 Last:Wed Aug 26 20:32:42 UTC 2015 avg: 19.684 i:26.701 r:47
 - Job Status PushSlave for dist0113 conn=true job=7/118668676 bc=0 Last:Wed Aug 26 20:31:03 UTC 2015 avg: 17.196 i:169.819 r:47
 - Job Status PushSlave for dist0113 conn=true job=7/118671460 bc=0 Last:Wed Aug 26 20:30:27 UTC 2015 avg: 17.963 i:150.665 r:44
 - Job Status DestMonitor push@pgemgr0112 Wed Aug 26 20:33:35 UTC 2015 subs=1 m:664 :: in phase FTPS Link sending file VM050_npp_d20150825_1171168_e1713142_b19824_c20150825180124880981_noaa_ops.h5 got Read timed out
 - Job Status DestMonitor adatest@pgemgr0112 Wed Aug 26 20:33:23 UTC 2015 subs=1 m:0 unverified (paused?):
 - Job Status DestMonitor rtpetest@dist0113 Wed Aug 26 20:33:38 UTC 2015 subs=1 m:304 ::
 - Job Status DestMonitor gravite@10.8.255.190 Wed Aug 26 20:33:22 UTC 2015 subs=1 m:0 unverified (paused?):
 - Job Status DestMonitor push@dist0112 Wed Aug 26 20:33:35 UTC 2015 subs=1 m:897 :: in phase FTPS Link sending file GDNBO_npp_d20150826_10928504_e0930146_b19834_c20150826154559738120_noaa_ops.h5 got Read timed out
- Job Status - <http://pge01test.gravite.gov:8677>
 - Job Status vstfpd Monitor - /var/log/vstfpd.log [1127157] avg: 0.024 i:0.014 r:5812

Other

- Pull Server Exit status: -1, Wed Aug 26 18:00:05 UTC 2015
- IDPS Delivery Check <http://ingest01test.gravite.gov:8679> up:



Ingest and Orbit Statistics



- Recent tests show, at times GRAVITE test system ingested files at 828,000 files/day and volume at 14.2 TB/day

Orbit:

Platform:

Domain:

List:

Jump To:

NPP:ops 19826 - 19840: 1555 cells

- Max Ingested Orbit, CLASS_NPP: 19837
- Max Ingested Orbit, IDPS_NPP: 19840

Sub-Product	19826	19827	19828	19829	19830	19831	19832	19833	19834	19835	19836
SPACECRAFT-DIARY-RDR	306	306	304	306	305	306	305	306	308	306	305
SPACECRAFT-TELEMETRY-RDR	11	11	11	11	11	11	11	11	12	11	11
ATMS-DIAGNOSTIC-RDR	-	-	-	-	-	4	-	-	-	-	-
ATMS-DUMP-RDR	-	-	-	-	-	-	-	-	-	-	-
ATMS-DWELL-RDR	10	11	10	10	10	11	10	10	12	10	10
ATMS-SCIENCE-RDR	194	192	191	192	192	193	192	191	197	192	192
ATMS-TELEMETRY-RDR	191	190	190	191	190	190	191	190	190	191	190
ATMS-SDR	190	190	191	190	190	190	190	190	191	190	190
ATMS-SDR-GEO	190	190	191	190	190	190	190	190	191	190	190
ATMS-TDR	190	190	191	190	190	190	190	190	191	190	190
CRIS-DIAGNOSTIC-RDR	-	-	-	-	-	-	-	-	-	-	-
CRIS-DUMP-RDR	-	-	-	-	-	-	-	-	-	-	-
CRIS-HSKDWELL-RDR	10	11	10	10	10	10	10	10	12	10	10
CRIS-IMDWELL-RDR	10	11	10	10	10	10	10	10	12	10	10
CRIS-SSMDWELL-RDR	10	11	10	10	10	10	10	10	12	10	10
CRIS-SCIENCE-RDR	194	192	191	192	192	193	192	192	198	192	192
CRIS-TELEMETRY-RDR	190	190	191	190	190	191	190	190	192	190	190
CrIS-SDR	190	190	191	190	190	191	190	190	191	190	190
CrIS-SDR-GEO	190	190	191	190	190	191	190	190	191	190	190
OMPS-DUMP-RDR	-	-	-	-	-	-	-	-	-	-	-
OMPS-LPDIAGCAL-RDR	18	-	43	18	18	18	18	19	-	44	-
OMPS-NPDIAGCAL-RDR	17	31	-	17	17	17	17	17	-	-	-
OMPS-TCDIAGCAL-RDR	17	30	-	17	17	17	17	17	-	-	-
OMPS-LPCALIBRATION-RDR	-	-	-	-	-	-	-	-	-	2	-
OMPS-NPCALIBRATION-RDR	-	-	-	-	-	-	-	-	-	-	-
OMPS-TGCALIBRATION-RDR	-	-	-	-	-	-	-	-	-	-	-
OMPS-LPDIAGEXPONE-RDR	-	-	-	-	-	-	-	-	-	-	-



Data Quality Tools



GRAVITE Gap Minder Trending Product Quality DQN Reporter ICVS

Home DQA Settings Help Log out

Last Updated @ 2015-07-10 19:26:08

Domain: ops
 Mission: NPP
 Instrument: VIIRS
 Product: GEO
 SubProduct:
 Start: 07/09/2015 16:00
 End: 07/10/2015 16:00

Filter

Domain	Mission	Instrument	Type	Sub-Type	Gaps	show
ops	NPP	VIIRS	GEO	VIIRS-CLD-AGG-GEO	1	show
ops	NPP	VIIRS	GEO	VIIRS-IMG-GEO-TC	1	show
ops	NPP	VIIRS	GEO	VIIRS-MOD-GEO-TC	1	show
ops	NPP	VIIRS	GEO	VIIRS-IMG-GTM-EDR-GEO	1	show
ops	NPP	VIIRS	GEO	VIIRS-Aeros-EDR-GEO	1	show
ops	NPP	VIIRS	GEO	VIIRS-MOD-GTM-EDR-GEO	1	show
ops	NPP	VIIRS	GEO	VIIRS-NCC-EDR-GEO	3	show
ops	NPP	VIIRS	GEO	VIIRS-MOD-UNAGG-GEO	1	show
ops	NPP	VIIRS	GEO	VIIRS-MOD-GEO	1	show
ops	NPP	VIIRS	GEO	VIIRS-NHF-EDR-GEO	1	show
ops	NPP	VIIRS	GEO	VIIRS-DNB-GEO	2	show
ops	NPP	VIIRS	GEO	VIIRS-IMG-GEO	1	show

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GRAVITE Gap Minder Trending Product Quality DQN Reporter ICVS

Home DQA Settings Help Log out

Last Updated @ 2015-06-10 14:54:29

Select:
 Start: 06/03/2015 14:54
 End: 06/10/2015 14:54
 Domain: ops
 Mission: NPP
 Instrument: ATMS
 Product: SDR
 SubProduct: ATMS-SDR
 Parameters:
 Updates Add Plot

Chart

Trend Data by Parameter - SATMS coldNedt

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GRAVITE Gap Minder Trending Product Quality DQN Reporter ICVS

Home DQA Settings Help Log out

Last Updated @ 2015-06-10 16:35:28

Orbit: 14 Orbits Back 7 Orbits Back 1 Orbit Back Reset Orbit 1 Orbit Forward 7 Orbits Forward 14 Orbits Forward

Platform: NPP
 Domain: ops
 Jump To: 18730

Sub-Product	18730	18731	18732	18733	18734	18735	18736	18737	18738	18739	18740	18741	18742	18743	18744
NPP:ops:ATMS:ATMS-SDR	1	0	0	0	1	0	0	1	0	0	1	0	0	0	0
NPP:ops:CrIS:CrIS-SDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:OMPS-TC:OMPS-TC-EDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-DNB-SDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-I1-IMG-EDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-I1-SDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-I4-IMG-EDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-I4-SDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-I5-IMG-EDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-I5-SDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-M1-SDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-M12-SDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-M1ST-EDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-M8-SDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NPP:ops:VIIRS:VIIRS-NCC-EDR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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DQA Offline Tools

- Gap Minder
- Trend Data Collector (TDC)
- Product File Quality Analyzer (PFQA)
- Sensor Quality Analysis Product Generations Executables (PGEs)
- Number Extractor (N-Extract)
- Integrated Calibration/Validation System (ICVS) Lite
- Data Quality Notification (DQN) Reporter



PGE Control



Looping Controls

Start	Stop	Status	PGE
START	STOP	■	ALL
START	STOP	■	AeronetDsMatchPpV3
START	STOP	■	AeronetMatchPpV2
START	STOP	■	AtmsTdrQfNextractV1
START	STOP	■	CrisDailyDqfAPlotV1
START	STOP	■	CrisDailyDqfBPlotV1
START	STOP	■	CrisSdrGeoQfNextractV1
START	STOP	■	OmpsAllRdrNpEarth24V1
START	STOP	■	OmpsAllRdrNpEarthV1
START	STOP	■	OmpsAllRdrTcEarth24V1
START	STOP	■	OmpsAllRdrTcEarthV1
START	STOP	■	OmpsCompareEarthSdrNpTcV1
START	STOP	■	OmpsSdrTcRadFlagNextractV1
START	STOP	■	OmpsStatisticsEarthSdrNpV1
START	STOP	■	OmpsStatisticsEarthSdrTcOzoneV2
START	STOP	■	OmpsStatisticsEarthSdrTcReflectivityV1
START	STOP	■	ViirsAeronetDsMatchV3
START	STOP	■	ViirsAeronetMatchV4
START	STOP	■	ViirsCloudApvV2
START	STOP	■	ViirsImgGeoMatchV1
START	STOP	■	ViirsIstMatchV1
START	STOP	■	ViirsLrvV1
START	STOP	■	ViirsLstMatchV1
START	STOP	■	ViirsSdrM7ReflectanceQfNextractV1
START	STOP	■	ViirsSurfRefIV4
START	STOP	■	ViirsTelScanEvalDailyV1
START	STOP	■	ViirsTelScanEvalMonthlyV1
START	STOP	■	ViirsTelScanEvalWeeklyV1
START	STOP	■	ViirsTleQualityFlagV1
START	STOP	■	ViirsVIQcV1
START	STOP	■	ViirsVITimelineV1

Terminator Controls

Stop	Task	ID	Status
STOP	Gravite Looping Planner-global-conditions-eval	urn:d56f10a4-db2a-4eae-a747-609c09d0a09c	PAUSED
STOP	ViirsImgGeoMatchV1	urn:a519cd72-f84d-4297-b729-021fdc3dfdb5	STARTED



Summary



- GRAVITE is currently in operations and has been successfully supporting SNPP since its launch in Oct 2011
- GRAVITE has evolved as a system with increased performance
 - Robust, stable, reliable, maintainable, scalable, and secure
 - Supports development, test, and production strings
 - Uses open source software
 - Compliant with NASA and NOAA standards



GRAVITE



Backup



Help



- New GRAVITE account request
 - Erica Handleman: erica.handleman@nasa.gov
 - Please cc operations mailing list: OPS-GRAVITE-DPES-JPSS@lists.nasa.gov
- Please contact GRAVITE
 - Support at gravite.service@noaa.gov for system access issues
 - Operators at ops-gravite-dpes-jpss@lists.nasa.gov for all other issues
- GRAVITE Web Interface:
 - <https://gravite.jpss.noaa.gov>



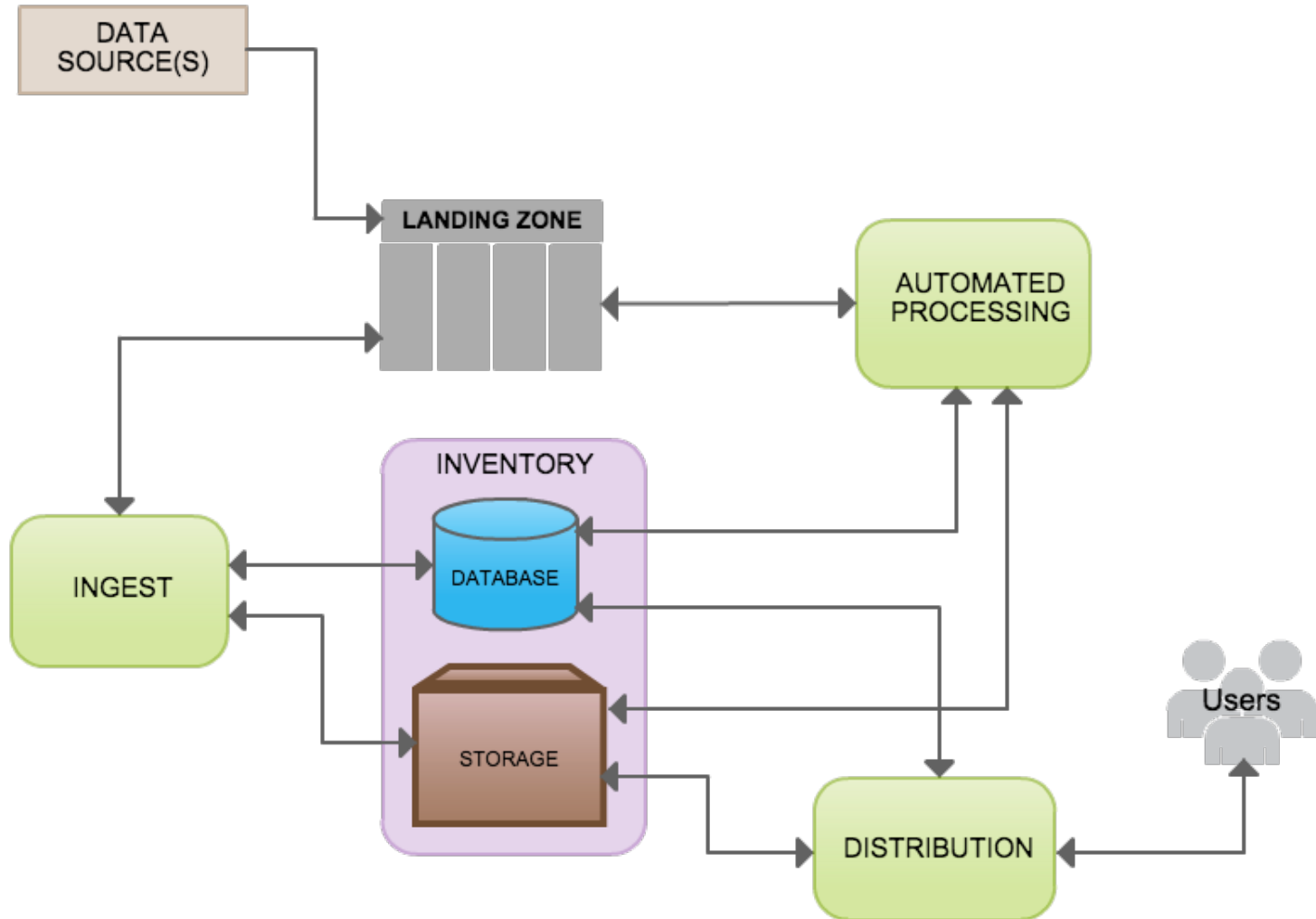
Documentation

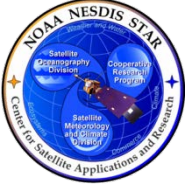


- The following documents are available at:
https://gip.jpss.noaa.gov/projects/gip_user/dmsf
 - GV4.0 Training Slides (GV4.0 Training Slides.pdf)
 - GRAVITE User Guide (GRAVITE User Guide.pdf)
 - GRAVITE DQE Guide (GRAVITE DQE Guide.pdf)
 - PGE Integration Form (GRAVITE PGE Integration Form.pdf)
 - PGE Details document (PGE details.xlsx)
 - DQA Configuration Details (dqConfig.html)
 - Documentation for the DQA Configuration (DQA Configuration Report.docx)
- Documents on individual Sensor Quality tools are available in:
https://gip.jpss.noaa.gov/projects/jpssdpa_external/repository
under Algorithm Support Function (ASF), Cal/Val and Data Quality Monitoring folders



IPS High Level Functions





Accessing Non-NOAA Data: Sentinel and Himawari

Frank Monaldo/Michael Soracco#*

NESDIS/STAR/SOCD/MECB

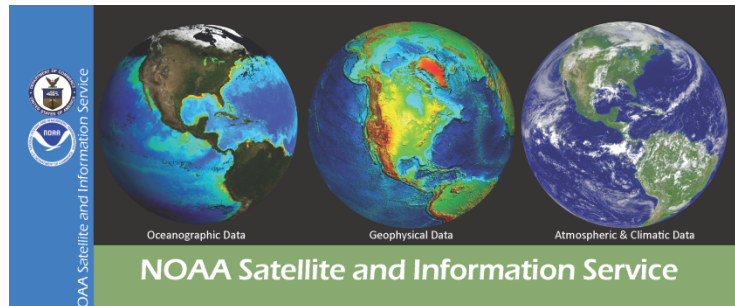
Frank.Monaldo@noaa.gov

Michael.Soracco@noaa.gov

**IPA from Johns Hopkins University APL*

DMT for NOAA/NESDIS/STAR/SOCD

NESDIS Mission Statement



Mission

The National Environmental Satellite, Data, and Information Service (NESDIS) is dedicated to providing timely access to global environmental data from satellites and other sources to promote, protect, and enhance the Nation's economy, security, environment, and quality of life. To fulfill its responsibilities, NESDIS does the following:

- acquires and manages the Nation's operational environmental satellites,
- operates the NOAA National Data Centers,
- provides data and information services including Earth system monitoring,
- performs official assessments of the environment, and
- conducts related research.

Vision

The NESDIS vision is to be the world's most comprehensive source and recognized authority for satellite products, environmental information, and official assessments of the environment in support of societal and economic decisions. To achieve the vision, NESDIS does the following:

- Operate the world's premier environmental satellite system, and the Nation's National Environmental Data Centers, fulfilling customer requirements for quality and timeliness of data.
- Collaborate with other agencies and organizations to describe changes to our climate and the implications of those changes.
- Continue to lead the effort with other agencies and countries in establishing a global observing system to meet the world's information needs for weather, climate, oceans, and disasters.
- Deliver state of the art products and services based on cutting edge operations, science, and applications.
- Partner with industry, academia, and other research and development agencies to facilitate the introduction of new techniques and technologies into our operations.
- Bring robust information and service delivery to our customers and invest in effective relationships with stakeholders and our partners in the media and private sector.
- Develop a skilled, energetic, and dedicated workforce through training, motivation, and teamwork.

“...NESDIS is dedicated to providing timely access to global environmental data from satellites and other sources to promote, protect, and enhance the Nation's economy, security, environment, and quality of life.”

“Continue to lead the effort with other agencies and countries in establishing a global observing system to meet the world's information needs for weather, climate, oceans, and disasters.”

Use of non-NOAA data sources is consistent with and necessary to complete the NESDIS Mission.



Non-NOAA Data



- **NASA and other agencies.**
- **Other countries.**
- **Varying data policies.**
- **Differ degrees of relevance to NOAA.**
- **Here we focus of accessing Sentinel data from Europe and Himawari data from Japan.**

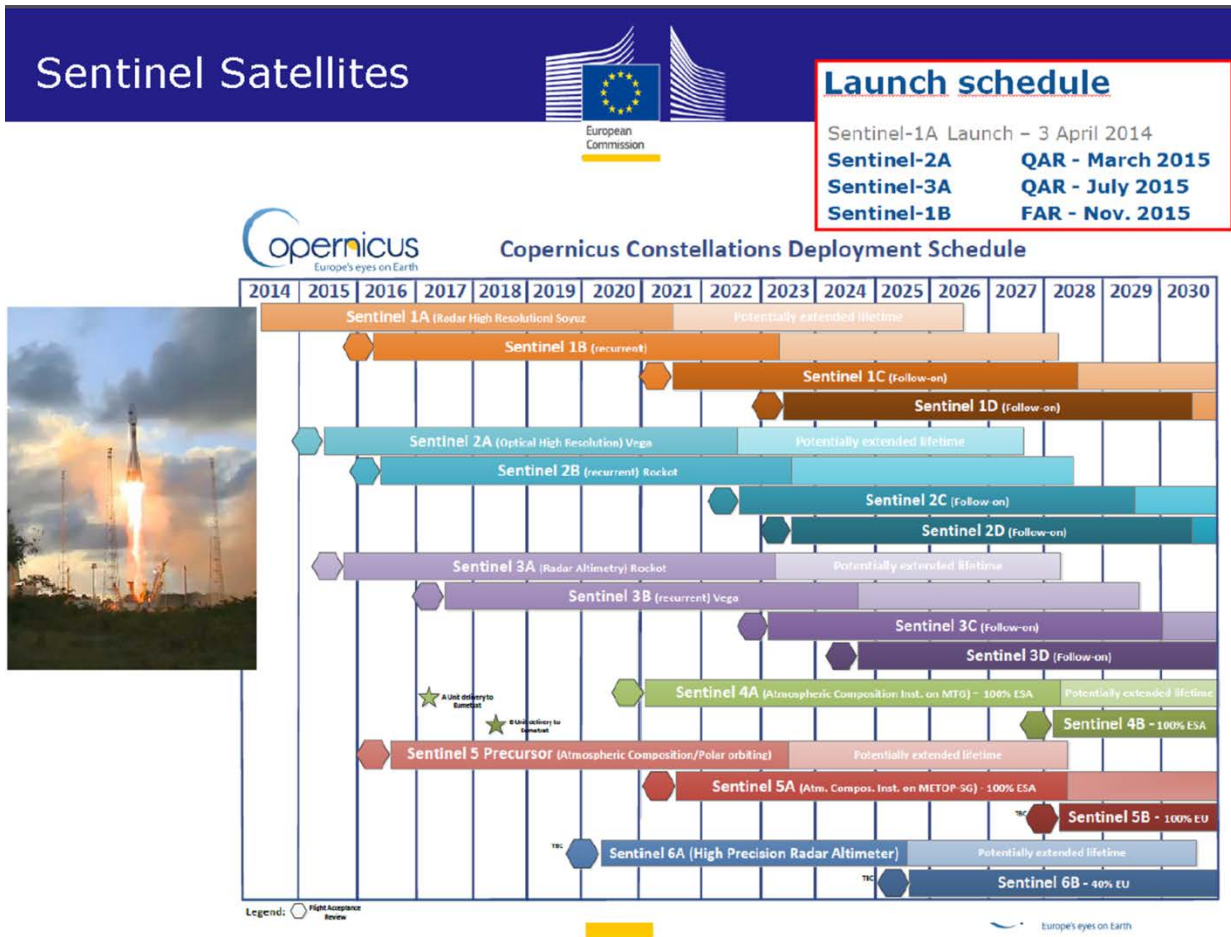


Copernicus Program



- **Europe's effort to provide necessary environmental data.**
- **Complements US efforts.**
- **Data is free and open.**
- **Long-term program, slated to spend \$10 billion to 2020 and significantly more out to 2030.**
- **The US just needs to apply sufficient resources to say "Yes."**

Copernicus Program



- **Sentinel-1:** SAR Imagery
- **Sentinel-2:** Multi-Spectral Imaging (Landsat)
- **Sentinel-3:** Ocean and global land monitoring (VIIRS/MODIS)
- **Sentinel-4:** GEO atmospheric composition
- **Sentinel-5:** LEO atmospheric composition
- **Sentinel-6:** LEO altimetry



2014-2017 Sentinel Data

- **Sentinel-1:**
 - C-band Synthetic Aperture Radar Imagery for wind speed, oil spill, ship detection, ocean wave spectra etc. (10-50 m resolution, 80-400 km swath)
 - 1A Launched April 2014
 - 1B Launch Early 2016
- **Sentinel-2: Multi-Spectral Imaging (Landsat)**
 - 13-channel multi-spectral imagery (443 – 2190 nm), 10-60 m resolution, 290 km swath
 - 2A Launched June 2015
 - 2B Launch Mid- 2016
- **Sentinel-3: Ocean and global land monitoring (VIIRS/MODIS)**
 - Instruments:
 - SLSTR (Sea and Land Surface Temperature Radiometer) , 0.5-1 km resolution, 1400 km swath.
 - OLCI (Ocean and Land Color Instrument.) 21 bands, 300 m resolution, 1270 km swath.
 - SRAL (SAR Altimeter).
 - 3A Launch Nov 2015
 - 3B Launch 18 months after 3A ~Early 2017



Data for International Partner



- Special portal for “International Partners.”
- Same interface as the open portal.
- NOAA, NASA and USGS are negotiating the high-level and technical arrangements. Expect conclusion in the fall.
- Data has lower latency than public portal.
- On Internet-2-Geant for higher bandwidth and less competition with general Internet traffic.
- EUMETSAT Level-2 Ocean Products through multicast

Open Sentinel Data Hub

<https://scihub.esa.int/dhus/>



The screenshot shows the Sentinel Scientific Data Hub website. The header features the European Commission logo, the title "Sentinels Scientific Data Hub", and the ESA logo. Below the header, there are navigation tabs for "Overview" and "About", a login form with "username:" and "password:" fields, and a "Login" button. The main content area is titled "Overview" and contains the following text:

The Sentinel Data Hub is a web based system designed to provide EO data users with distributed mirror archives and bulk dissemination capabilities for the Sentinels products. Detailed information on Sentinels products and Data Access mechanisms is available at <https://sentinel.esa.int/web/sentinel/sentinel-data-access>

References:

- <http://www.copernicus.eu/>
- <https://sentinel.esa.int/>

For a brief guide to the Sentinel Data Hub please click [here](#).

Some users have experienced problems while using IE9 (e.g. self-registration). This issue will be fixed in the enhanced web version of the Data Hub. For the time being we suggest using alternative browsers (IE10 or 11, Chrome, Firefox, Safari)

At the bottom right of the main content area, there is a "Register" link. A large blue arrow points to this link.

At the bottom of the page, there is a footer with the text: "© ESA 2013 - 2014" and "Created by Gael Systems - 2013 - Prototype V0.4.8 - serco".

Anyone can register for free access.

- Free and open data.
- Access to all Sentinel data.
- Interactive data selection.
- Scriptable calls using https to pull data within different time and location windows.

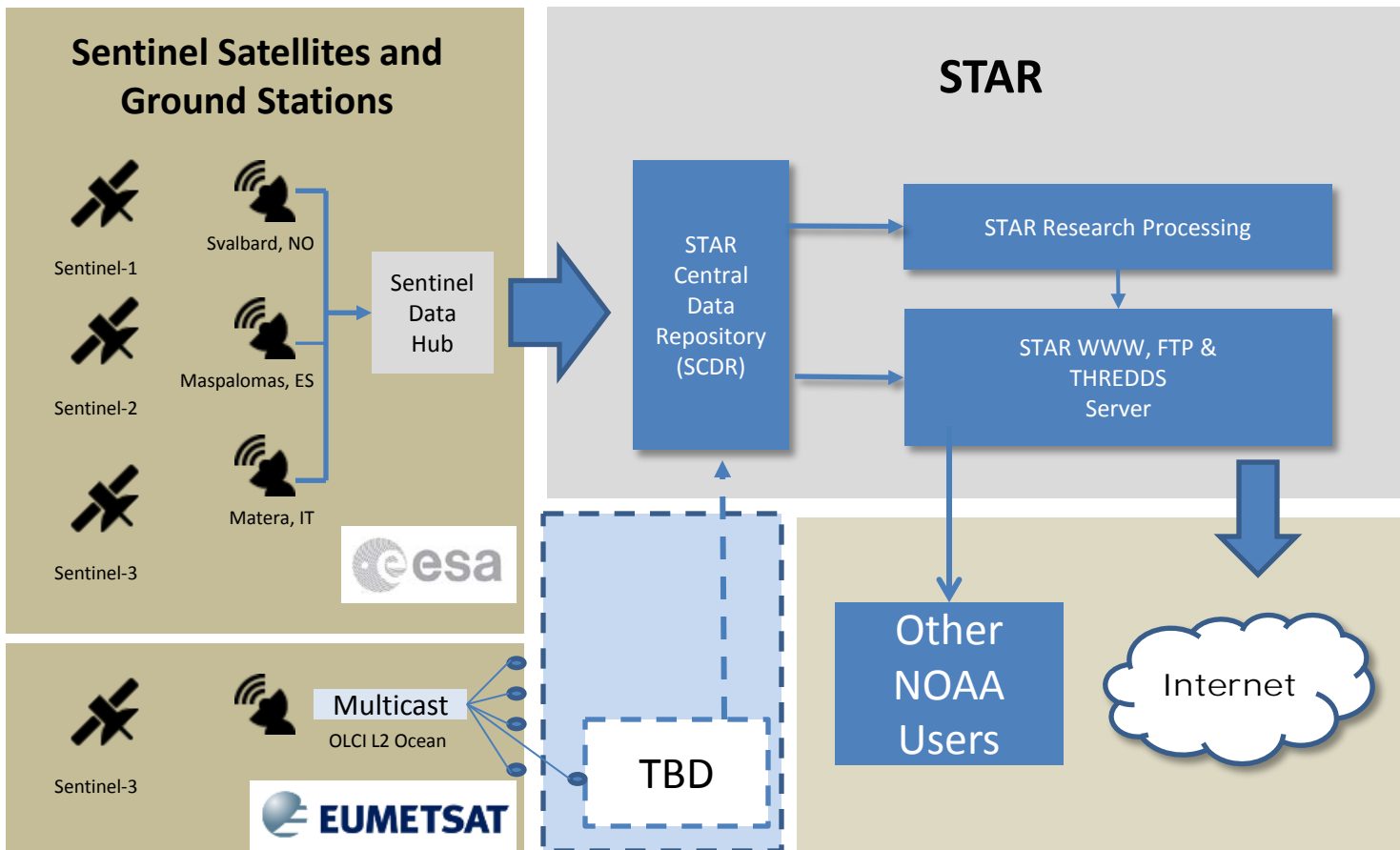


Sentinel Data Rates

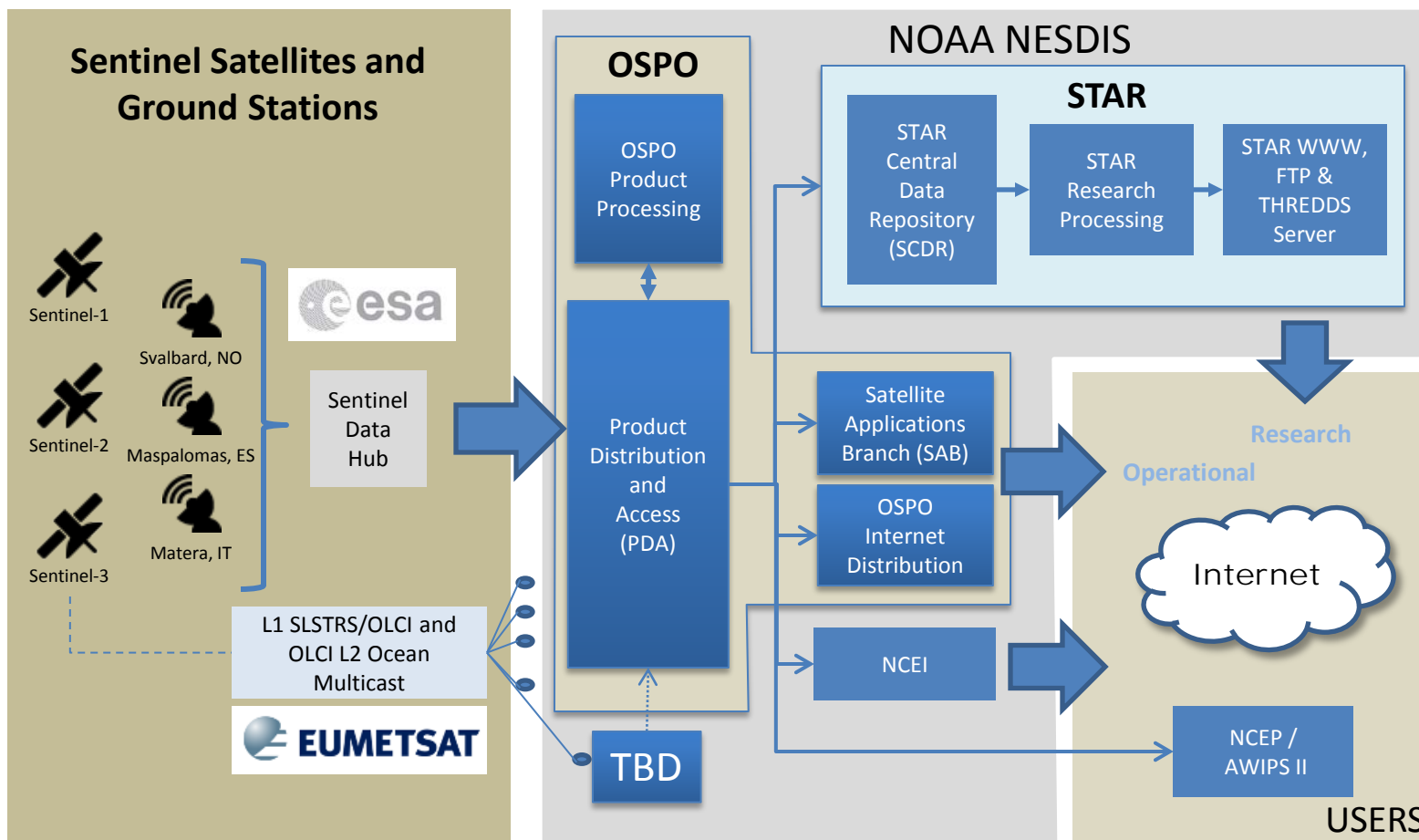
	Data rates (TB per day)	FY16	FY17
Sentinel-1A (Launched)	0.68*	0.68	0.68
Sentinel-1B (April2016)	0.68		0.68
Sentinel-2A (Launched)	1.66	1.66	1.66
Sentinel-3A (OCT2015)	2.62	2.62	2.62
Sentinel-2B(mid-2016)	1.66		1.66
Sentinel-3B (18 months after Sentinel-3A):	2.62		2.62
Total	9.92	4.96	9.92

* Currently pulling at medium resolution, approximately 300 GB/day. Only pulling polar regions and coasts of the US.

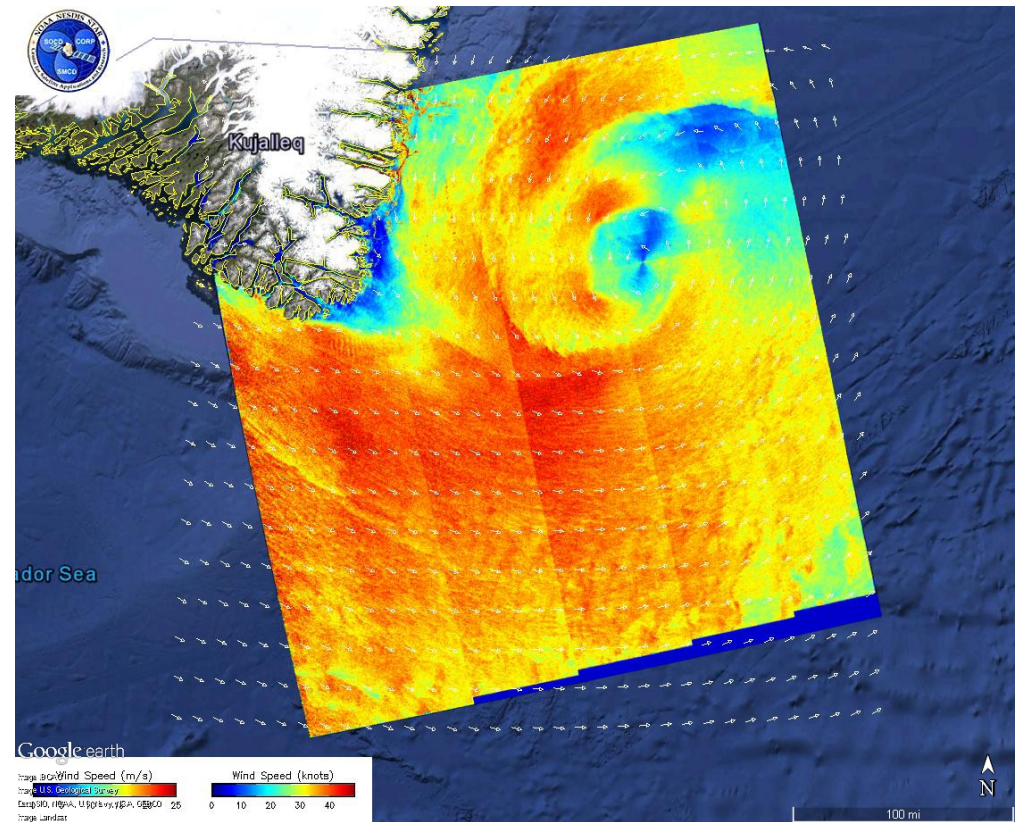
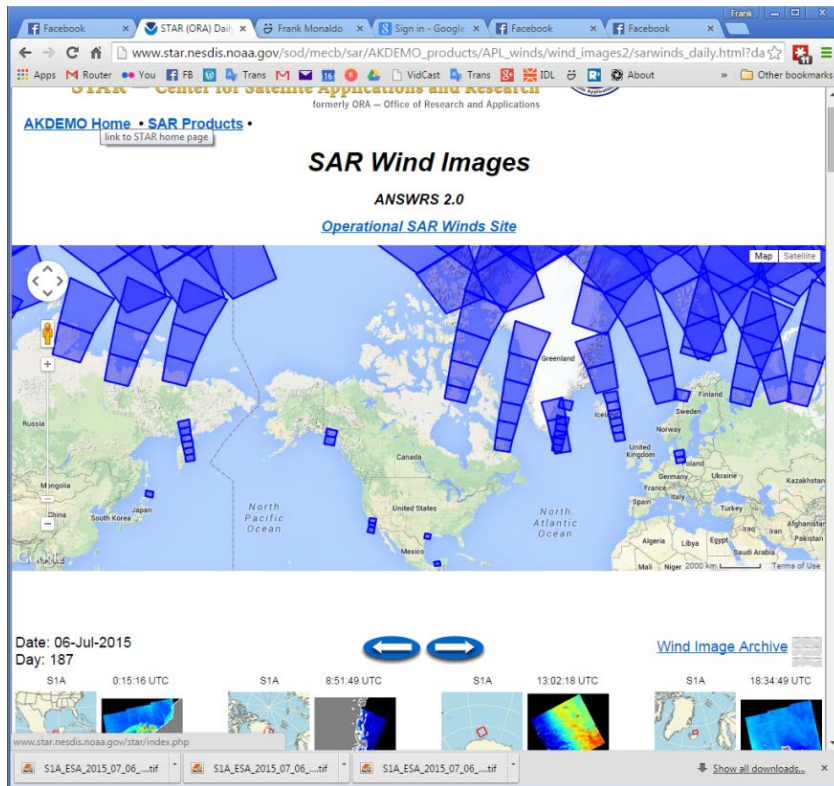
Nominal Data Flow For Sentinel Data in Pre-PDA Era



Nominal Data Flow For Sentinel Data PDA Era

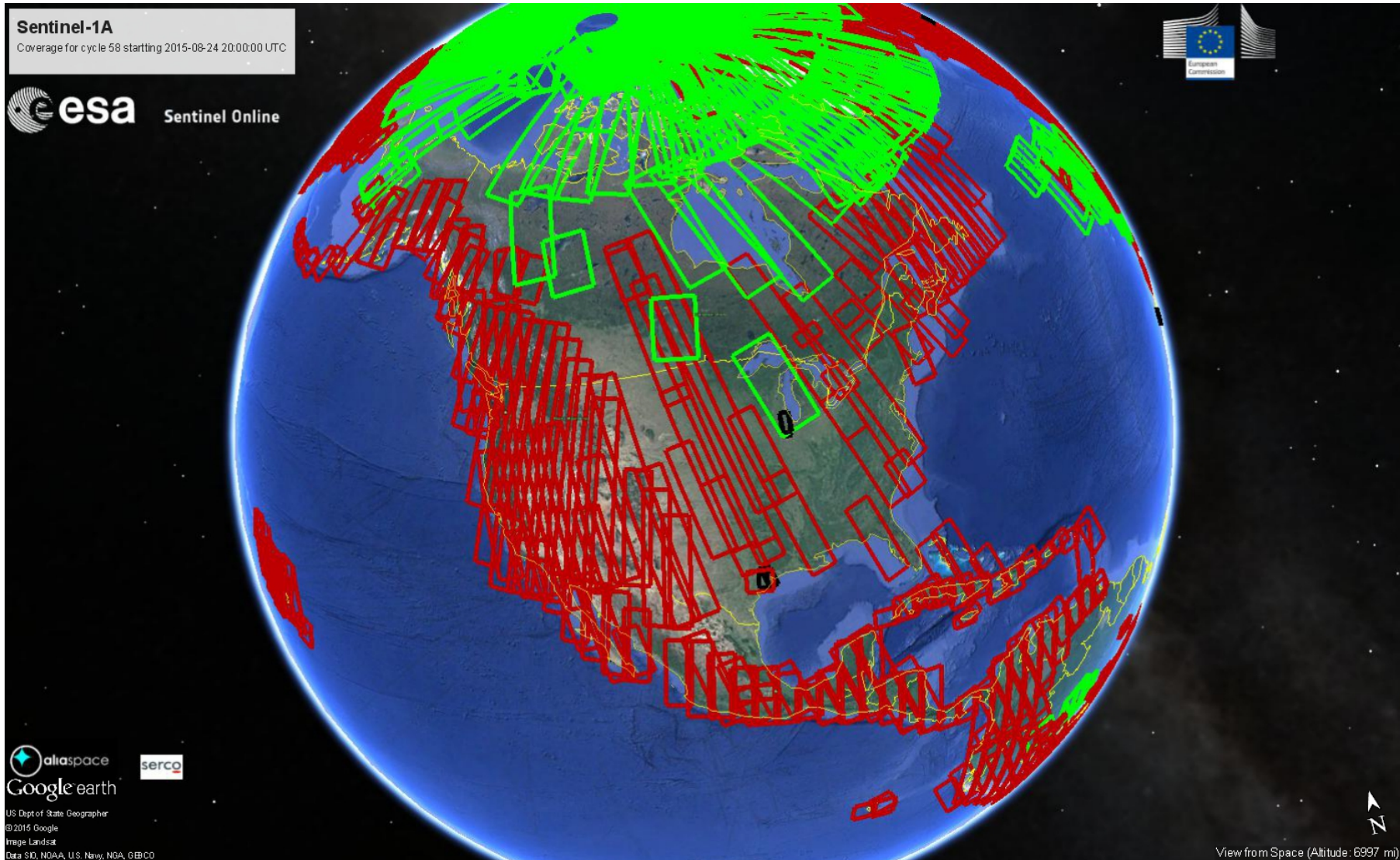


Sample Sentinel-1A Wind Retrieval



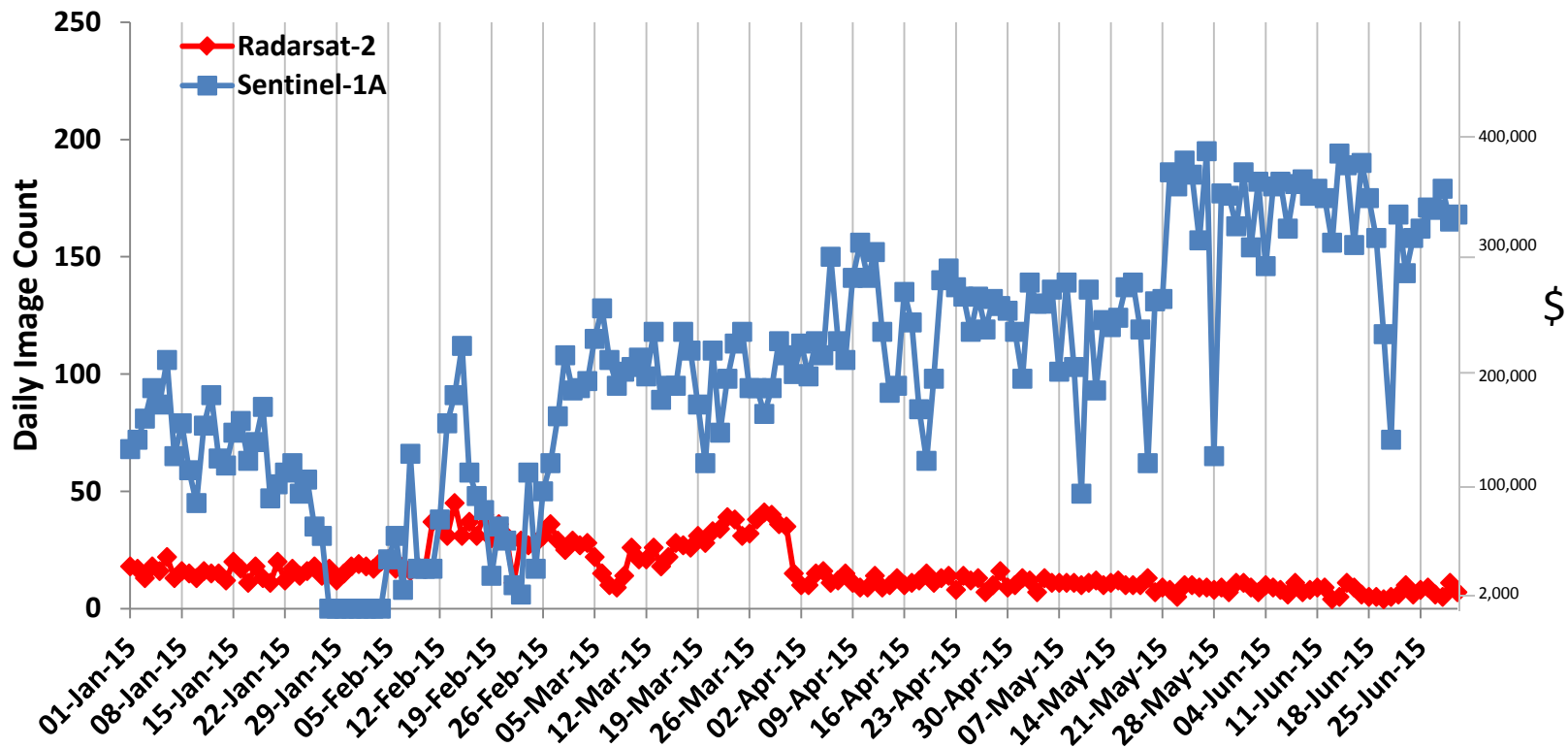


Sentinel-1A Coverage: 12 day cycle



Sample Cost Savings

Each Radarsat-2 image costs the US government \$2K or \$20K/day. At 100 images a day, Sentinel-1A represents \$200K/day of data.





NOAA/NOS Great Lakes Forecast, Sentinel-3



NCCOS planning on Sentinel-3 OLCI for improved Lake Erie HAB Forecasting and water quality monitoring

- 300m spatial resolution
- Spectral bands for product generation
- Relieves single-point-of-failure

Himawari 8/9

- Advanced Himawari Imager (AHI)

Wave length (μm)	Himawari-8/9			MTSAT-1R/2	
	Band number				
0.47	1		1		
0.51	2		1		
0.64	3		0.5		1
0.86	4		1		
1.6	5		2		
2.3	6		2		
3.9	7		2		4
6.2	8		2		4
6.9	9		2		
7.3	10		2		
8.6	11		2		
9.6	12		2		
10.4	13		2		4
11.2	14		2		
12.4	15		2		4
13.3	16		2		

: the sensor has its observing band.
Number : horizontal resolution (in [km]) at sub-satellite point.



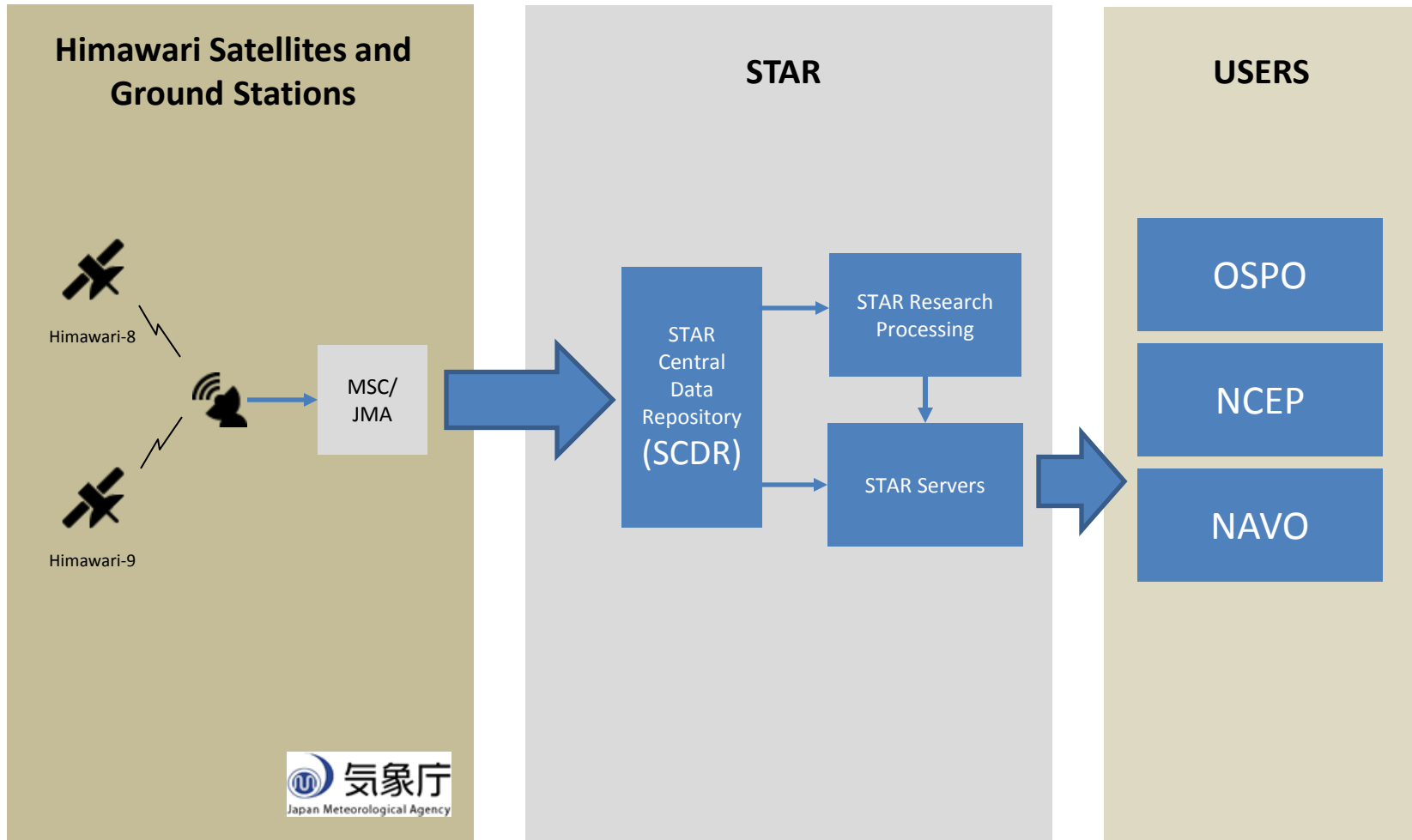


Himawari 8/9

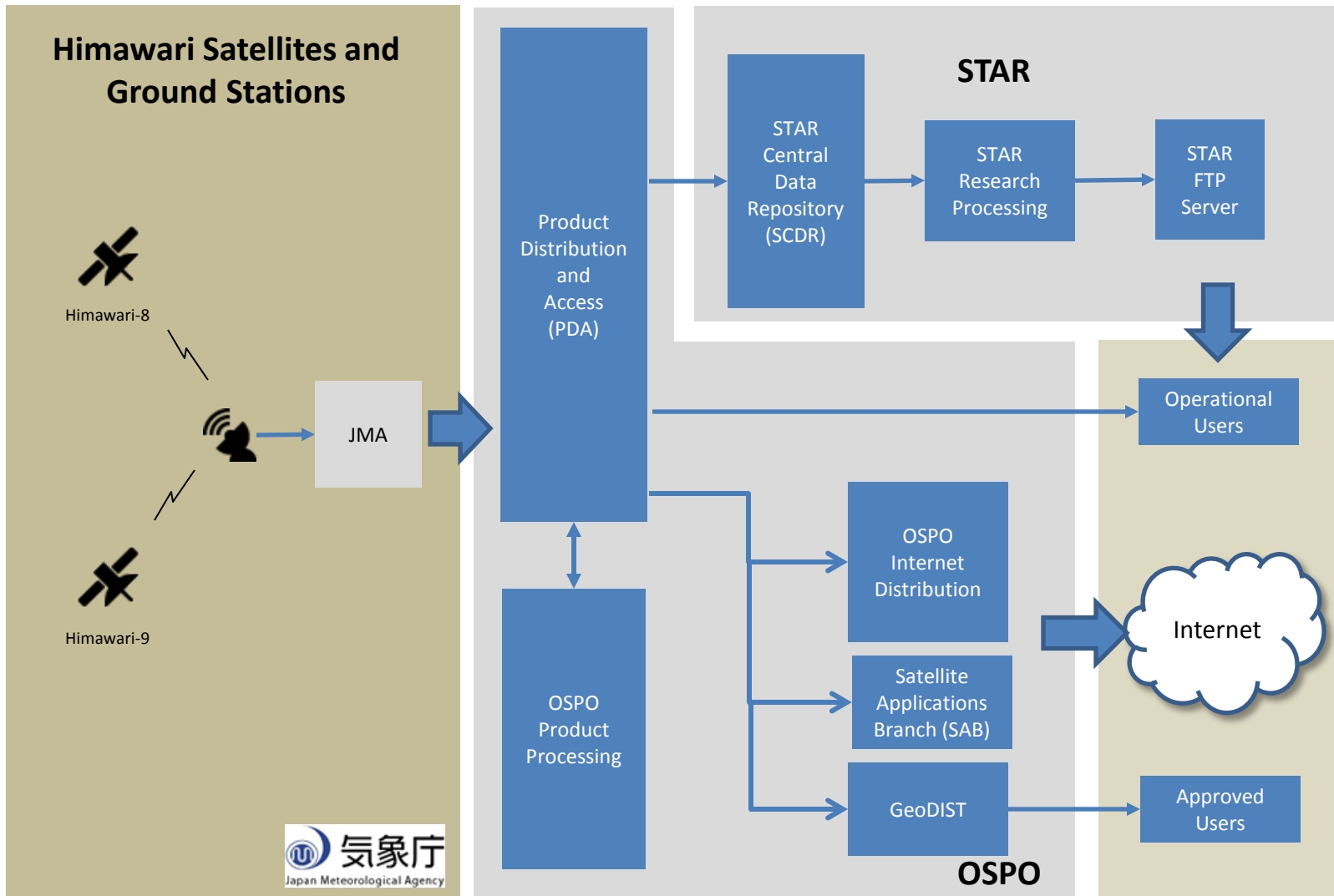


- Present:
 - 350GB/Day all channels of AHI HSD data
 - Every full disk, 10 minutes
 - Users are NWS and NAVO.
- Planned:
 - NESDIS/OSPO to set up H-8 data in McIDAS at the current MTSAT temporal/spatial resolution and bands.
 - Replacement of MTSAT hoped to be in place by Dec 2015, but may be delayed due to other OSPO priorities.
 - Users approved for MTSAT on GEODist servers will be granted access to H-8 McIDAS.
 - Access to full resolution H-8 data (NetCDF) will only be through PDA (~2016). (Existing users will be contacted around Jan 2016 to re-validate access for PDA.)
 - Himawari-8 SST data from either STAR or from Australia BoM to replace MTSAT in our blended SST product.

Himawari 8/9 Data Flow Pre-PDA



Himawari 8/9 Data Flow PDA



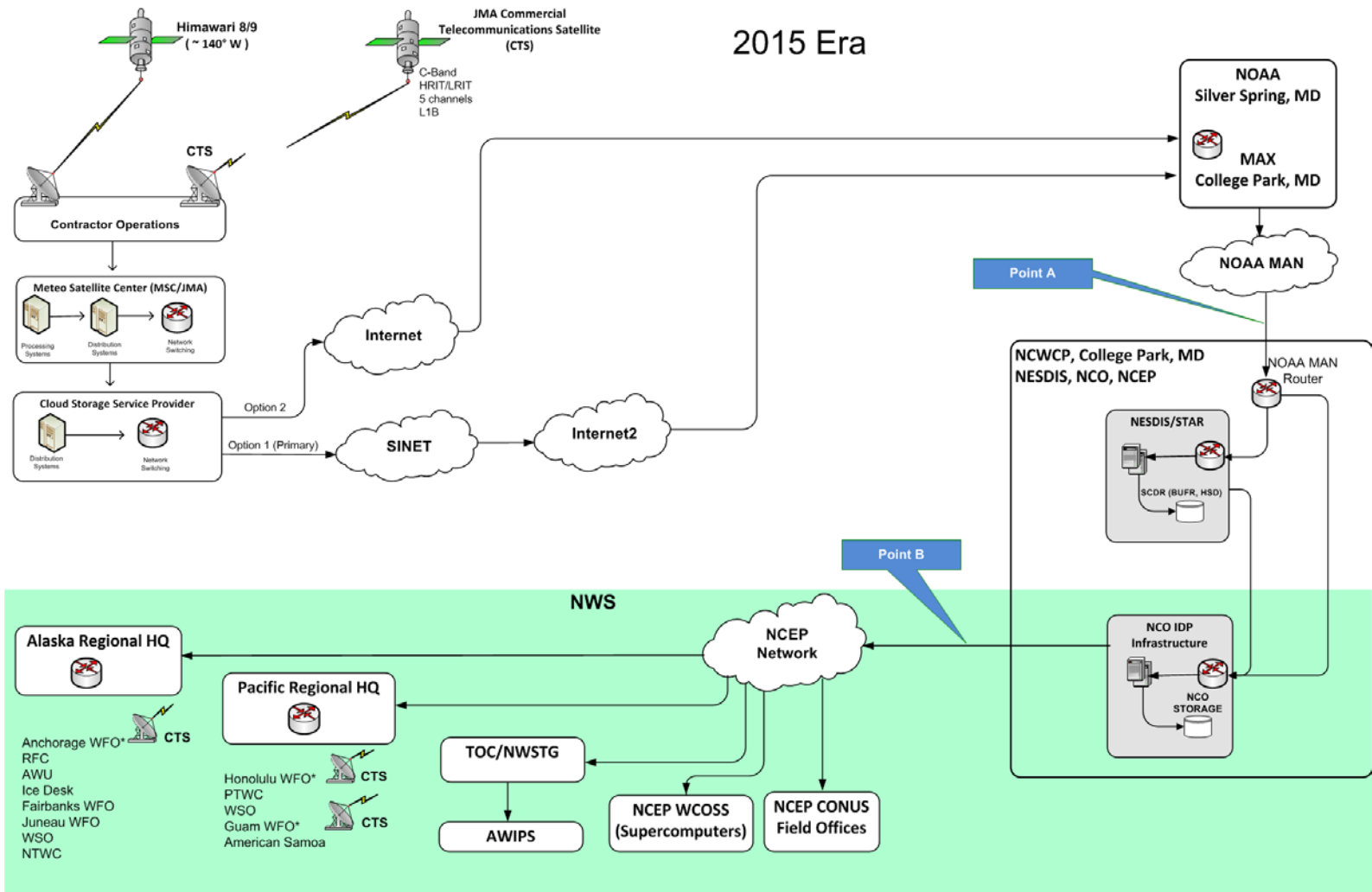


Conclusions

- **Other countries are providing increasing volumes and quality of Earth environmental data.**
- **In many cases, these data complement NOAA polar-orbiting and geostationary data.**
- **NESDIS is beginning to deal with Sentinel and Himawari data.**
- **Need to keep these data in mind when planning for resource requirement for data acquisition, processing, and distribution.**

Support slides

H-8 NWS Dissemination Architecture



Satellite Comparison for cyano

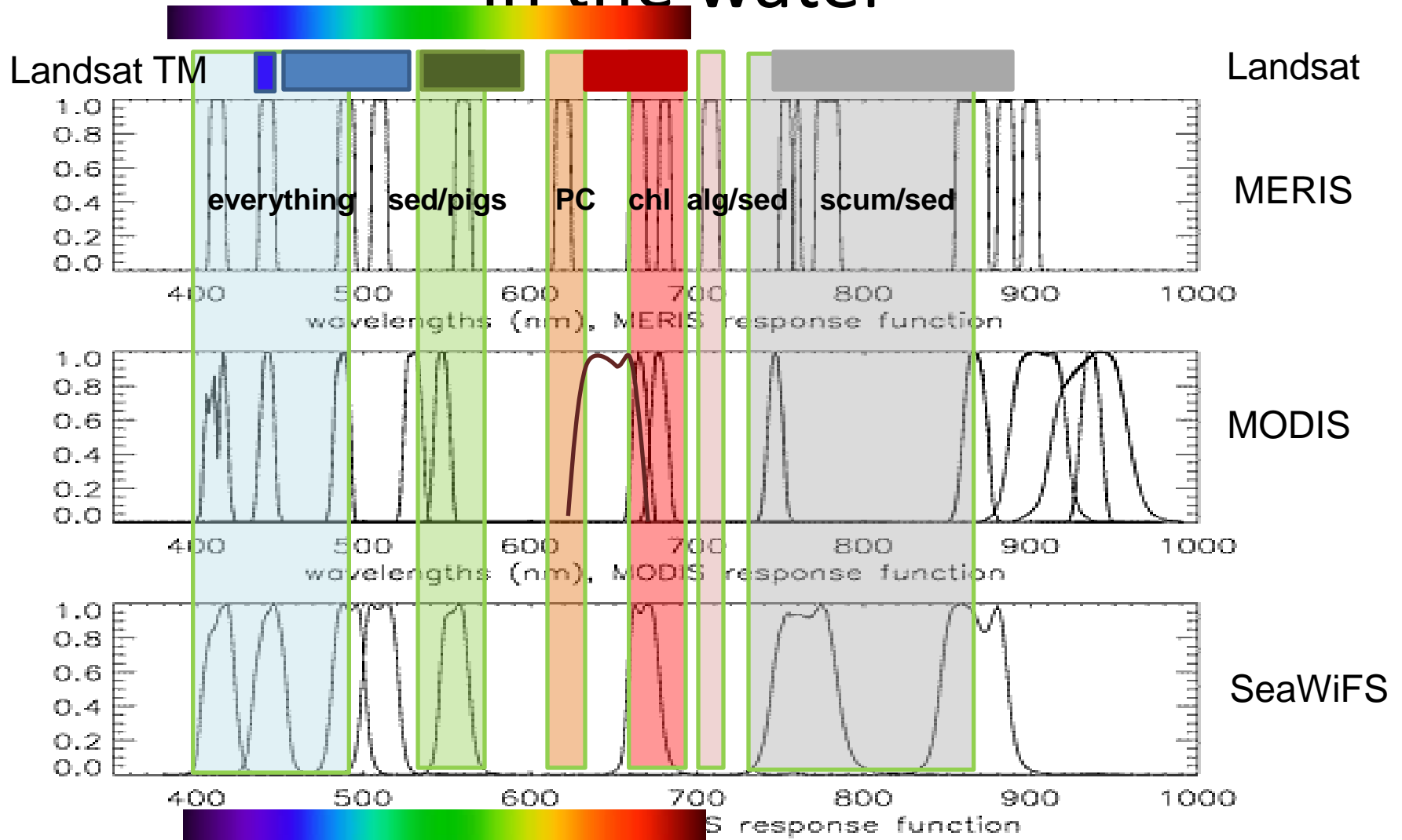
Satellite	Spatial	Temporal	Key Spectral
MERIS (2002-12) OLCI Sentinel-3 2015	300 m <i>OK</i>	2 day <i>good</i>	10 (5 on red edge) <i>good</i>
MODIS high res Terra 1999; Aqua 2002	250/500 m <i>OK</i>	1-2 day <i>good</i>	4 (1 red, 1 NIR) <i>marginal</i>
MODIS low res & SeaWiFS	1 km <i>poor</i>	1-2 day <i>good</i>	7-8 (2 in red edge) <i>OK</i>
Landsat	30 m <i>good</i>	8 or 16 day <i>poor</i>	4 (1 red, 1 NIR) <i>marginal</i>
Sentinel-2 (2015)	20 m <i>good</i>	10 day (5 day with 2 nd satellite in 2017) <i>Potential with 2</i>	5 (1 red; 2 NIR, 1 in red edge) <i>potential</i>

Clouds take out 1/2 to 2/3 of imagery

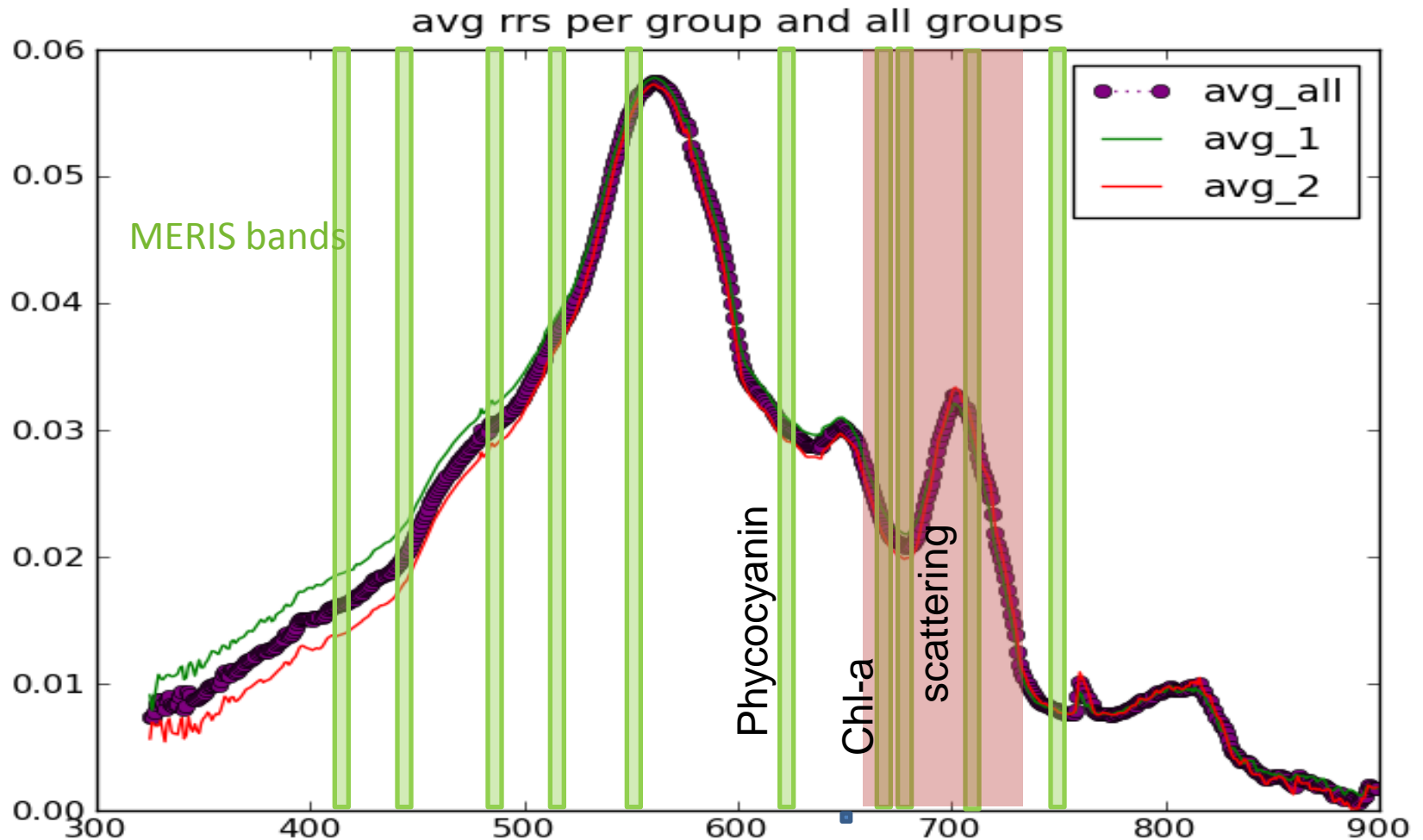
Some sunglint is not a problem for our algorithms

Minimum resolution, 3 pixels across (2 mixed land/water)

Satellite bands and sensitivity to materials in the water



Intense blooms in water, red/NIR bands provide discrimination



Extensive use of MERIS for monitoring

(Lake Erie example). Algorithm moved to 1 km MODIS in 2012.



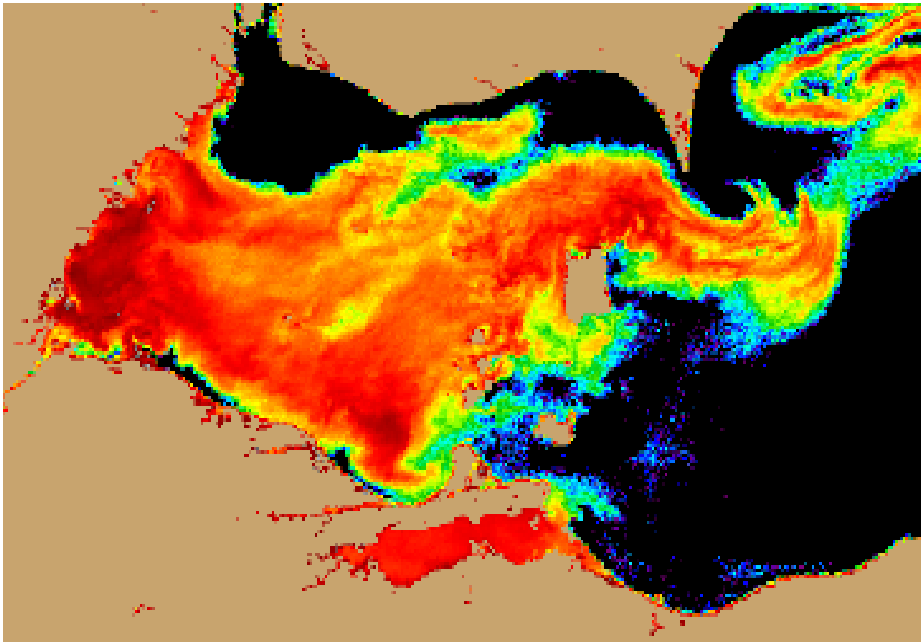
Experimental
Lake Erie Harmful Algal Bloom Bulletin
2011-008
08 September 2011
National Ocean Service
Great Lakes Environmental Research Laboratory
Last bulletin: 22 July 2011



Experimental Lake Erie Harmful
National Centers for Coastal Ocean Science and Great Lakes
24 August, 2015, Bulletin 13

The *Microcystis* cyanobacteria bloom continues across a large part of the western basin

MERIS 300 m



MODIS 1 km

