OVERVIEW OF THE Suomi NPP DATA PRODUCTS' PERFORMANCE AND PLANS FOR JPSS-1 CALIBRATION/VALIDATION

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with contribution from

JSTAR Algorithm and Data Products Algorithm Team Leads/Members

Outline

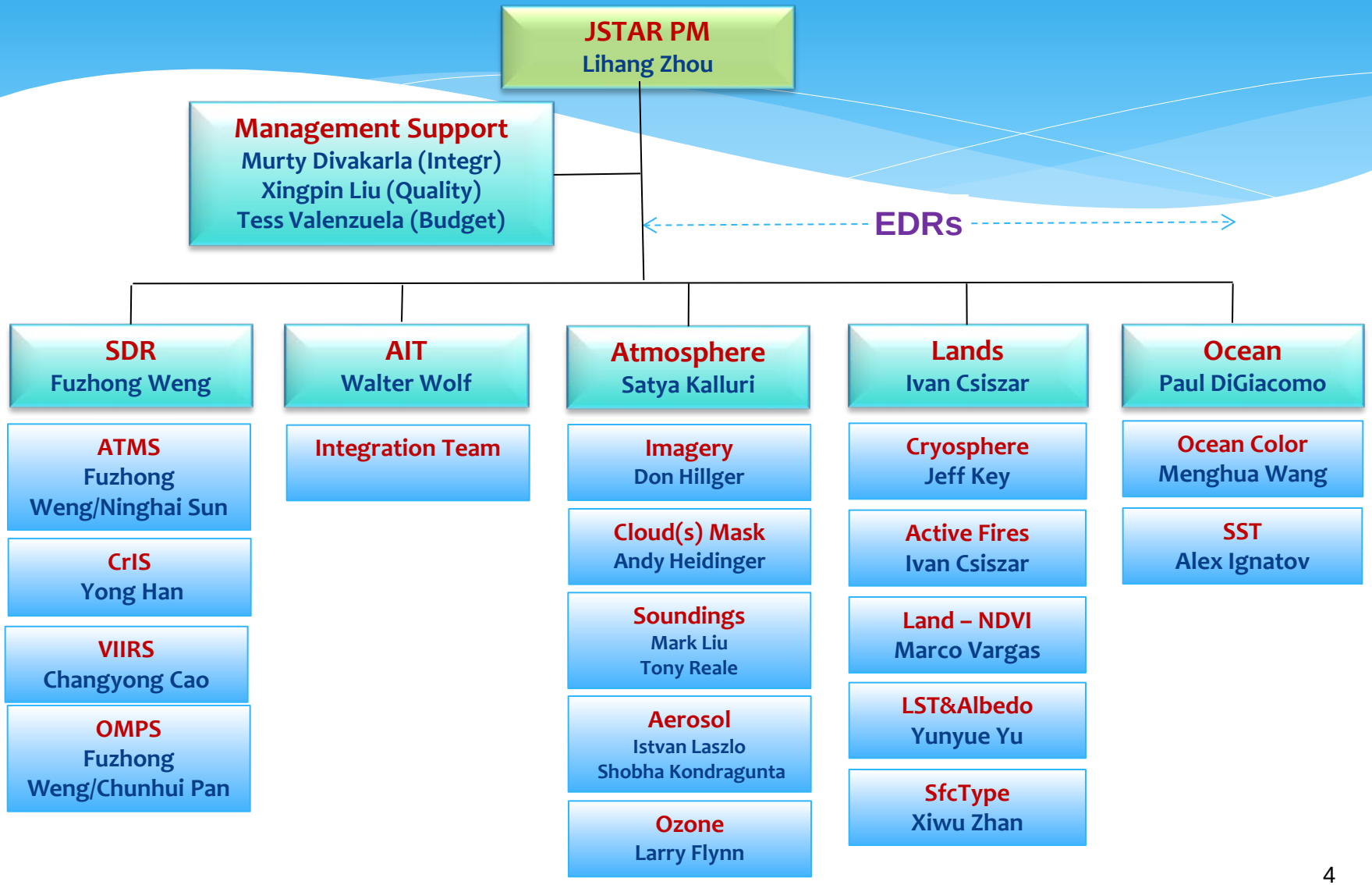
* Introduction
* Suomi NPP/JPSS Cal Val Process Overview
* Suomi NPP/JPSS Data Product Updates
* Summary and Conclusion

JPSS-STAR (JSTAR) Program

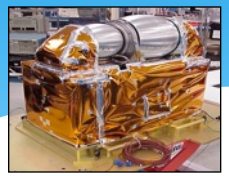
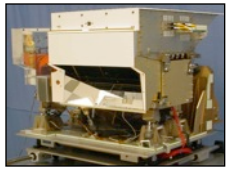
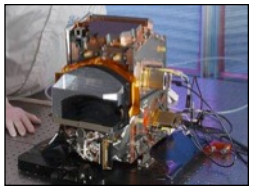
PURPOSE: To provide ***robust, affordable, and flexible*** *state-of-art* scientific solutions to meet JPSS requirements

- Leverages hundreds scientists from NOAA, NASA, DOD, and NOAA's Cooperative Institutes (University partners) and Industry Partners
- Applies first-hand knowledge of algorithms and cal val, developed in POES, GOES, DMSP, EOS, MetOP, and GOES-R, for JPSS Program
- Works closely with JPSS Program Science and all other elements to ensure the developments are in line with the users' requirements, and efficient science to operation transitions
- Facilitates algorithm consistency across platforms
  - **Supports science for multiple satellite systems (Enterprise Approaches)**

JPSS-STAR (JSTAR) Teams



JPSS Instruments

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

JPSS-1 Baseline Products for AWIPS-2

Slide Curtecy - Benjie Spencer (NWS Chief Engineer)

ATMS TDRs/SDRs (NWP – not AWIPS)	VIIRS Aerosol Particle Size[1]	VIIRS Volcanic Ash: Detection & Height
ATMS (MiRS) Land Surface Emissivity	VIIRS Albedo (Surface)	VIIRS Sea Ice Characterization
ATMS (MiRS) Moisture Profile	VIIRS Cloud Height (Top and Base)[1]	VIIRS Sea Surface Temperature (SST)
ATMS (MiRS) Rainfall Rate	VIIRS Cloud Cover/Layers	VIIRS Suspended Matter
ATMS (MiRS) Sea Ice Concentration	VIIRS Cloud Particle Size Distribution[1]	VIIRS Vegetation Health Index Suite
ATMS (MiRS) Land Surface Temperature	VIIRS Cloud Optical Depth[1]	VIIRS Snow Cover
ATMS (MiRS) Imagery	VIIRS Cloud Mask	VIIRS Vegetation Indices
ATMS (MiRS) Cloud Liquid Water [1]	VIIRS Cloud Top Phase[1]	CrIS SDRs (NWP – not AWIPS)
ATMS (MiRS) Snow Cover/Depth	VIIRS Cloud Top Pressure[1]	CrIS-NUCAPS Carbon Dioxide (CO_2)
ATMS (MiRS) Snow Water Equivalent[2]	VIIRS Cloud Top Temperature[1]	CrIS-NUCAPS Carbon Monoxide (CO)
ATMS (MiRS) Precipitable Water[1]	VIIRS Green Vegetation Fraction	CrIS-NUCAPS Methane (CH_4)
ATMS (MiRS) Temperature Profile	VIIRS Ice Surface Temperature	CrIS-NUCAPS Infrared Ozone Profile
VIIRS Imagery (KPP)	VIIRS Ice Age / Thickness	CrIS Outgoing Longwave Radiation
VIIRS Imagery (Critical Non-KPP)	VIIRS Ice Concentration	CrIS/ATMS-NUCAPS Moisture Profile
VIIRS Imagery (Non-Critical, Non-KPP)	VIIRS Land Surface Temperature	CrIS/ATMS-NUCAPS Temperature Profile
VIIRS Active Fires	VIIRS Ocean Color/Chlorophyll	OMPS Nadir Profile Ozone
VIIRS Aerosol Detection	VIIRS Polar Winds	OMPS Total Column Ozone
VIIRS Aerosol Optical Depth[1]	VIIRS Quarterly Surface Type Gridded	

KPP

Deployed at Initial Operational Readiness

Required for Full Operational Readiness

Not Required for AWIPS

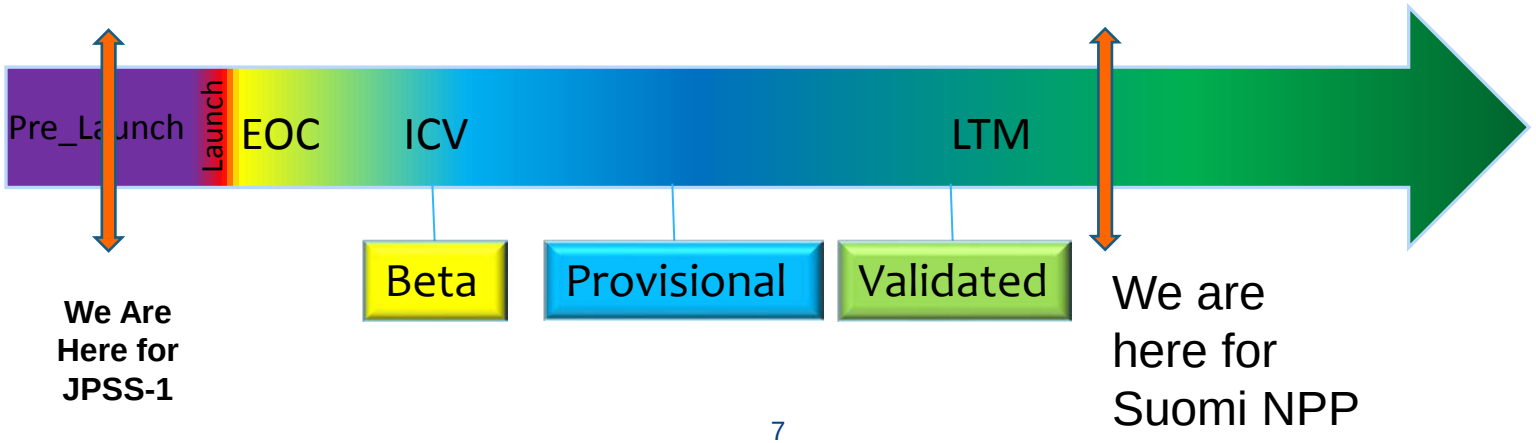
[1] may be implemented via sample tool tied to imagery

[2] may be implemented via sample tool tied to Snow Cover

Cal/Val Process Overview

- **Four Phases of Cal/Val:**
  1. **Pre-Launch;** all time prior to launch – Algorithm verification, sensor testing, and validation preparation
  2. **Early Orbit Check-out (EOC)** – System Calibration & Characterization
  3. **Intensive Cal/Val (ICV)** – Algorithm Calibration & Validation
  4. **Long-Term Monitoring (LTM);** through life of sensors after ICV (Validated) – Sensor Stability & Data Product Quality monitoring

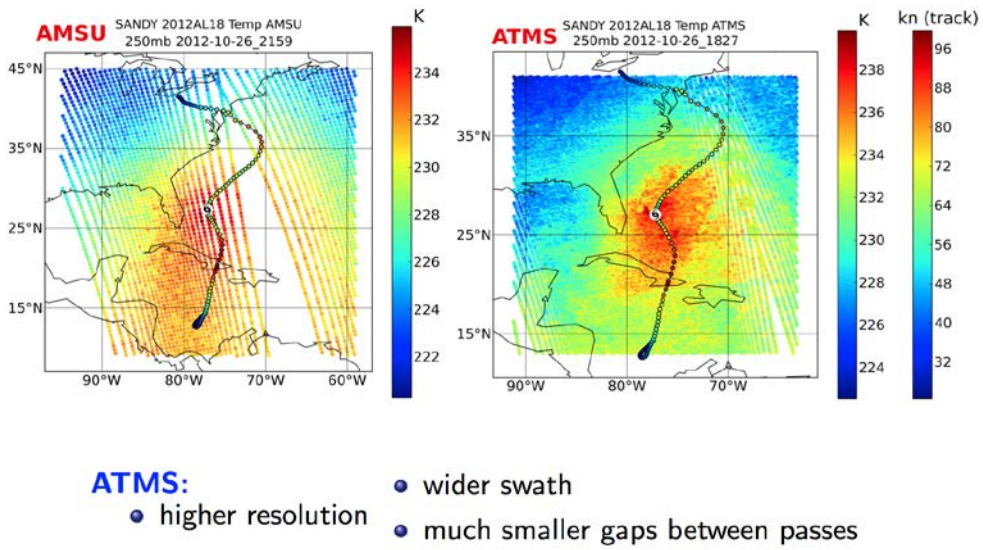
- **Algorithm Cal/Val Timeline**

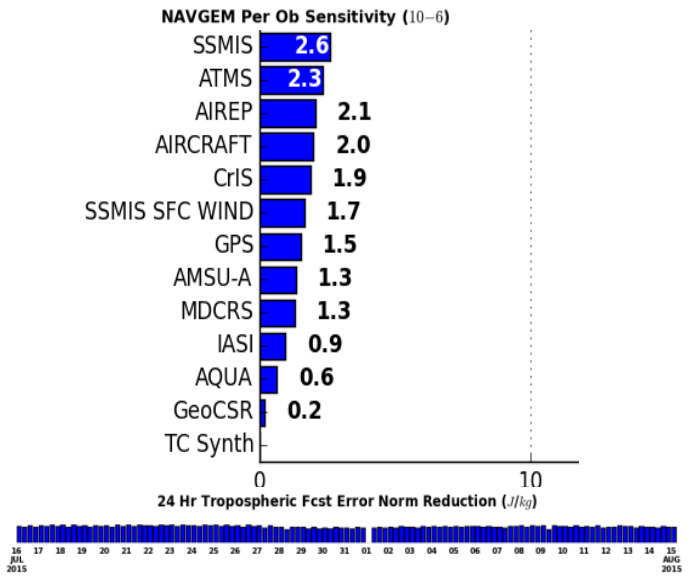


ATMS Instrument Characterization

Ch	Channel Central Freq.(MHz)	Polarization	Bandwidth Max. (MHz)	Frequency Stability (MHz)	Calibration Accuracy (K)	Nonlinearity Max. (K)	NEΔT (K)	3-dB Bandwidth (deg)	Remarks	Characterization at Nadir
1	23800	QV	270	10	1.0	0.3	0.5	5.2	AMSU-A2	Window-water vapor 100 mm
2	31400	QV	180	10	1.0	0.4	0.6	5.2	AMSU-A2	Window-water vapor 500 mm
3	50300	QH	180	10	0.75	0.4	0.7	2.2	AMSU-A1-2	Window-surface emissivity
4	51760	QH	400	5	0.75	0.4	0.5	2.2		Window-surface emissivity
5	52800	QH	400	5	0.75	0.4	0.5	2.2	AMSU-A1-2	Surface air
6	53596±115	QH	170	5	0.75	0.4	0.5	2.2	AMSU-A1-2	4 km ~ 700 mb
7	54400	QH	400	5	0.75	0.4	0.5	2.2	AMSU-A1-1	9 km ~ 400 mb
8	54940	QH	400	10	0.75	0.4	0.5	2.2	AMSU-A1-1	11 km ~ 250 mb
9	55500	QH	330	10	0.75	0.4	0.5	2.2	AMSU-A1-2	13 km ~ 180 mb
10	57290.344(f_o)	QH	330	0.5	0.75	0.4	0.75	2.2	AMSU-A1-1	17 km ~ 90 mb
11	f_o± 217	QH	78	0.5	0.75	0.4	1.0	2.2	AMSU-A1-1	19 km ~ 50 mb
12	f_o±322.2±48	QH	36	1.2	0.75	0.4	1.0	2.2	AMSU-A1-1	25 km ~ 25 mb
13	f_o±322.2±22	QH	16	1.6	0.75	0.4	1.5	2.2	AMSU-A1-1	29 km ~ 10 mb
14	f_o±322.2±10	QH	8	0.5	0.75	0.4	2.2	2.2	AMSU-A1-1	32 km ~ 6 mb
15	f_o±322.2±4.5	QH	3	0.5	0.75	0.4	3.6	2.2	AMSU-A1-1	37 km ~ 3 mb
16	88200	QV	2000	200	1.0	0.4	0.3	2.2	89000	Window H_2O 150 mm
17	165500	QH	3000	200	1.0	0.4	0.6	1.1	157000	H_2O 18 mm
18	183310±7000	QH	2000	30	1.0	0.4	0.8	1.1	AMSU-B	H_2O 8 mm
19	183310±4500	QH	2000	30	1.0	0.4	0.8	1.1		H_2O 4.5 mm
20	183310±3000	QH	1000	30	1.0	0.4	0.8	1.1	AMSU-B/MHS	H_2O 2.5 mm
21	183310±1800	QH	1000	30	1.0	0.4	0.8	1.1		H_2O 1.2 mm
22	183310±1000	QH	500	30	1.0	0.4	0.9	1.1	AMSU-B/MHS	H_2O 0.5 mm

ATMS Sensor Data Products



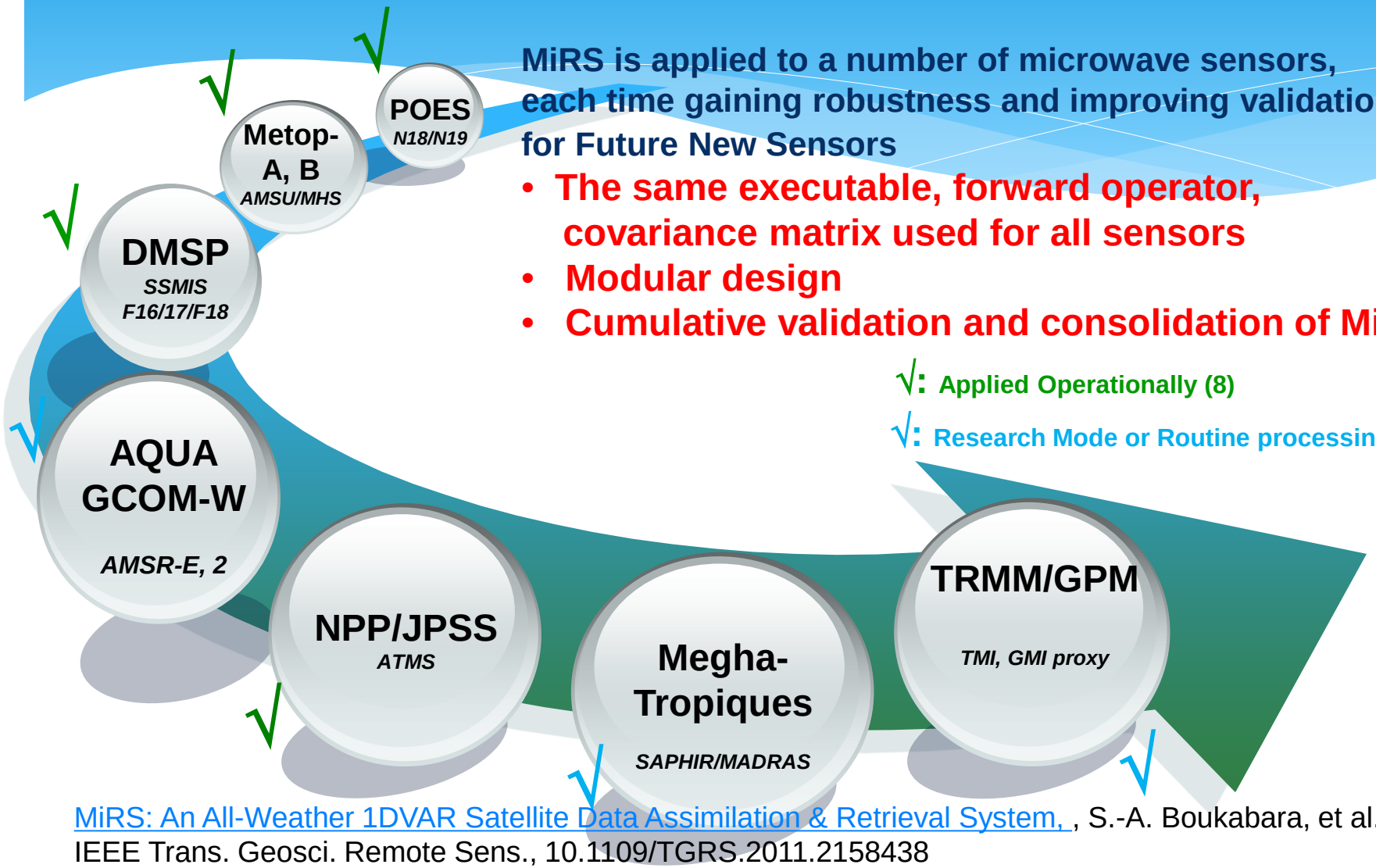


- Increased horizontal resolution potentially beneficial for high gradient phenomena (such as hurricanes)

•ATMS (and CrIS sensors) continue to perform consistently in forecast sensitivity to observation impact (from Ben Ruston NRL)

JSTAR ATMS Lead: Fuzhong Weng

STAR Microwave Integrated Retrieval System (MiRS) (http://mirs.nesdis.noaa.gov/)



MiRS is applied to a number of microwave sensors, each time gaining robustness and improving validation for Future New Sensors

- **The same executable, forward operator, covariance matrix used for all sensors**
- **Modular design**
- **Cumulative validation and consolidation of MiRS**

√: **Applied Operationally (8)**

√: **Research Mode or Routine processing (3)**

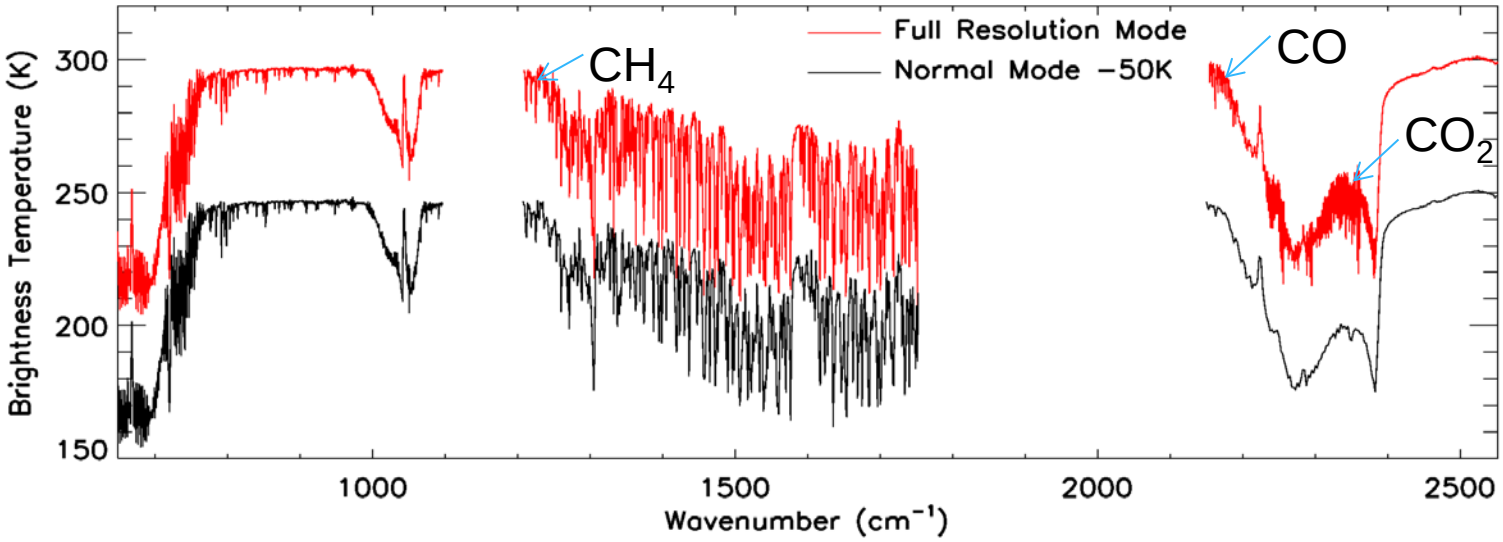
MiRS: An All-Weather 1DVAR Satellite Data Assimilation & Retrieval System, , S.-A. Boukabara, et al., IEEE Trans. Geosci. Remote Sens., 10.1109/TGRS.2011.2158438

JSTAR MIRS Cal Val Lead: Mark Liu

CrIS Sensor Data Products
Full Spectral Resolution Sensor Data Record (SDR)

Frequency Band	Spectral Range (cm^{-1})	Number of Channels	Spectral Resolution (cm^{-1})
LWIR	650 to 1095	713 (713)	0.625 (0.625)
MWIR	1210 to 1750	865 (433)	0.625 (1.25)
SWIR	2155 to 2550	633 (159)	0.625 (2.5)

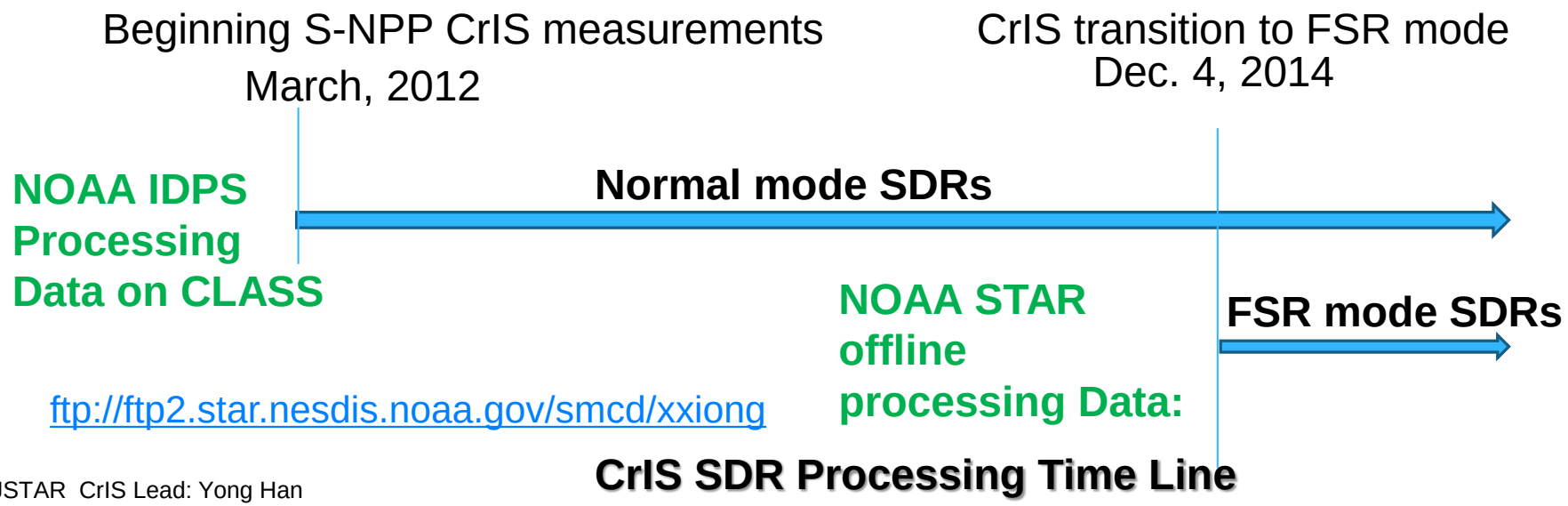
Red: Full resolution mode



Applications: Radiances as inputs for NWP Data Assimilations; Inter-calibration references for other instruments; Verification of weather/climate models

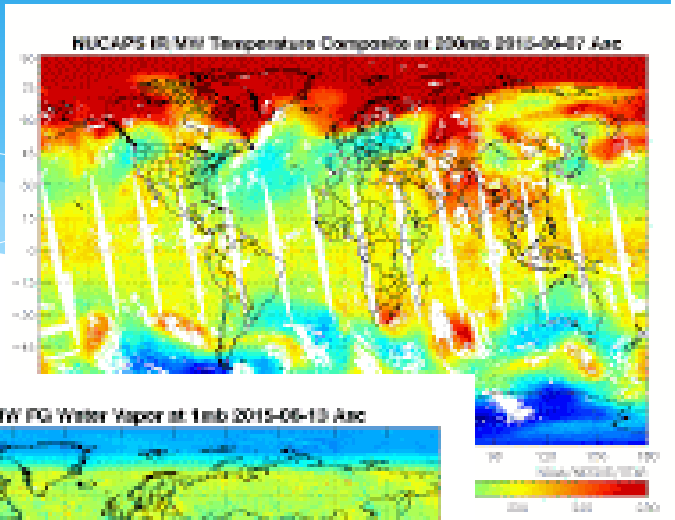
JPSS-1 CrIS SDR Algorithm Updates

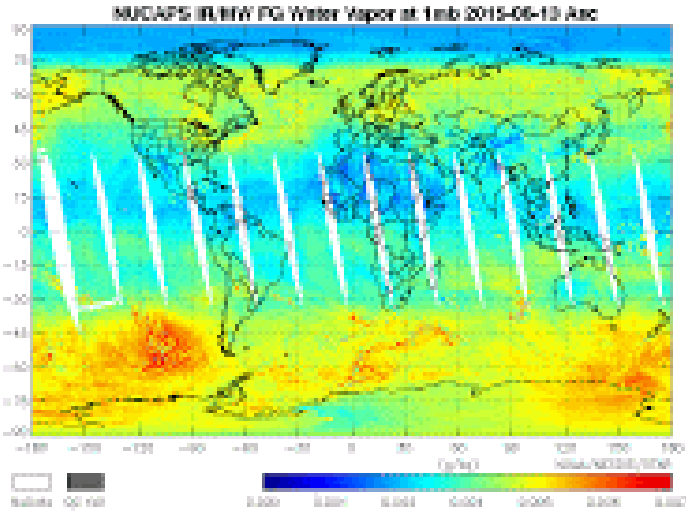
- Excellent instrument performances since the beginning of the mission
- Successful transition normal spectral resolution (NSR) mode to full spectral resolution (FSR) mode on 12/4/2014
- Completed and delivered J1 CrIS SDR software with backward compatibility for S-NPP data processing
- Both NSR and FSR SDRs are routinely generated in offline system; made available to the users; and monitored with web-based ICVS



NESDIS Unique CrIS-ATMS Product System (NUCAPS) Products

- **Products**
  - **Temperature profile (AVTP)**
  - **Water vapor profile (AVMP)**
  - **CrIS Ozone profile (O3)**
  - **Outgoing Longwave Radiation (OLR)**
  - Trace Gas (CO, CO2, CH4, SO2, N2O, HNO3)
  - File format: NetCDF4



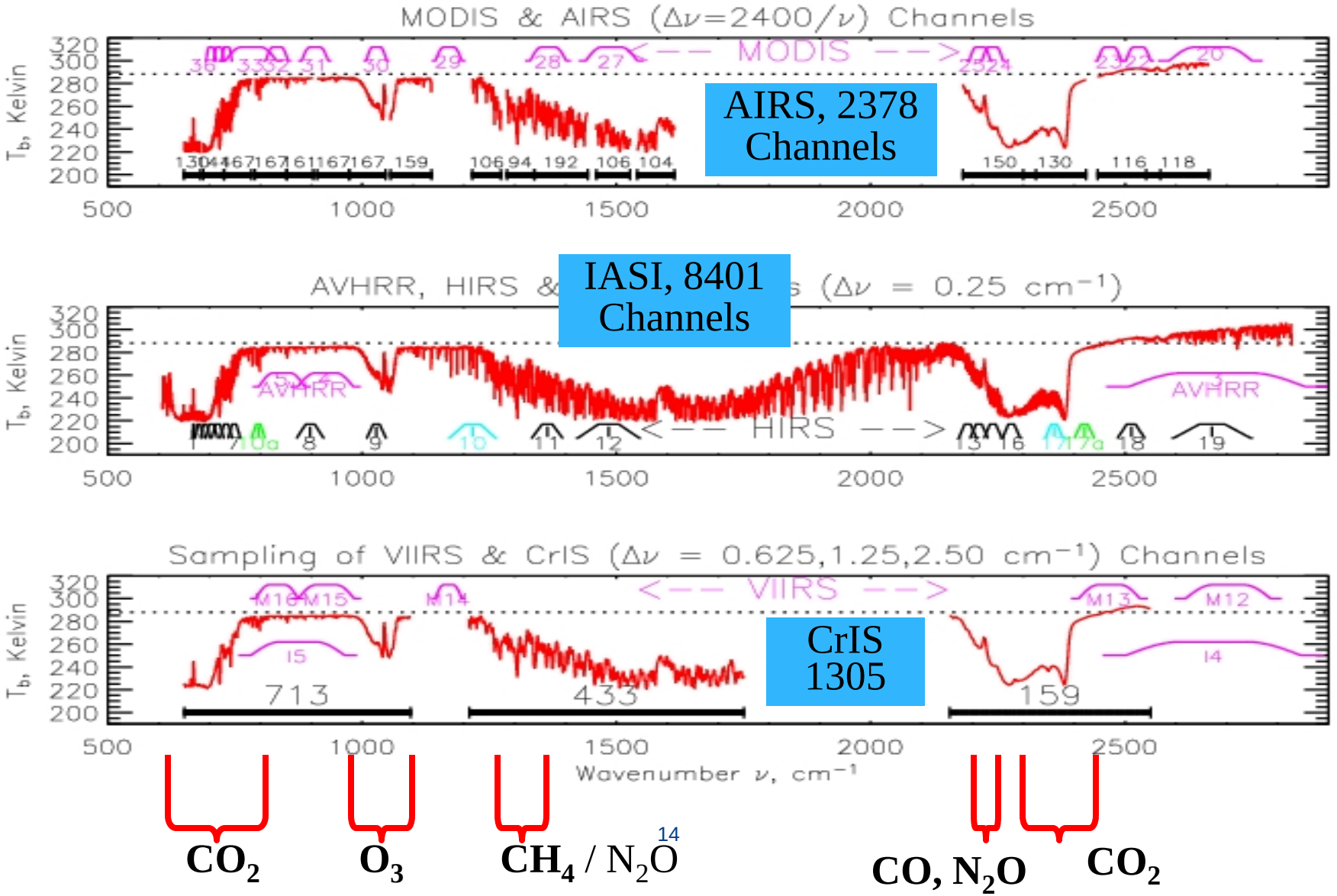


- **Cal/Val Maturity Status: Temperature/Water Vapor Profile reached Validated** 09/03/2014

- **J1 Updates/Improvements:**
  - Extend NUCAPS for CrIS full spectral data
  - Update trace gaseous and OLR products
  - Improve surface emissivity
  - Enhance microwave retrieval

Applications: 3-D Structure of Atmospheric Temperature and Humidity; Identify Cold Air Aloft (<65 deg.) to issue pilot advisories (Aviation Weather); Trace Gas Retrieval for Climate and Environment Monitoring

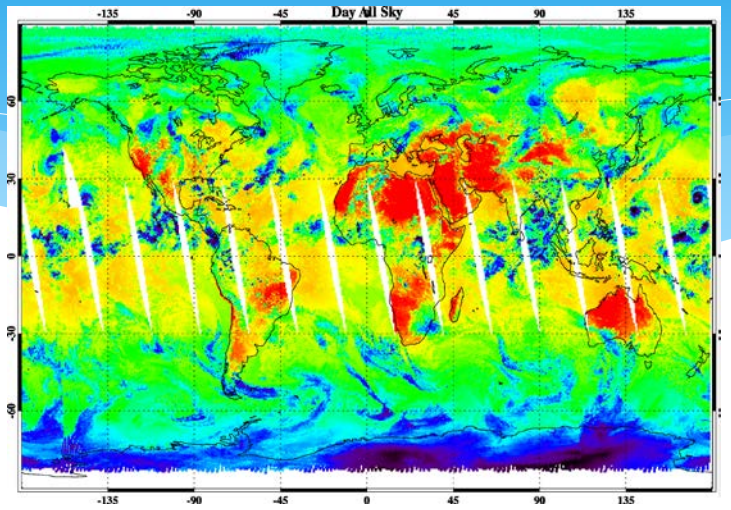
Spectral Coverage AIRS, IASI, & CrIS (Units: BT) is different, but considering the NEDT, the information contents are similar

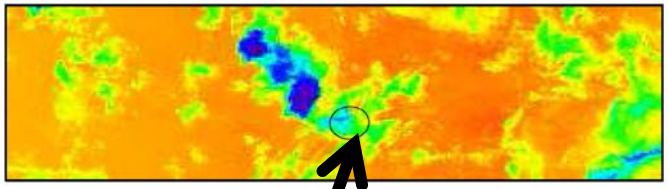


Collocation of VIIRS Measurements with CrIS

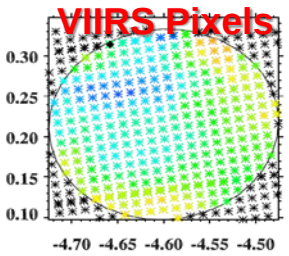
CrIS SDR Team – Likun Wang (CICS)

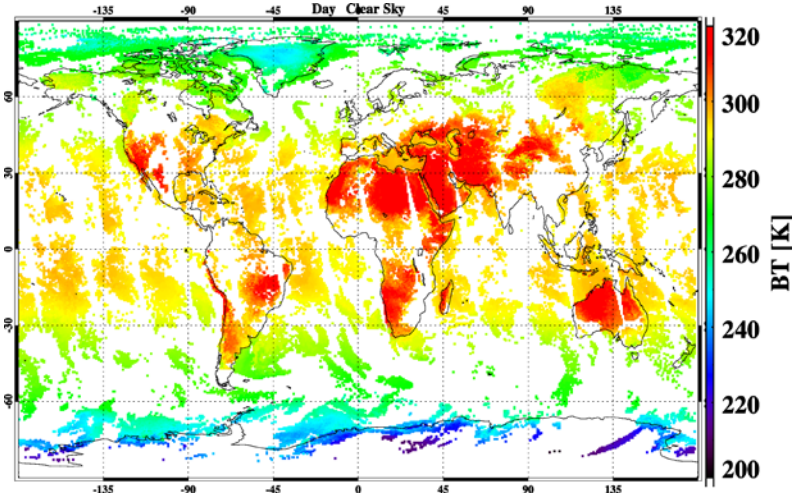
The CrIS clear sky FOVs can be found using the collocation algorithms to check VIIRS cloud pixels in each CrIS FOVs. IF all VIIRS pixels within CrIS FOV are labeled as clear, then this CrIS FOV is indicated as clear sky. This information is important for both atmospheric parameter retrievals and data assimilation using CrIS data.





CrIS FOV footprint





VIIRS: 22 spectral bands, 16 M bands (750m); 5 I bands (375m); and DNB (750m)

CrIS: 1305 bands; 14 km nadir

VIIRS: Next Generation Operational Polar Orbiting Imaging Radiometer

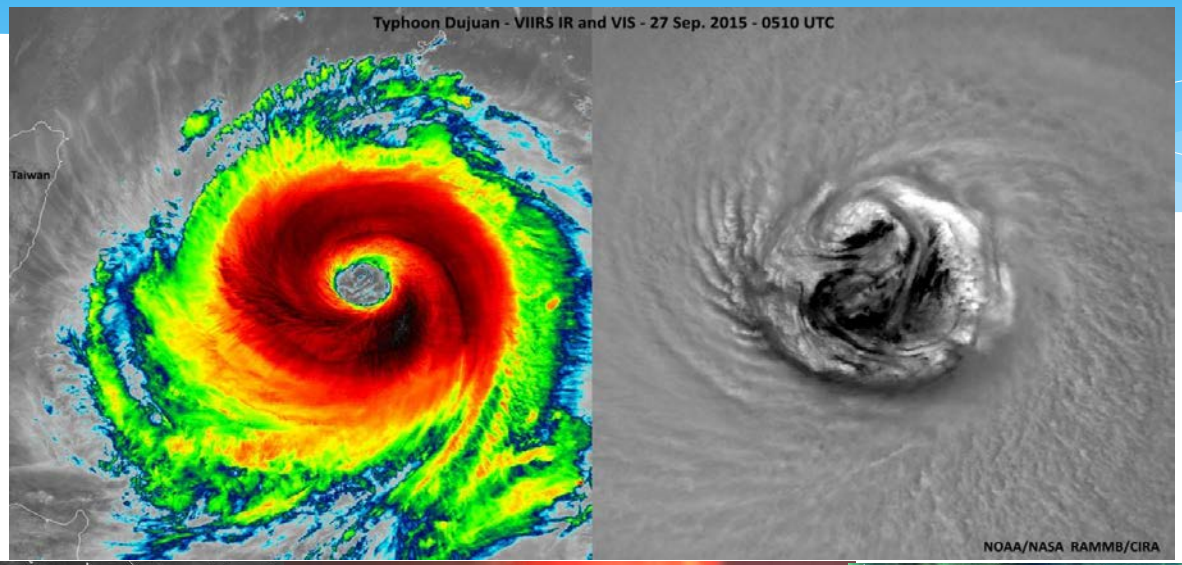
- 22 spectral bands
  - Visible to LWIR
  - Spatially registered
- **Better spatial resolution**
  - Reduced variation over scan
  - Higher resolution imaging bands
- **High radiometric accuracy**
  - NIST-traceable
  - Supported by on-board calibrators

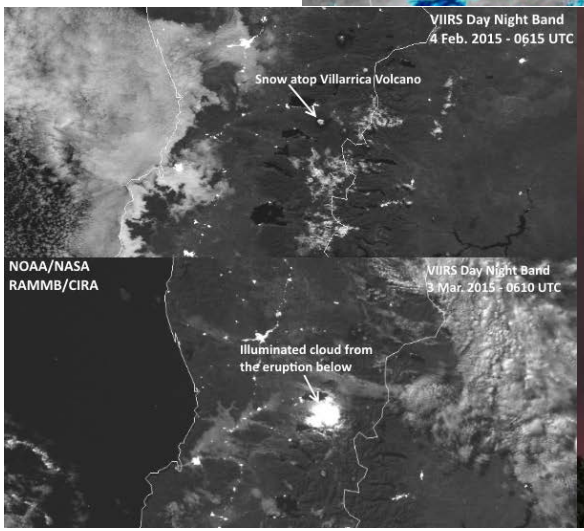
		Band No.	Wave-length (μm)	Horiz Sample Interval (km Downtrack x Crosstrack)		Driving EDRs
				Nadir	End of Scan	
VIS/NIR FPA	Silicon PIN Diodes	M1	0.412	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols
		M2	0.445	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols
		M3	0.488	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols
		M4	0.555	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols
		I1	0.640	0.371 x 0.387	0.80 x 0.789	Imagery
		M5	0.672	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols
		M6	0.746	0.742 x 0.776	1.60 x 1.58	Atmospheric Corr'n
		I2	0.865	0.371 x 0.387	0.80 x 0.789	NDVI
		M7	0.865	0.742 x 0.259	1.60 x 1.58	Ocean Color Aerosols
CCD		DNB	0.7	0.742 x 0.742	0.742 x 0.742	Imagery
S/MWIR	PV HgCdTe (HCT)	M8	1.24	0.742 x 0.776	1.60 x 1.58	Cloud Particle Size
		M9	1.378	0.742 x 0.776	1.60 x 1.58	Cirrus/Cloud Cover
		I3	1.61	0.371 x 0.387	0.80 x 0.789	Binary Snow Map
		M10	1.61	0.742 x 0.776	1.60 x 1.58	Snow Fraction
		M11	2.25	0.742 x 0.776	1.60 x 1.58	Clouds
		I4	3.74	0.371 x 0.387	0.80 x 0.789	Imagery Clouds
		M12	3.70	0.742 x 0.776	1.60 x 1.58	SST
		M13	4.05	0.742 x 0.259	1.60 x 1.58	SST Fires
LWIR	PV HCT	M14	8.55	0.742 x 0.776	1.60 x 1.58	Cloud Top Properties
		M15	10.763	0.742 x 0.776	1.60 x 1.58	SST
		I5	11.450	0.371 x 0.387	0.80 x 0.789	Cloud Imagery
		M16	12.013	0.742 x 0.776	1.60 x 1.58	SST

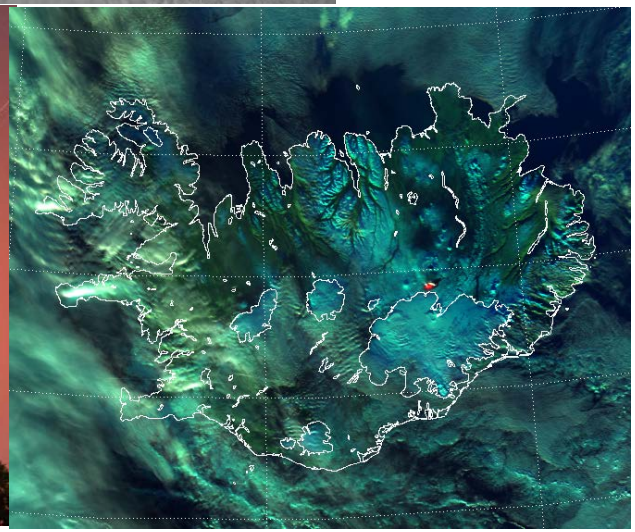
JSTAR VIIRS Lead: Changyong Cao

VIIRS Imagery EDR

Various VIIRS Imagery examples, depicting details in cloud formations or on the ground which were not seen with other instrumentation







JSTAR VIIRS Imagery EDR Lead: Don Hillger

VIIRS Ocean EDRs

- **SST Products**
  - Produced at NDE by the NOAA heritage Advanced Clear-Sky Processor for Oceans (ACSPO) system
- **Products are monitored online in near-real time**

Annual Validation statistics against drifters (Jun 2013- May 2014)
JPSS Spec: Bias 0.2K; Accuracy: 0.6K

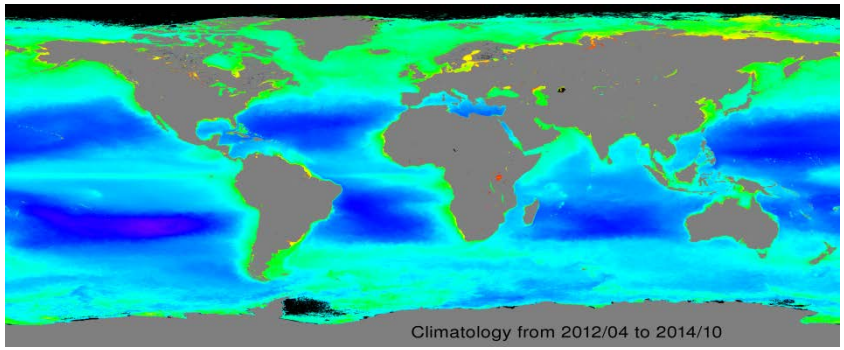
Processor	Mean / Std (Day)	Mean/Std (Night)
IDPS	-0.13 / 0.78	-0.08 / 0.43
ACSPO	+0.06 / 0.48	+0.01 / 0.36
NAVO	+0.02 / 0.43	+0.05 / 0.31

JSTAR SST Lead: Alex Ignatov

Ocean Color Products:

- Normalized water-leaving radiance (nL_w's) at VIIRS visible bands M1-M5
- Chlorophyll-a (Chl-a) concentration
- K_d(490) (New)
- K_d(PAR) (New)

VIIRS Climatology Chlorophyll-a Image (April 2012 to October 2014)



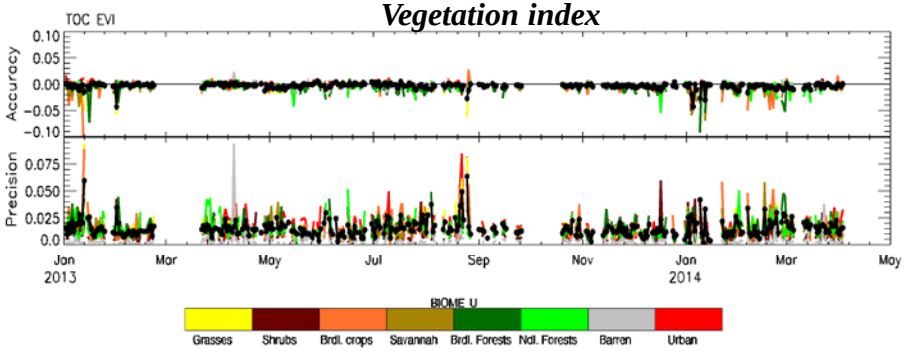
JSTAR Ocean Color Lead: Menghua Wang

CRITICAL INFORMATION FOR CLIMATE MONITORING, FISHERIES OPERATION, AND INTEGRATED ECOSYSTEM ASSESSMENT

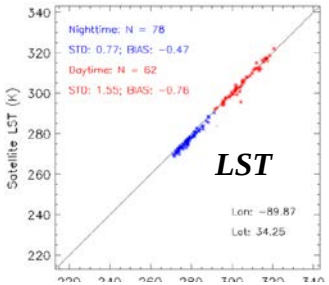
VIIRS Land Product Maturity and Validation

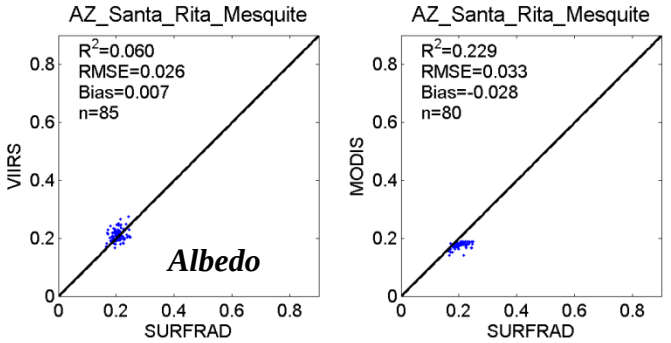
All Suomi NPP IDPS Land Products achieved Validated science maturity.

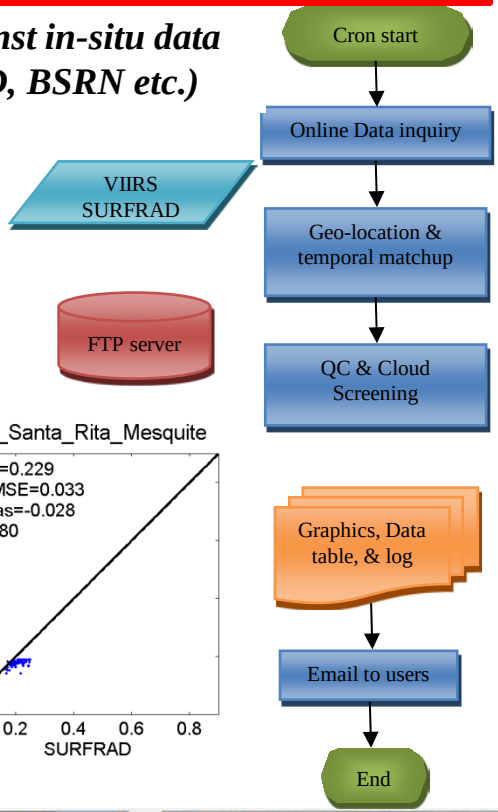
Vegetation index



Product validation against in-situ data (AERONET, SURFRAD, BSRN etc.)

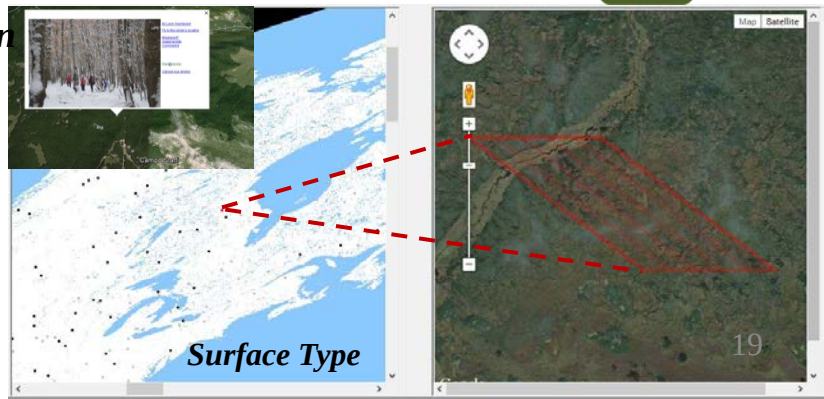






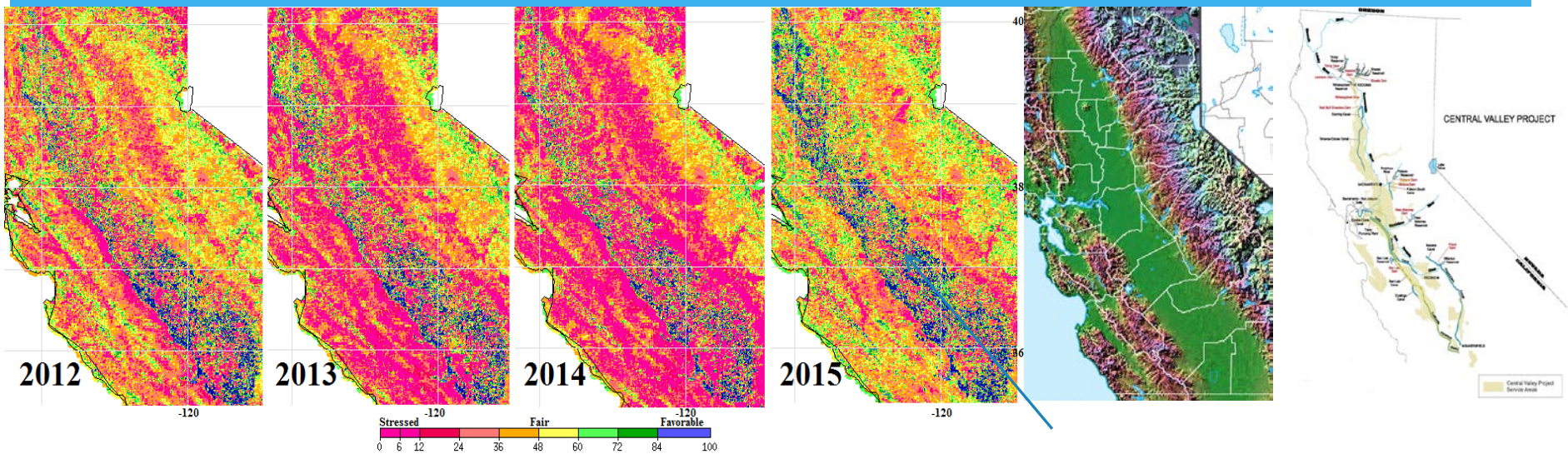
USGS / NOAA Land Product Characterization System

High resolution satellite data and in-situ



Products are evaluated by SPSRB for NOAA Operational status.

VIIRS 500m resolution gridded vegetation health provides indication of vegetation stress



S-NPP/VIIRS-500m Vegetation health, June 12, USA, California, Central Valley

June 2012 -2015 Vegetation Health – Note improvement in 2015 due to late spring precipitation which increased vegetation. (temporary reprieve since snow pack is low and dry summer setting up).

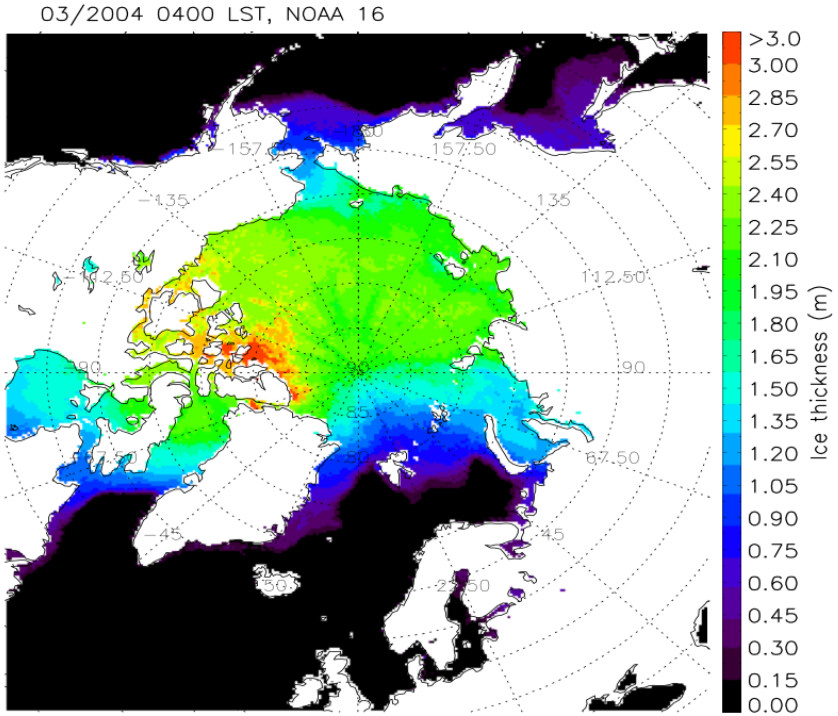
NOAA Service Report on the 2014 California Drought included the need to use remote sensing for assessments of temporal changes in the Central Valley configuration, channel shapes, vegetation cover….

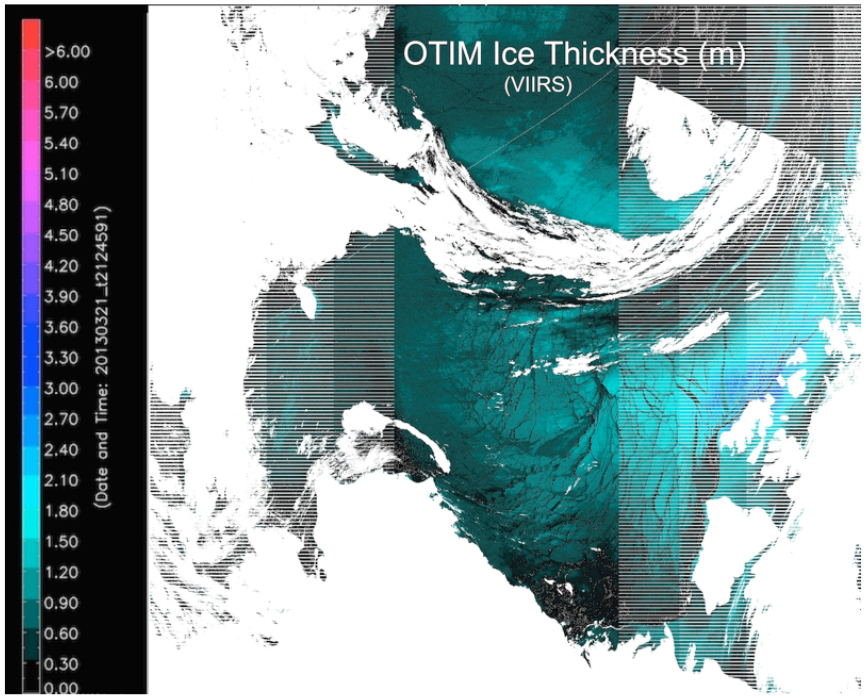
Blue areas show irrigation, If irrigation is cutback, depending on the magnitude, VIIRS VH maps in the central valley can be used for monitoring

Irrigation areas shown in upper right map

JSTAR Vegetation Health Lead: Felix Kogan

VIIRS Sea Ice Thickness





Examples of Arctic sea ice thickness retrieved by the One-dimensional Thermodynamic Ice Model (OTIM) with NOAA 16 AVHRR and S-NPP VIIRS data for March 2004, and March 21, 2014, respectively.

Sea Ice Thickness is critical to Climate Monitoring Navigation/Transportation Improve ice forecasts

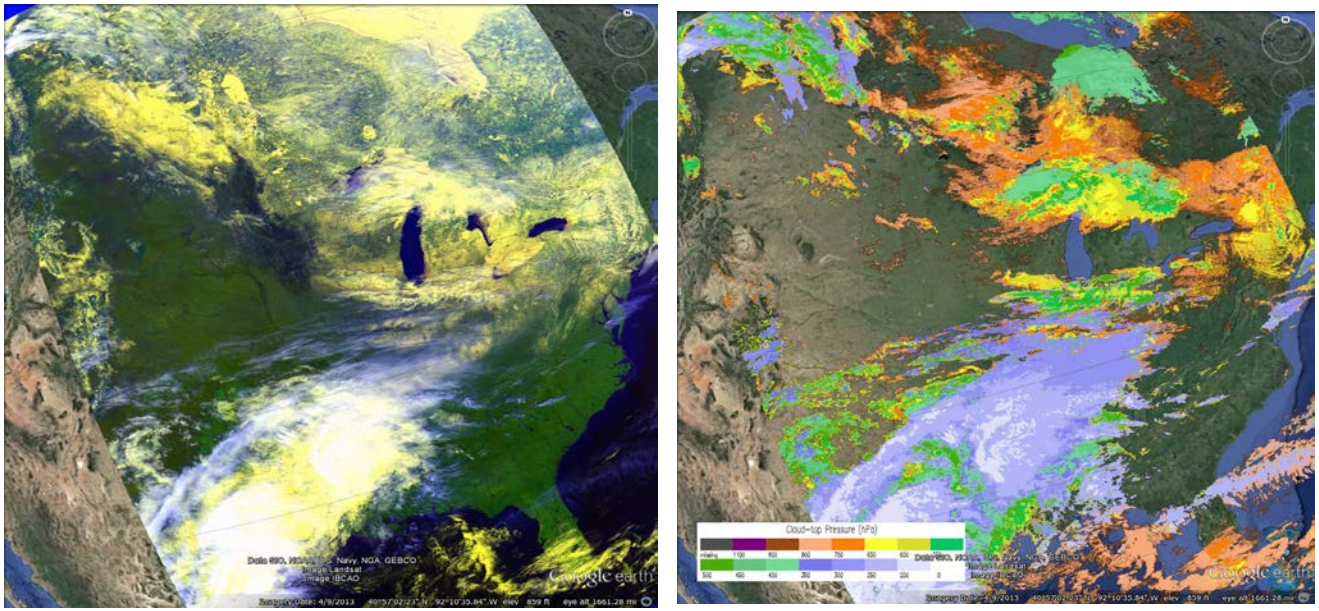
JSTAR Cryosphere Lead: Jeff Key

VIIRS Clouds

- **Products and Cal/Val Maturity Status:**
  - Cloud Mask: Validated 03/05/2014 Cloud Top (CTH,CTT,CTP), Cloud Optical Depth (daytime), Cloud Effective Particle Size, Cloud Base Height: Validated 09/03/2014
  - COD (nighttime), &CCL Provisional 08/20/2014

- **NOAA Enterprise Cloud Algorithm**: The Cloud from AVHRR Extended (CLAVR-x) is heritage NESDIS operational cloud processing system runs for multiple sensors on different satellites
- VIIRS must be combined with CrIS and ATMS to create a multilayered cloud phase

Clouds are Important for Weather and Climate; Cloud Top Pressure is important for Aviation and used in the VIIRS Winds Application



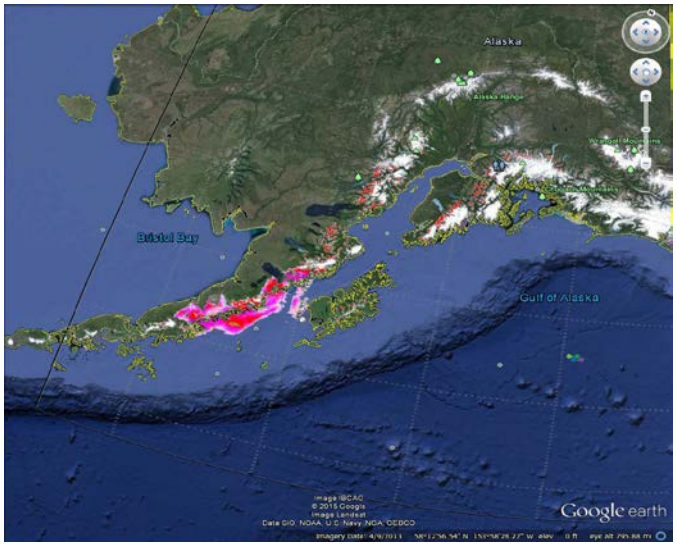
False color image (R=M5, G=M7, B=M15. (L) March 8, 2015. Orbit 17414.; Cloud Top Pressure (R)

JSTAR Cryosphere Lead: Andrew Heidinger (NOAA/NESDIS/STAR)

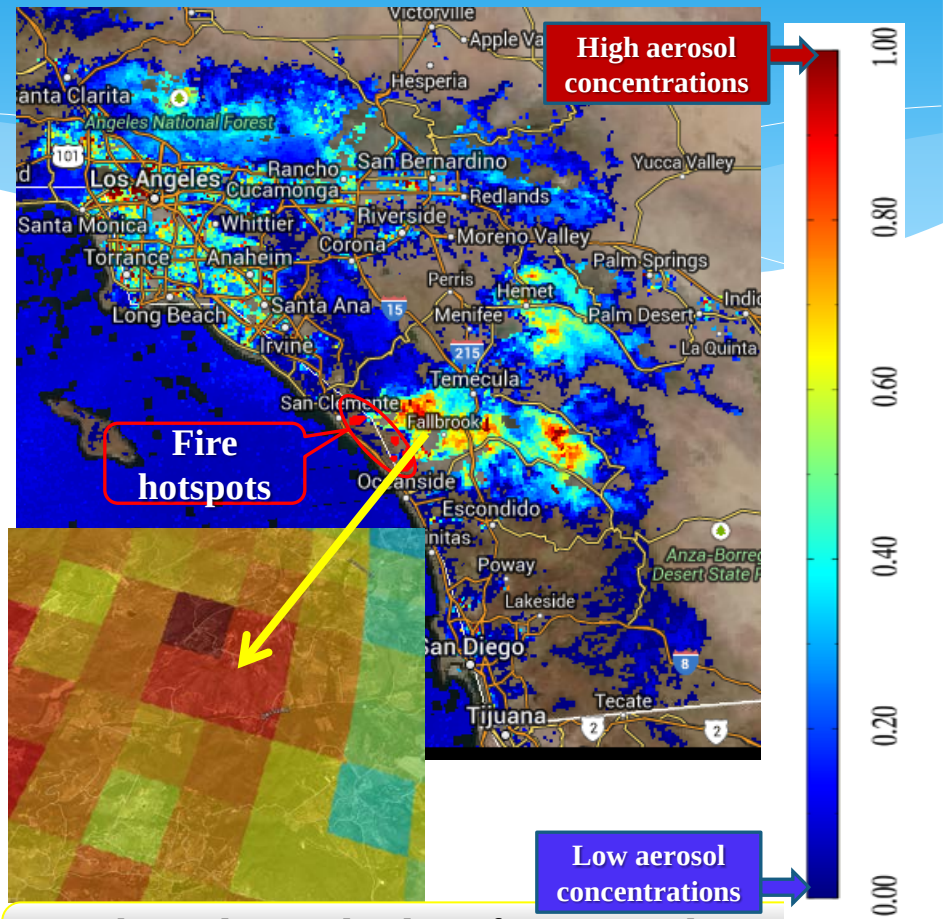
VIIRS Aerosol EDR

http://www.star.nesdis.noaa.gov/smcd/emb/viirs_aerosol/index.php

- **Products**
  - Aerosol Optical Depth (AOD)
  - Aerosol Particle Size Parameter (APSP)
  - Suspended Matter (dust and smoke)
  - File format: HDF5 (IDPS), NetCDF4 (NDE)



VIIRS Smoke (pink: light smoke; red: Intense smoke), Willow fire (Alaska), June 17, 2015



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

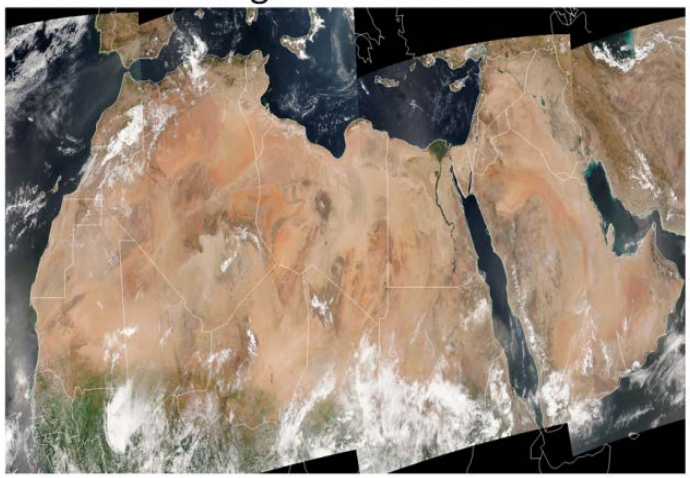
VIIRS Aerosol EDRs are used in Air Quality forecasts; also as Input to NWS global aerosol models (e.g., biomass burning emissions)

JSTAR Aerosol Leads: Shobha Kondragunta and Istvan Laszlo

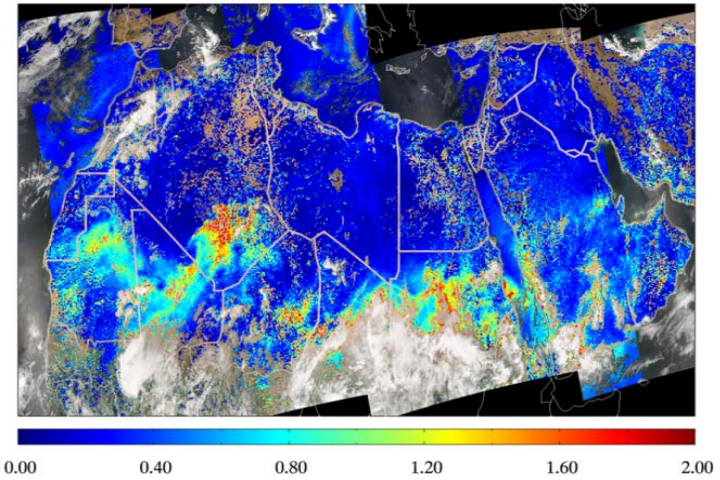
The STAR Bright Surface (BS) AOT Algorithm

2015 JPSS Annual Meeting: Hai Zhang, Hongqing Liu, Shobha Kondragunta, Istvan Laszlo, Lorraine Remer, Jingfeng Huang, Stephen Superczynski

VIIRS RGB image 20130823

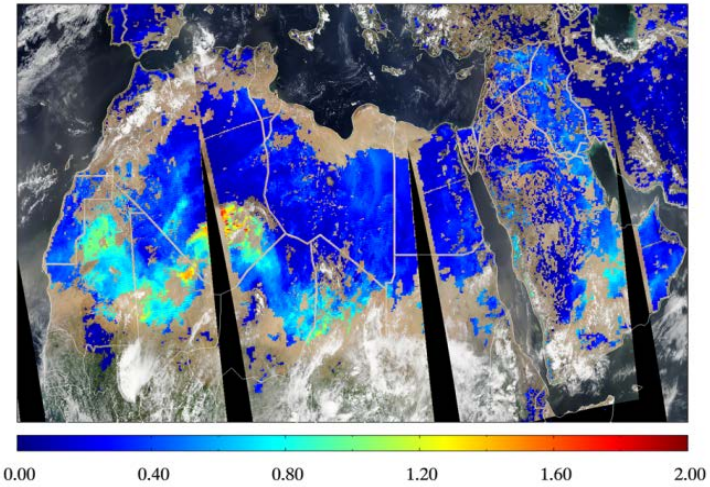


VIIRS AOT 20130823

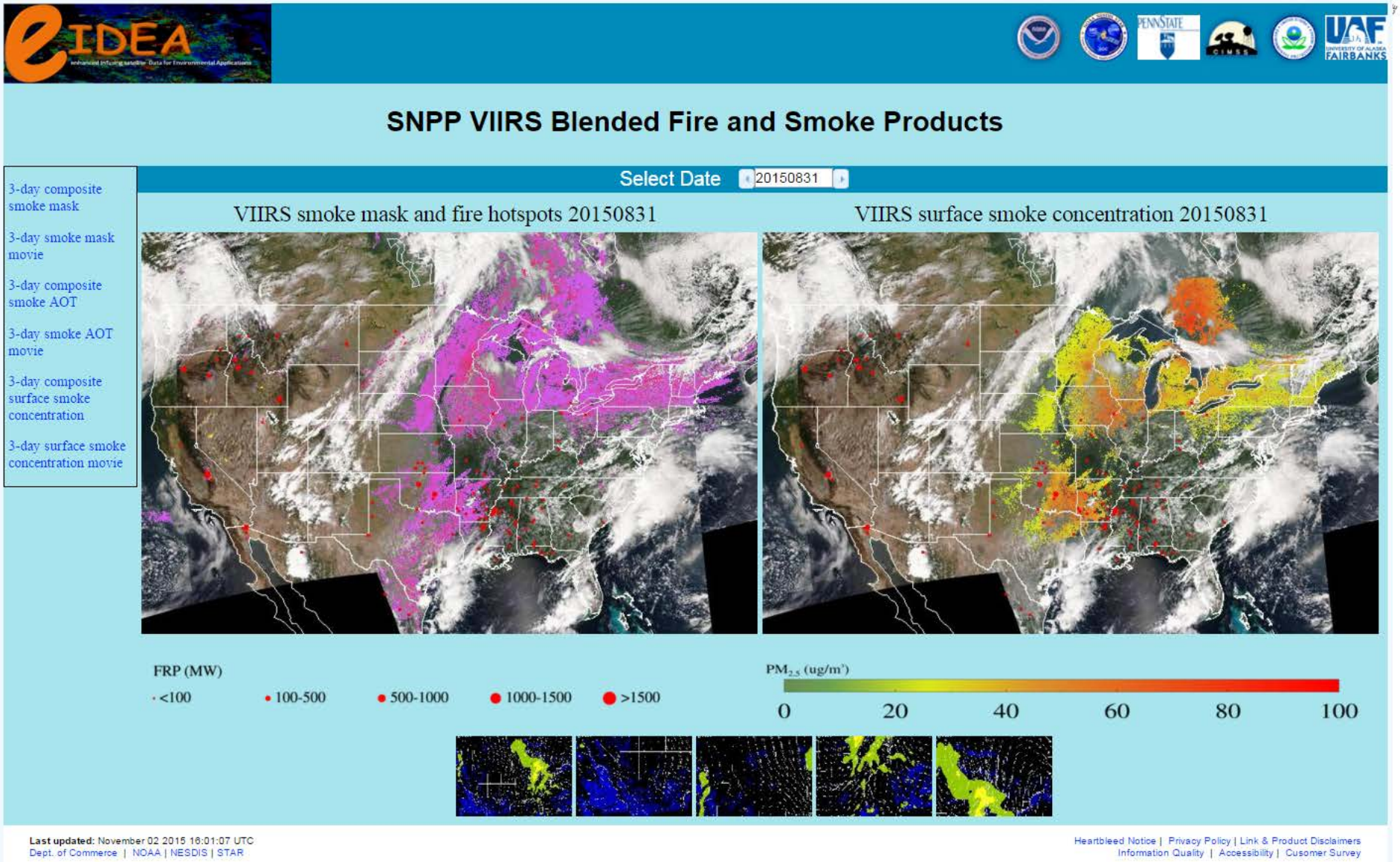


- VIIRS AOT retrievals are <u>in agreement</u> with MODIS deep blue AOT retrievals in most areas:
- *Both show dust storm in the west*
- *Low AOT regions agree mostly*
- <u>Differences:</u>
- *Some high AOT regions in VIIRS are not seen in MODIS deep blue*
- *Less coverage in MODIS deep blue*

MODIS deep blue AOT 20130823

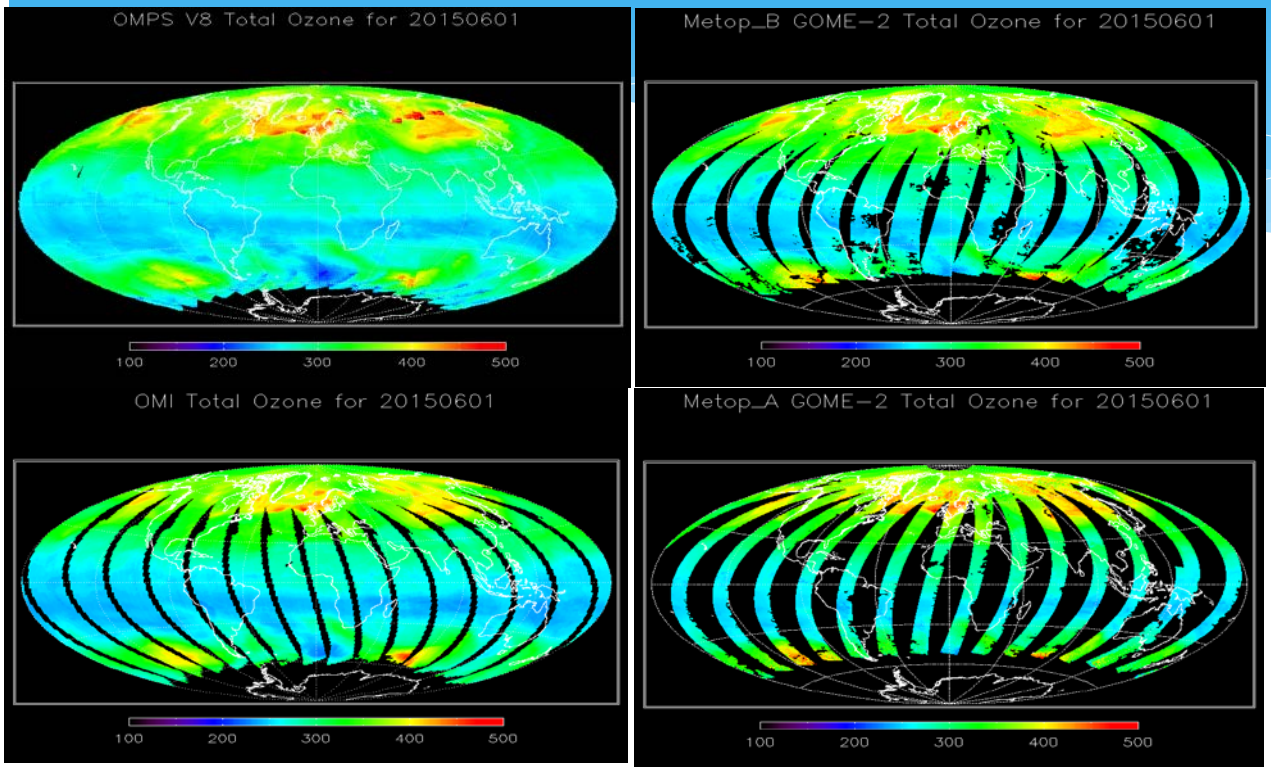


An example of AOT retrieval over north Africa and Arabian Peninsula

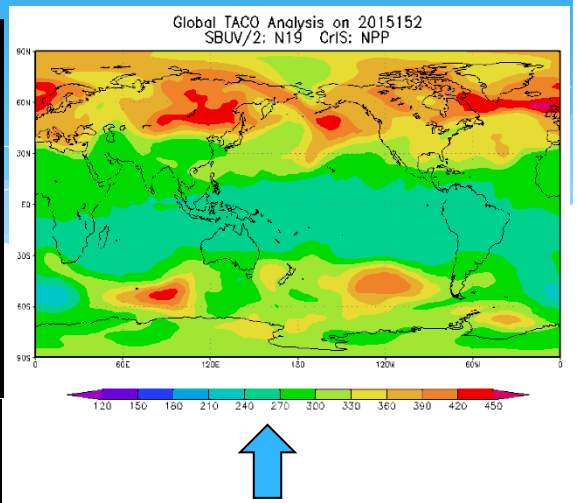


http://www.star.nesdis.noaa.gov/smcd/spb/aq/expr/expr2/

OMPS Ozone Product



Daily maps of total column ozone: The false color maps show the total column ozone in Dobson Units for June 1, 2015 for the V8TOz algorithm applied to S-NPP OMPS (Top Left), Metop-B GOME-2 (Top Right), EOS Aura (Bottom Left) and Metop-A GOME-2 (Bottom Right).

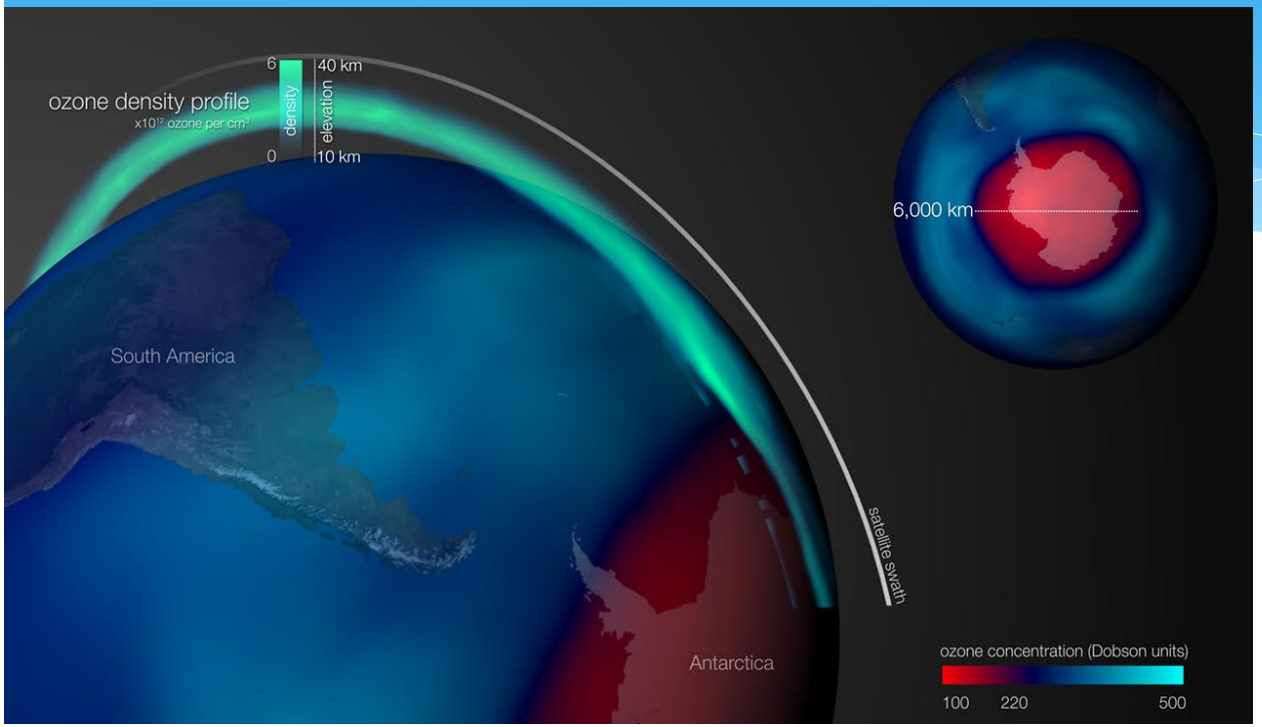


Total Ozone Analysis using TOAST (CrIS and SBUV/2) Global map of total column ozone in Dobson Units as produced from analysis using S-NPP CrIS IRO3 and NOAA-19 SBUV/2 V8Pro as inputs for Day 20150601.

http://www.ospo.noaa.gov/Products/atmosphere/toast/index.html

Courtesy: Larry Flynn, NOAA/NESDIS/STAR)

2015 Ozone Hole Monitored by Products from S-NPP, NOAA-19 and METOP-B



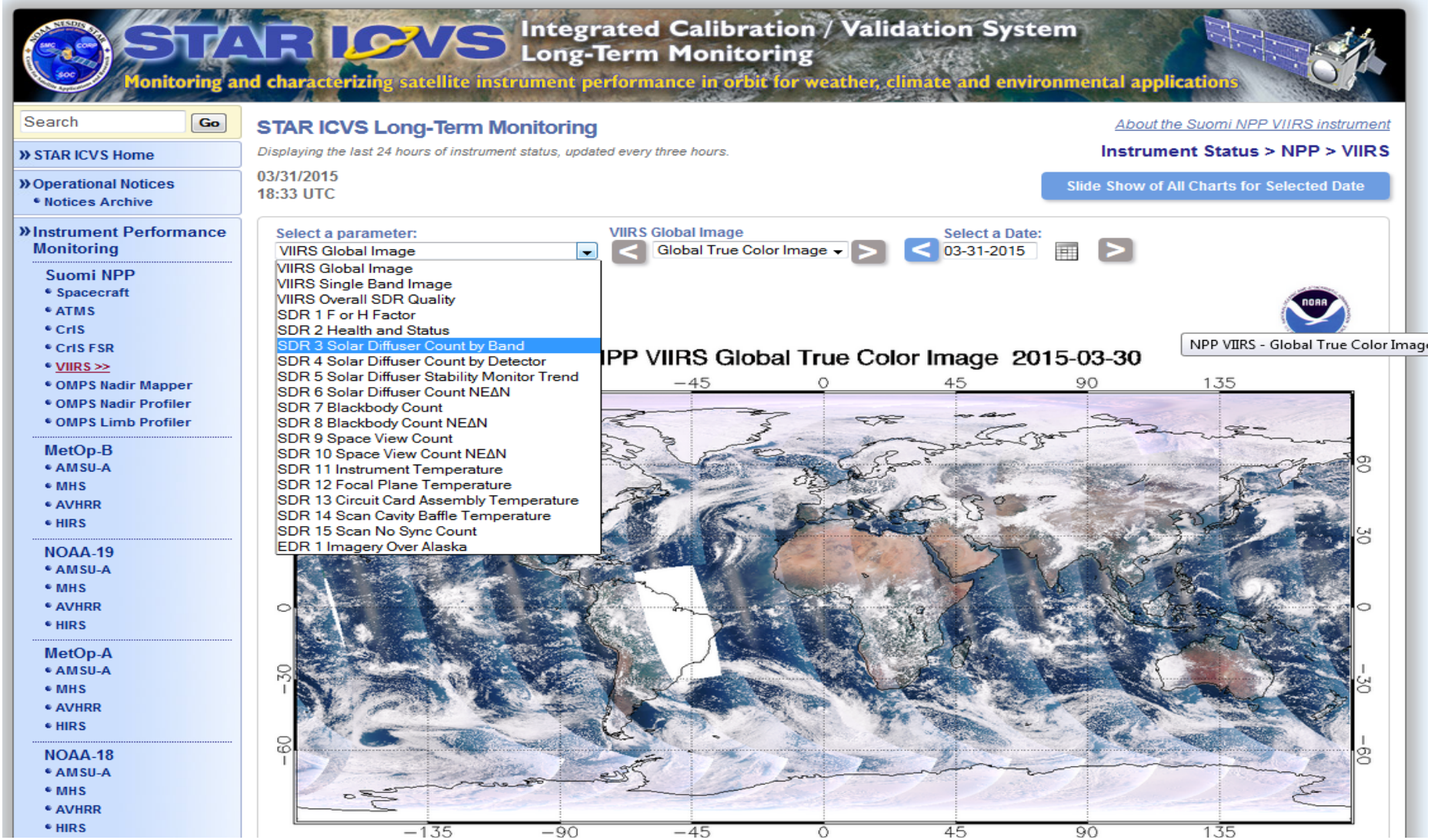
Atmospheric ozone product estimates uses
•OMPS LP ozone profile
•Total Ozone from Analysis of Stratospheric and Tropospheric components (TOAST) using S-NPP CrIS for the troposphere and NOAA-19 SBUV/2 for the stratosphere.

•This year's Ozone Hole has been particular large and deep reflecting the large and stable Antarctic Polar Vortex.
http://www.cpc.ncep.noaa.gov/products/stratosphere/sbuv2to/gif_files/ozone_hole_plot.png
http://www.star.nesdis.noaa.gov/jpss/EDRs/products_ozone.php#prod0
http://www.ospo.noaa.gov/Products/atmosphere/ozone.html

JSTAR Ozone Lead: Larry Flynn

NOAA Integrated CalVal System (ICVS)

Monitor on-orbit performance of NOAA satellite instruments



Monitors over 400 parameters for 28 instruments onboard NOAA/METOP/SNPP satellites

JSTAR ICVS Lead: Ninghai Sun

Priorities Moving Forward

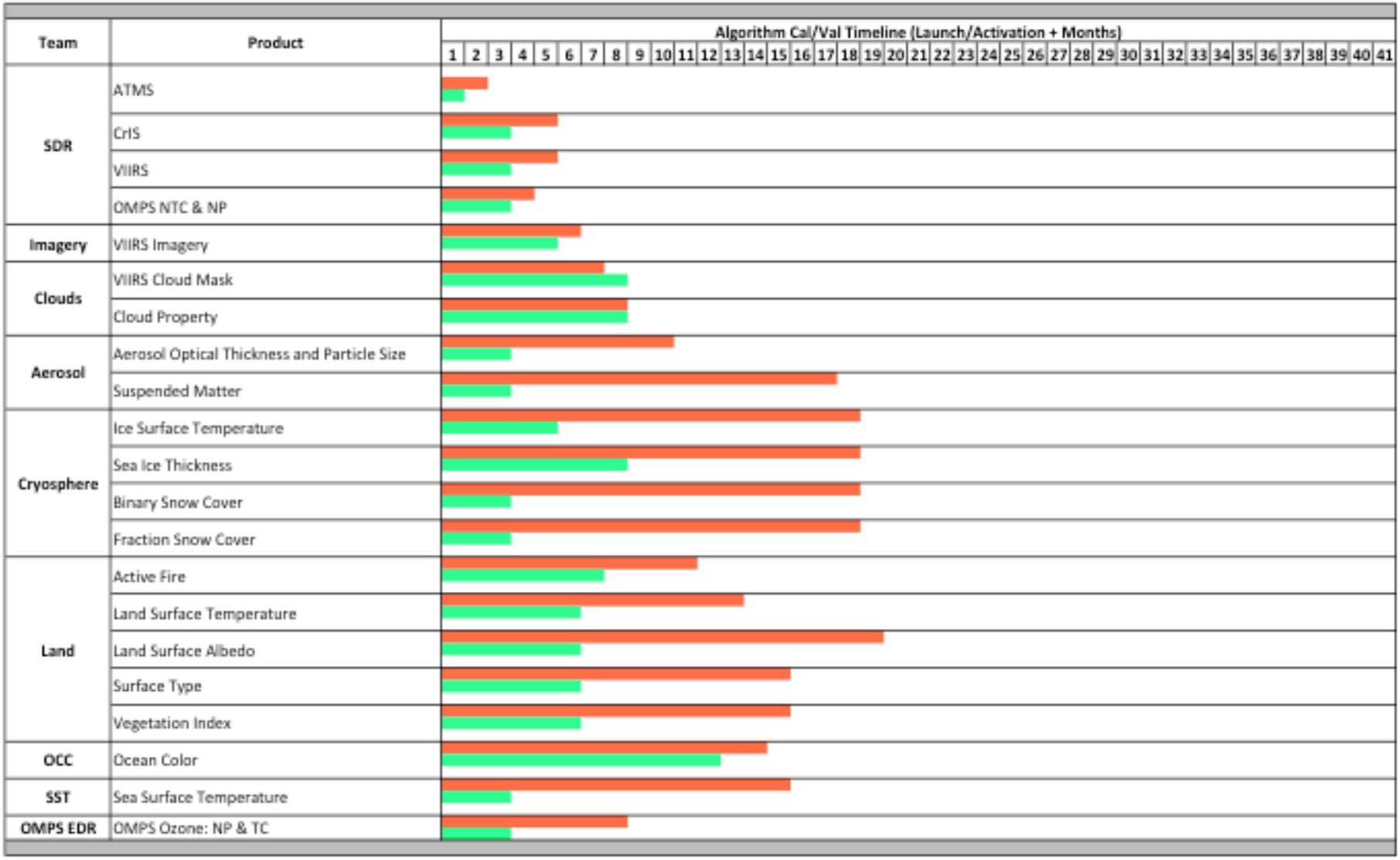
- **Ensure Cal/Val Team Readiness for JPSS-1**
  - Develop roadmap/plans toward enterprise algorithms
  - Algorithm development/Improvements for J1
  - Implement code to meet JPSS-1 requirements
  - Develop and update the Cal/Val plans
- **Continue Support for Suomi NPP Mission Objectives**
  - Provide Suomi NPP data products to support NOAA's operational missions.
  - Provide a pre-operational demonstration for JPSS user engagement (Testbed)

JPSS 1 Key Algorithm Updates

Milestones	Delivery Date
CrIS SDR: Full spectral resolutions SDR	Jan-15
CrIS SDR: Fringe Count Error module update	Jun-15
CrIS SDR: JPSS-1 Instrument Test Data Analysis Report	Mar-15
VIIRS SDR: JPSS-1 Instrument Test Data Analysis Report	Aug-15
OMPS SDR: JPSS-1 Instrument Test Data Analysis Report	Jul-14
OMPS SDR: Algorithm improvements to support extended spectral range, and reduced horizontal cell size at nadir	Apr-15 (TC) May-15 (NP)
OMPS Ozone NP: V8Pro	Feb-15
OMPS Ozone TC: V8TOz	Jul-15
Vegetation Indices: Add top-of-canopy NDVI	Mar-15
Ocean Color: OCC for coastal and inland water	Apr-15
Active Fires: 2D fire mask; include water for global coverage	Jun-15
JPSS-1 Cal Val Plans Draft Delivery	Jul-15
VIIRS SDR: LUT and GEO code update for JPSS-1	Aug-15

JPSS-1 vs. SNPP Cal Val Timeline

Beta Example (Red: Suomi NPP; Greeen – JPSS1)



DRAFT

Summary and Conclusions

- Suomi NPP is producing outstanding data – great job done by JSTAR teams on algorithms and cal val
  - The satellite is healthy and producing a high availability of data (~99.99%)
  - Operations of the satellite transferred from NASA to NOAA in 2013
  - Suomi NPP is the primary operational polar-orbiting satellite for NOAA
- Data are easily accessible via NOAA operations, direct readout, and CLASS
- The scientific maturity of these products are well documented and are easily accessible from the STAR JPSS website
- The Cal/Val activities for JPSS-1 are expected to be much accelerated than those for SNPP, and will be provided to decision makers/users with a much improved latency

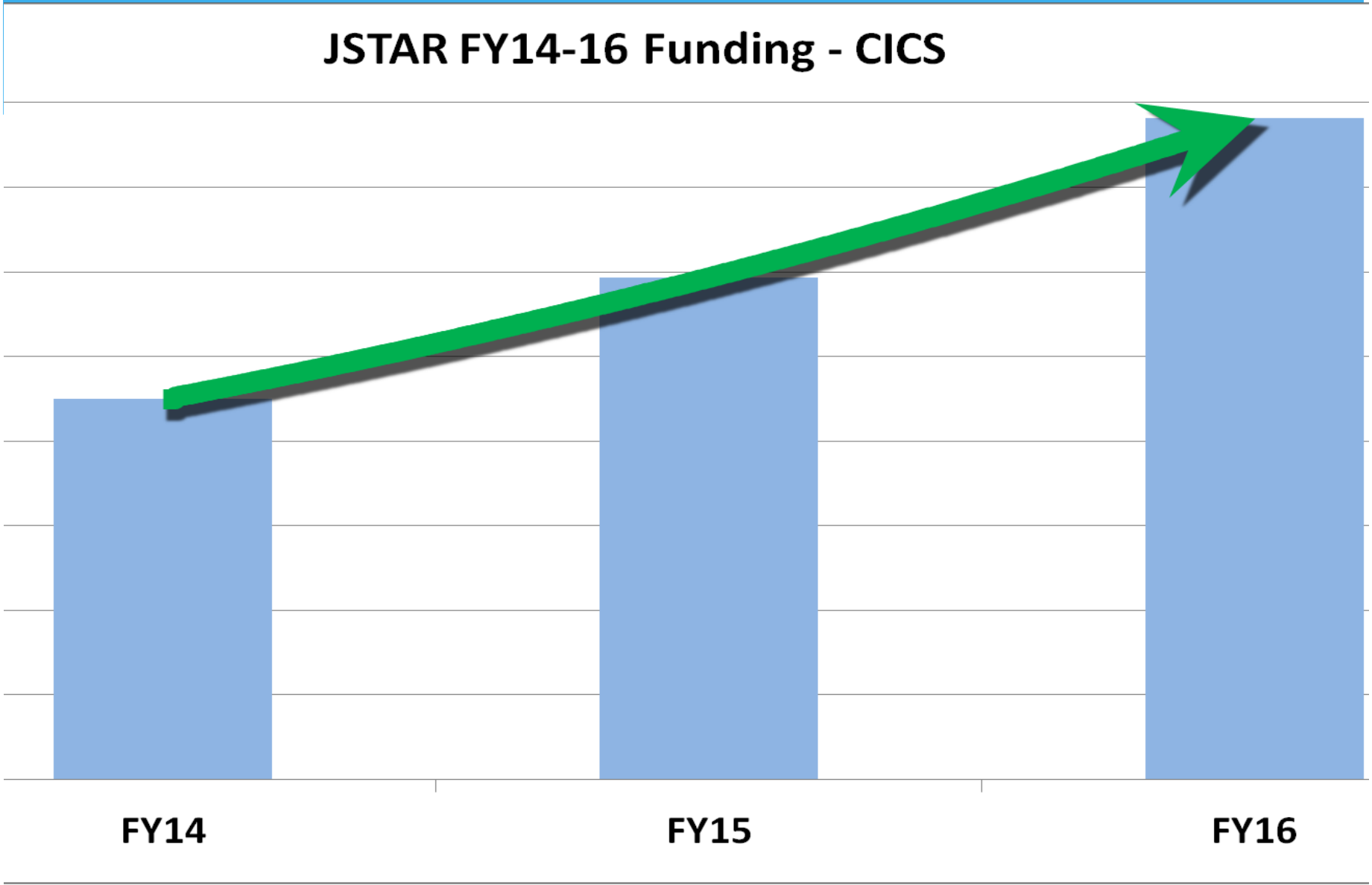
Thank You!

For More Information, please visit:

http://www.star.nesdis.noaa.gov/jpss/index.php

- Algorithm Theoretic Basis Documents
- Cal/Val Docs
- OAD and CDFCB
- Requirements Documents
- SDR/EDR Team Leads/Contacts
- Links to ICVS
- Links to EDR websites

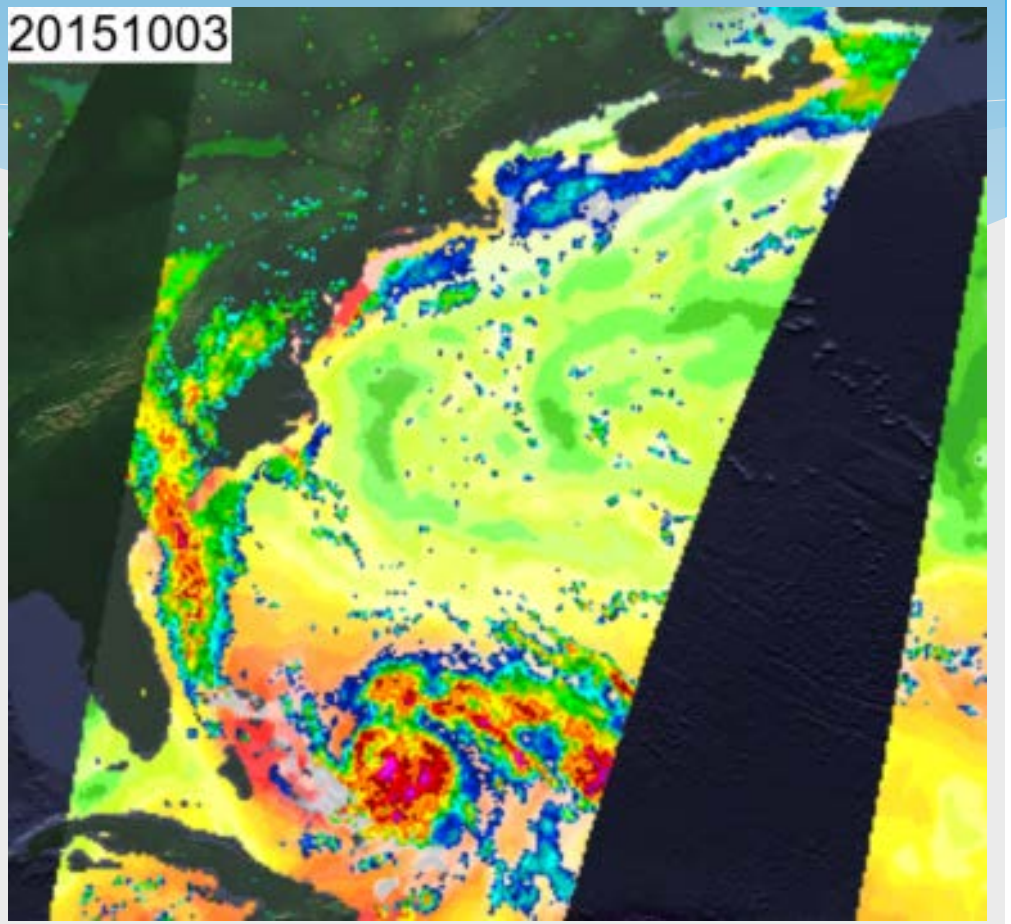
Increasing Supports from CICS Algorithm Science, Cal Val, and LTM



J-STAR GCOM
Product Development and Validation Project

- Day 1 Product Capability (products available operationally from OSPO in November 2015)
  - Microwave Brightness Temperature (MBT)
  - Total Precipitable Water (TPW)
  - Cloud Liquid Water (CLW)
  - Precipitation Type/Rate (PT/R)
  - Sea Surface Temperature (SST)
  - Sea Surface Wind Speed (SSW)

- Day 2 Product Capability (products available operationally from OSPO planned for 2016)
  - Soil Moisture (SM)
  - Sea Ice Characterization (SIC)
  - Snow Cover/Depth (SC/D)
  - Snow Water Equivalent (SWE)
  - Surface Type (ST)



The AMSR2 total precipitable water and rain rate composites for Hurricane Joaquin (03OCT2015) showing the copious amounts of water that was transported into the South and North Carolina regions that resulted in massive flooding.

JSTAR GCOM Leads: Paul Chang, Ralph Ferraro