Land EDR Overview

Land product suite
Presenter: Ivan Csiszar (STAR)
Contributors: STAR JPSS Land Team and external team members / partners
Date: August 25, 2015

Algorithm Cal/Val Team Members

PI	Org.	Key Team Members	Roles and Responsibilities
Ivan Csiszar	STAR/UMD	Louis Giglio, Wilfrid Schroeder	NOAA Product Team Lead, **Fire**
Miguel Román	NASA/UMD	Chris Justice, Sadashiva Devadiga	NASA Coordination, Validation co-lead, SIPS
Eric Vermote	NASA/UMD	Belen Franch	**Surface Reflectance**, VCM, calibration
Marco Vargas	STAR/U HI/AER	Tomoaki Miura, Zhangyan Jiang	**Vegetation Index, Green Vegetation Fraction**
Felix Kogan	STAR/IMSG	Wei Guo	**Vegetation Health**
Yunyue (Bob) Yu	STAR/SDSU	Xiaoyang Zhang	**Phenology**
Yunyue (Bob) Yu	STAR/UMD	Shunlin Liang, Dongdong Wang	**Albedo**
Bob Yu	STAR/ UMD	Yuling Liu, Zhen Song, Peng Yu	**Land Surface Temperature**
Jerry Zhan	STAR/ UMD	Chengquan Huang, Rui Zhang	**Surface Type**
Kevin Gallo	STAR/ USGS		Validation, data continuity
Walter Wolf	STAR/ IMSG	Marina Tsidulko, Qiang Zhao	STAR AIT Land
Leslie Belsma	Aerospace		JPSS Algorithm Manager
Mike Ek	NCEP/IMSG	Yihua Wu, Weizhong Zheng, Helin Wei	NCEP Land Team, data assimilation

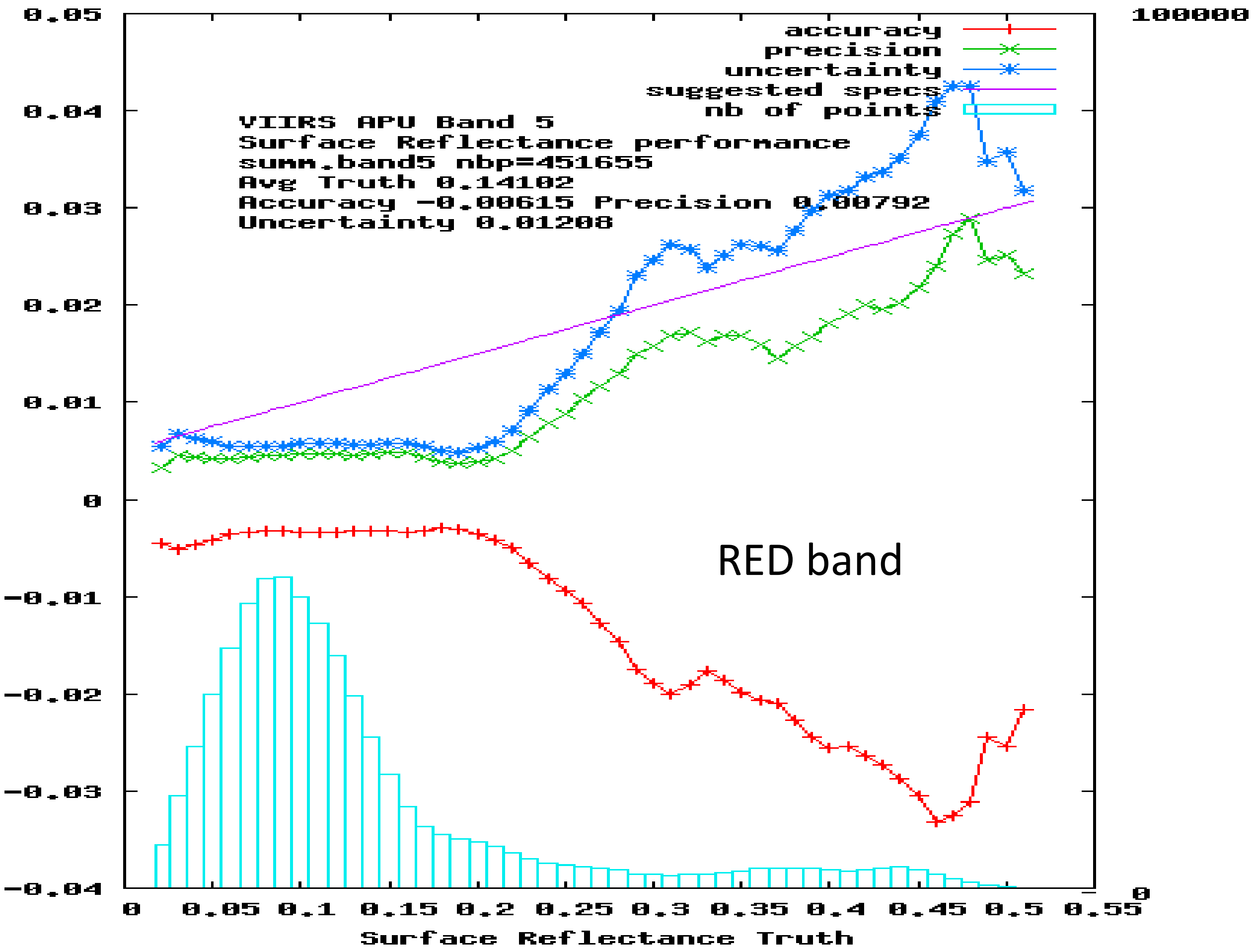
IDPS: Interface Data Processing Segment**; **NDE: NOAA-Unique**; **PGRR: Proving Ground / Risk Reduction

VIIRS Surface reflectance status

- Overall goal is to keep the NASA Science Product and the NOAA Operational product in sync
- Current the VIIRS SR product is directly heritage from collection 5 MODIS and that it has been validated to stage 1
  - Land PEATE adjusted version
  - ongoing code change for IDPS implementation
- MODIS algorithm refinements from Collection 6 will be integrated into the VIIRS algorithm
  - candidates for further improvements in the NOAA JPSS operational product
- NOAA algorithm integration supported by STAR AIT
- Algorithm is generic and tied to documented validated radiative transfer code so the accuracy is traceable enabling error budget.
- The use of BRDF correction enables easy cross-comparison of different sensors (MODIS,VIIRS,AVHRR, LDCM, Landsat, Sentinel 2 ,Sentinel 3…)

Evaluation of Algorithm Performance

VIIRS C11 reprocessing



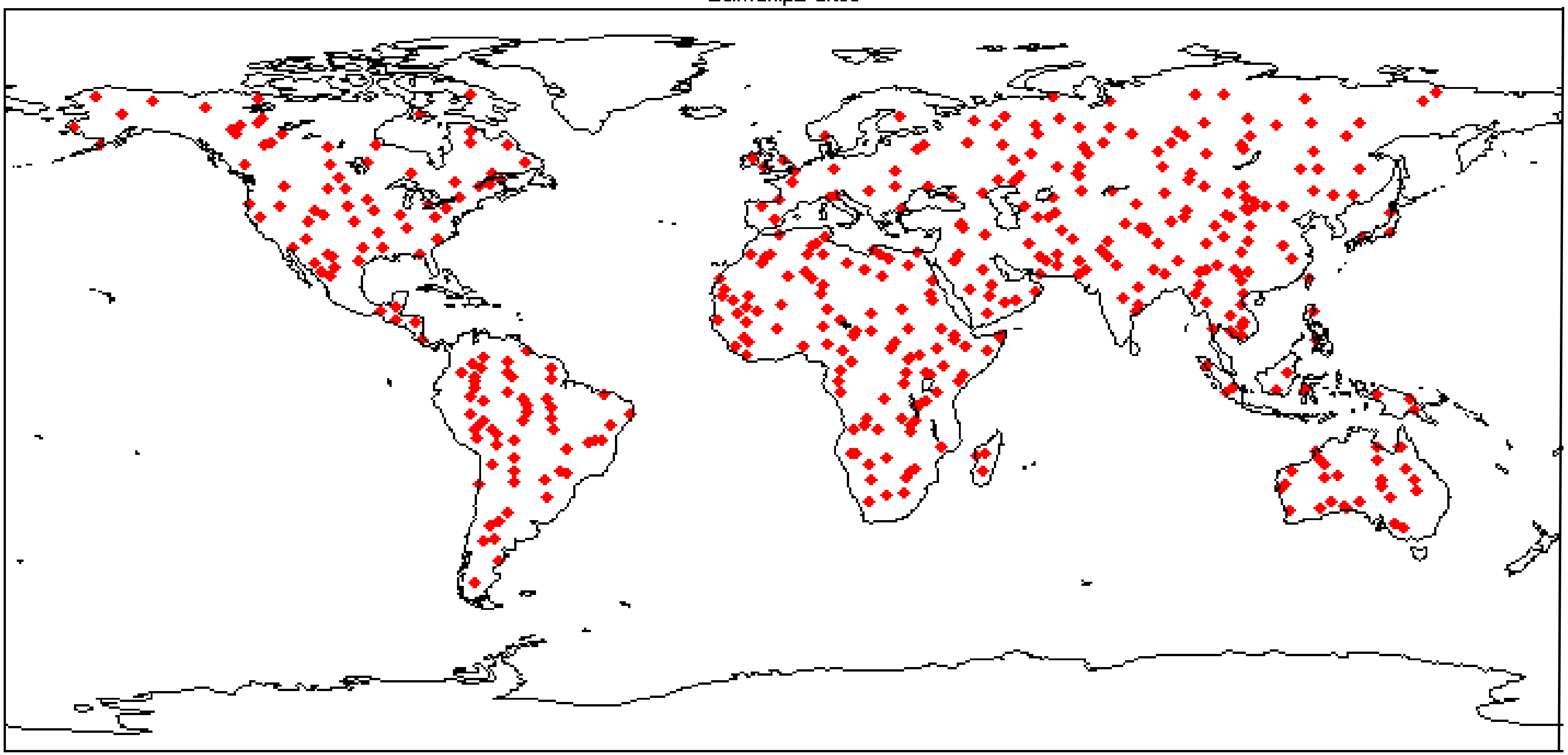
450000 pixels were analyzed for each band.

Red = Accuracy (mean bias)
Green = Precision (repeatability)
Blue = Uncertainty (quadratic sum of A and P)

On average well below magenta theoretical error bar

Cross comparison with MODIS over BELMANIP2

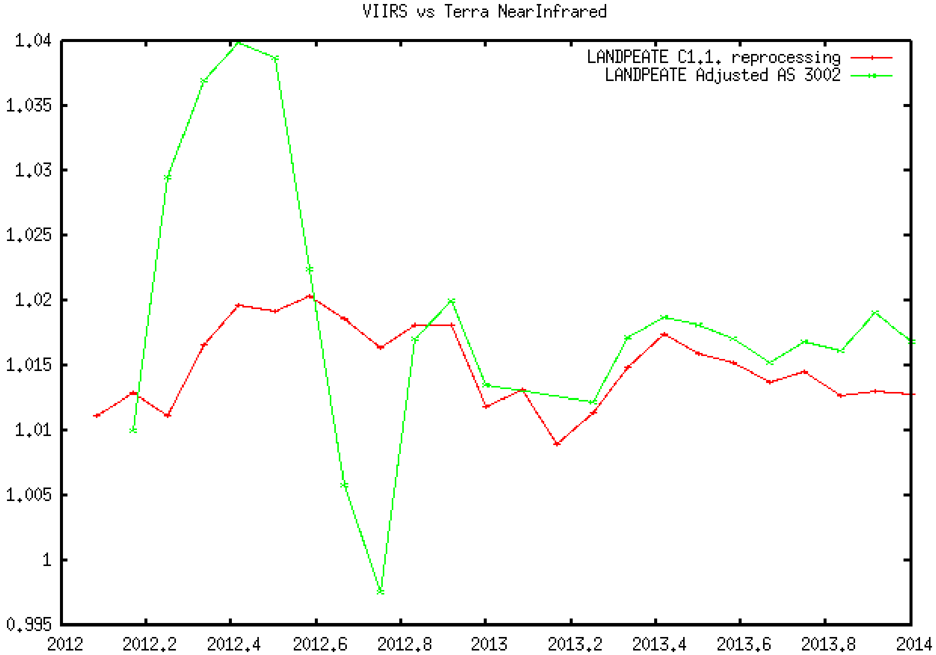
The VIIRS SR is now monitored at more than 400 sites (red losanges) through cross-comparison with MODIS.

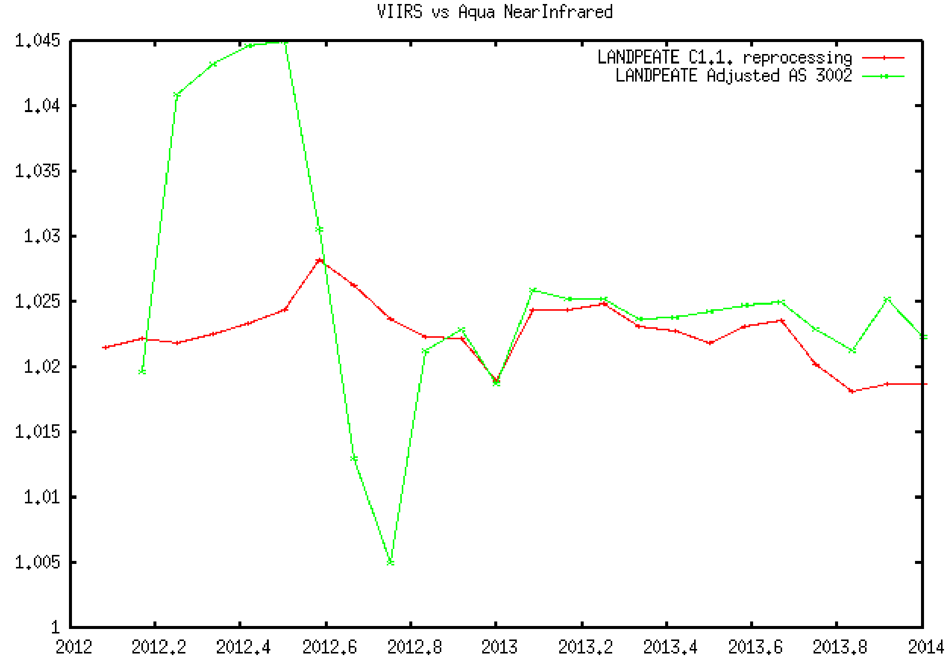


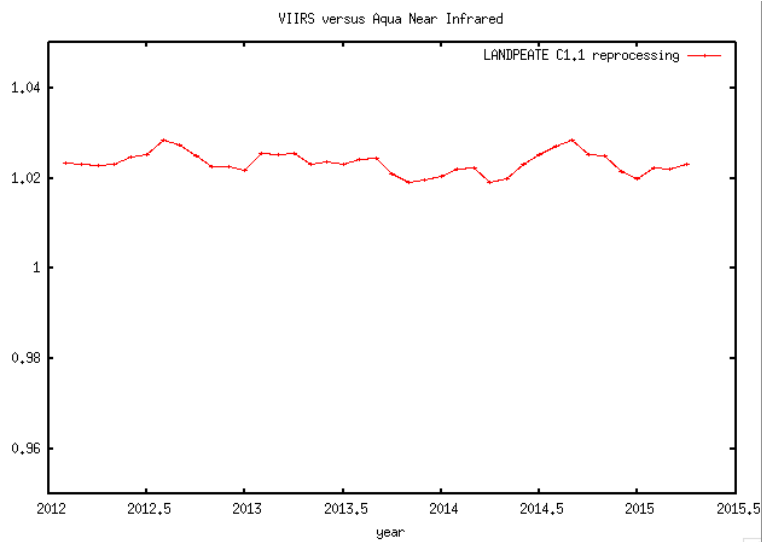
BELMANIP2: ***Benchmark Land Multisite Analysis and Intercomparison of Products***

http://calvalportal.ceos.org/web/olive/

Results over BELMANIP2







Algorithm improvements have ensured good consistency with validated MODIS SR product

For direct validation AERONET is central and a "standard" protocol for its use to be defined (CEOS CVWG initiative)

SNPP VIIRS Vegetation Index EDR Current Status

SNPP VI EDR Maturity: Validated Stage 1

JPSS1 Algorithm Development (J1 Upper)

- Completed the development of TOC NDVI
- CCR-15-2382 approved by AERB in July 2015

Validation activities

- Global comparisons with Aqua MODIS
- Evaluation over AERONET sites
- Time series validation over FLUXNET sites

Instrument/product quality

- High radiometric quality, meeting the L1RDS requirements
- Low atmospheric correction quality along cloud edges
- Overestimation of cloud shadows

VI algorithm issues

- Unrealistic EVI for snow/ice or cloud-contaminated pixels
- EVI compatibility with MODIS

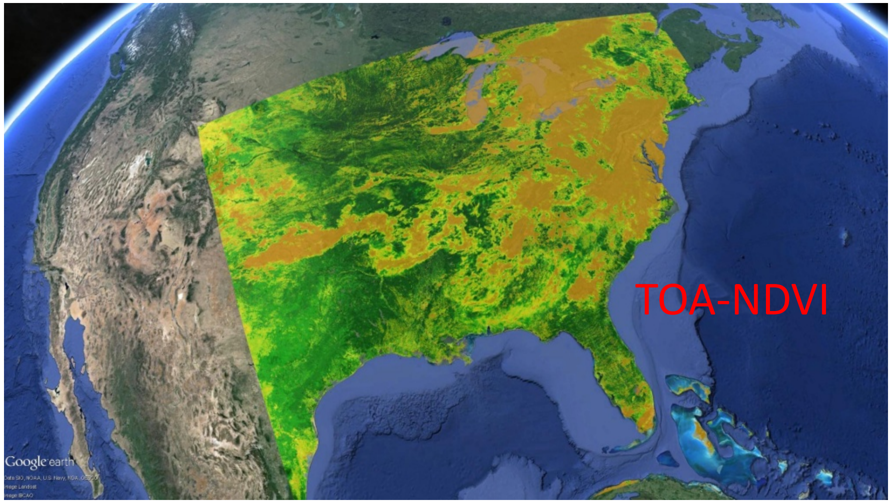
Long Term Monitoring (LTM)

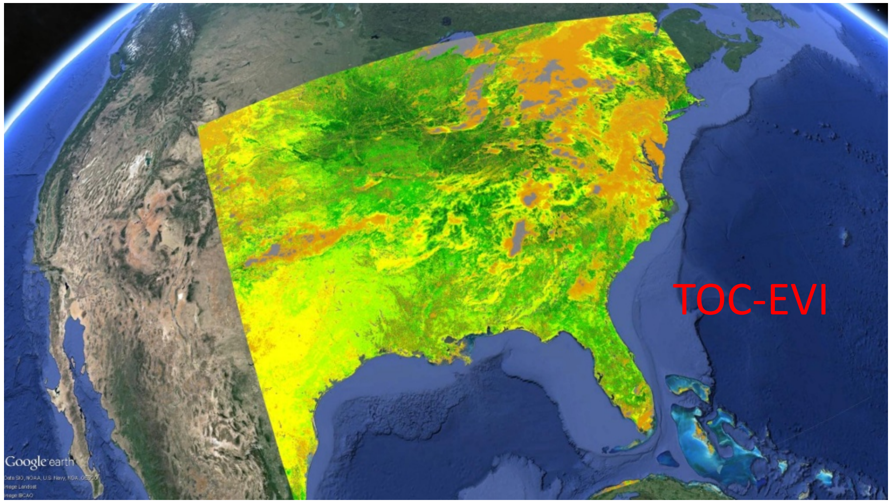
- Ongoing

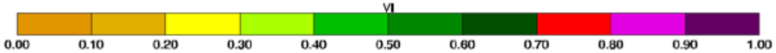
Global APU Estimates (2014 - 2015)

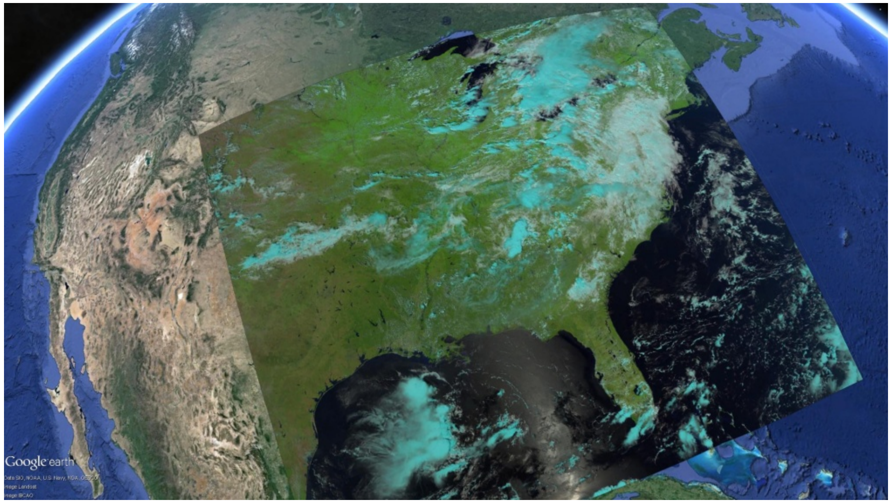
Attribute	L1RDS Threshold (VI units)	Validation Results
TOA NDVI Accuracy	0.05	0.005
TOA NDVI Precision	0.04	0.017
TOA NDVI Uncertainty	0.06	0.020
TOC EVI Accuracy	0.05	0.037
TOC EVI Precision	0.04	0.011
TOC EVI Uncertainty	0.06	0.039
TOC NDVI Accuracy	0.05	0.007
TOC NDVI Precision	0.04	0.023
TOC NDVI Uncertainty	0.06	0.025

VI-EDR August 10, 2015





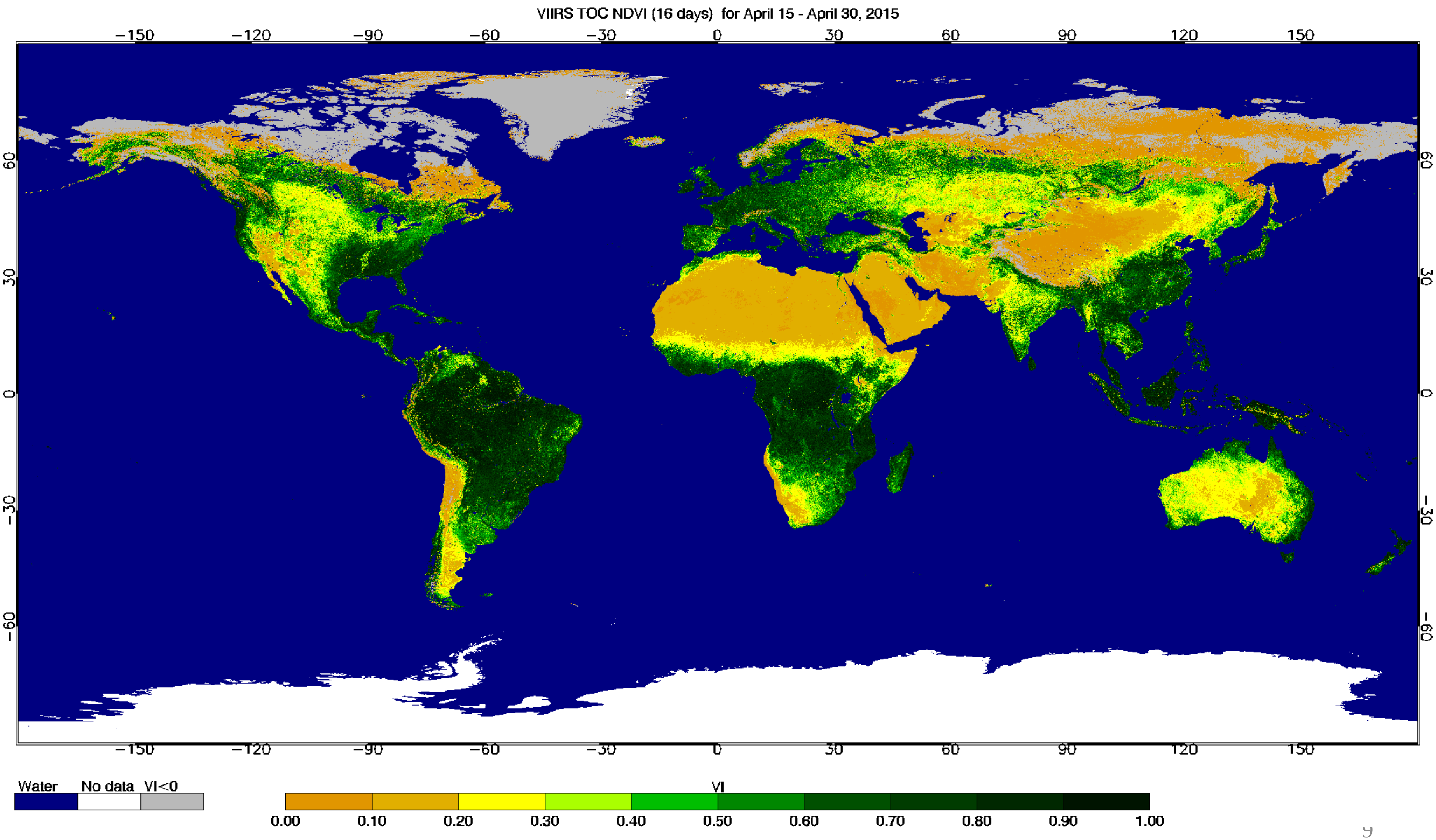




5 VIIRS VIVIO Granules

timestamp d20150810_t1844472
timestamp d20150810_t1846126
timestamp d20150810_t1847380
timestamp d20150810_t1849034
timestamp d20150810_t1850288

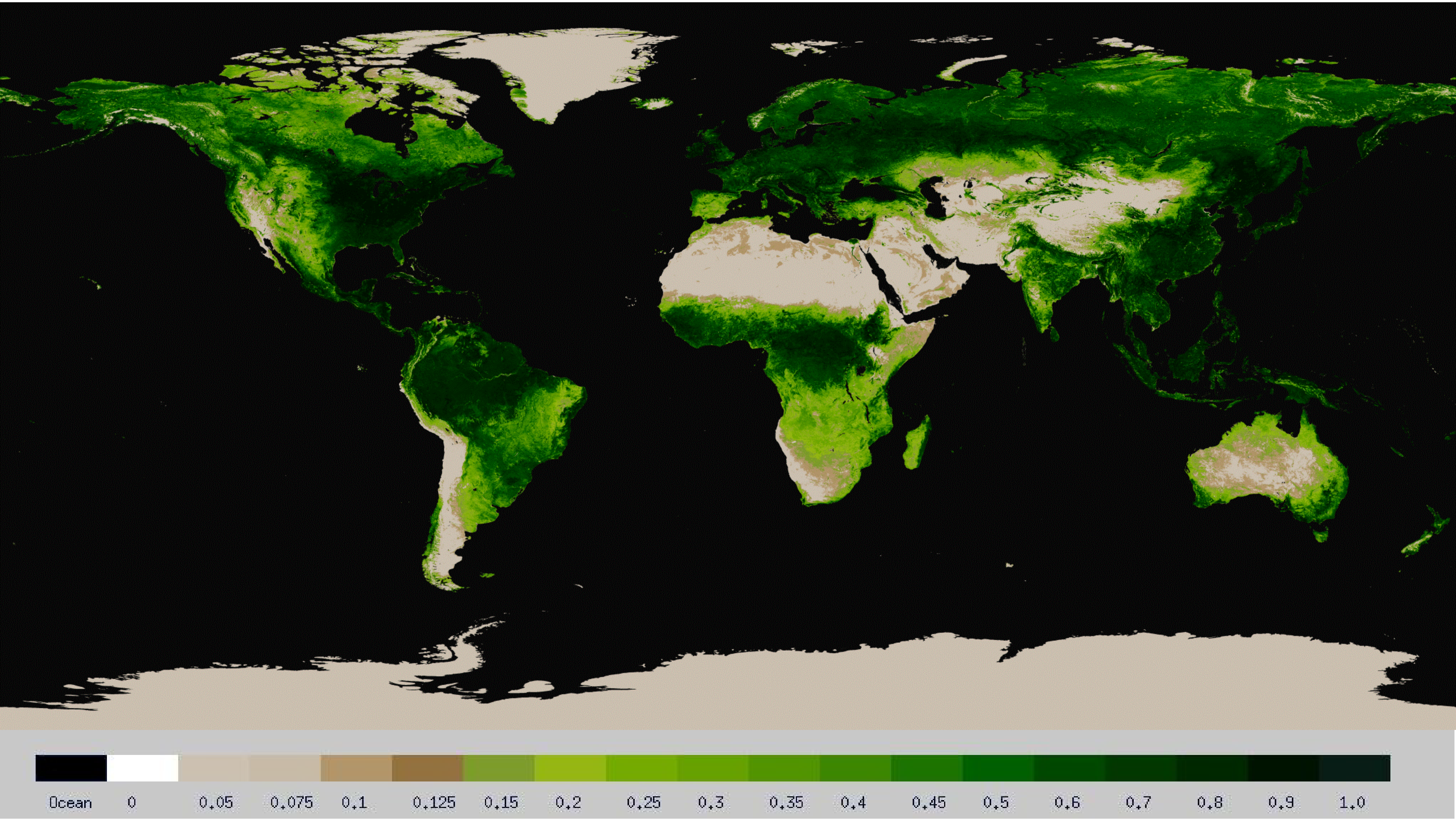
TOC-NDVI
16-day composite



SNPP VIIRS Green Vegetation Fraction

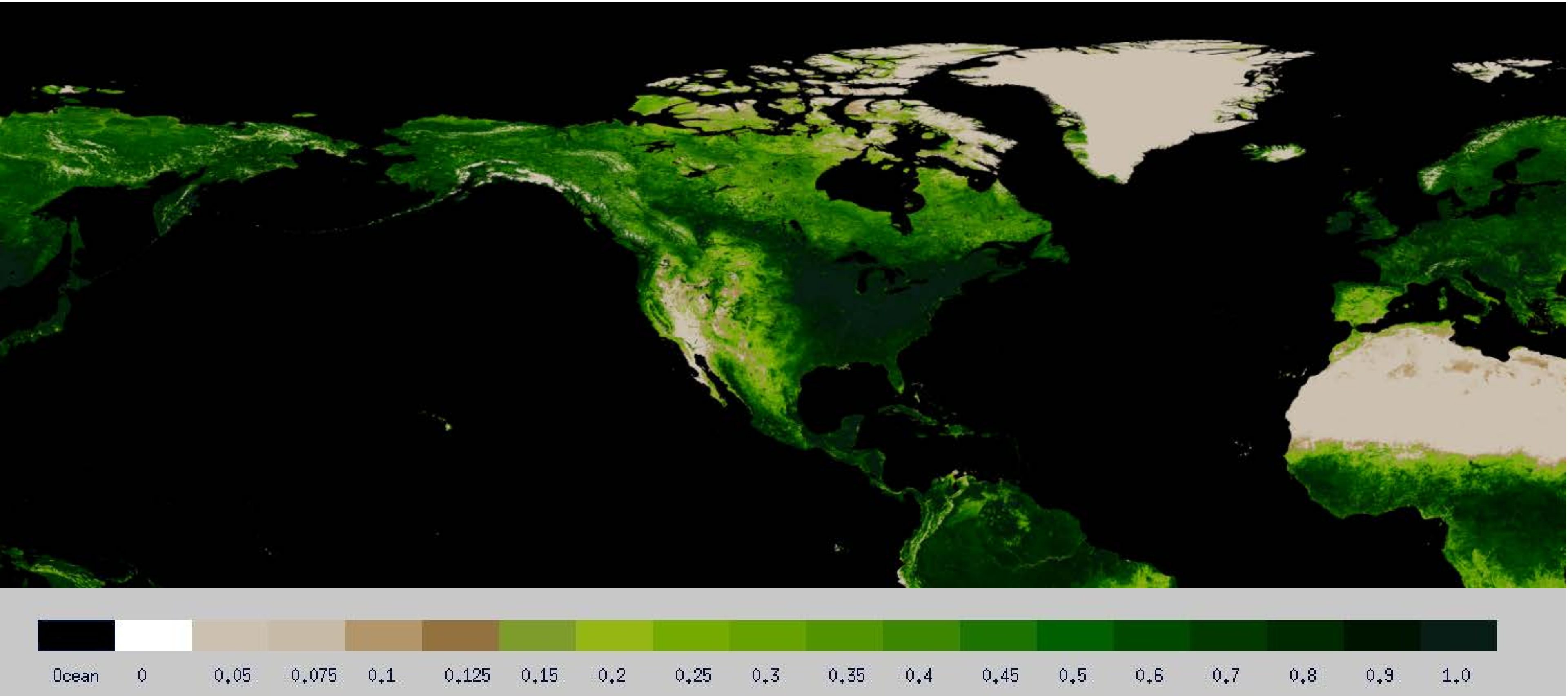
- The SNPP VIIRS GVF consists of two products:
  - Daily Rolling Weekly 4-km GVF on a global grid
  - Daily Rolling Weekly 1-km GVF regional
- SNPP VIIRS GVF products are derived from VIIRS surface reflectance data (Bands I1, I2 and M3)
- Surface reflectance data are gridded, composited and used for calculating the Enhanced Vegetation Index (EVI)
- GVF is derived from EVI

SNPP VIIRS GVF
Global (4km res)



4km resolution weekly global GVF (August 10-16, 2015)

SNPP VIIRS GVF
Regional Product (1km res)



1km resolution weekly regional GVF (August 7-13, 2015). Coverage Lat 90°N - 7.5°S, Lon 130°E - 30°E

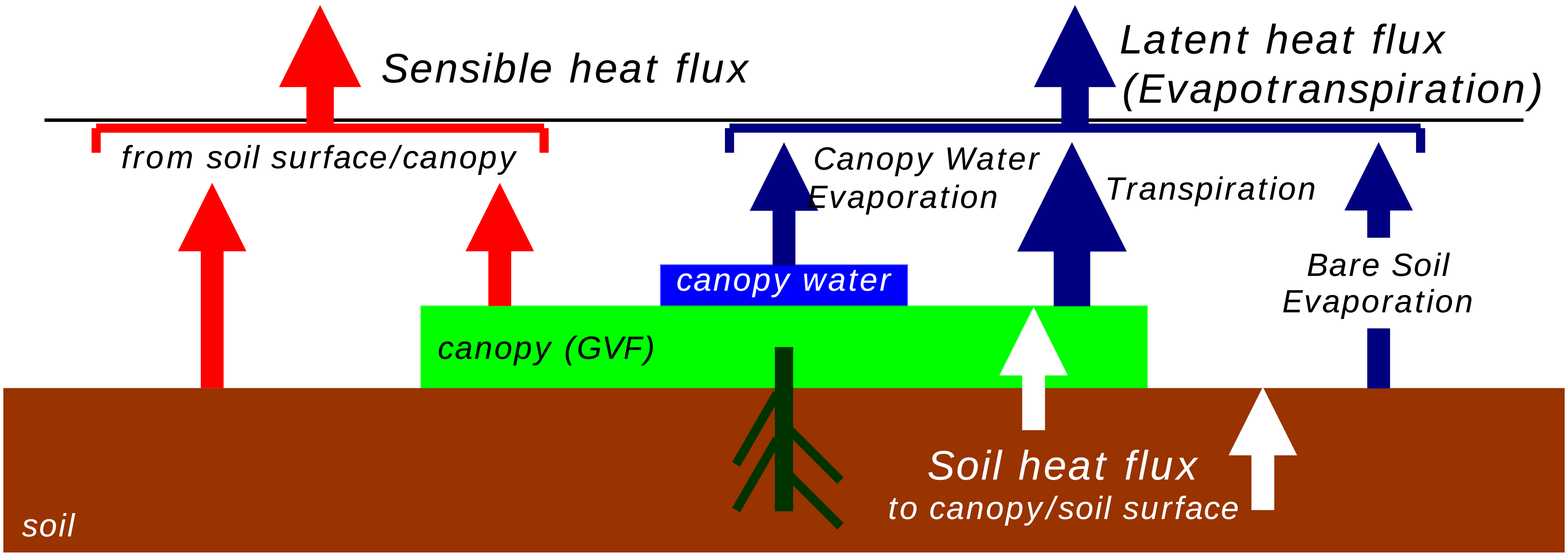
GVF: Recent Accomplishments

- Delivered SNPP VIIRS GVF LINUX DAP to NDE (May 2014)
- Supported the NDE IPT team to during the integration, testing and pre-operational phase of the GVF system
- Briefed the VIIRS GVF product at the monthly SPSRB meeting for an operational decision in Sep, 2014
- The GVF product became operational within the Suomi NPP Data Exploitation (NDE) production facility in February 2015
- Started collaboration with NWS/NCEP to demonstrate that using the VIIRS GVF operational product instead of the AVHRR climatology will improve the performance of NOAA's environmental prediction suite

The “Science”: Surface Fluxes

$$H = \rho c_p C_h U (T_{sfc} - T_{air})$$

$$LE = LE_c + LE_t + LE_d$$



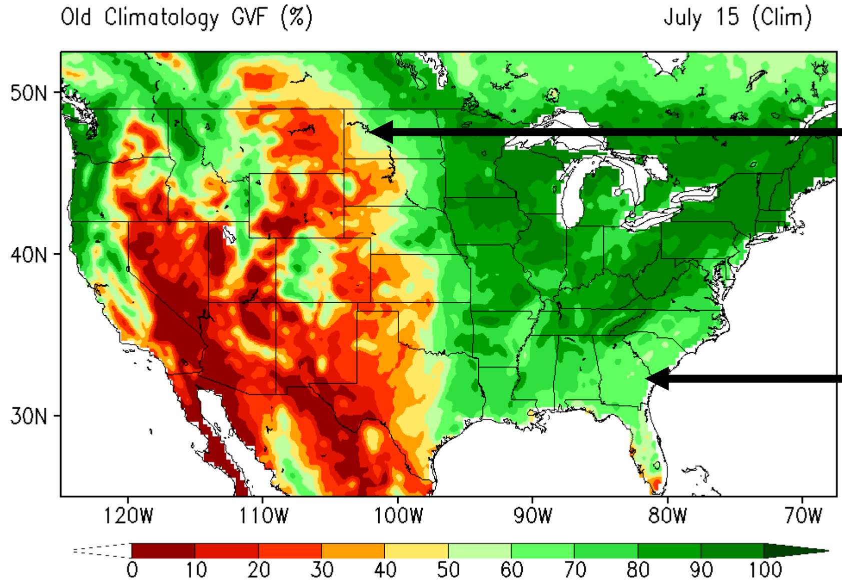
$$G = \left(\frac{K_T}{\Delta z}\right)(T_{sfc} - T_{soil})$$

$$R_n = H + LE + G$$

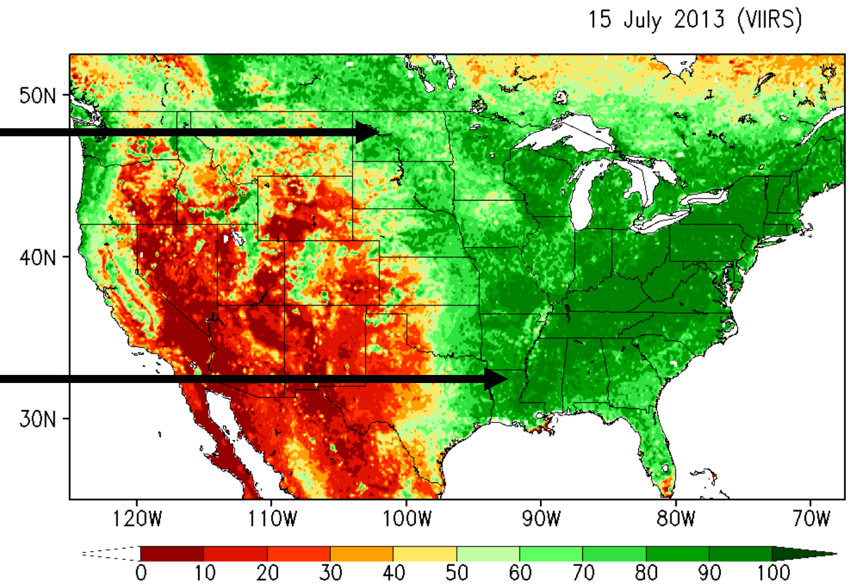
- **Surface fluxes balanced by net radiation (Rn), = sum of incoming and outgoing solar and terrestrial radiation, where GVF is important for energy partition between H, LE and G, i.e. surface roughness & near-surface turbulence (H), vegetation processes (LE), and heat transport through canopy (G), affecting evolving boundary-layer, clouds/convection, and precipitation.**

NOAA NESDIS VIIRS Green Vegetation Fraction

AVHRR Climatology (16km)

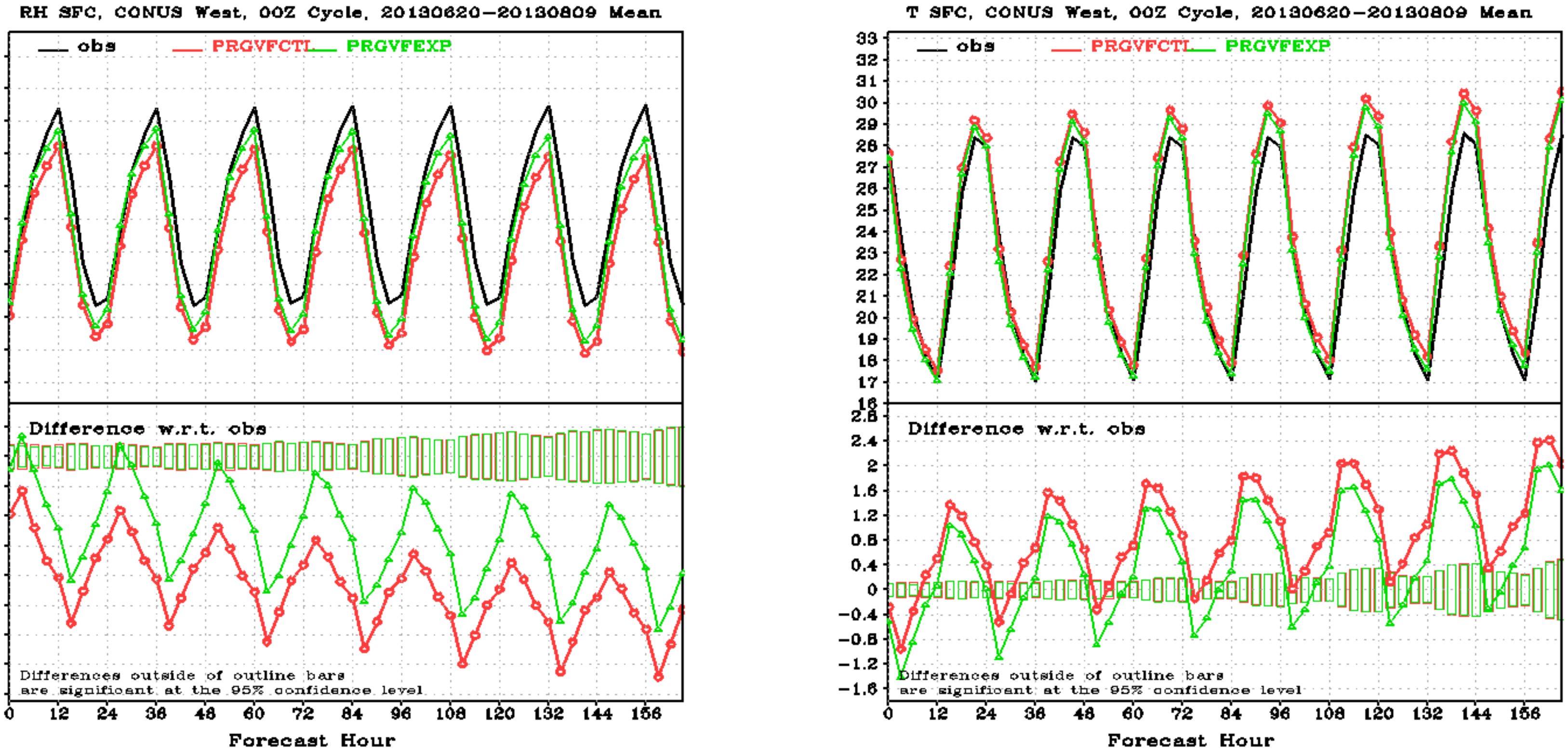


VIIRS weekly composite (4km)



Weekly GVF composites updated daily are being generated for use by the NOAA National Weather Service (NWS) National Centers for Environmental Prediction (NCEP). Early sensitivity studies have shown a reduction of errors of temperature, humidity and wind speed forecasts, and an improvement of precipitation scores in Global Forecasting System (GFS) performance, compared to the use of the heritage AVHRR-based climatology.

GVF impact studies: Summer 2013 example



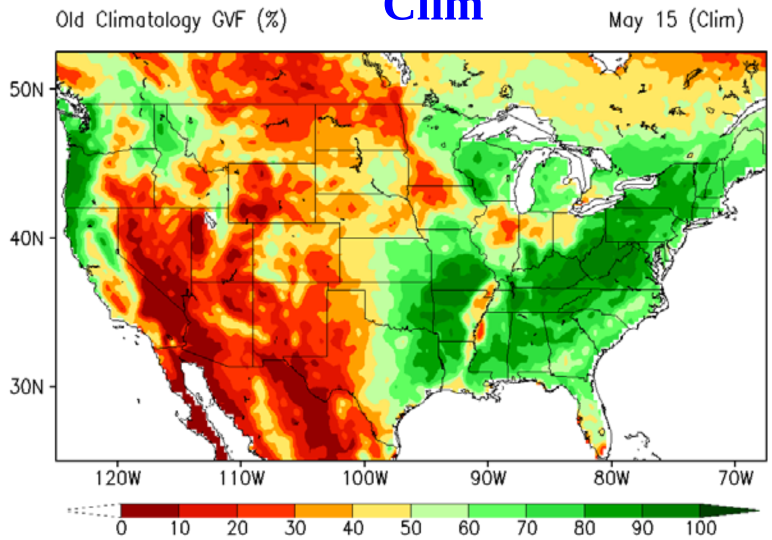
Surface relative humidity (left) and air temperature (right) GFS model runs for the Western CONUS for June 20 – August 9 2013. Black: observed; red: control run using AVHRR climatology; green: experimental run using VIIRS near-real-time data.

GVF anomalies: Spring 2014

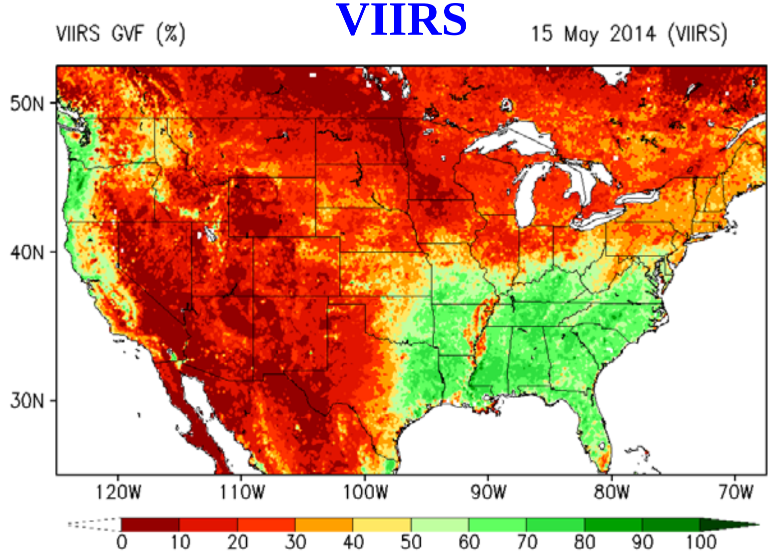
15 May 2014

Drought in Spring

Clim



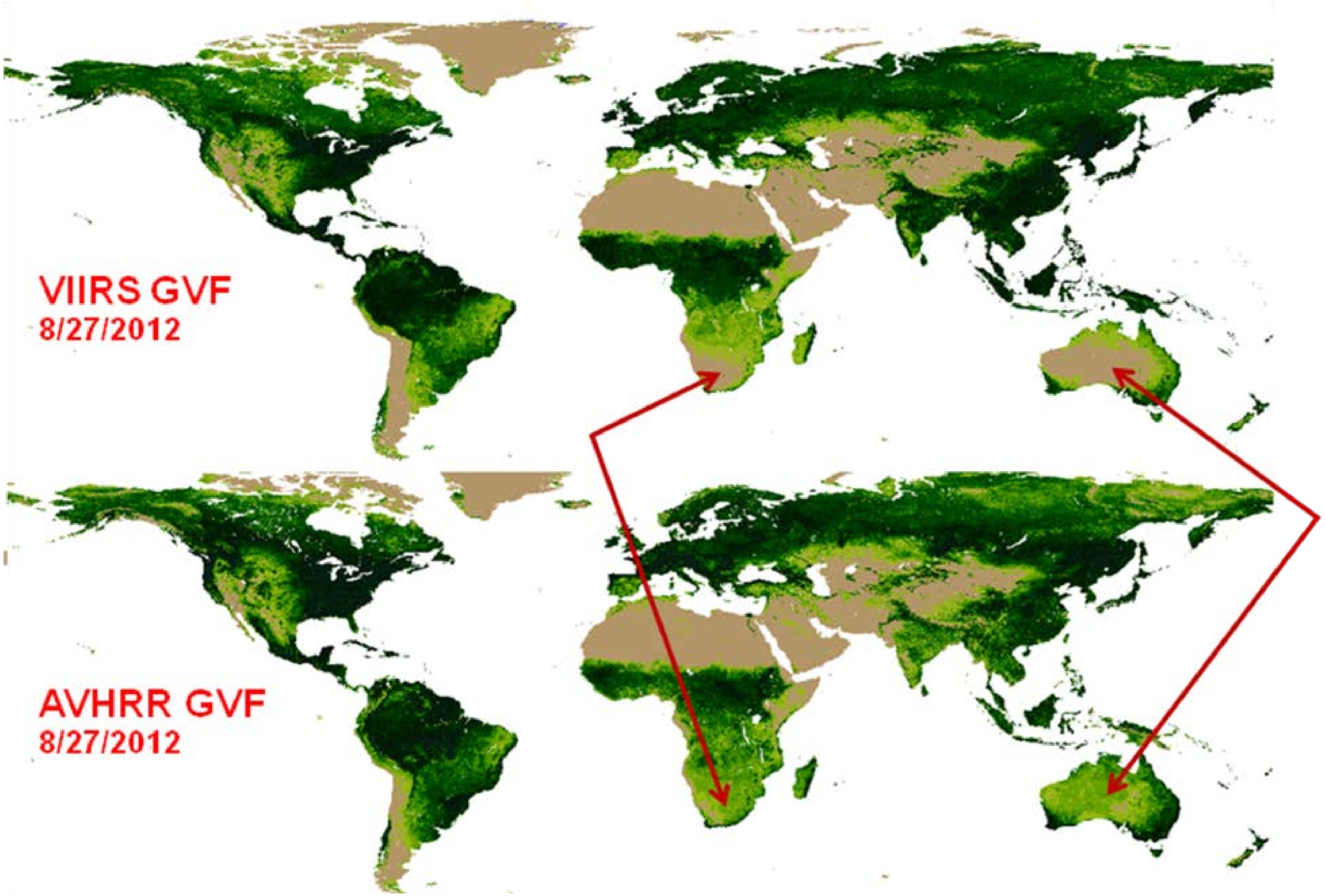
VIIRS



There is a critical need for establishing relationship between VIIRS and heritage AVHRR GVF for the characterization of anomalies.

VIIRS vs. AVHRR GVF

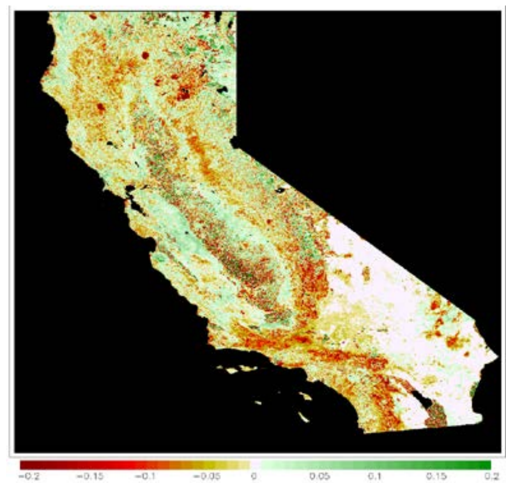
differences need to be understood and characterized to ensure continuity and incremental improvements



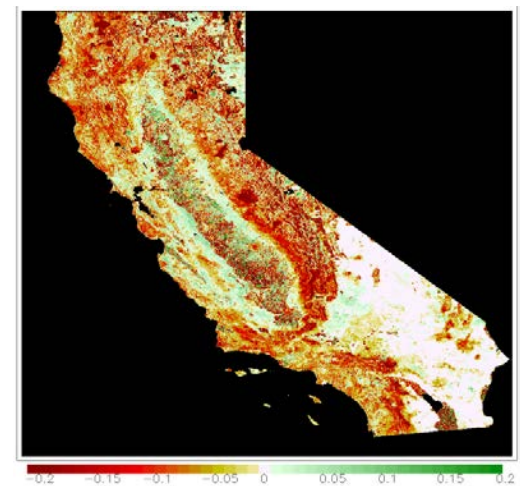
Monitoring Drought in California With SNPP VIIRS GVF

- California has been experiencing a severe drought since 2012
- Drought conditions develop gradually and they are often not identifiable immediately
- VIIRS Green Vegetation Fraction (GVF) can easily monitor changes in vegetation density

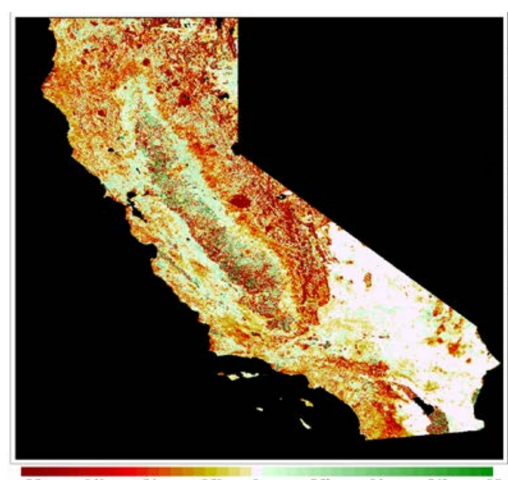
2013-08-15 minus 2012-08-15



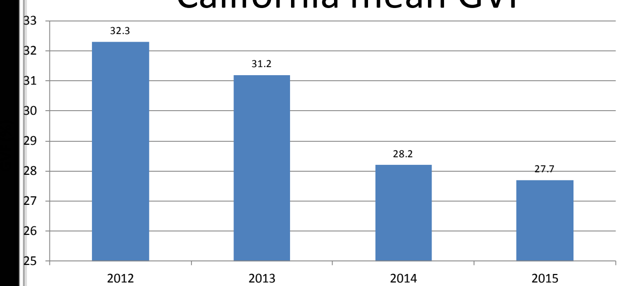
2015-08-15 minus 2012-08-15



2014-08-15 minus 2012-08-15



California mean GVF



California mean GVF in August decreased from 32.3% in 2012 to 27.7% in 2015

SNPP VIIRS GVF Validation

SNPP VIIRS GVF product Validation

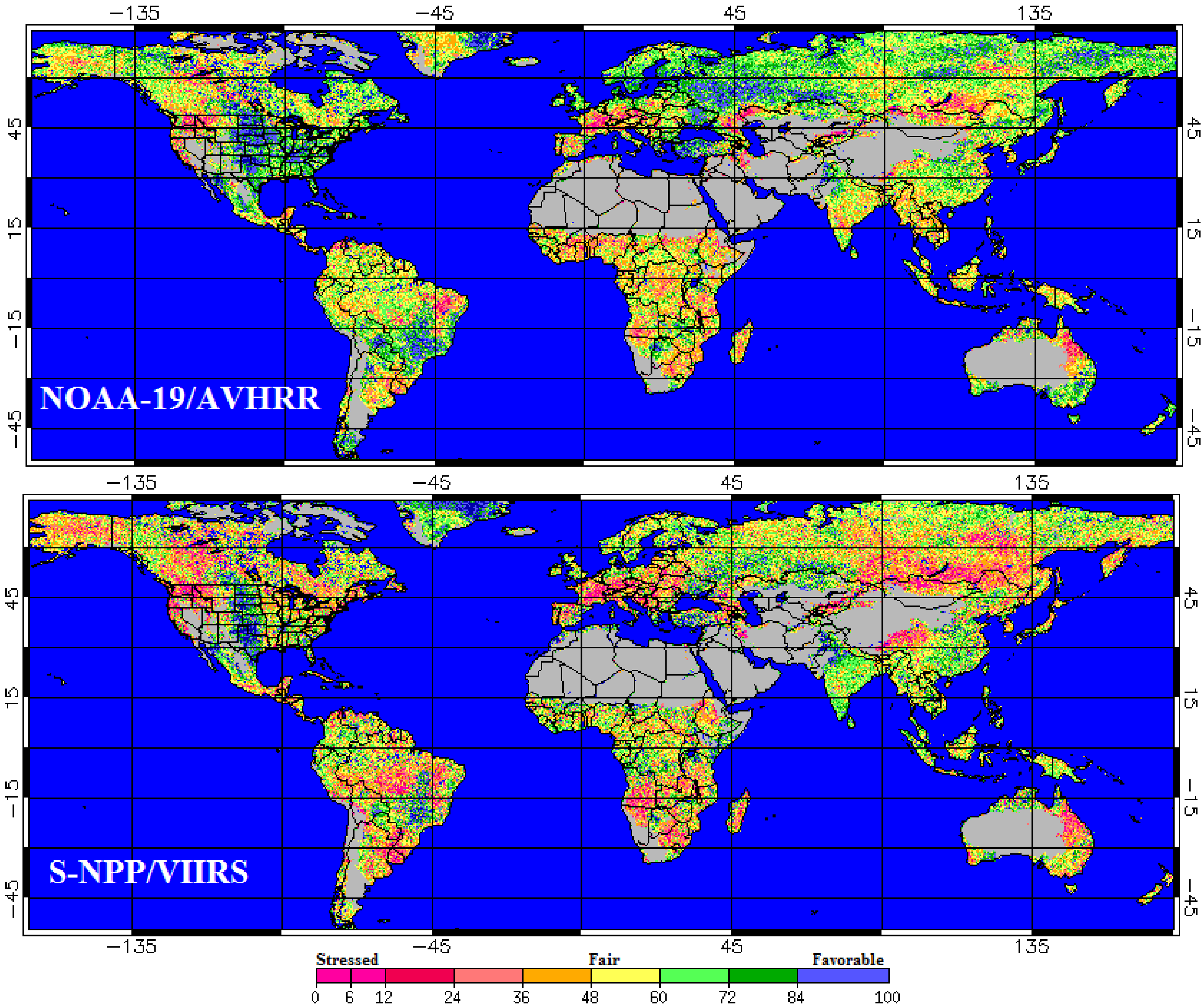
- GVF product maturity: Provisional
- The SNPP VIIRS GVF pre-operational product was shown to meet the threshold performance attributes identified in the JPSS Level 1 Requirements Supplement
- SNPP VIIRS GVF pre-operational product was validated against Landsat derived GVF, and compared with AVHRR derived GVF
- Time series stability monitoring

Attribute Analyzed	L1RD Threshold	VIIRS GVF
Measurement accuracy		
1. Global	12%	7.9%
2. Regional	12%	6.5%
Measurement precision		
1. Global	15%	10.9%
2. Regional	15%	12.6%
Measurement uncertainty		
1. Global	17%	13.4%
2. Regional	17%	14.2%

Vegetation Health product suite (VCI, TCI & VHI)

- Current operational: Applications
- (a) NOAA-19/AVHRR: 4 km, global (until the sensor deteriorate)
- (b) S-NPP/VIIRS: 4 km, global
- Future operational: Development
- (a) S-NPP/VIIRS: 1 km, global (2016-2017)
- (b) JPSS-1 & S-NPP/VIIRS: 0.5 km, global (after 2017)
- Cal/Val
- (a) S-NPP/VIIRS: 4 & 1 km, global – algorithm improvement
- (b) JPSS-1 & S-NPP/VIIRS validation
- (c) New indices
- Development of new products
- **Short term**: Vegetation health, Drought features, Moisture condition/stress, Thermal condition/stress, Malaria, Fire risk, Soil saturation, Growing season, Ecosystem productivity;
- **Long term:** Land cover change, Environmental condition change; Climate warming, Climate forcing, Ocean forcing

Vegetation health (VHI)



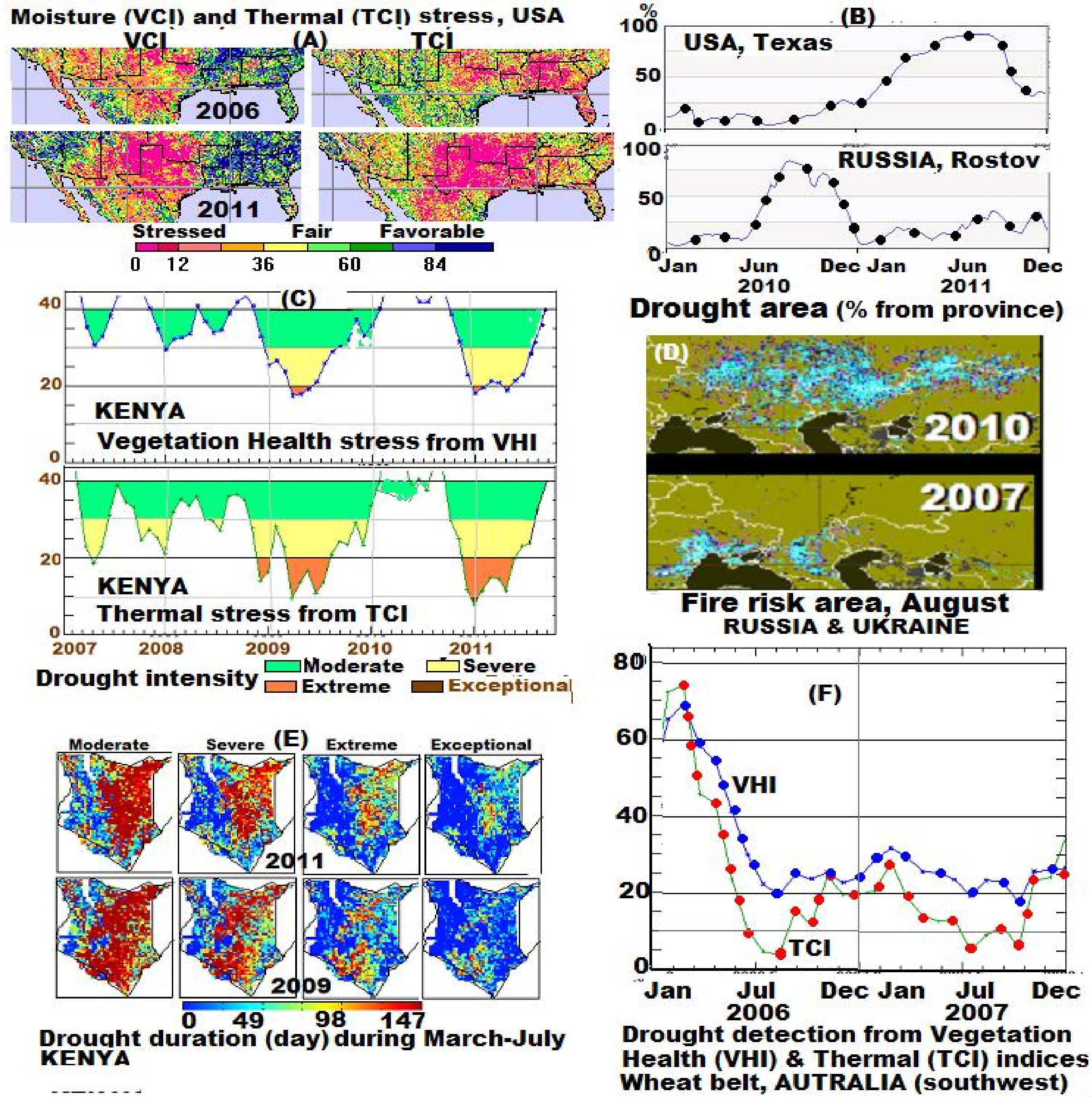
VEGETATION HEALTH, August 6, 2015

VH Applications

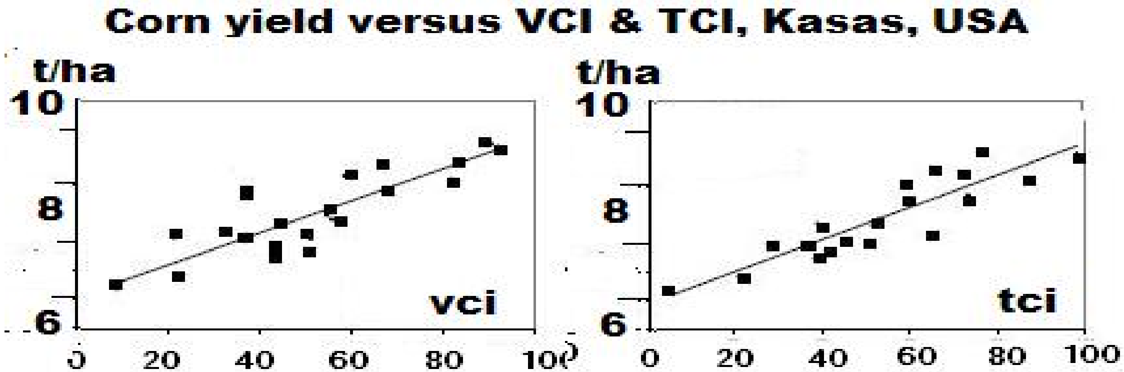
http://www.orbit.nesdis.noaa.gov/smcd/emb/vci

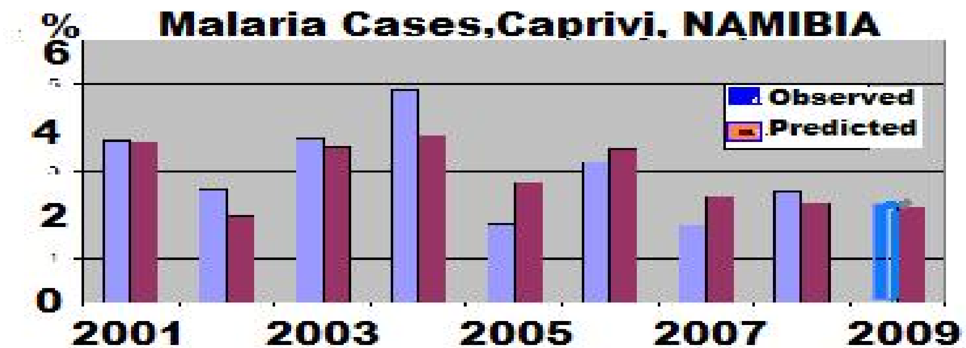
APPLICATIONS

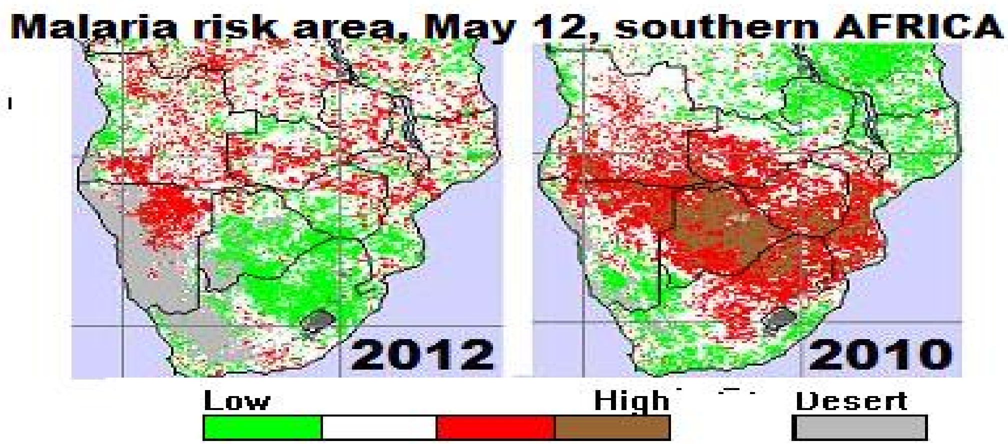
(A) Moisture & Thermal stress
(B) Drought area
(C) Intensity of vegetation stress
(D) Fire risk
(E) Drought duration
(F) Drought detection/prediction



VH Applications







APPLICATIONS

Crop/Pasture Production

Malaria:

Number of affected people

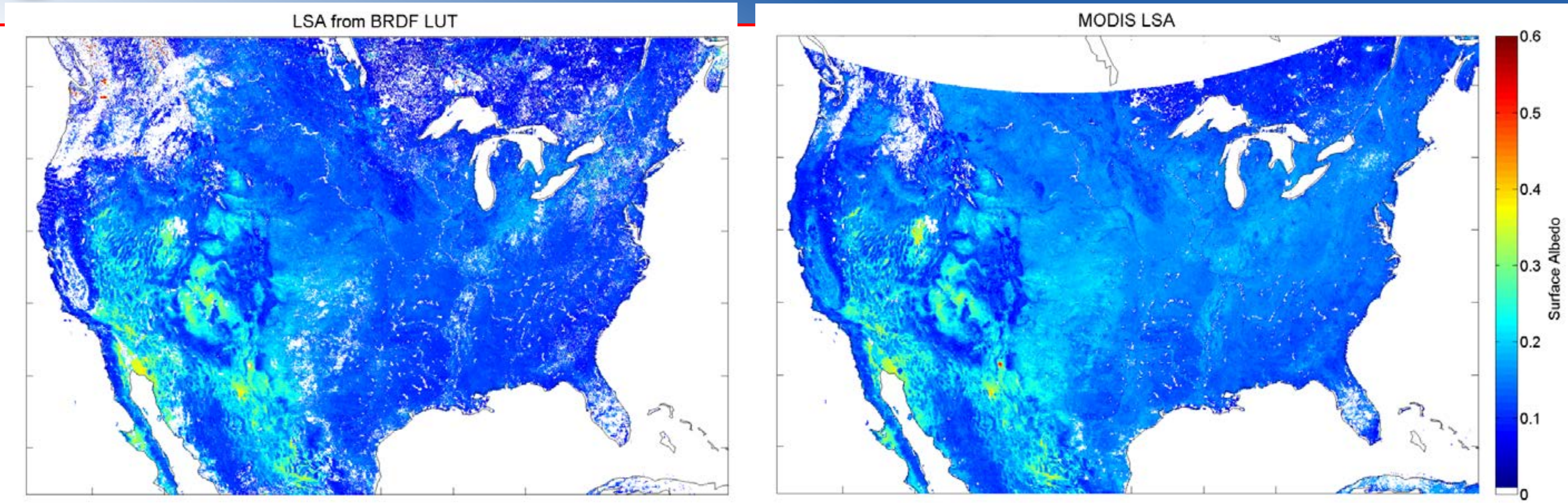
Affected area

Intensity

Status of VIIRS surface albedo EDR

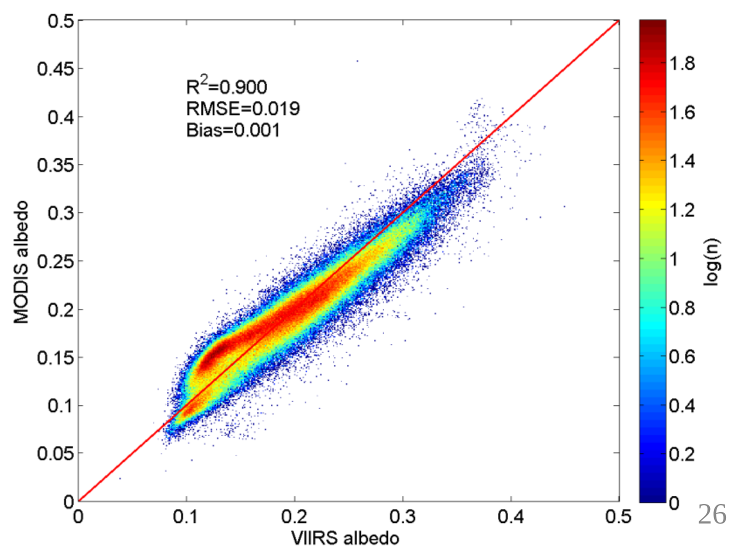
- Surface albedo (SA) EDR consists of land surface albedo (LSA), sea ice surface albedo and ocean surface albedo.
- A direct estimation method (BPSA) is developed to retrieve LSA from VIIRS clear-sky TOA reflectance data.
- The beta release was effective on 6/25/13 and the provisional release of LSA was effective on 4/17/14.
- The maturity of Validated Stage 1 was achieved on 11/28/14.
- Validation results suggest the VIIRS direct estimation approach can generate albedo retrievals with accuracy similar (or superior) to existing products.
- Surface albedo EDR is a full resolution ***granule instantaneous*** product. LSA is only generated for ***clear-sky*** pixels.
- We propose to develop a new high-level daily gridded LSA product with data gaps filled.

Inter-comparison with MODIS albedo



Contiguous US maps of 16-day mean LSA from VIIRS and MODIS, during DOY 145-160, 2012

Comparing 16-day mean VIIRS albedo from BRDF LUT with MODIS blue-sky albedo. Data are limited to those with at least 8 clear-day observations during the composite period of 16 days.



LST Product Status

- **Provisional Review – May 2014**
- **Validated V1 review – December, 2014**

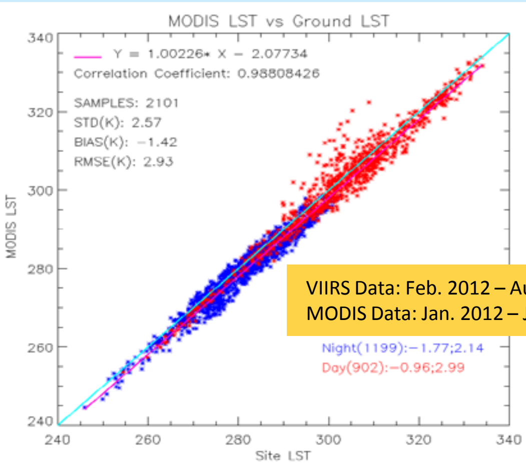
Attribute Analyzed	L1RD Threshold	Validation Result	Description
In-situ Validation	1.4K (2.5K)	**-0.37 (2.35)**	Results are based on the VIIRS data over SURFRAD sites for over 2.5 years . The error budget estimation is limited by ground data quality control, cloud filtering procedure and upstream data error.
R-based Validation	1.4K (2.5K)	0.47(1.12)	A forward radiative transfer model is used, over 9 regions in globe, representing all 17-IGBP types over the seasons. The error budget estimation is limited by profile quality, cloud screening procedure and sampling procedure.
Cross satellite Comparison		0.59(1.93): daytime 0.99(2.02): nighttime	The results are based on comparisons to MODIS LST, over 100 scenes, over low latitude, polar area and CONUSThe error budget estimation is limited by the spatial and temporal difference, sensor difference, angle difference etc.

Validation summaries of the LST EDR are shown in Table (**right**); validated 1 maturity approval in Dec. 2014. Marginally meet the requirement with limited "in-situ" data

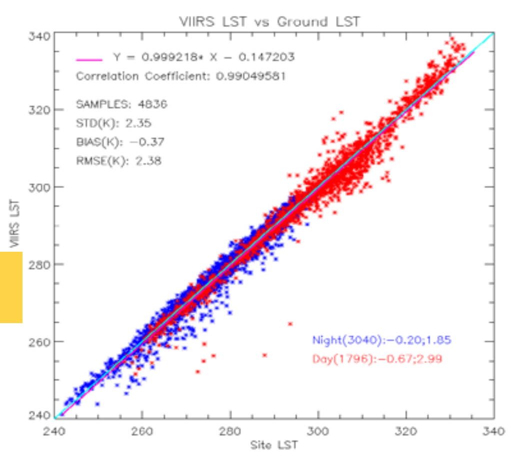
Validation details of the VIIRS LST comparisons against the SURFRAD station data are shown in the plots (**bottom-left**) and in the tables (**bottom-middle, bottom-right**).

U.S. SURFRAD stations

Season	Samples	Overall		Day		Night	
		Bias	STD	Bias	STD	Bias	STD
Spring	1297	-0.54	2.78	-0.69	3.82	-0.46	1.97
Summer	1403	-0.1	2.43	-0.87	3.68	0.26	1.39
Fall	1160	-0.28	1.9	-0.32	2.04	-0.24	1.79
Winter	976	-0.65	2.01	-0.83	1.65	-0.53	2.21

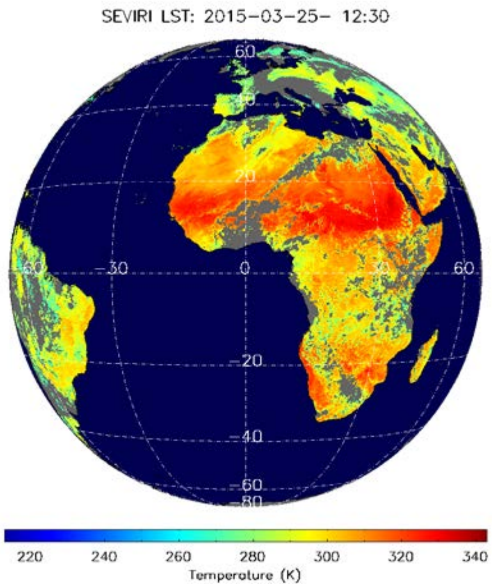


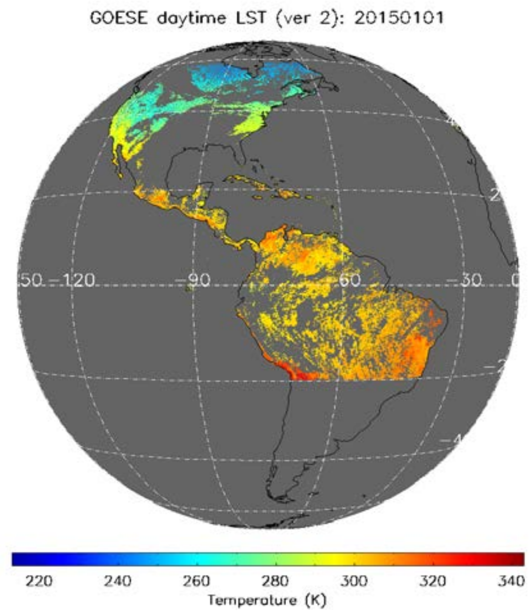
VIIRS Data: Feb. 2012 – Aug. 2014
MODIS Data: Jan. 2012 – Jul. 2013

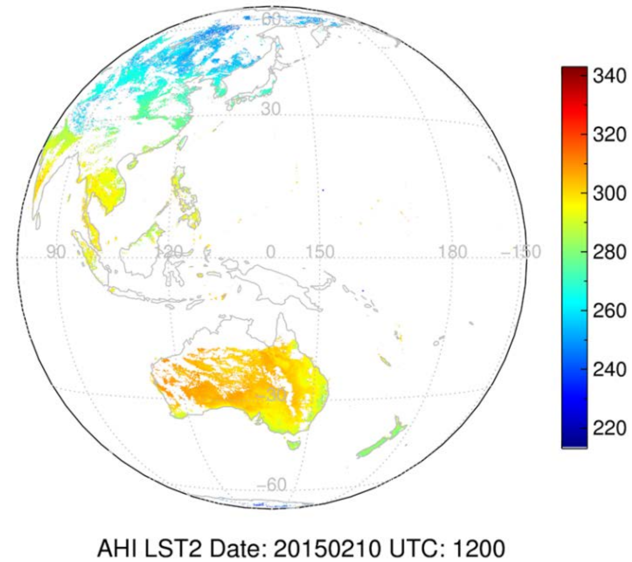


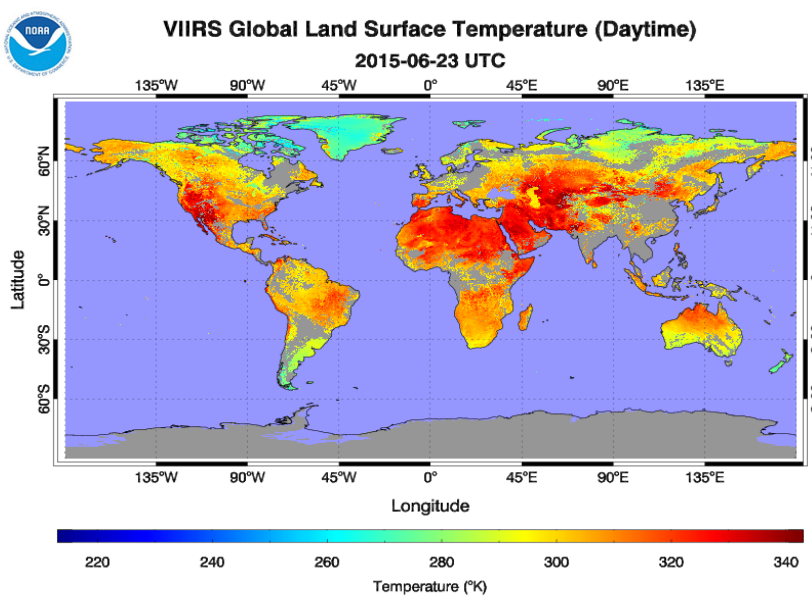
IGBP type	Samples	Overall		Day		Night	
		Bias	STD	Bias	STD	Bias	STD
4	18	-1.41	3.01	-1.82	2.66	-1.26	3.22
6	96	-0.98	1.41	-0.5	1.88	-1.32	0.84
7	955	-0.2	1.59	0.24	2.06	-0.61	0.79
8	286	0.19	2.56	-1.7	2.6	1.38	1.66
10	1048	-0.49	1.81	-0.85	2.3	-0.37	1.59
12	1238	-0.35	2.68	-0.63	3.8	-0.22	1.91
14	857	-0.28	2.54	-1.28	2.4	0.19	2.47
15*	189	-1.72	4.31	-1.72	4.31		
16	149	-0.23	1.55	0.87	1.67	-1.04	0.75

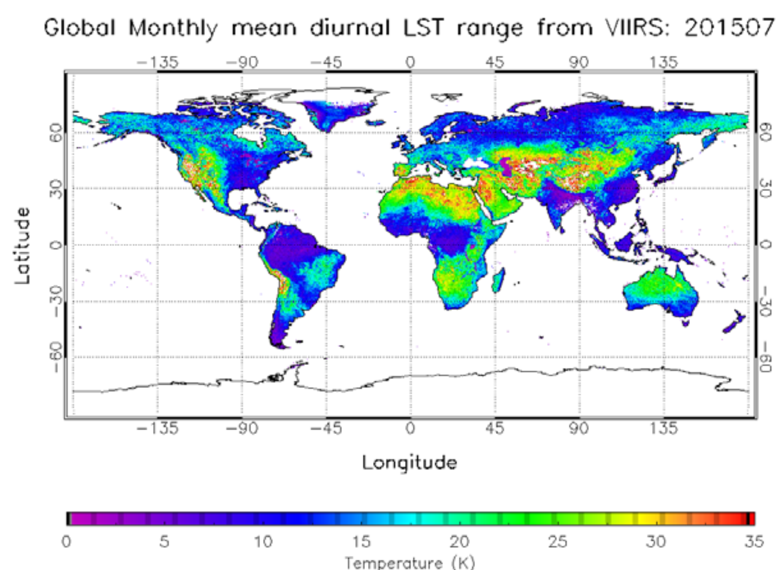
Monitoring -- LST images



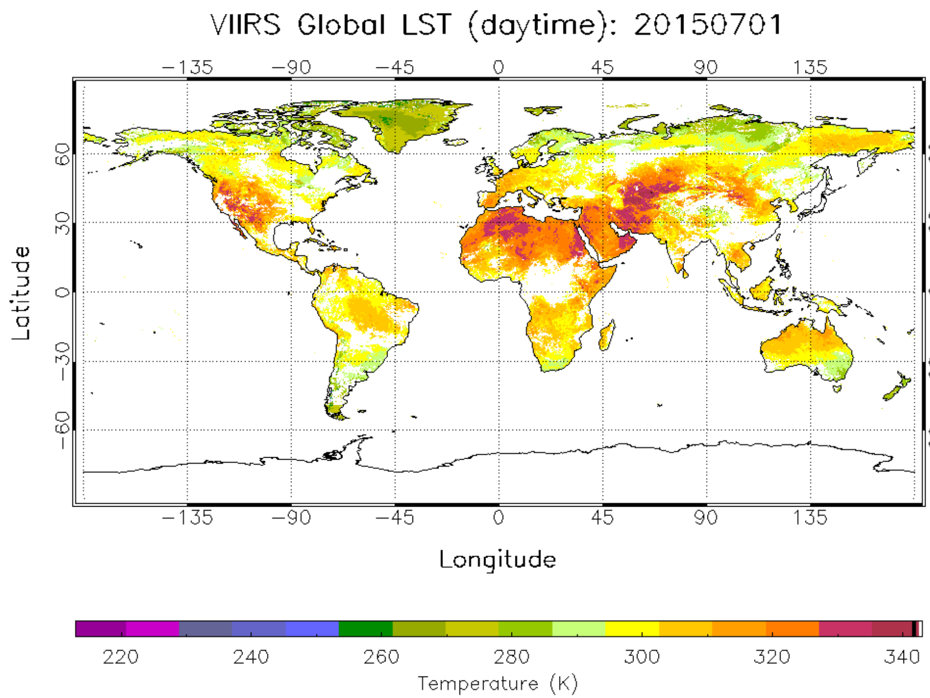


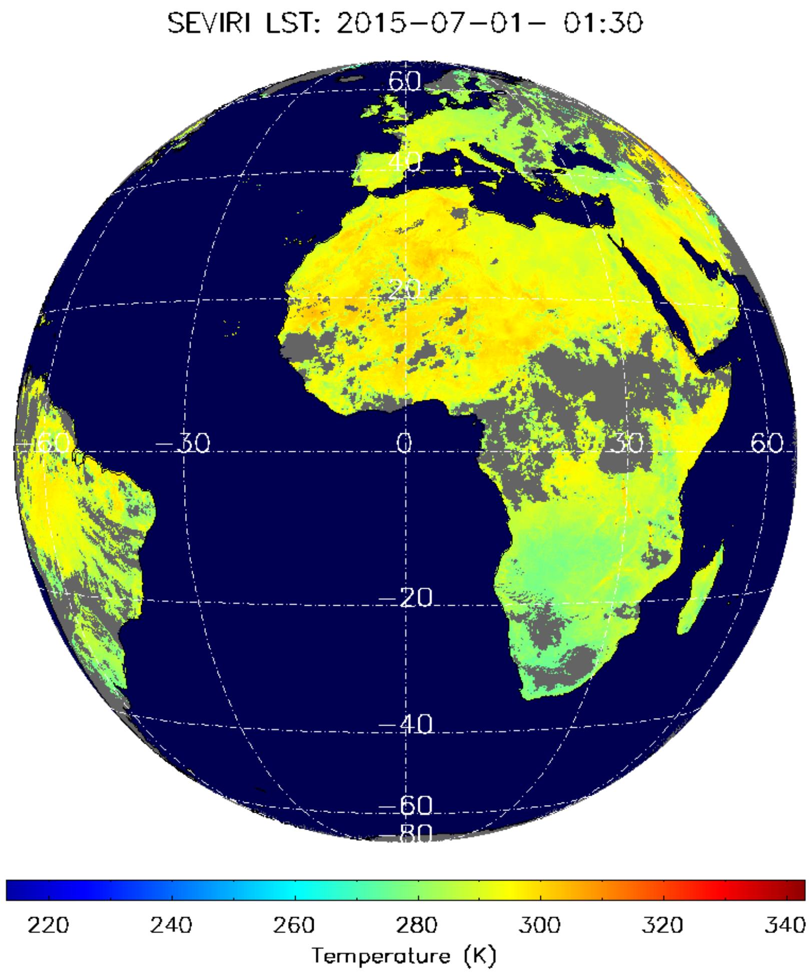


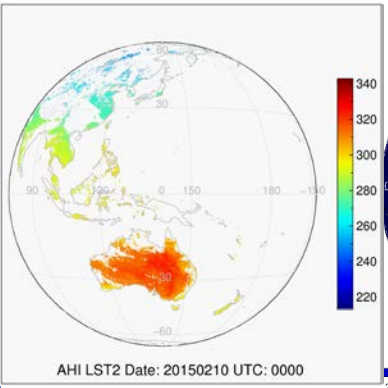


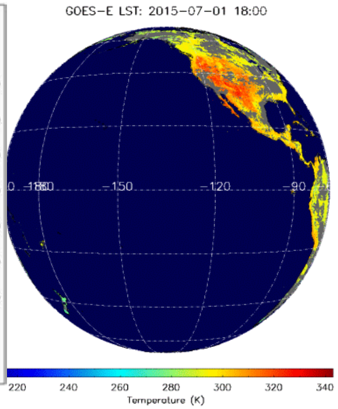


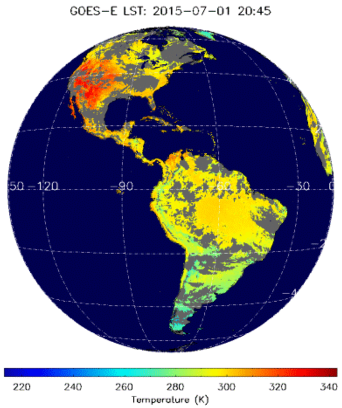
Monitoring -- Animation of Time Series



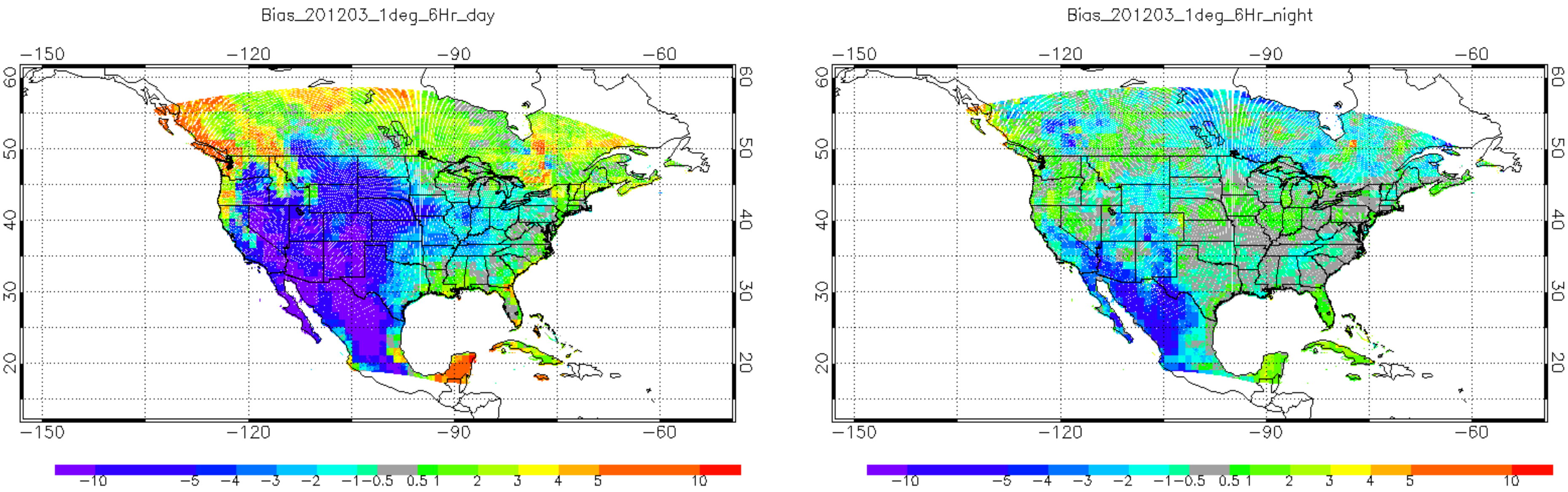








Observed vs. model LST



Distribution of monthly mean LST difference (NAM−VIIRS) between NAM hourly forecast (f00 cycle) and VIIRS LST in March 2012. Left; daytime; right: nighttime

NOAA Operational Fire product status

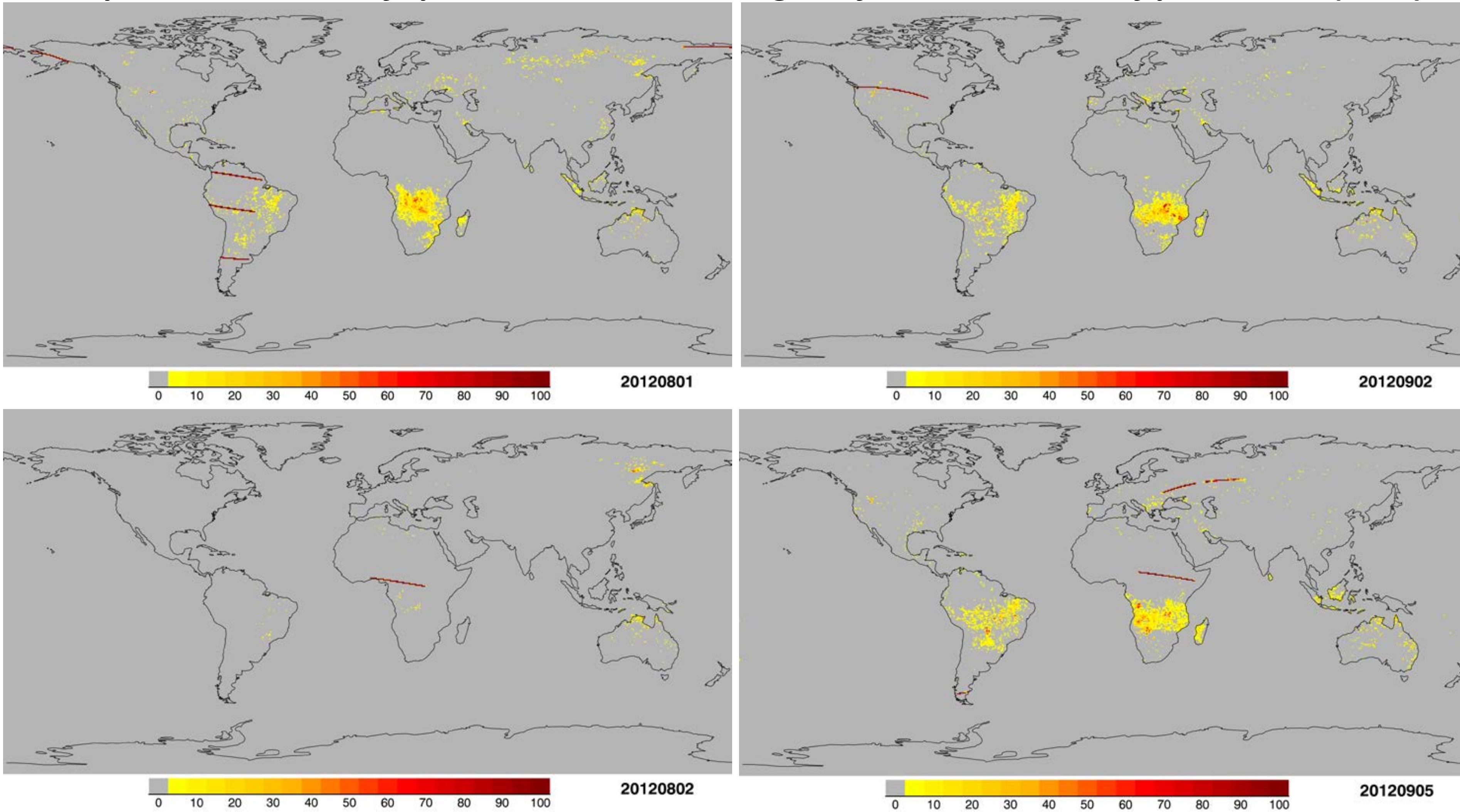
- <u>**Current 750m operational product**</u> in IDPS*
  - delivers a list of fire pixels
  - reached <u>**Validated 1 maturity status**</u> with an effectivity date (i.e. IDPS implementation) of <u>**August 13, 2014**</u>.
  - <u>**declared NOAA Operational**</u> product in September 2014
  - <u>**long-term monitoring**</u> and maintenance continues
- <u>**Upcoming 750 NOAA operational product**</u> in NDE**
  - the product is developed at UMD and is <u>**tailored subset of the NASA science product**</u> for real-time NOAA operations
  - <u>**global mask of thematic classes**</u> including water, cloud, non-fire clear land and fire at three confidence levels
  - <u>**fire radiative power**</u> for each fire-affected pixel
  - <u>**new algorithm elements**</u> to improve detection performance
- NOAA operational products are <u>**archived**</u> at NOAA CLASS***

****IDPS: Interface Data Processing Segment; **NDE: Suomi NPP Data Exploitation (NOAA operational ground data production systems)***

******Comprehensive Large Array-Data Stewardship System; www.class.noaa.gov***

Examples of early IDPS product

Frequent occurrence of spurious scanlines during the first ~10 months of production (Beta)



Examples of the operational real-time IDPS product as archived in NOAA CLASS.
Not reprocessed; not to be used for science analysis. Product history demonstration only.

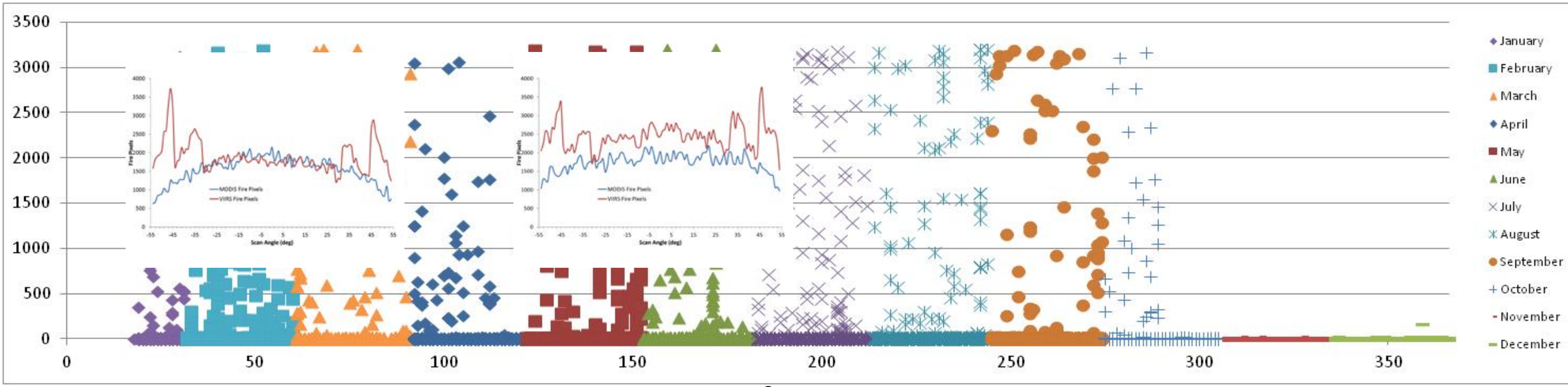
IDPS Suomi NPP Active Fire Product history: data anomalies and product maturity (2/1)

2012

April 3, 2012
IDPS Mx5.3

October 16, 2012
IDPS Mx6.3

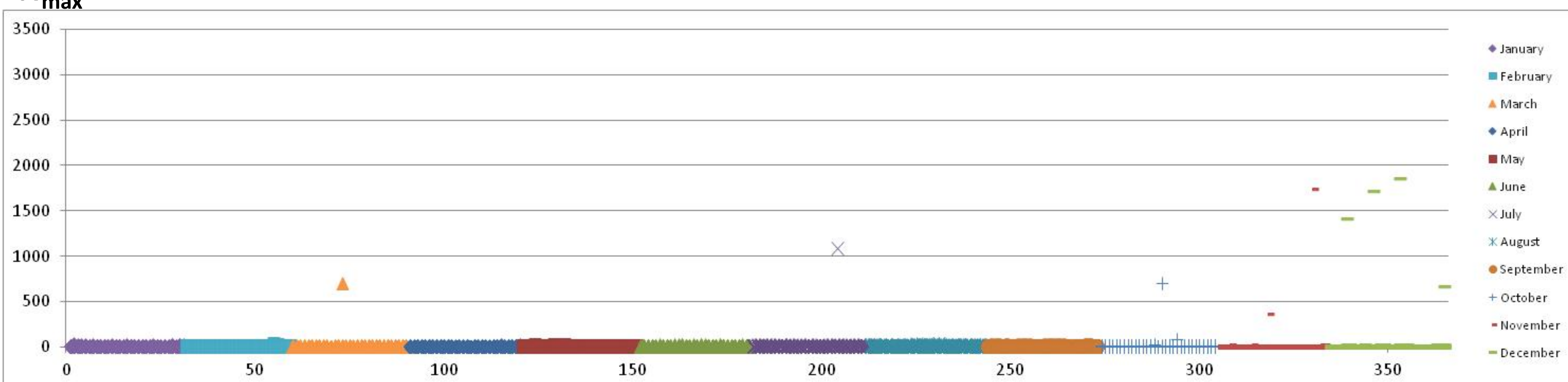
N_{max} ← *Pre-Beta* → ← *Beta* → ← *Provisional* →



Day of Year

2013

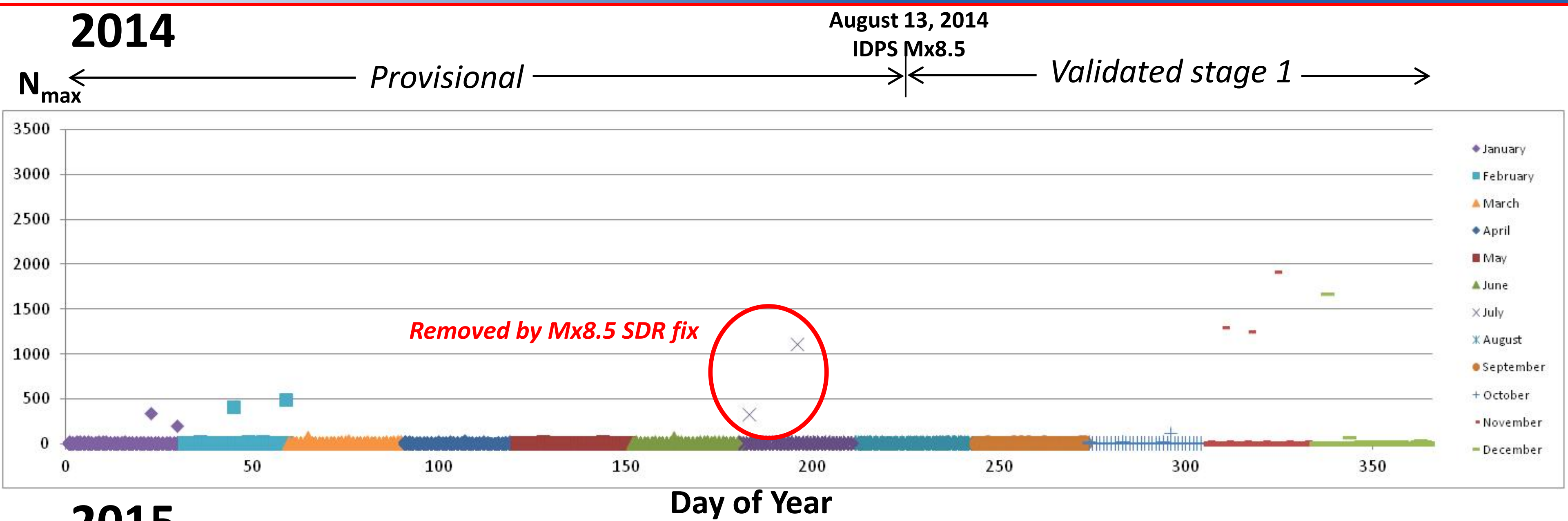
N_{max} ← *Provisional* →

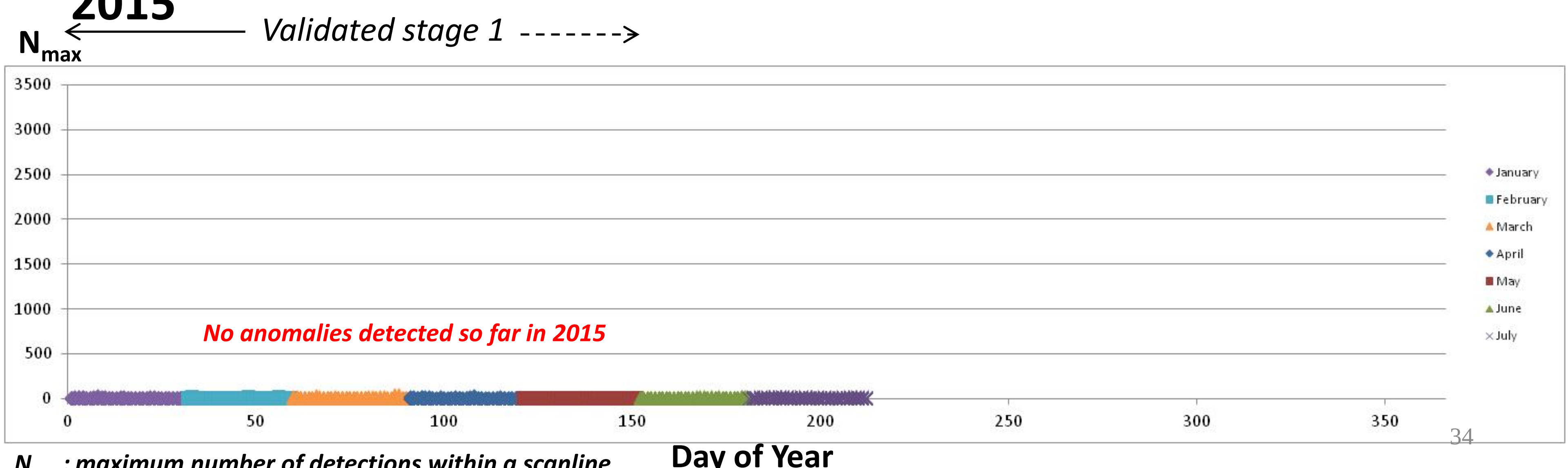


N_{max}: maximum number of detections within a scanline

Day of Year

IDPS Suomi NPP Active Fire Product history: data anomalies and product maturity (2/2)

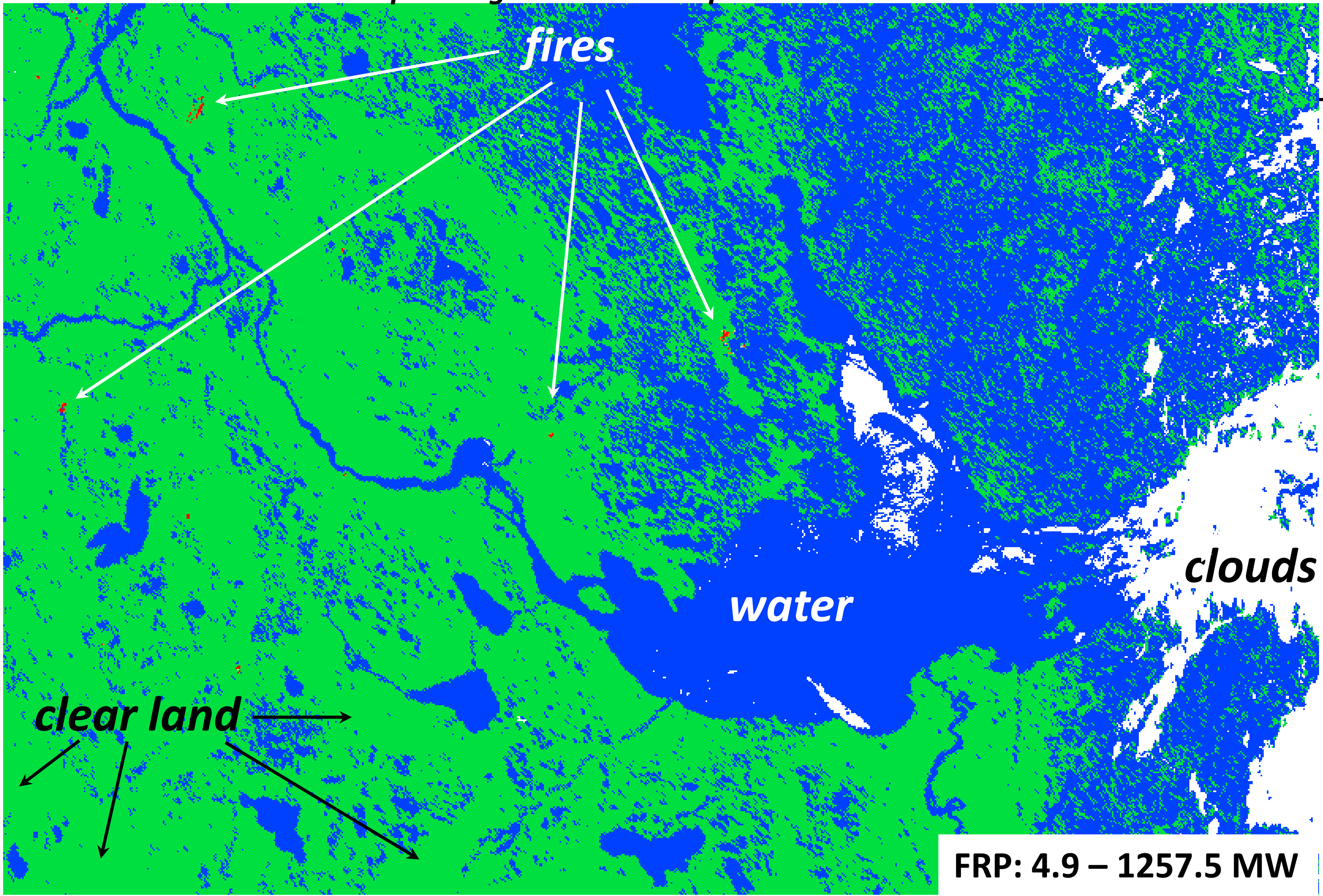




N_{max}: maximum number of detections within a scanline

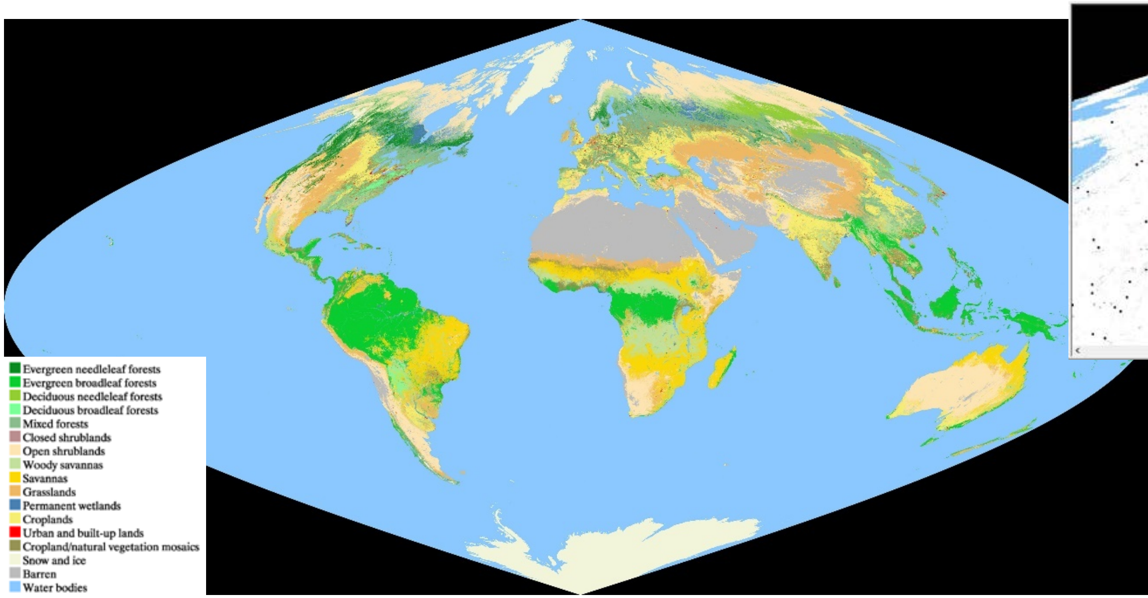
NOAA NDE VIIRS Active Fire Product

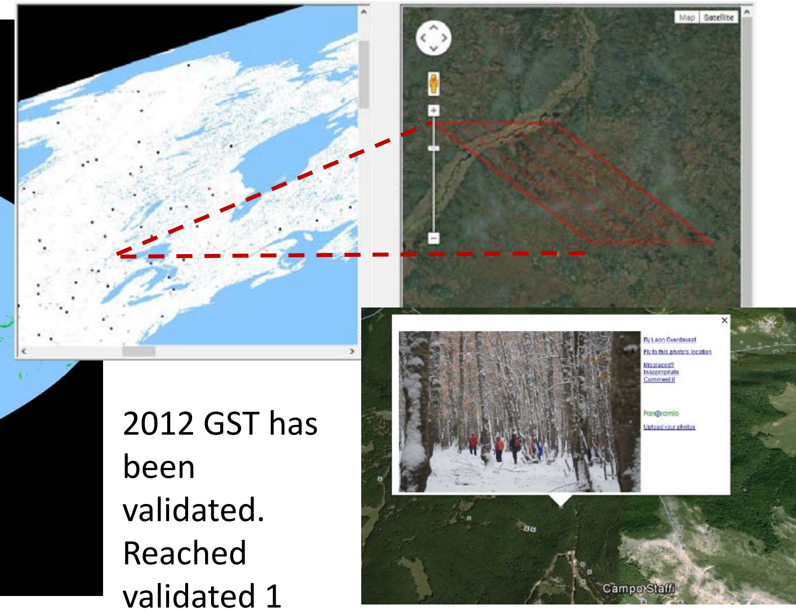
VIIRS fire mask generated at NOAA/NESDIS/STAR from IDPS input data. The NOAA Level-2 product is consistent with the corresponding NASA science product



VIIRS fire mask over NW Canada 5/29/2015 20:06 UTC (daytime)

Surface Type EDR Achievements

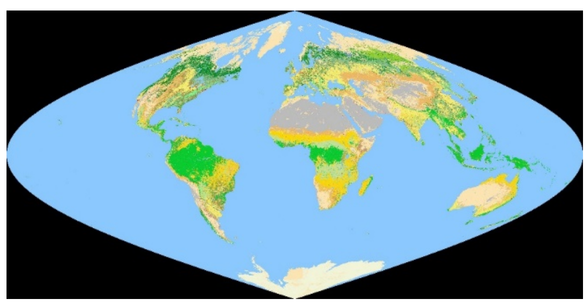




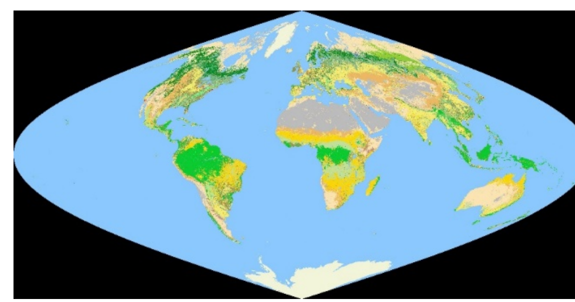
2012 GST has been validated. Reached validated 1 maturity

2012 Global gridded surface type classification map (GST) created using C5.0 decision tree. (shown on top)

2013 and 2014 GST are in production using the Support Vector Machines classification algorithm. (Preliminary results shown on right)

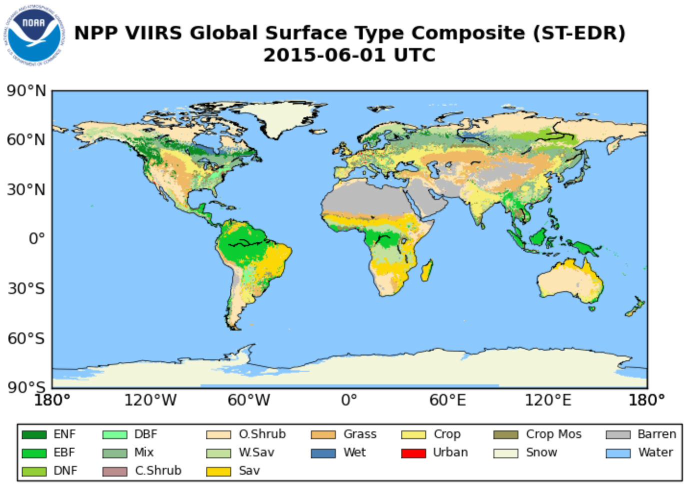


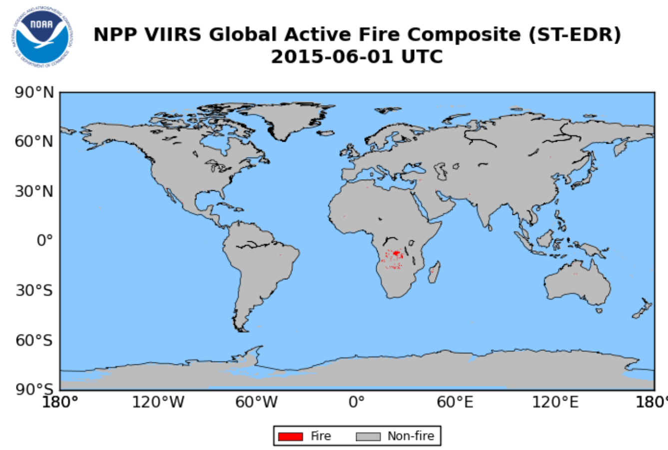
2013 GST

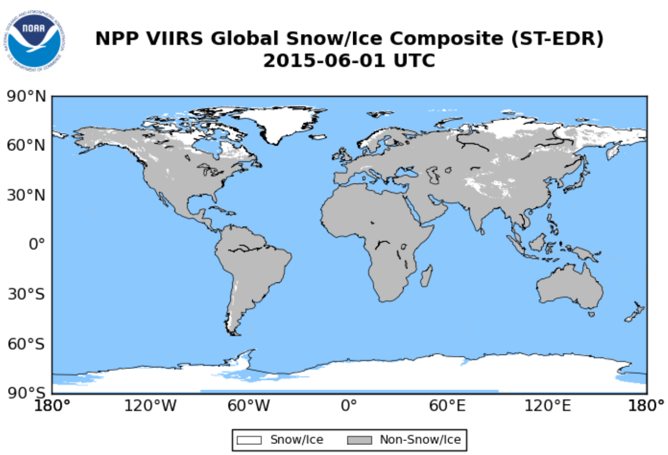


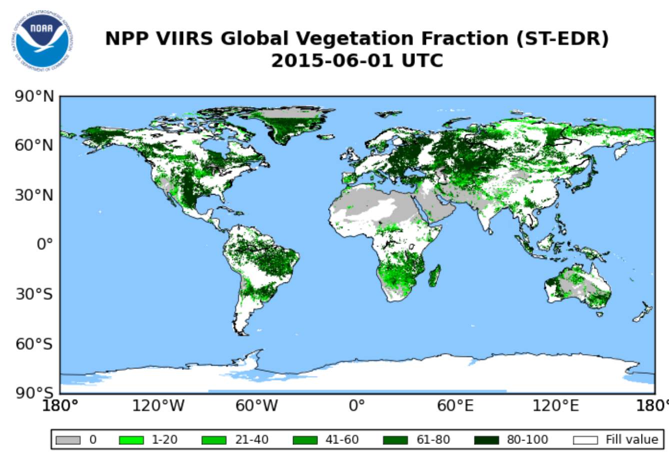
2014 GST

Surface Type EDR Achievements: LTM



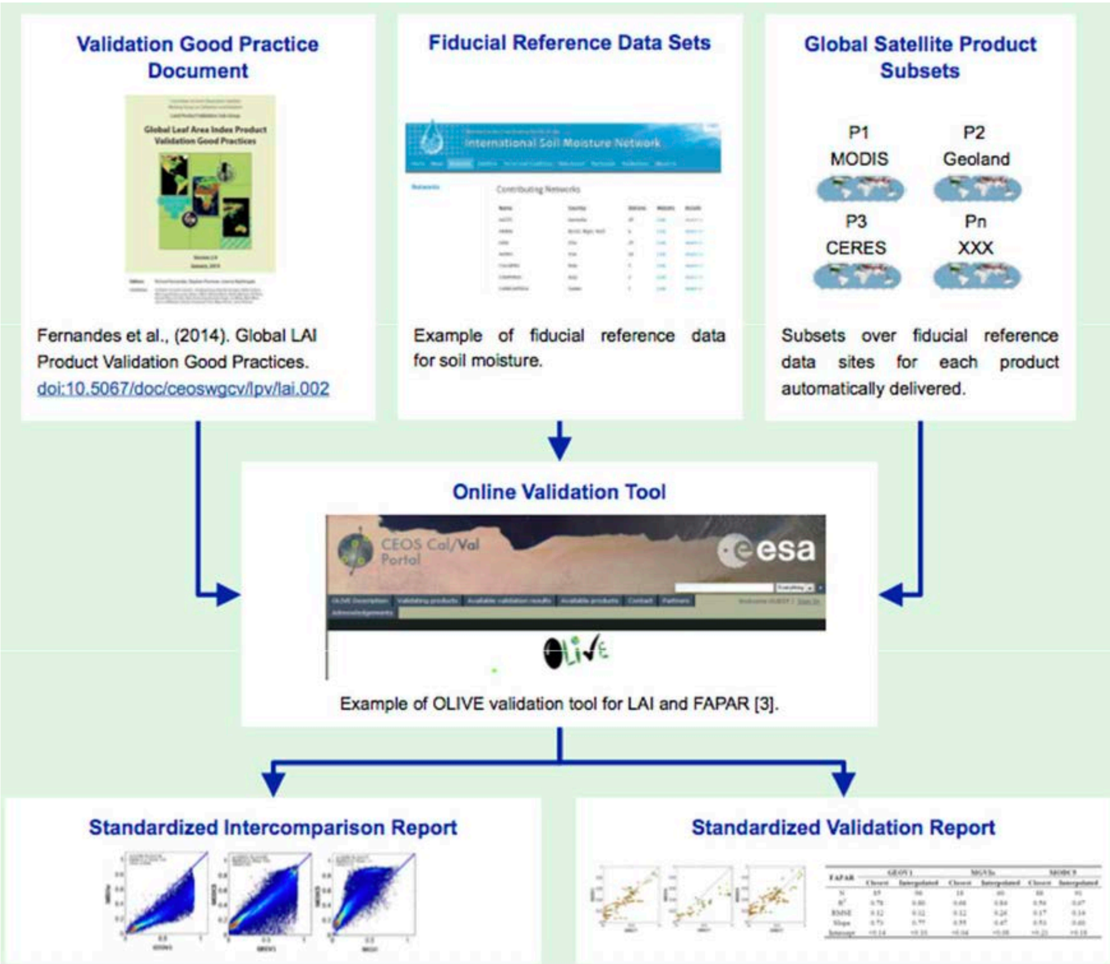






Daily global surface type, active fire, snow/ice and vegetation fraction maps are composited from the ST-EDR data for the long term monitoring

CEOS-WGCV Land Product Validation (LPV) Framework



- ***JPSS Land cal/val team has adopted the CEOS/WGCV LPV framework & validation stages.***
- ***Key JPSS contributions:***

1. Tower-based reference data (CRN, BSRN-SURFRAD)
2. Airborne-UAV reference data (MALIBU: Román et al.)
3. Land Product Characterization System (LPCS: K. Gallo)

- ***Participating CEOS member agencies:*** *NOAA-STAR, NOAA-NCDC, USGS-EROS, NASA-GSFC, ESA-ESRIN.*

CEOS/WGCV/LPV subgroup has developed a framework for land product intercomparison and validation based on: **(1) a citable protocol, (2) fiducial reference data, and (3) automated subsetting**. These components are integrated into an **online platform** where quantitative tests are run, and standardized intercomparison and validation results reported.

Land Product Validation plan comparison

Product	Variable	Metric	Correlative data	Reference data	Field Campaigns	Tools
SR	Surface Reflectance	APU	SNPP, MODIS, Landsat	AERONET, BELMANIP2		6SV radiative transfer code APU computation
VI	TOA NDVI		SNPP, MODIS, Landsat, AVHRR, Sentinel, GCOM SGLI	AERONET, BSRN, PEN, FLUXNET, NEON, SpecNet	ABoVE, NASA's Tree-Grass project	Monitor VIIRS Data Display VIIRS VI Time Series VI Cross-Comparison Global APU Computation VIIRS Matchup Display and Analysis VI Phenological Metrics
	TOC NDVI					
	TOC EVI	APU				
LSA	BPSA	APU	SNPP, MODIS (+GLASS), Landsat, AVHRR	BSRN, ARM, SURFRAD, GC-Net, FLUXNET	MALIBU (?)	Vizualiztion, monitoring and validation
LST	LST	APU	SNPP, MODIS, HI, FY, GOES-R	SURFRAD, BSRN		Matchup, QC, statistical analysis, reporting
AF	Detection	Probability of detection	SNPP, Aqua MODIS, TET, BIROS	Higher resolution (<30m) imagery		Sensor collocation / intercomparison
	FRP	APU	SNPP, Aqua MODIS, TET, BIROS	Higher resolution imagery, ground	opportunistic	Sensor collocation / intercomparison
ST	Surface type	Confusion matrix	MODIS, SNPP	High resolution imagery		Subset interpretation interface

- Ensure consistency of timeline with product precedence, including SDR, cloud mask etc.
- Linkage to CEOS validation protocols, resources and terminology
- Leverage validation tools and resources between JPSS and GOES-R
- Include use of LPVS where applicable

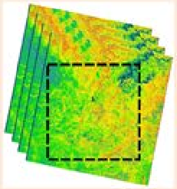
LPCS
Land Product Characterization System

Land Product Characterization System

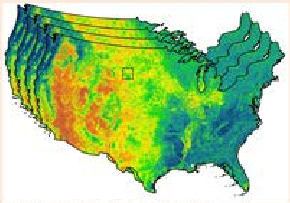
A web-based system designed to use moderate to high-resolution satellite data for characterization, and assist with validation, of GOES-R ABI and JPSS VIIRS land products.

Input Products in Native Projections

Simulated GOES-R ABI (Univ. Wisc./CIMMS)



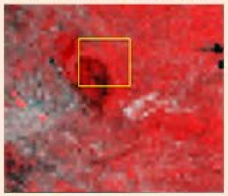
Landsat ETM+ (7), Landsat OLI/TIRS (8)



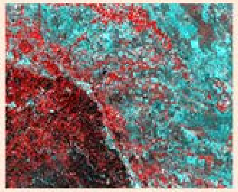
MODIS MOD/MYD09 (Surface Refl.) MODIS MOD/MYD13 (NDVI & EVI)

Geographically Registered Output Products

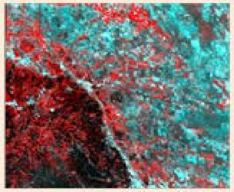
Simulated GOES-R ABI



Landsat



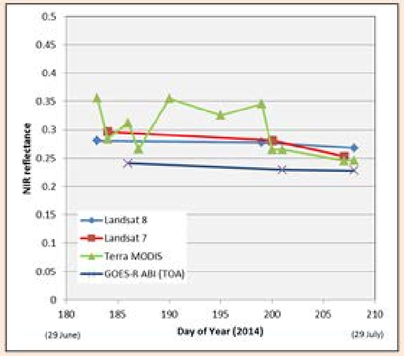
MODIS



Tables and Charts of Individual Bands or Indices

	A	B	C	D	E	F	G
1	DATE	DOY	MINIMUM	MAXIMUM	MEAN	STDDEV	VALID
2	7/2/2014	183	854	6850	3562.327	693.2124	yes
3	7/3/2014	184	349	8094	2836.911	495.3851	yes
4	7/5/2014	186	290	6780	3122.295	493.9331	yes
5	7/6/2014	187	308	4667	2653.052	575.2196	yes
6	7/9/2014	190	815	5553	3545.954	658.4303	yes
7	7/14/2014	195	191	7778	3254.757	636.479	yes
8	7/18/2014	199	1253	5621	3455.974	681.7747	yes
9	7/19/2014	200	343	5165	2643.97	393.5894	yes
10	7/20/2014	201	404	8447	2648.748	691.372	yes
11	7/26/2014	207	309	5266	2452.574	376.6008	yes
12	7/27/2014	208	457	4713	2462.386	465.7057	yes
13							

Mean, minimum, maximum, standard deviation



Near-IR time series inter-comparisons

NOAA Operational Land Product Status

- Evaluation and update of the heritage IDPS algorithms is practically complete
  - Products achieved validated stage 1 as defined by the NOAA JPSS program
  - Only remaining IDPS code change package is aerosol / SR (to implement validated algorithm in operations)
  - Long-term monitoring in place / transitioning to systematic production
- NOAA ESPC (NDE) operational implementation
  - Additional / added-value products
    - Green Vegetation Fraction – fully operational
    - Vegetation Health – transition to operations
    - Active Fire – re-allocated to NDE – transition to operations
    - Snow Fraction – in development
    - Phenology (Risk Reduction) – in development

NOAA Land Operational Product Status

- NOAA Enterprise Algorithm Development
  - Common algorithms / ground system implementation options to leverage resources and ensure best algorithm solutions
    - Targets NOAA satellite assets i.e. JPSS and GOES-R
      - Often results in the implementation of GOES-R algorithms to process JPSS data
      - "Risk Reduction" algorithm package transitioning into operations
      - Land products not part of this effort, but assessment is ongoing
- Use of non-NOAA assets for critical NOAA missions
  - Can be considered as the extension of NOAA Enterprise development
- New directions and framework for the Science Team's activities
  - Reactive maintenance and long-term monitoring of operational products
  - Algorithm development towards ESPC implementation of enterprise solutions; testbeds, demonstration products, active user involvement
  - Different review / TTO process / documentation
- Algorithm deliveries to STAR Algorithm Integration Team (AIT)

Land Products: Moving forward

- JPSS-1 preparation
  - Suite of algorithms include significant improvements
    - TOC NDVI, full fire mask and FRP – implemented for Suomi NPP
    - JPSS-1 test datasets are becoming available
  - JPSS-1 validation plans
    - draft plans delivered; review / feedback ongoing
    - final plans due December 31
- NOAA – NASA ST coordination and collaboration
  - Algorithm development
    - keep algorithms in sync (i.e. SR, Active Fire)
    - seeking common algorithm solutions where possible (i.e. LST)
    - different algorithm solutions where necessary
    - NASA-unique features (SDR, output format etc.) to be addressed
  - Validation
    - leveraging approaches and resources
- JPSS-2 and beyond assessment

NOAA JPSS Land and Cryosphere Products on VIIRSLAND website

Land: user involvement and added value products

- Close linkages between code cal/val and risk reduction activities
  - Risk reduction is also a platform for further algorithm changes
- Close collaboration with critical NOAA users
  - NOAA NCEP and other modeling groups – data assimilation
  - National Ice Center, Hazard Mapping System, CPC etc.
- Key Proving Ground Initiatives
  - e.g. Fire and Smoke, Land Data Assimilation
  - Joint Center for Satellite Data Assimilation as testbed
- Direct Broadcast CSPP and IPOPP and algorithm updates
- Development of new / level-3 and beyond products
  - GVF in operation
  - Gridded/composited LST, albedo etc.; LAI/fPAR
- Reprocessing
  - ongoing for select VIIRS bands / products (i.e. ocean)
  - planning / implementation for additional SDR and products

For further details and information

- COMING UP THIS THURSDAY:

- Land / Cryosphere Breakout Session 7c: Conference Room A 8:30 - COB

- Land-related posters: Thursday during lunch break

Land / Cryosphere Breakout Agenda (am)

<u>*Product overviews*</u>

- 8:45 Surface reflectance – Belen Franch
- 9:00 Vegetation index EDR and NDE Green Vegetation Fraction – Marco Vargas
- 9:15 Vegetation Health – Felix Kogan
- 9:30 Land surface albedo – Bob Yu
- 9:45 Land surface temperature – Bob Yu
- 10: 00 Active fire – Ivan Csiszar

10:15 Break

- 10:30 Surface type – Jerry Zhan
- 10:45 Sea ice characterization and thickness – Jeff Key
- 11:00 Sea ice concentration – Yinghui Liu
- 11:15 Sea ice surface temperature – Mark Tschudi
- 11:30 Binary snow cover – Peter Romanov
- 11:45 Snow fraction - Peter Romanov and Igor Appel
- 12:00 NASA SIPS Land Production and QA – Sadashiva Devadiga / Miguel Román

12:15 Lunch break

Land / Cryosphere Breakout Agenda (pm)

Product validation and long-term monitoring

- 1:00 Validation datasets and interagency / international coordination - Miguel Román
- 1:30 JPSS 1 land validation plan overview – Ivan Csiszar
- 1:45 GOES-R land validation activities and coordination with JPSS – Bob Yu
- 2:00 Land product characterization system – Kevin Gallo
- 2:15 Land long-term monitoring system – Lori Brown / Tony Reale

NOAA Enterprise system

- 2:30 Land / cryosphere enterprise product assessment– Ivan Csiszar / Jeff Key
- 2:45 Non-NOAA data sources for operational land / cryosphere applications: mission status, data access and plans Marco Vargas / Bob Yu / Jeff Key / Ivan Csiszar

3:00 Break

NOAA operational applications of JPSS land and cryosphere products

- 3:15 NCEP – Mike Ek
- 3:30 National Ice Center– Sean Helfrich

Open discussion and wrap-up

- 3:45 - 5:00 *Overarching topics such as re-processing, gridding, CLASS RIP archives, Direct Broadcast, summary and action items*