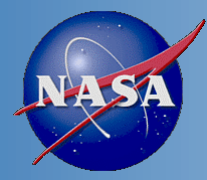


MODIS and VIIRS Product Status

Sadashiva Devadiga
NASA GSFC



Outline



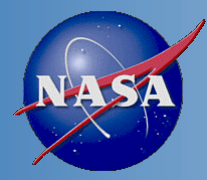
- **Land Product Status – Quick Summary**
- **Land Product Suite and Product inter-dependency**
- **MODIS and VIIRS Land SIPS – Operational Interface**
- **Land Product Status – C6 and C61**
- **VIIRS Product Status – V1 and V2**
- **SNPP to JPSS1**
- **Product Evaluation**
- **Conclusion**



Land Product Status – Quick Summary



- **MODIS (Terra, Aqua and Combined)**
 - C6 reprocessing completed for all products – standard and experimental.
 - C61 reprocessing in progress (started in Sept 2019).
- **VIIRS (SNPP)**
 - V1: Most land products in operational processing (exceptions: MAIAC, BA and Phenology)
 - V2: Reprocessing of L1 to start in Nov 2019, L2 in Dec 2019 and L3 in early 2020
- **VIIRS (J1)**
 - V1: Operational forward processing has been in progress since launch, L1 and L2 products available to science team for use in internal evaluation.
 - V2: L1 reprocessing completed, L2 and L3 to be operational by early 2020.



Standard MODIS and VIIRS Land Product Suite



Energy Balance Product Suite

- Surface Reflectance
- Land Surface Temperature, Emissivity
- BRDF/Albedo
- Snow/Sea-ice Cover

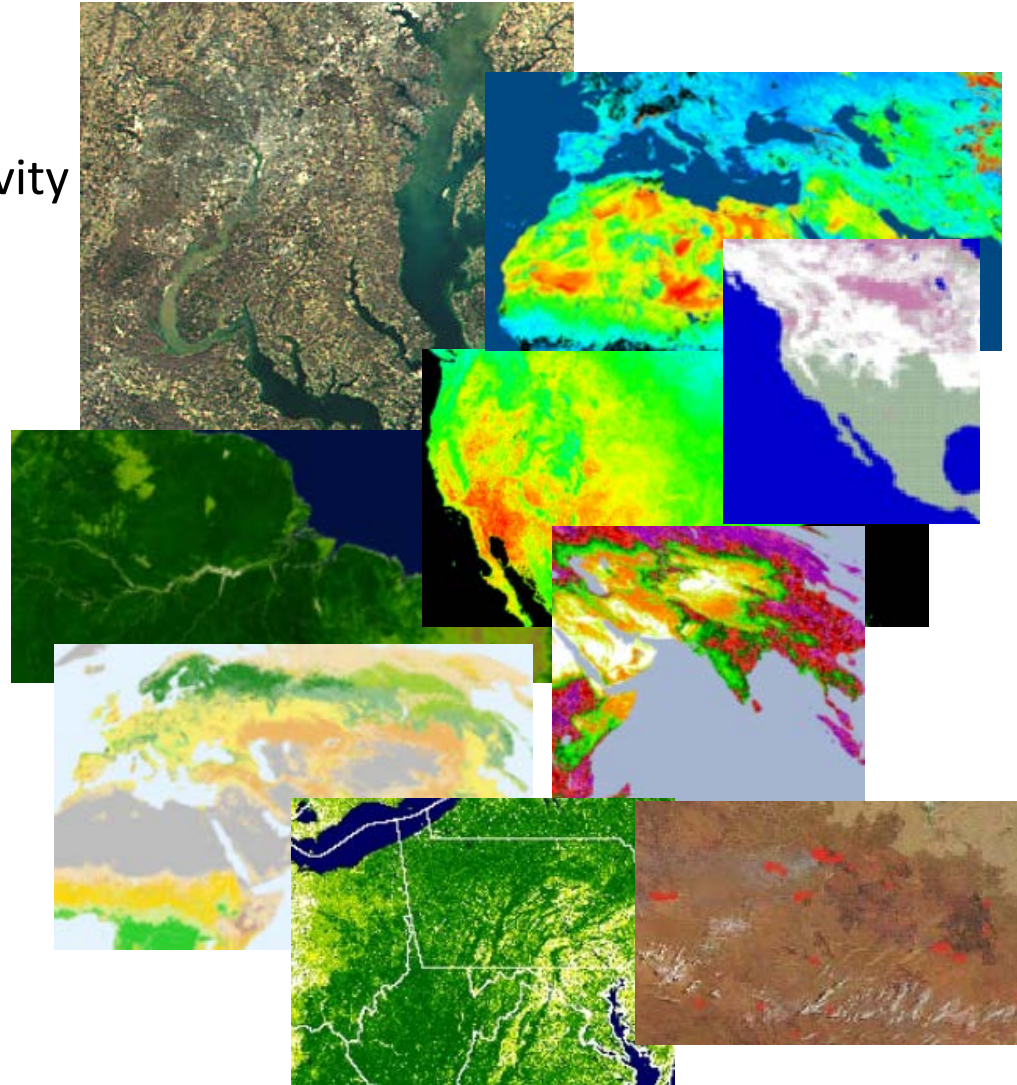
Vegetation Parameters Suite

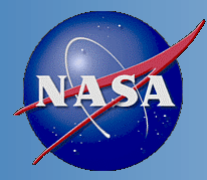
- Vegetation Indices
- LAI/FPAR
- Gross and Net Primary Production

Land Cover/Land Use Suite

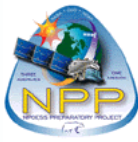
- Phenology
- Land Cover
- Vegetation Continuous Fields
- Active Fire
- Burned Area

No Continuity in VIIRS

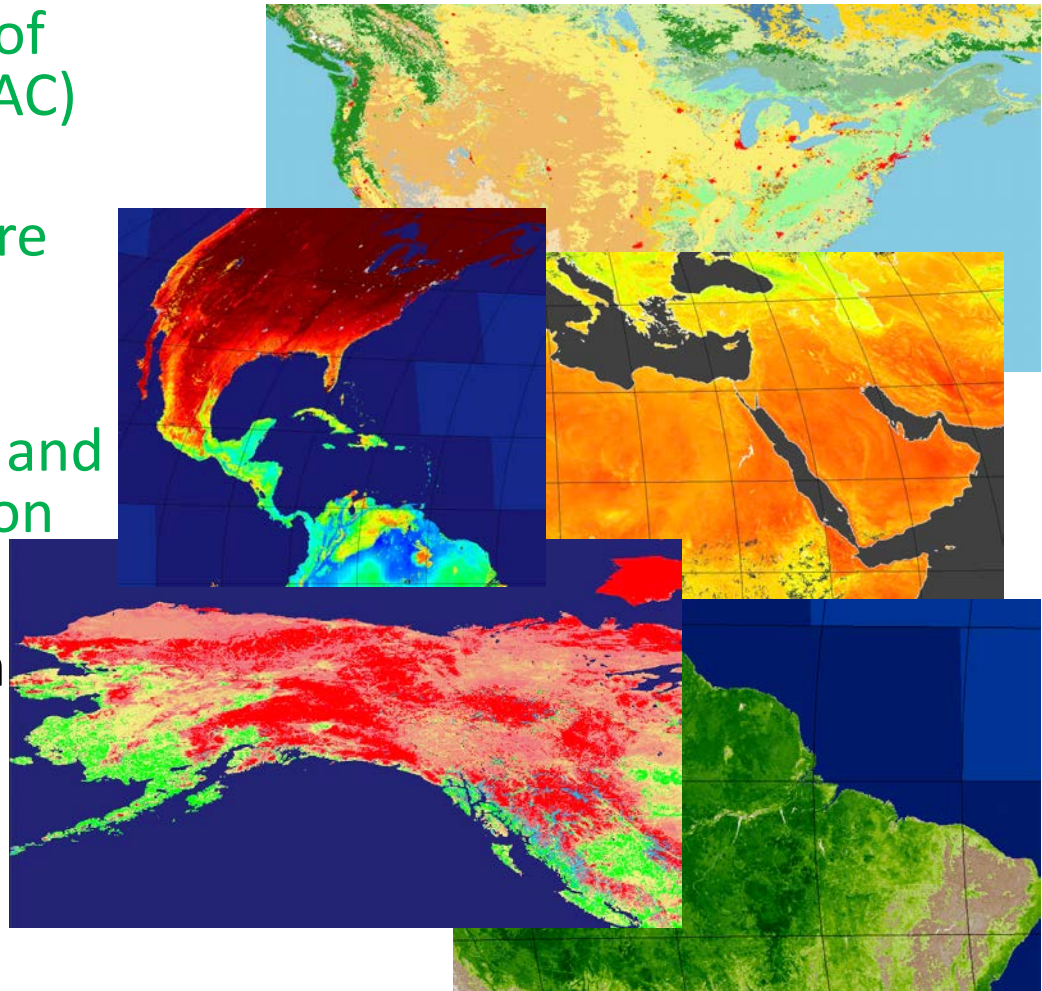




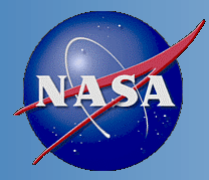
Experimental Products TTO in C6



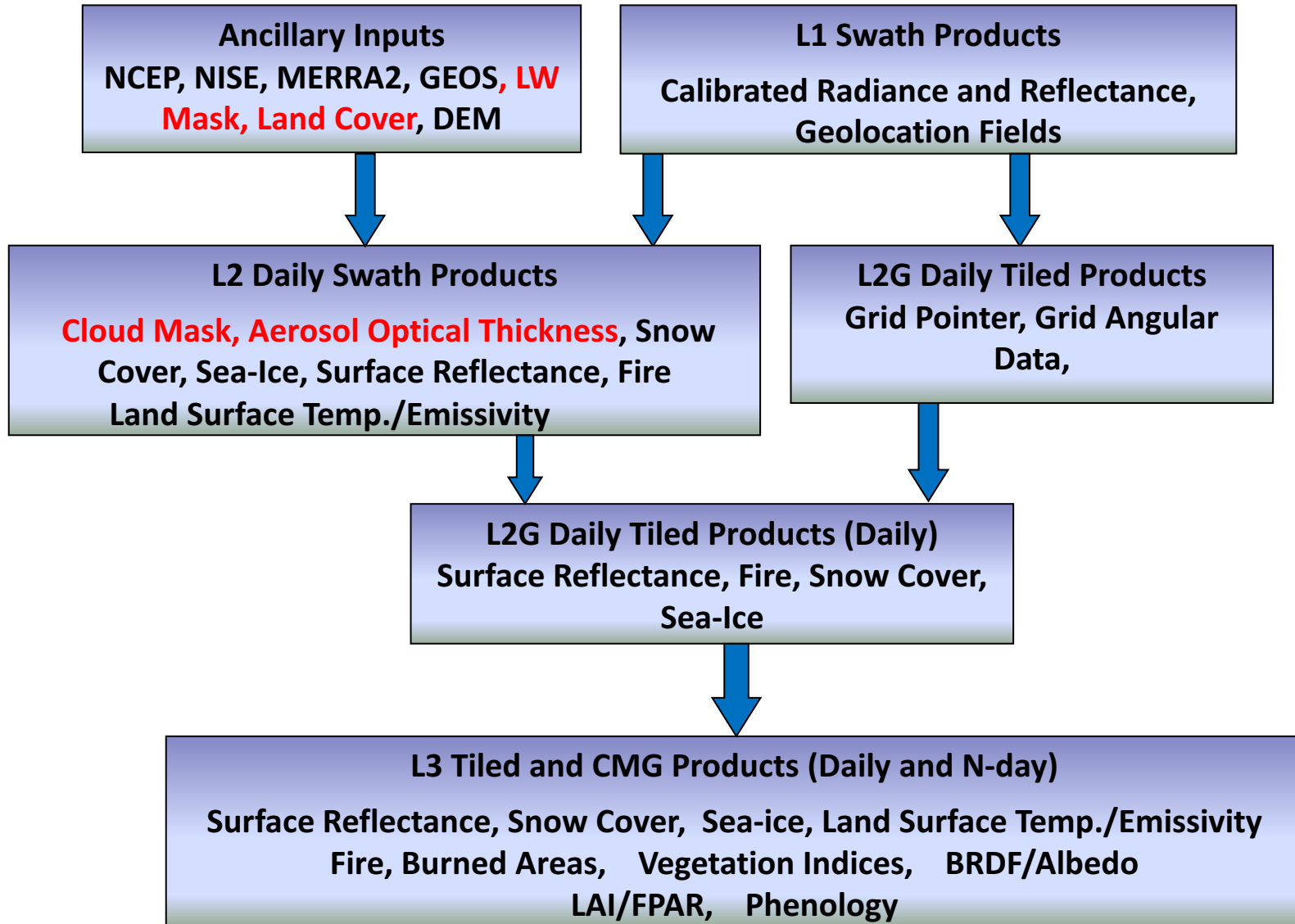
- Multi-Angle Implementation of Atmospheric Correction (MAIAC)
- JPL's Land Surface Temperature and Emissivity
- Downward Surface Radiation and Photosynthetic Active Radiation
- Terrestrial Evapotranspiration
- Gap Filled GPP/NPP and ET

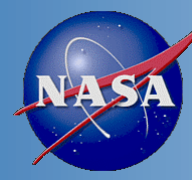


Continued to VIIRS

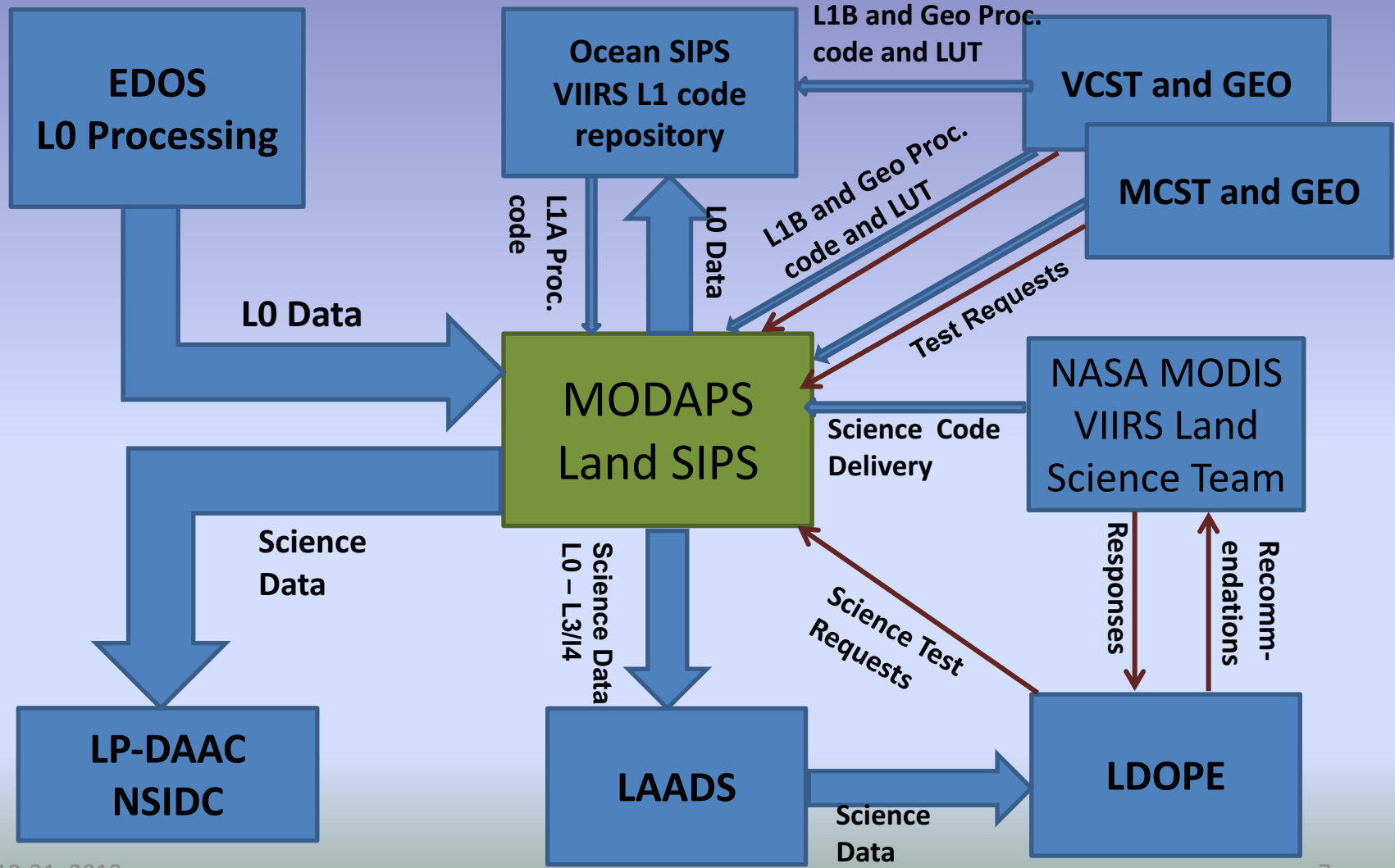


Land Product Interdependency





MODAPS and VIIRS Land SIPS: Operational Interface

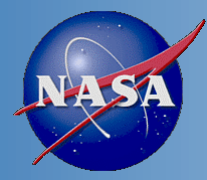




MODIS Land Product Status: C6



- **Leading edge of the C6 forward processing lags current day by a day or two except for maneuver days or satellite/instrument anomaly**
 - **Data evaluated by LDOPE for geolocation error from LOPA other data quality issue.**
- **C6 products are available to public from NASA DAACs. (LP-DAAC, NSIDC and LAADS)**
- **Selected land products also generated in near real time at LANCE-NRT.**
 - **Daily swath products available typically 2 to 2.5 hours after acquisition of data.**
 - **Near science quality products except for data impacted by maneuver**
- **GIBS images are generated using operational C6 land products. Processing is at leading edge.**

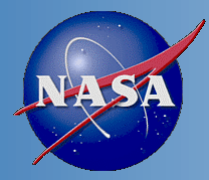


MODIS Land Product Status: C61



- Land products are reprocessed through this minor reprocessing campaign mainly to address known issues and inconsistencies in the C6 L1B products.
 - Change in calibration approach to RVS for Aqua MODIS
 - Polarization correction to Terra MODIS
 - Cross talk correction for the TEB (PV LWIR) in Terra MODIS
- No significant changes to land product science algorithms, included bug fix to known issues and minor improvements for some products
 - Reduced noise in Vegetation index
 - Use of GEOS (replacing MERRA2) in JPL's LST
 - Higher resolution DSR/PAR (5km -> 1km)
 - Use of Climatology LAI-FPAR as backup to operational LAI-FPAR in GPP/NPP and ET
 - New products: Cloud gap filled Snow Cover, JPL LST CMG product suite,
- Reprocessing started in Sept 2019, expected to complete by summer 2020.
- C6 reprocessing to be discontinued after completion of C61 reprocessing.

Details in report at the Land Break out session

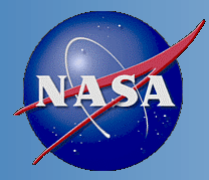


SNPP VIIRS Land Product Status: V1



EOS Products	Algorithms Delivered to Land SIPS	Product Integration and Testing	ATBD Delivery	Delivery of User's Guide	Products Delivered to assigned DAAC
Surface Reflectance	✓	✓	✓	✓	✓
LAI/FPAR	✓	✓	✓	✓	✓
Snow Products	✓	✓	✓	✓	✓
BRDF/Albedo	✓	✓	✓	✓	✓
Burned Area	✓	✓	✓	✓	Qtr 4, 2019
Active Fires	✓	✓	✓	✓	✓
Vegetation Index	✓	✓	✓	✓	✓
LST&E	✓	✓	✓	✓	✓
Ice Surface Temp	✓	✓	✓	✓	✓
Sea Ice Cover	✓	✓	✓	✓	✓
Phenology	✓	Underway	✓	✓	Qtr 4, 2019
Black Marble	✓	✓	✓	✓	Qtr 4, 2019

Details to be presented at the Land Break out session

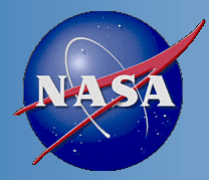


V1.0 SNPP VIIRS Land Product Status



- **V1 forward processing of Land products are typically 1-2 days behind real time**
 - Processing of maneuver days and days with satellite/instrument anomaly are delayed for LDOPE to complete quality assessment of the data
- **Products are first put in forward processing, followed by reprocessing from start of the mission**
 - Reprocessing completed: LSR, VI, LAI-FPAR, BRDF/Albedo, LST, Active Fire, L2 Snow and Sea-ice, L3 DNB Radiance.
 - Reprocessing in progress for BRDF CMG, DNB BRDF and L3 daily Cloud gap filled Snow
 - L3 DNB night light (LBAN) approved for operational reprocessing
 - Phenology in testing – expected to be operational by end of this year
 - MAIAC, L3 Snow and Sea-ice, DSR/PAR – to be operational in V2
- **Products available to public from NASA DAACs (LP-DAAC, NSIDC and LAADS)**
- **NRT processing of select land products is completed typically 2 to 2.5 hours after acquisition of data.**

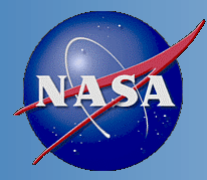
Details to be presented at the Land Break out session



V2.0 SNPP VIIRS Land Reprocessing



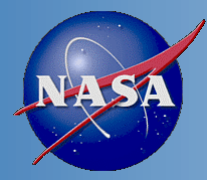
- **V2 Changes**
 - **Use the NASA L1B generated using the latest version of the L1B calibration algorithm and LUT delivered by the NASA VCST and Geo team.**
 - **V1 reprocessing used L1B SDR generated using the NOAA/IDPS Mx8.11 version of the operational software and NASA VCST provided LUT.**
 - **Improved version of the land cloud mask IP and aerosol IP products**
 - **Use C6 MODIS Land Water Mask**
- **Reprocessing Status**
 - **Reprocessing of L1 to start in Nov 2019**
 - **Reprocessing of L2 to start in Dec 2019 and L3 in Jan 2020**



J1 VIIRS Land: SNPP to J1



- **V1.0 L1 and L2 Land Products (Experimental only)**
 - L1B generated using the L1B calibration algorithm and LUT delivered by the NASA VCST and Geo team.
 - Mission period included mix of pre and post-launch LUTs, and incremental update to L1 process.
 - Select L2 products generated using preliminary V2 version of SNPP VIIRS land algorithms
 - Products considered experimental and made available to science teams and LDOPE only for use in internal assessment
- **V2.0**
 - Reprocessing of L1 completed in Aug 2019 - used the V2 calibration algorithm and LUT provided by the NASA VCST and Geo team
 - Reprocessing of L2 and L3 land product to follow V2 reprocessing of SNPP VIIRS. (Jan/Feb 2020)



Product Evaluation



- **Land Data Operational Product Evaluation (LDOPE): A centralized facility that provide supports to the Land Science Team in quality assessment of the Land data products**
 - **Undertake scientific and generic QA**
 - **Routine QA of Operational Products**
 - **Long Term Quality Monitoring**
 - **Algorithm Change Recommendation, Test and Verification**
 - **Collection Reprocessing**
 - **Product Maintenance (product that has no science team, intermediate products)**
 - **Develop, maintain and distribute QA tools**



QA Web Page



https://landweb.modaps.eosdis.nasa.gov/NPP_QA/index.html

NASA National Aeronautics and Space Administration
Goddard Space Flight Center

Suomi NPP - Land Science Investigator-Ied Processing System

VIIRS Land Product Quality Assessment

Visible Infrared Imaging Radiometer Suite

Home Browse Time Series Docs QA Info Alg Updates/Eval Links Early It

Welcome to the NPP VIIRS Land Product Quality Assessment

The objective of the VIIRS (Visible Infrared Imaging Radiometer Suite) Land Product QA is to evaluate and document the science quality of products made from the remotely sensed data acquired using VIIRS. Results of quality assessment of samples of VIIRS Land products made at Land SIPS (Science Investigator Processing System) and IDPS (Interface Data Processing System) and results of evaluation of improvements to the VIIRS Land Science algorithms derived by analyzing the products made at Land SIPS using the new algorithms are placed on the web pages located at this site.

The Suomi NPP (National Polar-orbiting Partnership) satellite was launched on Oct. 28, 2011. Evaluation of products from the IDPS OPS (Operation System) algorithms, and the Land SIPS adjusted version of the IDPS OPS algorithms run at Land SIPS and of the science algorithm improvements are done at LDOPE (Land Data Operational Product Evaluation). Results from LDOPE's evaluation of the pre-launch version of the IDPS algorithms done using simulated or proxy MODIS data and the results from the science test of changes to algorithm done post-launch using on-orbit data are posted on the Algorithm Updates/Evaluation section of this web page. This web page is constantly evolving. For global browse images from immediate post-launch period please click on the Brows menu at the top of this page. Please direct your questions and comments to [Sadashiva Devadiga](mailto:Sadashiva.Devadiga).

For more information about the VIIRS Land products, validation, and product maturity status, visit <http://viirsland.gsfc.nasa.gov/index.html>

Current and upcoming On-orbit S-NPP/J1 VIIRS Activities: [please click here.](#)

What's New

- J1/N20 V2 L1B re-processing at NASA Land SIPS is ongoing, data will be released through [LAADS](#) in early August.
- The S-NPP and J1/N20 V2 re-processing at NASA Land SIPS is about to begin in a few months. For details please click [here](#).
- Users are requested to make a note that certain L2 active fire products from current V1 re-processing of S-NPP in AS 5000 may be unusable. For details please click [here](#).
- V1 reprocessing and forward processing of the VIIRS Surface Reflectance suite of products (VNP09) is in progress in AS 5000. Reprocessing started with processing of Jan 2015 and forward processing started at day 2016188 (7/6/2016). Reprocessing stream will shift to the beginning of mission (1/19/2012) after the ongoing reprocessing completes through day 2017187. Moderate and Image resolution fire products (VNP14) are also being generated in both streams.
- Forward processing of VIIRS Land data product in AS 3002 was stopped on day 196 (07/14/2016). Products slated for permanent archive AS 3002/3001 are still available from LAADS.
- SNPP VIIRS Land Records from [C1.1](#) reprocessing using best of Calibration LUTs and science algorithms available from AS 311. This reprocessing contains records for the

NASA GODDARD SPACE FLIGHT CENTER + NASA Homepage Search known issues

MODIS Land Quality Assessment

home quality docs QA info tests links

What's New!

- The C6 year-end gap-filled versions of M*D16 and M*D17 8-day and annual products are now operational from MODAPS. These offer better science quality than the M*D16 and M*D17 products from regular production and users are advised to switch to these products, that are produced from NTSG. The NTSG equivalents are only available till 2014 and will be decommissioned in the near future.
- C6.1 re-processing of L1B and Atmosphere products is now fully complete and C61 re-processing of Land is expected to start around June/July of 2019. For further details of the C61 Land re-processing plan please click [here](#)
- C6 re-processing of all Land products are complete and all current C6 land products are at leading edge.
- Annual MOD17A3H/MYD17A3H and MOD16A3H/MYD16A3H from the operational C6 processing has been discontinued because of irregular retrieval issues and users are advised not to use this data, even if they had downloaded this data earlier from LP-DAAC. Instead, MODAPS will introduce better gap-filled year end M*D16A3GF and M*D17A3GF products soon

Welcome to the Land Quality Assessment Site

Quality assessment (QA) is an integral part of the MODIS Land production chain. The objective of MODLAND QA is to evaluate and document the scientific quality of the MODLAND products with respect to their intended performance. The results of MODLAND QA are made available on a routine basis and are formally stored as product metadata and as per-pixel information. MODLAND QA results are also placed on the Product Quality web pages located at this site. Users are encouraged to check these QA results when they order and use individual products to ensure that they were generated without error or artifacts.

Animation of MODIS NDVI 2010. See "Animation" link under the QAInfo menu for more...

https://landweb.modaps.eosdis.nasa.gov/cgi-bin/QA_WWW/newPage.cgi



Global Browse Images



VNP09 SURFACE REFLECTANCE BAND M5/M4/M3

SNPP C001(AS5000)

Sensor	Collection	ESDT	Dataset
SNPP VIIRS	001(AS5000)	VNP09C	Surface Reflectance M3, M4, M5

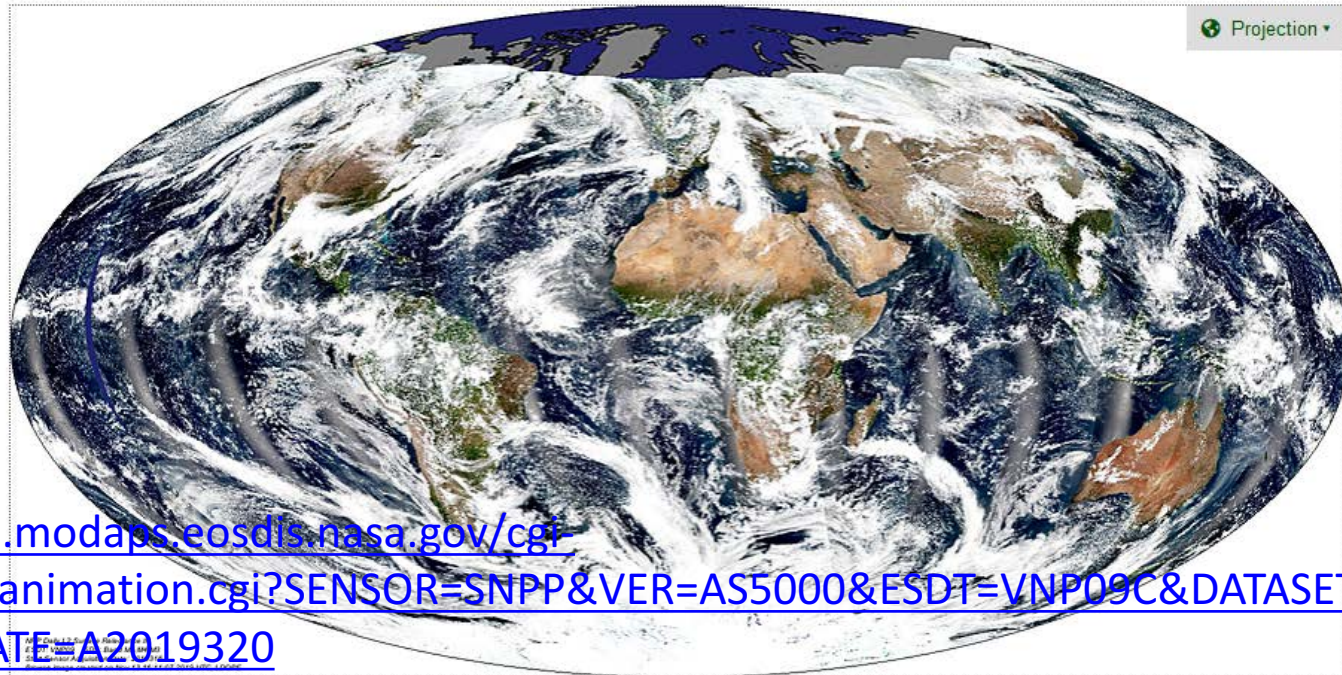
A2019316 (2019-11-12)

VNP09 Band M5/M4/M3

[Download](#)
[Open](#)
[Zoom](#)
[Animation](#)
[Compare](#)
[Orbit](#)
[Go to](#)
[Previous](#)
[Next](#)

Show Legend ▾

Projection ▾



<https://landweb.modaps.eosdis.nasa.gov/cgi-bin/QS/browse/animation.cgi?SENSOR=SNPP&VER=AS5000&ESDT=VNP09C&DATASET=VNP09C-M&DATE=A2019320>

SELECT DATA

	SENSOR	COLLECTION	ESDT	SDS	TILE	LAND COVER		
Plot1:	VIIRS	001	VNP09H1	SurfReflect_I1	h20v11	BIO: Savannas	+	-
Plot2:	VIIRS	001	VNP09H1	SurfReflect_I2	h20v11	BIO: Savannas	+	-
Plot3:	Aqua	006	MYD09A1	sur_refl_b01	h20v11	BIO: Savannas	+	-
Plot4:	Aqua	006	MYD09A1	sur_refl_b02	h20v11	BIO: Savannas	+	-

[remove all plots](#)

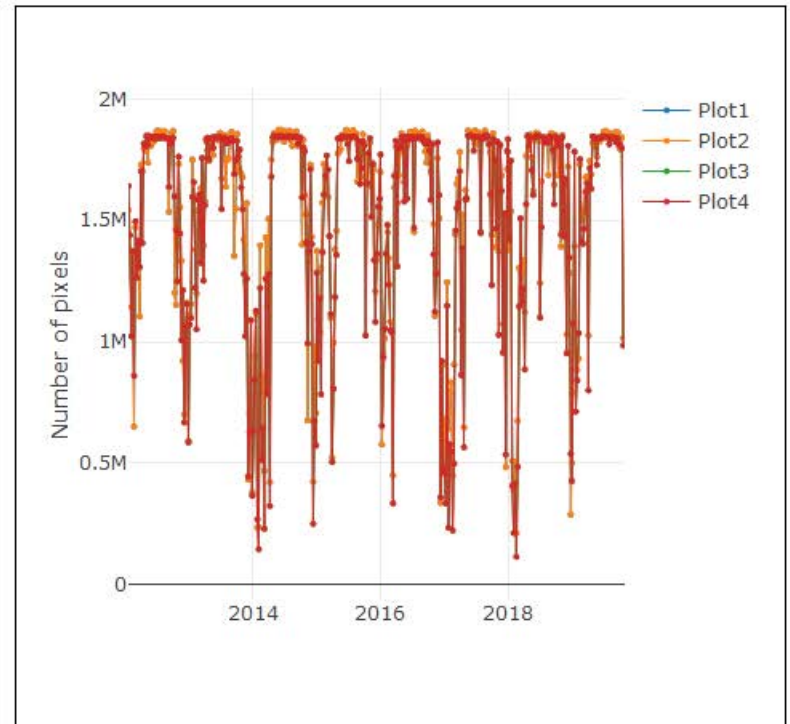
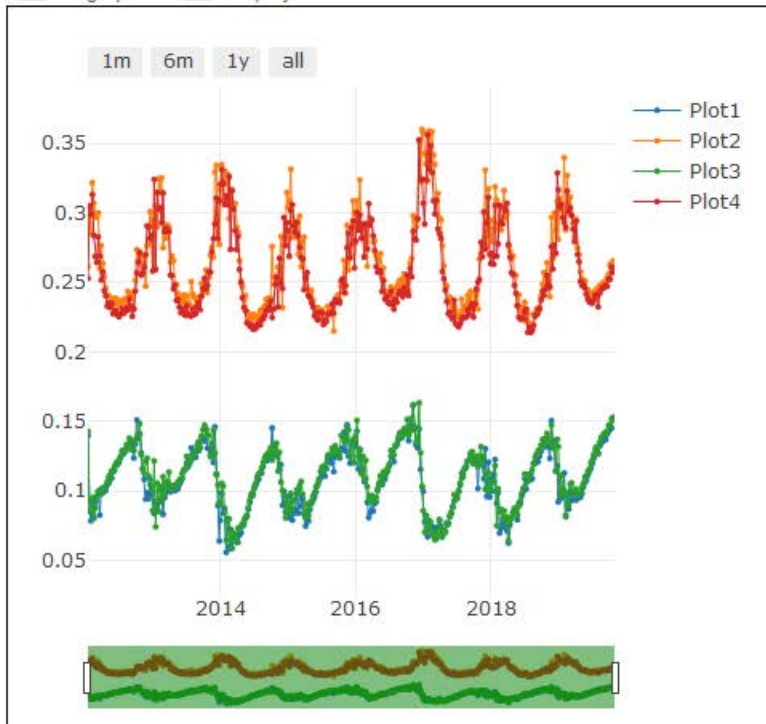
SELECT TIME RANGE

2012-01-17 2019-11-01

PLOT

Manually input dates
 STD

Large plots
 Display Browse
 [Edit Plot](#)



TEST THE C61 JPL LST WITH THE CHANGE IN WEATHER INPUTS FROM MERRA2 TO GEOS5

TEST AS1691

(last updated: Thu Sep 19 14:06:22 2019)

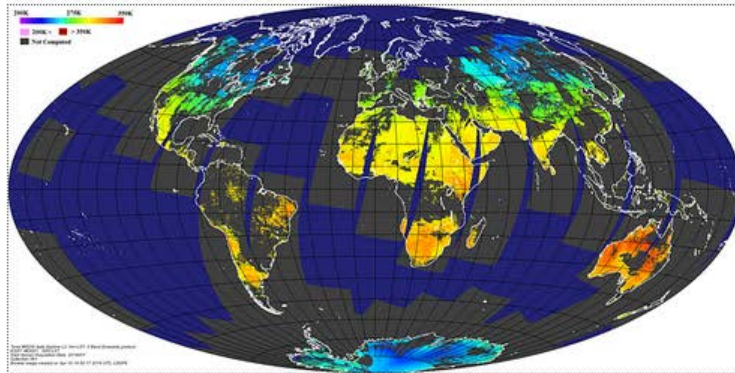
Baseline	ESDT	Dataset	Date
AS1690	MOD21	LSTDaytime	A2018001

[Zoom](#)
[Animation](#)
[Compare](#)
[Orbit](#)
[Download](#)
[Go to](#)
[First](#)
[Last](#)
[Previous](#)
[Next](#)

[ALL](#)
[BROWSE](#)
[DIFF](#)

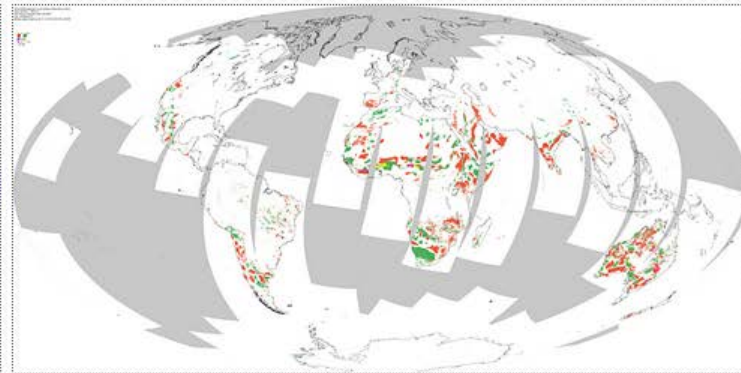
Browse:

Daily Daytime Land Surface Temperature (MOD21)



Difference:

Diff type: Scales: [Legend](#) [Map](#)



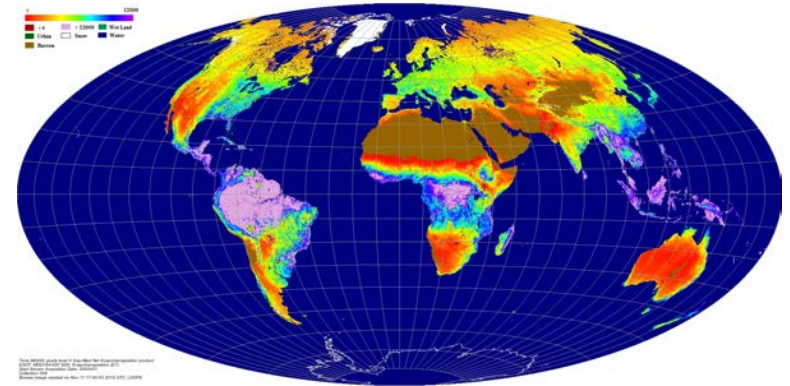
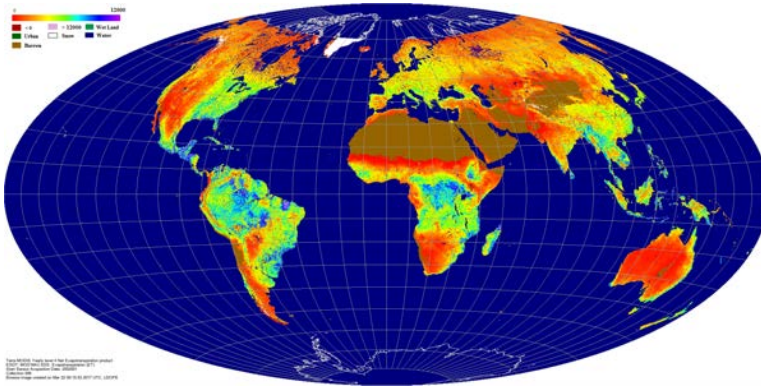
$$R \text{ Diff} = \frac{(\text{Test} - \text{Base})}{\text{Base}} * 100\%$$

Click on browse image to display baseline
Press [Z] and move mouse over images to zoom
Mouse over upper left of the images to display legend

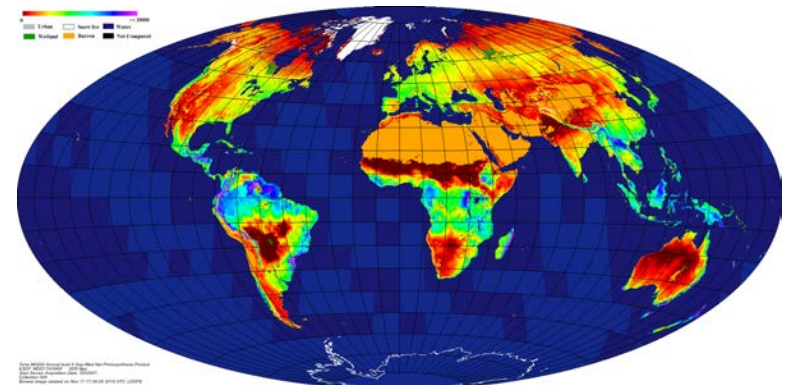
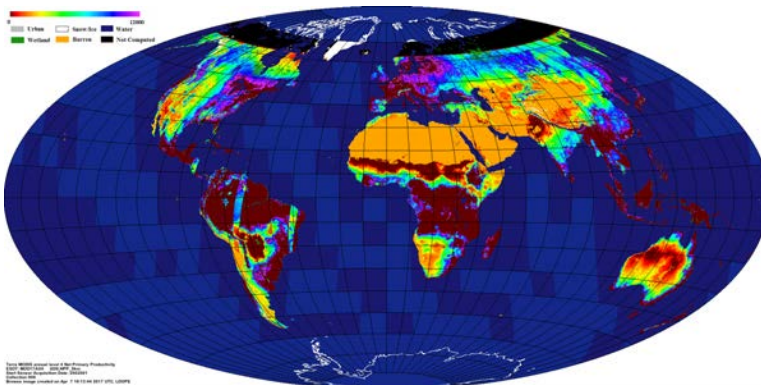
Original Non-gap-filled

Gap-filled

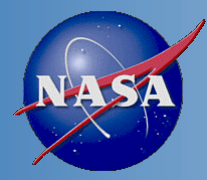
2002 MOD16A3
/MOD16A3GF
(annual total ET)



2002 MOD17A3
/MOD17A3HGF
(annual total Npp)



- MOD16A3GF/MOD17A3HGF are more complete and useful than the previous non-gap-filled.



Conclusion



- **MODIS (Terra, Aqua and Combined)**
 - C6 reprocessing completed for all products. C61 reprocessing in progress.
- **VIIRS (SNPP)**
 - All products planned for V1 are expected to be in operational processing by the end of 2019
 - Preparation for V2 nearly complete. Reprocessing of L1 is expected to start by Nov 2019, and land products in Dec 2019.
- **VIIRS (J1)**
 - V2: L1 reprocessing completed, L2 and L3 to be operational by early 2020.
- **LDOPE** continues to support science teams and operation in all aspects of algorithm maintenance and product quality assessment.