



JPSS STAR (J-STAR)

JPSS-CPO TIM

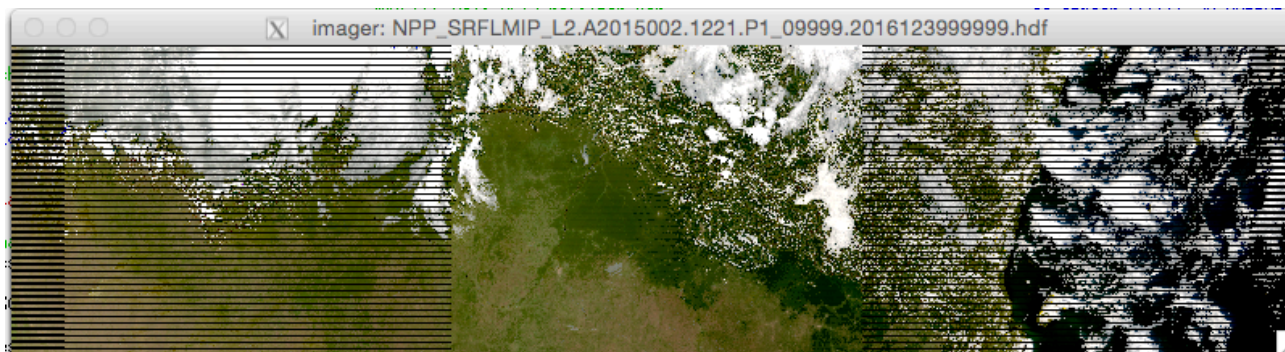
JPSS LAND PRODUCTS SUMMARY
IVAN CSISZAR

- Current operational products
 - VIIRS Surface Reflectance
 - VIIRS Vegetation
 - » Vegetation Indices
 - top-of-atmosphere (TOA) Normalized Difference Vegetation Index (NDVI)
 - Top-of-canopy (TOC) NDVI and Enhanced Vegetation Index (EVI)
 - » Green Vegetation Fraction
 - Derived from EVI
 - » Vegetation Health
 - Derived from TOA NDVI and infrared brightness temperatures
 - VIIRS Surface Albedo
 - VIIRS Land Surface Temperature (LST)
 - VIIRS Surface Type (Land Cover)
 - VIIRS Active Fire
 - GCOM AMSR-2 Soil moisture
- Research and Experimental Products
 - VIIRS Phenology, Flood/standing water, land cover change/burned area etc.

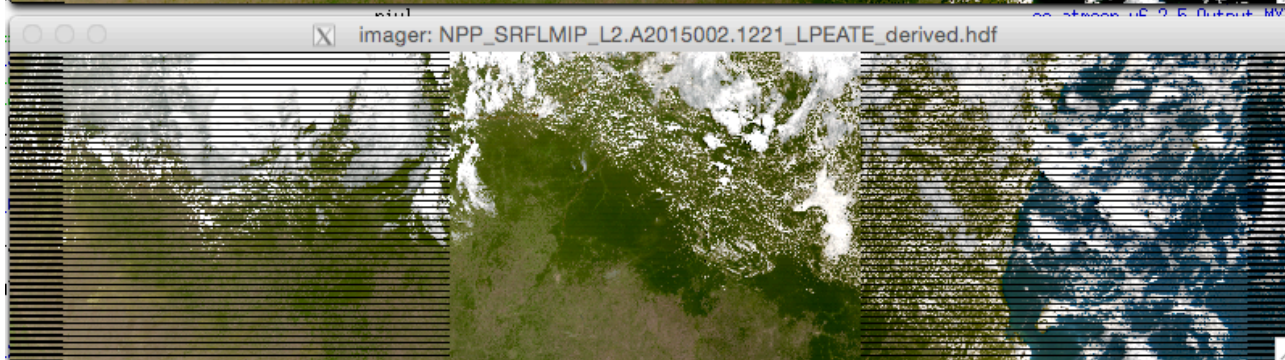
- Product Maturity
 - All Suomi NPP / JPSS products have been declared Validated
 - GCOM AMSR-2 Soil Moisture currently Provisional
 - » Validated Maturity Review planned for March 2017
 - <https://www.star.nesdis.noaa.gov/jpss/AlgorithmOperational.php>
- All Suomi NPP / JPSS operational products are transitioning to ESPC (NDE) or are already generated by NDE
- Production /archive status
 - IDPS: multi-year data record archived in CLASS
 - » Going back to the date of “Beta” maturity; dates vary
 - » Operational product, not suitable for long-term analysis
 - ESPC/NDE: production and CLASS archival phased in
 - » not the entire data record; more mature algorithms
- Best quality data record after reprocessing
 - critical for establishing multi-year baseline “climatology”

VIIRS Surface Reflectance

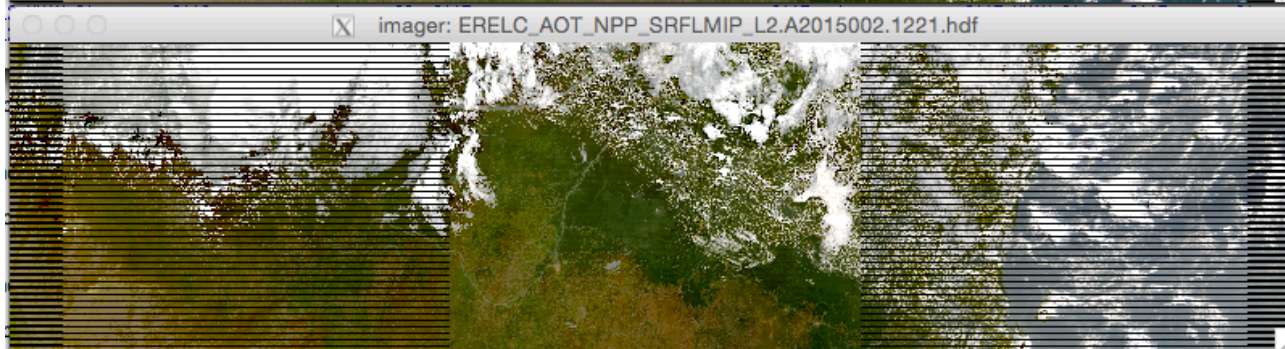
NOAA
Enterprise



NASA LSIPS C5



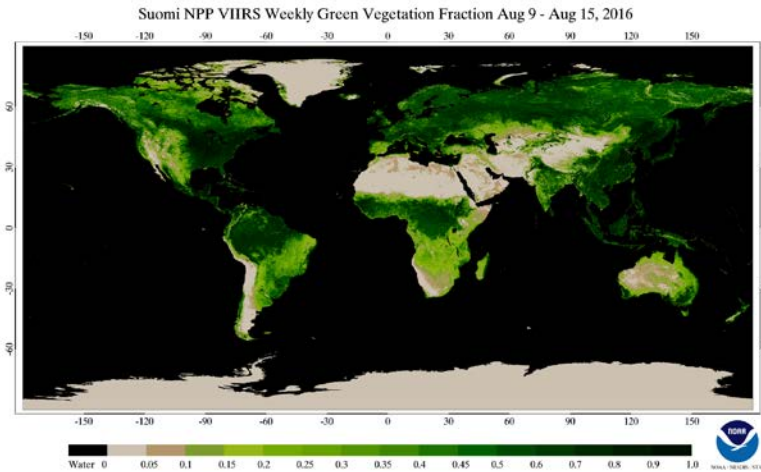
NASA LSIPS C6



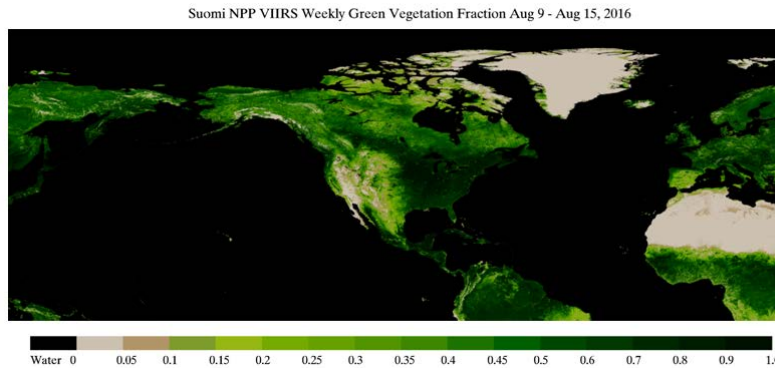
Implementation of the NOAA Enterprise version is ongoing.

VIIRS Gridded Vegetation Products

NDE Operational 4km global VIIRS GVF

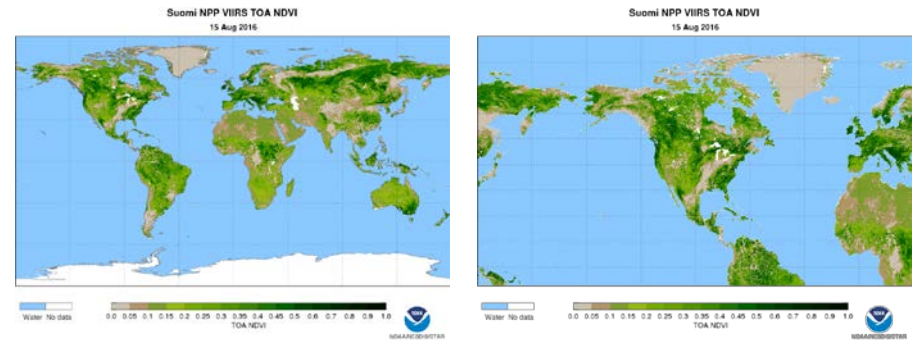


NDE Operational 1km regional VIIRS GVF

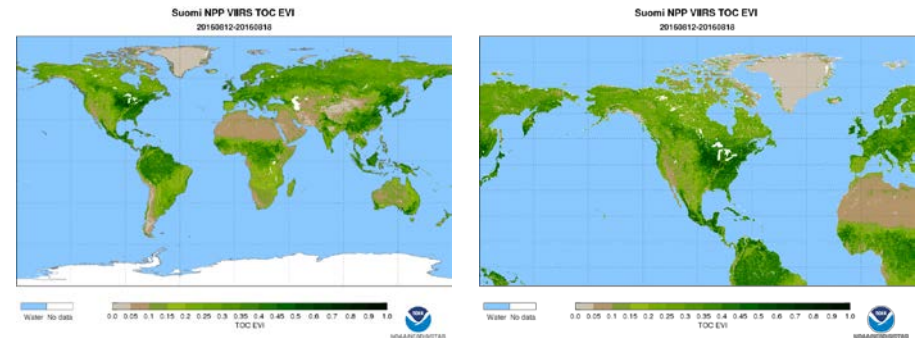


<http://www.star.nesdis.noaa.gov/jpss/gvf.php>

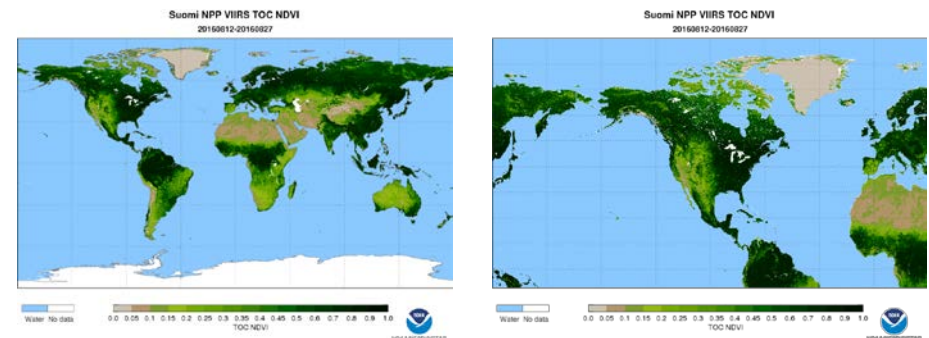
Gridded VIIRS Daily TOA NDVI (4km global and 1km regional)



Gridded VIIRS Weekly TOC EVI (4km global and 1km regional)

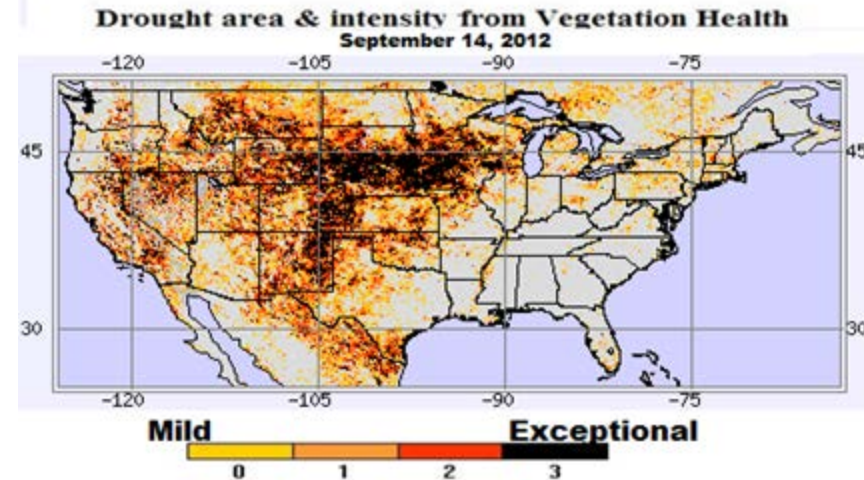
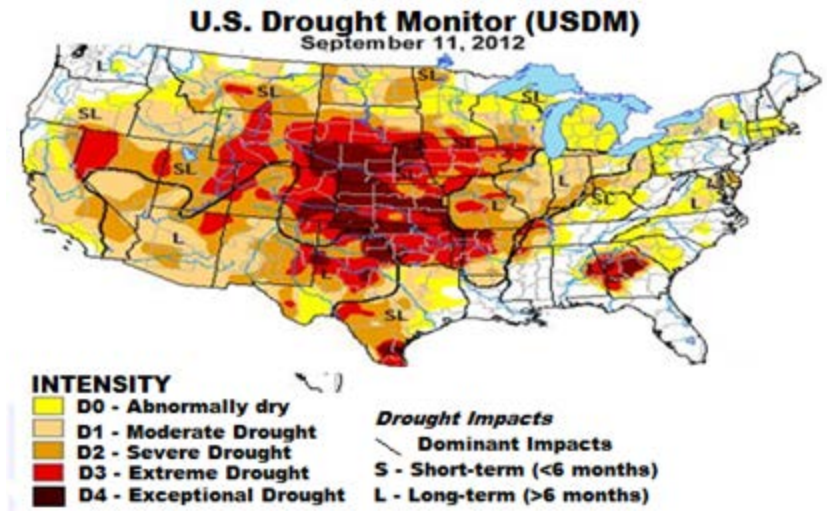
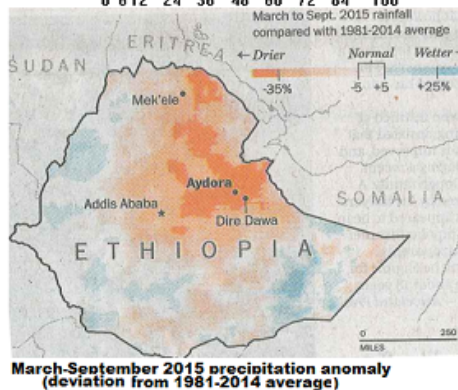
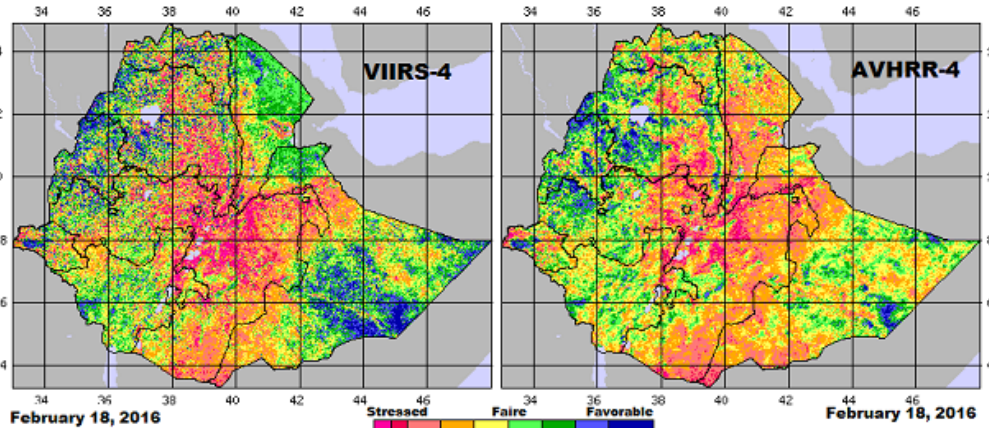


Gridded VIIRS Bi-weekly TOC NDVI (4km global and 1km regional)



Vegetation Health

VIIRS vs. AVHRR and Precipitation ETHIOPIA 2016

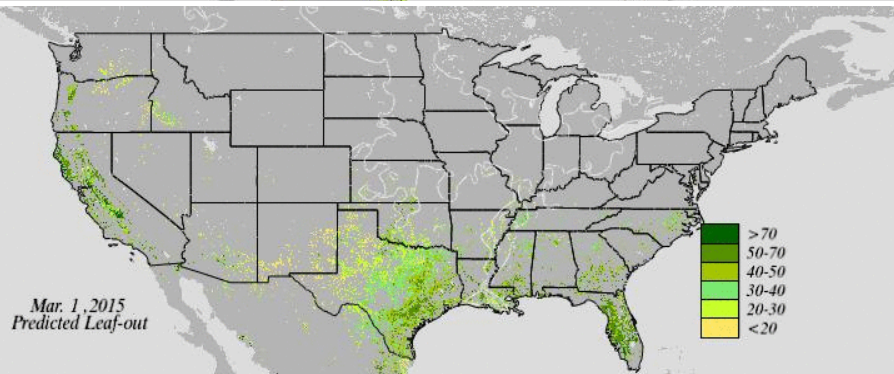
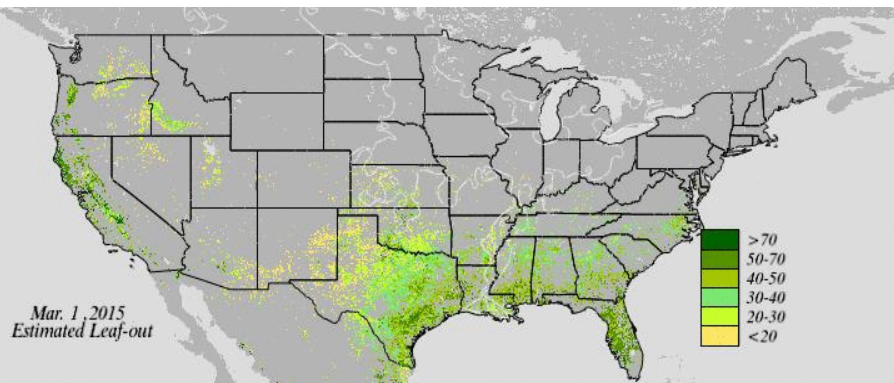
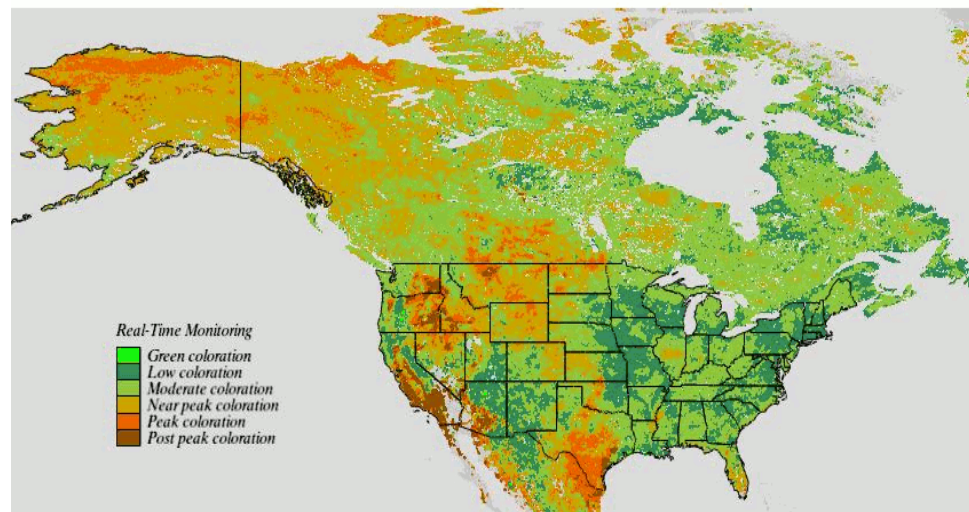


<https://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/index.php>

Phenology: monitoring and prediction of vegetation changes

Monitoring and predicting vegetation phenology supports applications in agriculture, ecosystem monitoring, numerical weather prediction and tourism.

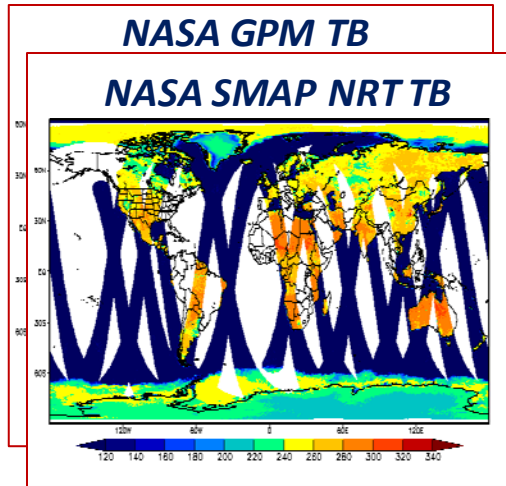
Monitoring NPP VIIRS Fall Foliage Coloration
15 September 2015



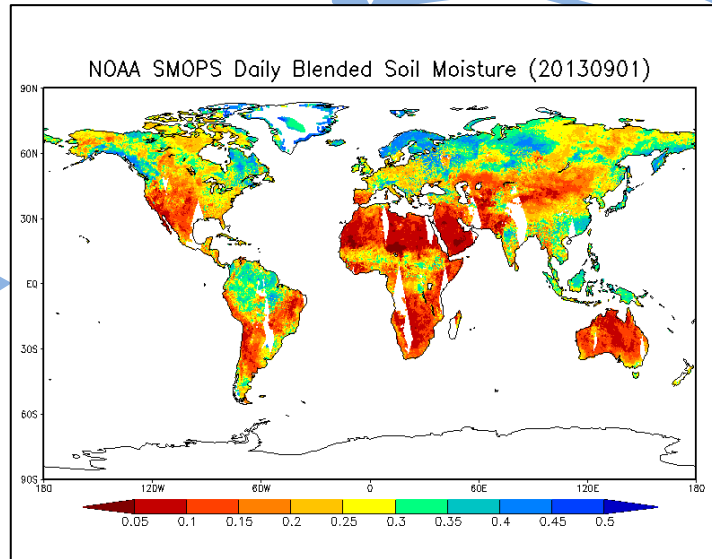
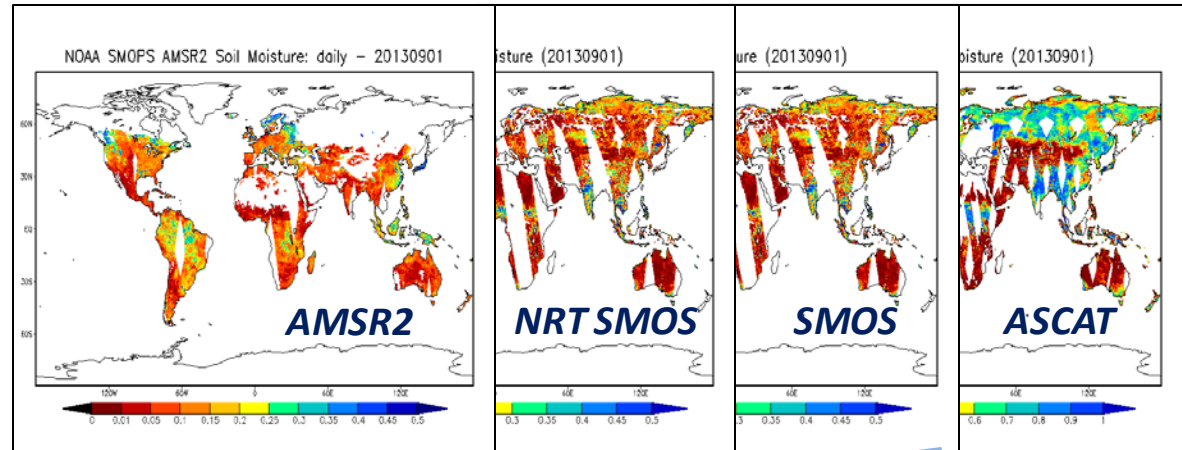
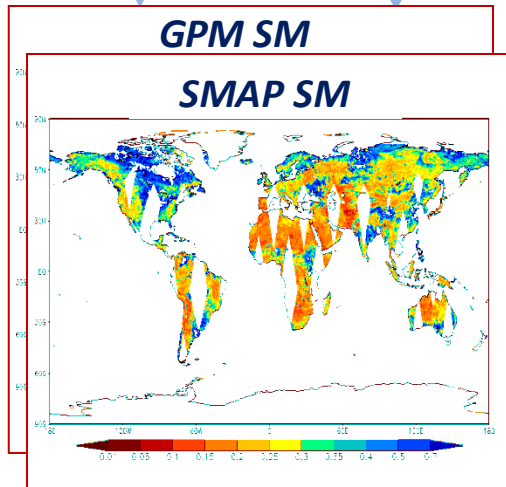
http://www.star.nesdis.noaa.gov/JPSS/EDRs/products_Foliage.php

NESDIS Soil Moisture Operational Product System

SMOPS 2.0/3.0



NOAA Ancillary Data



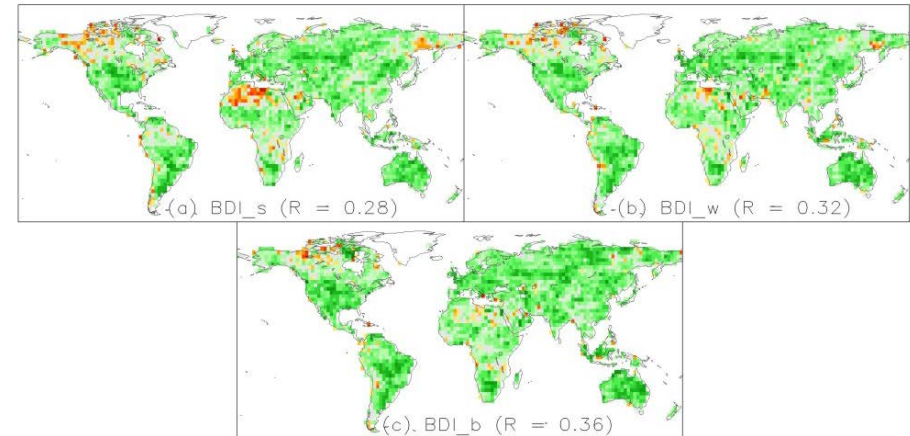
NWP models
NCEP
GFS/NAM
NLDAS/GLDAS
AFWA, etc

NESDIS SMOPS ingests operationally soil moisture product from JPSS/GCOM-W1 and blend them with soil moisture retrievals from SMOS, SMAP, GPM, & ASCAT

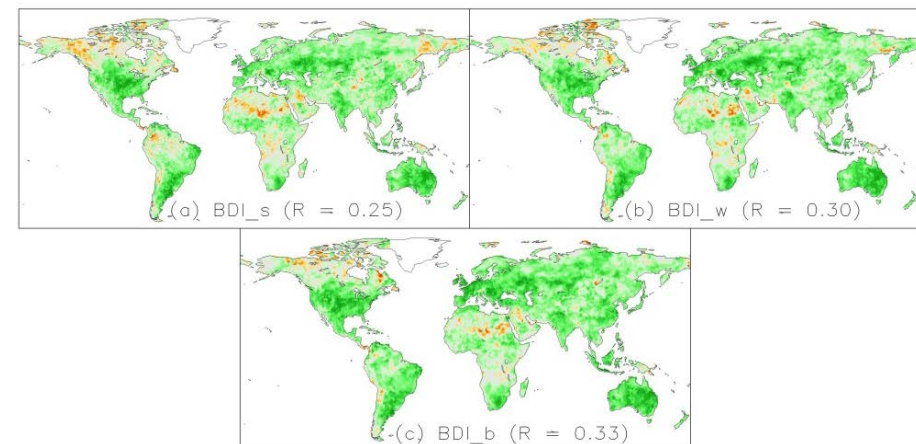
Quantitative Integration of Global Soil Moisture Data Products for Drought Monitoring

X. Zhan, J. Yin, C. Hain, J. Liu, L. Fang, M. Ek, J. Huang, M. Anderson, M. Svoboda

- Objectives
 - Using Triple Collocation Error Model to quantitatively integrate land surface model and satellite remote sensing soil moisture products for a blended drought Index (BDI)
- Primary sensors involved
 - S-NPP/VIIRS, GOES/GOES-R
 - GCOM-W1, SMOS, SMAP, GPM
- Primary ground data
 - Palmer Drought Severity Index (PDSI)
 - Standardized Precip ET Index (SPEI)
 - In situ observations
- Targeted end users
 - NIDIS of USDA, NOAA and USGS
 - NWS-NCEP



Correlations of **BDIs** with **PDSI**



Correlations of **BDIs** with **SPEI**

Evaporative Stress Index (ESI) Compared with North American Drought Monitor

North American Drought Monitor

August 31, 2011

Released: Friday September 9, 2011

<http://www.ncdc.noaa.gov/nadm.html>

Analysts:
Canada - Trevor Hadwen
Dwayne Chabanik
Richard Rieger
Mexico - Reynaldo Pascual
Adelino Albani
U.S.A. - Brian Fuchs*
Eric Luebbehusen

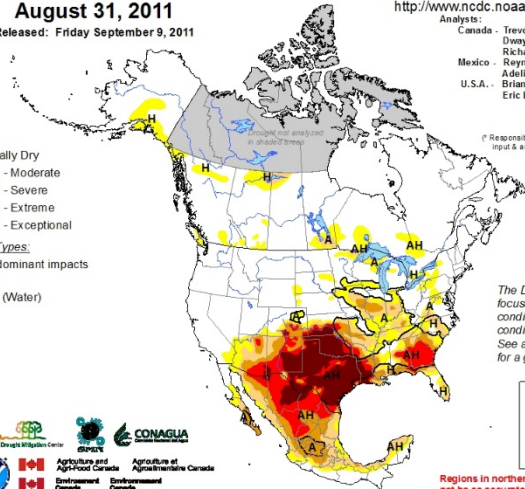
(* Responsible for collecting analysts' input & assembling the NADM map)

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

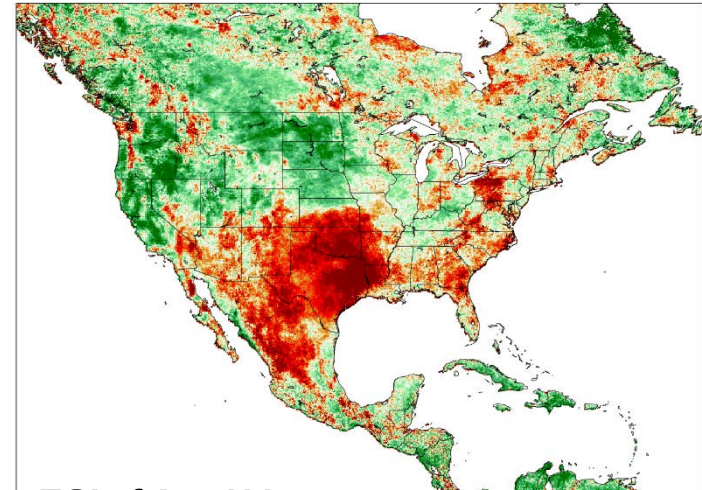
Drought Impact Types:

- ~ Delineates dominant impacts
- A = Agriculture
- H = Hydrological (Water)



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text for a general summary.

Regions in northern Canada may not be as accurate as other regions due to limited information.



ESI of Aug'11

North American Drought Monitor

August 31, 2012

Released: Thursday, September 13, 2012

<http://www.ncdc.noaa.gov/nadm.html>

Analysts:
Canada - Trevor Hadwen
Richard Rieger
Mexico - Reynaldo Pascual
Adelino Albani
U.S.A. - Brian Fuchs
Richard Heim
Liz Love-Brotak

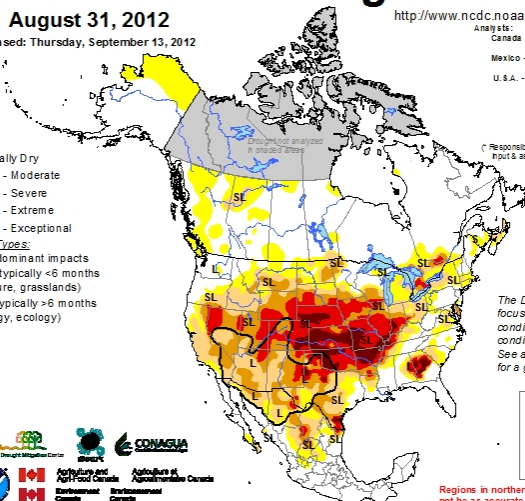
(* Responsible for collecting analysts' input & assembling the NADM map)

Intensity:

- D0 Abnormally Dry
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- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

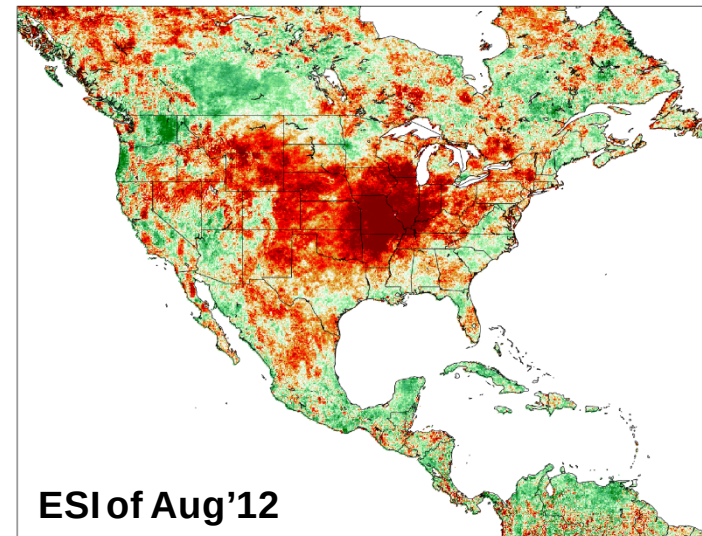
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically >6 months (e.g. hydrology, ecology)



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text for a general summary.

Regions in northern Canada may not be as accurate as other regions due to limited information.

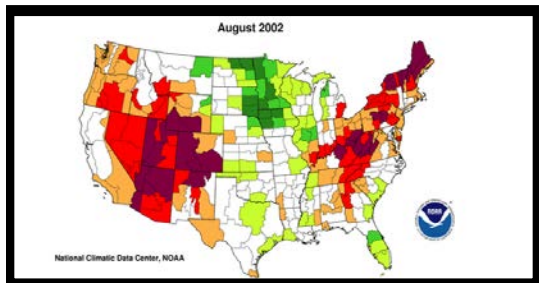


ESI of Aug'12

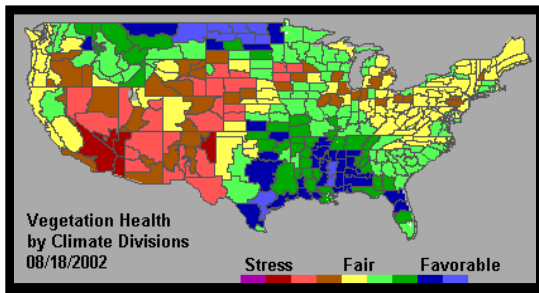


Enhancing US Drought Monitor

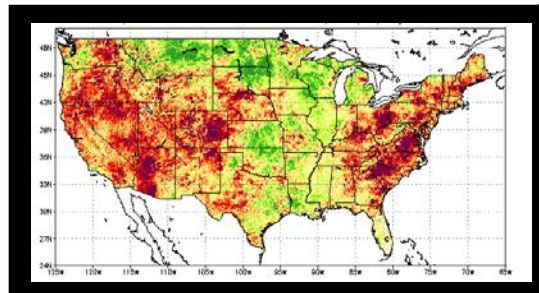
X. Zhan, J. Yin, C. Hain, J. Liu, L. Fang, M. Ek, J. Huang, M. Anderson, M. Svoboda



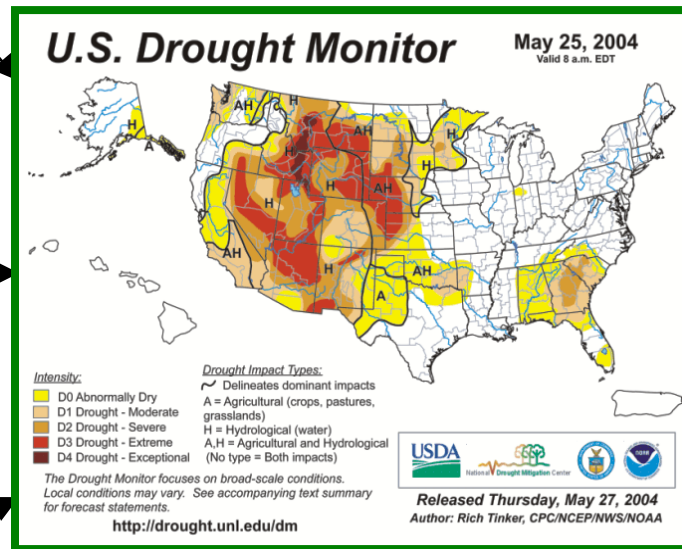
Palmer Drought Index



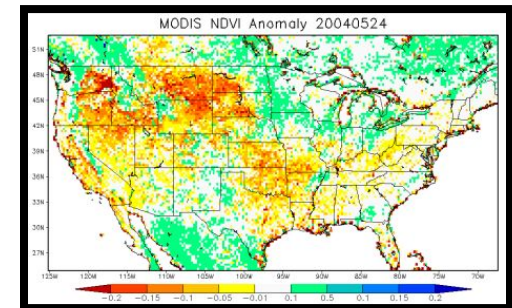
Vegetation Health Index



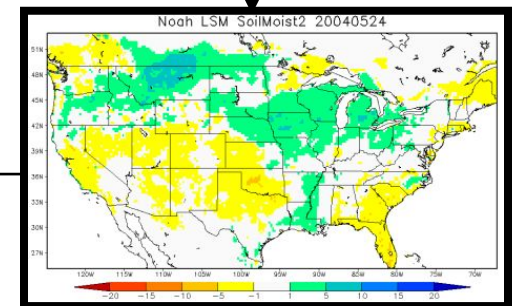
ALEXI ESI



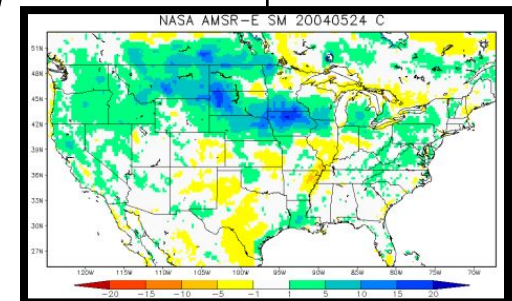
Utilities for assimilating global and regional soil moisture data products into Noah land surface model in NCEP GFS and WRF/NAM are developed and tested



Satellite ST, Alb, GVF/VI



LSM SM Output



Satellite SM

Funded by JPSS PGRR

CLASS:

<http://www.nsof.class.noaa.gov/saa/products/welcome>
(search for JPSS VIIRS EDR)

Team site :

<http://www.star.nesdis.noaa.gov/jpss/albedo.php>

NASA site:

<http://viirsland.gsfc.nasa.gov/Products/AlbedoEDR.html>

Monitoring:

http://www.star.nesdis.noaa.gov/jpss/EDRs/products_LST.php

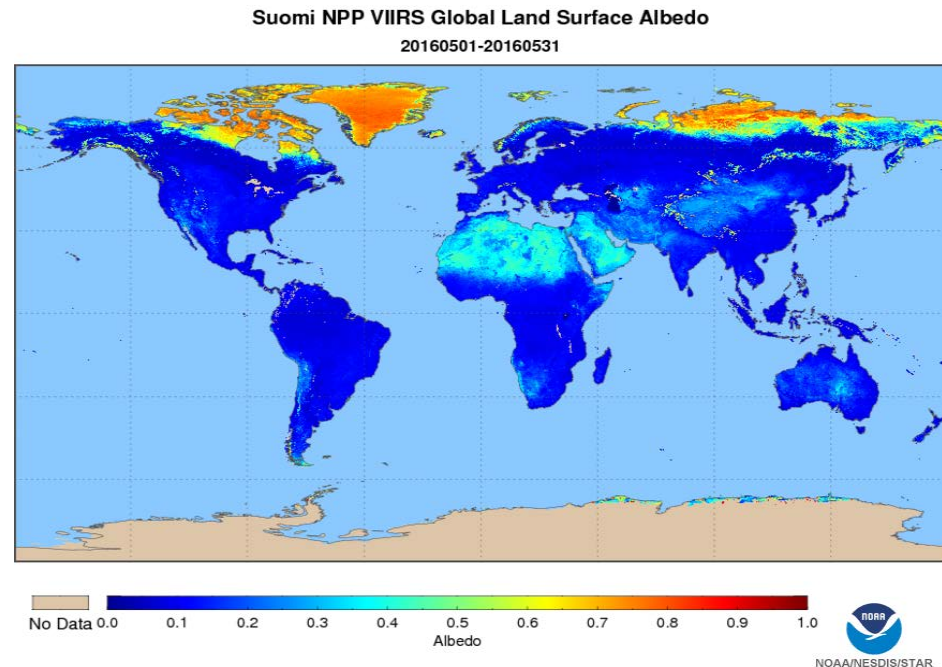
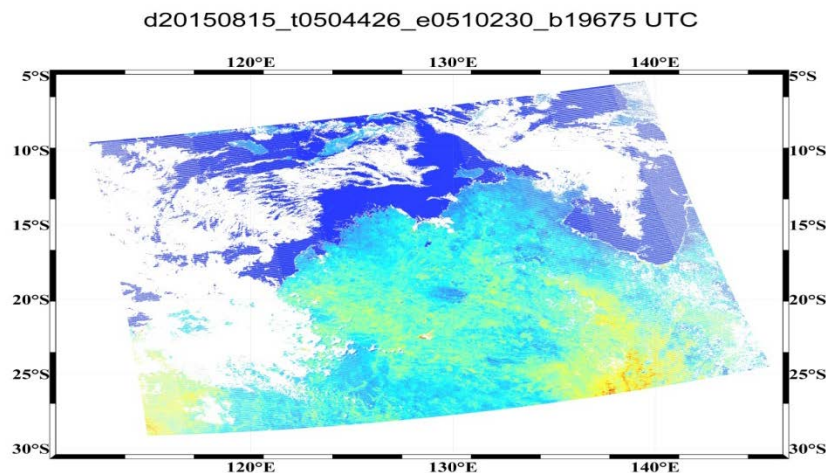
Two Products

- Single 1.5 min granule data
- Combined 4 x 1.5 min granule data

LUTs (coefficients set) update

- Beta (July, 2012), provision (July, 2014)
- Validated V1 (Nov 2016)

VIIRS LSA long-term monitoring and validation



A global map of land surface albedo composite with VIIRS products of June, 2016

Operational JPSS LST Products

Two Products

- Single 1.5 min granule data
- Combined 4 x 1.5 min granule data

LUTs (coefficients set) update

- Beta (July, 2012), provision (July, 2014)
- Validated V1 (March 2015)

CLASS:

<http://www.nsof.class.noaa.gov/saa/products/welcome>
(search for JPSS VIIRS EDR)

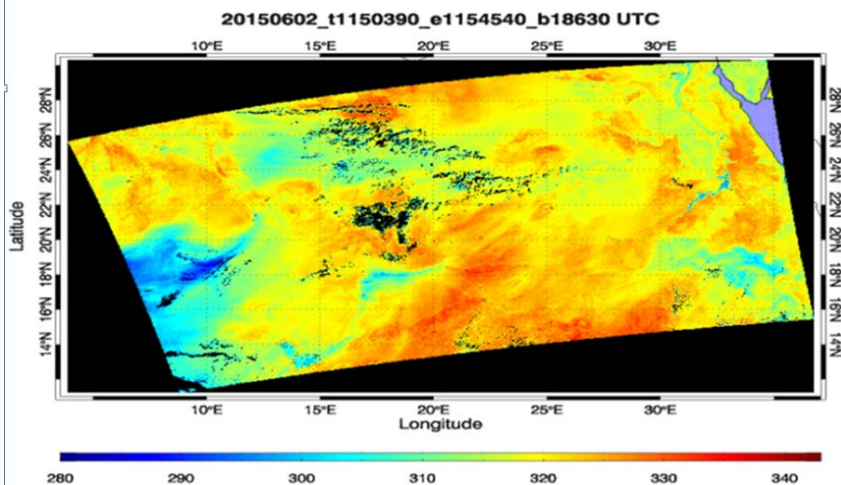
Team site : <http://www.star.nesdis.noaa.gov/jpss/lst.php>

NASA site:

<http://viirsland.gsfc.nasa.gov/Products/LSTEDR.html>

Monitoring:

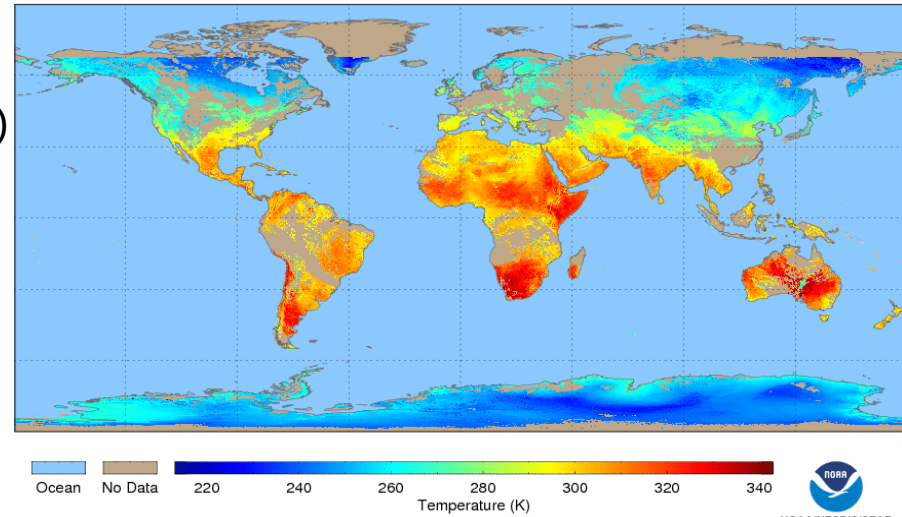
http://www.star.nesdis.noaa.gov/jpss/EDRs/products_LS_T.php



VIIRS LST long-term monitoring and validation

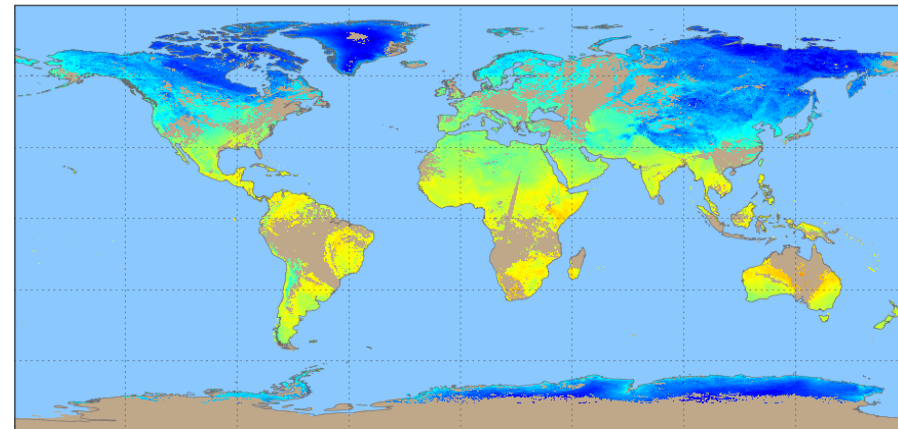
SNPP VIIRS Global Land Surface Temperature - Daytime

01 Feb 2016

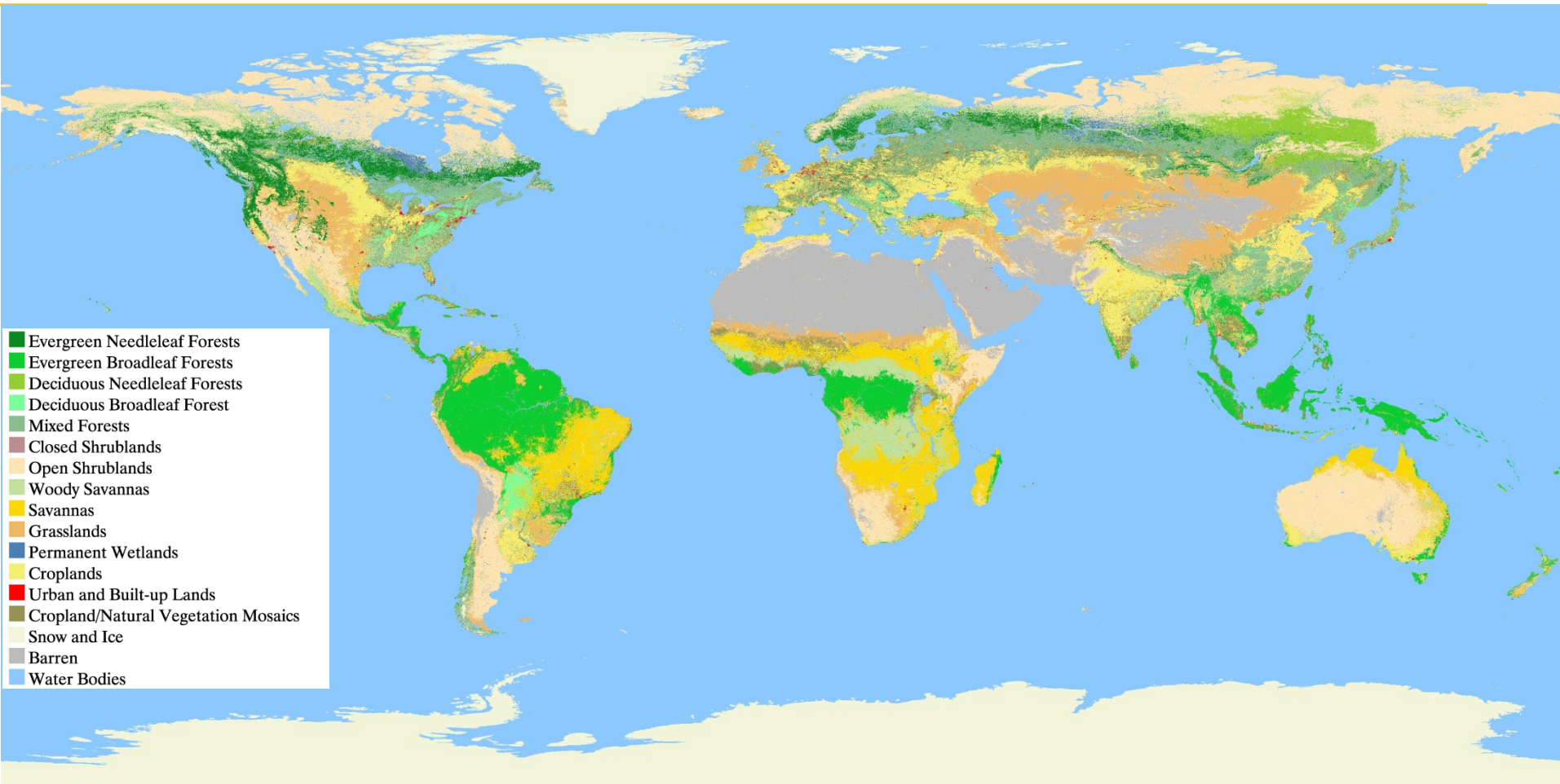


SNPP VIIRS Global Land Surface Temperature - Nighttime

01 Feb 2016



VIIRS Annual Surface Type



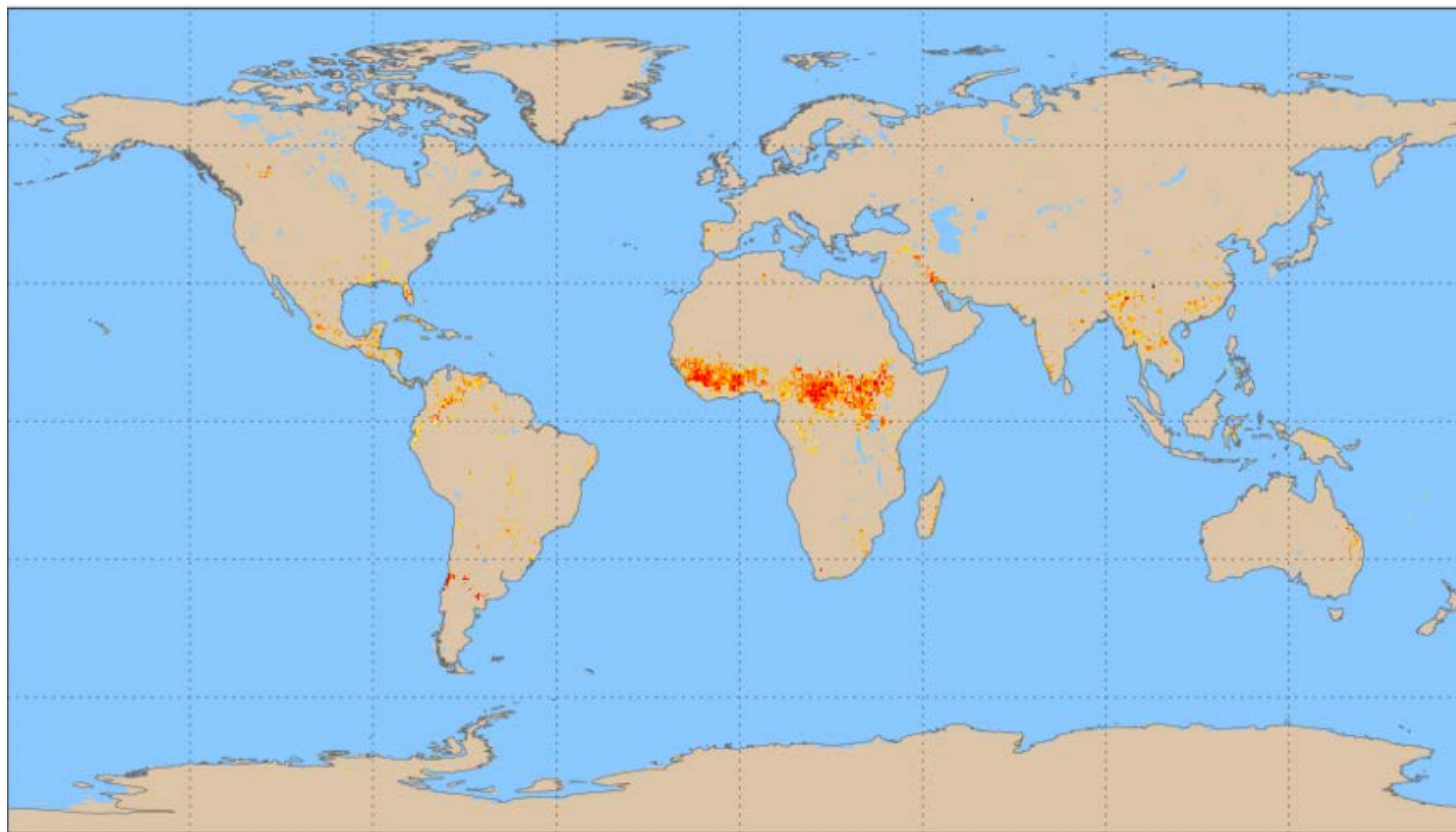
A new 1km surface type map is produced every year from VIIRS. The data are used to support numerical weather, climate, hydrological and ecological modeling.

<http://www.star.nesdis.noaa.gov/ipss/st.php>
<http://vct.geog.umd.edu/st/>

VIIRS Active Fire

Suomi NPP VIIRS - NDE Fire Radiative Power - Total

24 Jan 2017



<https://www.star.nesdis.noaa.gov/jpss/fires.php>

https://www.star.nesdis.noaa.gov/jpss/EDRs/products_activeFires.php

Land Prediction in Weather & Climate Models: NOAA's Operational Numerical Guidance Suite

