Land, Cryosphere, and Nighttime Science Products from Suomi NPP VIIRS: Overview and Status

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The Land PEATE: meeting the needs of the NASA Science Team and helping the NOAA IDPS VIIRS LDOPE QA: [http://landweb.nascom.nasa.gov/NPP_QA](http://landweb.nascom.nasa.gov/NPP_QA)

**VIIRS Global Browse**

**VIIRS Level 3 Products**

Known Issues Page
Suomi-NPP Land Cal/Val Phases

Late 2011


Liam (4yrs)  Luca (2yrs)  Clara (12 months)
MODIS/VIIRS cross calibration over a 50km x 50km site in Australia (left), and true color image of the site (right). The agreement between the two reflectance products is excellent. Data were acquired on 3/6/2012 after a calibration update of the VIIRS.
VIIRS Land Science Team Support Activities

Provision of spatially gridded VIIRS Surface Reflectance at both moderate (0.5 – 1.0 km) and CMG resolutions.

Land PEATE- adjusted version of VIIRS Surface Reflectance IP

E. Vermote (GSFC)

Integration and testing of VIIRS Active Fire DDR. New PGE installed to operations.

Level 2 Fire DDR, baseline NPP_VAFIP, 8/12/2012

L. Giglio (UMD)
Use of spatially refined satellite remote sensing fire detection data to initialize and evaluate coupled weather-wildfire growth model simulations

Janice L. Coen\(^1\) and Wilfrid Schroeder\(^2\)

The first nine VIIRS active fire detection polygons during the Little Bear Fire. Colors indicate detected fire extent at different Suomi-NPP overpass dates and times (UTC).

“Simulating wildfires from ignition can lead to accumulated errors from the model’s deteriorating skill even before first detection and any detectable fire growth.”
VIIRS Land Science Team Support Activities

Conversion of MODIS code for Daily LAI/FPAR to VIIRS Land Science DDR is complete.

R. Myneni (BU)

Reprocessing for IceBridge campaign: Latest code versions (MX6.3) were matched up with early 2012 NASA P3-B airborne campaign data.

(Left) Ice Surface Temperature and (Right) Sea Ice Characterization EDRs for 3/20/12.

M. Tschudi (CU-Boulder)
Recent Product Evaluations:
Global Absolute Difference in LST (Mx8.0 / Mx7.2), 2013.319

IDPS Mx8 version of the LST algorithm was recently found to underestimate the LST nearly for all of the surface types. LST generated from the previous IDPS build (Mx72) using Mx8 coefficient matches the current IDPS version. Thus, the surface type based coefficients are the source of the error in retrieved LST.

S. Devadiga (GSFC/LDOPE)
Evaluation of the VIIRS Land Surface Temperature (LST) EDR

The generation of a VIIRS LST product compatible with MODIS (i.e., a merged product using both split-window and dynamic emissivity retrieval) will result in a much more stable EDR.
The Suomi-NPP VIIRS Day Night Band

Detail of Italy 6/10/12, 00:02 UTC without stray light correction

Lunar phase: 65%

S. Mills, NGAS
Detail of Italy 6/10/12, 00:02 UTC with stray-light correction

Lunar phase: 65%

S. Mills, NGAS
Variations of carbon footprint of human settlements across cultures

Román with GSFC summer interns
An integrated perspective of global energy use across different sectors is currently needed to support measurement, reporting, and verification (MRV) in areas that currently lack MRV means.
We seek to benefit two separate communities that are both related to global climate change science. One deals with energy use from human settlements (mitigation), while the other deals with climate change effects on human settlements (adaptation).
Comparison of daily temporal profiles of total lighting electricity usage (TLEU) for six contrasting cities and three different holiday periods in 2012 and 2013 – Christmas (Left), Chinese Holiday (middle), and Ramadan (Right).
Findings:

- Different holidays have different energy consumption signatures.
- The character and economic role of the city plays a critical role in the variation in energy use.
- Less clear is what phenomena drive the variations within countries and regions.
- This study demonstrates the VIIRS high sensitivity to variations in energy use and its potential for assessing climate change mitigation and adaptation strategies.
Summary: Strengths and Weaknesses of the VIIRS

• What can **VIIRS** do that **MODIS** cannot?
  – Improved fire detections (25% higher VIIRS fire counts than MODIS in the three-pixel VIIRS aggregation zone).
  – (VIIRS Day/Night Band): VIIRS can directly assess a variety of phenomenon associated with human settlements (e.g., population, socio-economic activity, the built environment, and urbanization).

• What can **MODIS** do that **VIIRS** cannot?
  – **MODIS can ‘see’ the Amazon**: TERRA-MODIS was designed to cross the equator at a time when cloud cover is at its daily minimum (10:30AM, descending).

• What can **VIIRS** do that is currently missing?
  – VIIRS can/should be used to measure the Earth’s Biosphere: (i.e., not just daily VI and Surface Type, but also LAI/FPAR, NPP/GPP, Burned Area, Phenology, etc.)
For more information, visit:

http://viirsland.gsfc.nasa.gov/index.html