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VIIRS Imagery User Feedback
January 7, 2017
NexSat Home Page


Select Nexsat area of interest in the image map below.
NexSat: CONUS Domain

Products

- Visible
- Infrared
- Vapor
- True Color
- GEO-Color
- Cloud Tops
- Cloud Layers
- Cirrus
- Snow Cover
- Rain Rates
- Rain Totals
- Contrails
- Winds
- LowCloud
- Model Overlays
- Night Visible

West
- North
- South

Central
- North
- South

East
- North
- South
- GulfOfMexico

Age: <= 1 h
Age: <= 12 h
Age: <= 24 h
Age: > 24 h
# Catalog of NexSat Products

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*ViIRS products in orange*

* NAVGEM and COAMPS®

**Environmental Products**

- Aerosol amounts (optical depth)
- Biomass (vegetation type)
- Dust detection
- Fire detection (hot spots)
- Lightning detection
- Snow cover (surface)

**Standard Products**

- Visible (daytime)
- Visible (night time)
- Infrared
- Water Vapor
- True Color
- Pseudo/GEO True Color
- Rain Rates
- Rain Totals
  - 3, 6, 12, 24 hours
  - 2, 3, 4, 5, 6, 7, 10, 12, 14 days

**Cloud Products**

- Cloud layers (snow, low-middle, high)
- CloudSat (cloud profile)
- Cirrus cloud detection
- Contrail detection
- Low cloud detection (night)
- Convective cloud top height

**Cloud properties**

- effective radius
- optical depth
- cloud top temperature
- cloud top height
- cloud type

**Environmental Products**

- NWP model overlays
  - Sea Level Pressure
  - 500 mb Heights
  - sfc, 700 500 300 mb Winds
  - 1000-500 mb Thickness
  - Surface Temperature
  - Jet Stream
NRL VIIRS Cal/Val Web Page

http://www.nrlmry.navy.mil/VIIRS.html
Observing Aspects of Volcanic Ash

Monitoring Volcanic Plumes

Mt. Etna Eruption

NPP VIIRS True-Color 2013/11/23 12:16:22Z NRL-Monterey

10°E 15°E 20°E

45°N 40°N

VIIRS products available to the Volcanic Ash Advisory Centers (VAAC)

Dark airborne ash plume being ingested into mesoscale low

Collaboration: Volcanic Ash Advisory Centers (VAAC)
VIIRS provides a the required spectral suite of bands required to reproduce the MODIS ‘blue light absorption’ mineral dust enhancement algorithm of Miller (GRL; 2003).
Tools for Quantitative Lunar Applications from the VIIRS/DNB

- A lunar irradiance prediction model to allow conversion from DNB radiance to reflectance units

\[ R = \pi I^\uparrow / [\cos(\theta_m)E_m] \]

- Enables quantitative applications from measurements of reflected moonlight


A lunar availability assessment for the VIIRS/DNB to determine when and where nighttime lunar applications are possible for NPP and other polar orbits.

- \(~45\%\) all nights at mid-latitudes offer sufficient levels of moonlight

The lunar model can be used to produce a form of near constant contrast (NCC) imagery.

Applicable to **night-only** (i.e., to lunar observations at different times in the lunar cycle, especially near lunar terminator.

Not applicable to the day/night terminator where solar signal is present.

(28 June 2012, South Africa, around first-quarter Moon) shown here… → Moon is setting in the west at the time of the DNB nighttime overpass.
Nighttime Sea Ice Monitoring
DNB (low light visible) - Nighttime during Full Moon

11/27 – 12/04, Lunar cycle > 3/4

Collaboration with National Ice Center: Suitland, MD
Tracking the Rim Fire at Night
VIIRS DNB + IR enhanced with Lunar Irradiance Model
18 – 27 August

Collaboration: Navy Aerosol Analysis & Prediction Team
Comparing Nighttime Visible Products

DMSP-OLS 04:29Z

23 Aug

VIIRS-DNB 09:48Z
Nighttime TC Monitoring Via DNB

VIIRS DNB reflectance + IR reveals LLCC displaced ~60 nm from IR convection center

CPHC Warning:
- Relocated TS Flossie center fix well north
- Landfall no longer on island of Hawaii
- Revised track now impacts area along northern coasts

Collaboration: Joint Typhoon Warning Center
1. Contrast enhancement for cloud detection under faint illumination
2. Take advantage of highly variable air glow opportunities
1. Better land surface details in the desert SW.
2. Improved cloud detail and contrast of clouds with land/ocean backgrounds.
3. Moonglint region--better illustration of the island wake calm waters (SE of Catalina Island) for surface wind speed and direction inference.
4. Not only is it a nice image, but it's *quantitative* information which can be translated into various physical properties like cloud optical depth.
Low Clouds & Fog Detection

Feb 23, 2012

Airglow provides sufficient illumination to “light up” low clouds

Low Cloud Deck Boundary

Korean Peninsula

City lights

Fishing boats

Day/Night Band

Collaboration: Fleet Numerical & Meteorology Center
~1:30 AM Pacific: New Moon

Feb 22, 2012

Courtesy: S. Miller, CSU/CIRA
The NWS San Juan is very pleased to announce a customized domain of satellite imagery for Puerto Rico courtesy of the Naval Research Laboratory in Monterey, CA (NRL-MRY). The NexSat (Next-Generation Weather Satellite Demonstration Project) website displays high-resolution imagery from the newest sensor Visible Infrared Imager Radiometer Suite (VIIRS) that flies on the Suomi NPP (National Polar-orbiting Partnership) polar orbiter, the Moderate Resolution Imaging SpectroRadiometer (MODIS) on board NASA’s Aqua and Terra satellites, the Advanced Very High Resolution Radiometer (AVHRR) from NOAA’s and EUMETSAT satellites, and the Operational Linescan System (OLS) from the Defense Meteorological Satellite Program (DMSP). The VIIRS instrument has significant improvements over its heritage instruments AVHRR, MODIS and OLS in which its 3000 km wide scanning swath overlaps previous scans providing complete coverage of tropical regions at least twice daily sometimes twice in less than two hours. The satellite also maintains the same resolution