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”
Implementation of the NOAA Enterprise version is ongoing.

E. Vermote, NASA
VIIRS Gridded Vegetation Products

**NDE Operational 4km global 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)**

**NDE Operational 1km regional VIIRS GVF**


M. Vargas, STAR
Vegetation Health

VIIRS vs. AVHRR and Precipitation
ETHIOPIA 2016


F. Kogan, STAR
Phenology: monitoring and prediction of vegetation changes

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

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

Y. Yu, STAR; X. Zhang, SDSU
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
http://www.ncdc.noaa.gov/nadam.html

North American Drought Monitor
August 31, 2012
http://www.ncdc.noaa.gov/nadam.html

ESI of Aug’11

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

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.

Funded by JPSS PGRR

X. Zhan, STAR
Operational JPSS LSA 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 (Nov 2016)

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

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
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_LST.php
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/jpss/st.php
http://vct.geoq.umd.edu/st/

X. Zhan, STAR
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

- **Climate Forecast System (CFS)**
  - GFS, MOM4, GLDAS/LIS/Noah, Sea Ice
  - 3D-VAR DA

- **Regional Hurricane**
  - GFDL, WRF-NMM + Noah
  - 3D-VAR DA

- **Regional NAM**
  - NMMB
  - Noah land model
  - 3D-VAR DA
  - Short-Range Ensemble Forecast 21 members
  - WRF (ARW + NMM) NMMB 7 members each
  - High Res Windows
    - WRF-ARW & NMMB

- **Regional Bays**
  - Great Lakes (POM)
  - N Gulf of Mexico (FVCOM)
  - Columbia R. (SELF)
  - Chesapeake (ROMS)
  - Tampa (ROMS)
  - Delaware (ROMS)

- **North American Land Surface Data Assimilation System**
  - Noah Land Surface Model

- **Global Forecast System (GFS)**
  - Global Spectral
  - Noah LSM
  - Global Ensemble Forecast System (GEFS)
    - 21 GFS Members
  - North American Ensemble Forecast System
    - GEFS, Canadian Global Model

- **Ecosystem**
  - EwE

- **Air Quality**
  - CMAQ

- **Rapid Refresh**
  - WRF ARW
  - 3D-VAR DA

- **Space Weather**
  - ENLIL

- **Dispersion**
  - HYSPLIT

- **Radiation**
  - P-SURGE SLOSH

- **NEMS Aerosol Global Component (NGAC)**
  - GFS & GOCART

- **Estuarine and Tidewater Models**
  - ESTOFS
  - ADCIRC
  - SURGE
  - SLOSH
  - P-SURGE SLOSH

- **Waves**
  - WaveWatch III

- **Ocean (RTOFS)**
  - HYCOM

- **Ecosystem**
  - EwE

- **High-Res RR (HRRR)**
  - WRF ARW
  - 3D-VAR DA

- **M. Ek, NCEP**