Vegetation Health from SNPP/VIIRS

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WE START FROM: Normalized Difference Vegetation Index (NDVI) & Brightness Temperature (BT)
WE PRODUCE: Global Vegetation Health (VH)
From AVHRR/NOAA-19 Operational Polar Orbiting Satellite

Global Vegetation Health
October 9, 2012
From NOAA-19 Operational polar orbiting satl

Drought from USDM & SNPP/VIIRS
NEW vs OLD: VIIRS versus AVHRR

Channels

Climate data records problems

NDVI

BT

Normalized Difference Vegetation Index (NDVI)

Brightness Temperature (BT)
ADJUSTMENT: NDVI (SMN): AVHRR-VIIRS time series

Regression Coefficients: \( Y = a + b \cdot X \)
- \( a = -0.037363 \)
- \( b = 0.702253 \)

Correlation Coefficients: \( Y = a + b \cdot X \)
- \( \text{mean}(a) = 0.939411 \)
- \( \text{mean}(b) = 0.9374 \)
- \( \text{RMSE} = 0.0486750 \)

Data used: 2012 week 27 to 2013 week 30

\( Y = a + b \cdot X \)
- \( a = -0.0374925 \)
- \( b = 0.703031 \)

\( \text{Nsamples} = 4963003 \)
- \( \text{CC} = 0.9374 \)
- \( \text{RMSE} = 0.0486750 \)

\( \text{lon} = [-180.00, 180.00] \), \( \text{lat} = [-40.00, 40.00] \)
ADJUSTMENT: BT (SMT): AVHRR-VIIRS COR and Time Series

Regression Coefficients

Y = VIIRS-SM:mean_SMT, Y = VHP-SM:SMT

Y = a + b * X

mean(a) = -12.9047, mean(b) = 1.04711

Correlation Coefficients

X = VIIRS-SM:mean_SMT, Y = VHP-SM:SMT

mean(CC) = 0.963497

Nsamples = 8638092
CC = 0.9610
RMSE = 3.51405

lon = [-180.00, 180.00] lat = [-40.00, 60.00]

Data used: 2012 week 35 to 2013 week 47
Using High resolution VH products

• Present high resolution data by
  – Map tiles
  – Detail map of province or sub-divisions

• Using with GIS data
Viewed the 1km VH products by Leaflet (like Google map)
Using map tiles technology to present 1km VH data through web pages

Users access the country and province maps by clicking the web page.
Major Wheat Area of Australia

The small images with blue background are mask files generated from the polygons provided by USDA.
SMN time series, averaged for the selected regions

Western Australia

South Australia

Victoria

New South Wales

Queensland
EXPERIMENTS: 500 m S-NPP/VIIRS Vegetation Health: California

S-NPP/VIIRS-500m Vegetation health, June 12, USA, California, Central Valley
Vegetation Health from SNPP/VIIRS & Economic Indicators

(a) June 4, 2015
(b) August 1, 2015

Vegetation Health from 500 m S-NPP/VIIRS

(c) Economic Impacts of California Drought

Intensity of Economic and VH-assessed Impacts
- Stronger
- Moderate
- Weaker

August 1 - June 4, 2015