

Overview of the Land Product Validation System (LPVS) for Enhanced Data Access, Retrieval, and Analysis of Satellite Data

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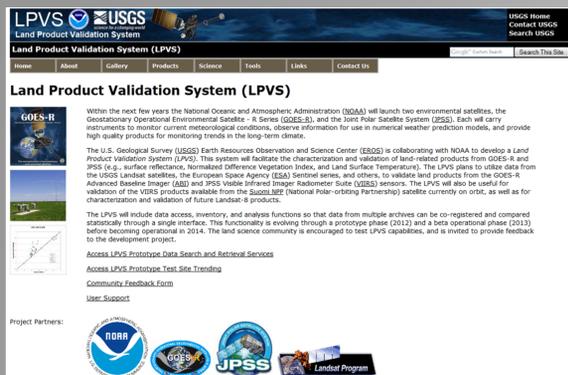
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The National Oceanic and Atmospheric Administration (NOAA) and the U.S. Geological Survey (USGS) Earth Resources Observation and Science (EROS) Center are collaborating on the development of a Land Product Validation System (LPVS) that will facilitate the application of multi-satellite and in-situ data for characterization and validation of land products (e.g., surface reflectance, normalized difference vegetation index (NDVI), and land surface temperature) derived from satellite sensors. Developed for evaluation of Geostationary Operational Environmental Satellite – R Series (GOES-R) and Joint Polar Satellite System (JPSS) products, LPVS will provide capabilities for cross-comparisons between multiple data sets. Data and products from satellites such as the USGS Landsat 8, the European Space Agency (ESA) Sentinel series of satellites, and other moderate to high spatial resolution sensors, will be added to LPVS when available.

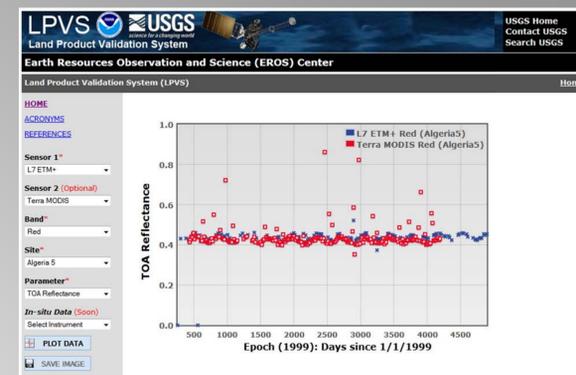
The LPVS includes data inventory, access, and analysis functions that will allow data from multiple archive facilities to be easily identified, retrieved, co-registered, and compared statistically through a single interface. This functionality is evolving through a prototype phase (September 2012) towards a beta operational phase (September 2013) that will transition to full operations in late 2014.



<http://landsat.usgs.gov/LPVS.php>



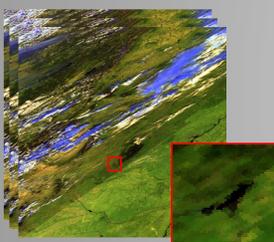
<http://lpvsexplorer.cr.usgs.gov/>



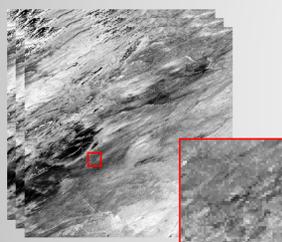
<https://calval.cr.usgs.gov/lpvs/ajax.php>

INPUT: Multiple Satellite Products

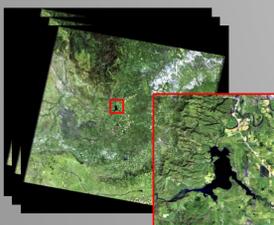
Time Series over Angostura Reservoir near Hot Springs, SD
Southern Black Hills



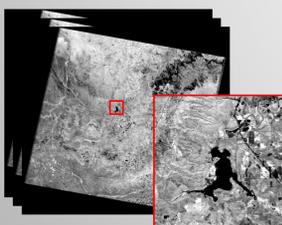
Terra
MODIS



MOD13A1 16-Day NDVI
500-m Sinusoidal Tile h10v04



Global Land Survey 2010 Surface Reflectance
30-m Universal Transverse Mercator (UTM)
Path 33 / Row 30



Global Land Survey 2010 NDVI
30-m UTM
Path 33 / Row 30

SERVICE PROCESSING OPTIONS

- File Format
 - GeoTiff
 - HDF4
 - HDF5
 - NetCDF
 - Binary
 - ASCII
- Band Subsets
 - Specific to Product
- Map Projection
 - UTM
 - Albers
 - Alaska Albers
 - Lambert Azimuthal
 - Geographic
- Resampling
 - Nearest Neighbor
 - Bilinear
 - Interpolation
 - Cubic Convolution

LPVS Service Processing Options

1 File Format: NetCDF

2 Band Subset: L7 ETM+

- Red (Band 3)
- Blue (Band 1)
- Green (Band 2)
- NIR (Band 4)

3 Map Projection: Lambert Azimuthal

- Datum: No Datum
- Center Longitude: -100
- Center Latitude: 45
- False Northing: 0
- False Easting: 0
- Sphere: 6370997

4 Resampling: Cubic Convolution

Pixel Size: 60 meter

5 Spatial Subset: Input Lat/Lon

- Upper Left D.D.: 49.6523, -102.59760
- Latitude: 41.1624, Longitude: -94.7516
- Lower Right D.D.

6 Statistical Analysis: Mean

- Apply to only this file
- Apply to all files in this collection

Cancel Save

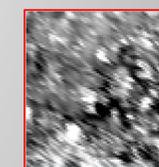
- Spatial Subset
 - Input Lat/Lon
- Pixel Size
 - 30-meter
 - 60-meter
 - 120-meter
 - 250-meter
 - 370-meter
 - 500-meter
 - 740-meter
 - 1000-meter
 - 2000-meter
- Statistical Analysis
 - Single Sensor
 - Multiple Sensors
 - Single Product
 - Multiple Products
 - Mean
 - Standard Deviation
 - Maximum
 - Minimum
 - Root Mean Square
 - Error

OUTPUT: Processed Products with Statistics

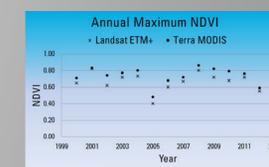


MODIS tile reprojected, resampled, and subset to match Landsat scene extent.

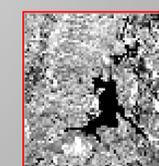
MODIS tile reprojected to Lambert Azimuthal and resampled to 250-m.



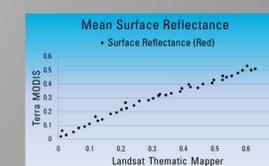
Terra MODIS Surface Reflectance (left) and NDVI (right) reprojected, resampled, and subset to area of interest over Angostura Reservoir near Hot Springs, SD (Lambert Azimuthal, 250-m).



Comparative plot of maximum NDVI per year for Landsat 7 Enhanced Thematic Mapper Plus (ETM+) and Terra MODIS.



L7 ETM+ Surface Reflectance (left) and NDVI (right) reprojected, resampled, and subset to area of interest over Angostura Reservoir near Hot Springs, SD (Lambert Azimuthal, 250-m).



Landsat ETM+ (x) and Terra MODIS (y) red surface reflectance values plotted for statistical comparison.

The LPVS will serve as a much needed tool for intercomparison of products from multiple satellites, including Landsat 7 ETM+ and Terra MODIS as represented here, and for GOES-R ABI, JPSS VIIRS, and Landsat 8 Operational Land Imager (OLI) as those data become available. LPVS is planning to add in-situ collections to its inventory as well, further enhancing its capability to provide data stacks and statistics from a single system for comparative analyses. Please visit the Web interfaces mentioned above for additional information and direct access to the LPVS.