LP DAAC Access and Capabilities

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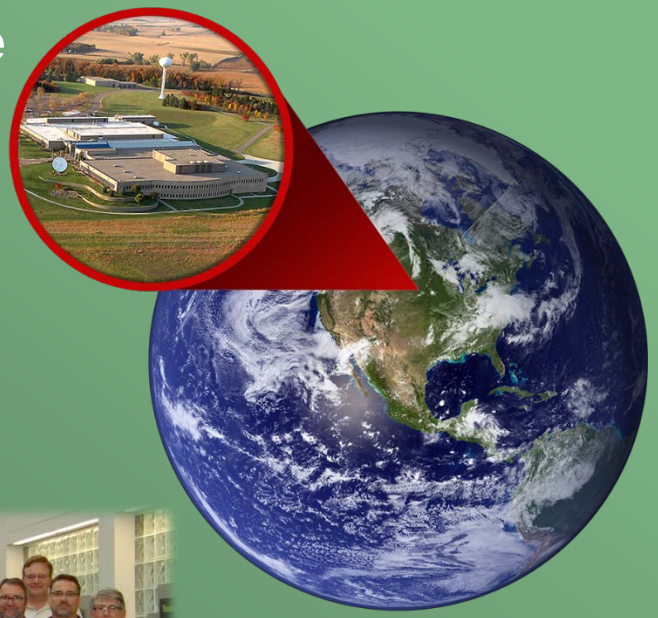
***Work performed under USGS contract G15PD00766**

NASA's LP DAAC

- Land Processes (LP) Distributed Active Archive Center (DAAC)
  - https://lpdaac.usgs.gov
- Located in Sioux Falls, SD at the USGS Earth Resources Observation Science (EROS) Center



NASA's LP DAAC

- 1 of 12 NASA Earth Observing System Data and Information System (EOSDIS) DAACs
- Part of in NASA's Earth Science Data Systems Program

What is a DAAC?

Tiered Customer Support

Sister DAAC support

Archive

Distribution

Access

Standards

Training

Awareness

Outreach

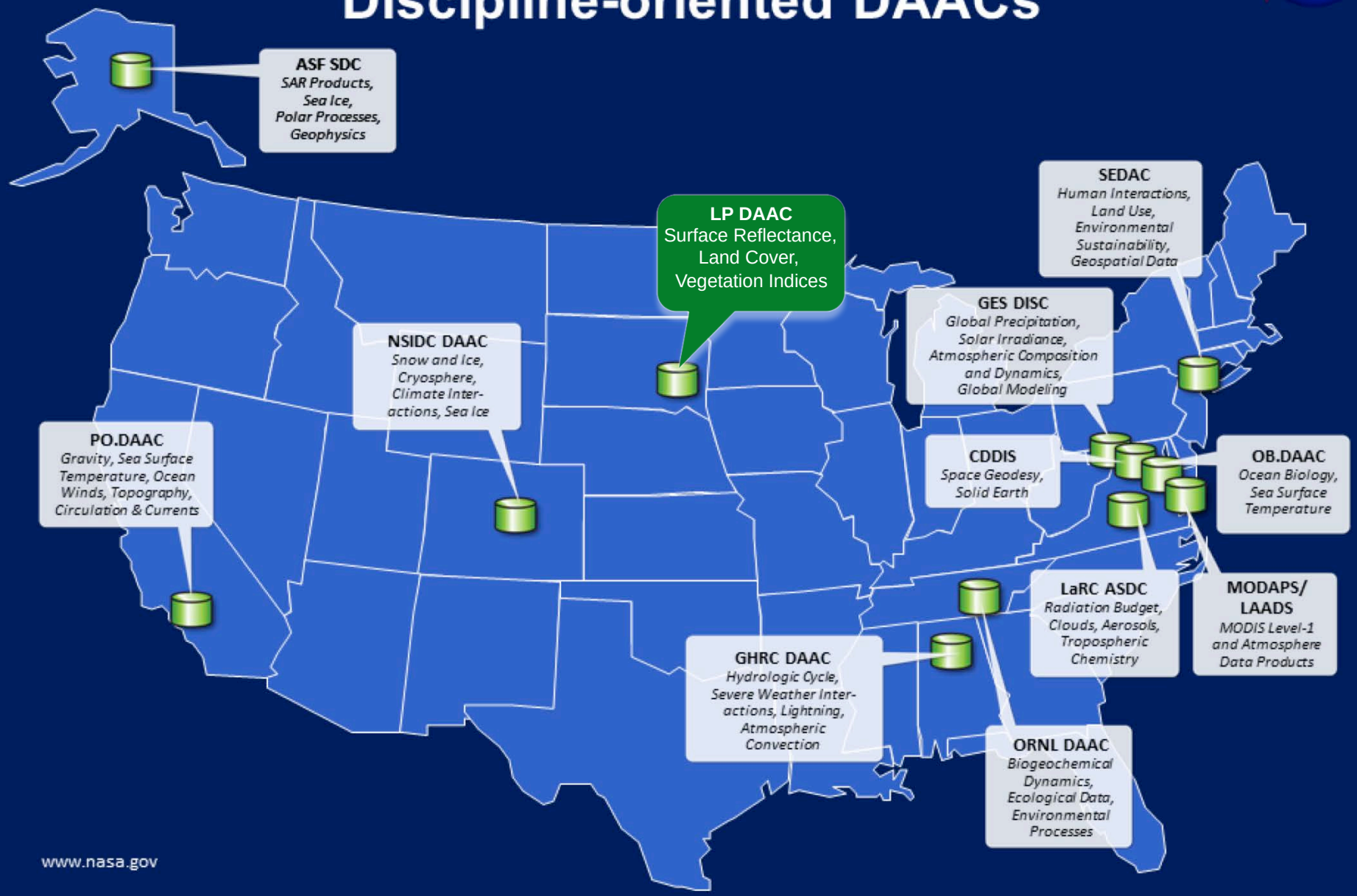
New technology exploration

Research and applied sciences support

USGS NASA

National Aeronautics and Space Administration

Discipline-oriented DAACs

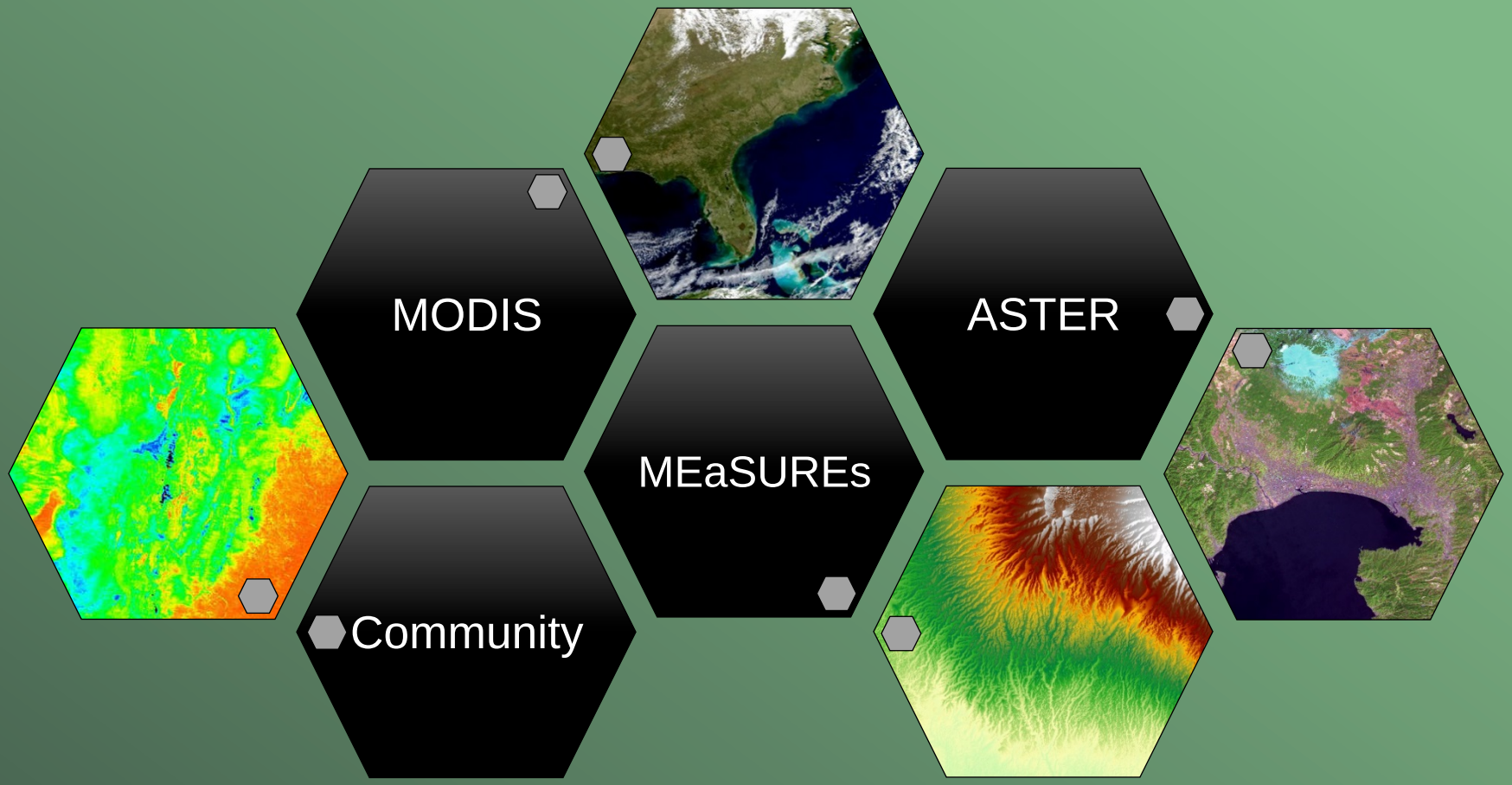


www.nasa.gov

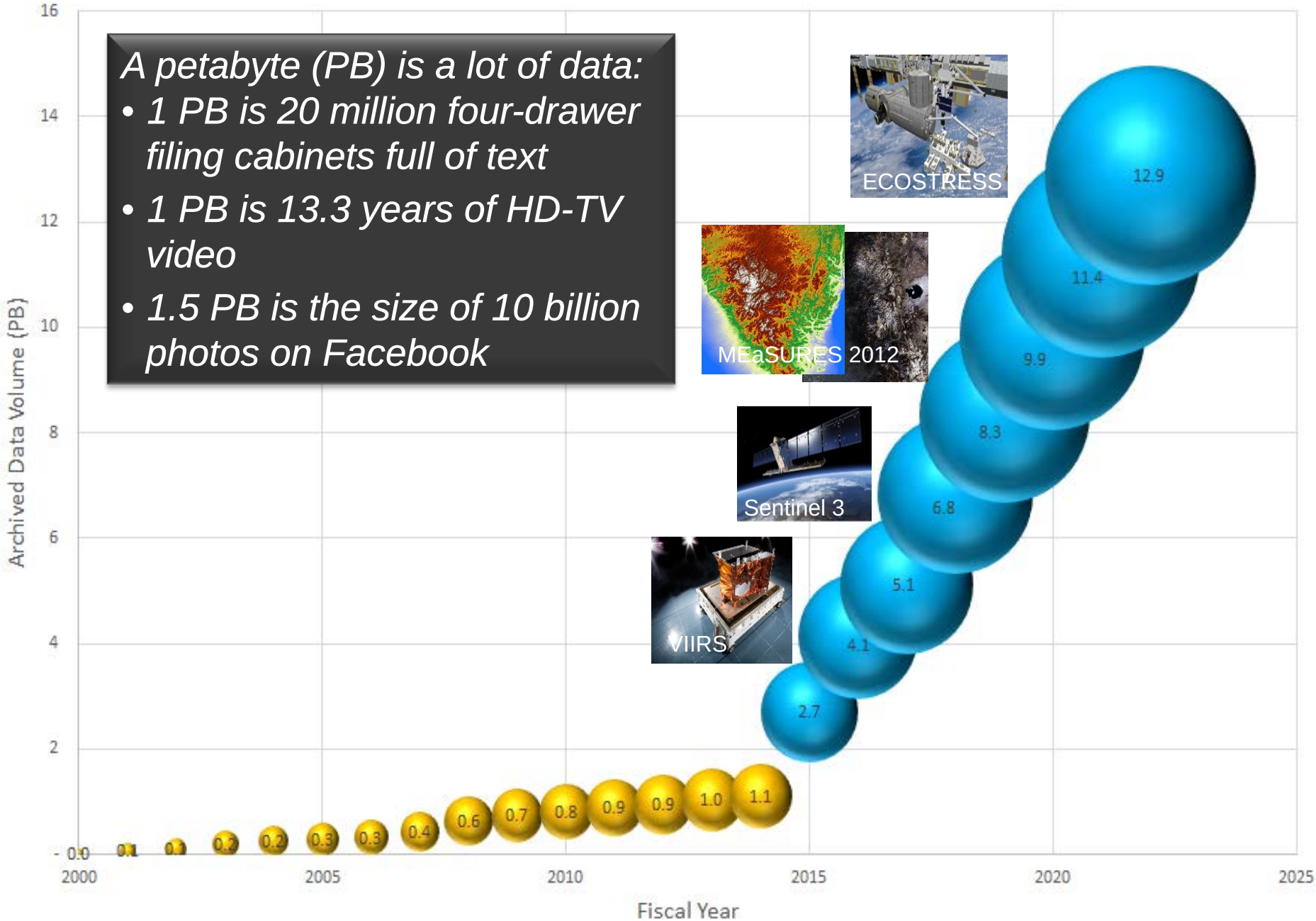
What does the LP DAAC do?

Processes, archives, and distributes land data products to NASA PI's, DOI land managers, and 100,000's of users in the public earth science remote sensing community

LP DAAC Distributed Data Products



LPDAAC Archive Data Volume Trend: FY00-22



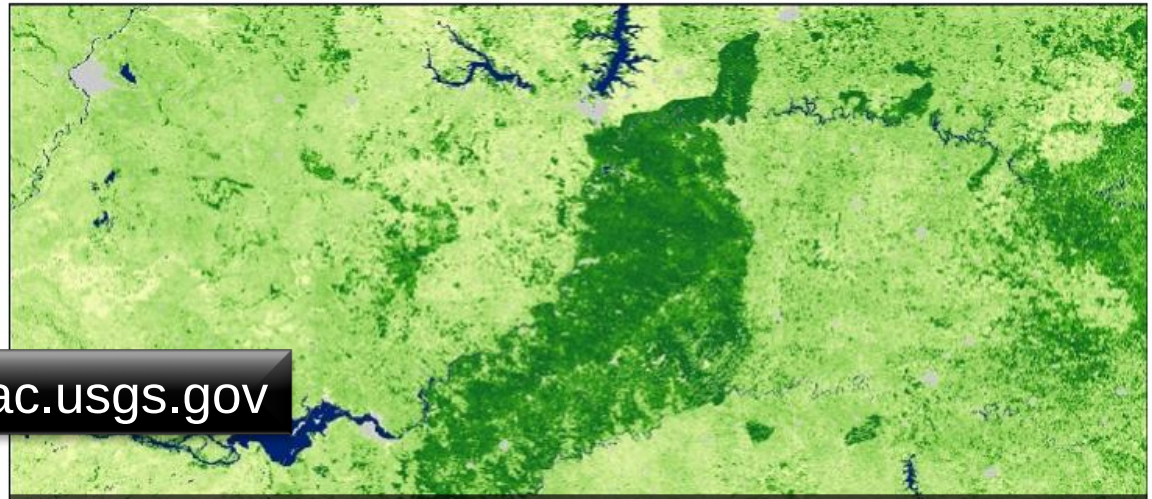
Data Discovery | DAACs | Community | Science Disciplines

LP DAAC

LAND PROCESSES DISTRIBUTED ACTIVE ARCHIVE CENTER

Home | About | Dataset Discovery | Citing Our Data | Tools | User Resources | User Services | Site | Search | Login with URS

The LP DAAC website has recently been updated. Please check your bookmarks for outdated or broken links.



Data In Action

More Pixels, More Definition: MODIS Version 6 LAI

View more

https://lpdaac.usgs.gov

NASA and USGS Partnership

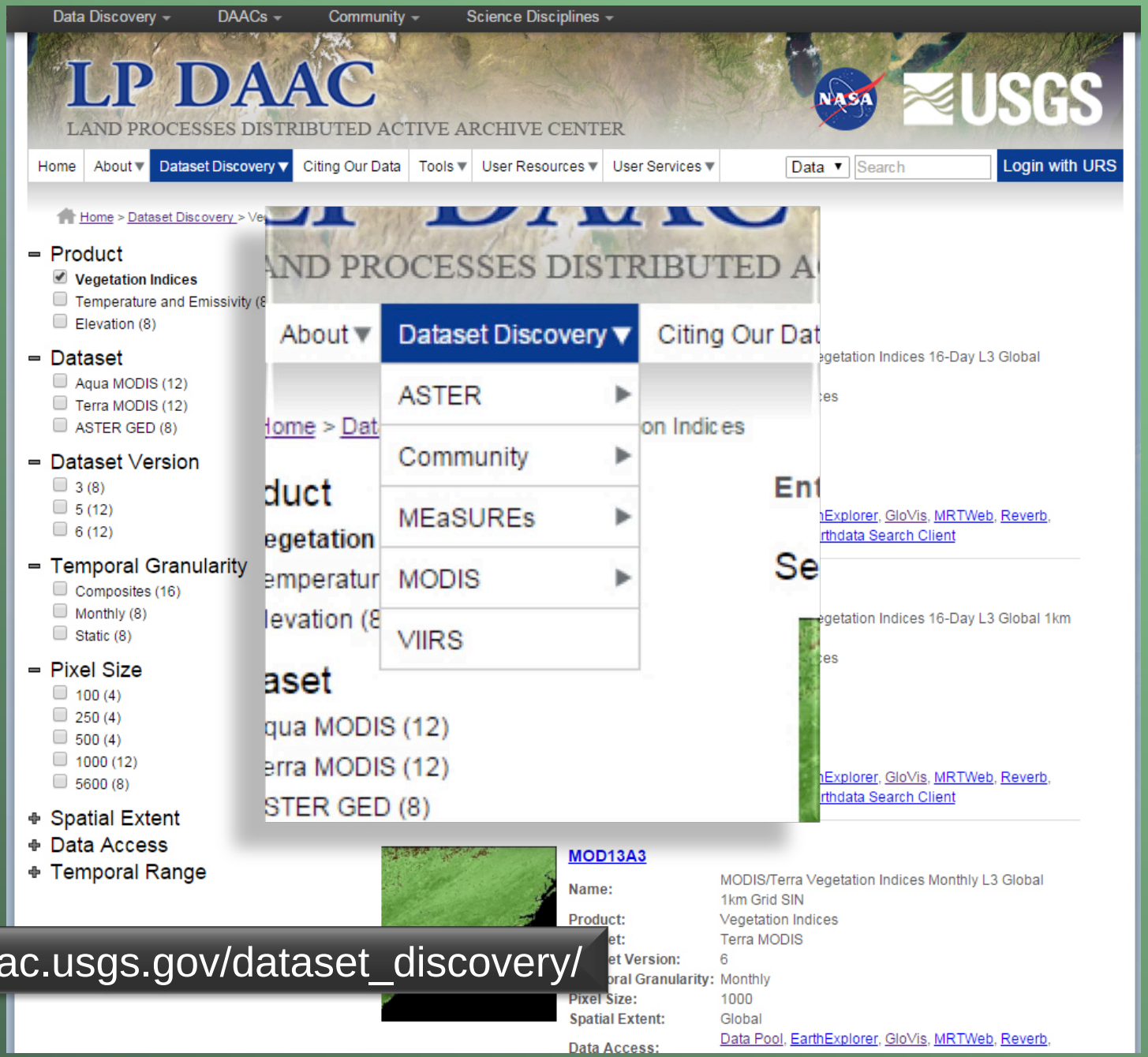
The Land Processes Distributed Active Archive Center (LP DAAC) is one of several discipline-specific data centers within the NASA Earth Observing System Data and Information System (EOSDIS). The LP DAAC is located at the USGS Earth Resources Observation and Science (EROS) Center in Sioux Falls, South Dakota.

News

SUBSCRIBE TO: NEWS FEED LISTSERV

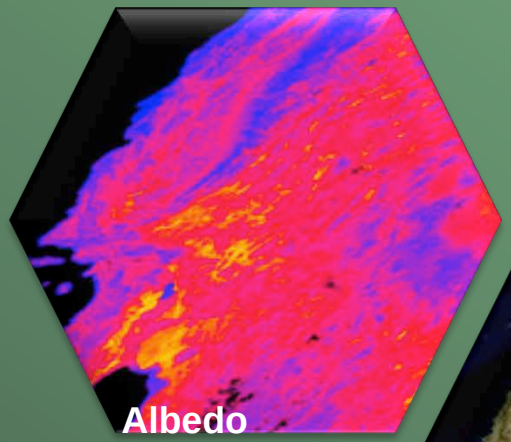
02/24/2016
Highlights from the Literature: October to December 2015

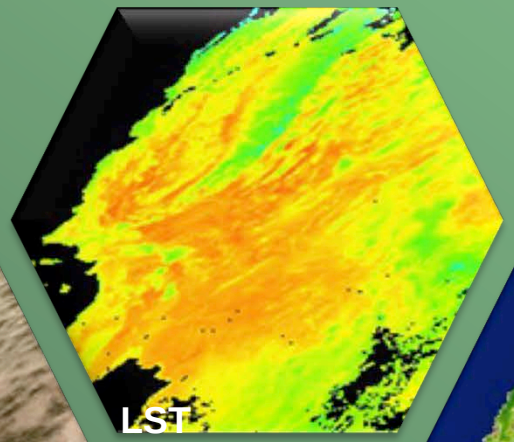
02/17/2016
MODIS Version 6 Bidirectional Reflectance Distribution Function (BRDF) and Albedo Products Unavailable

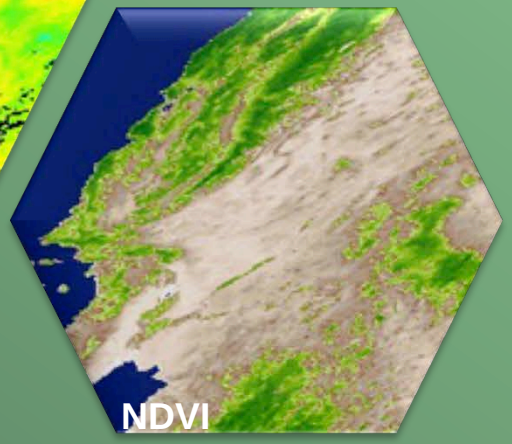


https://lpdaac.usgs.gov/dataset_discovery/

MODIS Products at the LP DAAC







MODIS Land Data Products

- Moderate Resolution Imaging Spectroradiometer (MODIS)
- On board NASA's Terra and Aqua satellites
- Level 2 and Level 3 land products

Temporal Coverage	2000 (Terra), 2002 (Aqua) - Present
Geographic Coverage	Global
Spatial Resolution	250 m, 500 m, 1,000 m, 5,600 m
Unique Products	126 and growing!

MODIS Data Product Types

- Radiation Budget Variables
  - Surface Reflectance
  - BRDF and Albedo
  - Land Surface Temperature and Emissivity
- Vegetation
- Thermal Anomalies and Fire
- Vegetation Characteristics
- Land Cover

MODIS Version 6 Collection-Wide Changes

- Geolocation updates
- Polarization Corrected L1B
- New Land Water mask
- Improved Cloud mask

Product-Specific Updates

DAACs Community Science Disciplines

LP DAAC
LAND PROCESSES DISTRIBUTED ACTIVE ARCHIVE CENTER

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Home > MODIS > MODIS Products Table > MOD09A1 V006

MOD09A1: MODIS/Terra Surface Reflectance 8-Day L3 Global 500m SIN Grid V006

Description

The MODIS Terra MOD09A1 Version 6 product provides an estimate of the surface spectral reflectance of Terra MODIS Bands 1-7 corrected for atmospheric conditions such as gasses, aerosols, and Rayleigh scattering. Along with the seven 500m reflectance bands is a Quality layer and four observation bands. For each pixel, a value is selected from all the acquisitions within the 8-day composite period. The criteria for the pixel choice include cloud and solar zenith. When several acquisitions meet the criteria the pixel with the minimum channel 3 (blue) value is used. Validation at stage 3 has been achieved for all MODIS Surface Reflectance products.

Improvements/Changes from Previous Versions

- Improvement to the aerosol retrieval and correction algorithm and use of new aerosol retrieval Look up Tables.
- Refinements to the internal snow, cloud, and cloud shadow detection algorithms. Uses BRDF database to better constraint the different threshold used.
- Processes ocean bands to create a new Surface Reflectance Ocean product and provide QA data sets for these bands.
- Improved discrimination of salt pans from cloud and snow and flag salt pan in QA band

Citation

PI Name: Eric Vermote

DOI: 10.5067/MODIS/MOD09A1.006

Citing Our Data

MOD09Q1. Acquired October 15, 2004. Tile H11V05. Southeast US.

DOI 10.5067/MODIS/MOD09A1.006

Product	Reflectance
Dataset	Terra MODIS
Dataset Version	6
Pixel Size	500
Temporal Granularity	Composites
Spatial Extent	Global
Data Access	DAAC2Disk, Data Pool, Earthdata Search Client, Reverb

What's new in MODIS Version 6

- Radiation Budget Variables
  - New surface reflectance products (M*DOCGA and M*DTGBA)
  - New Land Surface Temperature and Emissivity products created in response to user community requests (M*D11B2, M*D11B3)

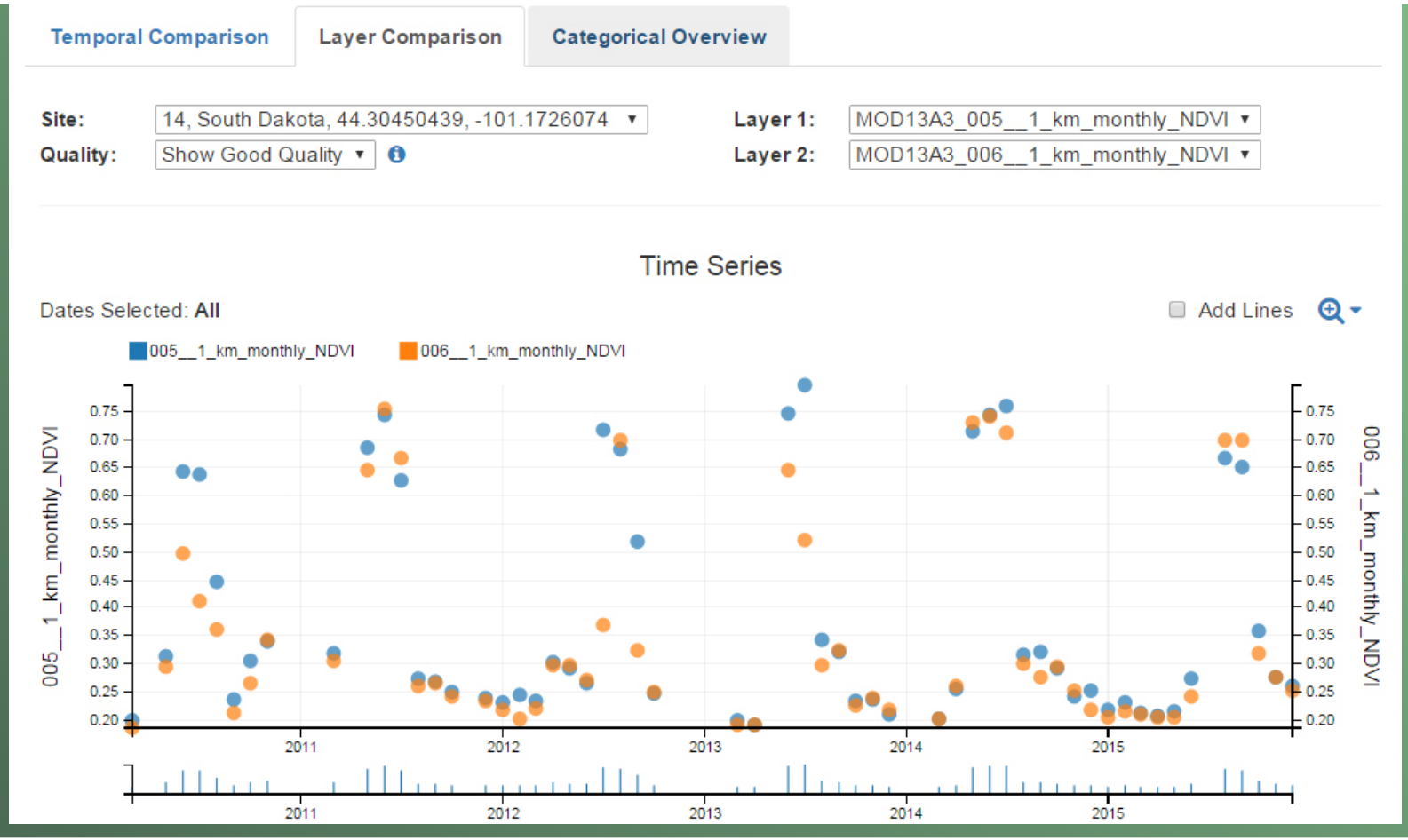
Available now!

What's new in MODIS Version 6

- Ecosystem Variables
  - New compositing process for Vegetation Indices (M*D13s)
  - Improved resolution of Leaf Area Index/FPAR (M*D15s), Gross and Net Primary Productivity (M*D17s) products

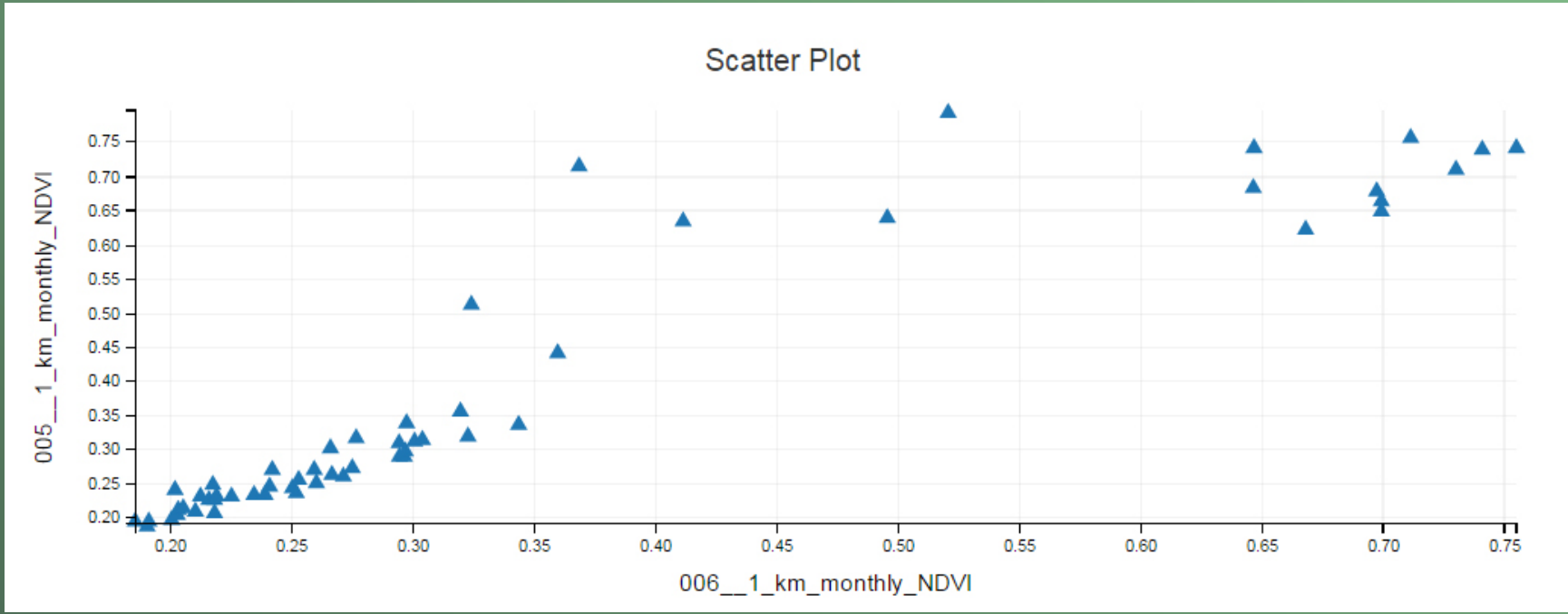
Available now!

Monthly MODIS NDVI V5 vs. V6



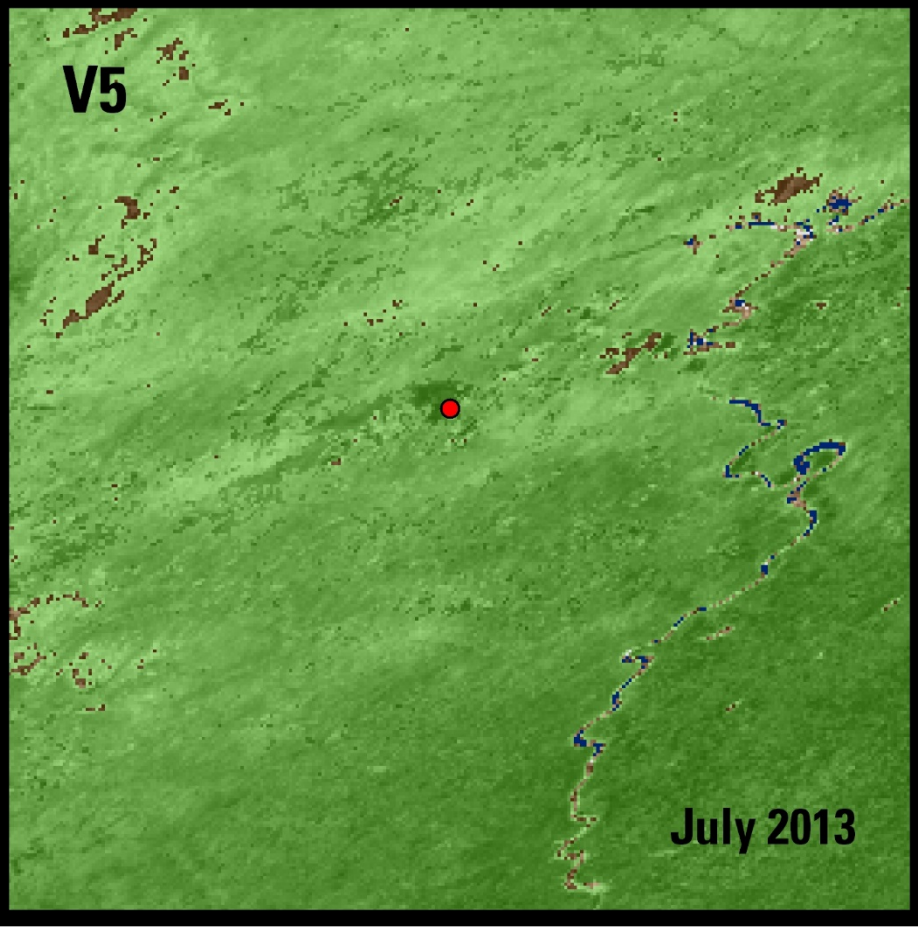
Monthly MODIS NDVI V5 vs. V6

South Dakota, 44.30450439, -101.1726074



Monthly MODIS NDVI V5 vs. V6

South Dakota,
44.30450439,
-101.1726074

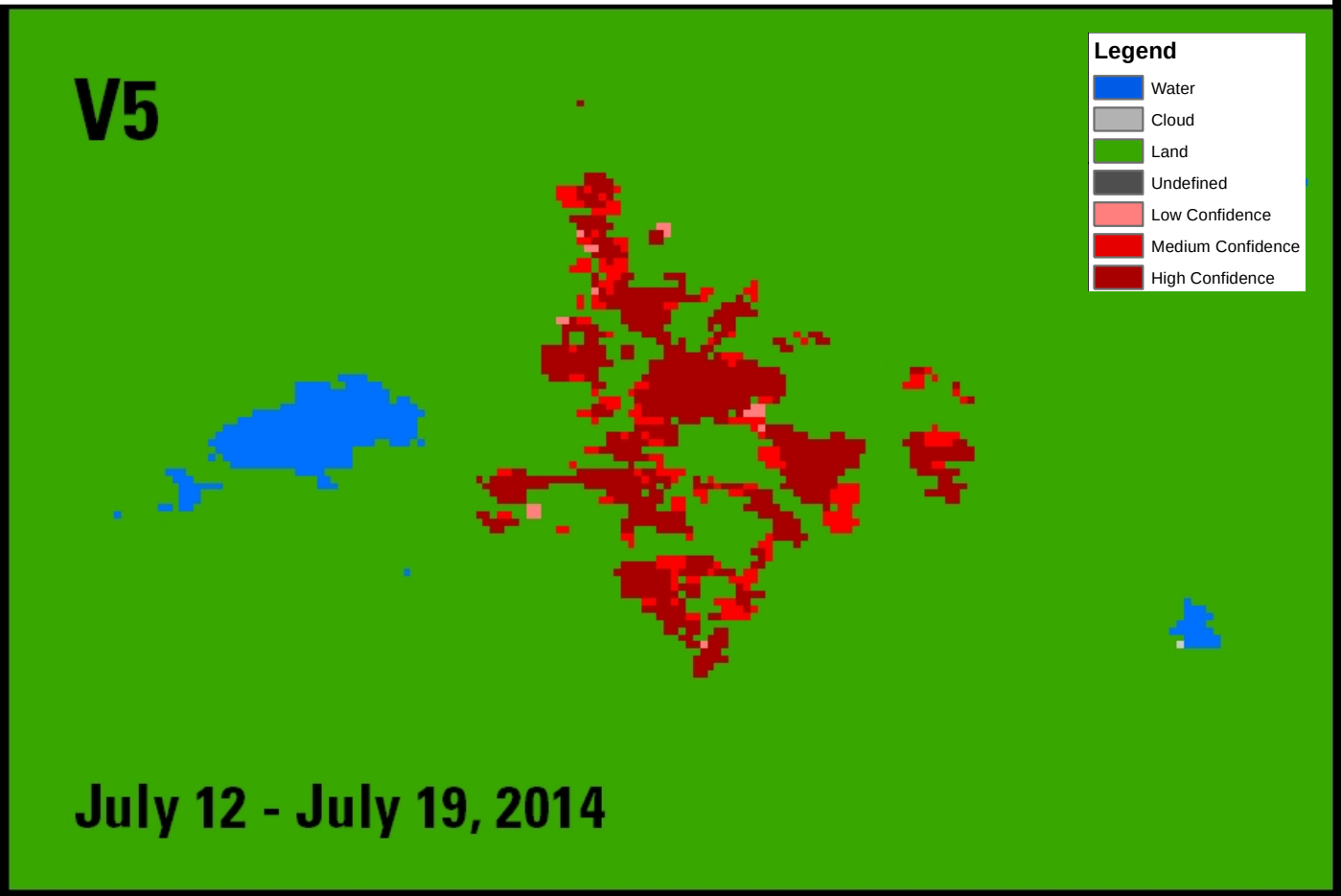


What’s new in MODIS Version 6

- **Landcover Characteristics**
  - **Fire**
    - **Detection of fire over water, e.g. offshore gas flaring**
      - ***Users must now appeal to bits 0–1 of the pixel-level algorithm QA layer to unambiguously discriminate land from water pixels.***
    - **Improved detection of small fires**
    - **Bug fix for assessment of cloud and water pixels next to fire pixels near the scan edge**

8-day MODIS Fire Mask V5 vs. V6

Buzzard Complex Fire, Oregon

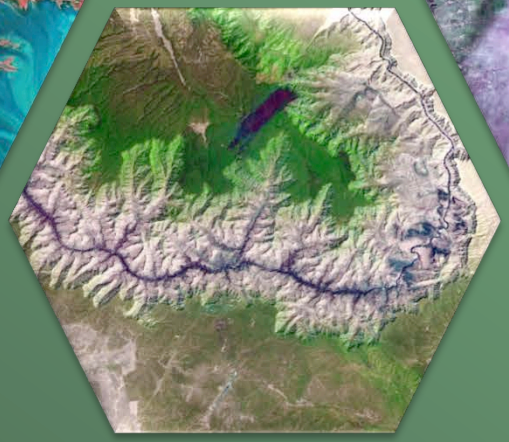
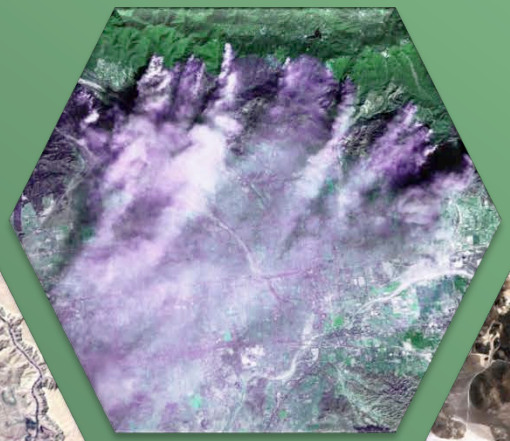
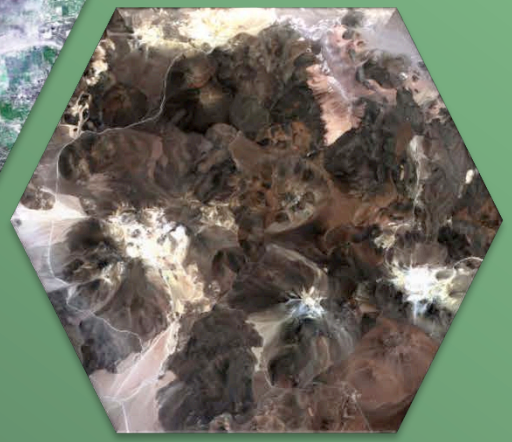


What's new in MODIS Version 6

- **Radiation Budget Variables**
  - New Surface Reflectance algorithm applied to bands 1-7 (MCD*19s)
  - New Land Surface Temp. & Emissivity (M*D21s)
  - New Albedo data product structure (MCD43's)
- **Ecosystem Variables**
  - Evapotranspiration (M*D16s)
- **Landcover Characteristics**
  - VCF products (MOD44B)
  - New 3 year land cover products (MCD12)

*Or beyond

ASTER Products at the LP DAAC

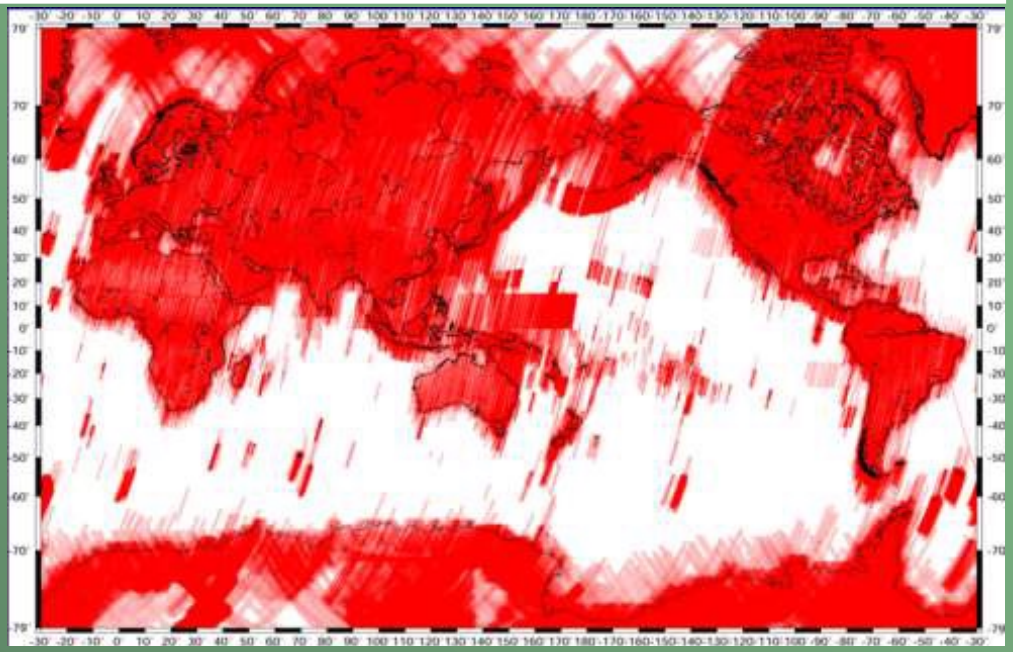
ASTER

- Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER)
- One of five instruments onboard NASA's Terra satellite
- Partnership between NASA, Japan's Ministry of Economy, Trade and Industry (METI), and the National Institute of Advanced Industrial Science and Technology (AIST)
- Select products available at no charge over U.S. and Territories

Temporal Coverage	2000 - Present
Geographic Coverage	Global
Spatial Resolution	15 m, (VNIR), 30 m (SWIR), 90 m (TIR)
Unique Products	6 standard, 10 on-demand

ASTER Acquisition and Coverage

- Data have been collected since 2000
- ~2.7 million scenes
- ~515 scenes/day
- Global coverage
  - Taskable
  - Pointable
  - Expedited
- ASTER can collect in stereo (3D)
  - Uses nadir- and aft-looking near infrared cameras



Spatial and temporal coverage may vary

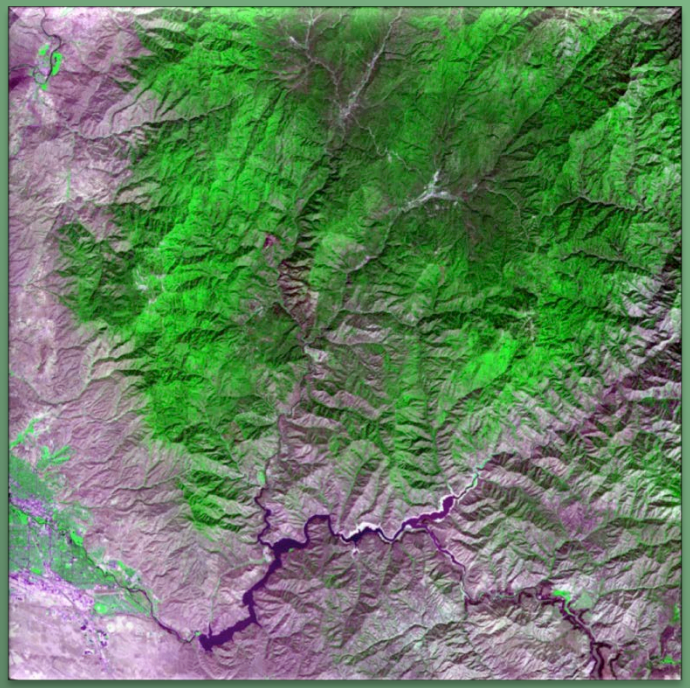
Terra ASTER Data Products

- Registered At-Sensor Radiance (AST_L1B)
  - Precision Terrain Corrected (AST_L1T)
  - Expedited (AST_L1BE)
  - Orthorectified* (AST14OTH, AST14DMO)
- Reconstructed Unprocessed Instrument Data (AST_L1A)
  - Expedited (AST_L1AE)
- Surface Reflectance* (AST_07, 07XT)
- Surface Radiance* (AST_09, 09XT, 09T)
- Surface Kinetic Temperature* (AST_08)
- Surface Emissivity* (AST_05)
- Global Digital Elevation Model (GDEM) (AST_GTM)
- Scene-based elevation* (AST14DEM)

*On-demand higher level products

ASTER L1T

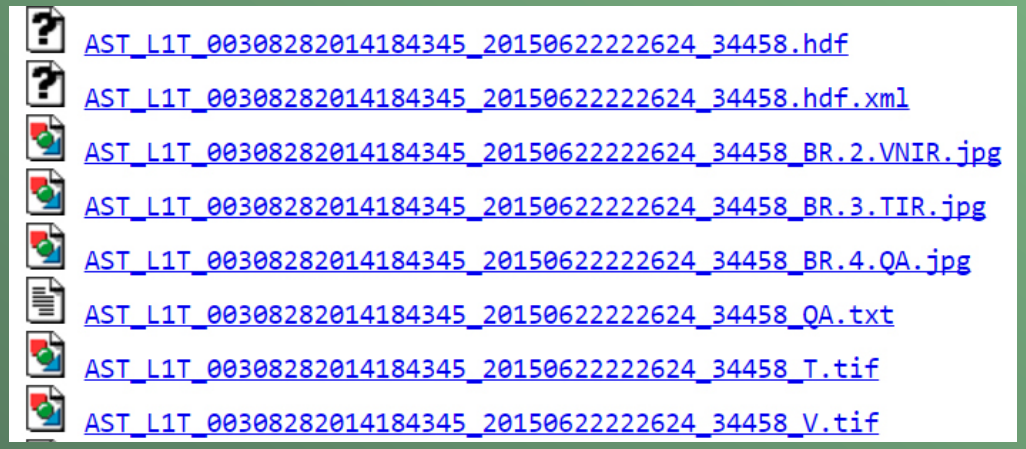
- ASTER Level 1 Precision Terrain Corrected Registered At-Sensor Radiance (AST_L1T)
- Generated with a single resampling of an ASTER Level 1A input scene
- Orthorectified
- Rotated north-up
- Soon to be input for ASTER higher-level products



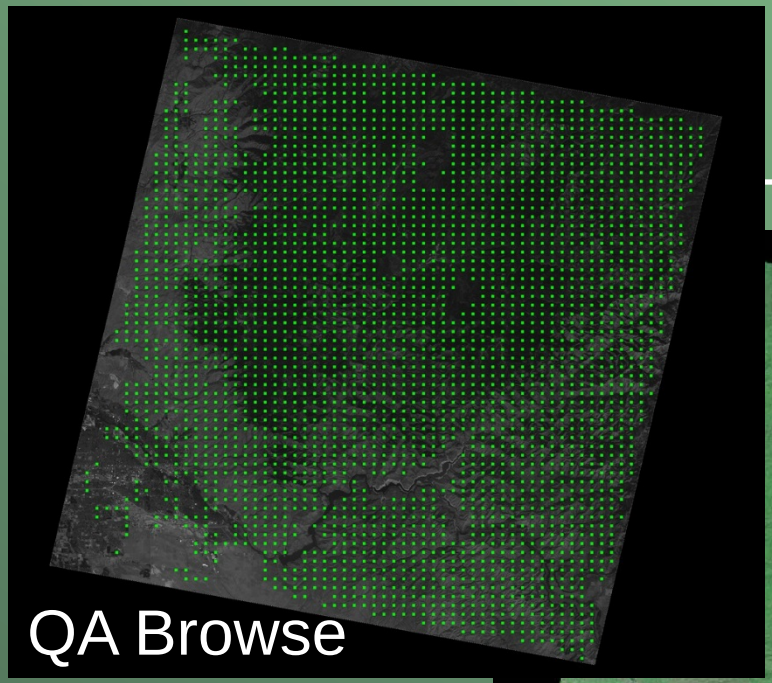
ASTER L1T Product contents

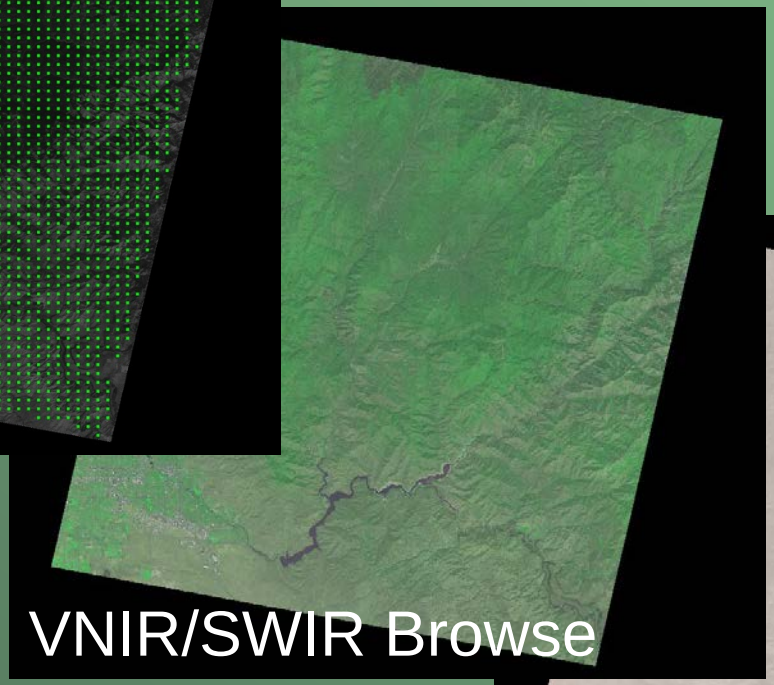
- Science Data (.HDF) and metadata (.XML)
- VNIR and TIR Full Resolution Browses (Geotiff)
- Quality Assurance (QA) file (.txt) and metadata (.XML)
- Bundled Browse (.HDF) and metadata (.XML)
- VNIR, TIR, and QA browses (.jpeg)

Files available
via HTTP download

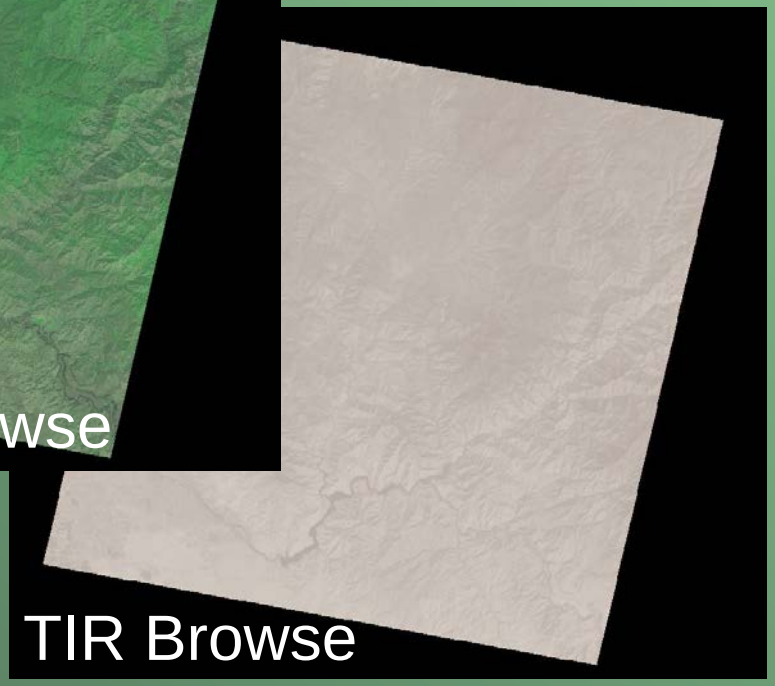


ASTER L1T GIS-Ready Browse

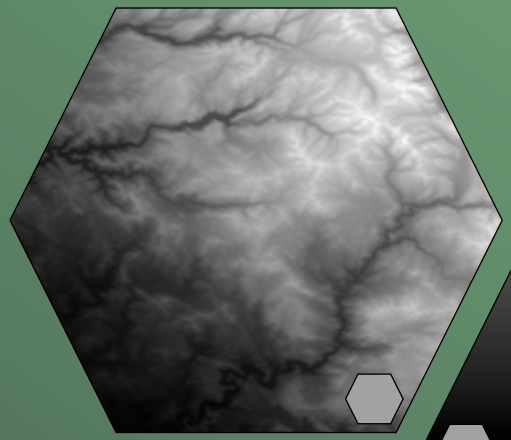




*SWIR band 4 included for pre-April 2008 data



MEaSUREs Products at the LP DAAC



NASA Shuttle Radar Topography Mission (SRTM) v3

Web-Enabled Landsat Data (WELD)

MEaSUREs

- Making Earth Science Data Records for Use in Research Environments (MEaSUREs)
- Supported by NASA's Earth Science Program
- Projects are focused on product generation, availability, and utility
- The LP DAAC is one of 10 participating DAACs that distribute MEaSUREs data products

Shuttle Radar Topography Mission (SRTM) Version 3.0

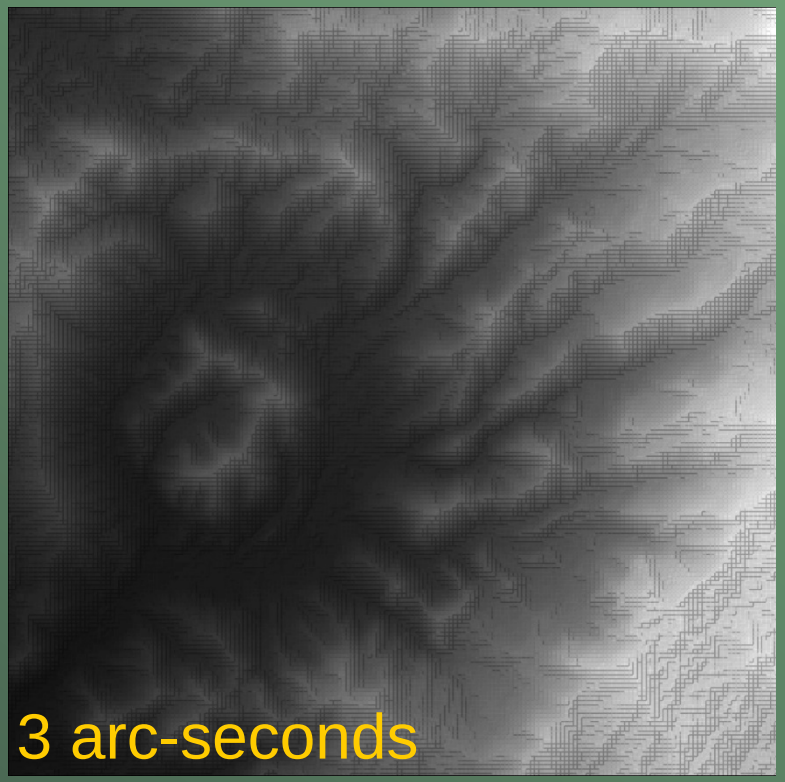
- Created by the Jet Propulsion Laboratory (JPL)
- Principal Investigator: Michael Kobrick, JPL
- Rasterized SRTM data with voids filled from ASTER GDEM2, USGS GMTED2010, and USGS NED

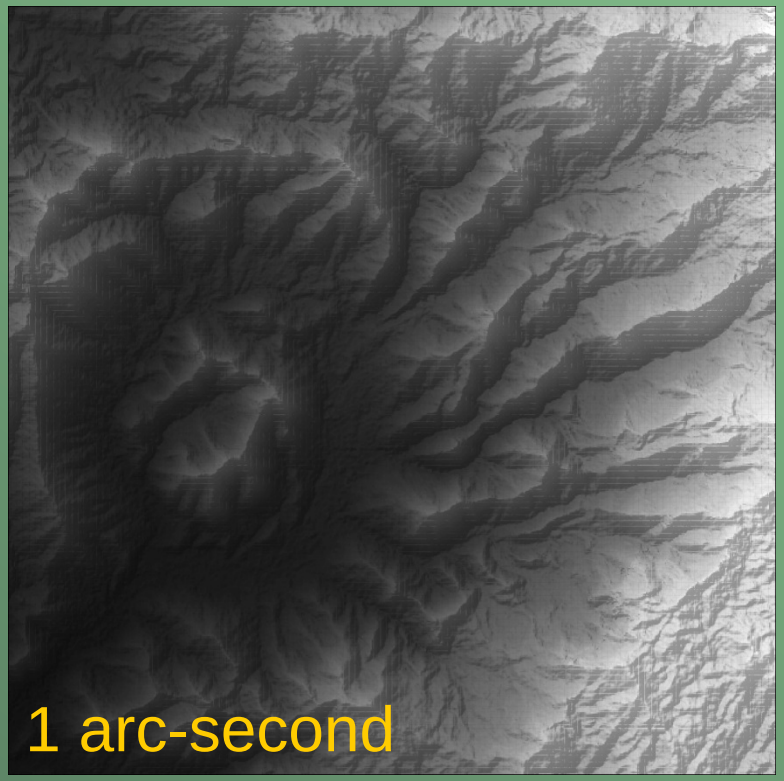
Geographic Coverage	Global (60ºN to 56ºS latitude)
Spatial Resolution	1 and 3 arc-seconds*
Tile Size	1º x 1º
Unique Products	8

*Version 2.1 NASA SRTM is 30 arc seconds

NASA SRTM v3

Mount Elgon, Uganda





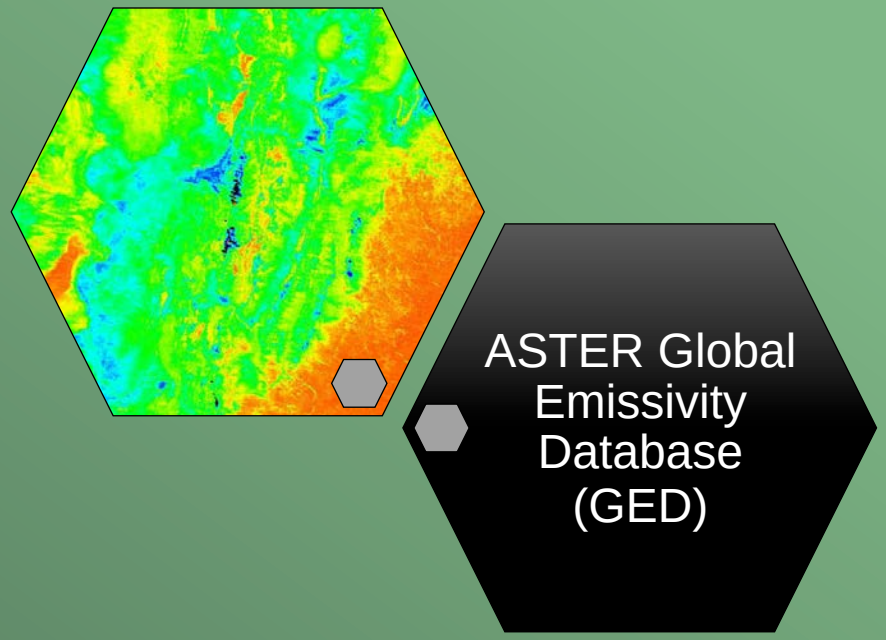
Web-Enabled Landsat Data (WELD)

- Created by South Dakota State University (SDSU)
- Principle Investigator: David Roy, SDSU
- Annual, seasonal, monthly, and weekly tiled mosaics of Landsat 7 ETM+

Temporal Coverage	2003 - 2012
Geographic Coverage	U.S.
Spatial Resolution	30 meter
Unique Products	11

Community Products

- Derived from one or more NASA EOS missions
- Generated by selected science investigators



ASTER GED

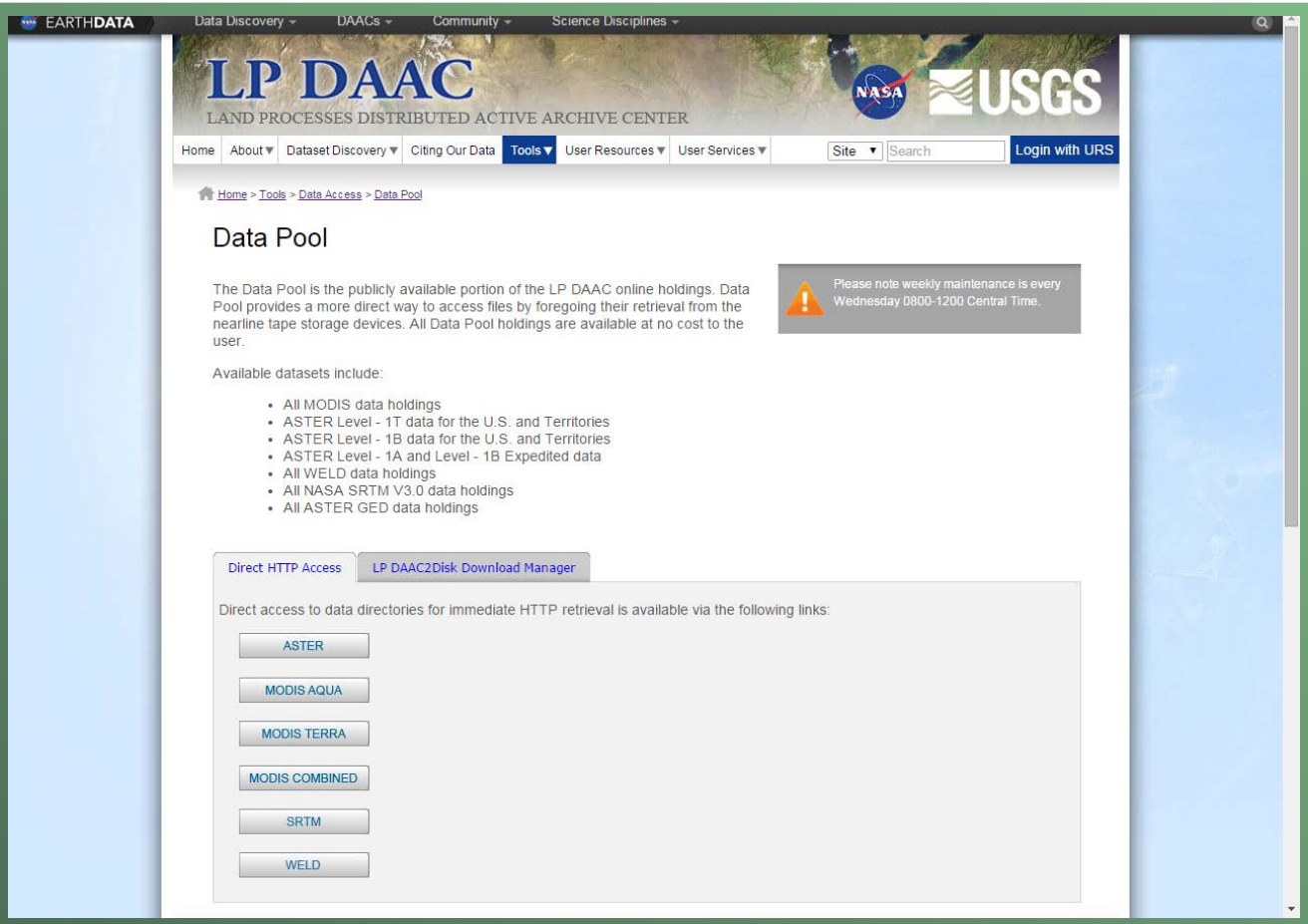
- Principal Investigator: Glynn Hulley, NASA Jet Propulsion Laboratory (JPL)
- Land surface emissivity derived from ASTER data

Temporal Coverage	2000 – 2008
Geographic Coverage	Global
Spatial Resolution	100 meter, 1 kilometer
Tile Size	1º x 1º
Unique Products	4

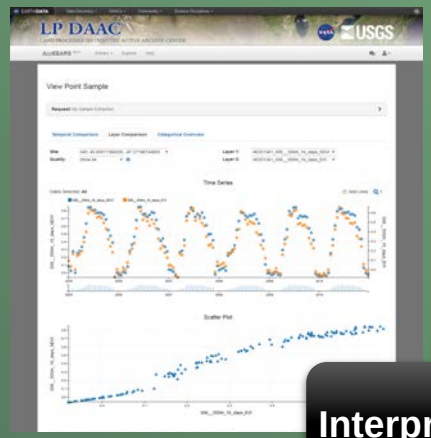
Data Access

- NASA EOSDIS Earthdata Search Client
- NASA Reverb
- USGS EarthExplorer
- USGS GloVis
- LP DAAC Data Pool & DAAC2Disk
- LP DAAC AppEEARS

LP DAAC Data Pool & DAAC2Disk



Application for Extracting and Exploring Analysis Ready Samples (AppEEARS)



Simplicity

Interpretability

AppEEARS

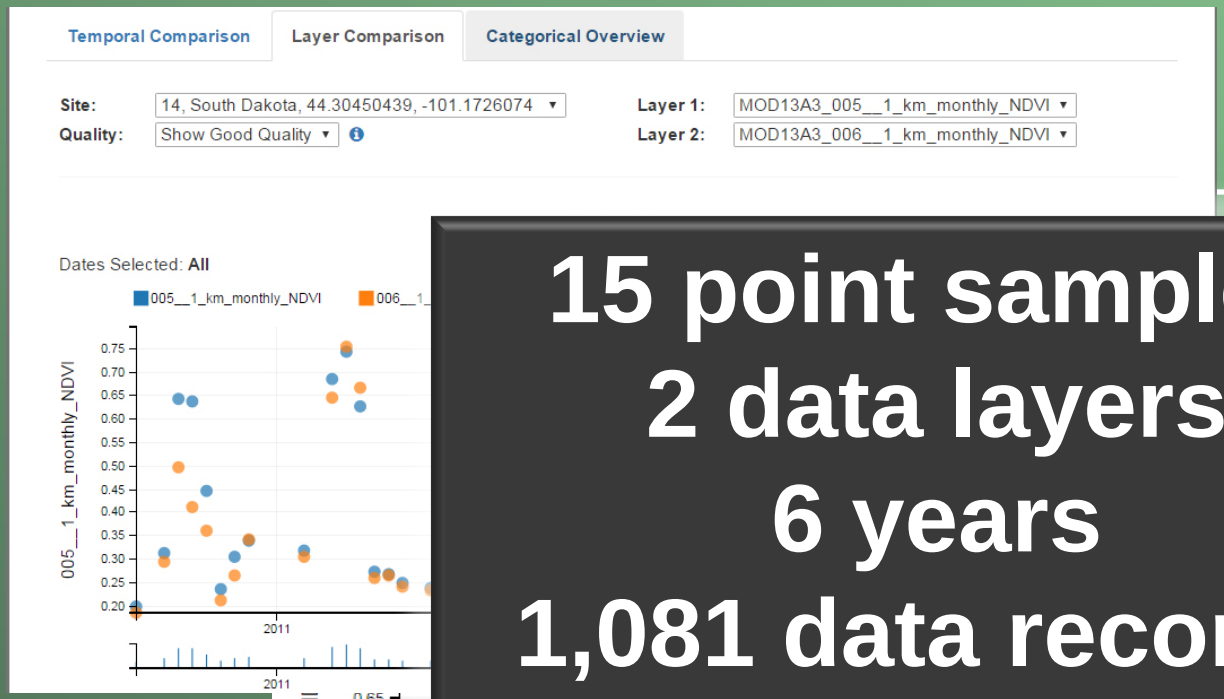
Efficiency

Traceability

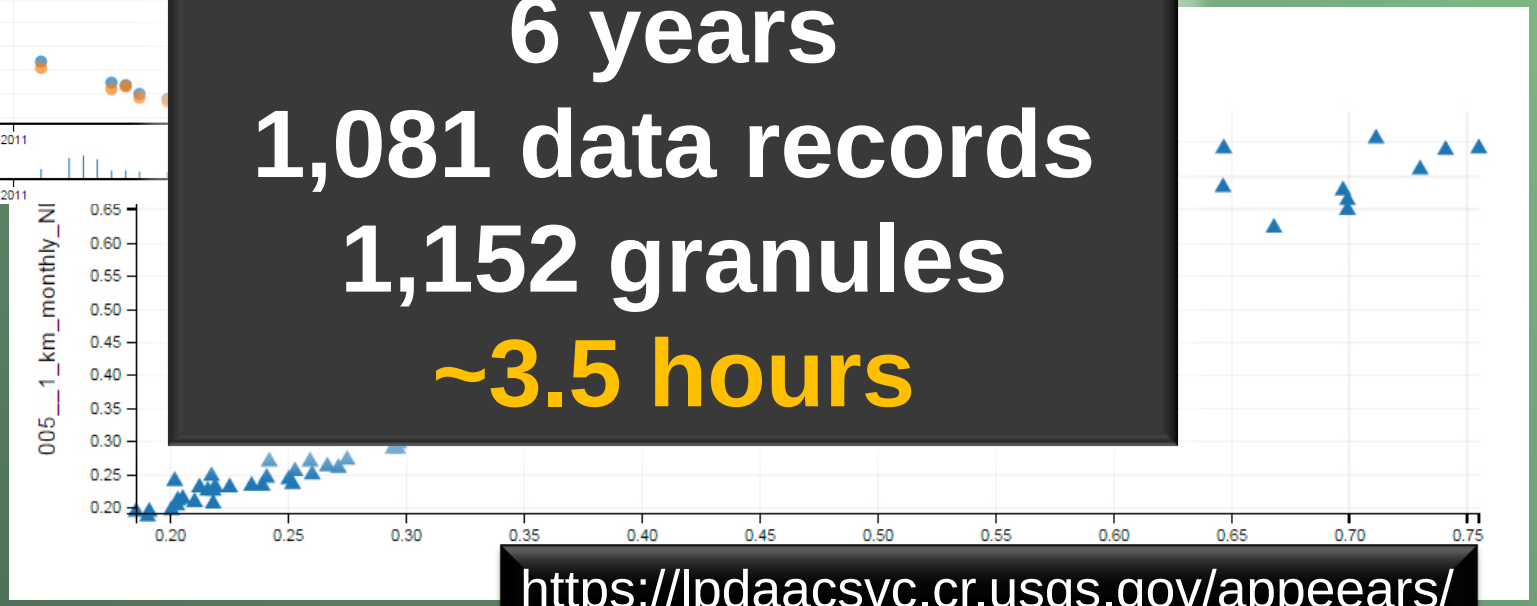
My-Sample-Extraction-granule-list.txt
My-Sample-Extraction-MOD13A1-006-results.csv
My-Sample-Extraction-request.json
My-Sample-Extraction-results.csv
README.txt

Data in minutes or hours, not days

USGS NASA

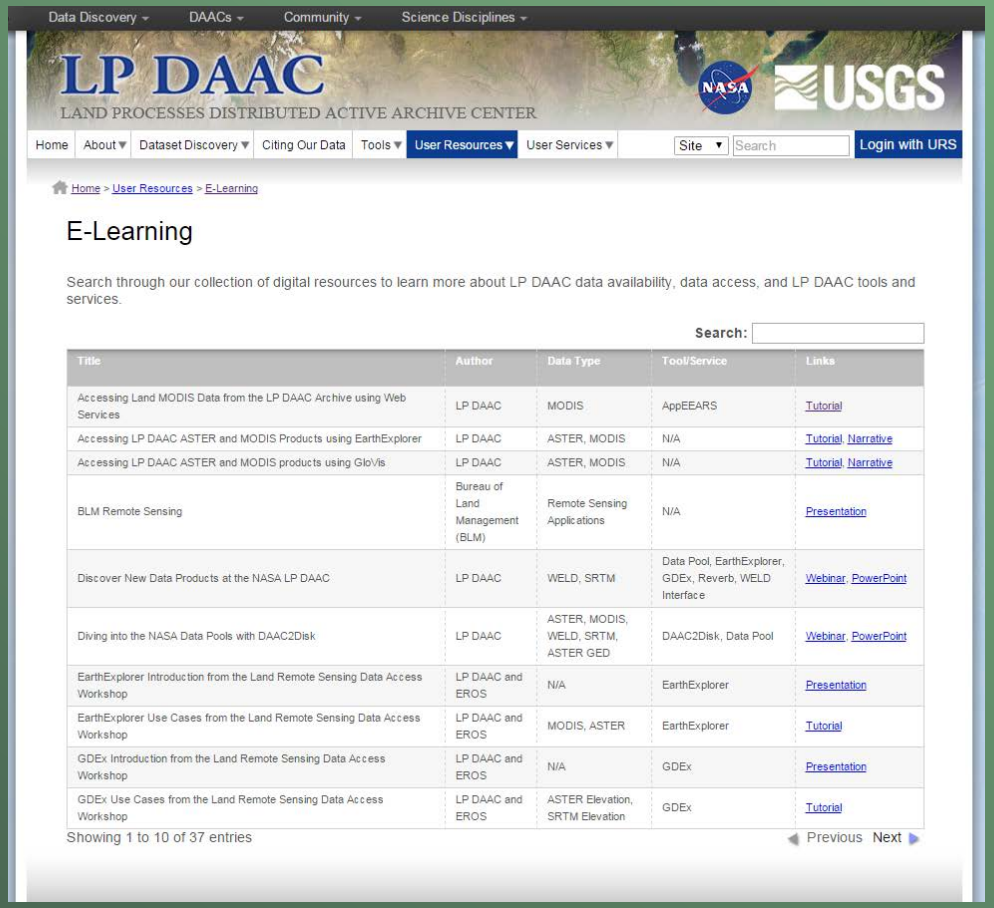


15 point samples
2 data layers
6 years
1,081 data records
1,152 granules
~3.5 hours



https://lpdaacsvc.cr.usgs.gov/appeears/

Want to learn more?



Title	Author	Data Type	Tool/Service	Links
Accessing Land MODIS Data from the LP DAAC Archive using Web Services	LP DAAC	MODIS	AppEEARS	Tutorial
Accessing LP DAAC ASTER and MODIS Products using EarthExplorer	LP DAAC	ASTER, MODIS	N/A	Tutorial, Narrative
Accessing LP DAAC ASTER and MODIS products using GloVis	LP DAAC	ASTER, MODIS	N/A	Tutorial, Narrative
BLM Remote Sensing	Bureau of Land Management (BLM)	Remote Sensing Applications	N/A	Presentation
Discover New Data Products at the NASA LP DAAC	LP DAAC	WELD, SRTM	Data Pool, EarthExplorer, GDEx, Reverb, WELD Interface	Webinar, PowerPoint
Diving into the NASA Data Pools with DAAC2Disk	LP DAAC	ASTER, MODIS, WELD, SRTM, ASTER GED	DAAC2Disk, Data Pool	Webinar, PowerPoint
EarthExplorer Introduction from the Land Remote Sensing Data Access Workshop	LP DAAC and EROS	N/A	EarthExplorer	Presentation
EarthExplorer Use Cases from the Land Remote Sensing Data Access Workshop	LP DAAC and EROS	MODIS, ASTER	EarthExplorer	Tutorial
GDEx Introduction from the Land Remote Sensing Data Access Workshop	LP DAAC and EROS	N/A	GDEx	Presentation
GDEx Use Cases from the Land Remote Sensing Data Access Workshop	LP DAAC and EROS	ASTER Elevation, SRTM Elevation	GDEx	Tutorial

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Questions???

https://lists.nasa.gov/mailman/listinfo/lpdaac