Land Product Characterization System

CEOS Land Surface Imaging-VC-2
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Land Product Characterization System (LPCS)

What is LPCS

Highlights of LPCS
  1. Inventory & Ordering
  2. Analysis Tools

Path Forward
  1. Status and Readiness
  2. CEOS LPV collaboration

Summary
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Summary
What is LPCS

A web-based system designed for comparative analysis of satellite data and higher-level land products.
What is LPCS:
Output example

Trending of similar bands of data from multiple sensors.

Near-IR Surface Reflectance
What is LPCS: Output examples

Multiple sensor (satellite and in situ) comparisons for *single location and date.*
Multiple sensor (satellite and in situ) comparisons for \textit{single location and date}.

Multiple sensor comparison for \textit{multiple locations and dates}.

What is LPCS: Output examples
What is LPCS

A web-based system designed for comparative analysis of satellite data and higher-level land products.
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Inventory and Ordering

GOES-R ABI and VIIRS Land Product Validation System

On demand data acquisition
Automated data acquisitions

Data and Inventory information stored at EROS.

NPP & JPSS VIIRS
GOES-R ABI
Landsat-7 & -8
MODIS
Sentinel-2
others...
& In Situ

Inventory and ordering of data
Inventory and Ordering

Begin at Search Criteria and Data Select tabs of LPCS. *Included data sets not arbitrary.*
USGS-NOAA validation synergy

USGS Requirements
• Landsat ECVs

Processing Data into Information

USGS ECVs
• Albedo
• Land Cover
• LAI
• Surface Water
• Snow/Ice
• Fire disturbance
• LST
USGS-NOAA validation synergy

Several products of mutual interest (e.g. GOES-R ABI)
Several products of mutual interest (e.g. VIIRS)
Inventory and Ordering

Search for Landsat data on date of simulated GOES-R ABI data (23 April 2013) (provided by Univ. Wisc./CIMSS).
Inventory and Ordering

Search for Landsat data on date of simulated GOES-R ABI data (23 April 2013).
### Define Output Products

Choose higher level products from selected data. *Additional ECVs and CDRs will be added to menu as available.*

#### Select Product Contents

<table>
<thead>
<tr>
<th>Source Products</th>
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<tbody>
<tr>
<td>Source Products</td>
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<tr>
<td>Source Metadata</td>
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<table>
<thead>
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<th>Climate Data Records</th>
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<tr>
<td>Top of Atmosphere Reflectance</td>
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<tr>
<td>Surface Reflectance</td>
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<td>Band 6 Brightness Temperature</td>
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<table>
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<th>Spectral Indices</th>
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<tr>
<td>Surface Reflectance NDVI</td>
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<tr>
<td>Surface Reflectance NDMI</td>
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<td>Surface Reflectance NBR</td>
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<td>Surface Reflectance SAVI</td>
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<td>Surface Reflectance EVI</td>
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<th>Other Products</th>
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<tbody>
<tr>
<td>CFMask (standalone file)</td>
</tr>
<tr>
<td>Solar Index</td>
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### Product Customization
Inventory and Ordering

NPP & JPSS VIIRS
GOES-R ABI
Landsat-7 & -8
MODIS
Sentinel-2
others...
& In Situ

Inventory and ordering of data

Co-register satellite and in situ data

stored at EROS
Inventory and Ordering

Define Output Products

*Product Customization*

1. Auto-registration of data to common map projections for analysis.
2. User defines area of interest for analysis.
3. Match pixel size for all images.
4. Several resampling options.

![Product Customization interface](image)
Analysis Tools

Analysis of satellite and in situ data

Generate statistics, charts and reports

Example Input Products

- Simulated GOES-R ABI (Univ. Wisc./CIMMS)
- Landsat ETM+ (7), Landsat OLI/TIRS (8)
- MODIS MOD/MYD09 (Surface Refl.)
- MODIS MOD/MYD13 (NDVI & EVI)

Output Products

- TOA Refl.
- Surface Refl.
- Surface Refl.

Pixel Resizing

Reproject.

Modify Extents

Tables and charts provided for individual bands or indices

Near-IR time series inter-comparisons

Minimum, maximum, mean and standard deviation values
Analysis Tools

Near-IR Surface Reflectance (L7, L8, and Terra/MODIS).
Analysis Tools

Flowchart:

1. Analysis of satellite and in situ data
2. Generate statistics, charts, and reports

Graph:

- Title: Multi Sensor SR NIR - Mean
- X-axis: Date (Jul 03 2014 to Jul 31 2014)
- Y-axis: Multi Sensor SR NIR - Mean

Table:

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LPCS also provides as output products the georegistered images selected for analysis.

Analysis Tools

Simulated GOES-R ABI  

VIIRS  

Landsat 8
Analysis Tools

Example of Potential Analysis

**VIIRS (TOC) NDVI** compared to **Landsat-8 (TOA) NDVI**

Each point within figures represents 100 km² sample area.

Landsat 8: 23 April 2013, NW USA.
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LPCS Status and Readiness

Current: Users access system, order and download data, and retrieve downloaded data into processing subsystem.

Future (September 2016): Seamless ordering and processing of data.
LPCS Status and Readiness

Introduction of future *data sets* and *analysis tools* within LPCS are planned, however, require additional resources.
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CEOS LPV collaboration

LPCS proposed/accepted as CEOS-LPV Online Validation Tool.
CEOS LPV collaboration

Albedo will be added to LPCS as requested by CEOS-LPV.
CEOS LPV collaboration

Additional analysis tools also requested by CEOS-LPV.
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  2. Expectations for User Interactions

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A web-based system designed for comparative analysis of satellite data and higher-level land products.
Questions?