NASA’s Terrestrial Ecology Data Repository: ORNL DAAC

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Oak Ridge National Laboratory (ORNL) DAAC
EOSDIS Distributed Active Archive Centers

Key

AF DAAC
SAR Products, Sea Ice, Polar Processes

LPDAAC
Land Processes and Features

NCAR, U. of Co., MOPITT

GES DISC
Atmos Composition & Dynamics, Global Modeling, Hydrology, Radiance

CDDIS
Crustal Dynamics Solid Earth

U. of Wisc., SNPP Atmosphere

JPL
MLS, TES, SNPP Sounder

PO.DAAC
Ocean Circulation Air-Sea Interactions

NSIDC DAAC
Cryosphere, Polar Processes

ORNL
Biogeochemical Dynamics, EOS Land Validation

GHRC
Hydrological Cycle and Severe Weather

GSFC
SNPP, MODIS, OMI, OBPG

OB.DAAC
Ocean Biology and Biogeochemistry

LAADS/MODAPS
Atmosphere

LaRC
CERES, SAGE III, MISR

ASDC
Radiation Budget, Clouds, Aerosols, Tropo Composition

Terrestrial Ecology Program Science Team Meeting
The Oak Ridge National Laboratory Distributed Active Archive Center archives data produced by NASA’s Terrestrial Ecology Program in support of NASA’s Carbon Cycle and Ecosystems focus area.
What does the ORNL DAAC do?

DAAC:
- distribute
- subset
- publish
- curate

Users:
- research
- applications
- education
- public
Data at ORNL DAAC

• 1400+ datasets
• 9 Science Themes
• 30,000+ users per year
• 4,200 data citations
NASA Projects

- **ABOVE**
- **FLUXNET**
- **CARVE**
- **ATOM**
- **GEDI**
- **FIFE**
- **SAFARI 2000**
- **LBA**
- **Delta-X**
- **North American Carbon Program**

**Carbon Monitoring System**
New Missions

Multi-beam waveform **lidar instrument on ISS**. L3+ data at ORNL DAAC will include gridded biomass, canopy cover, height, LAI, vertical foliage profile. (PI: Ralph Dubayah)

Airborne Mission studying sea-level change and deltaic evolution in the **Mississippi River Delta**. Flying AVIRIS-NG, AirSWOT & UAVSAR in summer 2020. (PI: Marc Simard)

Multi-decadal time series of vegetation **chlorophyll fluorescence (SIF)** and derived gross primary production (PI: Nick Parazoo)
NASA TE Data Impact

~200 datasets produced by NASA TE-funded science since 2015

<table>
<thead>
<tr>
<th>Program</th>
<th>Datasets</th>
<th>Downloads</th>
<th>Citations</th>
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<tbody>
<tr>
<td>ABoVE</td>
<td>95</td>
<td>473K</td>
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<td>550K</td>
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<td>Other</td>
<td>13</td>
<td>9K</td>
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</table>

Terrestrial Ecology Program Science Team Meeting
New and Notable Data Releases

- High Resolution Global Contiguous SIF Estimates Derived from OCO-2 SIF and MODIS
- PhenoCam Dataset v2.0: Vegetation Phenology from Digital Camera Imagery, 2000-2018
- Forest Carbon Stocks, Fluxes and Productivity Estimates, Western USA, 1979-2099
- Ecosystem Functional Type Distribution Map for Mexico, 2001-2014
- Synthesis of Winter In Situ Soil CO2 Flux in pan-Arctic and Boreal Regions, 1989-2017
- Landsat-derived Annual Dominant Land Cover Across ABoVE Core Domain, 1984-2014
- Reflectance Spectra of Tundra Plant Communities across Northern Alaska
Global Hydrologic Soil Groups (HYSOGs250m) for Curve Number-Based Runoff Modeling

Ross, C.W., L. Prihodko, J. Anchang, S. Kumar, W. Ji, and N.P. Hanan (Team led by Niall Hanan, New Mexico State University)

https://doi.org/10.3334/ORNLDAAC/1566
Global 1-km Gridded Thickness of Soil, Regolith, and Sedimentary Deposit Layers

J.D. Pelletier, P.D. Broxton, P. Hazenberg, X. Zeng, P.A. Troch, G. Niu, Z.C. Williams, M.A. Brunke, & D. Gochis (Team led by Jon Pelletier, University of Arizona)

https://doi.org/10.3334/ORNLDAAC/1304
Data Awards: Most Data Products

8
Lola Fatoyinbo and team

6
Rodrigo Vargas and team

Mangrove forests in coastal Gabon

Predictions of soil organic carbon across Latin America
Publishing Data with ORNL DAAC

Investigators
- Collect
- Document
- QA / QC
- Analyze
- Publish

DAAC
- QA Review
- Standards & Metadata
- Document
- Archive
- Distribute
- User Support
Earthdata Search

Spatial and Temporal Search: [https://search.earthdata.nasa.gov](https://search.earthdata.nasa.gov)

DEMO: daac.ornl.gov/resources/tutorials/search-above-data/
Searching for Data at ORNL DAAC
Data organization by NASA program
Spatial Data Access Tool (SDAT)

Visualize
Subset
Regrid
Reformat
Reproject

... all from your web browser!

https://webmap.ornl.gov/ogc
Spatial Data Access Tool  https://webmap.ornl.gov/ogc
Data Server - THREDDS

Find, visualize, and subset multidimensional data

Multi-dimensional Data Subsets

trim

slice

Use Remote Data like Local

Modelers
Daymet

Daily surface weather and climatological summaries.

**Spatial Resolution:** 1 km²

**Temporal Resolution:** daily

**Spatial Range:** N. America, Hawaii, Puerto Rico

**Temporal Range:** 1980 – 2018

**Variables**
- maximum temperature
- minimum temperature
- shortwave radiation
- vapor pressure
- snow water equivalent
- precipitation
- day length
Subsetting Tools

MODIS and VIIRS Land Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
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<tbody>
<tr>
<td>MOD09, MYD09, VNP09</td>
<td>Surface Reflectance</td>
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<tr>
<td>MCD12</td>
<td>Land Cover Type and Dynamics</td>
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<tr>
<td>MCD19</td>
<td>MAIAC Albedo</td>
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<td>MCD43</td>
<td>Albedo/BRDF/NBAR</td>
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<tr>
<td>MOD11, MYD11</td>
<td>Land Surface Temperature/Emissivity</td>
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<tr>
<td>MCD64</td>
<td>Burned Area</td>
</tr>
<tr>
<td>MOD13, MYD13, VNP13</td>
<td>Vegetation Indices</td>
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<tr>
<td>MOD14, MYD14</td>
<td>Thermal Anomalies/Fire</td>
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<td>MCD15, VNP15</td>
<td>Leaf Area Index/FPAR</td>
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<tr>
<td>MOD16, MYD16</td>
<td>Evapotranspiration</td>
</tr>
<tr>
<td>MOD17, MYD17</td>
<td>Gross/Net Primary Productivity</td>
</tr>
</tbody>
</table>

Fixed Sites Subsets
pre-processed subsets for 2000+ field and flux tower sites

Global Subsets
request a subset for any location on earth

Web Service
Retrieve subset data for any location, time period and area programmatically

Daymet
Daily Surface Weather Data, 1 km²
Soil Moisture Visualizer (SMV)

**Harmonizes** surface and root zone soil moisture data sets from **multiple sources** that encompass a range of spatial footprints, soil depths and measurement frequencies.

(https://daac.ornl.gov/soilmoisture/)
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Learning Resources

daac.ornl.gov/resources

Filter by type
- Tutorials
- Webinars

Filter by keyword
- Daymet
- Python
- R
- ABoVE
WORKSHOP
TODAY, 1 PM to 3 PM in the Crossland Ballroom
DATA MANAGEMENT & PUBLISHING
FOR NASA TE PROJECTS