Accessing Essential Biodiversity Variables (EBVs) from ORNL DAAC

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ORNL Distributed Active Archive Center

NASA Biodiversity and Ecological Forecasting Team Meeting
May 22, 2019

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Questions I want to answer today:

1. What is the ORNL DAAC?
2. What sorts of data do you have?
3. How can I publish my data at ORNL DAAC?
4. How do I search for data?
5. How do I get satellite data at my study site(s)?
About ORNL DAAC

The Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC) archives data produced by NASA’s Terrestrial Ecology Program in support of NASA’s Carbon Cycle and Ecosystems Focus Area.
Projects Supported

[Logos and images of various projects supported by NASA BEF Team, May 2019]
Data Themes

- Arctic Ecosystems
- Biomass
- Carbon Cycle
- Climate
- Fire
- Hydrology and Cryosphere
- Land Use and Human Dimensions
- Soils
- Vegetation and Forests
### Some example EBVs

**Ecosystem Structure**
- Forest cover
- Land cover
- Vegetation height
- Above-ground biomass
- Ecosystem distribution

**Climate**
- Temperature
- Precipitation
- Snow
- Solar radiation
- Daylength

**Ecosystem Function**
- NPP
- Leaf area index
- Vegetation phenology
- Soil moisture
- Fire

**Community Composition**
- Hyperspectral reflectance
- Vegetation and forest inventories
**Ecosystem Structure Data**

- Forest cover
- Land cover
- Vegetation height
- Above-ground biomass
- Ecosystem distribution
Ecosystem Structure Data: Examples

Land Cover and Vegetation Map, Arctic National Wildlife Refuge. [https://doi.org/10.3334/ORNLDAAC/1384](https://doi.org/10.3334/ORNLDAAC/1384)

Aboveground Biomass, Landcover, and Degradation, Kalimantan Forests, Indonesia. [https://doi.org/10.3334/ORNLDAAC/1645](https://doi.org/10.3334/ORNLDAAC/1645)


Aboveground Biomass for Lope, Mabounie, Mondah, and Rabi Sites, Gabon. [https://doi.org/10.3334/ORNLDAAC/1681](https://doi.org/10.3334/ORNLDAAC/1681)

Ecosystem Functional Type Distribution Map for the Conterminous USA. [https://doi.org/10.3334/ORNLDAAC/1659](https://doi.org/10.3334/ORNLDAAC/1659)

Land Cover Transitions Maps for Study Sites in Para, Brazil: 1970-2001. [https://doi.org/10.3334/ORNLDAAC/1098](https://doi.org/10.3334/ORNLDAAC/1098)
GEDI to measure global forest structure

ORNL DAAC to distribute:
- L3 gridded canopy height metrics and variability
- L4 footprint and gridded aboveground carbon estimates
- Expected in Spring 2020
Ecosystem Function Data

Curated collection of field measurements of biomass and estimated NPP for >100 terrestrial study sites worldwide.


Fire Data

Collection of >50 fire occurrence, severity, and emissions datasets.

https://doi.org/10.3334/ORNLDAAC/1642

https://doi.org/10.3334/ORNLDAAC/882
Soil Moisture Data

Provides surface and root-zone soil moisture from:
- Soil Moisture Active Passive satellite
- GRACE
- GPS satellites
- in-ground soil moisture from networks across North America

Seamlessly integrate precipitation, temperature, evapotranspiration, EVI, and GPP data.

https://daac.orl.gov/soilmoisture/
Get easy to use in-ground and satellite soil moisture data together in one place.
Community Composition Data

Hyperspectral Imagery from AVIRIS-NG, Alaskan and Canadian Arctic, 2017-2018. https://doi.org/10.3334/ORNLDAAC/1569

AfriSAR: Mondah Forest Tree Species, Biophysical, and Biomass Data, Gabon, 2016. https://doi.org/10.3334/ORNLDAAC/1580

Forest Inventories and DBH at Burned and Unburned Forest Sites, Acre, Brazil, 2017. https://doi.org/10.3334/ORNLDAAC/1654

Woody Vegetation Characteristics of Kalahari and Skukuza Sites, Botswana and South Africa. https://doi.org/10.3334/ORNLDAAC/777

Superior National Forest: Forest Cover by Species/Strata. https://doi.org/10.3334/ORNLDAAC/179

Arctic Vegetation Plots in NPS Arctic Network Parks, Alaska. https://doi.org/10.3334/ORNLDAAC/1542
Climate Data

<table>
<thead>
<tr>
<th>Daymet Data Products</th>
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<tbody>
<tr>
<td>Variable</td>
</tr>
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</tr>
<tr>
<td>minimum temperature</td>
</tr>
<tr>
<td>shortwave radiation</td>
</tr>
<tr>
<td>vapor pressure</td>
</tr>
<tr>
<td>snow water equivalent</td>
</tr>
<tr>
<td>precipitation</td>
</tr>
<tr>
<td>day length</td>
</tr>
</tbody>
</table>

https://daymet.ornl.gov/
Interested in publishing your data with us?

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

DAAC
- QA Review
- Standards & Metadata
- Document
- Archive
- Distribute
- User Support
Data Publication Process

Note: ORNL DAAC data acceptance policy based on:
1. NASA approval
2. Community interest and potential applications
Searching for Data at ORNL DAAC
Spatial and Temporal Search: https://search.earthdata.nasa.gov
Spatial and Temporal Search: https://search.earthdata.nasa.gov
Spatial and Temporal Search: https://search.earthdata.nasa.gov
Spatial and Temporal Search: https://search.earthdata.nasa.gov
Spatial and Temporal Search: https://search.earthdata.nasa.gov
Spatial and Temporal Search: https://search.earthdata.nasa.gov
Spatial Data Access Tool  
https://webmap.ornl.gov/ogc
Spatial Data Access Tool

OGC Standards-based Geospatial Data Visualization/Download

Science Disciplines
- All (168)
  - Agriculture (6)
  - Atmosphere (39)
  - Biosphere (107)
  - Climate Indicators (38)
  - Human Dimensions (22)
  - Land Surface (100)
  - Oceans (5)
  - Spectral/Engineering (4)
  - Other (0)

Projects
- High-Resolution Shrub Biomass and Uncertainty Maps, Toolik Lake Area, Alaska, 2013
- Global Hydrologic Soil Groups (HYSOGs250m) for Curve Number-Based Runoff Modeling
- ABoVE: Gridded 30-m Aboveground Biomass, Shrub Dominance, North Slope, AK, 2007-2016
- Pre-ABoVE: Land Cover and Vegetation Map, Arctic National Wildlife Refuge
- Pre-ABoVE: Fractional Open Water Cover for Pan-Arctic and ABoVE Domain Regions, 2002-2015
- ABoVE: Geobotanical and Impact Map Collection for Prudhoe Bay Oilfield, Alaska

Projection: WGS 84
Resolution (x, y): 0.00010000, 0.00003000 (degrees)
Format: ArcMap ASCII grid (BYTE)
Time: Default
Bands: 1
Interpolation Method: Nearest Neighbor


Map Legend:
- Deciduous Broadleaf Forest
- Cropland
- Built-Up Land
- Mixed Forests
- Shrubland
- Barren Land
- Flood Plain
- Open Water
- Water Bodies
- Permanent Wetland
- Snow and Ice
- Evergreen Needleleaf Forest

OGC WCS Requests:
- Show GetCapabilities
- Show DescribeCoverage

OGC WMS Requests:
- Show GetCapabilities
- GetMap Request

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NASA BEF Team, May 2019
EBV Data from MODIS and VIIRS satellite instruments

<table>
<thead>
<tr>
<th>Product</th>
<th>Frequency</th>
<th>Resolution</th>
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<tbody>
<tr>
<td>Land Cover</td>
<td>Annual</td>
<td>500 m</td>
</tr>
<tr>
<td>Phenology</td>
<td>Annual</td>
<td>500 m</td>
</tr>
<tr>
<td>LAI &amp; fPAR</td>
<td>8 day</td>
<td>500 m</td>
</tr>
<tr>
<td>Burned area</td>
<td>Monthly</td>
<td>500 m</td>
</tr>
<tr>
<td>NDVI &amp; EVI</td>
<td>16 day</td>
<td>250 m</td>
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<tr>
<td>ET</td>
<td>8 day</td>
<td>500 m</td>
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<tr>
<td>GPP</td>
<td>8 day</td>
<td>500 m</td>
</tr>
<tr>
<td>NPP</td>
<td>Annual</td>
<td>500 m</td>
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</tbody>
</table>

Go To: [https://modis.ornl.gov/](https://modis.ornl.gov/)
Fixed Sites Subsets Tool

The Fixed Sites Subsets Tool provides customized subsets and visualizations of several MODIS/VIIRS land products and Daymet daily surface weather data for selected field and flux tower sites around the world. Spatial subsets of the land products are available for predefined areas of about 8 X 8-km centered on the selected sites. The site-specific data can be downloaded in both comma separated value (*.csv) and JSON formats. The data are in the native projection system.

Citation: ORNL DAAC. 2016. Fixed Sites Subsetting and Visualization Tool. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1587
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Citation: ORNL DAAC, 2018. Fixed Sites Subsetting and Visualization Tool. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1567

48 NETWORKS
125 COUNTRIES
2802 SITES

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Fixed Sites Subsets Tool: Network - NEON

### Table

<table>
<thead>
<tr>
<th>Network_ID</th>
<th>Network</th>
<th>Country</th>
<th>Latitude</th>
<th>Longitude</th>
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<td>87.7082 W</td>
</tr>
</tbody>
</table>

- **48 Networks**
- **125 Countries**
- **2802 Sites**
Hands-on Demos

1. Explore spatial data at ORNL DAAC and download custom subsets and maps. 
   [https://webmap.ornl.gov/ogc](https://webmap.ornl.gov/ogc)


Access many more guides and tutorials on ORNL DAAC’s Resources page at [https://daac.ornl.gov/resources/learning/](https://daac.ornl.gov/resources/learning/)

I would love to help you find the data you need!
Alison Boyer – boyerag@ornl.gov