

Daymet V4:

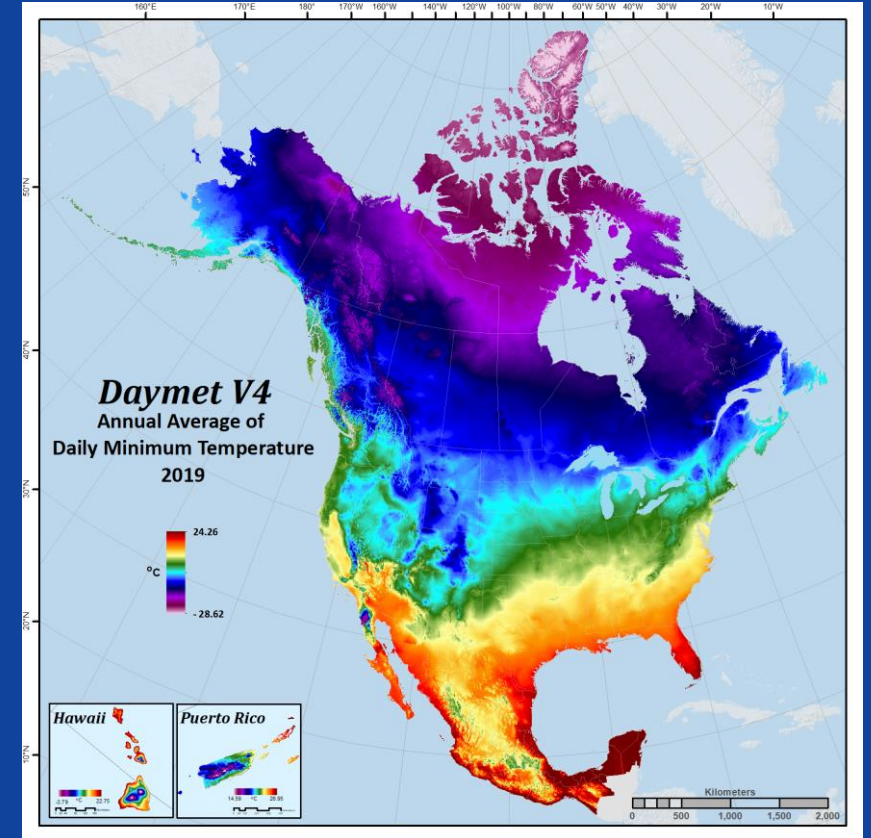
- NASA Earthdata Discovery/Access
- Analysis Ready Data
- Spatial Analysis in Python Xarray and Esri ArcGIS

NASA Earthdata Webinar, Aug 31, 2021

Michele Thornton (ORNL DAAC)

Rupesh Shrestha, Ph.D. (ORNL DAAC)

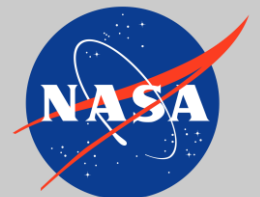
Lain Graham, Ph.D. (NASA ArcDAAC Collaboration/Esri)



The Oak Ridge National Laboratory Distributed Active Archive Center for Biogeochemical Dynamics operates under an interagency agreement between NASA and the U.S. Department of Energy

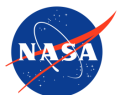


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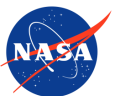
Webinar Objectives

1. Lower the barriers to obtaining subsets of gridded, multidimensional data available through web-based services like OPeNDAP
2. Introduce Python's Xarray (and other Geospatial capabilities) in performing spatial analysis on multidimensional datasets
3. Introduce Esri Multidimensional Raster Functionality



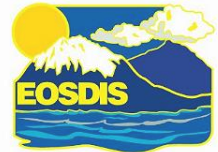
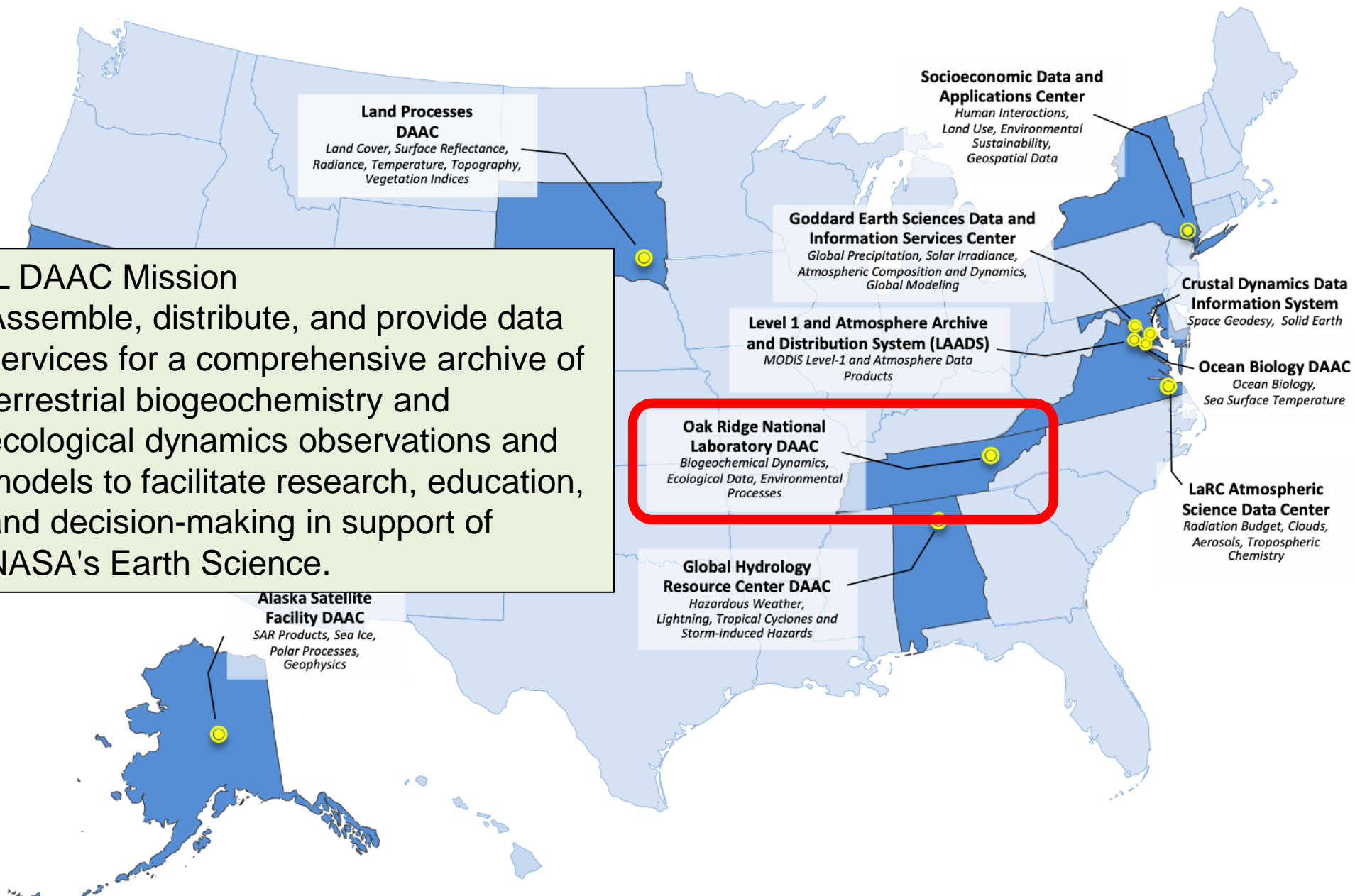
Webinar Content

- Introduce ORNL DAAC
- Introduce Daymet Version 4 Data
- ORNL DAAC Daymet Website
- NASA Earthdata Find Data Website
- Notebook Workflows



EOSDIS Distributed Active Archive Centers (DAAC)s

ORNL DAAC Mission
Assemble, distribute, and provide data services for a comprehensive archive of terrestrial biogeochemistry and ecological dynamics observations and models to facilitate research, education, and decision-making in support of NASA's Earth Science.



Daymet

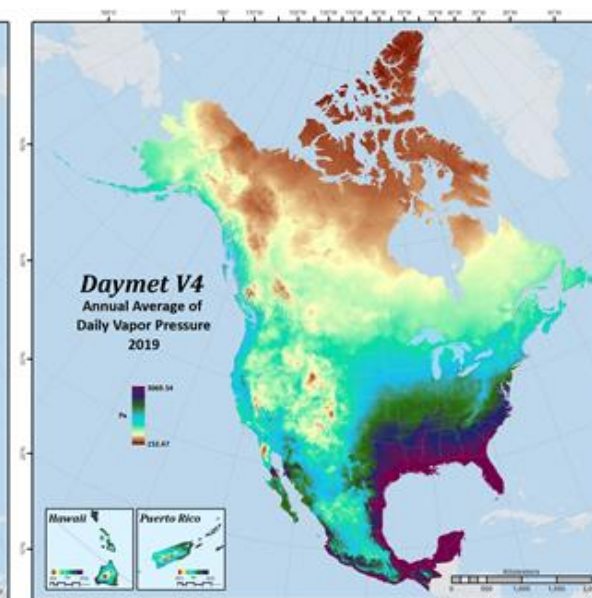
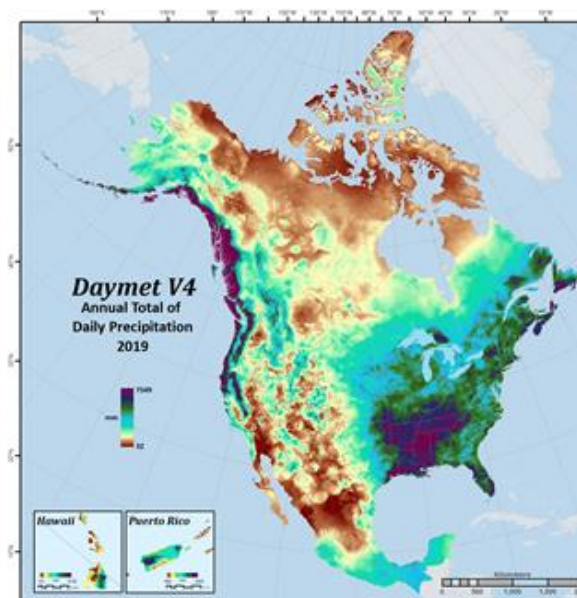
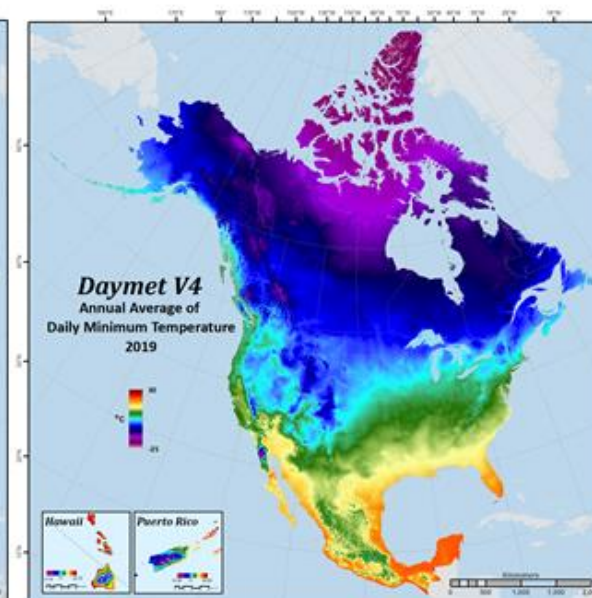
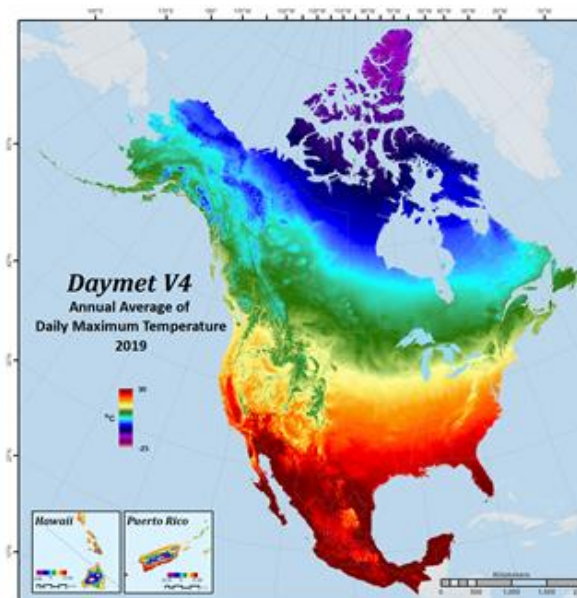
- gridded daily meteorological dataset derived from land surface weather station observations

Data Characteristics

Temporal / Spatial Resolution Daily / 1km x 1 km
Years Available 1980 – 2020 (and 2021)
Spatial Region North America, Hawaii, Puerto Rico
Primary Format netCDF

Daymet Data Products

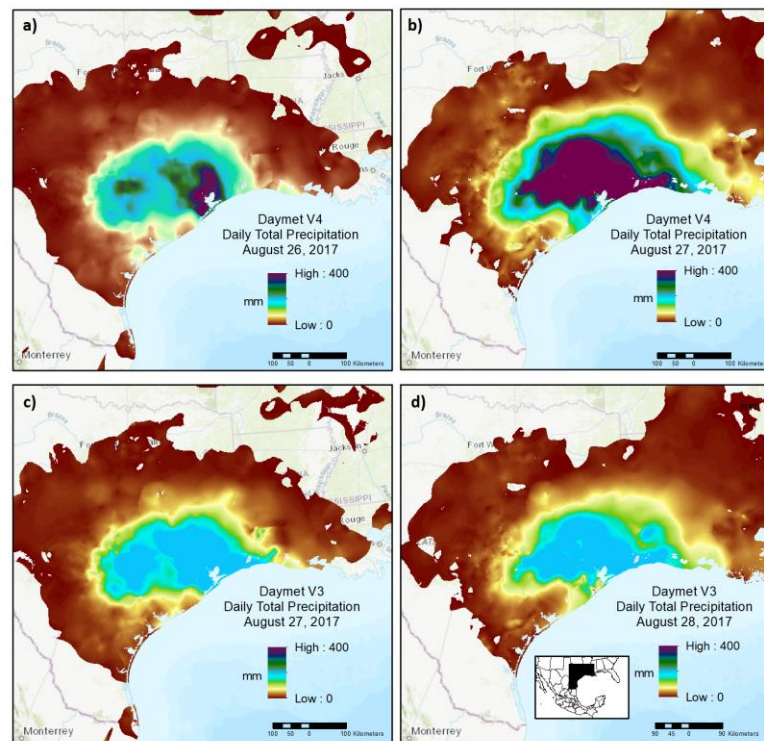
<u>Variable</u>	<u>Units</u>
maximum temperature	°C
minimum temperature	°C
shortwave radiation	W/m ²
vapor pressure	Pa
snow water equivalent	kg/m ²
precipitation	mm/day
day length	s/day



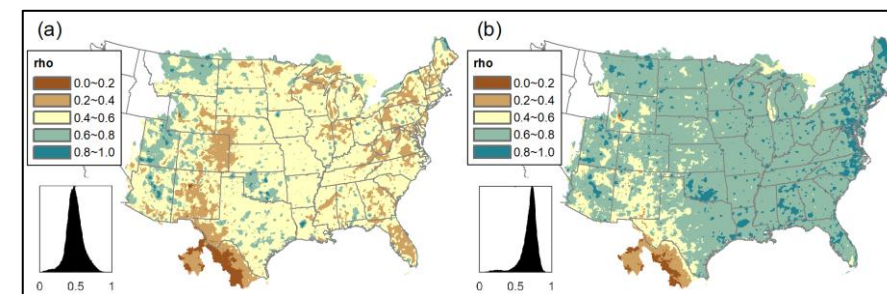
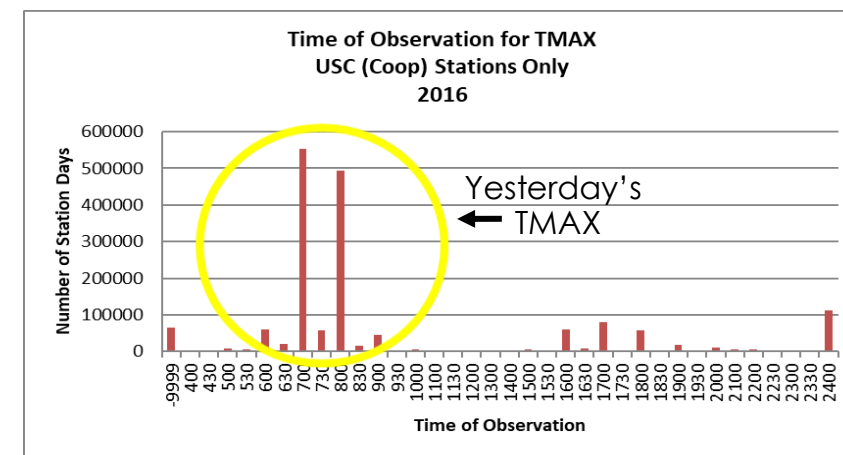
Daymet V4 - Improvements

- Version 4 – Data Released in December 2020

- Improvements include:
 - development to the three-dimensional regression model techniques in the core algorithm
 - reductions in the timing bias of input weather station measurements
 - novel approach to handling high elevation temperature measurement biases



Daily total precipitation for a sub-region that shows landfall of Hurricane Harvey in late August 2017. Top panels show two days from the Daymet V4. Bottom panels show the corresponding days from the V3 dataset. Date shifting based on time-of-observation bias for precipitation are shown.

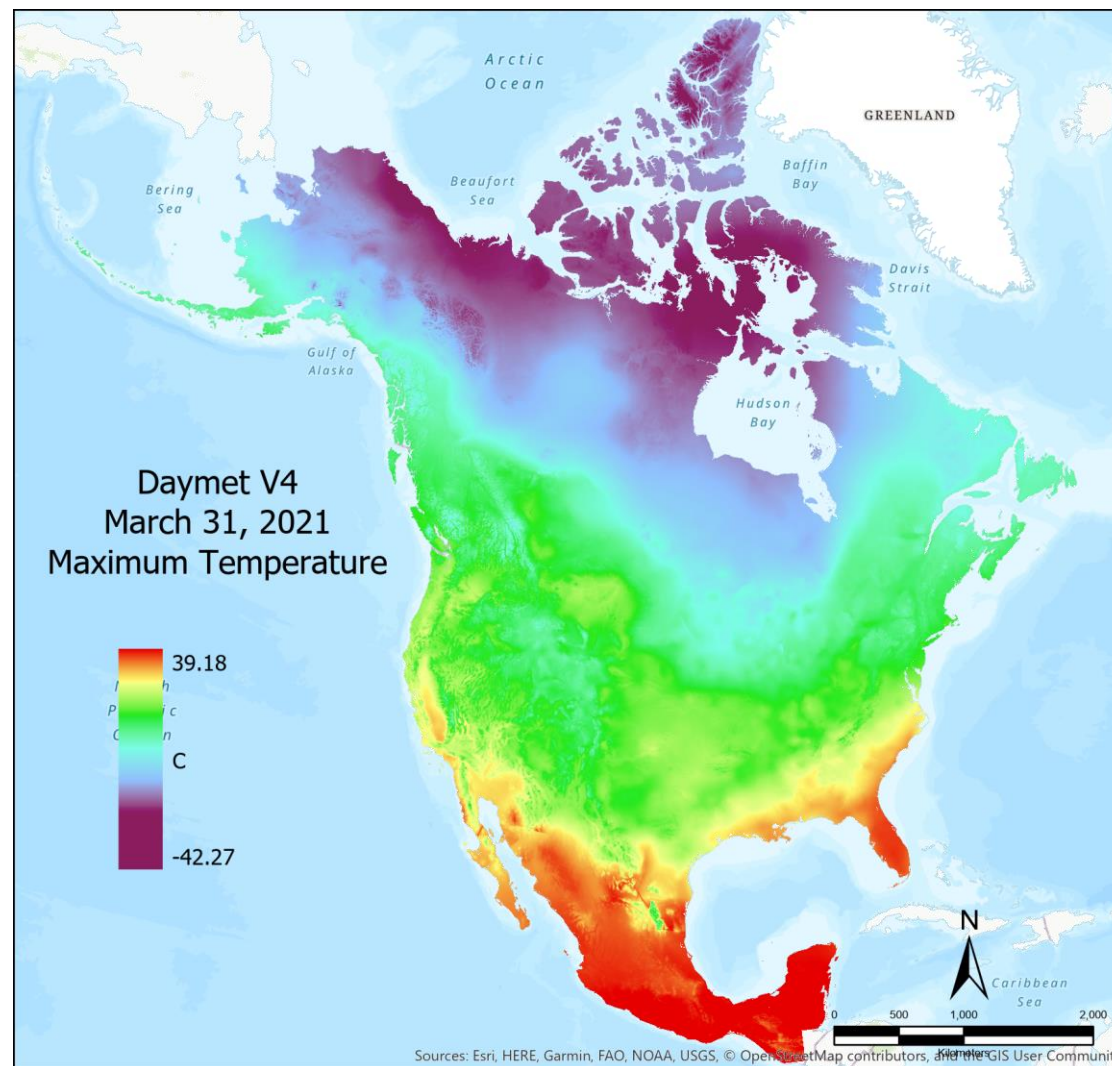


Radar-validated precipitation timing

Thornton, P.E., R. Shrestha, M. Thornton, S.-C. Kao, Y. Wei, B.E. Wilson (2021) Gridded daily weather data for North America with comprehensive uncertainty quantification. *Nature Scientific Data*, DOI:: 10.1038/s41597-021-00973-0

Daymet V4 lower-latency data product

- Daymet V4 lower-latency (LL)
 - Starting in Jan, 2021, Daymet **daily data** is provided on a monthly cycle
 - Published as a separate, provisional dataset
 - At the time of this Webinar; Jan, Feb, Mar, Apr, May, Jun, July daily data are available
 - Thornton, M.M., R. Shrestha, P.E. Thornton, S. Kao, Y. Wei, and B.E. Wilson. 2021. Daymet Version 4 Monthly Latency: Daily Surface Weather Data. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1904>



Daymet – Website

- ORNL DAAC Daymet Project Page
<https://daymet.ornl.gov>
- Four Main V4 `Collections`
 - Daily Surface Weather Data
 - Annual Climate Summaries
 - Monthly Climate Summaries
 - Daily Data, Monthly Latency

Daymet

daymet.ornl.gov

EARTHDATA Other DAACs

DAYMET
DAILY SURFACE WEATHER AND CLIMATOLOGICAL SUMMARIES
ORNL DAAC

Get Data Description Citations Publications Learning Sign in

Daymet Home

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Daymet derived annual average of daily minimum temperature, 1980 (left) and 2019 (right), for a subset of North America. Images are scaled from -20 to +20 degrees C.

Direct Downloads
Files with companion docs

Single Pixel Extraction Tool
ASCII download of any pixel

Web Services
RESTful API's to automate subsets

Learning
Code, Tutorials and Webinars

Daymet provides long-term, continuous, gridded estimates of daily weather and climatology variables by interpolating and extrapolating ground-based observations through statistical modeling techniques. The Daymet data products provide driver data for biogeochemical terrestrial modeling and have myriad applications in many Earth science, natural resource, biodiversity, and agricultural research areas. Daymet weather variables include daily minimum and maximum temperature, precipitation, vapor pressure, shortwave radiation, snow water equivalent, and day length produced on a 1 km x 1 km gridded surface over continental North America and Hawaii from 1980 and over Puerto Rico from 1950 through the end of the most recent full calendar year.

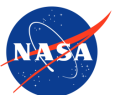
Daymet is a research product of the [Environmental Sciences Division](#) at Oak Ridge National Laboratory, Oak Ridge, TN. Daymet is supported by NASA through the Earth Science Data and Information System (ESDIS) and the TE Program. The continued development of the Daymet algorithm and processing is also supported by the [Office of Biological and Environmental Research](#) within the U.S. Department of Energy's Office of Science.

Daymet Version 4 is available as of December 15, 2020, through all delivery methods on the [Get Data](#) page.

Daymet

- ORNL DAAC Daymet Project Page

<https://daymet.ornl.gov>



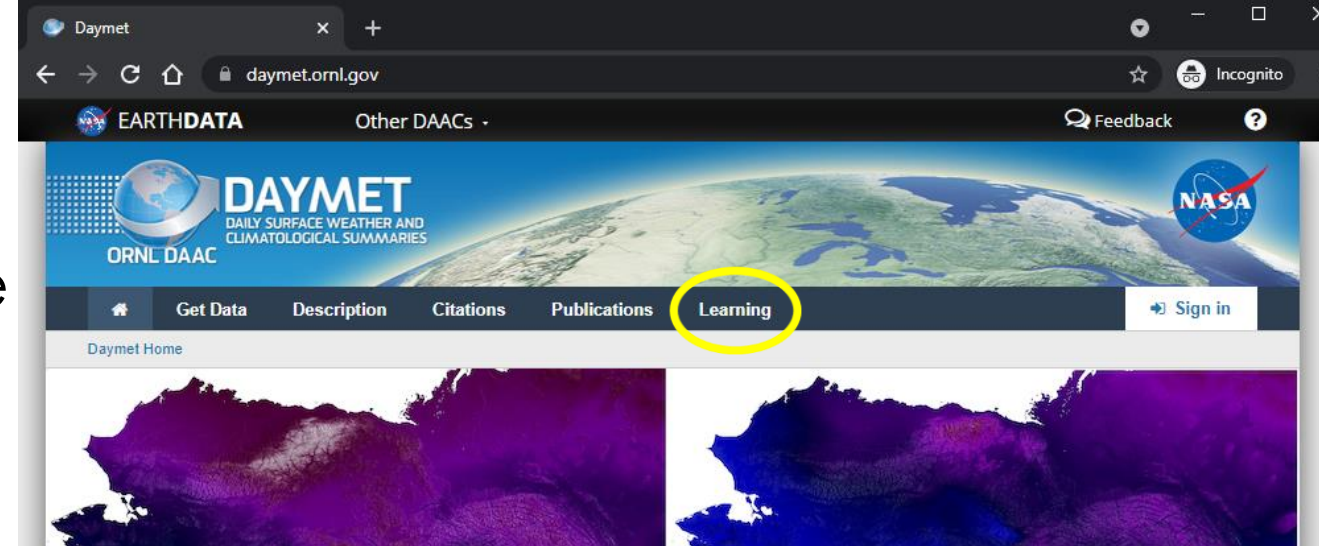
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Type: Tutorial 0 Webinar 1 Code 0 Help Page 0 Workshop 0

Keyword: Daymet 1 Python 1 Web Service 1 'R' 1 MODIS/VIIRS 0 OPeNDAP 0
netCDF 1 SDAT 0 THREDDS 0 Data Management 0 ABoVE 0 WMS 0
Single Pixel 0 MATLAB 0 Airborne 0 csv 0 NCSS 0 Bash Script 0

Show 10 entries Filter: daymet python web service

Title	Date	Type	Keywords
NetCD-what? An Ecologist's Guide to Working with Daymet and other NetCDF-formatted Data	2017-09-01	Webinar	Python, netCDF, Web Service, 'R', Daymet

Showing 1 to 1 of 1 entries (filtered from 42 total entries) < Previous 1 Next >



Single Pixel Extraction Tool
ASCII download of any pixel

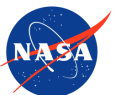
Web Services
RESTful API's to automate subsets

Learning
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Daymet

- NASA Earthdata Data Search

<https://search.earthdata.nasa.gov/search>

The screenshot shows the NASA Earthdata Search interface. The search term 'daymet' is entered in the search bar. The results show 11 matching collections. The first collection is 'Daymet: Daily Surface Weather Data on a 1-km Grid for North America, Version 4' with 1,071 granules. The second collection is 'Daymet: Daily Surface Weather Data on a 1-km Grid for North America, Version 3' with 840 granules. The third collection is 'Daymet: Annual Climate Summaries on a 1-km Grid for North America, Version 4' with 1,530 granules. The fourth collection is 'Daymet: Monthly Climate Summaries on a 1-km Grid for North America, Version 4' with 1,530 granules. A yellow box highlights the search term 'daymet' and the number of collections '11 Matching Collections'. A yellow text box explains: 'Collections == Daymet V4 Daily Data' and 'Granules == Files within a Collection'. The background shows a map of North America.

Notebook Content

- Daymet V4 - Programmatic Data Discovery, Access, Subsetting, and Download for Analysis Ready Data
- Daymet V4 - Deriving Climatological Normals and Anomalies from Analysis Ready Subsets
- ArcGIS – Analyzing Climate Impact on Wine Production In California Using Multidimensional Analysis

