

Carbon Cycle Science Data and Services

at the Goddard Earth Sciences Data Information and Services Center (GES DISC)

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Summary

The Goddard Earth Sciences Data Information and Services Center (GES DISC) archives and distributes a number of observational and model carbon cycle science data sets. We also provide services that facilitate **data discovery**, **intercomparison**, and **visualization** of these heterogeneous datasets for both research and applications users, such as **subsetting**, **format conversion**, **How-To** documentation, and the **Help Desk**.

Carbon Monitoring System (CMS) Data at the GES DISC

<https://disc.gsfc.nasa.gov>

The screenshot shows the Earthdata Search interface with the following details:

- Search Bar:** "Find a DAAC" with a search input field containing "CMS".
- Filters:** "65 Matching Collections" with options to sort by Relevance and checkboxes for "Only include collections with granules" and "Include non-EOSDIS collections".
- Results:** A list of collections including:
 - Carbon Monitoring System Flux for Ocean Carbon L4 V1 (CMSFluxOcean 1)
 - Carbon Monitoring System Flux for Fire L4 V1 (CMSFluxFire 1)
 - Carbon Monitoring System Flux from the Net Ecosystem Exchange L4 V1 (CMSFluxNEE 1)
 - Carbon Monitoring System Flux for Prior Total Carbon L4 V1 (CMSFluxTotalprior 1)
 - Carbon Monitoring System Flux for Fossil Fuel L4 V1 (CMSFluxFossilfuel 1)

The Earthdata Search Client <https://search.earthdata.nasa.gov/>

The Earthdata Search Client enables searches for NASA Earth science data from all data centers.

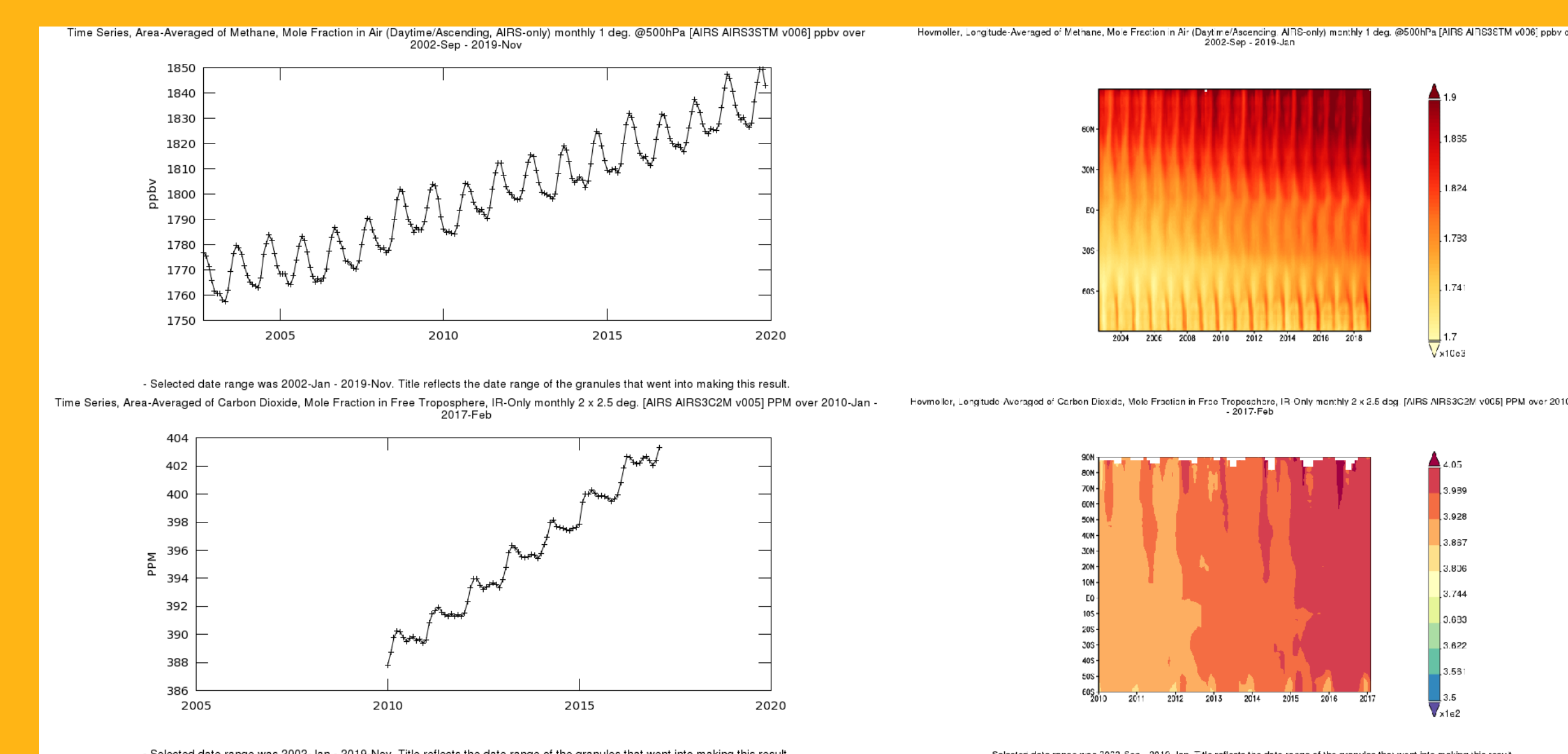
The screenshot shows the Earthdata Search Client interface with the following details:

- Search Bar:** "Find a DAAC" with a search input field containing "CMS".
- Map:** A map of the North Atlantic Ocean region.
- Filters:** "65 Matching Collections" with options to sort by Relevance and checkboxes for "Only include collections with granules" and "Include non-EOSDIS collections".
- Results:** A list of collections including:
 - Carbon Monitoring System Flux for Posterior Fire Carbon L4 V1 (CMSFluxFirepost) at GES DISC
 - Carbon Monitoring System Flux from the Net Ecosystem Exchange L4 V1 (CMSFluxNEE) at GES DISC
 - Carbon Monitoring System Flux for Posterior Total Carbon L4 V1 (CMSFluxTotalpost) at GES DISC

Services

Some data sets have additional **services** such as format conversion, spatial, temporal, or variable **subsetting**, and **visualization**. We also have a library of **How-To** documents, and we record distribution metrics.

Giovanni



Plots of Methane and Carbon Dioxide data from AIRS created with Giovanni.

Searching for Data at the GES DISC

The screenshot shows the GES DISC search results for "Methane" with the following details:

- Search Bar:** "Find a DAAC" with a search input field containing "Methane".
- Filters:** "Data Collections" with a search input field containing "Methane".
- Results:** A list of data collections including:
 - Methane (CH4) Flux for Mexican Oil/Gas Systems L4 V1
 - Methane (CH4) Flux for Canadian Oil/Gas Systems L4 V1
 - Methane (CH4) Flux for U.S. Oil/Gas Systems L4 V1

A sample search for CMS Methane data archived at the GES DISC.

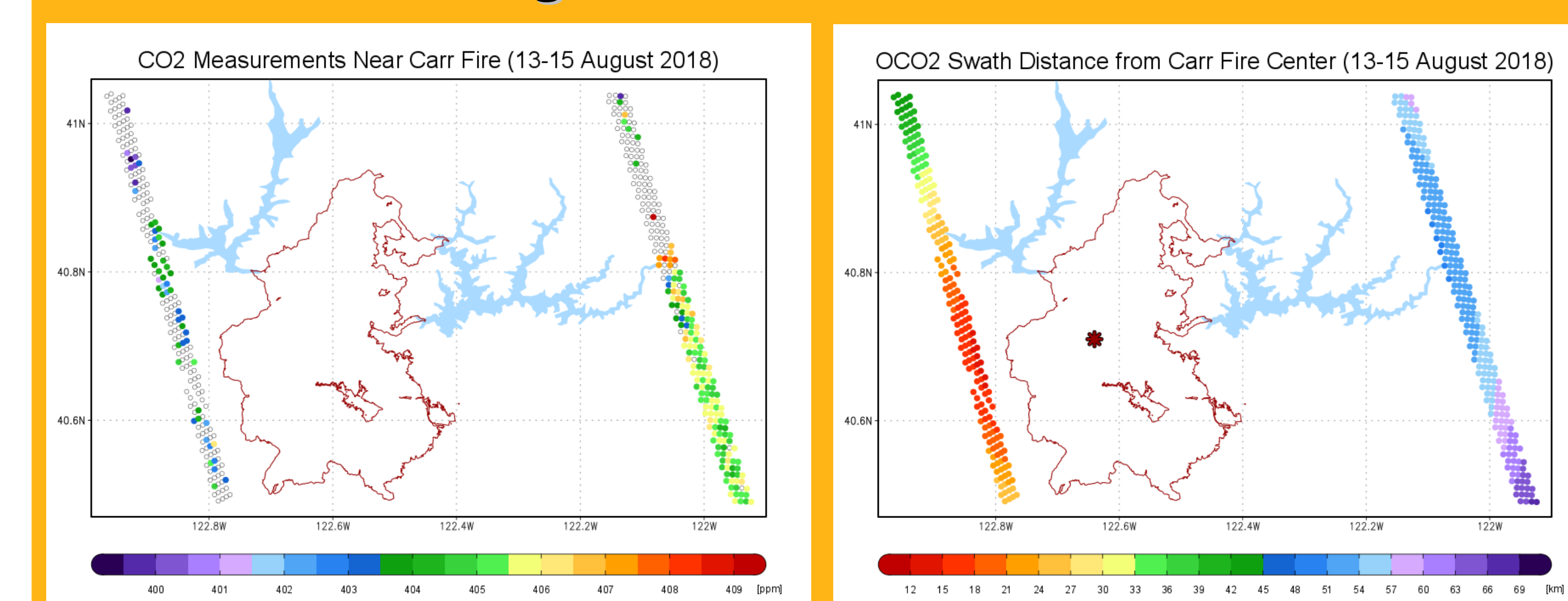
Dataset Landing Pages

The dataset landing page for each dataset has information about the data product, instructions on how to **cite the data**, links to related **documentation**, **software**, and **data access**.

The screenshot shows the dataset landing page for "CMS_CH4_FLX_MX" with the following details:

- Search Bar:** "Find a DAAC" with a search input field containing "Methane".
- Search Results:** "Go to Search Results" button.
- Dataset Information:**
 - Product Name: CMS_CH4_FLX_MX: Methane (CH4) Flux for Mexican Oil/Gas Systems L4 V1
 - Shortname: CMS_CH4_FLX_MX
 - Longname: Methane (CH4) Flux for Mexican Oil/Gas Systems L4 V1
 - DOI: 10.5067/RZAOB50RV3BS
 - Version: 1
 - Format: netCDF
 - Spatial Coverage: -119.05, 13.05, -84.95, 33.95
 - Temporal Coverage: 2010-01-01 to 2011-01-01
 - File Size: 1.8 MB per file
 - Data Resolution:
 - Spatial: 0.1 * x 0.1 *
 - Temporal: 1 year
- Data Access:**
 - Online Archive
 - Earthdata Search
 - OPENDAP
 - Get Data

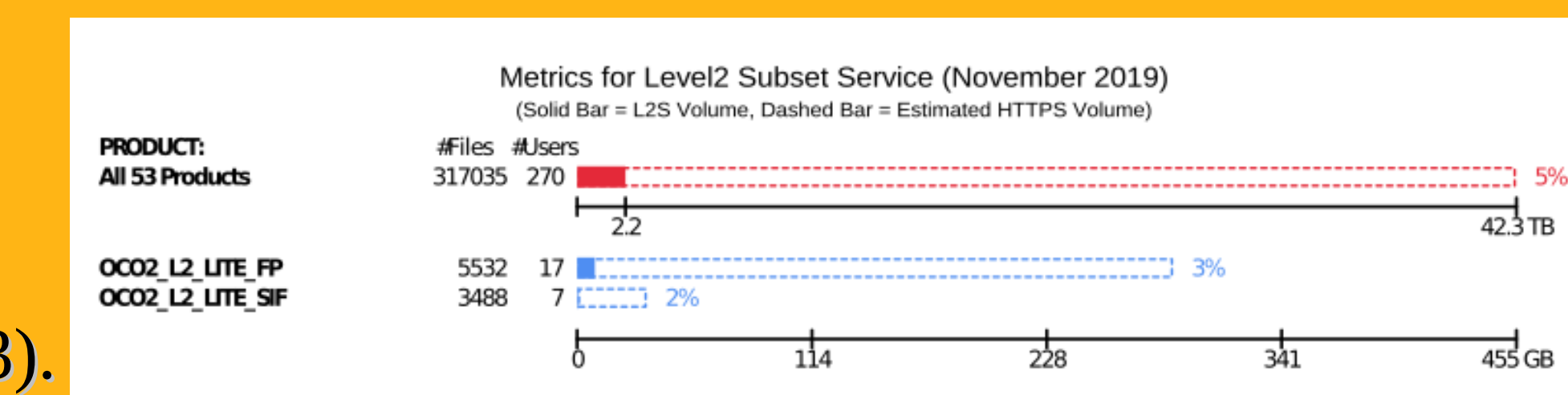
Subsetting and "How-To" Documentation



Above: The left panel shows xCO_2 for two OCO-2 orbits that passed within a 100 km of the Carr Fire (outlined in red). The right panel shows a plot of the "PointRadius" variable that is added to files that are subsetted within a user defined radius around a user specified location. How to create similar subsets, as well as other data operations, are described in GES DISC **How-To** documents.

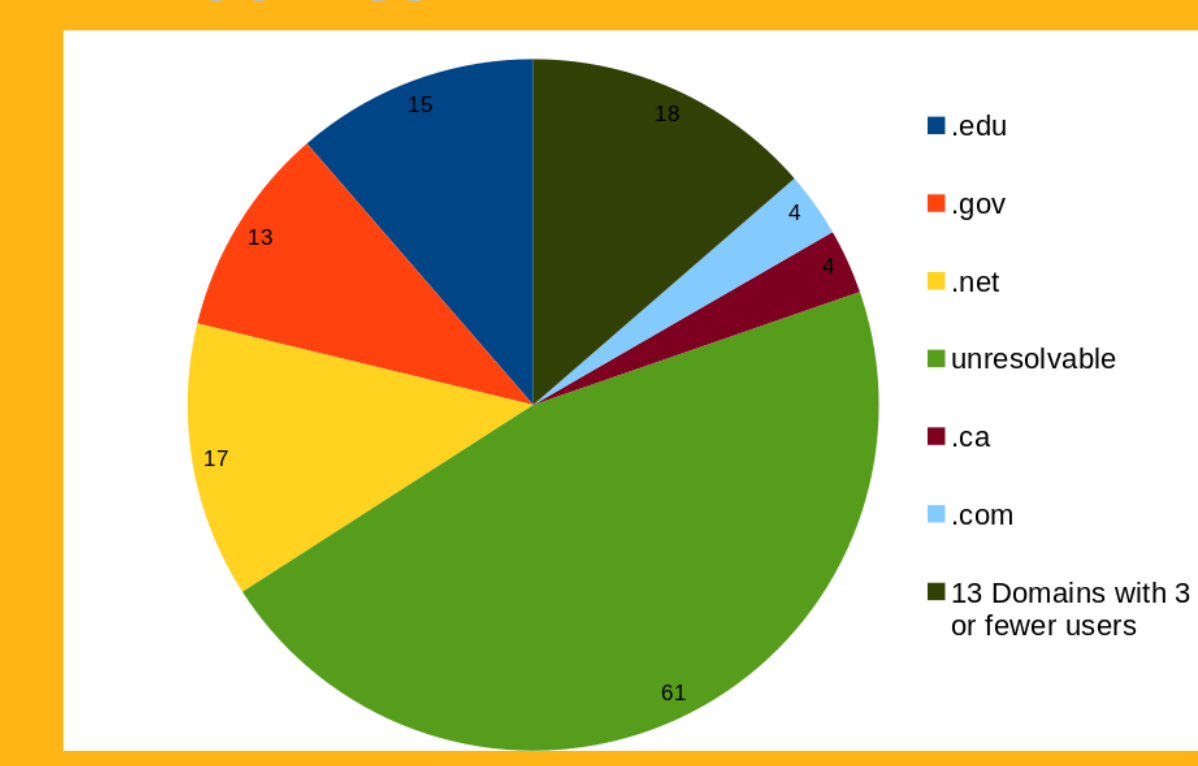
Level 2 Subsetter Metrics

This figure shows that subsetting level 2 data enables much smaller Downloads (IN51A-03).



Data Distribution Metrics

We collect metrics on the number of user downloads for all data sets archived at the GES DISC. The figure at right shows the domain of unique users of the CMS data Products archived at the GES DISC.



Additional Missions with Carbon Cycle Science Data

In addition to CMS, the GES DISC hosts carbon cycle science data from the following missions:

- ✓ Atmospheric CO2 Observations from Space (ACOS) data derived from the GOSAT-TANSO instrument
- ✓ Orbiting Carbon Observatory (OCO-2)
- ✓ Atmospheric Infrared Sounder (AIRS)
- ✓ Microwave Limb Sounder (MLS)
- ✓ Upper Atmosphere Research Satellite (UARS)
- ✓ Tropospheric Monitoring Instrument (TROPOMI)
- ✓ Cross Track Infrared Sounder (CrIS)
- ✓ Modern-Era Retrospective analysis for Research and Applications version 2 (MERRA-2)

Future Datasets

- ✓ Geostationary Carbon Observatory (GeoCarb)
- ✓ OCO-3 mission
- ✓ Additional CMS datasets

Help and Social Media

- ✓ Help Desk
- ✓ Twitter
- ✓ YouTube
- ✓ Earthdata Forum

The screenshot shows the Earthdata Search Client interface with the following details:

- Search Bar:** "Find a DAAC" with a search input field containing "Methane".
- Search Results:** "Go to Search Results" button.
- Help and Social Media:**
 - Help Desk
 - Twitter
 - YouTube
 - Earthdata Forum