



EOSDIS

NASA'S EARTH OBSERVING SYSTEM
DATA AND INFORMATION SYSTEM

Using UMM-Var and E2E To Improve The User Experience for Accessing NASA EOSDIS Data Sets

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Outline

- I. Introduction To UMM-Var
- II. E2E Capability and End-User Experience
- III. Demo of E2E Capability in Earthdata Search

I. Introduction To UMM- Var

What is the UMM-Var?

The Unified Metadata Model for Variables (UMM-Var) describes variable-level metadata. UMM-Var provides a higher level of specificity about the data than collections, and allows search and discovery of data at the variable level using community-sourced terms.

- Enables services at the variable level, as an extension to the UMM-C (Collections) and UMM-G (Granules) metadata models.
- Permits users to search and discover variables via well known geophysical terms (a.k.a. measurement names), as well as using existing Science Keywords.

Measurement: An observable property, usually geophysical. For models, it is a simulated observable property. Measurement Names are of the form: <object>__<quantity>. Names shall contain only lowercase letters and numbers along with the Standard Names separator characters (__, -, ~, _).

Examples:

"land_surface_air_flow",
"land_surface_air_heat-incoming-latent",
"land_surface_air-incoming-sensible",

Variable: A measured geophysical quantity associated with a particular data product, typically a point, swath or grid of values nested within the data file. One or more variables may be associated with a given collection.

Examples:

psl (mean sea level pressure)
O3_ppbv (ozone mixing ratio reported in parts per billion by volume)
Scat_550 (total dry aerosol scattering coefficient at 550 nm)

Fields in UMM-Var

This view highlights the top-level fields in the UMM-Var.

☐ Variable Information ☒ ☐ ☒ ☒ ☐ ☐ ☐ ☒ ☒ ☒ ☒	☒ Fill Values ☐	☐ Dimensions ☒
☒ Measurement Identifiers ☐	☒ Variable Characteristics ☐	☒ Size Estimation ☐
☐ Sets ☒	☒ Sampling Identifiers ☐	☒ Science Keywords ☐

What Does a Provider Need to Know About UMM-Var?

- **UMM-Var Version 1.5**

- Updated the use case for Size Estimation Service.
- Updated to support Size Estimation Service with better specification of data formats (via an enumeration) and a few fixes.
- Improvements following the Goddard Earth Sciences (GES) Data and Information Services Center (DISC) pathfinder work resulted in a refinement of the implementation of Variable uniqueness; added AcquisitionSourceName.

- **UMM-Var Metadata Curation**

- Records can be curated using the UMM-Var Generation (UVG) script.
- Records can be curated using the Metadata Management Tool (MMT).
- Records can be curated using the Common Metadata Repository (CMR) API.
- Records can be associated to a related collection record.

- **UMM-Var Documentation**

- Access the model and associated documentation at <https://wiki.earthdata.nasa.gov/display/CMR/CMR+Documents>.

II. End-To-End Service (E2E) Capability and End- User Experience

End-to-End Services (E2E) Capability

- Enables users to apply data transformations to data sets at the variable level.
- Requires both UMM-S and UMM-Var records to be present in CMR.
 - A UMM-S record is associated with all relevant UMM-C records.
 - The Service Options class in UMM-S provides a means to define the data transformations options available via a specific service.
- In Earthdata search, the service options show up for each of the variables within a collection.
- E2E goes beyond the traditional “order and download” paradigm and offers a more enhanced way to retrieve data.

What Does a Provider Need To Do to Add E2E Capabilities To Their Records?

- **Update UMM-S Records**
 - Curate record using the MMT or CMR API.
 - Add ServiceOptions to services, showing data transformations available, e.g. via OPeNDAP, THREDDS, WMS services (Note: E2E currently supports OPeNDAP only).
 - Add service to collection associations via MMT or the CMR API.
- **Update UMM-Var Records**
 - Use the UVG script to generate all the needed variable records.
 - By default, UVG adds variable–collection associations via the CMR API at the time of variable generation.
 - Manually curate records post-generation using the MMT or CMR API (note: there are ongoing improvements to the UVG script based on provider testing).

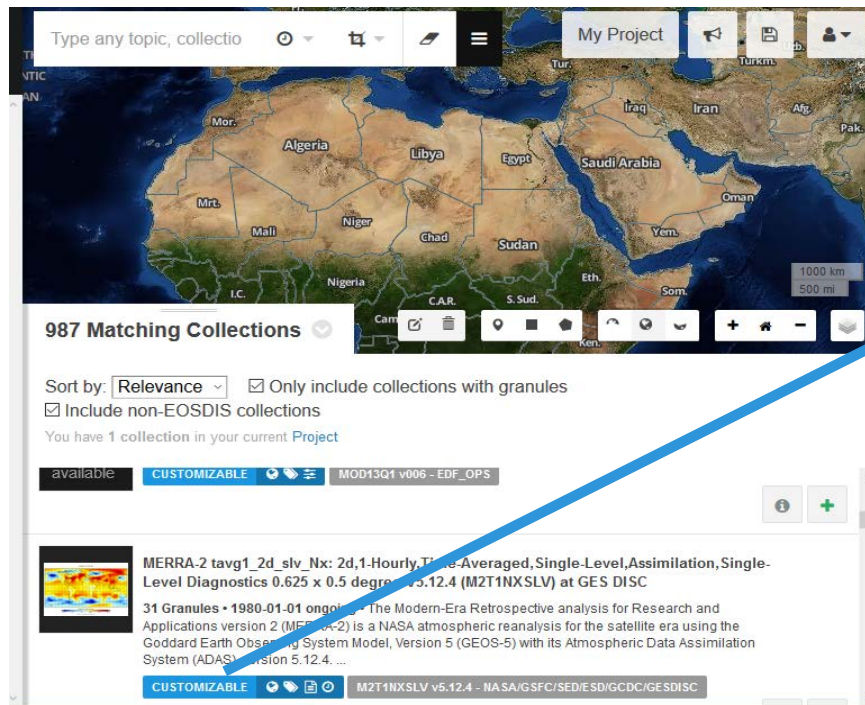
E2E Documentation

- Existing collection with **new services**:
 - <https://wiki.earthdata.nasa.gov/x/OhDZBw>
- **New collection** capable of services:
 - <https://wiki.earthdata.nasa.gov/x/NRDZBw>
- How To: Configure Customizable Icons:
 - <https://wiki.earthdata.nasa.gov/x/9ZsYC>
- UMM-S Curators Guide
 - <https://wiki.earthdata.nasa.gov/x/agFHC>

User Experience in Earthdata Search

Collection Search

Search for collection in Earthdata Search (<https://search.uat.earthdata.nasa.gov/>).



Customizable Badge

The Customizable badge is displayed to highlight that spatial, variable, reformatting, and temporal subsetting options are available on a given collection. These options are set in the UMM-Var metadata.



User Experience in Earthdata Search

Project Page

You can customize your data access and subsetting options.

Edit Options
MERRA-2 tavg1_2d_slv_Nx: 2d,1-Hourly, Time-Averaged, Single-Level,Assimilation,Single-Level Diagnostics 0.625 x 0.5 degree V5.12.4 (M2T1NXSLV) at GES DISC

Select Data Access Method

☐ Direct Download ?

☒ Customize (OPeNDAP) ?

Variable Selection
Use science keywords to subset your collection granules by measurements and variables.
No variables selected. All variables will be included in download.

[Edit Variables](#)

Output Format Selection
Choose from output format options like GeoTIFF, NETCDF, and other file types.

ASCII

Collection 1 of 1 [Done](#)

Variable Selection

Select specific variables for a given collection.

Customizations
MERRA-2 tavg1_2d_slv_Nx: 2d,1-Hourly, Time-Averaged, Single-Level,Assimilation,Single-Level Diagnostics 0.625 x 0.5 degree V5.12.4 (M2T1NXSLV) at GES DISC

[Back to Edit Options](#)

Variable Selection

[ALL LEAFNODES](#) ☒ AIR TEMPERATURE

☐ Select All Variables

PS
☐ surface_pressure
[View Details](#)

SLP
☐ sea_level_pressure
[View Details](#)

lat
☐ latitude
[View Details](#)

lon

[Back](#) [Save](#)

III. Demo of E2E Capability in Earthdata Search

Demo of E2E Capability in Earthdata Search

User Scenario:

I am looking for soil moisture data from SMAP in the Washington State region and want to reformat and download the data so I can use the data in a downloadable tool that supports HDF formatted data.

Thank You

- If you have any questions, please reach out to me (Tyler.B.Stevens@nasa.gov) or Valerie Dixon (Valerie.dixon@nasa.gov)

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