



EOSDIS

NASA'S EARTH OBSERVING SYSTEM
DATA AND INFORMATION SYSTEM

Global Change Master Directory (GCMD) Keyword Management Process and Lifecycle

ESIP Winter Meeting 2019

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Outline

- I. What Are the GCMD Keywords?
- II. Transparency in Process and Change
- III. GCMD Keywords in Action
- IV. Learn More
- V. Questions/Roundtable Discussion

I. What Are the GCMD Keywords?

GCMD Keywords

- A hierarchical set of controlled vocabulary covering Earth science disciplines that have been evolving for over 25 years.
- Helps describe Earth science data and services in a consistent and comprehensive manner.
- Allows for the precise searching of collection metadata and subsequent retrieval of data.
- Follows a governance process for keyword changes and additions.

GCMD Earth Science Keywords

 AGRICULTURE (2094) agricultural aquatic sciences, agricultural chemicals, agricultural engineering, agricultural plant science, animal commodities show all...	 ATMOSPHERE (8427) aerosols, air quality, altitude, atmospheric chemistry, atmospheric electricity show all...
 BIOLOGICAL CLASSIFICATION (4299) animals/invertebrates, animals/vertebrates, bacteria/archaea, fungi, plants show all...	 BIOSPHERE (8176) ecological dynamics, ecosystems, vegetation show all...
 CLIMATE INDICATORS (684) atmospheric/ocean indicators, biospheric indicators, cryospheric indicators, land surface/agriculture indicators, paleoclimate indicators show all...	 CRYOSPHERE (3284) frozen ground, glaciers/ice sheets, sea ice, snow/ice show all...
 HUMAN DIMENSIONS (4251) boundaries, economic resources, environmental governance/management, environmental impacts, habitat conversion/fragmentation show all...	 LAND SURFACE (6423) erosion/sedimentation, frozen ground, geomorphic landforms/processes, land use/land cover, landscape show all...
 OCEANS (11549) aquatic sciences, bathymetry/seafloor topography, coastal processes, marine environment monitoring, marine geophysics show all...	 PALEOCLIMATE (1619) ice core records, land records, ocean/lake records, paleoclimate reconstructions show all...
 SOLID EARTH (3149) earth gases/liquids, geochemistry, geodetics, geomagnetism, geomorphic landforms/processes show all...	 SPECTRAL/ENGINEERING (3174) gamma ray, infrared wavelengths, lidar, microwave, platform characteristics show all...
 SUN-EARTH INTERACTIONS (445) ionosphere/magnetosphere dynamics, solar activity, solar energetic particle flux, solar energetic particle properties show all...	 TERRESTRIAL HYDROSPHERE (3520) glaciers/ice sheets, ground water, snow/ice, surface water, water quality/water chemistry show all...

Keyword Examples

Category	Keyword Level	Example
Earth Science	Topic	Atmosphere
	Term	Weather Events
	Variable Level 1	Subtropical Cyclones
	Variable Level 2	Subtropical Depression
	Variable Level 3	Subtropical Depression Track
	Detailed Variable	Subtropical Depression 7 Track
Data Centers	Short Name	LP DAAC
	Long Name	Land Processes Distributed Active Archive Center
Projects	Short Name	ESIP
	Long Name	Earth Science Information Partner
Instruments-Sensors	Short Name	MODIS
	Long Name	Moderate-Resolution Imaging Spectroradiometer
Platforms-Sources	Short Name	Aqua
	Long Name	Earth Observing System, Aqua

II. Transparency in Process and Change


GCMD Keyword Community Forum

The **GCMD Keywords Community Forum** provides keyword users and metadata providers with a transparent area for discussion of keyword topics. Participants are invited to use the forum to ask questions, submit keyword requests, discuss trade-offs, and track the status of keyword requests. See <http://earthdata.nasa.gov/gcmd-forum>

GCMD Keywords Community Forum

Created by Ross Bagwell, last modified by Tyler Stevens on Sep 19, 2018

Welcome! The purpose of this forum is to provide keyword users and metadata providers with an area for discussion of topics related to the GCMD Keywords. Participants are invited to use this forum to ask questions, submit keyword requests, discuss trade-offs, and track the status of keyword requests.



Announcements

- NASA GCMD Keywords Version 8.6 Released (2018-03-15)
- Keyword Management Service API Documentation Updated (2017-09-26)

Forum

[CLICK HERE](#) TO SUBMIT A REQUEST FOR A NEW TOPIC

Search for Topics... ✕ [+ New Topic](#) ? 97 topics found

Show Advanced Filters Sticky topics on top

Keyword Topic	Author	# of Replies	Last Activity Date
NSIDC DAAC Keyword Request From Shannon Leslie	tstevens	8	25 minutes ago
Data Center Keyword Request From NSIDC	tstevens	46	Dec 06, 2018
Retrieve GCMD Keyword Sets by Version and Format	sritz	1	Dec 03, 2018
Summary of "Fast-Track" Keywords for November 2018	tstevens	0	Dec 03, 2018
ORNL DAAC Project Keywords	tstevens	4	Nov 27, 2018
NEW TOPIC REQUESTS	rebagwel	5	Nov 26, 2018
Identifying individual GCMD keyword sets	rowanbrownlee	4	Nov 20, 2018
Summary of "Fast-Track" Keywords for October 2018	tstevens	0	Nov 05, 2018
Summary of "Fast-Track" Keywords for September 2018	tstevens	0	Oct 25, 2018
What is the procedure of adding up a keyword? UK Best Essays	tstevens	1	Oct 24, 2018
Summary of "Fast-Track" Keywords for August 2018	tstevens	0	Sep 11, 2018

How To Use This Forum

To comment in the forum, an Earthdata Login account is required.

- > Directions for using this forum
- > Responsibilities for posting to this forum

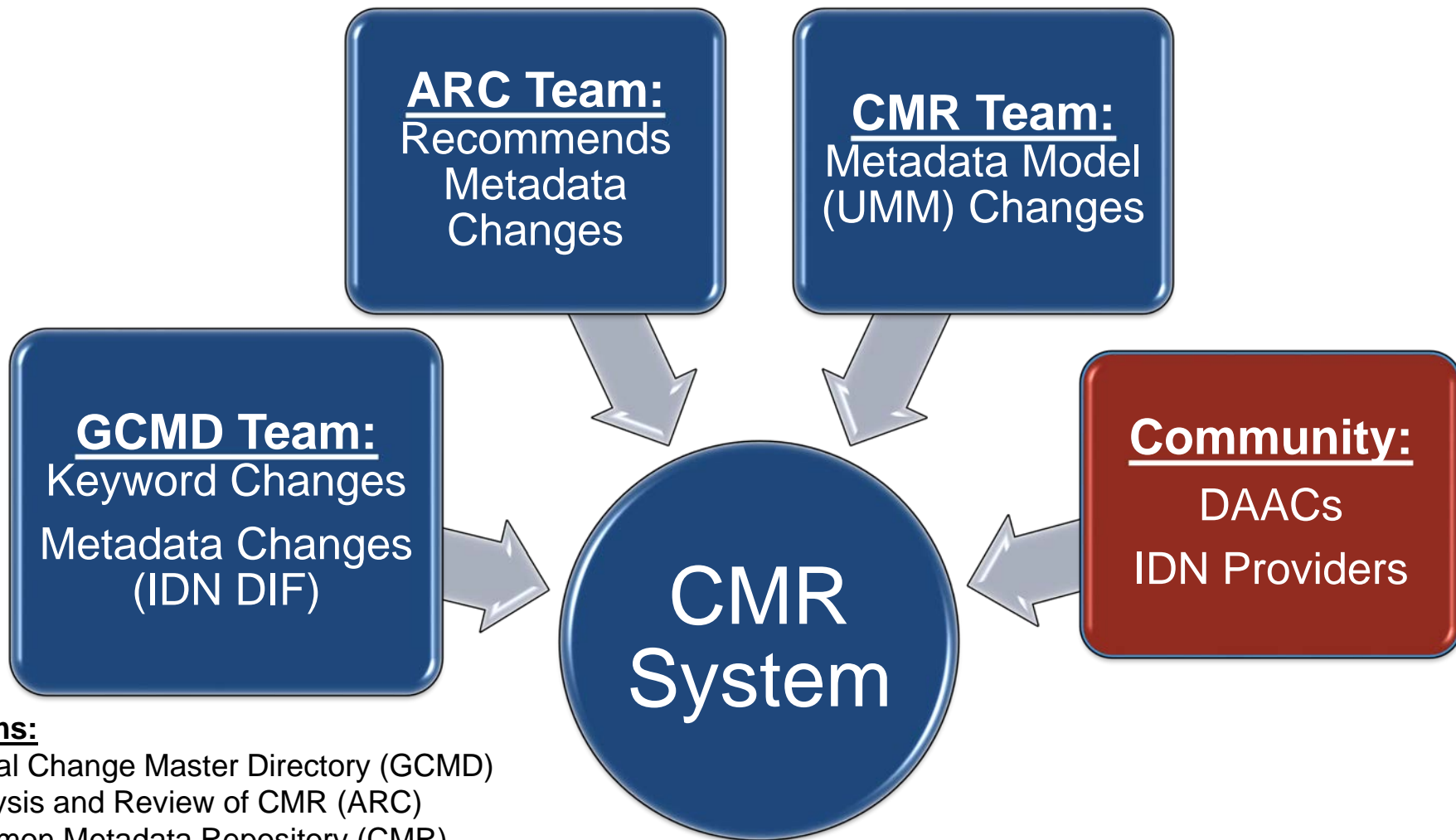
Keyword FAQ's

- What Are the GCMD Keywords?
- How Do I Submit a Keyword Request or Issue?
- How Long Will It Take For My Keyword To Be Reviewed?
- How Do I Access the GCMD Keywords?
- How Do I Cite the GCMD Keywords?

Related Keyword Links

- > More on GCMD Keywords
- > Other Related Links
- > Open Keyword Requests
- > All Keyword Requests

Who Makes Changes



Teams:

Global Change Master Directory (GCMD)

Analysis and Review of CMR (ARC)

Common Metadata Repository (CMR)

International Directory Network (IDN)

Contributing Keyword Changes

Keyword Forum

Slack #curation
Channel

Email
(support@earth
data.nasa.gov)

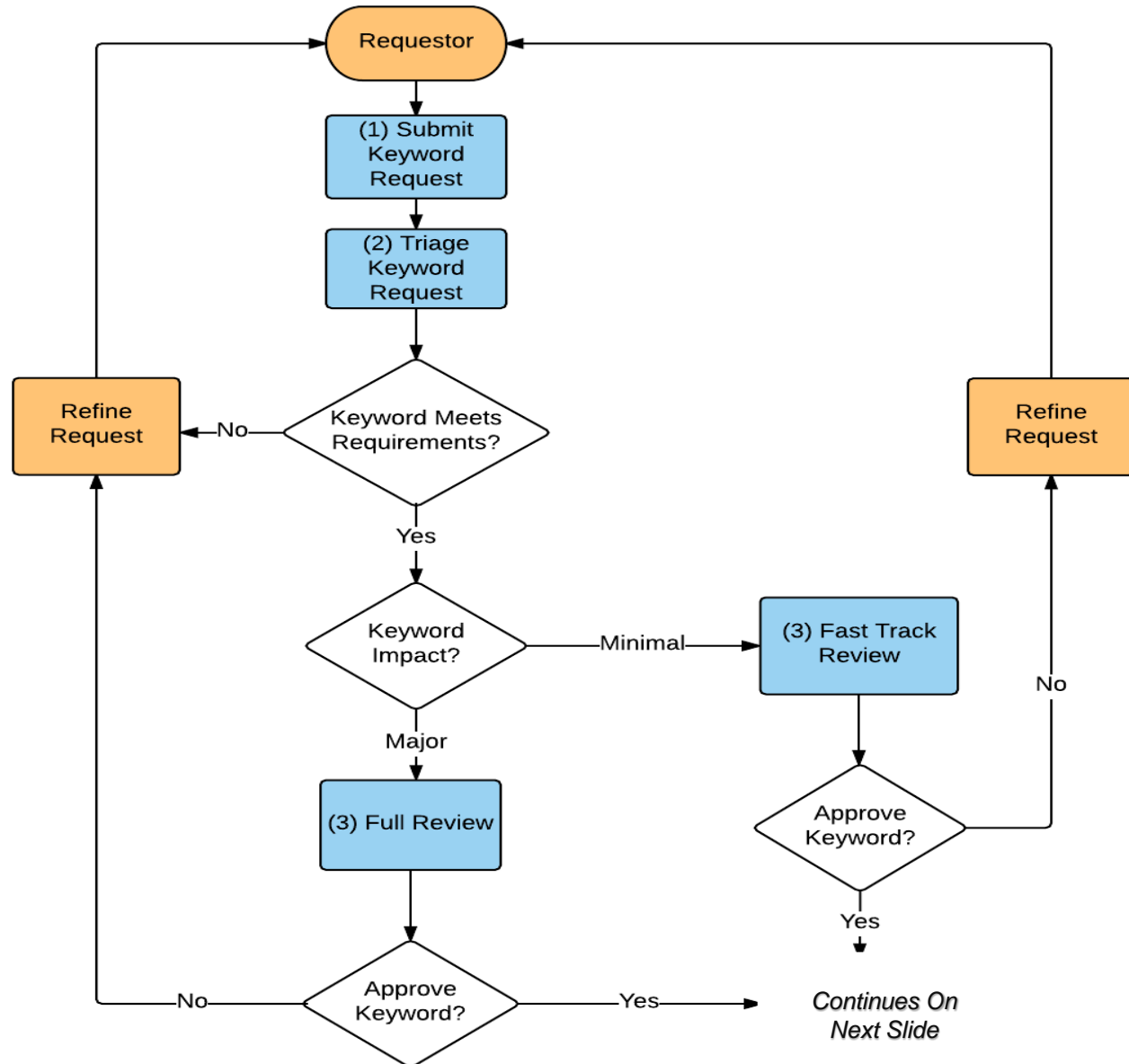
Rationale for Keyword Changes

- Fix Errors
- User Requests
- Keyword Backlog
- Align With Common Terminology
- Record Examination
- Keyword Gap Analysis
- User Search Behavior

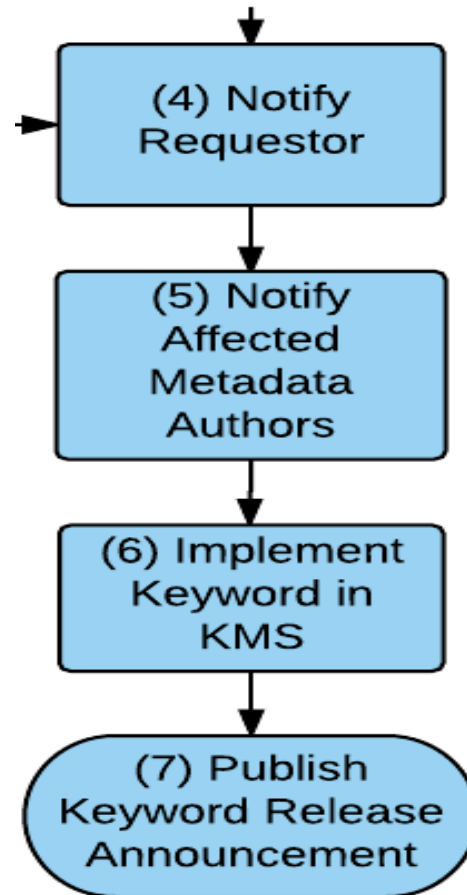
Keyword Review Types

- Fast Track
 - Impact is none to minimal
 - Small number of changes
 - Shorter turn around time (< a week)
 - *Example: “I would like to add a new Project keyword HMA > High Mountain Asia”.*
- Full Review
 - Impact is major
 - Large number of changes
 - Longer turn around time (yearly)
 - *Example: “I would like to add and revise all keywords under Terrestrial Hydrosphere > Water Quality/Water Chemistry”.*

Keyword Review Process (1 of 2)



Keyword Review Process (2 of 2)



Keyword Review Documents

Keyword Review Spreadsheet: Conveys keyword changes to reviewers

- Keyword levels are represented by different column levels.
- There are 90 rows in the table, one change per row.
- *Notes/Rationale* tab provides supplemental information.
- The keyword definition is visible when you hover over each keyword.
- Keyword legend indicates type of keyword change (new, updated, deprecated, or no change).
- Record impacted indicates how many impacted in the NASA Common Metadata Repository (CMR).

URLContentType	Type	Subtype	Records Impacted
DistributionURL	GET DATA	ALTERNATE ACCESS	0
DistributionURL	GET DATA	DATACAST URL	0
DistributionURL	GET DATA	EARTHDATA SEARCH	0
DistributionURL	GET DATA	EDSIS DATA POOL	0
DistributionURL	GET DATA	GEOWAVE	0
DistributionURL	GET DATA	KML	0
DistributionURL	GET DATA	LAADS	0
DistributionURL	GET DATA	LANCE	0
DistributionURL	GET DATA	LAS	0
DistributionURL	GET DATA	MIRADOR	0
DistributionURL	GET DATA	MODAPS	0
DistributionURL	GET DATA	MODIS CLASS	0
DistributionURL	GET DATA	ON-LINE ARCHIVE	0
DistributionURL	GET DATA	PORTAL	0
DistributionURL	GET DATA	DOWNLOAD	0
DistributionURL	GET DATA	DATA FREE	0
DistributionURL	GET DATA	DATA COLLECTION BUNDLE	0
DistributionURL	USE SERVICE API	IDS	0
DistributionURL	USE SERVICE API	WMTS	0
DistributionURL	USE SERVICE API	OPENDAP DATA	314
DistributionURL	USE SERVICE API	GDS	0

Keyword Review Survey: Reviewers rate the keyword changes

NASA's Global Change Master Directory (GCMD) Atmospheric Water Vapor and Atmospheric Winds Science Keyword Review

* Required

Introduction

The NASA Earth Science Data and Information System (ESDIS) Standards Office (ESO) is conducting a review of the GCMD Atmospheric Water Vapor and Atmospheric Winds Science Keywords. Your input is greatly appreciated and will help ensure the quality and scientific integrity of all GCMD Keywords.

GCMD Keywords:

- Consists of a hierarchical set of controlled Earth Science vocabularies
- Describe Earth science data and services in a consistent and comprehensive manner
- Allow for precise searching and retrieval of collection-level metadata and data
- Continue to be evaluated periodically for relevancy in response to user needs

Additional information about the GCMD Keywords can be found on the GCMD Keyword landing page at <https://earthdata.nasa.gov/about/gcmd/global-change-master-directory-gcmd-keywords>.

How to Complete the Review

- Review the scope of the proposed keywords to be reviewed below.
- Review the keyword proposal spreadsheet and existing keywords for cross reference (available online at <http://tinyurl.com/j8a8mzz>).
- Submit your completed responses using the online form below. You can also submit your feedback on the keywords as a whole or individually directly on the keyword proposal spreadsheet and send back to the ESO.

Scope of the Proposed GCMD Keywords to be Reviewed

Keyword Review Feedback: Conveys all feedback received from keyword reviewers

Reviewer	Reviewer Feedback	Response	Responded to User
<p>@Kathleen Baynes (NASA/ESDS) kathleen.baynes@nasa.gov</p>	<ol style="list-style-type: none"> I wouldn't use the related URL types as search terms. I cannot comment on science keywords I think "OpenSearch" should be modified to all caps (OPENSEARCH) I prefer long term to get rid of the verbs "GET", "VIEW", "USE", "GO TO", etc in favor of a simplified taxonomy 	<ol style="list-style-type: none"> The Related URL terms are not primary terms that users use within search, but there are use cases where users might want to search or refine their existing search for a specific Get Data type. For example, I want to search for data sets that have a MODAPS data type or a service that points to a software package as an end point. The term is consistent with the naming convention used by the OpenSearch organization and we are trying to be consistent with the accepted naming convention. Therefore, we recommend that the term stay as "OpenSearch". This terminology has been recommended by end users, the ARC team, DAAC metadata curators, and provides a clear understanding of the type of URL that users will obtain. I recommend that before making any decision, we consider the other feedback in the review. Do you have a use case or rationale for why these verbs should be removed? 	Yes
<p>Trevi Houka (LP DAAC/USGS) trevi.houka.chr@usgs.gov</p>	<ol style="list-style-type: none"> LP DAAC would like Related URL Keyword options for USGS EarthExplorer and AppEEARS. 	<ol style="list-style-type: none"> These Related URL keywords can be added. Can you please clarify that you want these sub-types added under DistributionURL > Get Data? 	Yes
<p>Les Hook (ORNL DAAC) hookla@ornl.gov</p>	<ol style="list-style-type: none"> Categories as Variable Level 1 for Water Quality/Water Chemistry? Not my favorite thing In this example, it appears that these Var_2 are only available as "Contaminants". True? This would not usually/necessarily be the case. Nutrients perhaps? Water Characteristics? Add to both categories? Contaminants >> Inorganic Matter Contaminants >> Nitrogen Compounds Contaminants >> Organic Matter Contaminants >> Phosphorous Compounds Don't put categories as Var_1 (Contaminants) 	<ol style="list-style-type: none"> The naming convention is not ideal and there are plans to address this issue in future keyword releases since in many cases, keywords at the Variable Level 1 level are not true variables. The current naming convention was adopted at a time when there were fewer keyword levels and all keywords at this level were true variables. The categories being proposed under Water Quality/Water Chemistry are consistent with keyword categories across other keyword topic areas. Some of the variables under "Contaminants" also apply as Nutrients since we define Nutrients as "Elements essential for growth and survival of a given organism". The following variables under "Contaminants" can be added under "Nutrients": Hydrocarbons, Inorganic Matter, Nitrogen Compounds, Organic Matter, Phosphorous 	Yes

How You Can Participate in Keyword Change Reviews

- The GCMD Keyword review is facilitated by the NASA ESDIS Standards Office (ESO).
- Keyword reviewers will review proposed keywords and complete an online questionnaire to provide their feedback.
- If you are interested in becoming a keyword reviewer, please contact the ESO at eso-staff@lists.nasa.gov.
- We need your science expertise!!

III. GCMD Keywords In Action

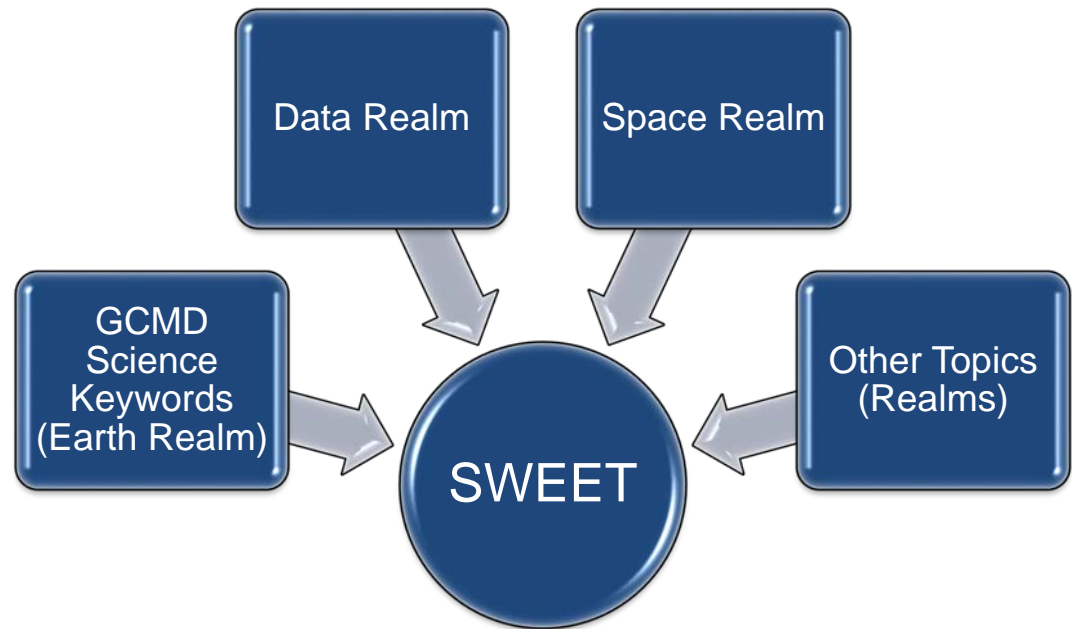
Authoritative Vocabulary, Taxonomy, or Thesaurus

Organizations that have adopted the GCMD keywords use them to describe their Earth science data in a consistent and comprehensive manner.



Foundation for Building Ontologies in SWEET and Other Ontologies

- Ontologies, including the Semantic Web for Earth and Environmental Terminology (SWEET) and Sea Ice, are using the GCMD keywords as a “low-level” source of keywords (knowledge base) for building broader domain specific ontologies.



Integration Within Metadata Curation Tools

- CMR metadata providers are required to use the GCMD keywords to describe their data.
- CMR metadata team reviews science keywords in records for consistency and makes recommendations as needed for additional keywords to better describe providers' data.

docBUILDER

Science Keywords ⓘ Select science keywords that describe the data set.

Select a Keyword Topic (from the upper box) to view only that Topic's subset of keywords in the lower box.

ALL
AGRICULTURE
ATMOSPHERE
BIOLOGICAL CLASSIFICATION
BIOSPHERE
CLIMATE INDICATORS

Search the list:

AGRICULTURE > AGRICULTURAL AQUATIC SCIENCES
AGRICULTURE > AGRICULTURAL AQUATIC SCIENCES > AQUACULTURE
AGRICULTURE > AGRICULTURAL AQUATIC SCIENCES > FISHERIES
AGRICULTURE > AGRICULTURAL CHEMICALS
AGRICULTURE > AGRICULTURAL CHEMICALS > FERTILIZERS
AGRICULTURE > AGRICULTURAL CHEMICALS > PESTICIDES
AGRICULTURE > AGRICULTURAL ENGINEERING
AGRICULTURE > AGRICULTURAL ENGINEERING > AGRICULTURAL EQUIPMENT
AGRICULTURE > AGRICULTURAL ENGINEERING > FARM STRUCTURES
AGRICULTURE > AGRICULTURAL PLANT SCIENCE
AGRICULTURE > AGRICULTURAL PLANT SCIENCE > CROP/PLANT YIELDS
AGRICULTURE > AGRICULTURAL PLANT SCIENCE > CROPPING SYSTEMS
AGRICULTURE > AGRICULTURAL PLANT SCIENCE > IRRIGATION
AGRICULTURE > AGRICULTURAL PLANT SCIENCE > PLANT BREEDING AND GENETICS
AGRICULTURE > AGRICULTURAL PLANT SCIENCE > PLANT DISEASES/DISORDERS/PESTS

Deselect Highlighted Items?

To add uncontrolled Science Keywords, append detailed variables to the selected keyword set(s) from the list above.
To add or modify a "controlled" keyword, please follow the [Procedures for GCMD Keyword Modification](#).

Keyword Pick-List From
GCMD Keyword Management
System (KMS)

Metadata Management Tool

Science Keywords ⓘ

EARTH SCIENCE > TERRESTRIAL HYDROSPHERE > SURFACE WATER > SURFACE WATER PROCESSES/MEASUREMENTS > DRAINAGE > DRAINAGE AMOUNT ⓘ

Science Keyword
EARTH SCIENCE
TERRESTRIAL HYDROSPHERE
SURFACE WATER
SURFACE WATER PROCESSES/MEASUREMENTS
AQUIFER RECHARGE

Search for keywords...

AQUIFER DEPTH
RECHARGE AMOUNT
RECHARGE FREQUENCY

➕ Add Keyword

Integration Within Metadata Catalogues for Search and Discovery

NASA Earthdata

The screenshot shows the NASA Earthdata Search interface. At the top, there's a search bar with the text "Type any topic, collection, or place name". Below the search bar is a world map. On the left, there are filters for "Browse Collections", "Features", and "Keywords". The "Keywords" section is expanded to show "Atmosphere" with various sub-categories like Aerosols, Air Quality, and Altitude. A search result for "MODIS/Aqua Aerosol 5-Min L2 Swath 3km V006" is displayed, including a thumbnail and a brief description.

NASA GES DISC

The screenshot shows the NASA GES DISC interface. At the top, there's a search bar with the text "From search bar". Below the search bar is a list of "Data Collections" and "Documentation". The "Measurement Sort" section is expanded to show a list of measurement types with checkboxes, such as Aerosol Backscatter, Aerosol Extinction, and Aerosol Optical Depth/Thickness. A table of search results is visible on the right side.

FEDEO

The screenshot shows the FEDEO (FedEO Client) interface. At the top, there's a search bar with the text "Search". Below the search bar is a world map. On the left, there are filters for "ERS-BAR", "Start date", "End date", "Place name", "Resolution (meter)", "Orbit number", "Orbit direction", "Track", "Frame", "Start time from...", and "Completion time from...". A search result for "Collection 2 of 127" is displayed, including a thumbnail and a brief description.

NOAA One Stop

The screenshot shows the NOAA One Stop interface. At the top, there's a search bar with the text "ocean". Below the search bar is a list of "Filters" including Location, Date, and Keywords. The "Search Results (showing 20 of 27928)" section is expanded to show a list of search results with thumbnails and titles, such as "Ocean Observatories Initiative (OOI)", "Data from the NOAA Office of Ocean", "Ocean Station Vessel", and "World Ocean Atlas 2013 (NOCI Accession)".

IV. Learn More

Keyword Landing Page

- Learn More about the Keywords
- Access the GCMD Keywords
- Submit a Keyword Request
- See Keyword Release Announcements
- Review the Keyword Governance Document

The screenshot shows the 'Global Change Master Directory (GCMD) Keywords' landing page. At the top, there is a search bar with the text 'Search datasets, news, articles, and information'. Below the search bar, the breadcrumb navigation reads 'About EOSDIS > Global Change Master Directory (GCMD) > Global Change Master Directory (GCMD) Keywords'. The page is divided into several sections:

- GCMD Keyword Links (Earthdata Wiki):** This section includes links for 'Access the GCMD Keywords', 'Submit a Keyword Request', 'Keyword Release Announcements', and 'Keyword Community Forum'.
- More Resources:** This section lists various resources such as 'Global Change Master Directory (GCMD)', 'Common Metadata Repository (CMR)', 'ESDIS Standards Office (ESO)', 'Keyword Governance and Community Guide Document', and 'GCMD Keyword Viewer (Alpha)'.
- Global Change Master Directory (GCMD) Keywords:** This is the main content area. It features a list of keyword categories: Earth Science, Earth Science Services, Data Centers, Projects, Instruments/Sensors, Platforms/Sources, Locations, Horizontal Data Resolution, Vertical Data Resolution, Temporal Data Resolution, URL Content Types, and Chronostratigraphic Units. Below the list, there is a paragraph explaining that the GCMD Keywords are a hierarchical set of controlled Earth Science vocabularies and that the categories are periodically analyzed for relevancy.
- GCMD Keyword Community Forum:** This section describes the forum as a place for keyword users and metadata providers to discuss topics, ask questions, and track the status of keyword requests. It includes a small thumbnail image of the forum interface.
- More Information About the Keywords:** This section contains three expandable cards: 'GCMD Keyword Structure', 'Community Use of GCMD Keywords', and 'GCMD Keyword Governance and Community Guide Document'.

<https://earthdata.nasa.gov/about/gcmd/global-change-master-directory-gcmd-keywords>

Utilizing the KMS API

- The Keyword Management Service (KMS) is a RESTful web service for maintaining and accessing the keywords.
 - Retrieve the keywords as SKOS Concepts (RDF, JSON, OWL), XML, and CSV
 - Retrieve previous versions
 - Retrieve in different case (Native, Title Case, Upper Case, Lower Case)
 - Search by keyword pattern (i.e. Search by 'Terra')
- Help Documentation
 - <https://wiki.earthdata.nasa.gov/x/gwxNBQ>

V. Questions/Roundtable Discussion

Questions for Audience Interaction Activity

- Ease of access of the GCMD keywords.
- Rate the usefulness of the GCMD keywords for describing Earth science data sets in your specific discipline.
- How did you hear about the GCMD keywords?

This work was supported by NASA/GSFC under Raytheon Co. contract number NNG15HZ39C.

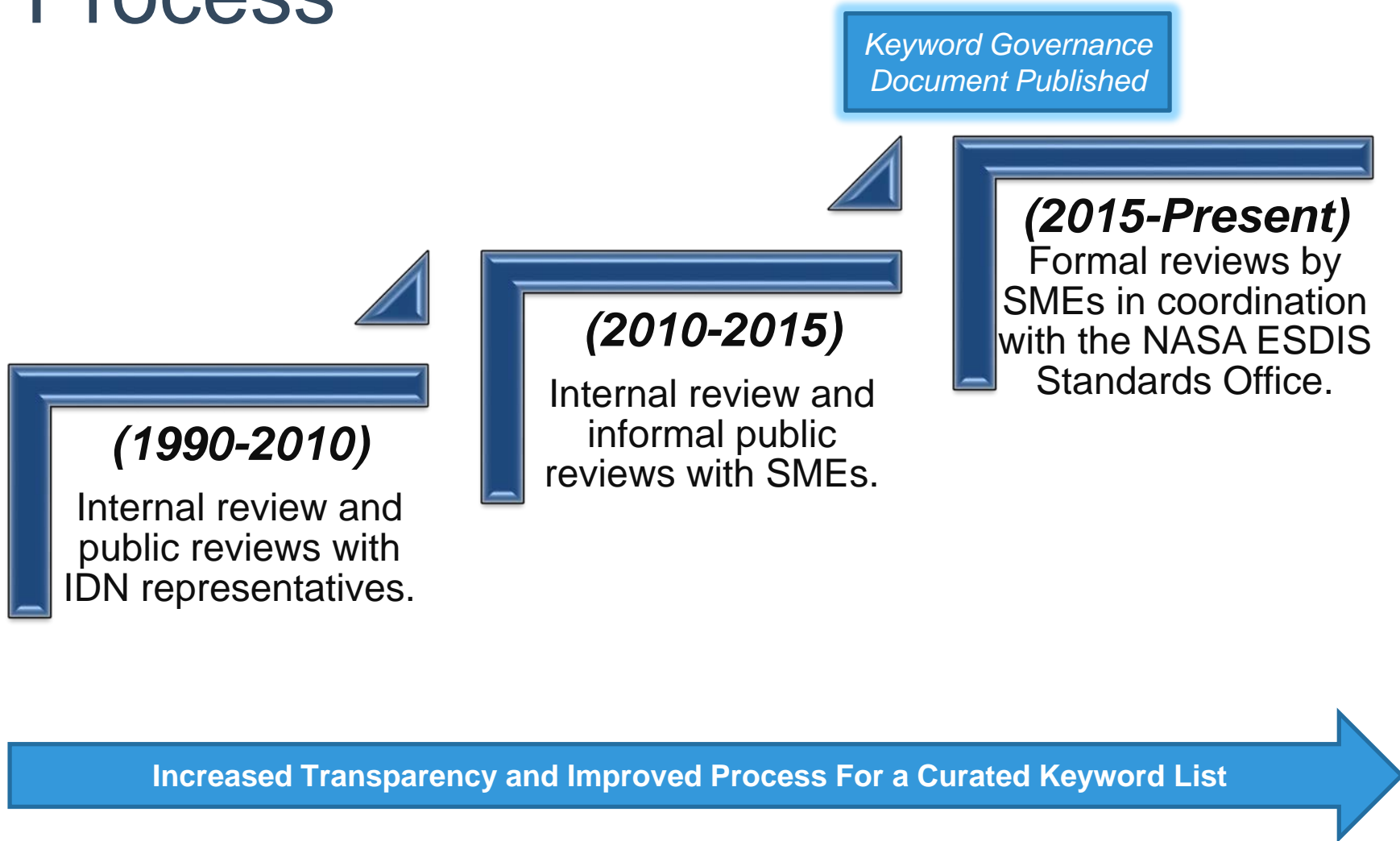
Raytheon

in partnership with



Backup

Evolution of Keyword Review Process



Tracking All Changes Across CMR

