



Establishing a Terminology Service for the Earth System Sciences

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Why Use Terminologies in Earth System Sciences?

- **Clarity Across Disciplines**
- **Consistent Data Annotation with Terminologies**
- **Improved Data Discovery**
- **Support for Automation**
- **Enhanced Collaboration**

→ *Terminologies are not just labels – they enhance clarity, consistency, and collaboration*





The BITS Project

Blueprints for the Integration of Terminology Services in Earth System Sciences

Development of a Terminology Service for Earth Scientists (TS ESS):

- Closely connected to the two ESS repositories of our partners DKRZ and SGN
- Involvement of the ESS community:
 - choice of terminologies for the TS ESS,
 - finding and closing gaps in terminologies,
 - development of supporting tools.



<https://projects.tib.eu/bits/home>



TIB Terminology Service (TIB TS)

- **Central service** that hosts all terminologies
- **Permanent** service
- **Co-developed across multiple projects and communities** (BITS, NFDI4Ing, NFDI4Chem,...).
- **Special services** for communities, e.g. engineers, chemists, earth scientists,...
- All terminologies in the TIB TS are **quality controlled**

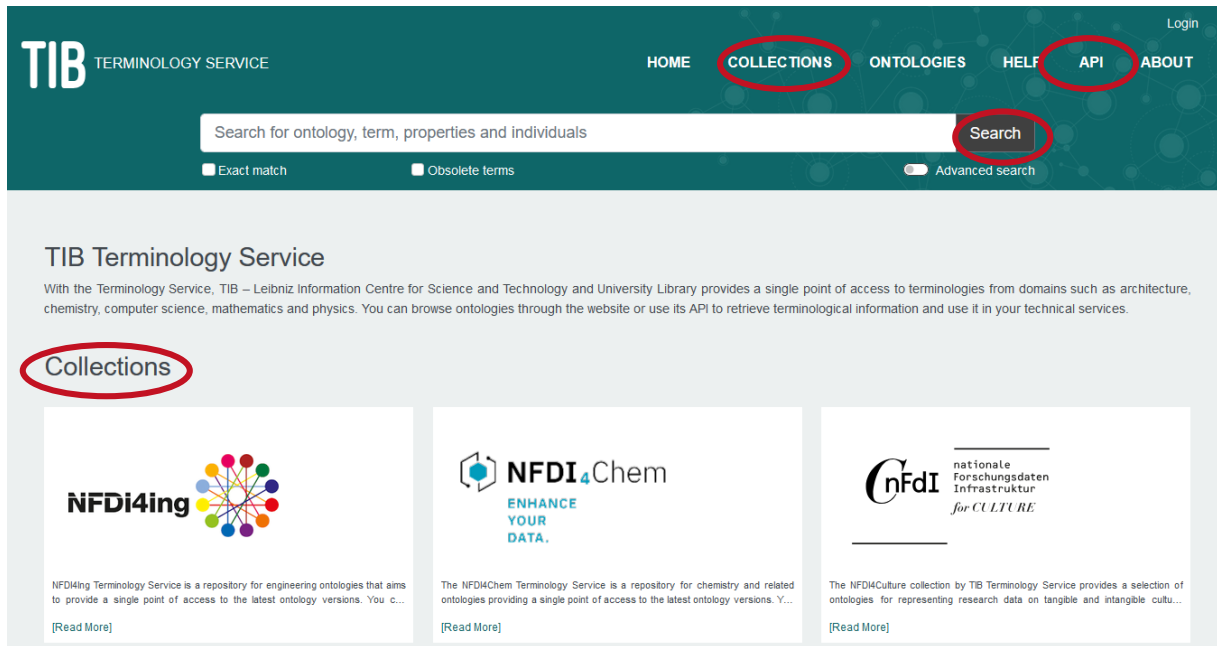
TIB TERMINOLOGY SERVICE



<https://terminology.tib.eu/ts/>

TIB TS Central

- Freetext searching
- Machine to machine communication (REST API)
- Collections



The screenshot shows the TIB Terminology Service website. The header is dark teal with the TIB logo and 'TERMINOLOGY SERVICE' text. Navigation links include HOME, COLLECTIONS (circled in red), ONTOLOGIES, HELP, API (circled in red), and ABOUT. A search bar is present with a 'Search' button (circled in red). Below the header, the 'Collections' section (circled in red) features three cards: NFDI4ing, NFDI4Chem, and CnFDI. Each card includes a logo, a brief description, and a '[Read More]' link.

TIB TERMINOLOGY SERVICE

HOME **COLLECTIONS** ONTOLOGIES HELP **API** ABOUT

Search for ontology, term, properties and individuals **Search**

☐ Exact match ☐ Obsolete terms ☐ Advanced search

TIB Terminology Service

With the Terminology Service, TIB – Leibniz Information Centre for Science and Technology and University Library provides a single point of access to terminologies from domains such as architecture, chemistry, computer science, mathematics and physics. You can browse ontologies through the website or use its API to retrieve terminological information and use it in your technical services.

Collections

NFDI4ing

NFDI4ing Terminology Service is a repository for engineering ontologies that aims to provide a single point of access to the latest ontology versions. You c...

[Read More]

NFDI4Chem

ENHANCE YOUR DATA.

The NFDI4Chem Terminology Service is a repository for chemistry and related ontologies providing a single point of access to the latest ontology versions. Y...

[Read More]

CnFDI

naionale Forschungsdaten Infrastruktur for CULTURE

The NFDI4Culture collection by TIB Terminology Service provides a selection of ontologies for representing research data on tangible and intangible cultu...

[Read More]

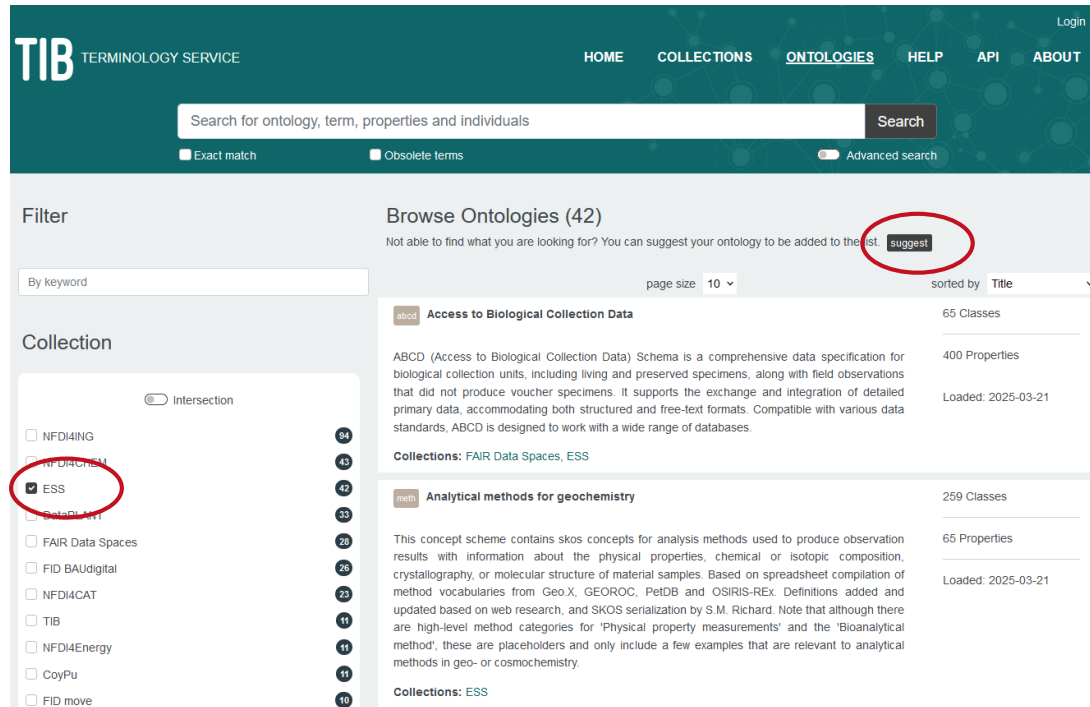
<https://terminology.tib.eu/ts/>



The ESS Collection



- Terminologies useful for ESS
- Additional terminologies can be suggested
- Work in progress - further terminologies will be added



The screenshot shows the TIB Terminology Service interface. The top navigation bar includes links for HOME, COLLECTIONS, ONTOLOGIES, HELP, API, and ABOUT. A search bar is present with a 'Search' button. Below the search bar, there are checkboxes for 'Exact match' and 'Obsolete terms', and a toggle for 'Advanced search'.

The main content area is titled 'Browse Ontologies (42)'. It includes a message: 'Not able to find what you are looking for? You can suggest your ontology to be added to the list.' A red circle highlights the 'suggest' button next to this message.

On the left side, there is a 'Filter' section with a 'By keyword' input field. Below this is a 'Collection' section with a list of checkboxes. The 'ESS' checkbox is checked and highlighted with a red circle. Other checkboxes include NFDI4ING, NFDI4CHEM, NFDI4AN, FAIR Data Spaces, FID BAUdigital, NFDI4CAT, TIB, NFDI4Energy, CoyPu, and FID move.

The main list of ontologies is displayed with columns for 'page size', 'sorted by', and 'Title'. The first ontology listed is 'Access to Biological Collection Data' (ABCD) with 65 Classes, 400 Properties, and a load date of 2025-03-21. The second ontology is 'Analytical methods for geochemistry' (meth) with 259 Classes, 65 Properties, and a load date of 2025-03-21.

<https://terminology.nfdi4earth.de/>



Feasibility study: PIDs for Terms of Terminologies

Problem: Disappearance of classes and individuals

New versions of some terminologies: classes or individuals have been deleted
→ the corresponding IRIs are no longer resolvable

Suggestion: PIDs for the terms of terminologies in the TIB TS

- All versions of a term are stored
- Persistent handles for terms are assigned by TIB
- Landing page of the handle is the page of the term in the TIB TS
- Each new version of a term gets an own handle

The logo consists of the text "hdl" in a bold, red, sans-serif font, followed by the word "enabled" in a smaller, blue, italicized, sans-serif font. The entire text is enclosed within a thin red rectangular border.

Search in dfgfo2024

Search

☐ Exact match☐ Obsolete terms☐ Advanced search

DFG Classification of Subject Areas Ontology - 2024-2028

<https://w3id.org/dfgfo/2024>[Overview](#) [Class Tree](#) [Property Tree](#) [Individuals](#) [Class List](#) [Notes \(0\)](#) [Github Panel](#) [Changes Management](#)Ontology language **en**

Jump to type your target term ...

Reset

Show Obsoletes

Sub Tree

- Engineering Sciences
 - Computer Science, Systems and Electrical Engineering
 - Computer Science
 - Security and Dependability, Operating, Communication and Distributed Systems**

Detail

Notes (0)

Graph View

Label

Security and Dependability, Operating, Communication and Distributed Systems

[copy label as link](#)[Guide me](#)

Imported From

DFGFO2024

Also In

CURIE

dfgfo2024:443-03

Term ID

dfgfo2024_443-03

fullIRI

<https://w3id.org/dfgfo/2024/443-03>

Handle Uri

https://hdl.handle.net/20.500.14488/DFGFO_443-03[Show Data as JSON](#)



Senckenberg Collections: Automated annotation of digital objects descriptions

- More than 40 million physical specimen
- Currently: 1,547,711 digital specimen in 124 collections
- Partial use of taxonomic transcriptions, but also use of mixed languages, handwritten notes, labels and other image data

Task:
Standardised descriptions of the specimen via automated annotation with terms from terminologies in the ESS Collection





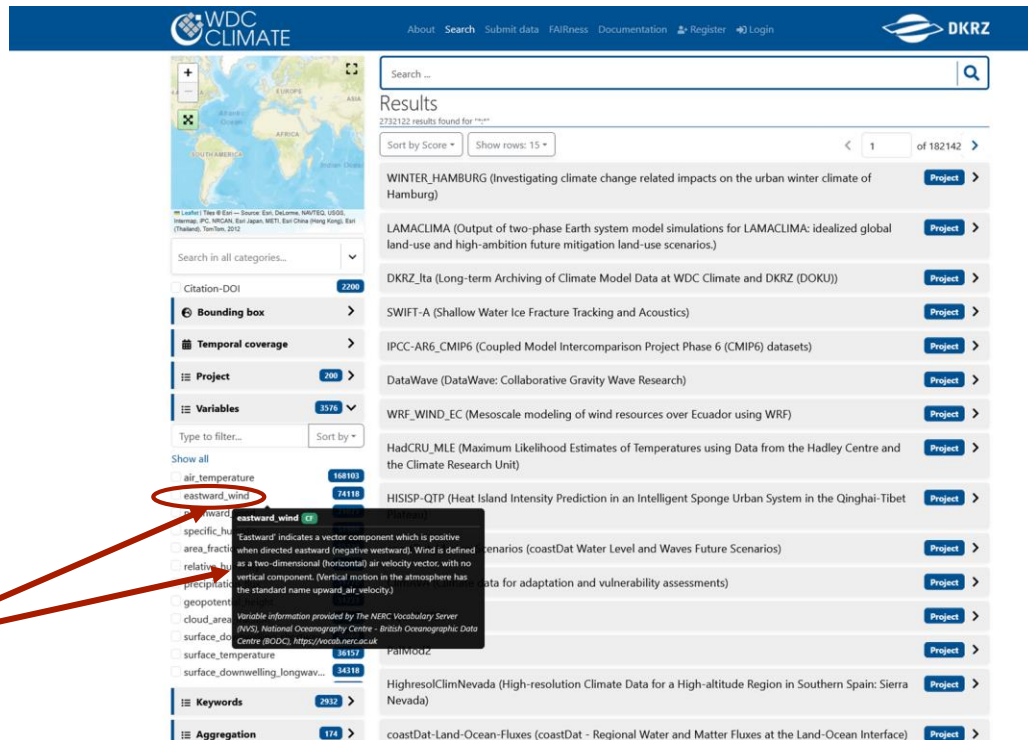
World Data Center for Climate: Displaying Definitions of Search Terms

Data from climate simulations:
standardised metadata (CF-
conventions)

Problem:

Researcher from other
disciplines are not familiar with
these conventions

Solution: Definition of the term
in the CF-vocabulary will be
shown



The screenshot shows the WDC Climate website interface. At the top, there is a navigation bar with links: About, Search, Submit data, Fairness, Documentation, Register, and Login. The DKRZ logo is on the right. Below the navigation bar, there is a search bar and a map of the world. The search results section shows 2732122 results found for 'eastward_wind'. The results are sorted by Score and show 15 rows. The first result is 'WINTER_HAMBURG' (Investigating climate change related impacts on the urban winter climate of Hamburg). Other results include 'LAMACLIMA', 'DKRZ_Ita', 'SWIFT-A', 'IPCC-AR6_CMIP6', 'DataWave', 'WRF_WIND_EC', 'HadCRU_MLE', and 'HISISP-QTP'. A tooltip is displayed over the 'eastward_wind' search term, providing a definition: 'Eastward: indicates a vector component which is positive when directed eastward (negative westward). Wind is defined as a two-dimensional (horizontal) air velocity vector, with no vertical component. (Vertical motion in the atmosphere has the standard name upward_air_velocity). Variable information provided by The NERC Vocabulary Server (NVS), National Oceanography Centre - British Oceanographic Data Centre (BODC), https://vocab.nerc.ac.uk'. The tooltip also shows the number of results for 'eastward_wind' (168101) and 'eastward' (14118).



We need your participation:

Please test our [Terminology Service](#):

and

Please take part in our survey:

[Improving the ESS Collection of the TIB TS](#)





Thank You !

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<https://projects.tib.eu/bits/home>

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TIB LEIBNIZ INFORMATION CENTRE
FOR SCIENCE AND TECHNOLOGY
UNIVERSITY LIBRARY



SENCKENBERG
world of biodiversity

funded by:
DFG Deutsche
Forschungsgemeinschaft