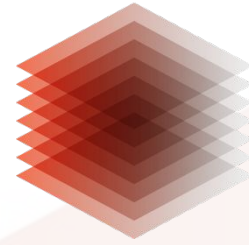


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TIB

The new Earth System Sciences Terminology Service (ESS TS)

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Oct. 11 2023

Motivation

FAIRness of data from the Earth System Sciences (ESS):
often reduced due to non-standardised metadata.

→ standardisation with semantic artefacts (terminologies or ontologies) is needed.

Enhance user-friendliness of searches in repositories:
Use metadata taken from ontologies.

Semantic artefacts for the ESS: hard to find and use.

→ Support in form of a Terminology Service for Earth Scientists is needed.



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The BITS Project (July 2023 - June 2026)

Blueprints for the Integration of Terminology Services in Earth System Sciences

Tasks:

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

- closely connected to the two ESS repositories of our partners DKRZ and SGN,
- blueprints for the integration of the service into other ESS repositories,
- involvement of the ESS community:
 - choice of terminologies for the TS ESS,
 - finding and closing gaps in terminologies,
 - development of supporting tools.



BluePrints for the Integration of Terminology
Services in Earth System Sciences

For more information visit <https://projects.tib.eu/bits/home>



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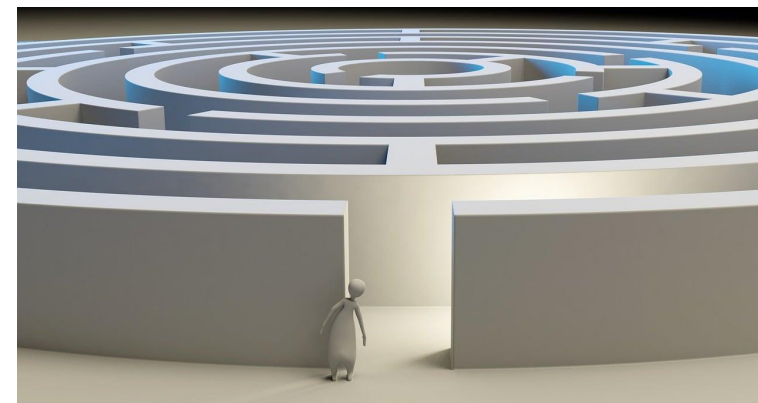
funded by: **DFG** Deutsche
Forschungsgemeinschaft

Terminology Service - Definition

In general: A Terminology Service is a web based platform that supports take-up and standardisation of terminologies

Used by **Scientists, knowledge Workers** and **RDM tools** as

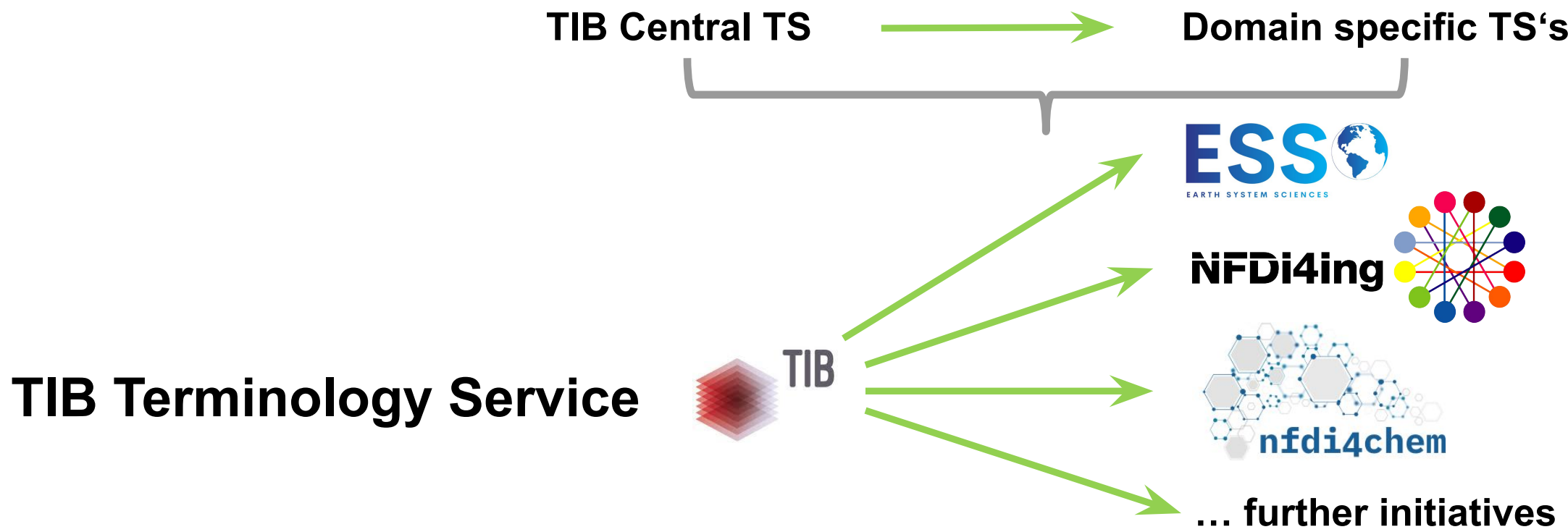
- **Entry Point** to prepare research data for effective later reuse:
 - **Tag/index** data sets with **keywords** from terminologies,
 - **Trace changes** of terminologies,
 - **Search:** Query reformulation, term suggestion, ...
- **Hub**, that fosters **awareness** and **alignment**:
 - Bundles terminologies of a domain,
 - Provides meta data and statistics,
 - Foster alignments.



Picture created by [Arek Socha](#),
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Terminology Services offered by TIB

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



Base system:

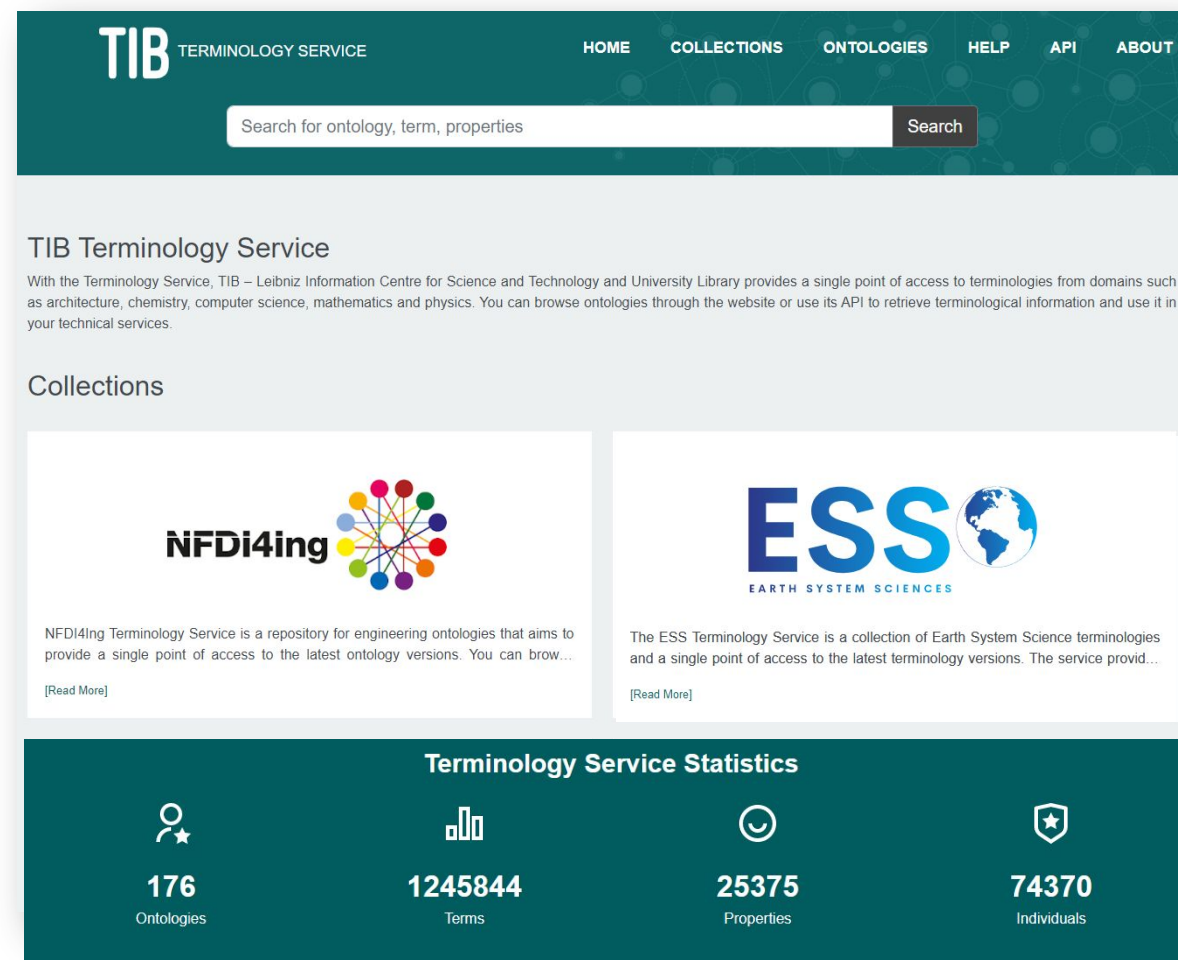
EBI - Ontology Lookup Service
Apache 2.0 Licence



TIB Terminology Service

TIB TS Central: <https://terminology.tib.eu/ts>

- First version released July '21
- Central service instance holds all terminologies
- Some statistics (end of Sept. 23)
 - 9 domain specific collections
 - **> 175 Terminologies**
 - **>1.200.000 terms**
 - **>25.000 properties**



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, ONTOLOGIES, HELP, API, and ABOUT. A search bar is present with the placeholder text 'Search for ontology, term, properties' and a 'Search' button.

The main content area has a light blue background. It features a section titled 'TIB Terminology Service' with a brief description: '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.'

Below this is a 'Collections' section with two featured collections:

- NFDi4ing**: Represented by a logo of a network of colored dots. The description states: 'NFDi4ing Terminology Service is a repository for engineering ontologies that aims to provide a single point of access to the latest ontology versions. You can brow...' with a '[Read More]' link.
- ESS**: Represented by a logo with the letters 'ESS' and a globe icon, with 'EARTH SYSTEM SCIENCES' below. The description states: 'The ESS Terminology Service is a collection of Earth System Science terminologies and a single point of access to the latest terminology versions. The service provid...' with a '[Read More]' link.

The footer is dark teal and titled 'Terminology Service Statistics'. It displays four statistics in a grid:

Icon	Value	Category
Person icon	176	Ontologies
Bar chart icon	1245844	Terms
Smiley face icon	25375	Properties
Shield icon	74370	Individuals

Terminology Service

TIB TS Central



Functional service offer

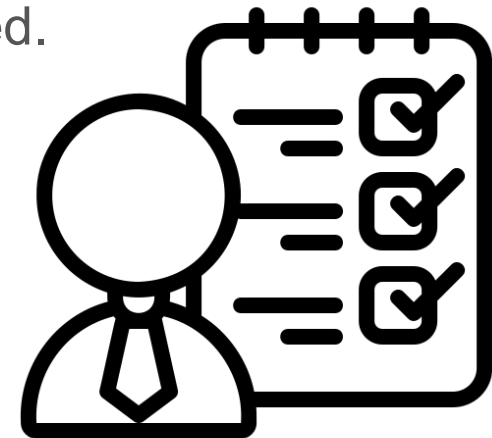
- Freetext searching
(for- and within ontologies)
- Browsing and filtering
- Visualisation
- Issue tracker
- Machine to machine communication
(REST interfaces)
- Collection Management

Selection of Terminologies

- Most of the terminologies in the TIB TS are developed and maintained by groups outside the TIB.
- All terminologies are **quality controlled** before they are ingested.
- Only the newest (ingestable) version of a terminology is shown.

Quality criteria:

- Open license,
- machine readable format (OWL or SKOS),
- Identifier IRI, purl,
- no errors, contradictions etc. in the terminology,
- mandatory and recommended metadata,
- terminology is used by others and regularly updated.



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Terminology Service

TIB TS Functional service offer: Searching and Filtering



TIB TERMINOLOGY SERVICE

HOME COLLECTIONS ONTOLOGIES HELP API ABOUT

temperature Search

Filter Results
[Clear All Filters](#)

3504 results found for "temperature"

Results Per Page 10

Type

- ☐ class 2781
- ☐ individual 608
- ☐ property 115

Ontologies

- ☐ BRICK 535
- ☐ SNOMEDCT 446
- ☐ NCIT 343
- ☐ TEMA 245
- ☐ CHMO 142

[+ Show More](#)

Collections

- ☐ ESS
- ☐ NFDI4CHEM
- ☐ FID BAUdigital

[class] Temperature NCIT_C25206
http://purl.obolibrary.org/obo/NCIT_C25206

A measure of the average kinetic energy of a system of particles. Temperature may be quantified, in the context of thermodynamics, as the potential of one system to transfer thermal energy to another system until both systems reach a state of thermal equilibrium.

Ontology: NCIT

[property] temperature temperature
<http://www.w3id.org/ecsel-dr-OOSMP#temperature>

Ontology: dr

[individual] temperature B11603849094_3
https://terminology.fraunhofer.de/voc/bau#B11603849094_3

Ontology: bau

Also in: bau

temperature Sea

Filter Results
[Clear All Filters](#)

378 results found for "temperature"

ESS

Type

- ☐ class 309
- ☐ individual 58
- ☐ property 11

Ontologies

- ☐ ENVO 136
- ☐ OM 80
- ☐ EFO 71
- ☐ PATO 27
- ☐ CHEBI 13

[+ Show More](#)

[class] Temperature Temperature
<http://ecoinformatics.org/oboe/oboe.1.2/oboe-characteristics.owl#Temperature>

Ontology: oboe

[class] temperature PATO_0000146
http://purl.obolibrary.org/obo/PATO_0000146

A physical quality of the thermal energy of a system.

Ontology: PATO

Also in: ENVO

Terminology Service

TIB TS Functional service offer: Collections

→ Bundle ontologies of a Designated Community, e.g. a project or a research area

bk	Basisklassifikation	2145 Classes
German decimal classification system based on the Dutch Basic Classification (NBC)		42 Properties
Collections: FID BAUdigital, FID move, NFDI4ING, ESS		Loaded: 2023-02-02
edam	Bioinformatics operations, data types, formats, identifiers and topics	3472 Classes
EDAM is a simple ontology of well established, familiar concepts that are prevalent within bioinformatics, including types of data and data identifiers, data formats, operations and topics. EDAM provides a set of terms with synonyms and definitions - organised into an intuitive hierarchy for convenient use.		82 Properties
Collections: NFDI4ING, NFDI4CHEM, ESS		Loaded: 2023-02-02

Terminology Service

Ontologies



Units of measurement ontology

<http://purl.obolibrary.org/obo/uo.owl>



Overview Class Tree Property Tree Individuals Class List

Units of measurement ontology

Metrical units for use in conjunction with PATO

Version	2023-05-25
VersionIRI	http://purl.obolibrary.org/obo/uo/releases/2023-05-25/uo.owl
IRI	http://purl.obolibrary.org/obo/uo.owl <button>copy</button>
HomePage	https://github.com/bio-ontology-research-group/unit-ontology <button>copy</button>
Issue tracker	https://github.com/bio-ontology-research-group/unit-ontology/issues <button>copy</button>
License	CC-BY
Creator	
Subject	General, Physics, Life Sciences, biology, Earth sciences
Is Skos	false
Download	<button>OWL</button> <button>Ontology metadata as JSON</button>

[+ Show more information](#)

Metrics

Number of Classes	572
Number of Properties	7
Number of Individuals	275

Show Ontology Metdata as JSON

Summary and Outlook

TIB Terminology Service:

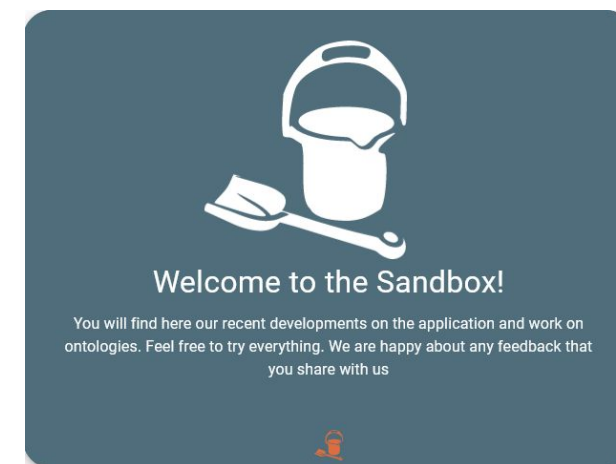
- **central service** that hosts all terminologies,
- **special services** for communities, e.g. engineers, chemists, earth scientists,...
- collaboratively developed within several projects and communities (BITS, NFDI4Ing, NFDI4Chem,...).



New features: Sandbox

<https://terminology.nfdi4ing.de/ts/sandbox>

- Development and tests of new features in the sandbox.
- Afterwards integration into those services who need them.
- Example: mapping tool enables the comparison of ontologies.



Summary and Outlook: ESS Terminology Service



Terminology Service for the ESS:

- Established as a part of the TIB Terminology Service,
- closely connected to DKRZ and SGN repositories,
- BITS: creation of blueprints for the integration of the ESS TS in other repositories.



BluePrints for the Integration of Terminology
Services in Earth System Sciences

Already implemented: ESS collection

Future plans:

- Add further semantic artefacts to the ESS collection,
- integrate the TIB TS in repositories,
- collaborative terminology **creation** and **update**
- ...



→ **Together with the ESS community!**



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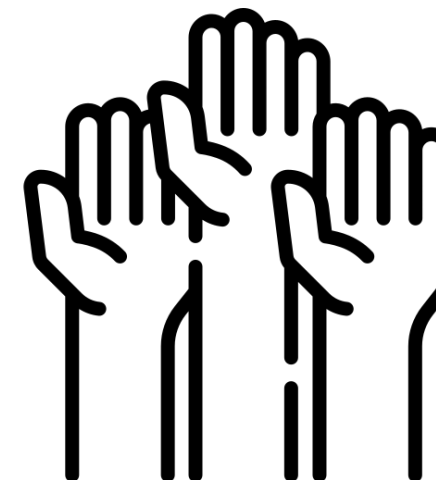
We need your participation:

Please test our Terminology Service!

If You

- miss terminologies in our service,
- miss terms in a terminology,
- miss a special feature in our service,
- want to use this TS for your repository.

→ write us an Email: Info.BITS@tib.eu

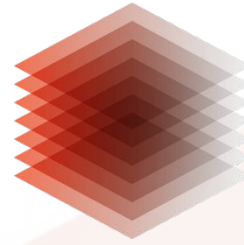


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You want to do more?

Join the new **FAIR ESS Terminologies Interest group** (NFDI4Earth, successor of IG FAIR Data).

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TIB

Thank You !

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