Data Description

1. General Description

The vocabulary on geological time scales is part of the GBA Thesaurus of the Geological Survey of Austria (resource.geolba.ac.at) – now part of GeoSphere Austria – and serves the semantic representation of geoscientific knowledge. It is a controlled, bilingual vocabulary (German/English) that has been continuously developed since 2010. Its foundation consists of terms from textual, data, and map publications of the Geological Survey of Austria, which are systematically captured, structured, and made digitally accessible.

The Geological Timescale theme includes chronostratigraphic and geochronological units from the International Stratigraphic Chart published by the International Commission on Stratigraphy, as well as their German translations as used by the Austrian Stratigraphic Commission. In addition, it incorporates the stage subdivision of the Paratethys as well as informal units, structured into historically and regionally used classifications.

The vocabulary supports the attribution and standardization of geoscientific data and plays a central role in harmonization within the framework of the European INSPIRE Directive. Moreover, it actively contributes to the implementation of the FAIR principles (Findable, Accessible, Interoperable, Reusable).

The vocabulary is provided as an RDF/XML file. The included terms are modeled as SKOS concepts with persistent URIs and are classified based on generic terms. Quality assurance and validation of the vocabulary are carried out in accordance with relevant international standards such as SKOS, RDFS, and DCMI.

2. Detail Information

	Details
Vocabulary Name	Geologic Time Scale
Base URI	http://resource.geolba.ac.at/GeologicTimeScale/
Number of SKOS Concepts	222
Publication File Created	18.11.2024
Development Period	2010 – 2022
skos:mappingRelation	- http://geosciml.org/resource/def/voc/ - http://inspire.ec.europa.eu/codelist/GeochronologicEraValue - https://www.dbpedia.org/
SPARQL Endpoint	Dedicated SPARQL API for querying the Geologic Time Scale vocabulary

2.1. Content Details

Hierarchy Structure	○ Thematic Area → Concept Scheme → Top Conzept → (Concept) ○ Polyhierarchical relationships are possible.

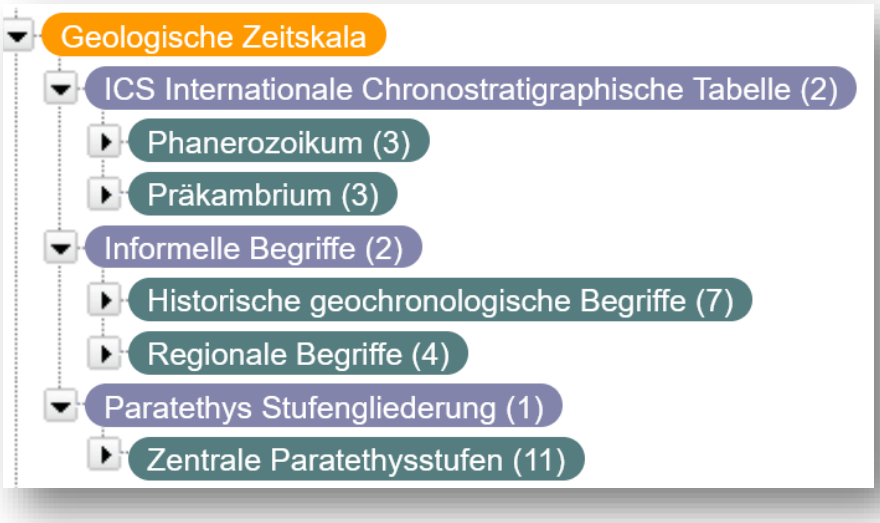

Fig. 1 Knowledge Management Software – Backend Visualization of the Top 3 Hierarchy Levels. Since the defined backend primary language of the vocabularies is German, this visualization is only available in German.

Division into 3 Concept Schemes:

- ICS International Chronostratigraphic Chart
  - Includes terms from the International Chronostratigraphic Chart 2022/10 of the International Commission on Stratigraphy (ICS). The German terminology was taken from the translation of the International Chronostratigraphic Chart 2022/02, carried out by the Austrian Commission on Stratigraphy (ACS).

- Informal Terms
  - Informal chronostratigraphic and chronometric terms that have a regional or historical character and are therefore not listed in the International Stratigraphic Chart.

- Paratethys Stage Classification
  - Regional stage classification of the Paratethys area, which deviates from the stage classification of the International Stratigraphic Chart. In the Eastern Alps, the stages of the Central Paratethys are traditionally used.

3. Maintenance and Further Development

	Details
Responsibility	Editorial team of the GeoSphere Austria Thesaurus: • Technical coordination: Schiegl M. und Linsberger Ch. • Content editing: Hörfarter Ch. • Contact: Thesaurus Feedback
Update Frequency	On an as-needed basis
Planned Changes	Migration of base URIs due to the organizational transition from the Geological Survey of Austria to GeoSphere Austria, extension of the vocabulary for harmonization according to the INSPIRE Directive, structural optimizations, and enhanced documentation of content and relationships.

4. Series Information for the GBA Thesaurus

This publication of the GBA Thesaurus SKOS/RDF vocabulary documents an interim status of the content and technical development and serves to secure the current working state during the organizational transition from the Geological Survey of Austria to GeoSphere Austria. The vocabulary is under ongoing revision and may still contain inconsistencies. Future versions will be published under new GeoSphere-compliant URIs; existing URIs will be permanently redirected.

Title	GBA Thesaurus – Controlled Vocabularies of the Geological Survey of Austria
Thematic Area	Geosciences
Content Basis	Concepts from text, data, and map publications of the Geological Survey of Austria (since 01.01.2023 GeoSphere Austria)
Background	Based on the legal obligation to implement the European INSPIRE Directive, with the aim of creating a common European geodata infrastructure.

Vocabulary Modules in the Series	The GBA Thesaurus vocabulary system is divided into 8 thematic modules (projects), each of which may contain multiple Concept Schemes: • Geologic Units • Lithology • Geologic Structures • Geologic Time Scale • Lithotectonic Units • Minerals • Mineral Resources • Bibliographic references
Purpose of Use	- INSPIRE-compliant data provision - Harmonization of geoscientific data - Semantic knowledge representation - Attribution of geological data - Implementation of the FAIR data principles
Creator	GeoSphere Austria (before 01.01.2023 Geological Survey of Austria)
Resource Language	German/English
Format	RDF-XML
Standard	SKOS, SPARQL, RDF,DCMI
Basic Ontology	SKOS W3C Standard
Modeling	- (Poly-)hierarchical structure based on SKOS principles (broader, narrower, related) - Handling of synonyms with skos:altLabel.
Specific Relations and Attributes	- The relation dcterms:references is used to link a GBA Thesaurus concept to a bibliographic resource. - Specific attributes for more detailed concept descriptions and visualization (e.g., FOAF depiction, GBA status).
Terms of Usage	Attribution 4.0 International (CC BY 4.0)
Interoperability	Linking to external data sources and standards: - INSPIRE - CGI-GeoSciML - DBPedia - BGS Rock classification - Mindat.org

Software and Validation	- PoolParty Semantic Suite by Semantic Web Company (since 2024 GRAPHWISE) - Version 8.1.8 - Revision 45873
Character Encoding	UTF-8
Used Prefixes (vann:preferredNamespacePrefix)	mlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#" xmlns:skos="http://www.w3.org/2004/02/skos/core#" xmlns:skosxl="http://www.w3.org/2008/05/skos-xl#" xmlns:owl="http://www.w3.org/2002/07/owl#" xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:dcterms="http://purl.org/dc/terms/" xmlns:csw="http://semantic-web.at/ontologies/csw.owl#" xmlns:ctag="http://commontag.org/ns#" xmlns:xsd="http://www.w3.org/2001/XMLSchema#" xmlns:foaf="http://xmlns.com/foaf/0.1/" xmlns:cyc="http://sw.cyc.com/concept/" xmlns:cycAnnot="http://sw.cyc.com/CycAnnotations_v1#" xmlns:dbpedia="http://dbpedia.org/resource/">
Lifecycle Information	• The development of the GBA Thesaurus began in 2010. • The first RDF publication released in 2025. • The vocabulary is continuously maintained and further developed within GeoSphere Austria.
Contact	Technical Coordination: Schiegl M. und Linsberger Ch. Content Editing: Hörfarter Ch. General:Thesaurus Feedback
Walkthrough Video	https://www.youtube.com/playlist?list=PLfshul-4XQW9H-k-_Q98eRI5LHfUPGbtc

5. List of Abbreviations

abbrevations	term/description	link
BGS	British Geological Survey	https://www.bgs.ac.uk
CGI-GeoSciML	Commission for the Management and Application of Geoscience Information – GeoSciML standard	https://cgi-iugs.org/project/geosciml/
DBPedia	Crowdsourced community effort to extract structured content from Wikipedia	https://wiki.dbpedia.org/
DCMI	Dublin Core Metadata Initiative	https://www.dublincore.org/

FOAF	Friend of a Friend	http://xmlns.com/foaf/spec/
GBA	Geologische Bundesanstalt (Austria)	https://www.geologie.ac.at/
INSPIRE	Infrastructure for Spatial Information in the European Community (EU-Richtlinie)	https://inspire.ec.europa.eu/
RDF	Resource Description Framework	https://www.w3.org/RDF/
RDFS	RDF Schema	https://www.w3.org/TR/rdf-schema/
SKOS	Simple Knowledge Organization System	https://www.w3.org/2004/02/skos/
SPARQL	SPARQL Protocol and RDF Query Language	https://www.w3.org/TR/sparql11-overview/
URI	Uniform Resource Identifier	https://datatracker.ietf.org/doc/html/rfc3986
UTF-8	Unicode Transformation Format – 8-bit	https://www.unicode.org/faq/utf_bom.html#UTF-8
W3C	World Wide Web Consortium	https://www.w3.org/
XML	Extensible Markup Language	https://www.w3.org/XML/

6. Supplementary Resources and Further Links (as of July 2025)

- *Cohen, K.M., Finney, S.C., Gibbard, P.L. & Fan, J.-X. (2013; updated) The ICS International Chronostratigraphic Chart. Episodes 36: 199-204. – https://stratigraphy.org/ICSchart/ChronostratChart2024-12German.pdf*

- *Geologic Timescale Elements in the International Chronostratigraphic Chart – http://resource.geosciml.org/classifier/ics/ischart/*

- *INSPIRE Registry – http://inspire.ec.europa.eu/codelist/GeochronologicEraValue*

- *World Wide Web Consortium (W3C) Simple Knowledge Organisation System (SKOS) – https://www.w3.org/2004/02/skos/*