

Data Model Geology

Description in UML Format and
Object Catalogue, Version 2.1

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Reference Documentation

Federal Office of Topography swisstopo, Swiss Geological Survey
www.geologyportal.ch > Knowledge > Lookup > Data Model

Reference Interlis-Model

<http://models.geo.admin.ch/swisstopo/>

Support

The Data Model Geology is supported by:

- SGK Swiss Geological Commission
- GTK Swiss Geotechnical Commission
- CHGEOL Swiss Association of Geologists
- Several domain experts (see list at the end of this documentation)

Cover Picture

Extract from the geological vector data 1:25 000, LK 1225, Gruyères with four layers as an example. The map itself (lowermost representation) is composed of the overlying layers.

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I Context

1 Purpose of the document

The purpose of this document is to describe the conception, the structure and the content of Data Model Geology.

2 Background

For the last 15 years, the demand for digital geological vector maps has risen steadily. In order to accommodate this growing demand, the Swiss Geological Survey began, in the 1990s, with the transfer of existing raster data into vector data. The Swiss Geological Survey cooperated with several institutions in order to accomplish this task. As a consequence, the structure of the datasets has become inconsistent. A first attempt to homogenise data was made in 2005 when the Swiss Geological Survey developed, in cooperation with the Institute for Geomatics and Risk Analysis (IGAR), at the University of Lausanne, a simple data model that allowed the transfer of all existing geological vector data. In order to satisfy client demand for seamless GIS analysis in the future, an extended geological data model is necessary, based not only on a more detailed data structure, but also on homogeneous attribution (including homogeneous attribute values). The Data Model Geology that is presented in this paper, is developed to guarantee homogeneous coverage of geological vector data for the whole of Switzerland

3 Legal obligation

According to the Geoinformation Ordinance (GeolO) of 21 May 2008, the data of the Swiss Geological Survey is considered as official, basic geodata required of Federal Law, and therefore must be described in a minimal data model (Geoinformation Act (GeolA), art. 5, par. 2b and GeolO, art. 8). The present Data Model Geology applies to basic vector geodata on geological maps; basic geodata identifiers GeolO no. 46.1, 46.2, 46.4 and 46.9.

4 Definitions

4.1 General definition of the term «Data Model»

In the context of the project «Data Model Geology», the definition of the term «Data Model» is adapted from a German dictionary of Geoinformatics:

*Term for an artificial, **abstract representation** of a **section of the real world** created with the intention to depict certain facts [...] exactly as data structures. A data model describes the **fundamental properties** that facilitate a homogeneous **depiction of reality** for all phenomena under a (specific) point of view. A data model determinates the **fundamental structures** and **their** possible theoretical **relationships** and **the properties** that can be assigned. [...]**

It is important for the above-noted definition, that a data model is a conceptual copy of a segment of the real world which is considered in a specific and specialized way. Section and viewpoint of the present project are described hereafter (Chapter 4.2).

Furthermore it has to be noted that – on the contrary of other model types (e.g. numeric models, 3D models of geological structures etc.) – a data model defines the structures and attributes of the considered classes as well as their associations to each other.

* <http://www.geoinformatik.uni-rostock.de/einzel.asp?ID=452> (accessed on: October 1st 2012)

4.2 Definition of the term «Data Model Geology»

Referring to the definition given in the chapter above, in this data model, geology is the corresponding section of the real world that is considered from the viewpoint of the user of geological data. Therefore, «Data Model Geology» describes all geological object types that exist in the real world and that are required by end users as well as their characteristics and relationships. The Data Model Geology is a conceptual data model.

4.3 Definition of the term «object catalogue»

The object catalogue is a structured and annotated listing of all themes and classes of Data Model Geology. It contains all characteristics and the admitted values.

4.4 Definition of the term «theme»

A theme contains all classes that describe a distinct and objective part of the real world.

Example: Rock Bodies

4.5 Definition of the term «class»

A class contains all object types with the same characteristics.

Example: Unconsolidated_Deposits_PT

4.6 Definition of the term «object type»

An object type – a record in the lookup table of the attribute Kind – defines object instances with same characteristics.

Example: erratic boulder

4.7 Definition of the term «object instance»

An object instance consists of data of a specific and clearly identifiable item of the real world with all the characteristics defined in its class.

Example: erratic boulder of Steinhof / SO

4.8 Definition of the term «attribute»

An attribute represents a specific property of a class. In Data Model Geology, the attribute *Kind* describes the object type and all other attributes refer to this attribute.

Example: Attribute Kind: erratic boulder; attribute Rock Type: crystalline rock

4.9 Definition of the term «lookup table»

A lookup table is an enumeration of valid values for each attribute.

*Example: Lookup table for the attribute Rock Type: - sedimentary rock
 - crystalline rock*

4.10 Definition of the term «cardinality»

The cardinality defines the minimum and the maximum number of attribute values that can be taken [min..max]. If the cardinality consists not of a range of admitted values (e.g. [1] or [5]), the minimum and the maximum are identical. If an asterisk is placed instead of a maximum, there is no limit for the authorised number of attribute values.

Example: Attribute Rock Type [0..1] (i.e. an erratic boulder must not obligatory have the value of the attribute Rock Type and may have not more than one value of the attribute)

4.11 Definition of the term «data type»

The data type defines the possible domain of an attribute.

Examples: Integers (short / long); float, string, codelist, Boolean value

5 Objectives of the Data Model Geology

The following objectives of Data Model Geology can be inferred from the definition mentioned above:

- Users of geological data obtain a description of all **relevant object types as well as their characteristics and their relationships**. All existing object types and their characteristics had been harmonised and registered in lookup tables.
- Data Model Geology has been developed for user-oriented applications requiring seamless vector data for the whole of Switzerland. The application within a **Geographical Information System (GIS)** is its primary focus.

Example: Request of all object instances of the class «Bedrock_PLG» with the specific property «Litho» = «Marl» or «Clay» on a slope with an angle of $> 30^\circ$.

The intention is to cover a maximum number of the above mentioned user requirements as possible.

- Data Model Geology supports the management of geological data as the foundation for the production of printed geological maps. (Printing of vector-«maps» does not have priority. This has to be done with a separate portrayal model.)
- Identification of interfaces to data models of other domains / departments and their accessibility.

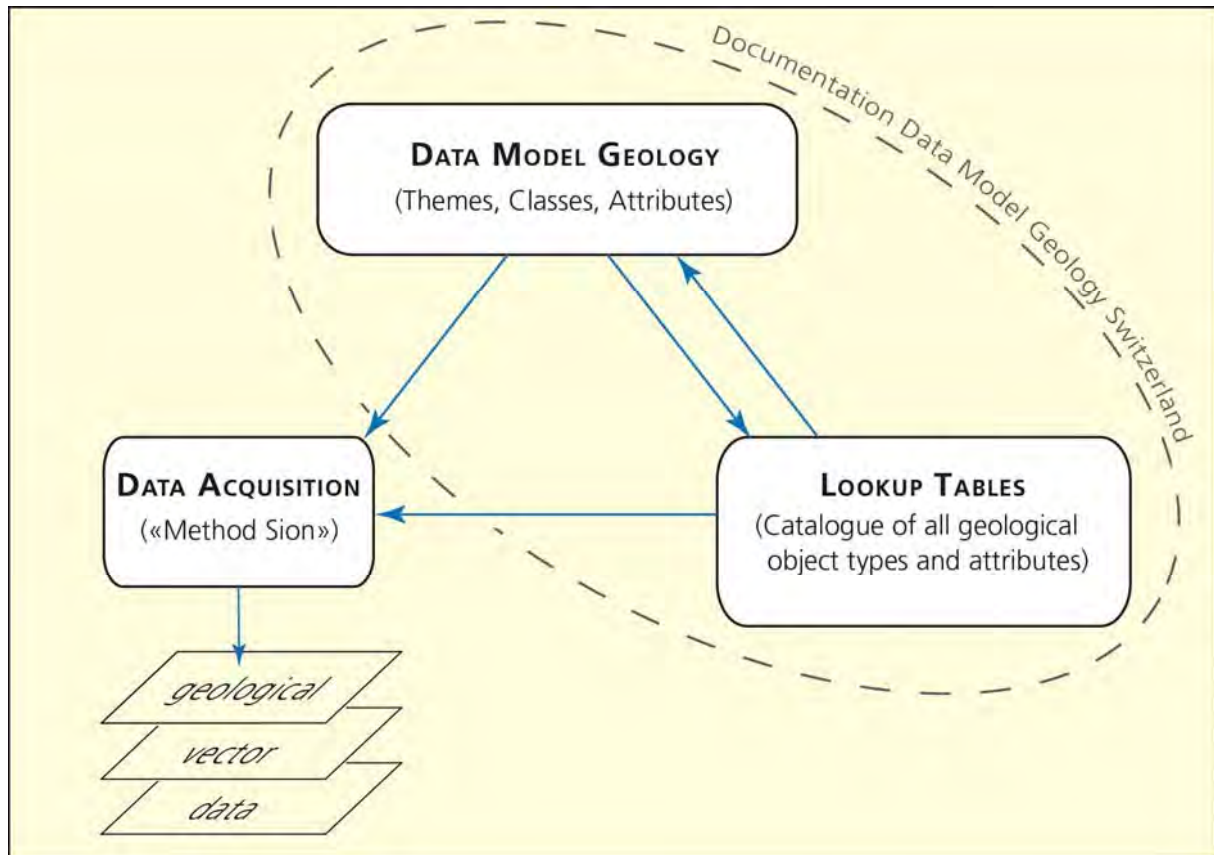
6 Non-objectives of the Data Model Geology

The Data Model Geology was not developed ...

- to set rules for data acquisition of geological vector data
- to define a portrayal of all object instances

7 Position of Data Model Geology within the production process of vector data

The schema below shows the interaction of three different domains that underpin the production of homogeneous structured geological vector datasets.



In the following, the individual domains are described shortly:

- **«Data Acquisition»:** Geological vector data are generated and structured according the «Method Sion» using «ToolMap» software. Lines and points are digitised and provided with attributes. The generated construction layers form an integral component of geological datasets. The topological consistence of the object instances is created and checked in different layers. All object instances are generated within the construction layers and updated. All thematic layers (classes of Data Model Geology) can be derived from the construction layers. Therefore, the domain «**data acquisition**» is considered as basic for the automatic generation of thematic layers as described in Data Model Geology. No further explanation on «data acquisition» is given in this document. Detailed informations concerning the «Method Sion» and «ToolMap» are described by Strasky et al. (2011), Schreiber et al. (2009) and Sartori et al. (2006).
- **«Lookup Tables»:** Digitised data are provided with attributes by means of standardised values. These standard values are defined in «**lookup tables**» of the corresponding attributes and constitute the catalogue of possible object types and their properties.
- **«Data Model Geology»:** The object instances generated during «data acquisition» are exported automatically in different thematic groups (integral part of the «Method Sion»).

These groups are represented as layers in a GIS. The objective of «**Data Model Geology**» is the classification of all geological object types and their subdivision in different themes.

8 Precision of the data

The objective of Data Model Geology is not to create an overall data model with identical precision for all themes. The core theme is «Rock Bodies» and is therefore of greatest importance. Other themes with a certain connection to geology have a more indicative character. This is due to simplification of particular datasets (e.g. springs or borehole data), where the limiting possibilities of representation of these data types on printed maps sometimes required a combined portrayal of several object instances. More detailed informations concerning these object types as well as their properties and relationships must be sought in data models of the respective departments.

The precision of object instances corresponds normally to the position accuracy of the original mapping scale.

Geological maps are the best possible representation of surface geology and they reflect the knowledge and the up-to-dateness at the time of mapping. Generalisations and simplifications of a complex reality characterise a geological map just as the interpretation of the author. Dealing with geological datasets requires careful consideration of these aspects and use of these data demands a certain geological understanding.

9 Extensions of the Data Model Geology

Data Model Geology represents an important basis for data models of other domains. In the future, specific data models referring to geology will be developed as an extension of Data Model Geology. Possible extensions are e.g. the Data Models 3D Geology, Borehole Data, Geophysics and Geotechnics.

10 Remarks

- In this documentation, the second version of Data Model Geology is presented. It is a modified version of the first release, published by Baland-Renaud & Oesterling (2007). The themes had been maintained essentially. In comparison with the first version, the number of classes had been reduced and the object types with the related attributes had been reorganized.
- The terminology of themes, classes and attributes is in English in order to simplify the handling of the database and the modelling (only one database for multilingual values).
- Modelling of Data Model Geology in UML format (Unified Modeling Language) and INTERLIS descriptions is based on base modules of the Confederation for «minimal geodata models» CHBase (GCG, 2011).
- The lookup tables in the following object catalogue are not final in respect of technical modelling aspects. This means more values can be added without any problems. It is of course not the intention to modify the data model constantly but updates will be necessary once in a while. Data Model Geology is intended to continuously evolve into the future.
- The Swiss Geological Survey is responsible for the update but also for the development of new versions of Data Model Geology.





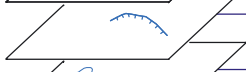




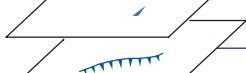
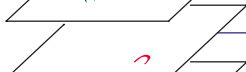


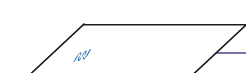
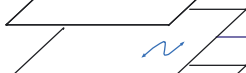
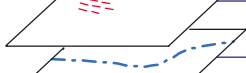
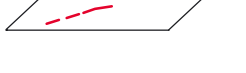
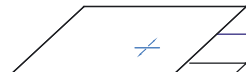




11 References





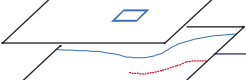





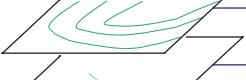



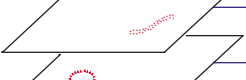
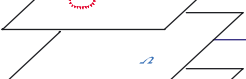

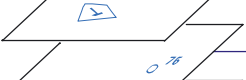
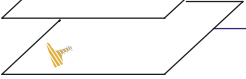

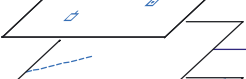

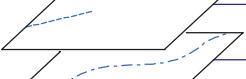

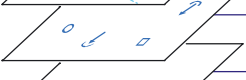

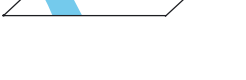

- BALAND-RENAUD, P. & OESTERLING, N. 2007. Modèle de données géologiques – Partie: stockage des données, Version 1.0. *Office fédéral de topographie swisstopo*, 117 pp.
- GCG [COORDINATION OF GEOGRAPHICAL INFORMATION WITHIN THE CONFEDERATION] 2011. Basismodule des Bundes für «minimale Geodatenmodelle», Version 1.0.
- SARTORI, M., ORNSTEIN, P., MÉTRAUX, C., SCHREIBER, L. & KÜHNI, A. 2006. From geological cartography to digital maps: spatial data model and GIS tool. *5th European Congress on Regional Geoscientific Cartography and Information Systems, Barcelona 2006, Proceedings, II*, 189–191.
- SCHREIBER, L., ORNSTEIN, P., SARTORI, M. & KÜHNI, A. 2009. TOOLMAP – «Sion» method: development of a new GIS Framework for digital geological mapping. *6th European Congress on Regional Geoscientific Cartography and Information Systems, Munich 2009, Proceedings, I*, 89–90.
- STRASKY, S., VANDELLI, A., SCHREIBER, L., SARTORI, M., ORNSTEIN, P. & MÖRI, A. 2011. TOOLMAP2 – a powerful tool for digital mapping. *Swiss Bulletin für angewandte Geologie*, Vol. 16/2, 87–95.

TOOLMAP website. www.toolmap.ch

II Structure of the Data Model Geology

The geological object types are subdivided in eight themes listed below. Every theme contains a certain number of classes. The structure of every single class within the themes and their attributes are described hereinafter.

THEMES	CLASSES	DESCRIPTION
Rock Bodies	 Unconsolidated_Deposits_PT	This theme contains the lithological units considered as the «most important» object types of a geological map. This theme includes spatially continuous unconsolidated deposits and bedrock units as well as erratic blocs.
	 Unconsolidated_Deposits_PLG	
	 Bedrock_PLG	
Geomorphology	 Instability_Structures_PT	This theme describes object types that are related to near surface processes that form characteristic landscapes. It includes erosion-, glacier- and karst-structures as well as gravitational mass movements including solifluction, sagging and slide areas.
	 Instability_Structures_L	
	 Instabilities_within_Unc_Deposits_PLG	
	 Instabilities_within_Bedrock_PLG	
	 Glacial_Structures_PT	
	 Glacial_and_Periglacial_Structures_L	
	 Glacial_Structures_PLG	
	 Erosional_Structures_PT	
	 Erosional_Structures_L	
	 Karstic_Structures_PT	
	 Karstic_Structures_PLG	
	 Alluvial_and_Lacustrine_Structures_L	
Tectonics	 Deformation_Structures_PT	This theme contains all tectonic object types such as faults and lineaments but also local deformation structures.
	 Deformation_Structures_L	
	 Deformation_Structures_PLG	
	 Tectonic_Boundaries_L	
Measurements Spatial Orientation	 Folds_PT	This theme contains object types describing the spatial situation of geological object instances (with direct field measurements). Other object types of this theme are the orientation of bedding, of a fold axis or of glacial striae.
	 Lineation_PT	
	 Planar_Structures_PT	

THEMES	CLASSES	DESCRIPTION
Local Additional Information	 Anomalies_PT	This theme contains object types with additional local information. This can be information concerning type localities, fossil sites, resources, anomalies, sedimentary structures and significant bedrock features.
	 Fossils_PT	
	 Indication_of_Resources_PT	
	 Mineralised_Zone_L	
	 Sedimentary_Structures_PT	
	 Type_Localities_PT	
	 Prominent_Lithological_Features_L	
	 Miscellaneous_PT	
	 Geological_Outlines_L	
Parameter and Modelling	 Slope_Bedrock_PT	This theme contains object types that represent modelling results, e.g. contour lines of the bedrock surface or of the water table.
	 Contour_Lines_Bedrock_L	
	 Modelled_Water_Table_PT	
	 Contour_Lines_Hydro_L	
Anthropogenic Features	 Archaeology_PT	This theme contains object types related directly to human influence. Archaeological object types, boreholes, quarries and mines as well as artificially modified ground are part of this theme.
	 Archaeology_L	
	 Archaeology_PLG	
	 Exploitation_Geomaterials_PT	
	 Exploitation_Geomaterials_L	
	 Exploitation_Geomaterials_PLG	
	 Boreholes_PT	
	 Artificial_Surface_Modifications_PLG	
Hydrogeology	 Construction_PT	This theme contains object types related to hydrogeology. Therefore, besides springs, piezometers and groundwater captures, also superficial water resources such as rivers, lakes of a certain size and glaciers are listed in this theme.
	 Construction_L	
	 Palaeohydrology_L	
	 Subsurface_Water_L	
	 Surface_Water_PT	
	 Surface_Water_L	
	 Surface_Water_PLG	

III Reading aid for the thematic description

Based on the example of the class «Karstic_Structures_PT» several points are explained, which simplify reading und handling of the present document.

Name of the class with an indication of the type of geometry (PT = Point; L = Line; PLG = Polygon)

2.10 Class Karstic_Structures_PT

Attribute name [cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.10.1)	Object type. The possible object types are listed in the table «Karstic_Structures_PT_Kind».
Ice_Cave [0..1]	Boolean	Is the cave an ice cave («glacière», this term applies for an exceptional cold cave where ice accumulates because of winter snow or freezing intrusive surface water and where ice will last over the summer period) (yes / no)?

Tabular overview of the class with the attributes including cardinalities, their data types and a short description (the attribute Kind describes the object types).

Lookup table of the attribute Kind (list of object types) in English and in German.

2.10.1 Kind: Attribute Kind; Table Karstic_Structures_PT_Kind

GeolCode Gkar101	Kind (en)	Kind (de)	CODE_SC	2.10.2 Ice_Cave
001	ponor	Ponor	519	n/a
002	cave, balm	Höhle, Balme	545	o

CODE_SC corresponds to the number of the symbol in the Symbol catalogue of the Geological Atlas of Switzerland 1:25 000 (GA25).

(m = mandatory; o = optional; n/a = not applicable)

2.10.2 Ice Cave: Attribute Ice_Cave Is the cave an ice cave («glacière») (yes / no)? (Data type: Boolean)

Additional attribute for an additional characterisation of object types of this class.

The column refers to the attribute 2.10.2 (Ice_Cave) and indicates, for which object type (listed in the lookup table of the attribute Kind) this attribute is mandatory (m) or optional (o) - or if this attribute may not be assigned (n/a).

The GeolCode is the unique identification of an attribute value and is composed as follows: first letter of the theme, three letters of the class name, the geometry (PT = 1, L = 2, PLG = 3, neutral = 4), the consecutive number of the attribute and the table entry. Example ponor: Gkar101001

IV Thematic description

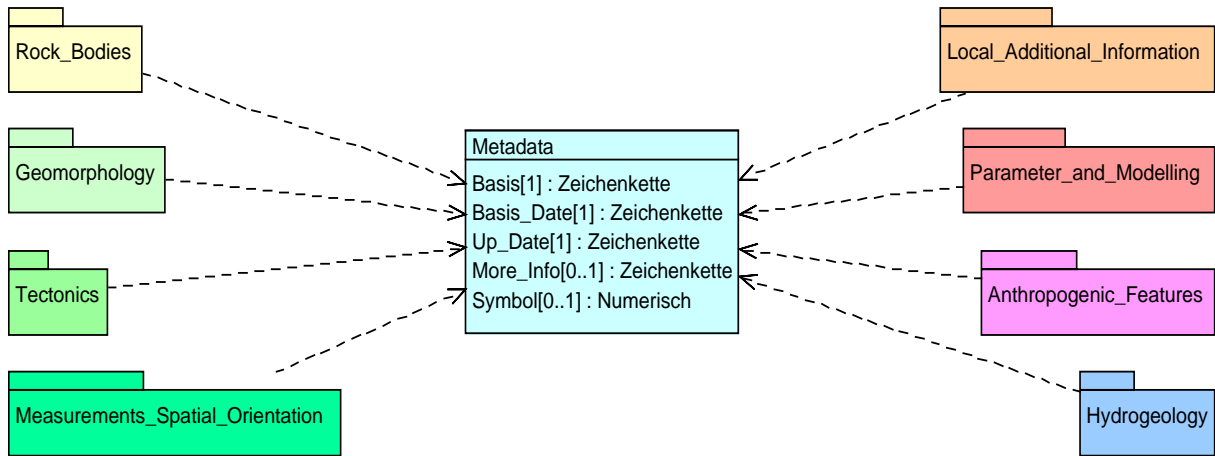
General attributes, structured standard properties Metadata

Apart from class-specific attributes described in the following document, each class also has general attributes. They contain a metadata character and information about the name and the number of the geological map, the original map scale, the topographical basis, the responsible authors and the data author («Basis»). The time span of the data collection and the year of the publication of the map are registered in the attribute «Basis_Date». The date of the first survey as well as the update of the vector data is given by the attribute «Up_Date». Furthermore, the general attribute «More_Info» contains information about available explanatory notes or reports and their year of publication. If the theme or the class has only an advising character, links to further information of specific departments are given («More_Info»). The general attribute «Symbol» also contains the reference for the standardised portrayal of signs, lines and polygons.

The general attributes are described in the table below. They are not mentioned in addition to each class.

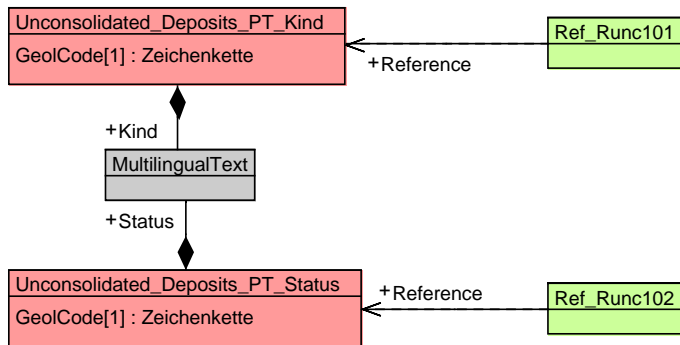
Attribute name [Cardinalität]	Data type (Domain)	Description
Basis [1]	String (254)	Name of the geological map; number of the map; scale; topographical basis; authors; data author.
Basis_Date [1]	String (254)	Timespan of data collection, year of publication of the map.
Up_Date [1]	String (254)	Date of the first survey of the vector data; date of update of the vector data.
More_Info [0..1]	String (254)	Explanatory notes, reports etc.; year of publication; link to further informations of the specific department.
Symbol [0..1]	Short Integer (Symbol_GA25)	Symbol key for the portrayal of the object types. For signs and lines, the number (CODE_SC) corresponds to the number of the Symbol catalogue of the Geological Atlas of Switzerland 1:25 000. Some polygons had been already defined for the SN-Norm 640 034b (signatures for geotechnics and geology). A harmonisation of data symbols (PT, L and PLG) will be done in a separate portrayal model.

Representation of all themes with the general attributes in an UML diagram

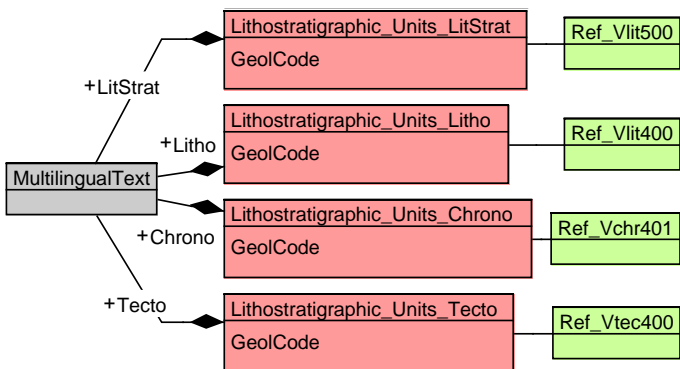


All classes in the following themes have the standard properties of the structure Metadata. That structure with the general attributes is not listed anymore in the following behind.

Example for a representation UML for the modelling of lookup tables



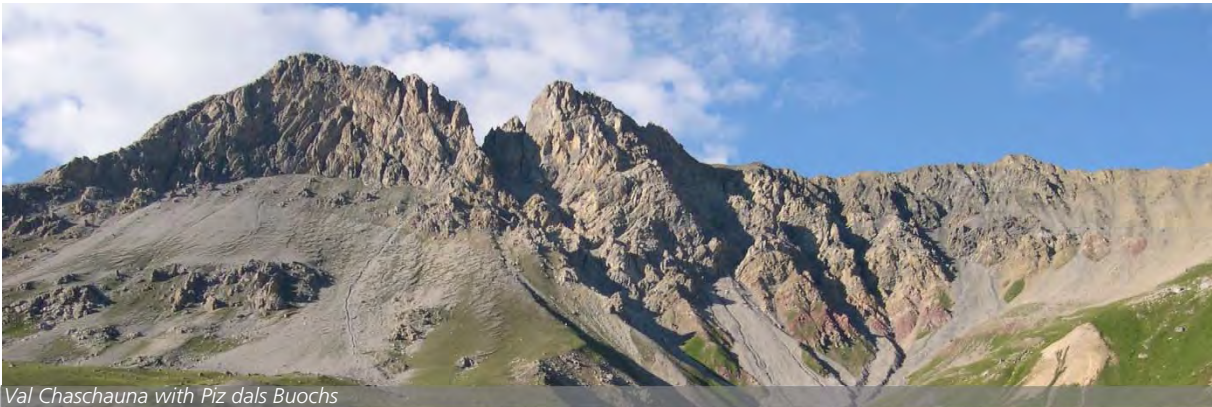
In the following lookup tables of the object catalogue are modelled as catalogue object types in a separate, multilingual catalogue according the base modules of the Confederation («CHBase», GCG, 2011). This catalogue can be enlarged and modified. The linkage between the catalogue and the data model is given by reference structures in the separate model GeologyModelLookUp. All classes look the same in GeologyModel→Look→Up (an example is shown on the left side; colours according to GCG, 2011)



The lookup tables in annex C are modelled according to CHBase in GeologyModelLook-Up as hierarchic dynamic enumerations (in separate catalogues).

In the following description of the individual themes the reference structures in Data Model Geology are represented in the same green.

1 Theme Rock Bodies



Subdivision of classes in the theme Rock Bodies

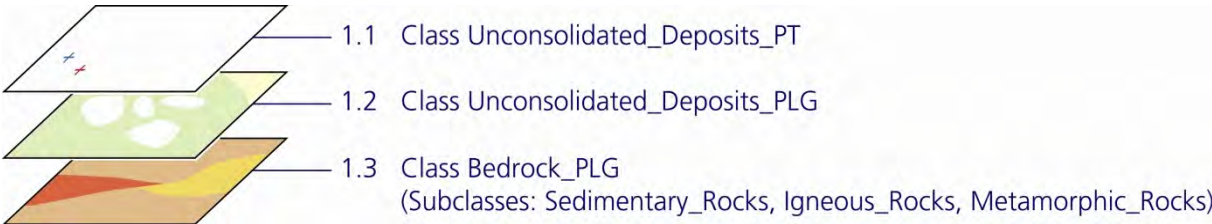
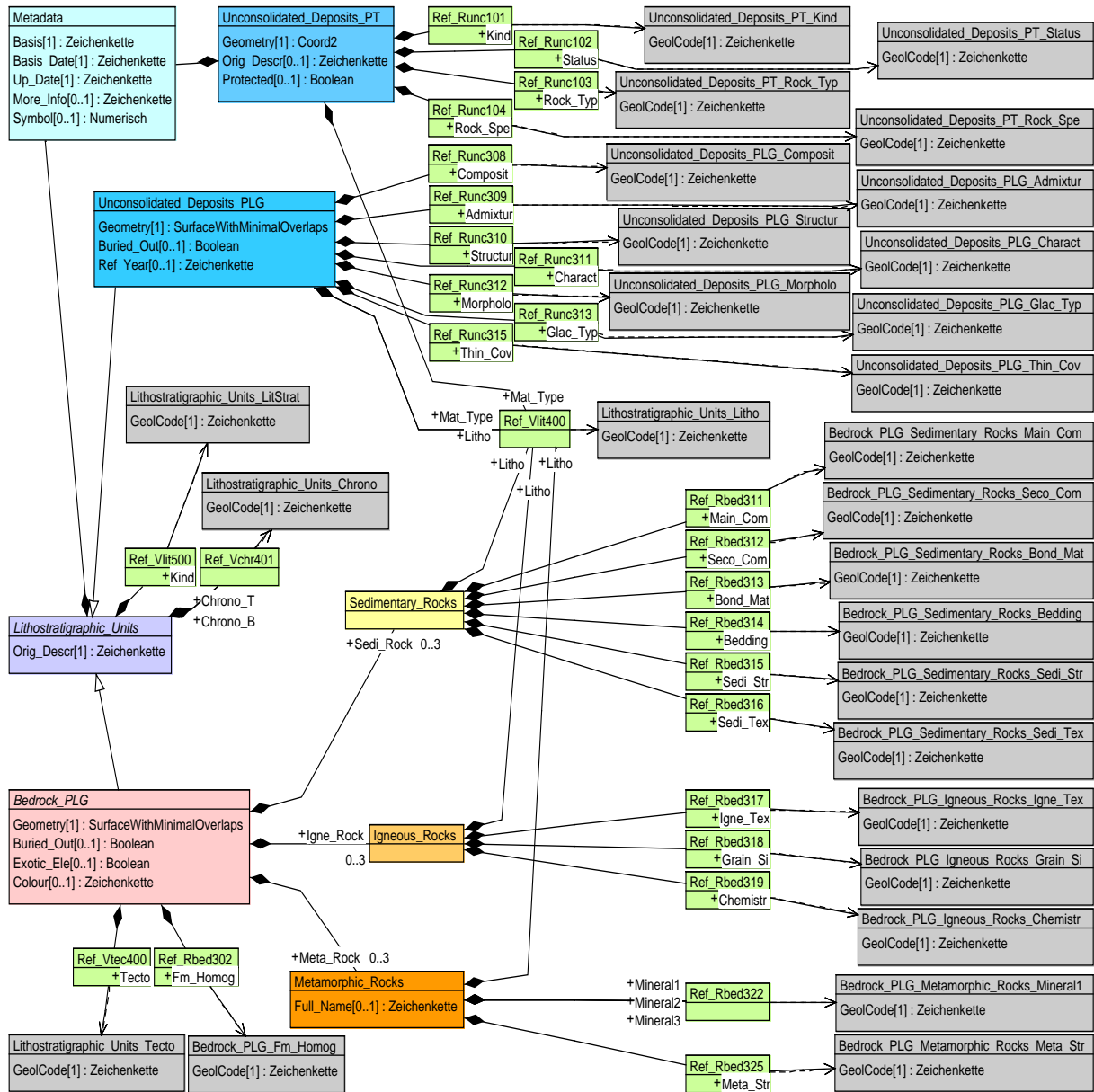


Illustration of the theme Rock Bodies in a UML Diagram



1.1 Class Unconsolidated_Deposits_PT

The class Unconsolidated_Deposits_PT contains rocks (grain size varying between cobble and boulder) that have been transported by gravitational, glacial or anthropogenic processes to their current position or that had been formed in situ by weathering of local rock.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 1.1.1)	Object type. The possible object types are listed in the table «Unconsolidated_Deposits_PT_Kind».
Status [0..1]	Codelist (Table 1.1.2)	Status of object type. The possible values are listed in the table «Unconsolidated_Deposits_PT_Status».
Rock_Typ [0..1]	Codelist (Table 1.1.3)	Rock type (crystalline rock / sedimentary rock). The possible values are listed in the table «Unconsolidated_Deposits_PT_Rock_Typ».
Rock_Spe [0..1]	Codelist (Table 1.1.4)	Name of the indicator rock. The possible values are listed in the table «Unconsolidated_Deposits_PT_Rock_Spe».
Mat_Type [0..1]	Codelist (Table C_2)	Designation of the material (lithologic unit). The possible values are listed in the table «Lithostratigraphic_Units_Litho» which is available in the annex of this document.
Orig_Descr [0..1]	String (254)	Original description according to the legend of the corresponding geological map.
Protected [0..1]	Boolean	Protected geological object instance (yes / no)?

1.1.1 **Kind:** Attribute Kind; Table Unconsolidated_Deposits_PT_Kind

GeolCode Runc101	Kind (en)	Kind (de)	CODE_ SC	1.1.					
				2 Sta- tus	3 Rock_ Typ	4 Rock_ Spe	5 Mat_ Type	6 Orig_ Descr	7 Protec ted
001	erratic block	erratischer Block	561–584	o	o	o	n/a	o	o
002	accumulation of erratic blocks	Schwarm erratischer Blöcke	585–590	n/a	o	o	n/a	o	o
003	anthropogenic accumulation of erratic blocks	anthropogene Ansammlung von erratischen Blöcken	591	n/a	o	o	n/a	o	o
004	gelifluction boulder	Wanderblock	610	n/a	o	o	n/a	o	o
005	glacial debris	Geschiebe	593–597	n/a	o	o	n/a	n/a	n/a
006	fallen block	Sturzblock	655	o	o	n/a	o	o	o
007	clearance cairns	Lesesteinhaufen	821	n/a	o	n/a	n/a	n/a	n/a
008	weathering residue (debris and/or concretions)	Verwitterungsrückstände (Gerölle und/oder Konkretionen)	598–602	n/a	o	n/a	n/a	n/a	n/a

(m = mandatory; o = optional; n/a = not applicable)

1.1.2 **Status:** Attribute Status; Table Unconsolidated_Deposits_PT_Status

GeolCode Runc102	Status (en)	Status (de)
001	displaced	versetzt
002	destroyed	zerstört

1.1.3 **Rock Type:** Attribute Rock_Typ; Table Unconsolidated_Deposits_PT_Rock_Typ

GeolCode Runc103	Rock_Typ (en)	Rock_Typ (de)
001	crystalline rock	Kristallingestein
002	sedimentary rock	Sedimentgestein

1.1.4 **Rock Specification:** Attribute Rock_Spe; Table Unconsolidated_Deposits_PT_Rock_Spe

GeolCode Runc104	Rock_Spe (en)	Rock_Spe (de)
001	Vallorcine-Conglomerate	Vallorcine-Konglomerat
002	Allalin-Gabbro	Allalin-Gabbro
003	Mont-Blanc-Granite	Mont-Blanc-Granit
004	Serpentinite	Serpentinit
005	Niesen-Breccia	Niesen-Brekzie
006	Hohgant-Sandstone	Hohgant-Sandstein
007	Grindelwald-Marble	Grindelwaldner Marmor
008	Aar-Granite	Aare-Granit
009	Gastern-Granite	Gastern-Granit
010	Habkern-Granite	Habkern-Granit
011	Windgällen-Porphyre	Windgällen-Porphyr
012	Glarus-Verrucano	Glarner Verrucano
013	Speer- and Stockberg-Area-Puddingstone	Kalknagelfluh des Speer- und Stockberggebietes
014	Illanz-Verrucano	Illanzer Verrucano
015	Mels-Sandstone	Melser Sandstein
016	Taspinite-Breccia	Taspinit-Brekzie
017	Albula-Granite	Albula-Granit
018	Punteglias-Granite	Punteglias-Granit
019	Rofna-Prophyre	Rofna-Porphyr
020	Degersheim-Puddingstone	Degersheimer Kalknagelfluh
021	Taveyannaz-Sandstone	Taveyannaz-Sandstein
022	Shelly sandstone	Muschelsandstein
023	Carboniferous-Breccia	Karbon-Brekzie
024	Alpine sedimentary rock	Alpines Sedimentgestein
025	Molasse sedimentary rock	Molasse-Sedimentgestein

1.1.5 **Material Type:** Attribute Mat_Type; Annex Table C_2

Lithostratigraphic_Units_Litho

Designation of the material (lithologic unit). The lithologic description is available in the annex of this document.

1.1.6 **Original Description:** Attribute Orig_Descr

Original description according to the legend of the corresponding geological map. (Data type: String (254))

1.1.7 **Protected:** Attribute Protected

Protected geological object instance (yes / no)? (Data type: Boolean)

1.2 Class Unconsolidated_Deposits_PLG

The class Unconsolidated_Deposits_PLG contains all mapped unconsolidated rocks. The information about the (gravitational) mass movement of unconsolidated deposits is listed in the class Instabilities_within_Unconsolidated_Deposits_PLG (Theme Geomorphology). Exceptions are unconsolidated rock masses that had been moved gravitationally and without information about the source material (e.g. slide deposits or strongly shattered «sagging masses»). These types of unconsolidated deposits are listed in the class Unconsolidated_Deposits_PLG as well as in the class Instabilities_within_Unconsolidated_Deposits_PLG. For a better understanding of the different object types some examples are represented in the annex A.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table C_1, to be defined)	Lithostratigraphic unit. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.
Litho [1]	Codelist (Table C_2)	Lithologic description. The possible values are listed in the table «Lithostratigraphic_Units_Litho» which is available in the annex of this document.
Chrono_T [1]	Codelist (Table C_3)	Chronostratigraphic attribution of the upper limit of a mapping unit (Top). The possible values are listed in the table «Lithostratigraphic_Units_Chrono» which is available in the annex of this document.
Chrono_B [1]	Codelist (Table C_3)	Chronostratigraphic attribution of the lower limit of a mapping unit (Basis). The possible values are listed in the table «Lithostratigraphic_Units_Chrono» which is available in the annex of this document.
Orig_Descr [1]	String (254)	Original description according to the legend of the corresponding geological map.
Mat_Type [0..3]	Codelist (Table C_2)	Designation of the material (lithologic unit). The possible values are listed in the table «Lithostratigraphic_Units_Litho» which is available in the annex of this document.
Buried_Out [1]	Boolean	Were the unconsolidated deposits re-buried (yes / no)?
Composit [0..3]	Codelist (Table 1.2.8)	Composition of the unconsolidated deposits. The possible values are listed in the table «Unconsolidated_Deposits_PLG_Composit».
Admixtur [0..2]	Codelist (Table 1.2.9)	Constituent. The possible values are listed in the table «Unconsolidated_Deposits_PLG_Admixtur».
Structur [0..1]	Codelist (Table 1.2.10)	Sediment structure. The possible values are listed in the table «Unconsolidated_Deposits_PLG_Structur».
Charact [0..3]	Codelist (Table 1.2.11)	Specific property. The possible values are listed in the table «Unconsolidated_Deposits_PLG_Charact».

Morpholo [0..1]	Codelist (Table 1.2.12)	Morphology of the unit of unconsolidated deposits. The possible values are listed in the table «Unconsolidated_Deposits_PLG_Morpholo».
Glac_Typ [0..1]	Codelist (Table 1.2.13)	Type of glacier; attribute only for tills. The possible values are listed in the table «Unconsolidated_Deposits_PLG_Glac_Typ».
Ref_Year [0..1]	String (254)	Time or time period: e.g. «1940-1943». Period of drainage (has to be defined).
Thin_Cov [0..1]	Codelist (Table 1.2.15)	Cover of unconsolidated deposits. The possible values are listed in the table «Unconsolidated_Deposits_PLG_Thin_Cov».

1.2.1 **Kind:** Attribute Kind; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphic unit. The lithostratigraphic table does not exist for the moment.

1.2.2 **Lithologic Description:** Attribute Litho; Annex Table C_2

Lithostratigraphic_Units_Litho

Lithologic description. The lookup table is available in the annex of this document.

1.2.3 **Chronostratigraphic Attribution at the Top:** Attribute Chrono_T; Annex Table C_3 Lithostratigraphic_Units_Chrono

Chronostratigraphic attribution of the upper limit of a mapping unit (Top). The lookup table is available in the annex of this document.

1.2.4 **Chronostratigraphic Attribution at the Bottom:** Attribute Chrono_B; Annex Table C_3 Lithostratigraphic_Units_Chrono

Chronostratigraphic attribution of the lower limit of a mapping unit (Basis). The lookup table is available in the annex of this document.

1.2.5 **Original Description:** Attribute Orig_Descr

Original description according to the legend of the corresponding geological map. (Data type: String (254))

1.2.6 **Material Type:** Attribute Mat_Type; Annex Table C_2

Lithostratigraphic_Units_Litho

Designation of the material (lithologic unit). The lithologic description is available in the annex of this document.

1.2.7 **Buried Outcrop:** Attribute Buried_Out

Were the unconsolidated deposits re-buried (yes / no)? (Data type: Boolean)

1.2.8 **Composition:** Attribute Composit; Table Unconsolidated_Deposits_PLG_Composit

GeolCode Runc308	Composit (en)	Composit (de)
001	clayey	tonig
002	loamy	lehmig
003	silty	siltig
004	sandy	sandig
005	gravelly	kiesig
006	pebbly, cobbly	geröllreich
007	peaty	torfig

1.2.9 **Admixture:** Attribute Admixture; Table Unconsolidated_Deposits_PLG_Admixtur

GeolCode Runc309	Admixture (en)	Admixture (de)
001	with loess	mit Löss
002	with loess loam	mit Lösslehm
003	with lake marl	mit Seekreide
004	with blocks	mit Blöcken
005	with alpine clasts	mit alpinen Geröllen
006	with scattered blocks and boulders	mit Block- und Geschiebestreu
007	mixed with coarse-grained scree	mit Blockschutt vermischt
008	mixed with fine-grained scree	mit Hangschutt vermischt
009	mixed with weathering debris	mit Verwitterungsschutt vermischt
010	with peat	mit Torf

1.2.10 **Structure:** Attribute Structure; Table Unconsolidated_Deposits_PLG_Structur

GeolCode Runc310	Structure (en)	Structure (de)
001	structureless	strukturlos
002	stratified	geschichtet
003	cross-bedded	schräg-/kreuzgeschichtet
004	large-scale cross-bedding (e.g. delta deposits)	grossmassstäbliche Schrägschichtung (z.B. Deltaschichtung)
005	glacial overprint (glacial tectonics)	glaziale Überprägung (Glazitektonik)
006	periglacially disturbed strata (diapir, ice wedge, etc.)	periglazial gestörte Schichtung (Diapir, Eiskeil, etc.)
007	laminated	laminiert
008	with varves	mit Warven
009	graded	gradiert
010	inversely graded	invers gradiert
011	bioturbated	bioturbiert
012	pedogenic overprint	pedogen überprägt

1.2.11 **Characteristic:** Attribute Charact; Table Unconsolidated_Deposits_PLG_Charact

GeolCode Runc311	Charact (en)	Charact (de)
001	fossilised	fossil
002	recent	rezent
003	weathered	verwittert
004	consolidated (through overburden)	verfestigt (durch Überlast)
005	cemented	verkittet (zementiert)
006	washed out	verschwemmt
007	marshy	sumpfig
008	dislocated	umgelagert
009	mined	abgebaut
010	drained	drainiert
011	irrigated (Wässermatten)	künstlich bewässert (Wässermatten)

1.2.12 **Morphology:** Attribute Morpholo; Table Unconsolidated_Deposits_PLG_Morpholo

GeolCode Runc312	Morpholo (en)	Morpholo (de)
001	cone	Kegel / Fächer
002	veneer	Schleier
003	dune	Düne
004	ridge	Wall
005	terrace	Terrasse
006	sandur	Sander
007	esker	Os
008	bastion	Bastion

1.2.13 **Glacier Type:** Attribute Glac_Typ; Table Unconsolidated_Deposits_PLG_Glac_Typ

GeolCode Runc313	Glac_Typ (en)	Glac_Typ (de)
001	local glacier	Lokalgletscher
002	large valley glacier and piedmont glacier	grosse Tal- und Vorlandgletscher

1.2.14 **Reference Year:** Attribute Ref_Year Time or time period: e.g. «1940-1943». Period of drainage (has to be defined). (Data type: String (254))

1.2.15 **Thin Cover:** Attribute Thin_Cov; Table
Unconsolidated_Deposits_PLG_Thin_Cov

GeolCode Runc315	Thin_Cov (en)	Thin_Cov (de)
001	thin unconsolidated deposit cover, undifferentiated	geringmächtige Lockergesteinsbedeckung, undifferenziert
002	thin till cover	geringmächtige Moränenbedeckung
003	thin gravel cover	geringmächtige Schotterbedeckung
004	thin colluvium cover	geringmächtige Schwemmlerbedeckung
005	thin loess or loess loam cover	geringmächtige Löss- oder Lösslehmbedeckung
006	profound alteration cover	tiefgründige Verwitterungsdecke

1.3 Class Bedrock_PLG

The class Bedrock_PLG contains all areal lithostratigraphic units of bedrock. The information about the (gravitational) mass movement of bedrock is listed in the class Instabilities_within_Bedrock_PLG (Theme Geomorphology).

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table C_1, to be defined)	Lithostratigraphic unit. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.
Fm_Homog [1]	Codelist (Table 1.3.2)	Lithological setup. The possible values are listed in the table «Bedrock_PLG_Fm_Homog».
Litho [1]	Codelist (Table C_2)	Lithologic description. The possible values are listed in the table «Lithostratigraphic_Units_Litho» which is available in the annex of this document.
Chrono_T [1]	Codelist (Table C_3)	Chronostratigraphic attribution of the upper limit of a mapping unit (Top). The possible values are listed in the table «Lithostratigraphic_Units_Chrono» which is available in the annex of this document.
Chrono_B [1]	Codelist (Table C_3)	Chronostratigraphic attribution of the lower limit of a mapping unit (Basis). The possible values are listed in the table «Lithostratigraphic_Units_Chrono» which is available in the annex.
Tecto [1]	Codelist (Table C_4)	Tectonic affiliation. The possible values are listed in the table «Lithostratigraphic_Units_Tecto» which is available in the annex of this document.
Orig_Descr [1]	String (254)	Original description according to the legend of the corresponding geological map.
Buried_Out [1]	Boolean	Was the bedrock re-buried (yes / no)?
Exotic_Ele [1]	Boolean	Is the object type an exotic element; e.g. inclusion, lense, pocket, olistolite (yes / no)?
Colour [0..1]	String (254)	Colour of the rock. It has to be indicated whether it is the colour of a fraction, of a weathered rock surface etc.; e.g. grey colour of weathered rock surface.
Sedimentary_Rocks		
Main_Com [0..1]	Codelist (Table 1.3.11)	Main rock component of a clastic sedimentary rock. The possible values are listed in the table «Bedrock_PLG_Sedimentary_Rocks_Main_Com».
Seco_Com [0..2]	Codelist (Table 1.3.12)	Secondary rock component of the sedimentary rock. The possible values are listed in the table «Bedrock_PLG_Sedimentary_Rocks_Seco_Com».

Bond_Mat [0..1]	Codelist (Table 1.3.13)	Bonding material of the sedimentary rock. The possible values are listed in the table «Bedrock_PLG_Sedimentary_Rocks_Bond_Mat».
Bedding [0..2]	Codelist (Table 1.3.14)	Bedding of the sedimentary rock. The possible values are listed in the table «Bedrock_PLG_Sedimentary_Rocks_Bedding».
Sedi_Str [0..2]	Codelist (Table 1.3.15)	Structure of the sedimentary rock. The possible values are listed in the table «Bedrock_PLG_Sedimentary_Rocks_Sedi_Str».
Sedi_Tex [0..2]	Codelist (Table 1.3.16)	Texture of the sedimentary rock. The possible values are listed in the table «Bedrock_PLG_Sedimentary_Rocks_Sedi_Tex».
Igneous_Rocks		
Igne_Tex [0..1]	Codelist (Table 1.3.17)	Texture of the igneous rock. The possible values are listed in the table «Bedrock_PLG_Igneous_Rocks_Igne_Tex».
Grain_Si [0..1]	Codelist (Table 1.3.18)	Grain size of the igneous rock. The possible values are listed in the table «Bedrock_PLG_Igneous_Rocks_Grain_Si».
Affinity [0..1]	Codelist (Table 1.3.19)	Chemical affinity of a magmatic series. The possible values are listed in the table «Bedrock_PLG_Igneous_Rocks_Affinity».
Metamorphic_Rocks		
Full_Name [0..1]	String (254)	Name of the metamorphic rock.
Mineral [0..3]	Codelist (Table 1.3.21)	Important mineral composition of the metamorphic rock. The possible values are listed in the table «Bedrock_PLG_Metamorphic_Rocks_Mineral».
Meta_Str [0..3]	Codelist (Table 1.3.22)	Structure of the metamorphic rock. The possible values are listed in the table «Bedrock_PLG_Metamorphic_Rocks_Meta_Str».

1.3.1 **Kind:** Attribute Kind; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphic unit. The lithostratigraphic table does not exist for the moment.

1.3.2 **Formation Homogeneity:** Attribute Fm_Homog; Table

Bedrock_PLG_Fm_Homog

GeolCode Rbed302	Fm_Homog (en)	Fm_Homog (de)
001	monolithological	monolithologisch
002	polylithological (alternate bedding)	polylithologisch (Wechselagerung)
003	polylithological (heterogeneous bedding)	polylithologisch (heterogene Lagerung)

1.3.3 **Lithologic Description:** Attribute Litho; Annex Table C_2

Lithostratigraphic_Units_Litho

Lithologic description. The lookup table is available in the annex of this document.

1.3.4 **Chronostratigraphic Attribution at the Top:** Attribute Chrono_T; Annex Table C_3 Lithostratigraphic_Units_Chrono
Chronostratigraphic attribution of the upper limit of a mapping unit (Top). The lookup table is available in the annex of this document.

1.3.5 **Chronostratigraphic Attribution at the Bottom:** Attribute Chrono_B; Annex Table C_3 Lithostratigraphic_Units_Chrono
Chronostratigraphic attribution of the lower limit of a mapping unit (Basis). The lookup table is available in the annex of this document.

1.3.6 **Tectonic Attribution:** Attribute Tecto; Annex Table C_4 Lithostratigraphic_Units_Tecto
Tectonic affiliation. The lookup table is available in the annex of this document.

1.3.7 **Original Description:** Attribute Orig_Descr
Original description according to the legend of the corresponding geological map. (Data type: String (254))

1.3.8 **Buried Outcrop:** Attribute Buried_Out
Was the bedrock re-buried (yes / no)? (Data type: Boolean)

1.3.9 **Exotic Element:** Attribute Exotic_Ele
Is the object type an exotic element (yes / no)? (Data type: Boolean)

1.3.10 **Colour:** Attribute Colour
Colour of the rock. (Data type: String (254))

Subclass: Sedimentary_Rocks

1.3.11 **Main Component:** Attribute Main_Com; Table Bedrock_PLG_Sedimentary_Rocks_Main_Com

GeolCode Rbed311	Main_Com (en)	Main_Com (de)
001	rock fragments, undifferentiated	Gesteinsbruchstücke undifferenziert
002	siliceous rocks (quartzite, quartz, radiolarite, siliceous limestone, quartzitic sandstone, chert)	kieselige Gesteine (Quarzit, Quarz (mineralisch), Radiolarit, Kieselkalk, Quarzsandstein, Hornstein)
003	sedimentary rock, undifferentiated	Sedimentgestein undifferenziert
004	claystone	Tonstein
010	marl	Mergelstein
005	limestone	Kalkstein
006	dolomite	Dolomitstein
007	crystalline rock, undifferentiated	Kristallingestein undifferenziert
008	volcanic rock	Vulkanit
009	metamorphic rock	Metamorphit

1.3.12 **Secondary Component:** Attribute Seco_Com; Table Bedrock_PLG_Sedimentary_Rocks_Seco_Com

GeolCode Rbed312	Seco_Com (en)	Seco_Com (de)
001	rock fragments, undifferentiated	Gesteinsbruchstücke undifferenziert
002	sedimentary rock, undifferentiated	Sedimentgestein undifferenziert
003	claystone	Tonstein
004	limestone	Kalkstein
022	marl	Mergelstein
005	dolomite	Dolomitstein
006	crystalline rock, undifferentiated	Kristallingestein undifferenziert
007	volcanic rock	Vulkanit
008	metamorphic rock	Metamorphit
009	quartzite	Quarzit
010	pyroclastic component	pyroklastische Komponenten
011	quartz	Quarz
012	feldspar	Feldspat
013	glauconite	Glaukonit
014	mica	Glimmer
015	intraformational rubble	intraformationelle Gerölle
016	calcareous concretion	Kalkkonkretionen
017	siderite concretion	Sideritkonkretionen
018	chert nodules	Silexkonkretionen
019	biogenic components	biogene Komponenten
020	terrigenous detritus	terrigenes Detritus
021	phosphorite	Phosphorit

1.3.13 **Bonding Material:** Attribute Bond_Mat; Table Bedrock_PLG_Sedimentary_Rocks_Bond_Mat

GeolCode Rbed313	Bond_Mat (en)	Bond_Mat (de)
001	calcareous cement	kalkiger Zement
002	dolomitic cement	dolomitischer Zement
003	siliceous cement	kieseliger Zement
004	clayey matrix	tonige Matrix
005	silty matrix	siltige Matrix
006	sandy matrix	sandige Matrix
007	calcareous matrix	kalkige Matrix
008	dolomitic matrix	dolomitische Matrix
009	organic impregnation (asphalte)	organische Imprägnierung (Asphalt)
010	mineral impregnation	mineralische Imprägnierung

1.3.14 **Bedding:** Attribute Bedding; Table Bedrock_PLG_Sedimentary_Rocks_Bedding

GeolCode Rbed314	Bedding (en)	Bedding (de)
001	massive	massig
002	bedded	gebankt
003	thickly bedded	dickbankig
004	thinly bedded	dünnbankig
005	laminated	blättrig
006	concretionary	knauerig
007	nodular	knollig

1.3.15 **Sedimentary Structure:** Attribute Sedi_Str; Table Bedrock_PLG_Sedimentary_Rocks_Sedi_Str

GeolCode Rbed315	Sedi_Str (en)	Sedi_Str (de)
001	structureless	strukturlos
002	stratified	geschichtet
003	cross-bedded	schräg-/kreuzgeschichtet
004	laminated	laminiert
005	graded	gradiert
006	inversely graded	invers gradiert
007	bioturbated	bioturbiert
008	stromatolitic	stromatolitisch

1.3.16 **Sedimentary Texture:** Attribute Sedi_Tex; Table Bedrock_PLG_Sedimentary_Rocks_Sedi_Tex

GeolCode Rbed316	Sedi_Tex (en)	Sedi_Tex (de)
001	monomictic	monomikt
002	polymictic	polymikt
003	micritic	mikritisch
004	spathic	spätig
005	bioclastic	biodetritisch
006	fossiliferous	Fossilien führend
007	oncolitic	onkolithisch
008	oolitic	oolithisch
009	pelitic	pelitisch
010	pisolitic	pisolithisch
011	lithoclastic	lithoklastisch

Subclass: Igneous_Rocks

1.3.17 **Igneous Texture:** Attribute Igne_Tex; Table Bedrock_PLG_Igneous_Rocks_Igne_Tex

GeolCode Rbed317	Igne_Tex (en)	Igne_Tex (de)
001	homogeneous grain size distribution	gleichkörnig
002	inhomogeneous grain size distribution	ungleichkörnig
003	porphyric	porphyrisch

1.3.18 **Grain Size:** Attribute Grain_Si; Table Bedrock_PLG_Igneous_Rocks_Grain_Si

GeolCode Rbed318	Grain_Si (en)	Grain_Si (de)
001	coarse-grained	grobkörnig
002	fine-grained	feinkörnig
003	aphanitic	aphanitisch

1.3.19 **Affinity:** Attribute Affinity; Table Bedrock_PLG_Igneous_Rocks_Affinity

GeolCode Rbed319	Affinity (en)	Affinity (de)
001	alkaline	alkalisch
002	calc-alkaline	kalkalkalisch
003	tholeiitic	tholeitisch

Subclass: Metamorphic_Rocks

1.3.20 **Full Name:** Attribute Full_Name

Name of the metamorphic rock. (Data type: String (254))

1.3.21 **Important Mineral:** Attribute Mineral; Table
Bedrock_PLG_Metamorphic_Rocks_Mineral

GeolCode Rbed322	Mineral (en)	Mineral (de)
001	actinolite	Aktinolith
002	albite	Albit
003	allanite	Allanit
004	almandine	Almandin
005	amphibolite	Amphibol
006	andalusite	Andalusit
007	ankerite	Ankerit
008	anorthite	Anorthit
009	antigorite	Antigorit
010	biotite	Biotit
011	calcite	Kalzit
012	carbonate mineral	Karbonatmineral
013	karpholite	Karpholith
014	chlorite	Chlorit
015	cloritoid	Chloritoid
016	klinzoesite	Klinozoisit
017	coesite	Coesit
018	cordierite	Cordierit
019	diopside	Diopsid
020	disthene	Disthen
021	dolomite	Dolomit
022	epidote	Epidot
023	feldspar	Feldspat
024	alkali feldspar	Alkalifeldspat
025	potassic feldspar	Kalifeldspat
026	glaucophan	Glaukophan
027	graphite	Graphit
028	garnet	Granat
029	hornblende	Hornblende
030	lawsonite	Lawsonit
031	magnetite	Magnetit
032	mica	Glimmer
033	white mica	Hellglimmer
034	microcline	Mikroklin
035	muscovite	Muskovit
036	olivine	Olivin

037	omphacite	Omphacit
038	orthoclase	Orthoklas
039	paragonite	Paragonit
040	phlogopite	Phlogopit
041	plagioclase	Plagioklas
042	prehnite	Prehnit
043	pyrite	Pyrit
044	pyrope	Pyrop
045	pyrophyllite	Pyrophyllit
046	pyroxene	Pyroxen
047	quartz	Quarz
049	serpentine	Serpentin
050	alumosilicate	Alumosilikat
051	sillimanite	Sillimanit
052	staurolite	Staurolith
053	stilpnomelane	Stilpnomelan
054	talc	Talk
055	zoisite	Zoisit
056	adularia	Adular
057	aegirine	Aegirin
058	aegirine-augite	Aegirin-Augit
059	andesine	Andesin
060	anhydrite	Anhydrit
061	annite	Annit
062	aragonite	Aragonit
063	augite	Augit
064	chrysotile	Chrysotil
065	grossular	Grossular
066	jadeite	Jadeit
067	margarite	Margarit
068	oligoclase	Oligoklas
069	orthopyroxene	Orthopyroxen
070	clinopyroxene	Klinopyroxen
071	phengite	Phengit
072	pumpellyite	Pumpellyit
073	sanidine	Sanidin
074	sapphirine	Sapphirin
075	spessartite	Spessartin
076	spinel	Spinell
077	titanite	Titanit
078	tremolite	Tremolit
079	tourmaline	Turmalin
080	forsterite	Forsterit
081	fayalite	Fayalit

082	enstatite	Enstatit
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1.3.22 **Metamorphic Structure:** Attribute Meta_Str; Table
Bedrock_PLG_Metamorphic_Rocks_Meta_Str

GeolCode Rbed325	Meta_Str (en)	Meta_Str (de)
001	massive	massig
002	banded	gebändert
003	eyed	augig
004	with exogenous inclusions	mit Schollen
005	schistose	schiefrig
006	phyllitic	phyllitisch
007	laminated	laminiert
008	layered	lagig
009	platy	plattig
010	bedded	gebankt
011	folded	gefältelt
012	veined	geadert
013	streaky	schlierig
014	lenticular	linsig
015	fibrous	flaserig
016	agmatic	agmatisch
017	breccia-like	brekziös

2 Theme Geomorphology



Subdivision of classes in the theme Geomorphology

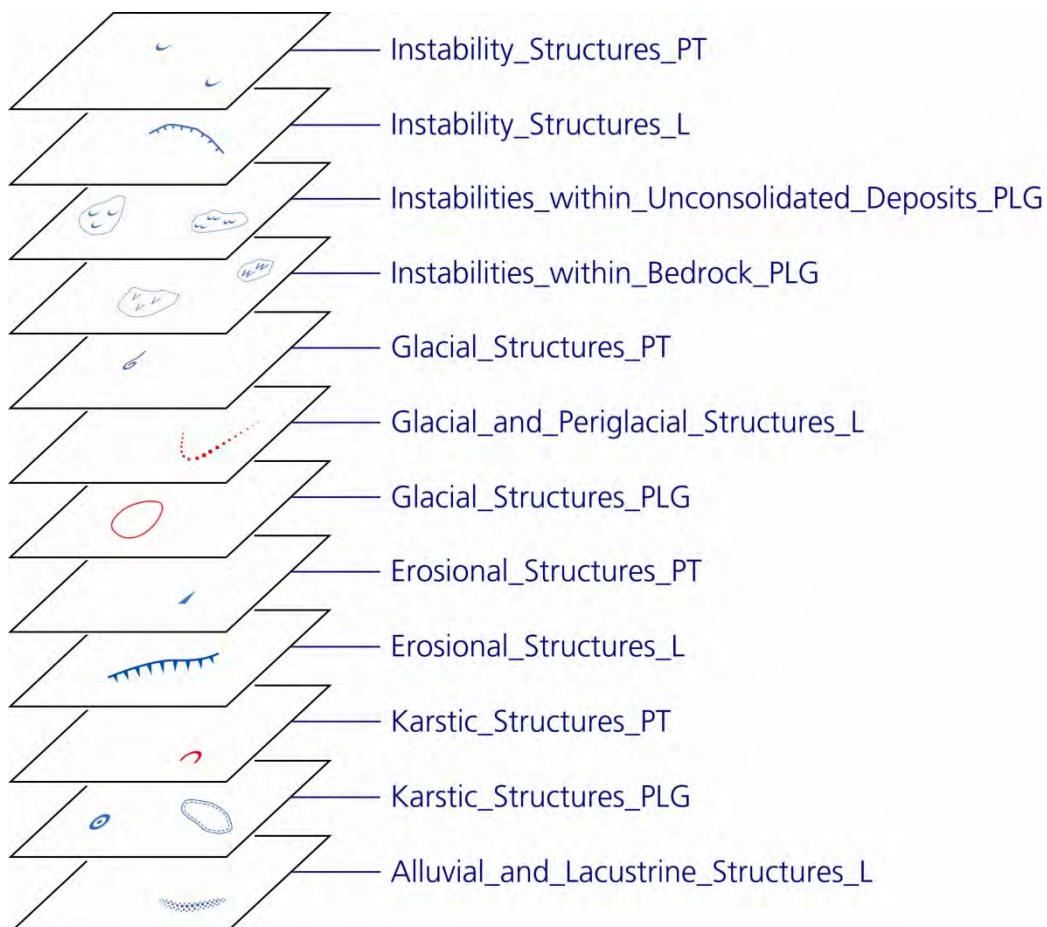


Illustration of the theme Geomorphology in a UML Diagram



2.1 Class Instability_Structures_PT

The class Instability_Structures_PT contains local indications of slope instabilities (slides), which cannot be restricted to a certain area. If possible, instable rock masses should be registered as polygons (class Instabilities_within_Unconsolidated_Deposits_PLG). A point recording should be avoided. This proceeding is usually reserved for the digitisation of printed maps.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.1.1)	Object type. The possible object types are listed in the table «Instability_Structures_PT_Kind».

2.1.1 Kind: Attribute Kind; Table Instability_Structures_PT_Kind

GeolCode Gins101	Kind (en)	Kind (de)	CODE_ SC
001	indication of slope instability	Hinweis auf Hanginstabilität	547

2.2 Class Instability_Structures_L

The class Instability_Structures_L contains linear morphologies that are the result of slope instabilities at the surface. The scarp is defined as the upper border of a sliding surface created by a mass movement of a slide or a sagging.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.2.1)	Object type. The possible object types are listed in the table «Instability_Structures_L_Kind».

2.2.1 Kind: Attribute Kind; Table Instability_Structures_L_Kind

GeolCode Gins201	Kind (en)	Kind (de)	CODE_ SC
001	landslide bulge	Stauchwulst	65
002	extension cracks	Nackentälchen	72
003	scarp	Abrisrand	71
004	open fissure	offene Spalte	71

2.3 Class Instabilities_within_Unconsolidated_Deposits_PLG

The class Instabilities_within_Unconsolidated_Deposits_PLG contains all polygons which limit areas with unstable unconsolidated deposits. In this class the processes of different types of mass movement are listed. The rock bodies and deposits concerned formed by these mass movement processes are described in the class Unconsolidated_Deposits_PLG. For a better understanding of the different object types some examples are represented in the annex A.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.3.1)	Object type. The possible object types are listed in the table «Instabilities_within_Unconsolidated_Deposits_PLG_Kind».

2.3.1 Kind: Attribute Kind; Table

Instabilities_within_Unconsolidated_Deposits_PLG_Kind

GeolCode Ginu301	Kind (en)	Kind (de)	CODE_ SC
001	slide area	Rutschgebiet	-
002	sagging area of unconsolidated deposits caused by an instability within the underlying bedrock	Gebiet einer Lockergesteinsackung, verursacht durch eine Instabilität im unterlagernden Festgestein	-
003	area of solifluction	Gebiet mit Solifluktion	-

2.4 Class Instabilities_within_Bedrock_PLG

The class Instabilities_within_Bedrock_PLG contains all polygons which limit areas with unstable rock masses. In this class the processes of different types of mass movements are listed. The rock bodies affected by these mass movement processes are described in the class Bedrock_PLG. For a better understanding different object types are listed in the annex A.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.4.1)	Object type. The possible object types are listed in the table «Instabilities_within_Bedrock_PLG_Kind».
Main_Mov [0..1]	Codelist (Table 2.4.2)	Main phase of movement. The possible object types are listed in the table «Instabilities_within_Bedrock_PLG_Main_Mov».

2.4.1 Kind: Attribute Kind; Table Instabilities_within_Bedrock_PLG_Kind

GeolCode Ginb301	Kind (en)	Kind (de)	CODE_ SC	2.4.2 Main_Mov
001	sagging area (including rock slide, subsidence and collapse of a concerned area)	Sackungsgebiet (inkl. von Felsrutschung, Absenkung und Einsturz betroffene Gebiete)	-	o
002	area of rock topple	Gebiet mit Hakenwurf	-	n/a

(m = mandatory; o = optional; n/a = not applicable)

2.4.2 Main Phase of Movement: Attribute Main_Mov; Table Instabilities_within_Bedrock_PLG_Main_Mov

GeolCode Ginb302	Main_Mov (en)	Main_Mov (de)
001	main phase of movement before the last glacial maximum	Hauptbewegungsphase vor dem letzteiszeitlichen Maximum
002	main phase of movement after the last glacial maximum	Hauptbewegungsphase nach dem letzteiszeitlichen Maximum

2.5 Class Glacial_Structures_PT

The class Glacial_Structures_PT contains object types which document the former presence of a glacier on selective points. (A glacial stria is a spatial oriented object type and therefore listed in the class Lineation_PT.)

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.5.1)	Object type. The possible object types are listed in the table «Glacial_Structures_PT_Kind».

2.5.1 Kind: Attribute Kind; Table Glacial_Structures_PT_Kind

GeolCode Ggla101	Kind (en)	Kind (de)	CODE_ SC
001	glacio-tectonic deformation	glazialtektonische Deformation	540
002	glacier mill, pot hole	Gletschermühle, Strudelloch	542

2.6 Class Glacial_and_Periglacial_Structures_L

The class Glacial_and_Periglacial_Structures_L contains linear structures that indicate a glacial or periglacial origin. With the exception of the trimline, this class contains only landscape types with accumulating forms such as moraine ridges or boulder bulges in the rock glacier.

Attribute name [Cardinality]	Data Type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.6.1)	Object type. The possible object types are listed in the table «Glacial_and_Periglacial_Structures_L_Kind».
Morai_Mo [0..1]	Codelist (Table 2.6.2)	Morphology of a moraine. The possible values are listed in the table «Glacial_and_Periglacial_Structures_L_Morai_Mo».
Glac_Typ [0..1]	Codelist (Table 2.6.3)	Type of glacier referred to by the object type. The possible values are listed in the table «Glacial_and_Periglacial_Structures_L_Glac_Typ».
Ice_M_P [0..1]	Codelist (Table 2.6.4)	Position of glacier. The possible values are listed in the table «Glacial_and_Periglacial_Structures_L_Ice_M_P».
Quat_Str [0..1]	Codelist (Table 2.6.5)	Stratigraphical classification of the moraine ridge within the Quaternary. The possible values are listed in the table «Glacial_and_Periglacial_Structures_L_Quat_Str». A more detailed stratigraphical subdivision of the Quaternary will be available in a further version.
Ref_Year [0..1]	Short integer	Reference year of older glacier positions.
Source [0..1]	String (254)	Source of historical records.

2.6.1 **Kind:** Attribute Kind; Table Glacial_and_Periglacial_Structures_L_Kind

Geol-Code Ggla201	Kind (en)	Kind (de)	CODE _ SC	2.6.2 Morai_ Mo	2.6.3 Glac_ Typ	2.6.4 Ice_ M_P	2.6.5 Chrono	2.6.6 Ref_ Year	2.6.7 Source
001	moraine ridge	Moränenwall	42-47	m	m	o	o	n/a	n/a
002	moraine ridge on a glacier or on dead ice	Moränenwall auf Gletscher oder auf Toteis	60	n/a	n/a	n/a	n/a	n/a	n/a
003	kame terrace edge	Kameterrassenkante	48	n/a	n/a	n/a	n/a	n/a	n/a
004	older glacier level	älterer Gletscherstand, basierend auf historischen Daten	54	n/a	n/a	n/a	n/a	o	o
005	trimline	Schliffgrenze	55	n/a	n/a	n/a	n/a	n/a	n/a
006	protalus rampart bulge	Protalus Rampart Wulst	59	n/a	n/a	n/a	n/a	n/a	n/a
007	boulder bulge in a rock glacier	Blockwulst im Blockgletscher	63-64	n/a	n/a	n/a	n/a	n/a	n/a
008	snow moraine ridge	Schneehaldenmoränenwall	62	n/a	n/a	n/a	n/a	n/a	n/a

(m = mandatory; o = optional; n/a = not applicable)

2.6.2 **Moraine Morphology:** Attribute Morai_Mo; Table Glacial_and_Periglacial_Structures_L_Morai_Mo

GeolCode Ggla202	Morai_Mo (en)	Morai_Mo (de)
001	symmetric	symmetrisch
002	unilateral	einseitig abfallend

2.6.3 **Glacier Type:** Attribute Glac_Typ; Table Glacial_and_Periglacial_Structures_L_Glac_Typ

GeolCode Ggla203	Glac_Typ (en)	Glac_Typ (de)
001	local glacier	Lokalgletscher
002	large valley and piedmont glacier	grosse Tal- und Vorlandgletscher

2.6.4 Ice Marginal Position: Attribute Ice_M_P; Table Glacial_and_Periglacial_Structures_L_Ice_M_P

GeolCode Ggla204	Ice_M_P (en)	Ice_M_P (de)
001	glacial maximum, undifferentiated	Maximalstand, undifferenziert
002	Bern	Bern
003	Bremgarten	Bremgarten
004	Konstanz	Konstanz
005	Feuerthalen	Feuerthalen
006	Gurten	Gurten
007	Hurden	Hurden
008	Killwangen	Killwangen
009	Mellingen	Mellingen
010	Muri	Muri
011	Rotkreuz	Rotkreuz
012	Schaffhausen	Schaffhausen
013	Schlieren	Schlieren
014	Schosshalde	Schosshalde
015	Seftigschwand	Seftigschwand
016	Solothurn	Solothurn
017	Spreitenbach	Spreitenbach
018	Spreitenbach-Killwangen	Spreitenbach-Killwangen
019	Stein am Rhein	Stein am Rhein
020	Stetten	Stetten
021	older Wangen-Stadial	älteres Wangener Stadium
022	younger Wangen-Stadial	jüngeres Wangener Stadium
023	Wittigkofen	Wittigkofen
024	Zurich	Zürich

2.6.5 Quaternary Stratigraphic Classification: Attribute Quat_Str; Table Glacial_and_Periglacial_Structures_L_Quat_Str

GeolCode Ggla205	Quat_Str (en)	Quat_Str (de)
001	This table is in progress	Diese Tabelle ist in Bearbeitung

2.6.6 Reference Year: Attribute Ref_Year *Reference year of older glacier positions. (Data type: Short integer)*

2.6.7 Source: Attribute Source *Source of historical records. (Data type: String (254))*

2.7 Class Glacial_Structures_PLG

The class Glacial_Structures_PLG contains areal glacier landscape types which are formed by the basal flowing or melting of glacier ice.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.7.1)	Object type. The possible object types are listed in the table «Glacial_Structures_PLG_Kind».

2.7.1 Kind: Attribute Kind; Table Glacial_Structures_PLG_Kind

GeolCode Ggla301	Kind (en)	Kind (de)	CODE_ SC
001	drumlin, drumlin-like gravel mound	Drumlin, drumlinartige Kieskuppe	49
003	roche moutonné	Rundhöcker	51
004	dead ice hole, kettle hole	Toteisloch, Söll	52–53

2.8 Class Erosional_Structures_PT

The class Erosional_Structures_PT contains local landscape elements which had been formed by different erosional processes in the course of time.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.8.1)	Object type. The possible object types are listed in the table «Erosional_Structures_PT_Kind».

2.8.1 Kind: Attribute Kind; Table Erosional_Structures_PT_Kind

GeolCode Gero101	Kind (en)	Kind (de)	CODE_ SC
001	earth pyramid	Erdpyramide	543

2.9 Class Erosional_Structures_L

The class Erosional_Structures_L contains linear erosive forms like erosional edges in general or terrace edges.

Very often, on older printed maps no distinction is made between these two forms. However, in the vector data a clear distinction is made. This means that during digitisation of older printed maps erosional edges and terrace edges must be distinguished. The attribute terrace edge is only applied if their position and corresponding gravel terrace can be clearly assigned. In case of doubt the forms are listed as erosional edges.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.9.1)	Object type. The possible object types are listed in the table «Erosional_Structures_L_Kind».

2.9.1 Kind: Attribute Kind; Table Erosional_Structures_L_Kind

GeolCode Gero201	Kind (en)	Kind (de)	CODE_ SC
001	erosional edge	Erosionsrand	86
002	terrace edge	Terrassenkante	79
003	escarpment	Schichtstufenkante	87

2.10 Class Karstic_Structures_PT

The class Karstic_Structures_PT contains karst phenomns that are represented punctiform (e.g. ponor or cave entrance).

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.10.1)	Object type. The possible object types are listed in the table «Karstic_Structures_PT_Kind».
Ice_Cave [0..1]	Boolean	Is the cave an ice cave («glacière», this term applies for an exceptional cold cave where ice accumulates because of winter snow or freezing intrusive surface water and where ice will last over the summer period) (yes / no)?

2.10.1 Kind: Attribute Kind; Table Karstic_Structures_PT_Kind

GeolCode Gkar101	Kind (en)	Kind (de)	CODE_ SC	2.10.2 Ice_Cave
001	ponor	Ponor	519	n/a
002	cave, balm	Höhle, Balme	545	o

(m = mandatory; o = optional; n/a = not applicable)

2.10.2 Ice Cave: Attribute Ice_Cave

Is the cave an ice cave («glacière») (yes / no)? (Data type: Boolean)

2.11 Class Karstic_Structures_PLG

The class Karstic_Structures_PLG contains areal karst forms like a doline or polje. Dolines are always registered as polygons (the DTM AV is an important base for this proceeding). Small dolines (with a diameter < 25 m) are represented with a defined standard surface of 500 m².

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.11.1)	Object type. The possible object types are listed in the table «Karstic_Structures_PLG_Kind».

2.11.1 Kind: Attribute Kind; Table Karstic_Structures_PLG_Kind

GeolCode Gkar301	Kind (en)	Kind (de)	CODE_ SC
001	depression without surface outflow	Senke ohne oberirdischen Abfluss	81
002	doline	Doline	82
003	limestone pavement	Karrenfeld	80
004	polje	Polje	83

2.12 Class Alluvial_and_Lacustrine_Structures_L

The class Alluvial_and_Lacustrine_Structures_L contains linear morphologies of alluvial or lacustrine origin.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 2.12.1)	Object type. The possible object types are listed in the table «Alluvial_and_Lacustrine_Structures_L_Kind».
Age [0..1]	Codelist (Table 2.12.2)	Age of object type. The possible values are listed in the table «Alluvial_and_Lacustrine_Structures_L_Age».

2.12.1 **Kind:** Attribute Kind; Table Alluvial_and_Lacustrine_Structures_L_Kind

GeolCode Gall201	Kind (en)	Kind (de)	CODE_ SC	2.12.2 Age
001	beach ridge	Strandwall	58	o
002	axis of a mudflow channel	Achse einer Murgangrinne	73	o

(m = mandatory; o = optional; n/a = not applicable)

2.12.2 **Age:** Attribute Age; Table Alluvial_and_Lacustrine_Structures_L_Age

GeolCode Gall202	Age (en)	Age (de)
001	fossil	fossil
002	recent	rezent

3 Theme Tectonics



Subdivision of classes in the theme Tectonics

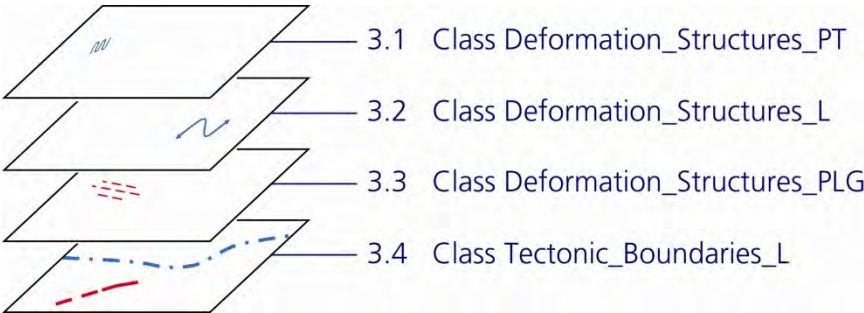
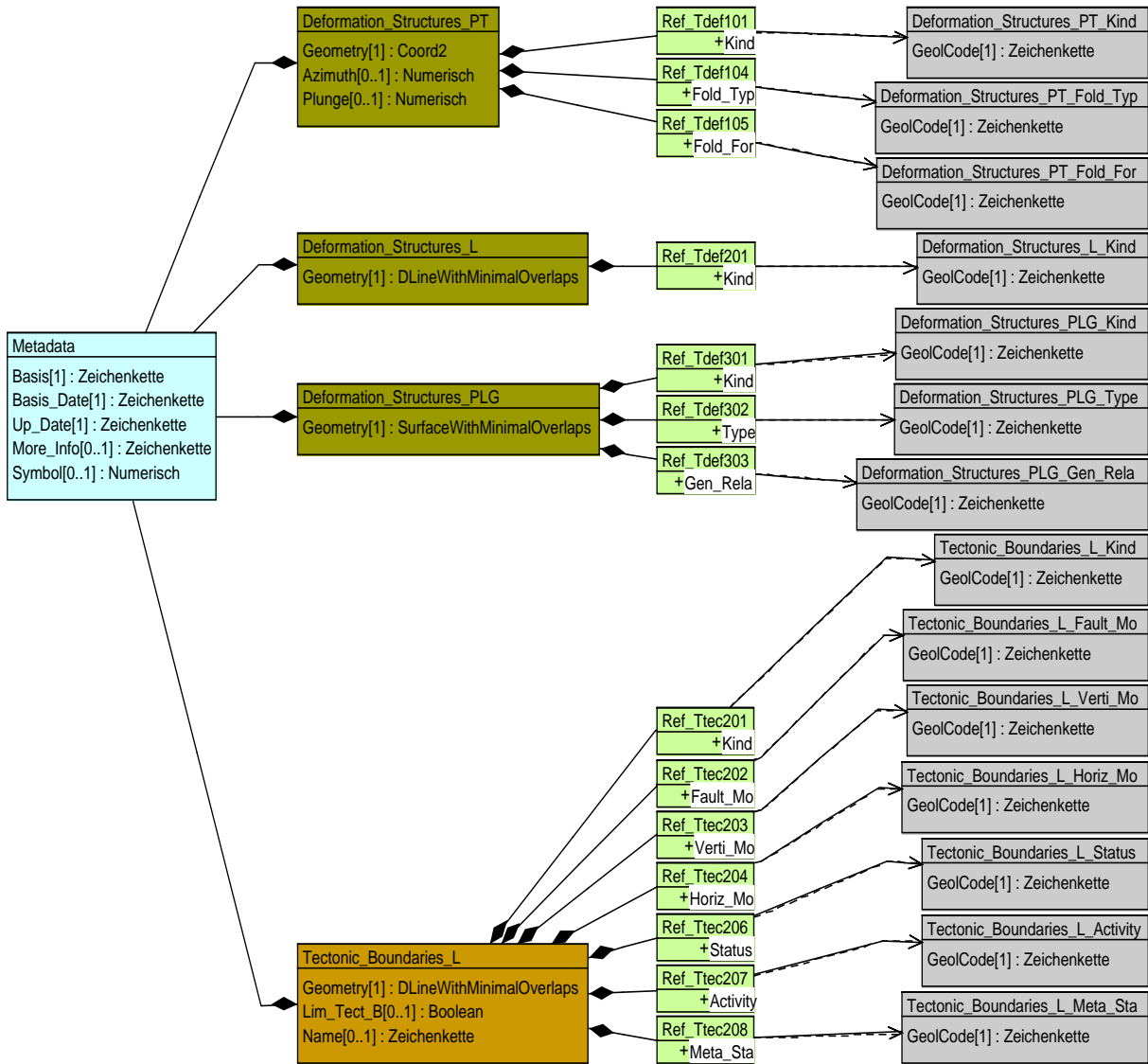


Illustration of the theme Tectonics in a UML Diagram



3.1 Class Deformation_Structures_PT

The class Deformation_Structures_PT contains tectonic deformation structures that can be observed at a specific point, e.g. locally strongly folded sites (minor folding) or sites with a distinct jointing. This class also contains constructed points such as the ones needed for the description of the orientation of the axial surface. The representation of the axial trace symbolises a constructed hinge line which is an intersection point of the axial surface and the topography. As an example and for the better understanding the last two ones are represented in the annex A.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 3.1.1)	Object type. The possible object types are listed in the table «Deformation_Structures_PT_Kind».
Azimuth [0..1]	Short integer	Direction (azimuth) of the respective point object type measured clockwise in degrees (0° - 359°).
Plunge [0..1]	Short integer	Inclination of the respective point object type. Value measured in degrees from the horizontal (0°) up to the vertical position (90°).
Fold_Typ [0..1]	Codelist (Table 3.1.4)	Fold type. The possible values are listed in the table «Deformation_Structures_PT_Fold_Typ».
Fold_For [0..1]	Codelist (Table 3.1.5)	Fold form. The possible values are listed in the table «Deformation_Structures_PT_Fold_For».

3.1.1 **Kind:** Attribute Kind; Table Deformation_Structures_PT_Kind

GeolCode Tdef101	Kind (en)	Kind (de)	CODE_ SC	3.1.2 Azimuth	3.1.3 Plunge	3.1.4 Fold_Typ	3.1.5 Fold_For
001	locally observed tectonic breccia	punktuell beobachtete tektonische Brekzie	736-739	n/a	n/a	n/a	n/a
002	distinct jointing	ausgeprägte Klüftung	734	n/a	n/a	n/a	n/a
003	tectonic unconformity	tektonische Diskordanz	733	n/a	n/a	n/a	n/a
004	orientation of the axial surface	Orientierung der Faltenachsenfläche	668-669	m	o	o	o
005	minor folding	Fältelung	731	n/a	n/a	n/a	n/a
006	representation of the axial trace	Darstellung der Spur einer Achsenfläche	685; 688	m	n/a	o	o
007	kink fold	Chevron-Falte, Kink Fold	729; 730	n/a	n/a	n/a	n/a

(m = mandatory; o = optional; n/a = not applicable)

3.1.2 **Azimuth:** Attribute Azimuth

Direction (azimuth) of the respective point object type. (Data type: Short integer)

3.1.3 **Plunge:** Attribute Plunge

Inclination of the respective point object type. (Data type: Short integer)

3.1.4 **Fold Type:** Attribute Fold_Typ; Table Deformation_Structures_PT_Fold_Typ

GeolCode Tdef104	Fold_Typ (en)	Fold_Typ (de)
001	anticline	Antiklinale
002	syncline	Synklinale

3.1.5 **Fold Form:** Attribute Fold_For; Table Deformation_Structures_PT_Fold_For

GeolCode Tdef105	Fold_For (en)	Fold_For (de)
001	antiform	Antiform
002	synform	Synform

3.2 Class Deformation_Structures_L

The class Deformation_Structures_L contains linear tectonic deformation structures such as the topography of a hinge line. An example is listed for illustration in the annex A.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 3.2.1)	Object type. The possible object types are listed in the table «Deformation_Structures_L_Kind».

3.2.1 **Kind:** Attribute Kind; Table Deformation_Structures_L_Kind

GeolCode Tdef201	Kind (en)	Kind (de)	CODE_ SC
001	hinge line	Faltenscharnier	35

3.3 Class Deformation_Structures_PLG

The class Deformation_Structures_PLG contains zones influenced by tectonic processes like tectonised zones or joint zones.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 3.3.1)	Object type. The possible object types are listed in the table «Deformation_Structures_PLG_Kind».
Type [0..1]	Codelist (Table 3.3.2)	Characteristics of the object types. The possible values are listed in the table «Deformation_Structures_PLG_Type».
Gen_Rel [0..1]	Codelist (Table 3.3.3)	Genetic relation. The possible values are listed in the table «Deformation_Structures_PLG_Gen_Rel».

3.3.1 Kind: Attribute Kind; Table Deformation_Structures_PLG_Kind

GeolCode Tdef301	Kind (en)	Kind (de)	CODE_ SC	3.3.2 Type	3.3.3 Gen_Rel
001	joint zone	Kluftzone	-	n/a	o
002	tectonised zone	tektonisierte Zone	36; 37; 735	o	o

(m = mandatory; o = optional; n/a = not applicable)

3.3.2 Type: Attribute Type; Table Deformation_Structures_PLG_Type

GeolCode Tdef302	Type (en)	Type (de)
001	cataclastic	kataklastisch
002	kakiritic	kakiritisch
003	mylonitic	mylonitisch
004	pseudotachylitic	pseudotachylitisch

3.3.3 Genetic Relation: Attribute Gen_Rel; Table Deformation_Structures_PLG_Gen_Rel

GeolCode Tdef303	Gen_Rel (en)	Gen_Rel (de)
001	linked to an overthrust	an eine Überschiebung gebunden
002	linked to a normal fault	an eine Abschiebung gebunden
003	linked to a fault zone	an einen Bruch gebunden
004	linked to a tectonic boundary with unknown sense of movement	an eine tektonische Grenze mit unbekannter Bewegungsrichtung gebunden
005	linked to an existing tectonic contact	an einen bestehenden tektonischen Kontakt gebunden

3.4 Class Tectonic_Boundaries_L

The class Tectonic_Boundaries_L contains all tectonic faults. The strike-slip faults in Switzerland can be represented as a «fault (Attribut «Fault_Mo» (Fault Movement)) parallel to the strike». There is no «strike-slip fault» in comparable dimensions in Switzerland which could be considered as an equivalent to «overthrust» or «normal fault». A detachment layer is represented as an «overthrust» or as a «normal fault». If the sense of movement is unknown, it is represented as a «tectonic boundary with unknown sense of movement». For improved understanding, different examples of object types are listed in the annex A.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 3.4.1)	Object type. The possible object types are listed in the table «Tectonic_Boundaries_L_Kind».
Fault_Mo [0..1]	Codelist (Table 3.4.2)	Sense of the movement of a fault. The possible values are listed in the table «Tectonic_Boundaries_L_Fault_Mo».
Verti_Mo [0..1]	Codelist (Table 3.4.3)	Movement parallel to the dip of the fault surface. The possible values are listed in the table «Tectonic_Boundaries_L_Verti_Mo».
Horiz_Mo [0..1]	Codelist (Table 3.4.4)	Movement parallel to the strike of the fault or shear zone. The possible values are listed in the table «Tectonic_Boundaries_L_Horiz_Mo».
Lim_Tect_B [1]	Boolean	Boundary of a tectonic unit such as a nappes, slices or zones etc. (yes / no)?
Status [1]	Codelist (Table 3.4.6)	Status of object type. The possible values are listed in the table «Tectonic_Boundaries_L_Status».
Activity [0..1]	Codelist (Table 3.4.7)	Activity of the object type. The possible values are listed in the table «Tectonic_Boundaries_L_Activity».
Meta_Sta [0..1]	Codelist (Table 3.4.8)	Tectonometamorphic chronology of the object types. The possible values are listed in the table «Tectonic_Boundaries_L_Meta_Sta».
Name [0..1]	String (254)	Specific name of the object type.

3.4.1 **Kind:** Attribute Kind; Table Tectonic_Boundaries_L_Kind

Geol-Code Ttec201	Kind (en)	Kind (de)	CODE _SC	3.4.							
				2 Fault _Mo	3 Verti _Mo	4 Horiz _Mo	5 Lim_ Tect_B	6 Status	7 Activ- ity	8 Meta _Sta	9 Name
001	overthrust	Überschiebung	23-27	n/a	n/a	o	m	m	o	o	o
002	normal fault	Abschiebung	21-22	n/a	n/a	o	m	m	o	o	o
003	tectonic boundary with unknown sense of movement	tektonische Grenze mit unbekannter Bewegungsrichtung	28-29	n/a	n/a	n/a	m	m	o	o	o
004	fault	Bruch	11-14	o	o	o	m	m	o	o	o

(m = mandatory; o = optional; n/a = not applicable)

3.4.2 **Fault Movement:** Attribute Fault_Mo; Table Tectonic_Boundaries_L_Fault_Mo

GeolCode Ttec202	Fault_Mo (en)	Fault_Mo (de)	3.4.3	3.4.4
001	oblique	schrägverschiebend	o	o
002	parallel to the strike	parallel zur Streichrichtung	n/a	o
003	parallel to the dip	parallel zur Fallrichtung	o	n/a

3.4.3 **Vertical Sense of Movement:** Attribute Verti_Mo; Table Tectonic_Boundaries_L_Verti_Mo

GeolCode Ttec203	Verti_Mo (en)	Verti_Mo (de)
001	inverted	aufschiebend
002	normal	abschiebend

3.4.4 **Horizontal Sense of Movement:** Attribute Horiz_Mo; Table Tectonic_Boundaries_L_Horiz_Mo

GeolCode Ttec204	Horiz_Mo (en)	Horiz_Mo (de)
001	dextral	dextral
002	sinistral	sinistral

3.4.5 **Limit of Tectonic Body:** Attribute Lim_Tect_B
Boundary of a tectonic unit (yes / no)? (Data type: Boolean)

3.4.6 **Status:** Attribute Status; Table Tectonic_Boundaries_L_Status

GeolCode Ttec206	Status (en)	Status (de)
001	certain, in general	gesichert, im Allgemeinen
002	certain, detected in the sub-surface	gesichert, unter Tage festgestellt
003	probable	vermutet
004	interpreted from seismic data	aus Seismikdaten interpretiert

3.4.7 **Activity:** Attribute Activity; Table Tectonic_Boundaries_L_Activity

GeolCode Ttec207	Activity (en)	Activity (de)
001	active	aktiv
002	inactive	inaktiv

3.4.8 **Metamorphic Status:** Attribute Meta_Sta; Table Tectonic_Boundaries_L_Meta_Sta

GeolCode Ttec208	Meta_Sta (en)	Meta_Sta (de)
001	before the emplacement of the nappe	vor der Platznahme der Decken
002	during the emplacement of the nappe	während der Platznahme der Decken
003	after the emplacement of the nappe	nach der Platznahme der Decken

3.4.9 **Name:** Attribute Name

Specific name of the object type. (Data type: String (254))

4 Theme Measurements Spatial Orientation



Subdivision of classes in the theme Measurements Spatial Orientation

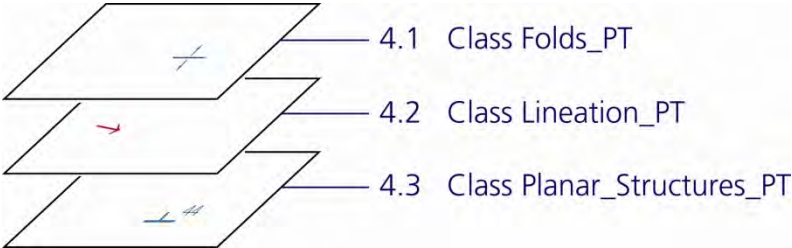
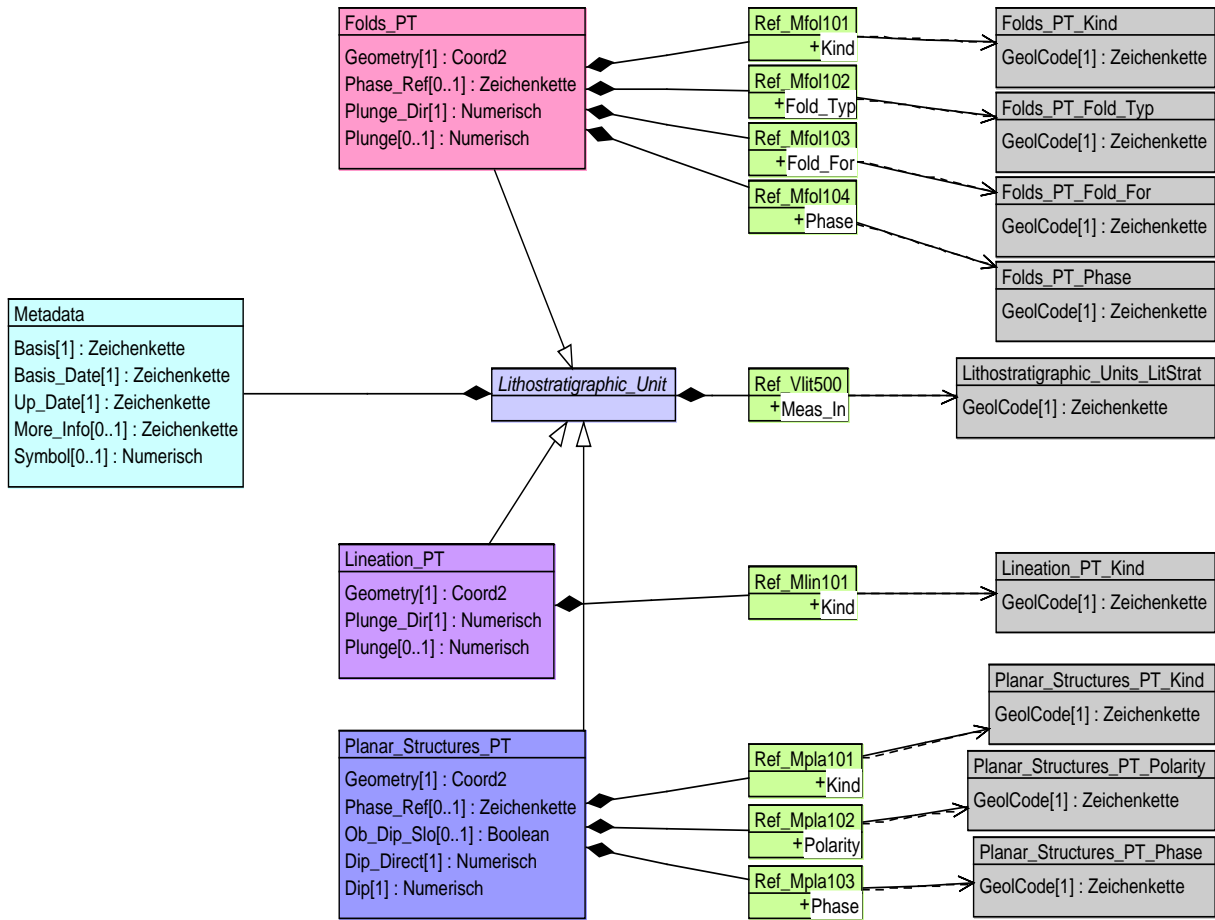


Illustration of the theme Measurements Spatial Orientation in a UML Diagram



4.1 Class Folds_PT

The class Folds_PT contains object types that describe the spatial orientation of folded geological objects (based on direct field measurements). As an example and for the better understanding of these object types the orientations of the fold axis and the crest line are represented in the annex A.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 4.1.1)	Object type. The possible object types are listed in the table «Folds_PT_Kind».
Fold_Typ [0..1]	Codelist (Table 4.1.2)	Fold type. The possible values are listed in the table «Folds_PT_Fold_Typ».
Fold_For [0..1]	Codelist (Table 4.1.3)	Fold form. The possible values are listed in the table «Folds_PT_Fold_For».
Phase [0..1]	Codelist (Table 4.1.4)	Phase of deformation. The possible values are listed in the table «Folds_PT_Phase».
Phase_Ref [0..1]	String (254)	Reference for the indication of the deformation phase.
Plunge_Dir [1]	Short integer	Plunge direction (azimuth) of the respective point object type (e.g. crest line, fold axis). Value measured clockwise in degree (0°-359°).
Plunge [0..1]	Short integer	Inclination of the respective point object type. Value measured in degrees from the horizontal (0°) up to the vertical position (90°).
Meas_In [1]	Codelist (Table C_1, to be defined)	Lithostratigraphical unit in which the object type was measured. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.

4.1.1 Kind: Attribute Kind; Table Folds_PT_Kind

Geol-Code Mfol101	Kind (en)	Kind (de)	CODE _SC	4.1.					
				2 Fold_ Typ	3 Fold_ For	4; 5 Phase; Phase_Ref	6 Plunge_ Dir	7 Plunge	8 Meas_ In
001	orientation of the fold axis	Orientierung der Faltenachse	689–699	o	o	o	m	m	m
002	orientation of the crest line	Orientierung der Scheitellinie	683–684	o	n/a	n/a	m	o	m
003	orientation of trough line	Orientierung der Muldenlinie	686–687	o	n/a	n/a	m	o	m

(m = mandatory; o = optional; n/a = not applicable)

4.1.2 **Fold Type:** Attribute Fold_Typ; Table Folds_PT_Fold_Typ

GeolCode Mfol102	Fold_Typ (en)	Fold_Typ (de)
001	anticline	Antiklinale
002	syncline	Synklinale

4.1.3 **Fold Form:** Attribute Fold_For; Table Folds_PT_Fold_For

GeolCode Mfol103	Fold_For (en)	Fold_For (de)
001	antiform	Antiform
002	synform	Synform

4.1.4 **Phase:** Attribute Phase; Table Folds_PT_Phase

GeolCode Mfol104	Phase (en)	Phase (de)
001	F1 (1 st phase)	F1 (1. Phase)
002	F2 (2 nd phase)	F2 (2. Phase)
003	F3 (3 rd phase)	F3 (3. Phase)

4.1.5 **Phase Reference:** Attribute Phase_Ref

Reference for the indication of the deformation phase.. (Data type: String (254))

4.1.6 **Plunge Direction:** Attribute Plunge_Dir

Plunge direction (azimuth) of the respective point object type. (Data type: Short integer)

4.1.7 **Plunge:** Attribute Plunge

Inclination of the respective point object type. (Data type: Short integer)

4.1.8 **Measured In:** Attribute Meas_In; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphical unit in which the object type was measured. The lithostratigraphic table does not exist for the moment.

4.2 Class Lineation_PT

The class Lineation_PT contains object types, which describe the spatial position of different linear elements (based on direct field measurements). The spatial orientations of a glacial stria or a slickenside stria are examples for this class as well as the orientation of stretching or intersection lineation.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 4.2.1)	Object type. The possible object types are listed in the table «Lineation_PT_Kind».
Plunge_Dir [1]	Short integer	Plunge direction (azimuth) of the respective point object type. Value measured clockwise in degree (0°-359°).
Plunge [0..1]	Short integer	Inclination of the respective point object type. Value measured in degrees from the horizontal (0°) up to the vertical position (90°).
Meas_In [1]	Codelist (Table C_1, to be defined)	Lithostratigraphical unit in which the object type was measured. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.

4.2.1 Kind: Attribute Kind; Table Lineation_PT_Kind

GeolCode Mlin101	Kind (en)	Kind (de)	CODE_ SC	4.2.2 Plunge_Dir	4.2.3 Plunge	4.2.4 Meas_In
001	orientation of the intersection lineation	Orientierung der Intersektionslineation	720–722	m	m	m
002	orientation of the stretching lineation	Orientierung der Streckungslineation	711–719	m	m	m
003	orientation of the slickenside striae	Orientierung von Rutschharnischen	726	m	m	m
004	orientation of the glacial striae	Orientierung von Gletscherschliffen	592	m	o	m

(m = mandatory; o = optional; n/a = not applicable)

4.2.2 Plunge Direction: Attribute Plunge_Dir

Plunge direction (azimuth) of the respective point object type. (Data type: Short integer)

4.2.3 Plunge: Attribute Plunge

Inclination of the respective point object type. (Data type: Short integer)

4.2.4 Measured In: Attribute Meas_In; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphical unit in which the object type was measured. The lithostratigraphic table does not exist for the moment.

4.3 Class Planar_Structures_PT

The class Planar_Structures_PT contains object types that describe the spatial orientation of planar elements (based on direct field measurements). As an example and for the better understanding of these object types the orientation of the cleavage or schistosity represented in the annex A.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 4.3.1)	Object type. The possible object types are listed in the table «Planar_Structures_PT_Kind».
Polarity [0..1]	Codelist (Table 4.3.2)	Spatial position of the object type. The possible values are listed in the table «Planar_Structures_PT_Polarity».
Phase [0..1]	Codelist (Table 4.3.3)	Deformation phase. The possible values are listed in the table «Planar_Structures_PT_Phase».
Phase_Ref [0..1]	String (254)	Reference for the indication of the deformation phase.
Ob_Dip_Slo [0..1]	Boolean	Dip slope observed (yes / no)?
Dip_Direct [1]	Short integer	Dip direction (azimuth) of the respective point object type (e.g. orientation of the bedding or fracture). Value measured clockwise in degree (0°-359°).
Dip [1]	Short integer	Inclination of the respective point object type. Value measured in degrees from the horizontal (0°) up to the vertical position (90°).
Meas_In [1]	Codelist (Table C_1, to be defined)	Lithostratigraphical unit in which the object type was measured. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.

4.3.1 **Kind:** Attribute Kind; Table Planar_Structures_PT_Kind

Geol-Code	Kind (en)	Kind (de)	CODE_SC	4.3.					
				2	3; 4	5	6	7	8
Mpla101				Polarity	Phase; Phase_Ref	Ob_Dip _Slo	Dip_ Direct	Dip	Meas _In
001	orientation of the bedding	Orientierung der Schichtung	671–675	o	n/a	o	m	m	m
002	orientation of the dyke	Orientierung eines Ganges	680–682	o	n/a	o	m	m	m
003	orientation of the fracture	Orientierung einer Bruchfläche	677–679	n/a	n/a	n/a	m	m	m
004	orientation of the cleavage or schistosity	Orientierung der Schieferung	700–710	n/a	o	o	m	m	m
005	orientation of a bedding or a cleavage or schistosity	Orientierung einer Schichtung oder Schieferung	-	n/a	n/a	o	m	m	m

(m = mandatory; o = optional; n/a = not applicable)

4.3.2 **Polarity:** Attribute Polarity; Table Planar_Structures_PT_Polarity

GeolCode	Polarity (en)	Polarity (de)
Mpla102		
001	normal	normal
002	reversed	überkippt

4.3.3 **Phase:** Attribute Phase; Table Planar_Structures_PT_Phase

GeolCode	Phase (en)	Phase (de)
Mpla103		
001	S1 (1 st phase)	S1 (1. Phase)
002	S2 (2 nd phase)	S2 (2. Phase)
003	S3 (3 rd phase)	S3 (3. Phase)

(for data collation: «main schistosity» = «undetermined»)

4.3.4 **Phase Reference:** Attribute Phase_Ref*Reference for the indication of the deformation phase. (Data type: String (254))*4.3.5 **Observed Dip Slope:** Attribute Ob_Dip_Slo*Dip slope observed (yes / no)? (Data type: Boolean)*4.3.6 **Dip Direction:** Attribute Dip_Direct*Dip direction (azimuth) of the respective point object type. (Data type: Short integer)*4.3.7 **Dip:** Attribute Dip*Inclination of the respective point object type. (Data type: Short integer)*

4.3.8 **Measured In:** Attribute Meas_In; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphical unit in which the object type was measured. The lithostratigraphic table does not exist for the moment.

5 Theme Local Additional Information



Subdivision of classes in the theme Local Additional Information

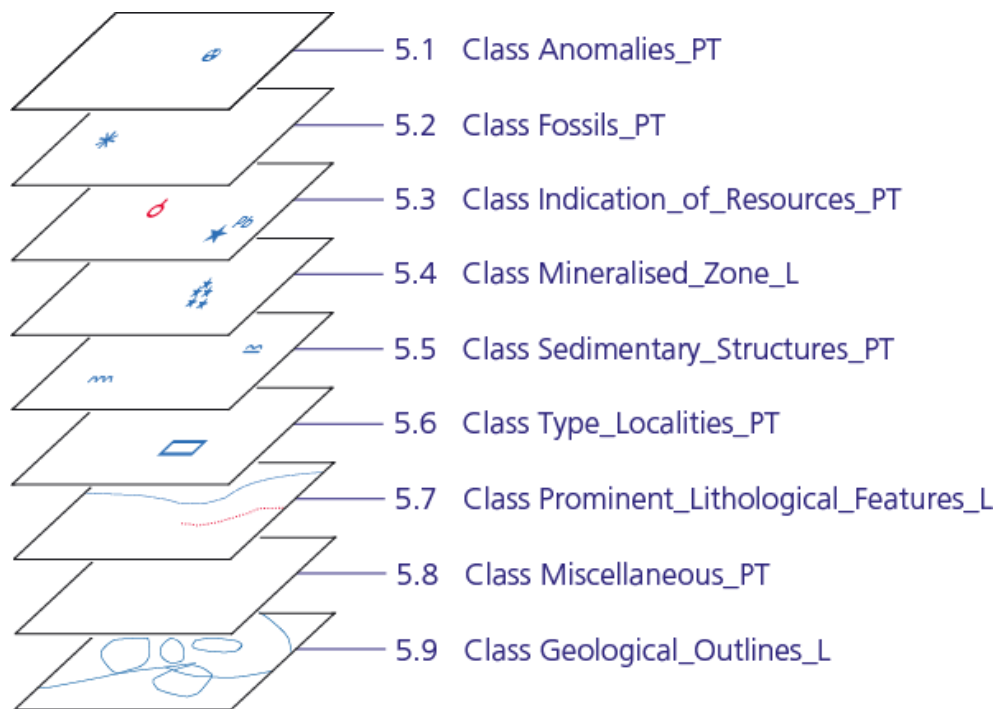
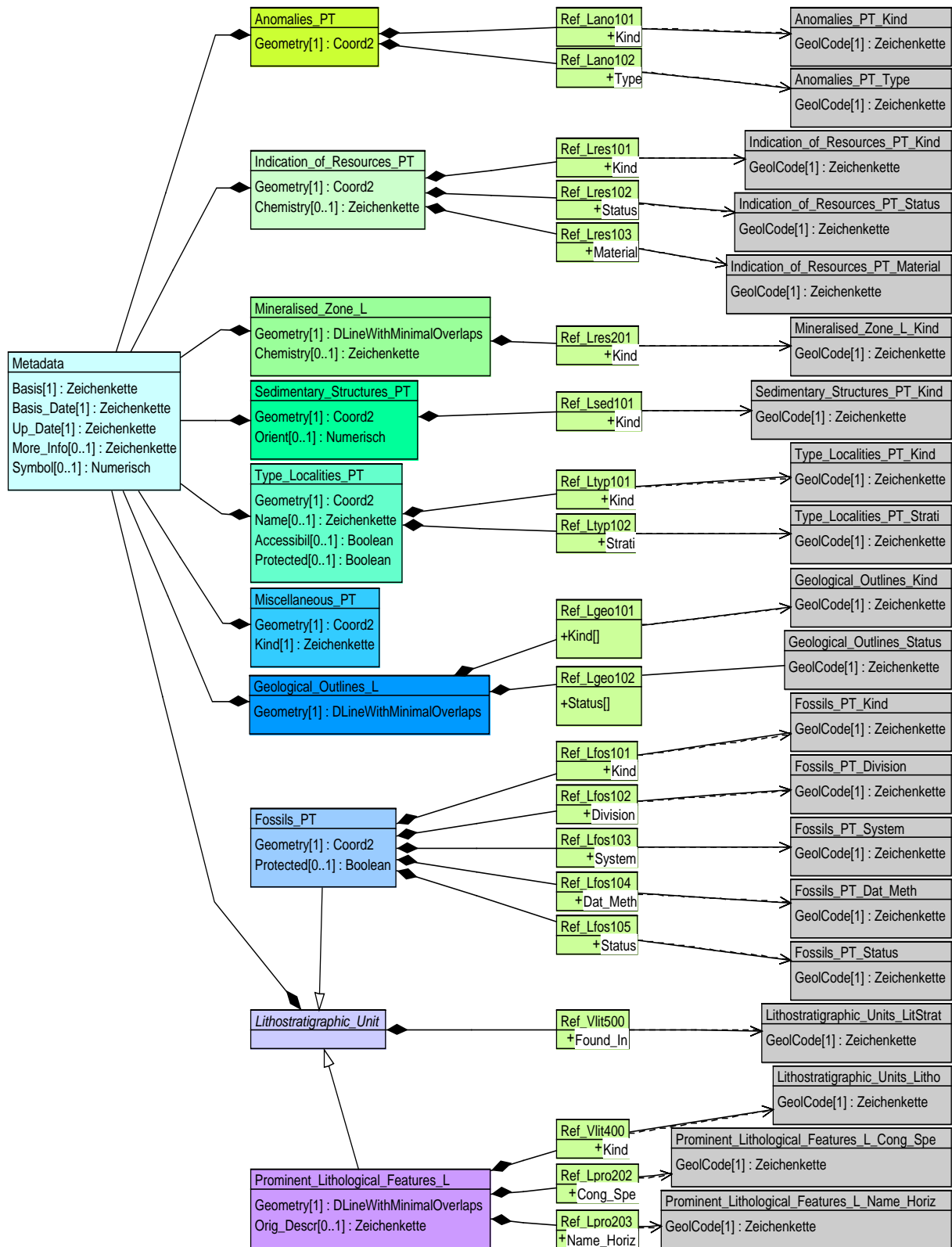


Illustration of the theme Local Additional Information in a UML Diagram



5.1 Class Anomalies_PT

The class Anomalies_PT contains observed and / or measured anomalies.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 5.1.1)	Object type. The possible object types are listed in the table «Anomalies_PT_Kind».
Type [0..1]	Codelist (Table 5.1.2)	Characteristic of the object type. The possible values are listed in the table «Anomalies_PT_Type».

5.1.1 **Kind:** Attribute Kind; Table Anomalies_PT_Kind

GeolCode Lano101	Kind (en)	Kind (de)	CODE_ SC	5.1.2 Type
001	measured anomaly	gemessene Anomalie	757–758	m
002	fulgurite	Fulgurit	756	n/a

(m = mandatory; o = optional; n/a = not applicable)

5.1.2 **Type:** Attribute Type; Table Anomalies_PT_Type

GeolCode Lano102	Type (en)	Type (de)
001	gravimetric	gravimetrisch
002	radiometric	radiometrisch

5.2 Class Fossils_PT

The class Fossils_PT contains all fossil sites.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 5.2.1)	Object type. The possible object types are listed in the table «Fossils_PT_Kind».
Division [0..1]	Codelist (Table 5.2.2)	Category of fossils to which an object instance can be attributed. The possible values are listed in the table «Fossils_PT_Division».
System [0..5]	Codelist (Table 5.2.3)	Fossil group. The possible values are listed in the table «Fossils_PT_System».
Dat_Meth [0..1]	Codelist (Table 5.2.4)	Dating method. The possible values are listed in the table «Fossils_PT_Dat_Meth».
Status [0..1]	Codelist (Table 5.2.5)	Status of object type. The possible values are listed in the table «Fossils_PT_Status».
Found_In [1]	Codelist (Table C_1, to be defined)	Lithostratigraphic unit in which the fossil was found. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.
Protected [0..1]	Boolean	Protected fossil site (yes / no)?

5.2.1 Kind: Attribute Kind; Table Fossils_PT_Kind

GeolCode Lfos101	Kind (en)	Kind (de)	CODE_ SC	5.2.2 Division	5.2.3 System	5.2.4 Dat_Meth	5.2.5 Status	5.2.6 Found_In	5.2.7 Protected
001	fossil site	Fossilfund- stelle	619– 627	o	o	o	o	m	o

(m = mandatory; o = optional; n/a = not applicable)

5.2.2 Division: Attribute Division; Table Fossils_PT_Division

GeolCode Lfos102	Division (en)	Division (de)
001	fauna	Tierreste
002	fauna and flora	Pflanzen- und Tierreste
003	flora	Pflanzenreste
004	tracks	Spuren

5.2.3 **System:** Attribute System; Table Fossils_PT_System

GeolCode Lfos103	System (en)	System (de)
001	vertebrates	Vertebraten
002	ostracods	Ostrakoden
003	gastropods	Gastropoden
004	foraminifera	Foraminiferen
005	algae	Algen
006	leafs	Blätter
007	gramineae	Gräser
008	wood	Holz

5.2.4 **Dating Method:** Attribute Dat_Meth; Table Fossils_PT_Dat_Meth

GeolCode Lfos104	Dat_Meth (en)	Dat_Meth (de)
001	radiometrically dated	radiometrisch datiert

5.2.5 **Status:** Attribute Status; Table Fossils_PT_Status

GeolCode Lfos105	Status (en)	Status (de)
001	outcropping	aufgeschlossen
002	re-buried	wieder verdeckt

5.2.6 **Found In:** Attribute Found_In; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphic unit in which the fossil was found. The lithostratigraphic table does not exist for the moment.

5.2.7 **Protected:** Attribute Protected

Protected fossil site (yes / no)? (Data type: Boolean)

5.3 Class Indication_of_Resources_PT

The class Indication_of_Resources_PT contains volcanic, mineral and non-mineral resources.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 5.3.1)	Object type. The possible object types are listed in the table «Indication_of_Resources_PT_Kind».
Status [0..1]	Codelist (Table 5.3.2)	Status of object type. The possible values are listed in the table «Indication_of_Resources_PT_Status».
Material [0..1]	Codelist (Table 5.3.3)	Material that is in relationship with the object type. The possible values are listed in the table «Indication_of_Resources_PT_Material».
Chemistry [0..1]	String (254)	Chemical component(s) that characterise the nature of the object type.

5.3.1 Kind: Attribute Kind; Table Indication_of_Resources_PT_Kind

GeolCode Lres101	Kind (en)	Kind (de)	CODE_ SC	5.3.2 Status	5.3.3 Material	5.3.4 Chemistry
001	mineral deposit	Mineralfundstelle	741	o	n/a	o
002	natural gas reserve	Gasquelle	750-751	o	n/a	n/a
003	indications of oil	Anzeichen auf Öl	748, 749	o	n/a	n/a
004	pocket, carst pocket, fissure with siderolitic filling	Tasche, Karsttasche, Kluft, mit Füllung von Siderolithikum	742	n/a	o	n/a
005	site with volcanic tuffite	Fundstelle von vulkanischem Tuffit	755	o	n/a	n/a
006	site with ejected volcanic rocks (tephra)	Fundstelle vulkanischer Auswürflinge (Tephra)	754	o	n/a	n/a
007	site of Ries ejecta	Fundstelle von Ries- Auswürflingen	-	o	n/a	n/a

(m = mandatory; o = optional; n/a = not applicable)

5.3.2 Status: Attribute Status; Table Indication_of_Resources_PT_Status

GeolCode Lres102	Status (en)	Status (de)
001	outcropping	aufgeschlossen
002	re-buried	wieder verdeckt

5.3.3 **Material:** Attribute Material; Table Indication_of_Resources_PT_Material

GeolCode Lres103	Material (en)	Material (de)
001	bolus clay	Boluston
002	hupper	Huppererde
003	pisolitic ironstone deposits	Bohnerzbildungen
004	glass sand	Glassand
005	fuller's earth	Walkerde

5.3.4 **Chemistry:** Attribute Chemistry

Chemical component(s) that characterise the nature of the object type. (Data type: String (254))

5.4 Class Mineralised_Zone_L

The class Mineralised_Zone_L contains mineralised zones.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 5.4.1)	Object type. The possible object types are listed in the table «Mineralised_Zone_L_Kind».
Chemistry [0..1]	String (254)	Chemical component(s) that characterise the nature of the object type.

5.4.1 **Kind:** Attribute Kind; Table Mineralised_Zone_L_Kind

GeolCode Lres201	Kind (en)	Kind (de)	CODE_ SC	5.4.2 Chemistry
001	mineralised zone	Vererzungszone	219	o

(m = mandatory; o = optional; n/a = not applicable)

5.4.2 **Chemistry:** Attribute Chemistry

Chemical component(s) that characterise the nature of the object type. (Data type: String (254))

5.5 Class Sedimentary_Structures_PT

The class Sedimentary_Structures_PT contains sedimentary structures.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 5.5.1)	Object type. The possible object types are listed in the table «Sedimentary_Structures_PT_Kind».
Orient [0..1]	Short integer	Orientation of the symbol. Measured value clockwise (0°-359°).

5.5.1 **Kind:** Attribute Kind; Table Sedimentary_Structures_PT_Kind

GeolCode Lsed101	Kind (en)	Kind (de)	CODE_ SC	5.5.2 Orient
001	sedimentary structures	Sedimentstrukturen	631	n/a
002	reef structures	Riffstrukturen	632	n/a
003	surface of erosion or omission, hardground, condensation zone	Erosions- oder Omissionsfläche, Hartgrund, Kondensations- horizont	635	n/a
004	stratigraphic position (polarity) of a series of strata	stratigraphische Lage (Polarität) einer Schichtserie	633	o
005	angular unconformity	Winkeldiskordanz	634	n/a

(m = mandatory; o = optional; n/a = not applicable)

5.5.2 **Orientation:** Attribute Orient

Orientation of the symbol. (Data type: Short integer)

5.6 Class Type_Localities_PT

The class Type_Localities_PT contains all object types that describe type localities or important geological outcrops.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 5.6.1)	Object type. The possible object types are listed in the table «Type_Localities_PT_Kind».
Strati [0..1]	Codelist (Table 5.6.2)	Lithostratigraphic add-on to the object type. The possible values are listed in the table «Type_Localities_PT_Strati».
Name [0..1]	String (254)	Name of the type locality. / Description of the geologically important outcrop.
Accessibil [0..1]	Boolean	Is the object type accessible at the moment of the mapping (yes / no)?
Protected [0..1]	Boolean	Protected geological object instance (yes / no)?

5.6.1 Kind: Attribute Kind; Table Type_Localities_PT_Kind

GeolCode Ltyp101	Kind (en)	Kind (de)	CODE_ SC	5.6.2 Strati	5.6.3 Name	5.6.4 Accessibil	5.6.5 Protected
001	important geological outcrop	geologisch relevanter Aufschluss	666–667	o	o	o	o
002	type locality	Typlokalität	661–664	m	m	o	o
003	type section	Typusprofil	661–664	m	m	o	o

(m = mandatory; o = optional; n/a = not applicable)

5.6.2 Stratigraphic Classification: Attribute Strati; Table Type_Localities_PT_Strati

GeolCode Ltyp102	Strati (en)	Strati (de)
001	group	Gruppe
002	sub-group	Subgruppe
003	formation	Formation
004	member	Member
005	bed	Bank
006	stage	Stufe

5.6.3 Name: Attribute Name

Name of the type locality. / Description of the geologically important outcrop.
(Data type: String (254))

5.6.4 **Accessibility:** Attribute Accessibil

Is the object type accessible at the moment of the mapping (yes / no)?

(Data type: Boolean)

5.6.5 **Protected:** Attribute Protected

Protected geological object instance (yes / no)? (Data type: Boolean)

5.7 Class Prominent_Lithological_Features_L

The class Prominent_Lithological_Features_L contains lenticular rock horizons. These geological bodies are only of descriptive use (e.g. «significant sandstone bed» within alternating sandstones and marls. They must be distinguished from geological markers (e.g. «Spatkalk Member» within the Hauptrogenstein). Geological markers are listed at any case as polygons in the class Bedrock_PLG.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table C_2)	Lithologic description. The possible values are listed in the table «Lithostratigraphic_Units_Litho» which is available in the annex of this document.
Cong_Spe [0..1]	Codelist (Table 5.7.2)	Description of the conglomerates according to their clast spectrum. The possible values are listed in the table «Prominent_Lithological_Features_L_Cong_Spe».
Name_Horiz [0..1]	Codelist (Table 5.7.3)	Name of the bentonite marker horizon. The possible values are listed in the table «Prominent_Lithological_Features_L_Name_Horiz».
Orig_Descr [0..1]	String (254)	Original description according to the legend of the corresponding geological map.
Found_In [1]	Codelist (Table C_1, to be defined)	Lithostratigraphic unit to which belongs the object type listed in Kind. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.

5.7.1 **Kind:** Attribute Kind; Annex Table C_2 Lithostratigraphic_Units_Litho
Lithologic description. The lookup table is available in the annex of this document.

5.7.2 **Conglomerate Specification:** Attribute Cong_Spe; Table Prominent_Lithological_Features_L_Cong_Spe

GeolCode Lpro202	Cong_Spe (en)	Cong_Spe (de)
001	puddingstone without or little crystalline elements	kristallinfreie bis -arme (Kalk-)Nagelfluh
002	puddingstone with crystalline elements	kristallinführende (Kalk-) Nagelfluh
003	multi-coloured to polygenic puddingstone	bunte bis polygene Nagelfluh
004	flyschsandstone-puddingstone, «Riesenkonglomerat»	Flyschsandstein-Nagelfluh, «Riesenkonglomerat»

5.7.3 **Name of the Geological Marker Horizon:** Attribute Name_Horiz; Table Prominent_Lithological_Features_L_Name_Horiz

GeolCode Lpro203	Name_Horiz (en)	Name_Horiz (de)
001	Combe Girard	Combe Girard
002	Leimbach	Leimbach
003	Winterthur	Winterthur
004	Aeugstertal	Aeugstertal
005	Küsnacht	Küsnacht
006	Urdorf-Uetikon	Urdorf-Uetikon
007	Wolhusen	Wolhusen
008	La Chaux	La Chaux
009	Bois-Genoud	Bois-Genoud

5.7.4 **Original Description:** Attribute Orig_Descr

Original description according to the legend of the corresponding geological map. (Data type: String (254))

5.7.5 **Found In:** Attribute Found_In; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphic unit to which belongs the object instance listed in Kind. The lithostratigraphic table does not exist for the moment.

5.8 Class Miscellaneous_PT

The class Miscellaneous_PT is reserved for very particular and specific geological object instances. They are without importance for the geological data setting. Therefore they had not been standardised for the Data Model Geology.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	String (254)	Object type and description of it.

5.8.1 **Kind:** Attribute Kind

Object type and description of it. (Data type: String (254))

5.9 Class Geological_Outlines_L

The class Geological_Outlines_L contains geological outlines. It includes the outlines of bedrock and unconsolidated deposits, tectonised zones but also the outlines of slide deposits and sagging masses as far as these are not limited by other outlines (e.g. tectonic boundaries).

A geological outline with the status «in general» includes stratigraphic and petrographic limits. Geological outlines that are covered by Quaternary deposits, waters or glaciers are considered as outlines with the status «probable»; this also applies for graduate transitions in bedrock or unconsolidated deposits (without distinct lithological boundaries in the meaning of «Signaturgrenze» in SC). Artificial geological outlines separate areas with good or poor information. This can be due to a lack of information but also be necessary because of representational reasons (digitizing scale). An artificial geological outline is considered as boundary outline («Abgrenzungskontur») according to SC.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 5.9.1)	Object type. The possible object types are listed in the table «Geological_Outlines_L_Kind».
Status [0..1]	Codelist (Table 5.9.2)	Status of object type. The possible values are listed in the table «Geological_Outlines_L_Status».

5.9.1 Kind: Attribute Kind; Table Geological_Outlines_L_Kind

GeolCode Lgeo201	Kind (en)	Kind (de)	CODE_SC	5.9.2 Status
001	geological outline	geologische Kontur	1, 2, 4, 6, 7, 74	m

(m = mandatory; o = optional; n/a = not applicable)

5.9.2 Status: Attribute Status; Table Geological_Outlines_L_Status

GeolCode Lgeo202	Status (en)	Status (de)
001	in general	im Allgemeinen
002	probable	vermutet
003	artificial	künstlich

6 Theme Parameter and Modelling



Subdivision of classes in the theme Parameter and Modelling

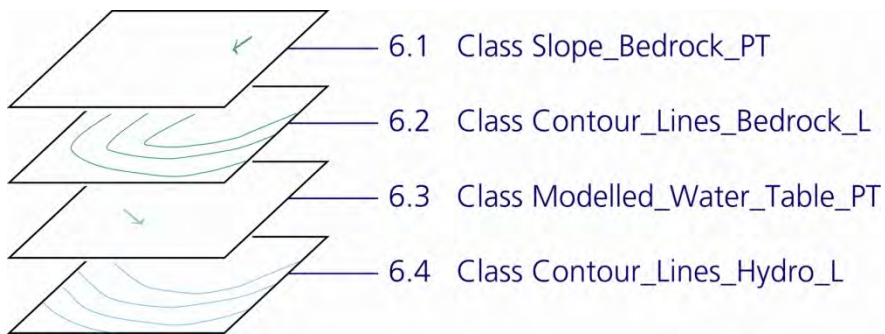
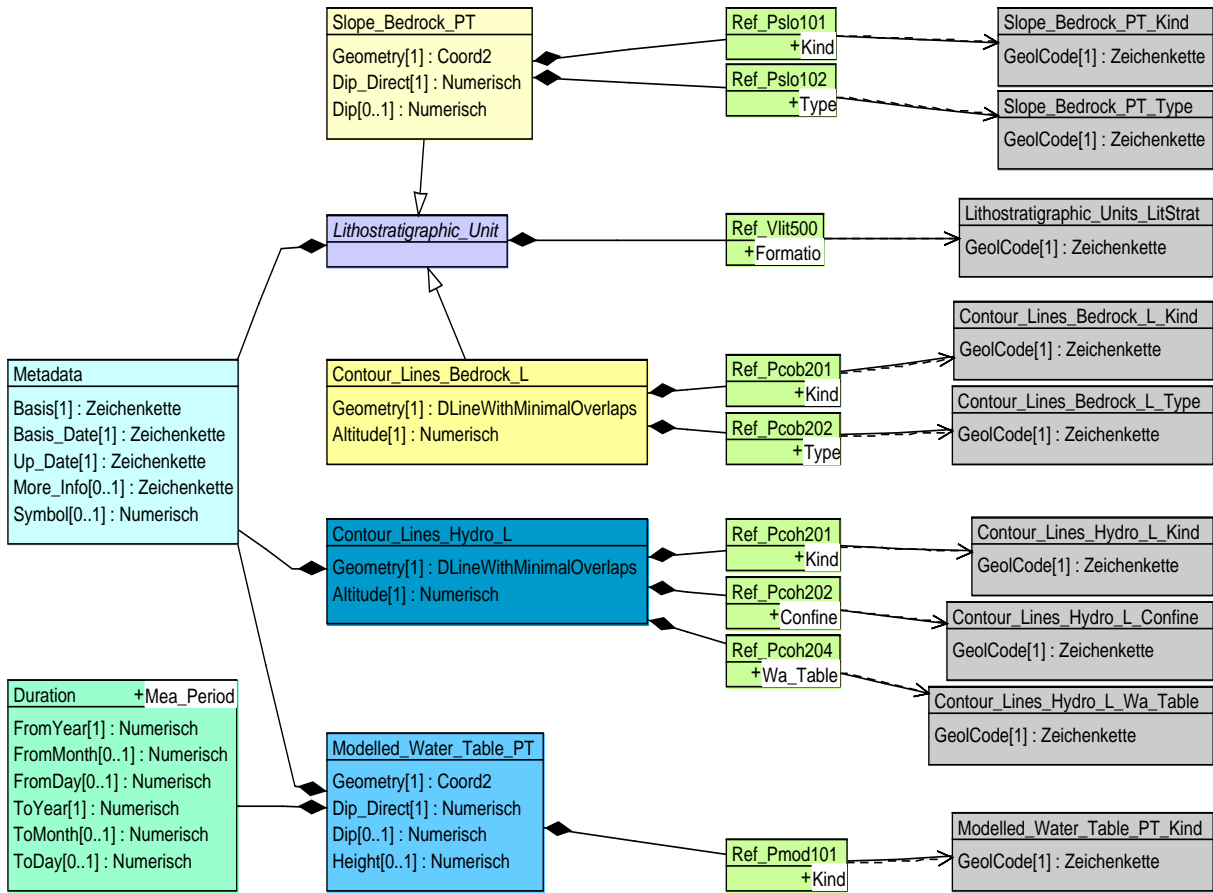


Illustration of the theme Parameter and Modelling in a UML Diagram



6.1 Class Slope_Bedrock_PT

The class Slope_Bedrock_PT contains precise information from modelling of bedrock in the geological set-up.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 6.1.1)	Object type. The possible object types are listed in the table «Slope_Bedrock_PT_Kind».
Type [1]	Codelist (Table 6.1.2)	Reference surface. The possible values are listed in the table «Slope_Bedrock_PT_Type».
Dip_Direct [1]	Short integer	Dip direction (azimuth) of the respective point object type. Value measured clockwise in degree (0°-359°).
Dip [0..1]	Short integer	Inclination of the respective point object type. Value measured in degrees from the horizontal (0°) up to the vertical position (90°).
Formatio [1]	Codelist (Table C_1, to be defined)	Lithostratigraphic unit of the modelled formation. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.

6.1.1 Kind: Attribute Kind; Table Slope_Bedrock_PT_Kind

GeolCode Pslo101	Kind (en)	Kind (de)	CODE_ SC	6.1.2 Type	6.1.3 Dip_Direct	6.1.4 Dip	6.1.5 Formatio
001	dip	Neigungsrichtung	862	m	m	o	o

(m = mandatory; o = optional; n/a = not applicable)

6.1.2 Type: Attribute Type; Table Slope_Bedrock_PT_Type

GeolCode Pslo102	Type (en)	Type (de)
001	bedrock surface	Felsoberfläche
002	upper surface of a given formation	Obergrenze einer gegebenen Formation

6.1.3 Dip Direction: Attribute Dip_Direct

Dip direction (azimuth) of the respective point object type. (Data type: Short integer)

6.1.4 Dip: Attribute Dip

Inclination of the respective point object type. (Data type: Short integer)

6.1.5 Formation: Attribute Formatio; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphic unit of the modelled formation. The lithostratigraphic table does not exist for the moment.

6.2 Class Contour_Lines_Bedrock_L

The class Contour_Lines_Bedrock_L contains contour lines referring to the position of the bedrock that result of geological modelling. Among others, contour lines of the bedrock surface are listed in this class.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 6.2.1)	Object type. The possible object types are listed in the table «Contour_Lines_Bedrock_L_Kind».
Type [1]	Codelist (Table 6.2.2)	Reference surface. The possible values are listed in the table «Contour_Lines_Bedrock_L_Type».
Altitude [1]	Float	Elevation of contour lines (altitude in m a.s.l.).
Formatio [1]	Codelist (Table C_1, to be defined)	Lithostratigraphic unit of the modelled formation. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.

6.2.1 **Kind:** Attribute Kind; Table Contour_Lines_Bedrock_L_Kind

GeolCode Pcob201	Kind (en)	Kind (de)	CODE_ SC	6.2.2 Type	6.2.3 Altitude	6.2.4 Formatio
001	contour line	Isohypse	111, 113	m	m	o

(m = mandatory; o = optional; n/a = not applicable)

6.2.2 **Type:** Attribute Type; Table Contour_Lines_Bedrock_L_Type

GeolCode Pcob202	Type (en)	Type (de)
001	bedrock surface	Felsoberfläche
002	upper surface of a given formation	Obergrenze einer gegebenen Formation
003	lower surface of a given formation	Untergrenze einer gegebenen Formation

6.2.3 **Altitude:** Attribute Altitude

Elevation of contour lines. (Data type: Float)

6.2.4 **Formation:** Attribute Formatio; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphic unit of the modelled formation. The lithostratigraphic table does not exist for the moment.

6.3 Class Modelled_Water_Table_PT

The class Contour_Lines_Bedrock_L contains precise information from modelling of the groundwater table.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 6.3.1)	Object type. The possible object types are listed in the table «Modelled_Water_Table_PT_Kind».
Dip_Direct [1]	Short integer	Dip direction (azimuth) of the respective point object type. Value measured clockwise in degree (0°-359°).
Dip [0..1]	Short integer	Inclination of the respective point object type. Value measured in degrees from the horizontal (0°) up to the vertical position (90°).
Height [0..1]	Float	Elevation of the groundwater table (altitude in m a.s.l.).
Mea_Period [0..1]	Duration	Measurement period.

6.3.1 Kind: Attribute Kind; Table Modelled_Water_Table_PT_Kind

GeolCode Pmod101	Kind (en)	Kind (de)	CODE_ SC	6.3.2 Dip_Direct	6.3.3 Dip	6.3.4 Height	6.3.5 Mea_Period
001	groundwater flow direction	Grundwasserfließrichtung	863	m	o	n/a	n/a
002	average height of the groundwater table	mittlere Höhe des Grundwasserspiegels	520	n/a	n/a	o	o

(m = mandatory; o = optional; n/a = not applicable)

6.3.2 Dip Direction: Attribute Dip_Direct

Dip direction (azimuth) of the respective point object type. (Data type: Short integer)

6.3.3 Dip: Attribute Dip

Inclination of the respective point object type. (Data type: Short integer)

6.3.4 Height: Attribute Height

Elevation of the groundwater table. (Data type: Float)

6.3.5 Measurement Period: Attribute Mea_Period

Measurement period. (Data type: Duration)

6.4 Class Contour_Lines_Hydro_L

The class Contour_Lines_Hydro_L contains contour lines referring to the groundwater.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 6.4.1)	Object type. The possible object types are listed in the table «Contour_Lines_Hydro_L_Kind».
Confine [0..1]	Codelist (Table 6.4.2)	Pressure conditions in the aquifer. The possible values are listed in the table «Contour_Lines_Hydro_L_Confine».
Altitude [1]	Float	Elevation of contour lines (altitude in m a.s.l.).
Wa_Table [0..1]	Codelist (Table 6.4.4)	Groundwater table. The possible values are listed in the table «Contour_Lines_Hydro_L_Wa_Table».

6.4.1 Kind: Attribute Kind; Table Contour_Lines_Hydro_L_Kind

GeolCode Pcoh201	Kind (en)	Kind (de)	CODE_ SC	6.4.2 Confine	6.4.3 Altitude	6.4.4 Wa_Table
001	contour lines of the water table	Isohypse des Grundwasserspiegels	112	o	m	o

(m = mandatory; o = optional; n/a = not applicable)

6.4.2 Confinement: Attribute Confine; Table Contour_Lines_Hydro_L_Confine

GeolCode Pcoh202	Confine (en)	Confine (de)
001	free	frei
002	confined	gespannt
003	confined artesian	gespannt artesisch

6.4.3 Altitude: Attribute Altitude

Elevation of contour lines. (Data type: Float)

6.4.4 Water Table: Attribute Wa_Table; Table Contour_Lines_Hydro_L_Wa_Table

GeolCode Pcoh204	Wa_Table (en)	Wa_Table (de)
001	mean elevation of the low water table	mittlere Höhe des Niedrigwasserstands
002	mean elevation of the high water table	mittlere Höhe des Hochwasserstands

7 Theme Anthropogenic Features



Subdivision of classes in the theme Anthropogenic Features

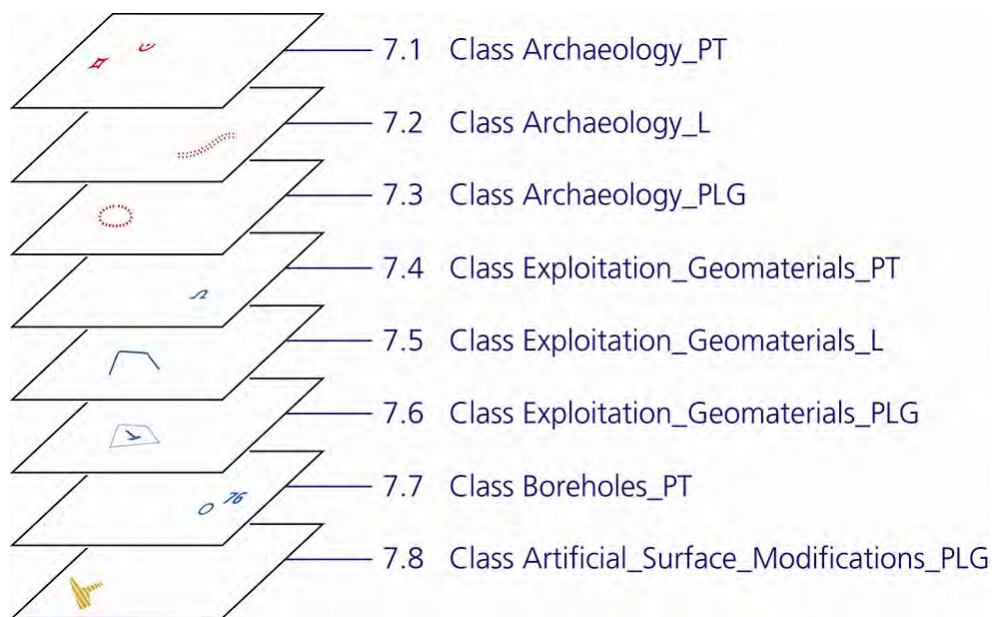
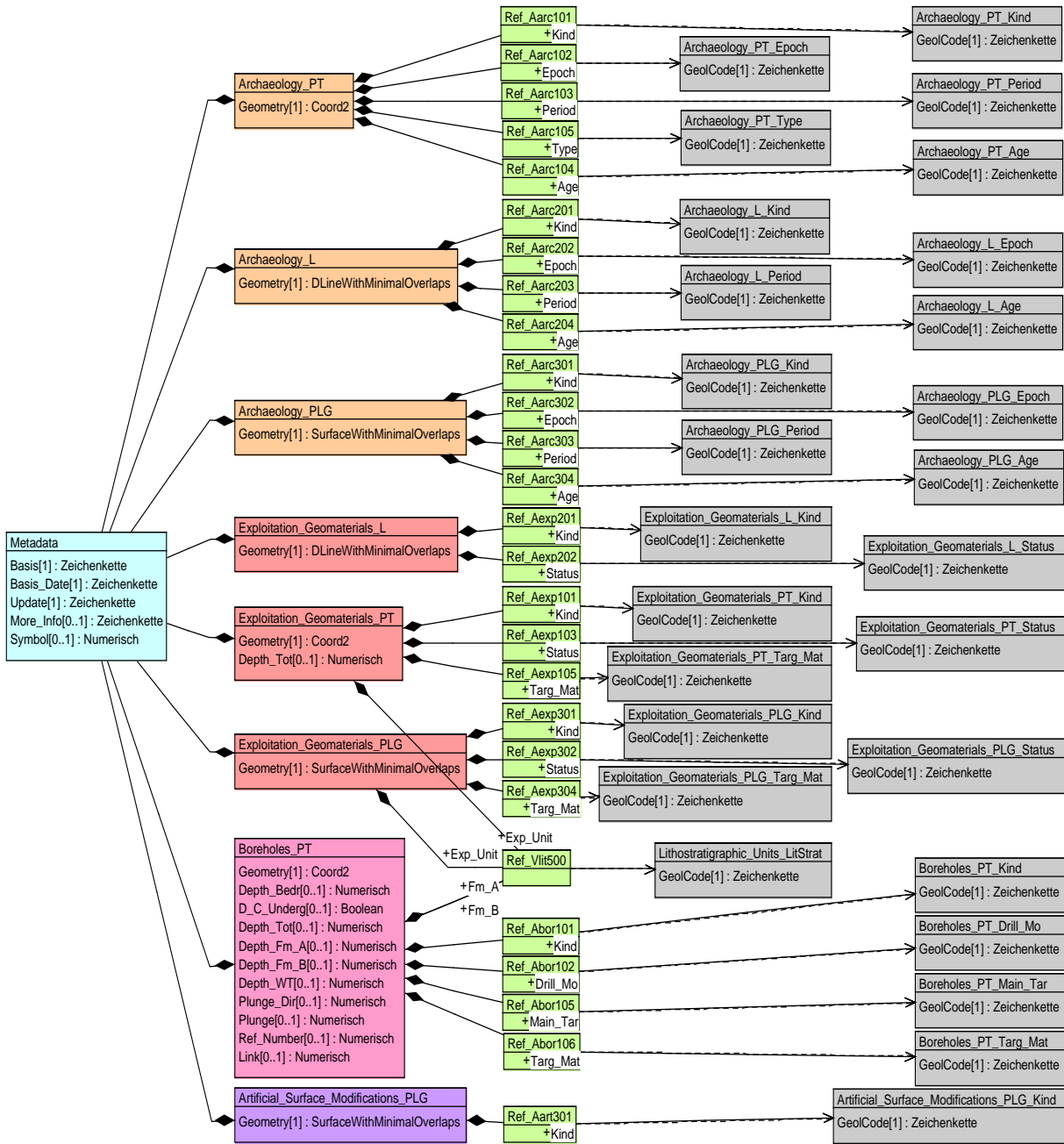


Illustration of the theme Anthropogenic Features in a UML Diagram



7.1 Class Archaeology_PT

The class Archaeology_PT contains object types concerning the different archaeological relics.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 7.1.1)	Object type. The possible object types are listed in the table «Archaeology_PT_Kind».
Epoch [0..1]	Codelist (Table 7.1.2)	Archaeological epoch of the object type. The possible values are listed in the table «Archaeology_PT_Epoch».
Period [0..1]	Codelist (Table 7.1.3)	Archaeological period of the object type. The possible values are listed in the table «Archaeology_PT_Period».
Age [0..1]	Codelist (Table 7.1.4)	Archaeological age of the object type. The possible values are listed in the table «Archaeology_PT_Age».
Type [0..1]	Codelist (Table 7.1.5)	Type of Megalith. The possible values are listed in the table «Archaeology_PT_Type».

7.1.1 Kind: Attribute Kind; Table Archaeology_PT_Kind

GeolCode Aarc101	Kind (en)	Kind (de)	CODE_ SC	7.1.2 Epoch	7.1.3 Period	7.1.4 Age	7.1.5 Type
001	archaeological site, rests of settlement	archäologische Fundstelle, Anlage, Siedlungsreste	841; 848	o	o	o	n/a
002	cave settlement	Höhlensiedlung	843	o	o	o	n/a
003	lake and pile dwellings	Pfahlbauten, Seerandsiedlung	842	o	o	o	n/a
004	motte, site of former castle or fortification	Burgstelle, Burghügel	851	o	o	o	n/a
005	tomb, grave field	Gräber, Gräberfeld	846	o	o	o	n/a
006	shallow grave, necropolis	Flachgrab, Nekropole	845	o	o	o	n/a
007	tumulus, dolmen	Grabhügel, Dolmengrab	844	o	o	o	n/a
008	Megalith	Kultstein	847	o	o	o	o
009	lime kiln	Kalkofen	820	o	o	o	n/a
010	rock cellar	Felsenkeller	823	o	o	o	n/a

(m = mandatory; o = optional; n/a = not applicable)

7.1.2 **Epoch:** Attribute Epoch; Table Archaeology_PT_Epoch

GeolCode Aarc102	Epoch (en)	Epoch (de)
001	historic	historisch
002	prehistoric	prähistorisch

7.1.3 **Period:** Attribute Period; Table Archaeology_PT_Period

GeolCode Aarc103	Period (en)	Period (de)
001	Modern Age	Neuzeit
002	Middle Age	Mittelalter
003	Roman Age	römische Epoche
004	Iron Age	Eisenzeit
005	Bronze Age	Bronzezeit
006	Stone Age	Steinzeit

7.1.4 **Age:** Attribute Age; Table Archaeology_PT_Age

GeolCode Aarc104	Age (en)	Age (de)
001	La Tène Period	La-Tène-Zeit
002	Hallstatt Period	Hallstatt-Zeit
003	Late Bronze Age	späte Bronzezeit
004	Middle Bronze Age	mittlere Bronzezeit
005	Early Bronze Age	frühe Bronzezeit
006	Neolithic	Neolithikum
007	Mesolithic	Mesolithikum
008	Palaeolithic	Paläolithikum

7.1.5 **Type:** Attribute Type; Table Archaeology_PT_Type

GeolCode Aarc105	Type (en)	Type (de)
001	menhir	Menhir
002	cup-marked stone	Schalenstein

7.2 Class Archaeology_L

The class Archaeology_L contains linear archaeological elements. Historical roads, sunken lanes or moats belong to this class.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 7.2.1)	Object type. The possible object types are listed in the table «Archaeology_L_Kind».
Epoch [0..1]	Codelist (Table 7.2.2)	Archaeological epoch of the object type. The possible values are listed in the table «Archaeology_L_Epoch».
Period [0..1]	Codelist (Table 7.2.3)	Archaeological period of the object type. The possible values are listed in the table «Archaeology_L_Period».
Age [0..1]	Codelist (Table 7.2.4)	Archaeological age of the object type. The possible values are listed in the table «Archaeology_L_Age».

7.2.1 Kind: Attribute Kind; Table Archaeology_L_Kind

GeolCode Aarc201	Kind (en)	Kind (de)	CODE_ SC	7.2.2 Epoch	7.2.3 Period	7.2.4 Age
001	road	Strasse	106	o	o	o
002	sunken lane	Hohlweg	109	o	o	o
003	artificial ditch, moat	künstlicher Graben, Befestigungsgraben	110	o	o	o
004	artificial wall	künstlicher Erdwall	107	o	o	o
005	aqueduct	Wasserleitung	105	o	o	o
006	megalithic alignment	Steinreihe	100	o	o	o
007	trench	Schützengraben	114	o	o	o

(m = mandatory; o = optional; n/a = not applicable)

7.2.2 Epoch: Attribute Epoch; Table Archaeology_L_Epoch

GeolCode Aarc202	Epoch (en)	Epoch (de)
001	historic	historisch
002	prehistoric	prähistorisch

7.2.3 **Period:** Attribute Period; Table Archaeology_L_Period

GeolCode Aarc203	Period (en)	Period (de)
001	Modern Age	Neuzeit
002	Middle Age	Mittelalter
003	Roman Age	römische Epoche
004	Iron Age	Eisenzeit
005	Bronze Age	Bronzezeit
006	Stone Age	Steinzeit

7.2.4 **Age:** Attribute Age; Table Archaeology_L_Age

GeolCode Aarc204	Age (en)	Age (de)
001	La Tène Period	La-Tène-Zeit
002	Hallstatt Period	Hallstatt-Zeit
003	Late Bronze Age	späte Bronzezeit
004	Middle Bronze Age	mittlere Bronzezeit
005	Early Bronze Age	frühe Bronzezeit
006	Neolithic	Neolithikum
007	Mesolithic	Mesolithikum
008	Palaeolithic	Paläolithikum

7.3 Class Archaeology_PLG

The class Archaeology_PLG contains archaeological relics (e.g. a roman castrum) that cover a larger area (surface).

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 7.3.1)	Object type. The possible object types are listed in the table «Archaeology_PLG_Kind».
Epoch [0..1]	Codelist (Table 7.3.2)	Archaeological epoch of the object type. The possible values are listed in the table «Archaeology_PLG_Epoch».
Period [0..1]	Codelist (Table 7.3.3)	Archaeological period of the object type. The possible values are listed in the table «Archaeology_PLG_Period».
Age [0..1]	Codelist (Table 7.3.4)	Archaeological age of the object type. The possible values are listed in the table «Archaeology_PLG_Age».

7.3.1 Kind: Attribute Kind; Table Archaeology_PLG_Kind

GeolCode Aarc301	Kind (en)	Kind (de)	CODE_ SC	7.3.2 Epoch	7.3.3 Period	7.3.4 Age
001	castrum	Castrum	852	o	o	o
002	refugium, earthwork	Refugium, Erdwerk	108	o	o	o

(m = mandatory; o = optional; n/a = not applicable)

7.3.2 Epoch: Attribute Epoch; Table Archaeology_PLG_Epoch

GeolCode Aarc302	Epoch (en)	Epoch (de)
001	historic	historisch
002	prehistoric	prähistorisch

7.3.3 Period: Attribute Period; Table Archaeology_PLG_Period

GeolCode Aarc303	Period (en)	Period (de)
001	Modern Age	Neuzeit
002	Middle Age	Mittelalter
003	Roman Age	römische Epoche
004	Iron Age	Eisenzeit

7.3.4 Age: Attribute Age; Table Archaeology_PLG_Age

GeolCode Aarc304	Age (en)	Age (de)
001	La Tène Period	La-Tène-Zeit
002	Hallstatt Period	Hallstatt-Zeit

7.4 Class Exploitation_Geomaterials_PT

The class Exploitation_Geomaterials_PT contains punctual indications about geomaterial pits.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 7.4.1)	Object type. The possible object types are listed in the table «Exploitation_Geomaterials_PT_Kind».
Exp_Unit [0..*]	Codelist (Table C_1, to be defined)	Mined lithostratigraphic unit. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.
Status [0..1]	Codelist (Table 7.4.3)	State of mining. The possible values are listed in the table «Exploitation_Geomaterials_PT_Status».
Depth_Tot [0..1]	Float	Total depth (m below ground level) of the object type.
Targ_Mat [0..1]	Codelist (Table 7.4.5)	Mined material. The possible values are listed in the table «Exploitation_Geomaterials_PT_Targ_Mat».

7.4.1 Kind: Attribute Kind; Table Exploitation_Geomaterials_PT_Kind

GeolCode Aexp101	Kind (en)	Kind (de)	CODE_ SC	7.4.2 Exp_Unit	7.4.3 Status	7.4.4 Depth_Tot	7.4.5 Targ_Mat
001	mine, deep mining	Bergwerk, Untertageabbau	813–814	m	o	n/a	o
002	adit entrance	Stolleneingang	815–816	m	o	n/a	n/a
003	shaft	Schacht	817–818	o	o	o	n/a
004	sinkhole (depression at the surface due to collapsed mining galleries)	Pinge (dolinen-artiger Stolleneinbruch)	819	m	n/a	n/a	n/a
005	prospecting pits	Schürflöcher	744	m	n/a	n/a	o
006	emptied pisolitic ironstone pocket deposits	ausgeräumte Bohnerztaschen	744	m	n/a	n/a	n/a

(m = mandatory; o = optional; n/a = not applicable)

7.4.2 Exploited Lithostratigraphic Unit: Attribute Exp_Unit; Annex Table C_1 (to be defined) Lithostratigraphic_Units_LitStrat
Mined lithostratigraphic unit. The lithostratigraphic table does not exist for the moment.

7.4.3 Status: Attribute Status; Table Exploitation_Geomaterials_PT_Status

GeolCode Aexp103	Status (en)	Status (de)
001	operating	in Betrieb
002	dormant	stillgelegt
003	filled in	aufgefüllt
004	collapsed	verfallen

7.4.4 Total Depth: Attribute Depth_Tot

Total depth (m below ground level) of the object type. (Data type: Float)

7.4.5 **Target Material:** Attribute Targ_Mat; Table Exploitation_Geomaterials_PT_Targ_Mat

GeolCode Aexp105	Targ_Mat (en)	Targ_Mat (de)
001	ore in general	Erze allgemein
002	gold	Gold
003	silver	Silber
004	copper, partly with silver, bismuth and arsenic	Kupfer, z.T. mit Silber, Wismut und Arsen
005	iron / iron oolite	Eisen / Eisenoolithe
006	lead-zinc	Blei-Zink
007	chrome-nickel, partly with cobalt	Chrom-Nickel, z.T. mit Kobalt
008	manganese	Mangan
009	molybdenum and tungsten	Molybdän und Wolfram
010	antimony	Antimon
011	barite	Barit
012	calcite	Kalzit
013	fluorite	Fluorit
014	quartz	Quarz
015	kaoline	Kaolin
016	magnesite	Magnesit
017	magnesium	Magnesium
018	phosphorite, apatite	Phosphorit, Apatit
019	talc	Talk
020	sulphur	Schwefel
021	uranium	Uran
022	pisolitic ironstone deposits	Bohnerzbildungen
023	asbestos	Asbest
024	coal, in general	Kohle allgemein
025	coal / anthracite	Steinkohle / Anthrazit
026	lignite	Lignit
027	graphite	Graphit
028	oil shale	Ölschiefer
029	asphalt / bitumen	Asphalt / Bitumen
030	hardrock	Hartgestein
031	roof slate / table slate	Dachschiefer / Tafelschiefer
032	serpentine	Serpentin
033	soapstone	Speckstein
034	gypsum	Gips
035	salt / halite	Salz / Steinsalz
036	clay / clay and silt (loam)	Ton / Ton und Silt (Lehm)
037	sand	Sand
038	sand and gravel	Sand und Kies

7.5 Class Exploitation_Geomaterials_L

The class Exploitation_Geomaterials_L contains linear informations for the exploitation of geomaterials (e.g. the position of the working area).

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 7.5.1)	Object type. The possible object types are listed in the table «Exploitation_Geomaterials_L_Kind».
Status [0..1]	Codelist (Table 7.5.2)	State of mining. The possible values are listed in the table «Exploitation_Geomaterials_L_Status».

7.5.1 **Kind:** Attribute Kind; Table Exploitation_Geomaterials_L_Kind

GeolCode Aexp201	Kind (en)	Kind (de)	CODE_ SC	7.5.2 Status
001	working area	Abbaufont	101; 103	o
002	gallery	Bergwerksstollen	104	o

(m = mandatory; o = optional; n/a = not applicable)

7.5.2 **Status:** Attribute Status; Table Exploitation_Geomaterials_L_Status

GeolCode Aexp202	Status (en)	Status (de)
001	operating	in Betrieb
002	dormant	stillgelegt
003	filled in	aufgefüllt
004	collapsed	verfallen

7.6 Class Exploitation_Geomaterials_PLG

The class Exploitation_Geomaterials_PLG contains areas where geomaterials were exploited when the sector was mapped.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 7.6.1)	Object type. The possible object types are listed in the table «Exploitation_Geomaterials_PLG_Kind».
Status [0..1]	Codelist (Table 7.6.2)	State of mining. The possible values are listed in the table «Exploitation_Geomaterials_PLG_Status».
Exp_Unit [1..*]	Codelist (Table C_1, to be defined)	Mined lithostratigraphic unit. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.
Targ_Mat [0..1]	Codelist (Table 7.6.4)	Mined material. The possible values are listed in the table «Exploitation_Geomaterials_PLG_Targ_Mat».

7.6.1 Kind: Attribute Kind; Table Exploitation_Geomaterials_PLG_Kind

GeolCode Aexp301	Kind (en)	Kind (de)	CODE_ SC	7.6.2 Status	7.6.3 Exp_Unit	7.6.4 Targ_Mat
001	quarry	Steinbruch	101	o	m	o
002	pit (unconsolidated deposits)	Grube (Lockergesteinsabbau)	101–103	o	m	o

(m = mandatory; o = optional; n/a = not applicable)

7.6.2 Status: Attribute Status; Table Exploitation_Geomaterials_PLG_Status

GeolCode Aexp302	Status (en)	Status (de)
001	operating	in Betrieb
002	dormant	stillgelegt
003	filled in	aufgefüllt
004	collapsed	verfallen

7.6.3 **Exploited Lithostratigraphic Unit:** Attribute Exp_Unit; Annex Table C_1 (to be defined) Lithostratigraphic_Units_LitStrat
Mined lithostratigraphic unit. The lithostratigraphic table does not exist for the moment.

7.6.4 **Target Material:** Attribute Targ_Mat; Table Exploitation_Geomaterials_PLG_Targ_Mat

GeolCode Aexp304	Targ_Mat (en)	Targ_Mat (de)
001	clay / clay and silt (loam)	Ton / Ton und Silt (Lehm)
002	sand	Sand
003	sand and gravel	Sand und Kies
004	hardrock	Hartgestein
005	roof slate / table slate	Dachschiefer / Tafelschiefer
006	gypsum	Gips
007	serpentine	Serpentin
008	soapstone	Speckstein
009	talc	Talk
010	barite	Barit
011	calcite	Kalzit
012	iron / iron oolite	Eisen / Eisenooolithe
013	kaoline	Kaolin
014	quartz	Quarz
015	asbestos	Asbest
016	pisolitic ironstone deposits	Bohnerzbildungen
017	peat	Torf

7.7 Class Boreholes_PT

The class Boreholes_PT contains drillings and soundings (on older maps, there is no distinction of the different types of soundings. It is also possible, that percussion core drillings are classified as drillings on older maps)

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 7.7.1)	Object type. The possible object types are listed in the table «Boreholes_PT_Kind».
Drill_Mo [0..1]	Codelist (Table 7.7.2)	Type of drilling. The possible values are listed in the table «Boreholes_PT_Drill_Mo».
Depth_Bedr [0..1]	Float	Depth (m below ground level) of the bedrock. (If the drilling does not reach the bedrock the value is -999; in the case of a drilling that starts in the bedrock, the value is 0).
D_C_Underg [1]	Boolean	Drilling site below ground level (yes / no)?
Main_Tar [0..1]	Codelist (Table 7.7.5)	Intention of the drilling. The possible values are listed in the table «Boreholes_PT_Main_Tar».
Targ_Mat [0..1]	Codelist (Table 7.7.6)	Material recovered from the drilling. The possible values are registered in the table «Boreholes_PT_Targ_Mat».
Depth_Tot [0..1]	Float	Final depth (m below ground level) of the object type.
Fm_A [0..1]	Codelist (Table C_1, to be defined)	Lithostratigraphic unit of the formation A reached. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.
Depth_Fm_A [0..1]	Float	Depth (m below ground level) of the formation A reached.
Fm_B [0..1]	Codelist (Table C_1, to be defined)	Lithostratigraphic unit of the formation B reached. The lithostratigraphic table «Lithostratigraphic_Units_LitStrat» does not exist for the moment.
Depth_Fm_B [0..1]	Float	Depth (m below ground level) of the formation B reached.
Depth_WT [0..1]	Float	Depth (m below ground level) of the groundwater table.
Plunge_Dir [0..1]	Short integer	Plunge direction (azimuth) of the respective point object type. Value measured clockwise in degree (0°-359°).
Plunge [0..1]	Short integer	Inclination of the respective type of point spatial object type. Value are measured in degrees from horizontal (0°) to vertical position (90°), or up to the top into the vertical position (-90°).

Ref_Number [0..1]	Short integer	Reference number of the object type in an additional document (explanatory notes, etc.)
Link [0..1]	Long integer	Object instance number in the INFOGEOLOG data base.

7.7.1 **Kind:** Attribute Kind; Table Boreholes_PT_Kind

GeolCode Abor101	Kind (en)	Kind (de)	CODE _SC	7.7.2 Drill_Mo	7.7.3 Depth_Bedr	7.7.4 D_C_Underg	7.7.5 – 7.7.16
001	borehole	Bohrung	771–800	o	m	m	o
002	sounding	Sondierschlitz	822	n/a	o	m	o
003	hand augering	Handsondierung	801	n/a	o	m	o
004	percussion drilling	Rammsondierung	-	n/a	o	m	o
005	percussion core drilling	Rammkernsondierung	-	n/a	o	m	o

(m = mandatory; o = optional; n/a = not applicable)

7.7.2 **Drill Mode:** Attribute Drill_Mo; Table Boreholes_PT_Drill_Mo

GeolCode Abor102	Drill_Mo (en)	Drill_Mo (de)
001	cored	gekernt
002	not cored	nicht gekernt

7.7.3 **Depth Bedrock:** Attribute Depth_Bedr

Depth (m below ground level) of the bedrock. (Data type: Float)

7.7.4 **Drill Collar Underground:** Attribute D_C_Underg

Drilling site below ground level (yes / no)? (Data type: Boolean)

7.7.5 **Main Target:** Attribute Main_Tar; Table Boreholes_PT_Main_Tar

GeolCode Abor105	Main_Tar (en)	Main_Tar (de)
001	geotechnics	Geotechnik
002	hydrogeology	Hydrogeologie
003	mineral water	Mineralwasser
004	mineral resources	Mineralische Rohstoffe
005	crude oil / natural gas	Erdöl / Erdgas
006	contaminated sites	belastete Standorte
007	seismic	Seismik
008	geothermal	Geothermie

7.7.6 **Target Material:** Attribute Targ_Mat; Table Boreholes_PT_Targ_Mat

GeolCode Abor106	Targ_Mat (en)	Targ_Mat (de)
001	salt / halite	Salz / Steinsalz
002	crude oil	Erdöl
003	natural gas	Erdgas
004	geothermal energy	Erdwärme

7.7.7 **Depth Total:** Attribute Depth_Tot

Final depth (m below ground level) of the object type. (Data type: Float)

7.7.8 **Formation A:** Attribute Fm_A; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphic unit of the formation A reached. The lithostratigraphic table does not exist for the moment.

7.7.9 **Depth to Formation A:** Attribute Depth_Fm_A

Depth (m below ground level) of the formation A reached. (Data type: Float)

7.7.10 **Formation B:** Attribute Fm_B; Annex Table C_1 (to be defined)

Lithostratigraphic_Units_LitStrat

Lithostratigraphic unit of the formation B reached. The lithostratigraphic table does not exist for the moment.

7.7.11 **Depth to Formation B:** Attribute Depth_Fm_B

Depth (m below ground level) of the formation A reached. (Data type: Float)

7.7.12 **Depth to Water Table:** Attribute Depth_WT

Depth (m below ground level) of the groundwater table. (Data type: Float)

7.7.13 **Plunge Direction:** Attribute Plunge_Dir

Plunge direction (azimuth) of the respective point object type. (Data type: Short integer)

7.7.14 **Plunge:** Attribute Plunge

Inclination of the respective type of point spatial object type. (Data type: Short integer)

7.7.15 **Reference Number:** Attribute Ref_Number

Reference number of the object type in an additional document. (Data type: Short integer)

7.7.16 **Link:** Attribute Link

Object instance number in the INFOGEO data base. (Data type: Long integer)

7.8 Class Artificial_Surface_Modifications_PLG

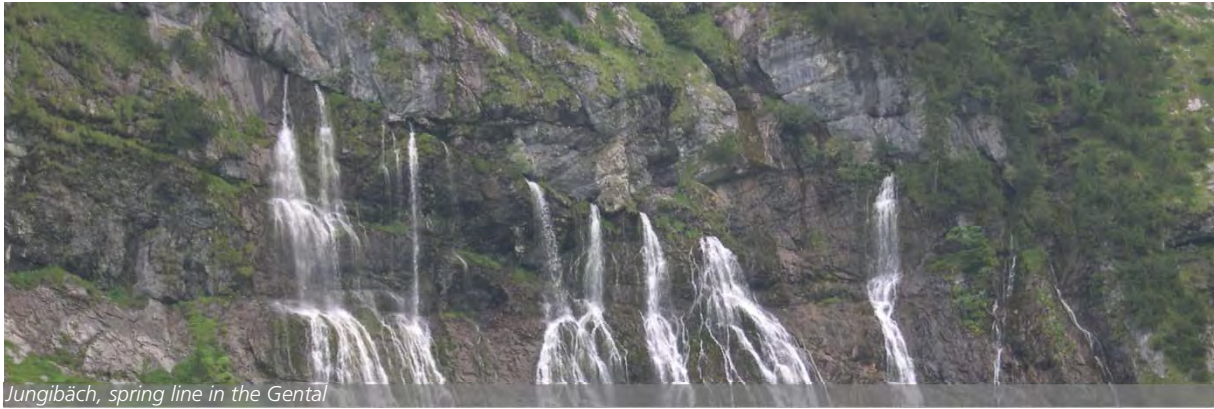
The class Artificial_Surface_Modifications_PLG contains important artificial modifications of the ground (e.g. golf course, skiing region). As a consequence, there is no evidence for the original morphology and a geomorphological interpretation could be misdirected.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 7.8.1)	Object type. The possible object types are listed in the table «Artificial_Surface_Modifications_PLG_Kind».

7.8.1 **Kind:** Attribute Kind; Table Artificial_Surface_Modifications_PLG_Kind

GeolCode Aart301	Kind (en)	Kind (de)	CODE_SC
001	artificially modified ground	künstlich gestaltete Geländeform	-

8 Theme Hydrogeology



Subdivision of classes in the theme Hydrogeology

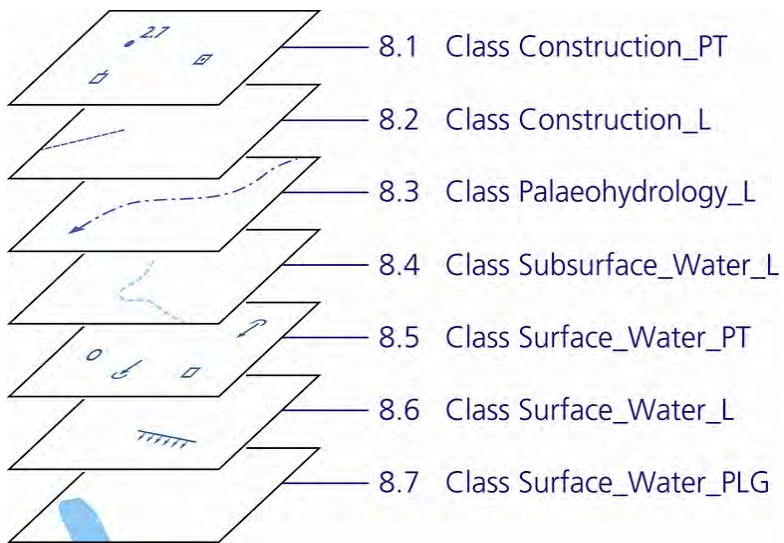
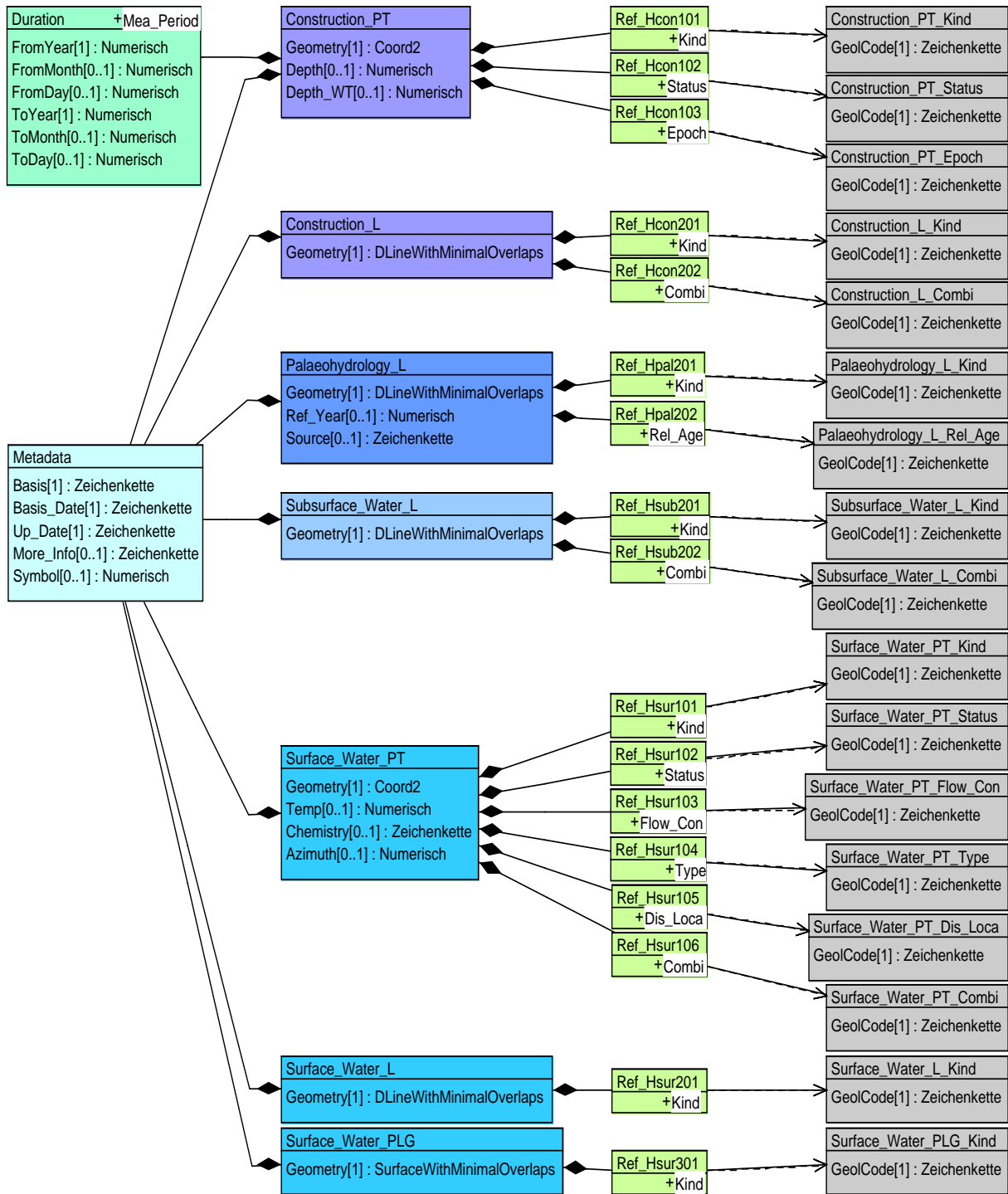


Illustration of the theme Hydrogeology in a UML Diagram



8.1 Class Construction_PT

The class Construction_PT contains hydraulic structures such as groundwater captures and cisterns. It also implies measurement instruments like piezometers and limnographs.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 8.1.1)	Object type. The possible object types are listed in the table «Construction_PT_Kind».
Status [0..1]	Codelist (Table 8.1.2)	Status of object type. The possible values are listed in the table «Construction_PT_Status».
Epoch [0..1]	Codelist (Table 8.1.3)	Epoch of the construction of the object type. The possible values are listed in the table «Construction_PT_Epoch».
Depth [0..1]	Float	Depth of the object type (m below ground level).
Depth_WT [0..1]	Float	Depth (m below ground level) of the groundwater table (mean value).
Mea_Period [0..1]	Duration	Measuring period of the groundwater table.

8.1.1 Kind: Attribute Kind; Table Construction_PT_Kind

GeolCode Hcon101	Kind (en)	Kind (de)	CODE _SC	8.1.				
				2	3	4	5	6
001	groundwater capture	Grundwasserfassung	515	o	n/a	o	o	o
002	cistern	Zisterne	531	o	o	n/a	n/a	n/a
003	well (in a arid area)	laufender Brunnen (in wasserarmem Gebiet)	511	n/a	n/a	n/a	n/a	n/a
004	water well	Sodbrunnen	512	o	o	o	o	o
005	drainage shaft	Versickerungs- schacht	518	n/a	n/a	n/a	n/a	n/a
006	limnograph	Limnigraph	522	n/a	n/a	n/a	n/a	n/a
007	piezometer	Piezometer	521	n/a	n/a	o	o	o
008	pumping station with lake or river water catchment	Pumpwerk mit See- bzw. Fluss- wasserfassung	517	o	n/a	n/a	o	o
009	pumping station without water catchment	Pumpwerk ohne Wasserfassung	516	o	o	n/a	o	o

(m = mandatory; o = optional; n/a = not applicable)

8.1.2 **Status:** Attribute Status; Table Construction_PT_Status

GeolCode Hcon102	Status (en)	Status (de)
001	operating	in Betrieb
002	dormant	stillgelegt

8.1.3 **Epoch:** Attribute Epoch; Table Construction_PT_Epoch

GeolCode Hcon103	Epoch (en)	Epoch (de)
001	Middle Age	Mittelalter
002	Roman Age	römische Epoche
003	prehistoric	prähistorisch

8.1.4 **Depth:** Attribute Depth

Depth of the object type (m below ground level). (Data type: Float)

8.1.5 **Depth to Water Table:** Attribute Depth_WT

Depth (m below ground level) of the groundwater table. (Data type: Float)

8.1.6 **Measurement Period:** Attribute Mea_Period

Measuring period of the groundwater table. (Data type: Duration)

8.2 Class Construction_L

The class Construction_L contains linear hydraulic structures like water catchment galleries. They can be combined with object types of the class Surface_Water_PT.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 8.2.1)	Object type. The possible object types are listed in the table «Construction_L_Kind».
Combi [0..1]	Codelist (Table 8.2.2)	Object type of another class that can be combined with an object type of this class. The possible combinations are listed in the table «Construction_L_Combi».

8.2.1 Kind: Attribute Kind; Table Construction_L_Kind

GeolCode Hcon201	Kind (en)	Kind (de)	CODE_ SC	8.2.2 Combi
001	water catchment gallery	Wasserfassungsstollen	96	o

(m = mandatory; o = optional; n/a = not applicable)

8.2.2 Combination: Attribute Combi; Table Construction_L_Combi

GeolCode Hcon202	Combi (en)	Combi (de)
001	combined with a catchment of a spring in a water gallery (oriented)	mit Quellfassung in Stollen (orientiert) kombiniert
002	combined with a catchment of a mineral spring in a water gallery (oriented)	mit gefasster Mineralquelle in Stollen (orientiert) kombiniert
003	combined with a catchment of a thermal spring in a water gallery (oriented)	mit gefasster Thermalquelle in Stollen (orientiert) kombiniert

8.3 Class Palaeohydrology_L

The class Palaeohydrology_L contains all linear object types having certain relation to former waters.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 8.3.1)	Object type. The possible object types are listed in the table «Palaeohydrology_L_Kind».
Rel_Age [0..1]	Codelist (Table 8.3.2)	Relative age of object type. The possible values are listed in the table «Palaeohydrology_L_Rel_Age».
Chrono [0..1]	Codelist (Table C_3)	Chronostratigraphic classification. The possible values are listed in the table «Lithostratigraphic_Units_Chrono» and available in the annex of this document.
Ref_Year [0..1]	Short Integer	Reference year of a former shore line.
Source [0..1]	String (254)	Data origin of historic documents.

8.3.1 **Kind:** Attribute Kind; Table Palaeohydrology_L_Kind

GeolCode Hpal201	Kind (en)	Kind (de)	CODE_ SC	8.3.2 Rel_Age	8.3.3 Chrono	8.3.4 Ref_Year	8.3.5 Source
001	paleo valley	Paläotal	88	n/a	o	n/a	n/a
002	former natural drainage channel	ehemalige Entwässerungsrinne	89	n/a	o	n/a	n/a
003	glacial meltwater channel	glaziale Abflussrinne	89	n/a	o	n/a	n/a
004	dry valley	Trockental	89	n/a	o	n/a	n/a
005	old river bed	ehemaliges Bachbett	92	n/a	n/a	n/a	o
006	banks of an old river course	Ufer eines ehemaligen Flussbetts	90–91	n/a	n/a	n/a	o
007	former shore line	ehemalige Uferlinie	93–95	o	n/a	o	o

(m = mandatory; o = optional; n/a = not applicable)

8.3.2 **Relative Age:** Attribute Rel_Age; Table Palaeohydrology_L_Rel_Age

GeolCode Hpal202	Rel_Age (en)	Rel_Age (de)
001	the most recent or the only	die Jüngste oder Einzige
002	older than the youngest	älter als die Jüngste
003	older than the youngest but one	älter als die Zweitjüngste

8.3.3 **Chronostratigraphic Attribution:** Attribute Chrono; Annex Table C_3

Lithostratigraphic_Units_Chrono

Chronostratigraphic classification. The lookup table is available in the annex of this document.

8.3.4 **Reference Year:** Attribute Ref_Year

Reference year of a former shore line. (Data type: Short Integer)

8.3.5 **Source:** Attribute Source

Data origin of historic documents. (Data type: String (254))

8.4 Class Subsurface_Water_L

The class Subsurface_Water_L contains linear object types indicating an underground water course. In most cases, the exact course is only inferred. There are some exceptions with surveyed cave systems. Existing dye tracing is mentioned in the explanatory notes. The underground water course can be combined with object types of the class Surface_Water_PT.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 8.4.1)	Object type. The possible object types are listed in the table «Subsurface_Water_L_Kind».
Combi [0..1]	Codelist (Table 8.4.2)	Object type of another class that can be combined with an object type of this class. The possible combinations are listed in the table «Subsurface_Water_PT_Combi».

8.4.1 **Kind:** Attribute Kind; Table Subsurface_Water_L_Kind

GeolCode Hsub201	Kind (en)	Kind (de)	CODE_ SC	8.4.2 Combi
001	underground water course	unterirdischer Gewässerlauf	84	o

8.4.2 **Combination:** Attribute Combi; Table Subsurface_Water_PT_Combi

GeolCode Hsub202	Combi (en)	Combi (de)
001	combined with the infiltration point of a water course	mit der Versickerungsstelle eines Baches kombiniert
002	combined with the resurgence of an underground water course	mit dem Wiederaustritt eines unterirdischen Bachlaufes kombiniert

8.5 Class Surface_Water_PT

The class Surface_Water_PT contains locally (in specific areas) observed superficial water like natural resurgences and infiltrations. Furthermore, the object type «rapids, waterfall» is listed in this class. This term designates a specific place in waterways. Its position depends on geological setting in the underground.

A «thermal spring» is a spring with an average annual temperature of $\geq 20^{\circ}\text{C}$. The attribute «Temp» is intended for these springs only and usually limited on the average water temperature. For this reason, no date is indicated for an analysis of this attribute.

Mineral springs are springs producing water with a mineral concentration of $\geq 1\text{g/l}$ or a concentration of CO_2 of $\geq 250\text{mg/l}$. The attribute «Chemistry» is intended for «mineral springs». Therefore, for this attribute, the characteristic element is indicated but not the complete chemistry of the water.

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Point	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 8.5.1)	Object type. The possible object types are listed in the table «Surface_Water_PT_Kind».
Status [0..1]	Codelist (Table 8.5.2)	Status of object type. The possible values are listed in the table «Surface_Water_PT_Status».
Flow_Con [0..1]	Codelist (Table 8.5.3)	Flow conditions of the water. The possible values are listed in the table «Surface_Water_PT_Flow_Con».
Type [0..1]	Codelist (Table 8.5.4)	Characteristic of the object type. The possible values are listed in the table «Surface_Water_PT_Type».
Dis_Loca [0..1]	Codelist (Table 8.5.5)	Location of the water outflow. The possible values are listed in the table «Surface_Water_PT_Dis_Loca».
Combi [0..1]	Codelist (Table 8.5.6)	Object type of another class that can be combined with an object type of this class. The possible combinations are listed in the table «Surface_Water_PT_Combi».
Temp [0..1]	Short integer	Average water temperature ($^{\circ}\text{C}$).
Chemistry [0..1]	String (254)	Characteristic chemical element in the mineral water (e.g. Fe).
Azimuth [0..1]	Short integer	Azimuth of the respective point object type. Value measured clockwise in degree (0° - 359°).

8.5.1 **Kind:** Attribute Kind; Table Surface_Water_PT_Kind

Geol Code Hsur101	Kind (en)	Kind (de)	CODE_ SC	8.5.						
				2	3	4	5	6	7-8	9
001	spring	Quelle	501-502; 504-505; 507-508; 523-525; 527-529	o	o	o	o	o	o	o
002	diffuse spring	diffuse Quelle	506	n/a	o	o	o	n/a	n/a	o
003	resurgence of an underground water course	Wiederaustritt eines unterirdischen Bachlaufes	510	n/a	o	n/a	n/a	o	n/a	o
004	infiltration point of a water course	Versickerungsstelle eines Baches	509	n/a	n/a	n/a	n/a	o	n/a	o
005	rapids, waterfall	Steilstufe in Bachrinne, Wasserfall	541	n/a	n/a	n/a	n/a	n/a	n/a	n/a

(m = mandatory; o = optional; n/a = not applicable)

8.5.2 **Status:** Attribute Status; Table Surface_Water_PT_Status

GeolCode Hsur102	Status (en)	Status (de)
001	captured	gefasst
002	not captured	nicht gefasst

8.5.3 **Flow Continuity:** Attribute Flow_Con; Table Surface_Water_PT_Flow_Con

GeolCode Hsur103	Flow_Con (en)	Flow_Con (de)
001	perennial	perennierend
002	temporary	temporär
003	dried up	versiegt

8.5.4 **Type:** Attribute Type; Table Surface_Water_PT_Type

GeolCode Hsur104	Type (en)	Type (de)
001	karst spring	Karstquelle
002	mineral spring	Mineralquelle
003	thermal spring	Thermalquelle

8.5.5 **Discharge Location:** Attribute Dis_Loca; Table Surface_Water_PT_Dis_Loca

GeolCode Hsur105	Dis_Loca (en)	Dis_Loca (de)
002	within a water gallery	in Stollen

8.5.6 **Combination:** Attribute Combi; Table Surface_Water_PT_Combi

GeolCode Hsur106	Combi (en)	Combi (de)
001	combined with a water catchment gallery	mit Wasserfassungsstollen kombiniert
002	combined with an underground water course	mit unterirdischem Gewässerlauf kombiniert

8.5.7 **Temperature:** Attribute Temp

Average water temperature (°C). (Data type: Short integer)

8.5.8 **Chemistry:** Attribute Chemistry

Characteristic chemical element in the mineral water. (Data type: String (254))

8.5.9 **Azimuth:** Attribute Azimuth

Azimuth of the respective point object type. (Data type: Short integer)

8.6 Class Surface_Water_L

The class Surface_Water_L contains linear surface waters (spring lines).

Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Line	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 8.6.1)	Object type. The possible object types are listed in the table «Surface_Water_L_Kind».

8.6.1 Kind: Attribute Kind; Table Surface_Water_L_Kind

GeolCode Hsur201	Kind (en)	Kind (de)	CODE_ SC
001	spring line	Quellhorizont	85

8.7 Class Surface_Water_PLG

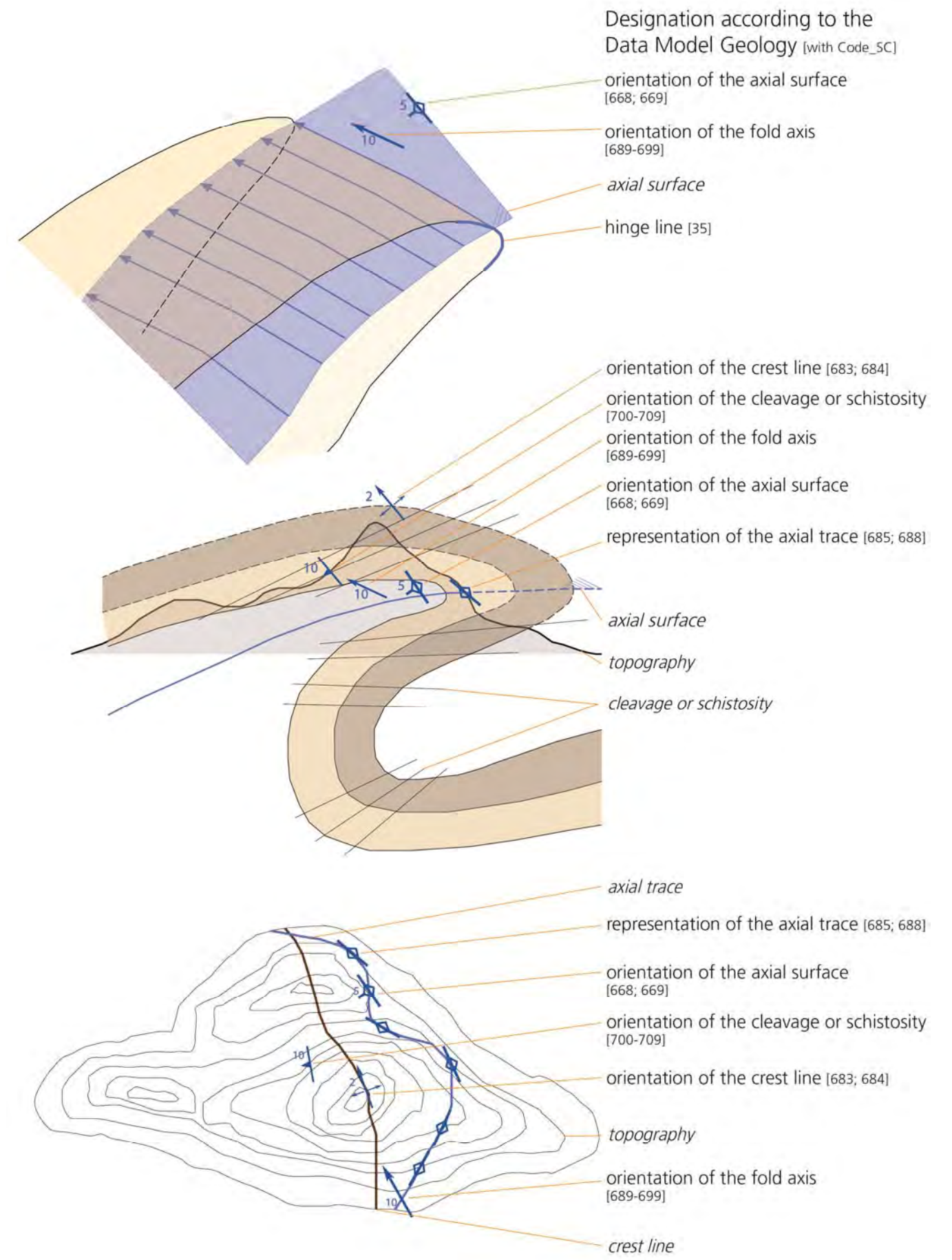
The class Surface_Water_PLG contains surface aquifers such as glaciers, lakes and rivers. They cover geological units and make an interpretation of subsoil geology often impossible. The entire drainage network is not a part of the Data Model Geology.

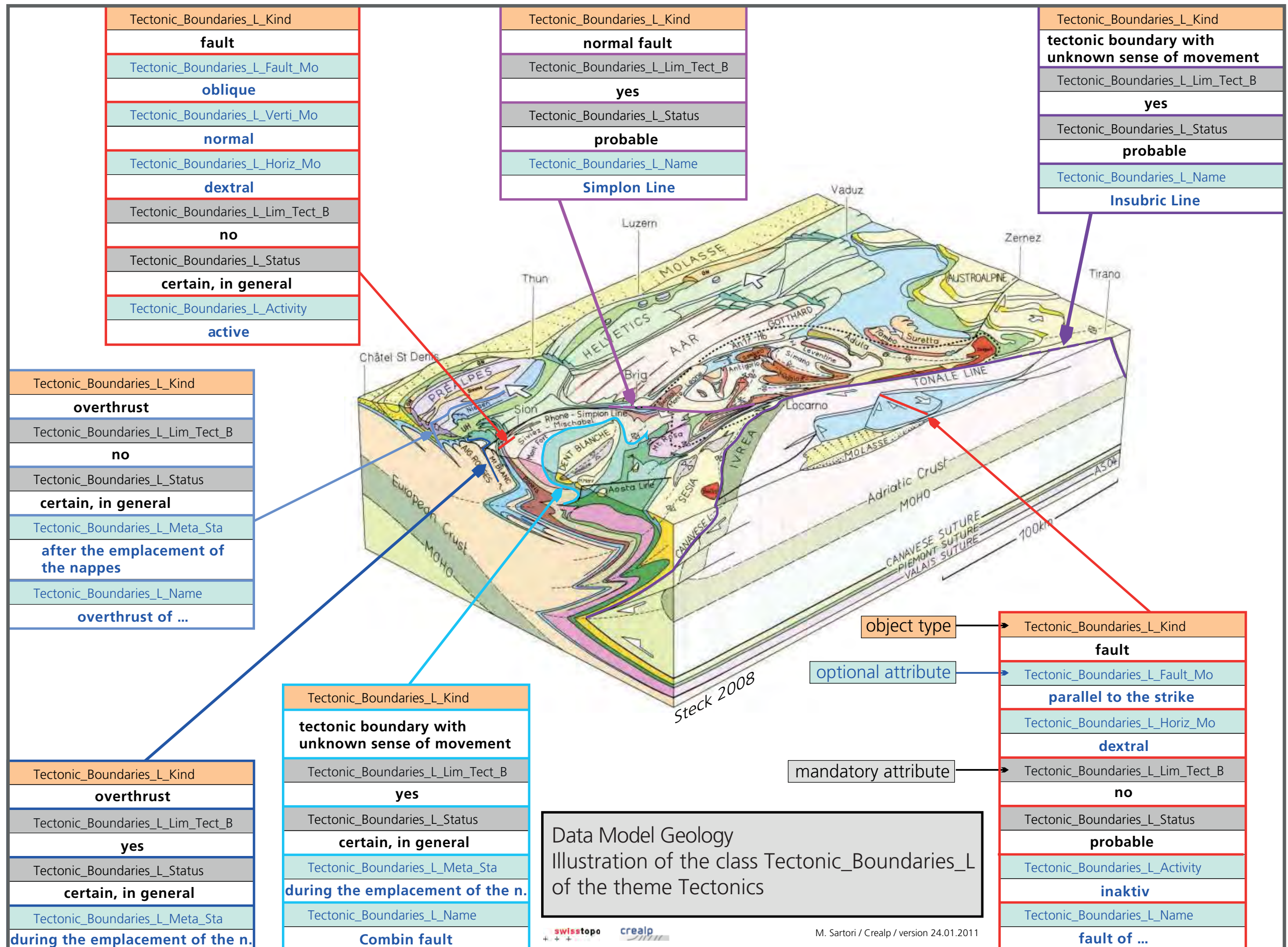
Attribute name [Cardinality]	Data type (Domain)	Description
Geometry [1]	Polygon	Geometry of the corresponding object type.
Kind [1]	Codelist (Table 8.7.1)	Object type. The possible object types are listed in the table «Surface_Water_PLG_Kind».

8.7.1 Kind: Attribute Kind; Table Surface_Water_PLG_Kind

GeolCode Hsur301	Kind (en)	Kind (de)	CODE_ SC
001	glacier	Gletscher	-
002	lake	See	-
003	river	Fluss	-

V Annex A – Examples of some object types





Tectonic_Boundaries_L_Kind
fault
Tectonic_Boundaries_L_Fault_Mo
oblique
Tectonic_Boundaries_L_Verti_Mo
normal
Tectonic_Boundaries_L_Horiz_Mo
dextral
Tectonic_Boundaries_L_Lim_Tect_B
no
Tectonic_Boundaries_L_Status
certain, in general
Tectonic_Boundaries_L_Activity
active

Tectonic_Boundaries_L_Kind
normal fault
Tectonic_Boundaries_L_Lim_Tect_B
yes
Tectonic_Boundaries_L_Status
probable
Tectonic_Boundaries_L_Name
Simplon Line

Tectonic_Boundaries_L_Kind
tectonic boundary with unknown sense of movement
Tectonic_Boundaries_L_Lim_Tect_B
yes
Tectonic_Boundaries_L_Status
probable
Tectonic_Boundaries_L_Name
Insubric Line

Tectonic_Boundaries_L_Kind
overthrust
Tectonic_Boundaries_L_Lim_Tect_B
no
Tectonic_Boundaries_L_Status
certain, in general
Tectonic_Boundaries_L_Meta_Sta
after the emplacement of the nappes
Tectonic_Boundaries_L_Name
overthrust of ...

Tectonic_Boundaries_L_Kind
tectonic boundary with unknown sense of movement
Tectonic_Boundaries_L_Lim_Tect_B
yes
Tectonic_Boundaries_L_Status
certain, in general
Tectonic_Boundaries_L_Meta_Sta
during the emplacement of the n.
Tectonic_Boundaries_L_Name
Combin fault

Tectonic_Boundaries_L_Kind
overthrust
Tectonic_Boundaries_L_Lim_Tect_B
yes
Tectonic_Boundaries_L_Status
certain, in general
Tectonic_Boundaries_L_Meta_Sta
during the emplacement of the n.

object type	Tectonic_Boundaries_L_Kind
	fault
optional attribute	Tectonic_Boundaries_L_Fault_Mo
	parallel to the strike
	Tectonic_Boundaries_L_Horiz_Mo
	dextral
mandatory attribute	Tectonic_Boundaries_L_Lim_Tect_B
	no
	Tectonic_Boundaries_L_Status
	probable
	Tectonic_Boundaries_L_Activity
	inaktiv
	Tectonic_Boundaries_L_Name
	fault of ...

Representation of slope instabilities

Major phase of movement before the Last Glacial Maximum (LGM)

→ «Old» bedrock sagging

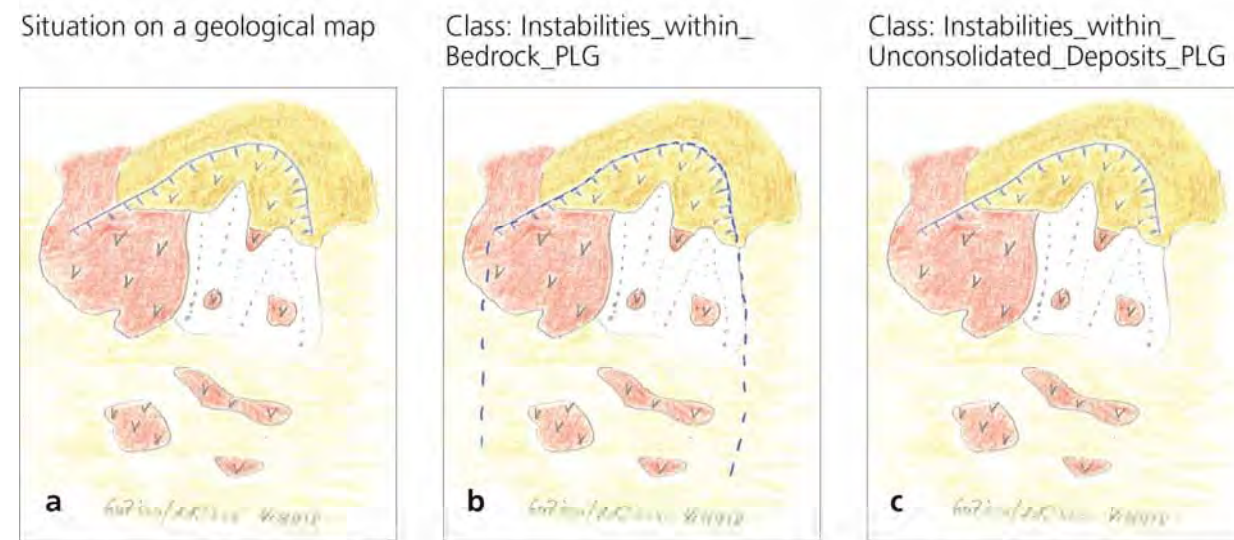


Fig.1: Slope instabilities within a main phase of movement before the Last Glacial Maximum («old» bedrock sagging) are only classified in the class Instabilities_within_Bedrock_PLG (the boundary of the sagging area is represented by the blue dotted line in **b**). In this case, the unconsolidated deposits have not undergone a passive sagging process; therefore there is no entry in the class Instabilities_within_Unconsolidated_Deposits_PLG (**c**)

Major phase of movement after the Last Glacial Maximum (LGM)

→ «Young» bedrock sagging → passive movements of unconsolidated deposits

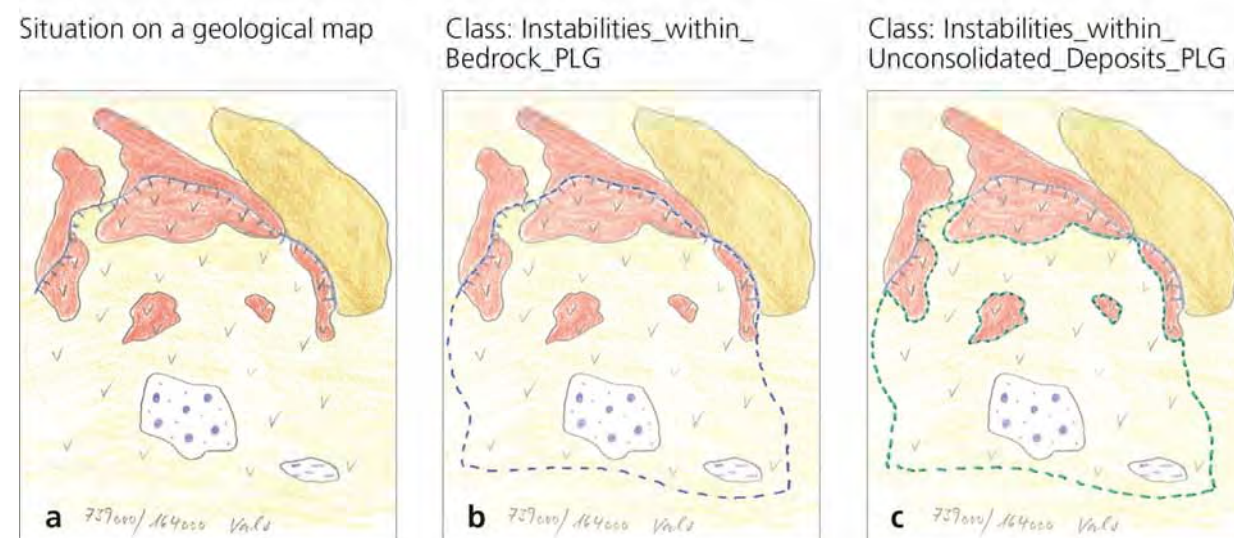
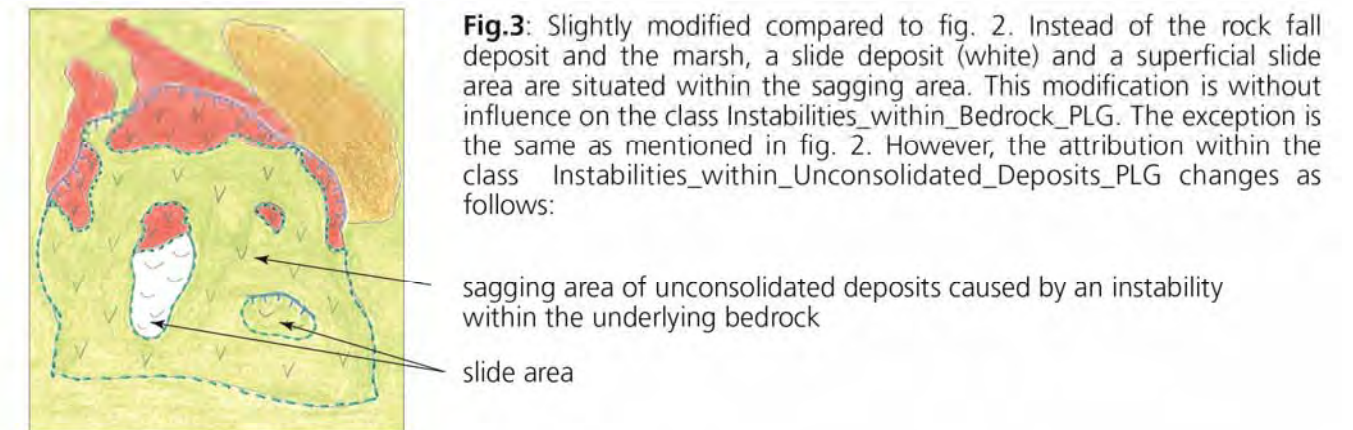


Fig.2: The movement of unconsolidated rocks on underlying instable bedrock is considered as a part of the bedrock instability (**b & c**). The classification of instability is valid for all unconsolidated deposits represented within the delimitation; (**c**): the «sagging area of unconsolidated deposits caused by an instability within the underlying bedrock» corresponds to the till, the rock fall deposit and the marsh. There are no further subdivisions. Slide deposits (white) or superficial slide areas within a sagging area would be an exception (Fig. 3).

Subdivision of different types of instability



Slide deposits with and without indication of the formation concerned

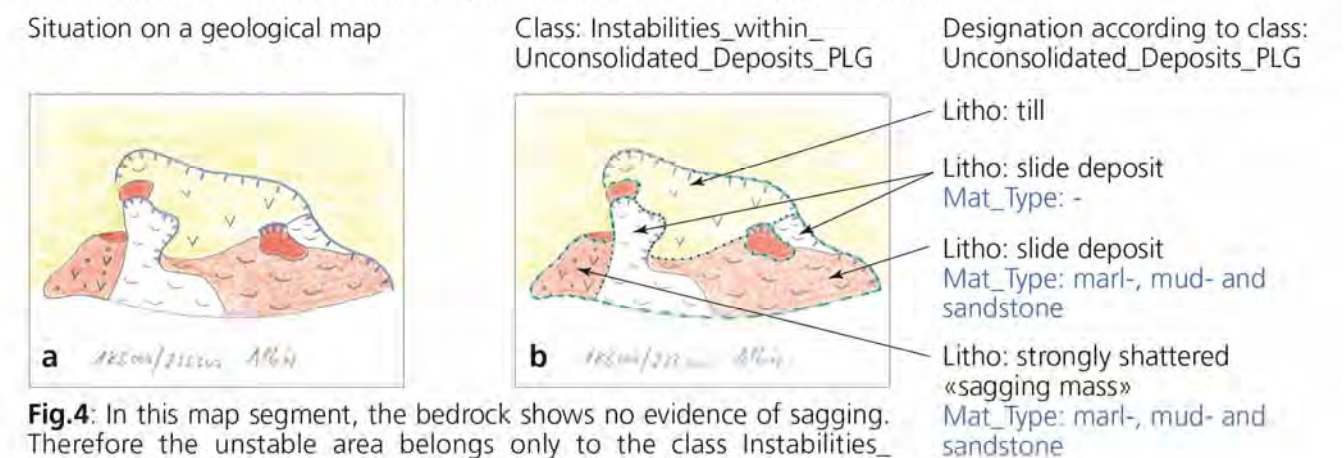


Fig.4: In this map segment, the bedrock shows no evidence of sagging. Therefore the unstable area belongs only to the class Instabilities_within_Unconsolidated_Deposits_PLG (green dotted line in **b**). The class Unconsolidated_Deposits_PLG is used to characterize the unconsolidated deposits.

Thin unconsolidated sediment cover

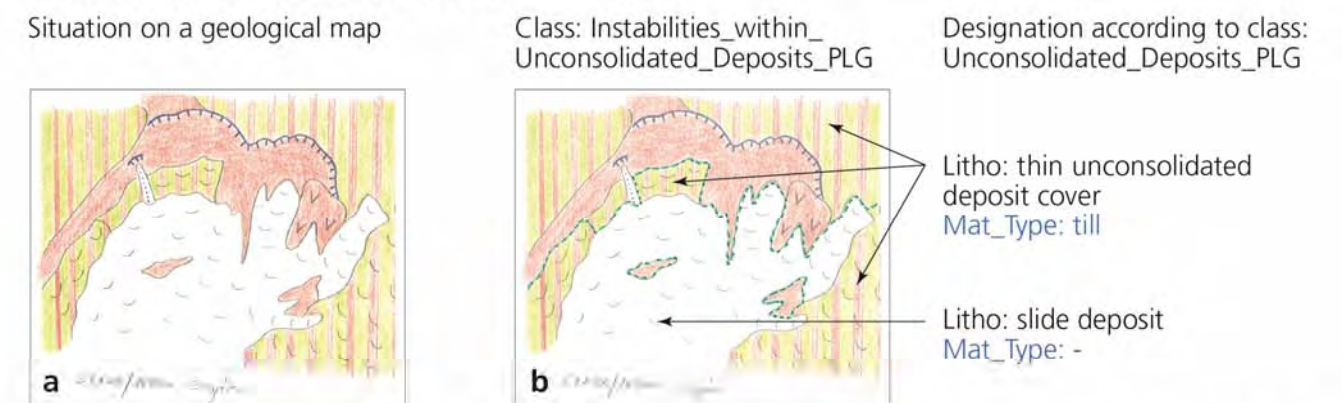


Fig.5: The respective terms of a thin unconsolidated deposit cover or a in situ alteration or weathering cover (of several meters) are enrolled in the class Unconsolidated_Deposits_PLG. Slope instabilities in areas with a thin unconsolidated sediment cover affect normally only the unconsolidated deposits. Therefore, these areas are only enrolled in the class Unconsolidated_Deposits_PLG.

VI Annex B – Synonyms and equivalents

Synonyms / Equivalentents	Attribute value in the Data Model Geology
ablation till	meltout till
Autunian (out of use)	Cisuralian
blown sand	aeolian sand, driftsand
boggy	marshy
flint nodules	chert nodules
outwash plain	sandur
quartzitic sand	hupper
rockhead	bedrock surface
sand barrier	beach ridge
Saxonian (out of use)	Middle Permian
sparry	spathic
Turingian (out of use)	Middle to Late Permian

VII Annex C – Lookup tables

1 Lookup table of the lithostratigraphic units



GeolCode **1st order –**
Vlit500 **Process Domain**

2nd order –
type

3rd order –
specification

000 **This table is in progress**

This table is in progress

This table is in progress

2 Lookup table of the lithological description

- Unconsolidated Deposits
- Sedimentary Rocks
- Igneous Rocks
- Metamorphic Rocks

GeolCode Vlit401	0 th order – Type of Rock	1 st order – Process Domain	2 nd order – Type	3 rd order – Specification
001	unconsolidated deposits	---	---	---
002	unconsolidated deposits	gravitative sediments and residual deposits	---	---
003	unconsolidated deposits	gravitative sediments and residual deposits	gravitative sediments and residual deposits, undifferentiated	---
004	unconsolidated deposits	gravitative sediments and residual deposits	<i>fall deposit</i>	---
005	unconsolidated deposits	gravitative sediments and residual deposits	fall deposit	fall deposit, undifferentiated
006	unconsolidated deposits	gravitative sediments and residual deposits	fall deposit	rock avalanche deposit
007	unconsolidated deposits	gravitative sediments and residual deposits	fall deposit	rock fall deposit
008	unconsolidated deposits	gravitative sediments and residual deposits	avalanche debris	---
009	unconsolidated deposits	gravitative sediments and residual deposits	fine-grained scree	---
010	unconsolidated deposits	gravitative sediments and residual deposits	coarse-grained scree	---
011	unconsolidated deposits	gravitative sediments and residual deposits	<i>argillaceous weathering deposit</i>	---
012	unconsolidated deposits	gravitative sediments and residual deposits	argillaceous weathering deposit	argillaceous weathering deposit, undifferentiated
013	unconsolidated deposits	gravitative sediments and residual deposits	argillaceous weathering deposit	loam deposit on plateau
014	unconsolidated deposits	gravitative sediments and residual deposits	argillaceous weathering deposit	colluvium
015	unconsolidated deposits	gravitative sediments and residual deposits	rock glacier	---
016	unconsolidated deposits	gravitative sediments and residual deposits	strongly shattered «sagging mass»	---
017	unconsolidated deposits	gravitative sediments and residual deposits	slide deposit	---
018	unconsolidated deposits	<i>glacial deposits</i>	---	---
019	unconsolidated deposits	glacial deposits	glacial deposits, undifferentiated	---
020	unconsolidated deposits	<i>glacial deposits</i>	<i>till</i>	---
021	unconsolidated deposits	glacial deposits	till	till, undifferentiated
022	unconsolidated deposits	glacial deposits	till	basal lodgement till
023	unconsolidated deposits	glacial deposits	till	meltout till
024	unconsolidated deposits	glacial deposits	till	glacier or dead ice covered by till
025	unconsolidated deposits	<i>fluvial deposit</i>	---	---
026	unconsolidated deposits	fluvial deposit	fluvial deposit, undifferentiated	---
027	unconsolidated deposits	<i>fluvial deposit</i>	<i>glaciofluvial deposit</i>	---
028	unconsolidated deposits	fluvial deposit	glaciofluvial deposit	glaciofluvial deposit, undifferentiated
029	unconsolidated deposits	fluvial deposit	glaciofluvial deposit	kame terrace deposit
030	unconsolidated deposits	fluvial deposit	glaciofluvial deposit	ice-marginal gravel
031	unconsolidated deposits	fluvial deposit	glaciofluvial deposit	gravel*
032	unconsolidated deposits	fluvial deposit	glaciofluvial deposit	gravel of a glacial advance
033	unconsolidated deposits	fluvial deposit	glaciofluvial deposit	gravel of a glacial retreat
034	unconsolidated deposits	fluvial deposit	glaciofluvial deposit	dammed deposit
035	unconsolidated deposits	<i>fluvial deposit</i>	<i>mixed deposit</i>	---
036	unconsolidated deposits	fluvial deposit	mixed deposit	mixed deposit, undifferentiated
037	unconsolidated deposits	fluvial deposit	mixed deposit	debris flow deposit
038	unconsolidated deposits	<i>fluvial deposit</i>	<i>alluvial deposit</i>	---
039	unconsolidated deposits	fluvial deposit	alluvial deposit	alluvial deposit, undifferentiated
040	unconsolidated deposits	fluvial deposit	alluvial deposit	gravel*
041	unconsolidated deposits	fluvial deposit	alluvial deposit	river gravel
042	unconsolidated deposits	fluvial deposit	flood plain deposit	---
043	unconsolidated deposits	<i>lacustrine deposit</i>	---	---
044	unconsolidated deposits	lacustrine deposit	lacustrine deposit, undifferentiated	---
045	unconsolidated deposits	<i>lacustrine deposit</i>	<i>glaciolacustrine deposit</i>	---
046	unconsolidated deposits	lacustrine deposit	glaciolacustrine deposit	glaciolacustrine deposit, undifferentiated
047	unconsolidated deposits	lacustrine deposit	glaciolacustrine deposit	deltaic deposits
048	unconsolidated deposits	lacustrine deposit	glaciolacustrine deposit	waterlaid till
049	unconsolidated deposits	lacustrine deposit	aggradation deposit	---
055	unconsolidated deposits	lacustrine deposit	ice-dammed lake deposits	---
056	unconsolidated deposits	lacustrine deposit	lacustrine terrace deposit	---
057	unconsolidated deposits	lacustrine deposit	deltaic deposits	---
058	unconsolidated deposits	lacustrine deposit	fine-grained lake deposit	---
059	unconsolidated deposits	lacustrine deposit	lake marl	---
060	unconsolidated deposits	<i>palustric deposit</i>	---	---
061	unconsolidated deposits	palustric deposit	palustric deposit, undifferentiated	---
079	unconsolidated deposits	palustric deposit	gyttja	---
052	unconsolidated deposits	palustric deposit	marsh	---
053	unconsolidated deposits	palustric deposit	peat, peatbog	---
054	unconsolidated deposits	palustric deposit	lignite	---
060	unconsolidated deposits	<i>aeolian deposit</i>	---	---
061	unconsolidated deposits	aeolian deposit	aeolian deposit, undifferentiated	---
062	unconsolidated deposits	aeolian deposit	aeolian sand, driftsand	---
063	unconsolidated deposits	aeolian deposit	loess	---
064	unconsolidated deposits	aeolian deposit	loess loam	---
065	unconsolidated deposits	aeolian deposit	volcanic ash	---
066	unconsolidated deposits	<i>anthropogenic features</i>	---	---
067	unconsolidated deposits	anthropogenic features	anthropogenic features, undifferentiated	---
068	unconsolidated deposits	anthropogenic features	<i>artificial deposit</i>	---
069	unconsolidated deposits	anthropogenic features	artificial deposit	artificial deposit, undifferentiated
070	unconsolidated deposits	anthropogenic features	artificial deposit	made ground, embankment
071	unconsolidated deposits	anthropogenic features	artificial deposit	infilled ground
072	unconsolidated deposits	anthropogenic features	artificial deposit	landfill
073	unconsolidated deposits	anthropogenic features	artificial deposit	spoil heap
075	unconsolidated deposits	<i>thin unconsolidated sediment cover*</i>	---	---
076	unconsolidated deposits	thin unconsolidated sediment cover*	thin unconsolidated sediment cover, undifferentiated	---
077	unconsolidated deposits	thin unconsolidated sediment cover*	thin unconsolidated deposit cover	---
078	unconsolidated deposits	thin unconsolidated sediment cover*	in situ alteration or weathering cover	---

* Thin quaternary sediment cover with a thickness of < 1.5-2 m and in situ alteration or weathering (of several metres) that cannot be attributed to a specific process are defined as «thin unconsolidated sediment cover»

* The «gravels» are equivalent of the German term «Schotter».

GeolCode Vlit402	0 order – Type of Rock	1st order – Main Group	2nd order – Sub Group	3rd order – Name of Rock
001	sedimentary rock	---	---	---
002	sedimentary rock	clastic sedimentary rock	---	---
003	sedimentary rock	clastic sedimentary rock	clastic sedimentary rock, undifferentiated	---
004	sedimentary rock	clastic sedimentary rock	conglomerate / breccia (psephite: grain size: gravel, boulder and block)	---
005	sedimentary rock	clastic sedimentary rock	conglomerate / breccia (psephite: grain size: gravel, boulder and block)	conglomerate and breccia, undifferentiated
006	sedimentary rock	clastic sedimentary rock	conglomerate / breccia (psephite: grain size: gravel, boulder and block)	breccia
007	sedimentary rock	clastic sedimentary rock	conglomerate / breccia (psephite: grain size: gravel, boulder and block)	conglomerate
008	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	---
009	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	sandstone, undifferentiated
010	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	quartzitic sandstone
011	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	calcareous sandstone
012	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	dolomitic sandstone
013	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	silicate sandstone
014	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	marly sandstone
015	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	argillaceous sandstone
016	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	arkose
017	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	flysch sandstone, greywacke
018	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	pebble bearing sandstone
019	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	mica sandstone
020	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	glauconite sandstone
021	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	nummulite sandstone
022	sedimentary rock	clastic sedimentary rock	sandstone (psammite: sand grain size)	shelly sandstone
023	sedimentary rock	clastic sedimentary rock	siltstone / claystone, marlstone (pelite: grain size: silt and clay)	---
024	sedimentary rock	clastic sedimentary rock	siltstone / claystone, marlstone (pelite: grain size: silt and clay)	pelite, undifferentiated
025	sedimentary rock	clastic sedimentary rock	siltstone / claystone, marlstone (pelite: grain size: silt and clay)	siltstone
026	sedimentary rock	clastic sedimentary rock	siltstone / claystone, marlstone (pelite: grain size: silt and clay)	claystone
027	sedimentary rock	clastic sedimentary rock	siltstone / claystone, marlstone (pelite: grain size: silt and clay)	marlstone
028	sedimentary rock	clastic sedimentary rock	siltstone / claystone, marlstone (pelite: grain size: silt and clay)	argillaceous marlstone
029	sedimentary rock	clastic sedimentary rock	siltstone / claystone, marlstone (pelite: grain size: silt and clay)	calcareous marlstone
030	sedimentary rock	clastic sedimentary rock	siltstone / claystone, marlstone (pelite: grain size: silt and clay)	mudstone
031	sedimentary rock	biogenic / biochemical / organic sedimentary rock	---	---
032	sedimentary rock	biogenic / biochemical / organic sedimentary rock	biogenic / biochemical / organic sedimentary rock, undifferentiated	---
033	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	---
034	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	limestone, undifferentiated
035	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	siliceous limestone
036	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	sparite
037	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	micrite
038	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	arenite
039	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	rudite
040	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	reef limestone
041	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	calcareous breccia
042	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	oolithic limestone
043	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	nummulite limestone
044	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	aptychus limestone
045	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	biogenic limestone, undifferentiated
046	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	detritic limestone
047	sedimentary rock	biogenic / biochemical / organic sedimentary rock	limestone	freshwater limestone
048	sedimentary rock	biogenic / biochemical / organic sedimentary rock	dolomite	---
049	sedimentary rock	biogenic / biochemical / organic sedimentary rock	dolomite	dolomite
050	sedimentary rock	biogenic / biochemical / organic sedimentary rock	siliceous rock	---
051	sedimentary rock	biogenic / biochemical / organic sedimentary rock	siliceous rock	siliceous rock, undifferentiated
052	sedimentary rock	biogenic / biochemical / organic sedimentary rock	siliceous rock	radiolarite
053	sedimentary rock	biogenic / biochemical / organic sedimentary rock	siliceous rock	spiculite
054	sedimentary rock	biogenic / biochemical / organic sedimentary rock	siliceous rock	chert
055	sedimentary rock	biogenic / biochemical / organic sedimentary rock	coal	---
056	sedimentary rock	biogenic / biochemical / organic sedimentary rock	coal	coal, undifferentiated
057	sedimentary rock	biogenic / biochemical / organic sedimentary rock	coal	sub-bituminous coal
058	sedimentary rock	biogenic / biochemical / organic sedimentary rock	coal	bituminous coal
059	sedimentary rock	biogenic / biochemical / organic sedimentary rock	coal	anthracite
060	sedimentary rock	biogenic / biochemical / organic sedimentary rock	ferriferous rock	---
061	sedimentary rock	biogenic / biochemical / organic sedimentary rock	ferriferous rock	iron oolite
062	sedimentary rock	biogenic / biochemical / organic sedimentary rock	phosphate-rich rock	---
063	sedimentary rock	biogenic / biochemical / organic sedimentary rock	phosphate-rich rock	phosphate-rich rock, undifferentiated
064	sedimentary rock	biogenic / biochemical / organic sedimentary rock	phosphate-rich rock	phosphate-rich sandstone
065	sedimentary rock	biogenic / biochemical / organic sedimentary rock	phosphate-rich rock	phosphate-rich limestone
066	sedimentary rock	biogenic / biochemical / organic sedimentary rock	phosphate-rich rock	phosphate-rich marlstone
067	sedimentary rock	chemical sedimentary rock	---	---
068	sedimentary rock	chemical sedimentary rock	chemical sedimentary rock, undifferentiated	---
069	sedimentary rock	chemical sedimentary rock	evaporite	---
070	sedimentary rock	chemical sedimentary rock	evaporite	evaporite, undifferentiated
071	sedimentary rock	chemical sedimentary rock	evaporite	anhydrite
072	sedimentary rock	chemical sedimentary rock	evaporite	gypsum
073	sedimentary rock	chemical sedimentary rock	evaporite	salt
074	sedimentary rock	chemical sedimentary rock	carbonate	---
075	sedimentary rock	chemical sedimentary rock	carbonate	carbonate undifferentiated
076	sedimentary rock	chemical sedimentary rock	carbonate	cellular dolomite
077	sedimentary rock	chemical sedimentary rock	carbonate	calcareous tufa
078	sedimentary rock	chemical sedimentary rock	carbonate	travertine
079	sedimentary rock	residual and pedogenetically altered deposits	---	---
080	sedimentary rock	residual and pedogenetically altered deposits	residual and pedogenetically altered deposits, undifferentiated	---
081	sedimentary rock	residual and pedogenetically altered deposits	ferruginous deposits	---
082	sedimentary rock	residual and pedogenetically altered deposits	ferruginous deposits	pisolitic ironstone
083	sedimentary rock	residual and pedogenetically altered deposits	silicate and ferriferous deposit	---
084	sedimentary rock	residual and pedogenetically altered deposits	silicate and ferriferous deposit	weathering deposits (siderolithic deposits)
085	sedimentary rock	residual and pedogenetically altered deposits	silicate deposits	---
086	sedimentary rock	residual and pedogenetically altered deposits	silicate deposits	silicate deposits, undifferentiated
087	sedimentary rock	residual and pedogenetically altered deposits	silicate deposits	bolus clay
088	sedimentary rock	residual and pedogenetically altered deposits	silicate deposits	hupper
089	sedimentary rock	residual and pedogenetically altered deposits	silicate deposits	quartzitic sand
090	sedimentary rock	residual and pedogenetically altered deposits	silicate deposits	silcrete
091	sedimentary rock	residual and pedogenetically altered deposits	pedogenic carbonate	---
092	sedimentary rock	residual and pedogenetically altered deposits	pedogenic carbonate	pedogenic carbonate, undifferentiated
093	sedimentary rock	residual and pedogenetically altered deposits	pedogenic carbonate	caliche
094	sedimentary rock	residual and pedogenetically altered deposits	pedogenic carbonate	calcrete

GeolCode Vlit403	0 order – Type of Rock	1st order – Main Group	2nd order – Sub Group	3rd order – Name of Rock
001	igneous rock	---	---	---
002	igneous rock	intrusive rock	---	---
003	igneous rock	intrusive rock	intrusive rock, undifferentiated	---
004	igneous rock	intrusive rock	plutonic rock	---
005	igneous rock	intrusive rock	plutonic rock	plutonic rock, undifferentiated
006	igneous rock	intrusive rock	plutonic rock	alkali granite
007	igneous rock	intrusive rock	plutonic rock	granite
008	igneous rock	intrusive rock	plutonic rock	granodiorite
009	igneous rock	intrusive rock	plutonic rock	quartz diorite
010	igneous rock	intrusive rock	plutonic rock	tonalite
011	igneous rock	intrusive rock	plutonic rock	diorite
012	igneous rock	intrusive rock	plutonic rock	syenite
013	igneous rock	intrusive rock	plutonic rock	alkali syenite
014	igneous rock	intrusive rock	plutonic rock	quartz gabbro
015	igneous rock	intrusive rock	plutonic rock	gabbro
016	igneous rock	intrusive rock	plutonic rock	norite
017	igneous rock	intrusive rock	plutonic rock	monzodiorite
018	igneous rock	intrusive rock	plutonic rock	monzogabbro
019	igneous rock	intrusive rock	plutonic rock	monzonite
020	igneous rock	intrusive rock	plutonic rock	pyroxenite
021	igneous rock	intrusive rock	plutonic rock	peridotite
022	igneous rock	intrusive rock	plutonic rock	nephelinitic syenite
023	igneous rock	intrusive rock	plutonic rock	essexite
024	igneous rock	intrusive rock	plutonic rock	granophyre
025	igneous rock	intrusive rock	dyke rock	---
026	igneous rock	intrusive rock	dyke rock	dyke rock, undifferentiated
027	igneous rock	intrusive rock	dyke rock	microgranite
028	igneous rock	intrusive rock	dyke rock	«rhyolite-porphyre»
029	igneous rock	intrusive rock	dyke rock	pegmatite
030	igneous rock	intrusive rock	dyke rock	aplite
031	igneous rock	intrusive rock	dyke rock	microdiorite
032	igneous rock	intrusive rock	dyke rock	microgabbro
033	igneous rock	intrusive rock	dyke rock	lamprophyre
034	igneous rock	intrusive rock	dyke rock	picrite
035	igneous rock	intrusive rock	dyke rock	dolerite
036	igneous rock	extrusive rock	---	---
037	igneous rock	extrusive rock	extrusive rock, undifferentiated	---
038	igneous rock	extrusive rock	effusive rock	---
039	igneous rock	extrusive rock	effusive rock	effusive rock, undifferentiated
040	igneous rock	extrusive rock	effusive rock	alkali rhyolite
041	igneous rock	extrusive rock	effusive rock	rhyolite
042	igneous rock	extrusive rock	effusive rock	rhyodacite
043	igneous rock	extrusive rock	effusive rock	dacite
044	igneous rock	extrusive rock	effusive rock	quartz andesite
045	igneous rock	extrusive rock	effusive rock	andesite
046	igneous rock	extrusive rock	effusive rock	alkali trachyte
047	igneous rock	extrusive rock	effusive rock	trachyte
048	igneous rock	extrusive rock	effusive rock	basalt
049	igneous rock	extrusive rock	effusive rock	picrite
050	igneous rock	extrusive rock	effusive rock	phonolite
051	igneous rock	extrusive rock	effusive rock	carbonatite
052	igneous rock	extrusive rock	pyroclastic rock (volcanic tuff; >75% pyroclastic components)	---
053	igneous rock	extrusive rock	pyroclastic rock (volcanic tuff; >75% pyroclastic components)	pyroclastic rock, undifferentiated
054	igneous rock	extrusive rock	pyroclastic rock (volcanic tuff; >75% pyroclastic components)	ignimbrite
055	igneous rock	extrusive rock	pyroclastic rock (volcanic tuff; >75% pyroclastic components)	pyroclastic breccia
056	igneous rock	extrusive rock	pyroclastic rock (volcanic tuff; >75% pyroclastic components)	lapilli tuff
057	igneous rock	extrusive rock	pyroclastic rock (volcanic tuff; >75% pyroclastic components)	crystal tuff
058	igneous rock	extrusive rock	pyroclastic rock (volcanic tuff; >75% pyroclastic components)	ash tuff
059	igneous rock	extrusive rock	tuffite (pyroclastic and non-volcanic sediments; 75-25% pyroclastic components)	---
060	igneous rock	extrusive rock	tuffite (pyroclastic and non-volcanic sediments; 75-25% pyroclastic components)	tuffite, undifferentiated
061	igneous rock	extrusive rock	tuffite (pyroclastic and non-volcanic sediments; 75-25% pyroclastic components)	tuff breccia
062	igneous rock	extrusive rock	tuffite (pyroclastic and non-volcanic sediments; 75-25% pyroclastic components)	tuffitic conglomerate
063	igneous rock	extrusive rock	tuffite (pyroclastic and non-volcanic sediments; 75-25% pyroclastic components)	tuffitic sandstone
064	igneous rock	extrusive rock	tuffite (pyroclastic and non-volcanic sediments; 75-25% pyroclastic components)	tuffitic siltstone
065	igneous rock	extrusive rock	tuffite (pyroclastic and non-volcanic sediments; 75-25% pyroclastic components)	tuffitic claystone
066	igneous rock	extrusive rock	tuffite (pyroclastic and non-volcanic sediments; 75-25% pyroclastic components)	bentonite

GeolCode Vlit404	0 order – Type of Rock	1st order – Main Group	2nd order – Sub Group	3rd order – Name of Rock
001	metamorphic rock	---	---	---
002	metamorphic rock	fault zone rock	---	---
003	metamorphic rock	fault zone rock	fault zone rock, undifferentiated	---
004	metamorphic rock	fault zone rock	<i>kakirite (strongly shattered and sliced, ± without cohesion)</i>	---
005	metamorphic rock	fault zone rock	kakirite (strongly shattered and sliced, ± without cohesion)	kakirite, undifferentiated
006	metamorphic rock	fault zone rock	kakirite (strongly shattered and sliced, ± without cohesion)	fault gouge
007	metamorphic rock	fault zone rock	kakirite (strongly shattered and sliced, ± without cohesion)	clay smear
008	metamorphic rock	fault zone rock	kakirite (strongly shattered and sliced, ± without cohesion)	fault breccia (without cohesion)
009	metamorphic rock	fault zone rock	<i>cataclasite (with larger fragments of neighbouring rock, mainly brittle deformation)</i>	---
010	metamorphic rock	fault zone rock	cataclasite (with larger fragments of neighbouring rock, mainly brittle deformation)	cataclasite, undifferentiated
011	metamorphic rock	fault zone rock	cataclasite (with larger fragments of neighbouring rock, mainly brittle deformation)	cellular dolomite
012	metamorphic rock	fault zone rock	cataclasite (with larger fragments of neighbouring rock, mainly brittle deformation)	tectonic dolomite breccia
013	metamorphic rock	fault zone rock	cataclasite (with larger fragments of neighbouring rock, mainly brittle deformation)	tectonic breccia (with cohesion)
014	metamorphic rock	fault zone rock	cataclasite (with larger fragments of neighbouring rock, mainly brittle deformation)	protocataclasite
015	metamorphic rock	fault zone rock	cataclasite (with larger fragments of neighbouring rock, mainly brittle deformation)	(meso)cataclasite
016	metamorphic rock	fault zone rock	cataclasite (with larger fragments of neighbouring rock, mainly brittle deformation)	ultracataclasite
017	metamorphic rock	fault zone rock	<i>mylonite (dynamic recrystallisation, banded, ductile deformation)</i>	---
018	metamorphic rock	fault zone rock	mylonite (dynamic recrystallisation, banded, ductile deformation)	mylonite, undifferentiated
019	metamorphic rock	fault zone rock	mylonite (dynamic recrystallisation, banded, ductile deformation)	protomylonite
020	metamorphic rock	fault zone rock	mylonite (dynamic recrystallisation, banded, ductile deformation)	mylonite
021	metamorphic rock	fault zone rock	mylonite (dynamic recrystallisation, banded, ductile deformation)	ultramylonite
022	metamorphic rock	fault zone rock	<i>phylonite (ductile deformation)</i>	---
023	metamorphic rock	fault zone rock	phylonite (ductile deformation)	phylonite
024	metamorphic rock	fault zone rock	<i>pseudotachylite (melted by frictional heat)</i>	---
025	metamorphic rock	fault zone rock	pseudotachylite (melted by frictional heat)	pseudotachylite
026	metamorphic rock	rock resulting from regional- or contact metamorphism	---	---
027	metamorphic rock	rock resulting from regional- or contact metamorphism	rock resulting from regional- or contact metamorphism, undifferentiated	---
028	metamorphic rock	rock resulting from regional- or contact metamorphism	<i>phyllite (very thin foliation, flaky)</i>	---
029	metamorphic rock	rock resulting from regional- or contact metamorphism	phyllite (very thin foliation, flaky)	phyllite
030	metamorphic rock	rock resulting from regional- or contact metamorphism	<i>schist (splitting in 0.1 - 1 cm thin plates)</i>	---
031	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	schist, undifferentiated
032	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	shale
033	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	sericite schist
034	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	chlorite schist
035	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	mica schist
036	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	glaucophane schist
037	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	calcareous schist
038	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	prasinite
039	metamorphic rock	rock resulting from regional- or contact metamorphism	schist (splitting in 0.1 - 1 cm thin plates)	talch schist
040	metamorphic rock	rock resulting from regional- or contact metamorphism	<i>gneiss (splitting in cm- or dm sized plates)</i>	---
041	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	gneiss, undifferentiated
042	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	augen gneiss
043	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	banded gneiss
044	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	veined gneiss
045	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	two-mica gneiss
046	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	agmatic gneiss
063	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	amphibolite gneiss
061	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	banded amphibolite
047	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	leptinite
048	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	paragneiss
049	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	orthogneiss
050	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	stronalite
051	metamorphic rock	rock resulting from regional- or contact metamorphism	gneiss (splitting in cm- or dm sized plates)	kinzigite
052	metamorphic rock	rock resulting from regional- or contact metamorphism	<i>fels (with granoblastic texture)</i>	---
053	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	fels, undifferentiated
054	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	calcilicite rock
055	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	marble
056	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	carbonate- and silicate-bearing rock
057	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	cipolin
058	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	granulite
059	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	rodingite
060	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	amphibolite
062	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	amphibolite with agmatitic structure
064	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	eclogite
065	metamorphic rock	rock resulting from regional- or contact metamorphism	fels (with granoblastic texture)	peridotite
066	metamorphic rock	rock resulting from regional- or contact metamorphism	<i>hornfels</i>	---
067	metamorphic rock	rock resulting from regional- or contact metamorphism	hornfels	hornfels
068	metamorphic rock	rock resulting from regional- or contact metamorphism	<i>metasomatite</i>	---
069	metamorphic rock	rock resulting from regional- or contact metamorphism	metasomatite	metasomatite, undifferentiated
070	metamorphic rock	rock resulting from regional- or contact metamorphism	metasomatite	skarn
071	metamorphic rock	rock resulting from regional- or contact metamorphism	metasomatite	greisen
072	metamorphic rock	rock resulting from regional- or contact metamorphism	metasomatite	gneiss with feldsparblasts
073	metamorphic rock	rock resulting from regional- or contact metamorphism	<i>anatexite (migmatite)</i>	---
074	metamorphic rock	rock resulting from regional- or contact metamorphism	anatexite (migmatite)	anatexite, undifferentiated
075	metamorphic rock	rock resulting from regional- or contact metamorphism	anatexite (migmatite)	migmatite
076	metamorphic rock	rock resulting from regional- or contact metamorphism	anatexite (migmatite)	metatexite with spotted structure
077	metamorphic rock	rock resulting from regional- or contact metamorphism	anatexite (migmatite)	metatexite with stromatitic structure
078	metamorphic rock	rock resulting from regional- or contact metamorphism	anatexite (migmatite)	metatexite with reticulated structure
079	metamorphic rock	rock resulting from regional- or contact metamorphism	anatexite (migmatite)	diatexite with nebulitic structure
080	metamorphic rock	rock resulting from regional- or contact metamorphism	anatexite (migmatite)	diatexite with schlieren structure
081	metamorphic rock	rock resulting from regional- or contact metamorphism	anatexite (migmatite)	diatexite with schollen structure
082	metamorphic rock	specific name	---	---
083	metamorphic rock	specific name	<i>monomineralic rock</i>	---
084	metamorphic rock	specific name	monomineralic rock	monomineralic rock, undifferentiated
085	metamorphic rock	specific name	monomineralic rock	biotitite
086	metamorphic rock	specific name	monomineralic rock	hornblendite
087	metamorphic rock	specific name	monomineralic rock	albitite
088	metamorphic rock	specific name	monomineralic rock	pyroxenite
089	metamorphic rock	specific name	monomineralic rock	chloritite
090	metamorphic rock	specific name	monomineralic rock	serpentinite
091	metamorphic rock	specific name	monomineralic rock	quartzite
092	metamorphic rock	protolite recognisable	---	---
093	metamorphic rock	protolite recognisable	<i>sedimentary protolite recognisable</i>	---
201	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metasediment
202	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metapelite

GeolCode Vlit404	0 order – Type of Rock	1st order – Main Group	2nd order – Sub Group	3rd order – Name of Rock
203	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metabreccia
204	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metaconglomerate
205	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metasandstone
206	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	quartzite
207	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metapsammite
208	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	meta-arkose
209	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metagreywacke
210	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	pebble bearing metasandstone
211	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metapelite
212	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metasiltstone
213	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	slate
214	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metamarl
215	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	marble
216	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	dolomitic marble
217	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metaradiolarite
218	metamorphic rock	protolite recognisable	sedimentary protolite recognisable	metacarbonate
095	metamorphic rock	protolite recognisable	igneous protolite recognisable	---
401	metamorphic rock	protolite recognisable	igneous protolite recognisable	metaigneous rock
402	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-intrusive rock
403	metamorphic rock	protolite recognisable	igneous protolite recognisable	metaplutonite
404	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-alkali granite
405	metamorphic rock	protolite recognisable	igneous protolite recognisable	metagranite
406	metamorphic rock	protolite recognisable	igneous protolite recognisable	metagranodiorite
407	metamorphic rock	protolite recognisable	igneous protolite recognisable	metaquartz diorite
408	metamorphic rock	protolite recognisable	igneous protolite recognisable	metatonalite
409	metamorphic rock	protolite recognisable	igneous protolite recognisable	metadiorite
410	metamorphic rock	protolite recognisable	igneous protolite recognisable	metasyenite
411	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-alkali syenite
412	metamorphic rock	protolite recognisable	igneous protolite recognisable	metaquartz gabbro
413	metamorphic rock	protolite recognisable	igneous protolite recognisable	metagabbro
414	metamorphic rock	protolite recognisable	igneous protolite recognisable	metanorite
415	metamorphic rock	protolite recognisable	igneous protolite recognisable	metamonzodiorite
416	metamorphic rock	protolite recognisable	igneous protolite recognisable	metamonzogabbro
417	metamorphic rock	protolite recognisable	igneous protolite recognisable	metamonzonite
418	metamorphic rock	protolite recognisable	igneous protolite recognisable	metapyroxenite
419	metamorphic rock	protolite recognisable	igneous protolite recognisable	metaperidotite
420	metamorphic rock	protolite recognisable	igneous protolite recognisable	nephelinitic metasyenite
421	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-essexite
422	metamorphic rock	protolite recognisable	igneous protolite recognisable	metagranophyre
423	metamorphic rock	protolite recognisable	igneous protolite recognisable	metadyke rock
424	metamorphic rock	protolite recognisable	igneous protolite recognisable	metamicrogranite
425	metamorphic rock	protolite recognisable	igneous protolite recognisable	«meta-rhyolite-porphyr»
426	metamorphic rock	protolite recognisable	igneous protolite recognisable	metapegmatite
427	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-aplite
428	metamorphic rock	protolite recognisable	igneous protolite recognisable	metamicrodiorite
429	metamorphic rock	protolite recognisable	igneous protolite recognisable	metamicrogabbro
430	metamorphic rock	protolite recognisable	igneous protolite recognisable	metalamphrophyre
431	metamorphic rock	protolite recognisable	igneous protolite recognisable	metapicrite
432	metamorphic rock	protolite recognisable	igneous protolite recognisable	metadolerite
433	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-alkali rhyolite
434	metamorphic rock	protolite recognisable	igneous protolite recognisable	metarhyolite
435	metamorphic rock	protolite recognisable	igneous protolite recognisable	metarhyodacite
436	metamorphic rock	protolite recognisable	igneous protolite recognisable	metadacite
437	metamorphic rock	protolite recognisable	igneous protolite recognisable	metaquartz andesite
438	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-andesite
439	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-alkali trachyte
440	metamorphic rock	protolite recognisable	igneous protolite recognisable	metatrachyte
441	metamorphic rock	protolite recognisable	igneous protolite recognisable	metabasalt
442	metamorphic rock	protolite recognisable	igneous protolite recognisable	metapicrite
443	metamorphic rock	protolite recognisable	igneous protolite recognisable	metaphonolite
444	metamorphic rock	protolite recognisable	igneous protolite recognisable	metapyroclastic rock
445	metamorphic rock	protolite recognisable	igneous protolite recognisable	meta-ignimbrite
446	metamorphic rock	protolite recognisable	igneous protolite recognisable	metavulcanite

3 Lookup table of the chronostratigraphic units

GeolCode Vchr401	1st order – Eon	2nd order – Era	3rd order – Subera	4th order – Period	5th order – Subperiod	6th order – Epoch	7th order – Subepoch	8th order – Stage	9th order – Substage
001	Phanerozoic	---	---	---	---	---	---	---	---
002	Phanerozoic	Cenozoic	---	---	---	---	---	---	---
003	Phanerozoic	Cenozoic	---	Quaternary	---	---	---	---	---
004	Phanerozoic	Cenozoic	---	Quaternary	---	Holocene	---	---	---
005	Phanerozoic	Cenozoic	---	Quaternary	---	Pleistocene	---	---	---
006	Phanerozoic	Cenozoic	---	Quaternary	---	Pleistocene	Late Pleistocene	---	---
007	Phanerozoic	Cenozoic	---	Quaternary	---	Pleistocene	Middle Pleistocene	---	---
008	Phanerozoic	Cenozoic	---	Quaternary	---	Pleistocene	Middle Pleistocene	Ionian	---
009	Phanerozoic	Cenozoic	---	Quaternary	---	Pleistocene	Early Pleistocene	---	---
010	Phanerozoic	Cenozoic	---	Quaternary	---	Pleistocene	Early Pleistocene	Calabrian	---
011	Phanerozoic	Cenozoic	---	Quaternary	---	Pleistocene	Early Pleistocene	Gelasian	---
012	Phanerozoic	Cenozoic	Tertiary	---	---	---	---	---	---
013	Phanerozoic	Cenozoic	Tertiary	Neogene	---	---	---	---	---
014	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Pliocene	---	---	---
015	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Pliocene	---	Piacenzian	---
016	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Pliocene	---	Zanclean	---
017	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	---	---	---
018	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Late Miocene	---	---
019	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Late Miocene	Messinian	---
020	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Late Miocene	Tortonian	---
021	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Middle Miocene	---	---
022	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Middle Miocene	Serravallian	---
023	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Middle Miocene	Langhian	---
024	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Early Miocene	---	---
025	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Early Miocene	Burdigalian	---
026	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Early Miocene	Burdigalian	Late Burdigalian
027	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Early Miocene	Burdigalian	Early Burdigalian
028	Phanerozoic	Cenozoic	Tertiary	Neogene	---	Miocene	Early Miocene	Aquitanian	---
029	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	---	---	---	---
030	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Oligocene	---	---	---
031	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Oligocene	---	Chattian	---
032	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Oligocene	---	Chattian	Late Chattian
033	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Oligocene	---	Chattian	Early Chattian
034	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Oligocene	---	Rupelian	---
035	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	---	---	---
036	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Late Eocene	---	---
037	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Late Eocene	Priabonian	---
038	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Late Eocene	Priabonian	[Late Priabonian / Latdorfian]
039	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Late Eocene	Priabonian	[Early Priabonian]
040	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Middle Eocene	---	---
041	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Middle Eocene	Bartonian	---
042	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Middle Eocene	Lutetian	---
043	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Early Eocene	---	---
044	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Eocene	Early Eocene	Ypresian	---
045	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Paleocene	---	---	---
046	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Paleocene	---	Thanetian	---
047	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Paleocene	---	Selandian	---
048	Phanerozoic	Cenozoic	Tertiary	Paleogene	---	Paleocene	---	Danian	---
049	Phanerozoic	Mesozoic	---	---	---	---	---	---	---
050	Phanerozoic	Mesozoic	---	Cretaceous	---	---	---	---	---
051	Phanerozoic	Mesozoic	---	Cretaceous	---	Late Cretaceous	---	---	---
052	Phanerozoic	Mesozoic	---	Cretaceous	---	Late Cretaceous	---	Maastrichtian	---
053	Phanerozoic	Mesozoic	---	Cretaceous	---	Late Cretaceous	---	Campanian	---
054	Phanerozoic	Mesozoic	---	Cretaceous	---	Late Cretaceous	---	Santonian	---
055	Phanerozoic	Mesozoic	---	Cretaceous	---	Late Cretaceous	---	Coniacian	---
056	Phanerozoic	Mesozoic	---	Cretaceous	---	Late Cretaceous	---	Turonian	---
057	Phanerozoic	Mesozoic	---	Cretaceous	---	Late Cretaceous	---	Cenomanian	---
058	Phanerozoic	Mesozoic	---	Cretaceous	---	Early Cretaceous	---	---	---
059	Phanerozoic	Mesozoic	---	Cretaceous	---	Early Cretaceous	---	Albian	---
060	Phanerozoic	Mesozoic	---	Cretaceous	---	Early Cretaceous	---	Aptian	---
061	Phanerozoic	Mesozoic	---	Cretaceous	---	Early Cretaceous	---	Barremian	---
062	Phanerozoic	Mesozoic	---	Cretaceous	---	Early Cretaceous	---	Hauterivian	---
063	Phanerozoic	Mesozoic	---	Cretaceous	---	Early Cretaceous	---	Valanginian	---
064	Phanerozoic	Mesozoic	---	Cretaceous	---	Early Cretaceous	---	Berriasian	---
065	Phanerozoic	Mesozoic	---	Jurassic	---	---	---	---	---
066	Phanerozoic	Mesozoic	---	Jurassic	---	Late Jurassic	---	---	---
067	Phanerozoic	Mesozoic	---	Jurassic	---	Late Jurassic	---	Tithonian	---
068	Phanerozoic	Mesozoic	---	Jurassic	---	Late Jurassic	---	Kimmeridgian	---
069	Phanerozoic	Mesozoic	---	Jurassic	---	Late Jurassic	---	Oxfordian	---
070	Phanerozoic	Mesozoic	---	Jurassic	---	Middle Jurassic	---	---	---
071	Phanerozoic	Mesozoic	---	Jurassic	---	Middle Jurassic	---	Callovian	---
072	Phanerozoic	Mesozoic	---	Jurassic	---	Middle Jurassic	---	Bathonian	---

4 Lookup table of the tectonic units

GeolCode Vtec401	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
001	Extra-alpine Domain					
002	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation				
003	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Black Forest Massif		
004	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Black Forest Massif	Crystalline Basement	
005	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Black Forest Massif	Badenweiler-Lenzkirch Zone	
006	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Vosges Massif		
007	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Vosges Massif	Crystalline Basement	
008	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Vosges Massif	Overlapped Paleozoic	
009	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Swabian Alb		
010	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Tabular Jura		
011	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Dinkelberg Bloc		
012	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Haute-Saône Plateaus		
013	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Upper Rhine Graben		Tertiary Graben
014	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Upper Rhine Graben	Piedmont Zone	Tertiary Graben
015	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Bresse Graben		Tertiary Graben
016	Extra-alpine Domain	European Continental Shelf not affected by Alpine Deformation		Hegau-Bodensee Graben		Tertiary Graben
017	Domain of Alpine Deformation					
018	Domain of Alpine Deformation	European Continental Shelf affected by Alpine Deformation				
019	Domain of Alpine Deformation	European Continental Shelf affected by Alpine Deformation		Detached Tabular Jura (Vorfaltenzone)		
020	Domain of Alpine Deformation	European Continental Shelf affected by Alpine Deformation		Detached Tabular Jura (Vorfaltenzone)	Herznach-Bözberg Plateau	
021	Domain of Alpine Deformation	European Continental Shelf affected by Alpine Deformation		Detached Tabular Jura (Vorfaltenzone)	Surbtal-Wehntal Plateau	
022	Domain of Alpine Deformation	European Continental Shelf affected by Alpine Deformation		Avant-Monts Zone		
023	Domain of Alpine Deformation	Folded Jura				
024	Domain of Alpine Deformation	Folded Jura	External Jura			
025	Domain of Alpine Deformation	Folded Jura	External Jura	Faisceaux		
026	Domain of Alpine Deformation	Folded Jura	External Jura	Plateaus		
027	Domain of Alpine Deformation	Folded Jura	Internal Jura			
028	Domain of Alpine Deformation	Folded Jura	Internal Jura	Folded Jura sensu stricto		

GeolCode Vtec402	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
001	Domain of Alpine Deformation	Molasse Basin				
002	Domain of Alpine Deformation	Molasse Basin	Plateau Molasse			
003	Domain of Alpine Deformation	Molasse Basin	Plateau Molasse	Plateau Molasse in Horizontal Position		
004	Domain of Alpine Deformation	Molasse Basin	Plateau Molasse	Folded and Uplifted Plateau Molasse		former Folded and Uplifted Molasse
005	Domain of Alpine Deformation	Molasse Basin	Triangle Zone			
006	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse			
007	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Rigi-Rossberg-Morgarten Slice	
008	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		St. Jost Slice	Equivalent to Grindelegg Slice
009	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Höhronen Slice	
010	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Speer-Stockberg Slice	
011	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Schorhüttenberg Slice	
012	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Kronberg Slice	
017	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		«Kronberg-Süd» Zone	
013	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Gäbris Slice	
014	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Beichlen-Farneren Slice	
015	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Hilfern Slice	
016	Domain of Alpine Deformation	Molasse Basin	Subalpine Molasse		Schangnau Slice	

GeoCode Vtec403	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
001	Domain of Alpine Deformation	Infrahelvetic				
002	Domain of Alpine Deformation	Infrahelvetic		Belledonne Massif		incl. Megève Window
003	Domain of Alpine Deformation	Infrahelvetic		Aiguilles Rouges Massif		
004	Domain of Alpine Deformation	Infrahelvetic		Aiguilles Rouges Massif	Salvan-Dorénaz Graben	
005	Domain of Alpine Deformation	Infrahelvetic		Aiguilles Rouges Massif	Fully Massif	
006	Domain of Alpine Deformation	Infrahelvetic		Aiguilles Rouges Massif	Arpille Massif	
007	Domain of Alpine Deformation	Infrahelvetic		Mont Blanc Massif		
008	Domain of Alpine Deformation	Infrahelvetic		Gastern Massif		
009	Domain of Alpine Deformation	Infrahelvetic		Aar Massif		incl. Biferten, Limmernboden, Vättis and Tamins Window
088	Domain of Alpine Deformation	Infrahelvetic		Hoch-Fulen Nappe		
010	Domain of Alpine Deformation	Infrahelvetic		Disentis Zone		
011	Domain of Alpine Deformation	Infrahelvetic		Subalpine Chains		
012	Domain of Alpine Deformation	Infrahelvetic		Subalpine Chains	Aravis Ranges	
013	Domain of Alpine Deformation	Infrahelvetic		Subalpine Chains	Bornes Massif	
014	Domain of Alpine Deformation	Infrahelvetic		Subalpine Chains	Bauges Massif	
015	Domain of Alpine Deformation	Infrahelvetic		Morcles Nappe		
016	Domain of Alpine Deformation	Infrahelvetic		Doldenhorn Nappe		
017	Domain of Alpine Deformation	Infrahelvetic		Ardon Nappe		
018	Domain of Alpine Deformation	Infrahelvetic		Jägerchrüz Nappe		
019	Domain of Alpine Deformation	Infrahelvetic		Plammis Nappe		
020	Domain of Alpine Deformation	Infrahelvetic		Gellihorn Nappe		
021	Domain of Alpine Deformation	Infrahelvetic		Tschep Nappe		
022	Domain of Alpine Deformation	Infrahelvetic		Sangle Nappe		
023	Domain of Alpine Deformation	Infrahelvetic		Griesstock Nappe		
024	Domain of Alpine Deformation	Infrahelvetic		Klausenpass Zone of Tectonic Slices		
025	Domain of Alpine Deformation	Infrahelvetic		Kammlistock Nappe		
026	Domain of Alpine Deformation	Infrahelvetic		Gitschen Nappe		
027	Domain of Alpine Deformation	Infrahelvetic		Cavistrau Nappe		
028	<i>Domain of Alpine Deformation</i>	<i>Helvetic</i>				
029	Domain of Alpine Deformation	Helvetic		Roselette Nappe		
030	Domain of Alpine Deformation	Helvetic		Diablerets Nappe		
031	<i>Domain of Alpine Deformation</i>	<i>Helvetic</i>		<i>Wildhorn Nappe</i>		
032	Domain of Alpine Deformation	Helvetic		Wildhorn Nappe	Prapio-Audon Slice	
033	Domain of Alpine Deformation	Helvetic		Wildhorn Nappe	Mont Gond Nappe	
034	Domain of Alpine Deformation	Helvetic		Wildhorn Nappe	Sublage Nappe	
035	Domain of Alpine Deformation	Helvetic		Wildhorn Nappe	Border Chain	incl. Urmiberg Slice and Hochflue Slice
036	Domain of Alpine Deformation	Helvetic		Wildhorn Nappe	Wildhorn Nappe sensu stricto	
038	Domain of Alpine Deformation	Helvetic		Glaris Nappe		
037	Domain of Alpine Deformation	Helvetic		Glaris Nappe	Wageten Slice	incl. Chapfenberg Slice
044	Domain of Alpine Deformation	Helvetic		Glaris Nappe	Gonzen-Walenstadt Zone of Tectonic Slices	
039	Domain of Alpine Deformation	Helvetic		Glaris Nappe	Mürtschen Nappe	
084	Domain of Alpine Deformation	Helvetic		Glaris Nappe	Glaris Nappe sensu stricto	
040	Domain of Alpine Deformation	Helvetic		Hohenems Nappe		
041	Domain of Alpine Deformation	Helvetic		Axen Nappe		
085	Domain of Alpine Deformation	Helvetic		Axen Nappe	Silberen Nappe	
086	Domain of Alpine Deformation	Helvetic		Axen Nappe	Bächistock Nappe	
087	Domain of Alpine Deformation	Helvetic		Axen Nappe	Axen Nappe sensu stricto	
042	Domain of Alpine Deformation	Helvetic		Wissberg Slice		
043	Domain of Alpine Deformation	Helvetic		Bundstock Element		

GeoCode Vtec403	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
045	Domain of Alpine Deformation	Helvetic		Säntis Nappe		
046	Domain of Alpine Deformation	Helvetic		Drusberg Nappe		
047	Domain of Alpine Deformation	Helvetic		Root Zone		
048	Domain of Alpine Deformation	Ultrahelvetic				
049	Domain of Alpine Deformation	Ultrahelvetic		Mont Chétif Massif		
050	Domain of Alpine Deformation	Ultrahelvetic		Furka Zone		
051	Domain of Alpine Deformation	Ultrahelvetic		Urseren Zone		
052	Domain of Alpine Deformation	Ultrahelvetic		Garvera Zone		
053	Domain of Alpine Deformation	Ultrahelvetic		Nufenen Zone		
054	Domain of Alpine Deformation	Ultrahelvetic		Termen Zone		
055	Domain of Alpine Deformation	Ultrahelvetic		Ilanz Zone		NEW: represents Ilanz Verrucano
056	Domain of Alpine Deformation	Ultrahelvetic		Goms Massif		
057	Domain of Alpine Deformation	Ultrahelvetic		Tavetsch Intermediate Massif		
058	Domain of Alpine Deformation	Ultrahelvetic		Gotthard Massif		
059	Domain of Alpine Deformation	Ultrahelvetic		Subalpine Flysch Zone		incl. subalpine «Border Flysch Zone»
067	Domain of Alpine Deformation	Ultrahelvetic		Subalpine Flysch Zone	Lauerz Zone of Tectonic Slices	
060	Domain of Alpine Deformation	Ultrahelvetic		Einsiedeln Zone of Tectonic Slices		
061	Domain of Alpine Deformation	Ultrahelvetic		Einsiedeln Zone of Tectonic Slices	external Einsiedeln Zone of Tectonic Slices	
062	Domain of Alpine Deformation	Ultrahelvetic		Einsiedeln Zone of Tectonic Slices	internal Einsiedeln Zone of Tectonic Slices	
063	Domain of Alpine Deformation	Ultrahelvetic		Wildhaus Zone of Tectonic Slices		
064	Domain of Alpine Deformation	Ultrahelvetic		Brülisau Zone of Tectonic Slices		
065	Domain of Alpine Deformation	Ultrahelvetic		Leist Zone of Tectonic Slices		
066	Domain of Alpine Deformation	Ultrahelvetic		Fliegenspitz Complex		
068	Domain of Alpine Deformation	Ultrahelvetic		Liebenstein Nappe		
069	Domain of Alpine Deformation	Ultrahelvetic		Sardona Nappe		
070	Domain of Alpine Deformation	Ultrahelvetic		Grabs Klippen		
071	Domain of Alpine Deformation	Ultrahelvetic		Southern Fläscherberg Slice		
072	Domain of Alpine Deformation	Ultrahelvetic		Plaine Morte Nappe		
073	Domain of Alpine Deformation	Ultrahelvetic		Sex Mort Nappe		
074	Domain of Alpine Deformation	Ultrahelvetic		Bex-Laubhorn Nappe		
075	Domain of Alpine Deformation	Ultrahelvetic		Arveyes Nappe		
076	Domain of Alpine Deformation	Ultrahelvetic		Meilleret Nappe		
077	Domain of Alpine Deformation	Ultrahelvetic		Habkern-Melange Zone		
078	Domain of Alpine Deformation	Ultrahelvetic		Scopi Zone		
079	Domain of Alpine Deformation	Ultrahelvetic		Frodalera Zone		eq. Trias of Frodalera-Peiden (Peiden Zone of Tectonic Slices)
080	Domain of Alpine Deformation	Ultrahelvetic		Peiden Zone of Tectonic Slices		
081	Domain of Alpine Deformation	Ultrahelvetic		Anzeinde Nappe		also in Infrahelvetic Position
082	Domain of Alpine Deformation	Ultrahelvetic		Blattengrat Nappe		also in Infrahelvetic Position
083	Domain of Alpine Deformation	Ultrahelvetic		Piora Zone		incl. Bündnerschiefer

GeoCode Vtec404	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
001	Domain of Alpine Deformation	Infrapenninic				
002	Domain of Alpine Deformation	Infrapenninic		Leventina Nappe		
003	Domain of Alpine Deformation	Infrapenninic		Lucomagno Nappe		
004	Domain of Alpine Deformation	Infrapenninic		Soja Nappe		
005	Domain of Alpine Deformation	Infrapenninic		Piz-Terri-Lunschania Zone		
006	Domain of Alpine Deformation	Infrapenninic		Piz-Terri-Lunschania Zone	Zone of Tectonic Slices Güida-Alpettas	
007	Domain of Alpine Deformation	Infrapenninic		Molare Zone		incl. Bündnerschiefer
008	Domain of Alpine Deformation	Infrapenninic		Simano Nappe		
009	Domain of Alpine Deformation	Infrapenninic		Verampio Nappe		
010	Domain of Alpine Deformation	Infrapenninic		Antigorio Nappe		incl. Teggiolo Zone, Sediments, Mesozoic Nappe Separation Zone
011	Domain of Alpine Deformation	Infrapenninic		Lebendun Nappe		Sabbione Zone, Sediment Cover
109	Domain of Alpine Deformation	Infrapenninic		San Giorgio Unit		
012	Domain of Alpine Deformation	Infrapenninic		Monte Leone Nappe		Holzerspitz Series, Sediment Cover
013	Domain of Alpine Deformation	Infrapenninic		Pizzo del Vallone Nappe		
014	Domain of Alpine Deformation	Penninic				
015	Domain of Alpine Deformation	Penninic	Lower Penninic			
016	Domain of Alpine Deformation	Penninic	Lower Penninic	Rosswald Series		Western Prolongation of the Grava or Tomül Nappe?
017	Domain of Alpine Deformation	Penninic	Lower Penninic	Cima Lunga Nappe		
018	Domain of Alpine Deformation	Penninic	Lower Penninic	Adula Nappe		
019	Domain of Alpine Deformation	Penninic	Lower Penninic	Gruf Complex		
020	Domain of Alpine Deformation	Penninic	Lower Penninic	Nappe Separation Zone Adula-Simano		
021	Domain of Alpine Deformation	Penninic	Lower Penninic	Castione Zone		
022	Domain of Alpine Deformation	Penninic	Lower Penninic	Arbedo Zone		
023	Domain of Alpine Deformation	Penninic	Lower Penninic	Orselina Zone		
024	Domain of Alpine Deformation	Penninic	Lower Penninic	Bellinzona Zone		
025	Domain of Alpine Deformation	Penninic	Lower Penninic	Isorno Zone		
026	Domain of Alpine Deformation	Penninic	Lower Penninic	Bosco Zone		
027	Domain of Alpine Deformation	Penninic	Lower Penninic	Niesen Nappe		
028	Domain of Alpine Deformation	Penninic	Lower Penninic	Sion-Courmayeur Zone		
029	Domain of Alpine Deformation	Penninic	Lower Penninic	Sion-Courmayeur Zone	Ferret Unit	
030	Domain of Alpine Deformation	Penninic	Lower Penninic	Sion-Courmayeur Zone	Moutiers Unit	
031	Domain of Alpine Deformation	Penninic	Lower Penninic	Sion-Courmayeur Zone	Roignais-Versoyen Unit	
032	Domain of Alpine Deformation	Penninic	Lower Penninic	Sion-Courmayeur Zone	Pierre Avoi Unit	resp. Cols Unit
033	Domain of Alpine Deformation	Penninic	Lower Penninic	Petit St-Bernard Unit		
034	Domain of Alpine Deformation	Penninic	Lower Penninic	Chiavenna Zone		
035	Domain of Alpine Deformation	Penninic	Lower Penninic	Vals Slices		
036	Domain of Alpine Deformation	Penninic	Lower Penninic	Aul Nappe		
037	Domain of Alpine Deformation	Penninic	Lower Penninic	Arblatsch Zone		
038	Domain of Alpine Deformation	Penninic	Lower Penninic	Grava Nappe		
039	Domain of Alpine Deformation	Penninic	Lower Penninic	Grava Nappe	Lugnez Schist	
040	Domain of Alpine Deformation	Penninic	Lower Penninic	Grava Nappe	Sosto Schist	
041	Domain of Alpine Deformation	Penninic	Lower Penninic	Tomül Nappe		
042	Domain of Alpine Deformation	Penninic	Lower Penninic	Prättigau Flysch		
043	Domain of Alpine Deformation	Penninic	Lower Penninic	Feuerstätt Nappe		
044	Domain of Alpine Deformation	Penninic	Lower Penninic	Rhenodanubian Flysch		
045	Domain of Alpine Deformation	Penninic	Lower Penninic	Roz-Champatsch Zone		
046	Domain of Alpine Deformation	Penninic	Lower Penninic	Ramosch Zone		
047	Domain of Alpine Deformation	Penninic	Lower Penninic	«Bündnerschiefer» of the Engadine Window		
048	Domain of Alpine Deformation	Penninic	Lower Penninic	Zone Submédiane		
049	Domain of Alpine Deformation	Penninic	Middle Penninic			
050	Domain of Alpine Deformation	Penninic	Middle Penninic	Zone Houillère		
051	Domain of Alpine Deformation	Penninic	Middle Penninic	Zone Houillère	External Zone Houillère	
052	Domain of Alpine Deformation	Penninic	Middle Penninic	Zone Houillère	Internal Zone Houillère	
053	Domain of Alpine Deformation	Penninic	Middle Penninic	Zone Houillère	Visperterminen Zone	
054	Domain of Alpine Deformation	Penninic	Middle Penninic	Zone Houillère	Lower Stalden Zone	
055	Domain of Alpine Deformation	Penninic	Middle Penninic	Cimes Blanches Nappe		

GeoCode Vtec404	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
056	Domain of Alpine Deformation	Penninic	Middle Penninic	Frilhorn Nappe		
057	Domain of Alpine Deformation	Penninic	Middle Penninic	Klippen Nappe		
058	Domain of Alpine Deformation	Penninic	Middle Penninic	Klippen Nappe	Nappe of the Préalpes médianes rigides	
059	Domain of Alpine Deformation	Penninic	Middle Penninic	Klippen Nappe	Nappe of the Préalpes médianes plastiques	
060	Domain of Alpine Deformation	Penninic	Middle Penninic	Klippen Nappe	Giswil Klippen	Préalpes médianes rigides
061	Domain of Alpine Deformation	Penninic	Middle Penninic	Klippen Nappe	Stans Klippe	Plastiques ou rigides?
062	Domain of Alpine Deformation	Penninic	Middle Penninic	Klippen Nappe	Buochs Klippe	Plastiques ou rigides?
063	Domain of Alpine Deformation	Penninic	Middle Penninic	Klippen Nappe	Iberg Klippen pro parte	Plastiques ou rigides?
064	Domain of Alpine Deformation	Penninic	Middle Penninic	Klippen Nappe	Mythen Klippen	Plastiques ou rigides?
065	Domain of Alpine Deformation	Penninic	Middle Penninic	Breccia Nappe		
066	Domain of Alpine Deformation	Penninic	Middle Penninic	Falknis Nappe		
067	Domain of Alpine Deformation	Penninic	Middle Penninic	Sulzfluh Nappe		
068	Domain of Alpine Deformation	Penninic	Middle Penninic	Tasna Nappe		
069	Domain of Alpine Deformation	Penninic	Middle Penninic	Schams Nappes		
070	Domain of Alpine Deformation	Penninic	Middle Penninic	Schams Nappes	Gelbhorn Nappe	
071	Domain of Alpine Deformation	Penninic	Middle Penninic	Schams Nappes	Gurschus-Kalkberg Nappe	
072	Domain of Alpine Deformation	Penninic	Middle Penninic	Schams Nappes	Tscherra Nappe	
073	Domain of Alpine Deformation	Penninic	Middle Penninic	Schams Nappes	Knorren Melange	
074	Domain of Alpine Deformation	Penninic	Middle Penninic	Schams Nappes	Bandfluhe Slice	
075	Domain of Alpine Deformation	Penninic	Middle Penninic	Schams Nappes	Martegnas (Melange) Zone	or Part of Platta Nappe (Upper Penninic)
076	Domain of Alpine Deformation	Penninic	Middle Penninic	Schams Nappes	Areua-Bruschghorn Melange	
077	Domain of Alpine Deformation	Penninic	Middle Penninic	Moncucco Zone		
078	Domain of Alpine Deformation	Penninic	Middle Penninic	Bombogno Zone		
079	Domain of Alpine Deformation	Penninic	Middle Penninic	Camughera Zone		
080	Domain of Alpine Deformation	Penninic	Middle Penninic	Ruitor Zone		
081	Domain of Alpine Deformation	Penninic	Middle Penninic	Upper Stalden Zone		
082	Domain of Alpine Deformation	Penninic	Middle Penninic	Berisal Zone		
083	Domain of Alpine Deformation	Penninic	Middle Penninic	Siviez-Mischabel Nappe		
084	Domain of Alpine Deformation	Penninic	Middle Penninic	Mont Fort Nappe		
085	Domain of Alpine Deformation	Penninic	Middle Penninic	Monte Rosa Nappe		
086	Domain of Alpine Deformation	Penninic	Middle Penninic	Maggia Nappe		
087	Domain of Alpine Deformation	Penninic	Middle Penninic	Maggia Nappe	Maggia Nappe sensu stricto	
088	Domain of Alpine Deformation	Penninic	Middle Penninic	Maggia Nappe	Sambuco Unit	
089	Domain of Alpine Deformation	Penninic	Middle Penninic	Tambo Nappe		
090	Domain of Alpine Deformation	Penninic	Middle Penninic	Suretta Nappe		
091	Domain of Alpine Deformation	Penninic	Upper Penninic			
092	Domain of Alpine Deformation	Penninic	Upper Penninic	Antrona Zone		
093	Domain of Alpine Deformation	Penninic	Upper Penninic	Zermatt-Saas-Fee Zone		
094	Domain of Alpine Deformation	Penninic	Upper Penninic	Tsaté Nappe		
095	Domain of Alpine Deformation	Penninic	Upper Penninic	Simmen Nappe		
096	Domain of Alpine Deformation	Penninic	Upper Penninic	Gets Nappe		
097	Domain of Alpine Deformation	Penninic	Upper Penninic	Avers Nappe		
098	Domain of Alpine Deformation	Penninic	Upper Penninic	Malenco-Forno-Lizun Nappe		incl. rests of Continental (Austroalpine) Crust
099	Domain of Alpine Deformation	Penninic	Upper Penninic	Platta Nappe		
100	Domain of Alpine Deformation	Penninic	Upper Penninic	Arosa Zone		
101	Domain of Alpine Deformation	Penninic	Upper Penninic	Arosa Zone	Arosa Zone sensu stricto	
102	Domain of Alpine Deformation	Penninic	Upper Penninic	Arosa Zone	Iberg Klippen pro parte	
103	Domain of Alpine Deformation	Penninic	Upper Penninic	Gurnigel Nappe		
104	Domain of Alpine Deformation	Penninic	Upper Penninic	Voirons Nappe		
105	Domain of Alpine Deformation	Penninic	Upper Penninic	Schlieren Nappe		
106	Domain of Alpine Deformation	Penninic	Upper Penninic	Wägital Nappe		
107	Domain of Alpine Deformation	Penninic	Upper Penninic	Dranses Nappe		
108	Domain of Alpine Deformation	Penninic	Upper Penninic	Sarine Nappe		

GeoCode Vtec405	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
001	Domain of Alpine Deformation	Austroalpine				
002	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine			
003	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Northern Calcareous Alps		
004	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Northern Calcareous Alps	Krabachjoch Nappe	
005	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Northern Calcareous Alps	Inntal Nappe	
006	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Northern Calcareous Alps	Lechtal Nappe	
007	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Northern Calcareous Alps	Allgäu Nappe	
008	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Northern Calcareous Alps	Iberg Klippen pro parte	Equivalent of Roggenstock-Mördergruebi-Nappe and Ober Roggen Slice
009	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Silvretta Nappe		
010	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Phyllitgneis Zone		event. Part of Silvretta Nappe
011	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Landeck Quartzphyllite Zone		event. Part of Silvretta Nappe
012	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	«subsilvrettide» Slices and Dolomite of S-chanf		
013	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Ötztal Nappe		
014	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Umbraill-Chavalatsch Zone of Tectonic Slices		incl. Terza Slice
015	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Quatervals Nappe		event. Sesvenna-S-charl-Quatervals Nappe
016	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Sesvenna Crystalline		event. Sesvenna-S-charl-Quatervals Nappe
017	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	S-charl Nappe		event. Sesvenna-S-charl-Quatervals Nappe
018	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Ortler Nappe		
019	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Campo Nappe		
020	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Languard Nappe		incl. Müsella Syncline; Müsella Syncline: only sediments
021	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	«Vinschgauer Sonnenberge» Mylonite Zone		
022	Domain of Alpine Deformation	Austroalpine	Upper Austroalpine	Tonale Zone		old term: «Tonale Series»
023	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine			
024	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Rothorn Nappe		Arosa Rothorn Crystalline and related Mesozoic
025	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Cenoman-Randschuppe		Equivalent of Arosa Zone
026	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Tschirpen Nappe		
027	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Stammerspitz Unit		
028	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Bernina Nappe Complex		
029	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Bernina Nappe Complex	Bernina Nappe sensu stricto	
030	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Bernina Nappe Complex	Mezzaun Unit	Müsella Slice = Corn Crystalline according to Schmid & Froitzheim (1993)
031	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Bernina Nappe Complex	Upper Albula Zone of Tectonic Slices	
032	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Bernina Nappe Complex	Ela Nappe	
033	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Bernina Nappe Complex	Julier Nappe	
034	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine		Samedan Zone	
035	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Err Nappe Complex		
036	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Err Nappe Complex	Murtiröl Unit	Murtiröl Slice, Seja Crystalline and Bugliana Slice
037	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Err Nappe Complex	Lower Albula Zone of Tectonic Slices	
038	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Err Nappe Complex	Err Nappe	
039	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Carungas Unit		event. Err Nappe Complex
040	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Grevasalvas Unit		event. Err Nappe Complex
041	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Corvatsch Unit		event. Err Nappe Complex
042	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Chastelets Unit		event. Err Nappe Complex
043	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Stretta Crystalline and Alv Syncline		
044	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Margna Nappe		incl. Tremoggia Syncline, Fex Zone of Tectonic Slices, Fedoz Syncline and Longoni Sediments
045	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Sella Nappe		or Part of Bernina Nappe Complex
046	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Mont Emilius Nappe		
047	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Mont Mary Nappe		

GeoCode Vtec405	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
048	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Mont Mary Nappe	Roisan Zone	Sediment Cover
049	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Mont Mary Nappe	Arolla Series	
050	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Mont Mary Nappe	Valpelline Series	
051	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Dent Blanche Nappe		Sediment Cover (Mont-Dolin)
052	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Dent Blanche Nappe	Arolla Series	
053	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Dent Blanche Nappe	Valpelline Series	
054	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Sesia Zone		
055	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Sesia Zone	Ila Zona Dioritico-Kinzigitica	«Upper unit»
056	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Sesia Zone	Gneiss-minuti-micascisti-eclogiti Unit	«Lower Unit»; subdivided into Mombarone and Bard Nappe
057	Domain of Alpine Deformation	Austroalpine	Lower Austroalpine	Sesia Zone	Scalero-Bonze Zone	

GeoCode Vtec406	0 Order – Region	1st Order – Domain	2nd Order – Sub-domain	3rd order – Unit	4th order – Sub-unit	Remarks
001	Domain of Alpine Deformation	South Alpine				
002	Domain of Alpine Deformation	South Alpine		Ivrea-Verbano Zone		
003	Domain of Alpine Deformation	South Alpine		Strona-Ceneri Zone		
004	Domain of Alpine Deformation	South Alpine		Canavese Zone		
005	Domain of Alpine Deformation	South Alpine		Upper Orobic Nappe		Crystalline (incl. Paleozoic sediments)
006	Domain of Alpine Deformation	South Alpine		Lower Orobic Nappe		Crystalline (incl. Paleozoic sediments)
007	Domain of Alpine Deformation	South Alpine		Tertiary of the Po Basin		Gonfolite Lombarda (incl. Chiasso-Formation), Pontegana-Conglomerate, Castel-di-Sotto-Clay
008	Domain of Alpine Deformation	South Alpine		Milano Overthrust Belt		

GeoCode Vtec407	Tertiary Intrusive and Extrusive Rocks					Remarks
001	Extra-alpine Domain	Extrusive Rocks				
002	Extra-alpine Domain	Extrusive Rocks	Hegau Volcanites			
003	Domain of Alpine Deformation	Intrusive Rocks				
004	Domain of Alpine Deformation	Intrusive Rocks	Adamello Intrusion			
005	Domain of Alpine Deformation	Intrusive Rocks	Novate Intrusion			
006	Domain of Alpine Deformation	Intrusive Rocks	Bergell Intrusion			
007	Domain of Alpine Deformation	Extrusive Rocks				
008	Domain of Alpine Deformation	Extrusive Rocks	Periadriatic Volcanites along the Insubrian Line			

VIII Support by experts

In order to gain maximum support for Data Model Geology and to increase its acceptance, experts from different regions and sectors have been invited to comment. We received general statements concerning Data Model Geology (Version 1.3) but also detailed comments and corrections from these experts. The Data Model Geology (Version 2.1) presented here was revised based on the received comments.

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