



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Bundesamt für Landestopografie swisstopo

wissen wohin  
savoir où  
sapere dove  
knowing where

# Management of geological data at the Swiss Geological Survey

22. Mai 2018

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Marcel Pfiffner



# Agenda

1. New **Data Strategy** of the Swiss Geological Survey
2. Geological **data of national relevance** – the main interest of swisstopo
3. Existing **data models**, standards for data harmonisation
4. Data-accessibility: **map.geologyportal.ch, strati.ch**  
**geocat.ch**



# 1) Data strategy

## Principial points

- Identification of stakeholders
- Definition of core business
- New strategic orientation Swiss Geological Survey for data collection and management
- Definition of specific workflows

→ **Paradigm shift**



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Collecting all
incomplete
partly digital
restricted access



Selected data
complete
entirely digital
open access (if possible)



# 1) Data strategy

## Data management process



### GIPS (Geological Information and Production System)

#### Production systems for

- Boreholes
- Digital geol. map
- Geophysical data
- ...

#### Information systems:

- geologieportal.ch
- strati.ch
- map.geologieportal.ch
- geocat.ch

#### Interface outside -> inside

- Which data? (national relevance)
- Quality?
- Harmonised?

→ Standardisation, data models

**→ Exercise III –  
Afternoon session**



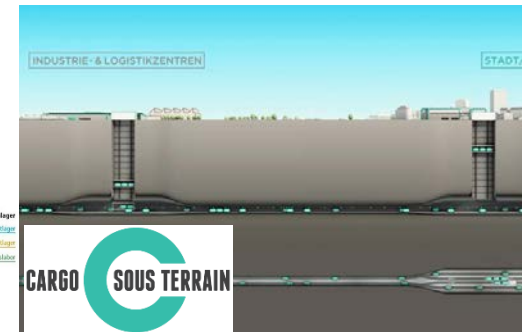
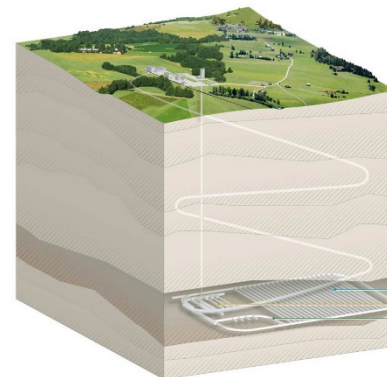
## 2) Data of national relevance

### Selected data from ...

- Projects with federal contribution
- Projects of companies with federal contribution (SBB, Alptransit etc)
- Studies of the Geotechnical and Geophysical Commission
- Prospection and exploration of energy-resources, e.g. geothermal energy



- Deep geological repositories
- Private projects of national importance, e.g. cargo sous terrain

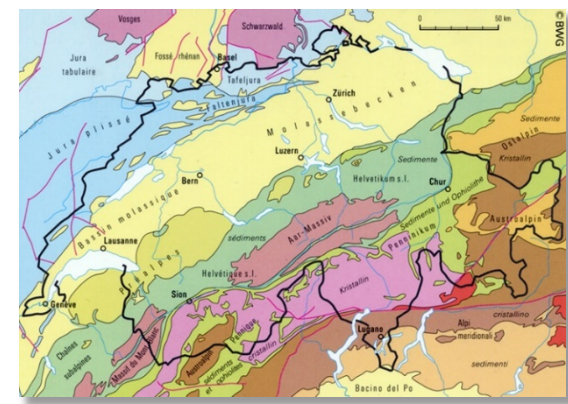
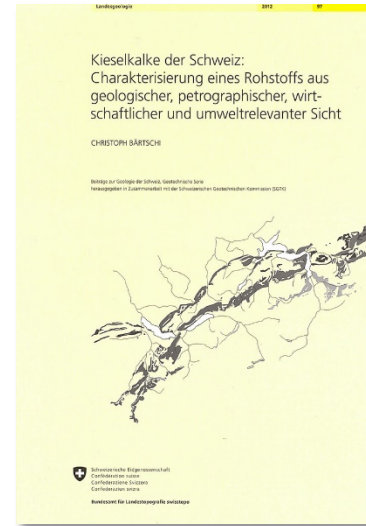
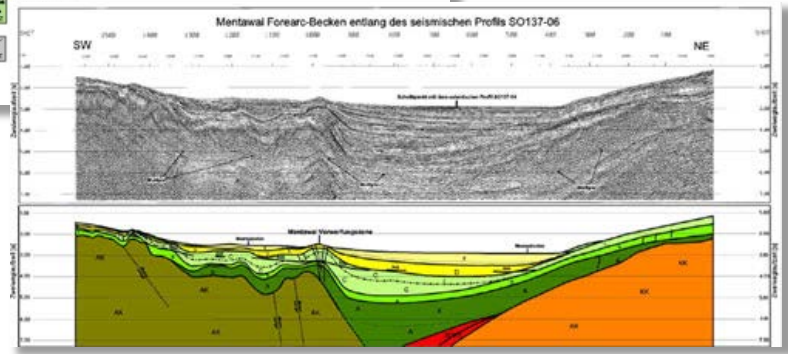
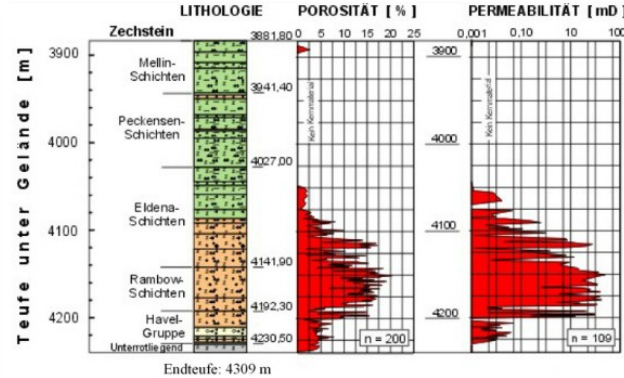




# 2) Data of national relevance

## Data types:

- Borehole data > 100m
- Geophysical data
- Maps and cross sections
- Reports
- Drill cores and cuttings
- Samples and Analysis





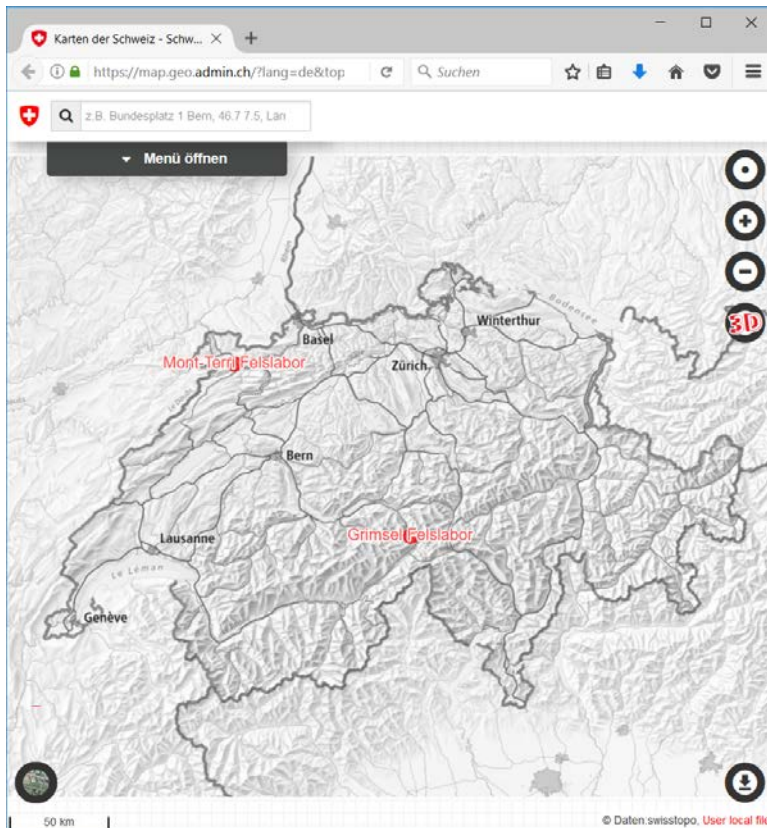


## 2) Data of national relevance

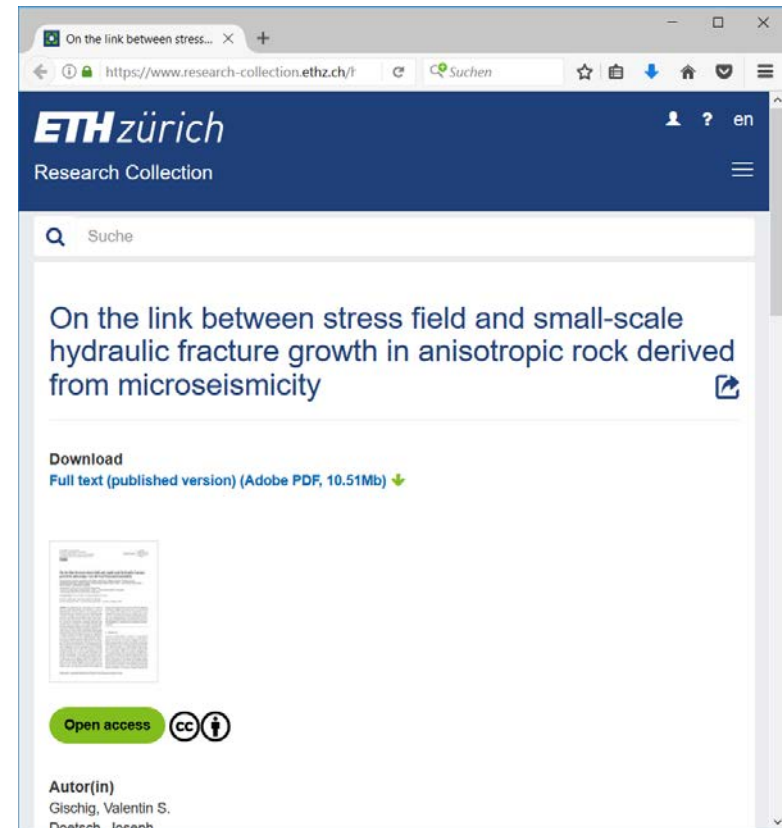
And what about Research Data?

**Example:** SCCER-SoE Grimsel ISC Project

High level meta data

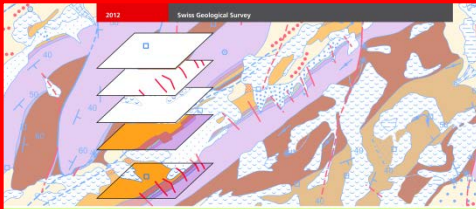


Detailed Research Data



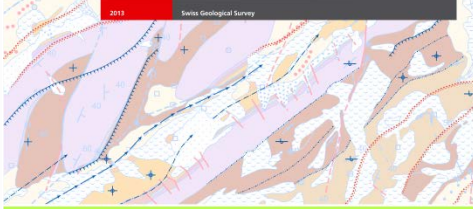


# 3) Data models, standards for exchange




**Data Model Geology**  
Description in UML Format and Object Catalogue, Version 2.1  
October 2012

Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra  
Federal Office of Topography swisstopo



**Portrayal Model Geology**  
Feasibility Study about Swiss Geological Symbols using the system-independent OGC SLD/SE Standards  
July 2013

Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra  
Federal Office of Topography swisstopo




**Data Model 3D Geology**  
Extension of the Data Model Geology Version 2.0

Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra  
Federal Office of Topography swisstopo



**Datenmodelle der nicht-vektoriellen Geobasisdaten der Landesgeologie: geologisches, geophysikalisches und geotechnisches Kartenwerk (Pixelkarten)**  
Objektkatalog und Beschreibungen in UML, XML und INTERLIS2, Version 1.0  
Dezember 2011

Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra  
Bundesamt für Landestopografie swisstopo



**Datenmodell Bohrdaten**  
Beschreibung des Kernmodells mit Objektkatalog und UML-Modell Version 2.0  
September 2014

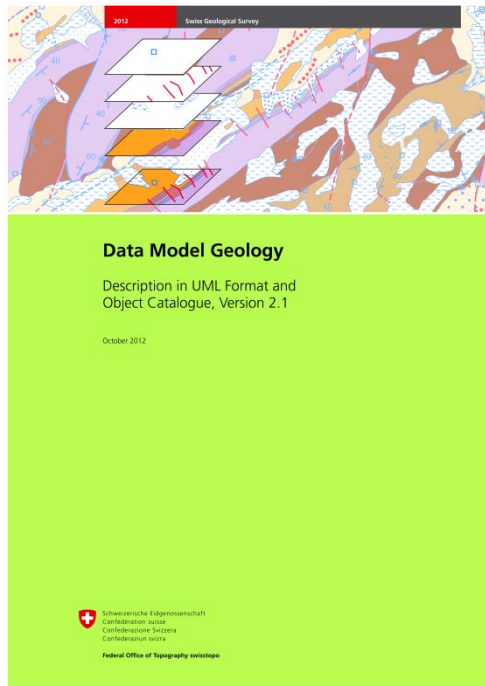
Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra  
Bundesamt für Landestopografie swisstopo



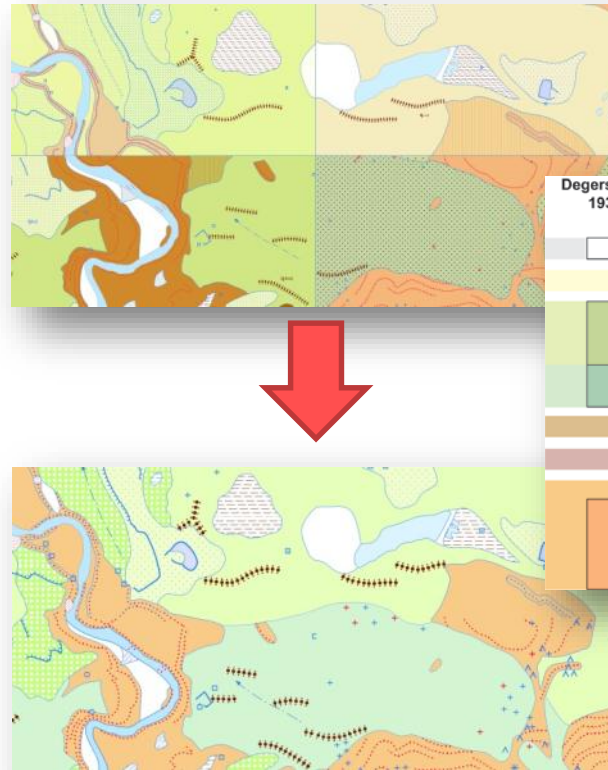


# 3) Data models, standards for exchange

## Data Model Geology



Structure and content of geological maps based on Geol. Atlas 1:25'000



## Harmonised stratigraphie

Degersheim 1930	Hörnli 1970	Bischofszell 1973	Wil 1988	Légende harmonisée
				Rezente Alluvionen
				Spätglaziale Rückzugsschotter
				Moräne der Letzten Vergletscherung
				Moräne der Vorletzten Vergletscherung
				Deckenschotter
				Tannenwald-Formation
				Gesteine der Obere Süsswassermolasse (OSM II)



# 3) Data models, standards for exchange

Harmonised lithologie / stratigrafie from Data Model Geology

## Data Model Borehole Data



### Datenmodell Bohrdaten

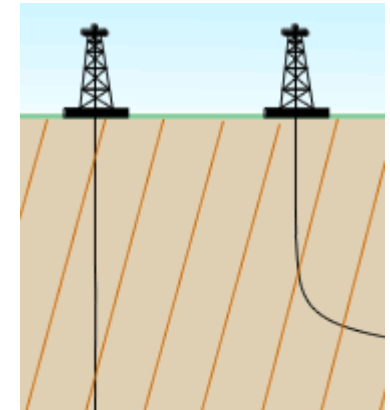
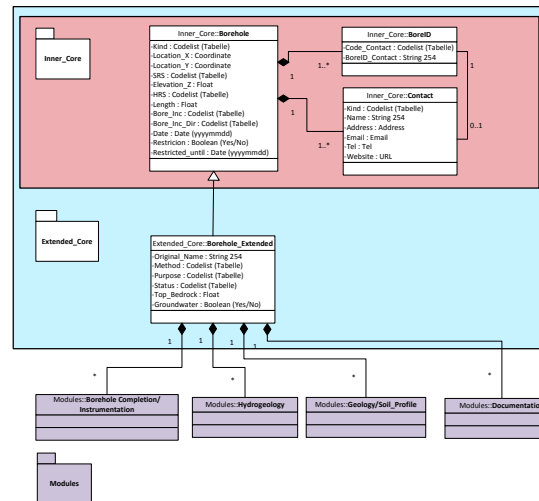
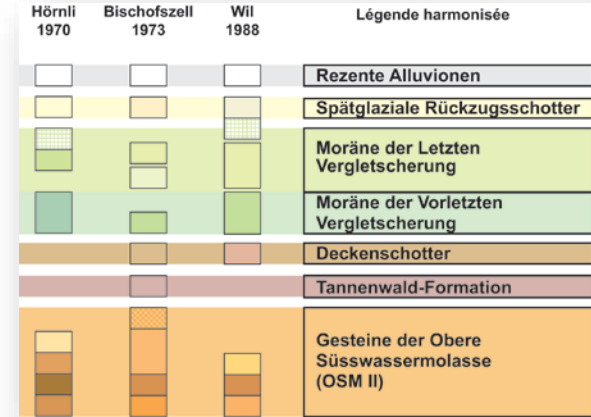
Beschreibung des Kernmodells mit Objektkatalog und UML-Modell Version 2.0

September 2014

Geologisches Büro Hammer & Lupe		Beispielbohrung KB 01/2012		Beilage	
Anlass/Ziel: 552.73 m U.M. Bohruntersuchen: Feinbohr AG		Objekt: Hydrogeologische Untersuchung Gildawasser		Bohr-Nr.: 2012013	
Koordinaten: 609.927 / 140.456		Bohrmeister: M. Stäubli		Messhöhe: 1.100	
Neigung / Richtung: vertikal		Auftragsdatum: 30.4.-25.2012		Geol. Aufnahme: Dr. G. Eol	
Bohrart	Bohr-Ø	Höhe (m) / Tiefe (m)	Symbol	Geologische Beschreibung	Zusätzliche Informationen
Rotationsbohrung	168 mm	0,00 - 0,15		Teerbelag	
5 N°		0,15 - 1,80		Kies, stark siltig-tonig, mit sehr wenig Sand, mit reichlich Steinen, beige-grau, lockes, wenig Ziegelfruchtlücke	Geol. 2012013 am 01.05.2012
		1,80 - 2,60		Sand, mäßig siltig-tonig, mit reichlich Kies und wenig Steinen, graubraun, locker gelagert	
		2,60 - 5,40		Kies, schwach siltig-tonig, mit viel Sand, mit vielen Steinen, halbbelzig, dicht gelagert, gerundet	
		5,40 - 8,45		Kies, schwach siltig-tonig, mit reichlich Sand, mit wenig Steinen, braunlichgrau	
		8,45 - 14,05		Kies, schwach siltig-tonig, mit reichlich Sand, mit wenig Steinen, braunlichgrau	
		14,05 - 18,30		graublaue, glimmerführende, siltiger Ton, durchsetzt von wenigem, feinem Gerdlein, aufgeweicht	
		18,30 - 19,70		graue, glimmerhaltige, siltiger Feinsand, kompakt, steif	
		19,70 - 20,80		graue, feinsiliger, glimmerhaltiger Ton, geschichtet, dicht feuchter, sand kompakt	
		20,80 - 22,70		graue, feinsiliger, glimmerhaltiger Ton, geschichtet, dicht feuchter, sand kompakt	
		22,70 - 40,30		graue, feinsiliger Sandstein, kompakt	
Messbohrung	4 N°	40,30 - 55,0		rotlicher Sandstein	Aufnahmedatum: 03.05.2012
		55,0 - 49,73		-45,30 m Bruchzone 30° zur Achse geneigt, Mächtigkeit ca. 10 cm, teilweise mit Calcit, leicht wasserführend	

Harmonised structure for ...

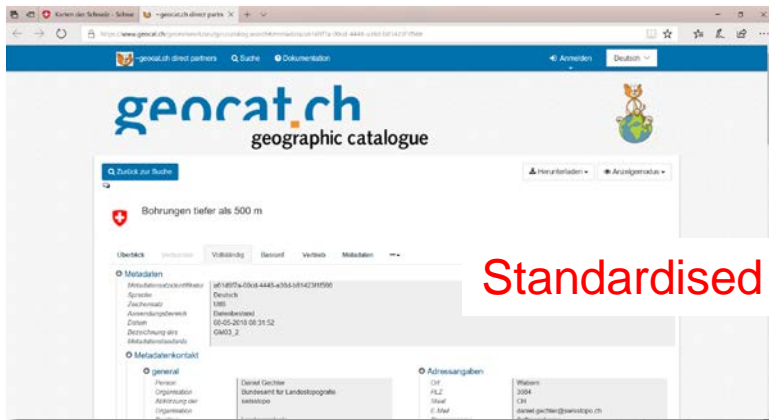
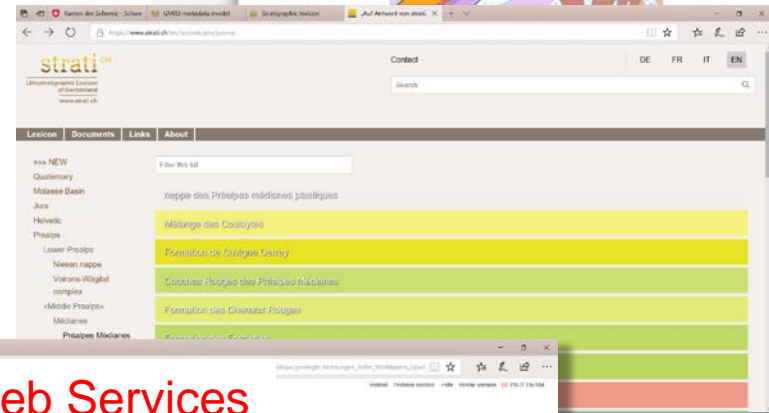
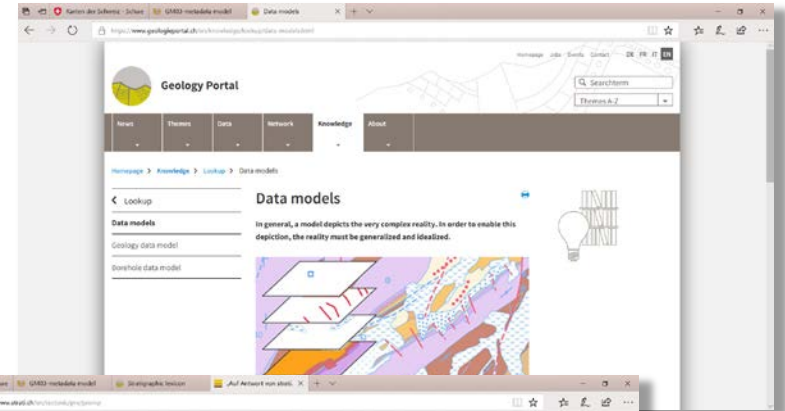
- Location and description of boreholes
- Layer stack (lithologie, stratigraphie)
- Drill path
- Samples
- Deep wells, etc



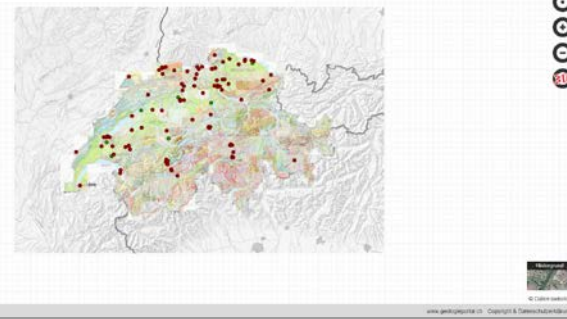


# 4) Data accessibility

- [www.geologyportal.ch](http://www.geologyportal.ch)
- [www.strati.ch](http://www.strati.ch)
- [map.geologyportal.ch](http://map.geologyportal.ch)
- [www.geocat.ch](http://www.geocat.ch)



Standardised Web Services






# Summary / Conclusions

- swisstopo ist collecting **selected data** → complete
- **Standardisation / harmonisation** is crucial for an efficient data mangement
- Use of **data models** facilitate data exchange and data integration
- Data models are **free accessible**
- **Visualisation and access of data via web** (standardised web services)

→ Exercise III – Afternoon session



A map of Bern, Switzerland, showing various landmarks and streets. The map is overlaid with numerous blue dots and circles, and several red markers. A red square is located in the upper left quadrant, and a red pin is in the center. A red cross is in the upper right quadrant. The text "Thank you for your attention!" is written in a red, outlined font across the center of the map. Other text on the map includes "Soteria", "Donnerbühl-Stadtbach", "Gross Schan", "Bern", "BERN", "Vilette", "Kocherpark", "Hüschergraben", "Monbijou", "Klinik-Frauenspital", "eDienste", and "Monu".

Thank you for your  
attention!

Questions ?...  
... during lunch break





# 4) Data accessibility

www.geologyportal.ch

The screenshot shows a web browser window with the URL <https://www.geologieportal.ch/en/knowledge/lookup/data-models.html>. The page features a header with the Geology Portal logo and navigation links (Homepage, Jobs, Events, Contact, DE, FR, IT, EN). A search bar and a 'Themes A-Z' dropdown are also present. The main navigation menu includes News, Themes, Data, Network, Knowledge, and About. The breadcrumb trail is 'Homepage > Knowledge > Lookup > Data models'. The left sidebar contains a 'Lookup' section with 'Data models' selected, and a list of 'Geology data model' and 'Borehole data model'. The main content area has the title 'Data models' and a sub-header 'Data models'. Below the title is a paragraph: 'In general, a model depicts the very complex reality. In order to enable this depiction, the reality must be generalized and idealized.' To the right of the text is an icon of a lightbulb next to a bookshelf. Below the text is a diagram showing geological layers in various colors (purple, orange, brown) with red dashed lines indicating faults or boundaries. The diagram also includes a blue square and a blue circle.



# 4) Data accessibility

www.strati.ch

The screenshot shows the website <https://www.strati.ch/en/tectonic/pre/premp>. The page features a navigation menu with 'Lexicon', 'Documents', 'Links', and 'About'. A search bar is present with the text 'Search'. The main content area displays a list of geological formations, each with a corresponding colored bar. A filter input field labeled 'Filter this list' is located at the top of the list.

Geological Formation	Color
nappe des Préalpes médianes plastiques	Light Yellow
Mélange des Coulaytes	Yellow
Formation de Cuvigne Derrey	Yellow-Green
Couches Rouges des Préalpes Médiannes	Light Green
Formation des Chenaux Rouges	Light Green
Formation des Forclettes	Light Green
Rote-Platte-Formation	Light Green
Formation de l'Intyamon	Red



# 4) Data accessibility

map.geologyportal.ch

The screenshot shows the web interface of the Swiss Geological Portal. At the top, there is a search bar with the text "Ort suchen oder Karte hinzufügen:" and a search input field containing "z.B. Bundesplatz 1 Bern, 46.7 7.5, Lärmkarte ...". Below the search bar is a map of Switzerland displaying geological data layers. A sidebar on the left contains a menu with options like "Teilen", "Drucken", "Zeichnen & Messen auf der Karte", and "Erweiterte Werkzeuge". Under the "Geologie" section, there is a "Thema wechseln" button and a list of data layers, including "Bohrungen > 500 m" which is currently selected. The map shows various geological features and red dots representing boreholes. At the bottom of the interface, there is a scale bar (50 km) and a coordinate system selector (CH1903+ / LV95). The footer contains the website URL "www.geologieportal.ch" and copyright information "© Daten: swisstopo Copyright & Datenschutzerklärung".

## Standardised Web Map Services: WMS, WMTS

Bundesamt für Landestopografie swisstopo

Workshop "Data Management in Science", Bern, May 22nd  
22. Mai 2018



# 4) Data accessibility

The screenshot shows the swisstopo web application interface. A dialog box titled "Thema wechseln" (Change theme) is open, displaying a grid of 25 pre-defined topics. The "Geologie" (Geology) topic is highlighted with a red border. The dialog box also includes a search bar and a close button. The background shows the map interface with a search bar and a sidebar menu.

**Thema wechseln** Pre-defined topics ✕

ARE	ASTRA	BAFU	BLW	swisstopo
Breitbandatlas	Energie	Funksender	Geodäsie	Geologie
Geothermie	Grundstückinformation	Hist. Verkehrswege	KGS Inventar 2009	Ländliche Entwicklung
Luftbilder	Luftfahrt	Sachpläne/Konzepte	Schneesport	Verkehrsunfälle
Verteidigung	Wasser	Wildruhezonen	Geokatalog	INSPIRE





# 4) Data accessibility

The screenshot shows the map.geo.admin.ch website. The main content is an infobox titled 'Bohrungen tiefer als 500 m (Bundesamt für Landestopografie swisstopo)'. The text in the infobox reads: 'Diese Karte zeigt die Bohrungen tiefer als 500 m in der Schweiz und im angrenzenden Ausland an. Diese Daten stammen vom Bundesamt für Landestopografie swisstopo, von Universitäten, Kantonen und privaten Unternehmen. Die Metadaten sind öffentlich zugänglich. Die damit verbundenen Dokumente, wenn sie öffentlich sind, können über den Kartenviewer des Geoportals Bund (map.geo.admin.ch) heruntergeladen werden. Für Auskünfte über die Dokumentation wenden Sie sich bitte direkt an den Rechteinhaber.' Below the text is a legend with two items: 'Bohrung > 500 m (mit Daten-Download)' and 'Bohrung > 500 m (ohne Daten-Download)'. At the bottom of the infobox, there is an 'Informationen' section with fields for ID, Gültiger Massstabsbereich, Metadaten, Detailbeschreibung, Datenbezug, and Thematisches Geoportal. The 'Datenbezug' field has a link to 'Link für Datenbezug'. The website header includes the Swiss flag, the text 'Schweizerische Eidgenossenschaft', and a search bar. The left sidebar shows a menu with 'Geologie' selected, and a list of categories including 'Geologische Kartenwerke', 'Geologische Grundlagen', 'Geologische Dokumente', 'Bohrdaten / Profile', 'Bohrungen > 500 m', 'Geophysikalische Daten', 'Mineralische Rohstoffe', 'Geometrie des Untergrundes', and 'Naturgefahren'. The bottom of the page shows a scale bar for 50 km and the text 'CH1903+ / LV95'.

- Meta data
- Data download
- Link zu external resources





# 4) Data accessibility

www.geocat.ch

The screenshot shows the geocat.ch website interface. The main header features the 'geocat.ch geographic catalogue' logo and the word 'Metadata' in red. A search bar contains the text 'Bohrungen tiefer als 500 m'. Below the search bar, there are tabs for 'Überblick', 'Verbunden', 'Vollständig', 'Basisinf.', 'Vertrieb', and 'Metadaten'. The 'Metadaten' tab is active, displaying a table of metadata fields and values. The table is organized into sections: 'Metadaten', 'Metadatenkontakt', and 'Adressangaben'.

Field	Value
Metadaten	
Metadatenidentifikator	a61d9f7a-00cd-4448-a36d-b81423f1f566
Sprache	Deutsch
Zeichensatz	Utf8
Anwendungsbereich	Datenbestand
Datum	08-05-2018 08:31:52
Bezeichnung des Metadatenstandards	GM03_2
Metadatenkontakt	
general	
Person	Daniel Gechter
Organisation	Bundesamt für Landestopografie
Abkürzung der Organisation	swisstopo
Organisation	Landestopografie
Person	
Adressangaben	
Ort	Wabern
PLZ	3084
Staat	CH
E-Mail	daniel.gechter@swisstopo.ch
Strassenname	Salferstrasse

## Standardised Discovery Service: Catalog Service for Web (CSW)

Bundesamt für Landestopografie swisstopo

Workshop "Data Management in Science", Bern, May 22nd  
22. Mai 2018