



GiGa
infosystems

GST User Meeting 2022



Webex Meetings

- * Everyone is muted by default
- * We welcome to see your face, but it is not a must
- * Raise your hand if you want to ask an immediate questions
- * Use “Questions & Answers” or “Chat” to ask a general question; will be answered later
- * Easy chat/Further questions during break



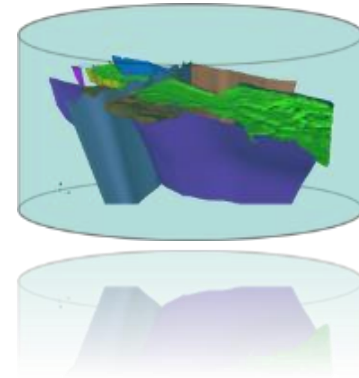
Agenda

- * 9.00 – 10.00 Developments 2021, Paul Gabriel
- * 10.05 – 10.35 GeoHub: Sustainable Geomodelling, Georg Semmler
- * 10.40 – 11.00 Digital Continuity with GST – The Nagra use case (BIM)
- * 11.00 – 11.15 Break, Everyone
- * 11.15 – 12.00 GST Web: The Rewrite, Johannes Camin & Jonas Klein
- * 12.00 – 13.00 Roadmap 2022/23, Paul Gabriel and all



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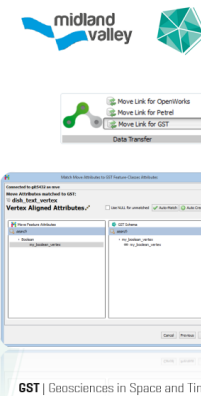
- * Team of 8
[3 Backend, 1.5 Desktop, 2 Web, 1 DevOps]
- * **Oracle Partner, GIS Award**
- * Cooperation with
 - * TU Bergakademie Freiberg
 - * Petex [MOVE]



In [app plugin](#)

Move link to GST

- * Direct save/load models to GST
- * define Project Extents to be used for the current session
- * work with features from GST (retrieve, lock/unlock, save edits, upload and delete)
- * view a summary of work undertaken during the session

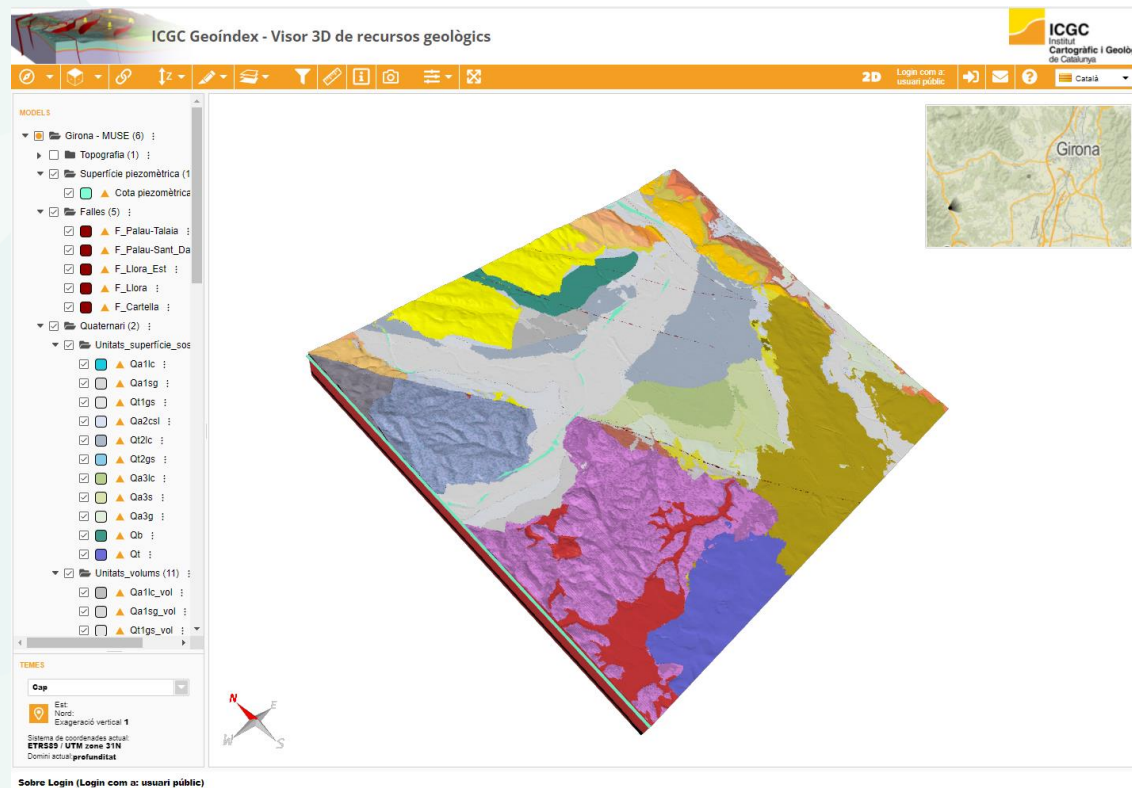


10



Development Customers 2021

ICGC (SaaS)





Developments 2021

- * Main developments with BGR, Nagra and Swisstopo:
 - * **SGrid Support**
 - * **Textured Geometries**
 - * **Elevation Grids**
 - * **Modelmanagement**
 - * **Boreholemarker**
 - * **Query Dialog**



Developments 2021

- * Main developments with BGR, Nagra and Swisstopo:
 - * **Shapefile/geopackage import and export**
 - * **Versioning of feature attributes**
 - * **Naming of Connections**
 - * **Write protected Feature classes**
 - * **Polygonal Support**
 - * **Performance Improvements**



Developments 2021

- * Main developments with BGR, Nagra and Swisstopo:
 - * **Use of IFC, Shape and Gocad ASCII for Tunnel Axis intersection**
 - * **Selection of system columns**
 - * **Alias for system columns**
 - * **More Translations**
 - * **Improved Accuracy**
 - * **Settings for Boreholes**



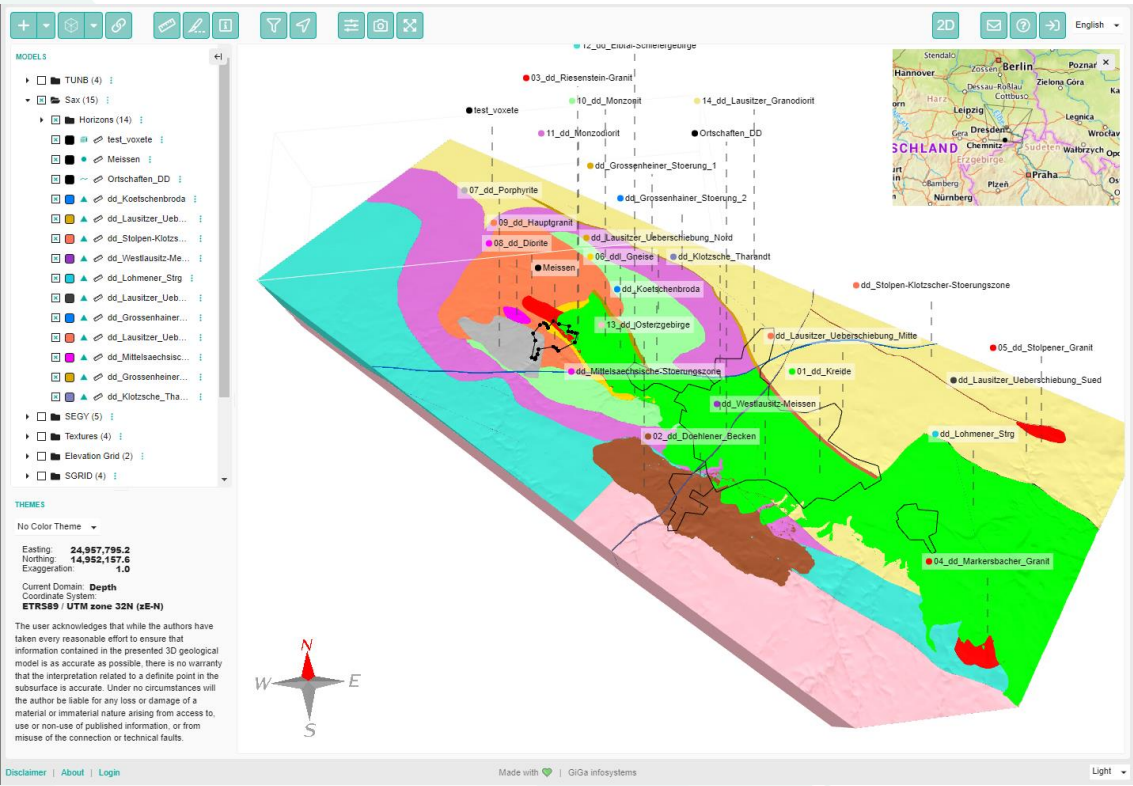
Developments 2021

- * Main developments with BGR, Nagra and Swisstopo:
 - * **Small scale model improvements**
 - * **STL Parser**
 - * **Default view for boreholes**



Developments 2021

* GST Web Rewrite:





GST Desktop

- * Improvements of the GUI
- * Query Dialog
- * Lifting of static Modeltree structure
- * Write protected feature classes
- * Bugs fixed

Speedup of common operations



- * We worked on improving the performance of some common operations:
 - * Boreholes/intersections,
- * Furthermore, client- and serverside RAM usage has been optimized for certain operations [e.g. joined tables].



Query Dialog

GST Desktop 3.8.1 - daniel@doc

Connect Feature Selection Models Commits Logs

Sel	Feature Class Name	Geometry Type	SRS	Feature Count	
2 <input type="checkbox"/>	EVERYBODY_pool.sax	TIN	EPSG:31469 (DHDN...	14	-
6 <input type="checkbox"/>	modeller_pool.faults	TIN	EPSG:31469 (DHDN...	0	-
8 <input type="checkbox"/>	modeller_pool.horizons	TIN	EPSG:31469 (DHDN...	14	-
10 <input type="checkbox"/>	web_pool.horizons	TIN	EPSG:31469 (DHDN...	0	-

Feature Query

Feature Class Filter (active)

Owner...

Name...

Geometry Type...

SRS...

Z-Axis Domain...

Semantic...

Feature Attribute Filter

Spatial Filter

Ready.

Theme [Native]

Query Dialog



GST Desktop 3.8.1 - daniel@doc

Connect Feature Selection Models Commits Logs

Sel	Feature Class Name	Geometry Type	SRS	Feature Count	
1 <input type="checkbox"/>	EVERYBODY_pool.grid	Grid	EPSG:31469 (DHDN...	1	cooper: float 8 bytes, g
2 <input type="checkbox"/>	EVERYBODY_pool.sax	TIN	EPSG:31469 (DHDN...	14	-
3 <input type="checkbox"/>	EVERYBODY_pool.segy2d	Line	EPSG:31468 (DHDN...	0	trace_data: float 4 byte
4 <input type="checkbox"/>	EVERYBODY_pool.segy3d	Grid	EPSG:31468 (DHDN...	0	trace_data: float 4 byte
5 <input type="checkbox"/>	modeller_pool.city_outlines	Line	EPSG:31469 (DHDN...	1	-
6 <input type="checkbox"/>	modeller_pool.faults	TIN	EPSG:31469 (DHDN...	0	-
7 <input type="checkbox"/>	modeller_pool.grids	Grid	EPSG:31469 (DHDN...	1	cooper: float 8 bytes, g
8 <input type="checkbox"/>	modeller_pool.horizons	TIN	EPSG:31469 (DHDN...	14	-
9 <input type="checkbox"/>	web_pool.dips	Point	EPSG:31469 (DHDN...	0	azimuth: float 8 bytes,
10 <input type="checkbox"/>	web_pool.horizons	TIN	EPSG:31469 (DHDN...	0	-

Feature Query

Feature Class Filter

Feature Attribute Filter (active)

Attribute: id: integer

Operator: =

Value: [text input]

Clear All

oname	Contains	dd
year	Equals	2020

Spatial Filter

Apply To Global Selection

Save Load Manage

Ready.



Query Dialog

GST Desktop 3.8.1 - daniel@doc

Connect Feature Selection Models Commits Logs

Sel	Feature Class Name	Geometry Type	SRS	Feature Count	
1 <input type="checkbox"/>	EVERYBODY_pool.grid	Grid	EPSG:31469 (DHDN...	1	cooper: float 8 bytes, g
2 <input type="checkbox"/>	EVERYBODY_pool.sax	TIN	EPSG:31469 (DHDN...	14	-
3 <input type="checkbox"/>	EVERYBODY_pool.segy2d	Line	EPSG:31468 (DHDN...	0	trace_data: float 4 byte
4 <input type="checkbox"/>	EVERYBODY_pool.segy3d	Grid	EPSG:31468 (DHDN...	0	trace_data: float 4 byte
5 <input type="checkbox"/>	modeller_pool.city_outlines	Line	EPSG:31469 (DHDN...	1	-
6 <input type="checkbox"/>	modeller_pool.faults	TIN	EPSG:31469 (DHDN...	0	-
7 <input type="checkbox"/>	modeller_pool.grids	Grid	EPSG:31469 (DHDN...	1	cooper: float 8 bytes, g
8 <input type="checkbox"/>	modeller_pool.horizons	TIN	EPSG:31469 (DHDN...	14	-
9 <input type="checkbox"/>	web_pool.dips	Point	EPSG:31469 (DHDN...	0	azimuth: float 8 bytes,
10 <input type="checkbox"/>	web_pool.horizons	TIN	EPSG:31469 (DHDN...	0	-

Feature Query

Feature Class Filter

Feature Attribute Filter

Spatial Filter (active)

Active

Selection Area

Box Polygon

Polygon

Source

File Feature Load

modeller_pool.city_outlines.Dresden

SRS

<none>

use same

Area Inclusion Criteria

Intersected Contained

Apply To Global Selection

Save Load Manage

Ready.



Query Dialog

GST Desktop 3.8.1 - daniel@doc

Connect | Feature Selection | Models | Commits | Logs

Sel	Feature Class Name	Geometry Type	SRS	Feature Count	
2 <input checked="" type="checkbox"/>	EVERYBODY_pool.sax	TIN	EPSG:31469 (DHDN...	14	-
6 <input type="checkbox"/>	modeller_pool.faults	TIN	EPSG:31469 (DHDN...	0	-
8 <input checked="" type="checkbox"/>	modeller_pool.horizons	TIN	EPSG:31469 (DHDN...	14	-
10 <input type="checkbox"/>	web_pool.horizons	TIN	EPSG:31469 (DHDN...	0	-

Feature Query

Feature Class Filter (active)

Feature Attribute Filter

Spatial Filter (active)

Active

Selection Area

Box Polygon

Polygon

Source

File Feature Load

SRS

EPSG:31469 (DHDN / 3-degree Gauss-Kruger zone 5)

Area Inclusion Criteria

Intersected Contained

Global Selection

- ▲ 01_ts_dd_geol_Kreide
- ▲ 02_ts_dd_geol_Doeblener_Becken
- ▲ 06_ts_dd_geol_Gneise
- ▲ 10_ts_dd_geol_Monzonit
- ▲ 11_ts_dd_geol_Monzodiorit
- ▲ 12_ts_dd_geol_Elbtal-Schiefergebirge
- ▲ 13_ts_dd_geol_Osterzgebirge
- ▲ 14_ts_dd_geol_Lausitzer_Granodiorit
- ▲ 01_ts_dd_geol_Kreide
- ▲ 02_ts_dd_geol_Doeblener_Becken
- ▲ 06_ts_dd_geol_Gneise
- ▲ 10_ts_dd_geol_Monzonit
- ▲ 11_ts_dd_geol_Monzodiorit
- ▲ 12_ts_dd_geol_Elbtal-Schiefergebirge
- ▲ 13_ts_dd_geol_Osterzgebirge
- ▲ 14_ts_dd_geol_Lausitzer_Granodiorit

Gocad (.vs,.pl,.ts,.so,.vo,.sg)

Ready.



Query Dialog

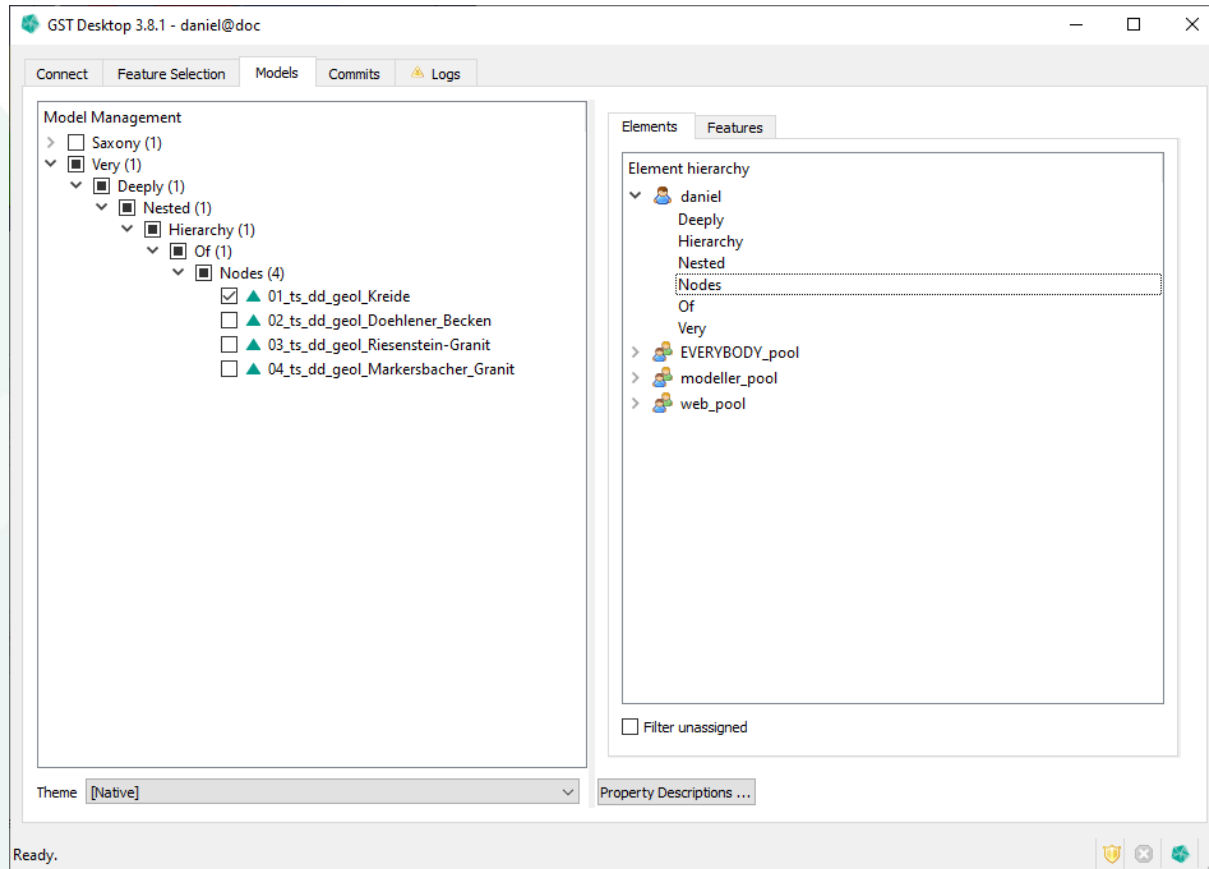
ID	Value	Description
(DHDN... 0	0	trace_data: float 4 byte
(DHDN... 0	0	trace_data: float 4 byte
(DHDN... 1	1	-
(DHDN... 0	0	-
(DHDN... 1	1	cooper: float 8 bytes, g
(DHDN... 14	14	-
(DHDN... 0	0	azimuth: float 8 bytes,
(DHDN... 0	0	-

Field	Operator	Value
oname	Contains	dd
year	Equals	2020

Buttons: Save, Load, Manage



Extended Modelmanagement hierarchy





Feature Attribute history

Browse feature class: modeller_pool.horizons

Select	oname text	Lock	Geometry Hull	model_feature text	year text
<input type="checkbox"/>	01_ts_dd_geol_Kreide	free	no	(NULL)	2020
<input type="checkbox"/>	02_ts_dd_geol_Doehleener_Becken	free	no	(NULL)	2021
<input type="checkbox"/>	03_ts_dd_geol_Riesenstein-Granit	free	no	(NULL)	2021
<input type="checkbox"/>	04_ts_dd_geol_Markersbacher_Granit	free	no	(NULL)	2020
<input type="checkbox"/>	05_ts_dd_geol_Stolpener_Granit	free	no	(NULL)	2021
<input checked="" type="checkbox"/>	06_ts_dd_geol_Gneise	free	no	(NULL)	2021
<input type="checkbox"/>	07_ts_dd_geol_Porphyrite	free	no	(NULL)	2021
<input type="checkbox"/>	08_ts_dd_geol_Diorite	free	no	(NULL)	2021
<input type="checkbox"/>	09_ts_dd_geol_Hauptgranit	free	no	(NULL)	2021
<input type="checkbox"/>	10_ts_dd_geol_Monzonit	free	no	(NULL)	2021
<input type="checkbox"/>	11_ts_dd_geol_Monzodiorit	free	no	(NULL)	2021
<input type="checkbox"/>	12_ts_dd_geol_Elbtal-Schiefergebirge	free	no	(NULL)	2021
<input type="checkbox"/>	13_ts_dd_geol_Osterzgebirge	free	no	(NULL)	2021
<input type="checkbox"/>	14_ts_dd_geol_Lausitzer_Granodiorit	free	no	(NULL)	2021

Object name: 06_ts_dd_geol_Gneise
Object appearance

Red:

Green:

Blue:

Transparency [%]:

- For current (06_ts_dd_geol_Gneise)
- Show logs (commit history) ...
- Show object property value history ...
- Return lock
- Delete
- Force remove all locks [admin only]
- Upload Hull
- Calculate Hull
- Delete Hull
- Add all to global selection
- Remove all from global selection
- Edit Feature Class ...

Hide default columns

Browse feature class: modeller_pool.horizons

Select	oname text	Lock	Geometry Hull	model_feature text	year text
<input type="checkbox"/>	01_ts_dd_geol_Kreide	free	no	(NULL)	2020
<input type="checkbox"/>	02_ts_dd_geol_Doehleener_Becken	free	no	(NULL)	2021
<input type="checkbox"/>	03_ts_dd_geol_Riesenstein-Granit	free	no	(NULL)	2021
<input type="checkbox"/>	04_ts_dd_geol_Markersbacher_Granit	free	no	(NULL)	2020
<input type="checkbox"/>	05_ts_dd_geol_Stolpener_Granit	free	no	(NULL)	2021
<input type="checkbox"/>	06_ts_dd_geol_Gneise	free	no	(NULL)	2021

Object name: 06_ts_dd_geol_Gneise
Object appearance

Red:

Green:

Blue:

Transparency [%]:

Object Property Value History

id	object property	user	timestamp	value
55	color	daniel	2022-03-03T14:06:03....	0.184314 0.843137 0 1
54	oname	daniel	2022-03-03T14:03:38....	06_ts_dd_geol_Gneise
53	oname	daniel	2022-03-03T14:01:07....	06_ts_dd_geol_Gnee
52	color	daniel	2022-03-03T14:00:58....	0.611765 0.843137 0 1
43	year	daniel	2022-03-03T13:37:44....	2021
9	oname	modeller_pool	2022-03-03T13:35:53....	06_ts_dd_geol_Gneise

Restore Value

Close

Hide default columns

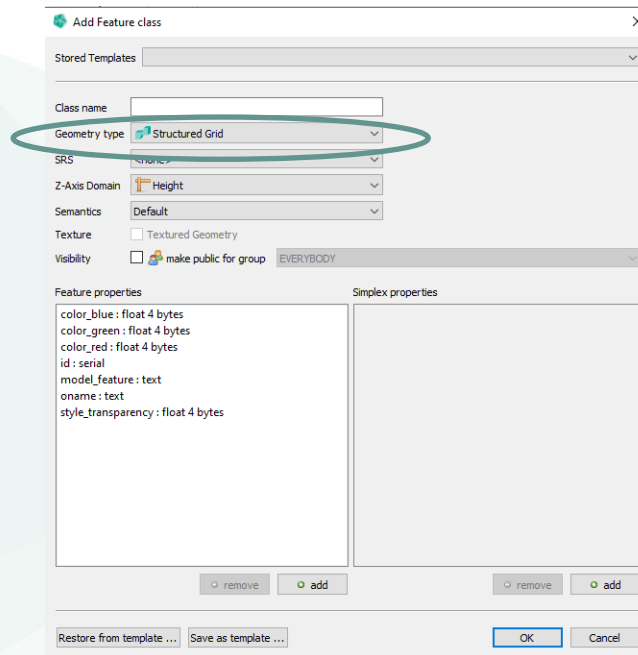
Edit via Clipboard ...

OK Cancel

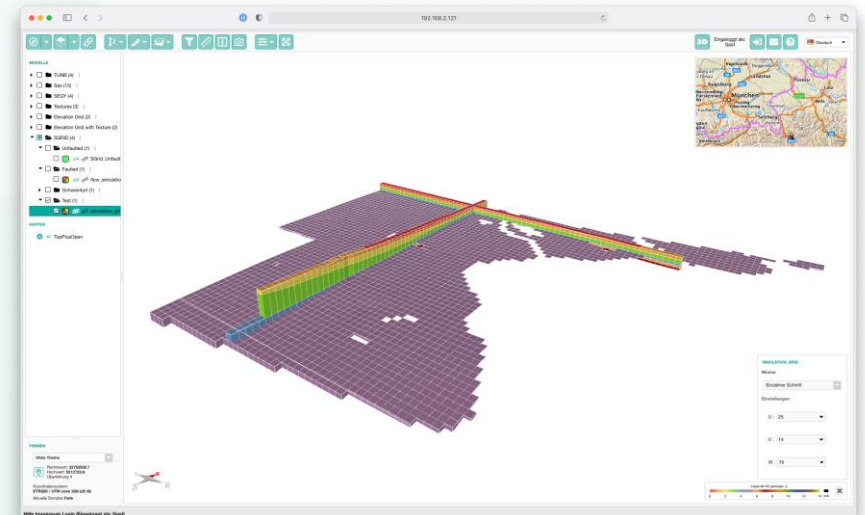
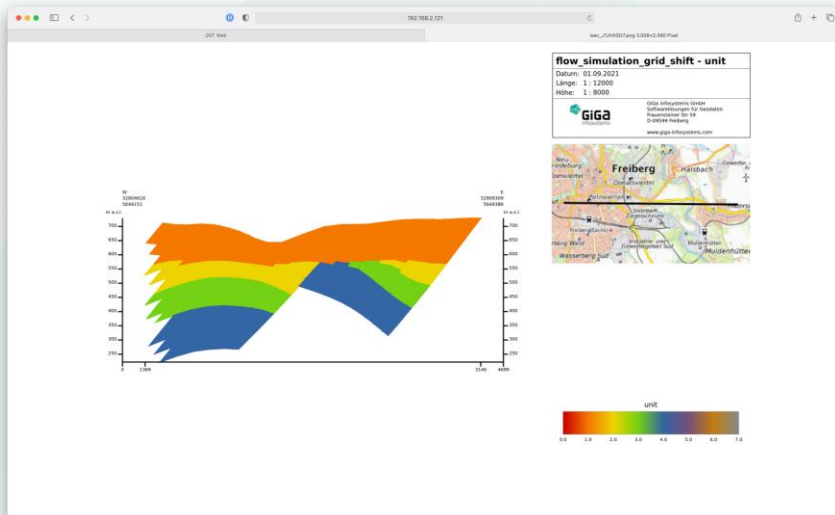
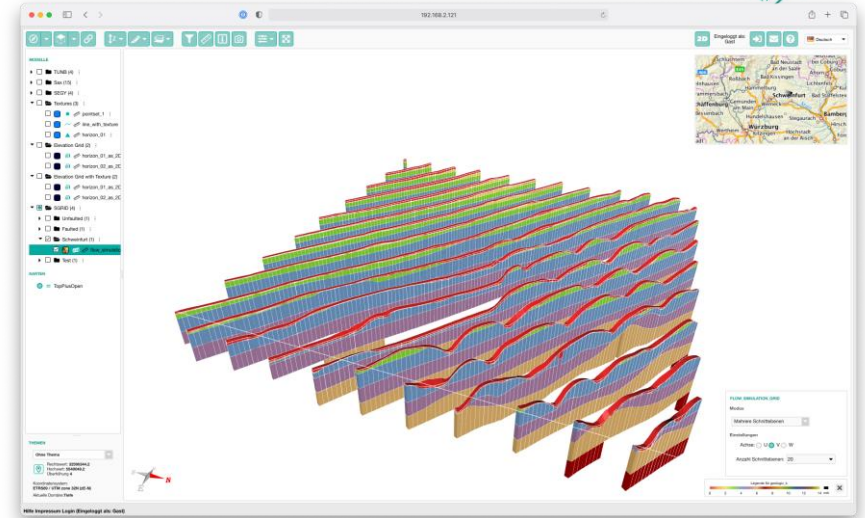
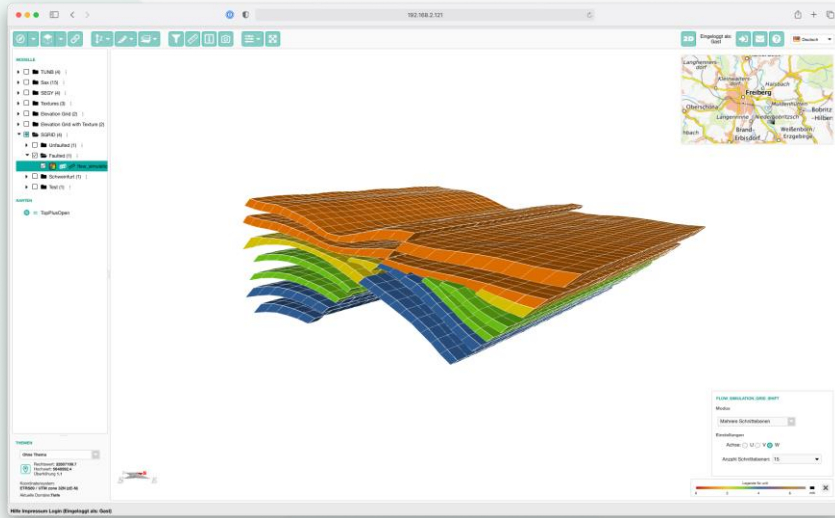
SGrids



- * Stratigraphic Grids: Grids following geology
- * New Geometry type



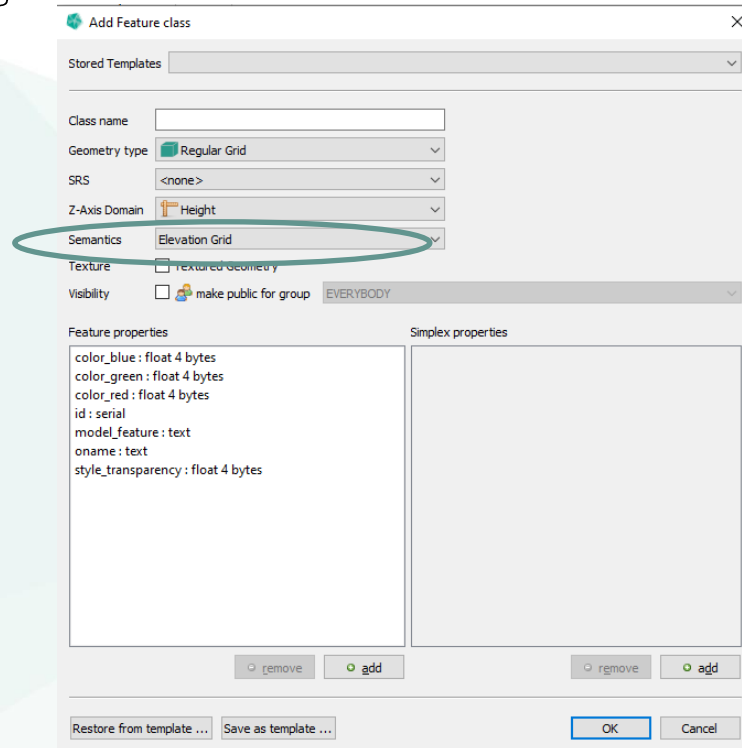
SGrids





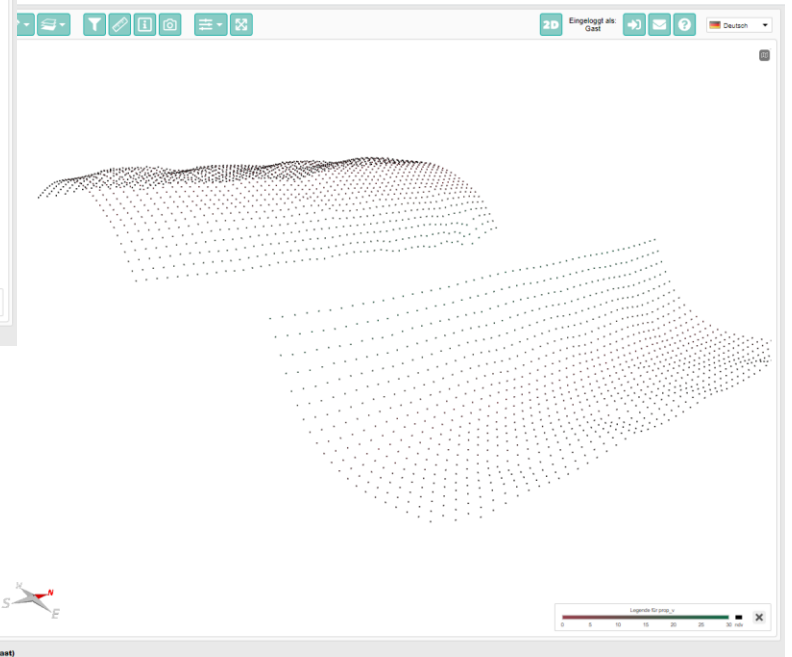
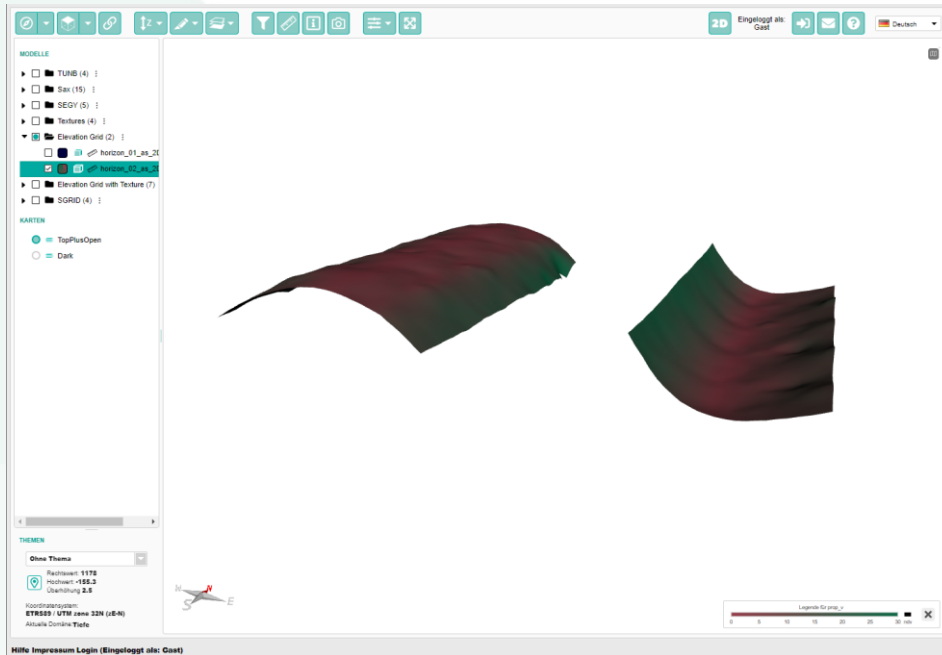
Elevation Grids

- * 2d grid with elevation values
- * Gocad: GSurf
- * New Semantic





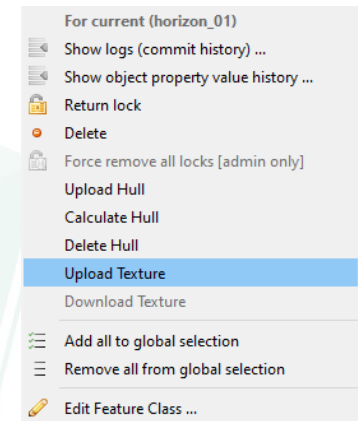
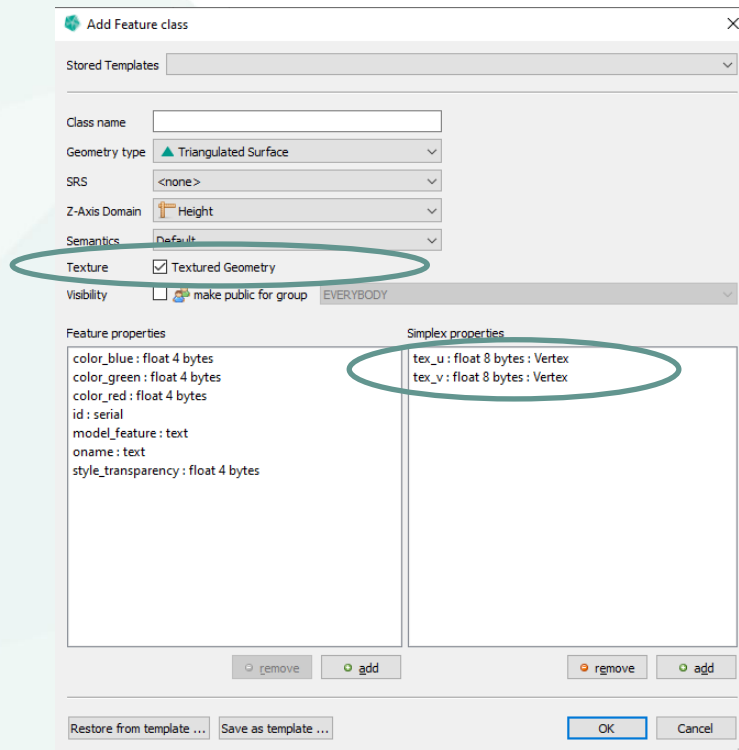
Elevation Grids





Texture Geometries

- * New Option
- * Storage of custom Texture Coordinates (U-V)
- * Storage of Texture in GST



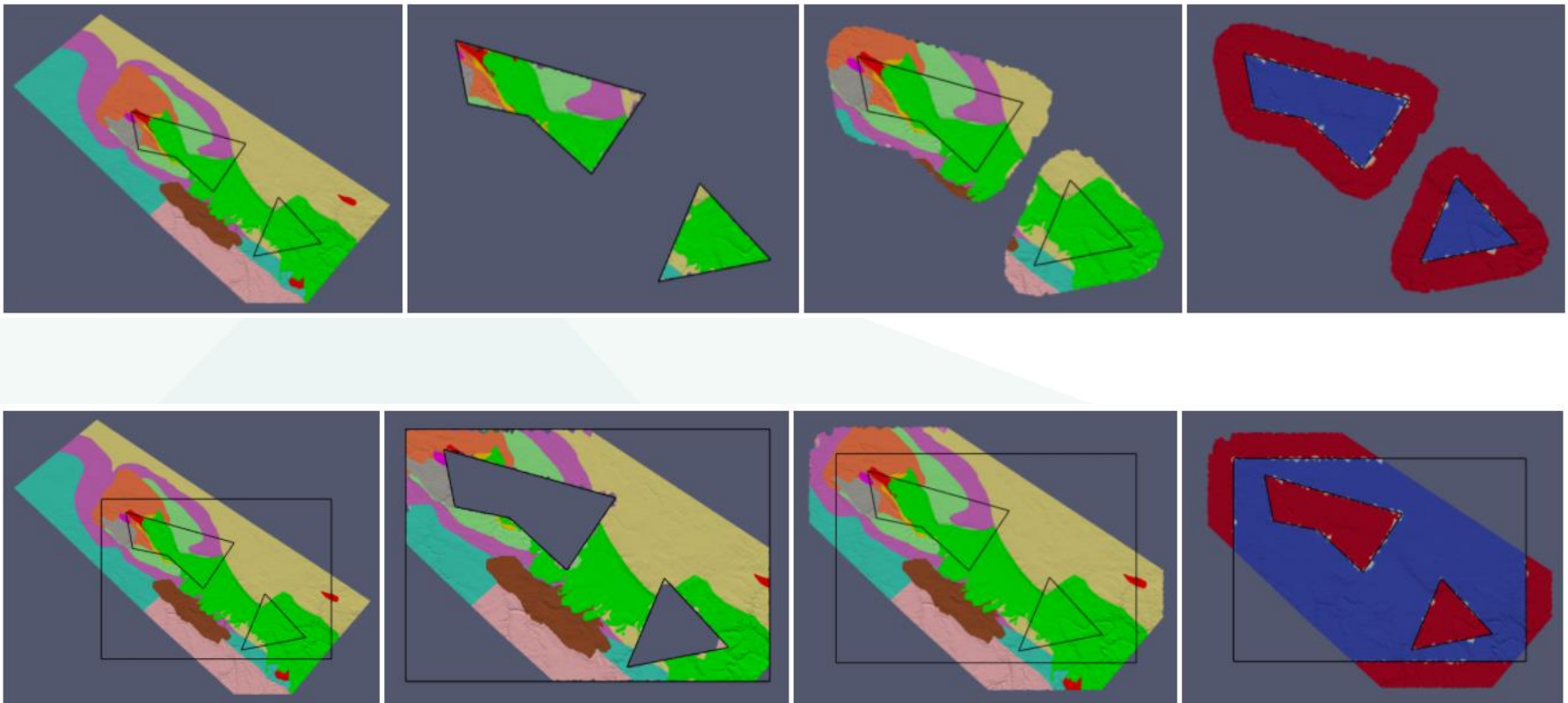
Texture Geometries



The screenshot displays a GIS application window with the following components:

- Toolbar:** Located at the top, containing icons for navigation, editing, and viewing.
- Top Right:** Shows the user is logged in as 'Gast' (Guest) and the language is set to 'Deutsch' (German).
- Left Panel (MODELLE):** A tree view of the 3D model layers:
 - TUNB (4)
 - Sax (15)
 - SEGY (5)
 - Textures (4):
 - pointset_1
 - line_with_texture
 - horizon_01
 - proper_tex_coore** (highlighted)
 - Elevation Grid (2)
 - Elevation Grid with Texture (7)
 - SGRID (4)
- Left Panel (KARTEN):** Map style options:
 - TopPlusOpen (selected)
 - Dark
- Main View:** A 3D perspective view of a terrain model with various colored textures (purple, green, cyan, orange) applied to different areas.
- Right Panel:** A small inset map showing the location of the main view on a world map.
- Bottom Left (THEMEN):** Metadata panel showing:
 - Ohne Thema
 - Rechtswert: -81.0
 - Hochwert: 621.6
 - Überhöhung: 1
 - Koordinatensystem: ETRS89 / UTM zone 32N (zE-N)
 - Aktuelle Domäne: Tiefe
- Bottom Center:** A compass rose indicating North (N), South (S), East (E), and West (W).
- Bottom Left:** A link for 'Hilfe Impressum Login (Eingelogggt als: Gast)'.

Polygon Support





Borehole Markers



BIM Sections

- * Project with Nagra and Geoldee [CH]

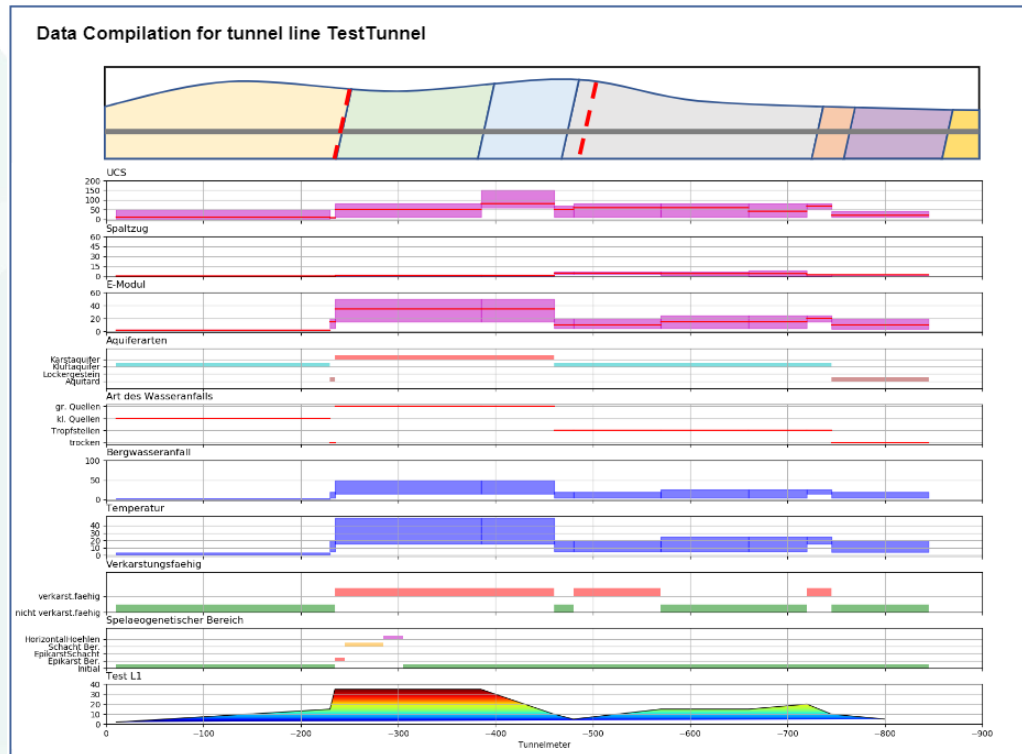


Figure by Dirk Arndt, Nagra



Questions?

Remarks?

Wishes?



Georg Semmler(GiGa infosystems) GeoHub: Sustainable Geomodelling



GIGA
infosystems

**Digital continuity with GST.
The Nagra use case**



Partners

- * Nagra
 - * Searching for nuclear waste deposit in Switzerland
 - * Provides data
 - * Employer

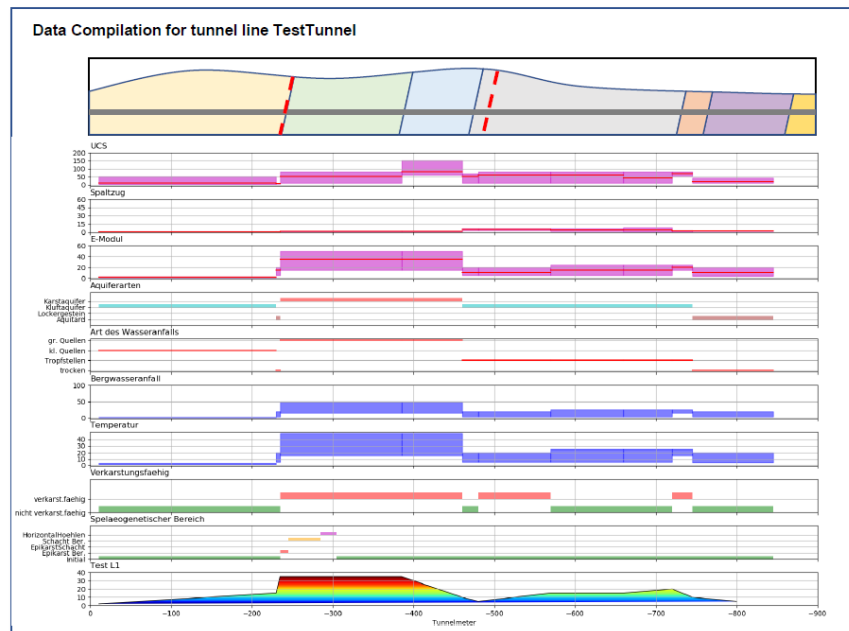
nagra ● aus verantwortung

- * Geoldee
 - * SME from Switzerland
 - * Familiar with geotechnics
 - * Familiar with graphics



Goal

- * Create Geotechnical Sections along tunnel axis with properties



Data Compilation

Parameter	0 - 100 m		100 - 200 m		200 - 300 m		300 - 400 m		400 - 500 m		500 - 600 m		600 - 700 m		700 - 800 m		800 - 900 m			
	Value	Unit	Value	Unit	Value	Unit	Value	Unit	Value	Unit	Value	Unit	Value	Unit	Value	Unit	Value	Unit		
UCS	100	MPa	100	MPa	100	MPa	100	MPa	100	MPa	100	MPa	100	MPa	100	MPa	100	MPa	100	MPa
Spaltzug	10	MPa	10	MPa	10	MPa	10	MPa	10	MPa	10	MPa	10	MPa	10	MPa	10	MPa	10	MPa
E-Modul	10000	MPa	10000	MPa	10000	MPa	10000	MPa	10000	MPa	10000	MPa	10000	MPa	10000	MPa	10000	MPa	10000	MPa
Aquiferarten	Kalkstein		Kalkstein		Kalkstein		Kalkstein		Kalkstein		Kalkstein		Kalkstein		Kalkstein		Kalkstein		Kalkstein	
Art des Wasseranfalls	gr. Quellen		gr. Quellen		gr. Quellen		gr. Quellen		gr. Quellen		gr. Quellen		gr. Quellen		gr. Quellen		gr. Quellen		gr. Quellen	
Temperatur	10	°C	10	°C	10	°C	10	°C	10	°C	10	°C	10	°C	10	°C	10	°C	10	°C
Verkarstungsfähig	ja		ja		ja		ja		ja		ja		ja		ja		ja		ja	
Spalteogenetischer Bereich	ja		ja		ja		ja		ja		ja		ja		ja		ja		ja	

Figure by Dirk Arndt, Nagra

What GST can

- * Store 3d models
- * Store properties on Object and Simplices/Vertices
- * Create Sections fast
- * Read IFC
- * Create 100s tiny boreholes fast

Data

* 3 Modelling Areas

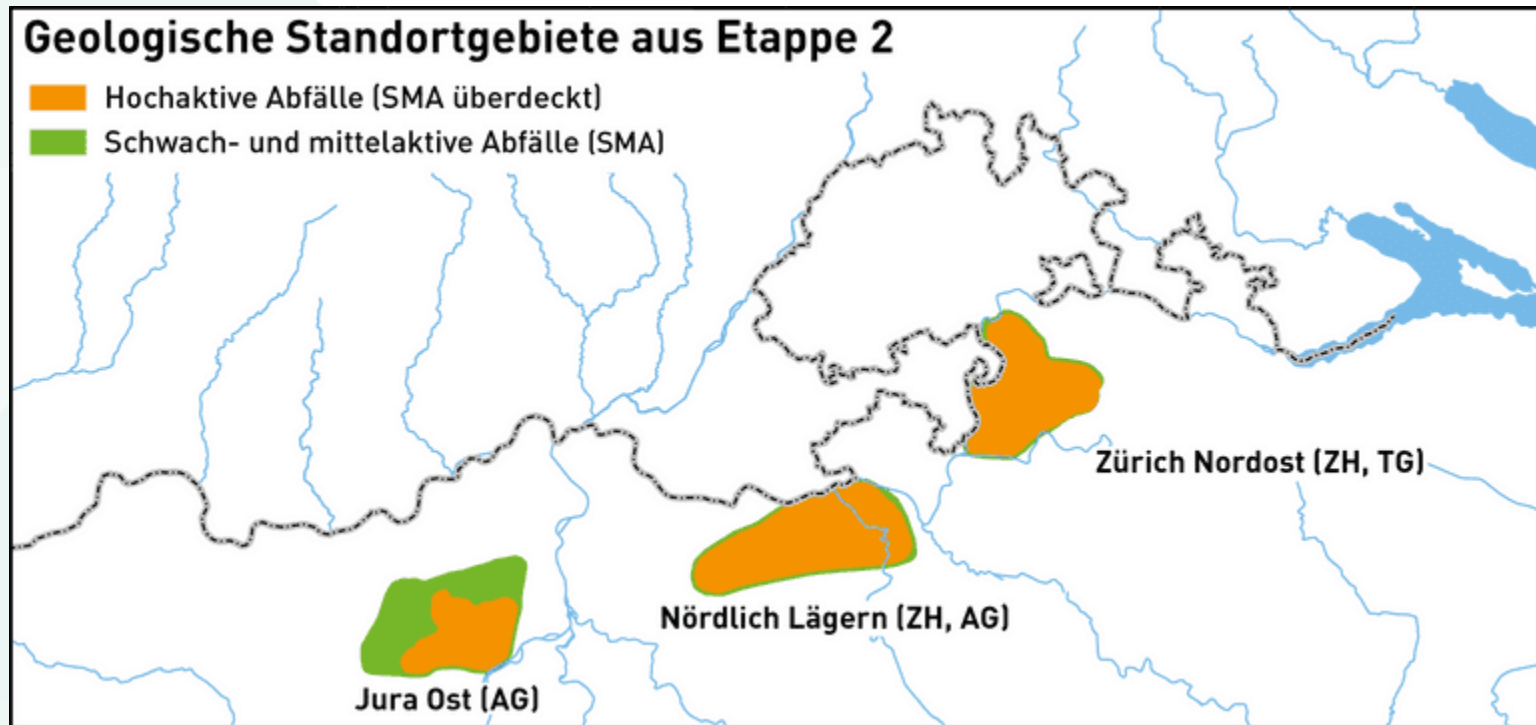
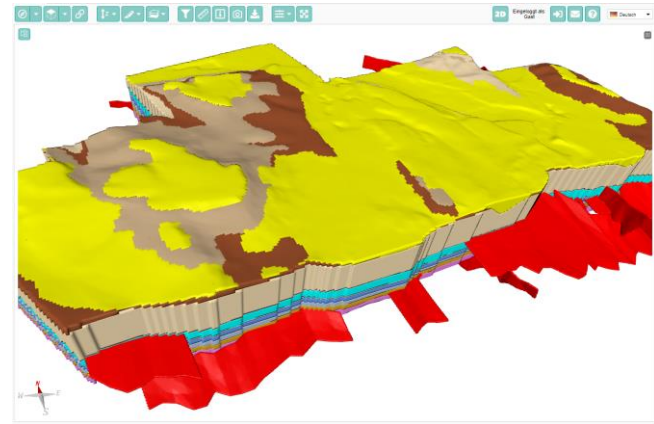


Figure by Dirk Arndt, Nagra

Data

- * Tetrahedra geometries
 - * 11 horizons
 - * 69 faults
 - * 633 properties
- * properties:
 - * Categorical texts: `geomechanik_einaxialdruckfestigkeit_parallel_datenuaiaet`
 - * “Gut” – “good”
 - * Statistical Floating point numbers: `geomechanik_einaxialdruckfestigkeit_parallel_p0.25`
 - * “32.366”
 - * Floating point numbers

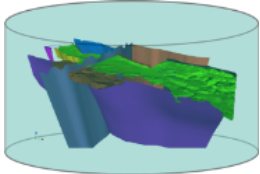




Geotechnical Database

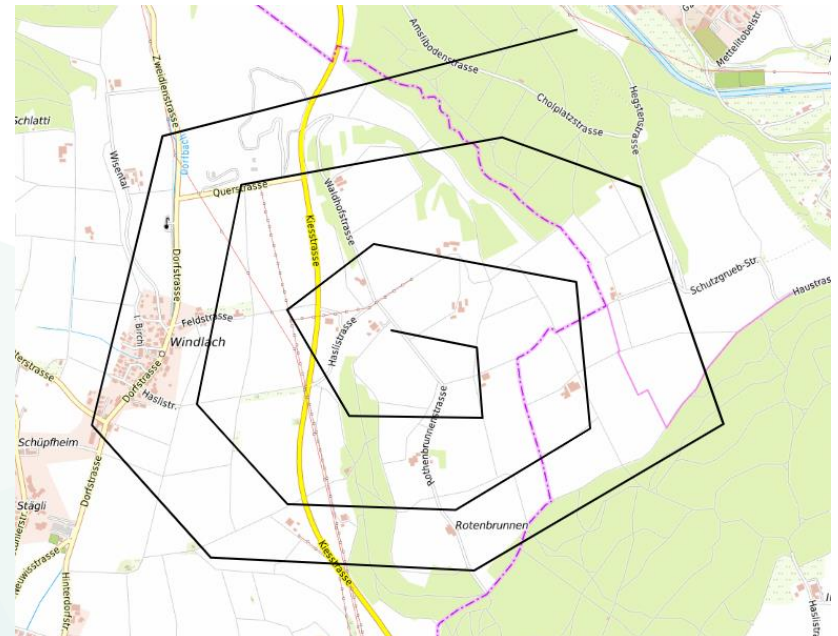
Beschreibung	Stufe 2	Stufe 3	Stufe 4	Physikalische Einheit	Minimalwert	Maximalwert	Text	Klassen	Datenqualität	Störung Nr
Hirarchiestufe 1	Stufe 2	Stufe 3	Stufe 4							
Eigenschaften der Gesteinseinheiten	Allgemeine Beschreibung									
		Label		---			x			Störung Nr 19
		Lithologische Kurzbeschreibung der Gesteinseinheit		---			x			Störung Nr 19
	Mineralgehalt									Störung Nr 19
		Quarzgehalt		%	0	100			x	
			P0.05							
			P0.25							
			P0.5							
			P0.75							
			P0.95							
			Mittelwert							
			Standardabweichung							
			Datenqualität							
		Karbonatgehalt		%	0	100			x	
			P0.05							
			P0.25							
			P0.5							
			P0.75							
			P0.95							
			Mittelwert							
			Standardabweichung							
			Datenqualität							
		Gehalt an Tonmineralien		%	0	100			x	
			P0.05							
			P0.25							
			P0.5							
			P0.75							
			P0.95							
			Mittelwert							
			Standardabweichung							
			Datenqualität							

Dataflow



Input Data

- * Tunnel axis from engineers
- * AutoCad and similar
- * IFC

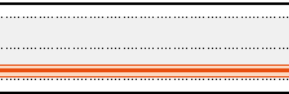


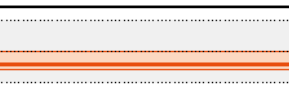
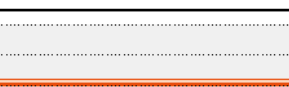


Artificial tunnel

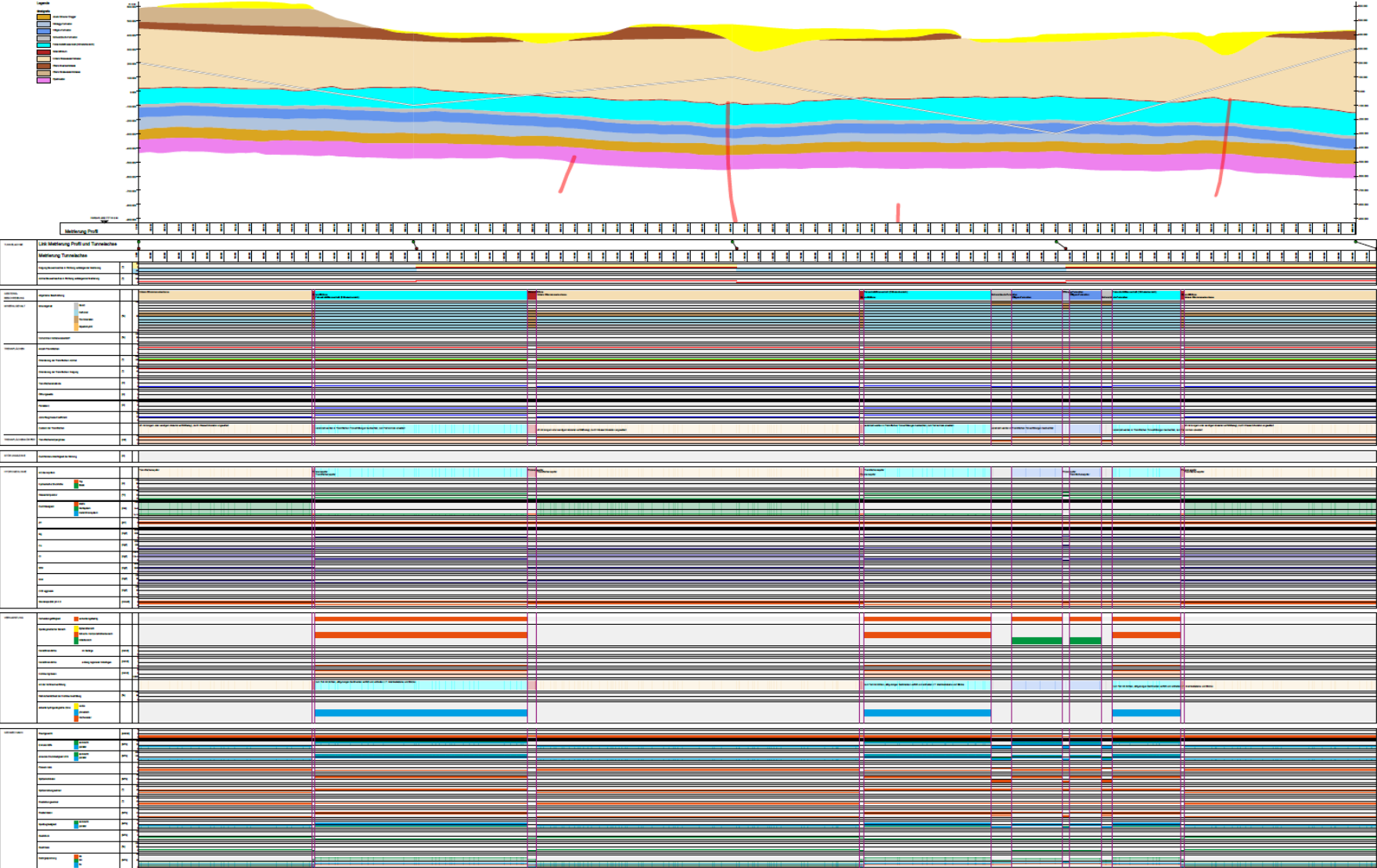
How are semantics encoded?

* geomechanik_einaxialdruckfestigkeit_parallel_p0.25

* Split by `_`: **Geomechanik** **Einaxialdruckfestigkeit** **Parallel** p0.25

GEOMECHANIK	Raumgewicht		[kN/m3]	5 4 2	
	E Modul 50%	<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: green; margin-right: 5px;"></div> senkrecht <div style="width: 10px; height: 10px; background-color: blue; margin-right: 5px; margin-left: 10px;"></div> parallel </div>	[MPa]	50 25 0	
	einaxiale Druckfestigkeit UCS	<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: green; margin-right: 5px;"></div> senkrecht <div style="width: 10px; height: 10px; background-color: blue; margin-right: 5px; margin-left: 10px;"></div> parallel </div>	[MPa]	300 150 0	
	Poisson ratio			1 0 0	
	Spitzenkohäsion		[MPa]	30 15 0	

Result



Future Development

- * Explore possible datamodels to store input data not dictionary based
- * Graphical adoptions
- * Interactivity as web application



Johannes Camin, Jonas Klein (GiGa infosystems)
GST Web: The Rewrite



Roadmap 2022

- * Extended Shapefile import
- * Management of Geological Profiles
- * Display Boreholes in Virtual Cross Sections
- * Correlation Plots of Boreholes
- * Use Colors from joined tables
- * SEGY Writer
- * Display Borehole logs in GST Web
- * More Input-/Outputformats: e.g. 3d tiles, gltf, ...



Questions?

Remarks?

Wishes?

A large teal graphic in the top right corner, consisting of several overlapping triangles and polygons in various shades of teal, creating a modern, abstract design.

Thank you!

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