

9th SGM - Zürich 2011

APPPLIED & **E**NVIRONMENTAL
GEOLOGY

The geological 3D-model of the Basel region – new insights

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Applied and Environmental Geology

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University Basel***

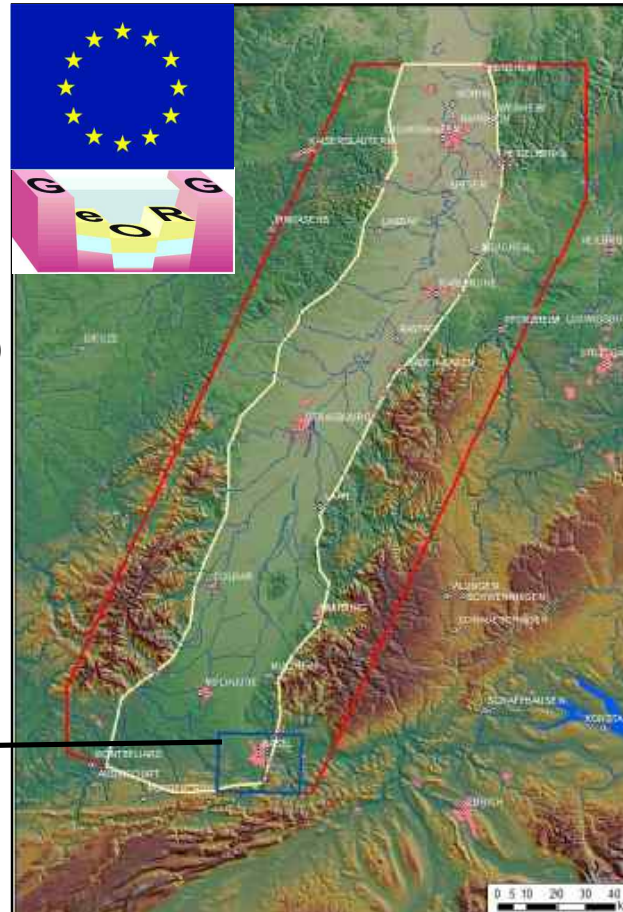
INTERREG project „GeORG“ & BFE project

3D-surfaces model

of the Upper Rhine Graben;
characterisation of geopotentials

- geothermal energy
- groundwater
- CO²- sequestration
- earthquake risks
- development of a spatial 3D planing tool for the deeper underground

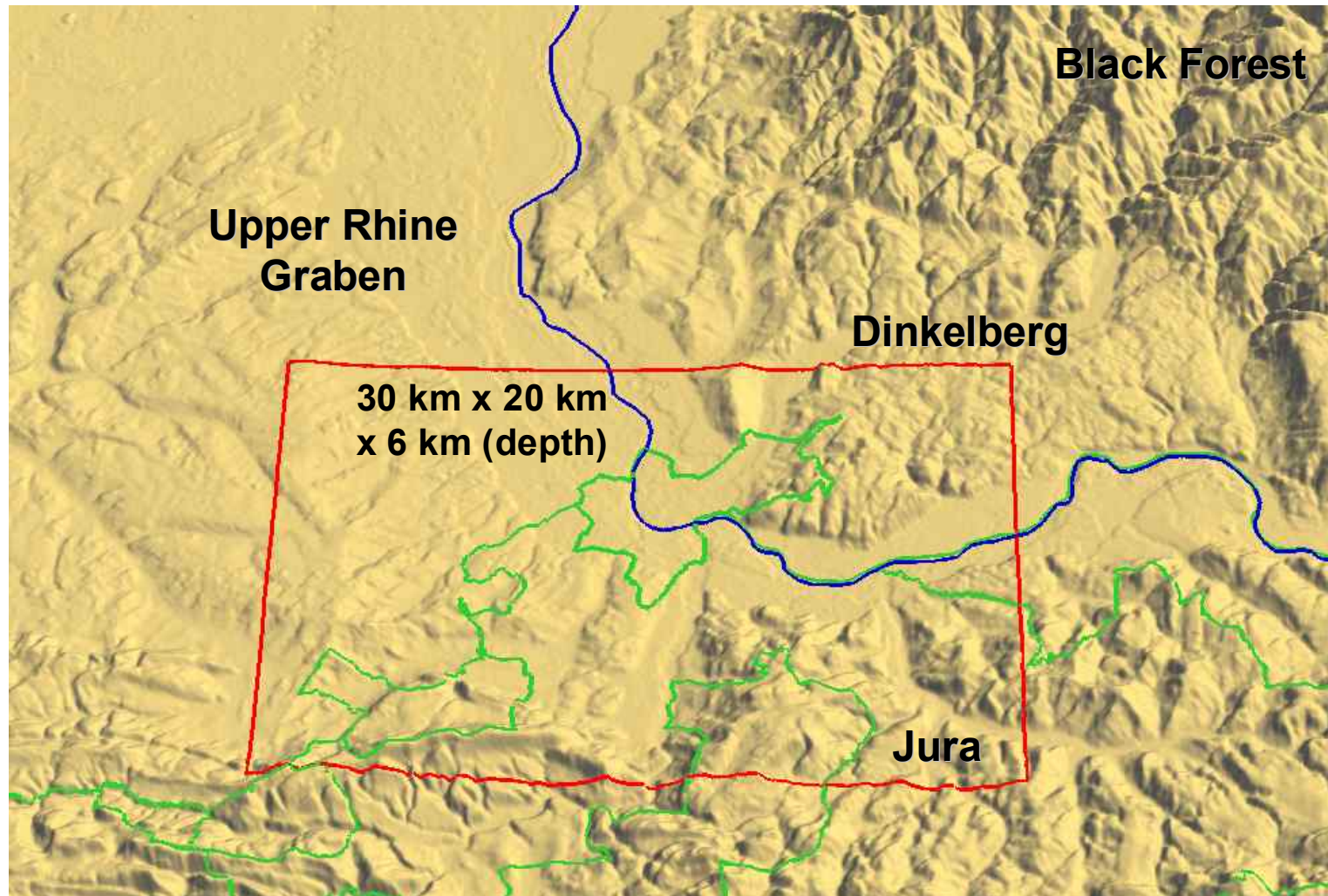
30 km x 20 km
x 6 km (depth)



related projects in the Basel area

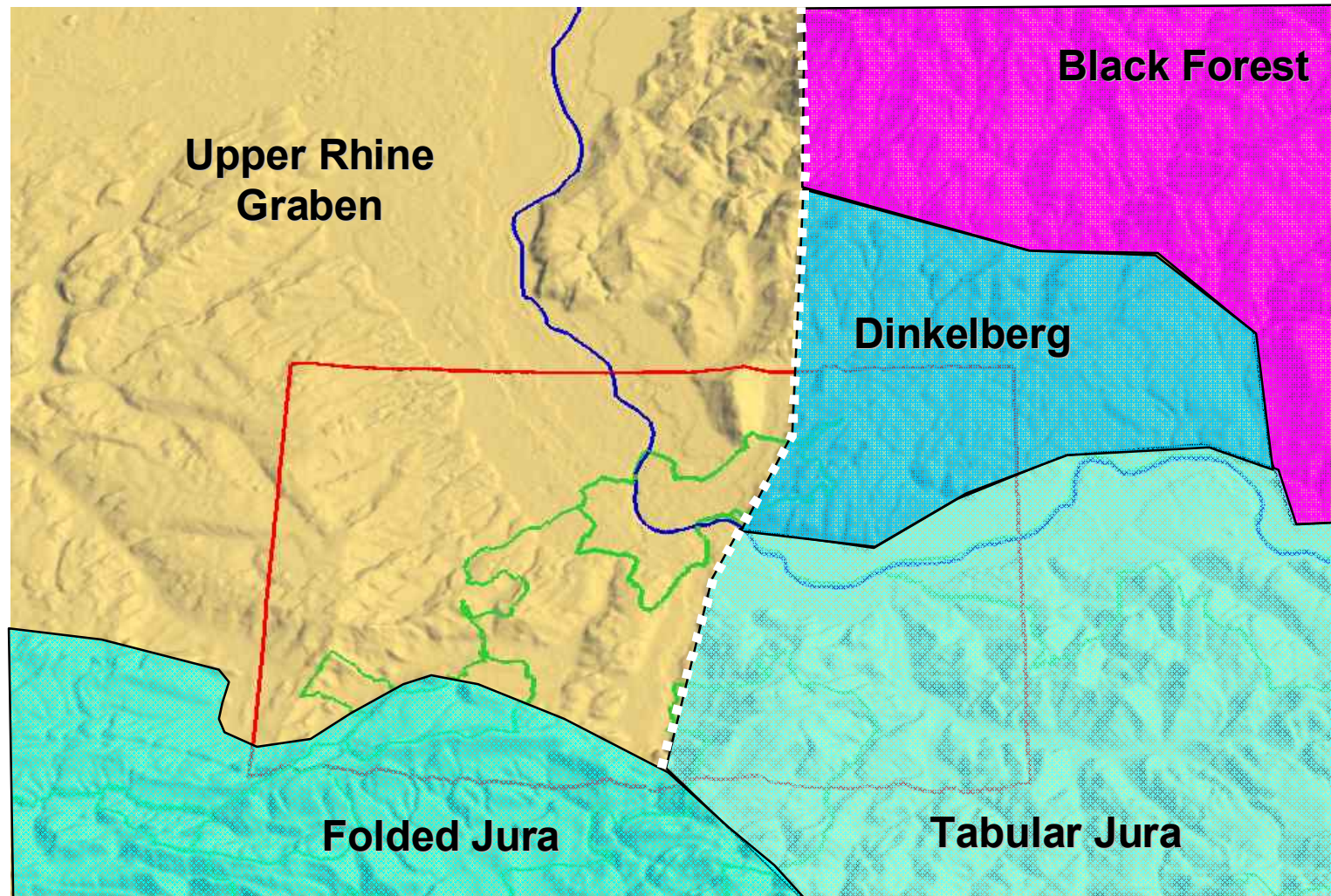
- studies for a highway tunnel below Basel
- groundwater protection in the Basel area
- development of rules for use of shallow thermal energy (BL)

geographic overview

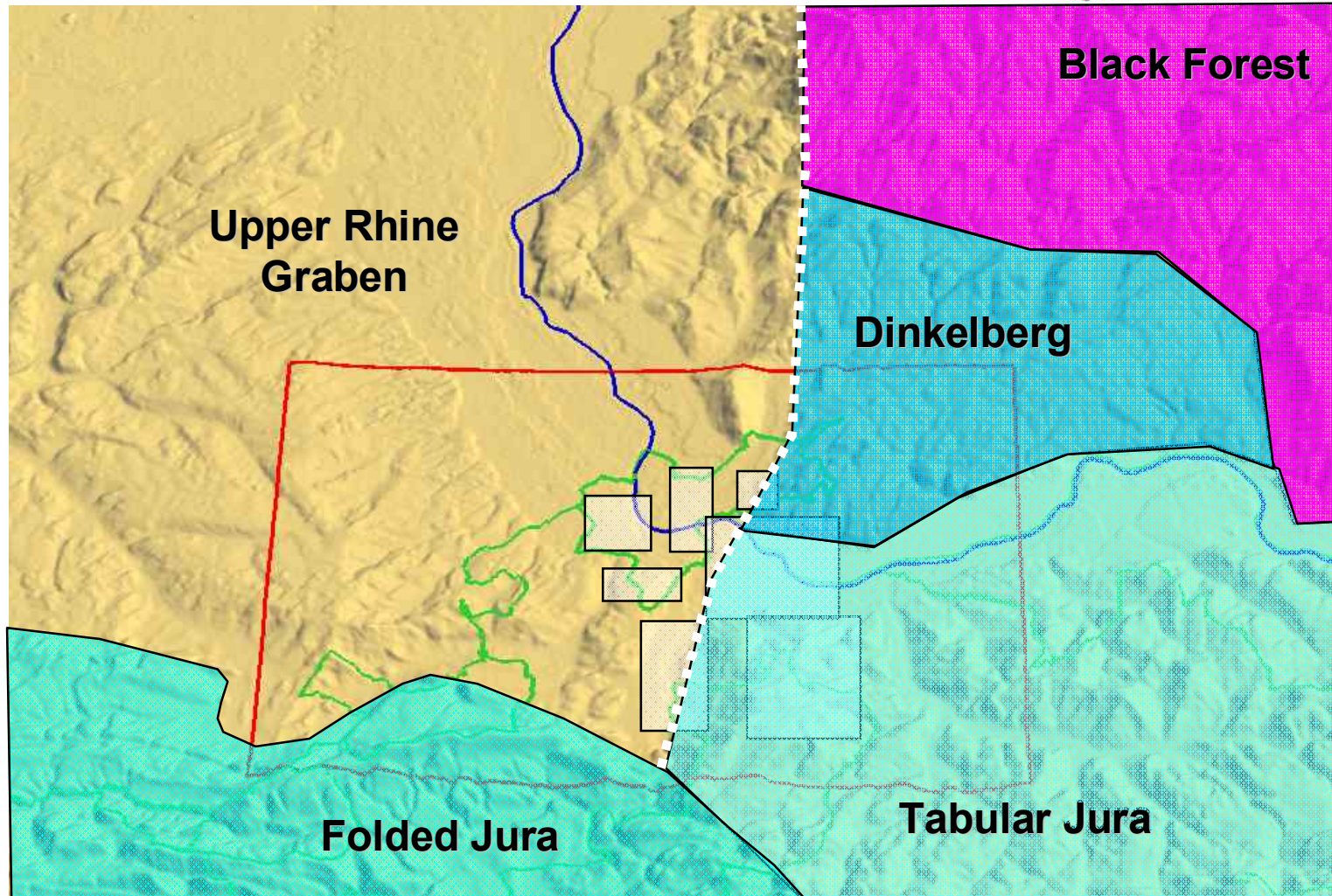


regional geological context of the 3D-model Basel

main border fault

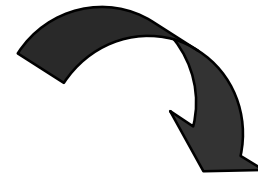
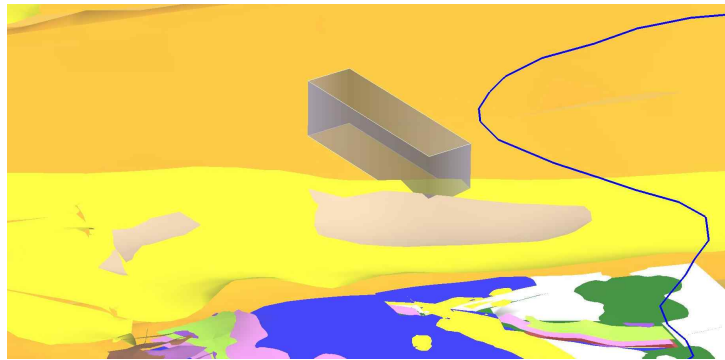


development of a flexible tool for space planning

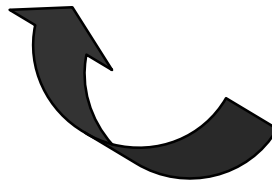
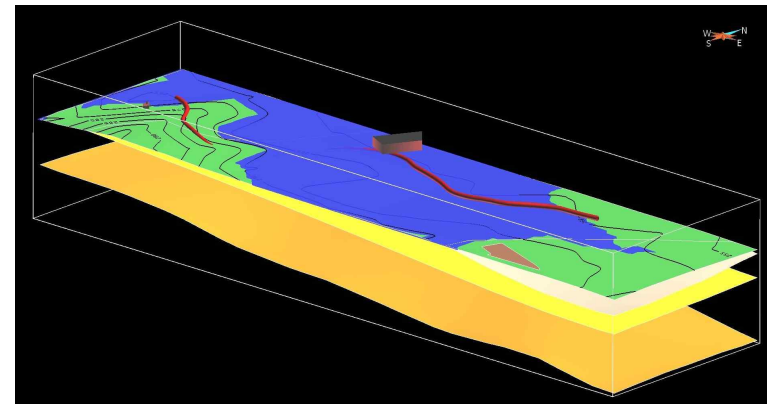


workflow local projects

export of a small model part



import new data,
study details,
model refining



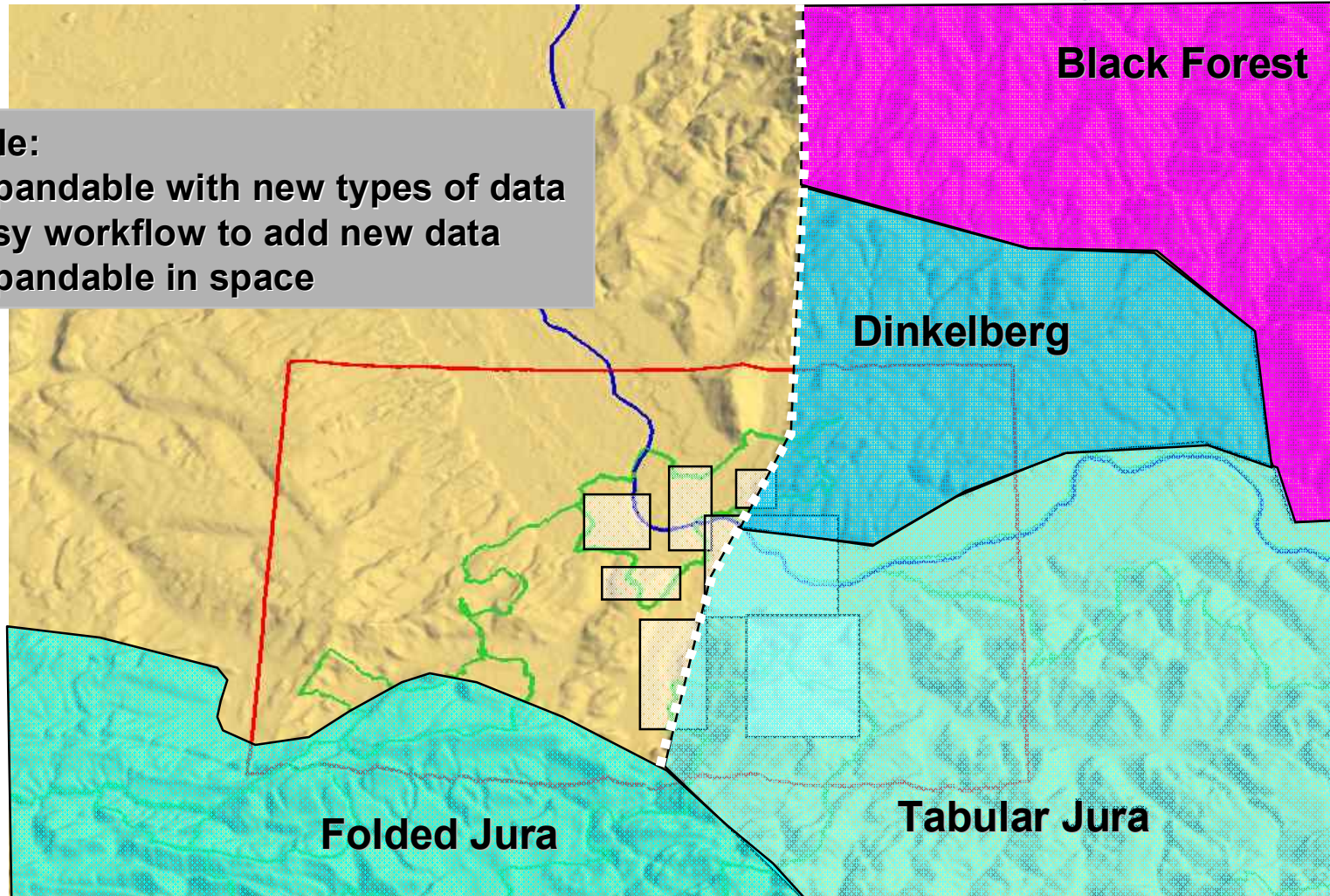
re-integration
of the updated model part

development of a flexible tool for space planning

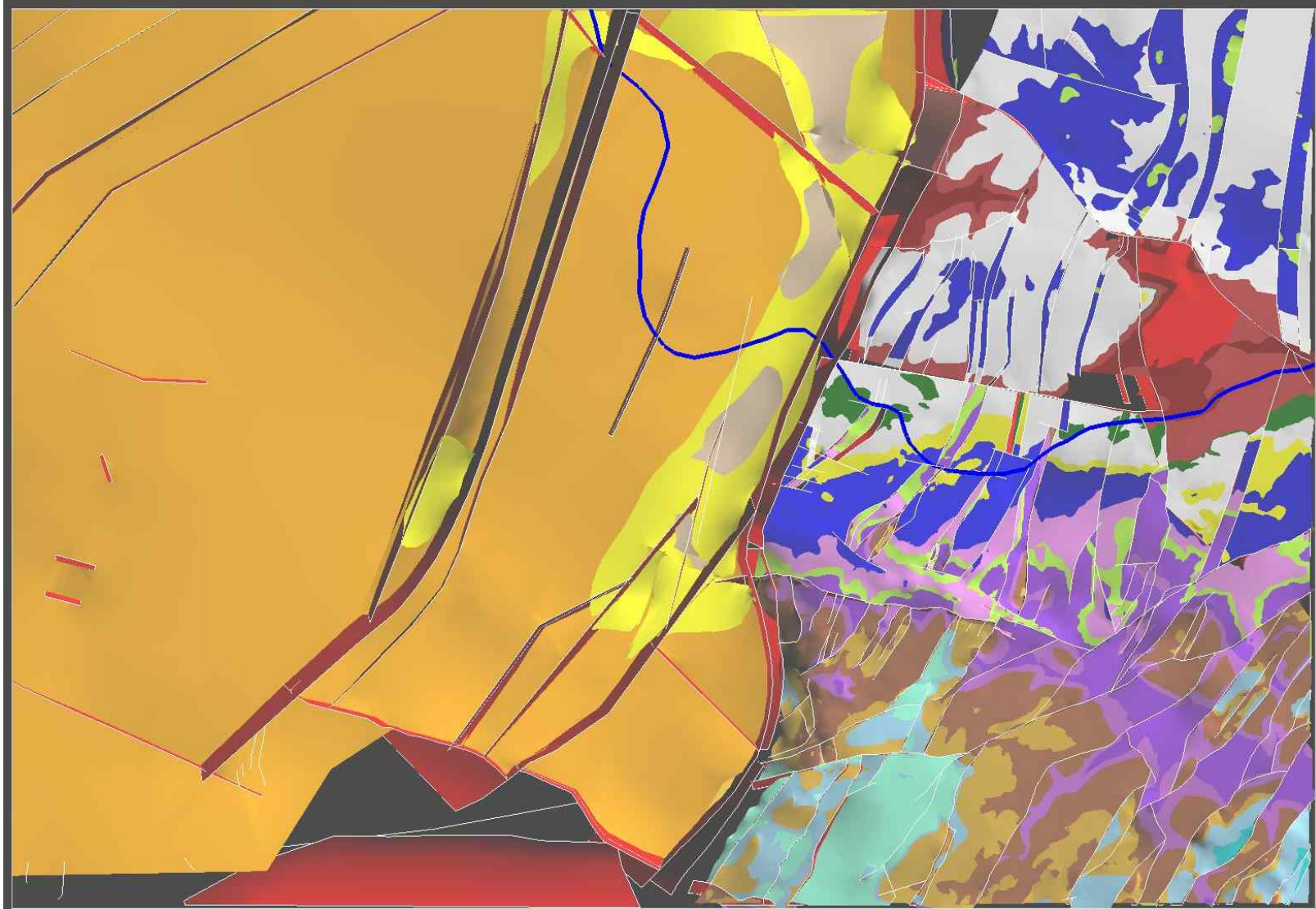


flexible:

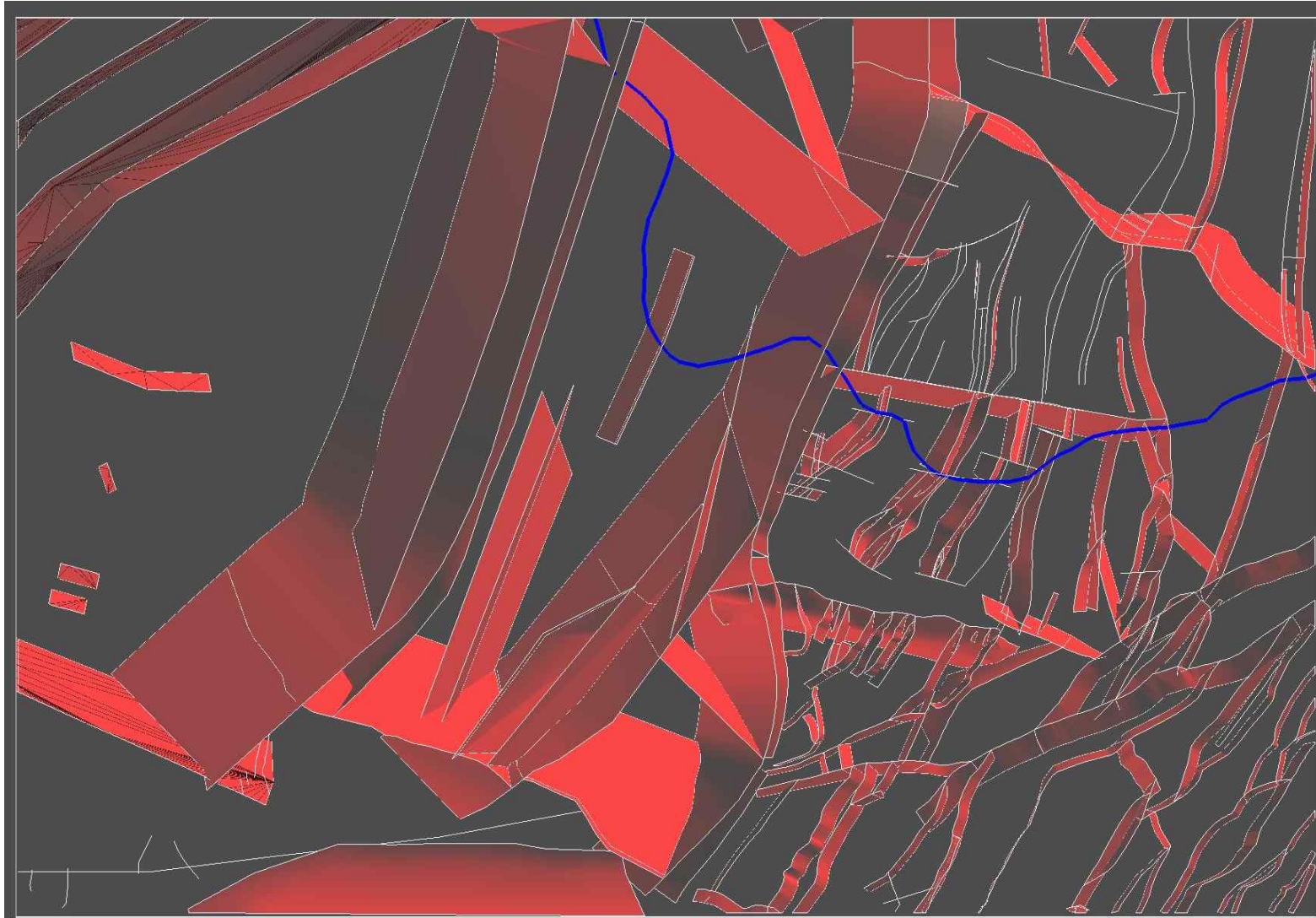
- expandable with new types of data
- easy workflow to add new data
- expandable in space



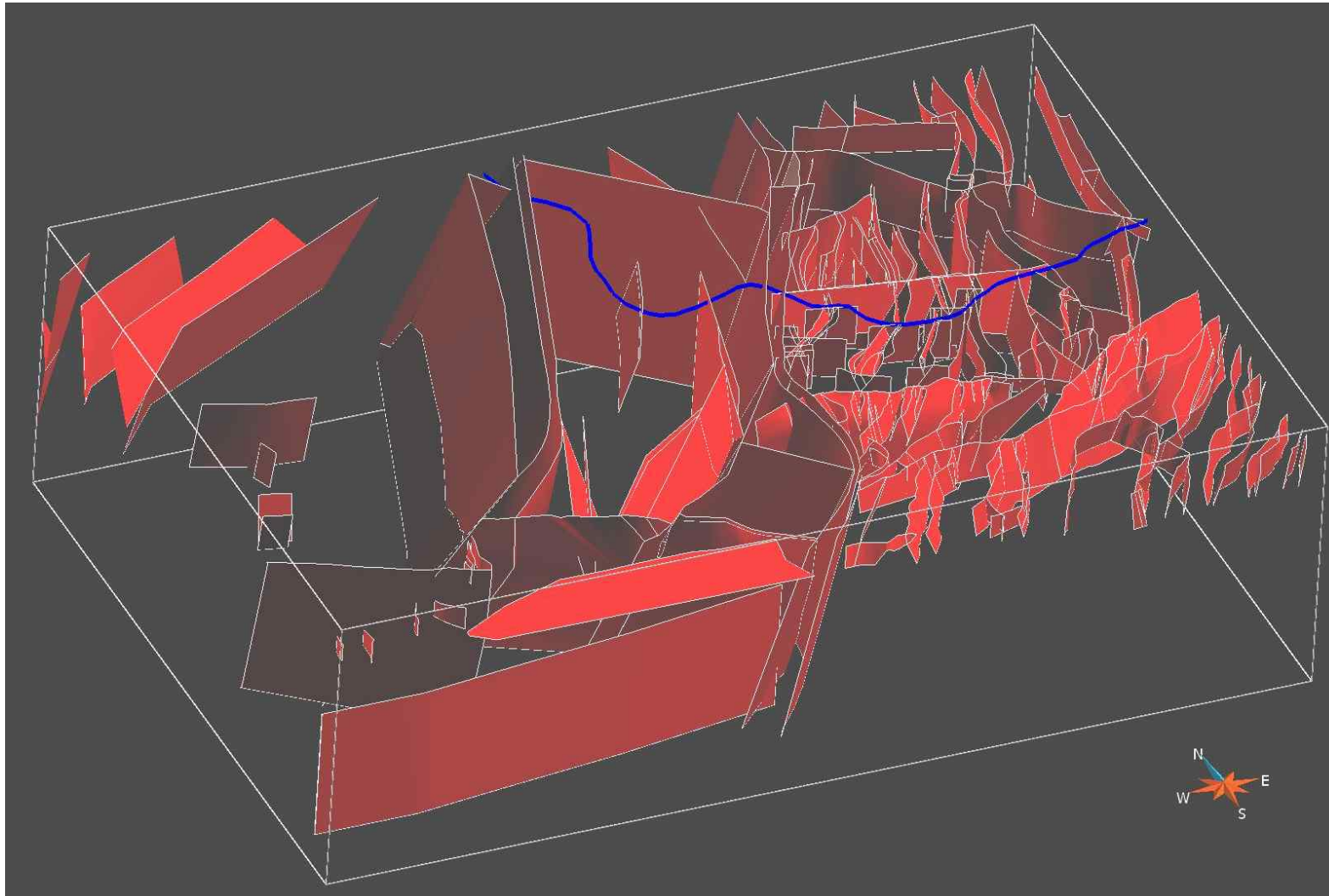
overview – map view



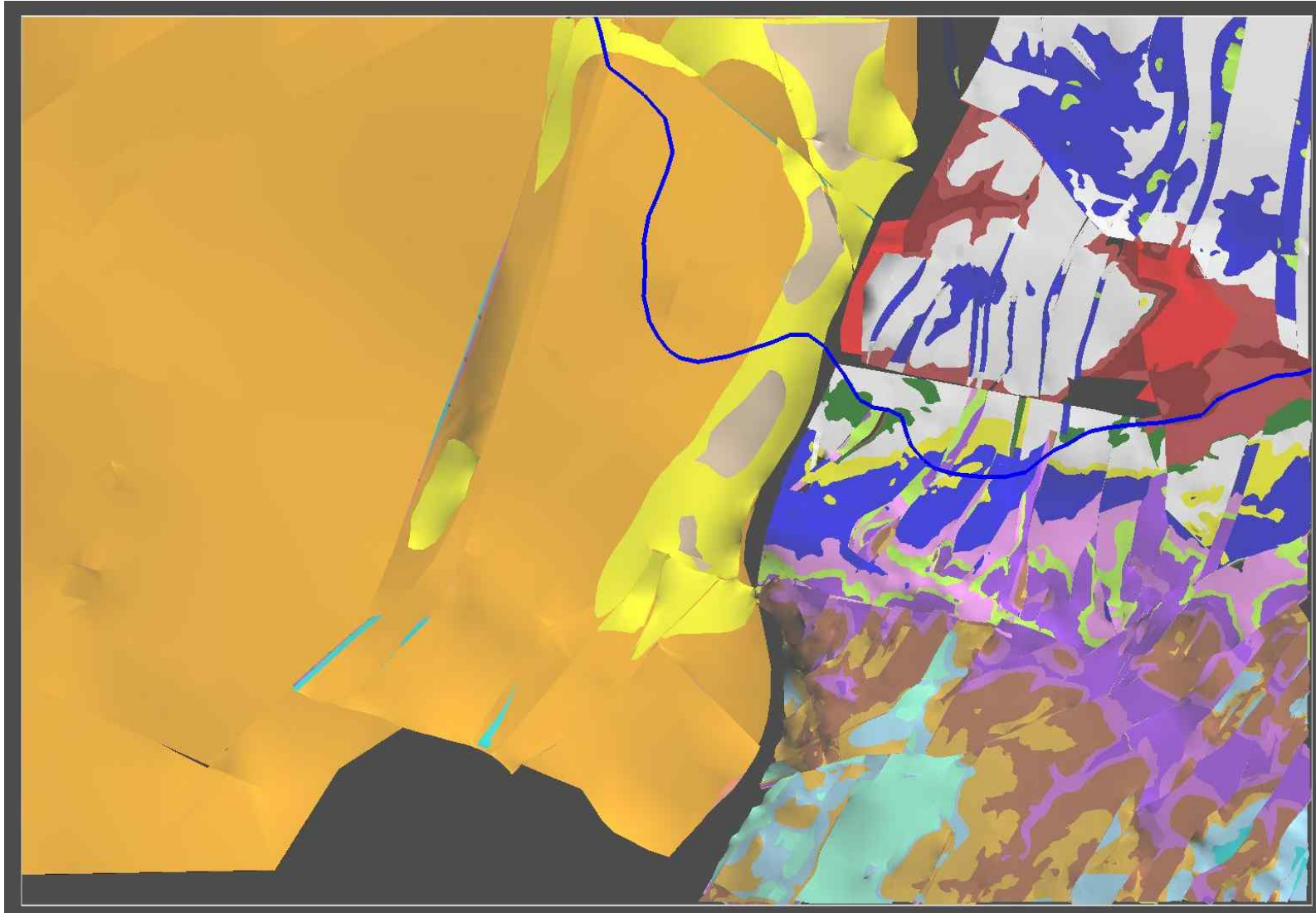
overview - faults



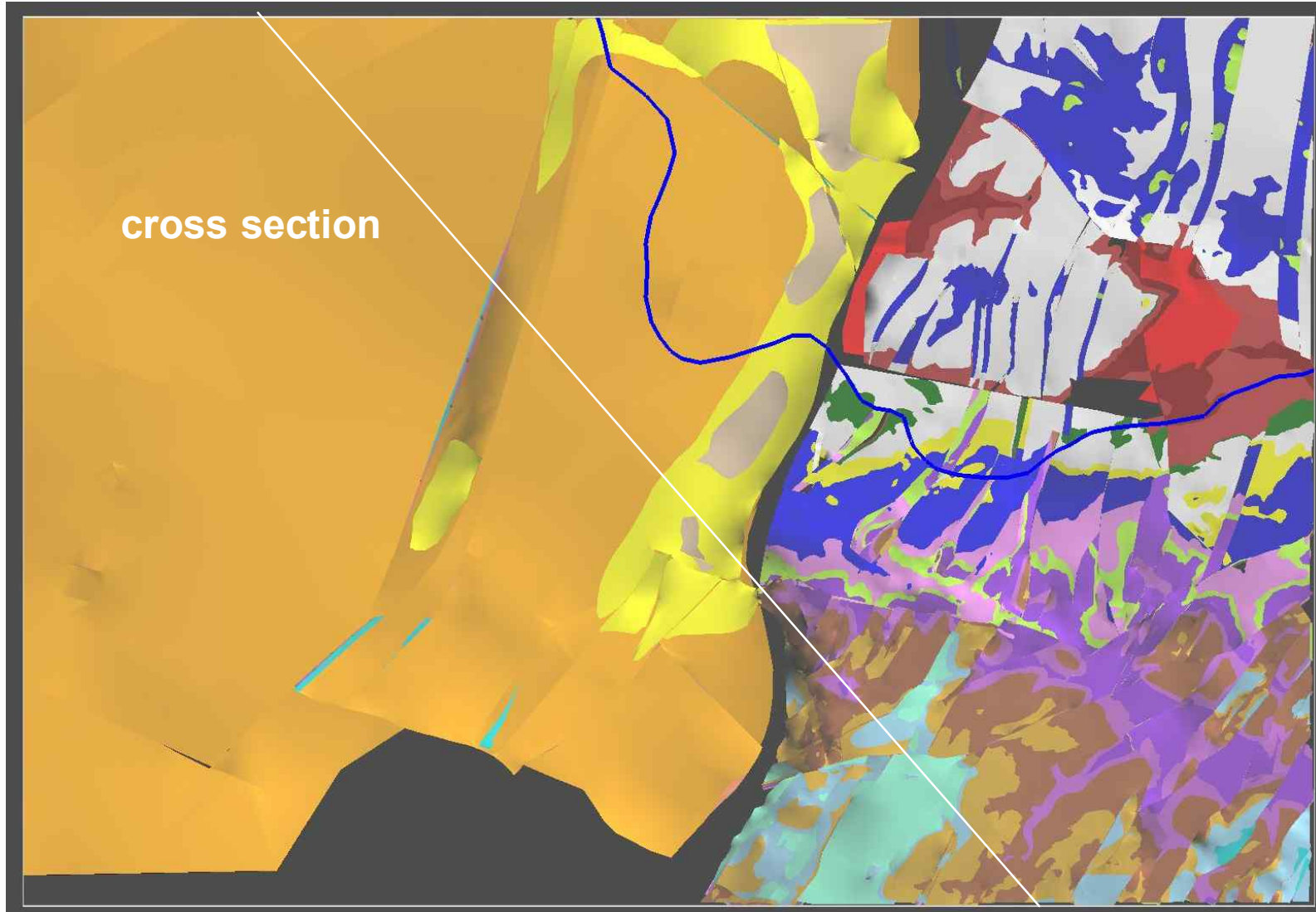
overview – faults (view from SE)



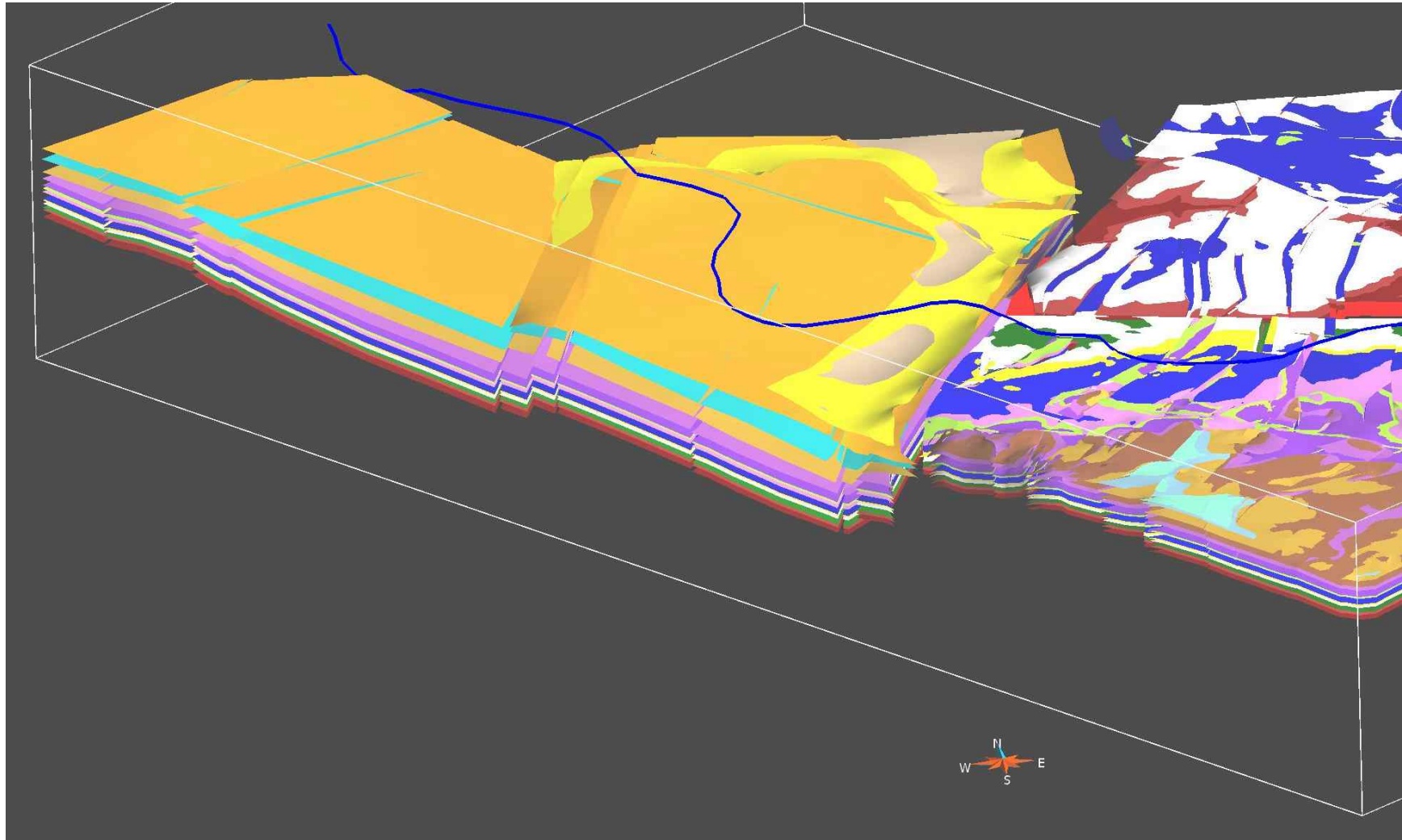
overview - horizons



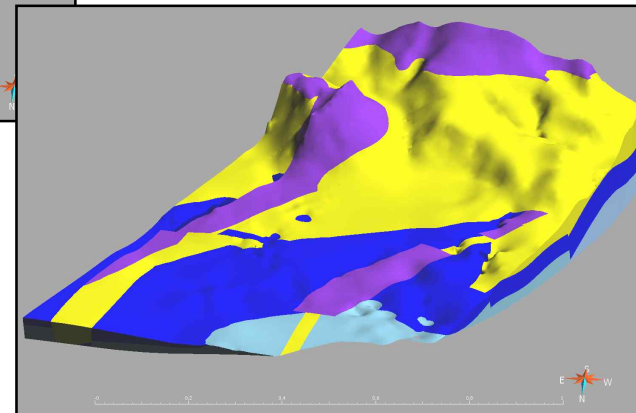
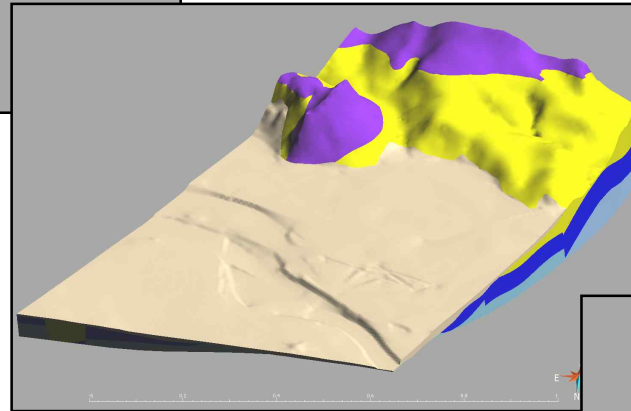
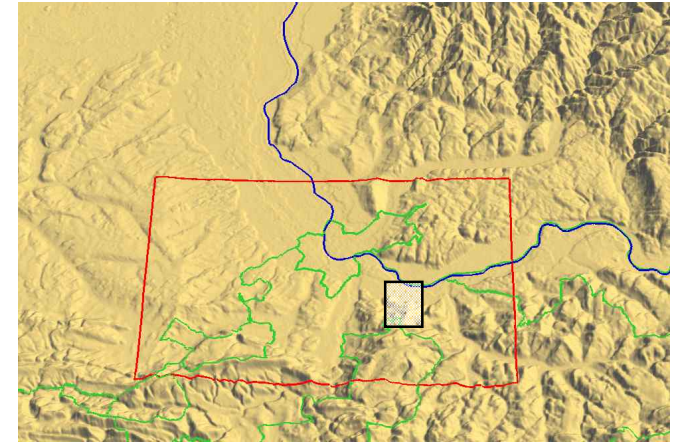
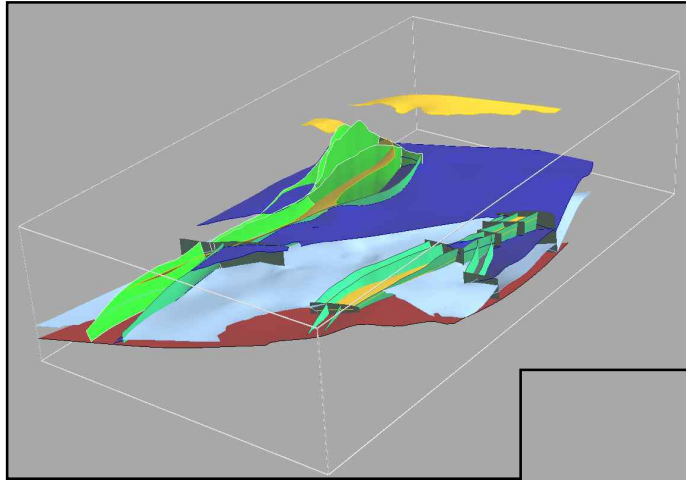
overview - horizons

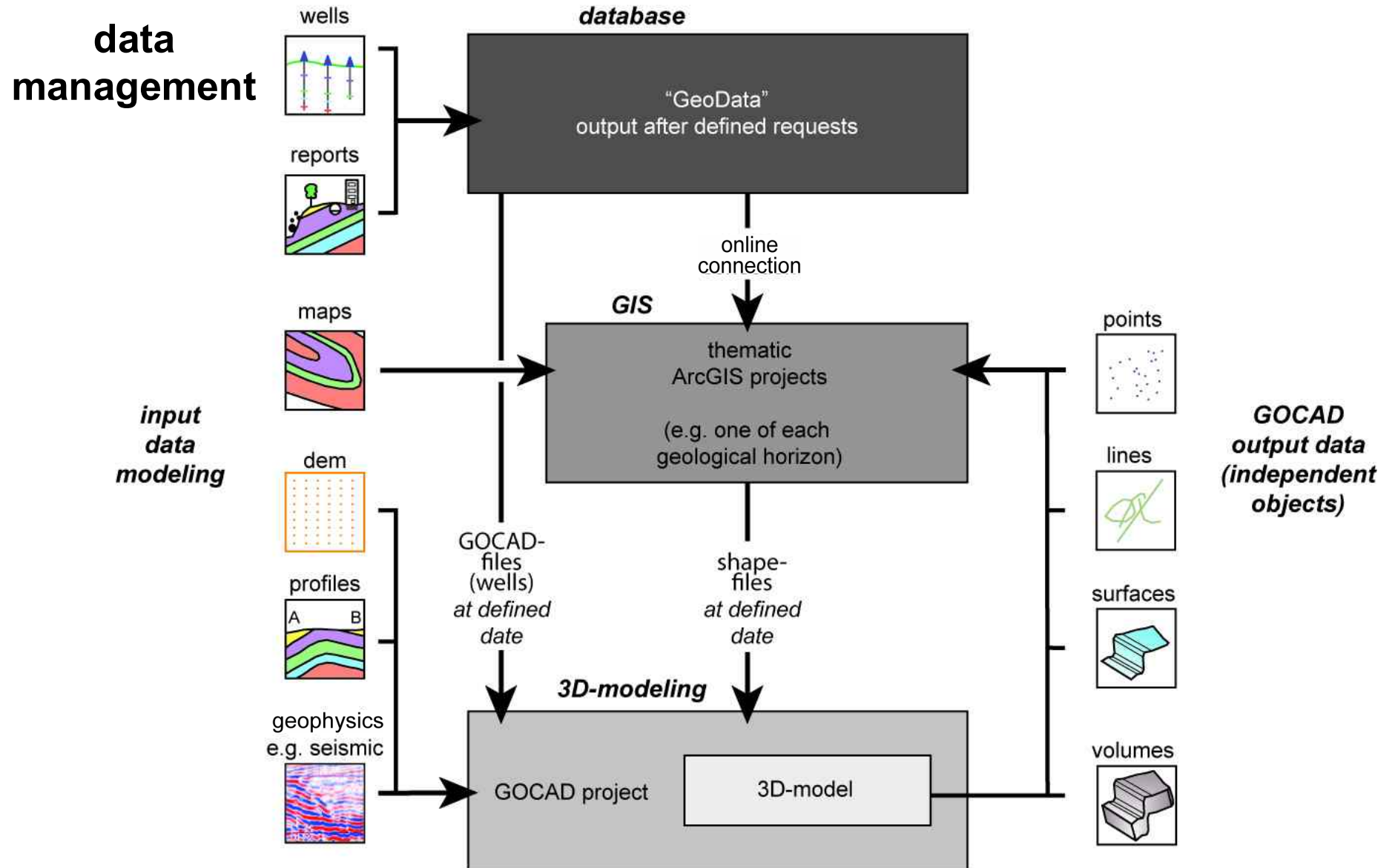


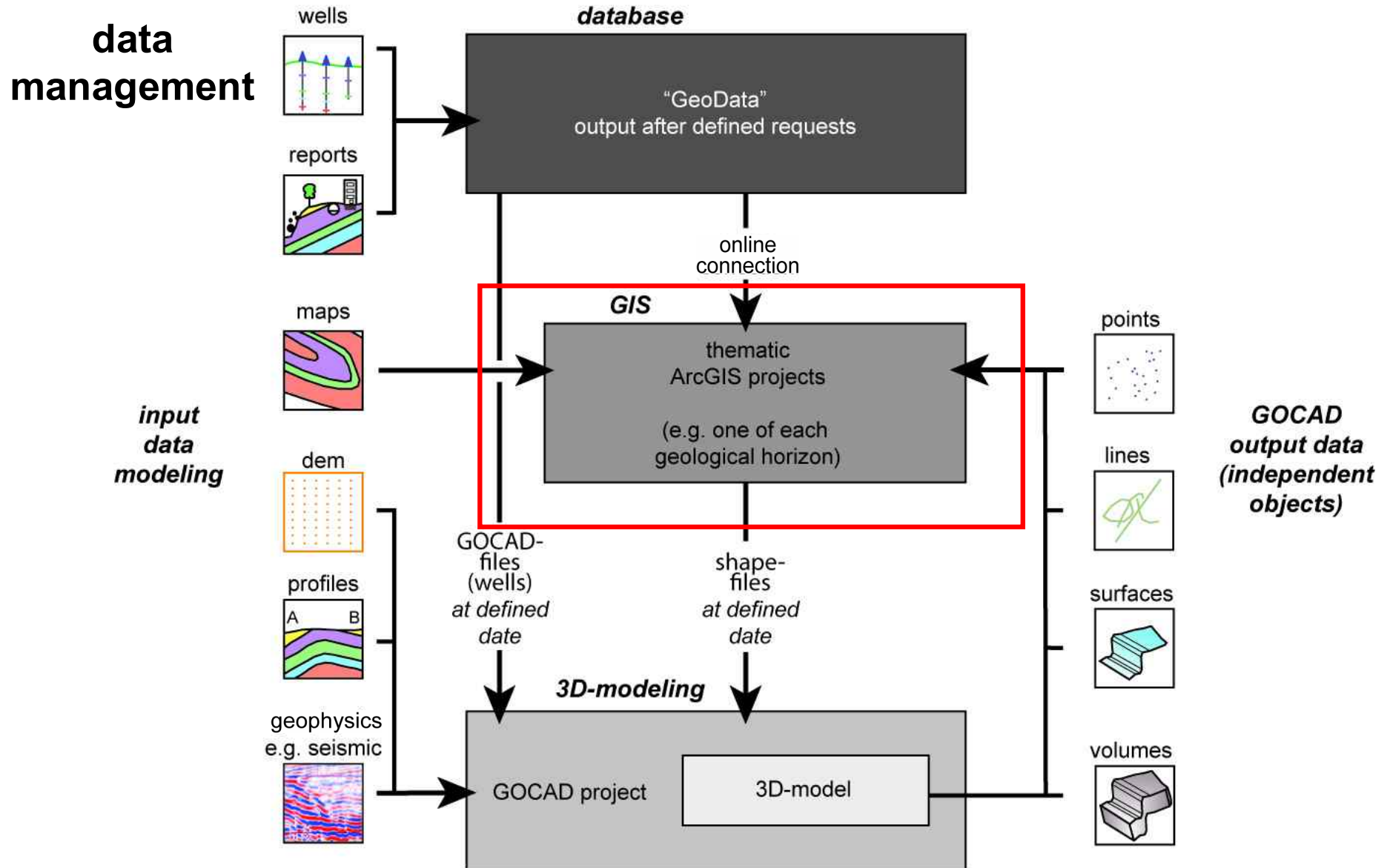
overview - horizons



volumes



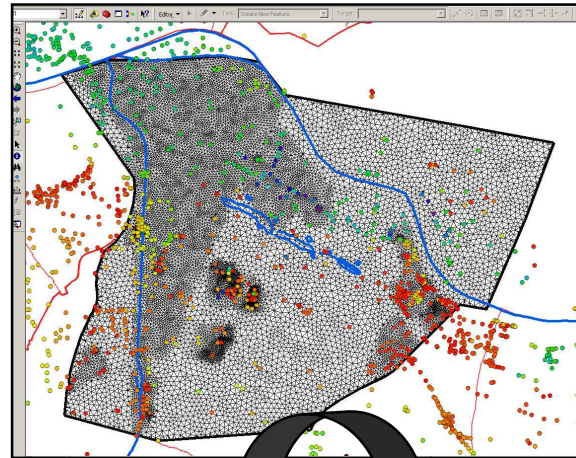




data management of each horizon

thematic ArcGIS projects:

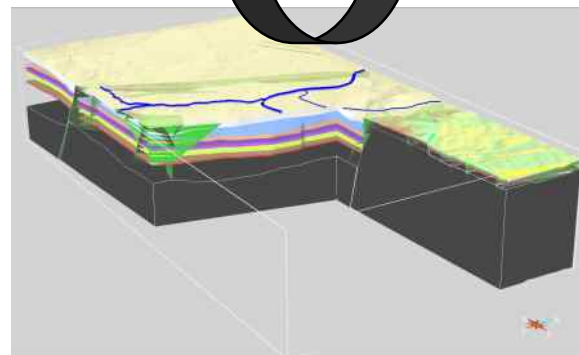
- storage / overview
- data preparation
- uncertainty estimation
- map creation



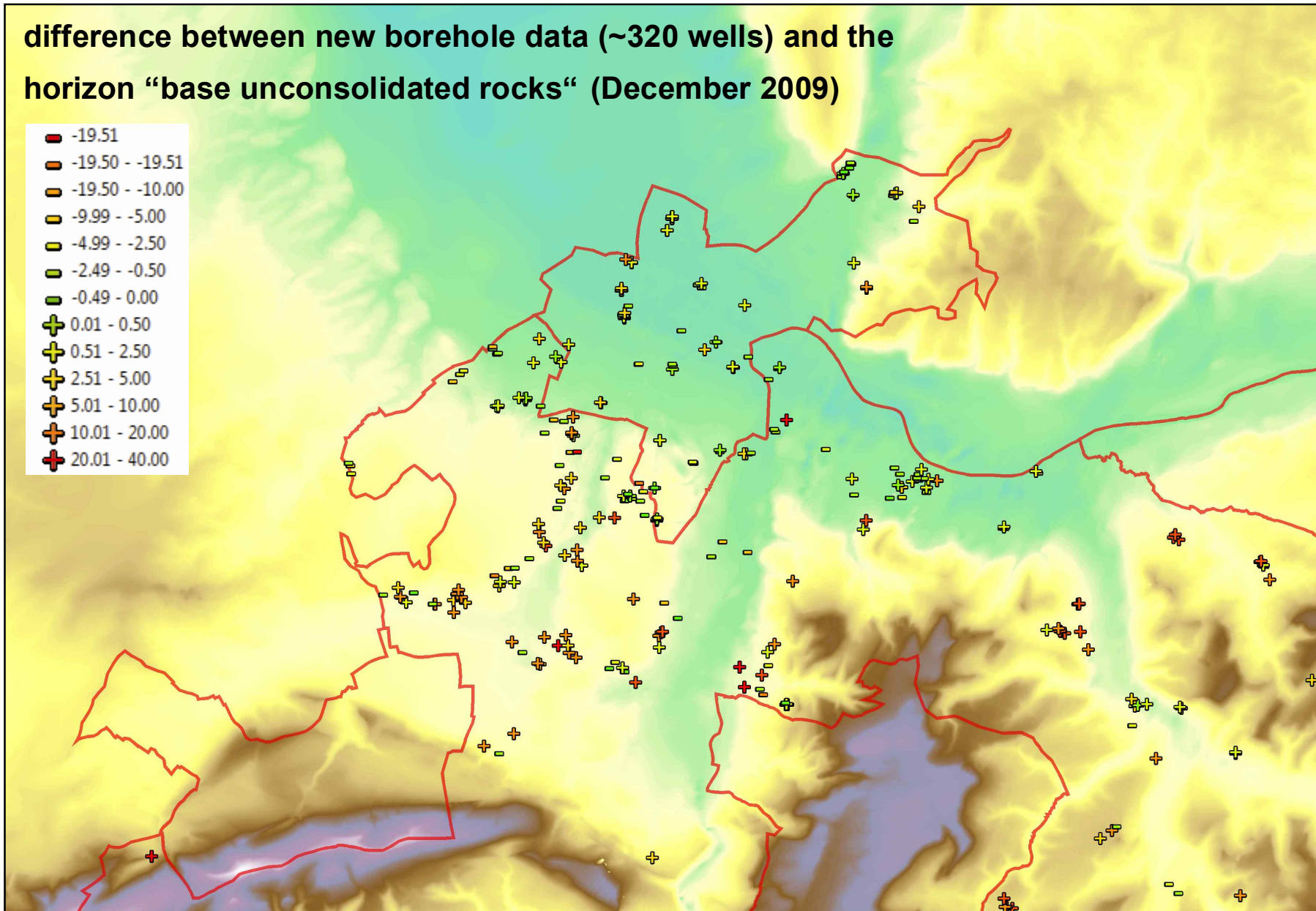
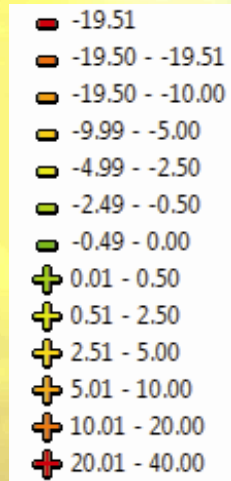
data exchange

GOCAD

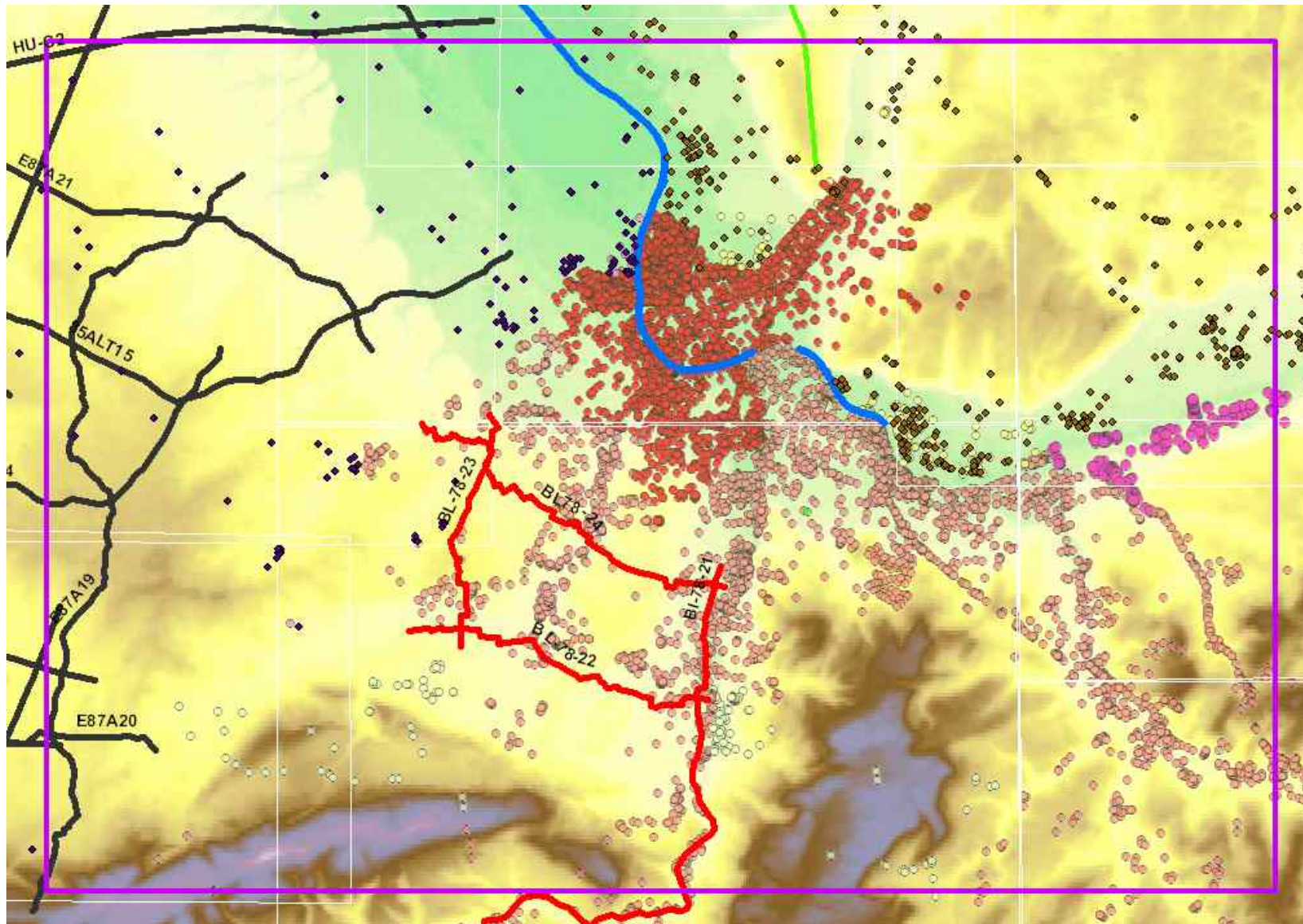
- 3D modeling
- interpretation



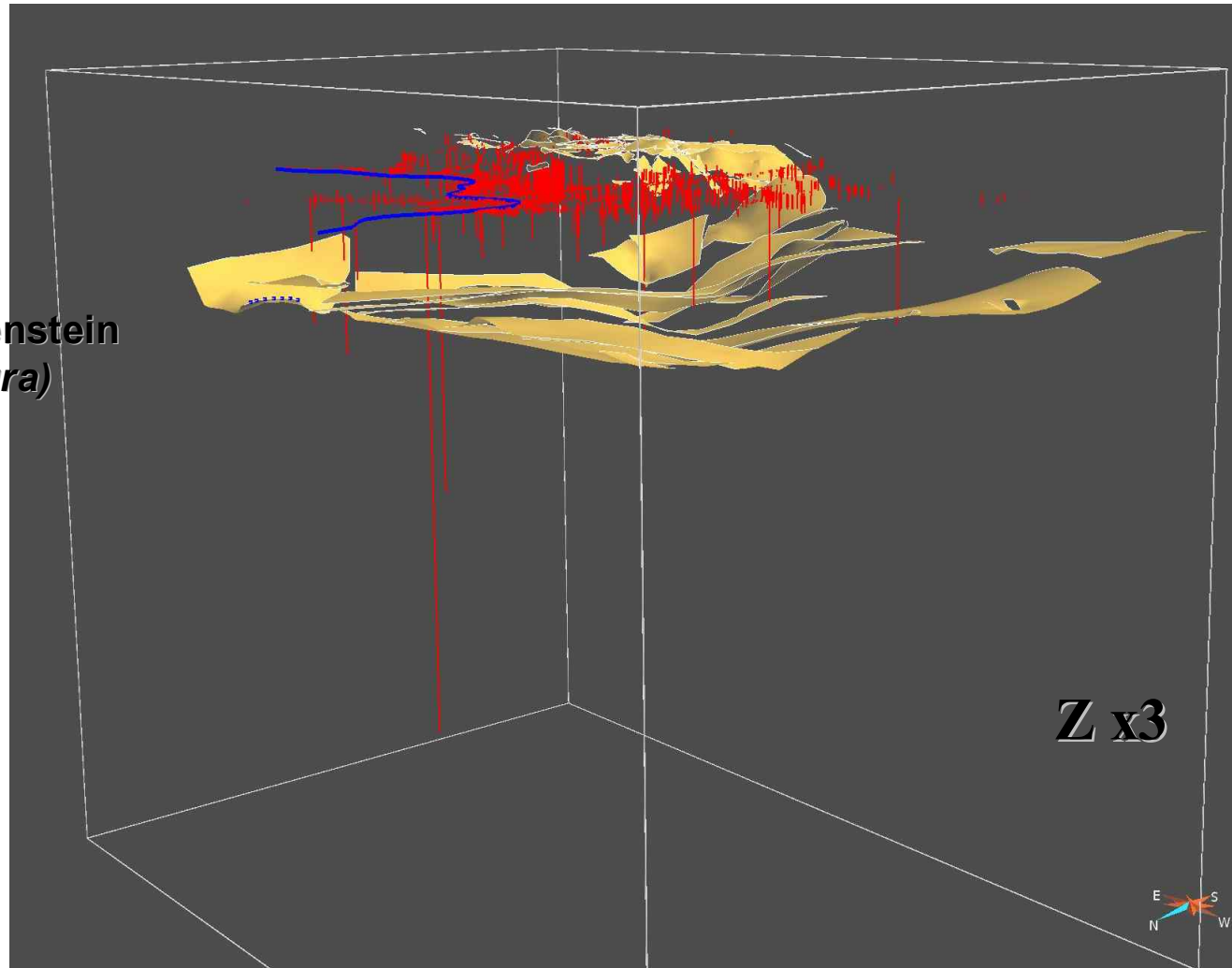
difference between new borehole data (~320 wells) and the horizon “base unconsolidated rocks“ (December 2009)



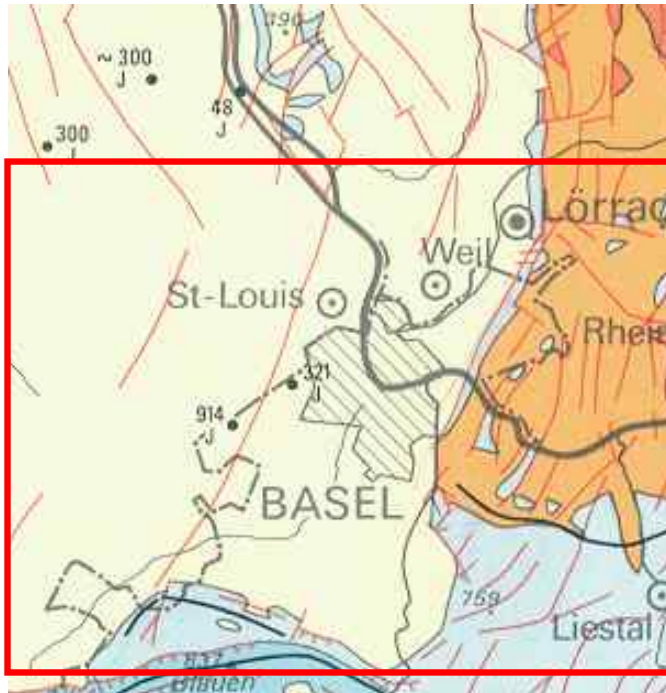
uncertainty vs. data distribution



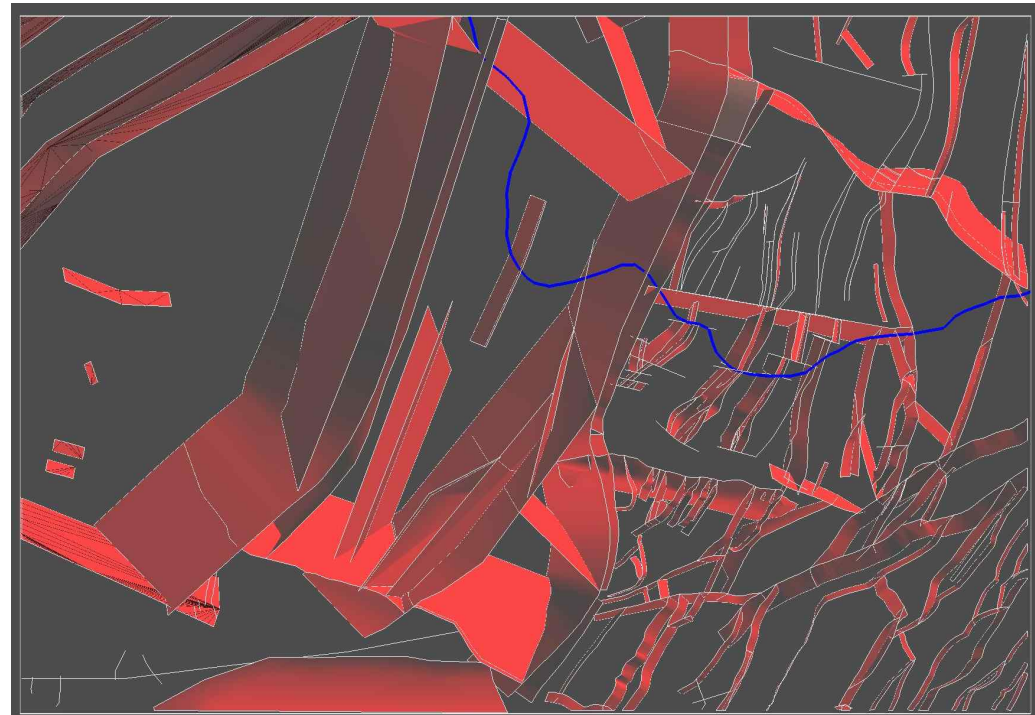
horizon:
Hauptrogenstein
(*Middle Jura*)



uncertainty by interpretation



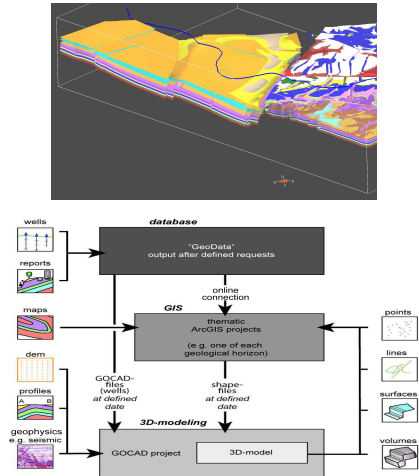
Fischer 1965



summery

The geological 3D model of the Basel region is established

A strategy for future development and maintenance of the model is developed



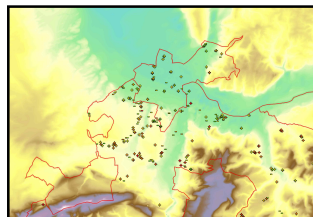
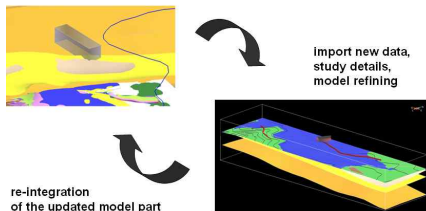
outlook:

improvement of the data management

improvement of routines for a fast integration of incoming new data to the 3D-model

improvement of uncertainty estimation

studies on the geological evolution of the area



summery

The geological 3D model of the Basel region is established

A strategy for future development and maintenance of the model is developed

Thank you !

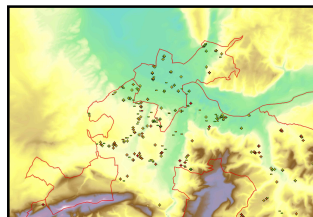
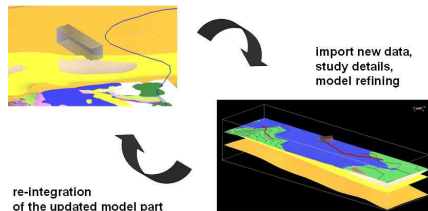
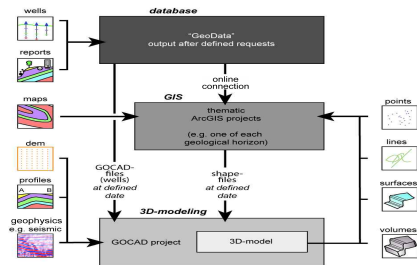
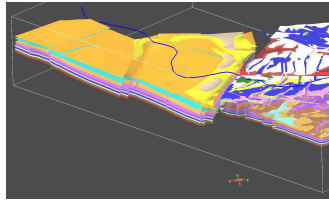
outlook:

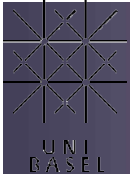
improvement of the data management

improvement of routines for a fast integration of incoming new data to the 3D-model

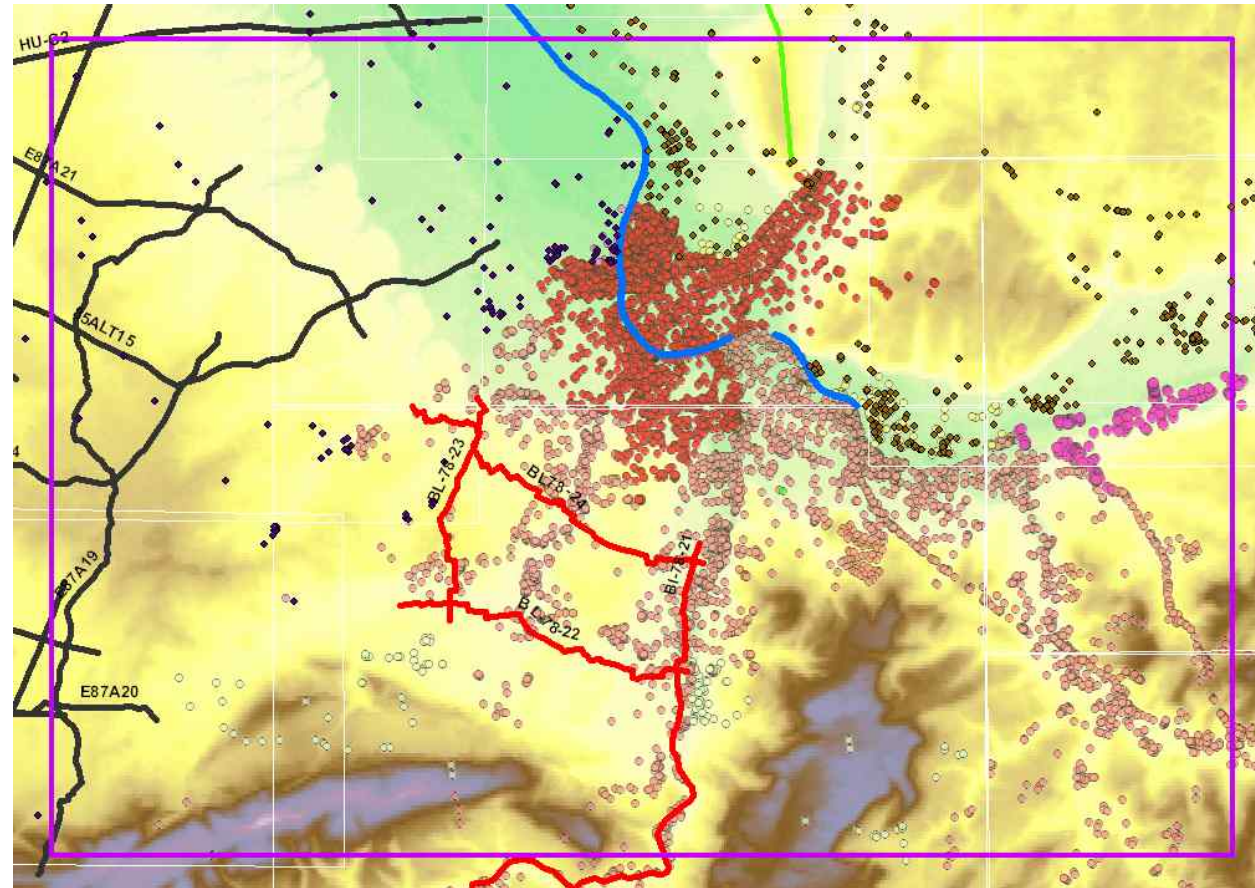
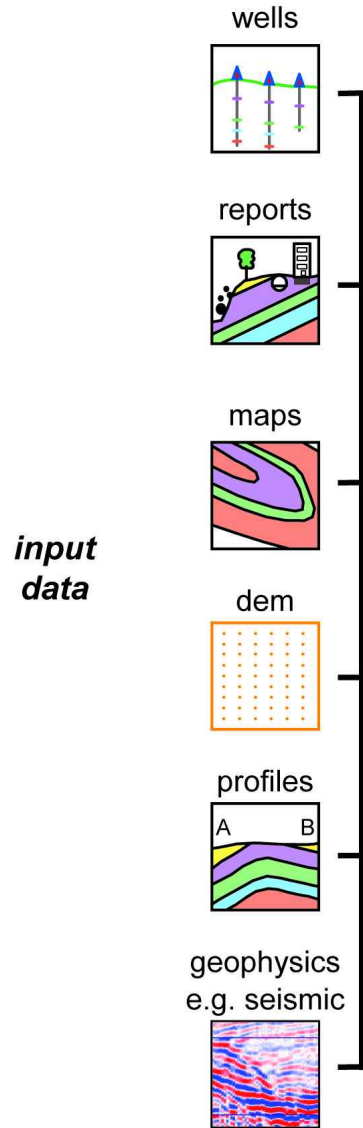
improvement of uncertainty estimation

studies on the geological evolution of the area





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GEOLOGY 



- borehole data of about 10000 wells (incl. D & F),
- reflexionseismic
- maps, DEM
- literature (tectonic framework, 2D-profiles, thickness maps, etc)