

A digital infrastructure for GeoLaB

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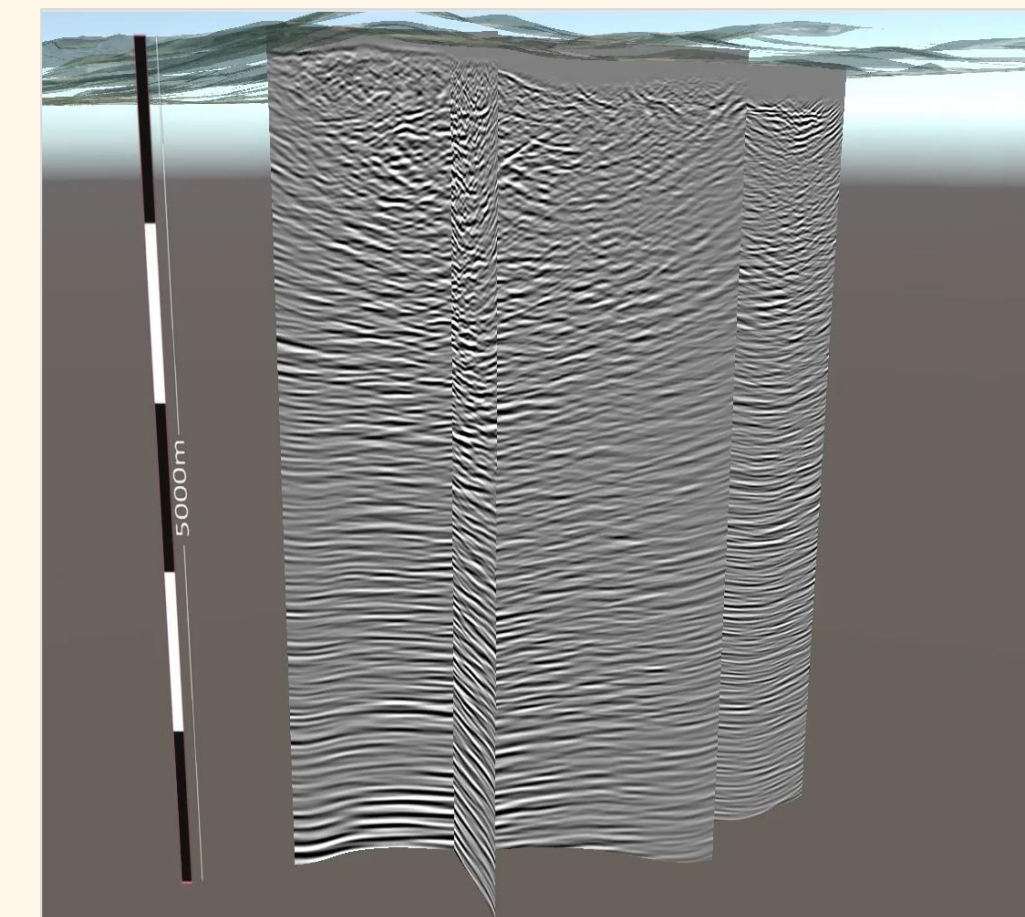
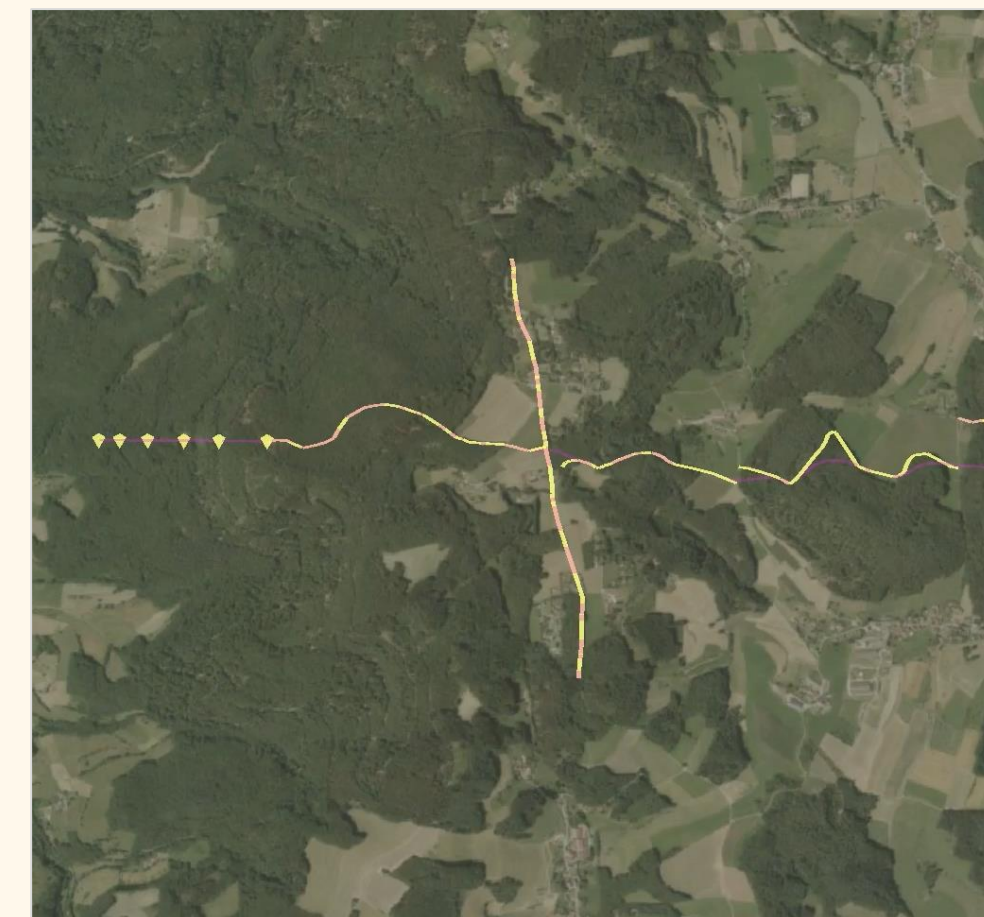
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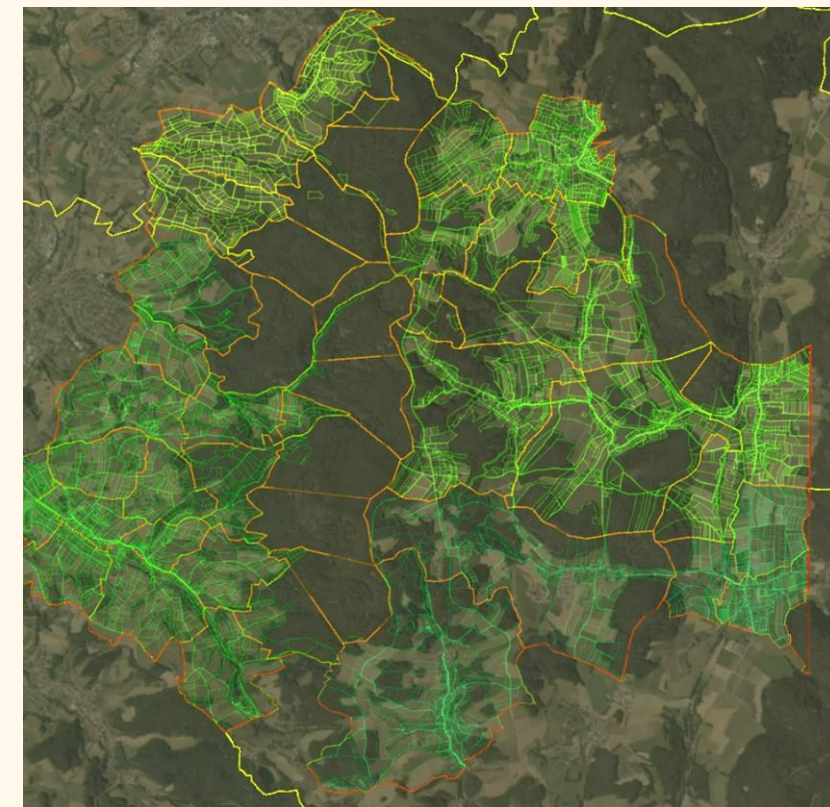
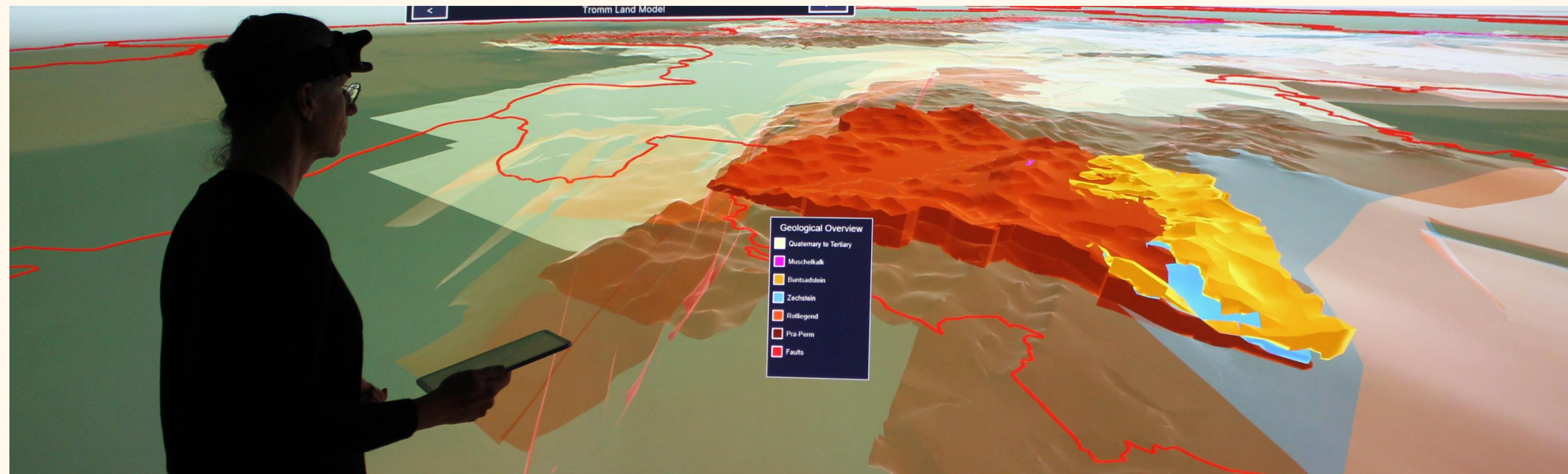
Agenda | A digital infrastructure for GeoLaB

- What is Digital GeoLab?
- Data Management
- 3D Scientific Visualisation
- Digital Twin



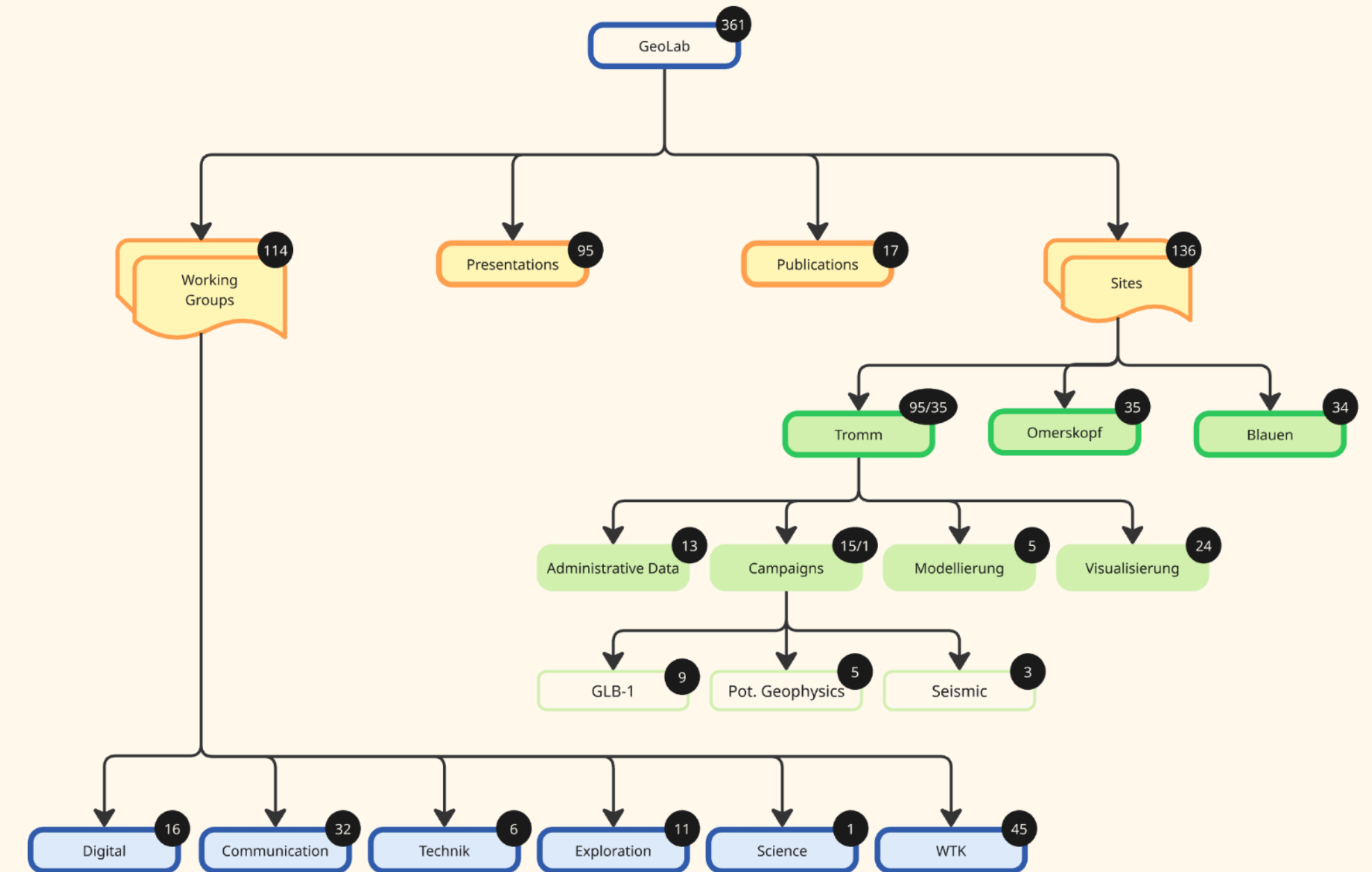
Digital GeoLaB

- Handling digital aspects for the research infrastructure GeoLaB
- Members from all participating research centres and universities
- Currently dealing with
 - Data management for the whole project
 - 3D Visualisation of the Tromm site
 - Prototyping for a digital twin of the underground research lab



Data Management

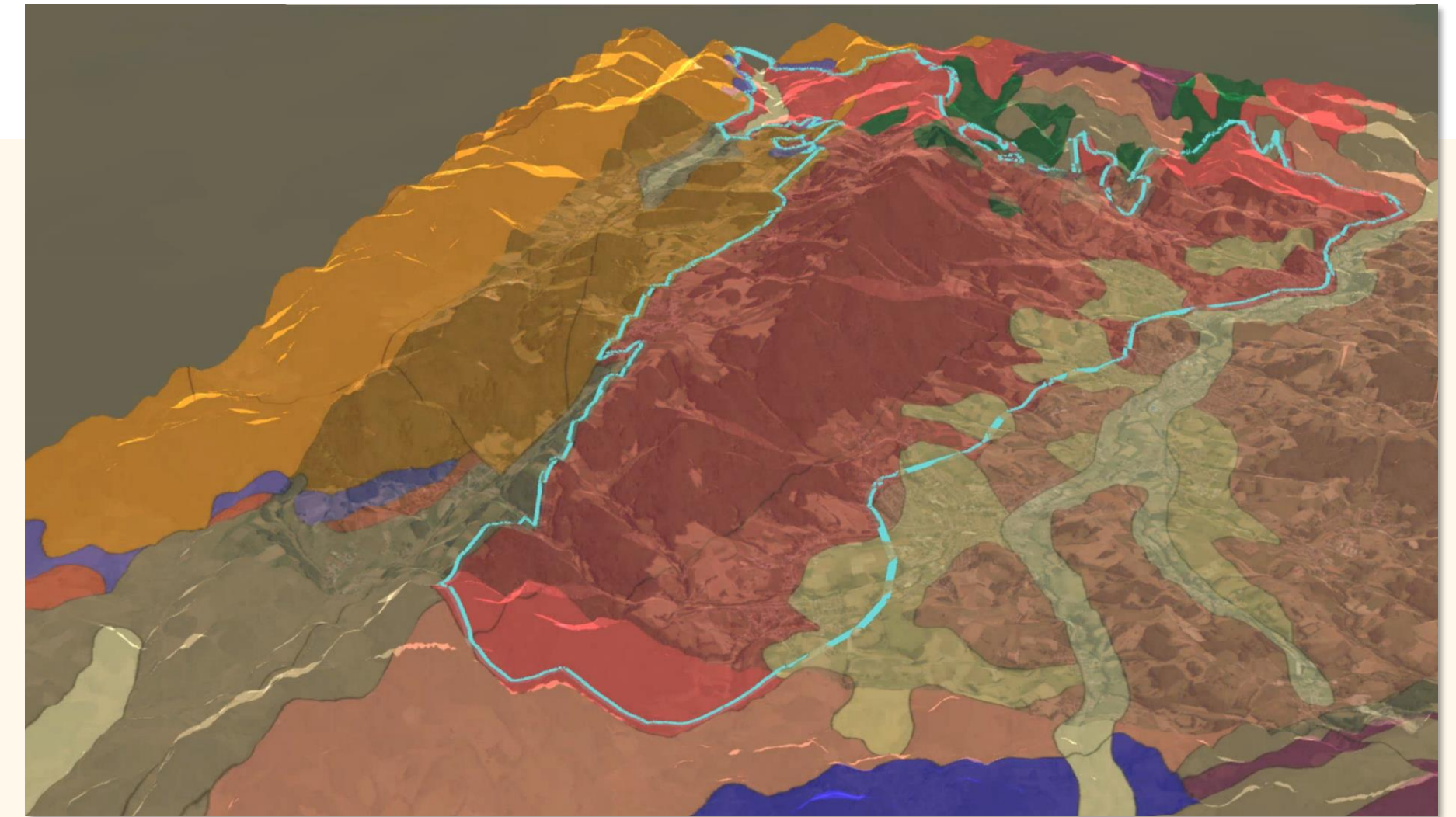
- Karlsruhe Data Infrastructure (KADI) as DMS for the project
- Storing all project-related data and providing access for all members
- Currently 400+ datasets
 - Available data from state offices and agencies (HLNUG, HVBG, NASA, BKG, etc.)
 - Campaign data (seismic, potential field geophysics, etc.)
 - Observation data, sensor logs, etc.
 - Publications, Presentations, Images, Videos
 - PR material



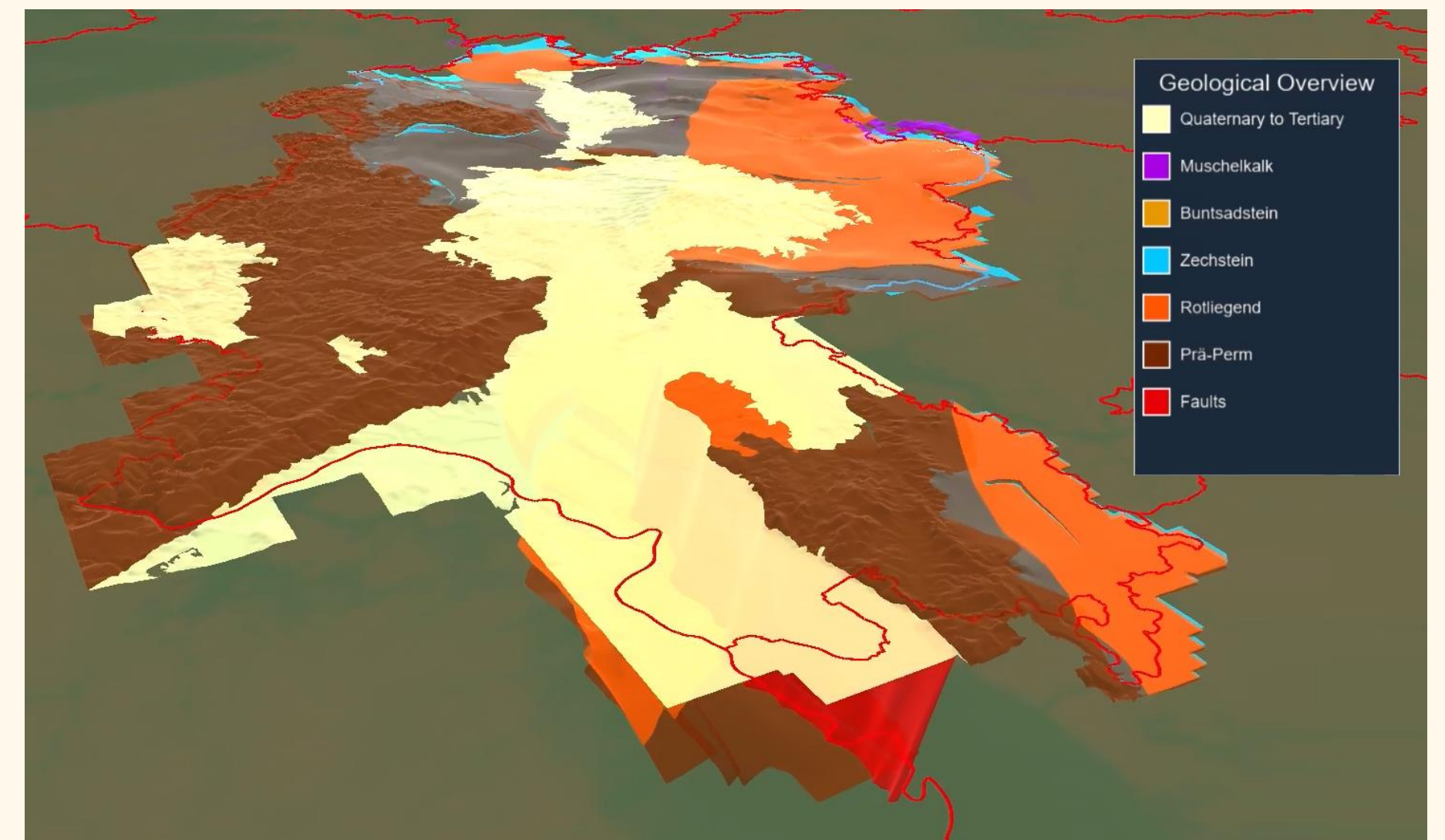
Structure of GeoLaB data management system

Scientific 3D Visualisation

- Integrating datasets into the same geographic context
- Investigating intuitive ways to present abstract data
- Illustrate relationships between datasets (e.g. ERT data in relation to geological overview map)
- Visualise the „inside“ of volumetric data
- Goals:
 - Better understanding of complex data by researchers
 - Evaluation and exploration datasets and their relation to each other
 - Presentation to stakeholders and the public



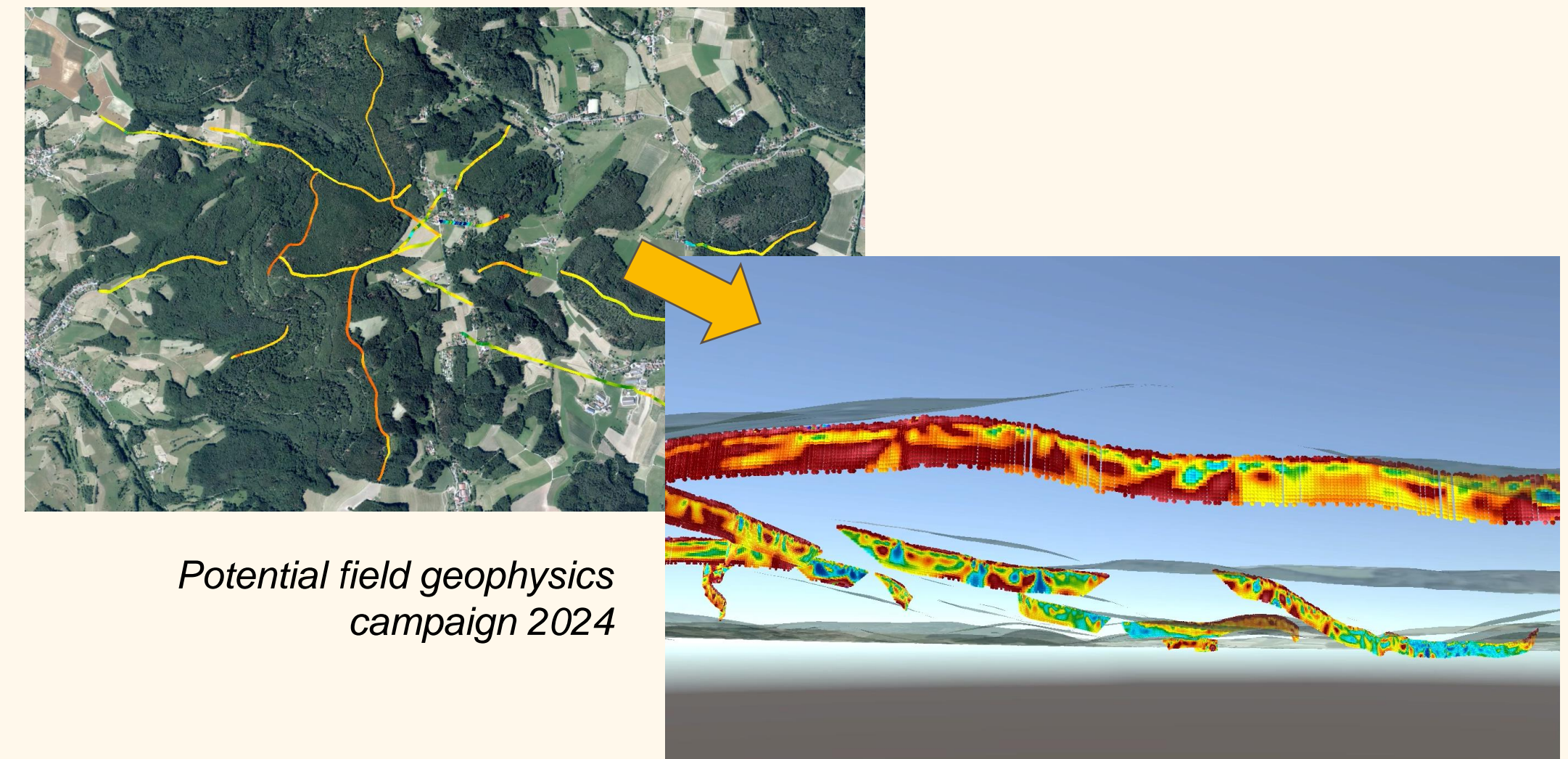
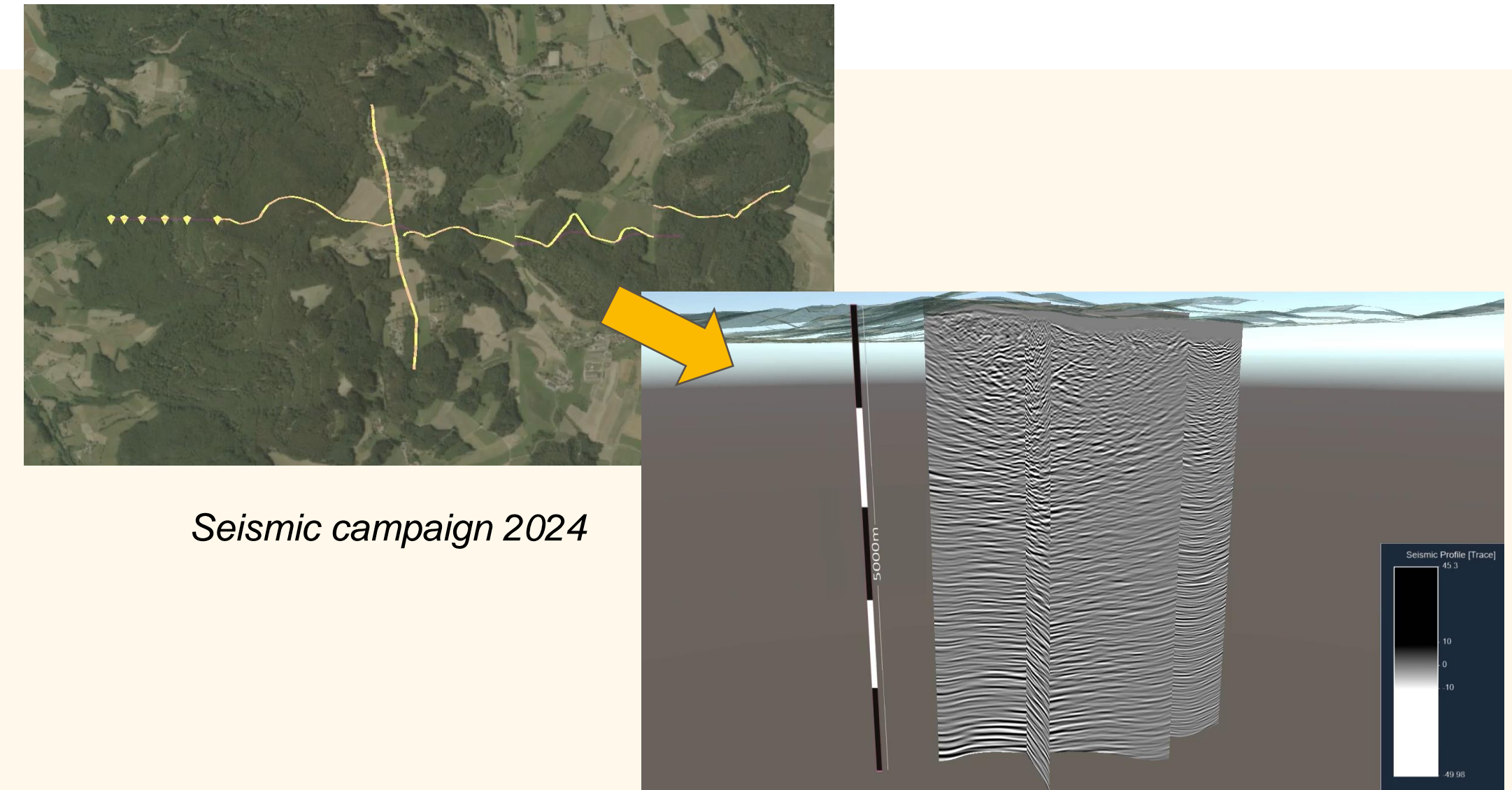
GÜK300 (HLNUG, 2017) + boundaries and faults



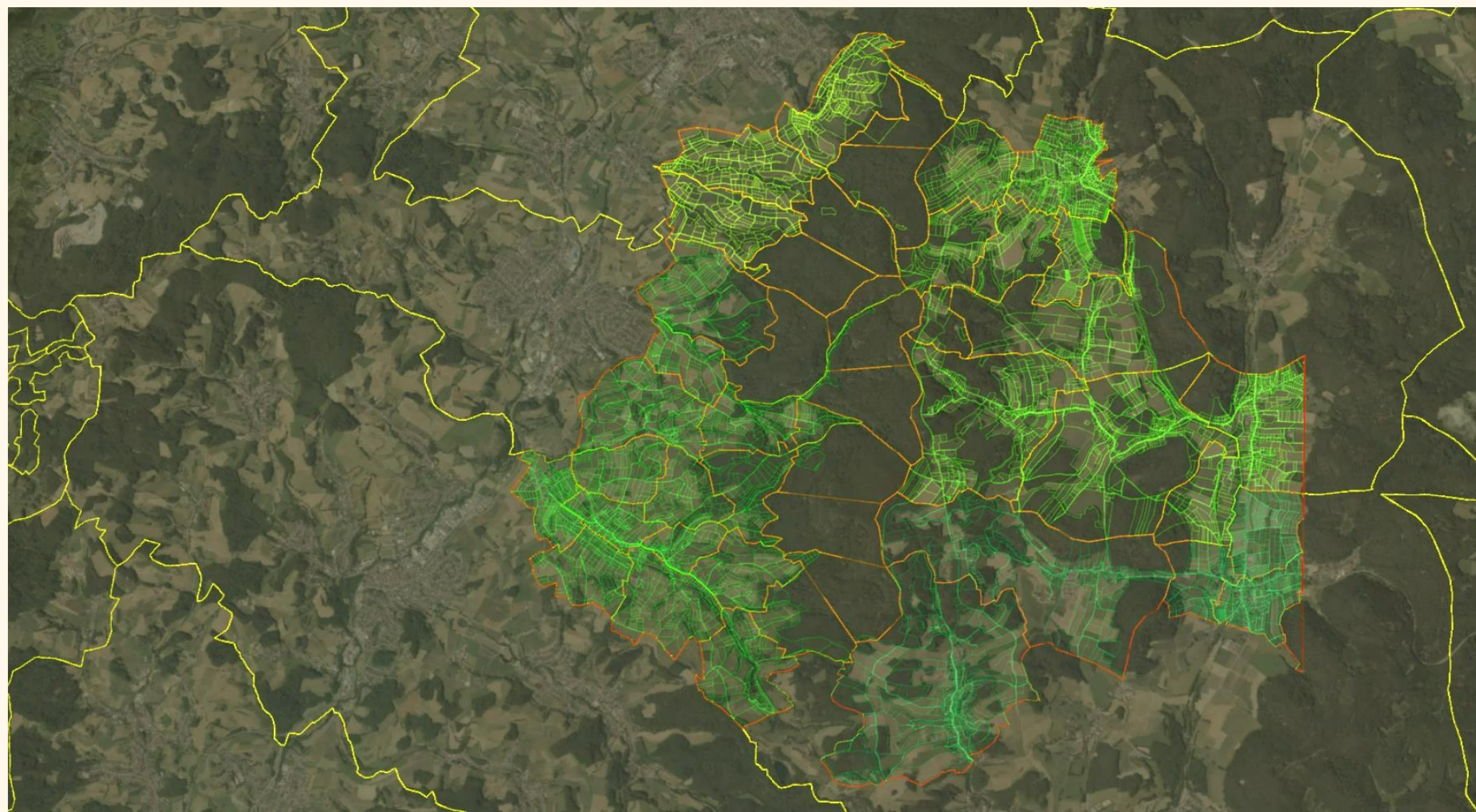
Hessen3D geological model (Arndt et al, 2011)

Visualising Campaign Data

- Field campaigns to investigate important aspects for siting process
 - Seismic
 - Potential field geophysics
 - Exploration wells
- Visualising data in cooperation with domain scientists, e.g.
 - Suitable use of colours according to existing standards
 - Interpolating surfaces based on ERT point clouds
- Placing datasets into geographic context
 - Allowing comparison and evaluation based on other data

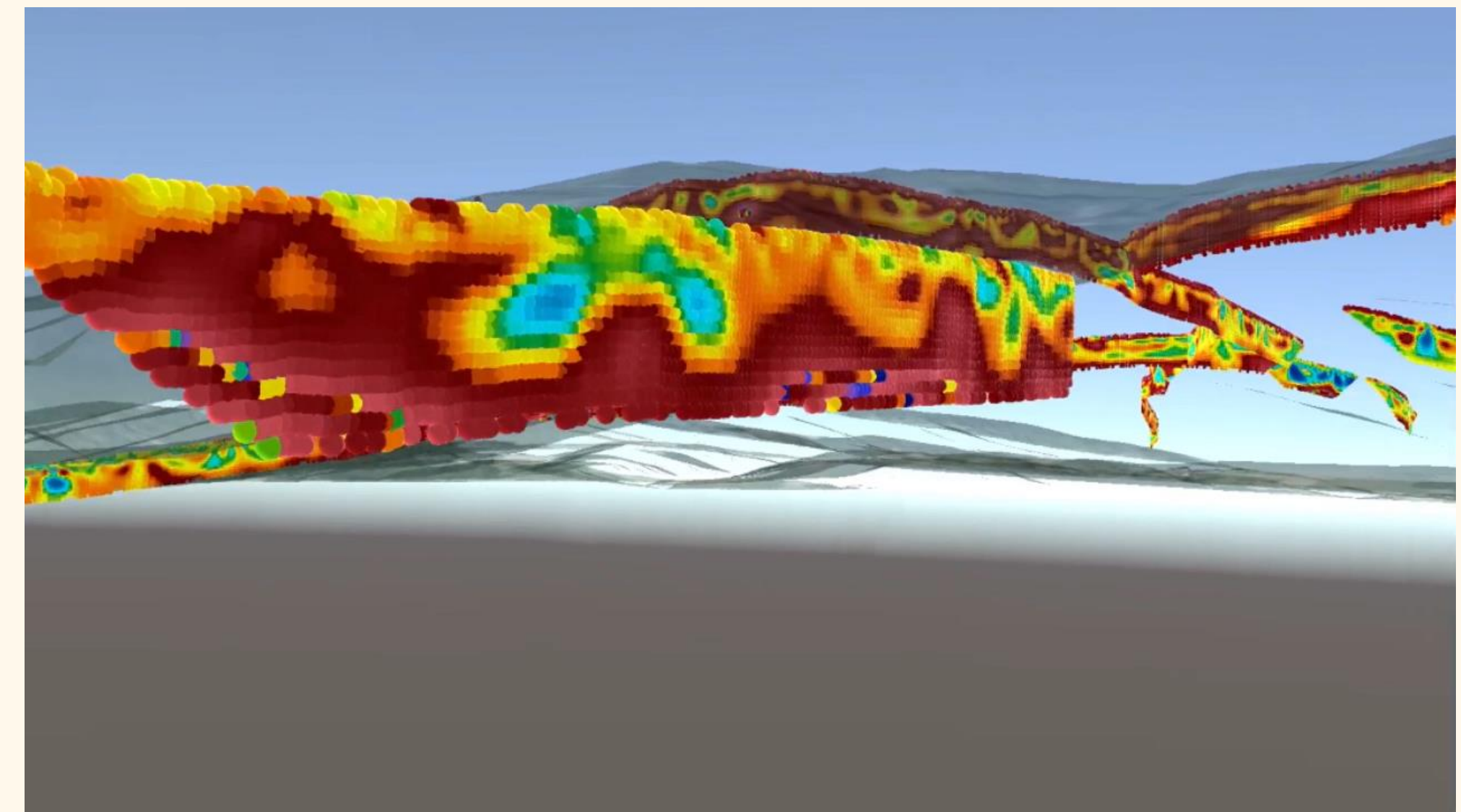
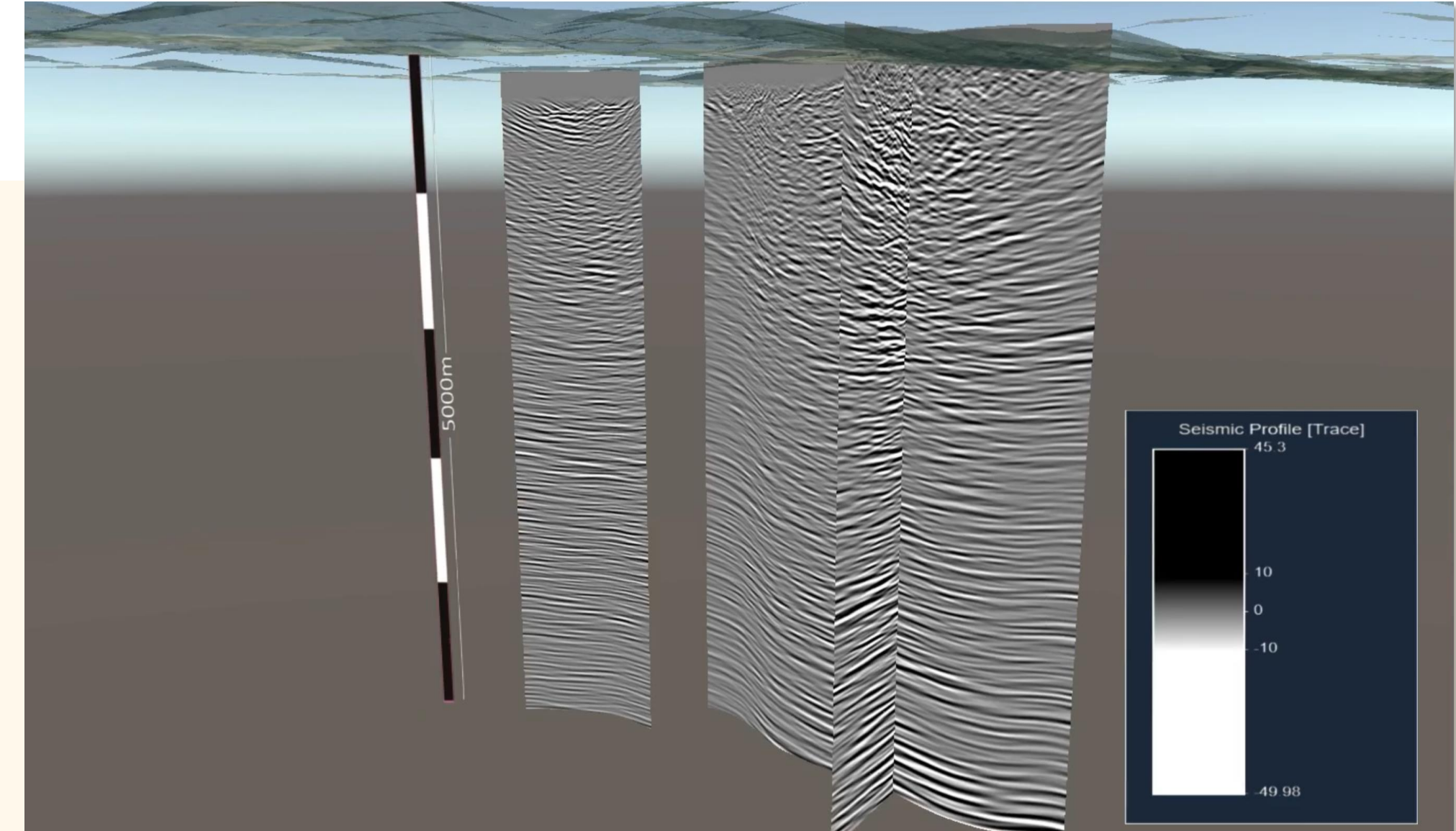


Exploration wells



Permitting

Seismic trace



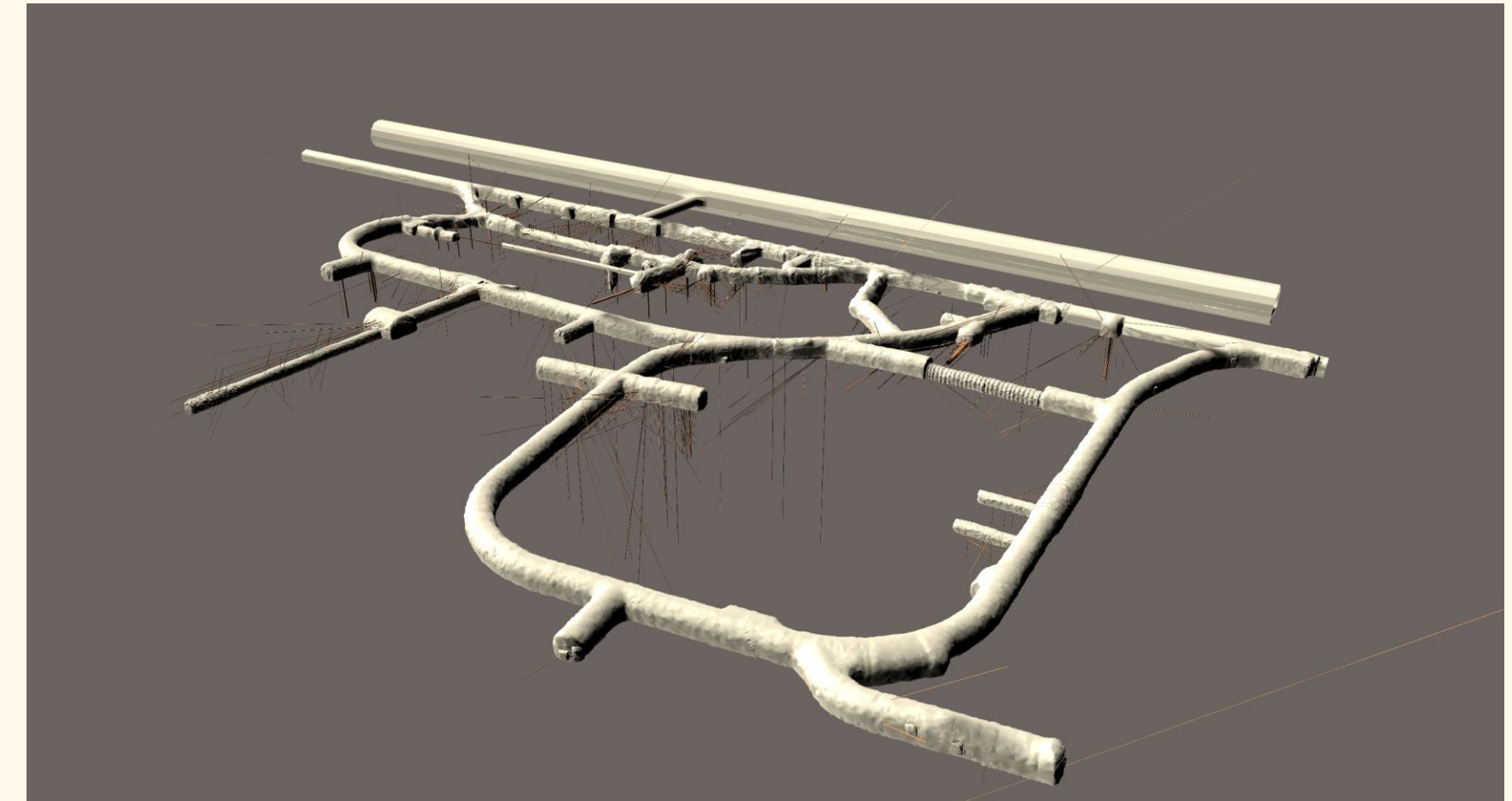
Electric resistance and gravimetry

Video

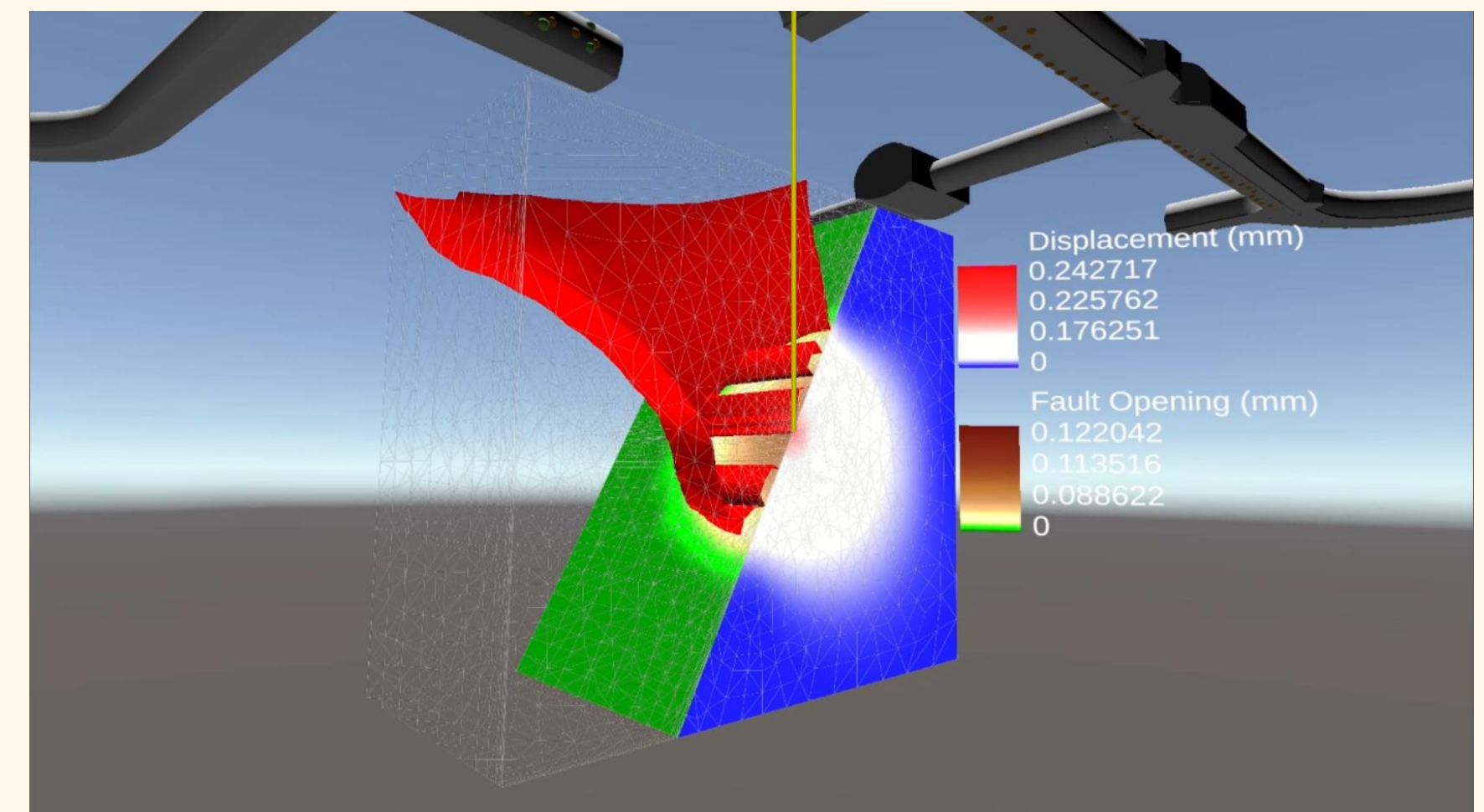


Outlook: A Digital Twin for GeoLaB

- Web-based framework for visualising
 - the underground research lab
 - Surrounding geo-data
 - Experiments
- Offering functionality for exploring and evaluating data
- Real-time access to databases for sensor data
- Parameterising numerical simulations
- Visualising simulation scenarios of experiments



Mont Terri URL, Switzerland



Visualisation of Fault Slip Experiment at Mont Terri

Thank you!



Check out our
YouTube channel!