

3D geological modelling and groundwater simulation for the Low Seismic Lab and Einstein Telescope in Lusatia, Saxony

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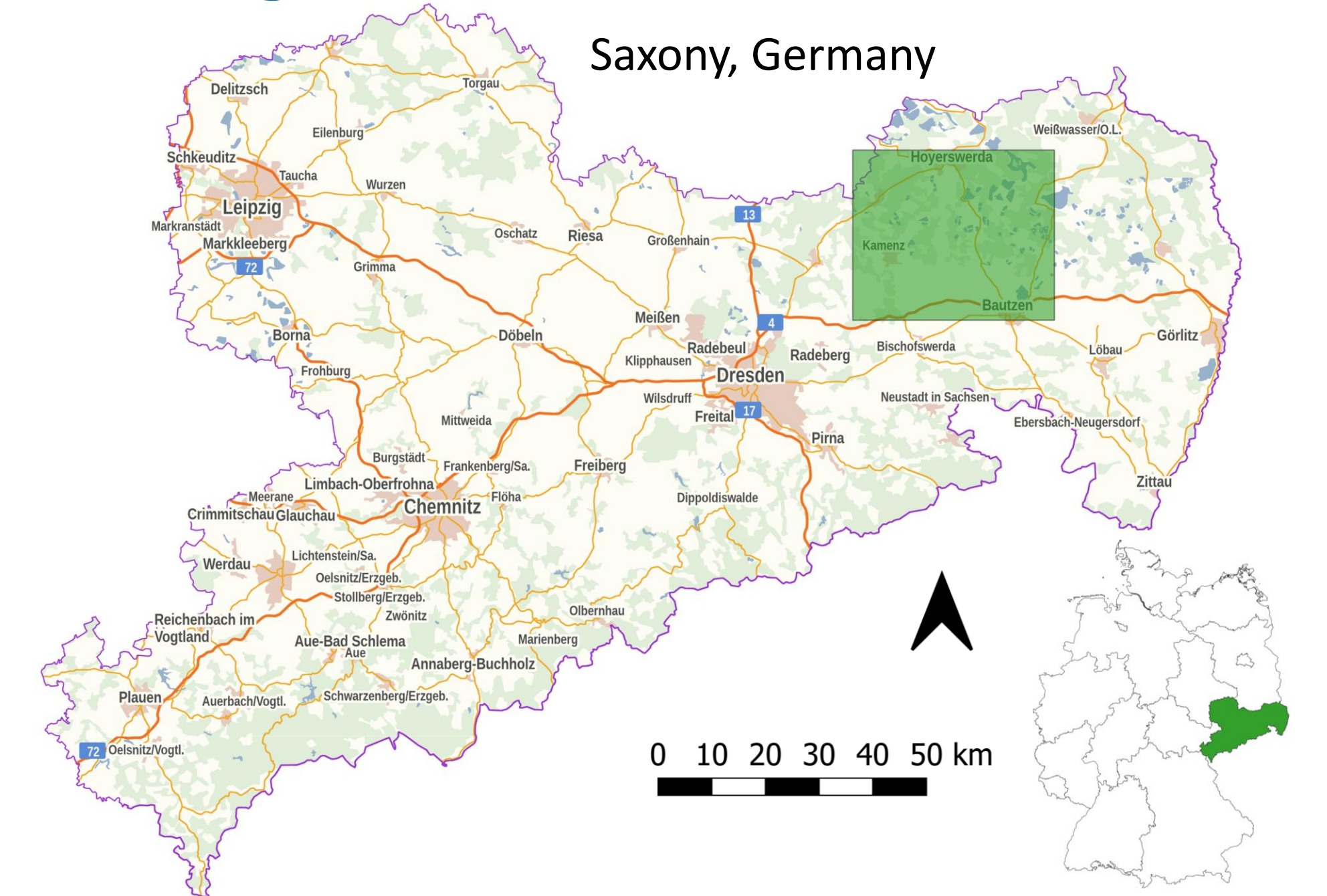
Introduction

One of the possible locations for ET is the granodiorite complex in Lusatia in eastern Germany. As part of this project, the Chair of Engineering Geology and Environmental Geotechnics at TU Bergakademie Freiberg is creating a geological-tectonic 3D model of the area using Leapfrog software.

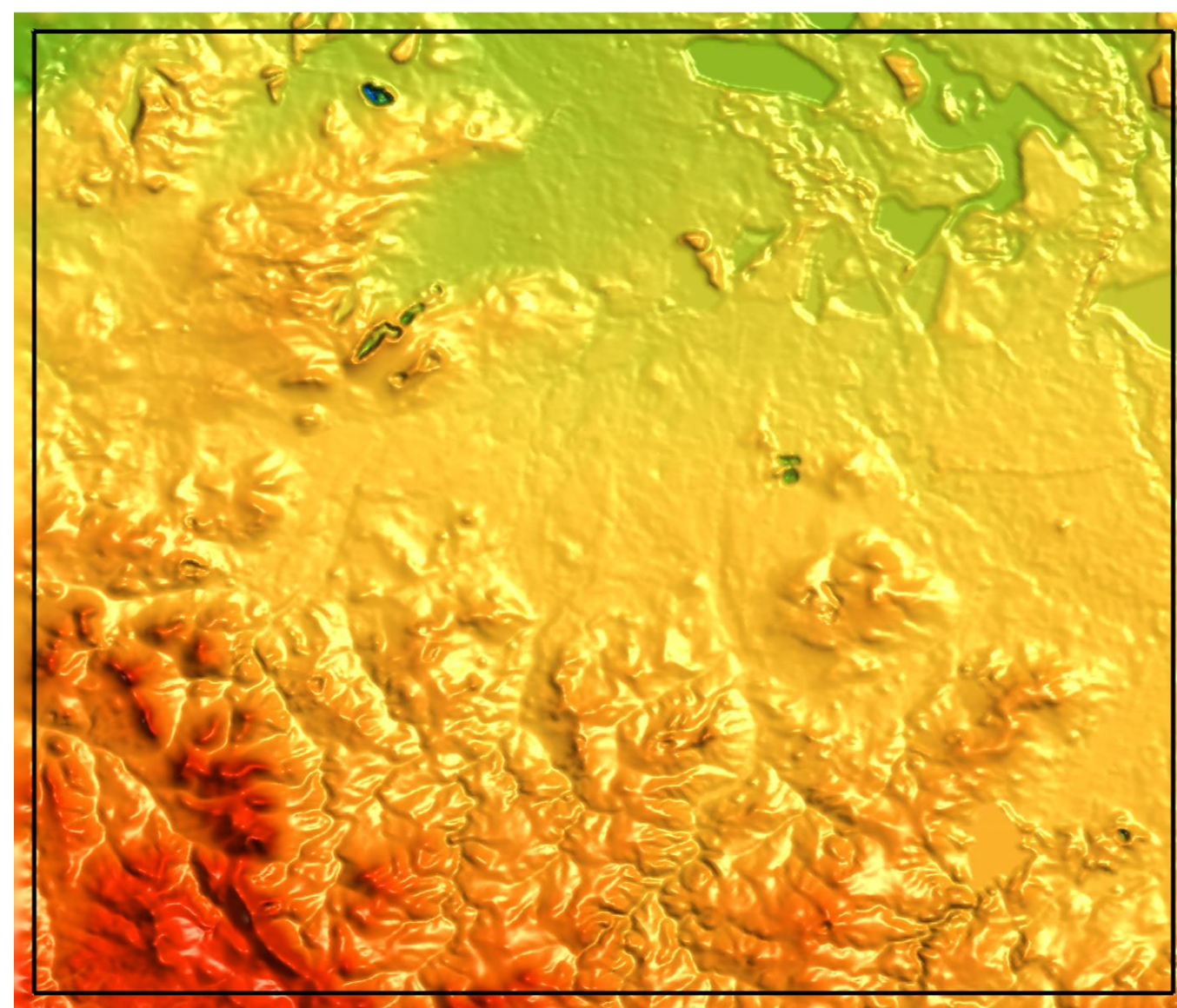
Main goals:

- update volumetric extension of the granodiorite massif
- searching for geologically stable location for ET and LSL in the granodiorite complex
- transfer to a finite element groundwater model → design an optimized drainage system (minimize the use of pumps in order to avoid seismic noise)
- creation of a hydro/geological digital twin of the Lusatia
- model will provide geometric basis for modeling noise effects

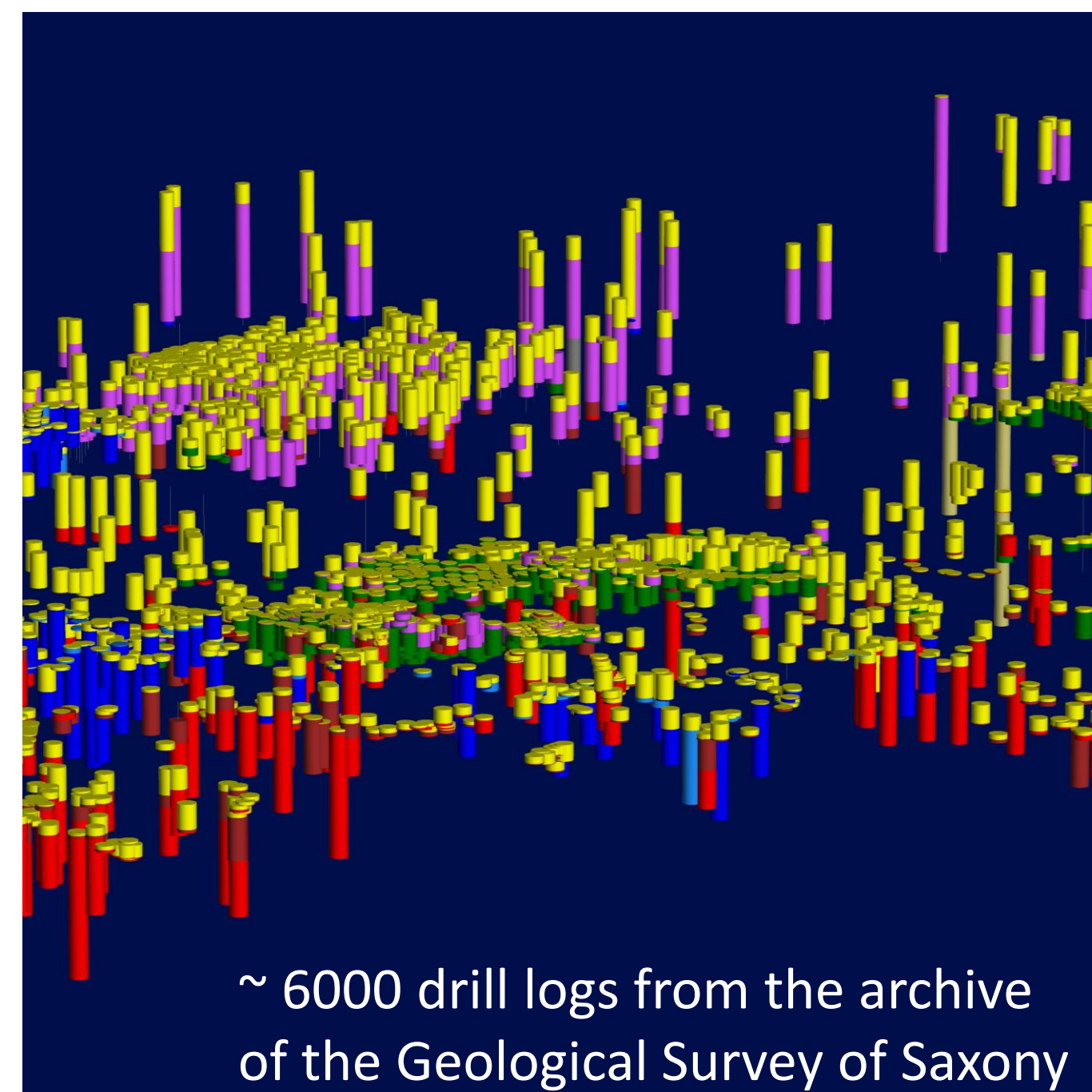
Investigation area



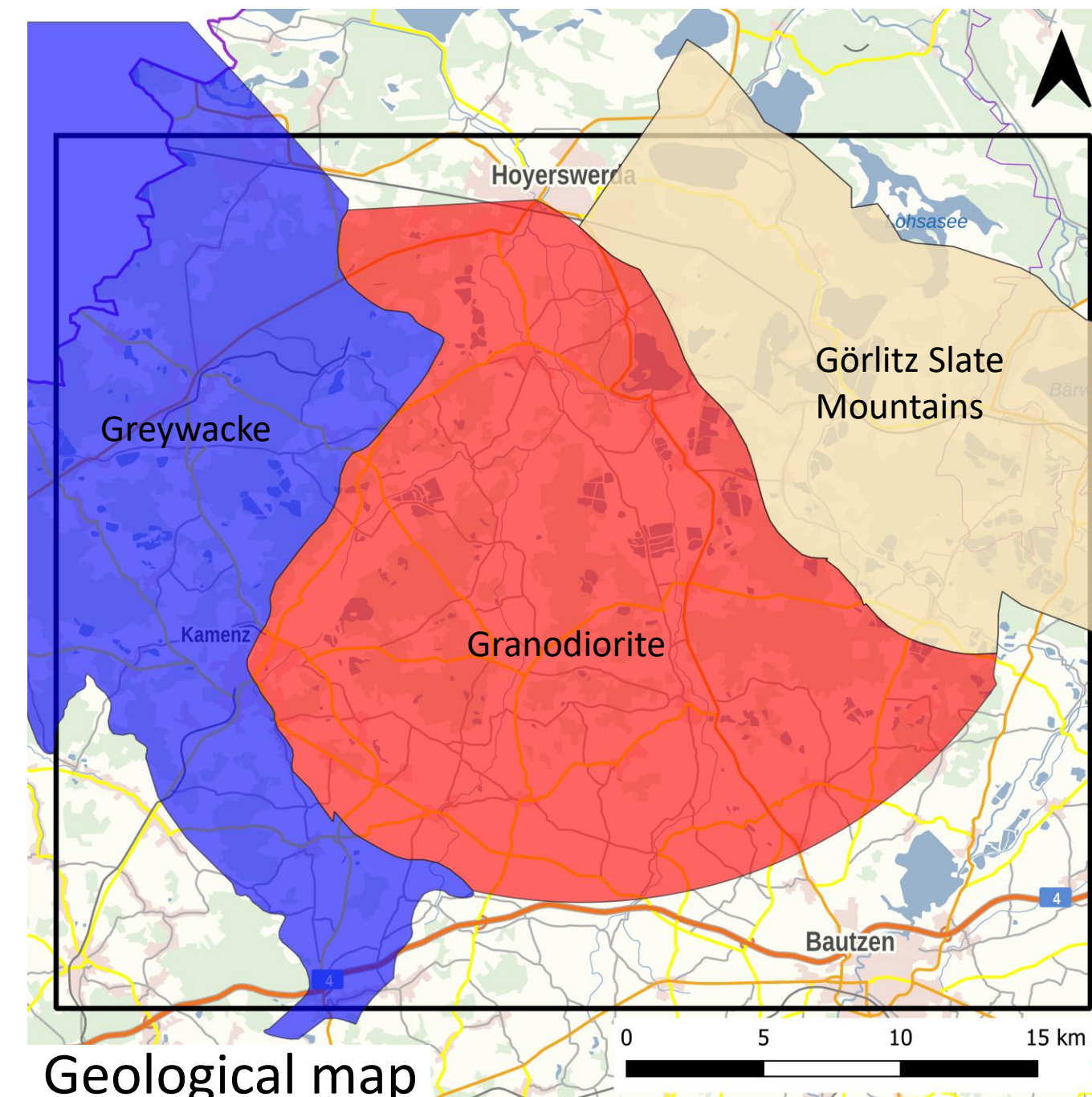
Input data



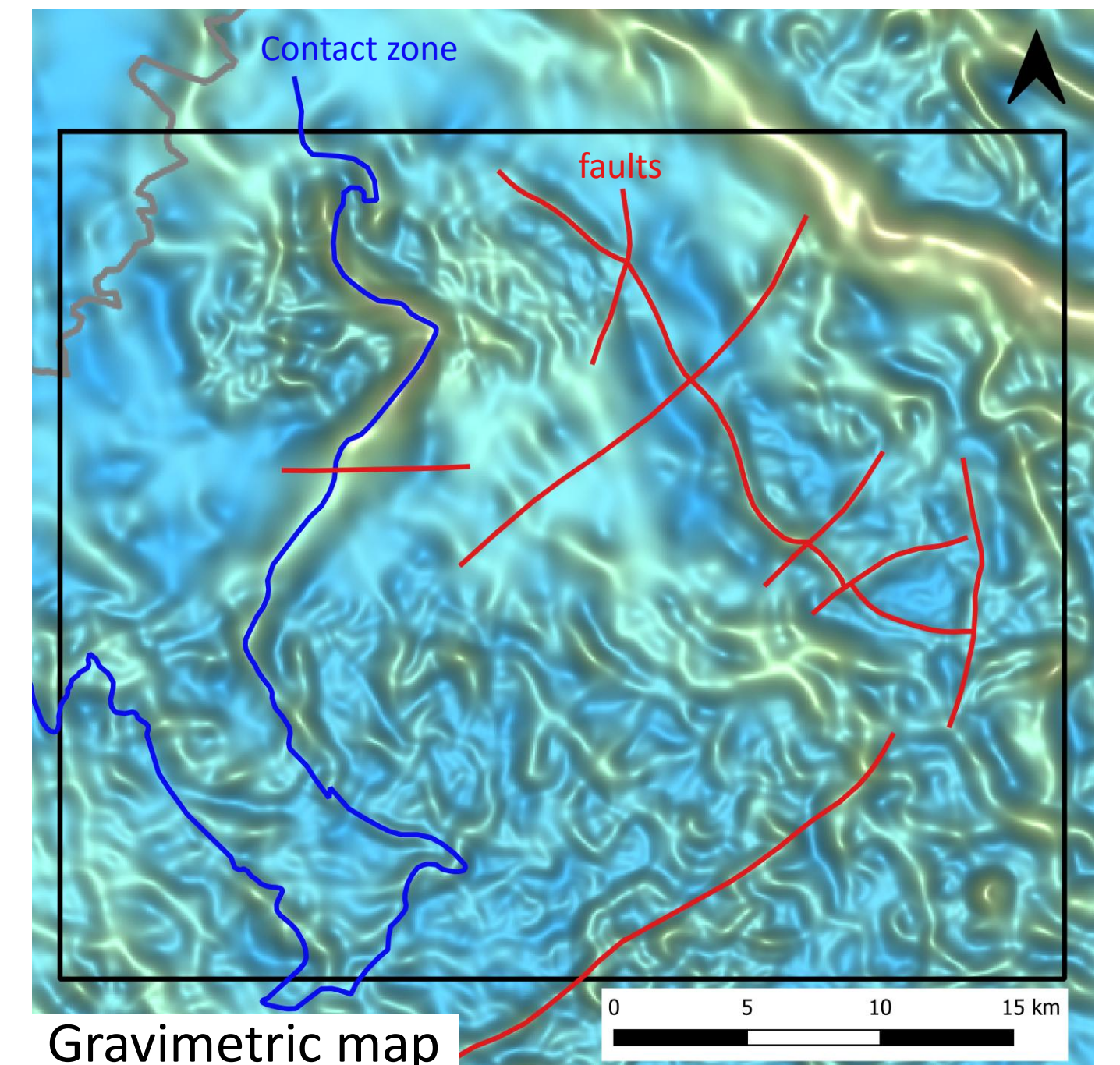
Digital elevation model



~ 6000 drill logs from the archive of the Geological Survey of Saxony

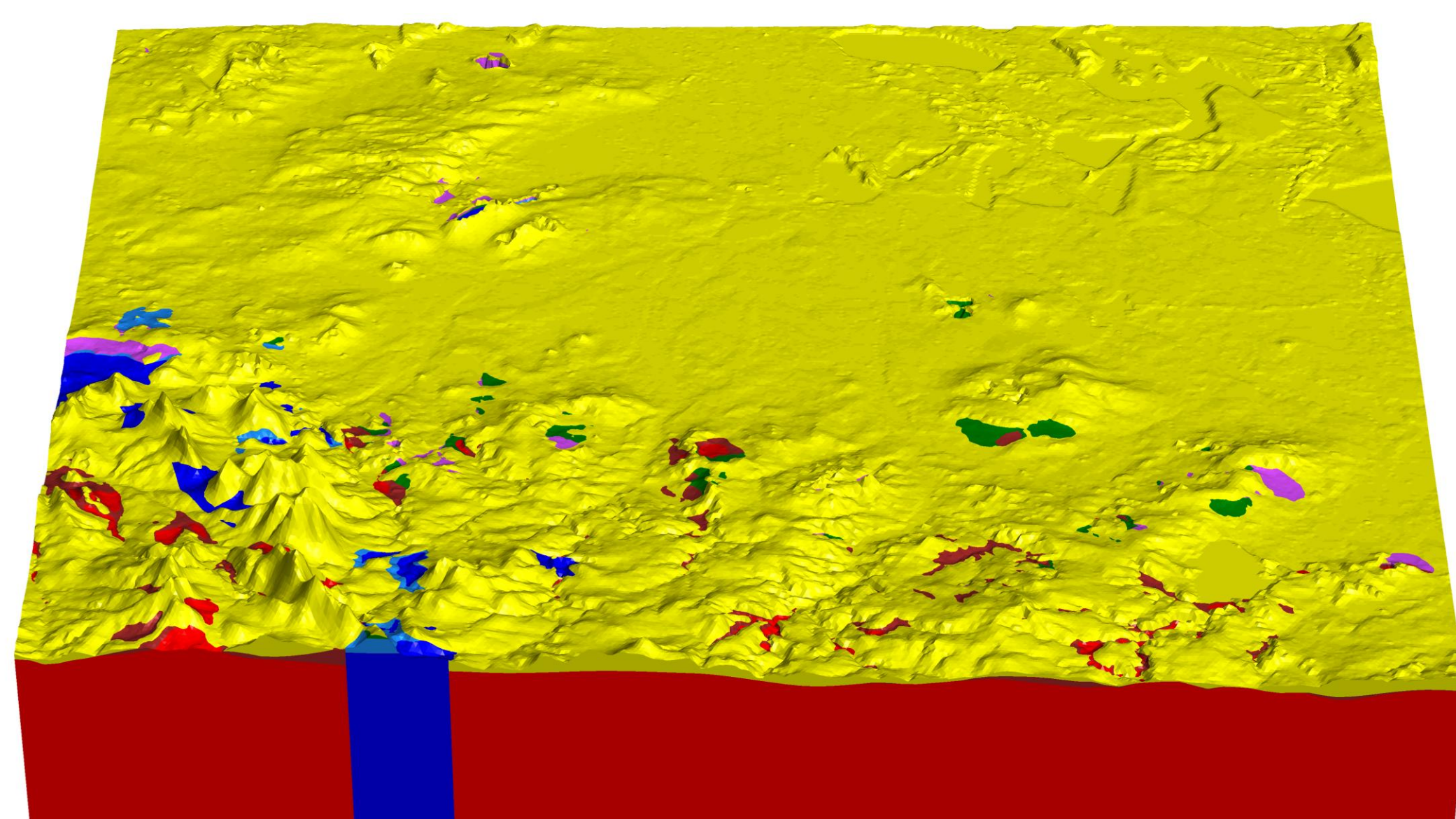


Geological map

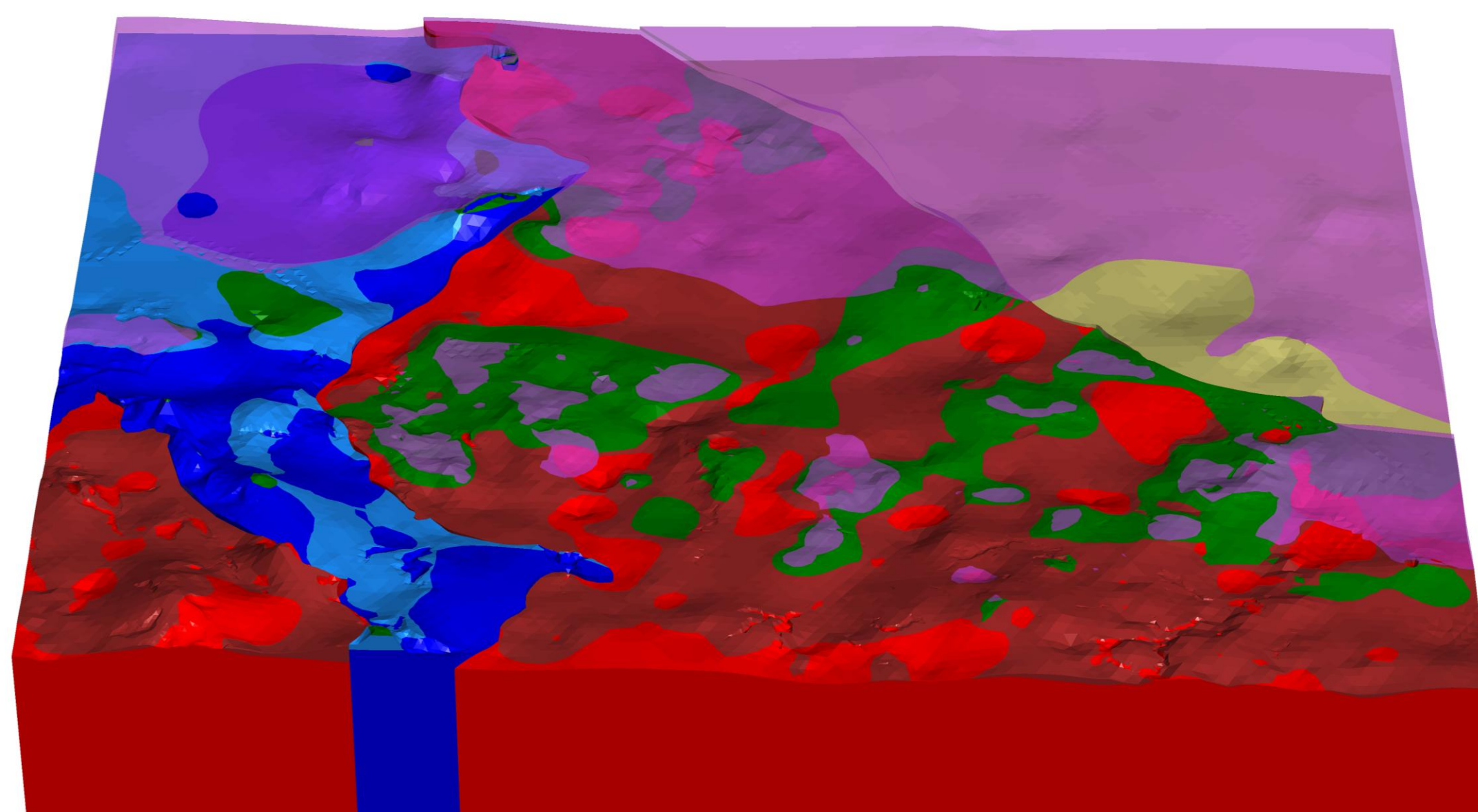


Gravimetric map

3D model (current state)

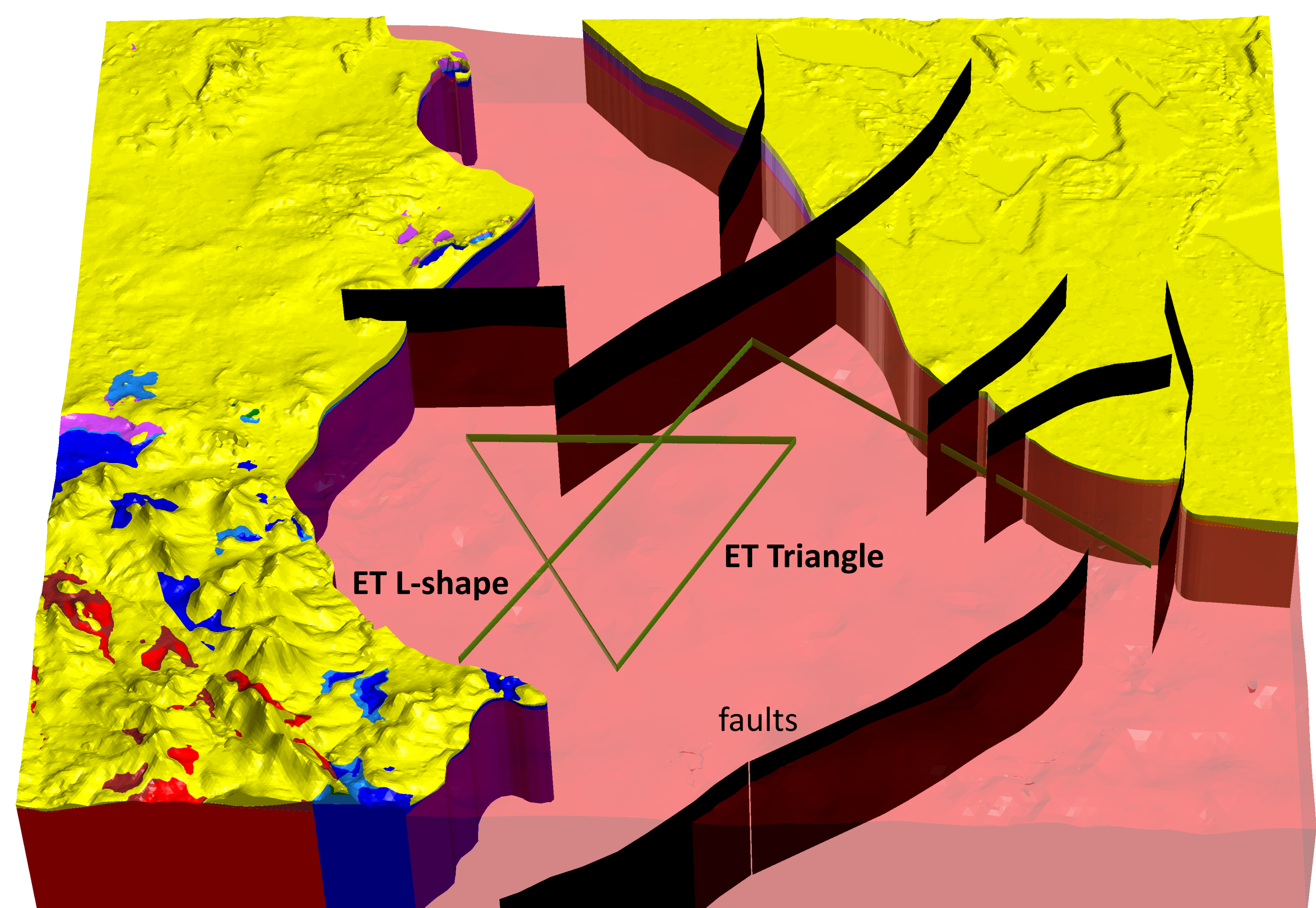


3D model with quaternary layer



3D model without quaternary layer and hollowed tertiary layer

Cap rock	Quaternary		
	Tertiary		
	Kaolin		
Base rock	Weathered granodiorite	Weathered greywacke	Görlitz Slate Mountains
	Granodiorite	Greywacke	



Hollowed granodiorite volume with faults and proposed ET L and triangle geometry