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Quantification of ATES potential of the fluvial Molasse reservoir across the Swiss Plateau

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Goals

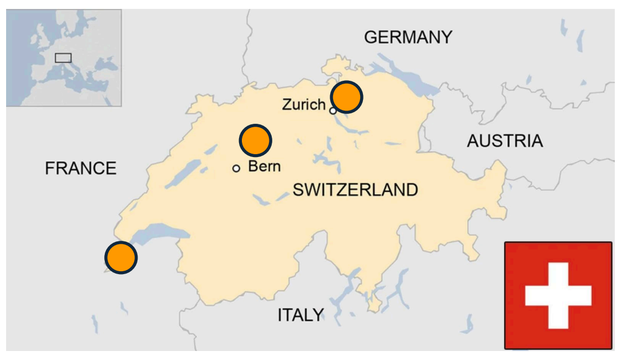
- Evaluate the potential of the Oligocene–Miocene clastic Molasse of the Swiss Plateau as a reservoir for Aquifer Thermal Energy Storage (ATES) and High-Temperature ATES (HT-ATES).
- Identify geological and hydrogeological conditions that are favourable for efficient, safe, and sustainable heat storage.

Problem

A good ATES or HT-ATES reservoir should be:

- Porous enough to circulate,
- Confined enough to retain heat,
- Chemically “quiet” enough to stay permeable, and
- Hydraulically isolated enough to not interfere with protected groundwater uses.

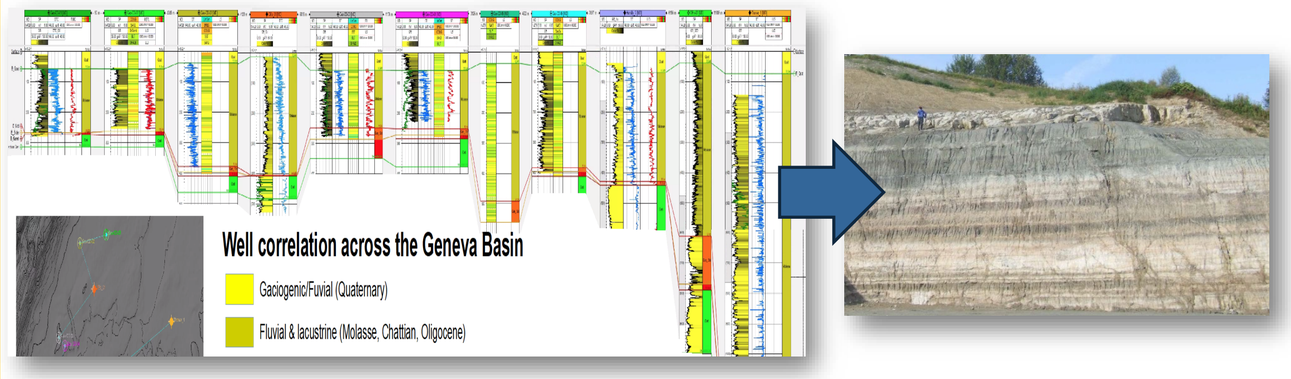
Introduction

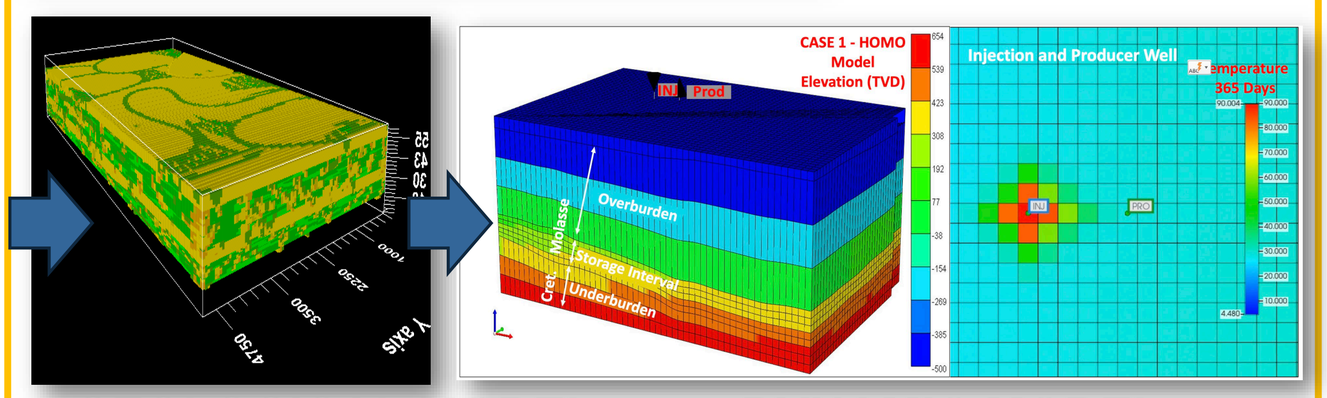


This study focuses on the Lower Freshwater Molasse in three selected areas of the Swiss Plateau: SE (Geneva), Central (Lenzburg), and NE (Zurich).
The work integrates available subsurface data, including seismic profiles, borehole lithology with sand–shale ratios, and, where available, geophysical logs and core data.
Static and dynamic modelling are implemented.

Method

LOGS & CORRELATION





GEOLOGICAL MODEL DYNAMIC MODEL

Results

- We reconstructed the internal architecture of the Molasse and implemented a workflow to quantify the potential heat storage in fluvial reservoirs.
- This allows more reliable quantification of ATES and HT-ATES potential and their techno-economic viability.

Conclusions

- Built a 3D model incorporating different sand/shale ratios.
- Developed a transferable workflow for other regions of Switzerland.
- Ran initial dynamic simulations to support techno-economic evaluation.

Core partners

UNIVERSITÉ DE GENÈVE
HSLU Hochschule Luzern
OST Ostschweizer Fachhochschule
ETH zürich
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