

Aquifer thermal energy storage (ATES) experiment

Context and objectives

Providing to our societies greenhouse-gas free energy sources is a main challenge tackled by the energy turnaround initiated in many countries. Heat demand and supply are off-phase over seasonal cycles. Storing heat in time of surplus and providing it when needed is part of the tools required to reduce the energy footprint. Underground Thermal Energy Storage (UTES) is one solution for this process. Various configuration of UTES are used including Aquifer Thermal Energy Storage (ATES).

Until now many studies have shown the potential of ATES in shallow porous geological media. But conflict of use, aquifer availability and environmental regulations pushes for going to deeper, hard rock aquifers for which characterization approaches and suitability evaluation for heat storage need to be developed.

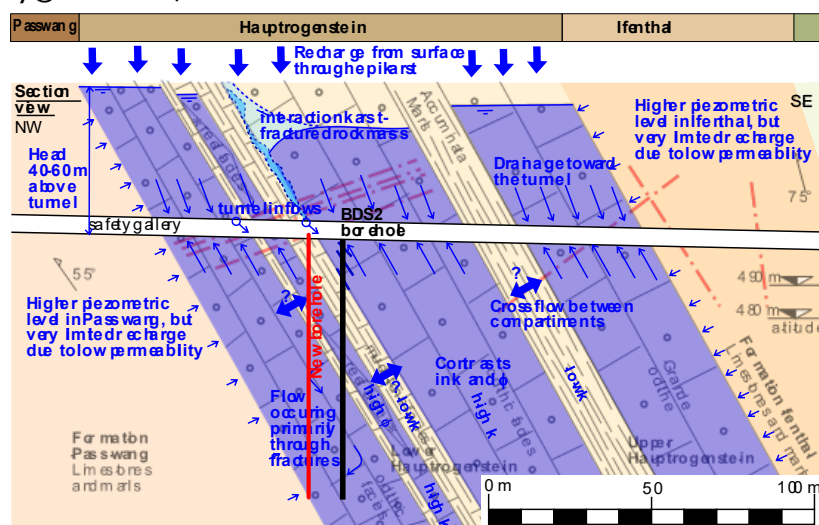
Methodology

Heat storage experiments will be performed at the Mt-Terri underground laboratory (Swisstopo) in fractured and karstified rocks in order to increase our understanding of a thermo-hydraulic and mechanical processes activated during heat storage. Particularly a new borehole will be drilled at the Mont-Terri laboratory in the second half of 2026 in order to establish a doublet in the limestone aquifer. The student will contribute to the planning and execution of this drilling and the execution of data acquisition in the is new borehole.

Supervision and collaboration

The project will be supervised by Prof. Dr. B. Valley (CHYN, UniNE). It will be carried out in collaboration with Swisstopo.

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Conceptual model for the heat storage experiment in Mont-Terri