

**THERMO-HYDRAULIC (TH) EXPERIMENTS AND
NUMERICAL SIMULATIONS TO QUANTIFY
FRACTURED LIMESTONE RESERVOIR****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.

Research approach and methodology

Here, the idea is to use our new experimental test site in fractured and karstified rocks at Concise (VD) Switzerland and to perform hot water push-pull tests during several days in order to devise a thermo-hydraulic characterization approach for ATES in fractured media.

The student will develop a detailed research/field skills. He will develop different operational scenarios using field experiment followed by numerical analysis options within a fractured/karsified hydrogeological situation.

Partners and collaboration

The project will be supervised by Dr. R. Sohrabi (UniNE) and Prof. Dr. B. Valley (UniNE). It will be carried out in collaboration with the University of Geneva (UniGE), the SIG (Industrial Services of Geneva) and the ETH Zurich. The project is part of the European GEOTHERMICA project (HORIZON 2020) which include many partner countries that will enable the student to come into contact with members of other research facilities and participate in scientific conferences.

Contact for further information: reza.sohrabi@unine.ch or benoit.valley@unine.ch