

**THERMO-MECHANICAL (TM) CHARACTERIZATION
OF FRACTURED LIMESTONE AQUIFER**



Context and objectives

The geomechanical characteristics of aquifer's rocks have a strong influence on key parameters that control the productivity of wells, such as good permeability, sufficient flow and heat. It also affects physical rock characteristics that are important to evaluate in order to develop geothermal projects. Indeed, mechanical parameters need to be integrated for hydrothermal well design and geothermal reservoir management.

Thus, this research aims at providing an initial geomechanical characterization in a fractured/karstified aquifer. This will be achieved by the analysis of the logging data collected at the CHYN Concise (VD) site. The study focusses on the assessment of the fracture distribution, the stress field, and the mechanical properties of the fractured limestone present around the boreholes.

The realisation of a local-scaled mechanical and a Discrete Fracture Network (DFN) model will allow then to understand the dominant process controlling the groundwater flow and heat transport as well as the influence of fault systems on the stress state and fracture distribution.

Research approach and methodology

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

Data will be provided by boreholes to a depth of 50m. Log data, geophysical measurement and rock analysis will be performed. Then, they will be integrated in a thermo-mechanical model to analyse heat capacity of the aquifer host rock.

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.

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