

Gravity data modelling in the Geneva Basin for geothermal resources assessment

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Context

The identification and characterization of the subsurface prior drilling is crucial to define potential geothermal or groundwater targets. Geophysical methods are the most effective to achieve this objective and gravity is proven to be an excellent exploration tool during the prospection phases to identify the main geological features which can host resources. In the framework of the Geothermie2020 program new gravity data will be collected in the future to characterize the Quaternary, Tertiary and Mesozoic units in a geothermal perspective. The main geothermal resources in the Geneva basin are located at different depths including the Quaternary deposits, the Tertiary Molasse sediments and the Mesozoic Units. Such resources can be used for heat and cold production and storage for individual uses or industrial and civil applications.

Objectives and Methods

Gravity method will be applied in this study to identify the main geological features that show favourable conditions for geothermal resource identification. Highly porous units and fault conduits are the main target in the Geneva area that can be constrained by gravity method.

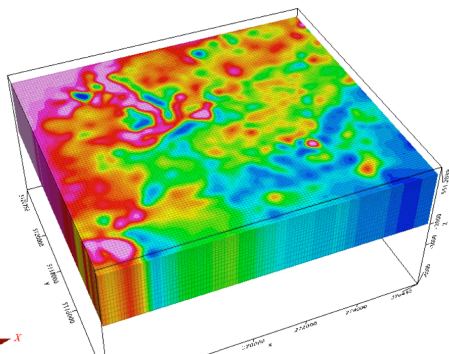
The study will focus on the acquisition, processing and interpretation of gravity data. The acquisition will include about 800 new gravity stations will be on selected areas across the Geneva Canton. Processing will focus on gravity gradiometry, pseudo-tomography, 2D and 3D forward and inversion modelling. The interpretation will be based on the geological understanding of the study sites and the integration to active seismic reflection data to produce 3D gravity models that will contribute to improve the existing petrophysical model of the Geneva Basin

Literature

Abdelfettah, Y., Schill, E., Kuhn, P., (2014). Characterization of geothermally relevant structures at the top of crystalline basement in Switzerland by filters and gravity forward modelling. *Geophys. J. Int.* 199, 226–241.

Altwegg, P., Schill, E., Abdelfettah, Y., Radogna, P.–V., Mauri, G. (2015). Toward fracture porosity assessment by gravity forward modeling for geothermal exploration (Sankt Gallen, Switzerland). *Geothermics*, 57, 26–38

Mauri G., Marguet L., Jansen G., Olivier R., Marti U., Baumberger R., Allenbach R., Kuhn P., Altwegg P., Miller S.A. (2015). Gravity prospection in region of La Broye. 13th Swiss Geosciences Meeting, Basel 2015. P 7.9



WEB sites

<http://unige.ch/ge-rgba>

Choice of orientation :

Sedimentary, Environmental and Reservoir Geology, gravimetry, geothermal