

GEOHERMAL ENERGY EXTRACTION PROJECT AT HAUGENSTUA, OSLO, NORWAY

Context

There is an ongoing installation project of geothermal energy supply for a shopping mall: COOP at Haugenstua in Oslo. The target formation is a fractured aquifer (partly artesian) below Holocene marine clay (seal), located in an urban area, high in the topography of Oslo, at the edge of the regional water divide. Several lithologies are found in the study area: Cambrosilurian mudstone/limestone, syenite and rhombic porphyry, representing very different hydraulic and thermal conductivities.

Several research questions are possible and can be selected depending on the interest of the candidate:

- Is there risk of differential compaction? (Flux control and pressure distributions over time. Geomechanical modelling in Plaxis)
- What is the source of high salinity? (Shallow versus deep flow paths involving fossil /connate water. Estimate fluid mixing and weathering in PHREEQC)
- What is the area of influence of the installation (P, T, flux) given the different lithologies? (Pumping tests, tracers, modelling)

Data / methodology

The work will include some field data acquisition in Oslo. The main source of information will be:

- 9 exploration boreholes already drilled, some of which may be plugged (but can be monitored);
- 8 open energy wells will be installed;
- Pore pressure in clay and hydraulic head in wells will be monitored and provide time series;
- Noble gas concentrations, water chemistry will also be collected.

This basic data set will be extended (analysis of geological heterogeneity for exemple) and analyzed using different techniques (including time series analysis, modeling or geochemical analysis) depending on the research question that the candidate will select.

Partners and collaborations

The project will be conducted mainly within the environmental geology group at University of Oslo with a close collaboration with the Norconsult company in Oslo which is in charge of the geothermal project.

The project will be supervised by Anja Sundal (Univ. of Oslo), Joseph Allen (Norconsult) and Philippe Renard (University of Neuchâtel).

