

Reactive Transport Modelling at the CarbFix2 ReInjection Site, Hellisheiði Geothermal Power Plant, SW-Iceland

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Non-condensable gases are currently being injected at the Husmuli reinjection site of the Hellisheiði Geothermal Power Plant in Iceland using the CarbFix process to dispose and permanently store CO₂ and H₂S by underground mineral storage. At current rate, about 10,000 tonnes of CO₂ are injected annually along with about 5,000 tonnes of H₂S.

The target reservoir consists of a fractured tholeiitic lava extends from the Husmuli reinjection site to the Skardsmýrarfjall production zone and ranges from the depth of – 800 to 2000 masl. The reservoir temperatures ranges from 220 to 260 °C. The gas-charged fluid is co-injected with the effluent water into the target reservoir at an average temperature of 60 °C. The chemistry of the injected fluid, mineralogy of the reservoir are included as initial conditions for the reactive chemistry.

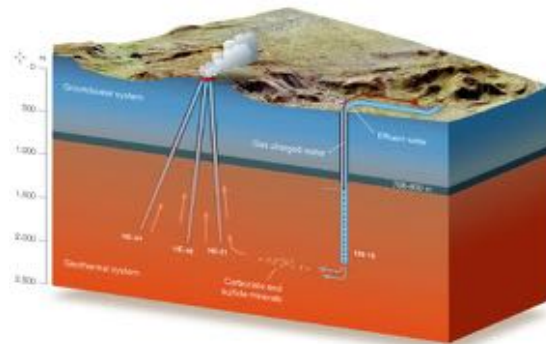


Figure 1: Schematic cross section of the CarbFix2 injection site.

Simplified one-dimensional models of the gas-enriched injection at the different depth to represent the different feedzones of the injection wells was developed. The model aims to evaluate the fluid-rock interactions under reservoir conditions as well as to quantify mineral sequestration processes in basalts. The model also includes the updated thermodynamic databases for mineral carbonation compiled at Háskóli Íslands as part of the CarbFix2 project.