Reviewed research article

Seismic monitoring during an injection experiment in the Svartsengi geothermal field, Iceland

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Abstract — *Portable, digital seismographs were operated around the Svartsengi geothermal field during May-August 1993 in order to monitor microearthquake activity prior to and during a waste water injection test. A total of 218 thousand tons of water were injected into borehole H–6 from July 19, through December 1993 at an average rate of 15 l/s, reaching a maximum of 30 l/s. The borehole accepted the injection fluid under gravity and pumping was not required. No detectable microearthquakes occurred within the Svartsengi geothermal field during the injection period. We conclude that the injection pressure was probably far below the level needed to induce seismicity. Fluid pressure drawdown caused by exploitation decreases pore pressure which again increases the rock strength. A drawdown of more than 20 bars in the Svartsengi field since 1976, and an equal rate in the adjacent Eldvörp field, may have raised the fracture limit and thus reduced the microseismic activity in these fields.*