DESTRESS

Demonstration of soft stimulation treatments of geothermal reservoirs

Peter A. Fokker

Peter Fokker is senior researcher at TNO, and part-time at Utrecht University and the Technical University of Turin, Italy. His research interests are related to the sustainable use of the subsurface in the field of reservoir engineering and reservoir geomechanics. More specifically, his interests focus on fast models for productivity prediction and well testing, and fast geomechanical models to predict subsidence, fault reactivation, induced seismicity, and fracturing.

Pulse Testing for Reservoir Monitoring

Harmonic Pulse Testing (HPT) has been developed as a form of well testing that can be used during ongoing field operations because a pulsed signal is superimposed on the background pressure trend. Its purpose is to determine well and formation parameters such as wellbore storage, well damage (skin), permeability (k) and the presence of boundaries within the volume investigated by the test. In comparison with conventional well testing, the advantage is that it does not require interruption of well and reservoir injection/production before and/or during the test. This makes it an ideal monitoring tool. Interpretation is streamlined through diagnostic plots mimicking conventional well test interpretation methods. To this end, analytical solutions in the frequency domain are available. The methodology was applied to monitor stimulation operations performed at an Enhanced Geothermal System (EGS) site in Pohang, Korea. An extension has been developed for the incorporation of the effect of a temperature front moving into the reservoir due to injection of hot (or cold) water. Our analytical solutions were applied to monitor the thermal front evolution in a doublet system. Thermal front position and average temperature around the injector could indeed be characterized through the application of the proposed HPT interpretation.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691728