

Complexity Science Seminar

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Earth Sciences 115

Controlling Fluid-Induced Seismicity during a 6.1-km-deep Geothermal Stimulation in Finland

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We show that near-realtime seismic monitoring of fluid injection allowed control of induced earthquakes during the stimulation of a 6.1 km-deep geothermal well near Helsinki, Finland. A total of 18,160 m³ of fresh water was pumped into crystalline rocks over 49 days in June-July 2018. Seismic monitoring was performed with a 24-station borehole seismometer network. Using near-realtime information on induced-earthquake rates, locations, magnitudes, and evolution of seismic and hydraulic energy, pumping was either stopped or varied – in the latter case, between wellhead-pressures of 60-90 MPa and flow rates of 400-800 l/min. This procedure avoided the nucleation of a project-stopping magnitude M 2.1 induced earthquake, a limit set by local authorities. Our results suggest a possible physics-based approach to controlling stimulation induced seismicity in geothermal projects.



Everyone is welcome!



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