

High-resolution microseismic monitoring for water injection in Okuaizu Geothermal Field, Japan

*Kyosuke Okamoto¹, Yi Li¹, Hiroshi Asanuma¹, Takashi Okabe², Yasuyuki Abe³, Masatoshi Tsuzuki⁴

1. National Institute of Advanced Industrial Science and Technology, 2. Geothermal Energy Research & Development Co., Ltd., 3. Okuaizu Geothermal Co., Ltd., 4. Japan Oil, Gas and Metals National Corporation

A continuous water injection test was conducted to halt the reduction in steam production in the Okuaizu Geothermal Field, Japan (first round: June–August, 2015. second round: November–December, 2015). Microseismic events associated with the water injection were recorded by 9 seismic stations (5 on the surface, 4 in borehole). We report the spatiotemporal behavior of the fluid inferred from the microseismic monitoring.

In the determination of the microseismic events, arrivals of P- and S-waves were manually picked from 1,000 Hz sampling continuous data. The determined events were further processed by a cluster analysis using waveform coherence to reproduce a high-resolution distribution of microseismic vents. We found that there were three patterns for microseismic events in terms of spatial distribution, which had correlation with the spatial distribution of water flow estimated by well head pressures. The result suggested that the high-resolution microseismic monitoring could indicate water flow associated with the water injection.

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