Supercritical geothermal reservoir and EGS technology revealed by natural analogue of granite-porphyry system

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Following the Great East Japan Earthquake and the accident at the Fukushima Daiichi Nuclear power station on 11th March, 2011, geothermal energy came to be considered one of the most promising sources of renewable energy for the future in Japan. To understand the geological properties of a supercritical geothermal reservoir, we investigated a granite–porphyry system as a natural analogue. Particularly, veinlet system (quartz veins, hydrothermal breccia veins and glassy veins) in granite-porphyry system provides important information on supercritical geofluids and their development. The glassy veins forms at 500-550 °C under lithostatic pressure condition, and then lithostatic pressure changes to hydrostatic pressure drastically. Connections between the lithostatic and hydrostatic pressure regimes were key to the formation of the hydrothermal breccia veins, and the granite–porphyry system provides useful information for understanding supercritical geothermal reservoirs and EGS technology.