

COMPARISON OF GEOCHEMICAL CHARACTERISTICS BETWEEN THERMAL AND GROUND WATERS IN DONGRAE HOT-SPRING AREA, KOREA

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A survey of chemical quality of the ground and thermal waters in Dongrae hot-spring area and its vicinity, Pusan city, Korea, was performed in May 1998 to characterize and compare geochemical properties of the waters. Eleven groundwater and nine thermal water wells were each sampled once. Major and minor elements were analyzed for the ground and thermal waters.

The groundwaters shown on the Piper diagram represent Ca-HCO₃ type, the thermal waters Na-Cl type. The Na and Cl concentrations in Dongrae hot-spring area were higher than that of other granite area in South Korea. The Na/Cl weight ratio for the thermal waters shows 0.89.

Based on the factor analysis for the groundwater, Ca, NO₃ and SO₄ belong to factor 1, Na, HCO₃, Cl and electrical conductance (EC belong to factor 2, and SiO₂, Mg and K belong to factor 3, while for the thermal water EC, Ca, K, Na, F, Cl and SO₄ belong to factor 1, Na, HCO₃, and SiO₂, Mg and HCO₃ belong to factor 2.

On the phase stability diagram, the groundwater samples are located in the field of stability of kaolinite, while the thermal water samples are located in the stability field of microcline or kaolinite depending on the chemical composition system.

By means of the Na/K, Na-K-Ca and Na-K-Ca-Mg geothermometers, the geothermal reservoir is estimated to have equilibrium temperature between 130 and 140°C.