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Hydrochemistry of non-volcanic hot springs around the Kofu plutonic complex

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Hot springs have great significance as local promotion and so on. A lot of hot springs have drilled in many parts of non-volcanic area in recent years, but most of the hydrochemistry of those hot springs are unclear. The purpose of this study is to explore the hydrochemistry of non-volcanic hot springs around the Kofu plutonic complex in Yamanashi prefecture. 13 samples of hot spring water were collected at 0-1500m depth to analyze major chemical components and isotopic compositions of oxygen, hydrogen and sulfur as sulfate anion.

Temperature measured onsite of water samples were from 18.8 degrees centigrade to 42.5 degrees centigrade, and pH values were from7.3 to 10.2. Most of the sample waters were classified as Na-HCO_3 type (9 samples). The others were classified as Na-SO_4 type (3 samples), and Na-$HCO_3 \cdot SO_4 \cdot Cl$ type (1 sample). Basic water quality of the hot spring waters in this area is the Na-HCO_3 type, and the relationships between Na^+ and the HCO_3^- and the saturation index of sample waters for the kaolinite indicate that major chemical components were caused by the albite mineralization.

$$2NaAlSi_3O_8 + 2CO_2 + 11H_2O \rightarrow 2Na^+ + 2HCO_3^- + Al_2Si_2O_5(OH)_5 + 4H_4SiO_4 \quad (1)$$

Constituent Granitoids of The Kofu plutonic complex were classified into magnetite-series and ilmenite-series granitoids based on magnetic susceptibility (e.g., Shimizu, 1986). Sample waters from magnetite-series area have positive delta ^{34}S values (1.7 to 10.0 per mill), while the water samples from ilmenite-series have negative values (-8.8 to -4.6 per mill). This tendency of heavy-light delta ^{34}S values of sample waters consist with that of the magnetite-series and ilmenite-series granitoids. These results suggest that the delta ^{34}S values of the water samples reflect the delta ^{34}S values of the granitic rock around the hot spring site.

Keywords: kofu plutonic complex, non-volcanic hot spring, chemical composition, genesis, recharge mechanisms, water-rock interaction