

Groundwater quality and flow system on the northeastern foot of Mt.Fuji

Tetsuo Itou[1]; Kieko Sato[2]; Shun'ichi Oguchi[1]

[1] Dept.of Geosystem Sci.,Nihon Univ; [2] Dept.of Geosystem Sci., Nihon Univ.

1. Introduction

A lot of studies have been done from various views on groundwater recharge and discharge system of volcanic body, including Mt.Fuji. Susuki and Taba (1994) indicated that shallow groundwater at the flowed eastern foot of Mt.Fuji was recharged by the water of Lake Yamanaka and there was groundwater system inflow to Oshino with the groundwater from Mt.fuji. We studied the quality on the relationship with groundwater of Oshino and the water of Lake Yamanaka.

2. Outline of the field and methods

The northeastern foot of Mt.Fuji consists of Oshino basin, fan distributed at Fujiyoshida City and Nashigawara, several elevations of Shin-Fuji lava flow and Tertiary mountains at northern Mt.Misaka and eastern Mt.Tanzawa, and River Katsura flows from Lake Yamanaka to Fujiyoshida City. Lake Yamanaka dammed by Takamarubi lava flow where distributes to Uchino at the eastern part of Oshino. We could find a few springs at the end of the lava flow.

Field surveys were carried out at three times from 21 to 22 in May, from 8 to 9 in July, and from 13 to 14 in December, 2004. Sampled waters were measured on water temperature, pH and electric conductivity (EC) in the field. We analyzed the water quality (Li⁺,Na⁺,NH₄⁺,K⁺,Mg²⁺,Ca²⁺ and H₂PO₄⁻,F⁻,Cl⁻,NO₂⁻,Br⁻,NO₃⁻,SO₄²⁻) by ion chromatographic method (SHIMADZU CLASS LC-10), HCO₃⁻ by pH 4.3 Bx method,SiO₂ by molybdosilicate yellow method, vanadium through inductively coupled plasma mass spectrometry (UK FUSION PQomega). And the water quality of Lake Yamanaka is quoted from Takayama (1995) and Koshimizu and Kobayashi (2000).

3. Results and conclusion

The results suggested that Ca²⁺, Mg²⁺, and HCO₃⁻ had high positive relationships originated from volcanic rocks. Because the whole-rock chemistry of Fuji-volcanic eruptives is fewer differences (Takahashi et al., 2003), these concentrations increased as the contact time with groundwaters and rocks. And the rate of Na⁺ in total positive ions showed to decrease with increase of Ca²⁺+Mg²⁺.

Concentration of SiO₂ showed the lowest at Lake Yamanaka (12.6mg/l) and relatively low concentration at springs on the end of Takamarubi lava flow and a part of groundwater in Uchino (23.2-27.8mg/l). Although the relationship with SiO₂ and Ca²⁺+Mg²⁺ showed the lower correlation coefficient (r=0.580) except the water of Lake Yamanaka, the correlation coefficient was higher (r=0.712) except the water of Lake Yamanaka, springs at the end of Takamarubi lava flow and a part of groundwater in Uchino. Therefore we suggested that springs at the end of Takamarubi lava flow and a part of groundwater in Uchino were diluted by the water of Lake Yamanaka.

Vanadium showed a negative relationship with Ca²⁺+Mg²⁺, and lower concentration at springs of the end of Takamarubi lava flow and a part of groundwater in Uchino affected by the water of Lake Yamanaka. Koshimizu and Kobayashi (2000) mentioned that concentration of vanadium showed the lowest in the water of Lake Yamanaka (4.80-5.78ppb), and springs at the end of Takamarubi lava flow and a part of groundwater in Uchino (16.6-86.9ppb) followed the lake water. Therefore we suggests that springs at the end of Takamarubi lava flow and a part of groundwater in Uchino received dilution by the water of Lake Yamanaka for vanadium.