

The affect of the quality of ground water to the Lake Haruna

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1. Introduction

A crater lake is recharged with rainfall and ground water. The water quality is affected by volcanic activity and geological features. Lake Haruna is a crater lake on Mt. Haruna. The lake water is mainly filled with ground water from bottom of the lake (Sato et al., 1977). The object of this study is to discuss how the chemistry of water in Lake Haruna is affected from that of ground water. Field surveys were carried at 23 sites of Lake Haruna, 1 site of hot spring, 7 sites of ground water around Lake Haruna and 1 site of Numao River on May 13, September 1-2 and December 6-7, 2004.

2. Methods

The items of field investigation were air temperature, water temperature, pH, EC, DO, TDS (total dissolved solids), transparency and stream flow, and gathering water samples. Major chemical composition were analyzed through ion chromatography (Shimadzu Co. LC-10), pH 4.3Bx method and molybdosilicate yellow color method.

3. Results and conclusion

The lake received 79.9-82.9% from ground water on water budget. And the results showed that ground water from Hitomokko had large effect on the water quantity and quality of Lake Haruna.

The transparency were 2.1m on May, 5.1-6.5m on September and 4.5-5.4m on December. The thermal stratification was formed on September, and pH in bottom water was higher than that at surface water because of H⁺ consumption by photosynthesis. pH was dwindle to the deep, and the cause was increase of CO₂ because of breathing or disintegration of remains by living things in the deep than the compensation depth. EC and SiO₂ were increasing to the deep. Thermal stratification caused vertical chemical stratification, so dissolved constituent in deeper lake water deposited on bottom sludge. In December, Lake Haruna was in a circulation stage.

The concentration of Ca²⁺ and SO₄²⁻ in ground water were higher than the lake water. In the hot spring, EC was 20 times than the lake water and water quality of the hot spring was Na-Cl type compared with Ca-HCO₃ type of the lake water.