

NEW GEOCHEMICAL DATA OF HYDROTHERMAL SYSTEM OF BARANSKY VOLCANO (KURIL ISLANDS)

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Intensive volcanic and hydrothermal activity in the Kuril Islands started in the Late Cretaceous and continue today. The Kuril Islands are isolated and unevenly studied. Using data collected between 2002 and 2005, we present results of trace elements and H, O, S, and He isotopes ratios for the hydrothermal system of Baransky Volcano.

The data show that three main groups of thermal waters can be distinguished: acid sulfate waters (pH<3.7), weak alkaline sodium-chloride (pH>7.3) and neutral, sodium-chloride-bicarbonate thermal waters. Acid sulfate waters have rather high contents of siderophile, chalcophile, and lithophile elements. Sodium chloride waters have high contents of main ions and very low rare earth elements. Sodium-chloride-bicarbonate waters occupied an intermediate position in contents of chemical elements. The index of mineral saturation indicates that the sodium-chloride waters are oversaturated relative to adularia, epidote, chlorite, and wairakite. Sodium-chloride-bicarbonate waters are oversaturated relative to albite, smectite, and low temperature zeolite assemblages. For Baransky Volcano, the classical geochemical zoning of thermal waters is observed. In the volcano crater acid sulfate waters occur; hypsometrically below in the volcano basement – sodium chloride water is typical. Neutral sodium-chloride-bicarbonate waters occur on the periphery of Baransky Volcano. On the basis of hydrogen and oxygen isotopic data thermal waters have an atmospheric origin. Sulfur isotopic data indicate magmatic origin of the sulfur in acid waters. The high values of the ³He/⁴He ratio (7.74) indicate a high percentage of mantle helium in waters. Thus, the chemical composition of the thermal waters is formed under influence of the country rocks and abyssal fluids. The flows of magmatic fluid which combine with infiltration waters change the solution influencing significantly the reaction run in the water-rock system.

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