Distribution of REE in thermal springs and surrounded surface waters of some active volcanic zones in Russia and Japan

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Distribution of chemical elements, especially REE in the areas with hydrothermal activities was investigated on Kunashir and Paramushir Islands of Kuril ridge (Far East of Russia) and in the Hakone area of Japan.

The waters studied are mostly acidic (pH up to 1 in the springs and up to 2.5-1.8 in the surface waters). The low pH of thermal waters was accompanied by a low oxygen concentration (up to 0 mg/l) with high mineralization and concentrations of trace elements.

Concentrations of REE are very different in different groups of springs and pots of studied areas and good connection of REE concentrations and water pH was found: the highest REE contents were found in the water with lowest pH.

At the time of study, the highest REE contents for acid waters were found in group of hot springs on the Ebeco's north-eastern fumarole fields (Paramushir island) where total dissolved REE reach more then 100 ppb. Concurently, the pots of Mendeleev Volcano on Kunashir Island had REE concentrations ranging between 30-40 ppb. For Hakone area of Japan, REE concentrations were lower then those measured during the Kuril study.

In total the composition of the surrounded surface waters reflects the composition of the thermal springs, discharge on the areas and has essentially different concentrations of REE as well. Maximum concentrations are typical in the stream draining north-eastern fumarole field of Ebeko Volcano where contents of La reach >20ppb and Ce up to 48 ppb. The lowest concentrations were found in the stream of Hakone area.

Normalized with NASC concentrations of REE in studied waters show more often enrichment in heavy REE with positive Eu anomaly.

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