

Geochemical and geocological aspects of volcanic eruptive activity (Klyuchevskaya group of volcanoes, Kamchatka)

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Estimation of concentration of petrogenic elements in seasonal snow cover and glaciers made it possible to introduce a method for estimating geochemical pollution caused by modern volcanism. The snow and ice can be viewed as a reflection of the regional lower atmosphere recording volcanic and anthropogenic pollution impacts on the local atmosphere, water basins and soil.

Glaciochemical data of the volcanic activity in the Klyuchevskaya group of volcanoes were analyzed (eruptions at Sheveluch, Klyuchevskoy, Bezymianny, and Ushkovsky volcanoes). Long-term investigations of single eruptions and core drilling of ice caps at active volcanoes allowed us to use space distribution of soluble and petrogenic elements, which come into natural environment.

It was shown that ion composition of chemical admixtures in snow cover and perennial sequences of firn and ice, along with horizons of buried tephra provide data on volcanogenic pollution, the size and character of ongoing volcanic events.

The paper provides results from complex research of a core from a 212-m deep borehole, which was drilled in the glacier at the summit of Ushkovsky Volcano in 1998. Major ion composition as well as pH and ice electroconductivity (EC) vary with depth and time. Both annual and perennial variations in concentration of chemical elements are related to transport of the erupted materials in the atmosphere and sedimentation on the summit of the volcano. Strong variations of ion concentration (from ppb traces to tens for the ppm level) indicates that high values are definitely related to the volcanic eruptions, just like it is shown at depths dated according to the following volcanic eruptions: 35 m for the 1955-1956 Bezymianny eruption; 84 m for the eruption in Hertz crater at Ushkovsky Volcano in spring 1890; 102 m for the 1829 Klyuchevskoy eruption.