

Quaternary eruptive history of Sarychev Peak volcano, Matua Island, Kuril Islands

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Eruptive history of Quaternary volcanoes of the Kurile Island Arc including active and potentially active are now studied poorly. The researches on reconstruction of Pleistocene-Holocene volcanism were done only in southern (Kunashir, Iturup) and northern (Paramushir, Onkotan) parts of the arc. So, the Central Kurile Islands is a real “white spot”- remote and almost inaccessible region.

Strong explosive-effusive eruption of Sarychev Peak volcano (fig. 1) in June 2009 initiated the beginning of special geology-volcanological works directed to detailed reconstruction of eruptive history of this volcano (Levin et al. 2010).

Sarychev Peak volcano (coordinates 48°05'24.49" N. and 153°12'08.18" E; absolute height 1446 m) represents intercalderal stratovolcano with summit crater (fig. 1). The volcano is located in caldera (D=3.5-4 km) of ancient (probably Pleistocene age) volcano Matua formed north-western part of the island (the Central Kurile Islands) (Gorshkov 1967; Laverov et al. 2005). Sarychev Peak volcano is one of the active volcanoes of the Kurile Arc; it is fixed not less than 10 its eruptions: in 1760th, 1878-1879, 1923, 1928, 1930, 1946, 1954, 1960, 1976, 2009 years. (Andreev et al., 1978; 1967; Levin et al. 2010; Shilov, 1962; Rybin et al., 2011).

The works on study of eruptive history of Sarychev Peak volcano included the complex of geologo- and geomorphologic-volcanological researches under the leading role of tephrochronology (Thorainsson, 1944; Braitseva et al., 1978). During the field works 9 sections of soil-pyroclastic covers were studied, which were made at different distance (4-7 km) from eruptive center, 3 of them were the fullest and by the time of sedimentation corresponded with late Pleistocene- early Holocene. Every section was described in details and sampled (by layers)

On the base of conducted investigations 3 main stages in eruptive history of Sarychev Peak volcano were detected:

Caldera-forming stage (late Pleistocene-early Holocene). Caldera-forming eruption of Matua volcano with formation of caldera which size was 3,5×4 km, and massive outburst of andesite pyroclastic;

Andesite stage (nearly all Holocene). Eruptive centers were located in the bounds of formed caldera. During this stage about 30 eruptions of different power were established, among them catastrophic eruptions were. The products of the eruptions are represented by the horizons of pumiceous andesites of light-yellow color.

Andesite-basalt stage (500-600 y.a.). During this stage modern Sarychev Peak stratovolcano was formed (I.V. Melekestsev was the first who suggested this). The activity of the volcano was mainly explosive and explosive-effusive. The eruptions were accompanied by numerous pyroclastic flows, thick covers of which are now seen in shore cliffs of the island. Tephra of Andesite-basalt stage is the thick layer of scoria having bi-structure. The low part of the section is formed by the layer of brown scoria (m=0.1-0.3 m), upper (0.5-1.2 m) is of black, dark brown of multiple stratified scoria.

Besides in soil-pyroclastic cover of Matua the layers of transit tephra were found – the ashes of caldera-forming eruption of Ushishir volcano (~1900-2000 y.a.) and strong eruptive event in Medvezh'ya caldera (Iturup Isl.) (~2100 л.н.) (Razjigaev et al., 2011 (in publishing); Nakagawa et al., 2008). In the Middle Holocene part of the section the ash of one of caldera-forming eruptions of Zavaritsky volcano is (Simushir Isl.)

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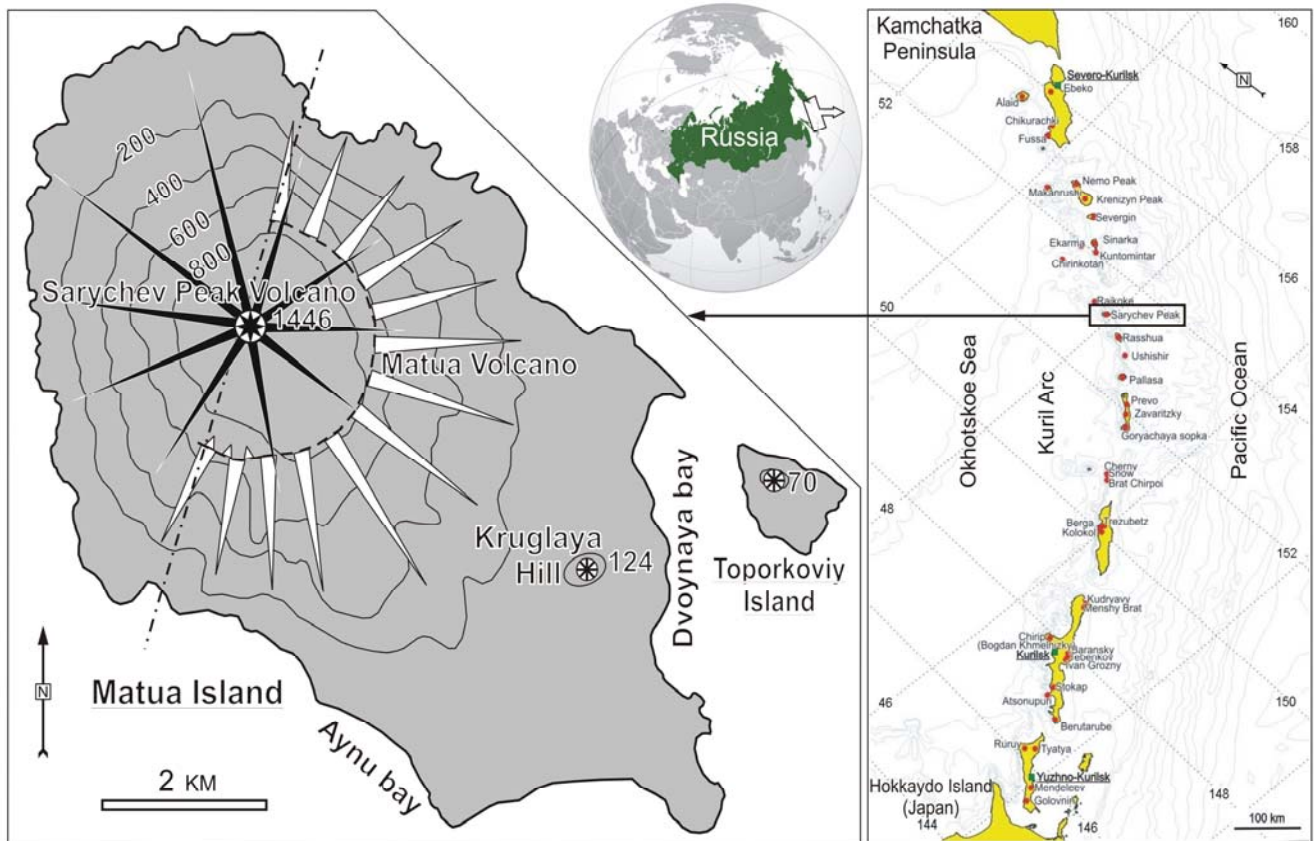


Fig. 1. Geological scheme of Sarychev Peak volcano, stroke shows the line of fault picked out by G.S.Gorshkov (1967). The map of the Kurile Islands is on the additional map.