THE LAVA FLOWS OF BEZYMIANNY VOLCANO, KAMCHATKA

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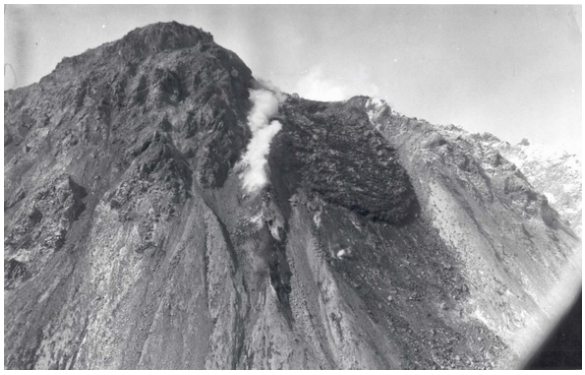

Fig.1. A viscous lava flow of Bezymianny volcano first was noted in 1977.

Fig.2. An activity of the lava flow of Bezymianny volcano on March 1990. Photo by Alexander V. Sokorenko.

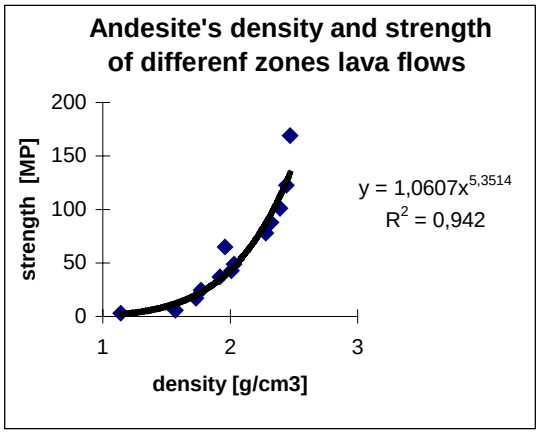

Fig.3. The increase of andesite's density and strength from depth to top of lava flow.

Bezymianny volcano is one of the most active volcanoes in Kamchatka. During the first two decades after the catastrophic eruption in May 30, 1956, the activity of the volcano was dominated by the growth of a lava dome in the explosive crater. A viscous lava flow was first noted in 1977 (Fig.1). From this time, a new phase of the volcano's activity began. The eruptions of the volcano repeated in the following pattern: slow extrusion of blocky lava in the summit crater; ash explosions of various magnitudes; a small, lateral directed blast; pyroclastic flows; and extrusion of viscous lava flows.

The velocity of the lava flows movement on the dome slope changed from 3-4 cm/hour (on November 1981) to 10 m/hour (on June 1986) and the lava flow's thickness reached up to 20-25 m. Sometimes after strong explosive eruptions of the volcano when the parts of the dome or of the old lava flows were destructed, we were able to observe a lava flow's interior structure (Fig.2). Block and ash pyroclastic flow's deposits were formed as a result of such eruptions. Andesite fragments of pyroclastic flow always have a different porosity (from dense to porous) and color (from white to black).

The lava flow eruption on June 24-25 was studied in September 1986. Four zones of andesites were noted in a vertical fissure of the flow from bottom to top: the densest white-grey andesites; the less dense grey; the porous black; and the foam grey ones. Samples were taken from these zones. They made up a standard collection for a study of andesites fragments from the other different lava and pyroclastic flows.

Gradually, a change of size and amount of Pl and Px – minerals and a color of volcanic glass was observed from the bottom to the top of the lava flows. The hard phase's density in different zones was 2.66-2.75 g/cm3 but the porosity changed greatly: from 8-11% to 34-35%. This tendency was observed with density and strength for andesites of the lava flow different zones (Fig.3).

Genesis probably is a general cause of different petrophysical characteristics of lava flow zones. When a lava flow is moving downslope on the dome, it is decontaminated, and its temperature falls. As a result of this, a zone lava flow with different structures and petrophysical characteristics its zones can be observed.

In the end, anisotropic lava flows are easily destroyed if a small part of magma extrudes from the top of the lava dome. These processes provoke explosive eruptions of the volcano.

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