

The Eruption of Bezymianny Volcano on August 7, 2001

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Bezymianny volcano is one of the most active volcanoes on the Kamchatka peninsula. After a long quiescent span of 900-1000 years, the 1955 eruption marked renewed activity of the volcano, which has continued to the present. During the first two decades after the catastrophic eruption in May 30, 1956, the activity of the volcano was dominated by growth of a lava dome in the 1956 explosive crater. Beginning in 1960, block and ash flows started, together with both cold and glowing rock-avalanches accompanied growth of the lava dome. A new phase of activity began in 1977 when eruptions repeated 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. Generally, eruptions of the volcano occurred once or twice a year. Forty explosions with the height of the ash plumes >1 km above the dome happened between 1977 and 2001.

The last explosive eruption of Bezymianny was in October 2000. The activity of the volcano was very weak from October 2000 till July 2001. According to KEMSD GS RAS data, renewed seismicity was registered at the volcano on July 25 consisting of shallow earthquakes and weak, long-duration local seismic events. According to AVHRR satellite data from AVO USA on July 26, a 3 pixel thermal anomaly at the dome of the volcano had a maximum Band 3 temperature of 26.8 oC within a background near 8 oC. The anomaly had a linear shape and trended southeast from the summit. We know that the thermal anomaly reflects an appearance of the volcano's extrusive activity. On July 27, KVERT's information release, stated: "According to seismic and satellite data, an extrusive process has begun at the dome of Bezymianny." On July 28, seismic activity decreased and remained at background levels until August 6. Weak fumarolic activity above the dome was observed during that time.

On July 31, 2001, the dome of Bezymianny was observed with the helicopter. A new extrusion 80-100 meters in diameter was noted at the top of the dome (Fig.1). The central part of the extrusion was massive, dense and light-colored. A border of the extrusion at the west and northwest parts of the dome was rough, with large blocks grey surface. Vigorous fumarolic activity was observed above the dome. A gas-steam plume extended 15-20 km to the south. Sometimes the extrusion growth produced rockfalls consisting of 2-5-m blocks that moved down the south and southeast slope of the dome.

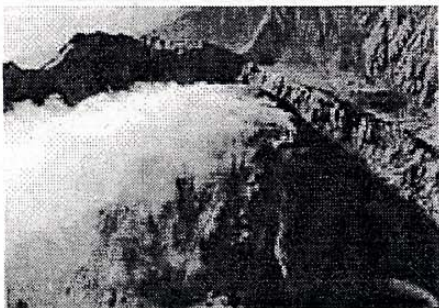


Fig.1. An extrusion at the top of the dome of Bezymianny volcano.

Photo by Alexei Ozerov.

The explosive eruption of Bezymianny began at 11:28 KDT on August 07 (at 22:28 UTC on August 06).

According to visual data from Klyuchi, at 11:28 KDT an ash plume rose 5,000 m ASL and extended to the east-southeast. Pyroclastic flows on the southeast slope of the volcano began to form after the first explosions. Pyroclastic flows were result from a mixture of the both styles: Soufriere and Merapi. At 12:15 on August 07 co-ignimbrite ash plumes rose

10,000 m ASL and extended >40 km to the east-southeast. From 11:28 until 13:00 KDT on August 07 spasmodic volcanic tremor up to 11.7×10^{-6} mps was recorded, but from 13:00 until 14:10 KDT on August 07 and later the tremor amplitude decreased up to 1.0×10^{-6} mps and less. At 17:02 KDT on August 07 an ash plume from Bezymianny was observed in a satellite image from AVO US. The plume was centered off the eastern coast of Kamchatka about 200 km south of Kronotsky. The ash cloud was approximately 200 km long and 100 km wide and was heading due south. Observers in Kronoki seismic station reported that on August 07 an ash fall was recorded (50 gr. of the ash per square m).

The explosive eruption of Bezymianny continued one day. A viscous lava flow began to form at the site of the active dome after this phase. According to AVO, a 3-pixel thermal anomaly with a maximum temperature of 28 degrees C was observed on the satellite image at 06:52 KDT on August 09. The results of the eruption were observed at the volcano on August 10, 2001. The run-out distance of the block-and-ash pyroclastic flows was 5-6 km (Fig.2). The bulk volume of the pyroclastic deposits (pyroclastic flow and surges and ash fall) was $\sim 0.003-0.004$ km³. From August 7 till August 10, a new viscous lava flow covered the south-southeast slope of the dome up to its bottom.



Fig. 2. The new lava flow on the dome and the block-and-ash pyroclastic flow on the slope of Bezymianny volcano, August 10, 2001.

Photo by Michael Zelenski.