

## IUGG 2003 Abstract

V08

## Caldera Formation and Unrest

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THE 1996-2003 ERUPTIONS IN THE AKADEMII NAUK CALDERA AND AT THE KARYMSKY VOLCANO, KAMCHATKA

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The Karymsky volcano located within the Karymsky volcanic center is one of the most active volcanoes of Kamchatka. This centre hosts more than five calderas and active volcanoes Karymsky and Maly Semiachik. Volcanic edifice of the Karymsky volcano is presented by the caldera formed about 8 thousand years ago and a new cone with summit crater. To the South, within the volcanic centre, caldera of the Akademii Nauk volcano is located, hosting the Karymskoye Lake. A number of events preceded the 1996-2003 eruptions. In April 1995, swarms of volcanic earthquakes started in this area. Strong earthquakes with magnitude up to 7 took place on January 1, 1996. Accurate short-term prediction of the eruption initiation was made. The eruption started on the night of January 2, 1996. During the first two days, the eruption occurred simultaneously out of two explosive centres located 6 km away from each other, that is, from the summit crater and the Karymskoye Lake. Almost incessant emission of gas-ash column occurred out of the summit crater of the Karymsky volcano to the height of 1200 m. In the lake, underwater eruption occurred from the eruptive center 500 m away from the lakeshore. Strong phreatic-magmatic explosions followed with the interval of 10-15 minutes. In the result of the underwater eruption, subaqueous scoria cone was formed called the New Year Peninsular (0.7 km<sup>2</sup>). The eruption in the lake stopped on January 3, and since January 4 till the present day (January, 2003) the eruptive activity has been concentrated in the summit crater of the Karymsky volcano. Explosions occurred to the height of 50-900 m with the interval from a few minutes to a few hours. Large-block lava flows moved along the slopes. Lava field was formed, 1.9 km long, 1.8 km wide and up to 30 m thick at the front. Volume of lava flows for 7 years of eruption was 0.03 km<sup>3</sup>. Total amount of pyroclastic material for the same period ikvels 0.036

km<sup>3</sup>. Volume of tephra having formed the scoria cone of the Novogodny Peninsular is 0.04 km<sup>3</sup>. Products of the 1996 eruption are presented by three rocks quite contrasting in composition: basalts (Karymskoye Lake), andesites (Karymsky volcano, its usual products), and dacites and rhyolites (Karymskoye Lake). In the course of geochemical studies, it has been established that all the rocks are constituent parts of a single magmatic series. Based on the detailed geodesy studies, it has been established that significant deformations occurred within the Karymsky volcanic center in 1996-2003. The most essential extensions (up to 2.3 m ( $6 \times 10^{-4}$ )) took place on January 1-2, 1996 in the area of the Akademii Nauk caldera, the new feeding dyke and New Year Peninsular. Gradually decreasing, they had spread over the area of 35 x 45 km. During the next 7 years, the eruption occurred under the conditions of extension ( $1 \times 10^{-5}$  per year) and subsidence (5-10 mm per year) of the ground surface in the vicinity of the Karymsky volcano cone and its caldera.