

## **The Tolbachik Fissure Basalt Eruption, Kamchatka (2012-2013)**

Evegeny I Gordeev, Valery A Droznin, Anna O Volynets, Yaroslav D Muravyev

Institute of Volcanology and Seismology, Russia

E-mail: gordeev@kscnet.ru

There is a large volcanic center in the south part of the Klyuchevskaya group of volcanoes, for which fissure eruptions of mafic lavas are typical in historic times. The latest large effusion of lavas in this zone occurred over the period 1975-1976 and was called the Great Tolbachik fissure eruption (GTFE).

After 37 years of rest, in the evening of November 27, 2012 liquid basalts started to effuse extensively to the south of Plosky Tolbachik Volcano. One day prior to the eruption, a swarm of earthquakes was recorded beneath the volcano. Seismic data showed that the fissure opened at 17h45m local time at an altitude of about 2.5 km on the southern flank of Plosky Tolbachik. The fissure stretched 6 km from north to south. Local residents reported three areas of eruptions late at night. The eruption was obviously explosive in the upper part of the fissure. At this stage the fissure produced the most powerful ash emissions resulting in ash deposits as far as several tens of kilometers from the volcano. In its lower part the fissure started to produce extremely fluid basaltic lava. A small lava flow from the central area of eruption traveled to the west and descended 9 km along the valley of Vodopadny creek to a height of 650 m a.s.l. and destroyed Vodopadnaya base camp, which had been built during the 1975-1976 Great Tolbachik fissure eruption. By November 30, the movement of Vodopadny lava flow had ceased.

The main lava flow resulted from the central part of the fissure. Gradually, the main eruptive center with up to three vents was formed above the upper fissure. The vents activity varies in time. By mid January 2013 a crater with a lava lake had been formed above the upper fissure. The crater is continuously fountaining hot material. Over the period of two months the erupted lava had covered an area of 30 km<sup>2</sup>. New portions of lava are coming to the surface along the lava channels increasing the thickness of the lava field. Sometimes lava bursts out of the field in forms of sporadic narrow 2-3 km long flows. The total volume of the eruptive material is estimated to be 0.3-0.4 km<sup>3</sup>.

Short seismic swarm and high-aluminous composition of effusing basalts provides evidence that magma comes to the surface from an intermediate chamber, the roof of which is located beneath the caldera of Plosky Tolbachik at a depth of about 4 km.