# Petrology and geochemistry of the New Tolbachik Fissure Eruption volcanic rocks and their evolution during the first two weeks of eruption

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The New Tolbachik Fissure Eruption started on 27.11.2012. Plosky Tolbachik is a stratovolcano, active in Holocene; it is intersected by Tolbachinsky Dol - the monogenetic lava field, formed by numerous cinder cones and lava flows eruptions which repeatedly took place for the last 10 Ka. Most of all cinder cones are concentrated in the narrow axial zone responding to the fault zone location (Fedotov et al., 1984). The last big fissure eruption in this region occurred 37 years ago and lasted for 2 years; the volume of erupted material was 2.2 km3, lava flows covered the area of 45 km2; magnesian, alumina and transitional basalts were erupted. Besides, a new caldera was formed at the summit crater of Plosky Tolbachik (Fedotov et al., 1984).

The New Tolbachik Fissure Eruption began from the effusion and explosion of high-K Ti-rich aluminous trachy-basaltic andesites, black, sub-aphyric, with rare phenocrysts of Pl, Ol and Cpx. Microlites of the groundmass with pilotaxitic and hyalopilitic structures are mainly Pl, dovetail shaped, and, to a lesser extent, Ol and Cpx; Mt is abundant; the areas with hyaline groundmass compositionally similar to the whole rocks are confined to the highly-porous parts of the rock. The petrography of the volcanic rocks of the first days of eruption attests very rapid cooling, high rates of eruption and high mobility of the lava. Composition of Ol varies from Fo64 to 80, Pl is An41 to 62; Cpx are Augites and Salites. The average content (wt.percent) of SiO2 in the whole rock from the first days of eruption is 54.57, Al2O3 16.6, K2O 2.5, MgO 3.36, TiO2 1.8 (for comparison, the eruption in 1975 started from high-Mg medium-K basalts and was continued by high-Al high-K basalts, which are close in composition to the newly erupted basaltic andesites, but have lower content of silica, alkalis and TiO2 at higher MgO and CaO). During the next two weeks bigger plagioclase crystals appeared as phenocrysts (up to 1 cm in diameter); also Ol became more abundant and bigger in size (up to 3 mm in diameter) in comparison to the lavas of the beginning of this eruption. The composition of rocks gradually changed to more mafic: after 10-14 days silica content (wt.percent) dropped to 52.79, while MgO increased to 4.08, TiO2 to 2.03, Al2O3 decreased to 15.8 and K2O remained roughly the same. The trace elements content also changes regularly with the shifting of the main oxides content. Overall, the incompatible trace elements content in lavas of the first portions of new eruption is higher than in all previously studied volcanic rocks of Tolbachinsky Dol; the distribution of trace elements on spidergrams and REE on REE-diagrams forms sub-parallel trends, indicating possible derivation of these rocks through fractional differentiation processes of parent magmas, responsible for the formation of basalts of the North and South Vents of the Great Fissure Tolbachik Eruption in 1975-76.

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