

## **Seismic anomaly as a medium-term precursor of new (2012-2013) fissure eruption of Plosky Tolbachik volcano, Kamchatka**

Yulia Kugaenko, Vadim Saltykov, Petr Voropaev

Geophysical Survey of Russian Academy of Sciences, Kamchatkan Branch, Russia

E-mail: ku@emsd.ru

New fissure eruption of Tolbachik volcano has begun on November 27, 2012. The radial fissure with length near 5 km directed to SSW has appeared on the south slope of the Plosky Tolbachik Volcano (PTV). Power lava fountain, intensive lava flow and moderate ash ejection were observed from several eruptive centers along fissure. The PTV and area of scoria cones were in the stage of rest from 1976 after completion of the Large Tolbachik Fissure Eruption (LTFE) 1975-1976. In contrast of the LTFE the eruption 2012-2013 was not forestalled by intensive seismic preparation. We analyzed seismicity of PTV retrospectively using regional catalogue 1999-2012. Anomalies of low-energy ( $M > 1.5$ ) seismicity parameters (increase of seismicity rate and seismic energy) were discovered. The duration of these anomalies is 3-4 months. This is evidence of seismic activation. The whole PTV including area of new fissure break was covered by this activation. The significance of this anomaly was estimated by distribution function of emitted seismic energy in 1999-2012. Statistically significant transfer of seismicity from background level to high level and extremely high level was revealed. It corresponds to multiple increase of earthquake number and seismic energy in 2012, July-November. The transition from background level to high level was happen in August 2012. During last three weeks before fissure eruption seismicity of analyzed seismoactive volume was on extremely high level. There is no similar anomaly during 1999-2012 in the area of Plosky Tolbachik Volcano.