SEISMIC PROCESSES AND MOVEMENT OF THE MAGMAS, OCCURRING AT THE GREAT TOLBACHIK FISSURE ERUPTION 1975–1976 AND THE TOLBACHIK FISSURE ERUPTION 2012–2013 (KAMCHATKA)

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Abstract. Seismic and volcanic processes in the Northern group of volcanoes (NGV) of Kamchatka 2012–2013 accompanying the Tolbachik fissure eruption (TFE, lately called «50 years of IVS») and the Great Tolbachik fissure eruptions (GTFE) of 1975–1976, and also seismic activity during the period between these two large basalt eruptions in 1977–2012 are considered. Features of development of seismic processes, similarity and differences in behavior of seismicity of the main volcanoes of NGV – Ploskii Tolbachik, Klyuchevskoi, Besymyannyi and Shiveluch – are revealed. Features of distribution of earthquakes on depth, their migration in space and time in the NGV area connections of seismic and volcanic activity in NGV are considered. The description of the main features of seismic activity during preparation and development of GTFE of 1975–1976, development of swarms of the earthquakes preceding emergence of its Northern and Southern breaks is provided. Features of seismic activity during the long period between GTFE and TFE eruptions are studied. The description of the main features of development of the seismic activity preceding and accompanying TFE in 2012–2013 is given. As a result of the conducted researches the main sources and channels of a magmatic feeding of volcanoes of NGV are revealed. It is shown that there is the main feeding channel in the mantle and the general intermediate magma center for all NGV. Depth of its location according to seismic data is 25–35 km. Ways-channels of magma outflow rise from this general intermediate center to active volcanoes Klyuchevskoi, Tolbachik, Besymyannyi and Shiveluch. Existence of a layer of neutral buoyancy at depths 15–20 km under all NGV and existence of a source of an areal volcanism of magnesian basalts at North-East from the Klyuchevskoi volcano at depths ~ 20 km are shown. These data partially confirm the geophysical model of magmatic feeding system of Klyuchevskoi group of volcanoes constructed earlier in 2010. The presented data cover wider area of all NGV and are based on new observations.

Keywords: magma channel, Kamchatka volcanoes, volcanic earthquakes, volcano activity.