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# The complex structure of the feeding system of the Kluchevskoy volcanic group inferred from the local travel time tomography

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The Kluchevskoy volcanic group (KVG) located in central part of the Kamchatka peninsula, Russia. The KVG have a size of approximately 50 km by 80 km and includes dozen of volcanoes, three of them are presently active. These active volcanoes (Tolbachik, Kluchevskoy and Bezymianny) have completely different composition and types of eruption. Here, we present 3D models of distribution of the anomalies of P- and S-wave and Vp/Vs ratio beneath the KVG down to 40 km depth. The models were obtained with use of the tomographic inversion algorithm LOTOS. We have analyzed combined dataset that include: (1) new data recorded by the KISS network (Shapiro et al., 2017) consisting of 77 stations, which were installed around KVG in 2015-2016 (picking of the arrival times is still ongoing); (2) data from the temporary network installed in 2014-2015 on the Tolbachik volcano (22 stations); (3) data from the temporary network on the Bezymianny volcano, installed in the framework of the PIRE project in 2009 (Thelen et al., 2010; West, 2013) and (4) data from the permanent regional network operated by the Kamchatkian Branch of The Geophysical Survey (KBGS). We perform a number of the synthetic tests, which provide information about resolution of the obtained models and solution stability. The tomographic results have shown that feeding systems of three active volcanoes of the KVG are different. The basaltic lavas of the Klyuchevskoy volcano are supplied directly from a reservoir at a depth of 25–30 km through a nearly vertical pipe-shaped conduit. The explosive Bezymianny volcano is fed through a dispersed system of crustal reservoirs where lighter felsic material separates from the mafic component and ascends to the upper crust to form andesitic magma sources. For Tolbachik, low-viscosity volatile-saturated basalts ascend from two deep reservoirs following a system of fractures in the crust associated with the intersections of regional faults. These results agree with the model presented in Koulakov et al. (2017), but here we obtain better resolution in the areas surrounding the KVG, and therefore presented here models provide additional details of the structure of the KVG feeding systems.
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