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## Source Mechanisms of Deep Long Period Earthquakes beneath the Klyuchevskoy Volcano Group (Kamchatka, Russia) inferred from S-to-P amplitude ratios

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Long-period earthquakes and tremors are one of two main classes of volcano-seismic activity. Deep long-period (DLP) earthquakes are of particular interest because usually they are attributed to the processes occurring in the deep magma reservoirs close the crust–mantle boundary. The physical mechanism of generation of these earthquakes is still not fully understood. The hypotheses of the DLPs origin include thermomechanical stresses associated with cooling of deep intrusions, rapid CO<sub>2</sub> degassing from the oversaturated basaltic magmas, and secondary boiling.

In this work, we study the long-period earthquakes that occur at the crust-mantle boundary beneath the Klyuchevskoy volcano group in Kamchatka in order to reconstruct their source mechanism. We considered three possible sources (single force, shear slip and tensile crack) that can produce DLPs. With given hypocentral location and radiation patterns we calculated synthetic seismograms for each of assumed mechanisms. Then, we compared obtained signals with real records measuring amplitudes of P and S waves at each channel and calculating their ratios. For each of the considered types of mechanisms, we perform a grid search in the parameter space and found an optimal solution that minimizes the misfit between the observations and the model predictions.

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