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Correlation slab heterogeneity and volcanism in Kamchatka arc

Olga Bergal-Kuvikas 

Institute of Volcanology and Seismology, Petropavlovsk-Kamchatsky, Russian Federation (kuvikas@mail.ru)

The correlation of subducted plate parameters with generated volcanism was studied along the Kamchatka arc. Increased slab age controls dip angle (25–45°) and length of the seismic zone (200–700 km slab depth) from the north (~53°N) to the south (~49°N) of the Kamchatka arc. All listed above parameters generate various aged volcanic belts with different parameters of volcanism. The natural boundary between various aged slabs is on ~53°N, on the extension Avachinsky transform fault. It divides the Kamchatka arc on Southern Kamchatka with slab age ~ 103–105 Ma and Eastern volcanic belt, Central Kamchatkan Depression with slab age ~ 87–92 Ma. Complicated evolution and various ages of the slab control magmatism along the Kamchatka arc. Basic-intermediate magma compositions dominantly characterized Quaternary-Pliocene volcanoes in Central Kamchatkan Depression. In contrast, Neogene-Quaternary volcanism on Southern Kamchatka represents by strong explosions of acidic magmas (Gordeev, Bergal-Kuvikas, 2022).

Monogenetic volcanism marked a Malko-Petropavlovsk zone of transverse dislocations (MPZ), which is located on the extension Avachinsky transform fault. Monogenetic cinder cones in MPZ are randomly distributed along to these long-lived rupture zones. Here I present new geochemical and isotopic results of monogenetic volcanism in MPZ. Based on whole rock and trace element geochemistry, Pb-Sr-Nd isotopic ratios of monogenetic cinder cones magmas were shown to tap the enriched mantle source (low ¹⁴³Nd/¹⁴⁴Nd isotopic ratios (0.512959–0.512999), as variated ⁸⁷Sr/⁸⁶Sr (0.703356–0.703451) and ²⁰⁶Pb/²⁰⁴Pb (18.30–18.45), ²⁰⁸Pb/²⁰⁷Pb (38.00–38.12) isotopic ratios). High Nb/Yb and La/Yb ratios, without significant inputs of the slab`s components (the lowest Ba, Th contents), indicate decompression melting predominately (Bergal-Kuvikas et al., 202X). Therefore, a combination of geophysical and geochemical methods enable us to conclude that monogenetic volcanism in MPZ mark a natural boundary between various aged slab on Avachinsky transform fault. Various aged slabs under Southern Kamchatka and the Eastern volcanic belt generate volcanism with different magma compositions and ages of volcanoes.

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