



The role of coastal marine environment in formation the Miocene basaltic andesite ignimbrites at Eastern volcanic belt, Kamchatka

Olga Bergal-Kuvikas (1,2), Aleksei Rogozin (1), and Evgeniy Kliapitskiy (1)

(1) Institute of Volcanology and Seismology, Petropavlovsk-Kamchatsky, Russian Federation (kuvikas@mail.ru), (2)

2Institute of Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry, Moscow, Russian Federation

Ignimbrites with basaltic andesite compositions are rare pyroclastic rocks on Earth. In last decades were opened wide fields of mafic (50-57 wt. % SiO₂, 3-8 wt.% MgO) Miocene ignimbrites (5.78-5.58 Ma) on Eastern volcanic belt, Kamchatka [1,2]. Their genesis are interest and needed to be studied. Based on statistical data of Global Volcanism Program of Smithsonian Institute [3] and published materials we presented comparing analysis of caldera-forming eruptions with basic-intermediate magma compositions in the world and showed that dominant numbers of their eruptions correlated with external water of open basins, seas or lagoons. Tracks of external water on formation the Miocene magmatic rocks were found in numerous outcrops at Kamchatkan Eastern volcanic belt. The thick continuously repeated interbedded layers of ignimbrites and altered tuffs with boulders and pebbles were formed under or in contact with external water. Columnar joints of studied ignimbrites suggest for high temperatures, which were hot enough to melt glasses and form fiammes. It possible recognize when a hot, gas-saturated pyroclastic flows comes into contact with cold water and form: (1) dense lava-like ignimbrites with basaltic andesite compositions under water and (2) altered tuffs, which were transfer above the water and slowly accumulate on the dense ignimbrite layers. Because the sea level in Kamchatka was higher than it is now and since Miocene the Eastern Volcanic belt significant uplifting (more than 1,5 km), we think that it is likely that the obtained ignimbrites formed in a shallow coastal marine environment. Accordingly, the reconstruction of submarine conditions in formations basic-intermediate ignimbrites in Miocene is important for understanding general tectono-magmatic evolution in early stage formation of Kamchatka arc.

References:

1. Leonov, V.L., Rogozin, A.N., Bindeman, I.N., Bergal-Kuvikas, O.V., Klyupitsky, E.S., 2011. Detection of new caldera on Kamchatka: boundary, age, caldera-forming deposits, unsolved problem. Conference to Volcanologist day "Volcanism and volcanic process". p. 53-56. In Russian.
2. Bergal-Kuvikas Olga, Leonov V., Rogozin A., Bindeman Ilya, Klyupitsky E. (2016)New discovered Late Miocene Verkhneavachinskay caldera on Eastern Kamchatka// 9th Biennial Workshop on Japan-Kamchatka-Alaska Subduction Processes (JKASP-2016), 2016, Fairbanks, Alaska University.
3. Global Volcanism Program. 2017. Database of Smithsonian Institution. Washington.