2010 GSA Denver Annual Meeting (31 October –3 November 2010)

Paper No. 266-6

Presentation Time: 8:00 AM-6:00 PM

THE CHEMICAL COMPOSITION OF THE ACCESSORY MINERALS INCLUSIONS IN OLIVINE AND PYROXENE PHENOCRYSTS, AS AN INDICATOR OF THE CALC-ALKALINE MAGMAS EVOLUTION CONDITIONS AT THE GORELY VOLCANO (KAMCHATKA)

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Gorely, in southern Kamchatka, is a large, long-lived shield-type volcano that is currently in an eruptive phase. Prior eruptions occurred in 1980 and 1984. It is comprised of three structural units: Pra-Gorely volcano; thick ignimbrite complex, associated with a caldera forming eruption; modern edifice named 'Young Gorely'.

An integrated mineralogical-geochemical have been conducted on all structural units of the Gorely volcanic edifice to determine their genetic conditions. After geochemical analysis two evolution series were found. First, Pra-Gorely volcano is represented by a suite of compositions ranging from basalt to rhyolite, with in this series, high-Mg basalts were discovered. Second, Young Gorely edifice is composed of only basalt, andesite and dacite. The reconstruction of chemical evolution trends shows that both volcanic series of Gorely volcano share the same genetic history with similar evolutionary stages. We suggest fractionation of an upper mantle peridotite as a common means to produce both volcanic series as a result of which the evolution of all rocks was generated.

Microprobe analyses conducted on the olivine and pyroxene phenocrysts of the Gorely volcano lavas, show that there were two stages of crystallization during the magmatic melt evolution. In addition, accessory minerals enclosed as mineral inclusions in high-Mg olivines and low-Mg pyroxenes were studied in order to reconstruct the magmatic melts evolution. The chemical composition of spinel crystals, which were found within the host-minerals, shows definite trends of mineral phase's evolution. Chromium spinels (Cr_2O_3 is about 25 wt. %) were found in high-Mg olivines (Mg# 87-77). Fe-Ti spinels (TiO_2 is about 15 wt. %) were found in low-Mg pyroxenes (Mg# 72-69). The chemical composition of mineral inclusions (spinel) in olivine and pyroxene confirm the two-stage nature of the magmatic melt evolution, which was detected by microprobe analysis of the phenocrysts of the Gorely volcano lavas.

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General Information for this Meeting

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Accessory Minerals as Monitors of Magmatic Processes: New Ideas, Applications, and Pitfalls (Posters)
Colorado Convention Center: Hall B
8:00 AM-6:00 PM, Wednesday, 3 November 2010

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