

GENESIS CONDITIONS OF ARC HIGH-ALUMINA BASALTS

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Gorely volcano (Kamchatka) was researched by our own investigations and by literary data. This is an active shield volcano, which has a complicated structure. There are three main structure elements of entire edifice: the elder body, caldera (38-40 thousand years), and the modern edifice (from Late Pleistocene).

By chemical and mineralogical composition Gorely's vulcanites produce evolutionary series of rocks from basalts to rhyodacites. The elder body of volcano consists of all rocks types from basaltic andesite to dacite. Deposits of the caldera forming eruption are mainly presented by ignimbrites. The modern volcanic edifice consists of basalts and basaltic andesites. Plagioclase, olivine and pyroxene present phenocrysts (5-30%) in basaltic rocks.

It was numerically estimated the conditions of arc high-alumina basalts (Al_2O_3 17%) generation using volcanic series of Gorely volcano (Kamchatka) and Okmok and Makushin volcanoes (Aleutians). As starting compositions to these series we can consider high-magnesia basalts (MgO 16wt%, $MgO/Al_2O_3 \approx 1.2$), similar to natural samples from Okmok. Crystallization and partial fractionation of 20% of olivine (Fo90-87) from primary melt provide appearance high-alumina residual melts under dry conditions and moderate pressure (6-8 kbar). This residual melt is equilibrated under the same conditions with following cotectic association: olivine Fo86 - plagioclase An86 - augite En49Fs6Wo45. The beginning of the association crystallization is going in following proportion: 15:45:40.

The stated conditions tie together genetically to the united series the high-magnesia basalts and high-alumina basalts. However these conditions don't provide more silicic rocks.

The scheme of high-alumina basalts generation is done by authors using following method: "Ariskin A.A. et al. Comagmat: a Fortran program to model magma differentiation processes. *Computer in Geosciences*, 19: 1155-1170, 1993"

MAGMA COMPOSITIONS OF BEZYMIANNY, SHIVELUCH, AND KARYMSKY VOLCANOES ACCORDING TO THE DATA ON STUDY OF GLASS INCLUSIONS (KAMCHATKA)

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Glass inclusions in plagioclase phenocrysts of andesites of recent eruptions of the volcanoes Bezymianny, Shiveluch, and Karymsky have been studied. Glass inclusions in andesites of the Bezymianny and Shiveluch volcanoes have show great composition variations (SiO_2 -56-81 mass%). 80% of inclusions dacitic-rhyolite composition. When content of SiO_2 increases in melts the amount of Al_2O_3 , MgO , FeO , CaO decreases and Na_2O rises. These andesites, especially ones of the Bezymianny volcano, are unusually high in K_2O content (1,8-6,6 mass%). For andesites of the Shiveluch volcano less variation of compositions of inclusions (SiO_2 -67-80%) and great H_2O content (up to 5-6 mass%) are characteristic. The composition of inclusions of the recent eruption of the Karymsky volcano has proved to be more basic and practically corresponding to the composition of rocks. Comparison of inclusions of plagioclases of the three volcanoes has shown that their compositions considerably differ. Basic andesites (56-59% SiO_2) of the Bezymianne volcano have great variation of inclusion compositions (SiO_2 =56-81%). Inclusions of different composition (high- and low-potassic) are met in one phenocryst. More acid andesites (SiO_2 =61%) of the Shiveluch volcano show less variation of inclusion compositions (SiO_2 =67-79%). Inclusions in the Karymsky volcano andesites show are more basic. They are enriched with Fe, Ti, Ca, Mg, P, Na and leaner in K content. Apparently, predominance of dacitic-rhyolite inclusions in plagioclases of andesites of the volcanoes Bezymianny and Shiveluch indicate that melts reside in strongly zoned magma chamber.