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GEOCHEMISTRY OF BEZYMIANNY VOLCANO LAVAS: SIGNATURES OF A MANTLE PRECURSOR AND MAGMA FRACTIONATION

R. Almeev (1,2), J-I. Kimura (2), A. Ozerov (3), A. Ariskin (4), G. Barmina (4)

(1) Institut fur Mineralogie, Universitat Hannover, Hannover, Germany, (2) Department of Geoscience, Shimane University, Matsue, Japan, (3) Institute of Volcanology, Petropavlovsk-Kamchatsky, Russia, (4) Vernadsky Institute of Geochemistry and Analytical Chemistry, Moscow, Russia

Assuming crystallization relationships between andesites and dacites of the Bezymianny volcano and cogenetic basaltic suite of the adjacent Klyuchevskoy volcano, Kamchatka arc (Ozerov et al., 1997), results of comprehensive study of whole-rock major, trace, and isotopic compositions, as well as phenocrysts geochemistry (XRF, TIMS, ICPMS, LA-ICPMS) is first presented. Geochemical data and radiogenic isotopes (Nd-Sr-Pb) suggest (1) the same mantle precursor that is similar to depleted MORBs source with an addition of fluid mobile elements, and (2) negligible contribution of assimilation processes to the magma-genesis beneath both volcanoes. Considered collectively, the basaltic and andesitic sub-series demonstrate a typical calc-alkaline trend with a common inflection point and continuous variations for compatible and incompatible trace elements. This indicates the dominant role of magma fractionation process that is additionally confirmed by systematic changes in the chemistry of CPx (Klyuchevskoy-Bezymianny) and Hbl (Bezymianny) phenocrysts displaying a strong correlation between mg# and trace element contents. The observed diversity of more primitive Klyuchevskoy basalts and evolved Bezymianny lavas might be attributed to a bifurcation of same initial magma conduit resulting in two different regimes of polybaric evolution. (1) The decompressional crystallization of a high-magnesia parent at 19 to 7 kbars was assumed to be peculiar to the Klyuchevskoy magma conduit, with high-alumina basalts as a final product. (2) Similar high-alumina magmas experienced essentially Şisobaric crystallizationŤ at 5-7 kbars with the formation of siliceous derivatives within a magma chamber beneath the Bezymianny

volcano. Preliminary data on apparent trace element partition coefficients (whole-rock/phenocrysts) allowed us to conclude the crucial role of hornblende in the formation of the calc-alkaline series. Intensive hornblende fractionation is shown to be responsible for the depletion in Y and HREE and high La/Yb ratio observed in andesitic and dacitic lavas of the Bezymianny volcano.