Geophysical Research Abstracts
Vol. 19, EGU2017-1182, 2017
EGU General Assembly 2017


# 3D Petrographical and Geochemical Evidences for Partial Melting Process in Mica-Pyroxenites and Monzonites: Gölcük Volcano, Isparta, Turkey

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Aphyric interstitial glassy droplets along rims of complex zoned and partly resorbed/embayed crystals of mica-pyroxenitic and monzonitic ejecta are frequently observed in host potassic-ultrapotassic explosive deposits of Gölcük volcano (Isparta, Turkey). The existence of glass in embayments of resorbed feldspars and phlogopites with significant sub-oriented vesicles indicate a possible partial melting process prior to phreatomagmatic eruptions of Gölcük volcano.
Major element geochemistry revealed that the interstitial glasses in the pyroxenites and monzonites are phonolite and trachyte-trachydacite (47-63% $SiO_2$). Trace element geochemistry of both interstitial glasses and host volcanic suites of Gölcük volcano are comparable. Trace element modeling for low-degree (0,5-10%) partial melting of monzonitic ejecta using the normative mineralogy of the both interstitial glasses and volcanic suites as melt modes, yield similar multi-element compositions to those of the actual host volcanic series. Furthermore, 3D petrography and associated morphometric analyses on the pyroxenites and the monzonites using X-Ray micro computed tomography (micro-CT) showed that the mean total porosity (19,48 %) is dominated by connected pores (up to 18.67 %). Moreover, calculated permeability (log k = -3.9) of the pyroxenitic ejecta demonstrate that partial melts might be able to flow through crystal-rich residue, generating the probable source magma of eruptive products in Gölcük volcanism.

Keywords: partial melting, trace element modeling, X-ray micro computed tomography, Gölcük volcano