



Geothermometry and Geobarometry of Kepsut-Dursunbey Volcanites (NW Anatolia, Turkey): Implications for Magma Chamber Depth and Crystallization Conditions

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The Kepsut-Dursunbey volcanic field (NW Turkey) contains various products of the Neogene magmatic activity. Two distinct volcanic suites have been recognized in the study area; Kepsut volcanic suite (KVS) and the Dursunbey volcanic suite (DVS). Both KVS and DVS are Early Miocene in age and representative for the post-collisional magmatism in western Anatolia. Mainly andesites, latites, basaltic andesites and pyroclastic rocks of KVS were formed during the early stage of volcanism in the study area. Without a major interruption in the volcanism, partly contemporaneously, KVS followed by felsic volcanic products of DVS. Rhyolitic domes, lavas and extensive pyroclastic units were formed during this felsic volcanic activity. Both DVS and KVS display textural and chemical evidence for interaction of mafic and silicic magmas. This is evidenced by disequilibrium textures such as existence of rounded plagioclase phenocrysts with reaction rims (regrowth), hornblende-mantled clinopyroxenes (corona texture), synneusis, sieve textured plagioclase, patchy zones and oscillatory zoning in plagioclase phenocrysts. Basic lavas of KVS also contains xenocrysts represented by biotite mantled quartz and asidic plagioclase ovoids and glomerocrysts entrained from melt zones near base of the crust. The observed disequilibrium textures in both suites are provide evidence for magma mixing or Assimilation and fractional crystallization (AFC). Calculated pressures and temperatures using the amphibole-plagioclase geothermometer and Al-in-hornblende geobarometer give values of 5.7–7.0 kbar and 927–982 °C for the KVS and 3.7–5.3 kbar and 783–787 °C for the DVS, indicating crystallization in magma chambers at deep and mid crustal levels; 21 km and 12 km, respectively. A main deep magma reservoir served as a source for the intermediate to basic lavas of KVS. The existence of similar mixing-compatible (disequilibrium) textures in both KVS and DVS support the establishment and evolution of KDVF magma system promoted by episodic basaltic inputs which may generate and mix/mingle with crustal melts at different depths.