Geophysical Research Abstracts
Vol. 14, EGU2012-7478, 2012
EGU General Assembly 2012

Geochemistry and Sr-Nd-Pb Isotopic Characteristics of The Oligomiocene Volcanism in NW Turkey: Susurluk Volcanites

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Crustal thinning due to regional extensional tectonics played an important role in the petrogenesis and chemical evolution of magmatism in western Anatolia starting in the Late Oligocene- Early Miocene. The study area is particularly critical because it contains various products of OligoMiocene magmatism whose geological and geochemical features indicate post-collisional setting. The magmatic rocks in this area are formed from two different groups of rocks, which display the close relationships in time and space. These are; the Çataldağ plutonic association and the Susurluk volcanic association.

Volcanism began with felsic pyroclastic rocks and felsic lavas and then, gave way to extensive intermediate volcanic rocks which are represented dominantly by andesitic lavas and associated pyroclastic rocks. The pyroclastic rocks associated with andesitic lavas are represented by various types of pyroclastic fall deposits and pyroclastic flow deposits. Pyroclastic fall deposits are formed from ash fall deposits and ash-block fall deposits. Pyroclastic flow deposits are represented mainly by ash-block flow deposits.

Geochemically, Susurluk lavas are subalkaline in character with rocks ranging in composition from dacite, to andesite. They show enrichment in large ion lithophile elements (LILE) and light rare earth elements (LREE) relative to the high field strength elements (HFSE). Trace element variations and inter-element ratios collectively suggest that magmas of the Susurluk volcanites show similar patterns to those of subduction-related arc magmas and/or post collisional lavas. Both dacite and andesite lavas have high initial 87Sr/86Sr ratios (0.707099-0.708785), low 143Nd/144Nd (0.512407- 0.512575). 206Pb/204Pb and 207Pb/204 Pb values vary from 18,831 to 18,952 and 15,696 to 15,704, respectivelly and εNd values range between -4.0 and -0.72. The major- trace element geochemistry and isotopic values of Susurluk volcanites indicate that these volcanic rocks are co-genetic and originated from a hybrid magma which was derived from the enriched sub-continental lithospheric mantle and was contaminated by the continental crustal components.