



Pliocene Basaltic Volcanism in The East Anatolia Region (EAR), Turkey

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East Anatolia Region (EAR) is one of the high Plateau which is occurred with north-south compressional regime formed depending on continent-continent collision between Eurasia and Arabia plates (Şengör and Kidd, 1979). Recent studies have revealed that last oceanic lithosphere in the EAR have completely depleted to 20 million years ago based on fission track ages (Okay et al. 2010). Our initial studies suggest that extensively volcanic activity in the EAR peaked in the Pliocene and continued in the same productivity throughout Quaternary. Voluminous basaltic lava plateaus and basaltic lavas from local eruption centers occurred as a result of high production level of volcanism during the Pliocene time interval.

In order to better understand the spatial and temporal variations in Pliocene basaltic volcanism and to reveal isotopic composition, age and petrologic evolution of the basaltic volcanism, we have started to study basaltic volcanism in the East Anatolia within the framework of a TUBITAK project (project number:113Y406). Petrologic and geochemical studies carried out on the Pliocene basaltic lavas indicate the presence of subduction component in the mantle source, changing the character of basaltic volcanism from alkaline to subalkaline and increasing the amount of spinel peridotitic melts (contributions of lithospheric mantle?) in the mantle source between 5.5-3.5 Ma. FC, AFC and EC-AFC modelings reveal that the while basaltic lavas were no or slightly influenced by crustal contamination and fractional crystallization, to more evolved lavas such as bazaltictachyandesite, basalticandesite, trachybasalt might have been important processes.

Results of our melting models and isotopic analysis data (Sr, Nd, Pb, Hf, 18O) indicate that the Pliocene basaltic rocks were derived from both shallow and deep mantle sources with different melting degrees ranging between 0.1 - 4 %. The percentage of spinel seems to have increased in the mantle source of the basaltic lavas. We argue that the temporal increase of spinel contribution and the melting degree in the mantle source region was responsible for transition from alkaline to subalkaline character in the lava chemistry in time. All these findings point to a regional tectonic event in Pliocene time responsible for the changing of tectonic regime and production of voluminous basaltic eruptions in Eastern Anatolia High Plateau.

Key words: East Anatolia, Pliocene, Basaltic volcanism, petrologic modelling