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Geochemical constraints for basaltic lavas from western part of Central Anatolia: The Significance of garnet - spinel stability field

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Widespread basaltic activities were developed at the westhern part of Central Anatolia, since middle to late Miocene, and, this study provides source constraints for the basaltic rocks and the geochemical processes effective throughout its evolutionary history. It significant to note that basaltic lavas lie along the NW-SE direction.

The great majority of basaltic rocks are situated in Seyitgazi in the east and Ilıca in the west, and some minor amounts are also found between these locations. Samples have both alkaline and sub-alkaline nature and they show compositional trend of trachybasalt, basaltictrachyandesite, basalticandesite and minor amount of andesites . The SiO_2 and MgO content of basaltic rocks range between (50.1 – 58.26 % Wt) and (7.52 – 3.07 % Wt) respectively. The primitive mantle normalised multi-element patterns of Seyitgazi basaltic rocks (50.1-50.63 % Wt) show enrichments in the LILE, relative to the HFS elements and display slightly negative Ta, Nb, P, Ti anomalies whereas Ilıca samples display similar LIL element signature that those of Seyitgazi samples but distinct from them with the depletion of HFS elements and the enrichments in Pb contents.

The basaltic rocks in both of the locations have low Nb/La (0.21-0.65), Nb/U (1.29-5.29) and high Ba/Nb (41.83-198) values that are typical of subduction zone magmatism and also reflect the lithospheric contributions. Furthermore, low Zr/Ba (0.08-0.37) and high Ba/La (16.49-29.97) ratios suggest that basaltic rocks were derived from a lithospheric source(s) as well, moreover, Seyitgazi and Ilıca basaltic rocks are represented by high and relatively high La/Yb(N) ratios (26.6-30.86 ; 12.77-16.49 respectively) and these differences are originated either change in degree of melting or change in the nature of the source. Similarly, Tb/Yb(N) ratios of Seyitgazi basaltic rocks range between 2.2-2.24 consistent with melting in garnet stability field whereas Ilıca samples ranging from 1.5- 1.78, were generated in spinel stability zone.

All these geochemical features suggest that variations on LIL/HFS HFS/REE REE/REE ratios are originated from either the combined effects of the different degrees of melting in source region with the significant amount of lithospheric contributions or change, probably transition in the nature of the source.