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Petrogenesis of Late Cenozoic Magmatism in Western Anatolia (Turkey)

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Turkey is located on an east-west trending fragment of the Alpine-Himalayan collision zone. Turkey is a natural laboratory to study collision-related magmatism, its geochemical characteristic, source region and also tectono-magmatic evolution. Late Mesozoic-Early Tertiary continent collisions in Turkey mainly took place in two episodes: (i) Cretaceous continent-island arc collision that postdated an earlier collision recorded to the north in the Pontides; and (ii) Eocene collision of the Tauride-Anatolide platform and microcontinent with the Pontides, after which large volumes of post-collisional magmas erupted in western and eastern Anatolia.
Western Anatolia is described by a great number of Late Cenozoic collision-related granites. Of these magmatics, the Early Miocened-aged Egrigöz pluton is one of the largest (400 km2) and least-understood pluton. They are mainly made up of granodiorite and granite. The Egrigöz intrusive rocks are high-K calc-alkaline, and have I-type characteristics. They are grey, dark grey in color and mainly medium- to coarse-grained, rarely porphyritic. They show enrichment in LILE and LREE relative to HFSE. Their chondrite-normalized REE patterns are fractionated and have small negative Eu anomalies. Low molar Al2O3/(FeO+MgO+TiO2) in combination with variable molar (Na2O+K2O)/(FeO+MgO+TiO2) ratios indicate that the parental magma(s) were derived from partial melting of mafic lower-crustal source rocks. High contents of CaO, Sr and also depletion in Eu/Eu* (0.72–0.19) values suggest the melting of a plagioclase-bearing source. In addition, less fractionated REE and nearly flat HREE patterns may imply that the role of garnet in the crustal protolith source was not important (Ozgenc and Ilbeyli).
In western Anatolia, the melt generation mechanism for the intrusive rocks could be crustal extension and uplift following collision.

Reference

Ozgenc, I. and Ilbeyli, N, 2008. Petrogenesis of the Late Cenozoic Egrigöz pluton in western Anatolia (Turkey): implications for magma genesis and crustal processes. International Geology Review, 50, 375-391.