Petrogenesis of middle Eocene post-collisional magmatism around Izmir-Ankara-Erzincan suture zone (Pontides, NE Turkey)

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Middle Eocene magmatic units around NE Turkey (Tokat-Sivas) developed along Cretaceous İzmir-Ankara-Erzincan Tethyan suture zone (IAESZ) at the post collisional stage and is an ideal place to study the development of the melting, assimilation, storage and homogenization processes as well as geodynamic mechanisms in an evolving orogenic belt.

Post-collisional middle Eocene magmatic units around IAESZ are represented by coevally developed plutonic and volcanic units. Plutonic units are represented by mainly alkaline hornblend-gabbro, olivine-gabbro, diorite stocks/dikes. Volcanic units are represented by calc-alkaline (andesite-dacite) and alkaline (olivine basalt, basaltic andesite, hawaiite) volcanic units.

All units have depleted HFSE (Hf, Zr, Nb, Ta) signatures that mimics the subduction related origin. They straddle around alkaline/sub alkaline divide and generally display continous fractionation trends from high to low MgO values. Common mineral assemblage of plutonic and volcanic units are represented by clinopyroxene (cpx) that generally displays normal zoning through the fractionation trends. Besides, there are also inverse trends in bulk data of the volcanic units themselves which can be interpreted as magma mixing. The inversion in bulk geochemistry is also supported by different cpx macrophenocryst populations with low Mg# cores (75-77) and high Mg# rims (89-94) and microphenocrysts with high Mg# (85-90) along their length in late stage alkaline lavas.

Plutonic and volcanic units that display continuous fractionation trends are probably products of the same magmatic system, which is also supported by overlapping εNd (+3 - +4) values and Ar-Ar ages (~44 - 42 m.a.). Besides, "inversed" series correspond to replenished and/or antecryst-xenocryst rich late stage activity.

The entire plutonic - volcanic system along the middle Eocene post-collisional magmatism possibly governed by denuding of lithospheric mantle at the post-collisional stage and irregular replenishment of conduits/or chambers with primitive magma.