



Subduction-related High- to Ultrahigh-Potassic Rocks of the Ankara-Erzincan Suture Belt of Turkey: a geochemical and isotopic approach to source and petrogenesis

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A Late Cretaceous Volcano-sedimentary Succession (LCVS) trends parallel to Neo-Tethyan Suture in North Central Anatolia. Volcanic members of the LCVS consist mainly of coeval leucite phonolite/tephrites, trachytes, lamprophyres and andesitic rocks. Obtained Ar-Ar ages reveal that the volcanic activity occurred between 73.6 ± 0.18 and 76.78 ± 0.19 Ma, contemporaneous with the subduction of the Neo-Tethyan ocean beneath the Pontides. The volcanic rocks of LCVS are classified as alkaline, High- to ultrahigh-K, and silica-saturated and silica-unsaturated, geochemically. Rare calc-alkaline andesitic lavas are also occur within the volcanic sucession.

Except the calc-alkaline samples, magmatic members of LCVS have similar major and trace element concentrations similar to the plagioclacites or ultrapotassic rocks of the active orogenic zones (i.e. the Roman Province ultrapotassic series, Peccerillo, 2005). The multi element patterns on N-MORB- and Chondrite-normalized spider diagrams are characterized by significant LILE and LREE enrichments relative to HFSE and HREE, and display apparent Nb and Ta depletions, implying the subduction-related magmas.

$^{87}\text{Sr}/^{86}\text{Sr}_{(i)}$ (0.704493-0.706090) and $^{143}\text{Nd}/^{144}\text{Nd}_{(i)}$ (0.512523-0.512680) isotope ratios are close to the mantle array, and are also in between the Aeolian Islands CA-Potassic rocks (Peccerillo, 2005), BSE and the circum-Mediterranean anorogenic Cenozoic igneous province (CiMACI, Lustrino&Wilson, 2007). Variable Mg# (33-60) evidences that these rocks are the products of evolved melts. The lead isotope values display a trend between EMI and DM, suggesting that the crustal involvement is more effective process during the generation of some lamprophyres relative to the other ultrapotassic rocks of LCVS.

The results of clinopyroxene thermobarometry calculations reveal significant differences in depth of crystallization for the rock suites. Some trace element abundances and inter elemental ratios together with their co-variations show that the magmatic rock suites of LCVS had different crystallization history. REE melting modelings suggest a common mantle source, which contains variable amount of spinel lherzolite and garnet lherzolitic proportions. Considering the presence of some phlogopite-bearing clinopyroxenite xenoliths in the lamprophyre and the leucite-bearing rocks, we propose that the LCVS ultrapotassic rocks were possibly derived from the low degree partial melting of veined SCLM.

Keywords: High- to Ultrahigh-K, Isotope, Ar-Ar, Cretaceous, Turkey, Veined SCLM

Lustrino, M., Wilson, M., 2007. ESR 81, 1-65.
Peccerillo, A., 1995. Springer-Verlag. 365pp.