



Petrology and petrogenesis of the Eocene Volcanic rocks in Yıldızeli area (Sivas), Central Anatolia, Turkey

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Yıldızeli region to the south of İzmir-Ankara-Erzincan suture zone is situated on the large Sivas Tertiary sedimentary basin. After the northern branch of the Neotethyan Ocean was northerly consumed beneath the Sakarya Continent, a continent – continent collision occurred between the Anatolide- Tauride platform and Pontides and followed a severe intermediate magmatism during the Late Cretaceous- Tertiary period. This created an east-west trending volcanic belt along the whole Pontide range.

In the previous studies different models are suggested for the Eocene volcanic succession such as post-collisional, delamination and slab-breakoff models as well as the arc model for its westernmost parts. We will present our field and geochemical data obtained from the Yıldızeli and its surroundings for its petrogenesis, and will discuss the tectonic model(s) on the basis of their geochemical/petrological aspects.

Cenozoic volcanic sequences of Yıldızeli region which is the main subject of this study, overlie Pre-Mesozoic crustal meta-sedimentary group of Kırşehir Massif, Ophiolitic mélangé and Cretaceous- Paleocene? flysch-like sequences. In the northern part of Yıldızeli region, north vergent thrust fault trending E-W separates the ophiolitic mélangé complex from the Upper Cretaceous-Paleocene and Tertiary formations. Volcano-sedimentary units, Eocene in age, of the Yıldızeli (Sivas-Turkey) which are intercalated with sedimentary deposits related to the collision of Anatolide-Tauride and a simultaneous volcanic activity (i.e. the Yıldızeli volcanics), exposed throughout a wide zone along E-W orientation.

Yıldızeli volcanics consist of basalts, basaltic-andesites and andesitic lavas intercalated flow breccias and epiclastic, pyroclastic deposits. Basaltic andesite lavas contain Ca-rich plagioclase + clinopyroxene ± olivine with minor amounts of opaque minerals in a matrix comprised of microlites and glass; andesitic lavas are generally contain Ca-Na plagioclase + hornblende ± pyroxene ± biotite + opaques in a matrix comprised of mostly glass, microlites or crypto to micro crystalline feldspars. All the lavas show mainly pilotaxitic, intersertal, cumulo-phyric and poikilitic textures.

Geochemically, Yıldızeli lavas ranging in composition from basalt to trachyandesite displaying the calc-alkaline affinity with medium-K and shoshonitic character. All intermediate and basic volcanic rocks show enrichment in large ion lithophile elements (LILE) and light rare earth elements (LREE) relative to the high field strength elements (HFSE) such as Nb, Ta, Zr and Ti. Volcanic rocks of the Yıldızeli region display the following range in Sr and Nd initial isotope ratios: $^{87}\text{Sr}/^{86}\text{Sr} = 0.704389$ to 0.706291 and $^{143}\text{Nd}/^{144}\text{Nd} = 0.512671$. The major- trace element geochemistry and isotopic values suggest that Yıldızeli volcanics derived possibly from a mantle source which was modified by subduction related fluids or was contaminated by the continental crustal components.