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Nature of the Özvatan (Kayseri) Foid-bearing Rocks from the Central Anatolia (Turkey): Sr-Nd-O Isotope Geochemical Approach

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The closure of Neotethys induced from calcalkaline through shoshonite to alkaline felsic and mafic intrusive within the Central Anatolia Crystalline Complex (CACC) during the Late Cretaceous-Early Paleogene. Despite of the genesis of alkaline felsic products are well understood, there is lack of data and petrogenetic explanation and nature of the alkaline felsic products in the eastern part of the Central Anatolia region and their relation between their equvalents in the western parts of the regions. Özvatan is the area where these late felsic magmatism is observed at the most eastern part of Central Anatolia. In accordance with the nature of these foid-bearing igneous rocks, we have carried out detailed petrographic, whole rock geochemical and Sr-Nd-O isotopic study in order to unravel all of these and compared with the equivalents within the Central Anatolia Region. Foid-bearing igneous rocks, which outcrop near Özvatan town in the vicinity of Kayseri city, intruded into the Paleozoic schist and marble as the basement of the region. Özvatan foid-bearing igneous rocks are mostly syenite and minor urtite in composition. The foid bearing igneous rocks have holocrystalline hipidiomorph texture and have nepheline, alkali feldspar, plagioclase, mica, amphibole, clinopyroxene, garnet, cancrinite, sodalite with rare amount of sphene, zircon, apatite, fluorite and opaque minerals. The unit is differentiated to six subgroups according to their mineralogical composition and texture features. Each subgroup has similar mineral compositions with different mineral proportions. These are biotite nepheline syenite, biotite sodalite melanite nepheline syenite, melanite cancrinite biotite nepheline syenite, cancrinite biotite amphibole melanite nepheline syenite, cancrinite melanite pyroxene amphibole nepheline syenite and urtite. The foid-bearing syenites have magma segregation and MME which are nepheline monzogabbro and diorite in composition. The mineral chemistry reveal that the alkali feldspars are orthoclase, plagioclases are bytownite, the pyroxenes are mostly diopsite, amphiboles are hastingsite, cancrinite are vishnevite, garnets are melanite (andradite), micas are annite and phlogopite in compositions. The detail mineralogical, petrographical and the mineral chemistry studies reveal that the melt from which Özvatan foid-bearing syenites may derived from a depth over 60 km. On the other hand, the mineral chemistry of the mica reveals that Özvatan foid-bearing syenites are

generated from the crust-mantle mixed source magma. The high $^{87}Sr/^{86}Sr$ (0.707822-0.710544) and low $^{143}Nd/^{144}Nd$ (0.512300-0.512379) of Özvatan foid-bearing syenites are indicative of mantle sources with large continental crustal components. Nepheline oxygen isotope data from Özvatan foid-bearing syenites have a range of $\delta^{18}O$ values +9.4 - +10.5‰ and are compatible with the values for mixed (mantle-crustal) origin. All isotope data suggest that these intrusive rocks have experienced fractional crystallisation coupled with the crustal assimilation with enriched mantle source. Özvatan foid-bearing syenites compared with the equivalents in the Central Anatolia Region, the Özvatan foid-bearing syenites are derived from a source which is richer in volatile components with less crustal contamination and comes from a deeper source than the western edge around Kırsehir city.

Keywords: Sr-Nd-O Isotope Geochemistry.

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