Geophysical Research Abstracts
Vol. 16, EGU2014-5103, 2014
EGU General Assembly 2014

Mineral and whole-rock geochemistry of the Topuk Granitoid (Bursa, Western Anatolia, Turkey)

Ayşe Orhan (1), Mehmet Demirbilek (2), and Halim Mutlu (3)

(1) Nevsehir Hacı Bektas Veli University, Geological Engineering, Nevsehir, Turkey (ayse.orhan@nevsehir.edu.tr), (2) Dumlupınar University, Geological Engineering, Kutahya, Turkey (m.demirbilek32@gmail.com), (3) Ankara University, Geological Engineering, Ankara, Turkey (halimmutlu@ankara.edu.tr)

Abstract

The Eocene aged Topuk Granitoid exposing in the Tavşanlı Zone at south of the Izmir-Ankara Suture Zone is one of the granitoids which were formed as a result of collision of the Anatolide-Tauride block with the Sakarya continent in the late Cretaceous. Nearly east-west extending, elliptical shaped Topuk Granitoid was intruded into the Paleozoic and Mesozoic metamorphites and upper Cretaceous ophiolitic rocks. The intrusion is in granodiorite composition and contains spherical/ellipsoidal mafic microgranular enclaves (MME) with composition of monzodiorite to monzogabbro. The granitoid which contains xenoliths is frequently cut by porphyritic granodiorite, granite aplite and quartz dikes at the margins.

Topuk Granitoid is represented by an I-type pluton with medium to high K calc-alkaline affinity and metaluminous melt composition. Ocean ridge granite (ORG) normalized element distributions show that the granitoid, dikes and MME's have similar patterns. A significant enrichment of LIL (Rb, Ba, K, Th and Sr) elements and relatively depletion of HFS (Ta, Nb, Ce, Hf, Y, Zr and Ti) elements are indicative of formation from hybrid magma in a subduction environment. In tectonic discrimination diagrams (Ta -Yb and Rb-Y+Nb), samples of the Topuk Granitoid are plotted into the volcanic arc granite (VAG) field which is characteristic for the post collision granites. The results of mineral chemistry show that plagioclases are in oligoclase-andesine (An20-49) composition, amphiboles are of magnesio-hornblende and biotites are of Fe-Mg-biotite composition. In the $Al2O_3$-FeO-MgO diagram biotite minerals are accompanied by amphibole and other ferromagnesian minerals and represent biotites of calc-alkaline orogenic zones. Calculations based on the hornblende-barometer indicate that the calc-alkaline magma was crystallized under pressure of 2-6 kbars (mean=4 kbars) and at depth of 7-20 km (mean=12 km).

The whole-rock and mineral chemistry data show that the Topuk Granitoid was formed by the interaction of post-collisional, calc-alkaline, metaluminous and I-type coeval felsic and mafic magmas at shallow depths under similar physicochemical conditions.

Keywords: Turkey, Western Anatolia, Topuk Granitoid, geochemistry.

Acknowledgement: This study is supported by the Scientific and Technical Research Council of Turkey (TÜBİTAK; YDABAG-111Y289).