ZIRCON GROWTH IN DISTINCT GRANITOID TYPES: EXAMPLES FROM CENTRAL ANATOLIAN GRANITOIDS

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ABSTRACT

The Central Anatolian Granitoids (CAG) display distinct petrological characteristics. S-, H- and A-type granitoids, supposed to be related to the continental collision and post-collision stages, were investigated in different aspects in previous studies and their petrological characteristics were described in terms of geological, geochemical and mineralogical studies. With a different approach for the investigation of the granitoids, in this study, we aimed to investigate the relationship between the granitoid type and the zircon growth by studying the zircons from the CAG.

In this scope; granitoid samples representing distinct granitoid types were collected from Ekecikdağ, Ağaçören, Baranadağ and Terlemez igneous suites, and outer and internal structural characteristics of the separated zircon crystals were examined.

Zircon typology method, proposed by Pupin (1980), depending on the proportions of the zircon crystal surfaces (pyramidal and prismatic) to solve the relationship between the zircon population and petrology of the host granitoid, was applied to the CAG.

Each zircon crystal were examined under binocular microscope and crystals representing the population were imaged by scanning electron microscope. Zircon typology method shows that in the H-type CAG commonly P- and S-, and rarely G-, L- and J-type zircon crystals exist and these granitoids were generated from hybrid magmatic source. Although zircons from S-type granitoids display similar typological features to those of the H-type ones they seem to have complex morphological characteristics. A-type granitoids on the other hand, comprise K-, P- and V-zircon types and represent alkaline sources based on the typological classification.

By investigation of internal structures of the zircon crystals by cathodoluminescence imaging it was possible to detect features, which were not observable on the outer views. Generally, zircon crystals from the CAG have euhedral to subhedral and zoned cores, however inherent, corroded and embayed cores were also observed. Besides wide-first order

or thin-second order oscillatory zoning, effects of late stage recrystallization are also present in zircon crystals.

S-type CAG zircons commonly include inherent cores and show epitaxial and parallel growths. These features, which are common in autochthonous or continental crustal sourced rocks, indicate that the S-type CAG zircons are very different from the H-type CAG in terms of internal structures.

In addition, multi-corrosion zones within the H-type CAG zircons showing changes in trace element concentrations imply migration of hot and probably basic magma into the magma chamber in different stages of evolution. Existence of these corrosion zones within the H-type CAG zircons is conformable with the other petrological data indicating magma mixing and hybridization processes during their evolution. Moreover, zircons from A-type CAG have internal structures related to metamictization and rapid growth.

We here suggest in the light of our findings that different and characteristic zircon types can be observed in different granitoids within Central Anatolia, zircon typology method is applicable to CAG, but to interpret their evolution stages internal structures of zircons must be investigated.

KEYWORDS: Zircon - Typology - Granitoid - Central Anatolia

References:

Pupin, J.P.,1980, Zircon and granite petrology, Contribution to Mineralogy and Petrology 73, 207-220.