



Geochemical Constraints on Collision-related Intrusive Rocks in Central, Northwestern and Western Anatolia (Turkey)

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The intrusive rocks in Anatolia occupy a broad petrological range from I- to A- type granitoids. Thus, Turkey is a natural laboratory to study collision-related magmatism, its geochemical characteristic, source region and also tectono-magmatic evolution. The central, northwestern and western Anatolian magmatic provinces are defined by a large number of Late Mesozoic to Late Cenozoic collision-related granitoids (Ilbeyli and Kibici 2009).

Calc-alkaline, subalkaline and alkaline intrusive rocks in central Anatolia are mainly metaluminous, high-K and I- to A-types. They cover a petrological range from monzodiorite through quartz monzonite to granite/syenite. All these intrusive rocks are enriched in LILE and are also radiogenic in terms of Sr, and unradiogenic in terms of Nd, isotope ratios. Their geochemical characteristics show that the intrusive rocks originated from a mantle source containing large subduction components, and have experienced crustal assimilation and fractional crystallization. Delamination of a thermal boundary layer, and/or slab breakoff is the likely mechanisms for the initiation of the diverse magmatism in the complex (Ilbeyli et al. 2009).

Calc-alkaline plutonic rocks in northwestern Anatolia are mainly metaluminous, medium- to high-K and I-types. They are monzonite to granite, and all are enriched in LILE and depleted in HFSE, showing features of arc-related intrusive rocks. Geochemical data reveal that these plutons were derived from partial melting of mafic lower crustal sources. These rocks are related to subduction of the northern branch of the Neo-Tethyan ocean beneath the Sakarya microcontinent during Cretaceous-Paleocene times (Kibici et al. 2008).

Calc-alkaline intrusive rocks in western Anatolia are metaluminous, high-K and I-types. They have a compositional range from granodiorite to granite, and are enriched in LILE and depleted in HFSE. Geochemical characteristics of these intrusive rocks indicate that they could have originated by the partial melting of mafic lower crustal source rocks. In western Anatolia, the melt generation mechanism for the intrusive rocks could be crustal extension and uplift following collision (Ozgenç and Ilbeyli 2008).

References

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