Petrology and origin of Yozgat Intrusive Complex, Central Anatolia, Turkey

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Yozgat Intrusive Complex (YIC) is located in the north part of the Central Anatolian Crystalline Complex (CACC). YIC represents the biggest intrusive body of the CACC and clarifies magmatism evolved during the late Cretaceous and Paleocene. YIC is mainly composed of granitic, gabbroic, monzonitic and syenitic rocks forming a complex of different sources and compositions in Central Anatolia. The composition of granitic rocks of YIC is in the range from alkali feldspar granite to the tonalite. The monzonitic rocks are in composition of monzonite and quartz monzonite. The syenitic rocks are in composition of syenite, foid syenite and foid monzosyenite. The gabbroic rocks of YIC are mostly exposed at the top of the hills and have a sharp contact with the felsic intrusive body.

Whole rock geochemistry reveals that granitic, gabbroic and monzonitic rocks are subalkaline whereas syenitic rocks are alkaline in nature. Granitic and monzonitic rocks have a calc-alkaline and gabbroic rocks have a tholeiitic character. Granitic rocks are peraluminous and metaluminous, and monzonitic and syenitic rocks are metaluminous in character. Tectonic discrimination diagrams suggest that the most granitic rocks of YIC are syn-collisional granite whereas monzonitic and syenitic rocks are post-collisional granite. The ORG-normalized elemental patterns of all the felsic intrusive rock units show similar patterns which are characterized by enrichment in large ion lithophile (LIL) with respect to high field strength (HFS) elements. Chondrite-normalized rare earth elemental patterns of granitic, monzonitic and syenitic rocks reveal almost a slight trend. Light rare earth elements (LREE) show enrichment compared to heavy rare earth elements (HREE). These elemental patterns show that the magma is mostly influenced by the crust. All these geological, petrological and geochronological data indicate the progressive evolution of the YIC magmatism respectively from calc-alkaline granites through shoshonitic monzonites to alkaline foid syenite compositions caused by crustal thinning.

Diversity of melts migration process within the uppermost mantle along a mid-ocean ridge: An example from the northern Oman ophiolite

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Dunite bands and veins in the ophiolitic mantle peridotite are interpreted as fossil melt conduits within the suboceanic mantle. In particular, concordant dunite bands are possibly important as the melt conduits through which parental melts of MORB (mid-ocean ridge basalts) were transported to shallower mantle beneath the ridge axis. However, no detailed petrological data of concordant dunite bands and surrounding peridotites have been published. We conducted sampling of concordant dunite bands and its aureole from various "stratigraphic levels" in the mantle section of an estimated ancient-segment center and its end in the northern Oman ophiolite. They are thick and high in frequency at segment center, but are thin and low at segment end. Dunite bands are almost pyroxene-free, and their orthopyroxenes, if any, are vermicular in shape.

Mineral chemistry shows systematic variations in the wall peridotites toward the dunite bands. In ambient residual peridotites, rare earth element (REE) patterns of clinopyroxene incline from light-REE (LREE) to heavy-REE (HREE) monotonously. The REE pattern of clinopyroxene in dunites and surrounding peridotites show various shapes, depending on the position, the segment center to end: U-shaped at the segment center, and gentle slope from HREE to LREE at the segment end.

We conducted calculation for REE enrichment of clinopyroxenes in dunites by using 1-D steady state modeling, which duplicates simple fractional melting process and influx melting process. The results indicate that melt volume was less to form dunite bands of segment center, whereas was high at segment end. This contrast dues to difference of dunite band distribution between segment center and end; degree of melt/peridotite interaction was high at segment center to form dunite bands, but not at segment end.

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