5.4.P20

Petrology of S-Type granites and gabbros of Yozgat Batholith: Central Anatolian Crystalline Complex

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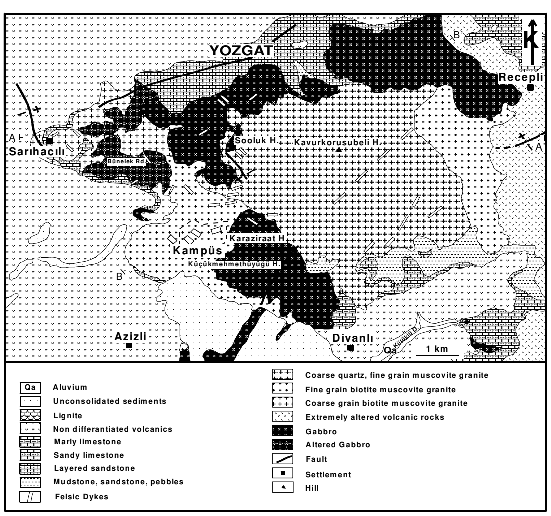
Yozgat Batholith is exposed in north central Anatolia and represents the biggest felsic plutonic body of Central Anatolian Crystalline Complex. The north-eastern part of Yozgat Batholith is mainly granitic and gabbroic rock. The granites are pinkish and make up most of the area, further differentiated into 3 subunits: coursly crystalline biotite muscovite granite, fine crystalline biotite muscovite granite and fine crystalline muscovite granite with coarse quartz grains (map). All subunits have transitional contact with each other and do not have any mafic micrugranular enclaves. The gabbroic rocks mostly outcrop at high topography with smooth elevation. The granite/gabbro contact relationship are mostly concealed by soil cover. Microscopic studies reveal that all subunits consist of quartz, K-feldspar, mica and garnet in different proportions. The gabbro has holocrystalline granular texture and has plagioclase and pyroxene.

Whole rock composition show that granitic and gabbroic units are subalkaline, the granite is calcalkaline and the gabbro is tholeiitic. Tectonic discrimination diagrams suggest that the granite of northern part of Yozgat Batholith is within the syn-collision granite and ORG-normalized elemental patterns for all the subunits have similar patterns characterized by enrichment in LIL with respect to HFS. The range patterns of the granite almost overlap with upper crust suggesting the same source. However, the range pattern of the gabbro plots below the lower crust suggesting a mantle source.



5.4.P21

Processes of fractional crystallization with minor crustal assimilation: The Kutsugata and Tanetomi lavas, Rishiri Volcano, Japan

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In this study we evaluate role of assimilation fractional crystallization (AFC) processes in the evolution of the Kutsugata and Tanetomi lavas, an alkali basalt-dacite suite erupted sequentially from Rishiri Volcano. Previous petrological work has shown that variations of major element compositions of the two lavas can be explained principally by boundary layer fractionation; i.e., mixing of a magma in the main part of the magma body with a fractionated interstitial melt transported from the floor mushy boundary layer [1,2]. Additionally, systematic variations are observed for Pb, Sr, and Nd isotopic compositions of the lavas with whole-rock SiO_2 content (Fig. 1). Given that there is no petrological evidence of "bulk mixing" of crustal materials, it is suggested that minor crustal assimilation occurred simultaneously with boundary layer fractionation.

AFC calculations were performed using isotopic compositions of granodioritic rocks found in Rishiri Island that might represent country rocks to the magma body. The calculations show that the r-value (mass assimilated/mass crystallized) is 0.08, and is constant throughout the evolution.

As is shown in Fig. 1, the variations of major element compositions are strongly coupled with those of isotopic compositions. This implies that the assimilated crustal melt mixed with the interstitial melt within the floor mush zones, and was then transported to the main magma. Therefore, melting of the floor country rocks is considered to have played an important role in the assimilation processes.

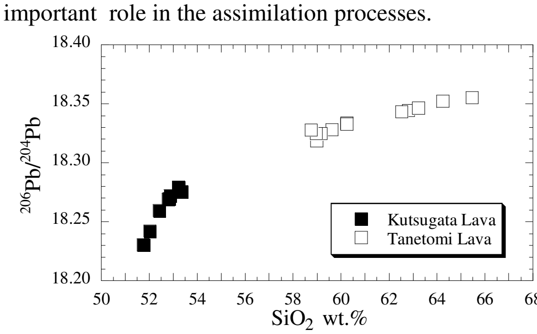

Figure 1. $^{206}Pb/^{204}Pb$ ratios of Kutsugata and Tanetomi lavas plotted against whole-rock SiO_2 content.

References

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