Geology and geochemistry of granitic rocks in the Yamizo Mountains, central Japan, with an emphasis on adakitic granitoids

Yutaka Takahashi[1], Shin-ichi Kagashima[2]

[1] Inst. Geosci. AIST (GSJ), [2] Graduate School of Science and Technology, Niigata Univ.

The Yamizo Mountains are composed of the Yamizo Group (Jurassic accretionary complex) and numerous small plutonic bodies intruding into the Yamizo Group. The plutonic bodies are mainly granitic and are classified into older (ca. 105 Ma) and younger bodies (ca. 65Ma). The older bodies are further subdivided into gabbroic body and quartz diorite to dioritic bodies. The gabbroic body is Bato Body, and the quartz diorite to diorite bodies, which sometimes include pyroxenes, are Oyamada, Fukuroda, Funyu, and Iwafune Bodies. The younger bodies are classified into two groups. One is composed of numerous small bodies of hornblende-biotite granodiorite lying in the western side of the Yamizo massif, and the other is composed of numerous small bodies of coarse-grained biotite granite lying in the eastern side of the Yamizo massif. The western hornblende-biotite granodiorite bodies are Hatajyuku, Minozawa, Iouno, Kizami, Shiobata, Kamehisa and Hanadatetoge Bodies and the eastern coarse-grained granitic bodies are Kaneyama, Yamagiwa, Osasayama and Yamatsuri Bodies. The Iwafune Body is a composite mass composed of two pyroxene bearing quartz diorite of the older group intruded by coarse-grained biotite granite of the younger group.

SiO2 contents are 42% for the older gabbro, 52-64% for the older quartz diorite to diorite, 67-71% for the younger hornblende-biotite granodiorite and 75-to 77% for the younger coarse grained biotite granite. Trace elements (Rb, Ba, K, Nb, Sr, P, Zr, Ti, Y) patterns on primitive mantle normalized spiderdiagram are LIL elements enriched and HFS elements depleted.

Anorthite contents of plagioclase are An 81-86% for the older gabbro, An 21-51% for the older quartz diorite to diorite, An 14-47% for the younger hornblende-biotite granodiorite, and An 1-14% for the younger granite. Mg/(Mg+Fe) ratios of amphibole systematically decrease from older gabbro through older quartz diorite-diorite to younger hornblende-biotite granodiorite. Mg/(Mg+Fe) ratios of biotite also systematically decrease from older quartz diorite-diorite through younger hornblende-biotite granodiorite to younger granite.

The older quartz diorite to diorite are rich in Sr (606-769 ppm) and poor in Y (13-27 ppm) and mainly plotted in the adakite field on the Sr/Y-Y diagram. Sr initial ratio of the older quartz diorite to diorite, calculated from the K-Ar age of 110 Ma, are 0.7038-0.7045. These fact suggest slab melting origin of the older quartz diorite to diorite.

Recently, Kiji et al., (2000) reported on adakitic granitoids situated in the Tamba Belt of northern Kyoto Prefecture. These adakitic granitoids are numerous small bodies of quartz diorite to tonalite, whose K-Ar ages are around 105 Ma (Kiji et al., 1995). The Yamizo Group belong to the Ashio Belt, which is the eastern extension of the Mino and Tamba Belts. Therefore, the older quartz diorite to diorite of the Yamizo Mountains are correlated to the adakitic granitoids in the Tamba Belt. Accordingly, at around 105 Ma, adakitic magmatism took place at Kinki region and Kanto region, simultaneously.

In the Ashio Belt, similar granitic bodies such as the Matsuki Body, which has two pyroxene and K-Ar age of 116 Ma (Yanai, 1972), are probably distributed. Further studies on older magmatism in the Ashio Belt are necessary.