

Potassium-argon Age Determination on the Higo Metamorphic Rock

By

Ken Shibata* & Hirosato Yamamoto**

Potassium-argon age determination was made on biotite from the Higo gneiss collected from half-way up 234 m hill southeast of Kitabeta, Ogawa town, Kumamoto prefecture.

The rock is dark reddish-colored, medium-grained and weakly foliated, and is named biotite-plagioclase-garnet-quartz gneiss. In thin section, it displays a granulitic texture, and is composed of plagioclase (An 47), quartz, biotite, garnet with a small amount of zircon. Garnet occurs as porphyroblasts with irregular outlines and sieve texture. It is pale red in color and isotropic with $N=1.648$. Biotite is pleochroic from pale yellowish brown to reddish brown.

Separation of biotite, potassium analysis by flame photometry, and argon analysis by the method of isotope dilution have been made at the Geological Survey of Japan. Details of the techniques will be reported later in this Bulletin.

The result is shown in the following.

Sample No.	K ₂ O (%)	Atmospheric argon (%)	Age (million years)
Og 96D	6.10	8.2	108±9
		5.7	106±11

$$\lambda_{\beta}=4.72 \times 10^{-10} \text{ yr}^{-1}, \quad \lambda_e=0.584 \times 10^{-10} \text{ yr}^{-1}$$

The rock dated belongs to the highest grade part of the Higo metamorphic zone, and this grade corresponds to the amphibolite facies by Eskola. From the viewpoint of character of the metamorphic type, the Higo metamorphic rocks have been considered to be the western extension of the Ryoke metamorphic zone. According to the recent report of Miller et al.¹⁾ (1961), the age of metamorphism of the Ryoke metamorphics is middle Cretaceous. The average age of 107 m. y. for the Higo gneiss is similar to that of the Ryoke metamorphic rocks as has been considered.

Saito and Nagasawa²⁾ recently dated the Higo plutonic rocks (Miyahara tonalite, Shirashino granodiorite) and obtained the age of about 108 m. y., which is very close to that of the Higo gneiss. This may, therefore, show the rejuvenescent phenomena by the intrusion of the Higo plutonic rocks situated on the south, although no thermal contact effect can be observed in thin section of the specimen.

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References

- 1) Miller, J. A., Shido, F., Banno, S. and Uyeda, S.: New data on the age of orogeny and metamorphism in Japan, *Jap. Jour. Geol. Geogr.*, **32**, p. 145~151, 1961
- 2) Saito, N. and Nagasawa, H.: Personal communication

* Technological Department

** Kurume Branch, Fukuoka College of Liberal Arts

肥後変成岩の K-Ar 年代

柴田 賢 山本 博達

要 旨

熊本県下益城郡小川町北部田で採取した肥後変成岩の黒雲母について、K-Ar 法による年代測定を行ない、 107×10^6 年の年代を得た。この年代は地質学的に推定されていたように、領家変成岩の変成年代とほぼ同じである。しかしこの年代を、肥後変成岩の南方に位置し変成岩とほぼ同じ K-Ar 年代を持つ肥後深成岩の侵入による熱変成の年代と考えることもできる。