

K-Ar Age of Omi Schist, Hida Mountains, Japan

By

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Abstract

K-Ar age of biotite from a biotite schist at Hashidate in the Omi area is 309 ± 16 m.y. and is correlated to late Carboniferous.

Geological setting

In the Omi district, there is exposed a series of schist which belongs to glaucophanitic metamorphism. This Omi schist is one of the Omi-Ise schist or Circum-Hida crystalline schist (SEKI, 1960). The Omi-Ise schist belt is broadened in the northern end, that is, the Omi district and its southern vicinity.

The Omi schist is in contact with Mesozoic and Paleozoic formations with fault accompanied by intervening serpentinite belt. It is covered by Miocene sediments.

Only here, biotite is found throughout the Omi-Ise metamorphic belt. In other area, muscovite and chlorite are characteristic minerals of schist derived from pelitic rocks. Petrological study was carried out by BANNO (1958) precisely.

The Omi-Ise schist belt is, in most area, a narrow belt fringing the southern and eastern boundary of the Hida metamorphic belt. Some geologists believe it to be the probable extension of Sangun metamorphic belt.

Description of the determined sample

Garnet-muscovite-biotite-plagioclase-quartz schist (TN 66081401)

Hashidate, Omi-cho, Nishikubiki-gun, Niigata Pref.

It is dark-colored schist intercalating bands of light-colored schist, 0.5~1.0cm thick.

Under the microscope, it is composed of quartz, plagioclase, biotite, muscovite and garnet with small quantities of iron ore and graphite. Quartz is angular or allotriomorphic, about 0.5mm across. Plagioclase is hypidiomorphic, 0.5~2.0mm across. Biotite is relatively fresh, flaky, 2~3 mm across, with pleochroism, X : nearly colorless, Y,Z : greenish brown. Muscovite is subordinate in amount. Garnet is granular or round idiomorphic, 0.5~2.0 mm across, with cracks.

Experimental procedure

Muscovite was isolated with an isodynamic separator after crushing and sieving

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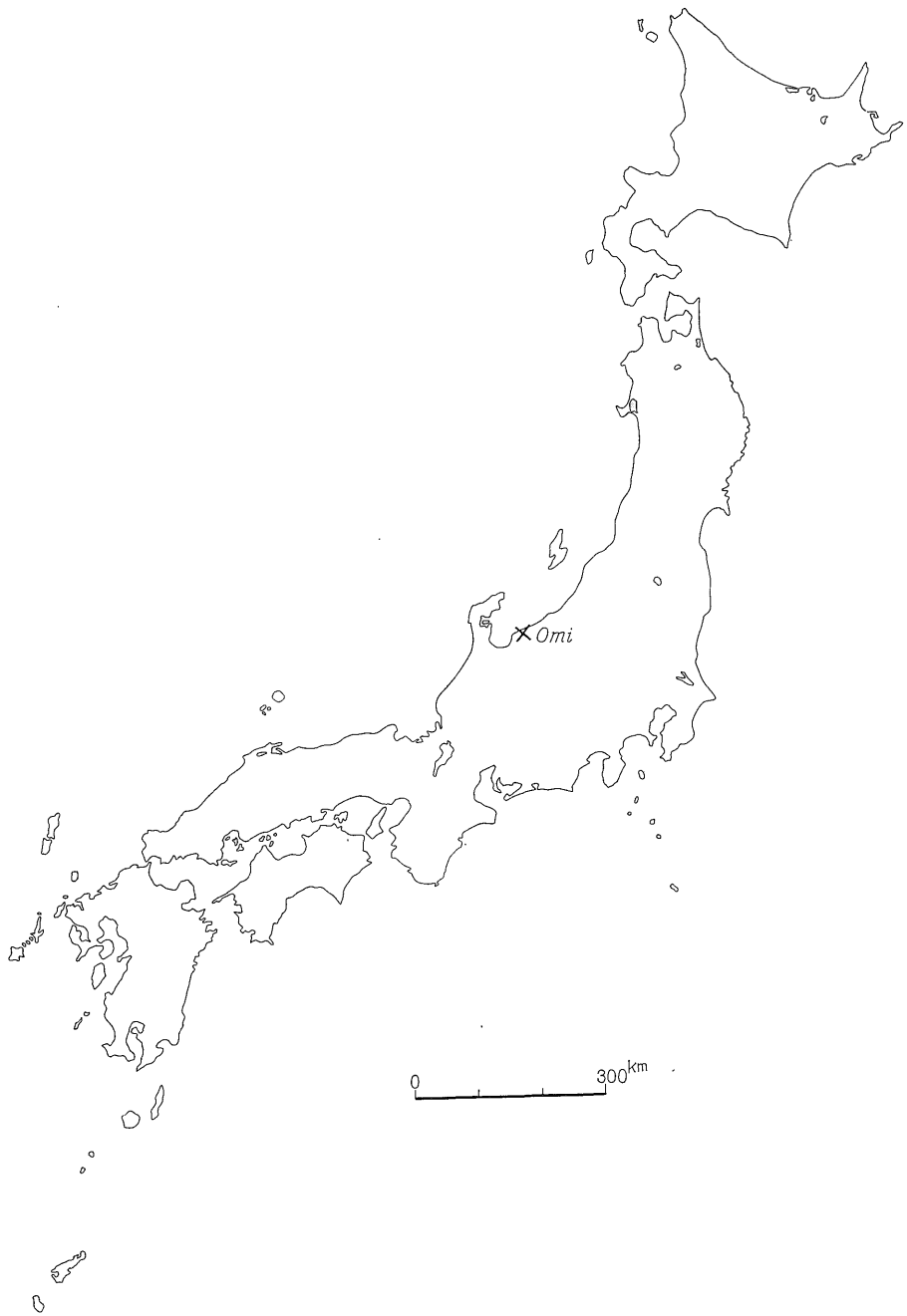


Figure 1 Index to Omi area

of the rock sample.

Argon was extracted and purified in the pyrex high vacuum system. The sample was fused in a molybdenum crucible at about 1300°C for 30 minutes with an induction heater. The Ar^{38} spike was added during fusion, and argon was purified

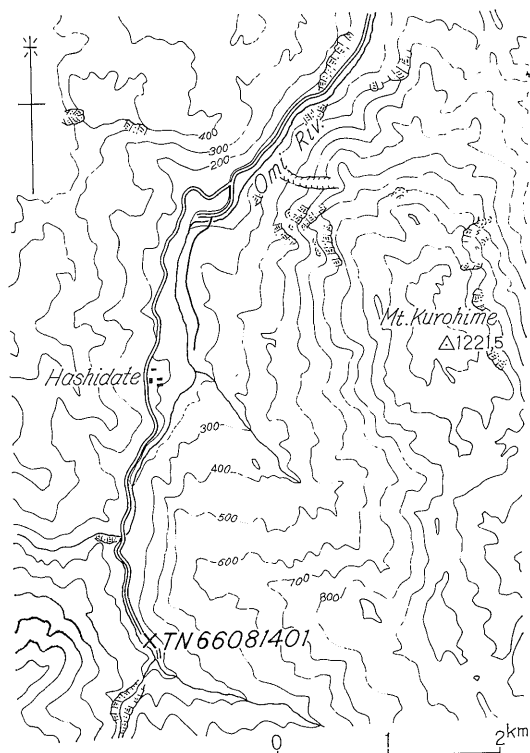


Figure 2 Sample locality on the 1/50,000 topographic map Kotaki

from other gases with hot titanium sponge. Isotopic ratios of argon were measured by the static operation on the Mitsubishi MS-315G mass spectrometer, which is Reynolds-type with 15 cm-radius 60°-sector analyzer.

Potassium was determined by flame photometry. The sample was digested with hydrofluoric acid and hydrochloric acid, and then the residue was dissolved in hydrochloric acid, diluted to a standard volume, and the potassium content of the solution was measured with the Hitachi EPU-2 flame photometer.

The constants used in the calculations are : $\lambda_{\beta} = 4.72 \times 10^{-10} \text{ yr}^{-1}$, $\lambda_{\alpha} = 0.584 \times 10^{-10} \text{ yr}^{-1}$, and $K^{40}/K = 0.0119\%$.

The result of the determination is given in the following table.

Table K-Ar age of Omi schist

Sample No.	Mineral	K ₂ O	Atmospheric contamination	Age and error
TN 66081401	Muscovite	5.39%	13.4%	309±16 m.y.

Geological meaning of the result

The age of biotite from Omi schist, 309 m.y. is correlated to late Carboniferous

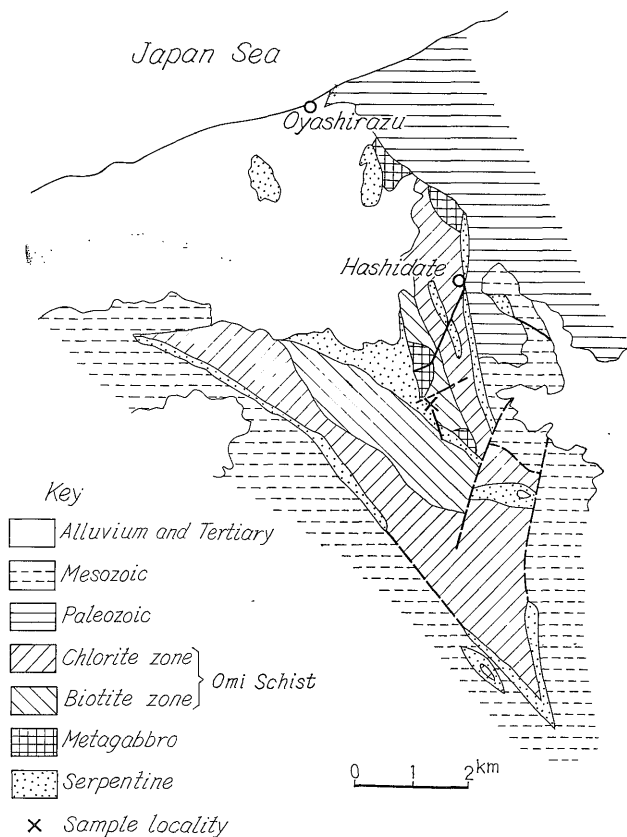


Figure 3 Geologic map of the Omi area (after BANNO, 1958)

and is not inconsistent to any geological evidences. However, it seems peculiar that the wide-spreading Hida metamorphic rocks show nearly one isotopic age, about 190 m.y. and the Omi-Ise belt, a narrow fringe of the Hida belt, is 309 m.y.

We have yet only one isotopic age determination on the Omi-Ise metamorphic belt. More determination is hoped urgently now.

Literature

- BANNO, S.(1958) : Glaucophane schists and associated rocks in the Omi district, Japan. *Jap. Jour. Geol. Geogr.*, vol. 29, nos. 1~3, p. 29~44.
- SEKI, Y.(1959) : Petrological studies on the Circum-Hida crystalline schist I, crystalline schists in the Gamata and Naradani district, Gifu prefecture. *Sci. Rept. Saitama Univ.*, Ser. B, vol. 3, no. 2, p. 209~220.

飛驒山地, 青海片岩の K-Ar 年令

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要 旨

青海地域の橋立の黒雲母片岩の黒雲母は、K-Ar 法によると、 309 ± 16 m.y. で、石炭期末期に相当する。