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K-Ar AGES OF WHITE MICA FRACTIONS FROM THE SUSUNAI METAMORPHIC ROCKS IN SAKHALIN, FAR EAST RUSSIA.

by

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(with 2 tables and 2 text-figures)

Abstract

K-Ar ages of four samples of metamorphic rocks from the Susunai Range, South Sakhalin have been obtained. These ages are 68-59 Ma. The ages are correlated to the young K-Ar ages of the Kamuikotan metamorphic rocks in Hokkaido.

Introduction

The Susunai metamorphic massif in the southeastern part of Sakhalin is considered to be the northern extension of the Kamuikotan metamorphic belt (Dobretsov and Kuroda, 1969). The massif as a whole is a tectonic melange zone surrounded by Cretaceous or younger units.

Rikhter (1981, 1986) divided the Susunai metamorphic rocks into three blocks, i. e. north, middle and south. Each block is bounded by fault (Text-fig. 1). The metamorphic rocks are composed mainly of pelitic and mafic schists with sporadic occurrence of eclogite.

Omata (1991) identified three major deformation phases in the area as shown in Table 1. The most distinguishable structure is F2 folds with wave length of several tens meters. However, F3 folds are also ubiquitous and have distorted F1 and F2 fold-axes. Therefore, foliation planes and fold axes of F1 and F2 are widely scattered (Text-fig. 2). There are some structural differences between the north and middle blocks as follows, the schistosity of D1 deformation in the north block trends NE-SW and dips 20°~30° to NW, but that of the middle block trends NE-SW and dips 40°~50° to NE. F2 folding axes of D2 deformation in the north block plunges to NW, while the middle block has folds of NW-SE direction as

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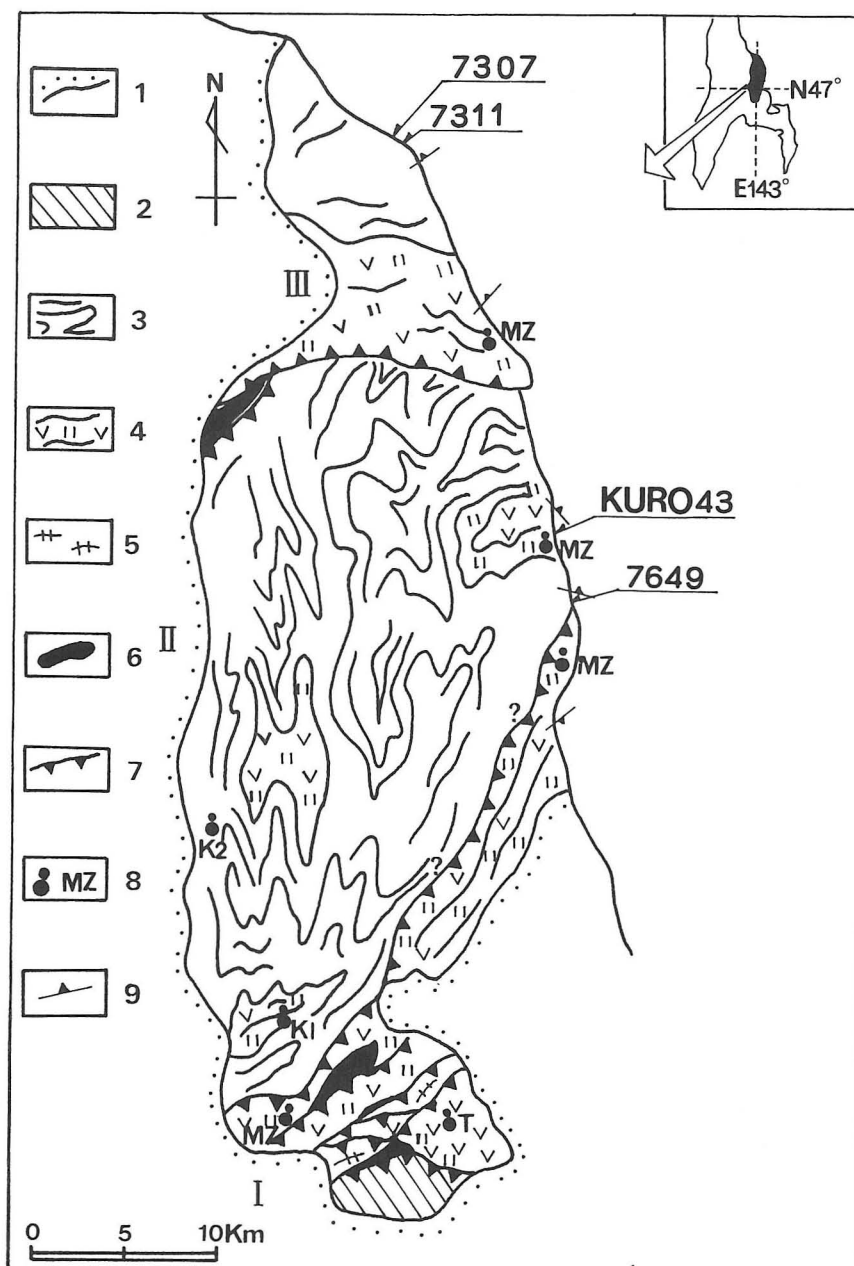
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Text-Fig. 1 Sample localities in the Susunai Range (map after Rikhter, 1986)

1. Oligocene-Quaternary sediments and sedimentary rocks 2. Upper Cretaceous sedimentary rocks in the Melensky zone 3. Siliceous-terrigenous sedimentary rocks 4. Volcanic-siliceous rocks 5. Amphibolite and amphibole-schist 6. Serpentinite and serpentinite melange 7. Main thrust zone 8. Fossil locality 9. Strike and dip of schistosity
 K2: Upper Cretaceous K1: Lower Cretaceous MZ: Mesozoic T: Tertiary
 I: South Susunaiskaya II: Middle Susunaiskaya III: North Susunaiskaya

Table 1 Deformation sequence in the Susunai metamorphic rocks

	Fold	Lineation	Foliation
D1	F1 : isoclinal fold mushroom-like fold	L1 : mineral lineation stretching lineation	S1 : schistosity plane
D2	F2 : tight~close fold	L2 : intersection of S1 with S2	S2 : axial-plane cleavage
D3	F3 : open~gentle fold	L3 : intersection of S1 with S3	S3 : axial-plane cleavage

shown in Text-fig. 2.

Four pieces of schists were collected from the east coast area in the Susunai metamorphic massif to date them with K-Ar age determination method. They are quartzose and pelitic schists from the both north and middle blocks (Text-fig. 1). Mica rich fractions from them were prepared by Gouchi and dated by Itaya using HIRU (Itaya et al., 1991).

Description of the samples

- 1) 7307 (north block) and 7649 (middle block)

Quartzose schists with pale greenish colour, having quartz-albite-white mica-chlorite.

- 2) 7311 (north block) and KURO43 (middle block)

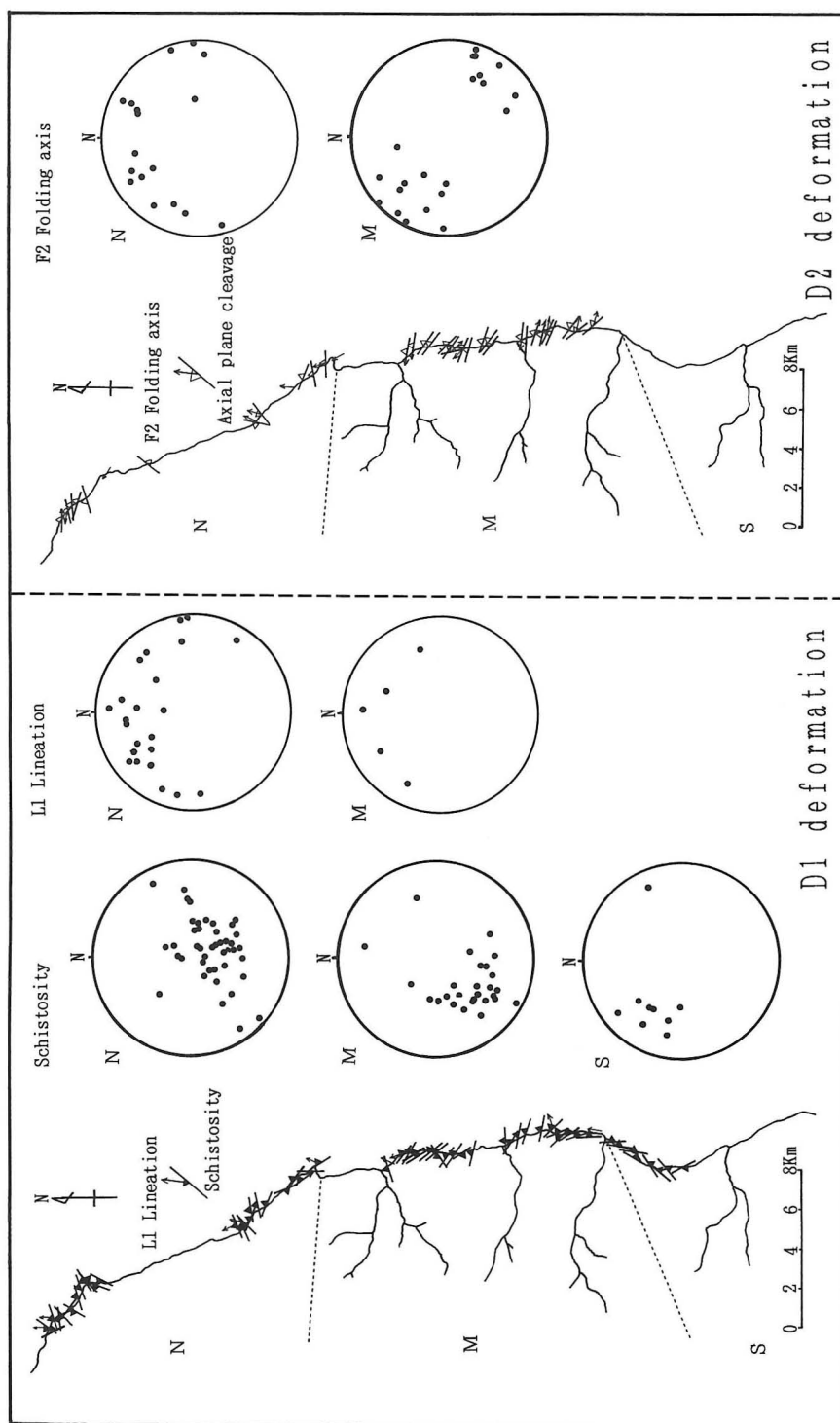
Dark-coloured pelitic schists with well developed micro-fold, having quartz-albite-white mica-carbonaceous material+minor pyrite and chlorite.

Result and discussion

K-Ar ages of the four samples are shown in Table 2. K contents of the fraction from quartzose schists are comparatively low, showing much impurity for the separation of white mica. However, their ages are nearly the same as those for the associated pelitic schists which were much better for the separation of mica. The result shows that the schists from the middle block (68-65 Ma in age) are slightly older than those from the north block (62-59 Ma).

Table 2 K-Ar ages of the Susunai metamorphic rocks

Number of Specimen	K (wt. %)	Rad. argon40 (10 ⁻⁸ ccSTP/g)	Non Rad. Ar(%)	K-Ar age (Ma)
7307	3.28±0.07	799±18	50.9	61.7±1.8
7311	6.06±0.12	1413±17	20.8	59.2±1.4
KURO43	6.11±0.12	1556±18	16.5	64.5±1.5
7649	3.77±0.08	1020±14	29.2	68.4±1.6



Text-Fig. 2 Structural map along the eastern coast of the Susunai Range

Rikhter (1986) compiled the K-Ar ages of the Susunai metamorphic rocks and classified into four stages: 1) 206-178 Ma for hornblendite and crossite bearing mafic rocks, 2) 133 Ma for eclogite suffered weak retrogressive metamorphism, 3) 96-90 Ma for amphibole schists and muscovite-quartz schists, 4) 77-55 Ma for glaucophane-muscovite schists, muscovite-quartz schists and muscovite schists.

The analysed metamorphic rocks, which consist of matrix of the tectonic melange zone, represent the youngest stage of the Susunai massif. Field relationships among those rocks of different stages are very important for fully understanding the formation of the Susunai metamorphic melange belt. The schists dated in this study are correlated to the young K-Ar ages in the Kamuikotan metamorphic rocks (Iwasaki et al, 1991).

Conclusions

There are some structural differences between the north and the middle blocks of the Susunai massif. K-Ar ages from the metamorphic rocks in the middle block are slightly older (68-65 Ma) than those from the north block (62-59 Ma). These ages are correlated to the young K-Ar age in the Kamuikotan metamorphic rocks in Hokkaido.

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