

Tectonic blocks of the greenstone *mélange* of the Atogura Nappe in the Yorii-Ogawa area, central Japan

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Thin slabs of metamorphic rocks with various metamorphic ages are piled up in the Sanbagawa-Chichibu Belt. The layered structure is partially disturbed by allochthonous geological units such as the Atogura Nappe. The Kiroko greenstone *mélange* is distributed in the southernmost margin of the Atogura Nappe in the Yorii-Ogawa area. The greenstone *mélange* consists of Kiroko metamorphic rocks, tectonic blocks and serpentinites. The Kiroko metamorphic rocks enveloped various tectonic blocks during its exhumation toward shallow parts of the crust, and as a result, the greenstone *mélange* was formed. Subsequently serpentinite intruded. If the Kiroko greenstone *mélange* is metamorphosed sedimentary *mélange*, tectonic blocks of amphibolites and hornblendites suffer the Kiroko metamorphism, and common hornblende crystals of the tectonic blocks are partially replaced by actinolite and chlorite. Granitic tectonic blocks exhibit partial recrystallization and meta-granitoids are formed. In fact many tectonic blocks do not exhibit such recrystallizations. However, its specific description is very small. So some concrete examples are reported here. Sampling locations and polarized microscopic photographs are presented in the attached figures.

* Tonalite in the Kiroko area, location *f*:

Common hornblende is not replaced by actinolite although prehnite veins and chlorite veins occur abundantly.

* Tonalite in the Kibe area, location *g*:

The tonalite mainly consists of coarse-grained plagioclase and quartz. K-feldspar is rare and colored minerals are small in amount. Large chloritized biotite occurs rarely. Small amounts of secondary minerals i.e. epidote and chlorite are formed, but most of plagioclases have not suffered remarkable recrystallization.

* Hornblendite in the Iyo area, location *a*:

This tectonic block is enclosed in actinolite rock as a small spherical block of about 25 cm in diameter. Hornblende crystals are fresh and do not suffer alteration. Planar thin prehnite veins are common.

* Schistose amphibolite exposed to the east of Iyo, location *d*:

The amphibolite is about 10m in thickness. Hornblende and plagioclase crystals are fresh, and do not suffer secondary recrystallization, although prehnite veins, chlorite veins and quartz-actinolite veins occur commonly. A quartz-actinolite vein cuts a prehnite vein judging from the observation under an optical microscope. A small sheared band with a width of about 1 cm occurs.

* Schistose amphibolite in the Kiroko area, location *e*:

A tectonic block of about 5m in thickness is enclosed in actinolite rock. The northern and southern boundaries between the tectonic block and actinolite rock are inclined at high angles. Hornblende crystals are fresh and do not suffer secondary recrystallization, although plagioclase grains suffered weak alteration. The K-Ar hornblende age is 402Ma.

* Non-metamorphic acidic tuff in the Kibe area, location *h*:

Many small angular clasts of acidic tuff, quartz crystals and K-feldspar grains occur in fine siliceous matrix. Kiroko greenstone *mélange* in the Tochiya area:

* A narrow greenstone *mélange* is distributed between quartz diorite and Atogura Formation (Figure, Tochiya). The greenstone *mélange* consists of greenstones and serpentinites with minor amounts of siliceous slates, jadeite-quartz rock and quartz-muscovite-biotite schist. White micas of the siliceous slate are so fine that it cannot be judged whether they are metamorphic minerals or sedimentary ones. To the

contrary, coarse phengite crystals are common in the pelitic schists of the Mikabu Unit exposed in the Tochiya area. Hence, the greenstone mélangé is not part of the Mikabu Unit.

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