

The Mikabu thrust of the KasaYama–DodairaYama area in the northern part of the Kanto Mountains

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The Mikabu Unit of the Sanbagawa Belt and the Kashiwagi Unit of the Chichibu Belt are distributed in the KasaYama- DodairaYama region of the northeastern part of the Kanto Mountains (Figure E). The unit boundary is fundamentally low-angle fault (Mikabu thrust). Siliceous tuff and chert of the late Jurassic to early Cretaceous Kashiwagi Unit are superimposed on middle Jurassic greenstones of the Mikabu Unit [1]. A sharp change of metamorphic temperature across the Mikabu thrust has been suggested [2]. In this study, modes of occurrences of the Mikabu thrust and metamorphic rocks exposed within about 2m from the thrust are studied at the outcrops of Obisawa and Hagidaira (Figure E, locs. 2 and 3). The significant gap of metamorphic grade between the Mikabu and Kashiwagi Units is revealed on the basis of petrographic investigations of pelitic, tuffaceous and siliceous metamorphic rocks in the KasaYama- DodairaYama area.

The thrust plane of the Hagidaira outcrop exhibits very wavy features (Figure A). The thrust plane of the Obisawa outcrop is relatively flat with a step of about 40 cm. Schistosity of greenstones of the Mikabu Unit is consistent with the wavy thrust plane and the flat thrust plane with a large step. On the other hand, the strike and dip of the schistosity of the Kashiwagi Unit are substantially constant (Figure A). Fault gouge is almost non-existent. However, small amounts of finely crushed mudstone are rarely found at the Obisawa outcrop. Many fine quartz veins and chlorite veins occur in the greenstones near the Mikabu thrust of the Obisawa outcrop. Prehnite vein and calcite vein are not observed. Chlorite and epidote are main constituent minerals of the greenstones. Fine acicular actinolite occurs as a subordinate mineral. Many tension cracks develop in the greenstones (Figure B). The cracks are mainly filled with chlorite and fine actinolite (Figure C). One of greenstones collected from the Obisawa outcrop is rich in sericite. Greenstones are intensely sericitized at the Hagidaira outcrop.

The Kashiwagi Unit is mainly composed of pale green siliceous tuff, white tuff, tuffaceous phyllite, phyllitic bedded chert, muddy chert and mudstone. Quartz grains of about 5 μm in diameter are common for mudstone, white tuff, muddy chert and pale green siliceous tuff near the Mikabu thrust. Alkali amphibole and stilpnomelane are found in pale green siliceous tuff. Phyllitic rocks are characterized by the alternation of thin layers of white tuff and chert or mudstone. Thickness of interbedded chert or mudstone is about 1-5 mm. Thin layers of white tuff are rich in fairly large white mica grains. Quartz grains of about 5 μm in diameter are common in the chert and mudstone layers (Figure D) although quartz grains of about 10-60 μm in diameter are often present in the chert layers.

The Mikabu Unit mainly consists of greenstones. However, pale green tuffaceous schists, white tuffaceous schist, pelitic schist, psammitic schist and quartz schist are exposed at localities shown in Figure E, loc.4-8. Original rocks of these schists appear to be similar with those of the weakly metamorphosed rocks of the Kashiwagi Unit. Sampling localities and dominant sizes of quartz grains of the studied rocks are listed in Figures E and F. Data of similar rock types are arranged in the same column. Quartz grains of the schistose rocks of the Mikabu Unit are clearly coarser than those of the weakly metamorphosed rocks of the Kashiwagi Unit. The same conclusion can be applied to phengite grains. Further, quartz schist shows remarkable plastic deformations. Quartz pools of various sizes have been formed commonly. In addition, the K-Ar whole rock age of quartz schist (loc.8) is 112Ma [2]. In view of the very good re-crystallization and strong shear deformations, the result of radiometric dating indicates the age of the Sanbagawa metamorphism of the Mikabu Unit studied.

[1] Matsuoka, 2013, Earth Sciences, v. 67, 101-112.

[2] Ono, 2015, Geological Society of Japan, Abstract of the 122 years Meeting, p.215.

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