

Geology of the Atogura Nappe of the Yoriii-Ogawa district in the northeastern Kanto Mountains

*Akira Ono

Geology of the Atogura Nappe was studied in the Yoriii-Ogawa district. The surveyed area is situated in the northeastern part of the Sanbagawa belt and is characterized by the wide distribution of Atogura (Atokura) Nappe. The results are shown in the attached figure. The geological map is partly based on the maps published before by the present writer [1, 2].

1) The Atogura thrusts were reported or supposed at locations a -e. In other localities the Atogura Nappe is in contact with pre-Miocene geological units by high-angle faults. Miocene deposits unconformably overlie the Atogura Nappe. Clasts of Ryoke metamorphic and granitic rocks are common in the Miocene deposits. The provenance of the clasts is the Ryoke Nappe tectonically superposed on the Atogura Nappe. The W-E geological section is figured on the basis of the assumption that the Ogawa Miocene sedimentary basin is a small half-graben.

2) The Atogura Nappe consists of various geological units. Large geological units are elongated in E-W directions. The large geological units are in contact with each other by high-angle faults. Many small tectonic blocks are distributed along the high-angle faults. Fault gouges and metasomatic rocks are accompanied by the high-angle faults. Prehnite is not found near the high-angle faults although prehnite is common in the Atogura Nappe.

3) Tectonic blocks of mid-Cretaceous Higo-Abukuma granitic and metamorphic rocks were found at many locations. Common rock-types are psammitic, calcareous and mafic metamorphic rocks. The metamorphic rocks exhibit variable metamorphic grades of amphibolite facies. Fusulinacean fossils are observed in some outcrops, but sillimanite- K-feldspar gneisses are exposed in a few outcrops.

4) Metamorphic rocks near the Kinshozan quartz diorite are usually described as Permian hornfels. It is however uncertain that all the metamorphic rocks are hornfels and were metamorphosed at Permian. Hence, the name of Shimonita metamorphic rocks is used here instead of Permian hornfels.

5) Acidic tuff and Higo-Abukuma granitic and metamorphic rocks are shown in the southernmost part of the Atogura Nappe. These rocks are members of the Kiroko greenstone mélangé which mainly consists of Kiroko metamorphic rocks, serpentinite and various kinds of tectonic blocks.

6) Deformation and alteration are not observed at the boundary zone between tectonic blocks and Kiroko metamorphic rocks although prehnite veins and quartz-albite veins were formed in some tectonic blocks. The tectonic blocks did not suffer the Kiroko metamorphism.

7) K-Ar whole-rock dating for the Kiroko metamorphic rock was carried out on a greenstone containing many small pelitic lenses. Secondary recrystallization of constituent minerals cannot be detected for the studied sample. The dating result is 57.4Ma. The result suggests that the Kiroko high-pressure type regional metamorphism occurred in early Paleogene.

8) Highly altered massive tonalites are exposed in the Tochimoto, Kibe district. They are tectonic blocks of the Kiroko greenstone mélangé. As fine epidote and felsic minerals are recrystallized abundantly in the altered tonalites, it is often difficult to detect initial plutonic textures. K-feldspar is very small in amount. Hence, the tonalites appear to be plagiogranites.

9) Yoriii acidic rocks mainly consist of early Paleogene pyroclastic rocks and porphyritic granites. These acidic rocks are believed to be formed very far from the subduction zone where serpentinites and the high-pressure-type Kiroko metamorphic rocks were exhumed. Hence, a considerable Nappe tectonics is supposed to take place before the formation of the Atogura Nappe.

[1] A. Ono, 2008, Abs. Japan Geosci. Union Meeting, G119-P002.

[2] A. Ono, 2013, Abs. Japan Geosci. Union Meeting, SGL41-P04.

Keywords: Atogura Nappe, Greenstone melange, Tectonic block, K-Ar dating, Nappe tectonics

