

Late Cretaceous and Paleogene nappe tectonics in the forearc regions of Southwest Japan

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Nappe tectonics occurred at many times in the Paleogene and late Cretaceous forearcs of Southwest Japan. Upper parts of the crust moved toward trench by the nappe tectonics (Figures A and B). Actually the Atokura and Ryoke Nappes are observed in the northern margin of the Kanto Mountains although most of the nappes were eroded. The Atokura Nappe is mainly composed of Permian granites, mid-Cretaceous granitic and metamorphic rocks, late Cretaceous Atokura Formation, early Paleogene Yorii Formation and late Cretaceous pyroclastic rocks. The Ryoke Nappe mainly consists of late Cretaceous granitic and metamorphic rocks. The Permian granitoids are geological bodies of the Kinshozan-South Kitakami Belt. The mid-Cretaceous granitic and metamorphic rocks were geological members of the Higo-Abukuma Belt. The late Cretaceous granitic and metamorphic rocks were distributed in or near the Ryoke Belt. These various rocks were located in the early Paleogene forearc (Figure B) and were removed by nappe tectonics (Ono, 2011, Abs. Geol. Soc. Japan, Meeting, p. 196).

It is important to reveal the tectonics of the lower crust when the upper crust of about 5km in thickness was moved as a nappe toward trench. The author postulates that the lower crust moved toward mantle. The surface layer of the crust moves as a nappe and the lower crust flows towards the mantle. A thrust is assumed near the base of the lower crust. Figure C shows directions of the movements of crustal materials. Tectonics like this has been repeated in late Cretaceous and Paleogene and almost all the mid-Cretaceous Higo-Abukuma metamorphic rocks were eliminated. The Ryoke Belt was also partly removed after the nappe tectonics.

The tectonics described above is consistent with the geological structure near the Median tectonic Line where the Ryoke Belt is directly in contact with the Shimanto Belt in the central part of the Kii Mountains. In this context, Ryoke granitic and metamorphic rocks are in contact with Sanbagawa metamorphic rocks from surface to lower crust according to the crustal section of Southwest Japan (Ito and Sato, 2010, Journal of Geography, 119, p.235). It is difficult to find a crustal layer which was situated in the deep parts of the Higo-Abukuma and Kinshozan-South Kitakami Belts in the crustal section.

Keywords: Southwest Japan, Forearc, Late Cretaceous and Paleogene, Nappe tectonics, Lower crust

