

Miocene counterclockwise rotation of the Koshiki Islands, Kagoshima prefecture

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Paleomagnetic measurements were made on samples of igneous rock dikes from the Koshikijima islands western part of Kyushu. The area is one of the Tertiary sedimentary basins in Eastern Asia, and the islands are located near the joint point of Southwest Japan Arc and Ryukyu Arc. The tectonic history of the area is apparently controlled by different active periods of two arcs, but details of such activities are still unknown. It is important to reveal the tectonic history of the area for understanding the Cenozoic tectonic evolution of eastern margin of Asia.

In this study two kinds of igneous rock dikes in the Koshikijima islands are investigated. One is the Northwest to Southeast trending andesite or trachyte (Type 1). The other is the North-northeast to South-southwest trending porphyry (Type 2). Type 2 dikes are dated Middle to early Miocene by K-Ar and fission track dating. Type 1 dikes are cut by Type 2 dikes, and therefore are older than Type 2. In this study, more than 300 samples of igneous rock dikes were collected from 28 sites in the study area. Natural remanent magnetizations were measured with either a spinner magnetometer or a cryogenic magnetometer, depending on the intensity of the magnetization. Type 1 dikes show a counterclockwise deflection in declination, whereas Type 2 dikes show no significant discrepancy in declination. These data indicate that the study area was experienced counterclockwise rotation with respect to the Asian continent during early to late Miocene. This declination agrees with that of Tsushima and Goto, northwest of Kyushu (Ishikawa, 1997). Tectonic rotation history of the western Kyushu is apparently different from that of central and north Kyushu, which experienced clockwise rotation in Miocene.