

Rock magnetism and paleomagnetism of the Nohi Rhyolite in the eastern part of Southwest Japan

SAKO, Kazuki¹ ; HOSHI, Hiroyuki^{1*}

¹Aichi University of Education

The Nohi Rhyolite is a late Cretaceous large volcanic complex in the eastern part of Southwest Japan and has a paleomagnetic record that can be used to infer the tectonic development of the eastern Asian margin. Previous studies have documented two distinct groups of paleomagnetic directions. One has a set of dual polarity antiparallel directions marked by an eastward-deflected declination, which has been reported from the peripheral areas of the Nohi Rhyolite. The eastward deflection suggests a clockwise tectonic rotation. Another is a reverse polarity directional set marked by a southward declination, which has been found in the central part. The southward direction was interpreted in a previous study to be a result of either (1) remagnetization around a fault running in the central part or (2) block rotation occurring in relation to the strike-slip faulting along the fault. To address this problem, we carried out detailed paleomagnetic and rock magnetic experiments and microscopic observations of volcanic and sedimentary rocks collected at 51 sites. We obtained 40 site-mean directions, and our experimental results suggest that they are retained primarily by magnetite and partly by hematite. Positive results of the paleomagnetic baked contact test indicate that the eastward-deflected characteristic remanent magnetization (ChRM) directions were acquired before 68 Ma. Our microscopic observations confirmed the existence of Fe-Ti oxides suffered by high-temperature oxidation in pyroclastic rocks at some sites where the eastward-deflected ChRM directions were detected, implying that the directions are primary thermoremanent magnetization. We obtained 15 reliable site-mean directions that were considered to be a primary magnetization. Basically they are consistent with the directions reported previously, but suggest more complicated crustal deformation in the eastern part of Southwest Japan than has previously been suggested, possibly resulting from the Miocene collision of the Izu-Bonin arc with the Honshu arc. In the central part of the Nohi Rhyolite, we found an outcrop where originally reddish pyroclastic rocks have partly been altered to greenish ones, and detailed magnetic experiments and microscopic observations were carried out for both rocks. Our results indicate that the reddish and greenish rocks possess an eastward-deflected direction and a reverse southward direction, respectively. The greenish rocks contain small secondary magnetite grains within an altered biotite. Therefore, we conclude that the reverse southerly direction is a secondary magnetization.

Keywords: Nohi Rhyolite, paleomagnetism, rock magnetism, tectonic rotation, late Cretaceous