

Rock magnetic study of the Middle to Late Permian shallow-sea limestones in the central Kyusyu

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Rock magnetic study was conducted on the Middle to Late Permian shallow-sea limestones exposed in the central Kyusyu. These rocks were divided into the Middle Permian black limestone of the Iwato Formation and the Late Permian light gray limestone of the Mitai Formation, which were originally derived from a mid-superoceanic palae-atoll on a seamount. NRM intensities of these rocks are too weak (its values are less than 10^{-4} A/m) to estimate reliable paleomagnetic directions. IRM acquisition and thermal demagnetization of composite-IRMs experiments revealed that magnetite ubiquitously exists through the whole sampled section and their amounts are almost constant in both the Iwato and the Mitai Formations except for around the boundary, while hematite only exists in the Iwato Formation as the predominant mineral. The rock magnetic boundary between the Iwato and the Mitai Formations occurs not at the formation boundary but at ca. 2-3 m below that. The high proportion of hematite to other magnetic minerals in the Iwato Formation was positively correlated with high stable carbon isotope ratio studied in the same section. Diagenetic processes such as consumption of hematite in the Mitai Formation or formation of hematite in the Iwato Formation are unlikely to explain the predominance of hematite in the Iwato Formation because of the presence of a constant amount of magnetite in both of the Iwato and Mitai Formations. An interpretation of transport from terrestrial origin of hematite is also discarded because of lithologic features of these formations. Consequently, the rock magnetic properties of the Iwato and the Mitai Formations are recognized as the origin depositional features, and the predominance of hematite accompanied with high stable carbon isotope ratio probably reflects paleo-environment changes in the superocean Panthalassa from the Middle Permian to the Late Permian period. The possible mechanism for formation of hematite in the Iwato Formation and paleo-environmental changes in the superocean will be discussed.