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石垣島産化石ハマサンゴ骨格の岩石磁気学的・岩石学的特徴
Rock magnetism and its petrological charactization of fossil Porites coral frameworks in Ishigaki island, Japan

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Radiocarbon (^{14}C) is produced by the cosmic rays in the atmosphere and is utilized for analysis of the past sun activity. But the Earth's geomagnetic field also controls radiocarbon variability, suggesting that a strong field would shield the planet from high energy charged particles. This mimics lower sun activity. Also, the short-term (in decadal or centennial scale) movement of the geomagnetic pole to the low latitude, such as geomagnetic jerk, could lead to an increased cosmic ray flux impinging on the terrestrial atmosphere and thus to a higher ^{14}C production rate. Therefore, in order to study the past sun activity from the ^{14}C production rate, we need to know the movement of geomagnetic pole position, its field strength and the variability of radiocarbon production during decadal to centennial periods. Many researches, which aim to reveal the paleomagnetic secular variation (PSV), have been performed using datasets obtained from volcanic rocks, sediment, and fired kilns. The some reconstruction models of geomagnetic dipole moment are also established from these data sets. But there are few recorders that can be used for the reconstruction of PSV in a decadal or centennial scale. Here we propose an alternative candidate of fossil coral frameworks as a possible paleomagnetic recorder for PSV research. The coral framework has an advantage in reconstructing both the radiocarbon variability and the geomagnetic field, although usual corals show extremely weak intensity of remanence and its low stability. However, it is shown that our recently-ceased coral framework samples from Ishigaki island possess a remanence intensity of 10^{-5} -10^{-4} A/m and a single-domain like stability from Lowrie-Fuller test. We prepared the standard 1-inch core samples cut parallel to the growth direction of coral *Porites*, including coral's growth bands for a ten to several tens of years. Our thermal and AF demagnetization experiments of oriented coral samples show that a characteristic remanence direction is parallel to the present Earth's magnetic field with some fluctuations. On the other hand, some samples exhibit different remanence directions from the present geomagnetic field with a calcite peak of X-ray diffraction analysis. The presence of calcite indicates that the meteoric diagenesis which changes aragonite coral frameworks into calcite affect the direction of initial magnetization. To constrain the remanence carriers, we are conducting a first order reversal curves (FORC) measurement and petrologic observations by a Schottky field-emission scanning electron microscope (FE-SEM) of acid-treated residuals of our corals. Our results suggest that Porites coral framework samples provide a role as a potential use for paleomagnetic recorder for annual to decadal scales with careful examination of calcite content.

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