石垣島産津波石の古地磁気からみる堆積記録

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Paleomagnetic depositional history of Tsunami boulders at Ishigaki Island, Japan

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The 1771 Meiwa Tsunami and/or prehistorical Tsunamis destructive wave occurred the deposition of boulders on the coast by breaking hematypic corals from the reef at Miyara Bay, Ishigaki Island, Japan. We call this Tsunami boulder. Recent studies have conducted the radiocarbon isotope dating to Tsunami boulders, and the dating tells us a termination age of coral's carbon cycle due to Tsunami destructive wave. Radiocarbon dating showed fifth peaks during B.C.500 to A.D.2000, so multiple Tsunami events occurred at Ishigaki Island. Because radiocarbon dating is the termination age, the age only represents the first Tsunami event. Therefore, the radiocarbon dating could not determine the complete record of multiple events (rotation and sliding) from individual Tsunami boulders. Here we propose a paleomagnetic dating strategy of multiple Tsunami event by using viscous remanent magnetization (VRM) acquisition of corals. VRM is characterized by the fact that, as a boulder remains in one orientation over time, new, progressively harder, magnetic components are added to the boulder in the direction of the geomagnetic field. This new magnetic component can be differentiated from pre-existing remanence which has been acquired during the process of their growth because boulders are reoriented by Tsunamis. From demagnetization temperature of VRM, Tsunami age is determined with the Neel's single domain theory. This theory gives the formula that natural VRM acquired at low temperature over a long time disappears at a high temperature in short time. We demagnetized the samples, in 17 steps from 80 C to 400C in 20C interval. The magnetic orientations for each sample were reviewed on vector plots that simultaneously show changes in declination and inclination, as well as magnitude. According to the 11 samples examined, most samples had inflection points that lay between 120C and 160C. These demagnetized temperatures correspond to 300 ˜1000 years ago by the Neel's theory of magnetite. Therefore, boulders were affected by a Tsunami and some boulders have multiple records of rotation made by historical and prehistorical Tsunamis. In this presentation, we present the results of particular progressive thermal demagnetization, discuss the record of multiple Tsunamis and some problems.