

Paleomagnetic depositional history of Tsunami boulders at Ishigaki Island, Japan

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Boulders at Miyara Bay, Ishigaki Island, Japan consisted of hermatypic coral, *Porites* are known to have deposited due to the 1771 Meiwa Tsunami and/or prehistorical Tsunamis, though some boulders might have been influenced of older Tsunamis and severe storms. At the ancient Tsunami, live *Porites* corals at reef fringes could have transported to the reef and land far beyond the transport limit of storm waves. Then, the corals cease growing and are fossilized. Recent studies have conducted the radiometric dating to Tsunami boulders with fossilized *Porites* and the result indicated that the age distribution is relatively wide range which is greater than the analytical error. Therefore, boulders at Ishigaki Island have had possibilities of the transportation by multiple Tsunami events, resulting in multiple rotations of Tsunami boulders. However, the radiometric dating could only obtain the date of first Tsunami event. Here we propose a paleomagnetic strategy to decide continuous rotation events of multiple Tsunamis from a coral Tsunami boulder. The boulders possess a depositional remanent magnetization of a magnetosome in origin which points to the ancient North pole. If the boulders rotate and stabilize in each new orientation, new magnetic vector component is overprinted to the original magnetization, which parallel to the present Earth's magnetic field. This new magnetization called viscous remanent magnetization (VRM) and increases progressively with age. New and original vector components are not parallel due to boulder rotations by multiple Tsunamis, so this study uses the progressive thermal demagnetization (PTD) to discriminate these new and original components. Furthermore, Neel's theory gives the formula of relationship between temperature and time for VRM acquisition. This formula predicts that natural VRM acquired at low temperature over a long time disappears at a high temperature in a short time in the laboratory. From comparing new magnetization (VRM) and the result of radiometric dating of Tsunami event, the validity of VRM dating is confirmed. If the VRM dating is suitable and the boulders acquire younger magnetization, the record of multiple Tsunami events is visualized from a single boulder. Preliminary experiment show the intensity of remanent magnetization is 2.6mA/m for the live *Porites* and its mean destructive field indicate 26mT, suggesting the presence of fine grain magnetite of magnetosome in origin. In this presentation, we present the paleomagnetic strategy and preliminarily results.

Keywords: boulder, Tsunami boulder, paleomagnetic history, viscous remanent magnetization (VRM)