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SEM37-P08 会場:3 階ポスター会場 時間:4 月 30 日 18:15-19:30

ネールの単磁区理論における磁鉄鉱の熱膨張の効果と放射性炭素年代との比較
Effect of thermal expansion on Neel's relaxation nomograph of magnetite and its agreement with the radiocarbon age

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Age gap between the paleomagnetic viscous dating and the radiocarbon age of tsunamigenic boulders in Ishigaki Island is focused. Recent researchers have conducted radiocarbon dating to label tsunami age, being able to calibrate the paleomagnetic viscous dating. These ages should be the same for the initial tsunami event. In the paleomagnetic viscous dating, time-temperature relation assuming Neel's single domain (SD) theory of magnetite is used. This monograph shows the older remagnetized component in nature can be erased by the higher temperature in the laboratory, and younger is its reverse. Thus, we can predict the age acquired the secondary magnetization by calculating demagnetization temperature and heating time. Our viscous dating results sometimes represented that the unblocking temperature of viscous components for tsunamigenic boulders is higher than the temperature predicted from Neel's relaxation theory of single domain magnetite, suggesting the older age than the one determined from the calibrated radiocarbon age. Previous numerous studies confirmed that the departure from Neel's theory is attributed to the presence of multi-domain magnetite. However, Lowrie-Fuller test, FORC (first order reversal curves) experiments and Low-temperature demagnetization of tsunamigenic boulders confirmed the presence of single domain magnetite. To solve this problem, we consider the thermal expansion of magnetite during stepwise thermal demagnetization process and propose a modified time-temperature relation to be able to fill the age gap. Currently, thermal expansion coefficient of magnetite is reported by some researcehrs (e.g. Nikolaev and Shipilin, 2000; Levy et al, 2004). If magnetite volume is bigger than initial volume during thermal demagnetization, unblocking temperature should indicate higher value under the assumption of constant coercive force. To confirm this hypothesis, we conducted stepwise thermal demagnetization to a boulder emplaced by 1771 Meiwa tsunami (242 years ago) and compare them to our new modified time-temperature relation.
Keywords: thermal expansion, Neel's theory, single domain, viscous remanence, blocking temperature