

A new pTRM method for Paleointensity Determination of Igneous Rocks

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We present a pre-treatment pTRM method based on comparison of their pTRM blocking temperature spectra and NRM unblocking temperature spectra, which involves partial alternating field (AF) demagnetization prior to regular Thellier heating steps. Our method can help improving the experimental scheme in the Thellier paleointensity method and extract paleointensity information from many samples that contain pseudo-single domain (PSD) and multidomain (MD) grains. Although Neel's theory satisfactorily explains the magnetic properties of single-domain (SD) which is an ideal recorder of both direction and intensity of the past geomagnetic field, numerous subsequent paleomagnetic research, coming from both continents and oceans, showed that only rarely the magnetic carriers in rocks are pure SD grains. In most cases, samples contain PSD and MD particles as remanence carriers. Theoretical and experimental studies have shown that the law of additivity of partial TRM (pTRM) required in the Thellier paleointensity method is no longer valid for MD particles, as well for PSD particles that contains more MD-like grains. We have developed a technique that combines AF pre-treatments to make sample remanence more SD-like. We found that mild AF pre-cleaning is effective to erase the MD spectrum, leaving the SD-like spectrum untouched. We have applied our technique to historical lava of Izu-Oshima and several Cretaceous aged rock samples from China and the Pacific Ocean and got reasonable results.

(Un)blocking Temperature Spectra of NRM & TRM
 Sample: STOP6, 1986 Izu-Oshima Lava

