Refinement of ultra-fine scale magnetostratigraphy of Mn crust with SQUID microscope

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We have conducted ultra-fine scale magnetostratigraphy on a Mn crust sample D96-m4 from northwest Pacific (38 degrees 48.7'N, 138 degrees 19.14'E, water depth 1940 m) with a high-resolution SQUID microscope at Vanderbilt University. Various rock-magnetic techniques delineate the presence of well dispersed single domain magnetic mineral with coercivity of about 30 mT and Curie temperature of about 550-570 degrees C. However, low temperature measurement did not show Verwey transition characteristic of magnetite and X-ray diffractometry on magnetic separate did not show any peaks of magnetite or maghemite. Two thin sections of 5 mm width x 35 mm length x 0.2 mm thickness were taken from a Mn crust, which are perpendicular to each other. The slices were subjected to SQUID scanning on 85 microns grids with a spatial resolution of about 100 microns for NRM, and after 10 and 20 mT AF demagnetization. The SQUID microscopy revealed fine scale magnetic anomaly parallel to the growth pattern. However, there are dipole anomalies even after AF demagnetization at 20 mT, which is considered to be originated from undemagnetized multi domain to pseudo single domain particles. We tried to modell these dipole anomalies and remove from the record to reveal clear pattern of magnetostratigraphy. This was partially successful and we could get better interpretation of the magnetic stripes. The identification of polarity boundaries made it possible to estimate growth rate of the Mn crust as 4.5 mm/Myr, which is basically the same as the previous estimate before the removal of dipoles and is consistent with the estimate by 10Be/9Be (5.9 mm/Myr).