Ultra-fine scale magnetostratigraphy of Mn crust by SQUID microscopy with spacial domain inversion

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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 ARM. The SQUID microscopy revealed fine scale magnetic anomaly parallel to the growth pattern. The preliminary interpretation of polarity pattern was successfully conducted and we could correlate with the standard paleomagnetic timescale. The identification of polarity boundaries made it possible to estimate growth rate of the Mn crust as 4.5 mm/Myr, which is consistent with the estimate by 10Be/9Be (5.9 mm/Myr). Furthermore, we will present the results of spacial domain inversion based on the method described by Weiss et al. (2007).