Investigation of a marine magnetic polarity reversal boundary in cross-section at the northern boundary of the Kane Megamullion, Mid-Atlantic Ridge 23°40’ N

*Min Xu[1], Maurice Tivey[2,3], Wen Yan[1]

1. SCSIO, CAS, 2. WHOI, 3. NSF

Near-bottom magnetic field measurements made by the submersible *Nautile* during the 1992 *Kanaut Expedition* define the cross-sectional geometry of magnetic polarity reversal boundaries and the vertical variation of crustal magnetization in lower oceanic crust exposed along the Kane Transform Fault (TF) at the northern boundary of the Kane Megamullion (KMM). The KMM exposes lower crust and upper mantle rocks on a low-angle normal fault that was active between 3.3 Ma and 2.1 Ma. The geometry of the polarity boundaries is estimated from an inversion of the submarine magnetic data for crustal magnetization. In general, the polarity boundaries dip away from the ridge axis along the Kane TF scarp, with a west-dipping angle of ~45° in the shallow (<1 km) crust and <20° in the deeper crust. The existence of the magnetic polarity boundaries (e.g. C2r.2r/C2An.1n, ~2.581 Ma) indicates that the lower crustal gabbros and upper mantle serpentinized peridotites are able to record a coherent magnetic signal. Our results support the conclusion of *Williams* [2007] that the lower crust cools through the Curie temperature of magnetite to become magnetic, with the polarity boundaries representing both frozen isotherms and isochrons. We also test the effects of the rotation of this isotherm structure and/or footwall rotation, and find that the magnetic polarity boundary geometry is not sensitive to these directional changes.

Keywords: Near-bottom magnetic, Kane Megamullion, Magnetic Reversal Boundary, isotherm and isochron