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Analysis of the 3D magnetic data on board R/V Mirai along the trans Pacific traverse

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Previous investigation about magnetic anomaly lineations at Northeastern Pacific, suggest that the Pacific plate has developed from a microplate and the plate boundaries have been reorganized (e.g. Nakanishi and Winterer, 1998). Moreover the Chile Triple Junction exists in the Southeastern Pacific where the seafloor age and development history were revealed (Tebbens et al., 1997). Continuous long-range three-component magnetic data (the 3D magnetic data) was taken from the Pacific during Mr08-06 Leg1 by the R/V Mirai Cruise which crossed the Pacific from Sekinehama to Valparaiso. The aim of this study was to reveal seafloor ages and magnetic boundaries by the 3D magnetic data analysis.

Magnetic anomalies in this study, were compared with magnetic lineation model, ages around the Japanese lineation set, the Pacific-Antarctic ridge, and the Chile ridge. The result was in good agreement with that reported by Nakanishi (1994), Tebbens et al. (1997), and age isochron model (Muller et al, 2008). Half-spreading rate of the Pacific -Antarctic ridge (~48 S) was ~3.2-4.4cm/yr which suggest the intermediate spreading, and strike of magnetic boundary was parallel to this ridge. Thus our result suggests that the spreading direction of the Pacific-Antarctic ridge is stable. The result of the Chile ridge was similar to that of the Pacific-Antarctic ridge, and thus, spreading direction might have tendency that becomes stable at intermediate spreading. Especially, at the Chile ridge, because of slow spreading rate of segment just before subduction. The spreading rate at the Chile ridge (between Guamblin Fracture Zone and Darwin FZ), might become slow before it subducts to oceanic trench. This phenomenon suggests the reduction of magma supply around the ridge.

Keywords: Pacific Plate, Nazca Plate, Pacific Plate, Geomagnetic chronology