

RECONSTRUCTIONS OF THE MOTION BETWEEN THE MACQUARIE AND ANTARCTIC PLATES

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ABSTRACT

The longest segment of Australian-Antarctic Ridge (AAR), located near 156°-161°E, is the tectonic boundary between the Australian and the Antarctic plates, and meets the Macquarie Triple Junction of Australian-Antarctic-Pacific plates at the eastern end of the segment. In 2011 and 2013, the multidisciplinary mid-ocean ridge program of Korea Polar Research Institute (KOPRI) conducted a series of geological, geochemical, geophysical, and hydrothermal studies at the segment. Especially, in order to determine the detailed location of the ridge axis, a number of short magnetic cross lines were observed in 2013. In 2015, we additionally collected the magnetic data and the high-resolution shipboard bathymetric data for two 400-km-long lines across the ridge segment. Here we utilize the observed magnetic data to estimate spreading rates and its temporal changes along the ridge segment. The full-spreading rates computed using MODMAG with our magnetic data range mostly between 64~66 mm/yr. According to the previous studies, the Macquarie plate, which is regarded as the intra-plate inside the Australian plate and bounded by the northern flank of the ridge segment in this study, has generated about 6 Ma. We revised rotation poles between the Macquarie-Antarctic plates for the chron C2Ay (2.58 Ma), chron C3Ay (6.04 Ma) and the other ages additionally. In this study, we employed the observed magnetic data with additional constraints from the available shipboard measurements. Ultimately, we examine relevant tectonic adjustments near the Macquarie plate using the revised rotation poles.