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Relation with spreading rate and stability of spreading in Southeast Indian Ridge (SEIR)

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The Southeast Indian Ridge (SEIR) is the boundary between Antarctic Plate and Australian Plate. The spreading rate of SEIR is 59-75 km/Ma (Small et al., 1999). An EPR-type axial high is observed on the ridge crest west of 102 E, whereas the ridge crest east of 102 E is characterised by a MAR-type axial valley (Ma and Cochran, 1997). The previous study on the relationship between the spreading rate and stability of spreading suggests that fast-spreading ridges such as the ridges bounding the Pacific Plate show stable spreading in that the Magnetic Boundary Strike (MBS) is almost parallel to the model isochron estimated by Muller et al. (2008), and that slow-spreading ridges such as the Southwest Indian Ridge show unstable spreading considering the high variability of the MBS on both sides of the ridge crests. The present study is to verify this hypothesis in the case of SEIR which is classified as an intermediate-spreading ridge. The 3-D magnetic data obtained on board the MIRAI MR03-04 Leg6 Cruise and SHIRASE JARE45 Expedition were analysed to get precise seafloor age and spreading rate on both sides of SEIR. The 3-D magnetic data were also used to calculate the Intensity of the Spatial Differential Vectors (ISDV) and the MBS's along the ship tracks. The tracks of the former cruise cross the SEIR at 90 E and 100 E, whereas the track of the latter cruise crosses SEIR at 110 E. The results shows that the standard deviation of the MBS is low in the area west of 100 E and high in the area east of 100 E. The variability of the spreading rate estimated from the seafloor age is lower in the former area whereas that is higher in the latter area. Therefore, it is concluded that the ridge crest west of 100 E has been more stable in spreading process than that east of 100 E.

Keywords: Southeast Indian Ridge, Magnetic anomaly