Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

SCG67-P16 Room:Poster Time:May 2 16:15-17:30

Spreading stability at the mid-ocean ridges derived from 3D magnetic survey

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The Shipboard Three Component Magnetometer (STCM) has provided vector data of the geomagnetic filed provided detailed information more than total magnetic force measurement. Previous study shows the results about relationship with ocean floor topography and standard deviation of magnetic boundary strike (MBS) calculated from Intensity of the Differential Vectors (ISDV) in Southeast Indian Ridge (SEIR) classified intermediate spreading rate. In this study, the standard deviation of MBS and half spreading rate were analyzed from STCM data in East Pacific Rise (EPR) of fast spreading ridge, Explorer Ridge (ER) and Southeast Indian Ridge (SEIR) classified intermediate spreading ridge and Mid Atlantic Ridge (MAR) categorized as slow spreading ridge. In EPR existing axial high, the results shows that standard deviation and half spreading rate are stable in west of EPR whereas standard deviation and half spreading rate are variability in east of EPR. However standard deviation is low and spreading rate is stable on both sides in MAR developed axial valley. Thus there is no relationship with topographic features and spreading of stability. Additionally, standard deviation of MBS is the low although half spreading rate has variability in ER. The results show differential MBS at the same position in SEIR. As a result, dispersion of MBS is caused by inaccurate measurements of magnetic anomaly. In addition, there is no clear relationship though the simulation was run about plate reconstruction. Therefore spreading stability is controlled by the balance among plate reconstruction, slab pull and magma provided from mantle.

Keywords: mid-ocean ridge, spreading rate, 3D magnetometry