Surveys with three components magnetometer in the Tsushima (Ulleung) and Japan basins

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It is important to understand the structure and its age beneath the Japan Sea to reveal the tectonic history of the Japan Sea. The crust in the Japan basin is considered as oceanic crust formed by seafloor spreading, but the Yamato and Tsushima (Ulleung) basins are considered including both extremely thinned continental crust and oceanic crust formed by seafloor spreading (e.g., Jolivet and Tamaki, 1992).

If oceanic crust formed by seafloor spreading exists in the regions, marine magnetic anomaly lineation should be recognized. Marine magnetic anomaly lineation has recognized in the Japan basin, but not recognized in the Yamato and Tsushima basins (e.g., Tamaki and Kobayashi, 1988; Isezaki and Shevaldin, 1996). Those studies is based on the observation with surface-towed proton precession magnetometer, however, it may be difficult to identify marine magnetic anomaly lineation clearly in the Japan sea where the amplitude of magnetic anomaly is small. In addition, it is difficult to analysis magnetic anomaly measured with proton precession magnetometer in detail because proton precession magnetometer can only measure one component.

We conducted the observation with three components magnetometer and surface-towed proton precession magnetometer in the Tsushima and Japan basins. We used the three components magnetometer as shipboard three components magnetometer (STCM) and deep-towed three components magnetometer (DTCM). The observation in the Tsushima basin had conducted by R/V EARDO of Korean Ocean Research and Development Institute in August 2004, and we acquired STCM and DTCM lines. The observation in the Japan basin had conducted by R/V Tansei-maru of JAMSTEC in April 2005, and we acquired STCM and DTCM lines that are same positions except for depth. The analysis of DTCM data indicates that magnetic anomaly due to two-dimensional magnetization structure is dominant in both basins, and the strikes of its in the Tsushima and Japan basins are about E-W and about NE-SW, respectively. Those results indicate that there is oceanic crust formed by seafloor spreading in both basins. In addition, comparing STCM and DTCM data shows that the horizontal component of STCM is less accuracy than the vertical component of STCM because of ship's effects.