

SEM001-P03

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Magnetic anomaly lineations in the Gulf of Aden

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The Gulf of Aden is located in the Indian Ocean between Yemen on the south coast of the Arabian Peninsula and Somalia in Africa. The Gulf of Aden is a young ocean basin formed by the rifting of Arabia away from Somalia. The Arabian plate moves away from Africa in a NE direction, at a rate of about 2 cm/yr. The rifting started from Oligocene.

Seafloor spreading started at 17.6 Ma in the eastern part of the Gulf of Aden (Fournier et al., 2010) and propagated westward into the Arabia-Africa continent (Manighetti et al., 1997). It reached the Afar hotspot area about 10 Ma (Audin et al., 2001). The spreading system continues to interact with the hotspot up to the present. Tamsett and Searle (1988) exposed that strike of segmentations of the spreading centers in the Gulf of Aden is NW-SE, although the trend of the spreading system is ENE.

To expose the seafloor spreading history of the Gulf of Aden west of the Alula-Fartak Fracture Zone, we examined magnetic anomaly lineations. Most of the geomagnetic data used in our study were collected by the cruises by R/V L'Atalante in 1995 and R/V Hakuho-maru in 2000. Geomagnetic data collected by other ships were also examined.

Elongated negative magnetic anomalies are observed over the spreading centers. The elongated anomalies are parallel with the spreading centers. The elongated magnetic anomalies west of 46°30'E have an E-W trend around the spreading centers. Our identification of magnetic anomaly lineations indicates a symmetric seafloor spreading, although Leroy et al. (2004) showed an asymmetric seafloor spreading of the Sheba Ridge, east of our study area. It also indicates a westward decrease in spreading rates in our study area. The kinematics of the Arabia plate changed about 5 Ma, but our results did not show any coeval change in spreading rates of the spreading system in the Gulf of Aden.

Keywords: Gulf of Aden, magnetic anomaly lineations, slow-spreading system