V. MAGNETIC ANOMALY LINEATIONS IN THE NORTHEASTERN MARGIN OF THE CENTRAL PACIFIC BASIN

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Total magnetic force was measured with a marine proton magnetometer, GeoMetrics Model G801 throughout entire GH79–1 area. Magnetic anomalies were calculated at 5-min.-interval by subtracting IGRF 1975.0 from the measured total magnetic force. Magnetic anomaly profiles obtained are shown in Fig.V-1. ISHIHARA and TAMAKI (1977) and JOSHIMA and MURAKAMI (1979) reported well developed lineations of magnetic anomaly, trending WNW, south of the GH79–1 area. TAMAKI *et al.* (1978) and TAMAKI *et al.* (1979) identified them M-sequence magnetic anomalies of early Cretaceous age, and named them the Magellan lineation set. The Magellan lineation set is fan-shaped, from M9 (121 Ma) to M11 (126 Ma) of early Cretaceous age with a symmetric axis at the Magellan Trough, which is a remanent spreading center and ceased its opening at the later half of M9 time. The northernmost lineation previously identified in the Magellan lineation set is M11 nearly along the 10°N parallel, and the data of extension of the lineations was lack to the north where older (larger number of M-sequence) lineations are possibly present.

Many seamounts in the survey area, some of which are not mapped in the previous bathymetric chart, make the magnetic anomalies complicated. However, three minor groups of magnetic anomaly lineations occur in the basins among the seamounts (Fig. V-1). The lineations trend EW to WNW and have the amplitudes of 150 to 500 nT p-p. We identified them tentatively without modeling.

The first group is northern continuation of the Magellan lineation set. M12 (128 Ma) to M13 (130 Ma) are identified northward in this group. The lineations in this group trend EW and represent nearly parallelness although the Magellan lineation set shows drastic fan shape.

The second group, which is the largest group in the GH79–1 area, is between 14°N and 12°30′N north of the Magellan lineation set. The second group trends WNW and includes M11 (126 Ma) to M14 (131 Ma) which are unconfidently identified. The age becomes younger to the north in the second group in contrast to the first group while the both groups are generated almost simultaneously. It appears from above that the spreading ridge which generated the second group had been active simultaneously and parallel with the Magellan spreading center. This suggests that the ridge system between the Phoenix and the Hawaiian lineation sets was complicated during early Creataceous age. The second group appears to continue to the north of 14°N where the present survey was not extended. If the survey is carried out in the north of the GH79–1 area, the identification of second group will be confirmed by the presence of characteristic anomalies from M10N to M10.

The third group is at 12°–13°N, 170°W. Anomalies M4 (117 Ma) to M7 (120 Ma), trending WNW, are identified in the third group although the continuation along strike

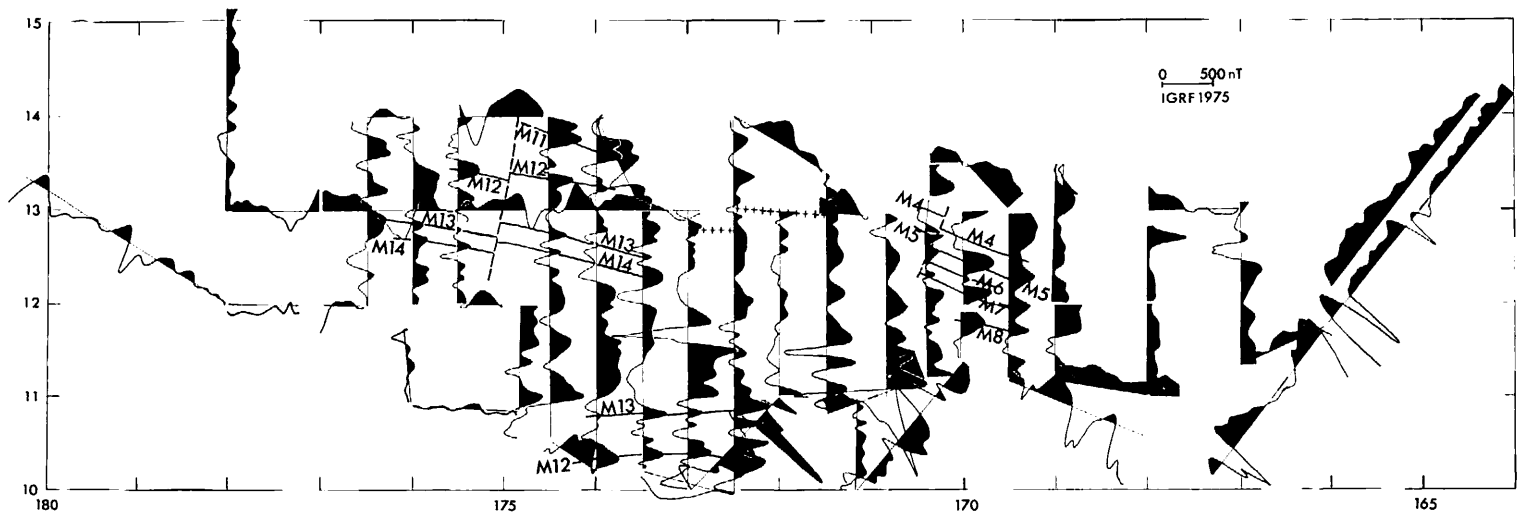

Fig. V-1 Magnetic anomaly data along ship's tracks. Positive anomalies are shown in black. Solid lines show identified magnetic anomaly lineations. Dashed lines show offsets of the lineations. Arrangement of cross shows possible remanent spreading axis.

is poor. The spreading ridge which generated the third group was active after the cessation of the spreading of the Magellan Trough at M9 time. This spreading ridge may have been a regeneration of the Magellan spreading center (the Magellan Trough), that is, the Magellan spreading center may have jumped to the north at M9 time and generated these third-group magnetic anomaly lineations of M8 to M4 subsequently. LARSON (1976, Fig. 2) shows the possible presence of M3 (114.5 Ma) to M1 (113 Ma) on the northeast of these magnetic anomaly lineations.

WINTERER (1976) inferred that the NW trend of the Hawaiian lineation set north of the Mid-Pacific Mountains extends to the south beyond the Mid-Pacific Mountains and postulated a ridge-ridge-ridge triple junction where the Hawaiian and the Phoenix lineation set meet. Thus, he presented continuous evolution model from the NW trending magnetic anomaly lineations of Cretaceous age in the northwestern Pacific to the NWN trending magnetic anomaly lineations of Cenozoic age in the eastern Pacific. The three groups of magnetic anomaly lineations in the GH79–1 area, however, trend differently from the Hawaiian lineation set. The discrepancy between those trends suggests that the tectonic evolution through Mesozoic to Cenozoic at the junction area between the Hawaiian and the Phoenix lineation set is not so simple as postulated by WINTERER (1976). Two possible remanent spreading centers, trending EW, associated with poorly developed magnetic anomaly lineations in mirror image, occur between the second and the third group of magnetic anomaly lineations. Their topographic features are similar to that of the Magellan Trough although their topographic amplitudes are relatively low. These possible spreading centers, together with the Magellan Trough, also suggest intricate feature at the junction between the Hawaiian and the Phoenix lineations.

The Mesozoic tectonic evolution in the western Pacific has been discussed in the reference frame of the Japanese, the Hawaiian, and the Phoenix lineations, i.e., in terms of the Pacific, the Farallon, and the Phoenix plates. We believe that those newly identified magnetic anomaly lineations in the present cruise and the Magellan lineation set should be added to the reference frame for better understanding of the tectonic evolution from the western Pacific to the eastern Pacific and also to reveal the origin of the Mid-Pacific Mountains and the Line Islands chain. The magnetic anomaly lineations in the GH79–1 area, which are poorly developed, together with the Magellan lineations set, will give us an important key to deduce Mesozoic tectonic history around the Mid-Pacific Mountains.

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