V. GEOMAGNETIC SURVEY

Teruki Miyazaki, Fumitoshi Murakami, Kiyokazu Nishimura, and Takemi Ishihara

Geomagnetic investigations around the Izu-Ogasawara Islands in cruises GH79-2, 3 and 4 resulted in more than fifty magnetic anomaly profiles, all at nearly right angles to the island arc system. Fig. V-1 shows the magnetic anomaly profiles and Fig. IV-2 gives them together with gravity and bathymetric data. The referenced field to be used here is IGRF 1975. The measurement system and data processing procedures are the same as used in previous cruises (e.g. MIYAZAKI, 1978).

Results

Derived magnetic anomaly values in the survey area are dominantly positive in contrast with those along the western margin of the Okhotsk Sea, the northern margin of the Japan Sea and the continental slope and the deep sea terrace on the Pacific side of Tohoku (MIYAZAKI, 1978; MIYAZAKI *et al.*, 1979; MURAKAMI *et al.*, 1977). That the residual fields, calculated by subtracting IGRF from the observed fields, are biased towards negative values in Northeast Japan and positive values in South Japan, may reflect the thermal and magnetic structures of the Tohoku and Ogasawara Arcs.

The Shichito-Iwojima and the Ogasawara Ridges are characterized by marked magnetic anomalies with short wave-lengths and large amplitudes, but anomalies along the Izu Ridge are not as intensive. On the continental slope and the deep sea terrace east of Hachijo Island, the magnetic anomaly has positive values that change rapidly at the basement high which forms the seaward border of the terrace. The Ogasawara Plateau seems to be magnetized like an oceanic volcano. The northern part of the Mariana Trough has magnetic anomalies which may form weak magnetic lineations, although the pattern of the lineations is difficult to see in the profiles.

A model has been attempted to clarify the lineations. Fig. V-2 shows a model for the magnetic anomaly profile of line L4, where the reversal chronology of LABRECQUE *et al.* (1977) is used to calculate a spreading rate of 1.4 cm/yr in the east and 2.0 cm/yr in the west. Fig. V-3 shows the lineation pattern inferred by this model, which indicates that one-sided opening occurs in the trough and that the western part of the trough is oldest.

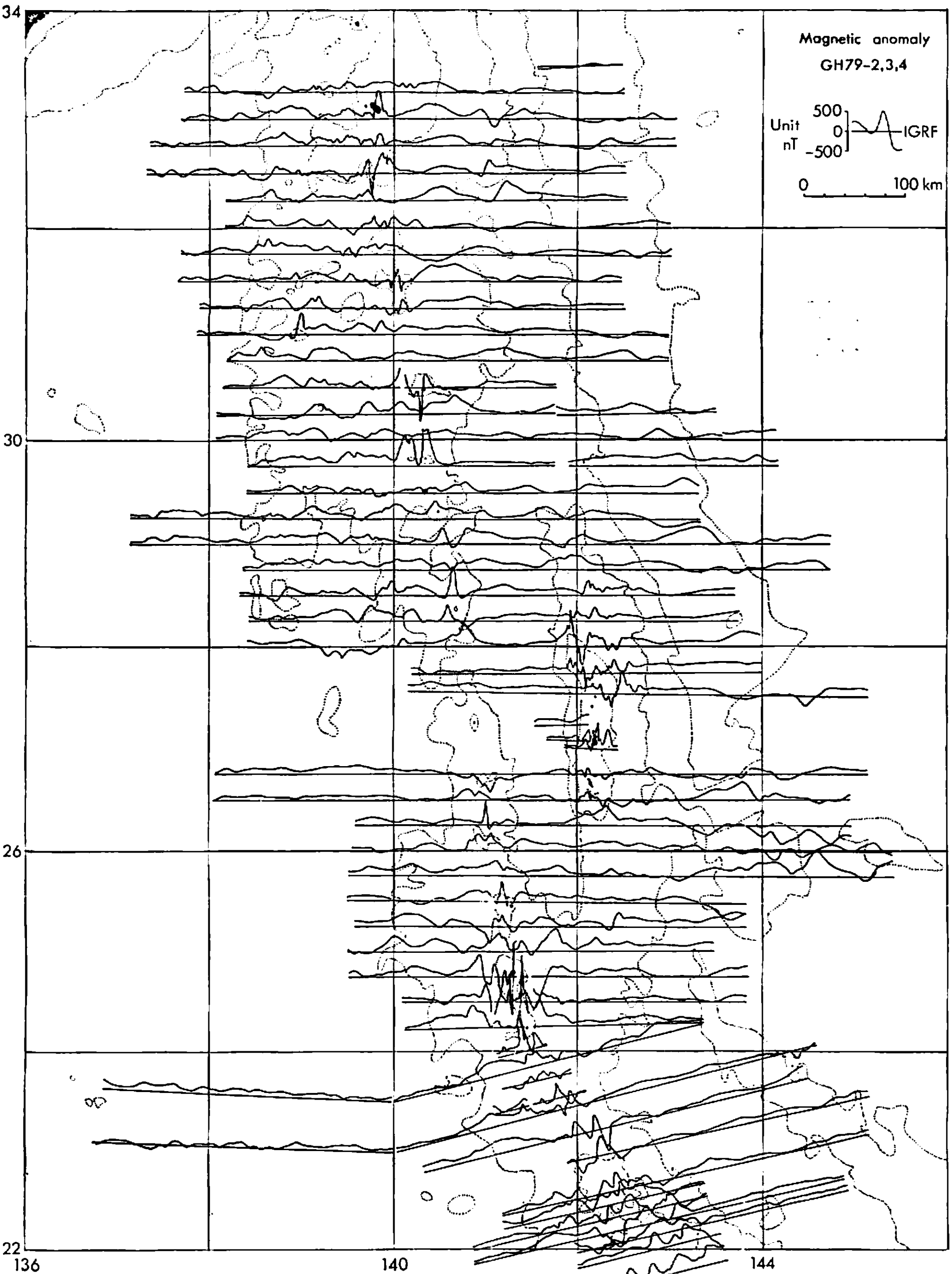

Fig. V-1 Observed anomaly profiles along tracks.

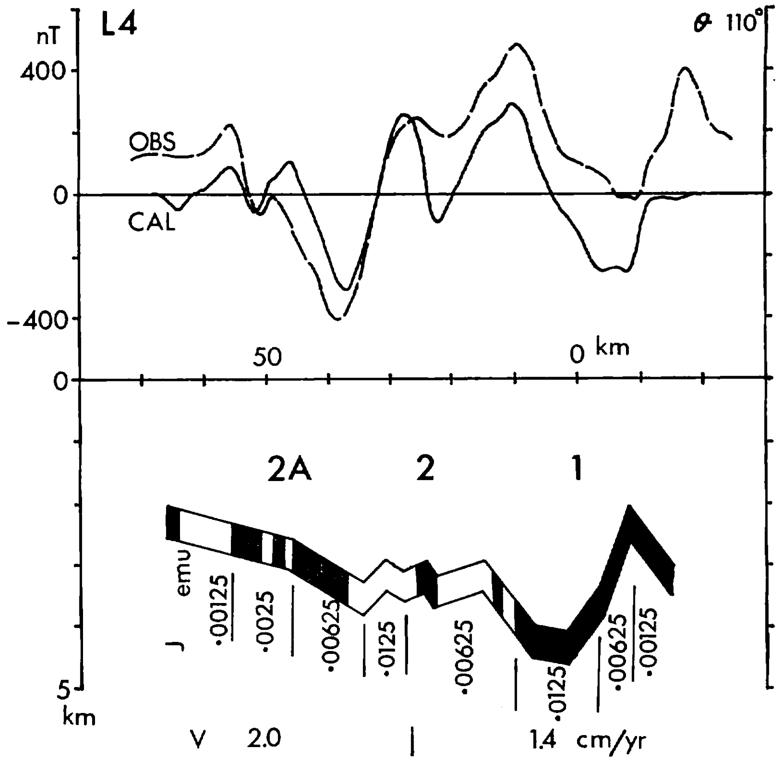

Fig. V-2 Comparison of observed anomalies of line L-4 (broken line) with a profile solid line) based on the model of LaBrecque *et al.* (1977). Spreading rate (v) is 1.4 cm/yr in the east and 2.0 cm/yr in the west. Model magnetized layer is 500 m under the seabottom, and magnetized at various values (J). The skewness (θ) is $-110°$.

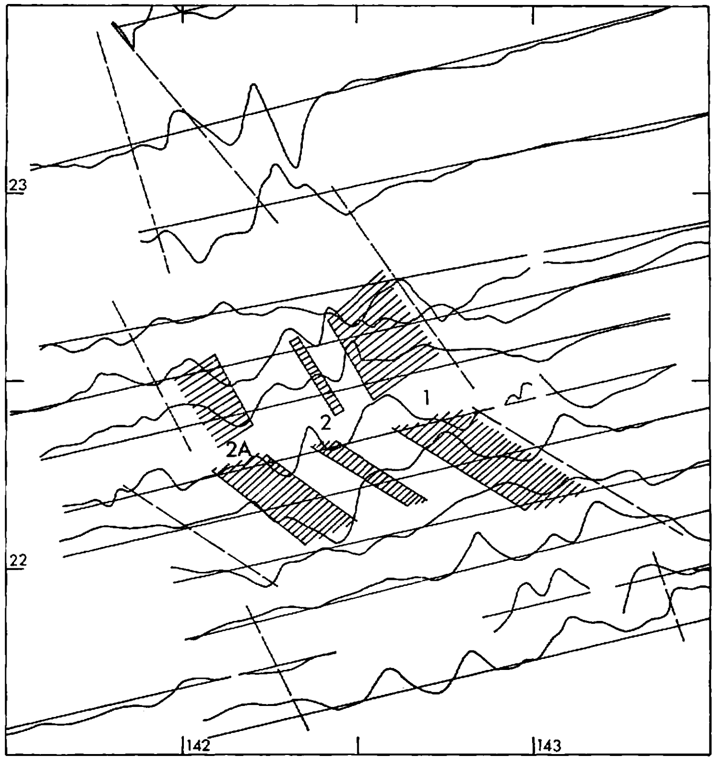

Fig. V-3 Inferred lineation based on the model shown in Fig. V-2.

References Cited

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