

IV. GRAVITY AND GEOMAGNETIC SURVEYS ON THE SOUTHEASTERN OFFSHORE OF THE BOSO PENINSULA

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Gravity and total magnetic field measurements were carried out by an air-sea gravity meter S-63 (LaCoste and Romberg Co.), and a proton free precession magnetometer model G-802 (GeoMetrics Co.), respectively. The ship's position during those surveys were fixed by the NNSS which uses the dead-reckoning those regulation based on satellite fixes. Gravity and geomagnetic data with navigational and bathymetric data were recorded at 30 sec intervals on a magnetic tape of the data logger in the NNSS. The recorded data tapes were edited by an onboard data processing system, and the ship's position was recalculated by using the post-analysis method. Finally, GH80-2 cruise file including all above data was created on a magnetic tape.

The observed gravity values have been correlated with the absolute gravity value (979,802.9 mgal, Potsdam system) on land at Funabashi private pier (Chiba Prefecture). The drift of the gravity meter was 3.2 mgal/month during the cruise. The Bouguer gravity anomalies were calculated by assuming a rock density of 2.0 g/cm³, and water density of 1.03 g/cm³ without topographic correction.

Magnetic anomalies were calculated by subtracting IGRF 1975.0 from observed total magnetic field.

Contour maps of free air gravity, Bouguer gravity and magnetic anomalies are shown in Fig. IV-1, 2 and 3, respectively. Some profiles including free air gravity, Bouguer gravity and magnetic anomalies and topography are shown in Fig. IV-4.

Results

Free air gravity anomalies Free air gravity anomalies in the survey area are almost related to the topography (Fig. IV-1). The values of the anomalies diminish southeastward from the Boso Peninsula, and reach -180 mgal in the southeast end of the area. Beyond the survey area they are reduced more and more, and have minimum values in the Japan Trench (NISHIMURA and MURAKAMI, 1977). The gradient of the anomalies is getting steep in the central part. On the Katagai and the Kamogawa canyons which cut the continental shelf and slope, the pattern of the contour lines penetrates into landward along these canyons. In the northwestern part where the continental shelf is developed, variations of the free air anomalies are few. A positive free air gravity anomaly of approximately 20 mgal in the northern part may be a southern edge of the Chosi high anomaly which has the maximum value about 25 km north of the survey area (Chapter X in this report). Positive anomaly area of up to 70 mgal is recognized off Katsuura, west part of the survey area. Negative anomalies of approximately -60 mgal are adjacent to the Kamogawa Canyon southwest end of the area.

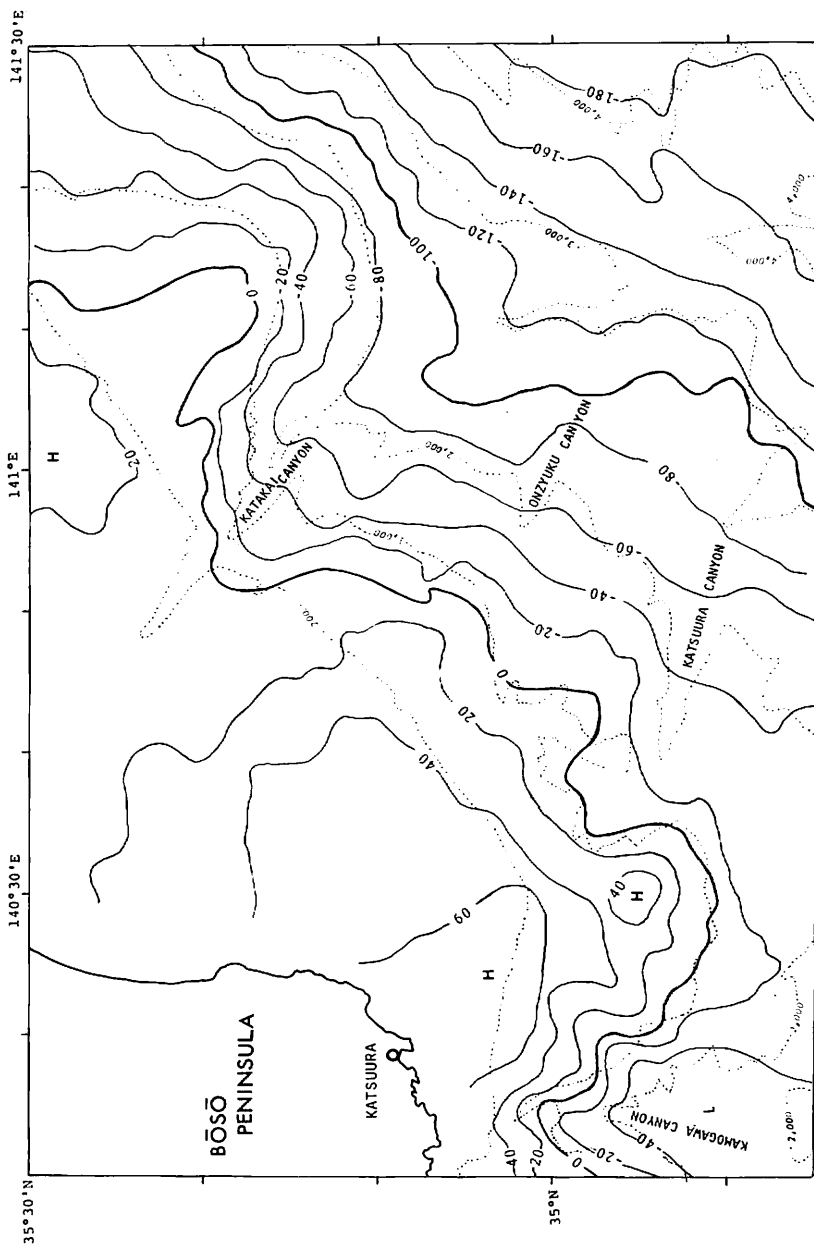


Fig. IV-1 Contour map of free air gravity anomalies. Contour interval is 20 mgal. Dotted lines show topography.

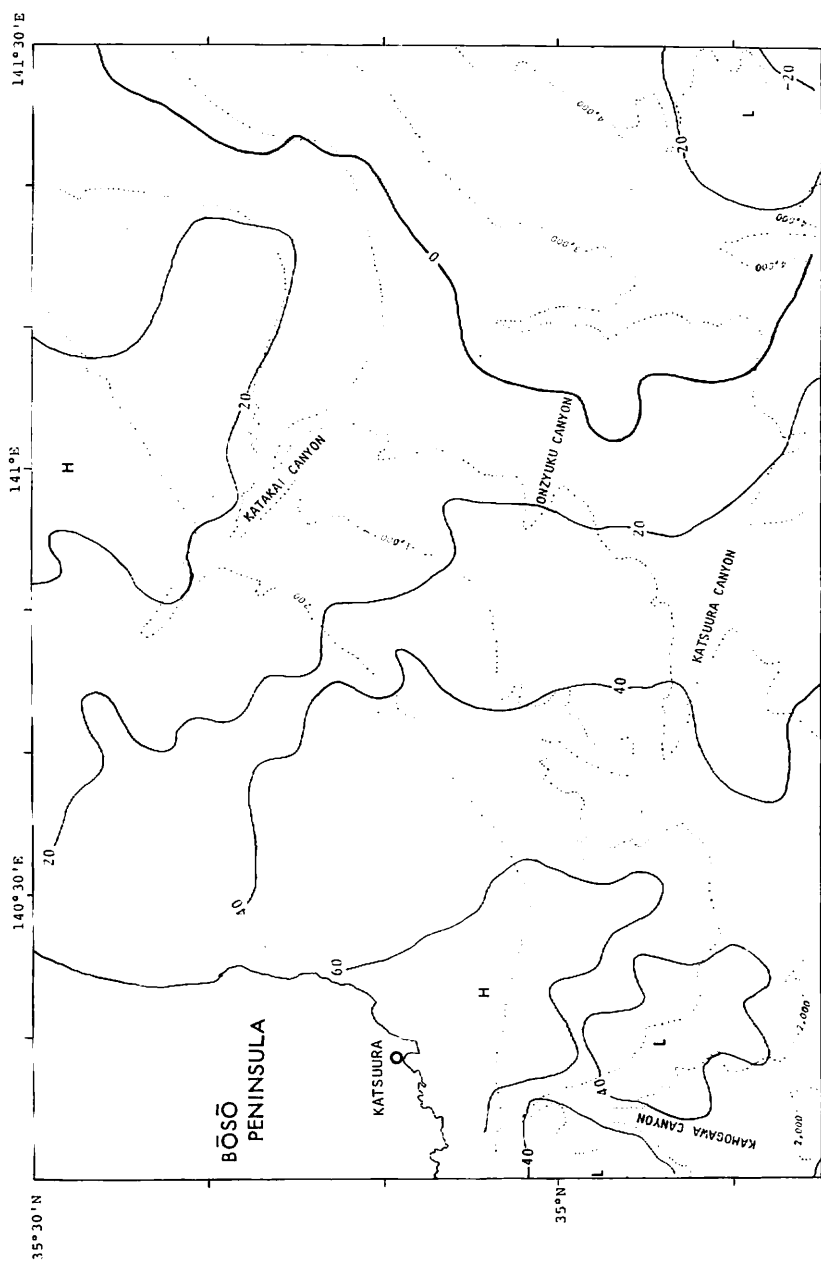


Fig. IV-2 Contour map of simple Bouguer gravity anomalies. 2.0 g/cm³ for the subbottom density and 1.03 g/cm³ for the water density are used for the Bouguer correction. Contour interval is 20 mgal. Dotted lines show topography.

Bouguer gravity anomalies The Bouguer gravity anomalies in the survey area seem to correspond to the geological structure. The values of the anomalies range from -30 to 70 mgal in the area. Four anomaly zones lie in an NW-SE direction, as an alternative pattern of high-low-high-low from north (Fig. IV-2). A high anomaly zone roughly bounded by the contour line of 20 mgal in the northern part appears to be continued from high Bouguer gravity anomalies near Chosi (MATSUDA and SUDA, 1964) as well as free air gravity anomalies. From the northern central part to the southeastern part in the survey area, a low anomaly zone less than 20 mgal can be seen in an NE-SW direction. This low anomaly zone seems to extend toward the low Bouguer gravity anomalies near the coast of Tokyo Bay in the north part of the Boso Peninsula (MATSUDA and SUDA, 1964). In the southeastern extension of this zone, anomalies attain approximately -20 mgal. The other high anomaly zone of approximately 60 mgal is situated off Katsuura. It continues to the high Bouguer gravity anomaly belt on land which probably corresponds to the Mineoka uplift zone in the south part of the Boso Peninsula (MATSUDA and SUDA, 1964). To the south side of the Mineoka high anomaly zone, there are low anomalies less than 40 mgal.

Geomagnetic anomalies There are scarcely geomagnetic anomalies with high amplitude in the survey area (Fig. IV-3). The positive anomalies in the east off Katsuura and the negative anomalies extending to a WNW-ESE direction in the south off Katsuura are observed. On the continental slope ($3,000$ – $3,500$ m depth) of the east end of the survey area (ca. 35°N , $141^{\circ}20'\text{E}$), the positive anomalies with long wavelength are recognized.

References Cited

- MATSUDA, T. and Y. SUDA (1964) Bouguer anomalies maps in Japan, *Geol. Surv. Japan Rept.*, no. 209.
- NISHIMURA, K. and F. MURAKAMI (1977) Gravity measurement, in E. HONZA (ed.), *Geol. Surv. Japan Cruise Rept.*, no. 7, p. 21–42.

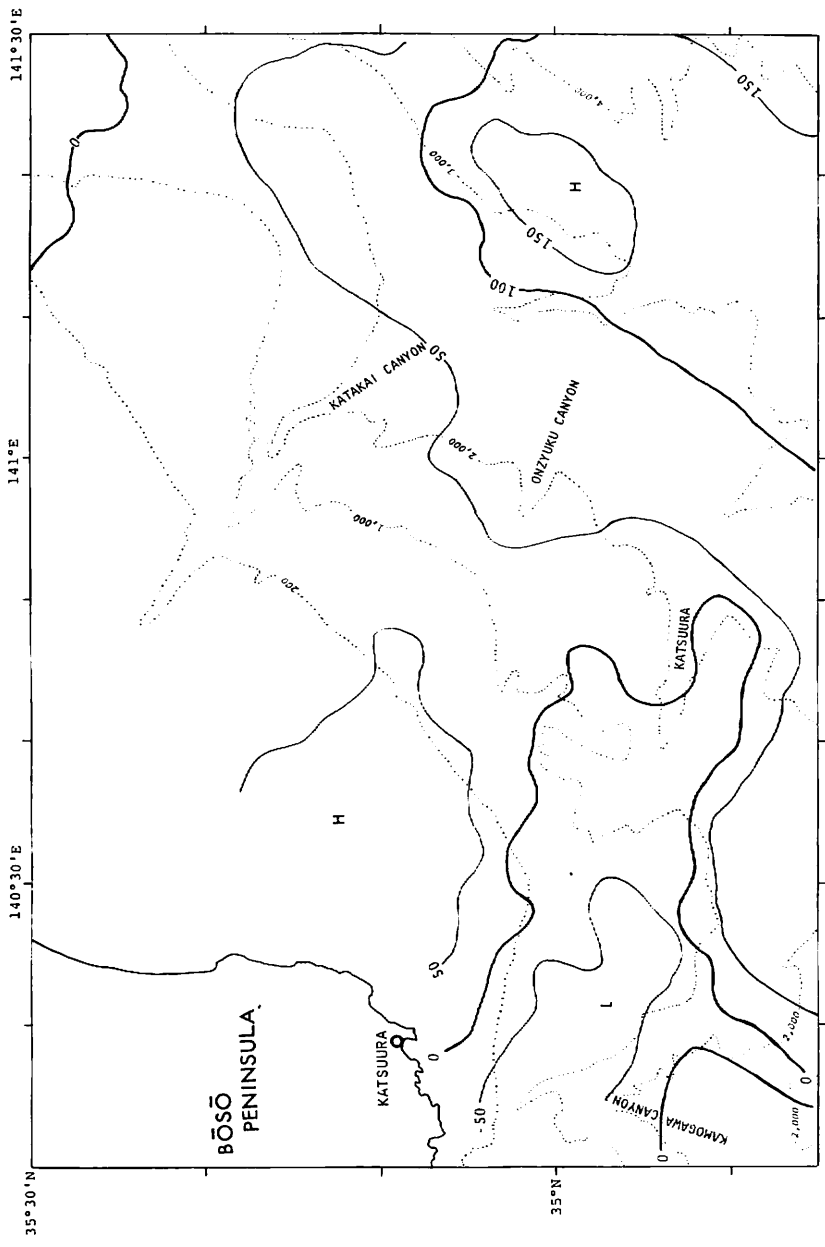


Fig. IV-3 Contour map of geomagnetic anomalies. Contour interval is 50 gamma. Dotted lines show topography.

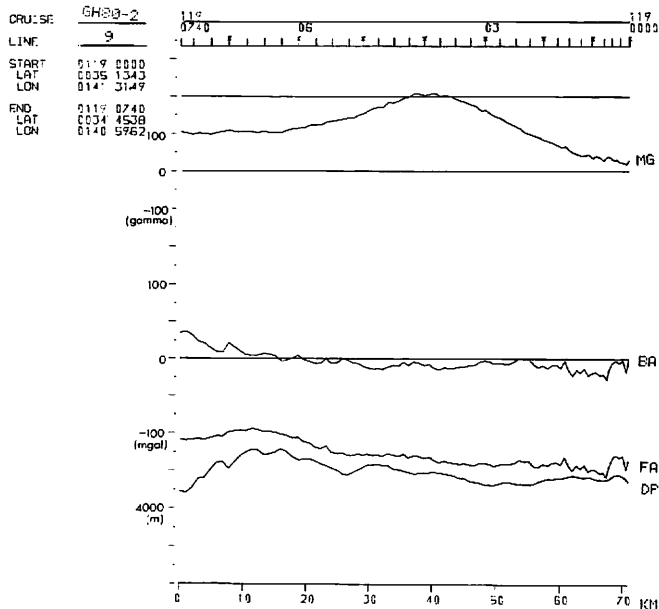
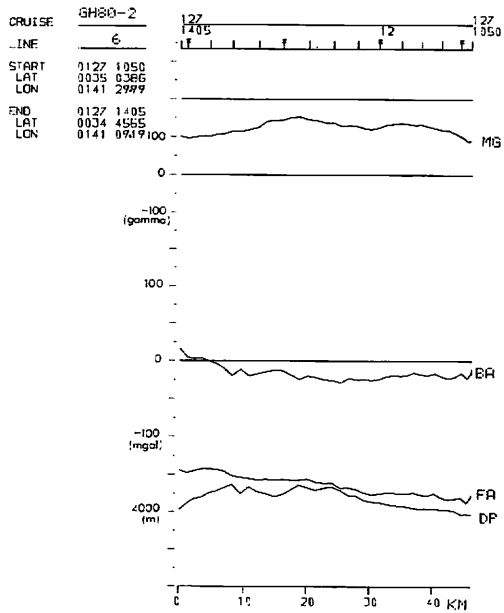
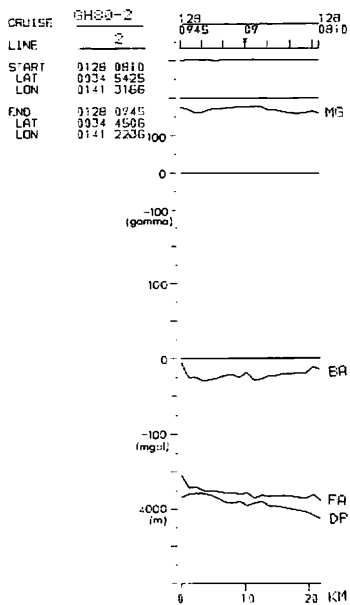
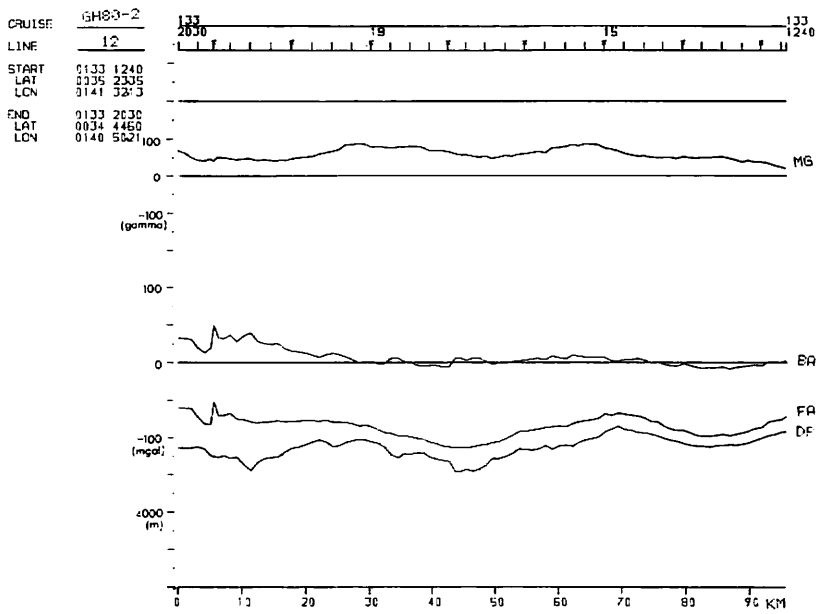
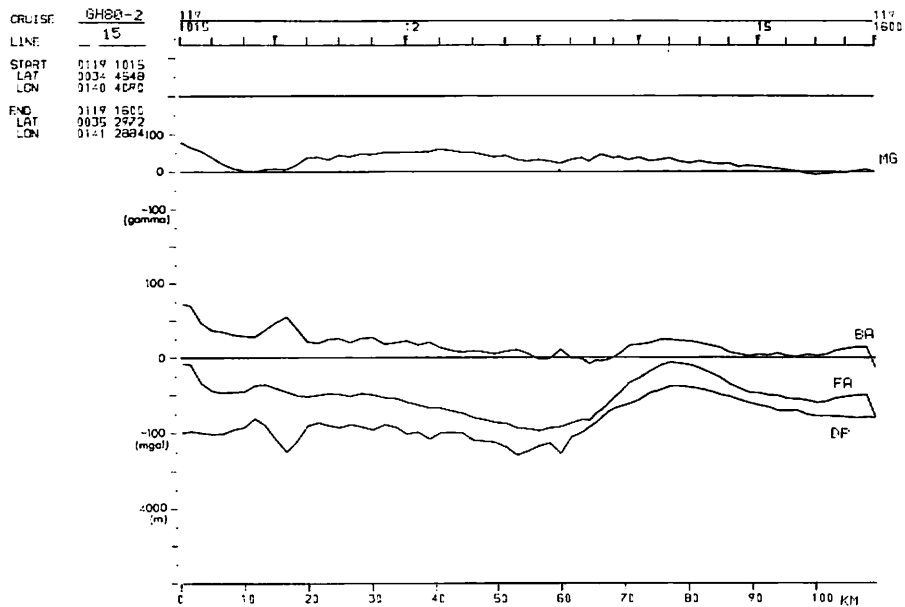


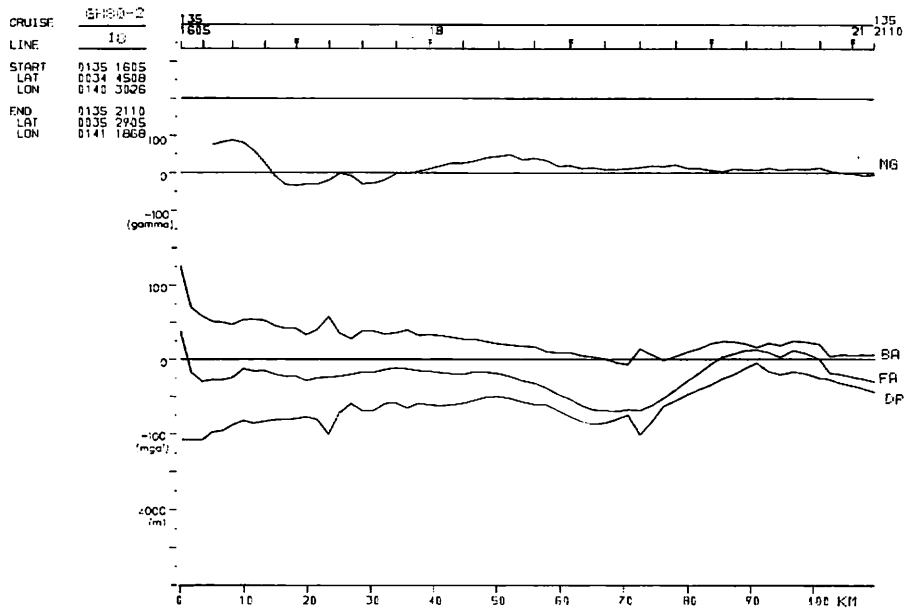
Fig. IV-4 Profiles of free air gravity, simple Bouguer gravity and geomagnetic anomalies together with topography along survey lines.



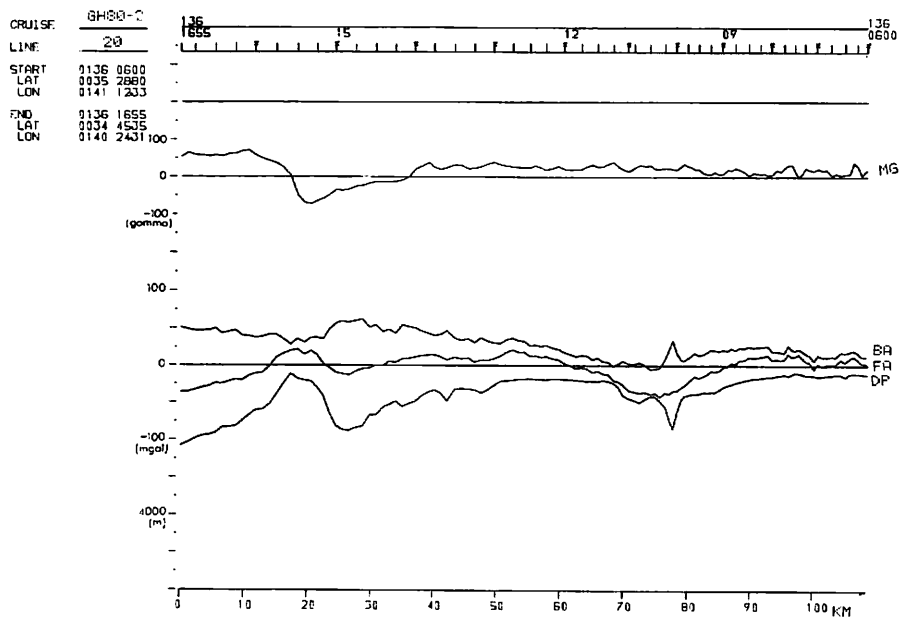
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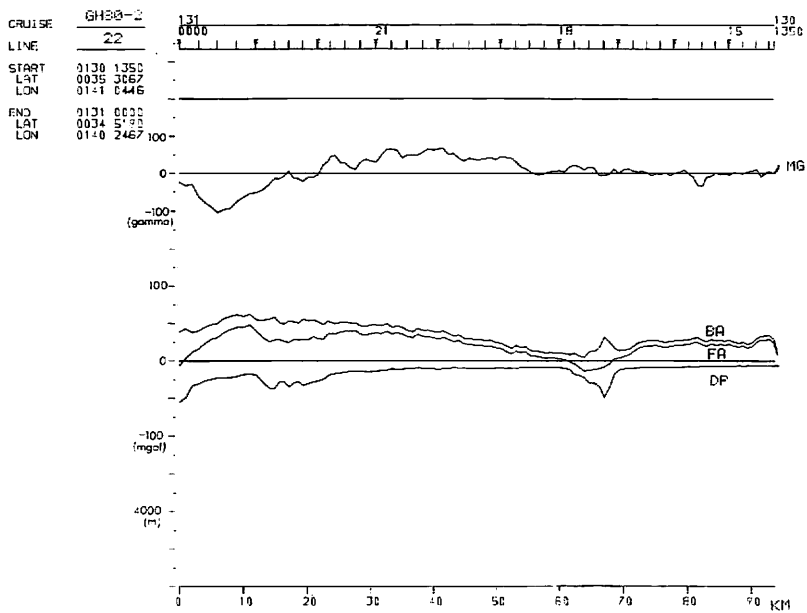
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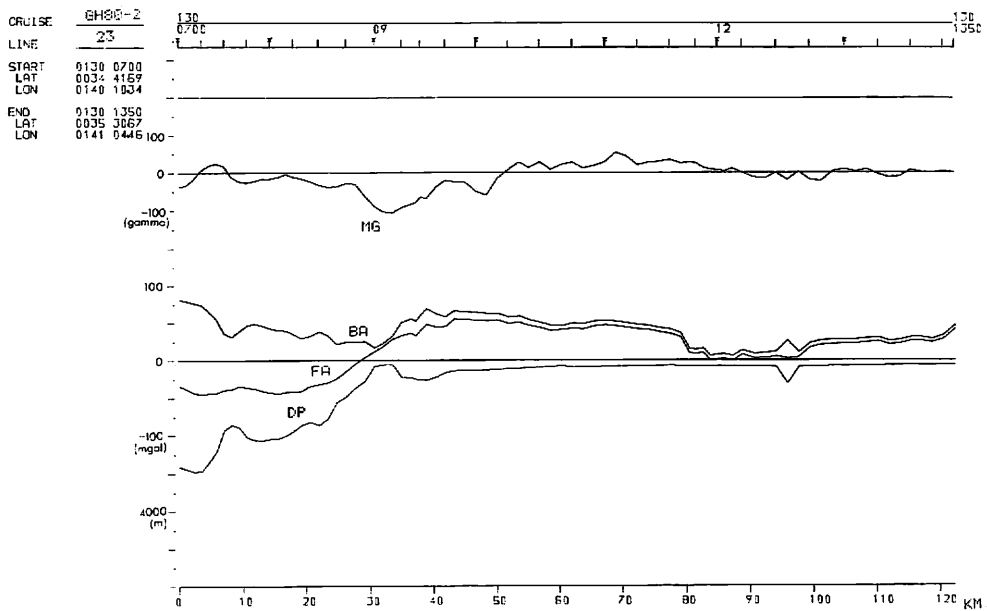
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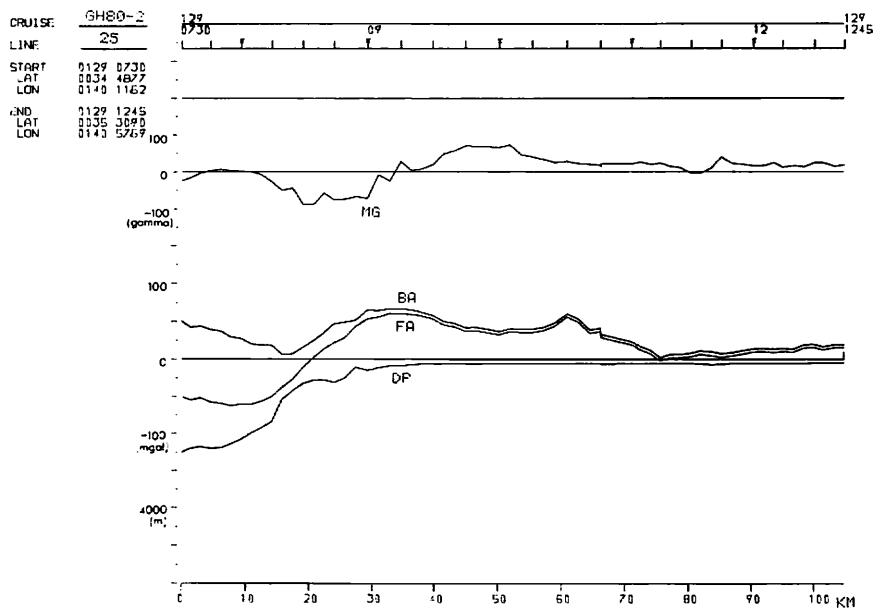
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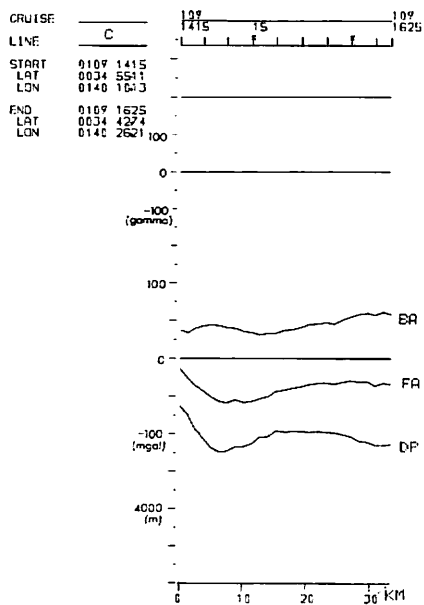
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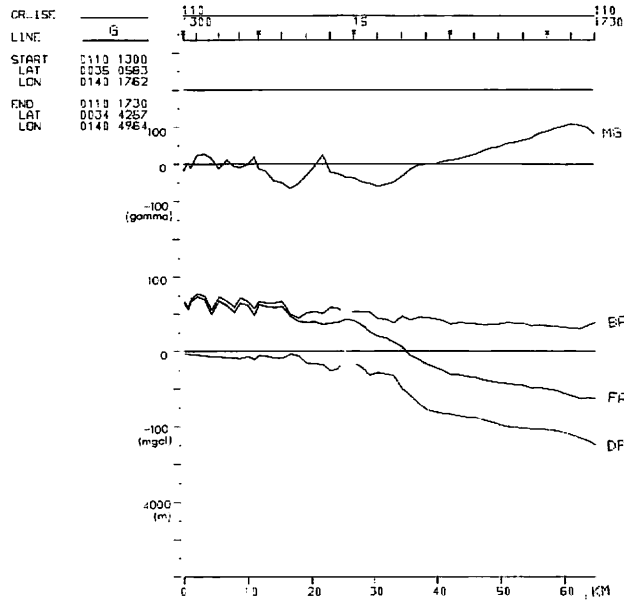
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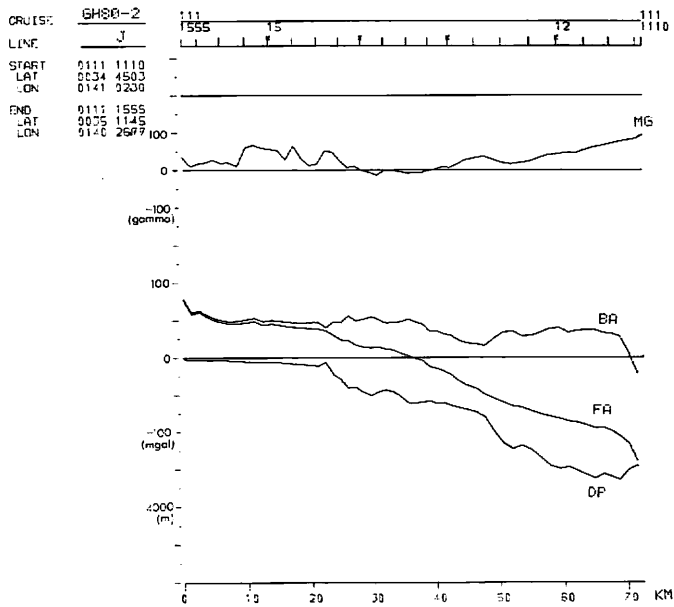
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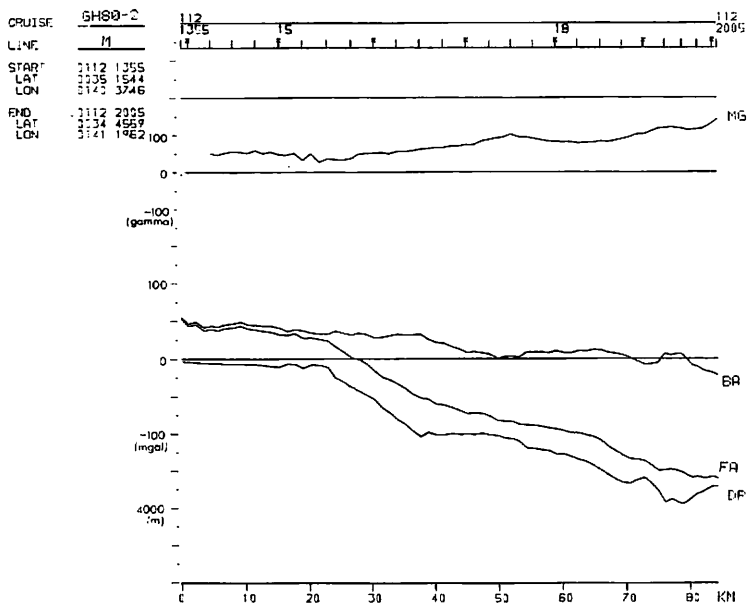
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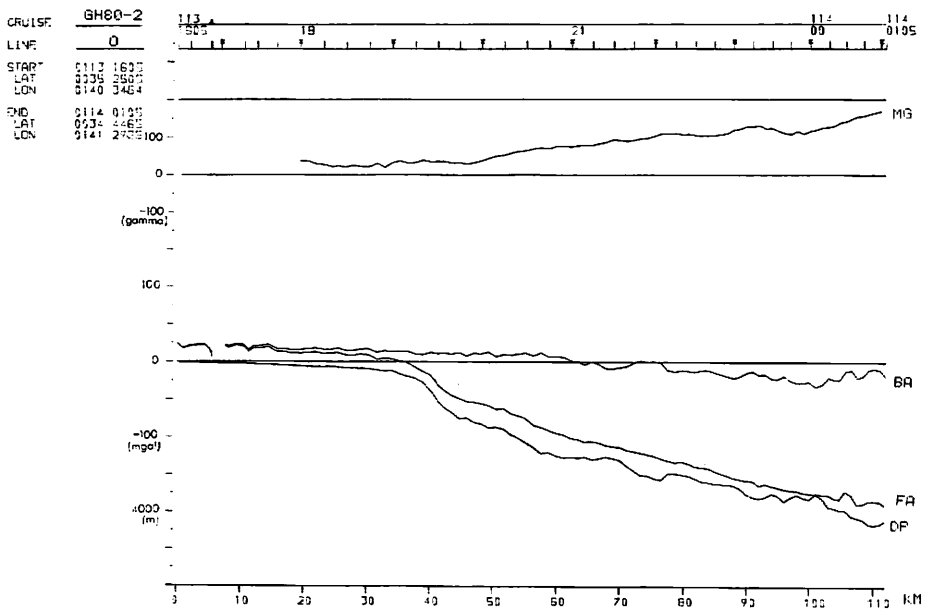
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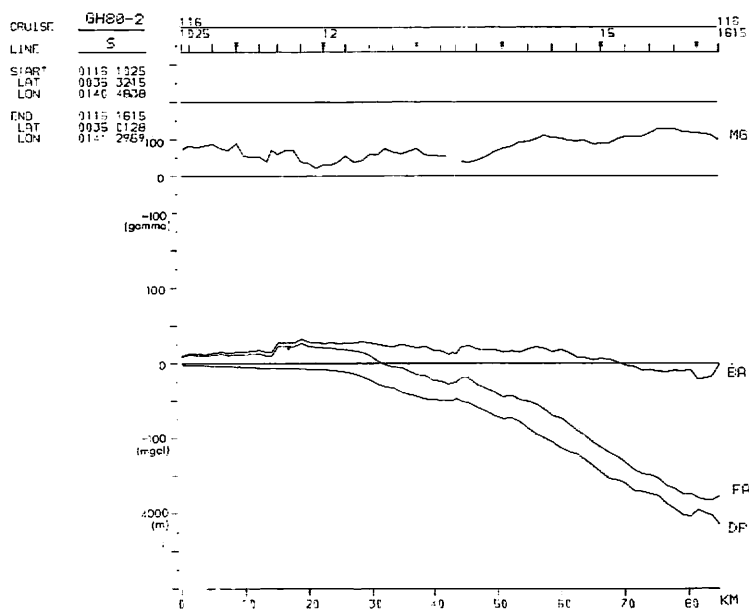
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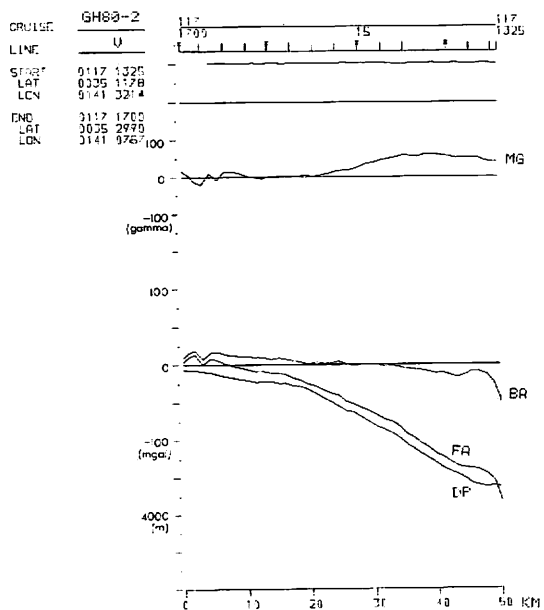
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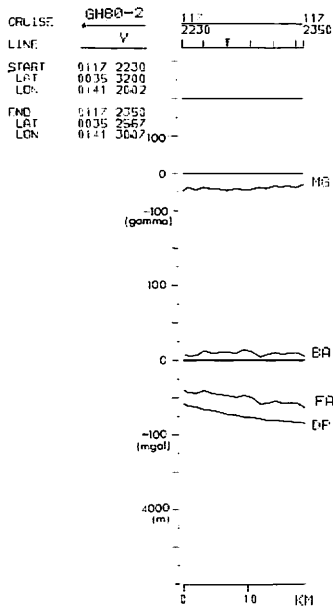
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