*Geological Survey of Japan Cruise Report No. 21, p. 16-20, 1986*

# II. MAGNETIC AND GRAVITY SURVEY OF THE GH81-4 CRUISE IN THE CENTRAL PACIFIC BASIN

*Takemi Ishihara and Toshitsugu Yamazaki*

## Data

Total magnetic field data were collected by a GeoMetrics G801 proton magnetometer, towed approximately 200 m astern of the vessel. Magnetic anomalies were calculated by subtracting IGRF 1980 values from the observed total magnetic fields.

Gravity data were obtained by a LaCoste-Romberg sea gravimeter, model S-63, mounted on a gyro-stabilized platform, with cross-coupling correction. The junction to the IGSN 71 system was made at Funabashi sea berth. The difference of the readings of the gravimeter between before and after the GH81-4 cruise at Funabashi sea berth was 1 mgal. A linear drift rate of 0.5 mgal/month was assumed. The IAG gravity formula 1967 was used for the latitude correction. Positioning by transit satellites was used for navigation control.

## Magnetic anomalies in the GH81-4 survey area

Fig. II-1 shows magnetic anomalies in the survey area at 50 nT interval. Magnetic lineations in this area trend mainly in NW to NNW directions. A belt of negative anomalies with minimum values below $-100$ nT occurs along a northern topographic high, and a belt of positive anomalies with maximum values above $+200$ nT trends parallel to it in the NE side. NNW-trending lineations occur also in the southern part of the survey area, but an east-trending positive anomaly belt, which continues from east to almost the western end of the survey area, cuts these lineations at 2°40′-2°50′N. This east-trending belt suggests a small transform fault, though no apparent fault structure is recognized in the bathymetric map of the survey area (Chapter I in this report).

## Magnetic anomalies around the GH81-4 survey area

Fig. II-2 shows profiles of magnetic anomalies around the survey area drawn by the data obtained from this and other cruises. A tentative interpretation of the magnetic lineations is also shown in this map. NEE to E-trending Phoenix lineation set, which has Early Cretaceous ages M1 to M7, occurs in the west of the survey area (LARSON, 1976). The negative anomaly M4 extends from west to just the west of the survey area, and probably changes its direction to southeastward and continues to the above-mentioned belt of negative anomalies along the northern topographic high in the survey area. NW-trending anomalies are predominant to the east and to the north of the survey area. We identified a lineated magnetic anomaly M4, which corresponds to the basement age of about 127 Ma according to the time scale of HARLAND *et al.* (1982), just east of the survey area and younger anomalies northeastward. If this identification is right, the age of the oceanic crust in the GH81-4 survey area is Early Cretaceous,

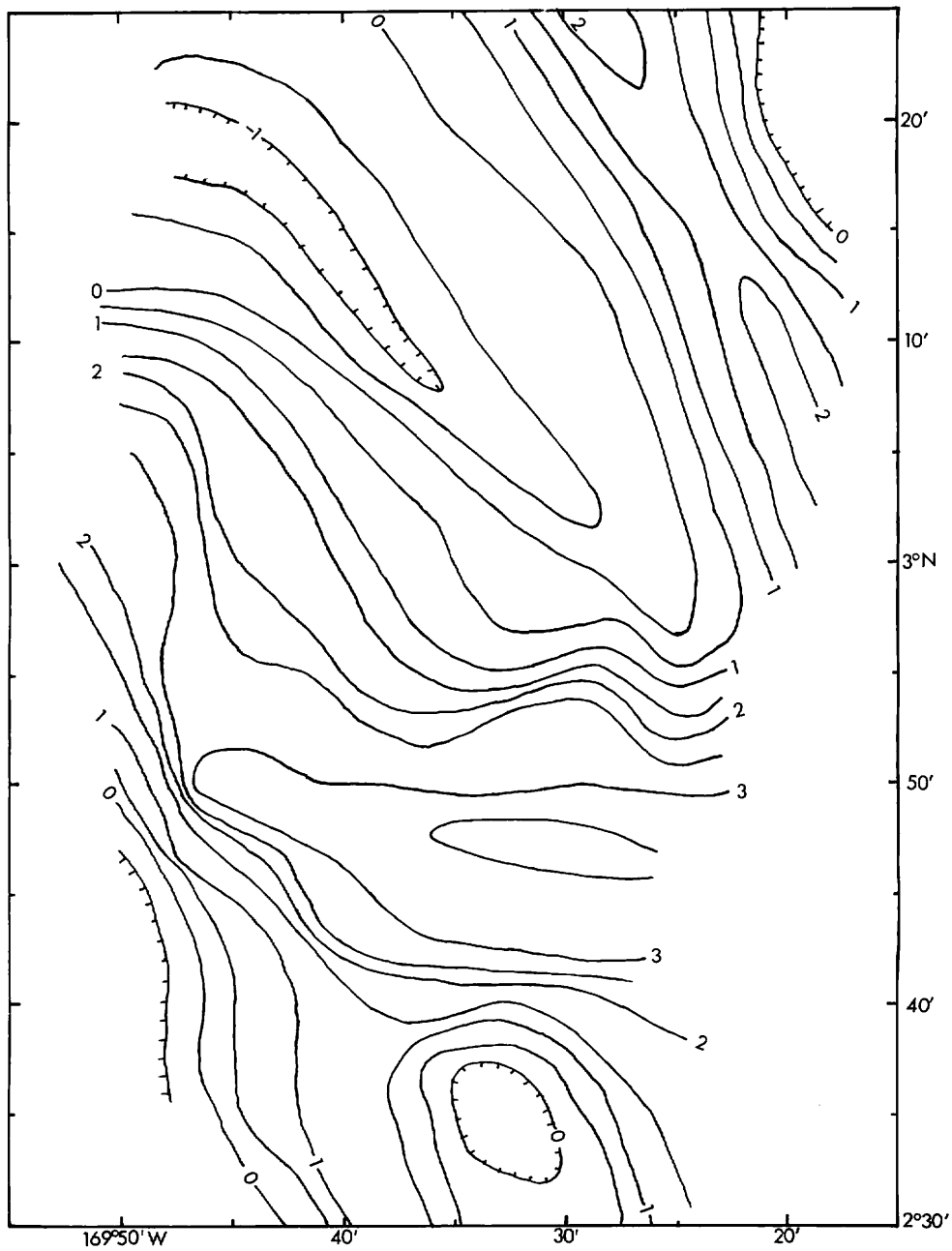


Fig. II-1 Contour map of magnetic anomalies in the GH81-4 survey area. Contour interval is 50 nT. Unit is 100 nT.

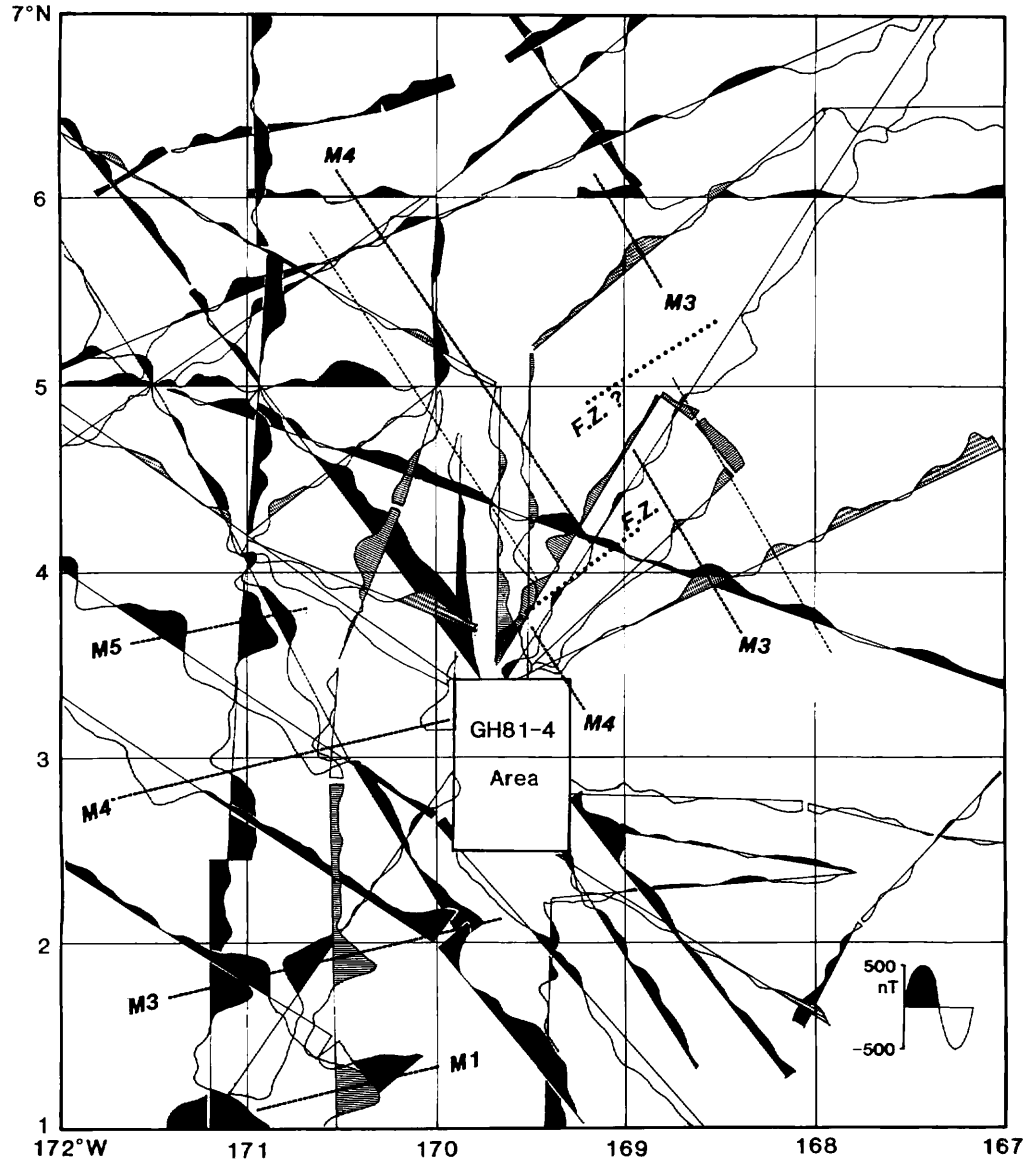


Fig. II-2 Profiles of magnetic anomalies around the GH81-4 survey area. Hatched (GH81-4 cruise) or solid (others) are positive anomalies.

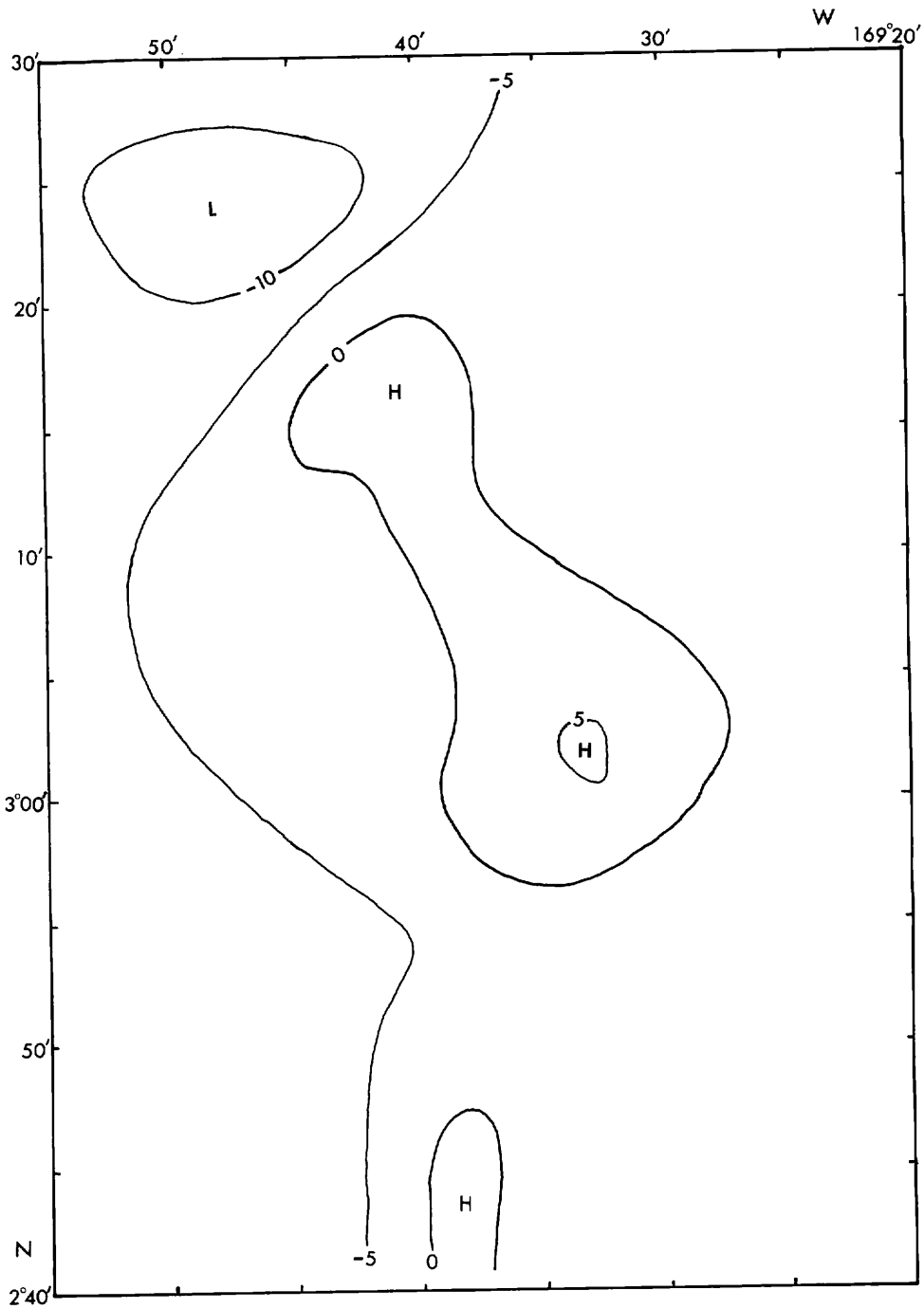


Fig. II-3 Contour map of free air gravity anomalies in the GH81-4 survey area. Contour interval is 5 mgal.

about 127 Ma or slightly older.

**Gravity anomalies in the GH81-4 survey area**

A contour map of the free-air gravity anomalies in the survey area is shown in Fig. II-3. In general, nearly zero or slightly negative anomalies predominate in the whole area, and there are no remarkable anomalies. Slightly positive anomalies (maximum 5 mgal) correspond to deep-sea hills, and negative anomalies of about −10 mgal occur on the topographic low of 5,700 m in depth at the northwestern end of the survey area.

## References


HARLAND, W. B., COX, A. V., LLEWELLYN, P. G., PICKTON, C. A. G., SMITH, A. G., WALTERS, R. (1982) *A geologic time scale*. Cambridge university press, Cambridge, 131p.

LARSON, R. L. (1976) Late Jurassic and Early Cretaceous Evolution of the western Central Pacific Basin, *J. Geomagn. Geoelectr.*, 28, 219-236.