

## **XI. GRAVITY SURVEY IN KASHIMA-NADA AREA**

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Gravity measurements in Kashima-Nada were obtained with a LaCoste-Romberg air-sea gravimeter on a gyrostabilized platform. The data processing procedures used are the same as for previous cruises (MIYAZAKI, 1979). The free air gravity anomaly map shown in Fig. XI-1 was drawn manually using 5-minute interval data (approximately 1.2 km spacing) along ship track lines.

The bathymetry in the survey area (MARITIME SAFETY AGENCY, 1979) shows wider continental shelves in the south and the north of the area than that in the central, and steep continental slopes in the south. Both the onshore geology (GEOLOGICAL SURVEY OF JAPAN, 1971) and the marine geology (GEOLOGICAL SURVEY OF JAPAN, 1978) indicate the existence of pre-Tertiary rocks along the coast of the area. These bathymetric and geologic features doubtless affect the gravity fields in the area.

Free air gravity anomalies in the survey area, which reach more than 80 mgal in the northern part of the area, decrease gradually or sharply in deep bathymetric area, and become negative on the continental slope east of Choshi. Free air gravity contours are nearly parallel to bathymetric contours on the northern coastal shelf and on the continental slope east of Choshi; they cut the bathymetric contours obliquely or at right angles in other places, such as between Nakaminato and Hitachi, between Nakaminato and Kashima, and south of Choshi.

Large positive free air anomalies along the coast can be divided into four blocks: the Hitachi, the Nakaminato, the Kashima, and the Choshi Highs (Fig. XI-2). The Hitachi and the Nakaminato Highs have values greater than 80 mgal, and are bounded by steep gravity gradients to the east. The coastal area west of the Hitachi High is underlain by Miocene strata, whereas the Hitachi District, farther west, contains metamorphic rocks as it is located south of the Abukuma Mountains metamorphic belt. West of the Nakaminato High, pre-Tertiary rocks crop out along the coast. These two Highs, or linear gradients of free air gravity anomaly, probably reflect the seaward extension of the older rocks.

The Kashima High is bounded on the north by the eastward inflection of contours from the Nakaminato High. The Kashima High seems to be a block structure similar to the Choshi High to the south. The Choshi High may indicate an eastward geological extension of the pre-Tertiary rocks exposed east of Choshi on land (Fig. XI-2). On the continental shelf south of Choshi, the E-W direction of the free air gravity contour lines is consistent with the general structural trend of the Neogene deposits in the Boso Peninsula (KAKIMI *et al.*, 1973). The Bouguer gravity anomaly map of the southeastern offshore of the Boso Peninsula (Chapter IV in this report) clarifies the relation of gravity anomalies to the geologic structure in the onshore area to the west.

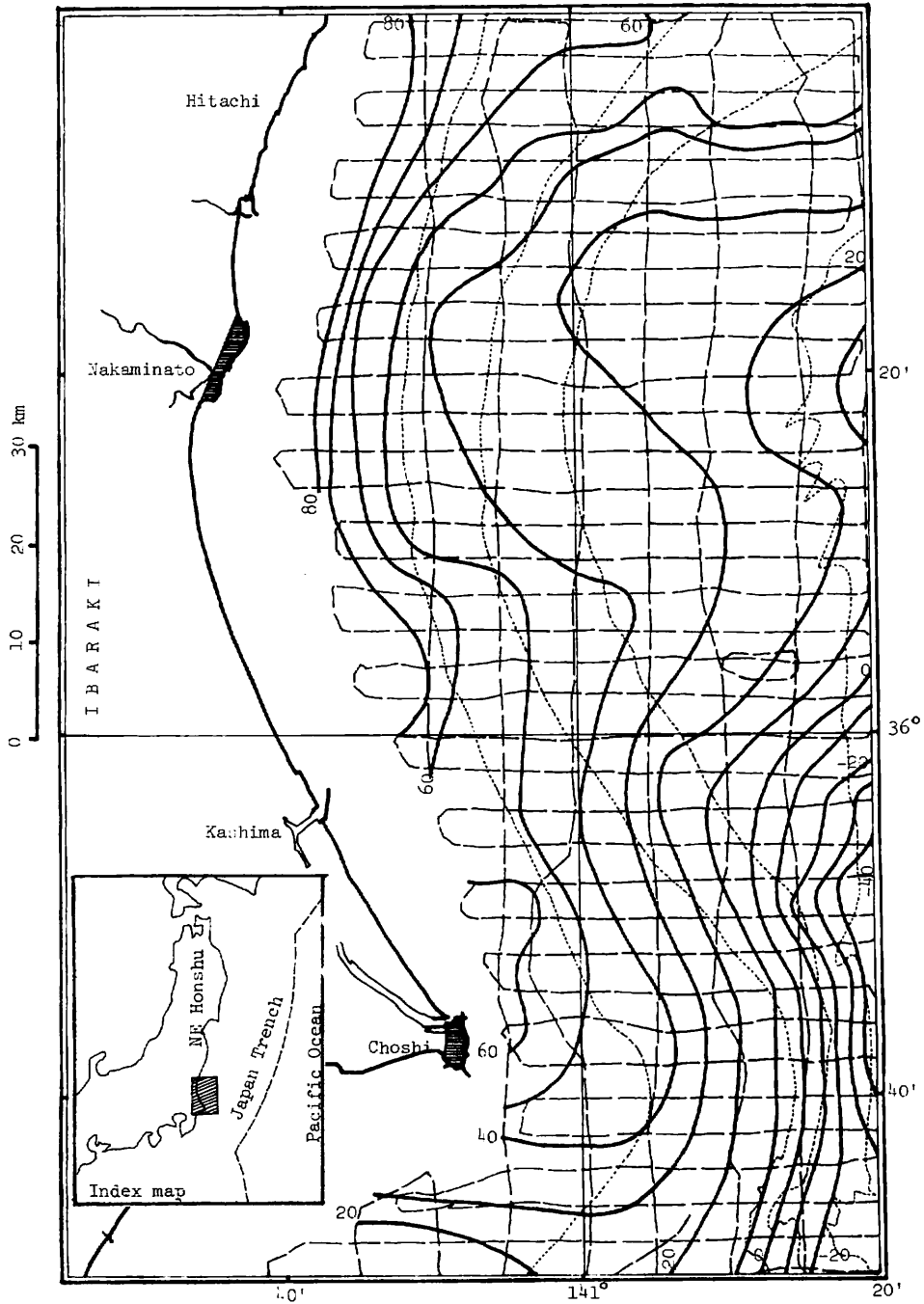


Fig. XI-1 Free air gravity anomalies in Kashima-Nada. Contour interval 10 mgal. Ship track lines are shown by broken lines; bathymetric contours, 100, 200, 500, and 1000 m shown by dotted lines are from Maritime Safety Agency (1979); outcrops of pre-Tertiary rocks along the coast shown by horizontal lines are from Geological Survey of Japan (1971).

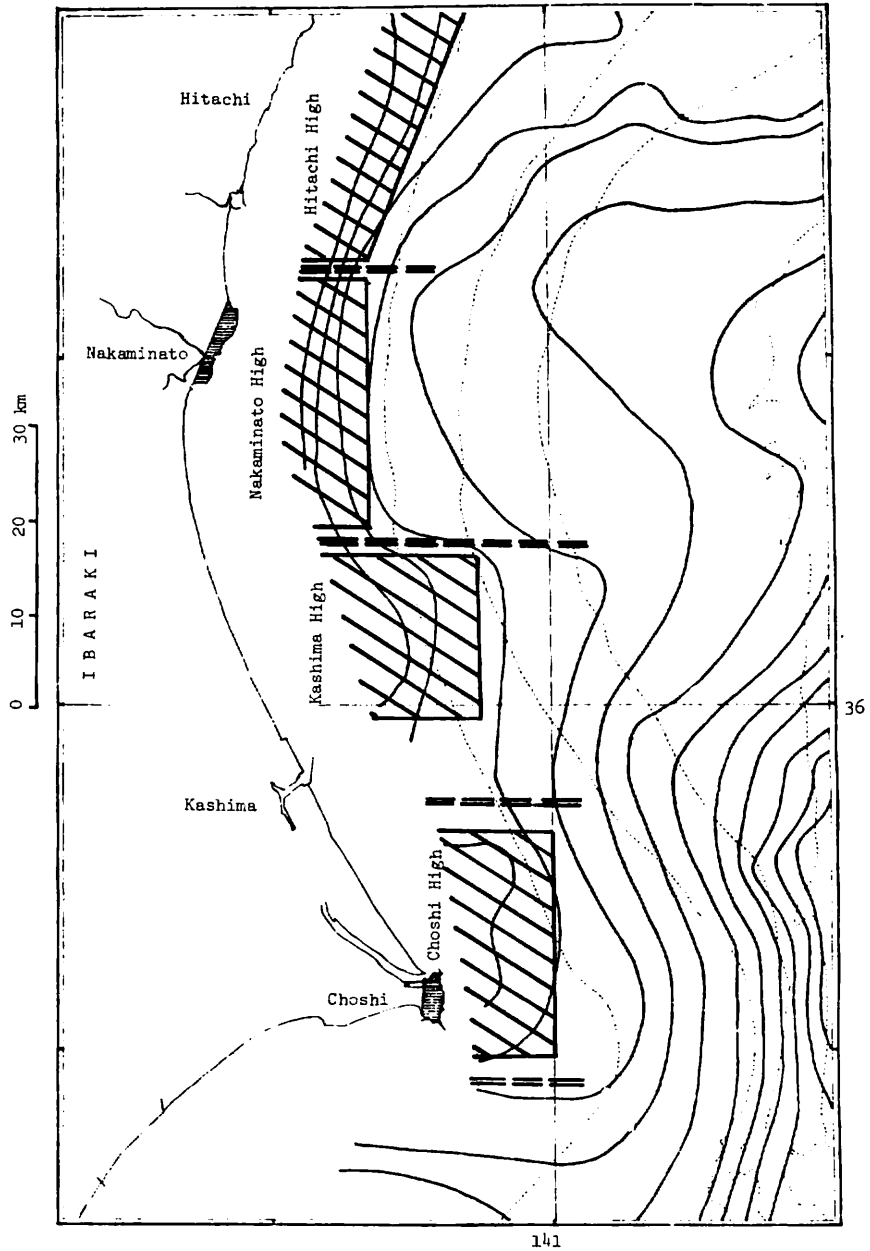


Fig. XI-2 Sketch map showing high free air gravity anomalies (slanted lines), and boundaries (heavy dashed lines).

### References Cited

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