

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Digital gravity and magnetic data collected
in 1980 in the northern Bering Sea

by

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

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During 1980 (cruise L6-80-BS) the U.S. Geological Survey collected 1800 km of digital gravity and magnetic data in the Gulf of Anadyr and across Navarin Basin (Fig. 1). Multichannel seismic-reflection data were also collected on the cruise and those data are described by Marlow et. al.(1982). A gravity map and magnetic profiles along interpretive seismic lines, based on these data, are shown in Marlow et. al. (1983).

MAGNETIC DATA

Total field magnetic data were sampled with a GEOMETRICS proton precession magnetometer and recorded every 4 seconds. The magnetometer was towed 183 meters behind the ship at an approximate depth of 18-31 meters. Reduction of the magnetic data included removal of the 1975 IGRF regional field (IAGA,1976), corrected to 1980, to obtain a total field anomaly. The location of each magnetic reading is not corrected for the 183 meter tow distance of the magnetometer behind the ship. Temporal magnetic variations, such as diurnal and storm variations, have not been removed from the data because a reference station was not available.

GRAVITY DATA

Shipboard gravity data were recorded at 20 second intervals with a 2-axis, stable-platform, LaCoste-Romberg seagravimeter (meter S-53). Because of problems in reading field tapes, most (80%) of the raw gravity values had to be hand-digitized from analog records at 1 minute intervals. Eotvos corrections, based on the final smoothed navigation, and adjustments for the 1967 reference ellipsoid (International Association of Geodesy, 1971) were applied to the field data to obtain free-air anomalies. A correction for gravity meter drift was also applied using base-station ties at the start (Dutch Harbor, AK) and end (Nome, AK) of the cruise.

NAVIGATION DATA

Navigational control of the survey was by satellite fixes integrated with Loran C (Rho-Rho) and doppler-sonar bottom-track navigation. Shipboard navigational fixes were subsequently smoothed for the gravity data to remove large changes in eotvos corrections between adjacent navigational fixes.

MAGNETIC TAPE DATA

In the final stage of the data reduction, the gravity and magnetic data were merged with the navigation data at 1 minute intervals and stored on magnetic tape. The information contained on the tape includes:

Year	Observed gravity	Observed magnetics
Julian Day	Theoretical gravity	IGRF regional field
Hour	Eotvos correction	Total field anomaly
Minute	Free-air anomaly	
Latitude		
Longitude		

Copies of the data are available through the National Geophysical Data Center, NOAA/EDIS/NGDC, Code D64, 325 Broadway, Boulder, CO 80303. Telephone (303) 497-6338.

REFERENCES

IAGA Division 1 Study Group, 1976, International Geomagnetic Reference Field: EOS, Transactions American Geophysical Union, v. 57, n. 3, p.120-121.

International Association of Geodesy, 1971, Geodetic reference system, 1967: Paris Bureau Central de l'Association Internationale de Geodesie Special Publication 3, 116 p.

Marlow, M.S., Cooper, A.K., Smith, G.L., and Chase, T.E., 1982, Multichannel seismic-reflection profiles collected in 1980 in the northern Bering Sea: U.S. Geological Survey open-file report, OF 82-1090, 3 p.

Marlow, M.S., Cooper, A.K., and Childs, J., 1983, Tectonic evolution of the Gulf of Anadyr and formation of Anadyr and Navarin basins: American Association of Petroleum Geologists Bulletin., 67 p., in press.

