UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Digital shipboard gravity and magnetic data collected in 1976 in the southern Bering Sea

by

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During 1976, the U.S. Geological Survey collected about 6000 km of digital gravity and magnetic data across the Bering Sea shelf (St. George, Bristol Bay , and Navarin basins) and abyssal basin (Figs. 1 and 2), aboard the USGS research vessel S.P. LEE (cruise L5-76-BS). Multichannel seismic-reflection data were also collected on the cruise and are described by Marlow and Cooper (1980a,b). Other magnetic traverses of the area (Cooper et al., 1985), a magnetic map of the adjoining Umnak Plateau region (Childs et al., 1981) and gravity map of the Bering sea (Childs et al, 1985a,b,c) are also available.

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 a depth of between 18 and 31 meters. Reduction of the magnetic data included removal of the 1975 IGRF regional field (IAGA,1976), corrected to 1976, 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 have not been removed from the data.

GRAVITY DATA

Shipboard gravity data were recorded at 20 second intervals with a 2-axis, stable-platform, LaCoste-Romberg seagravimeter (meter S-53). 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. Course and speed values between navigational fixes were subsequently smoothed for the gravity data to remove large changes in eotvos corrections.

DIGITAL 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

Childs, J.R., Cooper, A.K., and A.W. Wright, 1981, Residual magnetic map of Umnak Plateau region, southeastern Bering Sea: U.S. Geol. Survey map GP-939.

Childs, J.R., Magistrale, H.W., and A.K. Cooper, 1985a, Free-air gravity map of the Bering Sea, U.S. Geol. Survey MF map 1728.

Childs, J.R., Magistrale, H.W., and A.K. Cooper, 1985b, Free-air gravity map of the Umnak Plateau region, southeastern Bering Sea, U.S. Geol. Survey GP map 970.

Childs, J.R., Magistrale, H.W., and A.K. Cooper, 1985c, Free- air gravity map of the central and northern Bering Sea, U.S. Geol. Survey GP map 971.

Cooper, A.K., Marlow, M.S., and J.R. Childs, 1985, Digital shipboard gravity and magnetic data collected in 1976 in the southern Bering Sea: U.S. Geol. Survey Open-file report, 2p., in press.

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, 116p.

Marlow, M.S. and A.K. Cooper, 1980a, Multichannel seismic reflection profiles collected in 1976 in the southern Bering Sea, U.S. Geol. Survey Open-file report 80-389, 2p.

Marlow, M.S. and A.K. Cooper, 1980b, Mesozoic and Cenozoic structural trends beneath the southern Bering Sea shelf: Amer. Assoc. Petrol. Geol. Bull., v. 64, p. 2139-2155.

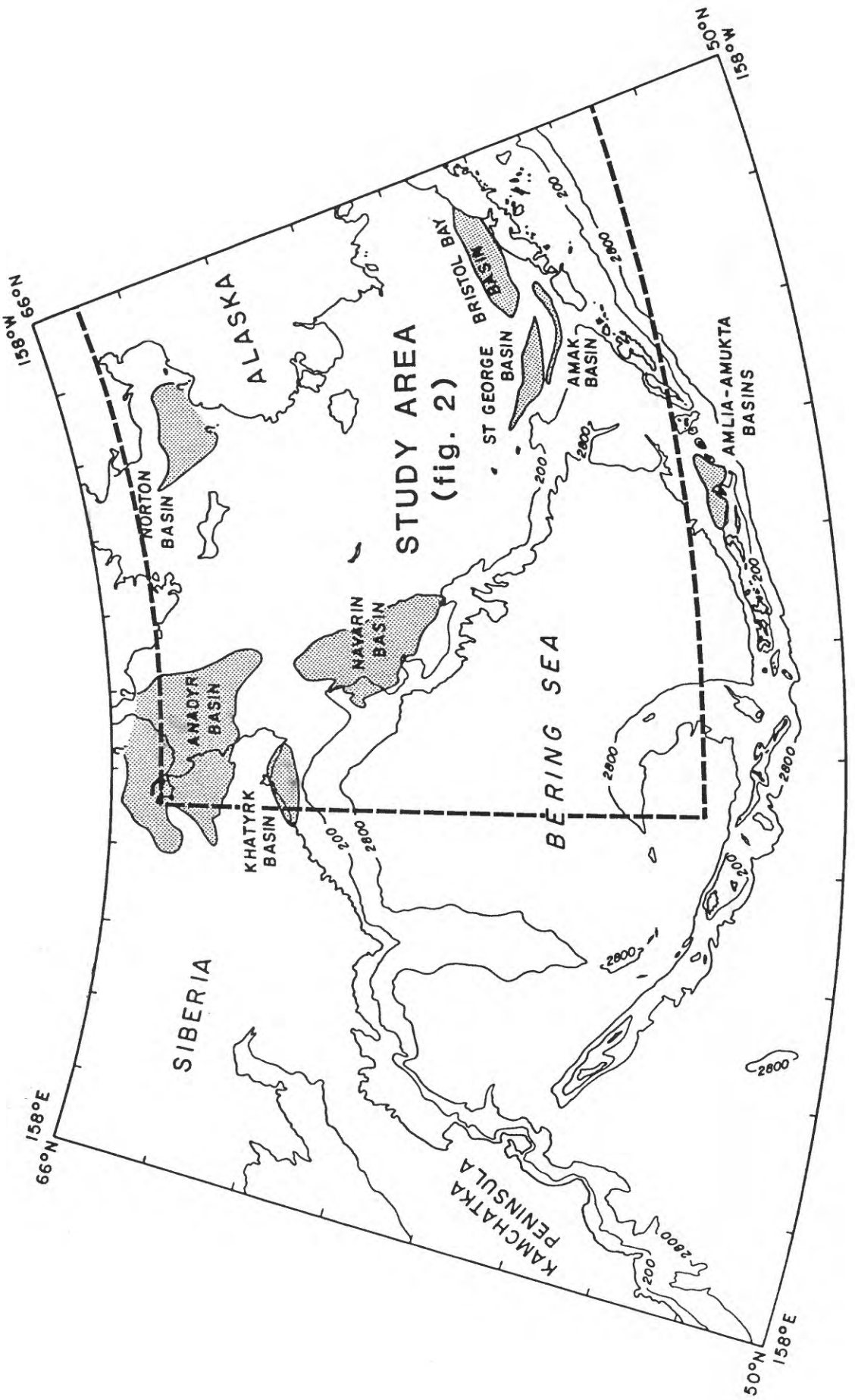

Figure 1: Index map of the Bering Sea showing location of trackline map in figure 2.

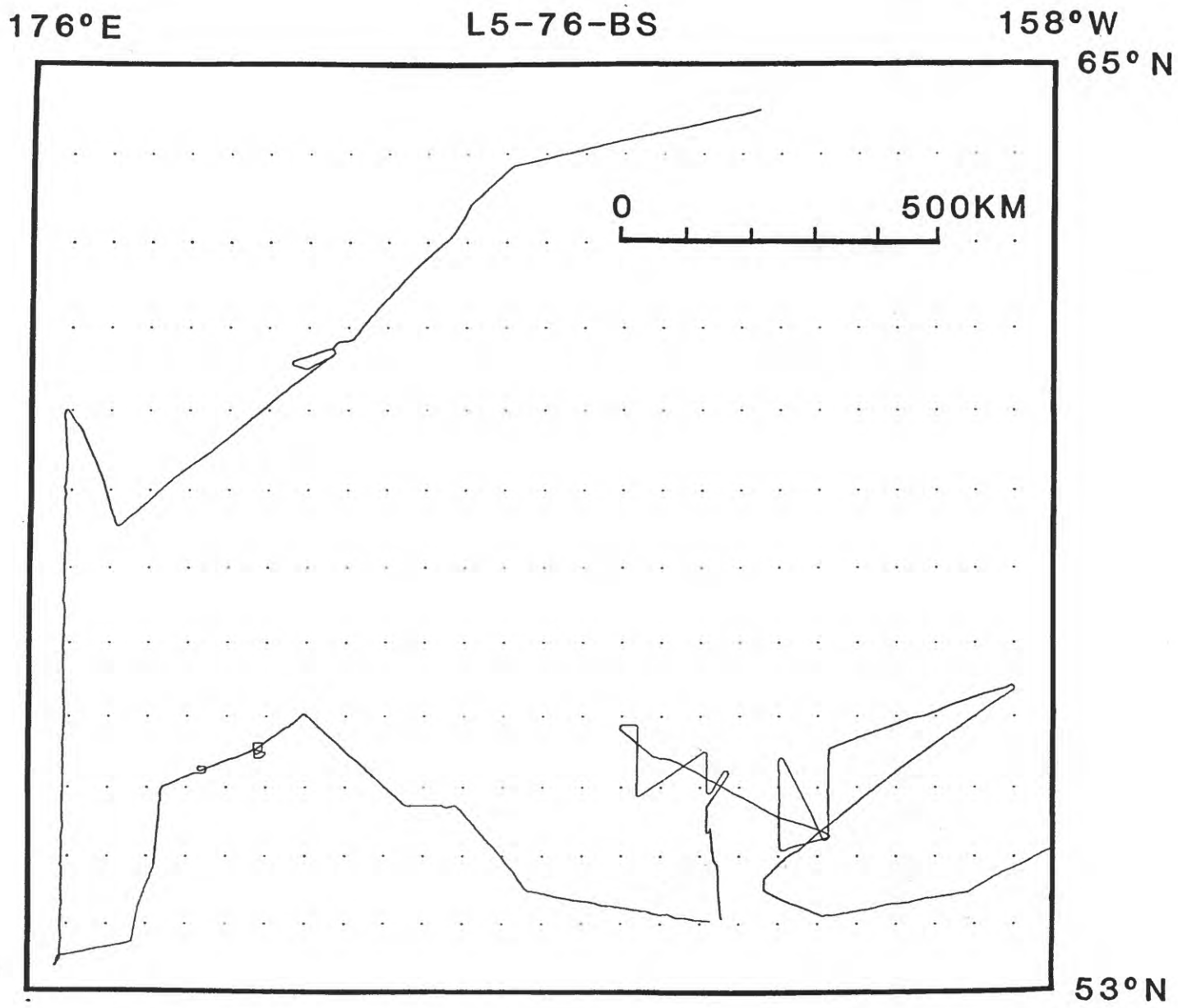

Figure 2: Map showing location of ship tracklines for USGS cruise L5-76-BS. Gravity and magnetic data were collected along most, but not all segments of these tracklines. See figure 1 for location.