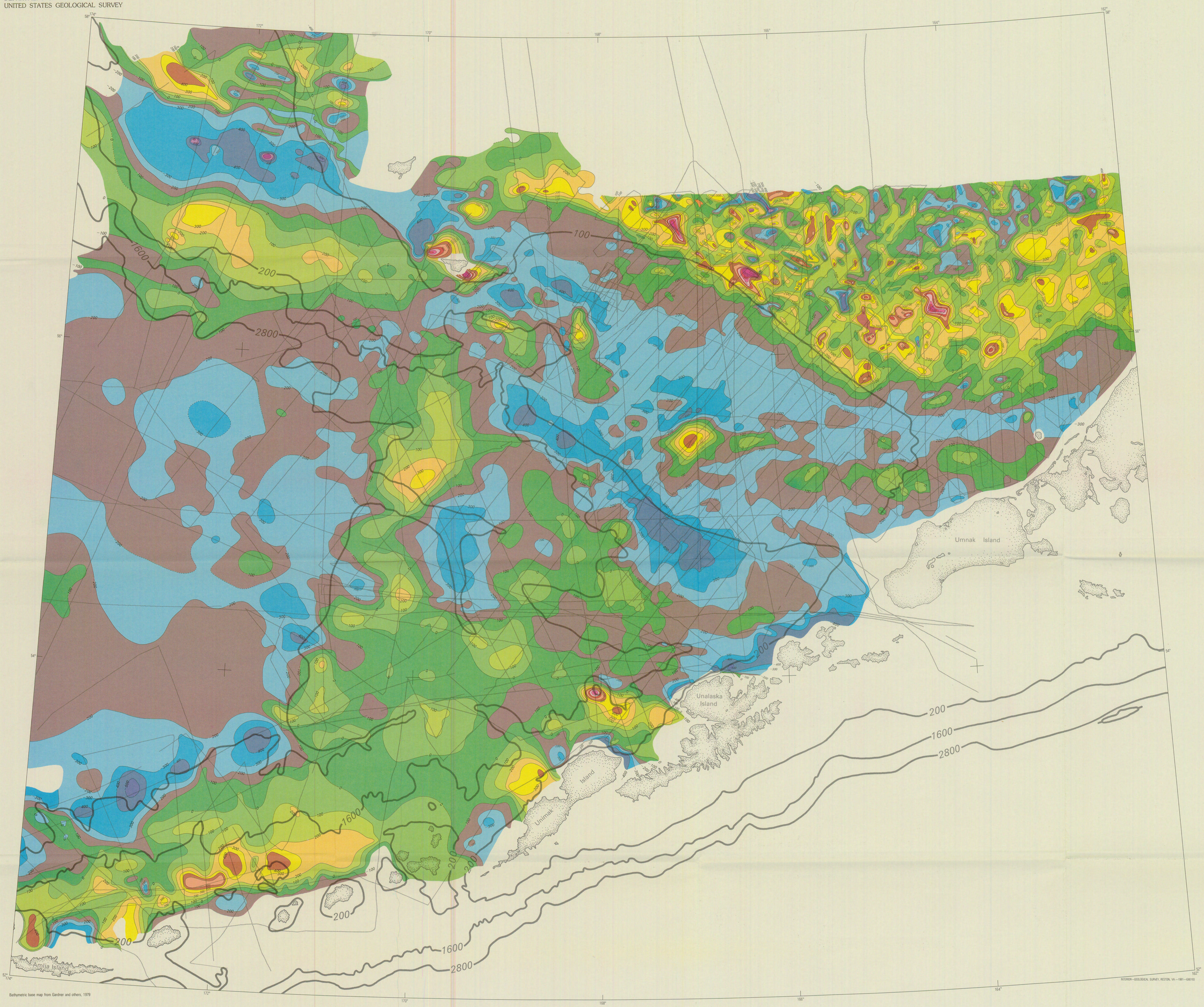
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEOPHYSICAL INVESTIGATIONS
MAP GP–939



Bathymetric base map from Gardner and others, 1979

SCALE 1:1 000 000

ALBERS EQUAL AREA PROJECTION
BASED ON STANDARD PARALLELS
OF 55° AND 65° NORTH

EXPLANATION

RESIDUAL MAGNETIC INTENSITY
(gammas)

1000, 900, 800, 700, 600, 500, 400, 300, 200, 100, 0, −100, −200, −300, −400, −500, −600, −700, −800

Magnetic contours—Showing residual magnetic field intensity, in gammas. Dashed where data incomplete. Interval 100 gammas

Ship tracklines

Land area

—200— Bathymetric contour, in meters

DATA ACQUISITION AND REDUCTION

The magnetic data shown on this map were recorded on 20 separate cruises during the period 1968–78 (table 1). All magnetic measurements were with a total-field proton precession magnetometer towed behind the ship; sampling intervals ranged from 2 to 15 minutes. An earlier (1975) contour map compiled by NOAA has been included, with modifications that reflect additional data coverage. Other maps that have been used in this compilation include those of Bailey and others (1975) and Cooper and others (1975).

Residual magnetic anomaly values were calculated by subtracting the earth's dipole field and secular components (International Geomagnetic Reference Field—IGRF) from the observed total field measurements. All data collected prior to 1975 were reduced with the 1965 IGRF field coefficients (Fabiano and Peddie, 1969; IAGA, 1969), while data collected during and after 1975 were reduced with the 1975 IGRF field coefficients (IAGA, 1976). The 1965 regional field is on the order of 45 gammas higher than the 1975 field for this region. Data are not corrected for diurnal variations (magnitude approximately 40 to 60 gammas) or for magnetic storms (magnitude typically 20 to 40 gammas, occasionally higher). The residual data values were initially plotted and contoured by a machine algorithm that maps the data onto an orthogonal grid (200 by 200 points) and fits a third-order spline (minimum curvature) surface to the grid values (Briggs, 1974). The machine contours have been modified to conform to known or inferred geologic structure.

Trackline crossings were examined to estimate the inaccuracies caused by navigational errors, uncorrected temporal magnetic variations, and the use of two different IGRF coefficient sets. Nearly 50 percent of the magnetic values at trackline crossings are within 10 gammas of the mean value at the crossing; 68 percent of the values are within 17 gammas of the mean; and fewer than 10 percent of the crossing values exceed 30 gammas of the crossing mean. A few lines had crossing values that were consistently low or high; a constant value (20–60 gammas) was added to these lines prior to contouring to improve the consistency of data crossings.

SELECTED REFERENCES

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NOAA, 1972a, Magnetic map, southeast Bering Sea east of Pribilof Islands: National Oceanic and Atmospheric Administration NOS 1711N–17M, scale 1:2,500,000.

NOAA, 1972b, Magnetic map, southwest Bristol Bay, vicinity of Amak Island: National Oceanic and Atmospheric Administration NOS 1711N–18M, scale 1:2,500,000.

TABLE 1

SHIP	ORGANIZATION	YEAR	NAVIGATION SYSTEMS
Sea Sounder	USGS	1979	Satellite, Loran C
S. P. Lee	USGS	1978	Satellite, Loran C
S. P. Lee	USGS	1977	Satellite, Loran C
Sea Sounder	USGS	1977	Satellite, Loran C
S. P. Lee	USGS	1976*	Satellite, Loran C
Sea Sounder	USGS	1976*	Satellite, Loran C
S. P. Lee	USGS	1975	Satellite, Loran C
Parizeau	GSC	1973	Satellite
Bent	USN	1972	Satellite
Conrad	LGO	1971	Satellite
Glomar Challenger	NSF(SIO)	1971	Satellite
Baffin	GSC	1970	Satellite
Bartlett	USGS(USN)	1970	Satellite
Hudson	GSC	1970	Satellite
Melville	SIO	1970	Satellite
Rainier	NOAA	1970	Satellite
Conrad	LGO	1969	Loran C, Radar
Surveyor	NOAA	1969	Satellite
Conrad	LGO	1968	Loran C, Radar

*Two cruises in area

USGS: United States Geological Survey
GSC: Geological Survey of Canada
USN: United States Navy
LGO: Lamont-Doherty Geological Observatory of Columbia University
NSF: National Science Foundation
SIO: Scripps Institution of Oceanography
NOAA: National Oceanic and Atmospheric Administration

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RESIDUAL MAGNETIC MAP OF UMNAK PLATEAU REGION, SOUTHEASTERN BERING SEA

By
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