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DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

BATHYMETRIC MAP OF THE WESTERN GULF OF ALASKA

by

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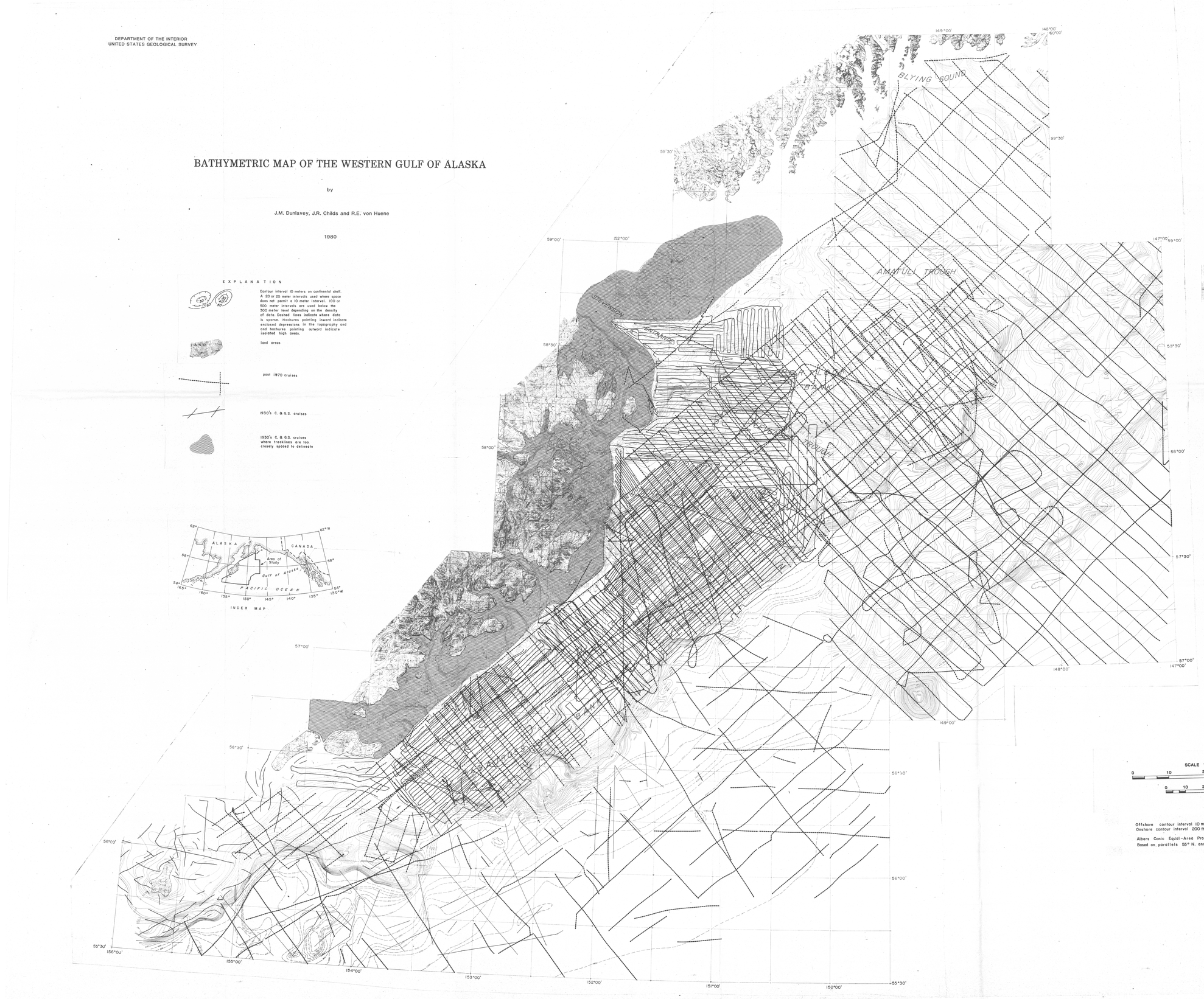
1980



DISCUSSION

These maps are a compilation of bathymetric surveys of the continental shelf and slope southeast of Kodiak Island and the Kenai Peninsula. The cruises from which data were derived are: 1) U.S. Geological Survey ship R/V S.P. Lee, 1976 (1500 km) and 1977 (576 km); 2) U.S. Geological Survey ship R/V Sea Sounder, 1976 (1150 km); 3) Petty-Ray Corporation, R/V Ditkin, 1976-77 (920 km); 4) National Oceanic and Atmospheric Administration ship R/V Surveyor, 1972 (6600 km); 5) hydrographic survey cruises conducted by the U.S. Coast and Geodetic Survey (U.S.C. & G.S.) during the years 1931-33.

The navigation systems used on the post-1970 U.S.G.S. cruises were computerized integrations of dead reckoning, satellite, Loran C, and doppler sonar (positioning was accurate to ± 100 m). The Petty-Ray Corporation cruises used a combination of Miniranger, Raydist, and Loran C; the R/V Surveyor used Hi-Fix and Sea-Fix navigation systems. Position for cruises conducted by the U.S. C. & G.S. during the 1930's was calculated by celestial navigation and triangulation.

Bathymetric instruments used on the R/V Lee and the R/V Sea Sounder were hull mounted 3.5-khz and 12-khz profilers. The R/V Surveyor acquired bathymetric data through a hull-mounted precision depth recorder (PDR). Petty-Ray Corporation obtained data with a 1000-joule sparker and a 3.5-khz profiler. Turner and others (1979) present a detailed explanation of depth determination for the Petty-Ray Survey. Average velocities for sound in sea water were calculated for the U.S.G.S. surveys to correct for annual and near tidal fluctuations. The U.S.C. & G.S. bathymetric data were collected with a continuously recording echo sounder and leadline corrections were made for variations in tidal height and sound velocity in water.

The solid tracklines (sheet 1 of 4) show the locations of the U.S.C. & G.S. surveys conducted during the 1930's. Thick, dashed tracklines (sheet 1 of 4) show areas of the post-1970 surveys. These two data sets pre-date and post-date the earthquake of March 28, 1964. This earthquake, a major seismic event that resulted in many slope changes in bathymetry, is a preliminary study of the tidal variation in the study area indicated a swings between 6 and 12 feet with an average of 9 feet. Accuracy of bathymetric data of each cruise was determined by comparing recorded depths at line intersections and was found to be nearly uniform at ± 2 meters. The effects caused by the 1964 earthquake were examined in the study area by comparing the U.S.C. & G.S. data with a tide-corrected version of the Petty-Ray data. Preliminary results indicate that deformation affected the overall depth by a maximum of 10 meters (contour interval). Most areas show that the magnitude of error due to tidal fluctuation, recording system noise, or earthquake deformation is less than one-half of the 10-meter contour interval. This information supplements the work of Turner, Thrasher, Shearer, and Holden (1979) by combining additional surveys and extending the boundaries of detailed contouring both landward and seaward.

The Albers conic equal-area projection uses straight line meridians and curved line parallels; graticule spacing preserves equivalence of area. The linear scale is accurate on the standard parallels. Although distance and direction measurements are good, these maps are not intended to be used for navigation.

Any trade names, trademarks, or corporations referred to in this publication are used for descriptive purposes only and do not constitute endorsement by the U.S. Geological Survey.

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BATHYMETRIC SURVEYS IN THE WESTERN GULF OF ALASKA

Ship	Organization	Year	Navigation System
Numerous vessels	United States Coast and Geodetic Survey	1931-33	Celestial and triangulation
R/V Surveyor	National Oceanic and Atmospheric Administration	1972	Hi-Fix and Sea-Fix
M/V Ditkin	Petty-Ray Corporation	1976-77	Miniranger, Raydist, and Loran C
R/V S.P. Lee	United States Geological Survey	1976-78	Satellite and Loran C
R/V Sea Sounder	United States Geological Survey	1976-78	Satellite and Loran C

SCALE 1:500,000

0 10 20 30 40 NAUTICAL MILES

0 10 20 30 40 KILOMETERS

Offshore contour interval 10 m, 25 m, and 100 m
Onshore contour interval 200 ft with 100 ft contours represented by dotted lines

Albers Conic Equal-Area Projection
Based on parallels 55° N. and 65° N.

This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature. Maps are not intended for use in navigation.