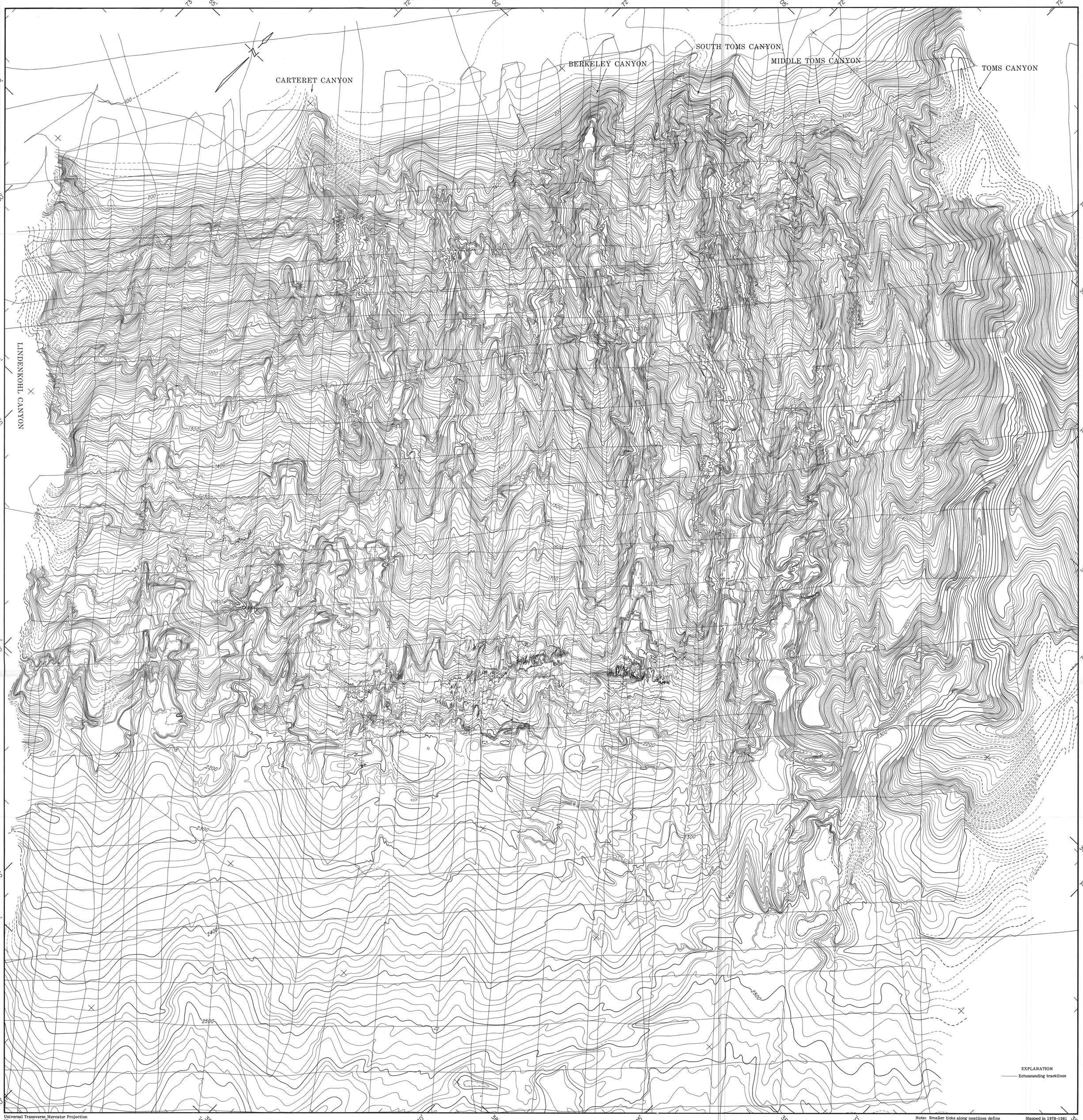
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH
THE U.S. BUREAU OF LAND MANAGEMENT

MISCELLANEOUS FIELD STUDIES
MAP MF–1443



Universal Transverse Mercator Projection
(Central meridian 75°W.)
This map is not intended for use in navigation

SCALE 1:50,000

0 5 10 KILOMETERS

0 5 NAUTICAL MILES

Depths, in meters, based on assumed sound velocity in sea water of 1500m/s
Contour interval 10 meters; dashed where inferred
Datum is Sea Level

Note: Smaller ticks along neatlines define lease block grid (From U.S. Bureau of Land Management Official Protraction Diagrams NJ 18-3 and NJ 18-6)

Mapped in 1978–1981

DISCUSSION

This map was prepared as part of a program of the U.S. Geological Survey (USGS) and the Bureau of Land Management (BLM) to investigate the nature of offshore areas to be leased for petroleum exploration and development (fig. 1). It updates and expands an earlier bathymetric map (Robb and others, 1981b) that was prepared using solely echosounding data. This present map, constructed using acoustic images of the sea bottom acquired with a midrange sidescan-sonar system (Sea-Marc I) as well as additional echosounding data, shows more detail at a larger scale. Although the sidescan sonographs do not provide quantitative depth information, they were used as a basis for interpolation of contours between echosounding tracklines to allow truer shapes of bottom features to be mapped. A preliminary geologic map of most of this area is presented by Robb and others (1981a).

METHODS

Echosoundings were gathered in 1978 aboard the RV COLUMBUS ISELIN (cruise 7807-1) and in 1979 aboard the RV JAMES M. GILLISS (cruise 7903-4) in a trackline grid having a general spacing of 900 m x 1700 m using hull-mounted 3.5-kHz profiling systems and high-resolution seismic-profiling systems. These data were supplemented in 1980 and 1981 by echosoundings from the RV GYRE (cruise 80-G-7A) and RV LULU (cruise 110). Locations of echosounding tracklines are shown on the map.

In 1980, aboard RV GYRE (cruise 80-G-8A), sidescan sonographs were acquired in cooperation with W. B. F. Ryan of the Lamont-Doherty Geological Observatory of Columbia University (L-DGO) over two sets of intersecting tracklines (fig. 2) so that images of the surveyed area were collected from two directions, allowing comparative views of bottom geomorphic features. The two side-looking transducers of L-DGO's Sea-Marc-I sidescan-sonar system operate at acoustic frequencies of 27 and 30 kHz. The sidescan fish was towed about 300 m over the bottom and scanned 2.5 km to each side of its track. Returning signals were electronically corrected for slant range, and recorders were manually adjusted for ship speed so that the resulting images have nearly the same scales along and across the 5-km swath. For mapping purposes the sidescan images were mosaicked manually by W. B. F. Ryan of L-DGO.

Interpretation of some details of bottom morphology from sidescan sonographs and echosounding profiles was aided by observations from four dives by DSRV ALVIN (operated by the Woods Hole Oceanographic Institution) during July 1981, in cooperation with BLM and Barbara Hecker of L-DGO. Locations of these observations are as follows: dive 1112, near lat 38°48' N., long 72°46' W. (1,650 m to 1,400 m); dive 1113, near lat 38°45' N., long 72°45' W. (2,100 m to 1,850 m); dive 1115, near lat 39°44' N., long 72°39' W. (2,200 m to 2,100 m); and dive 1117, near lat 38°50' N., long 72°35' W. (2,000 m to 1,650 m).

The generalized contours of bottom features mapped in the region of Toms Middle Canyon and Toms Canyon are a result of limited data: sounding along sparse tracklines and partial coverage by sidescan-sonar images (fig. 2). Supplementary data is from Veatch and Smith (1939).

Navigation for all cruises primarily used Loran-C, with corroboration from satellite fixes. Positions of mapped features are estimated to be within 200 m of their correct geographic positions.

The echosounding profiles, seismic-reflection profiles, and sidescan-sonar sonographs used in the preparation of this map have been described by Robb (1980a,b); Robb and others (1981c) and Hampson (1982). Microfilms of these data are available for purchase from the National Geophysical and Solar-Terrestrial Data Center, NOAA/EDIS/NGSDC, Code D621, 325 Broadway, Boulder, CO. 80303 (303-497-6338).

This work has been accomplished by the USGS in cooperation with the Bureau of Land Management under Memoranda of Understanding AA551-MU8-21, AA551-MU8-4, AA851-MUO-18, and AA551-IA1-17.

REFERENCES CITED

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Veatch, A. C., and Smith, P. A., 1939, Atlantic submarine valleys of the United States and the Congo submarine valley: Geological Society of America Special Paper 7, 101 p., and charts.

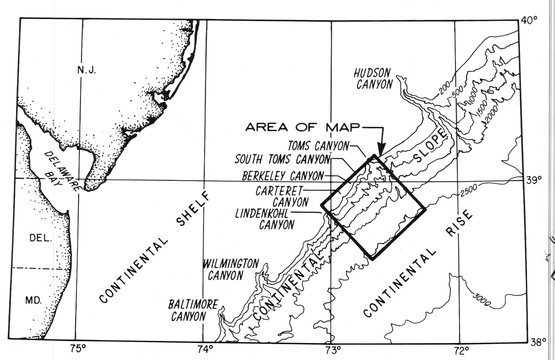

Figure 1.—Index map showing location of study area. Bathymetric contours in meters.

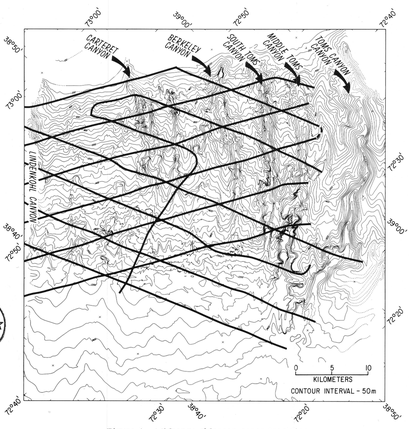

Figure 2.—Midrange sidescan-sonar tracklines.

DETAILED BATHYMETRIC MAP OF THE UNITED STATES CONTINENTAL SLOPE BETWEEN LINDENKOHL CANYON AND TOMS CANYON, OFFSHORE NEW JERSEY

By
John R. Kirby, James M. Robb, and John C. Hampson, Jr.

1982