Bathymetry of the upper Continental Rise in the vicinity of a Sewage Sludge Dumpsite near 39°N, 72°W, Offshore New Jersey and New York

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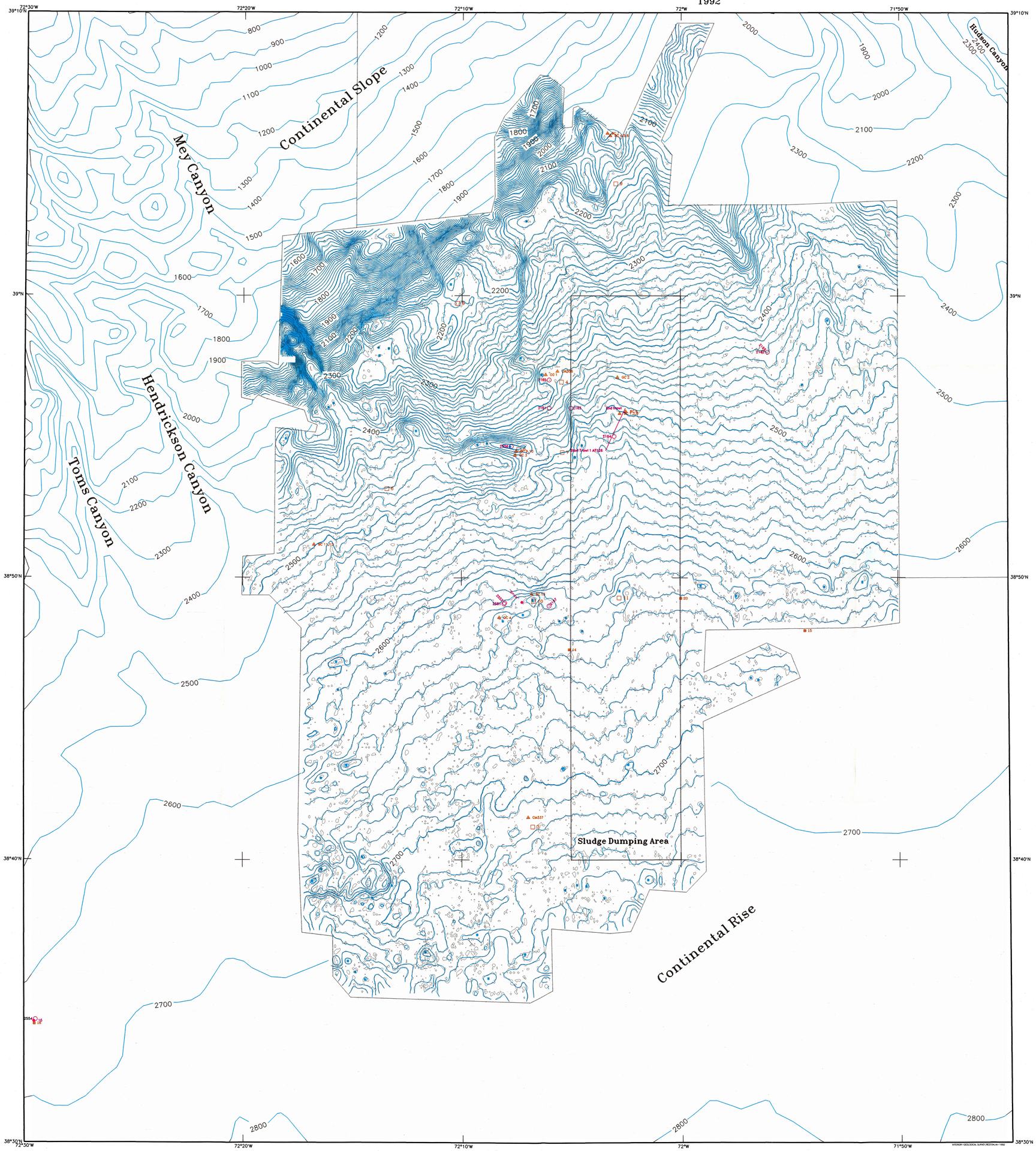

Albers Equal-Area Conic Projection

Standard Parallels 29°30'N and 45°30'N.

Bathymetry compiled from various sources as outlined in text is not intended for navigational purposes.

Contour Interval 10 meters in central area, 100 meters in peripheral areas.

Scale 1:100000

0 5 10 15 KILOMETERS

0 2 4 6 8 10 NAUTICAL MILES

EXPLANATION

The bathymetry of the sea floor south and west of Hudson Canyon off New York and New Jersey was mapped as part of a study to determine the effects of offshore dumping of municipal sewage sludge on the sea bottom (index map). The detailed bathymetric data were acquired aboard RV Atlantis II during September, 1989, by using a Sea Beam multibeam echo-sounding system[1] and computer software developed by the University of Rhode Island (Davis and others, 1986; Tyce, 1986). The map depicts 1750 km^2 of the sea floor at a 10-m contour interval. Some sea-floor sample and observation sites are indicated.

The Sea Beam system measures water depths using 16 acoustic beams in a swath across the ship's track. The beams are shaped by two sets of hull-mounted transducers, one set mounted along the keel and the other athwartship, and are corrected for pitch and roll. The resolution of the depth measurements is limited by the pulse length and frequency of digitization to about 2.5 m. Areal resolution is limited by the 2.66° cone shape of each beam. The maximum width of the swath mapped by the system corresponds to 73 percent of the water depth. Many individual echo soundings in swaths along the survey-ship's track were compiled and gridded into 125-m cells for contouring. The grid was contoured for this plot using an ISM[1] computer program. The narrow black contours are unsmoothed to allow some assessment of the data, and the blue contours are smoothed.

The trackline direction of this survey was primarily north-south. A textural effect of north-south banding and some spurious north-trending low scarps are found on the map some in some places on the continental rise, due to small discrepancies in the position of the ship from line to line and the very low slope of the bottom surface (about 0.5°). Scattered boulders and some downslope-trending furrows and ridges (3-4 m relief) in the central area of the map that were observed from DSRV ALVIN and by deep-towed sidescan-sonar systems are below the resolution of these bathymetric data (Robb et al., 1990; Robb and Grassle, 1991).

Bathymetry of this detail and resolution was not available previously for this part of the continental rise, and the surrounding area is shown using contours from two other sources. A set of 100-m bathymetric contours (from the National Oceanographic and Atmospheric Administration, digitized by NOAA and the United States Geological Survey (Escowitz and others, 1988) is used in the western and southern parts of the map. Unpublished 100-m contours derived from a 1983 Sea Beam survey and bathymetric data of the Lamont-Doherty Geological Observatory (A. N. Shor, personal communication, 1990) are used to the northeast of the detailed survey.

Outline of the Deepwater Municipal Sludge Dumpsite is shown as designated by the U. S. Environmental Protection Agency (49 FR 19005) 4 May 1984.

Navigation for the Sea Beam bathymetry collected in 1989 aboard RV Atlantis II relied primarily on Loran-C, supported by fixes from the satellite-based Global Positioning System (GPS).

ACKNOWLEDGEMENTS

J. Frederick Grassle of Rutgers University organized the overall program to study the benthic environment of this deep-water dumpsite region, of which this investigation is one part. I thank the officers and crews of RV Farnella and RV Atlantis II, the Alvin Group of the Woods Hole Oceanographic Institution, and the Sea Beam processing group of the Graduate School of Oceanography, University of Rhode Island; Joyce Miller shepherded the collection and processing of the Sea Beam bathymetric data aboard Atlantis II. A. N. Shor of the University of Hawaii kindly gave pemission to use his contours of bathymetry in the region of Hudson Canyon. This work was funded by the National Undersea Research Program of the National Oceanic and Atmospheric Administration and the U. S. Geological Survey.

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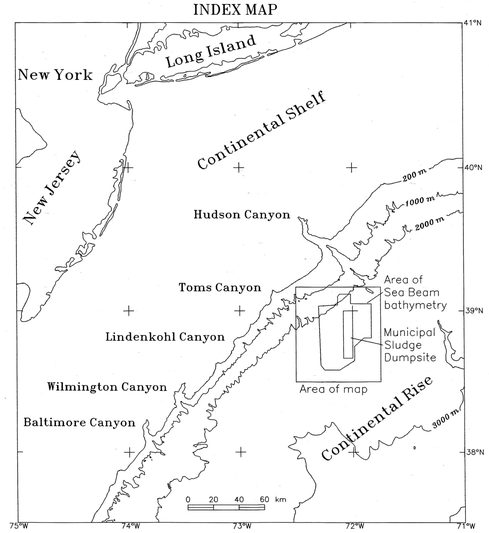
Tyce, R. C., 1986, Deep seafloor mapping systems -- a review: Marine Technology Society Journal, v. 20, no. 4, p. 4-16.

[1]Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

LEGEND

- DSRV Alvin dives (2161-2167, 1989; 2549-2556, 1992)
- RV Atlantis II, Cruise 122 stations (1989)
- RV Oceanus, Cruise 222 stations (1990)
- RV Oceanus, Cruise 227 stations (1990)
- RV Betty Chouest (1991) stations (1991)
- RV Atlantis II, Cruise 126 stations (1992)
- Topographic depressions (i.e., closed-contour lows in the unsmoothed contours)

INDEX MAP



Map approved for open-file release October 8, 1992

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code.

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