UNITED STATES DEPARTMENT OF TH ERIOR

GEOLOGICAL SURVEY

SIDESCAN DATA COLLECTED IN THE WILMINGTON CANYON AREA DURING 1980, GYRE CRUISE 80-G-8B

by

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Prepared in cooperation with the

U.S. BUREAU OF LAND MANAGEMENT

under Memorandum of Understanding AA851-MU0-18

[and in cooperation with the Lamont-Doherty Geological Observatory]

Open-File Report 82-499

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS or the Bureau of Land Management.

1982

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During 1980, geophysical data were collected seaward of New Jersey in the vicinity of Wilmington Canyon (Fig. 1) on three cruises, GYRE 80-G-7B (McGregor and Hampson, 1982), GYRE 80-G-8B (discussed here), and ENDEAVOR 80-EN-056 (McGregor, 1982). The objectives of these surveys of the Continental Slope and upper Rise, including Wilmington Canyon and the adjacent margin, were to extend existing geophysical coverage (McGregor and Bennett, 1981) to the south of Wilmington Canyon and to provide detailed geologic and geophysical data on the possible origin and evolution of submarine canyons and on sediment transport and other processes within the canyon domain.

On GYRE Cruise 80-G-8B, September 10-13, 1980, a midrange sidescan-sonar survey was conducted in the study area (Fig. 1) in cooperation with Lamont-Doherty Geological Observatory of Columbia University. The sidescan images show the microtopography of the slope in plan view. The tracklines were oriented obliquely across the Continental Slope (Fig. 2). One profile was run perpendicular to the slope parallel to Wilmington Canyon to study the canyon axis. The trend of the profiles oblique to the major down-slope trending morphologic features was selected to show the interrelationship of the morphologic features as well as to increase the length of time each feature reflected the sound.

The navigation for this cruise is based on Loran C. All times given on the data and navigation plots are in Greenwich mean time (GMT or Z).

A Sea Marc I sidescan-sonar system constructed by International Submarine Technology, Inc., of Redmond, Washington, was used. The sonar fish was towed at a speed of approximately 2 knots (3.7 km/hr) while being maintained approximately 300 m above the sea floor. In water depths of 2,000 m, the fish could be as far as 3 km behind the ship. A swath of sea floor 5 km wide was mapped along each trackline (2.5 km to each side).

Data recorded simultaneously included sidescan data in various formats as well as profile data. A strip chart of real-time, slant-range-corrected, dual-channel images, port and starboard, 2.5-km swath per channel, is labeled "A" or "orthorectified". This record was occasionally adjusted manually for rate of paper feed as the ship speed varied. Another strip chart of slant-range-corrected, dual-channel images, port and starboard, 2.5-km swath per channel, at a constant rate of paper feed, is labeled "B" or "slant range corrected". A dual-channel strip-chart record with no corrections is labeled "Raw port (P) + starboard (S)" and shows data for a 3-km swath per channel. A separate, single-channel strip chart with no data corrections of each of the "Raw port" and "Raw starboard" data with 3-km swath and 4-second sweep rate was also collected. Shallow penetration subbottom profile data were collected using a 3.5-kHz hull-mounted transducer on R/V GYRE and a 4.5-kHz transducer mounted on the sidescan fish. Strip-chart records for each of these are labeled "Ship's 3.5 kHz" (most data were collected at a 4-second sweep rate; a few data were collected at a 1-second sweep rate), and "fish-flyer record"; the dual-channel record shows ship's 3.5-kHz profile and the fish 4.5-kHz profile.

The quality of the records is generally very good.

The interpretation of these data was discussed by McGregor and others (1982) and Stubblefield and others (1982).

Original records may be viewed at the U.S. Geological Survey, Woods Hole, MA 02543. Microfilms of the data and 1:40,000 scale trackcharts can be purchased only from the National Geophysical and Solar-Terrestrial Data Center, NOAA/EDIS/NGSDC, Code D621, 325 Broadway, Boulder, Colorado, 80303 (303-497-6338).

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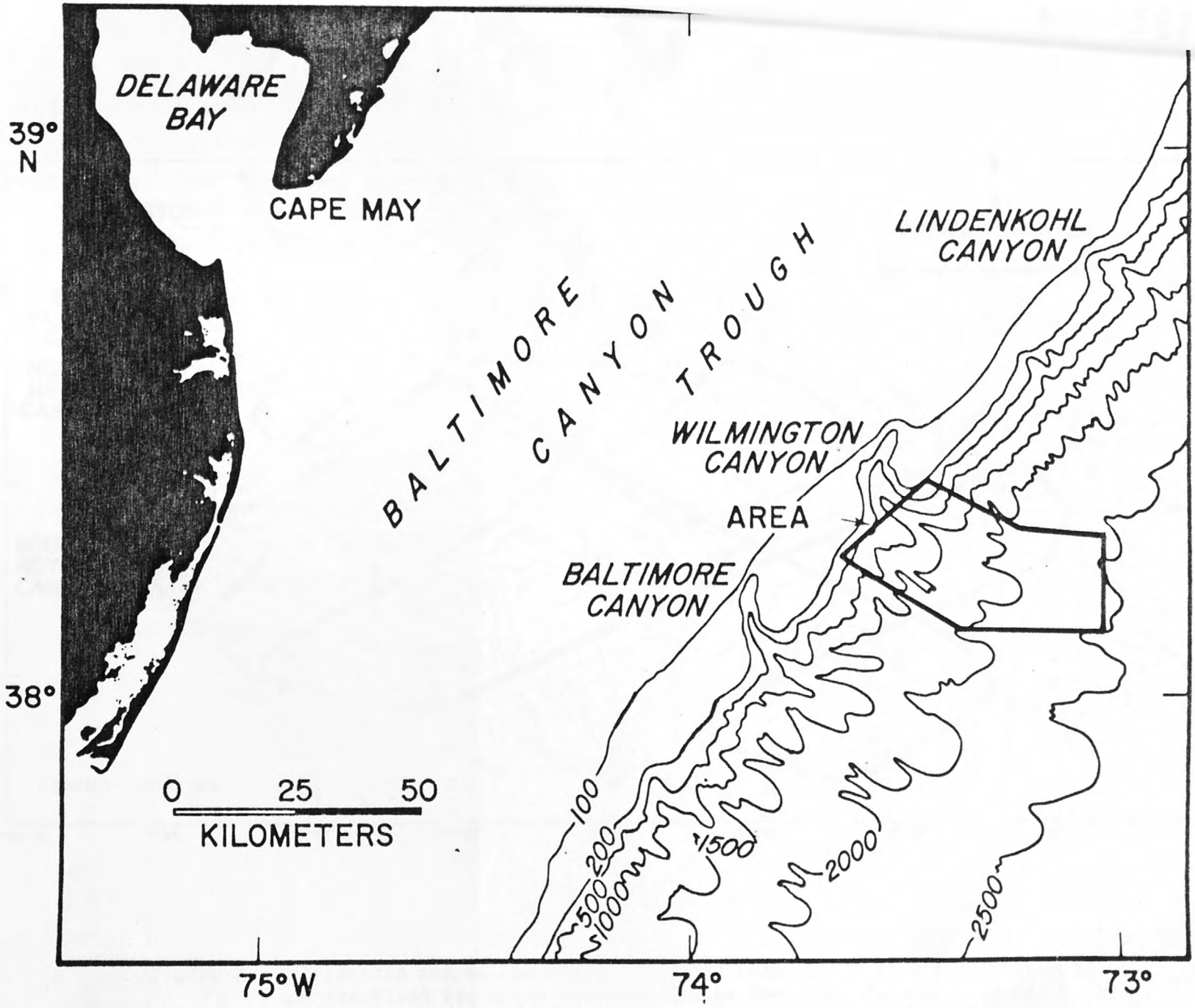

Figure 1. Index map showing location of study area in the vicinity of Wilmington Canyon. Contours are in meters.

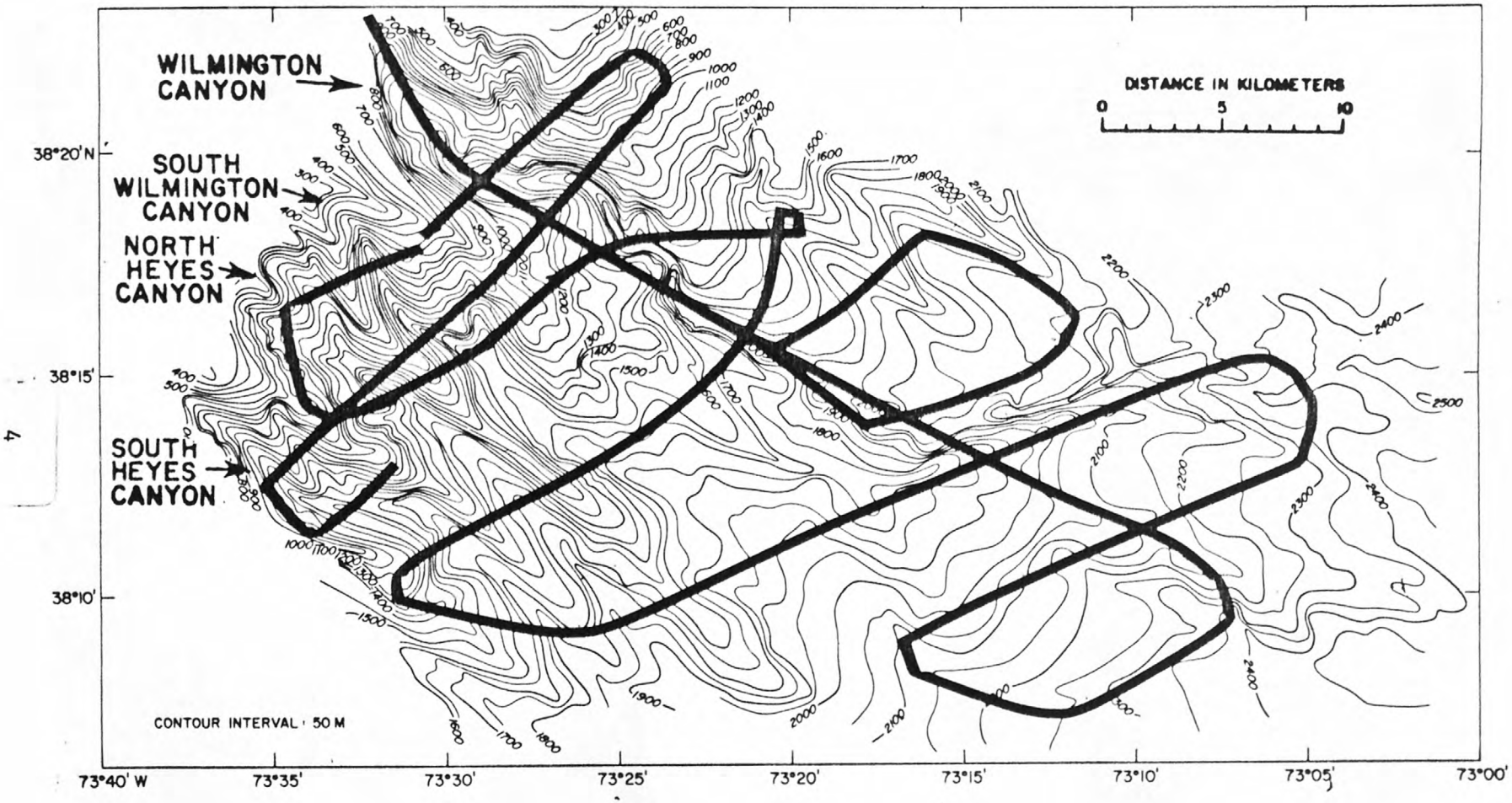

Figure 2. Bathymetric map of the slope and upper rise (see Fig. 1 for location) and trackline locations for GYRE Cruise 80-G-8B. Canyon names are from Veatch and Smith (1939).