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Single-channel seismic-reflection profiles collected on the northern Blake Plateau 29 September to 19 October 1978

by Peter Popenoe

During 29 September to 19 October 1978, the U.S. Geological Survey (USGS) collected 3,570 km of single-channel airgun, 3,487 km of minisparker, and 3,565 km of 3.5-kHz echo-sounder seismic-reflection profiles from the Research Vessel COLUMBUS ISELIN in the area of the northern Blake Plateau (fig. 1). These data were acquired in cooperation with the U.S. Bureau of Land Management (BLM) as part of a study to determine potential geologic hazards or limitations to petroleum exploration or development on the northern Blake Plateau area. Fourteen lines were acquired perpendicular to the margin and were spaced about 25 km apart; two converging tie lines parallel the margin. The seismic-reflection profiles were placed to intersect similar seismic lines acquired in 1976 to 1977 on the Florida-Hatteras Shelf and inner Blake Plateau (Paull and Dillon, 1979) and to be tied to the offshore drill holes JOIDES 4 and 6 and ASP3 (Emery and Zarudzki, 1967; Schlee, 1977; Dillon and others, 1979). All acquired seismic-reflection data are of excellent quality, and for airgun data, penetration is to a depth equivalent to a two-way travel time of as much as 2.0 seconds.

Three acoustical energy sources were utilized simultaneously

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throughout the survey: two Bolt 40-in^3 airguns were fired simultaneously at 10-s intervals at a pressure of 2,000 psi; a Teledyne sparker unit of 600 joules was activated at a repetition rate of 1.5 s; and a ORE 3.5-kHz-tuned transducer was used in an overside fish. Return signals from the airguns were gathered by a 300-m-long hydrophone array consisting of 200 elements, and a shorter 20-element array received the sparker signal. Towing speeds were maintained between 5 and 6 knots and the hydrophones were streamed at a depth of 4 to 5 m. Analog signals were recorded on magnetic tape and graphically on EPI recorders after passing through band-pass filters set for 150/300 Hz for the sparker system and 65/150 Hz for the airgun unit. Sweep rates were 0.5 s for the sparker and 1.0 and 2.0 s for airgun.

Navigation was by Loran-C (5-minute fix interval) and satellite.

The original data may be inspected at the offices of the U.S. Geological Survey in Woods Hole, MA 02543. Microfilm copies of the data are available for purchase from the National Geophysical and Solar-Terrestrial Data Center (NGSDC), Boulder, CO 80303.

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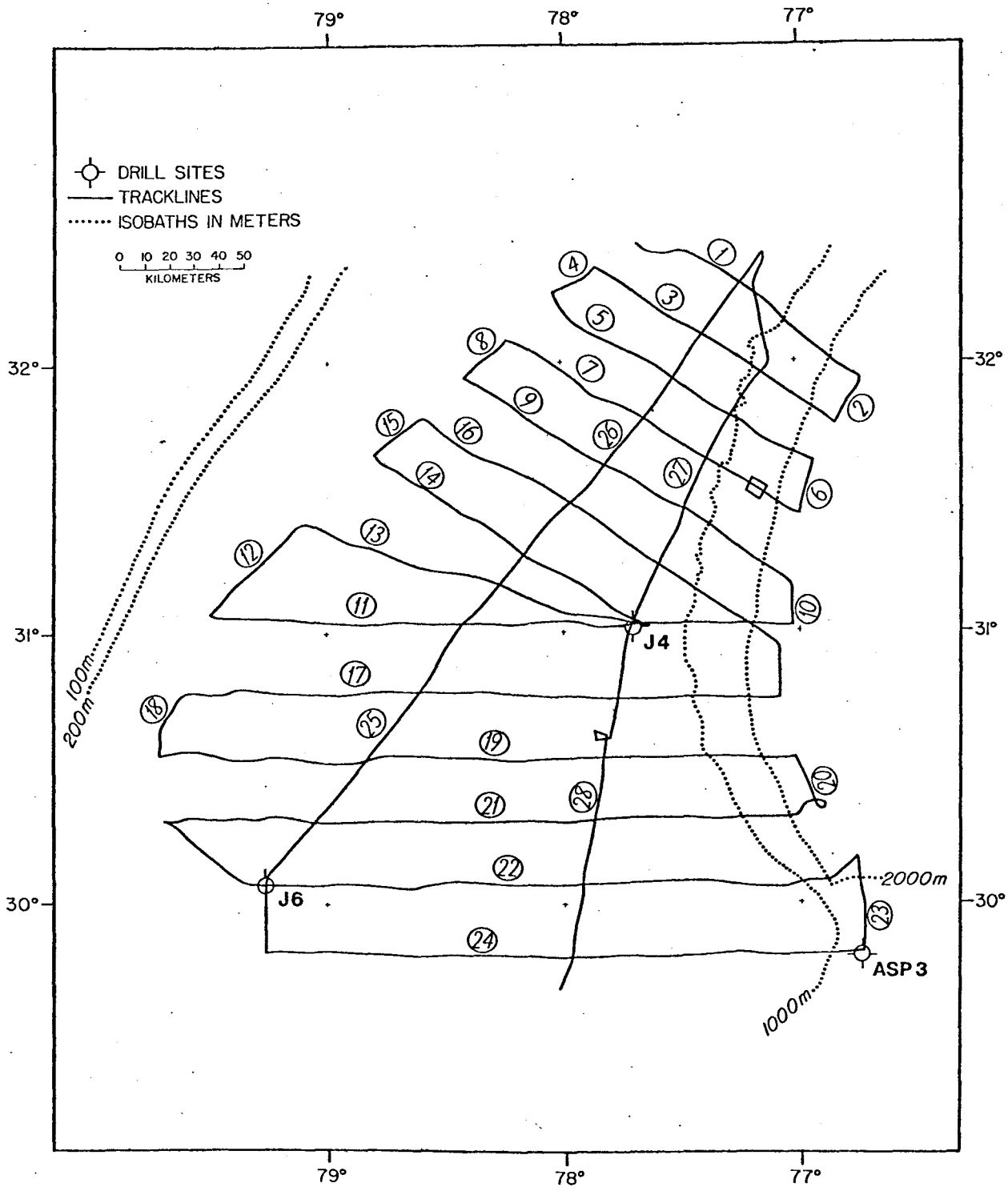

Figure 1. Index map showing locations of tracklines and drill sites, R/V COLUMBUS ISELIN CRUISE CI 7-78-3, 29 September - 19 October 1978.