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Single-channel seismic-reflection profiles collected over the U.S. Atlantic Continental Shelf, Slope, and Rise east of Cape Hatteras

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The U.S. Geological Survey collected more than 8,500 km of single-channel seismic-reflection profiles during the R/V FAY 019 cruise in July and August 1976. The purpose of the 19-day cruise was to obtain long geophysical profiles over the Continental Shelf, Slope, and Rise off Cape Hatteras on the Atlantic coast (fig. 1) between the more heavily surveyed oil and gas lease sale sections of the Baltimore Canyon Trough and the Southeast Georgia Embayment areas.

Seismic instruments included a Teledyne 1/ 600-joule minisparker system, a 3.5-kHz echosounder, an airgun system which used four airguns of variable chamber capacity as sound sources, and a Seismic Engineering Inc. streamer with 40 acceleration-cancelling multidyne (MDS) hydrophone transducers in a single 300-foot-long active element. The streamer had a 100-foot stretch section and as much as 400 feet of faired lead-in cable. During the cruise, 200 to 300 feet of lead-in cable were normally deployed to enable the streamer to reach a depth of 35 to 40 feet, which was measured by a depth transducer at the head of the active section. In general, one 40-in^3 gun was used on the shelf, and the 80-in^3 or 160-in^3 guns were used in deeper water.

1/ Use of trade names in this report is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.

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Filter settings were between 16 and 60 Hz for deepwater work, and 3 to 4 seconds of penetration were frequently obtained. The airgun records were recorded on a Raytheon 19-inch dry paper recorder on a 5-second sweep; in deepwater, the delay was as long as 5 seconds. Firing rates ranged from 5 to 15 seconds. On a few occasions, a 2-second sweep and firing interval was tried in shallow water.

The minisparker system was a Teledyne 600-joule system with EPC Curley 19-inch dry paper recorders on half-second sweep with a 1-second repetition rate. The data were usually filtered between 280 and 1060 Hz.

An ORE 3.5-kHz transducer, towed at a depth of about 5 meters, was used with a Raytheon CESP II pulse correlation system and an automatic digital tracking system for echo sounding.

Navigational control during the cruise was maintained by means of an Integrated Navigation System (INS) contracted through Western Geophysical, Inc. The INS contained the following subsystem:

1. Satellite receiver.
2. Teledyne range-range LORAN C unit.
3. Rubidium frequency standard.
4. Mark 29 gyrocompass.
5. Hewlett-Packard 21MX computer system.
6. Two 9-track digital tape transports.
7. Calcomp 30-inch plotter.
8. Keyboard and line printers.

The airgun profiles provide excellent resolution of basement and the deeper Mesozoic horizons; the minisparker profiles provide equally

good high-resolution control of the upper 500 meters of sediment. The 3.5-kHz profiles did not show any subbottom reflections (even on the Continental Shelf) and served only to provide bathymetry in shallow waters. During the cruise, 8,540 line kilometers of data were collected, including 3,590 km of airgun data, 4,270 km of minisparker data, and 680 km of 3.5-kHz data.

The original records may be examined at the U.S. Geological Survey, 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 80302.

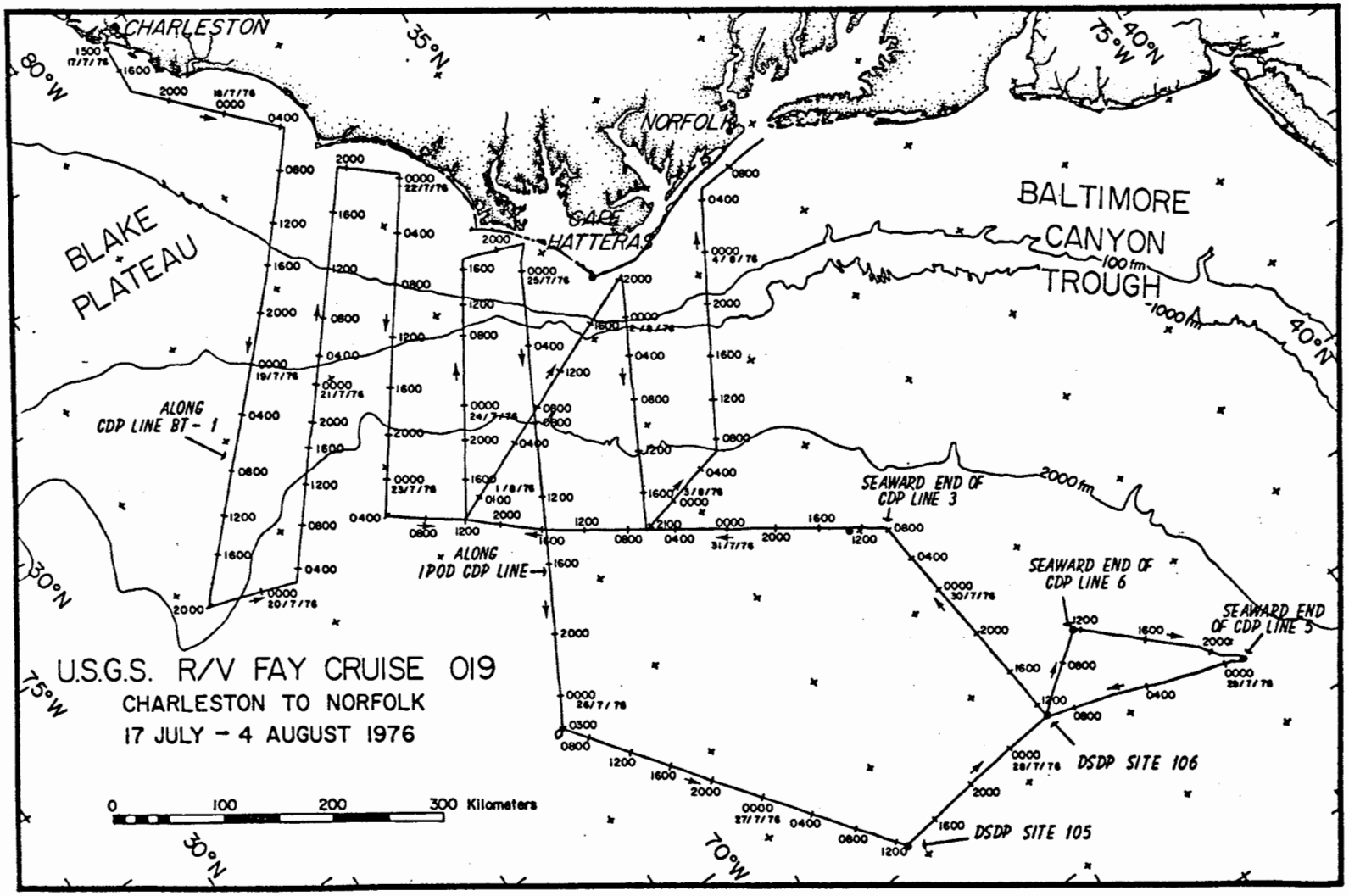

Figure 1. -- Course followed during R/V FAY cruise 019. CDP, common depth point; DSDP, Deep Sea Drilling Project; IPOD, International Program of Ocean Drilling.