

**U.S.G.S. MARINE GEOLOGIC STUDIES IN THE BEAUFORT SEA, ALASKA,
1979; DATA TYPE, LOCATION, AND RECORDS OBTAINED**

By

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The U.S.G.S. vessel R/V KARLUK ran approximately 1300 kilometers of trackline surveys on the inner shelf of the Beaufort Sea, Alaska, from July through September 1979. In addition to the trackline surveys, 12 observational SCUBA dives were made and 20 vibracore samples were collected. Three maps (PLATES 1 through 3) show the locations of tracklines, dive sites, and vibracore stations. A portion of the work was funded by the Bureau of Land Management; Outer Continental Shelf Environmental Assessment Program.

Ice and weather conditions were very favorable this season and several major areas and environments were studied in detail:

- 1) Several trackline surveys using fathometer, side-scanning sonar, and high-resolution seismic gear were run seaward of the islands between Cross and Flaxman Islands (Plates 2 and 3), where major data gaps existed.
- 2) High-resolution seismic surveys were run over the sites of 20 U.S.G.S. Conservation Division core holes that were drilled during the winter of 1979. These seismic surveys were run to see if the drill logs and seismic records could be correlated.

- 3) Detailed bathymetric and side-scan sonar surveys were run in several areas (test line 1, test line 2, etc.) for the purpose of determining rates of ice gouging and sediment reworking. Some of these surveys were run in order to gain information on arctic nearshore processes (Reindeer Island and Pingok Island surveys are examples).
- 4) Sediment samples and bottom observations were made by SCUBA diving and vibracoring in several different environments which included the Boulder Patch (Reimnitz and Ross, 1979), areas of strudel scour, stiff silty clay outcrops, and ice-gouged terrain.

On most survey lines positions were plotted using a Del Norte range-range system with a distance-measuring accuracy of +3 meters. On most lines this system provided a position accuracy of + 8 meters. However, in areas near the baseline extension of the navigation shore stations, the position error is much greater due to the geometry involved. Lines 3, 20 and 63, for example, were run near the baseline extensions and therefore have some positioning errors. In areas not covered by the Del Norte system, radar ranges were taken from available targets, usually with an accuracy of +200 m.

Bathymetry was recorded on a Raytheon RTT 1000 dry paper recorder using either a hull-mounted 200 kHz transducer with an 8⁰ beam width, or a 200 kHz narrow beam (4⁰) transducer towed below the surface. All records are corrected for draft of vessel or tow depth. A 7 kHz transducer used in conjunction with the RTT 1000 recorded subbottom reflectors up to 5 m below the sea floor. Deeper penetration high-resolution seismic data were recorded on an EPC Model 1400 recorder at 1/4 or 1/2 second sweep and fire, the signal was filtered to approximately 600-1600 kHz. Several different sound sources were used for the high-resolution seismic work including a 500J minisparker, a 600J EG&G Model 234 uniboom, a 500J 3-tip sparker, and a 10 inch³ air gun.

The side-scan sonar records were taken using a Model 259-3 EG&G system and a Model 272 sonar fish operated with a 105 kHz 1/10 second pulse at a 20⁰ beam angle depression.

Vibracore samples were obtained with a Kiel vibracorer. The vibracore uses an electric motor to drive a hammer against an anvil at the core head. The force generated by the hammer striking the anvil 2,840 times a minute drives a 2-m core barrel into the sediment. The core barrels are 10 x 10 cm metal boxes. Core lengths varied from 20 to 190 cm.

Data acquired consist of approximately 1150 km of bathymetry and 7 kHz subbottom profiles, 825 km of side-scan sonar, and 630 km of high-resolution seismic records. The data is in the form of 37 rolls of bathymetry, 30 rolls of side-scan sonar, 14 rolls of high-resolution seismic records, 2 rolls of Simrad fathometer records, and the ship's log. The ship's log contains important information on systems in use on each line, system settings (scale, filters, etc.), navigational data used in plotting the lines and information on unique observations or system difficulties. In addition to the above data, 10 observational SCUBA dives were made and 20 vibracore samples were collected. All data are available for inspection at the U.S. Geological Survey, Rm. B-164, Deer Creek Facility, 3475 Deer Creek Road, Palo Alto, California 940304. Copies of this report and the data are available from National Geophysical and Solar-Terrestrial Data Center, NOAA, Boulder, CO 80302.

The data presented here are currently being studied by the authors as part of a long-term study of the Beaufort Sea. The authors may be contacted for a bibliography of publications using the above data and data from previous years.

Reference

Reimnitz, Erk, and Ross, Robin, 1979, Lag deposits of boulders in Stefansson Sound, Beaufort Sea, Alaska, U.S. Geological Survey Open-file Report 79-1205, 26 p.