UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Cruise Results L7-80-BS
Northern Bering Sea:
Geophysical Investigations

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Cruise Results L7-80-BS
August-September 1980

The U.S. Geological Survey research vessel S.P. LEE was used to conduct geophysical studies and geologic sampling in Norton Basin during cruise L7-80-BS in August and September 1980. The work was a continuation of geologic hazard investigations of Norton Basin under NOAA's Outer Continental Shelf Environmental Assessment Program (OCSEAP). Previous OCSEAP cruises in Norton Basin were conducted in 1976, 1977, 1978, and 1979. The 1980 work consisted largely of high- and low-resolution seismic reflection profiling and side-scan sonar surveys as well as vibracore sampling in Western Norton Basin (Chirikov Basin). Additional seismic surveys and sampling operations were carried out at predesignated sites of geologic interest, particularly in Norton Sound, north of Cape Prince of Wales, and in the sand wave fields west of Port Clarence.

The navigation utilized consisted of an integrated system employing Motorola satellite, Loran-C, and doppler sonar input. The close proximity of the Loran-C master station at Port Clarence, however, severely handicapped the performance of the integrated system. Final navigation tracklines are based primarily on satellite derived positions. Positions between successive satellites are calculated using deadreckoned fixes updated by doppler sonar and Loran-C inputs. Line-of-sight and radar positioning supplement positions calculated by the integrated navigation system. Location accuracy is 100 meters or better.

Tracklines, annotated navigation positions, and station locations are presented in Maps 1 and 2. Figure 1 shows the type of data collected along tracks. Due to weather problems, equipment malfunction, and equipment maintenance not all geophysical equipment was operated continuously.

Single Channel Airgun. A Teledyne single-channel streamer was used to receive deep-penetration seismic data produced by an array of two 40 in^3 airguns. Signals were processed through a Teledyne amplifier and band-pass filtered at 25-98 Hz. Records were displayed on a Raytheon recorder and annotated every 15 minutes with date, time, depth, and line number. Changes in ships course, speed, or equipment status were noted when they occurred.

Uniboom. A hull-mounted Uniboom system with a towed hydrophone streamer were used to collect high-resolution records of the upper 100 m of sediment. Records were printed on a Raytheon recorder after processing through a Krohn-Hite filter. Time marks were made every five minutes and complete annotation every 15 minutes.

3.5 and 12 kHz profiling. One or both of these systems were operated during underway and on-station operations. They monitored detailed bathymetry and resolve shallow, close-spaced, reflecting horizons. Hull-mounted transducer and receiver arrays are used in both systems. Records were recorded and annotated in a fashion similar to that of Uniboom records.

Side-Scan Sonar. An EG&G SMS-960 digital side-scan sonar provided good to excellent quality data along the survey track. The system was normally operated at a scale of 100 m to either side of the towed fish. An instrument altitude of 5 to 7 m was maintained as closely as possible.

The seismic data, cores, videotapes, and bottom photographs may be examined at the United States Geological Survey Office, Room B-164, 3475 Deer Creek Road, Palo Alto, CA, 94304. Copies of the seismic data on 35 mm continuous flow film are available through the National Geophysical and Solar-Terrestrial Data Center, NOAA, Boulder, CO, 80302, telephone (303) 499-1000, ext. 6542.

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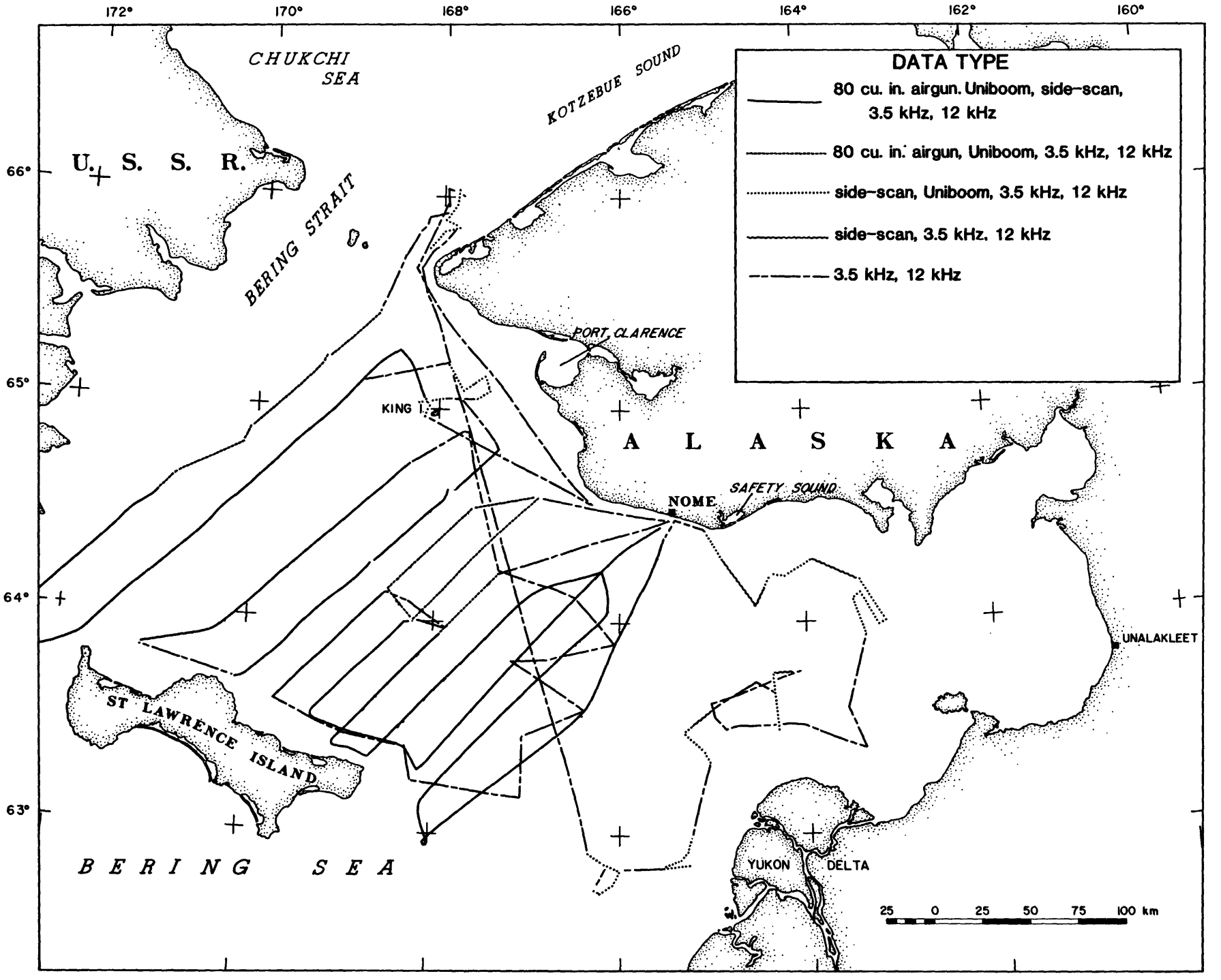
172°
170°
168°
166°
164°
162°
160°
66°
65°
64°
63°
CHUKCHI SEA
KOTZEBUE SOUND
U. S. S. R.
BERING STRAIT
PORT CLARENCE
KING I.
A L A S K A
NOME
SAFETY SOUND
UNALAKLEET
ST LAWRENCE ISLAND
BERING SEA
YUKON DELTA
DATA TYPE
80 cu. in. airgun. Uniboom, side-scan, 3.5 kHz, 12 kHz
80 cu. in. airgun, Uniboom, 3.5 kHz, 12 kHz
side-scan, Uniboom, 3.5 kHz, 12 kHz
side-scan, 3.5 kHz, 12 kHz
3.5 kHz, 12 kHz
25 0 25 50 75 100 km