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MULTICHANNEL SEISMIC-REFLECTION DATA COLLECTED IN 1982 IN THE EASTERN CHUKCHI SEA

by

Arthur Grantz, Ray W. Sliter, Dennis M. Mann and Steven D. May

U.S. Geological Survey

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In early September 1982, the U.S. Geological Survey (USGS) conducted a reconnaissance geophysical survey from 157° to 170° W longitude across the Chukchi Shelf north of Cape Lisburne (fig. 1). Approximately 920 km of multichannel seismic-reflection data were recorded along five tracklines. The profiles were collected on the USGS Research Vessel Samuel P. Lee, (USGS survey identifier L11-82-CS).

Seismic energy was provided by a tuned array of five airguns with a total volume of 1311 cubic inches of air at a manifold pressure of approximately 1900 psi. The recording system consisted of a 24-channel, 2400 meter long streamer with a group interval of 100 m, and a GUS (Global Universal Science) model 4200 digital recording instrument. A shooting geometry of 50-m shotpoint intervals with 100-m group intervals resulted in 24-fold data collection. Navigational control for the survey was provided by a Magnavox integrated navigation system using transit satellites fixes, and doppler-sonar speed log augmented by Loran-C (Rho-Rho). A 2-millisecond sampling rate was used in the field; the data were later desampled to 4-milliseconds during the demultiplexing process. Record lengths of 8 or 10 seconds were used, which yielded up to 10 seconds of two way travel time. Processing was done at the USGS processing center in Menlo Park, California, in the sequence editing-demultiplexing, velocity analysis, CDP stacking, deconvolution-filtering, and plotting on an electrostatic plotter (Table 1). Plate 1 is a trackline chart showing detailed shotpoint navigation.

Significant recording problems occurred during this cruise. Malfunctions in the interface between the streamer and recording computer caused random high amplitude noise spikes across all channels. Surgical editing of each shot was required to remove the noise which, although time consuming, greatly improved the stacked sections.

The data are available in the following formats:

1) Electrostatically plotted profiles which have been deconvolved and filtered after stacking. Copies of the profiles may be purchased through:

National Geophysical Data Center
NOAA/EDIS/Code D64
325 Broadway
Boulder, Colorado 80303

2) Digital magnetic stack tapes which have been processed using velocities derived from velocity analysis. These tapes are not deconvolved or band-pass filtered. Stack tapes are in Phoenix format- a Seismograph Service Corp., 16-bit integer trace sequential format. Copies of the stack tapes and a description of the tape format can be obtained at the requesters expense by contacting:

Dennis M. Mann
U.S. Geological Survey
345 Middlefield Rd. MS 999
Menlo Park, California 94025
Tel. (415) 354-3174

3) Digital magnetic demultiplexed tapes. These tapes have been edited for missed shots and muting times. Demultiplexed tapes are in Phoenix I format- a Seismograph Service Corp. modified SEG-X 32-bit floating point format. Copies of the demultiplexed tapes and a description of the tape formats can be obtained at the requesters expense by contacting Dennis Mann at the above address.

4) A presentation of the geologic and geophysical framework of the Chukchi Sea is available in:

Scholl, D.W., Grantz, A., and Vedder, J.G., 1988, Geology and Resource Potential of the Continental Margin of Western North America and Adjacent Ocean Basins - Beaufort Sea to Baja California Region, Circum-Pacific Council for Energy and Mineral Resources Earth Science Series, Vol. 6: Circum-Pacific Council for Energy and Mineral Resources, Houston, Texas.

5) Additional copies of this report may be obtained by contacting:

Books and Open-File Reports Section
U.S. Geological Survey
P.O. Box 25425
Federal Center, Bldg 810
Denver, Colorado 80225
Tel. (303) 236-7476

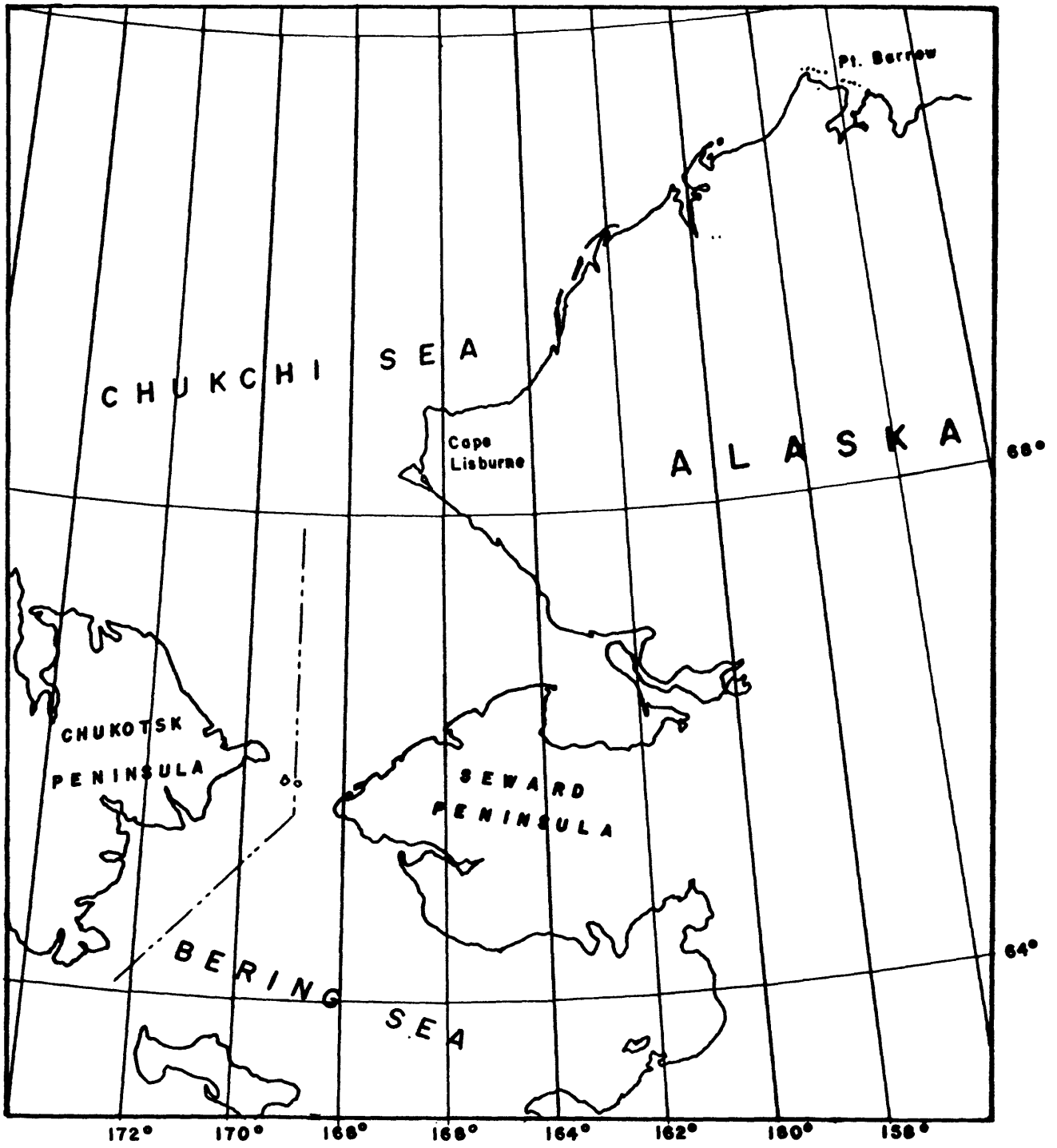

FIGURE 1. AREA OF STUDY. PLATE 1 SHOWS DETAILED LOCATION OF TRACKLINES AND SHOTPOINTS

RECORDING PARAMETERS

DATE RECORDED:	8/82
SOURCE:	BOLT AIR GUNS
AIR GUNS IN ARRAY:	5
NET VOLUME:	1326 CU. IN.
MANIFOLD PRESSURE:	2000 PSI
GUN DEPTH:	8.5 M
SHOT SPACING:	50 M
STREAMER:	SEI MULTIDYNE. CHARGE COUPLED
GEOMETRY:	

GROUP INTERVAL:	100 M
AVERAGE DEPTH:	12 M
GROUP LENGTH:	100 M
PHONES/GROUP:	60
DEPTH CONTROLLERS:	SEI VARIABLE WING BIRDS
RECORDING:	GUS MOOR 4200. BINARY GAIN
SAMPLE INTERVAL:	2 MS
RECORD LENGTH:	10 S
GUS RECORDING FILTER:	5-110 HZ
NUMBER OF CHANNELS:	24
NAVIGATION:	MAGNAVOX INTEGRATED SYSTEM
SHOT ON:	DISTANCE
PRIMARY NAVIGATION:	SATELLITE. DOPPLER SONAR
DIRECTION RECORDED:	E

PROCESSING SEQUENCE

DATE PROCESSED:	6/83
1 DEMULTIPLEX:	
DESAMPLE:	4 MS
GAIN RECOVERY:	
REFORMAT:	PHOENIX I
2 TRACE SHOT EDIT:	
3 STATIC CORRECTIONS:	
RECORDING STATICS:	156 MS
DATUM:	SEA LEVEL
4 CDP SORT:	
5 VELOCITY ANALYSIS:	
WINDOW LENGTH:	100 MS
WINDOW INTERVAL:	4 MS
BAND PASS FILTER:	3-6-40-50 HZ
VELOCITY RANGE:	1400-4000 M/S
6 NMO CORRECTION:	
7 24-FOLD TAPER STACK:	WEIGHTED
8 BANDPASS FILTER:	COSINE
FILTER POINTS:	101
TIME WINDOW:	0.0 - 8.0 S
FREQUENCY:	4-8-35-45 HZ
9 PREDICTIVE DECONVOLUTION:	
DESIGN WINDOW:	2000 MS
OPERATOR:	200 MS
GAP:	32 MS
10 AGC WINDOW:	500 MS

PLOT PARAMETERS

MODE:	VARIABLE AREA/WIGGLE TRACE
HORIZONTAL SCALE:	20 TRACES/IN.
VERTICAL SCALE:	1.75 IN./S
CLIP:	1.75 TRACE WIDTHS
GAIN:	1.0 (SCALAR)

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Table 1. Recording parameters, processing sequence and plot parameters for stacked multichannel seismic-reflection data collected on USGS cruise L11-CS-82