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Geological Survey

MULTICHANNEL SEISMIC-REFLECTION DATA COLLECTED
IN 1981 ACROSS THE ALEUTIAN ARC AND TRENCH, ALASKA

by

Dave W. Scholl, Dennis M. Mann, Tracy L. Vallier and Ray W. Sliter

Open File Report
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Menlo Park, CA

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In late July and early August 1981, the U.S. Geological Survey (USGS) conducted a reconnaissance geophysical survey from 173 to 171 W longitude along the Aleutian Arc and Trench, near the islands of Atka, Amlia, Kiska, and Agattu. Approximately 2100 km of 24-channel seismic-reflection data were recorded: eight lines of data perpendicular and seven subparallel to the trench-arc system. The profiles were collected on the USGS Research Vessel S.P. Lee, (USGS survey identifier L9-AA-81).

Seismic energy was provided by a tuned array of five airguns with a total volume of 1301 cubic inches of air compressed to 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 and doppler-sonar. A 2-millisecond sampling rate was used in the field; the data were later desampled to 4-milliseconds during the demultiplexing process. Record length of 8 to 12 seconds was used which, combined with a deep water delay, yielded up to 16 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. Sheets 1 and 2 are trackline charts showing shotpoint navigation.

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 PhoenixI format; a Seismograph Service Corp. modified S.E.G.-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 geological and geophysical results from the 1981 Aleutian Arc survey 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:

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

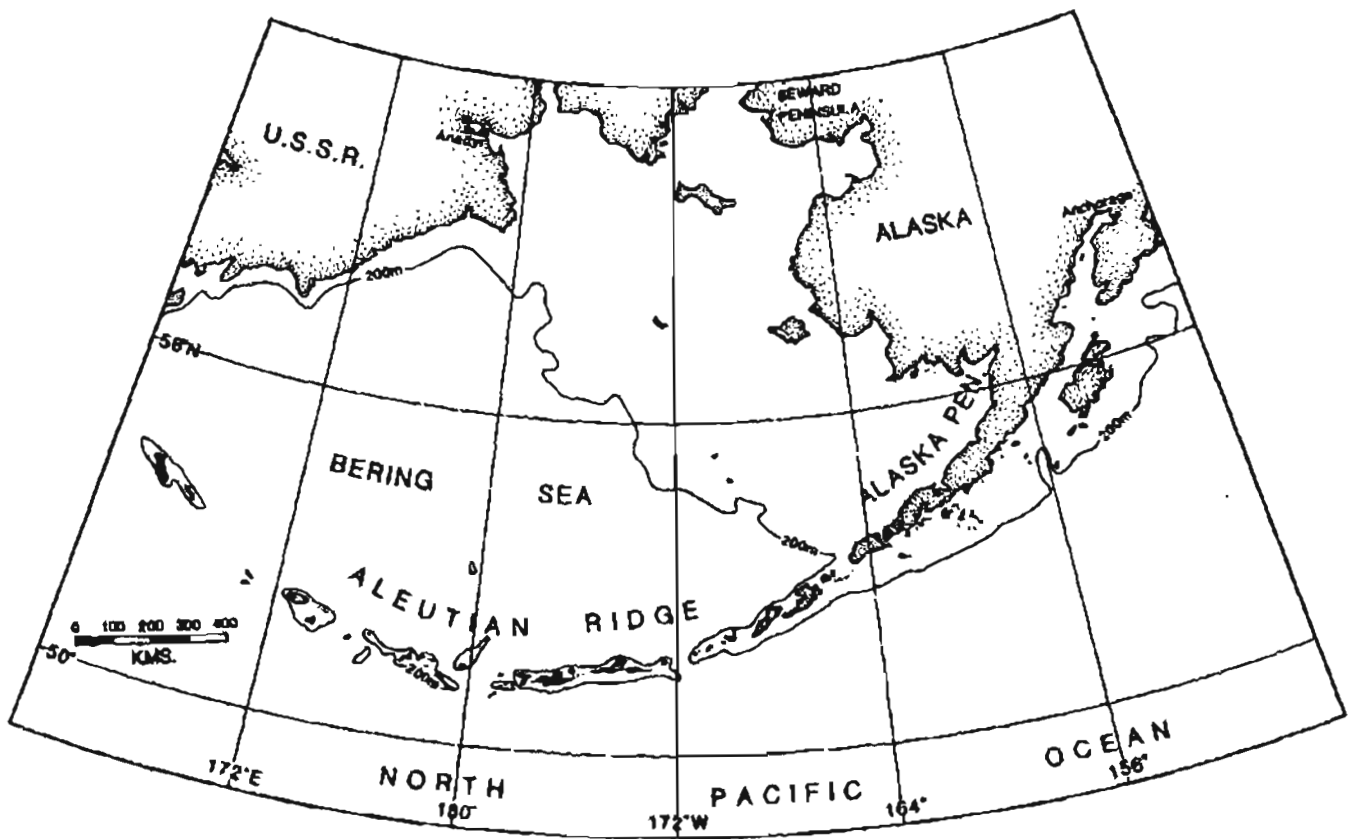


Figure 1. Area of study. Plates 1 and 2 show detailed tracklines and shotpoint locations.

RECORDING PARAMETERS

DATE RECORDED: 7/81
 SOURCE: BOLT AIR GUNS
 AIR GUNS IN ARRAY: 5
 NET VOLUME: 1313 CU. IN.
 MANIFOLD PRESSURE: 2000 PSI
 GUN DEPTH: 8.5 M
 SHOT SPACING: 50 M
 STREAMER: SEI MULTIDYNE. CHARGE COUPLED
 GEOMETRY:

CENTER FAR TRACE ← 261.1 M → CENTER NEAR TRACE ← 287 M → SOURCE ← 98 M → SHIP

GROUP INTERVAL: 100 M
 AVERAGE DEPTH: 12 M
 GROUP LENGTH: 100 M
 PHONES/GROUP: 60
 DEPTH CONTROLLERS: SEI VARIABLE WING BIRDS
 RECORDING: GUS MODR 4200. BINARY GAIN
 SAMPLE INTERVAL: 2 MS
 RECORD LENGTH: 11 S
 GUS RECORDING FILTER: 5-110 HZ
 NUMBER OF CHANNELS: 24
 NAVIGATION: MAGNAVIX INTEGRATED SYSTEM
 SHOT ON: DISTANCE
 PRIMARY NAVIGATION: SATELLITE
 DIRECTION RECORDED: S

PROCESSING SEQUENCE

DATE PROCESSED: 2/82
 1 DEMULTIPLEX:
 DESAMPLE: 4 MS
 GAIN RECOVERY:
 REFORMAT: PHOENIX I
 2 TRACE SHOT EDIT:
 3 STATIC CORRECTIONS:
 RECORDING STATICS: 276 MS
 DATUM: SEA LEVEL
 4 COP 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 STACK: NORMALIZED WEIGHTING
 8 BANDPASS FILTER:
 FILTER POINTS: COSINE
 TIME WINDOW: 101
 FREQUENCY: 0.0-10.0 S
 4-8-50-60 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: 1.50 IN./S
 CLIP: 2.0 TRACE WIDTHS
 GAIN: 1.0 (SCALAR)

ANY USE OF TRACE NAMES IS FOR PURPOSES OF IDENTIFICATION ONLY AND DOES NOT
 IMPLY ENDORSEMENT BY THE U. S. GEOLOGICAL SURVEY

CHIEF SCIENTISTS: D. SCHOLL, T. VALLIER PROCESSORS: D. HANN, R. SLITZER

Table 1. Recording parameters, processing sequence and plot parameters for stacked multichannel seismic reflection data collected on USGS cruise L9-81-AA.