United States
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Geological Survey

MULTICHANNEL SEISMIC-REFLECTION PROFILES COLLECTED IN MAY 1981, BETWEEN LATITUDES 40° 40' AND 45° 00' NORTH, OFFSHORE OF NORTHERN CALIFORNIA AND SOUTHERN OREGON

by

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[1]Menlo Park, CA

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During May 1981 the US Geological Survey (USGS) collected approximately 1005 km of 24-channel seismic-reflection data across the continental margin in the eastern Pacific Ocean off of the California and Oregon coast (Plates 1 and 2). This survey area includes the Eel River sedimentary basin offshore of northern California.

The data were collected on the USGS Research Vessel S. P. Lee (cruise identifier L5-81-NC). Seismic energy was provided by a tuned array of five airguns with a total volume of 1311 cubic inches of air compressed to approximately 1800 psi. The recording system consisted of a 24-channel streamer 2400 m long, and a GUS (Global Universal Science) model 4200 digital recording instrument. Records were sampled in the field at a 2-millisecond rate and later processed at a 4-millisecond rate. Record lengths vary from 8 to 10 seconds, depending on water depth, in order to obtain 6 to 7 seconds of data below the seafloor. Navigational control for the survey was provided by a Marconi integrated navigation system using transit satellites and doppler-sonar augmented by Loran C (Rho-Rho).

The data were processed at the USGS Marine Seismic Processing Center in Menlo Park, California. Processing was done in the following sequence: editing-demultiplexing, trace-balancing, deconvolution-filtering, velocity analysis and normal-moveout correction, muting, normalized stacking, time-varying bandpass-filtering, automatic gain control, and finally plotting on an electrostatic plotter (Table 1). In areas of shallow seafloor, early arrivals on far-offset traces were muted before stacking to remove refracted energy and the direct-arrival of the outgoing pulse. In deeper water, the near-offset traces were muted before stacking at and below approximately twice the water-bottom time to suppress the water-bottom multiples on the stacked traces.

A reflection geometry of 50-m shotpoint intervals and 100-m group intervals resulted in optimally 24-fold data collection. However, twelve of the included seismic lines are nominally 22-fold after trace editing, and the remaining five lines are 10- to 12-fold, due to reconfiguration of the streamer in the field and subsequent editing. Two of the lines contain minor acoustic interference in the deeper parts of the records that apparently originated from another seismic surveying ship nearby.

The structure and history of the Eel River basin survey area have been recently described in Clarke (1987).

The data are available in three formats:

1. Electrostatically plotted data which have been deconvolved, stacked and frequency-filtered. Copies of the profiles may be purchased through:

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

2. Digital magnetic tapes of the stacked data. Copies of these tapes and a description of the tape format can be obtained at the requester's expense by contacting:

   Data Curator
   Branch of Pacific Marine Geology
   Mail Stop 999
   US Geological Survey
   345 Middlefield Road
   Menlo Park, California 94025

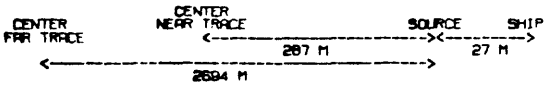
3. Digital magnetic tapes of the demultiplexed 24-fold shot data. These tapes have been edited for missed shots and blanking times. Demultiplexed tapes are in Phoenix-I format, a Seismograph Service Corporation modified S.E.G.-X 32-bit floating-point format. Copies of the demultiplexed tapes and a description of the tape format can be obtained at the requester's expense by contacting the USGS at the above address.

REFERENCES

Clarke, Jr., S. H., 1987, Geology of the California continental margin north of Cape Mendocino: Chapter 15, in Scholl, D. W., Grantz, A., and Vedder, J. G., eds., 1987, Geology and Resource Potential of the Continental Margin of Western North America and Adjacent Ocean Basins--Beaufort Sea to Baja California, Circum-Pacific Council for Energy and Mineral Resources Earth Science Series, Volume 6, pp. 337-351.

RECORDING PARAMETERS

DATE RECORDED:	5/81
SOURCE :	BOLT AIR GUNS
AIR GUNS IN ARRAY:	5
NET VOLUME:	1311 CU. IN.
MANIFOLD PRESSURE:	1800 PSI
GUN DEPTH:	8.5 M
SHOT SPACING:	50 M
STREAMER:	SEI MULTIDYNE. CHARGE COUPLED
GEOMETRY:	



GROUP INTERVAL:	100 M
AVERAGE DEPTH:	8 M
GROUP LENGTH:	100 M
PHONES/GROUP:	30
DEPTH CONTROLLERS:	SEI VARIABLE WING BIRDS
RECORDING:	GUS HDDR 4200. BINARY GAIN
SAMPLE INTERVAL:	2 MS
RECORD LENGTH:	10 S
GUS RECORDING FILTER:	5-110 HZ
NUMBER OF CHANNELS:	24
NAVIGATION:	MARCONI INTEGRATED SYSTEM
SHOT ON:	DISTANCE
PRIMARY NAVIGATION:	SATELLITE. LORAN C
DIRECTION RECORDED:	SE

PROCESSING SEQUENCE

DATE PROCESSED:	12/88
1 DEMULTIPLEX	
DESAMPLE:	4 MS
GAIN RECOVERY:	
REFORMAT:	PHOENIX I
2 TRACE SHOT EDIT	
3 STATIC CORRECTIONS	
RECORDING STATICS:	256 MS
DATAUM:	SEA LEVEL
4 CDP SORT	
5 VELOCITY ANALYSIS:	CONST. VEL. GATHERS
VELOCITY FUNCTIONS:	5
BAND PASS FILTER:	5-10-40-50 HZ
VELOCITY RANGE:	1600-3500 M/S
6 SPIKING DECONVOLUTION	
DESIGN WINDOW:	3000 MS
OPERATOR:	450 MS
WHITE NOISE ADDED:	10 PERCENT
7 NMO CORRECTION	
8 24-FOLD STACK:	NORMALIZED WEIGHTING
9 TIME-VARYING BP FILTER	
TAPER:	HANNING
FILTER POINTS:	101

TIME RANGE (SUB-SEAFLOOR)	PASS-BAND
0.0	5-10-40-50 HZ
4000.0 - END	5-10-20-30 HZ

10 AGC WINDOW:	500 MS

PLOT PARAMETERS

MODE:	VARIABLE AREA/WIGGLE TRACE
HORIZONTAL SCALE:	25 TR/IN
VERTICAL SCALE:	1.25 IN/S
CLIP:	3.0 TRACE WIDTHS
GAIN:	1.0 (SCALAR)

Table 1. Recording parameters, processing sequence and plot parameters for stacked multichannel seismic-reflection data collected on USGS cruise L5-81-NC.