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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1Menlo 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 refrac­
ted energy and the direct-arrival of the outgoing pulse. In deeper water,
the near-offset traces were muted before stacking at and below approximate­
ly 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

RECORDING PARAMETERS

DATE RECORDED: 5/81
SOURCE: BOLT AIR GUNS
AIR GUNS IN ARRAY: S
NET VOLUME: 1311 CU. IN.
MANIFOLD PRESSURE: 1000 PSI
GUN DEPTH: 60.5 M
SHOT SPACING: 50 M
STREAMER: SEI Multidyne, Charge Coupled
GEOMETRY:
CENTR:
FRACTURED:
SOURCE:
SHIP:
207 M -> 27 M
GROUP INTERVAL: 100 M
AVERAGE DEPTH: 6 M
GROUP LENGTH: 100 M
PHONES/GROUP: 50
DEPTH CONTROLLERS: SEI VARIABLE WING BIRDS
RECORDING:
SAMPLE INTERVAL: 2 MS
RECORD LENGTH: 8.5
GUN RECORDING FILTER: 5-110 HZ
NUMBER OF CHANNELS: 24
NAVIGATION:
SHOT ON:
PRIMARY NAVIGATION: HARCOURT INTEGRATED SYSTEM
DIRECTION RECORDED: SE

PROCESSING SEQUENCE

DATE PROCESSED: 12/86
1 DEMULTIPLEX
DESAMPLE:
GAIN RECOVERY:
REFORMAT:
PHOENIX I
2 TRACE SHOT EDIT
3 STATIC CORRECTIONS
RECORDING STATICS:
ORTAUM:
256 MS
SEA LEVEL
4 COP SORT
5 VELOCITY ANALYSIS:
VELOCITY FUNCTIONS:
BAND PASS FILTER:
VELOCITY RANGE:
6 SPIKING DECONVOLUTION
DECONVOLUTION WINDOW:
OPERATOR:
WHITE NOISE ADDED:
10 PERCENT
7 NMO CORRECTION
8 24-FOLD STACK:
NORMALIZED WEIGHTING
9 TIME-VARYING BP FILTER
TAPER:
FILTER POINTS:
HANNING
101
TIME RANGE (SUB-SEAFLOOR): 0.0
4000.0 - END
10 RGW WINDOW:
500 MS

PLOT PARAMETERS

MODE:
HORIZONTAL SCALE:
25 TR/IN
VERTICAL SCALE:
1.25 IN/S
CLIP:
3.0 TRACE WIDTHS
GRIN:
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.