DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Availability of deep crustal multichannel seismic reflection data collected for the Trans-Alaska Crustal Transect, southeastern Alaska

by
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Open File Report 88-521

Introduction

In February and March 1986, the U. S. Geological Survey acquired 190 km of 128 fold, long offset (15 km), seismic reflection data in the southeastern part of Alaska, as part of the Trans-Alaska Crustal Transect (TACT). Part of the objective of this study was to investigate two tectonic terrane boundaries in southern Alaska: the Border Ranges fault, separating the Peninsular terrane to the north and the Chugach terrane to the south, and the Denali fault, separating the Wrangellia terrane to the south from the Yukon-Tanana terrane to the north (Figure 1; Jones et al., 1984).

These data were collected along two north-south trending lines, following the Richardson Highway (Figure 1). The southern line, named the Chugach line, starts near the town of Glenallen, and extends southward to within approximately 60 km of Valdez. The northern line, named the Denali line, extends from approximately 20 km north of Paxon to near the town of Delta Junction. Receiver station maps for the Chugach and Denali lines with respect to UTM coordinates (Alaska coordinate system, zone 3) are shown in Figures 2 and 3, respectively. The acquisition parameters used for both lines are shown in Table 1.

Samples of the common depth point (CDP) stack sections are shown in Figures 4 and 5. Of particular interest are the middle to lower crustal reflections on the southern end of the Chugach line. Geologic interpretation of the Chugach line is provided by Fisher et al. (in press). In addition, Brocher et al. (in press) interprets the upper 2 kilometers along the Chugach line by using refraction modelling of the shot gathers.

Available Data

This open file report announces the release of magnetic tapes that contain the full dataset of demultiplexed and correlated field records. There are a total of 76 tapes for the Chugach line and 59 tapes for the Denali line. The data were written at 6250 bpi in a non-standard format, described in Table 2. In addition, tapes are available of the line geometry. Copies of these tapes can be obtained at the requester's expense by contacting,

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Additional Copies of this report may be obtained by contacting,

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U.S. Geological Survey
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Telephone: (303) 236-7476

References

Brocher, T. M., M. A. Fisher, E. L. Geist, and N. I. Christensen, in press, A high-resolution seismic reflection/refraction study of the Chugach-Peninsular terrane boundary, southern Alaska, Journal of Geophysical Research.

Fisher, M. A., T. M. Brocher, G. Plafker, W. J. Nokleberg, and G. L. Smith, in press, Seismic reflection images of the crustal structure beneath the northern Chugach terrane, Alaska, Preliminary results of a survey for the Trans-Alaska Crustal transect (TACT), Journal of Geophysical Research.

Jones, D. L., N. J. Silberling, P. J. Coney, and G. Plafker, 1984, Lithotectonic terrane map of Alaska (west of the 141st meridian) Part A, in N. J. Silberling and D. L. Jones, editors, Lithotectonic terrane map of the North American Cordillera, U. S. Geological Survey Open File Report 84-523, p. A1-A2.

Table 1
Acquisition Parameters

COMPANY: Geophysical Systems Corp.
CREW#: GSC-122   DATE SHOT: 2-86
INSTRUMENT: Geocor IV
SAMPLE RATE: 4 ms
RECORD LENGTH: 24 s
RECORDING FILTERS   LOW: out   HIGH: 100 hz 50 db/oct NOTCH: in
FORMAT: Geosystems
TRACES: 1024
OFFSET   #1: -15330 m   #512: 0 m   #513: 30 m   #1024: 15360 m

RECEIVERS
GROUP INTERVAL: 30 m
TYPE: Mark Products L21A
FREQ: 10 hz
RECEIVERS/STATION: 6
ARRAY LENGTH: (point)

SOURCES(Vibrator)
VP INTERVAL: 120 m
VP RANGES: all
VIB TYPE: Litton 311
SWEEP TYPE: Varisweep
SWEEP LENGTH: 20 s
VIBS: 5
SWEEP FREQUENCIES: 6-48 hz
SWEEP POSITIONS: 1
SWEEPS/VP: 12
ARRAY LENGTH: 50 m inline

Table 2
Format of Field Tapes

Density (bpi): 6250
Trace length (ms): 24000
Sample rate (ms): 4
Maximum number of traces/shot: 1024
Number of blocks to skip on the first reel to find the first trace: 1
Number of blocks to skip on subsequent reels to find the first trace: 1
Length of trace header (bytes): 64
Format of data: 16 bit integer; two's complement
Number of consecutive EOF marks to cause an end of reel: 2
Index of the start of the data for a trace (bytes): 65
Reel names (Chugach line): CHUA1 through CHUA76, inclusive
Reel names (Denali line): DENA1 through DENA59, inclusive

Header Description:

Header Name	Byte Count*	Header Length (bytes)	Starting Bit	Ending Bit
FFID	1	2	1	16
TR	3	2	1	16
SHOT	5	2	1	16
PORT	7	2	1	6
CHAN	7	2	7	16
RECSTA	21	2	1	16

*From the beginning of the trace header to the first byte of the header value.

Format of Geometry Tapes

Values listed: station #, x-coord, y-coords
Density (bpi): 6250
Format of data: 16 bit integer; two's complement
Reel names: CHUAGEOM and DENAGEOM

Figure 1
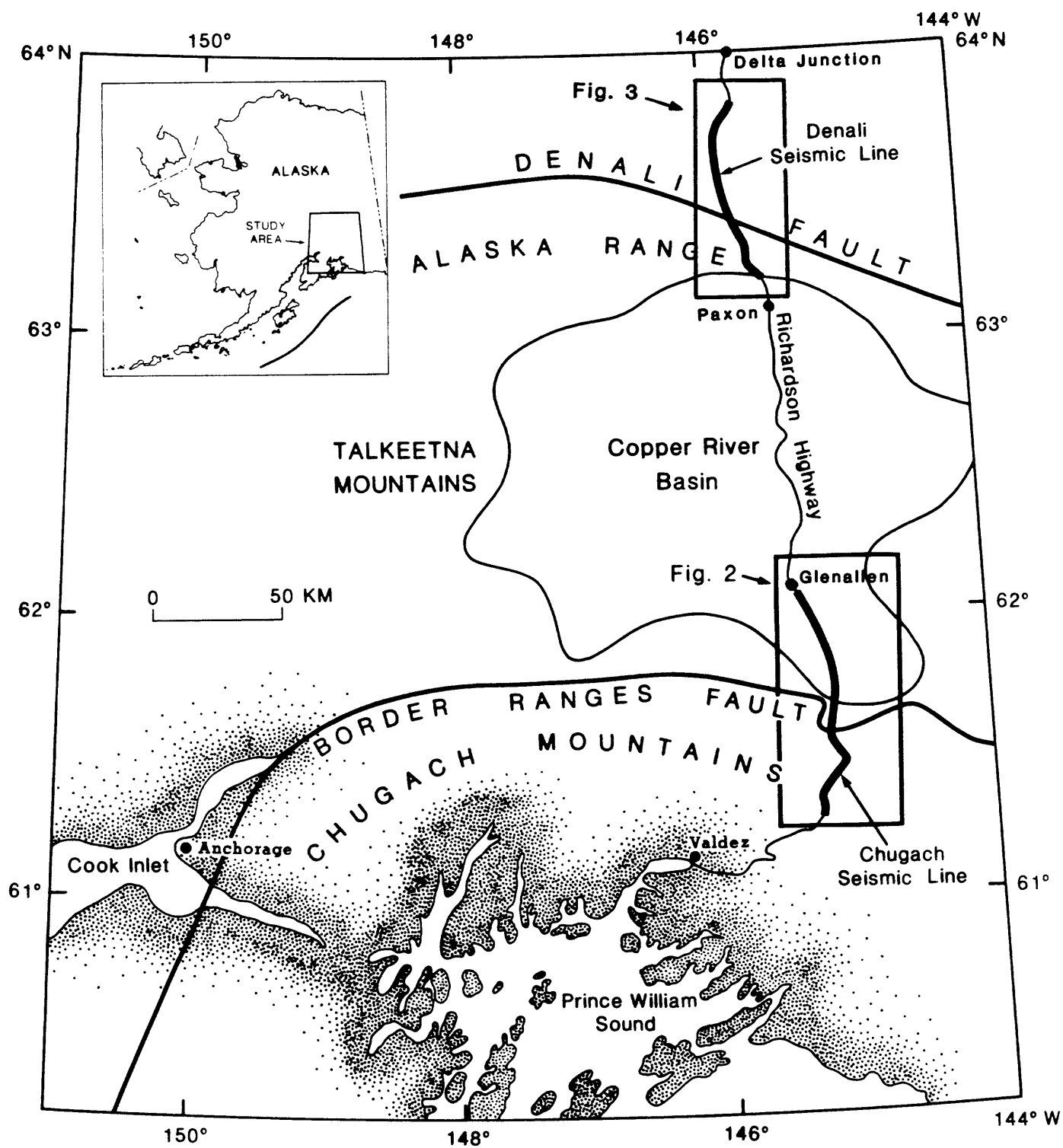Location map of the TACT corridor

Figure 2
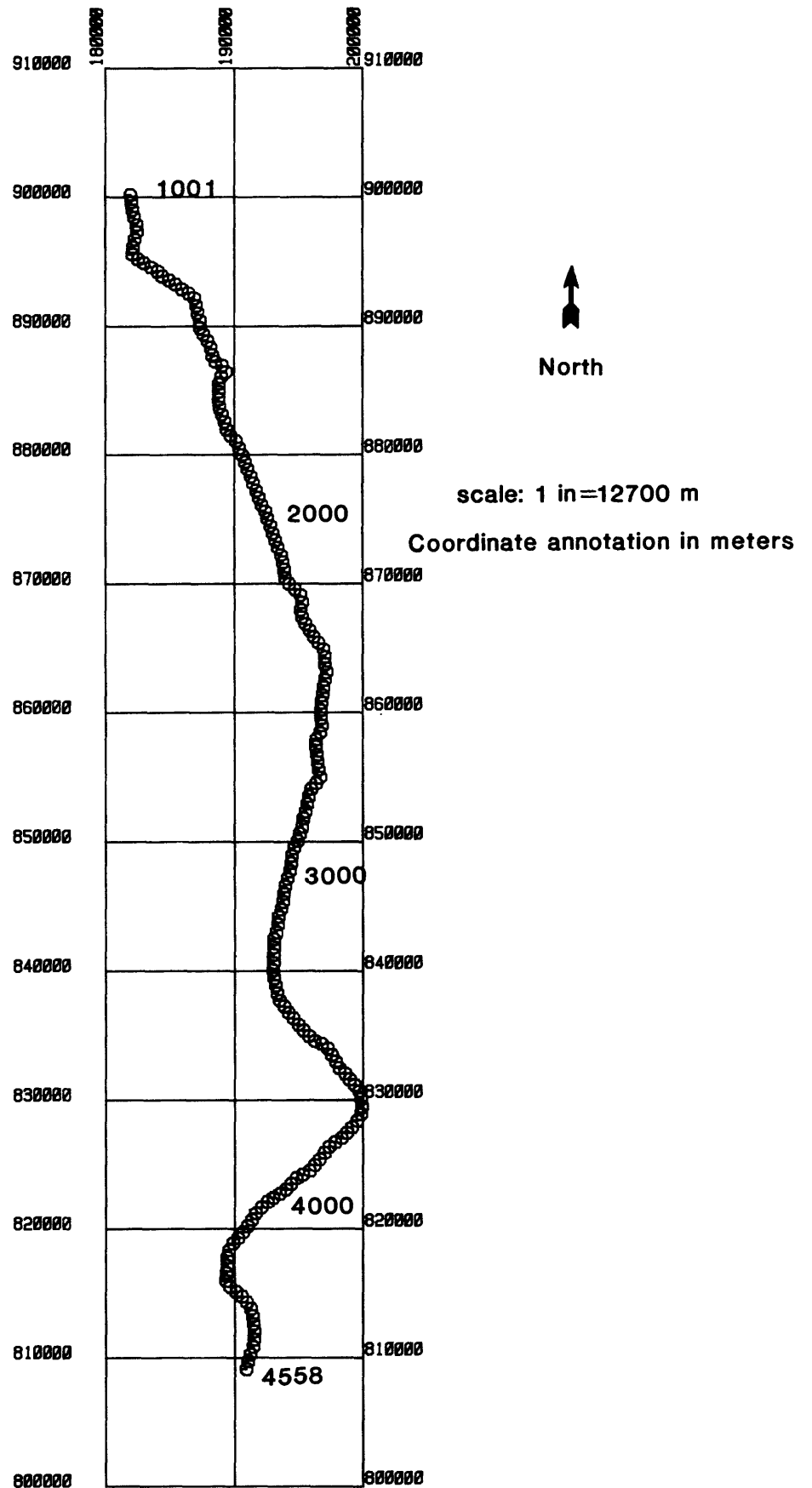Receiver station locations for the Chugach line

Figure 3
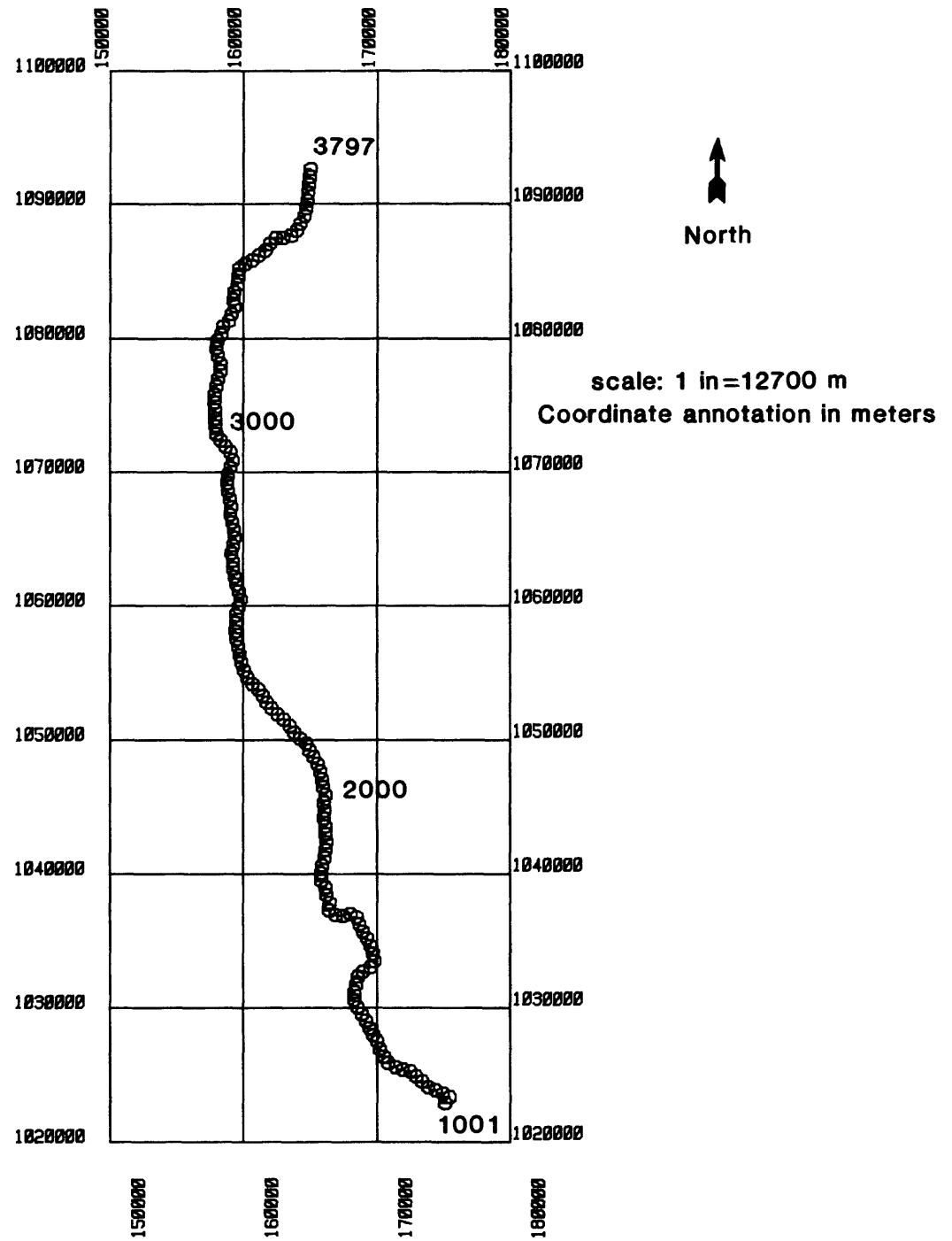Receiver station locations for the Denali line

Figure 4
CDP stack section of the Chugach line
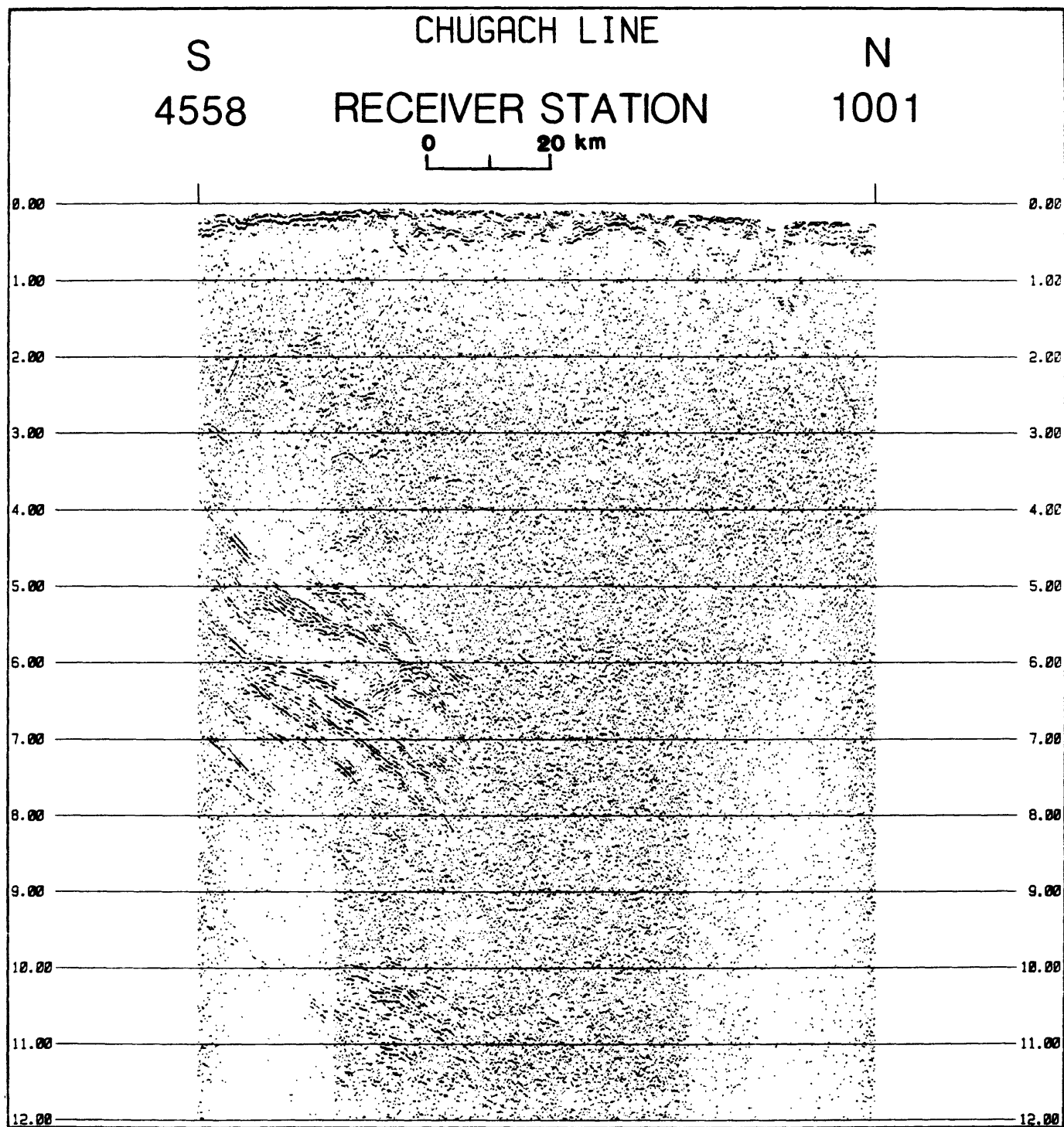Two-way travel time, in seconds, annotated along the side

Figure 5
CDP stack section of the Denali line
Two-way travel time, in seconds, annotated along the side