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GEOLOGICAL SURVEY

CATALOG OF EARTHQUAKES IN SOUTHERN ALASKA

JANUARY-MARCH 1978

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This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature

Menlo Park, California

1979

Cover map: Top of the World Map, National Geographic Society, 1965

CATALOG OF EARTHQUAKES IN SOUTHERN ALASKA JANUARY-MARCH 1978

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INTRODUCTION

The National Center for Earthquake Research of the U.S. Geological Survey (USGS) began a program of telemetered seismic recording in south-central Alaska in 1971. The principal objectives of this program have been to use data recorded by this network to precisely locate earthquakes in the active seismic zones of southern Alaska, to delineate seismically active faults, to assess seismic risk, to document potential premonitory earthquake phenomena, to investigate current tectonic deformation, and to study the structure and physical properties of the crust and upper mantle. A task fundamental to all of these goals is the routine cataloging of earthquake parameters for earthquakes located within and adjacent to the seismograph network.

The initial network of 10 stations, 7 around Cook Inlet and 3 near Valdez, was installed in 1971. Each summer since then additions or modifications to the network have been made. By the Fall of 1973, 26 stations extended from western Cook Inlet to eastern Prince William Sound, and 4 stations were located between Cordova and Yakutat. A year later 20 additional stations were installed. Thirteen of these were placed along the eastern Gulf of Alaska with support from the National Oceanic and Atmospheric Administration (NOAA) under the Outer Continental Shelf Environmental Program to investigate the seismicity of the outer continental shelf (OCS) region of interest for oil exploration. During the subsequent years the region covered by the network has remained relatively fixed while effort has been made to improve the instrumentation and installation of the stations in order to make them more reliable.

This earthquake catalog presents origin times, focal coordinates and magnitudes for 384 shocks occurring in the first quarter of 1978. Readings from a total of 62 stations were used to locate the shocks, including 11 stations operated by the NOAA Alaska Tsunami Warning Center (formerly Palmer Observatory), and 5 stations operated by the Geophysical Institute of the University of Alaska (U. of A.).

Earthquakes in south-central Alaska as small as magnitude 3.0 have been routinely located by the National Earthquake Information Service of the USGS and its predecessor since the great Alaska earthquake of 1964 and published in the reports "Preliminary Determination of Epicenters" (PDE). In contrast the shocks included in this catalog are as small as magnitude 1.0 and most are smaller than magnitude 3.0. Data for the larger historic earthquakes in south-central Alaska have been tabulated by Meyers (1976).

The locations of the stations of the USGS seismograph network are plotted in Figure 1 and listed in Table 1 along with the additional stations from which readings were obtained. The USGS stations have single, vertical-component seismometers except for GLB, PNL, RDT, SKN, and VLZ which also have two horizontal seismometers.

INSTRUMENTATION

The instrumentation in the USGS seismograph network is illustrated in the block diagram in Figure 2. Data from each seismometer are telemetered to a central recording point at the NOAA Alaska Tsunami Warning Center. The standard equipment at each field station includes a vertical seismometer with a natural frequency of 1.0 Hz (Mark Products, Model L-4), a package consisting

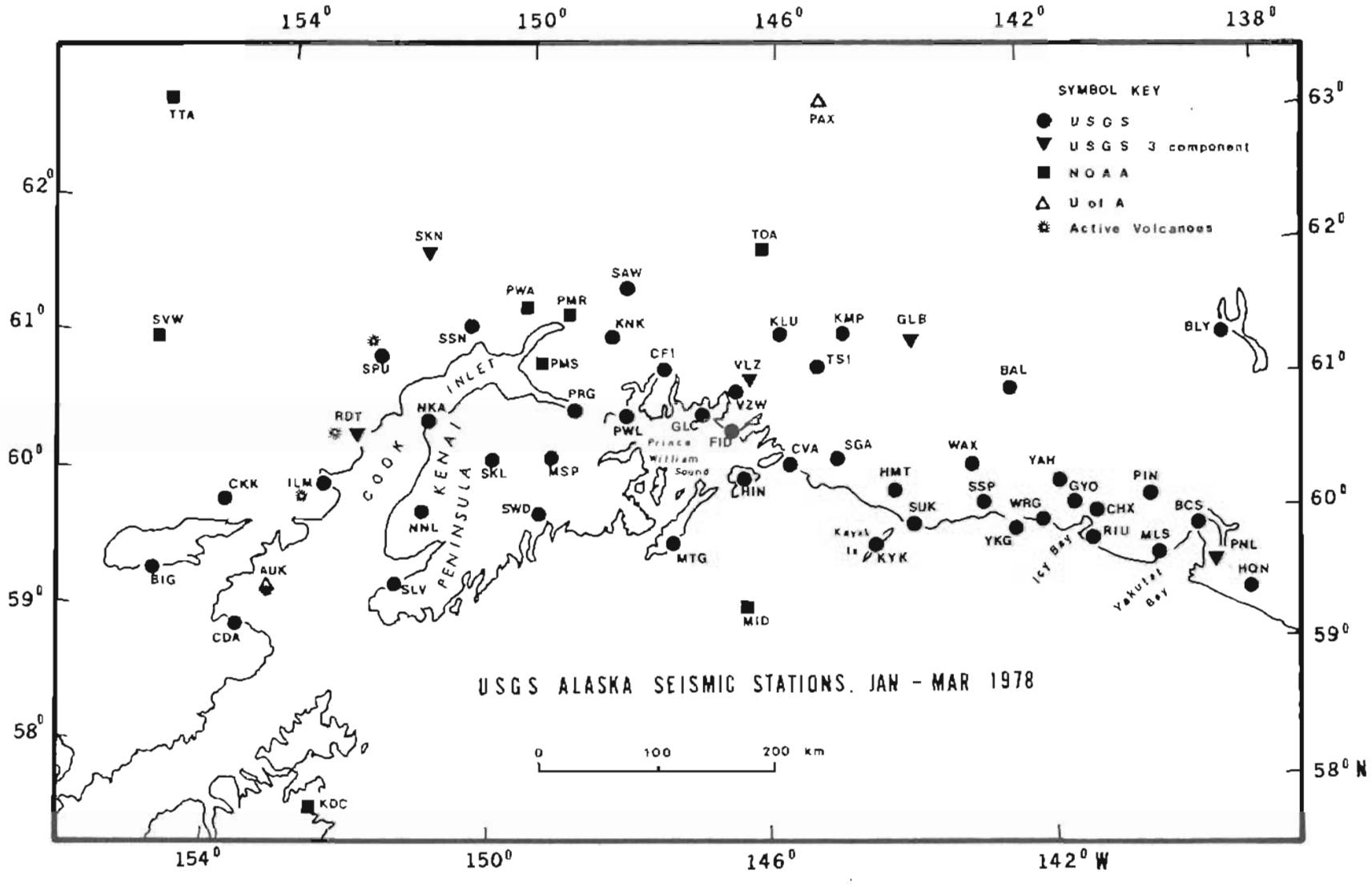

Figure 1. Map showing the USGS Alaska seismic network for the first quarter of 1978. Stations from which additional readings were obtained are also shown.

Table 1. Station Data

SEISMIC STATIONS UTILIZED DURING JANUARY - MARCH 1975

STA CODE	STATION NAME	LAT N DEG	LAT N MIN	LONG W DEG	LONG W MIN	ELEV M	D KM	DELAY SEC	TDLY SEC	MAG @ 1HZ	INST
AUK	AUGUSTINE IS.	59	20.10	153	25.66	293	0.01	0.00	0.00		UOFA
BAL	BALDY	61	2.17	142	20.67	1300	0.01	0.00	0.00	117000	USGS
BCS	BANCAS POINT	59	56.90	139	37.00	10	0.00	0.00	0.30	29700	USGS
BIG	BIG MOUNTAIN	59	23.34	155	13.02	567	0.01	0.00	0.00	117000	USGS
BLR	BLACK RAPIDS	63	30.10	145	50.70	809	0.01	0.00	0.00		NOAA
CDA	CAPE DOUGLAS	58	57.32	153	31.77	386	0.01	0.00	0.00		USGS
CFI	COLLEGE FIORD	61	10.96	147	45.99	2	0.01	0.00	0.00	117000	USGS
CHX	CHAIX HILLS	60	4.00	141	7.10	793	0.01	0.00	0.30	59400	USGS
CKK	CHEKOK	59	57.58	154	13.99	732	0.01	0.00	0.00	7400	USGS
COL	COLLEGE	64	54.00	147	47.60	320	0.01	0.00	0.00		USGS
CVA	CORDOVA	60	32.79	145	44.96	90	0.01	0.00	0.30	59400	USGS
FID	FIDALGO	60	43.73	146	35.79	488	0.01	0.00	0.30	234000	USGS
GIL	GILMORE	64	58.50	147	29.70	350	0.01	0.00	0.00		NOAA
GLB	GILAHINA BUTTE	61	26.51	143	48.63	845	0.01	0.00	0.00	234000	USGS
GLC	GLACIER IS.	60	53.44	147	4.35	3	0.01	0.00	0.30	117000	USGS
GLM	GILMORE DOME	64	59.23	147	23.33	820	0.01	0.00	0.00		UOFA
GYO	GUYOT HILLS	60	8.78	141	28.29	183	0.00	0.00	0.30	117000	USGS
HMT	MT. HAMILTON	60	20.19	144	15.64	620	0.01	0.00	0.30	117000	USGS
HQN	HARLEQUIN LAKE	59	27.10	138	52.62	372	0.01	0.00	0.30	117000	USGS
ILM	ILIAMNA	60	10.92	152	48.97	550	0.01	0.44	0.00	117000	USGS
IMA	INDIAN MOUNTAIN	66	4.11	153	40.72	1380	0.01	0.00	0.00		NOAA
KDC	KODIAK	57	44.87	152	29.50	13	0.01	0.00	0.00		NOAA
KLU	KLUTINA	61	29.57	145	55.21	1012	0.01	0.00	0.00	234000	USGS
KMP	KIMBALL PASS	61	30.78	145	1.09	1143	0.00	0.00	0.30	117000	USGS
KNK	KNIK	61	24.75	148	27.34	595	0.01	0.00	0.00	234000	USGS
KYK	KAYAK IS.	59	52.10	144	31.39	375	0.01	0.00	0.30	59400	USGS
LVY	LEVY	64	13.00	149	15.20	230	0.01	0.00	0.00		UOFA
MCK	MCKINLEY PARK	63	43.94	148	56.10	610	0.01	0.00	0.00		UOFA
MID	MIDDLETON IS.	59	25.67	146	20.34	37	0.01	0.00	0.30		NOAA
MLS	MALASPINA	59	45.80	140	9.00	2	0.01	0.00	0.30	14700	USGS
MSP	MOOSE PASS	60	29.35	149	21.64	150	0.01	0.00	0.00	117000	USGS
NKA	NIKISHKA	60	44.58	151	14.28	100	4.00	1.36	0.08	7400	USGS
PAX	PAXSON	62	58.25	145	28.11	1130	0.01	0.00	0.00		UOFA
PIN	PINNACLE	60	5.80	140	15.40	975	0.01	0.00	0.30	59400	USGS
PMR	PALMER OBSERVATORY	61	35.53	149	7.85	100	0.01	0.00	0.00		NOAA
PMS	ARCTIC VALLEY	61	14.68	149	33.63	716	0.01	0.00	0.00		NOAA
PNL	PENINSULA	59	40.12	139	23.82	579	0.01	0.00	0.30	59400	USGS
PRG	PORTAGE	60	51.87	149	1.42	55	0.01	0.00	0.00	117000	USGS
PWA	HOUSTON	61	39.05	149	52.72	137	0.01	0.70	0.00		NOAA
PWL	PORT WELLS	60	51.56	148	20.09	549	0.01	0.00	0.00	117000	USGS
RDT	REDOUBT	60	34.43	152	24.37	930	0.01	0.36	0.00	14700	USGS
RIU	RIOU	59	52.70	141	13.70	15	0.00	0.00	0.30	7400	USGS
SAW	SAWMILL	61	48.49	148	19.98	740	0.01	0.00	0.00	234000	USGS
SGA	SHERMAN GLACIER	60	30.07	145	12.42	424	0.00	0.00	0.30	59400	USGS
SKL	SKILAK	60	30.86	150	12.91	660	0.01	0.10	0.00	117000	USGS
SKN	SKWENTNA	61	58.82	151	31.78	564	0.01	0.00	0.00	234000	USGS
SLV	SELDOVIA	59	28.28	151	34.83	91	0.01	0.00	0.00	29700	USGS
SPU	SPURR	61	10.90	152	3.26	800	0.01	0.39	0.00	234000	USGS
SSN	SUSITNA	61	27.83	150	44.60	1297	0.01	0.67	0.00	234000	USGS
SSP	SUNSHINE POINT	60	10.80	142	50.30	732	0.01	0.00	0.30	117000	USGS
SUK	SUCKLING HILLS	60	4.60	143	47.00	427	0.01	0.00	0.30	117000	USGS
SVW	SPARREVOHN	61	6.49	155	37.30	762	0.01	0.00	0.00		NOAA
SWD	SEWARD	60	6.22	149	26.96	55	0.01	0.00	0.00	29700	USGS
TOA	TOLSONA	62	6.29	146	10.34	909	0.01	0.00	0.00		NOAA
TSI	TSINA	61	13.57	145	20.24	1113	0.00	0.00	0.30	117000	USGS
TTA	TATALINA	62	55.80	156	1.32	914	0.01	0.00	0.00		NOAA
VLZ	VALDEZ	61	7.89	146	19.92	10	0.01	0.00	0.30	7400	USGS
VZW	VALDEZ WEST	61	3.54	146	33.24	796	0.01	0.00	0.30	234000	USGS
WAX	WAXELL RIDGE	60	27.00	142	51.10	975	0.01	0.00	0.30		USGS
WFG	WHITE RIVER GLCR	60	2.27	142	1.90	550	0.01	0.00	0.30	29700	USGS
YAH	YAHTSE	60	21.80	141	44.70	2135	0.01	0.00	0.30	59400	USGS
YKG	YAKATAGA	60	4.20	142	25.33	60	0.01	0.00	0.30	7400	USGS

This table lists geographic coordinates and other pertinent information for stations used in the preparation of this catalog. D is the thickness of the low-velocity surficial sedimentary layer, in kilometers, assigned in the calculation of travel-times to a given station. DELAY is the station P-phase travel-time delay in seconds. TDLY is the telephone line delay in seconds. The magnification (MAG) of the vertical seismograph component is given at 1 Hz. The institutions (INST) operating the stations are the NOAA Alaska Tsunami Warning Center and the Geophysical Institute os the University of Alaska (UOFA).

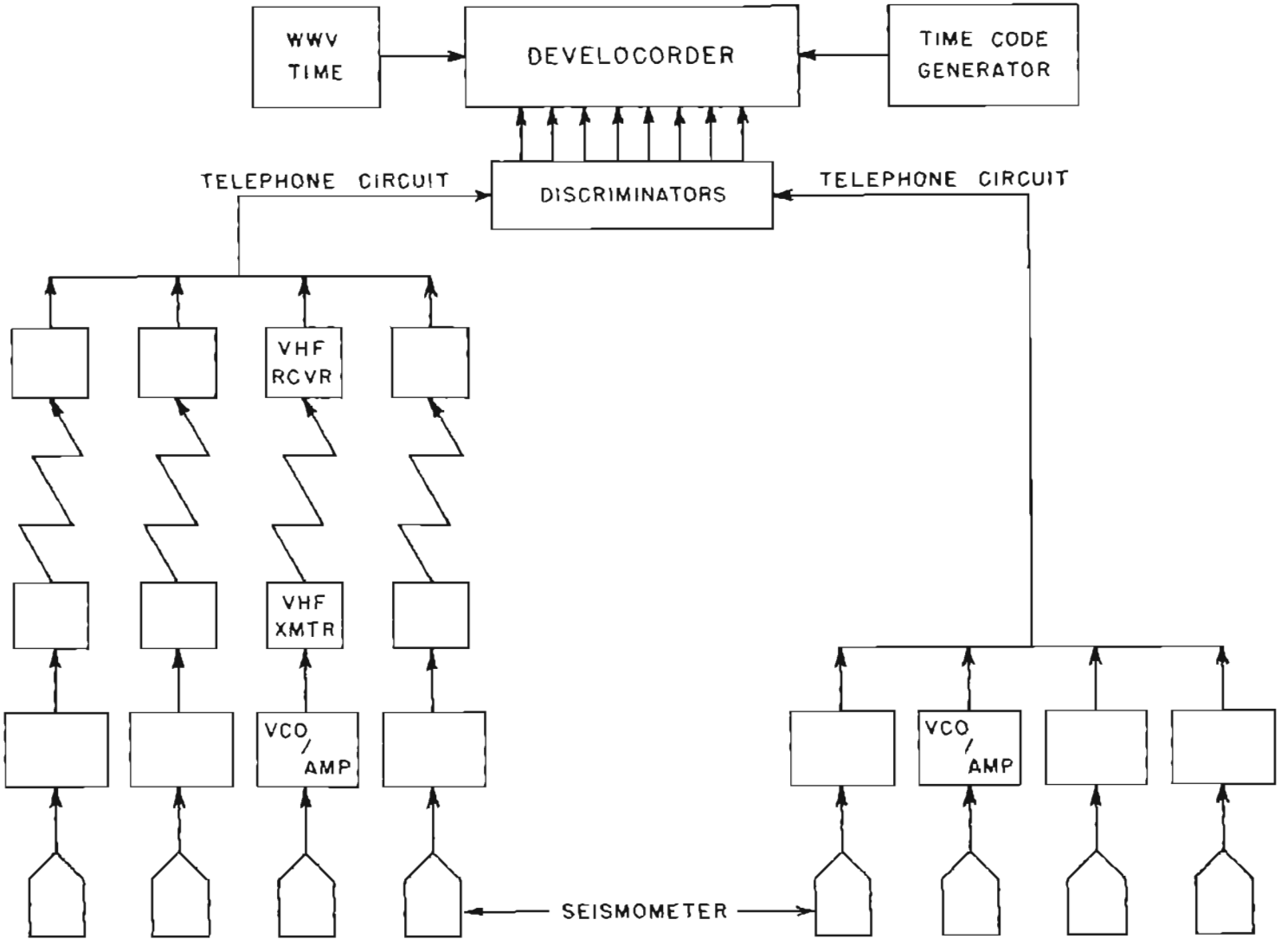

Figure 2. Block diagram of telemetered seismograph system in the USGS network.

of a pre-amplifier and a voltage-controlled oscillator (VCO model NCER 202) and air-cell storage batteries (McGraw-Edison, Model ST-2-1000). Data are telemetered via a leased telephone circuit or a VHF (162-174 MHz) radio link feeding a telephone circuit. The radio link is provided by a low-power transmitter (100 mw) and receiver adapted from a HT-200 Motorola handie-talkie transceiver and two Yagi antennae with 9 db directional gain (Scala, Model CAS-150). The central recording facility incorporates a bank of discriminators (NCER J101 or Develco Model 6203), a 16 mm-film multi-channel oscillograph (Teledyne Geotech Develocorder, Model 4000D), a time-code generator (Datum, Model 9100) and a radio receiver for WWV time signals (Specific Products SR7R).

The principle of operation is as follows: The seismometer translates movement of the ground into an electrical voltage that is fed into the amplifier/VCO unit where the amplified voltage causes the frequency of an audio-band oscillator to fluctuate about its center frequency. The frequency-modulated (FM) tone from the amplifier/VCO unit is carried directly by voice-grade telephone circuit to the recording site or alternately is fed through a VHF radio link onto a telephone circuit. At the recording site, the FM seismic signal is demodulated by a discriminator. The demodulated signal, which is simply an amplified form of the initial signal from the seismometer, is recorded photographically on a multichannel oscillograph, together with time marks from a crystal-controlled chronometer. Each day is recorded on a single 142-foot roll of film.

Signals from more than one seismograph can be transmitted on a single telephone circuit by employing VCO units with different center frequencies. In the standard configuration there is a 340 Hz separation between center frequencies and a fixed bandwidth of 250 Hz. Up to eight seismic channels with center frequencies ranging from 680 to 3060 Hz may be placed on a single voice-grade telephone circuit.

Figure 3 illustrates the response characteristics of the entire seismic system from seismometer to film viewer. The response level at each station is adjusted in steps of 6 decibels so that the ambient seismic noise produces a small deflection of the trace on the film. As a result, the actual response for an individual station may differ from that of the typical station by a factor of 2, 4, 8, etc. The magnification of the typical station is about 6×10^4 at 1 Hz and 10^6 at 10 Hz.

The installation of a typical radio-linked station is shown in Figure 4. Degradation or interruption of data transmission due to inclement weather conditions is a major problem during the winter months.

DATA PROCESSING

The 16 mm films (four per day) are mailed weekly to Menlo Park where the seismic data are processed by the following multistep routine:

1. Scanning. The scan film, which has 18 stations distributed throughout the network is scanned to identify and note times of all seismic events whether of local, regional, or teleseismic origin.

2. Timing. For the "well-recorded" local earthquakes identified in the

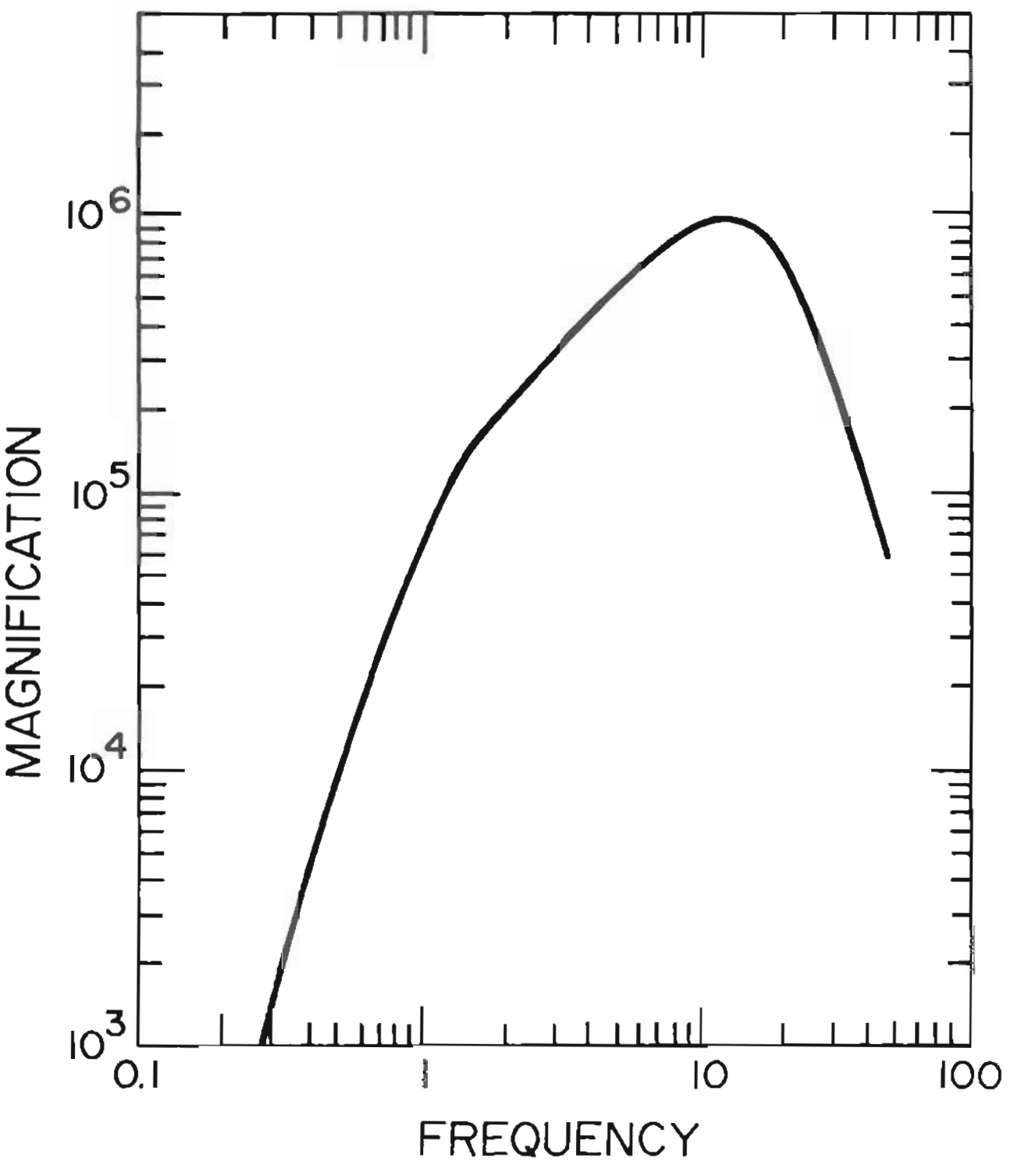

Figure 3. Response curve for a typical USGS seismograph system.

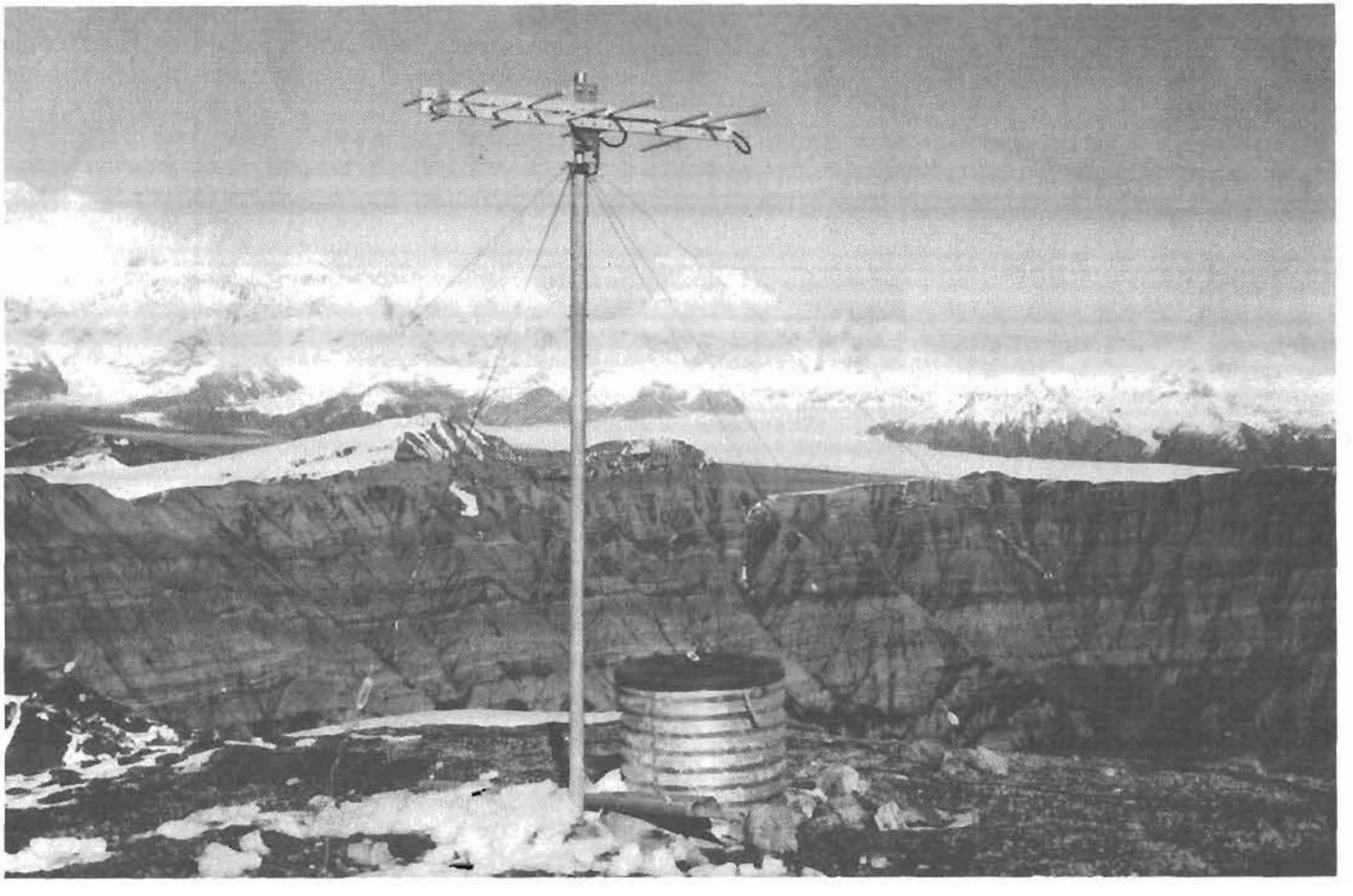

Figure 4. Installation of a typical seismograph station (CHX). VCO/amplifier unit, radio transmitter and batteries are housed in a 30-inch diameter culvert partially set in the ground at the base of the antenna. Seismometer is buried in the ground about 30 meters from the culvert.

In order to determine any bias that might result from this approximation, a set of events in the Benioff zone below Cook Inlet was relocated using a ray-tracing program of E. R. Engdahl that incorporates a more realistic, three-dimensional velocity model (Lahr, 1975). Hypocenter shifts, apparently due to the oversimplified flat-layer model, ranged from near zero at a depth of 60 km to as great as 25 km at the 160 km depth. The offsets were oriented in such a way that the dip of the Benioff zone would appear to be too great in the flat-layered model.

Two different P-wave velocity models are used to locate the earthquakes. West of 149°W the velocity model used is based on Model A of Matumoto and Page (1969) derived for the eastern Kenai Peninsula-Prince William Sound region. The velocity model is specified as follows:

Layer	Depth (km)	P velocity (km/sec)
1	0 - D	2.75
2	D - 4	5.3
3	4 - 10	5.6
4	10 - 15	6.2
5	15 - 20	6.9
6	20 - 25	7.4
7	25 - 33	7.7
8	33 - 47	7.9
9	47 - 65	8.1
10	below 64	8.3

The thickness of the first layer is allowed to vary between stations to account for the presence of thick sections of low-velocity sediments beneath the stations NKA and NNL, which are located in the Cook Inlet basin. For these stations D is 4 km. For all other stations D is 0.01 km. For earthquakes that occurred east of 149°, the velocity model used to locate the events is one that was developed by minimizing the travel-time residuals for a group of earthquakes near Valdez. The model is specified by:

Layer	Depth (km)	P velocity (km/sec)
1	0	2.75
2	0.01	6.0
3	20	7.0
4	below 32	8.2

A value of 1.78 for the velocity ratio between P and S is assumed for both models. The initial trial depth for earthquakes which occur west of 149°W is 75 km. East of 149°W this value is 15 km because the seismicity in this part of the net occurs at shallow depths.

Travel-time delays were applied to stations in the network that had consistent and large residuals for the locations of a large group of earthquakes. Additional delays were applied at several stations to correct for a satellite link in the relay of the signal. The P-phase delays are listed in Table 1 and are added to the calculated P-phase travel-times at each station. For S-phases the delay is multiplied by 1.78, the P to S velocity ratio.

MAGNITUDE

Magnitudes are determined from either the signal duration or the maximum trace amplitude. Eaton and others (1970) approximate the Richter local magnitude, whose definition is tied to maximum trace amplitudes recorded on standard horizontal Wood-Anderson torsion seismographs, by an amplitude magnitude based on maximum trace amplitudes recorded on high-gain, high-frequency vertical seismographs such as those operated in the Alaskan network. The amplitude magnitude XMAG used in this catalog is based on the work of Eaton and his co-workers and is given by the expression (Lee and Lahr, 1972)

$$XMAG = \log_{10} A - B_1 + B_2 \log_{10} D^2 \qquad (1)$$

where A is the equivalent maximum trace amplitude in millimeters on a standard Wood-Anderson seismograph, D is the hypocentral distance in kilometers, and B_1 and B_2 are constants. Differences in the frequency response of the two seismograph systems are accounted for in A; however, it is assumed that there is no systematic difference between the maximum horizontal ground motion and the maximum vertical motion. The terms

$$-B_1 + B_2 \log_{10} D^2$$

approximate Richter's $-\log_{10} A_0$

function (Richter, 1958, p. 342), which expresses the trace amplitude for an earthquake of magnitude zero as a function of epicentral distance. For small local earthquakes in central California, $B_1 = 3.38$ and $B_2 = 1.50$ for Δ = 200 to 600 km.

For small, shallow earthquakes in central California, Lee and others (1972) express the duration magnitude FMAG at a given station by the relation

$$FMAG = -0.87 + 2.00 \log_{10} \tau + 0.0035\Delta \qquad (2)$$

where τ is the signal duration in seconds from the P-wave onset to the point where the peak-to-peak trace amplitude on the Geotech Model 6585 film viewer falls below 1 cm and Δ is the epicentral distance in kilometers.

Comparison of XMAG and FMAG estimates from equations (1) and (2) for 77 Alaskan shocks in the depth range 0 to 150 km and in the magnitude range 1.5 to 3.5 reveals a systematic linear decrease of FMAG relative to XMAG with increasing focal depth. To remove this discrepancy, a linear dependence on depth is added to the expression for FMAG as follows:

$$FMAG = -1.15 + 2.00 \log_{10} \tau + 0.007z + 0.0035\Delta \qquad (3)$$

where z is the focal depth in kilometers.

For earthquakes larger than magnitude 3.0, FMAG values may be compared to m_b magnitudes listed in the PDE reports. The average and standard deviations for 47 events in the magnitude range 3.0 to 5.5 are 0.02 and 0.44 respectively; hence the two measures are compatible.

The magnitude preferentially assigned to each earthquake in this catalog is the FMAG estimate. The XMAG value is used only where no FMAG can be determined.

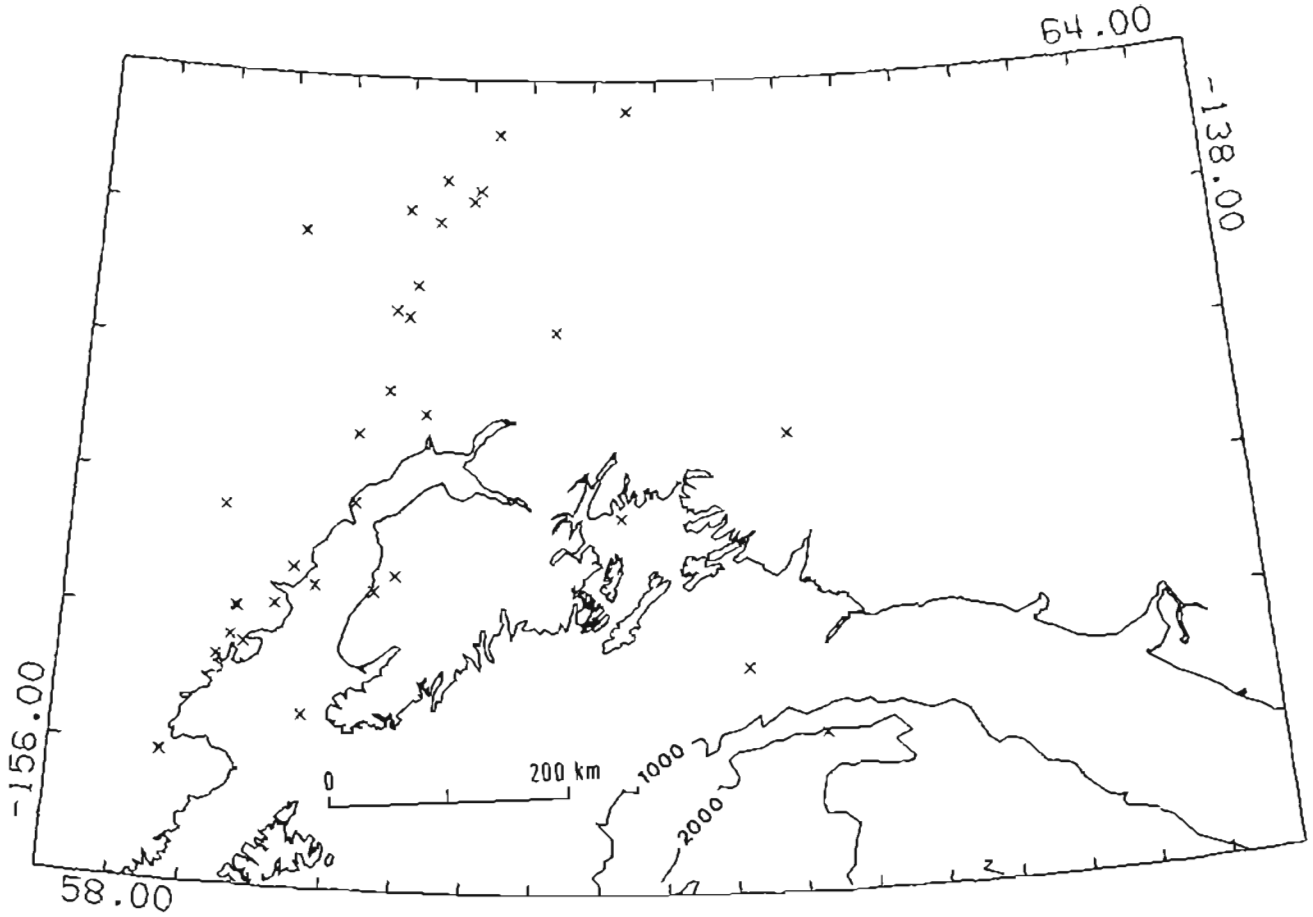

Figure 6. Map of earthquakes of Figure 5 that have magnitude greater than 3.5.

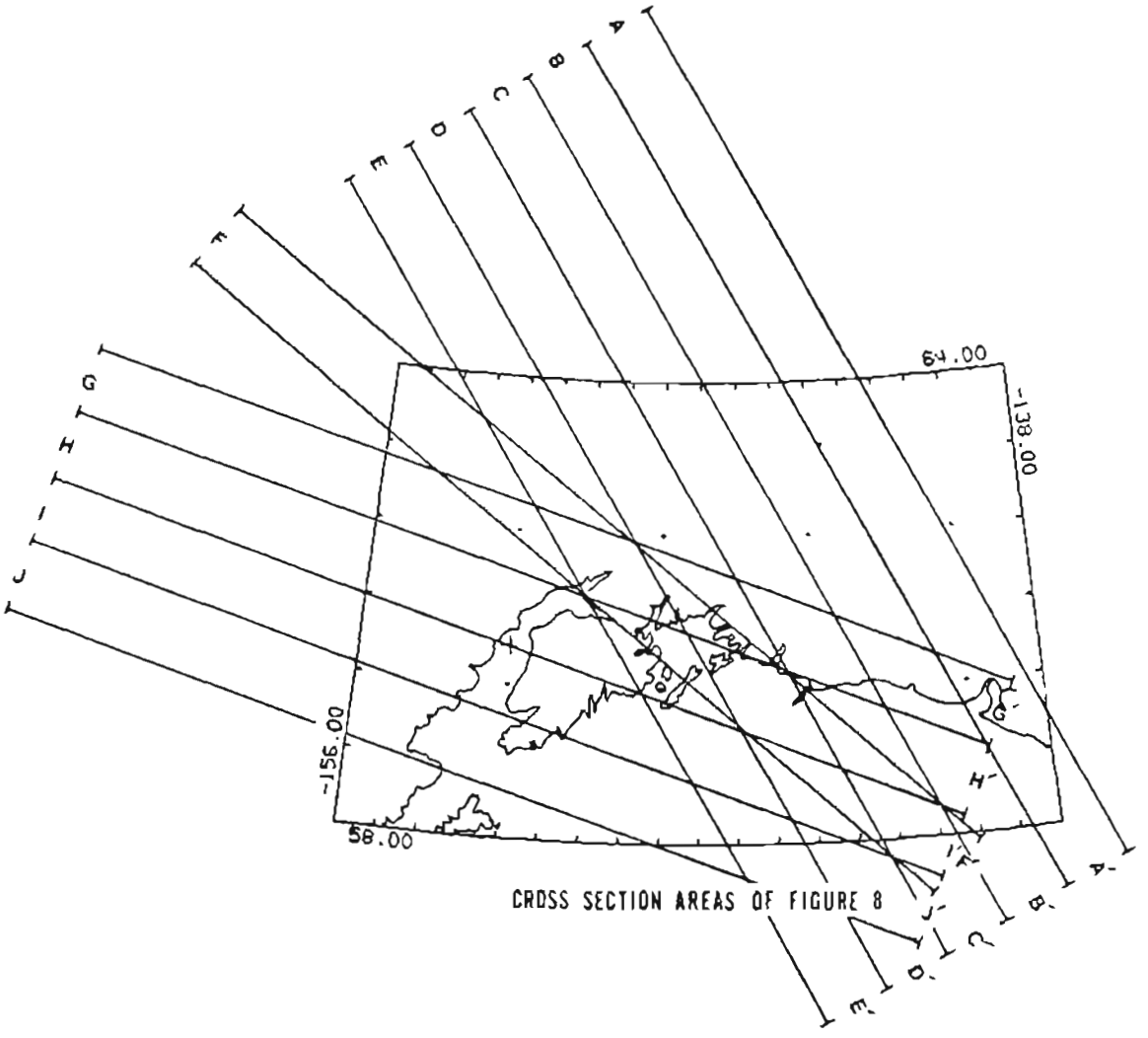

Figure 7. Map showing the area included in each of the cross sections of Figure 8. Direction of view for sections A-E is N 60° E, for section F is N 40° E, and for sections G-J is N 20° E.

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We are indebted to all of those who have spent time fabricating, installing, and maintaining the seismograph network in Alaska, particularly John Roger, Marion Salsman, Tom Walker and Tom Cleese.

Betty McIntire and the staff of the USGS Anchorage office has been of great assistance in solving logistic problems, both in the field and in the office.

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SOUTHERN ALASKA EARTHQUAKE CATALOG

1978		ORIGIN HR	MN	TIME SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	DS KM	RMS SEC	ERH KM	ERZ KM	Q	REMARKS
JAN	1	8	9	21.8	61	29.2	146	42.5	19.3	2.2	20	15	90	48	0.45	0.9	1.2	A	
	1	9	30	9.4	60	10.0	139	38.3	1.2	2.9	17	5	223	56	0.40	2.9	2.8	B	
	1	16	16	4.1	59	21.0	145	0.6	15.1	2.8	22	18	204	106	0.36	2.8	1.6	B	
	2	4	23	12.9	60	50.9	151	42.3	72.6	3.6	28	8	54	49	0.36	1.5	2.5	A	
	2	13	14	55.2	59	52.4	141	37.2	17.7	2.0	15	12	163	35	0.43	1.9	1.1	A	
	2	14	34	8.2	59	50.9	141	38.9	17.0	1.7	12	9	165	38	0.42	1.7	1.1	A	
	2	16	49	1.8	60	5.9	139	21.0	1.3	1.7	6	3	241	50	0.58	4.7	17.4	D	
	2	20	44	19.9	61	53.8	147	19.0	17.6	2.9	24	16	157	81	0.54	1.6	1.9	A	
	2	21	12	48.0	60	58.0	147	0.1	22.5	2.8	31	19	65	34	0.43	1.0	1.1	A	
	2	23	42	59.4	59	21.0	140	38.6	45.8	2.4	12	9	211	84	0.25	3.3	8.1	C	
	3	4	11	25.2	60	35.1	142	41.2	15.0	1.2	5	6	101	57	0.27	2.0	2.2	A	
	3	8	8	34.1	59	50.5	143	4.5	17.7	1.3	8	8	192	81	0.32	2.4	1.7	A	
	3	9	47	53.8	60	8.8	139	41.4	16.1	1.0	4	3	249	56	0.09	6.6	2.5	C	
	3	12	47	32.4	59	33.1	139	4.6	15.9*	1.1	3	2	182	90	0.02	25.0	25.0	D	
	3	15	56	11.0	62	27.0	148	8.7	13.8	2.7	17	15	217	109	0.50	2.8	2.0	B	
	3	17	28	7.3	60	18.7	140	38.9	17.7	1.6	10	8	174	49	0.36	2.4	1.6	A	
	3	23	35	21.0	60	6.4	140	40.4	17.8	1.7	9	6	157	40	0.39	3.0	1.5	B	
	4	18	31	26.3	60	26.5	141	10.6	14.7	1.3	9	8	171	42	0.39	2.1	1.6	A	
	4	18	36	39.3	61	30.1	141	16.0	0.8	2.0	7	5	251	136	0.32	2.5	3.2	B	
	5	10	26	40.4	59	27.9	143	57.6	17.8	3.4	26	10	178	99	0.54	2.5	1.8	A	
	5	12	20	25.0	61	23.2	146	41.8	20.0	2.8	28	15	81	43	0.43	0.8	1.9	A	
	5	15	4	4.4	60	17.5	140	39.7	20.1	1.1	5	4	229	99	0.09	5.0	3.9	C	
	5	19	56	12.2	61	21.8	151	41.3	90.0	4.1	29	3	65	69	0.36	2.0	3.5	B	
	5	20	41	25.3	60	7.8	139	39.7	0.7	1.6	10	7	205	53	0.44	3.8	3.3	B	
	5	23	0	24.9	60	10.4	139	35.4	2.2	1.6	10	7	211	55	0.35	3.3	4.2	B	
	6	0	58	42.0	60	31.8	146	53.4	19.0	2.8	27	16	132	62	0.53	1.2	1.1	A	
	6	4	41	44.1	61	18.2	143	34.5	0.1	2.5	24	8	171	103	0.72	1.8	1.9	A	
	6	6	39	55.7	60	27.6	142	57.8	11.2	1.3	5	2	161	62	0.31	4.4	3.4	B	
	6	11	32	12.9	61	27.2	146	28.2	13.3	2.4	24	14	80	44	0.65	0.8	1.0	A	
	6	14	18	34.2	60	48.8	140	17.4	0.4	2.2	6	4	229	137	0.63	4.8	2.8	B	
	6	21	59	2.0	60	54.5	149	14.6	27.9	4.1	33	3	52	69	0.40	1.0	2.2	A	FELT (IV) IN ANCHORAGE, (III) AT ELMENDORF AFB AND IN PALMER
	6	23	32	18.1	60	13.4	140	59.3	16.7	1.1	8	6	148	28	0.33	2.8	2.5	B	
	7	2	18	5.0	60	18.4	140	35.6	12.5	1.4	12	9	176	52	0.31	2.7	1.5	B	
	7	19	28	7.2	60	11.1	141	4.2	12.6	2.2	20	5	139	35	0.62	1.5	1.2	A	
	7	22	39	50.9	60	7.5	140	58.2	1.3	1.5	13	4	131	31	0.44	1.4	2.9	B	
	8	18	0	39.9	61	50.9	147	21.9	17.0	2.4	19	13	152	76	0.57	1.7	1.9	A	
	8	23	12	12.3	61	4.8	149	49.3	29.9	2.5	23	13	40	64	0.36	0.9	2.9	B	
	9	7	6	6.8	61	58.1	148	48.3	9.2	3.4	22	3	173	65	0.56	2.1	1.5	A	
	9	15	31	20.0	59	49.3	139	23.8	6.2	1.6	9	4	186	51	0.36	2.3	1.8	A	
	10	2	32	43.1	60	28.7	140	51.5	1.6	1.7	8	10	188	51	0.44	1.1	2.3	A	
	10	11	21	8.4	61	58.7	150	32.4	1.1	2.8	21	3	176	58	0.50	2.1	1.2	A	
	10	12	5	33.9	60	36.7	141	17.5	10.7	1.3	5	6	222	61	0.25	2.5	10.6	D	
	10	20	49	19.2	60	43.5	144	12.9	11.9	1.8	4	3	200	106	0.15	2.2	2.0	A	
	10	22	40	32.9	60	2.0	140	58.4	23.5	1.0	5	3	214	40	0.20	17.0	4.4	D	
	11	12	46	19.4	61	41.6	150	57.2	67.7	3.1	13	6	184	82	0.24	3.1	2.3	B	

SOUTHERN ALASKA EARTHQUAKE CATALOG (CONTINUED)

1978	ORIGIN HR	MN	TIME SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	D3 KM	RMS SEC	ERH KM	ERZ KM	Q	REMARKS
JAN 11	17	33	10.4	60	34.7	141	51.3	0.1•	0.9	3	3	193	58	0.21	1.9	25.0	D	
12	3	37	40.0	61	58.2	148	47.8	8.6	2.7	21	4	201	65	0.52	2.3	1.5	A	
12	5	16	9.1	60	36.7	142	32.9	19.2	1.4	5	4	109	51	0.49	1.2	1.2	A	
12	13	43	56.3	60	11.6	141	19.3	18.1	1.2	3	3	223	60	0.17	6.1	4.5	C	
12	19	32	25.0	61	32.7	146	37.6	20.1	2.1	6	5	166	77	0.40	1.3	6.8	C	
12	21	35	44.0	60	15.4	139	38.6	15.9	1.2	3	1	337	99	0.07	25.0	13.3	D	
13	1	54	44.1	60	12.6	140	5.5	7.2	1.4	6	4	194	77	0.16	4.7	3.2	B	
13	8	46	55.2	60	21.1	147	45.2	10.2	2.8	25	8	147	90	0.44	1.8	1.4	A	
13	15	11	58.8	60	12.4	139	32.1	1.0	1.9	9	5	215	60	0.36	2.4	2.6	B	
13	23	14	55.9	59	54.2	141	10.4	8.6	1.3	5	5	192	60	0.20	3.4	2.7	B	
15	0	41	17.3	60	1.6	141	27.1	15.0	1.1	7	5	199	41	0.33	2.7	2.0	B	
15	9	0	47.2	60	32.7	143	13.9	15.0•	1.5	3	2	249	73	0.63	8.3	13.7	D	
15	9	43	7.7	60	30.8	143	8.5	15.0•	1.7	4	3	185	73	0.37	7.9	8.8	C	
15	21	9	0.3	59	10.0	144	38.3	13.0	4.4	29	1	202	112	0.25	3.7	2.7	B	
16	5	10	2.8	61	58.1	150	32.9	3.0	2.5	13	4	175	57	0.41	1.5	2.2	A	
16	10	38	32.4	61	9.7	147	13.8	11.9	2.2	15	8	72	48	0.50	1.1	0.9	A	
16	11	39	14.2	59	29.0	138	55.4	12.0	1.4	3	2	192	101	0.05	25.0	9.5	D	
16	15	41	11.2	60	4.7	141	9.7	11.0	1.4	5	2	175	50	0.15	4.3	1.4	B	
17	12	13	37.1	60	3.0	139	13.1	0.0	1.4	6	4	221	58	0.28	2.2	2.7	B	
18	5	28	42.8	61	28.1	146	34.6	19.9	2.2	19	10	85	71	0.60	0.9	1.4	A	
18	7	6	6.4	60	1.0	142	37.7	4.9	1.4	5	5	264	50	0.25	3.2	2.3	B	
18	7	19	25.9	60	41.6	143	20.8	17.2	1.3	4	3	180	87	0.26	13.8	18.9	D	
18	7	51	36.9	59	58.8	141	5.0	15.0•	1.0	3	1	200	101	0.41	25.0	10.1	D	
18	10	24	33.6	60	32.7	141	36.3	15.0	1.5	8	6	160	60	0.34	1.5	2.6	B	
18	11	52	26.2	60	35.0	142	51.3	0.9	1.1	3	2	210	58	0.24	12.0	25.0	D	
18	13	16	31.5	60	35.3	142	57.5	25.48	1.4	3	2	175	106	0.45	17.8	18.1	D	
18	14	39	30.1	60	13.8	139	30.2	2.9	1.6	6	5	218	63	0.37	3.2	2.7	B	
19	16	24	49.6	63	10.5	149	52.1	98.4	4.6	25	1	123	172	0.33	4.0	22.8	D	
19	20	5	14.0	61	41.2	146	23.3	22.8	2.6	27	9	96	62	0.61	1.0	1.9	A	
20	1	16	5.2	61	31.8	146	29.6	23.1	2.2	15	9	87	66	0.51	0.8	1.5	A	
20	4	25	44.0	60	8.1	140	51.7	16.7	2.0	13	6	136	34	0.41	1.3	1.1	A	
20	5	0	59.2	61	15.5	143	30.9	16.5	1.2	4	4	170	85	0.32	25.0	16.1	D	
20	10	39	20.5	60	31.0	143	5.3	3.9	1.8	9	4	146	71	0.33	1.6	1.9	A	
21	1	49	51.9	60	15.6	141	38.1	17.8	1.4	6	4	143	36	0.25	2.5	1.0	B	
21	7	52	28.2	60	5.0	141	1.7	4.6	1.0	5	3	188	128	0.59	4.4	3.1	B	
21	11	13	22.3	60	11.2	140	59.5	17.0	1.7	12	6	142	42	0.41	1.7	1.2	A	
21	19	12	17.9	59	55.9	140	4.2	0.2	1.7	6	3	157	60	0.37	5.1	3.7	C	
22	2	2	58.0	60	14.2	152	16.0	105.3	4.1	27	3	51	94	0.24	1.8	3.9	B	
22	13	54	16.4	62	8.0	148	0.9	19.8	2.5	19	11	208	84	0.44	2.1	1.4	A	
22	21	1	34.4	61	24.7	146	46.1	19.9	2.6	27	6	84	46	0.46	0.8	1.2	A	
23	0	6	50.7	60	8.3	139	39.5	16.2	1.4	8	3	206	50	0.38	4.9	2.2	B	
23	9	12	12.1	60	57.0	143	25.8	7.5	0.4	3	3	189	64	0.17	2.1	25.0	D	
23	9	33	49.6	60	43.5	147	22.5	6.7	3.0	30	7	135	55	0.51	1.1	1.2	A	
23	13	39	32.2	60	0.1	139	33.7	0.4	2.1	8	0	201	40	0.15	5.1	12.4	D	
23	21	7	49.7	59	59.2	139	32.4	13.4	0.5	4	2	221	42	0.04	8.7	3.1	C	

SOUTHERN ALASKA EARTHQUAKE CATALOG (CONTINUED)

1978	ORIGIN HR	MN	TIME SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	D3 KM	RMS SEC	ERH KM	ERZ KM	Q	REMARKS
FEB 5	23	47	10.1	61	25.5	146	51.5	17.8	2.4	19	6	87	51	0.48	1.1	1.3	A	
7	14	0	32.5	60	25.5	147	36.6	3.3	2.8	22	6	103	97	0.49	1.1	1.4	A	
7	16	36	34.2	59	50.5	141	18.3	14.8	1.7	9	5	186	63	0.39	2.5	1.3	B	
7	18	39	12.9	59	58.1	140	55.3	10.6	1.3	5	3	180	120	0.16	5.1	3.6	C	
7	18	39	57.8	60	56.9	149	8.8	22.3	2.2	14	5	87	52	0.44	1.1	2.1	A	
8	3	17	55.1	61	40.9	150	21.9	40.1	3.0	23	3	139	65	0.24	1.6	3.0	B	
8	12	31	20.3	60	0.5	141	10.4	11.2	2.6	18	4	108	48	0.48	1.6	1.3	A	
8	13	59	36.6	60	0.4	141	9.0	12.6	2.1	13	5	108	49	0.53	1.4	1.1	A	
8	14	11	48.4	60	0.7	141	10.0	8.9	1.3	10	4	109	48	0.43	2.5	2.3	B	
9	6	26	46.4	60	45.9	143	14.6	0.0	1.4	4	3	241	127	0.19	4.9	6.5	C	
9	19	33	53.9	63	35.5	149	34.2	109.7	4.2	18	4	237	217	0.21	17.6	25.0	D	
9	20	36	13.1	59	59.2	141	19.5	10.7	0.9	4	2	223	61	0.20	17.4	23.5	D	
9	21	18	22.5	60	27.4	141	16.5	5.5	0.9	6	3	168	69	0.22	3.3	12.0	D	
9	21	59	9.3	60	34.1	142	58.1	12.9	1.2	5	1	132	62	0.13	11.0	9.5	D	
9	22	11	5.5	60	29.6	141	13.3	2.1	1.9	10	6	175	68	0.37	1.5	3.0	B	
10	0	56	4.7	60	6.5	141	26.6	9.9	1.1	9	2	137	33	0.24	3.4	2.8	B	
10	5	8	46.6	61	48.5	149	11.0	3.3	2.5	23	7	159	45	0.70	1.3	1.2	A	
10	5	53	13.0	60	19.0	143	3.5	0.9	1.5	9	6	142	73	0.44	1.7	2.8	B	
10	13	18	44.9	62	8.3	148	37.3	27.5	3.5	26	6	104	81	0.32	2.4	1.9	A	
11	5	36	7.5	60	17.4	139	42.0	2.3	1.7	8	2	214	71	0.25	12.5	15.1	D	
11	13	39	35.8	63	5.8	149	57.6	82.2	3.8	23	4	213	166	0.35	7.0	13.3	D	
11	17	57	50.4	60	15.3	138	45.2	18.3	1.8	4	1	251	90	0.15	14.4	25.0	D	
11	20	22	27.6	60	37.5	143	10.8	0.5	1.3	8	3	144	65	0.45	1.1	3.2	B	
11	22	54	25.2	60	36.3	143	10.1	11.68	1.4	5	2	156	66	0.19	13.6	18.7	D	
12	0	2	45.8	60	19.2	143	7.0	0.9	2.1	10	5	175	68	0.52	2.0	2.4	A	
12	8	56	39.8	59	16.6	152	22.8	71.8	4.5	21	0	95	129	0.24	2.6	6.5	C	FELT (II) AT HOMER, KODIAK,
12	12	21	35.6	60	5.9	141	8.8	6.1	1.9	9	5	156	50	0.70	2.4	1.8	A	KING SALMON, AND ENGLISH BAY
12	12	54	43.1	59	45.6	139	13.4	10.2	1.7	5	1	197	40	0.08	3.7	4.4	B	
12	13	38	55.7	59	14.6	139	26.2	19.5	2.2	8	4	245	79	0.17	8.2	7.8	C	
13	1	16	55.3	59	41.2	153	40.7	130.2	4.9	19	1	81	82	0.25	2.7	5.2	C	
13	8	36	0.9	61	39.1	141	43.0	6.8	2.1	8	1	250	144	0.27	10.4	7.3	D	
13	12	14	1.1	59	47.2	139	28.2	8.8	2.1	10	6	163	50	0.41	3.9	1.9	B	
13	17	59	9.2	59	43.9	139	26.3	12.3	0.7	3	2	176	45	0.00	18.8	10.4	D	
13	19	57	28.1	60	5.9	141	1.2	19.2	1.2	5	5	154	103	0.27	5.8	3.0	C	
13	22	28	12.8	60	21.1	141	10.7	14.5	1.5	7	5	159	59	0.31	2.0	1.6	A	
14	4	41	19.0	60	14.6	140	40.1	18.7	1.3	6	5	172	61	0.13	4.8	1.9	B	
14	9	35	4.7	60	26.2	141	10.6	17.5	0.9	3	2	170	92	0.22	25.0	25.0	D	
14	9	42	12.2	60	29.5	141	9.5	0.2	1.0	6	4	178	66	0.19	1.3	6.8	C	
14	9	54	9.4	60	28.9	141	9.2	1.6	1.4	9	5	177	66	0.30	1.6	3.6	B	
14	12	53	6.2	60	28.1	141	10.4	14.4	1.2	6	3	176	65	0.19	2.5	3.9	B	
14	14	30	39.5	63	19.3	147	22.0	0.1	1.3	21	5	264	213	0.34	25.0	25.0	D	
14	15	10	4.0	60	0.1	141	36.9	13.8	2.1	11	4	163	41	0.46	1.9	1.2	A	
14	22	22	48.0	59	58.5	141	18.5	11.5	0.9	6	1	145	60	0.23	4.8	4.2	B	
15	10	19	30.1	60	40.9	146	55.5	14.1	2.7	24	11	141	59	0.50	1.1	1.1	A	
15	14	42	5.2	60	1.6	138	9.7	10.3	2.2	7	3	276	82	0.41	6.6	3.7	C	

SOUTHERN ALASKA EARTHQUAKE CATALOG (CONTINUED)

1978	ORIGIN HR	MN	TIME SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	D3 KM	RMS SEC	ERH KM	ERZ KM	Q	REMARKS
FEB 16	6	33	21.0	59	40.9	139	20.0	5.4	1.4	5	1	163	36	0.11	3.4	2.6	B	
16	14	25	27.3	60	22.0	143	5.2	4.9	2.0	10	8	150	74	0.41	1.4	1.6	A	
16	14	35	53.0	60	17.7	143	8.8	0.2	1.4	5	4	196	94	0.19	2.1	6.5	C	
16	14	52	44.6	59	39.5	145	45.1	10.1	3.8	29	2	148	99	0.47	1.5	1.6	A	
16	20	53	51.7	61	23.2	145	1.6	38.2	3.5	32	1	83	65	0.28	1.4	3.3	B	
16	22	19	21.6	60	8.2	14[illegible]	9.0	15.5	1.7	7	5	153	50	0.36	2.8	1.3	B	
17	2	38	4.8	59	58.4	141	21.9	7.1	1.2	5	3	225	63	0.10	4.1	4.8	B	
17	10	43	2.0	61	14.2	143	30.5	15.0	1.1	5	4	145	86	0.29	25.0	13.7	D	
17	10	57	57.0	59	30.8	138	36.3	10.5	1.8	4	3	296	75	0.22	4.9	2.2	B	
17	12	9	20.6	59	31.6	138	34.7	9.3	2.0	6	2	295	75	0.13	4.7	2.1	B	
17	18	6	53.7	60	43.5	147	23.2	7.1	2.4	24	12	135	55	0.49	0.9	0.9	A	
17	21	48	2.9	60	2.2	141	11.0	11.8	1.2	4	2	191	128	0.16	4.6	1.7	B	
18	14	27	24.4	60	29.2	143	20.9	0.2	1.7	9	6	181	82	0.28	1.4	2.1	A	
18	15	53	10.8	59	21.1	138	32.2	15.5	1.6	5	1	341	90	0.10	25.0	3.6	D	
18	17	58	57.9	60	0.5	141	20.2	5.3	1.5	7	4	186	61	0.24	2.6	2.1	B	
18	23	33	41.6	60	51.6	143	45.3	0.9	2.1	7	5	132	79	0.59	1.3	2.5	A	
19	3	32	57.2	60	28.8	139	30.9	2.6	2.7	7	2	228	114	0.47	6.4	5.6	C	
19	5	24	48.2	60	53.9	150	54.8	10.6	2.7	21	3	55	64	0.55	0.9	2.4	A	
19	6	4	0.2	60	21.7	143	2.1	1.0	2.7	6	4	208	84	0.43	3.1	3.8	B	
19	20	11	32.4	61	19.4	140	38.6	0.5	2.5	5	1	285	154	0.50	8.1	3.3	C	
21	4	36	46.3	60	41.8	143	29.3	0.2	1.6	7	6	156	73	0.31	1.3	2.9	B	
21	5	31	25.0	62	50.8	152	43.6	1.4	3.9	14	1	133	199	0.64	5.4	4.0	C	
21	6	8	22.2	60	20.2	142	57.8	5.4	1.5	6	3	150	85	0.51	2.1	1.8	A	
21	14	57	15.7	61	35.8	143	53.2	15.2	1.4	3	2	320	140	0.11	7.9	2.6	C	
22	6	8	12.1	60	10.2	141	6.6	11.7	1.4	9	2	140	87	0.33	5.6	3.8	C	
22	8	35	18.6	60	19.7	143	12.5	1.5	1.7	8	4	183	81	0.38	2.1	4.0	B	
22	11	29	8.8	60	35.4	142	48.4	14.8	1.8	8	4	112	56	0.27	1.7	1.6	A	
22	17	2	44.2	60	26.9	143	32.9	0.2	1.6	7	6	185	93	0.32	2.1	3.3	B	
22	20	44	55.9	59	52.4	141	18.2	7.3	1.7	9	5	197	63	0.44	2.7	2.7	B	
22	22	34	54.9	59	59.7	141	34.7	8.8	1.6	8	5	194	75	0.25	2.8	2.1	B	
22	22	40	59.3	60	0.0	141	12.4	12.8	2.6	14	3	107	50	0.37	1.9	1.2	A	
22	23	23	38.9	59	50.6	141	17.0	6.8	1.5	6	1	244	64	0.26	11.3	5.2	D	
23	2	22	38.8	60	20.7	143	0.3	4.4	1.4	7	2	156	85	0.23	2.7	3.5	B	
23	6	35	41.0	59	57.1	141	18.1	0.1	1.2	7	2	212	60	0.40	4.6	5.8	C	
23	6	47	11.5	60	12.2	141	3.2	11.1	1.4	8	4	142	46	0.30	3.3	2.6	B	
23	8	1	2.5	60	12.0	140	45.6	17.2	1.6	8	3	155	57	0.32	4.4	2.3	A	
23	8	43	44.8	61	32.0	141	11.2	0.7	1.7	4	3	259	151	0.26	5.1	3.5	C	
23	9	56	28.8	61	30.3	141	12.3	0.5	1.6	4	3	255	147	0.08	5.7	7.3	C	
23	15	3	1.3	59	27.5	140	50.3	1.6*	2.2	4	1	245	85	0.49	5.6	25.0	D	
23	23	29	15.7	60	20.1	140	27.3	3.28	1.0	4	2	210	129	0.41	3.9	7.0	C	
24	2	35	50.3	60	47.5	138	24.7	1.08	2.6	9	3	266	136	0.28	5.9	3.9	C	
24	6	55	13.2	61	40.3	141	47.8	3.58	1.7	3	3	306	148	0.05	2.9	6.2	C	
24	7	45	13.5	60	35.7	150	46.4	7.2	2.6	21	5	73	79	0.58	1.1	1.5	A	
24	17	52	39.7	60	30.7	143	6.5	2.7	1.5	6	5	148	72	0.22	1.5	3.0	B	
24	18	45	28.4	60	39.5	141	9.3	7.0	1.0	7	4	194	77	0.27	3.7	6.2	C	

SOUTHERN ALASKA EARTHQUAKE CATALOG (CONTINUED)

1978	ORIGIN HR	MN	TIME SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	D3 KM	RMS SEC	ERH KM	ERZ KM	Q	REMARKS
FEB	24	19	31	55.2	60	9.3	140	51.3	17.3	0.9	4	2	143	128	0.09	8.4	3.5	C
	24	20	17	17.0	60	17.0	140	43.5	16.9	1.1	5	3	175	119	0.18	7.4	3.8	C
	25	7	20	49.9	60	18.2	141	31.7	5.98	2.0	11	6	137	50	0.56	1.0	2.1	A
	25	15	27	47.9	60	14.8	139	31.4	0.0	1.6	8	5	218	96	0.29	4.1	3.7	B
	26	4	17	34.5	60	1.8	140	33.8	13.8	1.4	5	3	166	115	0.15	3.0	1.8	B
	26	10	52	39.9	60	5.3	152	51.5	110.8	3.8	22	3	72	90	0.23	1.9	4.8	B
	26	11	9	28.5	61	33.6	147	20.4	15.6	2.8	26	8	108	62	0.56	1.1	1.1	A
	26	13	27	54.2	60	0.3	141	14.6	14.3	1.2	6	3	122	49	0.31	1.9	1.3	A
	26	14	49	54.2	59	50.1	139	30.8	0.9	1.3	5	2	165	56	0.10	3.8	5.0	C
	26	15	53	39.7	60	23.3	141	13.5	13.4	1.0	5	4	207	63	0.08	3.4	2.5	B
	26	16	14	50.2	60	8.2	141	17.2	17.0	1.9	9	4	125	36	0.41	1.8	1.1	A
	26	21	16	46.0	61	9.4	147	37.7	24.5	2.5	25	9	90	70	0.61	1.3	1.3	A
	27	11	37	18.0	60	30.2	143	8.6	2.3	1.4	5	3	186	74	0.30	1.9	3.2	B
	27	19	9	48.3	60	2.1	141	30.7	15.6	1.5	9	3	144	39	0.40	2.1	1.9	A
	27	19	10	35.3	59	59.8	141	13.4	11.5	1.5	10	7	106	50	0.53	1.6	1.7	A
	27	19	33	23.7	60	52.7	140	52.2	10.28*	1.3	3	2	236	93	0.00	10.1	25.0	D
	27	20	32	22.2	59	59.4	141	24.8	21.0	1.1	3	3	209	66	0.03	5.4	5.2	C
	28	7	32	8.9	60	14.4	140	57.8	15.9	1.9	7	3	153	45	0.33	2.1	1.6	A
	28	11	47	2.8	60	9.0	141	4.6	20.2	1.6	5	4	147	46	0.16	11.0	9.4	D
	28	14	6	35.9	60	11.2	141	7.7	14.9	1.4	5	4	155	49	0.26	3.0	2.3	B
	28	18	44	4.6	61	19.4	147	37.8	20.3	2.3	25	12	76	66	0.54	1.1	1.5	A
	28	18	50	25.8	60	36.0	142	43.4	9.4	2.2	15	10	89	60	0.69	1.3	1.8	A
	28	20	40	47.2	60	34.6	142	44.5	15.4	1.4	4	3	164	56	0.11	5.1	4.0	C
MAR	1	8	51	7.4	60	23.4	142	52.2	6.4	2.0	13	9	90	62	0.36	0.8	1.2	A
	1	12	45	44.9	61	24.5	146	50.0	24.5	2.5	22	9	85	77	0.45	1.1	1.4	A
	1	12	50	31.7	61	41.5	149	36.0	30.3	2.6	21	6	148	50	0.41	1.3	1.8	A
	1	13	3	45.5	60	9.0	141	36.8	5.3	1.1	7	3	178	68	0.20	1.2	2.7	B
	1	16	17	26.2	60	38.5	143	9.8	0.5	1.6	5	4	178	63	0.35	1.2	7.3	C
	1	22	52	4.7	61	50.6	141	17.1	0.5	2.2	6	5	263	177	0.19	2.8	2.4	B
	2	4	14	31.5	61	10.9	141	26.6	1.5	2.3	8	7	229	112	0.39	2.1	6.0	C
	2	13	34	38.6	60	1.3	148	56.1	0.0	2.7	21	8	154	90	0.40	2.0	1.4	A
	3	3	20	43.4	61	15.0	141	25.8	0.0	2.7	11	5	228	118	0.51	3.1	2.1	B
	3	3	52	14.1	61	29.3	141	20.6	3.0	2.2	6	4	251	132	0.38	3.1	2.6	B
	3	5	52	59.8	60	10.7	141	4.8	1.6	1.7	9	5	157	98	0.28	1.4	3.5	B
	4	4	23	12.0	63	15.0	150	25.3	116.3	4.5	11	3	218	193	0.31	13.6	25.0	D
	4	12	29	10.0	60	13.7	140	57.2	11.1	2.3	10	3	162	46	0.61	2.0	1.5	A
	4	16	38	20.3	60	31.0	141	13.4	12.9	1.2	6	4	227	90	0.22	2.9	2.8	B
	4	18	6	4.8	62	41.7	148	3.3	11.7	2.5	7	5	251	150	0.31	7.9	5.7	C
	5	6	1	37.8	59	57.3	141	9.3	36.9	1.0	3	3	134	53	0.11	3.9	4.5	B
	5	13	51	24.4	60	2.8	153	24.6	147.1	3.9	21	5	71	81	0.29	2.3	3.0	B
	5	20	19	24.0	61	55.3	140	48.3	33.7*	1.4	4	2	280	197	0.04	16.2	25.0	D
	5	23	43	28.3	61	25.8	143	10.5	19.68	0.5	3	2	222	146	0.11	10.2	8.3	D
	6	0	49	5.7	60	31.7	142	10.4	5.5	2.3	9	2	124	57	0.52	1.2	2.0	A
	6	1	57	19.2	60	8.8	141	36.0	13.8	2.5	14	5	117	69	0.38	1.6	1.3	A
	6	4	52	57.5	60	17.3	139	47.3	1.5	1.3	5	5	235	106	0.19	4.1	4.5	B

SOUTHERN ALASKA EARTHQUAKE CATALOG (CONTINUED)

1978	ORIGIN HR	MN	TIME SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	D3 KM	RMS SEC	ERH KM	ERZ KM	Q	REMARKS
MAR 6	11	21	42.9	60	4.9	141	6.3	5.8	1.3	3	3	264	97	0.07	5.2	12.0	D	
6	20	47	27.9	58	57.3	154	22.7	122.1	3.8	12	3	175	69	0.22	2.9	4.0	B	
7	6	1	59.4	61	32.2	146	35.1	20.0	2.6	22	9	91	67	0.50	1.1	1.4	A	
7	13	25	36.9	61	41.2	146	53.8	8.7	2.4	21	8	119	69	0.57	0.9	1.1	A	
8	1	55	40.6	59	16.5	145	4.8	10.6	1.9	10	7	281	147	0.38	5.4	2.2	C	
8	9	13	52.5	60	4.7	141	3.8	16.8	1.1	5	2	169	107	0.09	13.2	5.9	D	
8	21	47	40.3	60	20.9	140	34.0	12.1	1.3	8	8	188	65	0.31	2.7	1.5	B	
9	2	15	47.7	60	13.7	140	47.9	17.8	1.4	10	6	159	55	0.30	2.1	1.1	A	
10	2	34	33.3	60	47.2	153	41.6	0.6&	3.7	20	1	80	176	0.56	1.6	8.8	C	
10	2	34	38.9	60	41.1	153	28.3	33.0	#	6	0	247	255	0.13	25.0	25.0	D	
10	5	50	36.3	60	5.0	141	23.8	9.6	1.7	11	8	115	37	0.53	1.3	1.2	A	
10	12	9	34.3	60	24.8	141	8.3	13.4	1.3	8	6	170	60	0.35	3.0	1.7	B	
10	12	21	59.9	60	24.3	141	9.1	8.6	1.2	6	3	181	94	0.18	5.9	6.6	C	
10	13	10	59.5	60	26.1	141	8.8	7.2	1.4	7	2	172	62	0.27	1.8	5.8	C	
10	17	29	18.0	59	58.5	139	12.0	0.7	1.1	5	3	238	61	0.17	4.0	5.3	C	
10	20	22	2.5	61	57.5	148	48.8	13.7	2.7	18	8	172	64	0.44	1.8	1.1	A	
10	22	6	57.2	59	53.9	139	51.8	2.0	1.1	4	1	177	177	0.10	13.4	4.5	D	
11	21	32	57.7	60	34.6	141	26.5	17.7	2.6	22	10	169	78	0.41	1.3	1.5	A	
11	22	4	25.3	61	19.2	147	6.8	12.9	2.2	23	13	80	67	0.48	1.0	0.8	A	
12	3	15	19.9	61	31.3	150	39.4	51.7	3.6	22	3	132	81	0.34	2.4	4.7	B	
12	10	46	0.6	60	35.3	142	44.5	16.1	1.3	4	4	163	54	0.12	4.7	3.7	B	
12	10	47	2.3	60	5.2	141	3.7	22.7&	1.0	4	2	198	107	0.14	16.6	5.6	D	
12	11	44	22.3	60	8.8	141	15.9	15.8	1.6	6	3	150	94	0.11	3.7	1.9	B	
12	15	31	31.8	60	17.6	140	45.3	16.2	1.1	4	2	210	117	0.09	11.7	7.8	D	
12	16	3	31.3	60	2.5	139	27.0	12.1	0.5	3	3	236	73	0.11	12.1	10.9	D	
12	16	54	9.5	61	3.2	147	11.7	15.0*	2.4	24	12	104	84	0.48	1.2	1.1	A	
12	19	27	44.3	60	17.6	140	11.2	7.8	1.4	8	1	197	86	0.31	9.3	6.2	C	
12	20	49	7.3	60	16.2	140	11.4	0.0	1.3	7	3	198	87	0.21	5.3	5.9	C	
12	21	10	0.4	59	58.2	139	31.0	0.4	1.6	8	1	201	44	0.31	3.8	4.5	B	
13	4	45	38.0	61	37.7	147	52.4	0.1	2.1	17	9	110	67	0.54	1.3	2.1	A	
13	5	35	35.0	61	30.9	146	22.4	27.3&	2.8	19	8	84	52	0.50	1.0	1.3	A	
14	0	29	47.4	60	4.0	141	19.3	1.0	1.5	6	2	210	59	0.12	9.0	15.9	D	
14	7	26	51.5	61	52.5	149	9.0	28.6	2.6	21	10	165	46	0.31	1.6	2.2	A	
14	20	27	51.4	60	8.9	141	15.3	14.4	1.1	6	2	149	56	0.10	3.1	1.8	B	
15	3	22	58.2	60	16.3	140	51.3	17.2	1.7	6	3	164	110	0.37	2.5	1.5	B	
15	3	26	25.9	61	40.3	149	41.5	31.2	2.4	17	10	146	48	0.38	1.4	1.6	A	
15	20	40	42.6	61	22.3	144	4.2	15.3	1.8	5	4	143	100	0.33	2.0	1.1	A	
16	13	59	50.4	61	19.3	147	17.0	15.1	2.3	23	11	80	63	0.45	1.3	1.0	A	
16	18	47	46.3	61	31.2	150	3.2	37.8	2.7	20	6	89	40	0.37	1.2	2.8	B	
16	20	20	44.2	60	1.7	145	34.5	12.0	2.6	21	10	189	127	0.49	2.0	1.4	A	
16	22	7	25.8	60	37.1	141	10.6	10.4	1.9	8	6	191	77	0.39	1.1	1.7	A	
17	1	5	38.8	60	49.2	143	50.2	0.5	2.1	6	7	161	85	0.51	1.0	3.1	B	
17	3	32	40.9	60	34.9	141	27.2	20.7	1.2	7	6	173	70	0.20	1.6	4.6	B	
17	9	8	23.9	60	40.7	142	59.2	7.2	1.5	5	3	129	56	0.41	1.6	10.3	D	
17	17	40	32.5	60	32.8	142	59.9	0.1	1.6	6	1	136	65	0.30	2.3	4.0	B	

SOUTHERN ALASKA EARTHQUAKE CATALOG (CONTINUED)

1978	ORIGIN HR	MN	TIME SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	D3 KM	RMS SEC	ERH KM	ERZ KM	Q	REMARKS
MAR 18	4	22	32.2	60	11.6	141	20.3	13.9	1.3	4	2	134	88	0.24	5.5	4.0	C	
18	21	26	39.8	62	27.9	150	50.8	67.6	3.7	22	3	143	112	0.33	3.0	6.9	C	
19	3	37	5.6	63	46.3	147	29.1	1.68	3.8	18	3	108	127	0.71	1.8	3.8	B	
19	12	14	52.7	60	18.8	140	49.5	17.8	1.9	9	7	173	53	0.30	1.6	1.4	A	
19	20	42	18.0	60	58.6	146	58.8	16.0	2.5	19	12	102	82	0.40	1.1	1.3	A	
19	20	44	22.2	60	37.2	143	5.4	3.78	1.2	4	2	125	72	0.29	4.2	25.0	D	
20	3	33	27.3	59	15.8	138	21.0	7.3	2.0	5	2	341	142	0.16	19.8	4.2	D	
20	3	59	4.9	60	3.8	153	26.9	172.38	5.1	20	0	81	123	0.33	2.6	8.5	C	FELT (II) IN HOMER, AND (I) IN ANCHORAGE
20	7	46	10.7	60	36.4	142	50.6	41.8	1.6	3	3	151	91	0.38	6.3	16.6	D	
20	8	15	38.6	59	47.7	153	17.3	139.1	4.6	18	1	71	100	0.24	2.4	6.8	C	FELT (III) AT SOLDOTNA, AND (II) AT HOMER AND KENAI
20	23	14	51.8	60	20.6	141	10.0	17.6	2.5	13	7	157	52	0.44	1.2	1.0	A	
21	7	6	22.0	60	9.8	140	59.6	10.6	1.7	6	1	166	102	0.11	4.7	3.4	B	
21	7	13	45.2	60	34.6	143	26.9	1.58	1.7	5	2	165	79	0.19	4.0	17.2	D	
21	7	15	47.2	60	5.7	141	4.0	11.4	1.5	4	2	186	106	0.37	20.4	24.0	D	
22	4	45	16.5	61	49.6	140	37.2	15.08*	1.7	3	2	324	283	0.26	25.0	25.0	D	
22	8	35	59.2	60	9.2	141	1.3	14.1	1.2	7	5	145	46	0.31	6.4	2.9	C	
22	13	31	49.7	60	9.5	139	40.4	13.9	0.8	4	2	252	57	0.13	12.7	4.9	D	
22	20	19	21.1	60	17.7	140	51.1	11.8	1.8	13	6	168	50	0.50	2.1	1.4	A	
23	0	53	20.9	62	21.9	148	5.3	16.9	2.8	22	13	210	104	0.47	2.2	1.6	A	
23	8	0	4.7	60	2.1	141	11.3	11.4	1.2	6	4	164	52	0.14	7.7	3.8	C	
23	8	56	22.8	60	5.2	141	8.0	11.1	1.5	10	7	150	49	0.44	2.7	1.7	B	
23	12	5	33.5	59	59.0	145	32.1	13.3	2.5	17	9	194	64	0.36	2.2	1.1	A	
23	13	7	32.2	59	53.8	141	33.5	14.4	1.7	12	7	161	53	0.49	1.9	1.4	A	
23	16	52	35.4	60	22.8	142	21.9	5.5	2.1	19	8	92	34	0.46	1.0	1.3	A	
23	20	0	0.4	60	2.3	141	43.1	17.6	1.4	6	6	161	36	0.34	2.1	1.5	A	
23	23	39	36.0	62	14.4	149	31.0	43.9	3.0	21	9	200	79	0.35	2.5	3.7	B	
24	2	47	42.5	62	10.3	148	42.3	19.6	2.6	20	15	191	85	0.49	1.6	1.4	A	
24	4	39	49.3	60	36.2	143	52.1	3.5	1.5	9	5	108	74	0.48	2.2	2.8	B	
24	6	31	53.5	60	0.2	140	30.5	20.0	1.3	6	2	143	56	0.26	5.2	8.4	C	
24	8	32	46.3	60	8.6	141	24.8	11.5	1.7	13	4	122	31	0.41	1.5	1.4	A	
24	10	32	45.3	60	33.1	141	10.8	10.2	1.8	8	6	184	72	0.25	1.9	3.0	B	
24	17	28	41.1	60	14.2	141	2.1	10.9	1.5	9	7	149	42	0.37	1.8	2.5	B	
24	17	32	13.8	60	14.2	140	59.3	12.1	1.9	9	5	151	44	0.41	1.5	1.5	A	
24	18	42	12.6	60	22.8	142	21.8	7.2	1.9	19	5	92	34	0.49	1.0	1.4	A	
25	2	39	19.4	60	13.7	141	0.0	13.8	1.6	11	6	149	44	0.58	1.7	1.7	A	
25	18	13	55.2	60	27.7	142	58.8	0.8	1.5	9	5	80	53	0.64	1.7	3.3	B	
25	20	51	53.7	60	11.4	140	54.3	8.5	1.5	7	3	146	39	0.19	2.4	6.3	C	
26	0	30	2.3	60	28.2	142	55.9	0.2	1.6	8	4	79	53	0.64	1.3	2.7	B	
26	15	35	29.6	60	29.2	147	23.3	13.3	2.5	21	5	96	92	0.38	1.9	2.2	A	
26	19	23	4.2	62	9.5	142	32.5	3.88	1.6	3	3	283	193	0.44	4.3	4.1	B	
26	19	24	1.5	60	19.9	139	27.7	3.1	1.9	9	4	224	103	0.44	5.9	4.4	C	
26	19	29	38.3	60	14.5	139	37.9	3.4	1.2	5	1	237	103	0.07	15.2	9.8	D	
26	20	22	0.7	59	57.1	141	7.1	10.08	0.8	3	2	204	138	0.14	13.9	18.0	D	
27	9	7	25.7	61	22.1	146	49.9	16.5	1.9	13	7	81	82	0.45	1.8	1.5	A	
27	10	15	7.1	62	50.1	149	42.7	5.4	2.9	12	3	202	135	0.37	6.4	6.9	C	

SOUTHERN ALASKA EARTHQUAKE CATALOG (CONTINUED)

1978	ORIGIN HR	TIME MN	SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	D3 KM	RMS SEC	ERH KM	ERZ KM	Q	REMARKS
MAR 28	4	23	3.1	60	9.9	138	7.2	0.3	2.1	4	0	291	90	0.11	25.0	25.0	D	
28	17	5	11.7	61	41.7	151	52.3	96.1	3.2	13	6	138	106	0.31	3.6	3.4	B	
29	19	3	11.7	60	11.5	139	26.7	7.5	1.9	6	3	218	129	0.13	10.1	7.8	D	
29	20	16	11.6	60	18.4	142	27.4	1.7	1.2	6	4	104	27	0.38	1.2	6.1	C	
30	7	29	55.7	63	12.9	147	6.0	18.9	3.1	10	2	297	201	0.30	22.0	20.6	D	
30	7	38	60.0	62	16.6	151	10.1	72.6	3.6	22	7	168	97	0.41	2.6	4.1	B	
30	15	23	7.2	n0	48.5	146	52.1	13.5	2.7	14	10	126	136	0.40	1.6	1.8	A	
31	0	19	8.5	60	21.9	152	35.9	107.4	3.9	22	2	63	96	0.24	2.0	3.9	B	
31	0	38	14.8	61	41.4	151	14.6	80.3	4.7	27	3	105	71	0.27	2.3	3.5	B	FELT (IV) IN TALKEETNA AND
31	7	36	38.2	60	18.0	141	3.1	12.9	1.1	4	2	197	101	0.07	9.5	8.9	C	ANCHORAGE, (III) IN PALMER AND KENAI, AND (II) IN HOMER
31	9	28	15.2	61	56.2	149	27.6	26.3	2.8	19	7	171	61	0.42	2.0	4.8	B	
31	22	15	32.0	59	56.6	141	2.3	2.9	1.3	5	3	185	47	0.06	5.6	11.7	D	

THE MAGNITUDE OF THIS EARTHQUAKE COULD NOT BE DETERMINED BECAUSE THE CODAS OVERLAPPED WITH THOSE OF THE PREVIOUS EVENT.

ADDITIONAL SOUTHERN ALASKA EARTHQUAKES, JAN-MAR 1978

1978		ORIGIN HR	MN	TIME SEC	LAT N DEG	MIN	LONG W DEG	MIN	DEPTH KM	MAG	NP	NS	GAP DEG	D3 KM	RMS SEC	ERH KM	ERZ KM	Q
JAN	3	18	50	10.4	59	0.4	136	53.8	17.2	2.4	4	3	349	186	0.27	67.7	72.5	D
	11	23	27	18.7	59	39.1	137	42.8	0.4	2.9	6	2	322	151	0.20	14.6	7.5	D
	14	18	26	57.0	58	2.0	136	49.8	15.0	3.8	4	0	349	302	0.12	99.0	99.0	D
	17	21	15	13.6	58	16.8	136	37.3	14.5	3.0	4	3	357	253	1.05	99.0	72.7	D
FEB	12	12	47	13.1	58	42.6	136	28.1	18.4	2.9	4	3	353	226	0.34	67.6	72.4	D
	17	15	8	32.9	58	49.9	137	44.2	5.4	2.4	3	2	358	201	0.17	98.9	5.0	D
MAR	2	14	41	38.2	55	55.6	158	24.3	101.8	5.4	21	1	308	447	0.32	14.3	89.8	D
	4	10	23	11.6	56	43.1	152	26.8	48.5	4.9	21	1	273	297	0.47	28.4	12.0	D
	4	20	21	4.4	59	12.9	137	12.9	8.0	2.9	9	3	345	158	0.30	28.8	7.6	D
	8	23	51	52.1	58	52.2	137	37.1	4.3	2.3	3	1	359	202	0.02	99.0	2.9	D
	22	17	11	54.0	58	50.9	136	51.1	33.0	2.8	4	3	352	199	0.26	36.1	98.9	D
	23	3	18	6.5	58	57.1	136	29.4	31.8	3.0	4	3	350	209	0.28	52.3	84.9	D