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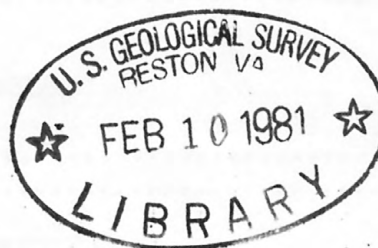


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CATALOG OF EARTHQUAKES ALONG THE SAN ANDREAS FAULT
SYSTEM IN CENTRAL CALIFORNIA, APRIL - JUNE 1977

By S. M. Marks and F. W. Lester

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INTRODUCTION

Numerous small earthquakes occur each day in the Coast Ranges of central California. The detailed study of these earthquakes provides a tool for gaining insight into the tectonic and physical processes responsible for the generation of damaging earthquakes. This catalog contains the fundamental parameters for earthquakes located within and adjacent to the seismograph network operated by the U.S. Geological Survey(USGS), during the second quarter of 1977.

The motivation for these detailed studies has been described by Pakiser and others (1969) and by Eaton and others (1970). Similar catalogs of earthquakes for the years 1969, 1970, and 1971 have been prepared by Lee and others (1972b, c and d). Catalogs for the first, second, third, and fourth quarters of 1972 and the first, second, third and fourth quarters of 1973 have been prepared by Wesson and others (1972a, b, 1973b, and 1974a and b), by Bufe and others (1975), and by Lester and others (1976a and b). Catalogs for the years 1974, 1975 and 1976 and the first quarter of 1977 have been prepared by Lester and Meagher (1978), by McHugh and Lester (1978 and 1979) and by Marks and Lester (1980). The basic data contained in these catalogs provide a foundation for further studies.

This catalog contains data on 608 earthquakes in central California. Arrival times at 225 seismograph stations were used to locate the earthquakes listed in this catalog. Of these 205 were telemetered stations operated by USGS. Readings from the remaining 20 stations were obtained through the courtesy of the Seismographic Stations, California Institute of Technology, Pasadena, University of California, Berkeley (UCB), and the California Department of Water Resources, Sacramento.

The Seismographic Station of the University of California, Berkeley, has for many years published a bulletin describing earthquakes in northern California and the surrounding area and listing readings at UCB stations from more distant events. The purpose of the present catalog is not to replace the UCB Bulletin, but rather to supplement it, by describing the seismicity of a portion of central California in much greater detail.

INSTRUMENTATION

The telemetered seismograph system used may be illustrated by block diagram (Figure 1). The equipment at each station includes a vertical component, 1 Hz seismometer (usually Mark Products, Model L-4C), a package containing a preamplifier and voltage-controlled oscillator (U.S.G.S., Model J302), and batteries. The frequency-modulated tone produced at each station is carried by wire (occasionally by radio) to a terminal where it is combined with the tones of up to 7 other stations. The resulting multiplexed signal is then transmitted by voice-grade telephone circuits or radio to the USGS office in Menlo Park, California. The eight channels of data on each line are separated and demodulated by

discriminators and recorded on 16 mm film using a Develocorder (Teledyne, Geotech, Model FR-400). Each Develocorder records seismic signals of up to 17 stations. In addition, 3 timing signals (WWVB on one trace, and a chronometer on the other two) are recorded simultaneously with the seismic signals.

Figure 2 illustrates the overall response of the seismic systems for typical stations. Magnification for individual stations is adjusted according to the background noise level in steps of 6 decibels. As a result, the response for an individual station may differ from that of the typical station by a factor of 2, 4, 8, or 16. Precise calibrations indicate that most stations are operated at magnifications of 25,000 to 100,000 at 1 Hz.

All stations used in the present study are listed in Table 1. Station locations are plotted on Figure 3, except for 11 stations which are located outside the map boundaries.

Station names were changed in June 1977 to reflect their geographic location. A station list showing the new names and their respective old names is in Table 2.

DATA PROCESSING AND ANALYSIS

The telemetered seismic data recorded on 16 mm film are processed manually to yield information on first P-arrivals, directions of first motions, maximum amplitudes, and signal durations. These data are then processed by computer to give origin time, hypocenter location, magnitude, and pattern of first motions of the earthquakes using the HYP071 computer program (Lee and Lahr, 1972). Each roll of film contains about 24 hours recording time and is processed in the following steps: (1) scanning, (2) timing using a digitizer which prepares punched cards, (3) batch processing by computer program HYP071, (4) correcting errors, (5) adding data from other sources, (6) rerunning HYP071, (7) analyzing poor solutions, and (8) eliminating explosions.

In the routine data processing, local events with signal duration or coda of 10 seconds or more are always timed. This corresponds to a cutoff at about magnitude 1 for events within the USGS network. Some smaller events for which 6 clear first arrivals can be obtained are also timed. The magnitude cutoff for events outside, but near the USGS network, is somewhat larger than 1. The catalog of earthquakes reported here contains all hypocenter solutions obtained. Because the station coverage is not uniform and because some events outside the network are reported, the cutoff for small magnitudes is not uniform over the entire area reported.

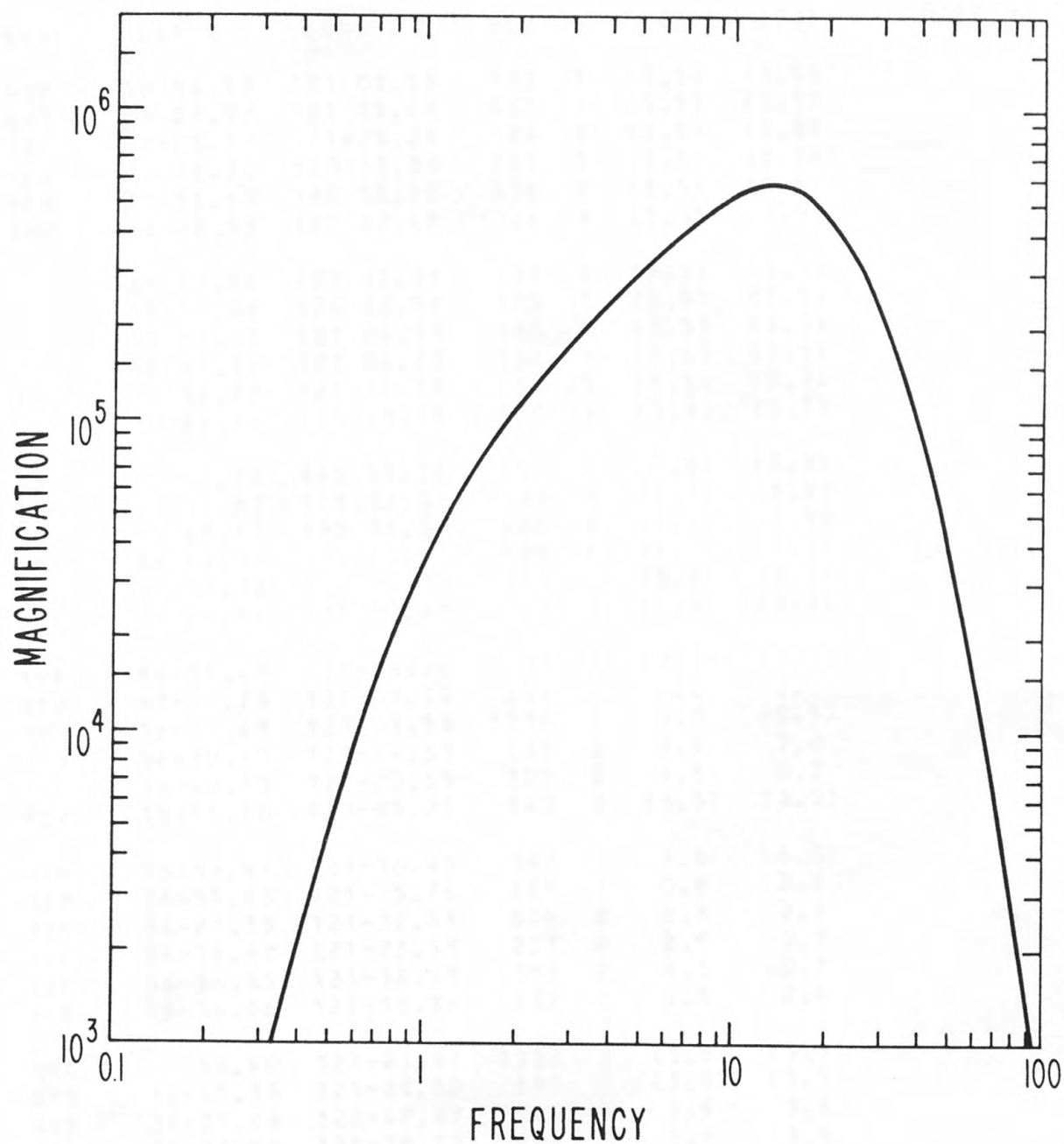


Figure 2. System response of an USGS telemetered seismograph station. This magnification curve is obtained for a system (L-4C seismometer, U.S.G.S. J302M, VCO/Amplifier with attenuation set at 12 db, Develco Discriminator, and Geotech Develocorder).

TABLE 1. STATION DATA *

USGS TELEMETERED STATIONS

CODE	LAT N	LONG W	ELV	K	D(F)	D(W)	NOTE **
AAR	39 16.57	121 01.53	930	1	(3.5)	(3.5)	
ABJ	39 09.92	121 11.47	457	1	(3.5)	(3.5)	
ABR	39-08.11	121-29.21	24	1	(3.5)	(3.5)	
ADW	38 26.35	120 50.89	251	1	(3.5)	(3.5)	
AFD	38 56.69	120 58.10	524	1	(3.5)	(3.5)	
AFH	39 02.51	120 47.48	1064	1	(3.5)	(3.5)	
AFR	38 47.54	121 20.91	31	1	(3.5)	(3.5)	
AGI	38 50.68	120 58.88	305	1	(3.5)	(3.5)	
AHD	39 02.90	121 04.59	483	1	(3.5)	(3.5)	
AHR	38 51.26	121 04.23	354	1	(3.5)	(3.5)	
ALN	38 53.28	121 17.27	54	1	(3.5)	(3.5)	
AOD	38 36.89	120 43.75	520	1	(3.5)	(3.5)	
AOH	39 22.52	121 15.36	457	1	(3.5)	(3.5)	
APR	38 52.62	121 13.03	133	1	(3.5)	(3.5)	
ARJ	38 41.19	120 57.38	460	1	(3.5)	(3.5)	
ARR	38 45.92	121 10.31	127	1	(3.5)	(3.5)	
ARW	38-57.38	121-09.73	320	1	(3.5)	(3.5)	
ASR	38 29.86	121 12.29	52	1	(3.5)	(3.5)	
AVR	39-01.49	121-16.08	91	1	(3.5)	(3.5)	
BAV	37-38.75	121-01.79	604	1	2.0	2.4	
BBG	36-35.48	121- 1.52	1216	1	3.0	(3.5)	
BBN	36-30.60	121- 4.53	448	2	3.4	3.0	
BCG	36-42.55	121-20.60	305	2	4.8	0.7	
BCH	35-11.10	120-05.05	1140	2	(3.5)	(3.5)	
BEH	36-39.88	121-10.45	342	1	1.6	4.0	
BEM	36-39.68	121- 5.76	488	1	0.8	2.2	
BHS	36-21.35	121-32.41	646	2	1.8	2.2	
BJC	36-32.82	121-23.53	207	2	0.9	0.9	
BJO	36-36.65	121-18.81	1052	2	1.5	0.7	
BLR	36-39.96	121-16.36	232	2	5.1	2.4	
BMC	36-39.40	121-21.91	1022	2	(3.5)	(3.5)	
BMH	36-41.18	121-24.80	811	2	(3.5)	(3.5)	
BMS	36-39.48	120-47.62	769	1	3.9	3.8	
BPC	36-33.90	121-38.15	268	2	1.8	1.6	
BPF	36-13.82	121-46.32	349	1	2.2	2.4	
BPI	36-29.40	121-10.11	329	2	1.2	0.3	
BPP	36-10.12	121-22.68	1591	2	2.1	1.3	
BRM	36-50.70	120-49.40	372	1	5.7	5.4	
BRV	36-25.46	121- 1.08	555	2	5.5	2.1	
BSB	36-44.27	121-17.21	398	1	3.8	4.9	
BSC	36-37.98	121-14.05	357	1	5.5	1.9	
BSG	36-24.83	121-15.22	192	2	0.4	0.1	

TABLE 1. STATION DATA (CONTINUED)

USGS TELEMETERED STATIONS

CODE	LAT N	LONG W	ELV	K	D(E)	D(W)
BSL	36-46.53	121-20.96	155	1	(3.5)	(3.5)
BSR	36-39.99	121-31.12	395	2	1.4	0.5
BVL	36-34.51	121-11.34	510	2	3.1	0.6
BVY	36-44.96	121-24.80	585	2	4.4	(3.5)
CAC	37-53.57	121-45.62	74	1	7.0	6.2
CAD	37- 9.77	121-37.45	244	1	3.0	3.2
CAI	37-51.68	122-25.77	223	1	2.2	2.2
CAL	37-27.07	121-47.95	265	1	4.4	4.3
CAO	37-20.96	121-31.96	628	1	3.9	4.2
CBR	37-48.97	122- 3.72	510	1	4.6	5.0
CBW	37-55.45	122- 6.40	221	1	5.1	5.1
CCN	37-47.49	121-56.89	219	1	7.4	(3.5)
CCO	37-15.46	121-40.35	366	1	5.9	6.8
CCY	37-33.70	122-05.45	67	1	2.5	3.2
CCO	37-43.80	121-50.12	198	1	6.8	6.8
CDS	37-57.98	122-15.17	109	1	(3.5)	(3.5)
CCU	38- 1.78	122- 0.05	168	1	8.0	5.4
CLC	37-44.28	122- 3.83	312	1	4.3	4.6
CMC	37-46.88	122-10.55	90	1	3.1	(3.5)
CMH	37-21.57	121-45.38	518	1	5.3	6.2
CMJ	37-31.25	121-52.23	498	1	4.3	4.3
CMO	37-48.68	121-48.15	792	1	6.6	6.6
CMR	37-35.68	121-38.22	500	1	4.6	4.5
CPL	37-37.88	121-57.37	463	1	4.3	4.1
CRA	37-46.03	121-56.25	171	1	(3.5)	(3.5)
CRP	37-54.75	121-54.33	331	1	4.8	4.8
CSC	37-17.11	121-46.35	128	1	5.4	4.8
CSH	37-38.88	122-02.57	170	1	(3.5)	4.0
GAF	38-53.59	123-32.28	710	1	5.1	(3.5)
GAX	38-42.65	122-45.30	379	1	0.8	0.8
GBG	38-48.84	122-40.76	1125	1	3.0	(3.5)
GBD	38-49.46	122-50.57	879	1	3.1	(3.5)
GCM	38-48.35	122-45.31	1286	1	3.8	(3.5)
GCV	38-46.14	123-00.89	150	1	3.7	(3.5)
GDC	38-46.03	123-14.31	772	1	4.3	(3.5)
GGL	38-53.80	122-46.58	893	1	2.8	(3.5)
GGP	38-45.88	122-50.65	1054	1	3.4	(3.5)
GHC	38-36.36	123-11.31	518	1	3.6	(3.5)
GHG	39-07.70	122-49.47	903	1	2.8	(3.5)
GHL	39-02.43	123-01.12	956	1	2.8	(3.5)
GMC	38-47.56	123-07.80	426	1	3.7	(3.5)
GMK	38-58.17	122-47.22	906	1	3.9	(3.5)

TABLE 1. STATION DATA (CONTINUED)

USGS TELEMETERED STATIONS

CODE	LAT N	LONG W	ELV	K	D(E)	D(W)	
GMO	38-42.61	123-08.59	802	1	3.0	(3.5)	
GPM	38-50.85	122-56.78	783	1	1.7	1.6	
GRM	39-01.23	122-35.06	469	1	3.2	(3.5)	
GRT	38-56.32	122-40.18	619	1	1.9	(3.5)	
GSG	38-52.03	122-42.58	1080	1	4.1	4.0	
GSM	38-46.15	122-46.87	1017	1	3.0	(3.5)	
GSN	38-56.43	123-11.50	870	1	4.0	(3.5)	
GSS	38-42.12	123-00.81	282	1	3.0	(3.5)	
HAZ	36-53.08	121-35.45	122	2	4.4	1.4	
HBT	36-51.01	121-33.04	98	2	4.5	2.3	
HCA	37- 1.52	121-29.02	332	1	3.6	5.0	
HCB	36-55.88	121-39.63	219	2	4.4	3.2	
HCO	36-53.31	121-42.34	129	2	4.0	3.7	
HCR	36-57.46	121-35.01	241	1	2.1	3.6	
HCZ	36-54.54	121-48.02	30	2	4.0	3.6	
HDL	36-50.12	121-38.64	204	2	3.2	2.2	
HFE	36-59.00	121-24.09	323	1	3.2	4.3	
HFH	36-53.29	121-28.13	101	1	(3.5)	(3.5)	
HFP	36-45.22	121-29.43	705	2	2.2	0.8	
HGS	37- 5.75	121-26.83	778	1	2.3	4.4	
HGW	37-01.02	121-39.20	133	1	2.1	2.5	
HJG	36-47.88	121-34.43	171	2	3.0	1.5	
HJS	36-48.99	121-17.92	215	1	2.6	3.9	
HKR	36-54.10	121-25.56	66	1	4.0	5.6	
HLT	36-53.07	121-18.49	183	1	3.0	4.5	
HMO	36-36.03	121-55.06	192	2	1.1	1.1	
HOR	36-55.03	121-30.46	98	1	3.0	4.4	
HPH	36-51.38	121-24.37	122	1	4.6	6.6	
HPL	37- 3.13	121-17.40	152	1	2.2	3.6	
HPR	36-57.19	121-41.70	94	2	3.7	(3.5)	
HQR	36-50.02	121-12.76	536	1	3.1	4.0	
HSE	36-48.72	121-29.97	340	2	4.5	3.4	
HSL	37-04.81	121-05.55	122	1	(3.5)	(3.5)	
JAL	37- 9.50	121-50.82	244	1	1.6	1.3	
JBC	37- 9.62	122- 1.57	560	2	3.7	4.7	
JBG	37-20.52	122-20.34	158	2	3.8	3.8	
JBL	37-07.67	122-09.98	792	2	1.7	1.7	04/01 TO 05/17
JBL	37-07.69	122-10.08	792	2	1.7	1.7	05/17 TO 06/30
JBM	37-19.09	122-09.16	820	1	3.6	3.3	
JBZ	37-01.07	121-49.15	213	2	4.9	5.2	
JCB	37- 6.71	121-41.33	192	1	2.2	2.7	
JEC	37- 3.04	121-48.56	438	2	3.0	3.8	

TABLE 1. STATION DATA (CONTINUED)

USGS TELEMETERED STATIONS

CODE	LAT N	LONG W	ELV	K	D(E)	D(W)
JEG	37-30.84	120-27.74	202	2	2.5	2.7
JHL	37-06.56	121-49.95	908	2	2.8	3.1
JLT	37-21.22	122-12.25	270	2	3.8	3.4
JLX	37-12.11	121-59.17	244	1	2.9	(3.5)
JMG	37-38.22	122-28.43	201	2	2.4	2.4
JPL	36-58.62	121-49.93	158	2	4.9	4.0
JPP	37-15.87	122-12.78	186	2	4.0	3.7
JPR	37-47.70	122-28.43	107	1	3.0	3.4
JPS	37-11.94	122-20.90	84	2	3.2	2.5
JRG	37-02.22	121-57.87	213	2	(3.5)	(3.5)
JRR	37-03.27	121-43.61	408	1	(3.5)	(3.5)
JSA	37-34.95	122-25.03	207	2	2.2	2.2
JSC	37-17.07	122- 7.42	357	2	3.0	3.0
JSF	37-24.31	122-10.55	143	1	4.0	4.0
JSG	37-16.96	122-03.00	198	1	5.5	4.0
JSJ	37-20.03	122- 5.48	122	1	5.7	4.1
JSM	37-12.74	122-10.06	262	2	4.6	4.0
JSS	37-10.17	121-55.84	946	1	2.8	3.4
JST	37-12.41	121-47.84	149	1	3.2	3.8
JTG	37-01.71	121-52.58	253	2	4.7	4.1
JUC	37-00.07	122-02.90	177	2	(3.5)	(3.5)
JWS	37-25.08	122-16.33	280	2	3.3	2.5
LCF	40-29.18	121-31.44	840	1	(3.5)	(3.5)
LRD	40-27.78	121-27.85	2292	1	(3.5)	(3.5)
LSL	40-25.64	121-32.05	2048	1	(3.5)	(3.5)
MBF	37-40.71	120-20.80	309	1	(3.5)	(3.5)
MCH	38- 1.12	120-30.57	475	1	(3.5)	(3.5)
MCS	37-56.33	120-31.76	373	1	(3.5)	(3.5)
MCU	37-58.36	120-37.02	336	1	(3.5)	(3.5)
MMW	38-03.83	121-10.89	1411	1	(3.5)	(3.5)
MNH	38-08.75	120-48.82	219	1	(3.5)	(3.5)
MOY	37-54.00	120-34.04	176	1	(3.5)	(3.5)
MRF	38-14.72	120-31.24	799	1	(3.5)	(3.5)
MST	37-54.27	120-24.29	366	1	(3.5)	(3.5)
NBP	38-40.07	122-11.60	867	1	3.9	(3.5)
NBR	38-15.65	122-32.99	137	1	2.8	2.2
NCD	38-22.19	122-27.70	620	1	2.2	2.2
NCF	38-19.28	122-47.73	98	1	2.2	2.2
NFI	37-41.90	123- 0.00	107	2	1.3	1.3
NFR	38-31.36	123-09.66	528	1	3.9	(3.5)
NGV	38-16.84	122-12.89	257	1	4.4	5.2
NHB	38-35.36	122-54.54	165	1	3.8	(3.5)

TABLE 1. STATION DATA (CONTINUED)

USGS TELEMETERED STATIONS

CODE	LAT N	LONG W	ELV	K	D(E)	D(W)
NHM	38- 9.28	121-48.02	65	1	6.3	6.3
NLN	38- 9.15	122-42.75	120	1	1.9	1.9
NMH	38-40.17	122-37.93	1311	1	1.3	1.6
NMT	38-48.34	122-26.76	422	1	3.4	(3.5)
NMW	38-33.03	122-43.37	134	1	3.3	3.3
NMX	38-24.68	122- 3.44	177	1	5.7	5.7
NOL	38-02.50	122-47.64	37	2	2.6	2.6
NSH	38-31.20	122-36.43	328	1	2.0	2.0
NSP	38-10.96	122-27.20	88	1	3.2	2.2
NTA	38-23.15	122-40.83	105	1	2.7	2.7
NJT	36-49.46	121-27.44	128	1	(3.5)	(3.5) 04/01 TO 04/27
NWR	38-27.42	122-53.26	50	1	1.6	1.6
OBH	39-39.10	121-27.70	916	1	(3.5)	(3.5)
OCH	39-52.55	121-45.93	530	1	(3.5)	(3.5)
OGO	39-39.22	121-36.72	158	1	(3.5)	(3.5)
OHC	39-20.18	121-29.05	76	1	(3.5)	(3.5)
ORA	39-26.13	121-24.80	585	1	(3.5)	(3.5)
OST	39-22.12	121-35.80	29	1	(3.5)	(3.5)
OSU	39-16.23	121-51.10	67	1	(3.5)	(3.5)
OTB	39-32.75	121-33.65	223	1	(3.5)	(3.5)
OWY	39-27.19	121-29.20	177	1	(3.5)	(3.5)
PAR	36-14.95	120-20.52	485	1	6.7	5.2
PBW	36-18.90	120-55.75	381	2	2.1	2.1
PCA	35-55.90	120-20.22	1189	1	5.2	5.2
PCR	36-05.65	120-26.08	296	1	(3.5)	(3.5)
PGH	35-49.86	120-21.17	433	1	3.3	3.4
PHC	35-40.93	121-09.15	514	2	4.3	4.3
PHR	36-22.38	120-49.13	750	1	4.0	1.0
PJV	35-54.39	120-40.94	497	2	4.2	3.4
PJR	36- 5.02	121-10.15	336	2	1.7	2.2
PLO	36-14.79	121- 2.55	308	2	0.1	0.1
PMP	36-12.91	120-47.69	784	2	1.8	1.9
PPF	35-52.91	120-24.81	469	1	4.3	5.3
PPT	36- 6.50	120-43.27	506	2	1.7	1.9
PSM	36-04.18	120-35.68	988	1	(3.5)	(3.5)
PTY	35-56.73	120-28.45	552	1	4.3	5.6
PWK	35-48.87	120-30.67	503	2	4.2	4.4
YEG	35-26.18	119-57.56	939	2	(3.5)	(3.5)

** THIS COLUMN INDICATES THE OPERATION PERIOD. IF IT IS BLANK THEN THIS STATION HAS BEEN OPERATED CONTINUOUSLY DURING THE SECOND QUARTER OF 1977.

TABLE 1. STATION DATA (CONTINUED)

CAL TECH STATIONS

CODE	LAT N	LONG W	ELV	K	D(E)	D(W)
ISA	35-39.80	118-28.40	835	2	(3.5)	(3.5)
SYP	34-31.63	119-58.67	1305	2	(3.5)	(3.5)

UNIVERSITY OF CALIFORNIA STATIONS

CODE	LAT N	LONG W	ELV	K	D(E)	D(W)
BKS	37-52.60	122-14.10	276	1	2.4	2.4
BRK	37-52.40	122-15.60	81	1	2.4	2.4
FHC	40-48.10	123-59.10	610	1	(3.5)	(3.5)
FRI	36-59.50	119-42.50	119	1	(3.5)	(3.5)
JAS	37-56.80	120-26.30	457	1	(3.5)	(3.5)
LLA	36-37.00	120-56.60	475	1	1.5	2.1
MHC	37-20.50	121-38.50	1282	1	4.5	5.0
MIN	40-20.70	121-36.30	1495	1	(3.5)	(3.5)
PCC	37-30.00	122-22.90	91	2	3.7	3.7
PRI	36- 8.50	120-39.90	1187	1	4.0	4.0
PRS	36-19.90	121-22.20	363	2	1.1	1.1
SAO	36-45.90	121-26.70	350	2	2.7	1.0
WDC	40-34.80	122-32.40	300		(3.5)	(3.5)

CALIFORNIA DEPARTMENT OF WATER RESOURCES STATIONS

CODE	LAT N	LONG W	ELV	K	D(E)	D(W)
KPK	39-35.01	121-18.32	897	1	(3.5)	(3.5)
MGL	39-48.71	121-33.42	1010	1	(3.5)	(3.5)
ORV	39-33.33	121-30.00	362	1	(3.5)	(3.5)
PAM	39-26.94	121-31.19	131	1	(3.5)	(3.5)
SLD	37-04.48	121-13.33	443	1	2.3	5.2

* LAT AND LONG ARE LATITUDE AND LONGITUDE IN DEGREES AND MINUTES. ELV IS ELEVATION IN METERS. D(E) AND D(W) ARE GIVEN IN KILOMETERS. SEE TEXT (P. 20) FOR EXPLANATION OF K, D(E), AND D(W).

Table 2

<u>New Code</u>	<u>Station Name</u>	<u>Old Code</u>	<u>Output Levels</u>
AAR	Airport Road	AARS	41
ABJ	Bob Jauregui Ranch	ABJS	36
ABR	Brophy Road	ABRS	38
ADW	Drytown Water District	ADWD	40
AFD	Forest Hill Divide	AFHD	44
AFH	Forest Hill Site	AFHS	37
AFR	Fiddymment Road	AFID	36
AGI	Gold Rush Inn	AGRI	44
AHD	Hacienda Drive	AHDR	38
AHR	Harold F. Ross	AHFR	43
ALN	Lincoln	ALIN	38
AOD	Outingdale	AOTD	39
AOH	Oregon House	AOHO	
APR	Poppy Hill Road	APHR	43
ARJ	Robert W. Jensen	ARWJ	31
ARR	Rickey Ranch	ARRA	39
ARW	Richard P. Wilkes	ARPW	40
ASR	Slough House Road	ASHR	
AVR	Valley Road Site	AVRS	36
BAV	Antelope Valley	ANV	35
BBG	Big Mountain	BGM	16
BBN	San Benito	BEN	4
BCG	Cienega Road	CNR	33
BEH	Elkhorn Ranch	EKH	7
BEM	Emmet	EMM	35
BHS	Hastings	HST	17
BJC	Johnson Canyon	JHC	16
BJO	Mt. Johnson	JON	16
BLR	Lewis Ranch	LWR	35
BMC	McPhails Peak	MCP	35
BMH	Mt. Harlan	MTH	32
BMS	Mercey Hot Springs	MRS	33
BPC	Pine Canyon	PNQ	10
BPF	Pfieffer Point	PFP	16
BPI	Pinnacles	PIN	15
BPP	Pinyon Peak	PNP	16
BRM	Rolling Bench Mark	RBM	33
BRV	Little Rabbit Valley	LRV	17
BSB	Swanson Bluff	SWB	33
BSC	Stone Canyon	STQ	17
BSG	Shirt Tail Gulch	SHG	33
BSL	Silva Ranch	SLV	33
BSR	Salinas Radio Site	SRQ	32
BVL	Bear Valley	BVL	16
BVY	Vineyard	VYD	33

Table 2 (continued)

<u>New Code</u>	<u>Station Name</u>	<u>Old Code</u>	<u>Output*</u> <u>Levels</u>
CAC	Antioch	ACH	19
CAD	Anderson Dam	AND	35
CAI	Angel Island	ANG	22
CAL	Calaveras	CAL	33
CAO	Arnold Ranch	ARN	35
CBR	Bollinger Road	BOL	23
CBW	Brookwood Reservoir	BWR	22
CCN	Crow Canyon Road	CCQ	34
CCO	Coe Ranch	COE	42
CCY	Coyote Hills	CYO	33
CDO	Doolan Road	DOO	37
CDS	Don Santos Ranch	DSR	20
CDU	Duarte Ranch	DUR	21
CLC	Lake Chabot	LCH	37
CMC	Mills College	MIL	25
CMH	Mt. Hamilton Road	MHR	46
CMJ	Mission San Jose	MSJ	34
CMO	Morgan Territory	MOR	34
CMR	Mines Road	MNR	38
CPL	Palamares	PAL	14
CRA	San Ramon	SRA	
CRP	Russellman Park	RUS	19
CSC	Silver Creek	SVC	25
CSH	Cal. State Hayward	CSH	37
GAF	Pt. Arena A.F.A	AAF	42
GAX	Alexander Valley	ALX	37
GBG	Boggs	BGG	42
GBO	Black Oak	BKO	34
GCM	Cobb Mountain	CMT	36
GCV	Cloverdale	CVD	36
GDC	Dry Creek	DRY	38
GGL	Glenview	GLV	42
GGP	Geyser Peak	GYP	36
GHC	House Creek	HOC	39
GHG	Hog Mountain	HOG	40
GHL	Highland Springs	HLS	22
GMC	McLaughlin Ranch	MCL	37
GMK	Mt. Konoctai	MKI	35
GMO	Moffitt Ranch	MOF	35
GPM	Pine Mountain	PNM	36
GRM	Round Mountain	RDM	
GRT	Round Top Mountain	RTM	45
GSG	Seigler Mountain	SGM	31
GSM	Socrates Mine	SCR	15
GSN	Snow Mountain	SNO	12
GSS	Skaggs Springs	SKG	38

Table 2 (continued)

<u>New Code</u>	<u>Station Name</u>	<u>Old Code</u>	<u>Output Levels</u>
HAZ	Anzar	ANZ	36
HBT	San Juan Bautista	BTT	34
HCA	Canada Road	CAN	40
HCB	Chamberlin Ranch	CBC	34
HCO	Corn Cob Canyon	CCC	34
HCR	Chase Ranch	CHR	37
HCZ	Cordoza Dairy	CZD	35
HDL	Dillion Ranch	DIL	34
HFE	San Felipe	FEL	35
HFH	Flint Hills	FTH	19
HFP	Fremont Peak State Park	FRP	34
HGS	Gilroy Hot Springs	GHS	42
HGW	Gilroy West	GRW	32
HJG	San Juan Grade	SJG	35
HJS	John Smith Road	JSR	33
HKR	Kincaid Ranch	KNR	33
HLT	Lone Tree Road	LTR	35
HMO	Monterey	MON	33
HOR	O'Connell Ranch	OCR	29
HPH	Parkhill	PKH	35
HPL	Pacheco Lake	PCL	38
HPR	Peckham Road	PMR	34
HQR	Quien Sabe Road	QSR	31
HSF	Saint Francis Retreat	STF	35
HSL	San Luis Dam	SL8	44
JAL	Almaden	ALM	35
JBC	Bear Creek Road	BCR	46
JBG	Bear Gulch	BGH	35
JBL	Camp Ben Lomond	CBL	34
JBM	Black Mountain	BAM	40
JBZ	Buzzard Lagoon Road	BUZ	36
JCB	Chesbro Reservoir	CBO	36
JEC	Eureka Canyon	EUC	32
JEG	El Granada	ELG	33
JHL	Holstrom Ranch	HLM	33
JLT	Los Trancos Woods	LTW	37
JLX	Lexington Reservoir	LXR	45
JMG	Miligra Ridge	MGA	34
JPL	Pleasant Valley	PLV	35
JPP	Portola State Park	POR	
JPR	Presidio	PRO	15
JPS	Pescadero	PES	44
JRG	Rodeo Gulch Road	RGR	33
JRR	Redwood Retreat	RDR	24
JSA	San Andreas Lake	SAC	36
JSC	Stevens Creek	STV	43
JSF	Stanford Telescope	SFT	36

Table 2 (continued)

<u>New Code</u>	<u>Station Name</u>	<u>Old Code</u>	<u>Output Levels</u>
JSG	Saratoga Golf/Country Club	SGC	39
JSJ	St. Joseph's Seminary	STJ	41
JSM	Sawmill Road	SAW	40
JSS	Soda Springs	SOS	46
JST	Santa Teresa	SNT	46
JTG	Trout Gulch Road	TGR	33
JUC	U.C. Santa Cruz	UCS	41
JWS	Woodside	WDS	38
LCF	Crecent Cliffs	CCF	
LRD	Redding Peak	RED	
LSL	South Lassen	SLA	
MBF	Blanchard Fire Station	BFS	44
MCH	Carson Hill	CRH	
MCU	Copperopolis	COP	40
MCS	Central Site	CNS	39
MMW	Mi Wuk Village	MWV	32
MNH	New Hogan Reservoir	NHR	40
MOY	O'Brian Ferry	OBF	41
MRF	Railroad Flat Road	RFR	32
MST	Stent	STN	40
NBP	Berryessa Peak	BRP	42
NBR	Beebe Ranch	BBR	22
NCD	Cavedale Road	CDR	40
NCF	Canfield Road	CAR	38
NFI	Farallones Islands	FAR	18
NFR	Fort Ross	FTR	33
NGV	Green Valley Ranch	GVR	3
NHB	Healdsburg	HLB	40
NHM	Hamilton Ranch	HMR	21
NLN	Lincoln School	LNS	20
NMH	Mt. Saint Helena	SHQ	39
NMT	Middletown	MDT	42
NMW	Mark West Spring	MWS	39
NMX	Mix Canyon	MIX	32
NOL	Olema	OLQ	20
NSH	St. Helena Road	SHR	38
NSP	Sears Point	SPT	21
NTM	Taylor Mountain	TMN	15
NWR	Wright Ranch	WHW	40

Table 2 (continued)

<u>New Code</u>	<u>Station Name</u>	<u>Old Code</u>	<u>Output Levels</u>
OBH	Bloomer Hill	OBLO	41
OCH	Cohasset Ridge	OCOR	40
OGO	Van Goodin Ranch	OGOO	
OHC	Honcut	OHON	40
ORA	Rattlesnake Point	ORAT	42
OST	Stimpson Lane	OSTI	38
OSU	Sutter Buttes	OSUT	33
OTB	Table Mountain	OTAB	41
OWY	Wyandotte	OWYN	40
PAR	Anticline Ridge	ATR	11
PBW	Bitterwater	BTW	17
PCA	Castle Mountain	CAS	30
PCR	Curry Mountain	CRY	30
PGH	Gold Hill	GDH	31
PHC	Hearst Castle	HEC	33
PHR	Hernandez	HER	1
PIV	Indian Valley	IND	29
PJR	Jolon Road	JOL	30
PLO	Lone Oak Road	LOR	11
PMP	Monarch Peak	MOP	32
PPF	Parkfield	PKF	32
PPT	Peach Tree Valley	PTV	32
PSM	Smith Mountain	SMM	31
PTY	Taylor Ranch	TAY	32
PWK	Work Ranch	WKR	31

* Output levels, prior to March 25, 1977, with amplitudes measured peak to peak.

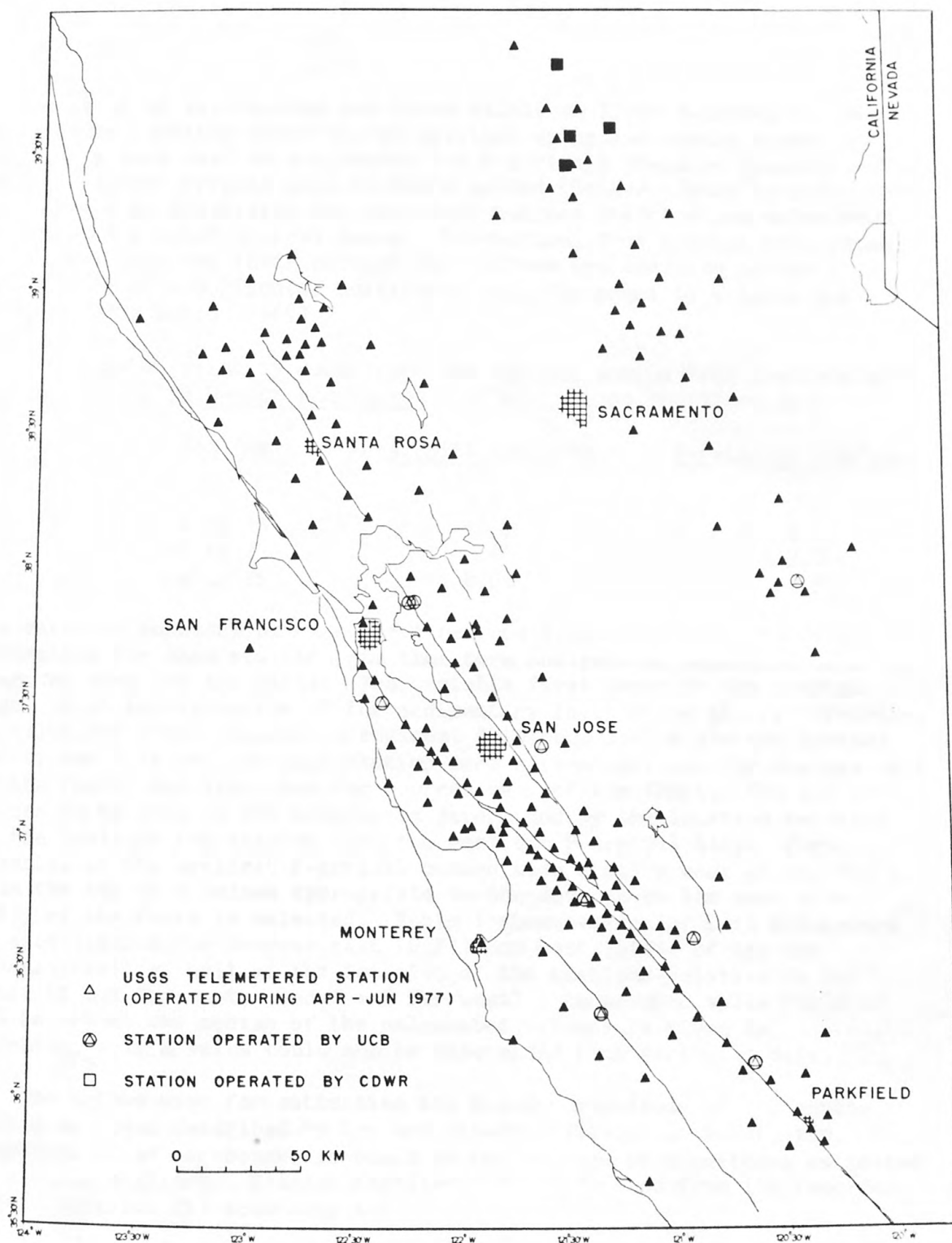


Figure 3. Map showing principal seismograph stations used in locating earthquakes for the second quarter of 1977.

Location of earthquakes was based mainly on first P-arrivals. When an adequate location could not be obtained using P-arrivals alone, S-arrivals were used to supplement the P-arrivals whenever possible. The HYP071 computer program uses Geiger's method (Geiger, 1912) to determine hypocenters by minimizing the residuals between observed and calculated arrivals in a least-squares sense. Traveltimes from a trial hypocenter to the stations and their partial derivatives are computed on the assumptions of a horizontal multilayer velocity model by a technique introduced by Eaton (1969).

The crustal velocity model used was derived mostly from analysis of explosion data by Wesson and others (1973a). It is specified by:

<u>Layer</u>	<u>Depth (km)</u>	<u>P-velocity (km/sec)</u>	<u>S-velocity (km/sec)</u>
1	0 to D	4.0	2.2
2	D to 15	5.9	3.3
3	15 to 25	6.8	3.8
4	below 25	8.05	4.5

The variable boundary between the first and second layer (depth D) is determined for each station from time-term analysis of explosion data whenever they are available. The variable first layer in the crustal model is an approximation of the sedimentary layer above the Pg refractor. To allow for sharp changes in sediment thickness across the San Andreas fault, two D values for each station were determined: one for sources east of the fault, and the other for sources west of the fault. The set of D values to be used in the program is determined by the location relative to the fault of the station with the earliest P-arrival time. For example, if the earliest P-arrival occurs at a station west of the fault, then the set of D values appropriate to the sources on the west side, D(W), of the fault is selected. Table 1 shows values of D in kilometers at each station for sources east (D(E)) and west (D(W)) of the San Andreas fault as well as the location of the stations relative to the fault (K = 1 for east, and K = 2 for west). An assumed value for D of 3.5 km (about the median of the calculated values) is given in parentheses if a value could not be determined from explosion data.

The method used for estimating the Richter magnitude of the earthquakes has been described by Lee and others (1972a). In brief, the magnitude of an earthquake is based on the average of magnitudes estimated at various stations. Station magnitude (M) is derived from its recorded signal duration (τ) according to:

$$M = -0.87 + 2.00 \log (\tau) + 0.0035 \Delta$$

where Δ is the epicentral distance in kilometers. The signal duration or coda is defined as the duration time in seconds from the onset of the first P-arrival to the point where the trace amplitude (peak-to-peak) falls below 1 cm as it appears on the Geotech film viewer.

For earthquakes with Richter magnitudes of 3.5 and below, equation (1) gives a good estimate of the magnitude. Richter magnitudes have been calculated (Richter, 1942) for earthquakes with coda magnitudes of 3.5 or greater using records obtained from the UCB Wood-Anderson seismographs at Berkeley and Mount Hamilton, and the Stanford-USGS Wood-Anderson at Palo Alto. The earthquakes for which the Richter magnitude has been determined from Wood-Anderson records are indicated in the catalog by an R next to the magnitude.

Beginning March 25 through April 26, 1977 all developeocorders were calibrated so that output levels would be standardized for all stations recorded on film. Prior to March 25 the introduction of a 5 Hz, 1volt (peak to peak) signal into each developeocorder produced random output levels for each station and these are listed in Table 2. Since completion of calibrations, on April 26, the same input signal generates a standard 20 mm (peak to peak) output level for each station. Comparing this value with those listed in Table 2 it is apparent that this standardization process has resulted in a decrease in gain for most stations recorded on film. Consequently this has probably resulted in a decrease in coda magnitude for most of the earthquakes reported, since the method for measuring codas was not changed. At present no adequate investigation has been made to accurately determine the actual amount of magnitude bias introduced by these gain changes. However, Bakun (personal communication) has estimated from a small sample study that magnitudes may be bias downward by as much as one quarter of a magnitude unit.

A substantial effort has been made to identify explosions so as to eliminate them from the catalog. Explosions can be identified on the basis of several criteria: location of a known quarry or blasting site, shallow focal depth, time of day, focal mechanism, and/or through correspondence with quarry operators. During the second quarter of 1977, 48 blasts were identified and eliminated from the catalog.

DISCUSSION OF CATALOG

The parameters for the earthquakes listed in the Appendix include the origin time, location of hypocenter (epicenter and focal depth), and magnitude. In addition, six other parameters are listed so that an evaluation of the quality of the hypocenter solution may be made. These parameters are (1) the largest azimuthal separation between stations (GAP), (2) the epicentral distance to the nearest station (DMIN), (3) the root-mean-square error of the time residuals (RMS), (4) the standard error of the epicenter (ERH), (5) the standard error of the focal depth (ERZ) and (6) the number of P- and S-arrivals used in the location (NO). Based on these parameters, the general reliability of each earthquake solution is graded as either excellent (A), good (B), fair (C), or poor (D). Exact rules of quality classification are given in the Appendix.

A brief discussion on the accuracy of hypocenter determinations has been given by Lee and others (1971). To obtain a reliable epicenter, GAP should be less than 180° ; to obtain a reliable focal depth, DMIN should be less than the focal depth. In addition, systematic errors arise from uncertainties in the crustal velocity model. These errors cannot be determined except through controlled experiments, e.g., known explosions in the focal region. Because we present all hypocenter solutions of earthquakes in the region we studied, their quality varies. Although standard errors of epicenter and focal depth (ERH and ERZ) are given, they must be interpreted with caution, especially for quality C and D solutions. Hypocenter solutions for known blasts distributed throughout the San Francisco Bay region indicate that the true positions are often within the standard error limits of the solutions, provided that the conditions $GAP < 180^\circ$ and DMIN is within a few kilometers are met. For example, comparison of locations determined for well-recorded quarry blasts (solution quality A) with the known coordinates indicate a typical error of about 1 km. As suggested by known blasts, a general statement on the accuracy of our hypocenter solutions is as follows:

Solution Quality	Approximate accuracy in	
	Epicenter	Focal Depth
A (excellent)	1 km	2 km
B (good)	2.5 km	5 km
C (fair)	5 km	5 km
D (poor)	5 km	5 km

Epicenters listed in the Appendix are plotted according to magnitude in Figure 4.

The dashed lines in Figure 4 indicate the boundaries of the USGS seismograph network as it existed during the second quarter of 1977. We feel that the hypocenters listed in the the Appendix represent a nearly complete set of earthquakes above magnitude 1 within these boundaries and that these earthquakes are generally well located. Earthquakes outside the dashed boundaries in Figure 4 tend to be less well located, depending on their distance from the network and their relationship to its geometry. Further, the minimum magnitude event that we can detect and locate increases with increasing distance from the network. For earthquakes outside the network, which yielded unsatisfactory locations on the basis of first P-arrivals alone, S-arrivals were included whenever possible.

We believe that the precision of the earthquake locations (or the relative locations) is better than the absolute accuracy of the earthquake locations. Despite our attempts to model the laterally inhomogeneous nature of the velocity structure within the earth's crust using a variable-thickness surface layer, we suspect that the locations within certain parts of the area included in the boundaries of the network may be systematically biased by as much as 2-3 km (Mayer-Rosa, 1973).

Some of the earthquakes listed in this catalog are multiple events, that is, earthquakes from a given source region which occur in such rapid succession that the seismographs are still recording arrivals from one earthquake when the first arrivals from a following earthquake begin to appear. Depending on the size of the individual events and their separation in time, it may be possible to accurately time and locate the later event(s). Sometimes, however, this is not possible.

The contents of the Appendix, along with similar location information for central California earthquakes since 1969, may be obtained (at modest cost) in forms amenable to computer input (magnetic tape) by contacting:

National Oceanic and Atmospheric Administration
Environmental Data and Information Service
NGSDC, Mail Code D62
325 Broadway
Boulder, CO 80303

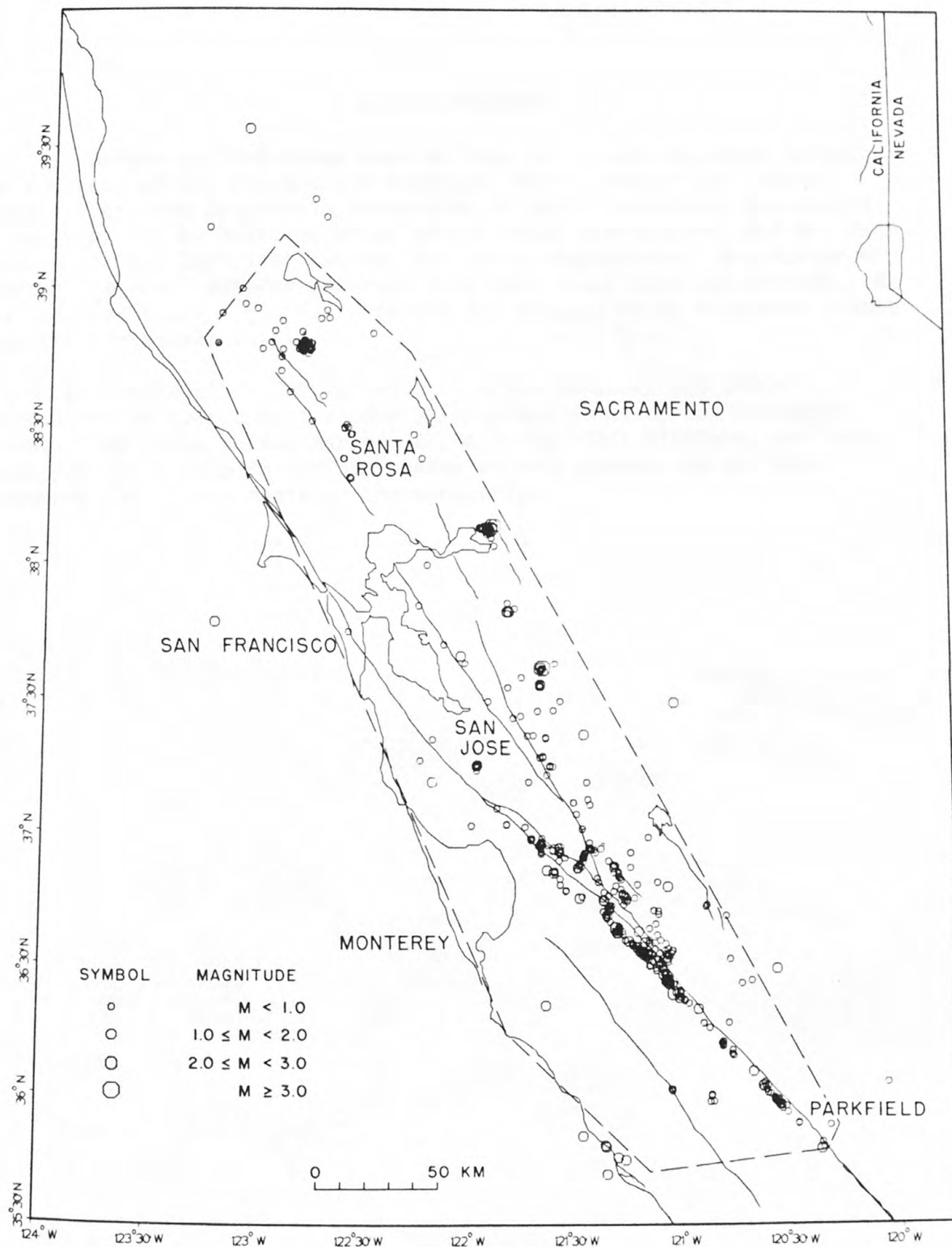


Figure 4. Map showing earthquake epicenters reported in the Appendix. Earthquakes in the region enclosed by the dashed line are generally well recorded and located.

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APPENDIX: CATALOG OF EARTHQUAKES April-June (1977)

Earthquakes along the San Andreas fault system in central California for January-March 1977 are listed chronologically in this APPENDIX.

The following data are given for each event:

1. Origin time in Coordinated Universal Time (UTC): date, hour (HR), minute (MN), and second (SEC). To convert to Pacific Standard Time (PST), subtract eight hours, to Pacific Daylight Time (PDT), subtract seven hours.
2. Epicenter in degrees and minutes of north latitude (LAT N) and west longitude (LONG W).
3. DEPTH, depth of focus in kilometers. If "*" follows the DEPTH, it means that the focal depth is constrained by the location program.
4. MAG, local magnitude of the earthquake. If "R" follows the magnitude, it indicates the Richter magnitude calculated from Wood-Anderson seismograph records.
5. NO, number of P- and S-arrivals used in locating earthquake.
6. GAP, largest azimuthal separation in degrees between stations.
7. DMIN, epicentral distance in kilometers to the nearest station.
8. RMS, root-mean-square error of the time residuals:

where R_i is the observed seismic-wave arrival time minus the computed time at the i th station.

9. ERH, standard error of the epicenter in kilometers:

where SDX and SDY are the standard errors in latitude and longitude, respectively, of the epicenter.

10. ERZ, standard error of the depth in kilometers.

11. Q, solution quality of the hypocenter. This measure is intended to indicate the general reliability of each solution.

<u>Q</u>	<u>Epicenter</u>	<u>Focal Depth</u>
A	excellent	good
B	good	fair
C	fair	poor
D	poor	poor

Q is based on both the nature of the station distribution with respect to the earthquake and the statistical measure of the solution. These two factors are each rated independently according to the following schemes.

Station Distribution

	<u>NO</u>	<u>GAP</u>	<u>DMIN</u>
A	6	90	DEPTH or 5 km
B	6	135	2 x DEPTH or 10 km
C	6	180	50 km
D	Others		

Statistical Measures

	<u>RMS (sec)</u>	<u>ERH (km)</u>	<u>ERZ (km)</u>
A	0.15	1.0	2.0
B	0.30	2.5	5.0
C	0.50	5.0	
D	Others		

Q is taken as the average of the ratings from the two schemes, i.e., an A and a C yield a B, and two B's yield a B. When the two ratings are only one level apart the lower one is used, i.e., an A and a B yield a B.

12. QUADRANGLE, for earthquakes between 35° 00.0' and 40° 00.0' N latitude and 119° 45.0' and 123° 45.0' W longitude, QUADRANGLE indicates the name of the U.S. Geological Survey 7.5' quadrangle (or quadrant of 15' quadrangle), in which the epicenter is located. For earthquakes offshore or outside the designated area, the entry is starred and indicates the general geographic area in which the epicenter is located, for example, "****MONTEREY BAY****".

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977

1977	HR	MIN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DIR IN	RPS	ERI	ERZ	QUADRANGLE	
APR	1	7	2	54.3	35-49.1	120-22.1	4.8	1.9	14	223	1.7	0.12	1.0	0.5 C	CHOLAME VALLEY
	1	7	52	48.8	38-48.7	122-47.9	3.8	1.1	10	80	3.3	0.12	0.7	0.5 A	THE GEYSERS
	1	10	20	59.4	37-40.0	122-3.0	4.4	2.1	54	33	2.2	0.15	0.5	0.2 A	HAYWARD
	1	12	39	38.3	38-48.2	122-48.5	1.3	1.0	2	76	3.3	0.04	0.2	0.1 A	THE GEYSERS
	1	12	48	28.8	39-30.3	122-35.3	6.3	1.3	19	121	1.1	0.13	0.3	1.1 B	CALISTOGA
	1	13	18	49.4	37-15.4	121-58.3	5.1	2.3	46	30	6.1	0.12	0.2	0.3 B	SAN JOSE WEST
	1	13	33	58.3	37-15.3	121-58.3	6.2	1.9	38	29	5.2	0.11	0.3	1.0 A	SAN JOSE WEST
	1	15	46	55.0	35-45.1	121-16.5	5.1	2.0	17	215	13.4	0.09	0.5	0.9 C	BURRO MTN
	2	0	15	34.4	36-46.3	121-22.7	8.0	1.3	15	66	2.7	0.08	0.4	0.3 A	HOLLISTER
	2	0	22	24.0	35-48.1	120-21.7	4.9	1.8	2	262	3.4	0.11	1.3	0.7 C	CHOLAME VALLEY
	2	0	56	12.2	36-51.3	121-36.5	6.1	1.9	47	55	3.6	0.23	0.5	0.7 B	SAN JUAN BAUTISTA
	2	4	45	11.1	36-2.3	120-37.8	3.2	1.7	13	84	4.3	0.14	0.9	0.8 A	SLACK CANYON
	2	5	48	39.2	37-4.5	121-30.4	3.9	1.5	33	71	5.3	0.14	0.4	0.3 B	GILROY
	2	7	0	53.4	36-51.4	121-36.4	5.8	1.7	52	55	3.4	0.25	0.5	0.3 B	SAN JUAN BAUTISTA
	2	7	2	4.5	36-51.7	121-36.3	5.3	1.5	42	70	2.2	0.27	0.7	0.8 B	SAN JUAN BAUTISTA
	2	7	56	58.7	37-15.4	121-58.2	4.9	2.4	40	30	6.3	0.10	0.2	0.3 B	SAN JOSE WEST
	2	8	12	45.1	37-14.9	121-58.3	7.1	1.5	26	63	5.4	0.14	0.4	1.2 A	LOS GATOS
	2	9	5	40.6	36-2.3	120-37.2	4.3	1.3	11	100	4.1	0.07	0.4	0.4 B	SMITH MTN
	2	10	35	17.9	38-49.0	122-48.1	3.5	1.3	13	88	3.3	0.15	0.6	0.6 A	THE GEYSERS
	2	10	52	23.0	36-5.7	120-41.2	5.4	2.1	15	127	3.5	0.17	1.0	0.3 B	SLACK CANYON
2	13	57	24.0	36-45.7	121-16.2	7.8	1.8	40	47	3.1	0.13	0.3	0.7 A	TRES PINOS	
2	18	51	0.6	35-45.7	121-18.5	6.9	2.1	12	220	16.7	0.13	1.0	1.1 C	BURRO MTN	
2	19	46	51.4	36-32.3	121-4.7	7.6	1.8	19	67	3.1	0.14	0.5	1.1 A	SAN BENITO	
3	0	31	26.3	36-55.6	121-28.0	4.8	1.6	23	66	3.3	0.10	0.4	0.8 A	SAN FELIPE	
3	7	4	27.7	36-55.6	121-28.1	4.6	1.3	21	65	3.7	0.10	0.3	0.5 A	SAN FELIPE	
3	9	29	15.2	36-29.4	121-6.2	1.9	2.0	17	85	3.3	0.16	0.6	0.4 B	TOPO VALLEY	
3	10	5	29.0	36-55.3	121-15.3	7.3	1.6	36	85	7.0	0.14	0.4	1.2 A	THREE SISTERS	
3	10	20	43.9	39-34.3	123-4.5	4.3	2.7	29	174	54.0	0.24	2.0	1.0 C	SANHEDRIN MTN	
3	10	41	46.1	36-41.3	121-7.5	7.5	1.3	20	125	4.7	0.11	0.5	0.8 B	PANOCH PASS	
3	10	47	58.7	36-42.5	121-7.5	6.3	1.4	17	129	5.2	0.09	0.4	0.3 B	CHERRY PEAK	
3	15	22	46.3	38-49.1	122-48.1	3.5	1.4	15	49	3.7	0.16	0.6	0.5 B	THE GEYSERS	
3	17	17	53.8	36-37.9	121-17.5	5.7	1.7	22	58	3.1	0.13	0.6	1.1 B	PAICINES	
3	17	18	23.4	36-28.6	121-5.3	7.0	1.4	12	103	3.3	0.09	0.5	0.9 B	TOPO VALLEY	
3	18	44	17.5	38-48.4	122-48.9	1.4	1.2	10	70	3.1	0.08	0.3	0.3 A	THE GEYSERS	
3	19	20	58.3	36-33.2	121-10.2	9.0	1.6	22	62	3.0	0.10	0.3	0.7 A	RICKMORE CANYON	
3	20	44	52.7	36-27.7	121-5.1	5.8	2.3	40	84	5.4	0.22	0.6	1.4 B	TOPO VALLEY	
3	21	33	15.8	36-33.8	121-8.6	9.1	1.9	22	61	4.3	0.15	0.5	1.0 A	RICKMORE CANYON	
3	21	45	51.9	36-33.3	121-8.6	10.9	1.4	17	61	4.3	0.07	0.4	0.3 A	RICKMORE CANYON	
3	23	48	7.0	38-47.9	122-48.2	1.4	1.1	11	69	3.3	0.07	0.3	0.3 A	THE GEYSERS	
4	17	40	10.4	36-26.1	121-4.1	9.8	1.3	13	60	4.6	0.16	0.7	1.4 B	TOPO VALLEY	
4	18	16	37.5	37-15.5	121-58.1	4.8	2.3	43	29	6.4	0.11	0.2	0.2 B	SAN JOSE WEST	
4	18	34	32.0	35-57.6	120-32.2	5.8	1.7	12	73	5.3	0.12	0.5	2.3 B	STOCKDALE MTN	
4	18	47	48.8	36-55.2	121-28.4	4.3	1.1	30	57	3.1	0.13	0.3	0.3 A	SAN FELIPE	
4	19	4	10.5	36-23.9	121-1.7	8.3	2.3	35	87	3.0	0.20	0.6	1.2 B	TOPO VALLEY	
4	19	6	45.3	36-24.0	121-1.5	7.1	1.4	13	99	2.2	0.07	0.5	0.9 B	TOPO VALLEY	

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977--CONTINUED

1977	HR	MN	SEC	LAT N	LONG W	DEPTH	MAG	DD	GAP	DM1	RMS	ERH	ERZ		QUADRANGLE	
APR	4	22	45	32.6	36-33.6	121- 3.7	12.5	1.4	22	69	4.7	0.14	0.6	0.7	A	SAN BENITO
	4	23	14	2.1	36-48.3	121-19.4	4.8	1.3	20	52	2.5	0.12	0.4	0.4	A	TRES PINOS
	5	1	28	19.5	33-47.2	122-60.0	3.6	1.2	12	83	2.5	0.12	0.4	0.3	A	ASTI
	5	5	48	3.3	38-49.0	122-48.0	3.5	0.9	14	70	3.3	0.13	0.5	0.5	A	THE GEYSERS
	5	6	34	16.1	36- 2.7	120- 3.3	5.2	1.8	12	276	27.3	0.17	0.2	3.2	D	LA CIMA
	5	7	15	1.6	36-57.4	121-40.9	9.8	1.3	33	50	1.2	0.15	0.4	0.8	B	WATSONVILLE EAST
	5	17	10	42.2	37-11.7	122-10.8	4.9	2.1	36	101	2.2	0.13	0.4	0.4	B	BIG BASIN
	5	23	54	40.6	38-48.1	122-46.4	2.0	0.9	9	91	1.7	0.03	0.4	0.3	B	THE GEYSERS
	5	23	57	29.8	38-48.2	122-46.5	1.7	0.8	13	65	1.7	0.10	0.3	0.3	A	THE GEYSERS
	6	1	17	40.6	36-33.5	121- 5.7	9.3	1.5	25	63	7.2	0.15	0.5	1.0	B	SAN BENITO
	6	1	53	52.5	37-15.6	121-58.4	6.5	1.2	18	70	6.7	0.06	0.3	0.7	B	SAN JOSE WEST
	6	1	59	33.4	36-31.1	121- 9.2	8.3	1.3	13	67	3.7	0.24	0.9	1.9	B	BICKMORE CANYON
	6	2	38	27.4	37-11.6	121-27.6	4.7	2.0	74	132	10.9	0.15	0.3	0.3	C	MISSISSIPPI CREEK
	6	3	37	2.4	37-15.4	121-58.1	4.8	1.5	29	31	6.3	0.14	0.4	0.4	B	SAN JOSE WEST
	6	3	49	1.9	38-48.1	122-49.2	1.5	0.9	11	86	3.3	0.04	0.2	0.1	A	THE GEYSERS
	6	4	49	18.1	38- 4.4	121-53.8	16.3	1.8	27	119	10.4	0.23	1.1	1.4	B	HONKER RAY
	6	10	48	26.0	38-48.8	122-47.9	3.5	0.9	16	77	3.7	0.14	0.5	0.5	A	THE GEYSERS
	6	12	43	36.9	37-38.3	121-36.6	6.5	1.3	17	114	5.4	0.28	2.4	1.5	B	MIDWAY
	6	13	22	2.0	36-44.9	121-22.6	4.9	2.0	54	23	3.2	0.23	0.4	0.5	B	MT HARLAN
	6	16	40	58.9	38-49.1	122-48.0	3.4	1.4	13	41	3.8	0.16	0.5	0.4	B	THE GEYSERS
	6	17	25	3.1	36-32.7	121- 5.1	6.6	1.2	14	88	3.9	0.18	0.8	1.8	B	SAN BENITO
	7	1	24	0.5	36-33.3	121-11.0	5.4	1.4	18	65	2.3	0.16	0.6	1.2	B	BICKMORE CANYON
	7	1	43	49.4	36-38.9	121-18.4	3.9	1.5	23	38	3.7	0.18	0.5	0.6	B	PAICINES
	7	4	44	27.4	37-50.6	121-48.0	8.2	2.0	29	139	3.5	0.21	0.7	1.2	C	TASSAJARA
	7	5	30	38.9	36-57.1	121-35.4	5.8	1.6	41	46	0.3	0.13	0.3	0.7	A	CHITTENDEN
	7	6	56	16.7	36-37.1	121- 7.8	15.9	1.1	17	67	5.7	0.11	0.6	0.8	A	BICKMORE CANYON
	7	7	11	40.6	36-58.0	121-40.1	9.2	1.8	27	40	2.3	0.09	0.3	0.5	A	WATSONVILLE EAST
	7	7	24	10.6	36-58.0	121-40.0	9.3	1.6	22	39	2.9	0.07	0.3	0.5	A	WATSONVILLE EAST
	7	8	52	57.9	37-38.3	122- 1.8	2.3	1.8	24	42	1.5	0.14	0.4	0.3	A	HAYWARD
	7	12	59	13.2	36-53.3	121-29.4	8.6	1.3	28	39	1.9	0.13	0.4	0.8	A	SAN FELIPE
	7	13	47	6.6	37-51.8	121-50.0	3.3	1.4	15	128	6.3	0.13	0.7	0.4	B	TASSAJARA
	7	13	51	12.2	36-53.4	121-29.4	9.9	1.8	50	40	1.7	0.12	0.3	0.4	A	SAN FELIPE
	7	19	59	54.5	38-47.5	122-48.2	3.1	1.1	14	65	3.1	0.12	0.5	0.5	A	THE GEYSERS
	7	21	49	42.9	36-42.4	121-22.9	0.7	1.0	11	65	3.4	0.14	0.6	0.7	A	MT HARLAN
	8	2	18	59.9	36-10.7	120-46.9	6.8	1.3	8	124	4.3	0.11	1.0	1.4	B	MONARCH PEAK
	8	2	29	41.2	38-37.0	122-42.6	5.5	1.2	14	93	7.4	0.12	1.0	3.2	B	MARK WEST SPRINGS
	8	8	17	41.5	36-45.4	121-22.9	6.1	1.5	23	64	2.7	0.15	0.5	1.0	B	HOLLISTER
	8	9	45	0.6	38-48.7	122-48.2	2.1	0.8	10	83	3.7	0.09	0.4	0.3	A	THE GEYSERS
	8	13	20	12.9	36-57.9	121-40.3	9.3	2.0	41	40	2.5	0.14	0.4	0.7	A	WATSONVILLE EAST
	8	13	53	34.5	36-57.9	121-40.3	9.3	1.5	36	39	2.5	0.12	0.3	0.6	A	WATSONVILLE EAST
	8	15	33	15.9	38-23.4	122-36.7	10.6	1.6	21	83	13.2	0.13	0.5	1.1	B	KENWOOD
	8	16	27	49.6	38-23.4	122-36.4	10.8	1.5	21	70	12.7	0.13	0.5	0.9	B	KENWOOD
	8	16	57	8.5	36-47.5	121-18.0	3.4	1.2	52	57	2.7	0.13	0.3	0.6	A	TRES PINOS
	8	17	41	43.0	36-45.0	121-22.3	5.2	2.1	34	27	3.1	0.20	0.5	0.8	B	HOLLISTER
	8	19	42	59.9	38-48.7	122-47.9	3.0	1.2	9	83	3.7	0.04	0.2	0.1	A	THE GEYSERS

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

1977	HR	MIN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DMIN	RMS	ERH	ERZ	Q	QUADRANGLE	
APR	8	20	17	53.5	36-56.9	121-27.0	5.8	1.4	28	71	5.6	0.12	0.4	0.9	A	SAN FELIPE
	8	20	46	47.4	36-56.9	121-35.2	5.3	2.0	48	30	1.1	0.09	0.2	0.3	A	CHITTENDEN
	9	2	9	7.5	37-22.2	121-42.6	3.0	1.4	19	136	4.3	0.16	0.6	0.4	C	LICK OBSERVATORY
	9	2	45	2.0	37-15.2	121-37.1	4.6	1.7	54	92	4.8	0.15	0.3	0.2	B	ISABEL VALLEY
	9	5	58	0.8	38-48.8	122-48.2	3.8	1.0	10	85	3.6	0.14	0.7	0.7	A	THE GEYSERS
	9	6	48	51.3	38-48.4	122-46.8	2.6	1.5	17	72	2.1	0.12	0.4	0.2	A	THE GEYSERS
	9	13	37	48.2	36-58.3	121-40.3	8.9	1.5	37	35	2.9	0.15	0.4	0.7	A	WATSONVILLE EAST
	9	14	22	54.9	36-54.6	121-28.5	7.2	1.2	23	62	2.6	0.11	0.4	0.8	A	SAN FELIPE
	9	14	37	24.8	35-50.7	121-28.3	9.3	2.4	23	243	36.8	0.11	1.2	0.5	C	VILLA CREEK
	9	18	56	30.7	36-38.6	121-10.0	14.1	1.2	20	79	2.5	0.13	0.7	0.7	A	CHERRY PEAK
	9	21	12	14.2	36-27.5	121- 4.9	7.3	1.4	19	63	5.8	0.19	0.7	1.5	B	TOPO VALLEY
	9	22	8	39.9	38-48.3	122-48.6	0.0	2.0	18	59	3.6	0.08	0.2	0.3	A	THE GEYSERS
	9	23	57	48.0	38-49.1	122-48.1	3.7	1.0	9	90	3.6	0.11	0.7	0.6	B	THE GEYSERS
	10	0	15	42.5	36-47.1	121-19.9	5.6	2.0	36	46	1.3	0.12	0.3	0.5	A	TRES PINOS
	10	10	30	29.5	36- 3.2	120-38.1	2.5	1.2	7	113	4.0	0.03	0.2	0.2	B	SLACK CANYON
	10	11	19	26.8	36-56.7	121-23.6	8.6	1.2	21	90	4.3	0.12	0.5	0.9	A	SAN FELIPE
	10	23	47	42.9	38-48.3	122-48.4	1.6	1.1	11	76	3.3	0.06	0.2	0.2	A	THE GEYSERS
	11	2	51	52.5	37- 2.2	121-49.9	4.5	1.5	18	84	2.4	0.14	0.5	0.3	A	LOMA PRIETA
	11	2	55	14.0	37- 2.1	121-49.9	4.4	1.5	17	83	2.1	0.13	0.5	0.3	A	LOMA PRIETA
	11	6	34	3.4	38-54.7	122-43.4	5.7	1.1	11	103	4.8	0.13	0.3	1.6	B	CLEARLAKE HIGHLANDS
	11	10	11	2.9	37-15.2	121-58.4	8.1	1.3	29	34	5.3	0.11	0.3	0.8	A	SAN JOSE WEST
	11	10	54	40.6	35-54.1	120-19.9	5.2	1.2	7	201	3.5	0.07	1.2	2.4	C	THE DARK HOLE
	11	14	15	6.5	36-56.7	121-35.1	5.4	1.4	22	40	1.1	0.10	0.3	0.6	A	CHITTENDEN
	11	14	50	13.3	38-47.7	122-48.5	3.3	1.5	19	69	3.8	0.14	0.4	0.4	A	THE GEYSERS
	11	19	32	56.2	38-48.0	122-48.4	1.3	1.3	16	64	4.1	0.10	0.3	0.2	A	THE GEYSERS
	11	23	45	28.4	36-55.6	121-28.7	5.5	1.9	39	52	11.0	0.16	0.4	0.6	C	SAN FELIPE
	12	4	23	7.2	36-45.7	121-16.2	6.2	1.4	38	46	3.0	0.15	0.4	0.9	A	TRES PINOS
	12	4	40	24.2	36-39.5	121-18.4	4.2	1.0	12	61	3.1	0.22	1.0	1.9	B	PAICINES
	12	5	40	26.3	36-53.4	121-15.3	4.5	1.2	34	107	4.3	0.13	0.4	0.3	B	THREE SISTERS
	12	9	51	19.8	36-39.8	121-18.5	4.0	1.9	25	60	3.2	0.16	0.4	0.4	B	PAICINES
12	10	21	52.3	38-48.5	122-48.0	2.5	0.5	10	77	3.9	0.05	0.2	0.2	A	THE GEYSERS	
12	10	26	25.7	36-39.9	121-18.4	4.8	1.5	21	63	3.1	0.14	0.4	0.6	A	PAICINES	
12	19	48	55.6	36-33.8	121- 3.7	11.6	1.7	12	71	4.6	0.06	0.3	0.6	A	SAN BENITO	
12	20	41	43.2	36-42.1	121-21.9	3.5	1.9	25	53	2.1	0.15	0.5	0.4	B	PAICINES	
13	0	0	12.6	38- 7.1	121-54.5	19.2	1.8	20	88	10.4	0.32	1.9	1.8	B	HONKER BAY	
13	0	12	14.6	38- 7.0	121-54.5	19.3	1.9	22	88	10.3	0.37	1.6	1.6	B	HONKER BAY	
13	1	52	44.3	38-48.6	122-48.2	2.0	0.8	3	79	3.3	0.05	0.3	0.2	A	THE GEYSERS	
13	2	7	52.8	38-48.4	122-47.8	1.3	1.1	12	74	3.7	0.07	0.3	0.3	A	THE GEYSERS	
13	2	8	57.3	38-48.3	122-47.8	2.5	0.6	2	73	3.6	0.07	0.3	0.3	A	THE GEYSERS	
13	4	36	59.2	38-48.4	122-47.8	2.6	0.7	8	74	3.6	0.03	0.1	0.1	A	THE GEYSERS	
13	6	40	36.6	36-33.7	121- 5.6	9.2	1.6	27	63	6.0	0.14	0.4	0.9	A	SAN BENITO	
13	13	2	33.8	37- 2.5	121-44.7	11.1	1.2	22	59	2.1	0.12	0.4	0.8	A	MT MADONIA	
13	17	8	36.8	38-56.3	123- 1.6	6.9	1.9	24	96	10.5	0.13	0.6	2.6	B	HOPLAND	
13	22	34	10.8	37-28.7	121-37.0	5.8	1.9	37	157	13.1	0.16	0.5	0.5	C	EYLAR MTJ	
14	3	55	41.0	38-49.2	122-48.0	3.6	1.3	17	80	3.7	0.17	0.6	0.6	B	THE GEYSERS	

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

1977	HR	MIN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	D MIN	RMS	FRH	ERZ	Q	QUADRANGLE
APR 14	8	11	1.8	36-32.2	121- 5.1	7.0	2.2	35	65	3.0	0.17	0.4	0.9	B	SAN BENITO
14	14	5	15.4	36-30.5	121- 8.1	10.7	2.0	31	46	3.2	0.23	0.6	1.1	B	BICKMORE CANYON
14	14	6	15.3	36-29.2	121- 8.0	9.4	1.4	26	47	3.7	0.22	0.7	1.3	B	NORTH CHALONE PEAK
14	22	7	8.4	38-48.4	122-48.6	1.8	1.0	12	73	3.5	0.06	0.2	0.2	A	THE GEYSERS
14	23	38	41.6	38-49.0	122-47.8	2.3	0.8	9	87	3.3	0.09	0.4	0.3	A	THE GEYSERS
15	9	31	42.7	36- 3.3	120-38.4	1.6	2.2	15	94	4.4	0.10	0.5	0.6	B	SLACK CANYON
15	9	32	47.0	36-34.2	121-13.7	6.6	1.1	17	59	3.5	0.08	0.3	0.6	A	BICKMORE CANYON
15	13	19	46.1	36-26.8	121- 3.3	8.6	1.8	30	67	4.1	0.12	0.3	0.7	A	TOPO VALLEY
15	14	5	2.3	38-49.1	122-47.8	2.3	1.1	14	69	3.3	0.08	0.3	0.2	A	THE GEYSERS
16	11	1	44.2	36-55.6	121-28.2	6.6	1.5	74	59	3.5	0.10	0.2	0.4	A	SAN FELIPE
16	22	37	9.1	38-49.6	122-46.9	3.2	1.8	20	40	3.3	0.13	0.4	0.2	A	THE GEYSERS
17	6	47	58.4	36-35.7	121-14.6	6.9	1.7	29	31	4.3	0.15	0.4	0.8	A	BICKMORE CANYON
17	7	14	51.8	37-52.1	122-14.9	9.6	1.6	33	48	10.2	0.13	0.3	0.6	B	OAKLAND EAST
17	7	22	33.1	36-41.0	121-20.9	3.4	1.3	20	56	2.2	0.19	0.6	0.4	B	PAICINES
17	21	29	58.1	36-53.9	121-19.9	4.4	1.4	25	106	2.6	0.15	0.5	0.6	B	THREE SISTERS
18	6	53	14.4	36-32.3	121- 5.2	6.8	1.8	26	65	3.3	0.17	0.5	1.1	B	SAN BENITO
18	9	14	51.4	38-48.8	122-48.4	3.6	1.1	11	83	3.4	0.12	0.6	0.5	A	THE GEYSERS
18	11	12	19.0	36-26.2	121- 3.1	8.7	1.5	18	67	3.2	0.09	0.4	0.7	A	TOPO VALLEY
18	12	3	12.6	36-10.7	120-47.0	7.4	2.0	21	115	4.1	0.19	0.8	1.4	B	MONARCH PEAK
18	12	51	6.9	36-52.2	121-18.6	2.8	1.5	37	76	1.5	0.13	0.3	0.2	A	TRES PINOS
19	3	32	52.7	38-38.7	122-52.0	3.8	1.3	17	86	7.2	0.18	0.7	0.6	B	JIMTOWN
19	4	41	0.5	36-34.4	121- 3.3	12.4	1.2	19	82	3.3	0.11	0.6	0.9	A	SAN BENITO
19	6	30	41.6	37-12.6	121-43.8	9.5	1.5	19	68	6.1	0.09	0.3	0.7	A	MORGAN HILL
19	10	50	41.7	36-29.3	121- 6.0	3.6	1.2	11	97	3.2	0.12	0.6	1.7	B	TOPO VALLEY
19	15	56	48.7	36-42.2	121-22.0	2.2	1.6	30	42	2.2	0.21	0.5	0.4	B	PAICINES
20	3	30	41.6	36-29.0	121- 6.1	3.7	2.0	31	61	3.3	0.16	0.4	0.4	B	TOPO VALLEY
20	9	50	0.6	36-35.9	121-14.5	4.8	1.4	21	64	3.2	0.18	0.6	1.1	B	BICKMORE CANYON
20	15	8	7.6	36-36.6	121-15.6	5.3	2.0	22	47	3.5	0.19	0.5	0.8	B	MT JOHNSON
21	3	16	22.2	36-21.1	120-56.4	0.3	2.0	15	92	4.2	0.13	0.6	0.9	B	LONOAK
21	7	8	31.8	38-48.4	122-47.5	2.3	0.8	12	71	3.2	0.10	0.4	0.3	A	THE GEYSERS
21	10	36	33.6	36- 0.6	120-35.4	0.0	1.6	9	102	6.7	0.17	0.9	0.9	B	SMITH MTN
21	10	46	25.8	36-56.6	121-28.2	7.2	1.1	23	60	4.4	0.09	0.3	0.7	A	SAN FELIPE
21	14	59	28.6	36-32.3	121-10.3	8.0	1.3	22	49	4.4	0.16	0.6	1.1	B	BICKMORE CANYON
21	18	0	3.0	36-38.6	121-19.0	8.1	2.2	76	33	3.6	0.17	0.3	0.5	B	PAICINES
21	18	1	47.5	36-39.0	121-19.0	7.4	1.1	24	41	4.3	0.16	0.5	1.0	B	PAICINES
21	18	20	34.6	36-38.6	121-18.7	6.7	2.0	44	39	3.5	0.21	0.4	0.9	B	PAICINES
21	19	58	55.5	36-38.5	121-18.9	8.3	3.0	73	32	3.4	0.20	0.4	0.6	B	PAICINES
21	20	5	15.3	36-38.7	121-18.6	7.2	1.2	34	39	3.3	0.14	0.3	0.7	A	PAICINES
21	20	17	4.8	36-38.5	121-18.9	7.8	2.3	57	32	3.4	0.18	0.3	0.6	B	PAICINES
21	20	33	17.7	36-38.8	121-18.9	7.7	1.8	38	41	4.0	0.13	0.3	0.6	A	PAICINES
21	20	54	22.1	36-38.5	121-18.8	7.3	2.1	46	40	3.4	0.17	0.4	0.7	B	PAICINES
21	23	29	57.7	35-42.8	121-21.5	7.1	2.2	23	227	13.2	0.13	0.9	0.6	C	PIEDRAS BLANCAS
22	11	54	6.7	36-38.8	121-18.9	7.6	1.6	21	66	4.1	0.11	0.4	0.8	A	PAICINES
22	11	58	14.6	32-16.5	122-42.0	4.9	1.1	7	294	12.5	0.08	5.0	8.3	D	FOUTS SPRINGS
22	14	32	46.8	36-38.3	121-18.8	7.2	1.4	23	40	4.0	0.13	0.4	0.8	A	PAICINES

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

	1977	HR	MIN	SEC	LAT N	LONG W	DEPTH	MAG	NO	SAP	PHI	RES	ERI	ER7	Q	QUADRANGLE
APR	23	2	50	36.0	35-50.3	121-34.9	2.6	1.0	15	85	2.3	0.21	0.6	0.4	B	SAN JUAN BAPTISTA
	24	3	37	5.7	38-57.7	123- 5.1	4.3	1.5	19	151	9.4	0.10	0.4	0.9	B	HOPLAND
	24	13	2	59.1	36-57.4	121-25.6	9.6	1.6	41	44	3.6	0.12	0.3	0.6	A	SAN FELIPE
	24	20	20	45.2	35-58.3	120-33.7	2.5	1.5	7	110	8.3	0.06	0.4	0.3	B	STOCKDALE MTN
	25	1	19	36.3	36- 1.3	120-52.7	11.6	1.3	24	97	21.7	0.17	0.7	0.9	B	SAN ARDO
	25	1	53	39.4	36-29.5	121- 5.7	3.0	1.2	12	78	2.6	0.11	0.5	0.7	A	TOPO VALLEY
	25	3	33	15.6	37-16.3	121-37.8	5.3	1.4	26	95	4.1	0.09	0.3	0.2	B	LICK OBSERVATORY
	25	6	1	3.5	35-58.0	120-33.2	2.8	1.6	9	73	7.5	0.10	0.5	0.5	B	STOCKDALE MTN
	25	10	34	20.8	38-47.9	122-54.2	6.5	1.0	11	124	6.3	0.31	2.0	4.0	C	ASTI
	25	13	45	58.7	38-48.1	122-46.4	2.1	0.9	9	91	1.6	0.09	0.4	0.3	B	THE GEYSERS
	25	17	35	19.8	36-39.2	121-18.6	4.1	1.3	23	44	3.6	0.16	0.4	1.0	B	PAICINES
	25	17	39	13.9	36-56.3	121-25.1	8.9	1.3	31	80	4.4	0.13	0.4	0.8	A	SAN FELIPE
	26	0	56	50.3	36-27.6	120-41.5	10.7	1.8	28	142	14.9	0.20	0.8	1.1	C	IDRIA
	26	2	25	50.2	38-49.1	122-47.6	3.8	2.4	27	64	3.6	0.12	0.3	0.3	A	THE GEYSERS
	26	3	50	46.5	38-49.4	122-57.5	3.7	1.0	14	125	2.3	0.15	0.7	0.5	B	ASTI
	26	4	37	50.3	38-48.0	122-48.3	1.7	1.0	12	72	4.0	0.09	0.3	0.3	A	THE GEYSERS
	26	14	35	51.8	38-48.2	122-45.9	2.5	1.5	17	67	0.9	0.09	0.3	0.2	A	THE GEYSERS
	26	18	5	10.7	36-57.5	121-40.3	8.9	1.5	28	45	2.3	0.10	0.3	0.5	A	WATSONVILLE EAST
	26	19	47	23.8	38-48.4	122-48.6	1.4	1.3	11	72	3.4	0.07	0.2	0.2	A	THE GEYSERS
	26	22	13	23.1	36-50.0	121- 7.8	6.4	1.2	18	212	7.4	0.12	0.9	1.8	C	QUIEN SAGE VALLEY
	26	23	34	24.6	37-22.7	121-39.1	5.3	1.5	31	104	9.5	0.12	0.3	0.4	B	MT DAY
	27	1	26	4.8	37- 8.7	121-27.3	4.8	1.5	35	142	5.5	0.18	0.6	0.5	C	MISSISSIPPI CREEK
	27	4	2	46.1	36-23.3	121- 0.3	4.6	2.0	32	64	4.1	0.22	0.6	0.8	B	TOPO VALLEY
	27	6	44	32.3	36- 2.9	120-38.6	0.8	1.5	9	98	4.9	0.11	0.8	1.0	B	SLACK CANYON
	27	8	22	25.0	36-51.4	121-18.6	4.8	1.4	30	103	3.1	0.17	0.6	0.6	B	TRES PINOS
	27	8	58	3.0	36-22.0	121-38.7	10.0	2.1	61	100	9.5	0.16	0.4	0.5	B	VENTANA CONES
	27	20	48	47.5	36-16.3	120-53.3	2.5	1.6	17	100	5.4	0.15	0.6	0.5	B	LONOAK
	27	21	24	42.7	36- 1.7	120-37.2	3.1	1.6	12	80	5.1	0.25	1.3	1.9	B	SMITH MTN
	27	23	21	10.5	37-30.7	121-55.2	0.3	1.7	29	59	4.5	0.15	0.4	0.6	A	NILES
	28	0	22	4.0	36-44.9	121-17.2	4.1	1.2	17	82	1.2	0.19	0.7	0.6	B	PAICINES
	28	1	12	18.4	36-44.3	121-20.9	10.6	1.5	25	59	3.3	0.14	0.5	0.8	A	PAICINES
	28	3	43	39.1	37-46.3	122-34.8	10.2	1.4	12	194	9.6	0.10	0.3	0.7	C	POINT BONITA
	28	10	41	23.6	36-55.7	121-23.5	4.4	1.3	55	45	3.2	0.16	0.3	0.3	B	SAN FELIPE
	28	14	53	42.1	36-45.7	121-16.3	5.5	1.4	36	46	3.0	0.12	0.3	0.5	A	TRES PINOS
	28	18	54	38.9	38-48.0	122-46.8	3.8	1.0	9	88	2.3	0.06	0.3	0.3	A	THE GEYSERS
	29	3	45	11.0	36-33.8	121-10.2	8.3	1.5	25	61	2.2	0.17	0.5	1.1	B	BICKMORE CANYON
	29	6	37	13.0	38-49.2	122-47.9	2.3	0.8	9	89	3.9	0.04	0.2	0.2	A	THE GEYSERS
	29	8	23	50.2	38-48.3	122-48.1	2.1	1.0	11	75	3.3	0.05	0.2	0.2	A	THE GEYSERS
	29	14	3	33.1	36-53.0	121-30.0	4.4	1.5	44	28	2.9	0.10	0.2	0.2	A	CHITTENDEN
	29	15	22	43.6	37-22.4	121-39.0	4.4	1.7	34	120	9.6	0.26	0.8	0.7	B	LICK OBSERVATORY
	29	18	0	31.3	37- 0.1	121-10.4	5.1	1.3	35	178	11.1	0.16	0.7	0.6	C	PACHECO PASS
	29	20	15	16.8	37-30.3	121- 3.1	7.6	2.1	19	112	46.0	0.15	0.8	0.9	C	BRUSH LAKE
	29	20	54	57.5	37-33.8	121-49.6	4.3	1.3	22	74	6.1	0.13	0.7	0.5	B	LA COSTA VALLEY
	30	5	9	48.8	36-47.0	121-16.9	8.9	1.4	31	59	4.0	0.12	0.3	0.7	A	TRES PINOS
	30	6	11	44.5	36-27.6	121- 5.4	9.9	2.2	40	60	5.3	0.21	0.5	1.0	B	TOPO VALLEY

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977

	1977	HR	MN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DMIN	RMS	ERH	ERZ	Q	QUADRANGLE
APR	30	7	55	45.7	36-34.5	121-12.6	5.4	1.5	26	38	1.7	0.20	0.6	1.2	B	BICKMORE CANYON
	30	11	37	49.9	36-35.5	121- 9.8	8.9	1.0	21	49	2.7	0.21	0.8	1.6	B	BICKMORE CANYON
	30	17	20	35.6	36-27.8	121- 5.1	7.5	1.4	17	105	5.3	0.14	0.6	1.2	B	TOPO VALLEY
	30	19	3	17.8	37-48.3	123-12.3	7.9	2.3	12	243	44.7	0.06	1.0	0.9	C	*** NW - FARALLONE ISLANDS ***
MAY	1	4	37	41.9	36-29.2	121- 5.9	3.0	1.5	15	98	5.2	0.14	0.6	0.8	B	TOPO VALLEY
	1	5	31	41.7	38- 1.1	122-12.6	7.2	1.5	20	87	6.8	0.12	0.5	0.5	A	BENICIA
	1	6	9	9.2	38-48.2	122-46.5	1.9	1.5	20	65	1.3	0.11	0.3	0.2	A	THE GEYSERS
	1	10	3	11.3	36-44.9	120-53.9	4.5	1.8	27	103	12.7	0.15	0.5	0.5	B	CERRO COLORADO
	1	10	4	32.2	36-34.9	121- 4.6	14.3	1.5	23	79	4.3	0.14	0.5	0.4	A	SAN BENITO
	1	13	2	20.5	36-59.0	121-26.8	2.8	1.3	15	61	4.0	0.21	0.9	0.8	B	SAN FELIPE
	1	14	43	19.1	36-53.2	121-29.9	5.2	2.2	47	34	2.7	0.12	0.2	0.6	A	SAN FELIPE
	1	16	34	57.8	35-54.6	120-28.7	3.2	1.4	8	73	3.9	0.08	0.5	0.4	A	PARKFIELD
	2	0	58	41.8	38-48.2	122-46.5	2.2	1.1	13	66	1.8	0.06	0.2	0.1	A	THE GEYSERS
	2	1	45	5.6	38-48.2	122-46.6	2.3	1.3	15	65	1.9	0.06	0.2	0.1	A	THE GEYSERS
	2	6	23	12.7	36-31.8	121- 7.0	9.6	1.5	28	57	4.3	0.17	0.5	1.0	B	SAN BENITO
	2	7	38	12.1	36-46.1	121-16.0	5.8	1.5	36	50	3.8	0.13	0.3	0.8	A	TRES PINOS
	2	8	8	14.8	38-56.5	122-41.8	2.3	1.4	12	76	2.3	0.16	0.7	0.5	B	CLEARLAKE HIGHLANDS
	2	9	31	6.7	38-48.7	122-48.0	1.7	1.1	12	80	3.9	0.10	0.3	0.3	A	THE GEYSERS
	2	17	6	50.4	36- 1.5	120-36.5	2.1	1.8	14	95	5.2	0.13	0.6	0.5	B	SMITH MTN
	2	18	23	19.0	38-48.3	122-46.7	2.0	1.7	20	66	2.0	0.11	0.3	0.2	A	THE GEYSERS
	2	22	42	21.0	35-59.8	120-34.8	1.0	2.0	11	60	8.1	0.10	0.4	0.4	B	STOCKDALE MTN
	2	23	23	12.8	38-48.2	122-48.8	0.7	1.3	11	66	3.5	0.08	0.3	0.3	A	THE GEYSERS
	3	15	56	48.3	38-48.9	122-48.4	1.7	0.9	10	88	3.3	0.07	0.3	0.3	A	THE GEYSERS
	3	19	23	22.4	36- 2.4	120-37.5	3.7	1.6	11	102	4.3	0.21	1.8	1.6	B	SMITH MTN
	3	19	58	44.4	36-54.2	121-29.5	5.0	1.4	30	49	2.1	0.16	0.4	0.8	B	SAN FELIPE
	4	4	9	8.6	36-31.9	121- 5.4	6.9	2.2	31	64	2.7	0.18	0.5	1.1	B	SAN BENITO
	4	5	35	34.6	36-47.1	121-17.2	10.2	2.1	47	57	3.7	0.20	0.5	0.8	B	TRES PINOS
	4	5	57	54.6	36-28.2	121- 4.2	5.7	1.9	25	66	4.5	0.20	0.7	1.6	B	TOPO VALLEY
	4	6	4	58.4	36-30.3	120-34.5	10.3	2.8	41	174	26.2	0.20	0.7	0.6	C	MONOCLINE RIDGE
	4	8	36	22.2	36-36.8	121-16.7	5.5	1.4	24	45	3.2	0.19	0.5	1.1	B	MT JOHNSON
	4	10	13	52.9	36-32.0	121- 4.8	8.7	1.3	16	118	2.5	0.15	0.9	1.7	B	SAN BENITO
	4	10	30	50.4	36-27.8	121- 4.1	3.3	1.6	17	25	5.2	0.20	0.3	0.7	B	TOPO VALLEY
	4	19	43	33.6	38- 9.8	121-54.5	14.8	3.1	75	37	9.5	0.29	0.6	0.8	B	DENVERTON
	5	0	58	1.7	38-49.0	122-48.1	3.6	1.3	20	41	3.7	0.14	0.4	0.4	A	THE GEYSERS
	5	4	11	53.6	37-17.4	122-14.2	5.1	1.7	24	80	3.5	0.14	0.5	0.8	A	MINDEGO HILL
	5	4	31	4.9	38- 8.9	121-55.9	18.6	1.8	36	107	11.6	0.22	0.8	1.1	B	DENVERTON
	5	6	14	9.5	38-48.2	122-46.4	2.0	1.0	9	98	1.6	0.10	0.4	0.3	B	THE GEYSERS
	5	6	37	33.8	38- 9.0	121-55.3	20.6	2.0	25	110	10.7	0.20	0.9	1.0	B	DENVERTON
	5	8	26	6.1	36-39.3	121-18.6	4.4	1.9	38	40	3.5	0.16	0.4	0.4	B	PAICINES
	5	16	27	1.7	36-38.5	121-18.7	7.6	2.3	46	32	3.4	0.15	0.3	0.6	B	PAICINES
	5	21	59	50.1	37- 2.8	121-59.7	8.5	1.7	34	78	3.0	0.17	0.5	0.9	B	LAUREL
	5	22	40	31.6	38- 8.8	121-54.7	20.8	3.1	27	81	9.3	0.23	1.0	1.1	B	DENVERTON
	5	22	43	24.0	38- 9.5	121-56.3	19.1	1.7	20	113	12.1	0.13	1.0	1.5	B	DENVERTON
	6	3	14	45.1	38-47.5	122-48.3	3.1	1.4	13	74	3.3	0.12	0.5	0.5	A	THE GEYSERS
	6	4	41	1.3	38- 9.7	121-57.3	14.4	1.3	13	146	13.5	0.22	1.3	1.2	C	DENVERTON

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977

1977	HR	MN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DIIV	R'S	ERH	ERZ	D	QUADRANGLE	
MAY	6	5	30	18.5	38-48.1	122-48.3	0.8	1.3	9	73	4.1	0.15	0.2	0.3	A	THE GEYSERS
	6	9	27	31.9	38- 8.7	121-56.2	17.7	1.3	27	106	12.0	0.27	1.2	1.8	B	DENVERTON
	6	13	16	7.4	37- 7.6	121-26.7	9.8	1.3	15	138	3.3	0.08	0.4	0.9	B	MISSISSIPPI CREEK
	6	15	54	14.4	38- 9.2	121-55.3	20.3	1.7	21	66	10.6	0.18	0.2	1.3	B	DENVERTON
	6	16	58	32.7	38- 8.8	121-55.1	20.4	1.6	15	108	10.4	0.13	0.9	1.1	B	DENVERTON
	6	17	56	41.8	37-43.5	122- 7.8	1.4	1.4	15	51	6.7	0.13	0.5	0.4	B	SAN LEANDRO
	6	18	15	20.9	38-48.1	122-47.9	2.9	1.3	17	57	3.7	0.08	0.3	0.2	A	THE GEYSERS
	7	1	55	38.0	38-43.3	122-54.6	5.0	1.5	22	49	7.5	0.16	0.3	1.0	B	GEYSERSVILLE
	7	5	48	21.3	36- 2.6	121- 3.6	12.8	1.5	21	177	10.9	0.17	0.7	0.5	C	ESPINOSA CANYON
	7	8	29	49.7	36-35.8	121-11.4	8.7	1.3	17	57	2.4	0.10	0.4	0.3	A	BICKMORE CANYON
	7	9	53	23.8	38-46.3	122-54.6	5.3	1.2	13	72	5.7	0.15	0.8	2.3	B	ASTI
	7	23	39	3.5	36-47.6	121-17.6	7.0	1.5	32	67	2.7	0.14	0.4	0.3	A	TRES PINOS
	8	6	11	32.2	36-23.8	121- 1.3	7.0	1.3	20	63	3.1	0.15	0.5	1.2	A	TOPO VALLEY
	8	6	29	9.8	38- 9.0	121-55.5	21.6	2.2	29	108	11.0	0.20	0.9	1.0	B	DENVERTON
	8	12	11	1.6	38-48.9	122-48.1	3.9	1.1	16	79	3.7	0.14	0.5	0.7	A	THE GEYSERS
	8	13	8	29.0	36-44.6	121-21.2	9.2	1.6	28	39	3.5	0.18	0.6	1.0	B	PAICINES
	8	13	27	56.6	36-33.0	121- 4.9	10.1	2.2	33	66	6.3	0.13	0.5	1.0	B	SAN BENITO
	8	15	13	5.0	38-49.5	122-46.3	2.9	1.0	9	96	2.5	0.12	0.6	0.4	B	THE GEYSERS
	8	15	15	46.0	38-49.4	122-46.0	4.1	1.1	7	106	2.2	0.07	0.6	0.5	B	THE GEYSERS
	9	0	48	43.6	38-48.1	122-46.8	2.2	1.2	11	67	2.2	0.07	0.3	0.2	A	THE GEYSERS
	9	18	17	44.6	38-48.0	122-48.4	1.4	1.1	9	74	4.1	0.08	0.3	0.3	A	THE GEYSERS
	10	4	4	11.1	38-49.3	122-45.8	3.6	1.1	11	103	2.7	0.09	0.5	0.3	B	THE GEYSERS
	10	14	28	36.2	38-49.2	122-48.0	3.7	1.3	21	42	3.7	0.14	0.4	0.4	A	THE GEYSERS
	11	2	53	47.6	36-32.5	120-47.5	10.6	1.7	25	129	13.4	0.31	1.1	1.7	C	PANOCH
	11	9	40	26.3	36-33.9	121- 3.9	12.1	1.2	30	68	4.6	0.16	0.5	0.9	B	SAN BENITO
	11	17	17	37.8	38- 9.4	121-57.8	12.0	1.4	15	107	14.3	0.19	0.9	1.2	B	DENVERTON
	11	20	29	24.0	36-54.9	121-35.2	4.4	1.5	30	43	3.5	0.13	0.3	0.3	A	CHITTENDEN
	12	3	19	8.2	36-32.9	121- 4.8	9.8	2.2	30	66	6.3	0.15	0.4	0.9	A	SAN BENITO
	12	15	13	3.3	38-48.2	122-46.8	2.3	1.3	10	85	2.1	0.06	0.3	0.2	A	THE GEYSERS
	12	17	13	59.3	37-14.2	121-38.7	7.4	1.3	29	93	3.3	0.09	0.3	0.6	B	MORGAN HILL
	14	4	5	20.1	36-33.0	121-10.7	5.4	1.5	22	44	2.7	0.17	0.5	1.2	B	BICKMORE CANYON
	14	14	9	1.3	38-48.4	122-48.9	1.7	1.1	12	58	3.2	0.04	0.1	0.1	A	THE GEYSERS
	14	18	41	45.7	38-48.3	122-47.7	3.4	1.0	9	73	3.5	0.08	0.4	0.3	A	THE GEYSERS
	14	20	9	25.1	36-40.6	121- 8.3	6.1	1.4	20	77	3.5	0.10	0.4	0.7	A	CHERRY PEAK
	15	3	3	44.2	36-49.5	121-34.8	3.8	1.8	36	51	3.0	0.27	0.6	0.4	B	SAN JUAN BAUTISTA
	15	6	52	57.3	38-48.0	122-48.8	2.3	1.0	9	90	3.3	0.03	0.1	0.1	A	THE GEYSERS
	15	8	23	18.5	38-48.0	122-48.7	2.3	1.2	9	79	3.3	0.02	0.1	0.1	A	THE GEYSERS
	15	10	0	5.7	36-44.2	121-21.5	10.7	1.3	15	85	3.3	0.17	1.1	2.1	B	PAICINES
	15	16	53	11.4	35-59.7	120-53.1	13.1	1.1	8	173	20.7	0.11	1.0	1.1	B	HAMES VALLEY
	15	19	28	19.7	38- 9.3	121-56.4	18.5	2.2	19	110	12.3	0.13	0.7	1.3	B	DENVERTON
	15	20	2	52.0	35-49.1	121-21.8	4.6	2.1	18	193	24.3	0.15	1.0	0.3	C	BURRO MTN
	15	21	42	6.2	36-31.1	121- 7.2	10.8	1.4	12	68	4.1	0.21	0.3	1.6	B	SAN BENITO
	16	0	12	28.4	38- 8.9	121-55.5	20.8	1.4	10	108	10.9	0.20	1.9	2.9	B	DENVERTON
	16	1	30	39.6	36-34.0	121- 9.3	13.3	1.2	13	57	3.2	0.12	0.5	0.9	A	BICKMORE CANYON
	16	1	59	47.8	36- 1.0	120-52.8	12.5	1.5	15	89	17.5	0.14	0.7	0.7	B	SAN ARDO

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

1977	HR	MIN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DMIN	R15	FRH	FRZ	QUADRANGLE	
MAY	16	9	42	3.7	38-48.1	122-48.8	3.2	1.4	16	63	3.7	0.15	1.5	0.5 A	THE GEYSERS
	16	9	58	2.3	36-33.7	121- 9.3	12.2	1.2	11	115	3.4	0.07	0.5	0.2 B	BICKMORE CANYON
	16	16	31	37.8	36-57.7	121-26.6	4.9	2.0	43	56	4.3	0.12	0.3	0.4 A	SAN FELIPE
	17	5	52	12.0	38-48.6	122-48.4	1.9	1.3	17	68	3.6	0.08	0.2	0.2 A	THE GEYSERS
	17	9	27	41.8	37-27.3	121-48.2	5.0	1.3	37	53	0.4	0.14	0.4	0.3 A	CALAVERAS RESERVOIR
	17	15	20	14.5	36-27.3	121- 4.4	8.8	2.3	31	64	5.6	0.14	0.4	0.6 A	TOPO VALLEY
	17	17	34	28.9	36-57.3	121-26.8	4.2	1.4	22	65	4.6	0.13	0.4	0.3 A	SAN FELIPE
	17	18	40	1.2	36-32.6	121- 7.4	7.7	1.9	25	59	5.7	0.17	0.5	1.1 B	SAN LLENITO
	18	1	7	7.1	36-57.6	121-26.7	2.9	1.8	20	58	4.6	0.13	0.5	0.5 A	SAN FELIPE
	18	9	49	53.4	36-27.3	121- 4.3	7.6	1.4	16	73	5.5	0.09	0.4	0.2 A	TOPO VALLEY
	18	10	33	34.8	36-59.1	121-40.2	4.4	1.9	33	33	4.3	0.12	0.3	0.3 A	WATSONVILLE EAST
	18	12	11	44.5	36-42.7	121-21.8	7.8	1.7	21	56	1.3	0.15	0.6	1.0 B	PAICINES
	18	17	31	25.3	36-23.0	121- 0.1	5.9	1.1	10	85	4.8	0.10	0.6	1.3 A	TOPO VALLEY
	19	7	5	57.1	36-54.9	121-21.4	5.1	1.5	30	49	5.5	0.11	0.3	0.8 B	THREE SISTERS
	19	11	42	38.9	38-48.0	122-48.3	0.7	0.9	3	72	4.3	0.06	0.3	0.4 A	THE GEYSERS
	19	13	39	42.7	36-32.6	121- 7.8	9.5	1.5	21	65	6.2	0.17	0.6	1.2 B	BICKMORE CANYON
	20	19	19	12.3	36-38.6	121-18.9	7.9	2.1	27	40	3.6	0.13	0.4	0.7 A	PAICINES
	21	2	28	3.9	38-48.7	122-48.5	3.5	1.1	14	71	3.3	0.14	0.6	0.6 A	THE GEYSERS
	21	3	53	9.4	38-48.1	122-46.6	3.1	1.1	14	64	1.9	0.10	0.4	0.3 A	THE GEYSERS
	21	4	27	35.2	36-18.0	120-47.9	8.6	1.9	17	110	3.4	0.22	1.0	1.6 B	HEPSEDAM PEAK
	21	4	40	37.6	37-28.6	121-41.3	4.7	1.3	16	116	10.2	0.16	0.6	0.6 C	MT DAY
	21	8	22	39.8	36-50.1	121-24.2	7.0	1.9	46	37	2.4	0.15	0.3	0.8 B	HOLLISTER
	22	3	51	58.9	38-48.7	122-48.5	2.1	1.2	16	53	3.3	0.07	0.2	0.2 A	THE GEYSERS
	22	4	23	20.5	36-52.2	121-36.7	5.3	2.2	38	60	2.5	0.23	0.6	0.8 B	SAN JUAN BAUTISTA
	22	6	10	39.1	36-58.6	121-39.8	4.1	1.5	24	42	3.9	0.13	0.4	0.3 A	WATSONVILLE EAST
	22	6	12	27.1	36-57.5	121-26.2	8.5	1.2	32	59	4.1	0.15	0.4	0.9 A	SAN FELIPE
	22	10	32	34.4	36-44.6	120-54.2	4.9	1.4	9	102	13.3	0.06	0.5	0.4 B	CERRO COLORADO
	22	17	35	19.3	37-27.4	121-46.1	7.3	1.5	15	83	2.9	0.04	0.2	0.4 A	CALAVERAS RESERVOIR
	22	23	55	14.7	36-57.4	121-26.4	8.3	1.3	23	58	4.6	0.14	0.5	1.0 A	SAN FELIPE
	23	3	32	33.9	38-48.6	122-47.0	4.1	0.6	10	77	2.5	0.09	0.5	1.2 A	THE GEYSERS
	23	3	41	27.1	38-48.2	122-46.5	2.1	0.9	12	65	1.3	0.09	0.3	0.2 A	THE GEYSERS
	23	5	9	20.9	36- 2.7	121- 3.8	14.1	1.5	12	178	10.5	0.07	0.5	0.4 B	ESPINOSA CANYON
	23	17	10	43.3	38-48.7	122-48.8	1.3	0.8	10	80	3.7	0.07	0.3	0.2 A	THE GEYSERS
	24	15	55	54.9	36-43.7	121- 8.8	6.8	1.1	15	92	7.4	0.09	0.5	1.1 B	CHERRY PEAK
	25	0	33	14.3	38-48.9	122-48.1	3.9	1.1	12	77	3.3	0.13	0.6	0.8 A	THE GEYSERS
	25	1	46	21.4	36-53.6	121-19.8	4.8	2.0	32	51	2.2	0.11	0.3	0.4 A	THREE SISTERS
	25	1	59	39.0	36-43.5	121-20.9	9.5	1.0	8	64	1.9	0.05	0.6	1.6 A	PAICINES
	25	3	19	43.9	38-48.9	122-48.1	4.0	0.8	9	87	3.7	0.12	0.7	0.9 A	THE GEYSERS
	25	4	22	0.9	36-53.7	121-19.8	4.6	1.5	26	86	2.3	0.10	0.3	0.3 A	THREE SISTERS
	25	16	9	24.2	38-29.8	122-34.2	7.3	1.7	29	84	4.2	0.17	0.5	1.1 B	KENWOOD
	26	2	9	18.6	36-34.7	121-12.8	3.8	2.0	31	32	2.2	0.16	0.4	0.4 B	BICKMORE CANYON
	26	3	15	49.3	36-10.4	120-46.6	7.1	1.9	20	116	4.3	0.16	0.5	1.2 B	MONARCH PEAK
	26	4	57	21.0	36-52.4	121-18.6	4.2	1.2	24	110	1.2	0.15	0.5	0.4 B	TRES PINOS
	26	11	8	42.0	38-54.2	122-54.4	5.2	1.1	16	90	7.0	0.15	0.6	2.2 B	HIGHLAND SPRINGS

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

	1977	HR	MIN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DMIN	RMS	ERH	ERZ	Q	QUADRANGLE
MAY	26	13	8	22.2	36-58.7	121-23.0	5.3	0.9	30	70	1.7	0.14	0.4	0.9	A	SAN FELIPE
	26	16	2	3.3	36-38.3	121-17.3	4.4	1.0	16	64	3.5	0.15	0.6	0.8	A	PAICINES
	27	2	45	11.7	36-58.1	121-38.5	4.4	0.8	15	74	4.4	0.09	0.3	0.3	A	WATSONVILLE EAST
	27	12	22	30.0	39-20.4	122-45.4	7.3	1.4	8	297	24.3	0.07	3.9	5.0	D	POTATO HILL
	27	23	33	37.6	38-54.9	122-41.1	4.1	1.3	11	84	2.7	0.13	0.7	0.7	A	CLEARLAKE HIGHLANDS
	28	6	26	53.6	36-39.5	121-19.1	4.8	3.0	38	39	4.2	0.15	0.3	0.4	A	PAICINES
	28	7	24	29.7	36-13.3	120-49.9	8.1	1.4	10	98	3.3	0.16	1.0	1.6	B	MONARCH PEAK
	28	9	37	52.3	36-55.9	121-28.1	4.9	1.1	18	64	3.2	0.08	0.3	0.4	A	SAN FELIPE
	28	13	11	39.2	38-48.2	122-46.5	2.1	1.2	12	68	1.3	0.11	0.4	0.3	A	THE GEYSERS
	28	14	35	50.5	38-47.8	122-48.6	3.6	1.8	17	58	4.1	0.15	0.5	0.5	A	THE GEYSERS
	28	19	12	39.6	38-48.1	122-49.6	2.0	1.3	16	48	2.8	0.06	0.2	0.1	A	THE GEYSERS
	28	21	19	25.0	38-49.1	122-48.2	1.1	1.1	13	80	3.5	0.10	0.3	0.3	A	THE GEYSERS
	29	1	51	46.5	36-59.9	121-43.1	4.0	1.2	27	43	5.4	0.11	0.3	0.4	B	WATSONVILLE EAST
	29	2	1	35.0	36-60.0	121-42.8	5.5	1.3	33	42	5.4	0.12	0.3	0.6	A	WATSONVILLE EAST
	29	7	2	44.1	36-53.9	121-29.8	4.4	1.6	51	48	2.4	0.13	0.3	0.2	A	SAN FELIPE
	29	7	42	3.4	38-48.1	122-46.3	3.8	1.1	12	64	1.5	0.07	0.3	0.2	A	THE GEYSERS
	29	9	53	31.9	38-48.4	122-48.4	3.7	1.0	11	75	3.7	0.17	0.3	0.8	B	THE GEYSERS
	29	14	24	35.0	38-32.5	122-45.7	3.1	1.5	22	44	3.5	0.11	0.4	0.3	A	HEALDSBURG
	29	14	52	2.0	36-52.3	121-38.6	8.5	2.1	68	88	4.7	0.21	0.4	0.7	B	WATSONVILLE EAST
	29	16	20	19.7	38-49.7	122-48.7	1.5	1.0	10	102	2.3	0.08	0.3	0.3	B	THE GEYSERS
	29	21	36	30.5	36-44.1	121-20.9	8.6	1.5	17	70	3.0	0.13	0.6	1.0	A	PAICINES
	30	0	8	7.2	36-41.9	121-21.7	2.7	1.9	23	51	2.1	0.19	0.5	0.5	B	PAICINES
	30	4	38	23.9	36-44.0	121-20.6	5.9	1.6	16	63	2.6	0.15	0.7	1.2	B	PAICINES
	30	4	47	26.4	36-27.8	121- 5.2	8.9	2.0	28	63	5.2	0.16	0.5	0.9	B	TOPO VALLEY
	30	10	0	9.0	36-36.4	121-11.2	10.3	2.4	27	44	3.4	0.14	0.4	0.7	A	BICKMORE CANYON
	30	11	22	29.6	38-48.7	122-48.3	3.4	1.5	14	83	3.5	0.15	0.6	0.5	B	THE GEYSERS
	30	12	16	57.7	38-24.5	122-14.3	4.4	1.8	16	118	14.2	0.19	0.9	1.2	C	CAPELL VALLEY
	30	19	47	49.1	36-46.9	121-21.5	6.0	1.2	15	51	1.1	0.13	0.5	1.0	A	TRES PINOS
	30	19	48	31.8	36-34.0	121-12.0	6.8	1.0	18	67	1.4	0.17	0.7	1.3	B	BICKMORE CANYON
	31	6	9	14.1	36-47.5	121-17.6	7.5	1.0	18	67	2.7	0.10	0.4	0.8	A	TRES PINOS
	31	6	20	55.1	36-26.0	121- 3.6	6.7	0.7	18	95	3.8	0.22	1.3	2.3	B	TOPO VALLEY
	31	12	38	12.8	38-48.4	122-49.1	1.5	0.9	9	86	2.2	0.09	0.4	0.3	A	THE GEYSERS
	31	14	27	39.9	38-48.4	122-48.3	3.2	0.9	8	85	3.9	0.11	0.7	0.7	A	THE GEYSERS
	31	14	33	29.9	38-48.4	122-48.2	2.2	2.0	29	44	4.0	0.08	0.2	0.1	A	THE GEYSERS
	31	21	23	33.4	36-33.8	121- 7.3	8.0	1.9	27	58	6.2	0.18	0.5	1.1	B	SAN BENITO
	31	21	28	35.8	36-33.9	121- 7.1	8.6	1.6	25	58	6.5	0.18	0.6	1.2	B	SAN BENITO
	31	22	48	25.1	36-58.7	121-40.0	4.5	1.4	27	37	3.3	0.13	0.3	0.3	A	WATSONVILLE EAST
	31	22	56	49.7	38- 8.7	121-54.9	21.0	2.4	29	107	10.1	0.24	1.0	1.2	B	DENVERTON
JUN	1	4	30	32.0	35-57.1	120-31.7	9.3	1.8	17	76	5.0	0.13	0.5	1.0	A	STOCKDALE MTN
	1	9	38	52.1	38- 8.9	121-56.2	17.7	1.6	39	64	11.2	0.25	0.3	1.3	B	DENVERTON
	1	9	43	36.9	38- 8.9	121-56.1	18.4	1.5	27	106	11.3	0.25	1.1	1.4	B	DENVERTON
	1	13	31	32.7	38- 8.5	121-56.1	18.6	1.5	32	64	11.3	0.25	0.9	1.3	B	DENVERTON
	1	17	50	25.9	38-48.5	122-48.6	1.5	0.9	8	89	3.4	0.08	0.4	0.4	A	THE GEYSERS
	1	19	43	8.6	36-34.6	121-12.5	3.5	1.4	17	66	1.8	0.19	0.7	0.5	B	BICKMORE CANYON
	1	22	4	5.8	36-35.5	121-13.6	3.1	1.5	20	55	3.2	0.22	0.7	0.5	B	BICKMORE CANYON

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

1977	HR	MN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DMIN	RMS	ERH	ERZ	Q	QUADRANGLE	
JUN	1	23	28	9.9	38-49.0	122-47.8	5.2	1.2	9	86	3.8	0.16	1.0	2.3	P	THE GEYSERS
	2	2	14	50.0	39-48.3	122-48.9	1.8	0.9	9	84	3.2	0.05	0.2	0.2	A	THE GEYSERS
	2	2	43	49.6	38-48.1	122-46.5	2.0	1.3	10	90	1.9	0.09	0.4	0.3	A	THE GEYSERS
	2	9	9	55.5	36-55.6	121-28.2	4.6	1.4	37	59	3.6	0.11	0.3	0.3	A	SAN FELIPE
	2	9	31	15.9	36-57.3	121-37.0	3.8	1.2	20	65	2.9	0.10	0.3	0.2	A	CHITTENDEN
	2	11	28	18.2	38-48.3	122-46.5	2.1	1.3	10	85	1.8	0.10	0.4	0.3	A	THE GEYSERS
	2	16	8	41.3	38-48.6	122-48.3	2.7	1.0	8	80	3.7	0.06	0.3	0.3	A	THE GEYSERS
	2	17	35	9.5	36-27.0	121- 4.6	8.4	2.0	21	63	6.0	0.15	0.6	1.1	A	TOPO VALLEY
	3	4	14	21.5	38-47.8	122-48.3	2.6	1.7	14	59	3.7	0.03	0.3	0.2	A	THE GEYSERS
	3	9	49	44.4	38-48.5	122-48.4	1.3	1.1	8	76	3.7	0.07	0.3	0.3	A	THE GEYSERS
	3	9	50	42.3	38-48.8	122-48.2	2.7	1.3	12	86	3.6	0.08	0.3	0.2	A	THE GEYSERS
	3	12	11	50.4	36-36.1	121-10.2	11.0	1.5	15	49	3.4	0.17	0.9	1.8	B	BICKMORE CANYON
	3	12	48	58.6	38-47.9	122-48.5	2.5	1.3	11	65	4.0	0.04	0.2	0.1	A	THE GEYSERS
	3	13	16	36.9	38-48.6	122-48.0	0.9	1.6	14	79	3.9	0.07	0.2	0.2	A	THE GEYSERS
	3	13	38	59.8	38-48.6	122-47.9	0.5	1.2	9	80	3.8	0.09	0.4	0.5	A	THE GEYSERS
	3	21	13	3.1	36-42.4	120-48.6	4.0	2.0	17	165	5.1	0.23	1.3	0.8	C	MERCY HOT SPRINGS
	3	22	43	26.9	36-44.7	121-20.5	11.0	1.3	11	74	3.4	0.13	1.0	1.8	B	PAICINES
	4	1	49	14.5	38-48.0	122-49.0	1.4	1.8	22	48	3.6	0.09	0.2	0.2	A	THE GEYSERS
	4	2	30	15.2	37-16.1	121-37.9	2.5	1.5	19	95	3.8	0.14	0.6	0.4	B	LICK OBSERVATORY
	4	12	8	50.8	38-48.2	122-48.6	2.7	1.4	20	45	3.6	0.07	0.2	0.1	A	THE GEYSERS
	4	17	35	47.1	36-36.9	121- 6.9	14.4	1.3	23	47	5.5	0.18	0.8	1.1	B	SAN BENITO
	4	18	2	0.7	38-29.7	122-34.6	6.5	1.5	15	126	3.9	0.16	0.9	1.3	B	KENWOOD
	4	20	57	7.6	38- 9.2	121-54.6	19.9	3.9R	46	58	9.6	0.27	0.8	0.7	B	DENVERTON
	4	21	0	17.6	38- 8.6	121-55.1	22.0	1.5	13	105	10.4	0.20	1.6	2.4	B	DENVERTON
	4	21	6	54.8	38- 9.2	121-55.2	19.7	2.6	56	58	10.5	0.29	0.7	0.7	B	DENVERTON
	4	22	30	30.3	38- 8.4	121-55.4	21.0	1.5	11	103	10.9	0.23	1.8	2.9	R	DENVERTON
	5	1	2	48.6	38- 8.5	121-55.9	18.2	1.9	32	104	11.7	0.25	1.0	1.4	B	DENVERTON
	5	3	18	16.5	36-22.5	120-59.0	5.1	1.2	15	63	6.3	0.12	0.5	1.5	B	ROCK SPRING PEAK
	5	3	32	9.1	38- 8.5	121-55.6	20.0	1.5	23	105	11.2	0.27	1.1	1.2	B	DENVERTON
	5	4	18	36.2	38- 8.3	121-55.7	19.3	1.5	23	106	11.2	0.24	0.9	1.5	B	DENVERTON
	5	6	6	8.5	36-46.5	121-14.2	4.9	1.2	13	89	6.1	0.10	0.5	0.5	B	QUIEN SAGE VALLEY
	5	7	16	18.6	36-28.0	121- 5.2	7.2	1.3	21	105	5.0	0.19	0.8	1.5	B	TOPO VALLEY
	5	10	57	38.0	38-48.6	122-48.3	1.5	1.2	9	74	3.7	0.04	0.2	0.2	A	THE GEYSERS
	5	16	9	51.4	36-51.1	121-18.3	5.2	1.7	29	55	3.6	0.03	0.2	0.4	A	TRES PINOS
	5	16	50	57.8	39- 9.4	121-57.5	7.7	1.5	8	108	13.9	0.28	1.6	1.8	B	DENVERTON
	5	21	18	9.7	38-48.6	122-48.6	1.3	1.3	15	54	3.2	0.08	0.2	0.2	A	THE GEYSERS
	5	21	38	46.7	38- 9.3	121-55.4	20.3	2.0	16	58	10.8	0.19	1.0	1.2	B	DENVERTON
	5	21	52	24.9	36-51.1	121-18.4	6.2	0.8	11	105	3.7	0.08	0.5	0.9	B	TRES PINOS
	5	23	1	42.5	36-27.8	121- 5.3	8.2	1.7	24	62	5.3	0.15	0.5	1.0	A	TOPO VALLEY
	6	0	52	52.7	38-46.5	122-54.3	4.6	0.9	13	64	5.5	0.17	0.3	2.9	B	ASTI
	6	3	1	26.6	38-49.2	123-12.6	3.0	1.0	12	83	6.3	0.13	0.6	0.4	B	SW 1/4 HOPLAND
	6	3	2	6.0	38-49.1	123-12.5	3.2	0.7	11	81	6.3	0.12	0.6	0.4	B	SW 1/4 HOPLAND
	6	3	41	13.8	38- 8.6	121-54.9	21.8	1.5	11	105	10.1	0.27	2.2	2.8	B	DENVERTON
	6	5	13	17.1	38-48.2	122-46.6	2.3	0.7	7	87	1.9	0.02	0.1	0.1	A	THE GEYSERS
	6	5	51	0.1	38- 9.3	121-57.9	7.5	1.7	14	109	14.2	0.32	1.4	1.6	C	DENVERTON

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

1977	HR	MN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	QMIN	RMS	ER1	ER2	Q	QUADRANGLE	
JUN	6	12	17	40.6	38- 9.4	121-55.6	21.5	1.5	2	152	11.1	0.13	1.5	1.8	C	DENVERTON
	6	13	16	53.3	38- 8.7	121-55.7	12.3	1.7	13	106	11.3	0.25	1.4	1.9	B	DENVERTON
	6	16	17	7.5	38- 8.5	121-56.1	20.2	1.5	11	141	11.3	0.25	2.2	2.7	C	DENVERTON
	6	16	38	51.9	38- 8.3	121-55.5	18.2	2.4	26	102	11.1	0.27	1.2	1.4	B	DENVERTON
	7	5	55	18.0	35-59.3	120-34.2	1.5	1.3	7	73	9.4	0.05	0.3	0.3	B	STOCKDALE MTN
	7	6	40	8.3	35-59.3	120-34.1	1.9	1.6	7	116	9.4	0.06	0.5	0.4	B	STOCKDALE MTN
	7	17	50	50.4	36-54.3	121-29.3	4.6	1.3	31	52	2.2	0.09	0.2	0.3	A	SAN FELIPE
	7	22	19	45.3	35-59.8	120-52.1	12.8	1.7	15	171	19.5	0.15	1.0	1.0	C	WUHPPOST
	8	8	1	5.9	36-57.3	121-37.0	3.3	1.2	20	64	3.0	0.12	0.4	0.3	A	CHITTENDEN
	8	11	36	33.6	36-58.8	121-40.6	2.9	1.5	25	34	3.5	0.15	0.4	0.3	A	WATSONVILLE EAST
	8	11	43	37.6	36-59.0	121-40.1	4.2	1.6	26	34	4.0	0.14	0.4	0.3	A	WATSONVILLE EAST
	8	14	44	40.4	35-58.9	120-33.6	13.7	2.3	12	76	3.7	0.12	0.7	0.6	A	STOCKDALE MTN
	8	16	51	43.6	36- 0.0	120-34.6	6.7	2.4	22	72	7.2	0.15	0.5	0.8	B	SMITH MTN
	8	18	2	22.7	36-59.6	121-42.9	3.6	2.0	27	44	4.8	0.11	0.3	0.3	A	WATSONVILLE EAST
	8	18	12	14.4	38-49.4	122-47.9	3.4	1.1	10	91	3.2	0.13	0.6	0.5	B	THE GEYSERS
	8	20	32	2.2	38-48.8	122-48.1	3.5	1.6	17	77	3.8	0.14	0.5	0.5	A	THE GEYSERS
	8	23	54	1.5	36-54.9	121-28.5	5.7	1.4	16	62	2.9	0.05	0.2	0.4	A	SAN FELIPE
	9	0	1	11.1	35-60.0	120-34.3	3.5	1.6	10	79	8.0	0.14	1.4	1.7	B	STOCKDALE MTN
	9	1	34	44.6	38-48.9	122-48.1	4.0	2.2	21	41	3.7	0.13	0.4	0.5	A	THE GEYSERS
	9	4	5	48.8	36-36.1	121- 5.4	15.5	1.3	15	61	5.2	0.14	0.3	1.0	A	SAN BENITO
	9	4	27	48.7	36-34.8	121-12.5	3.6	1.2	11	94	1.8	0.10	0.5	0.7	B	BICKMORE CANYON
	9	18	5	9.3	36-33.9	121-10.0	9.1	1.3	22	59	2.3	0.17	0.6	1.1	B	BICKMORE CANYON
	9	22	20	41.1	38-31.3	122-35.3	3.5	1.6	28	83	1.5	0.21	0.7	0.5	B	CALISTOGA
	9	22	39	25.0	36- 2.2	121- 3.6	12.2	1.7	19	180	23.3	0.17	0.9	0.7	C	ESPINOSA CANYON
	9	22	40	3.1	38-49.4	122-48.8	0.9	1.1	10	85	2.5	0.10	0.3	0.5	A	THE GEYSERS
	10	0	36	54.9	38-20.3	122-34.7	6.8	1.3	12	78	9.0	0.11	0.6	2.0	B	GLEN ELLEN
	10	3	42	29.4	38-48.2	122-46.7	2.1	1.2	9	88	2.0	0.11	0.5	0.4	A	THE GEYSERS
	10	3	44	57.4	38-48.0	122-46.1	1.3	1.1	10	64	1.3	0.14	0.5	0.6	A	THE GEYSERS
	10	6	0	28.1	38-48.3	122-46.8	2.0	1.6	22	50	2.2	0.14	0.3	0.2	A	THE GEYSERS
	10	6	50	45.0	38-49.0	122-48.3	1.9	1.2	11	79	3.4	0.06	0.2	0.2	A	THE GEYSERS
	10	7	8	43.4	38-48.9	122-47.8	3.5	1.8	26	40	3.7	0.17	0.4	0.4	B	THE GEYSERS
	10	9	55	25.9	38-48.6	122-48.1	1.6	1.0	10	79	4.0	0.10	0.4	0.3	A	THE GEYSERS
	10	10	44	41.5	38-49.0	122-48.9	3.4	0.7	8	93	2.5	0.13	0.8	0.6	B	THE GEYSERS
	10	20	30	0.7	36-40.3	121-19.9	3.5	1.5	17	66	3.5	0.20	0.8	0.6	B	PAICINES
	10	21	35	43.7	36-47.4	121-17.7	6.5	1.2	32	67	3.0	0.15	0.4	0.9	B	TRES PINOS
	10	21	44	9.2	36-38.9	121-13.0	9.5	2.3	42	57	2.3	0.13	0.3	0.5	A	CHERRY PEAK
	10	22	8	56.5	38-20.0	122-34.4	7.4	1.5	23	81	8.3	0.16	0.6	1.4	B	GLEN ELLEN
	11	12	27	48.0	36-33.9	121-11.4	3.4	1.3	22	65	1.2	0.20	0.6	0.5	B	BICKMORE CANYON
	11	15	52	20.9	35-59.5	120-33.7	4.4	1.9	12	77	9.2	0.10	0.7	8.3	C	STOCKDALE MTN
	11	17	15	11.0	36-33.7	121-11.5	3.8	2.5	46	41	1.6	0.18	0.4	0.4	B	BICKMORE CANYON
	11	18	43	18.4	36-33.6	121-11.4	3.8	1.8	24	64	1.7	0.18	0.6	0.5	B	BICKMORE CANYON
	11	19	25	2.0	36-23.7	121- 1.5	9.7	2.8	50	62	3.4	0.23	0.5	0.7	B	TOPD VALLEY
	12	0	35	15.4	38-48.3	122-47.8	0.7	1.3	11	71	3.7	0.10	0.3	0.4	A	THE GEYSERS
	12	7	7	46.6	38-51.8	122-48.8	0.5	1.2	15	57	4.8	0.16	0.5	0.5	B	THE GEYSERS
	12	13	42	7.9	37-23.0	121-44.2	5.7	1.8	35	82	3.5	0.11	0.3	0.4	A	MT DAY

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

1977	HR	MIN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DMIN	RMS	ERH	ERZ	QUADRANGLE	
JUN	12	15	19	9.6	38-47.7	122-48.4	2.3	1.1	10	72	3.7	0.07	0.3	0.2 A	THE GEYSERS
	12	16	55	50.1	38-51.5	122-48.2	3.9	0.3	11	102	4.7	0.14	0.3	0.2 B	THE GEYSERS
	12	19	5	51.7	38-48.4	122-49.2	1.5	0.8	9	88	2.7	0.05	0.2	0.2 A	THE GEYSERS
	12	21	54	45.8	36-52.4	121-20.0	4.2	1.3	20	53	2.5	0.08	0.3	0.2 A	TRES PINOS
	13	0	59	5.9	38-48.8	122-47.8	2.6	1.2	12	77	3.7	0.09	0.3	0.3 A	THE GEYSERS
	13	5	19	44.8	37- 1.7	121-28.4	4.4	1.0	17	64	1.1	0.09	0.3	0.6 A	GILROY HOT SPRINGS
	13	5	46	57.1	37-18.2	121-39.7	4.7	1.4	15	64	5.1	0.09	0.4	0.3 B	LICK OBSERVATORY
	13	8	51	14.7	35-49.5	121-22.1	9.6	2.1	12	268	33.3	0.08	1.7	0.7 C	SURRO MTN
	13	9	9	45.9	36-13.0	120-49.5	7.3	1.4	9	120	2.7	0.15	1.3	1.7 B	MONARCH PEAK
	13	15	21	30.0	37-23.3	121-28.4	5.2	2.3	42	86	6.3	0.15	0.5	0.4 B	MT BOARDMAN
13	15	59	2.7	38-47.8	122-46.4	1.0	1.7	21	51	1.2	0.16	0.4	0.3 B	THE GEYSERS	
13	18	16	42.6	37-18.2	121-40.7	4.4	1.2	21	62	9.4	0.15	0.5	0.4 B	LICK OBSERVATORY	
13	22	38	42.8	36-35.7	121-13.0	2.2	1.5	11	125	3.3	0.10	0.5	0.4 B	BICKMORE CANYON	
14	1	35	0.4	36-36.3	121-14.8	4.7	1.9	28	62	3.4	0.14	0.4	0.6 A	BICKMORE CANYON	
14	8	9	19.5	36-31.7	121- 6.4	11.4	1.7	23	65	3.4	0.18	0.6	1.0 B	SAN BENITO	
14	22	52	4.4	38-31.0	122-36.4	3.7	1.4	23	77	0.4	0.23	1.0	0.7 B	CALISTOGA	
15	6	28	8.9	38-48.8	122-49.1	1.2	1.2	15	70	2.4	0.10	0.3	0.2 A	THE GEYSERS	
15	9	50	35.4	36-17.7	120-54.9	2.6	1.5	17	89	2.2	0.20	0.9	0.7 B	LONDOK	
15	17	52	37.3	38-31.1	122-36.4	3.8	1.7	23	89	0.1	0.21	0.9	0.5 B	CALISTOGA	
16	0	42	15.1	36-31.5	121- 9.3	5.6	2.2	30	41	4.3	0.26	0.7	1.0 B	BICKMORE CANYON	
16	21	25	2.7	38-48.6	122-48.0	2.4	0.9	8	78	3.9	0.07	0.4	0.3 A	THE GEYSERS	
17	2	47	52.3	38-48.7	122-48.6	2.4	1.5	15	80	3.3	0.07	0.2	0.2 A	THE GEYSERS	
17	8	14	19.3	38-48.7	122-48.3	2.0	0.8	8	87	3.4	0.05	0.3	0.3 A	THE GEYSERS	
17	12	42	23.0	37-50.8	121-49.5	10.5	2.0	23	80	4.4	0.17	0.7	0.9 B	TASSAJARA	
17	12	43	48.0	36-48.3	121-33.2	5.1	1.6	28	53	1.9	0.23	0.7	1.3 B	SAN JUAN BAUTISTA	
17	13	23	0.9	37-50.4	121-49.9	7.0	1.5	20	119	4.2	0.18	0.8	0.9 B	TASSAJARA	
17	19	38	48.3	38- 9.7	121-53.7	15.2	3.7R	50	59	8.3	0.18	0.5	1.1 B	DENVERTON	
17	19	59	8.3	38- 9.2	121-55.8	19.4	1.3	20	110	11.4	0.18	1.0	1.2 B	DENVERTON	
17	20	59	57.3	36-12.6	120-49.6	2.9	2.0	25	118	2.8	0.19	0.7	0.5 B	MONARCH PEAK	
18	3	6	13.3	37-50.8	121-50.1	8.9	2.5	40	120	4.3	0.20	0.6	0.7 B	TASSAJARA	
18	3	21	18.6	37-50.9	121-49.6	9.9	2.3	43	127	4.7	0.19	0.6	0.5 B	TASSAJARA	
19	0	7	0.9	36-57.6	121-36.5	7.2	2.3	75	35	2.3	0.17	0.3	0.6 B	CHITTENDEN	
19	0	57	3.5	38-48.3	122-48.6	1.5	0.9	9	69	3.6	0.06	0.3	0.2 A	THE GEYSERS	
19	3	36	30.8	36-48.1	121-33.3	4.2	1.8	34	40	1.7	0.21	0.5	0.5 B	SAN JUAN BAUTISTA	
19	3	46	27.6	38-48.5	122-48.5	1.6	1.0	9	77	3.5	0.05	0.3	0.2 A	THE GEYSERS	
19	9	13	6.5	36-50.7	121-17.9	5.4	1.7	46	88	3.1	0.11	0.2	0.3 A	TRES PINOS	
19	14	24	47.0	37-37.4	121-39.2	12.4	1.4	16	168	3.5	0.13	1.0	0.9 B	MENDENHALL SPRINGS	
20	7	38	53.0	38-48.6	122-47.7	1.5	1.1	13	72	3.5	0.09	0.3	0.2 A	THE GEYSERS	
20	7	39	3.8	38-48.6	122-47.8	1.8	0.9	10	79	3.5	0.06	0.2	0.2 A	THE GEYSERS	
20	7	39	19.7	38-48.7	122-47.9	0.9	1.8	14	99	6.6	0.12	0.5	0.5 B	THE GEYSERS	
20	11	6	24.6	35-54.5	120-28.7	3.2	1.6	3	73	4.1	0.07	0.5	0.4 A	PARKFIELD	
20	12	22	57.9	36-36.3	121- 8.4	10.7	1.3	23	53	5.4	0.15	0.5	1.0 A	BICKMORE CANYON	
20	18	0	52.0	39- 1.0	123- 6.0	4.2	1.3	14	173	7.5	0.14	0.7	0.3 B	PURDYS GARDENS	
20	22	30	14.2	38-48.6	122-49.3	1.2	1.1	8	89	2.4	0.03	0.2	0.1 A	THE GEYSERS	
21	2	43	6.5	37-38.2	121-40.0	10.5	4.5R	38	97	5.4	0.15	0.6	0.5 B	ALTAMONT	

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

1977	HR	MIN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	MIN	RMS	ERH	ERZ	QUADRANGLE	
JUN	21	2	56	42.5	37-38.2	121-40.1	9.2	1.6	18	96	5.5	0.12	0.6	0.2 B	ALTAMONT
	21	2	59	19.4	37-38.0	121-40.3	9.4	1.1	10	174	5.3	0.10	0.2	1.6 B	ALTAMONT
	21	4	17	10.4	37-38.2	121-39.8	9.1	1.2	11	101	5.1	0.17	1.3	1.7 B	ALTAMONT
	21	4	42	8.5	37-37.6	121-40.5	9.3	1.2	11	165	4.2	0.12	0.9	1.5 B	ALTAMONT
	21	4	43	57.9	37-37.5	121-40.5	9.1	1.2	14	146	4.7	0.12	0.3	1.3 B	MENDENHALL SPRINGS
	21	5	0	26.2	37-37.7	121-40.6	9.1	1.3	16	84	5.0	0.12	0.6	1.2 A	ALTAMONT
	21	8	3	43.6	38-52.1	122-56.5	4.2	1.2	16	58	2.3	0.15	0.7	1.1 B	ASTI
	21	8	45	45.6	37-18.5	121-39.8	4.5	1.3	14	124	5.7	0.10	0.4	0.3 B	LICK OBSERVATORY
	21	15	29	14.8	36-24.3	121- 3.2	9.7	3.1	52	43	3.4	0.24	0.6	0.6 B	TOPO VALLEY
	21	15	31	4.7	36-25.0	121- 2.7	7.9	2.0	28	48	2.6	0.19	0.6	1.1 B	TOPO VALLEY
	21	21	6	14.8	36-49.1	121- 4.9	5.4	2.3	60	85	11.3	0.17	0.4	0.5 C	RUBY CANYON
	21	22	12	34.5	37- 8.1	121-31.3	7.1	1.6	40	101	7.9	0.13	0.4	1.1 B	MT SIZER
	21	22	12	55.3	37- 8.1	121-31.2	7.3	1.5	39	102	7.3	0.15	0.4	1.2 B	MT SIZER
	22	7	4	32.6	37- 6.7	121-52.6	10.3	1.2	24	58	3.2	0.14	0.5	0.9 A	LAUREL
	22	10	42	45.9	36-13.7	120-49.5	4.4	1.4	15	116	3.1	0.19	1.0	1.9 B	MONARCH PEAK
	22	16	14	22.7	37-37.7	121-40.6	8.4	1.7	15	166	5.1	0.14	0.9	1.7 B	ALTAMONT
	22	19	1	51.3	37-37.8	121-40.5	9.3	1.3	10	168	5.1	0.09	0.7	1.3 B	ALTAMONT
	22	23	50	7.1	36-25.5	121- 1.3	1.1	1.3	8	82	0.4	0.06	0.4	0.2 A	TOPO VALLEY
	23	4	41	2.8	36-32.9	121-11.1	7.9	1.9	26	42	2.9	0.16	0.5	1.0 B	BICKMORE CANYON
	23	11	59	8.8	37-37.8	121-40.2	9.0	1.8	27	174	4.8	0.15	0.7	0.8 C	ALTAMONT
	23	17	58	50.9	35-48.6	120-22.4	5.1	2.3	12	235	3.0	0.10	1.0	0.4 C	CHOLAME VALLEY
	23	18	22	32.5	37-30.8	121-35.0	5.6	1.7	12	193	10.3	0.11	0.3	0.7 C	CEDAR MTN
	23	19	36	25.1	37-38.4	121-40.4	9.4	2.1	39	158	6.0	0.17	0.6	0.7 C	ALTAMONT
	23	23	1	25.3	36-33.9	121-11.9	7.4	1.5	20	63	1.3	0.16	0.6	1.1 B	BICKMORE CANYON
	24	9	44	55.1	36-42.5	121-21.7	1.6	2.4	30	53	1.6	0.22	0.5	0.4 B	PAICINES
	24	15	23	20.2	36-36.9	121-10.0	11.5	1.7	28	57	4.2	0.17	0.5	0.9 B	BICKMORE CANYON
	24	16	16	11.9	38-48.4	122-49.1	1.8	1.4	14	66	2.2	0.06	0.2	0.1 A	THE GEYSERS
	24	20	7	40.3	36-32.2	121- 3.5	9.6	1.0	15	71	3.4	0.17	0.9	1.7 B	SAN BENITO
	25	11	46	41.9	36-57.0	121-40.2	11.9	1.0	16	71	2.2	0.08	0.4	0.7 A	WATSONVILLE EAST
	25	14	10	28.3	37-34.1	121-40.6	6.4	1.3	15	103	4.5	0.11	0.5	0.4 B	MENDENHALL SPRINGS
	25	16	36	45.5	36-46.5	121-29.4	4.8	2.5	72	53	2.3	0.23	0.4	0.5 B	HOLLISTER
	25	22	9	39.3	38-48.3	122-48.9	1.0	1.0	10	67	3.2	0.18	0.7	0.6 B	THE GEYSERS
	26	0	39	23.2	38-48.5	122-47.9	2.9	1.0	8	76	3.3	0.06	0.4	0.3 A	THE GEYSERS
	26	2	35	8.1	36-27.0	120-44.3	7.9	1.8	32	132	11.3	0.21	0.9	2.0 B	IDRIA
	26	3	50	8.9	36-34.2	121-12.4	4.4	1.1	15	45	1.6	0.05	0.2	0.4 A	BICKMORE CANYON
	26	5	30	59.5	36-34.3	121-12.5	5.1	2.5	40	38	1.3	0.19	0.4	0.5 B	BICKMORE CANYON
	26	11	16	18.2	36-29.0	121- 6.1	3.5	2.1	16	77	3.8	0.14	0.6	1.1 A	TOPO VALLEY
	26	15	39	35.9	36-46.8	121-28.7	2.3	1.4	27	73	3.1	0.25	0.7	0.6 B	HOLLISTER
	26	18	3	31.9	38-49.3	122-47.1	2.6	0.9	7	92	3.2	0.08	0.6	0.5 B	THE GEYSERS
	26	20	11	1.9	36-56.6	121-40.2	10.8	1.1	21	53	2.5	0.12	0.5	0.8 A	WATSONVILLE EAST
	26	20	24	35.5	37- 0.0	121-40.0	5.3	1.0	14	73	2.4	0.13	0.6	1.2 A	MT MADONNA
	26	21	1	41.1	36-46.0	121-17.0	4.3	1.0	15	81	3.2	0.13	0.6	0.6 B	TRES PINOS
	26	21	12	56.3	36-53.7	121-28.9	7.8	1.9	57	28	1.4	0.12	0.2	0.5 A	SAN FELIPE
	27	2	7	42.4	36-30.5	121- 6.6	3.1	1.0	12	112	3.2	0.12	0.7	0.5 B	SAN BENITO
	27	2	16	40.8	38-49.2	122-49.3	1.4	0.9	8	98	1.2	0.04	0.3	0.2 A	THE GEYSERS

CENTRAL CALIFORNIA EARTHQUAKES--SECOND QUARTER 1977 (CONTINUED)

1977	HR	MN	SEC	LAT N	LONG W	DEPTH	MAG	NO	GAP	DMIN	RMS	ERH	ERZ	Q	QUADRANGLE	
JUN	27	3	13	57.6	38-55.7	123-11.6	4.3	1.2	15	105	1.4	0.17	0.9	0.7	B	NW 1/4 HOPLAND
	27	4	28	47.3	37-22.2	122-10.7	5.4	1.6	30	71	2.9	0.13	0.4	0.5	A	MINDEGO HILL
	27	15	29	13.2	36-55.7	121-33.6	6.6	1.4	22	61	3.9	0.09	0.3	0.6	A	CHITTENDEN
	28	1	57	38.2	36-51.1	121-24.5	4.8	1.4	18	48	0.6	0.08	0.3	0.6	A	HOLLISTER
	28	5	56	44.1	36-49.6	121-13.4	6.0	1.3	19	90	1.2	0.09	0.4	0.6	A	QUIEN SAGE VALLEY
	28	12	46	40.4	37-34.5	121-40.6	6.5	2.7	44	95	4.0	0.14	0.4	0.4	B	MENDENHALL SPRINGS
	28	13	4	38.8	37-34.3	121-40.6	6.7	2.2	32	99	4.3	0.13	0.4	0.4	B	MENDENHALL SPRINGS
	28	14	54	15.5	37-34.1	121-40.8	6.4	1.2	11	99	4.3	0.10	0.6	0.5	B	MENDENHALL SPRINGS
	28	22	0	55.5	37-34.4	121-40.7	6.4	1.7	21	95	4.3	0.13	0.6	0.5	B	MENDENHALL SPRINGS
	28	22	46	12.5	38-47.9	122-46.7	3.8	1.1	11	63	2.2	0.07	0.4	0.4	A	THE GEYSERS
	29	0	55	35.2	38-49.6	122-50.6	1.8	1.1	12	58	0.2	0.10	0.5	0.3	A	THE GEYSERS
	29	9	33	21.3	36-57.0	121-35.1	5.4	2.6	52	28	0.3	0.10	0.2	0.3	A	CHITTENDEN
	29	12	45	56.2	36-57.0	121-34.8	5.4	1.1	14	73	0.9	0.05	0.2	0.4	A	CHITTENDEN
	29	13	20	16.5	37- 2.2	121-28.8	3.8	1.4	13	66	1.2	0.13	0.5	0.4	A	GILROY HOT SPRINGS
	29	14	31	19.2	39-14.1	123-15.5	3.9	1.6	15	260	29.9	0.11	1.5	0.5	C	NE 1/4 BOONVILLE
	29	23	30	10.6	37-36.1	121-45.9	2.8	1.3	9	118	11.3	0.07	0.4	0.3	B	LA COSTA VALLEY
	30	0	7	20.2	36-56.8	121-35.2	5.2	1.8	53	37	1.1	0.13	0.3	0.5	A	CHITTENDEN
	30	1	9	12.7	38-48.7	122-49.0	1.0	2.0	26	47	2.7	0.03	0.2	0.2	A	THE GEYSERS
	30	7	52	1.5	38-29.7	122-16.6	2.2	1.7	21	133	20.6	0.24	1.0	0.8	C	YOUNTVILLE
	30	17	13	42.7	36- 0.2	120-35.3	1.7	1.4	10	86	7.3	0.13	0.7	0.6	B	SMITH MTN
	30	18	17	32.3	38-51.6	122-28.5	2.6	1.5	13	159	6.5	0.15	0.9	0.7	C	JERICO VALLEY
	30	19	36	38.2	36-31.0	121- 9.9	9.2	1.2	15	73	3.1	0.23	1.2	2.0	B	BICKMORE CANYON
	30	19	52	25.2	38-49.4	122-48.9	2.9	1.5	16	45	2.4	0.11	0.4	0.2	A	THE GEYSERS

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