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THE SOUTHERN CALIFORNIA NETWORK BULLETIN

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1. INTRODUCTION

The southern California region has long been recognized as one of the most seismically active in North America. The responsibility for locating and cataloging its earthquakes lies with the Southern California Seismic Network, which records data from 241 seismograph stations across the region. The central laboratory is located in the South Mudd Building on the campus of the California Institute of Technology in Pasadena, where the seismic data produced by the network are archived. Caltech has had a central role in operating the Network since its inception; it was the sole operator for many years. Since 1974 the Network has been operated jointly by Caltech and the U.S. Geological Survey. The USGS maintains a field office at 525 South Wilson Avenue, adjacent to the Caltech campus.

In its 53 years of operation many hundreds of thousands of earthquakes have been located within the Network. This immense data set is of interest to a wide variety of researchers; it is difficult to use, however, without information on how to gain access to the data.

This publication is intended as a research support document for users of seismic data from the Southern California Seismic Network. Published semiannually from the Pasadena field office of the USGS, it will include summaries of seismicity within the Network, as well as information on changes to equipment and operation of the Network itself. The first issue contains additional sections describing the physical structure of the Network its history, and how researchers may obtain access to earthquake data. Future issues will describe the methods used to locate earthquakes and how earthquake data are archived. Other topics relevant to research will be presented as information becomes available.

2. HISTORY

The concept for the Network began with a 1916 report by H.O. Wood, who recommended that an array of seismograph stations be designed and implemented to record local earthquakes. Data collected could be used to study the role of local earthquakes as possible precursors to major shocks in California. His report, in addition to others describing seismicity in the region, attracted the interest of the Carnegie Institute in Washington, D.C..

The outcome of this interest was the establishment of a Seismological Laboratory at the California Institute of Technology in 1927. Designs for the short-period, vertical seismometers required to detect local earthquakes were completed by Dr. Hugo Benioff in 1931, allowing a seven-station network to be established by 1932. The first annual earthquake catalog was published for that year (Hileman et al., 1973).

In 1936 the Carnegie Institute turned the Network over to Caltech, who continued to slowly develop it during the next three decades. Some stations were added following the 1952 Kern County earthquake (M 7.7). At the end of 1972 there were 39 stations; 24 had one or more component monitored at Pasadena through phone lines. Five of the stations were owned and operated by other agencies, including the California Department of Water Resources.

The years following 1972 saw major changes in the operation and character of the Network. The U.S. Geological Survey had developed a dense network of short-period, vertical component seismometers in central California to study microearthquakes. That agency had also contributed financial support for the Southern California Network, and expressed interest in adding a similar network to the existing Caltech array. Negotiations began between the USGS and Caltech, which led to the USGS becoming a joint operator of the Network in 1974.

The USGS began adding stations in the Imperial Valley in 1973, and continued the expansion in other areas over the next two years. The greatest network growth periods were from 1973 to 1975, and 1980 through 1983. In that ten-year period the station total increased from 39 to the present 241. The current density of the Network minimizes the possibility of experiencing periods of incomplete data due to station down time, and provides event detection thresholds as low as M 1.2 in some areas.

Such increases in station density are useful only if the data reduction process in the laboratory can handle the resulting greater volume of seismic data. Although earthquakes had been routinely located by computer since 1961, the phase data were obtained by hand from helicorder and develocorder records until 1977.

In the late 1970's a series of computer systems were developed to streamline the process of earthquake detection and the acquisition of phase data (Johnson 1979; Johnson, 1983). These systems, digitizing seismic data directly from the phone line discriminator outputs, sped up data processing tremendously and were a key factor in making continued growth of the Network possible.

Although several versions of digital data processing have been used since 1977, they have operated in generally the same way. The systems are based on two computers, although more recent versions have added a third to provide an on-line backup. One computer monitors the incoming station signals. When an earthquake is detected the signals are stored on the disk as data files, which are then transferred via magnetic tape to the off-line computer.

Since mid-1983 the Caltech-USGS Seismic Processing system (CUSP) has been running on the off-line computer (Johnson, 1983). CUSP is an integrated data management system that keeps track of all earthquake data and guides each event file through all necessary processing states. The only human input required during the analysis process is the picking of earthquake arrival times from seismograms. This division of labor takes advantage of a human's ability to recognize patterns and the computer's efficiency in following instructions.

CUSP allows earthquake data to be managed and processed by a small staff. In 1984 an average of 1760 earthquakes were catalogued each month, both in and outside of the Network. A more detailed description of CUSP will be provided in a future issue of this report.

3. THE SOUTHERN CALIFORNIA SEISMIC NETWORK

The joint Caltech-USGS group operate 215 of the 241 stations currently recorded by the Network. The other 26 stations are received from other agencies. These include the Western Region Headquarters of the USGS in Menlo Park, the University of California at Berkeley, the University of Southern California in Los Angeles, and the California Department of Water Resources. The locations of all stations are displayed in Figure 1, and station coordinates are listed in Tables 1A and 1B.

The southern California area is geologically complex, displaying a wide variety of seismic behavior. Station spacing reflects this variety, varying from about 12 to 30 km according to local seismic conditions and research interest. The densest concentrations occur in the Coast range near Parkfield, the southern Sierra Nevada, and the Imperial Valley south of the Salton Sea. Areas of sparse coverage include the Coast ranges south of Parkfield, the Los Angeles Basin, and the eastern Mojave Desert. A few stations are located offshore on the Channel Islands and Catalina Island.

3.1. Instrumentation

Although the network is jointly managed by Caltech and the USGS, each agency has retained the responsibility for maintaining its own stations. The thirty Caltech stations include eight multi-component sites, which utilize both short-period vertical and horizontal seismometers. The horizontals in this group consist of both simulated and "real" Wood-Anderson torsion seismometers, and are used to calculate local magnitudes. Table 2A lists these stations. The Pasadena seismic station has the most extensive instrumentation of this group. It is located in the basement of the Kresge Laboratory, a few miles from the Caltech campus. The instrument vault contains twenty-five seismometers of various periods; these are listed in Table 2B.

Most of the 185 USGS sites have been installed since 1973. The instrumentation at these sites consists of a Mark Products L4C short-period vertical seismometer and a USGS-built "J" series amplifier/VCO unit. Station maintenance is performed by field personnel from the Stanwick Corporation, under contract.

3.2. Data Telemetry

Most sites transmit data back to Pasadena via telephone lines, radio links, or a combination of both. About 60% of the sites use an initial radio link to feed data into a phone drop, while the remainder feed directly into a phone line or transmit by radio directly to Pasadena. The phone lines are voice-quality, each carrying up to 9 multiplexed station signals. Each of the 38 telephone lines passes through a discriminator bank at the laboratory, where its constituent carriers are filtered out and demodulated for input to the on-line computers, helicorders, and analog tape recorders used to record seismic data. Some of the Caltech stations are recorded photographically on paper at the field site.

4. DATA AVAILABILITY

Seismic data exist in a variety of formats and degrees of processing completeness. Some of these are available directly to researchers, while others require some intermediate steps to obtain. The reader should note that formal procedures for gaining access to seismic data have not yet been finalized, and the procedures and personnel listed in this section may change.

4.1 Seismograms

Signals from 21 southern California stations are routinely recorded on paper, either photographically or with pen and ink helicorders. The record lengths vary from 24 hours to 7 days, depending on the seismometer type and period. A guide to these records is given in Tables 2A and 2B.

Records from the past two years can usually be found in room 269 of the South Mudd Building, adjacent to the laboratory. Older records are stored at the Kresge Laboratory, located a few miles from the Caltech campus. In addition, all seismograms and phase data from 1932 to 1962 have been duplicated on microfilm. Copies of these films are available at both the Millikan Library on the Caltech campus, and the Menlo Park office of the USGS. Requests for access to the films can be directed to either the Millikan Archive Center (818) 356-6433, or the USGS (818) 405-7823. Access to the records at Kresge can be arranged through Paul Roberts, (818) 356-6966.

The reader should note that records from some significant earthquakes have been borrowed and never returned. To avoid the loss of irreplaceable earthquake seismograms, Caltech does not allow the removal of records from the South Mudd Building. The Seismology Department has facilities for making full-size copies, which may be retained by visitors for their own use.

Seismograms from many southern California earthquakes may also be obtained from analog FM tape recordings stored in the USGS facilities in Menlo Park. These consist of multiplexed phone line signals recorded on 1-inch tape which must be played back through discriminators and onto a suitable strip chart recorder to obtain the seismograms. Although many of the catalogued earthquakes should be available in this form, the tapes are mainly used as a back up during periods of on-line system failure and do not comprise a complete data set. For information on these tapes, contact Jack Tomey at (415) 323-8111 ext. 2632 in Menlo Park.

4.2. Phase Data And Digital Seismograms

Phase data were obtained from microfilm and helicorder records until 1977, when digital data processing began. The seismograms and phase data are stored on magnetic tapes in several different formats, each one adapted to the computer system and data processing software then in use. See Table 3 for details on the condition of the catalog and availability of data for 1974 to 1985.

One consequence of these changes in the procedures for data production is that some of the older data formats are not compatible with CUSP. At present, there are no local facilities to read them; however, a planned reformatting program will soon make these tapes accessible to the CUSP system.

Procedures are being developed for making these data available to users in a reasonably simple and orderly way. Details of these procedures will be in future issues of this bulletin as they become available. Urgent requests can be directed to Dr. Kate Hutton at Caltech (818) 356-6959 or Dr. Lucy Jones at the USGS (818) 405-7817. Readers should be aware that neither the data nor the systems for obtaining access to them are complete as yet.

Table 4 contains a list of known reversals in station polarity, which has been compiled by Dr. Lucy Jones of the USGS. She would like to be informed of any reversals that are not mentioned in the list, and can be reached at (818) 405-7817.

4.3 Earthquake Catalog

The Caltech/USGS earthquake catalog contains epicentral data from 1932 through 1984. It is believed to be essentially complete at and above the magnitude 3 level, although this is less certain for the early years of network operation. Catalog data exist in several forms, which include annual versions published by Caltech and an on-line version on the Caltech VAX 11/750 computer.

The catalog has also been published in a set of three volumes, (Hileman et al., 1973, Friedman et al., 1976, Hutton et al., 1984) entitled "The Seismicity of the Southern California Region". The three volumes cover the time intervals 1932-1972, 1972-1974, and 1975-1984 respectively. In addition to the epicentral data they contain detailed station information and references to a number of important publications on Southern California seismicity. Readers desiring a more complete overview of the Network than that presented here will find them useful. Much of the historical information presented in this report was obtained from these volumes. Several copies are available for use in Room 269 of the South Mudd Building; limited copies are also available for purchase through the Caltech Student Book Store.

5. NETWORK OPERATION, JANUARY 1 THROUGH JUNE 30, 1985

Network configuration was stable during this period; no stations were added or discontinued, and station performance was generally good. The only notable outages occurred in the eastern Mojave desert, where 10 sites were damaged by lightning during a sequence of severe storms there on June 19. These are remote sites that are usually reached by helicopter; they should be active again within a few months.

The most significant new project within the Network was the start of construction on the new microwave telemetry system. The system will transmit data from the field to Pasadena through a series of relay stations, mostly owned and maintained by the USGS. Some data will be carried on existing microwave channels owned by the Air Force. The first part of the system will carry data currently running on 14 phone lines between Edwards Air Force Base and Pasadena. The receiving station at Caltech was completed in April, but at press time none of the links had been activated.

A complete inventory of all discriminators was performed from June 13 to 26. The information documented from each included its station assignment, frequency response, gain, and center frequency alignment. The results will be used to identify those that have deviated from specifications and need adjustment. This is the first step in a planned effort to ensure consistent performance within each of the discriminator types used in the Network.

6. SYNOPSIS OF SEISMICITY, JANUARY 1 THROUGH JUNE 30 1985

Seismicity within southern California was moderate during most of the period; the most notable activity involved earthquake swarms in the Desert Hot Springs and San Diego areas. Felt reports were received for 39 events, none of which was associated with reports of damage. Figures 2 and 3 display the earthquakes located during the period; Table 5 lists the location of all earthquakes of magnitude 3 and above. Figure 5 contains a series of cumulative seismicity plots from the 11 regions within southern California that are shown in figure 4. Each plot covers the 48-month period ending on June 30, 1985, providing a brief visual summary of activity within each region. These will be updated with each issue of this report.

The reader will note that the area covered in the southern California seismicity maps and hypocentral data table is considerably larger than the area covered by the Network itself. Although all locations have been obtained with data from Network stations, those outside of the area of station coverage are frequently of poor quality and may be inaccurate. They have been included only to allow the reader to view seismicity in southern California in context with some of the seismicity of adjacent areas, and are not discussed in this report.

An earthquake swarm began in the Desert Hot Springs area on January 19. The epicentral area lies in the San Bernardino Mountains between the San Andreas and Pinto Mountain faults. near the location of a magnitude 6-1/2 event that occurred in 1948. Six events of M 3.1 and greater occurred between January 19 and 25, the most active period of the swarm. Seven earthquakes were reported to the Seismological Laboratory at Caltech as felt events. The swarm was preceded by an M 3.9 event on January 2, located about 10 km northwest of the swarm center. Its relationship with the swarm is uncertain.

Epicenter and depth distributions of events within the swarm suggest that they occurred along an approximately vertical northeast-trending plane. Focal mechanisms were calculated for the January 2 event and for five events in the swarm; the swarm event mechanisms show left-lateral slip on the northeast trend of the focal plane indicated by the earthquake locations (Figure 7). The swarm events also show a small component of normal slip in the focal mechanisms, which has been seen in other earthquakes in this region.

940 earthquakes in this swarm had been catalogued by the end of March, although activity had decreased greatly by this time. During the next three months only 37 locatable events occurred within the epicentral area.

Another significant swarm ocurred directly below the east shore of Coronado Bay, within the city limits of San Diego. It began with a M 3.9 at 0012 UTC on June 18, and included 2 other events of M 3.8 and M 4.0 during the next 4 hours. Six events were felt between June 17 and 21, generating considerable interest from the public and news media in that area. The epicentral area is displayed at two different scales in figures 8 and 9.

The northern half of the network has also been active, with the largest earthquakes of the period. The coastal region in the vicinity of Santa Barbara has been noticeably more active than usual since May 1984. Ten felt earthquakes occurred there during the period, as well as three M 4.5 events; one in May 1984, another in November 1984, and a third in April 1985.

The April earthquake was located 16 miles east-northeast of Ventura. with the felt area extending along the coast as far east as the Los Angeles Basin. Its depth is reasonably constrained near 25 km. making it the deepest well-recorded coastal event known to have occurred in southern California. A focal mechanism for the event is shown in figure 10.

Two earthquakes were felt in the Bakersfield area. The first was a M 4.1 in the Kern County aftershock zone northeast of Bakersfield on February 8; on May 6, a M 4.0 occurred 21 miles west-southwest of town. No reports of damage were received from either earthquake. Focal mechanisms for these two events are in Figure 10.

REFERENCES

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TABLE 1A:

SOUTHERN CALIFORNIA SEISMIC NETWORK STATIONS, 1985

CODE	STATION NAME	LAT	LONG	EL.(M)	DATE ACTIVATED
ABL	MOUNT ABEL	34 51.05	119 13.25	1981	JULY 1976
ADL	ADELANTO	34 33.38	117 25.02	900	FEBRUARY 1975
AMS	AMOS	33 08.48	115 15.25	140	MARCH 1973
ARV	ARVIN	35 07.63	118 49.76	268	FEBRUARY 1981
BAR	BARRETT DAM	32 40.80	116 40.30	510	JANUARY 1978
BAT	BAT CAVE BUTTE	33 27.54	115 50.46	-18	DECEMBER 1980
BCH	BRANCH MTN	35 11.10	120 05.05	1140	AUGUST 1976
BC2	BIG CHUCKWALLA MT.	33 39.42	115 27.67	1185	MARCH 1982
BLK	BLACK MTN	35 05.28	117 13.11	648	APRIL 1981
BLU	BLUE RIDGE	34 24.40	117 43.61	1880	FEBRUARY 1975
BLUV	BLUE RIDGE, LO GAIN	34 24.40	117 43.61	1880	-
BMT	BEAR MTN	35 08.15	118 35.81	1237	JULY 1977
BOO	SOUTH BASE BOOSTER	34 52.08	117 54.62	704	MARCH 1982
BON	BOND'S CORNER	32 41.67	115 16.11	14	MARCH 1978
BRG	BORREGO MTN	33 10.27	116 10.44	219	MARCH 1981
BRT	BERTELL RANCH	34 36.69	117 57.78	789	MAY 1981
BTL	BUTLER PEAK	34 15.43	117 00.29	2526	NOVEMBER 1975
CAH	CAHUILLA VALLEY	33 30.22	116 41.91	1219	APRIL 1981
CAL	CALIFORNIA CITY	35 06.21	117 56.86	722	MAY 1981
CAV	CAVE MTN	35 03.14	116 20.35	664	MAY 1981
CBK	CANEBRAKE	32 54.94	116 15.16	414	AUGUST 1981
CFL	CHILAO FLAT	34 19.97	118 1.38	1586	APRIL 1979
CFT	CRAFTON HILLS	34 02.11	117 06.66	671	JANUARY 1975
CH2	CHOCOLATE MTN	33 17.77	115 20.17	347	DECEMBER 1975
CIS	SANTA CATALINA ISLE	33 24.40	118 24.20	485	JULY 1971
CJV	CASA JUVAN	34 31.83	118 08.67	1341	MARCH 1981
CLC	CHINA LAKE	35 49.00	117 35.80	766	JULY 1949
CLI	CALIPATRIA	33 08.45	115 31.64	-59	NOVEMBER 1976
CO2	COXCOMB MTN	33 50.95	115 20.68	276	NOVEMBER 1974
COA	COACHELLA	32 51.81	115 07.36	34	MARCH 1973
COK	COOK RANCH	32 50.95	115 43.61	-15	APRIL 1973
COY	COYOTE MTN	33 21.63	116 18.56	232	JUNE 1976
COY	COYOTE MTN, LO GAIN	33 21.63	116 18.56	232	-
CPE	CAMP ELLIOT	32 52.80	117 06.00	213	NOVEMBER 1972
CPM	COPPER MTN	34 9.24	116 11.80	937	JUNE 1974
CRG	CROCKER GRADE	35 14.53	119 43.40	1204	JULY 1976
CRR	CARRIZO PLAIN	32 53.18	115 58.10	98	MARCH 1973
CTW	COTTONWOOD MTN	33 40.78	115 52.31	561	AUGUST 1977
CWC	COTTONWOOD CREEK	36 26.35	118 04.68	1620	OCTOBER 1965
DBM	DOUBLE MTN	34 58.74	118 21.63	1204	MARCH 1981
DB2	DOUBLE BUTTE	33 44.10	117 03.72	625	APRIL 1975
DTP	DESERT TORTOISE PK.	35 16.05	117 50.72	951	MAY 1981

CODE	STATION NAME	LAT	LONG	EL.(M)	DATE ACTIVATED
EAG	EAGLE MTN	33 28.94	115 28.39	366	OCTOBER 1974
ECF	ECHO FALLS	34 27.48	119 05.44	100	NOVEMBER 1974
ELM	EL MIRAGE	34 31.57	117 38.41	986	APRIL 1981
ELR	ELMORE RANCH	33 08.84	115 49.95	-63	NOVEMBER 1976
ELS	ELSINORE MTN	33 38.87	117 25.63	853	JUNE 1981
EMS	EAST MESA	32 44.48	114 59.27	47	MAY 1982
ERP	ERNIE'S PLACE	32 44.61	115 39.76	-9	JUNE 1981
EWC	EAST WIDE CYN-HGV	33 56.24	116 22.86	512	APRIL 1981
EWCE	EAST WIDE CYN-E/W	33 56.24	116 22.86	512	APRIL 1981
EWCN	EAST WIDE CYN-N/S	33 56.24	116 22.86	512	APRIL 1981
EWCV	EAST WIDE CYN-LGV	33 56.24	116 22.86	512	APRIL 1981
FAL	FALLING SPRINGS	34 18.59	117 48.55	2316	JUNE 1981
FIL	FILMORE	34 25.43	118 50.07	243	MARCH 1982
FLS	FLASH 2 PK	34 58.22	117 2.31	1037	JUNE 1979
FOX	FOX AIRPORT	34 43.98	118 13.84	716	MARCH 1981
FRG	FARGO CYN	33 45.43	116 03.69	934	MAY 1981
FRK	FRINK	33 24.05	115 38.21	91	JULY 1981
FTC	FORT TEJON	34 52.25	118 53.51	924	JULY 1976
GAV	GLEN AVON	34 01.35	117 30.74	186	JANUARY 1976
GAVV	GLEN AVON, LO GAIN	34 01.35	117 30.74	186	-
GLA	GLAMIS	33 03.10	114 49.60	627	DECEMBER 1966
GLAE	GLAMIS E/W	33 03.10	114 49.60	627	DECEMBER 1966
GLAN	GLAMIS N/S	33 3.10	114 49.60	627	DECEMBER 1966
GRP	GRANITE PASS	34 48.26	115 36.27	1238	APRIL 1974
GSC	GOLDSTONE	35 18.10	116 48.30	990	NOVEMBER 1961
HAY	HAYFIELD	33 42.40	115 38.20	439	JUNE 1956
HDG	HIDALGO MTN	34 25.73	116 18.30	1347	APRIL 1974
HOD	HODGE	34 50.33	117 14.75	829	MAY 1981
HOT	HOT SPRINGS MTN	33 18.85	116 34.90	1963	JUNE 1976
HYS	HAYSTACK BUTTE	34 51.83	117 34.12	867	MARCH 1982
IKP	INKOPAH	32 38.93	116 06.48	957	NOVEMBER 1972
IND	INDIO HILLS	33 48.97	116 13.78	354	AUGUST 1981
ING	INGRAM RANCH	32 59.30	115 18.61	2	MARCH 1973
INS	INSPIRATION	33 56.14	116 11.66	1700	APRIL 1974
IRC	IRON CANYON	34 23.31	118 24.09	579	NOVEMBER 1971
IRN	IRON MTN	34 09.60	115 11.04	980	SEPTEMBER 1974
IRS	IRIS	33 11.45	115 25.75	-10	JULY 1983
ISA	ISABELLA	35 39.80	118 28.40	835	APRIL 1967
ISAE	ISABELLA-E/W	35 39.80	118 28.40	835	APRIL 1967
ISAN	ISABELLA-N/S	35 39.80	118 28.40	835	APRIL 1967
JAW	JAWBONE CYN	35 18.95	118 02.69	762	SEPTEMBER 1985
JFS	JOSEPH F. STATEN	35 21.05	117 40.20	1433	JUNE 1979
JNH	JUNIPER HILLS	34 26.85	117 57.27	1317	NOVEMBER 1977
JTR	JOSHUA TREE PARK	33 52.59	115 58.70	1353	JUNE 1981
JUL	JULIAN	33 02.90	116 36.77	1292	APRIL 1978
KEE	KEEN CAMP	33 38.30	116 39.19	1366	FEBRUARY 1977
KYP	KEY POINT	34 06.11	118 52.77	700	JUNE 1973

CODE	STATION NAME	LAT	LONG	EL.(M)	DATE ACTIVATED
LAN	LANCASTER	34 43.62	118 03.06	719	APRIL 1981
LAQ	LA QUINTA	33 37.68	116 16.78	49	AUGUST 1981
LAV	LAVIC	34 45.95	116 17.19	902	MAY 1981
LED	LEAD MTN	34 28.06	115 56.19	853	APRIL 1974
LEO	LEONA VALLEY	34 37.88	118 18.22	1073	MARCH 1981
LHU	LAKE HUGHES	34 40.30	118 24.70	1036	JULY 1976
LJB	LOVEJOY BUTTE-HGV	34 35.47	117 50.88	899	DECEMBER 1977
LJBN	LOVEJOY BUTTE-N/S	34 35.47	117 50.88	899	DECEMBER 1977
LJBE	LOVEJOY BUTTE-E/W	34 35.47	117 50.88	899	DECEMBER 1977
LJBV	LOVEJOY BUTTE-LGV	34 35.47	117 50.88	899	DECEMBER 1977
LLA	LLANO	34 50.73	117 29.13	1018	MAY 1981
LOK	LOCKWOOD VALLEY	34 43.47	119 5.48	1570	APRIL 1982
LRM	LAUREL MTN	35 28.64	117 41.35	1256	APRIL 1982
LRR	LITTLE ROCK RES.	34 31.56	118 01.66	908	JUNE 1976
LTC	LITTLE CHUCKWALLA MT	33 29.34	115 4.20	458	APRIL 1974
LTM	LITTLE MARIA MTN	33 54.90	114 55.10	744	APRIL 1974
MAR	MARICOPA	35 00.15	119 20.36	436	FEBRUARY 1980
MDA	MOUNT DAVIS	33 54.78	116 59.97	845	JANUARY 1975
MEC	MECCA HILLS	33 38.12	116 1.71	495	MAY 1981
MIR	MARTINEZ IND. RES.	33 24.97	116 4.86	91	APRIL 1981
MLL	MILL CREEK	34 05.48	116 56.18	1513	DECEMBER 1974
MRV	MORONGO VALLEY	34 03.68	116 32.58	981	MARCH 1978
MWC	MOUNT WILSON	34 13.40	118 3.50	1730	APRIL 1928
NW2	NEW RIVER	33 05.43	115 41.54	-68	NOVEMBER 1977
OLY	MOUNT OLYMPUS	33 25.88	117 07.05	482	JUNE 1981
ORC	ORICOPIA MTN	33 33.97	115 46.15	1087	MAY 1981
PAS	PASADENA	34 8.95	118 10.29	308	MARCH 1927
PASE	PASADENA-E/W	34 8.95	118 10.29	308	MARCH 1927
PASN	PASADENA-N/S	34 8.95	118 10.29	308	MARCH 1927
PCF	POMONA	34 03.19	117 47.44	163	JANUARY 1976
PEM	PINE MTN	34 10.04	117 52.18	500	FEBRUARY 1976
PEMV	PINE MTN, LO GAIN	34 10.04	117 52.18	500	-
PKM	PEAK MTN	34 53.75	119 49.13	1704	JULY 1976
PLM	PALOMAR	33 21.20	116 51.70	1672	DECEMBER 1966
PLME	PALOMAR-E/W	33 21.20	116 51.70	1672	DECEMBER 1966
PLMW	PALOMAR-N/S	33 21.20	116 51.70	1672	DECEMBER 1966
PLT	PILOT KNOB	32 43.87	114 43.76	61	MARCH 1973
PNM	PINTO MTN	33 58.64	115 48.05	1147	APRIL 1974
POB	POLLY BUTTE	33 41.20	116 55.40	1003	MAY 1976
POBV	POLLY BUTTE, LO GAIN	33 41.20	116 55.40	1003	-
PSP	PALM SPRINGS	33 47.63	116 32.93	195	MARCH 1975
PTD	POINT DUME	34 00.25	118 48.380	40	JUNE 1973
PVR	PALOS VERDES	33 45.13	118 22.23	183	SEPTEMBER 1981
QAL	QUAIL LAKE	34 44.98	118 42.88	1256	MARCH 1981
RAY	RAYWOOD FLAT	34 02.18	116 48.67	2342	NOVEMBER 1975
RAYV	RAYWOOD, LO GAIN	34 02.18	116 48.67	2342	-
RCH	RECHE MTN	34 18.44	116 21.03	841	APRIL 1979

CODE	STATION NAME	LAT	LONG	EL.(M)	DATE ACTIVATED
RDM	ROUND MTN	34 24.00	117 11.10	1426	DECEMBER 1976
RMR	RIMROCK	34 12.77	116 34.52	1702	NOVEMBER 1974
RUN	RUTHVEN	32 58.33	114 58.63	152	MARCH 1973
RVM	RIO VISTA MINE	34 10.81	114 12.02	243	MAY 1977
RVR	RIVERSIDE	33 59. 6	117 22. 5	260	OCTOBER 1926
RVS	RIVERSIDE MTN	34 2.08	114 31.08	677	APRIL 1974
RYS	REYES PEAK	34 38 60	119 21.10	1841	JULY 1976
SAD	SADDLE PEAK	34 04.86	118 39.90	732	AUGUST 1973
SBB	SADDLEBACK BUTTE	34 41.30	117 49.50	850	JANUARY 1974
SBCC	COLSON CANYON	34 56.38	120 10.32	610	NOVEMBER 1969
SBCD	CASITAS DAM	34 22.12	119 20.63	213	NOVEMBER 1971
SBCE	SANTA BARBARA-E/W	34 26.50	119 42.80	90	DECEMBER 1977
SBCN	SANTA BARBARA-N/S	34 26.50	119 42.80	90	DECEMBER 1977
SBK	SADDLEBACK MTN	35 04.73	117 34.88	881	APRIL 1981
SBLC	LA CUMBRE PEAK	34 29.79	119 42.81	1190	NOVEMBER 1969
SBLG	LAGUNA PEAK	34 06.87	119 03.85	415	NOVEMBER 1969
SBLP	LOMPOC	34 33.57	120 24.02	134	NOVEMBER 1969
SBSC	SANTA CRUZ IS.	33 59.68	119 37.99	457	NOVEMBER 1969
SBSM	SAN MIGUEL IS.	34 02.24	120 21.01	172	NOVEMBER 1969
SBSN	SAN NICOLAS IS.	33 14.68	119 30.38	259	MARCH 1970
SCI	SAN CLEMENTE IS.	32 58.80	118 32.80	219	NOVEMBER 1971
SCY	STONE CYN RES.	34 6.37	118 27.25	287	SEPTEMBER 1971
SDW	SIDEWINDER MINE	34 36.55	117 04.45	1184	FEBRUARY 1975
SGL	SIGNAL MTN	32 38.95	115 43.52	110	MARCH 1973
SHH	SHEEP HOLE MTN	34 11.26	115 39.27	1122	APRIL 1974
SIL	SILVER PEAK	34 20.87	116 49.60	1730	NOVEMBER 1975
SILV	SILVER PK, LO GAIN	34 20.87	116 49.60	1730	-
SIP	SIMI PEAK	34 12.24	118 47.94	700	JUNE 1973
SLT	SALTON SEA TEST BASE	33 15.89	115 55.39	-50	MARCH 1981
SME	SANTA ROSA MINE	33 49.36	117 21.32	494	FEBRUARY 1975
SMO	SANTA ROSA MTN	33 32.15	116 27.70	2437	APRIL 1976
SND	SAND CYN	35 08.58	118 18.13	1317	APRIL 1981
SNS	SAN ONOFRE	33 25.9	117 32.9	190	JANUARY 1975
SNR	SCHAFFNER RANCH-HGV	32 51.71	115 26.21	-30	MARCH 1973
SNRE	SCHAFFNER RANCH-E/W	32 51.71	115 26.21	-30	MARCH 1973
SPM	SHIP MTN	34 28.32	115 24.16	915	APRIL 1974
SRT	SNORT	35 41.51	117 44.96	698	JULY 1982
SS2	SAN SEVAINE	34 12.46	117 29.98	1609	JANUARY 1977
STT	SCOTT RANCH	34 47.31	118 27.71	829	APRIL 1981
SUN	SUNSET PEAK	34 12.64	117 41.58	1683	JANUARY 1976
SUP	SUPERSTITION MTN	32 57.31	115 49.43	219	MARCH 1973
SYP	SAN YNEZ PEAK	34 31.63	119 58.67	1305	JUNE 1967
SYS	SAN YSIDRO	32 34.78	116 54.69	277	APRIL 1981
TEJ	EL TEJON	35 13.79	118 41.37	634	FEBRUARY 1981
THC	TEHACHAPI MICROWAVE	34 54.52	118 39.81	1718	MARCH 1981
TIN	TINEMAHA	37 03.30	118 13.70	1195	1933

CODE	STATION NAME	LAT	LONG	EL.(M)	DATE ACTIVATED
TINE	TINEMAHA-E/W	37 03.30	118 13.70	1195?	1933
TINN	TINEMAHA-N/S	37 03.30	118 13.70	1195?	1933
TJR	TEJON RANCH	35 01.65	118 44.55	439	FEBRUARY 1981
TMB	TEMBLOR RANGE SE	35 05.24	119 32.08	1021	JULY 1976
TOW	TOWER ONE	35 48.54	117 45.86	684	AUGUST 1982
TPC	29 PALMS	34 06.35	116 02.92	761	MAY 1972
TPO	TROPICO HILLS	34 52.73	118 13.66	799	JUNE 1976
TTM	TURTLE MTN	34 20.12	114 49.65	1098	APRIL 1974
TWL	TWIN LAKES	34 16.70	118 35.67	381	NOVEMBER 1971
VG2	VISTA GRANDE	33 49.91	116 48.55	1484	MARCH 1977
VPD	VILLA PARK DAM	33 48.90	117 45.70	183	JULY 1971
VST	VISTA	33 09.4	117 13.9	112	JANUARY 1975
WAS	ALTA SIERRA	35 44.29	118 33.42	1871	APRIL 1980
WBM	BOWMAN	35 36.48	117 53.40	925	APRIL 1982
WBS	BIRD SPRING	35 32.22	118 8.37	1932	APRIL 1980
WCH	CHIMNEY PEAK	35 52.98	118 4.48	2475	SEPTEMBER 1979
WCPN	CACTUS PEAK-N/S	36 4.26	117 51.01	1494	SEPTEMBER 1975
WCS	COSO HOT SPRINGS	36 1.58	117 46.01	1143	SEPTEMBER 1975
WCX	CHINA LK RADIO SITE	35 42.63	117 35.98	671	AUGUST 1978
WHF	HANNING FLAT	35 41.77	118 20.91	902	MAY 1979
WHS	HAIWEE SPRINGS	36 6.30	117 45.67	1448	SEPTEMBER 1975
WHV	HAVILAH	35 30.60	118 31.07	1006	MAY 1979
WIS	WISTER	33 16.56	115 35.58	-68	NOVEMBER 1976
WJP	JOHNS PEAK	35 24.65	118 28.84	1122	MAY 1979
WKT	KERN TULARE	35 47.64	118 26.55	890	MAY 1979
WLH	LITTLE HORSE	36 09.14	118 18.70	2676	JULY 1984
WLK	WIEST LAKE	33 03.08	115 29.44	-48	MARCH 1973
WMF	MCCLOUD FLAT	36 07.05	117 51.17	1560?	
WML	WESTMORELAND	33 00.91	115 37.35	-44	NOVEMBER 1976
WNM	NINEMILE CYN	35 50.57	117 54.29	951	SEPTEMBER 1975
WOF	OAK FLAT	35 32.14	118 42.75	1341	AUGUST 1981
WOR	ONYX RANCH	35 41.79	118 14.52	837	JULY 1981
WRC	RENEGADE CYN	35 57.04	117 38.89	945	SEPTEMBER 1975
WRV	ROSE VALLEY	36 0.47	117 53.42	1066	SEPTEMBER 1975
WSC	SHORT CYN	35 42.26	117 53.19	881	MAY 1979
WSH	SPANGLER HILLS	35 37.96	117 29.50	780	APRIL 1982
WSP	WARM SPRINGS	34 35.77	118 34.72	1219	MARCH 1982
WVP	VOLCANO PEAK	35 56.98	117 49.02	1463	SEPTEMBER 1975
WWP	WALKER PASS	35 44.13	118 5.22	1151	MAY 1979
WWR	WHITEWATER	33 59.51	116 39.36	702	JANUARY 1979
XMS	CHRISTMAS CYN	35 31.40	117 21.28	704	APRIL 1982
YAQ	YAQUI MEADOWS	33 10.08	116 21.00	441	MARCH 1982
YEG	YEGUAS MTN	35 26.18	119 57.56	939	JULY 1976
YMD	YUMA DESERT	32 33.28	114 32.68	76	JULY 1975
YUH	YUHA DESERT	32 38.86	115 55.38	186	JUNE 1981

TABLE 1B
SEISMIC STATIONS MANAGED BY OTHER AGENCIES

CODE	STATION NAME	LAT	LONG	EL.(M)	OPERATED BY
BNP	BOUNDARY PEAK, NEV.	37 59.31	118 18.10	2438	DEPT. WATER RES.
CIW	SANTA CATALINA IS.	33 27.92	118 33.10	50	U.S.C.
CSP	CEDAR SPRINGS	34 17.87	117 21.33	1266	DEPT. WATER RES.
FMA	FORT MCARTHUR	33 42.75	118 17.12	15	U.S.C.
FRI	FRIANT	36 59.50	119 42.50	119	U.C. BERKELEY
JAS	JAMESTOWN	37 56.80	120 26.30	457	U.C. BERKELEY
LCL	RANCHO CERRITOS	33 50.00	118 11.55	8	U.S.C.
ORV	ORVILLE	39 99.34	121 13.00	356	DEPT. WATER RES.
PAD	ADELAIDA	35 38.36	120 14.96	471	USGS-MENLO PARK
PAR	ANTICLINE RIDGE	36 14.95	120 20.52	485	USGS-MENLO PARK
PCR	CURRY MTN	36 05.63	120 26.08	296	USGS-MENLO PARK
PDR	DOMENGINE RANCH	36 20.14	120 22.124	88	USGS-MENLO PARK
PEC	PERRIS	33 53.51	117 09.60	616	DEPT. WATER RES.
PGW	GRACE WEST	35 11.03	120 37.62	148	USGS-MENLO PARK
PHB	JURON FISHING BRIDGE	36 14.93	120 04.96	100	USGS-MENLO PARK
PKE	KETTLEMAN HILLS	36 03.69	120 06.54	288	USGS-MENLO PARK
PMCV	MCMILLAN MTN	35 43.48	120 22.23	488	USGS-MENLO PARK
PPR	PASA ROBLES	35 38.86	120 42.04	279	USGS-MENLO PARK
PRC	ROACH CYN	36 15.37	120 37.20	623	USGS-MENLO PARK
PRI	PRIEST	36 08.50	120 39.90	1187	U.C. BERKELEY
PSH	SHANDON	35 35.45	120 24.92	390	USGS-MENLO PARK
PTR	TWISSLEMAN RANCH	35 39.28	120 12.67	643	USGS-MENLO PARK
PVP	PALOS VERDES	33 47.20	118 24.15	0	U.S.C.
PWM	WESTLAND MAINT. STA	36 12.66	120 12.66	72	USGS-MENLO PARK
PYR	PYRAMID	34 34.08	118 44.50	1247	DEPT. WATER RES.
SBI	SANTA BARBARA IS.	33 28.84	119 01.72	6	U.S.C.

TABLE 2A
HELICORDER AND PHOTOGRAPHIC RECORDS AVAILABLE FROM SINGLE AND MULTI-COMPONENT STATIONS

Southern California network stations that are routinely recorded on helicorders or photographically. All records usually cover a 24-hour period except those noted below. The Pasadena station components that record photographically are listed separately in Table 2b.

All the horizontal components that record photographically are from standard Wood-Anderson torsion seismometers. The horizontals that record on helicorders are from seismometers that have been modified to simulate the response of Wood-Anderson instruments.

STA	COMP.	RECORD TYPE	GAIN	STA	COMP.	RECORD TYPE	GAIN
BAR	Z	Helicorder	240,000	MWC	Z	Helicorder	300,000
CPE	Z	Helicorder	87,000	PAS	Z	Helicorder	240,000
CIS	Z	Helicorder	430,000	PLM	Z	Helicorder	483,000
					Z	Photographic	*
					N/S	Photographic	2800
					E/W	Photographic	2800
CLC	Z	Helicorder	240,000	RVR	Z	Helicorder	240,000
					Z	Helicorder	*
					N/S	Photo., 48 hr.	2800
					E/W	Photo., 48 hr.	2800
					NS/EW	Photo., 24 hr.	2800
CWC	Z	Photographic	*	SBB	Z	Helicorder	400,000
GSC	Z	Helicorder	480,000	SBC	N/S	Photographic	2800
					E/W	Photographic	2800
GLA	Z	Helicorder	360,000	SYP	Z	Helicorder	90,000
	N/S	Helicorder	2,000				
	E/W	Helicorder	2,800				
HAY	Z	Helicorder	*	TIN	Z	Photographic	60,000
					Z	Photographic	*
					N/S	Photographic	2800
					E/W	Photographic	2800
IKP	Z	Helicorder	189,000	TPC	Z	Helicorder	
ISA	Z	Helicorder	240,000				
	N/S	Helicorder	2,800				
	E/W	Helicorder	2,800				

* Gain value not available at this time.

TABLE 2B:
PASADENA STATION RECORDS

The following table lists all components recorded at the Pasadena station (PAS). Record lengths vary from 24 hours to 1 week. The strong motion seismometers (11A through 11D, 18A through 18D) are recorded daily on 35mm film. Prints are made only once weekly unless an earthquake has been recorded; in that case, a print is made as soon as possible.

COMP.	NUM.	SEISMOMETER	APPROX. DURATION	DISPLAY	TS	TG	GAIN
Z	--	LP Benioff	48 hr.	Helicorder	1.0	90.0	3000
N/S	--	LP Benioff	48 hr.	Helicorder	1.0	90.0	3000
Z	9	10-sec. torsion	48 hr.	photo.	10	none	800
E/W	10	10-sec. torsion	48 hr.	photo.	10	none	800
N/S	11	10-sec. torsion	48 hr.	photo.	10	none	800
U/D	14	SP Benioff	24 hr.	photo.	1.0	0.2	160,000
U/D	16	LP Benioff	24 hr.	photo.	1.0	90.0	2000
NS/EW	18	SP Benioff	24 hr.	photo.	1.0	0.2	160,000
E/W	18a	Ultra-LP	7 days	photo.	*	*	28
NS/EW	20	LP Benioff	24 hr.	photo.	1.0	90.0	2000
N/S	20a	Ultra-LP	7 days	photo.	*	*	28
E/W	26	SP Torsion	48 hr.	photo.	0.8	none	2800
N/S	31	SP Torsion	48 hr.	photo.	0.8	none	2800
U/D	33	Ultra-LP	7 days	photo.	*	*	28
N/S	34a	Press-Ewing	72 hr.	photo.	30	90	2200
E/W	34b	Press-Ewing	72 hr.	photo.	30	90	2200
U/D	34c	Press-Ewing	72 hr.	photo.	30	90	2200
N/S	35a	Ultra-LP	24 hr.	photo.	*	*	2200
E/W	35b	Ultra-LP	24 hr.	photo	*	*	2200
N/S	11a	Strong motion	--	35mm film			4
N/S	11b	Strong motion	--	35mm film			100
E/W	11c	Strong motion	--	35mm film			100
U/D	11d	Strong motion	--	35mm film			100
--	18a	Continuous time-code film	--	35mm film			--
E/W	18c	Strong motion	--	35mm film			4
U/D	18d	Strong motion	--	35mm film			4

* Ts and Tg values are not relevant for this type of seismometer.

TABLE 3

AVAILABILITY OF SEISMIC DATA FROM THE CALTECH/USGS CATALOG

The following two charts describe the processing status of seismic data within the Caltech/USGS catalog and how it is archived from 1974 to 1985. There are phase data, digital seismograms, and a summary catalog available for use. The letter and number codes defined below apply to each month on the following page.

Readers should note that the P1 and P5 phase data formats listed below are ASCII and thus generally accessible. There are systems available for researchers to read P4 "Freeze" tapes at both the USGS and Caltech. No generally available system exists for reading P2 or P3 formats, but plans are being made to translate these tapes into the CUSP P4 format.

CODE DEFINITIONS AND NOMENCLATURE FOR ARCHIVED DATA:

I. SUMMARY DATA:

- C1- "Pink" data, located from a limited number of stations, read to 0.1 sec. accuracy from hardcopy and/or helicorder records;
- C2- Preliminary locations, from develocorder films read to about 0.05 sec. accuracy;
- C3- "Final", i.e. checked and edited locations from develocorder;
- C4- Preliminary locations from digital data, read to 0.02 sec. accuracy;
- C5- "Final" locations from digital data.

II. PHASE DATA:

- P1- ASCII card image ("SQD") tape;
- P2- "PEST" or "FEST" binary tapes; listings can be copied for small numbers of events;
- P3- "Q-tapes" and listings;
- P4- CUSP "Freeze" binary tapes and listings;
- P5- CUSP "Access" ASCII tapes.

III. DIGITAL SEISMOGRAMS

- S1- CEDAR archive tapes
- S2- CUSP archive tapes

TABLE 3

AVAILABILITY OF SEISMIC DATA FROM THE CALTECH/USGS CATALOG

This chart summarizes the state in which data has been stored from 1974 to the present. The codes listed with each year are explained on the previous page.

	1974	1975	1976	1977
JAN	C3, P1	C2, P1	C2, P1,	C4, P2, S1
FEB	C3, P1	C2, P1	C2, P1,	C4, P2, S1
MAR	C3, P1	C2, P1	C2, P1,	C4, P2, S1
APR	C3, P1	C2, P1	C2, P1	C4, P2, S1
MAY	C3, P1	C2, P1	C2, P1	C4, P2, S1
JUN	C3, P1	C2, P1	C2, P1	C4, P2, S1
JUL	C3, P1	C2, P1	C2, P1	C4, P2, S1
AUG	C3, P1	C2, P1	C2, P1	C4, P2, S1
SEP	C3, P1	C2, P1	C2, P1	C4, P2, S1
OCT	C3, P1	C2, P1	C2, P1	C4, P2, S1
NOV	C3, P1	C2, P1	C2, P1	C4, P2, S1
DEC	C3, P1	C2, P1	C2, P1	C4, P2, S1

	1978	1979	1980	1981
JAN	C5, P2, S1	C4, P2, S1	C4, P2, S1	C1
FEB	C5, P2, S1	C4, P2, S1	C4, P2, S1	C1
MAR	C5, P2, S1	C4, P2, S1	C4, P2, S1	C1, P4
APR	C5, P2, S1	C4, P2, S1	C4, P2, S1	C4, P3/4, S2
MAY	C5, P2, S1	C4, P2, S1	C1	C4, P3/4, S2
JUN	C5, P2, S1	C4, P2, S1	C1	C4, P3/4, S2
JUL	C5, P2, S1	C4, P2, S1	C1	C4, P3/4, S2
AUG	C5, P2, S1	C4, P2, S1	C1	C4, P3/4, S2
SEP	C5, P2, S1	C4, P2, S1	C1	C4, P3/4, S2
OCT	C5, P2, S1	C4, P2, S1	C1	C4, P3/4, S2
NOV	C5, P2, S1	C4, P2, S1	C1	C4, P3, S2
DEC	C5, P2, S1	C4, P2, S1	C1	C4, P3, S2

	1982	1983	1984	1985
JAN	C4, P3, S2	C4, P3/4, S2	C5, P4/5, S2	C4, P4, S2
FEB	C4, P3, S2	C1	C5, P4/5, S2	C4, P4, S2
MAR	C4, P3, S2	C1	C5, P4/5, S2	C4, P4, S2
APR	C4, P3/4, S2	C1	C5, P4/5, S2	C4, P4, S2
MAY	C4, P3/4, S2	C1	C5, P4/5, S2	C4, P4, S2
JUN	C4, P3/4, S2	C1	C5, P4/5, S2	C4, P4, S2
JUL	C4, P3/4, S2	C1	C5, P4/5, S2	
AUG	C4, P3/4, S2	C4, P4, S2	C5, P4, S2	
SEP	C4, P3/4, S2	C4, P4, S2	C5, P4, S2	
OCT	C4, P3/4, S2	C4, P4, S2	C5, P4, S2	
NOV	C4, P3/4, S2	C4, P4, S2	C5, P4, S2	
DEC	C4, P3/4, S2	C4, P4, S2	C5, P4, S2	

TABLE 4:
POLARITY REVERSALS IN CALTECH/USGS NETWORK
1977 TO PRESENT

The following are stations that have had reversed polarity on vertical seismometers and the times during which that reversal occurred. If the time when a change in polarity occurred is uncertain, the times that bracket the change are given in parentheses. Both computer and film records were checked for the period between 1977 and mid-1980. After that time, only computer-recorded polarities are given. The operators of each station are given after its name by the following initials: USGS = U.S. Geological Survey, Pasadena; MP = U.S. Geological Survey, Menlo Park; CIT = Caltech; DWR= Department of Water Resources; USC = University of Southern California; UCB = University of California, Berkeley. There are also five stations in Nevada that were received by the southern California net for a few years in the early 1980's. These stations always had reversed polarity and are listed at the end of the table.

BAR	(CIT)	reversed ?/?/77 to 3/28/78
BLU	(USGS)	reversed 6/5/79 to 6/28/79
CIS	(CIT)	reversed (8/7/77 - 11/9/77) to 8/19/78 doubtful in 1981 until November 12
CIW	(USC)	reversed 7/17/85 to 85/11/11; prior state uncertain
CPE	(CIT)	computer reversed (12/16/83 - 5/1/85) to present film reversed (5/28/78 - 6/21/78) to 9/7/78
CSP	(DWR)	always reversed
DHS	(USGS)	film reversed (4/27/78 - 9/7/78) computer always normal
FMA	(USC)	uncertain throughout 1978
FRI	(UCB)	always reversed
GAV	(USGS)	reversed (8/5/82 - 12/10/82) to (12/16/83 - 5/1/84)
GSC	(CIT)	reversed (7/25/80 - 4/28/81) to (4/28/81 - 6/6/81)
HAY	(CIT)	reversed (3/1/84 - 10/1/84)
HOT	(USGS)	reversed (8/4/77 - 9/7/77) to 4/21/78 reversed (6/16/78 - 8/25/78)
IKP	(CIT)	film reversed 6/16/78 to 9/7/78 computer reversed 11/13/84 to present
IRC	(CIT)	reversed (8/4/77 - 10/8/77) to 4/20/78 reversed 10/23/80 to (4/25/82 - 8/5/82)

JAS	(UCB)	always reversed
LTM	(USGS)	film reversed ?? to 9/7/78, computer okay
MOV	(USGS)	film reversed (4/11/78 - 4/26/78) to 9/7/78 computer okay
ORV	(DWR)	always reversed
PEC	(DWR)	reversed 1977 to (4/26/80 - 4/28/81) reversed (6/24/82 - 8/5/82) to (7/25/84 - 3/23/85)
PKM	(USGS)	probably reversed (12/10/82 - 5/1/84) to present
PRI	(UCB)	always reversed
PSP	(USGS)	reversed (3/8/77 - 4/8/77) to 6/7/77
PTD	(USGS)	reversed 4/23/80 to 9/10/85
PYR	(DWR)	reversed (10/12/76 - 11/18/76) to (10/14/77 - 11/9/77) reversed (6/24/82 - 8/5/82) to present
RVS	(USGS)	film reversed (2/25/78 - 3/28/78) to 9/7/78 computer okay
SBLG	(USGS)	probably reversed (12/77 - 4/5/78) to 8/1/80
SNS	(USGS)	reversed 6/18/78 to (5/18/79 - 6/28/79)
SYP	(CIT)	reversed (8/4/77 - 9/27/77) to (2/16/78 - 4/5/78)
TPC	(CIT)	reversed (5/25/77 - 6/7/77) to 6/14/78 reversed (7/25/80 - 4/28/81) to (8/5/82 - 12/20/82) reversed (5/31/84 - 8/30/84) to present
TPO	(USGS)	reversed (5/25/77 - 6/7/77) to 4/24/78
VPD	(USGS)	reversed (4/28/78 - 6/21/78) to 11/20/78
WBM	(USGS)	reversed 4/28 (at installation) to 8/8/85

LAS VEGAS STATIONS

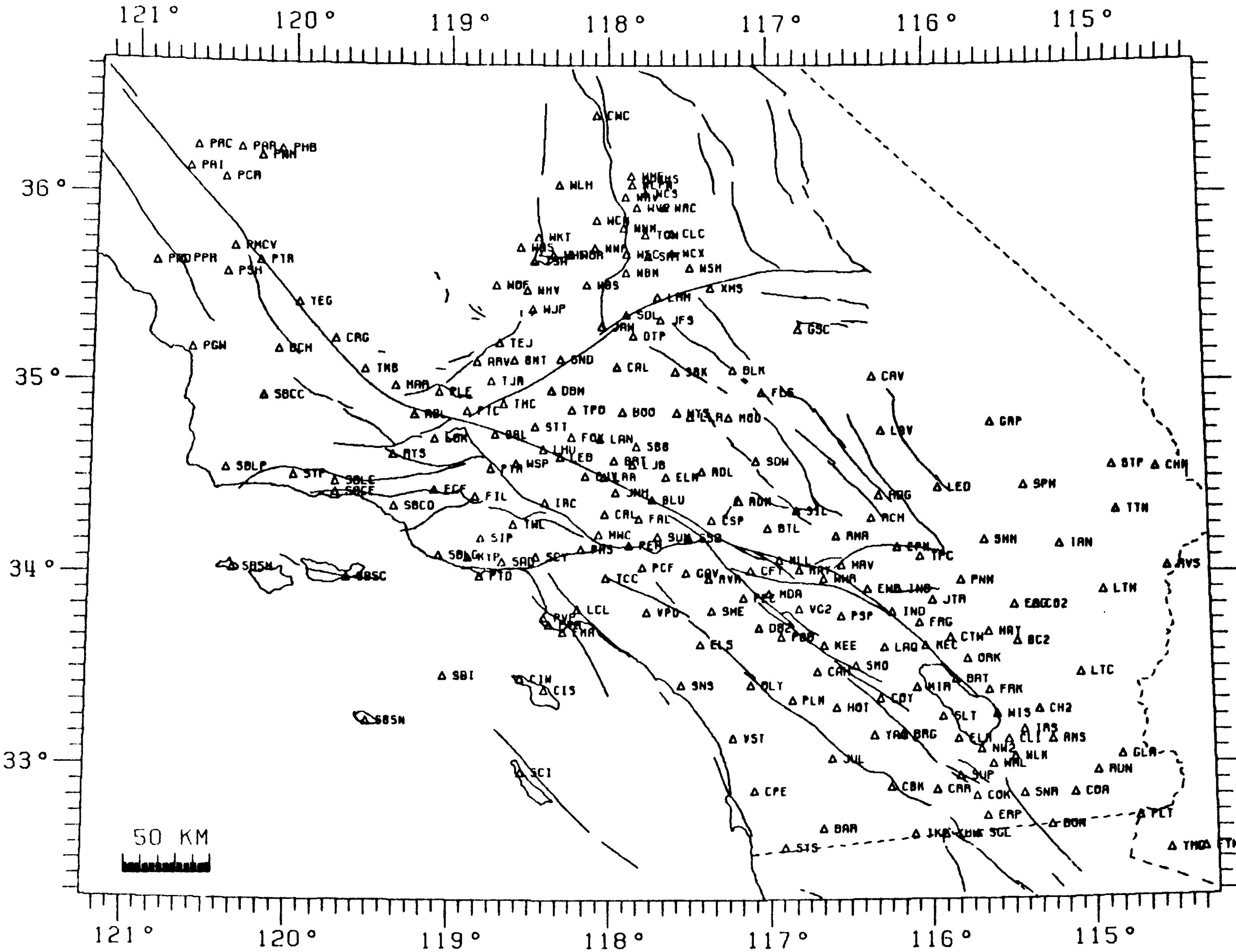
GWV	always reversed
LCH	always reversed
MZP	always reversed
NOP	always reversed
PPK	always reversed

MENLO PARK STATIONS

The following stations are operated from the USGS office in Menlo Park. New VCO's were installed at these stations between January and June of 1985, resulting in temporary reversals of station polarity. The time intervals listed below indicate the period each station was reversed.

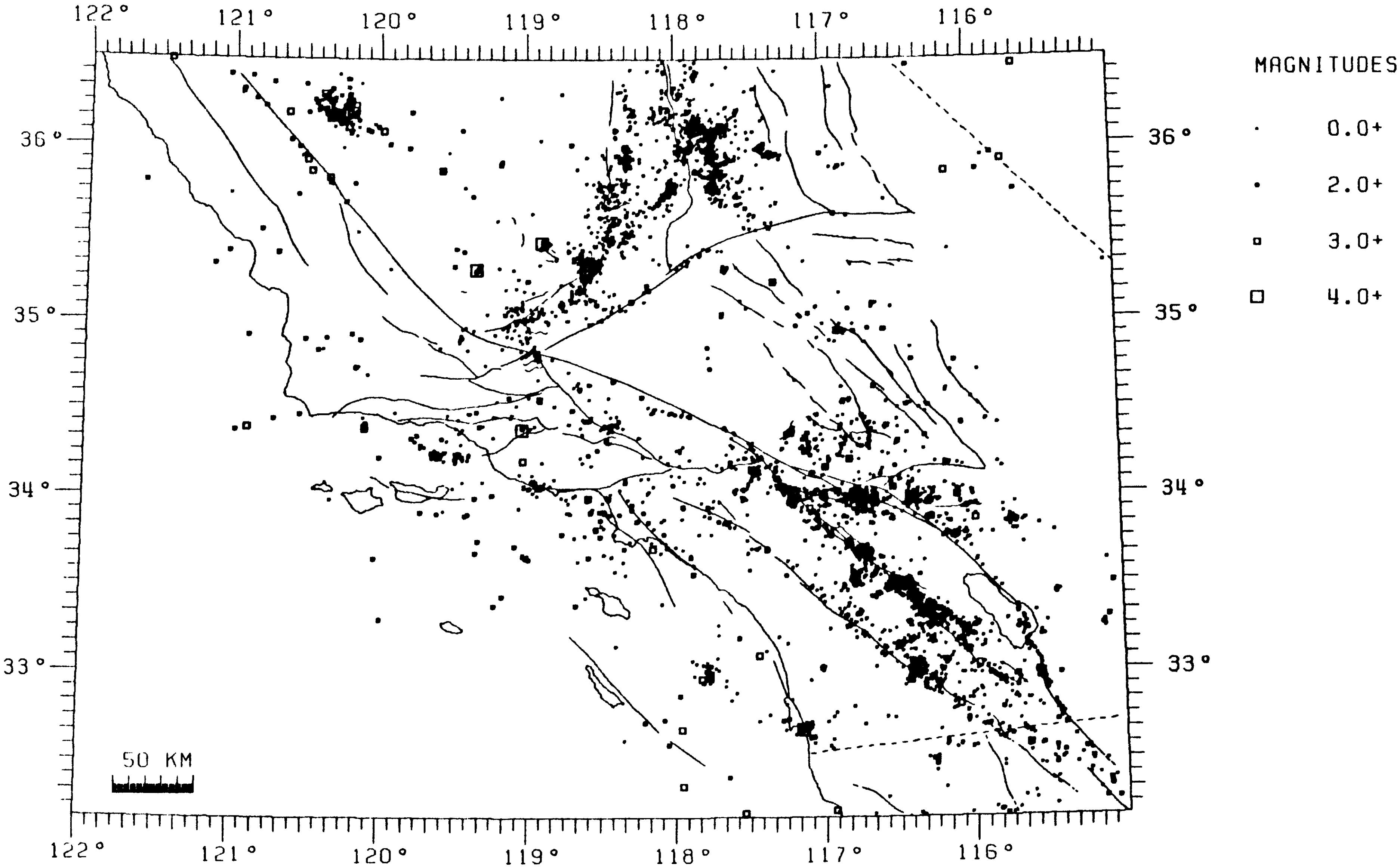
PAG	3/27 - 8/8	PBW	4/26 - 8/7	PCA	4/11 - ongoing
PGH	5/02 - 8/8	PHA	3/28 - 8/8	PHC	4/29 - 8/7
PHS	5/24 - 8/9	PMCV	3/28 - 8/8	PMCZ	3/28 - 8/8
PMP	4/25 - 8/7	PMPV	4/25 - 8/8	PMR	3/26 - 8/8
PPF	3/06 - 8/8	PSH	4/10 - 8/8	PSR	4/11 - 8/8
PST	3/29 - 8/9	PTR	5/20 - 8/8	PWK	3/06 - 8/9

FIGURE 1:
SOUTHERN CALIFORNIA STATIONS, 1985



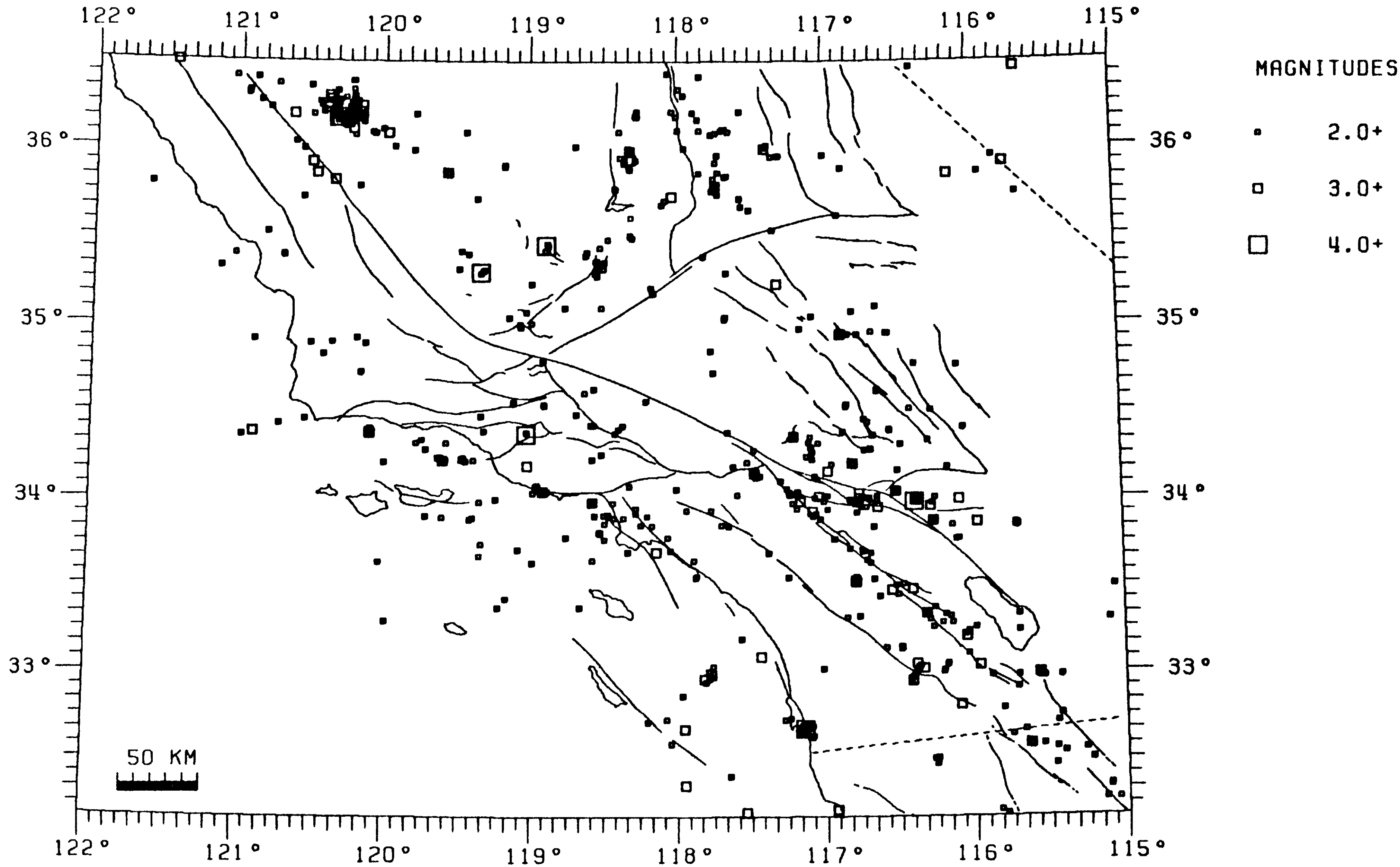
Locations of currently active seismograph stations within the Southern California Seismic Network. Some sites contain more than one component. See Tables 1A and 1B for station coordinates.

FIGURE 2:
SOUTHERN CALIFORNIA, MAG. 0 AND ABOVE, JANUARY 1 - JUNE 30 1985



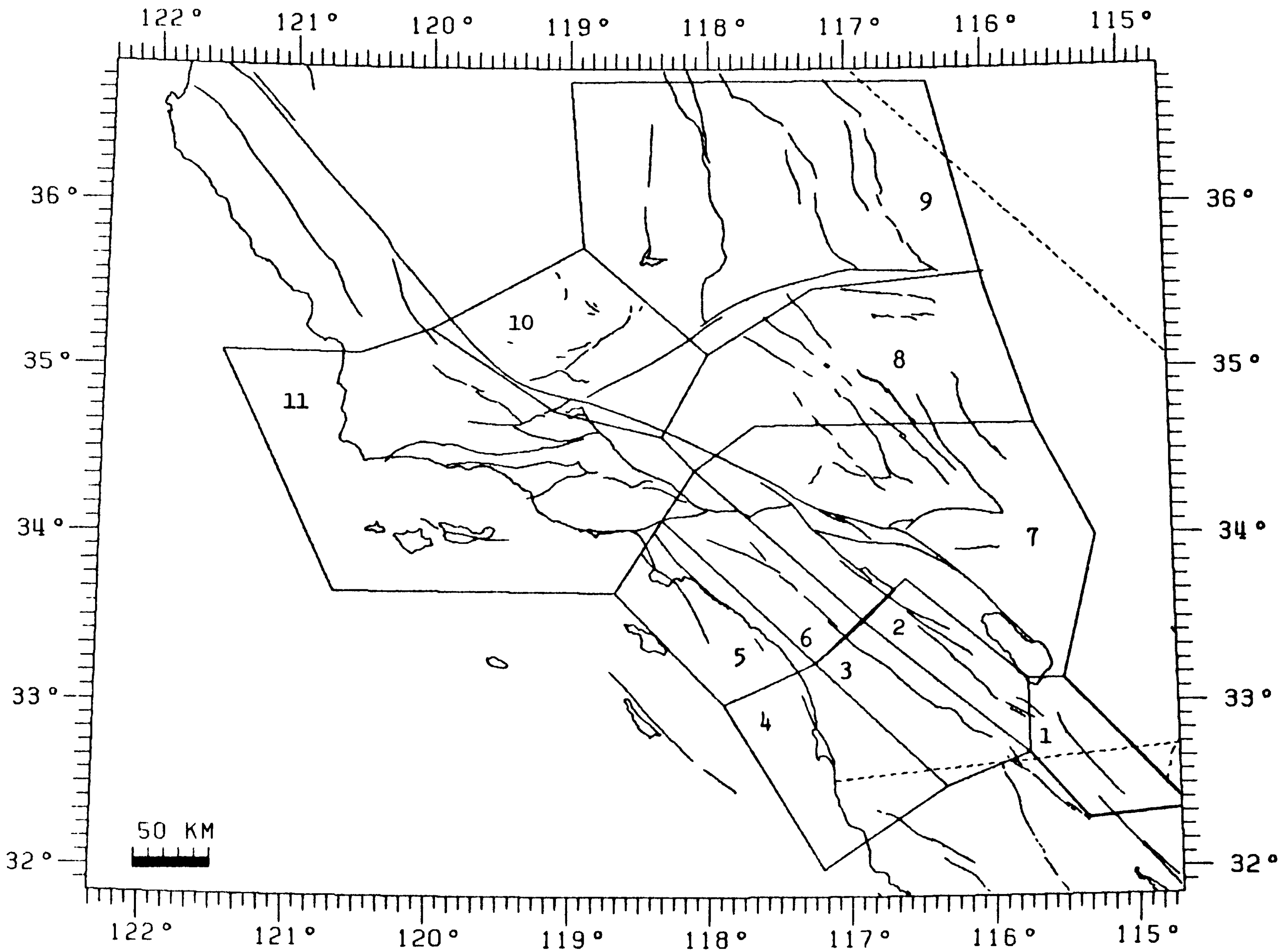
The epicenters of all earthquakes of M $\geq$ 0.0 located by the Network from January through June of 1985.

FIGURE 3:
SOUTHERN CALIFORNIA, MAG. 2 AND ABOVE, JANUARY 1 - JUNE 30 1985



The epicenters of all earthquakes of $M \geq 2.0$ located by the Network from January through June of 1985.

FIGURE 4:
MAP OF REGIONS FOR SEISMICITY RATES



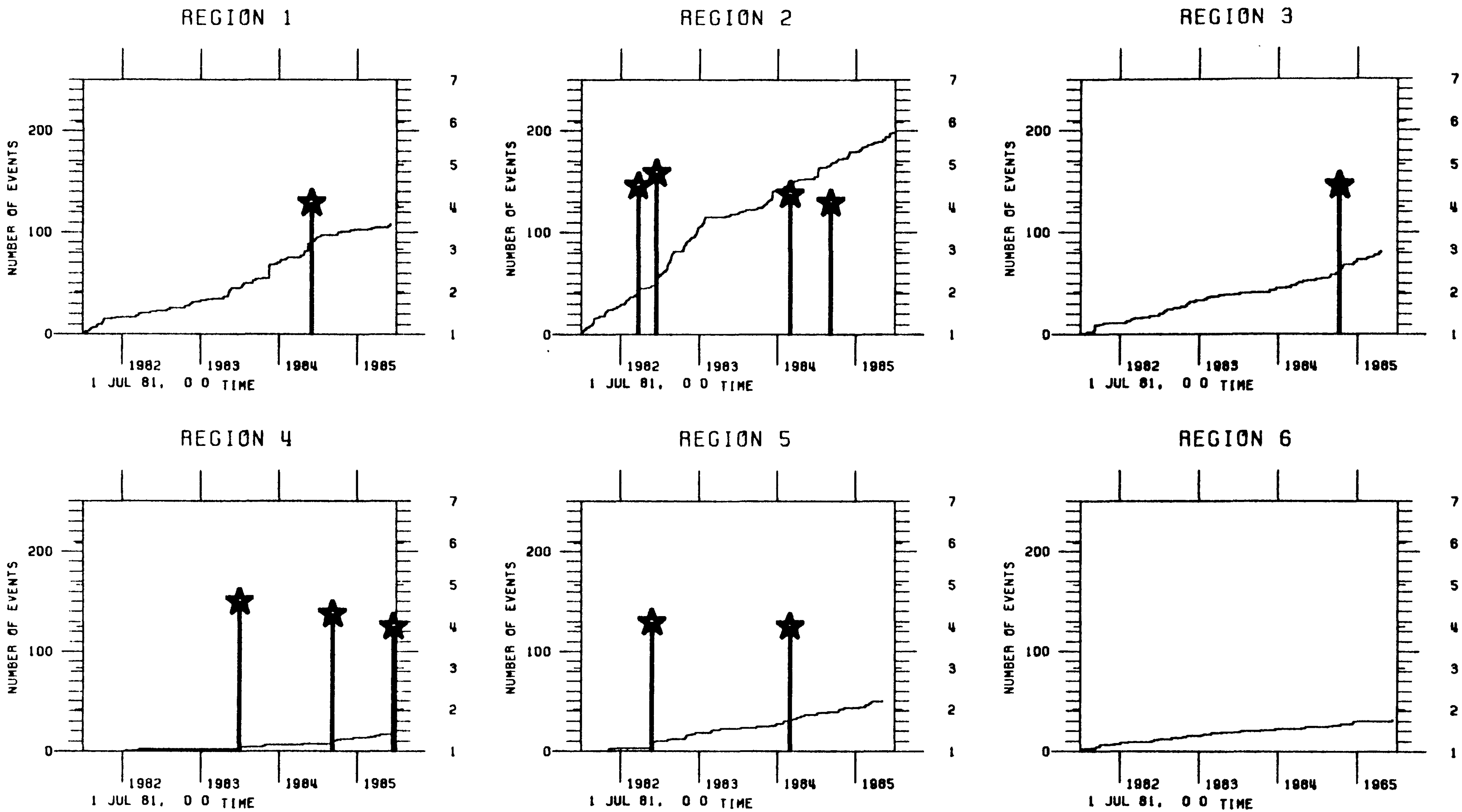


Figure 5a - The cumulative number of earthquakes that occurred in regions 1-6 shown in Figure 4 over the 48 month period ending June 30, 1985. All events of M 2.5 or greater are included. The starred vertical lines denote earthquakes of M 4.0 or greater (magnitude scale at right.) Note that regions 7 and 9 have a different count scale than the others and that some regions extend beyond the area of complete station coverage.

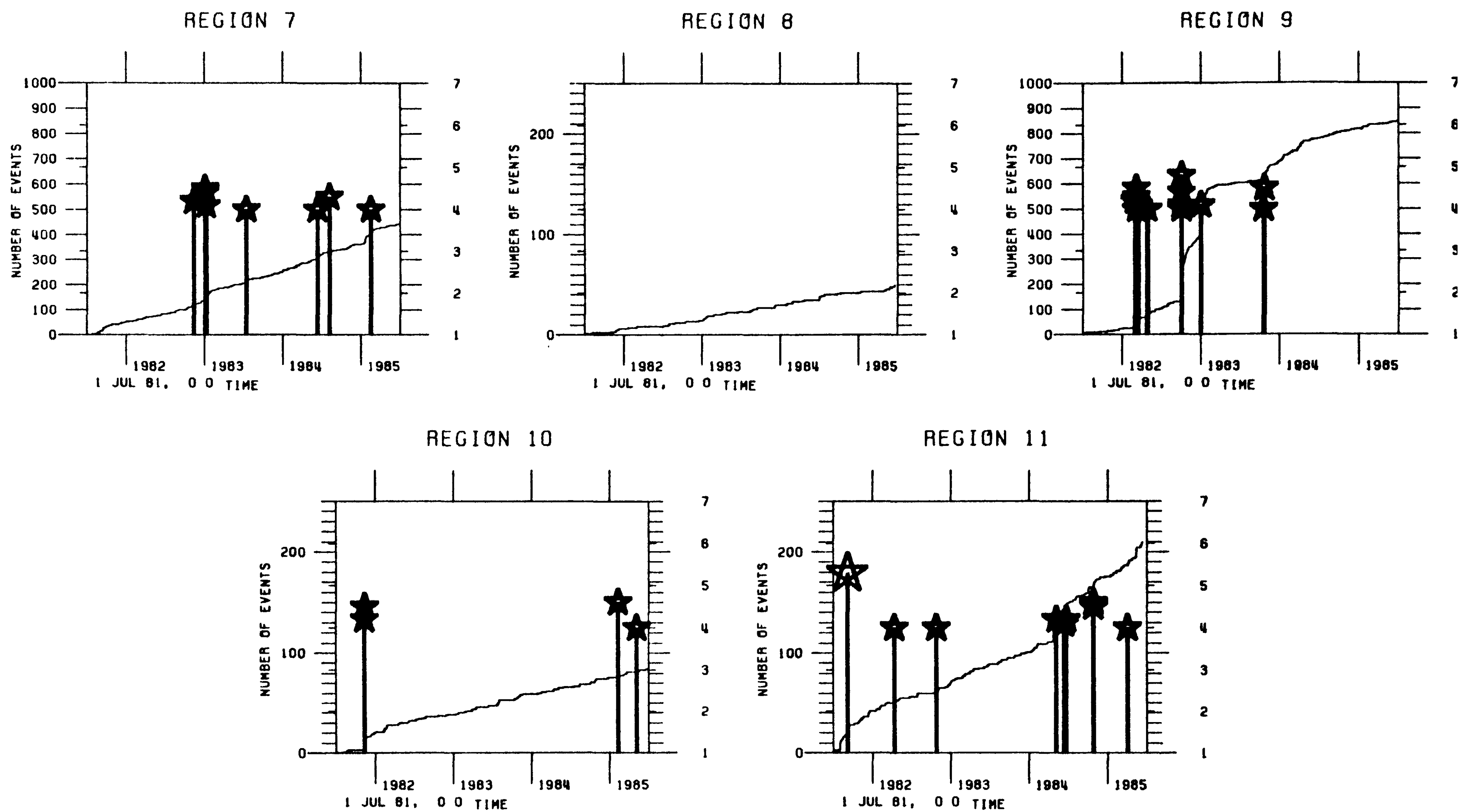
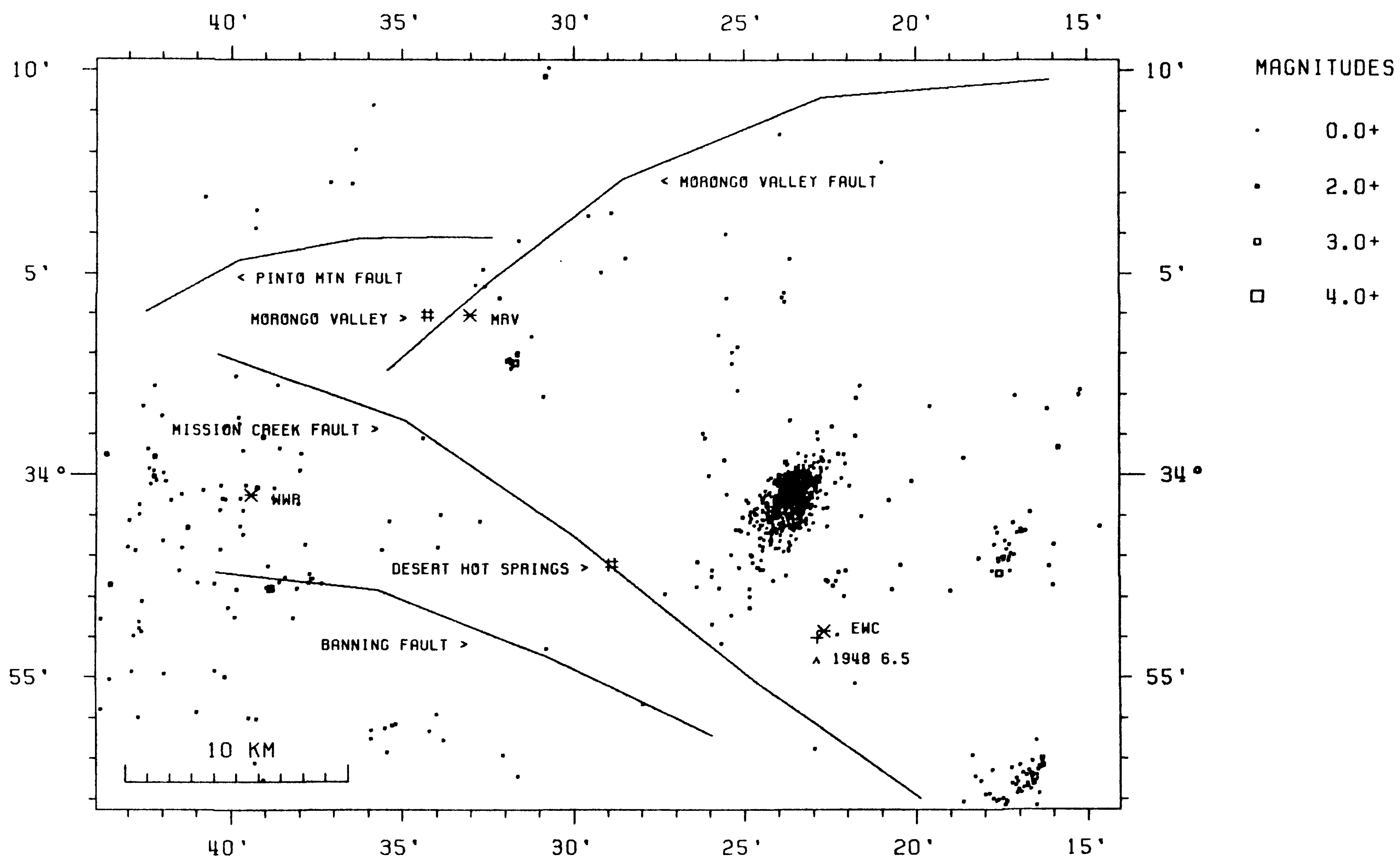


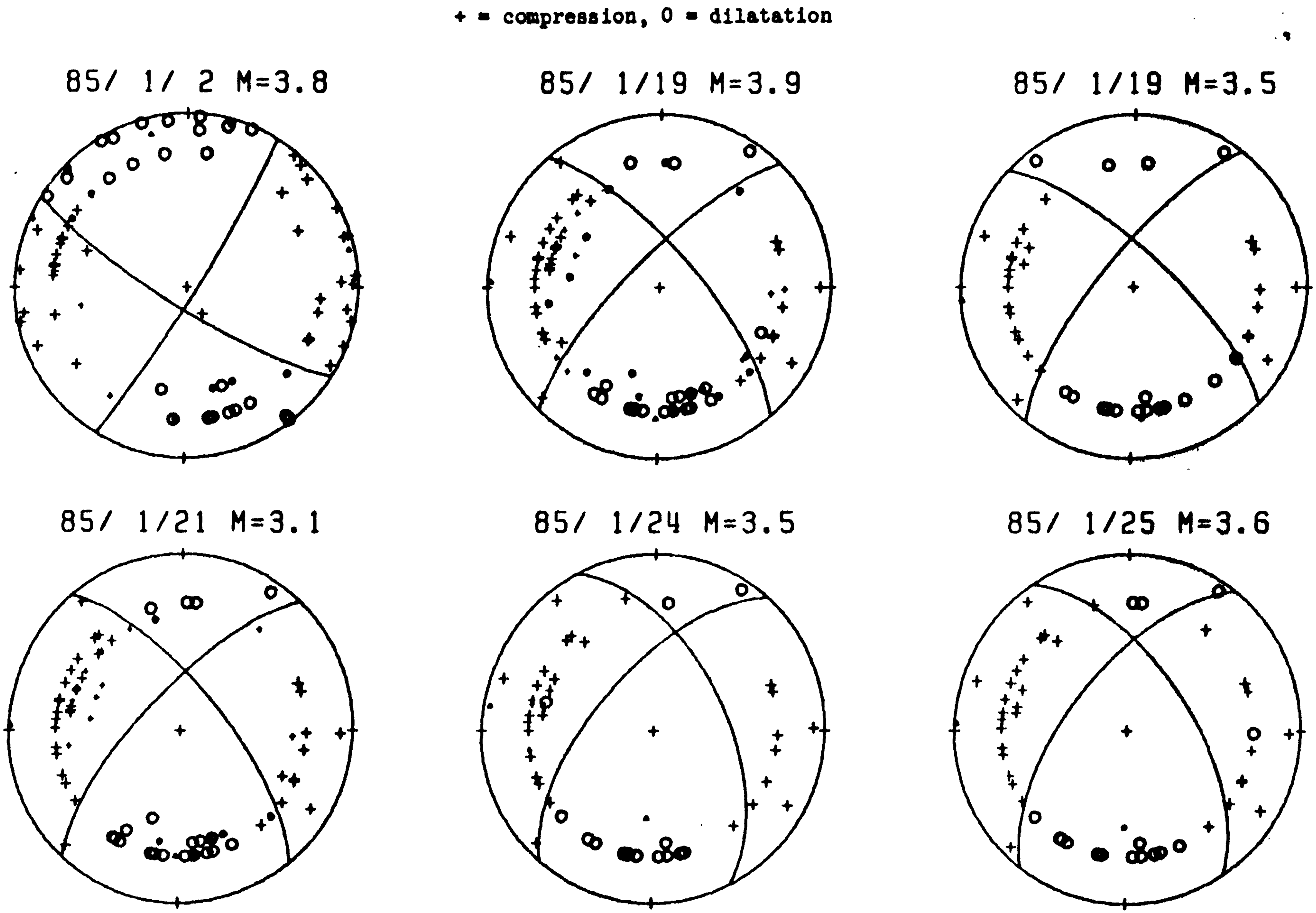
Figure 5b - The cumulative number of earthquakes that occurred in regions 7-11 shown in Figure 4 over the 48 month period ending June 30, 1985. All events of M 2.5 or greater are included. The starred vertical lines denote earthquakes of M 4.0 or greater (magnitude scale at right.) Note that Regions 7 and 9 have a different count scale than the others and that some regions extend beyond the area of complete station coverage.

FIGURE 6:
DESERT HOT SPRINGS SWARM AREA, JAN.1 - MAR. 30 1985



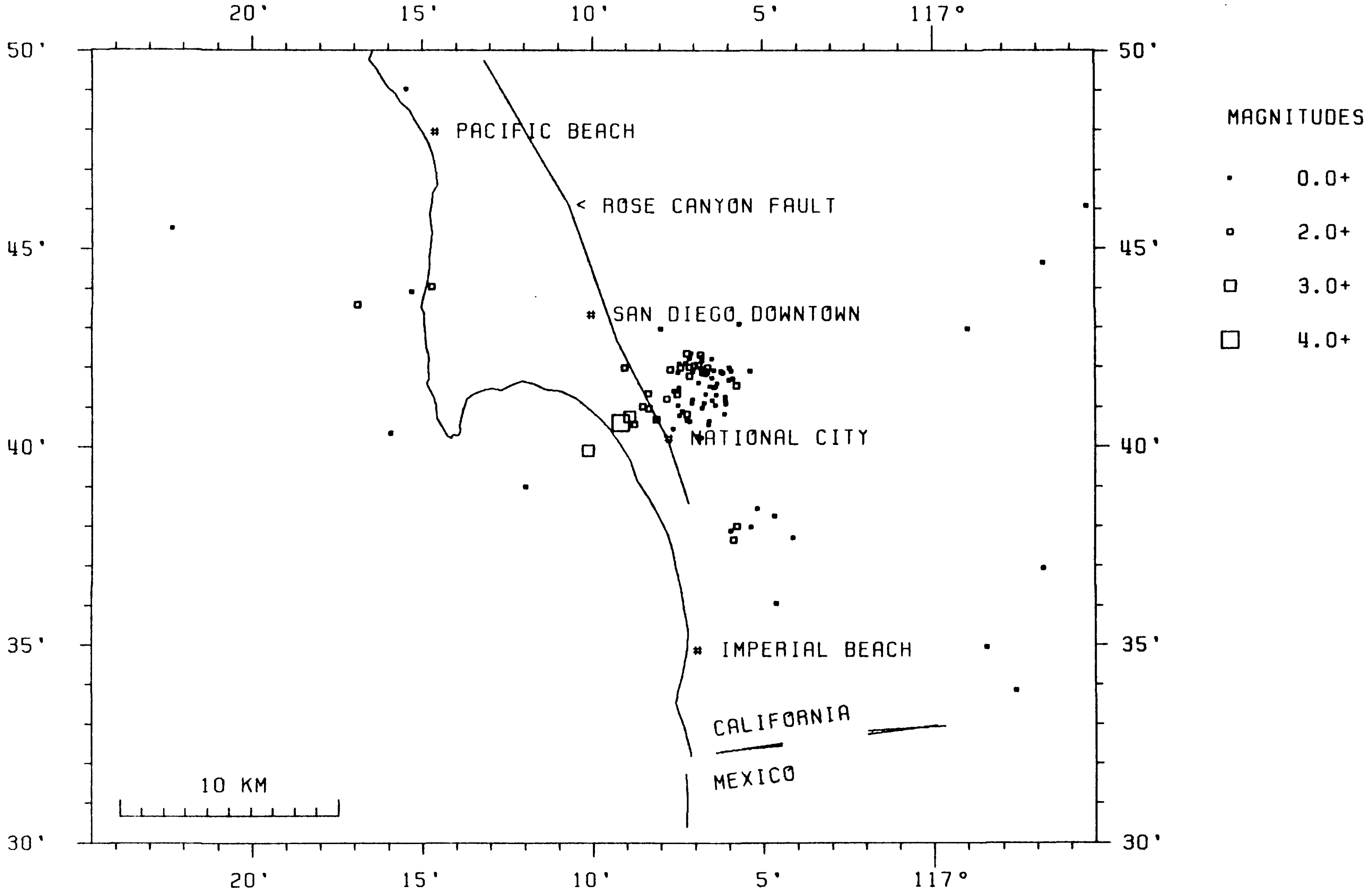
Epicentral area of the January 1985 Desert Hot Springs swarm. The labels refer to geological and cultural features of the area. Asterisks denote Network stations; pound signs indicate population centers. The location of the 1948 earthquake (M 6.5) is shown by a cross in the lower right center of the plot.

FIGURE 7: FOCAL MECHANISMS FOR SELECTED DESERT HOT SPRINGS SWARM EARTHQUAKES



Focal mechanisms for five Desert Hot Springs swarm events, and the January 2nd event northwest of the epicentral area.

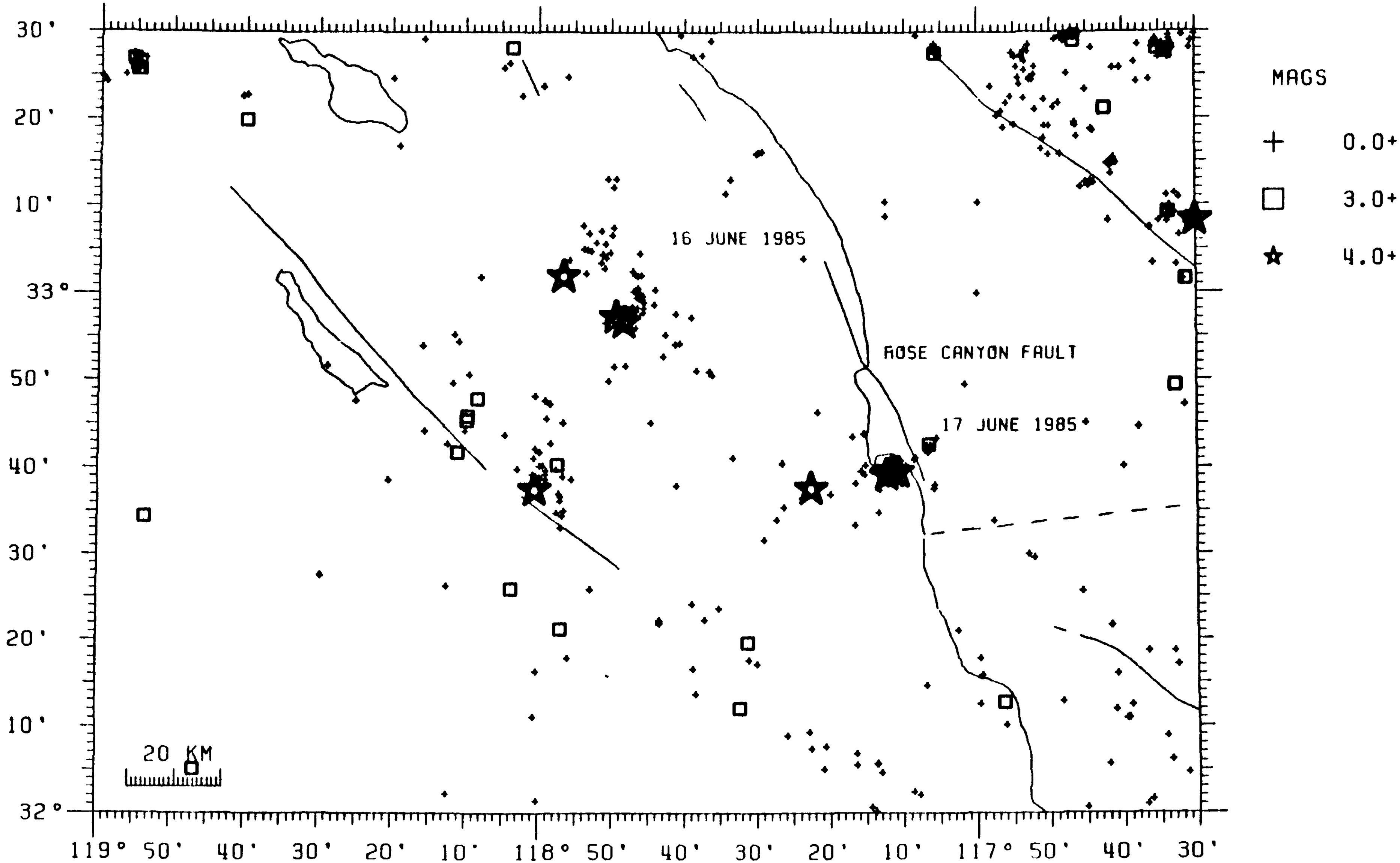
FIGURE 8: SAN DIEGO SWARM AREA



Epicentral area of the June 1985 San Diego swarm. The labels refer to geological and cultural features of the area. Pound signs indicate the locations of population centers.

FIGURE 9:

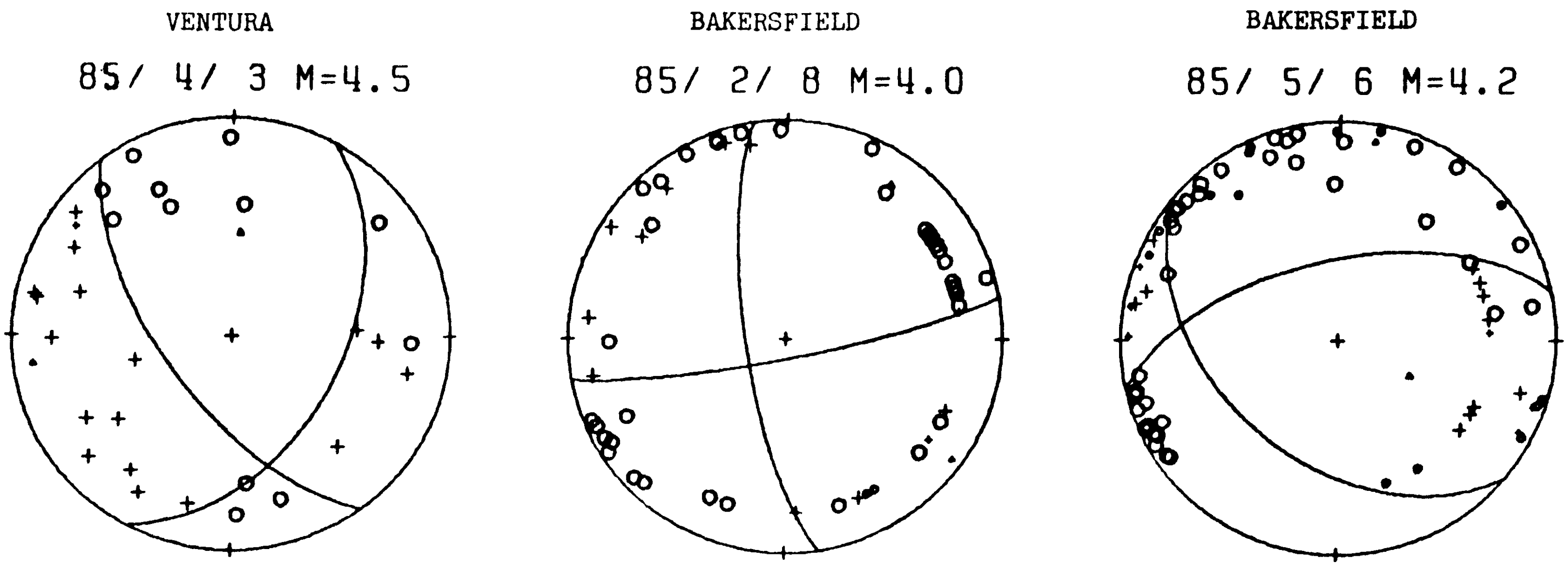
SOUTHERN CALIFORNIA COASTAL REGION
M > 2.0   1981 - 17 JUNE 1985



Epicentral area of the San Diego swarm, at a smaller scale than Figure 8. The date labels refer to the date of occurrence of the clusters of events adjacent to them.

FIGURE 10: FOCAL MECHANISMS

+ = compression, 0 = dilatation



This report represents a beginning in the effort required to put essential facts in the hands of those workers interested in accessing and using data from the Southern California Network in their research. We would be very much interested in receiving suggestions for topics to be included in future reports in this series so we can better serve the needs of the research community. Suggestions should be sent to:

Bob Norris
Physical Science Technician
U.S. Geological Survey
525 S. Wilson Ave.
Pasadena, Ca. 91104

TABLE 5
SOUTHERN CALIFORNIA EARTHQUAKES, MAG. 3 AND ABOVE
JANUARY 1 THROUGH JUNE 30, 1985

The following table contains epicentral data. The CUSP-ID column lists the unique number assigned to each event by the CUSP system during processing on the off-line computer.

CUSP-ID	YEAR	MON	DA	HRMN	SEC	LATITUDE	LONGITUDE	DEP.	Q	MAG	TYP	RMS	NPH
55737	1985	JAN	2	524	58.22	34.0464	-116.5286	-8.95	A	3.8	ML	0.21	94
57812	1985	JAN	3	1045	22.78	36.1759	-120.3368	-6.00	C	4.1	ML	0.12	15
57815	1985	JAN	3	1103	18.89	36.1712	-120.3284	-2.80	A	3.8	ML	0.18	13
57913	1985	JAN	3	1122	27.99	36.1759	-120.3221	-7.85	C	4.3	ML	0.35	25
57864	1985	JAN	4	712	37.58	35.8615	-120.4765	-6.00	C	3.3	ML	0.31	21
57898	1985	JAN	4	2011	37.28	32.2012	-117.5403	-6.00	D	3.2	ML	0.13	9
58038	1985	JAN	6	1833	24.65	36.6123	-121.3998	-6.00	D	3.8	ML	0.24	16
58196	1985	JAN	9	2125	46.41	36.1133	-120.2298	-0.01	C	3.1	ML	0.18	14
58482	1985	JAN	14	2157	50.78	32.0221	-116.4510	-9.40	C	3.3	ML	0.29	26
58866	1985	JAN	18	1724	43.01	33.8652	-115.9784	-10.75	A	3.1	ML	0.19	46
58825	1985	JAN	19	30	15.07	33.9916	-116.3977	-2.59	A	3.8	ML	0.34	97
58848	1985	JAN	19	324	12.65	33.9945	-116.3941	-2.60	A	3.5	ML	0.18	56
59123	1985	JAN	21	1332	13.03	33.9908	-116.3981	-2.71	A	3.1	ML	0.19	57
59130	1985	JAN	21	1405	37.08	33.9929	-116.3910	-2.32	A	3.1	ML	0.18	52
59267	1985	JAN	22	1138	52.81	33.9829	-116.7833	-17.08	A	3.2	ML	0.21	70
59447	1985	JAN	24	2325	32.29	33.9964	-116.3990	-2.05	A	3.5	ML	0.30	58
59463	1985	JAN	25	528	29.95	33.9909	-116.3996	-2.77	A	3.6	ML	0.20	61
59479	1985	JAN	25	1350	12.83	33.9285	-117.0883	-14.03	A	3.4	ML	0.23	74
59558	1985	JAN	26	641	14.27	34.1987	-119.0279	-22.46	A	3.3	ML	0.25	48
57977	1985	FEB	3	1748	21.14	32.5876	-115.6429	-14.61	A	3.8	ML	0.35	50
60103	1985	FEB	4	309	24.50	32.3545	-117.9497	-6.00	D	3.8	ML	0.42	14
60226	1985	FEB	4	1104	10.61	36.2781	-120.3873	-14.48	C	3.0	ML	0.18	8
58486	1985	FEB	8	658	16.93	35.4524	-118.8986	-11.05	A	4.6	ML	0.33	87
58495	1985	FEB	8	851	41.60	36.1492	-120.2800	-6.00	C	3.3	ML	0.37	16
60590	1985	FEB	10	920	0.06	35.7265	-118.0372	-8.63	A	3.5	ML	0.16	60
60547	1985	FEB	10	1359	6.06	33.8761	-116.2763	-1.32	A	3.6	ML	0.22	62
60740	1985	FEB	11	1358	5.95	32.9508	-116.4288	-6.00	C	3.2	ML	0.23	28
60829	1985	FEB	14	2322	22.34	33.6978	-118.1509	-2.81	B	3.3	ML	0.23	28
60882	1985	FEB	15	1626	43.30	34.1488	-117.4788	-3.14	A	3.0	ML	0.14	32
60919	1985	FEB	15	2326	26.57	33.9848	-116.4023	-2.30	A	4.0	ML	0.33	90
60954	1985	FEB	16	42	39.82	33.9933	-116.3976	-0.52	A	3.4	ML	0.31	27
61165	1985	FEB	18	1353	43.29	33.0201	-116.3517	-6.05	C	3.2	ML	0.25	58
61197	1985	FEB	19	509	35.26	34.1595	-116.9821	-9.87	A	3.3	ML	0.18	75
61212	1985	FEB	19	1338	26.81	36.0893	-119.9887	-8.71	C	3.6	ML	0.49	34
61218	1985	FEB	19	1637	14.73	34.0347	-116.7708	-12.49	A	3.1	ML	0.23	75
61355	1985	FEB	21	754	42.57	33.4798	-116.4177	-8.10	A	3.1	ML	0.23	63
61694	1985	FEB	26	2335	51.97	35.8645	-119.5801	-6.00	C	3.5	ML	0.59	74
61738	1985	FEB	28	442	8.57	33.9600	-116.2930	-10.03	A	3.7	ML	0.19	74
61908	1985	MAR	3	126	9.49	32.6724	-117.9582	-6.00	D	3.5	ML	0.38	13
61982	1985	MAR	4	1151	10.83	33.9877	-118.5816	-6.00	C	3.2	ML	0.33	31
62090	1985	MAR	5	1418	14.87	36.2582	-120.3476	-5.42	A	3.4	ML	0.29	19
62315	1985	MAR	9	1953	8.43	36.1953	-120.6384	-6.00	C	3.1	ML	0.43	14
60692	1985	MAR	13	1719	26.30	33.2043	-116.0595	-2.04	A	3.1	ML	0.23	47

62905	1985	MAR	20	352	29.84	33.0496	-116.3990	-6.01	C	3.3	ML	0.28	45
63299	1985	MAR	27	833	44.11	36.2957	-120.4024	-6.00	C	3.5	ML	0.36	19
63393	1985	MAR	28	2229	39.99	36.1782	-120.1906	-6.00	C	3.4	ML	0.15	13
63375	1985	MAR	29	246	52.58	32.0694	-116.3705	-6.00	C	3.3	ML	0.32	15
63455	1985	MAR	30	1834	59.63	32.4981	-114.0253	-6.00	D	3.3	MC	0.49	26
63554	1985	APR	1	613	33.37	35.9976	-117.3958	0.00	A	3.2	ML	0.24	42
61973	1985	APR	3	404	49.85	34.3781	-119.0350	-27.93	A	4.0	ML	0.26	117
63874	1985	APR	6	1315	9.99	36.5846	-121.3076	-6.00	D	3.2	ML	0.75	19
63943	1985	APR	6	1316	18.59	36.6374	-121.1804	-6.00	D	3.5	ML	0.59	18
63859	1985	APR	8	109	33.13	34.0508	-118.9220	-13.15	A	3.4	ML	0.31	77
63962	1985	APR	8	1320	24.91	34.0499	-118.9224	-13.13	A	3.0	ML	0.30	50
64053	1985	APR	9	323	23.95	36.2550	-120.2139	-6.00	C	3.7	ML	0.47	42
64012	1985	APR	9	342	27.86	36.2416	-120.2208	-6.00	C	3.4	ML	0.29	23
64658	1985	APR	18	2126	4.19	32.8114	-116.1019	-6.00	C	3.1	ML	0.24	23
63271	1985	APR	19	355	52.40	32.2128	-116.9380	-6.00	D	3.8	ML	0.35	46
65121	1985	APR	26	1906	44.86	36.4865	-121.4595	-6.00	C	3.1	MC	0.24	12
65240	1985	APR	28	2223	53.75	34.0161	-117.0439	-11.83	A	3.1	ML	0.16	70
65552	1985	MAY	4	200	55.35	34.3613	-117.2120	-3.38	A	3.1	MC	0.15	14
64604	1985	MAY	6	2314	33.02	35.2971	-119.3456	-24.39	A	4.0	MC	0.36	130
524896	1985	MAY	7	2006	10.99	36.5900	-116.1465	-6.00	D	3.5	MH	0.27	6
66012	1985	MAY	10	1547	59.31	34.3911	-120.8992	-6.00	D	3.8	MC	0.22	8
65002	1985	MAY	11	857	16.84	36.6091	-117.1558	-6.00	C	3.0	MC	0.23	38
65000	1985	MAY	11	859	22.98	36.2156	-120.1988	-6.00	C	4.1	MC	0.37	32
66361	1985	MAY	13	955	37.29	34.2250	-119.6025	-13.83	A	3.1	MC	0.38	46
66270	1985	MAY	13	2124	0.39	35.7854	-117.7376	-7.38	A	3.4	MC	0.15	56
66386	1985	MAY	14	1735	36.36	33.5229	-116.8012	-1.23	A	3.7	MC	0.15	49
66852	1985	MAY	21	1324	20.40	35.8216	-120.3527	-10.27	B	3.1	MC	0.12	15
67089	1985	MAY	25	419	39.49	35.9223	-120.5117	-12.58	B	3.2	MC	0.21	22
67812	1985	MAY	25	1550	45.43	33.9535	-116.6477	-13.40	A	3.1	MC	0.18	69
67449	1985	MAY	31	2026	56.54	35.9352	-118.3129	-6.00	C	3.1	MC	0.20	44
65577	1985	JUN	2	1501	17.57	34.3852	-120.0969	-1.80	A	3.1	MC	0.33	32
67587	1985	JUN	3	205	30.48	33.9998	-116.0978	-8.52	A	3.0	MC	0.14	48
67614	1985	JUN	3	653	27.52	33.0380	-115.9722	-10.95	A	3.2	MC	0.27	57
67748	1985	JUN	5	1000	50.31	32.9922	-115.5750	-8.37	A	3.2	MC	0.23	38
67773	1985	JUN	5	1810	5.59	33.3419	-116.3281	-11.68	A	3.6	MC	0.26	76
67918	1985	JUN	7	1806	14.39	34.3926	-120.1013	-2.10	B	3.3	MC	0.30	22
68036	1985	JUN	10	58	1.59	34.2068	-116.8199	-10.85	A	3.3	MC	0.17	53
68304	1985	JUN	14	1124	2.14	36.2058	-120.1867	-6.00	C	3.5	MC	0.37	29
68378	1985	JUN	16	1026	58.88	32.9602	-117.8217	-6.00	C	3.8	MC	0.33	39
68562	1985	JUN	18	12	55.09	32.6795	-117.1493	-6.00	C	3.9	MC	0.25	35
68480	1985	JUN	18	123	40.80	35.2272	-117.3213	-8.00	B	3.8	MC	0.26	94
68492	1985	JUN	18	322	28.63	32.6769	-117.1534	-5.99	C	4.0	MC	0.34	83
68502	1985	JUN	18	428	14.93	32.6654	-117.1696	-6.00	C	3.9	MC	0.31	75
68681	1985	JUN	21	50	59.24	33.9891	-117.1716	-14.33	A	3.4	MC	0.16	71
68682	1985	JUN	21	115	35.10	32.1173	-115.6921	-6.00	C	3.2	MC	0.25	10
66486	1985	JUN	21	951	51.40	33.0919	-117.4396	-12.00	C	3.3	MC	0.42	53
69054	1985	JUN	27	438	54.38	36.5410	-121.2642	-6.00	D	3.4	MC	0.38	15
69222	1985	JUN	29	1823	50.93	33.4771	-116.5576	-13.19	A	3.1	MC	0.29	75