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INTRODUCTION

The Pasadena Office of the U.S. Geological Survey together with the California Institute of Technology Seismology Laboratory (Caltech Seismo Lab) operates a network of more than 300 remote seismometers in southern California called the Southern California Seismic Network (SCSN). Signals from these sites are telemetered to the central processing site at the Caltech Seismology Laboratory in Pasadena. These signals are continuously monitored by computers that detect and record thousands of earthquakes each year. Phase arrival times for these events are picked by analysts and archived along with digital seismograms. Data acquisition, processing and archiving is achieved using the CUSP system (*Dollar, 1989*). These data are used to compile the SCSN Catalog of Earthquakes, a list beginning in 1932 that currently contains more than 300,000 events. This data set is critical to the evaluation of earthquake hazards in California and to the advancement of geoscience as a whole.

This and previous Network Bulletins are intended to serve several purposes. The most important goal is to make Network data more accessible to current and potential users. It is also important to document the details of Network operation, because only with a full understanding of the process by which the data are produced can researchers use the data responsibly.

NETWORK NOTES

TriNet Project Upgrades the Seismic and Strong-motion Networks

Caltech, USGS, and the California Division of Mines and Geology (CDMG) have formed the TriNet project to carry out major improvements to the seismic and strong-motion networks that record earthquakes in southern California. The Caltech/USGS component is converting the regional seismic network into a modern system with broadband and high dynamic range recording combined with new digital telemetry technologies. CDMG is working closely with Caltech and USGS to integrate the strong motion recording into the system.

This ambitious instrumental and system development project has three main objectives.

1. *Rapidly provide ground shaking information following damaging earthquakes to increase the effectiveness of emergency response.* Point measurements at critical facilities and contour maps of the distributions will be quickly distributed to local emergency response groups so appropriate actions can be taken in heavily impacted areas.

2. *Record ground motion data for improvement of seismic provisions in building codes.* Weak and strong motion data will be used to understand and quantify the levels of shaking during damaging earthquakes. Those making regulatory decisions on building and retrofit practices need better information on the expected ground motions.

3. *Develop prototype Early Warning system.(Heaton, 1991)* Ground motion information will be recorded rapidly, analyzed, and communicated to selected user sites. Seismic waves travel a few kilometers per second, so the rapid determination of earthquake information can serve as an early warning to distant locations (over 100 km) that large seismic waves from an earthquake are on the way. This is the situation for Los Angeles where a 10-40 second warning could be given before the intense shaking from a large San Andreas earthquake.

To address these objectives, the project will produce several new products which will mainly be distributed through the Internet and other electronic communication channels.

•Quick map of potentially damaging ground shaking (ShakeMap) following significant earthquakes. Up to 600 instruments in southern California will be reporting information.

•Frequency-dependent amplification maps for the Los Angeles region. These maps will quantify the geology-dependent site effects that locally amplify or attenuate shaking.

•Publically accessible database of weak and strong ground motions needed for improvement of building codes. This collection of parametric and waveform data will be used mainly by the engineering and research community in ongoing work.

•Prototype Early Warning system. A system will be developed to test the feasibility of providing very rapid warnings of expected seismic waves. Part of this element is a data utilization component which will examine the problems of implementing and educating users about this technology.

Phase I

Following the Northridge earthquake in 1994, the USGS received funds appropriated by Congress to the National Earthquake Hazard Reduction Program. The allocation was originally split into portions for realtime system improvements to the regional network and upgrading of the strong motion recording. Early in the planning, USGS decided it was more appropriate to combine the two parts and begin to build a single system that integrated the functions of the regional seismic network and the engineering strong-motion network. Seismologists and engineers of USGS and Caltech worked together to design a system that took advantage of modern instrumentation which could record both weak motions from small events and the strong shaking from larger earthquakes. Working for the last 27 months, experimental system designs and installation of hardware has marked the start to the TriNet project.

•30 state-of-the-art digital seismic stations are operating with continuous communication to Caltech/USGS. Continuous telemetry on frame-relay telephone lines and spread spectrum radios are being tested.

•25 free-field strong-motion sites installed with many near critical structures. 45 more sites will be completed in the next year.

•Instrumentation of two high-rise buildings has been completed. Other monitoring installations (steel-frame building, non-ductile concrete building, building drift experiment) will be completed in the next year.

•Alarming and processing software that combine information from the new digital signals and the existing analog system have been designed and implemented.

•Automated maps of contoured ground shaking are available on the WEB within a few minutes after felt and damaging earthquakes (**http://www-socal.wr.usgs.gov**; see *Access to Earthquake Data*).

Phase II

With major support from the FEMA (Federal Emergency Management Agency) Hazard Mitigation program through the California Office of Emergency Services, the second phase of TriNet is beginning in 1997. The project is divided into two sections with the realtime information emphasis centered at Caltech/USGS in Pasadena and the extensive collection of strong-motion data for engineering purposes centered at CDMG in Sacramento.

At the completion of the project in 2002, 670 sites will be established or upgraded in southern California. Caltech/USGS will be installing broadband and strong-motion sensors with continuous telemetry, expanding the efforts started under Phase I for a total of 200 high dynamic range sites in southern California. CDMG will be installing new sites or upgrading existing instrumentation to provide digital strong motion recording from 400 stations. Also included in the system are the 70 digital strong-motion sites being installed by USGS under Phase I.

Connecting the telemetry from the Caltech/USGS stations to the central processing site in Pasadena is a major challenge for the project. One of the tasks is to provide fast communications that will be reliable even during the strong shaking of an earthquake. A variety of telemetry paths will be utilized to minimize any single points of failure. Frame relay telephone lines, spread spectrum radios, digital microwave links will all be utilized in the system.

The 400 CDMG sites (plus the 70 USGS strong-motions sites from Phase I) will be connected to telephone telemetry. These instruments will provide significant contributions to the database of strong motions recorded in southern California, and provide the basis for improvements to the seismic provisions of building codes. The dial-up telemetry from these sites will provide additional information in tens of minutes, to the initial estimates of shaking distributions that will be provided by the realtime system.

There will be extensive software development to handle the large volume of digital data. The new system will be designed to handle data very quickly for the Early Warning applications, and produce rapid estimates of earthquake source parameters and shaking distributions. The system will also provide databases with standard user interfaces.

Collaborations

The TriNet Project is being built upon existing infrastructure and collaborations. Southern California's first digital network began with the installation of seismographs known as TERRAscope, made possible by a grant from the Whittier Foundation and the ARCO Foundation. Pacific Bell through its CalREN Program has provided new frame-relay digital communications technology for telemetry. The CUBE (Caltech-USGS Broadcast of Earthquakes) project started in 1991 has formed a consortium of government agencies and private industry concerned with the earthquake problem in southern California. This group has built support for the project and provided valuable user input into the design of the earthquake information systems.

The total cost of the project is $22.1 million. For Phase I, USGS provided $4.0 million, NSF $0.5 million, California Trade and Commerce Agency $0.45M, and Pacific Bell through the CalREN project $0.15 million. In Phase II, FEMA will provide $12.75 million through the California Office of Emergency Services. The balance is to be matched by Caltech ($2.5 million) and CDMG ($1.75 million). Several private sector partners, including GTE and Pacific Bell, are assisting Caltech with matching funds for its portion of the TriNet balance.

New Stations

Most of the new seismic stations added to the Network in 1996 were digital stations. All new digital and analog stations added through December 31, 1996 are included in Table 1. Figure 1 is a current SCSN station map showing the locations of all the analog and TERRAscope stations.

Table 1. New Stations

Code	Site Name	Lat. (North)	Long. (East)	Elev. (meters)	Date Installed	Instr.
ARG*	Argus Range	36.08370	-117.48060	2500	12/03/96	FBA-23 & L4
BKR	Baker	35.26930	-116.07030	305	10/14/96	Squash
COO	Compton	33.89604	-118.21639	-1	10/10/96	K2
EW2*	East Wide Canyon	33.94033	-116.40817	669	02/16/96	FBA-23 & L4
FUR	Furnace Creek	36.46720	-116.86350	-24	11/19/96	Squash
GPO	Geothermal Prog. Off.	35.64940	-117.66190	735	01/12/96	TERRAscope
JRC	Joshua Ridge/Coso	35.98252	-117.80811	1482	12/16/96	Squash
LKL	Lake Los Angeles	34.61600	-117.82440	814	05/09/96	Squash
MTP	Mountain Pass	35.48483	-115.55333	1582	09/10/96	Squash
MWC	Mount Wilson	34.22368	-118.05287	1696	10/09/96	Squash
PLS	Pleasants	33.79530	-117.60906	1181	12/20/96	Squash
RG2*	Ridgecrest	35.74883	-117.62900	688	01/19/96	FBA-23 & L4
RVR	Riverside	33.88350	-117.37550	232	10/04/96	Squash
SHO	Shoshone	35.89950	-116.27570	373	10/14/96	Squash
SOT	Solamint	34.41600	-118.44900	439	05/09/96	Squash
SU2*	Superstition	32.94483	-115.80000	134	05/09/96	L4
TIN	Tinemaha	37.05422	-118.23009	1164	12/20/96	Squash
WS2*	Warm Springs	34.59417	-118.58033	1159	05/22/96	L4

Notes: An * next to a station code indicates an analog site.

Three-letter codes ending in "2" indicate that the station previously existed in a nearby location, but was moved far enough to warrant a new site name.

SCSN Analog & Digital Stations - January 1997

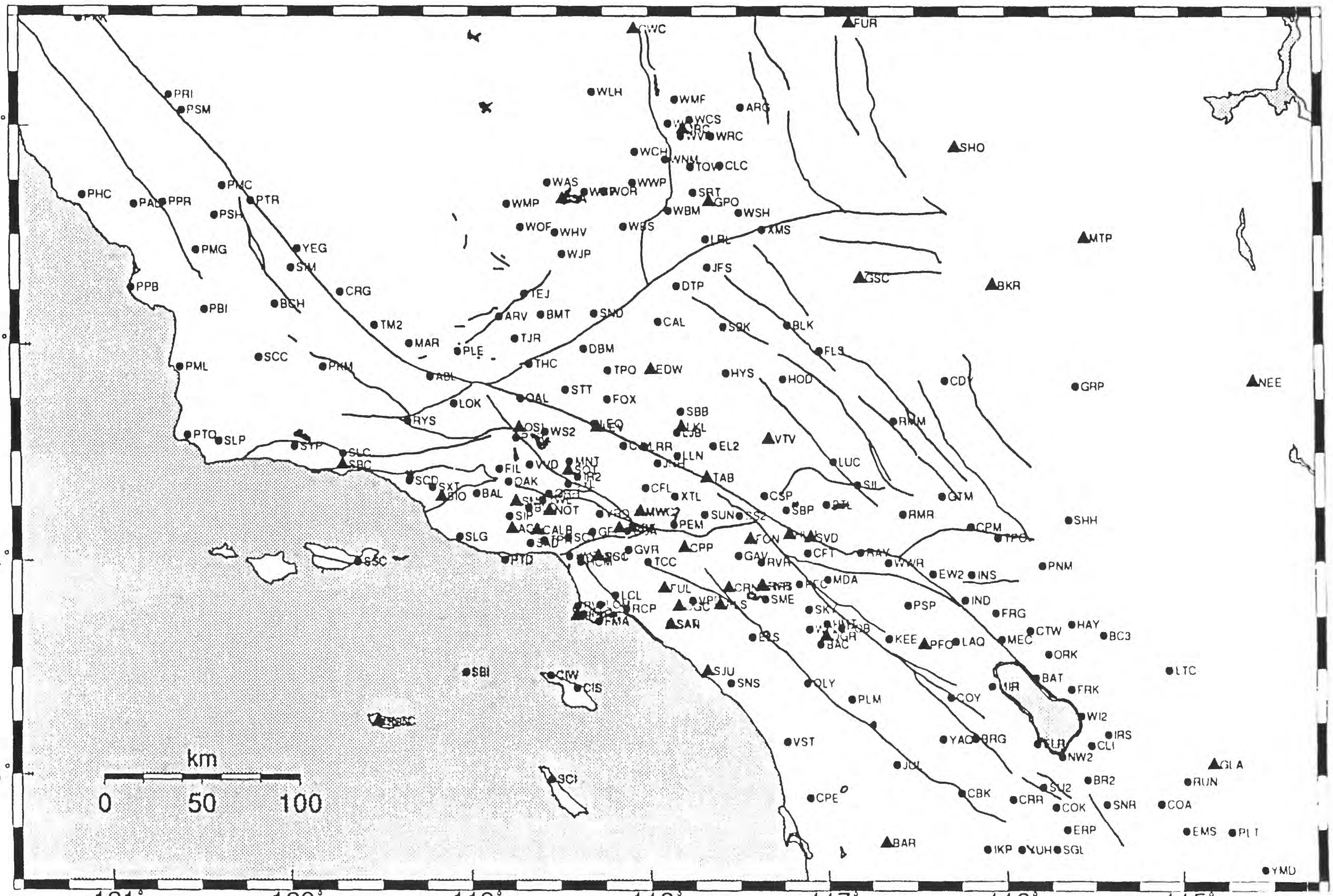

Figure 1. Southern California Seismographic Network - January 1997. Filled triangles represent digital stations; filled circles are analog stations.

Discontinued Stations

17 stations were removed in 1996. The removal dates are shown below in Table 2 Some were moved to a nearby site for permitting reasons, and many were removed as they were replaced with digital instruments at a nearby site.

Table 2. Discontinued Stations

Code	Station Name	Date Removed
ADL	Adelanto	11/12/96
BON	Bonds Corner	07/19/96
COO	Compton	10/10/96
CO2	Coxcomb Mountain	05/26/96
EWC	East Wide Canyon	02/15/96
JAW	Jawbone Canyon	01/12/96
LHU	Lake Hughes	07/11/97
MLL	Mill Creek	11/13/96
PCF	Pomona	09/12/96
RGC	Ridgecrest	01/19/96
RG2	Ridgecrest	12/02/96
SMTC	Superstition	05/01/96
SSM	San Miguel Island	03/29/96
SUP	Superstition Mountain	05/08/96
SWM	Sawmill	05/17/96
WSC	Short Canyon	03/12/96
WSP	Warm Springs	05/17/96

Notes: SUP (Superstition) was replaced with a digital instrument. RGC (Ridgecrest) was moved to a nearby site (RG2), and then replaced with a digital instrument. COO (Compton) was replaced with a digital instrument.

Status of Seismic Data Processing

The status of each month of the catalog data since the advent of digital recording is described in Table 3. Events for months marked preliminary **(P)** have been timed but have not yet run the gauntlet of quality checking, addition of helicorder amplitudes and re-archiving necessary to become final **(F** with shading). For months marked "pinked" **(PNK)**, larger events (~3.0) have only been timed crudely on a few stations and smaller events are absent. A period in 1980-1981 has actually been timed and digital seismograms are available, but the "pinked" version is still used for any purpose requiring good magnitudes or completeness for large earthquakes; some events and magnitudes are missing otherwise. The last three quarters of 1981 are now finalized except for missing magnitude calibrations in the months marked with a "**P**". 1983 data is now in the process of being timed and finalized. The months marked "**P**" in 1993-94 are finalized except for missing magnitude calibrations. The months marked "**P**" in 1995 and 1996 also have been finalized except for missing magnitude calibrations.

In addition to triggered events, an archive of other interesting seismic time periods and teleseisms are kept on continuously-recorded DAT tapes. See Appendix B for a list of these times and/or events for 1996.

Table 3. Processing Status of Network Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1932-1974	PRE-DIGITAL RECORDING - COMPLETE FOR $M \geq 3.0$											
1975	F	F	F	F	F	F	F	F	F	F	F	F
1976	F	F	F	F	F	F	F	F	F	F	F	F
1977	P	P	P	P	P	P	P	P	P	P	P	P
1978	F	F	F	F	F	F	F	F	F	F	F	F
1979	P	P	P	P	P	P	P	P	P	P	P	P
1980	PNK	PNK	PNK	PNK	PNK	PNK	PNK	PNK	PNK	PNK	PNK	PNK
1981	PNK	PNK	P	P	P	P	F	F	F	F	F	F
1982	F	F	F	F	F	F	F	F	F	F	F	F
1983	P	PNK	PNK	PNK	PNK	PNK	PNK	F	F	F	F	F
1984	F	F	F	F	F	F	F	F	F	F	F	F
1985	F	F	F	F	F	F	F	F	F	F	F	F
1986	F	F	F	F	F	F	F	F	F	F	F	F
1987	F	F	F	F	F	F	F	F	F	F	F	F
1988	F	F	F	F	F	F	F	F	F	F	F	F
1989	F	F	F	F	F	F	F	F	F	F	F	F
1990	F	F	F	F	F	F	F	F	F	F	F	F
1991	F	F	F	F	F	F	F	F	F	F	F	F
1992	F	F	F	P	P	P	P	P	P	P	P	P
1993	F	F	F	F	F	F	P	P	P	P	P	P
1994	F	P	P	F	F	F	F	F	F	F	F	F
1995	F	F	F	F	F	F	F	F	F	F	F	F
1996	F	F	F	F	F	F	P	P	P	P	P	P
1997	P	P										

Access to Earthquake Data

Web Pages

The Pasadena Field Office has a newly designed Web page for easier access to earthquake data. The bulk of information is divided up into three categories: PAST, PRESENT, and FUTURE. The PAST button contains information about past earthquakes, such as catalogs, source models and weekly seismicity reports. The PRESENT button has current seismicity information (see next paragraphe for more information). The FUTURE button has links to hazard maps, probability maps, and earthquake preparedness information. You can also get information on current research and projects under way by the various staff and scientists in the Pasadena Field Office, in addition to a variety of other earthquake and geological information through other links on the page. The URL is:

http://www-socal.wr.usgs.gov/

Rapid Peak Acceleration Maps from SCSN

We are now generating rapid (< 5 minutes) peak ground acceleration and peak ground velocity contour maps for all earthquakes in southern California with magnitudes greater than 3.5. The contours are overlayed on top of high-resolution topography, fault systems, and freeways and are displayed on the Web as soon as generated. The URL is: **http://www-socal.wr.usgs.gov/pga.html.** The map is interactive - earthquake parameters and peak ground motion values recorded at each station can be obtained by selecting the epicenter or station of interest on the contoured imagemap. The map scale, contour intervals, and region of interest are all dependant on the earthquake magnitude and location. The first-motion focal mechanism is also provided.

Ground Motion Maps And Finite-Fault Model Repository

We have constructed a Web site to provide digital slip models and maps of strong ground motions for important California earthquakes. Specific earthquakes can be interactively selected by epicenter or name, and each has individual pages that include source information, maps of strong ground motion overlayed on high-resolution topography, slip maps, peak acceleration maps, rupture movies, and links to related web pages. Further, each earthquake has a link to slip models that have been provided by a variety of researchers. For each, the reference is given (linked if available on the WWW), and an image of the model is provided. The viewer can download the image as well as a digital representation of the rupture model. The rupture model file contains all necessary information to recreate the model in space and time for use in a variety of earthquake studies including, but not limited to, ground motion modeling, stress loading, and engineering analyses. The URL is:

http://www-socal.wr.usgs.gov/slipmodels.html

SCEC Data Center

The Southern California Earthquake Center Data Center (SCEC_DC) is the principal archive for all the seismic information generated by the SCSN including catalog information, waveforms, phase data, and seismic station information. The URL is: **http://www.scecdc.scec.org/**

SUMMARY OF SEISMICITY

A total of 18,390 earthquakes and 1213 blasts were cataloged for 1996 (Figure 2). Of the cataloged events, 151 were greater than or equal to M_L3.0 (Appendix A, Figure 3). The largest earthquake within the SCSN network in 1996 had an magnitude of 5.3 and was located in the Coso Range. Focal mechanisms for 11 selected events ($M_L \geq 3.5$) are shown in Figure 4.

For the following discussion southern California has been divided into eleven sub-regions (Figure 5). These regions are arbitrary, but useful for discussing characteristics of seismicity in a manageable context. Figure 6 summarizes the activity of each sub-region over the past ten years. A separate discussion section follows for those regions with notable activity. The dates mentioned in the text are based on Pacific time, however those in Appendix A are based on GMT, thus the discrepancy in a few dates.

Imperial Valley- Region 1

The only noteworthy activity in this region were some of the usual swarms. There was one in late May near Obsidian Butte at the southern end of the Salton Sea. The swarm included an M3.5 earthquake. It picked up again in late June with an M3.2, and again in Late July. In the nearby Niland area there was a small swarm that occurred on October 6. The largest event was an M3.2, and there were six events >M2.0, half of them within a 10-minute period.

An M4.0 that was located just south of the U.S./Mexico border was felt in the Imperial Valley on August 29.

South San Jacinto- Region 2

This region was relatively quiet with only an M3.7 near Borrego Springs on November 13 that was sharply felt in the San Diego area.

South Elsinore - Region 3

No significant seismic activity was recorded in this region in 1996.

San Diego - Region 4

No significant seismic activity was recorded in this region in 1996.

Los Angeles - Region 5

Several very small earthquakes occurred in the Los Angeles area during the year as is normal, but the only one ≥M3.5 was an M3.5 located 3 km (2 mi) west-northwest of East Los Angeles near downtown on May 23. It was on a west-striking fault and was felt in downtown Los Angeles. An M3.5 also struck on October 12 offshore 29 km (18 mi) northeast of San Clemente Island.

North Elsinore - Region 6

No significant seismic activity was recorded in this region in 1996.

San Bernardino/South Mojave - Region 7

Aftershocks of the Joshua Tree/Landers/Big Bear (hereafter referred to as JLB) earthquakes continued throughout the year. They included two events north of Yucca Valley — an M3.8 on February 21 and an M3.9 on April 8, both felt. An M3.8 aftershock also occurred on January 5 just 11 km (7 mi) east of Desert Hot Springs that was felt as far away as Palm Springs. The remainder of JLB aftershocks of M3.5+ were located in the area north of Joshua Tree— an M4.3 on August 13 (Figure 4, FM #7) that was felt as far away as Los Angeles and an M4.1 in almost the same location on October 19 (Figure 4, FM #8). Both were strike-slip events. In addition there was an M4.1 very close to the Joshua Tree epicenter on November 26 (Figure 4, FM #10) that was widely felt in Yucca Valley and Desert Hot Springs.

Besides the JLB aftershocks, there were several other events of note. An M3.4 hit near Fontana on February 24. Further south along the San Jacinto Fault system there was an M3.6 on December 28 near Hemet and an M3.8 on September 12 near Lake Perris that was felt in Idyllwild and Palm Desert. There were also several M2.3 earthquakes in the San Gorgonio Pass area in the later half of the year, and just north of the Salton Sea there was a swarm that started April 14 that included an M3.1 on the 19th and an M3.3 on the 26th.

North Mojave - Region 8

The only event of note in this area was an M3.8 aftershock of the Landers earthquake near Barstow on February 3.

South Sierra Nevada - Region 9

This was the most seismically active region in 1996 due to a sequence of events near Ridgecrest and a very active swarm in the Coso area that included the largest earthquake in southern California for the year. The year began with an M5.2 event 16 km (10 mi) north of Ridgecrest on January 7 (Figure 4, FM #1) that was felt as far away as Los Angeles. This strike-slip earthquake was located approximately 1.5 km (1 mi) north of the September 20, 1995 M5.8 event and about 3 km (2 mi) east of the August 17, 1995 M5.4 event. Aftershocks followed sporadically throughout the year, but the two largest, an M4.2 and M4.3 (Figure 4, FM #2 & #3), were the following day on January 8. Many of the events produced unusually long-period energy that was determined to be a result of originating in the soft sediments of the Indian Wells Valley. Other mentionable aftershocks included an M4.1 on January 26 (Figure 4, FM #4), and M3.5 on May 12, and an M3.7 on September 10.

The seismic activity in the Coso area started on March 14 with a swarm near Coso Junction (~30 km or 20 mi north of the Ridgecrest sequence) that lasted about one week (Figure 7). The swarm activity commenced again in early September with two M3.5 events included. They occurred on a north-striking normal fault, which is common in this extensional environment. The activity continued through mid-September. Finally an $M_w5.3$ struck on November 27 in the Coso Range east of Coso Junction (Figure 4, FM #11). The focal mechanism indicated a right-lateral strike-slip motion on a northwest-southeast striking plane. It produced a large number of aftershocks — 1220 were recorded in the two weeks following the mainshock, and they continued into 1997.

In addition there was a two-day swarm in the Kern River area in mid-July, and another swarm near Boron that began in early September and lasted through mid-September. This one included an M3.1. And finally there was an M3.5 (not part of a swarm) that occurred on October 10 about 21 km (13 mi) southeast of the town of Lake Isabella.

Kern County- Region 10

No significant seismic activity was recorded in this region in 1996.

Santa Barbara - Region 11

Aftershocks of the January 17, 1994 $M_w6.7$ Northridge earthquake once again dominated seismicity in this region. Those with a magnitude of M3.5 or greater included an M3.8 on January 30 approximately 6.5 km (4 mi) southeast of Newhall, an M4.1 on March 19 (Figure 4, FM #5), and an M4.1 just 8 km (5 mi) north of Simi Valley on May 1 (Figure 4, FM #6).

An M4.2 on October 23 (Figure 4, FM #9) (that was not a Northridge aftershock) occurred 11 km (7 mi) west-northwest of Ojai that had several aftershocks including an M3.5 the following day. It had a thrust mechanism and was about 18 km (11 mi) deep.

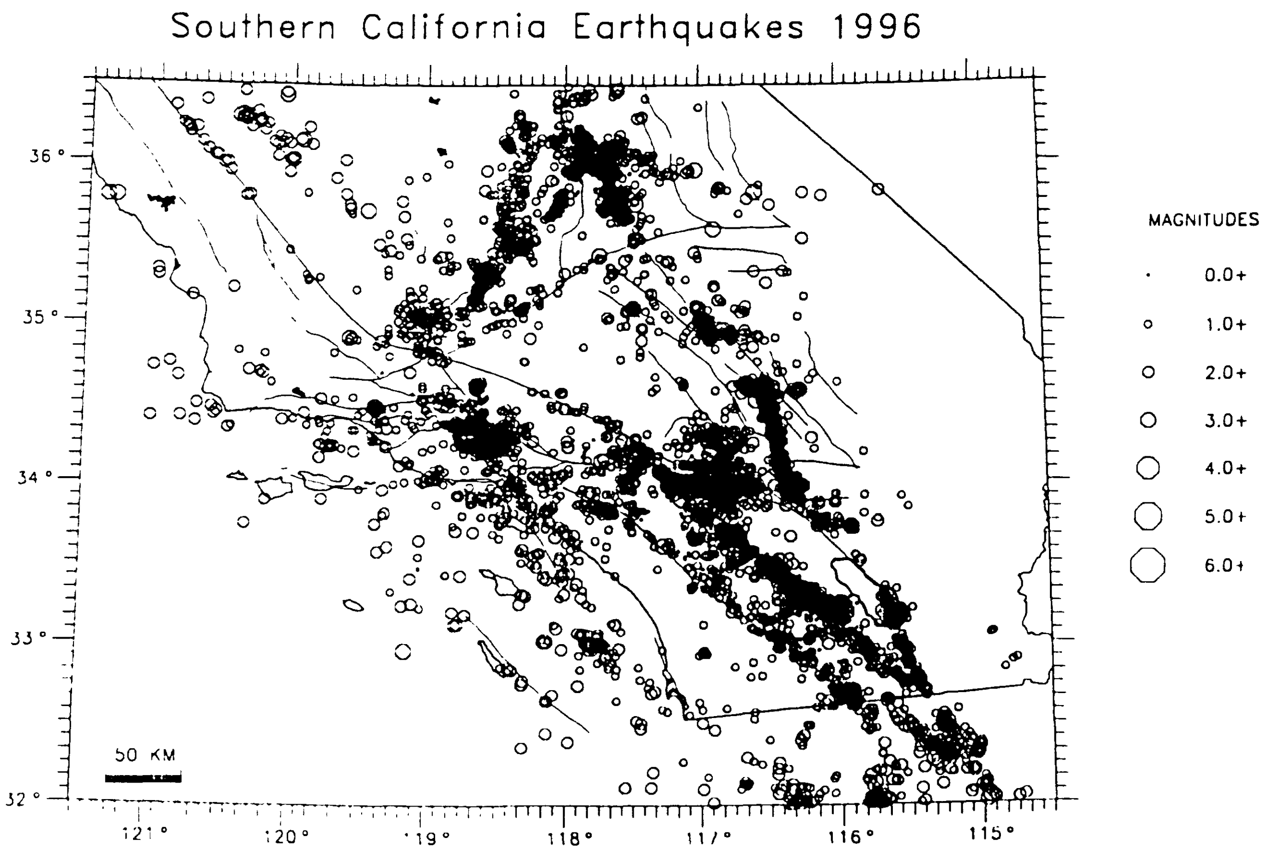

Figure 2. Map of all located earthquakes in southern California for the period of January through December 1996.

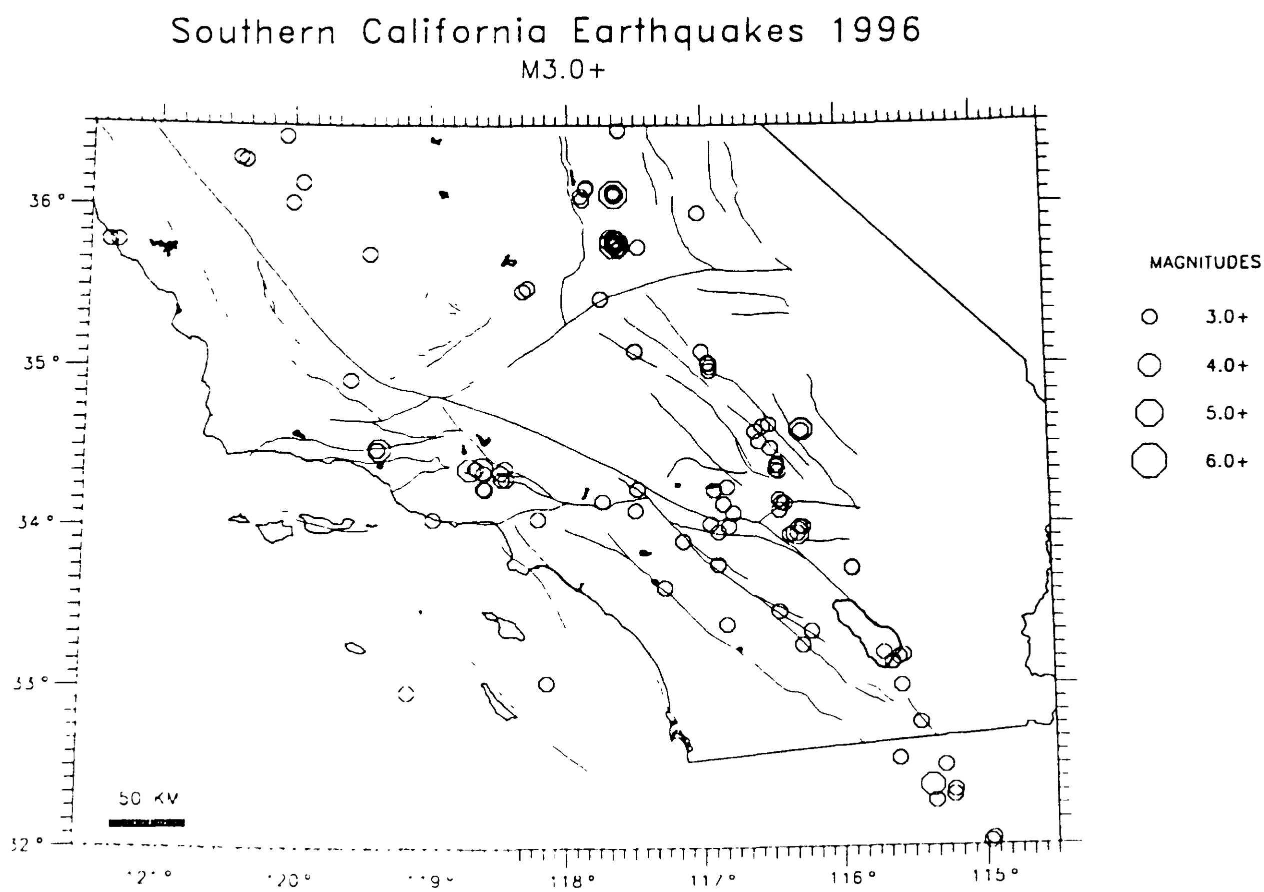

Figure 3. Map of located earthquakes of magnitude 3.0 and larger in southern California for the period of January through December 1996.

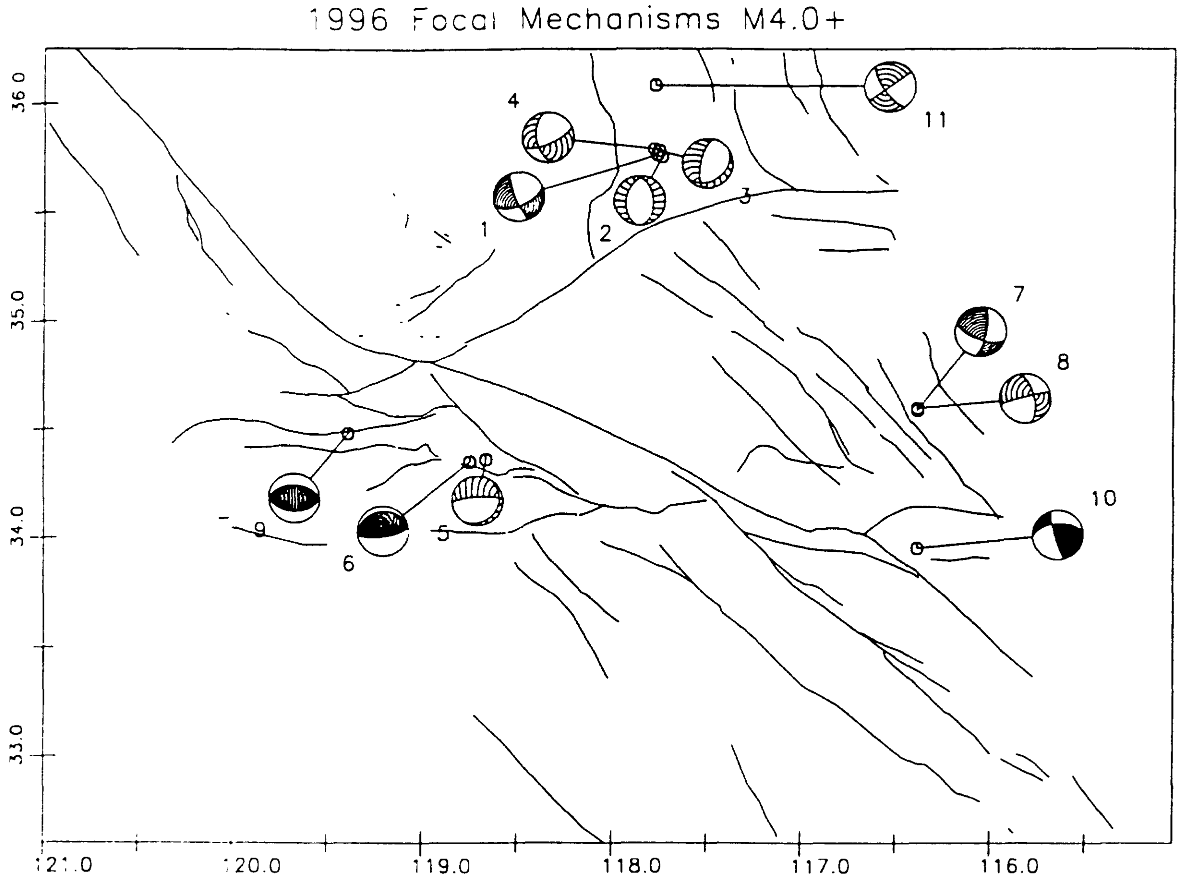

Figure 4. Lower hemisphere focal mechanisms for selected events for the period January through December 1996. Event numbers correspond to numbers in FM column of Appendix A.

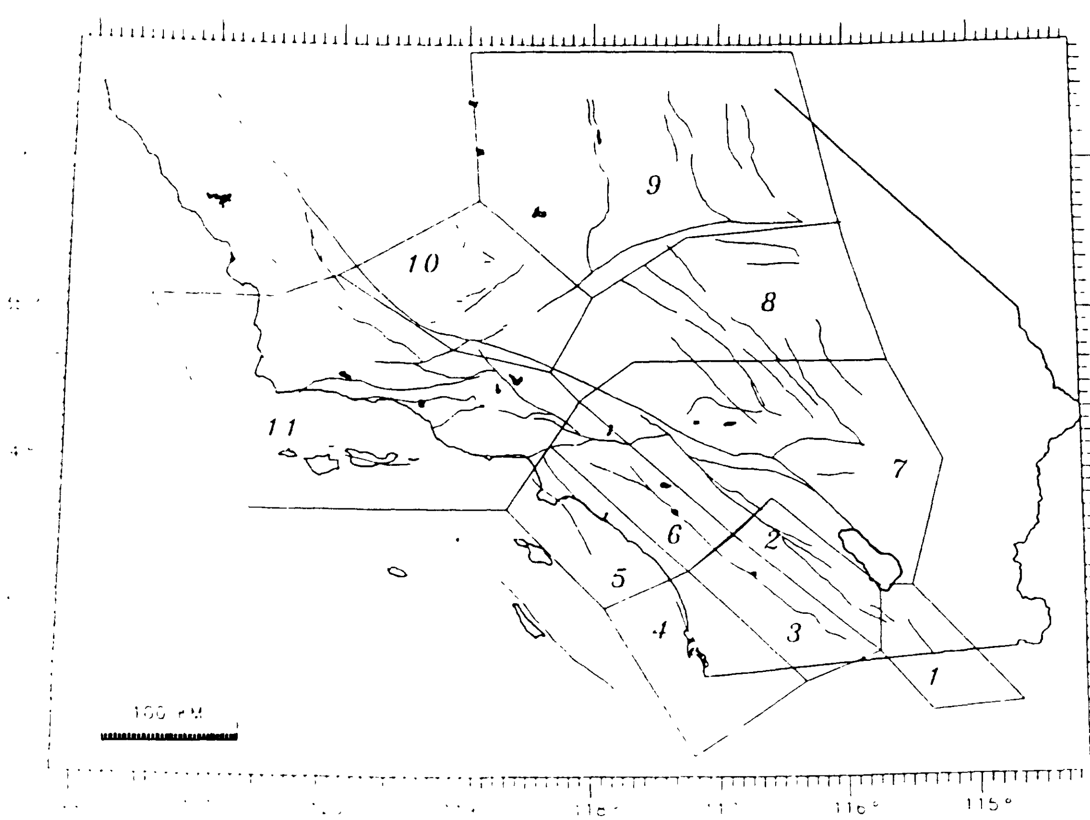

Figure 5. Map of sub-regions used in Figure 6. The geographic name of each sub-region, as used in the text, can be found in the headings of Figure 6.

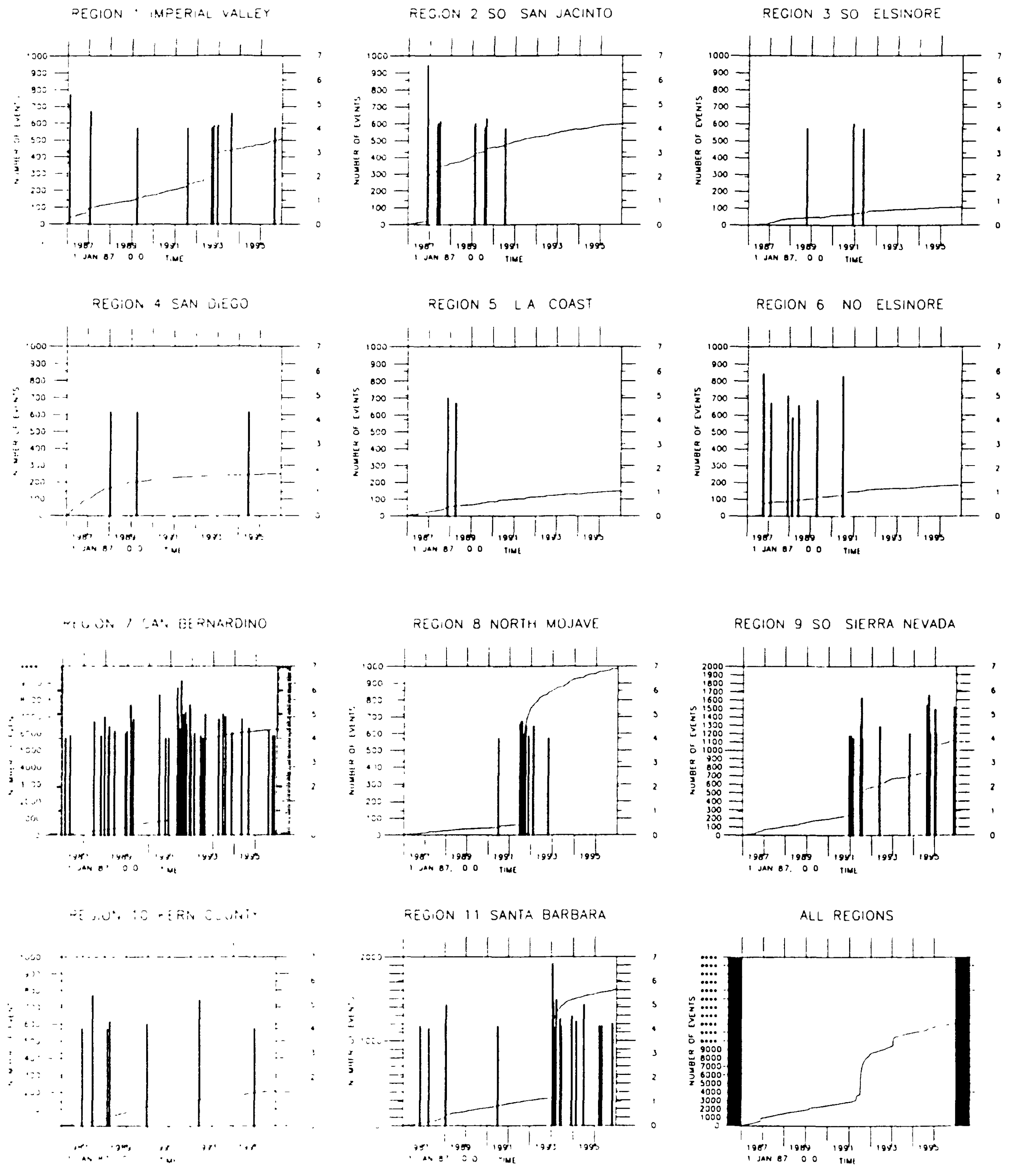

Figure 6. Cumulative number of events ($M_L \geq 2.5$) in all sub-regions over the ten year period ending December 1996. The boundaries of the sub-regions are shown in Figure 5. Vertical bars represent time and magnitude (scale on right) of large events ($M_L \geq 4.0$). Note that the vertical scales of the plots may not be the same.

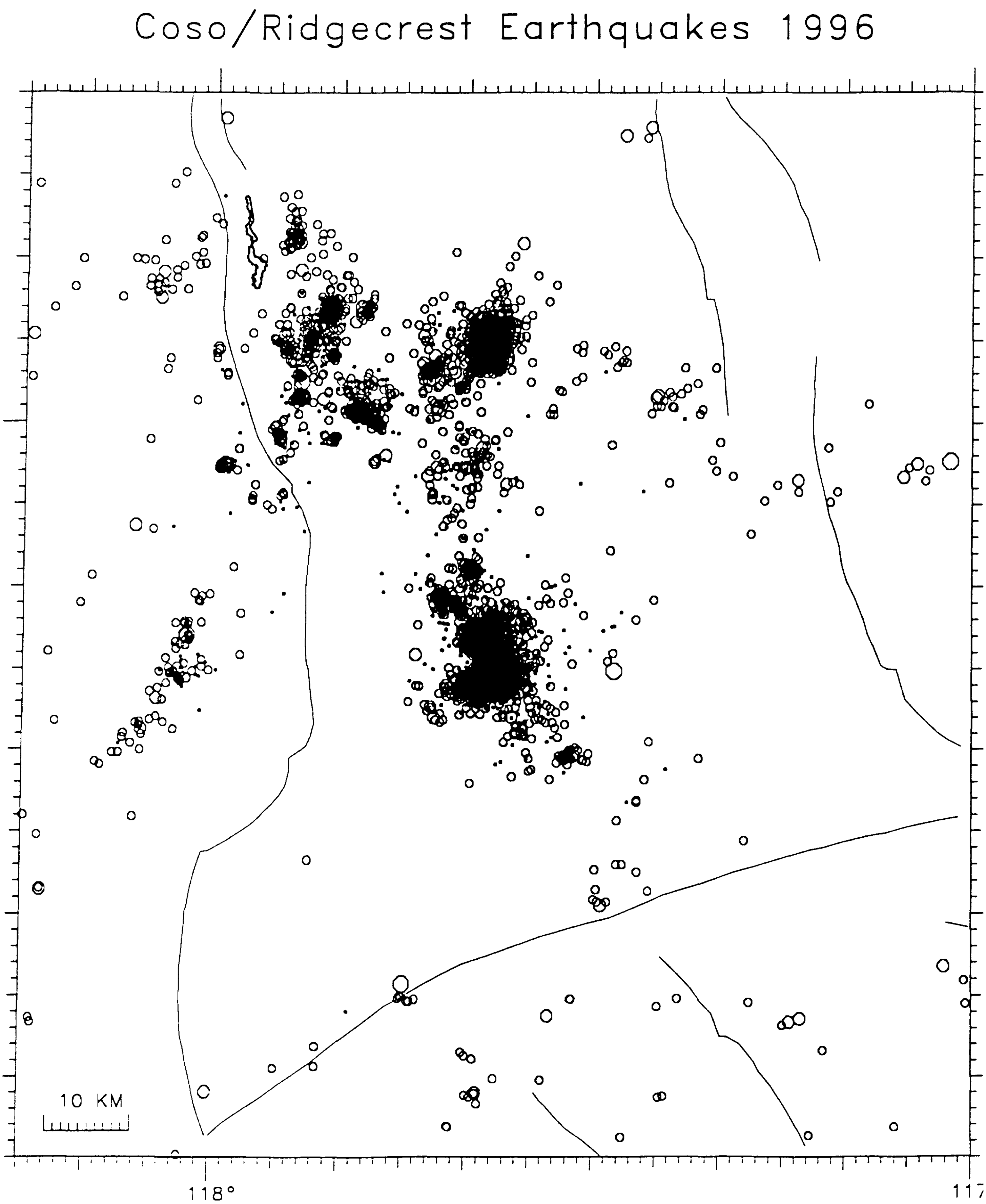

Figure 7. Coso/Ridgecrest Earthquakes - 1996. Earthquake catalog locations for the Coso and Ridgecrest earthquake sequences occurring in 1996.

References

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Klein, F.W., User's guide to HYPOINVERSE, a program for the VAX and professional 350 computers to solve for earthquake locations, *U.S. Geological Survey Open-File Report 89-314,* 40pp., 1989.

Acknowledgements

We would like the thank Nick Scheckel for compiling the DAT tape list for Appendix B. The Summary of Seismicity section was written using information in the Weekly Earthquake Reports. Thanks to Doug Given for the review.

Appendix A

Significant Southern California Earthquakes

All events of M_L ≥3.0 for the period January to December 1996. Times are GMT, Q is the overall quality of the location, M is the magnitude, Z is the depth in km, PH is the number of phases picked, RMS is the root mean square of the location error, ID is the unique number assigned to the event by the CUSP system, and F denotes the number of the accompanying focal mechanism in Figure xx. Note that these events have not been finalized, therefore their magnitudes may not be correct. In most cases, if the magnitude is incorrect, it is really larger than indicated.

DATE			TIME			LOCATION				Q	M	Z	PH	RMS	ID	F
1996	1	1	14	53	12.24	34	20.06	-118	35.98	A	3.3	15.22	102	0.24	3248264	
1996	1	4	0	25	36.52	35	1.41	-116	57.34	A	3.4	0.76	89	0.19	3248466	
1996	1	5	6	54	35.35	34	29.09	-116	30.28	A	3.0	1.48	76	0.16	3248632	
1996	1	5	11	57	40.14	33	56.68	-116	22.11	B	3.8	6.94	103	0.18	3248652	
1996	1	7	10	32	46.39	36	28.18	-117	36.99	C	3.8	6.00	67	0.23	3248836	
1996	1	7	14	32	53.06	35	45.96	-117	38.91	A	5.2	5.90	126	0.17	3248846	1
1996	1	7	14	50	31.16	35	46.05	-117	38.84	A	3.0	5.48	66	0.15	3248856	
1996	1	7	14	57	43.45	35	45.30	-117	38.39	A	3.2	5.45	38	0.15	3249285	
1996	1	7	14	58	3.58	35	45.74	-117	38.68	B	3.2	6.21	33	0.15	3249292	
1996	1	7	14	59	41.82	35	46.38	-117	38.38	B	3.2	6.79	32	0.14	3249332	
1996	1	7	15	6	33.94	35	45.74	-117	37.92	A	3.1	5.00	53	0.16	3248858	
1996	1	7	15	40	23.58	35	46.21	-117	39.18	A	3.4	6.56	60	0.15	3248873	
1996	1	7	16	4	14.91	35	46.07	-117	38.55	A	3.6	5.44	67	0.17	3248879	
1996	1	7	16	24	15.09	35	46.01	-117	39.15	A	3.1	7.37	48	0.14	3248903	
1996	1	8	8	57	11.05	35	45.48	-117	37.36	A	4.1	3.88	77	0.19	3249165	2
1996	1	8	10	52	28.92	35	47.03	-117	38.11	A	4.3	5.08	69	0.17	3249191	3
1996	1	8	14	49	4.10	35	46.62	-117	38.24	A	3.7	4.92	52	0.14	3249235	
1996	1	8	14	59	4.62	35	47.01	-117	38.63	A	3.1	5.48	35	0.14	3249236	
1996	1	8	16	36	59.58	35	46.76	-117	38.32	A	3.1	5.17	50	0.16	3249252	
1996	1	8	22	40	36.03	35	46.05	-117	38.80	A	3.6	5.46	80	0.17	3249348	
1996	1	9	13	23	33.28	35	46.48	-117	38.34	A	3.3	5.29	80	0.17	3249479	
1996	1	9	17	21	39.31	35	45.81	-117	38.31	B	3.0	5.42	24	0.11	3249534	
1996	1	9	21	8	37.32	35	45.67	-117	38.01	A	3.1	5.39	55	0.16	3249578	
1996	1	11	2	58	36.65	36	1.19	-120	0.56	C	3.3	6.00	40	0.47	3249876	
1996	1	11	6	30	13.86	35	43.98	-117	37.84	A	3.0	5.46	66	0.17	3249896	
1996	1	11	7	20	27.23	35	43.66	-117	37.26	A	3.2	10.97	58	0.16	3249899	
1996	1	11	7	34	47.66	35	45.32	-117	38.13	A	3.5	5.43	85	0.17	3249902	
1996	1	12	0	35	5.96	35	47.31	-117	39.38	A	3.7	5.55	53	0.15	3250030	
1996	1	12	5	35	58.22	32	16.75	-115	21.14	C	3.1	6.00	16	0.25	3250202	
1996	1	12	11	27	35.35	36	8.64	-119	56.29	C	3.0	6.00	28	0.36	3250103	
1996	1	13	17	55	23.43	34	21.85	-118	26.83	A	3.6	4.29	128	0.29	3250324	
1996	1	16	1	50	42.98	35	44.53	-117	37.20	A	3.3	5.26	46	0.16	3250696	
1996	1	16	12	47	57.42	34	13.43	-116	55.35	B	3.1	5.50	108	0.27	3250740	
1996	1	17	23	9	53.32	34	14.54	-116	49.73	A	3.4	7.41	77	0.15	3250955	
1996	1	18	20	17	40.70	35	44.70	-117	37.06	A	3.0	5.24	55	0.18	3251076	
1996	1	21	12	1	18.40	34	5.77	-116	26.69	A	3.2	8.20	79	0.17	3251401	
1996	1	24	7	56	29.90	34	55.24	-119	33.71	A	3.0	11.80	72	0.37	3251783	
1996	1	25	5	35	12.66	34	9.80	-116	26.80	A	3.5	1.91	79	0.18	3251903	
1996	1	26	13	6	2.85	35	47.57	-117	39.90	A	4.2	5.70	108	0.16	3252027	4
1996	1	30	18	34	10.91	34	20.24	-118	28.64	A	3.9	10.69	126	0.32	3252559	
1996	1	31	1	35	52.97	35	46.25	-117	37.21	A	3.1	3.02	47	0.18	3252613	
1996	2	4	6	28	47.63	35	1.83	-116	57.72	A	3.6	3.67	99	0.17	3253210	
1996	2	9	12	14	12.66	34	22.30	-116	27.79	A	3.6	0.86	105	0.19	3253994	
1996	2	16	0	20	54.83	32	46.11	-115	27.09	C	3.0	8.00	41	0.46	3254786	
1996	2	19	13	8	7.89	34	38.03	-116	30.84	A	3.1	7.04	74	0.18	3255214	
1996	2	21	15	54	31.96	34	23.39	-116	27.46	A	3.8	2.86	72	0.17	3255477	
1996	2	24	18	57	7.29	34	5.88	-117	29.46	A	3.3	14.59	135	0.21	3255807	
1996	2	28	1	59	33.58	32	18.90	-115	13.40	C	3.3	6.00	26	0.47	3256165	
1996	2	29	6	38	47.89	34	9.14	-117	44.05	A	3.1	11.06	121	0.27	3256349	
1996	3	9	23	20	46.57	34	20.92	-116	28.11	A	3.3	4.29	68	0.15	3257703	
1996	3	20	7	37	59.76	34	21.74	-118	36.90	A	4.1	12.98	152	0.29	3258844	5
1996	3	25	13	54	39.69	34	14.18	-118	36.32	A	3.2	18.88	114	0.28	3259403	
1996	4	2	3	47	0.35	33	44.29	-115	55.30	A	3.3	7.01	65	0.17	3260451	

DATE			TIME			LOCATION				Q	M	Z	PH	RMS	ID	F
1996	4	7	18	8	17.26	34	21.66	-118	39.43	A	3.0	14.09	109	0.25	3261066	
1996	4	7	22	24	47.20	34	22.70	-116	27.65	A	3.1	1.20	77	0.15	3261089	
1996	4	8	15	20	49.44	34	22.71	-116	27.68	A	3.0	0.98	67	0.16	3261157	
1996	4	8	23	46	41.34	34	22.64	-116	27.59	A	3.9	1.25	92	0.17	3261222	
1996	4	12	22	21	38.44	35	57.66	-117	1.73	C	3.1	6.00	24	0.24	3261593	
1996	4	16	5	7	32.95	34	37.30	-116	33.81	A	3.1	8.41	79	0.18	3261930	
1996	4	19	19	18	4.51	34	8.12	-116	51.26	A	3.1	11.17	84	0.19	3262277	
1996	4	19	19	52	19.98	33	43.98	-115	55.12	A	3.1	7.97	57	0.19	3262281	
1996	4	26	19	14	52.91	33	44.15	-115	55.33	A	3.3	7.82	73	0.22	3262968	
1996	5	1	19	49	56.43	34	21.25	-118	42.21	A	4.1	14.36	158	0.25	3263467	6
1996	5	13	3	33	48.18	35	44.11	-117	37.63	A	3.4	5.51	56	0.15	3264709	
1996	5	20	17	12	48.68	33	20.77	-116	13.34	A	3.4	10.83	71	0.28	3265173	
1996	5	22	3	49	48.26	33	9.06	-115	38.53	A	3.2	4.12	46	0.35	3265392	
1996	5	22	4	22	57.07	33	8.97	-115	38.68	A	3.4	4.25	43	0.29	3265309	
1996	5	22	5	54	12.31	33	8.69	-115	38.66	A	3.5	10.85	62	0.28	3265331	
1996	5	23	15	26	36.10	34	2.62	-118	12.45	A	3.5	11.50	99	0.29	3265445	
1996	6	6	21	29	5.65	35	1.14	-116	57.49	A	3.2	3.29	77	0.18	3266854	
1996	6	12	18	15	11.77	34	13.80	-117	28.64	A	3.2	8.62	106	0.20	3267376	
1996	6	21	2	16	58.53	33	10.79	-115	35.85	A	3.2	3.68	44	0.35	3268247	
1996	7	2	21	55	1.79	35	46.75	-121	18.19	D	3.3	0.12	18	0.36	3269474	
1996	7	3	7	42	34.26	35	46.75	-121	21.80	D	3.7	0.01	32	0.30	3269513	
1996	7	4	8	16	59.28	33	59.71	-116	17.89	A	3.4	5.20	132	0.21	3269588	
1996	7	16	12	19	18.58	35	5.86	-117	0.35	C	3.1	5.24	61	0.16	3270707	
1996	7	21	12	53	18.98	33	59.75	-116	48.83	A	3.4	12.47	99	0.19	3271205	
1996	7	23	14	2	3.12	35	0.04	-116	56.91	C	3.2	6.00	79	0.18	3271377	
1996	7	27	13	35	35.37	35	42.48	-119	26.23	C	3.2	6.00	64	0.40	3271790	
1996	7	28	9	46	13.50	33	59.51	-116	16.44	C	3.4	5.37	53	0.17	3271840	
1996	8	5	9	33	7.75	32	1.33	-114	58.49	D	3.1	6.00	11	0.41	3272576	
1996	8	6	11	52	11.50	34	4.72	-116	46.89	A	3.4	12.78	76	0.17	3272788	
1996	8	9	3	37	56.10	33	15.57	-116	17.24	A	3.3	9.10	70	0.30	3273396	
1996	8	14	3	5	27.49	34	35.96	-116	16.77	C	4.3	6.00	121	0.28	3273970	7
1996	8	14	17	27	37.99	35	44.91	-117	28.41	A	3.3	9.72	52	0.19	3274069	
1996	8	15	12	17	52.55	33	57.76	-116	53.28	A	3.3	18.28	99	0.17	3274131	
1996	8	19	15	5	49.69	32	57.82	-119	8.28	C	3.3	6.00	22	0.27	3274502	
1996	8	25	14	2	54.63	34	2.40	-118	57.82	A	3.1	15.29	88	0.40	3275096	
1996	8	30	6	24	47.60	32	22.53	-115	22.67	C	4.0	6.00	33	0.52	3275544	
1996	9	4	9	0	30.68	36	7.04	-117	51.27	A	3.5	6.27	60	0.24	7041781	
1996	9	4	10	32	57.60	35	6.07	-117	29.68	B	3.2	5.51	97	0.20	7041796	
1996	9	4	22	48	44.81	34	58.65	-116	57.14	B	3.3	5.91	86	0.20	7041883	
1996	9	5	16	24	16.29	36	6.40	-117	51.63	A	3.4	4.37	51	0.24	7041979	
1996	9	8	22	40	30.26	35	5.95	-117	29.61	A	3.1	5.50	86	0.21	7042493	
1996	9	11	0	25	32.08	35	47.87	-117	37.93	A	3.7	5.43	74	0.15	7042732	
1996	9	12	11	15	16.05	36	16.97	-120	22.28	C	3.2	6.00	15	0.34	7042894	
1996	9	12	21	18	18.32	33	54.33	-117	8.71	A	3.8	14.05	138	0.17	7042960	
1996	9	29	13	54	8.91	36	25.67	-120	4.03	C	3.0	6.00	19	0.36	7044869	
1996	10	6	5	33	50.12	34	17.71	-118	26.60	A	3.3	5.41	104	0.29	7045533	
1996	10	7	1	21	59.77	33	11.47	-115	33.96	A	3.2	4.27	53	0.35	7045642	
1996	10	10	7	57	9.89	35	29.62	-118	17.51	A	3.5	3.28	76	0.19	7045996	
1996	10	12	22	25	5.18	33	1.46	-118	8.68	C	3.5	6.00	45	0.35	7046214	
1996	10	17	3	19	9.26	35	25.68	-117	44.93	A	3.3	7.82	63	0.19	7046649	
1996	10	20	0	17	33.39	34	36.25	-116	16.70	C	4.1	6.00	82	0.23	7046881	8
1996	10	23	22	9	29.38	34	28.84	-119	21.17	A	4.2	14.52	128	0.31	7047275	9

DATE			TIME			LOCATION				Q	M	Z	PH	RMS	ID	F
1996	10	23	23	18	19.71	34	28.77	-119	22.01	A	3.6	15.25	115	0.45	7047280	
1996	10	25	5	48	25.81	34	28.75	-119	21.76	A	3.5	14.49	106	0.45	7047411	
1996	10	25	11	51	32.18	34	8.31	-116	24.43	A	3.4	3.61	70	0.17	7047437	
1996	11	1	17	57	54.53	34	20.40	-116	27.02	A	3.3	5.16	68	0.16	7047958	
1996	11	2	3	4	49.32	33	12.43	-115	42.21	A	3.0	10.74	43	0.26	7047994	
1996	11	2	19	17	47.53	33	0.07	-115	34.83	A	3.0	18.00	48	0.29	7048020	
1996	11	3	6	32	5.03	34	35.72	-116	16.79	C	3.3	6.00	64	0.27	7048074	
1996	11	4	2	13	39.13	34	8.49	-116	25.71	A	3.1	3.07	81	0.17	7048135	
1996	11	13	12	37	0.41	33	28.10	-116	27.17	A	3.7	0.30	80	0.20	7049125	
1996	11	14	20	27	52.27	32	20.70	-115	13.10	C	3.7	6.00	25	0.43	7049295	
1996	11	16	11	26	56.38	34	17.66	-118	28.38	A	3.0	8.90	101	0.35	7049431	
1996	11	18	4	6	3.51	35	28.45	-118	19.55	A	3.2	5.10	54	0.18	7049584	
1996	11	20	13	23	46.60	32	32.75	-115	36.21	A	3.1	14.87	34	0.29	7049838	
1996	11	25	4	43	8.37	34	0.75	-116	56.67	A	3.3	14.16	117	0.18	7050199	
1996	11	27	1	42	43.82	33	57.18	-116	18.82	A	4.1	6.02	122	0.22	7050391	10
1996	11	27	2	16	12.85	33	57.17	-116	18.80	A	3.1	4.81	98	0.20	7050397	
1996	11	27	20	17	24.11	36	4.50	-117	38.97	A	5.3	1.19	131	0.20	7050470	11
1996	11	27	22	29	6.90	36	4.47	-117	38.08	A	3.7	1.33	64	0.17	3285900	
1996	11	27	23	41	7.15	32	29.94	-115	16.97	C	3.1	6.00	26	0.51	3286108	
1996	11	28	8	49	21.46	36	4.77	-117	38.42	A	3.5	1.00	47	0.17	7050745	
1996	11	28	11	29	30.56	36	5.40	-117	39.37	A	3.2	1.60	45	0.19	7050790	
1996	11	28	21	47	13.51	36	5.24	-117	39.08	A	3.5	1.61	49	0.20	3286408	
1996	11	28	22	5	56.90	36	5.37	-117	39.14	A	3.7	1.57	47	0.18	7050952	
1996	11	29	21	31	42.29	36	5.41	-117	39.30	A	3.1	1.54	40	0.19	7051159	
1996	11	30	22	11	14.52	36	5.59	-117	39.14	A	3.6	1.44	62	0.19	7051337	
1996	11	27	21	5	10.84	36	4.31	-117	38.66	A	3.5	1.62	44	0.19	3285842	
1996	11	27	21	33	12.19	36	5.30	-117	39.16	A	3.6	1.99	51	0.17	3285875	
1996	11	27	21	57	57.58	36	4.78	-117	39.18	A	3.1	1.44	42	0.17	3288188	
1996	12	1	15	30	26.94	34	35.43	-116	37.09	A	3.1	7.05	82	0.39	7051454	
1996	12	3	20	44	18.45	36	3.82	-117	39.07	A	3.3	0.83	54	0.18	7051803	
1996	12	5	17	6	36.47	36	17.86	-120	24.78	C	3.3	6.00	18	0.21	3287813	
1996	12	6	18	30	38.20	36	4.56	-117	38.97	A	3.5	1.49	50	0.18	7052178	
1996	12	11	5	1	34.78	36	5.01	-117	39.31	A	3.3	1.56	46	0.19	7052734	
1996	12	11	9	5	13.73	36	5.39	-117	39.28	A	3.4	1.27	56	0.21	7052774	
1996	12	13	3	0	5.37	36	5.03	-117	39.51	A	3.8	1.26	57	0.18	7053013	
1996	12	16	10	30	22.52	36	5.19	-117	39.20	A	3.6	1.52	52	0.18	7053458	
1996	12	17	4	3	22.57	36	5.01	-117	39.35	A	3.8	2.24	67	0.19	7053554	
1996	12	17	16	41	30.81	36	5.01	-117	39.49	A	3.0	1.72	35	0.18	7053608	
1996	12	22	4	27	49.31	32	2.50	-114	57.41	D	3.2	6.00	9	0.33	7054081	
1996	12	23	7	26	5.09	33	23.34	-116	50.03	D	3.3	6.00	5	0.14	7054171	
1996	12	23	11	40	59.54	36	3.85	-117	53.86	A	3.0	2.73	36	0.20	7054196	
1996	12	23	21	39	48.85	34	31.52	-116	35.38	D	3.2	21.91	5	0.10	7054231	
1996	12	25	15	21	50.00	34	13.88	-118	35.57	C	3.0	19.97	7	0.08	7054419	
1996	12	25	15	40	50.27	36	2.52	-117	53.19	A	3.2	2.36	29	0.16	7054437	
1996	12	28	22	41	20.23	33	45.65	-116	53.44	A	3.5	13.14	143	0.21	7054725	
1996	12	30	1	41	54.84	33	37.08	-117	16.64	A	3.0	12.68	81	0.20	7054903	

Appendix B

DAT Tape Archives

All telemetered network data - 330 channels digitized at 100 samples per second - are continuously recorded on 4mm DAT tapes. Three 2-Gbyte tapes are used each day. These tapes provide on-line system backup and capture signals that do not trigger the local network detection system. The tapes have been useful for recording data that normally would not have been saved, such as teleseismic body and surface waves, and late arrivals from local earthquakes.

All tapes are saved for about one month and then at the end of the month, time periods containing significant earthquakes, important periods of seismicity (such as the Landers earthquake sequence), and other noteworthy events (i.e. space shuttle landings and NTS blasts) are identified and the appropriate tapes are archived. The criteria for saving tapes are given below. Tapes that do not contain significant data are re-used. The archived tapes are boxed and stored chronologically in a cabinet in the SCSN data analysis room at the Caltech Seismological Laboratory.

Tapes are saved if they contain earthquakes meeting any of these broad criteria:
- local events, mag >= 4.0
- regional events, mag >= 4.5
- teleseisms, mag >= 6.0
- deep events, >= 100 km, mag >= 5.5
- someone has requested the tape be saved.

To request that a tape be pulled and saved from the last month's batch of recordings, or for more information about these tapes, contact Nick Scheckel,818-395-6955, nick@bombay.gps.caltech.edu.

Instructions on reading the DAT tapes at our facilities can be found in any of the red binders - the emergency and important procedures manuals.

Below is a list of events from 1996 that have been saved on 4mm DAT tapes.

Teleseismic & Regional Events

DATE	TIME	LAT.	LONG.	D	MB	MSZ	ML	LOCATION
01JAN96	08:05.11	0.7 N	119.9 E	33	6.2	7.8(Mw)		MINAHASSA, SULAWESI
01JAN96	09:57.51	53.9 N	159.5 E	33	5.8	6.5		E COAST OF KAMCHATKA
09JAN96	07:37.45	43.1 N	126.5 W	10	4.9			OFF COAST OF OREGON
10JAN96	22:35.58	6.2 S	133.5 E	10	5.8	5.9(Mw)		ARU ISLANDS
11JAN96	03:51.34	8.4 S	158.6 E	95	5.5	5.9(Mw)		SOLOMON ISLANDS
12JAN96	02:17.34	23.2 S	170.7 E	33	5.8	5.9(Mw)		LOYALTY ISLANDS
16JAN96	05:15.27	18.7 S	177.4 W	334	5.4	5.7(Mw)		FIJI ISLANDS REGION
17JAN96	10:06.45	4.4 S	139.9 E	104	5.6	6.1(Mw)		IRIAN JAYA
22JAN96	23:20.01	60.6 S	25.7 W	33	5.7	6.3(Mw)		S SANDWICH ISLANDS
29JAN96	13:06.29	11.2 N	125.3 E	119	5.4			SAMAR, PHILIPPINE IS
30JAN96	22:00.12	32.9 S	178.3 W	33	5.5	6.3(Mw)		S KERMADEC ISLANDS
30JAN96	22:29.57	32.8 S	178.3 W	33	5.5	6.7		S KERMADEC ISLANDS
31JAN96	20:30.47	44.5 N	149.4 E	58	5.8	6.1(Mw)		KURIL ISLANDS
01FEB96	07:18.05	44.9 N	146.3 E	180	5.7	6.2(Mw)		KURIL ISLANDS
03FEB96	11:14.19	27.2 N	100.5 E	10	6.3	6.5(Mw)		YUNNAN, CHINA
07FEB96	21:36.45	45.2 N	150.0 E	33		7.0		KURIL ISLANDS
09FEB96	17:33.49	5.9 S	146.5 E	33	5.8	6.0(Mw)		E NEW GUINEA REG.
12FEB96	09:08.12	11.1 S	118.6 E	33	5.8	6.0(Mw)		S OF SUMBAWA
14FEB96	21:26.56	29.3 N	140.4 E	142	5.9			S OF HONSHU
16FEB96	09:44.58	1.5 S	15.2 W	10	6.0	6.4(Mw)		N OF ASCENSION IS
16FEB96	15:22.57	37.3 N	142.5 E	33	6.2	6.6(Mw)		OFF E COAST HONSHU
17FEB96	05:59.29	0.9 N	137.0 E	33	6.5	8.1		IRIAN JAYA REGION
17FEB96	10:18.02	6.9 S	125.3 E	528	5.9			BANDA SEA
17FEB96	14:21.24	0.5 S	135.9 E	33		6.7		IRIAN JAYA REGION
17FEB96	20:18.07	0.8 S	136.0 E	33		6.6		IRIAN JAYA REGION
18FEB96	02:12.19	0.7 S	136.4 E	33		6.3		IRIAN JAYA REGION

18FEB96	02:25.36	1.4 S	136.4 E	33		6.5(Mw)	IRIAN JAYA REGION
18FEB96	09:57.16	13.8 N	120.6 E	242		5.6(Mw)	MINDORO, PHILIPP.
18FEB96	23:49.27	1.3 S	14.2 W	10	6.3	6.5(Mw)	N OF ASCENSION IS
20FEB96	00:52.07	43.4 N	126.7 W	33	4.8	4.6	OFF COAST OF OREG
21FEB96	12:51.04	9.7 S	79.7 W	33	5.8	7.3(Mw)	OFF COAST N PERU
22FEB96	13:40.53	33.6 S	71.3 W	44	5.9	6.0(Mw)	NR COAST CEN CHILE
22FEB96	14:59.09	45.3 N	148.5 E	133		6.3(Mw)	KURIL ISLANDS
24FEB96	15:52.59	0.9 S	137.0 E	33	5.6	6.2(Mw)	IRIAN JAYA REGION
25FEB96	03:08.16	16.2 N	97.9 W	33	5.9	7.1(Mw)	OAXACA, MEXICO
25FEB96	09:18.00	16.2 N	97.9 W	33	5.6	6.2(Mw)	OAXACA, MEXICO
28FEB96	09:44.09	1.7 N	125.9 E	103	6.1	6.4(Mw)	N MOLUCCA SEA
02MAR96	01:50.04	6.1 S	146.4 E	63	6.1		E NEW GUINEA REG
03MAR96	14:55.11	11.6 N	86.6 W	33	5.7	6.8(Mw)	OFF CST COSTA RICA
03MAR96	16:37.31	11.9 N	86.7 W	33	5.7	6.8(Mw)	NR COAST NICARAGUA
04MAR96	15:59.05	2.6 N	125.4 E	151	5.9		TALAUD ISLAND
05MAR96	14:52.32	24.8 N	122.3 E	33	6.1	6.3(Mw)	TAIWAN REGION
06MAR96	01:35.03	18.6 S	174.8 W	134	5.4		TONGA ISLANDS
09MAR96	15;19.39	4.9 S	152.6 E	104		5.5	NEW BRITAIN, P.N.G.
09MAR96	16:15.37	43.6 N	148.0 E	33	5.6	6.1(Mw)	KURIL ISLANDS
09MAR96	16:17.16	43.6 N	148.0 E	33	5.7	6.0	KURIL ISLANDS
16MAR96	22:04.06	29.1 N	138.9 E	477	5.9	6.6(Mw)	BONIN ISLANDS REGION
17MAR96	14:48.56	14.7 S	167.2 E	164	5.8	6.6(Mw)	VANUATU ISLANDS
17MAR96	17:58.20	6.2 S	147.4 E	33	5.5	6.1(Mw)	E NEW GUINEA REGION
19MAR96	15:00.26	39.9 N	76.7 E	28	5.7	6.1(Mw)	SOUTHERN XINJIANG
22MAR96	03:24.20	51.3 N	178.6 E	20	5.7	6.8(Mw)	RAT IS, ALEUTIAN IS
22MAR96	17:31.06	35.3 S	146.0 E	10	5.3	6.1(Mw)	W OF MACQUARIE IS
28MAR96	07:28.28	11.9 N	57.8 E	10	5.8	6.1(Mw)	ARABIAN SEA
30MAR96	13:05.17	52.2 N	168.7 W	33	5.9	6.2(Mw)	FOX IS, ALEUTIAN IS
11APR96	11:24.26	10.8 N	161.5 E	43	5.9	6.0(Mw)	SOLOMON ISLANDS
12APR96	18:45.52	6.3 S	154.8 E	55	5.3	6.0(Mw)	SOLOMON ISLANDS
15APR96	12:29.20	43.6 N	127.5 W	10	4.7	4.9	OFF COAST OF OREGON
18APR96	06:12.57	12.8 N	124.9 E	33	5.5	6.0(Mw)	SAMAR, PHILIPPINE IS
19APR96	00:19.31	23.8 S	70.0 W	50	6.0	6.6(Mw)	COAST OF N CHILE
20APR96	19:17.06	24.0 S	66.7 W	197	5.2	5.4(Mw)	SALTA PROV, ARGENTINA
24APR96	17:06.36	8.1 S	74.3 W	151	5.6		PERU-BRAZIL BORDER
27APR96	08:40.41	2.3 N	79.3 W	10	4.8	6.2(Mw)	SOUTH OF PANAMA
29APR96	14:40.41	6.5 S	154.9 E	44	6.3	7.1(Mw)	SOLOMON IS
01MAY96	09:21.23	6.6 S	154.6 E	33		6.0(Mw)	SOLOMON ISLANDS
01MAY96	10:05.09	6.7 S	154.7 E	33		6.0(Mw)	SOLOMON ISLANDS
02MAY96	02:32.34	6.3 S	154.3 E	33		6.0(Mw)	SOLOMON ISLANDS
02MAY96	13:34.19	4.4 S	154.8 E	400	5.7	6.6(Mw)	SOLOMON ISLANDS
03MAY96	03:32:47	40.7 N	109.6 E	26	5.5	6.0(Mw)	MONGOLIA
07MAY96	08:44.36	1.6 N	126.6 E	33	6.0	6.0(Mw)	N MOLUCCA SEA
07MAY96	23:19.59	43.7 N	147.6 E	50		6.2(Mw)	KURIL ISLANDS
11MAY96	13:43.44	6.5 S	154.8 E	33		6.4(Mw)	SOLOMON ISLANDS
14MAY96	12:36.59	17.8 S	178.7 W	606	5.5		FIJI ISLANDS REG
26MAY96	01:43.43	22.2 S	171.2 E	108	5.5		LOYALTY ISLANDS REG
30MAY96	03:04.37	56.6 S	26.1 W	85	6.0		S SANDWICH ISL REG
02JUN96	02:19.50	30.5 N	41.9 W	20	5.4	5.4	N MID-ATLANTIC RIDGE
02JUN96	02:52.09	10.6 N	42.3 W	10		6.8	N MID-ATLANTIC RIDGE
02JUN96	09:37.47	27.5 N	128.5 E	44	5.9		RYUKYU ISLANDS
03JUN96	10:50.14	9.1 S	157.0 E	33		6.2	SOLOMON ISLANDS
03JUN96	08:15.38	9.1 S	156.9 E	33		6.1	SOLOMON ISLANDS
04JUN96	04:13.26	50.0 S	114 7 E	10		5.9(Mw)	S EAST PACIFIC RISE
06JUN96	17:35.36	41.4 S	80.6 E	10	6.0	6.3(Mw)	MID-INDIAN RIDGE
08JUN96	23:19.14	51.4 N	178.1 W	33	6.3	6.4(Mw)	ANDREANOF IS, AL IS.
09JUN96	01:12.17	17.5 N	145.7 E	147	6.0	6.5(Mw)	MARIANA ISLANDS
10JUN96	01:04.46	13.5 S	167.1 E	200		6.7(Mw)	VANUATU ISLANDS
10JUN96	04:03.34	51.4 N	177.8 W	33	7.7	7.9(Mw)	ANDREANOF IS, AL IS.
10JUN96	15:24.56	51.3 N	177.0 W	33	7.2	7.1(Mw)	ANDREANOF IS, AL IS.
10JUN96	15:36.31	51.4 N	176.5 W	33	5.9		ANDREANOF IS, AL IS.
17JUN96	11:22.18	7.1 S	122.6 E	593	7.5	7.8(Mw)	FLORES SEA
21JUN96	13:57.11	51.8 N	159.0 E	33	6.0	7.0(Mw)	OFF E CST KAMCHATKA

22JUN96	00:32.11	53.3 S	9.0 E	10	6.0	6.3(Mw)	BOUVET ISLAND REGION
22JUN96	14:50.07	51.9 N	158.8 E	33	5.9	6.2(Mw)	E COAST KAMCHATKA
26JUN96	03:22.03	27.7 N	139.8 E	468	5.4	6.2(Mw)	BONIN ISLANDS REG.
28JUN96	20:45.40	6.0 N	125.8 E	216	5.6		MINDANAO, PHIL. ISL
29JUN96	04:46.28	2.6 S	139.4 E	33		5.9	N COAST IRIAN JAYA
30JUN96	11:32.35	51.8 N	159.7 E	33	5.5	6.0(Mw)	E COAST KAMCHATKA
04JUL96	15:50.38	8.5 N	141.5 E	33		6.0(Mw)	W CAROLINE ISLS
06JUL96	21:36.28	22.1 N	142.8 E	240	5.7	6.3(Mw)	MARIANA ISLS REG
07JUL96	06:27.06	31.5 N	115.6 W	6		4.3	ENSENADA, MEXICO
15JUL96	16:51.21	18.8 N	145.4 E	176	5.7	6.3(Mw)	MARIANA ISLANDS
15JUL96	21:23.34	17.5 N	100.9 W	33	6.5	6.6(Mw)	GUERRERO, MEXICO
16JUL96	03:48.27	56.0 N	165.0 E	33	6.3	6.3(Mw)	KOMANDORSKY ISLS
16JUL96	10:07.36	1.0 N	120.1 E	33	6.4	6.6(Mw)	MINAHASSA, SULAWESI
16JUL96	21:31.45	40.5 N	127.6 W	10	4.6		OFF COAST N. CALIF
20JUL96	00:00.42	36.3 N	27.0 E	33	6.2	6.1(Mw)	DODECANESE ISLANDS
22JUL96	14:19.35	0.9 N	120.1 E	33	6.9	6.9(Mw)	MINAHASSA, SULAWESI
23JUL96	03:32.11	26.8 S	177.4 W	33	6.4	6.5(Mw)	SOUTH OF FIJI ISLS
23JUL96	05:20.03	26.6 S	177.7 W	33	6.2	6.2(Mw)	SOUTH OF FIJI ISLS
01AUG96	04:08.23	0.0 S	122.9 E	149	5.5		MINAHASSA, SULAWESI
02AUG96	12:55.29	10.7 S	161.4 E	33	6.2	6.9(Mw)	SOLOMON ISLANDS
05AUG96	02:08.58	16.3 S	173.1 E	41	6.0	6.7(Mw)	TONGA ISLANDS
05AUG96	21:39.16	1.9 S	81.0 W	33	5.7	6.2(Mw)	OFF COAST ECUADOR
05AUG96	22:38.22	20.7 S	178.3 w	550	6.4	7.3(Mw)	FIJI ISLANDS
09AUG96	08:08.06	13.8 N	120.8 E	130	5.6	5.4(Mw)	MINDORO, PHILIPPINE
10AUG96	11:20.19	4.9 S	152.1 E	33	5.6	6.1(Mw)	NEW BRITIAN
11AUG96	01:31.16	13.4 S	166.7 E	100	5.6	6.1(Mw)	VANUATU ISLAND
12AUG96	17:00.27	0.1 S	125.1 E	33	5.8	6.0(Mw)	S MOLUCCA SEA
15AUG96	07:33.50	13.3 S	166.8 E	33	5.7	6.3(Mw)	VANUATU ISLANDS
22AUG96	05:35.41	7.1 S	123.2 E	596	5.8	5.8(Mw)	BANDA SEA
27AUG96	06:24.07	22.5 S	179.9 W	573	5.4	5.9(Mw)	S OF FIJI ISL
30AUG96	21:13.41	52.2 N	151.4 E	579	5.4	5.9(Mw)	SEA OF OKHOTSK
03SEP96	17:01.53	26.1 N	110.5 W	10	5.0		GULF OF CALIF
04SEP96	19:06.50	9.4 N	84.3 W	33	5.9	6.1(Mw)	COSTA RICA
05SEP96	08:14.13	22.3 S	113.4 W	10	7.1	6.7(Mw)	EASTER ISLAND REGION
05SEP96	09:10.20	22.1 S	113.1 W	10	5.5	6.3(Mw)	EASTER ISLAND REGION
05SEP96	09:46.58	22.2 S	113.1 W	10	5.9	6.4(Mw)	EASTER ISLANDREGION
05SEP96	20:44.09	42.9 N	17.9 E	10	5.9	6.0(Mw)	ADRIATIC SEA
05SEP96	23:42.07	22.0 N	121.4 E	33	6.6	6.6(Mw)	TAIWAN REGION
06SEP96	17:03.46	7.2 S	155.6 E	33	6.1	6.3(Mw	ISLANDS
06SEP96	20:42.30	40.3 N	126.3 W	10	4.5		COAST OF N CALIF
08SEP96	08:08.13	15.6 S	73.1 W	97	5.5	5.7(Mw)	SOUTHERN PERU
09SEP96	00:20.38	32.0 S	71.4 W	39	6.1	6.0(Mw)	COAST OF CENT CHILE
11SEP96	02:37.16	35.5 N	140.9 E	70	5.9	6.1(Mw)	E COAST HONSHU JAPAN
14SEP96	02:53.24	00.0 S	122.8 E	181	5.5		MINAHASSA PEN
14SEP96	08:01.03	36.0 N	70.6 E	118	5.4	5.8(Mw)	HINDU KUSH REG
14SEP96	13:10.52	10.8 S	165.8 E	66	6.0	6.4(Mw)	SANTA CRUZ ISLANDS
18SEP96	17:34.19	11.3 N	85.6 W	187	5.5		NICARAGUA
20SEP96	00:03.18	9.6 N	126.4 E	33	6.2	6.4(Mw)	MINDANAO PHILIPPINES
20SEP96	04:10.27	9.5 N	126.2 E	33	6.4	6.6(Mw)	MINDANAO PHILIPPINES
20SEP96	12:24.43	9.4 N	127.3 E	33	6.0	6.0(Mw)	PHILIPPINE ISL REG
24SEP96	11:42.18	15.2 N	61.4 W	148	5.6	5.9(Mw)	LEEWARD ISLANDS
28SEP96	14:10.17	10.1 N	124.8 E	33	5.9	6.4(Mw)	LEYTE, PHILIPPINES
30SEP96	05:49.50	54.0 N	160.0 E	102	5.5		E COAST KAMCHATKA
01OCT96	15:50.24	12.6 N	57.8 E	10	5.9	6.3(MW)	ARABIAN SEA
01OCT96	19:09.03	26.5 N	110.9 W	10	5.0		GULF OF CALIFORNIA
01OCT96	22:09.30	44.4 N	128.5 W	10	4.5		OFF COAST OF OREGON
02OCT96	09:48.01	11.7 N	125.6 E	33	6.4	6.3(MW)	SAMAR, PHILIPPINES
02OCT96	11:24.47	44.8 N	151.1 E	33	5.9	6.0(MW)	EAST OF KURIL ISLAND
03OCT96	10:09.30	44.3 N	128.9 W	10	4.9		OFF COAST OF OREGON
06OCT96	20:13.09	49.0 N	128.0 W	10	6.3	6.2(MW)	VANCOUVER ISLAND
08OCT96	01:36.54	46.2 S	95.4 E	10	5.8	6.1(MW)	SE INDIAN RIDGE
08OCT96	07:52.57	52.8 N	152.5 E	620	5.1	5.6(MW)	NW OF KURIL ISLANDS
09OCT96	07:11.23	49.7 N	129.7 W	10	5.4	5.8 MW)	VANCOUVER IS. REG

09OCT96	13:10.52	34.5 N	32.1 E	33	6.8	6.8(MW)	CYPRUS REGION
10OCT96	15:21.05	3.7 N	98.0 E	33	6.0	6.2(MW)	N SUMATERA INDONESIA
12OCT96	15:36.01	7.1 S	155.3 E	33	5.8	6.0(MW)	SOLOMON ISLANDS
14OCT96	23:26.21	7.0 S	155.5 E	33	7.0	6.7(MW)	SOLOMON ISLANDS
19OCT96	14:44.42	31.9 N	131.4 E	33	6.7	7.0(MW)	KYUSHU, JAPAN
19OCT96	14:53.47	20.3 S	178.9 W	583	6.0	6.8(MW)	FIJI ISLANDS REGION
24OCT96	19:31.56	67.1 N	172.8 W	33	6.0	6.0(MW)	COAST OF E SIBERIA
25OCT96	19:59.41	17.3 S	69.9 W	116	5.7	5.7(MW)	PERU-BOLIVIA BRD REG
02NOV96	00:08.47	7.4 S	117.2 E	268	5.5		BALI SEA
04NOV96	17:24.59	7.2 N	77.5 W	33	6.1		PANAMA-COLOMBIA BOR
04NOV96	22:54.15	43.6 N	127.3 W	10	4.9		OFF COAST OF OREGON
05NOV96	09:41.34	31.1 S	180.0 E	369	6.0		KERMADEC ISLANDS
06NOV96	20:01.03	28.1 N	143.7 E	33	6.6		BONIN ISLANDS REG
07NOV96	06:10.15	9.8 N	126.0 E	33	6.0		MINDANAO,PHILIPPINES
11NOV96	00:47.21	32. S	179.2 W	33	5.9	6.0(MW)	S OF KERMADEC IS
11NOV96	09:22.26	19.4 N	94.9 E		5.8	6.0(MW)	MYANMAR
12NOV96	16:59.43	14.9 S	75.5 W	33	7.3	7.7(MW)	NEAR COAST OF PERU
13NOV96	02:41.39	14.7 S	75.4 W	33	5.7	6.0(MW)	NEAR COAST OF PERU
13NOV96	12:32.09	15.4 S	75.2 W	33	5.7	6.1(MW)	NEAR COAST OF PERU
14NOV96	13:47.37	21.1 S	176.9 W	190	5.7	6.1(MW)	FIJI ISLANDS REGION
14NOV96	20:27.49	32.3 N	115.1 W	5		4.0	CALIF/MEXBOARDER
16NOV96	09:47.49	15.2 S	176.4 W	33	5.7	6.0(MW)	FIJI ISLANDS REGION
17NOV96	21:11.20	22. S	179.9 W	5.4		6.1(MW)	SOUTH OF FIJI IS
19NOV96	10:44.45	35.2 N	78.2 E	33	7.1	6.8(MW)	EASTERN KASHMIR
20NOV96	02:27.48	34.4 N	141.1 E	33	5.8	6.1(MW)	E COAST OF HONSHU
21NOV96	07:43.35	6.8 N	126.4 E	33	5.6	6.1(MW)	MINDANAO, PHILIPPINE
01DEC96	23:09.41	30.4 S	179.8 W	354	5.4	6.0(MW)	KERMADEC ISLANDS REG
02DEC96	22:17.57	31.8 N	131.2 E	33		6.7(MW)	KYUSHU, JAPAN
03DEC96	12:56.56	18.3 S	172.5 W	33		6.1(MW)	TONGA ISLAND REG
08DEC96	03:48.04	44.0 N	129.6 W	10	5.1		COAST OF OREGON
08DEC96	05:42.18	44.1 N	129.3 W	10	4.6		COAST OF OREGON
09DEC96	03:54.17	8.0 S	107.2 E	53	5.5	6.1(MW)	JAWA, INDONESIA
09DEC96	11:28.47	29.9 N	42.6 W	10		6.1(MW)	N MID-ATLANTIC RIDGE
10DEC96	08:36.18	0.8 N	30.0 W	10		6.6(MW)	C MID-ATLANTIC RIDGE
12DEC96	08:35.49	38.6 N	119.5 W	1	4.7		CALIF/NEV BORDER
17DEC96	16:24.10	36.8 N	71.2 E	176	5.5	5.5(MW)	AFGHAN/TAJIK BORDER
22DEC96	14:53.27	43.2 N	138.9 E	227	6.0	6.5(MW)	EASTERN SEA OF JAPAN
26DEC96	20:48.22	2.3 S	138.9 E	33		6.1(MW)	IRIAN JAYA, INDONESIA
30DEC96	19:41.52	4.0 S	128.1 E	33	6.1	6.1(MW)	SERAM, INDONESIA
31DEC96	12:41.40	15.7 N	93.0 W	95	5.7	6.3(MW)	COAST CHIAPAS, MEXICO

Local Events

DATE	TIME	LAT.	LONG.	D	MB	MSZ	ML	LOCATION
07JAN96	14:32.53	35.8 N	117.6 W	6	4.6	5.2		RIDGECREST
08JAN96	08:57.11	35.8 N	117.6 W	4		4.2		RIDGECREST
08JAN96	10:25.28	35.8 N	117.6 W	4		4.3		RIDGECREST
26JAN96	13:06.02	35.8 N	117.6 W	6		4.1		RIDGECREST
20MAR96	07:37.59	34.3 N	118.6 W	13		4.1		NEWHALL
30MAR96	15:22.24	37.6 N	118.8 W	6		4.0		MAMMOTH LAKES
30MAR96	23:15.18	37.6 N	118.8 W	6		4.0		MAMMOTH LAKES
02APR96	01:50.07	37.6 N	118.8 W	7		4.2		MAMMOTH LAKES
19APR96	00:52.41	36.8 N	121.6 W	5		4.5		HOLLISTER
01MAY96	19:49.46	34.4 N	118.7 W	14	4.0	4.3		CANOGA PARK
21MAY96	20:50.20	37.4 N	121.7 W	8	4.3	4.7		SAN JOSE
14AUG96	03:05.27	34.6 N	116.3 W	6	4.2	4.4		YUCCA VALEY
30AUG96	06:24.47	32.3 N	115.4 E	6		4.0		EL CENTRO
20OCT96	00:17.31	34.6 N	116.2 W	5		4.0		TWENTYNINE PALMS
23OCT96	22:09.27	34.4 N	119.4 W	15		4.7		CARPINTERIA
26NOV96	01:42.44	33.9 N	116.3 E	6	4.1	4.1		DESERT HOT SPRINGS
27NOV96	20:17.24	36.1 N	117.6 E	1		5.3(MW)		COSO JUNCTION

Saved Time Periods for Local Sequences

DATE	TIME SPAN	DESCRIPTION
23NOV96	10 DAYS	COSO JUNCTION

Miscellaneous

DATE	TIME OF EVENT OR TAPE	DESCRIPTION
27JAN96	21:29.57 22.3 S 138.8 W 0 5.3 NUKE	TUAMOTU ARCHIPELAGO
08JUN96	02:55.57 41.6 N 88.6 E 0 6.0 NUKE	XINJIANG, CHINA
09JUL96	21:50.	SONIC: S. CALIF

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