Partial Support of Joint USGS-CALTECH Southern California Seismographic Network

#14-08-0001-A0613

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INVESTIGATIONS

This Cooperative Agreement provides partial support for the joint USGS-Caltech Southern California Seismic Network. The purpose is to record and analyze data from local earthquakes and generate a data base of phase data and digital seismograms. The primary product derived from the data base is a joint USGS-Caltech catalog of earthquakes in the southern California region.

For more detailed information about data access, please contact:
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RESULTS

Seismicity

The Southern California Seismographic Network (SCSN) recorded 4691 earthquakes during the six months from October 1990 through April 1991, an average of 670 per month, making it an unusually quiet reporting period (Figure 1).

There was only one event of $M_L \geq 4.0$ in California during the last six months. This M_L4.2 earthquake occurred on 18 December 1990 and was located in the eastern San Joaquin Valley, 8 miles east of Bakersfield. The second largest earthquake that occurred during this reporting period was an M_L3.8, located in the Costa Mesa area, near the Newport-Inglewood fault at the southern edge of the Los Angeles basin, at 1721 GMT on October 17, 1990. Both events were followed by a few aftershocks. Only one earthquake of $M \geq 3.5$ occurred during the first 4 months of 1991.

During the last six months the prominent areas of microseismicity were the usual ones: the Coso and Kern River areas, the San Jacinto fault, the southern Elsinore fault, the Imperial Valley and the San Bernardino and Little San Bernardino Mountain areas. Aftershocks continued at a rate clearly higher than background in the Oceanside sequence (M_L5.3 on July 13, 1986) and the Coalinga sequence (M_L6.3 on May 3, 1983).

Focal Mechanisms

The focal mechanism for earthquakes of $M \geq 3.5$ are shown in Figure 2. A total of 7 events of $M \geq 3.5$ were recorded in California from 1 October 1990 to 30 April 1991 and reliable focal mechanisms could be determined for 6 events. The one M_L3.5 event (31 January 1991) for which a focal mechanism was not determined, occurred at a shallow depth (probably less than 1 km) in the Orcutt Oil Field in the Santa Maria basin. This

event was most likely induced in the oil field. The M_L4.2 Bakersfield event (18 December 1990) showed a mixture of strike-slip and normal faulting. The M_L3.8 Costa Mesa event (October 17, 1990) also showed a mixture of strike-slip and normal faulting. Three events showing strike-slip faulting occurred in the San Bernardino Mountains. One event (14 December 1990) showing strike-slip faulting was recorded north of the Coso Geothermal Area.

Weekly Seismicity Report

In January 1990, the Seismographic Network initiated a weekly seismicity report, patterned after a similar report issued by the U.S. Geological Survey in Menlo Park. The language of the "earthquake report" is aimed at the general public. So far, the report has been enthusiastically received. A few members of the local media have started basing regular news features on it.

TABLE . Locations and Focal Mechanisms of M≥3.5 Earthquakes that Occurred During January - September 1990

Origin	Time	Latitude	Longitude	Depth	Mag	Focal Mechanisms		
Day	UT	N	W	km	M_L	Ddir	Dip	Rake
901018	1721 56.08	33-38.74	117-53.43	5.11	3.8	95	75	-150
901109	0711 20.00	34-25.23	116-48.88	4.21	3.5	115	80	0
901214	1422 33.05	36-33.60	117-55.82	6.00	3.6	330	60	-20
901217	1744 21.22	34-12.20	117- 1.64	6.74	3.7	310	45	0
901218	1656 43.14	35-22.05	118-50.53	5.53	4.2	185	80	-140
910308	0927 35.56	34- 8.71	116-43.26	10.73	3.7	70	90	170

Publications Using Network Data (Abstracts excepted).

Hauksson, E., and S. Gross, Source parameters of the 1933 Long Beach earthquake, *Seismol. Soc. Am., Bull., 81*, 81-98, 1991.

Michael, A. J., Spatial variations in stress within the 1987 Whittier Narrows, California, aftershock sequence: New techniques and results, *J. Geophys. Res., 96*, 6303-6319, 1991.

Mori, J., Estimates of velocity structure and souce depth using multiple P waves from aftershocks of the 1987 Elmore Ranch and Superstition Hills, California, earthquakes, *Seismol. Soc. Am., Bull., 81*, 508-523, 1991.

Su, F., K. Aki, and N. N. Biswas, Discriminating quarry blasts from earthquakes using coda waves, *Seismol. Soc. Am., Bull., 81*, 162-178, 1991.

Wesnousky, S. G., Seismicity as a function of cumulative geologic offset: Some observations from southern California, *Seismol. Soc. Am., Bull., 80*, 1374-1381, 1990.

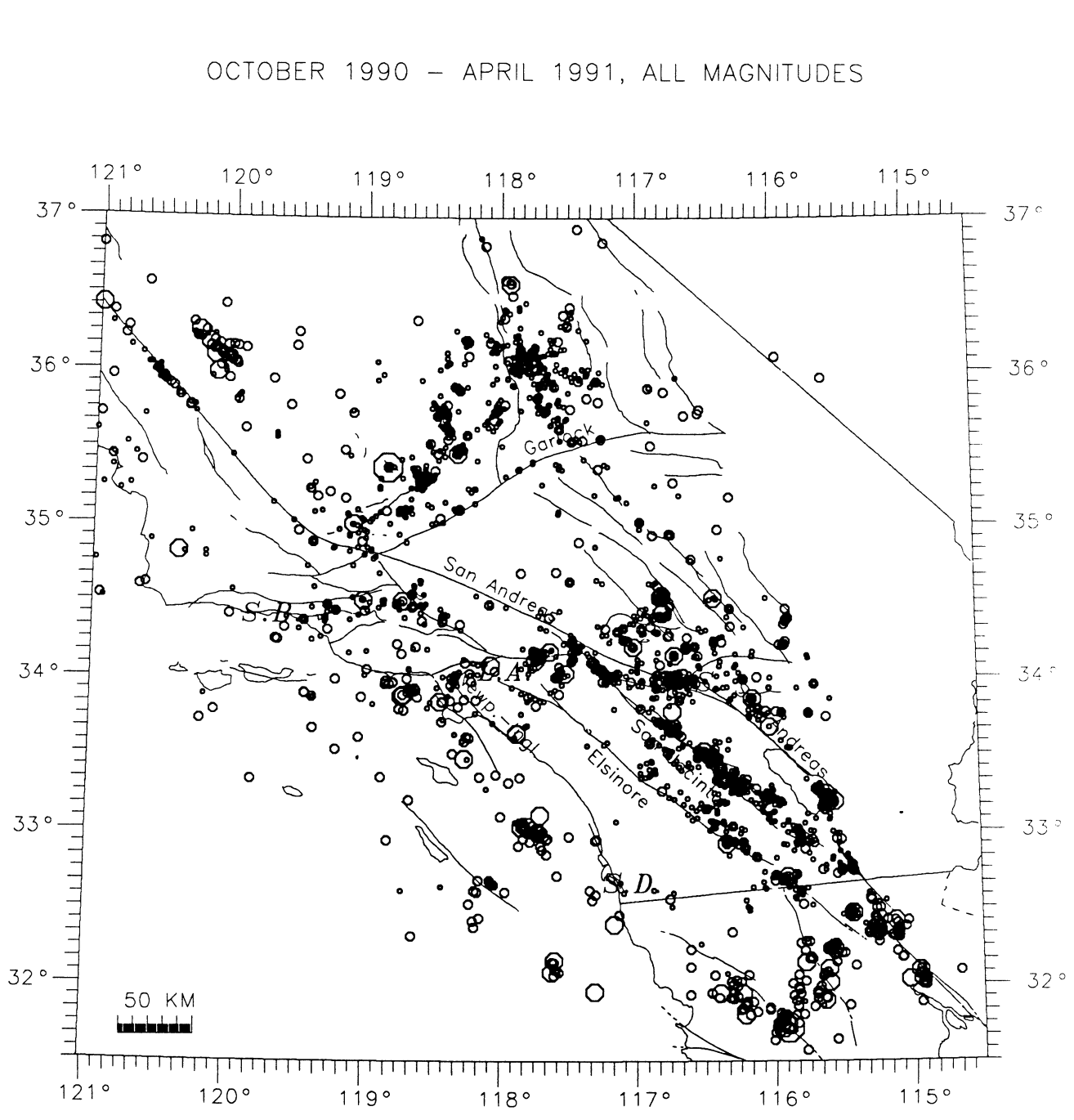

Figure 1. Map of epicenters of earthquakes in the southern California region, 1 October 1990 to 30 April 1991.

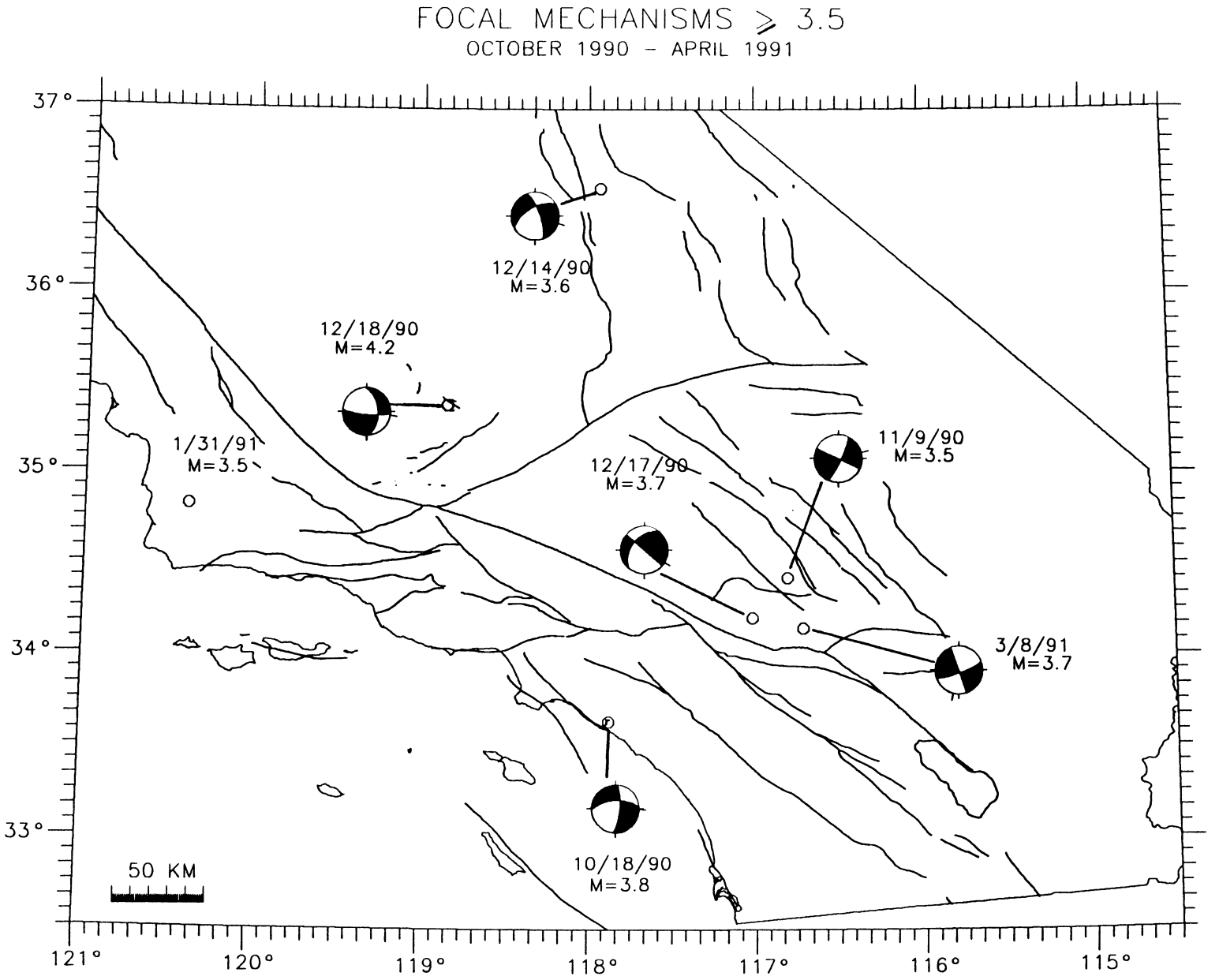

Figure 2. Focal mechanisms of earthquakes of M≥3.5 that occurred in southern California from 1 October 1990 to 30 April 1991. (See also enclosed table).