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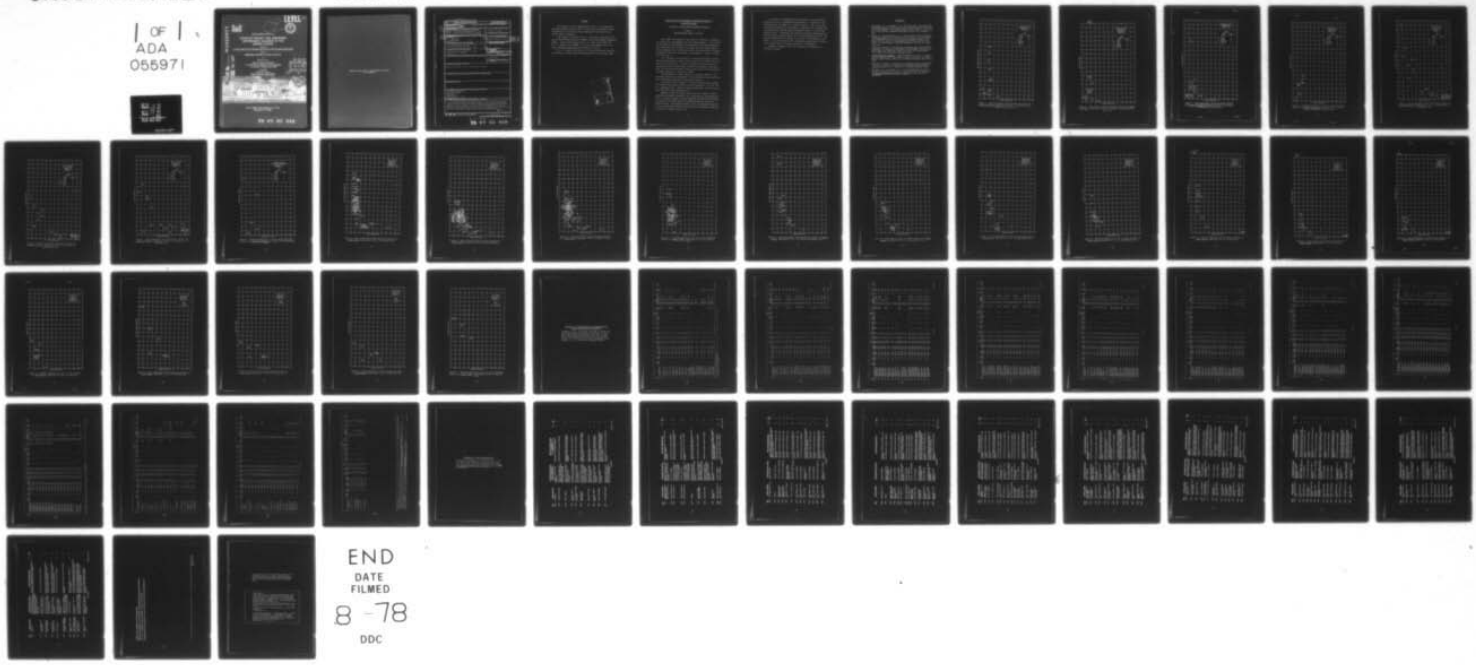

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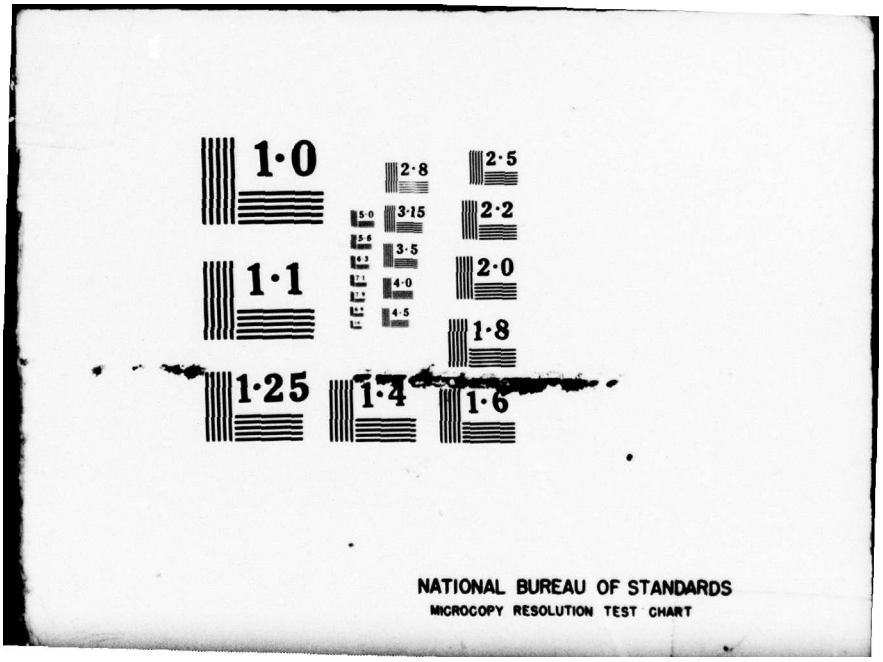
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STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED STATES

Report 9

CATALOGUE OF STRONG MOTION EARTHQUAKE RECORDS

Volume I

WESTERN UNITED STATES, 1933-1971

by

Frank K. Chang

Soils and Pavements Laboratory
U. S. Army Engineer Waterways Experiment Station
P. O. Box 631, Vicksburg, Miss. 39180

April 1978
Report 9 of a Series

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A working catalogue was prepared to facilitate the selection of strong motion earthquake records for design purposes. The records are those processed by the California Institute of Technology from western United States during the period 1933-1971. They are presented graphically in terms of magnitude, type of fault, focal depth, site classification, peak acceleration, velocity, displacement, duration, and distance from epicenter.

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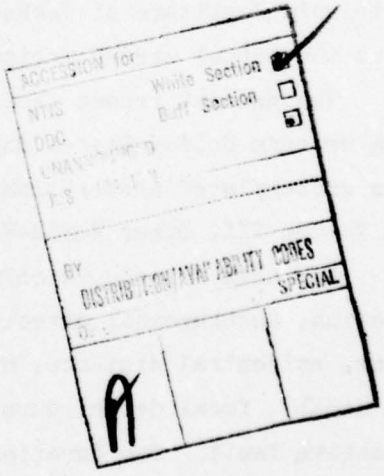
Preface

This report is part of ongoing work at the U. S. Army Engineer Waterways Experiment Station (WES) in Civil Works Investigation Study: "Methodologies for Selecting Design Earthquakes," sponsored by the Office, Chief of Engineers.

This study is directed by Dr. E. L. Krinitzsky, Engineering Geology and Rock Mechanics Division (EG&RMD), Soils and Pavements Laboratory (S&PL). General direction was by Mr. J. P. Sale, Chief, S&PL, and Mr. D. C. Banks, Chief, EG&RMD. The report was prepared by Mr. F. K. Chang, Earthquake Engineering and Vibrations Division.

COL J. L. Cannon, CE, and Mr. F. R. Brown were Director and Technical Director, respectively, of WES during the period of this study.



STATE-OF-THE-ART FOR ASSESSING EARTHQUAKE HAZARDS IN THE UNITED STATES

CATALOGUE OF STRONG MOTION EARTHQUAKE RECORDS

Volume I

WESTERN UNITED STATES, 1933-1971

This report was prepared to facilitate the selection of appropriate strong motion earthquake records for design purposes. It is a working catalogue in which groupings of earthquakes were made according to their magnitude, type of fault, focal depth, and site classification. For each category, the records are shown by peak acceleration, velocity, displacement, duration, and distance from epicenter. Figures 1-24 present these data.

It is intended that peak values for design earthquakes will have been determined earlier either by use of Report 7[1] and Report 8[2] of this series, or by other means. Figures 1-24 then provide an easy-to-use presentation of what strong motion records are available in each category. The records would then be selected for either direct utilization in dynamic analyses or rescaling as needed.

The presentation of peak values is by catalogue numbers of the California Institute of Technology[3] (CIT) uniformly processed data from which the actual strong motion records were obtained.

The present report (Volume I) concerns the strong motion records from western United States during the period 1933-1971. The other volumes contemplated are: Volume II, Western Hemisphere, 1972 to present; and Volume III, Other World-Wide Data.

Appendix A lists in columns 1-16 the CIT file numbers, station location, instrumental direction, site classification, peak ground motions, epicentral distance, Richter magnitude, MM intensity (epicentral and local), focal depth, duration, predominant period, and type of causative fault. The duration (column 12) is the "bracketed duration" or the time interval between the first and last acceleration peaks that is equal to or greater than 0.05 g.

To compile the predominant periods (column 13), three different sources were used, as designated by subcolumns 1-3. Subcolumn 1 was calculated from the formula $T = 2\pi(V/a)$, where V and a are peak velocity and acceleration, respectively. Subcolumn 2 was obtained from the publications, "United States Earthquakes" by the U. S. Coast and Geodetic Survey.[4] Subcolumn 3 was determined from the maximum value of the acceleration response spectra and its corresponding period.[2,5] The periods calculated by the formula $T = 2\pi(V/a)$ do not agree with the others. Of the three sources, the predominant period values in subcolumn 3, adopted from the response spectra, are recommended.

Appendix B summarizes the site conditions as determined by Trifunac and Brady.[6]

References

1. Krinitzsky, E. L. and Chang, F. K., "State-of-the-Art for Assessing Earthquake Hazards in the United States; Specifying Peak Motions for Design Earthquakes," Miscellaneous Paper S-73-1, Report 7, Jan 1978, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

2. Chang, F. K. and Krinitzsky, E. L. "State-of-the-Art for Assessing Earthquake Hazards in the United States; Duration, Spectral Content, and Predominant Period of Strong Motion Earthquake Records from Western United States," Miscellaneous Paper S-73-1, Report 8, Jan 1978, U. S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

3. California Institute of Technology, Earthquake Engineering Research Laboratory, "Strong Motion Earthquake Accelerograms; Corrected Accelerograms and Integrated Ground Velocities and Displacements," Vol 2, Parts A-Y, 1971-1975, Pasadena, Calif.

4. United States Earthquakes. Annual publication of the U. S. Department of Commerce, Coast and Geodetic Survey, 1933-1968; the NOAA National Ocean Survey, 1969; and the NOAA Environmental Data Service, 1970.

5. California Institute of Technology, Earthquake Engineering Research Laboratory, "Analyses of Strong Motion Earthquake Accelerograms; Response Spectra," Vol 3, Parts A-Y, 1973-1975, Pasadena, Calif.

6. Trifunac, M. D. and Brady, A. G., "On the Correlation of Seismic Intensity Scales with the Peaks of Recorded Strong Ground Motion," Bulletin, Seismological Society of America, Vol 65, Feb 1975, pp 139-162.

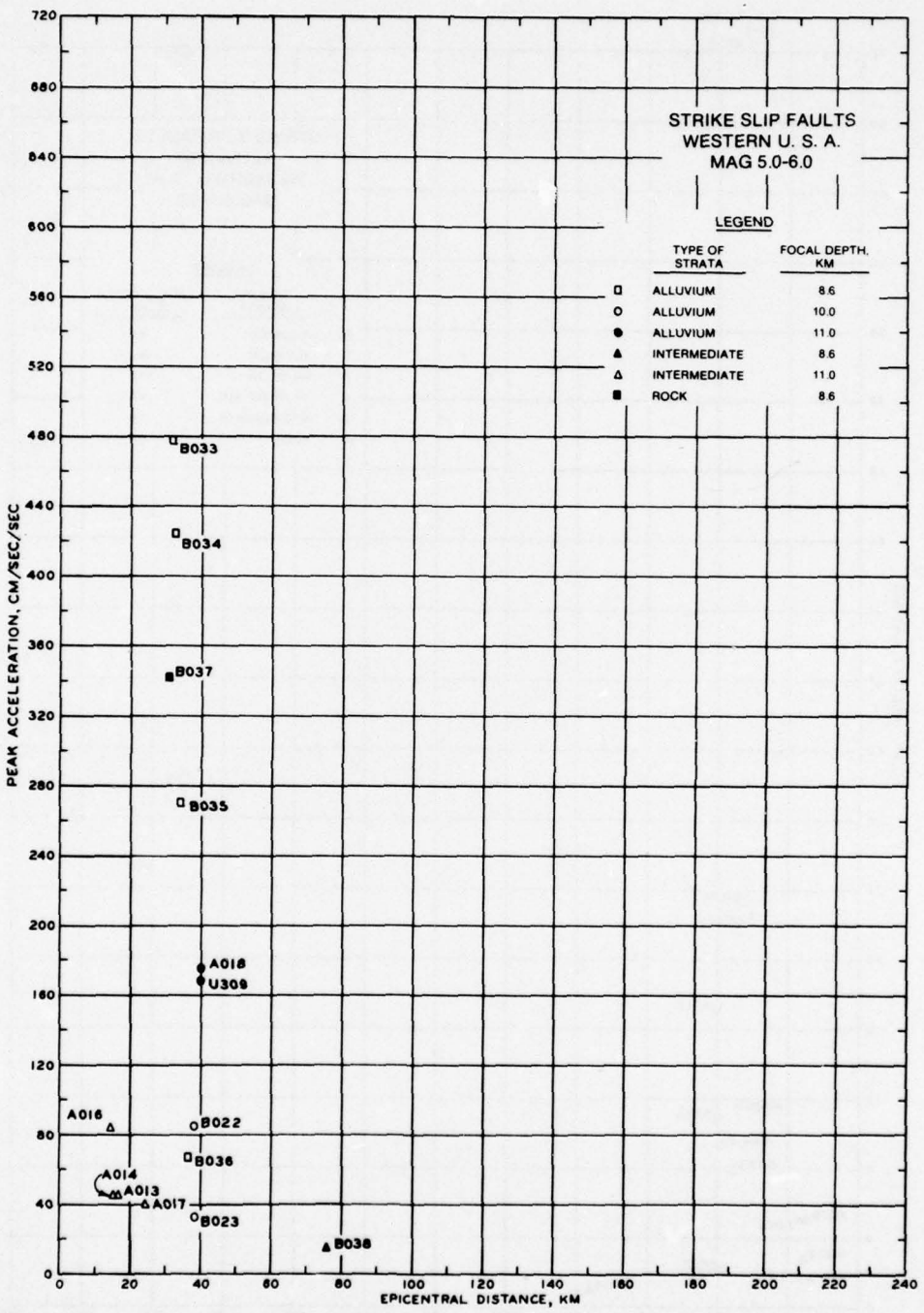


Figure 1. Peak acceleration versus epicentral distance for strike-slip faults, magnitudes 5.0-6.0, in alluvial, intermediate and rock sites

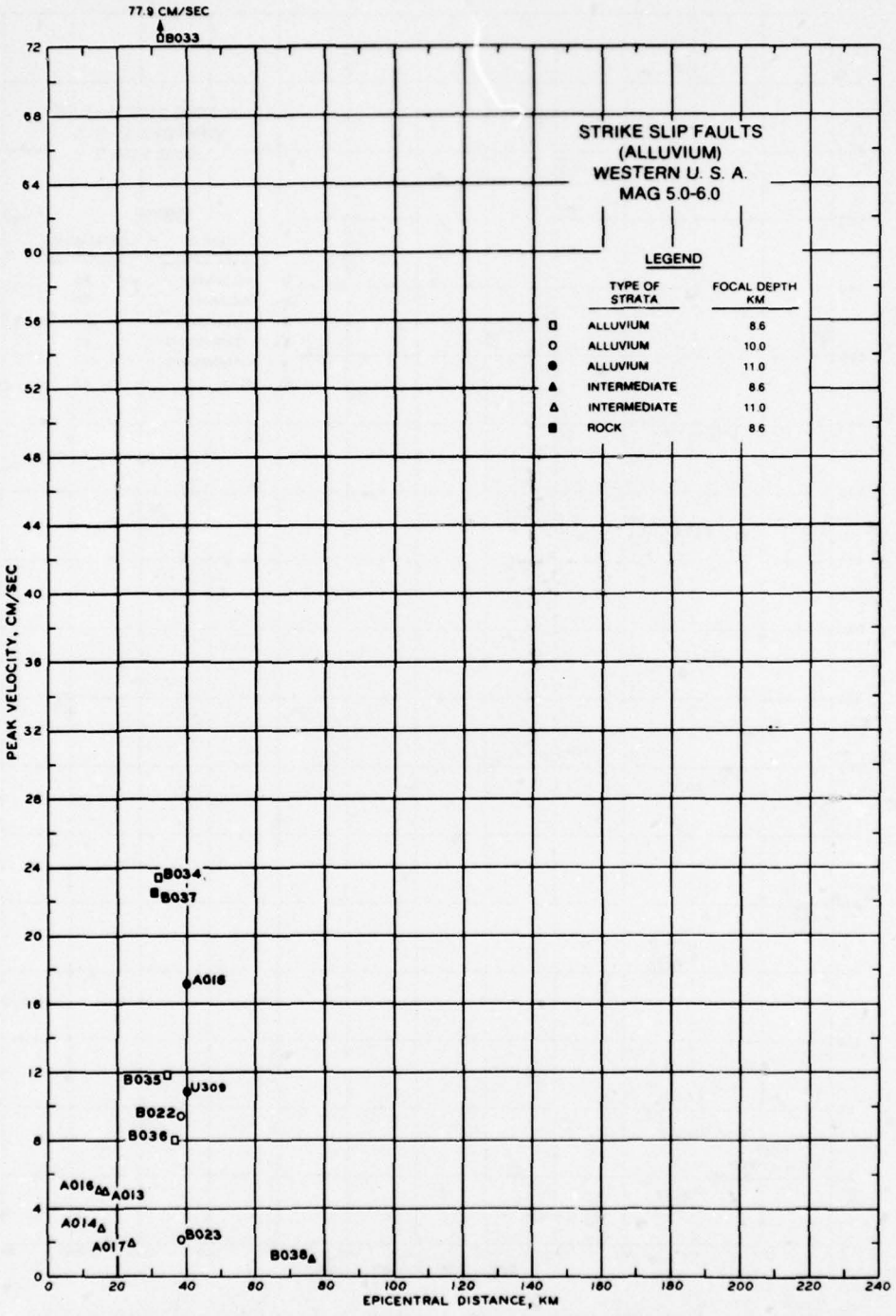


Figure 2. Peak velocity versus epicentral distance for strike-slip fault, magnitudes 5.0-6.0, in alluvial, intermediate and rock sites

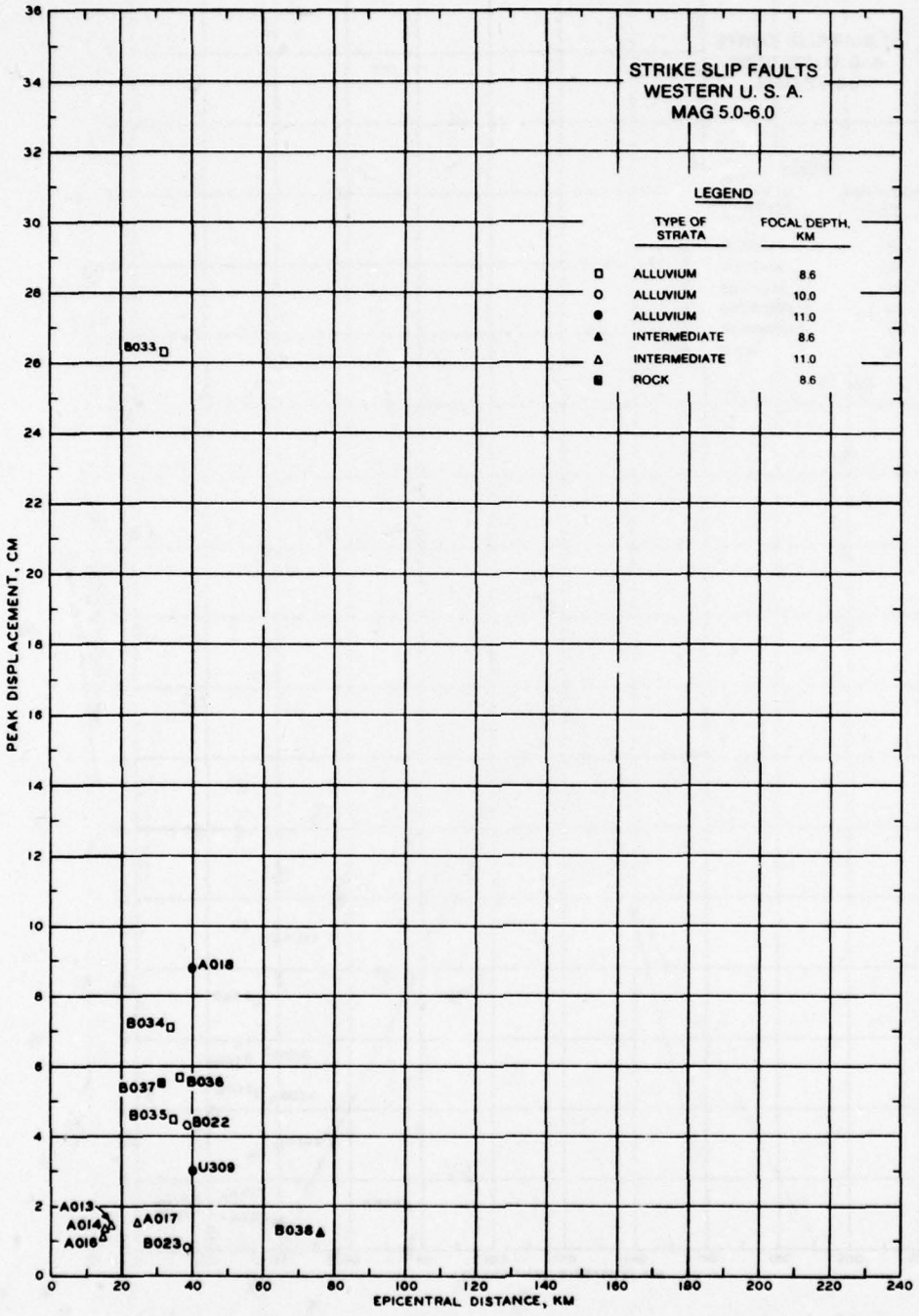


Figure 3. Peak displacement versus epicentral distance for strike-slip fault, magnitudes 5.0-6.0, in alluvial, intermediate and rock sites

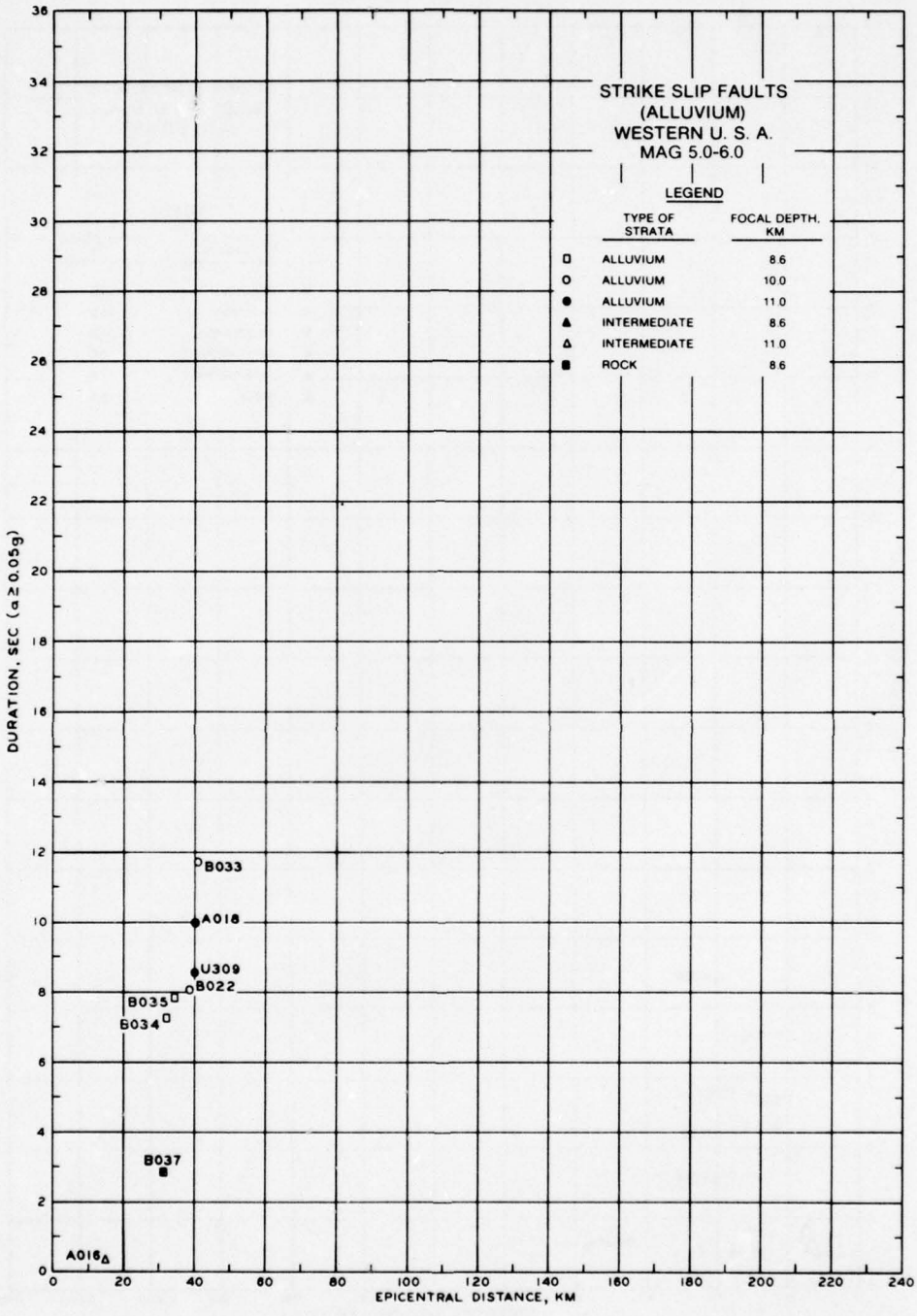


Figure 4. Bracketed duration (a $\geq$ 0.05 g) versus epicentral distance for strike-slip faults, magnitudes 5.0-6.0, in alluvial, intermediate and rock sites

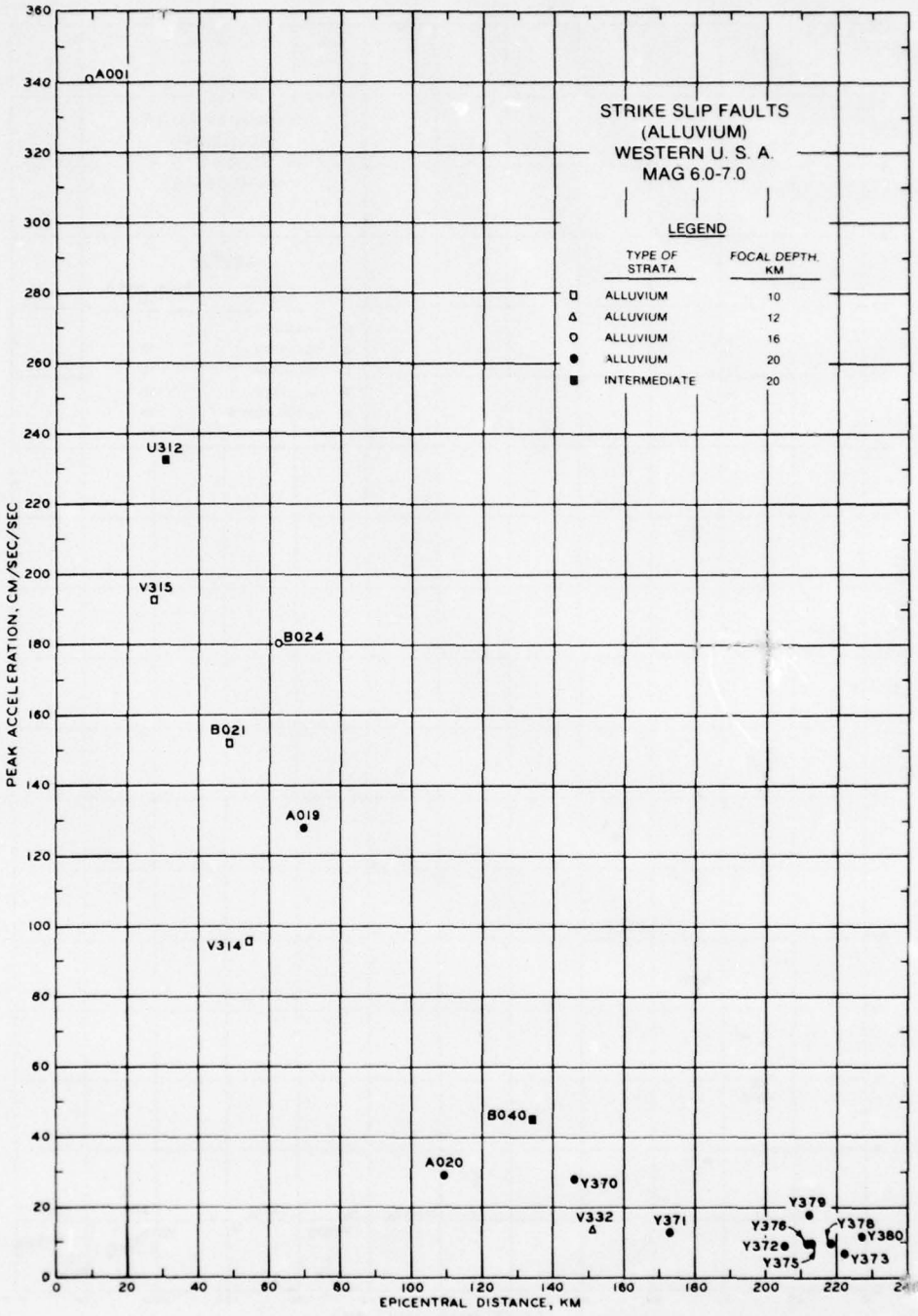


Figure 5. Peak acceleration versus epicentral distance for strike-slip faults, magnitudes 6.0-7.0, in alluvial and intermediate sites

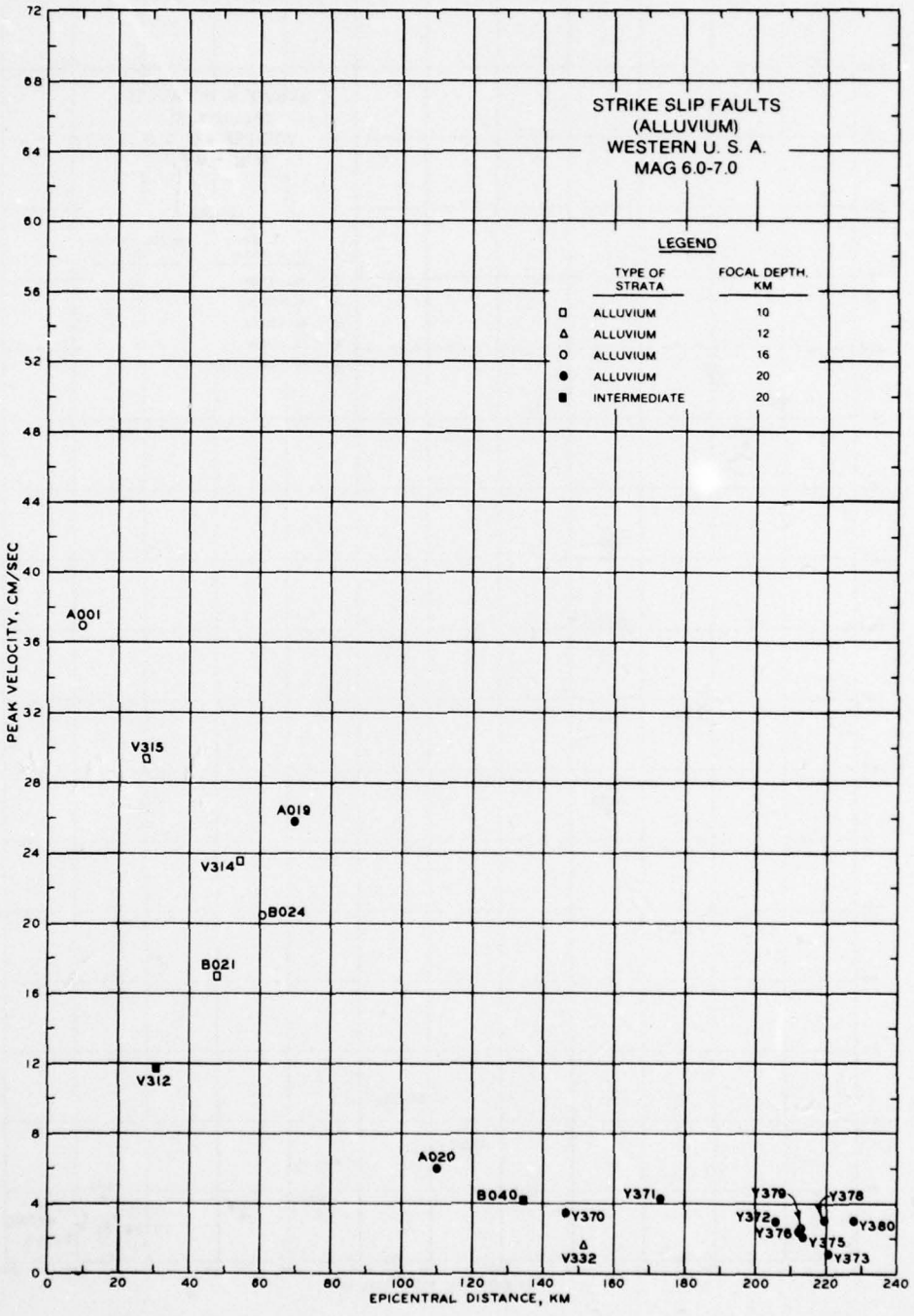


Figure 6. Peak velocity versus epicentral distance for strike-slip faults, magnitudes 6.0-7.0, in alluvial and intermediate sites

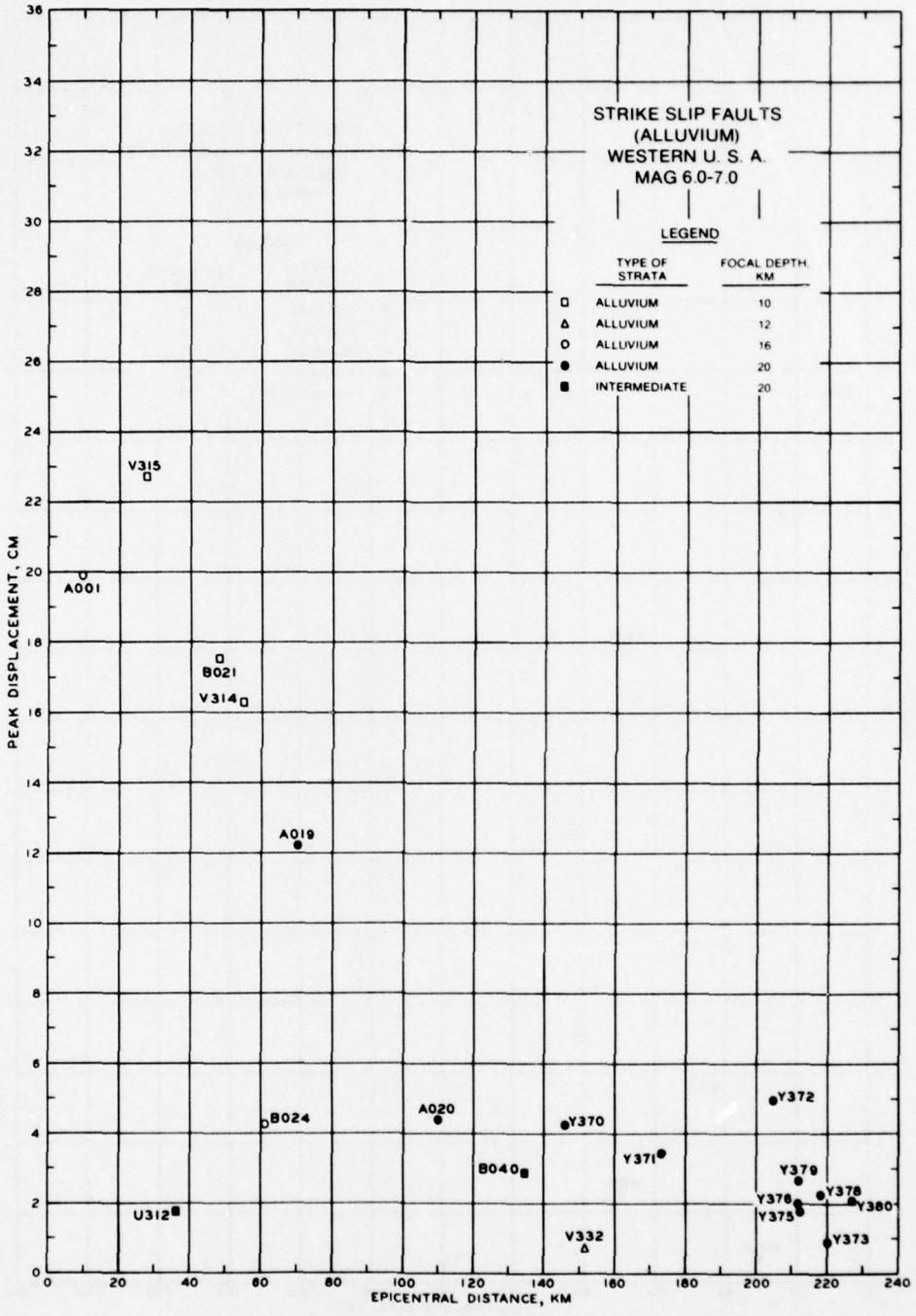


Figure 7. Peak displacement versus epicentral distance for strike-slip faults, magnitudes 6.0-7.0, in alluvial and intermediate sites

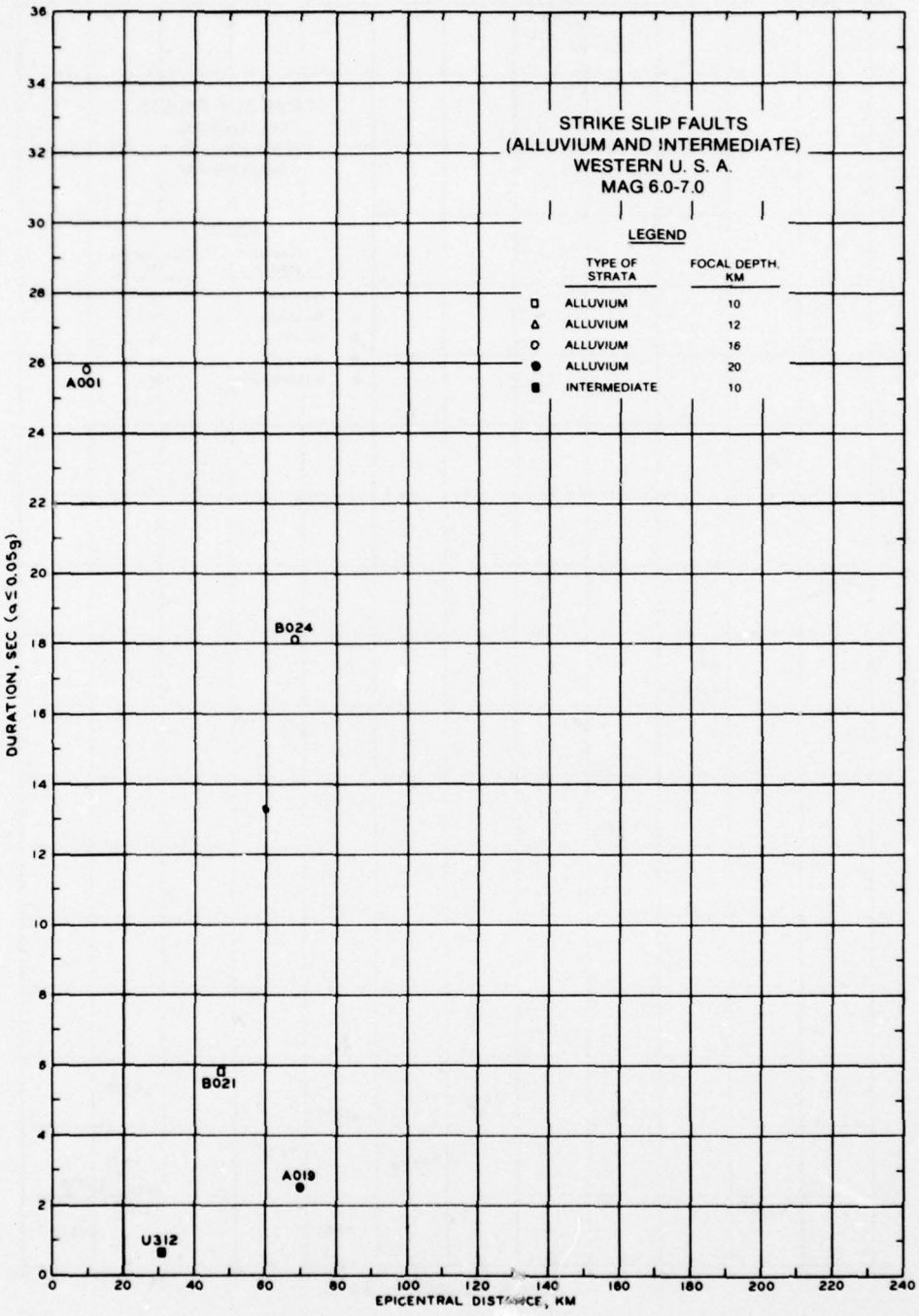


Figure 8. Bracketed duration ($a \geq 0.05$ g) versus epicentral distance for strike-slip faults, in alluvial and intermediate sites

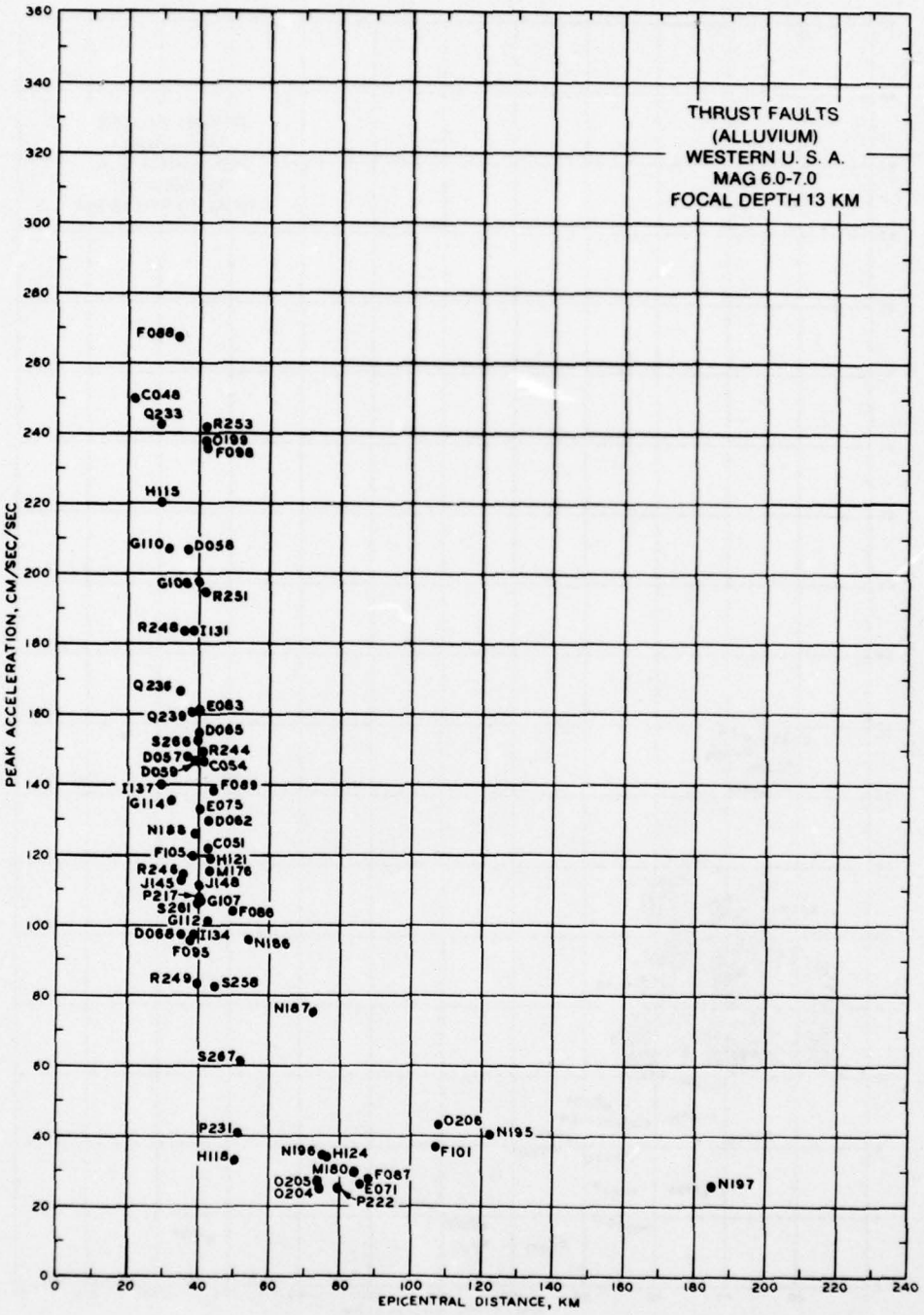


Figure 9. Peak acceleration versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in alluvial sites

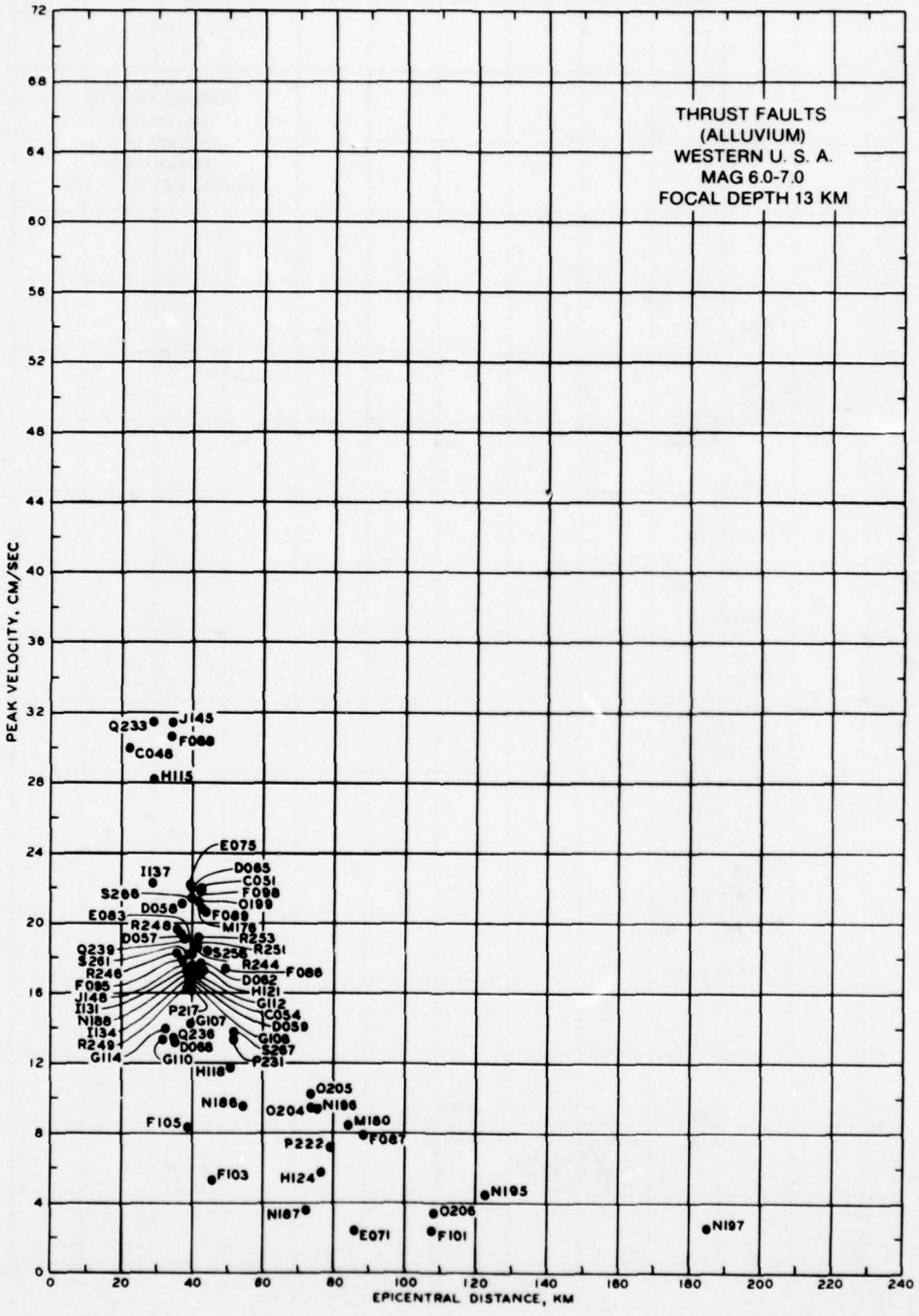
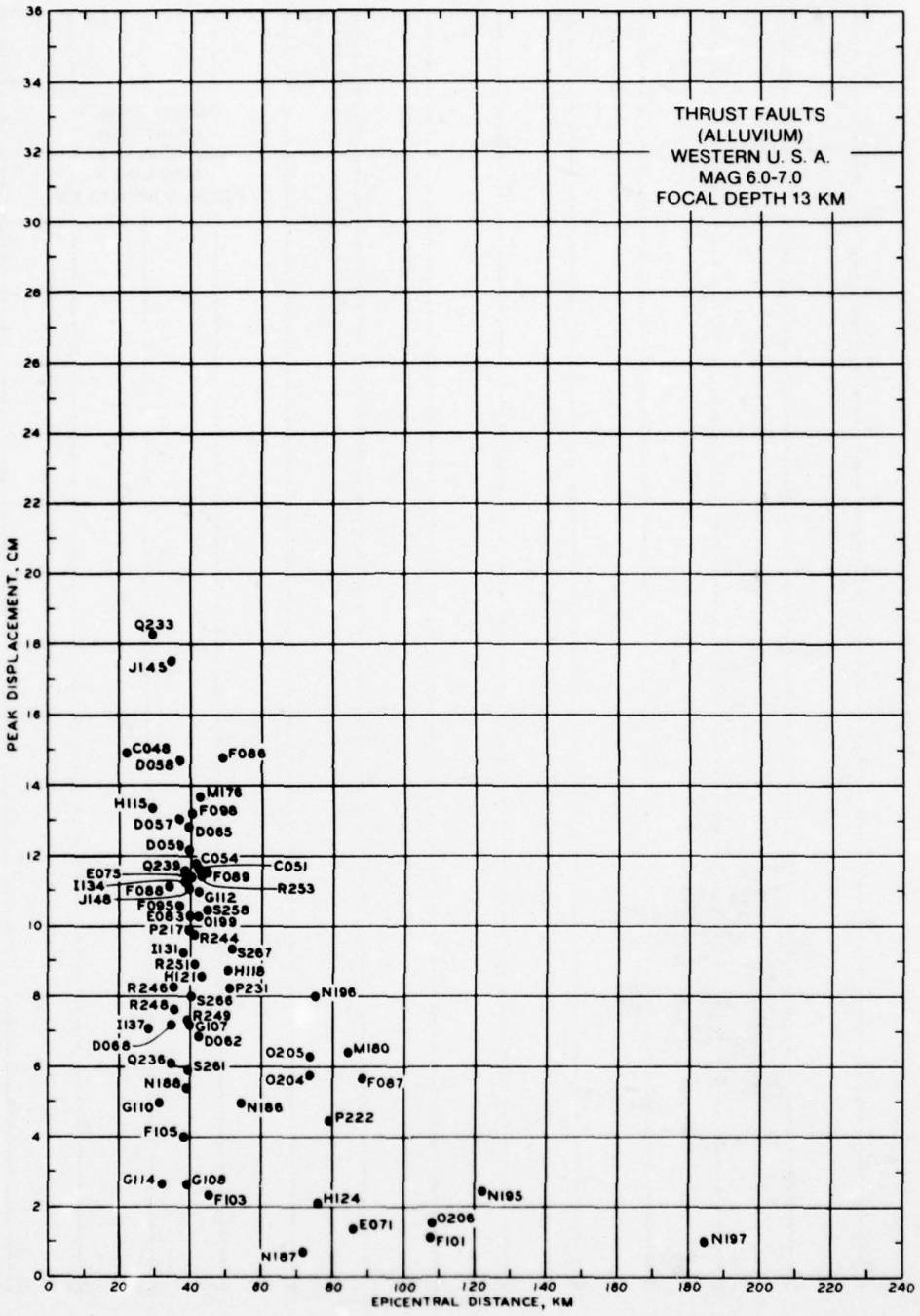


Figure 10. Peak velocity versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in alluvial sites



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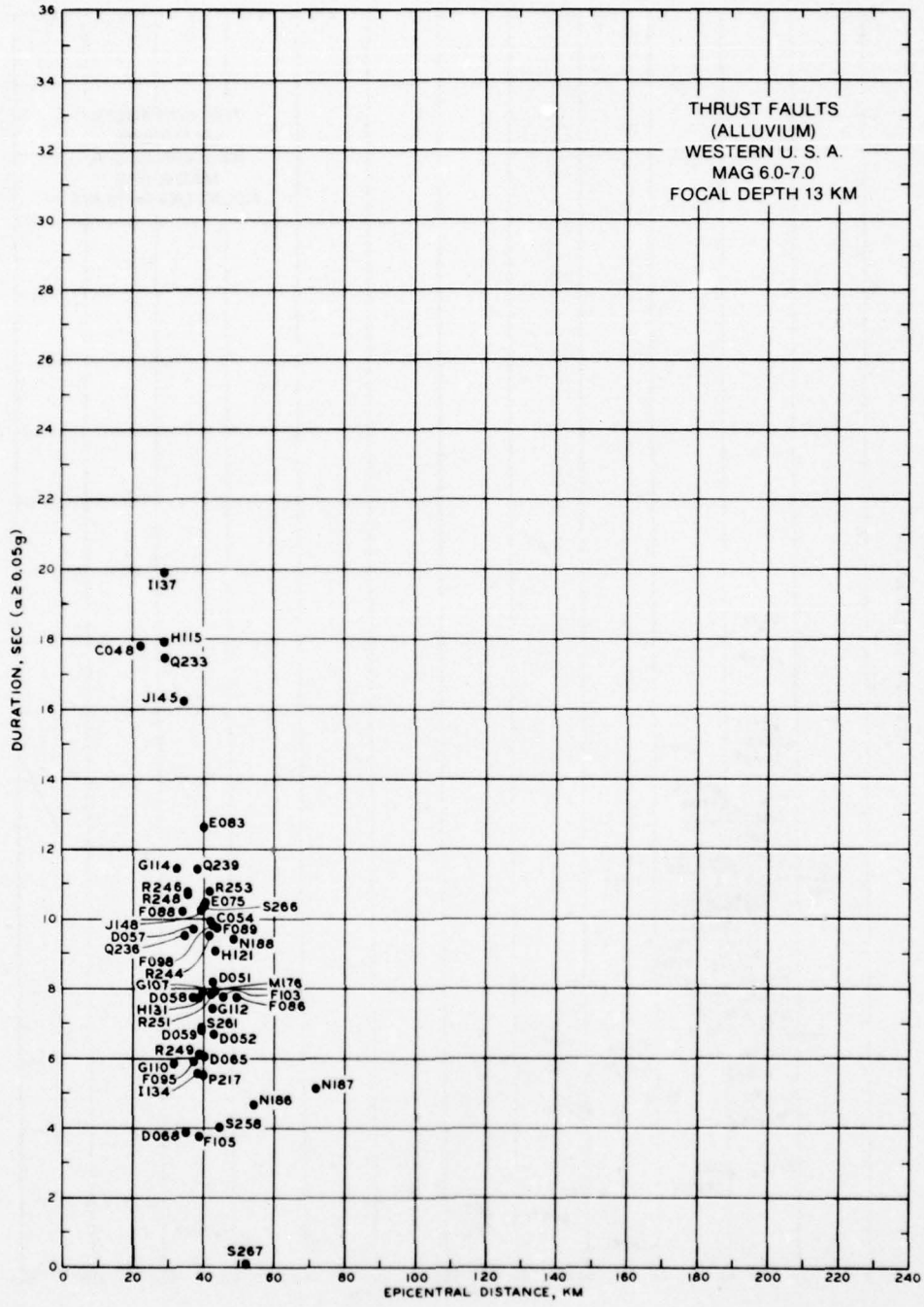

Figure 12. Bracketed duration (a $\geq$ 0.05 g) versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in alluvial sites

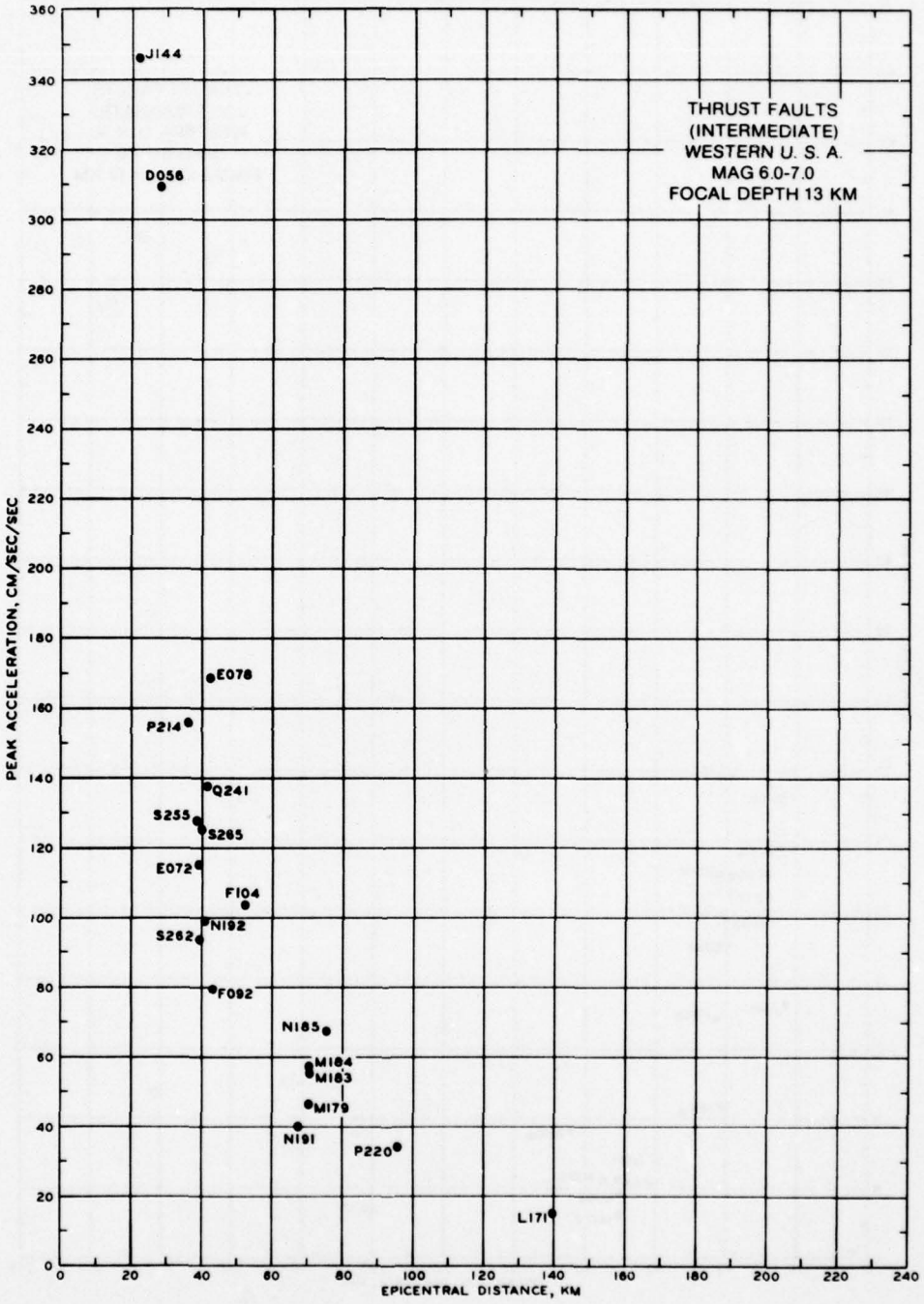

Figure 13. Peak acceleration versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in alluvial intermediate sites

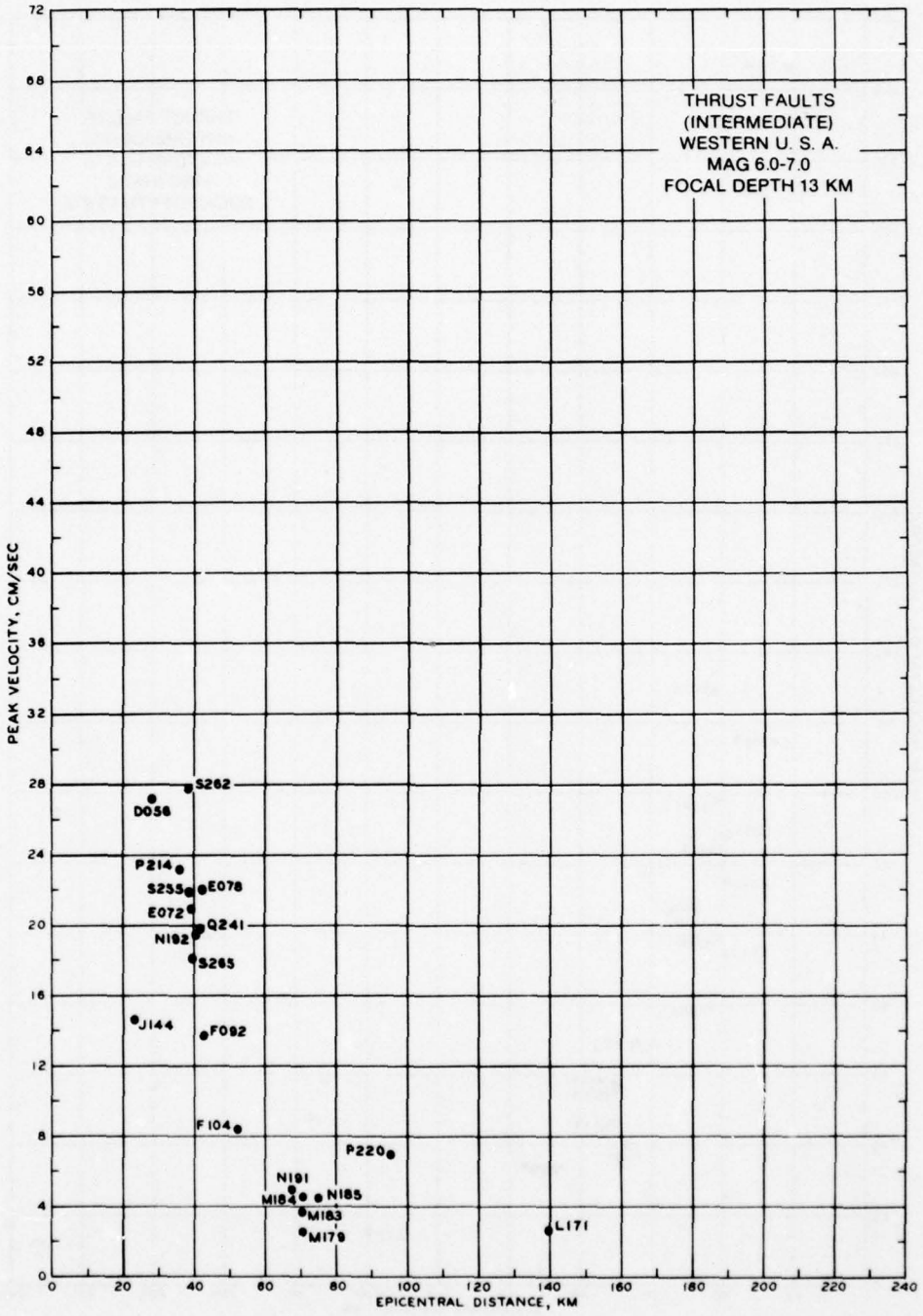

Figure 14. Peak velocity versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in intermediate sites

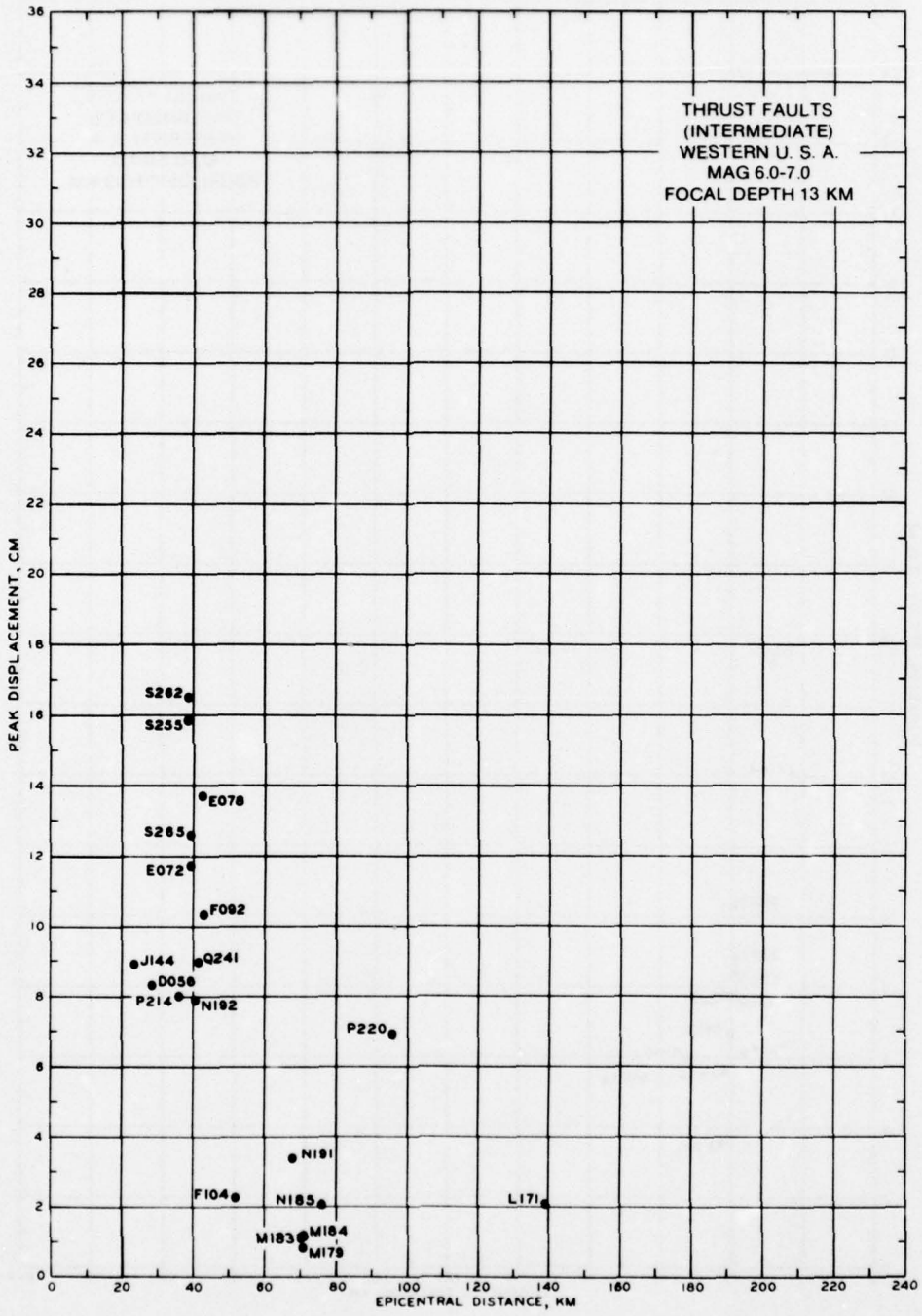

Figure 15. Peak displacement versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in intermediate sites

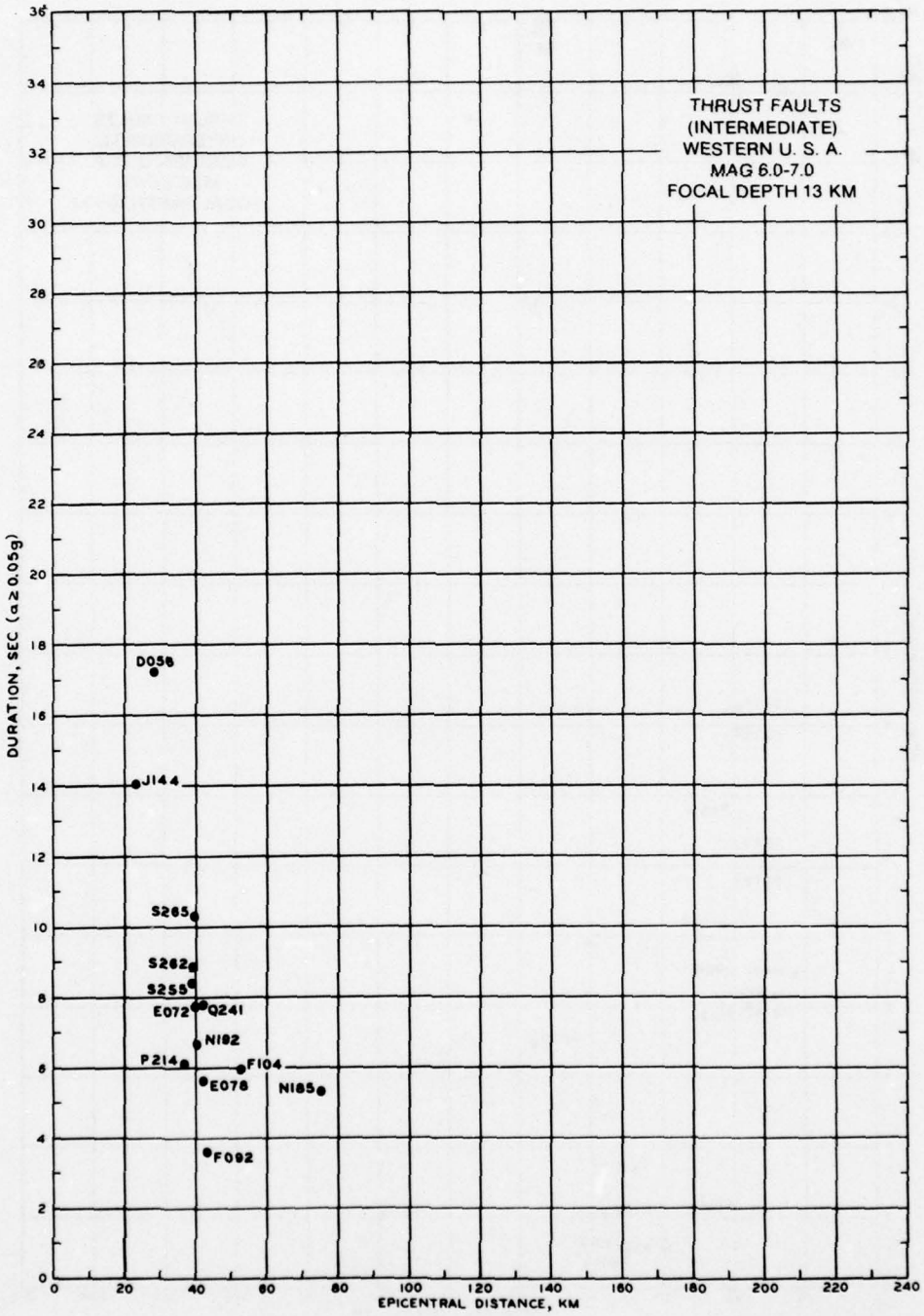

Figure 16. Bracketed duration (a $\geq$ 0.05 g) versus distance for thrust faults, magnitudes 6.0-7.0, in intermediate sites

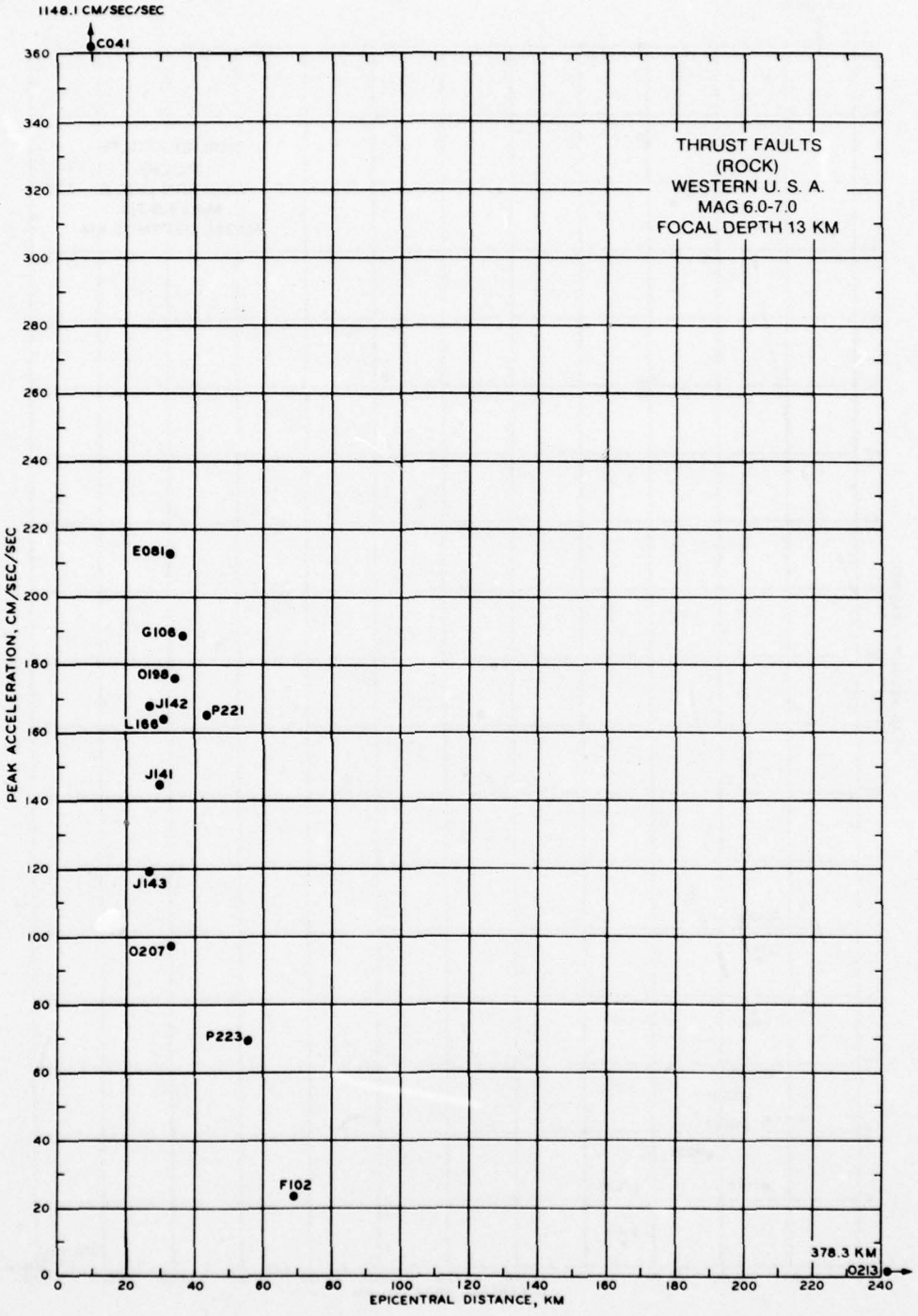

Figure 17. Peak acceleration versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in rock sites

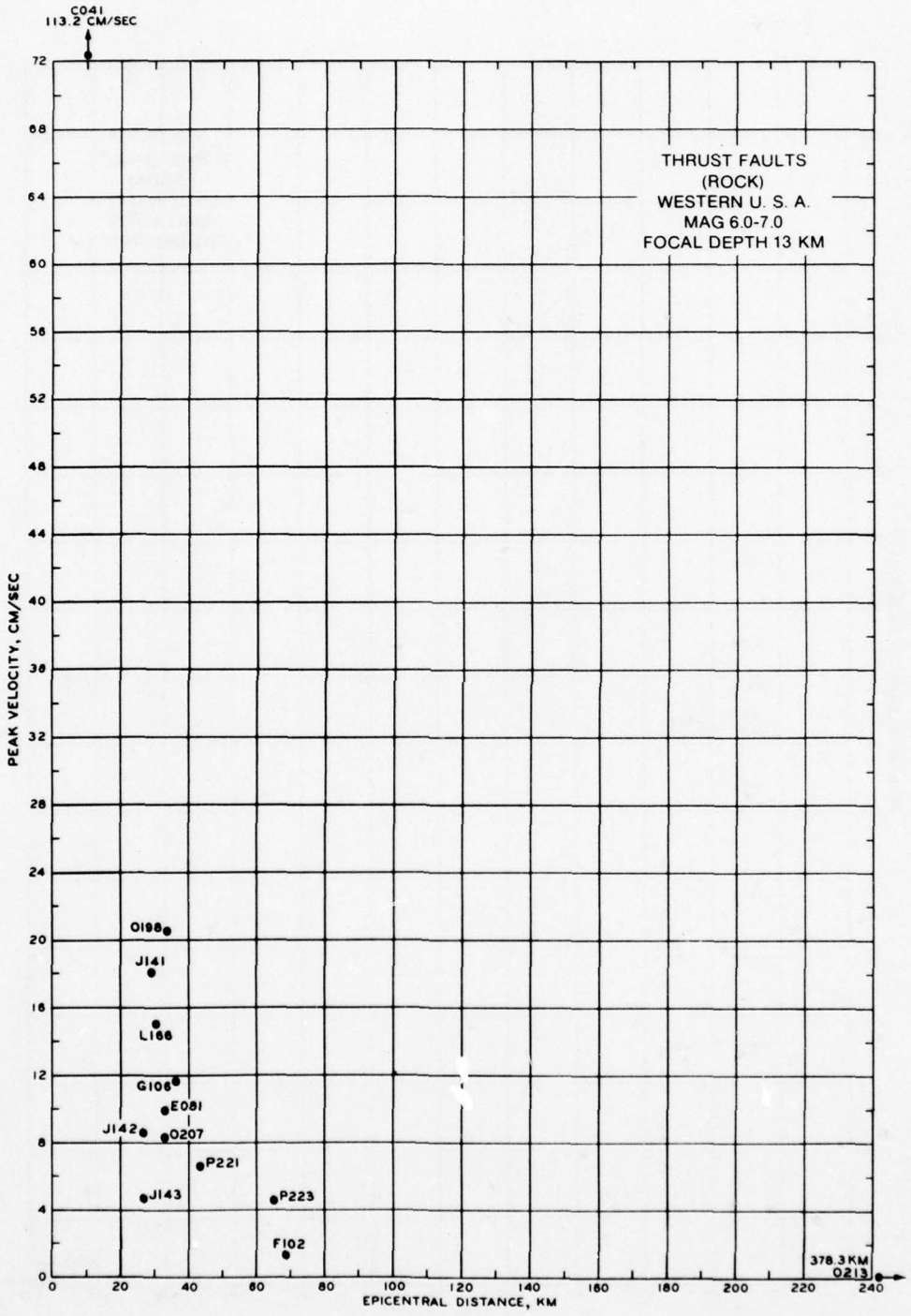

Figure 18. Peak velocity versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in rock sites

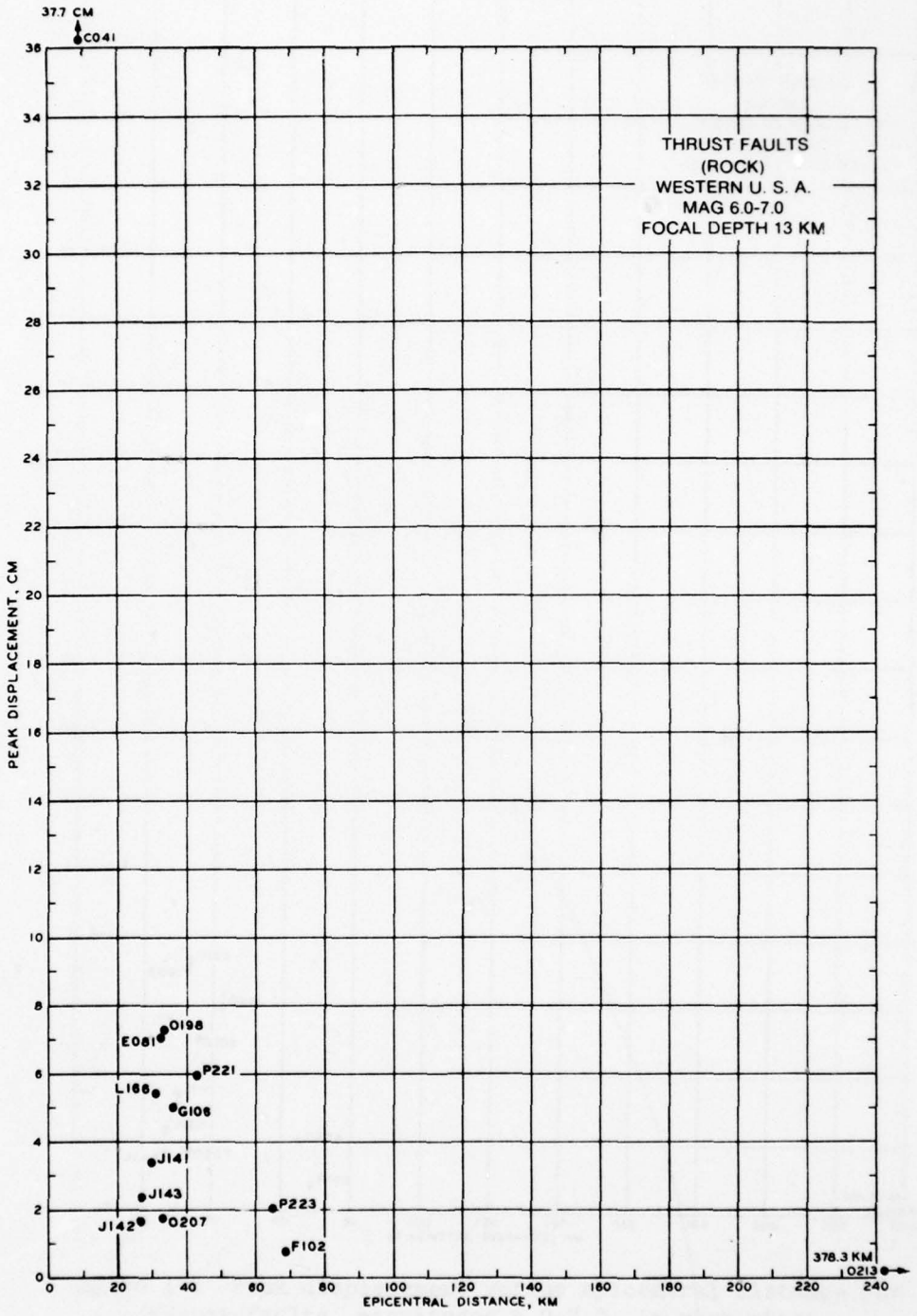

Figure 19. Peak displacement versus epicentral distance for thrust faults, magnitudes 6.0-7.0, in rock sites

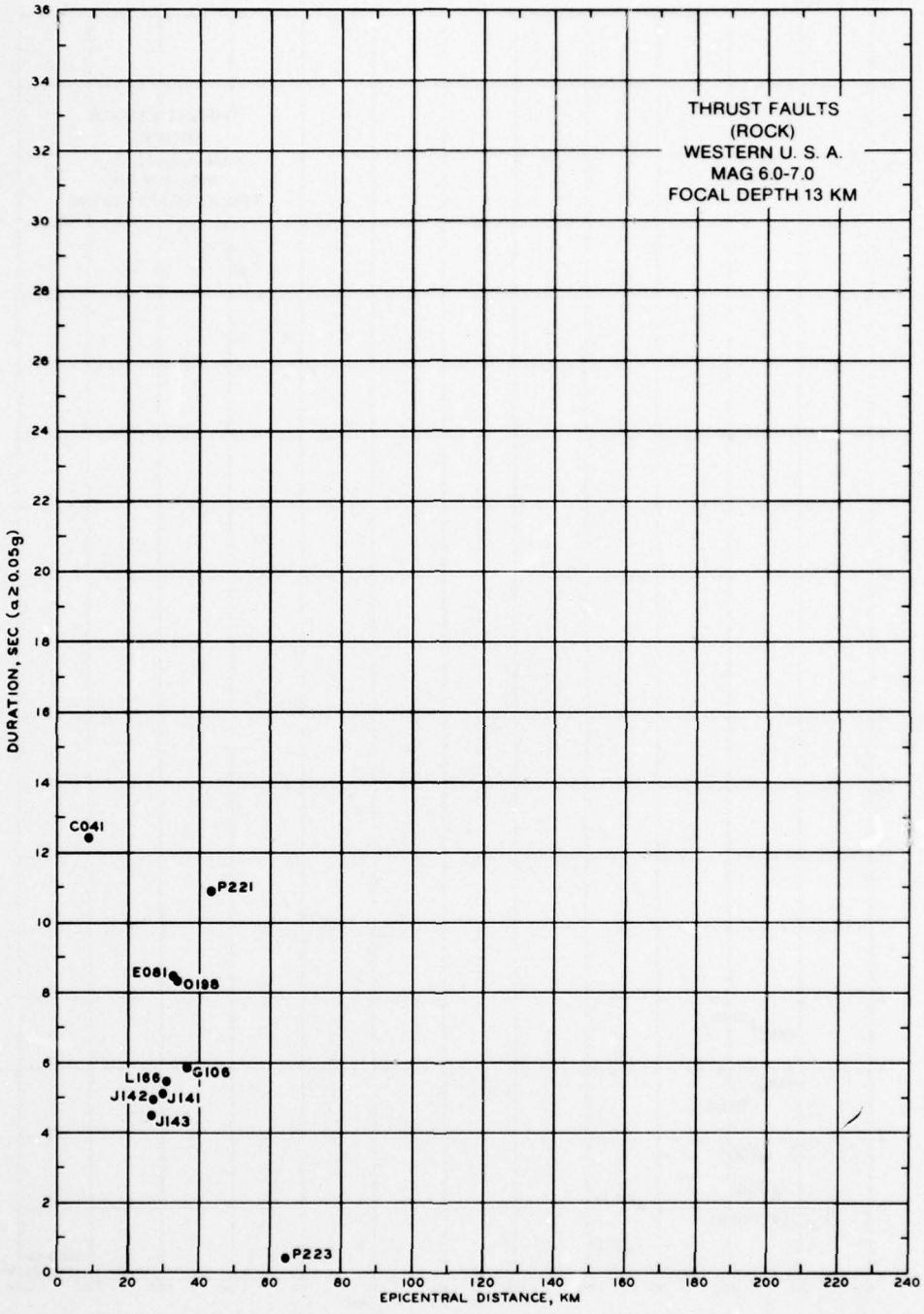

Figure 20. Bracketed duration ($a \geq 0.05$ g) versus distance for thrust faults, magnitudes 6.0-7.0, in rock sites

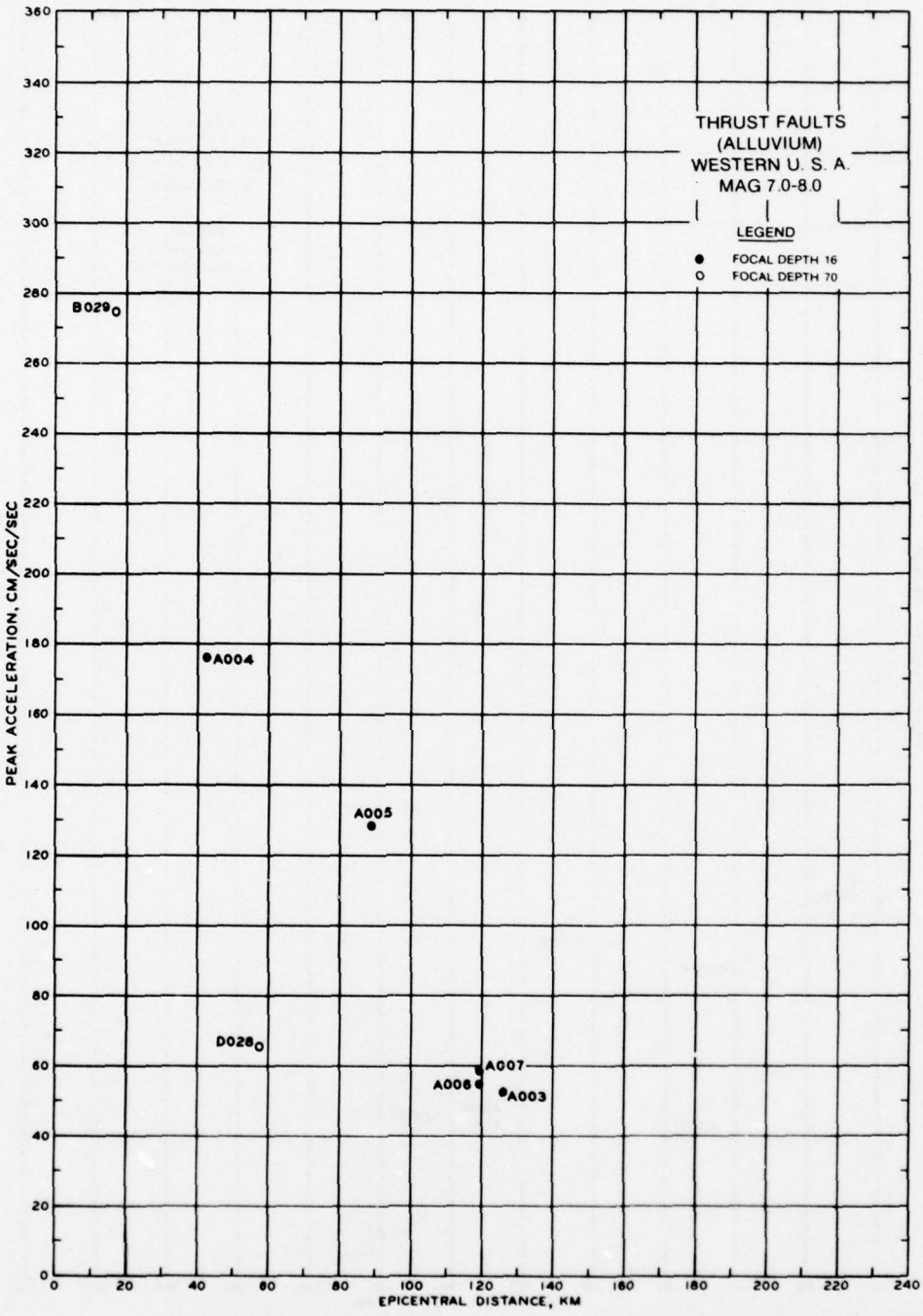

Figure 21. Peak acceleration versus epicentral distance for thrust faults, magnitudes 7.0-8.0, in alluvial sites

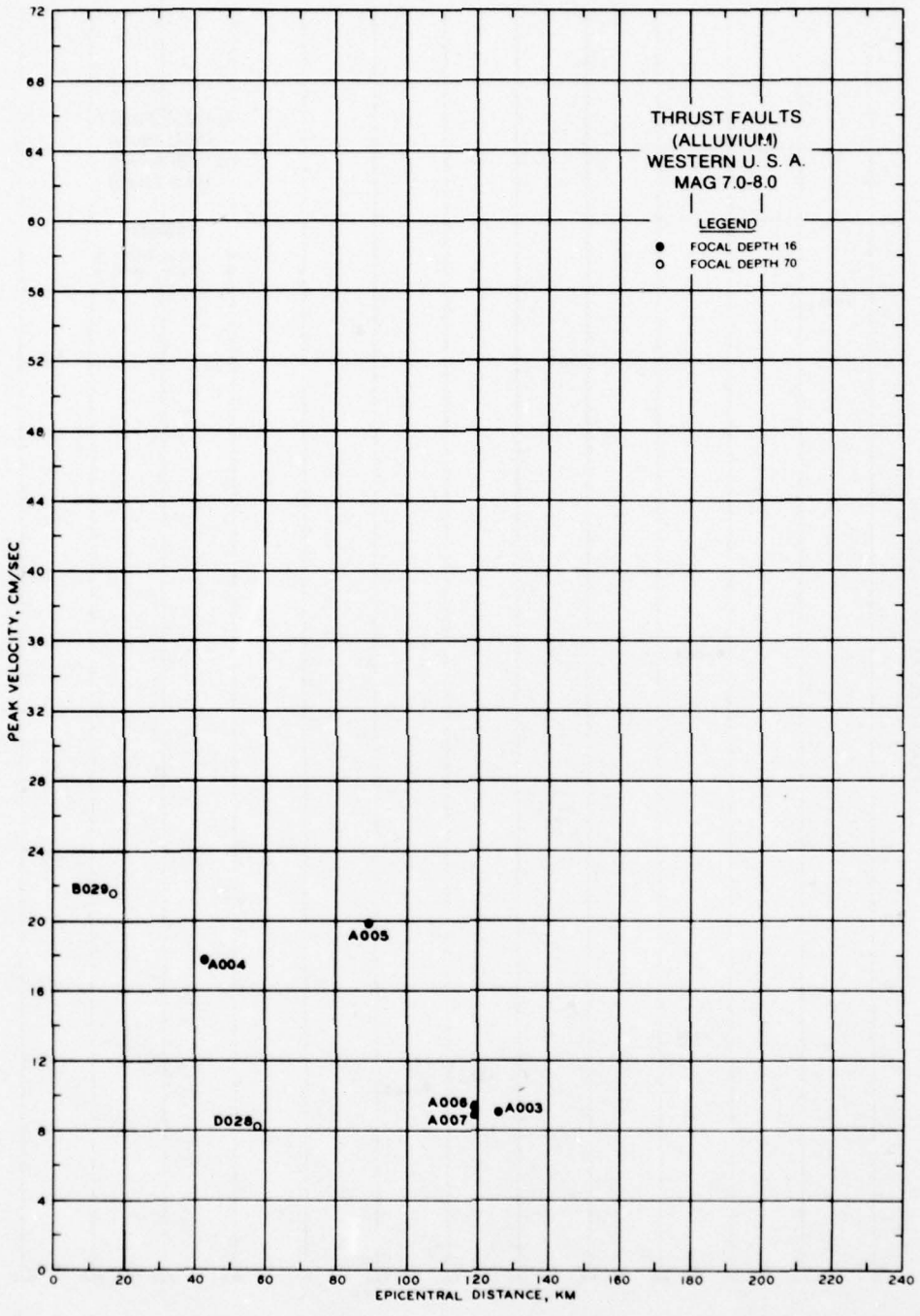

Figure 22. Peak velocity versus epicentral distance for thrust faults, magnitudes 7.0-8.0, in alluvial sites

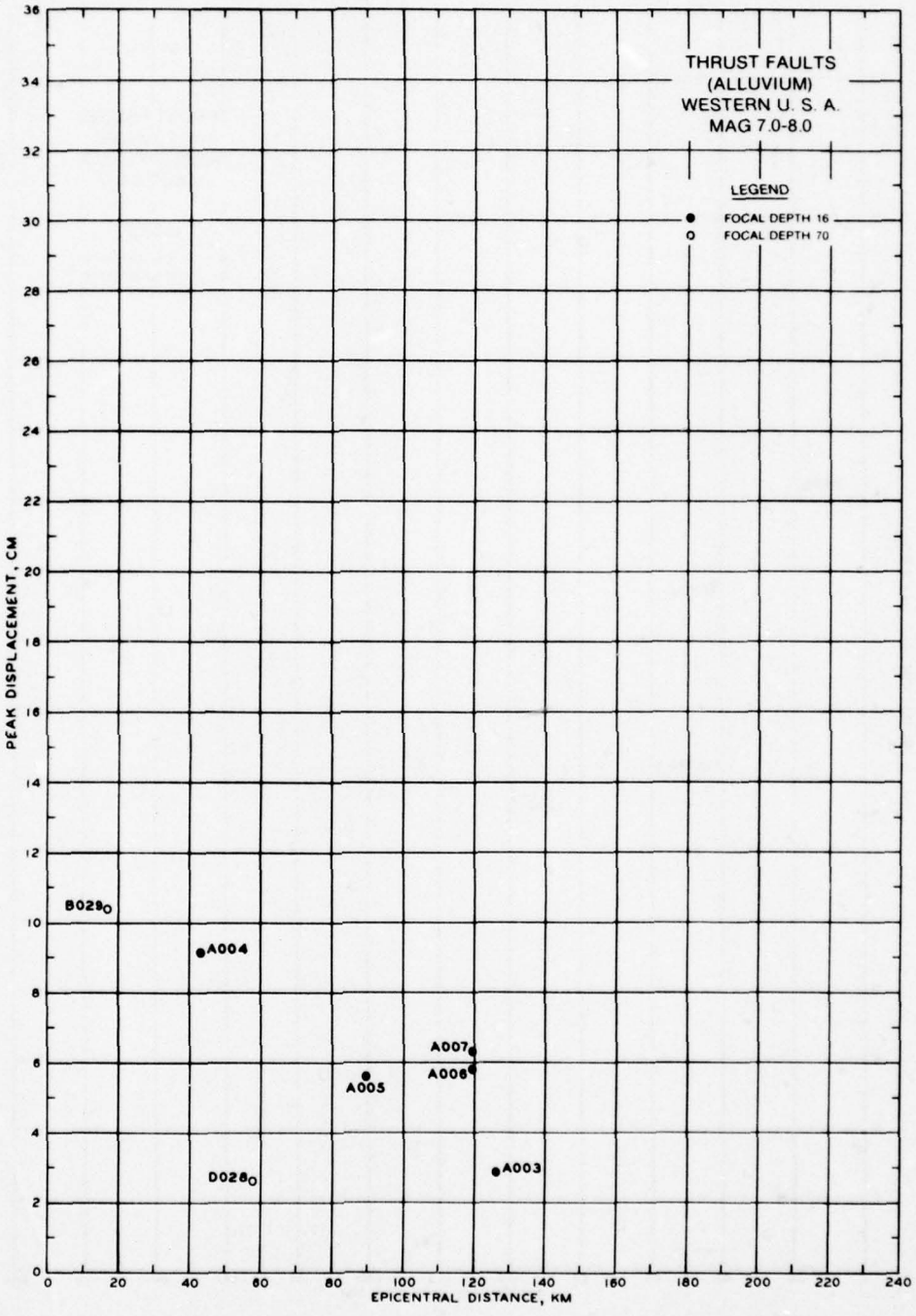

Figure 23. Peak displacement versus epicentral distance for thrust faults, magnitudes 7.0-8.0, in alluvial sites

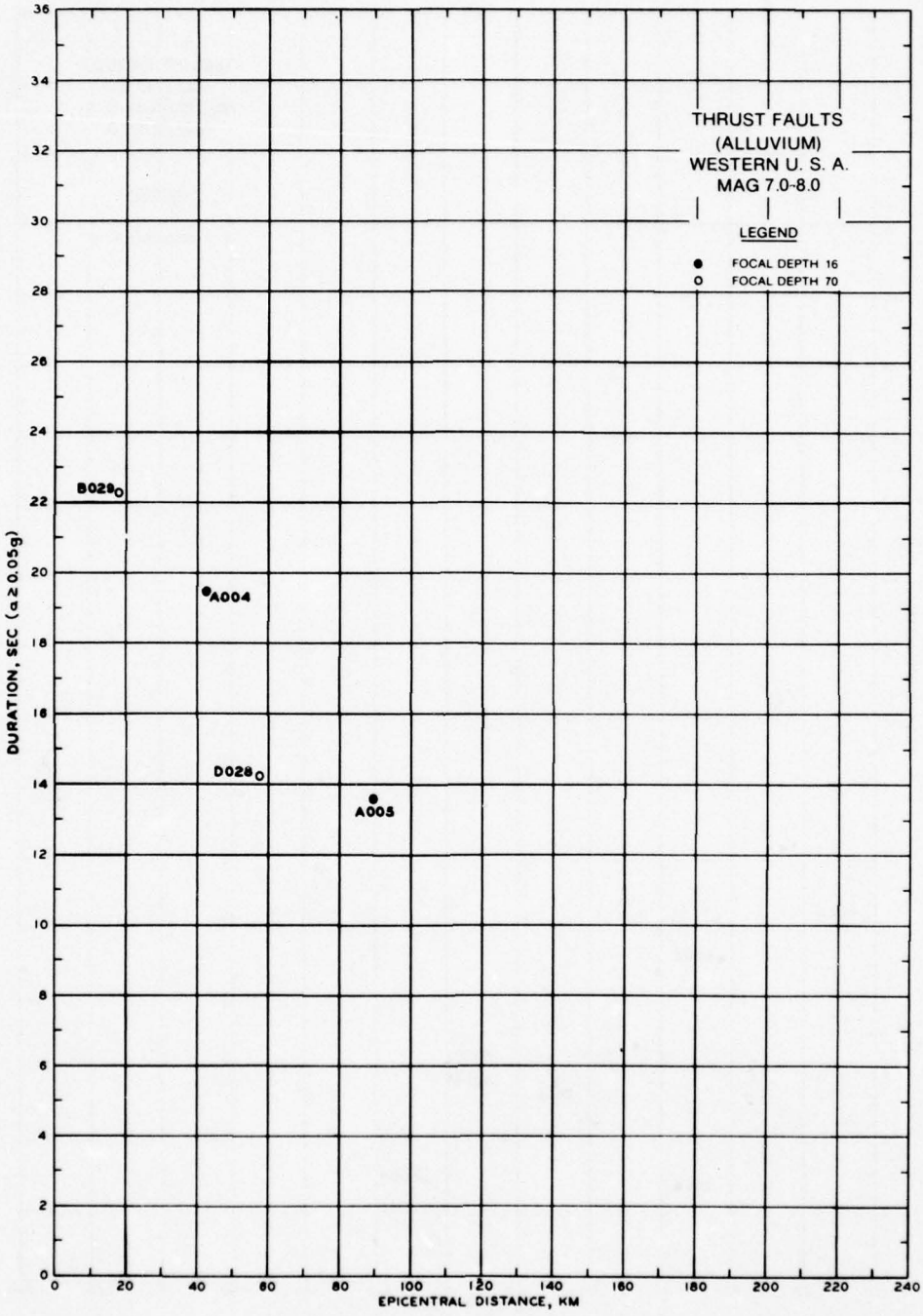

Figure 24. Bracketed duration ($a \geq 0.05$ g) versus epicentral distance for thrust faults, magnitudes 7.0-8.0, in alluvial sites

Appendix A: Strong Motion Data, Earthquakes of Western United States, 1933-1971

(Columns 1 to 10: California Institute of Technology, Earthquake Engineering Research Laboratory, "Strong Motion Earthquake Accelerograms; Corrected Accelerograms and Integrated Ground Velocities and Displacements," Vol 2, Parts A-Y, 1971-1975, Pasadena, Calif. Columns 11 to 16: Compilation prepared at WES.)

CIT File No.	Recording Station	(1) Site Classification*	(2) Date of Earthquake	(3) Epicenter Location	(4) Instrument Component	(5) Peak Acceleration cm/sec²	(6) Peak Velocity cm/sec	(7) Peak Displacement cm	(8) Epicentral Distance km	(9) Richter Magnitude M	(10) Modified Mercalli Intensity	(11) Approximate Record Length sec	(12) Duration (a ≥ 0.05 g) sec	(13) Predominant Period, sec 1**	2**	3**	(14) Focal Depth km	(15) Type of Fault	(16) Reference No.†
A001	El Centro Site, Imperial Valley	A	5-18-40	32°44' N 115°27' W	S 00° E S 90° W Up	341.7 210.1 206.3	33.4 36.9 10.8	10.9 19.8 5.6	9.3	6.7	VIII	30	25.86 25.40 13.26	0.6141 1.1035 0.3289	0.18 0.19 0.11	0.25 0.50 0.35	16	Strike-slip	
A002	Northwest California Earthquake, Ferndale City Hall	I	10-7-51	40°17' N 124°48' W	S 44° W N 46° W Up	102.0 109.5 26.4	4.8 7.4 2.2	2.4 2.7 1.6	56.3		V		0.40 2.48	0.2956 0.4246 0.5236	0.17 0.20 0.36	0.20 0.30	16		
A003	Kern County Earthquake Athenaeum	A	7-21-52	35°00' N 119°02' W	S 00° E S 90° W Up	46.5 52.1 29.3	6.2 9.1 4.5	2.7 2.9 3.0	126.0	7.7	VII	50		0.8377 1.0974 0.9649	0.63 0.68 0.73		16	Thrust	
A004	Kern County Earthquake Taft Lincoln School	A	7-21-52	35°00' N 119°02' W	N 21° E S 69° E Up	152.7 175.9 102.9	15.7 17.7 6.7	6.7 9.2 5.0	43.0	7.7	VII	54	19.50 15.12 13.54	0.6460 0.6322 0.4091	0.24 0.41 0.54	0.35 0.45 0.35	16	Thrust	
A005	Kern County Earthquake Santa Barbara Courthouse	A	7-21-52	35°00' N 119°02' W	N 42° E S 48° E Up	87.8 128.6 43.6	11.8 19.3 5.0	4.6 5.8 2.2	89.5	7.7	VII	54 60	13.64 8.62	0.8444 0.9429 0.7205	0.47 0.50 0.18	0.50 0.90	16	Thrust	
A006	Kern County Earthquake Hollywood Storage Basement	A	7-21-52	35°00' N 119°02' W	S 00° W N 90° E Up	54.1 43.5 22.5	6.1 9.4 4.2	5.1 5.9 2.2	119.5	7.7	VII	82 82		0.7084 1.3577 1.1728	0.42 0.67 0.55		16	Thrust	
A007	Kern County Earthquake Hollywood Storage P. E. Lot	A	7-21-52	35°00' N 119°02' W	S 00° W N 90° E Up	58.1 41.2 20.3	6.6 8.9 3.0	4.5 6.4 3.4	119.5	7.7	VII	79 79		0.7137 1.3572 0.9285	0.62 0.30 0.09		16	Thrust	
A008	Eureka Earthquake Eureka Federal Bldg	I	12-21-54	32°38' N 117°07' W	N 11° W N 79° E Up	164.5 252.7 81.3	31.6 29.4 8.2	12.4 14.1 4.7	24.0	6.5	VII	26 30	3.80 6.02 0.80	1.2069 0.7310 0.6337	0.40 0.50 0.14	0.40 0.40 0.15	16		
A009	Eureka Earthquake Ferndale City Hall	I	12-21-54	32°38' N 117°07' W	N 44° E N 46° W Up	155.7 197.3 41.9	35.6 26.0 7.6	14.2 9.6 3.9	40.4	6.5	VII	30 20	10.04 8.50	1.4366 0.8279 1.1396	1.30 1.30 0.9	0.40 0.80	16		
A010	San Jose Earthquake San Jose Bank of America Basement	A	7-4-55	37°22" N 121°53' W	N 31° W N 59° E Up	100.2 105.8 44.2	10.8 4.4 1.2	2.8 1.7 1.2	9.8	5.5	VII	30	0.82 0.42	0.6785 0.2613 0.1705	0.20 0.20	0.30 0.20	16		
A011	El Alamo, Baja California Earthquake, El Centro Site, Imperial Valley Irrigation District	A	2-9-56	31°45' N 115°55' W	S 00° W S 90° W Up	32.4 50.1 12.4	4.0 7.0 2.9	2.4 4.1 1.6	125.9	6.8	VI	70		0.7757 0.8778 1.4694 1.0117	0.4 0.7 0.2 0.9				
A012	El Alamo, Baja California Earthquake, El Centro Site, Imperial Valley Irrigation District (Aftershock)		2-9-56	31°45' N 115°55' W	S 00° W S 90° W Up	11.8 15.4 3.7	1.9 2.7 1.8	1.7 2.3 2.9	125.9	6.4				1.1016 3.0566	0.6 0.2				
A013	San Francisco Earthquake, San Francisco Pacific Bldg	I	3-22-57	37°40' N 122°29' W	N 45° S N 45° W Up	45.9 44.9 26.8	2.9 5.0 1.5	1.1 1.4 0.9	16.8	5.3	VII	26		0.3969 0.6996 0.3516	0.2 0.4 0.2		11	Strike-slip	1
A014	San Francisco Earthquake, San Francisco Alexander Bldg Basement	I	3-22-57	37°40' N 122°29' W	N 09° W N 81° E Up	41.8 45.4 30.0	2.9 2.1 1.3	1.3 1.0 0.4	15.2	5.3	VII	25		0.4359 0.2906 0.2722	0.1 0.3 0.2		11	Strike-slip	2
A015	San Francisco Earthquake, San Francisco Golden Gate Park	HR	3-22-57	37°40' N 122°29' W	N 10° E S 80° E Up	81.8 102.8 37.2	4.9 4.6 1.2	2.3 0.8 0.7	11.8	5.3	VII	12	0.28 1.30	0.3763 0.2811 0.2026	0.1 0.1 0.09	0.25 0.20	11	Strike-slip	
A016	San Francisco Earthquake, San Francisco State Bldg Basement	I	3-22-57	37°40' N 122°29' W	S 09° W S 81° W Up	83.8 55.1 43.5	5.1 4.0 8.3	1.1 0.9 0.6	14.6	5.3	VII		0.30 1.26	0.3823 0.4561 0.3322	0.3 0.2 0.3	0.25 0.40	11	Strike-slip	

(Continued)

NOTE: Locations in California unless otherwise noted.

* A = alluvium, I = intermediate, and HR = hard rock.

** 1. $T = 2\pi * v/a$; 2. Published in "United States Earthquakes" by Coast and Geodetic Survey; 3. Largest amplitude in acceleration response spectrum.

† References listed at end of this appendix.

CIT File No.	Recording Station	(1) Site Classification*	(2) Date of Earthquake	(3) Epicenter Location	(4) Instrument Component	(5) Peak Acceleration cm/sec^2	(6) Peak Velocity cm/sec	(7) Peak Displacement cm	(8) Epicentral Distance km	(9) Richter Magnitude M	(10) Modified Mercalli Intensity	(11) Approximate Record Length sec	(12) Duration (a $\geq$ 0.05 g) sec	(13) Predominant Period, sec 1**	2**	3**	(14) Focal Depth km	(15) Type of Fault	(16) Reference No.†
A017	San Francisco Earthquake, Oakland City Hall Basement	I	3-22-57	37°40' N 122°29' W	N 26° E S 64° E Up	39.0 23.7 15.3	2.0 1.2 0.9	1.5 1.1 1.3	24.3	5.3	VI			0.32 0.32 0.37	0.2 0.2 0.07		11	Strike-slip	
A018	Holister Earthquake Holister City Hall	A	4-8-61	36°40' N 121°18' W	S 01° W N 89° W Up	63.4 175.7 49.1	7.8 17.1 4.7	2.8 8.8 2.2	40.0	5.6	VII	30	10.00 9.04	0.77 0.61 0.60	0.20 0.31 0.17	0.55 0.40	11	Strike-slip	3
A019	Borrego Mt Earthquake El Centro Site, Imperial Valley Irrigation District	A	4-6-68	33°09' N 116°08' W	S 00° W S 90° W Up	127.8 56.3 29.7	25.8 14.7 3.4	12.2 11.0 3.9	69.8	6.5	VI	60	2.56	1.27 1.64 0.72	1.27 1.05 0.16	0.25	20	Strike-slip	3
A020	Borrego Mt Earthquake San Diego Light & Power Bldg	A	4-8-68	33°09' N 116°08' W	S 00° W N 90° E Up	29.5 28.9 12.7	6.0 6.1 1.9	4.4 3.0 1.3	109.9	6.5	VI	30		1.28 1.33 0.94			20	Strike-slip	3
B021	Long Beach Earthquake Vernon CMD Bldg	A	3-10-33	33°35' N 117°59' W	N 08° E S 82° E Up	130.6 151.5 149.5	28.7 17.0 12.0	15.5 17.5 7.4	47.8	6.3	VI	30	1.72 5.82 3.64	1.38 0.70 0.50	0.70 0.70 0.70	0.30 0.30 0.20	10	Strike-slip	
B022	Southern California Earthquake, Hollywood Storage Bldg Penthouse	A	10-2-33	33°47' N 118°08' W	S 00° E S 90° W Up	43.3 85.4 26.8	5.2 9.4 1.9	1.8 4.3 0.9	38.2	5.4	V		8.04	0.75 0.69 0.44	0.74 0.54 0.50	0.55	10	Strike-slip	
B023	*Southern California* Earthquake, Hollywood Storage Bldg Basement	A	10-2-33	33°47' N 118°08' W	S 00° E S 90° E Up	32.1 26.4 10.7	2.0 2.2 0.9	0.8 0.4 0.5	38.2	5.4	V			0.39 0.52 0.53	0.45 0.70 0.50		10	Strike-slip	
B024	Lower California Earthquake, El Centro Imperial Valley	A	12-30-34	32°12' N 115°30' W	N 00° E N 90° E Up	156.8 179.1 68.1	20.5 11.5 8.8	4.2 3.7 5.6	60.8	6.5	VI	30	12.86 18.12 11.70	0.82 0.40 0.81	0.25 0.25 0.10	0.25 0.25 0.25	16	Strike-slip	
B025	Helena, Montana Earthquake, Helena, Montana, Carroll College	HR	10-31-35	46°37' N 111°58' W	N 00° E N 90° E Up	143.5 142.5 87.5	7.3 13.3 9.5	1.4 3.7 2.8	6.6	6.0	VII	5	1.46 1.30 0.48	0.32 0.59 0.68	0.15 0.15 0.12	0.15 0.30 0.25	8	Normal	
B026	1st Northwest California Earthquake Ferndale City Hall	I	9-11-38	40°18' N 124°48' W	S 45° W N 45° W Up	140.9 87.1 31.6	6.6 6.6 1.4	3.9 1.6 0.6	55.3	5.5	VI		1.32 1.24	0.29 0.48 0.28	0.18 0.18 0.18	0.30 0.20	16		
B027	2nd Northwest California Earthquake Ferndale City Hall	I	2-9-41	40°54' N 125°24' W	S 45° W N 45° W Up	61.3 38.4 19.2	3.5 3.4 2.1	2.0 2.2 1.9	98.4	6.6	VI			0.36 0.57 0.69	0.25 0.33 0.56		16		
B028	Western Washington Earthquake, District Engineers Office at Army Base	A	4-13-49	46°06' N 122°42' W	S 02° W N 88° W Up	66.5 65.9 22.0	8.2 7.9 2.4	2.4 2.7 2.3	57.8	7.1	VIII		14.32 0.92	0.77 0.75 0.68	0.88 0.36 0.63	0.90 0.30	70	Thrust	4
B029	Western Washington Earthquake, Olympia, Washington, Highway Test Laboratory	A	4-13-49	46°06' N 122°42' W	S 04° E S 86° W Up	161.6 274.6 90.6	21.4 17.0 6.8	8.5 10.4 4.0	16.8	7.1	VIII	26	22.30 21.04 18.36	0.83 0.39 0.47	0.41 0.34 0.10	0.30 0.35 0.30	70	Thrust	4
B030	Northern California Earthquake, Ferndale City Hall	I	9-22-52	40°12' N 124°25' W	S 44° W N 46° W Up	53.1 74.1 29.2	6.9 4.7 3.0	2.0 1.9 1.5	43.2	5.5	VI		0.06	0.82 0.40 0.64	0.46 0.43	0.20	16		
B031	Wheeler Ridge, California Earthquake, Taft Lincoln School Tunnel	A	1-12-54	35°00' N 119°01' W	N 21° E S 69° E Up	63.9 66.8 35.5	5.8 3.6 2.4	1.7 1.1 2.9	43.0	5.9	VII		0.02 0.02	0.57 0.34 0.42	0.30 0.20 0.20	0.30 0.20			
B032	Puget Sound, Washington Earthquake, Olympia, Washington, Highway Test Laboratory	A	4-29-65	47°24' N 122°18' W	S 04° E S 86° W Up	134.2 194.3 59.9	8.0 12.7 3.0	2.7 3.8 1.7	61.1	6.5	VII	32	10.18 9.20 1.12	0.37 0.41 0.31	0.16 0.12 0.05	0.15 0.25 0.20	60	Dip-slip normal	5
B033	Parkfield, California Earthquake, Cholame, *Shandon Array No. 2*	A	6-27-66	35°54' N 120°54' W	N 65° E Down	479.6 202.2	77.9 14.1	26.3 4.3	31.9	5.6	VII	14	11.74 6.90	1.02 0.44	0.60 0.10	0.45 0.65	8.6	Strike-slip	

(Continued)

CIT File No.	Recording Station	(1) Site Classification*	(2) Date of Earthquake	(3) Epicenter Location	(4) Instrument Component	(5) Peak Acceleration cm/sec^2	(6) Peak Velocity cm/sec	(7) Peak Displacement cm	(8) Epicentral Distance km	(9) Richter Magnitude M	(10) Modified Mercalli Intensity	(11) Approximate Record Length sec	(12) Duration (a ≥ 0.05 g) sec	(13) Predominant Period, sec 1**	2**	3**	(14) Focal Depth km	(15) Type of Fault	(16) Reference No.†
B034	Parkfield, California Earthquake, Cholame, Shandon Array No. 5	A	6-27-66	35°54' N 120°54' W	N 05° W	347.8	22.5	5.2	32.4	5.6	VI		6.64	0.41	0.3	0.30		Strike-slip	
					N 85° E	425.7	25.4	7.1				22	7.30	0.37	0.3	0.35	8.6		
					Down	116.9	6.8	3.4					7.32	0.37	0.1	0.15			
B035	Parkfield, California Earthquake, Cholame, Shandon Array No. 8	A	6-27-66	35°54' N 120°54' W	N 50° E	232.6	10.8	4.4	34.1	5.6	VI		7.84	0.29	0.1	0.15		Strike-slip	
					N 40° W	269.6	11.8	3.9				20	5.70	0.28	0.2	0.20	8.6		
					Down	77.7	4.5	2.1					3.94	0.36	0.1	0.90			
B036	Parkfield, California Earthquake, Cholame, Shandon Array No. 12	A	6-27-66	35°54' W 120°54' W	N 50° E	52.1	7.0	4.1	36.5	5.6	VI			0.84	0.3			Strike-slip	
					N 40° W	63.2	8.0	5.7						0.79	0.2		8.6		
					Down	44.6	5.0	2.6						0.70	0.1				
B037	Parkfield, California Earthquake, Temblor No. 2	HR	6-27-66	35°54' N 120°54' W	N 65° W	264.3	14.5	4.7	31.0	5.6	VII		2.90	0.34	0.3	0.25		Strike-slip	
					S 25° W	340.8	22.5	5.5				22	2.08	0.41	0.2	0.35	8.6		
						129.8	4.4	1.4					0.58	0.21	0.2	0.15			
B038	Parkfield, California Earthquake, San Luis Obispo Recreation Bldg	I	6-27-66	35°54' N 120°54' W	N 36° W	14.2	1.1	1.2	76.1	5.6	V			0.49				Strike-slip	
					S 54° W	11.4	0.8	0.6						0.44			8.6		
					Up	6.1	1.3	0.9						1.34					
B039	2nd Northern California Earthquake, Eureka Federal Bldg	I	12-10-67	40°30' N 124°36' W	S 11° E	20.4	2.3	0.9	50.6	5.8	V			0.71				Strike-slip	1
					N 79° E	19.5	2.8	1.4						0.90			10-20		
					Down	7.7	1.5	1.3						1.22					
B040	Borrego Mountain Earthquake, San Onofre SCE Power Plant	I	4-8-68	33°09' N 116°08' W	N 33° E	40.0	3.7	1.6	134.4	6.5	V			0.58				Strike-slip	3
					N 57° W	45.5	4.2	2.9						0.58			20		
					Down	54.2	3.5	1.7						0.41					
C041	San Fernando Earthquake Pacoima Dam	HR	2-9-71	34°24' N 118°23'42" W	S 16° E	1148.1	113.2	37.7	9.1	6.6	X	16	11.36	0.62	0.2	0.40		Thrust	
					S 74° W	1054.9	57.7	10.8				14	12.44	0.34	0.3	0.45	13		
					Down	696.0	58.3	19.3					10.50	0.53	0.3	0.25			
C042	San Fernando Earthquake Aftershock at 52.6 sec, Pacoima Dam		2-9-71	34°24' N 118°23'42" W	S 74° W	27.1	2.9	1.7						0.67				Thrust	
					S 16° E	20.7	1.5	0.9						0.45			13		
					Down	8.2	1.1	1.0						0.84					
C044	San Fernando Earthquake Aftershock at 104.6 sec, Pacoima Dam		2-9-71	34°24' N 118°23'42" W	S 74° W	109.9	4.8	2.2						0.27				Thrust	
					S 16° E	113.2	4.7	2.3						0.26			13		
					Down	40.5	1.8	1.0						0.28					
C048	San Fernando Earthquake 8244 Orion Blvd, 1st Floor, Holiday Inn	A	2-9-71	34°24' W 118°23'42" W	N 00° W	250.0	30.0	14.9	22.4	6.6	VII	41	17.22	0.75	0.6	0.65		Thrust	
					S 90° W	131.7	23.9	13.8					17.82	1.14	0.3	0.35	13		
					Down	167.5	32.0	14.6					22.22	1.20	0.3	0.30			
C051	San Fernando Earthquake 250 East First St, Basement, Los Angeles	A	2-9-71	34°24' W 118°23'42" W	N 36° E	97.8	17.1	9.2	42.8	6.6	VII	15	8.16	1.10	0.1	0.40		Thrust	
					N 54° W	122.7	21.9	11.6					6.16	1.12	0.2	0.45	13		
					Down	48.0	7.8	5.8						1.02					
C054	San Fernando Earthquake 445 Figueroa St, Subbasement, Los Angeles	I,A	2-9-71	34°24' W 118°23'42" W	N 52° W	147.1	17.4	11.8	41.9	6.6	VII	40	5.52	0.74	0.4	0.45		Thrust	
					S 38° W	117.0	17.3	11.8				40	9.92	0.93	0.3	0.25	13		
					Down	51.7	10.7	5.1						1.30	0.2				
D056	San Fernando Earthquake Old Ridge Route Castaic	I	2-9-71	34°24' N 118°23.7' W	N 21° E	309.4	16.5	4.2	28.6	6.6	VI		13.78	0.33	0.3	0.35		Thrust	
					N 69° W	265.4	27.2	9.3				30	17.24	0.64	0.2	0.20	13		
					Down	153.3	6.2	14.0					7.42	0.25	0.2	0.20			
D057	San Fernando Earthquake Hollywood Storage Basement	A	2-9-71	34°24' N 118°23.7' W	S 00° W	103.8	17.0	8.6	37.1	6.6	VII		9.70	1.03	0.4	0.25		Thrust	
					N 90° E	148.2	19.4	13.1				40	7.74	0.82	0.3	0.25	13		
					Up	49.8	6.0	3.8						0.75					
D058	San Fernando Earthquake Hollywood Storage P. E. Lot	A	2-9-71	34°24' N 118°23.7' W	S 00° W	167.3	16.5	8.0	37.1	6.6	VII	21	5.98	0.62	0.4	0.25		Thrust	
					N 90° E	207.0	21.1	14.7				21	7.72	0.64	0.2	0.25	13		
					Up	87.0	5.0	3.0					6.00	0.36	0.1	0.35			
D059	San Fernando Earthquake 1901 Ave, The Stars Subbasement	A	2-9-71	34°24' N 118°23.7' W	N 46° W	133.8	9.6	7.5	39.8	6.6	VII	55	6.14	0.45	0.2	0.15		Thrust	
					S 44° W	147.1	16.7	12.2				55	6.80	0.71	0.1	0.15	13		
					Down	66.7	4.8	2.5						0.45	0.2				

(Continued)

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D062	San Fernando Earthquake 1640 South Marengo St 1st Floor, Los Angeles	A	2-9-71	34°24' N 118°23.7' W	N 38° W	118.0	16.1	12.0	42.8	6.6	VII	30	6.68	0.86	0.2	0.20		Thrust	
					S 52° W	130.0	17.6	6.9				30	6.68	0.85	0.2	0.25	13		
					Down	74.6	9.0	4.1						0.76	0.2				
D065	San Fernando Earthquake 3710 Wilshire Blvd Basement, Los Angeles	A,I	2-9-71	34°24' N 118°23.7' W	S 00° W	146.7	18.0	10.3	40.0		VII	17	5.78	0.77	0.5	0.30		Thrust	
					S 90° W	155.7	22.1	12.9				17	6.06	0.89	0.4	0.30	13		
					Down	73.1	9.0	4.9					2.56	0.77	0.2	0.30			
D068	San Fernando Earthquake 7080 Hollywood Blvd Basement, Los Angeles	A	2-9-71	34°24' N 118°23.7' W	N 00° E	81.2	12.6	8.1	35.0	6.6	VII		3.60	0.97	0.3	0.30		Thrust	
					N 90° E	98.0	13.3	7.2					3.84	0.85	0.3	0.35	13		
					Down	57.2	5.6	4.2						0.62	0.2				
E071	San Fernando Earthquake Wheeler Ridge	A	2-9-71	34°24' N 118°23.7' W	S 00° W	26.5	1.9	1.4	86.0	6.6	V			0.45	0.1			Thrust	
					N 90° E	25.3	2.5	2.1						0.62	0.2		13		
					Down	13.0	2.4	3.3						1.16	0.1				
E072	San Fernando Earthquake 4680 Wilshire Blvd Basement, Los Angeles	I	2-9-71	34°24' N 118°23.7' W	N 75° W	82.2	20.8	14.7	39.5	6.6	VII	18	7.76	1.59	0.6	0.55		Thrust	
					N 15° E	115.0	21.5	11.7				18	5.50	1.17	0.4	0.15	13		
					Down	64.8	6.9	3.2					1.70	0.67	0.4	0.15			
E075	San Fernando Earthquake 3470 Wilshire Blvd Subbasement, Los Angeles	A	2-9-71	34°24' N 118°23.7' W	N 00° E	133.8	22.3	11.4	40.1	6.6	VII	22	5.10	1.05	0.3	0.30		Thrust	
					S 90° W	111.8	18.5	11.6					10.44	1.04	0.3	0.30	13		
					Down	47.3	7.3	3.9						0.97	0.2				
E078	San Fernando Earthquake Water and Power Bldg Basement, Los Angeles	I	2-9-71	34°24' N 118°23.7' W	N 50° W	126.5	23.2	13.7	42.5	6.6	VII	17	5.26	1.15	0.8	0.35		Thrust	
					S 40° W	169.2	16.1	8.9					5.68	0.59	0.2	0.30	13		
					Down	67.2	10.2	6.4						0.95	0.2				
E081	San Fernando Earthquake Santa Felicia Dam, Outlet Works	HR	2-9-71	34°24' N 118°23.7' W	S 08°E	213.0	9.9	7.0	32.9	6.6	VI	34	8.48	0.29	0.1	0.30		Thrust	
					S 82° W	198.3	6.2	4.6				34	3.48	0.20	0.1	0.55	13		
					Down	63.7	4.5	2.8					0.76	0.44	0.1	0.30			
E082	San Fernando Earthquake Santa Felicia Dam, Crest		2-9-71	34°24' N 118°23.7' W	S 15° E	203.3	22.2	7.1	32.8	6.6	VI	37		0.68				Thrust	
					S 75° W	174.0	18.1	5.3						0.65			13		
					Down	65.0	6.2	2.8						0.60					
E083	San Fernando Earthquake 3407 6th St, Basement, Los Angeles	A	2-9-71	34°24' N 118°23.7' W	S 00° W	158.2	18.3	9.0	40.0	6.6	VII	25	12.32	0.73	0.2	0.30		Thrust	
					N 90° E	161.9	16.5	10.3				25	12.60	0.64	0.1	0.15	13		
					Down	55.5	8.8	4.4					0.02	0.99	0.1	0.15			
F086	San Fernando Earthquake Vernon, CMD Bldg	A	2-9-71	34°24' N 118°23.7' W	N 83° W	104.6	17.4	14.8	49.4	6.6	V		5.52	1.05	0.5	0.45		Thrust	
					S 07° W	80.5	15.1	10.7					7.72	1.18	0.3	0.25	13		
					Up	42.7	6.7	4.0						0.99					
F087	San Fernando Earthquake Engineering Bldg Santa Ana, Orange County	A	2-9-71	34°24' N 118°23.7' W	S 04° E	26.8	5.0	3.6	88.5	6.6	VI			1.17	0.2			Thrust	
					S 86° W	28.2	8.0	5.7						1.78	0.3		13		
					Up	16.7	2.4	1.7						0.90	0.2				
F088	San Fernando Earthquake 633 East Broadway Municipal Service Bldg, Glendale	A,I	2-9-71	34°24' N 118°23.7' W	S 70° E	265.7	30.7	11.1	34.1	6.6	VII	27	6.02	0.73	0.28	0.60		Thrust	
					S 20° W	209.1	23.5	5.3				27	10.20	0.71	0.23	0.20	13		
					Down	131.5	15.6	5.6					9.62	0.74	0.14	0.80			
F089	San Fernando Earthquake 808 South Olive St Los Angeles	A	2-9-71	34°24' N 118°23.7' W	S 53° E	131.9	20.8	14.5	44.0	6.6	VII	22	6.52	0.99	0.6	0.45		Thrust	
					S 37° W	139.0	20.7	11.6				22	9.76	0.94	0.5	0.15	13		
					Down	75.3	9.9	6.0					2.96	0.83	0.6	0.30			
F092	San Fernando Earthquake 2011 Zonal Ave, Basement, Los Angeles	I	2-9-71	34°24' N 118°23.7' W	S 62° E	64.2	13.8	10.3	43.1	6.6	VII		2.56	1.35	0.4	0.15		Thrust	
					S 28° W	79.1	11.5	6.3					3.66	0.91	0.4	0.35	13		
					Down	48.7	7.1	3.8						0.92					
F095	San Fernando Earthquake 120 North Robertson Blvd, Subbasement, Los Angeles	A	2-9-71	34°24' N 118°23.7' W	S 88° E	96.2	16.8	10.6	37.4	6.6	VII		4.70	1.09	0.6	0.30		Thrust	
					S 02° W	83.9	17.9	12.1					5.96	1.34	0.4	0.50	13		
					Down	26.5	6.2	3.9						1.47					
F098	San Fernando Earthquake 646 South Olive Ave Basement, Los Angeles	A	2-9-71	34°24' N 118°23.7' W	S 53° E	236.4	21.8	13.2	42.7	6.6	VII	22	7.56	0.58	0.2	0.20		Thrust	
					S 37° W	192.0	18.5	13.4					9.80	0.60	0.2	0.20	13		
					Down	69.2	9.6	5.3					4.68	0.87	0.1	1.20			

(Continued)

CIT File No.	Recording Station	(1) Site Classification*	(2) Date of Earthquake	(3) Epicenter Location	(4) Instrument Component	(5) Peak Acceleration cm/sec²	(6) Peak Velocity cm/sec	(7) Peak Displacement cm	(8) Epicentral Distance km	(9) Richter Magnitude M	(10) Modified Mercalli Intensity	(11) Approximate Record Length sec	(12) Duration (a ≥ 0.05 g) sec	(13) Predominant Period, sec 1**	2**	3**	(14) Focal Depth km	(15) Type of Fault	(16) Reference No.†
F101	San Fernando Earthquake Edison Company Colton	A	2-9-71	34°24' N 118°23.7' W	S 00° W N 90° E Up	37.5 30.0 19.7	2.5 2.2 1.5	1.1 1.3 1.4	107.6	6.6	V			0.42 0.46 0.48	0.3 0.3 0.2		13	Thrust	
F102	San Fernando Earthquake Fort Tejon, Tejon	HR	2-9-71	34°24' N 118°23.7' W	N 00° E N 90° E Down	24.6 20.6 15.3	1.4 1.3 1.0	0.8 0.7 0.5	68.5	6.6	V			0.36 0.39 0.41	0.2 0.1 0.1		13	Thrust	
F103	San Fernando Earthquake Pumping Plant, Pearblossom	A	2-9-71	34°24' N 118°23.7' W	N 00° E N 90° W Down	91.5 120.5 47.4	4.4 5.4 2.3	2.5 2.4 1.7	45.4	6.6	V		7.72 7.48	0.30 0.28 0.30	0.1 0.1	0.15 0.15	13	Thrust	
F104	San Fernando Earthquake Oso Pumping Plant, Gorman	I	2-9-71	34°24' N 118°23.7' W	N 00° E N 90° W Down	85.2 103.1 35.5	8.5 6.0 3.8	2.0 2.3 1.2	52.2	6.6	V		6.00 1.80	0.63 0.36 0.67	0.2 0.2 0.2	0.20 0.20	13	Thrust	
F105	San Fernando Earthquake UCLA Reactor Laboratory, Los Angeles	A	2-9-71	34°24' N 118°23.7' W	S 00° W N 90° E Up	83.1 77.6 67.1	8.3 8.5 4.5	4.0 4.9 2.9	38.7	6.6	VII		3.76 1.86 5.40	0.68 0.69 0.42	0.1 0.2 0.2	0.20 0.30 0.15	13	Thrust	
G106	San Fernando Earthquake CIT Seismological Laboratory	HR	2-9-71	34°24'42" N 118°24'00" W	S 00° W S 90° W Down	87.5 188.6 83.5	5.8 11.6 5.7	1.6 5.0 2.3	36.1	6.6	VII	25	4.20 5.88 2.12	0.42 0.39 0.43	0.1 0.2 0.1	0.25 0.25 0.15	13	Thrust	
G107	San Fernando Earthquake Athenaeum, CIT	A	2-9-71	34°24'42" N 118°24'00" W	N 00° E N 90° E Down	93.5 107.3 92.9	7.9 14.3 6.6	3.0 7.3 2.6	39.8	6.6	VII	26	6.42 7.92 0.56	0.53 0.84 0.45	0.4 0.4 0.2	0.30 0.45 0.30	13	Thrust	
G108	San Fernando Earthquake CIT Millikan Library	A	2-9-71	34°24'42" N 118°24'00" W	N 00° E N 90° E Down	198.0 181.6 91.2	9.8 16.3 8.7	2.7 6.9 2.4	39.8	6.6	VII	35		0.31 0.56 0.60	0.3 0.4 0.4		13	Thrust	
G110	San Fernando Earthquake CIT Jet Propulsion Laboratory Basement	A,I	2-9-71	34°24'42" N 118°24'00" W	S 82° E S 08° W Down	207.8 139.0 126.3	13.4 9.0 5.7	5.0 2.9 2.6	31.5	6.6	VII	23	5.60 5.88 4.60	0.41 0.41 0.28	0.3 0.4 0.3	0.35 0.25 0.35	13	Thrust	
G112	San Fernando Earthquake 611 West Sixth St Basement, Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 52° W N 38° E Down	101.9 78.5 53.2	17.0 15.7 9.9	11.0 9.2 5.2	40.5	6.6	VII	45	7.42 4.00 1.30	1.05 1.26 1.17	0.3 0.2 0.2	0.60 0.60 0.25	13	Thrust	
G114	San Fernando Earthquake Palmdale Fire Station Storage Room Palmdale	A	2-9-71	34°24'42" N 118°24'00" W	S 60° E S 30° W Down	110.8 136.2 86.6	14.0 9.3 7.6	3.8 2.7 2.4	32.3	6.6	VI	30	10.88 11.44 5.46	0.80 0.43 0.55	0.2 0.2 0.1	0.25 0.30 0.20	13	Thrust	
H115	San Fernando Earthquake 15250 Ventura Blvd Basement	A	2-9-71	34°24'42" N 118°24'00" W	N 11° E N 79° W Down	220.6 146.0 94.5	28.2 23.5 9.3	13.4 10.3 4.3	29.3	6.6	VII	39	16.82 17.90 9.34	0.80 1.01 0.62	0.2 0.3 0.1	0.25 0.40 0.40	13	Thrust	
H118	San Fernando Earthquake 8639 Lincoln Ave Basement, Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	S 45° E S 45° W Down	33.7 32.7 41.0	11.8 9.1 6.9	8.8 7.8 3.9	50.2	6.6	VI	76		2.20 1.75 1.06	0.4 0.8 0.3		13	Thrust	
H121	San Fernando Earthquake 900 South Fremont Ave Basement, Alhambra	A	2-9-71	34°24'42" N 118°24'00" W	S 90° W S 00° W Down	119.4 112.3 79.2	17.1 10.5 8.2	8.6 4.4 3.4	41.1	6.6	VII	27	9.10 6.38 4.86	0.90 0.58 0.65	0.3 0.2 0.2	0.30 0.15 0.20	13	Thrust	
H124	San Fernando Earthquake 2600 Nutwood Ave Basement, Fullerton	A	2-9-71	34°24'42" N 118°24'00" W	S 90° W S 00° W Down	34.9 34.5 14.7	4.4 5.8 2.3	2.1 2.7 1.9	76.8	6.6	VI	34		0.79 1.06 0.98	0.3 0.4 0.2		13	Thrust	
I128	San Fernando Earthquake 435 North Oakhurst Ave Basement, Beverly Hills	A	2-9-71	34°24'42" N 118°24'00" W	N 00° E S 90° W Down	60.9 91.6 36.4	13.2 15.0 5.8	7.2 8.1 2.3					5.58	1.36 1.03 1.00	0.4 0.2 0.5	0.40	13	Thrust	
I131	San Fernando Earthquake 420 North Roxbury Dr 1st Floor, Beverly Hills	A	2-9-71	34°24'42" N 118°24'00" W	N 50° E N 40° W Down	184.3 160.6 37.2	17.2 14.1 4.5	9.2 6.1 2.3	38.2	6.6	VI	48	7.74 6.26	0.58 0.55 0.76	0.1 0.2 0.2	0.25 0.20	13	Thrust	

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I134	San Fernando Earthquake 1800 Century Park East, Basement (P3) Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 54° E	97.9	16.7	11.3	38.9	6.6	VII		5.12	1.07	0.4	0.40		Thrust	
					S 36° E	82.3	10.7	6.2					5.54	0.82	0.3	0.40	13		
					Down	62.5	5.7	2.5					0.30	0.57	0.3	0.30			
I137	San Fernando Earthquake 15910 Ventura Blvd Basement, Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	S 81° E	140.2	16.1	7.1	29.0	6.6	VII		19.50	0.72	0.4	0.45		Thrust	
					S 09° W	129.0	22.3	8.4				39	16.12	1.08	0.4	0.25	13		
					Down	99.9	7.9	2.6					10.20	0.49	0.3	0.40			
J141	San Fernando Earthquake Lake Hughes Array No. 1	HR	2-9-71	34°24'42" N 118°24'00" W	N 21° E	145.5	18.0	3.4	29.6	6.6	VI	22	3.54	0.78	0.7	0.70		Thrust	
					S 69° E	108.9	14.4	2.9					5.14	0.83	0.5	0.65	13		
					Down	93.0	11.7	2.9					5.96	0.79	0.1	0.70			
J142	San Fernando Earthquake Lake Hughes Array No. 4	HR	2-9-71	34°24'42" N 118°24'00" W	S 69° E	168.2	5.3	1.2	26.8	6.6	VI		4.94	0.20	0.2	0.15		Thrust	
					S 21° W	143.5	8.6	1.7				37	4.32	0.38	0.2	0.20	13		
					Down	150.8	6.8	1.6					4.82	0.28	0.2	0.20			
J143	San Fernando Earthquake Lake Hughes Array No. 9	HR	2-9-71	34°24'42" N 118°24'00" W	N 21° E	119.3	4.8	2.0	26.6	6.6	VI	27	4.50	0.25	0.1	0.15		Thrust	
					N 69° W	109.4	4.3	2.4					2.82	0.25	0.1	0.30	13		
					Down	71.5	2.5	2.2					2.68	0.25	0.1	0.45			
J144	San Fernando Earthquake Lake Hughes Array No. 12	I	2-9-71	34°24'42" N 118°24'00" W	N 21° E	346.2	14.7	1.8	23.3	6.6	VI	22	14.04	0.27	0.2	0.20		Thrust	
					N 69° W	277.9	12.4	8.9					14.00	0.28	0.2	0.25	13		
					Down	105.3	4.1	3.3					3.66	0.24	0.1	0.70			
J145	San Fernando Earthquake 15107 Van Owen St Basement, Los Angeles	A	2-9-71	34°24' N 118°23'42" W	S 00° W	113.9	31.5	17.5	34.9	6.6	VII	40	15.74	1.73	0.3	0.40		Thrust	
					S 90° W	103.4	28.8	15.3					16.26	1.75	0.3	0.40	13		
					Down	106.4	18.1	7.0					21.60	1.07	0.4	0.20			
J148	San Fernando Earthquake 616 South Normandie Ave, Basement, Los Angeles	A,I	2-9-71	34°24' N 118°23'42" W	N 00° E	107.6	16.2	7.3	39.9	6.6	VII		6.94	0.94	0.6	0.15		Thrust	
					S 90° W	112.0	17.5	11.1				19	10.24	0.98	0.2	0.30	13		
					Down	51.6	6.7	3.4						0.82	0.2				
L166	San Fernando Earthquake 3838 Lankershim Blvd Basement, Los Angeles	I	2-9-71	34°24' N 118°23'42" W	N 00° E	164.2	12.3	4.9	30.8	6.6	VII		5.42	0.47	0.2	0.15		Thrust	
					S 90° W	147.6	15.0	5.4				26	5.36	0.64	0.3	0.25	13		
					Down	69.7	5.0	2.4					6.14	0.45	0.2	0.35			
L171	San Fernando Earthquake Nuclear Power Plant San Onofre	I	2-9-71	34°24' N 118°23'42" W	N 33° E	12.0	1.8	2.1	139.8	6.6	V			0.94	0.2			Thrust	
					N 57° W	15.9	2.8	2.1				52		1.11	0.4		13		
					Down	10.3	1.5	2.0						0.91	0.2				
M176	San Fernando Earthquake 1150 South Hill St Subbasement, Los Angeles	A	2-9-71	34°24' N 118°23'42" W	N 37° E	83.4	20.9	13.7	42.9	6.6	VII	33	7.90	1.57	0.4	1.20		Thrust	
					S 53° E	116.0	17.7	13.7					7.06	0.96	0.4	1.10	13		
					Down	41.6	8.9	4.3						1.34	0.2				
M179	San Fernando Earthquake Tehachapi Pumping Plant, CWR Site Grapevine	I	2-9-71	34°24' N 118°23'42" W	S 00° W	20.8	1.1	0.7	70.7	6.6	VI			0.33				Thrust	
					N 90° E	46.7	2.6	0.9				13		0.35			13		
					Down	38.5	2.0	1.2						0.33					
M180	San Fernando Earthquake 4000 West Chapman Ave Basement, Orange	A	2-9-71	34°24' N 118°23'42" W	S 00° W	23.9	5.7	3.5	84.3	6.6	V			1.49				Thrust	
					S 90° W	29.9	8.5	6.5						1.78			13		
					Down	18.2	3.9	2.5				95		1.35					
M183	San Fernando Earthquake 6074 Park Dr, Ground Level, Wrightwood	I	2-9-71	34°24' N 118°23'42" W	N 65° W	42.4	3.8	1.2	70.8	6.6	V			0.56	0.2			Thrust	
					N 25° E	55.7	2.6	0.9				20		0.29	0.3		13		
					Down	22.9	2.0	1.2						0.55	0.1				
M184	San Fernando Earthquake 6074 Park Dr, Ground Level, Wrightwood	I	2-9-71	34°24' N 118°23'42" W	N 65° E	43.1	4.6	1.2	70.8	6.6	V	26		0.67	0.3			Thrust	
					S 25° W	57.2	2.9	0.7						0.32	0.3		13		
					Down	24.7	1.8	0.9						0.46	0.1				
N185	San Fernando Earthquake Carbon Canyon Dam Crest	I	2-9-71	34°24'42" N 118°24'00" W	S 50° E	67.3	3.3	1.7	75.6	6.6	V		3.02	0.31	0.2	0.35		Thrust	
					S 40° W	67.3	4.5	2.1				40	5.34	0.42	0.3	0.25	13		
					Down	41.5	2.5	1.6						0.38	0.2				

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N186	San Fernando Earthquake Whittier Narrows Dam	A	2-9-71	34°24'42" N 118°24'00" W	S 37° E	95.7	8.8	4.9	54.1	6.6	VI		2.76	0.58	0.2	0.20		Thrust	
					S 53° W	96.7	9.7	5.0				45	4.62	0.63	0.2	0.20	13		
					Down	58.6	3.6	2.3						0.38	0.1				
N187	San Fernando Earthquake San Antonio Dam Upland	A	2-9-71	34°24'42" N 118°24'00" W	N 75° W	55.7	3.1	0.7	72.1	6.6	VI		5.12	0.35	0.3	0.25		Thrust	
					N 15° E	75.9	3.7	0.8				25		0.31	0.3		13		
					Down	28.3	1.5	0.8						0.33	0.2				
N188	San Fernando Earthquake 1880 Century Park East, Parking, 1st Level, Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 54° E	114.4	17.0	10.8	38.9	6.6	VII	45	5.22	0.93	0.3	0.30		Thrust	
					N 36° W	126.5	12.1	5.4					9.46	0.60	0.3	0.30	13		
					Down	62.5	5.0	2.4					5.08	0.50	0.1	0.30			
N191	San Fernando Earthquake 2516 Via Tejon Ground Level, Palos Verdes Estates	I	2-9-71	34°24'42" N 118°24'00" W	N 65° E	24.7	4.1	2.6	67.8	6.6	VI			1.04	0.2			Thrust	
					S 25° E	40.1	5.0	3.4				65		0.78	0.4		13		
					Down	18.9	2.2	1.4						0.73	0.2				
N192	San Fernando Earthquake 2500 Wilshire Blvd Basement, Los Angeles	I	2-9-71	34°24'42" N 118°24'00" W	N 29° E	96.7	14.8	7.7	40.7	6.6	VII		6.70	0.96	0.2	0.20		Thrust	
					N 61° W	98.9	19.5	7.9				25	5.82	1.24	0.1	1.10	13		
					Down	42.5	7.7	3.3						1.14	0.1				
N195	San Fernando Earthquake San Juan Capistrano	A	2-9-71	34°24'42" N 118°24'00" W	N 57° W	31.0	4.6	2.4	122.6	6.6	V	99		0.93	0.3			Thrust	
					N 33° E	40.9	3.6	2.4						0.55	0.2		13		
					Down	21.0	3.4	1.6						1.02	0.6				
N196	San Fernando Earthquake Long Beach State College, Ground Level	A	2-9-71	34°24'42" N 118°24'00" W	N 76° W	35.0	9.5	8.0	75.4	6.6	VI	50		1.70	0.5			Thrust	
					S 14° W	31.2	9.3	6.7						1.87	0.2		13		
					Down	25.8	4.9	3.8						1.19	0.3				
N197	San Fernando Earthquake Anza Post Office Storage Room, Anza	A	2-9-71	34°24'42" N 118°24'00" W	N 45° E	25.6	2.2	1.2	185.0	6.6	V			0.54	0.2			Thrust	
					N 45° W	35.4	2.6	1.0				43		0.46	0.2		13		
					Down	14.0	1.4	1.1						0.63	0.2				
0198	San Fernando Earthquake Griffith Park Observatory, Los Angeles	HR	2-9-71	34°24'42" N 118°24'00" W	S 00° W	176.0	20.5	7.28	34.0	6.6	VII		6.60	0.73	0.4	0.25		Thrust	
					S 90° W	167.0	14.5	5.45				23	8.34	0.54	0.3	0.20	13		
					Down	120.0	7.42	3.38					6.38	0.39	0.2	0.20			
0199	San Fernando Earthquake 1625 Olympic Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 28° E	137.0	17.60	9.78	42.0	6.6	VII			0.81	0.3			Thrust	
					N 62° W	238.0	21.30	10.30				30		0.56	0.4		13		
					Down	148.0	10.40	5.74						0.44	0.1				
0204	San Fernando Earthquake 215 West Broadway Long Beach	A	2-9-71	34°24'42" N 118°24'00" W	N 00° E	25.9	8.17	5.81	73.8	6.6	VI			1.98				Thrust	
					N 90° E	20.7	9.58	7.27				69		2.91			13		
					Up	12.2	6.12	3.58						3.15					
0205	San Fernando Earthquake Terminal Island Long Beach	A	2-9-71	34°24'42" N 118°24'00" W	N 21° W	28.4	7.37	6.39	73.6	6.6	VI			1.63	0.4			Thrust	
					S 69° W	28.1	10.30	8.72				60		2.30	0.2		13		
					Up	16.1	4.24	2.83						1.65	0.5				
0206	San Fernando Earthquake Hall of Records San Bernardino	A	2-9-71	34°24'42" N 118°24'00" W	N 00° E	37.4	3.45	1.30	108.2	6.6	VI	53		0.58	0.4			Thrust	
					N 90° E	43.9	2.86	1.05						0.41	0.2		13		
					Down	18.5	1.52	0.80						0.52	0.2				
0207	San Fernando Earthquake Fairmont Reservoir Fairmont	HR	2-9-71	34°24'42" N 118°24'00" W	N 56° E	64.6	3.84	1.23	32.8	6.6	VI			0.37	0.2			Thrust	
					N 34° W	97.0	8.35	1.71				20		0.54	0.2		13		
					Up	32.90	3.37	1.73						0.64	0.4				
0208	San Fernando Earthquake University of California, Santa Barbara	I	2-9-71	34°24'42" N 118°24'00" W	N 42° E	16.40	2.69	1.65			V			1.03	0.2			Thrust	
					S 48° E	17.00	3.67	2.32						1.35	0.3		13		
					Up	11.00	1.69	1.45						0.96	0.3				
0210	San Fernando Earthquake Fire Station, Hemet	A	2-9-71	34°24'42" N 118°24'00" W	S 45° E	34.90	2.86	1.66		6.6	V			0.51	0.2			Thrust	
					S 45° W	38.40	2.74	1.32						0.45	0.1		13		
					Down	25.00	2.33	1.25						0.58	0.3				

(Continued)

CIT File No.	Recording Station	(1) Site Classification*	(2) Date of Earthquake	(3) Epicenter Location	(4) Instrument Component	(5) Peak Acceleration cm/sec^2	(6) Peak Velocity cm/sec	(7) Peak Displacement cm	(8) Epicentral Distance km	(9) Richter Magnitude M	(10) Modified Mercalli Intensity	(11) Approximate Record Length sec	(12) Duration (a ≥ 0.05 g) sec	(13) Predominant Period, sec 1**	2**	3**	(14) Focal Depth km	(15) Type of Fault	(16) Reference No.†
Q213	San Fernando Earthquake 1215 Gallery, Hoover Dam	HR	2-9-71	34°24'42" N 118°24'00" W	S 45° E S 45° W Up	0.65 1.23 0.86	0.27 0.29 0.55	0.21 0.19 0.71	378.3	6.6	III			2.61 1.48 4.02			13	Thrust	
P214	San Fernando Earthquake 4867 Sunset Blvd Los Angeles	I	2-9-71	34°24'42" N 118°24'00" W	S 89° W S 01° E Down	154.00 156.00 115.00	23.20 16.20 9.84	8.02 7.94 5.15	36.2	6.6	VII	15	6.12 5.74 6.62	0.95 0.65 0.54	0.4 0.4 0.1	0.25 0.15	13	Thrust	
P217	San Fernando Earthquake 3345 Wilshire Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	S 00° W N 90° E Down	108.00 88.10 60.10	14.70 16.10 7.07	9.94 9.09 4.61	40.0	6.6	VII	35	5.52 5.32 3.00	0.85 1.15 0.74	0.5 0.4 0.1	0.45 0.30 0.20	13	Thrust	
P220	San Fernando Earthquake 666 West 19th St Costa Mesa	I	2-9-71	34°24'42" N 118°24'00" W	S 00° W N 90° E Down	24.10 34.30 9.29	7.01 5.78 3.47	6.92 6.70 2.32	95.8	6.6	VI	60		1.83 1.06 2.35	0.3 0.5 0.2		13	Thrust	
P221	San Fernando Earthquake Santa Anita Reservoir Arcadia	HR	2-9-71	34°24'42" N 118°24'00" W	N 03° E N 87° W Down	137.00 165.00 47.60	5.29 6.66 4.46	3.15 5.91 2.46	43.3	6.6	VI	28	10.88 5.80	0.24 0.25 0.59	0.1 0.2 0.1	0.20 0.15	13	Thrust	
P222	San Fernando Earthquake Navy Laboratory Port Hueneme	A	2-9-71	34°24'42" N 118°24'00" W	S 00° W S 90° W Up	25.90 25.20 10.40	7.25 5.51 3.19	4.54 4.92 2.17	79.3	6.6	VI	58		1.76 1.37 1.92	0.3 0.7 0.3		13	Thrust	
P223	San Fernando Earthquake Puddingstone Reservoir, San Dimas	HR	2-9-71	34°24'42" N 118° 24'00" W	N 55° E N 35° W Down	69.70 53.20 37.80	4.60 4.39 2.24	2.07 1.82 1.79	65.0	6.6	V	32	0.42 0.02	0.41 0.52 0.37	0.3 0.1 0.1	0.20 0.15	13	Thrust	
P231	San Fernando Earthquake 9841 Airport Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 00° E S 90° W Up	41.30 37.70 17.90	10.60 13.30 5.68	8.28 10.20 3.47	51.7	6.6	VI	30		1.61 2.22 1.99	0.3 0.4 0.2		13	Thrust	
Q233	San Fernando Earthquake 14724 Ventura Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	S 12° W N 78° W Up	243.00 197.00 96.00	31.50 17.80 9.65	18.30 9.46 3.82	29.3	6.6	VII	36 36	17.48 15.12 7.54	0.81 0.57 0.63	0.0 0.3 0.2	0.30 0.20 0.30	13	Thrust	
Q236	San Fernando Earthquake 1760 North Orchid Ave Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	South East Up	167.00 122.00 73.20	13.40 10.30 7.49	6.13 5.85 1.87	34.9	6.6	VII	30	9.50 5.20 5.36	0.50 0.53 0.64	0.2 0.2 0.2	0.20 0.20 0.30	13	Thrust	
Q239	San Fernando Earthquake 9100 Wilshire Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	South East Up	119.00 161.00 40.50	17.20 19.10 7.16	9.79 11.60 2.88	38.0	6.6	VII	36 36	11.40 7.98	0.91 0.74 1.11	0.2 0.3 0.2	0.20 0.30	13	Thrust	
Q241	San Fernando Earthquake 800 West First St Los Angeles	I	2-9-71	34°24'42" N 118°24'00" W	N 37° E N 53° W Up	86.80 138.00 60.80	17.90 19.60 8.73	9.22 9.98 5.08	41.8	6.6	VII	25 25	7.86 5.66 0.16	1.29 0.89 0.90		0.25 0.25 0.15	13	Thrust	
R244	San Fernando Earthquake 222 Figueroa St Los Angeles	A or I	2-9-71	34°24'42" N 118°24'00" W	N 53° W S 37° W Up	149.00 126.00 43.20	18.30 18.70 8.50	9.80 9.93 4.36	41.9	6.6	VII	20	8.16 9.54	0.77 0.89 1.24	0.5 0.4 0.2	0.40 0.30	13	Thrust	
R246	San Fernando Earthquake 6464 Sunset Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	South East Up	115.00 106.00 74.10	16.70 18.30 7.07	8.29 10.40 1.99	35.7	6.6	VII	23	9.04 10.72 5.20	0.91 1.08 0.60	0.5 0.3 0.2	0.30 0.20 0.15	13	Thrust	
R248	San Fernando Earthquake 6430 Sunset Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	South East Up	184.00 174.00 88.90	19.70 18.20 6.33	7.68 10.20 2.76	35.7	6.6	VII	28	9.70 10.68 10.78	0.67 0.65 0.45	0.2 0.2 0.1	0.15 0.20 0.15	13	Thrust	
R249	San Fernando Earthquake 1900 Avenue of the Stars, Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 44° E S 46° E Up	79.80 84.10 57.30	16.20 10.00 4.56	11.40 7.34 2.03	39.2	6.6	VII		4.24 6.10	1.27 0.75 0.50	0.3 0.2 0.2	0.30 0.30	13	Thrust	
R251	San Fernando Earthquake 234 South Figueroa St Los Angeles	A or I	2-9-71	34°24'42" N 118°24'00" W	N 37° E S 53° E Up	195.00 188.00 67.50	16.70 18.70 7.78	8.93 9.49 4.75	41.8	6.6	VII	20	7.64 6.76	0.54 0.62 0.72	0.3 0.2 0.5	0.30 0.45	13	Thrust	

(Continued)

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R253	San Fernando Earthquake 533 South Fremont Ave Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 30° W	242.00	19.20	11.40	43.0	6.6	VII	25	8.40	0.49	0.3	0.25		Thrust	
					S 60° W	220.00	18.00	12.40					10.76	0.51	0.3	0.30	13		
					Up	81.60	9.88	5.40					1.40	0.76	0.3	0.20			
S255	San Fernando Earthquake 6200 Wilshire Blvd Los Angeles	I	2-9-71	34°24'42" N 118°24'00" W	N 08° E	123.00	22.50	15.80	38.9	6.6	VII	21	6.26	1.15	0.3	0.35		Thrust	
					N 82° W	128.00	21.90	10.90					8.46	1.07	0.6	0.45	13		
					Up	46.80	5.20	2.65						0.70	0.2				
S258	San Fernando Earthquake 3440 University Ave Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 29° E	56.30	17.20	10.30	44.6	6.6	VII		4.02	1.92	0.3	0.35		Thrust	
					S 61° E	83.30	18.50	10.50					2.48	1.39	0.6	1.10	13		
					Up	54.50	7.14	3.56					0.00	0.82	0.3	0.30			
S261	San Fernando Earthquake 1177 Beverly Dr Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	N 59° E	97.70	18.30	12.20	39.6	6.6	VII	39	6.82	1.18	0.4	0.35		Thrust	
					N 31° W	107.00	11.20	5.92					4.78	0.66	0.5	0.35	13		
					Up	64.00	4.95	2.26					4.50	0.49	0.1	0.40			
S262	San Fernando Earthquake 5900 Wilshire Blvd Los Angeles	I	2-9-71	34°24'42" N 118°24'00" W	N 83° W	68.30	25.70	16.50	39.0	6.6	VII	25	8.80	2.36	0.4	0.35		Thrust	
					S 07° W	93.60	27.80	13.70				20	4.10	1.87	0.2	0.45	13		
					Up	32.90	6.17	2.74						1.18	0.7				
S265	San Fernando Earthquake 3435 Wilshire Blvd†† Los Angeles	I	2-9-71	34°24'42" N 118°24'00" W	South	104.00	17.80	8.69	39.9	6.6	VII		6.08	1.07	0.2	0.15		Thrust	
					West	125.00	18.20	12.60				21	10.30	0.91	0.2	0.15	13		
					Up	53.70	6.79	3.56					0.00	0.79	0.1	0.50			
S266	San Fernando Earthquake 3550 Wilshire Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	North	153.00	17.50	8.04	40.0	6.6	VII		5.76	0.72	0.4	0.30		Thrust	
					West	129.00	21.40	11.60				30	10.30	1.04	0.2	0.25	13		
					Up	54.20	7.08	3.15					2.30	0.82	0.1	0.15			
S267	San Fernando Earthquake 5260 Century Blvd Los Angeles	A	2-9-71	34°24'42" N 118°24'00" W	North	55.50	13.50	8.49	52.0	6.6	VI	49	0.04	1.53	0.5	0.70		Thrust	
					East	61.50	13.80	9.38				49	0.02	1.41	0.2	0.20	13		
					Up	25.40	5.42	3.64						1.34	0.2				
T286	El Centro, Imperial Valley Irrigation District	A	10-21-47	32°58'00" N 116°00'00" W	North	58.40	6.22	4.24	46.5	6.5	VI	30		0.67					
					East	46.50	6.05	3.33						0.82			16		
					Up	25.10	1.58	0.79						0.39					
T287	El Centro, Imperial Valley Irrigation District	A	1-23-51	32°59'00" N 115°44'00" W	North	30.30	2.98	1.95	27.5	5.6	VI	30		0.62	0.42				
					East	27.50	3.09	1.00						0.71	0.47		16		
					Up	13.20	1.21	0.89						0.57	0.33				
T288	El Centro, Imperial Valley Irrigation District	A	6-13-53	32°57'00" N 115°43'00" W	North	7.21	1.39	1.31	23.6	5.5	V			1.21	0.16				
					East	35.80	6.32	1.51				30		1.11	0.21		16		
					Up	16.80	0.88	0.98						0.33	0.11				
T289	El Centro, Imperial Valley Irrigation District	A	11-12-54	31°30'00" N 116°00'00" W	North	24.10	3.76	0.99	149.8	6.3	IV			0.98	0.6				
					East	27.00	3.17	2.66				30		0.74	0.8		16		
					Up	6.74	0.95	1.09						0.88	0.4				
T292	El Centro, Imperial Valley Irrigation District	A	12-16-55	33°00'00" N 115°30'00" W	North	62.50	4.60	2.06	23.5	5.4	VI			0.46	0.1			Strike-slip	
					East	71.00	5.16	2.19				30		0.46	0.1		16		
					Up	56.40	1.54	0.62						0.17	0.1				
T293	El Centro, Imperial Valley Irrigation District	A	8-7-66	31°48'00" N 114°30'00" W	North	13.50	2.43	2.02	148.1	6.3	VI			1.13					
					East	14.70	2.40	1.66						1.02			16		
					Up	4.96	1.36	1.72						1.72					
U294	City Hall, Ferndale	I	7-6-34	41°42'00" N 124°36'00" W	N 45° W	14.50	1.40	1.12	128.9		IV			0.61	0.41			Strike-slip	1,6,7
					S 45° W	14.60	1.05	1.26						0.45	0.22				
					Up	5.98	0.82	1.03						0.86	0.43				
U295	Federal Building Helena, Montana	HR	10-31-35	46°37'00" N 111°58'00" W	North	29.30	0.54	0.32	5.8		VII			0.12				Normal	
					East	25.20	0.39	0.16						0.1					
					Up	7.11	0.52	0.67						0.46					
U297	Helena, Montana, Federal Building	HR	11-28-35	46°37'00" N 111°58'00" W	North	74.80	3.22	0.84	5.8	5.0	VI		0.42	0.27	0.10	0.20		Thrust or normal	
					East	83.00	3.88	0.99				20		0.29	0.10	0.20	5		
					Up	31.70	1.42	0.78						0.28	0.11				

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†† The original address of this building, when the instruments were first installed, was 3411 Wilshire Boulevard.

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U298	City Hall, Ferndale	I	2-6-37	40°30'00" N 125°15'00" W	N 45° W S 45° W Up	38.40 35.90 13.90	4.07 2.71 1.59	0.90 0.99 1.04	85.1		V			0.66 0.47 0.72	0.18 0.28				
U299	Santa Barbara Courthouse	A	6-30-41	34°22' N 119°35' W	N 45° E S 45° E Up	233.00 172.00 68.50	21.70 21.60 3.64	3.74 3.92 2.59	35.9	5.9	VIII	15	3.14 1.54 0.00	0.58 0.79 0.33	0.24 0.21 0.13	0.35 0.35 0.15			
U300	City Hall, Ferndale	I	10-3-41	40°36' N 124°36' W	N 45° W S 45° W Up	118.00 113.00 37.50	6.92 5.74 2.56	2.95 2.51 1.12	29.8	6.4	VII	30		0.37 0.32 0.43	0.45 0.38 0.35				
U301	Public Library Holister	A	3-9-49	37°06' N 121°18' W	N 89° W S 01° W Up	193.00 119.00 69.50	11.70 8.26 3.63	1.40 1.71 0.96	29.3	5.3	VII	30	3.64 5.00 0.02	0.38 0.44 0.33	0.29 0.32 0.22	0.30 0.35 0.30	16		
U305	Public Library Holister	A	4-25-54	36°48' N 121°48' W	N 89° W S 01° W Up	52.00 48.90 23.10	4.19 4.52 1.94	2.24 1.36 1.06	36.2	5.3	VI	33	0.00	0.51 0.58 0.53	0.6 0.7 0.1	0.65	16		
U307	Public Library Holister	A	1-19-60	36°47' N 121°26' W	N 89° W S 01° W Up	55.50 35.30 23.60	5.25 3.64 2.10	1.85 1.21 1.08	8.5	5.0	VI	35		0.59 0.65 0.56	0.3 0.2 0.3				
U308	City Hall, Ferndale	I	6-5-60	40°49' N 124°53' W	N 46° W S 44° W Up	57.50 73.50 14.40	3.11 3.60 1.06	1.21 1.18 0.81	60.3	5.7	VI	65	4.24 0.26	0.34 0.31 0.46	0.1 0.2 0.3	0.20 0.25			
U309	Public Library Holister	A	4-8-61	36°30' N 121°18' W	N 89° W S 01° W Up	168.00 74.90 60.20	10.80 6.28 4.23	3.00 1.77 1.99	40.0	5.7	VII	30	8.60 0.56	0.40 0.52 0.44	0.31 0.20 0.17	0.35 0.30	11		
U310	Federal Office Building Seattle, Washington	A	4-29-65	47°24' N 122°18' W	S 32° E S 58° W Up	52.10 77.50 32.10	5.59 9.35 8.35	2.55 5.43 1.62	22.3	6.5	VIII	30		0.67 0.76 0.46	0.27 0.50 0.19		57	Normal	5
U311	Lincoln School Tunnel Taft	A	6-27-66	35°57'18" N 120°29'54" W	N 21° E S 69° E Up	8.10 11.20 5.95	2.10 2.21 1.10	2.53 1.49 1.50	130.5	5.6	III	55		1.63 1.24 1.16	0.62 0.58 0.69		5-10	Strike-slip	8
U312	City Hall, Ferndale	I	12-10-67	40°30' N 124°36' W	N 46° W S 44° W Up	103.00 232.00 32.40	11.80 11.90 2.69	1.76 1.66 1.00	30.6	5.8	VI	35	0.16 0.70	0.72 0.32 0.52	0.46 0.23 0.84	0.15 0.15	10-20 (USCS)	Strike-slip	1
U313	Holister	A	12-18-67	37°00'36" N 121°47'18" W	N 89° W S 01° W Up	13.10 16.20 10.00	2.67 1.74 1.14	2.26 2.03 1.33	39.0	5.2	V	60		1.28 0.67 0.72	0.49 0.63 0.84				
V314	Los Angeles Subway Terminal Subbasement	I,A	3-10-33	33°37' N 117°58' W	N 39° E N 51° W Up	62.30 95.60 63.60	17.30 23.60 9.07	8.21 16.30 5.72	54.9	6.3	VII	80		1.74 1.55 0.89	1.0-1.6 1.5 0.2-1.5		10	Strike-slip	
V315	Public Utilities Building, Long Beach	A	3-10-33	33°37' N 117°58' W	South West Up	192.00 155.00 279.00	29.40 16.50 30.10	22.70 11.80 26.30	27.2	6.3	VIII	40		0.96 0.67 0.68	0.30 1.50 0.11		10	Strike-slip	
V316	Public Utilities Building, Long Beach	A	11-14-41	33°47' N 118°15' W	North East Up	39.70 53.60 8.47	7.61 9.32 1.04	2.47 3.56 0.56	6.2	5.4	VI	20		1.20 1.09 0.77	0.32 0.66 0.14				
V317	Los Angeles Chamber of Commerce Building Basement	A	11-14-41	33°47'00" N 118°15'00" W	S 50° E S 40° W Up	14.90 11.20 6.69	1.33 1.42 0.79	0.85 0.49 0.41	28.5	5.4	VI	60		0.56 0.79 0.74	0.42 0.22 0.42				
V319	City Recreation Building, San Luis Obispo	I	11-21-52	35°50' N 121°10' W	N 36° W S 54° W Up	52.90 35.40 26.30	3.35 2.89 2.63	0.80 1.26 1.20	76.1	6.0	VI	26		0.39 0.51 0.63	0.24 0.17 0.36				
V320	Southern Pacific Building Basement, San Francisco (Foreshock)	A	3-22-57	37°40' N 122°28' W	N 45° E N 45° W Up	2.02 2.42 1.52	0.28 0.33 0.33	0.32 0.43 0.46	16.2	3.8	V			0.87 0.86 1.36				Strike-slip	

(Continued)

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V322	San Francisco South Pacific Building	A	3-22-57	37°39'00" N 122°27'00" W	N 45° S	8.56	0.83	0.40	17.3	4.4	V	45		0.61	0.7				
					N 45° W	24.50	2.61	1.17						0.67	0.4		11		
					Up	6.05	0.88	0.88						0.91	0.6				
V323	San Francisco Alexander Building	I	3-22-57	37°39'00" N 122°27'00" W	N 81° E	15.60	0.82	0.26	15.60	4.4	V	23		0.33	0.2				
					N 09° W	18.50	0.98	0.72						0.33	0.4		11		
					Up	5.80	0.88	0.86						0.95	0.2				
V328	Southern Pacific Building Basement, San Francisco (Aftershock)	A	3-22-57	37°39' N 122°29' W	N 45° E	2.07	0.42	0.38	18.30	4.0	V			1.27	0.2			Strike-slip	
					N 45° W	9.00	0.91	0.48				20		0.63	0.5				
					Up	2.79	0.54	0.51						1.22	0.5				
V329	Port Hueneme	A	3-18-57	34°07'06" N 119°13'12" W	South	163.00	17.90	4.02	5.4	4.7	VI	45		0.69	0.5				
					West	86.80	8.85	2.61						0.64	0.5				
					Up	24.70	1.93	0.48						0.49	0.6				
V330	Federal Building Eureka	I	9-4-62	40°58' N 124°12' W	N 79° E	45.30	3.52	1.70	19.0	5.0	VI	70		0.49	0.29			Strike-slip	1
					S 11° E	47.30	2.67	1.18						0.35	0.35				
					Up	12.90	1.50	2.00						0.73	0.30				
V331	Old Ridge Route (CWR Site), Castiac	I	7-15-65	34°29'06" N 118°31'18" W	South	40.40	2.12	0.87	21.2	4.0	V	30		0.33					
					East	35.90	1.13	0.42						0.20					
					Down	26.20	0.58	0.18						1.24					
V332	Sacramento, Pacific Telephone and Telegraph	A	9-12-66	39°24'00" N 120°06'00" W	South	14.40	1.57	0.74	151.5	6.3	VI			0.68				Strike-slip	
					East	12.40	1.74	0.75				40		0.88			12		
					Up	8.07	0.83	0.65						0.65					
W334	6074 Park Dr Wrightwood	I	9-12-70	34°16'12" N 117°32'24" W	S 65° E	139.00	8.87	2.21	13.4	5.4	VI			0.40					
					S 25° W	194.00	9.63	1.03				17		0.31			9		
					Down	53.00	3.18	1.44						0.37					
W335	Cedar Springs, Allen Ranch	HR	9-12-70	34°16'12" N 117°32'24" W	S 85° E	69.80	5.55	2.42	20.8	5.4	VI	35		0.50					
					S 05° W	54.90	1.96	2.00						0.22			9		
					Down	59.30	2.56	1.15						0.27					
W336	Cedar Springs, Pump House on Dam Abutment	I	9-12-70	34°16'12" N 117°32'24" W	S 54° E	55.90	2.94	0.78	23.8	5.4	VI			0.33					
					S 36° W	69.40	3.96	1.21						0.36			9		
					Down	36.90	1.25	0.36						0.21					
W338	Hall of Records, San Bernardino	A	9-12-70	34°16'12" N 117°32'24" W	North	113.00	4.75	1.75	22.9	5.4	VI	25		0.26					
					East	57.50	3.10	1.66						0.34			9		
					Down	52.50	1.85	1.54						0.22					
W339	Southern California Edison Company Colton	A	9-12-70	34°16'12" N 117°32'24" W	South	40.20	2.55	0.95	31.5	5.4	VI	35		0.39					
					East	35.30	1.87	0.70						0.33			9		
					Up	33.60	1.30	0.72						0.24					
W342	Millikan Library Basement, CIT, Pasadena	A	9-12-70	34°16'12" N 117°32'24" W	North	19.30	1.53	1.74	56.0	5.4	V	24		0.50					
					East	18.70	1.44	1.13						0.48			9		
					Down	12.30	0.68	0.52						0.35					
W344	J. P. L. Basement Pasadena	I	9-12-70	34°16'12" N 117°32'24" W	S 82° E	14.40	1.03	1.03	58.9	5.4	V			0.45					
					S 08° W	24.10	2.00	2.37				24		0.52			9		
					Down	15.40	1.86	1.44						0.76					
Y370	Southern California Edison Company Colton	A	4-8-68	33°11'24" N 116°07'42" W	South	21.40	3.53	4.25	146.2	6.4	VI	81		1.04	0.28			Strike-slip	
					East	28.10	2.71	2.11						0.61	0.13		20		
					Up	21.40	1.80	1.07						0.53	0.33				
Y371	Engineering Building Santa Ana, Orange County	A	4-8-68	33°11'24" N 116°07'42" W	S 04° E	13.10	4.38	3.47	173.1	6.4	V	82		2.10	0.72			Strike-slip	
					S 26° W	11.70	4.28	2.85						2.29	0.72		20		
					Up	5.65	2.21	1.94						2.46	0.53				
Y372	Terminal Island Southern California Edison Plant, Long Beach	A	4-8-68	33°11'24" N 116°07'42" W	N 21° W	8.73	3.19	4.98	205.1	6.4	VI	52		2.29	0.37			Strike-slip	
					S 69° W	9.51	2.86	2.11						1.89	0.40		20		
					Up	5.14	1.75	1.82						2.14	0.40				
Y373	J. P. L. Basement Pasadena	A,I	4-8-68	33°11'24" N 116°07'42" W	S 82° E	7.35	1.35	0.53	220.3	6.4	VI	30		1.15	0.90			Strike-slip	
					S 08° W	7.02	1.32	0.96						1.18	0.77		20		
					Down	4.89	0.99	0.72						1.27	0.42				

(Continued)

CIT File No.	Recording Station	(1) Site Classification*	(2) Date of Earthquake	(3) Epicenter Location	(4) Instrument Component	(5) Peak Acceleration cm/sec^2	(6) Peak Velocity cm/sec	(7) Peak Displacement cm	(8) Epicentral Distance km	(9) Richter Magnitude M	(10) Modified Mercalli Intensity	(11) Approximate Record Length sec	(12) Duration (a ≥ 0.05 g) sec	(13) Predominant Period, sec 1**	2**	3**	(14) Focal Depth km	(15) Type of Fault	(16) Reference No.†
Y375	Millikan Basement, CIT Pasadena	A	4-8-68	33°11'24" N 116°07'42" W	North	9.82	2.20	1.70	212.9	6.4	VI	52		1.41				Strike-slip	
					East	10.30	2.24	1.84						1.37			20		
					Down	6.38	1.14	0.85						1.12					
Y376	Pasadena, CIT Athenaeum	A	4-8-68	33°11'24" N 116°07'42" W	South	6.99	2.10	2.02	212.0	6.4	VI			1.88				Strike-	
					West	10.00	2.45	1.62						1.54			20		
					Up	3.81	0.99	1.05						1.63					
Y377	Southern California Edison Bldg, 601 W. 5th St, Los Angeles	A	4-8-68	33°11'24" N 116°07'42" W	N 52° W	7.66	2.33	1.98		6.4	VI			1.91	0.87			Strike-	
					S 38° W	11.90	3.08	2.31						1.63	1.30		20	slip	
					Up	4.12	1.33	1.36						2.03	0.52				
Y378	Subway Terminal Basement, Los Angeles	A,I	4-8-68	33°11'24" N 116°07'42" W	S 52° E	6.97	2.23	1.07	218.8	6.4	VI			2.01	0.35			Strike	
					S 38° W	11.40	3.07	2.30				30		1.69	0.70		20	slip	
					Up	5.41	1.23	1.01						1.43	0.70				
Y379	CMD Building, Vernon	A	4-8-68	33°11'24" N 116°07'42" W	N 83° W	18.40	4.27	2.50	212.2	6.4	VI	60		1.46	0.21			Strike-	
					S 07° W	18.50	4.65	2.69						1.58	0.69		20	slip	
					Up	6.97	2.38	1.47						2.14	0.27				
Y380	Hollywood Storage P. E. Lot, Los Angeles	A	4-8-68	33°11'24" N 116°07'42" W	South	10.90	2.42	2.12	227.3	6.4	VI			1.39				Strike-	
					East	12.30	3.18	1.38				51		1.62			20	slip	
					Up	4.79	1.11	1.06						1.46					

References (column 16)

1. Bolt, B. A., Lomnitz, C., and McEvilly, T. V., "Seismological Evidence on the Tectonics of Central and Northern California and the Mendocino Escarpment," Bulletin of the Seismological Society of America, Vol 58, Dec 1968, pp 1725-1768.
2. Tocher, D., "San Francisco Earthquakes of March 1957," California Division of Mines Special Report, 57, 39.
3. Allen, C. R. et al., "The Borrego Mountain, California, Earthquake of April 9, 1968, A Preliminary Report," Bulletin of the Seismological Society of America, Vol 58, Jun 1968, pp 1183-1186.
4. Hodgson, J. H. and Storey, R. S., "Direction of Faulting in Some Larger Earthquakes of 1949," Bulletin of the Seismological Society of America, Vol 44, 1954, pp 57-83.
5. Algermissen, S. T. and Harding, S. T., "The Puget Sound, Washington Earthquake of April 29, 1965, Preliminary Seismological Report," U. S. Coast and Geodetic Survey, Rockville, Maryland, 1965; U. S. Government Printing Office, Washington, D. C.
6. Byerly, P., "Earthquakes off the Coast of Northern California," Bulletin of the Seismological Society of America, Vol 27, No. 2, 1937, pp 73-96.
7. Byerly, P., "The Earthquake of July 6, 1934: Amplitude and First Motion," Bulletin of the Seismological Society of America, Vol 28, No. 1, 1938, pp 1-13.
8. McEvilly, T. V., Bakun, W. H., and Casaday, K. B., "The Parkfield California Earthquakes of 1966," Bulletin of the Seismological Society of America, Vol 57, Dec 1967, pp 1221-1244.

Appendix B: Site Characteristics

(Courtesy of Trifunac, M. D. and Brady, A. G., "On the Correlation of Seismic Intensity Scales with the Peaks of Recorded Strong Ground Motion," Bulletin, Seismological Society of America, Vol 65, 1975, pp 139-162.)

Rec.	Station Location	Abbreviated Site Geology (with 8 estimates[2] of site classification[3])	Data from Geological Map (with 7 estimates of site classification)	U[1]	Ave.
A001	El Centro	Alluvium, several 1000' (00000001)	Quaternary lake deposits (0000010)	-	0
A002	Ferndale City Hall	1500' of Plio-Pleistocene loosely consolidated massive conglomerate, sandstone, and claystone (02111122)	Recent Quaternary alluvium (0000010)	-	1
A005	Santa Barbara	Approx. 600' of Pleistocene cemented alluvium over sand, silt and clay (10101001)	Recent Quaternary alluvium bounded by Quaternary nonmarine terrace deposits (0100011)	-	0
A010	San Jose (Bank of America)	Unconsolidated alluvium and estuarine deposits (00000000)	Recent Quaternary alluvium (0000010)	-	0
A015	San Francisco (Golden Gate Park)	Outcropping of Franciscan chert and thin interbedded shale (22212221)	Recent Quaternary dune sand (0002010)	-	1
A016	San Francisco (State Bldg.)	Dune sand over clay, sand and gravel. 200' to Franciscan bedrock - shale interbedded with fine-grained sandstone (10101000)	Boundary of recent Quaternary dune sand, alluvium and Mesozoic ultrabasic intrusive rocks (1111011)	-	1
A017	Oakland City Hall	Approx. 250' of unconsolidated Quaternary terrace deposits (10110002)	Pleistocene marine and marine terrace deposits (0100111)	-	1
A020	San Diego Light & Power	Shallow alluvium (50-100') over sedimentary rock (01000000)	Recent Quaternary alluvium bonded by Pleistocene marine and marine terrace deposits (0100011)	-	0
B028	Seattle, Washington	Sand, silt, and gravel over blue clay hardpan (10101000)	Narrow strip of recent Quaternary alluvium bounded by Puget Sound and Pleistocene glacial drift: till, outwash, and associated deposits (0100001)	-	0
B031	Taft (Lincoln School)	Quaternary alluvium, sand, and gravel veneer over 2000' of consolidated gravel, sand and clay (00101001)	Recent Quaternary, Great Valley fan deposits (0001000)	-	0

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
B032	Olympia, Washington (Materials Lab. - State Dept. of Hwys.)	Sand and silt fill over recent alluvium - unconsolidated clay, silt, sand, and gravel (00100000)	Pleistocene glacial drift: till, outwash, and associated deposits (0100001)	-	0
B033	Cholame-Shandon #2	Alluvium (00000000)	Recent Quaternary alluvium (0000010)	-	0
B034	Cholame-Shandon #5	Unconsolidated shallow soil and alluvium, overlying Plio-Pleistocene loosely consolidated sand, gravel, silt, and clay (00000000)	Boundary of recent Quaternary alluvium and Plio-Pleistocene nonmarine (0100110)	-	0
B035	Cholame-Shandon #8	Alluvium (00000000)	Recent Quaternary alluvium (0000010)	-	0
B036	Cholame-Shandon #12	Unconsolidated shallow soil and alluvium, overlying Plio-Pleistocene loosely consolidated sand, gravel, silt, and clay (00000000)	Quaternary nonmarine terrace deposits (1100121)	-	0
B037	Temblor	Indeterminate age serpentine and hard, severely fractured ultrabasic complex (22222211)	Boundary of Plio-Pleistocene nonmarine and upper Miocene marine (1101121)	-	2
B038	San Luis Obispo (City Rec. Bldg.)	Thin veneer of alluvium and stream gravels over Franciscan sandstone, conglomerate, and shale (22101022)	Recent Quaternary alluvium (0000010)	-	1
B039	Eureka City Hall	Pleistocene non-marine, loosely consolidated beds of gravel, sand, silt, and clay. Total thickness 200-400' (10100001)	Pleistocene nonmarine deposits (1101121)	-	1
C041	Pacoima Dam, Pacoima	Highly jointed diorite gneiss (22222222)	On the boundary of pre-Cretaceous metamorphic rocks and Mesozoic granitic rocks: granodiorite (2222222)	-	2
C048	8244 Orion Blvd., L.A.	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
C051	250 E. First, L.A.	Alluvium (01000001)	Recent Quaternary alluvium (0000010)	0	0

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
C054	445 Figueroa St., L.A.	Shale (01112102)	On the borders of upper and middle Pliocene marine, and Pleistocene nonmarine sedimentary rocks (1111-21)	1	0[4]
D056	Castaic	Sandstone (12111112)	Upper Miocene marine sedimentary rock (1111122)	1	1
D057	Hollywood Storage Building, L.A.	700±, of alluvium (00000001)	Pleistocene nonmarine sedimentary rock (111-121)	0	0
D058	Hollywood Storage Building, L.A.	700±, of alluvium (00000001)	Pleistocene nonmarine sedimentary rock (111-121)	0	0
D059	1901 Avenue of Stars, L.A.	Silt and sand layers. Water table at 70-80′ (00100000)	Pleistocene nonmarine sedimentary rock (1111121)	0	0[4]
D062	1640 S. Marengo, L.A.	Pleistocene alluvium. Water level at 35′ (00000000)	Pleistocene nonmarine sedimentary rock bordering recent Quaternary alluvium (0111121)	0	0
D065	3710 Wilshire Blvd., L.A.	Alluvium (00000001)	Pleistocene nonmarine sedimentary rock (1111121)	0	1
D068	7080 Hollywood Blvd., L.A.	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
E071	Wheeler Ridge	Alluvium, 200-300′ (10000000)	Recent Quaternary Great Valley fan deposits bordered by Plio-Pleistocene nonmarine sedimentary rock (1101100)	0	0
E072	4680 Wilshire Blvd., L.A.	Alluvium (00000001)	Pleistocene nonmarine sedimentary rock (1111121)	0	1
E075	3470 Wilshire Blvd., L.A.	Alluvium (00000001)	Pleistocene nonmarine sedimentary rock (1111121)	0	0[4]
E078	L.A. Water & Power, L.A.	Miocene siltstone (01111111)	Border of recent Quaternary alluvium and upper Pliocene marine sedimentary rock (0111011)	1	1
E081	Santa Felicia Dam (Piru)	Sandstone - shale complex (12112112)	Upper Miocene marine sedimentary rock (1111122)	1	1

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
E083	3407 Sixth St., L.A.	Alluvium (00000001)	Pleistocene nonmarine sedimentary rock (1111121)	0	0[4]
F086	Vernon	Greater than 1000′ of alluvium. Water table > 300′ (00000001)	Recent Quaternary alluvium (0000010)	0	0
F087	Orange County Eng. Bldg., Santa Ana	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
F088	633 E. Broadway, Glendale	Alluvium (00000001)	Pleistocene nonmarine sedimentary rock (1111121)	0	1
F089	808 S. Olive, L.A.	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
F092	2011 Zonal, L.A.	Shale at east end of bldg. 8′ of fill at west end (01111101)	Upper Miocene marine sedimentary rock bordering on Pleistocene nonmarine (1111121)	1	1
F095	120 N. Robertson, L.A.	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
F098	646 S. Olive, L.A.	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
F101	Southern Calif. Edison, Colton	Alluvium > 500′ (00000001)	Recent Quaternary alluvium (0000010)	0	0
F102	Fort Tejon, Tejon	Granitic (22222222)	Mesozoic granitic rocks: granite and adamellite, and tonalite and diorite (2222222)	0	2
F103	Pumping Plant, Pearblossom	400′ of alluvium over 14,000′ of sedimentary rock (10000010)	Recent Quaternary alluvium and Pleistocene nonmarine bordered by Mesozoic granitic rock: granite and adamellite (0100111)	0	0
F104	Oso Pumping Plant, Gorman	Alluvium (10000010)	Pleistocene nonmarine sedimentary rock (1112111)	0	1
F105	U.C.L.A. (Boelter Hall), L.A.	70′ of alluvium over 5000′ of sedimentary rock (01000000)	On the boundary between Pleistocene nonmarine sedimentary rock and recent Quaternary alluvium (0111011)	0	0
G106	Seis. Lab., C.I.T., Pasadena	Weathered granitic (22122222)	Mesozoic granitic rock: tonalite diorite (2222222)	2	2

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
G107	Athenaeum, C.I.T., Pasadena	Approx. 1000' of alluvium upon granite (00000000)	Pleistocene nonmarine sedimentary rock (1110121)	0	0
G108	Millikan Library, C.I.T., Pasadena	Approx. 1000' of alluvium upon granite (00000001)	Pleistocene nonmarine sedimentary rock (1110121)	0	0[4]
G110	J.P.L., Pasadena	Sandy-gravel (21110011)	Upper Miocene marine sedimentary rock (1111121)	0	1
G112	611 W. Sixth St., L.A.	Alluvium (00000001)	Recent Quaternary alluvium bordered by upper Pliocene marine sedimentary rock (0101011)	0	0
G114	Fire Station, Palmdale	Alluvium (10000001)	Recent Quaternary alluvium (0000010)	0	0
H115	15250 Ventura Blvd., L.A.	Alluvium, water table at 55' (00000000)	Recent Quaternary alluvium (0000010)	0	0
H118	8639 Lincoln, L.A.	Terrace deposits - sand (01110010)	Recent Quaternary dune sand (0000010)	0	0
H121	900 S. Fremont Ave., Alhambra	Few 100 feet of alluvium over siltstone (00100000)	Pleistocene nonmarine sedimentary rock (1111121)	0	0
H124	2600 Nutwood, Fullerton	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
I128	435 N. Oakhurst, Beverly Hills	Alluvium, water table at 22' (00000000)	Recent Quaternary alluvium (0000010)	-	0
I131	450 N. Roxbury, Beverly Hills	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
I134	1800 Century Park East, L.A.	Silt and sand layers. Water table at 70-80' (00100001)	Pleistocene nonmarine sedimentary rock bordered by recent Quaternary alluvium (0111111)	0	0
I137	15910 Ventura Blvd., L.A.	Alluvium, water table at 35' (00000001)	Recent Quaternary alluvium (0000010)	0	0
J141	Array Station 1, Lake Hughes	Granitic (22222222)	Mesozoic granitic rocks: granite and adamellite (22222222)	0	2
J142	Array Station 4, Lake Hughes	Weathered granitic (22122222)	Pre-Cambrian metamorphic rocks (gneiss) (22222222)	2	2

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
J143	Array Station 9, Lake Hughes	Gneiss (22222222)	Pre-Cambrian metamorphic rocks (gneiss) (22222222)	2	2
J144	Array Station 12, Lake Hughes	Eocene sandstone below a shallow (10'±) layer of alluvium (12112112)	Paleocene marine sedimentary rock (1112222)	0	1
J145	15107 Vanowen St., L.A.	Alluvium 500', water table at 70' (00000001)	Recent Quaternary alluvium (0000010)	0	0
J148	616 S. Normandie Ave., L.A.	Alluvium. Siltstone at 25' (01110000)	Border of recent Quaternary alluvium and Pleistocene nonmarine sedimentary rock (0111011)	0	1
L166	3838 Lankershim Blvd., L.A.	Interlayered soft sandstone and shale (01111101)	Border of upper Miocene marine and recent Quaternary alluvium (0101011)	0	1
L171	Southern Calif. Edison, San Onofre	Lightly cemented Pliocene sandstone, > 325' depth (02111111)	Tertiary marine sedimentary rock bordered by Pleistocene marine and marine terrace deposits (1112111)	1	1
M176	1150 S. Hill St., L.A.	500' of gravelly sand over shale (00110000)	Recent Quaternary alluvium (0000010)	0	0
M179	Tehachapi Pumping Plant, Grapevine	15' of alluvium over gneiss (22112010)	On the boundary of Oligocene nonmarine and recent Quaternary Great Valley fan deposits, and bounded by Eocene marine and Mesozoic granitic rocks: tonalite and diorite (1102111)	2	1
M180	4000 W. Chapman Ave., Orange	Alluvium > 300' over shale (00000001)	Recent Quaternary alluvium (0000010)	0	0
M183	6074 Park Drive, Wrightwood	Alluvium veneer on igneous metamorphic complex (22112012)	Recent Quaternary alluvium bordered by pre-Cambrian igneous and metamorphic rock complex (0102110)	2	1
N185	Carbon Canyon Dam, Brea	Thin alluvium over poorly cemented siltstone (01111012)	Narrow strip of recent Quaternary alluvium between upper Pliocene marine sedimentary rock (0101111)	1	1
N186	Whittier Narrows Dam, Whittier	More than 1000' of alluvium (00000001)	Recent Quaternary alluvium (0001010)	-	0
N187	San Antonio Dam, Upland	Up to 150' of alluvium over granitics (20001010)	Recent Quaternary alluvium bordered by Pleistocene nonmarine sedimentary rock (0101010)	-	0

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
N188	1880 Century Park East, L.A.	Silt and sand layers. Water table at 70-80' (00110000)	Pleistocene nonmarine sedimentary rock bounded by recent Quaternary alluvium (0111111)	0	0
N191	2516 Via Tejon, Palos Verdes Estates	Shallow Pleistocene sands over shale-volcanic complex (21111001)	Narrow strip of Quaternary nonmarine terrace deposits between upper Miocene marine and middle Miocene sedimentary rocks (1101111)	1	1
N192	2500 Wilshire Blvd., L.A.	Alluvium. Siltstone at 20-30'. Water table at 35' (01100000)	Pleistocene nonmarine sedimentary rock (1111121)	0	1
N195	San Juan Capistrano	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
N196	Long Beach State College, Long Beach	Unconsolidated silt-sand-clay (00100000)	Quaternary nonmarine terrace deposits bordering recent Quaternary alluvium (0100110)	0	0
N197	Anza Post Office, Anza	Alluvium (10000011)	Recent Quaternary alluvium, bordered by pre-Cenozoic granitic and metamorphic rocks (0100110)	-	0
O198	Griffith Park Observatory, L.A.	Granitic (22222222)	Mesozoic granitic rock bordered by Miocene volcanic (2222222)	2	2
O199	1525 Olympic Blvd., L.A.	Alluvium (00000001)	On an approximately located contact between Pleistocene nonmarine sedimentary rock and recent Quaternary alluvium (0011011)	0	0
O204	205 W. Broadway, Long Beach	Alluvium. Water table at 15'. (00000000)	Quaternary nonmarine terrace deposits (1100110)	0	0
O205	Terminal Island, Long Beach	Alluvium. Water table < 20'. (00000000)	Recent Quaternary alluvium (0000010)	0	0
O206	Hall of Records, San Bernardino	Alluvium - 1000'. Water table at 30' (00000001)	Recent Quaternary alluvium (0000010)	0	0
O207	Fairmont Reservoir, Fairmont	Granitic (22222222)	Mesozoic granitic rock: granite and adamellite, bordered by Pleistocene nonmarine sedimentary rock (22222222)	2	2
O208	University of Calif., Santa Barbara	Alluvium veneer over sandstone (12111011)	Quaternary nonmarine terrace deposits (1001110)	0	1
O210	Fire Station, Hemet	Alluvium (0000001)	Recent Quaternary alluvium (0000010)	-	0

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
Q213	1215 Gallery, Hoover Dam	Several 100′ of volcanic breccia over basalt (22211222)	Cretaceous volcanic rocks, predominantly andesitic flows and tuffs (2122222)	-	2
P214	4867 Sunset Blvd., L.A.	Shallow alluvium over Miocene siltstone (01101010)	Pleistocene nonmarine bordered by upper Miocene marine sedimentary rocks (1101121)	0	1
P217	3345 Wilshire Blvd., L.A.	Alluvium (00000001)	Pleistocene nonmarine sedimentary rock (1111121)	0	0[4]
P220	666 W. 19th St., Costa Mesa	Terrace deposits (01110012)	Quaternary nonmarine terrace deposits (1100120)	0	1
P221	Santa Anita Reservoir, Arcadia	Granite diorite complex (22222222)	Mesozoic granitic rocks: tonalite and diorite (22222222)	2	2
P222	Navy Lab., Port Hueneme	Alluvium > 1000′ (00000001)	Recent Quaternary alluvium (0000010)	0	0
P223	Puddingstone Reservoir, San Dimas	Volcanic clastics and intrusions with associated shales (12121212)	Miocene volcanic rock, bordered by Pleistocene nonmarine sedimentary rock (2121122)	1	2
P231	9841 Airport Blvd., L.A.	Alluvium (00000001)	Quaternary nonmarine terrace deposits (1100120)	0	0
Q233	14724 Ventura Blvd., L.A.	Alluvium (00000001)	Recent Quaternary alluvium (0000010)	0	0
Q236	1760 N. Orchid Ave., L.A.	Alluvium (00000001)	Recent Quaternary alluvium bordered by middle Miocene marine sedimentary rock (0101010)	-	0
Q239	9100 Wilshire Blvd., L.A.	Alluvium. Water table at 40′ (00000000)	Recent Quaternary alluvium (0000010)	-	0
Q241	800 W. First St., L.A.	Pliocene siltstone (01111101)	On the boundary of upper Miocene marine, middle and/or lower Pliocene marine, and recent Quaternary alluvium (0101011)	1	1
R244	222 Figueroa St., L.A.	25′ of alluvium over shale. Water at 20′ (01101000)	On the boundary of upper Miocene marine, middle and/or lower Pliocene marine, and recent Quaternary alluvium (0000010)	0	1[4]
R246	6464 Sunset Blvd., L.A.	Alluvium. Water table at 55′ (00000000)	Recent Quaternary alluvium (0000010)	0	0

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
R248	6430 Sunset Blvd., L.A.	Alluvium. Water table at 55′ (00000000)	Recent Quaternary alluvium (0000010)	0	0
R249	1900 Avenue of the Stars, L.A.	Silt and sand layers. Water level at 70′ (00110000)	Pleistocene nonmarine bordered by Pleistocene marine and marine terrace deposits (0101110)	0	0
R251	234 S. Figueroa St., L.A.	25′ of alluvium over shale. Water at 20′ (01101000)	On the boundary of upper Miocene marine, Pleistocene nonmarine and middle and/or lower Pliocene marine sedimentary rock (0111121)	0	1
R253	533 S. Fremont Ave., L.A.	Alluvium (00000001)	On the boundary of Pleistocene nonmarine sedimentary rock and recent Quaternary alluvium (0111011)	0	0
S255	6200 Wilshire Blvd., L.A.	Thin layer of alluvium over asphaltic sands (01100000)	Pleistocene nonmarine sedimentary rock (1111121)	1	1
S258	3440 University Ave., L.A.	400′ of alluvium over clay and shale. Water table at 375′ (0000000-)	Recent Quaternary alluvium (0000010)	0	0
S261	1177 Beverly Dr., L.A.	Alluvium (00000001)	Pleistocene marine and marine terrace deposits (0100110)	0	0
S262	5900 Wilshire Blvd., L.A.	Alluvium - asphaltic sands (01000001)	Pleistocene nonmarine sedimentary rock (1111121)	1	1
S265	3411 Wilshire Blvd., L.A.	Siltstone. Water table at basement level (01111101)	Pleistocene nonmarine sedimentary rock (1111121)	1	1
S266	3550 Wilshire Blvd., L.A.	Alluvium. Water table at 35′ (00000000)	Border of Pleistocene non-marine sedimentary rock and recent Quaternary alluvium (0111111)	0	0
S267	5260 Century Blvd., L.A.	Alluvium (00000001)	Quaternary nonmarine terrace deposits (1100120)	0	0
U297	Helena, Montana (Federal Building)	Limestone bedrock (22222122)	Cambrian, bordering with pre-Cambrian Helena limestone, and Tertiary and Quaternary sedimentary deposits (1212121)	-	2

(Continued)

Rec.	Station Location	Abbreviated Site Geology	Data from Geological Map	U	Ave.
U313	Hollister	Recent unconsolidated alluvium over partly consolidated gravels, and well consolidated marine sandstone and shale. Water table from 85-95′ (00100000)	Boundary of Pleistocene River terrace deposits and recent Quaternary alluvium (0100011)	-	0
V317	L.A. (Chamber of Commerce)	Alluvium veneer over late Tertiary unconsolidated marine sediments (01101011)	Recent Quaternary alluvium (0000010)	-	0
V322	San Francisco (So. Pacific Building)	Sand fill over clay, sand, and gravel. 285′ to Franciscan bedrock-sandstone and shale (10100000)	Boundary between recent Quaternary alluvium, dune sand and the Franciscan Formation (Jurasic-Cretaceous) (0110011)	-	0
V323	San Francisco (Alexander Bldg.)	Sand and clay over thin bedded shale and sandstone (10100000)	Boundary between recent Quaternary alluvium, dune sand and the Franciscan Formation (Jurasic-Cretaceous) (0111011)	-	1
V329	Port Hueneme	Coarse grained sand and gravel veneer over fine grained silt and clay (00110000)	Recent Quaternary alluvium (0000010)	0	0
V332	Sacramento (Pacific Telphone & Telegraph)	Approx. 40′ of inorganic, clayey silt over consolidated sand, gravel, and silt. 8000′ to basement rock (00100001)	Recent Quaternary Great Valley fan deposits (0000000)	-	0
W335	Cedar Springs, Allen Ranch	Granitic (22222222)	Mesozoic granitic rocks - tonalite and diorite (2222222)	2	2
W336	Cedar Springs, Pump house on Dam abutment	Shallow gravelly alluvium (22101022)	On the boundary of Mesozoic granitics, Pleistocene nonmarine and Quaternary alluvium (1102111)	1	1
Y377	So. Calif. Edison Bldg. (L.A.)	30′ of alluvial clay silt, and sand overlying 365′ of Upper Pliocene blue clay (01100000)	Narrow strip of recent Quaternary alluvium bordering with Pleistocene nonmarine, upper Miocene marine and middle and/or lower Pliocene deposits (0101001)	-	0
Y378	Subway Terminal Bldg. (L.A.)	Alluvium veneer over late Tertiary marine sediments (01100002)	Recent Quaternary alluvium bordering with upper Pliocene marine deposits (0101011)	-	0

(Continued)

[1]Modified site classifications of Duke et al (1972).

[2]Estimates in parentheses by staff members of Earthquake Engineering Research Laboratory.

[3]0, 1, and 2 correspond to soft, intermediate, and hard sites (see text).

[4]Adjustments made to classification to ensure consistency across small geographical areas.

In accordance with letter from DAEN-RDC, DAEN-ASI dated 22 July 1977, Subject: Facsimile Catalog Cards for Laboratory Technical Publications, a facsimile catalog card in Library of Congress MARC format is reproduced below.

Chang, Frank K
State-of-the-art for assessing earthquake hazards in the United States; Report 9: Catalogue of strong motion earthquake records; Vol. I: Western United States, 1933-1971 / by Frank K. Chang. Vicksburg, Miss. : U. S. Waterways Experiment Station ; Springfield, Va. : available from National Technical Information Service, 1978.
28, 13, 12 p. : ill. ; 27 cm. (Miscellaneous paper - U. S. Army Engineer Waterways Experiment Station ; S-73-1, Report 9, v.1)
Prepared for Office, Chief of Engineers, U. S. Army, Washington, D. C.
References: p. 4.

1. Earthquake engineering. 2. Earthquake hazards. 3. Earthquakes. 4. Ground motion. 5. State-of-the-art studies. I. United States. Army. Corps of Engineers. II. Series: United States. Waterways Experiment Station, Vicksburg, Miss. Miscellaneous paper ; S-73-1, Report 9, v.1.
TA7.W34m no.S-73-1 Report 9 v.1