STATE OF CALIFORNIA - THE RESOURCES AGENCY

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December 23, 1994

CSMIP STRONG-MOTION DATA FROM THE PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994

Report OSMS 94-24
California Strong Motion Instrumentation Program (CSMIP)

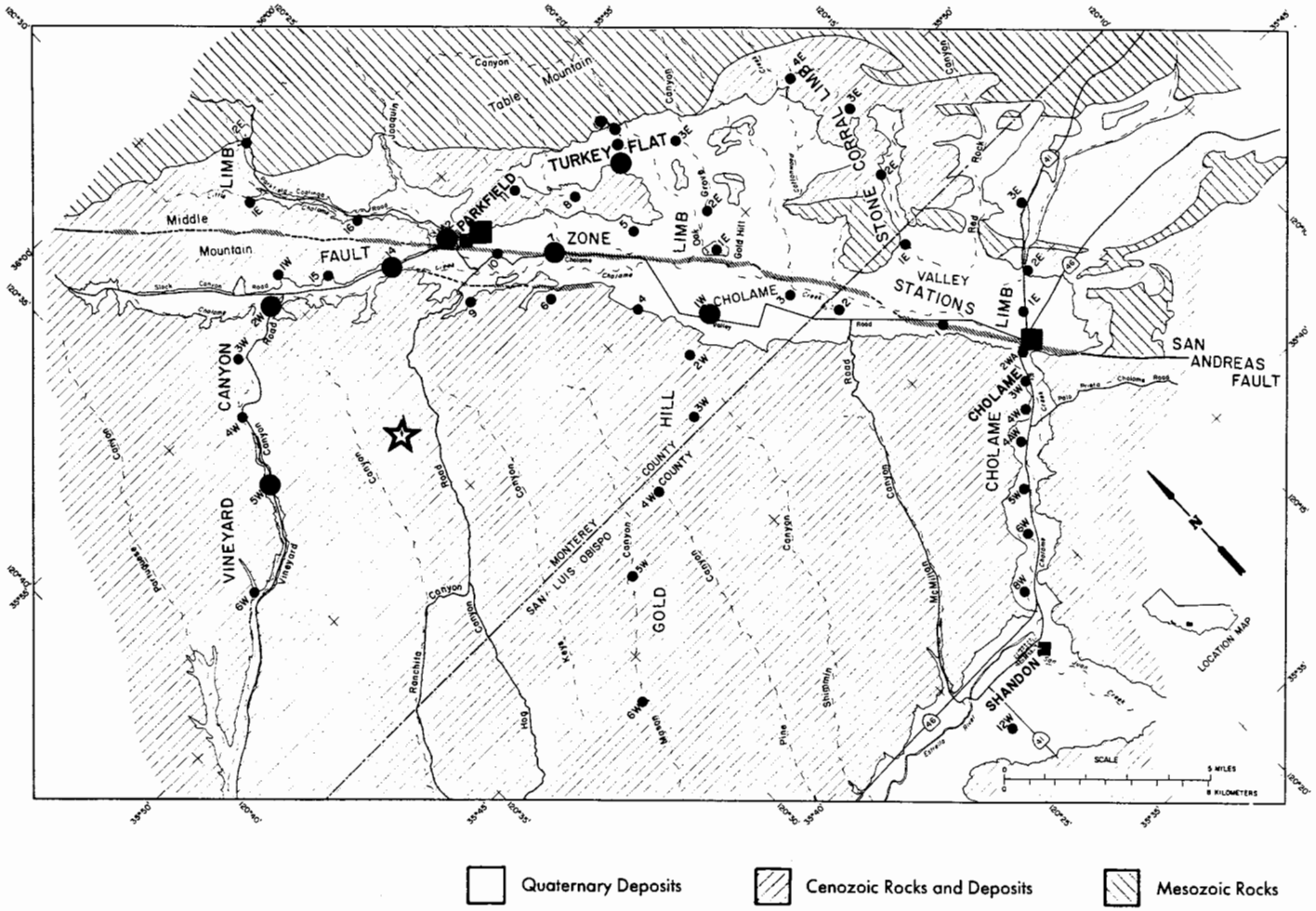
A magnitude 5.0 (M_L BRK; moment magnitude 5.0 BRK) earthquake occurred on December 20, 1994 at 2:27 am (PST), approximately 5 km west of Parkfield. The preliminary hypocenter is located at 35.86°N, 120.50°W with a depth near 6 km (USGS).

Table 1 summarizes the strong-motion data at 10 CSMIP stations, ranging in epicentral distance from 6 to 39 km. The locations of these stations and other CSMIP stations in the Parkfield area are shown on the map in the attached figure. The records from 7 ground-response stations are included in this early release.

The largest horizontal and vertical accelerations are 0.43 and 0.21 g, respectively. These accelerations were recorded at Fault Zone #7 located about 9 km from the epicenter. Interestingly, three nearby stations (Fault Zone #12, Gold Hill #1W and Turkey Flat #1) all recorded significantly smaller accelerations of 0.1 g or less. Recovery of data from the many other CSMIP stations in the Parkfield area continues.

Maximum accelerations from 3 structures are included in this early release. Peak structural accelerations of 0.09 and 0.20 g were recorded on the ground floor and roof of a 1-story wood-frame school building in Parkfield. Peak accelerations of 0.01 and 0.02 g were recorded at the base and roof, respectively of a 1-story hospital in Templeton approximately 39 km SW of the epicenter. A peak acceleration of 0.05 g was recorded at a small concrete bridge abutment 24 km south of the epicenter.

Processed acceleration, velocity and displacement and response spectra (preliminary) from Fault Zone #7, Turkey Flat #1 and the 1-story School Building in Parkfield are included in this early release. The early processing and release of these data take advantage of new developments in instrumentation and communications. Files of the processed data from the 2 ground-response stations can be obtained on the Internet. (They are available in directory pub/cs/csmip_eq_data at ftp.netcom.com by anonymous ftp).



CSMIP ground and structure stations in the vicinity of the December 20, 1994 Parkfield earthquake are shown as solid circles and squares, respectively. Data for the stations with the large symbols are summarized in this report, record recovery is underway at the other stations. The Templeton hospital is not shown on the map. The epicenter (open star) is located west of Parkfield. The generalized geology is also shown.

TABLE 1

Data recovered from 10 CSMIP stations for the December 20 Earthquake

Station No.	Station Name	Structure Type	Station Coords.	Epic Dist (km)	Maximum Acceleration Ground	Maximum Acceleration Structure	Site Geology
36440	Parkfield - Vineyard Canyon #5W	Small shelter	35.885 N 120.565 W	6	0.13g H 0.06g V		Alluvium
36456	Parkfield - Fault Zone #14	Small shelter	35.908 N 120.458 W	7	0.27g H 0.15g V		Alluvium
36447	Parkfield - Vineyard Canyon #2W	Small shelter	35.927 N 120.509 W	7	0.19g H 0.11g V		Alluvium
36531	Parkfield - 1-story School Bldg.	1-story wood-frame building	35.899 N 120.432 W	8	0.09g H	0.20g H	Alluvium
36138	Parkfield - Fault Zone #12	Small shelter	35.893 N 120.426 W	8	0.08g H 0.08g V		Alluvium
36431	Parkfield - Fault Zone #7	Small shelter	35.871 N 120.404 W	9	0.43g H 0.21g V		Alluvium
36415	Parkfield - Gold Hill #1W	Small shelter	35.818 N 120.378 W	12	0.04g H 0.06g V		Alluvium
36529	Parkfield - Turkey Flat #1 (Rock South)	Small shelter	35.878 N 120.358 W	13	0.10g H 0.03g V		Sandstone
36668	Parkfield - Hwy46/ Cholame Creek Bridge	Concrete bridge	35.733 N 120.289 W	24		0.048g H 0.020g V	Alluvium
36695	Templeton - 1-story Hospital	1-story wood-frame building	35.556 N 120.719 W	39	0.010g H 0.005g V	0.021g H	Alluvium

PARKFIELD - FAULT ZONE #7: CSMIP S/N 431

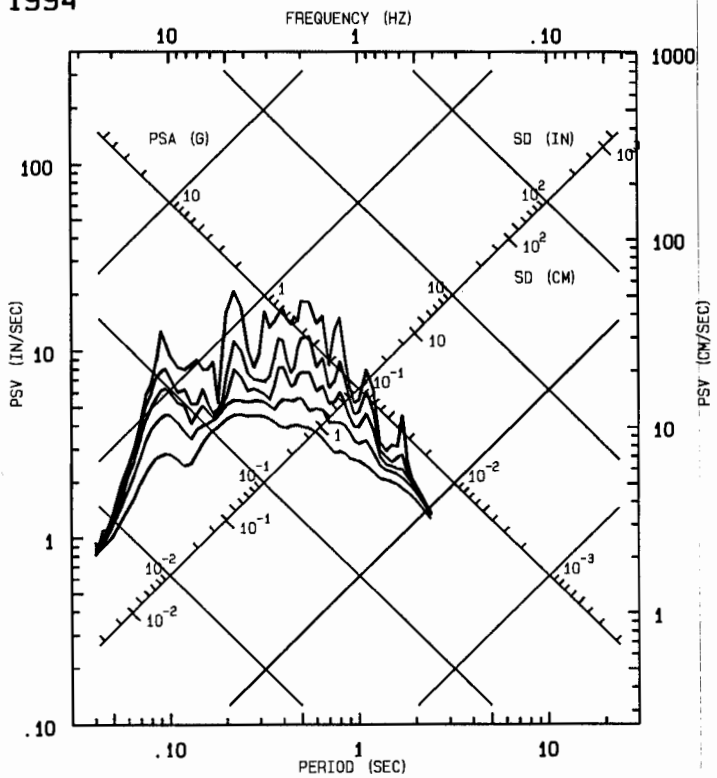
PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994
CSMIP PRELIMINARY PROCESSING

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.51 TO 23.6 HZ
(0.04 TO 1.96 SEC)

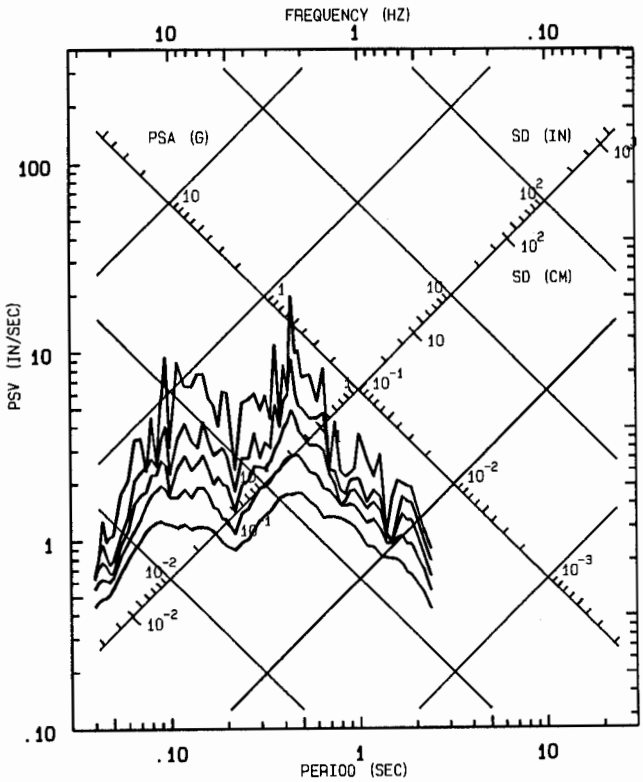
RECORD ID: 36431-S4379-94355.02

—— RESPONSE SPECTRA: PSV, PSA & SD
DAMPING VALUES: 0, 2, 5, 10, 20%

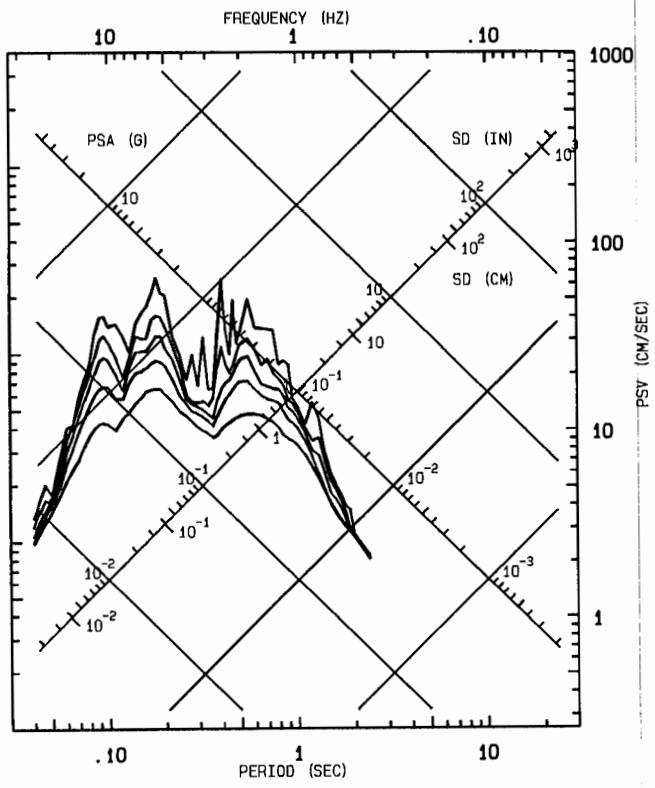
CHN 1: 90 DEG



CHN 2: UP



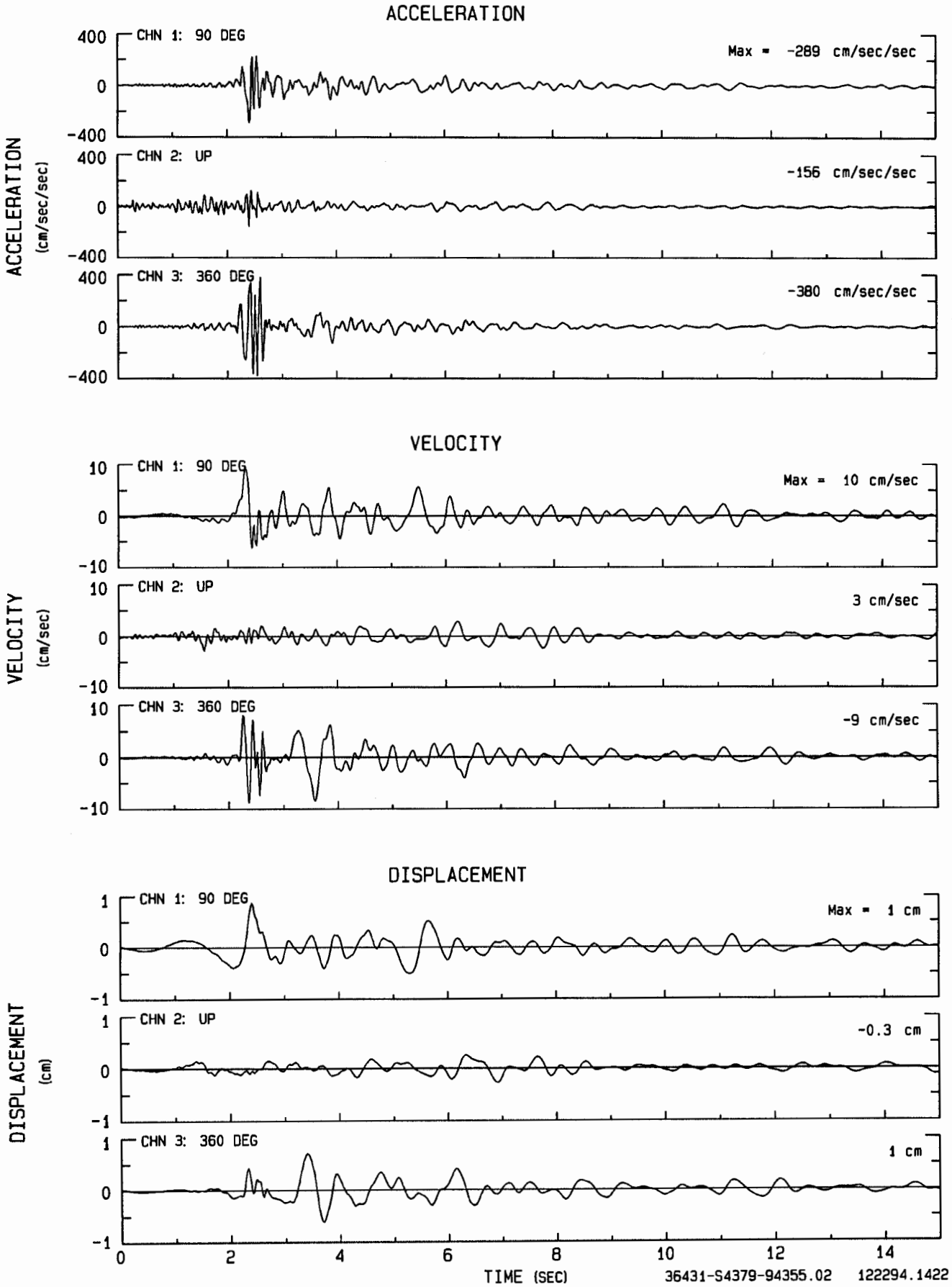
CHN 3: 360 DEG



PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994 CSMIP PRELIMINARY PROCESSING

PARKFIELD - FAULT ZONE #7 CSMIP Sta Num 36431

Usable Data Bandwidth: .51 to 23.6 Hz (.04 to 2.0 Sec)



PARKFIELD - TURKEY FLAT #1 (ROCK SOUTH): CSMIP S/N 529

PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994
CSMIP PRELIMINARY PROCESSING

PHASE 3 DATA: RESPONSE SPECTRA
USABLE DATA BANDWIDTH: 0.25 TO 47.2 HZ
(0.02 TO 3.92 SEC)

RECORD ID: 36529-E0565-94354.09

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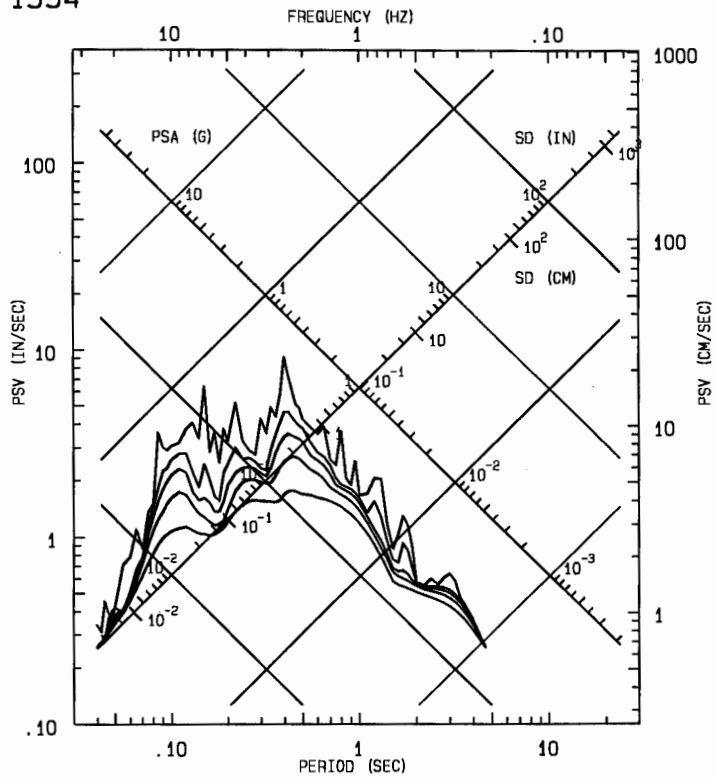
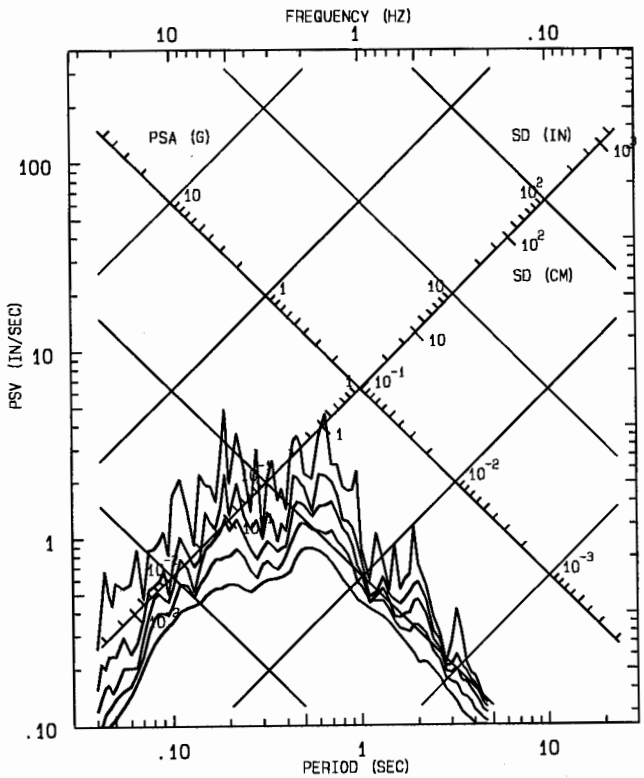
DAMPING VALUES: 0, 2, 5, 10, 20%

CHN 1: 0 DEG
SURFACE



CHN 2: UP
SURFACE



CHN 3: 90 DEG
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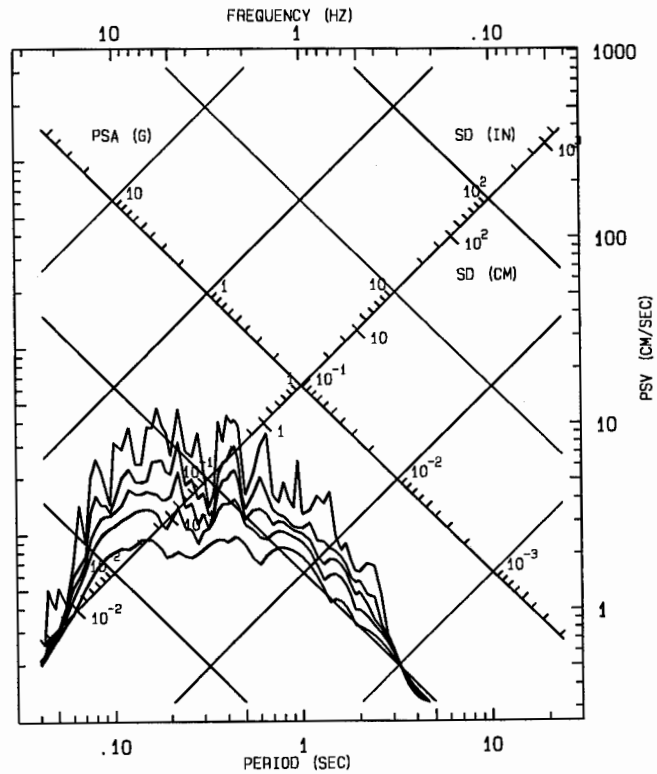

PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994 CSMIP PRELIMINARY PROCESSING

PARKFIELD - TURKEY FLAT #1 (ROCK SOUTH) CSMIP Sta Num 36529

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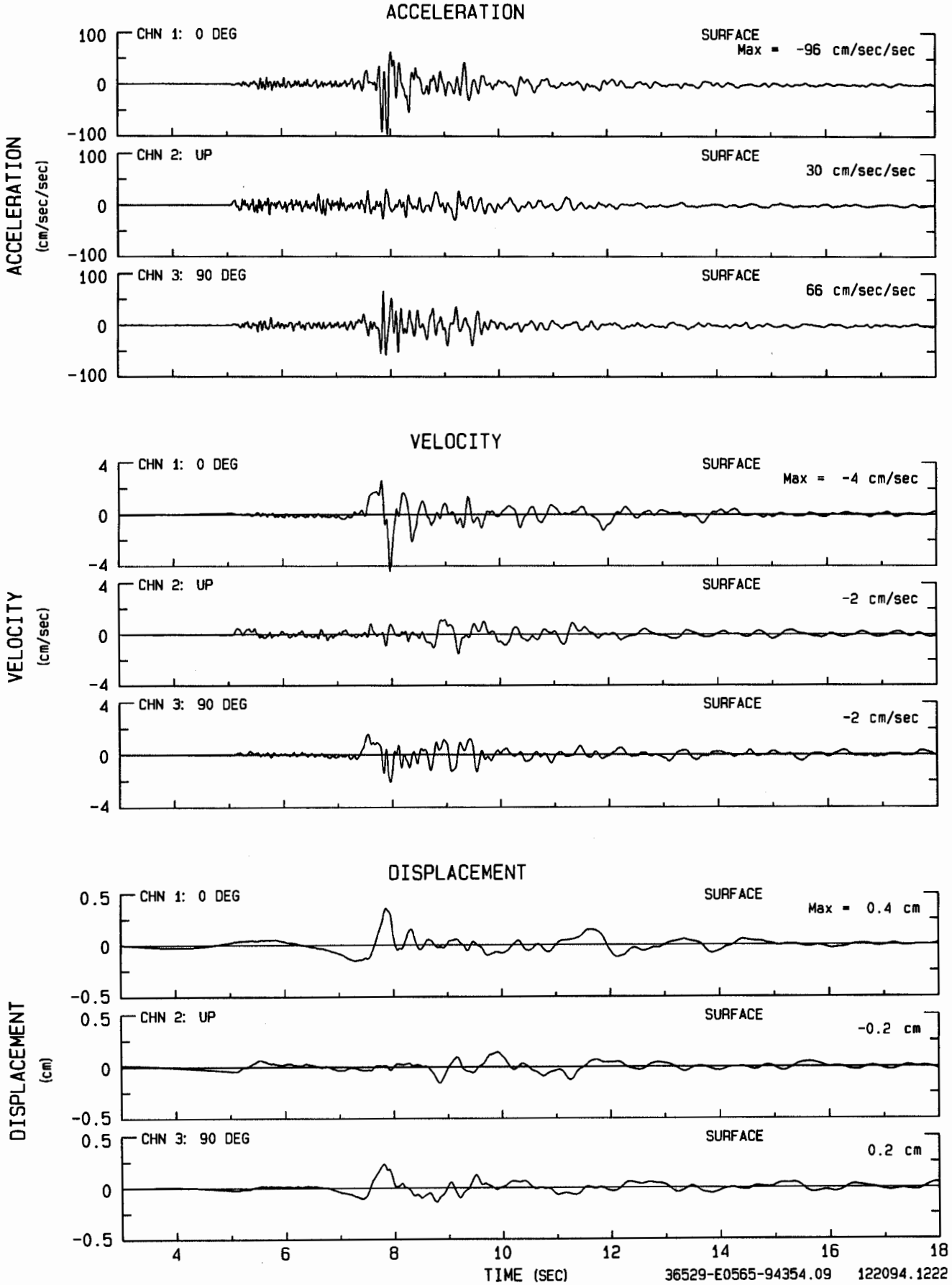
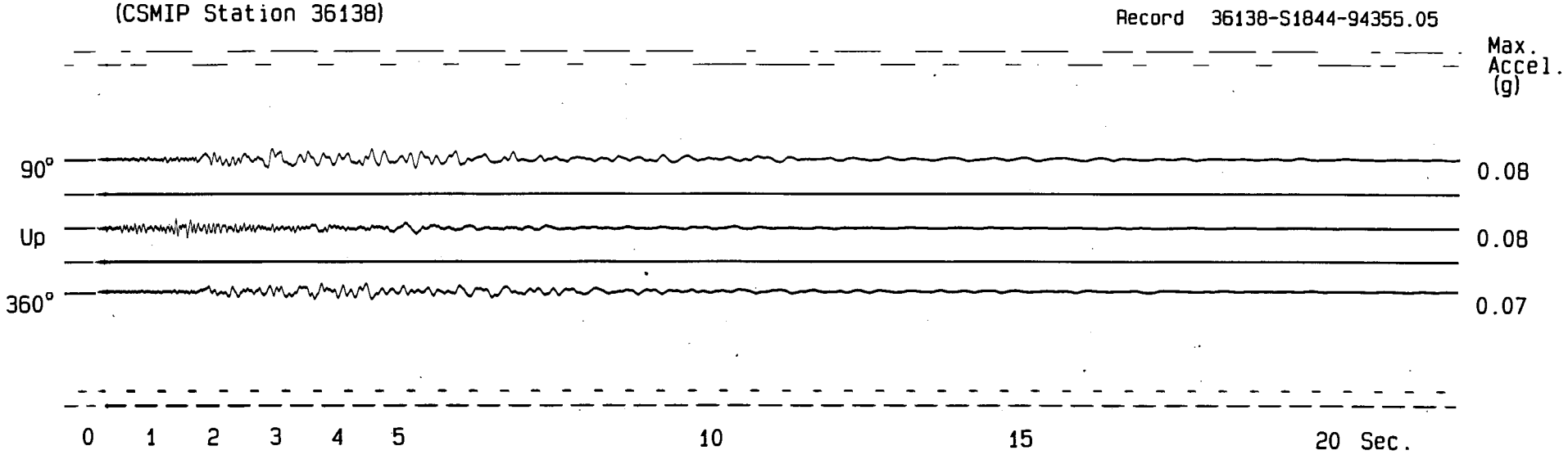
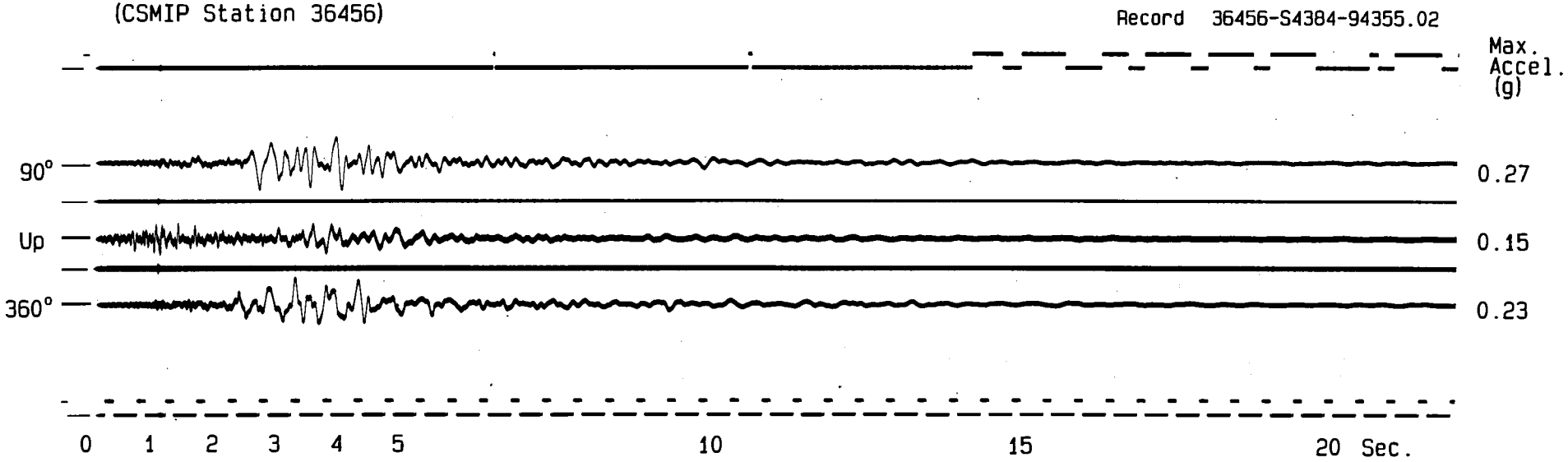


Parkfield - Fault Zone #12
(CSMIP Station 36138)

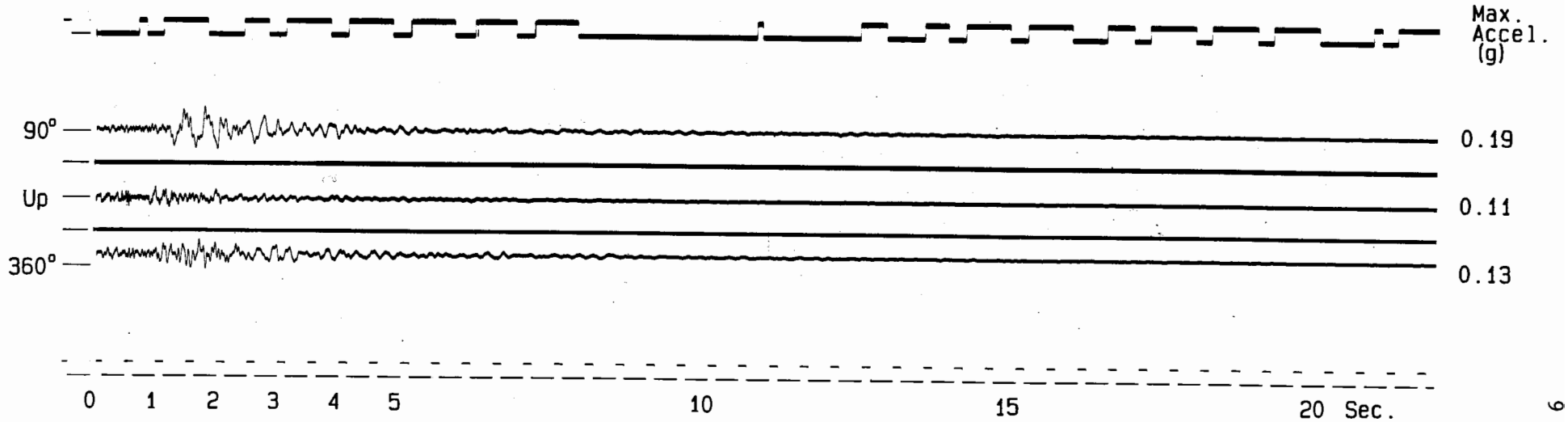


Parkfield - Fault Zone #14
(CSMIP Station 36456)



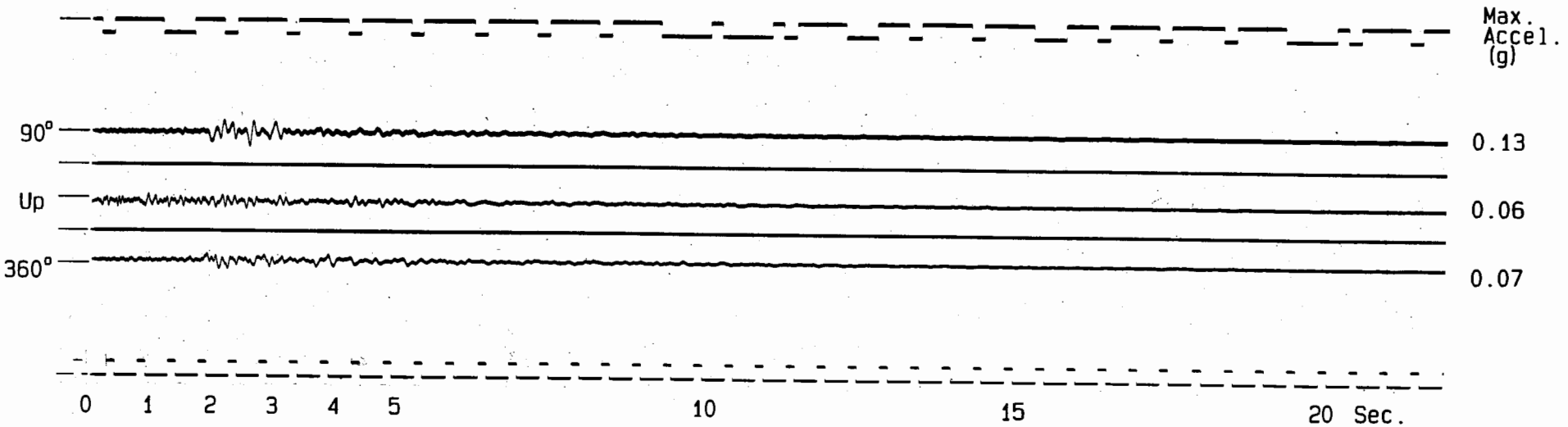
Parkfield - Vineyard Canyon #2W
(CSMIP Station 36447)

Record 36447-S4812-94355.02



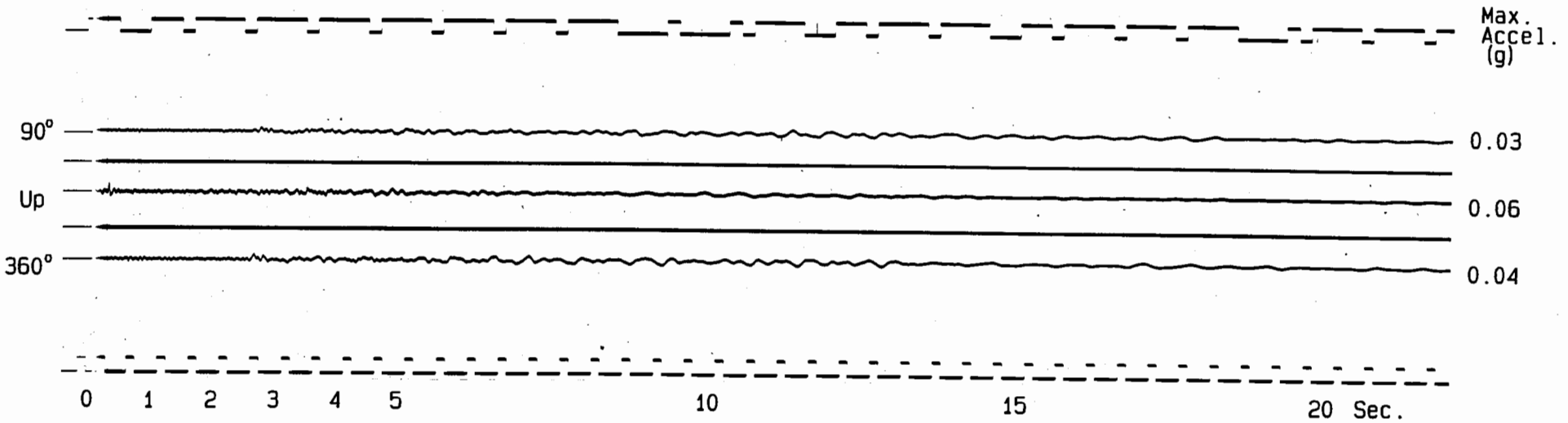
Parkfield - Vineyard Canyon #5W
(CSMIP Station 36440)

Record 36440-S2521-94355.02



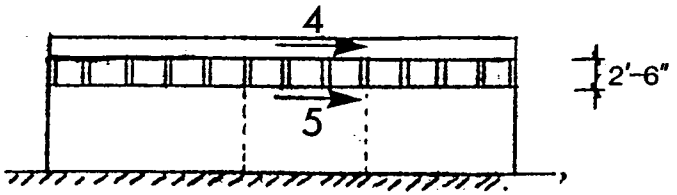
Parkfield - Gold Hill #1W
(CSMIP Station 36415)

Record 36415-S1812-94355.02

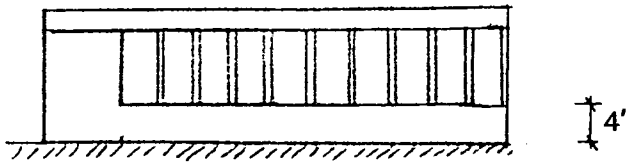


Parkfield - 1-story School Building
(CSMIP Station No. 36531)

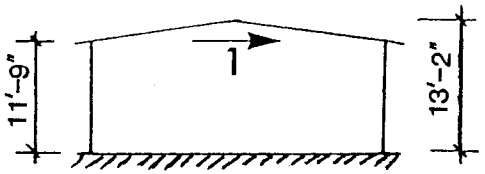
SENSOR LOCATIONS



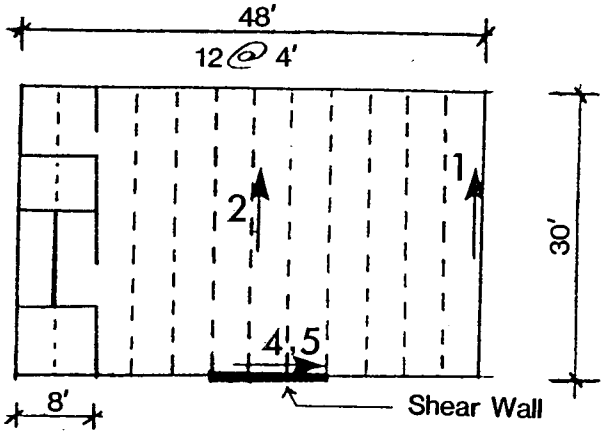
South Wall



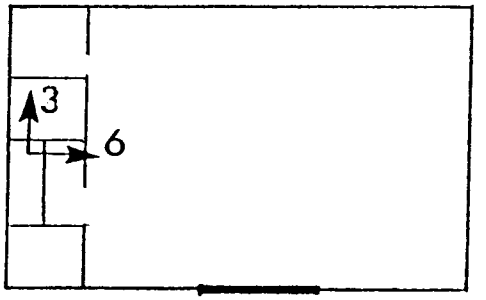
North Wall



East Wall



Roof Level Plan



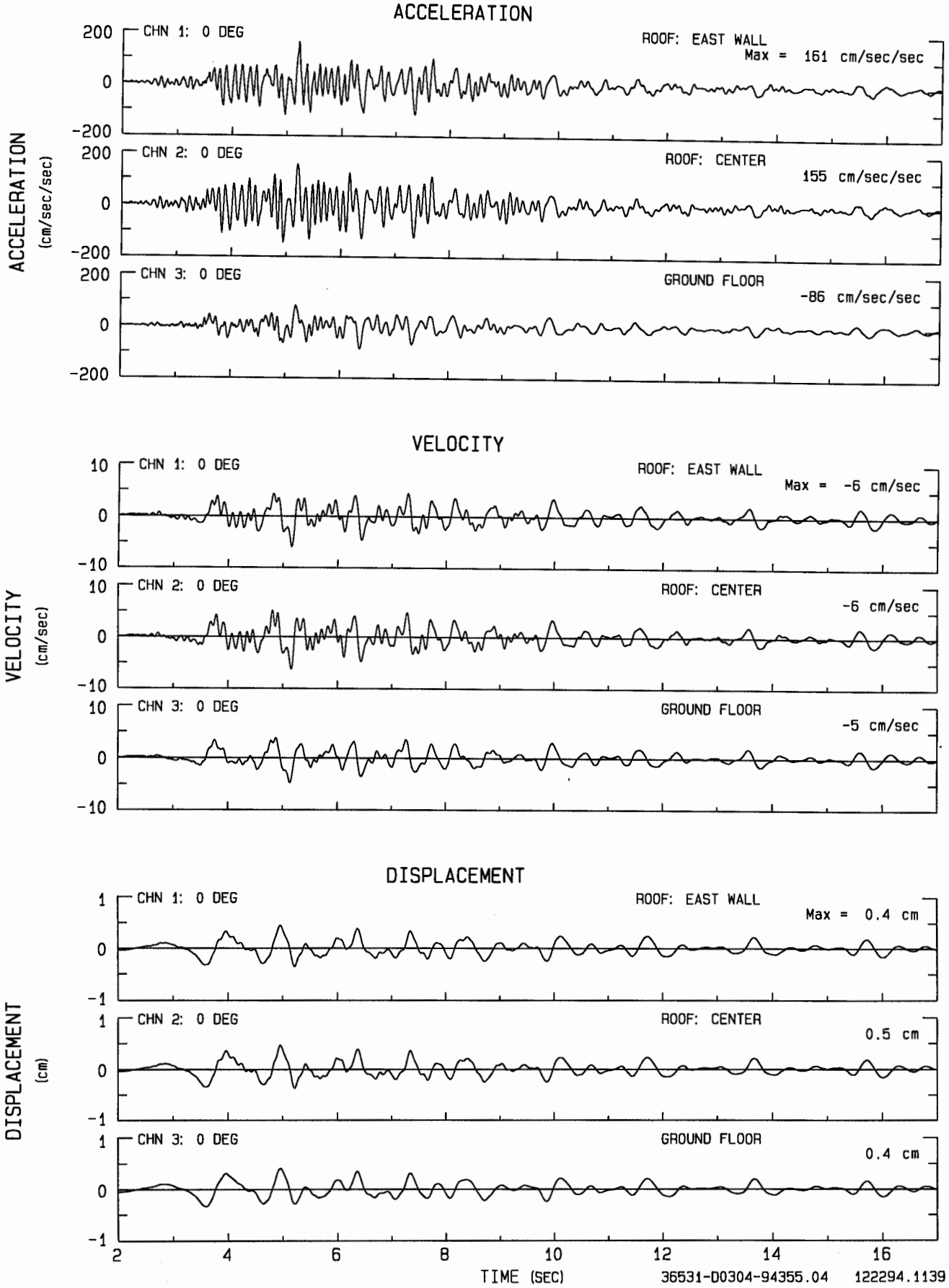
Ground Level Plan

Structure Reference
Orientation: N = 3°

PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994 CSMIP PRELIMINARY PROCESSING

PARKFIELD - 1-STORY SCHOOL BLDG. CSMIP Sta Num 36531

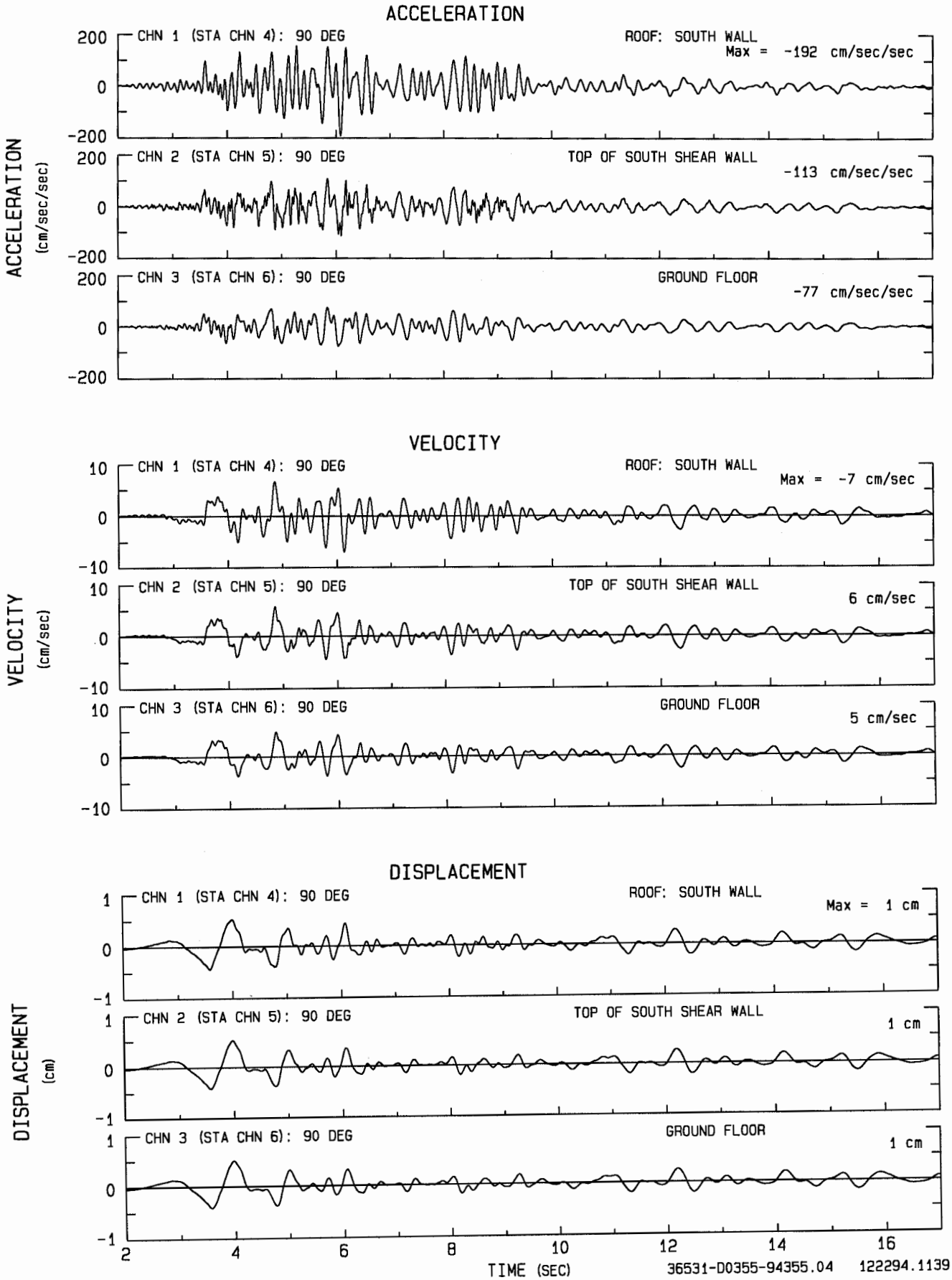
Usable Data Bandwidth: .51 to 47.2 Hz (.02 to 2.0 Sec)



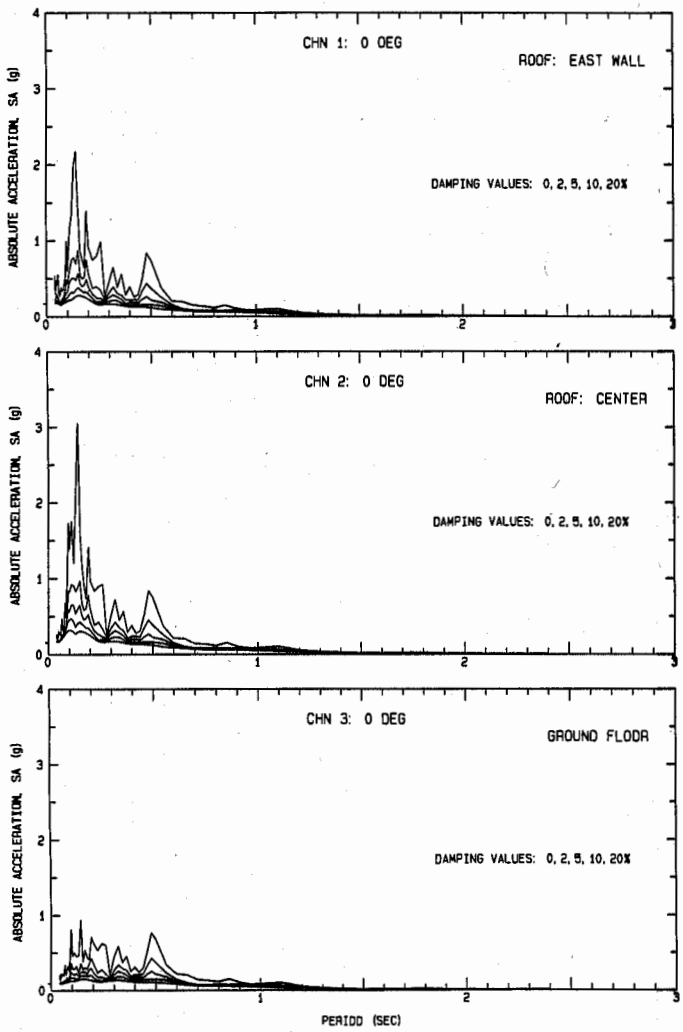
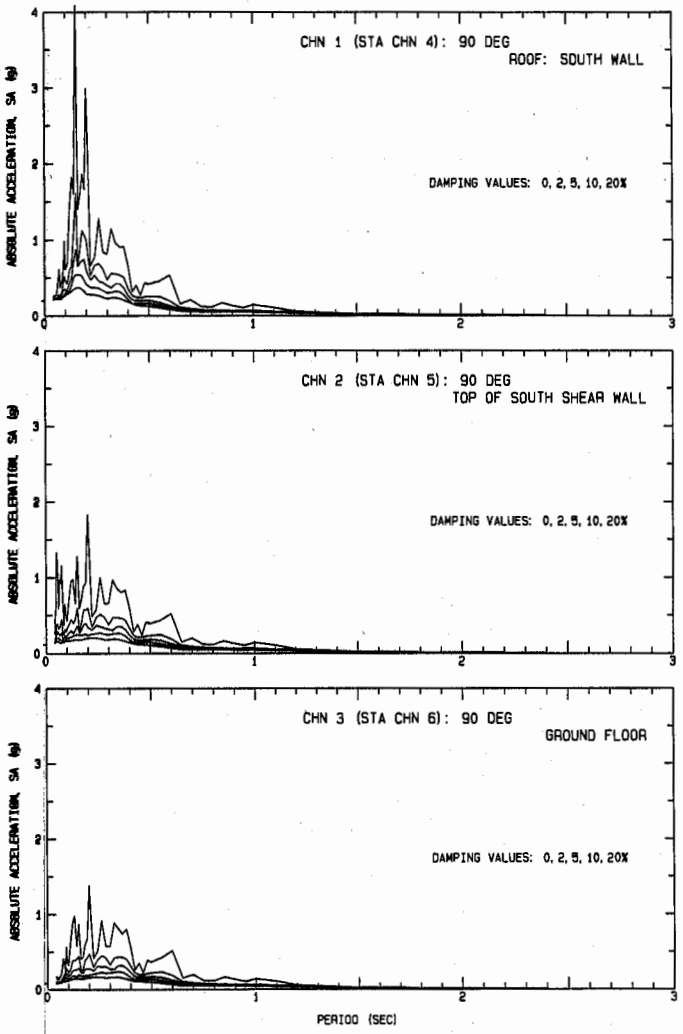
PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994 CSMIP PRELIMINARY PROCESSING

PARKFIELD - 1-STORY SCHOOL BLDG. CSMIP Sta Num 36531

Usable Data Bandwidth: .51 to 47.2 Hz (.02 to 2.0 Sec)



PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994 CSMIP PRELIMINARY PROCESSING
PARKFIELD - 1-STORY SCHOOL BLDG.
ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .30-.60 TO 46.0-50.0 HZ.
36531-00304-94355.04 122294.1229-QP94A531



PARKFIELD EARTHQUAKE OF 20 DECEMBER 1994 CSMIP PRELIMINARY PROCESSING
PARKFIELD - 1-STORY SCHOOL BLDG.
ACCELEROGRAM BANDPASS-FILTERED WITH RAMPS AT .30-.60 TO 46.0-50.0 HZ.
36531-00355-94355.04 122294.1229-QP94A531