PROCESSED DATA FROM THE STRONG-MOTION RECORDS OF THE SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978

FINAL RESULTS

1979

CALIFORNIA DIVISION OF MINES AND GEOLOGY

SPECIAL REPORT 144
VOLUME 3

STATE OF CALIFORNIA
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SPECIAL REPORT 144

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IN THREE VOLUMES

By

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UCSB NORTH HALL BUILDING

North Hall is a three-story reinforced concrete and masonry office building (Figure 9) constructed in 1960 at the University of California. Santa Barbara, Goleta, California. In 1975 the building was found to be unsafe for seismic loading and reinforced concrete shear walls were added. The building is located 12.75 km from the epicenter of the 13 August 1978 Santa Barbara earthquake, at an epicenter-station azimuth of 290.40°.

The building (Figures 10 and 11) is rectangular with plan dimensions of 34 ft. 0 in. by 240 ft. 0 in. and the overall height is 33 ft. 0 in. The lateral load resisting system in both directions is composed of the originally constructed full height masonry shear walls and the added full height reinforced concrete shear walls. During a structural engineering review of all campus buildings, it was found that the building was originally designed for 1/10th the 1958 code seismic force, and reinforced concrete shear walls were added in both directions. The vertical load carrying system includes a 2.5 in. concrete slab, pan joists and floor beams supported by concrete columns, masonry columns and masonry walls. The foundation is concrete caissons under walls and columns tied with horizontal grade beams.

Remote accelerometers were placed at the roof, third floor and ground floor at the locations shown in Figures 10 and 11. All accelerations were recorded simultaneously on 7 in. wide film at a central recorder located on the ground floor. The building was instrumented in accordance with the procedures developed at the U.S. Geological Survey (Rojahn and Matthiesen, 1977) together with considerations of the ambient vibration studies of this particular structure.

The digitized uncorrected accelerograms, corrected acceleration, velocity, displacement plots and spectra are shown on pages 6 through 80. Peak north-south (NS) corrected accelerations were 1.0 g at the roof, 0.66 g at the third floor and 0.40 g at the ground floor. Peak east-west (EW) corrected accelerations were 0.55 g at the third floor and 0.27 g at the ground floor. In general, the NS accelerations were greater than EW accelerations at all levels. Visible damage to the structure was limited to fine cracks in the reinforced concrete shear walls.

TABLE III

Recorder Information, UCSB North Hall Building

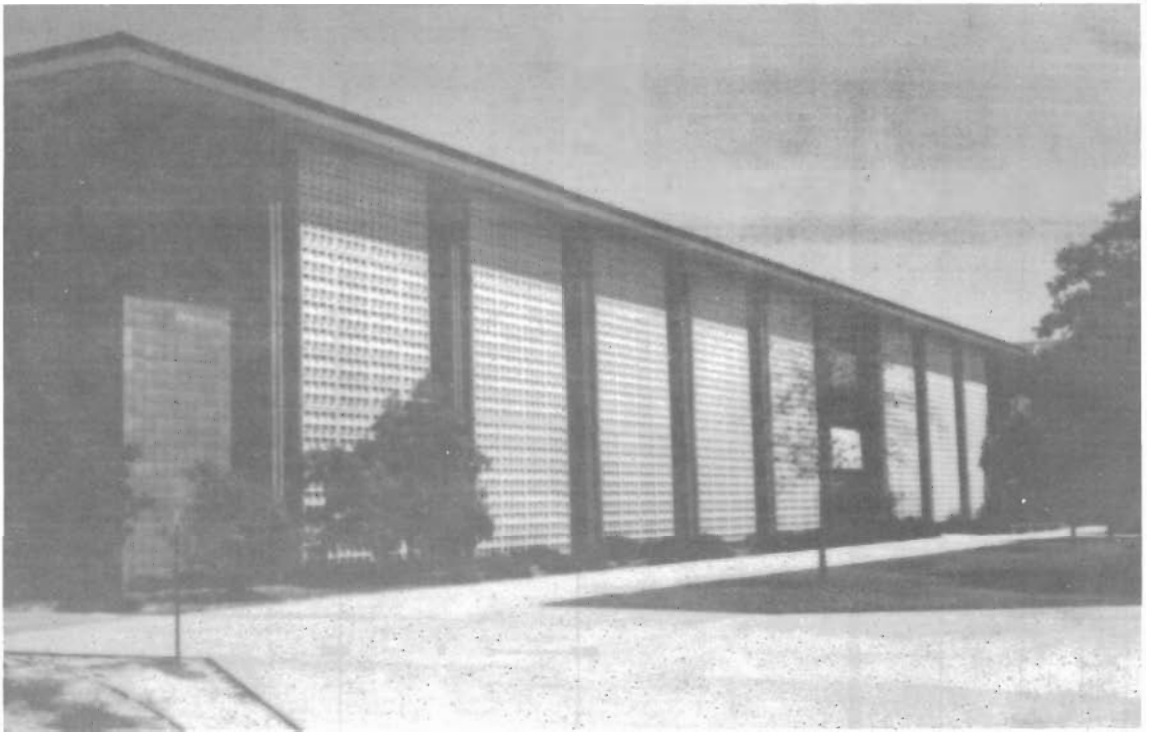
Instrument type: Kinemetrics CRA-1
Serial number 115
Installed 7 November 1975

Film installed: 3 August 1978 Recovered 14 August 1978

Trace*	Orientation (floor/loc)	Sensitivity † (mm/g)	Zero Signal A°	Galvanometer Angles deflection for + 1 g B°+	deflection for - 1 g B-	Period (sec)	Crit. Damp %
1	N (grnd/core)	18.5	6.45	5.95	5.74	.01848	65.2
2	UP (grnd/core)	18.3	2.45	5.94	5.85	.01852	65.2
3	E (grnd/core)	18.7	-1.29	5.98	6.02	.01848	61.4
4	N (grnd/W end)	18.6	8.70	6.02	5.98	.01821	69.0
5	N (3rd/core)	19.3	5.01	6.17	6.13	.01832	72.1
6	E (3rd/core)	19.0	1.48	6.14	6.03	.01934	67.2
7	S (roof/core)	17.9	1.93	5.80	5.69	.01880	65.2
8	N (3rd/W end)	18.6	-1.61	6.02	5.92	.01916	69.0
9	N (3rd/E end)	18.2	-4.76	5.87	5.74	.01803	67.2

* Trace numbers coincide with accelerometer numbers on Figures 10 and 11.

† Sensitivities which may be used prior to taking into account the oblique-angle recording geometry.



a.

b.

Figure 9. UCSB North Hall Building showing south view (a) and west view (b) of the structure.

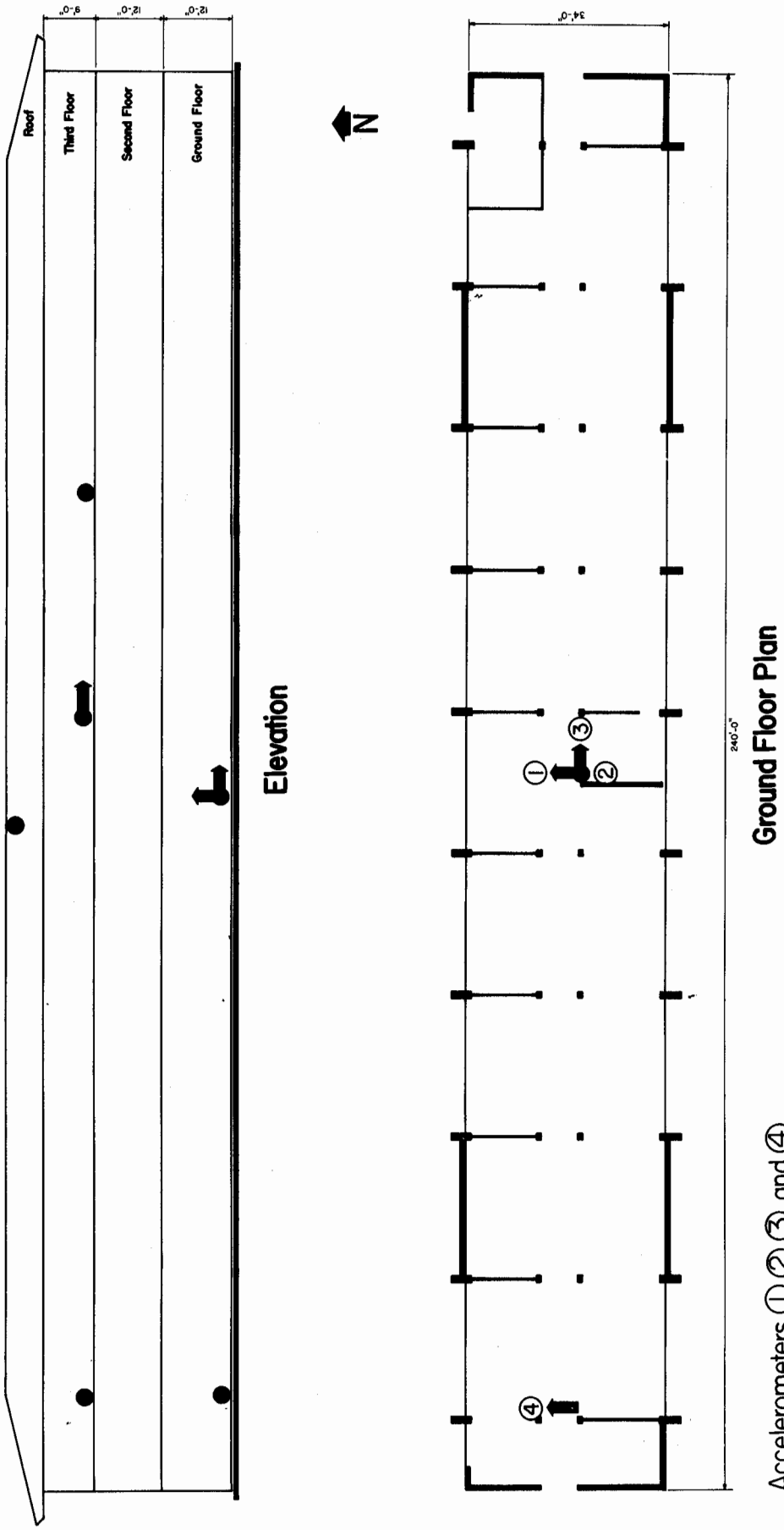


Figure 10. North Hall Plan and Elevation

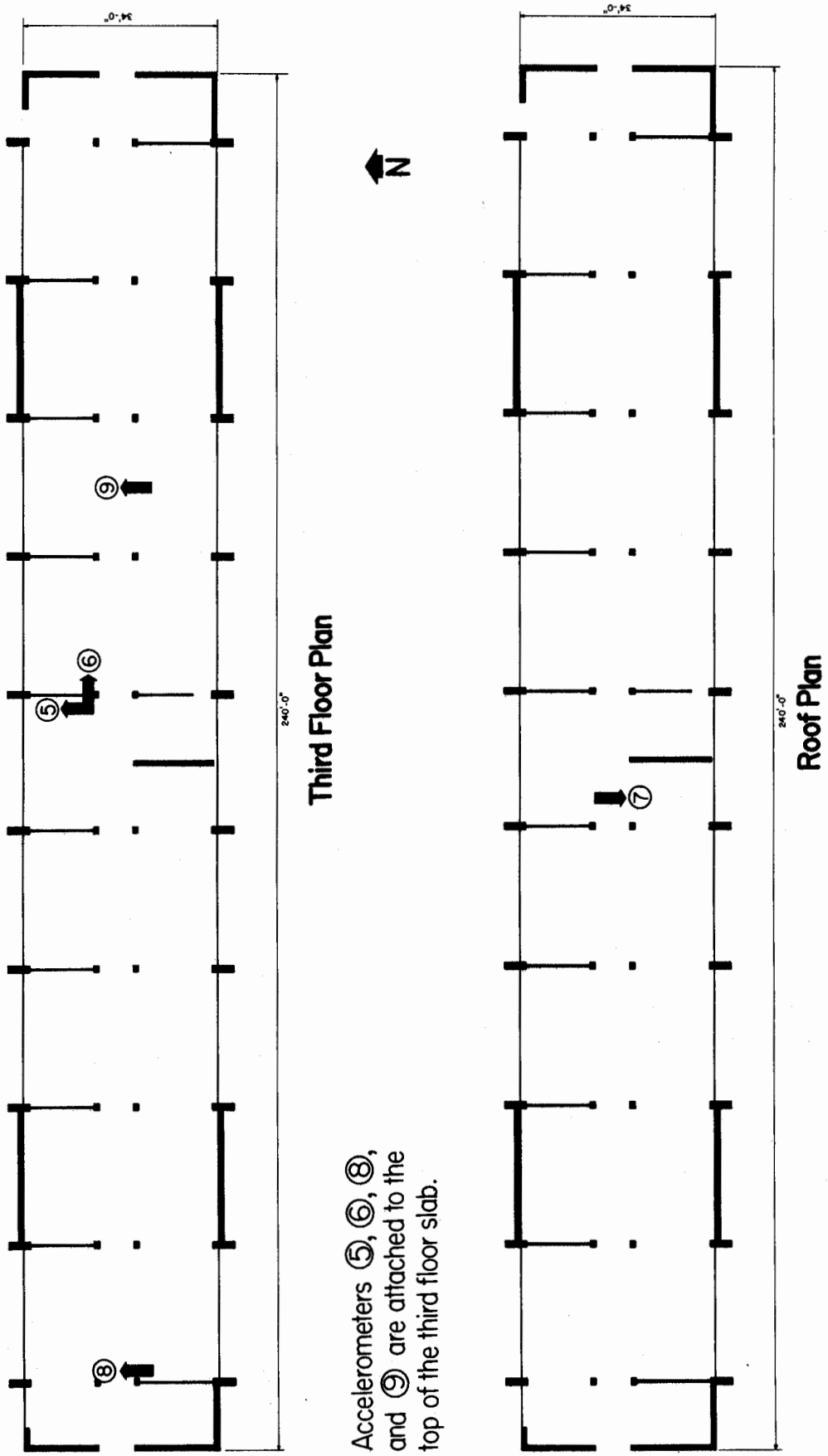
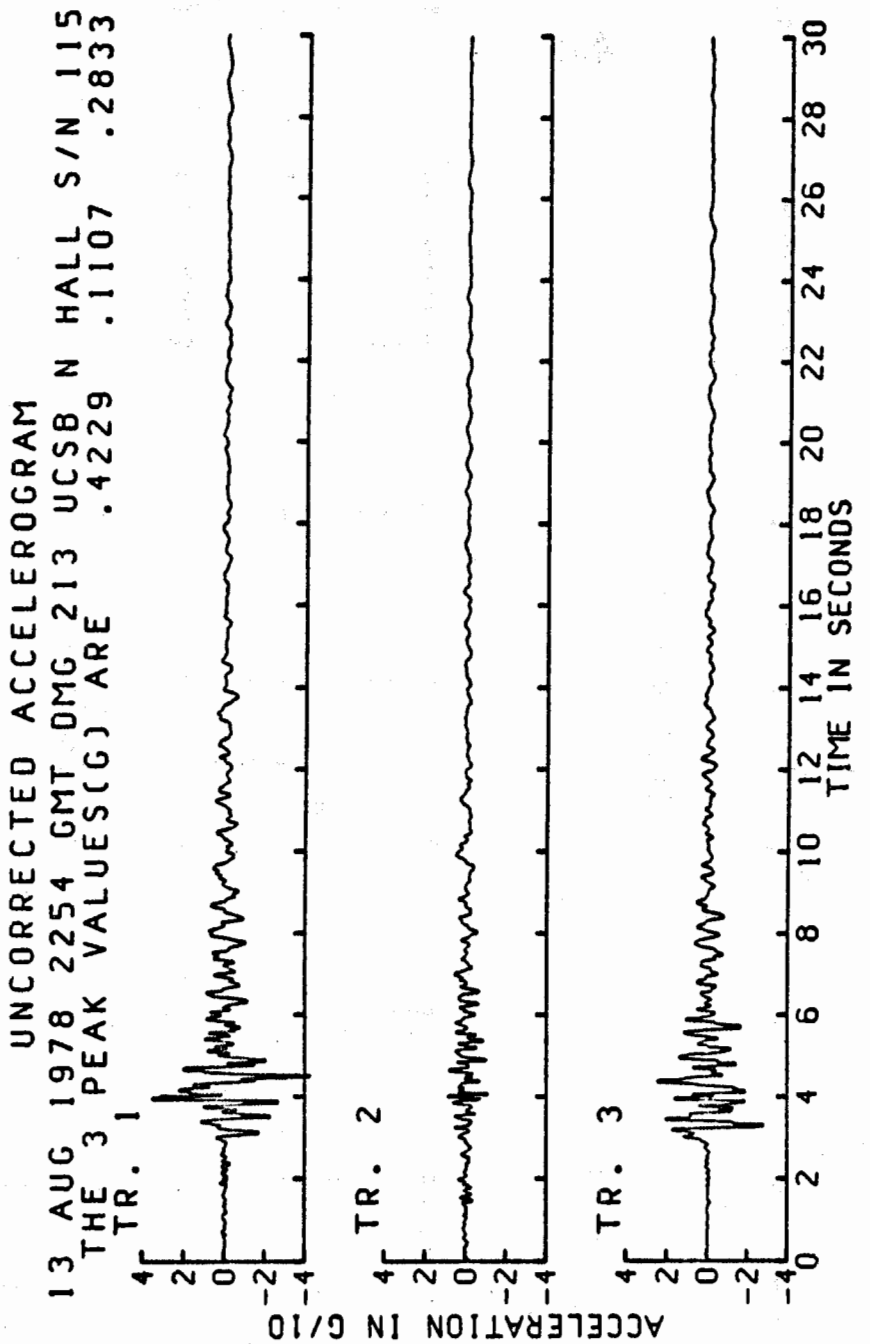
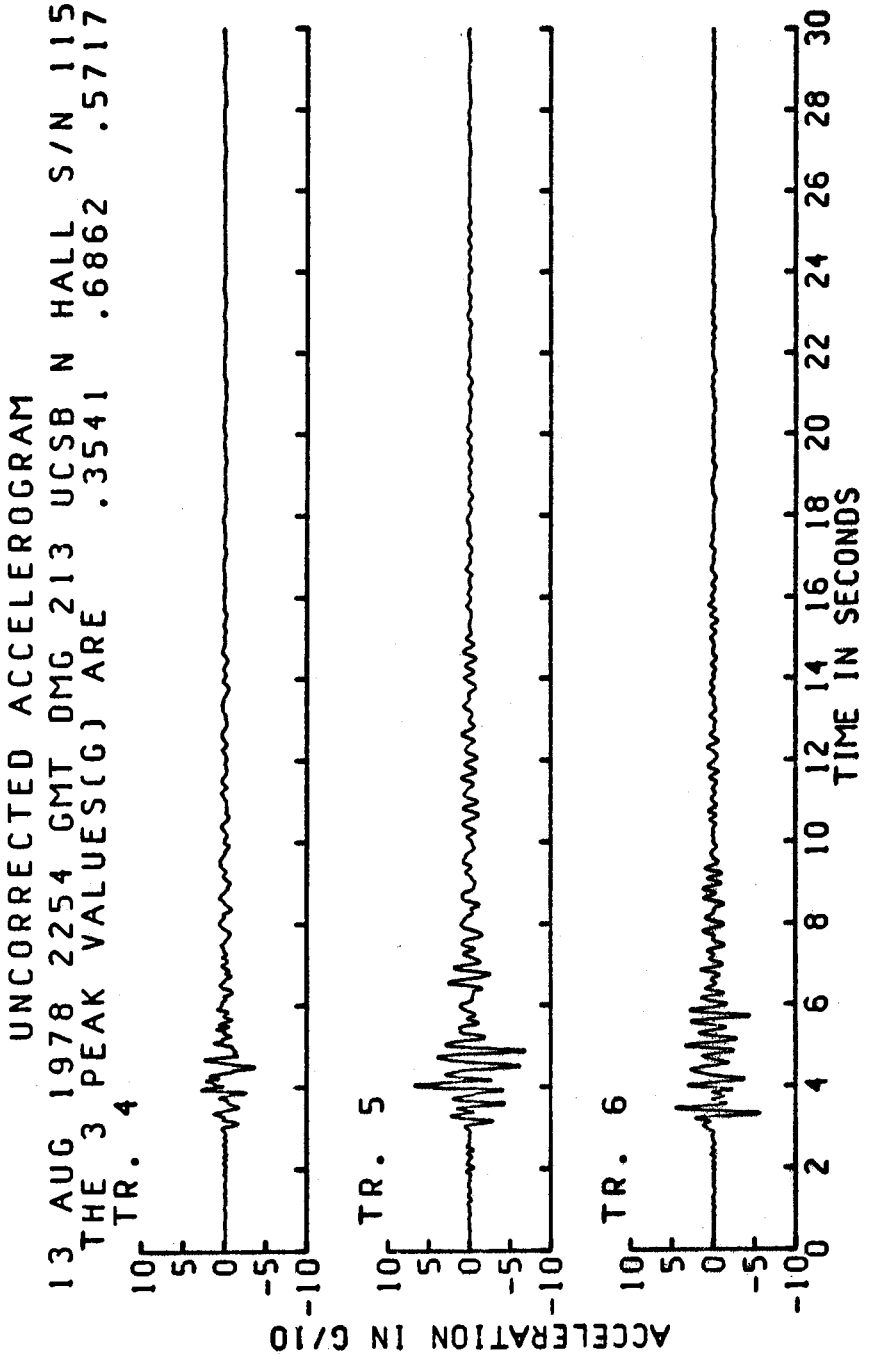
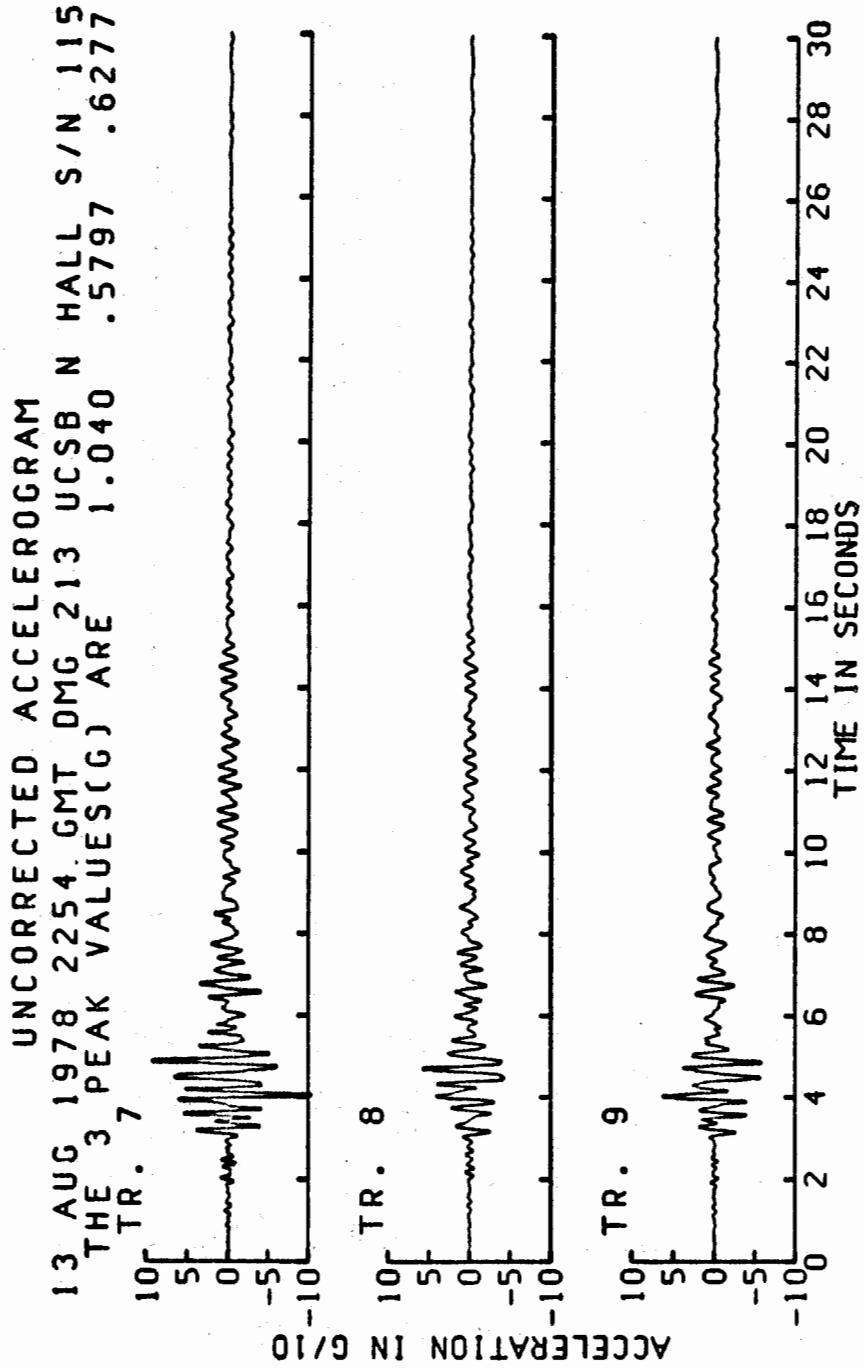


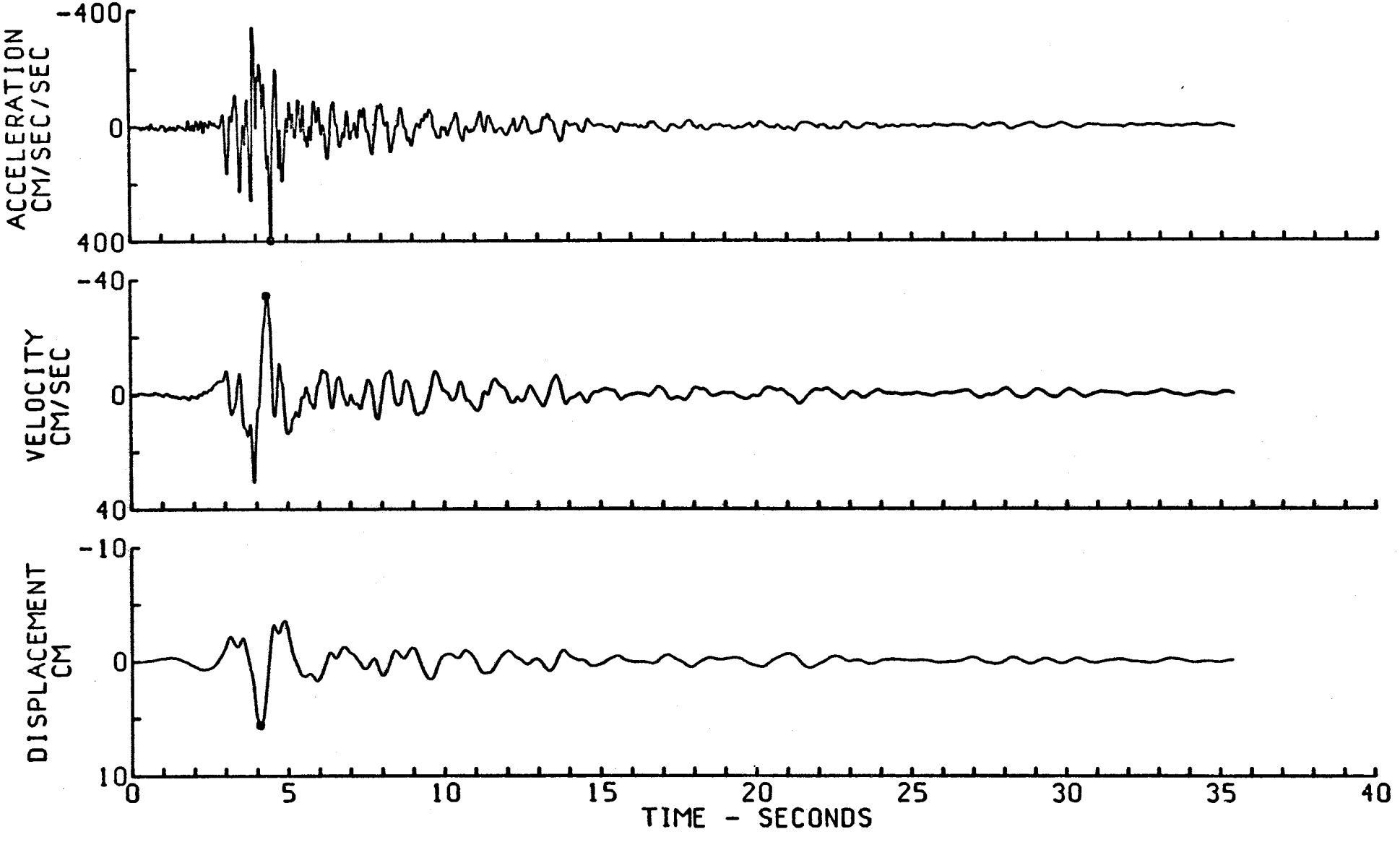
Figure 11. North Hall Plans


UNCORRECTED ACCELEROGRAM
13 AUG 1978 2254 GMT DMG 213 UCSB N HALL S/N 115
THE 3 PEAK VALUES(G) ARE .4229 .1107 .2833
TR. 1
TR. 2
TR. 3
ACCELERATION IN G/10
TIME IN SECONDS
4
2
0
-2
-4
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

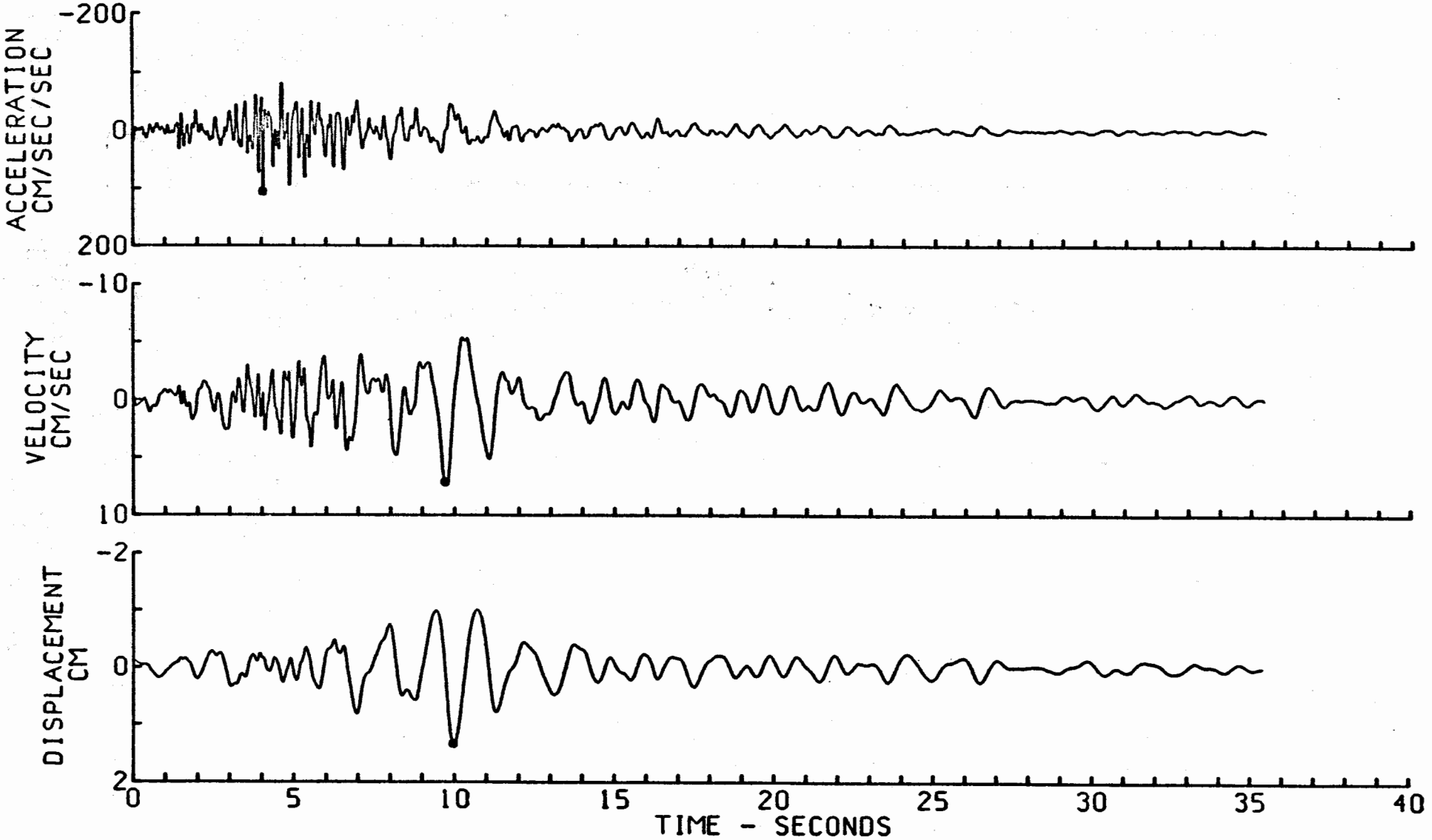

UNCORRECTED ACCELEROGRAM
13 AUG 1978 2254 GMT DMG 213 UCSB N HALL S/N 115
THE 3 PEAK VALUES(G) ARE .3541 .6862 .5717
TR. 4
TR. 5
TR. 6
10
5
0
-5
-10
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
TIME IN SECONDS
ACCELERATION IN G/10


UNCORRECTED ACCELEROGRAM
13 AUG 1978 2254 GMT DMG 213 UCSB N HALL S/N 115
THE 3 PEAK VALUES(G) ARE 1.040 .5797 .6277
TR. 7
TR. 8
TR. 9
10
5
0
-5
-10
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
TIME IN SECONDS
ACCELERATION IN G/10

CORRECTED ACCELERATION,VELOCITY,DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 1
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
ACCELEROGRAM IS BAND PASS FILTERED BETWEEN .200 - .500 AND 23.00 - 25.00 CYC/SEC
• PEAK VALUES ACCEL=395.9 CM/SEC/SEC,VELOCITY=-34.37 CM/SEC,DISPL=5.590 CM



CORRECTED ACCELERATION.VELOCITY.DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 2
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
ACCELEROGRAM IS BAND PASS FILTERED BETWEEN .200 - .500 AND 23.00 - 25.00 CYC/SEC
• PEAK VALUES ACCEL=105.6 CM/SEC/SEC.VELOCITY=7.140 CM/SEC.DISPL=1.340 CM



CORRECTED ACCELERATION,VELOCITY,DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 3
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
ACCELEROGRAM IS BAND PASS FILTERED BETWEEN .200 - .500 AND 23.00 - 25.00 CYC/SEC
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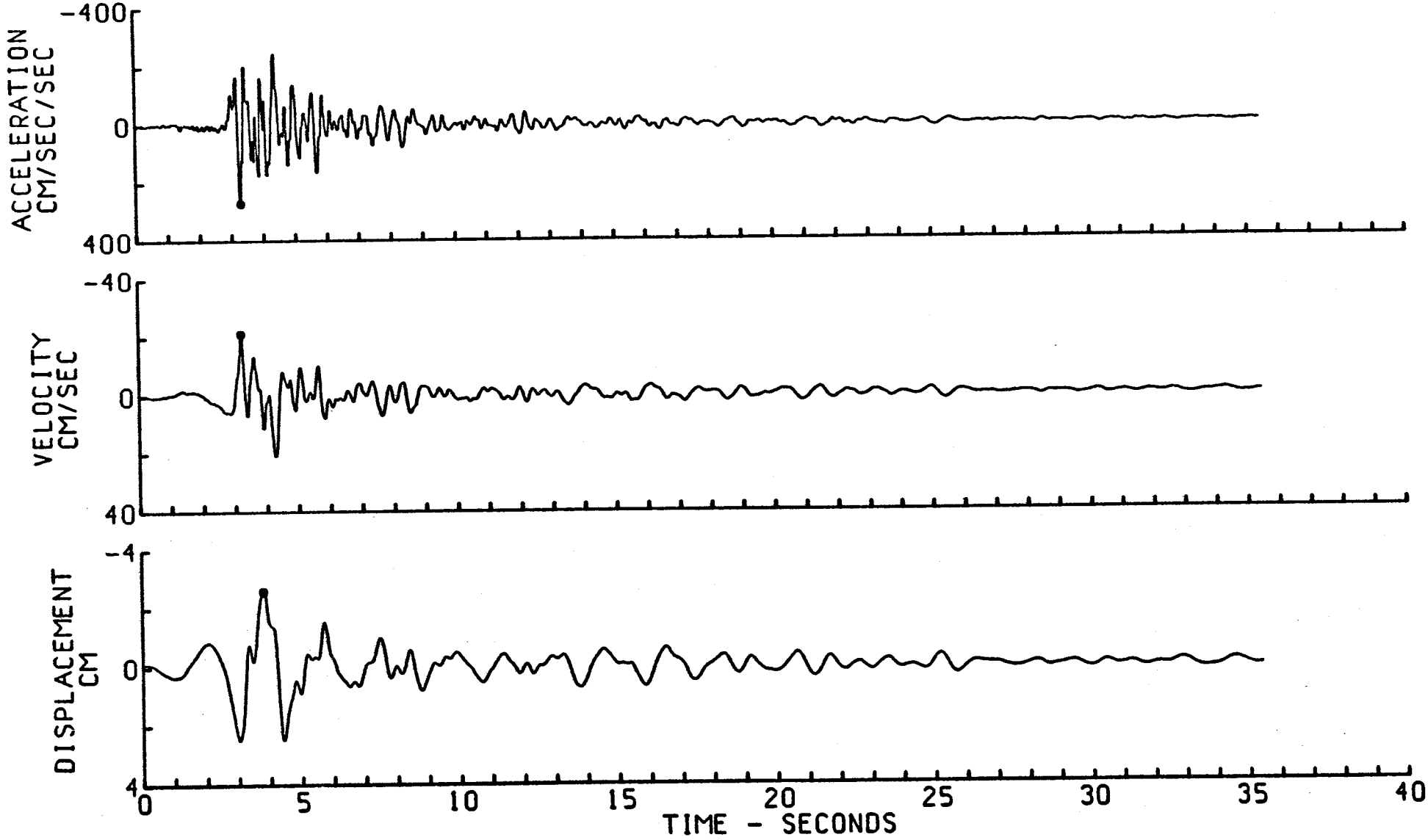

CORRECTED ACCELERATION,VELOCITY,DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 4
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
ACCELEROGRAM IS BAND PASS FILTERED BETWEEN .200 - .500 AND 23.00 - 25.00 CYC/SEC
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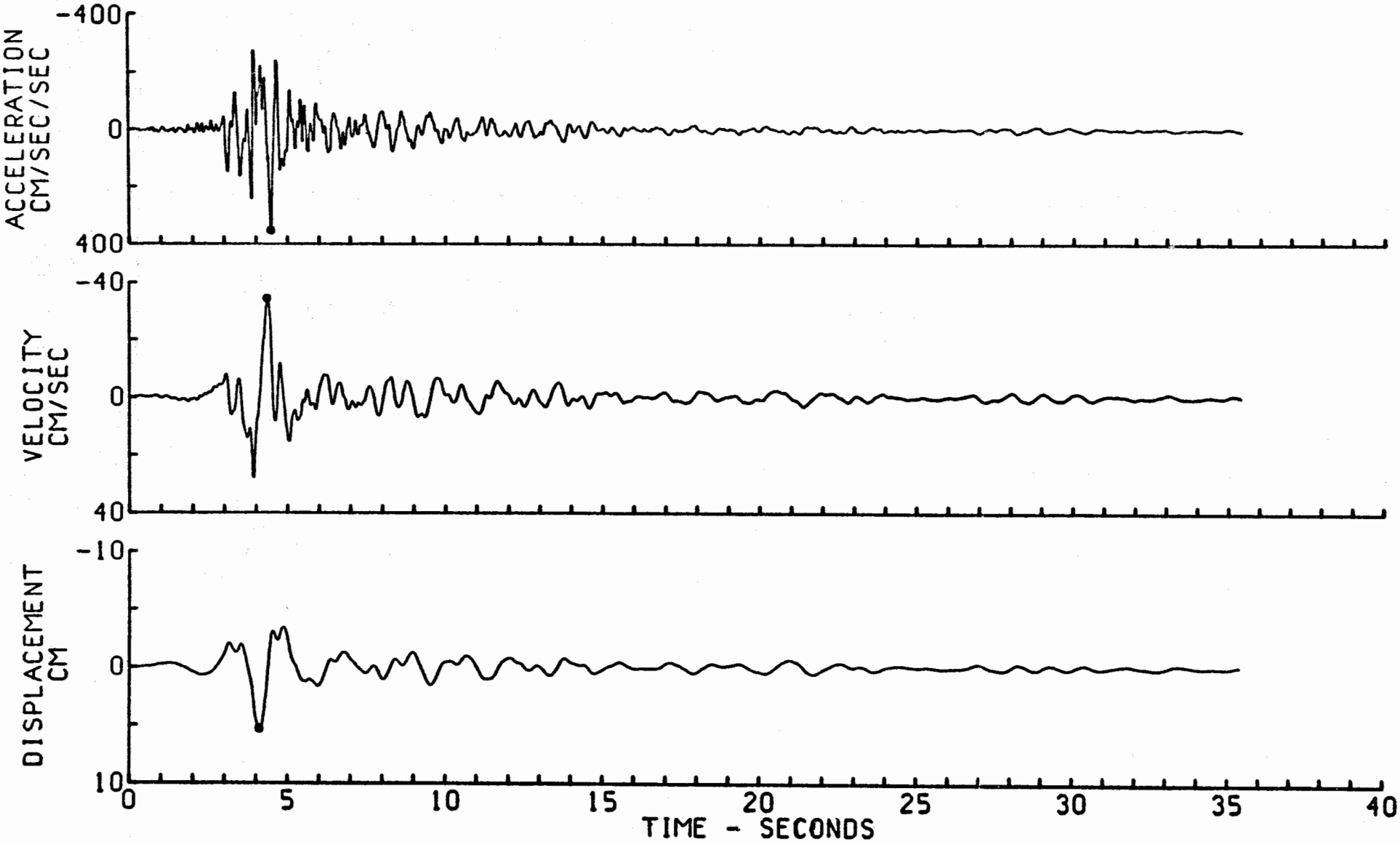
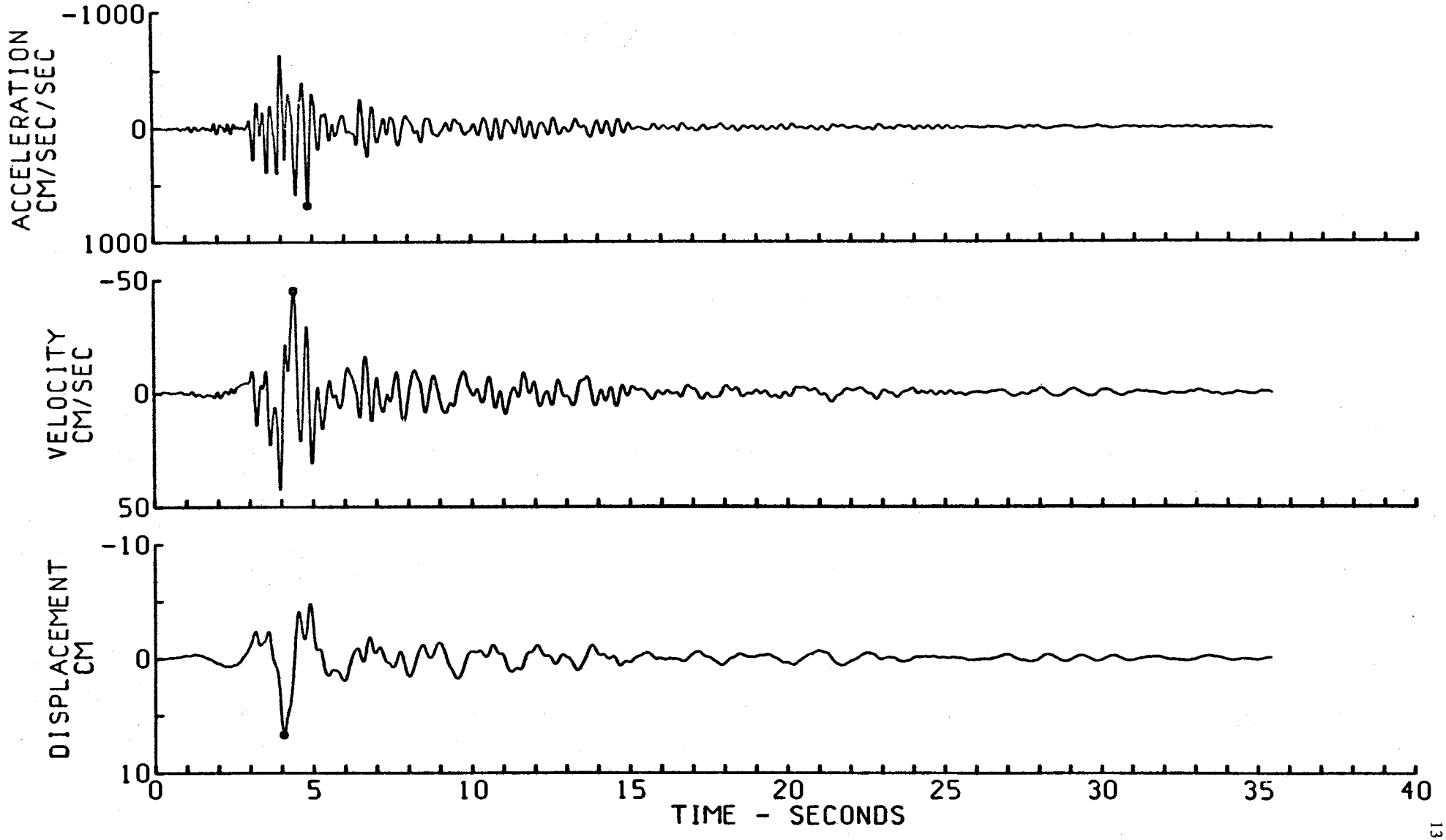
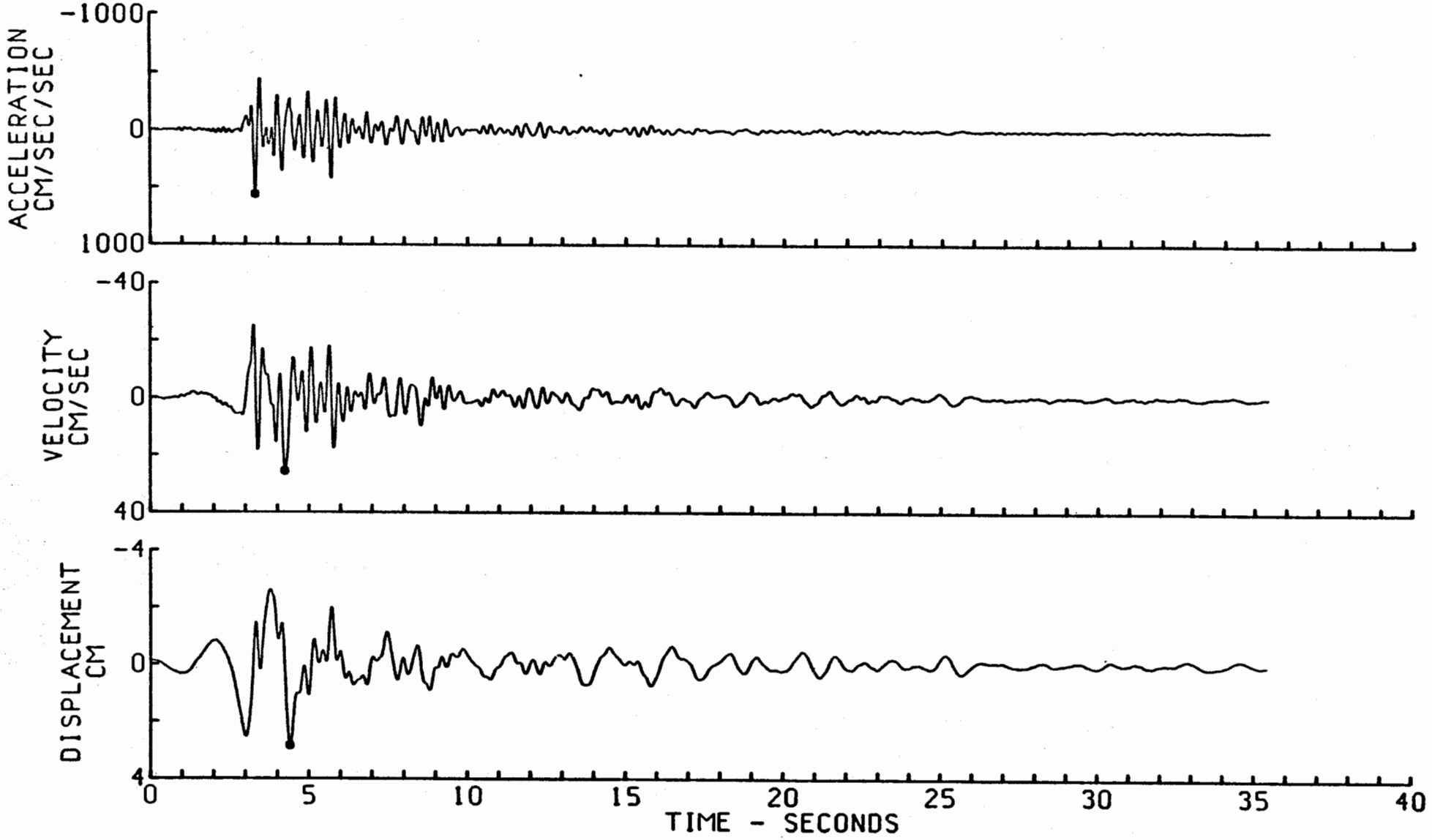


CORRECTED ACCELERATION,VELOCITY,DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 5
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
ACCELEROGRAM IS BAND PASS FILTERED BETWEEN .200 - .500 AND 23.00 - 25.00 CYC/SEC
• PEAK VALUES ACCEL=676.7 CM/SEC/SEC,VELOCITY=-45.01 CM/SEC,DISPL=6.690 CM



CORRECTED ACCELERATION,VELOCITY,DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 6
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
ACCELEROGRAM IS BAND PASS FILTERED BETWEEN .200 - .500 AND 23.00 - 25.00 CYC/SEC
• PEAK VALUES ACCEL=561.0 CM/SEC/SEC,VELOCITY=25.64 CM/SEC,DISPL=2.850 CM



CORRECTED ACCELERATION,VELOCITY,DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 7
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
ACCELEROGRAM IS BAND PASS FILTERED BETWEEN .200 - .500 AND 23.00 - 25.00 CYC/SEC
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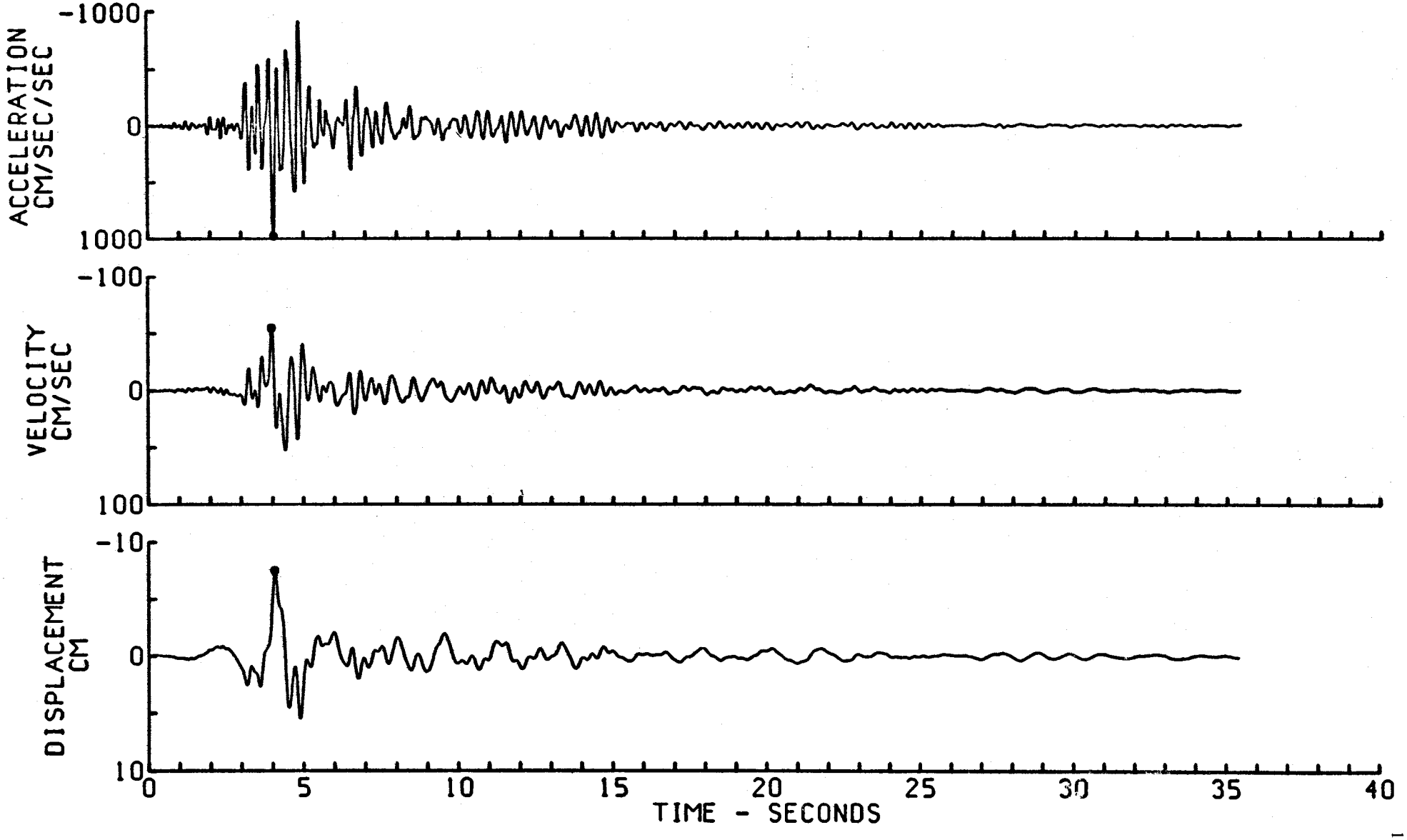

CORRECTED ACCELERATION,VELOCITY,DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 8
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
ACCELEROGRAM IS BAND PASS FILTERED BETWEEN .200 - .500 AND 23.00 - 25.00 CYC/SEC
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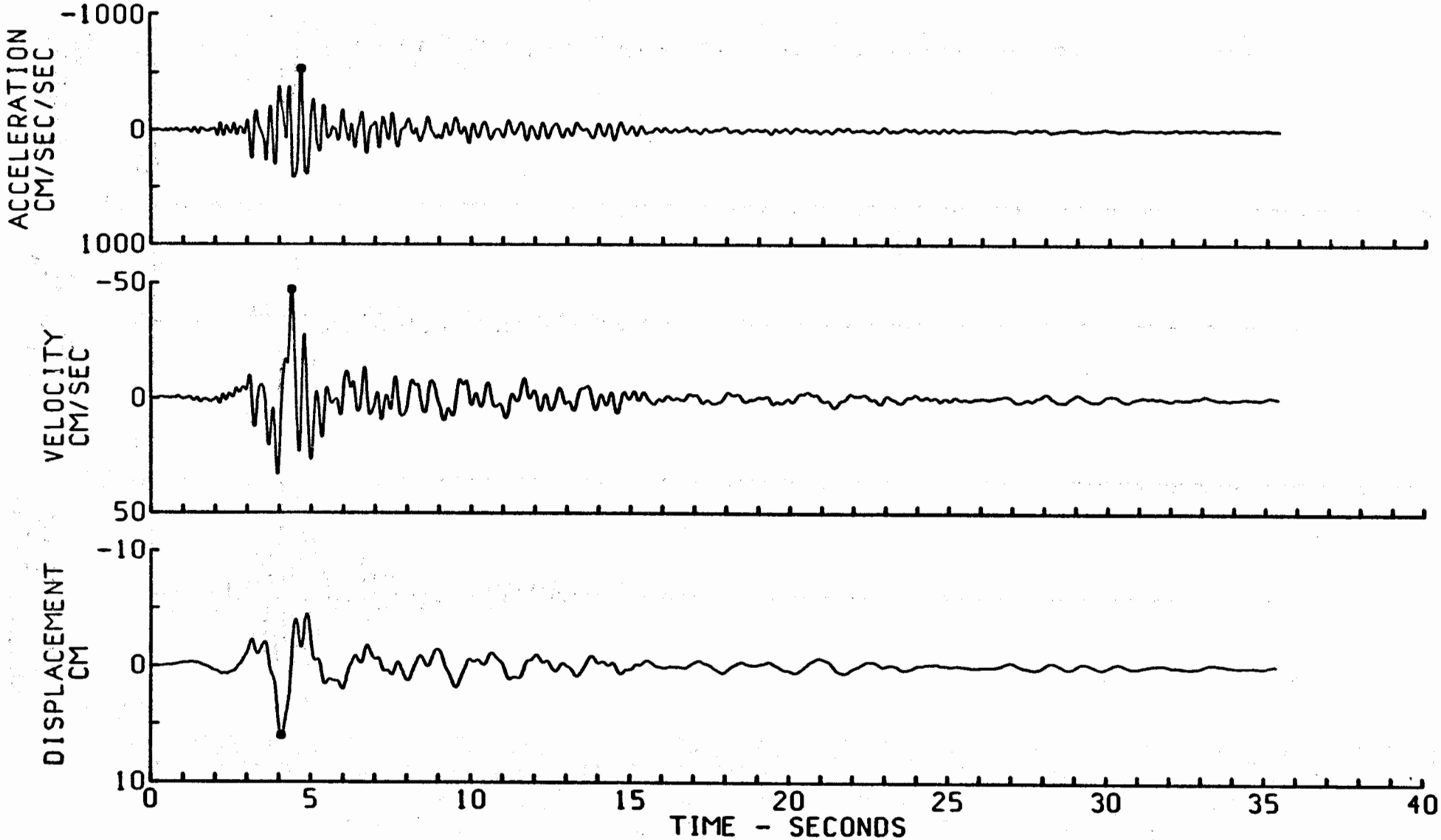

CORRECTED ACCELERATION,VELOCITY,DISPLACEMENT
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 9
DATA IS PLOTTED AT EQUAL TIME INCREMENTS OF .02000 SEC
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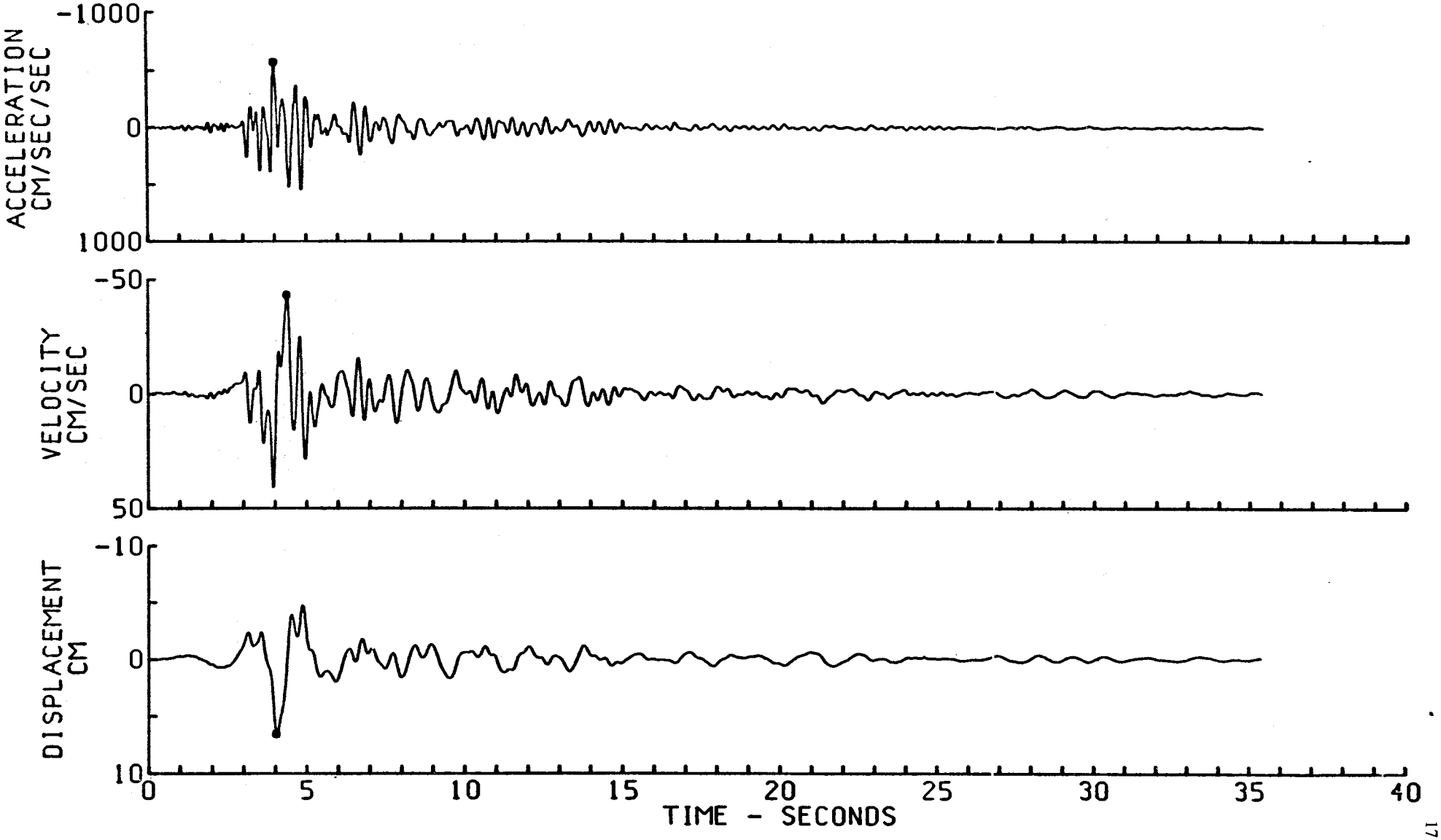
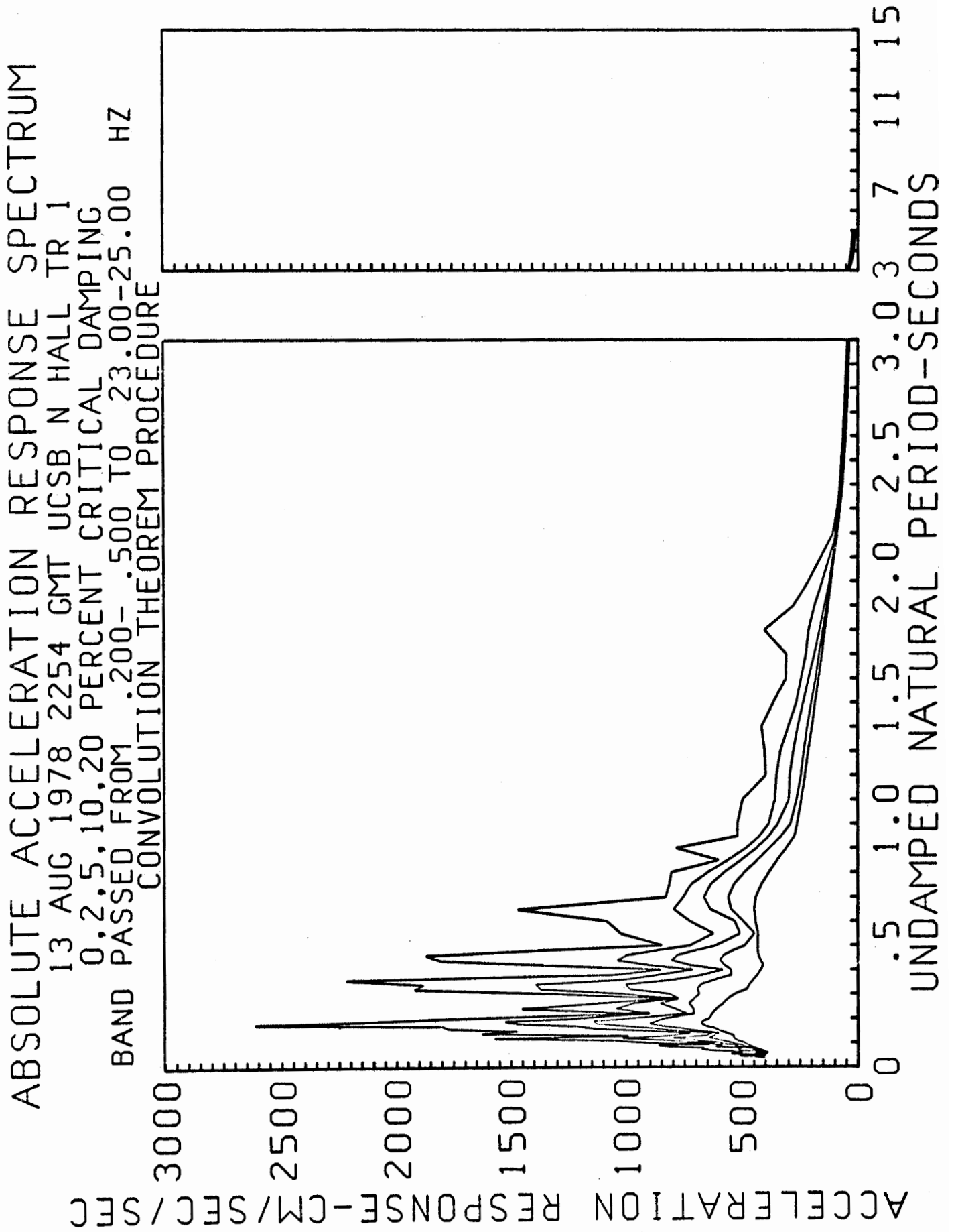
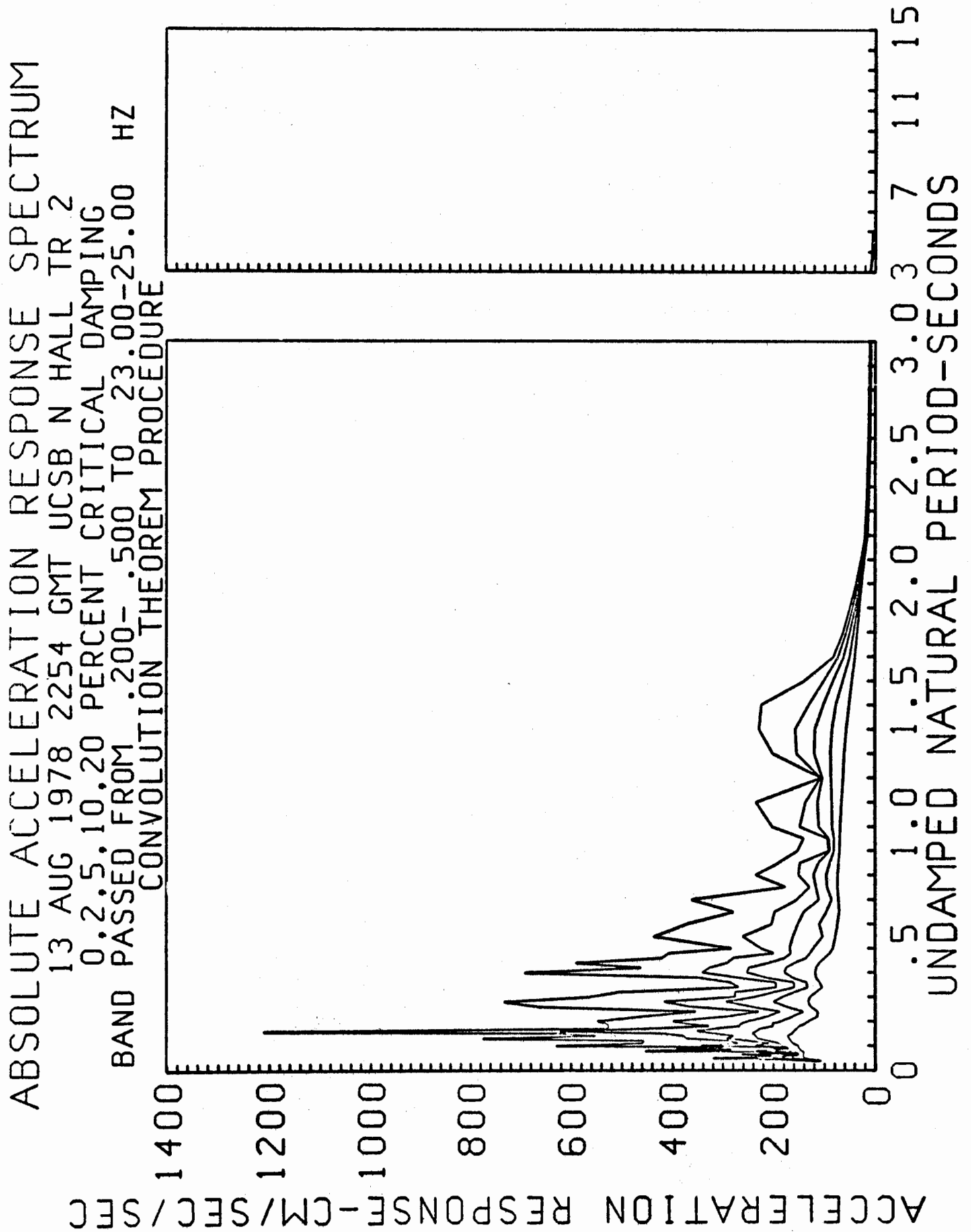



ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 1
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION RESPONSE-CM/SEC/SEC
3000
2500
2000
1500
1000
500
0
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS


ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 2
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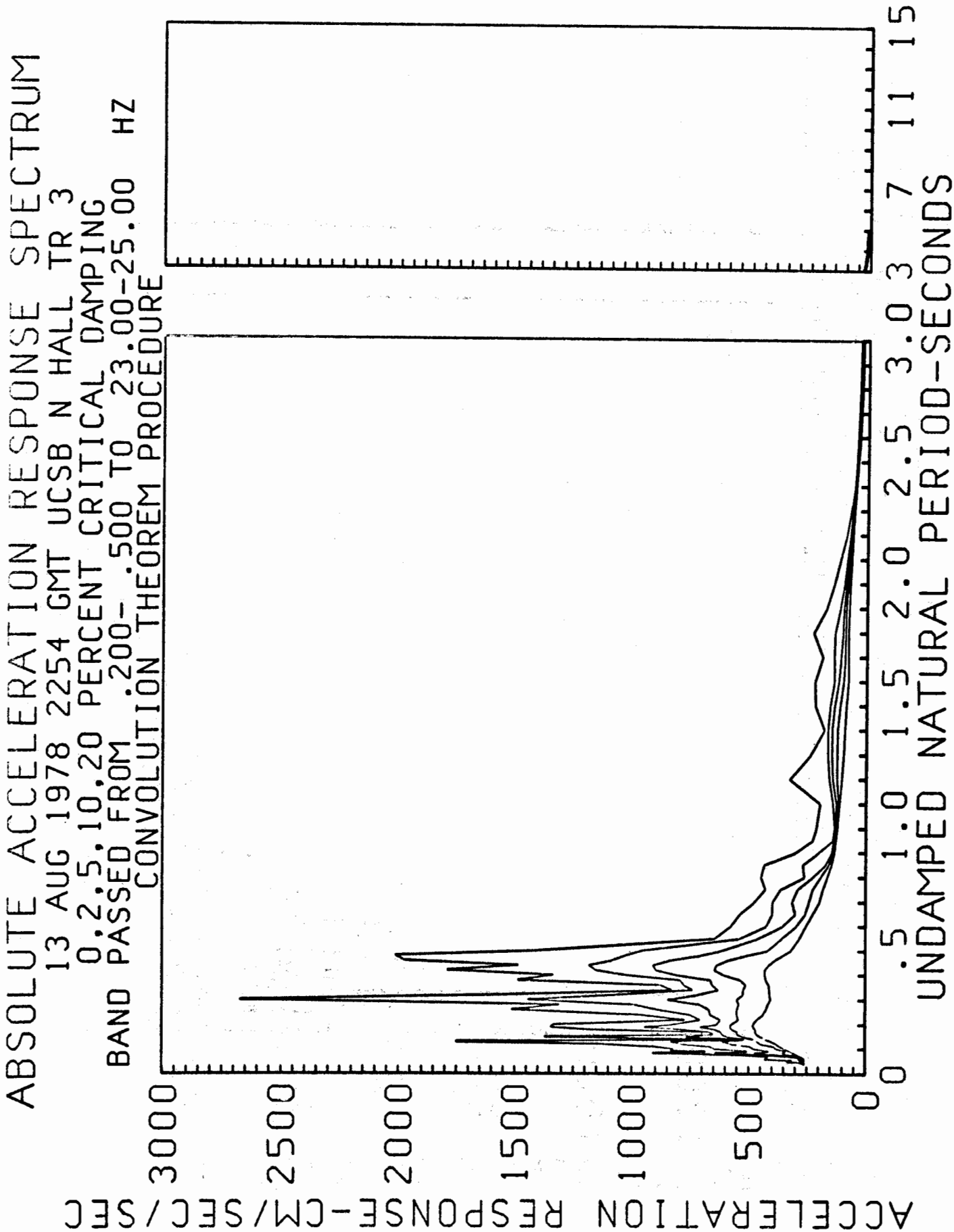
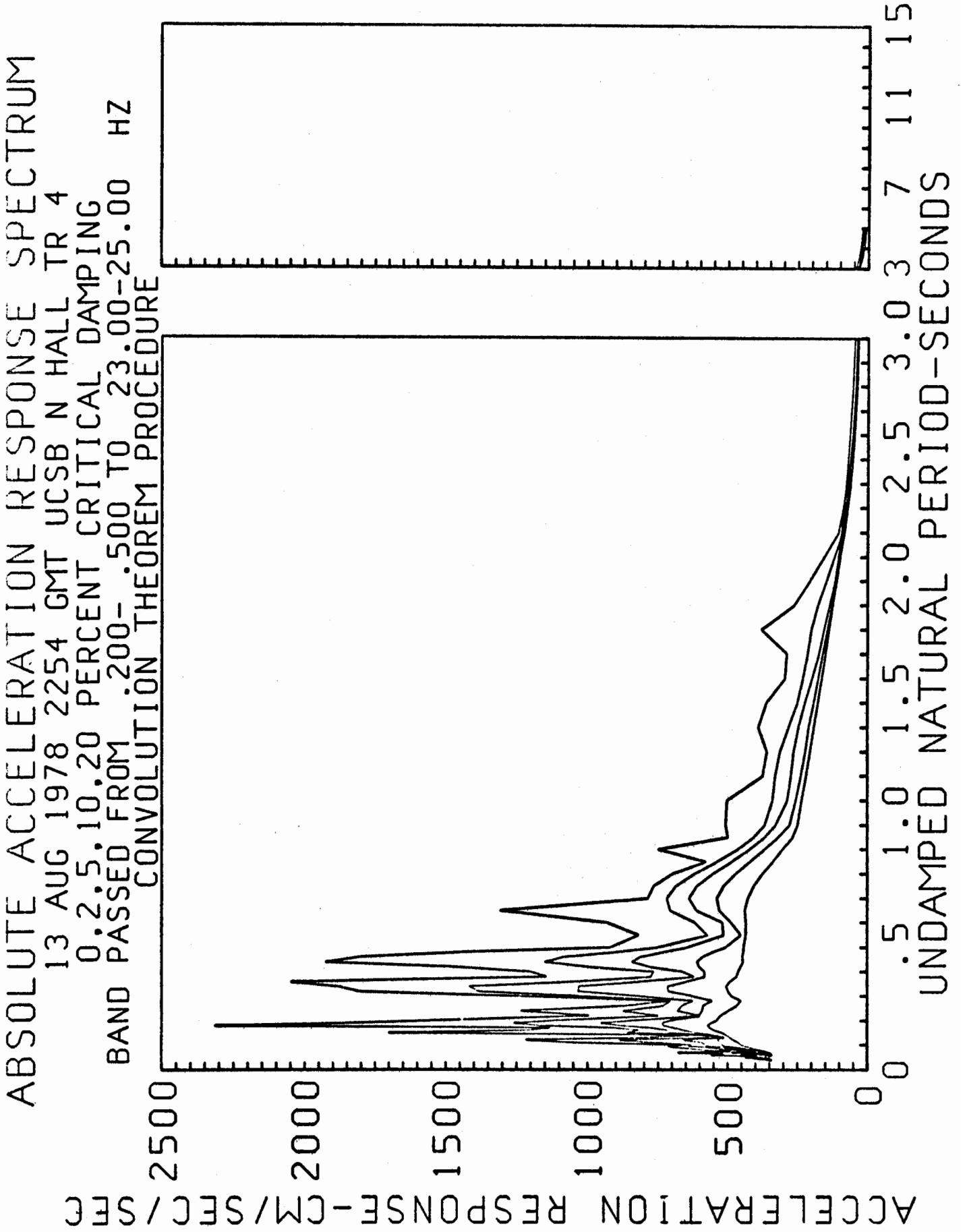
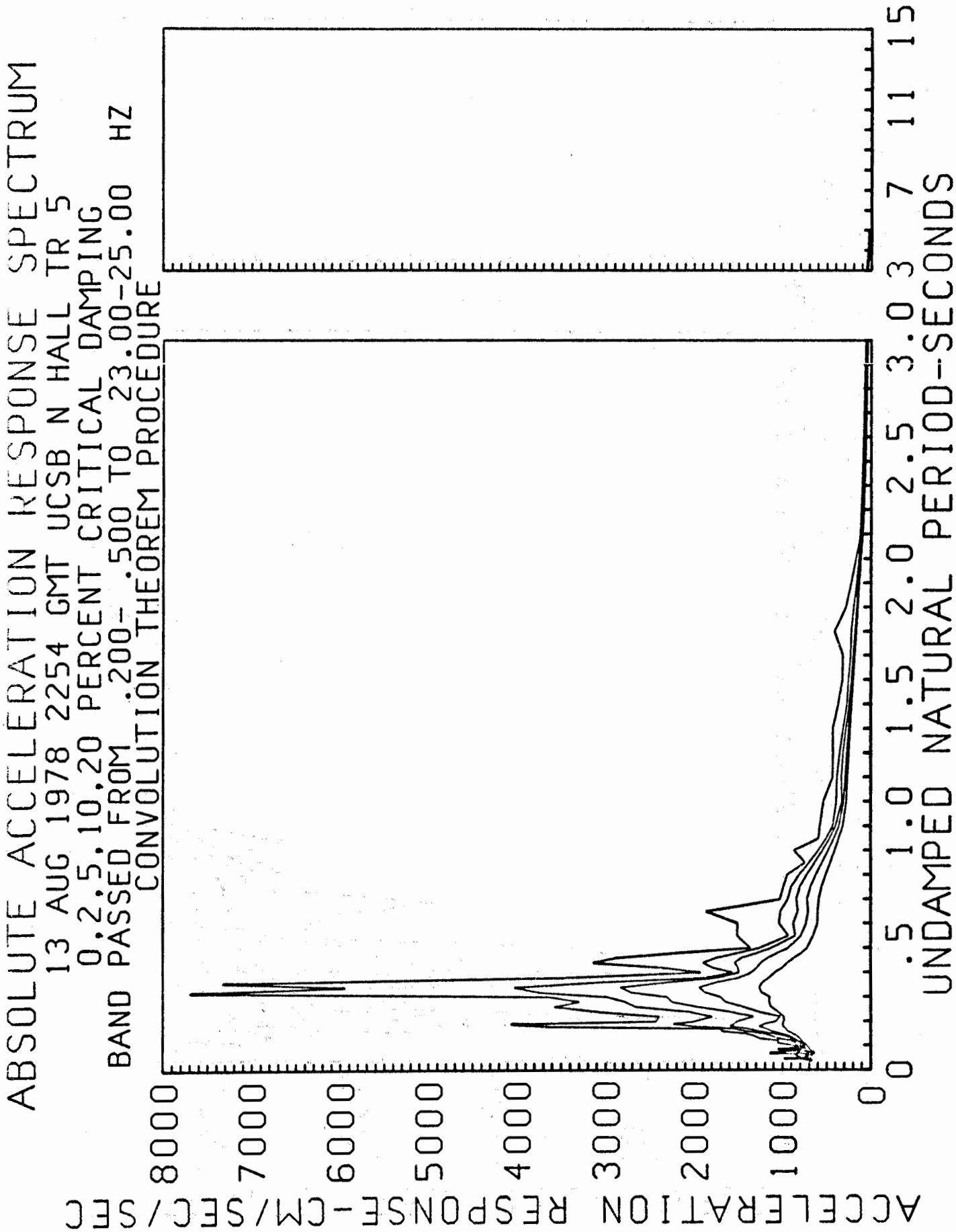
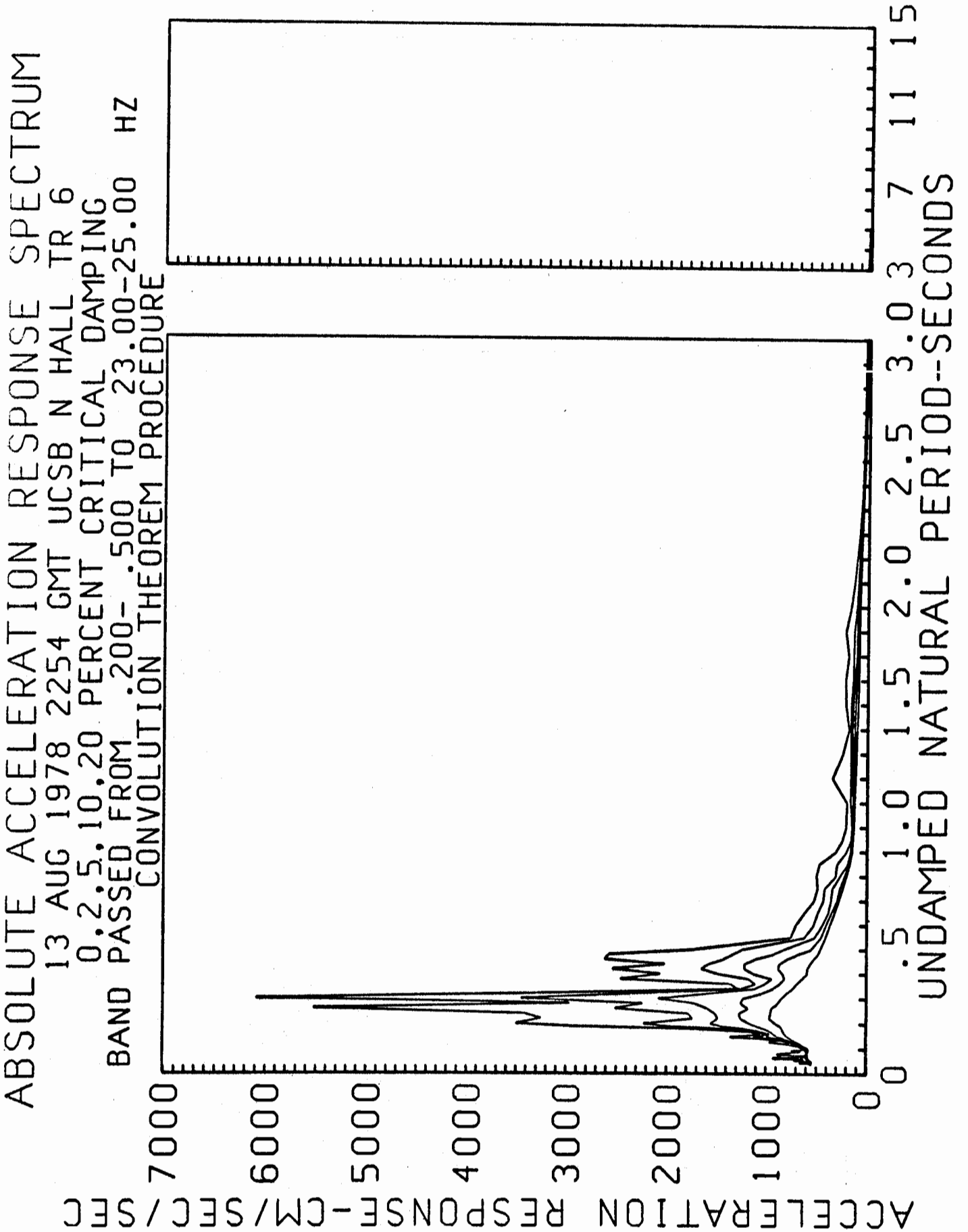
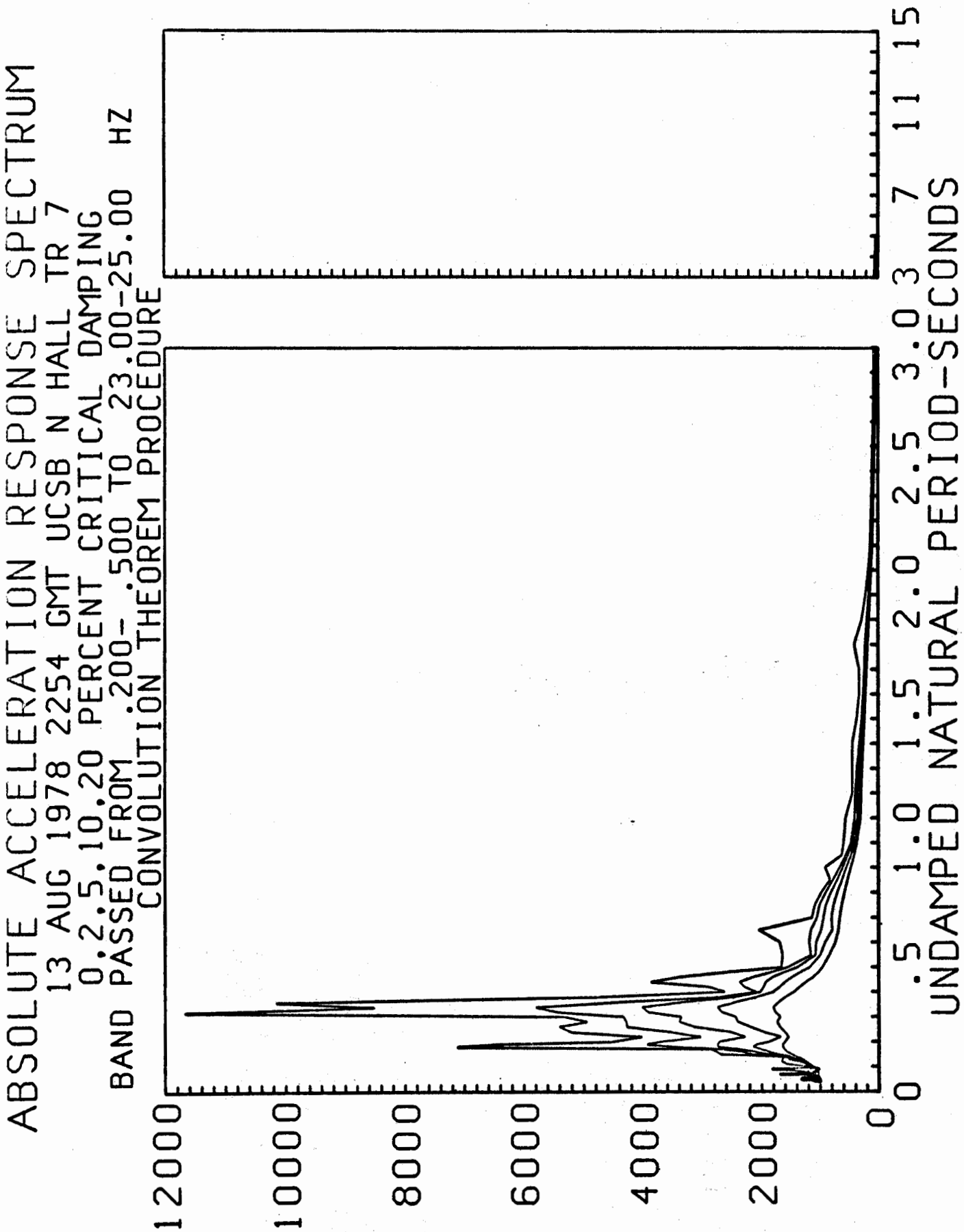
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION RESPONSE-CM/SEC/SEC
1400
1200
1000
800
600
400
200
0
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS

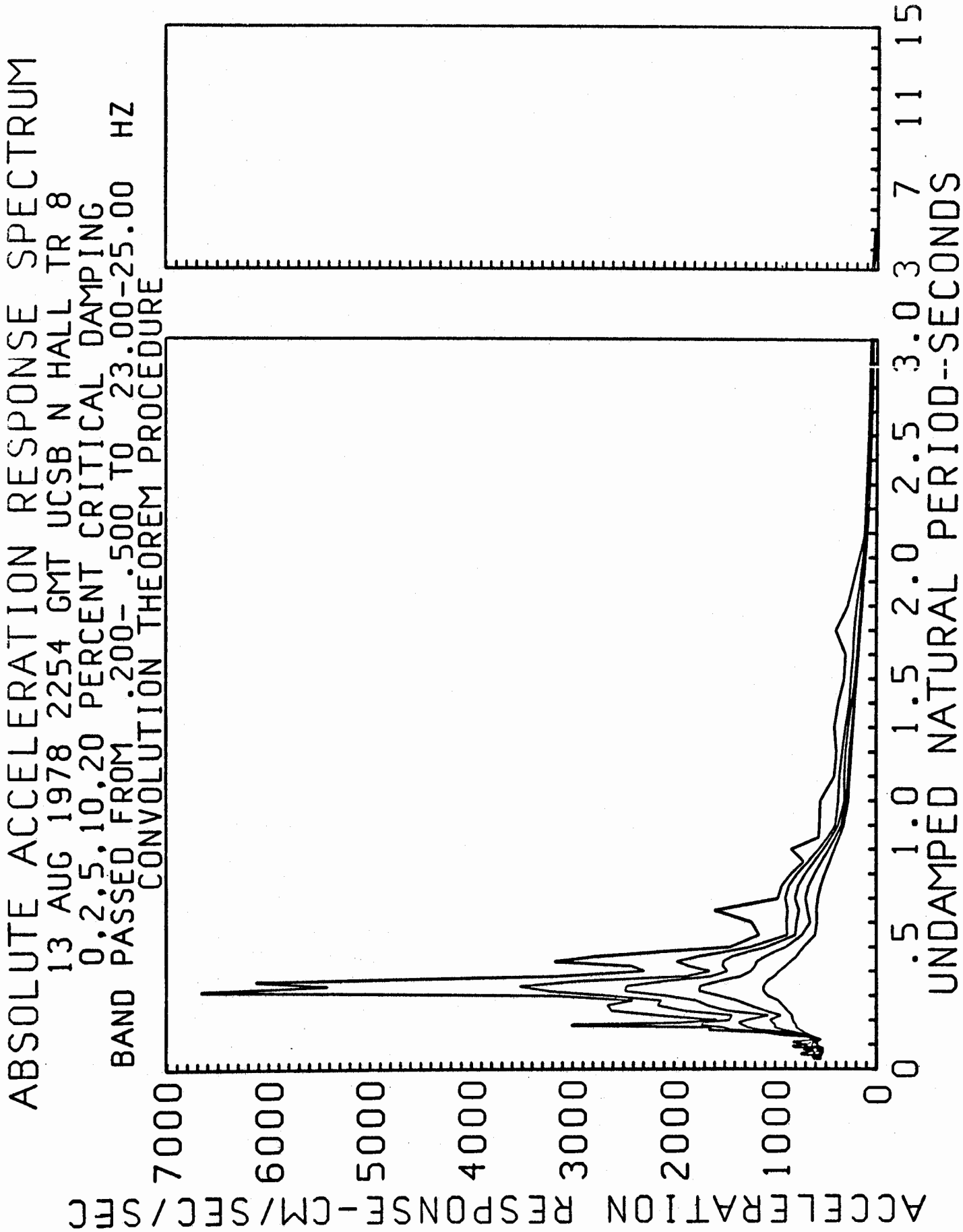

ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 3
0.2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION RESPONSE-CM/SEC/SEC
3000
2500
2000
1500
1000
500
0
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS

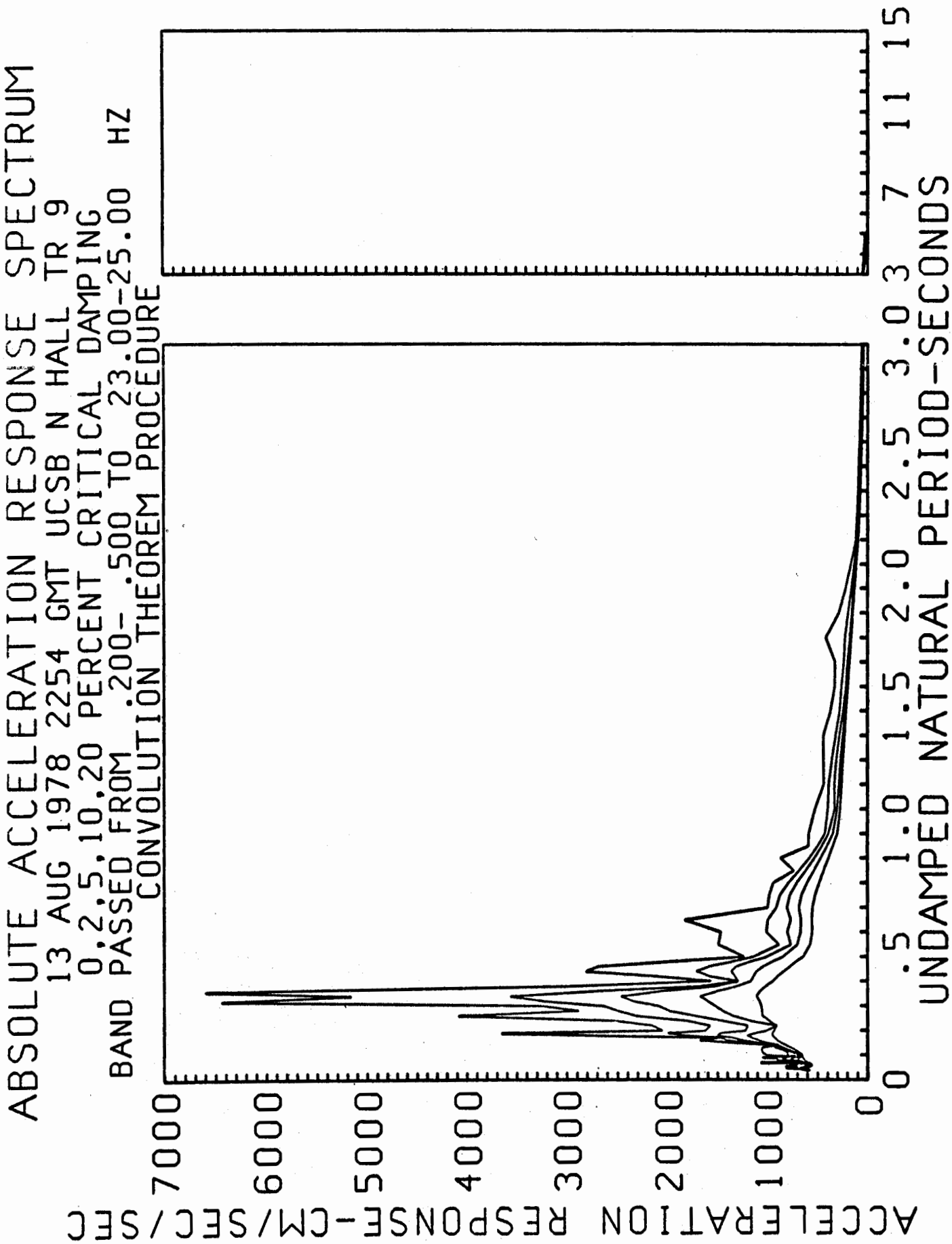

ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 4
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION RESPONSE-CM/SEC/SEC
2500
2000
1500
1000
500
0
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS

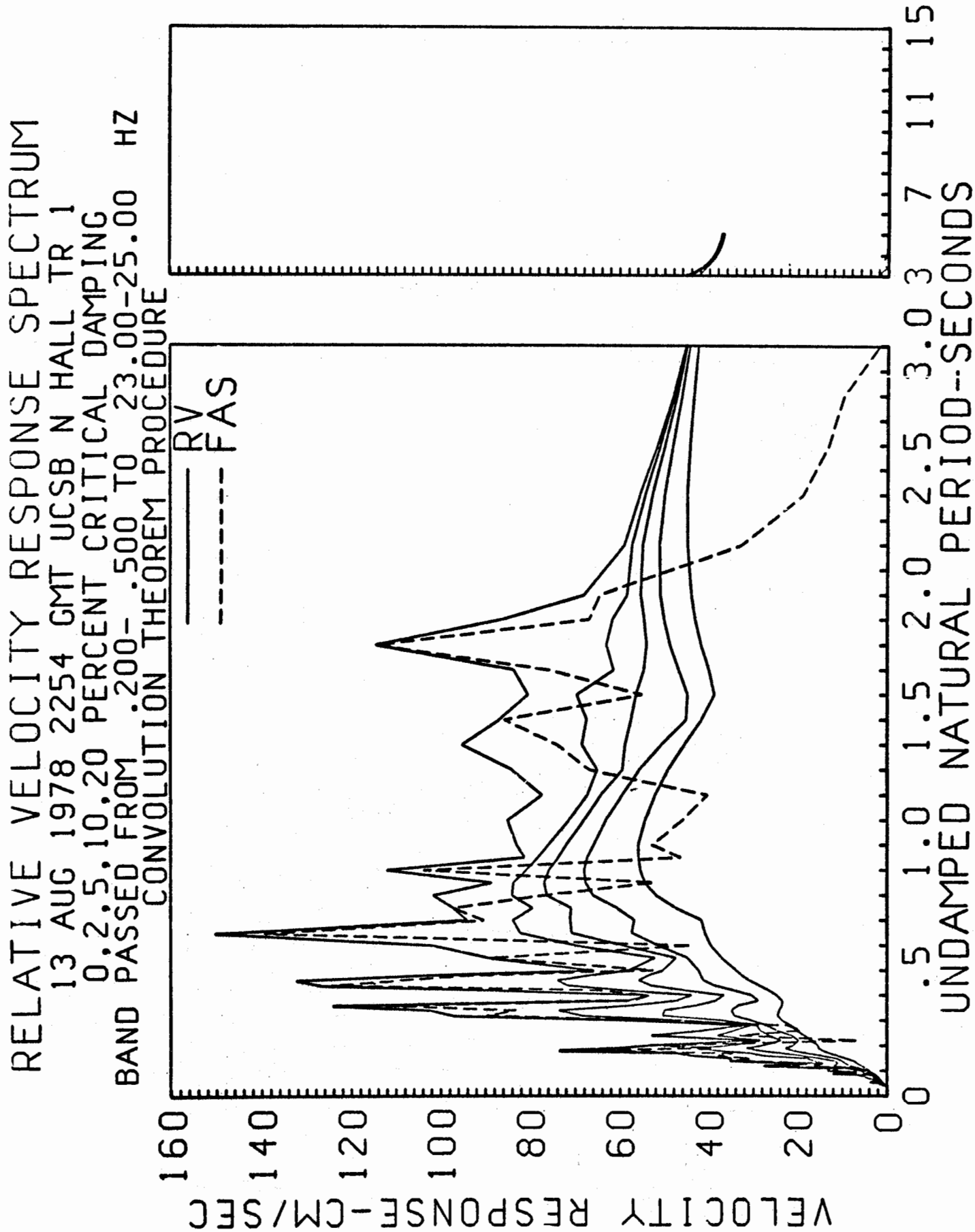

ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 5
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION RESPONSE-CM/SEC/SEC
8000
7000
6000
5000
4000
3000
2000
1000
0
.5 1.0 1.5 2.0 2.5 3.0 3 7 11 15
UNDAMPED NATURAL PERIOD-SECONDS

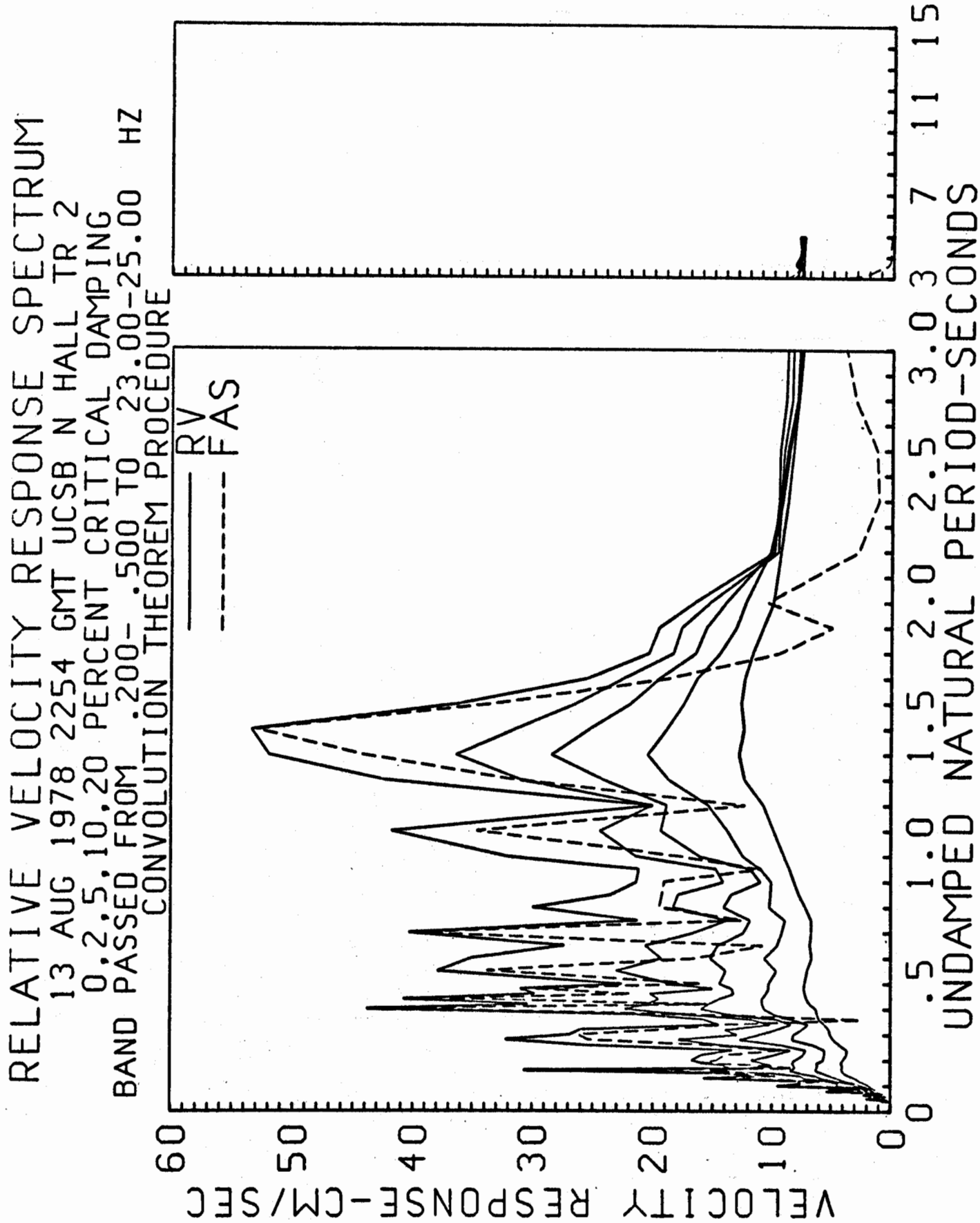

ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 6
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION RESPONSE-CM/SEC/SEC
7000
6000
5000
4000
3000
2000
1000
0
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD--SECONDS

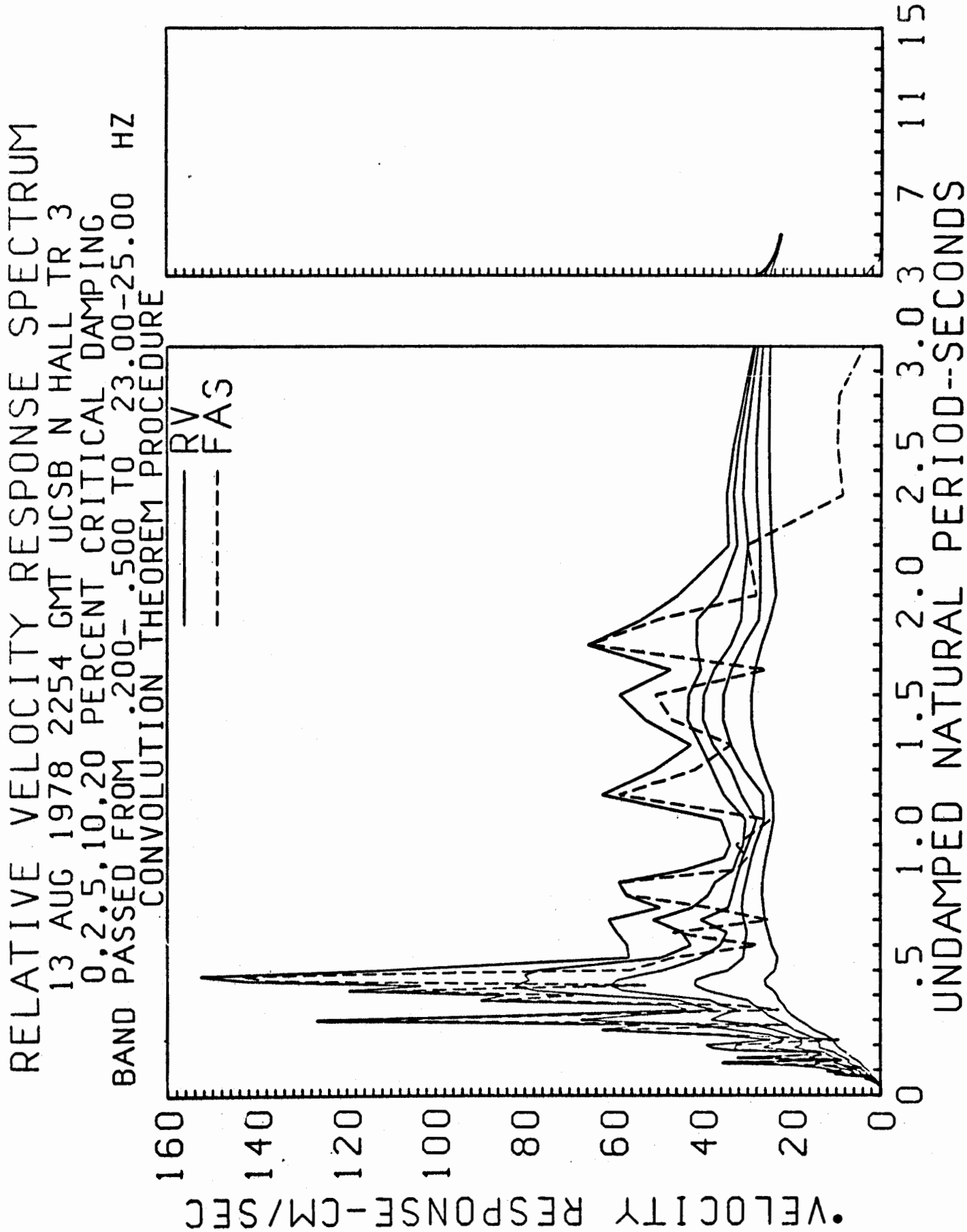

ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 7
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
12000
10000
8000
6000
4000
2000
0
0 .5 1.0 1.5 2.0 2.5 3.0 3 7 11 15
UNDAMPED NATURAL PERIOD-SECONDS

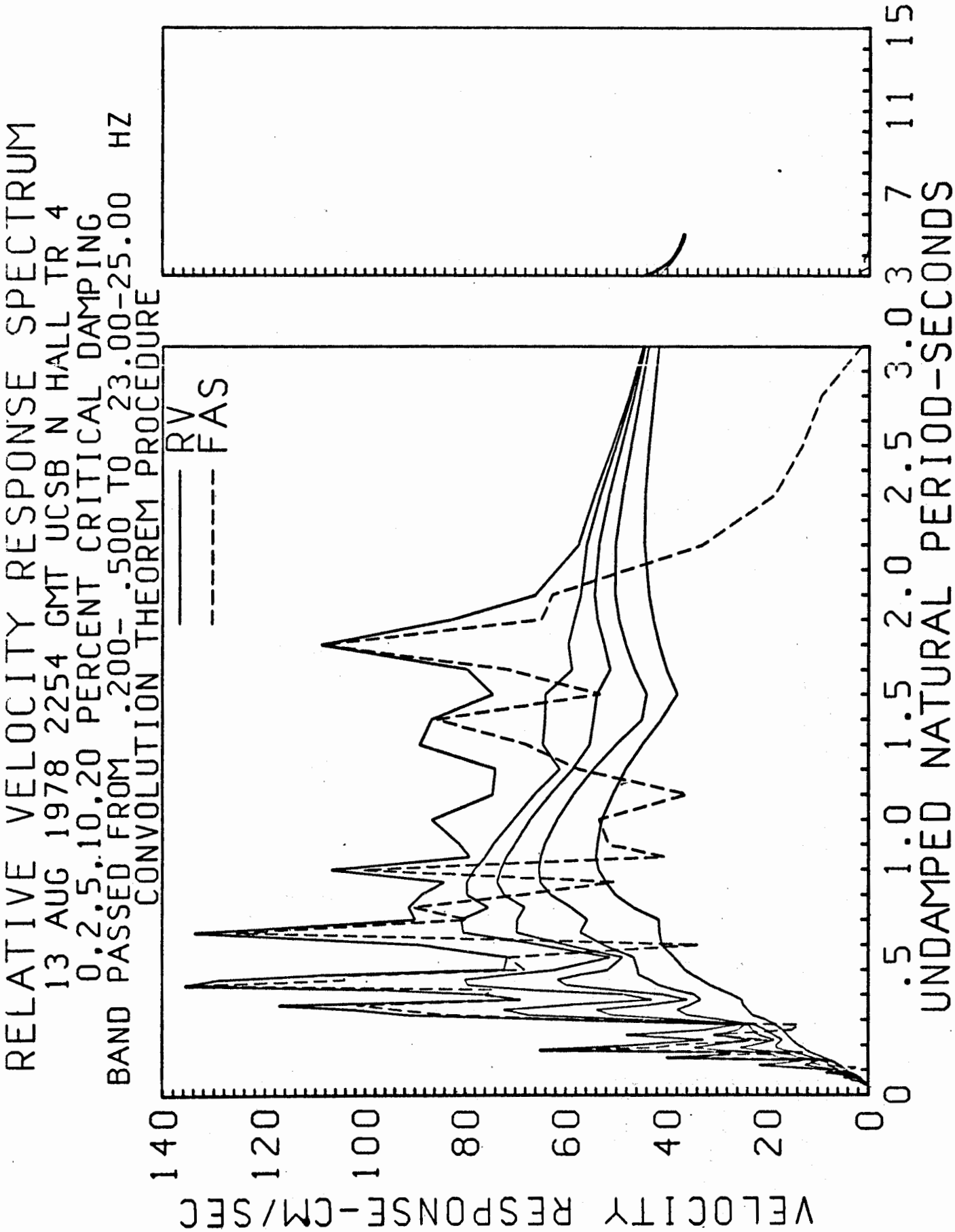

ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 8
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION RESPONSE-CM/SEC/SEC
7000
6000
5000
4000
3000
2000
1000
0
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD--SECONDS

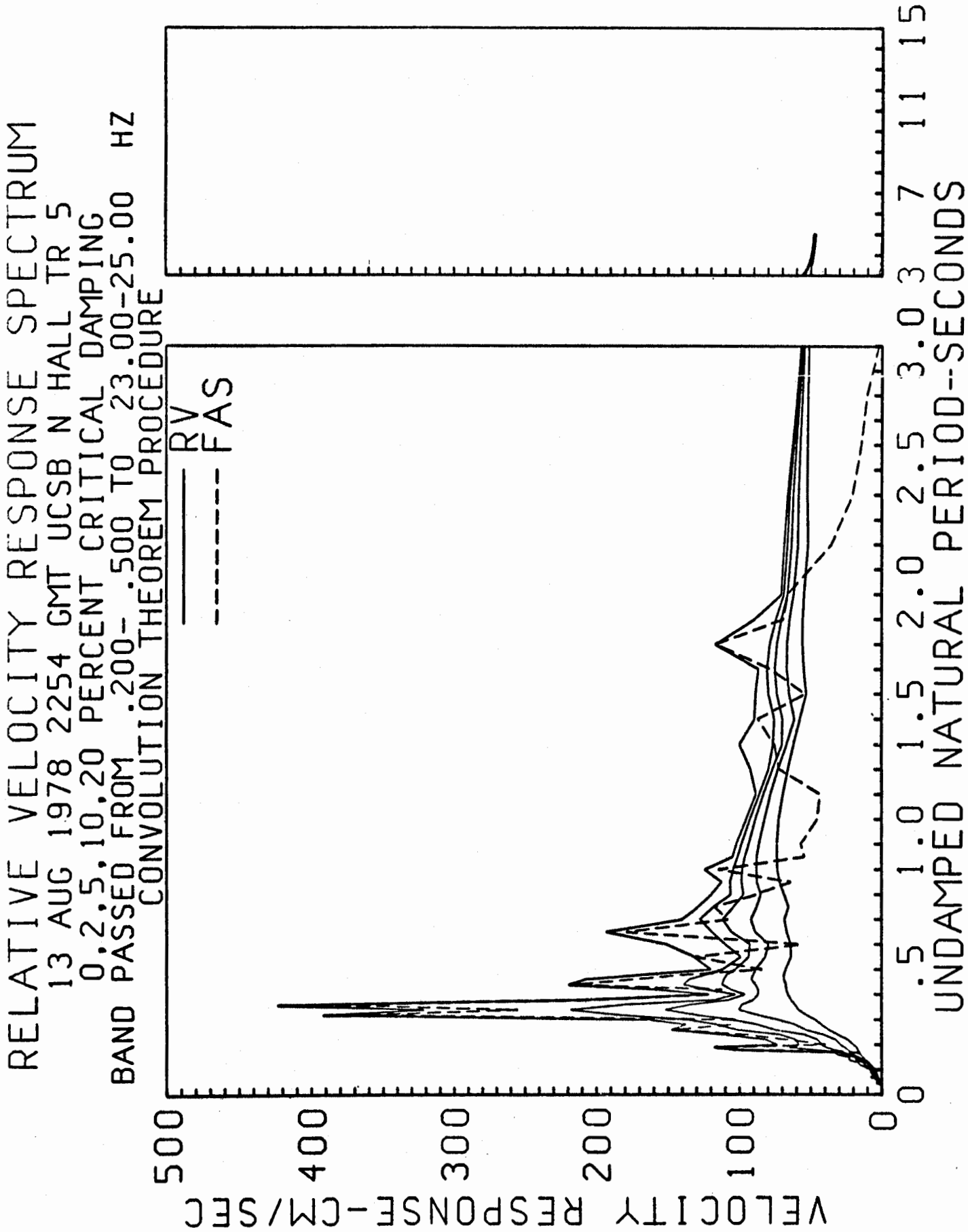

ABSOLUTE ACCELERATION RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 9
0.2,.5,10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION RESPONSE-CM/SEC/SEC
7000
6000
5000
4000
3000
2000
1000
0
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS

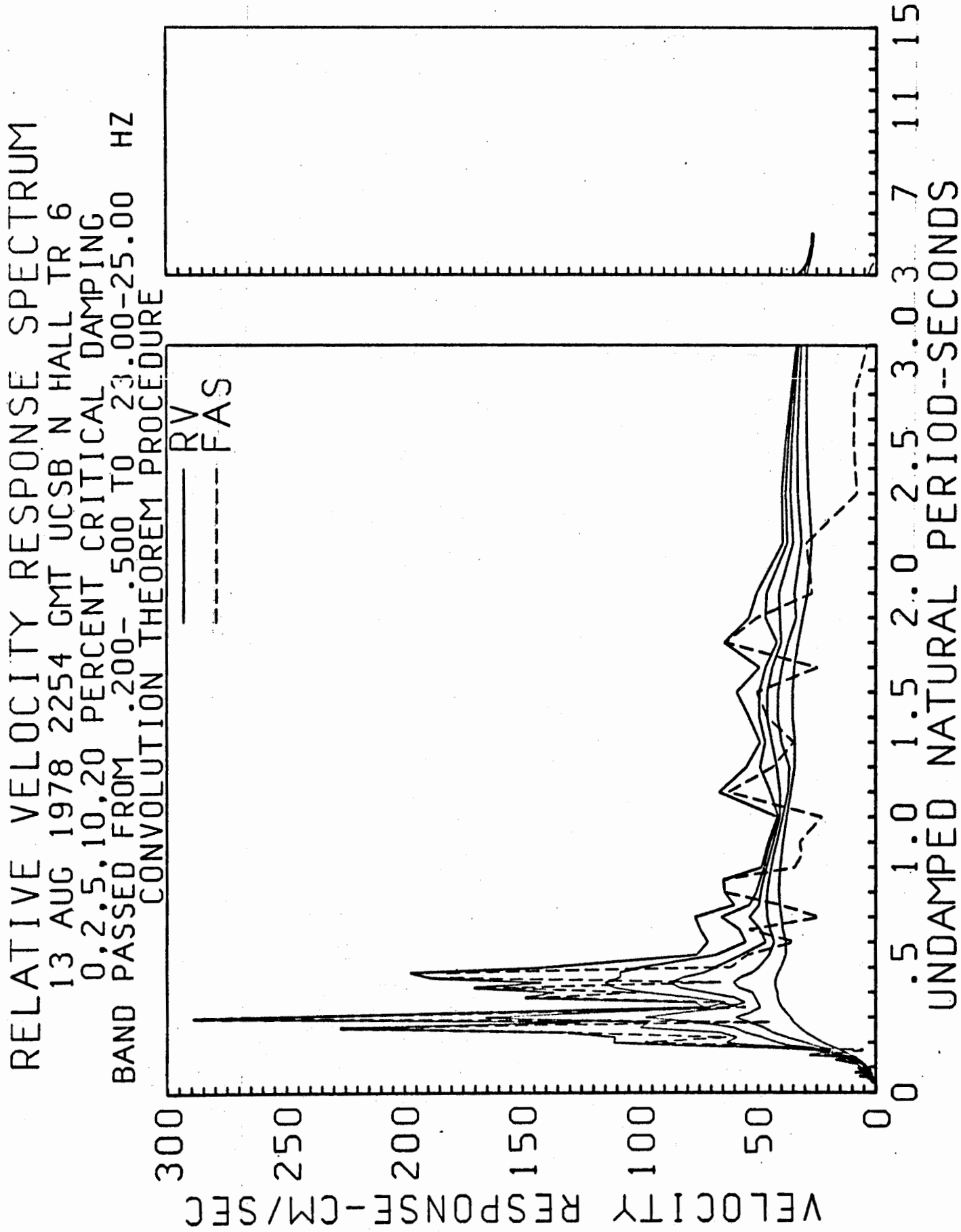

RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 1
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
0
20
40
60
80
100
120
140
160
UNDAMPED NATURAL PERIOD--SECONDS
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15

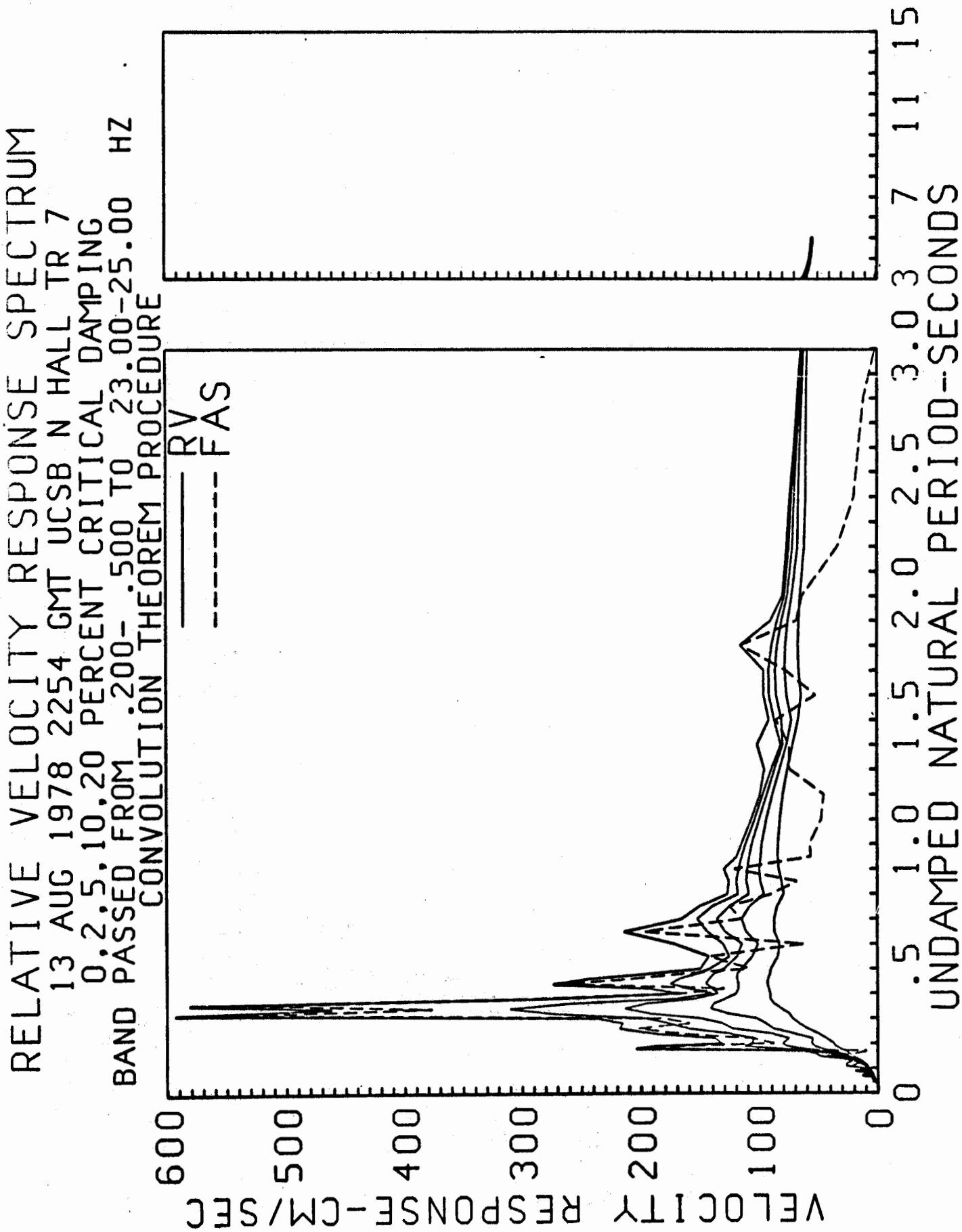

RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 2
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
0
10
20
30
40
50
60
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS

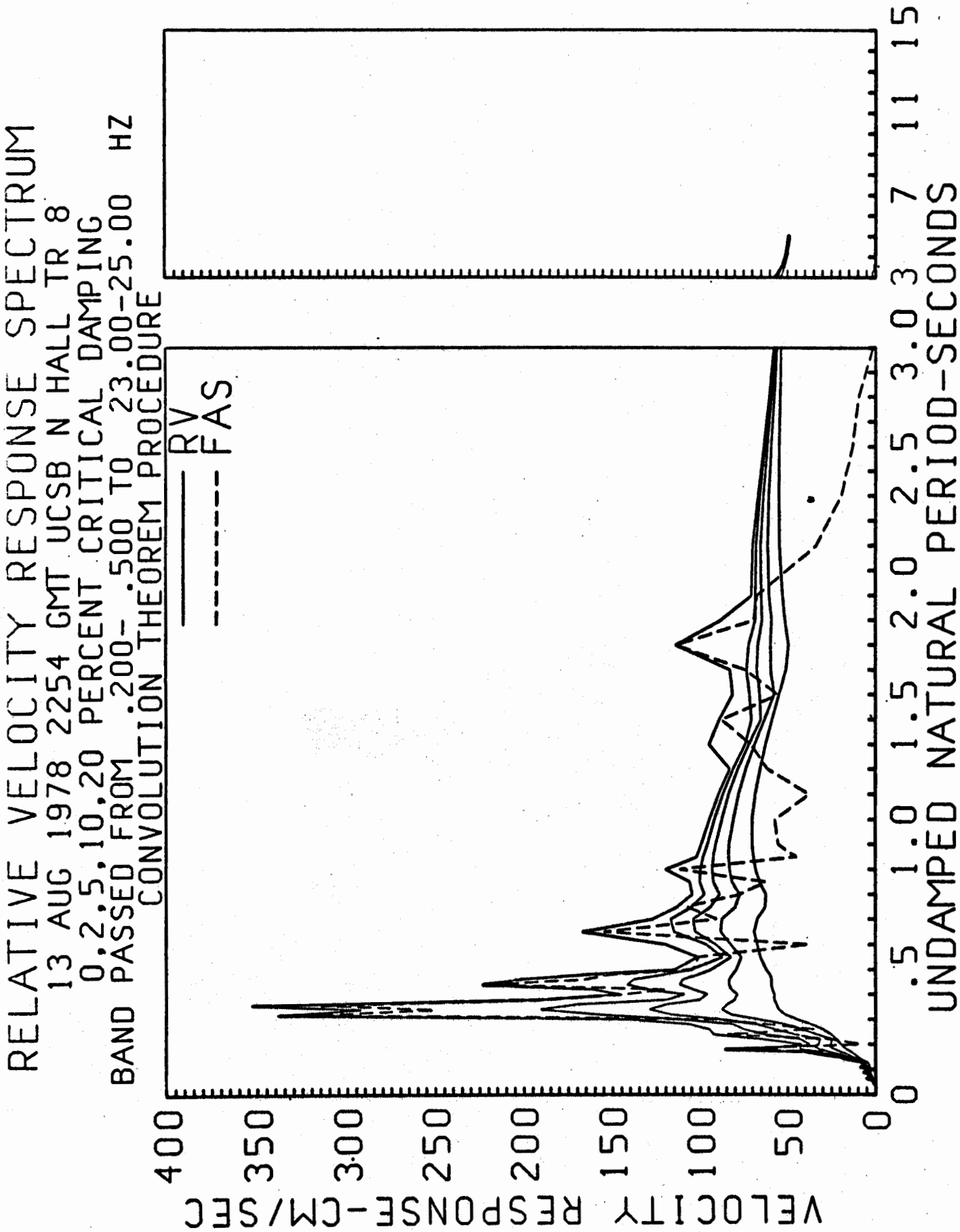

RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 3
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
0
20
40
60
80
100
120
140
160
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD--SECONDS

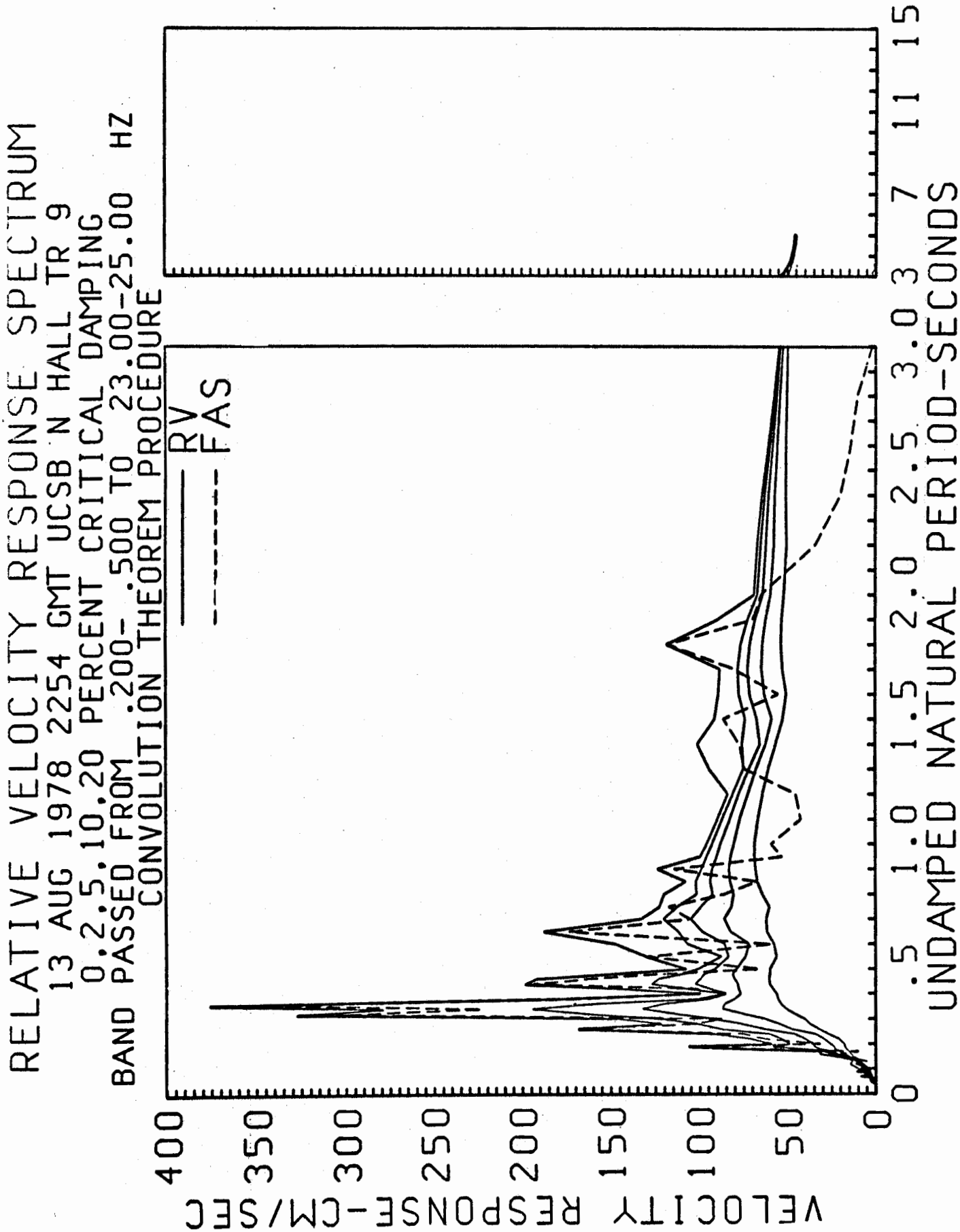

RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 4
0.2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
0
20
40
60
80
100
120
140
UNDAMPED NATURAL PERIOD-SECONDS
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15


RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 5
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
500
400
300
200
100
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD--SECONDS


RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 6
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
300
250
200
150
100
50
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS


RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 7
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
600
500
400
300
200
100
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS


RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 8
0.2,.5,10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
400
350
300
250
200
150
100
50
0
.5
1.0
1.5
2.0
2.5
3.0
3
7
11
15
UNDAMPED NATURAL PERIOD-SECONDS


RELATIVE VELOCITY RESPONSE SPECTRUM
13 AUG 1978 2254 GMT UCSB N HALL TR 9
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
RV
FAS
VELOCITY RESPONSE-CM/SEC
0
50
100
150
200
250
300
350
400
UNDAMPED NATURAL PERIOD-SECONDS
0
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1.0
1.5
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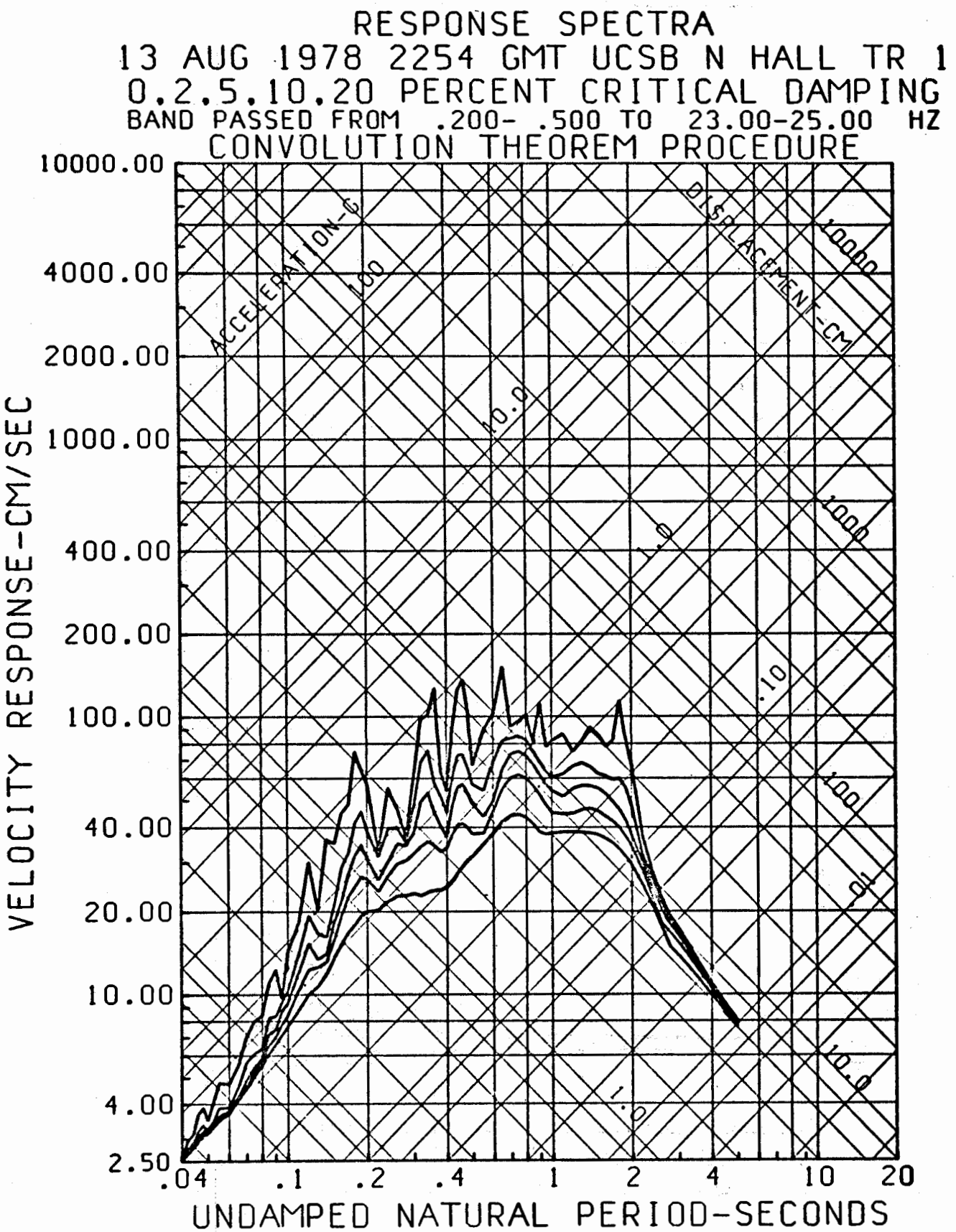
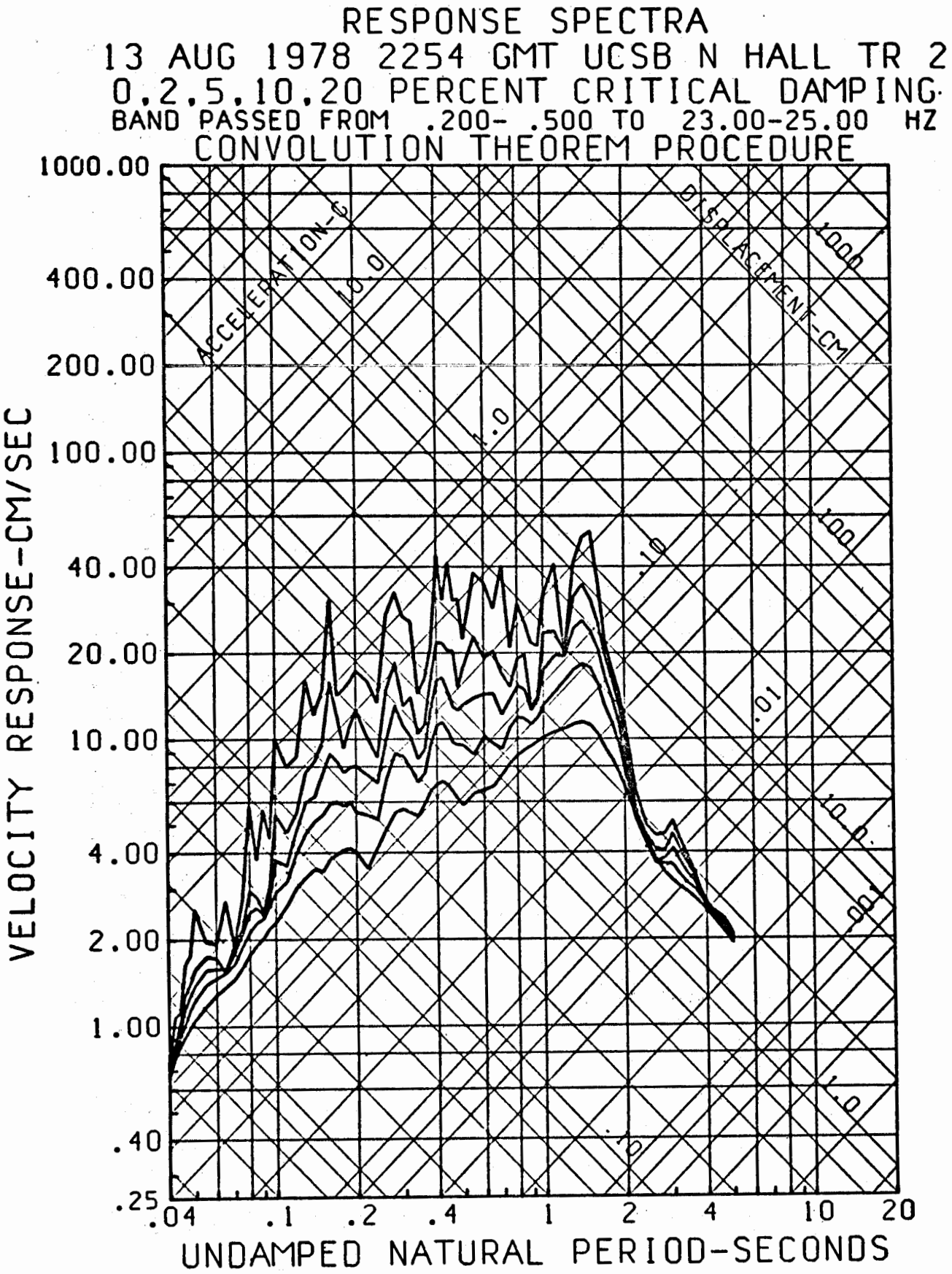
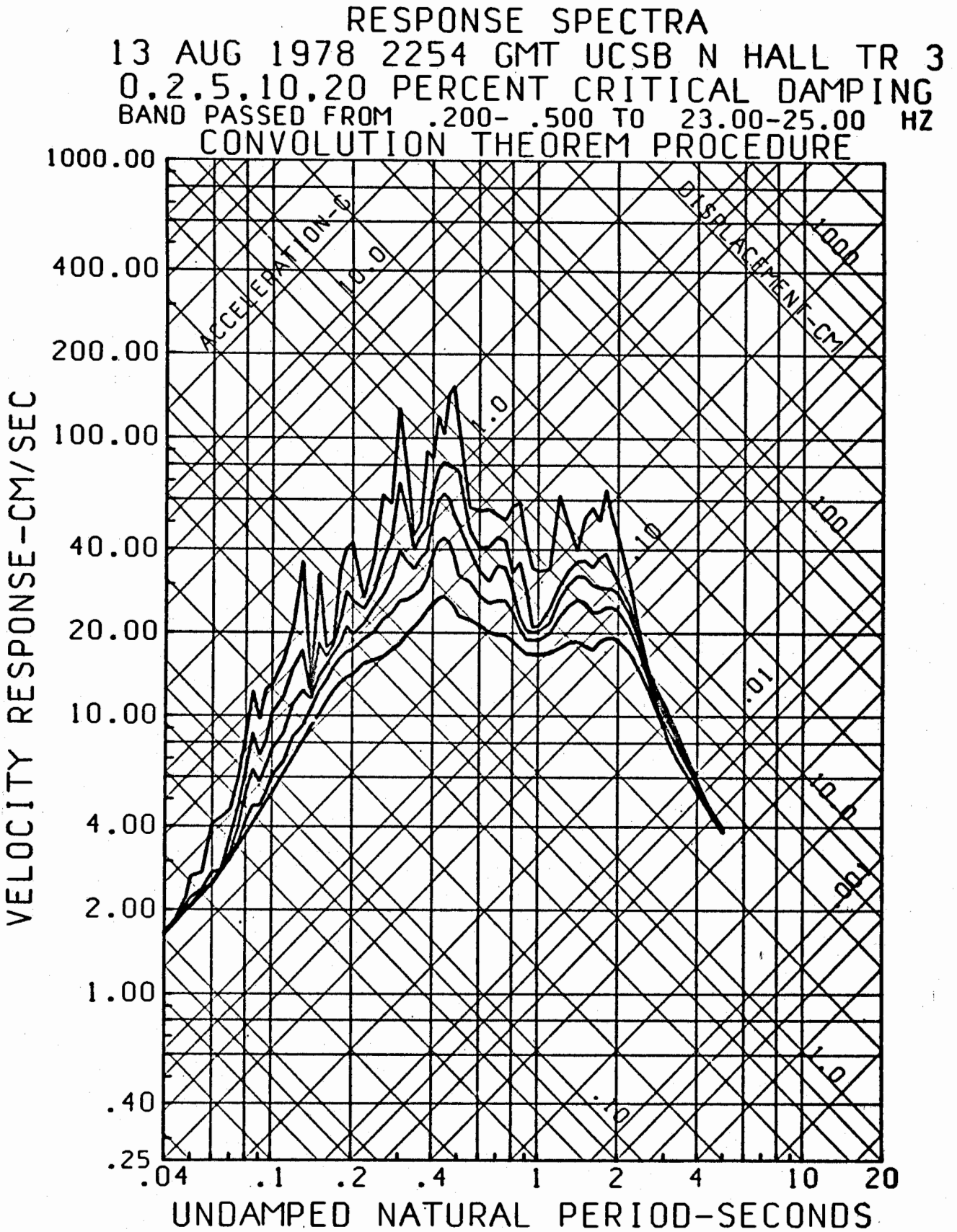
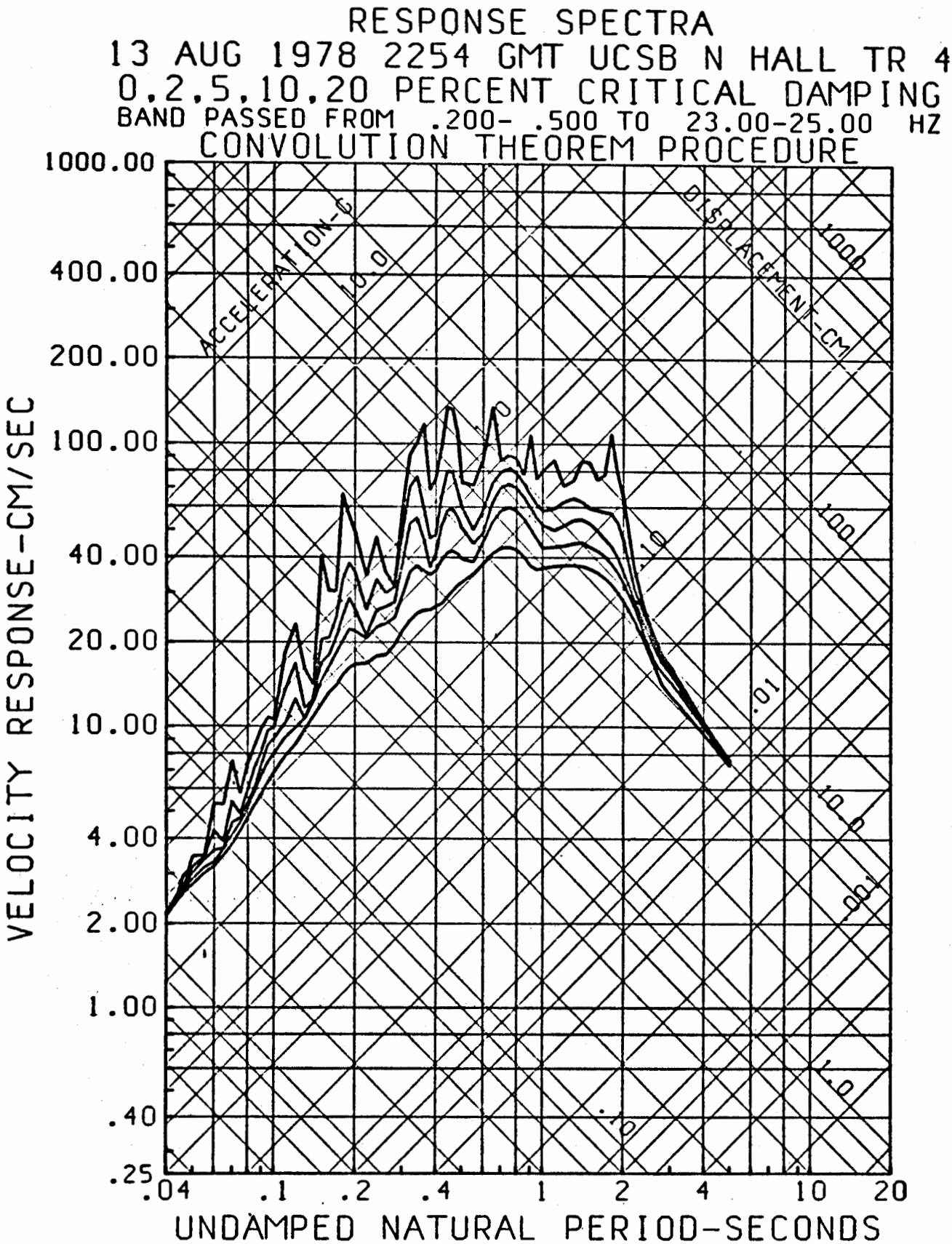
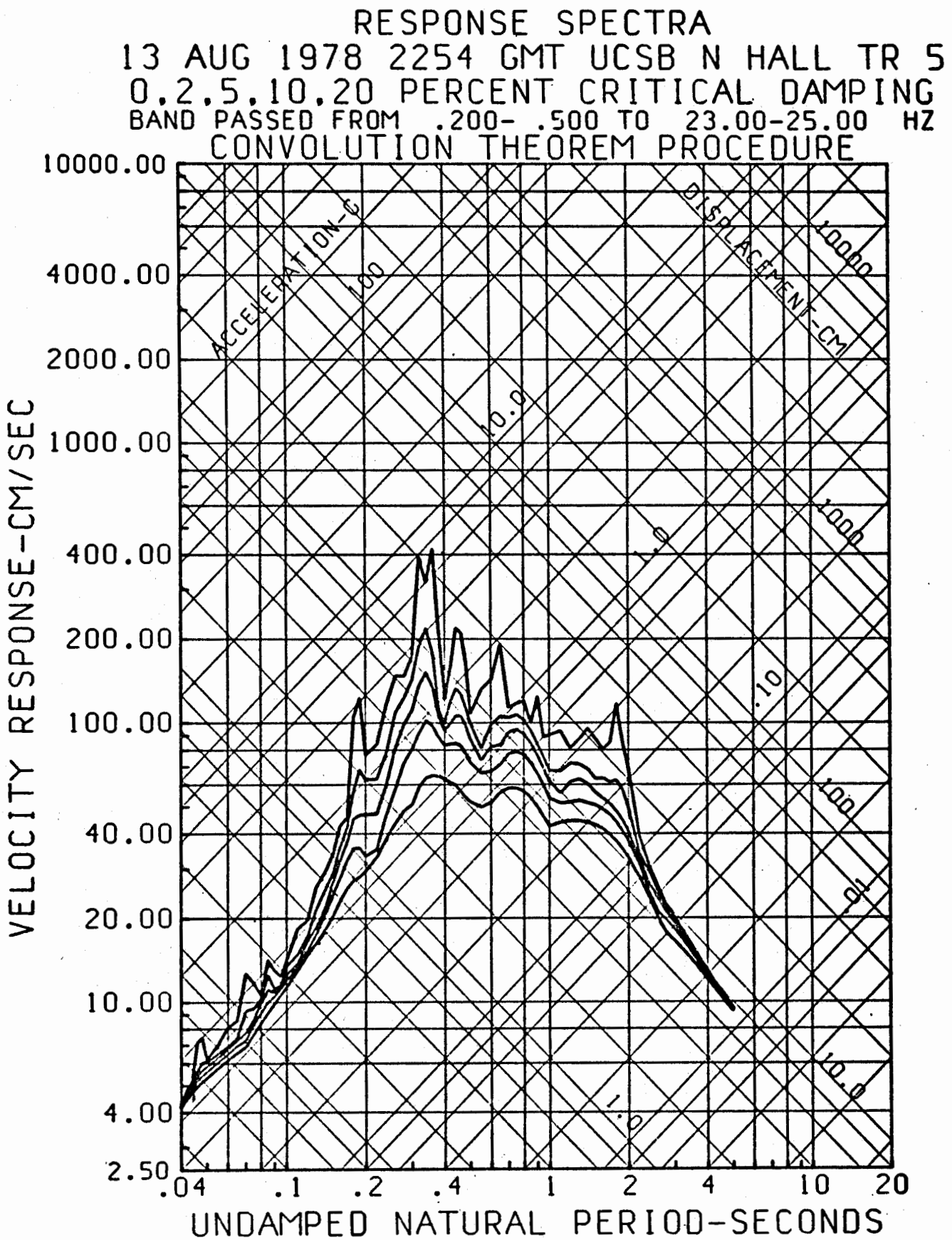
2.5
3.0
3
7
11
15

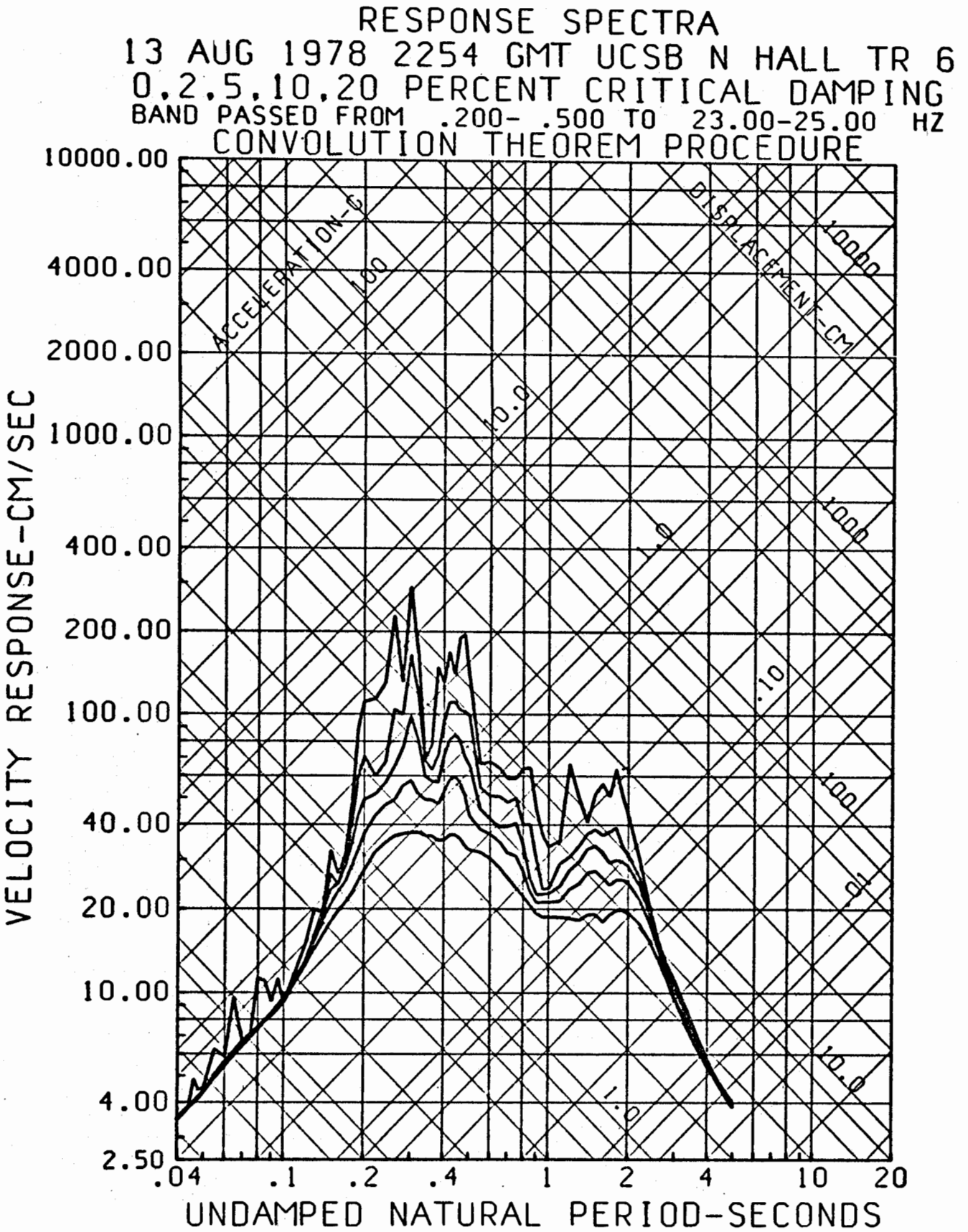

RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 1
0,2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
10000.00
4000.00
2000.00
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.50
.04
.1
.2
.4
1
2
4
10
20

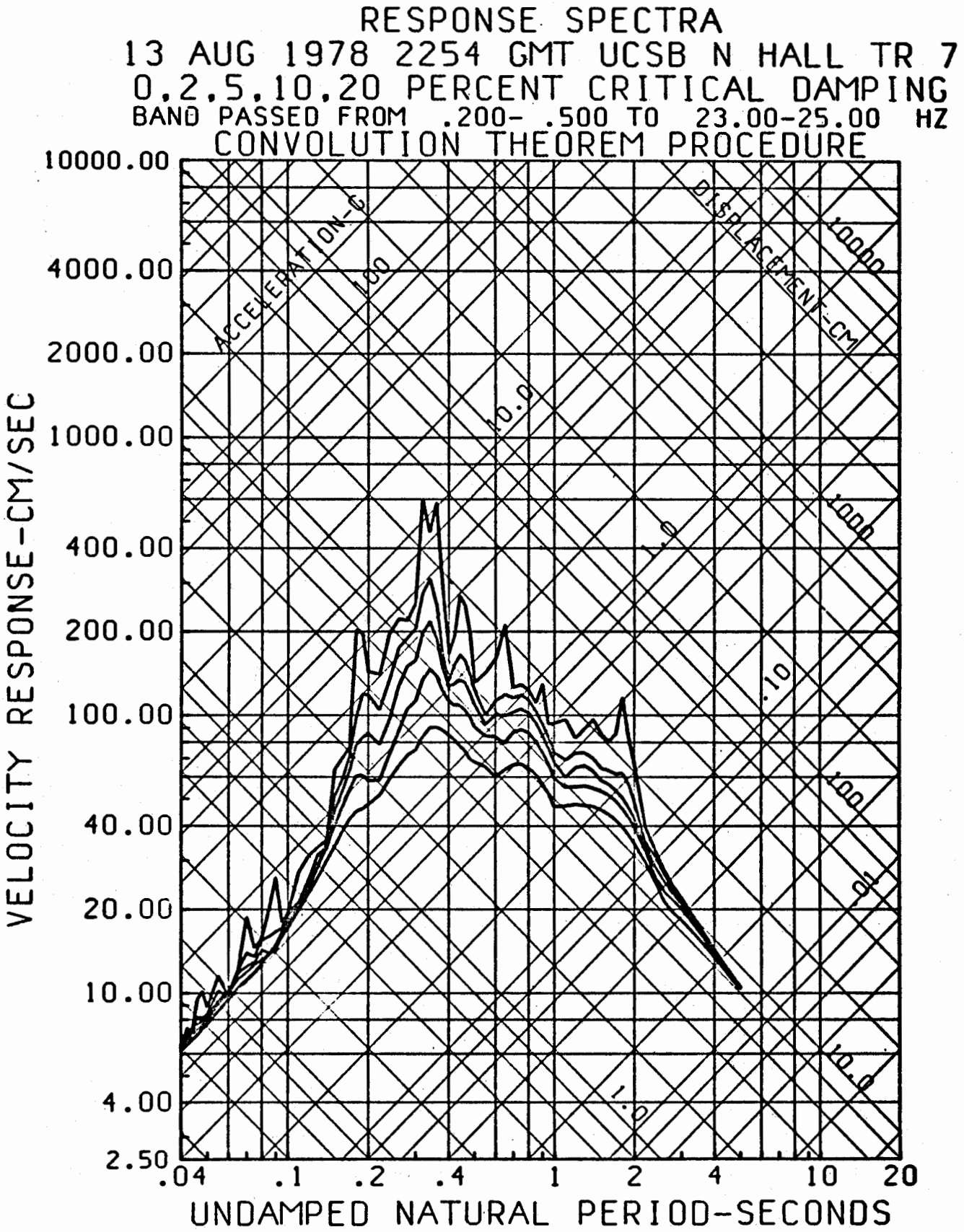

RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 2
0,2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.00
1.00
.40
.25
.04
.1
.2
.4
1
2
4
10
20

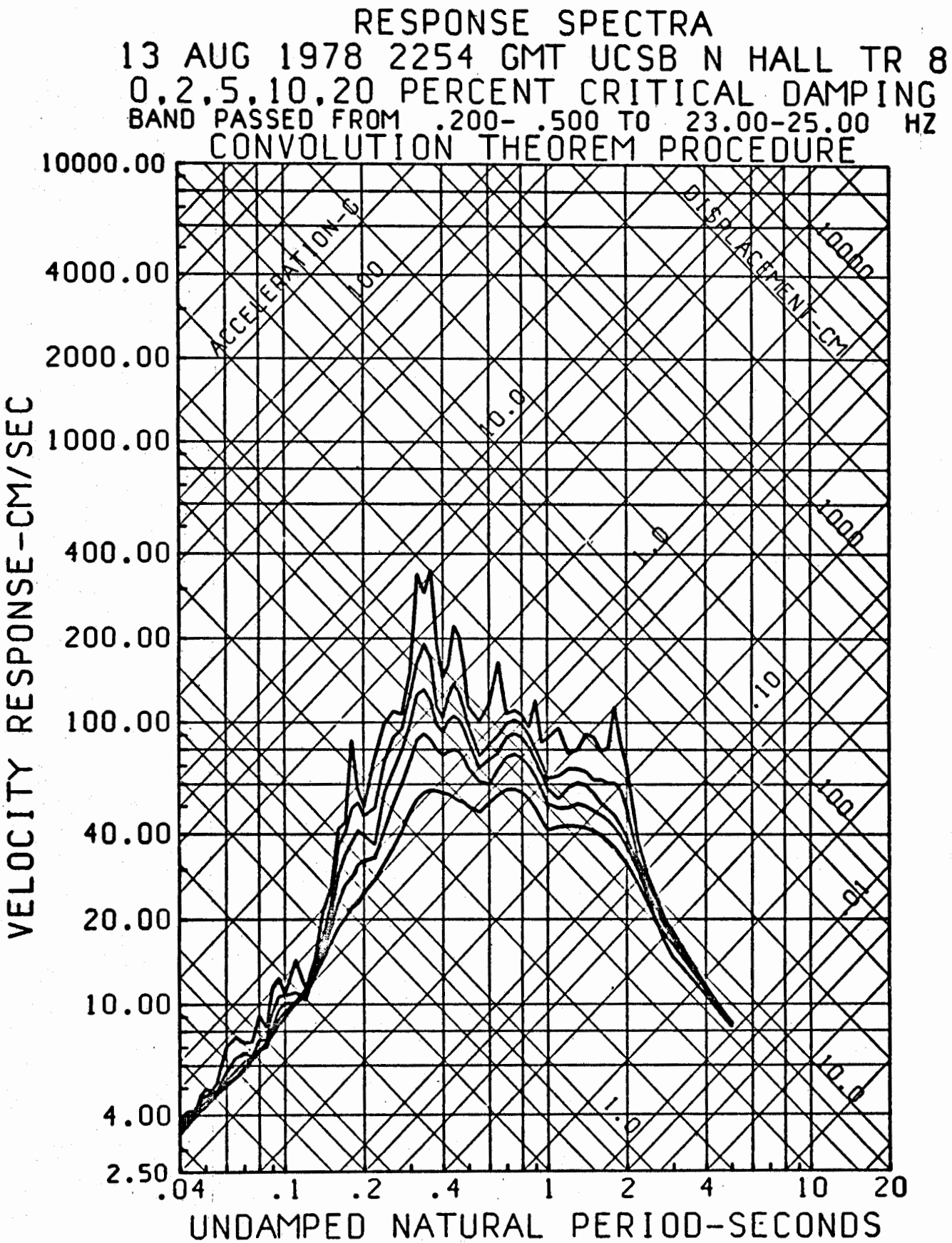

RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 3
0.2.5.10.20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.00
1.00
.40
.25
.04
.1
.2
.4
1
2
4
10
20

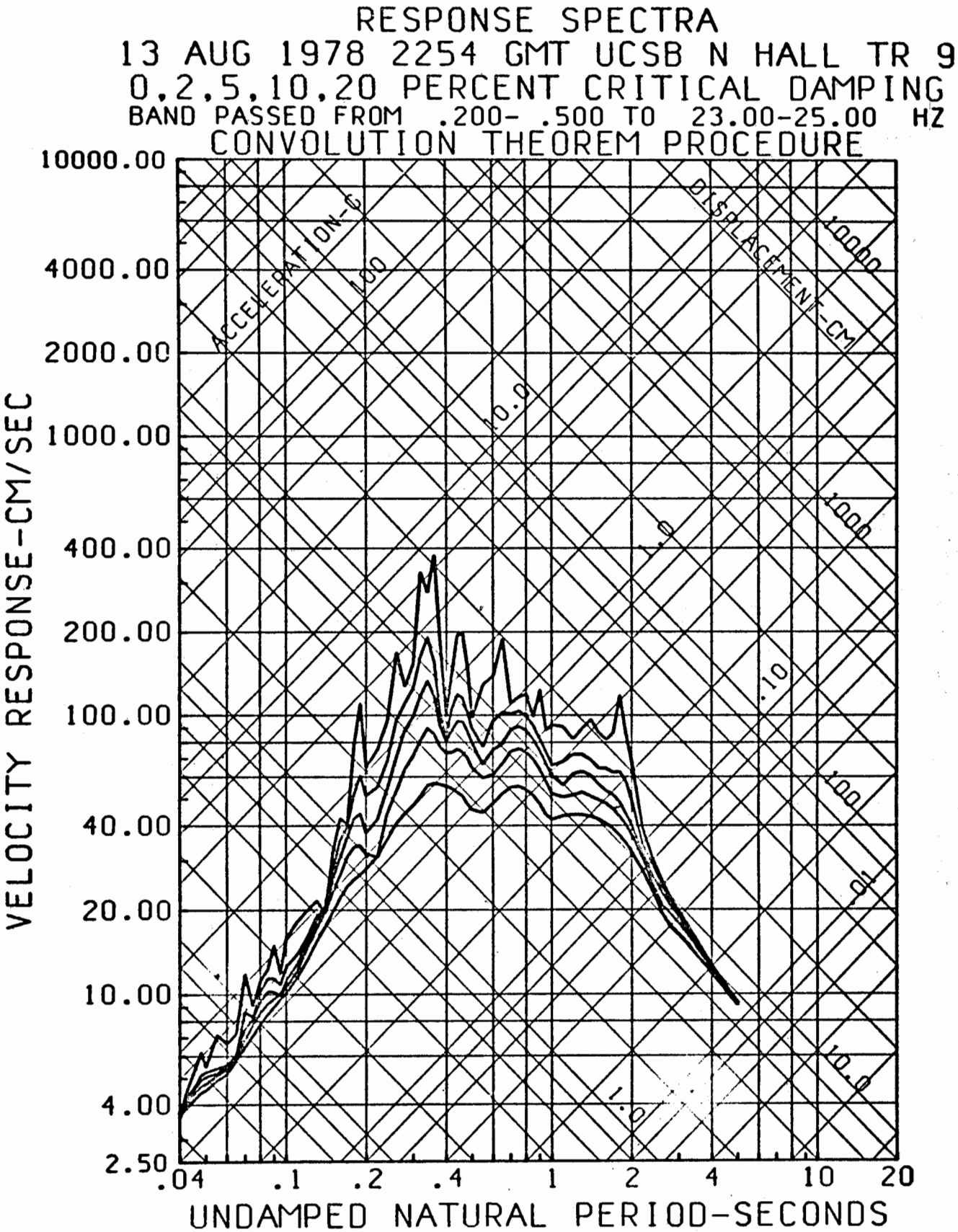

RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 4
0,2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.00
1.00
.40
.25
.04
.1
.2
.4
1
2
4
10
20

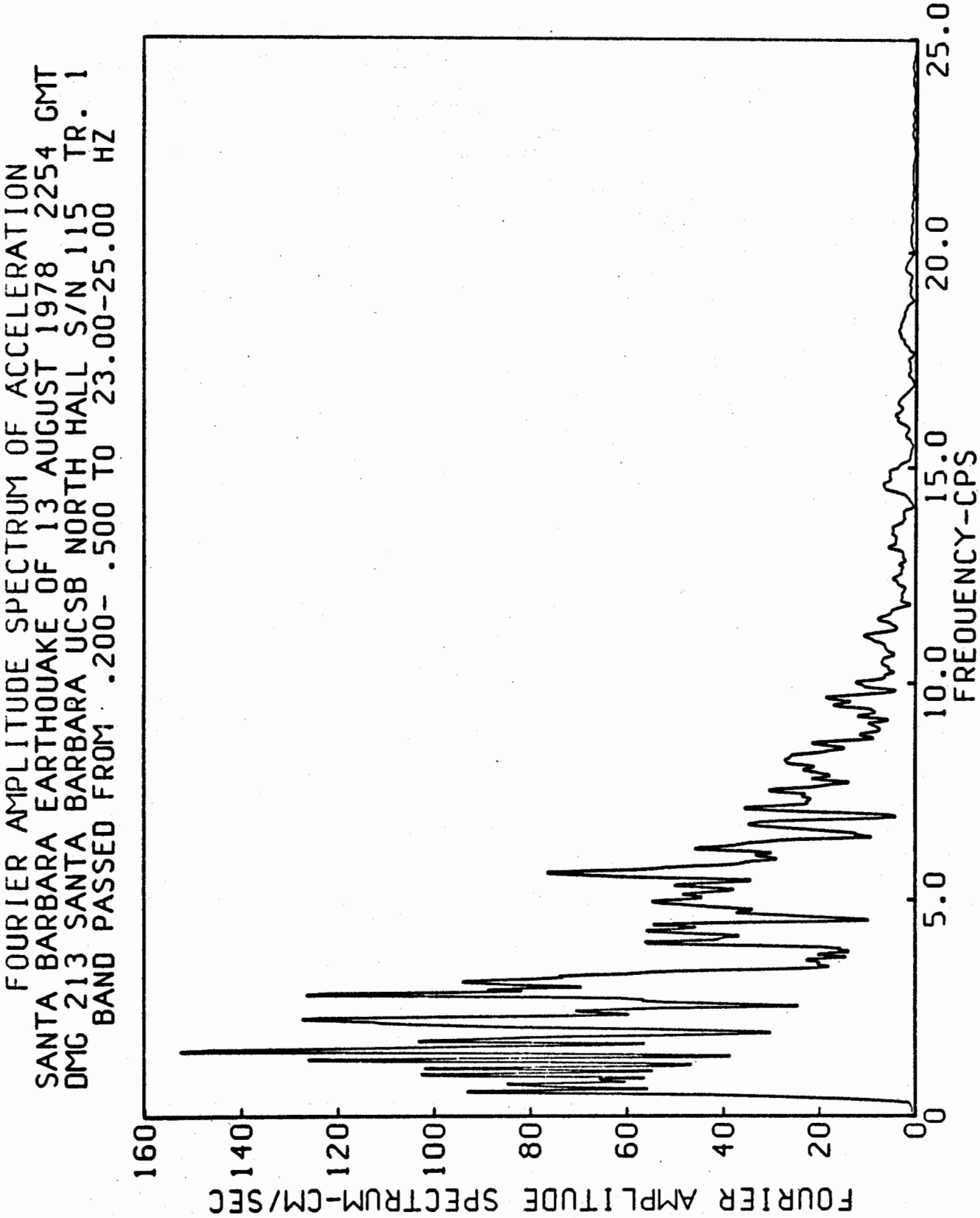

RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 5
0,2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
10000.00
4000.00
2000.00
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.50
.04
.1
.2
.4
1
2
4
10
20

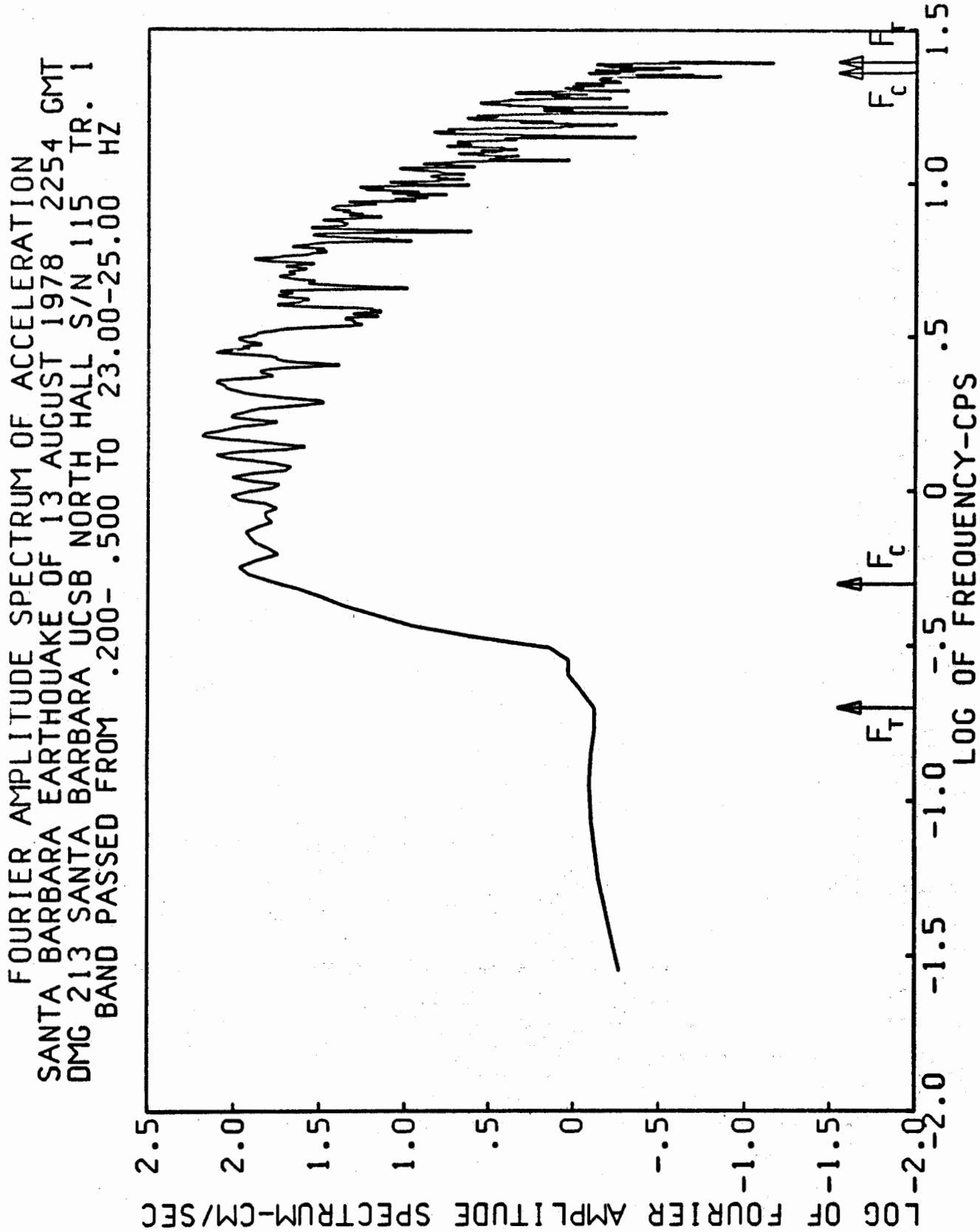

RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 6
0,2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
10000.00
4000.00
2000.00
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.50
.04
.1
.2
.4
1
2
4
10
20

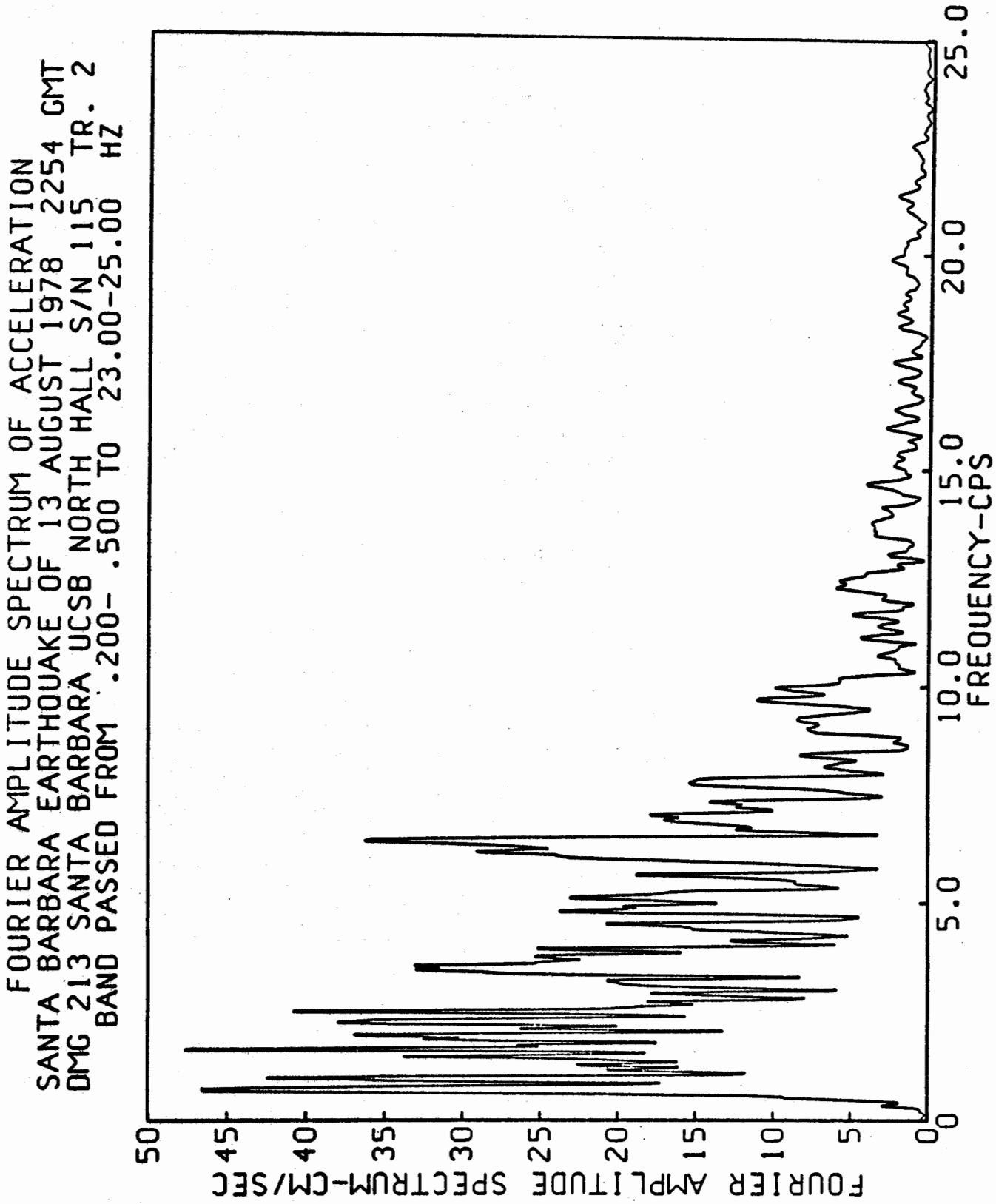

RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 7
0,2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
10000.00
4000.00
2000.00
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.50
.04
.1
.2
.4
1
2
4
10
20

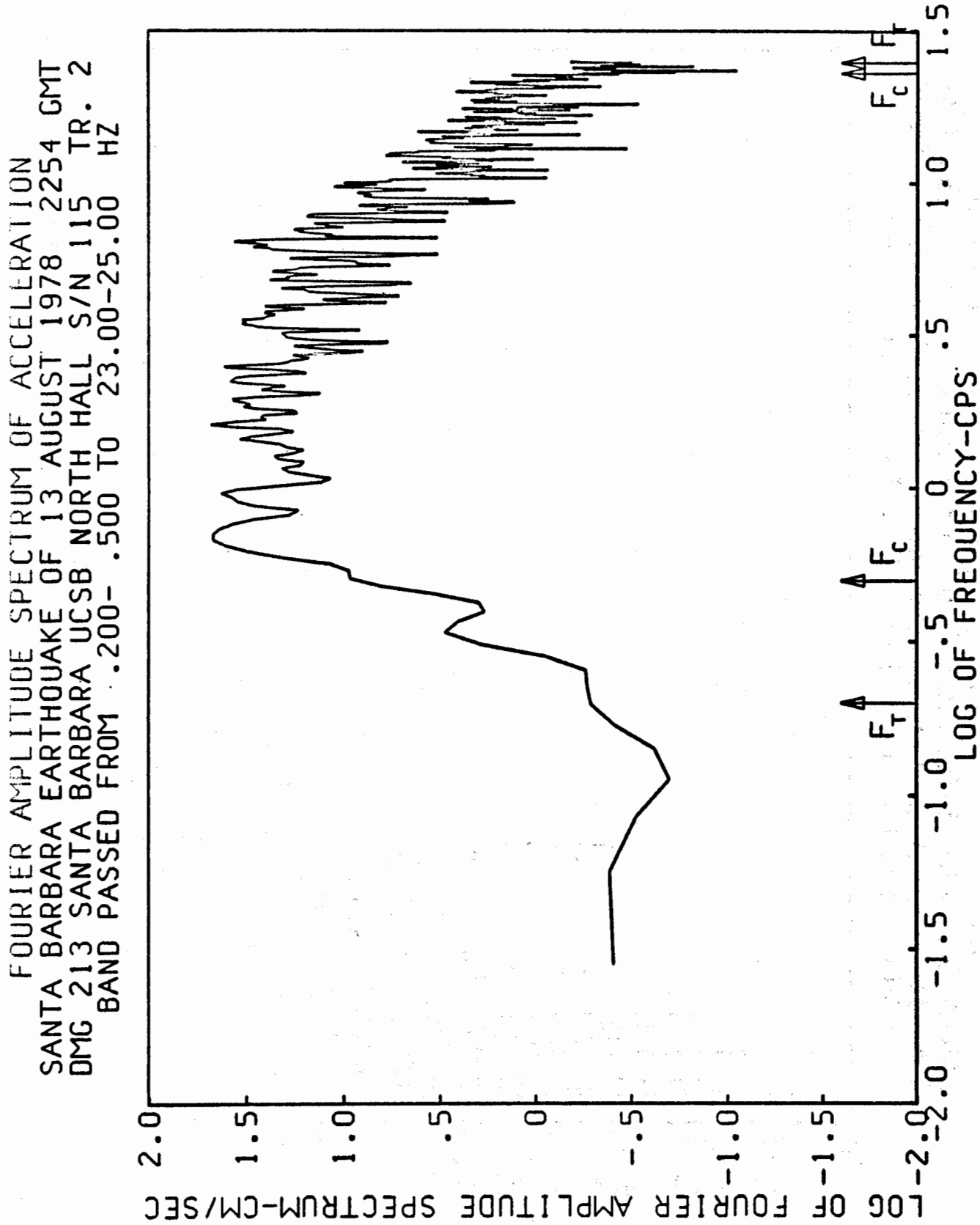

RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 8
0,2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
10000.00
4000.00
2000.00
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.50
.04
.1
.2
.4
1
2
4
10
20


RESPONSE SPECTRA
13 AUG 1978 2254 GMT UCSB N HALL TR 9
0,2,5,10,20 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
CONVOLUTION THEOREM PROCEDURE
ACCELERATION-G
DISPLACEMENT-CM
VELOCITY RESPONSE-CM/SEC
UNDAMPED NATURAL PERIOD-SECONDS
10000.00
4000.00
2000.00
1000.00
400.00
200.00
100.00
40.00
20.00
10.00
4.00
2.50
.04
.1
.2
.4
1
2
4
10
20


FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 1
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
0
20
40
60
80
100
120
140
160
0
5.0
10.0
15.0
20.0
25.0
FREQUENCY-CPS


FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 1
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
LOG OF FREQUENCY-CPS
2.5
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
-1.5
-1.0
-.5
0
.5
1.0
1.5
F_T
F_c
F_c
F_T


FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 2
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
0
5
10
15
20
25
30
35
40
45
50
FREQUENCY-CPS
0
5.0
10.0
15.0
20.0
25.0


FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 2
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
LOG OF FREQUENCY-CPS
-1.5
-1.0
-.5
0
.5
1.0
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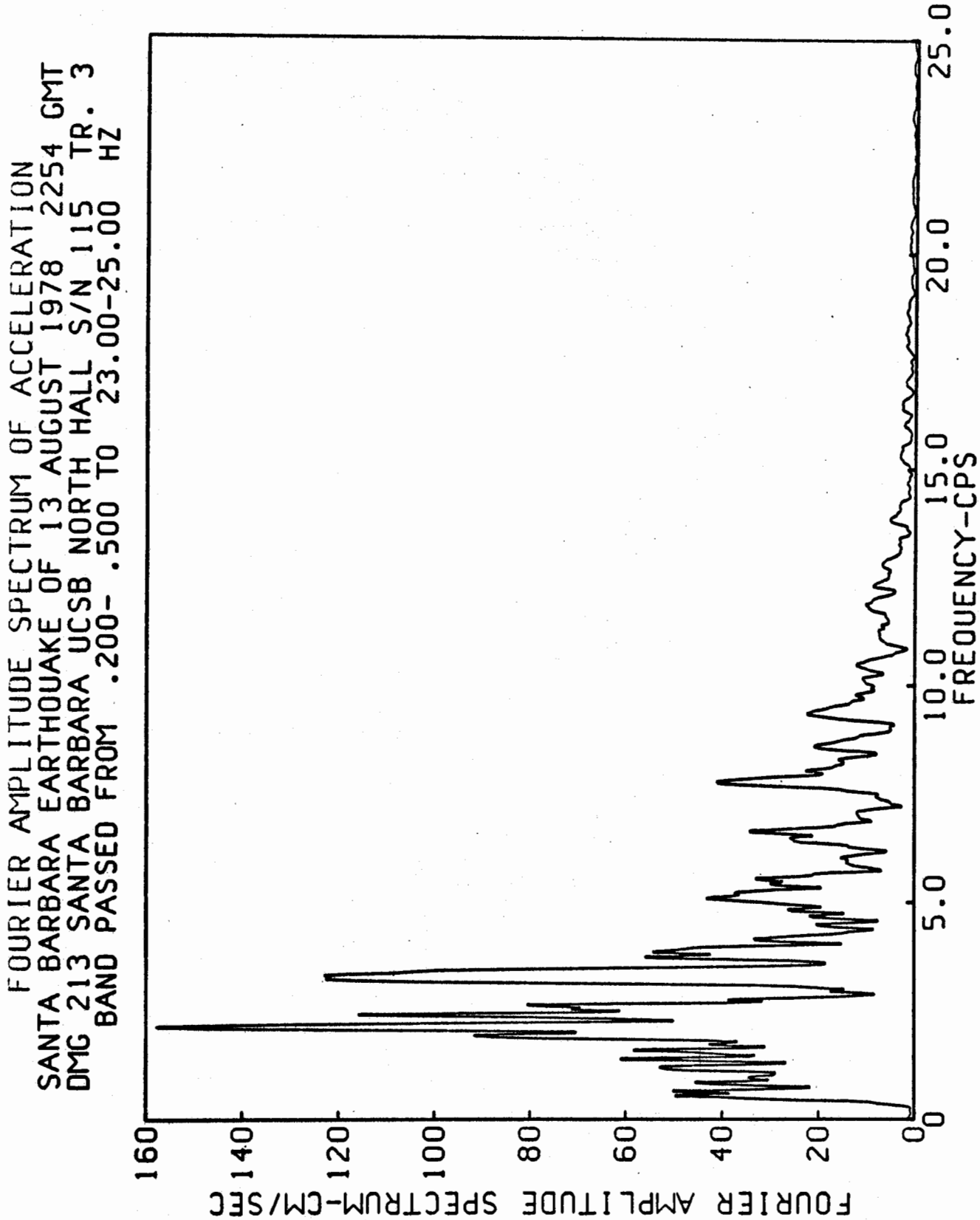
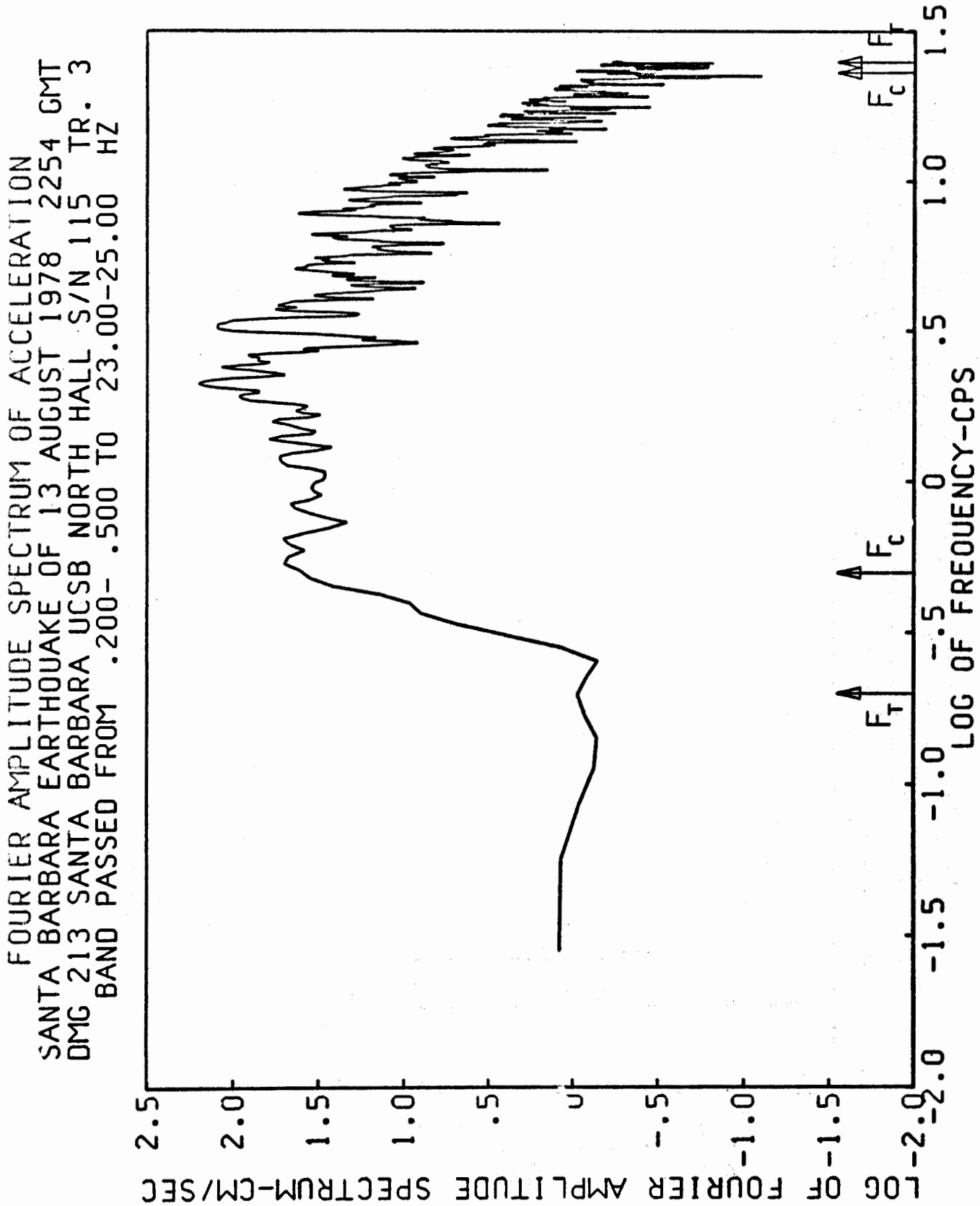
F_T
F_c
F_c
F_T


FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 3
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
0
20
40
60
80
100
120
140
160
0
5.0
10.0
15.0
20.0
25.0
FREQUENCY-CPS


FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 3
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
2.5
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
LOG OF FREQUENCY-CPS
-2.0
-1.5
-1.0
-.5
0
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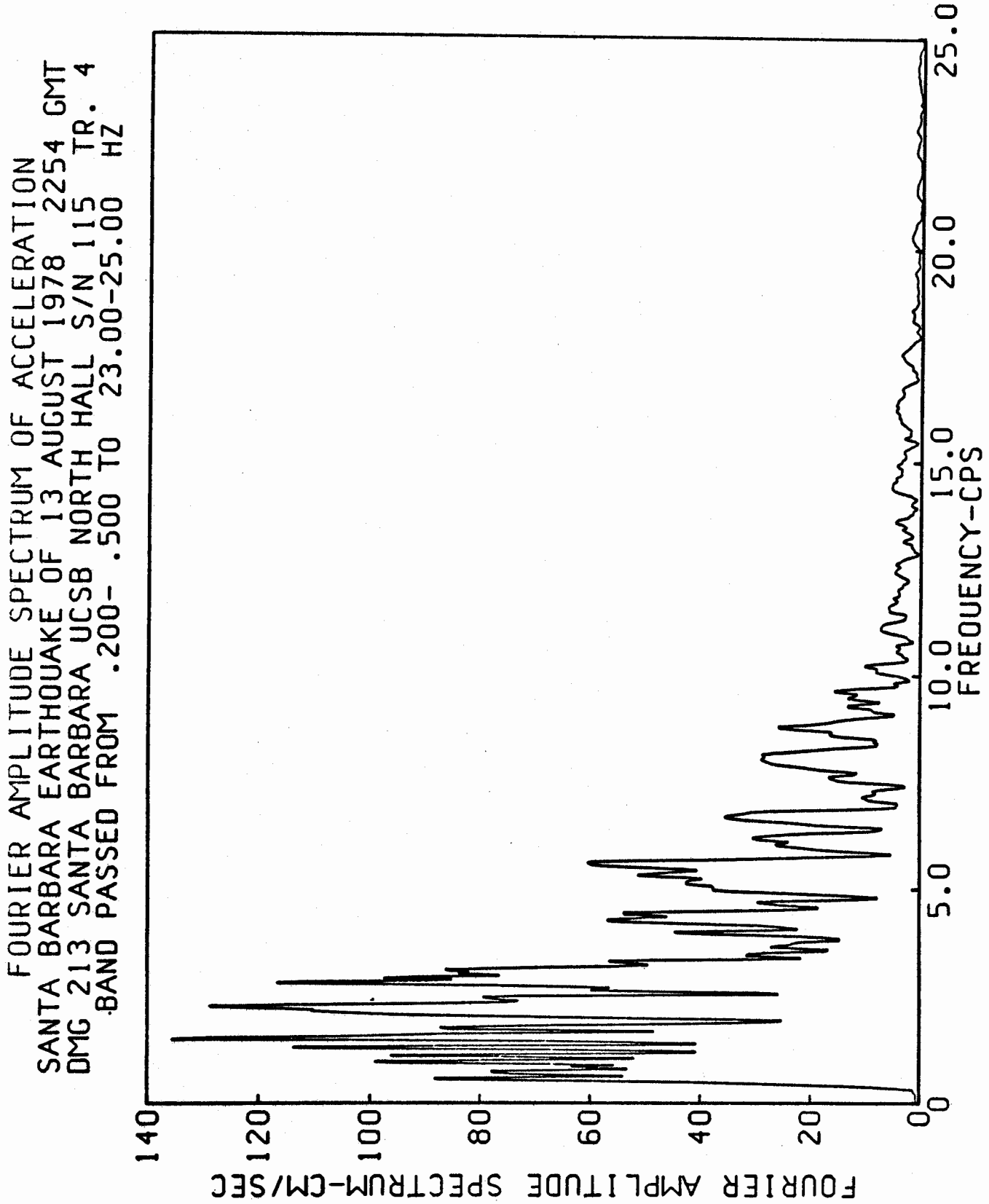
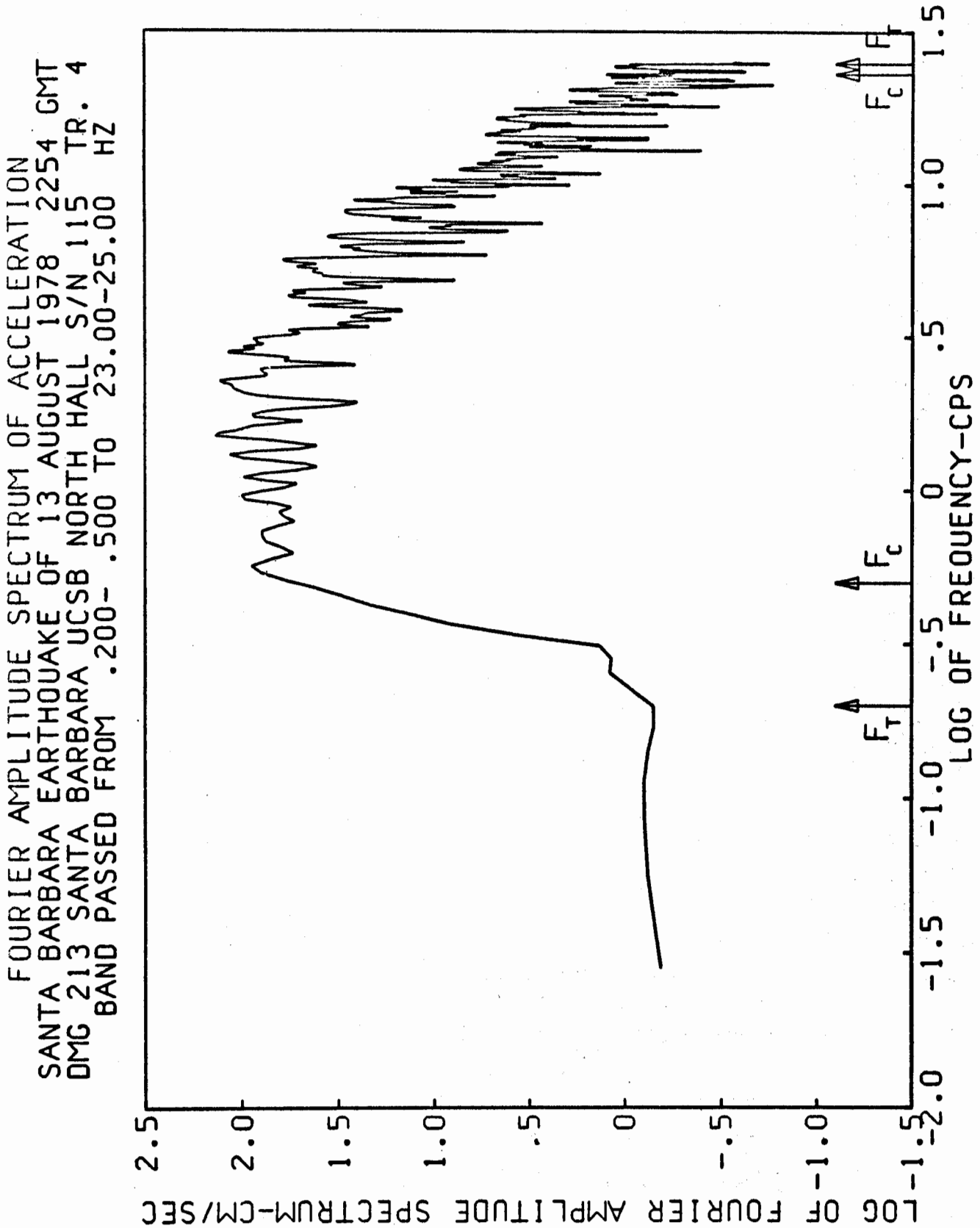
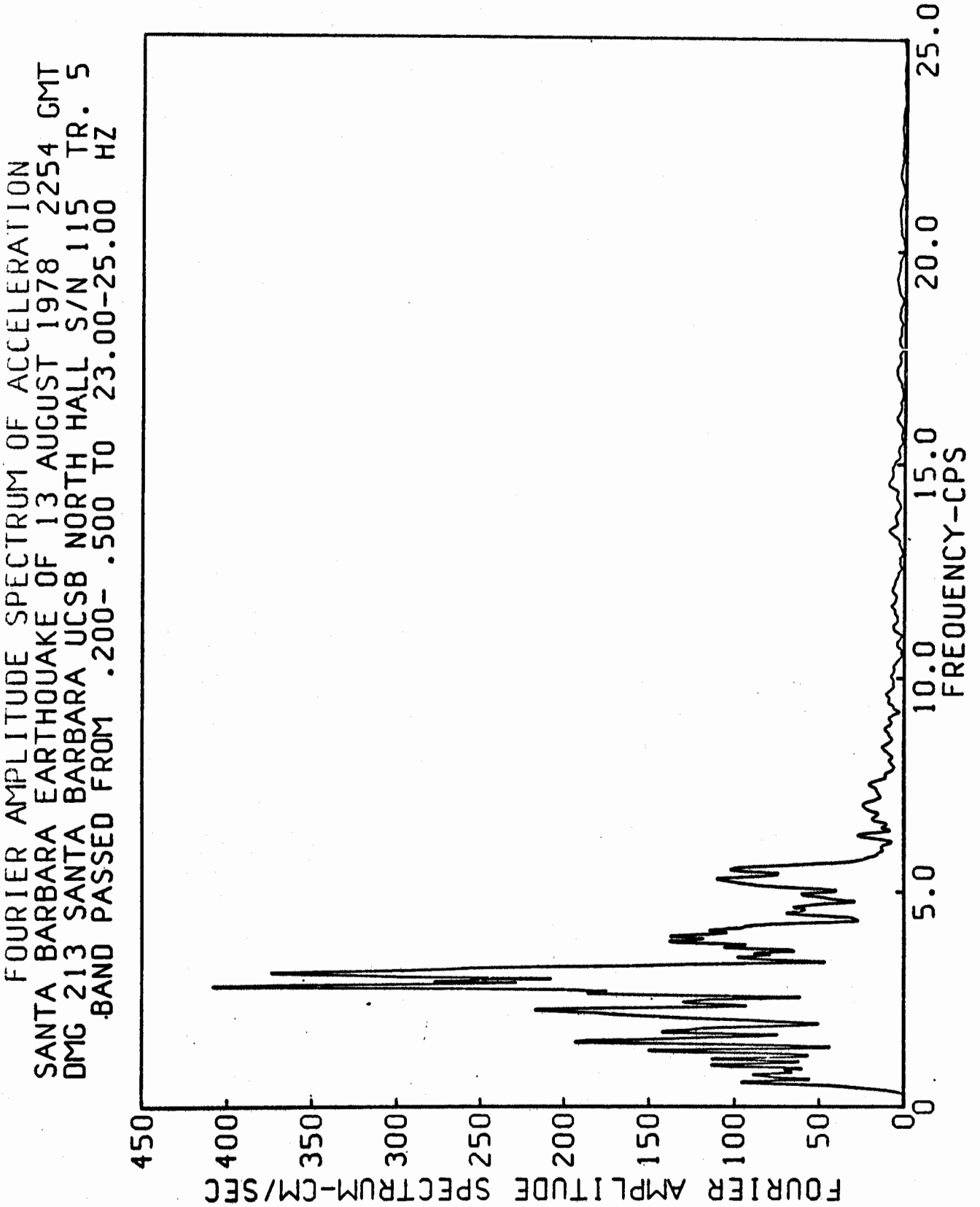
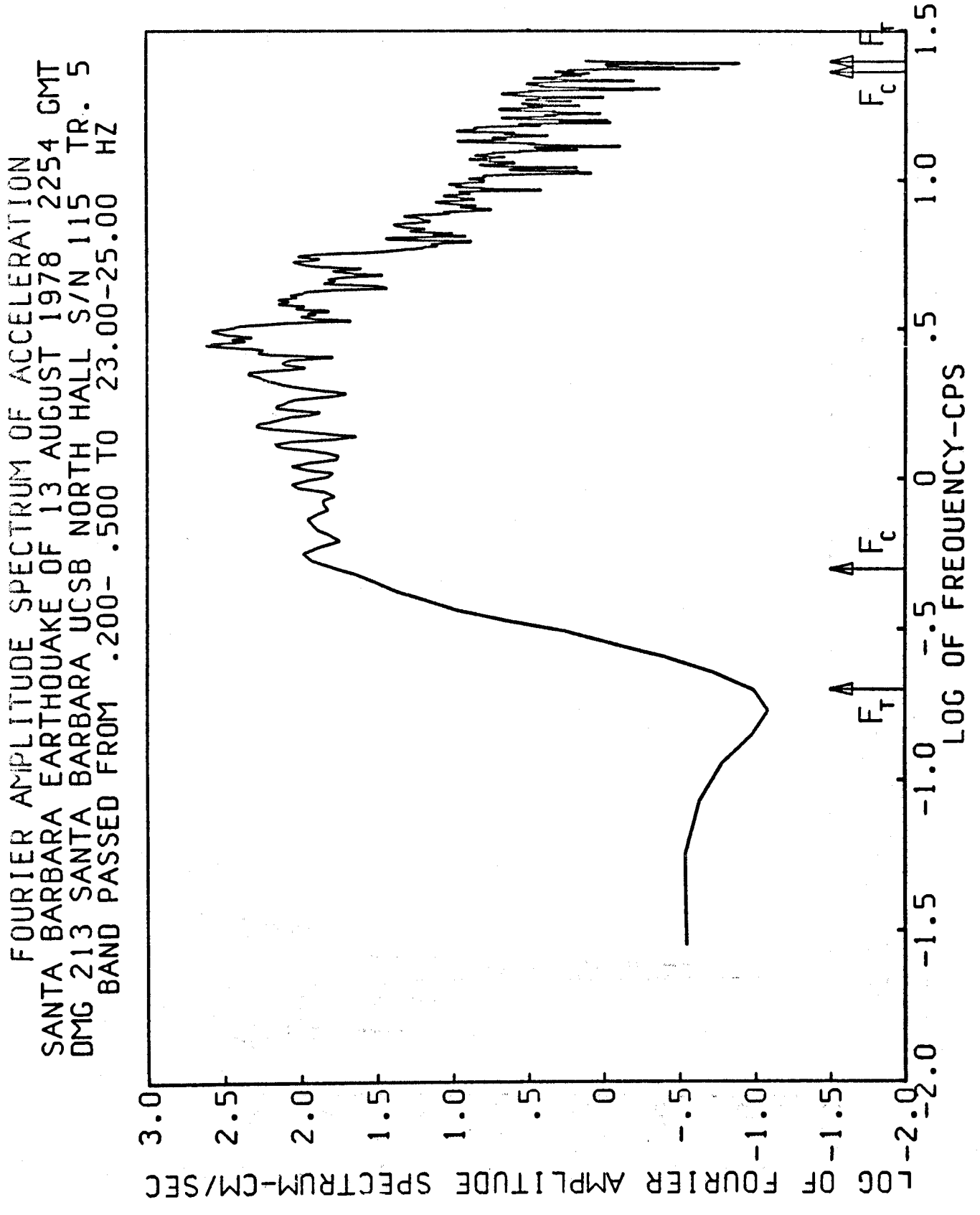
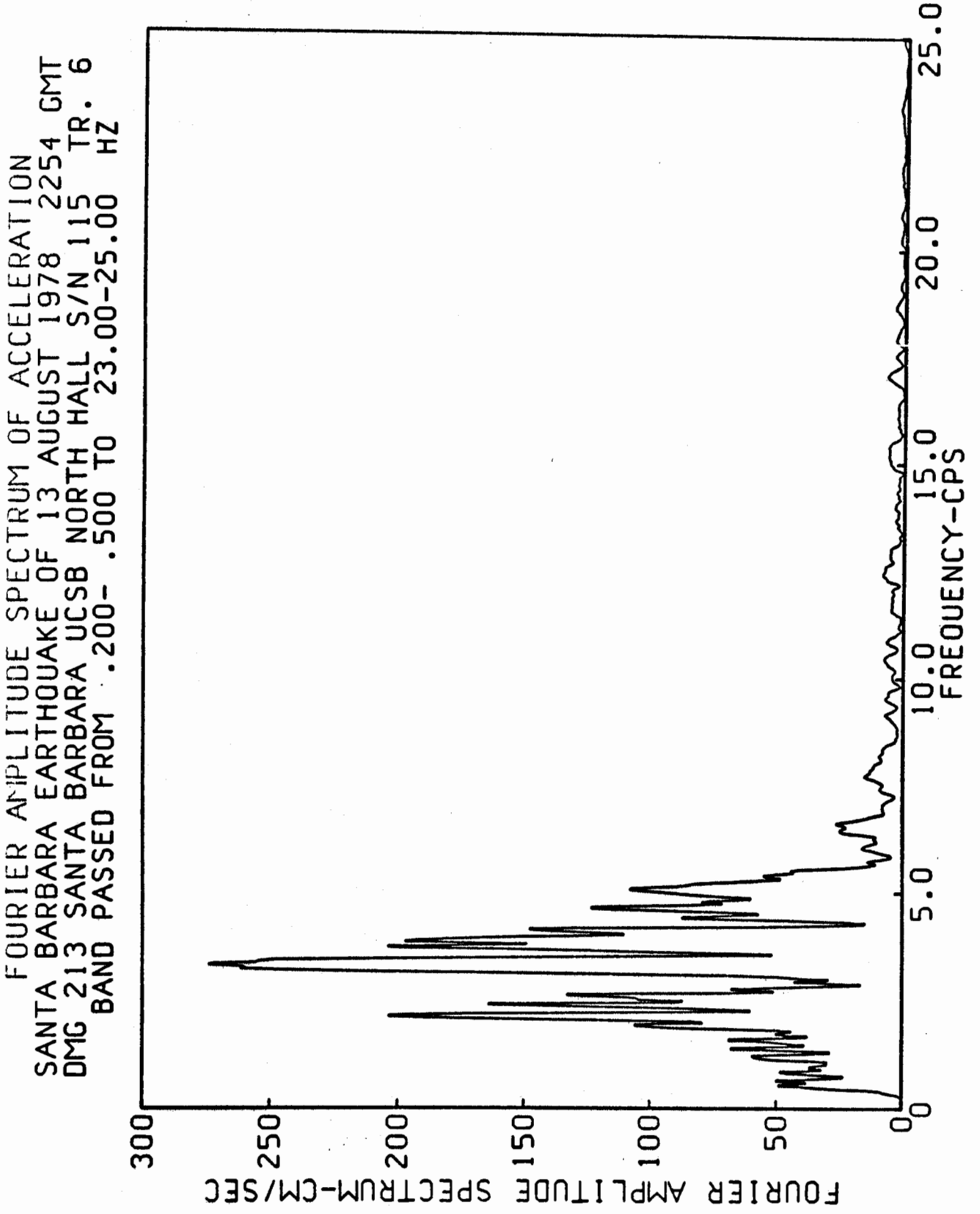
F_T
F_c
F_c
F_T

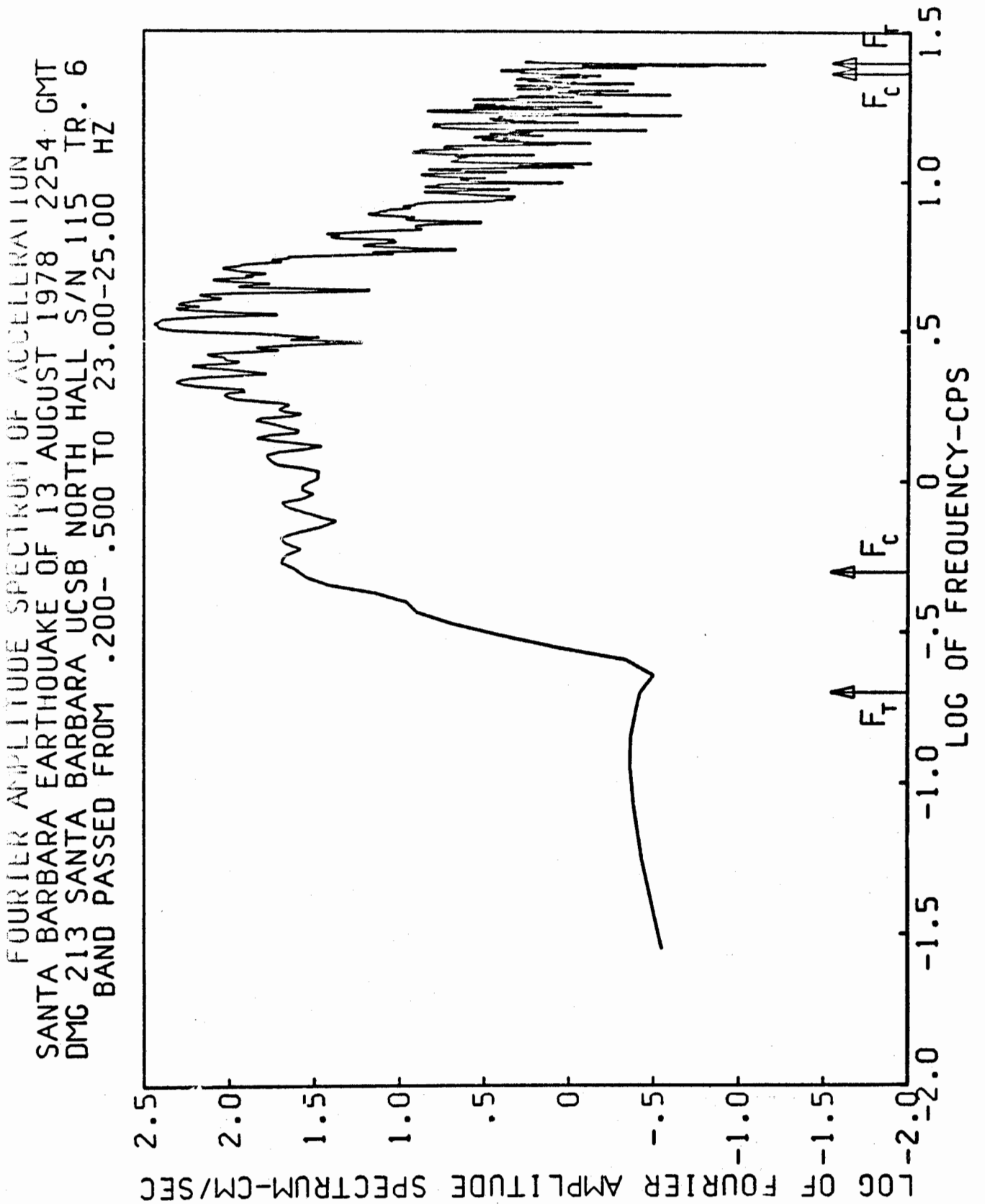

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 4
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
0
20
40
60
80
100
120
140
0
5.0
10.0
15.0
20.0
25.0
FREQUENCY-CPS

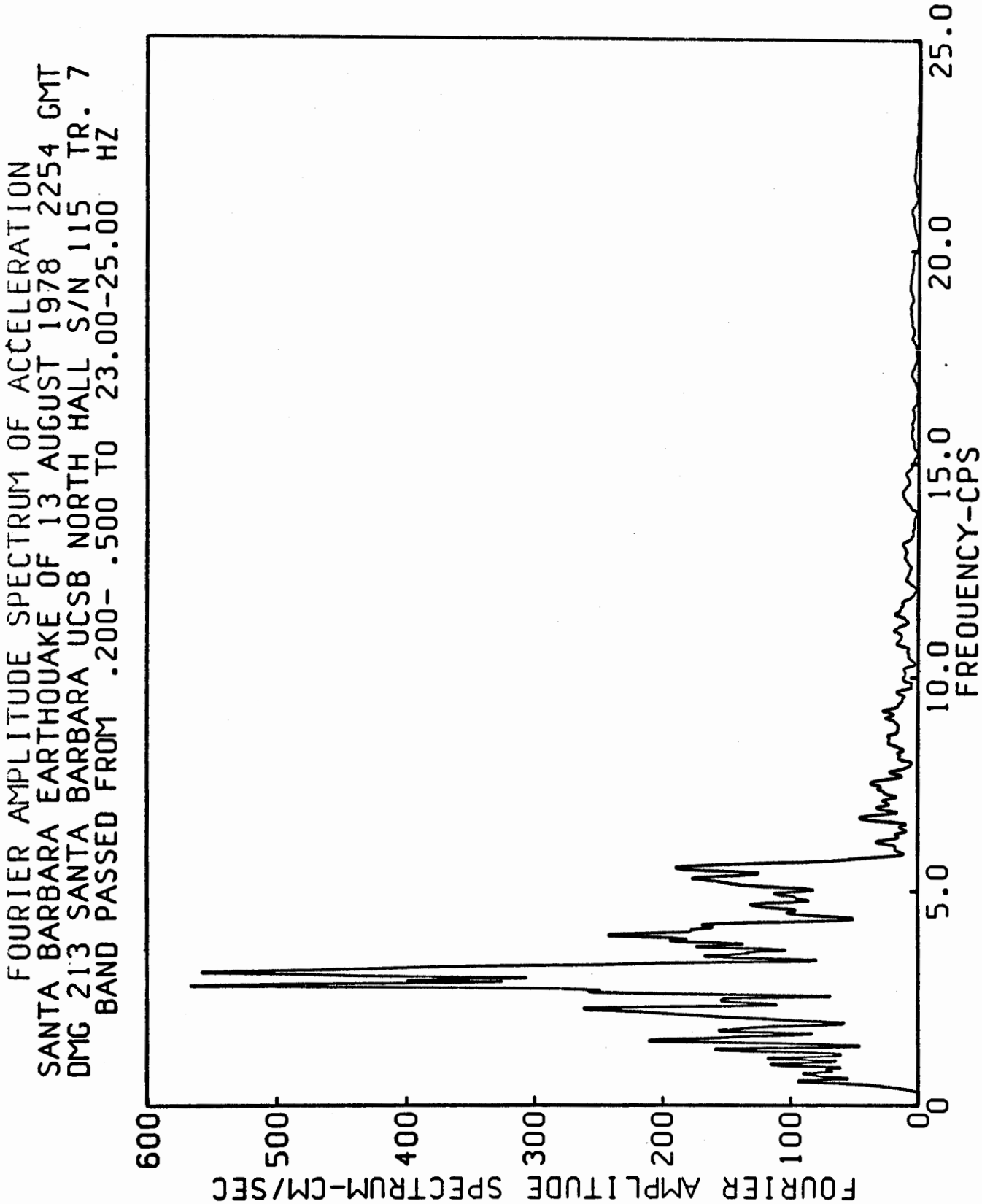

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 4
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
2.5
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
-1.5
-1.0
-.5
0
.5
1.0
1.5
LOG OF FREQUENCY-CPS
F_T
F_c
F_c
F_T

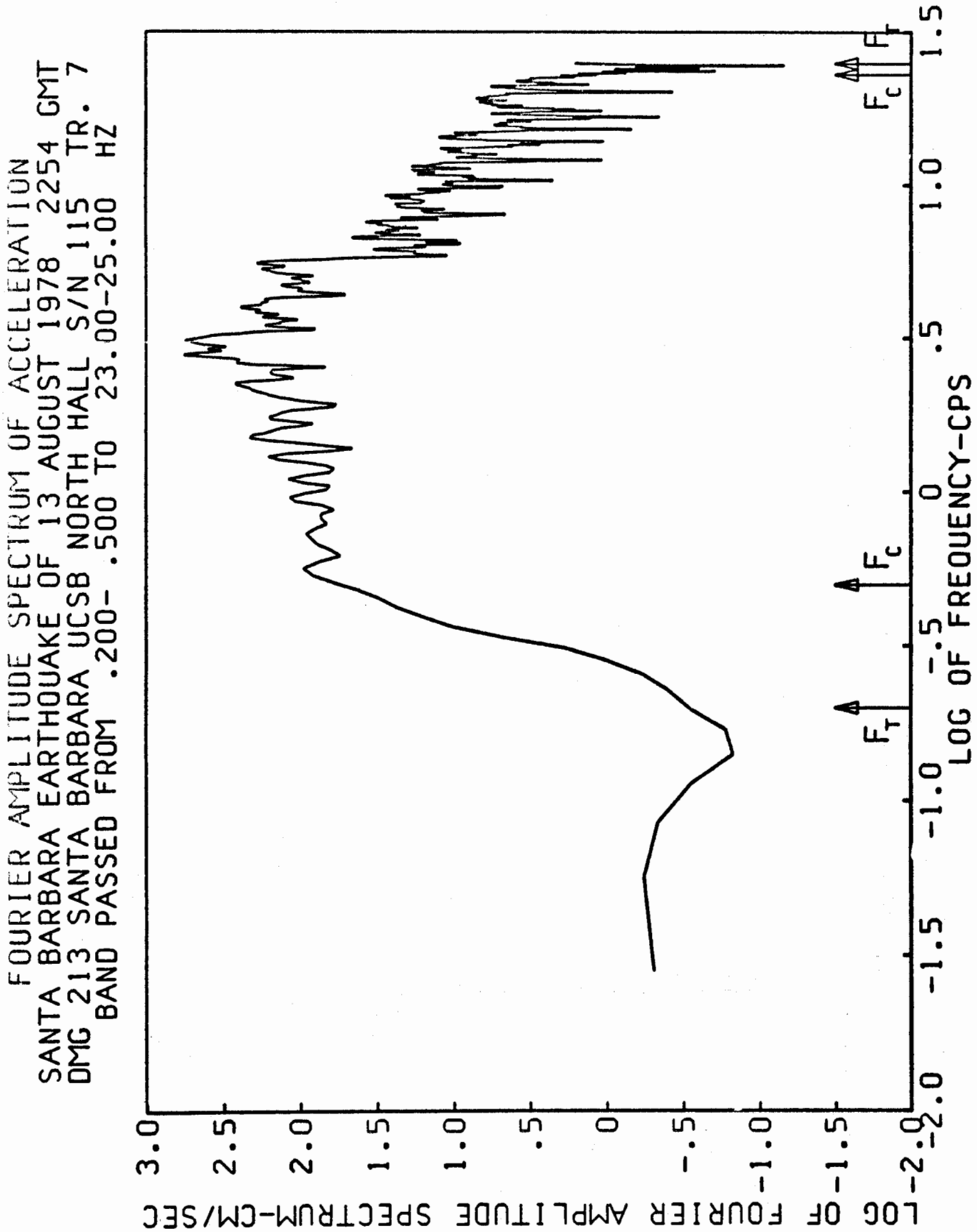

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 5
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
450
400
350
300
250
200
150
100
50
0
0
5.0
10.0
15.0
20.0
25.0
FREQUENCY-CPS

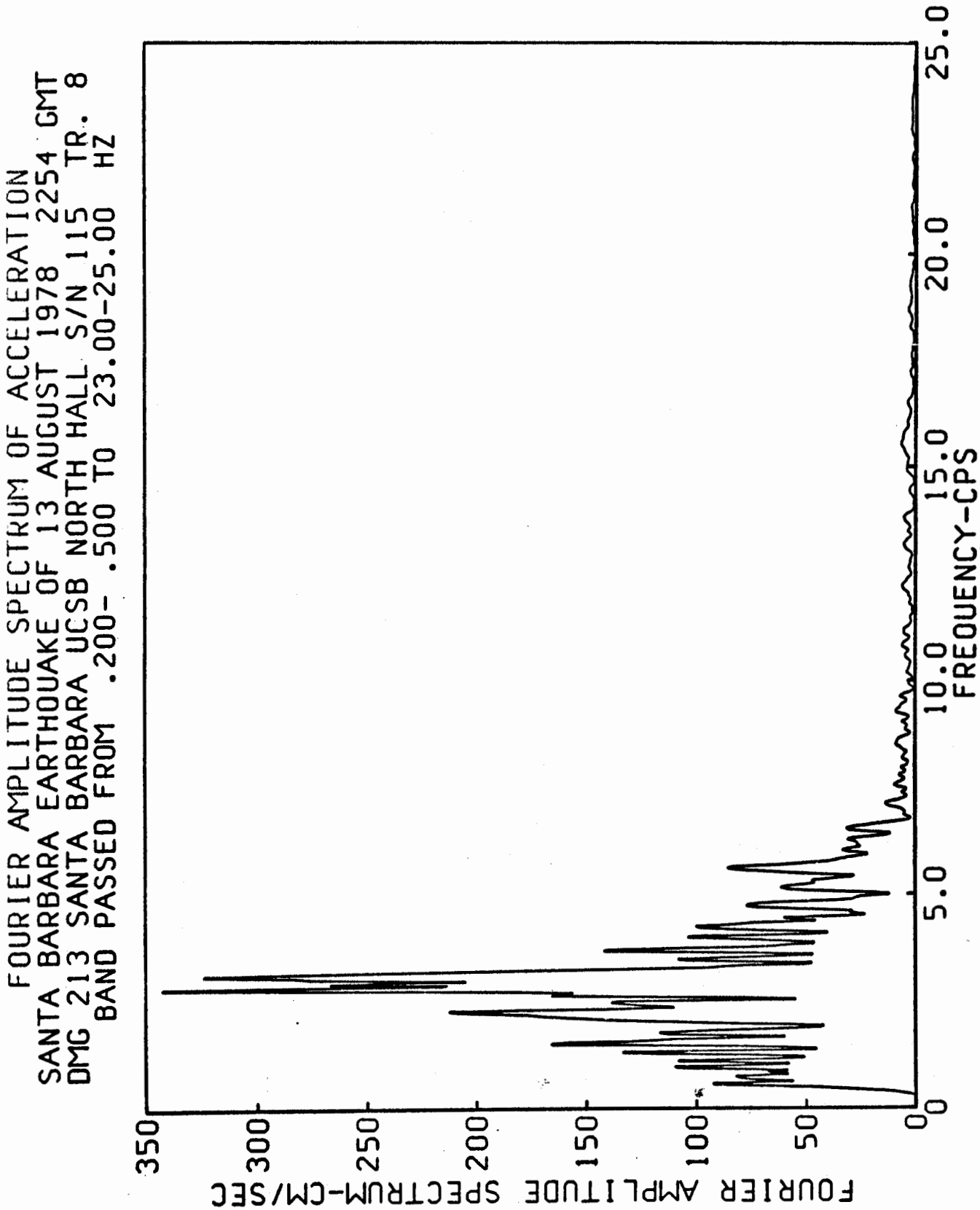

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 5
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
3.0
2.5
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
LOG OF FREQUENCY-CPS
-2.0
-1.5
-1.0
-.5
0
.5
1.0
1.5
F_T
F_c
F_c
F_T

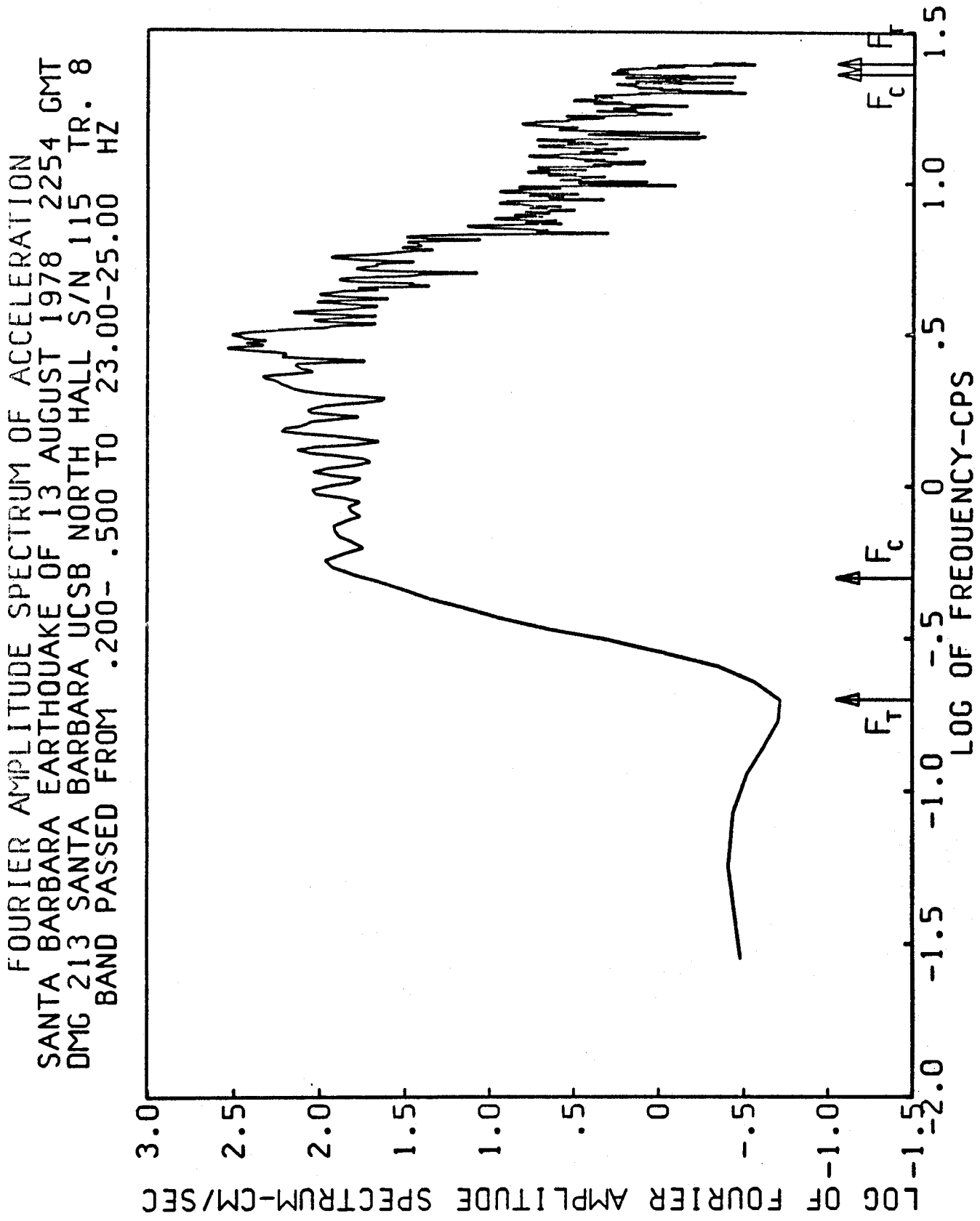

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 6
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
300
250
200
150
100
50
0
0
5.0
10.0
15.0
20.0
25.0
FREQUENCY-CPS

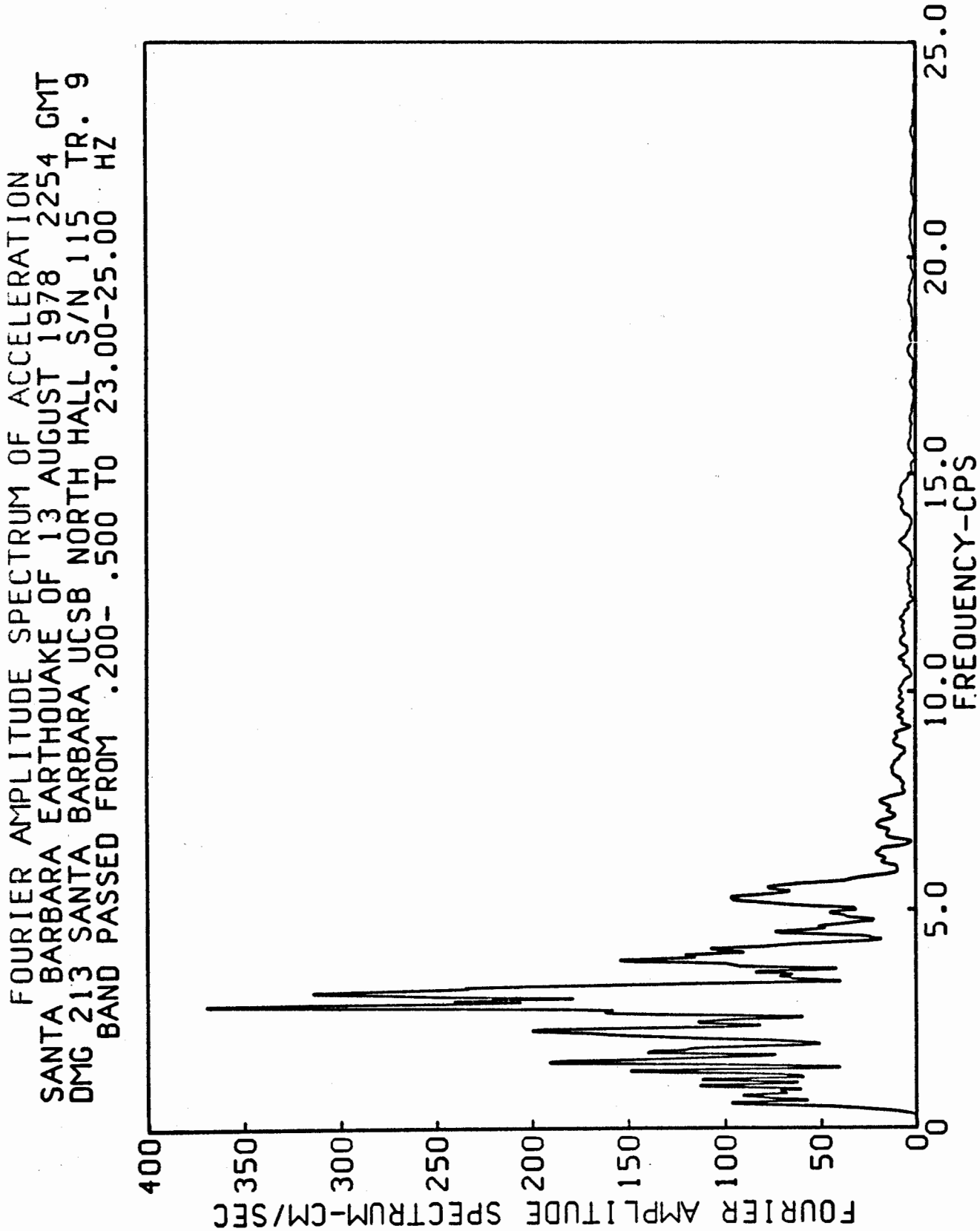

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 6
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
2.5
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
-2.0
-1.5
-1.0
-.5
0
.5
1.0
1.5
LOG OF FREQUENCY-CPS
F_T
F_c
F_c
F_T

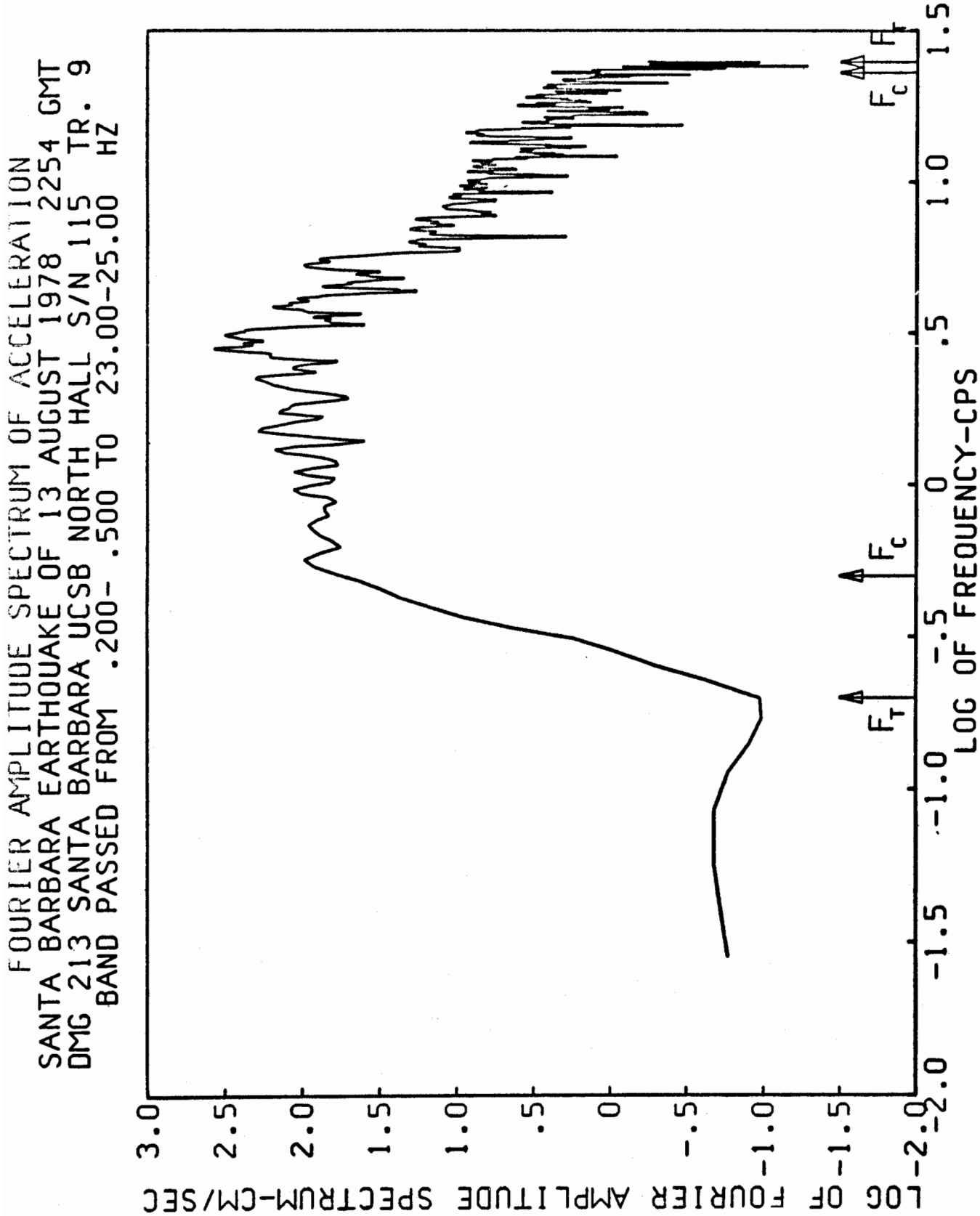

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 7
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
0
100
200
300
400
500
600
FREQUENCY-CPS
0
5.0
10.0
15.0
20.0
25.0

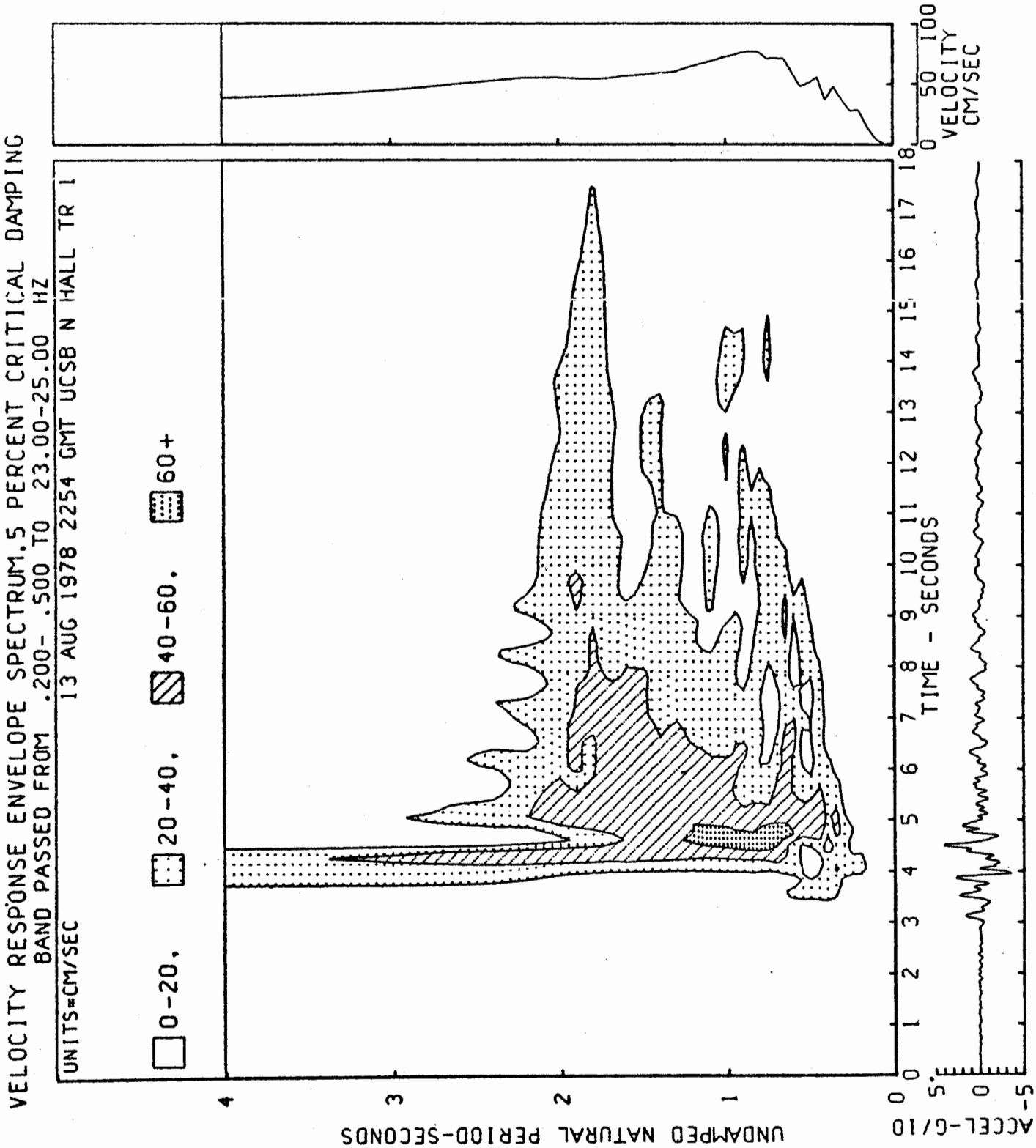

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 7
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
LOG OF FREQUENCY-CPS
3.0
2.5
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
-2.0
-1.5
-1.0
-.5
0
.5
1.0
1.5
F_T
F_c
F_c
F_T

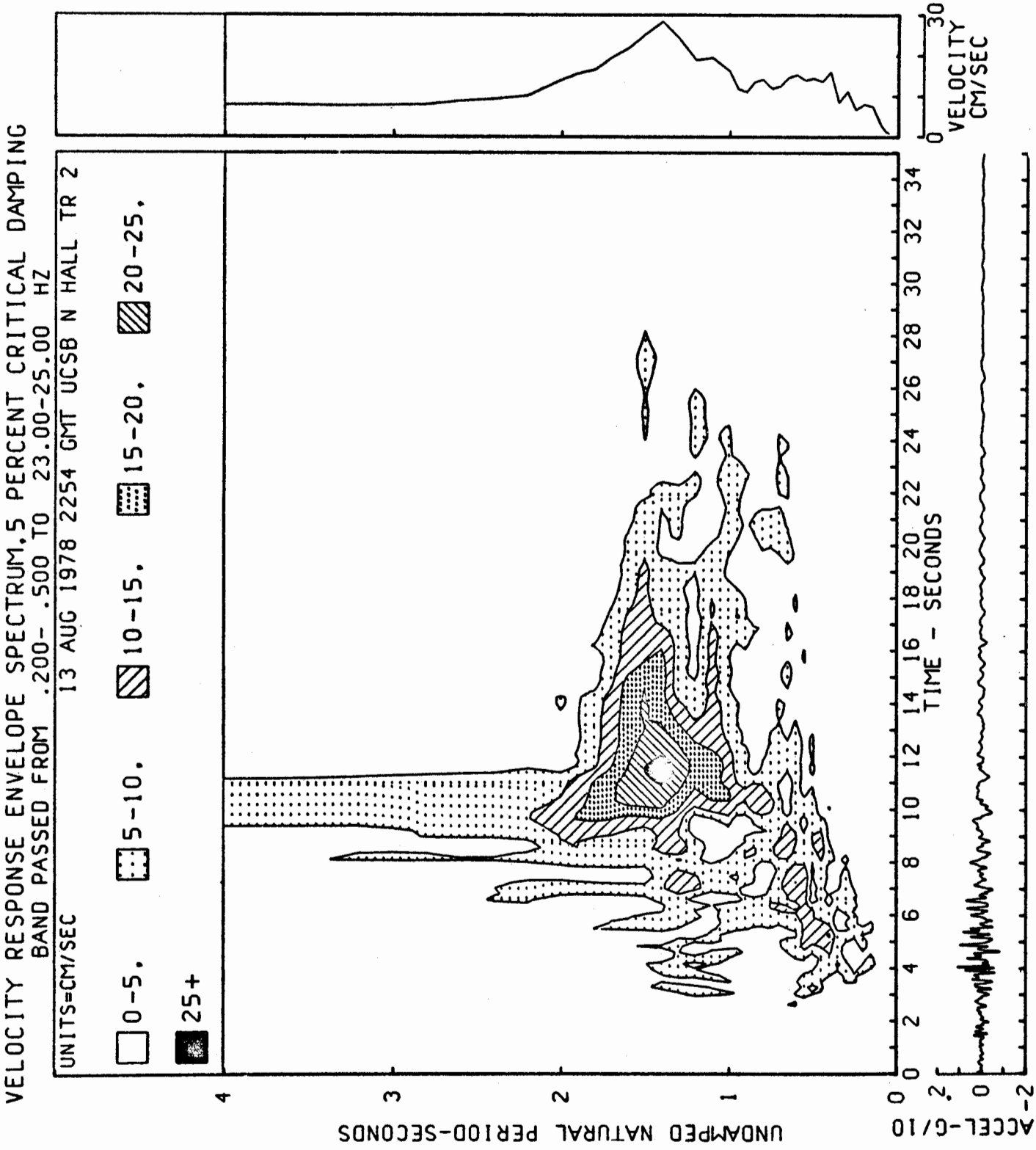

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 8
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
0
50
100
150
200
250
300
350
0
5.0
10.0
15.0
20.0
25.0
FREQUENCY-CPS

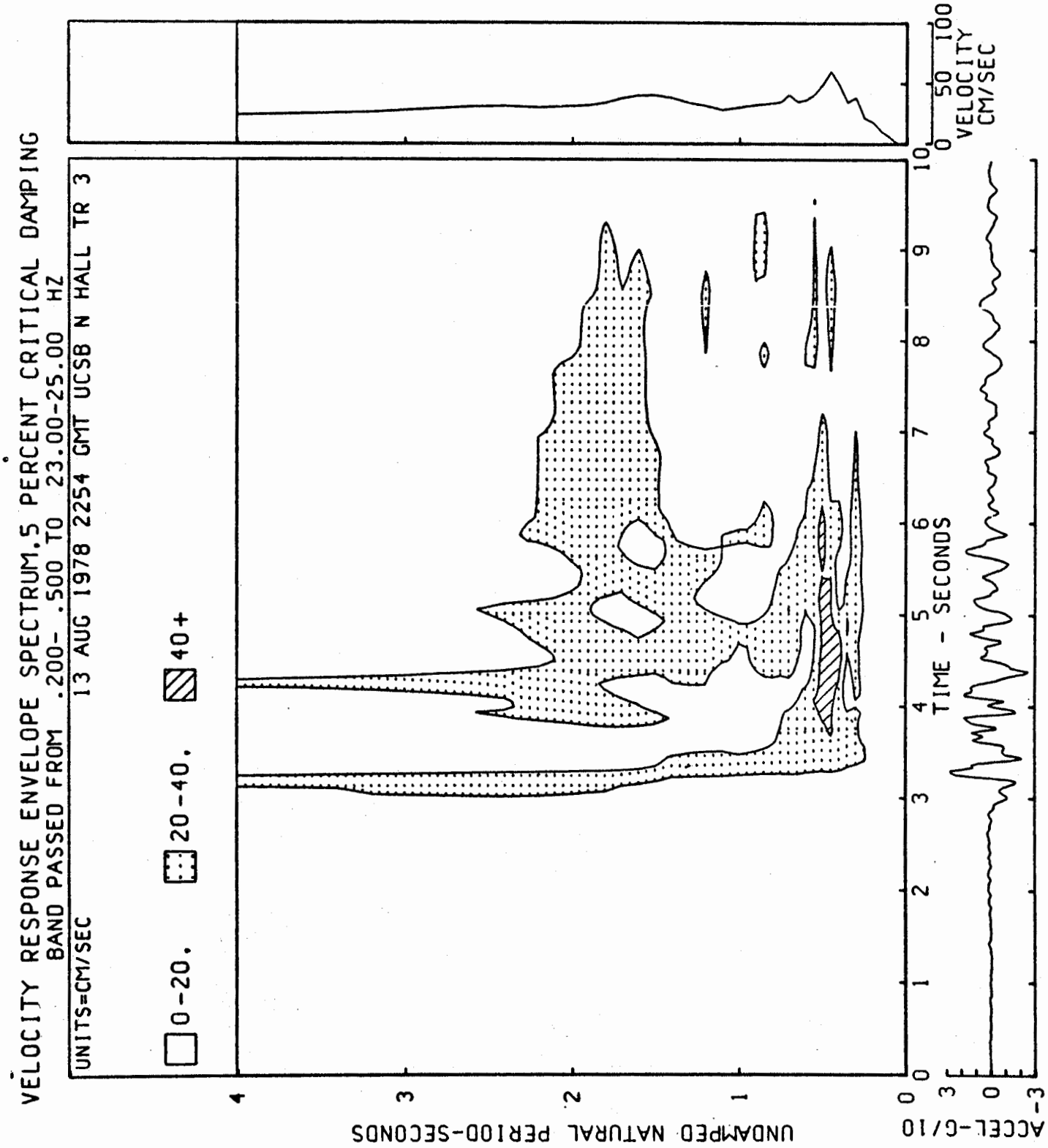

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 8
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
3.0
2.5
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
LOG OF FREQUENCY-CPS
-1.5
-1.0
-.5
0
.5
1.0
1.5
F_T
F_c
F_c
F_T

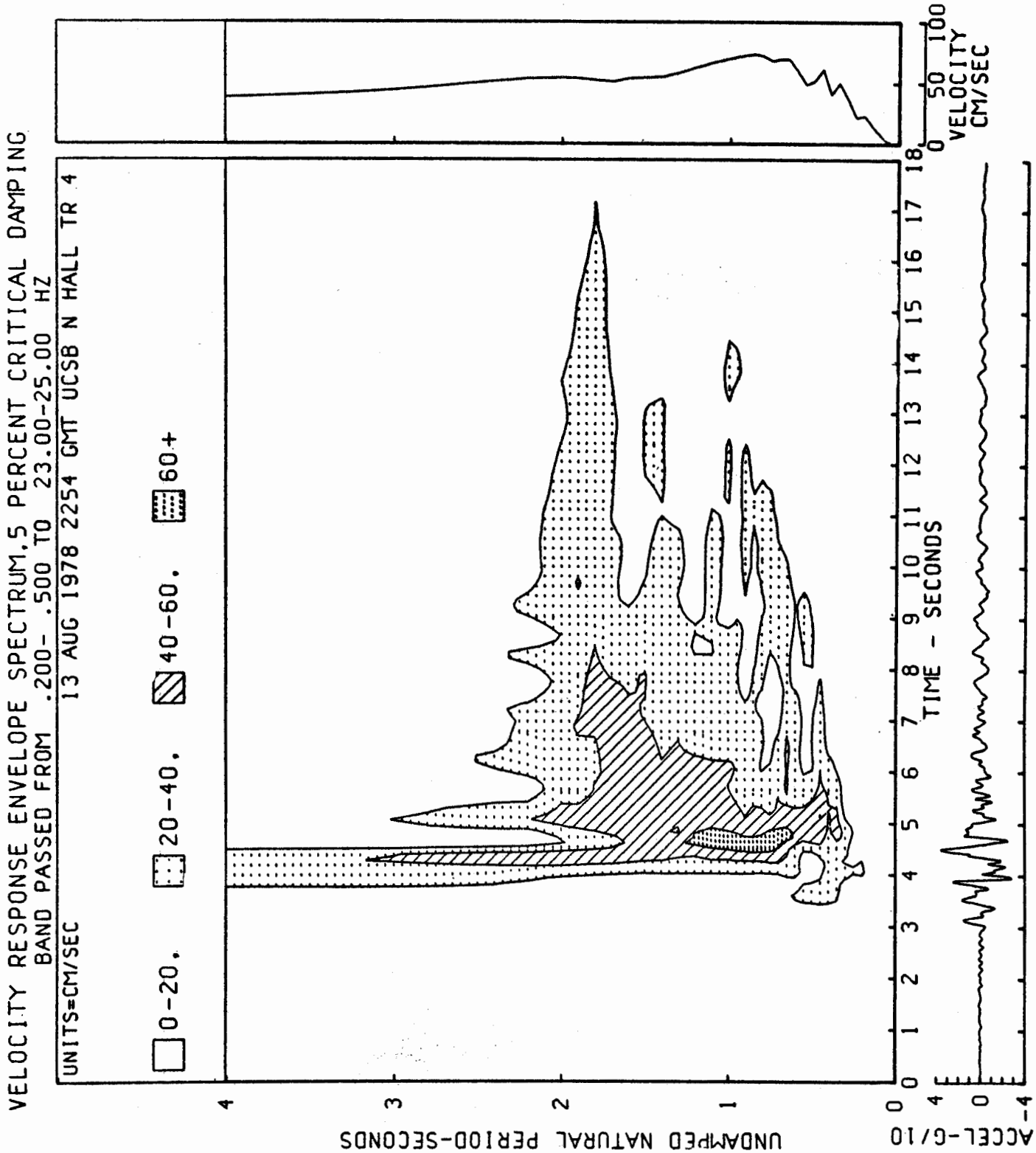

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 9
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
FOURIER AMPLITUDE SPECTRUM-CM/SEC
400
350
300
250
200
150
100
50
0
0
5.0
10.0
15.0
20.0
25.0
FREQUENCY-CPS

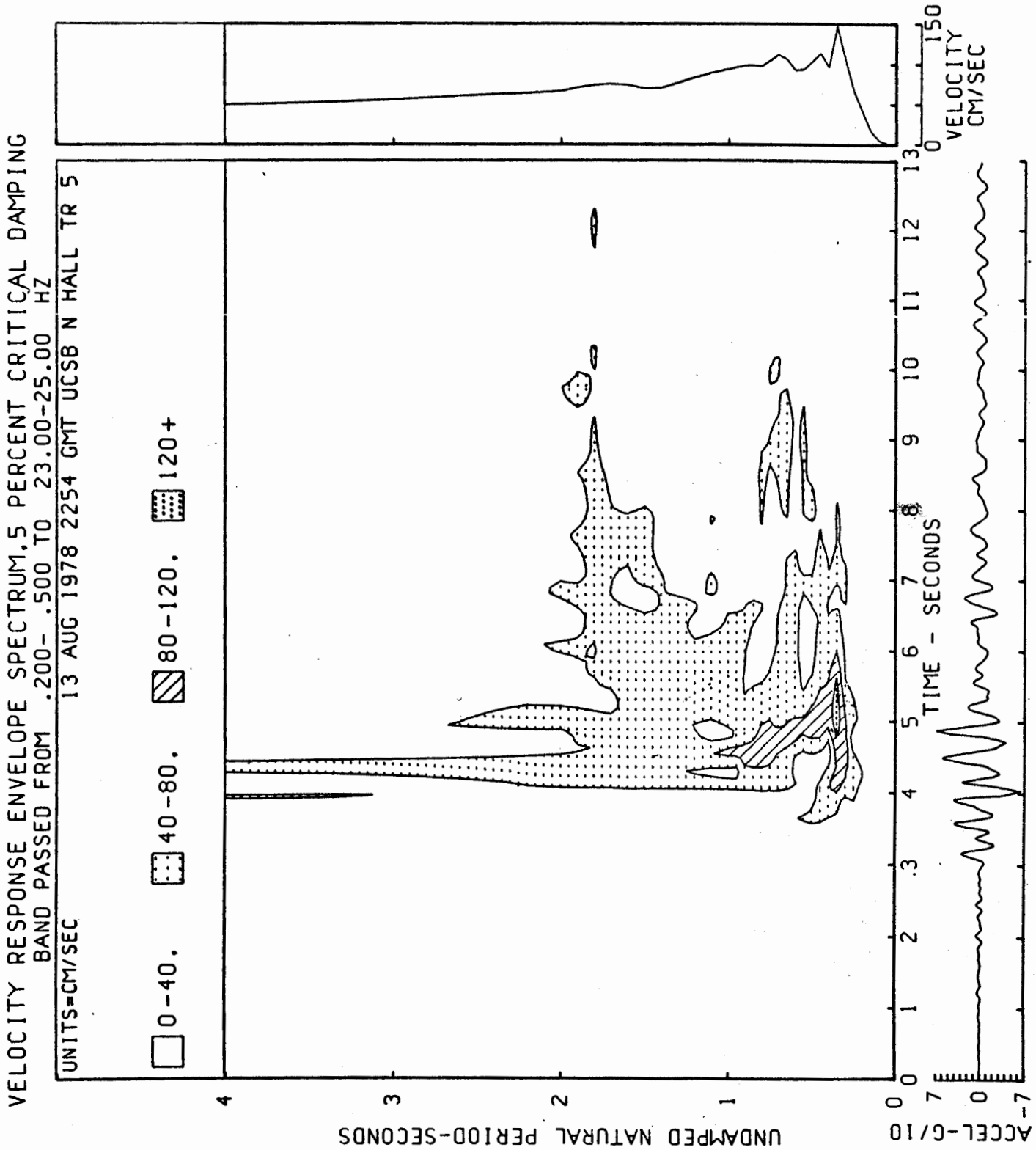

FOURIER AMPLITUDE SPECTRUM OF ACCELERATION
SANTA BARBARA EARTHQUAKE OF 13 AUGUST 1978 2254 GMT
DMG 213 SANTA BARBARA UCSB NORTH HALL S/N 115 TR. 9
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
LOG OF FOURIER AMPLITUDE SPECTRUM-CM/SEC
3.0
2.5
2.0
1.5
1.0
.5
0
-.5
-1.0
-1.5
-2.0
LOG OF FREQUENCY-CPS
-2.0
-1.5
-1.0
-.5
0
.5
1.0
1.5
F_T
F_c
F_c
F_T

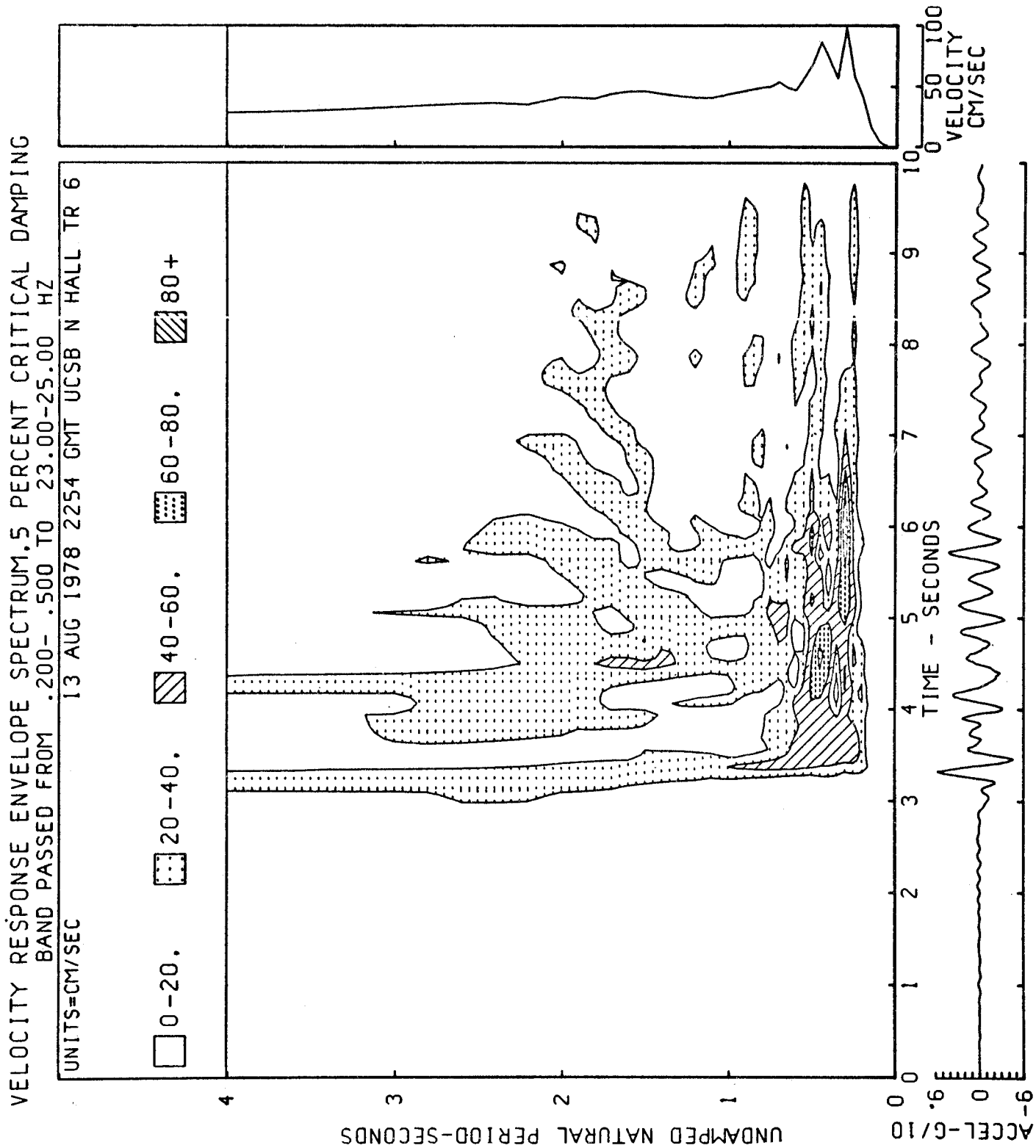

VELOCITY RESPONSE ENVELOPE SPECTRUM.5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 1
0-20.
20-40.
40-60.
60+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

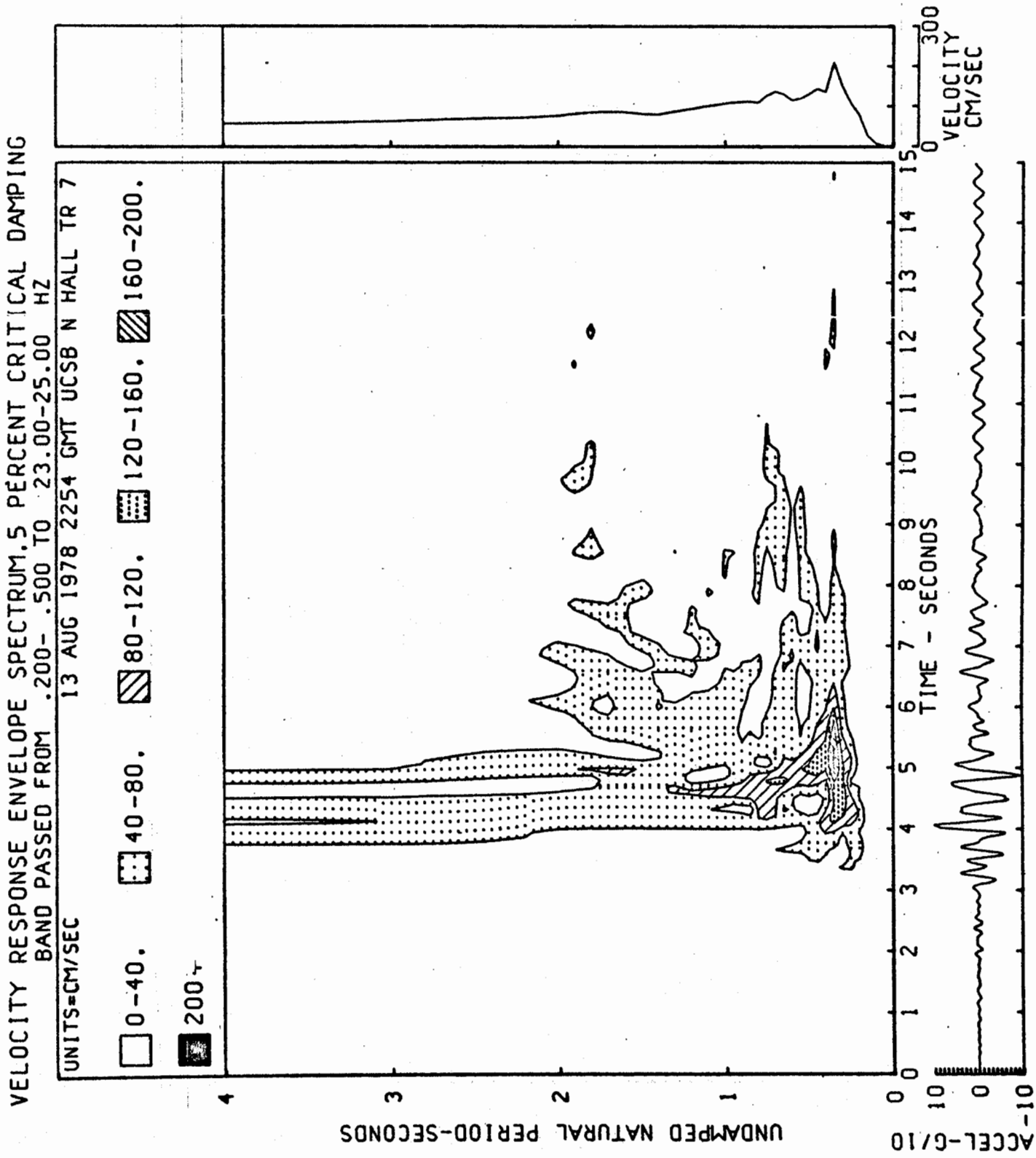

VELOCITY RESPONSE ENVELOPE SPECTRUM,.5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 2
0-5.
5-10.
10-15.
15-20.
20-25.
25+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

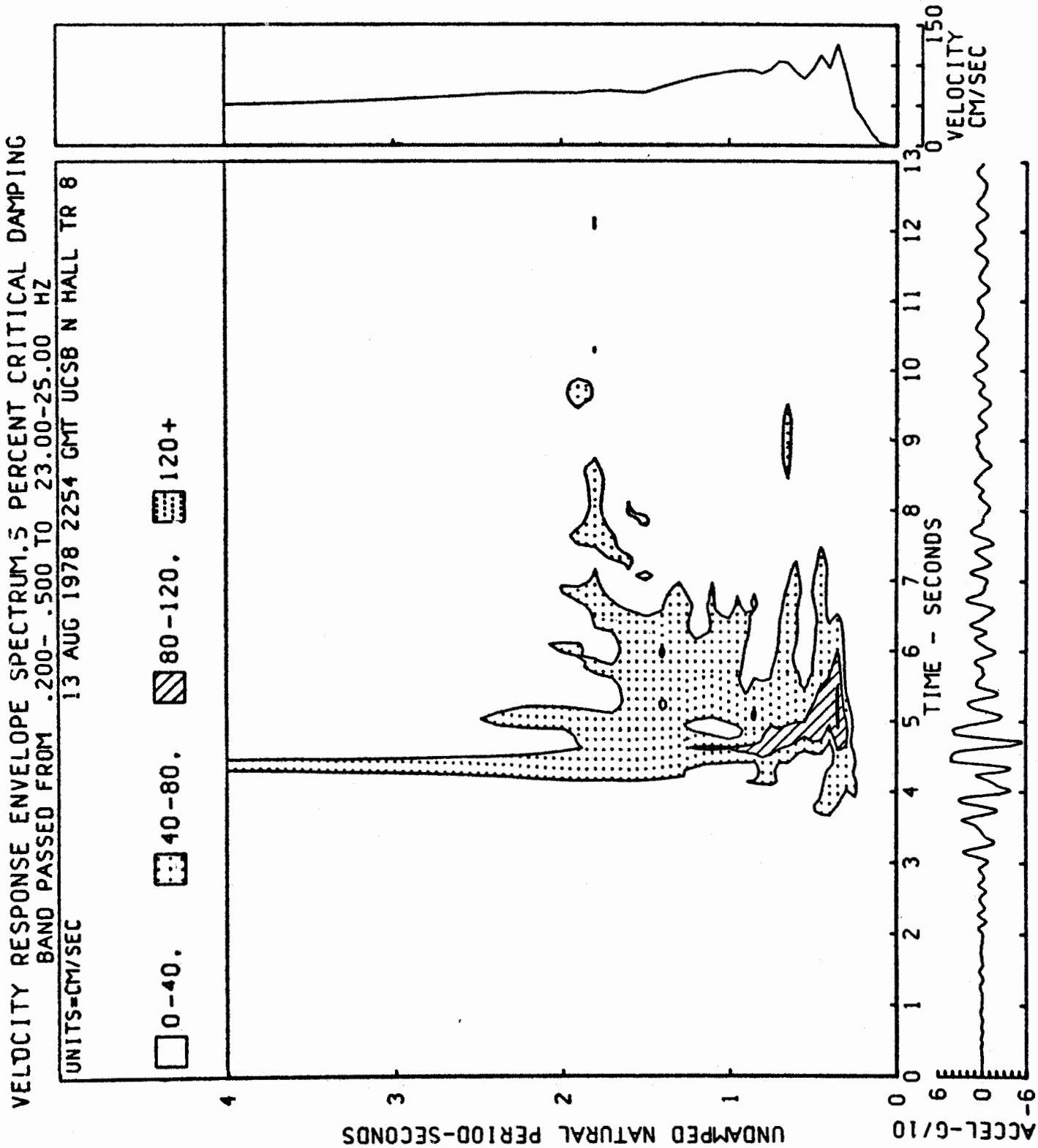

VELOCITY RESPONSE ENVELOPE SPECTRUM.5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 3
0-20.
20-40.
40+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

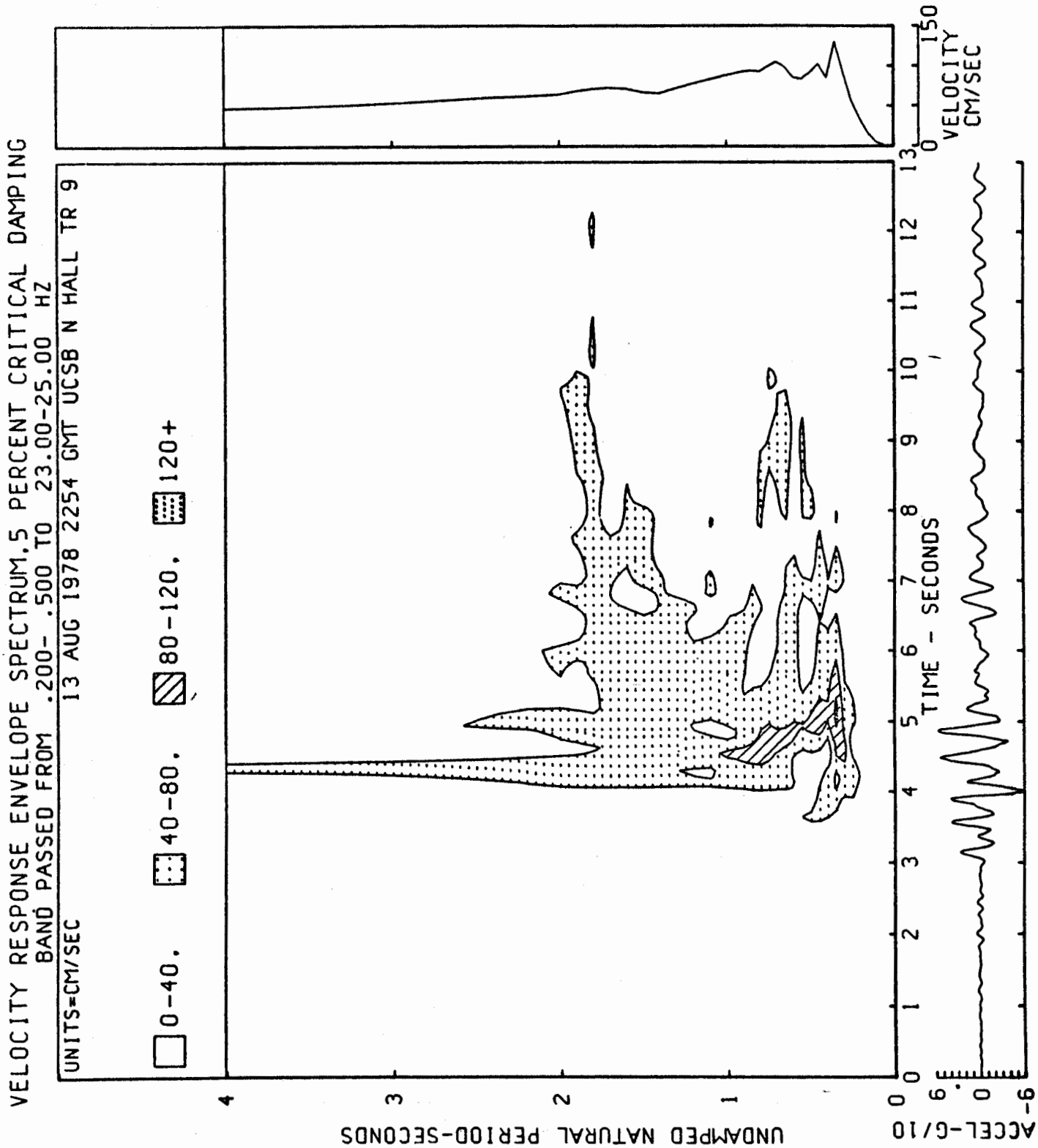

VELOCITY RESPONSE ENVELOPE SPECTRUM,5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 4
0-20.
20-40.
40-60.
60+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

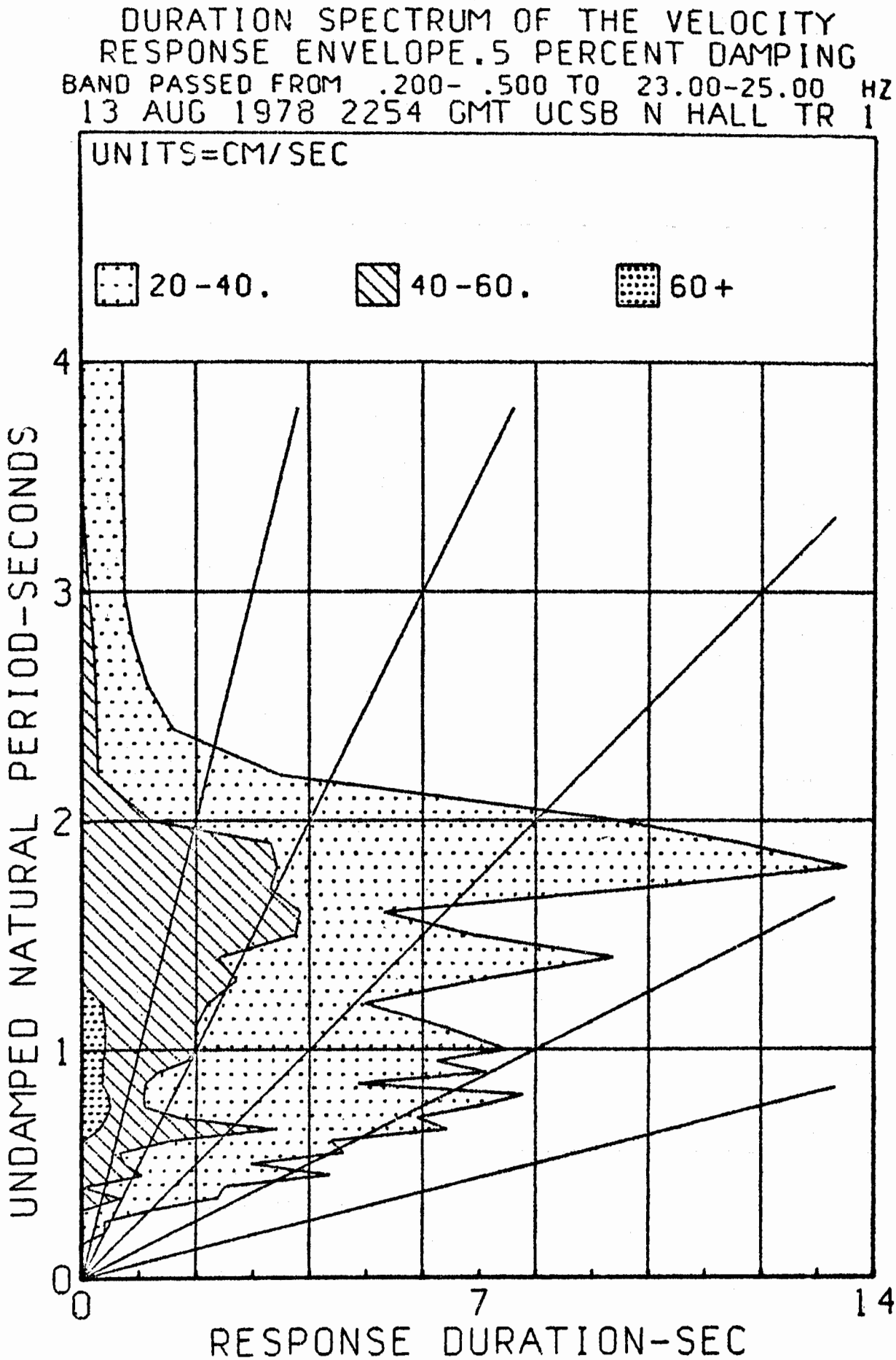

VELOCITY RESPONSE ENVELOPE SPECTRUM.5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 5
0-40.
40-80.
80-120.
120+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

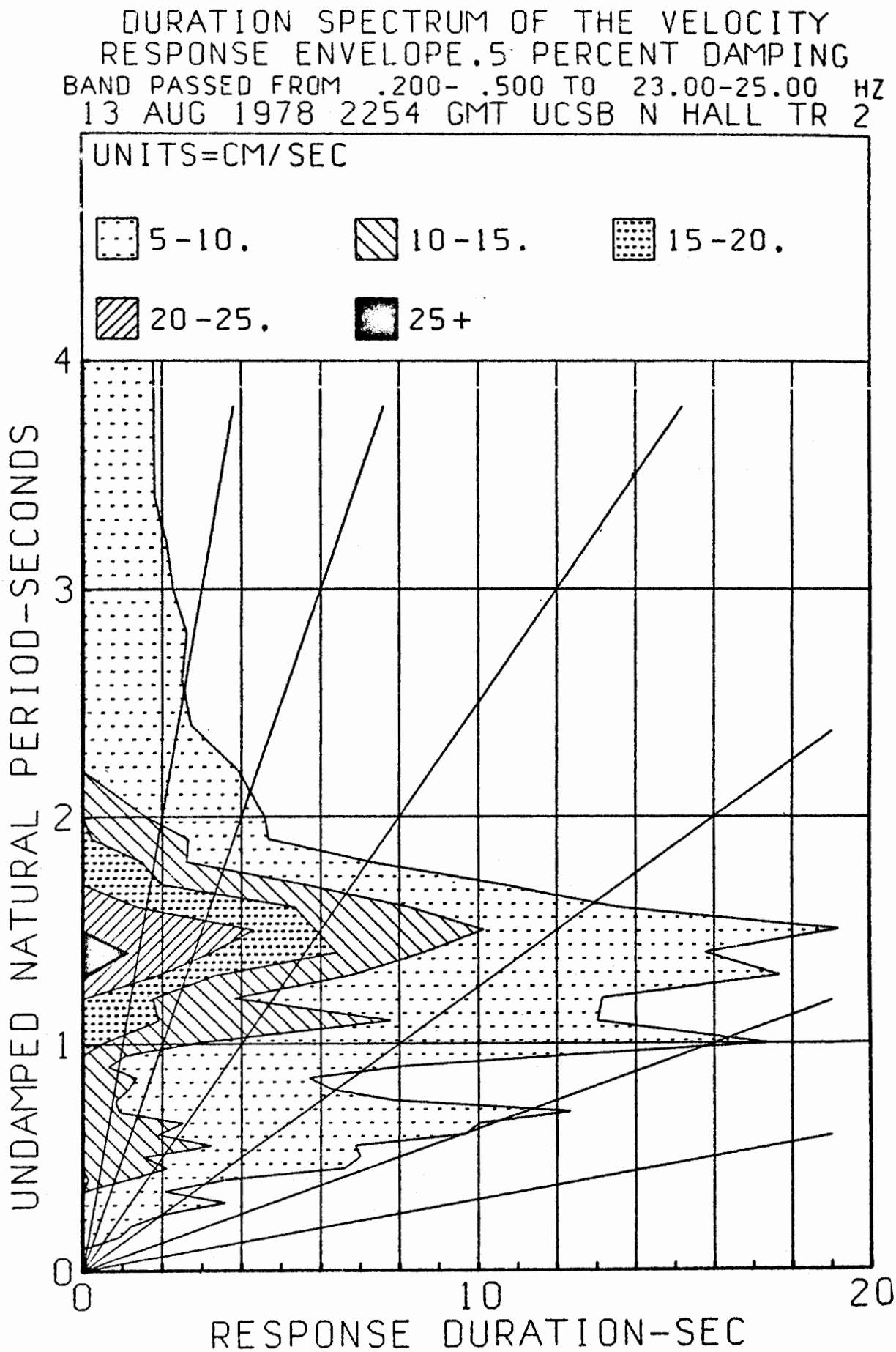

VELOCITY RESPONSE ENVELOPE SPECTRUM.5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 6
0-20.
20-40.
40-60.
60-80.
80+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

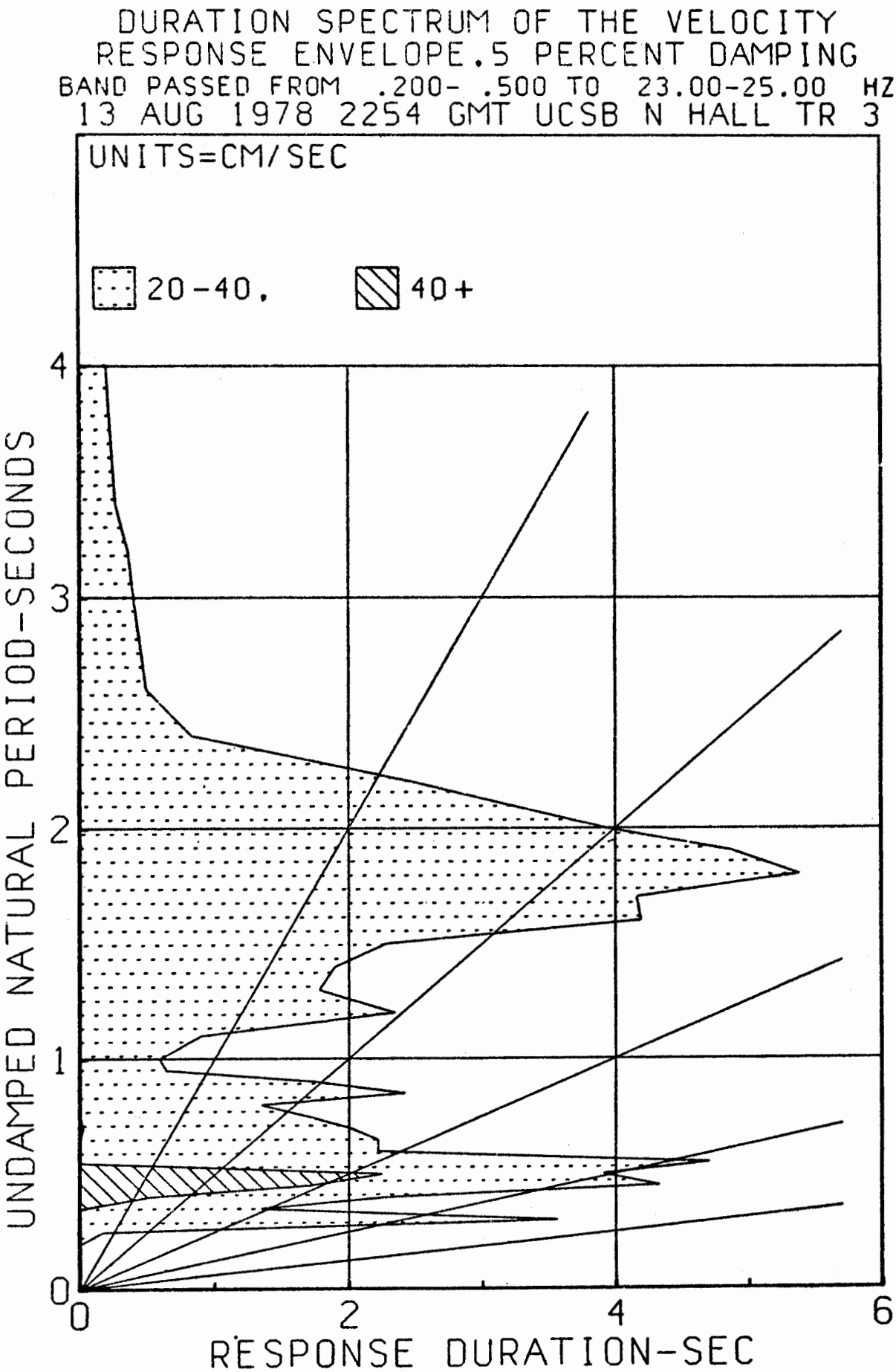

VELOCITY RESPONSE ENVELOPE SPECTRUM.5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 7
0-40.
40-80.
80-120.
120-160.
160-200.
200+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

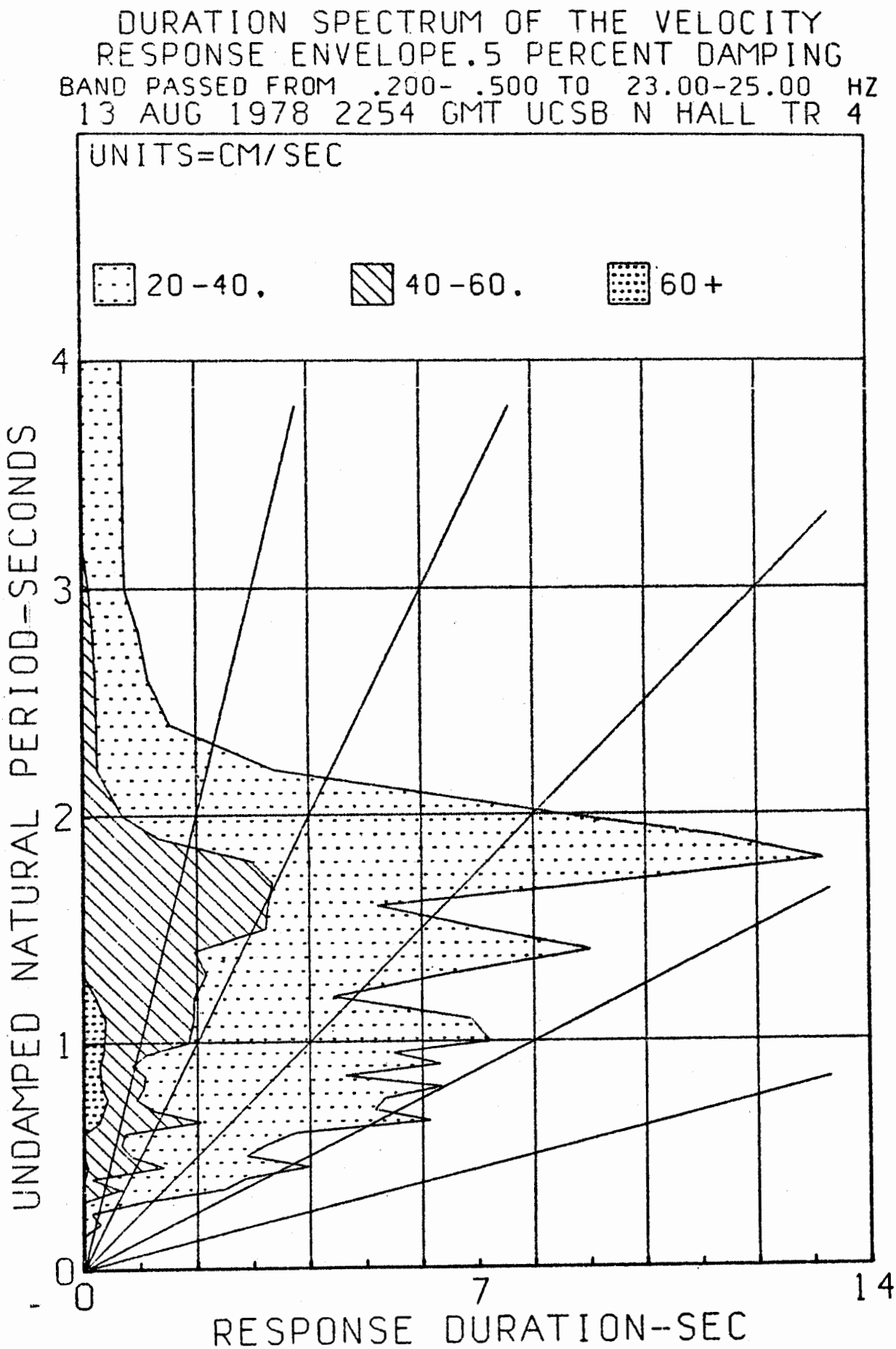

VELOCITY RESPONSE ENVELOPE SPECTRUM.5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 8
0-40.
40-80.
80-120.
120+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

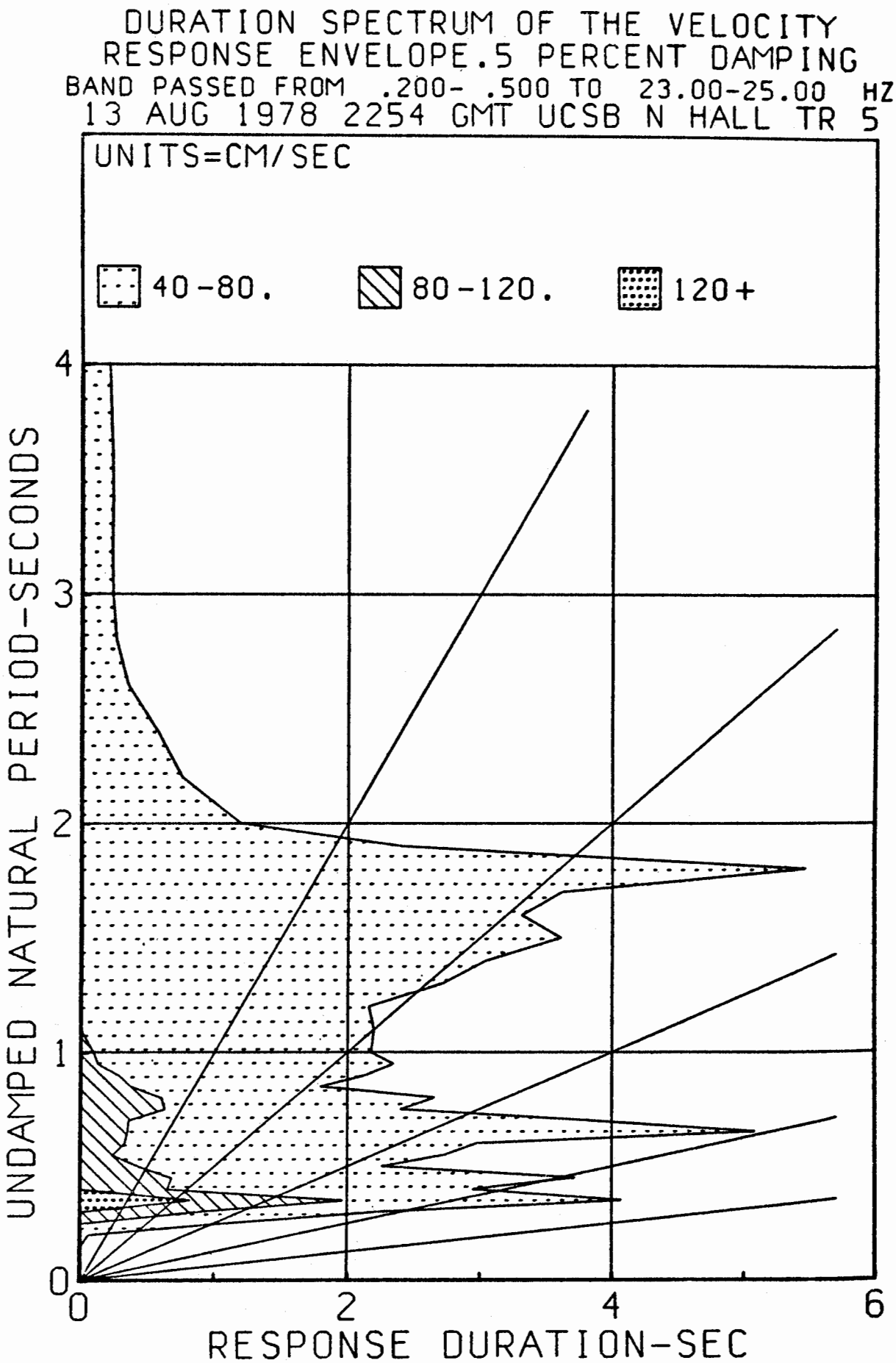

VELOCITY RESPONSE ENVELOPE SPECTRUM,5 PERCENT CRITICAL DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
UNITS=CM/SEC
13 AUG 1978 2254 GMT UCSB N HALL TR 9
0-40.
40-80.
80-120.
120+
UNDAMPED NATURAL PERIOD-SECONDS
TIME - SECONDS
VELOCITY CM/SEC
ACCEL-G/10

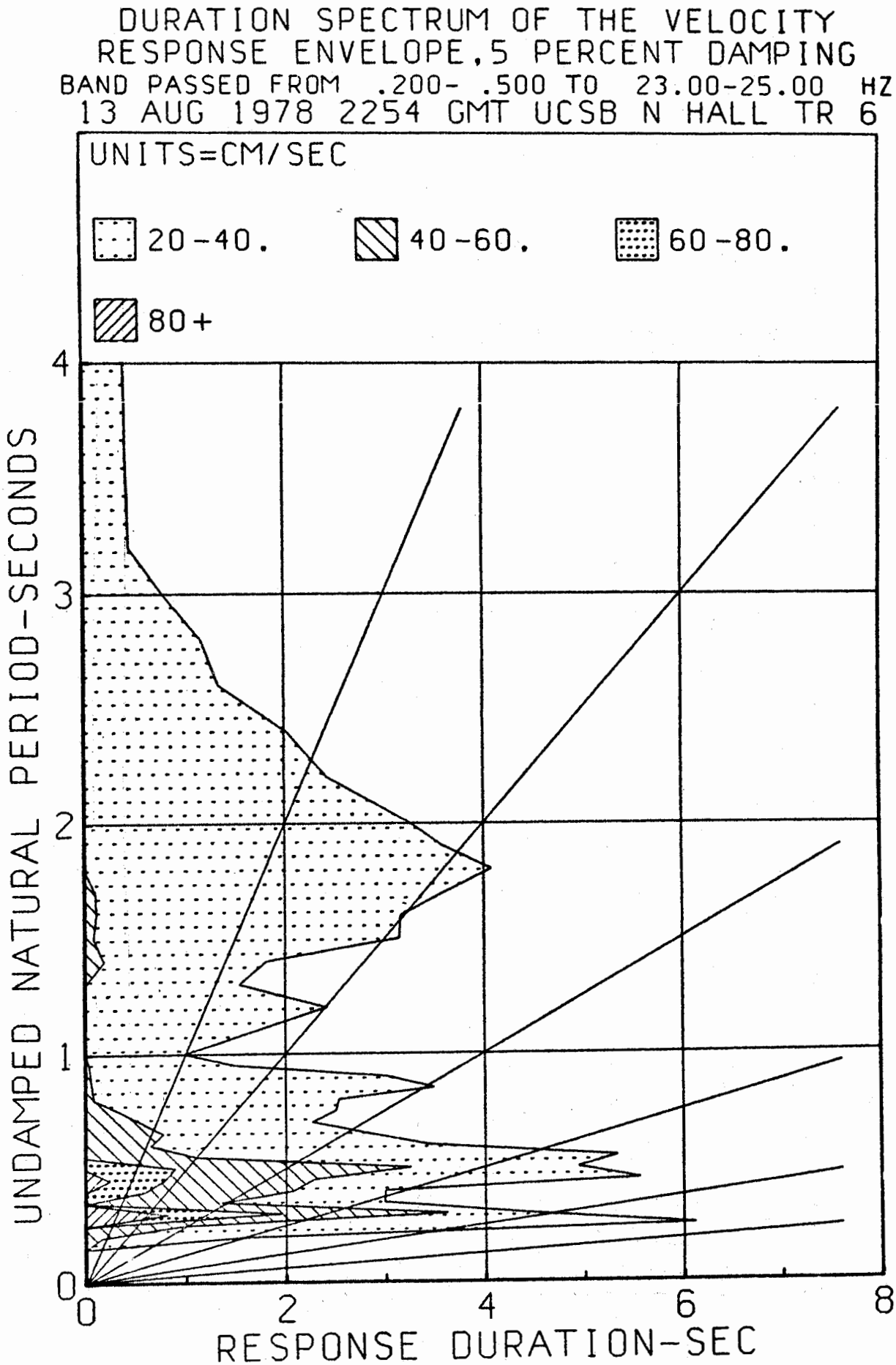

DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE.5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 1
UNITS=CM/SEC
20-40.
40-60.
60+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
7
14
RESPONSE DURATION-SEC

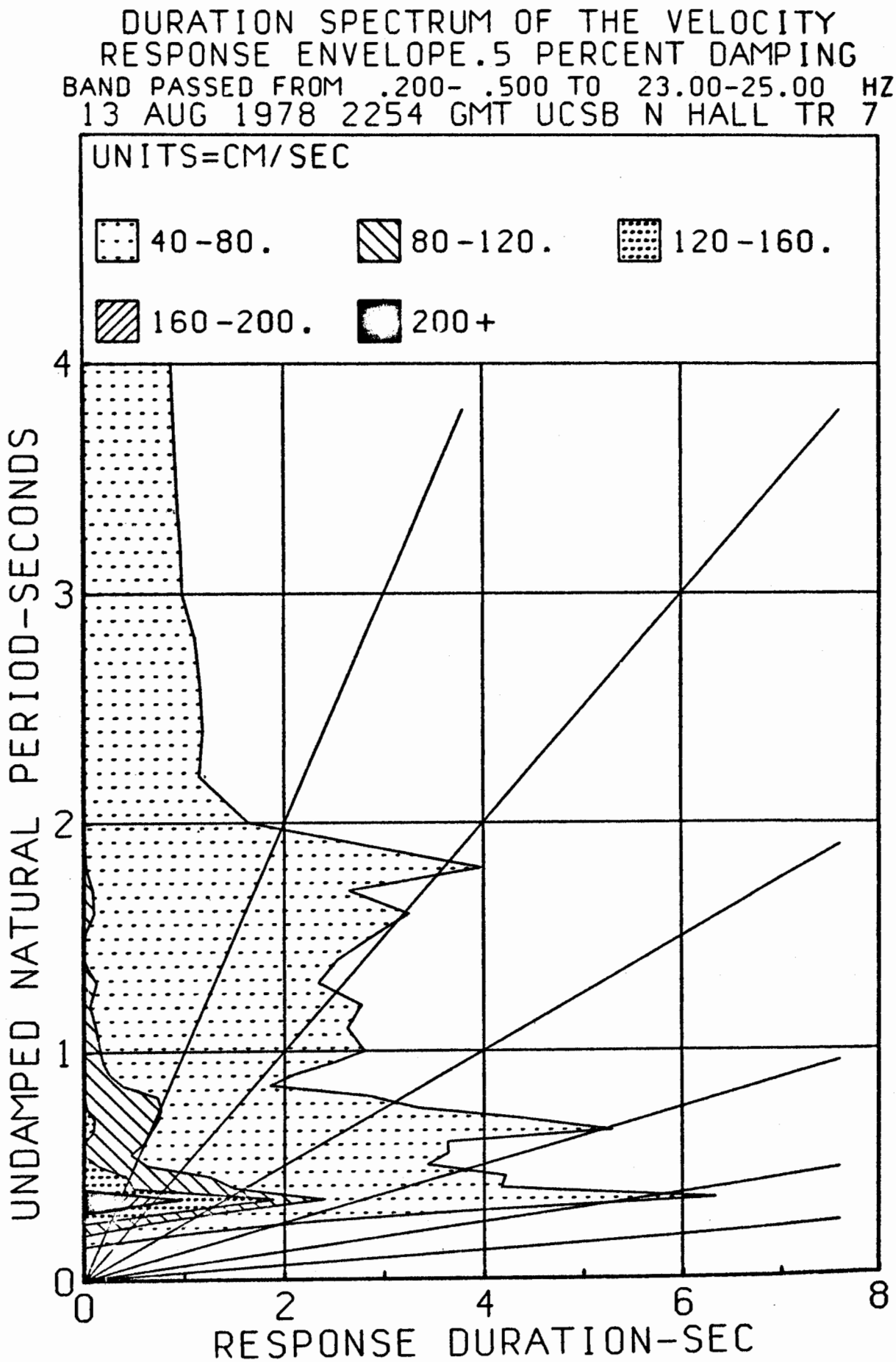

DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE.5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 2
UNITS=CM/SEC
5-10.
10-15.
15-20.
20-25.
25+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
10
20
RESPONSE DURATION-SEC

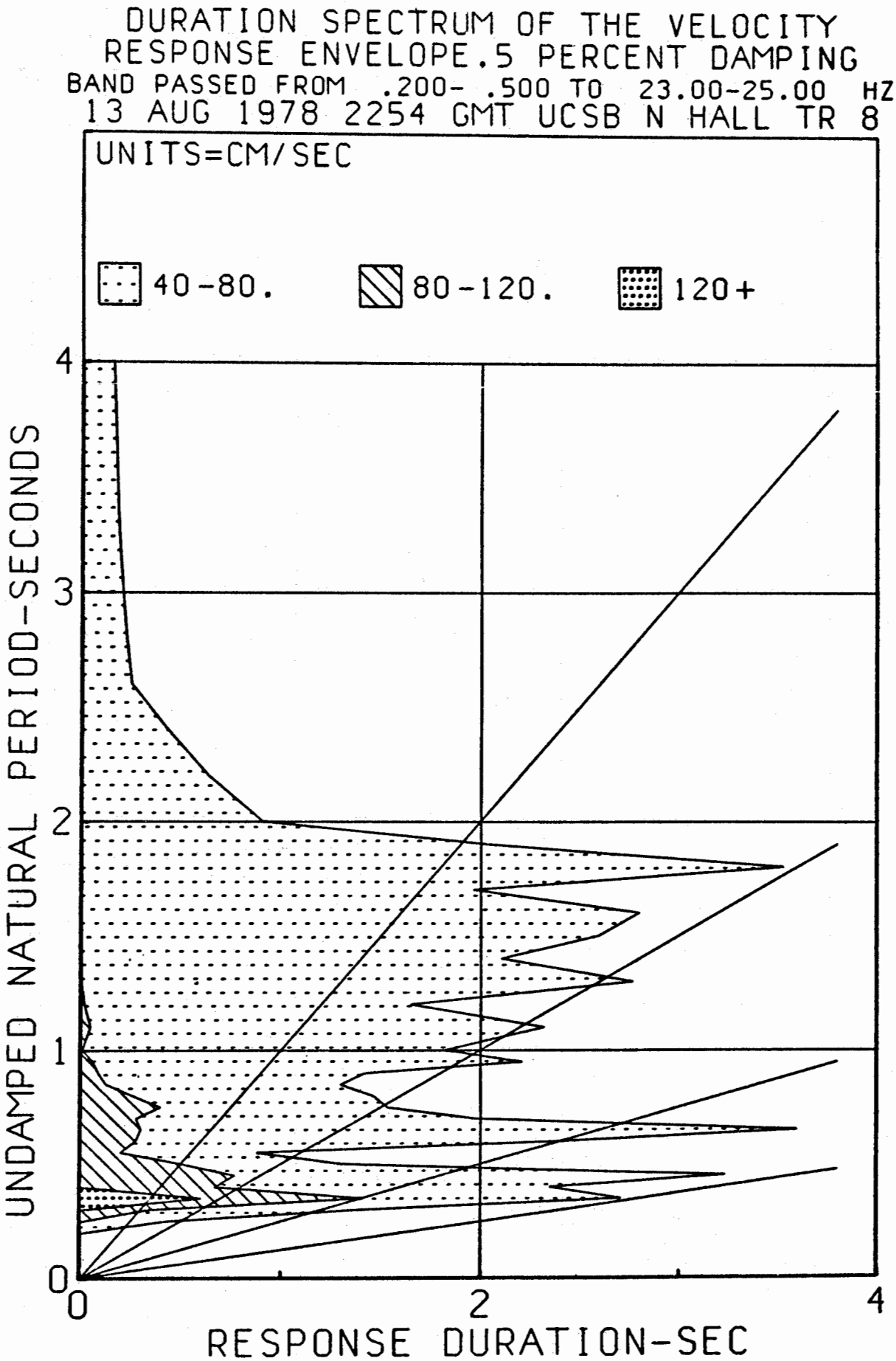

DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE.5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 3
UNITS=CM/SEC
20-40.
40+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
2
4
6
RESPONSE DURATION-SEC

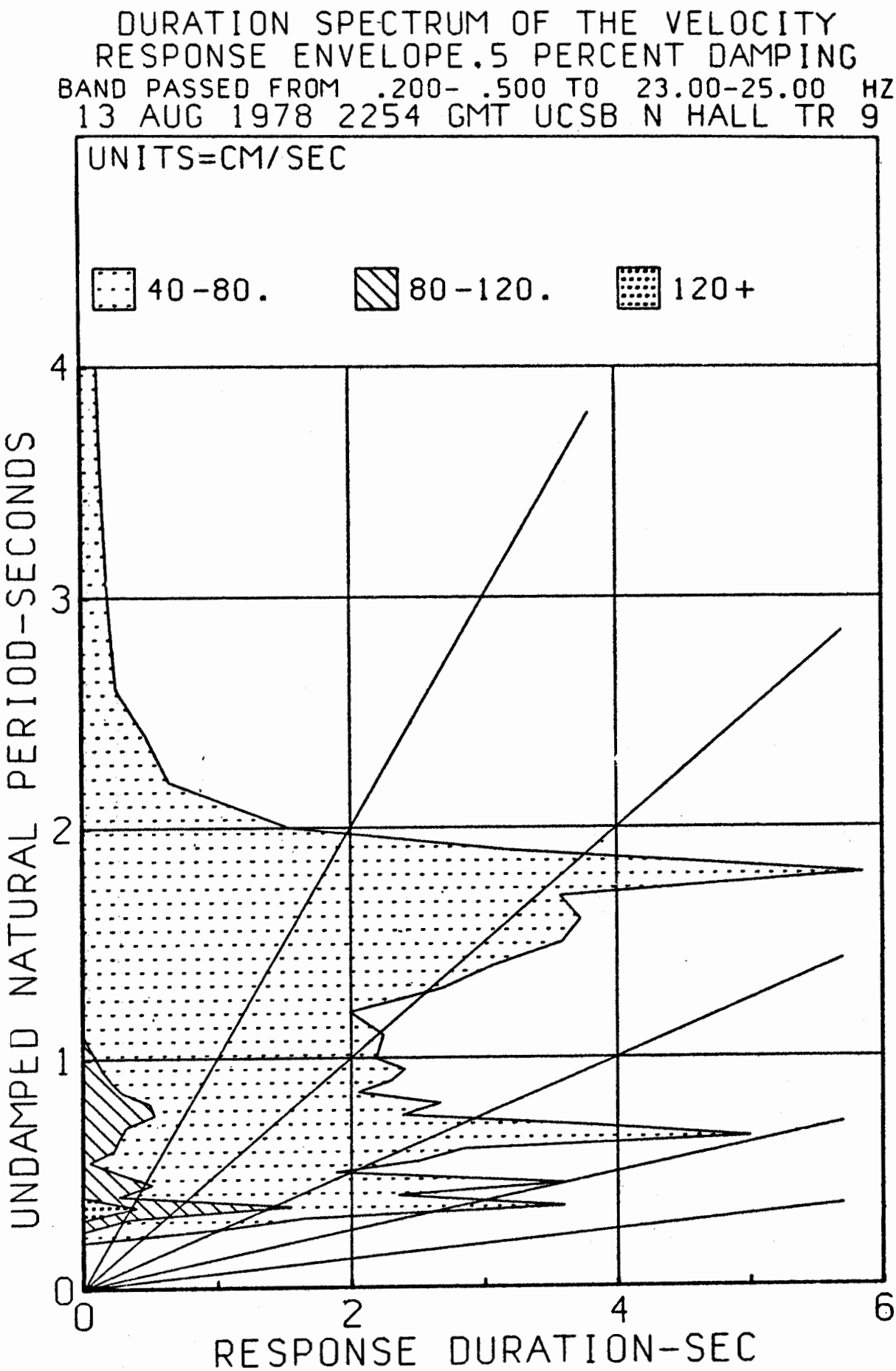

DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE.5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 4
UNITS=CM/SEC
20-40.
40-60.
60+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
7
14
RESPONSE DURATION-SEC


DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE.5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 5
UNITS=CM/SEC
40-80.
80-120.
120+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
2
4
6
RESPONSE DURATION-SEC


DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE,5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 6
UNITS=CM/SEC
20-40.
40-60.
60-80.
80+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
2
4
6
8
RESPONSE DURATION-SEC


DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE.5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 7
UNITS=CM/SEC
40-80.
80-120.
120-160.
160-200.
200+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
2
4
6
8
RESPONSE DURATION-SEC


DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE.5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 8
UNITS=CM/SEC
40-80.
80-120.
120+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
2
4
RESPONSE DURATION-SEC


DURATION SPECTRUM OF THE VELOCITY
RESPONSE ENVELOPE.5 PERCENT DAMPING
BAND PASSED FROM .200- .500 TO 23.00-25.00 HZ
13 AUG 1978 2254 GMT UCSB N HALL TR 9
UNITS=CM/SEC
40-80.
80-120.
120+
UNDAMPED NATURAL PERIOD-SECONDS
0
1
2
3
4
0
2
4
6
RESPONSE DURATION-SEC

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APPENDIX A

REFERENCE DOCUMENTS ON THE DATA PROCESSING SYSTEM OF THE CALIFORNIA STRONG MOTION INSTRUMENTATION PROGRAM
(listed in the order of data flow)

1. Porter, L.D., Memoradum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the BUTTER Code, a Computer Program for the Automatic Reassembly of Multiframe Accelerograms, CDMG Memorandum OSMS-DPCD-79-1.4, 30 March 1979.

2. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the FA Code, a Computer Program for the Automatic Editing and Assembling of Strong-Motion Data Files, CDMG Memorandum OSMS-DPCD-79-2.3, 30 March 1979.

3. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the Phase I Code, a Computer Program for the Calculation of Uncorrected Acceleration Data, CDMG Memorandum OSMS-DPCD-79-3.3, 30 March 1979.

4. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the Phase I Plotting Code, a Computer Program for the Device-Independent Plotting of Acceleration Data, CDMG Memorandum OSMS-DPCD-79-4.1, 30 March 1979.

5. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the Phase II Code, a Computer Program for the Calculation of Corrected Strong Motion Data, CDMG Memorandum OSMS-DPCD-79-5.1, 30 March 1979.

6. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the Phase II Plotting Code, a Computer Program for the Device-Independent Plotting of Corrected Accelerations, Velocities and Displacements, CDMG Memorandum OSMS-DPCD-79-6.1, 30 March 1979.

7. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the Phase III Code, a Computer Program for the Calculation of Response Spectra from Strong-Motion Data, CDMG Memorandum OSMS-DPCD-797.1, 30 March 1979.

8. Porter, L.D., Memorandum for the Record: Processing of StrongMotion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the Phase IV Code, a Computer Program for the Calculation of Fourier Spectra from Strong-Motion Data, CDMG Memorandum OSMS-DPCD-79-8.1, 30 March 1979.

9. Porter, L.D., Memorandum for the Record: Processing of StrongMotion Data from the Santa Barbara Earthquake of 13 August 1978, Source Listing for the Phase V Code, a Computer Program for the Calculation of Response Envelope Spectra from Strong-Motion Data, CDMG Memorandum OSMS-DPCD-799.1, 30 March 1979.

APPENDIX B

TEST RESULTS FOR THE DATA PROCESSING SYSTEM OF THE CALIFORNIA STRONG MOTION INSTRUMENTATION PROGRAM

1. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Consistency and Reproducibility of the IOM-TOWILL Line-Following Digitizer - Processed Data and Test Results for a Doubly-Digitized Trace (UCSB North Hall Trace 8), CDMG Memorandum OSMS-DPTR-79-1.2, 30 March 1979.

2. Porter, L.D., Memorandum for the Record: Preliminary Diagnostic Results for the BUTTER Code, a Computer Program for the Automatic Reassembly of Multiframe Accelerograms, Period Ending 26 January 1979, CDMG Memorandum OSMS-DPTR-79-2.1, 31 January 1979.

3. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Test Results for the Multiphase Processing of the Freitas Building Records, Traces 1, 2, 3, CDMG Memoandum OSMS-DPTR-79-3.1, 30 March 1979.

4. Porter, L.D., Memorandum for the Record: Final Diagnostic Results for the BUTTER Code, a Computer Program for the Automatic Reassembly of Multiframe Accelerograms, Period Ending 15 March 1979, CDMG Memorandum OSMS-DPTR-79-4.1, 30 March 1979.

5. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Test Results for a Hanning Filter Cutoff of 75 Micrometers in the BUTTER Program, Test Data Set Freitas Building Traces 1, 2, 3, CDMG Memorandum OSMS-DPTR-79-5.1, 30 March 1979.

6. Porter, L.D., Memorandum for the Record: Processing of Strong-Motion Data from the Santa Barbara Earthquake of 13 August 1978, Test Results for the Phase I Code with Variable Sensitivities, Test Data Set Freitas Building Traces 1, 2, 3, CDMG Memorandum OSMS-DPTR-79-6.4, 30 March 1979.