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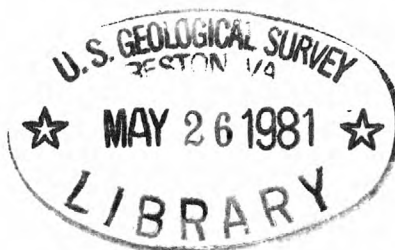
Digital Seismograms of Aftershocks
of the Imperial Valley, California Earthquake
of October 15, 1979

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This report is preliminary and has not been reviewed for conformity with
U.S. Geological Survey editorial standards and stratigraphic nomenclature.



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This report presents the digital seismograms collected for the aftershocks of the Imperial Valley, California earthquake ($M_L = 6.6$) that occurred on October 15, 1979. A short summary follows that describes the field procedures, instrumentation, and routine computer analysis that was used to produce the ground motion time histories. Boore and Fletcher (1981) may be referenced for selected fault plane solutions, spectra and moments. Requests for digital time histories on magnetic tape may be made to the Branch of Ground Motion and Faulting, Menlo Park, California.

Field Procedures

Although the epicenter of the main shock was south of the U.S.-Mexico border, preliminary epicenters of the aftershocks suggested that the northern end of the Imperial fault was the site of the greatest aftershock activity. Thus our instruments were first deployed around the junction of the Imperial and Brawley faults: 9 instruments were installed by October 17, 1978 with the tenth (SLD) operational on October 18, 1979 (See table 1 and figure 1 and 2). Our goals in deploying the array were three-fold: 1) to gain a data set where each event is recorded unclipped on three or more stations and where the events span as broad a magnitude range as possible for source mechanism and ground motion studies; 2) to obtain recordings at the same sites as the strong motion accelerographs of small events near the main shock hypocenter to help unravel source and wave propagation effects; and 3) to gain P- and S-wave arrival times that would help in locating the aftershocks. Given of the above considerations we positioned the instruments as close to the epicentral

region of the aftershocks as possible to reduce the effects of attenuation and provide the best azimuthal coverage for the majority of events. Generally the more sensitive systems with velocity transducers are positioned around the outside of the aftershock zone to provide the best azimuthal coverage for location purposes and the strong motion systems with force balance accelerometers are sited next to the fault trace where we expect the strongest shaking to occur. On about October 25 (see figure 1) the array was changed to record aftershocks at the permanent strong motion sites, at the same time keeping a skeleton version of the original array. This configuration was maintained until the end of the investigation on about November 19, 1979.

Instrumentation

Both velocity transducers and force balance accelerometers (FBA) were mated to Sprengnether DR100 digital event recorders to provide an exceptionally versatile system for recording both strong and weak ground motions from an earthquake sequence. The basic recorder has a 12 bit analog to digital convertor (A/D) that yields 72 db dynamic range and resolution. Each system is capable of recording 3 channels: each channel is digitized at a rate of 200 samples/sec. A five-pole Butterworth filter with a corner at 50 Hz was used to prevent aliasing. A pre-amplifier (Sprengnether Model AS-110) is employed in all systems to closely tailor the range in ground motion we wish to record with the range of the A/D. High and low cut filters are also incorporated into the AS-110 to provide signal conditioning, but were always used in the "out" position. Gains of 18-24 db were typically used with velocity systems and 6-18 db gain for the accelerometer systems.

The frequency response is governed primarily by the sensor natural period (table 2) and the anti-aliasing filter, with additional influence from the open circuit response of the signal conditioning filters. For the velocity system the low end of the response was determined by the natural period of the transducers at 1 or 2 Hz and the high end of the frequency band by the anti-aliasing filter. The response of the FBA system (table 2) is approximately flat to acceleration from DC to its natural period at 50 Hz, where the anti-aliasing filter also contributes to eliminating the high frequencies.

The response of the high- and low-cut filter section when in the "out" position, band limit the response at the input from about 10 sec to 100 hertz. Specifically the high-cut filter is a two stage filter where each stage is a Butterworth filter with a corner at 100 Hz and a roll-off of 6db/octave. The low cut filter (in the "out" position) has a corner at 10 sec (6 db point) if just the main amplifier is used, but increases to 5 sec if both the pre- and main amplifier are activated.

The trigger circuit computes a short term average (STA) and a long term average (LTA) over the time trace. Their ratio (STA/LTA) is compared with that of a pre-set threshold. Values for the STA, LTA, and threshold typically ranged from 0.2 to 1.0 sec, 10 to 20 sec, 6 to 12 db respectively. Unfortunately the sensitivity of the trigger circuit is not as sensitive as the A/D by a factor of about 2 (8 mv compared to 5 mv) whereas ideally it should be more sensitive if the lower order bits of the A/D are to be used effectively. In order to conserve tape, durations (time of recording after the dynamic ratio -STA/LTA- in the trigger circuits goes below the pre-set threshold) were set at 5 or 10 sec. to conserve tape.

Routine Processing

In the field the quality of the digital data are checked by inspecting the digital to analog converted data and header information. In the office the data are generally stored on a minicomputer as demultiplexed component files; each file containing the necessary header information for describing the data in that file. The procedure for obtaining the component files involves several steps -- transferring the digital data from the cassettes to the minicomputer, decoding the data to separate component files, and synchronizing the header time to the data trace.

Data are transferred in a parallel format from the Sprengnether playback unit (DP100) to a Digital Equipment Corp. (DEC) pdp 11/70 via a 16 bit parallel input/output interface (DEC model DR11K) which uses a timing strobe from the DP100 as an interrupt flag to synchronize the requests to transfer data among the other system functions of a multi-user computer system. Each DP100 word, comprised of 14 bits (12 bits of data and 2 bits for channel identification, or 8 bits of header information and 5 bits of identification and 1 unused bit), and is converted to one 16 bit computer word. The data from each cassette are stored in a single disk file. The records from each file are then decoded first to individual event files and then each event file to demultiplexed component files: Our component files use random-access disk blocks, so that any sequential subset of a data trace maybe plotted easily. The first two blocks are reserved for the header information which now includes the time of the first time mark in the trace, the sample rate, and the number of channels active on the recorder.

The last step replaces the header time which now represents the time of the first time mark to the time of the first sample. Synchronization between the time base of the DR100 recorder and the data stream is done by inserting time marks (a single bit at 1/2 the battery supply voltage) at odd seconds in the data stream only when the dynamic trigger ratio exceeds the pre-set threshold. This method has the advantage that fewer header bits are needed to reestablish the synchronization to a precision of one sample interval, but has the disadvantage that a "glitch" has been entered into the data stream and must be removed before Fourier or for other analysis is performed. Time marks may be identified visually with cursors on an interactive plotting device or automatically using discrimination by slope, coincidence across all channels and synchronization with other glitches at 2 second intervals. The elapsed time to the time mark is subtracted from the initial header time resulting in a header time that corresponds with the first sample of the data stream. A linear interpolation is performed with the points adjacent to each time mark as a way of calculating the data point that replaces each time mark.

Clock Correction

Clock corrections (see fig. 1) were made by recording WWVB on one of the input channel for about 10 secs once each time the cassettes were changed. The WWVB time code, displayed in a graphics terminal in the same manner as an earthquake record, is compared to the time according to the DR100 clock to get a clock correction. We use the standard convention for the sign of the correction, as follows:

$$\text{Recorder time} + \text{clock correction} = \text{WWVB time}$$

Clock corrections are then manually entered after the arrival time of a body wave has been picked. Paul Spudich, however, has now developed a more automated procedure developed for processing of the Mammoth Lakes data (Personal communication).

Location Procedures

Arrival times of P and S waves were picked interactively on a graphics computer terminal and combined with clock correction for input to program HYPOINVERSE (Klein, 1978) to calculate hypocenters for those events with a minimum data set of 3 P-wave arrivals. The velocity model used is based on the work of Fuis et al (1981) and incorporates linear velocity gradients within each layer (see table 3). The S wave velocity structure is taken as the P wave velocity structure divided by 1.9. The epicenters are plotted in figure 2 and listed in table 4.

Seismograms and Accelerograms

Time traces for both the velocity and accelerometer system are presented in figure 3 for those events that were recorded on three or more stations. Table 5 is a cross reference for the records available for those events recorded in three or more stations: Table 6 includes all other events. The traces are not corrected for the instrument response; they include the effect of both the filter and sensor responses. Clock corrections have not been applied and the header denotes the times of the first sample point. On some traces for stations that used force balance accelerometers,

There is a transient that lasts about 1 sec starting in the P-wave train. This is due to a power surge in the recorder when the cassette drive was activated. A more appropriate DC-DC converter is now used to eliminate this transient. The second and third channels for station CRK were not operating up through event 10/10 14.56.

Acknowledgements

The field program was the cumulative effort of several people, but E. Sembrera and J. Coakley were largely responsible for the quality and depth of this data set. R. E. Warrick provided much of the data in tables 1 and 2.

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Table 1

Imperial Valley, October 1979

Station code	N. Lat.	W. Long.	Elev., m	Sensor type/ Ser. number	Polarity ⁽¹⁾ Index
AFB	32° 55.71'	115° 37.69'	-24	Vel./6725	A
BCS	32° 41.50'	115° 20.31'	9	geophone	B
CFG	32° 50.23'	115° 31.54'	-18	FBA/107	D
CRK	32° 54.84'	115° 27.35'	-38	Vel./6726	A
FBR	32° 52.79'	115° 32.16'	-37	Vel./6727	A
GPN	32° 48.62'	115° 31.75'	-16	geophone	E
GRS	32° 52.46'	115° 38.80'	-19	Vel./6723	A
HRS	32° 53.06'	115° 30.41'	-40	FBA/102	C
HUS	32° 50.35'	115° 29.37'	-30	Vel./6723	A
IVC	32° 49.71'	115° 30.51'	-19	Vel./6753	A
JMS	32° 50.88'	115° 27.94'	-29	FBA/106	C
KYR	32° 54.89'	115° 32.48'	-40	FBA/105	C
ROB	32° 51.31'	115° 27.92'	-29	geophone	E
RVR	32° 56.29'	115° 26.60'	-40	FBA/104	C
SLD	32° 59.76'	115° 32.85'	-49	Vel./6724	A

(1) referred to in Table 2.

Table 2

Polarity Index	Sensor type	Channel	Natural ¹ Period (Hz)	Sensitivity ²	Damping ³	Direction
A	Sprengnether S-6000 Geophone	1	2.0	0.5	0.7	down
		2	2.0	0.5	0.7	north
		3	2.0	0.5	0.7	west
B	Geospace HS-10 Geophone	1	2.0	2.6	0.75	up
		2	2.0	2.6	0.75	north
		3	2.0	2.6	0.75	east
C	Sprengnether SA-3000 Force Balance Accelerometer	1	50.0	0.0068	0.6	down
		2	50.0	0.0068	0.6	west
		3	50.0	0.0068	0.6	north
D	Sprengnether SA-3000 Force Balance Accelerometer	1	50.0	0.0068	0.6	down
		2	50.0	0.0068	0.6	north
		3	50.0	0.0068	0.6	east
E	Mark Products L-4 Geophone	1	1.0	1.0	0.8	up
		2	1.0	1.0	0.8	north
		3	1.0	1.0	0.8	east

¹ nominal values

² in units of volts/cm/sec for velocity transducers volts/cm/sec² for Force balance accelerometers

³ percent of critical

Table 3

Layer	Velocity (km/sec)*	Depth (km)
1	1.8	0.0
2	3.0	1.8
3	5.1	4.55
4	5.65	5.55
5	5.95	12.0
6	6.60	12.5
7	7.20	13.3

* This is the velocity of the top of the layer at the noted depth, and varies linearly within each layer.

Table 4

Origin	Time (h:m:s)	Latitude	Longitude	Depth (km)
Oct 18	3:17:16.12	32° 54.33'	115° 33.78'	6.9
Oct 18	3:41:51.21	32° 55.84'	115° 40.63'	8.1
Oct 18	5:37:20.14	32° 54.23'	115° 33.95'	6.9
Oct 18	12:01:09.54	32° 57.05'	115° 36.26'	8.1
Oct 18	13:20:26.61	32° 52.33'	115° 30.80'	8.8
Oct 18	13:52:40.27	32° 54.28'	115° 34.15'	6.8
Oct 18	14:56:19.93	33° 0.22'	115° 30.67'	10.5
Oct 18	16:24:37.32	32° 52.60'	115° 32.75'	9.4
Oct 18	19:18:57.14	32° 56.79'	115° 36.58'	8.8
Oct 19	9:55:56.66	32° 58.34'	115° 33.31'	7.2
Oct 19	10:35:08.40	32° 54.38'	115° 33.02'	5.5
Oct 19	16:56:11.58	32° 54.33'	115° 33.97'	6.6
Oct 19	18:50:38.38	32° 54.11'	115° 33.07'	5.4
Oct 19	18:51:28.49	32° 54.29'	115° 32.89'	5.7
Oct 20	0:14:27.13	32° 56.58'	115° 32.03'	5.8
Oct 20	3:14:52.51	32° 54.28'	115° 34.04'	7.2
Oct 20	5:04:07.43	32° 54.74'	115° 32.38'	9.0
Oct 20	13:36:27.98	33° 2.00'	115° 33.51'	7.5
Oct 20	14:52:54.93	32° 53.02'	115° 29.96'	5.9
Oct 20	22:32:44.58	32° 54.78'	115° 30.41'	6.8
Oct 21	18:17:57.66	32° 53.99'	115° 30.57'	6.3
Oct 21	21:14:27.93	32° 52.52'	115° 32.13'	6.6
Oct 22	22:04:39.35	32° 54.00'	115° 30.52'	8.0
Oct 23	1:13:13.14	32° 54.42'	115° 32.51'	5.5
Oct 23	1:41:55.33	32° 53.55'	115° 31.46'	8.1
Oct 29	2:39:20.21	32° 54.67'	115° 33.51'	5.9
Oct 29	18:33:46.92	32° 53.93'	115° 31.70'	6.8
Oct 31	11:43:46.33	32° 43.13'	115° 26.12'	6.5
Nov 4	17:13:30.62	33° 01.23'	115° 30.87'	4.4
Nov 14	3:52:47.48	32° 57.36'	115° 32.15'	2.9

Table 5

Calendar Date	Julian Day	Time	Mag	Station																Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals	
10-18-79	291	03.17	3.6	*				*		*									3	
10-18-79	291	03.41	2.3	*				*		*									3	
10-18-79	291	05.37	3.0	*				*		*									3	
10-18-79	291	12.01	3.5	*				*		*									3	
10-18-79	291	12.42	2.7	*				*		*									3	
10-18-79	291	13.20	3.2	*				*		*									3	
10-18-79	291	13.52	2.6	*				*		*									3	
10-18-79	291	14.56	3.3	*				*		*									3	
10-18-79	291	16.24	3.2	*		*				*									3	
10-18-79	291	19.10	2.7	*			*			*									3	
10-18-79	291	19.19	3.2	*			*	*		*									4	
10-18-79	291	20.53	2.7	*			*			*									3	
10-19-79	292	09.56	2.9	*			*	*		*									4	
10-19-79	292	10.35	3.4	*		*	*	*		*					*		*	*	8	
10-19-79	292	16.56	2.6	*			*	*		*					*			*	6	
10-19-79	292	18.50	2.6	*			*	*		*					*				5	
10-19-79	292	18.51	2.8	*		*	*	*		*					*			*	7	
10-19-79	292	23.09	2.4	*				*		*									3	
10-20-79	293	00.14	2.8	*			*	*		*					*			*	6	
10-20-79	293	03.14	2.6	*				*		*					*				4	
10-20-79	293	05.04	3.0	*		*	*	*		*					*		*	*	8	
10-20-79	293	13.36	2.8	*				*		*								*	3	
10-20-79	293	14.52	3.3	*		*	*	*		*				*			*		7	
10-20-79	293	20.52	3.0	*						*								*	3	
10-20-79	293	22.32	2.4					*		*					*				3	
10-21-79	294	05.00	2.6	*				*										*	3	
10-21-79	294	18.18	3.3	*			*	*		*	*			*	*			*	8	
10-21-79	294	21.14	2.3	*			*	*			*							*	4	
10-22-79	295	22.04	2.4	*			*	*			*			*	*			*	7	
10-23-79	296	01.13	3.0	*		*	*	*		*	*			*	*			*	9	
10-23-79	296	01.41	2.8	*			*	*		*	*				*			*	7	
10-29-79	302	02.39	2.0	*			*	*										*	4	
10-29-79	302	03.39	2.5	*				*				*							3	
10-29-79	302	18.33	2.5	*			*	*			*					*			5	
10-31-79	304	11.43	3.4	*	*		*	*	*		*	*		*		*		*	9	
11-04-79	308	17.13	3.6	*			*	*			*							*	5	
11-11-79	315	15.32	2.7		*				*		*								3	
11-14-79	318	03.52	2.7				*	*	*		*							*	5	

Table 6

Calendar Date	Julian Day	Time	Mag	Station																Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals	
10-17-79	290	03:31	0.0													*			1	
10-17-79	290	05:25	--					*											1	
10-17-79	290	05:36	--					*											1	
10-17-79	290	05:42	--					*											1	
10-17-79	290	05:57	2.9					*											1	
10-17-79	290	06:14	3.5					*											1	
10-17-79	290	07:01	2.9					*											1	
10-17-79	290	08:27	2.9					*											1	
10-17-79	290	08:39	3.1					*											1	
10-17-79	290	08:52	1.4					*											1	
10-17-79	290	08:58	2.2					*											1	
10-17-79	290	09:01	1.8					*											1	
10-17-79	290	09:02	2.2					*											1	
10-17-79	290	09:12	3.0					*											1	
10-17-79	290	09:17	3.2					*											1	
10-17-79	290	10:13	2.7					*											1	
10-17-79	290	11:43	2.7					*											1	
10-17-79	290	11:57	2.9					*											1	
10-17-79	290	17:41	--			*													1	
10-17-79	290	17:44	2.2			*													1	
10-17-79	290	19:14	4.1			*													1	
10-17-79	290	20:51	2.4				*												1	
10-17-79	290	20:52	4.2				*												1	
10-17-79	290	20:59	2.1				*												1	
10-17-79	290	21:24	0.0					*											1	
10-17-79	290	21:42	--					*											1	
10-17-79	290	21:48	--					*											1	
10-17-79	290	22:09	2.3				*	*											2	
10-17-79	290	22:10	2.2					*											1	
10-17-79	290	22:19	2.9				*												1	
10-17-79	290	22:31	2.9				*	*											2	
10-17-79	290	22:45	4.5				*	*											2	
10-17-79	290	22:47	--				*	*											2	
10-17-79	290	22:50	3.2				*												1	
10-17-79	290	22:54	3.4				*	*											2	
10-17-79	290	23:27	3.2				*	*											2	
10-17-79	290	23:31	2.8				*												1	
10-17-79	290	23:41	--	*															1	
10-17-79	290	23:42	--	*															1	
10-17-79	290	23:48	--	*															1	

[illegible]

[illegible]

Calendar Date	Julian Day	Time	Mag	Station															Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals
10-20-79	293	00:25	0.0				*	*											2
10-20-79	293	03:15	2.6															*	1
10-20-79	293	05:56	2.4															*	1
10-20-79	293	11:35	3.0							*									1
10-20-79	293	14:53	3.3															*	1
10-20-79	293	14:56	2.5					*											1
10-20-79	293	15:33	2.5															*	1
10-20-79	293	16:57	2.4					*											1
10-20-79	293	19:14	2.0					*											1
10-20-79	293	19:48	0.0															*	1
10-20-79	293	19:53	2.7				*												1
10-20-79	293	22:51	--					*											1
10-20-79	293	23:09	--															*	1
10-21-79	294	00:32	0.0				*												1
10-21-79	294	00:49	--														*		1
10-21-79	294	00:51	--														*		1
10-21-79	294	01:07	--				*												1
10-21-79	294	01:32	--											*					1
10-21-79	294	04:54	0.0					*											1
10-21-79	294	14:39	--				*												1
10-21-79	294	15:26	--			*													1
10-21-79	294	15:49	--					*											1
10-21-79	294	15:53	--					*											1
10-21-79	294	16:52	--								*								1
10-21-79	294	16:53	--								*								1
10-21-79	294	19:04	2.9				*			*									2
10-21-79	294	21:47	--															*	1
10-21-79	294	23:04	--															*	1
10-21-79	294	23:09	--					*										*	2
10-21-79	294	23:19	--															*	1
10-21-79	294	23:42	--	*															1
10-21-79	294	23:58	--							*									1
10-22-79	295	00:24	--											*					1
10-22-79	295	00:37	--				*												1
10-22-79	295	00:43	2.6							*									1
10-22-79	295	00:55	--				*												1
10-22-79	295	05:55	--					*			*								1
10-22-79	295	10:40	2.6				*			*									2
10-22-79	295	13:26	2.3															*	2
10-22-79	295	15:33	--					*											1
10-22-79	295	18:52	--															*	1
10-22-79	295	19:24	--	*															1

Calendar Date	Julian Day	Time	Mag	Station																Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals	
10-22-79	295	23:07	--					*											1	
10-23-79	296	02:22	--								*								1	
10-23-79	296	05:16	2.5														*		1	
10-23-79	296	05:20	0.0														*		1	
10-23-79	296	11:07	2.6														*		1	
10-23-79	296	12:52	2.4							*									1	
10-23-79	296	15:30	--					*											1	
10-23-79	296	16:03	--														*		1	
10-23-79	296	16:38	--				*												1	
10-23-79	296	16:40	--				*												1	
10-23-79	296	19:09	--					*											1	
10-23-79	296	19:10	0.0					*											1	
10-23-79	296	22:13	--					*											1	
10-23-79	296	22:29	--							*									1	
10-23-79	296	22:32	--							*									1	
10-23-79	296	22:51	--	*															1	
10-23-79	296	22:54	--	*															1	
10-23-79	296	23:14	--												*				1	
10-24-79	297	00:04	--								*								1	
10-24-79	297	00:20	--											*					1	
10-24-79	297	02:00	2.5														*		1	
10-24-79	297	03:05	2.6							*				*					2	
10-24-79	297	06:19	0.0							*									1	
10-24-79	297	06:44	3.1							*									1	
10-24-79	297	07:17	--								*								1	
10-24-79	297	07:44	--								*								1	
10-24-79	297	16:57	--				*												1	
10-24-79	297	18:15	--				*												1	
10-24-79	297	19:46	--				*												1	
10-24-79	297	19:50	0.0							*									1	
10-24-79	297	20:55	--				*												1	
10-24-79	297	21:50	--										*						1	
10-24-79	297	21:52	--										*						1	
10-24-79	297	22:51	--				*												1	
10-25-79	298	15:18	--					*											1	
10-25-79	298	16:42	--				*												1	
10-25-79	298	17:08	--											*					1	
10-25-79	298	17:44	--				*												1	
10-25-79	298	17:54	--				*												1	
10-25-79	298	17:55	--				*												1	
10-25-79	298	18:10	--				*												1	
10-25-79	298	18:21	--				*												1	
10-25-79	298	18:32	--				*												1	

Calendar Date	Julian Day	Time	Mag	Station															Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals
10-25-79	298	18:44	--				*												1
10-25-79	298	18:55	--				*												1
10-25-79	298	19:26	--										*						1
10-25-79	298	19:35	--				*												1
10-25-79	298	19:36	--				*												1
10-25-79	298	21:17	--													*			1
10-25-79	298	21:32	--										*						1
10-25-79	298	22:40	--													*			1
10-26-79	299	00:11	--		*														1
10-26-79	299	00:30	--		*														1
10-26-79	299	00:32	--		*														1
10-26-79	299	03:35	--		*														1
10-26-79	299	07:54	2.2		*														1
10-26-79	299	08:10	--		*														1
10-26-79	299	09:06	--		*														1
10-26-79	299	09:09	--		*														1
10-26-79	299	09:11	2.5		*														1
10-26-79	299	10:32	--		*														1
10-26-79	299	12:04	--		*														1
10-26-79	299	13:20	--		*														1
10-26-79	299	13:35	--		*														1
10-26-79	299	13:44	--		*														1
10-26-79	299	13:52	--		*														1
10-26-79	299	13:59	--										*						1
10-26-79	299	16:04	--	*	*														2
10-26-79	299	16:10	--		*														1
10-26-79	299	16:22	--				*												1
10-26-79	299	16:29	--														*		1
10-26-79	299	17:10	--				*												1
10-26-79	299	18:14	--									*							1
10-26-79	299	18:21	--										*						1
10-26-79	299	18:54	--										*						1
10-26-79	299	19:08	--		*														1
10-26-79	299	19:33	2.8									*							1
10-26-79	299	19:40	--		*														1
10-26-79	299	19:52	--		*														1
10-26-79	299	20:24	--		*														1
10-26-79	299	21:01	--							*									1
10-26-79	299	21:02	--							*									1
10-26-79	299	21:03	--							*									1

Calendar Date	Julian Day	Time	Mag	Station															Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals
10-26-79	299	21:06	--		*														1
10-26-79	299	21:53	--				*												1
10-26-79	299	21:55	--				*												1
10-26-79	299	21:57	--				*												1
10-26-79	299	22:03	--										*						1
10-26-79	299	22:17	--		*														1
10-26-79	299	22:22	--		*														1
10-26-79	299	22:27	--				*												1
10-26-79	299	22:59	--				*												1
10-27-79	300	: 0	--		*										*				2
10-27-79	300	01:08	--		*														1
10-27-79	300	01:39	--		*														1
10-27-79	300	03:28	1.7												*				1
10-27-79	300	05:02	2.2	*				*											2
10-27-79	300	05:59	--						*										1
10-27-79	300	07:44	--		*														1
10-27-79	300	07:45	2.5						*										1
10-27-79	300	08:21	--		*														1
10-27-79	300	14:10	2.9											*					1
10-27-79	300	14:37	--											*					1
10-27-79	300	14:50	--				*												1
10-27-79	300	15:34	--														*		1
10-27-79	300	16:34	--									*							1
10-27-79	300	16:44	--						*										1
10-27-79	300	16:45	--						*										1
10-27-79	300	16:47	--						*										1
10-27-79	300	16:51	--		*														1
10-27-79	300	17:38	0.0		*														1
10-27-79	300	17:45	--													*			1
10-27-79	300	17:48	2.1		*														1
10-27-79	300	18:22	1.7														*		1
10-27-79	300	18:39	--					*											1
10-27-79	300	19:21	--		*														1
10-27-79	300	20:21	--		*														1
10-27-79	300	20:32	--		*														1
10-27-79	300	20:33	--									*							1
10-27-79	300	20:51	1.9									*							1
10-27-79	300	20:53	--					*											1
10-27-79	300	21:12	2.0														*		1
10-27-79	300	21:21	--									*							1
10-27-79	300	21:51	2.8					*											1
10-27-79	300	21:54	2.8		*														1
10-27-79	300	22:08	--				*												1
10-27-79	300	23:32	0.0						*										1
10-27-79	300	23:35	--						*										1

[illegible]

Calendar Date	Julian Day	Time	Mag	Station															Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals
10-30-79	303	15:47	--															*	1
10-30-79	303	15:56	--		*														1
10-30-79	303	16:21	--					*											1
10-30-79	303	16:24	--					*											1
10-30-79	303	16:27	--		*														1
10-30-79	303	16:47	--				*												1
10-30-79	303	16:49	--				*												1
10-30-79	303	16:53	--				*												1
10-30-79	303	17:13	--													*			1
10-30-79	303	17:16	--													*			1
10-30-79	303	17:20	--				*												1
10-30-79	303	17:26	--									*							1
10-30-79	303	17:38	--									*							1
10-30-79	303	17:49	--										*						1
10-30-79	303	17:50	--										*						1
10-30-79	303	18:10	--							*									1
10-30-79	303	18:13	--							*									1
10-30-79	303	18:49	--		*														1
10-30-79	303	18:55	--		*														1
10-30-79	303	19:02	--		*														1
10-30-79	303	19:11	--		*														1
10-30-79	303	19:39	--		*														1
10-30-79	303	19:45	--		*														1
10-30-79	303	19:57	--		*														1
10-30-79	303	20:34	--		*														1
10-30-79	303	20:47	--		*														1
10-30-79	303	21:01	2.7		*														1
10-30-79	303	21:21	--										*						1
10-30-79	303	21:51	--										*						1
10-30-79	303	23:55	0.0		*														1
10-31-79	304	00:18	1.4		*														1
10-31-79	304	00:26	--		*														1
10-31-79	304	02:12	--		*														1
10-31-79	304	08:05	--		*														1
10-31-79	304	08:37	--		*														1
10-31-79	304	09:59	--									*							1
10-31-79	304	14:32	--		*														1
10-31-79	304	14:45	--										*						1
10-31-79	304	14:52	--		*														1
10-31-79	304	16:05	--		*														1

Calendar Date	Julian Day	Time	Mag	Station															Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals
10-31-79	304	16:09	--				*												1
10-31-79	304	16:10	--		*														1
10-31-79	304	16:45	--										*						1
10-31-79	304	18:49	3.4														*		1
10-31-79	304	18:58	--					*											1
10-31-79	304	19:01	--										*						1
10-31-79	304	19:03	--										*						1
10-31-79	304	20:02	--							*									1
10-31-79	304	20:08	--							*									1
11-01-79	305	09:29	3.0	*														*	2
11-01-79	305	09:48	2.9	*														*	2
11-01-79	305	17:28	--														*		1
11-01-79	305	17:32	--														*		1
11-01-79	305	18:00	--														*		1
11-01-79	305	18:01	--														*		1
11-01-79	305	18:25	--														*		1
11-01-79	305	18:41	--														*		1
11-01-79	305	20:38	--														*		1
11-02-79	306	18:36	--										*						1
11-02-79	306	19:01	--				*												1
11-02-79	306	22:03	--									*							1
11-02-79	306	22:36	--														*		1
11-02-79	306	23:27	--										*						1
11-03-79	307	00:00	--							*									1
11-03-79	307	01:26	--		*														1
11-03-79	307	15:28	--	*															1
11-03-79	307	23:30	--															*	1
11-04-79	308	00:07	0.0	*				*											2
11-04-79	308	00:26	0.0					*											1
11-04-79	308	09:30	--				*											*	2
11-04-79	308	09:41	--					*											1
11-04-79	308	10:23	--	*				*											2
11-04-79	308	20:08	2.7				*										*		2
11-04-79	308	22:37	--														*		1
11-05-79	309	00:41	--		*														1
11-05-79	309	17:30	--	*															1
11-05-79	309	17:36	--	*															1
11-05-79	309	18:38	--															*	1
11-05-79	309	18:45	--															*	1
11-05-79	309	19:54	--				*												1
11-05-79	309	19:58	--				*												1

Calendar Date	Julian Day	Time	Mag	Station															Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals
11-05-79	309	21:55	--					*											1
11-05-79	309	22:06	--					*											1
11-06-79	310	00:49	--		*														1
11-06-79	310	00:57	--		*														1
11-06-79	310	16:06	--													*			1
11-06-79	310	16:14	--													*			1
11-06-79	310	16:28	--									*							1
11-06-79	310	16:48	--										*						1
11-06-79	310	16:56	--										*						1
11-06-79	310	17:14	--						*										1
11-06-79	310	19:20	--						*										1
11-06-79	310	21:16	--										*						1
11-06-79	310	21:24	--		*														1
11-06-79	310	23:53	--		*														1
11-06-79	310	23:55	--		*														1
11-07-79	311	07:57	--						*										1
11-07-79	311	13:47	2.7		*														1
11-07-79	311	14:10	--										*						1
11-07-79	311	15:47	--						*										1
11-07-79	311	19:25	--		*														1
11-07-79	311	19:35	--													*			1
11-07-79	311	19:36	--													*			1
11-07-79	311	19:38	--													*			1
11-07-79	311	19:52	--													*			1
11-07-79	311	19:53	--													*			1
11-07-79	311	20:06	--													*			1
11-07-79	311	20:15	--													*			1
11-07-79	311	21:18	--						*										1
11-07-79	311	21:21	--										*						1
11-07-79	311	21:26	--										*						1
11-07-79	311	21:33	--										*						1
11-07-79	311	22:50	--										*						1
11-07-79	311	23:37	--										*						1
11-08-79	312	02:48	--						*										1
11-08-79	312	13:51	2.5					*									*		2
11-08-79	312	16:43	--										*						1
11-08-79	312	16:48	--				*												2
11-08-79	312	16:56	--				*												1
11-08-79	312	17:02	--										*						1
11-08-79	312	17:34	--		*														1
11-08-79	312	17:36	--		*														1

Calendar Date	Julian Day	Time	Mag	Station																Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals	
11-08-79	312	17:37	--		*														1	
11-08-79	312	17:44	--										*						1	
11-08-79	312	19:21	--				*												1	
11-08-79	312	19:28	--					*											1	
11-08-79	312	19:30	--					*											1	
11-08-79	312	20:44	--										*						1	
11-08-79	312	21:03	--	*															1	
11-08-79	312	21:44	--				*												1	
11-08-79	312	21:52	--												*				1	
11-08-79	312	22:04	--														*		1	
11-08-79	312	22:09	--														*		1	
11-08-79	312	22:41	--										*						1	
11-08-79	312	23:23	--	*															1	
11-09-79	313	00:02	--		*														1	
11-09-79	313	00:10	--		*														1	
11-09-79	313	00:52	--		*														1	
11-09-79	313	04:24	--						*										1	
11-09-79	313	17:51	--										*						1	
11-09-79	313	20:58	--					*											1	
11-09-79	313	21:14	--										*						1	
11-09-79	313	21:37	--									*							1	
11-09-79	313	22:00	--										*						1	
11-09-79	313	22:04	--										*						1	
11-09-79	313	23:04	--										*						1	
11-10-79	314	00:19	--		*														1	
11-10-79	314	00:58	--				*												1	
11-10-79	314	03:40	0.0				*												1	
11-10-79	314	10:12	--						*										1	
11-10-79	314	15:24	--						*										1	
11-10-79	314	16:09	--		*														1	
11-10-79	314	17:06	--	*															1	
11-10-79	314	17:55	2.5				*												1	
11-10-79	314	19:05	--						*										1	
11-10-79	314	20:35	2.6		*		*												1	
11-10-79	314	20:37	--									*							1	
11-10-79	314	20:55	0.0						*										1	
11-10-79	314	22:53	--														*		1	
11-10-79	314	23:03	2.0				*												1	
11-11-79	315	06:42	3.3	*													*		2	
11-11-79	315	13:19	0.0				*												1	
11-11-79	315	15:59	2.4		*														1	
11-11-79	315	16:36	--										*						1	

Calendar Date	Julian Day	Time	Mag	Station															Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals
11-12-79	316	00:12	--															*	1
11-12-79	316	00:54	1.8															*	1
11-12-79	316	03:01	--										*						1
11-12-79	316	16:05	--						*										1
11-12-79	316	16:08	--										*						1
11-12-79	316	17:16	--									*	*						2
11-12-79	316	17:31	--										*						1
11-12-79	316	17:35	--					*	*										2
11-12-79	316	17:37	--					*											1
11-12-79	316	18:33	--										*						1
11-12-79	316	19:02	--				*												1
11-12-79	316	19:12	--						*										1
11-12-79	316	20:24	--	*															1
11-12-79	316	21:22	--										*						1
11-12-79	316	21:32	--					*											1
11-12-79	316	21:34	--						*										1
11-13-79	317	12:27	--						*										1
11-13-79	317	16:57	--										*						1
11-13-79	317	17:27	--										*						1
11-13-79	317	17:32	--										*						1
11-13-79	317	18:36	--										*						1
11-13-79	317	19:31	--						*										1
11-13-79	317	20:00	--										*						1
11-13-79	317	21:24	2.4						*										1
11-13-79	317	21:36	--										*						1
11-13-79	317	21:42	--										*						1
11-13-79	317	21:49	--										*						1
11-14-79	318	02:12	--													*			1
11-14-79	318	15:35	--					*											1
11-14-79	318	15:38	--						*										1
11-14-79	318	16:22	--													*			1
11-14-79	318	16:24	--													*			1
11-14-79	318	16:49	--				*												1
11-14-79	318	17:00	--					*											1
11-14-79	318	17:13	--					*											1
11-14-79	318	17:46	--	*															1
11-14-79	318	17:49	--	*															1
11-14-79	318	18:12	--														*		1
11-14-79	318	18:19	--														*		1
11-14-79	318	18:47	--									*							1

Calendar Date	Julian Day	Time	Mag	Station																Total
				AFB	BCS	CFG	CRK	FBR	GPN	GRS	HRS	HUS	IVC	JMS	KYR	ROB	RVR	SLD	Arrivals	
11-16-79	320	20:15	--						*										1	
11-16-79	320	20:31	--											*					1	
11-16-79	320	20:46	--									*							1	
11-16-79	320	20:50	--				*												1	
11-16-79	320	20:54	--										*						1	
11-16-79	320	21:02	0.0													*			1	
11-16-79	320	21:22	--					*											1	
11-16-79	320	21:26	--									*							1	
11-16-79	320	21:32	--													*			1	
11-16-79	320	21:44	--									*							1	
11-16-79	320	21:46	--					*											1	
11-16-79	320	21:55	--	*															1	
11-16-79	320	22:12	--													*			1	
11-16-79	320	22:17	--													*			1	
11-16-79	320	22:18	--													*			1	
11-16-79	320	22:19	--														*		1	
11-16-79	320	22:30	--				*												1	
11-16-79	320	22:41	--	*															1	
11-16-79	320	22:45	--				*												1	
11-16-79	320	23:06	--				*												1	
11-16-79	320	23:08	--									*							1	
11-16-79	320	23:10	--					*											1	
11-16-79	320	23:27	--				*												1	
11-16-79	320	23:29	--									*							1	
11-16-79	320	23:32	--				*												1	
11-16-79	320	23:46	--				*												1	
11-16-79	320	23:50	--				*												1	
11-17-79	321	00:06	--														*		1	
11-17-79	321	00:16	--					*											1	
11-17-79	321	00:34	--						*										1	
11-17-79	321	00:52	--					*											1	
11-17-79	321	09:00	0.0	*															1	
11-17-79	321	10:00	--	*					*										2	
11-17-79	321	15:06	--													*			1	
11-17-79	321	17:51	--													*			1	
11-17-79	321	18:08	--													*			1	

Figure Captions

1. Station activity and clock corrections. Solid horizontal bars denote time periods during which that station was recording. The solid dots connected by lines are the clock corrections available for that station.

2. Station locations, and epicenters up to October 25 (figure 2a) and after October 25 (figure 2b). Imperial and Brawley faults are also shown.

3. Seismograms for those events with three or more recordings. Each seismogram is scaled to its appropriate ground motion: cm/sec. for systems with velocity transducers and cm/sec^2 for systems with force balance accelerometers. Although the original traces have the polarities noted in table 2 for the purposes of this report, the components for each station have been ordered and rotated when appropriate to always show polarities of up, north and east. Three seconds should be added to the time of event 10-31-79 11.43 as the instrument triggered well before the P wave and three seconds of data were skipped before the traces were plotted. See the text for additional comments.

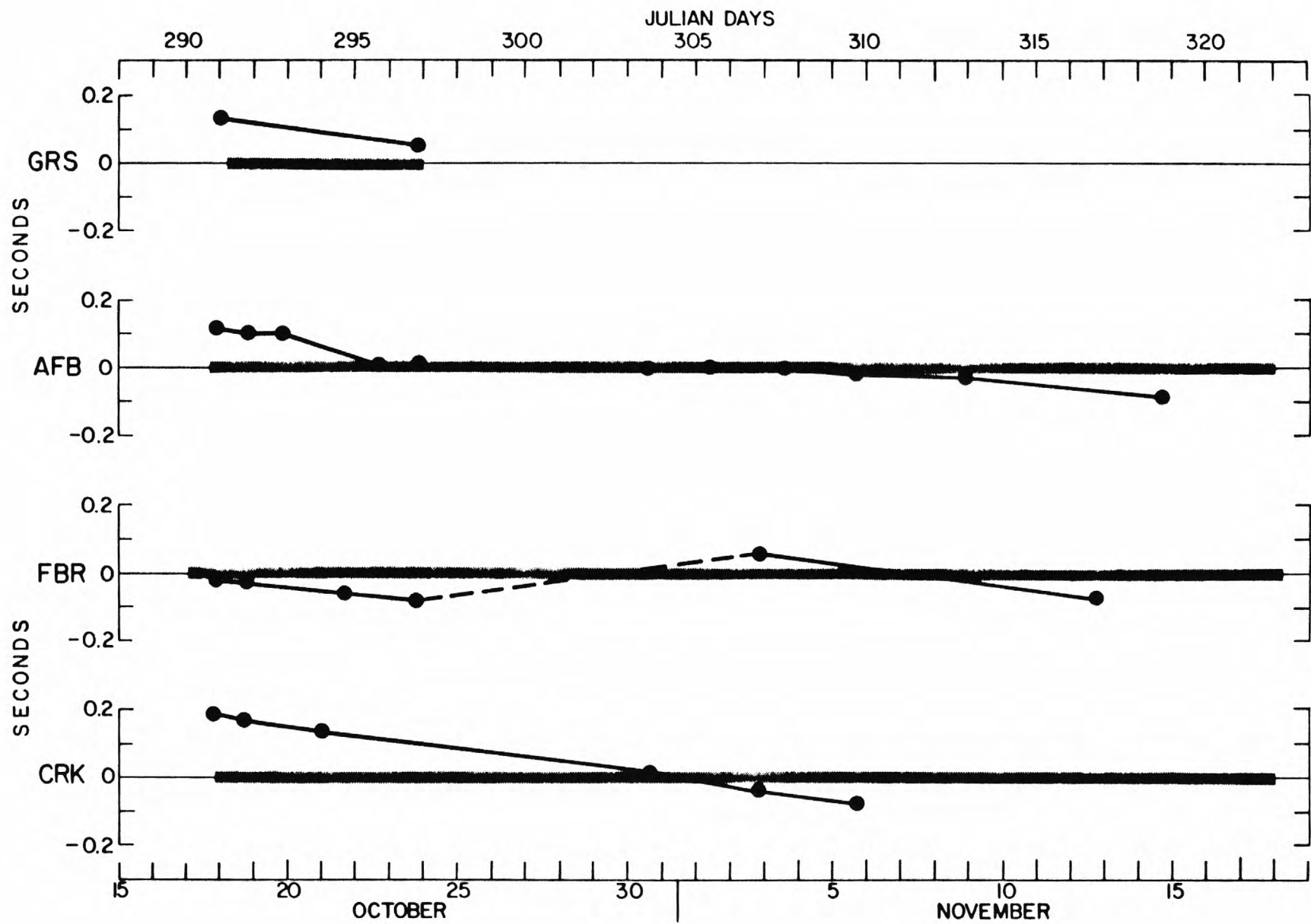
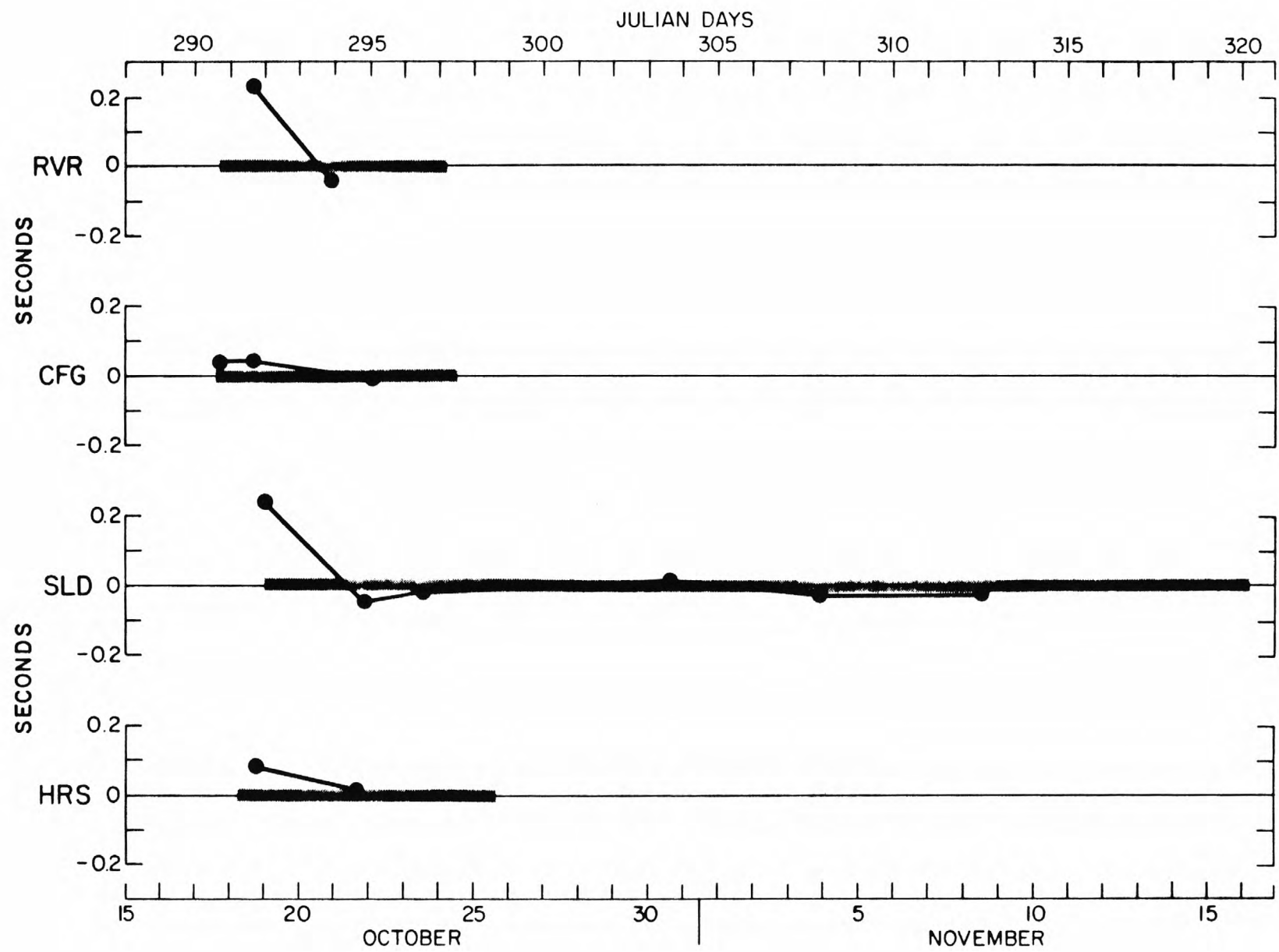
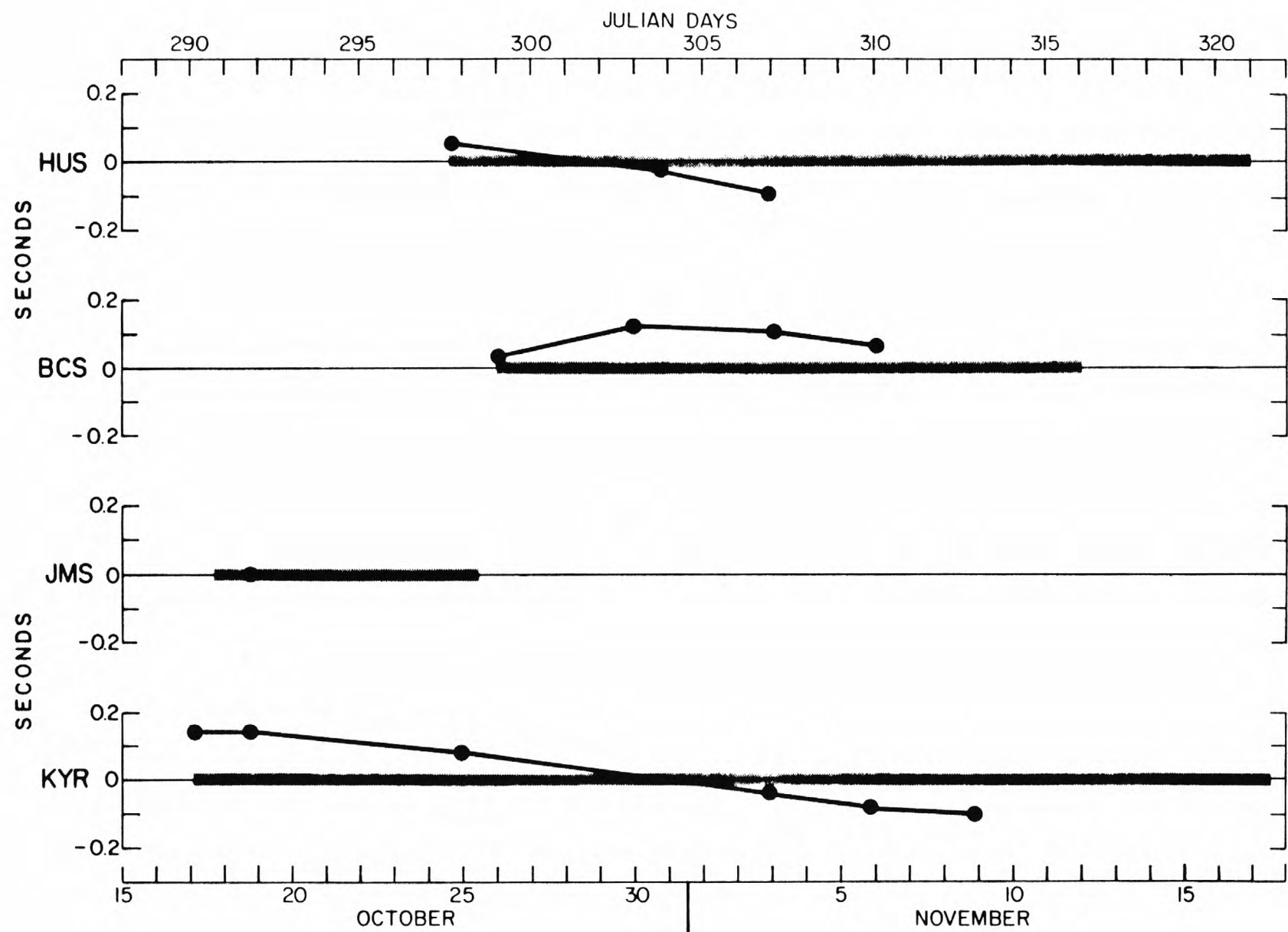
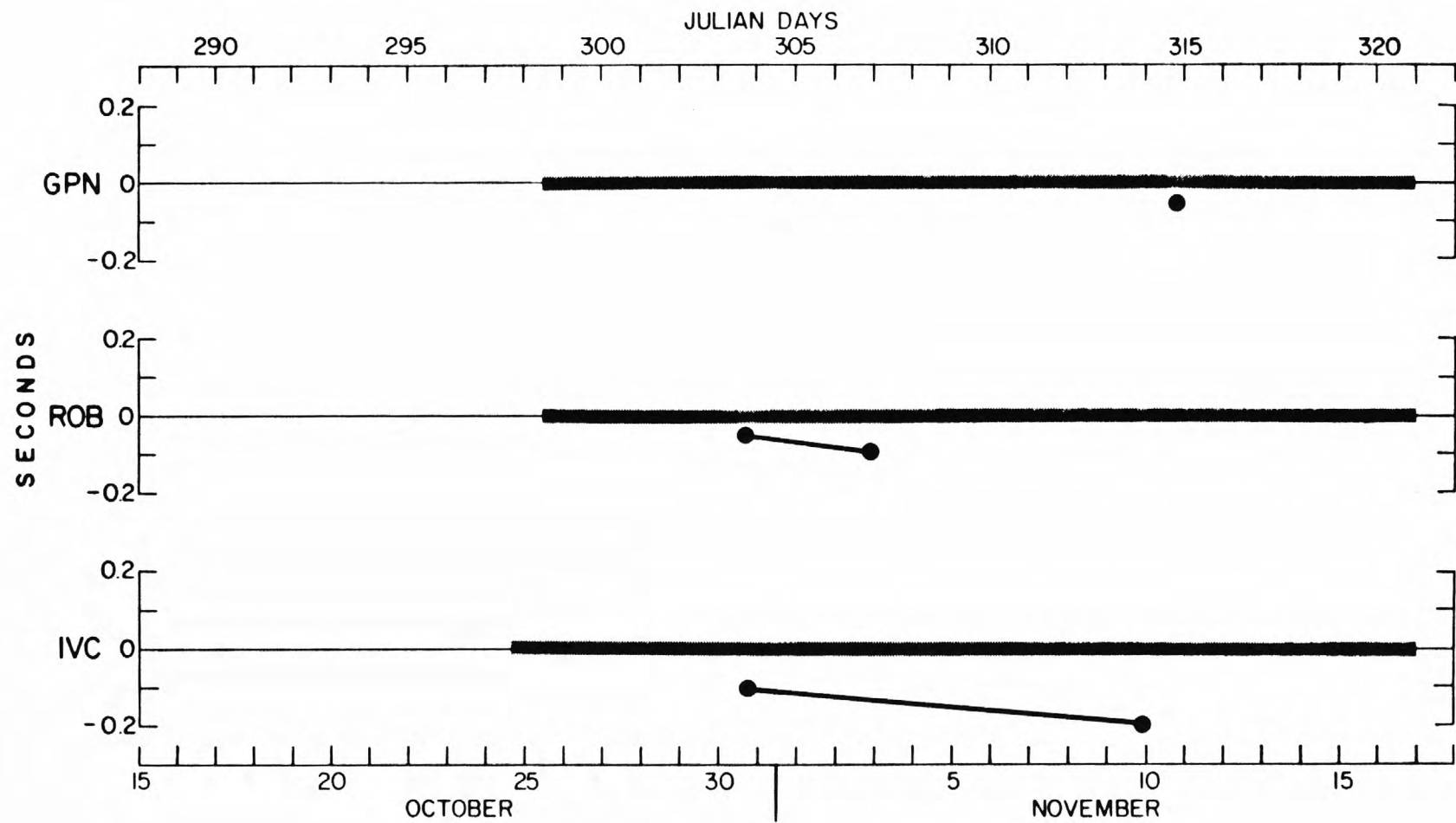


Fig 1







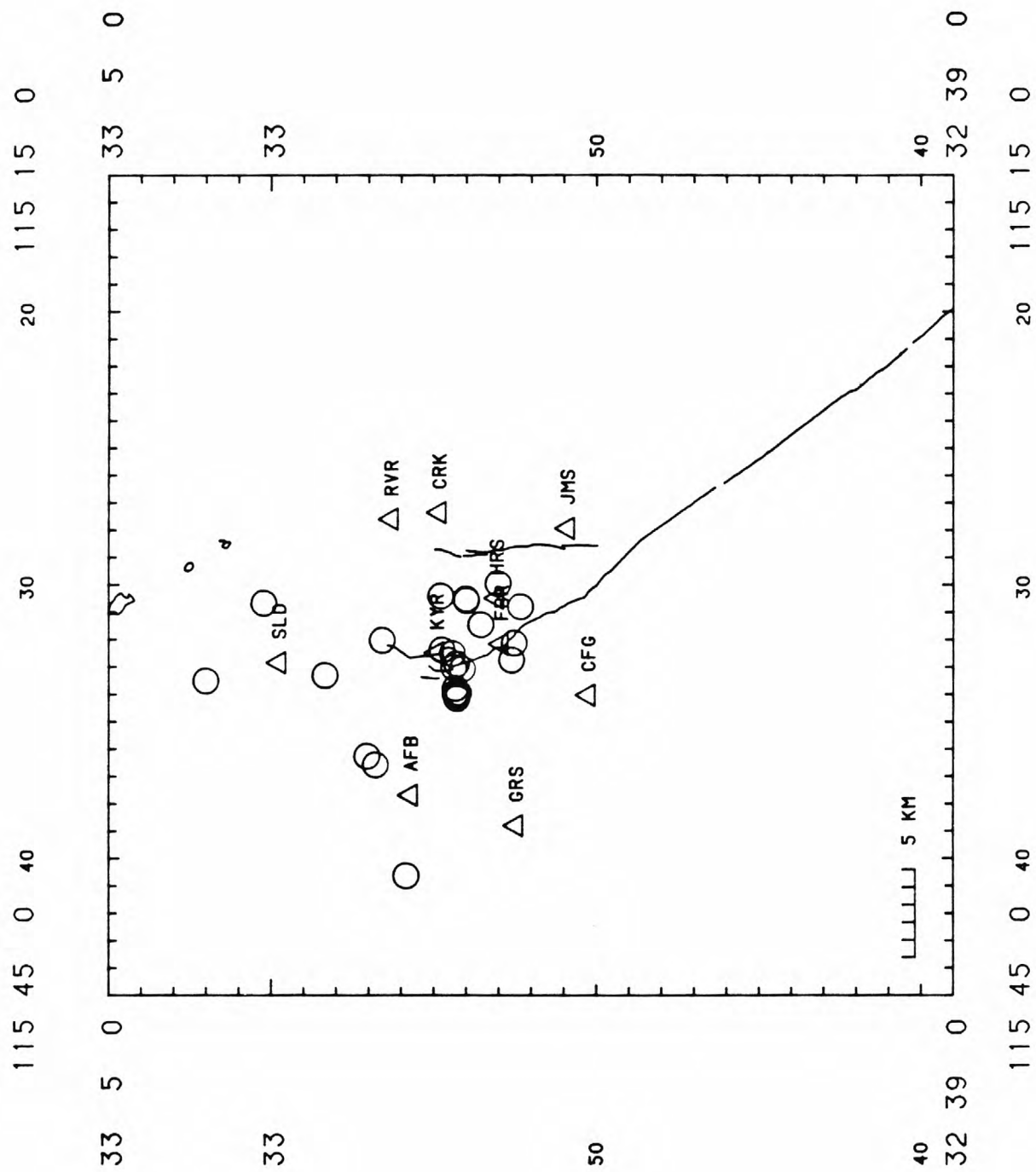


Fig 2c

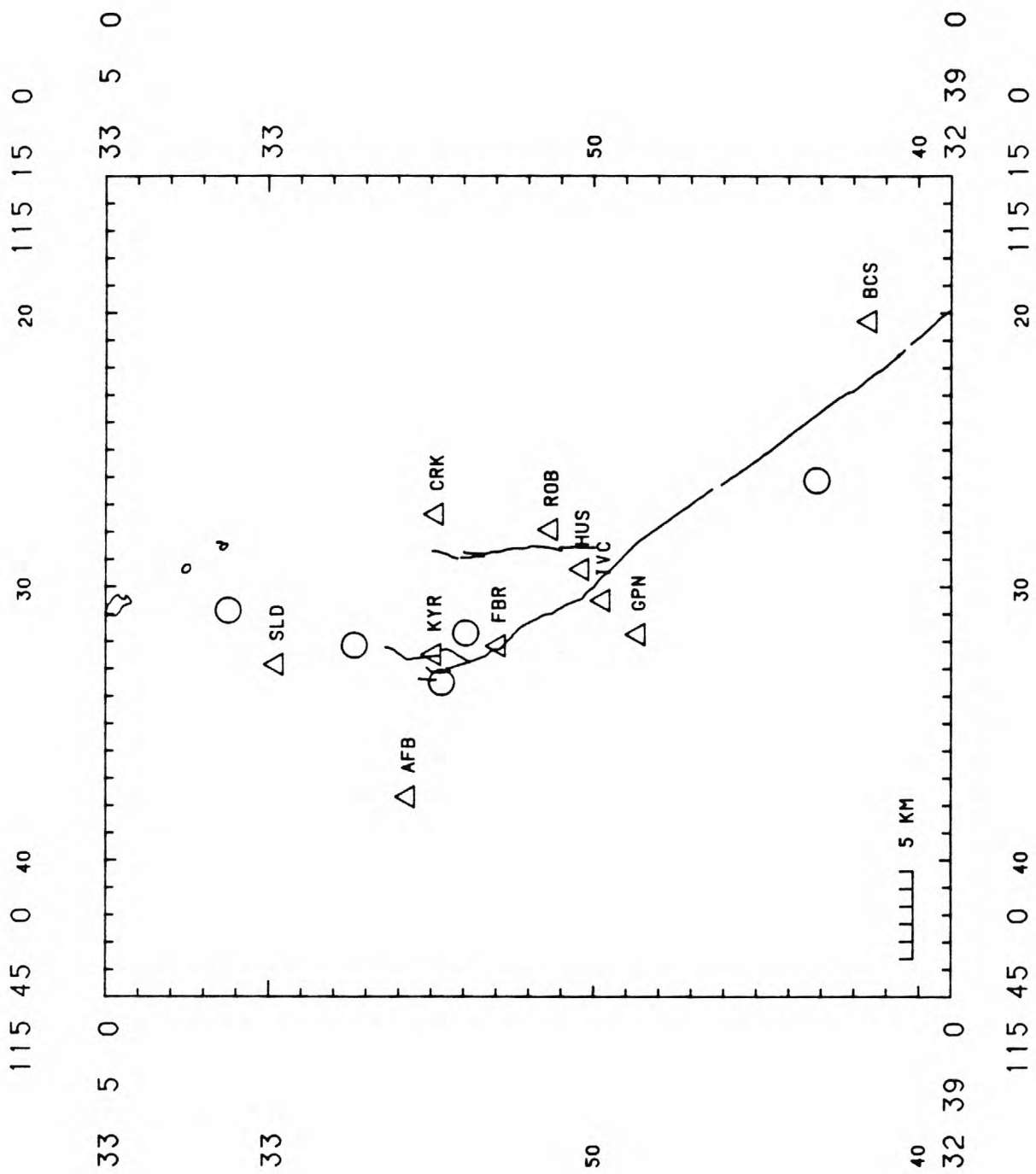
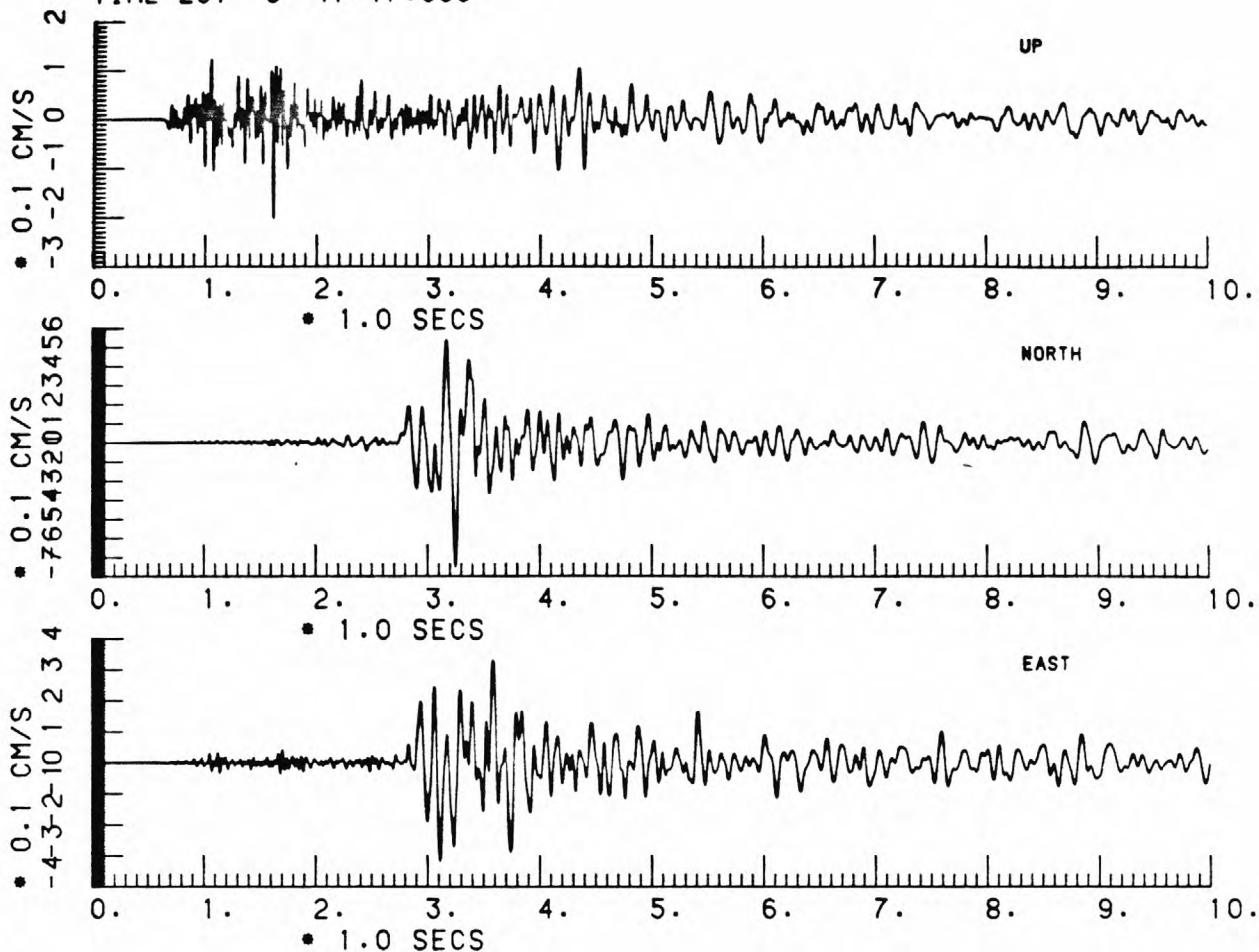
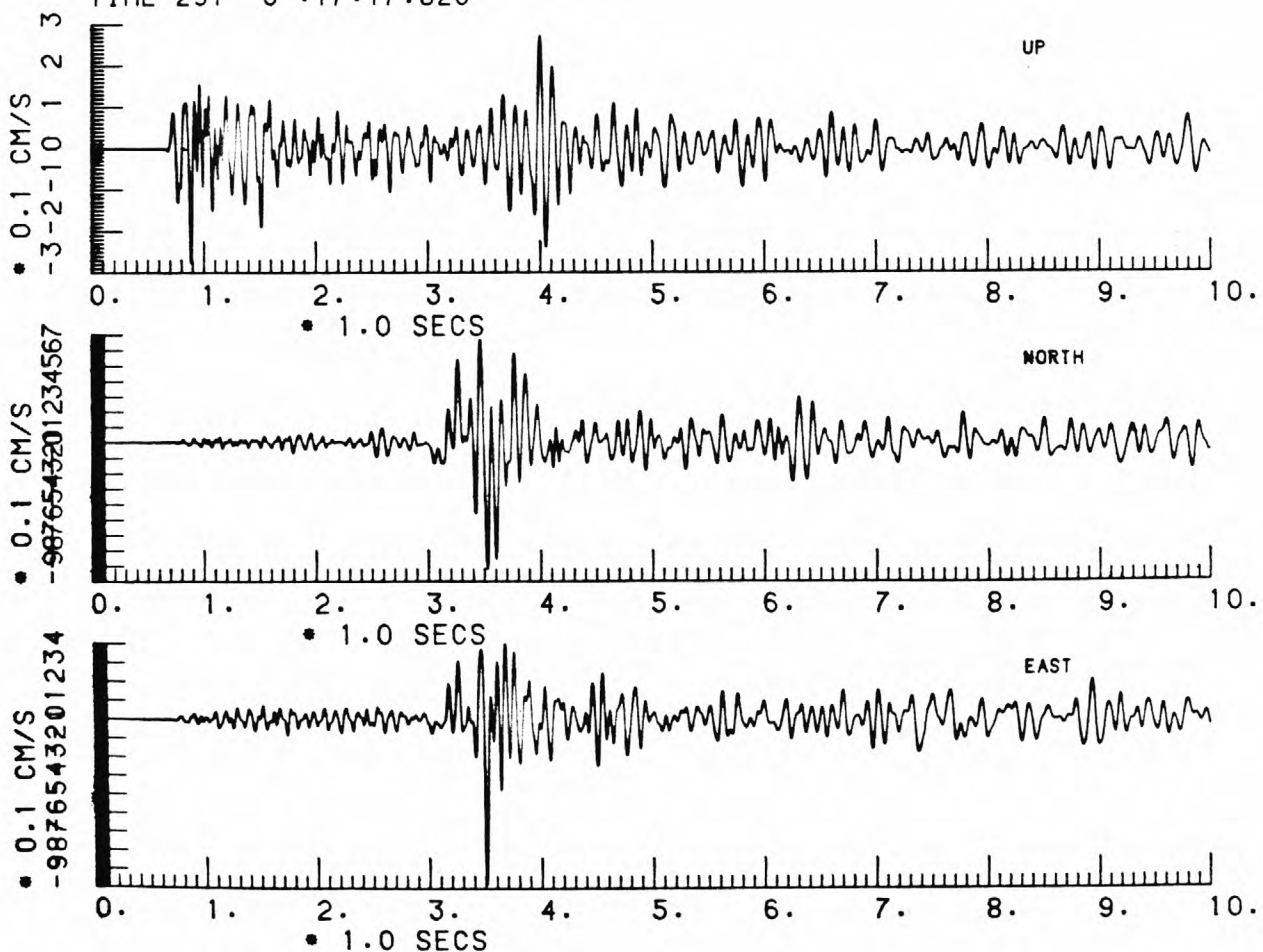


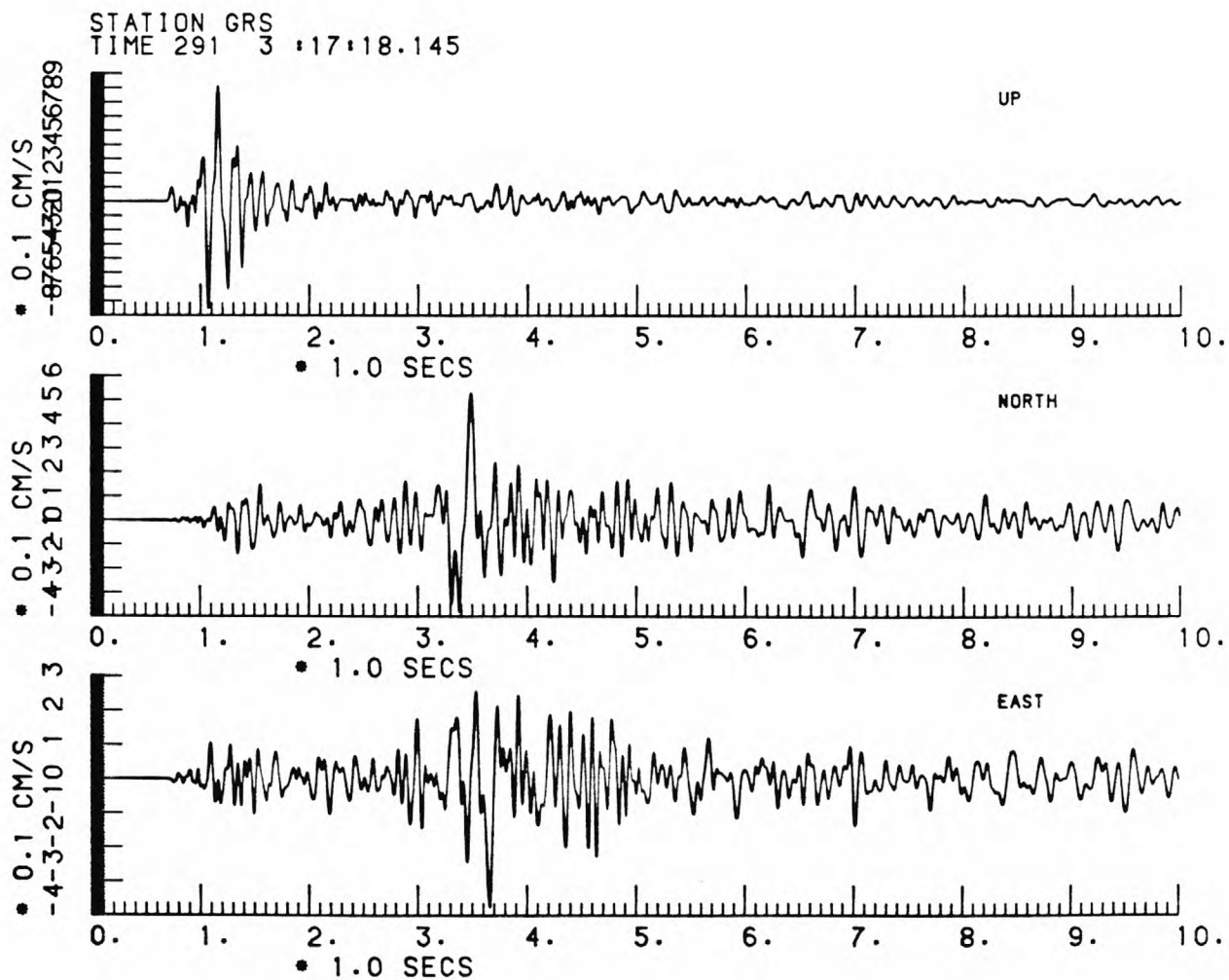
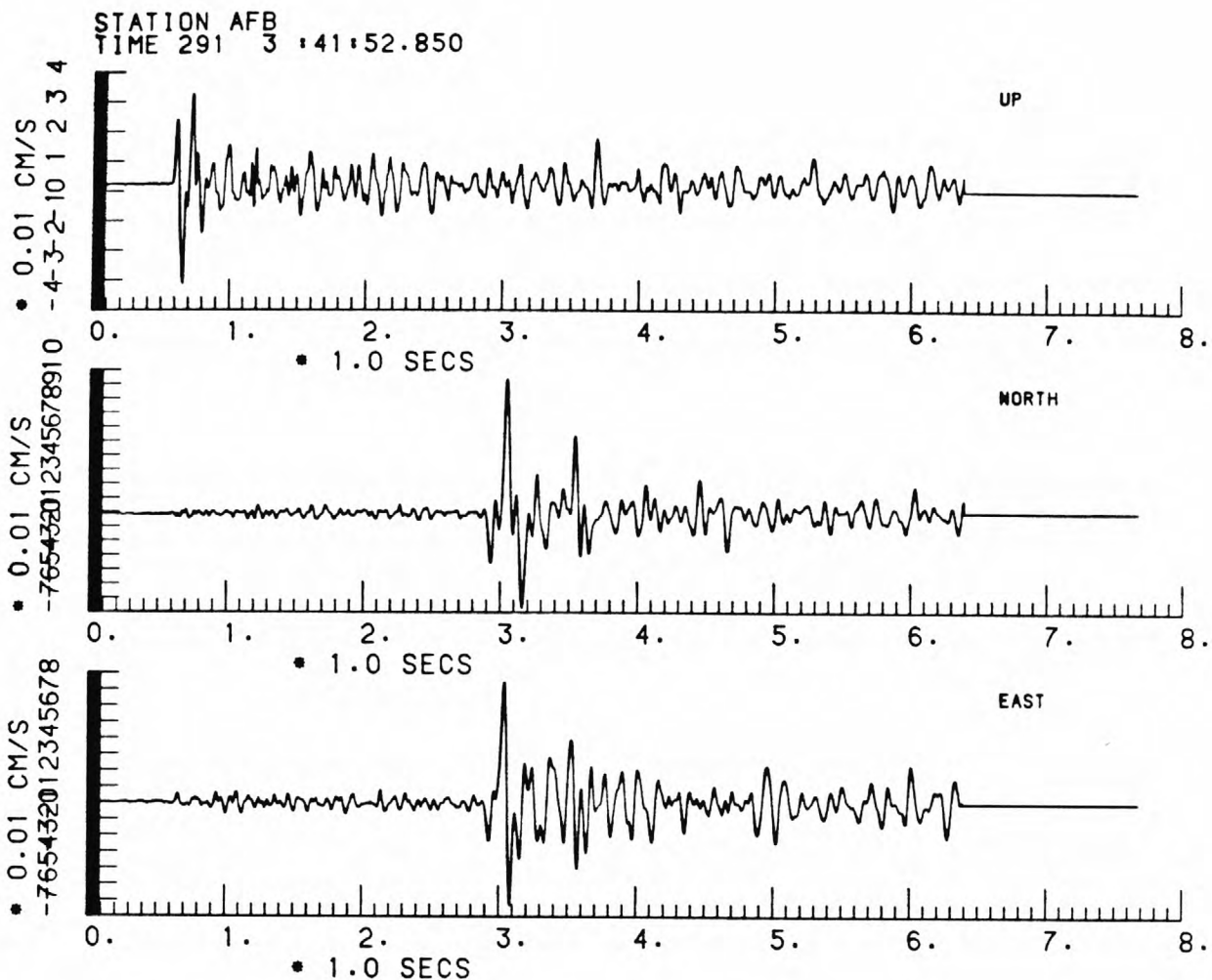
Fig 25

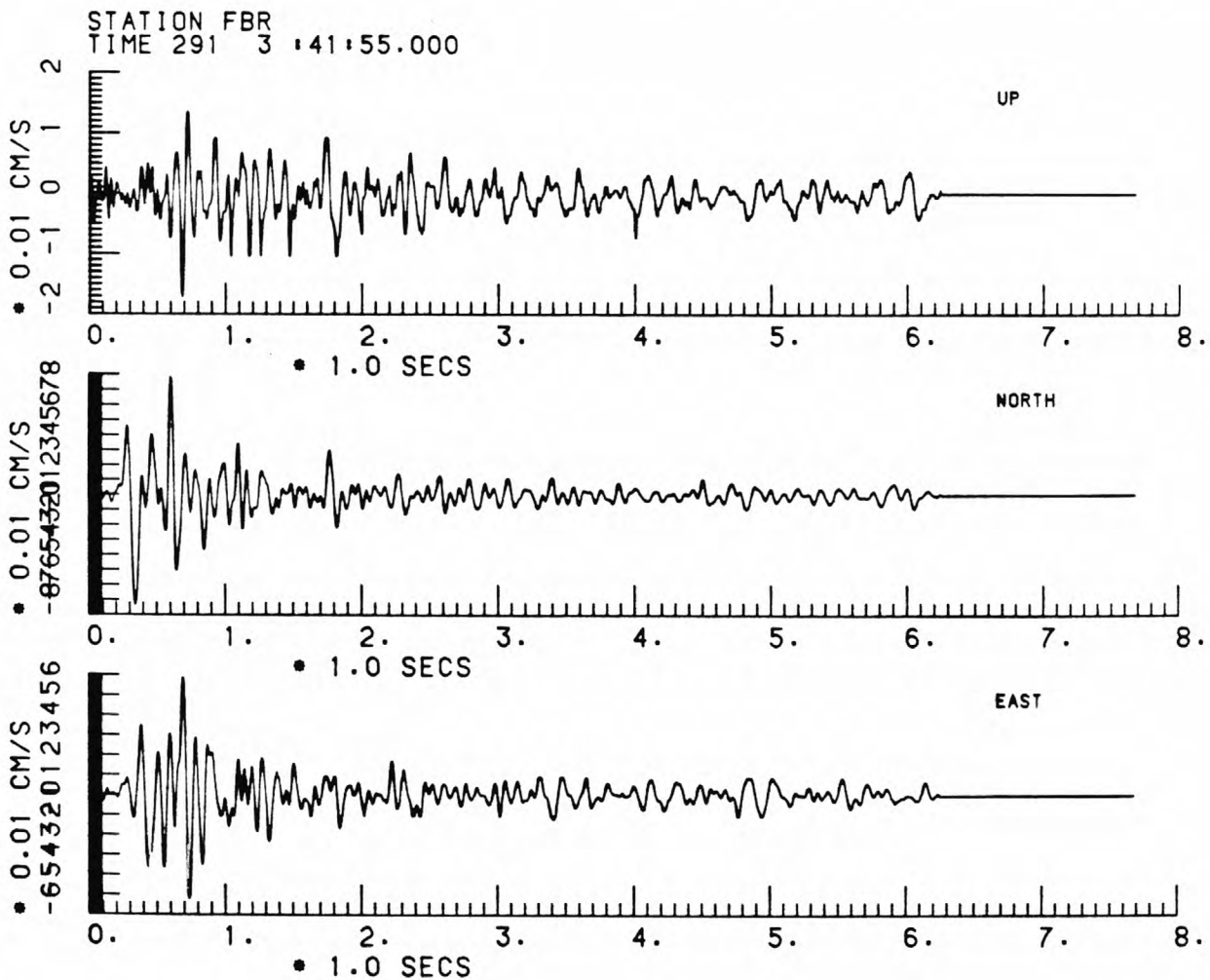
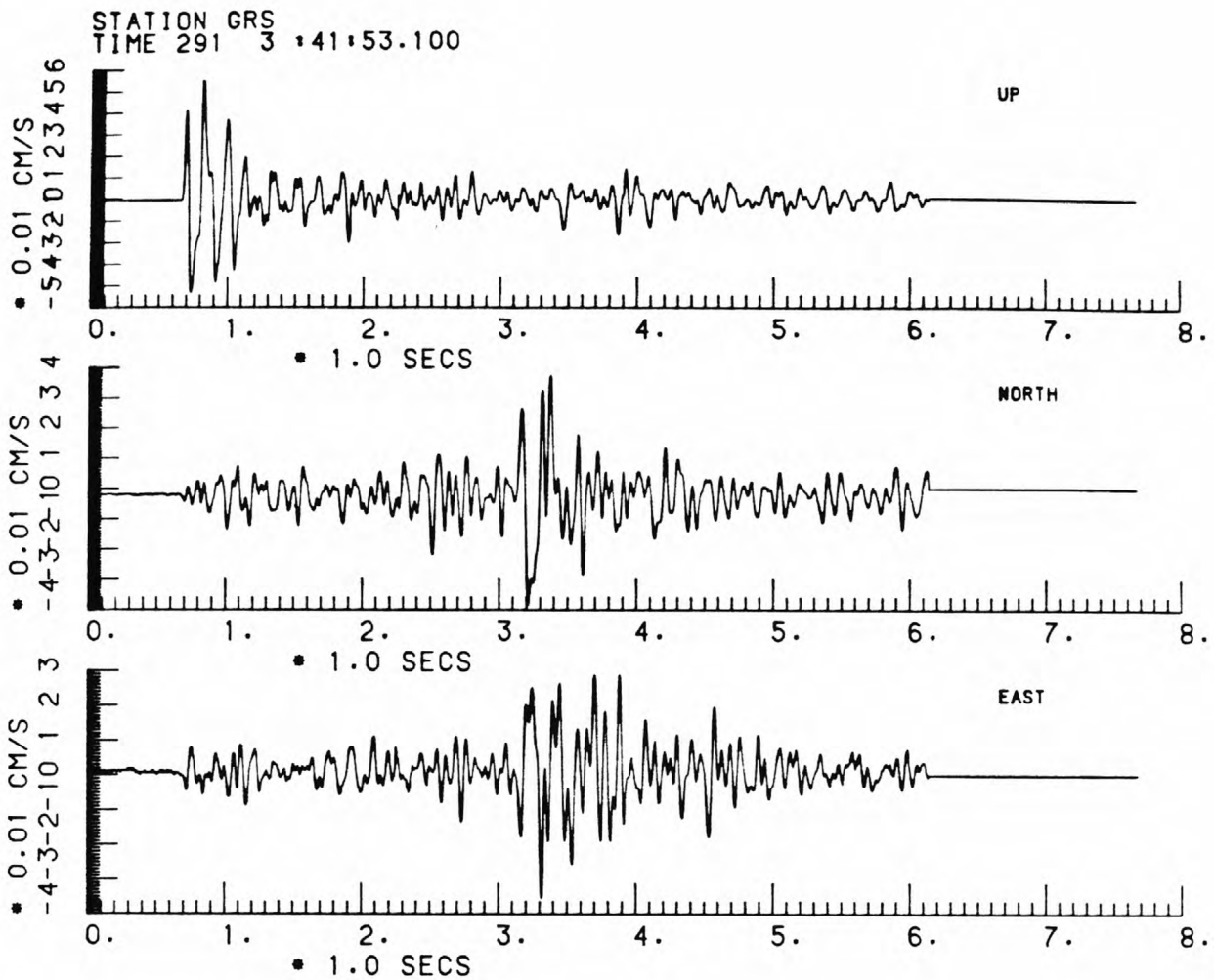
STATION FBR
TIME 291 3 :17:17.550

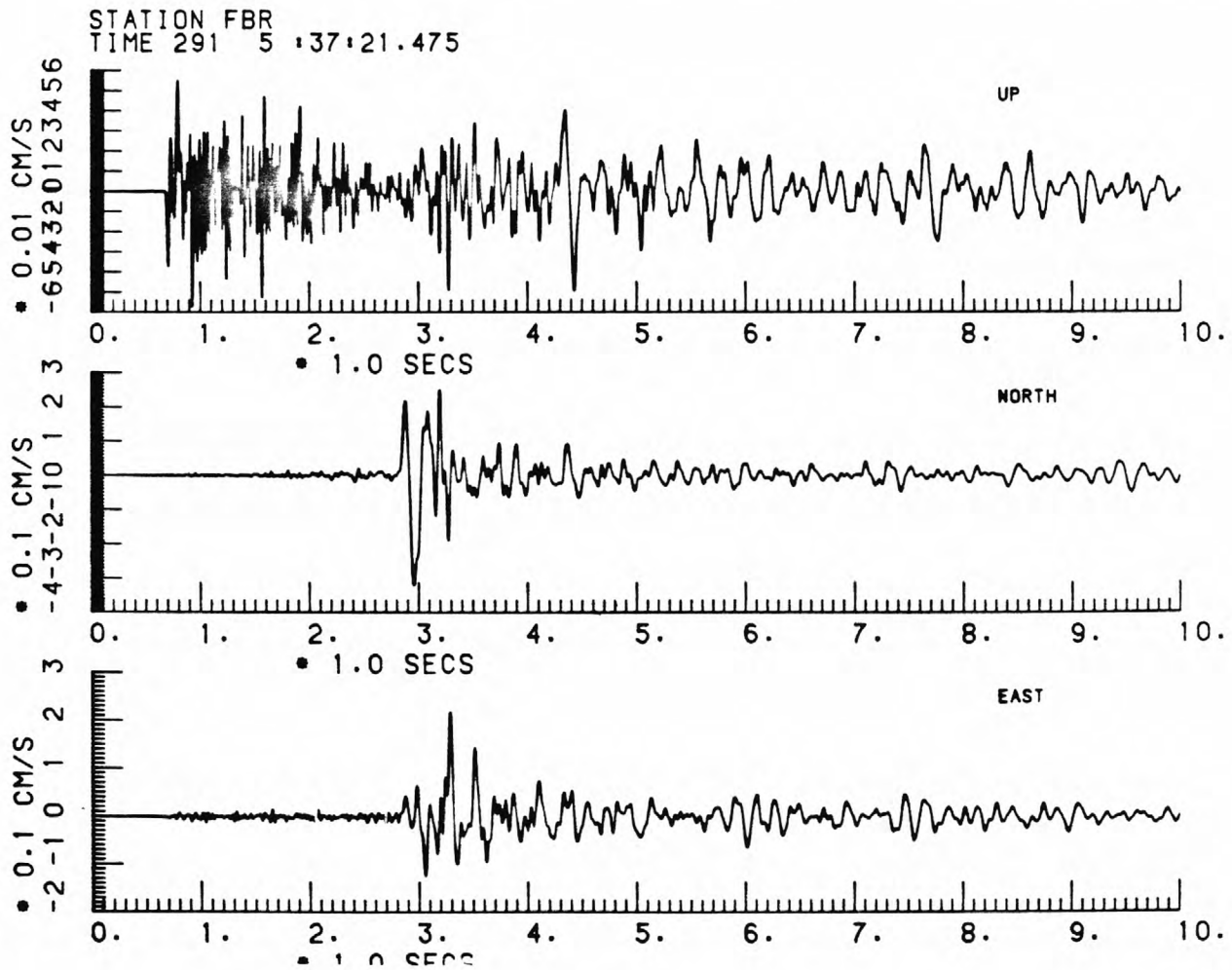
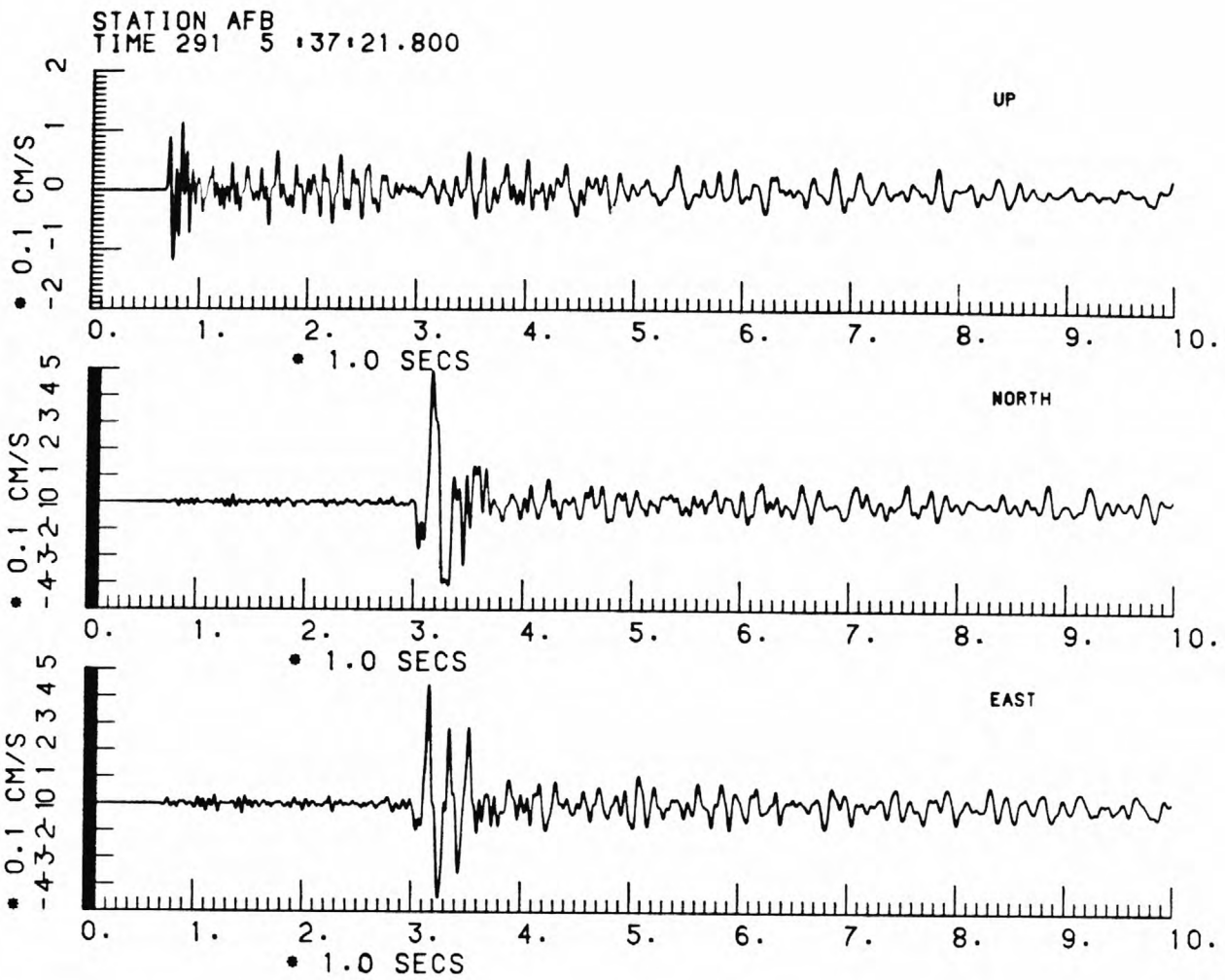


STATION AFB
TIME 291 3 :17:17.826

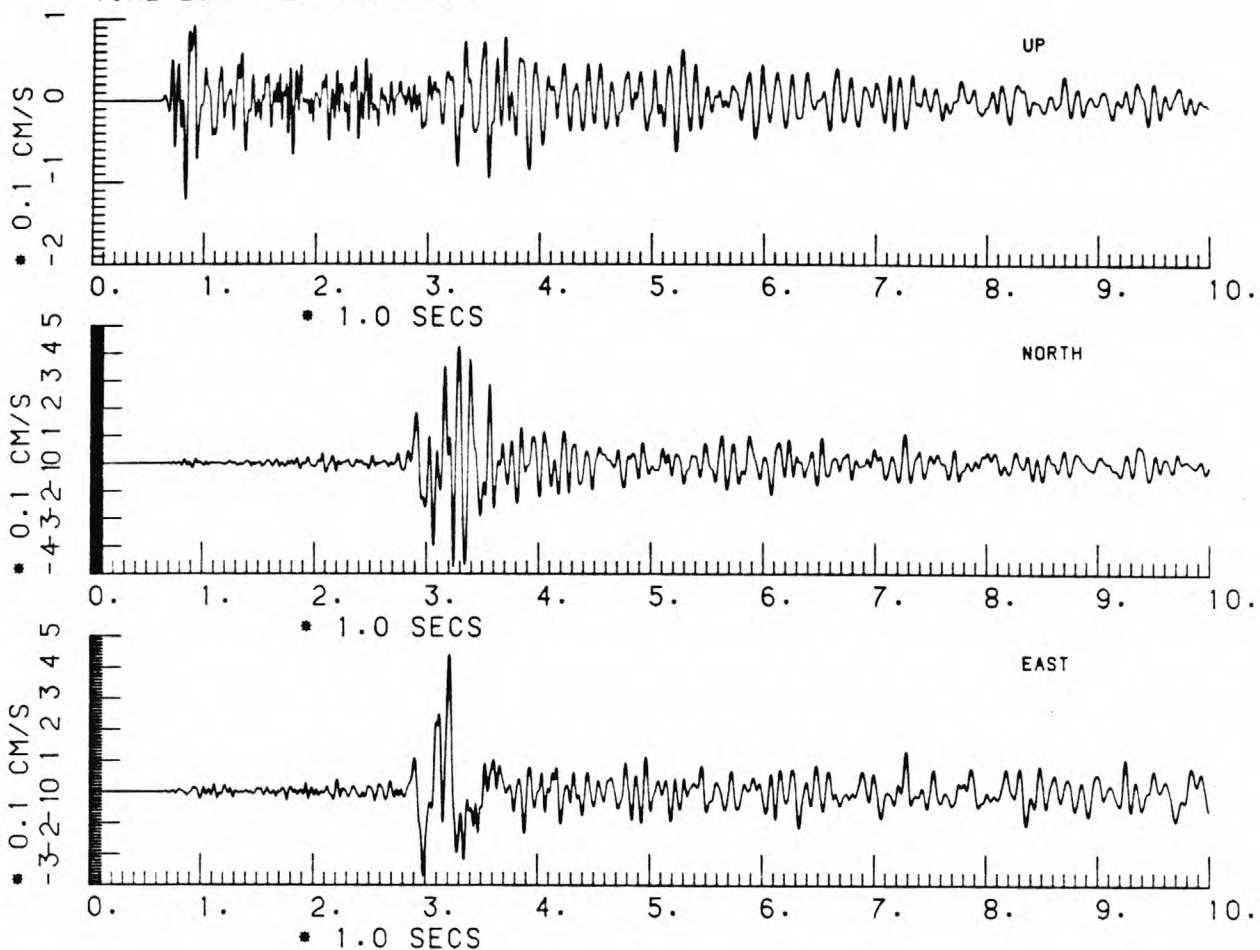




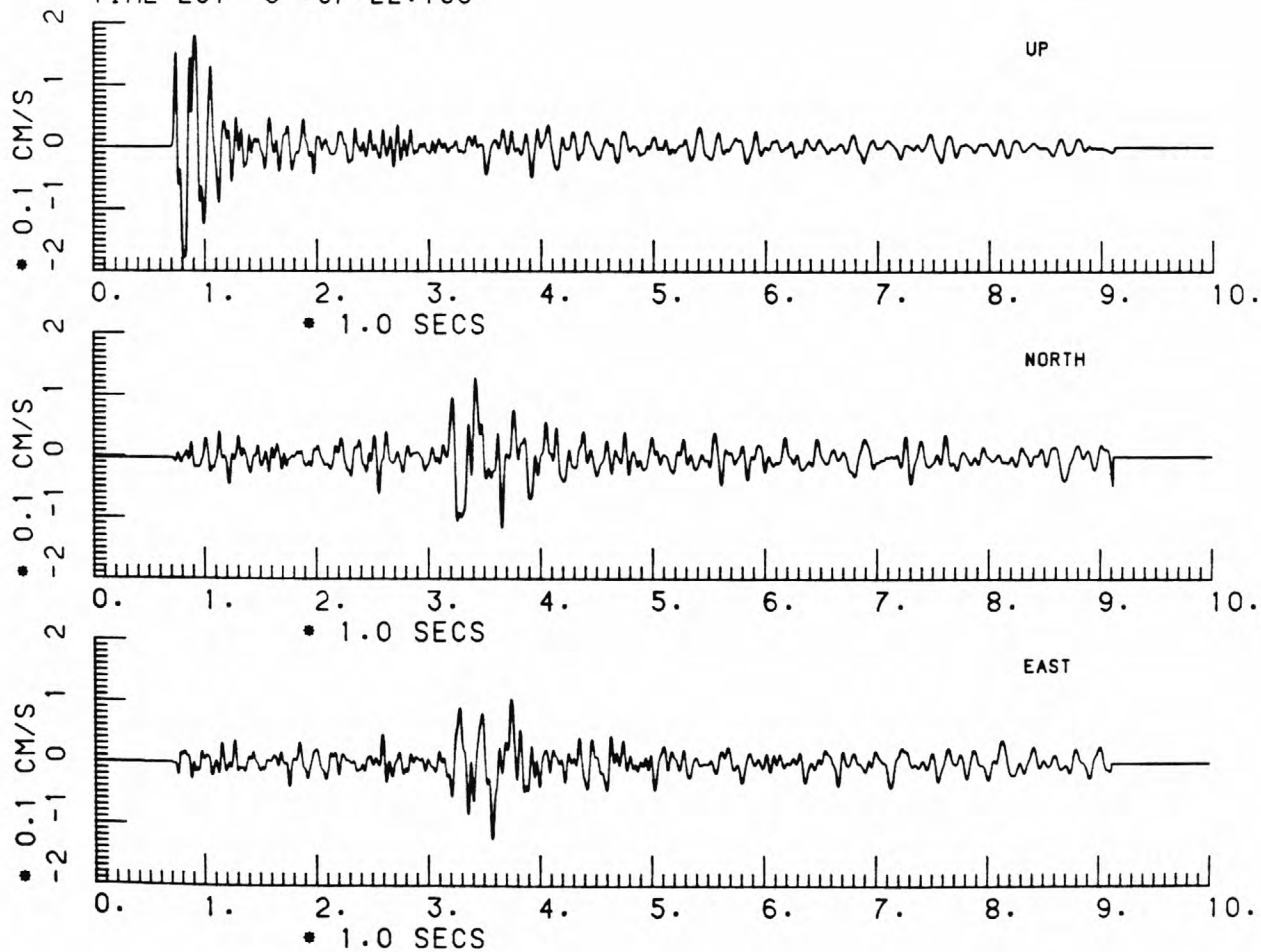




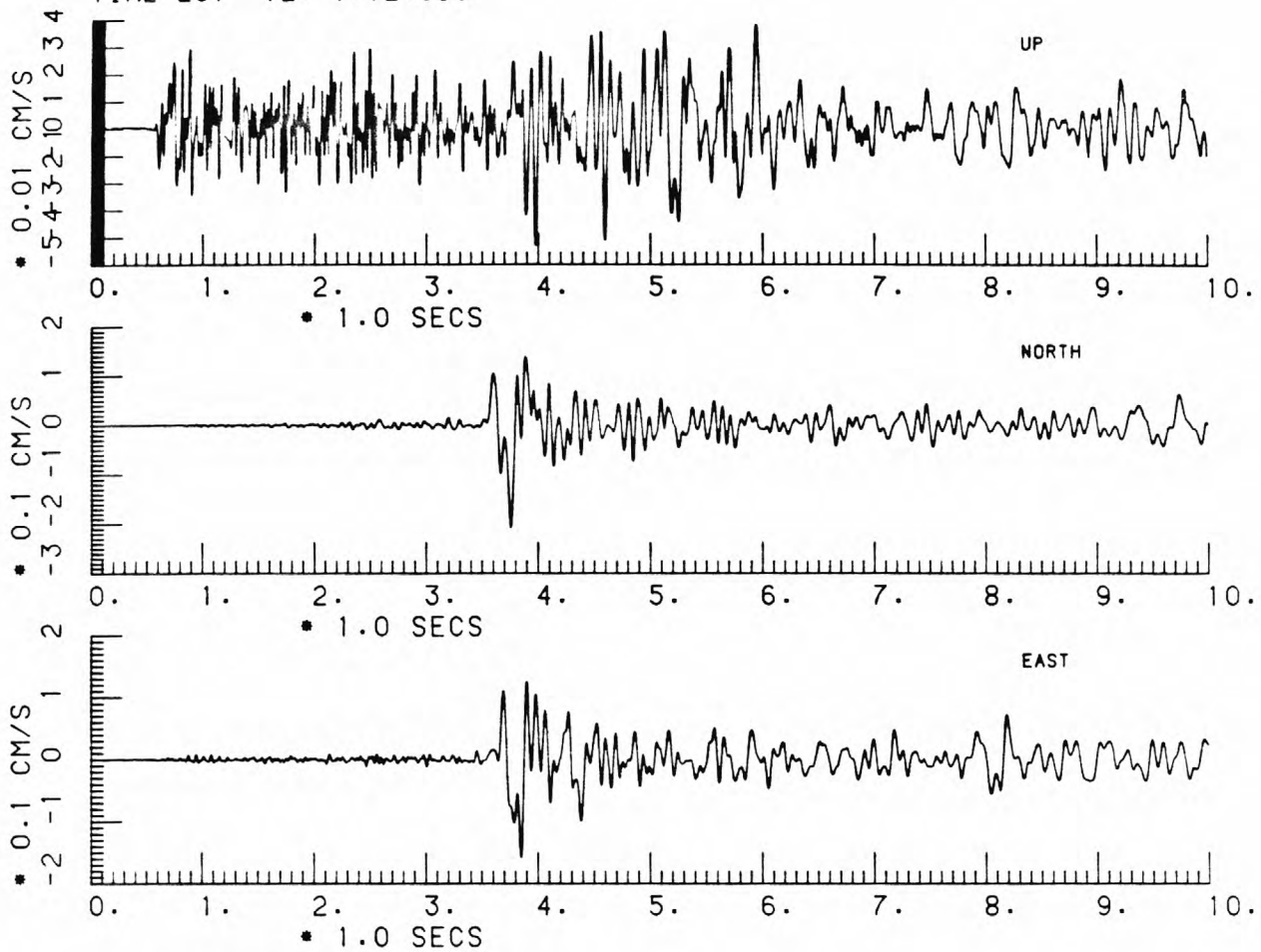
STATION AFB
TIME 291 12: 1:11.030



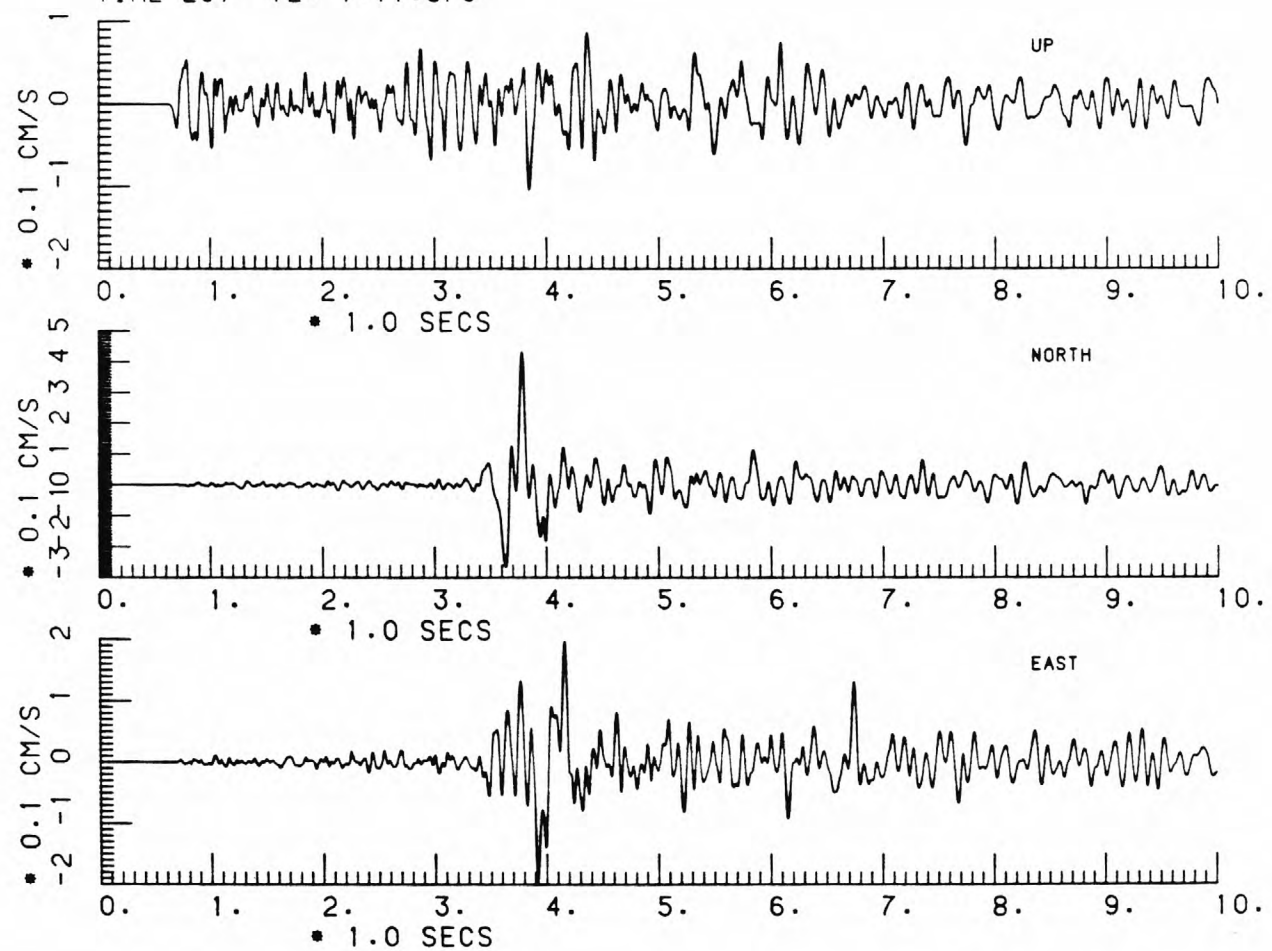
STATION GRS
TIME 291 5 :37:22.135



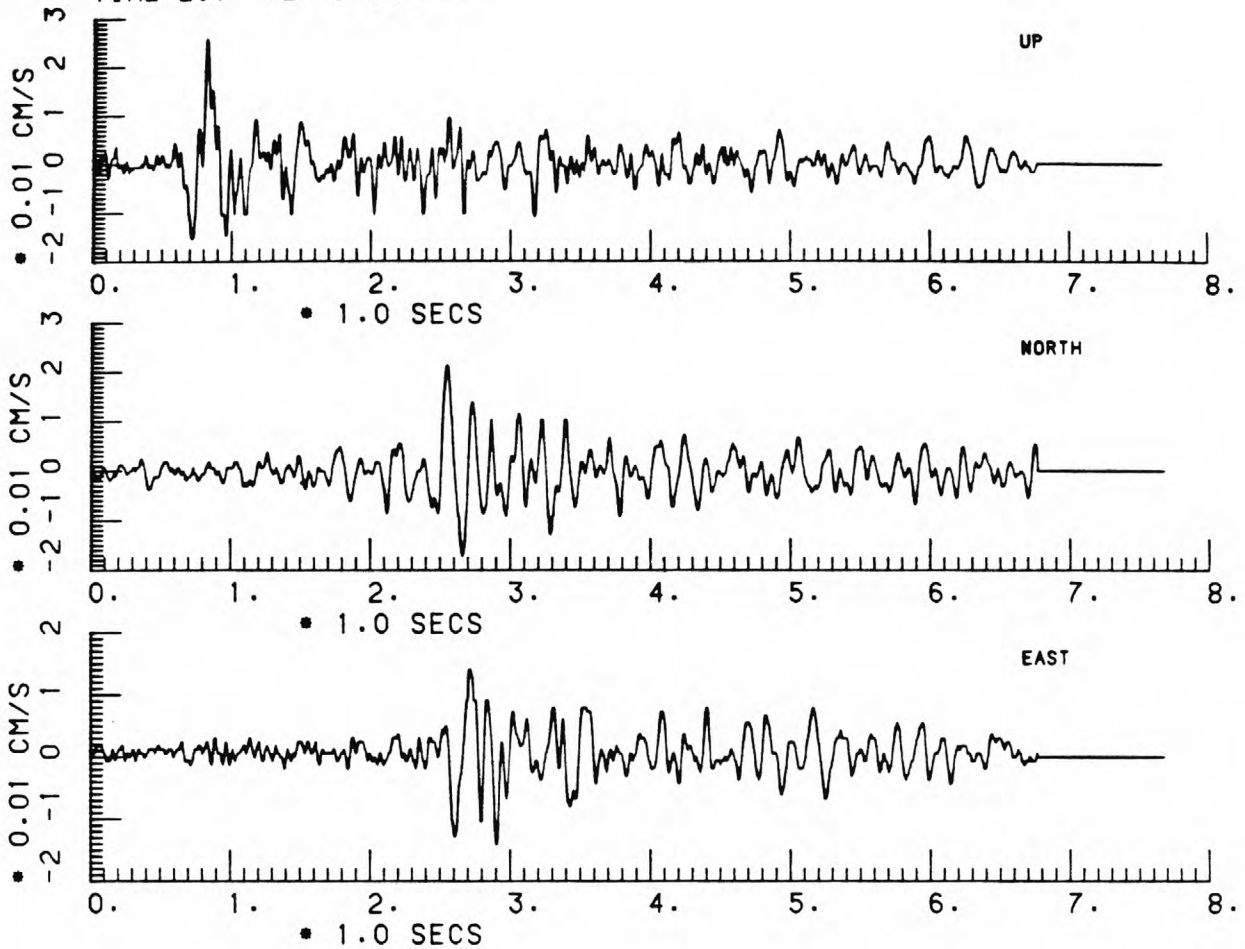
STATION FBR
TIME 291 12: 1:12.080



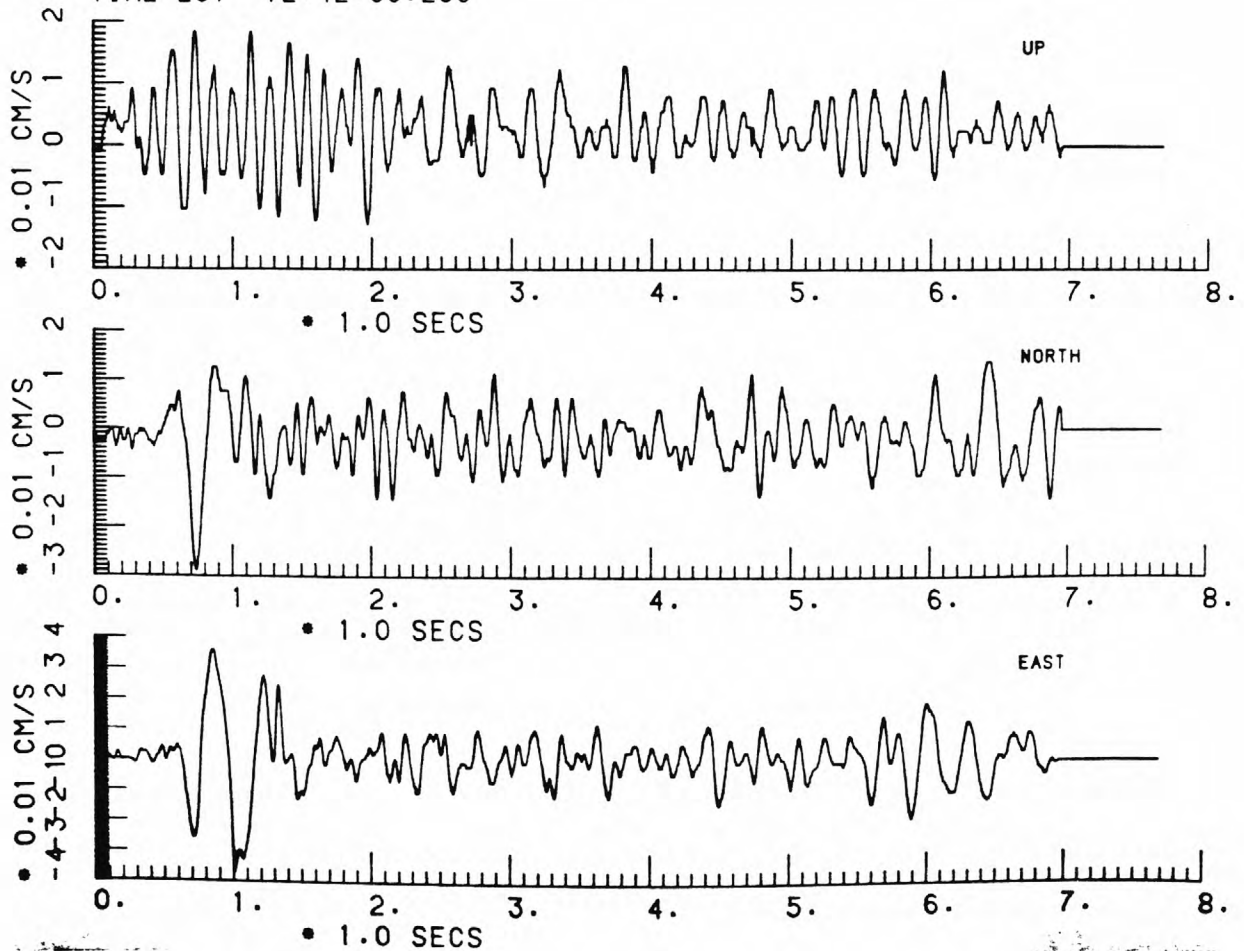
STATION GRS
TIME 291 12: 1:11.870

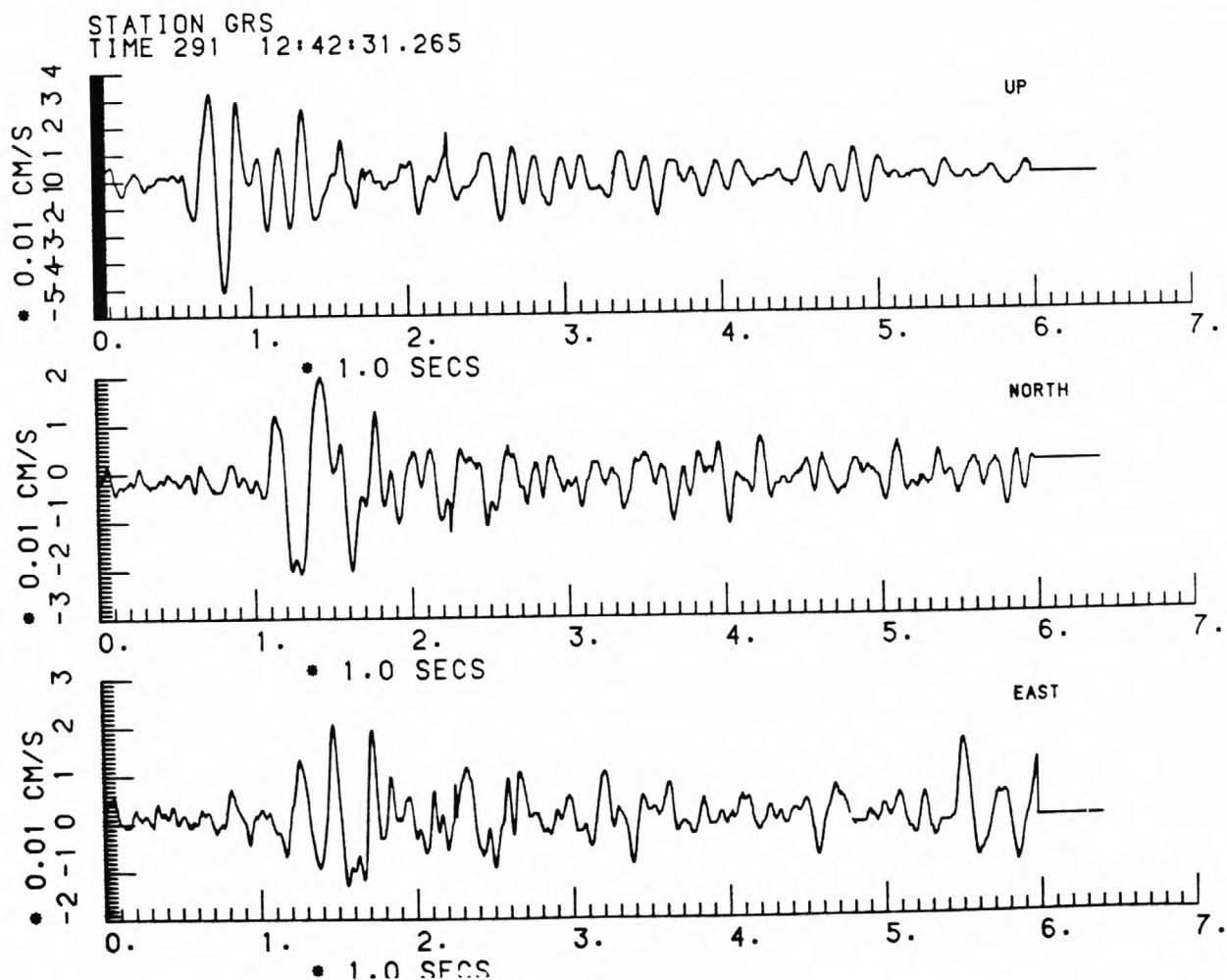
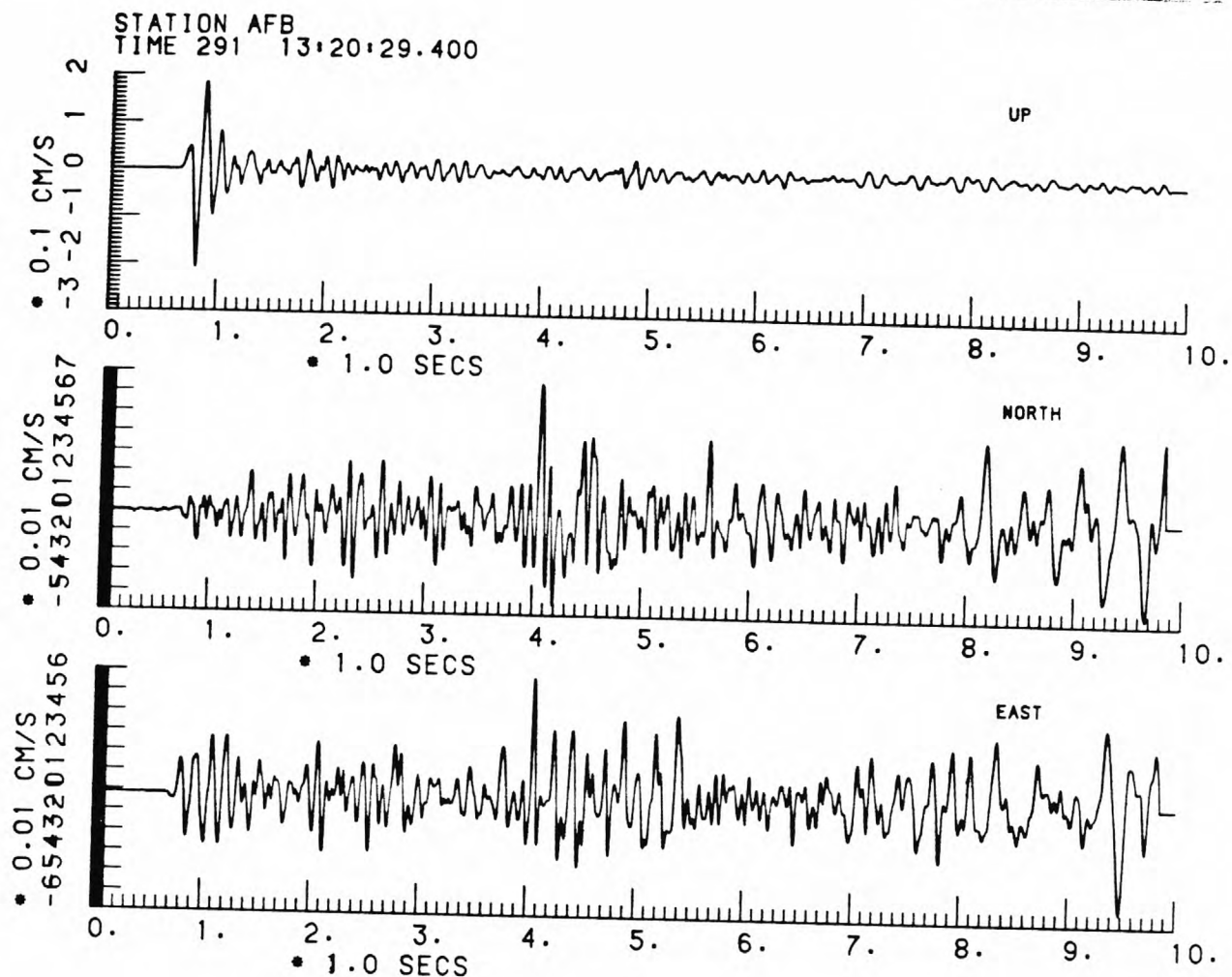


STATION FBR
TIME 291 12:42:28.470

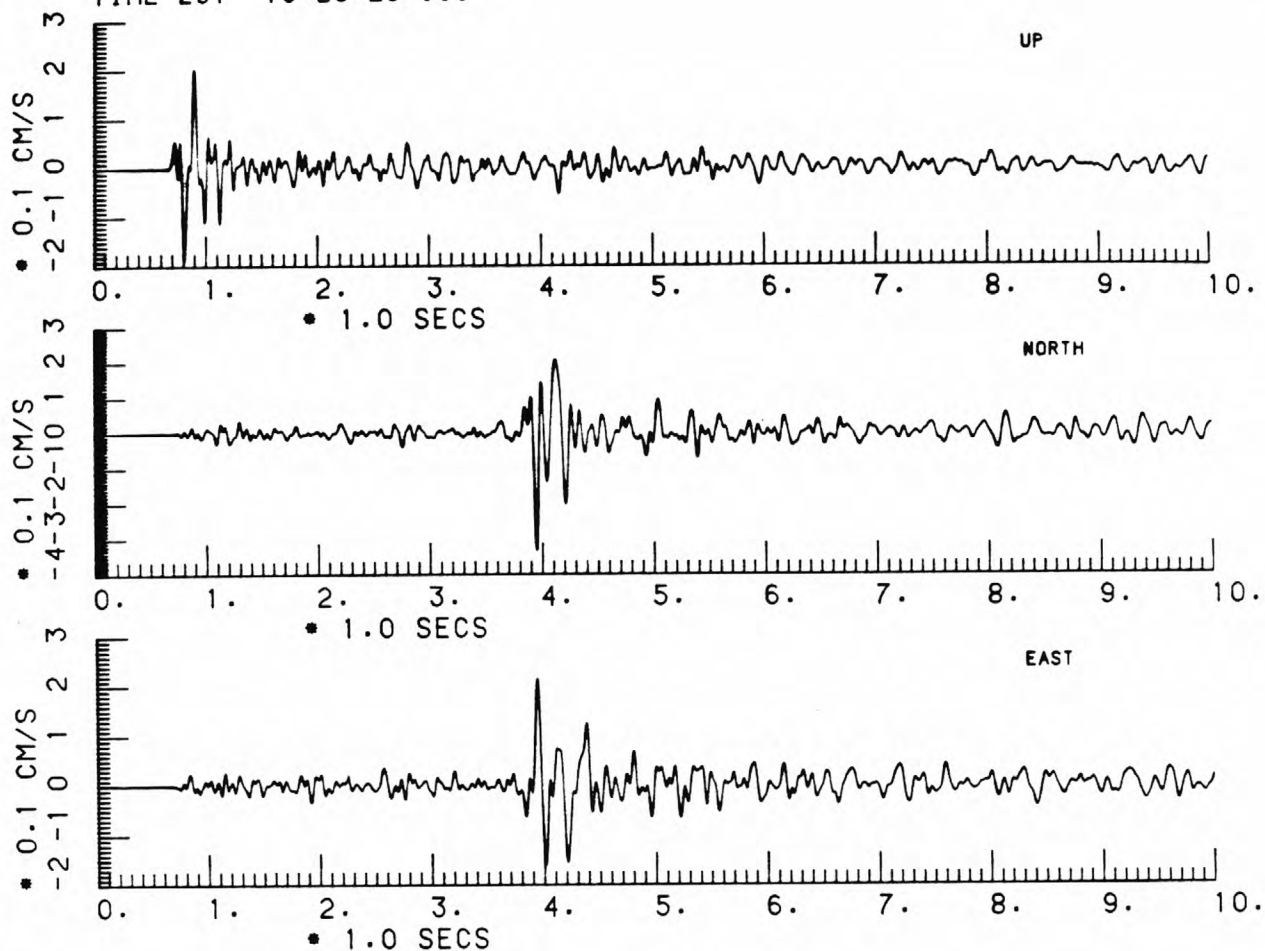


STATION AFB
TIME 291 12:42:30.290

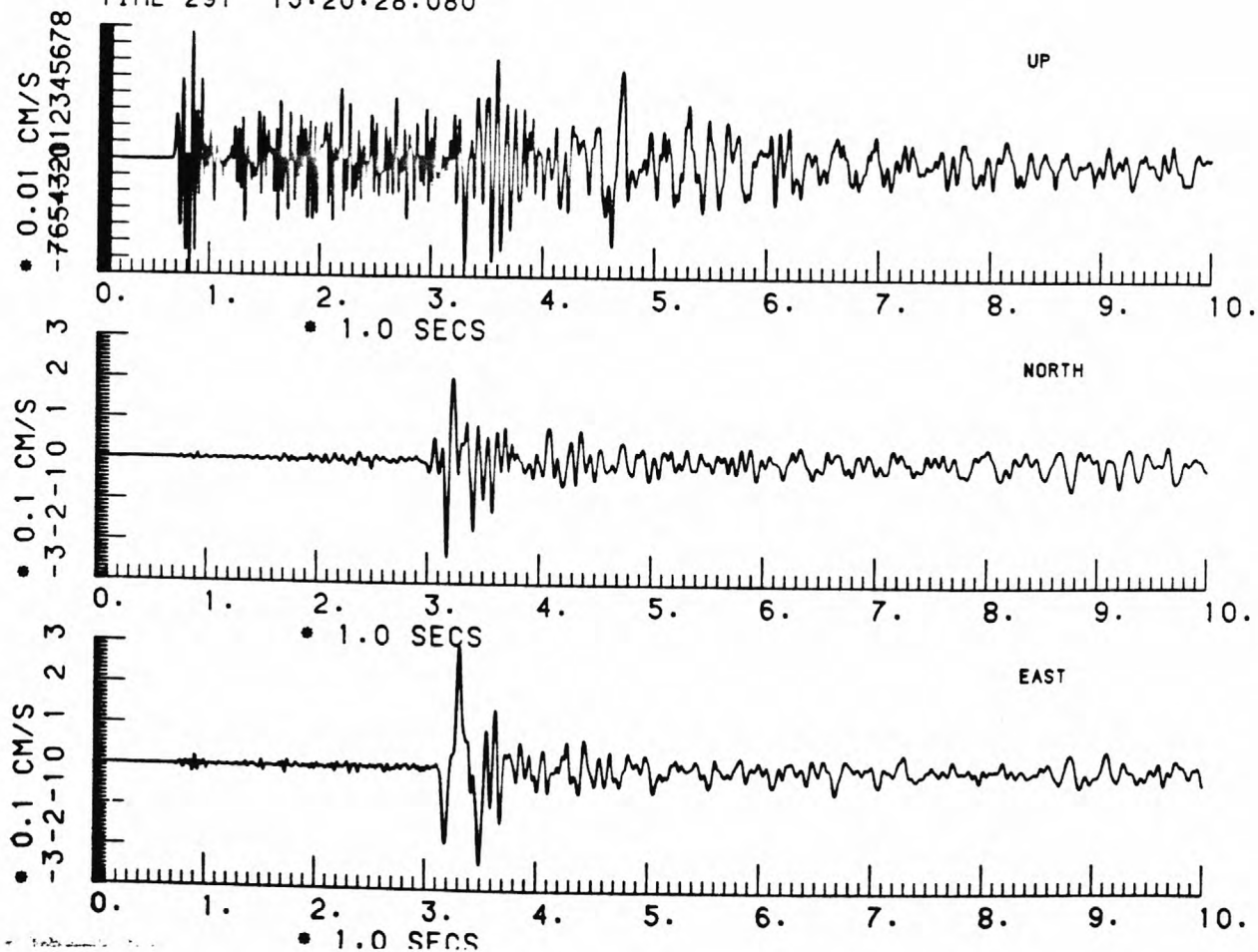


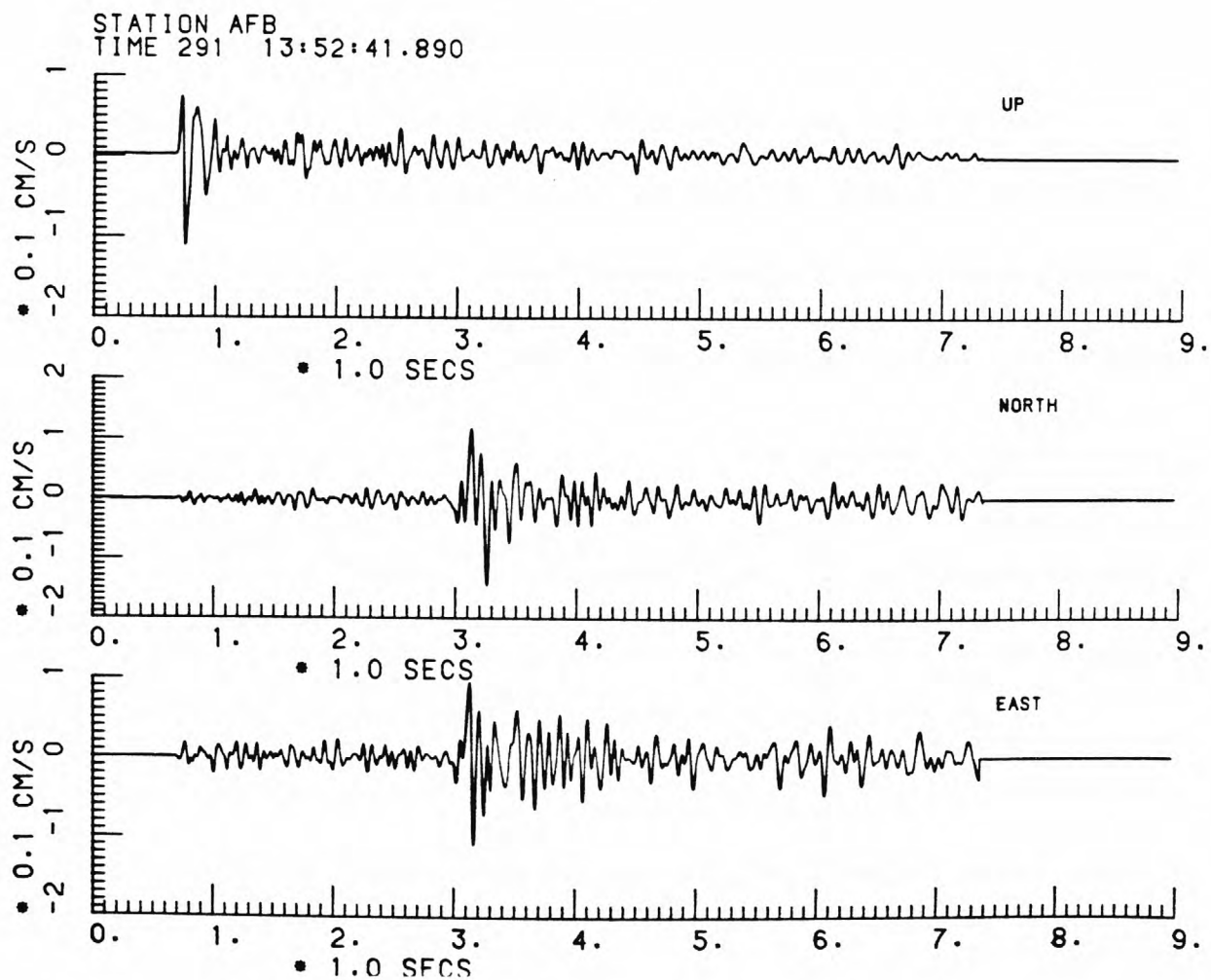
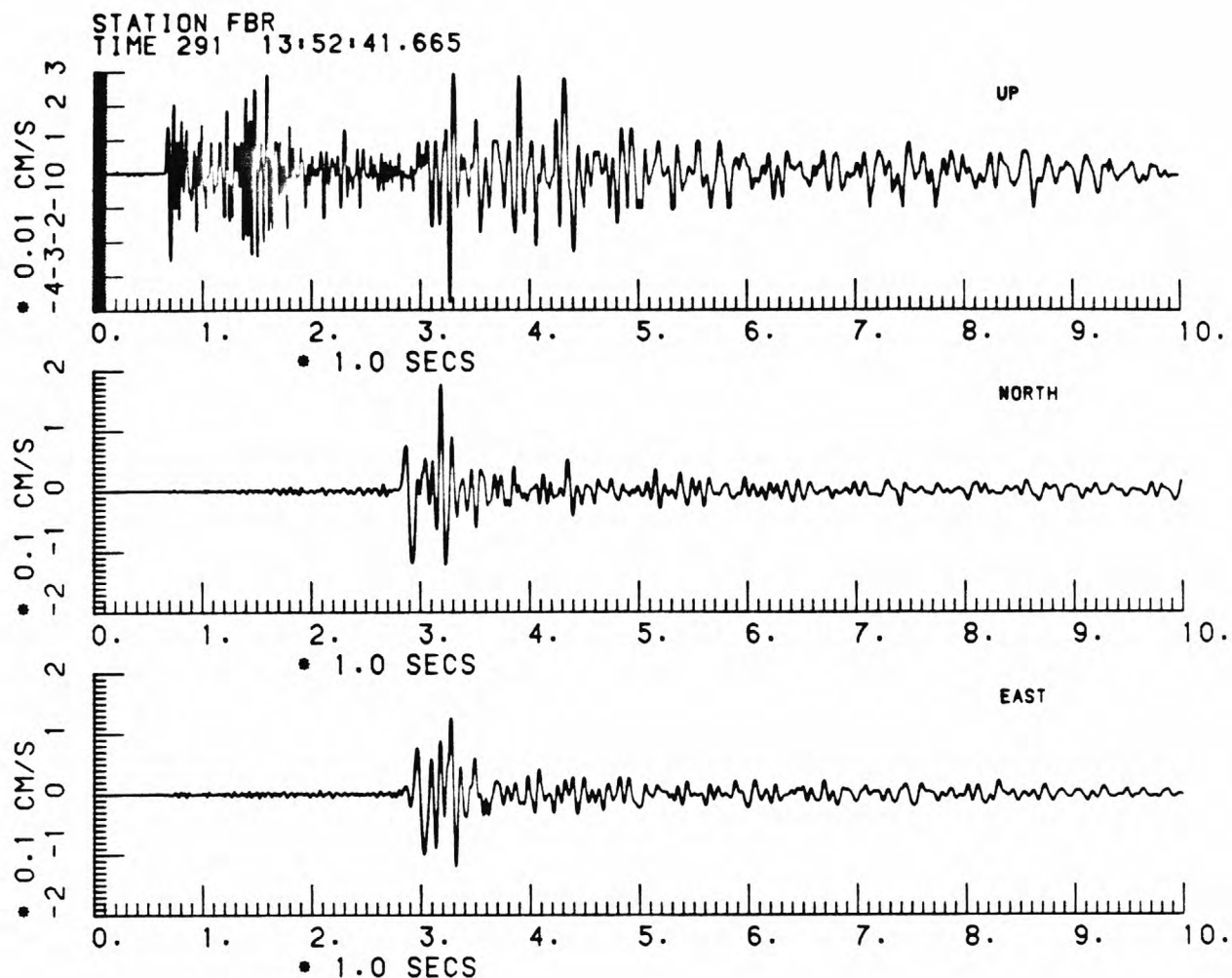


STATION GRS
TIME 291 13:20:29.530

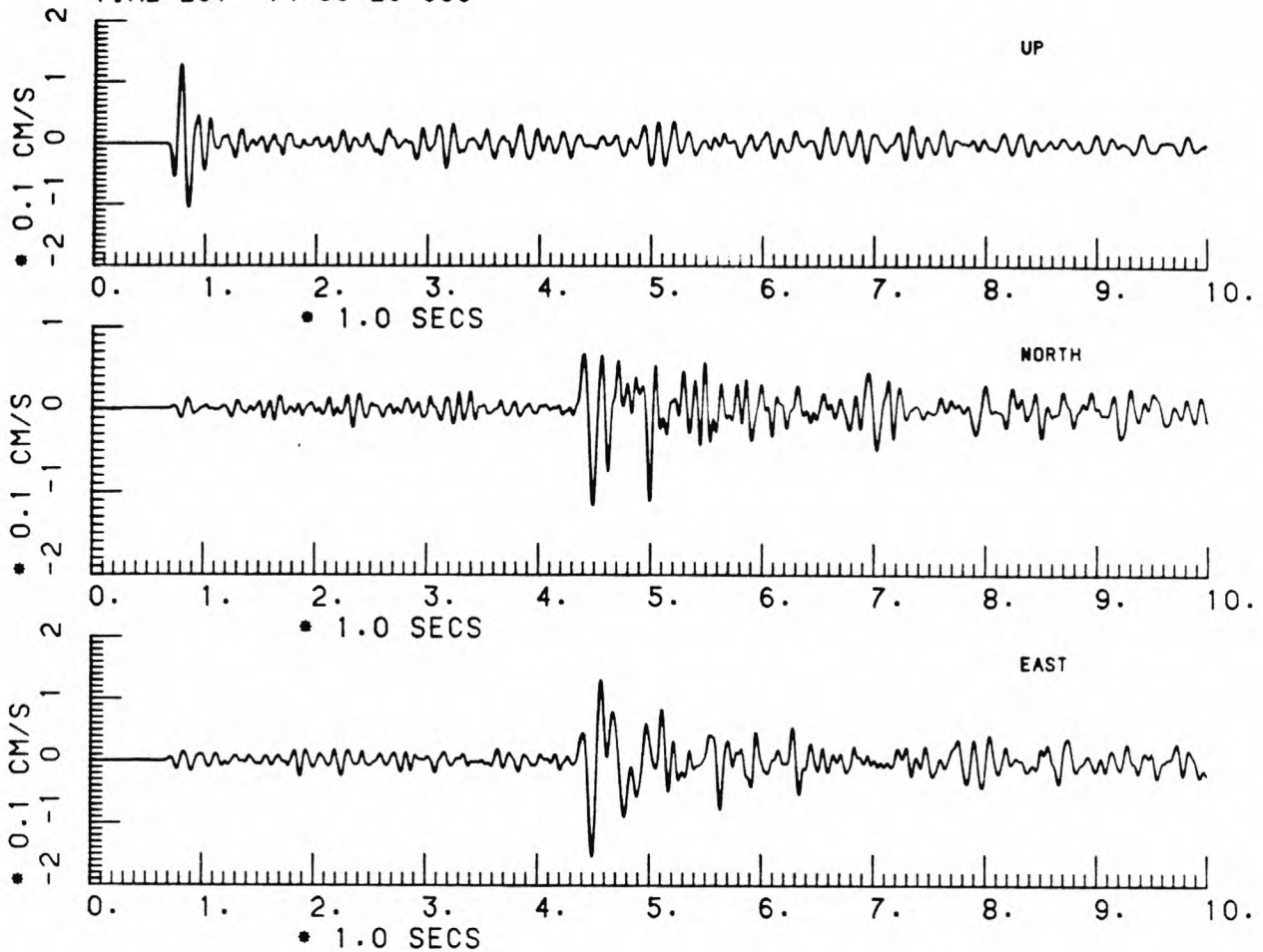


STATION FBR
TIME 291 13:20:28.080

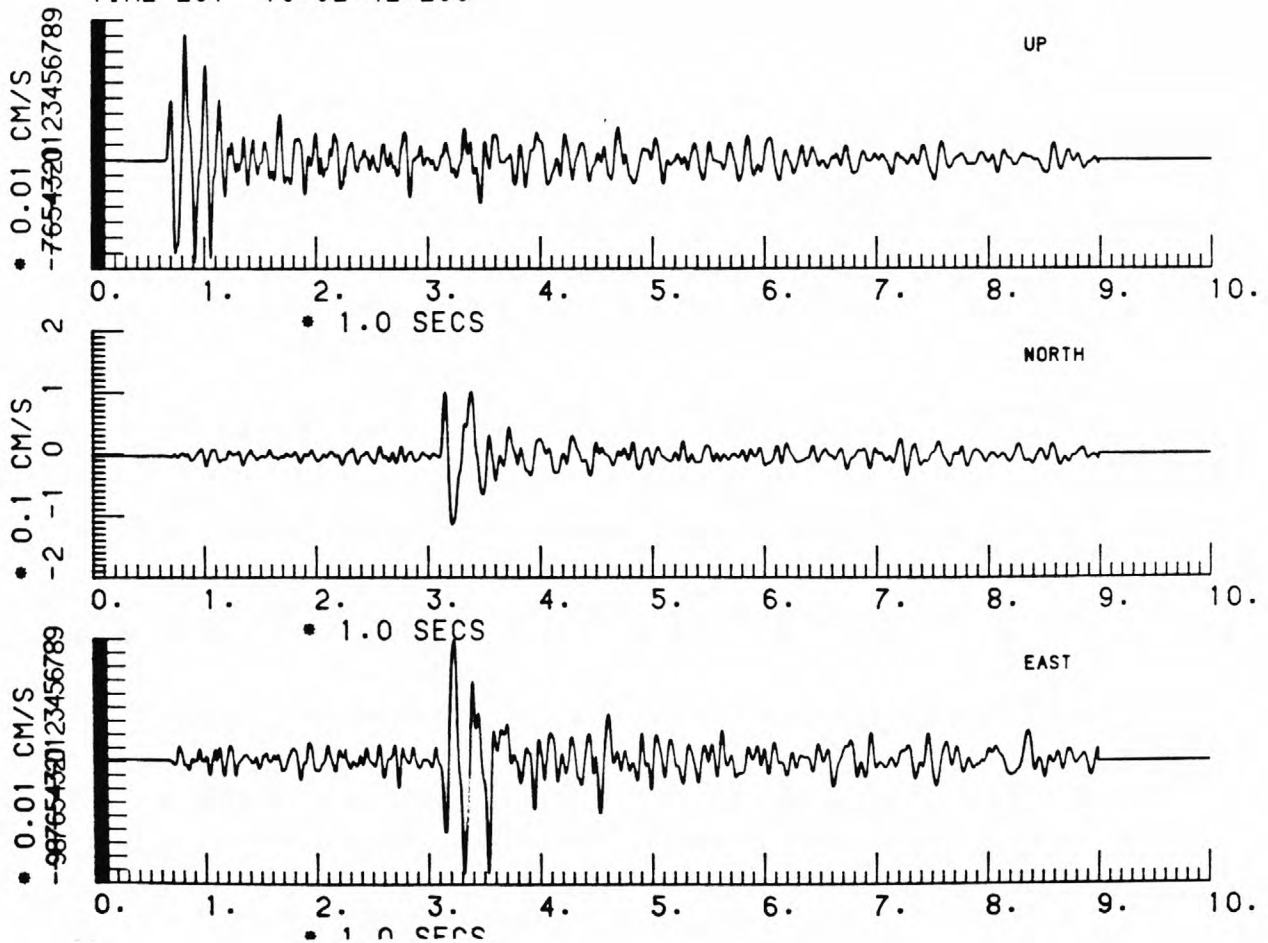




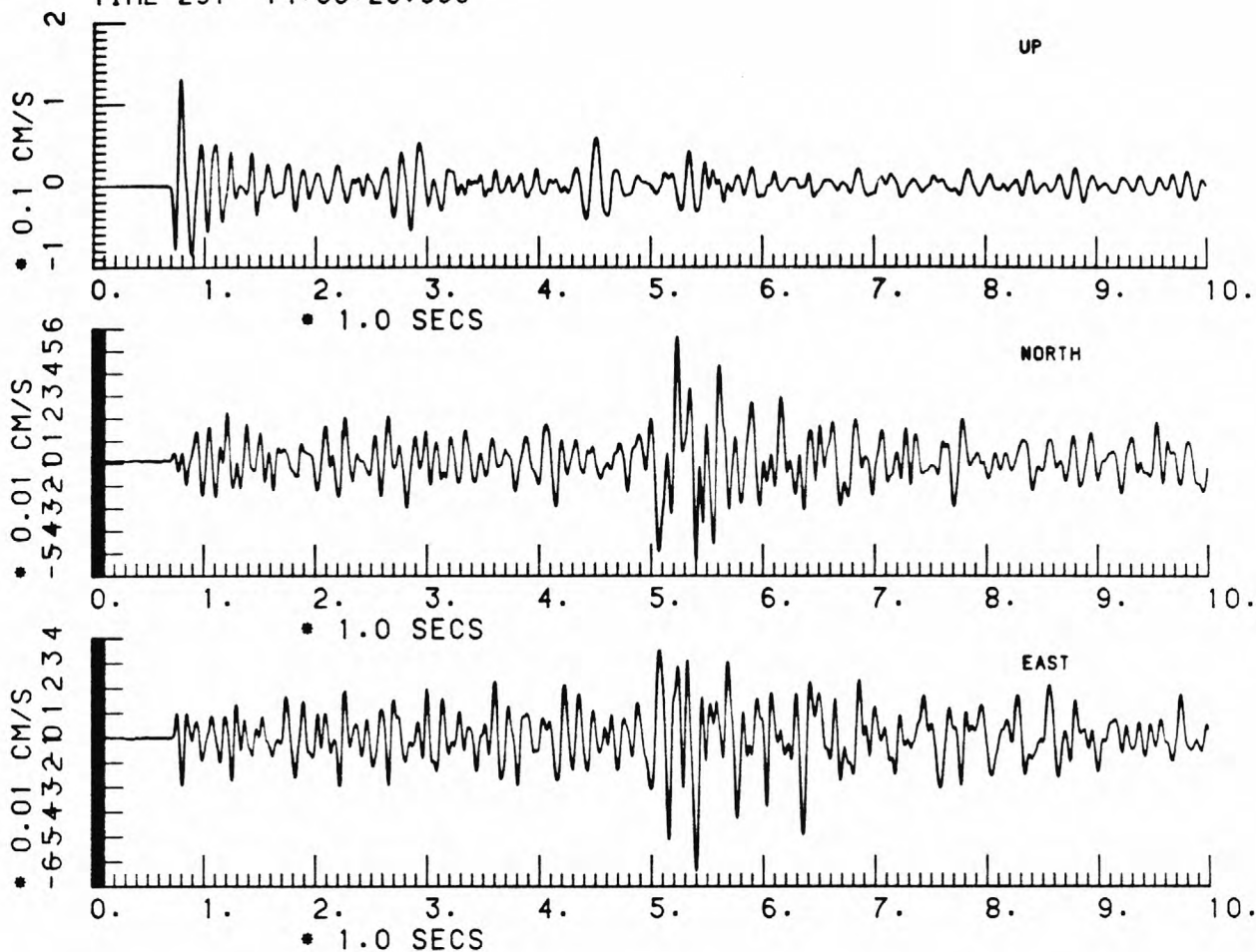
STATION AFB
TIME 291 14:56:23.030



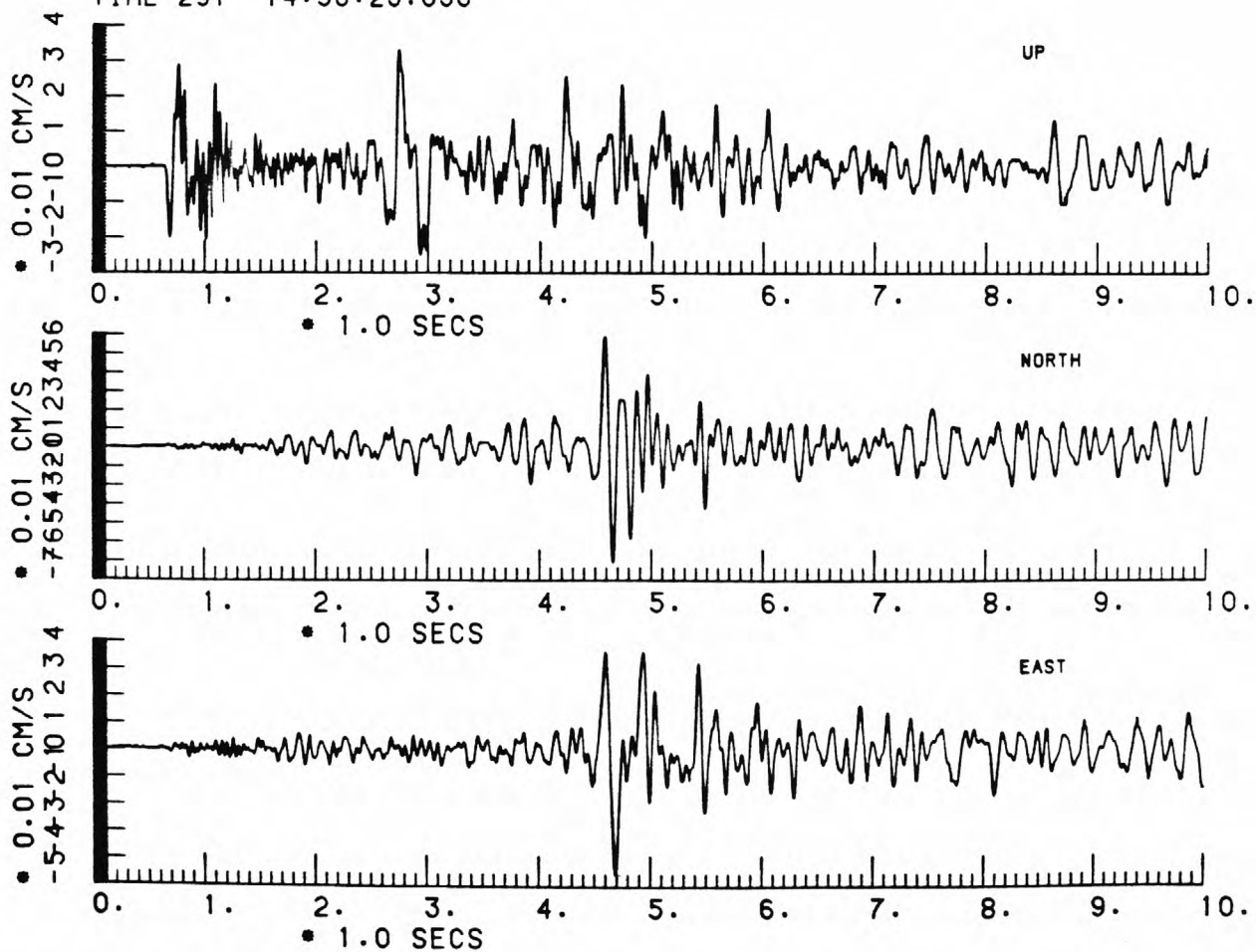
STATION GRS
TIME 291 13:52:42.256



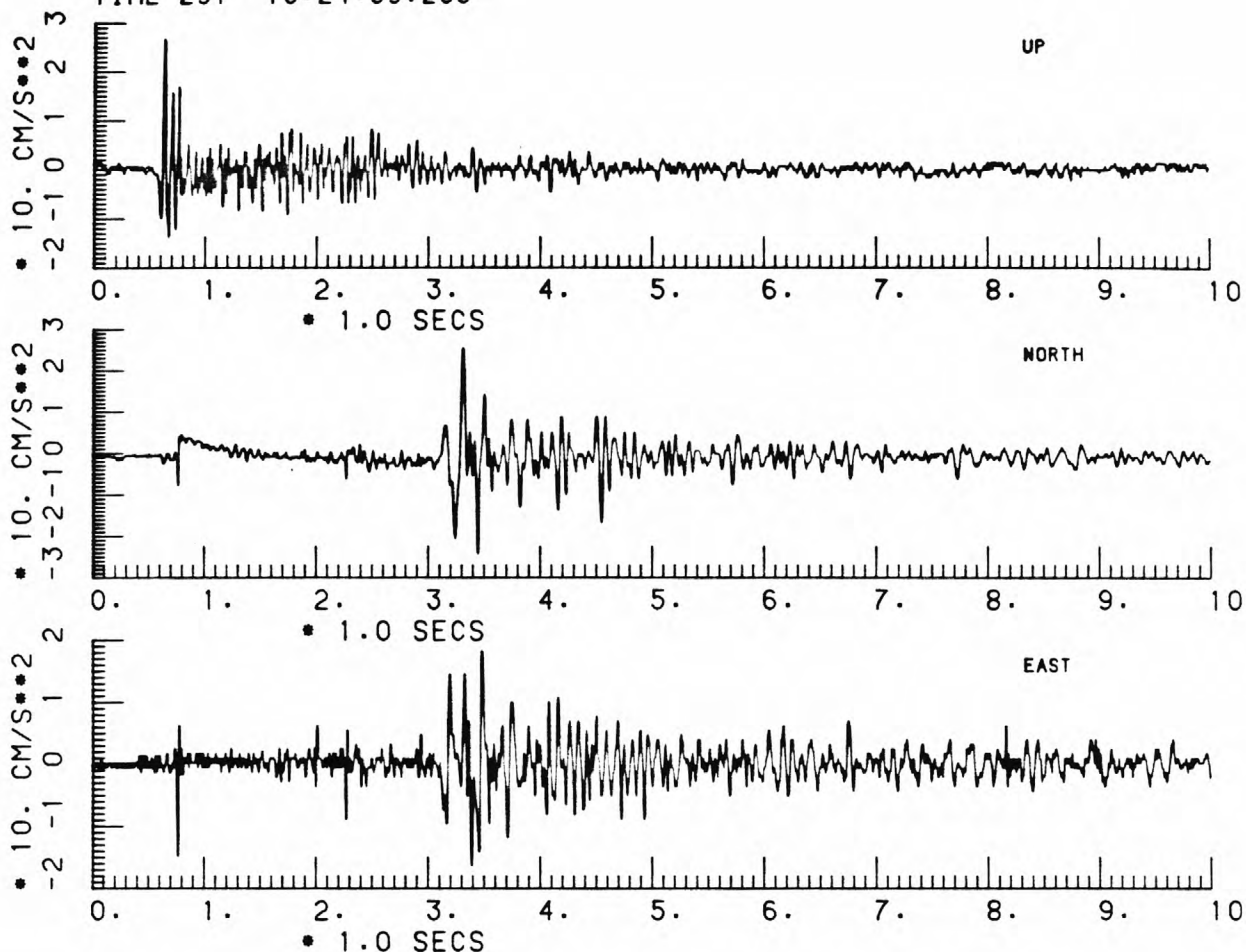
STATION GRS
TIME 291 14:56:23.996



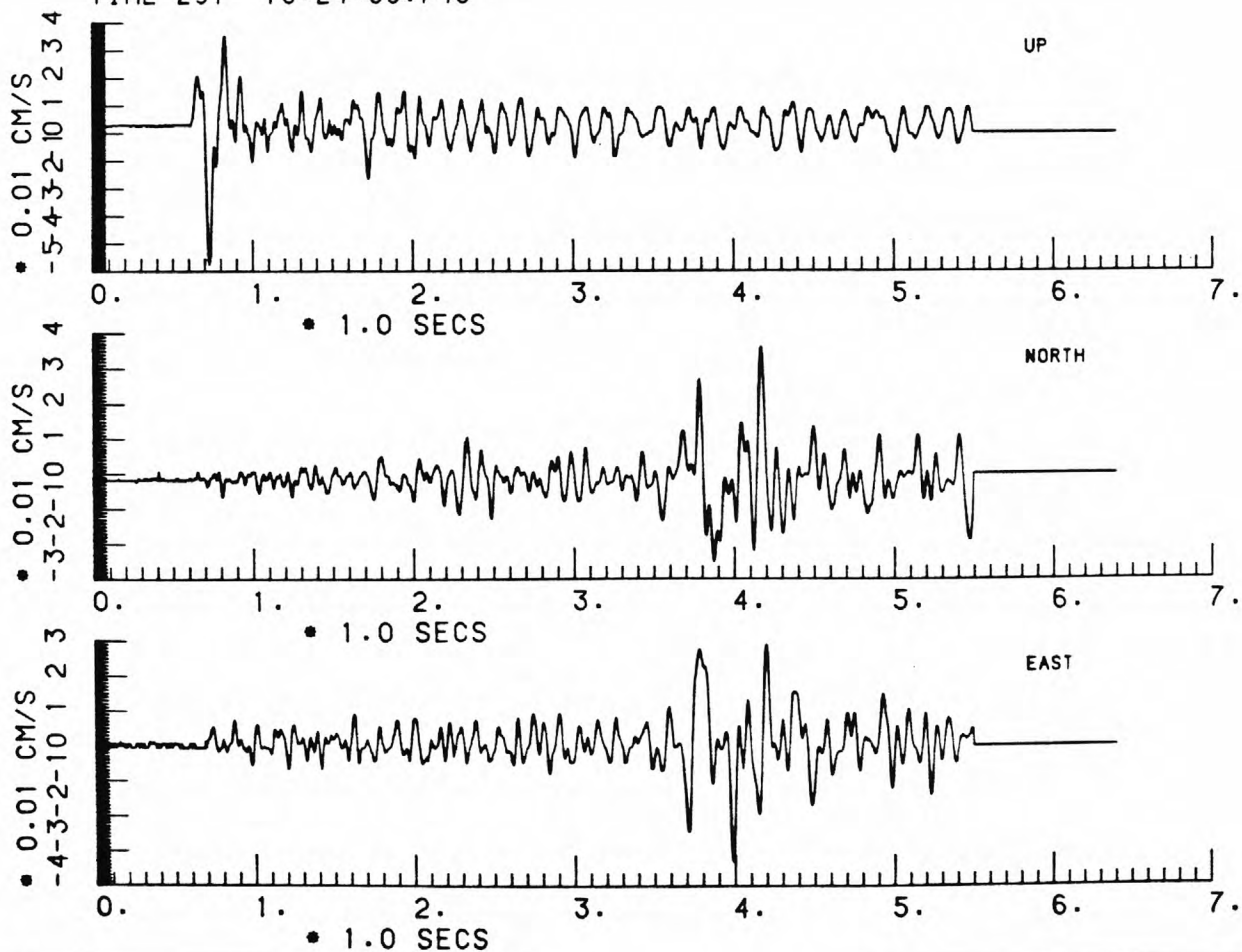
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TIME 291 14:56:23.030



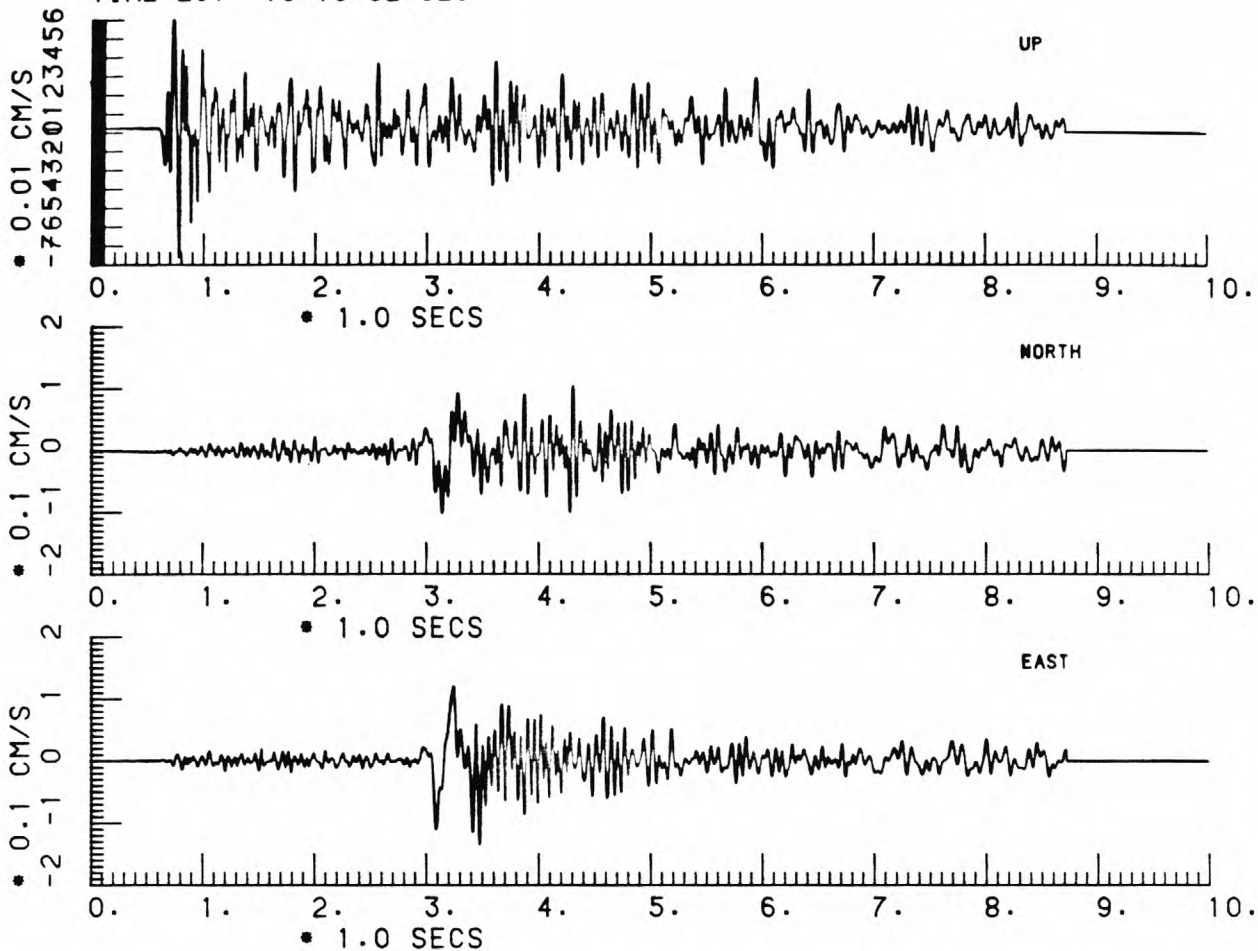
STATION CFG
TIME 291 16:24:39.235



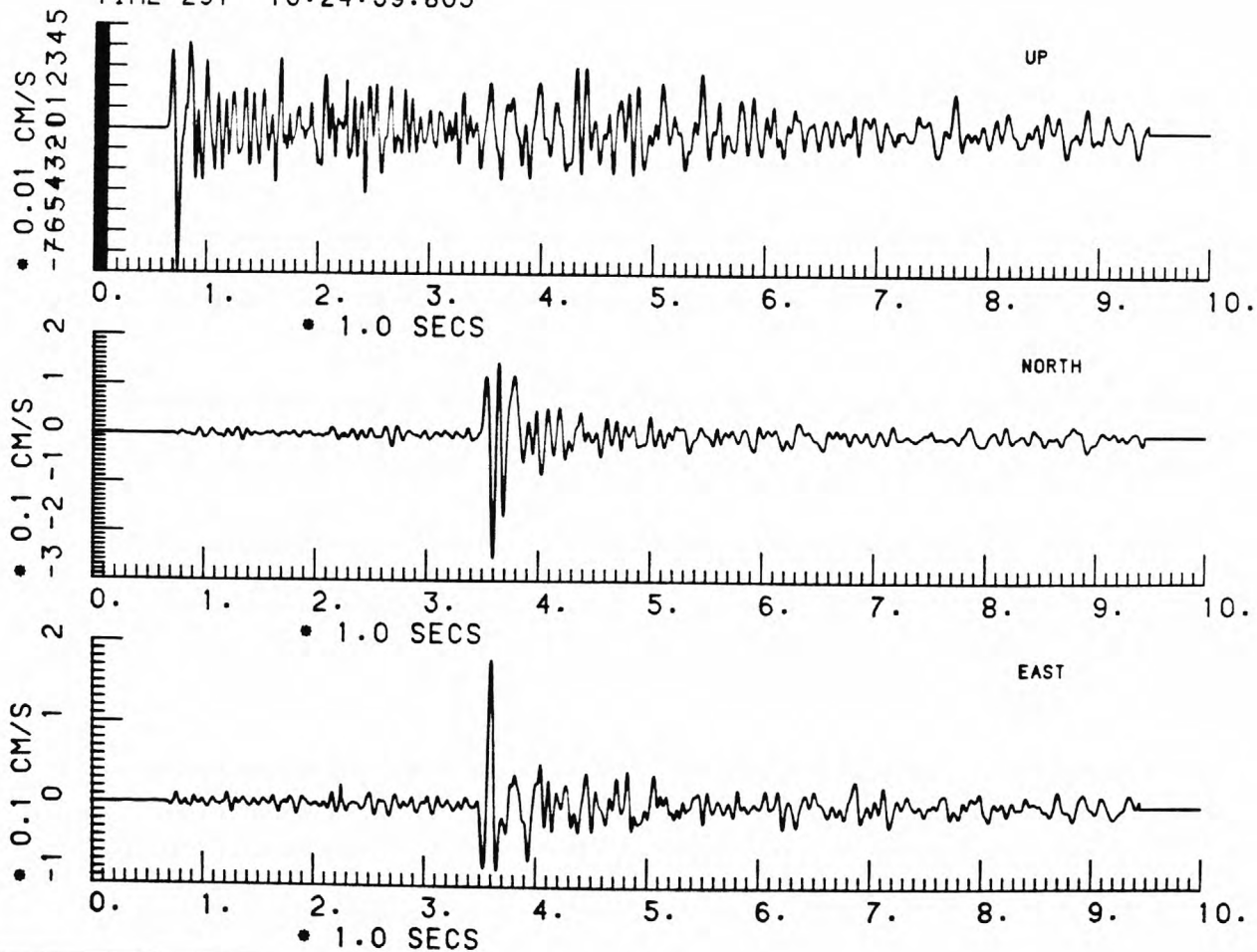
STATION AFB
TIME 291 16:24:39.745



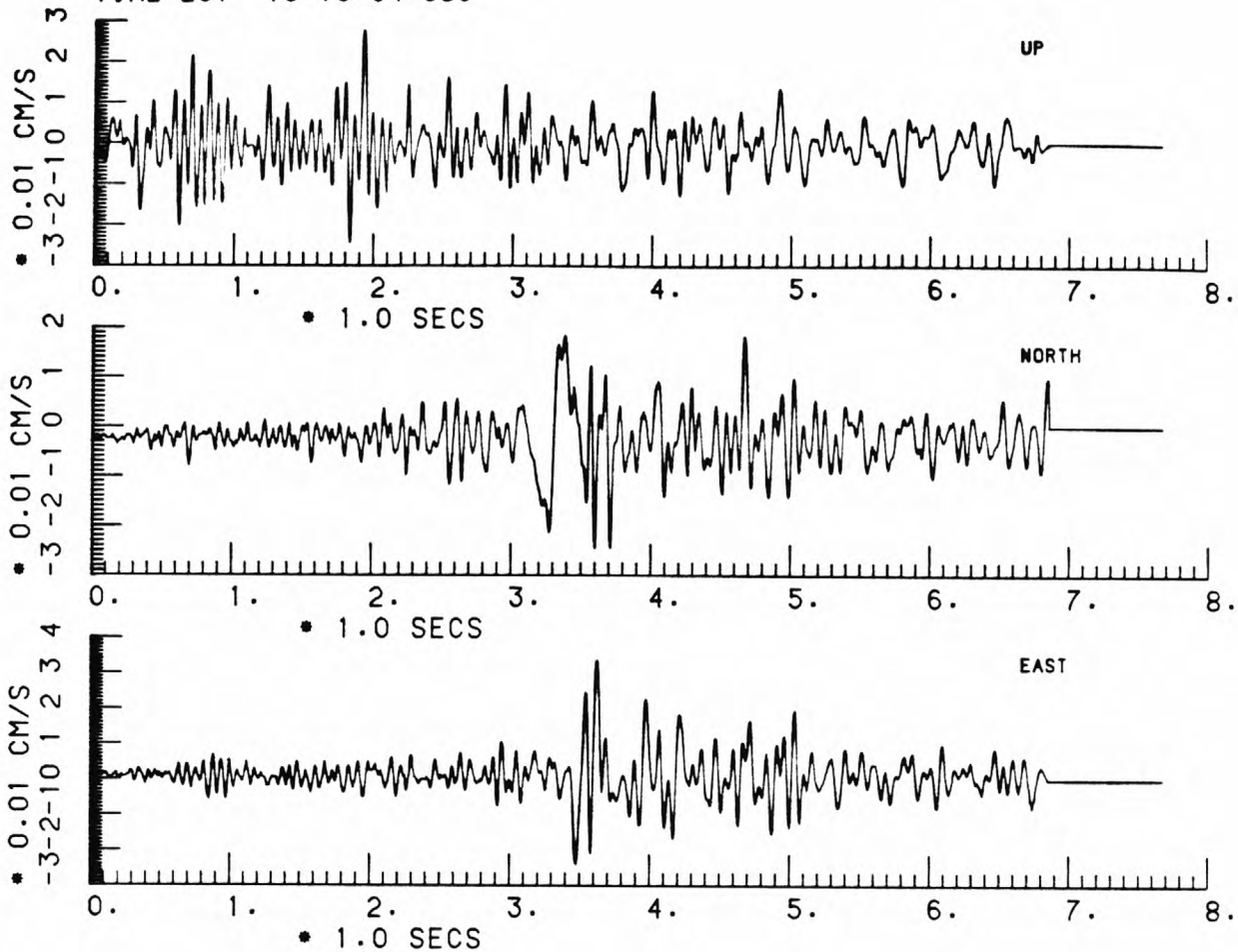
STATION AFB
TIME 291 19:10:52.520



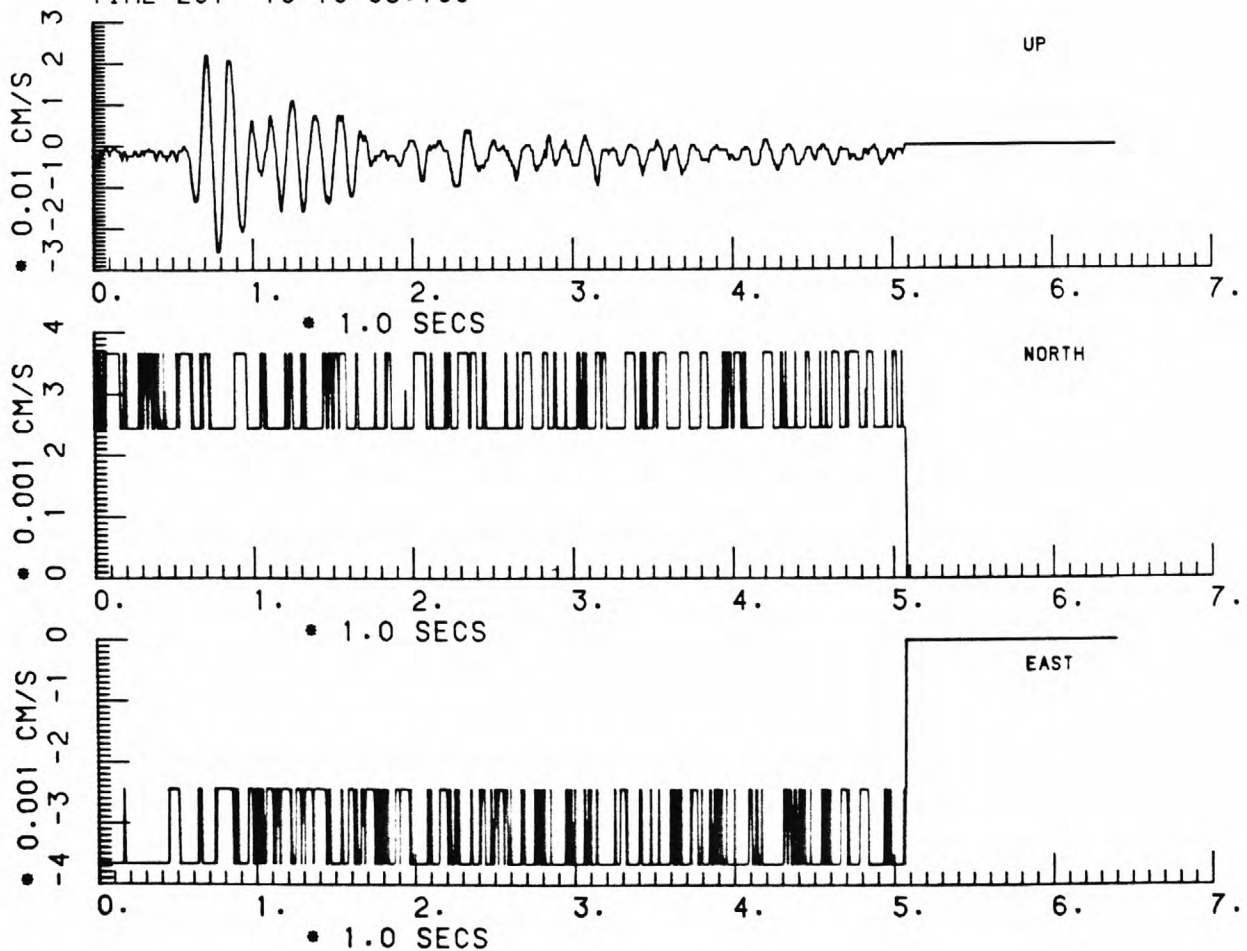
STATION GRS
TIME 291 16:24:39.805



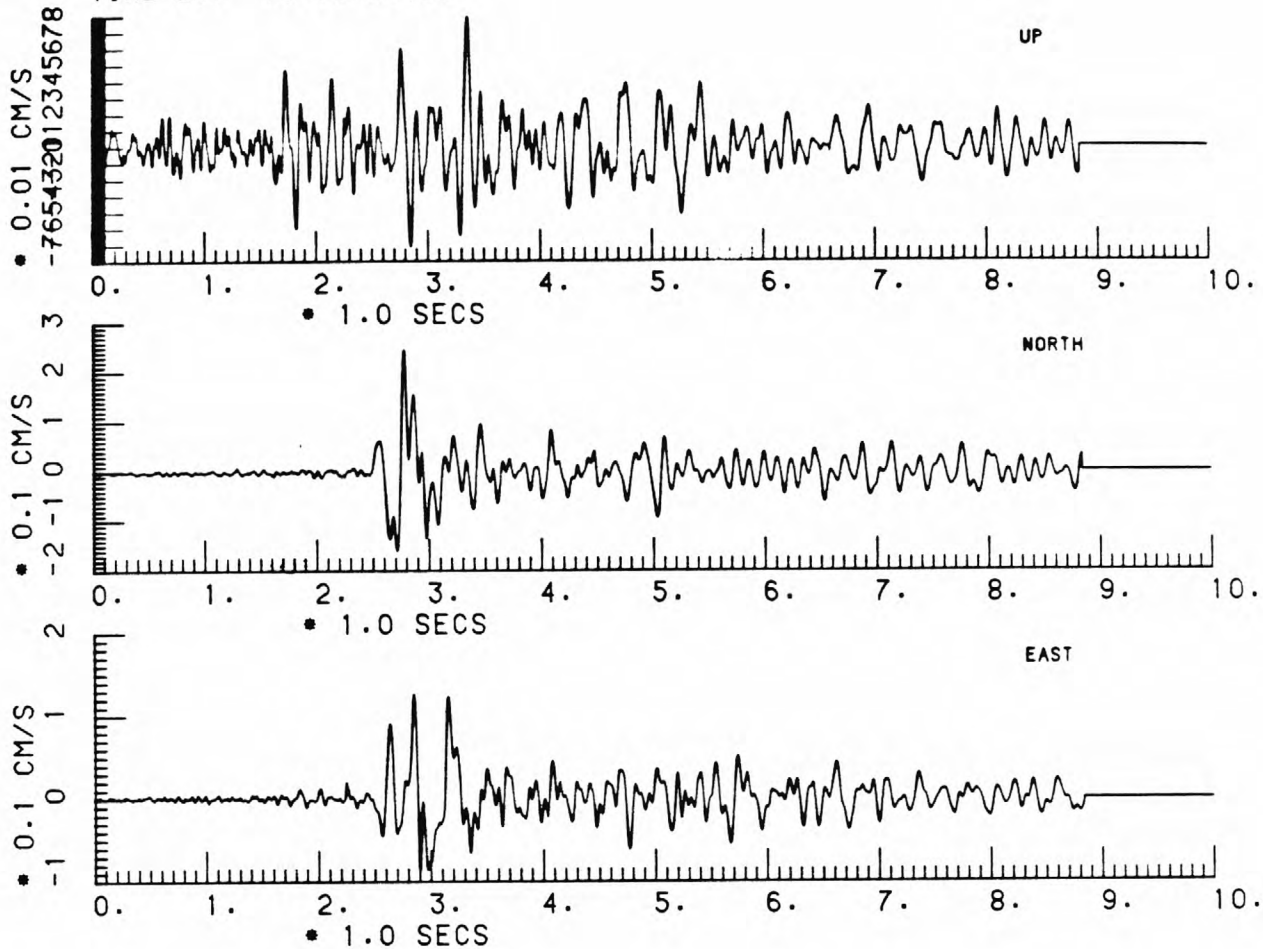
STATION GRS
TIME 291 19:10:54.385



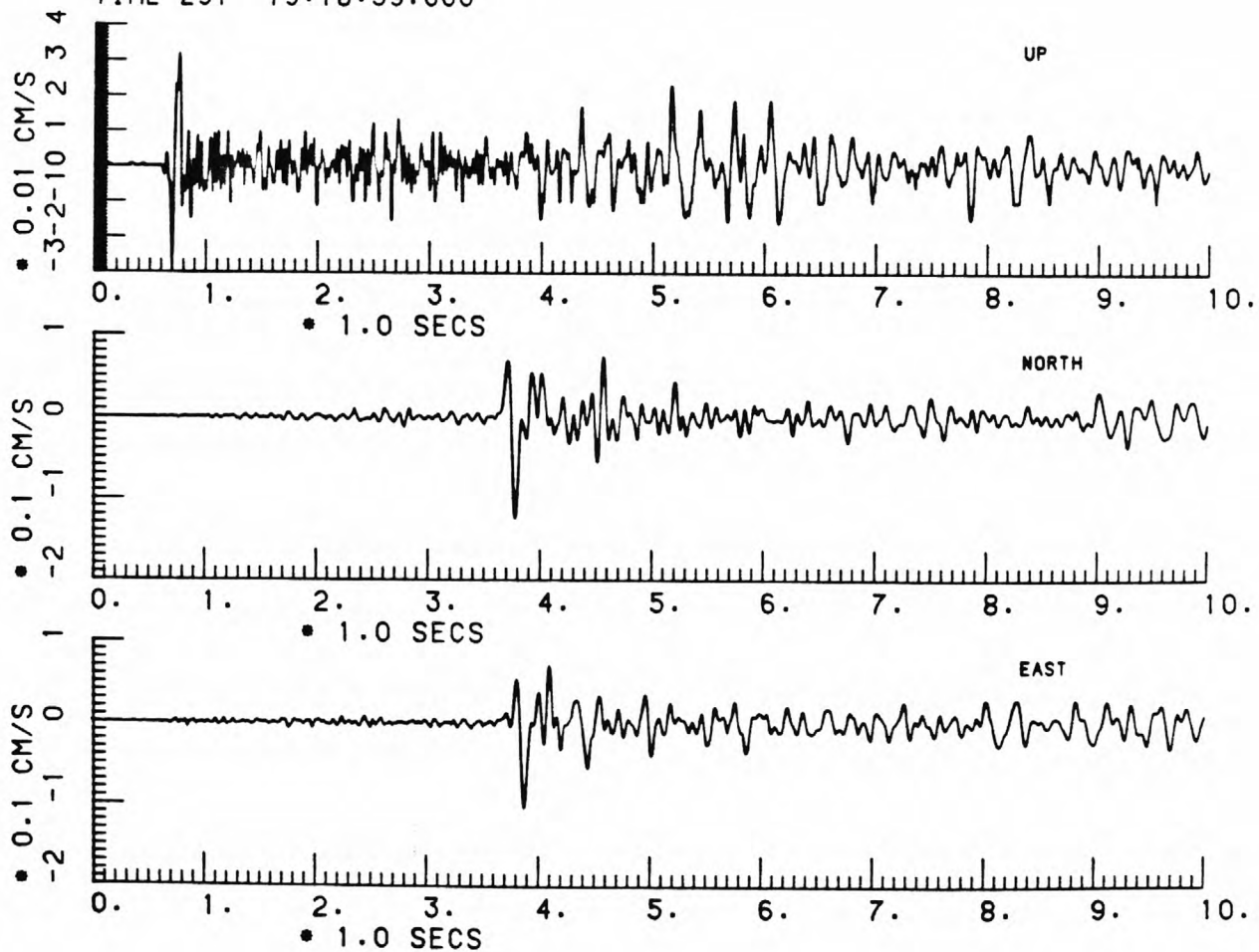
STATION CRK
TIME 291 19:10:58.165



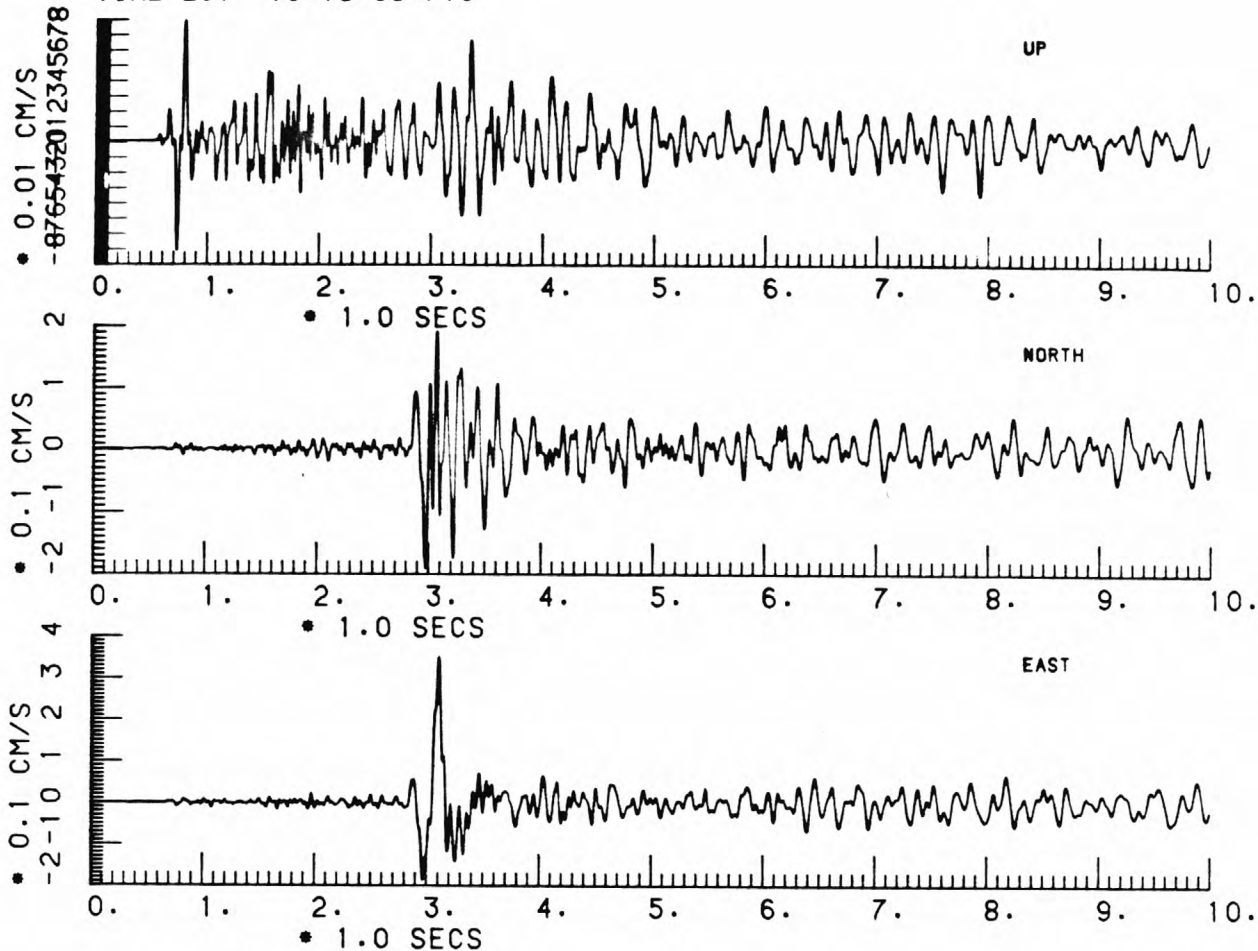
STATION GRS
TIME 291 19:19:0.405



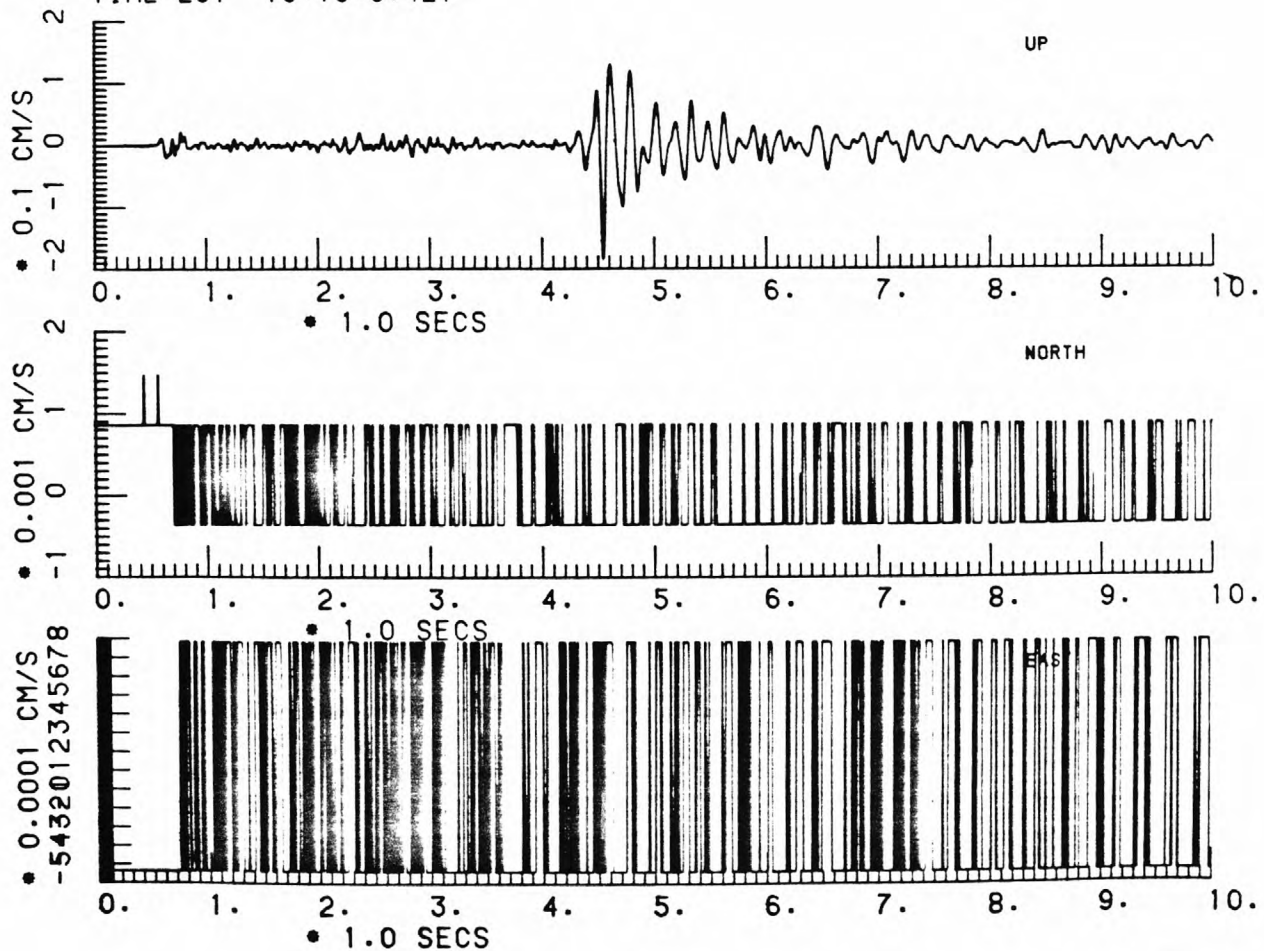
STATION FBR
TIME 291 19:18:59.660



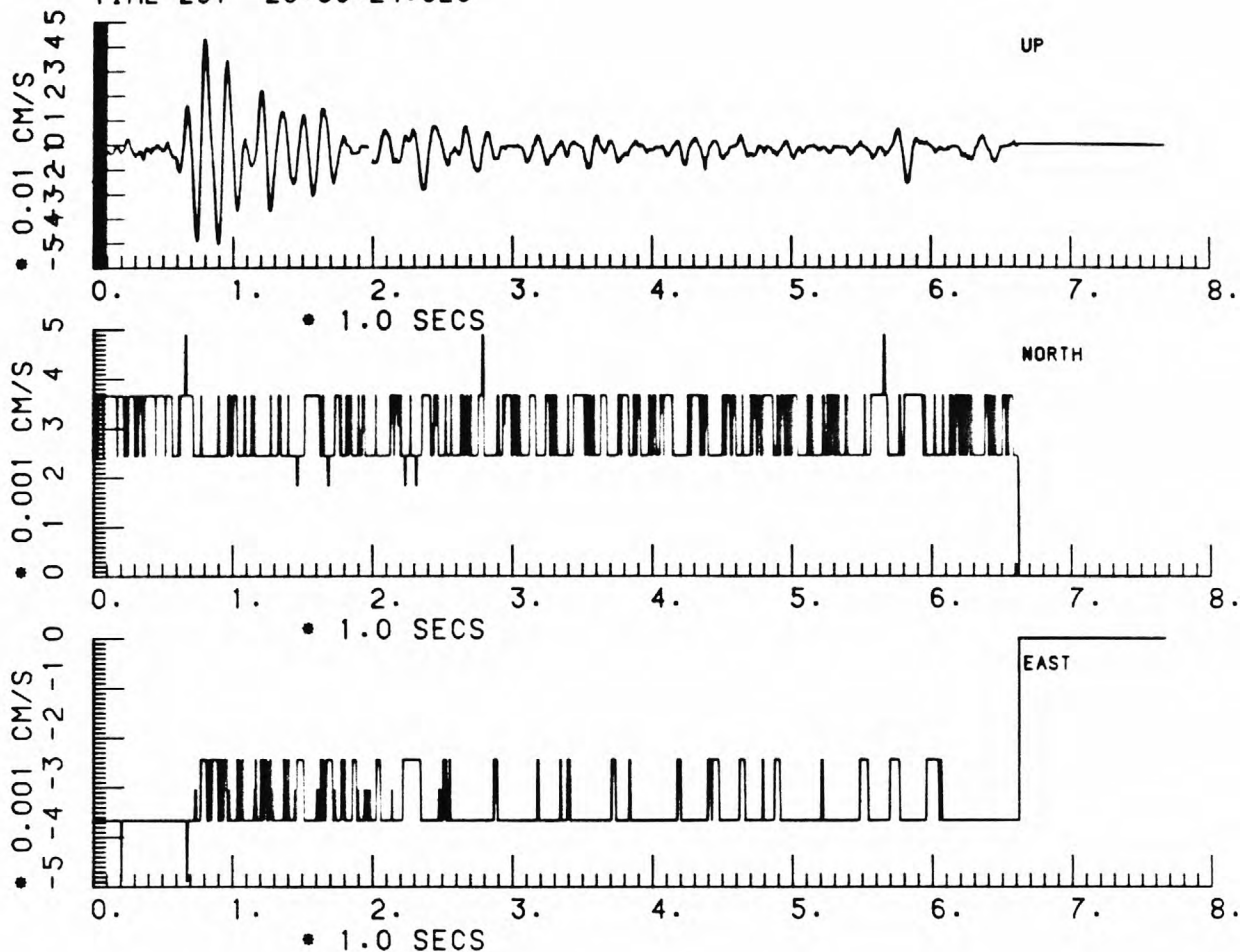
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TIME 291 19:18:58.715



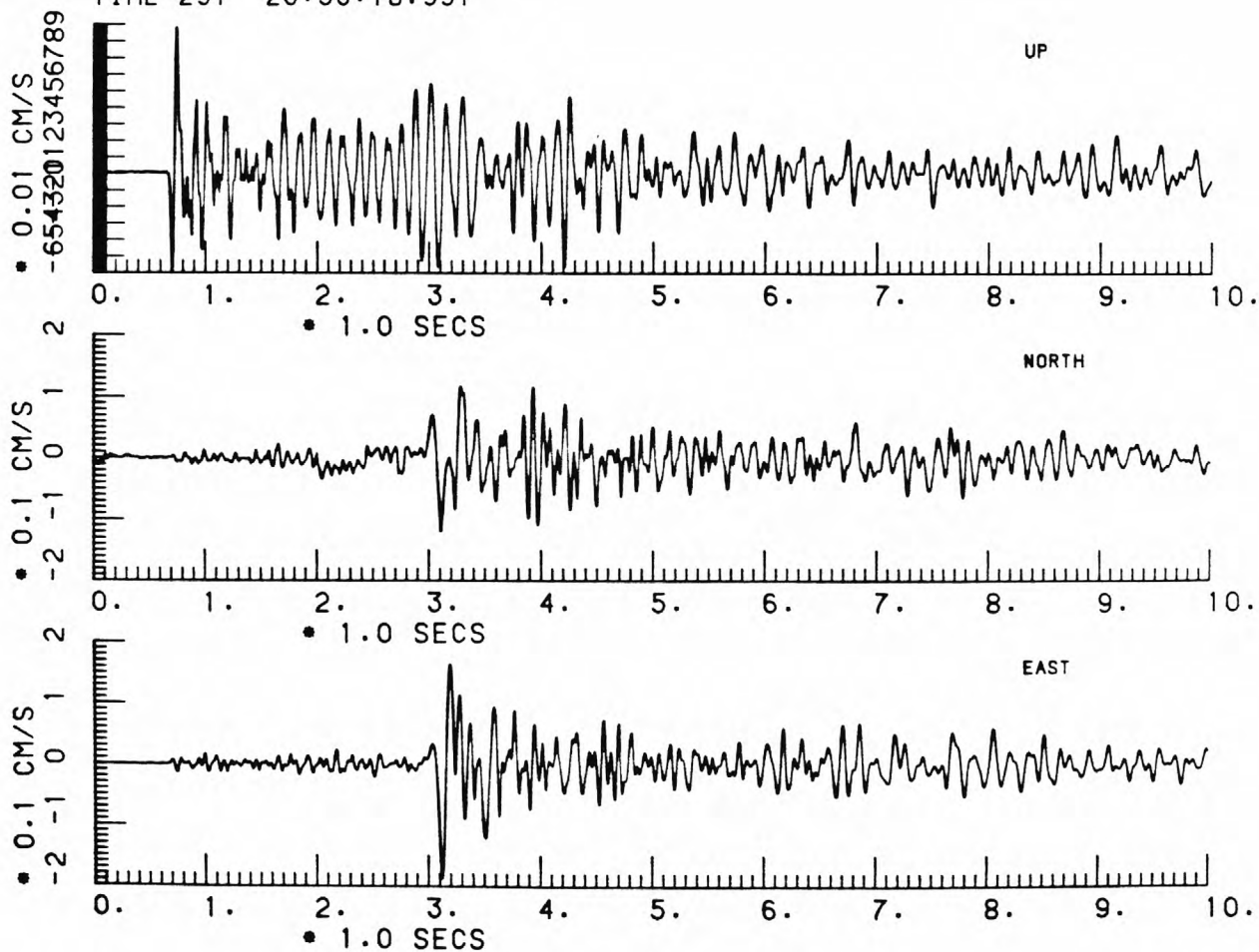
STATION CRK
TIME 291 19:19:00.421

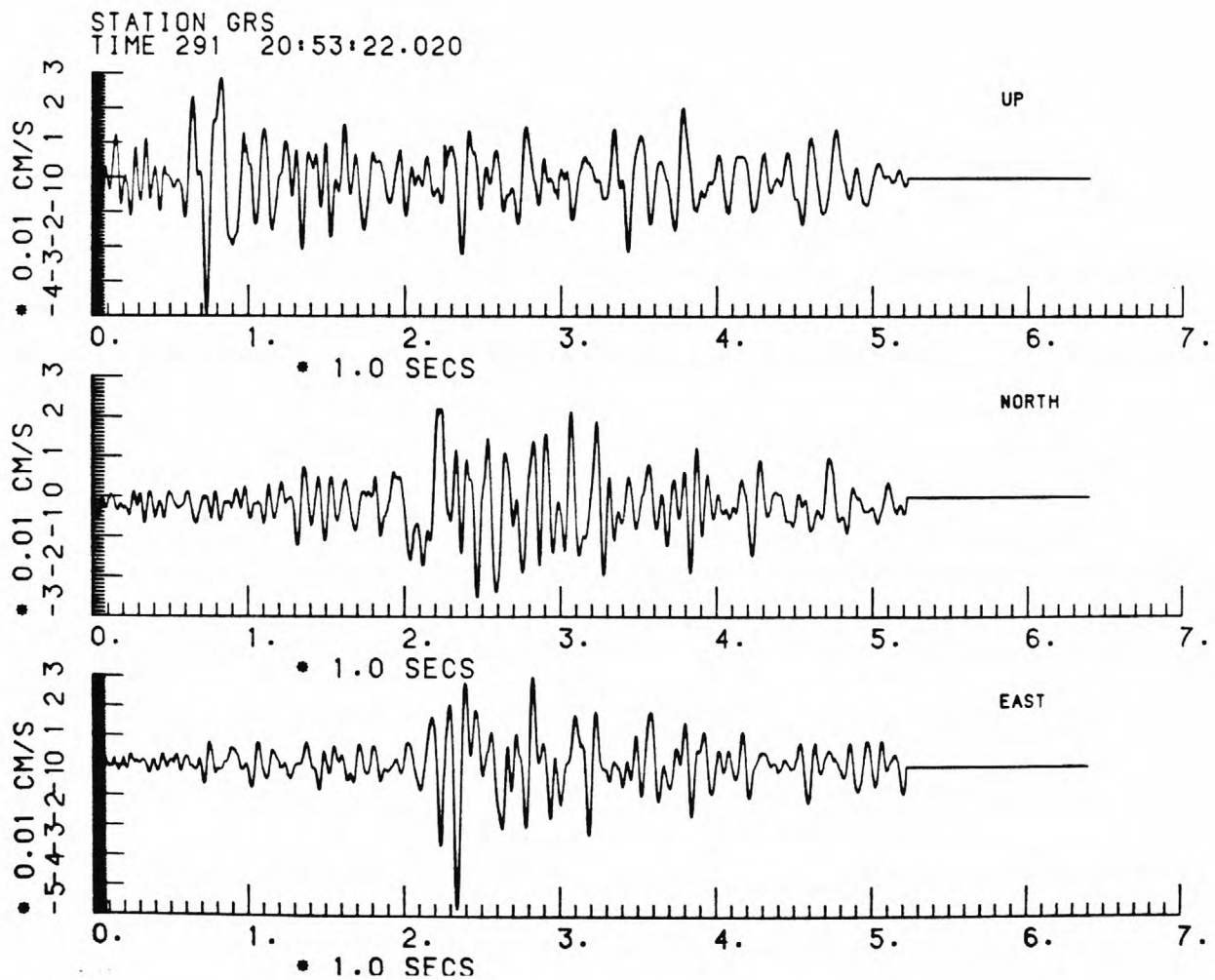
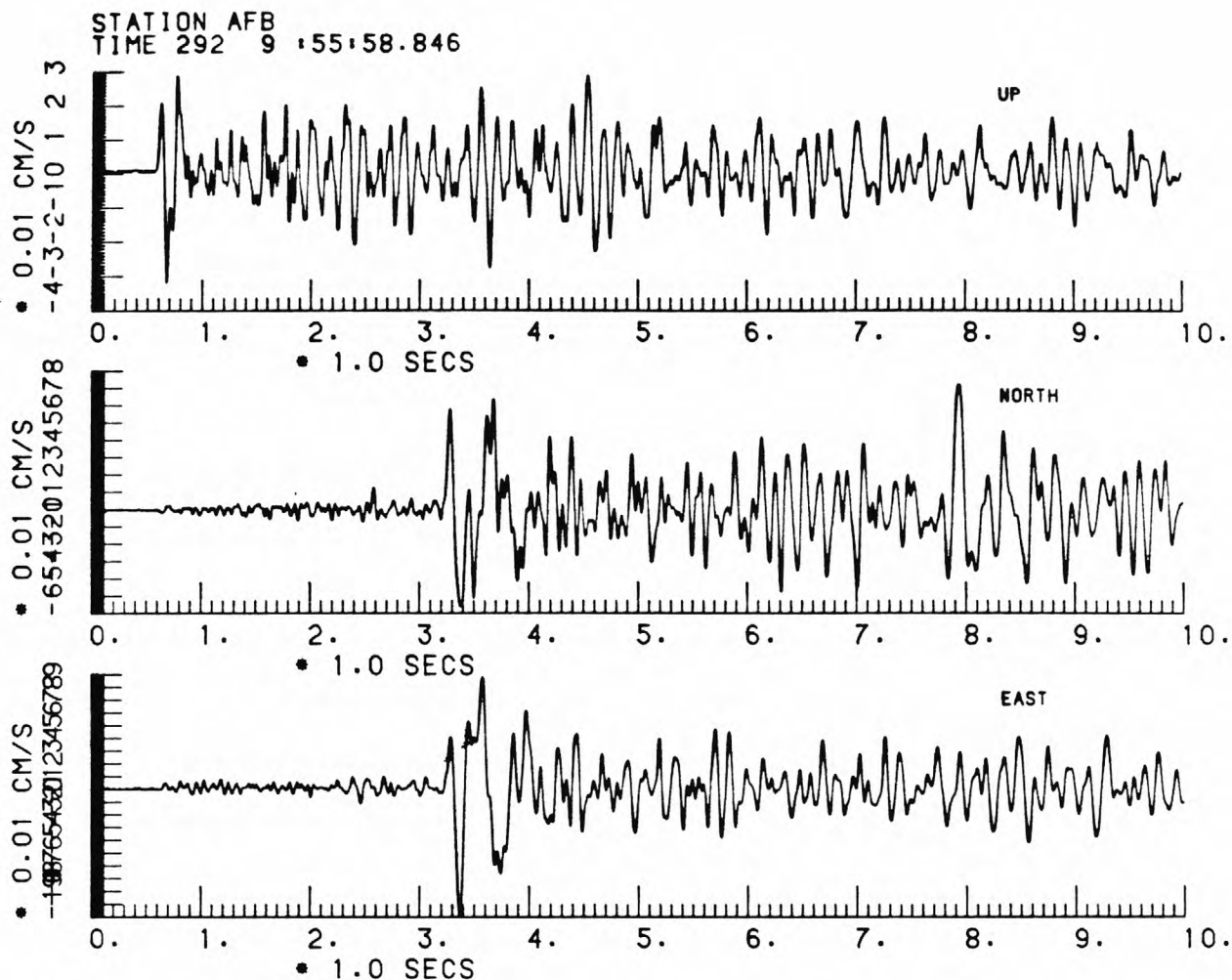


STATION CRK
TIME 291 20:53:24.620

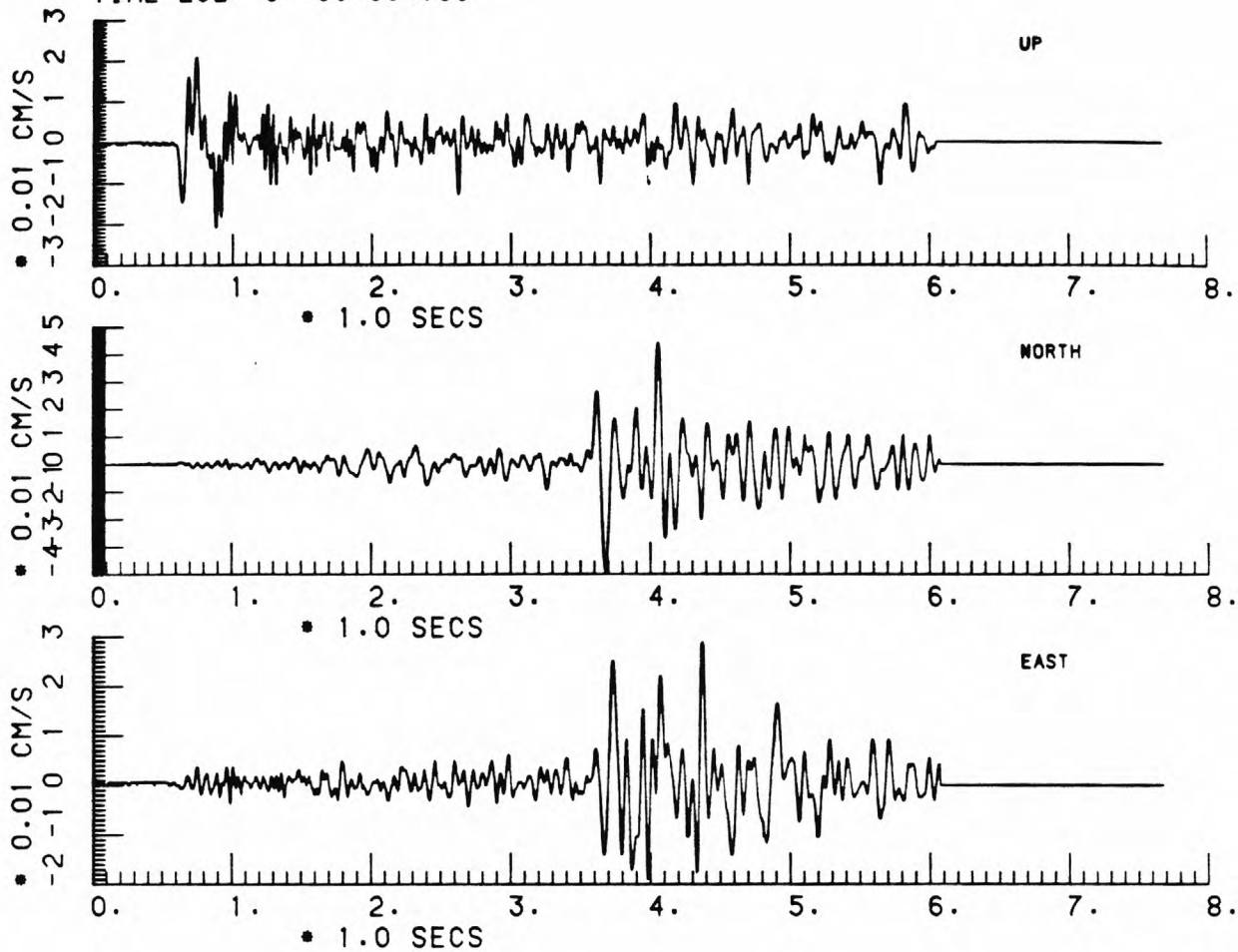


STATION AFB
TIME 291 20:53:18.991

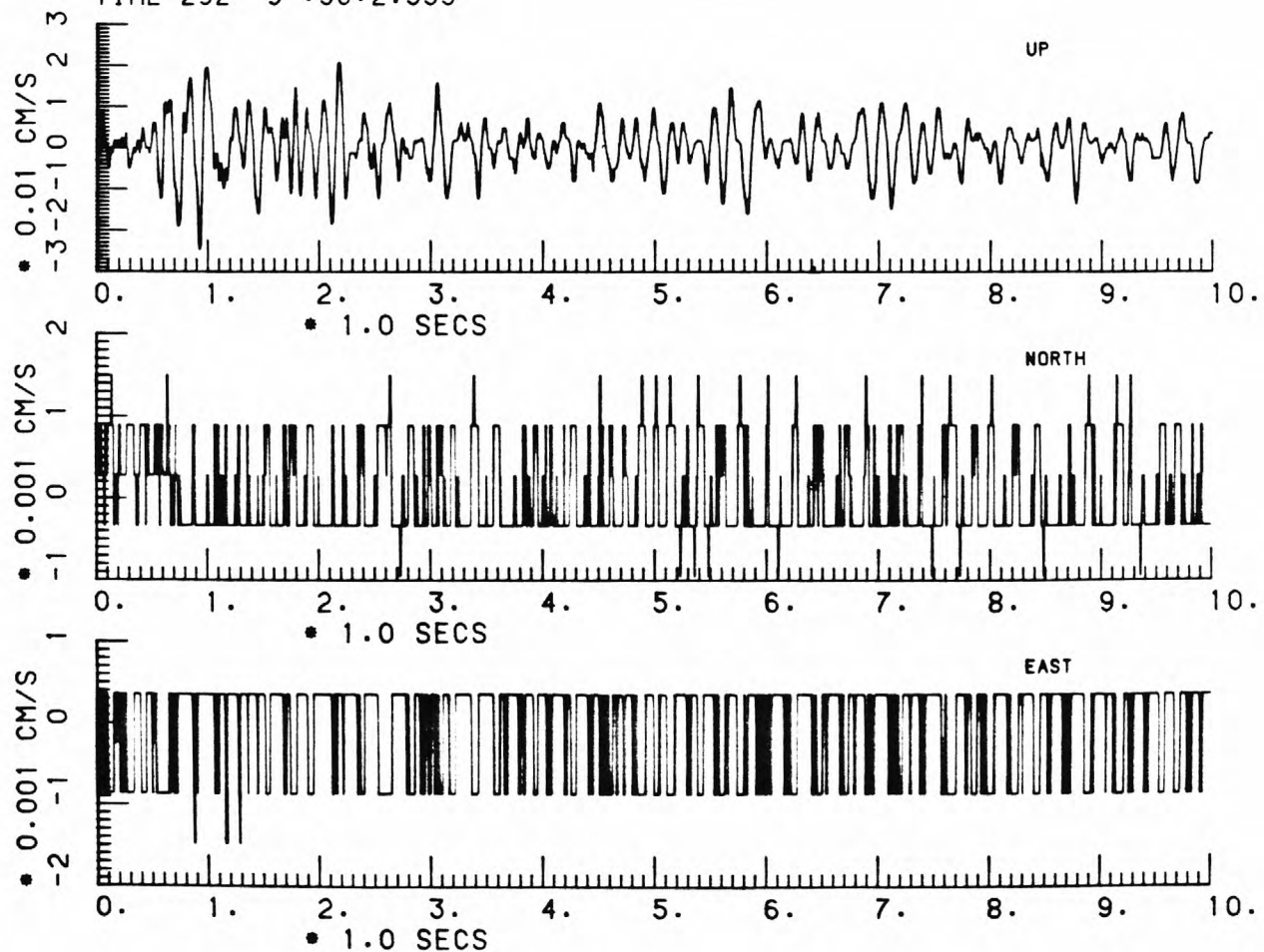


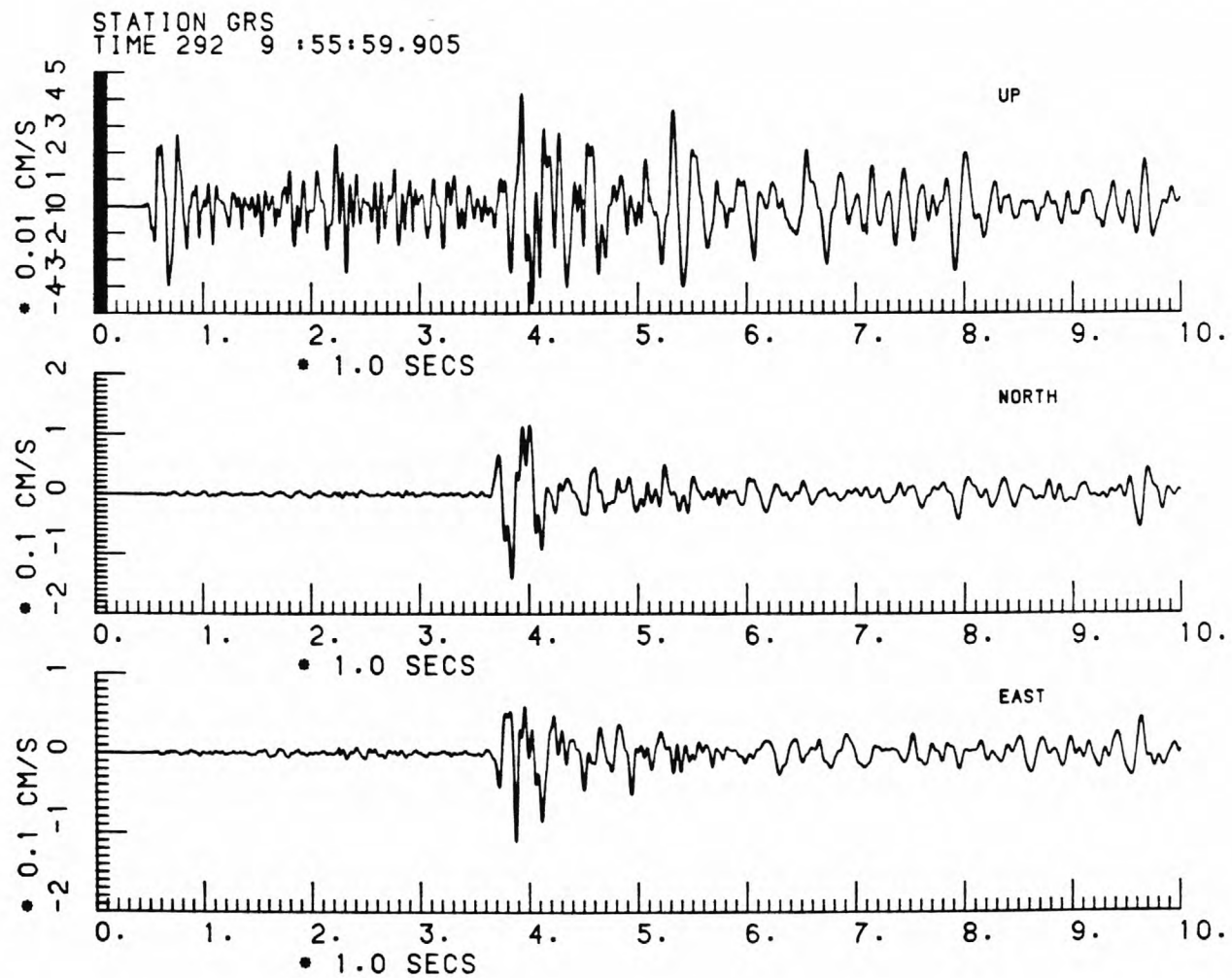
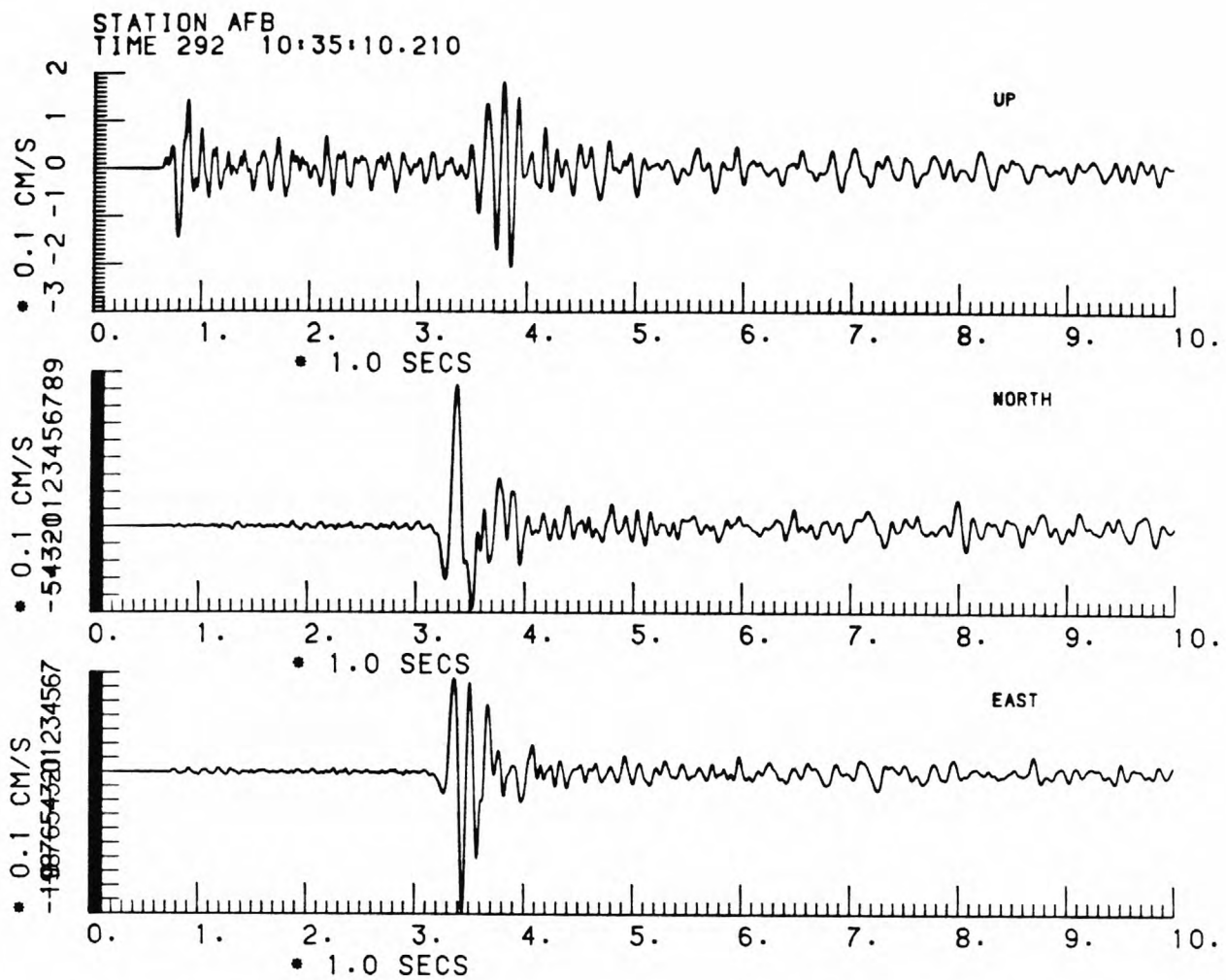


STATION FBR
TIME 292 9 :55:59.165

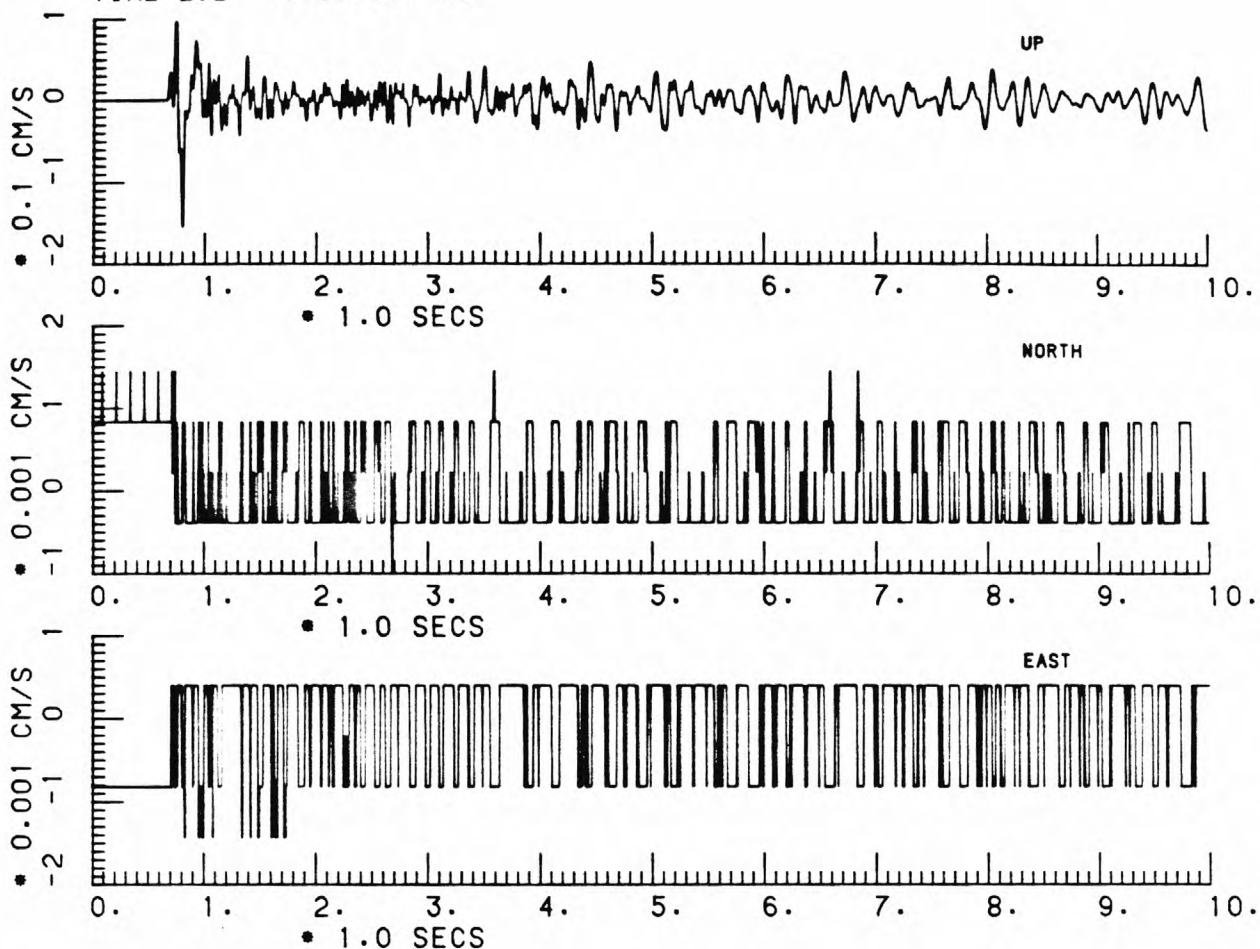


STATION CRK
TIME 292 9 :56:2.555

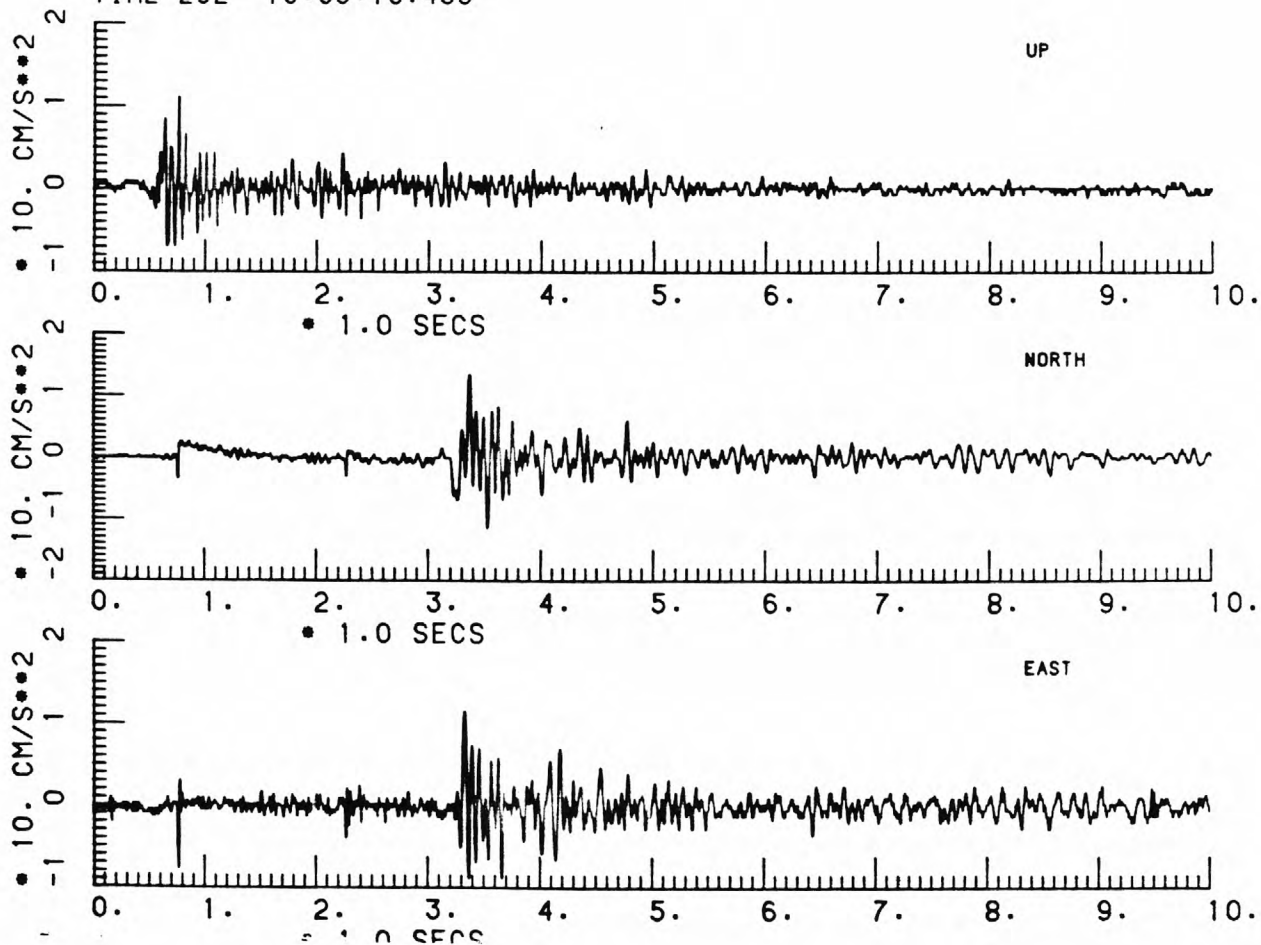


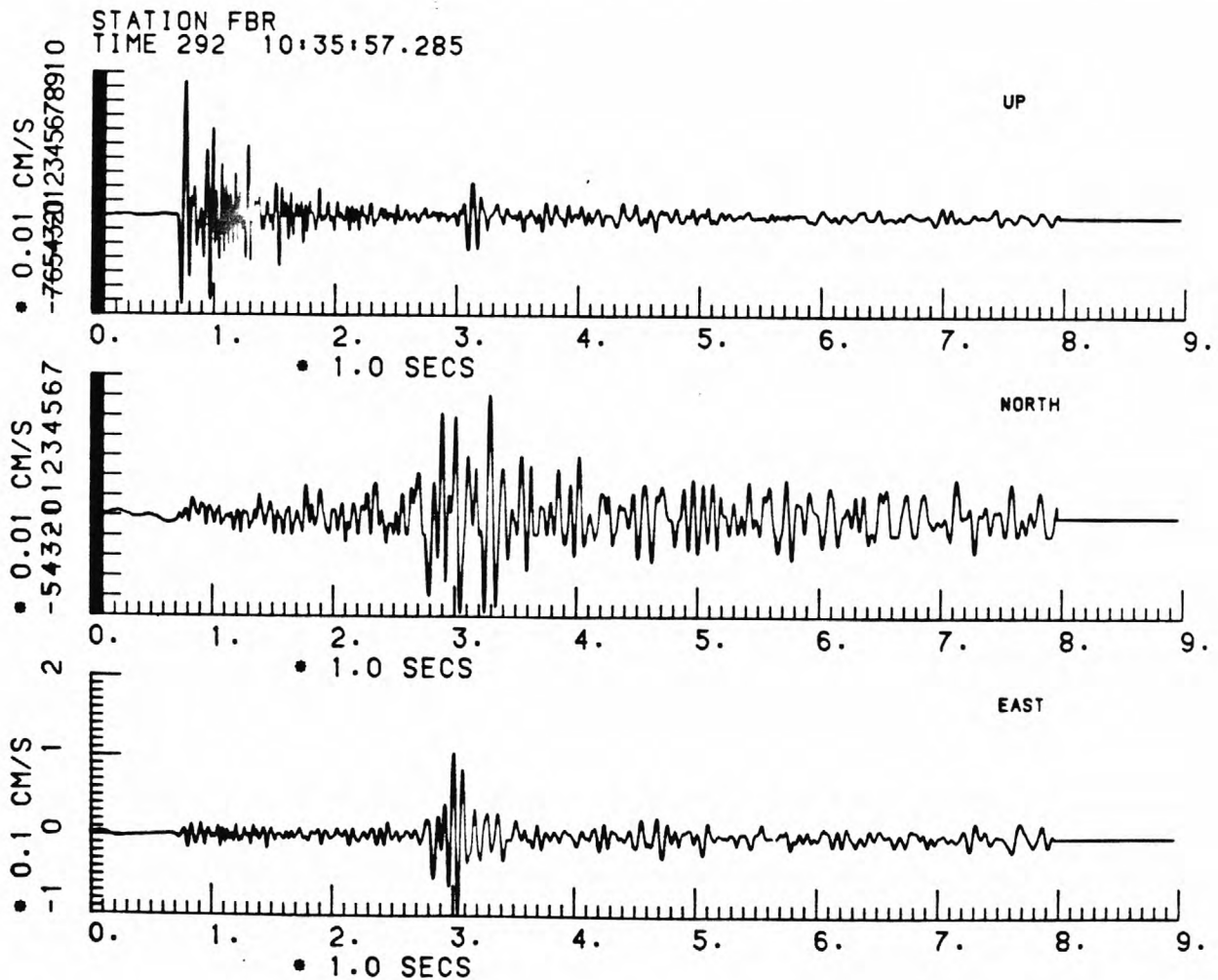
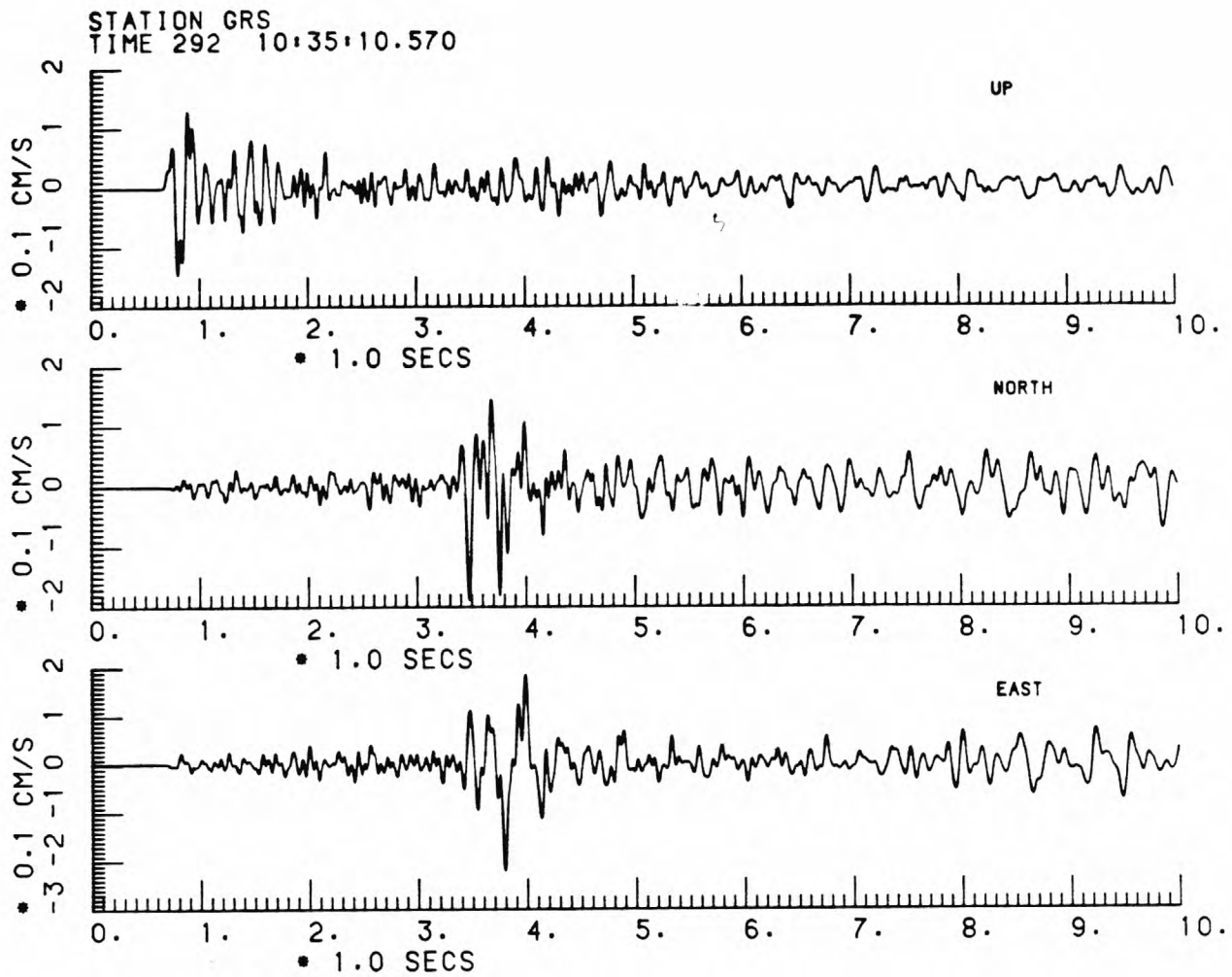


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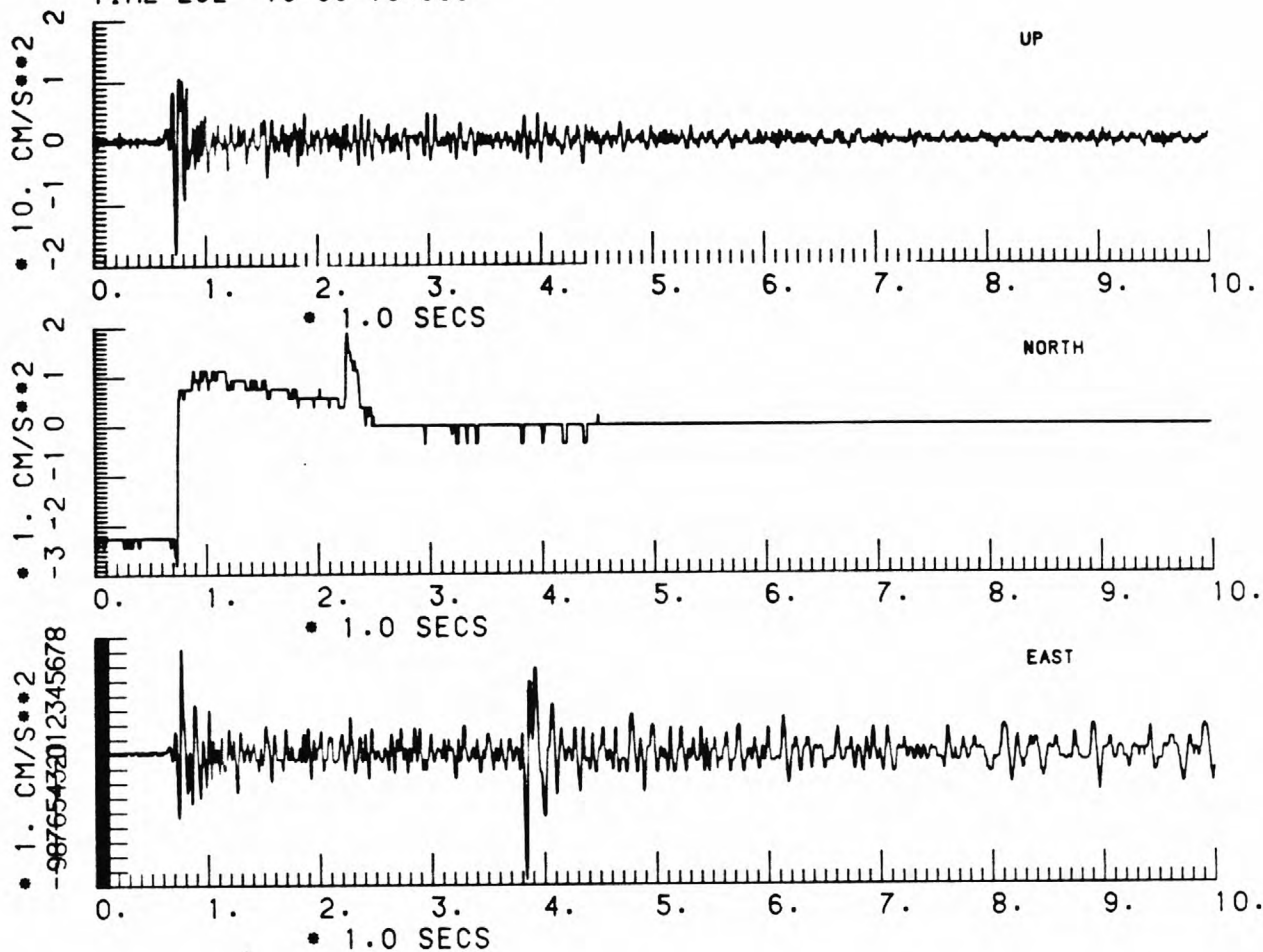


STATION CFG
TIME 292 10:35:10.455

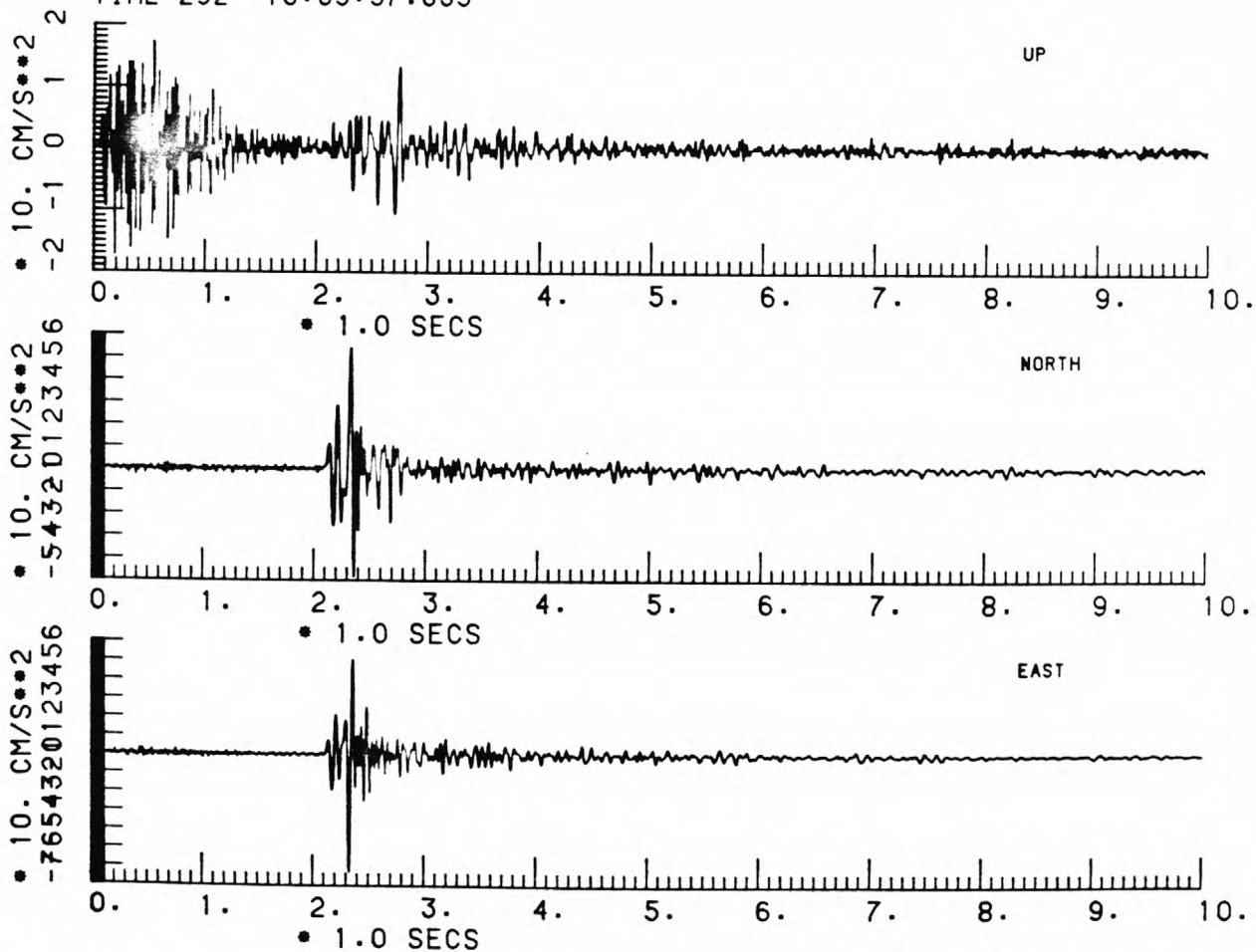




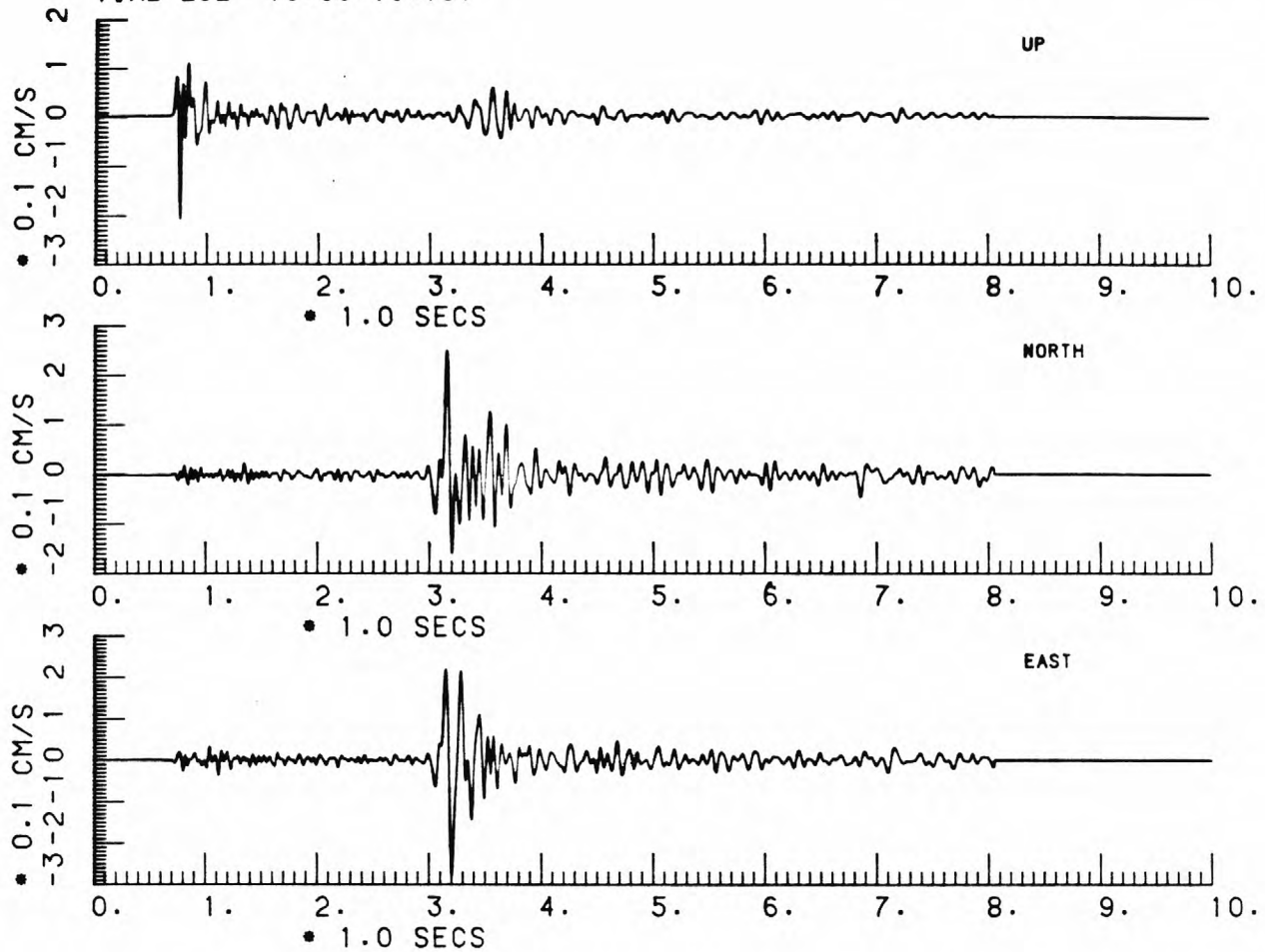
STATION RVR
TIME 292 10:35:10.500



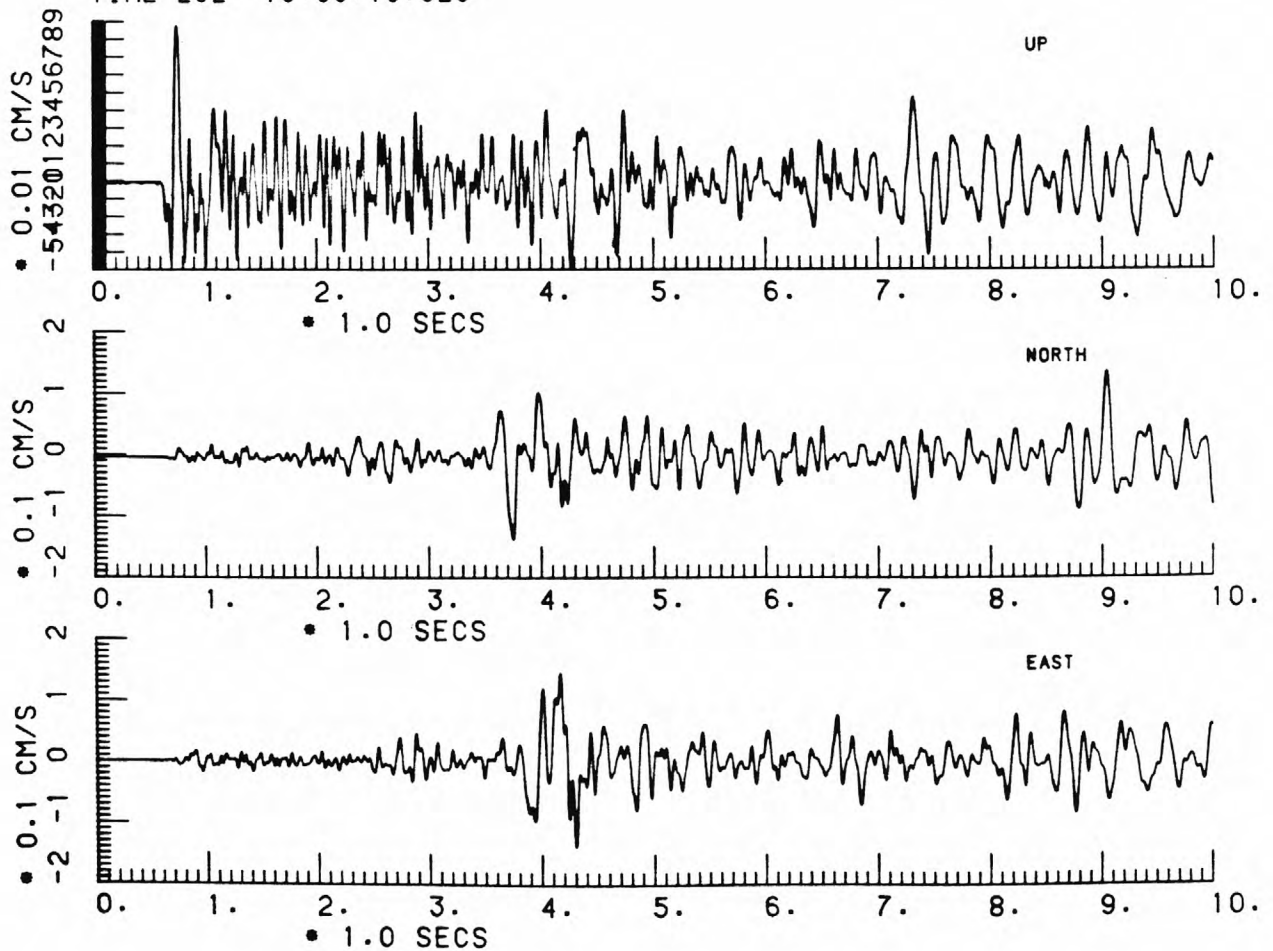
STATION KYR
TIME 292 10:35:57.635



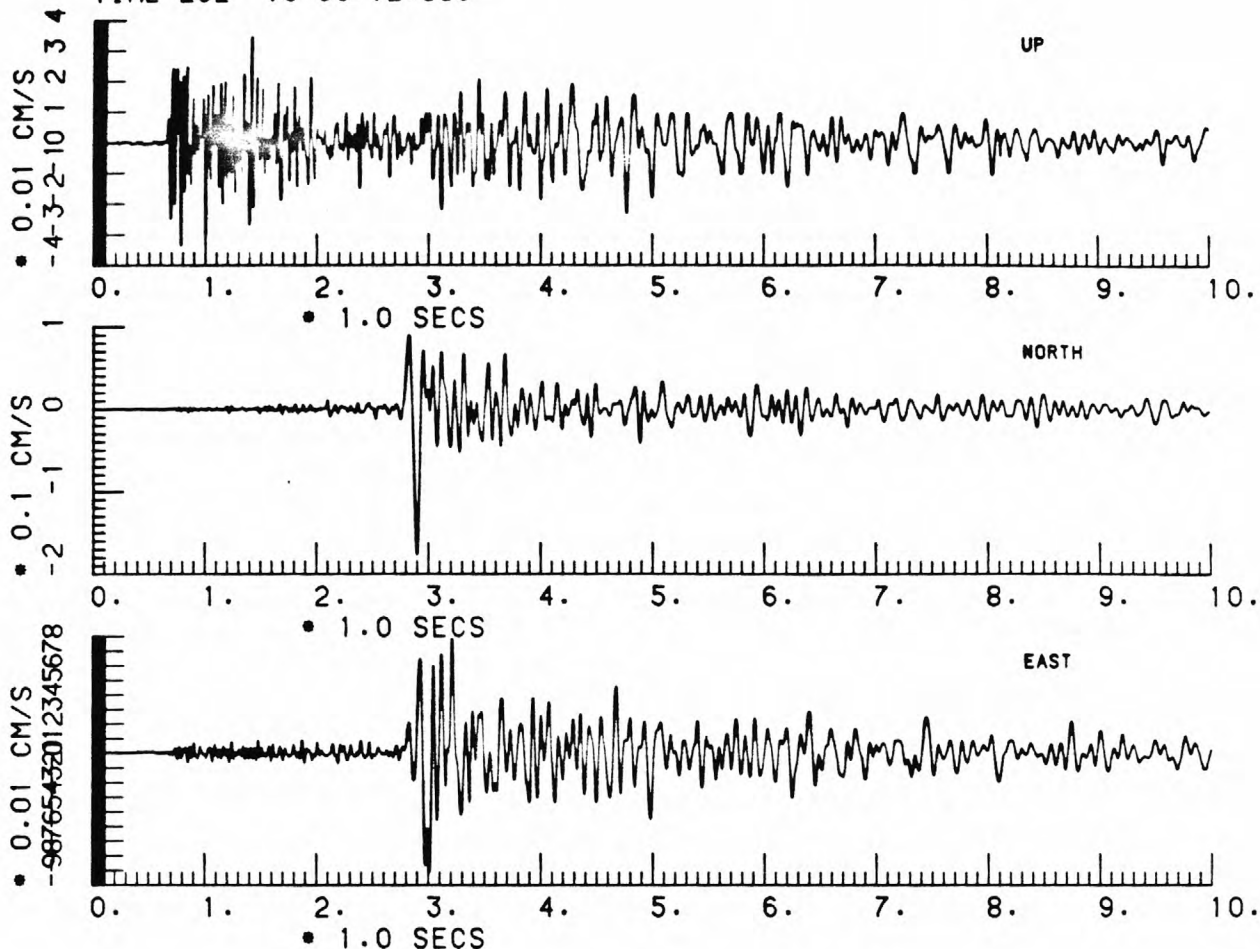
STATION AFB
TIME 292 16:56:13.191



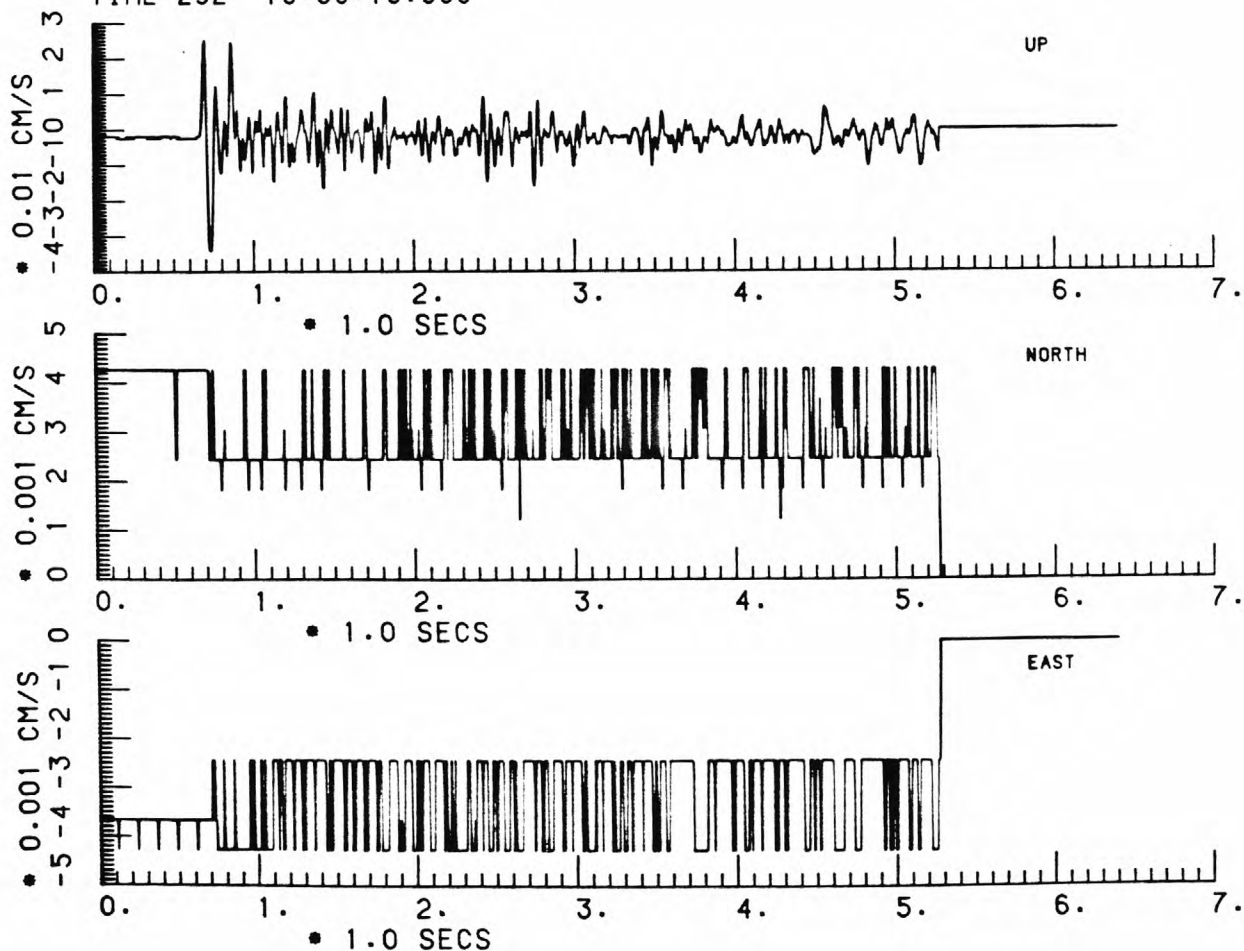
STATION SLD
TIME 292 10:35:10.520



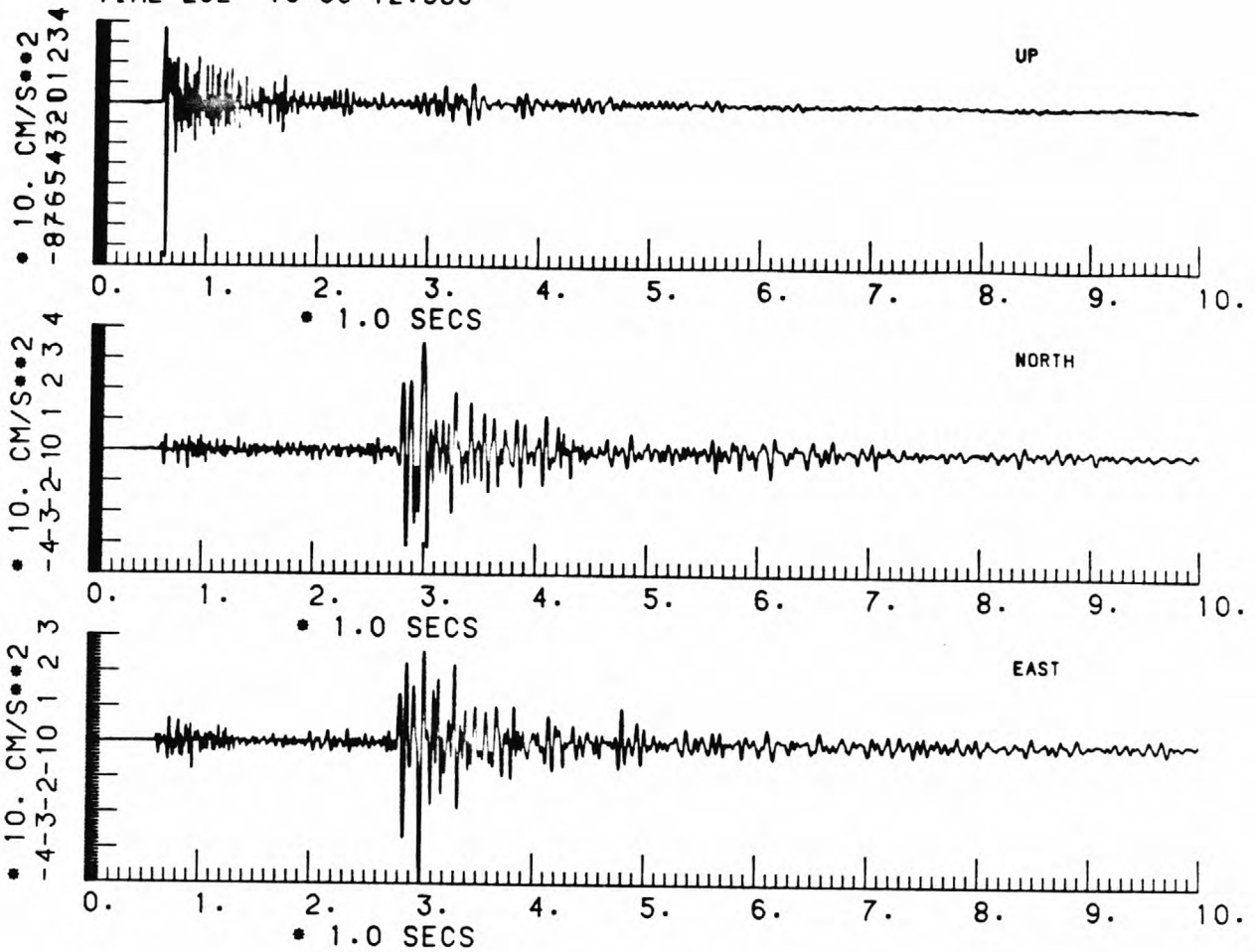
STATION FBR
TIME 292 16:56:12.885



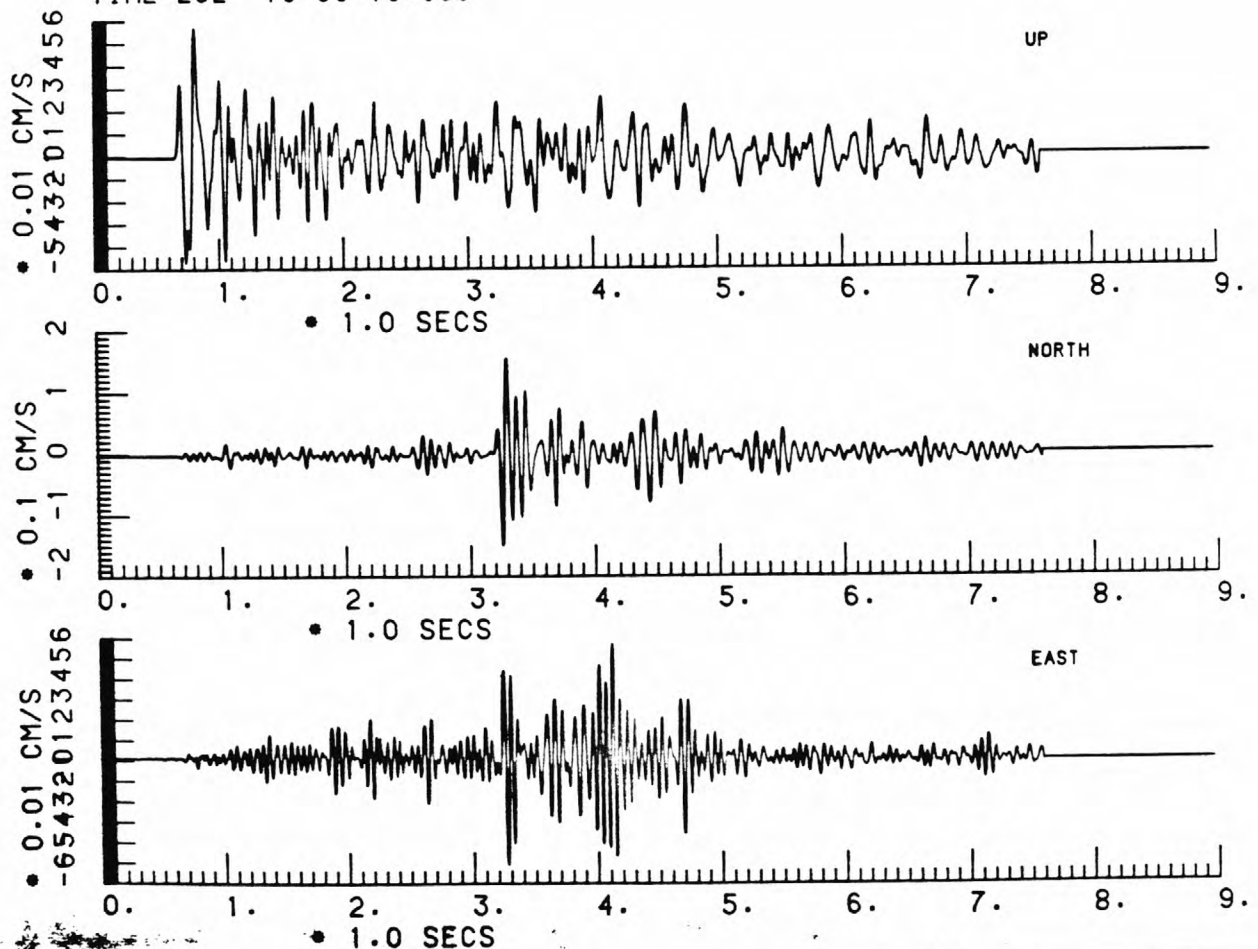
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TIME 292 16:56:13.966

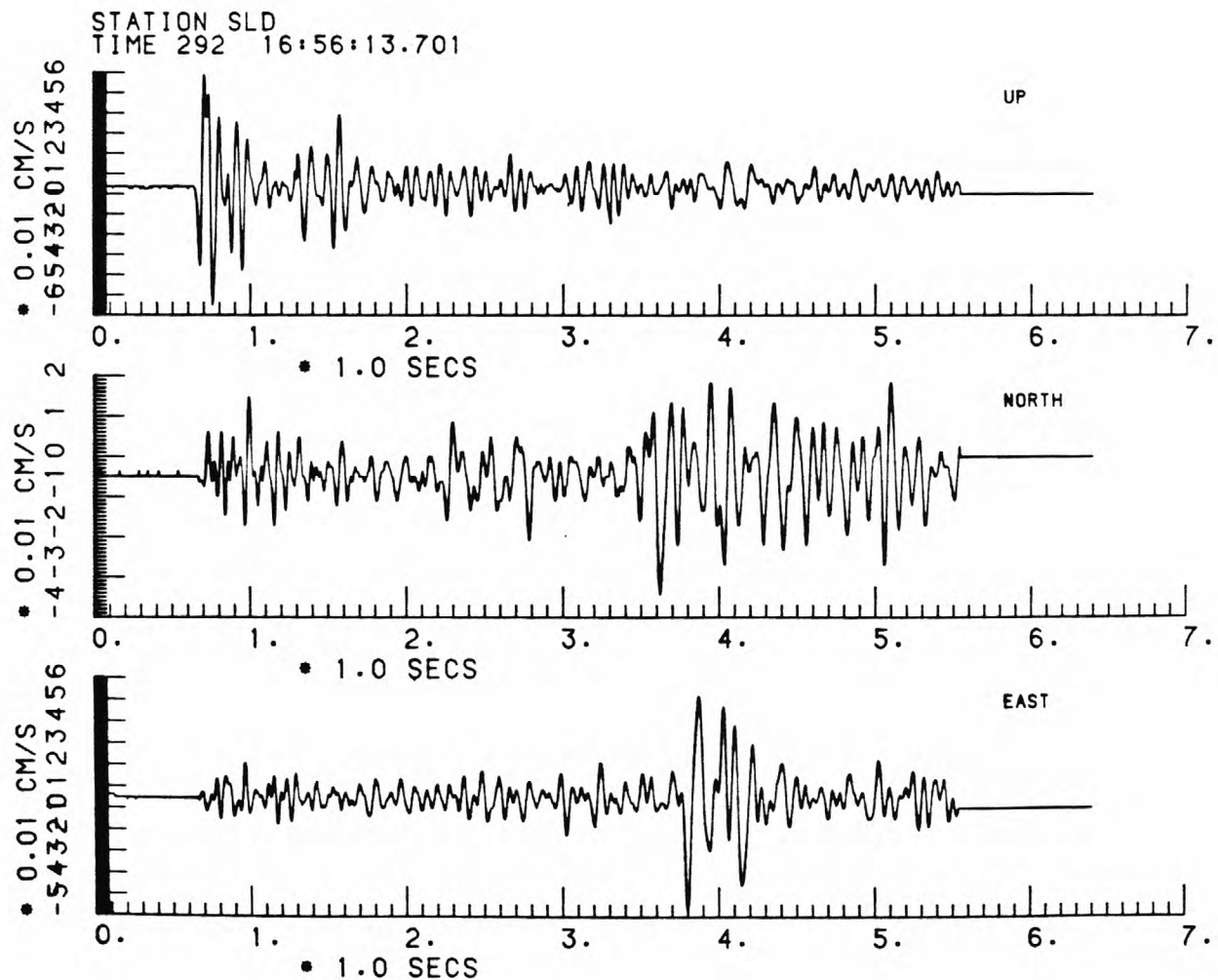
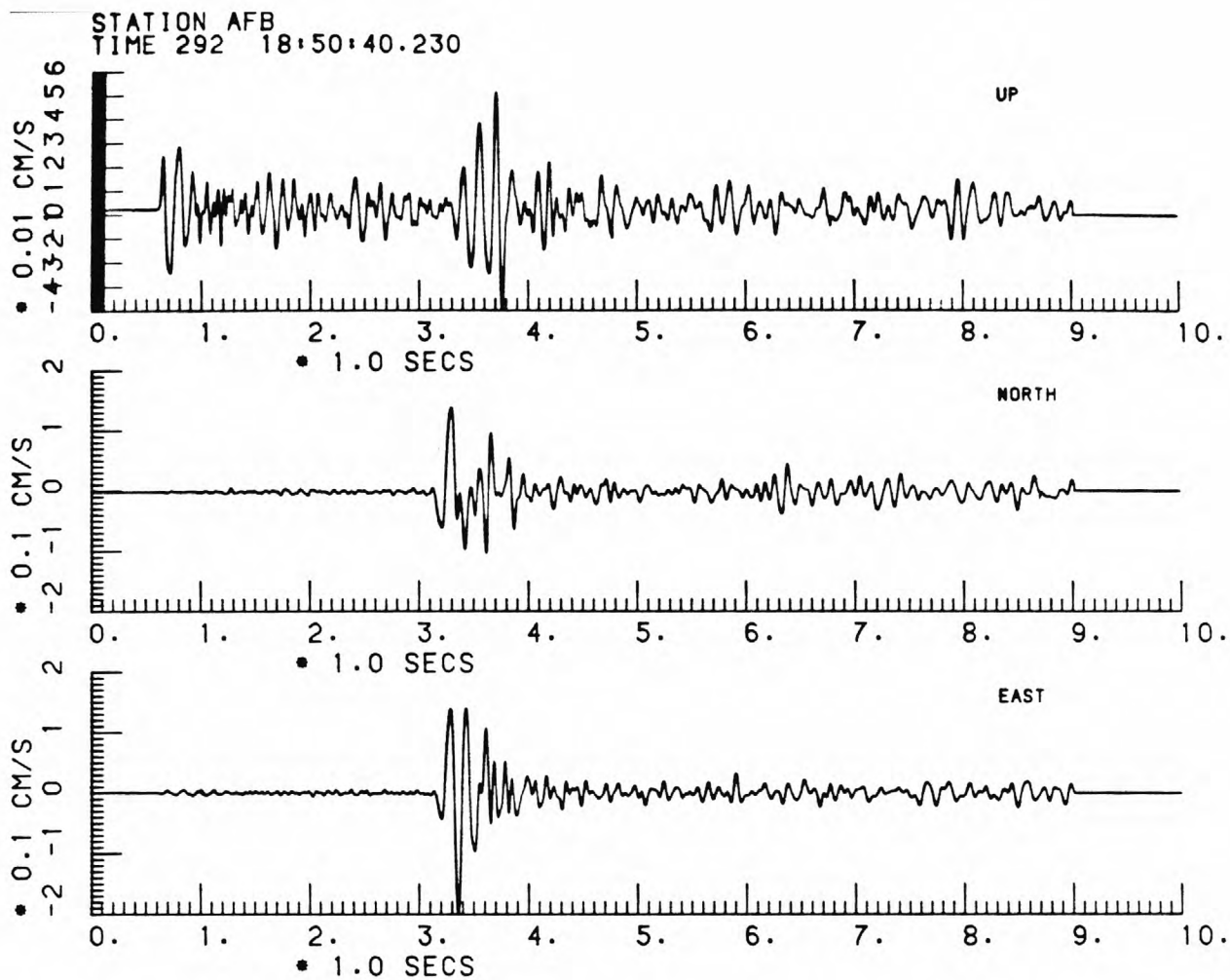


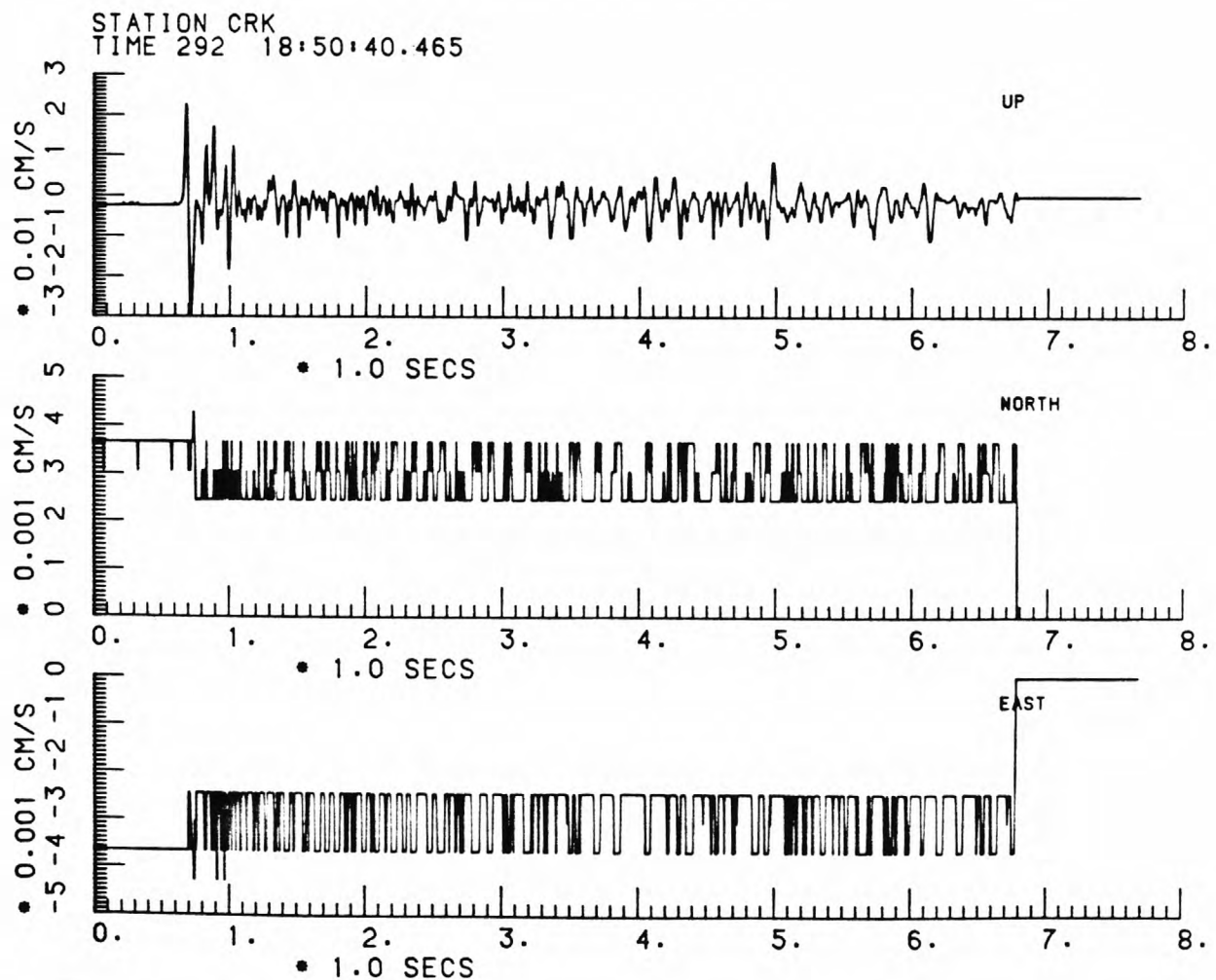
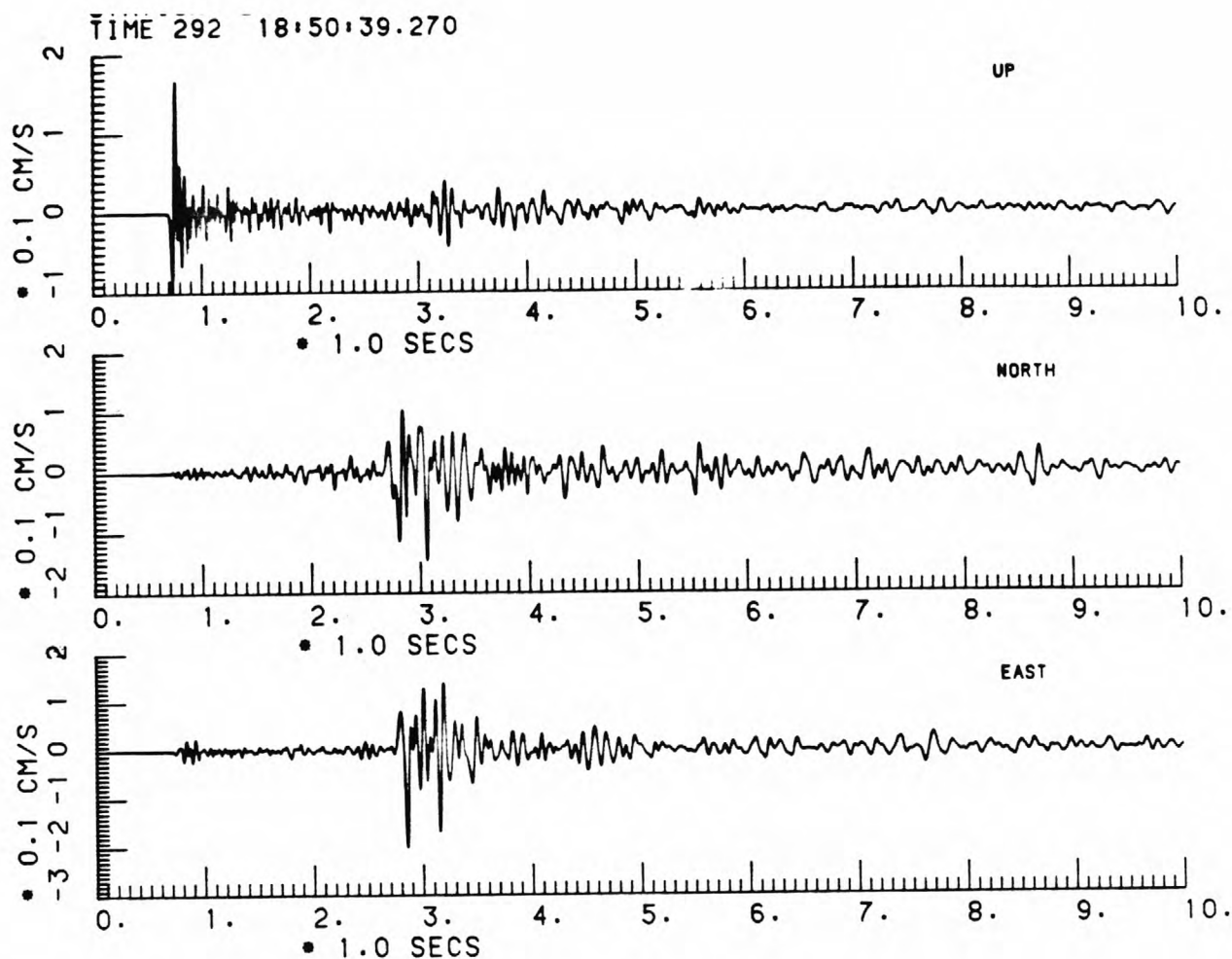
STATION KYR
TIME 292 16:56:12.586



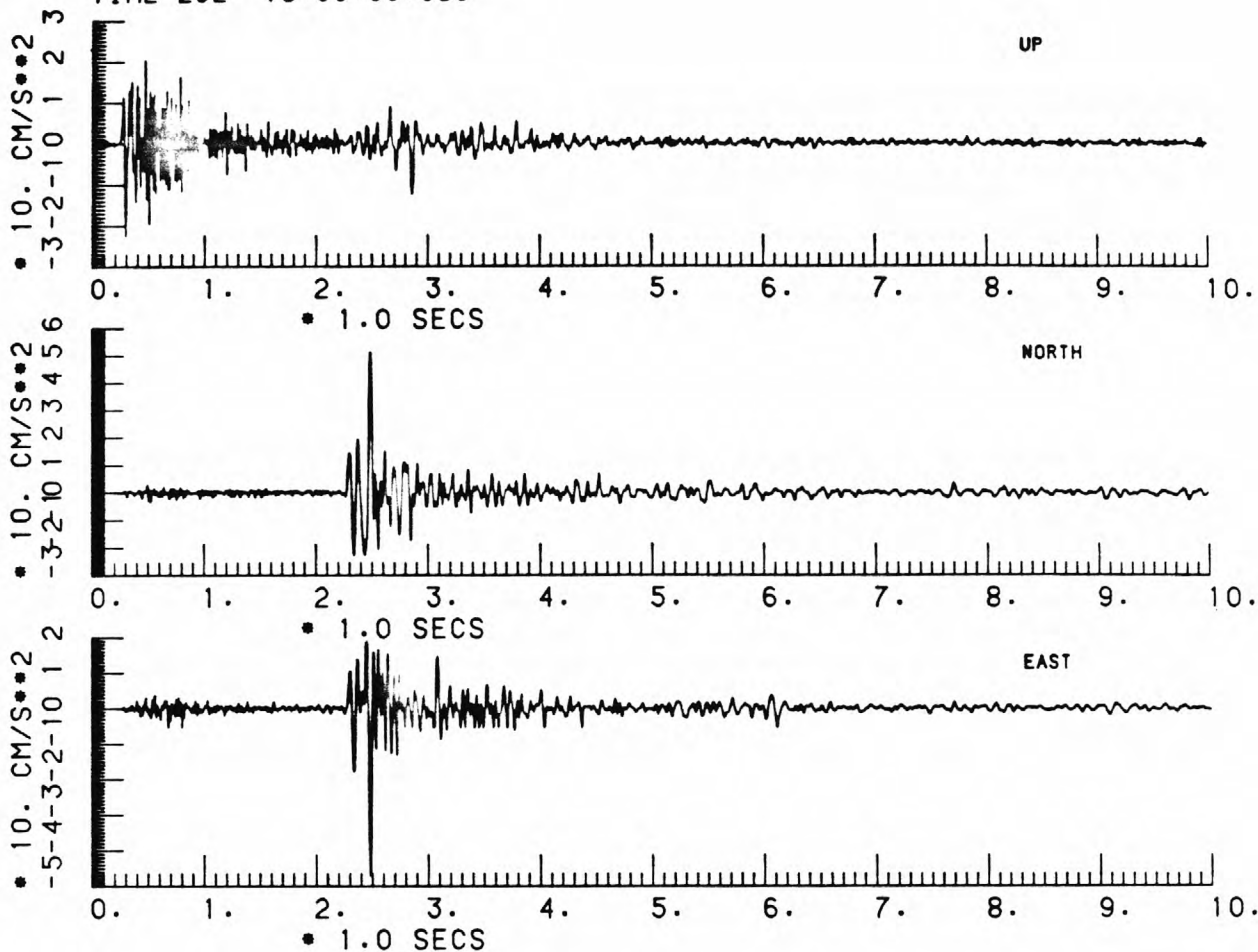
STATION GRS
TIME 292 16:56:13.655



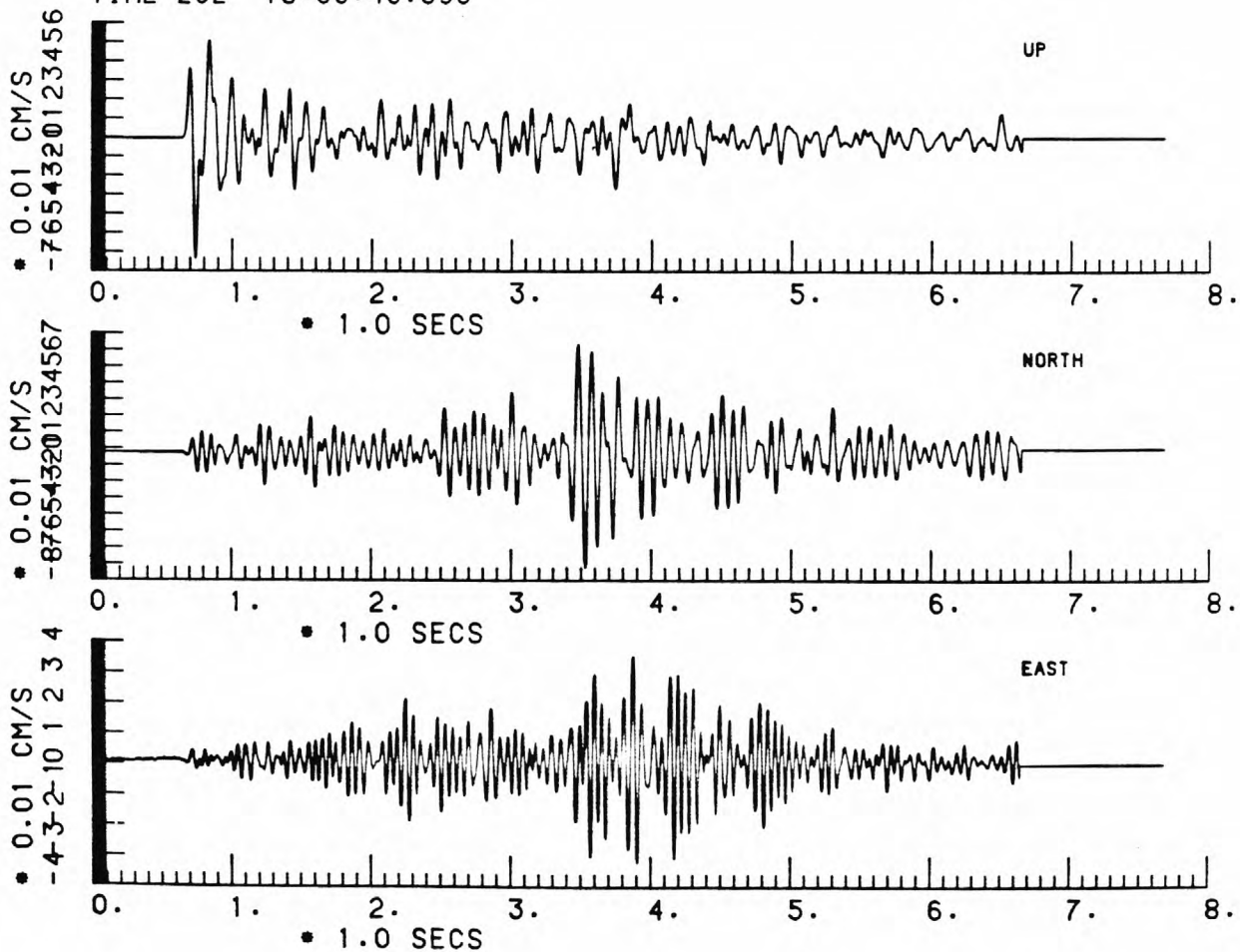


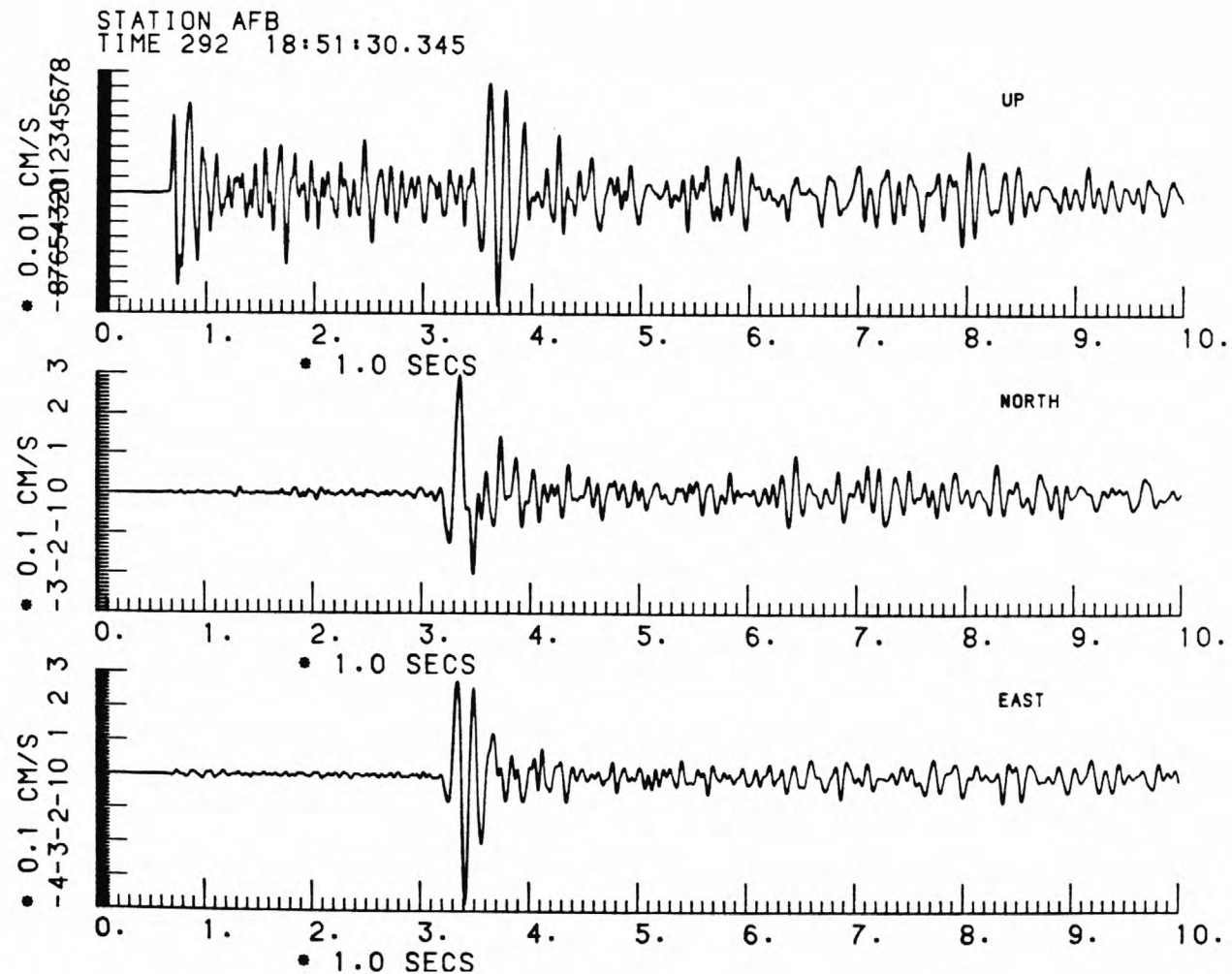
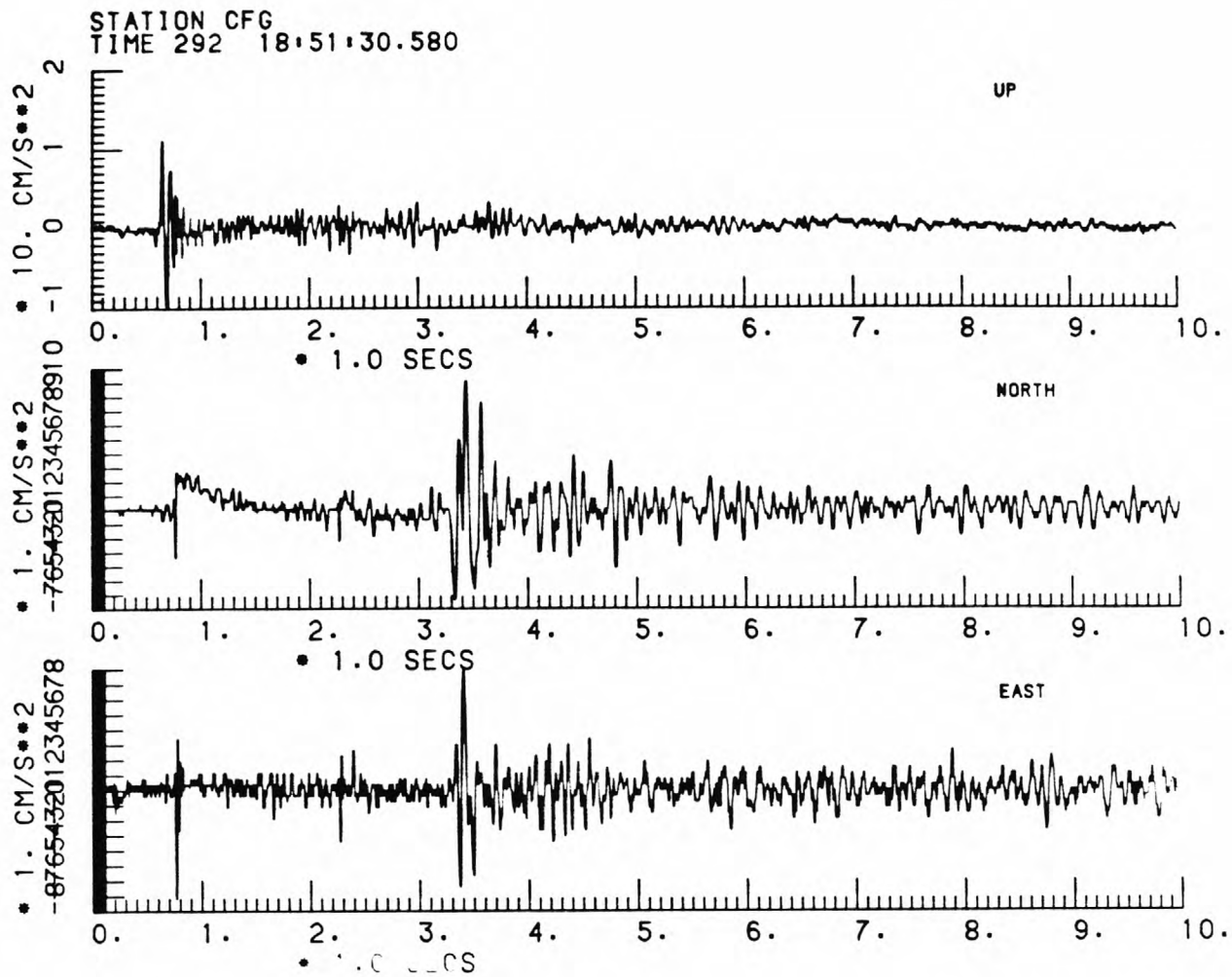


STATION KYR
TIME 292 18:50:39.385

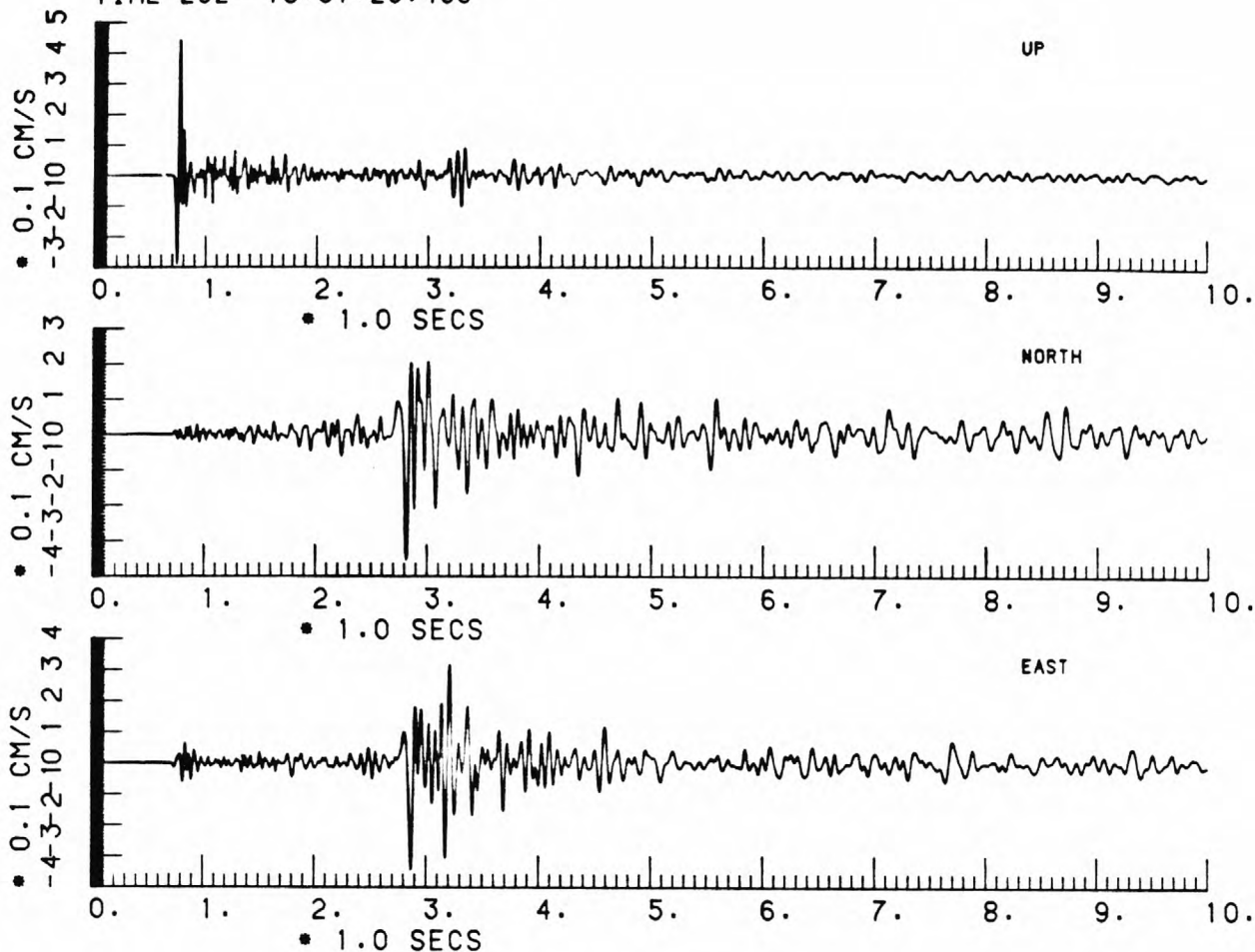


STATION GRS
TIME 292 18:50:40.596

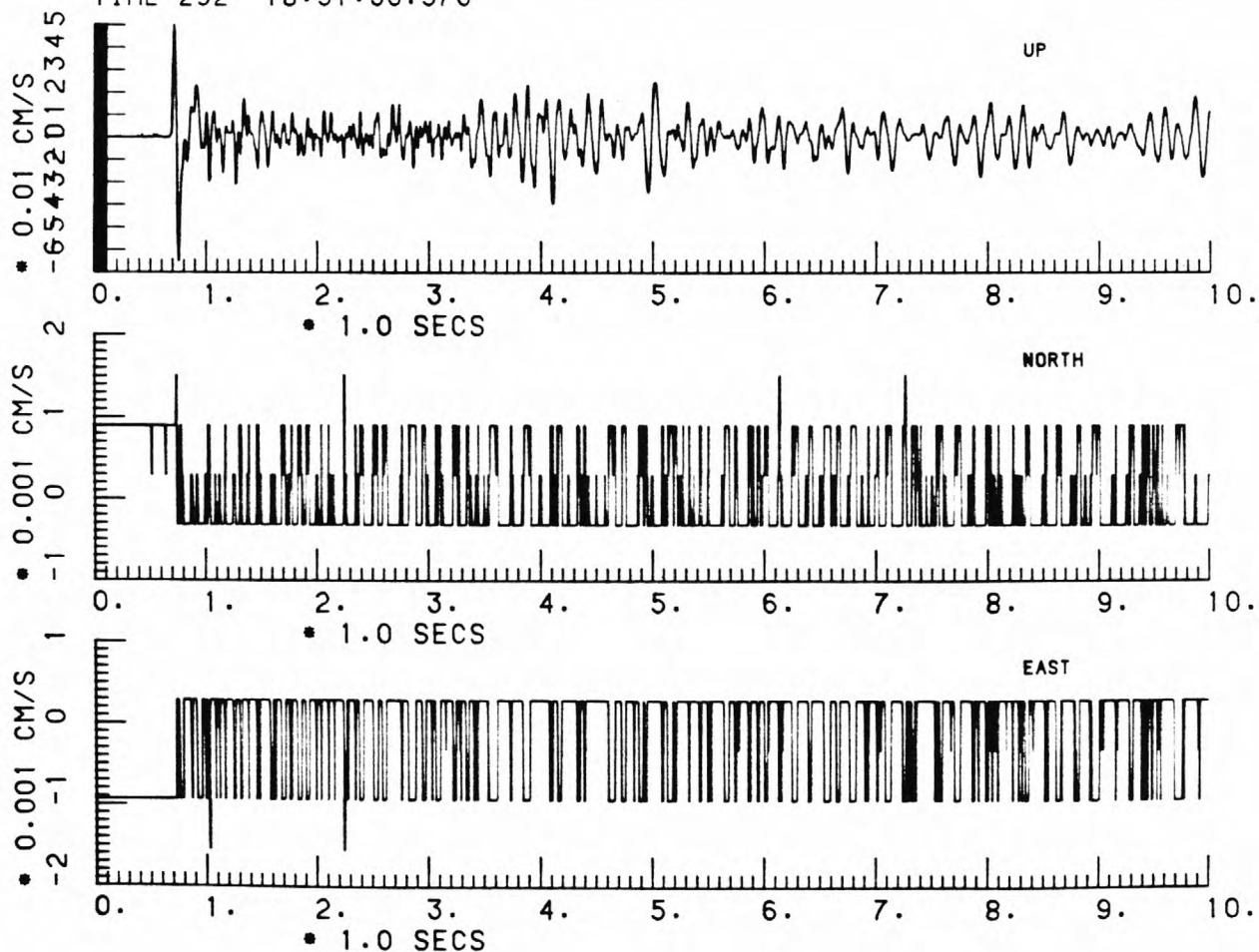




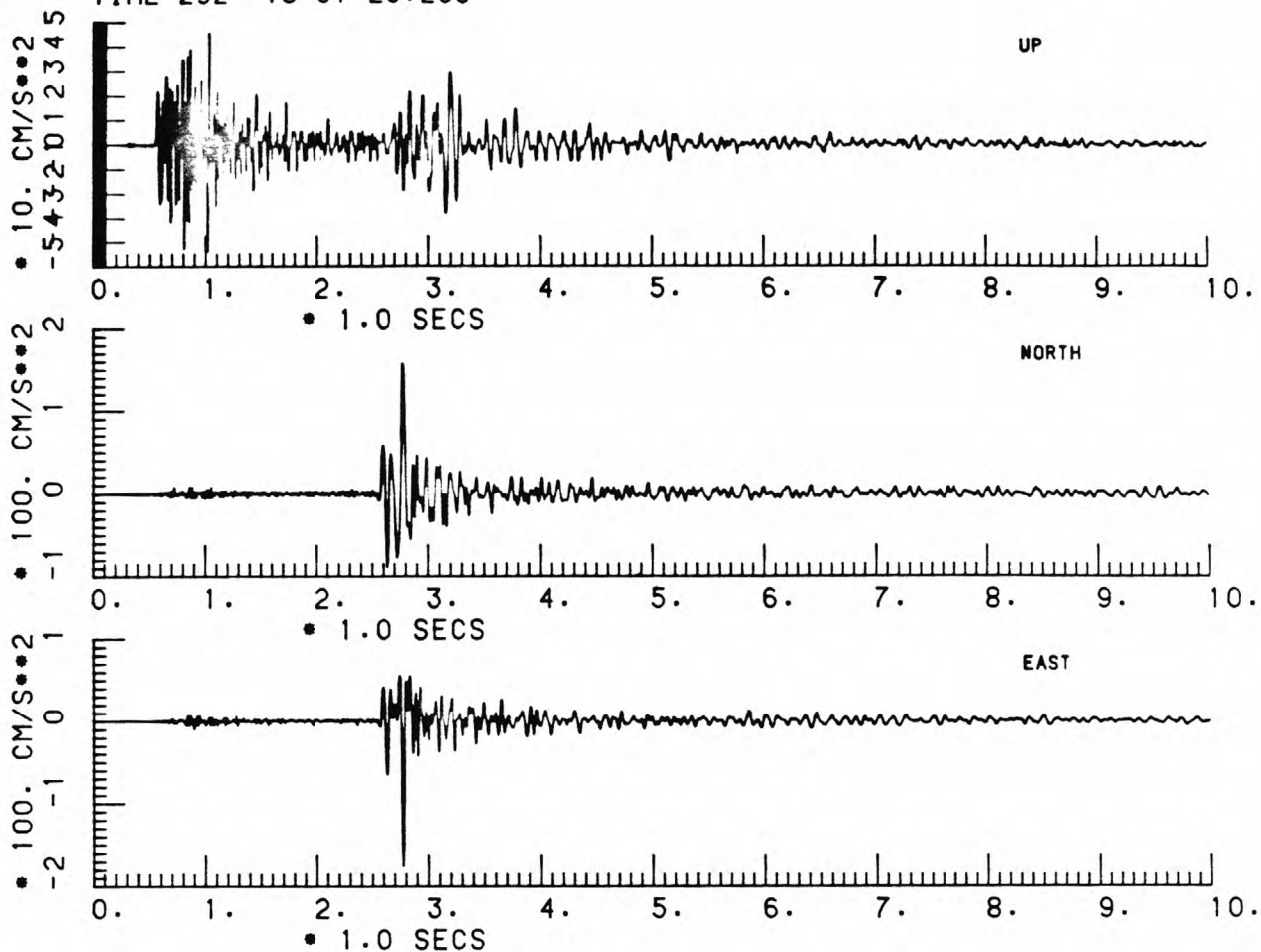
STATION FBR
TIME 292 18:51:29.435



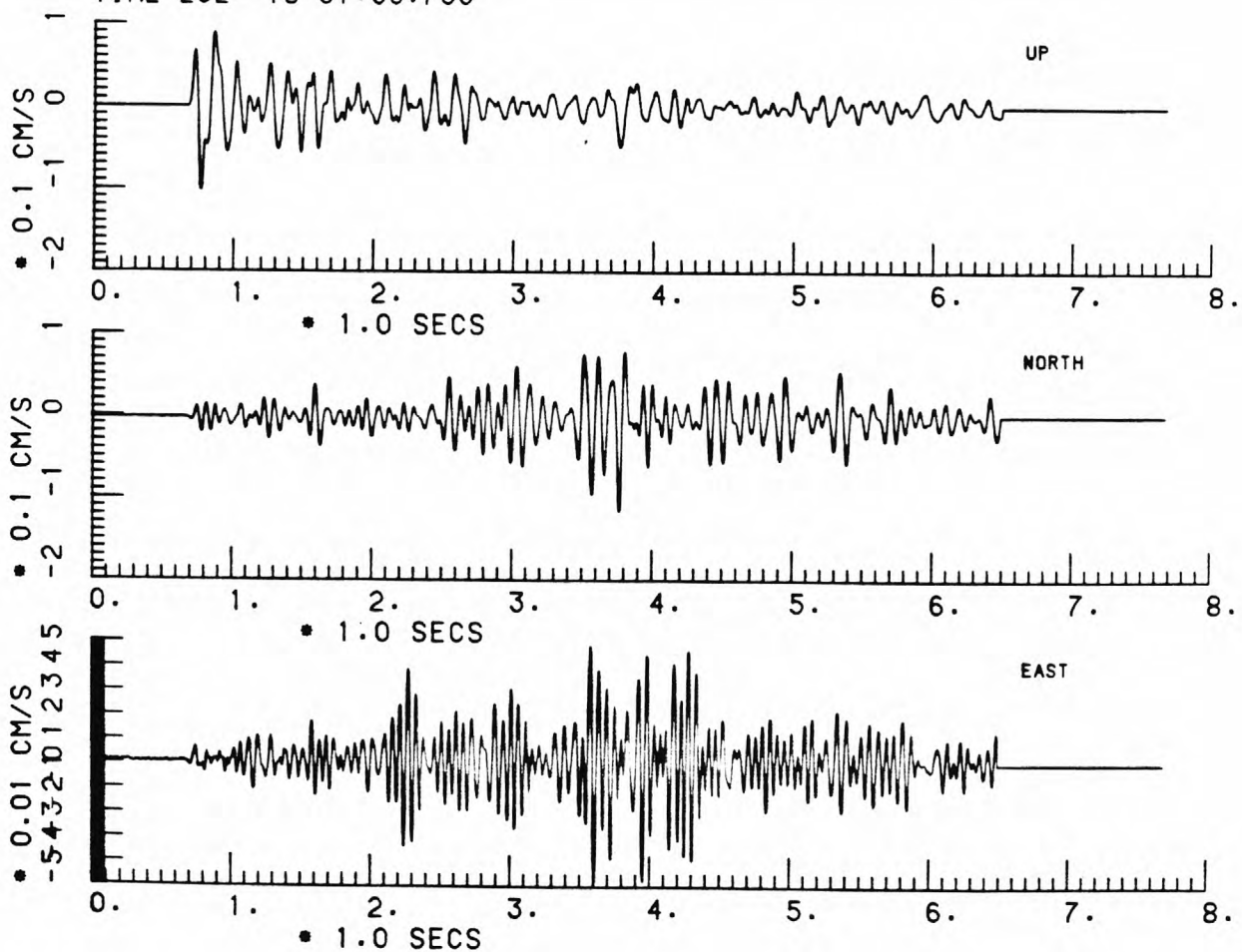
STATION CRK
TIME 292 18:51:30.570

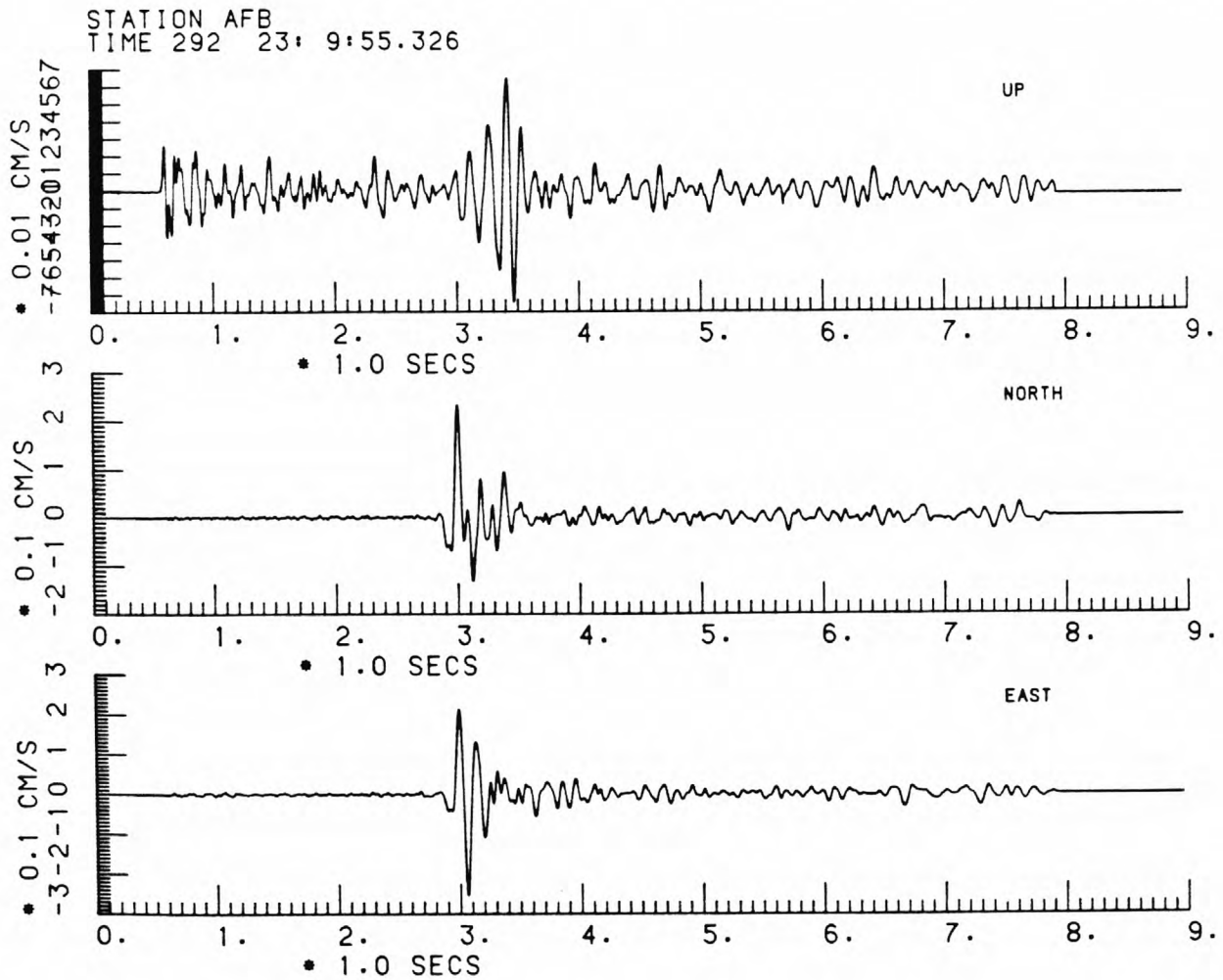
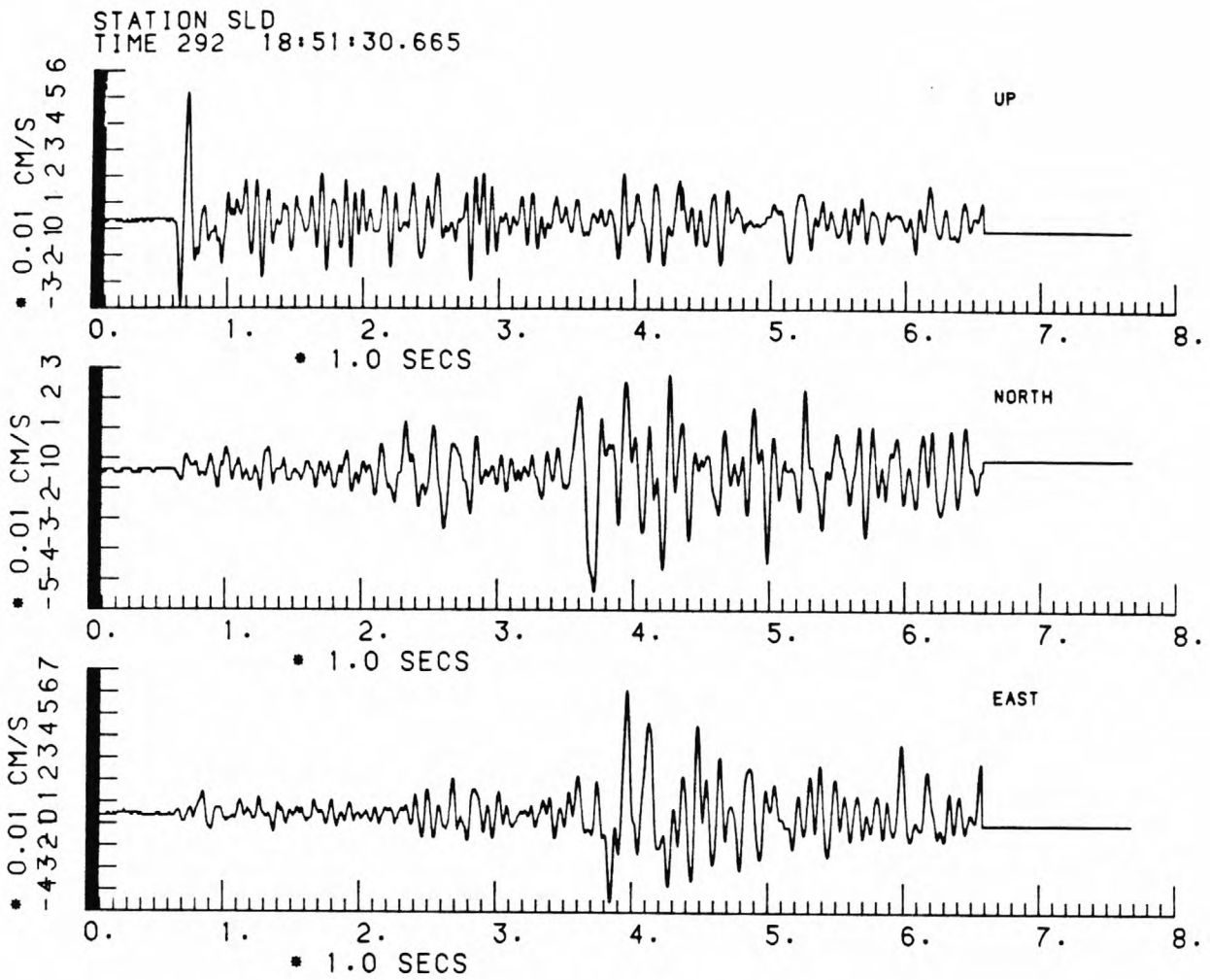


STATION KYR
TIME 292 18:51:29.235

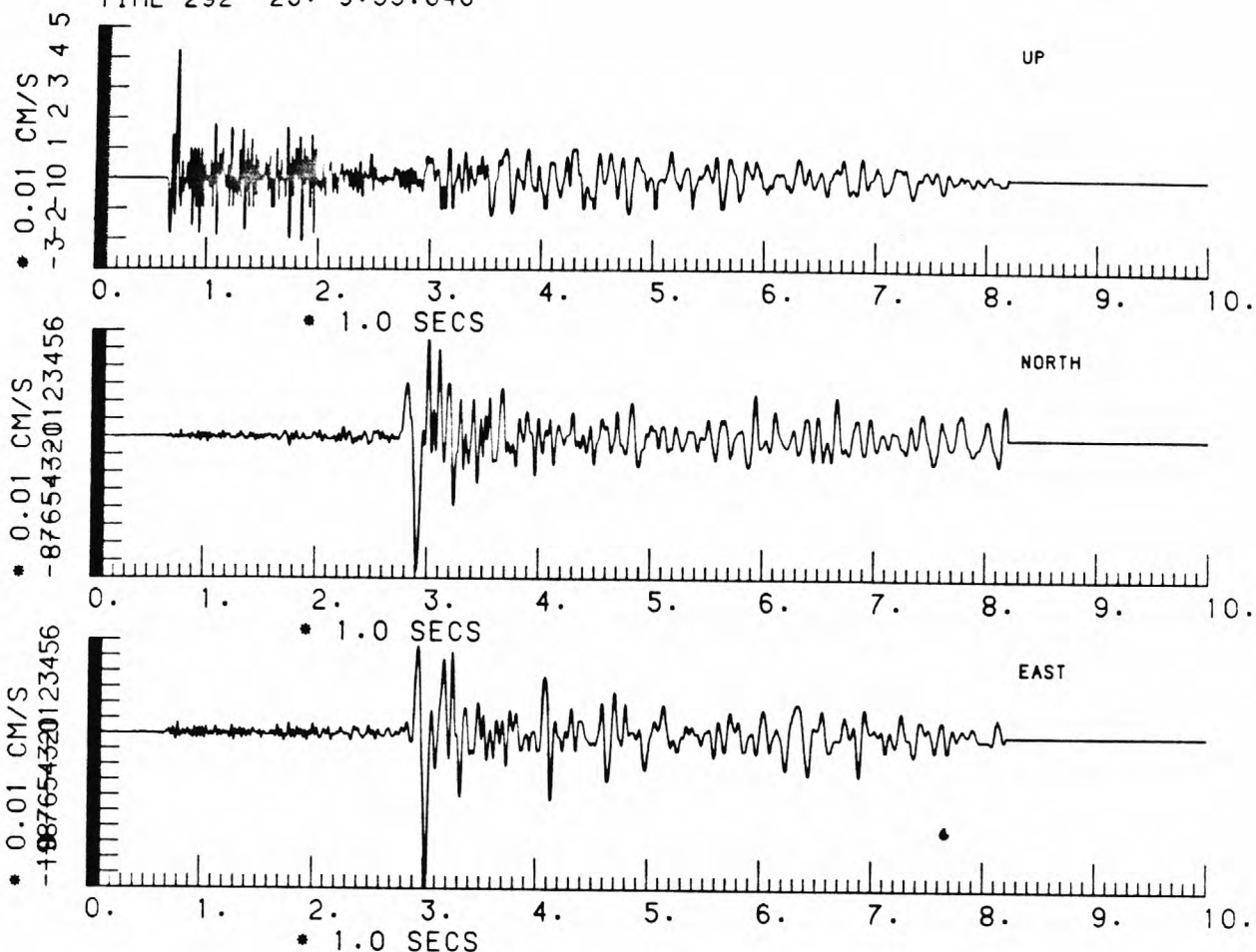


STATION GRS
TIME 292 18:51:30.750

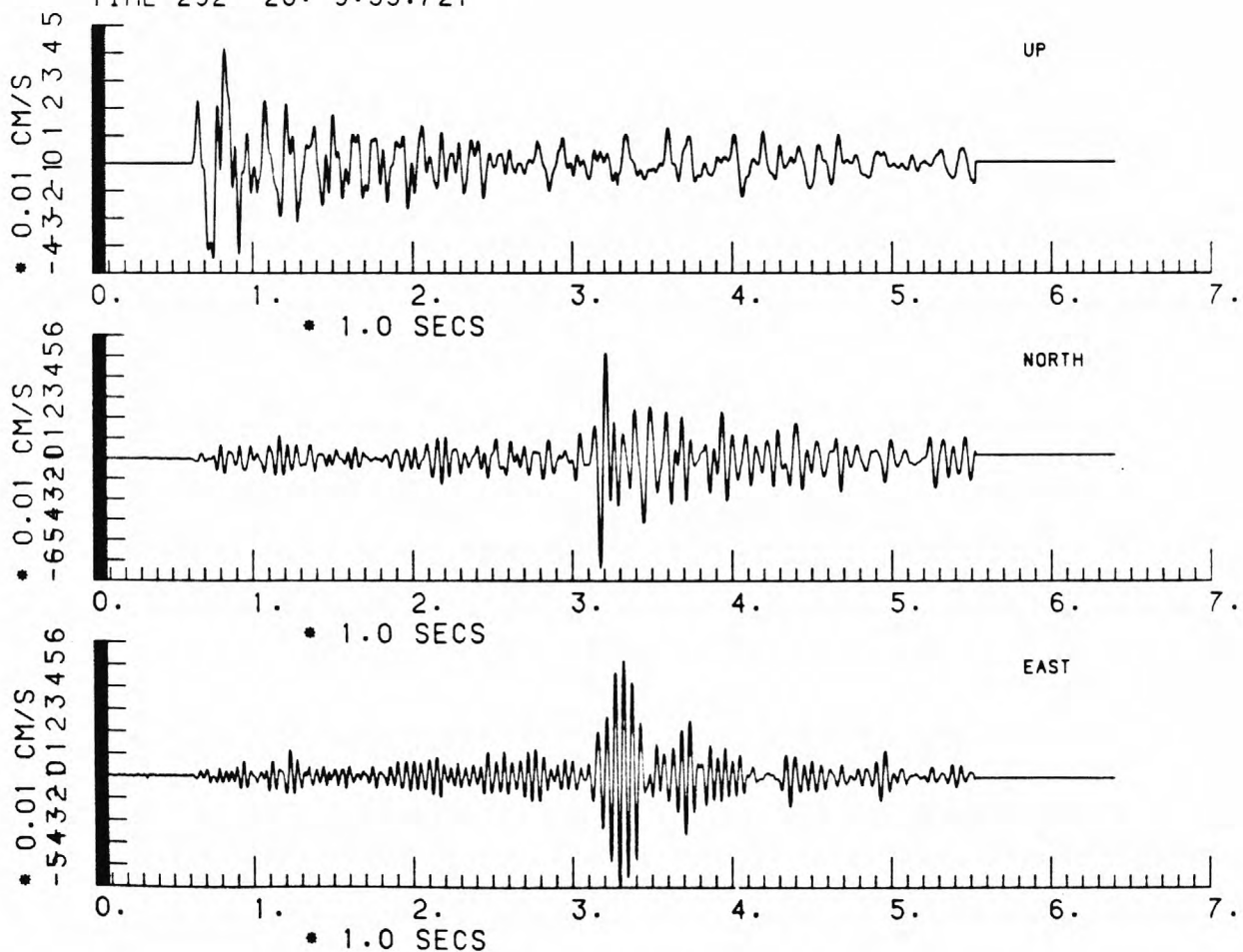




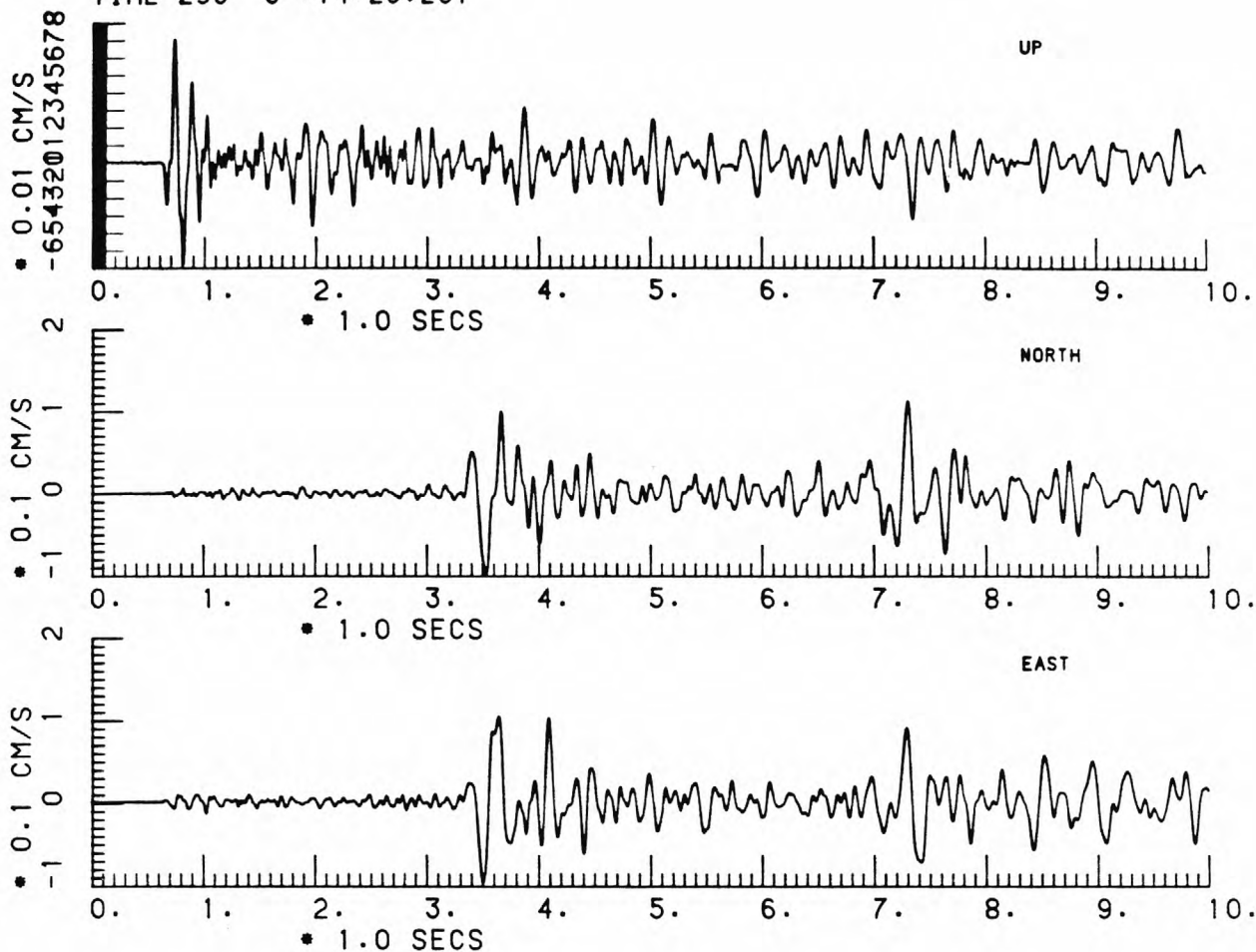
STATION FBR
TIME 292 23: 9:55.040



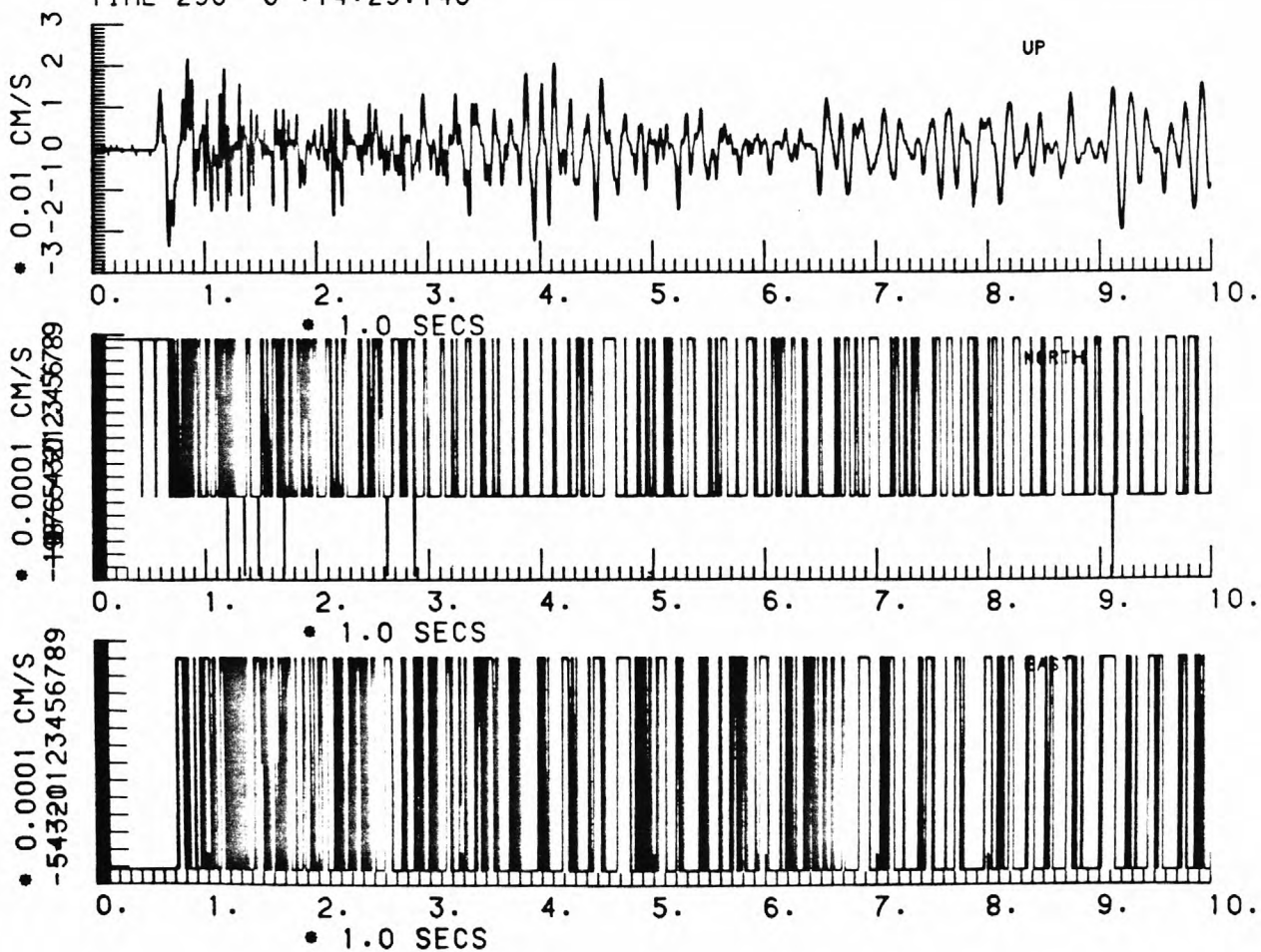
STATION GRS
TIME 292 23: 9:55.721

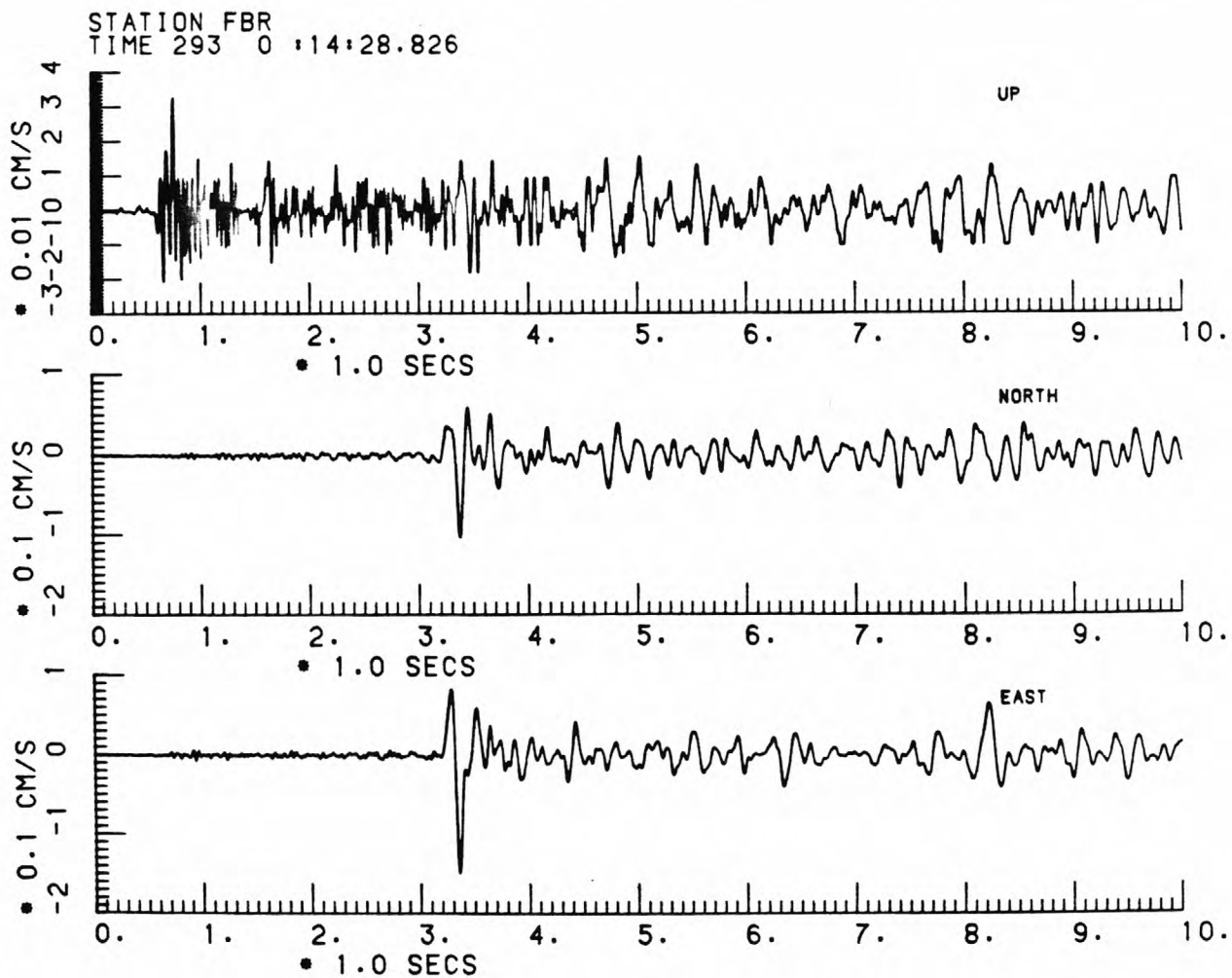
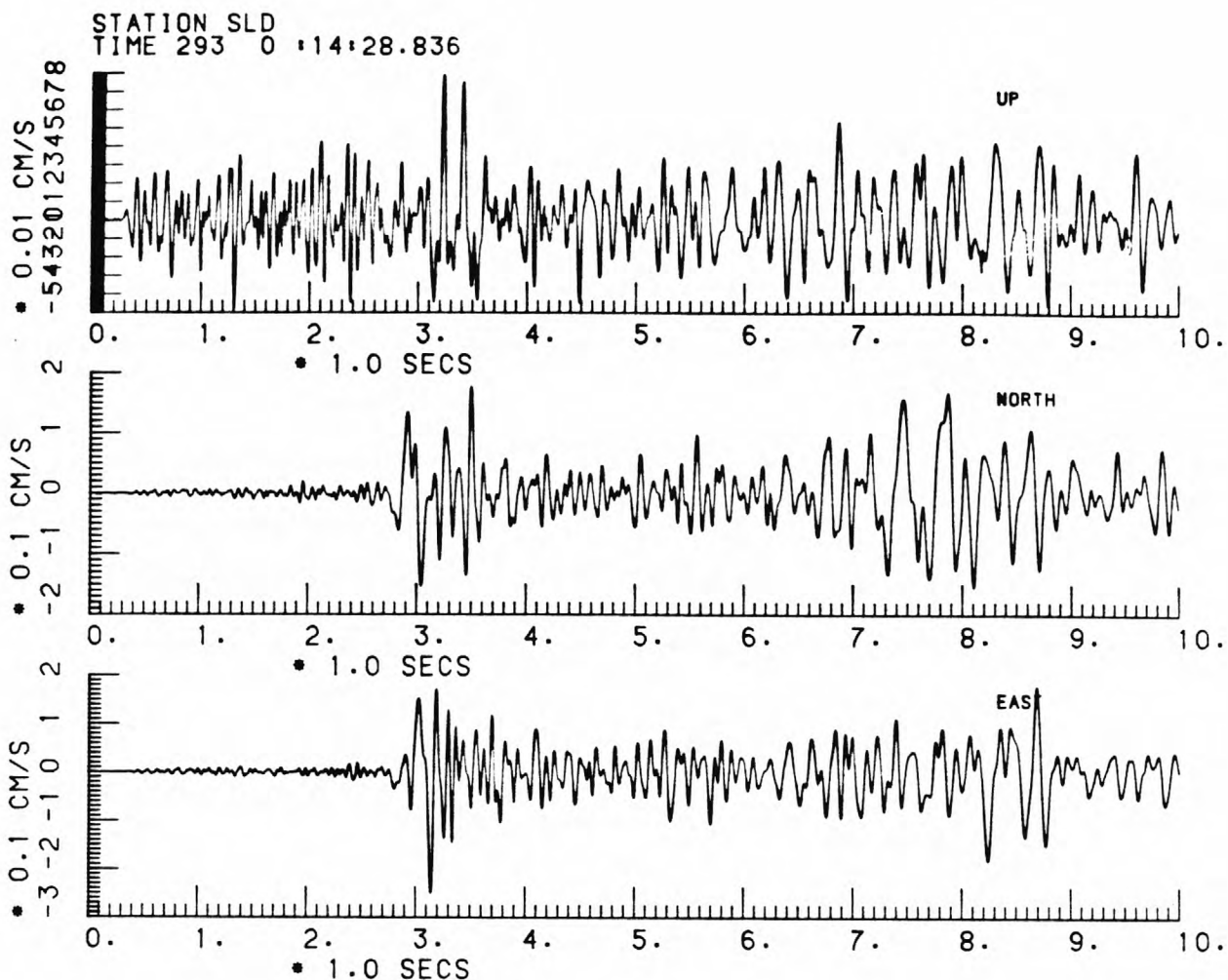


STATION AFB
TIME 293 0 :14:29.201

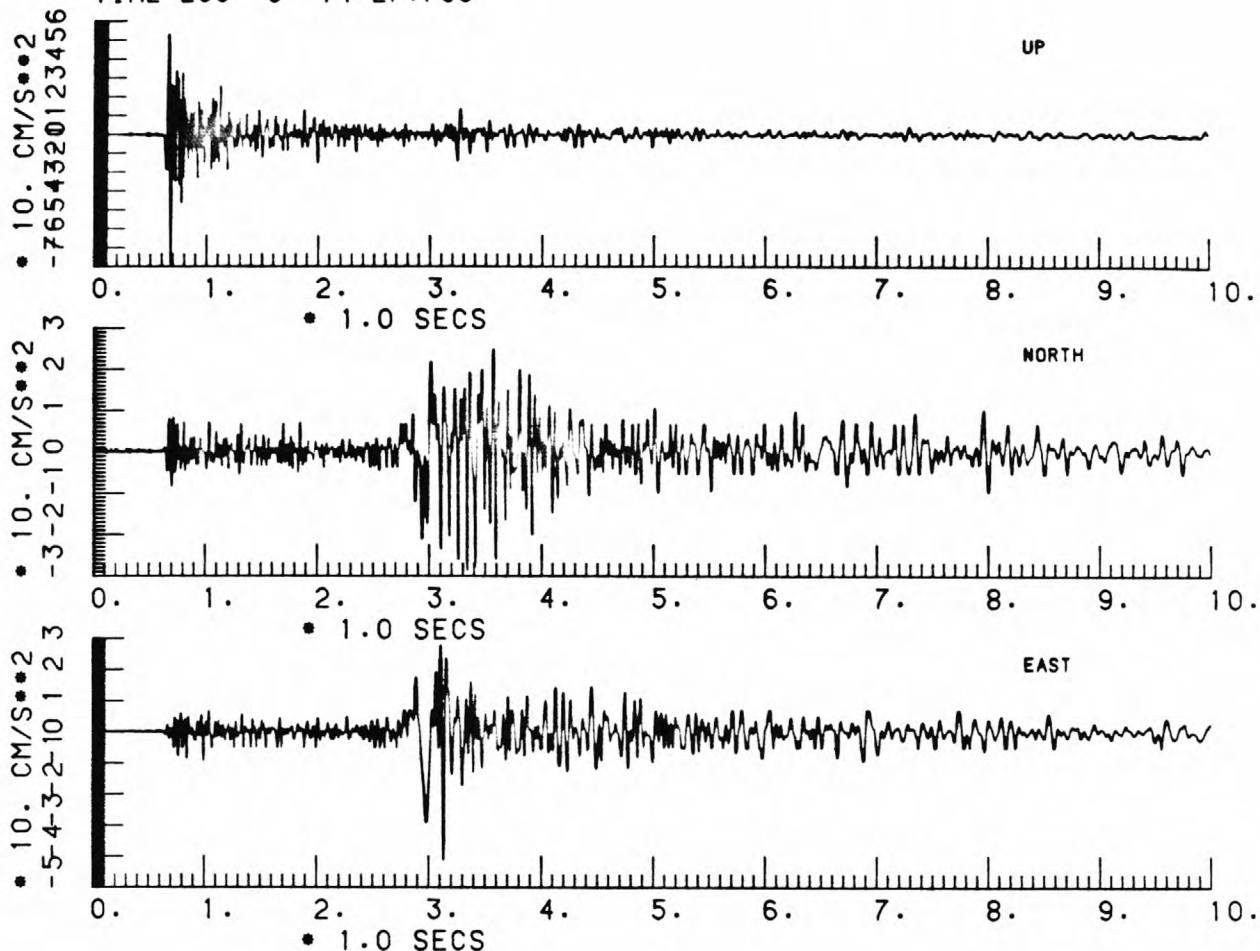


STATION CRK
TIME 293 0 :14:29.140

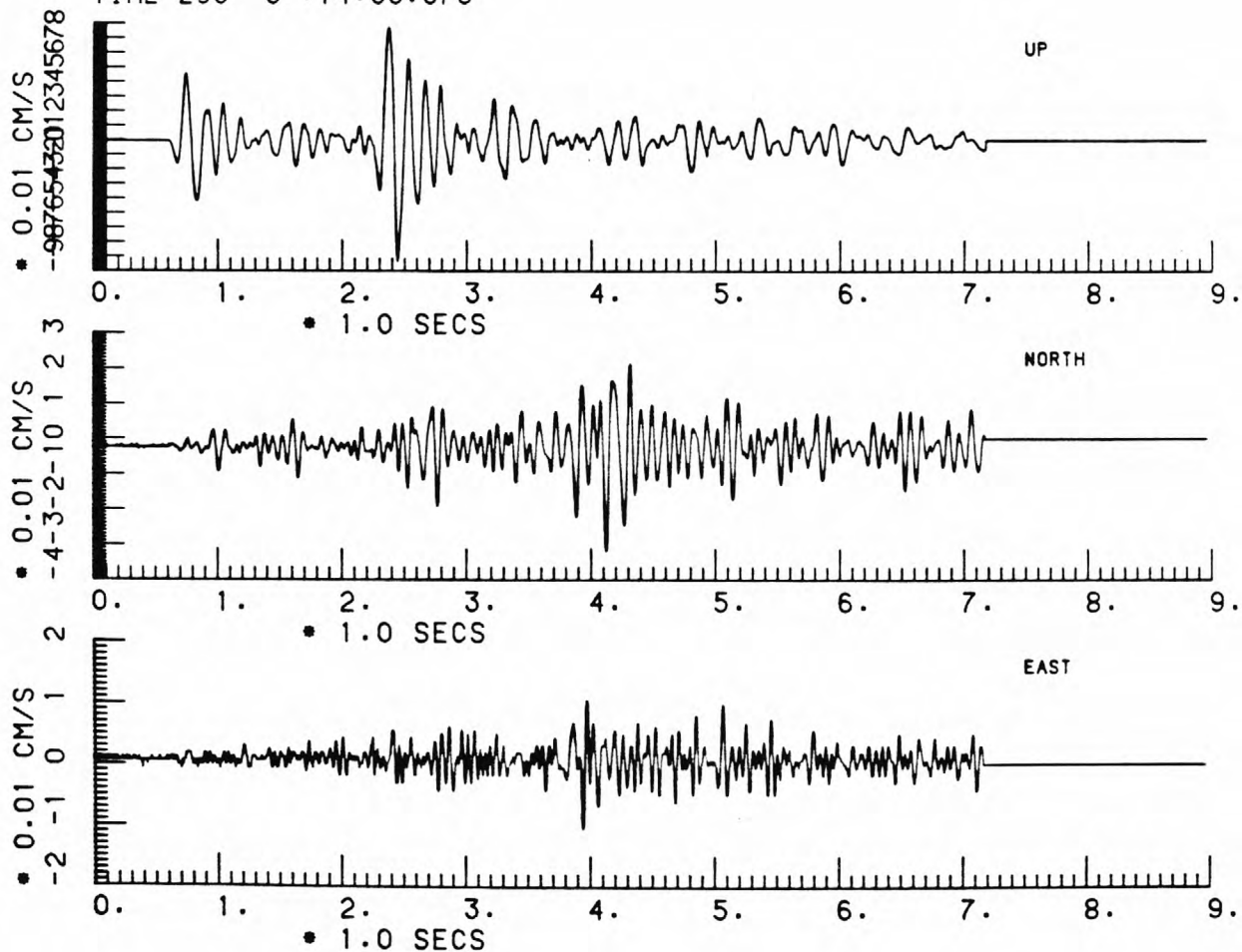




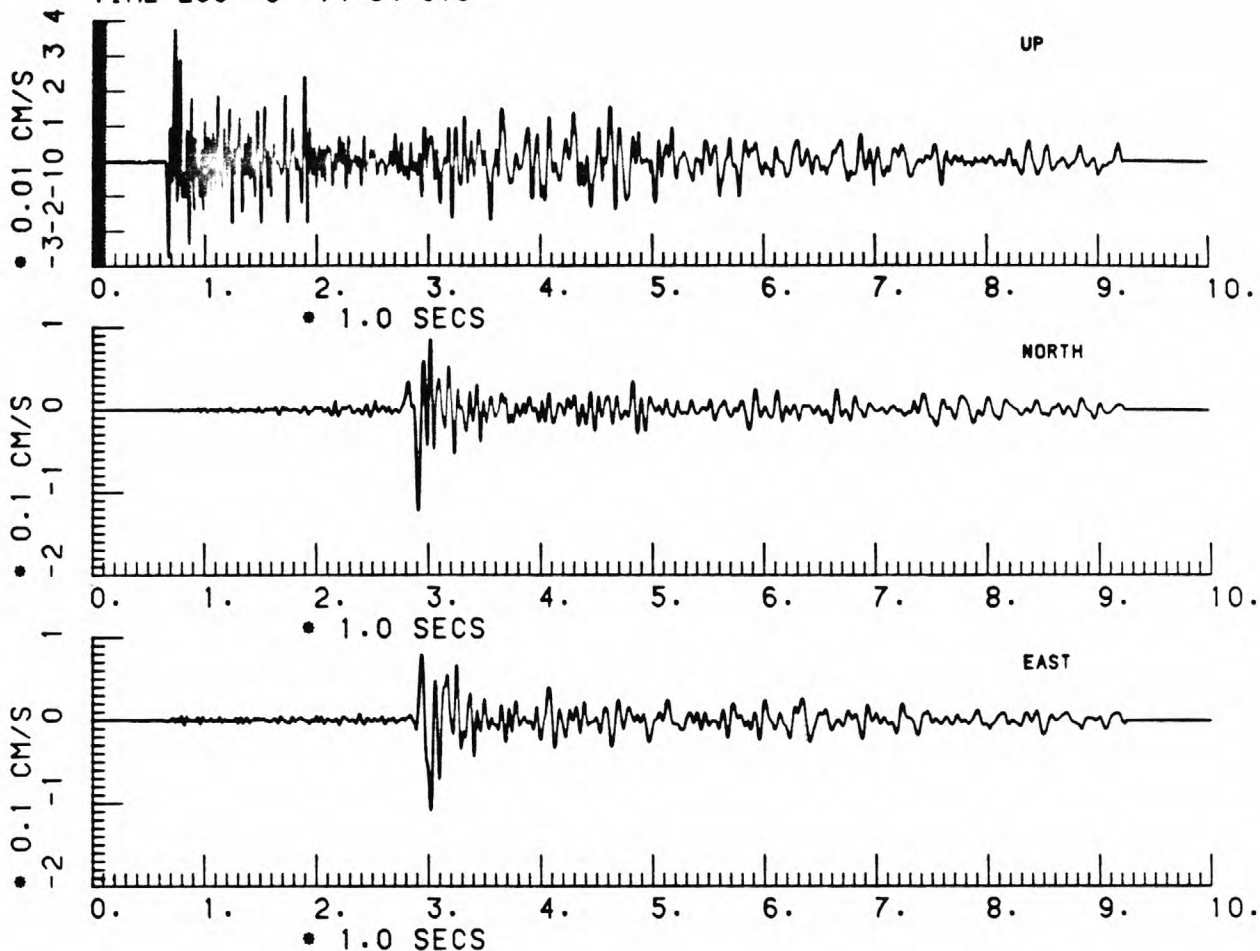
STATION KYR
TIME 293 0 :14:27.755



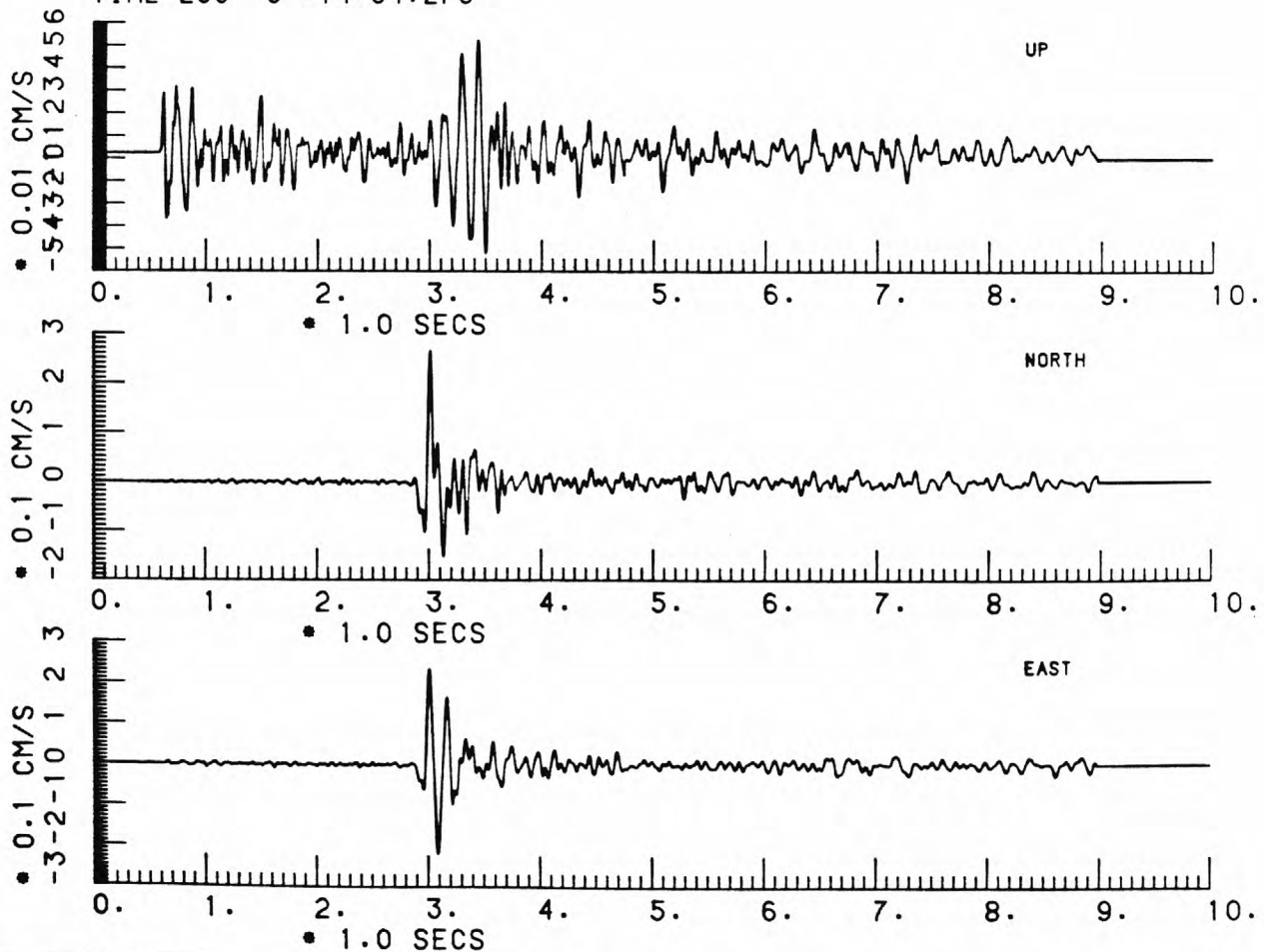
STATION GRS
TIME 293 0 :14:30.075

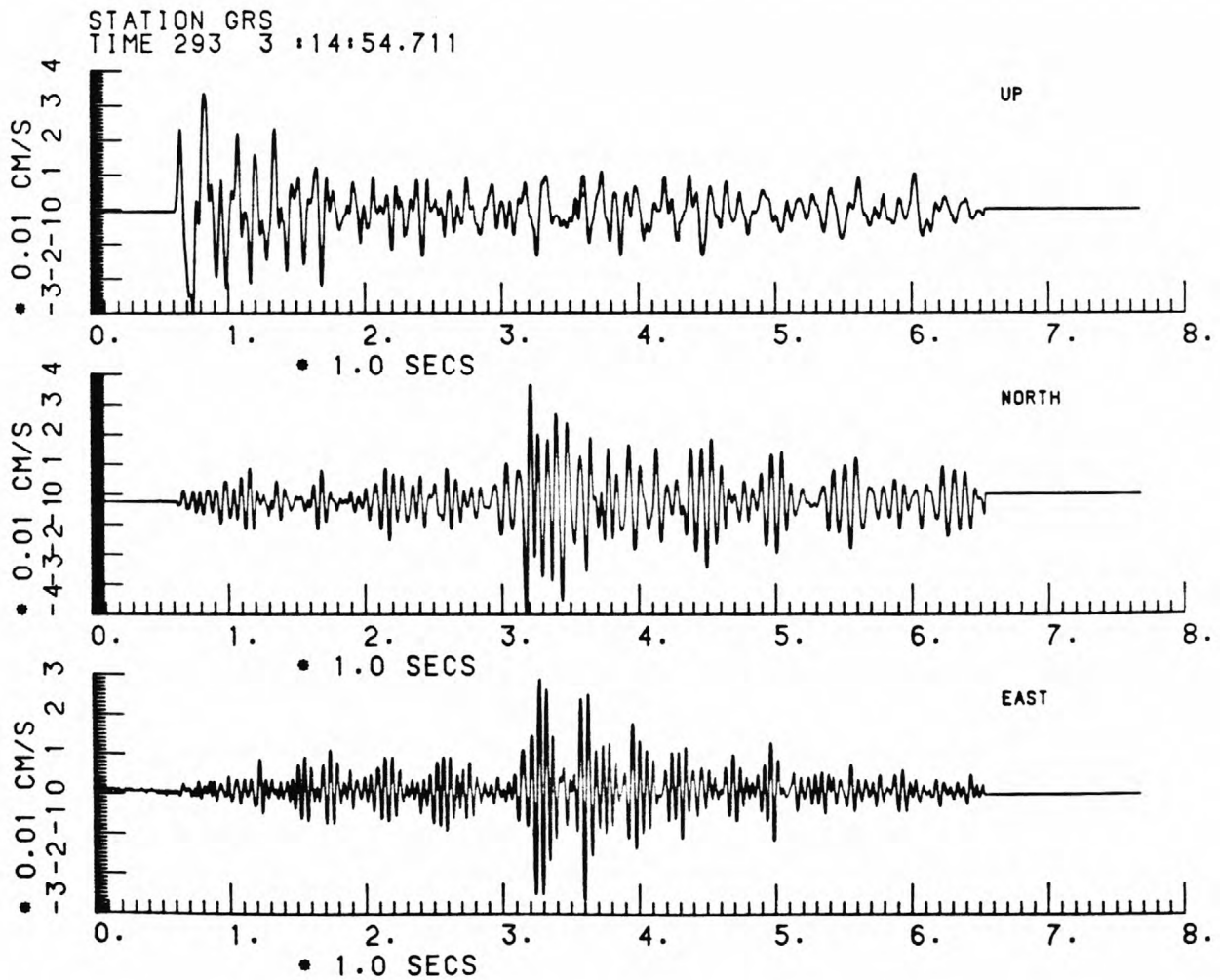
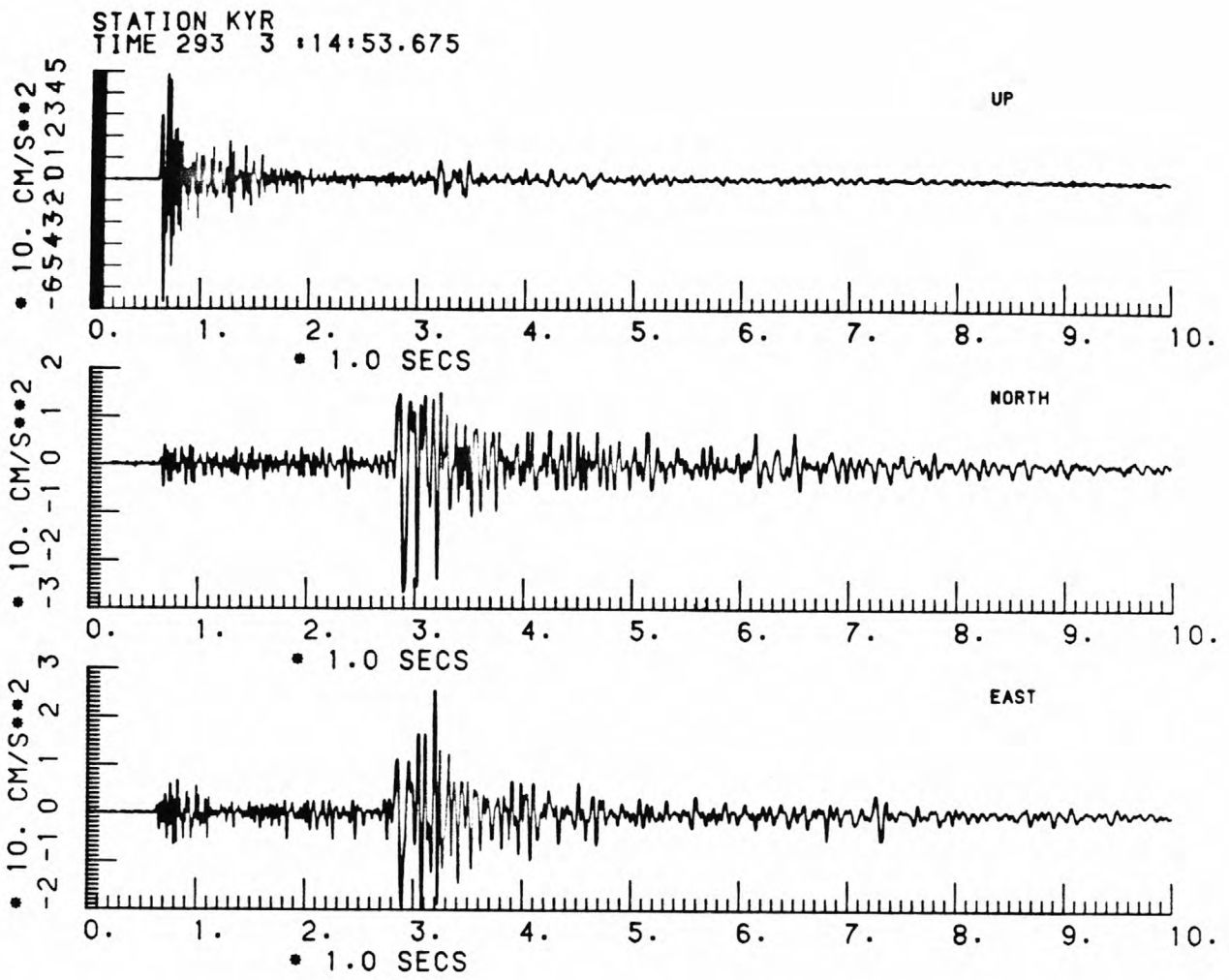


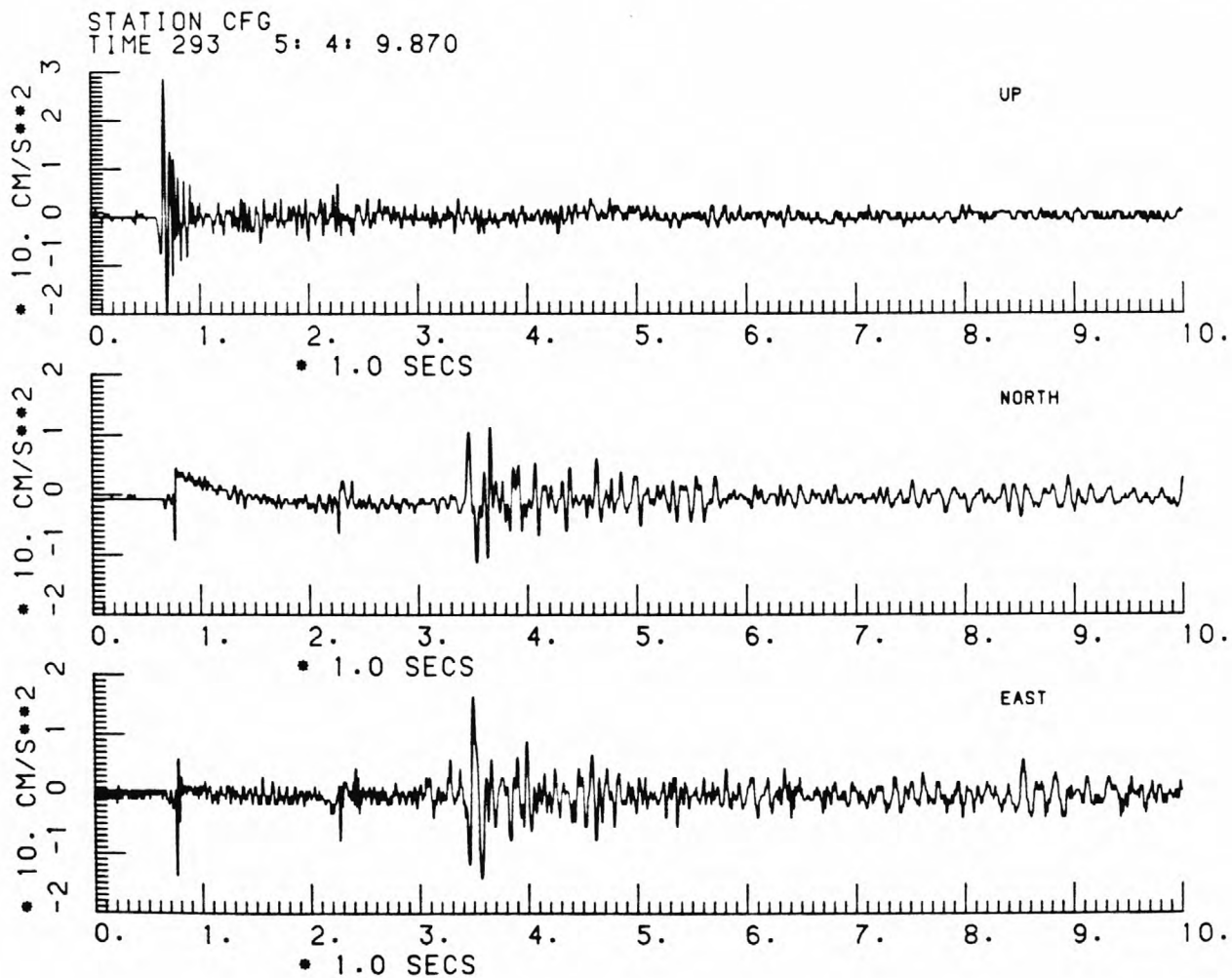
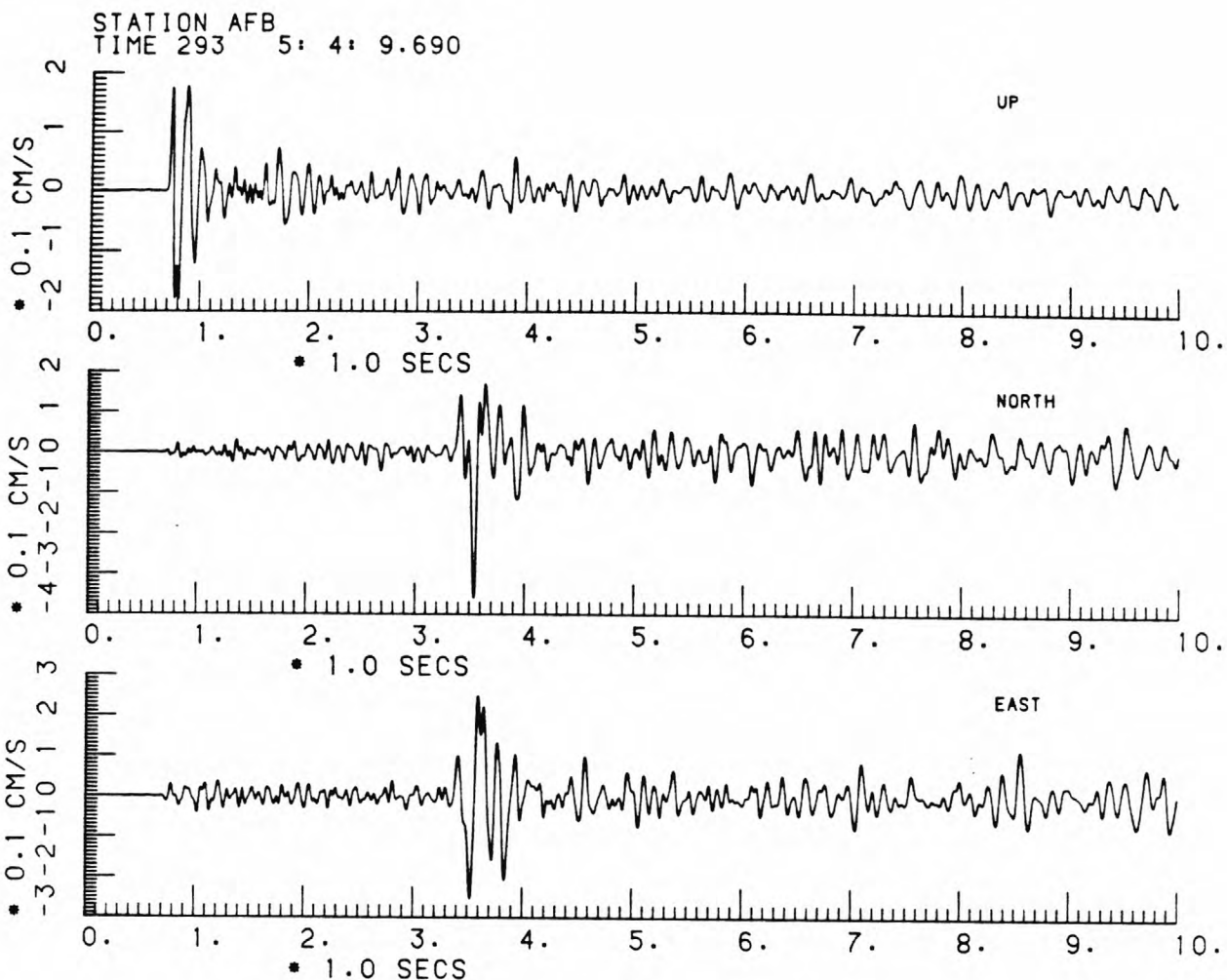
STATION FBR
TIME 293 3 :14:54.015



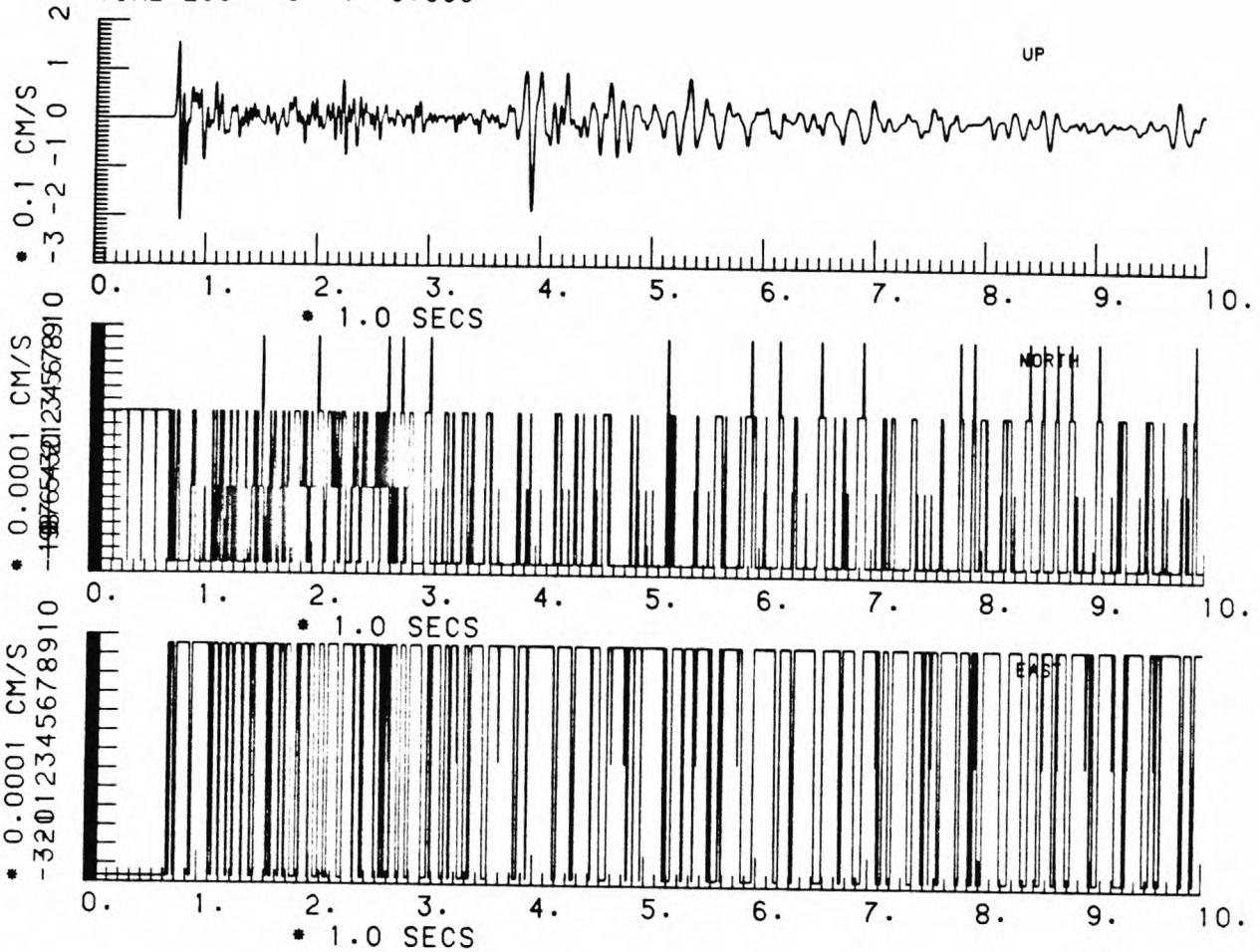
STATION AFB
TIME 293 3 :14:54.270



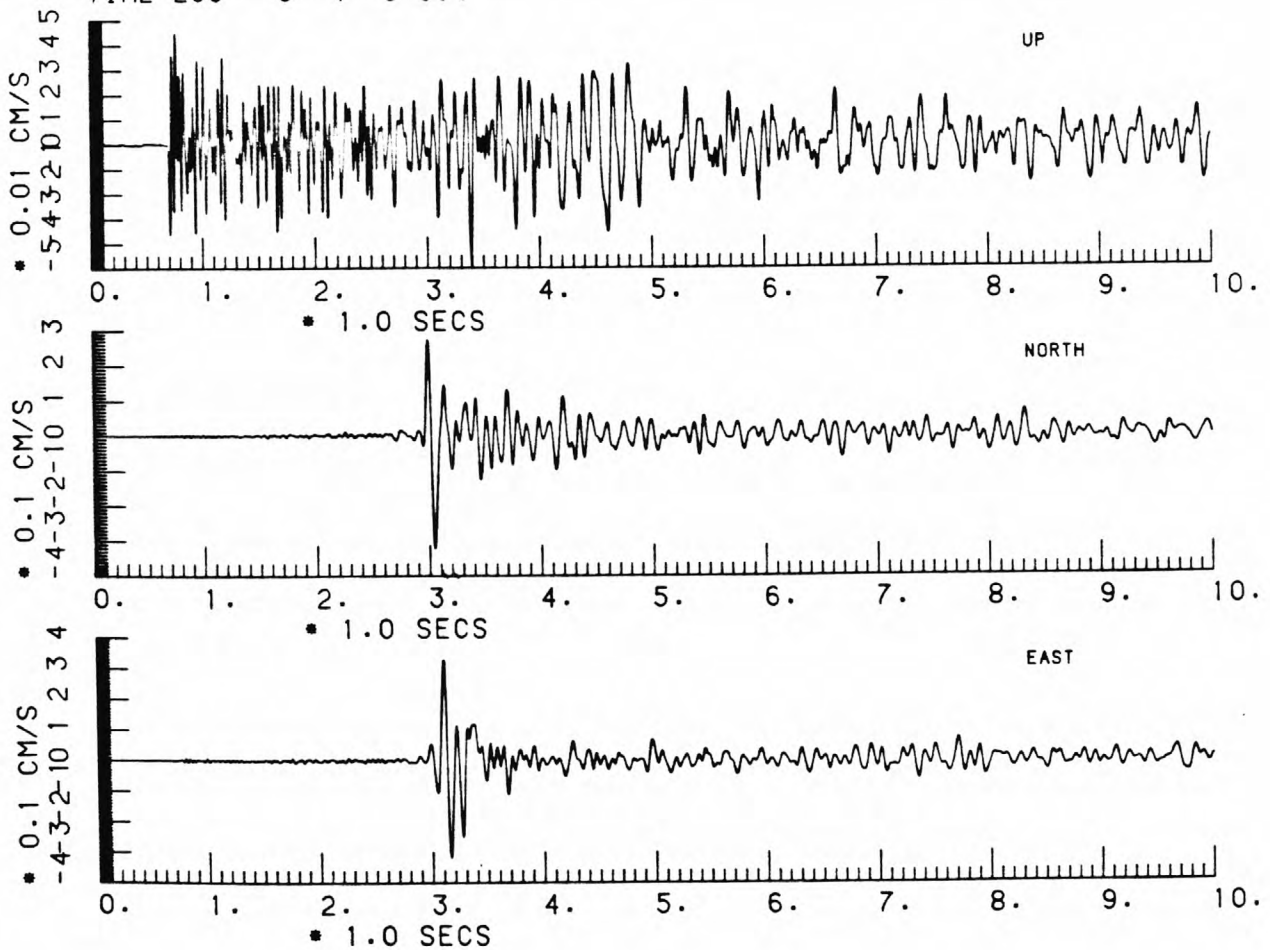




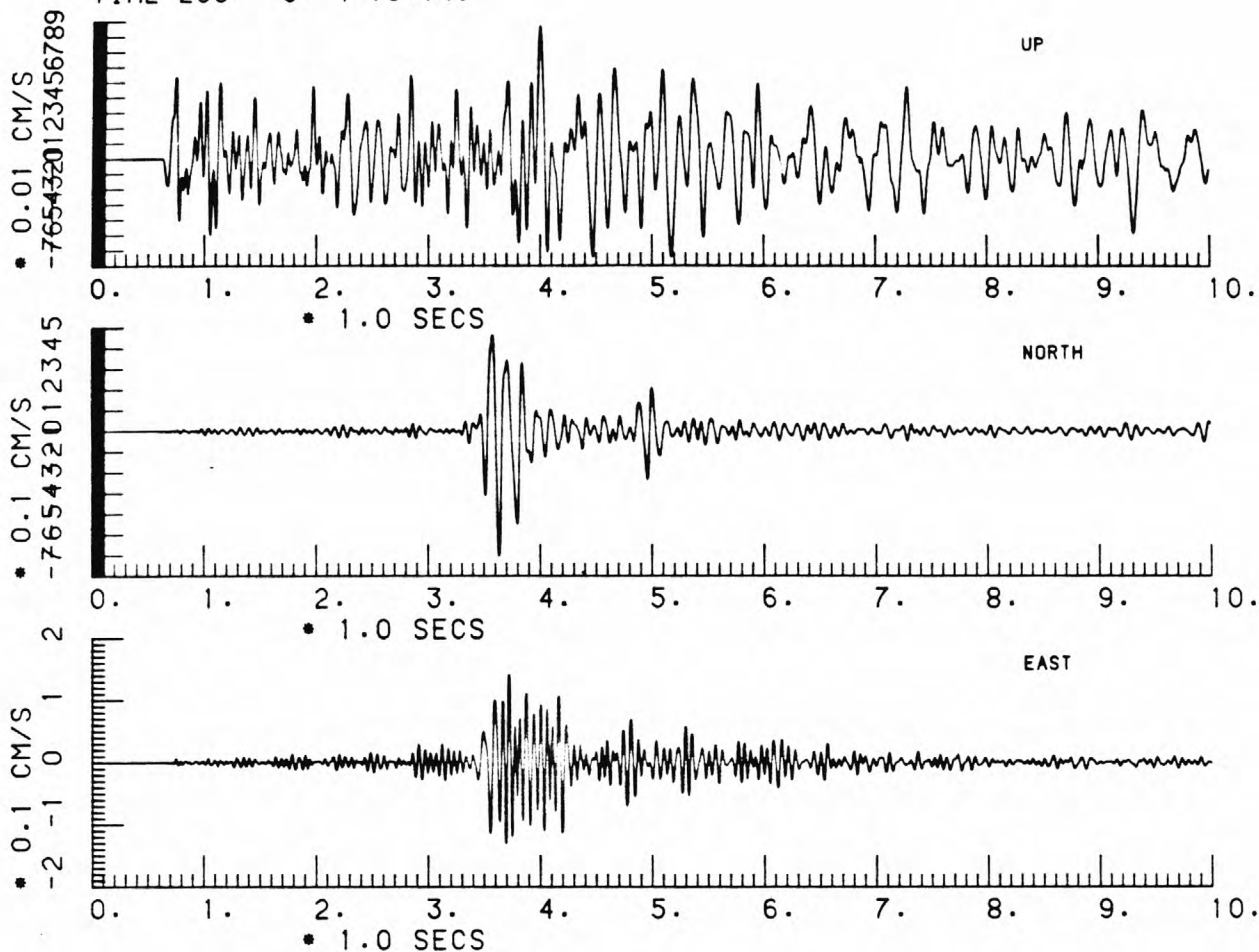
STATION CRK
TIME 293 5: 4: 9.505



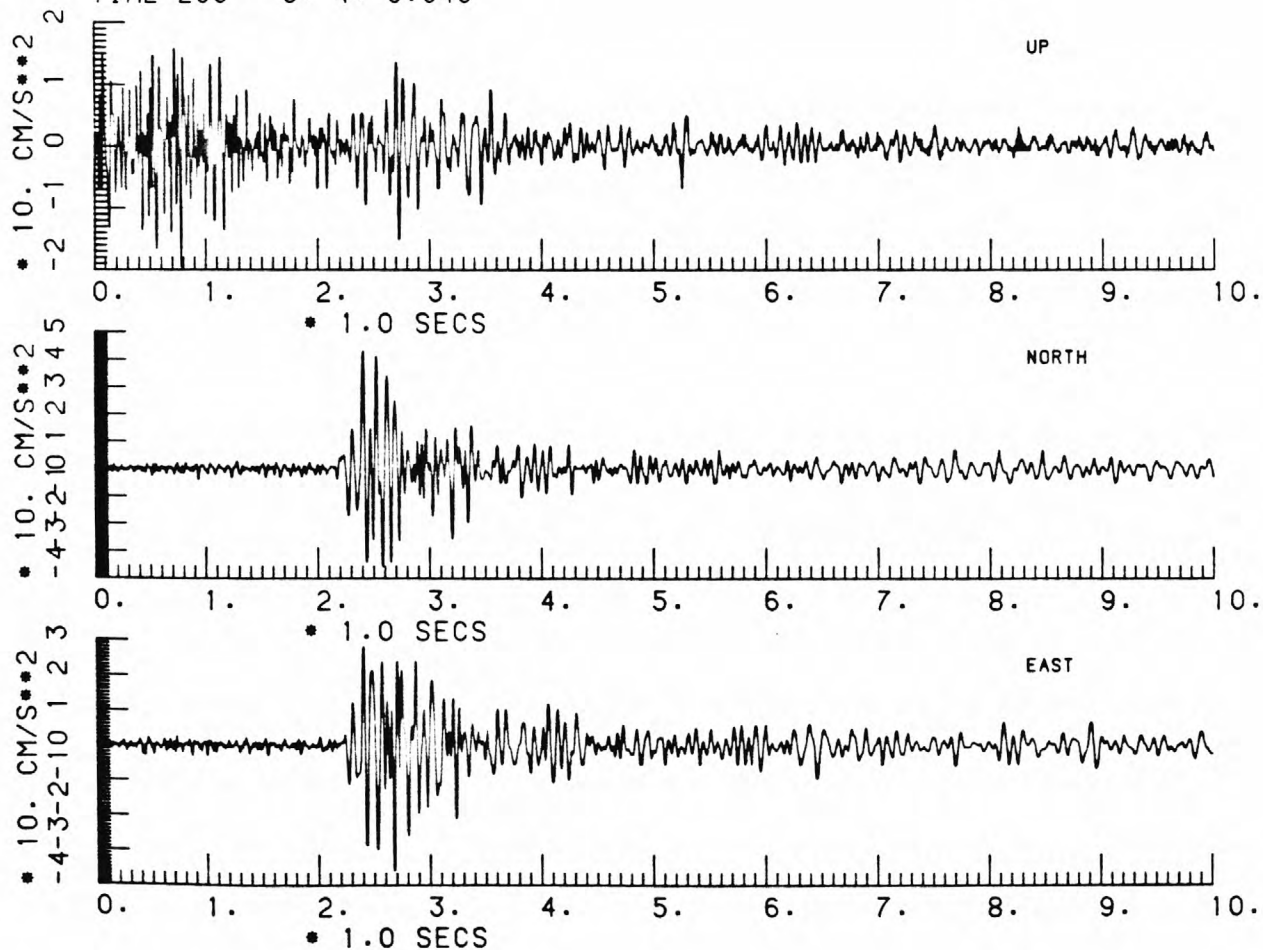
STATION FBR
TIME 293 5: 4: 9.054



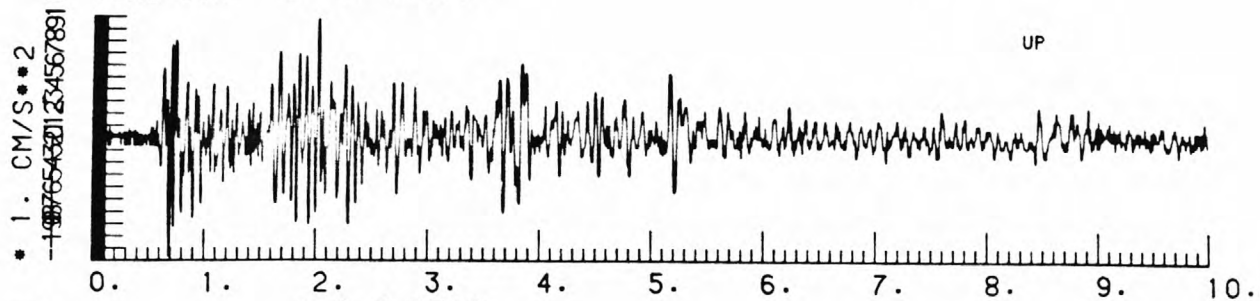
STATION GRS
TIME 293 5: 4:10.145



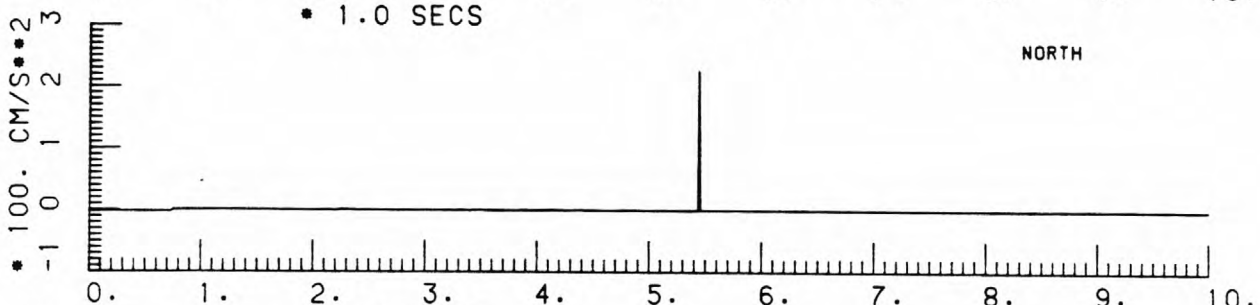
STATION KYR
TIME 293 5: 4: 9.640



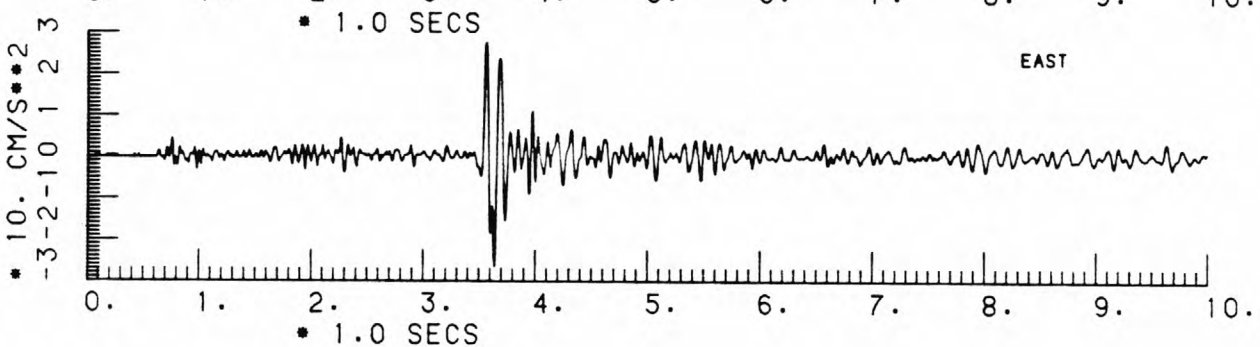
1. CM/S**2
--19876543212345678910



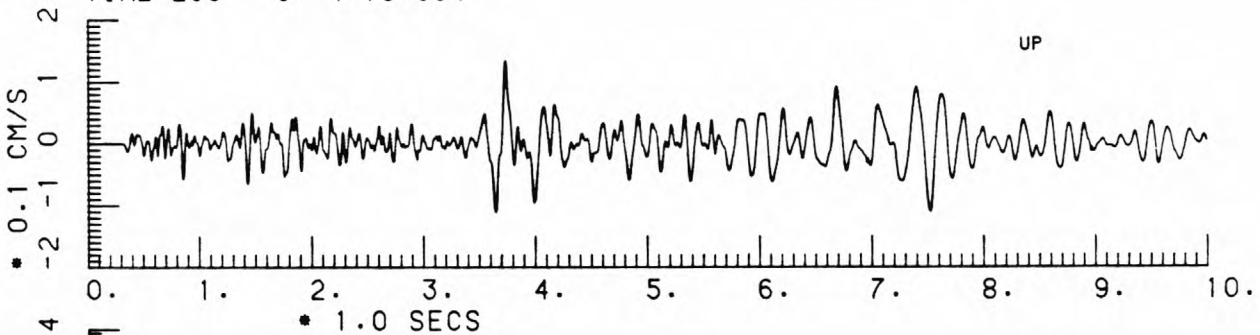
* 100. CM/S**2



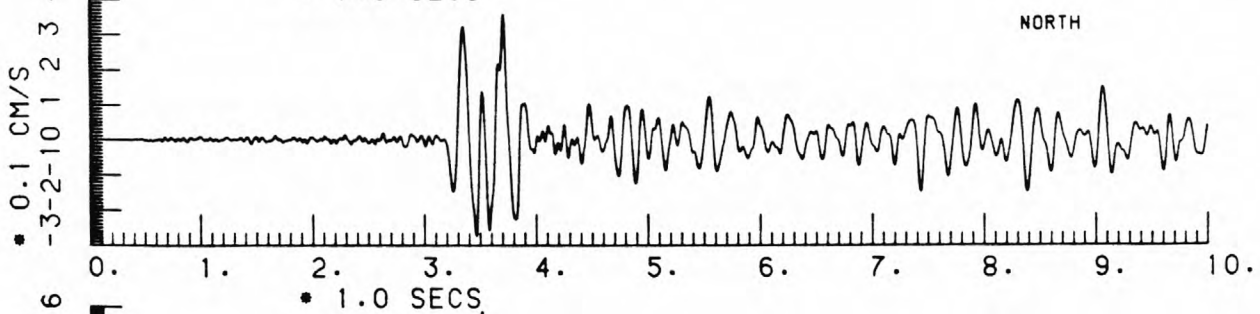
* 10. CM/S**2
-3-2-10 1 2 3



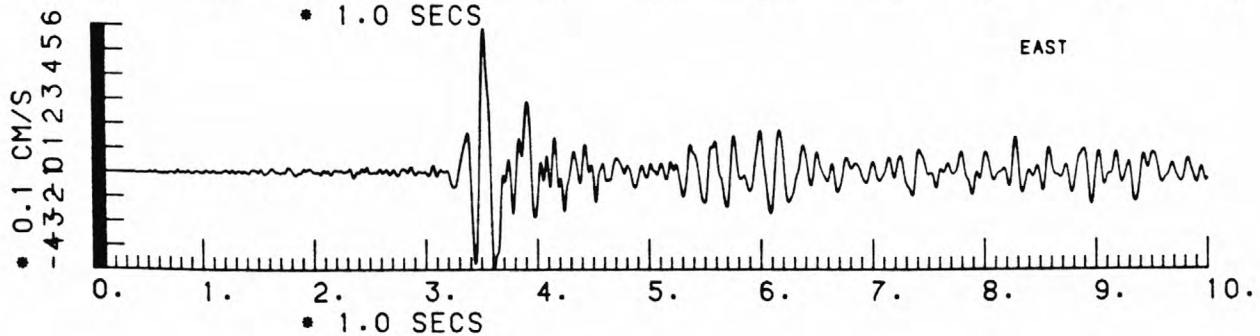
* 0.1 CM/S
-2 -1 0 1 2

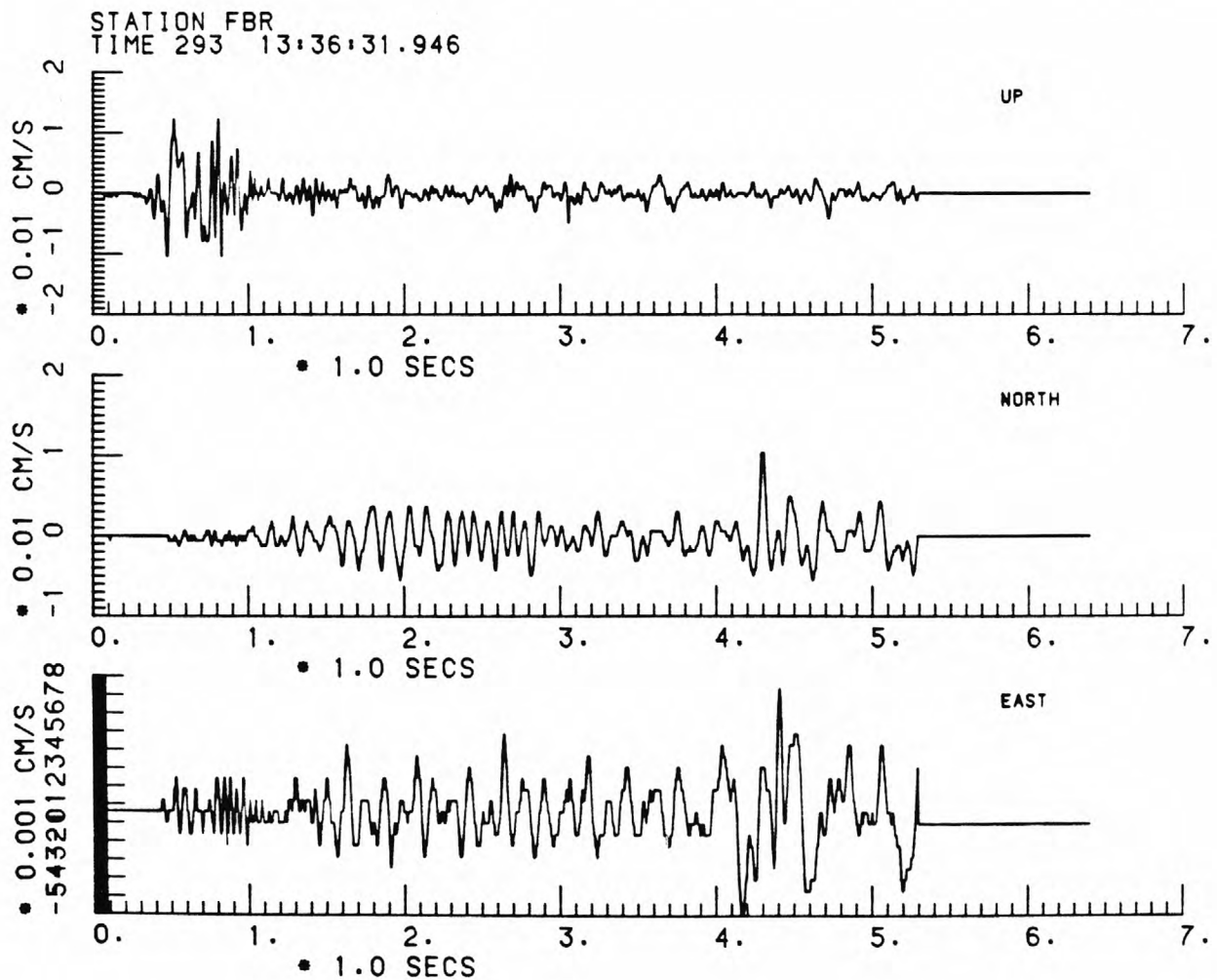
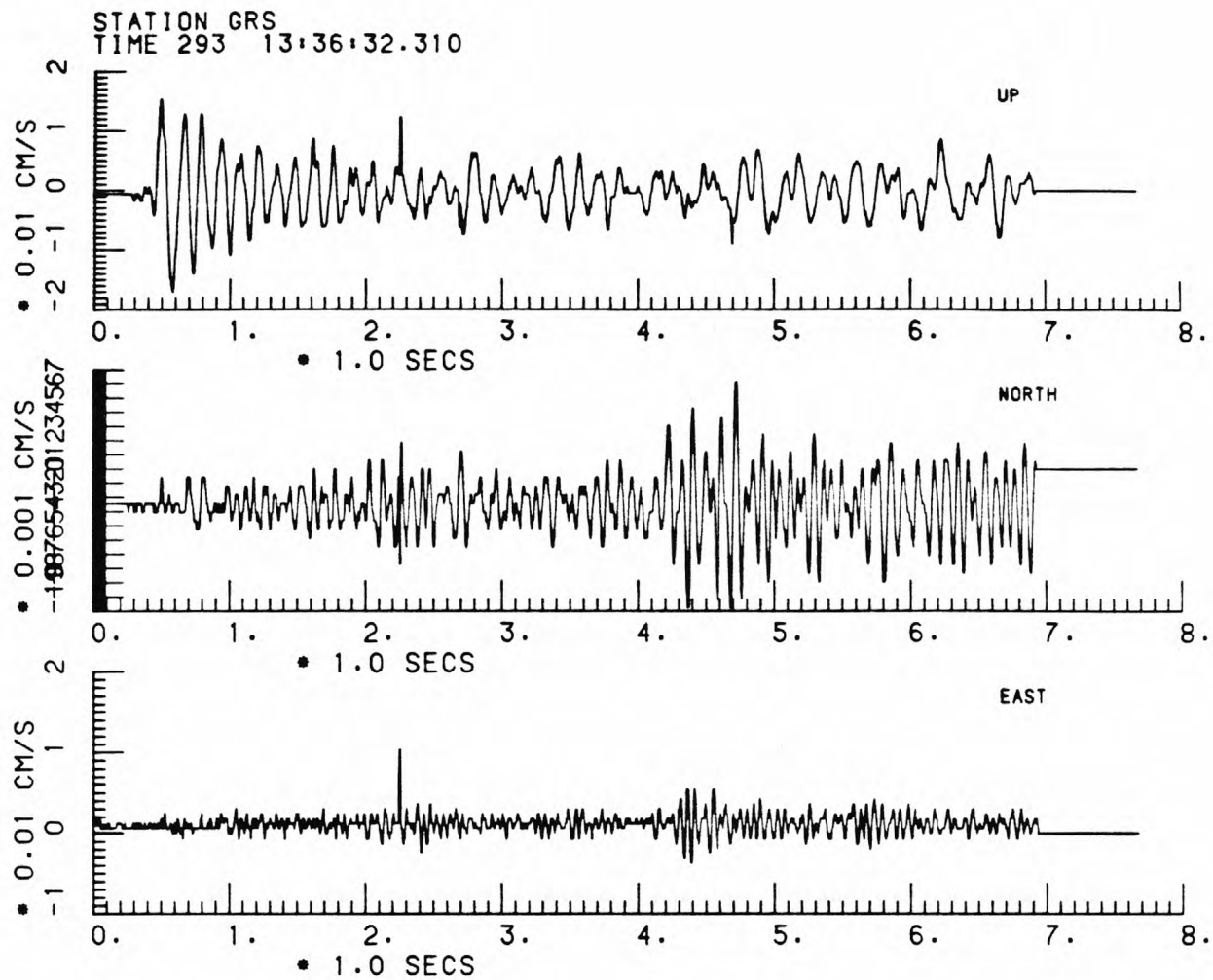


* 0.1 CM/S
-3-2-10 1 2 3

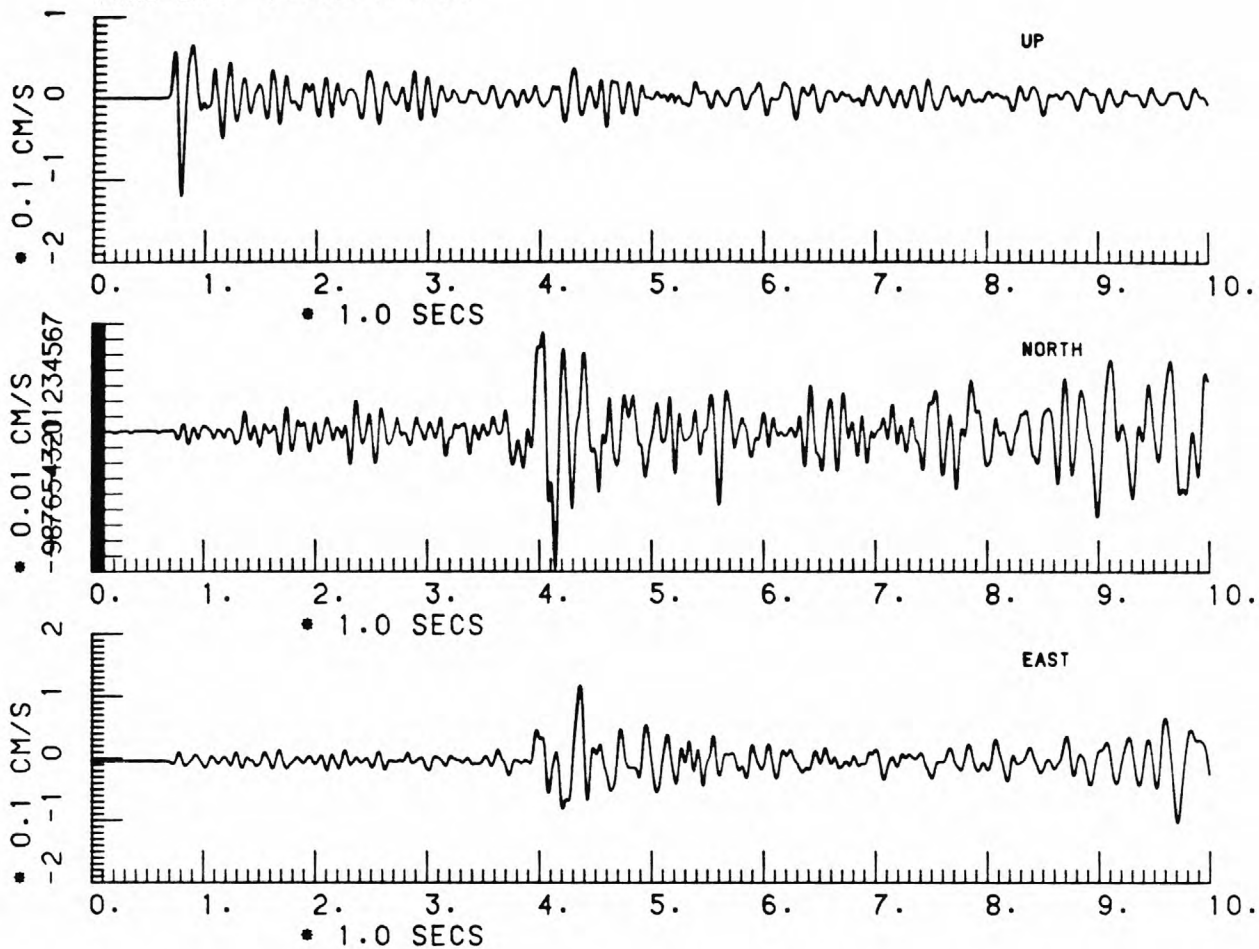


* 0.1 CM/S
-4320123456

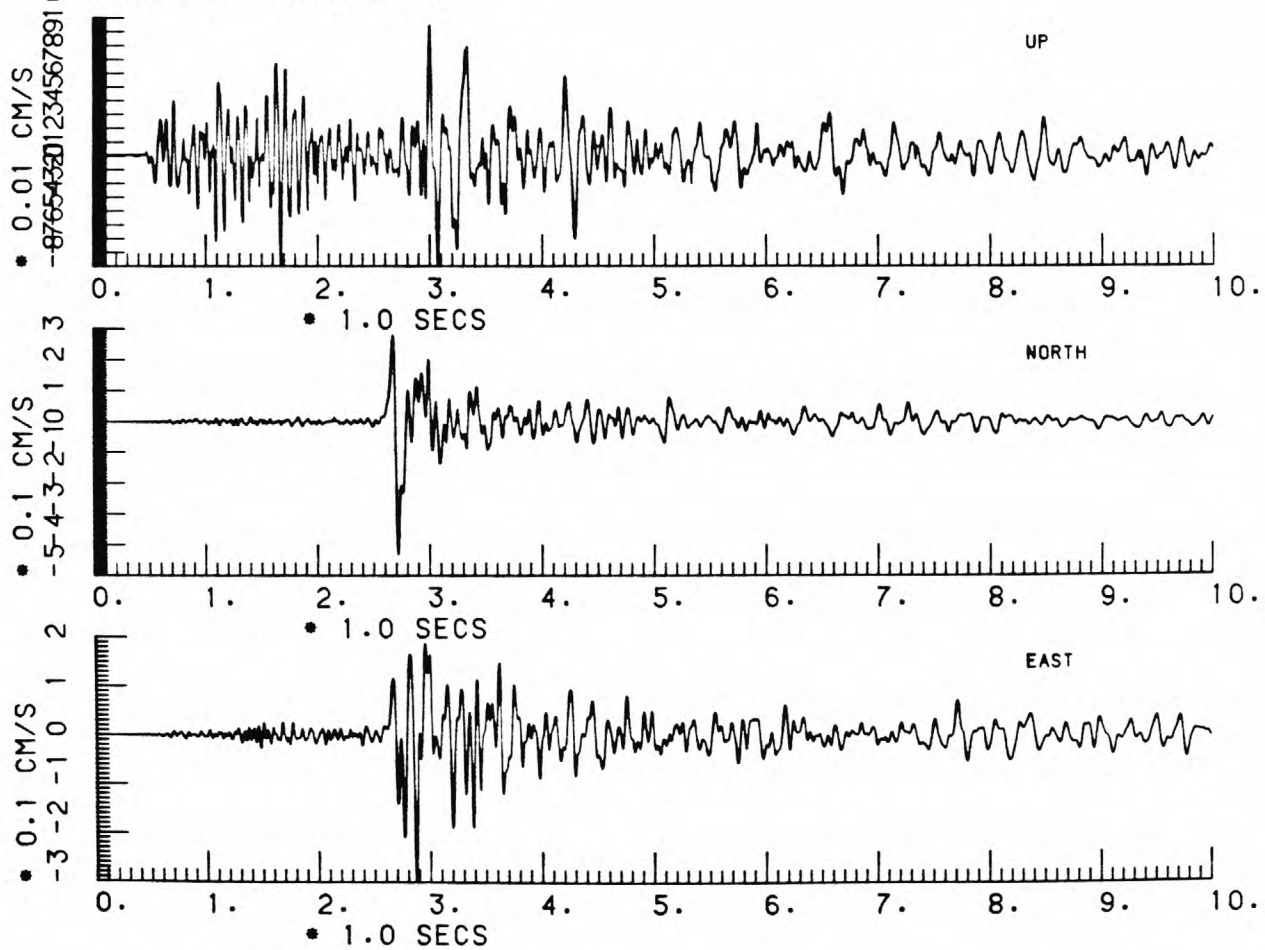




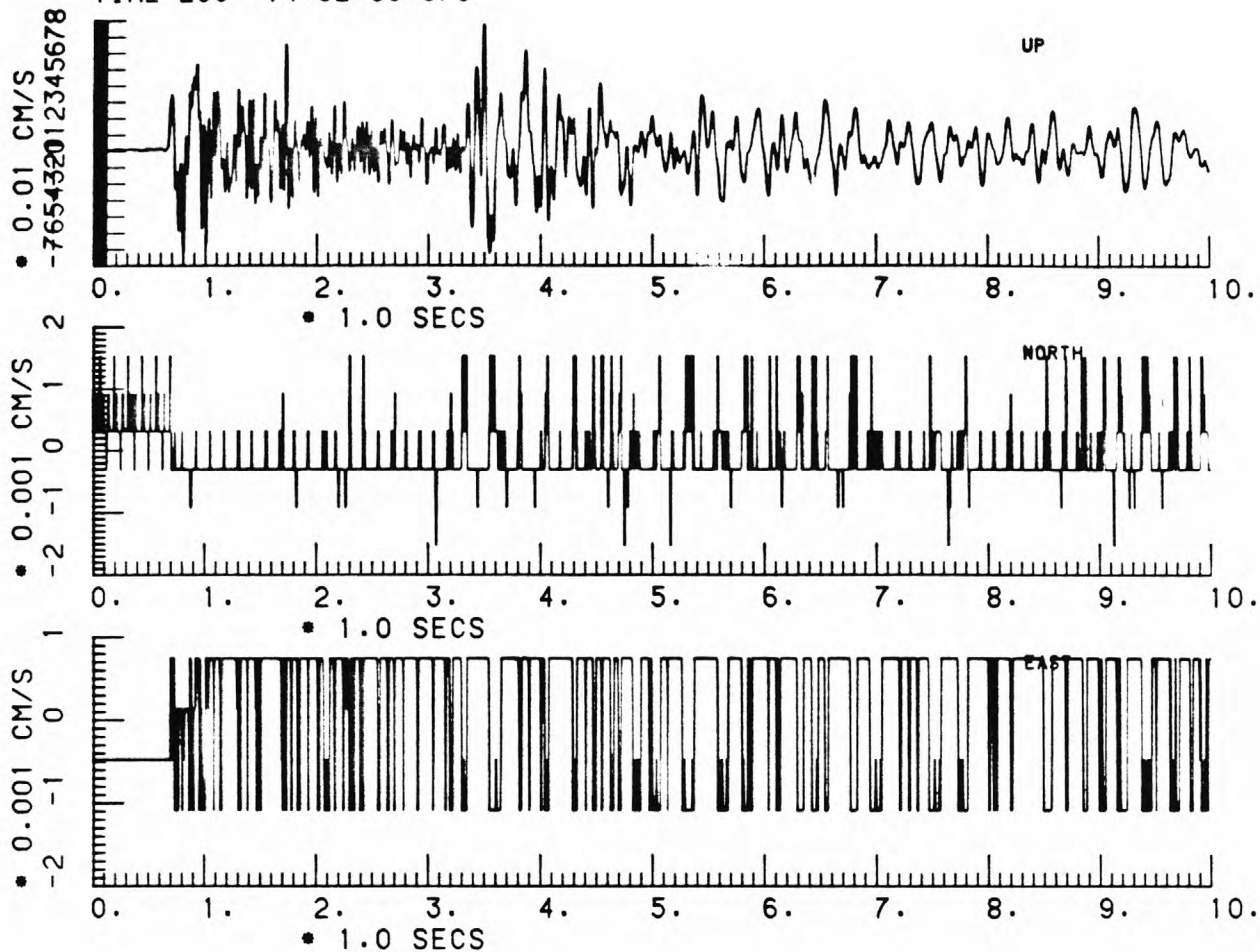
STATION AFB
TIME 293 14:52:57.795



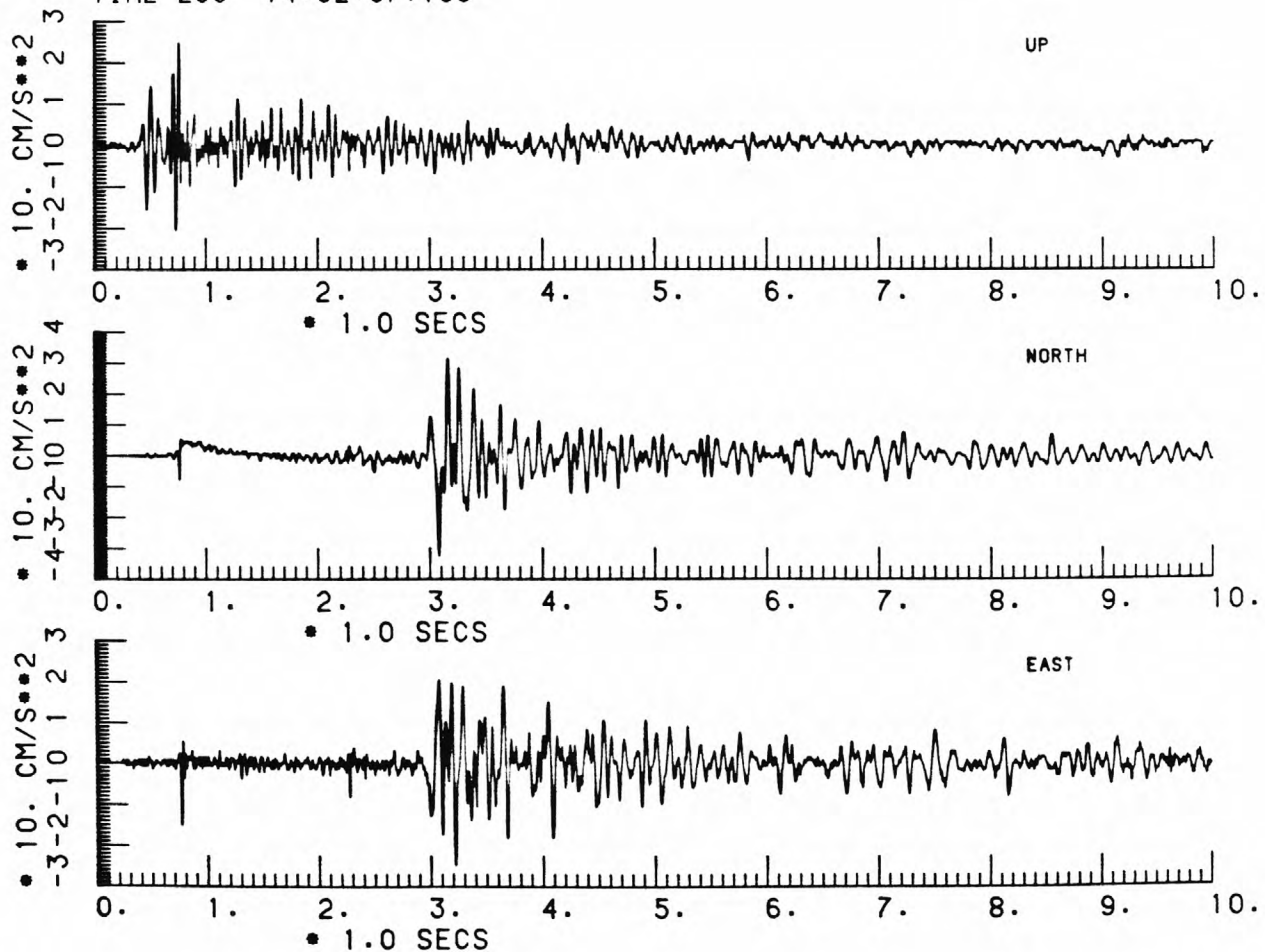
STATION SLD
TIME 293 13:36:29.675



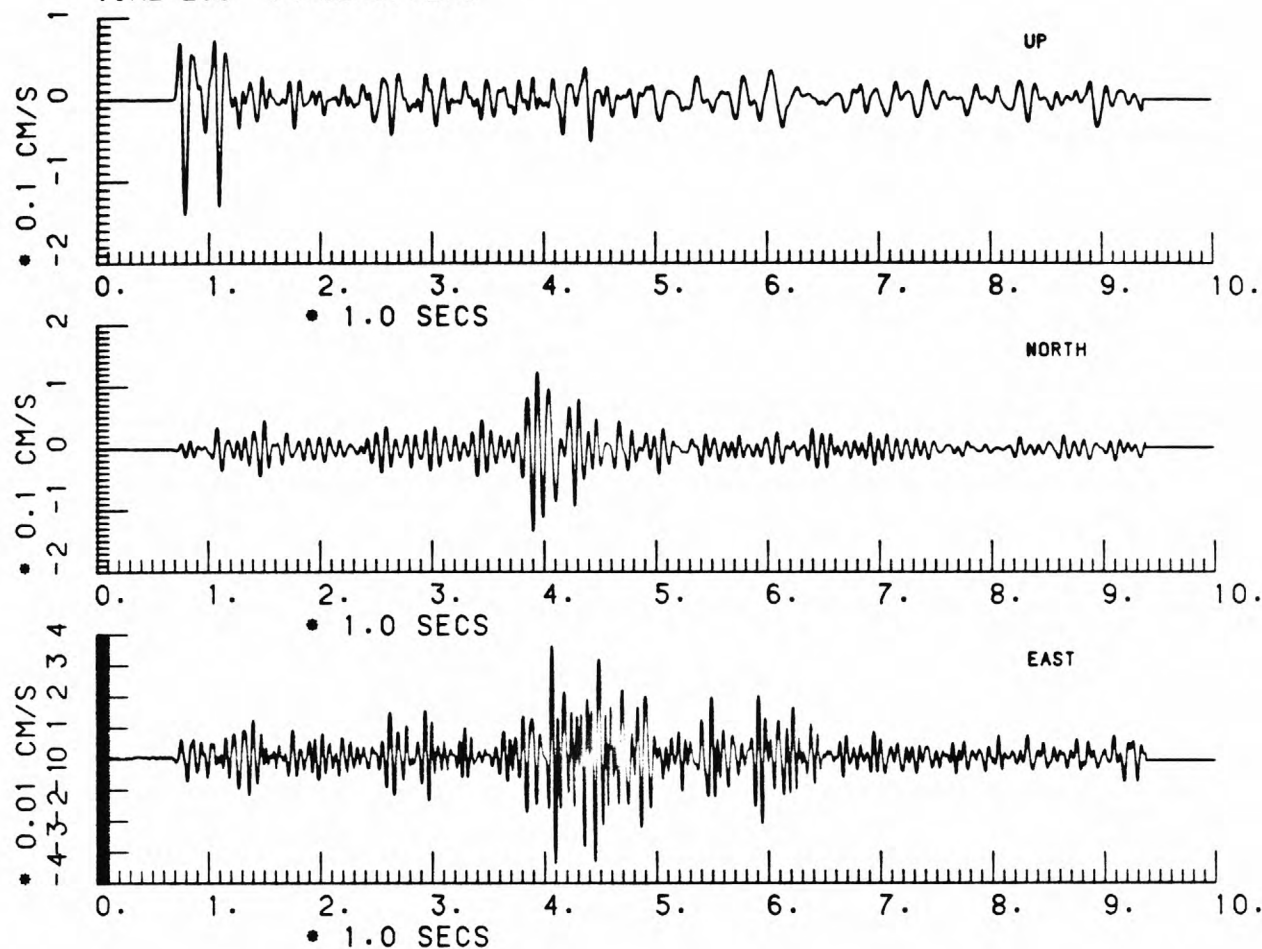
STATION CRK
TIME 293 14:52:56.370



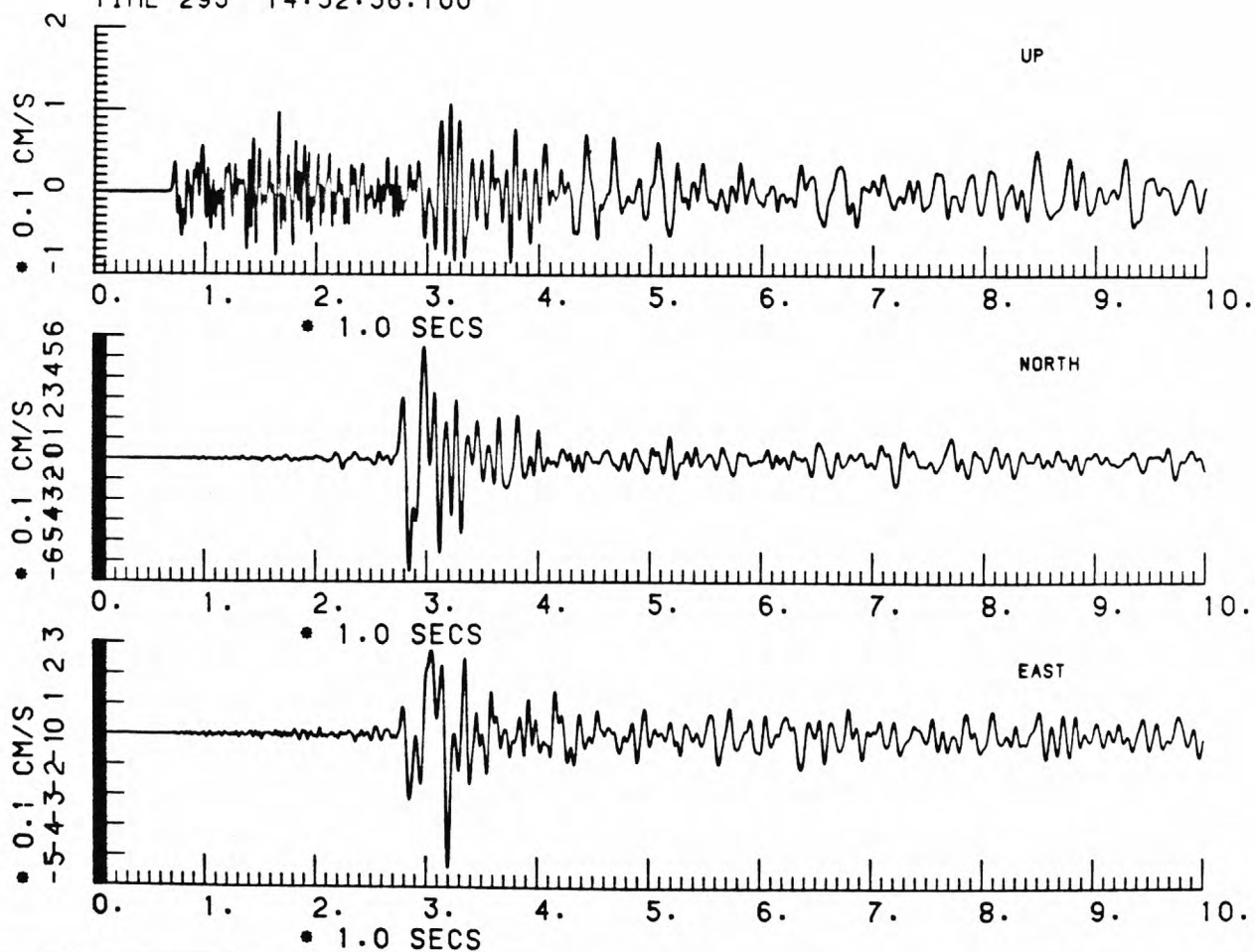
STATION CFG
TIME 293 14:52:57.155



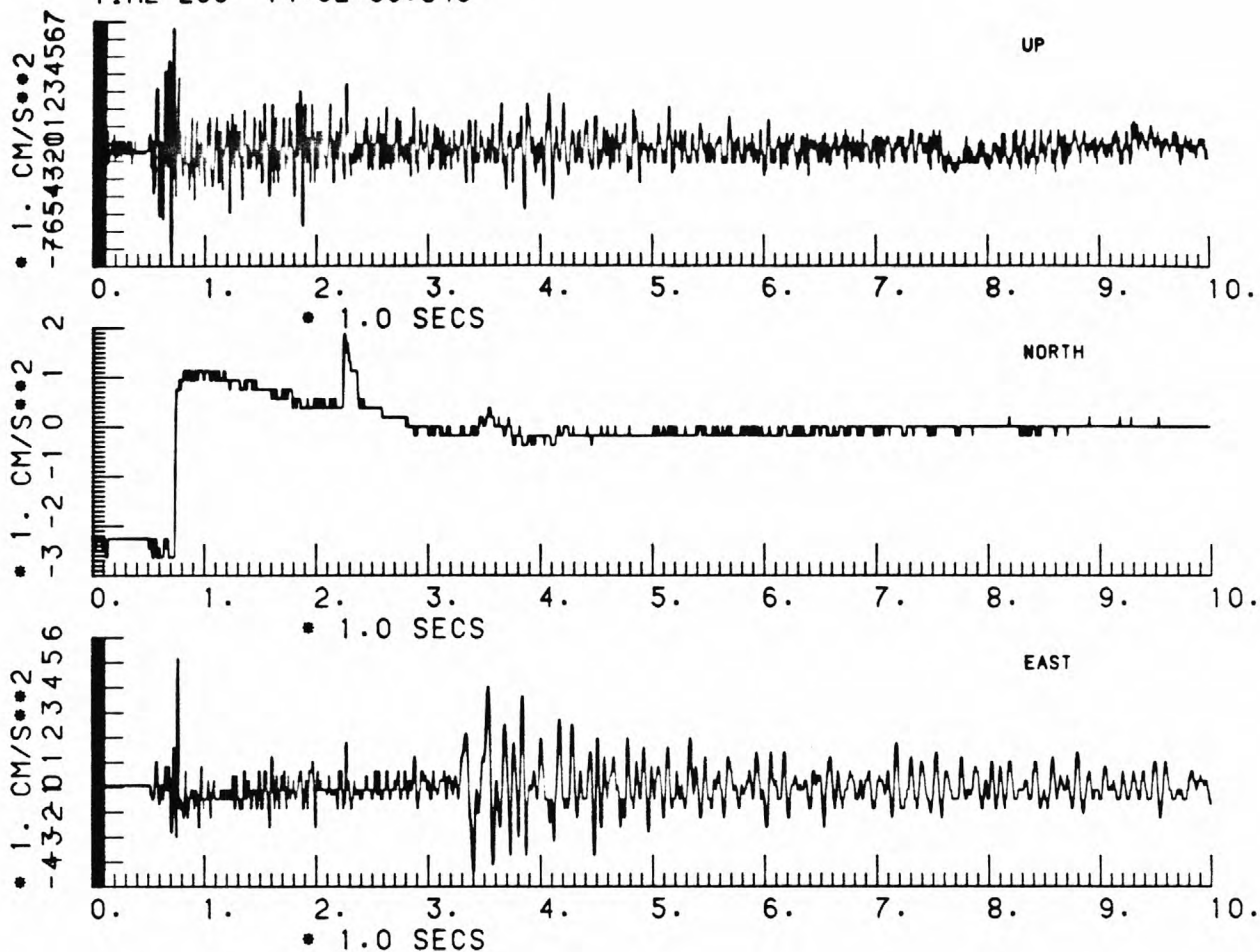
STATION GRS
TIME 293 14:52:57.870



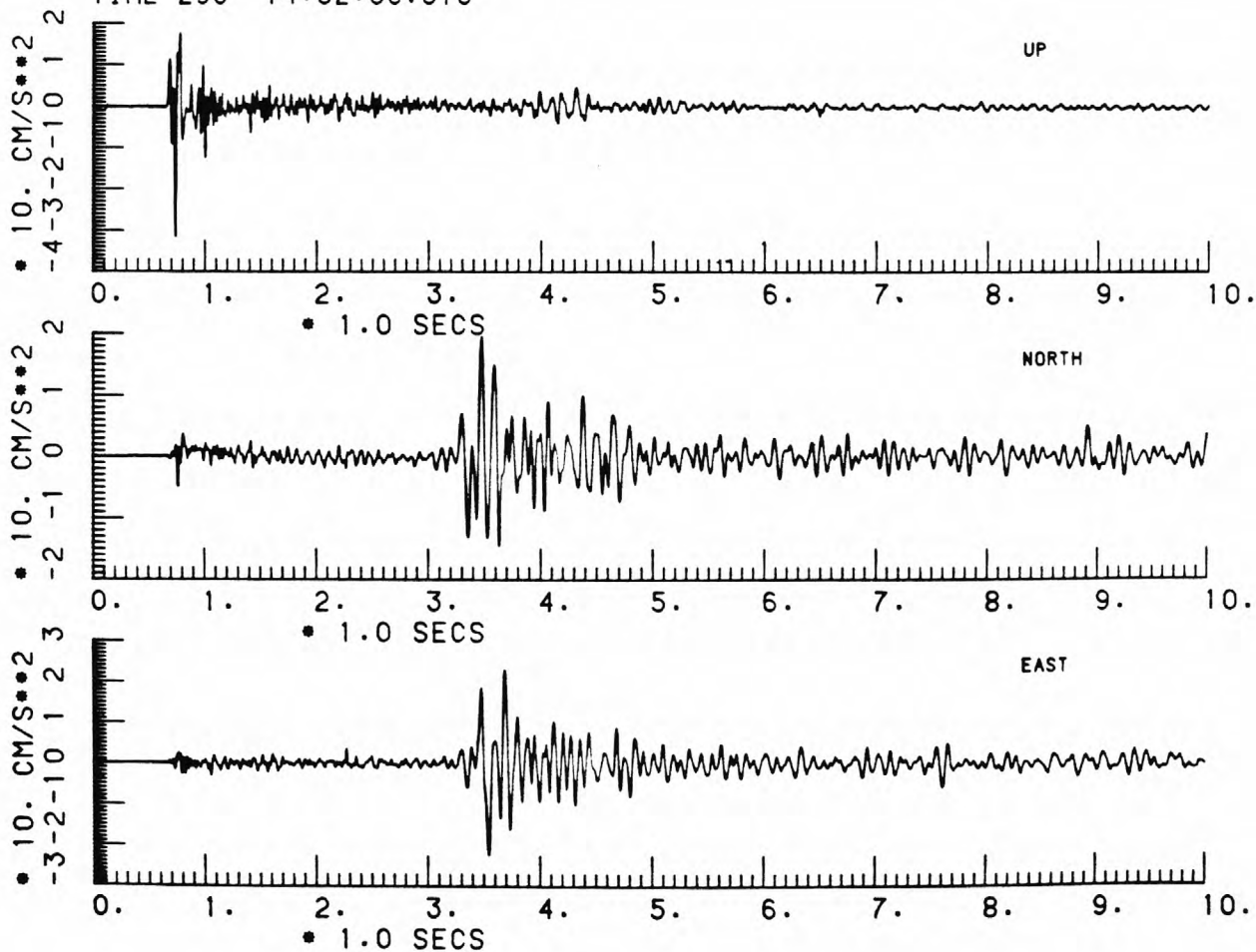
STATION FBR
TIME 293 14:52:56.100



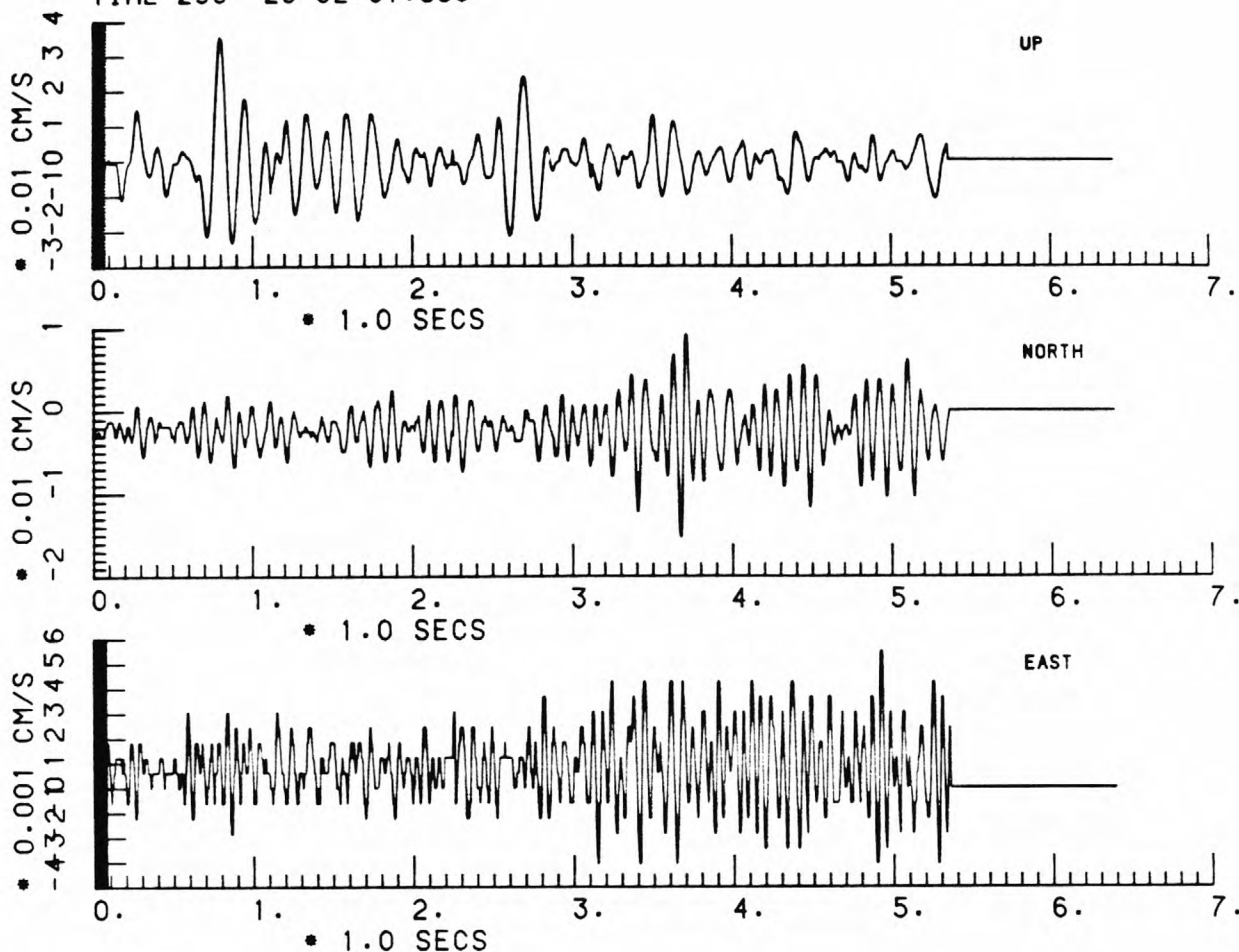
STATION RVR
TIME 293 14:52:56.840



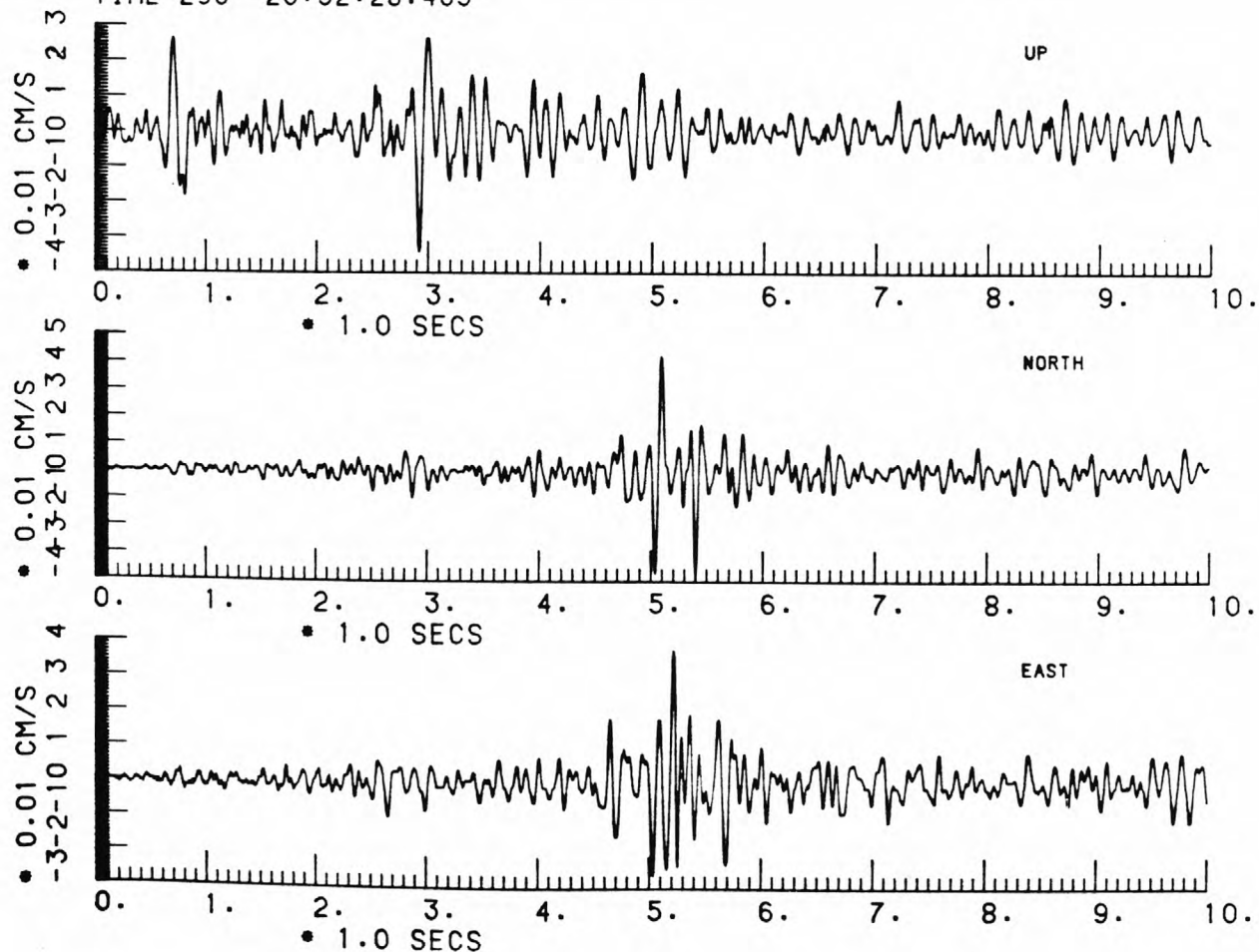
STATION JMS
TIME 293 14:52:56.516



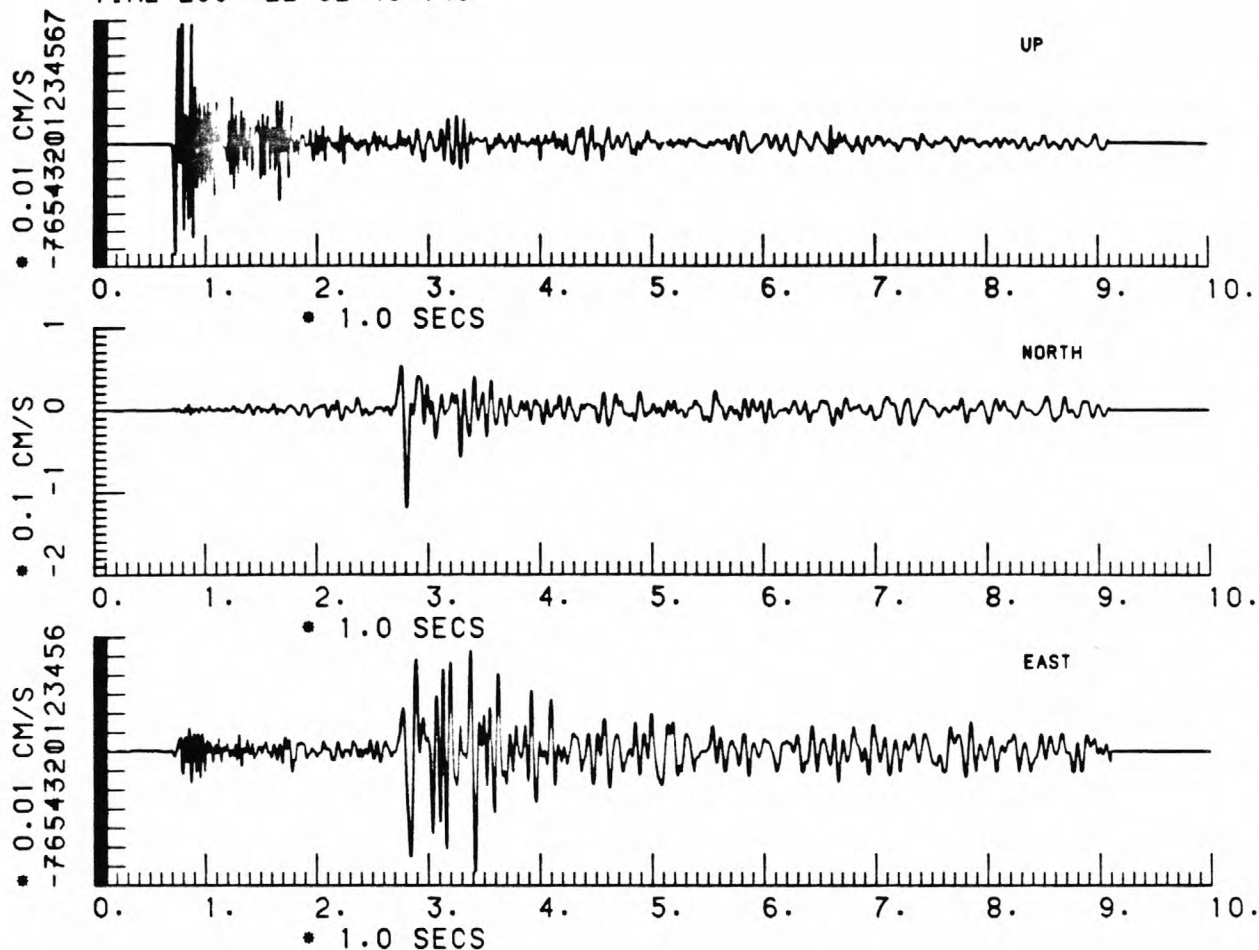
STATION GRS
TIME 293 20:52:31.885



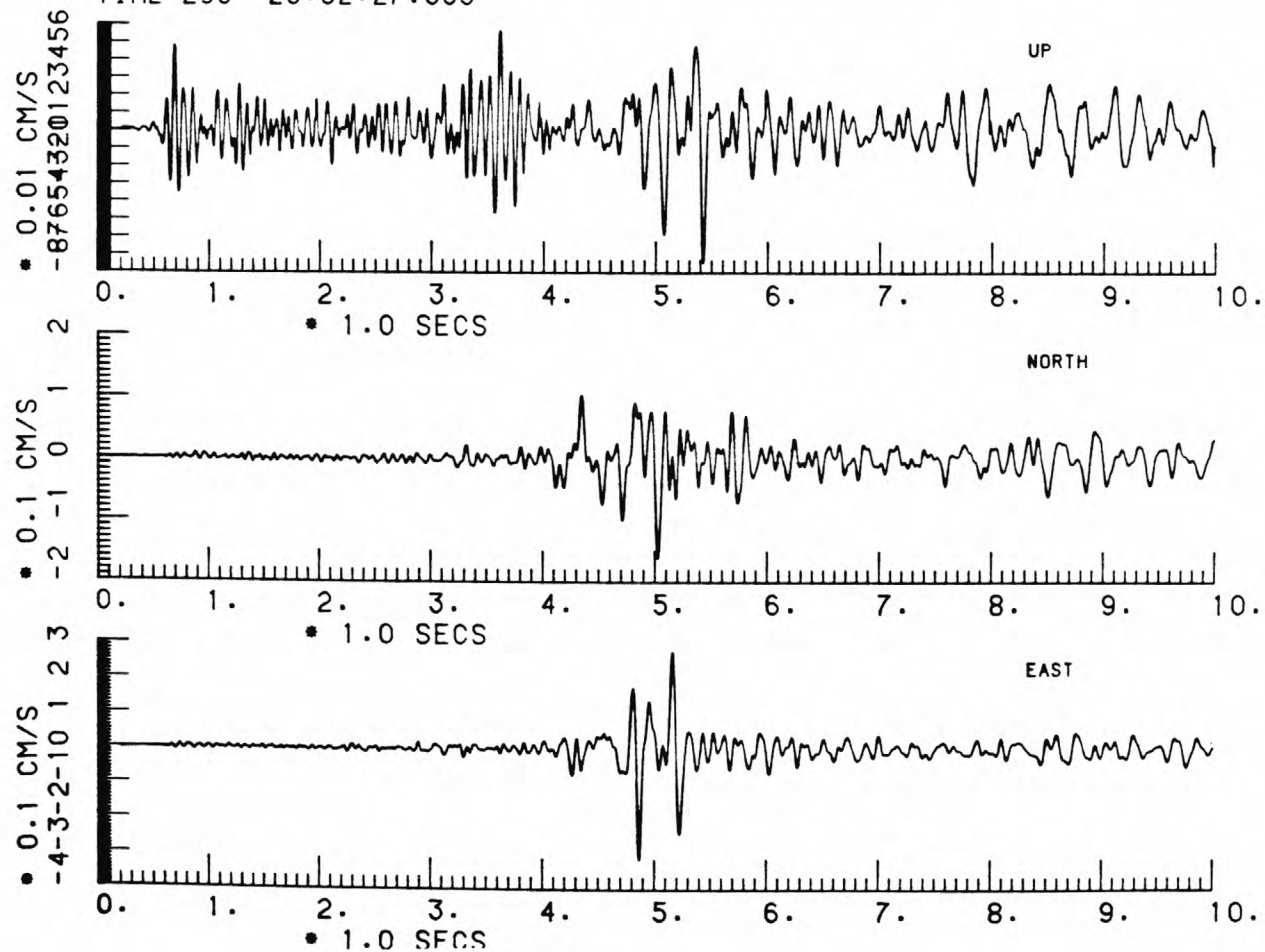
STATION AFB
TIME 293 20:52:28.465



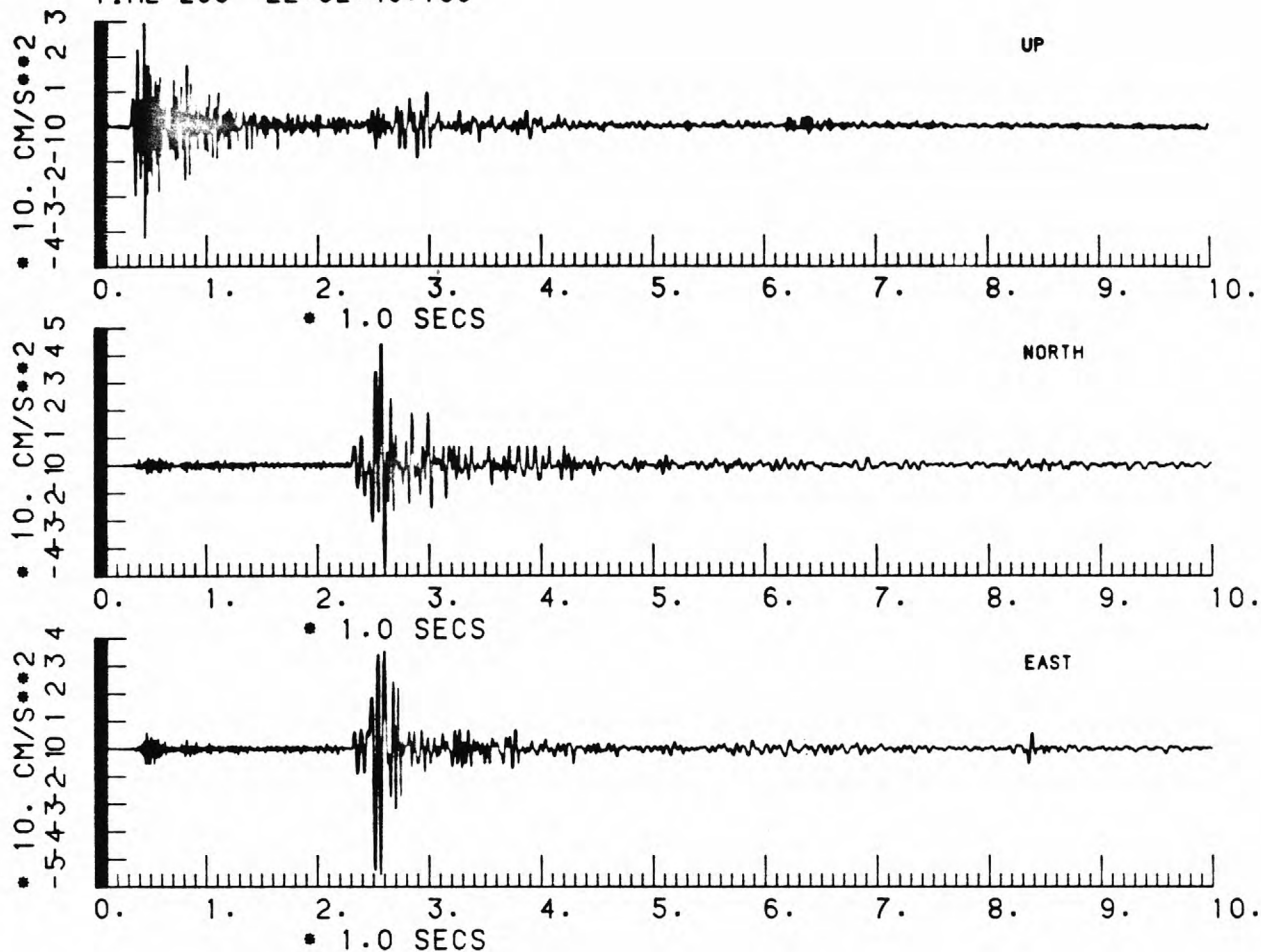
STATION FBR
TIME 293 22:32:46.145



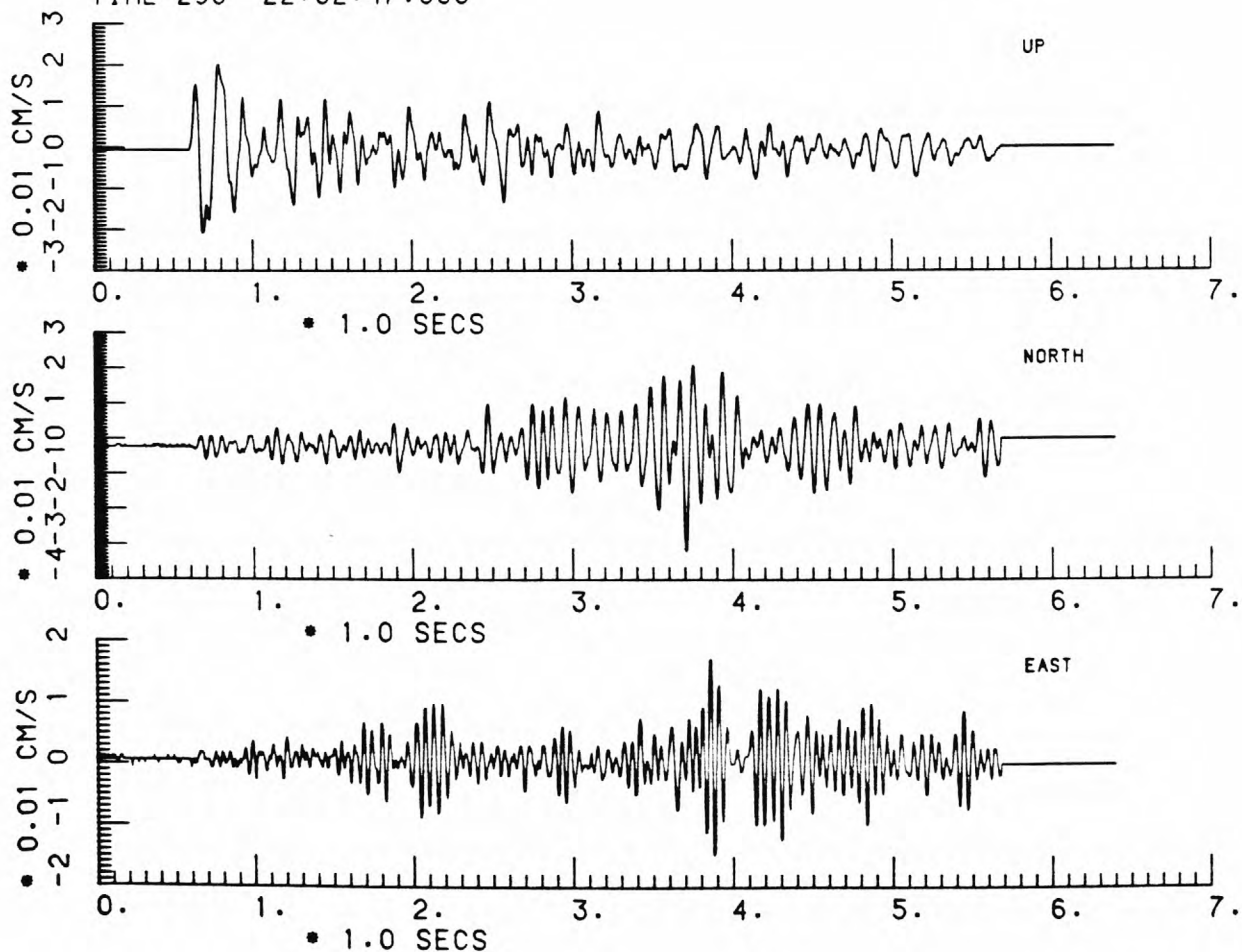
STATION SLD
TIME 293 20:52:27.035

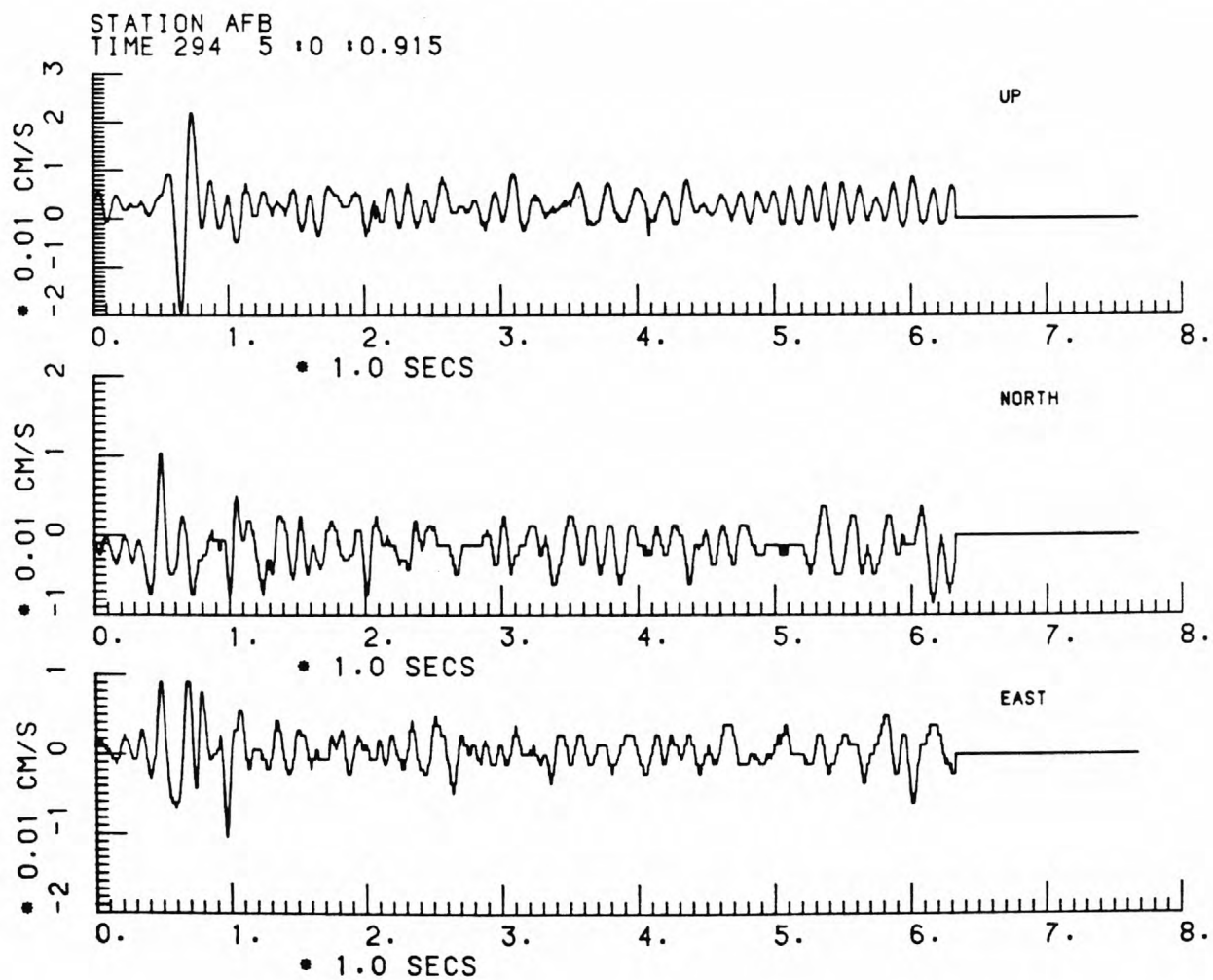
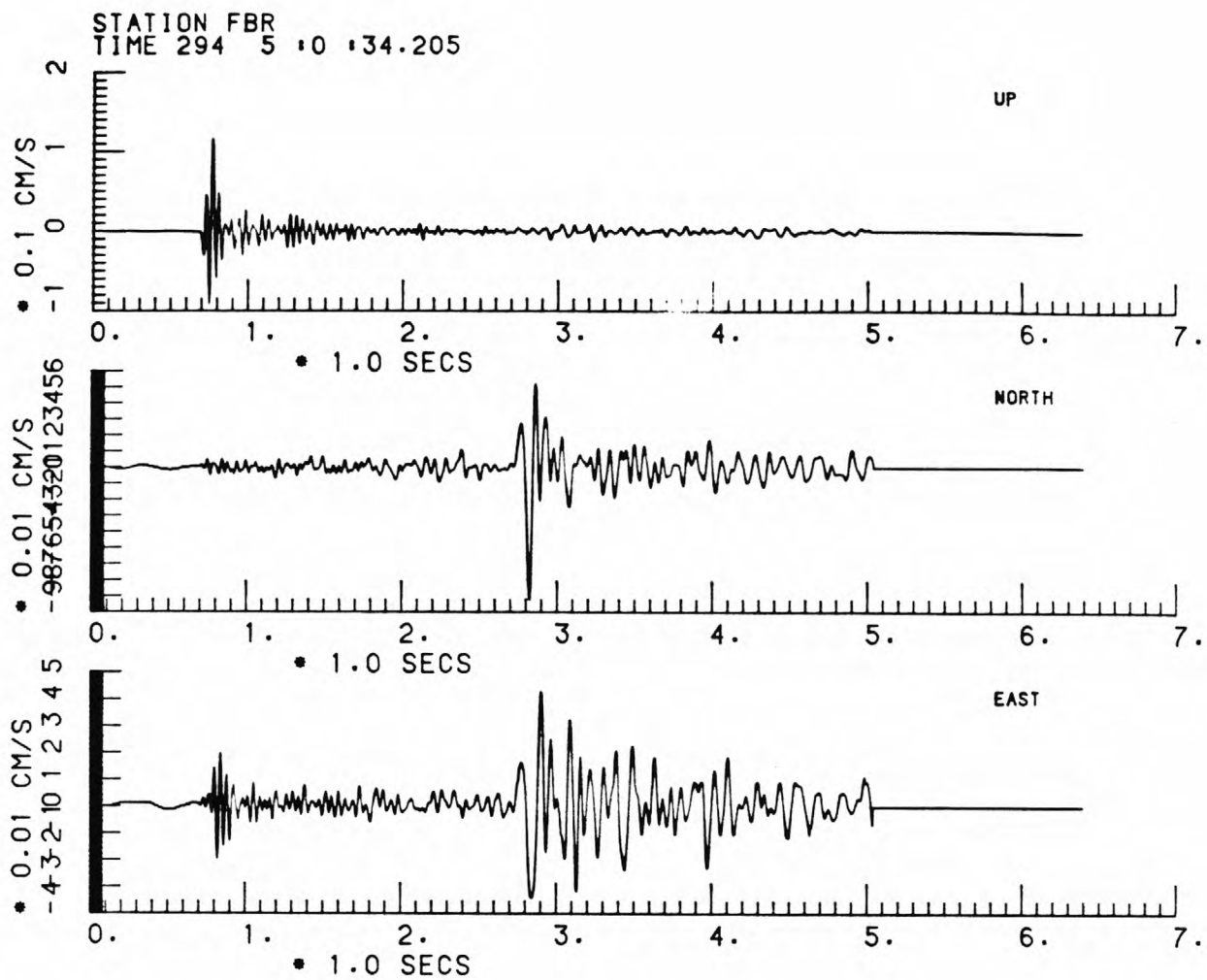


STATION KYR
TIME 293 22:32:46.150

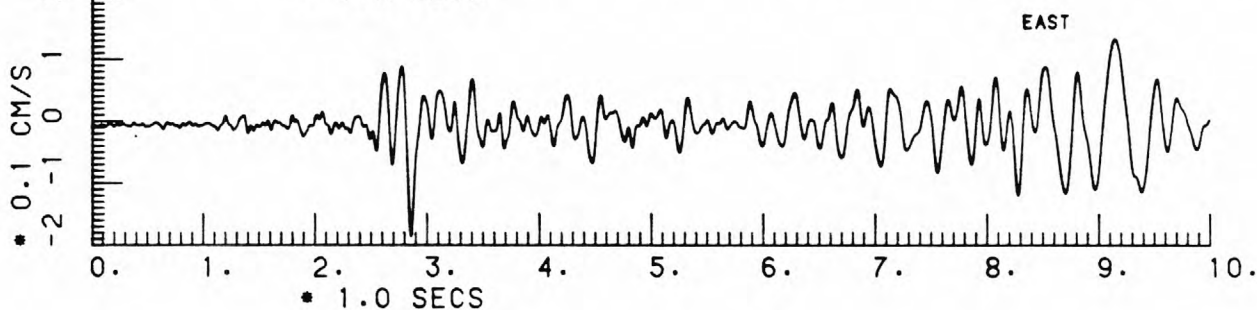
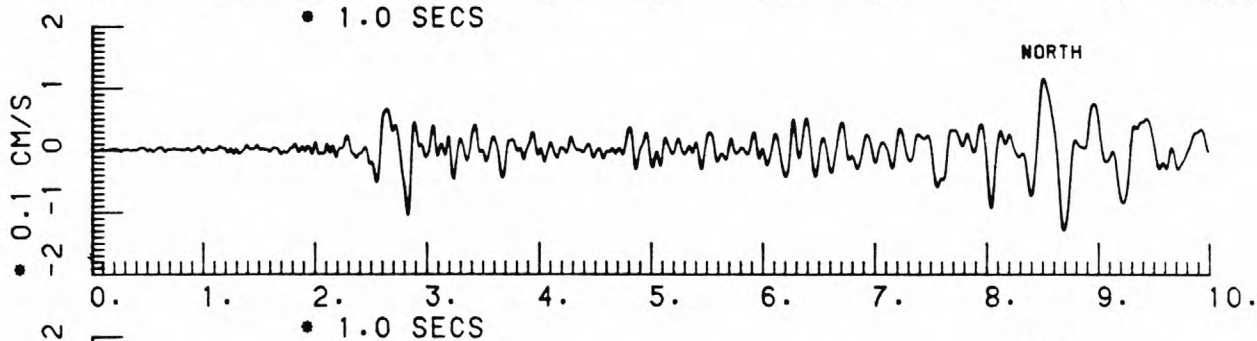
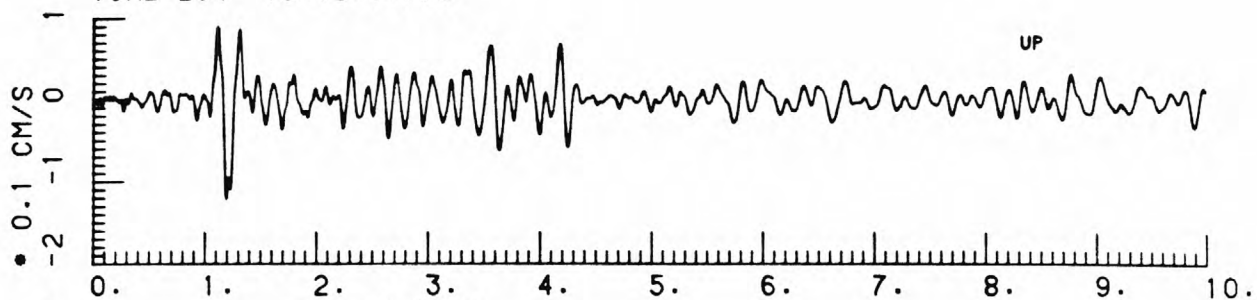


STATION GRS
TIME 293 22:32:47.560

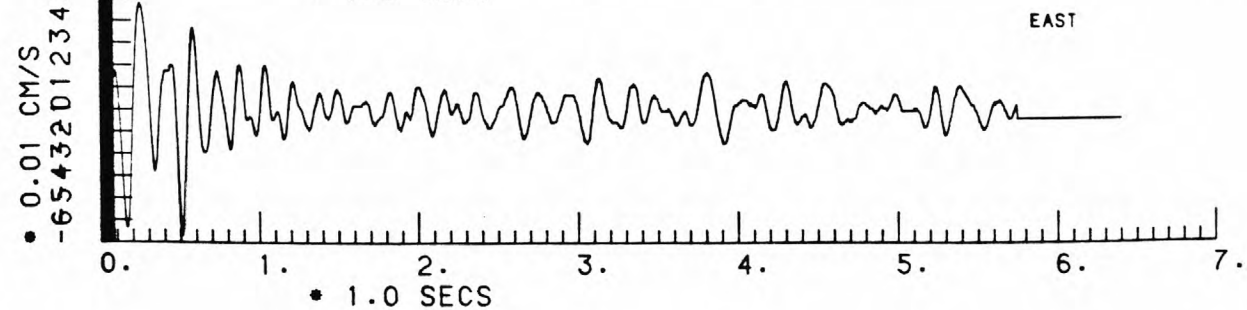
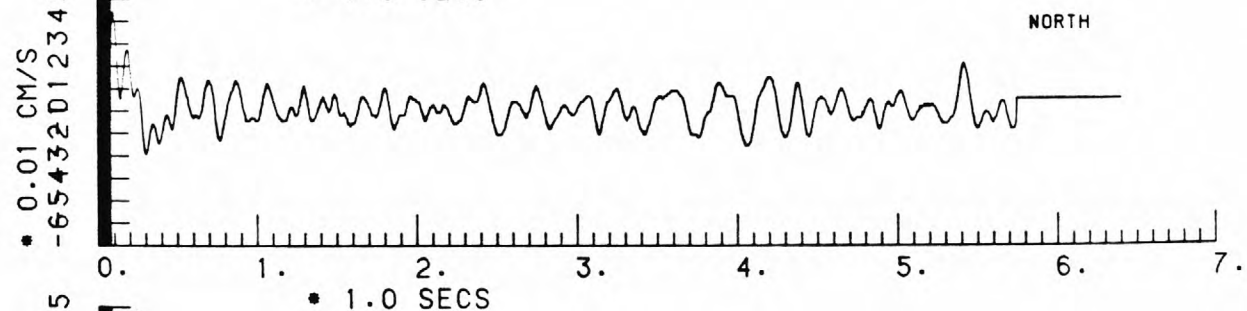
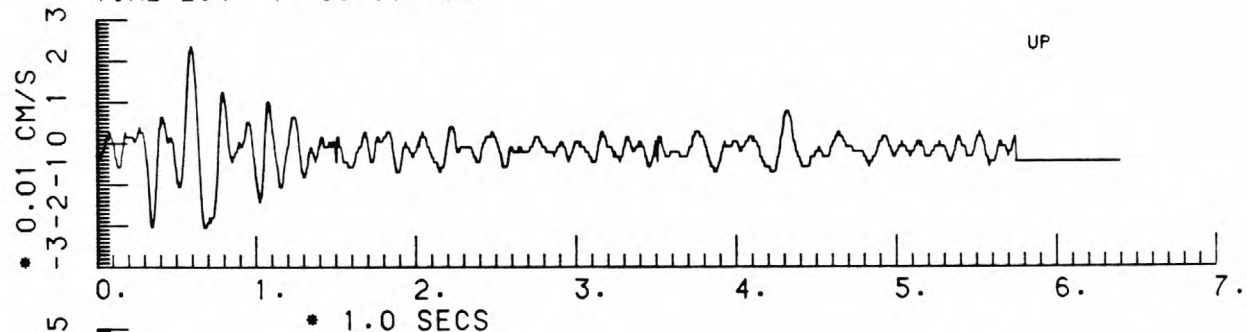




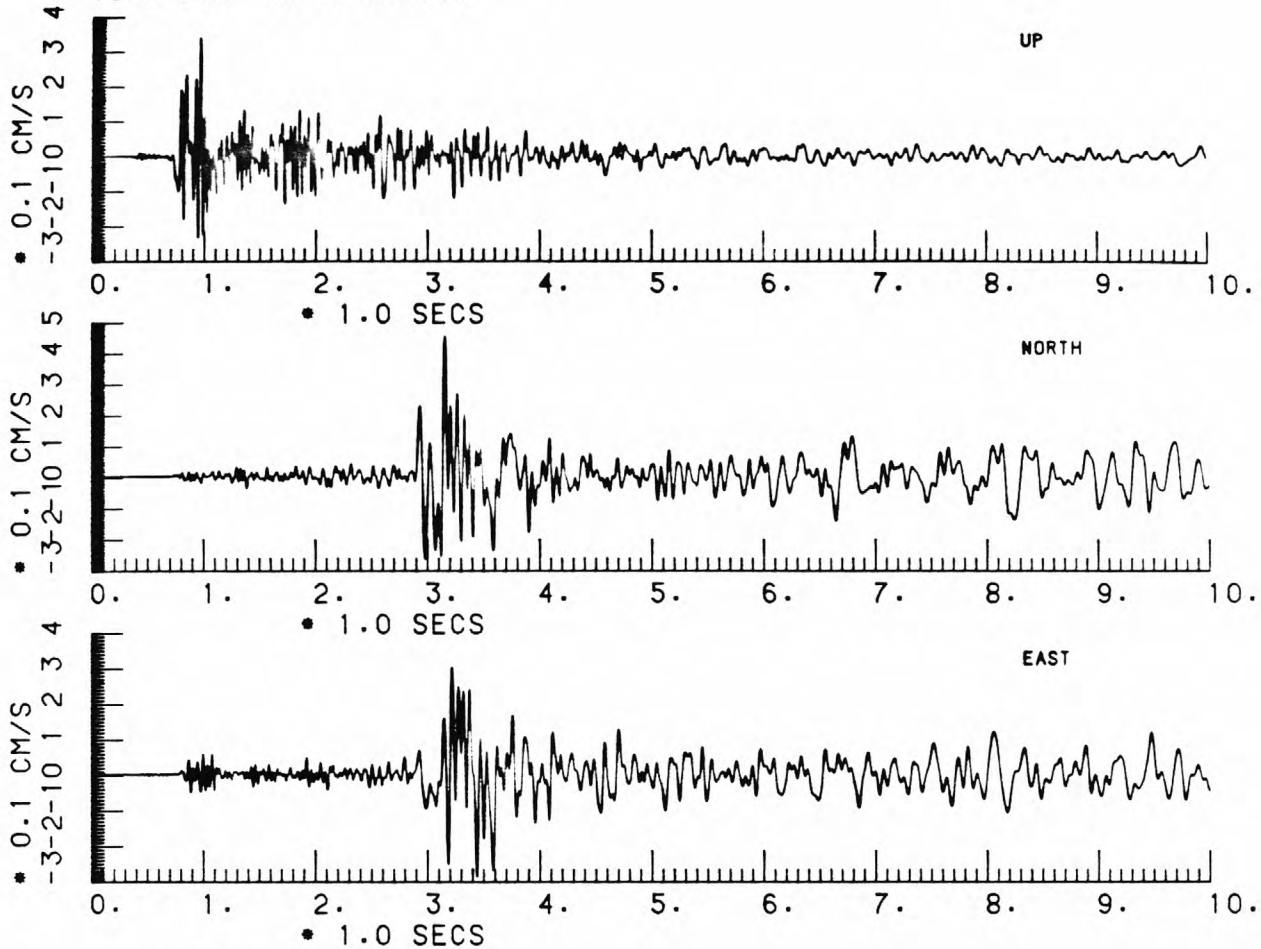
STATION AFB
TIME 294 18:18:1.770



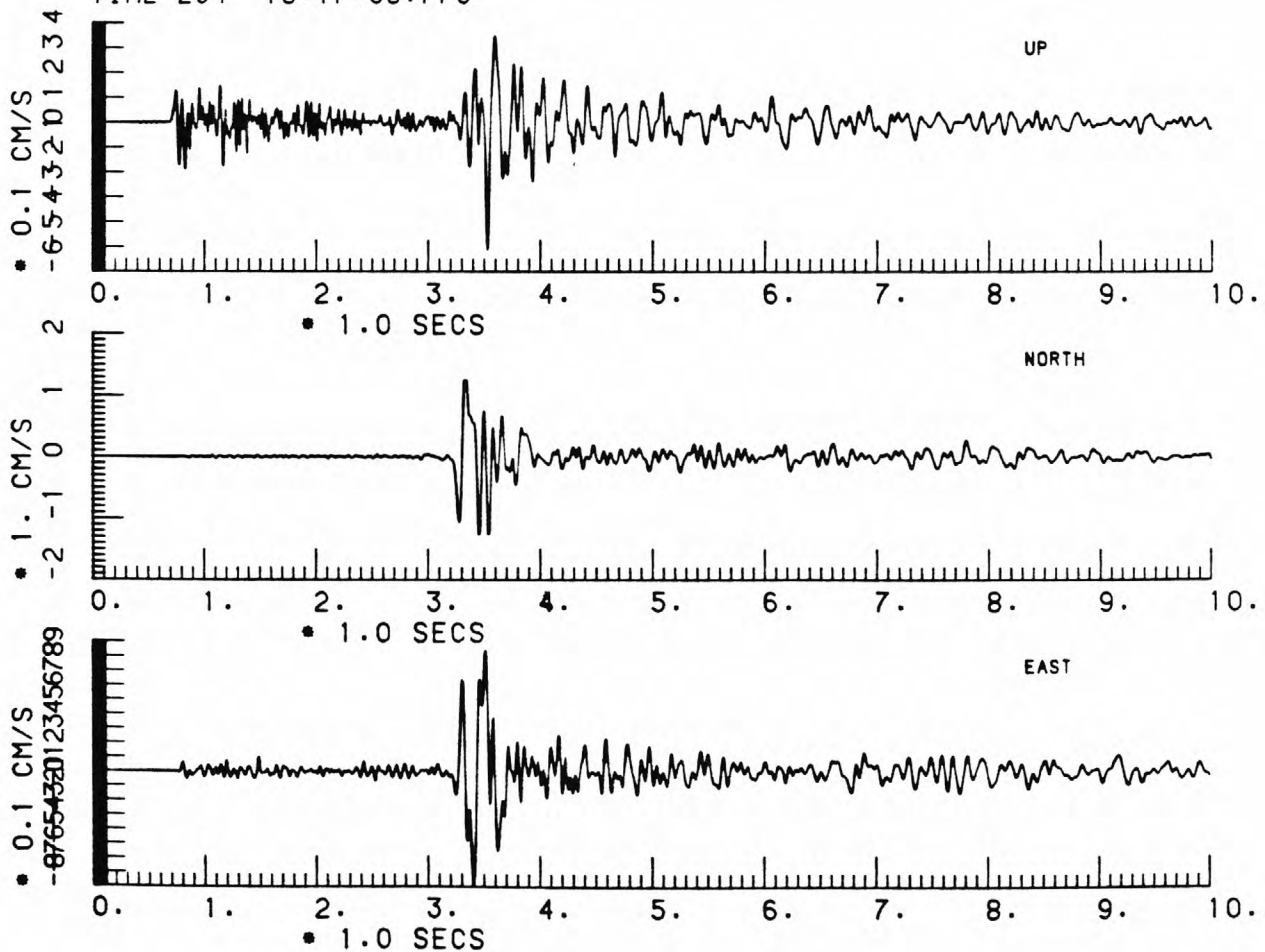
STATION SLD
TIME 294 4 :59:59.495



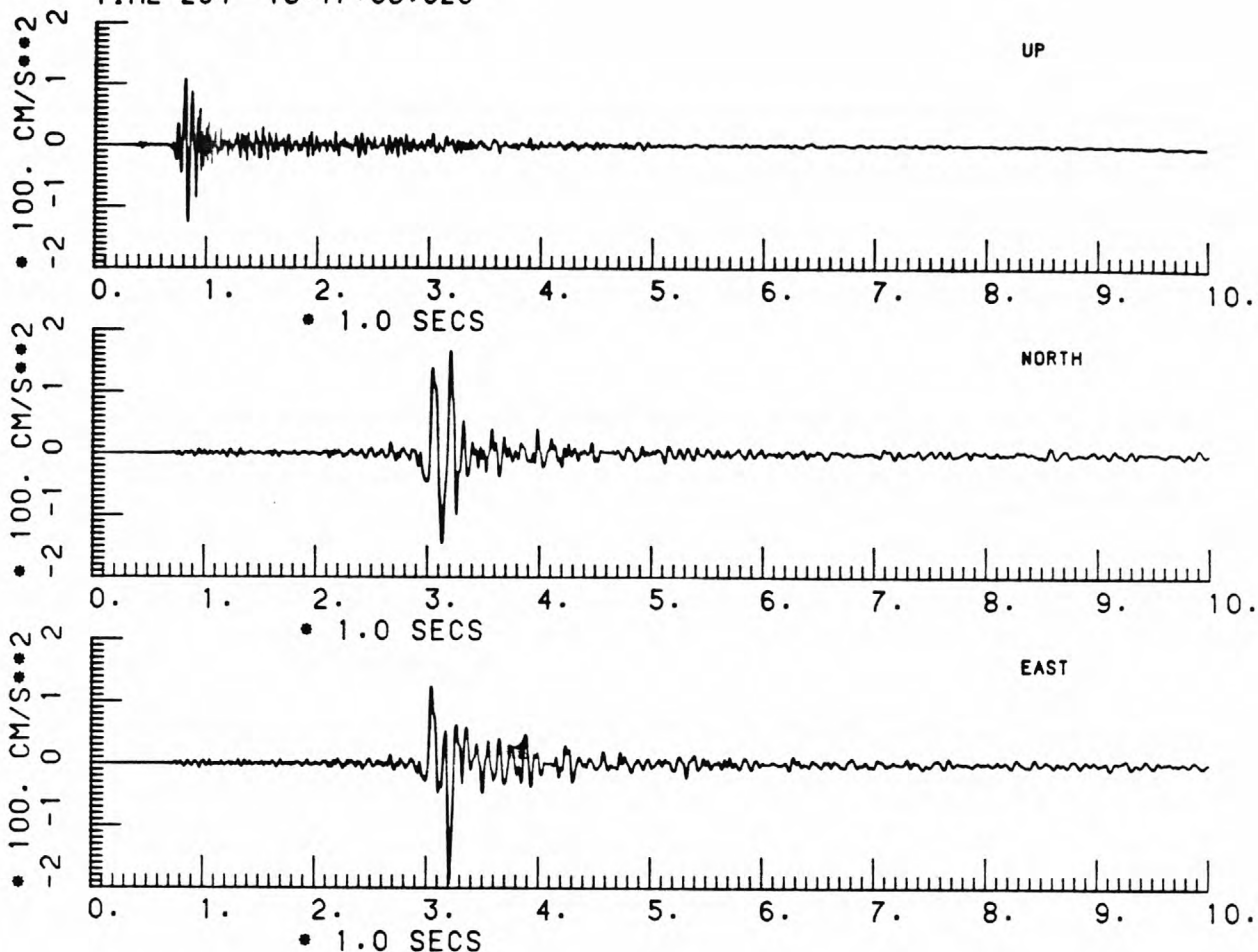
STATION FBR
TIME 294 18:17:58.711



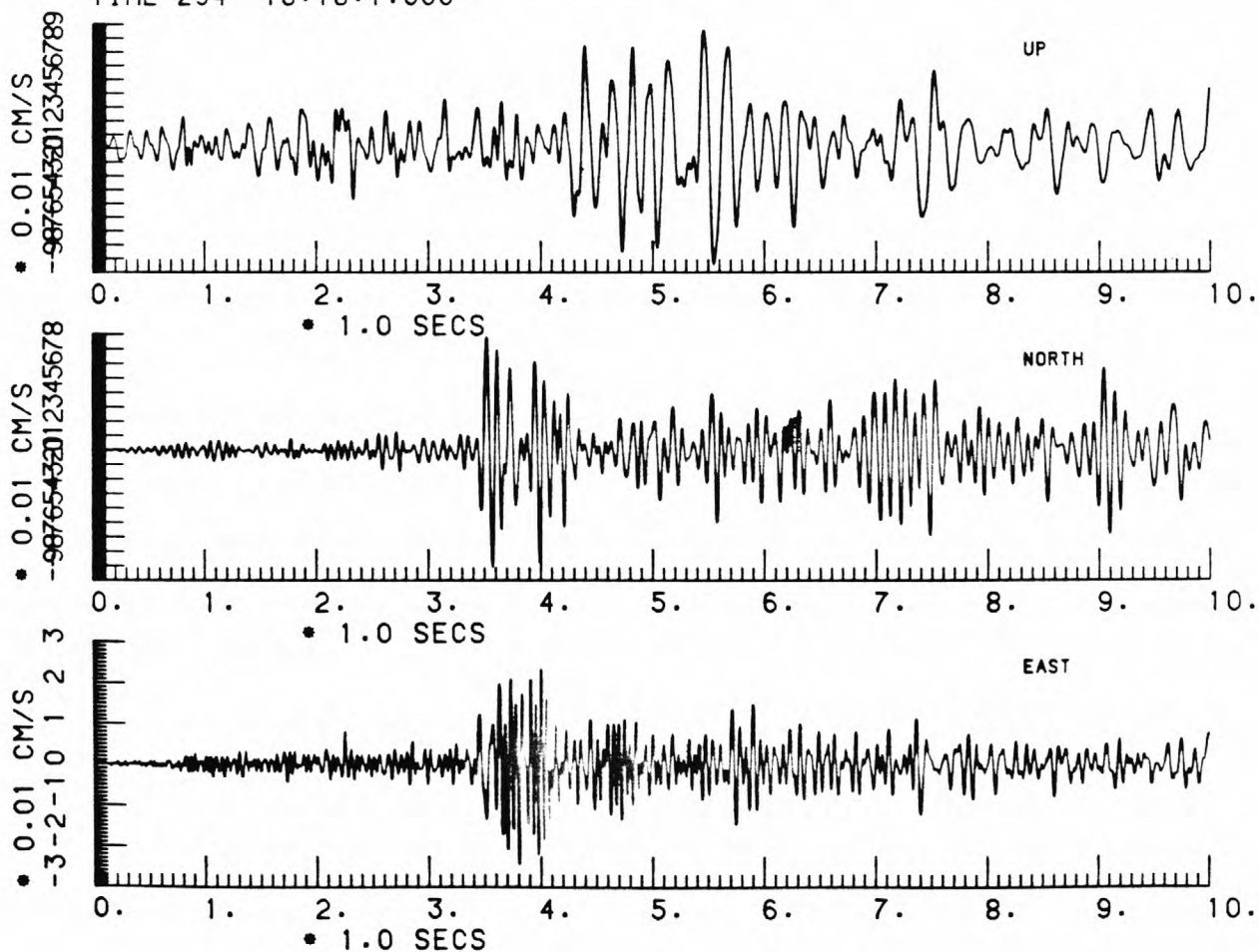
STATION CRK
TIME 294 18:17:58.776



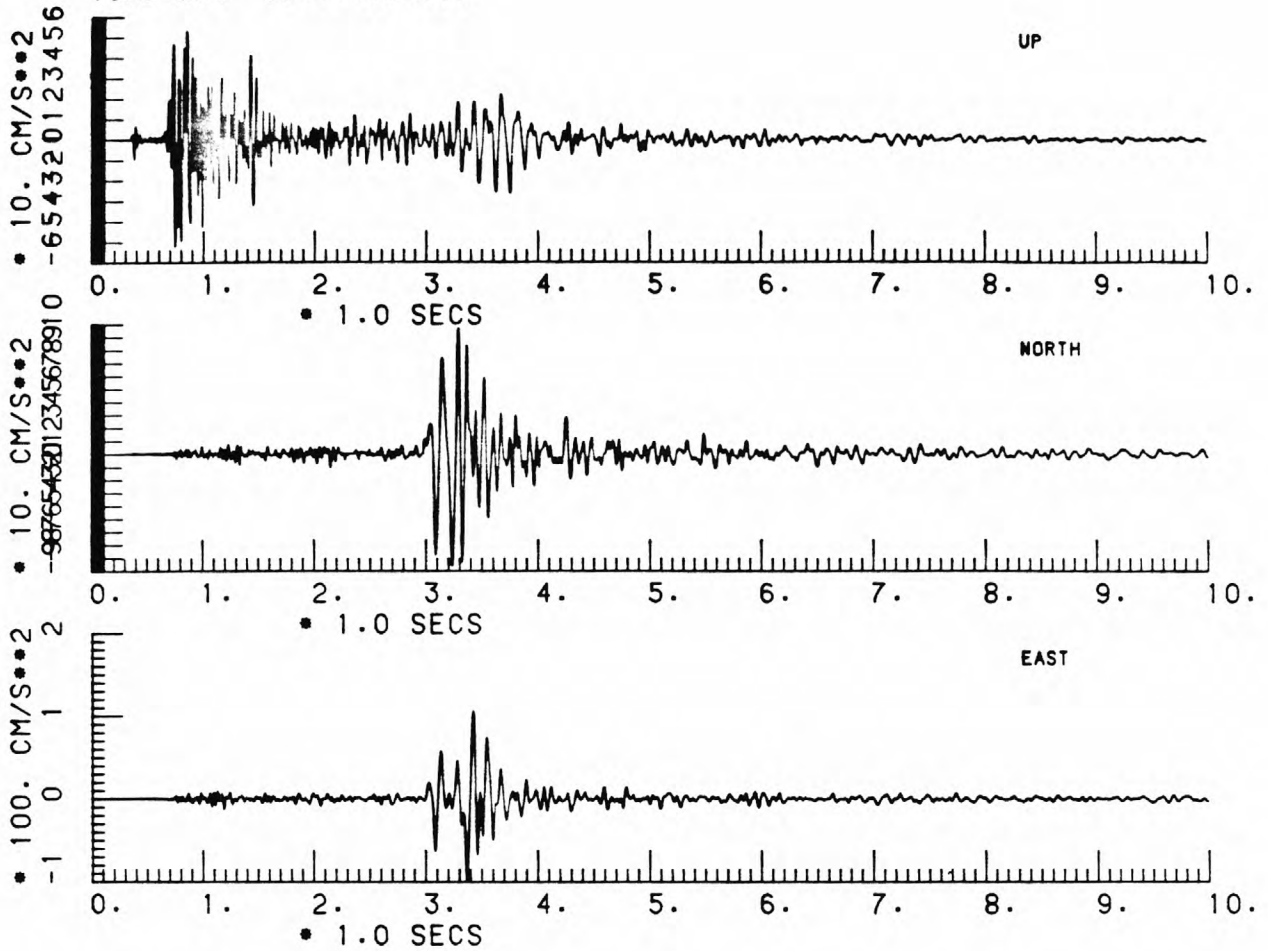
STATION HRS
TIME 294 18:17:58.320



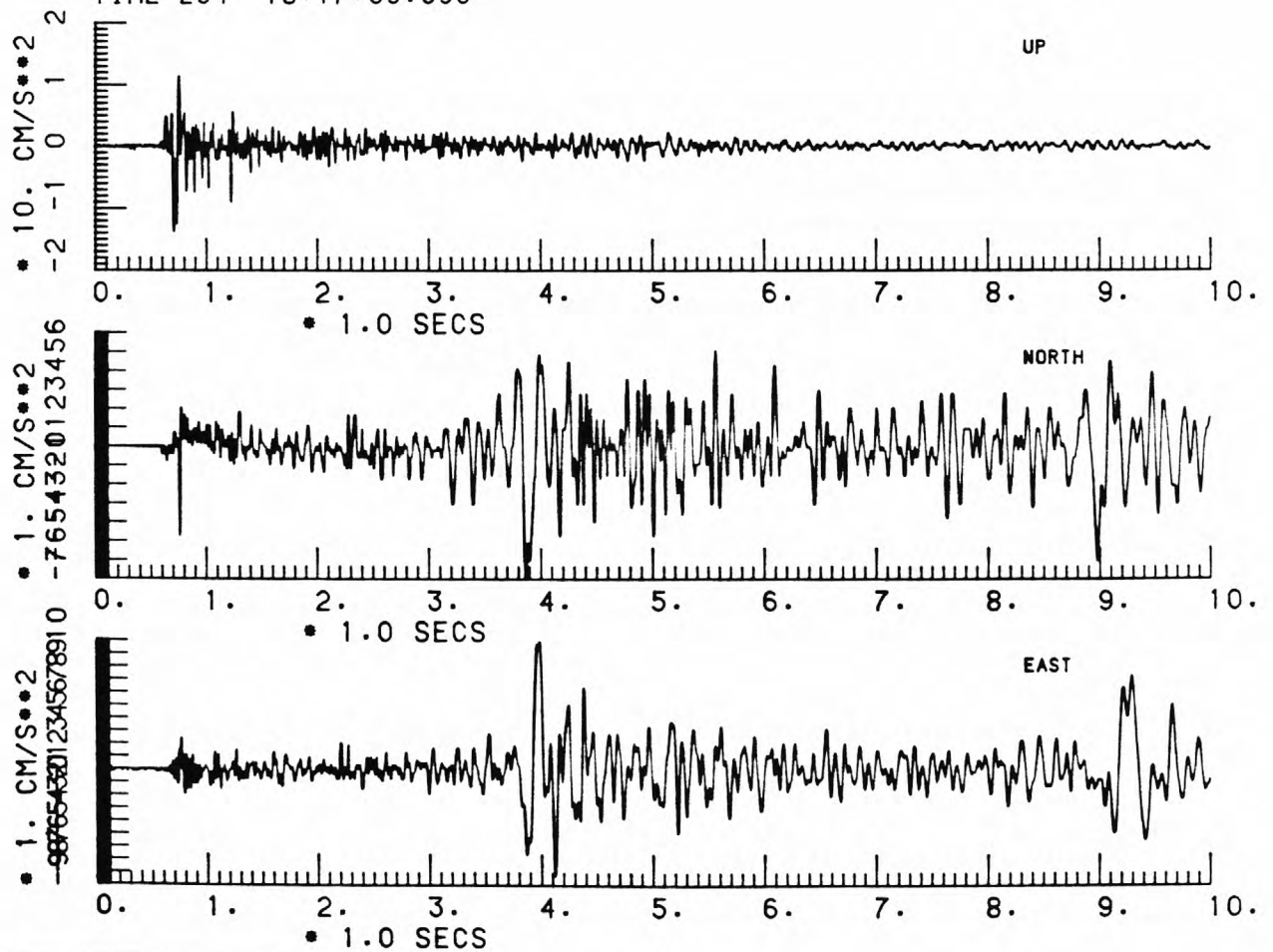
STATION GRS
TIME 294 18:18:1.300



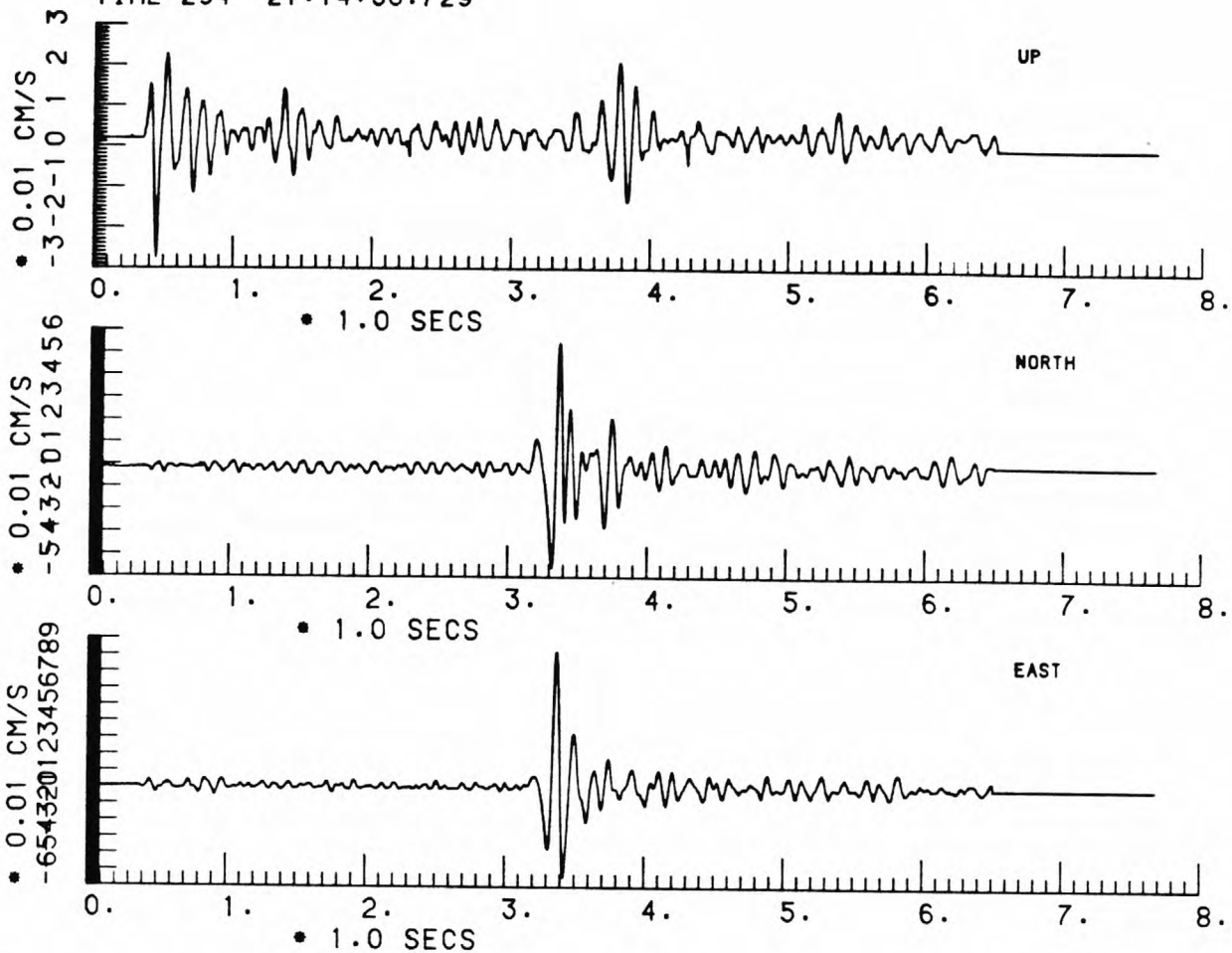
STATION KYR
TIME 294 18:17:58.506



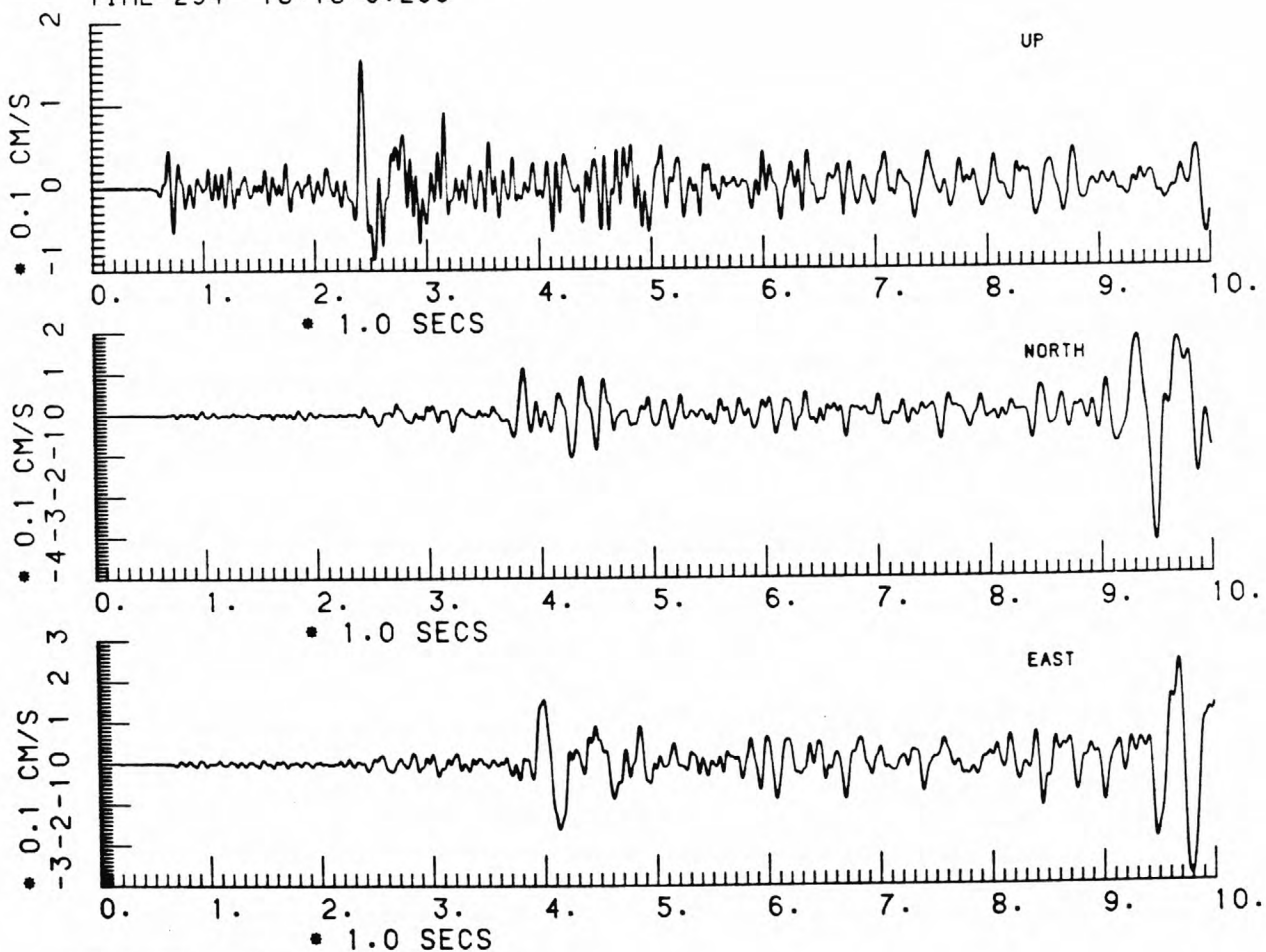
STATION JMS
TIME 294 18:17:59.696



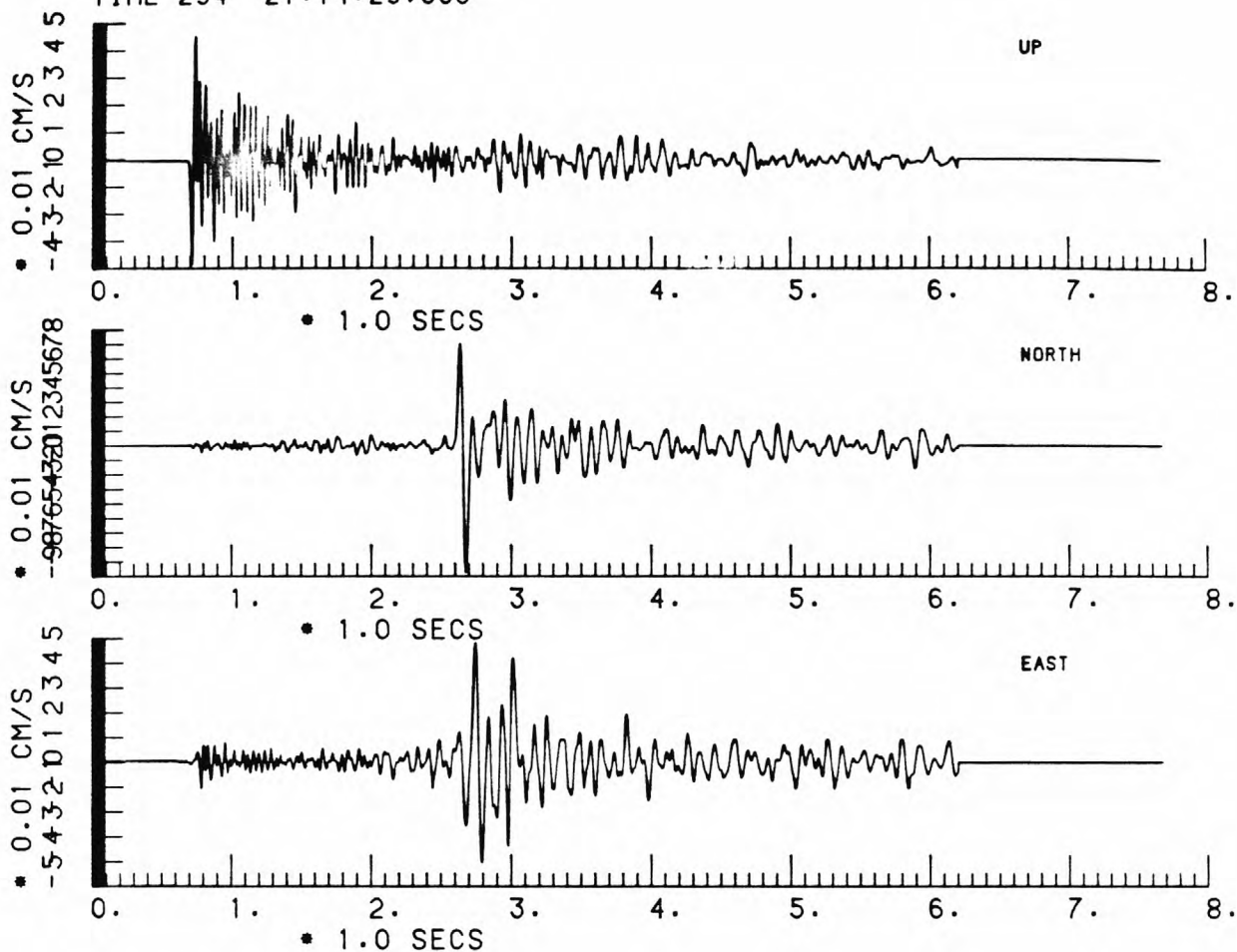
STATION AFB
TIME 294 21:14:30.729



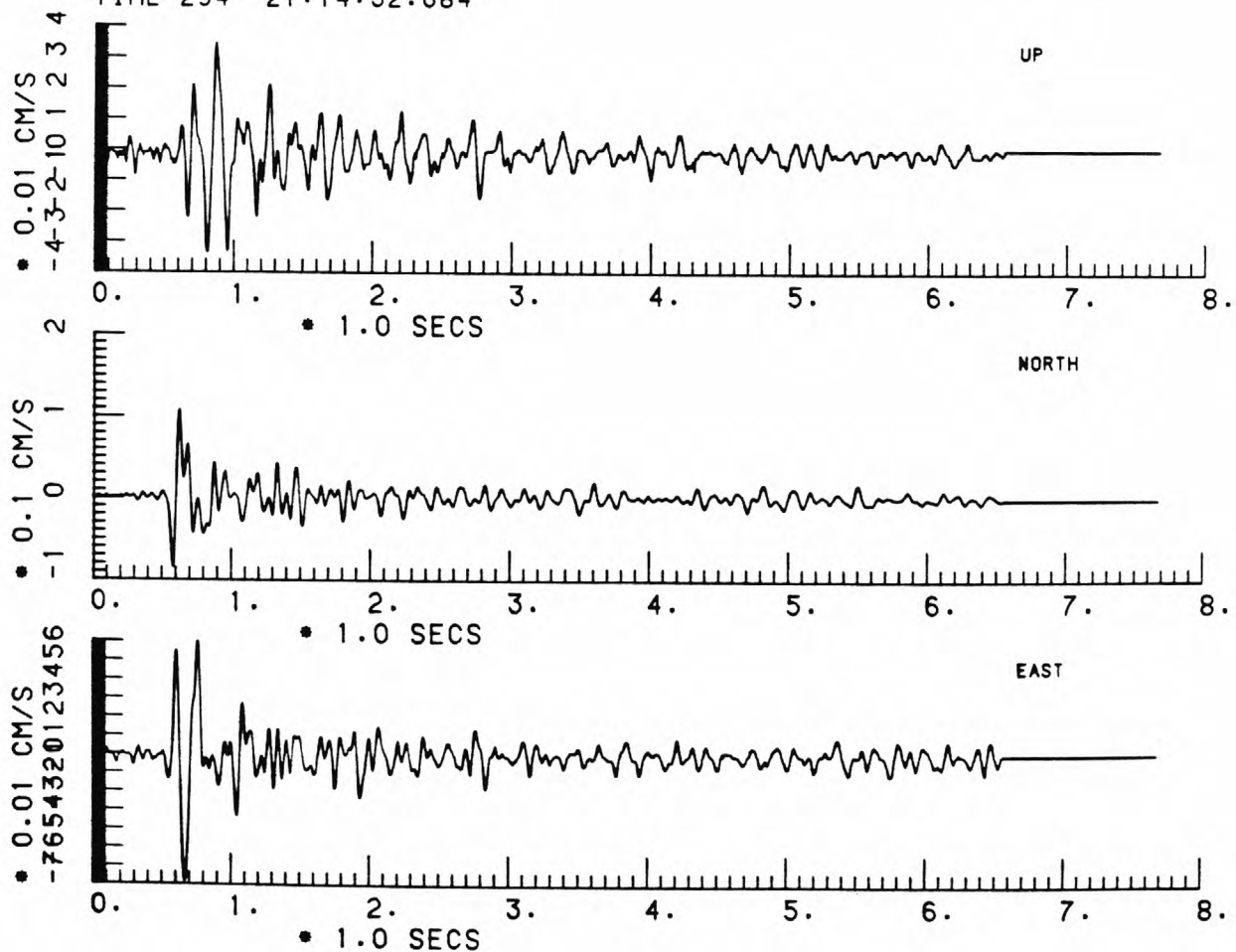
STATION SLD
TIME 294 18:18:0.290



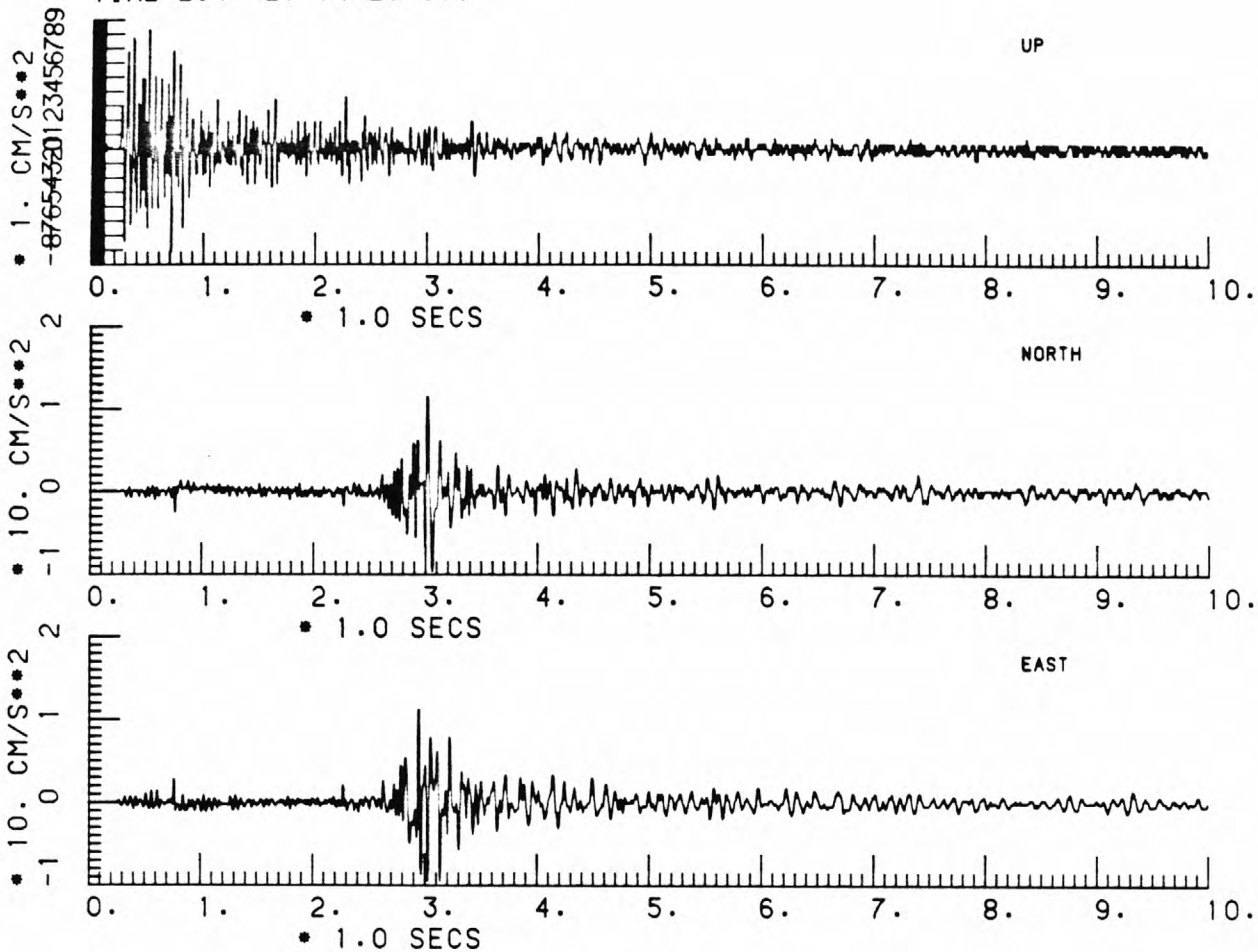
STATION FBR
TIME 294 21:14:29.035



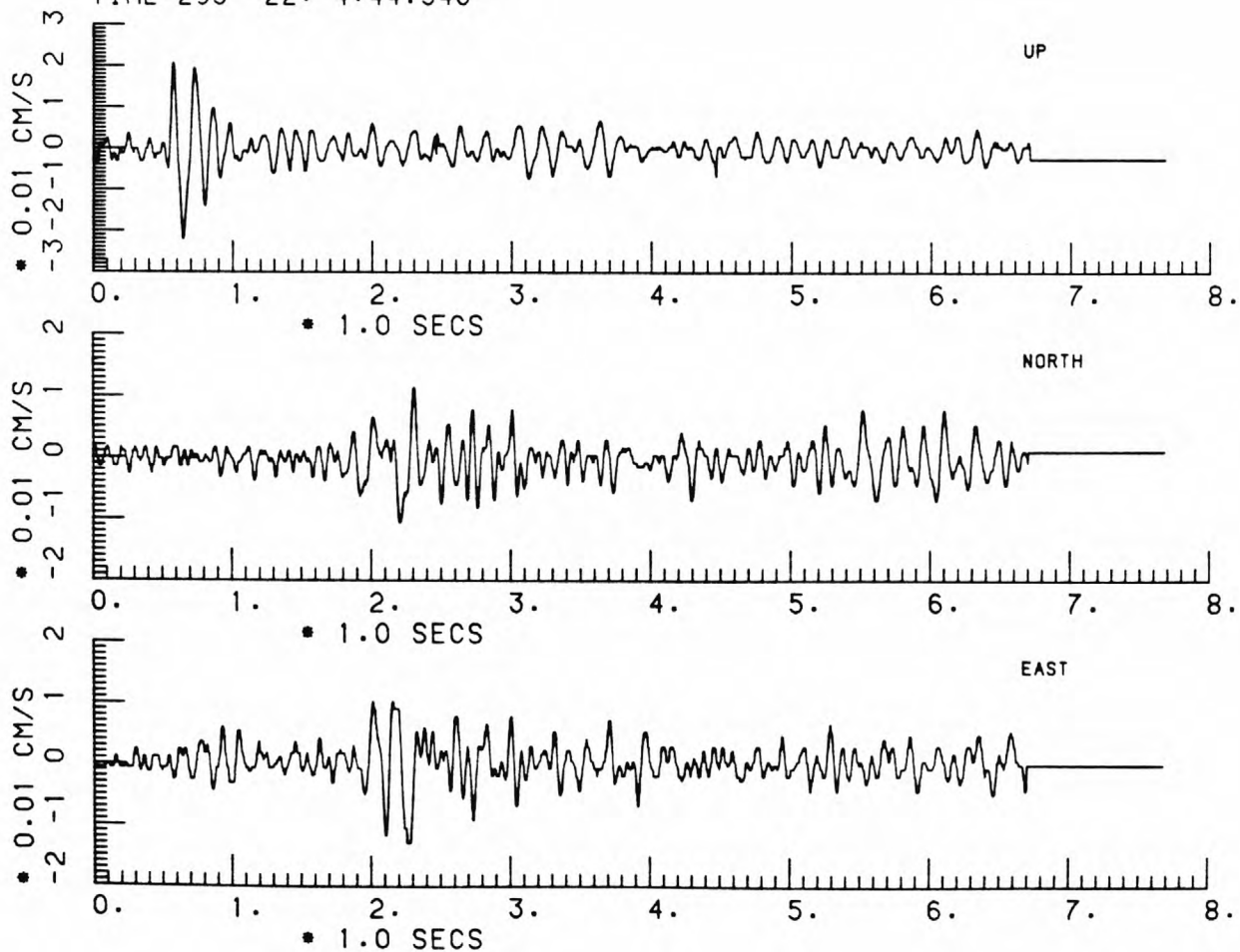
STATION CRK
TIME 294 21:14:32.684



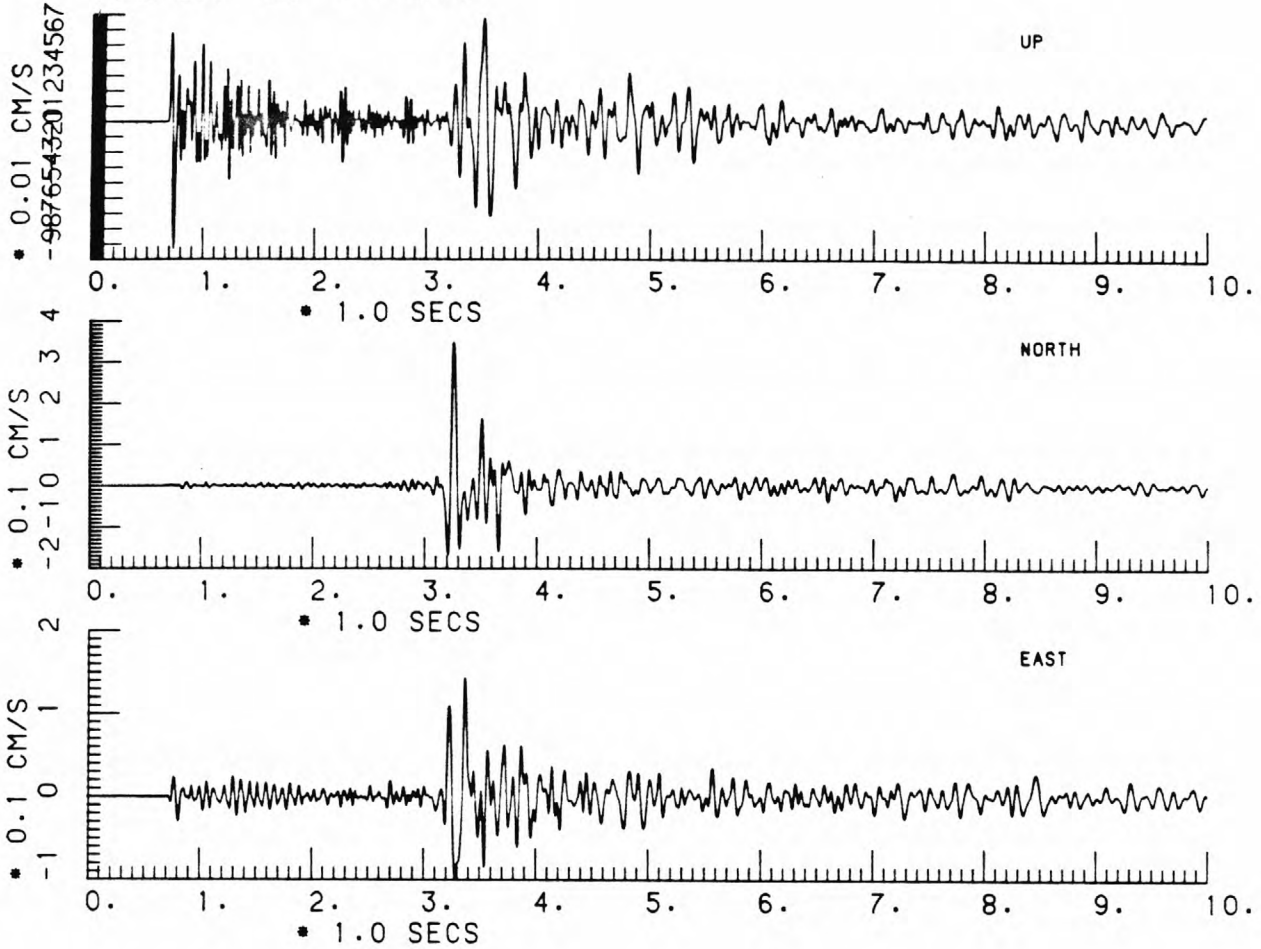
STATION HRS
TIME 294 21:14:29.659



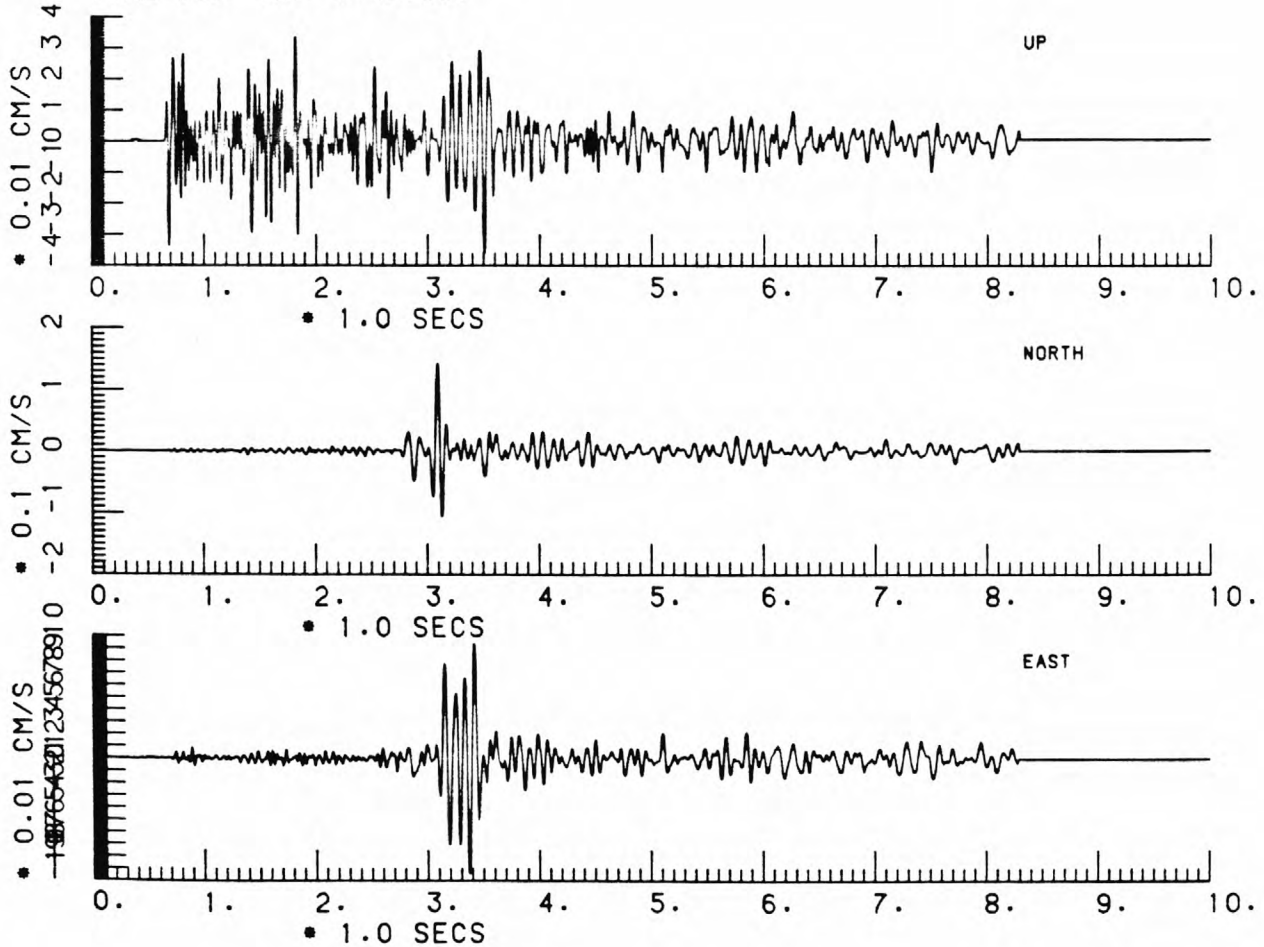
STATION AFB
TIME 295 22: 4:44.540



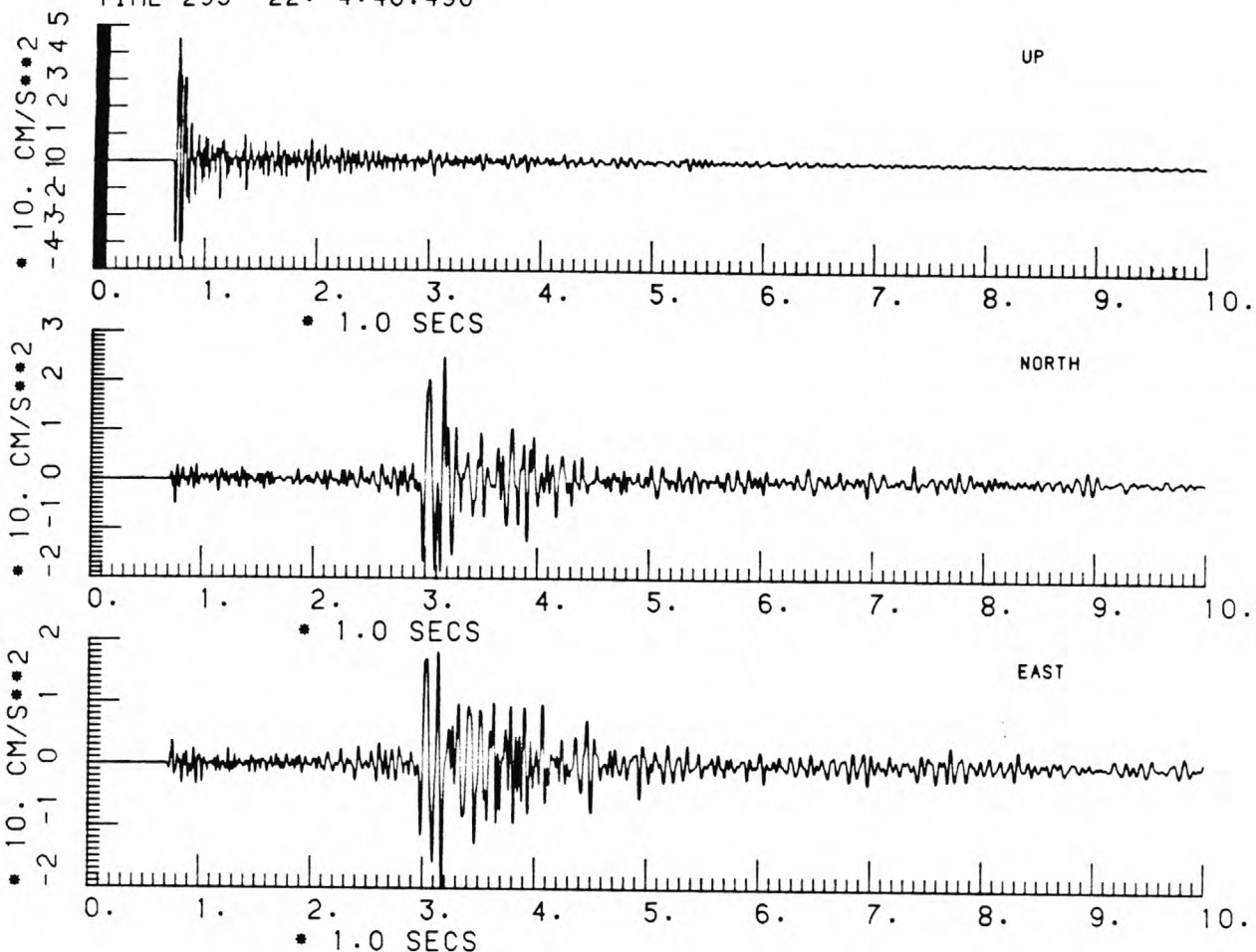
STATION CRK
TIME 295 22: 4:40.856



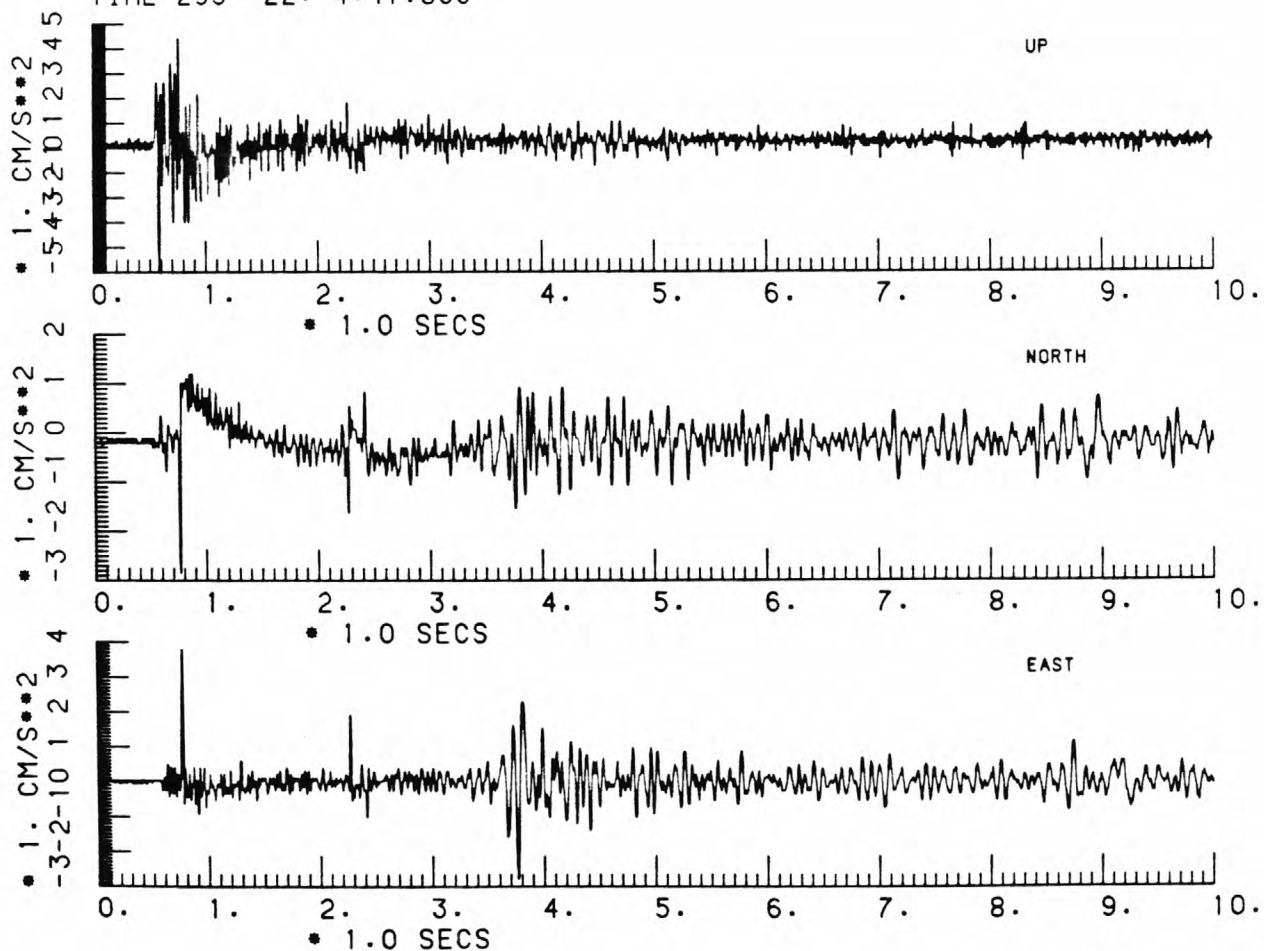
STATION FBR
TIME 295 22: 4:40.961



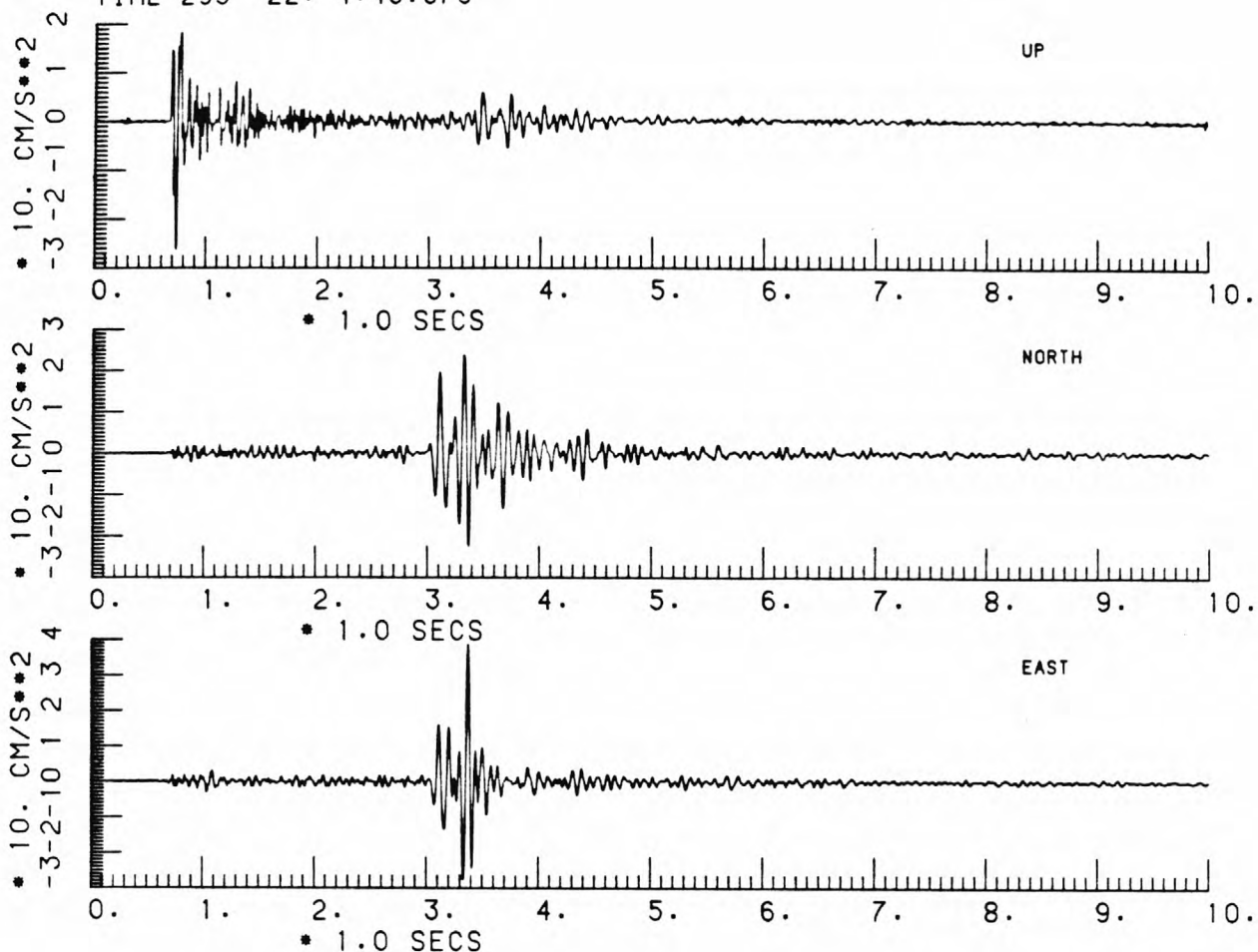
STATION HRS
TIME 295 22: 4:40.490



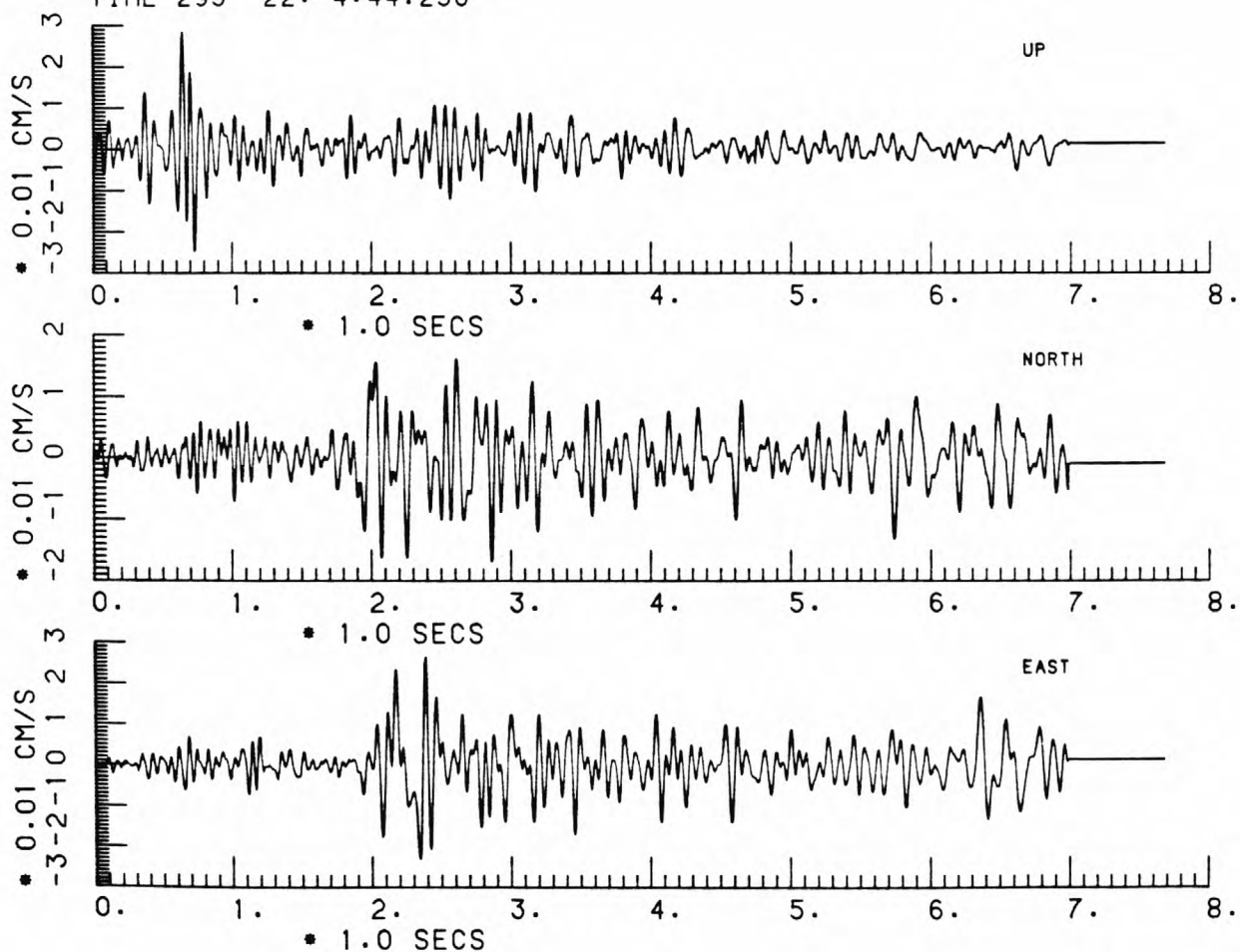
STATION JMS
TIME 295 22: 4:41.836



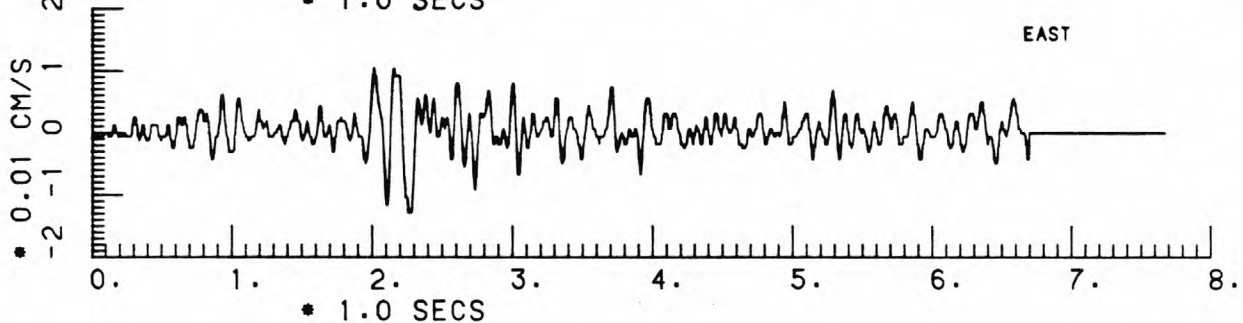
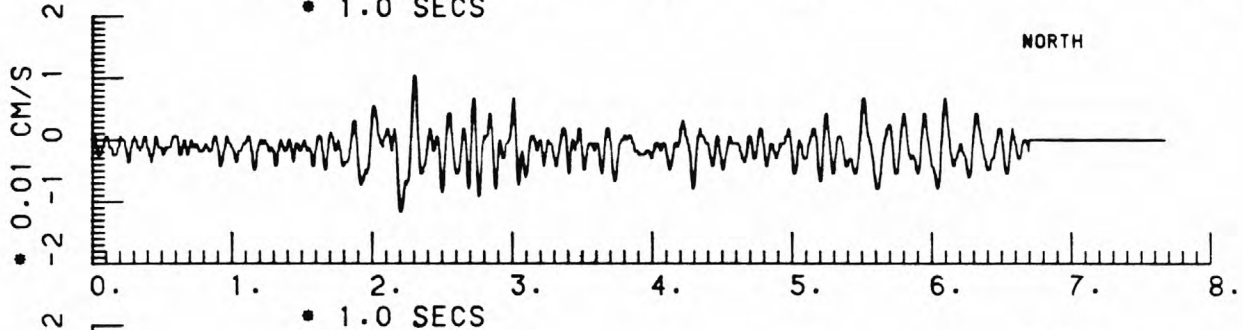
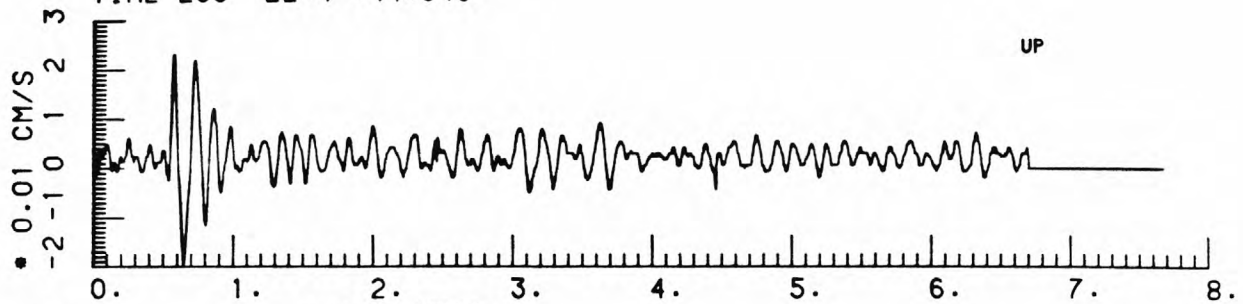
STATION KYR
TIME 295 22: 4:40.675



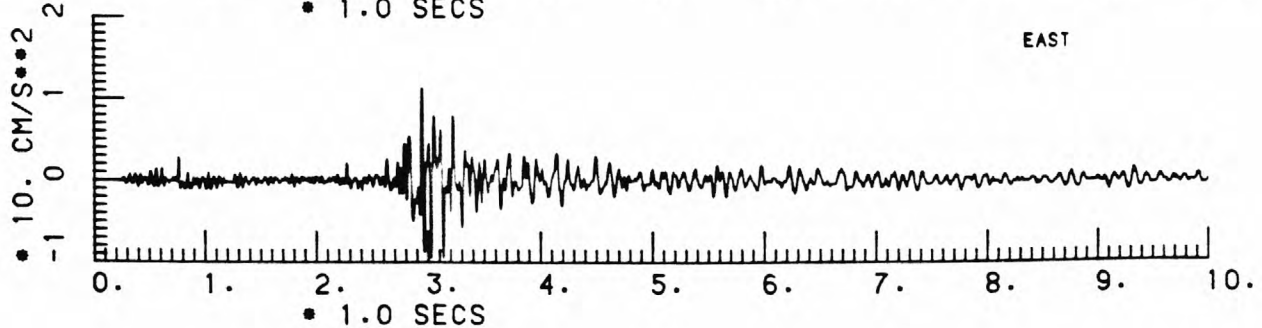
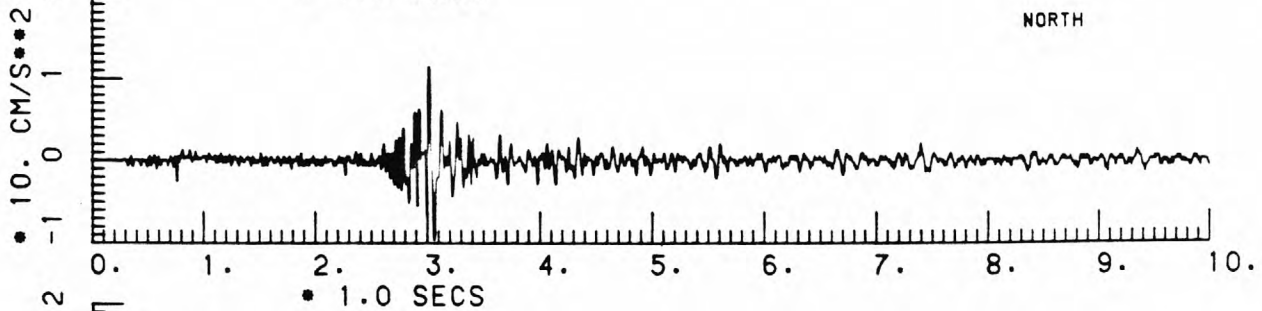
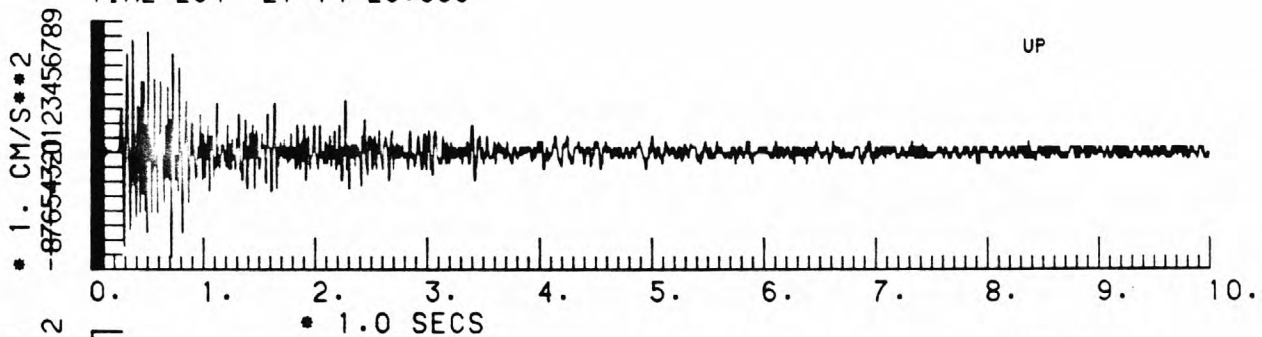
STATION SLD
TIME 295 22: 4:44.256



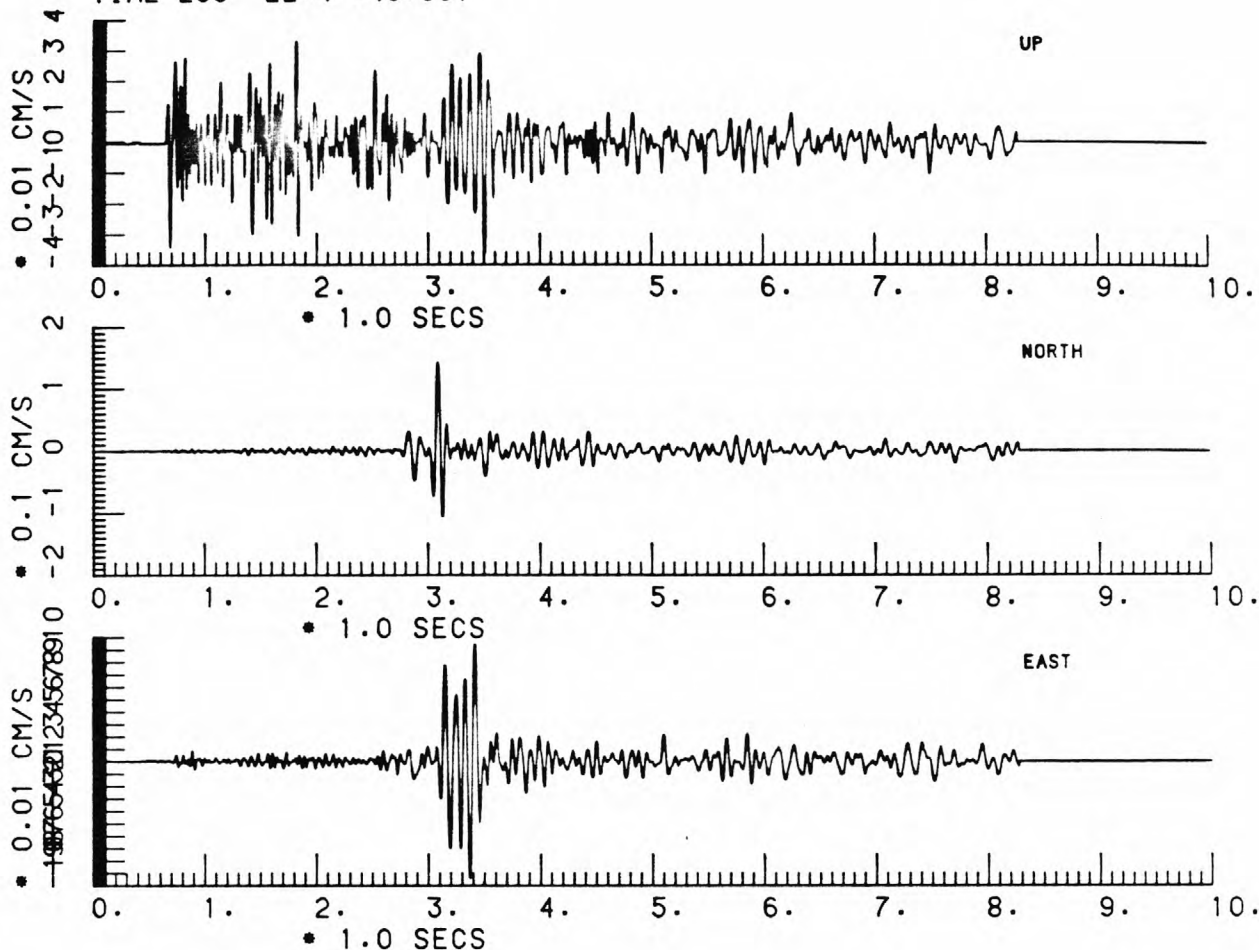
STATION AFB
TIME 295 22:44.540



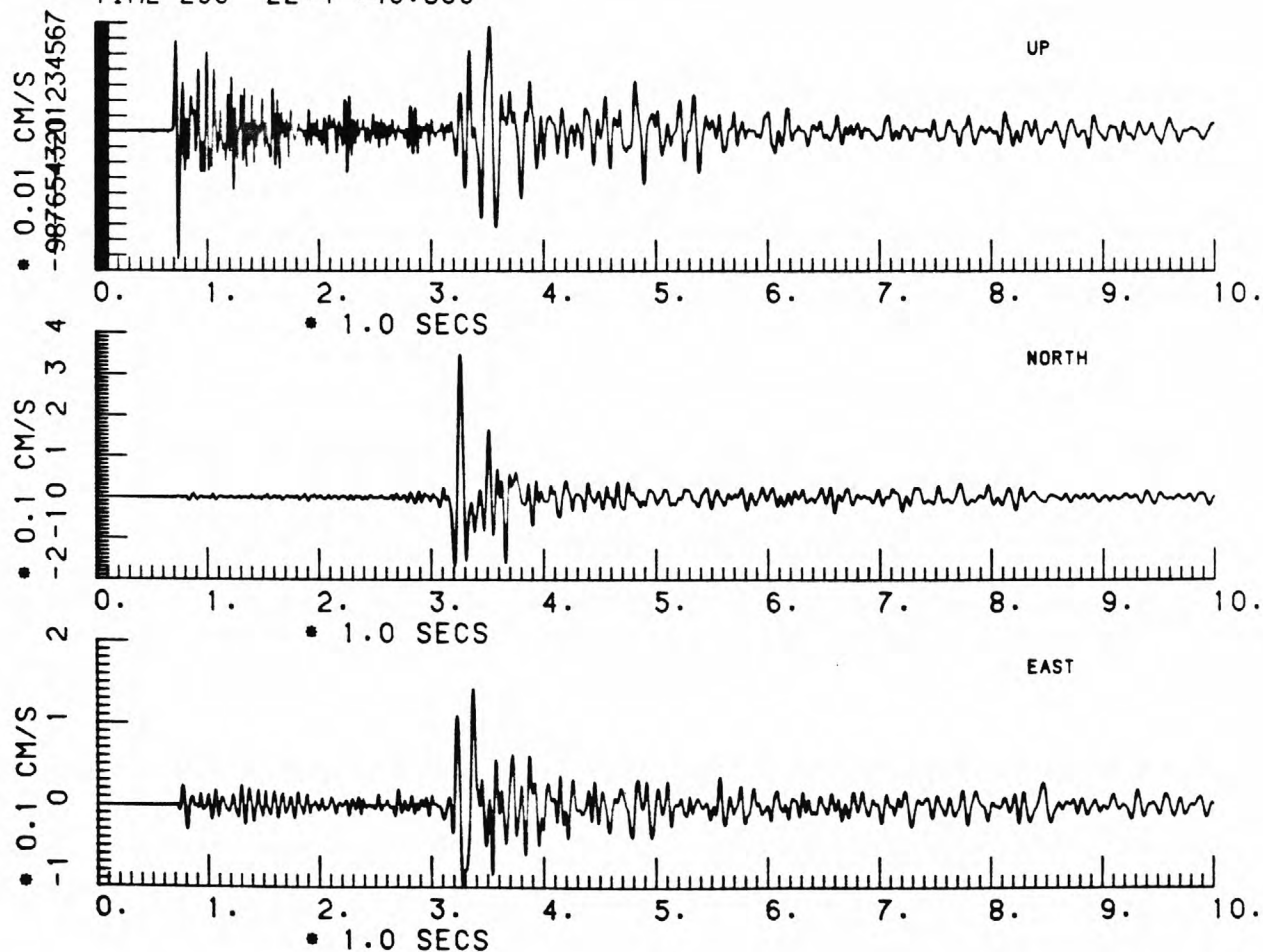
STATION HRS
TIME 294 21:14:29.659



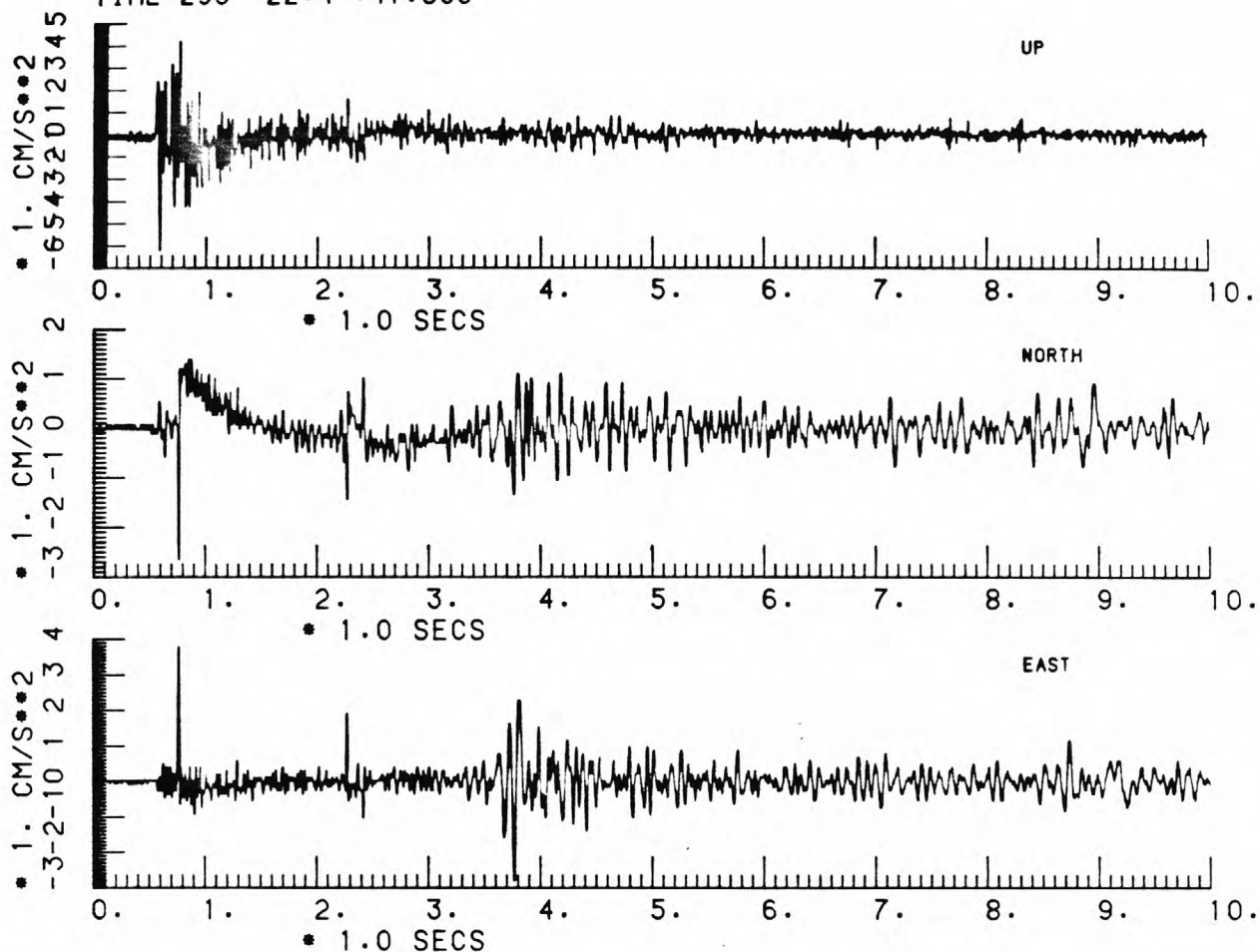
STATION FBR
TIME 295 22:4 :40.961



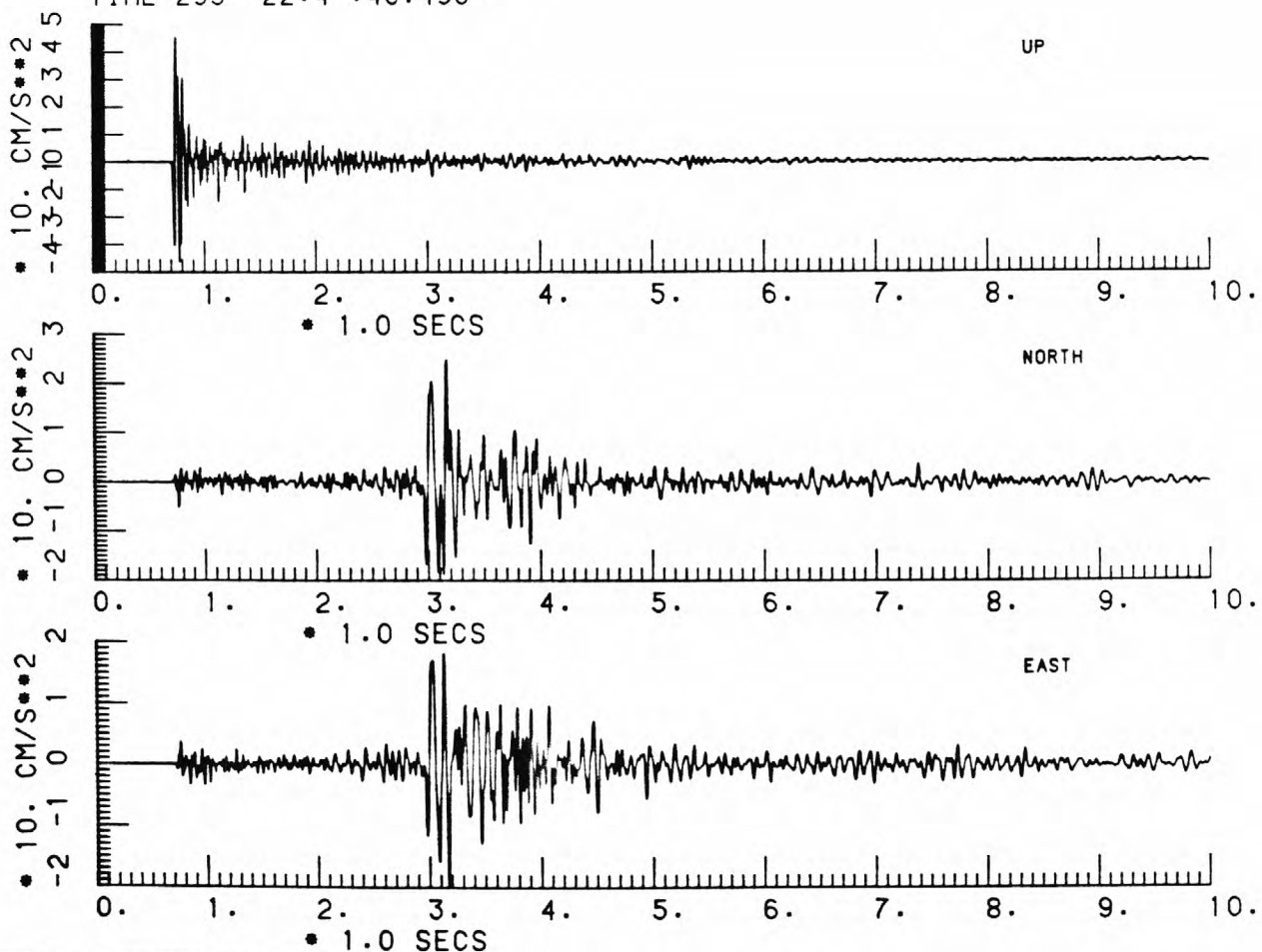
STATION CRK
TIME 295 22:4 :40.856

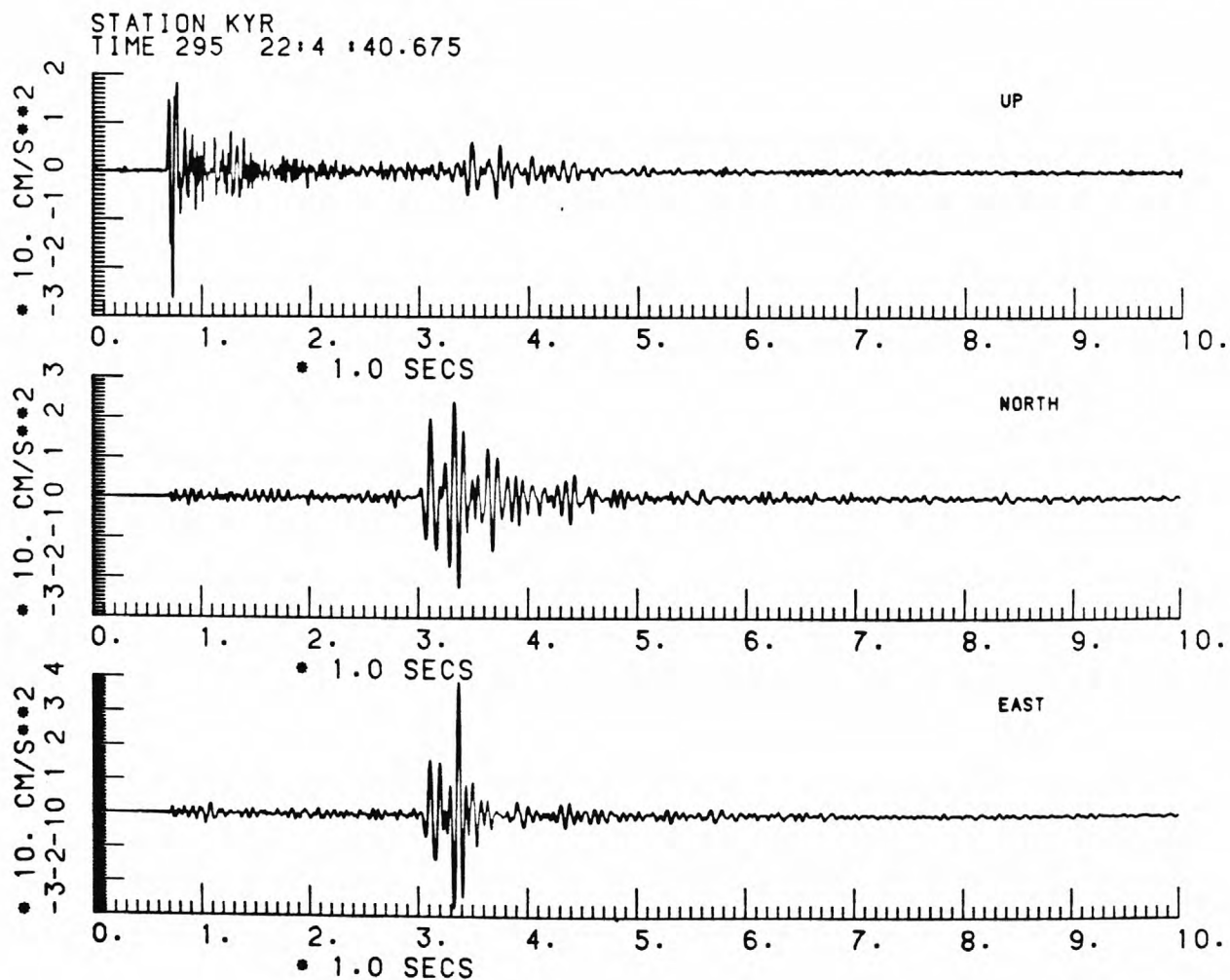
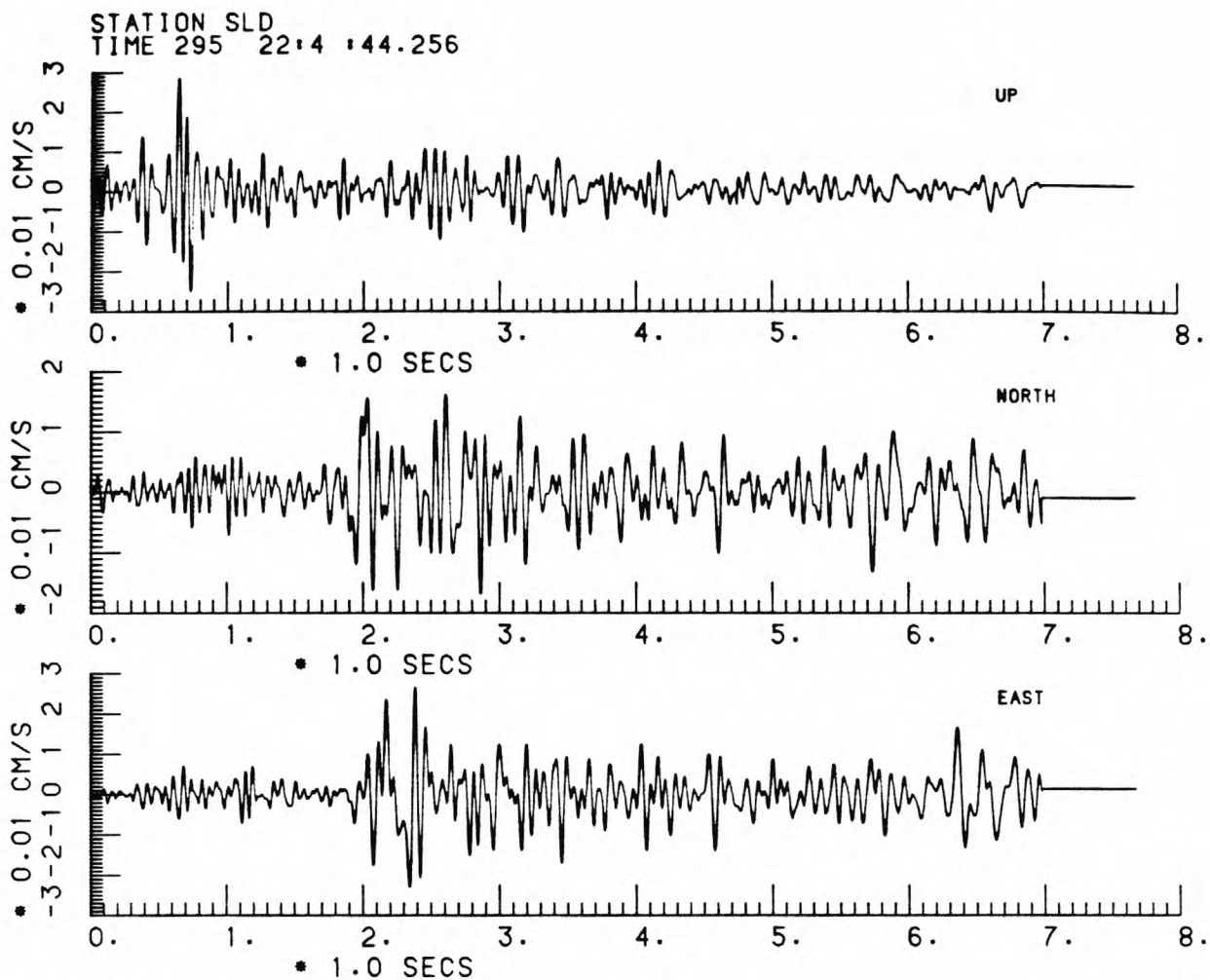


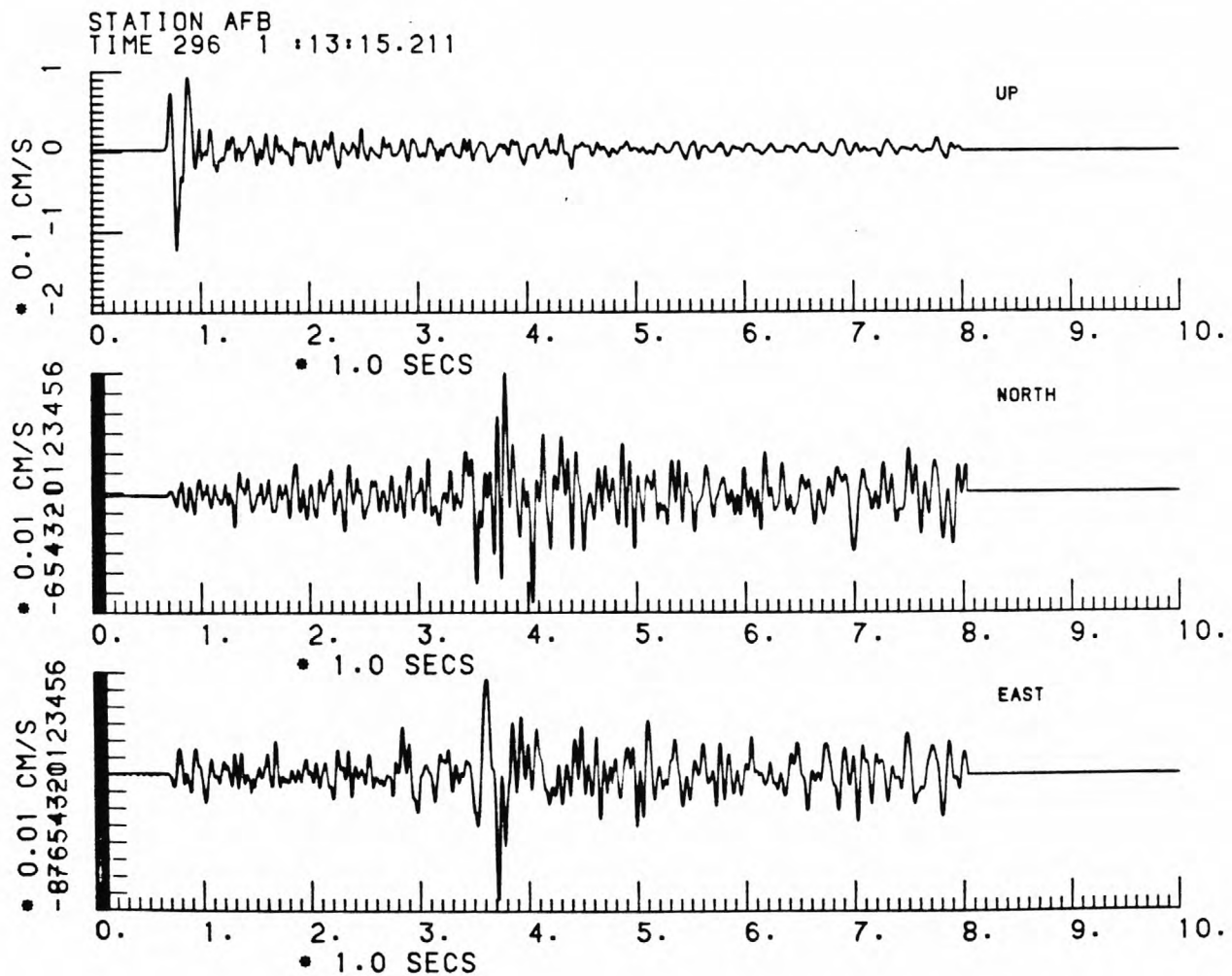
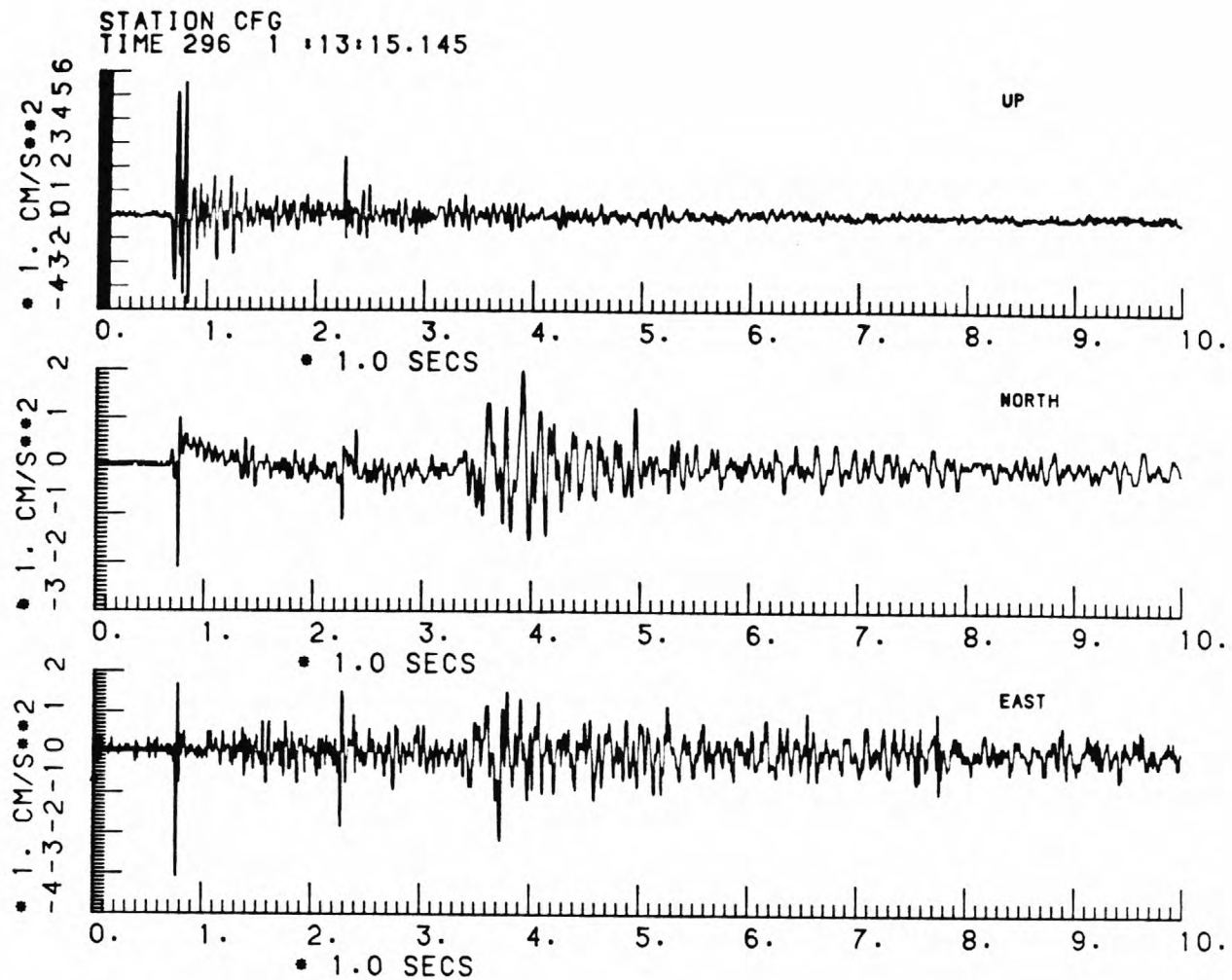
STATION JMS
TIME 295 22:4 :41.836



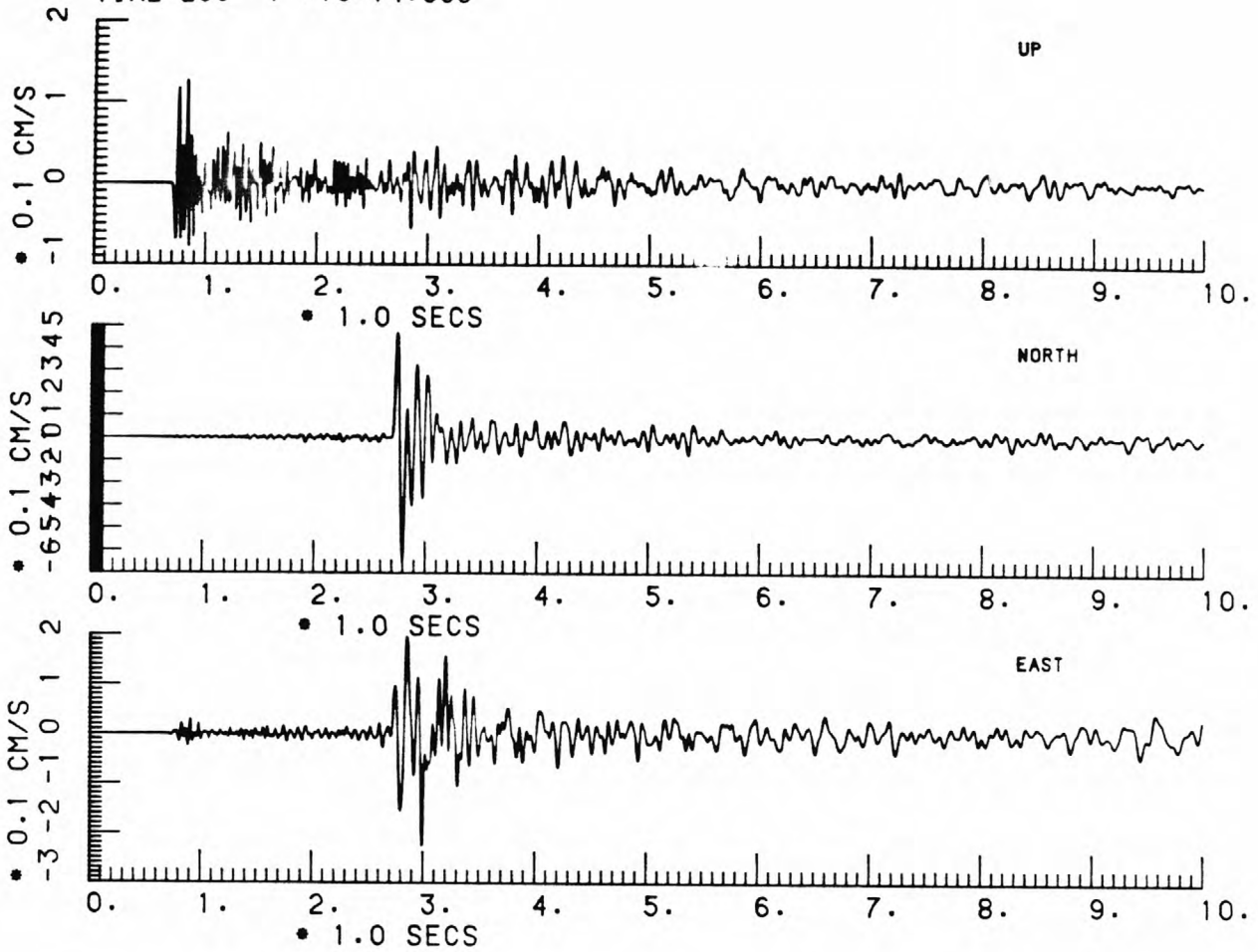
STATION HRS
TIME 295 22:4 :40.490



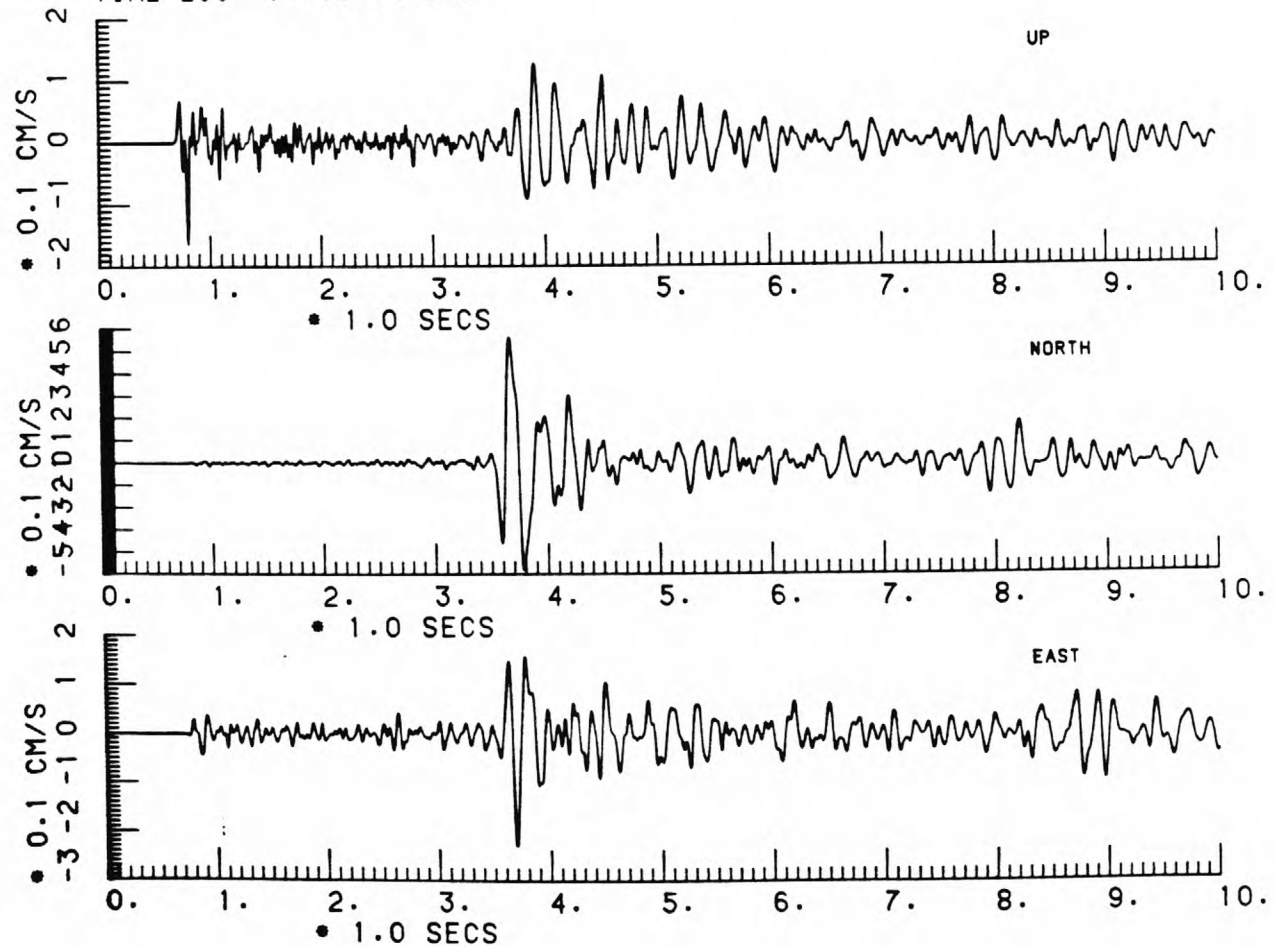


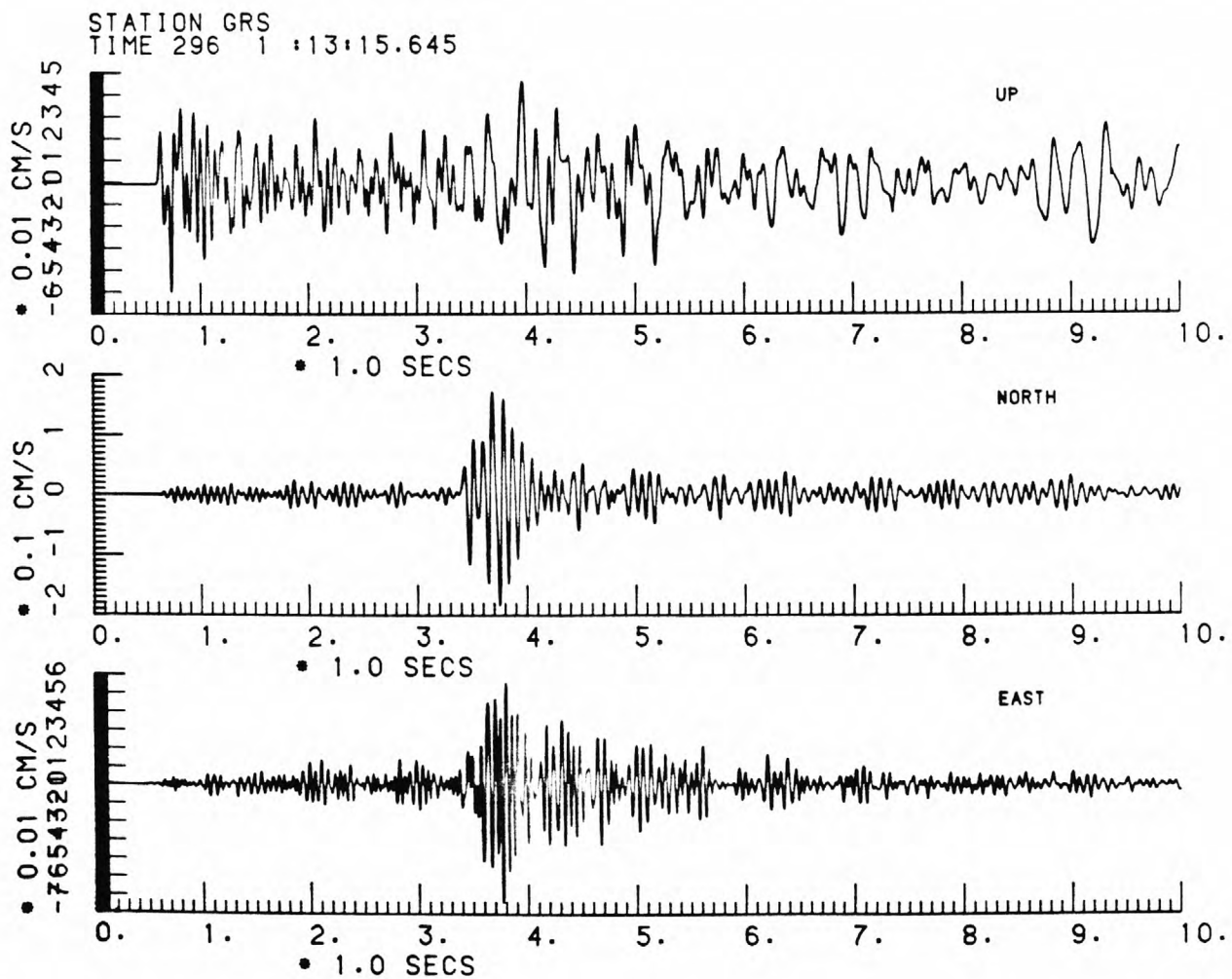
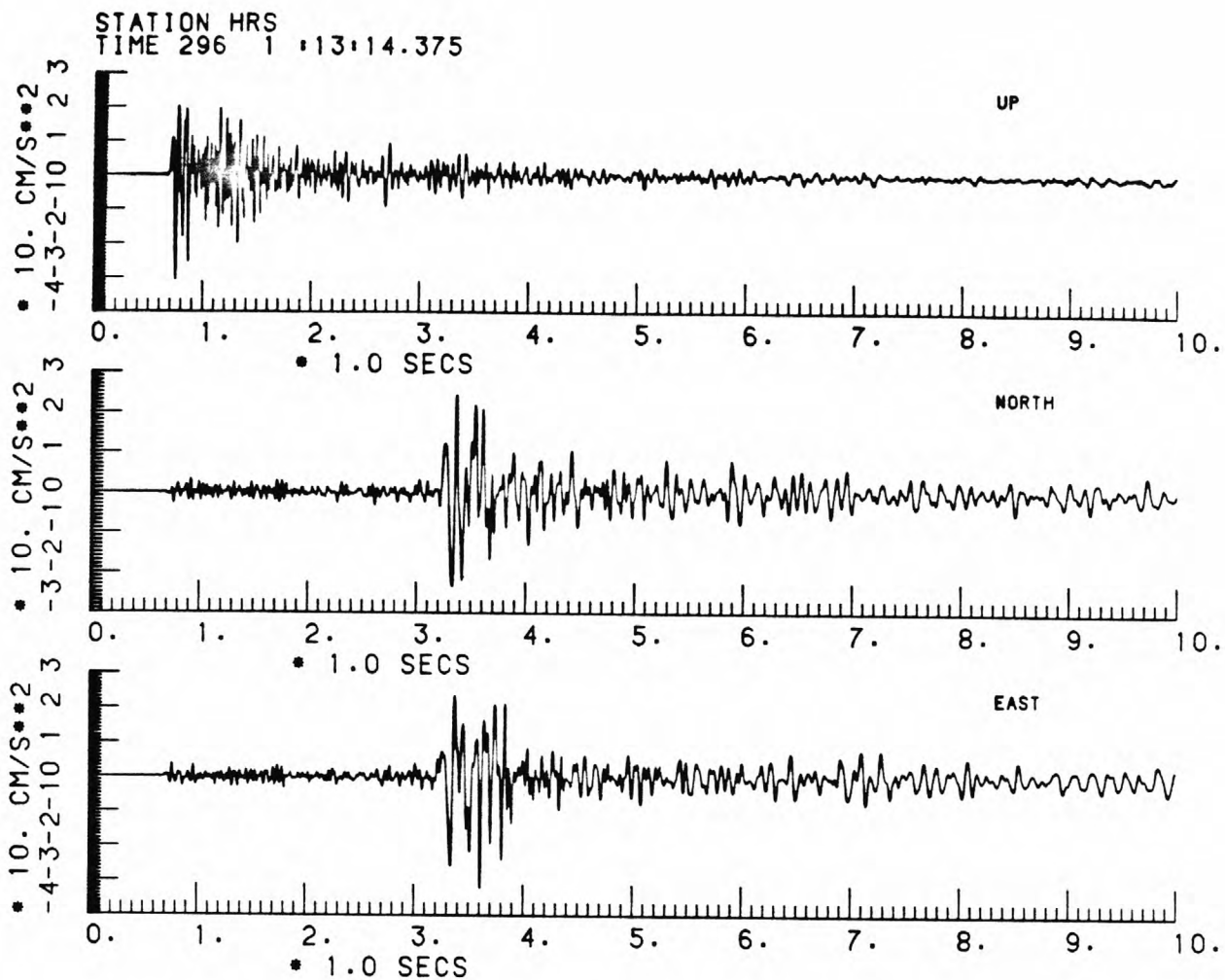


STATION FBR
TIME 296 1 :13:14.065

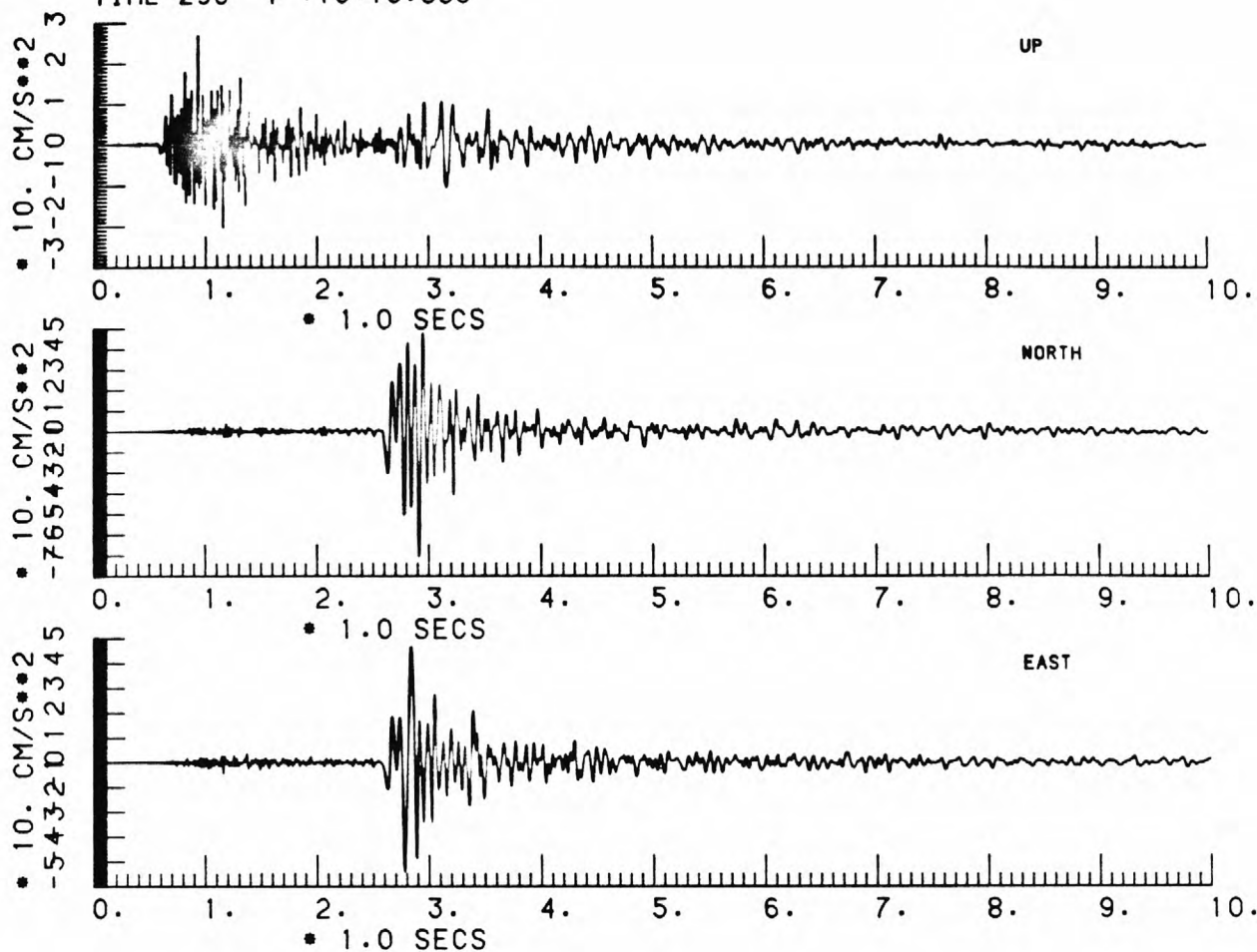


STATION CRK
TIME 296 1 :13:14.840

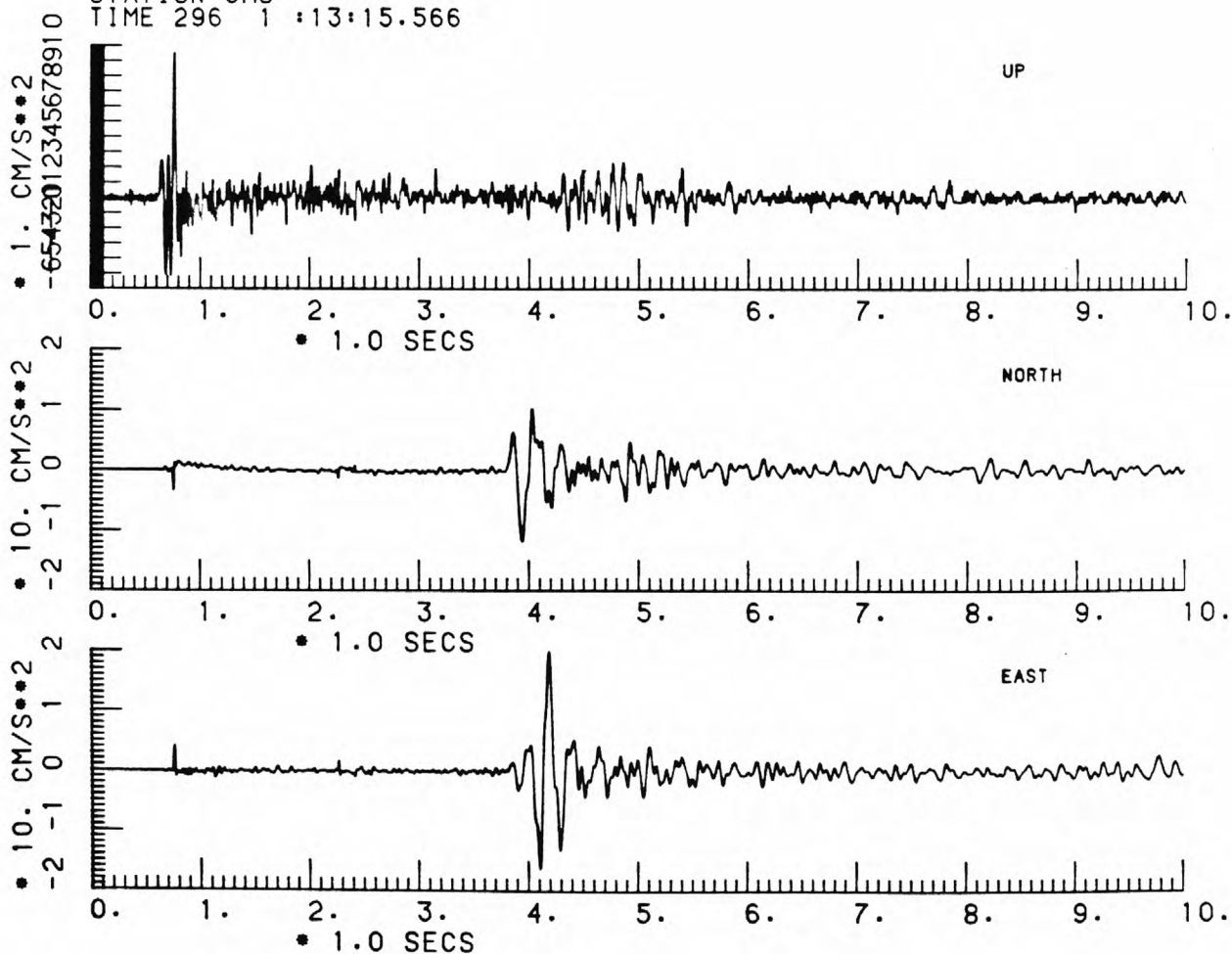




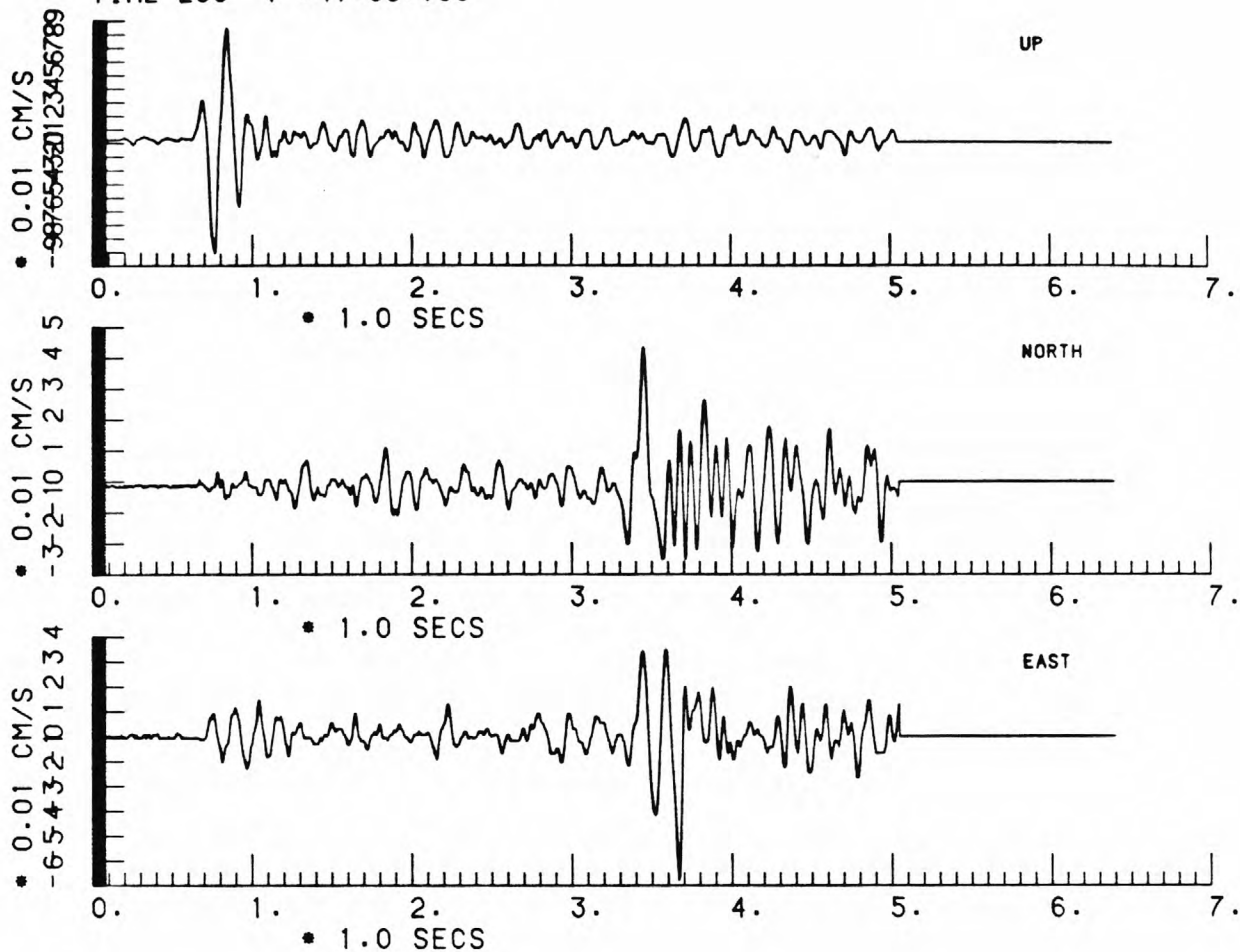
STATION KYR
TIME 296 1 :13:13.885



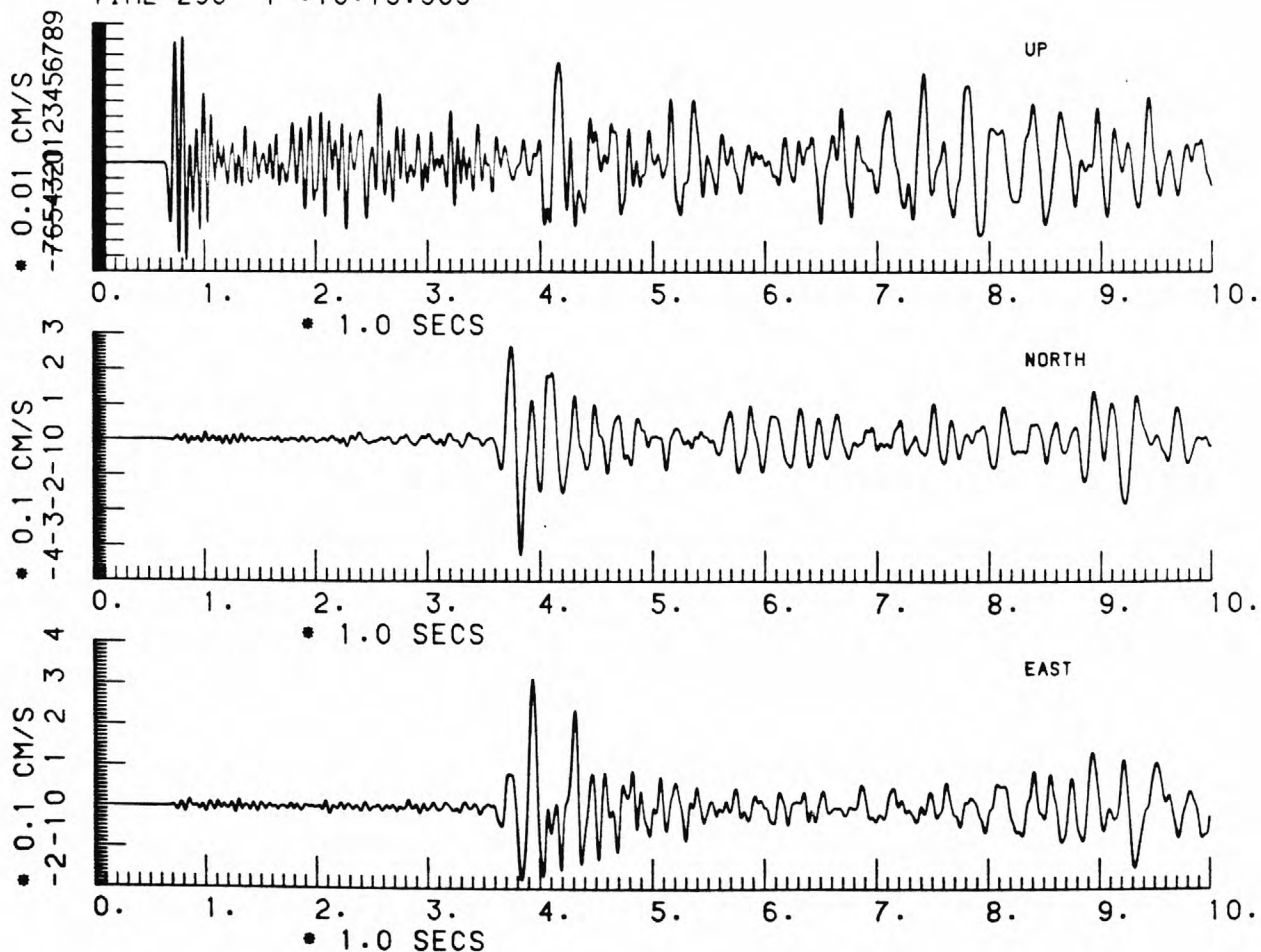
STATION JMS
TIME 296 1 :13:15.566



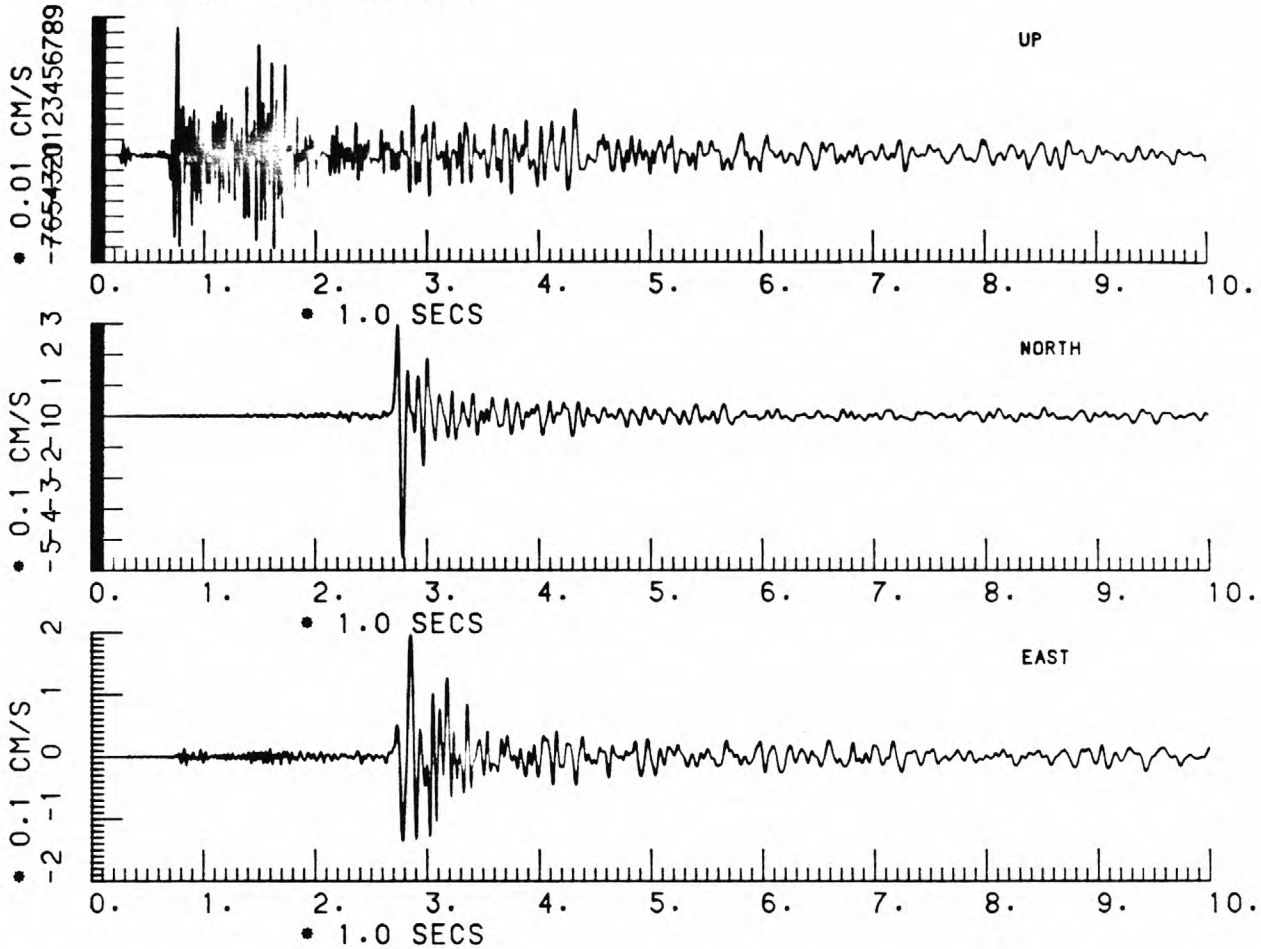
STATION AFB
TIME 296 1 :41:58.190



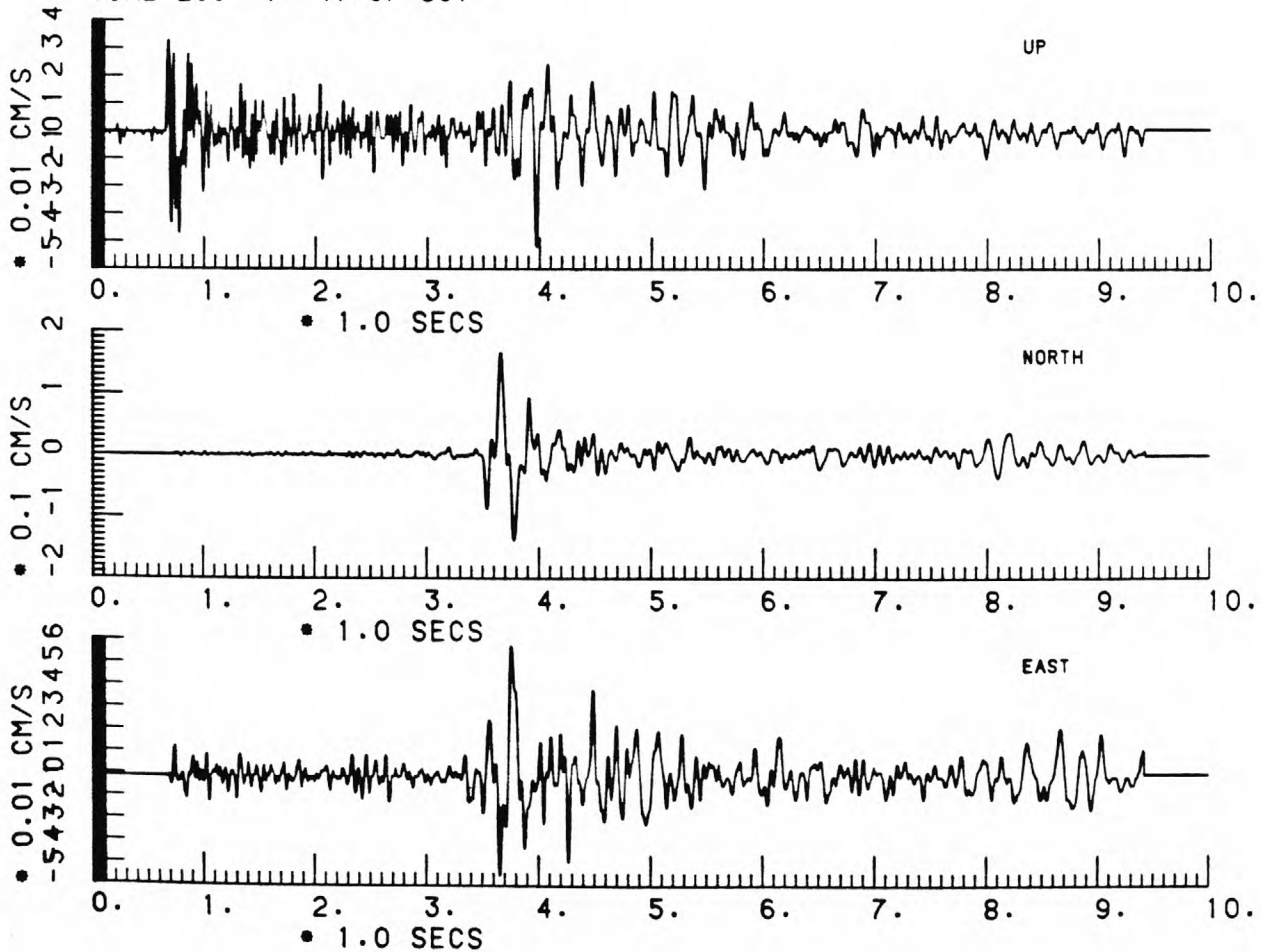
STATION SLD
TIME 296 1 :13:15.505



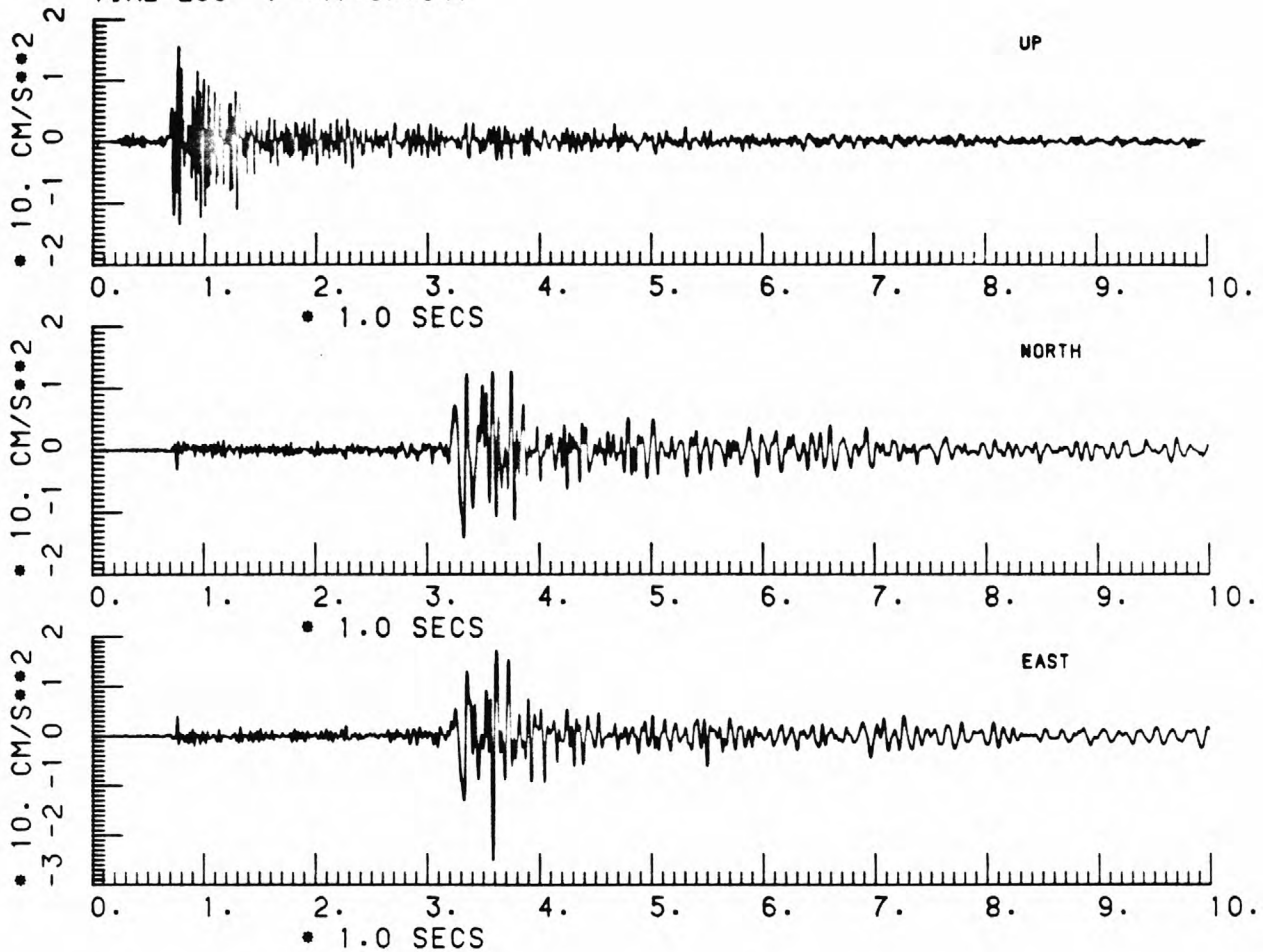
STATION FBR
TIME 296 1 41:57.010



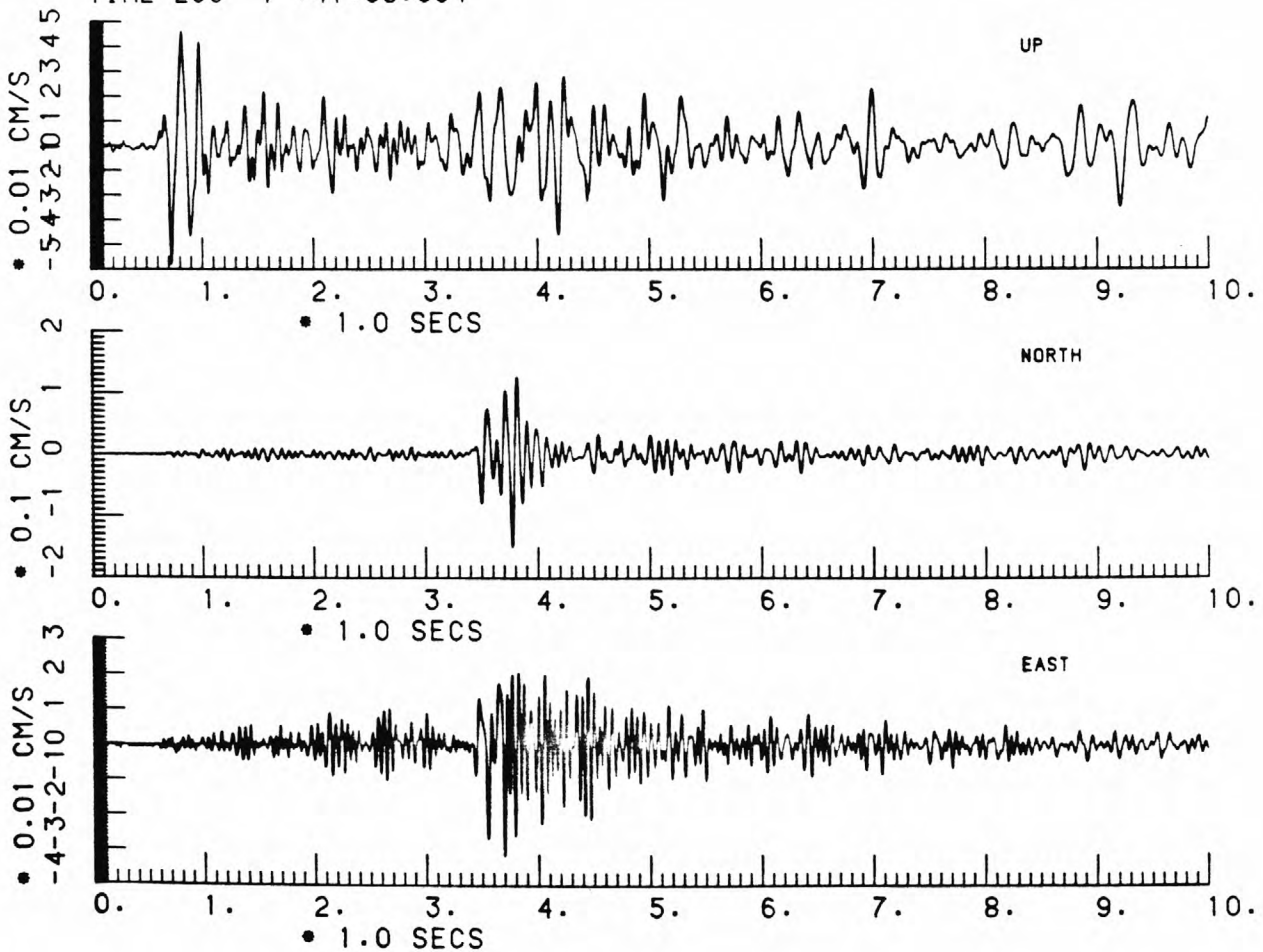
STATION CRK
TIME 296 1 41:57.831



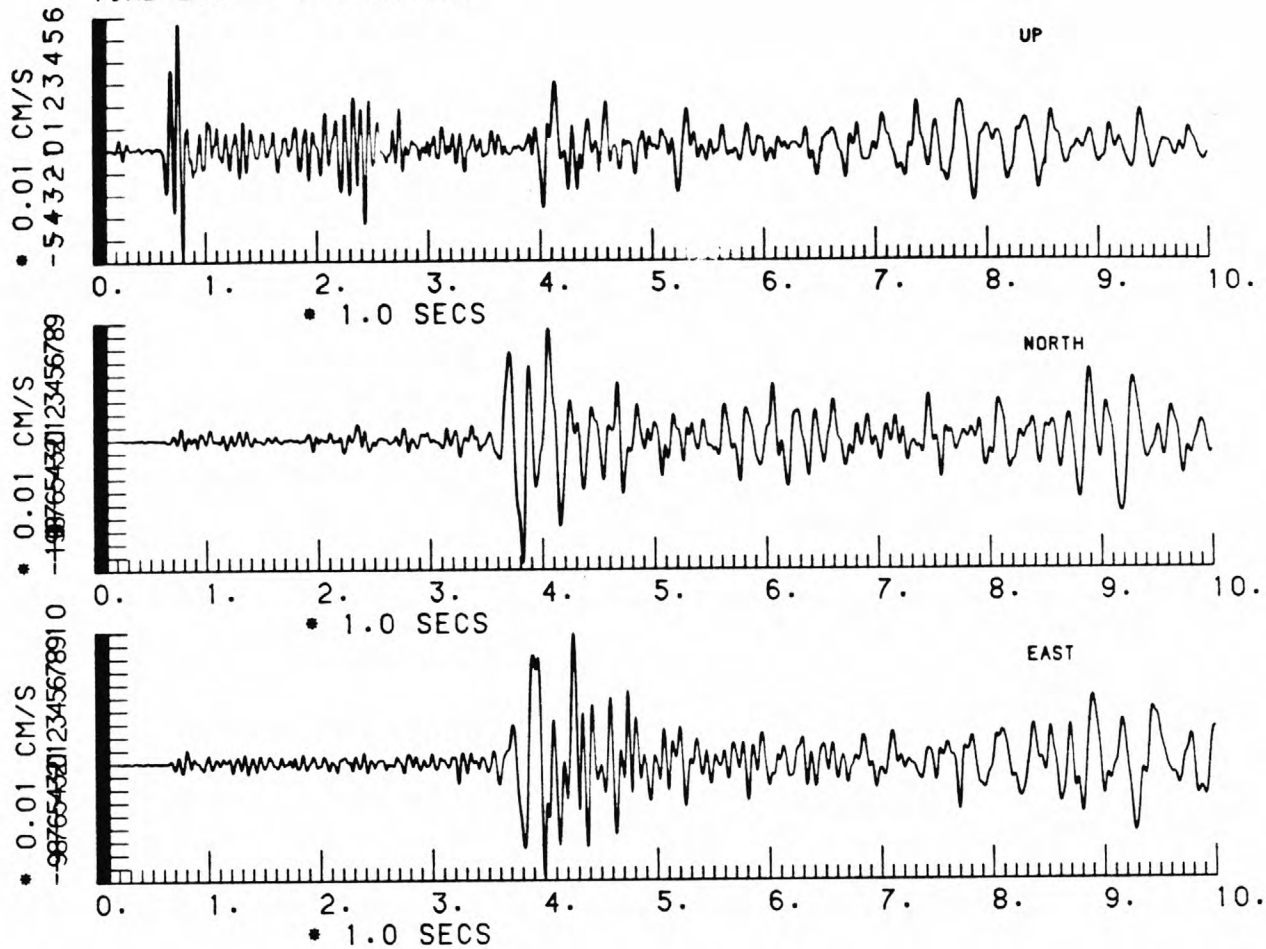
STATION HRS
TIME 296 1 :41:57.341



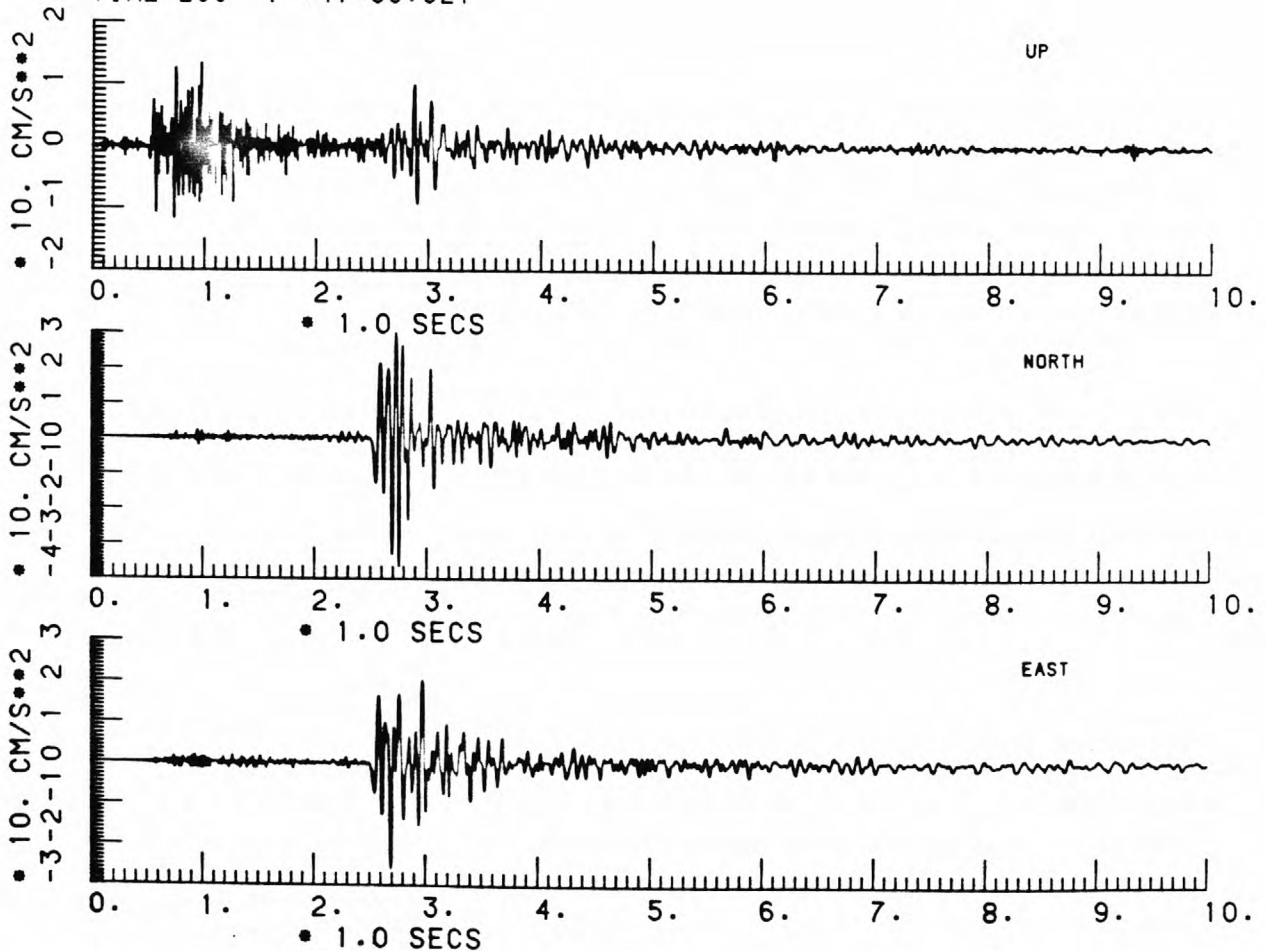
STATION GRS
TIME 296 1 :41:58.554



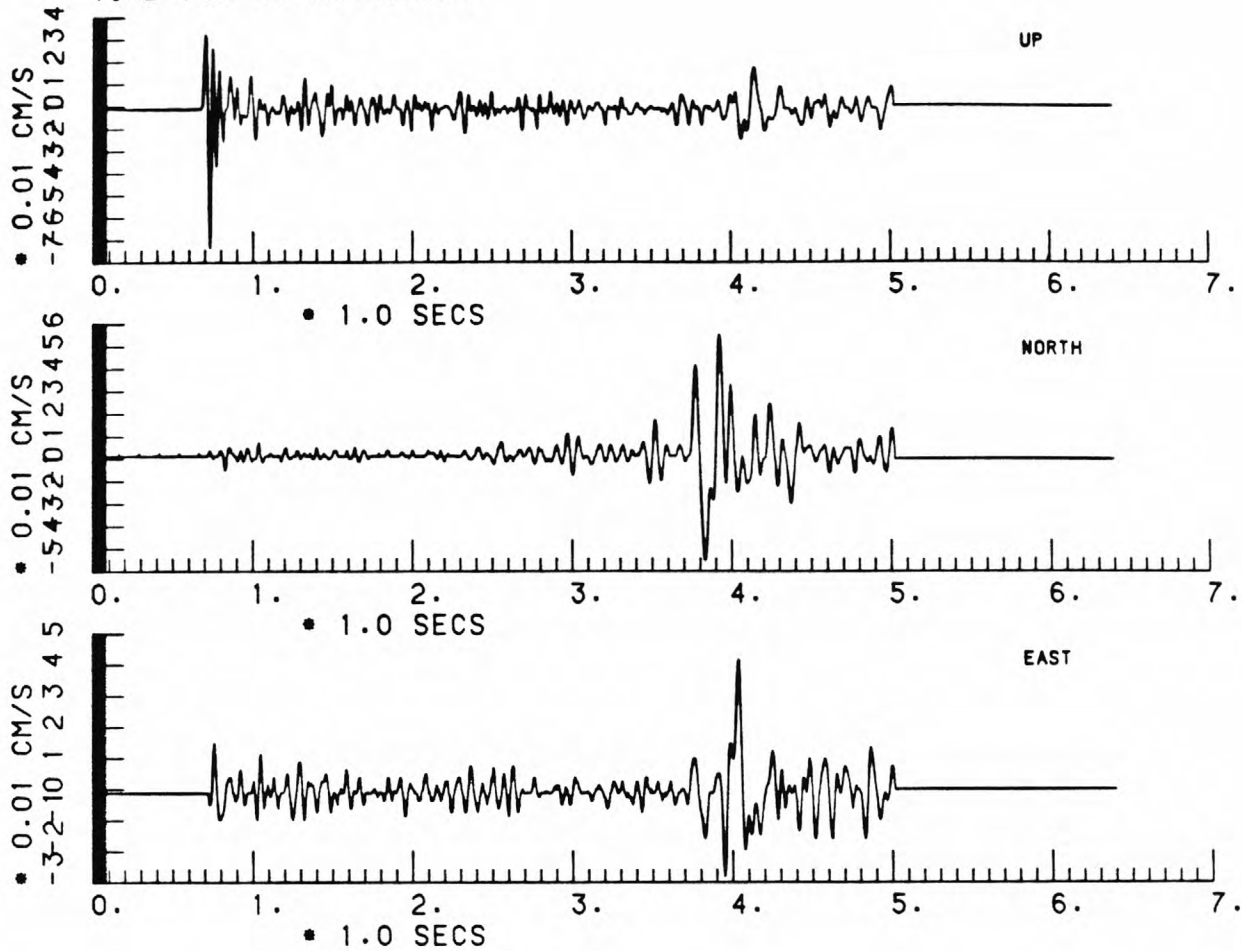
STATION SLD
TIME 296 1 :41:58.479



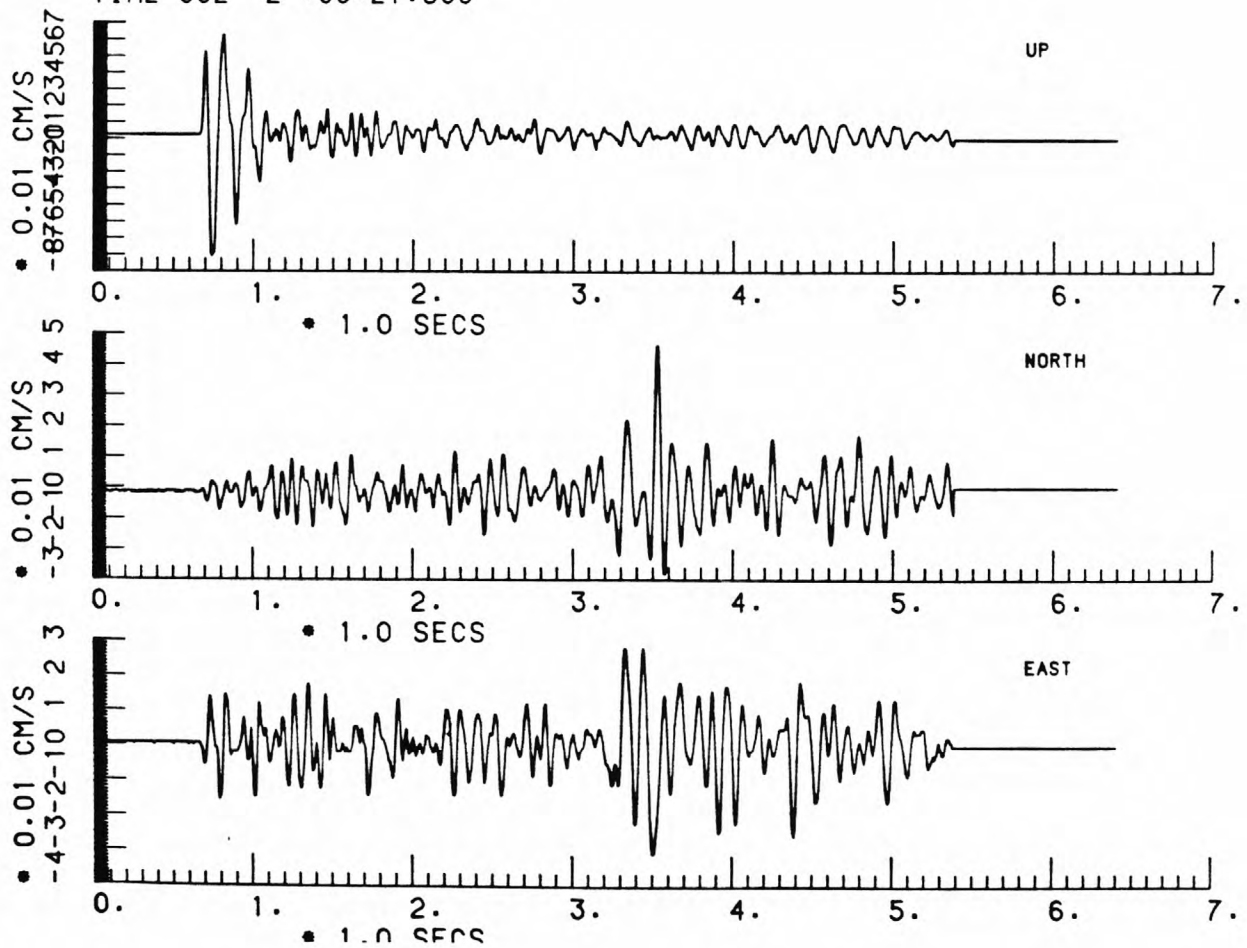
STATION KYR
TIME 296 1 :41:56.921



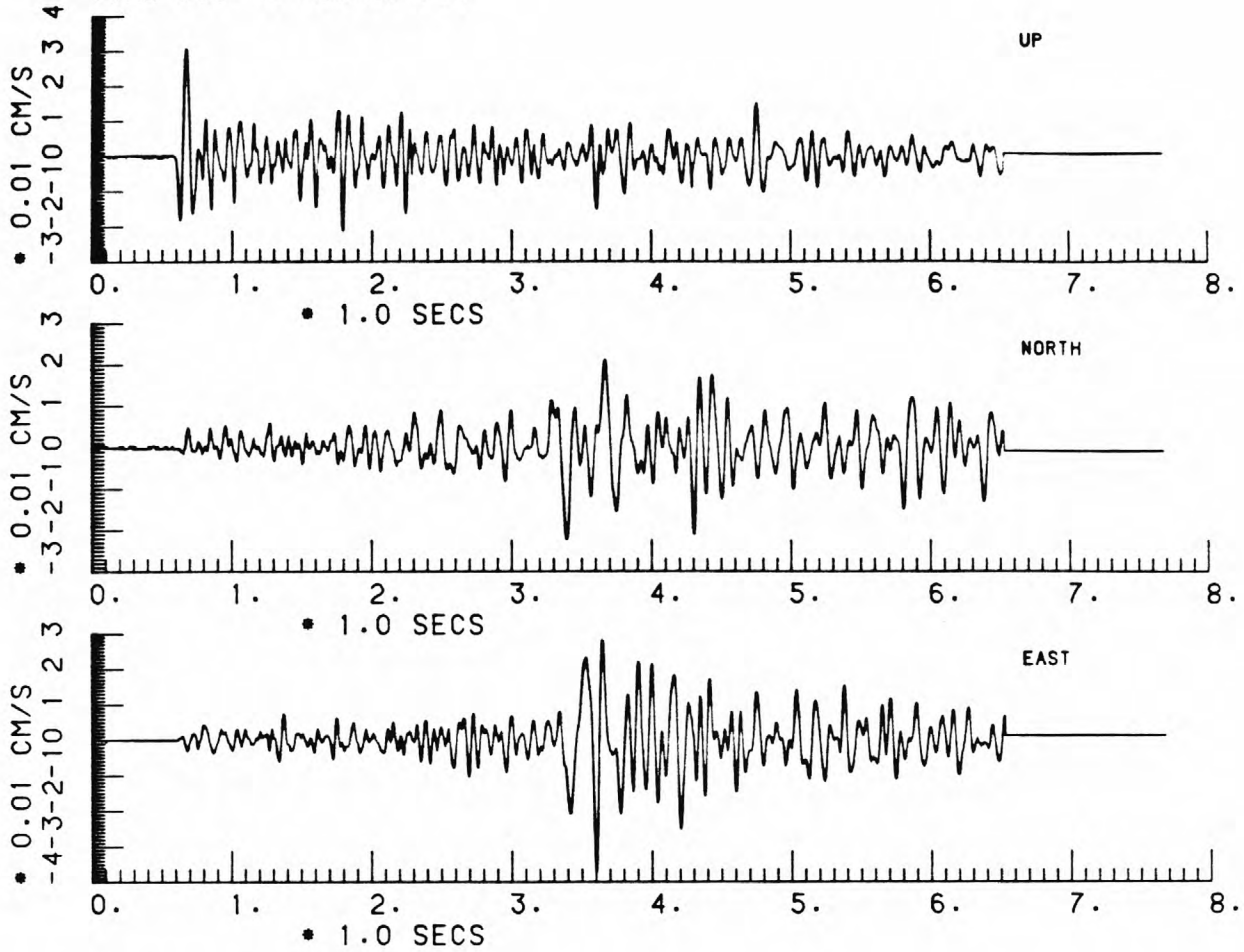
STATION CRK
TIME 302 2 :39:22.220



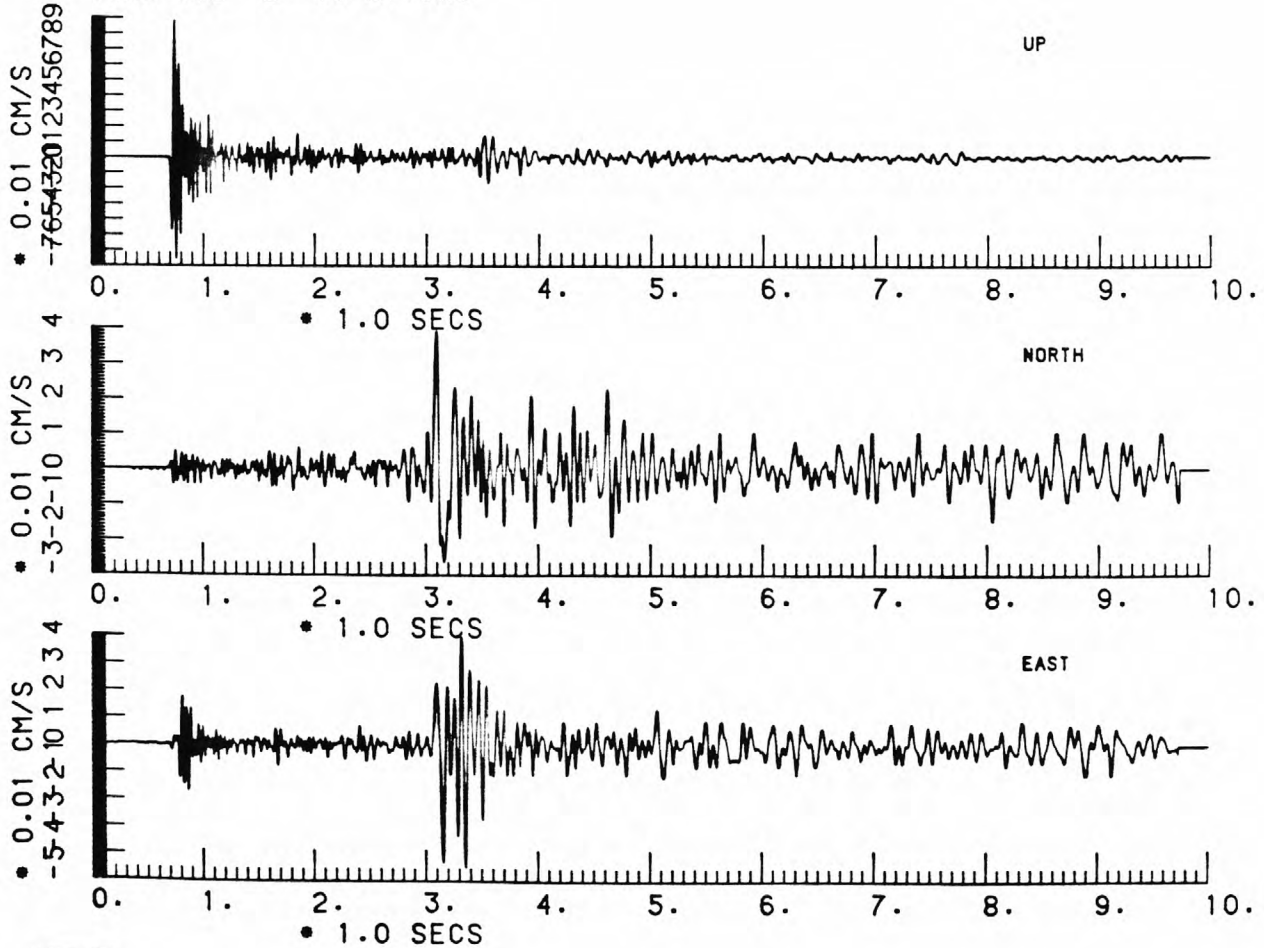
STATION AFB
TIME 302 2 :39:21.866



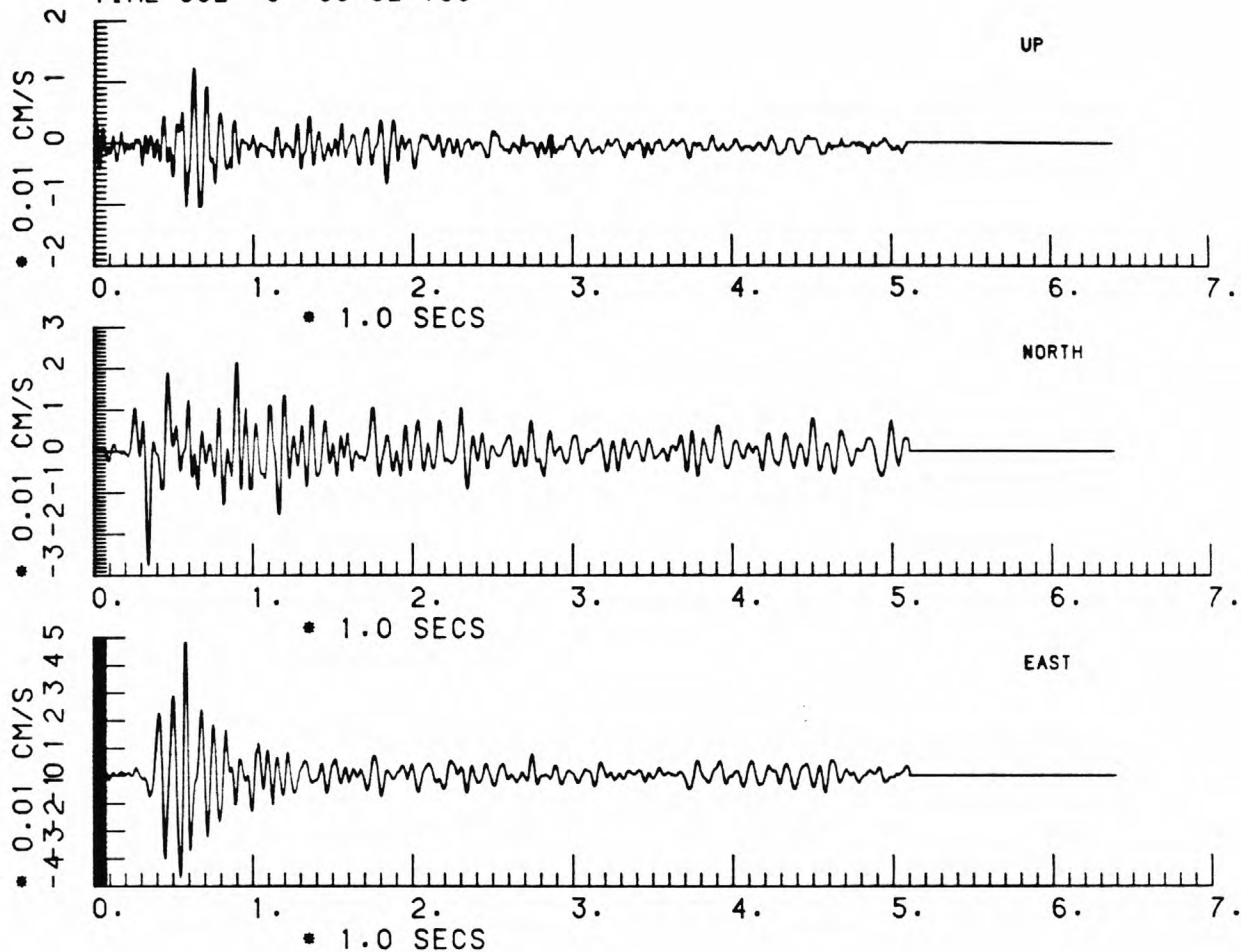
STATION SLD
TIME 302 2 :39:22.711



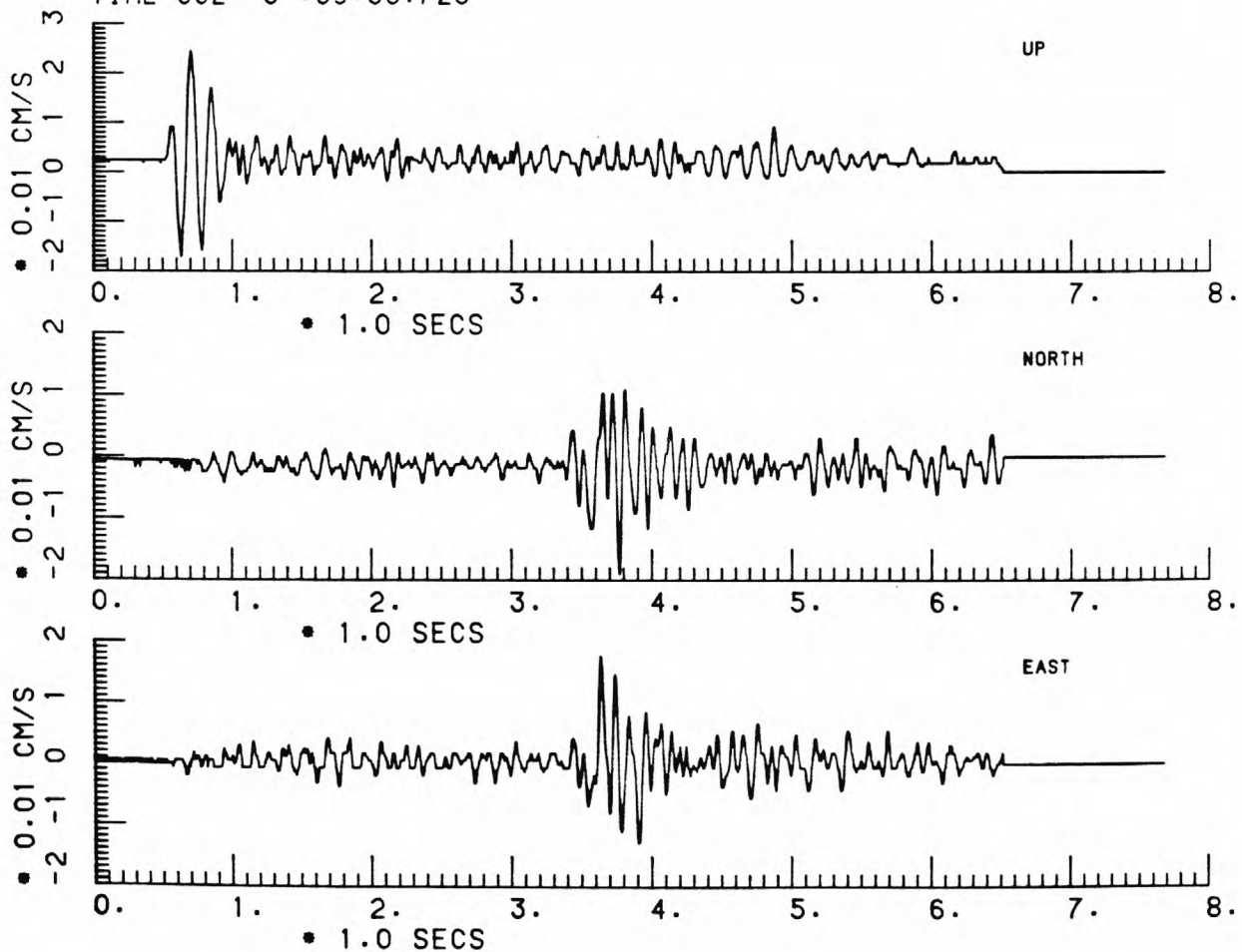
STATION FBR
TIME 302 2 :39:21.520



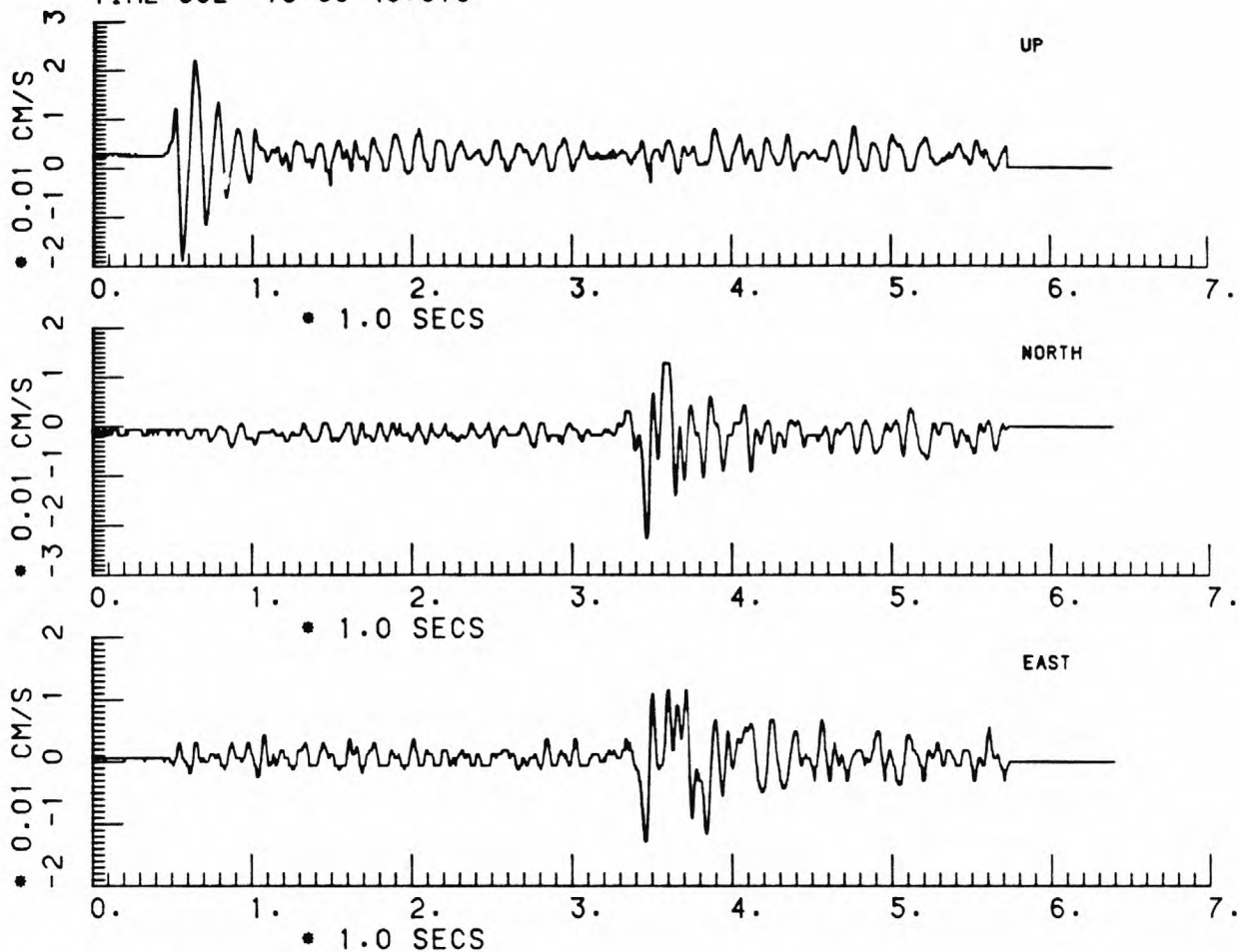
STATION FBR
TIME 302 3 :39:52.135



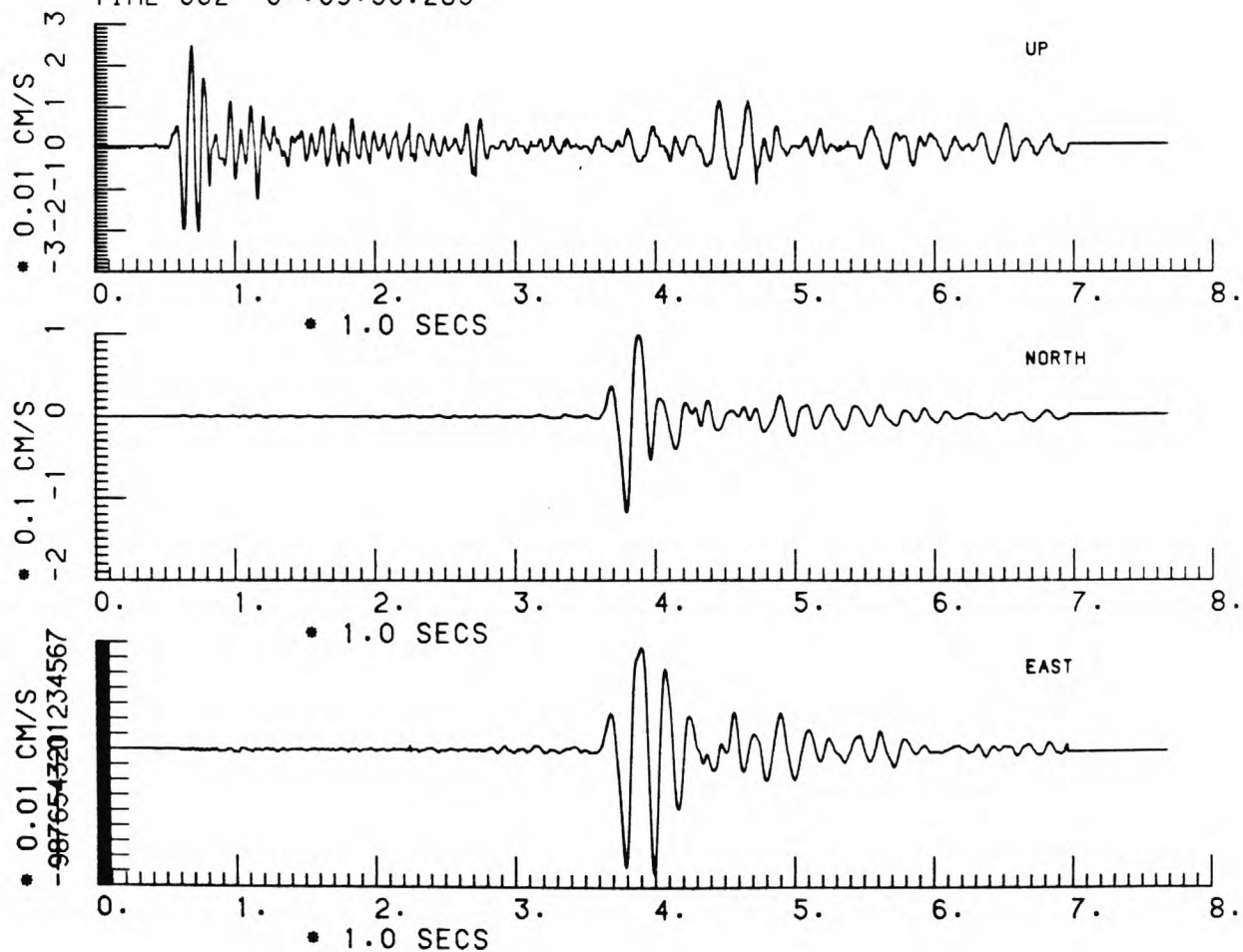
STATION AFB
TIME 302 3 :39:50.725



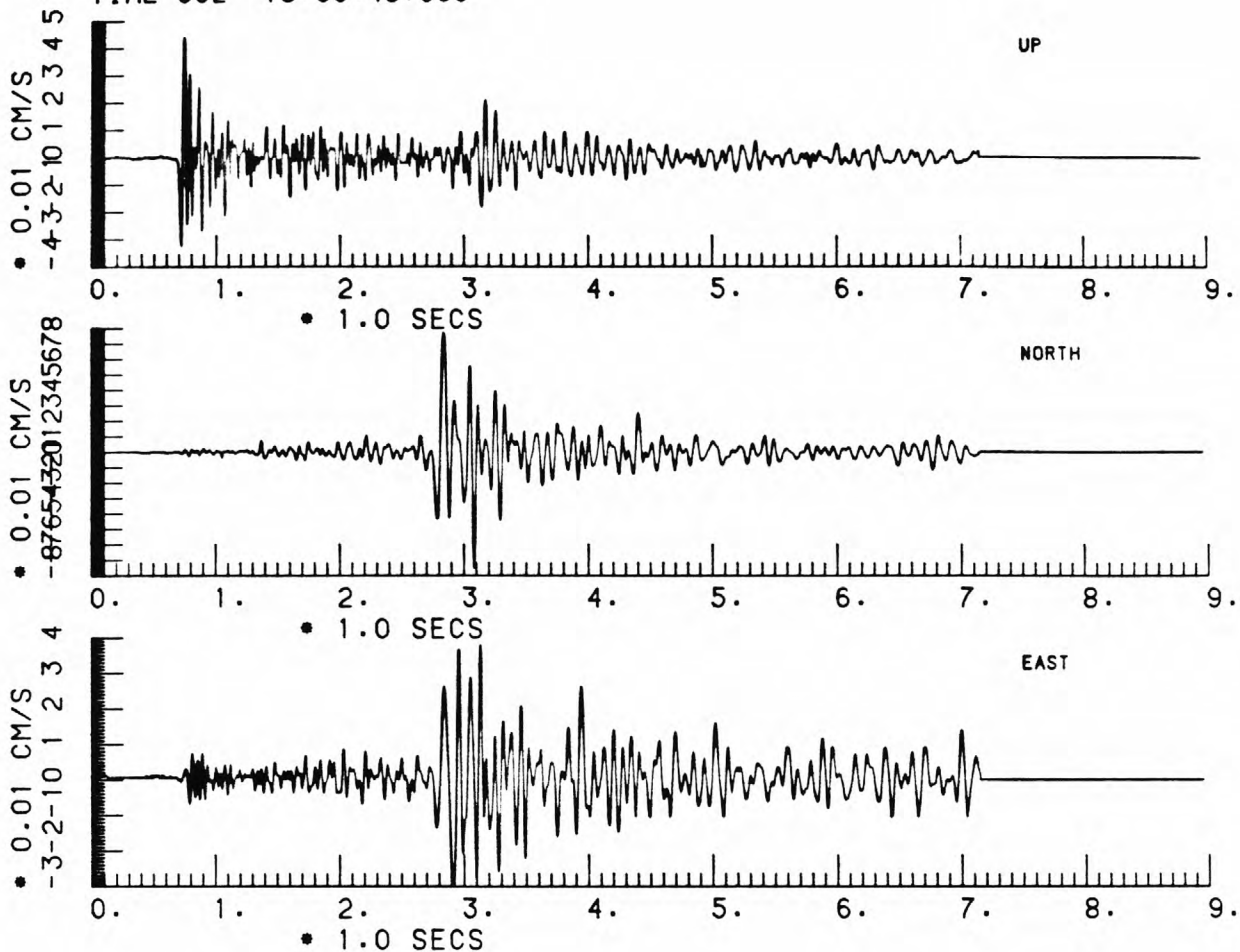
STATION AFB
TIME 302 18:33:49.510



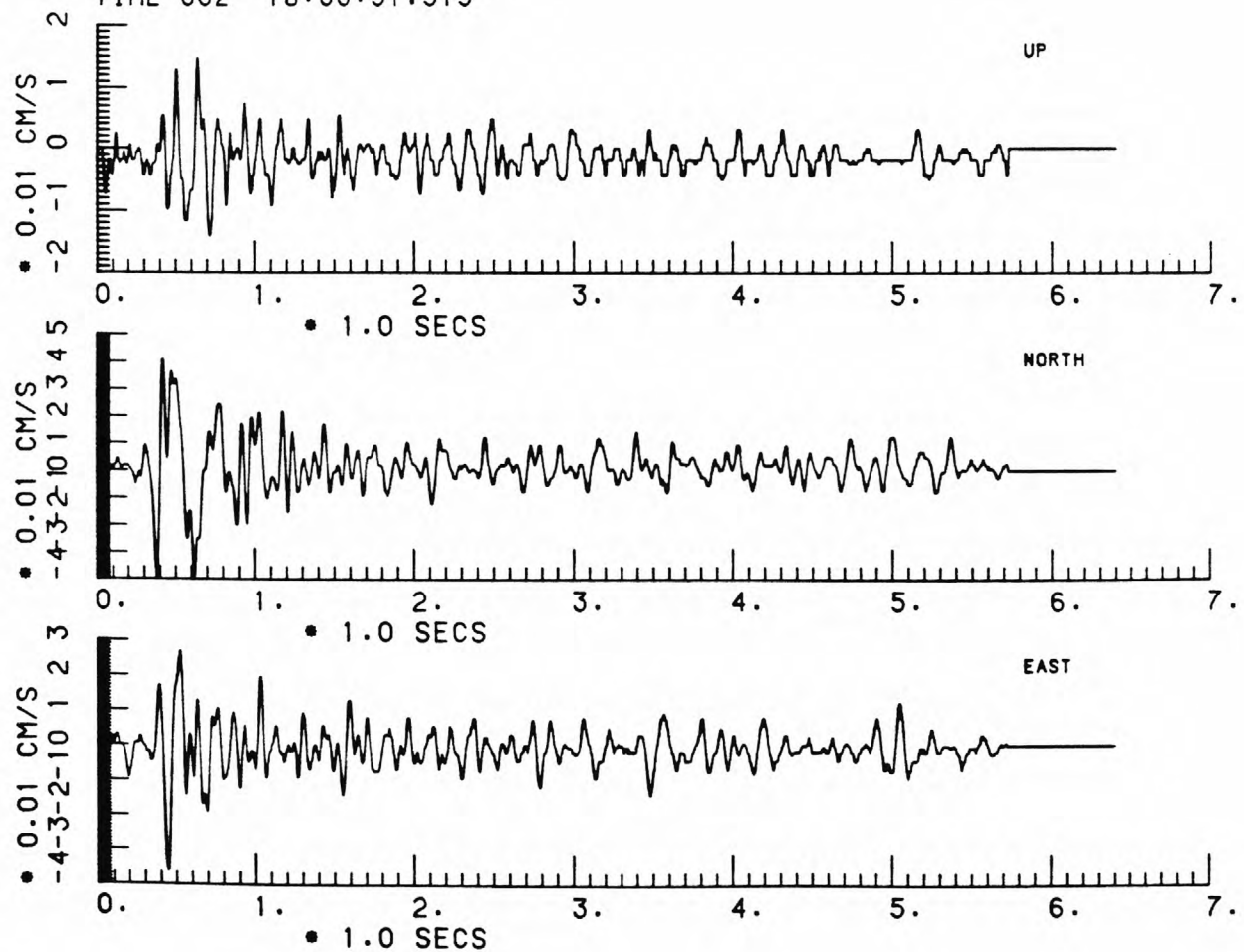
STATION HUS
TIME 302 3 :39:50.285



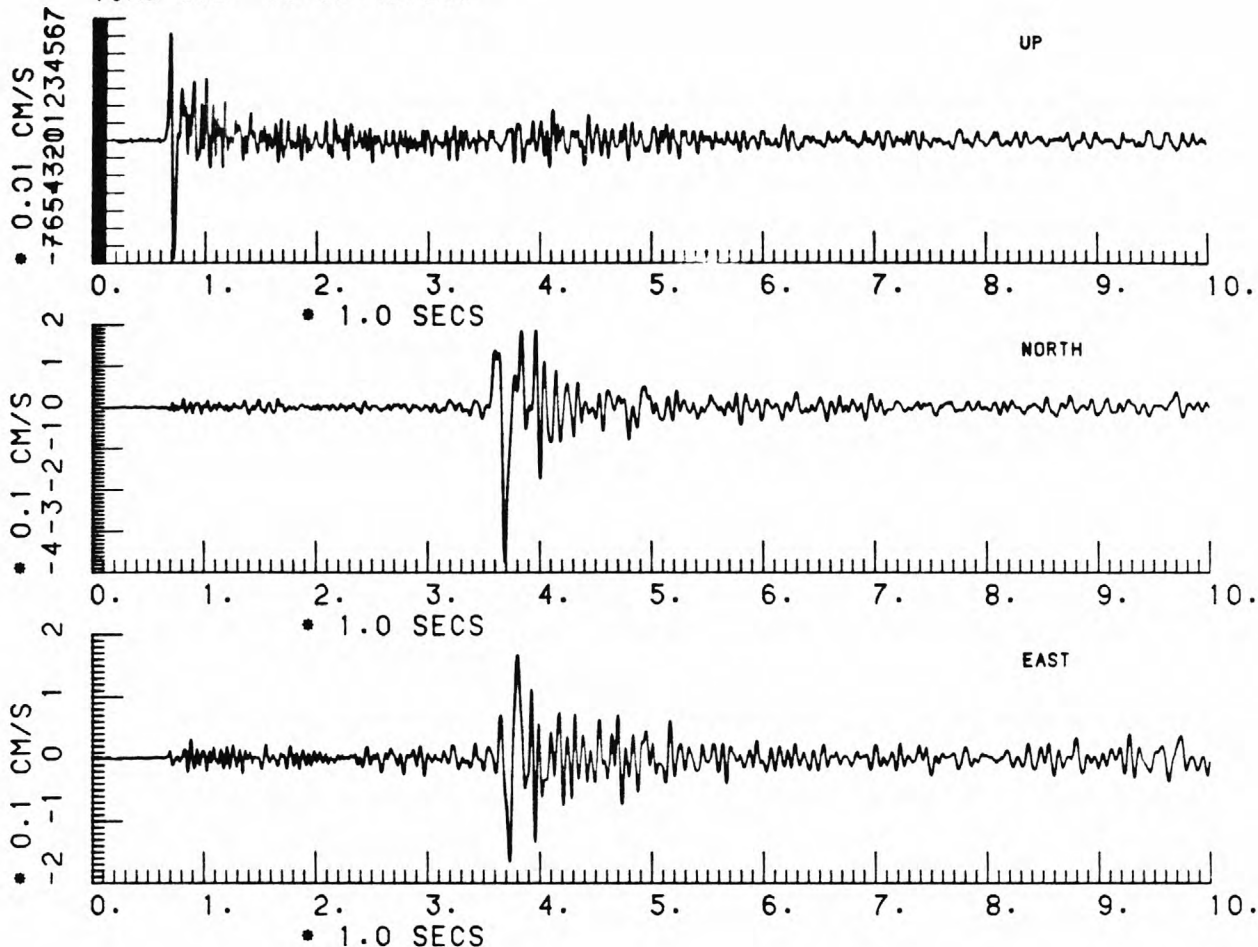
STATION FBR
TIME 302 18:33:48.095



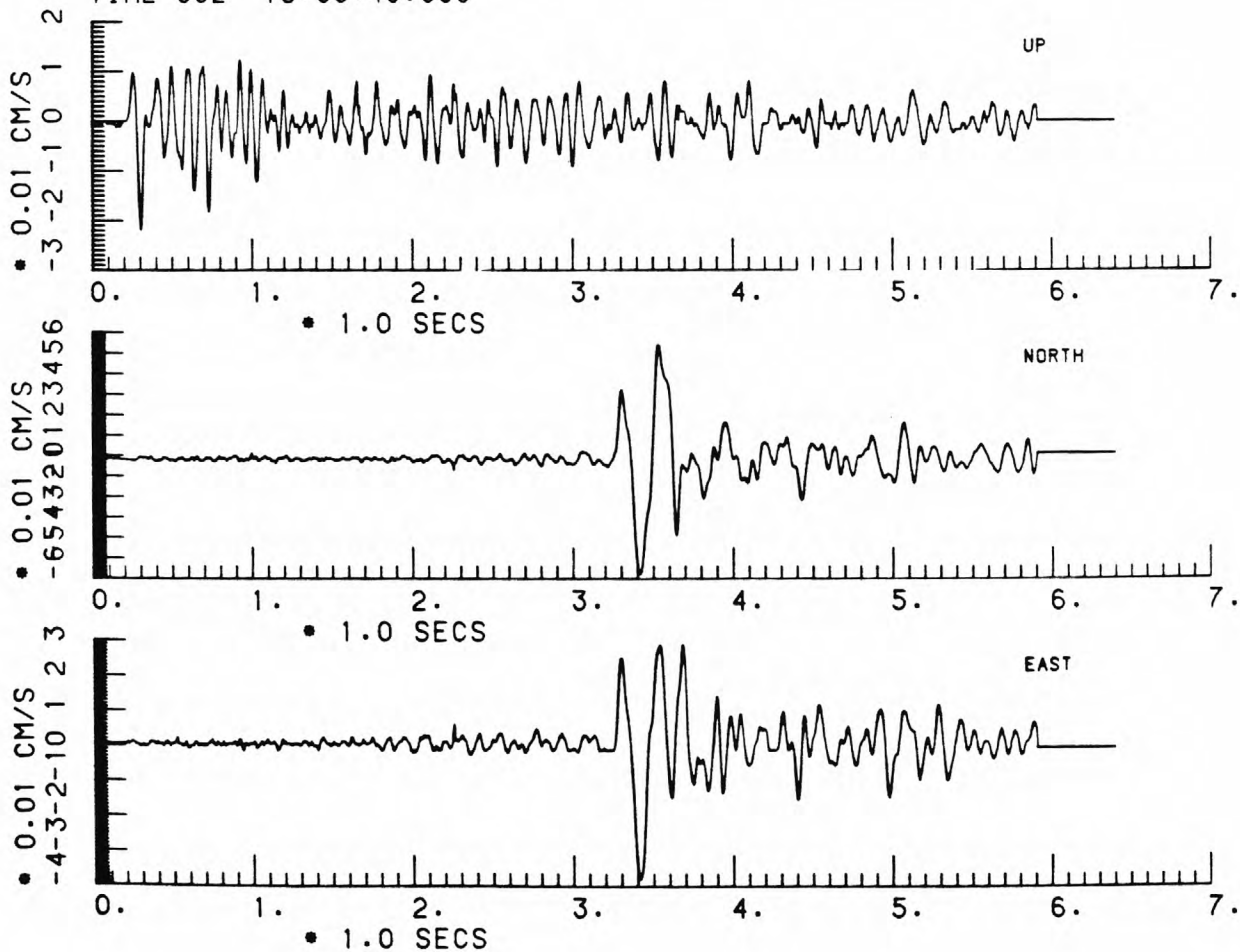
STATION CRK
TIME 302 18:33:51.515



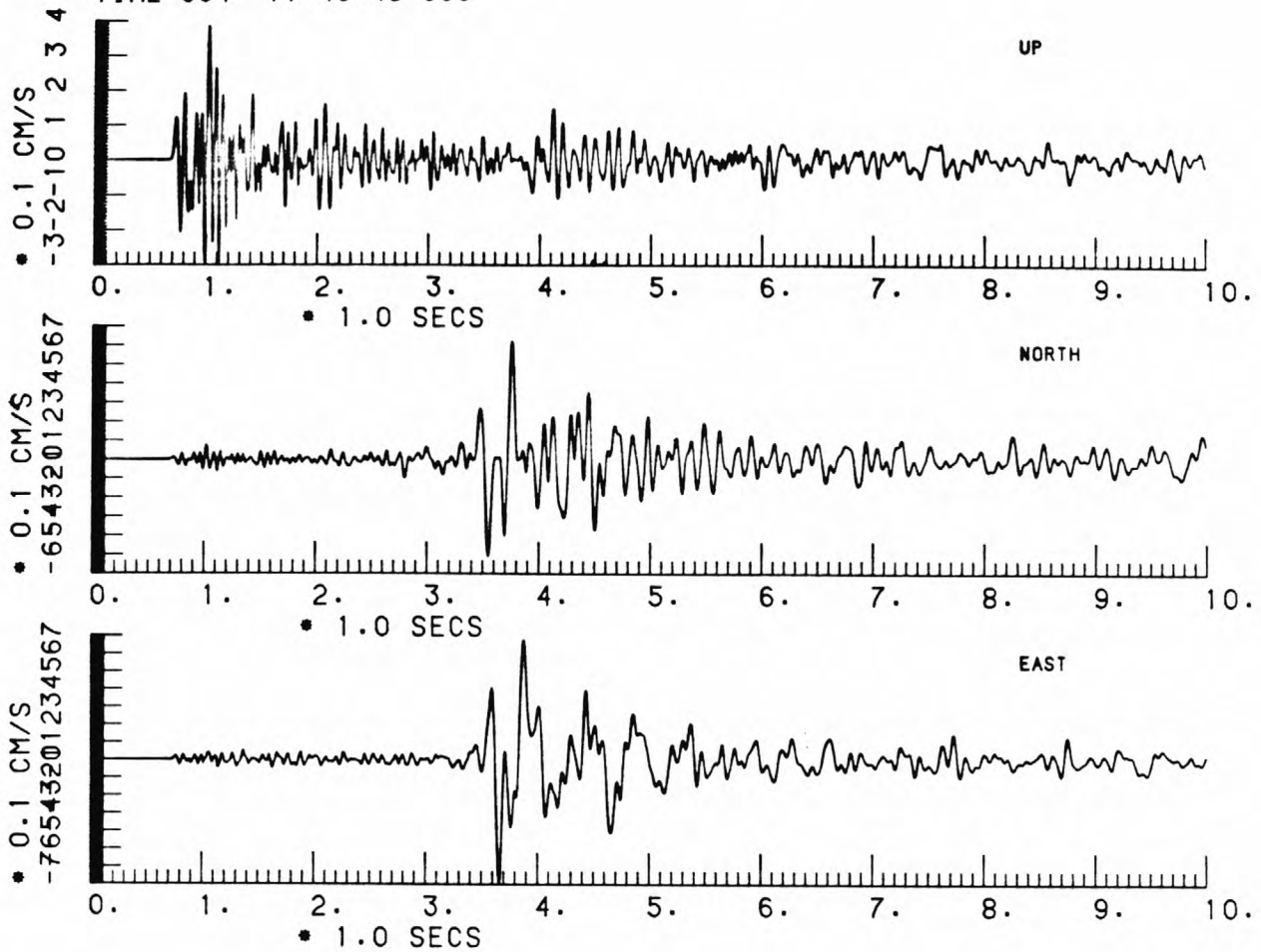
STATION ROB
TIME 302 18:33:48.840



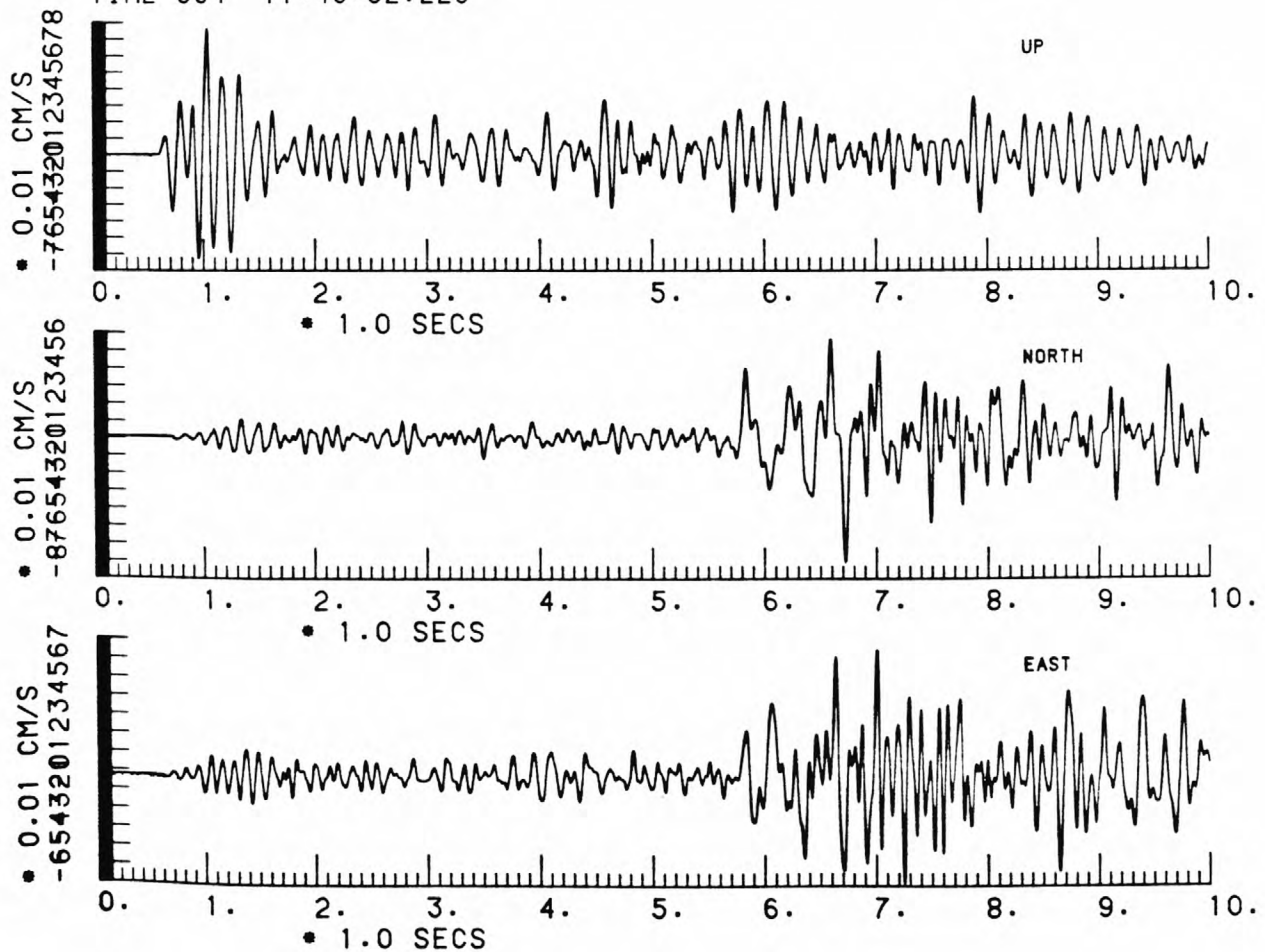
STATION HUS
TIME 302 18:33:49.336



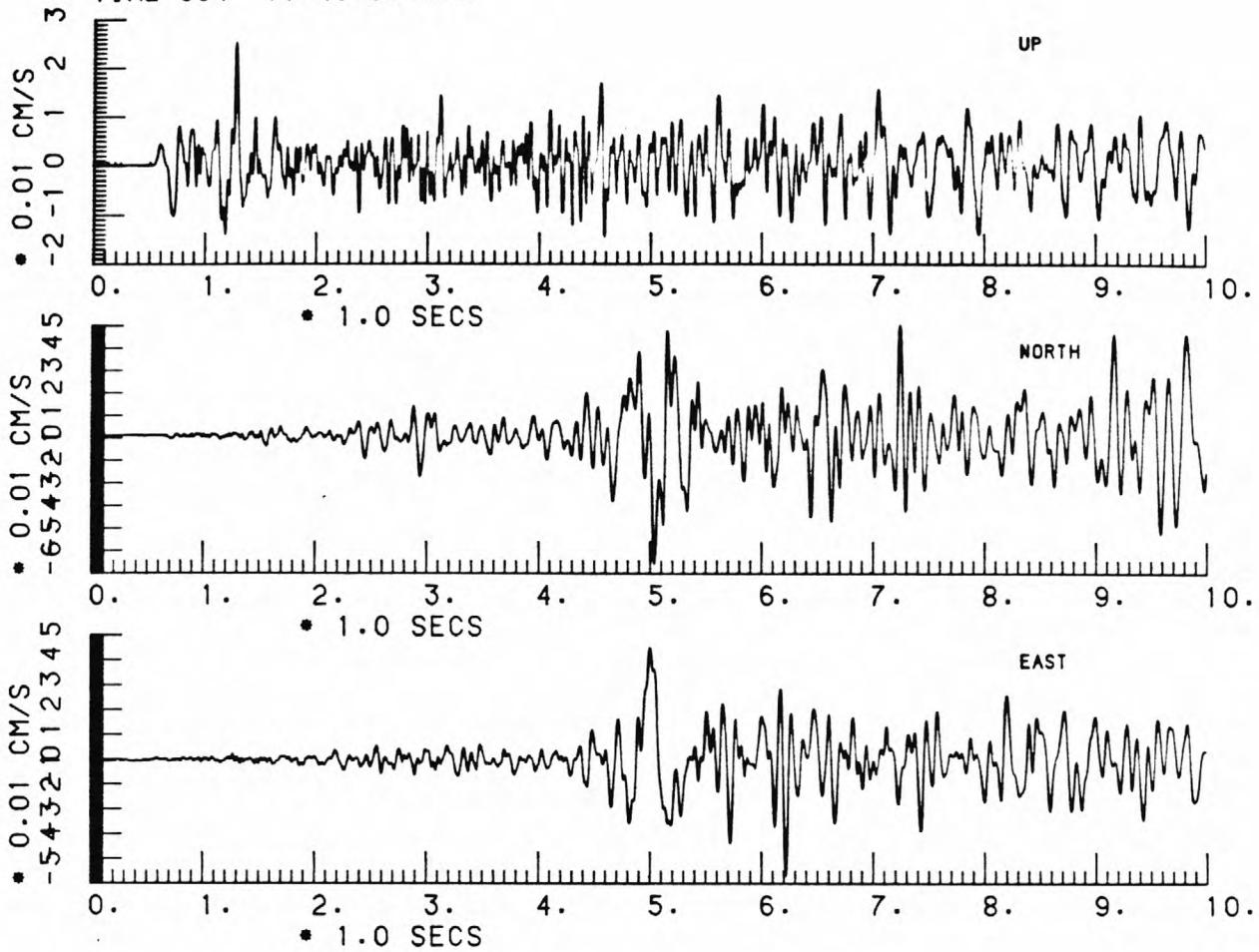
STATION BCS
TIME 304 11:43:48.550



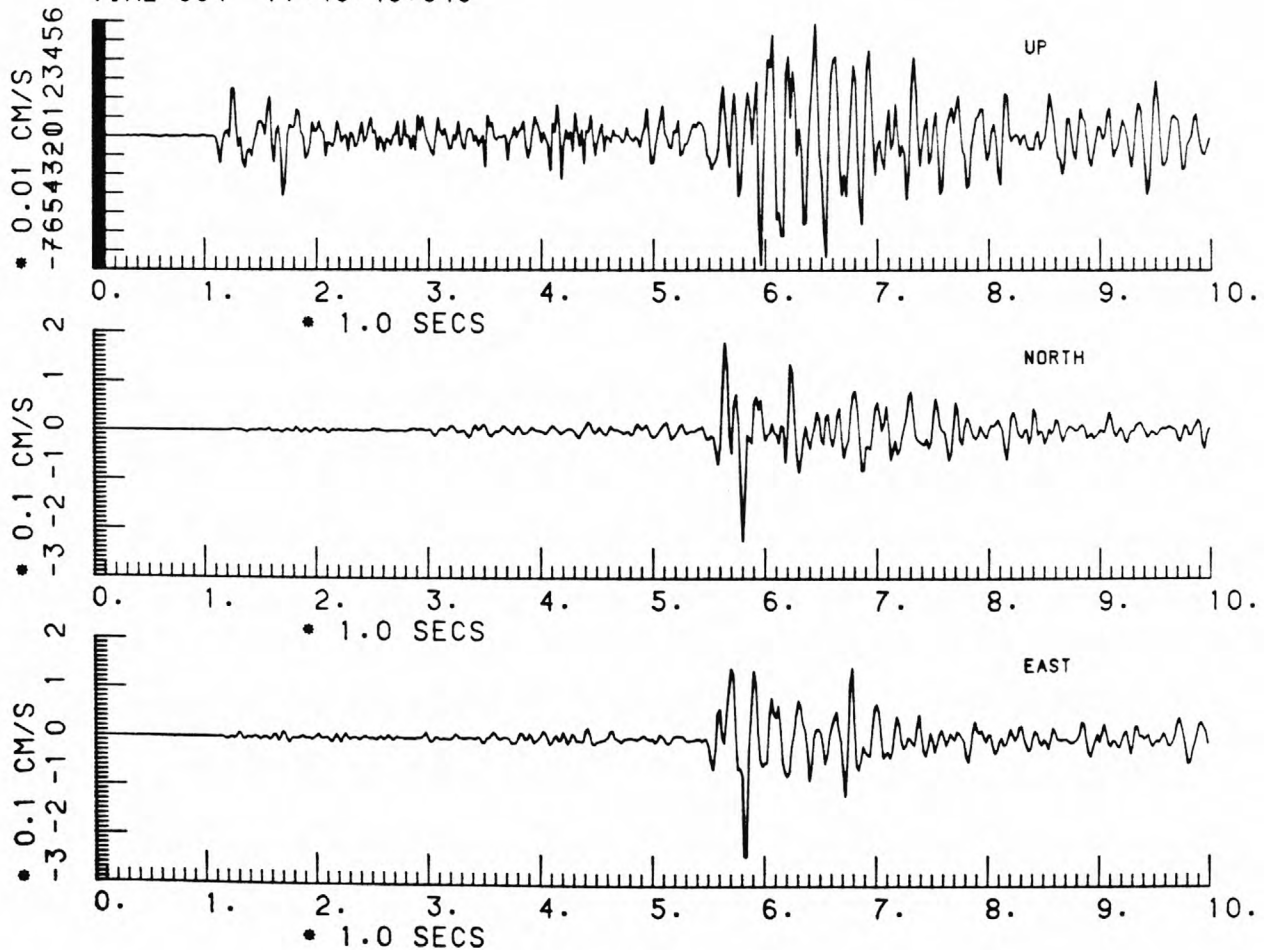
STATION AFB
TIME 304 11:43:52.229

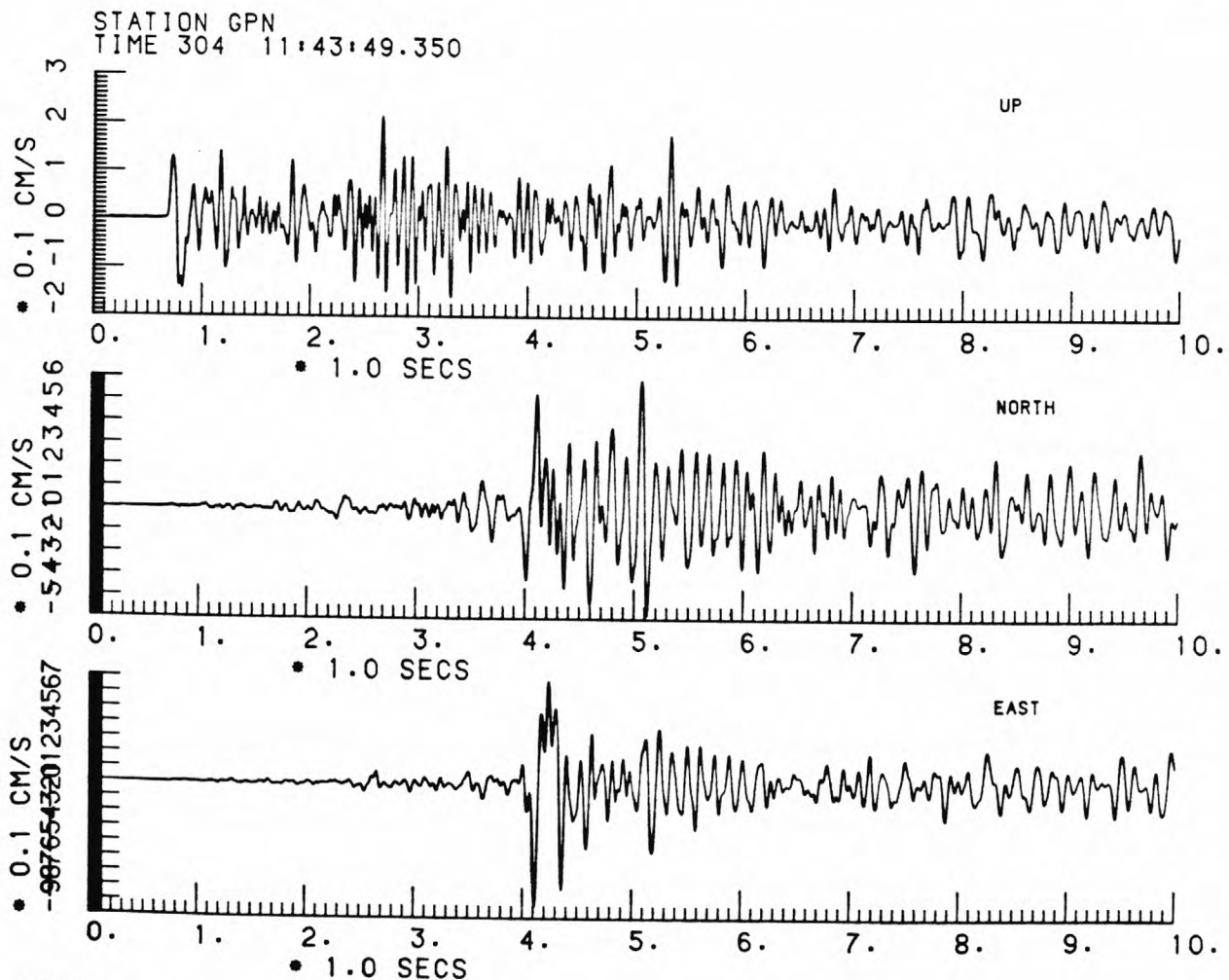
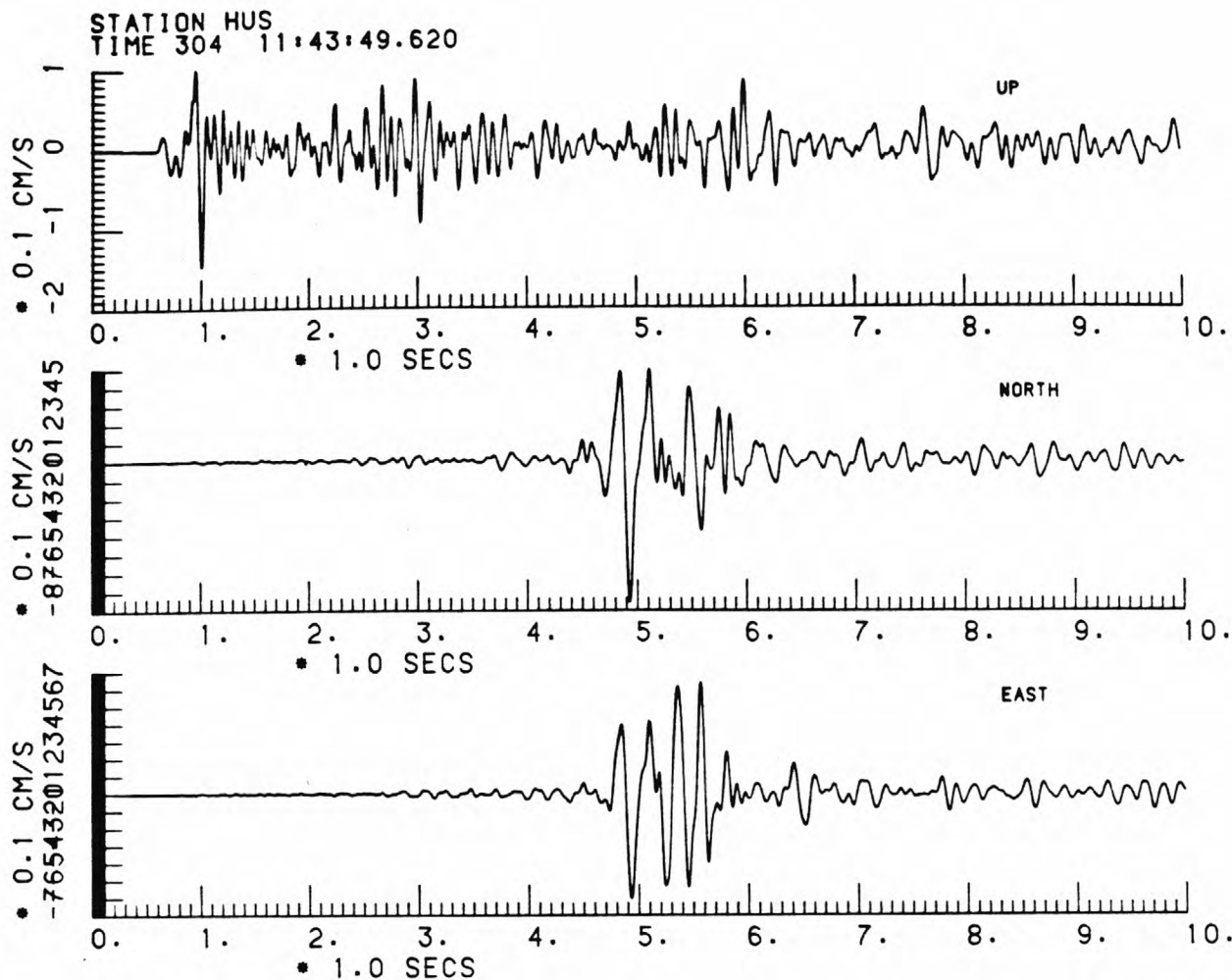


STATION FBR
TIME 304 11:43:50.705

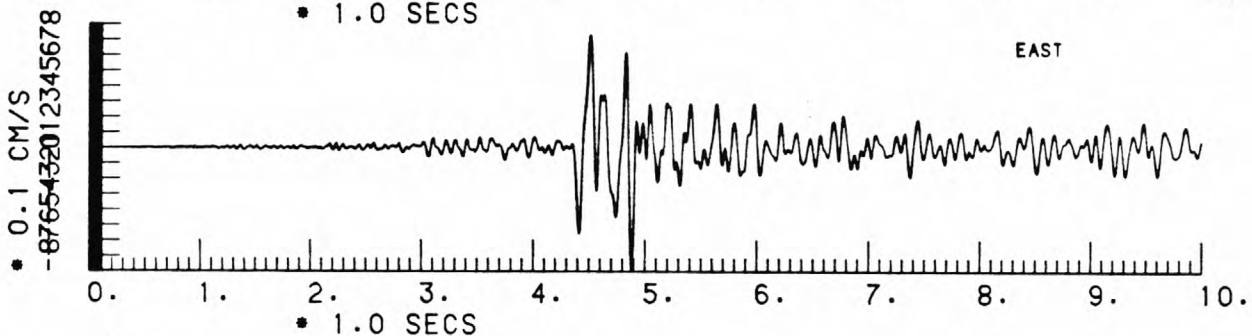
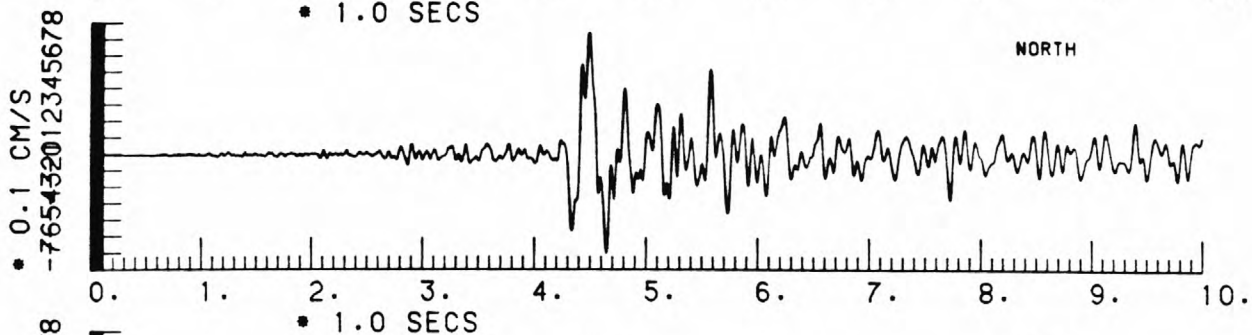
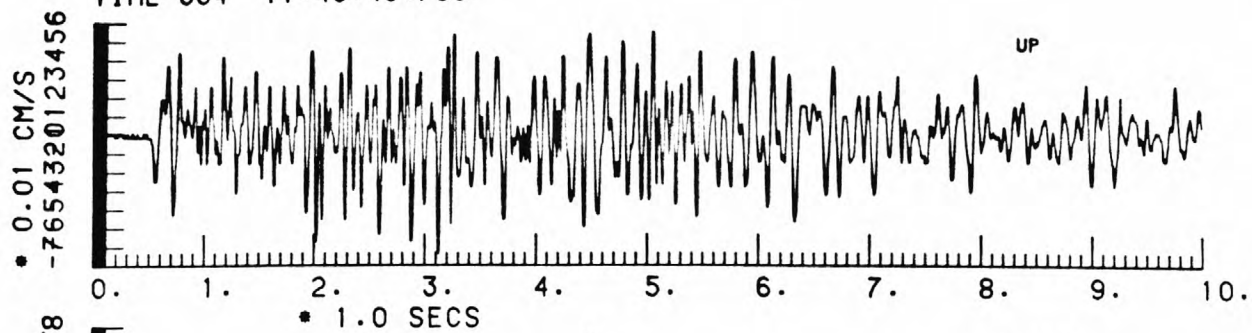


STATION CRK
TIME 304 11:43:43.640

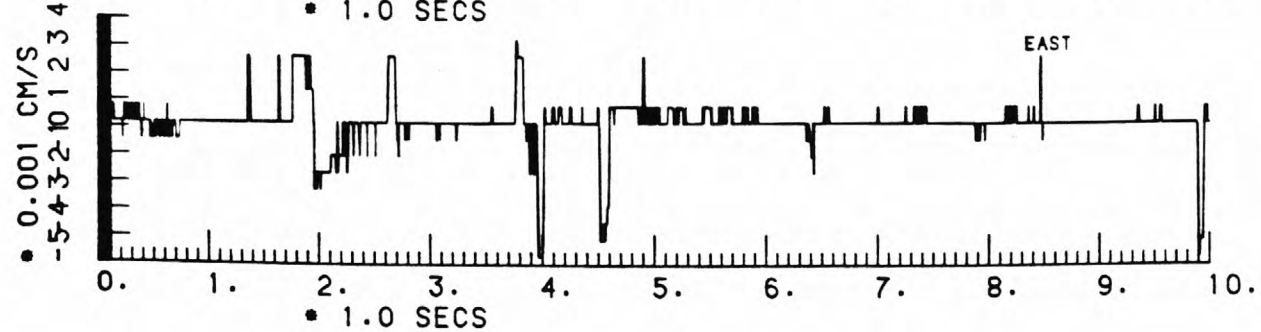
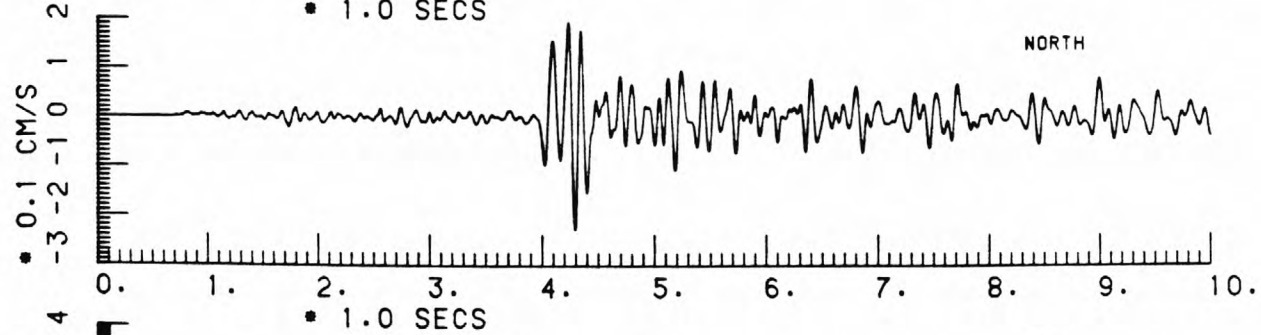
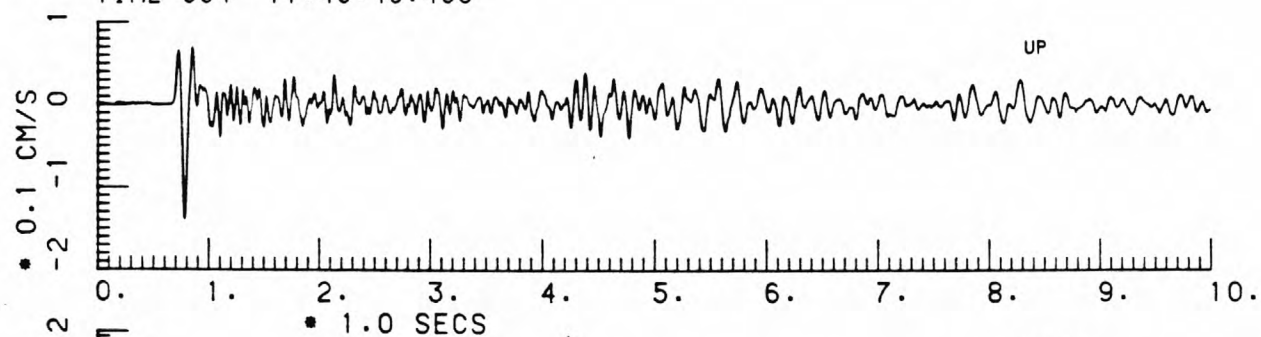




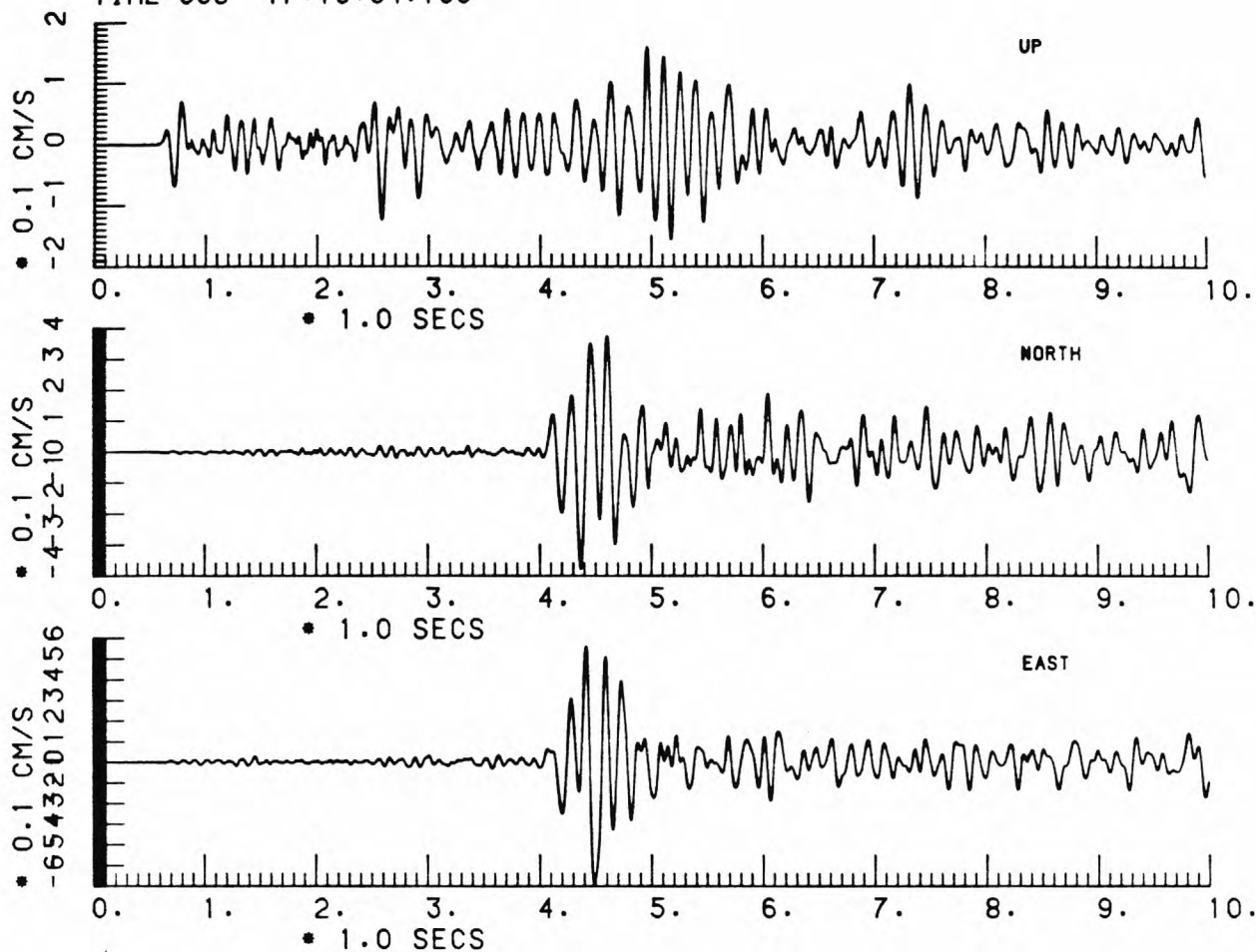
STATION ROB
TIME 304 11:43:49.760



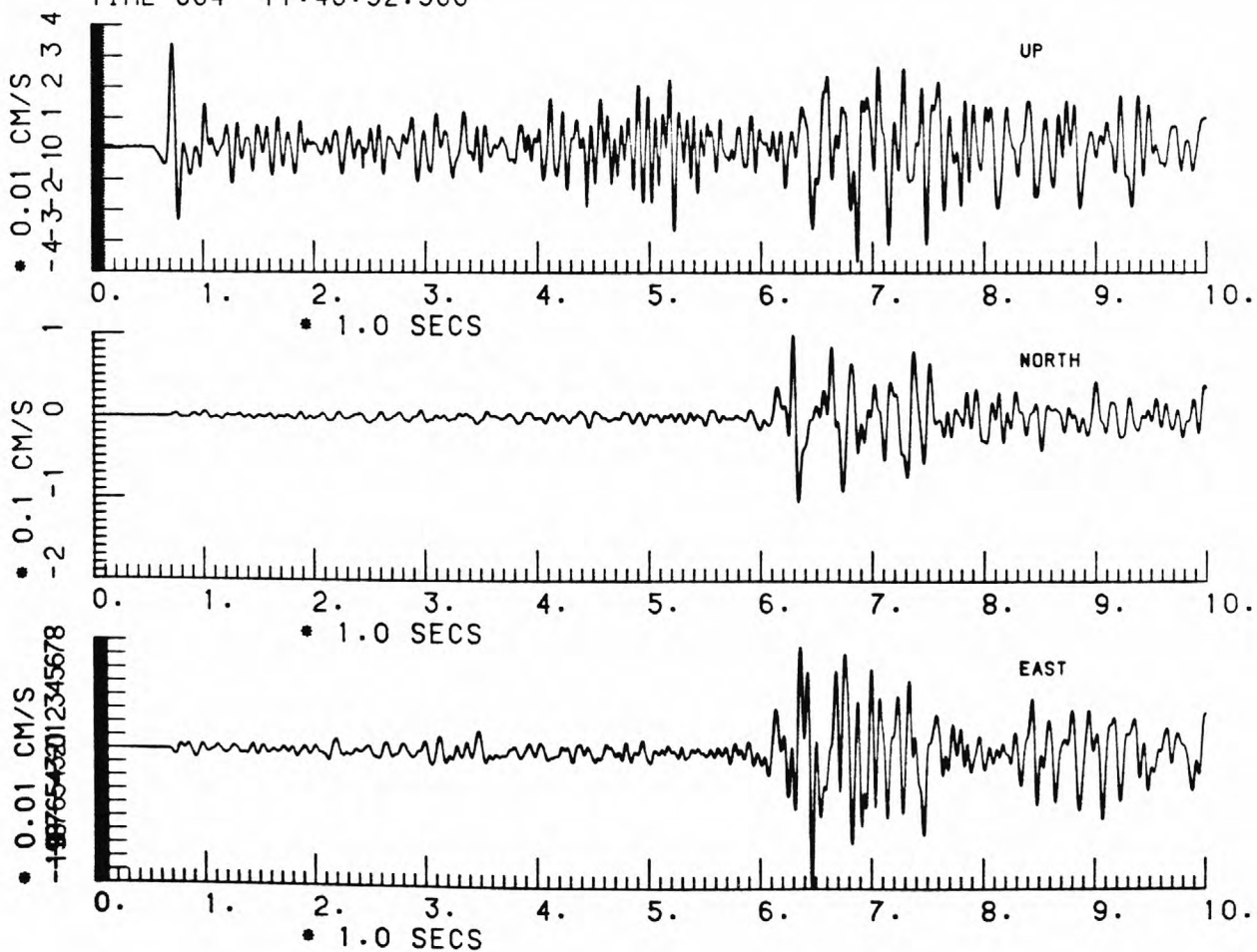
STATION IVC
TIME 304 11:43:49.465



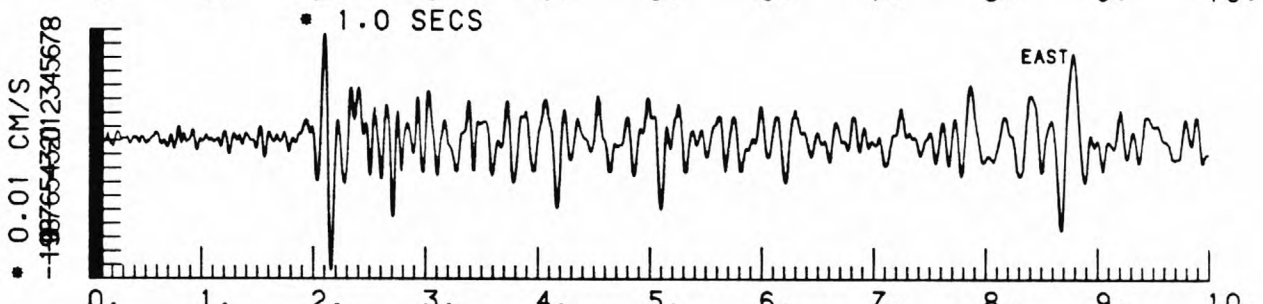
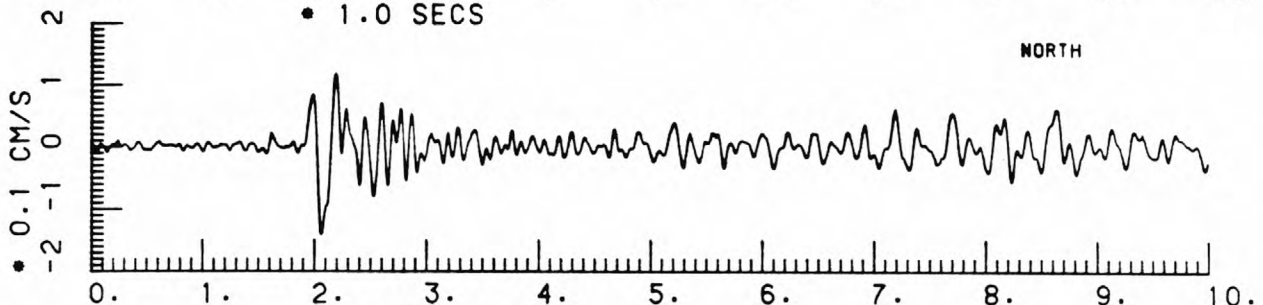
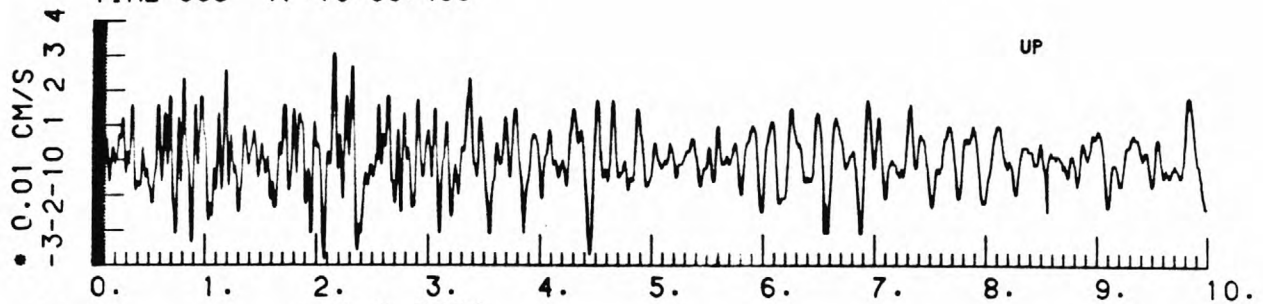
STATION AFB
TIME 308 17:13:34.130



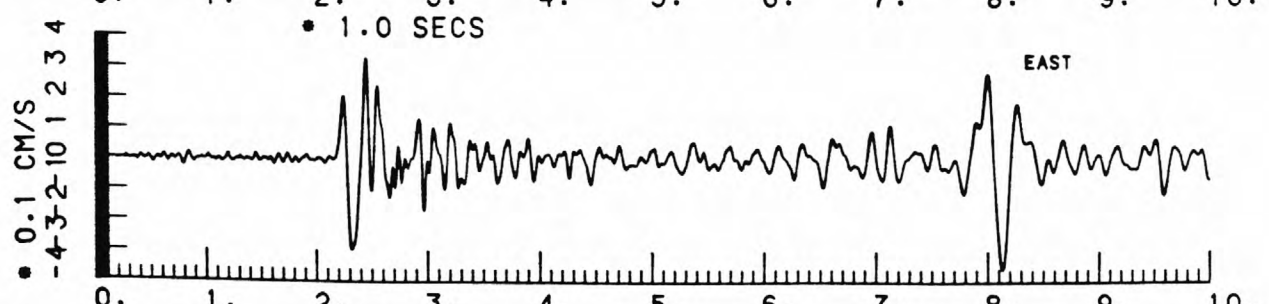
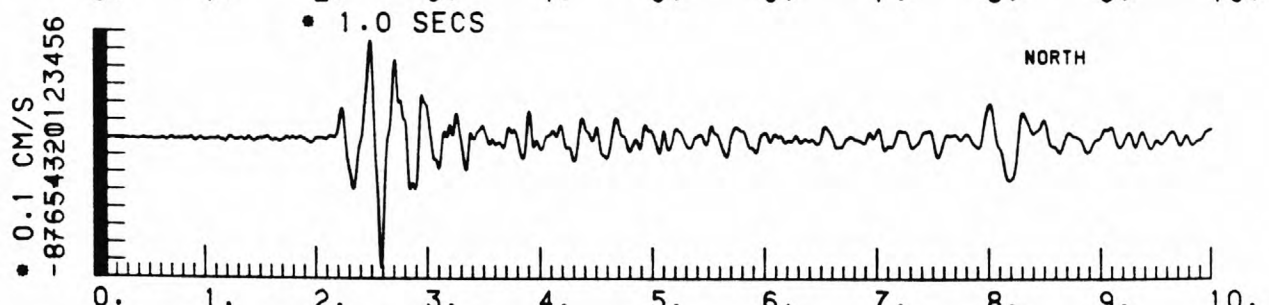
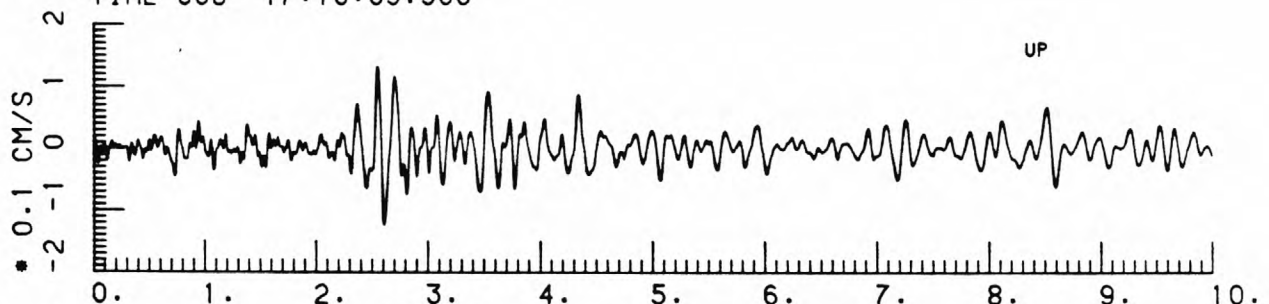
STATION SLD
TIME 304 11:43:52.560



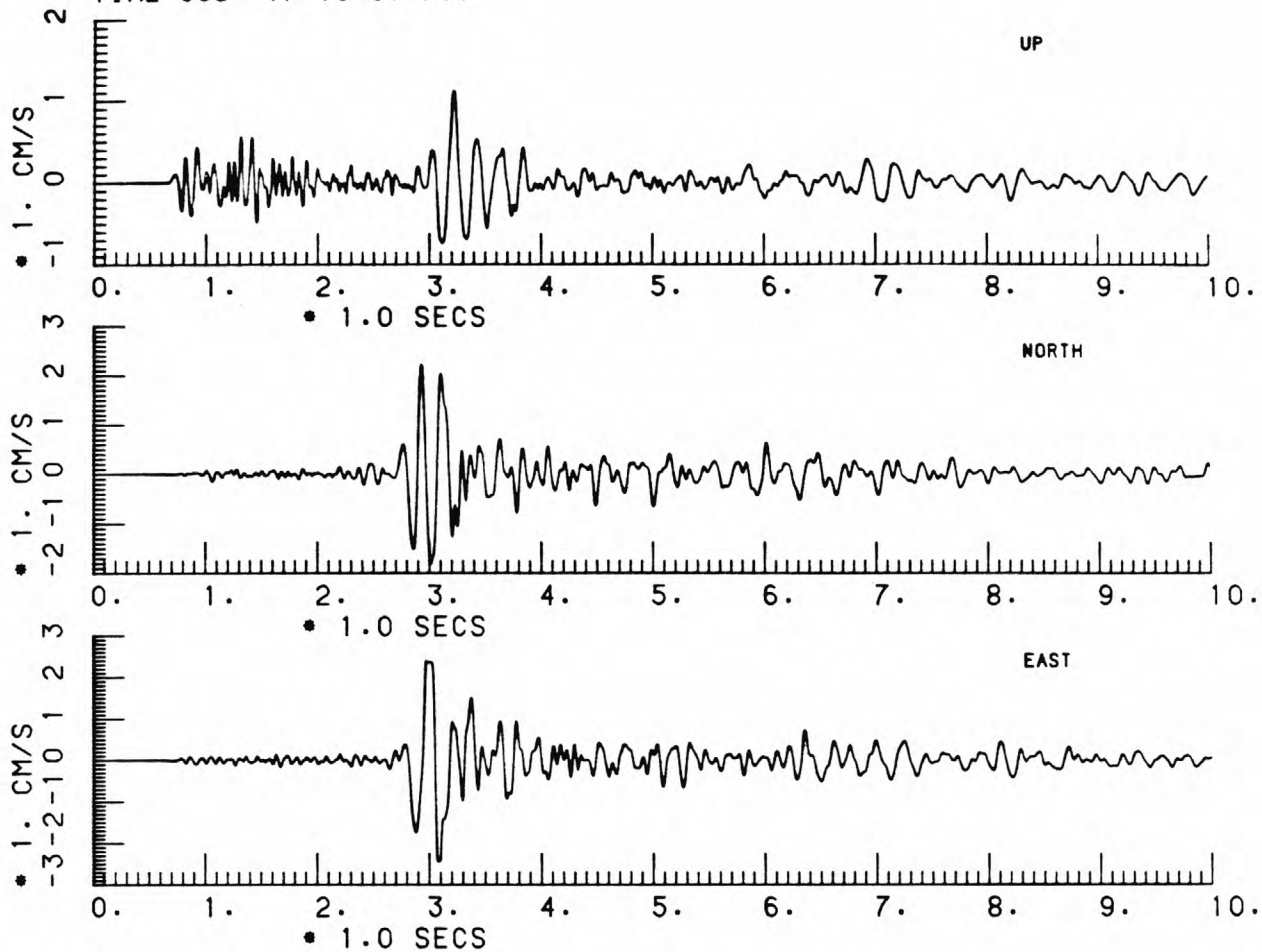
STATION FBR
TIME 308 17:13:36.455



STATION CRK
TIME 308 17:13:35.500



STATION SLD
TIME 308 17:13:31.711



STATION HUS
TIME 308 17:13:37.885

