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STRONG-MOTION EARTHQUAKE RECORDS ON THE 1993 HOKKAIDO-NANSEI-OKI EARTHQUAKE IN PORT AREAS

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1993年北海道南西沖地震の港湾地域における強震記録

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Contents

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要　旨

1993年7月12日22時17分12秒，北海道日本海岸の奥尻島の北方を震源とする気象庁マグニチュード7.8の地震が発生した。気象庁によって，この地震は「平成5年（1993年）北海道南西沖地震」と命名された。本地震の震源位置は，北緯42度46.8分，東経139度11.0分，深さ35kmであった。本地震によって，北海道の小樽，寿都，江差，青森県の深浦で震度Vの強震が記録されたのをはじめ，北海道および東北の各地に激しい地震動がもたらされ多くの被害が発生した。また，これと同時に本地震によって大津波が発生し，奥尻島をはじめ日本海沿岸部の広い範囲で多くの被害ならびに犠牲者が出た。これらの被害により，港湾施設の被害額は全体で約130億円に達した。

1962年より観測が開始され，1963年から記録が得られている港湾地域強震観測網においては，本地震によって10港13地点で強震計が作動し，6港9地点でデジタルデータとしての加速度記録を得ることができた。記録が得られた港湾は，青森港，函館港（地表2箇所・地中基盤・構造物），小樽港，室蘭港，苫小牧港，宮古港の6港9地点であった。浦河港，酒田港の記録については加速度値が小さかったため，八戸港の記録については記録が不鮮明であったため，秋田港の記録については強震計の記録の巻取り部に問題があったため，それぞれ記録をデジタル化することができず加速度の最大値のみの読み取りに留まった。

本資料で報告する記録は，北海道南西沖地震の際に港湾地域強震観測網で観測された9個の強震記録，ならびに7月12日23時4分24秒に発生した余震の記録（3港6地点），7月13日1時1分5秒に発生した余震の記録（3港5地点），および8月8日4時42分44秒に発生した余震の記録（3港5地点）である。報告する内容は，それぞれの記録について，1）未補正加速度記録，2）計器特性による補正加速度記録，3）SMAC-B2型強震計の計器特性と等価なものに換算した補正加速度記録，4）積分により求めた速度・変位，5）応答スペクトル，6）フーリエスペクトル，7）加速度・速度・変位の軌跡，を示している。函館港においては，地中基盤と地表の2層同時観測を行っているので，更に加速度の増幅率を示している。また，本震の全記録を対象として，加速度・速度・変位の距離減衰関係を併せて示している。

キーワード：地震，強震観測，数字化加速度記録，応答スペクトル，港湾

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STRONG-MOTION EARTHQUAKE RECORDS ON THE 1993 HOKKAIDO-NANSEI-OKI EARTHQUAKE IN PORT AREAS

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Synopsis

The 1993 Hokkaido-Nansei-Oki Earthquake of JMA (Japan Meteorological Agency) Magnitude 7.8 occurred in south-west off Hokkaido island in Japan at 22 : 17 : 12, July 12, 1993. This earthquake triggered 13 accelerographs installed at 10 ports in the strong-motion earthquake observation network of the Port and Harbour Research Institute. 9 accelerograms out of 13 were obtained as digital acceleration data of three components observed in port areas in Japan.

This report presents the strong-motion earthquake observation results of this earthquake and the results of preliminary analyses of the 9 digitized acceleration records obtained by this earthquake. The records of the after shock at 23 : 04 : 24, July 12, 1993, at 01 : 01 : 05, July 13, 1993 and at 04 : 42 : 44, August 8, 1993 are also presented. Original acceleration without instrument correction, corrected acceleration, SMAC-B2 equivalent acceleration, integrated velocity and displacement, response spectra, Fourier spectra and loci of accelerations, velocities and displacements are presented as results of preliminary analyses. Amplification of accelerations of the main shock and the after shocks at Hakodate port are also presented because surface ground motion and base motion were observed simultaneously there. Attenuation relations of acceleration, velocity and displacement of the main shock are also presented in this report.

Key Words : Earthquake, Strong-Motion Earthquake Observation, Digitized Acceleration Record, Response Spectra, Port

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1. Introduction

At 22 : 17 : 12, July 12, 1993, an earthquake of JMA Magnitude 7.8 hit northern part of Japan. The epicenter of the earthquake was located in south-west off Hokkaido island in Japan. The earthquake was named as '1993 HOKKAIDO-NANSEI-OKI EARTHQUAKE' by the Japan Meteorological Agency (JMA). This earthquake caused strong ground motion in northern part of Japan and also caused great tsunami which propagated to coast lines of countries around Japan Sea area. Structures were damaged and many lives were lost by the earthquake and the tsunami.

This earthquake triggered 13 accelerographs installed at 10 ports in the strong-motion earthquake observation network of the Port and Harbour Research Institute (PHRI). 9 accelerograms at 6 ports out of 13 accelerograms at 10 ports were obtained as digital acceleration data of three components. Ports where digitized accelerograms were obtained were Hakodate port (two ground surface, in ground and on structure), Otaru port, Muroran port, Tomakomai port, Aomori port and Miyako port. The four of triggered accelerograms, which were obtained at Urakawa port, Hachinohe port, Akita port and Sakata port, were not able to be digitized because of the small acceleration amplitude of analog traces of records at Urakawa port and Sakata port, because of unclear analog traces of records at Hachinohe port and because of the problem of the paper rolling system of the accelerograph at Akita port.

The strong-motion earthquake observation in port areas in Japan was started by PHRI in 1962 and the strong-motion records observed in the network of PHRI have been published as annual reports on strong-motion earthquake records in Japanese port since 1963 [1)–27)]. When great earthquakes occurred, such as 1968 Tokachi-Oki Earthquake, the 1978 Miyagi-Ken-Oki Earthquake, the 1983 Nipponkai-Chubu Earthquake and the 1993 Kushiro-Oki earthquake, etc., special volumes on records obtained by these great earthquakes have been compiled besides annual reports because there exist many accelerograms with large maximum acceleration observed at the same time and it is convenient to use records for investigating damage of structures by compilation[28)–35)].

This report presents the strong-motion earthquake observation results of this earthquake and the following results of preliminary analyses of the 9 digitized acceleration records observed in the network by the main shock at 22 : 17 : 12, July 12, 1993. 6 accelerograms were also obtained by the after shock on July 12, 23 : 04 : 24, 5 accelerograms at 01 : 01 : 05, July 13, 1993 and 5 accelerograms at 04 : 42 : 44, August 8, 1993. The results of observation and preliminary analyses of these records by the after shocks are also presented in this report.

- Original Acceleration
- Corrected Acceleration
- SMAC-B2 Equivalent Acceleration
- Integrated Velocity and Displacement
- Response Spectra and Fourier Spectra of Corrected Acceleration
- Loci of Corrected Accelerations, Integrated Velocities and Displacements

Amplification of accelerations at Hakodate port are also presented as square root of the ratio of power spectrum of surface ground motion to that of base motion because surface ground motion and base motion by the main shock and the after shocks were observed simultaneously at Hakodate port. Attenuation relations of acceleration, velocity and displacement of the main shock are also presented in this report.

Following organizations cooperated with PHRI in the strong-motion earthquake observation in port areas in Japan.

- The Bureau for Ports and Harbours of the Ministry of Transport

- The Regional Bureaus for Port Construction of the Ministry of Transport
- The Port and Harbour Division, The Hokkaido Development Bureau of the Hokkaido Development Agency
- The Okinawa General Office of the Okinawa Development Agency
- The Harbour Bureau of the Tokyo Metropolitan Government
- The Harbour Bureau of the Osaka Municipal Government
- The Harbour Section of the Shizuoka Prefectural Government
- The Harbour Section of the Miyazaki Prefectural Government

2. Earthquakes and Triggered Stations

The 1993 Hokkaido-Nansei-Oki Earthquake at 22 : 17 : 12, July 12, 1993 triggered 13 accelerographs installed at 10 ports in the network of PHRI. The after shock at 23 : 04 : 24, July 12 triggered 6 accelerographs at 3 ports,

Table 1 Details of Earthquakes

Earthquakes	Details	
Main Shock 1993 Hokkaido-Nansei-Oki Earthquake	Date	July 12, 1993
	Time	22:17:12
	Hypocenter	
	Epicenter Region	south west off Hokkaido
	Latitude	42° 46.8' ±0.7' N
	Longitude	139° 11.0' ±2.4' E
	Depth	35.1±3.5 km
	JMA Magnitude	7.8
After Shock	Date	July 12, 1993
	Time	23:04:24
	Hypocenter	
	Epicenter Region	north west off Shakotan Peninsula
	Latitude	43° 01.2' ±0.8' N
	Longitude	139° 27.6' ±2.1' E
	Depth	34.5±3.5 km
	JMA Magnitude	5.4
After Shock	Date	July 13, 1993
	Time	01:01:05
	Hypocenter	
	Epicenter Region	south west off Hokkaido
	Latitude	42° 43.3' ±0.8' N
	Longitude	139° 19.9' ±1.9' E
	Depth	28.6±3.8 km
	JMA Magnitude	6.0
After Shock	Date	August 8, 1993
	Time	04:42:44
	Hypocenter	
	Epicenter Region	south west off Hokkaido
	Latitude	41° 57.3' ±0.6' N
	Longitude	139° 53.3' ±1.1' E
	Depth	23.2±3.1 km
	JMA Magnitude	6.3

the after shock at 01 : 01 : 05, July 13 triggered 5 accelerographs at 3 ports and the after shock at 04 : 42 : 44, August 8 triggered 5 accelerographs at 3 ports. Details of these four earthquakes are listed in **Table 1**[41]. Locations of epicenter of the main shock and the after shocks, which are slightly different from those by the Jishin-Kazan-Gaikyo published by JMA as a prompt report, are shown in **Figure 1**[41),42)].

The triggered stations in the network of PHRI, the maximum of original accelerations without instrument correction and JMA seismic intensity scale of the main shock are shown in Figure 2. Dots in **Figure 2** indicate ports where triggered accelerographs were installed and roman numerals attached to ports represent JMA seismic intensity scale in its area.

All the triggered stations by the main shock are listed in **Table 2** with name of locations, name of stations, type of accelerographs and installation conditions. The name of stations are composed of name of ports, type of accelerographs and installation conditions. As for the type of accelerographs, two kinds of accelerographs have been used in the strong-motion earthquake observation network of PHRI. One is the SMAC-B2 accelerograph of mechanical type and the other is the ERS accelerograph of electrical type equipped with either analog or digital recorder. There are several kinds of the ERS accelerograph and the ERS-G type is the newest type at present. Detailed descriptions of name of stations and accelerographs are reported in the preceding annual reports. Site conditions of the stations, which are listed in the right column of **Table 2** as the number of the Technical Note of the Port and Harbour Research Institute, are also available in the reports on site characteristics[36)-40)].

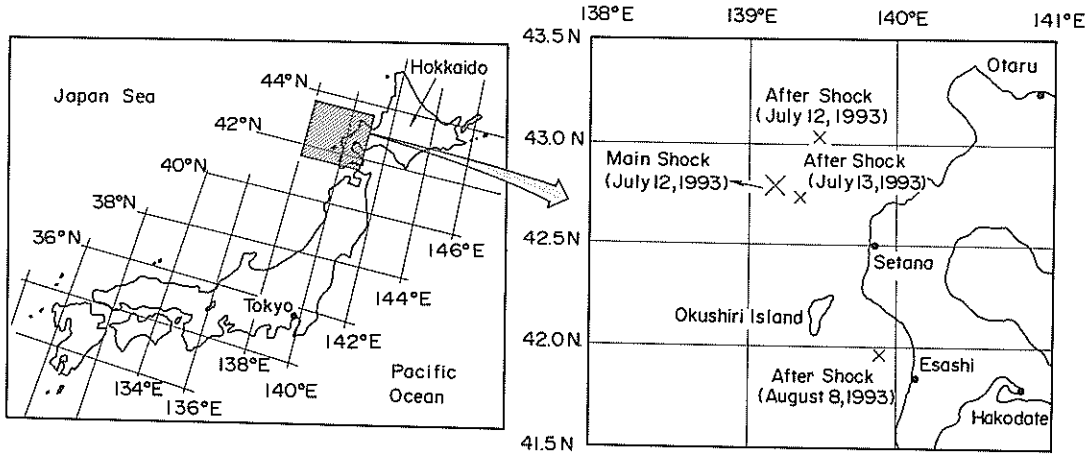

Figure 1 Locations of Epicenter of the Main Shock and the After Shocks

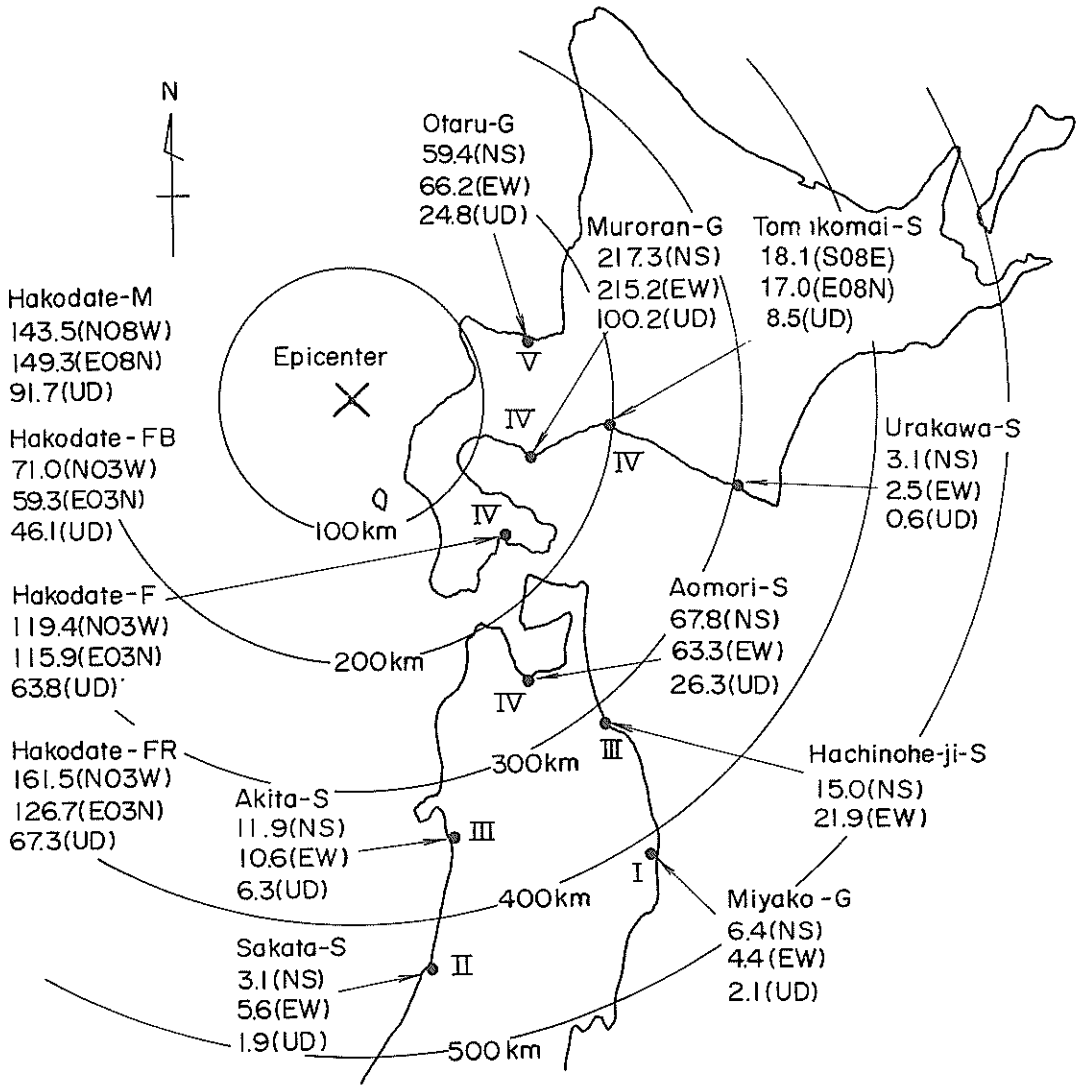

Figure 2 Triggered Stations of PHRI, Maximum Original Acceleration and JMA Seismic Intensity Scale of the Main shock

Table 2 List of Strong-Motion Earthquake Observation Stations of PHRI triggered by the Main Shock

Name of port		Name of station	Type of accelerograph	Installation condition	Ref. No.*
1 Urakawa	1	Urakawa-S	SMAC-B2	ground surface	
2 Tomakomai	2	Tomakomai-S	SMAC-B2	ground surface	107
3 Muroran	3	Muroran-G	ERS-G	ground surface	34, 107
4 Otaru	4	Otaru-G	ERS-G	ground surface	107
5 Hakodate	5	Hakodate-M	ERS-C	ground surface	298
	6	Hakodate-FB	ERS-F	in ground	
	7	Hakodate-F	ERS-F	ground surface	
	8	Hakodate-FR	ERS-F	on structure	
6 Aomori	9	Aomori-S	SMAC-B2	ground surface	107, 156
7 Akita	10	Akita-S	SMAC-B2	ground surface	34, 351
8 Sakata	11	Sakata-S	SMAC-B2	ground surface	34
9 Hachinohe	12	Hachinohe-ji-S	SMAC-B2	ground surface	34, 107
10 Miyako	13	Miyako-G	ERS-G	ground surface	34, 107

* The numbers correspond to those of the Technical Note of the Port and Harbour Research Institute, in which site characteristics of stations are given.

3. Digitization and Preliminary Analyses

Procedures of digitization and preliminary analyses are identical with those described in the preceding annual reports and are not described here.

The results of preliminary analyses of the main shock and the after shocks are summarized in **Table 3** to **Table 6**. Name of stations, record numbers, type of accelerographs, installation conditions, epicentral and hypocentral distance are shown in these tables with the results of preliminary analyses. As results of preliminary analyses, the maximum of each component of original acceleration without instrument correction, SMAC-B2 equivalent acceleration, corrected acceleration, integrated velocity and integrated displacement are presented in these tables. Computer plots of these records are also presented in the later part of this report with response spectra, Fourier spectra and loci of accelerations, velocities and displacements.

Original acceleration used in this report denotes the digitized acceleration data with base line correction and without instrument correction.

SMAC-B2 equivalent acceleration denotes the acceleration data corrected by the frequency characteristics of the SMAC-B2 accelerograph of mechanical type. The SMAC-B2 accelerograph has been a main accelerograph in the network of PHRI and many accelerograms have been recorded by this accelerograph. Because frequency characteristics of the SMAC-B2 accelerographs, however, are not very sensitive in high frequency range in comparison with those of the ERS accelerograph of electrical type, the maximum accelerations of records by the SMAC-B2 accelerograph are tend to be smaller than those by the ERS accelerograph. By this procedure of computing SMAC-B2 equivalent acceleration, the maximum acceleration of all the records, which were recorded by the ERS accelerographs, can be directory compared with those by the SMAC-B2 accelerograph so far.

Corrected acceleration denotes the acceleration data with instrument correction processed through the variable filter which is briefly described in the preceding annual reports. For the records by the SMAC-B2 accelerograph, acceleration components around 10 Hz in frequency domain are amplified by this procedure. For

Table 3 Results of Preliminary Analyses of the Main Shock at 22 : 17 : 12, July 12, 1993

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Aomori-S S - 2523	SMAC-B2	Epicentral Dist. = 253 Hypocentral Dist. = 255	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	67.8 -------- 72.1 17.12 16.18 5.41 6.44	63.3 -------- 68.6 12.78 13.64 4.43 4.32	26.3 -------- 26.5 5.04 5.41 1.95 1.52
Hachinohe-ji-S S - 2524 (Not digitized)	SMAC-B2	Epicentral Dist. = 313 Hypocentral Dist. = 315	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	15.0 -------- -------- -------- -------- -------- --------	21.9 -------- -------- -------- -------- -------- --------	-------- -------- -------- -------- -------- -------- --------
Akita-S S - 2525 (Not digitized)	SMAC-B2	Epicentral Dist. = 345 Hypocentral Dist. = 347	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	11.9 -------- -------- -------- -------- -------- --------	10.6 -------- -------- -------- -------- -------- --------	6.3 -------- -------- -------- -------- -------- --------
Urakawa-S S - 2526 (Not digitized)	SMAC-B2	Epicentral Dist. = 303 Hypocentral Dist. = 305	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	3.1 -------- -------- -------- -------- -------- --------	2.5 -------- -------- -------- -------- -------- --------	0.6 -------- -------- -------- -------- -------- --------

(to be continued)

(Table 3 Continued)

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Sakata-S S - 2527 (Not digitized)	SMAC-B2	Epicentral Dist. = 431 Hypocentral Dist. = 432	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	3.1 -------- -------- -------- -------- -------- --------	5.6 -------- -------- -------- -------- -------- --------	1.9 -------- -------- -------- -------- -------- --------
Tomakomai-S S - 2528	SMAC-B2	Epicentral Dist. = 200 Hypocentral Dist. = 203	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	18.1 S08E -------- 19.9 6.83 11.45 7.42 16.39	17.0 E08N -------- 17.5 6.00 7.21 5.10 7.85	8.5 -------- 8.9 2.87 2.78 1.70 1.55
Hakodate-M M - 1472	ERS-C	Epicentral Dist. = 169 Hypocentral Dist. = 173	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	143.5 N08W 131.0 145.4 33.21 30.57 11.99 12.81	149.3 E08N 134.5 148.8 27.54 28.43 14.85 15.26	91.7 77.1 87.3 21.23 20.00 5.36 5.17
Otaru-G F - 538	ERS-G	Epicentral Dist. = 158 Hypocentral Dist. = 162	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	59.4 33.6 58.4 5.72 8.83 2.92 6.58	66.2 36.8 68.2 5.69 5.54 2.47 5.53	24.8 19.2 24.9 2.32 4.42 1.70 5.54

(to be continued)

(Table 3 Continued)

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Hakodate-FB F - 541	ERS-F (GL-201.0m)	Epicentral Dist. = 169 Hypocentral Dist. = 173	Original Acceleration (cm/s²)	71.0 N03W	59.3 E03N	46.1
			SMAC-B2 Equivalent Acceleration (cm/s²)	64.6	51.5	39.4
			Corrected Acceleration (cm/s²)	71.0	59.8	45.9
			Integrated Velocity - fixed (cm/s)	16.52	14.76	9.82
			Integrated Velocity - variable (cm/s)	14.11	16.43	9.99
			Integrated Displacement - fixed (cm)	5.97	10.15	3.13
			Integrated Displacement - variable (cm)	9.89	12.26	5.52
Hakodate-F F - 545	ERS-F	Epicentral Dist. = 169 Hypocentral Dist. = 173	Original Acceleration (cm/s²)	119.4 N03W	115.9 E03N	63.8
			SMAC-B2 Equivalent Acceleration (cm/s²)	110.9	106.8	51.6
			Corrected Acceleration (cm/s²)	118.3	115.1	61.5
			Integrated Velocity - fixed (cm/s)	26.41	22.80	11.81
			Integrated Velocity - variable (cm/s)	32.48	24.74	12.44
			Integrated Displacement - fixed (cm)	12.49	11.65	3.92
			Integrated Displacement - variable (cm)	15.48	12.59	5.20
Hakodate-FR F - 549	ERS-F (On Structure)	Epicentral Dist. = 169 Hypocentral Dist. = 173	Original Acceleration (cm/s²)	161.5 N03W	126.7 E03N	67.3
			SMAC-B2 Equivalent Acceleration (cm/s²)	136.4	113.3	62.2
			Corrected Acceleration (cm/s²)	157.2	127.6	67.9
			Integrated Velocity - fixed (cm/s)	30.88	22.83	12.30
			Integrated Velocity - variable (cm/s)	34.85	24.36	13.47
			Integrated Displacement - fixed (cm)	13.16	10.75	4.27
			Integrated Displacement - variable (cm)	15.98	11.78	4.54
Muroran-G F - 554	ERS-G	Epicentral Dist. = 153 Hypocentral Dist. = 157	Original Acceleration (cm/s²)	217.3	215.2	100.2
			SMAC-B2 Equivalent Acceleration (cm/s²)	151.9	141.0	70.8
			Corrected Acceleration (cm/s²)	217.6	214.2	100.0
			Integrated Velocity - fixed (cm/s)	12.87	12.95	4.20
			Integrated Velocity - variable (cm/s)	12.85	13.50	5.53
			Integrated Displacement - fixed (cm)	1.84	3.11	2.08
			Integrated Displacement - variable (cm)	6.30	6.58	5.08

(to be continued)

(Table 3 Continued)

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Miyako-G F - 587	ERS-G	Epicentral Dist. = 420 Hypocentral Dist. = 421	Original Acceleration (cm/s²)	6.4	4.4	2.1
			SMAC-B2 Equivalent Acceleration (cm/s²)	5.1	3.1	1.7
			Corrected Acceleration (cm/s²)	6.5	4.2	2.1
			Integrated Velocity - fixed (cm/s)	0.56	0.74	0.58
			Integrated Velocity - variable (cm/s)	1.27	0.99	1.41
			Integrated Displacement - fixed (cm)	0.56	0.46	0.67
			Integrated Displacement - variable (cm)	1.82	1.30	2.29

(Remark)

Original Acceleration : Digitized acceleration without instrument correction
SMAC-B2 Equivalent Acceleration : Acceleration corrected by SMAC-B2 equivalent filter
Corrected Acceleration : Acceleration with instrument correction
Integrated Velocity - fixed : Velocity integrated by fixed filter (cut-off frequency is constant)
Integrated Velocity - variable : Velocity integrated by variable filter (cut-off frequency is varied)
Integrated Displacement - fixed : Displacement integrated by fixed filter (cut-off frequency is constant)
Integrated Displacement - variable : Displacement integrated by variable filter (cut-off frequency is varied)

Table 4 Results of Preliminary Analyses of the After Shock at 23 : 04 : 24, July 12, 1993

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Hakodate-M M - 1473	ERS-C Ground Surface	Epicentral Dist. = 173 Hypocentral Dist. = 176	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	16.9 N08W 14.7 16.4 2.12 1.31 0.64 0.18	15.0 E08N 12.5 14.9 1.06 0.86 0.41 0.10	5.8 4.4 5.6 0.90 0.55 0.47 0.06
Otaru-G F - 539	ERS-G Ground Surface	Epicentral Dist. = 130 Hypocentral Dist. = 134	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	10.7 4.3 10.9 0.26 0.22 0.06 0.03	15.1 7.0 15.0 0.47 0.38 0.05 0.02	3.2 1.7 3.4 0.18 0.12 0.03 0.01
Hakodate-FB F - 542	ERS-F GL-201.0m	Epicentral Dist. = 173 Hypocentral Dist. = 176	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	5.5 N03W 3.9 5.3 0.43 0.47 0.11 0.08	5.6 E03N 4.9 5.6 0.44 0.44 0.16 0.15	3.6 2.6 3.4 0.34 0.34 0.10 0.07
Hakodate-F F - 546	ERS-F Ground Surface	Epicentral Dist. = 173 Hypocentral Dist. = 176	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	12.4 N03W 9.9 12.5 1.09 0.96 0.34 0.27	16.4 E03N 13.5 16.5 1.31 1.10 0.27 0.17	4.6 3.8 4.5 0.42 0.41 0.12 0.08

(to be continued)

(Table 4 Continued)

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Hakodate-FR F - 550	ERS-F On Structure	Epicentral Dist. = 173 Hypocentral Dist. = 176	Original Acceleration (cm/s²)	16.6 N03W	11.3 E03N	4.1
			SMAC-B2 Equivalent Acceleration (cm/s²)	14.7	10.7	3.5
			Corrected Acceleration (cm/s²)	16.8	11.5	4.2
			Integrated Velocity - fixed (cm/s)	1.44	1.07	0.49
			Integrated Velocity - variable (cm/s)	1.24	1.02	0.39
			Integrated Displacement - fixed (cm)	0.34	0.21	0.12
			Integrated Displacement - variable (cm)	0.26	0.14	0.08
Muroran-G F - 560	ERS-G Ground Surface	Epicentral Dist. = 144 Hypocentral Dist. = 148	Original Acceleration (cm/s²)	8.2	13.1	5.7
			SMAC-B2 Equivalent Acceleration (cm/s²)	6.0	8.8	3.4
			Corrected Acceleration (cm/s²)	8.2	12.9	5.6
			Integrated Velocity - fixed (cm/s)	0.39	0.72	0.26
			Integrated Velocity - variable (cm/s)	0.37	0.70	0.22
			Integrated Displacement - fixed (cm)	0.04	0.06	0.03
			Integrated Displacement - variable (cm)	0.03	0.05	0.01

(Remark)

Original Acceleration : Digitized acceleration with no instrument correction
SMAC-B2 Equivalent Acceleration : Acceleration corrected by SMAC-B2 equivalent filter
Corrected Acceleration : Acceleration with instrument correction
Integrated Velocity - fixed : Velocity integrated by fixed filter (cut-off frequency is constant)
Integrated Velocity - variable : Velocity integrated by variable filter (cut-off frequency is varied)
Integrated Displacement - fixed : Displacement integrated by fixed filter (cut-off frequency is constant)
Integrated Displacement - variable : Displacement integrated by variable filter (cut-off frequency is varied)

Table 5 Results of Preliminary Analyses of the After Shock at 01 : 01 : 05, July 13, 1993

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Otaru-G F - 540	ERS-G Ground Surface	Epicentral Dist. = 148 Hypocentral Dist. = 151	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	8.4 2.9 8.6 0.28 0.22 0.11 0.05	9.1 4.7 9.6 0.23 0.22 0.08 0.04	3.1 1.6 3.1 0.24 0.15 0.07 0.02
Hakodate-FB F - 544	ERS-F GL-201.0m	Epicentral Dist. = 156 Hypocentral Dist. = 158	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	3.0 N03W 2.5 3.0 1.09 0.97 0.54 0.51	3.0 E03N 2.9 2.9 0.80 0.69 0.48 0.47	3.1 2.5 3.0 0.58 0.58 0.19 0.15
Hakodate-F F - 548	ERS-F Ground Surface	Epicentral Dist. = 156 Hypocentral Dist. = 158	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	7.8 N03W 6.1 7.9 1.41 1.31 0.69 0.53	6.6 E03N 5.4 6.5 1.76 1.71 1.04 0.92	3.7 3.0 3.7 0.67 0.62 0.30 0.18
Hakodate-FR F - 552	ERS-F On Structure	Epicentral Dist. = 156 Hypocentral Dist. = 158	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	9.3 N03W 7.9 9.2 1.58 1.51 0.75 0.51	6.1 E03N 5.3 5.8 1.85 1.57 1.04 0.83	3.4 2.9 3.1 0.79 0.62 0.32 0.17

(to be continued)

(Table 5 Continued)

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Muroran-G F - 568	ERS-G Ground Surface	Epicentral Dist. = 140 Hypocentral Dist. = 143	Original Acceleration (cm/s^2)	29.4	37.9	15.9
			SMAC-B2 Equivalent Acceleration (cm/s^2)	18.3	21.9	10.5
			Corrected Acceleration (cm/s^2)	29.2	37.0	15.6
			Integrated Velocity - fixed (cm/s)	1.30	1.69	0.69
			Integrated Velocity - variable (cm/s)	1.18	1.62	0.64
			Integrated Displacement - fixed (cm)	0.28	0.27	0.17
			Integrated Displacement - variable (cm)	0.19	0.19	0.08

(Remark)

Original Acceleration : Digitized acceleration with no instrument correction
SMAC-B2 Equivalent Acceleration : Acceleration corrected by SMAC-B2 equivalent filter
Corrected Acceleration : Acceleration with instrument correction
Integrated Velocity - fixed : Velocity integrated by fixed filter (cut-off frequency is constant)
Integrated Velocity - variable : Velocity integrated by variable filter (cut-off frequency is varied)
Integrated Displacement - fixed : Displacement integrated by fixed filter (cut-off frequency is constant)
Integrated Displacement - variable : Displacement integrated by variable filter (cut-off frequency is varied)

Table 6 Results of Preliminary Analyses of the After Shock at 04 : 42 : 44, August 8, 1993

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Aomori-S S - 2530	SMAC-B2 Ground Surface	Epicentral Dist. = 145 Hypocentral Dist. = 147	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	20.9 ------ 22.2 5.39 4.76 1.54 1.30	15.8 ------ 17.3 3.12 3.00 1.04 0.61	9.2 ------ 9.1 1.68 1.28 0.76 0.26
Tomakomai-S S - 2531	SMAC-B2 Ground Surface	Epicentral Dist. = 161 Hypocentral Dist. = 163	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	7.1 S08E ------ 6.9 1.58 1.04 0.92 0.27	12.7 E08N ------ 13.3 1.61 1.44 0.95 0.28	4.8 ------ 3.7 1.00 0.34 1.28 0.07
Hakodate-M M - 1476	ERS-C Ground Surface	Epicentral Dist. = 73 Hypocentral Dist. = 76	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	51.8 N03W 35.3 52.7 3.71 3.78 1.07 0.64	56.1 E03N 40.2 55.0 3.85 3.28 1.33 0.82	30.6 16.3 32.3 2.26 1.83 0.76 0.32
Hakodate-F F - 603	ERS-F Ground Surface	Epicentral Dist. = 73 Hypocentral Dist. = 76	Original Acceleration (cm/s²) SMAC-B2 Equivalent Acceleration (cm/s²) Corrected Acceleration (cm/s²) Integrated Velocity - fixed (cm/s) Integrated Velocity - variable (cm/s) Integrated Displacement - fixed (cm) Integrated Displacement - variable (cm)	47.1 N03W 39.9 47.2 4.21 4.61 1.85 1.80	50.4 E03N 45.8 50.2 4.10 3.73 1.52 1.42	20.5 14.1 20.3 1.73 1.75 0.41 0.31

(to be continued)

(Table 6 Continued)

Name of Station & Number of Record	Type of Accelerograph	Distance (km)	Type of Data	Maximum of N-S Component	Maximum of E-W Component	Maximum of U-D Component
Hakodate-FR F - 604	ERS-F On Structure	Epicentral Dist. = 73 Hypocentral Dist. = 76	Original Acceleration (cm/s²)	49.4 N03W	45.6 E03N	16.0
			SMAC-B2 Equivalent Acceleration (cm/s²)	40.5	41.4	14.9
			Corrected Acceleration (cm/s²)	49.4	45.4	16.3
			Integrated Velocity - fixed (cm/s)	4.62	4.97	1.70
			Integrated Velocity - variable (cm/s)	4.24	4.85	1.67
			Integrated Displacement - fixed (cm)	1.94	1.55	0.44
			Integrated Displacement - variable (cm)	1.84	1.35	0.36

(Remark)

Original Acceleration : Digitized acceleration with no instrument correction
SMAC-B2 Equivalent Acceleration : Acceleration corrected by SMAC-B2 equivalent filter
Corrected Acceleration : Acceleration with instrument correction
Integrated Velocity - fixed : Velocity integrated by fixed filter (cut-off frequency is constant)
Integrated Velocity - variable : Velocity integrated by variable filter (cut-off frequency is varied)
Integrated Displacement - fixed : Displacement integrated by fixed filter (cut-off frequency is constant)
Integrated Displacement - variable : Displacement integrated by variable filter (cut-off frequency is varied)

the records by the ERS accelerograph of earlier type (ERS-B, -C and -D type), acceleration is slightly amplified in accordance with frequency. For the records by the recent type of the ERS accelerograph (ERS-F and -G type), phase characteristics of records are only corrected.

Integrations for computing velocities and displacements are conducted by using two types of low cut filter. One is the fixed filter of which cut off frequency is fixed and the other is the variable filter of which cut off frequency is varied according to the content of low frequency components of records. Detailed descriptions of these filtering procedures are reported in the preceding annual reports.

Response spectra, Fourier spectra and loci of corrected accelerations, velocities and displacements of each record are also presented with the computer plots of time history data of accelerations, velocities and displacements. As for response spectra, acceleration ratio of absolute acceleration response to the maximum acceleration of the input motion, absolute acceleration response, relative velocity response and relative displacement response are presented. As for loci, corrected accelerations and integrated velocities and displacements computed with the variable filter are used for plots.

4. Attenuation Relations

Attenuation relations of peak ground acceleration of corrected acceleration, peak ground velocity and displacement computed with the variable filter are shown in **Figure 3** to **Figure 5.** Results of horizontal and vertical motions are shown together in these figures. As for horizontal motion, larger of two horizontal components is used. There exist clear attenuation relations in both horizontal and vertical acceleration data. Site characteristics of the stations, such as shear wave velocity profile, are not considered here.

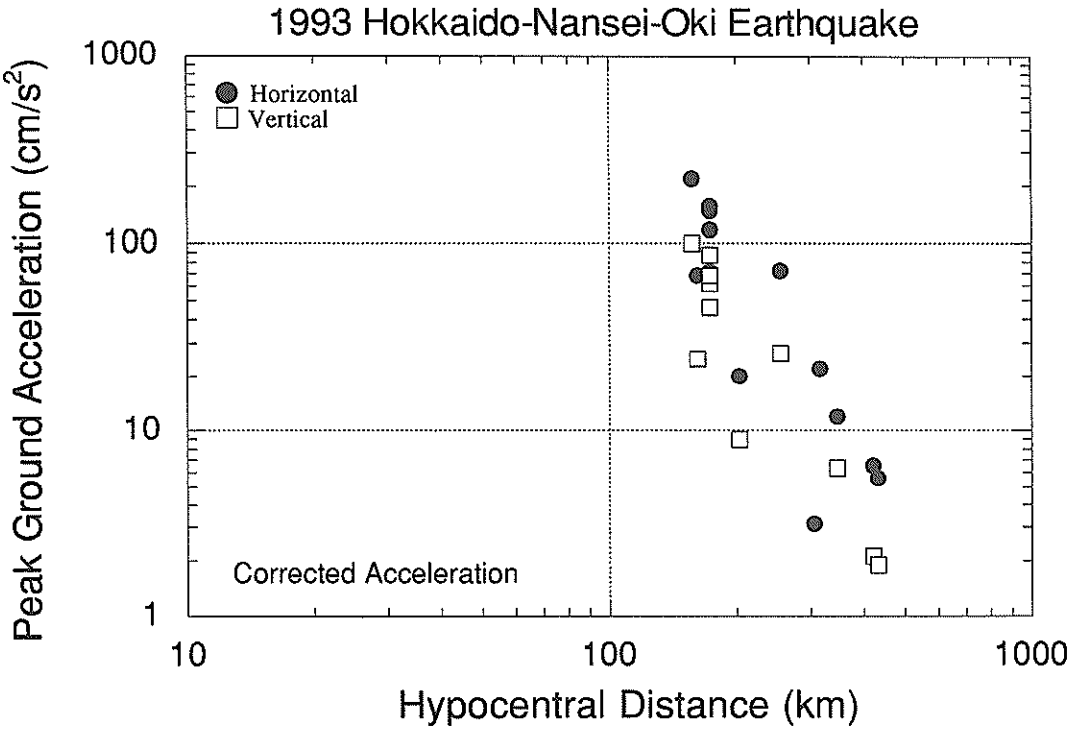

Figure 3 Attenuation Relation of Peak Ground Acceleratrion

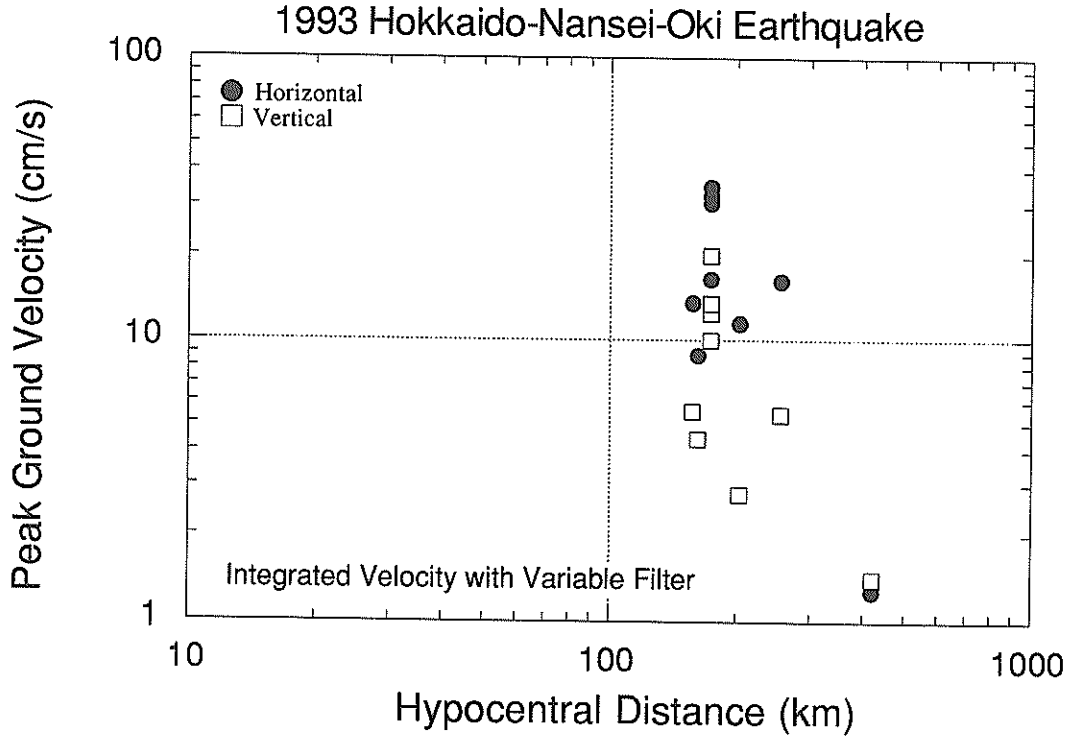

Figure 4 Attenuation Relation of Peak Ground Velocity

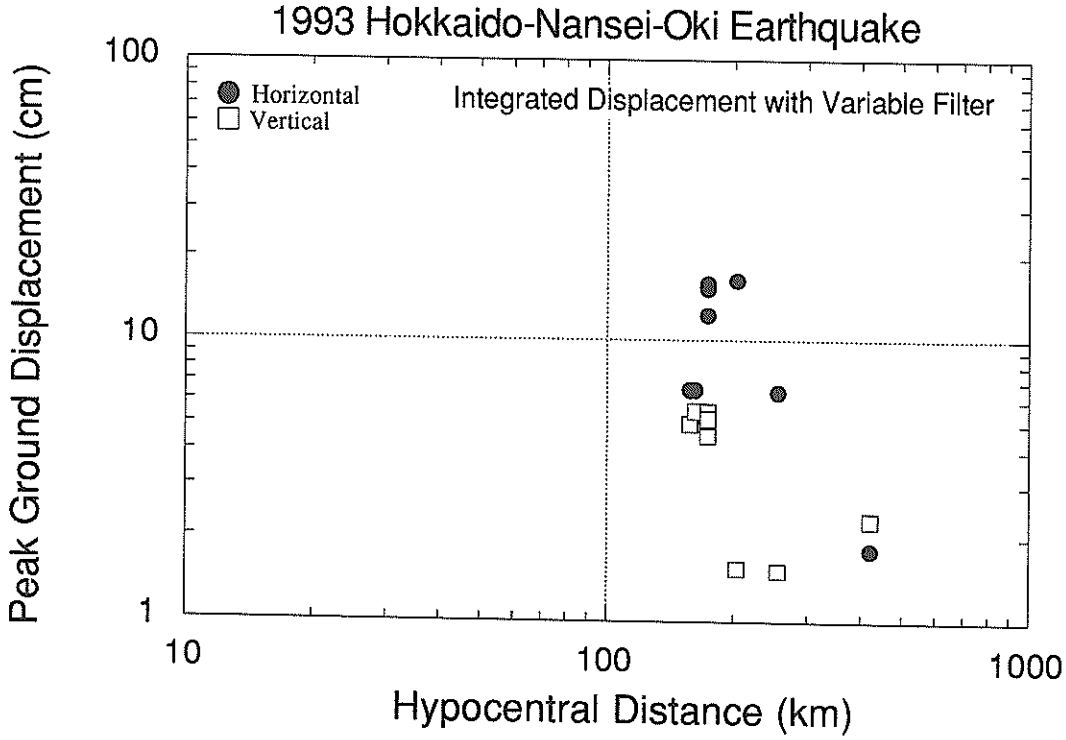

Figure 5 Attenuation Relation of Peak Ground Displacement

5. Amplification of Acceleration at Hakodate Port

Surface ground motion and base motion of the main shock and the after shocks were observed simultaneously at Hakodate port. Amplification of accelerations, which are computed by square root of the ratio of power spectrum of surface ground motion to that of base motion, are shown in **Figure 6** to **Figure 8**. Amplification of the main shock becomes slightly smaller than those of the after shocks and frequency at peak amplification is almost identical.

Amplification of accelerations by the after shock on August 8 are not presented here because Hakodate-FB station, which were installed at the depth of ground level -201m, did not work because of the problem of power supply.

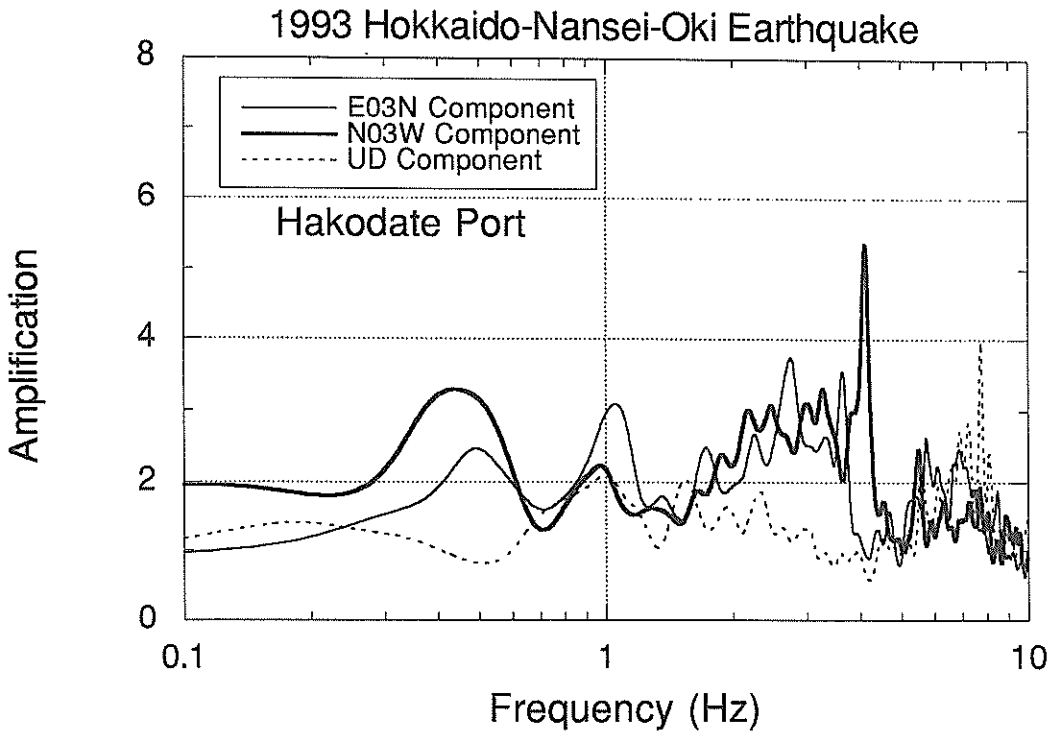

Figure 6 Amplification of Acceleration at Hakodate Port (Main Shock on July 12)

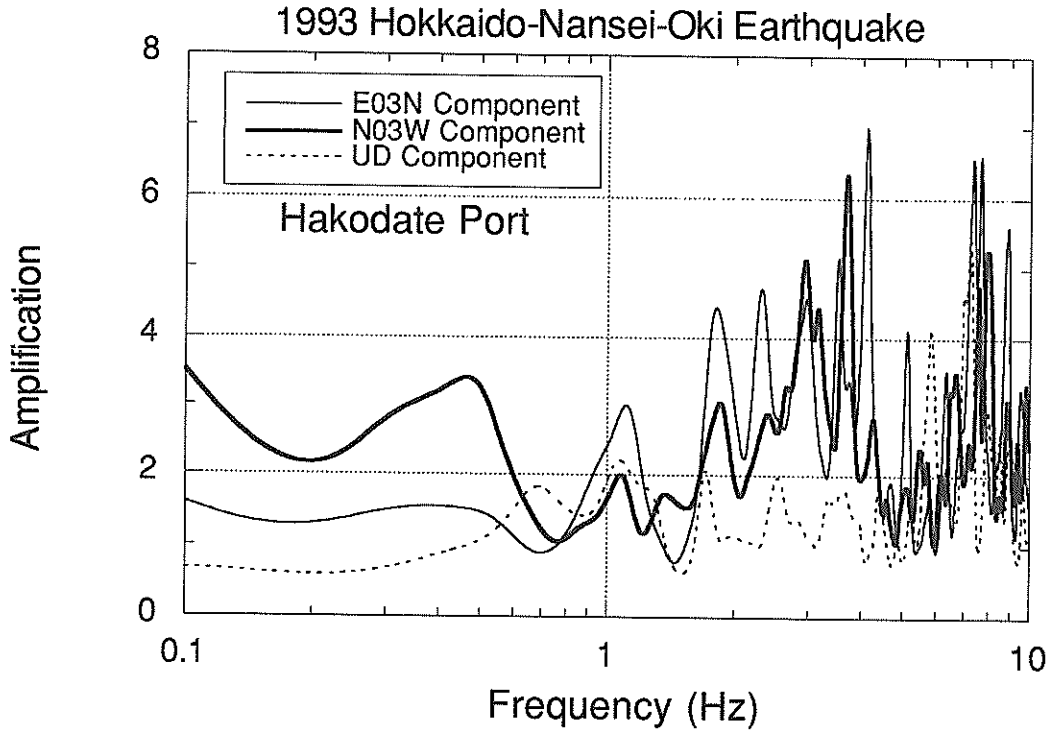

Figure 7 Amplification of Acceleration at Hakodate Port (After Shock on July 12)

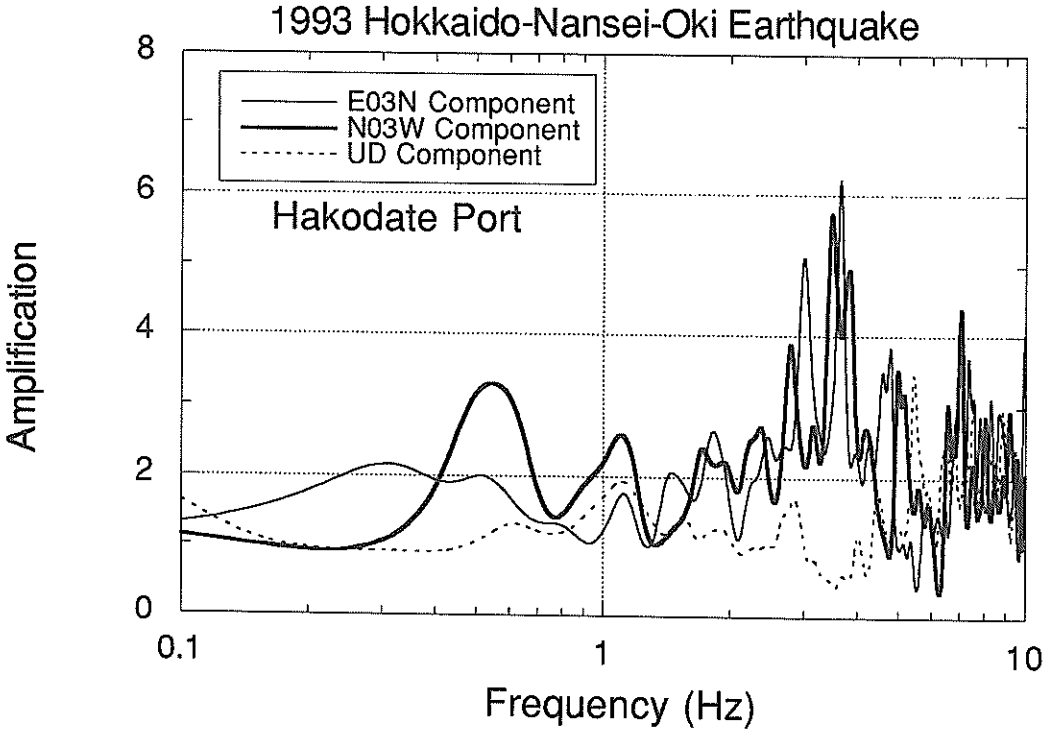

Figure 8 Amplification of Acceleration at Hakodate Port (After Shock on July 13)

6. Remarks for Records by Hakodate-F station

Accelerographs of Hakodate-F (ground surface), Hakodate-FB (base) and Hakodate-FR (structure) stations, which are installed at Hakodate port, work simultaneously when Hakodate-FB station is triggered, and these accelerographs have delay memory for 10 seconds (1024 data). However, delay circuit of Hakodate-F station did not work because of the problem of the power supply. Therefore, zero data for 10 seconds are added before the records of F-545, F-546, F-548 and F-603, which were obtained by Hakodate-F station, for comparison with the records by Hakodate-FB and Hakodate-FR station.

7. Summary

The 1993 Hokkaido-Nansei-Oki Earthquake of JMA Magnitude 7.8 occurred in south-west off Hokkaido island at 22 : 17 : 12, July 12, 1993. Lifeline facilities as well as engineering structures were damaged by this earthquake. This earthquake caused also great tsunami and many structures were damaged and many lives were lost by the tsunami.

The earthquake triggered 13 accelerographs at 10 ports in the strong-motion earthquake observation network of the Port and Harbour Research Institute. 9 accelerograms at 6 ports out of 13 accelerograms at 10 ports were obtained as digital acceleration data of three components.

The records of the main shock and of the after shocks at 23 : 04 : 24, July 12, at 01 : 01 : 05, July 13 and at 04 : 42 : 44, August 8 are presented in this report. Original acceleration without instrument correction, corrected acceleration, SMAC-B2 equivalent acceleration, integrated velocity and displacement, response spectra, Fourier spectra and loci of accelerations, velocities and displacements are reported as results of preliminary analyses of all the digitized records. Attenuation relations of acceleration, velocity and displacement of the main shock are also shown in this report. Amplification of accelerations at Hakodate port are also presented.

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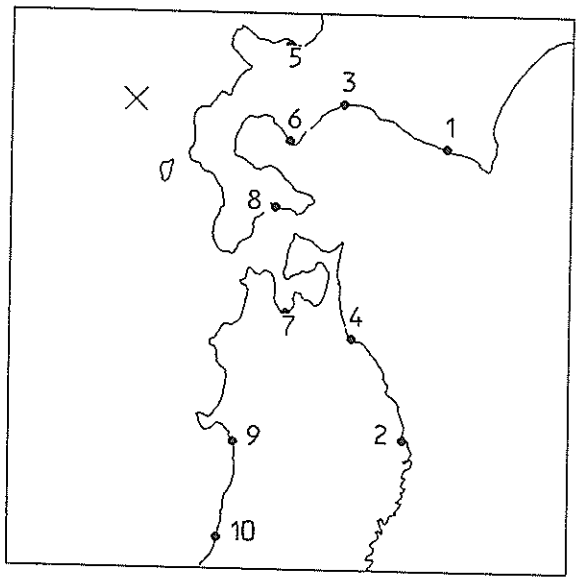
Strong-Motion Earthquake Observation Results of the Main Shock at 22:17:12, July 12, 1993

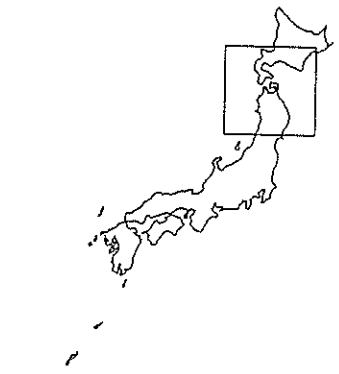
STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

22:17 JULY 12,1993
SW OFF HOKKAIDO
EPICENTER : 42°46.8'N 139°11.0'E
DEPTH : 35.1KM MAGNITUDE : 7.8

JMA INTENSITIES

Ⅴ : OTARU,ESASHI,FUKAURA
Ⅳ : MURORAN,HAKODATE,
TOMAKOMAI
Ⅲ : HIROO,HACHINOHE





	STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS)	(EW)	(UD)	DIST. (KM)
1	URAKAWA-S	ON GROUND	S-2526	3	3	1	302
2	MIYAKO-G	ON GROUND	F- 587	6	4	2	419
3	TOMAKOMAI-S	ON GROUND	S-2528	18	17	9	199
4	HACHINOHE-JI-S	ON GROUND	S-2524	15	22		313
5	OTARU-G	ON GROUND	F- 538	59	66	25	157
6	MURORAN-G	ON GROUND	F- 554	217	215	100	152
7	AOMORI-S	ON GROUND	S-2523	68	63	26	253
8	HAKODATE-FR	ON STRUC.	F- 549	162	127	67	168
8	HAKODATE-F	ON GROUND	F- 545	119	116	64	168
8	HAKODATE-FB	IN GROUND	F- 541	71	59	46	168
8	HAKODATE-M	ON GROUND	M-1472	144	149	92	168
9	AKITA-S	ON GROUND	S-2525	12	11	6	345
10	SAKATA-S	ON GROUND	S-2527	3	6	2	431

Results of Preliminary Analyses of the Main Shock at 22:17:12, July 12, 1993

RECORD NUMBER : S-2523

STATION : AOMORI-S

EARTHQUAKE DATA

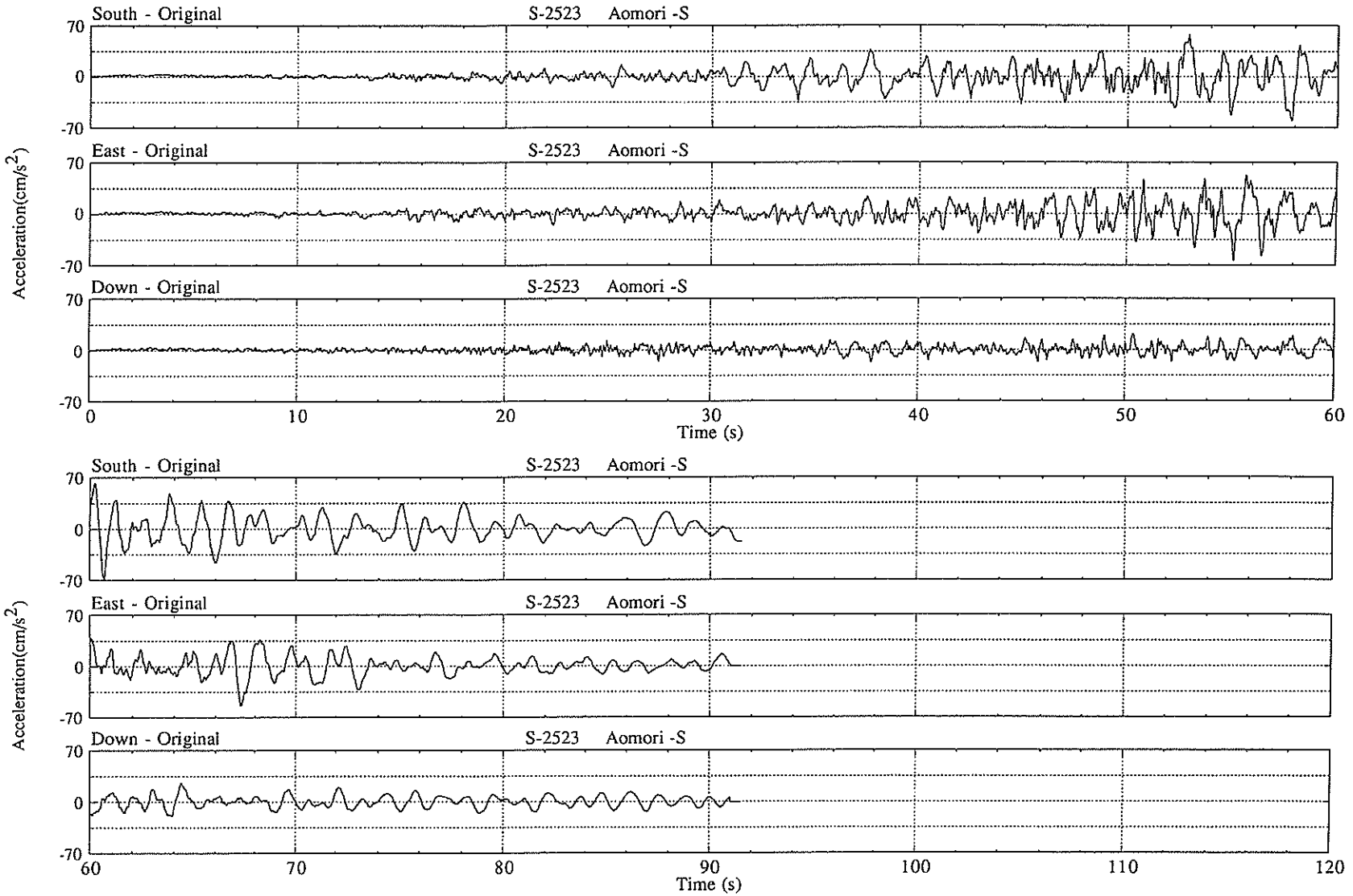
****

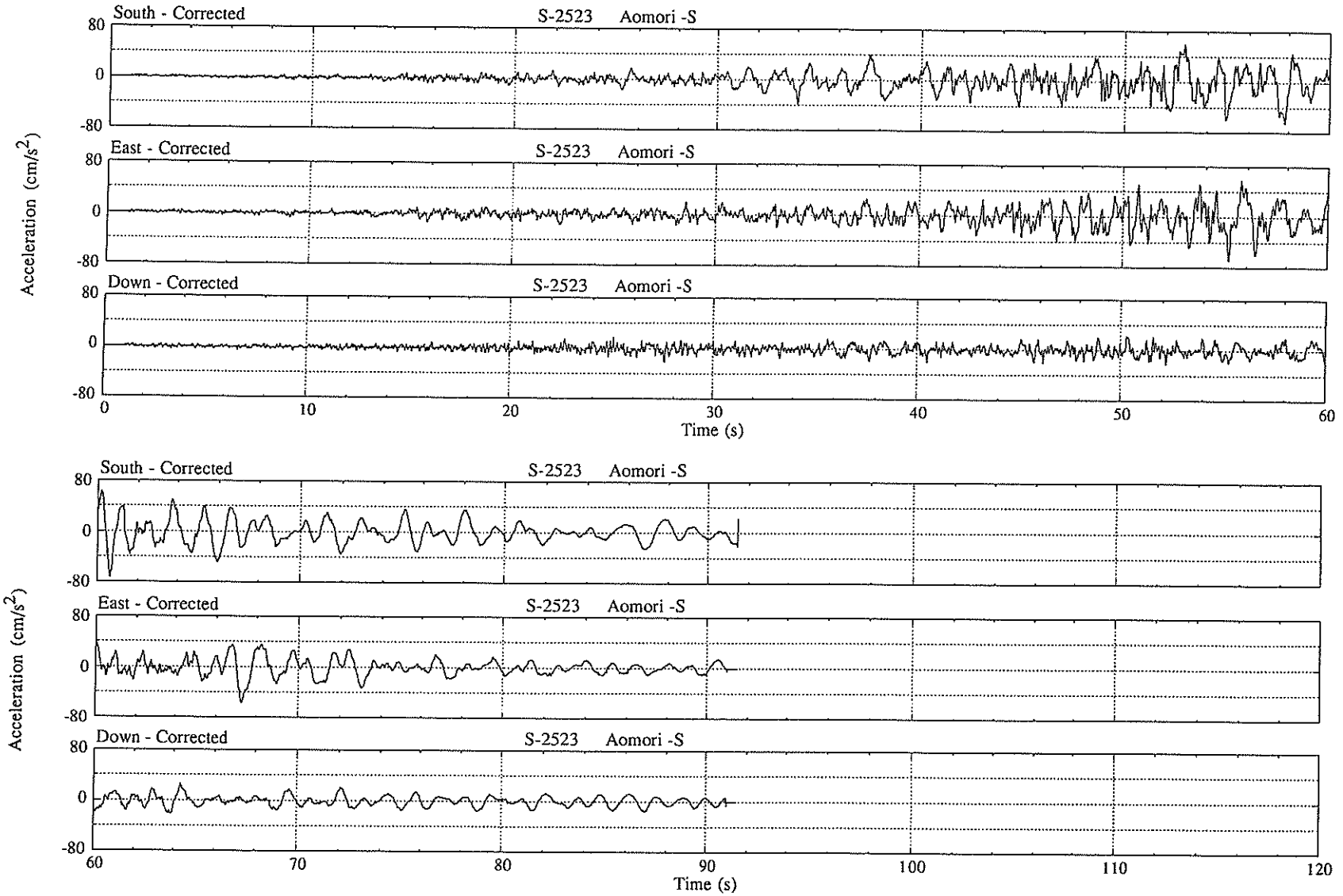
DATE AND TIME	22:17 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°46.8' N
LONGITUDE	139°11.0' E
DEPTH	35.1KM
JMA MAGNITUDE	7.8

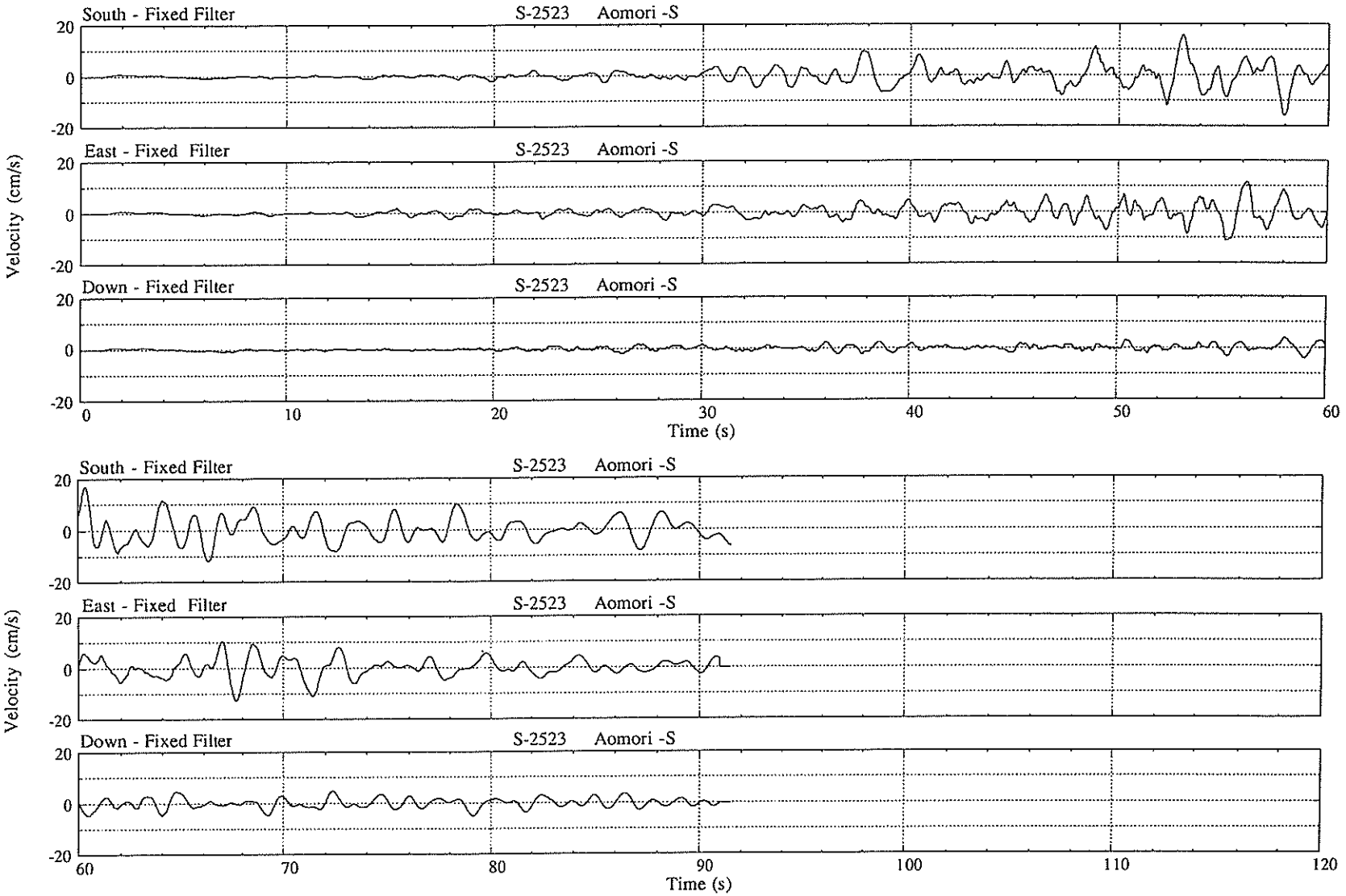
****

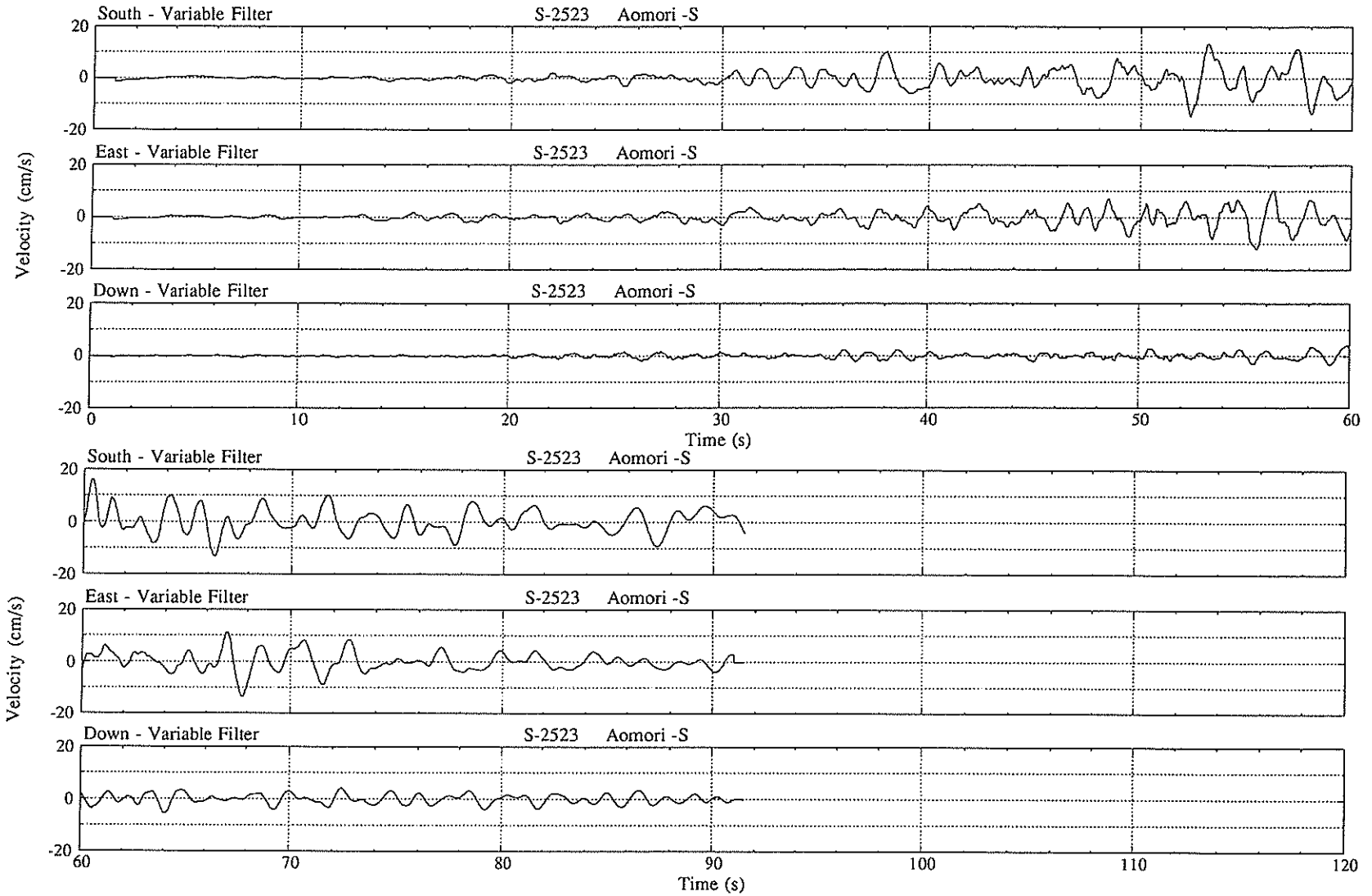
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.096	0.109	0.182	
MAXIMUM ACCELERATION (GAL)				
ORIGINAL	67.8	63.3	26.3	67.8
CORRECTED	72.1	68.6	26.5	72.2
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	17.12	12.78	5.04	18.09
VARIABLE FILTER	16.18	13.64	5.41	16.40
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	5.41	4.43	1.95	5.54
VARIABLE FILTER	6.44	4.32	1.52	7.65

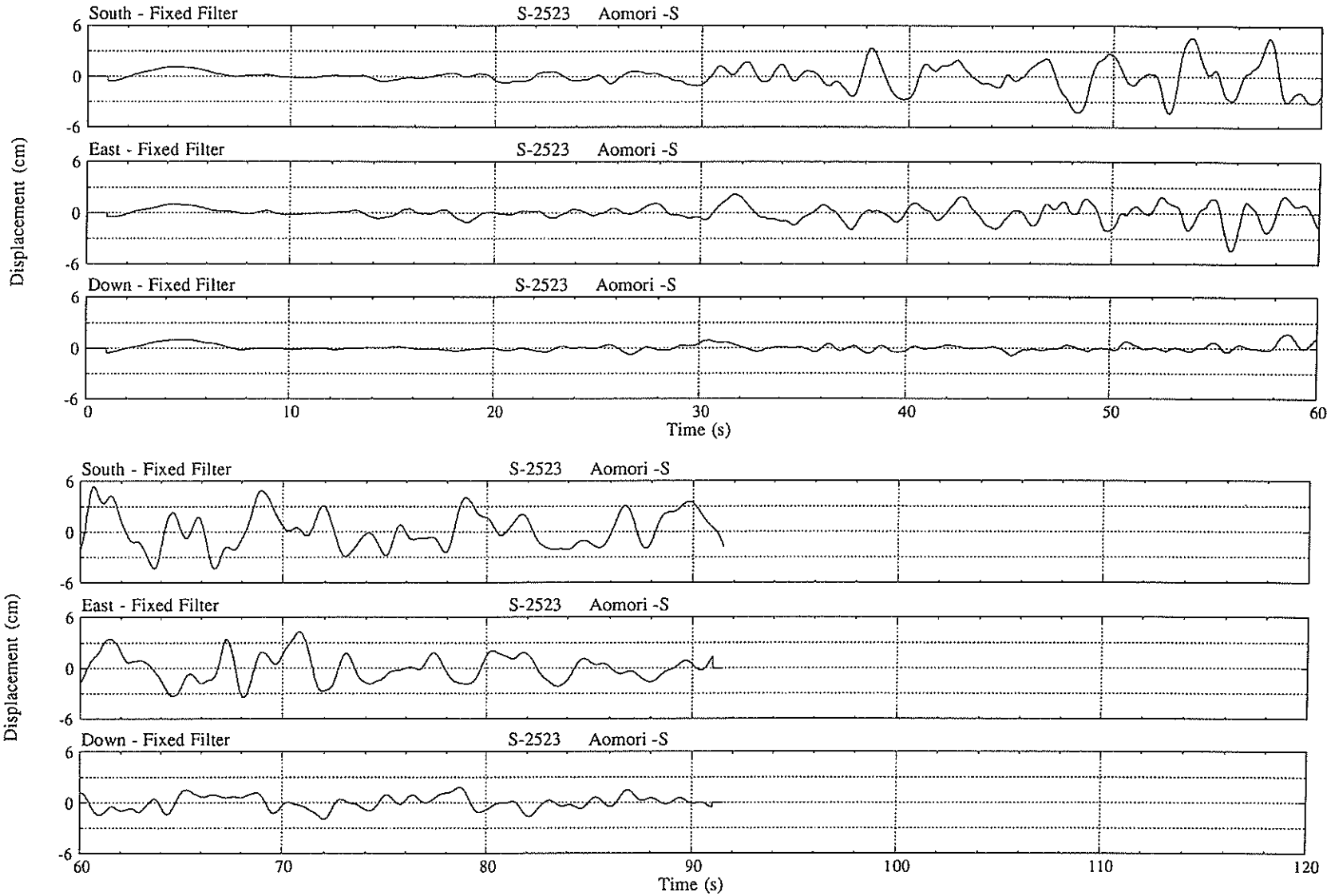
* RESULTANT OF HORIZONTAL COMPONENTS

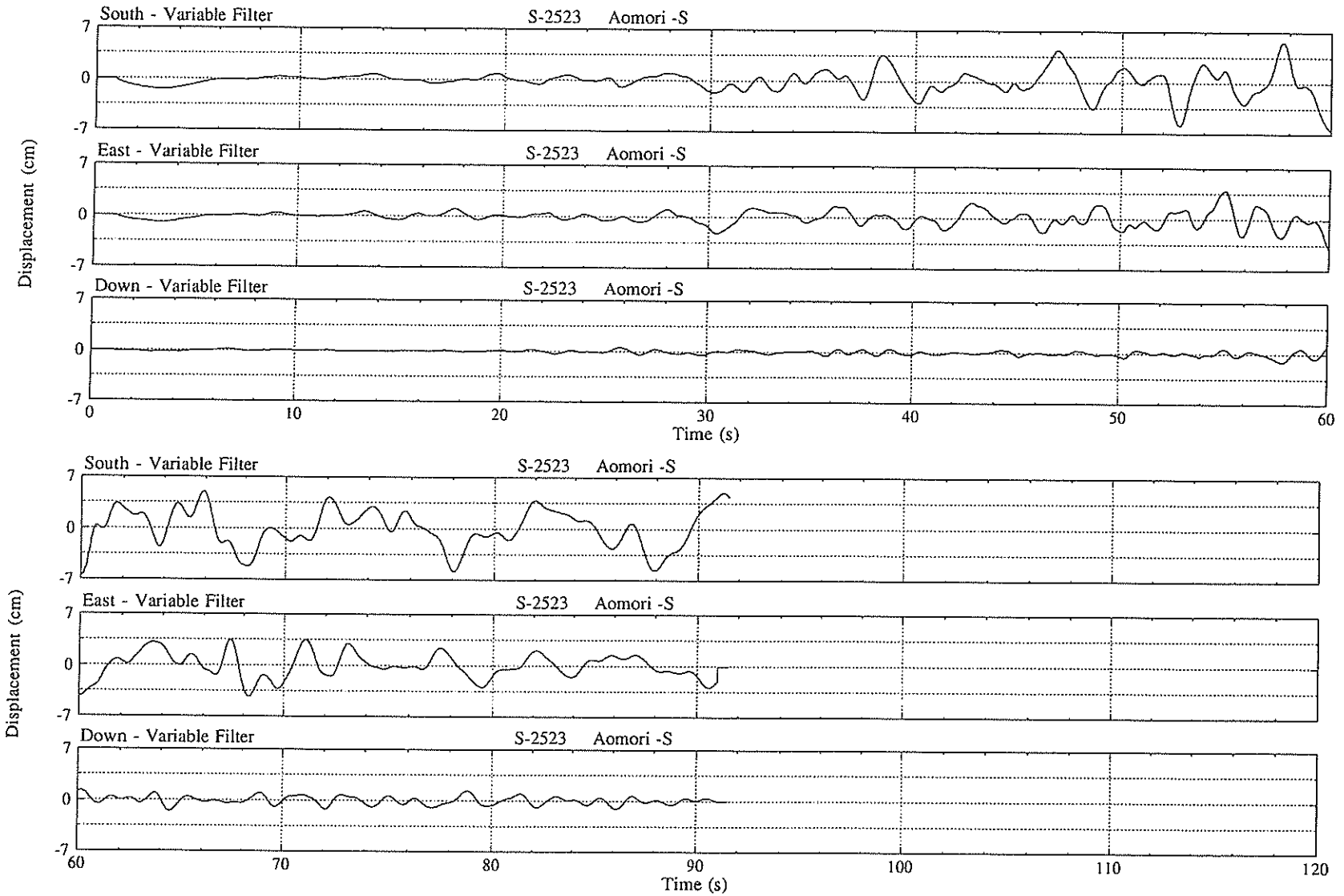

South - Original
S-2523 Aomori -S
East - Original
S-2523 Aomori -S
Down - Original
S-2523 Aomori -S
Acceleration(cm/s2)
70
0
-70
0
10
20
30
40
50
60
Time (s)
South - Original
S-2523 Aomori -S
East - Original
S-2523 Aomori -S
Down - Original
S-2523 Aomori -S
Acceleration(cm/s2)
70
0
-70
60
70
80
90
100
110
120
Time (s)

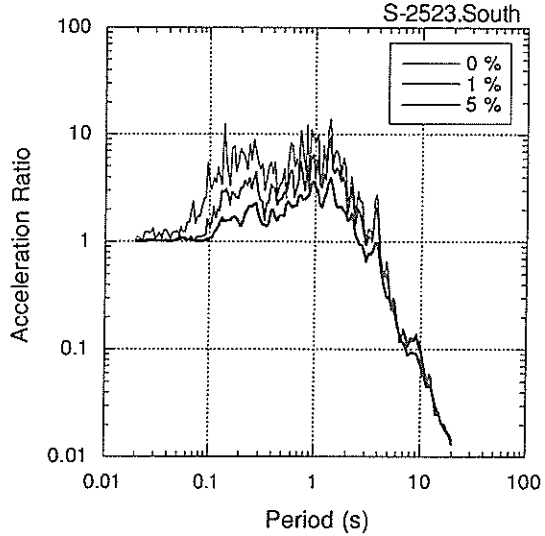

South - Corrected
S-2523 Aomori -S
East - Corrected
S-2523 Aomori -S
Down - Corrected
S-2523 Aomori -S
Acceleration (cm/s2)
80
0
-80
0
10
20
30
40
50
60
Time (s)
South - Corrected
S-2523 Aomori -S
East - Corrected
S-2523 Aomori -S
Down - Corrected
S-2523 Aomori -S
Acceleration (cm/s2)
80
0
-80
60
70
80
90
100
110
120
Time (s)

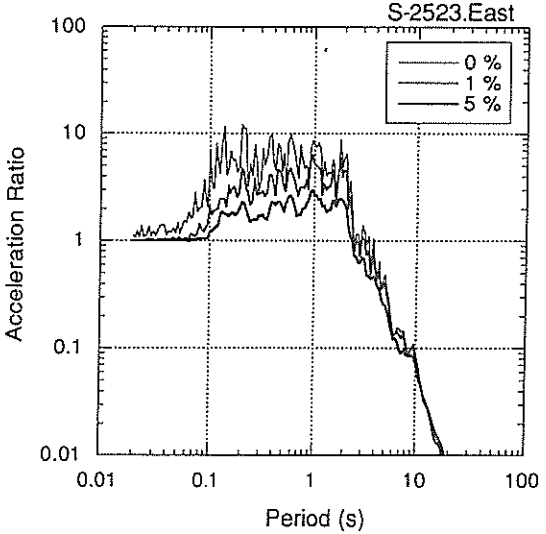

South - Fixed Filter
S-2523 Aomori -S
East - Fixed Filter
S-2523 Aomori -S
Down - Fixed Filter
S-2523 Aomori -S
Velocity (cm/s)
20
0
-20
0
10
20
30
40
50
60
Time (s)
South - Fixed Filter
S-2523 Aomori -S
East - Fixed Filter
S-2523 Aomori -S
Down - Fixed Filter
S-2523 Aomori -S
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

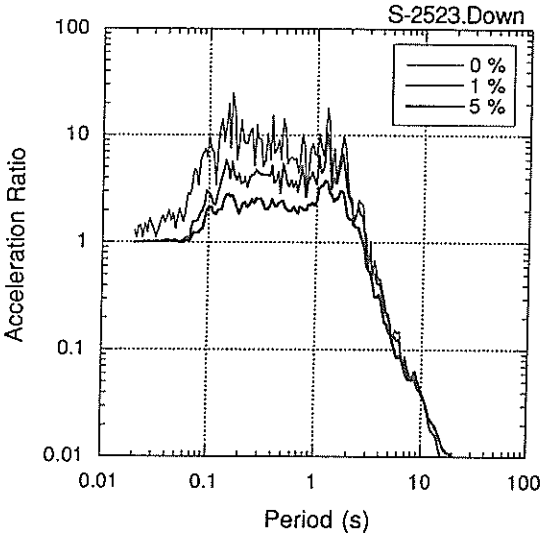

South - Variable Filter
S-2523 Aomori -S
East - Variable Filter
S-2523 Aomori -S
Down - Variable Filter
S-2523 Aomori -S
Velocity (cm/s)
Time (s)
20
0
-20
0
10
20
30
40
50
60
70
80
90
100
110
120

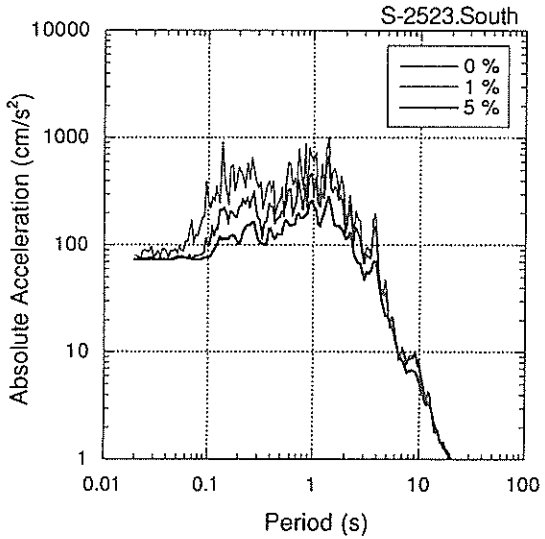

South - Fixed Filter
S-2523 Aomori -S
East - Fixed Filter
S-2523 Aomori -S
Down - Fixed Filter
S-2523 Aomori -S
Displacement (cm)
6
0
-6
0
10
20
30
40
50
60
Time (s)
South - Fixed Filter
S-2523 Aomori -S
East - Fixed Filter
S-2523 Aomori -S
Down - Fixed Filter
S-2523 Aomori -S
Displacement (cm)
6
0
-6
60
70
80
90
100
110
120
Time (s)

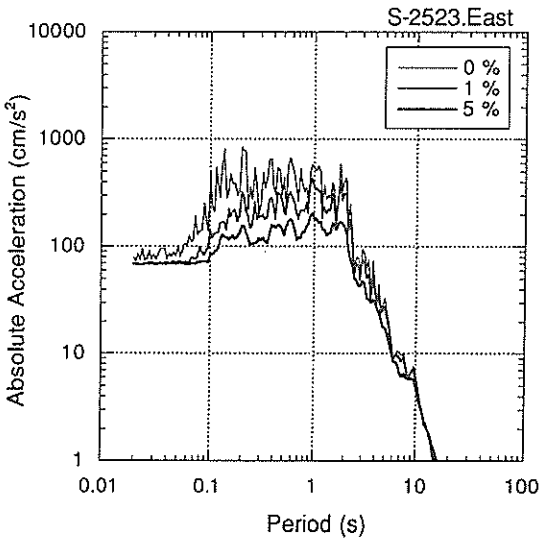

South - Variable Filter
S-2523 Aomori -S
East - Variable Filter
S-2523 Aomori -S
Down - Variable Filter
S-2523 Aomori -S
Displacement (cm)
7
0
-7
0
10
20
30
40
50
60
Time (s)
South - Variable Filter
S-2523 Aomori -S
East - Variable Filter
S-2523 Aomori -S
Down - Variable Filter
S-2523 Aomori -S
Displacement (cm)
7
0
-7
60
70
80
90
100
110
120
Time (s)

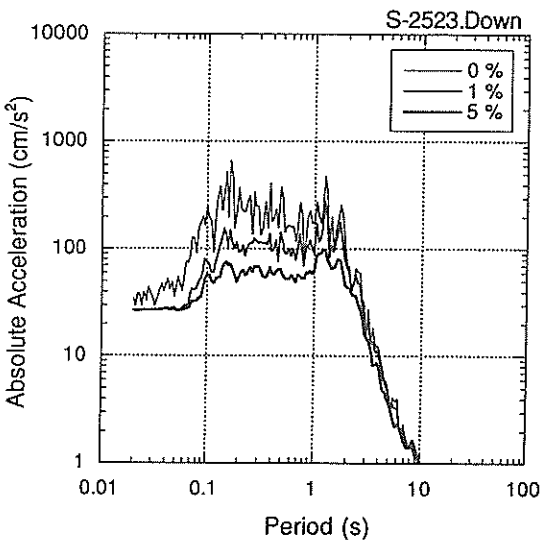

S-2523.South
0 %
1 %
5 %
Acceleration Ratio
Period (s)

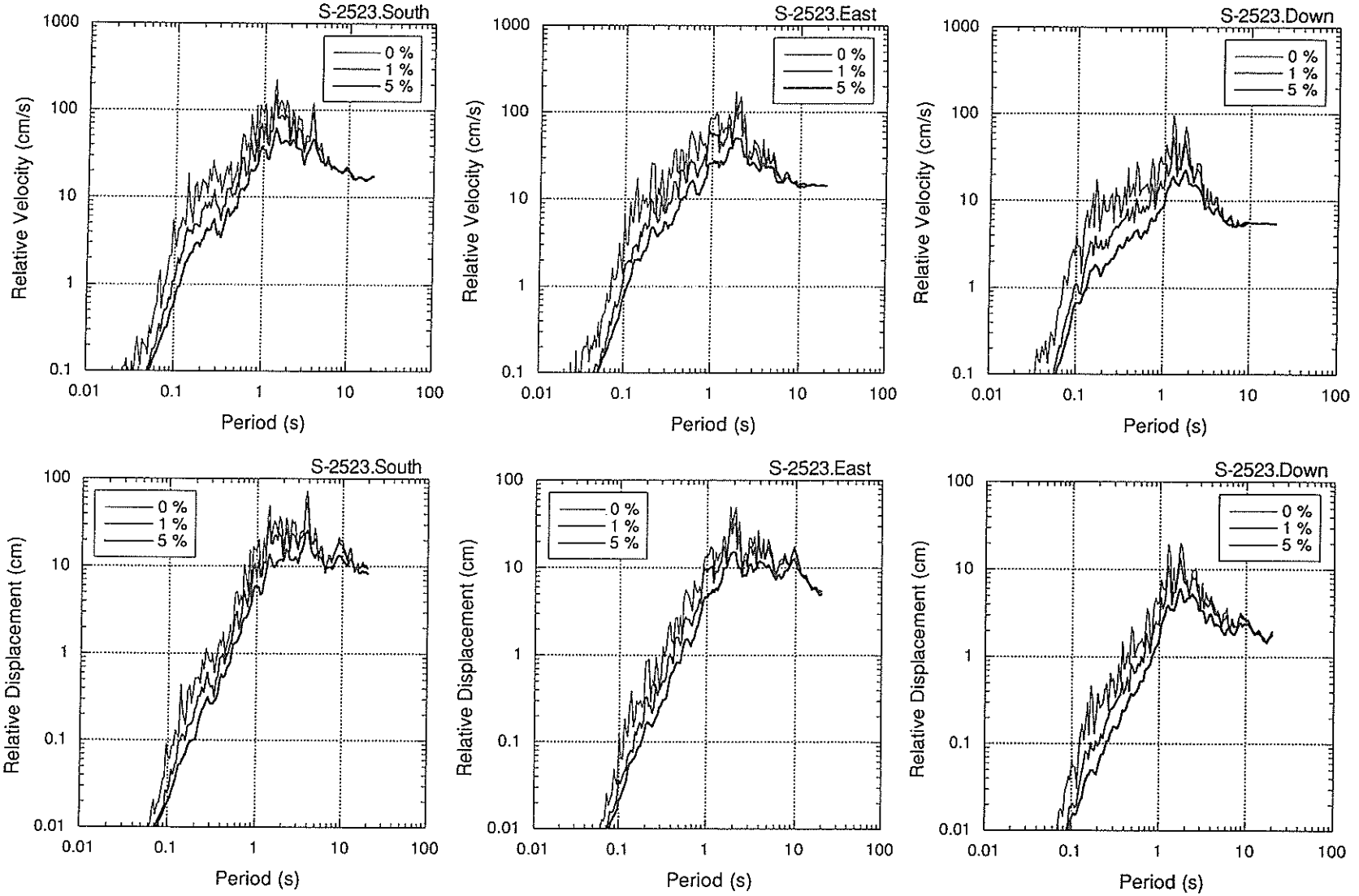

S-2523.East
0 %
1 %
5 %
Acceleration Ratio
Period (s)

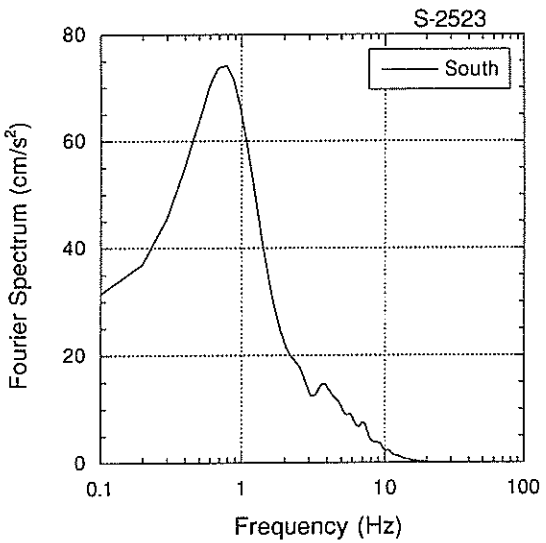

S-2523.Down
0 %
1 %
5 %
Acceleration Ratio
Period (s)

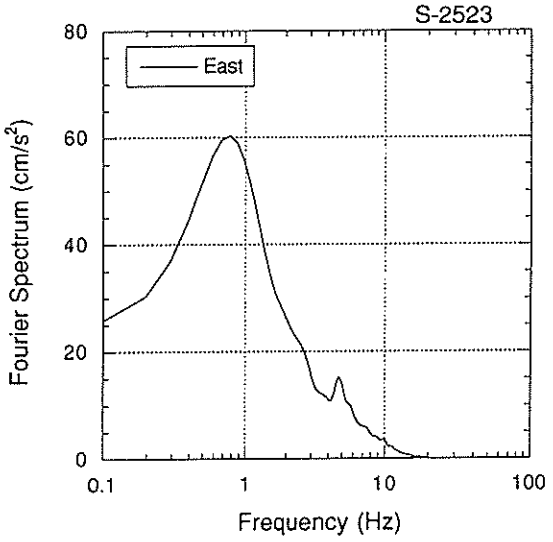

S-2523.South
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

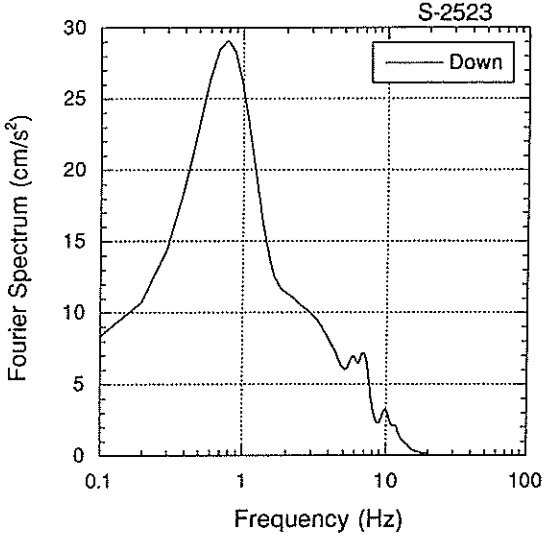

S-2523.East
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

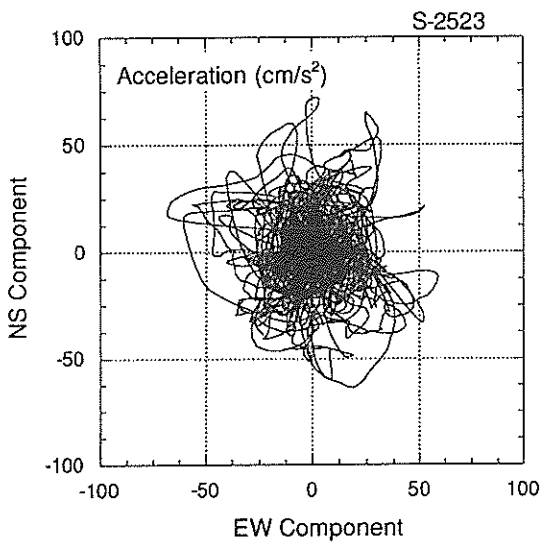

S-2523.Down
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

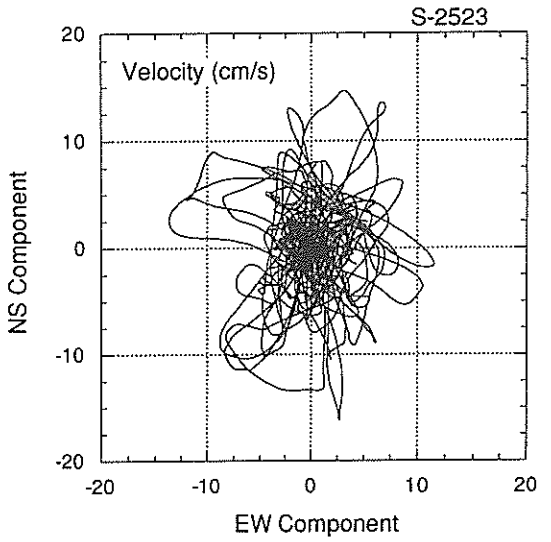

S-2523.South
S-2523.East
S-2523.Down
Relative Velocity (cm/s)
Relative Displacement (cm)
Period (s)
0 %
1 %
5 %
0.01
0.1
1
10
100
1000

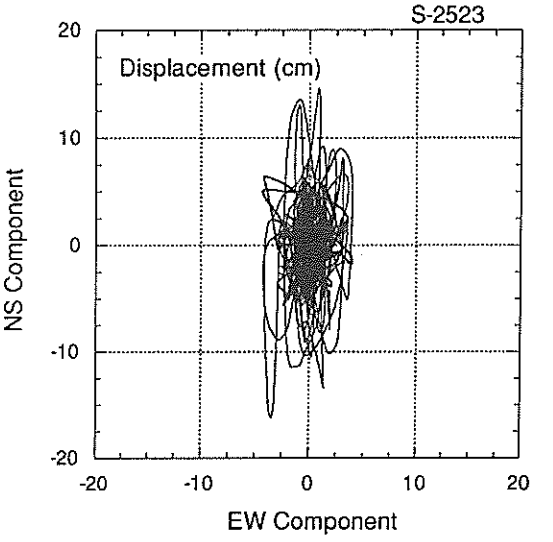

S-2523
South
Fourier Spectrum (cm/s²)
Frequency (Hz)


S-2523
East
Fourier Spectrum (cm/s²)
Frequency (Hz)


S-2523
Down
Fourier Spectrum (cm/s²)
Frequency (Hz)


S-2523
Acceleration (cm/s²)
NS Component
EW Component


S-2523
Velocity (cm/s)
NS Component
EW Component


S-2523
Displacement (cm)
NS Component
EW Component

RECORD NUMBER : S-2528

STATION : TOMAKOMAI-S

EARTHQUAKE DATA

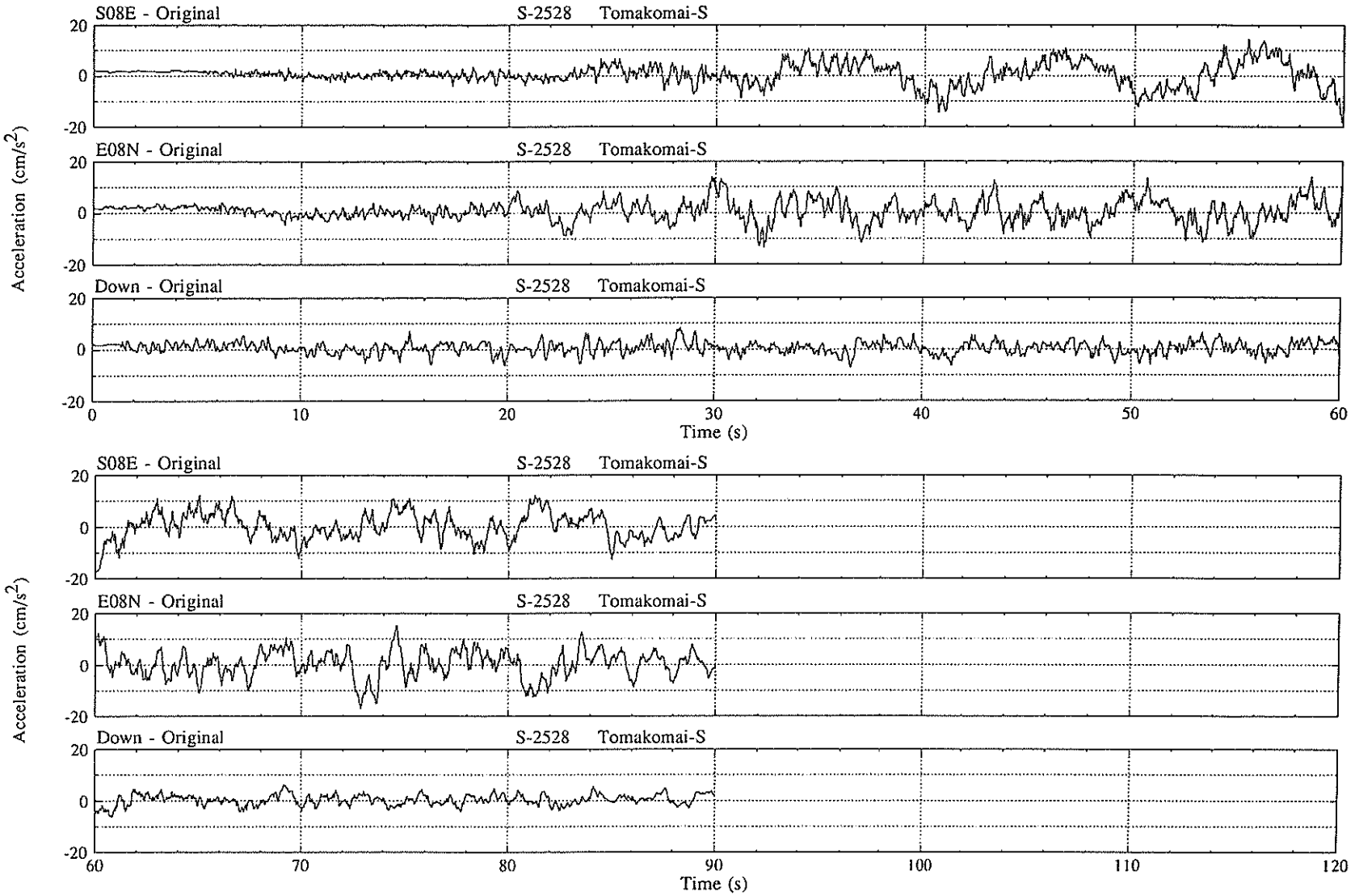
****

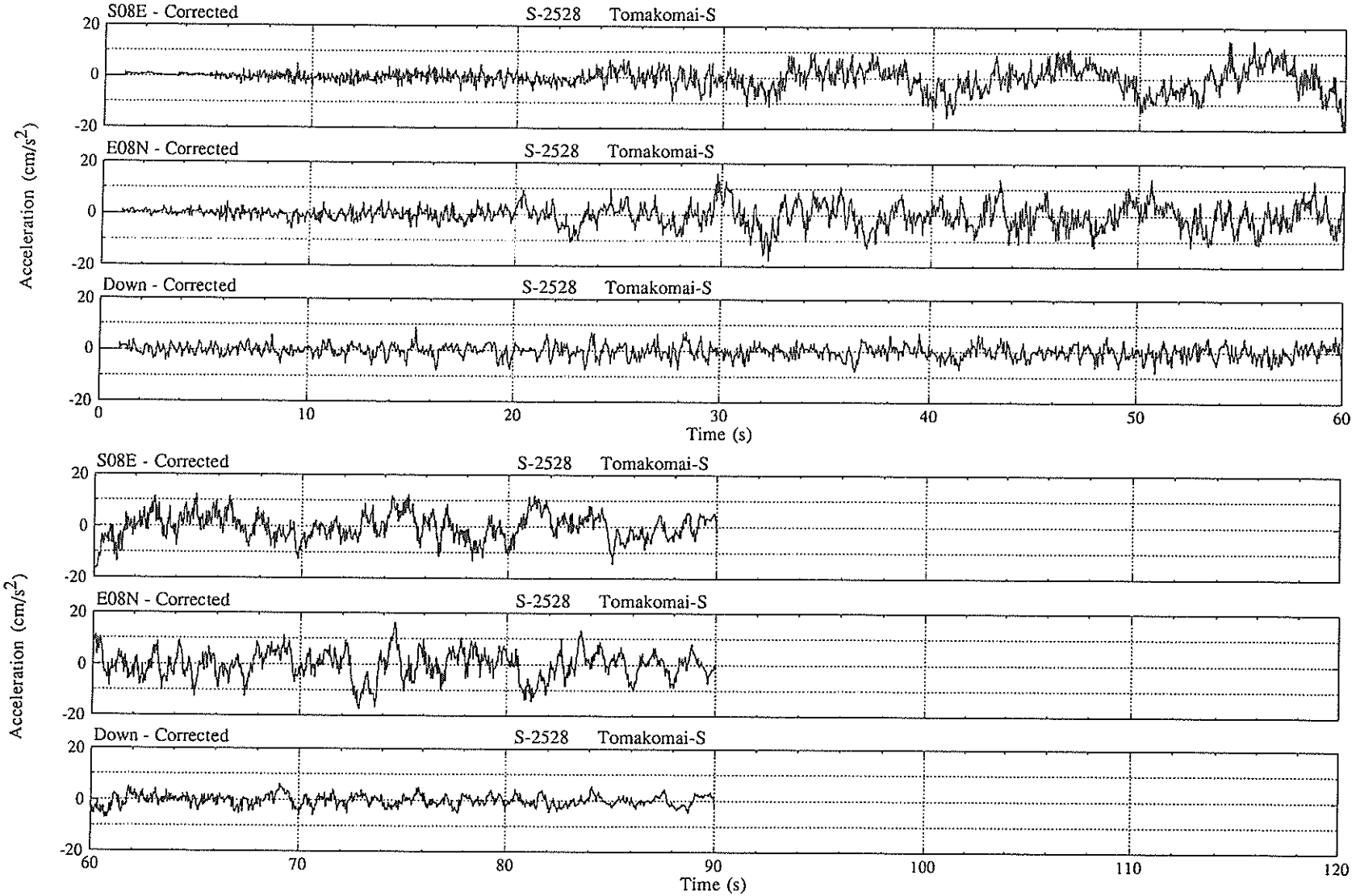
DATE AND TIME	22:17 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°46.8' N
LONGITUDE	139°11.0' E
DEPTH	35.1KM
JMA MAGNITUDE	7.8

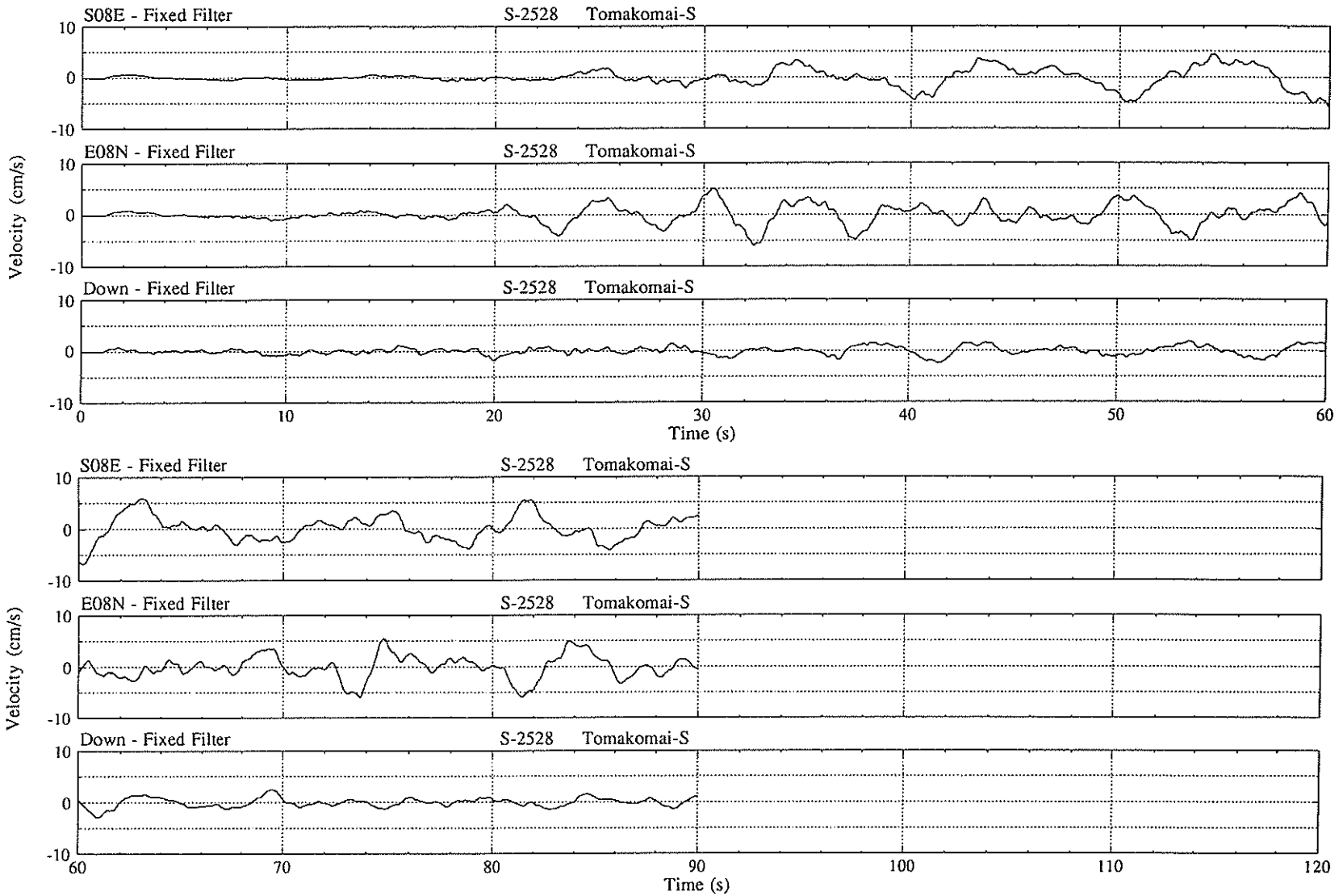
****

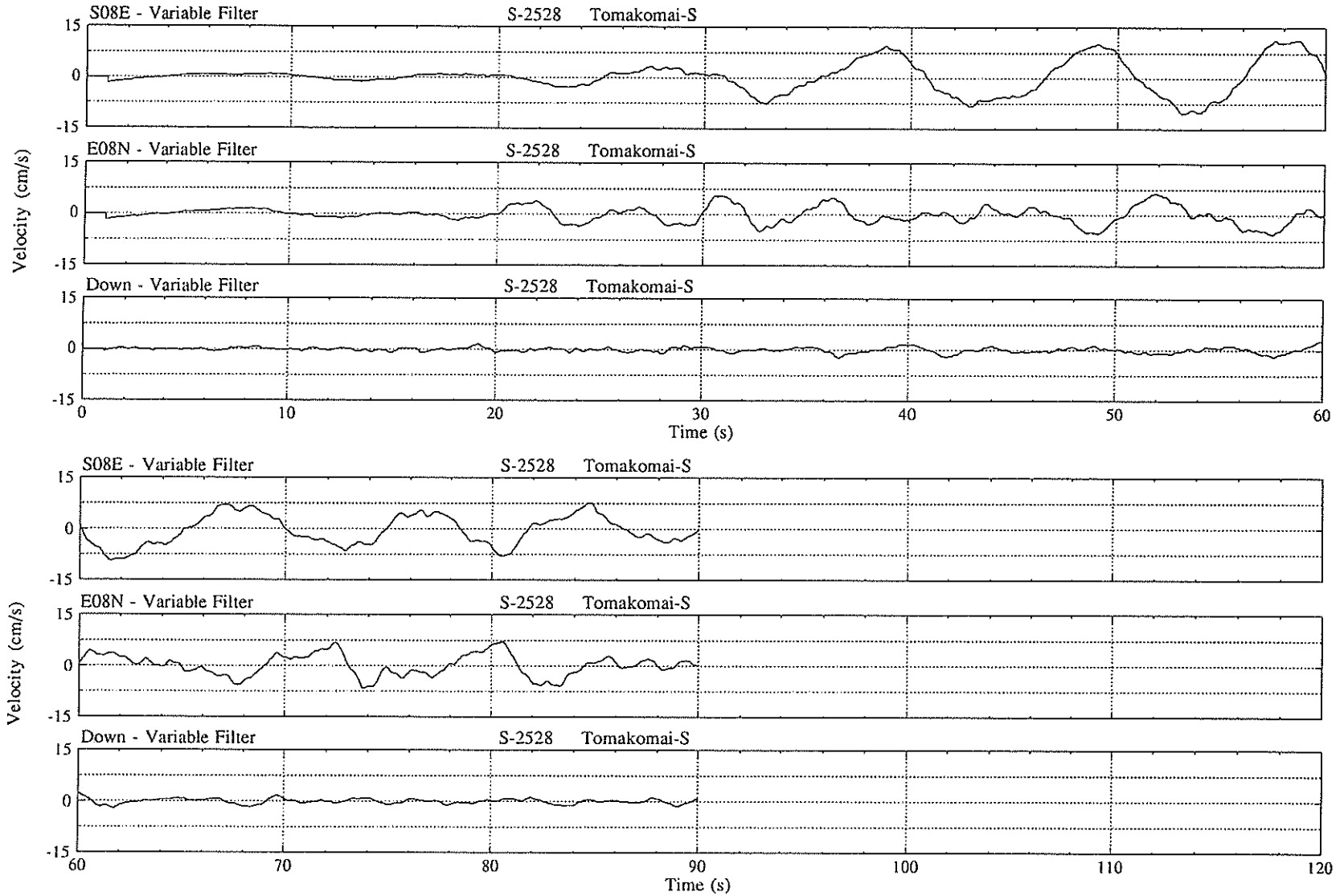
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.066	0.078	0.139	
MAXIMUM ACCELERATION (GAL)				
ORIGINAL	18.1	17.0	8.5	20.7
CORRECTED	19.9	17.5	8.9	20.4
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	6.83	6.00	2.87	8.04
VARIABLE FILTER	11.45	7.21	2.78	12.51
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	7.42	5.10	1.70	7.70
VARIABLE FILTER	16.39	7.85	1.55	17.19

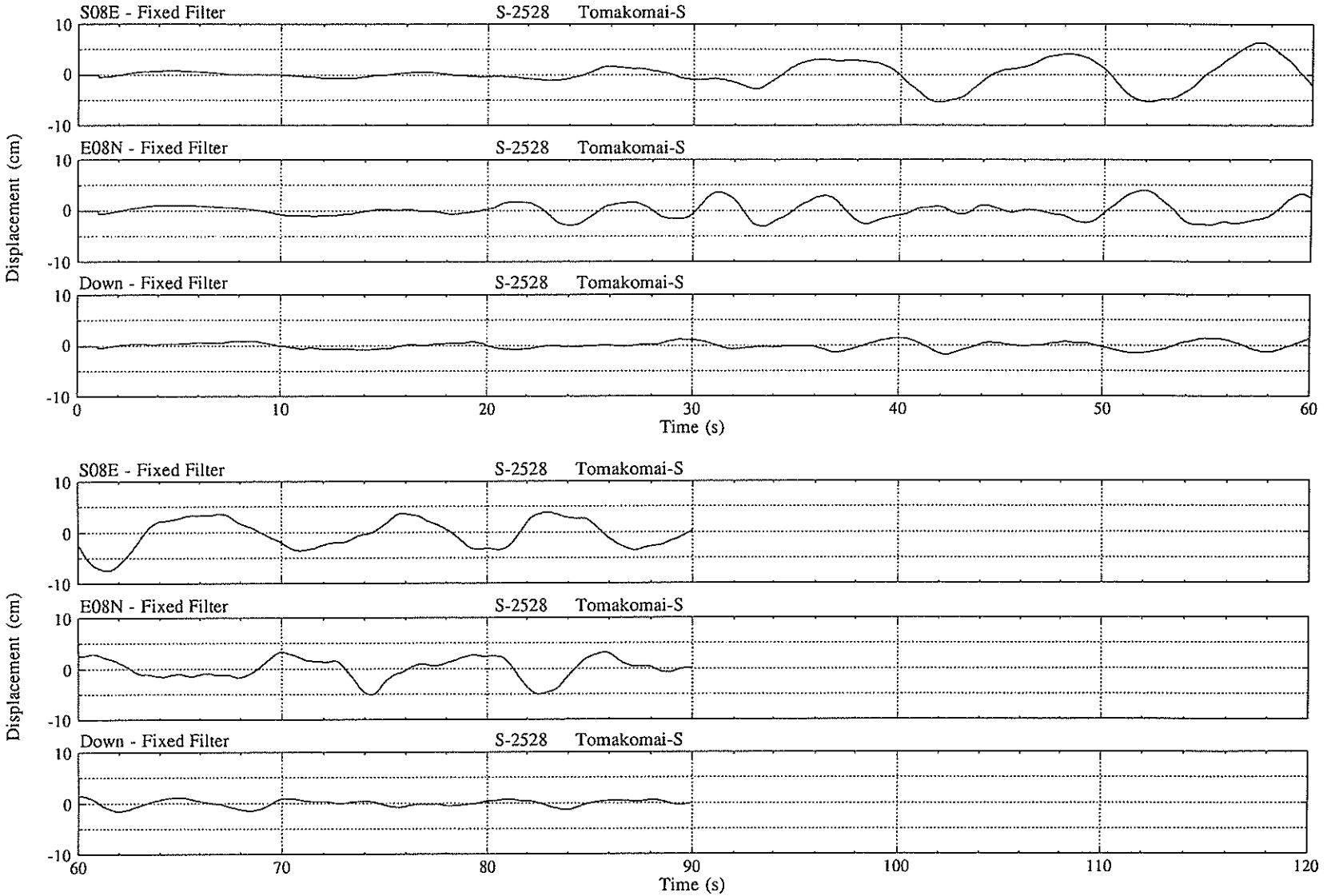
* RESULTANT OF HORIZONTAL COMPONENTS

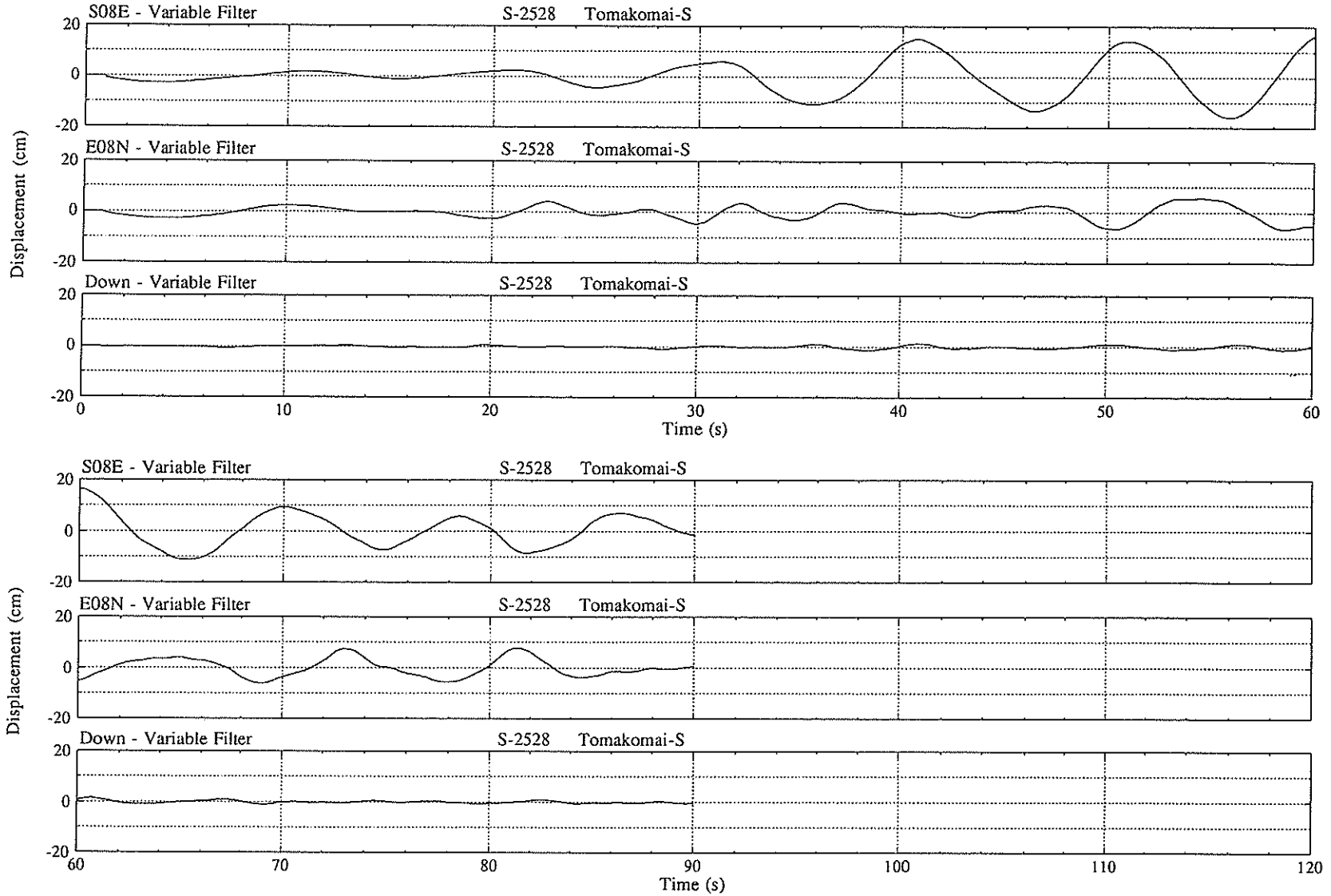

S08E - Original
S-2528 Tomakomai-S
E08N - Original
S-2528 Tomakomai-S
Down - Original
S-2528 Tomakomai-S
Acceleration (cm/s2)
20
0
-20
0
10
20
30
40
50
60
Time (s)
S08E - Original
S-2528 Tomakomai-S
E08N - Original
S-2528 Tomakomai-S
Down - Original
S-2528 Tomakomai-S
Acceleration (cm/s2)
20
0
-20
60
70
80
90
100
110
120
Time (s)

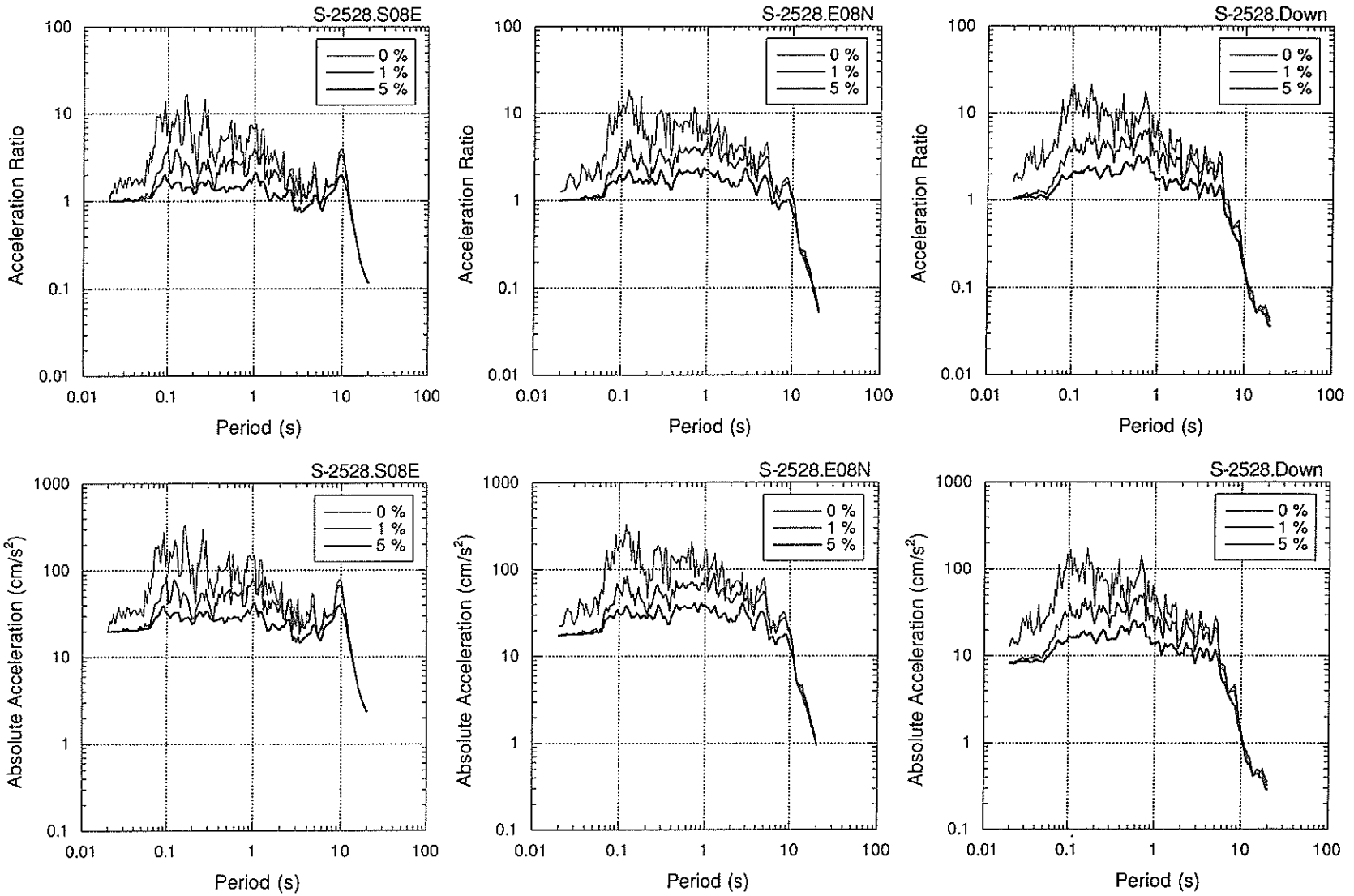

S08E - Corrected
S-2528 Tomakomai-S
E08N - Corrected
S-2528 Tomakomai-S
Down - Corrected
S-2528 Tomakomai-S
Acceleration (cm/s2)
20
0
-20
0
10
20
30
40
50
60
Time (s)
S08E - Corrected
S-2528 Tomakomai-S
E08N - Corrected
S-2528 Tomakomai-S
Down - Corrected
S-2528 Tomakomai-S
Acceleration (cm/s2)
60
70
80
90
100
110
120
Time (s)

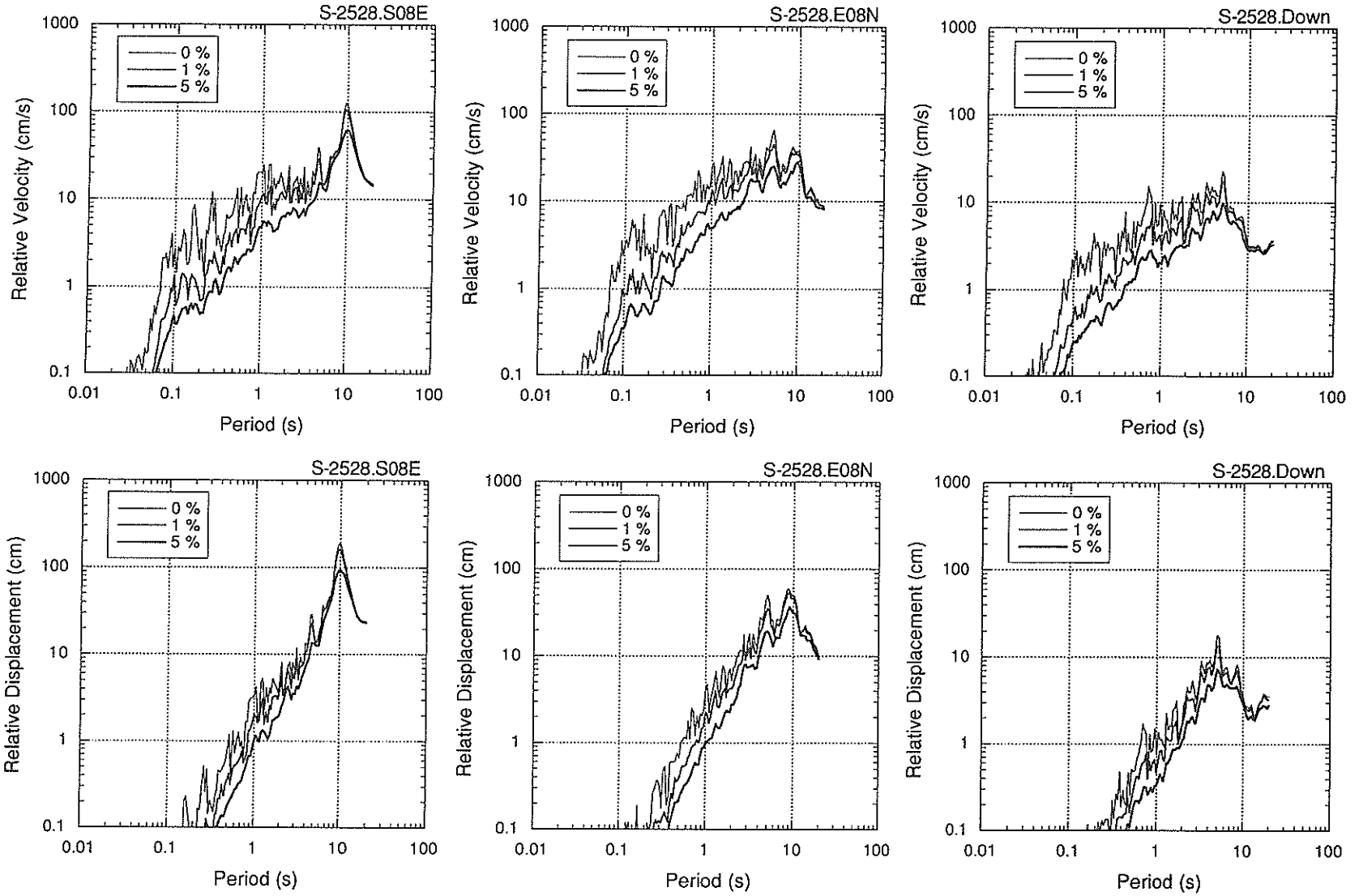

S08E - Fixed Filter
S-2528 Tomakomai-S
E08N - Fixed Filter
S-2528 Tomakomai-S
Down - Fixed Filter
S-2528 Tomakomai-S
Velocity (cm/s)
Time (s)
10
0
-10
0
10
20
30
40
50
60
70
80
90
100
110
120

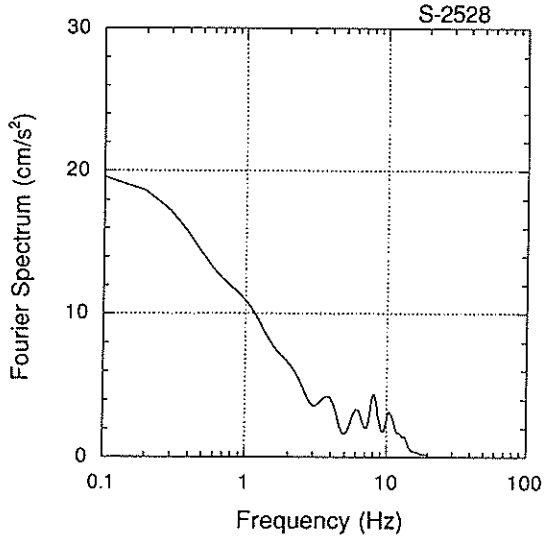

S08E - Variable Filter
S-2528 Tomakomai-S
E08N - Variable Filter
S-2528 Tomakomai-S
Down - Variable Filter
S-2528 Tomakomai-S
Velocity (cm/s)
15
0
-15
0
10
20
30
40
50
60
Time (s)
S08E - Variable Filter
S-2528 Tomakomai-S
E08N - Variable Filter
S-2528 Tomakomai-S
Down - Variable Filter
S-2528 Tomakomai-S
Velocity (cm/s)
15
0
-15
60
70
80
90
100
110
120
Time (s)

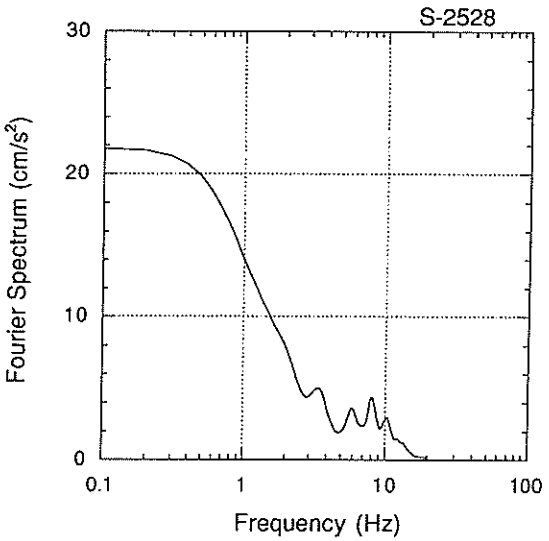

S08E - Fixed Filter
S-2528 Tomakomai-S
E08N - Fixed Filter
S-2528 Tomakomai-S
Down - Fixed Filter
S-2528 Tomakomai-S
Displacement (cm)
10
0
-10
0
10
20
30
40
50
60
Time (s)
S08E - Fixed Filter
S-2528 Tomakomai-S
E08N - Fixed Filter
S-2528 Tomakomai-S
Down - Fixed Filter
S-2528 Tomakomai-S
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

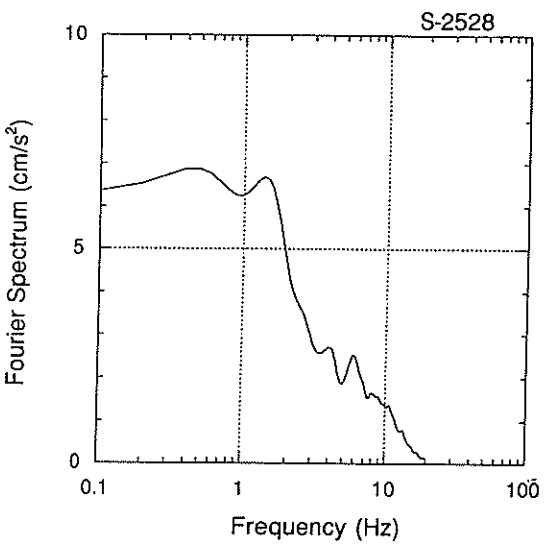

S08E - Variable Filter
S-2528 Tomakomai-S
E08N - Variable Filter
S-2528 Tomakomai-S
Down - Variable Filter
S-2528 Tomakomai-S
Displacement (cm)
Time (s)
S08E - Variable Filter
S-2528 Tomakomai-S
E08N - Variable Filter
S-2528 Tomakomai-S
Down - Variable Filter
S-2528 Tomakomai-S
Displacement (cm)
Time (s)

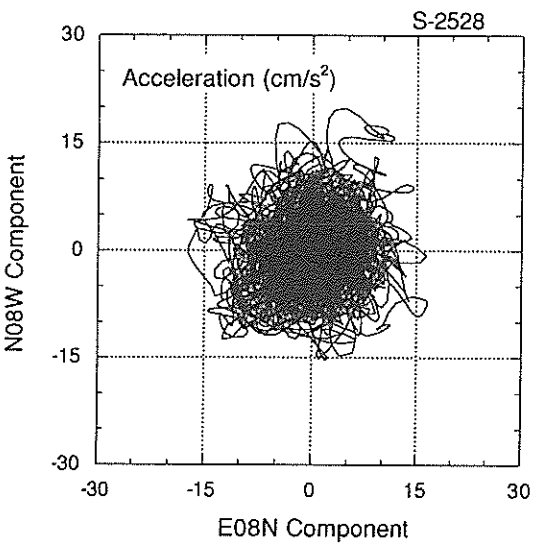

S-2528.S08E
S-2528.E08N
S-2528.Down
0 %
1 %
5 %
Acceleration Ratio
Absolute Acceleration (cm/s²)
Period (s)
0.01
0.1
1
10
100
1000

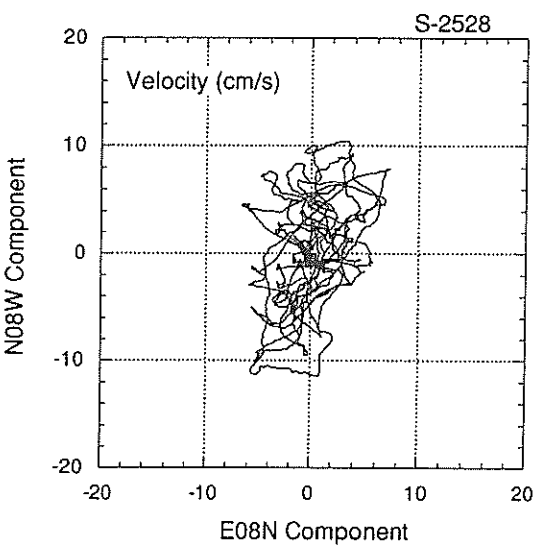

S-2528.S08E
S-2528.E08N
S-2528.Down
0 %
1 %
5 %
Relative Velocity (cm/s)
Relative Displacement (cm)
Period (s)
0.01
0.1
1
10
100
0.1
1
10
100
1000

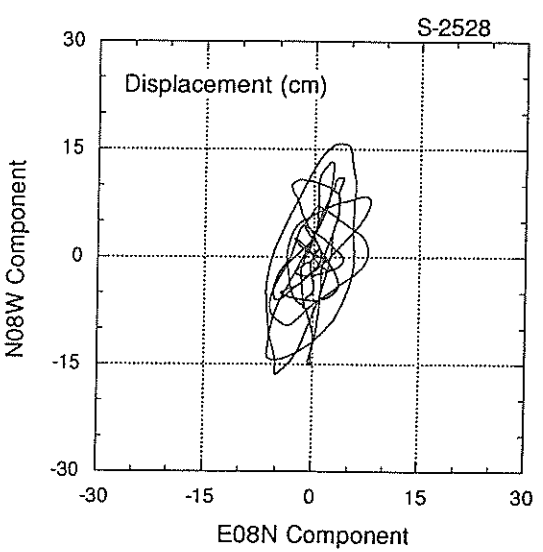

S-2528
Fourier Spectrum (cm/s²)
Frequency (Hz)
30
20
10
0
0.1
1
10
100


S-2528
Fourier Spectrum (cm/s²)
Frequency (Hz)
30
20
10
0
0.1
1
10
100


S-2528
Fourier Spectrum (cm/s²)
Frequency (Hz)
10
5
0
0.1
1
10
100


S-2528
Acceleration (cm/s²)
N08W Component
E08N Component
30
15
0
-15
-30


S-2528
Velocity (cm/s)
N08W Component
E08N Component
20
10
0
-10
-20


S-2528
Displacement (cm)
N08W Component
E08N Component
30
15
0
-15
-30

RECORD NUMBER : M-1472

STATION : HAKODATE-M

EARTHQUAKE DATA

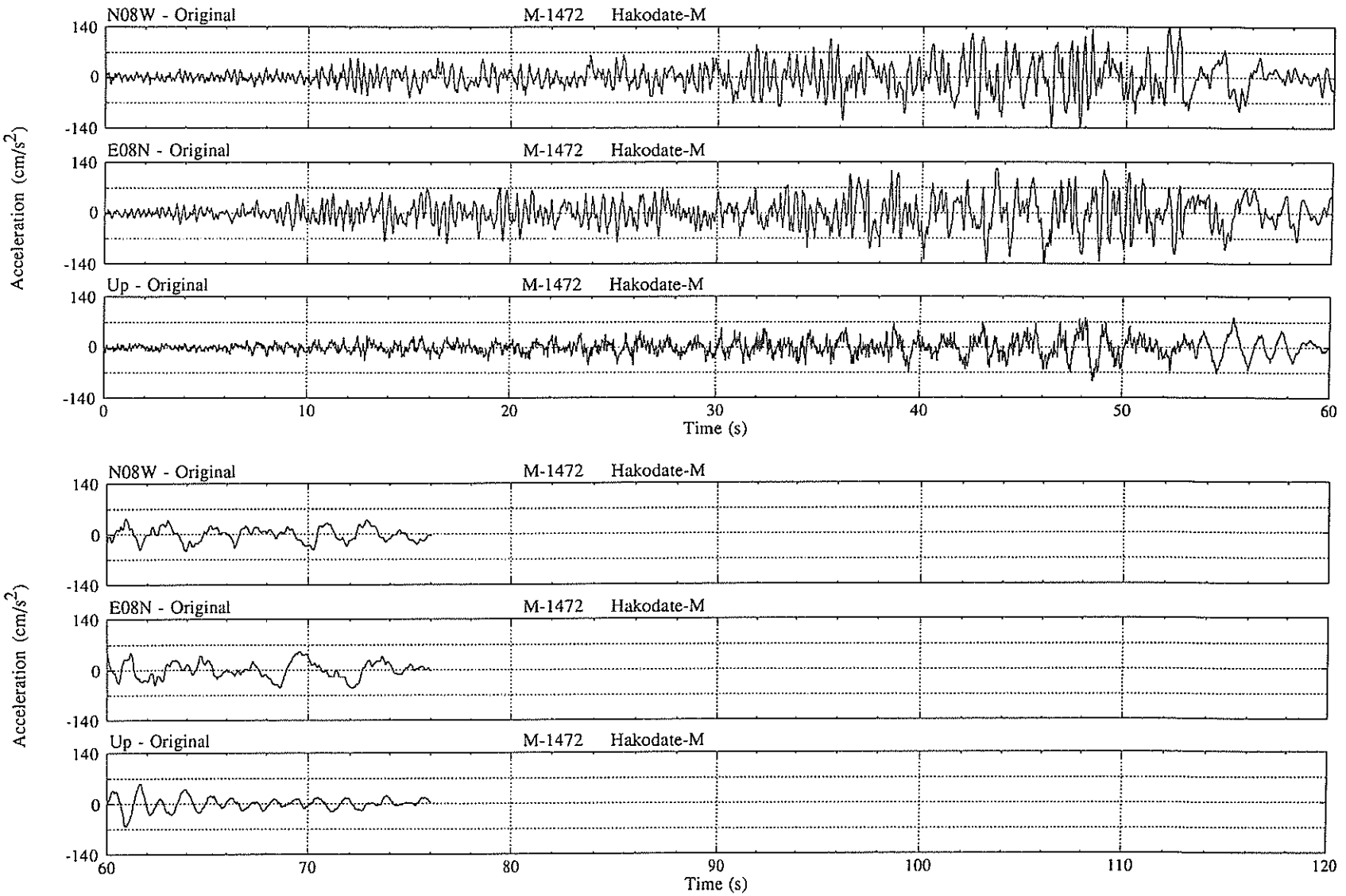
****

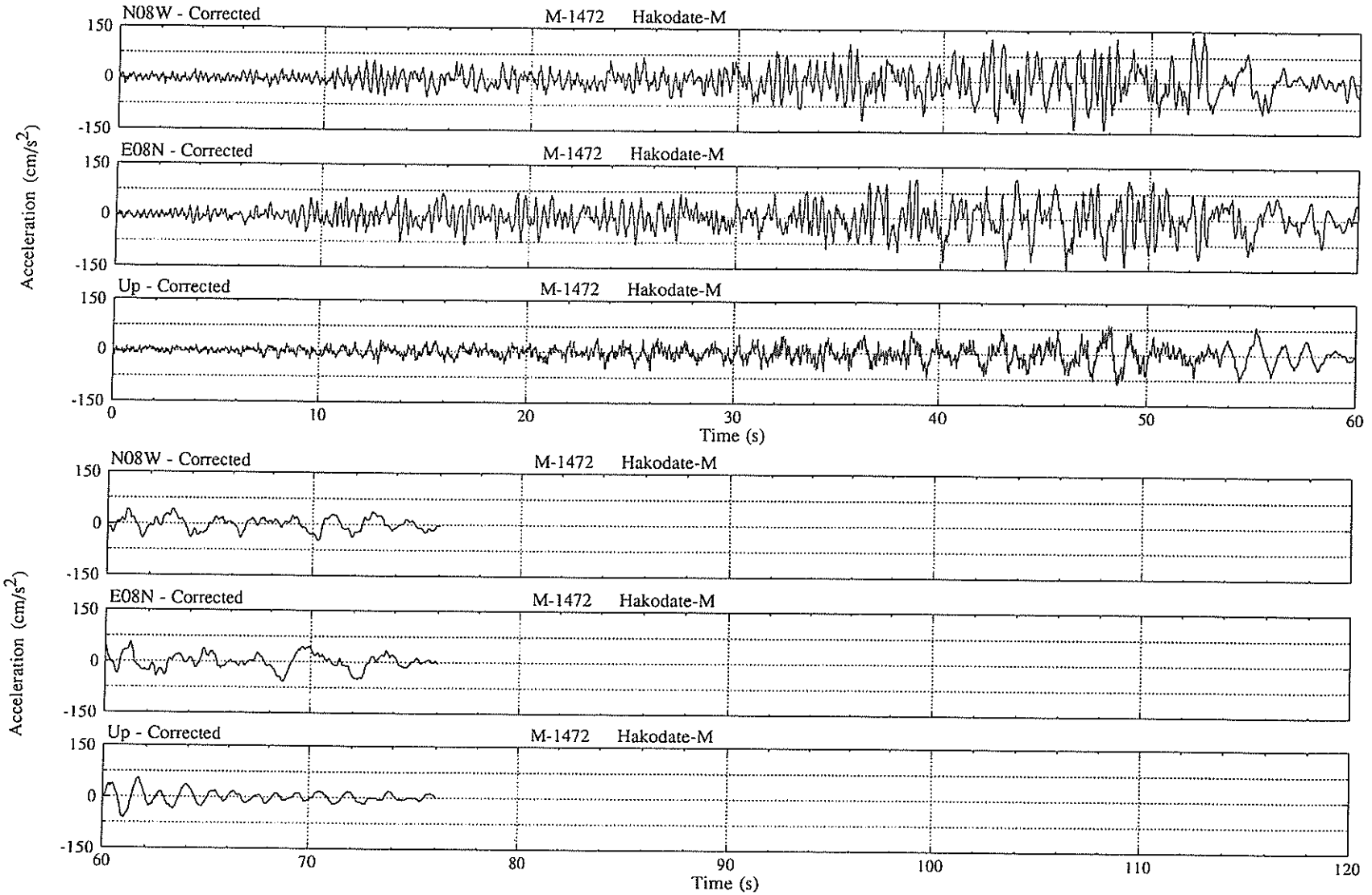
DATE AND TIME	22:17 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42° 46.8' N
LONGITUDE	139° 11.0' E
DEPTH	35.1KM
JMA MAGNITUDE	7.8

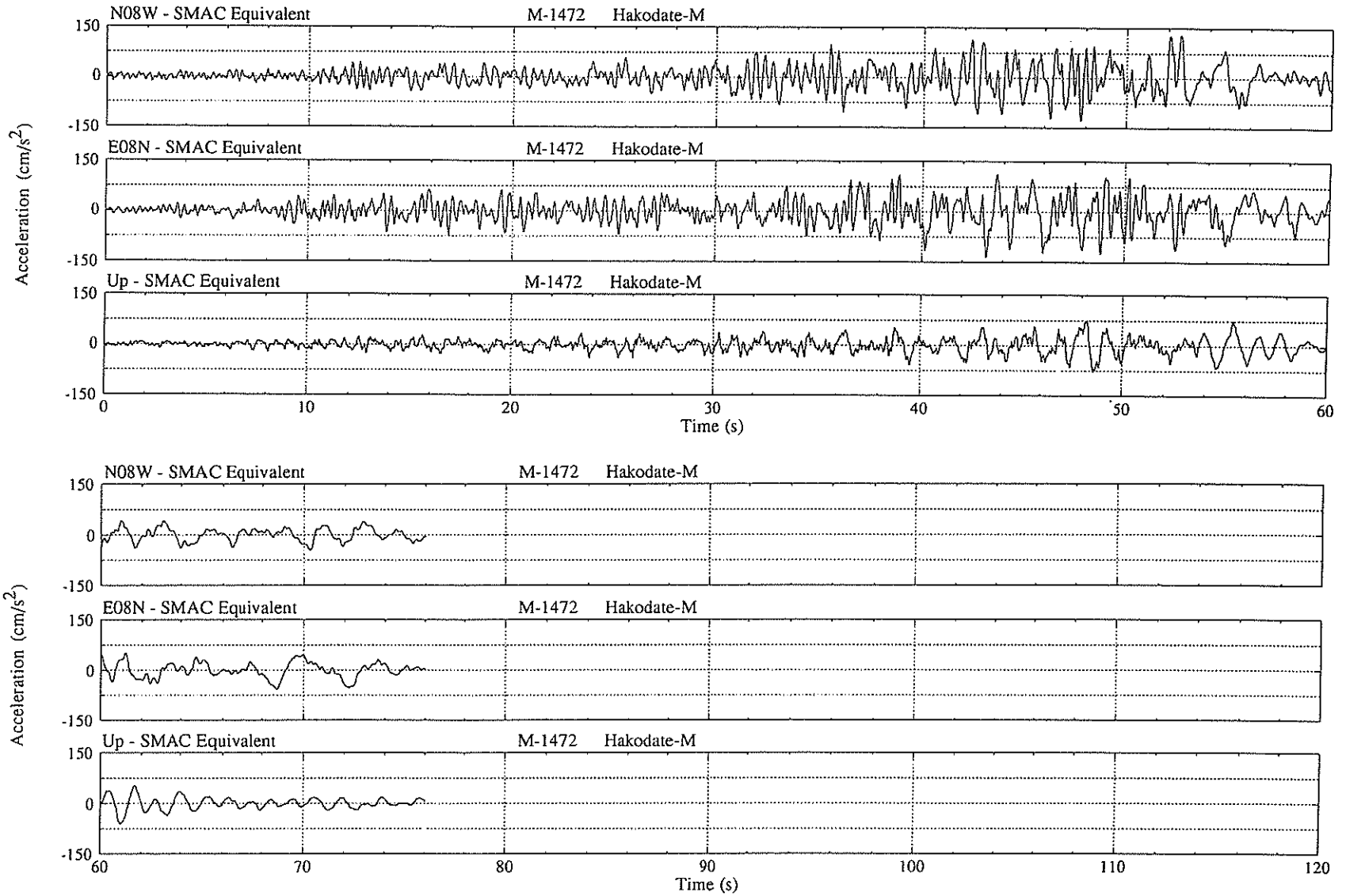
****

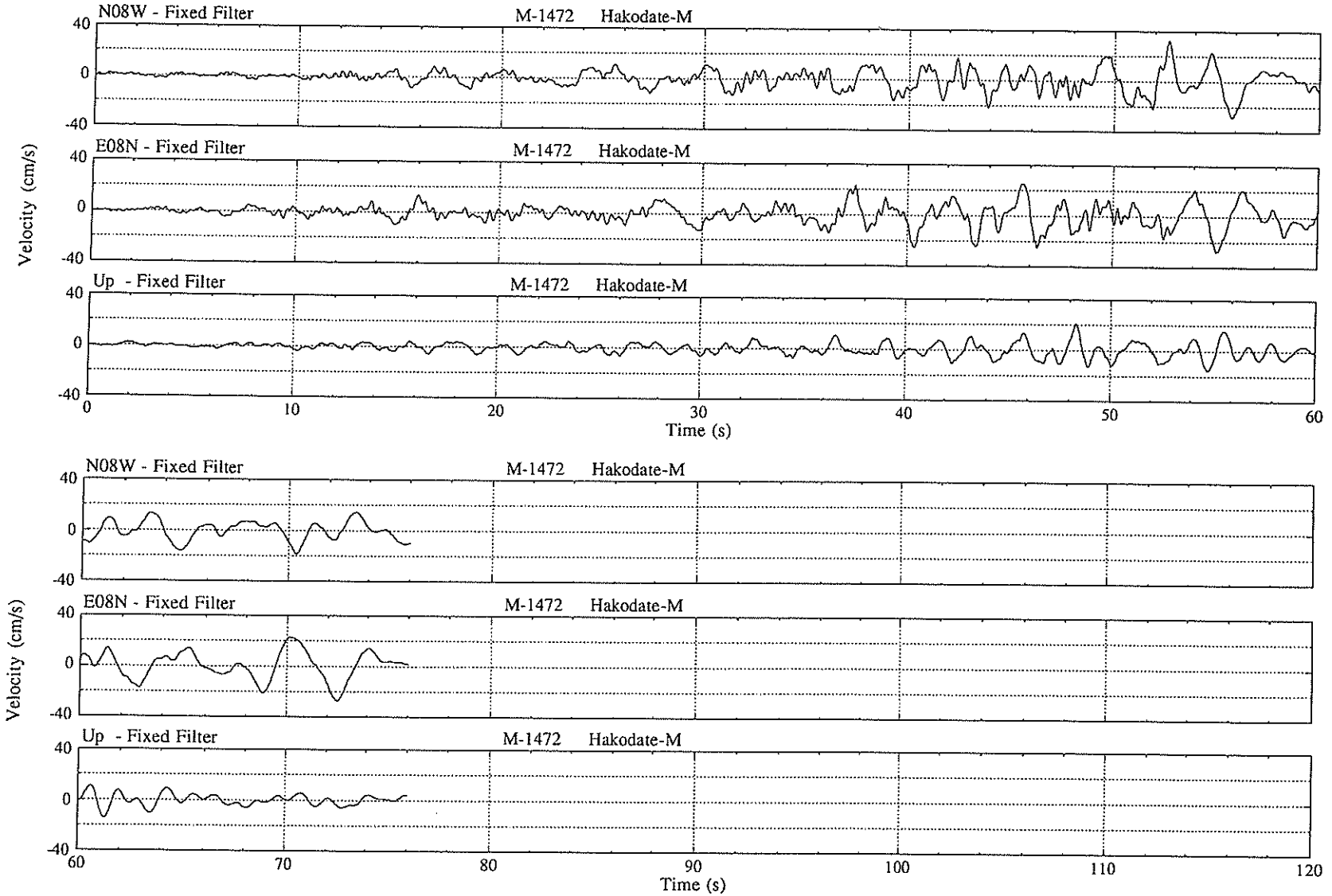
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.113	0.112	0.143	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	131.0	134.5	77.1	140.3
ORIGINAL	143.5	149.3	91.7	152.6
CORRECTED	145.4	148.8	87.2	151.8
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	33.21	27.54	21.23	33.97
VARIABLE FILTER	30.57	28.43	20.00	32.29
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	11.99	14.85	5.36	16.68
VARIABLE FILTER	12.81	15.26	5.17	17.03

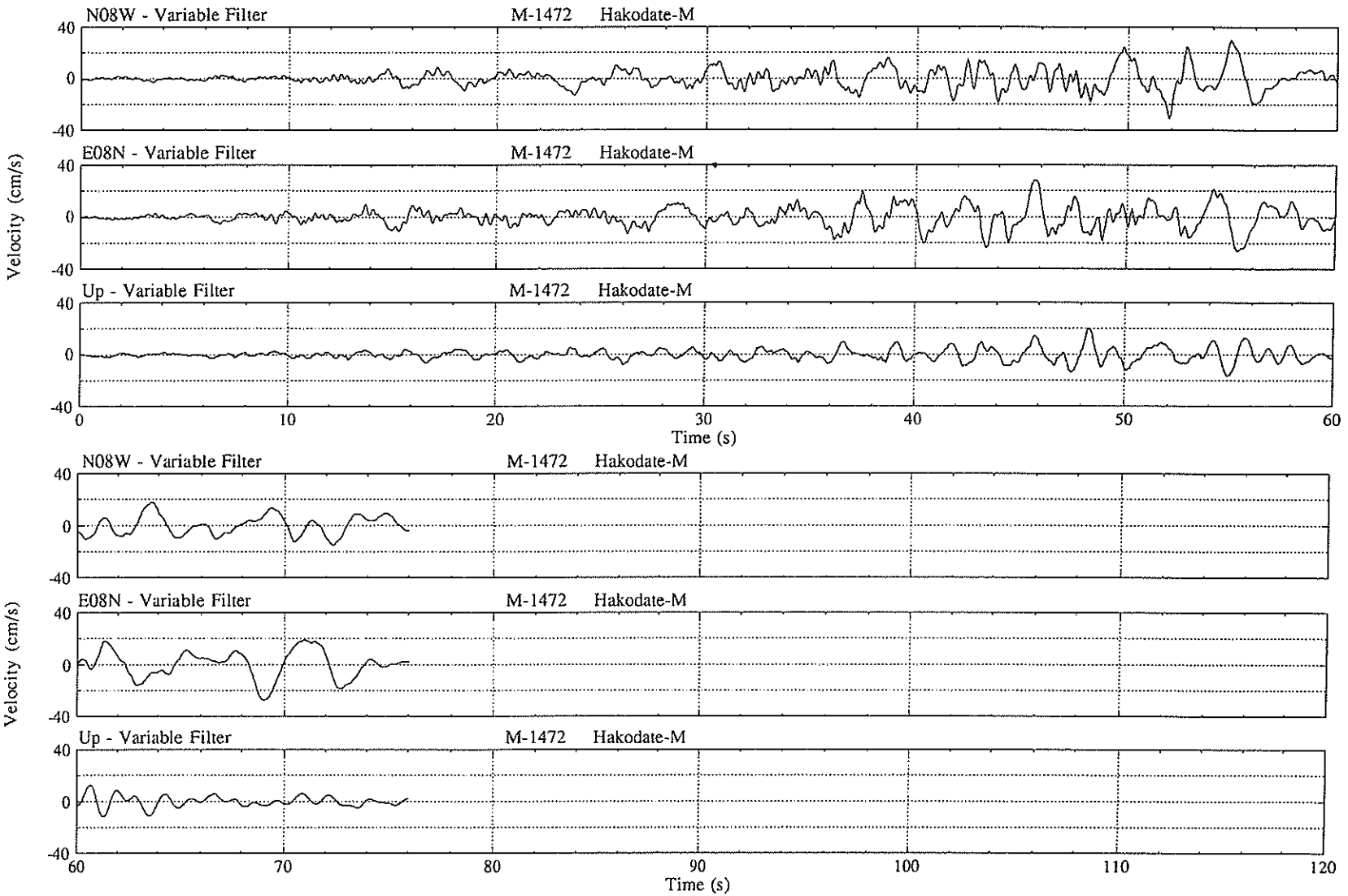
* RESULTANT OF HORIZONTAL COMPONENTS

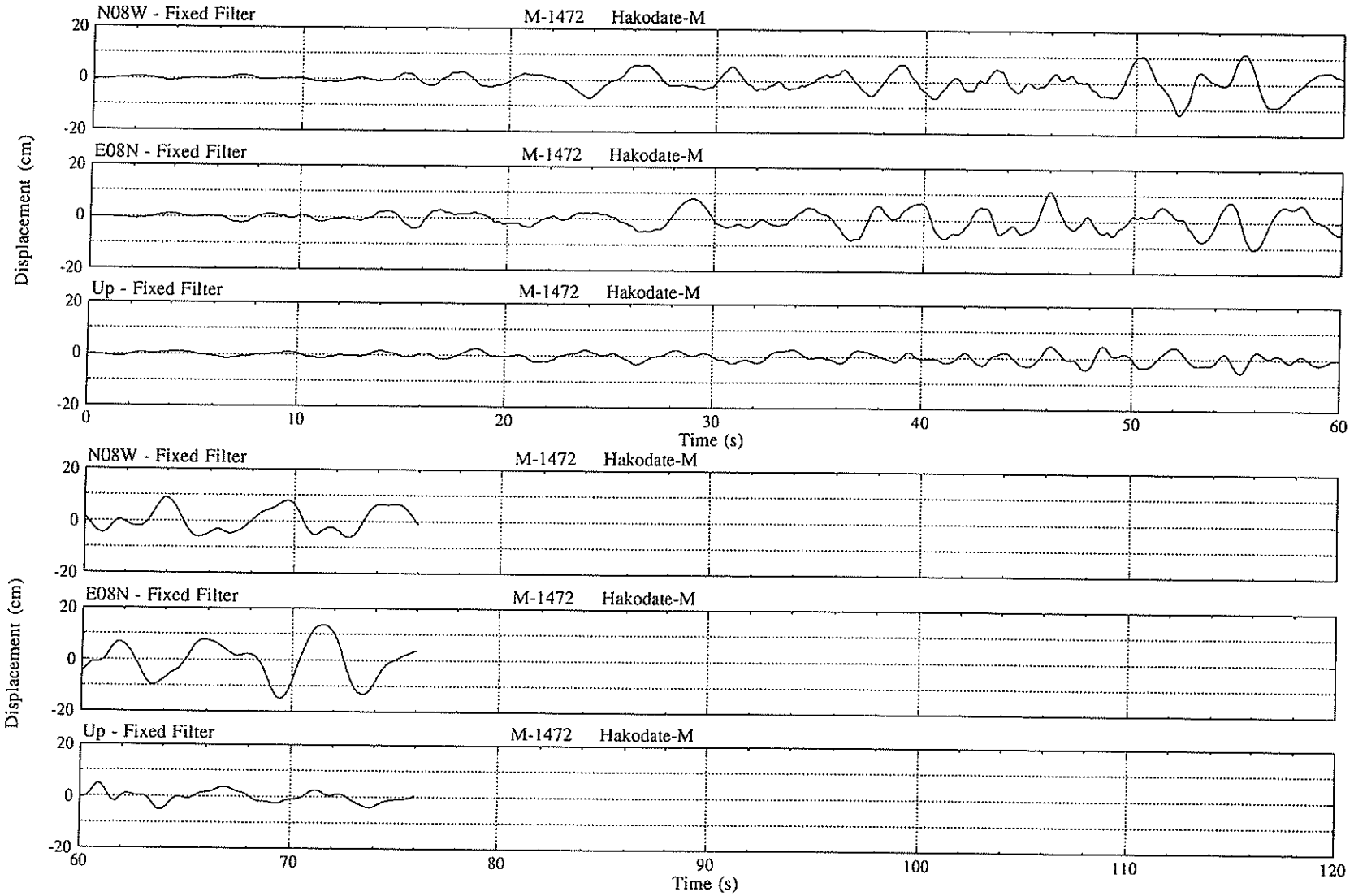

N08W - Original
M-1472 Hakodate-M
E08N - Original
M-1472 Hakodate-M
Up - Original
M-1472 Hakodate-M
Acceleration (cm/s2)
140
0
-140
0
10
20
30
40
50
60
Time (s)
N08W - Original
M-1472 Hakodate-M
E08N - Original
M-1472 Hakodate-M
Up - Original
M-1472 Hakodate-M
Acceleration (cm/s2)
60
70
80
90
100
110
120
Time (s)

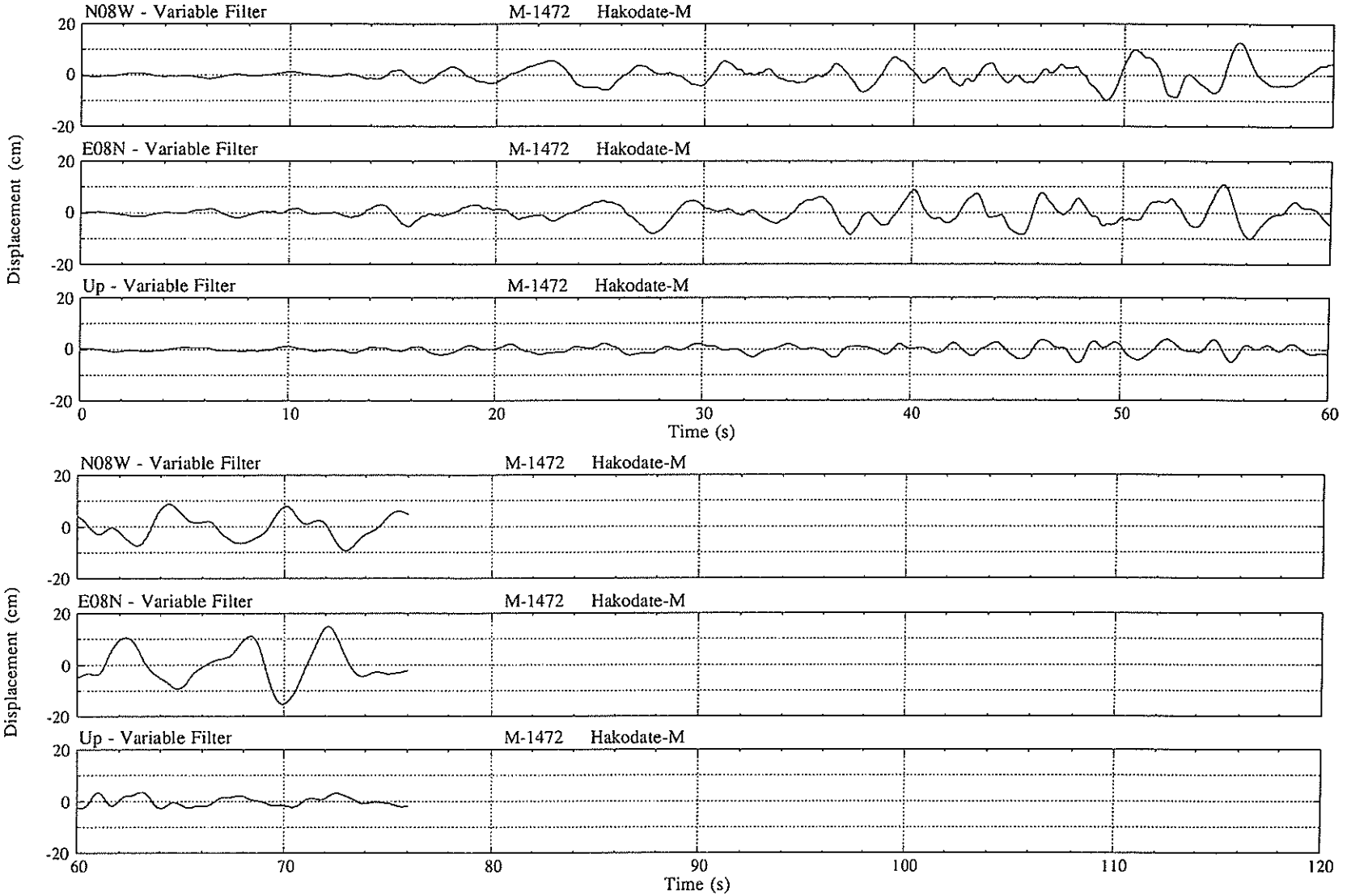

N08W - Corrected
M-1472 Hakodate-M
E08N - Corrected
M-1472 Hakodate-M
Up - Corrected
M-1472 Hakodate-M
Acceleration (cm/s2)
150
0
-150
0
10
20
30
40
50
60
Time (s)
N08W - Corrected
M-1472 Hakodate-M
E08N - Corrected
M-1472 Hakodate-M
Up - Corrected
M-1472 Hakodate-M
Acceleration (cm/s2)
60
70
80
90
100
110
120
Time (s)

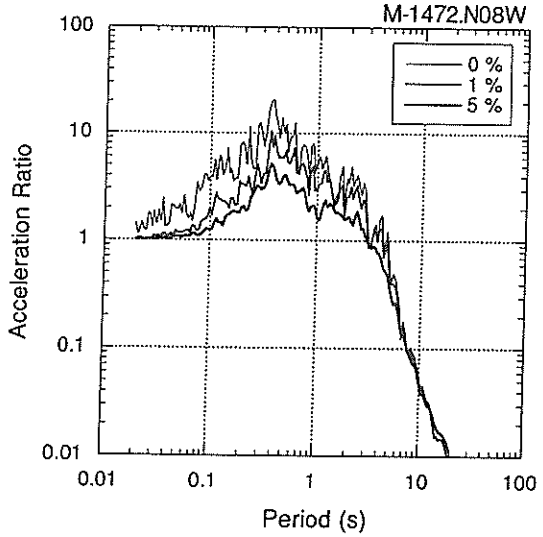

N08W - SMAC Equivalent
M-1472 Hakodate-M
E08N - SMAC Equivalent
M-1472 Hakodate-M
Up - SMAC Equivalent
M-1472 Hakodate-M
Acceleration (cm/s^2)
150
0
-150
0
10
20
30
40
50
60
Time (s)
N08W - SMAC Equivalent
M-1472 Hakodate-M
E08N - SMAC Equivalent
M-1472 Hakodate-M
Up - SMAC Equivalent
M-1472 Hakodate-M
Acceleration (cm/s^2)
150
0
-150
60
70
80
90
100
110
120
Time (s)

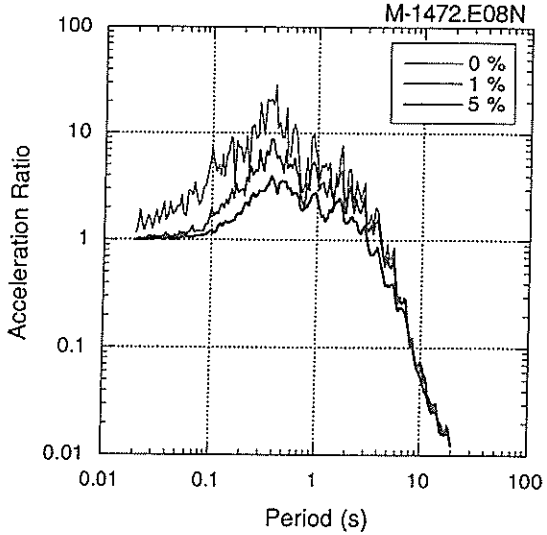

N08W - Fixed Filter
M-1472 Hakodate-M
E08N - Fixed Filter
M-1472 Hakodate-M
Up - Fixed Filter
M-1472 Hakodate-M
Velocity (cm/s)
40
0
-40
0
10
20
30
40
50
60
Time (s)
N08W - Fixed Filter
M-1472 Hakodate-M
E08N - Fixed Filter
M-1472 Hakodate-M
Up - Fixed Filter
M-1472 Hakodate-M
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

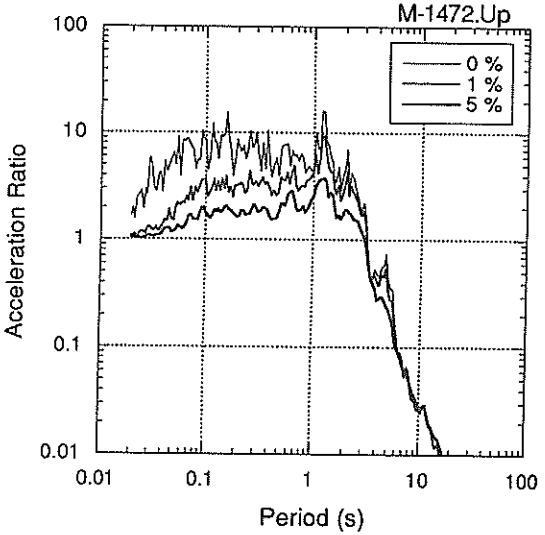

N08W - Variable Filter
M-1472 Hakodate-M
E08N - Variable Filter
M-1472 Hakodate-M
Up - Variable Filter
M-1472 Hakodate-M
Velocity (cm/s)
40
0
-40
0
10
20
30
40
50
60
Time (s)
N08W - Variable Filter
M-1472 Hakodate-M
E08N - Variable Filter
M-1472 Hakodate-M
Up - Variable Filter
M-1472 Hakodate-M
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

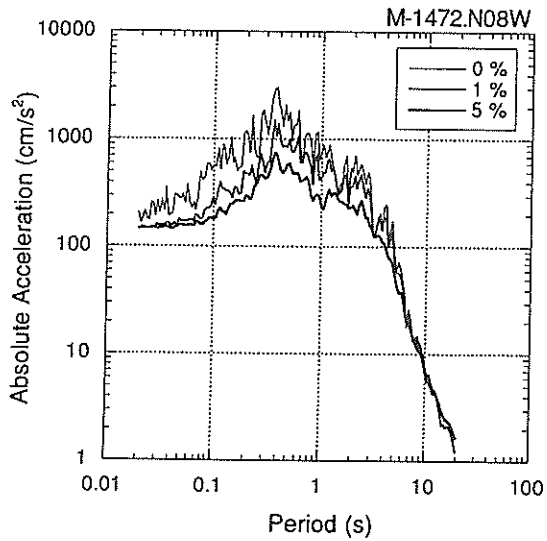

N08W - Fixed Filter
M-1472 Hakodate-M
E08N - Fixed Filter
M-1472 Hakodate-M
Up - Fixed Filter
M-1472 Hakodate-M
Displacement (cm)
20
0
-20
0
10
20
30
40
50
60
Time (s)
N08W - Fixed Filter
M-1472 Hakodate-M
E08N - Fixed Filter
M-1472 Hakodate-M
Up - Fixed Filter
M-1472 Hakodate-M
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

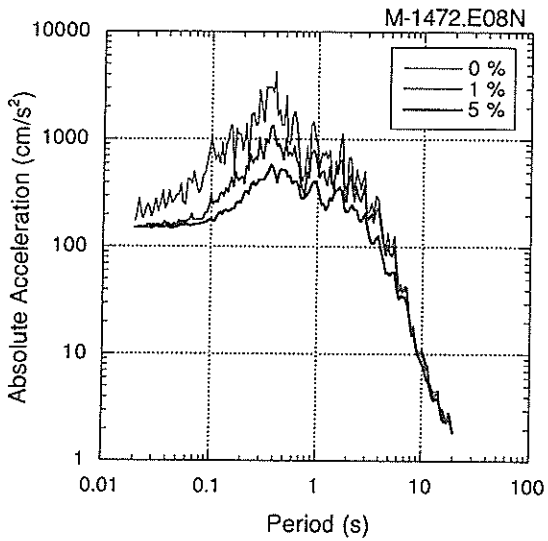

N08W - Variable Filter
M-1472 Hakodate-M
E08N - Variable Filter
M-1472 Hakodate-M
Up - Variable Filter
M-1472 Hakodate-M
Displacement (cm)
20
0
-20
0
10
20
30
40
50
60
Time (s)
N08W - Variable Filter
M-1472 Hakodate-M
E08N - Variable Filter
M-1472 Hakodate-M
Up - Variable Filter
M-1472 Hakodate-M
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

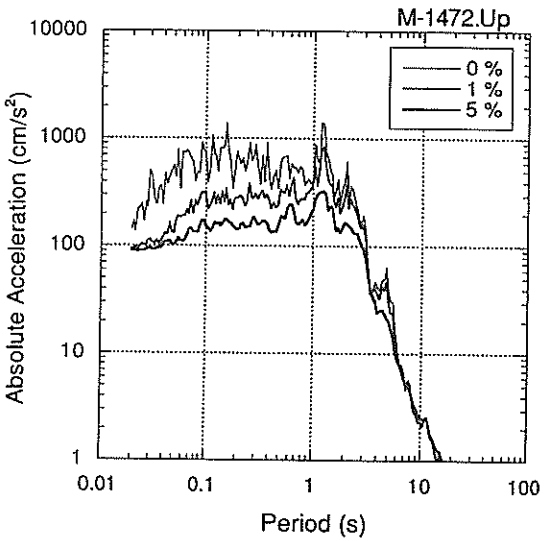

M-1472.N08W
0 %
1 %
5 %
Acceleration Ratio
Period (s)

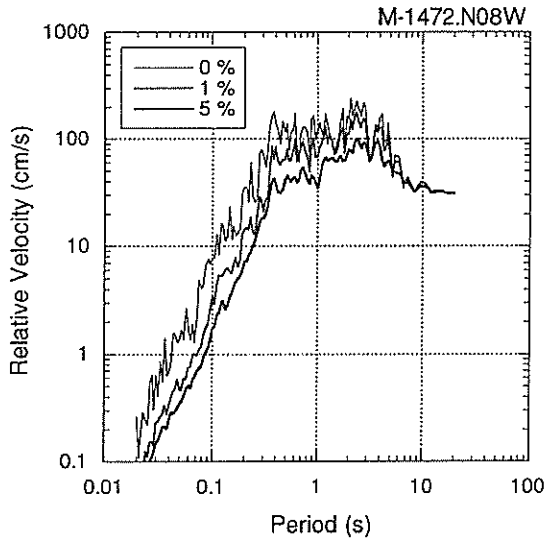

M-1472.E08N
0 %
1 %
5 %
Acceleration Ratio
Period (s)

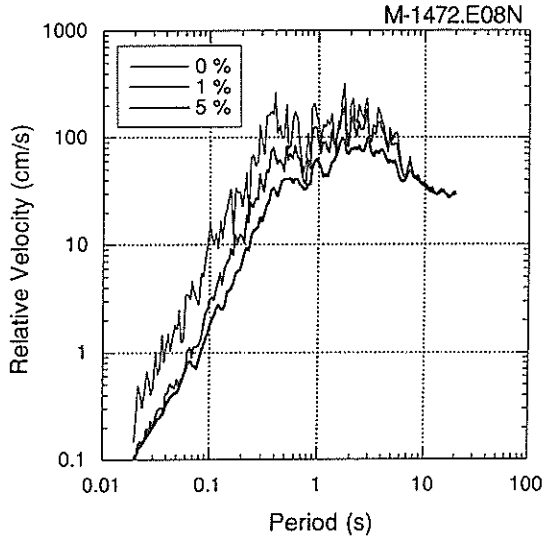

M-1472.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)

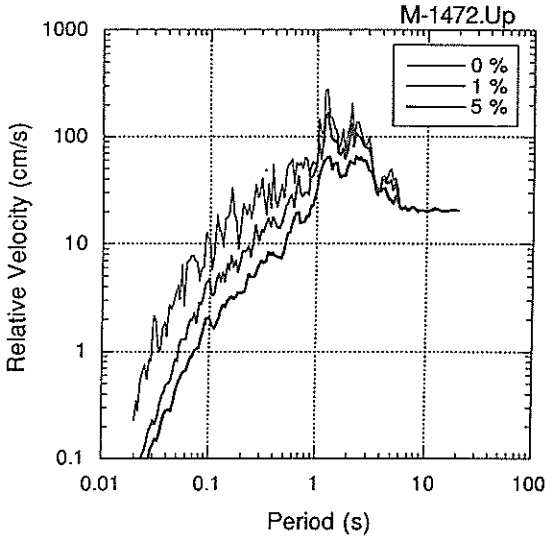

M-1472.N08W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

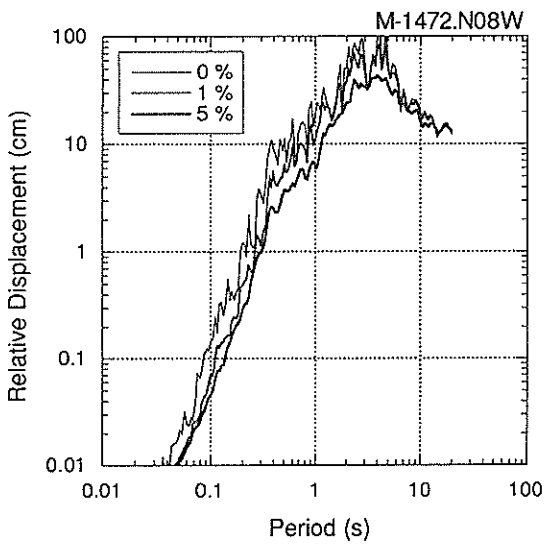

M-1472.E08N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

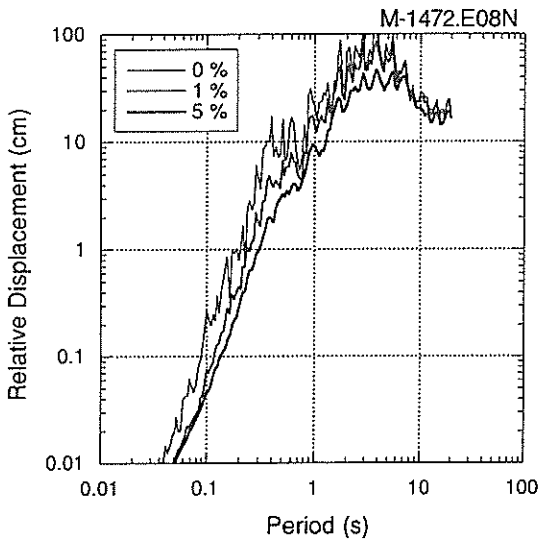

M-1472.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

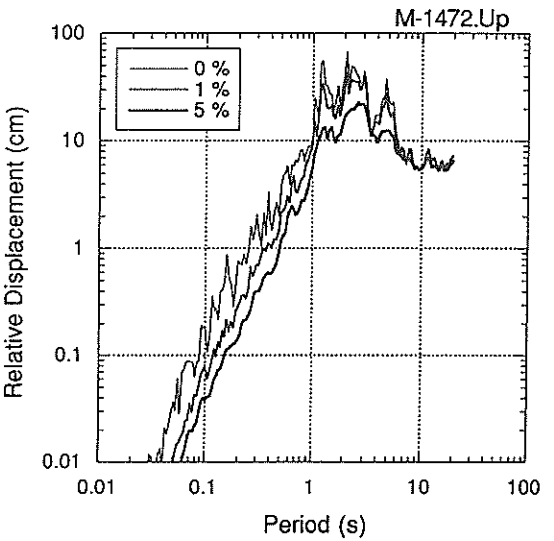

M-1472.N08W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

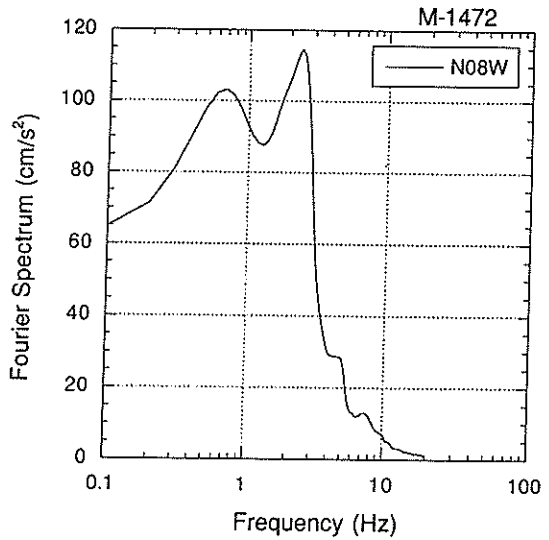

M-1472.E08N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

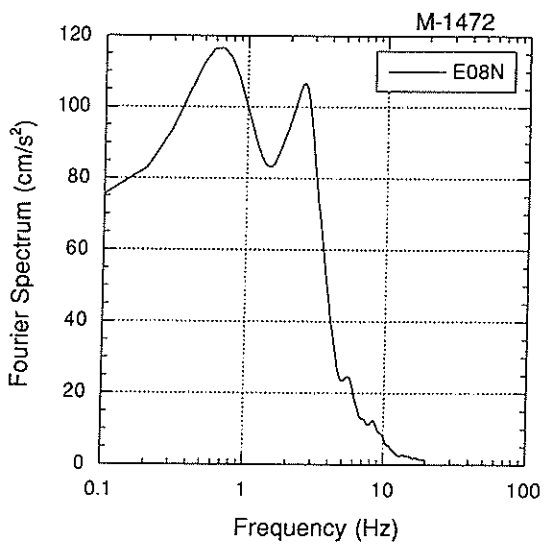

M-1472.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

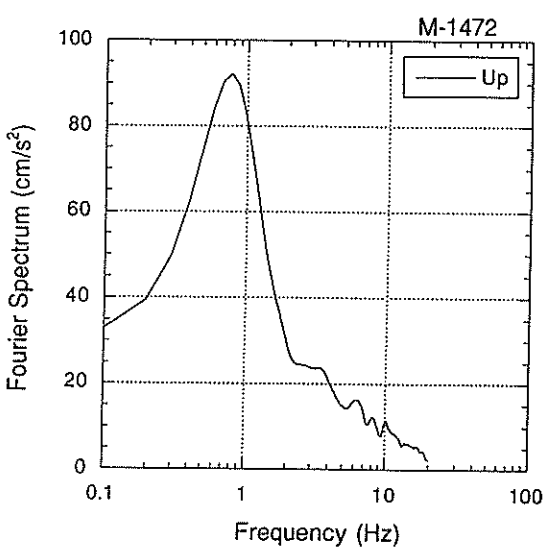

M-1472.N08W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

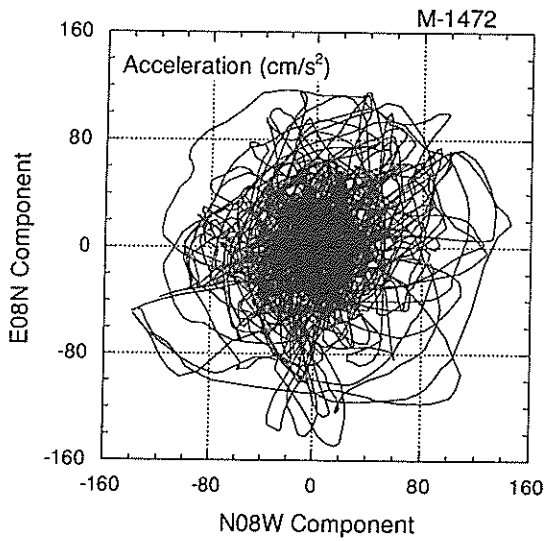

M-1472.E08N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

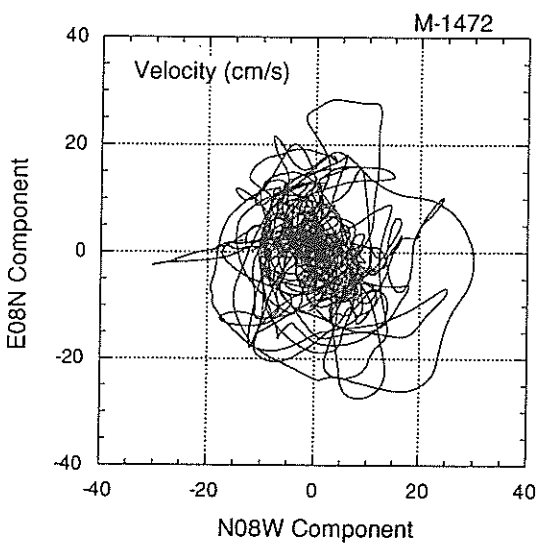

M-1472.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

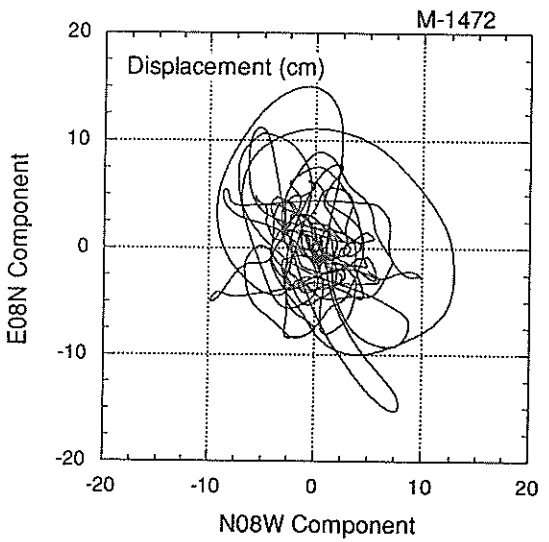

M-1472
N08W
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1472
E08N
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1472
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1472
Acceleration (cm/s²)
E08N Component
N08W Component


M-1472
Velocity (cm/s)
E08N Component
N08W Component


M-1472
Displacement (cm)
E08N Component
N08W Component

RECORD NUMBER : F-538

STATION : OTARU-G

EARTHQUAKE DATA

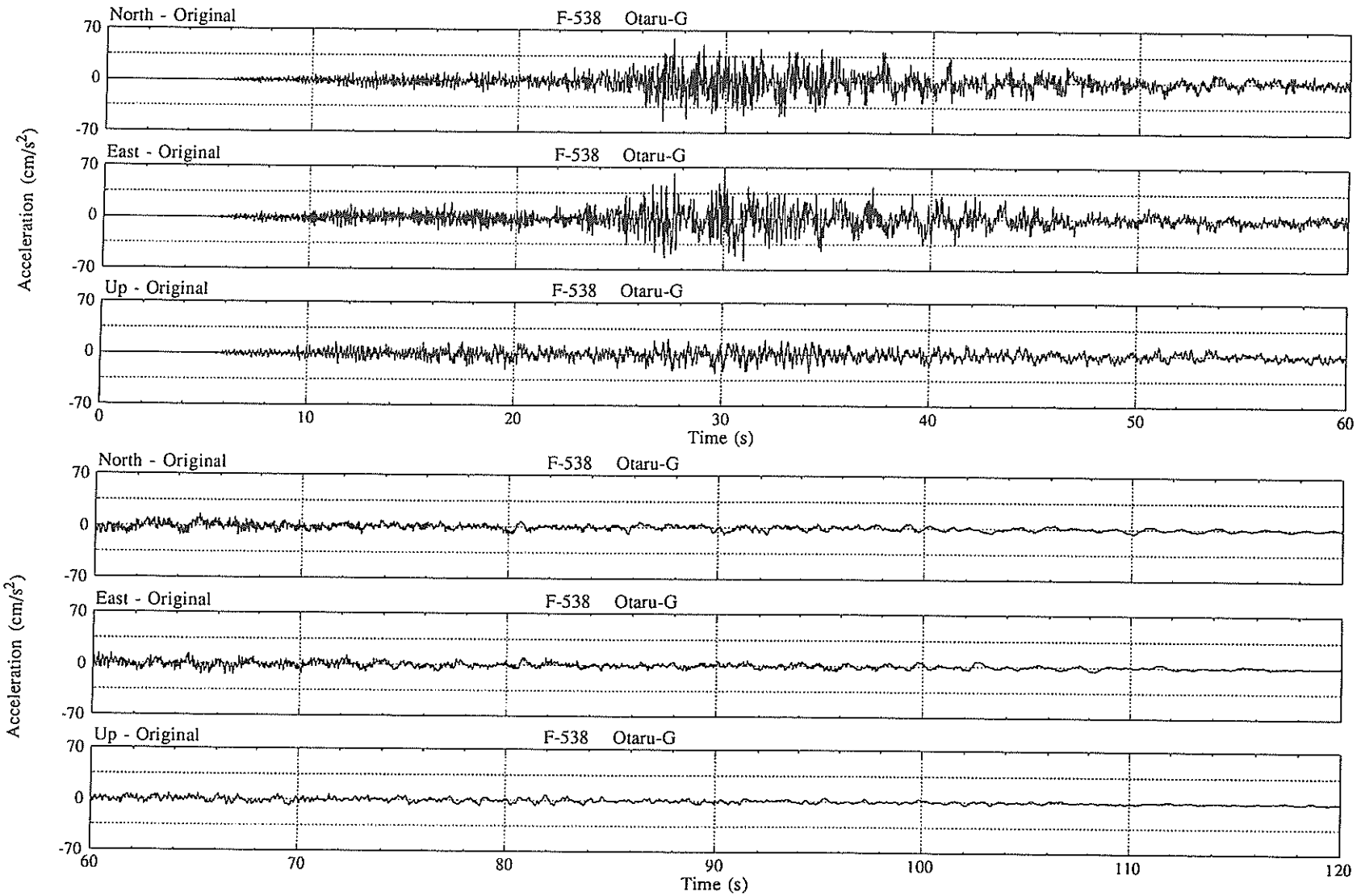
****

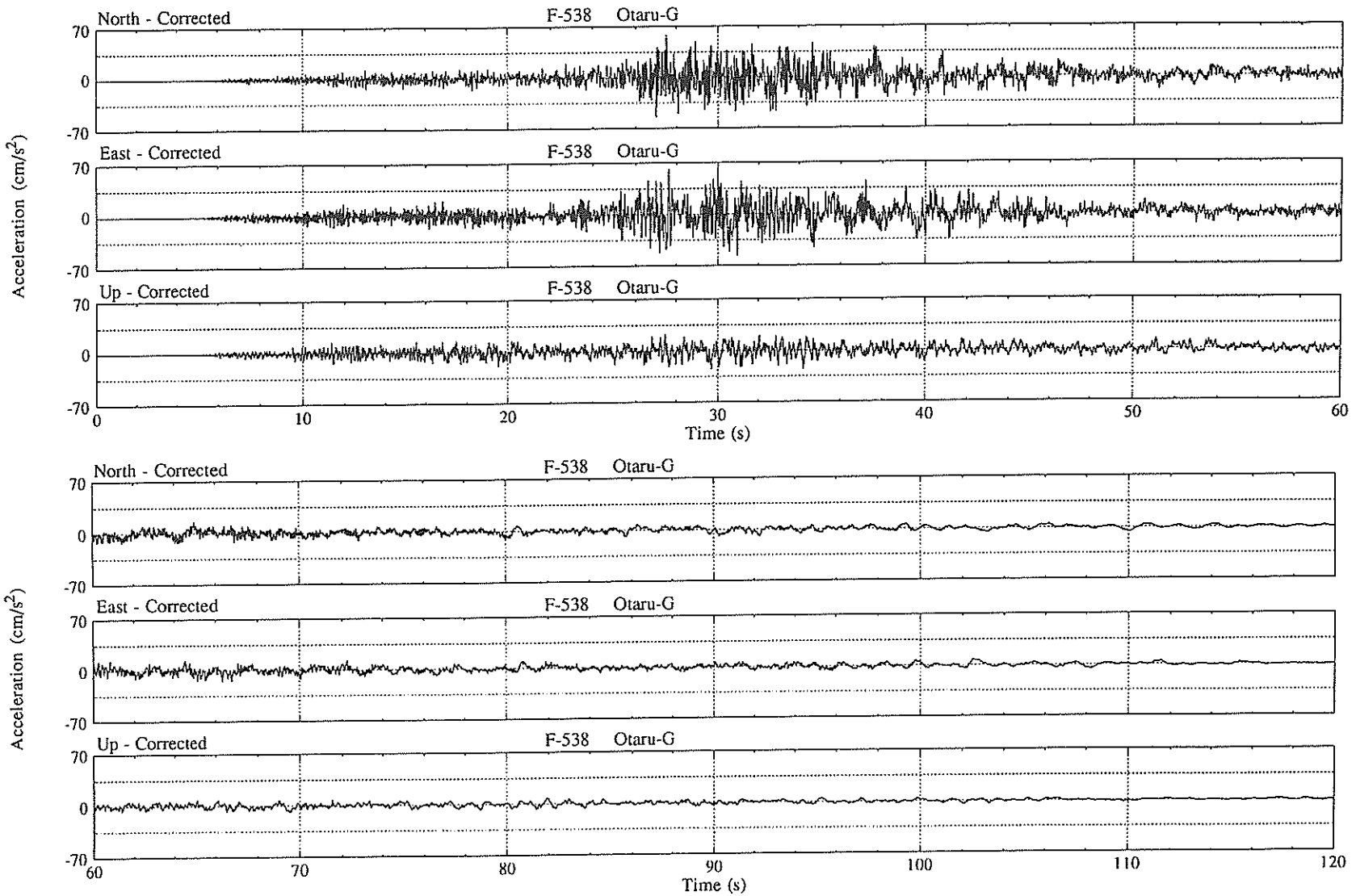
DATE AND TIME	22:17 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°46.8' N
LONGITUDE	139°11.0' E
DEPTH	35.1KM
JMA MAGNITUDE	7.8

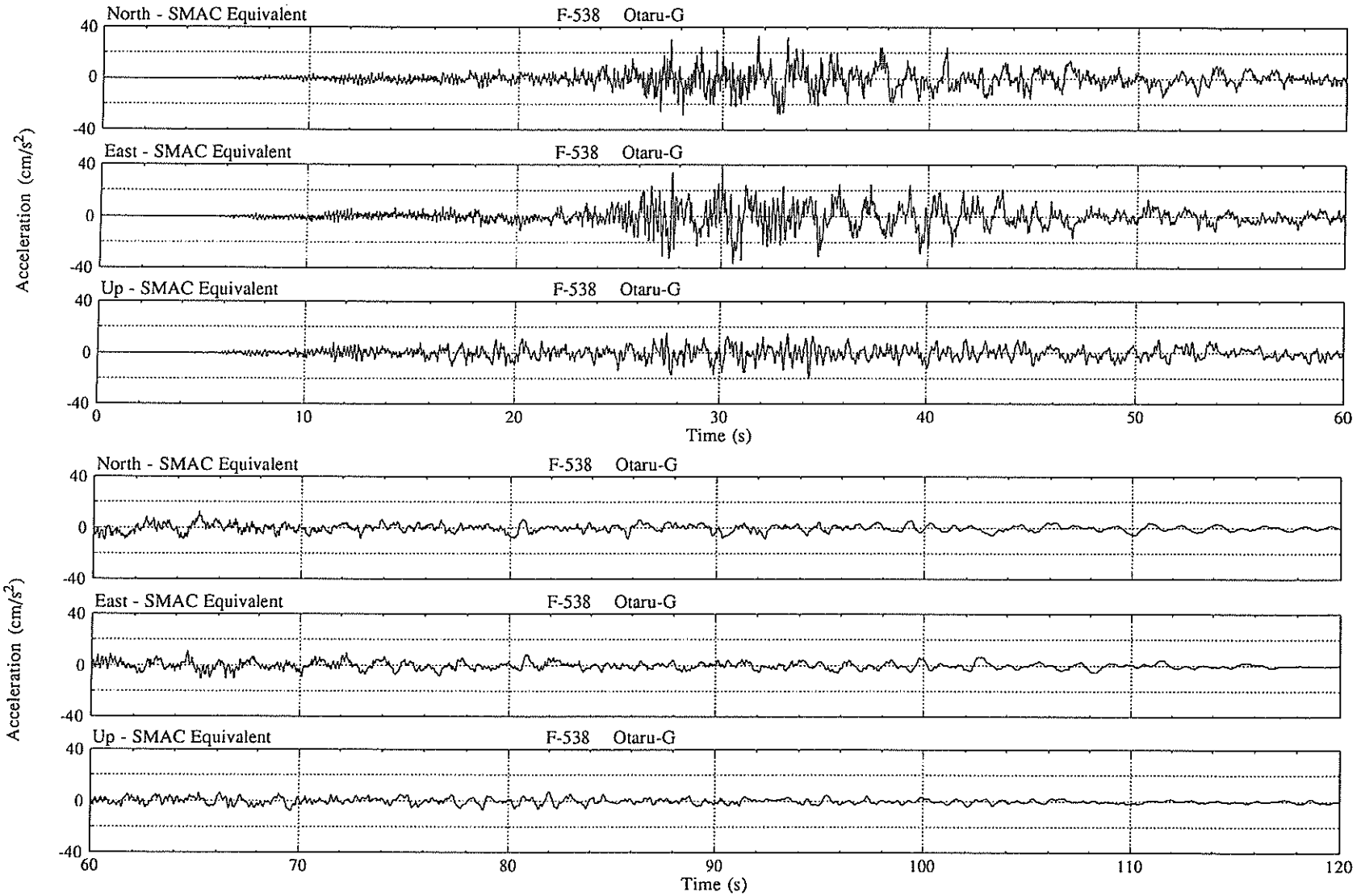
****

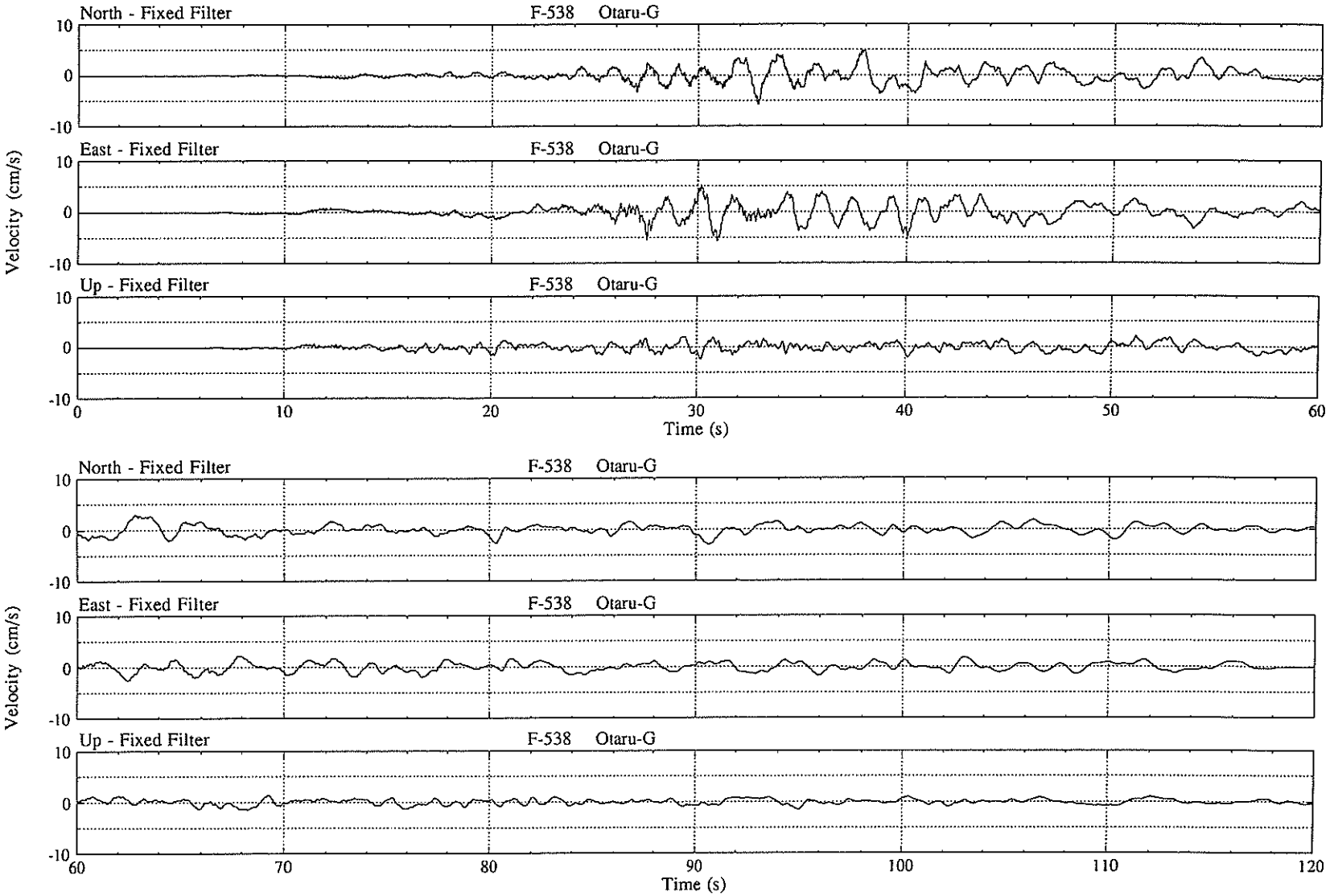
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.048	0.048	0.048	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	33.6	36.8	19.2	44.6
ORIGINAL	59.4	66.2	24.8	71.8
CORRECTED	58.4	68.2	24.9	73.3
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	5.72	5.69	2.32	5.98
VARIABLE FILTER	8.83	5.54	4.42	8.83
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	2.92	2.47	1.70	3.29
VARIABLE FILTER	6.58	5.53	5.54	8.16

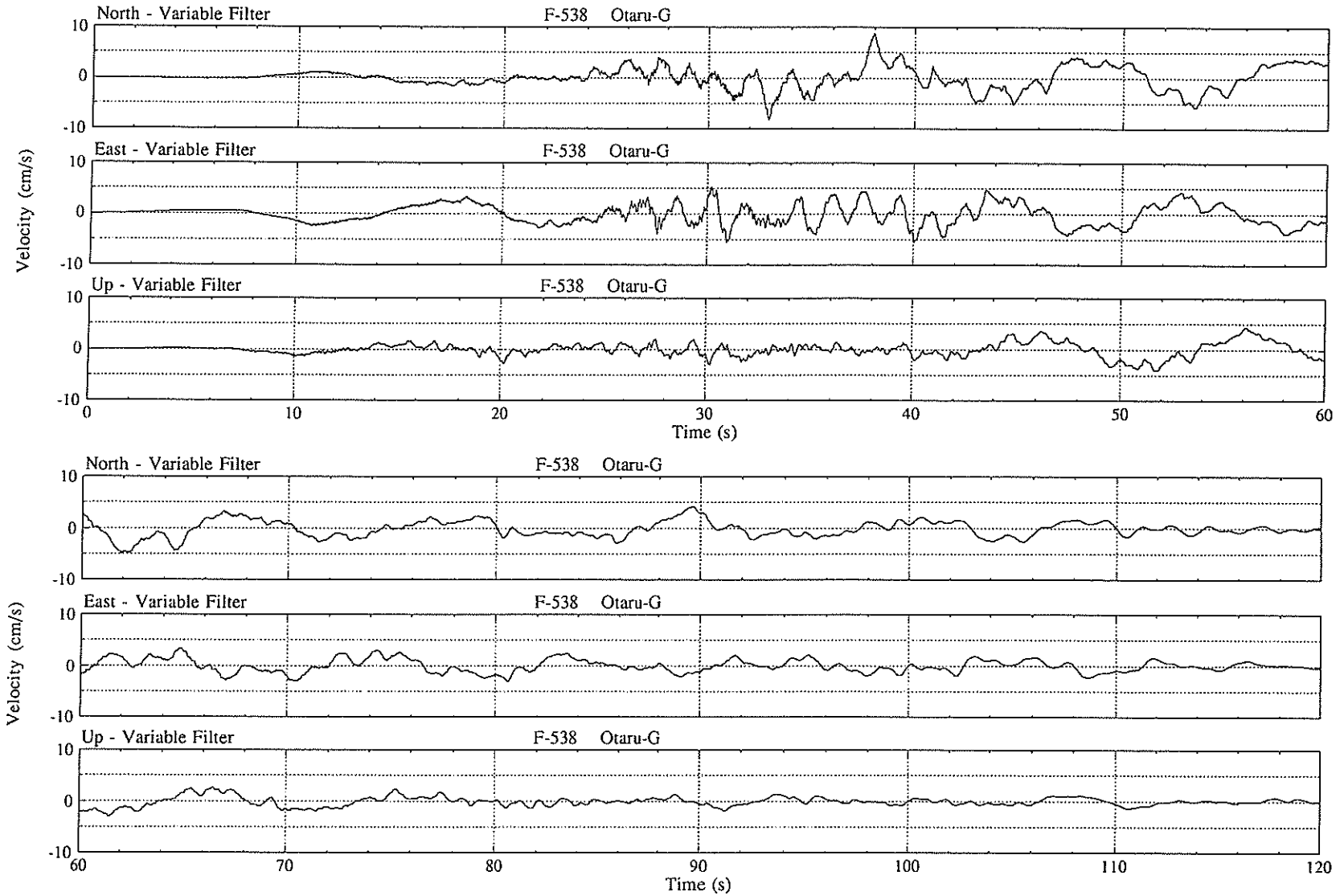
* RESULTANT OF HORIZONTAL COMPONENTS

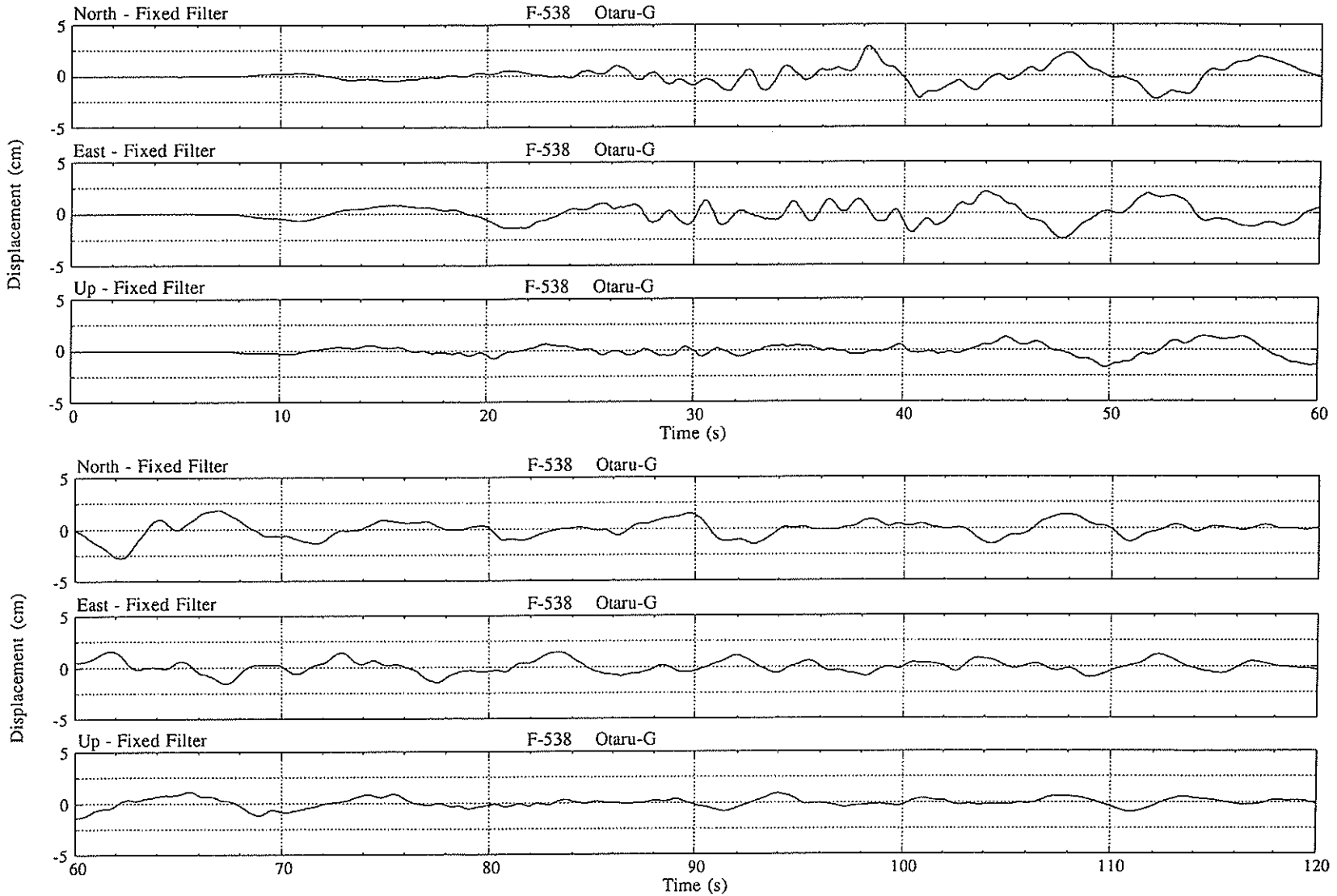

North - Original
F-538 Otaru-G
East - Original
F-538 Otaru-G
Up - Original
F-538 Otaru-G
Acceleration (cm/s²)
70
0
-70
0
10
20
30
40
50
60
Time (s)
North - Original
F-538 Otaru-G
East - Original
F-538 Otaru-G
Up - Original
F-538 Otaru-G
Acceleration (cm/s²)
70
0
-70
60
70
80
90
100
110
120
Time (s)

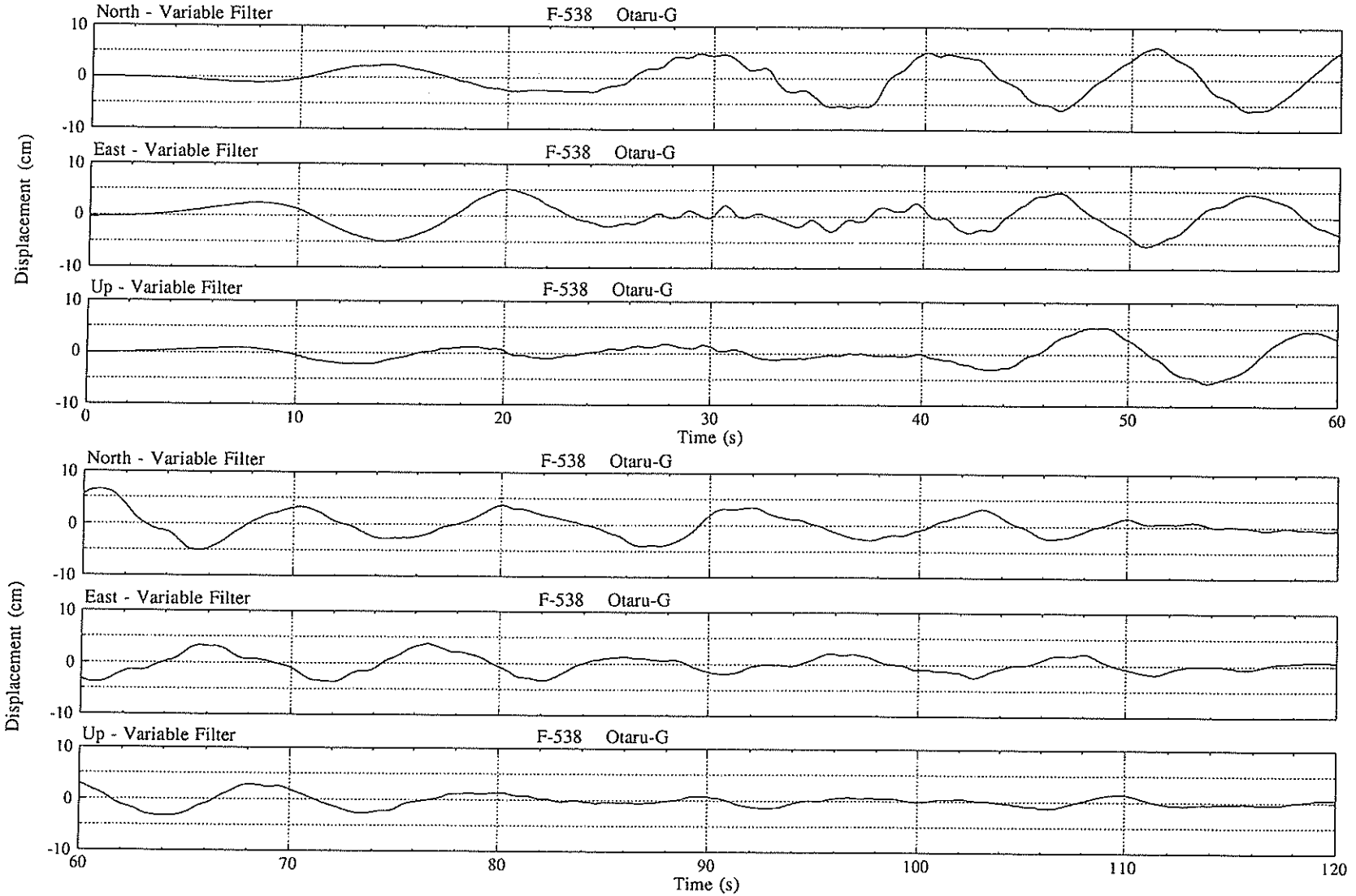

North - Corrected
F-538 Otaru-G
East - Corrected
F-538 Otaru-G
Up - Corrected
F-538 Otaru-G
Acceleration (cm/s²)
70
0
-70
0
10
20
30
40
50
60
Time (s)
North - Corrected
F-538 Otaru-G
East - Corrected
F-538 Otaru-G
Up - Corrected
F-538 Otaru-G
Acceleration (cm/s²)
70
0
-70
60
70
80
90
100
110
120
Time (s)

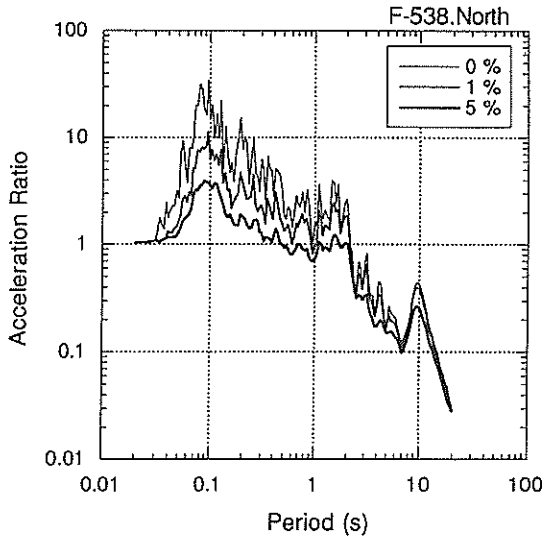

North - SMAC Equivalent
F-538 Otaru-G
East - SMAC Equivalent
F-538 Otaru-G
Up - SMAC Equivalent
F-538 Otaru-G
Acceleration (cm/s²)
40
0
-40
0
10
20
30
40
50
60
Time (s)
North - SMAC Equivalent
F-538 Otaru-G
East - SMAC Equivalent
F-538 Otaru-G
Up - SMAC Equivalent
F-538 Otaru-G
Acceleration (cm/s²)
40
0
-40
60
70
80
90
100
110
120
Time (s)

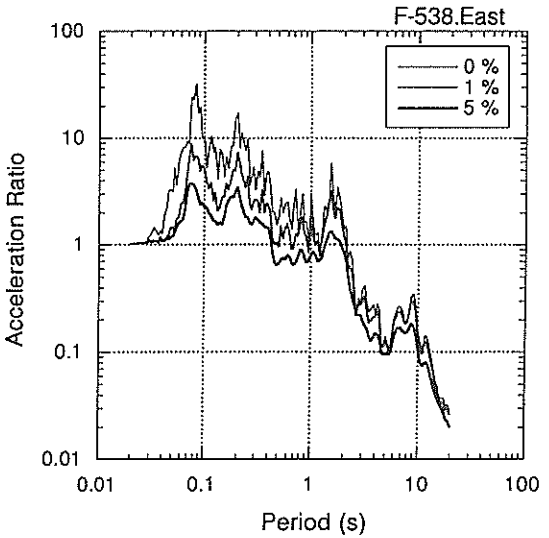

North - Fixed Filter
F-538 Otaru-G
East - Fixed Filter
F-538 Otaru-G
Up - Fixed Filter
F-538 Otaru-G
Velocity (cm/s)
Time (s)
10
0
-10
0
10
20
30
40
50
60
70
80
90
100
110
120

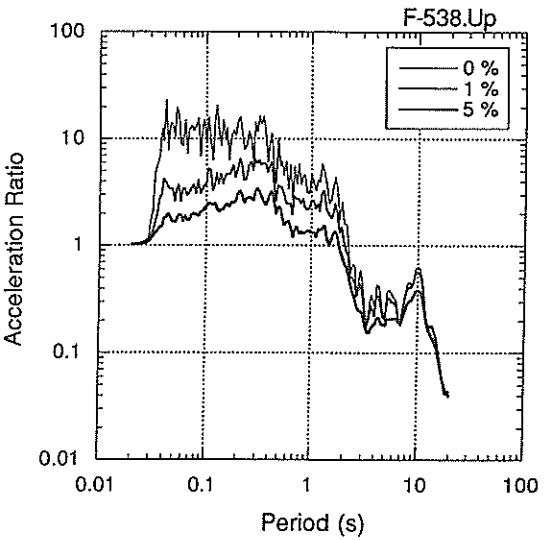

North - Variable Filter
F-538 Otaru-G
East - Variable Filter
F-538 Otaru-G
Up - Variable Filter
F-538 Otaru-G
Velocity (cm/s)
10
0
-10
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-538 Otaru-G
East - Variable Filter
F-538 Otaru-G
Up - Variable Filter
F-538 Otaru-G
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

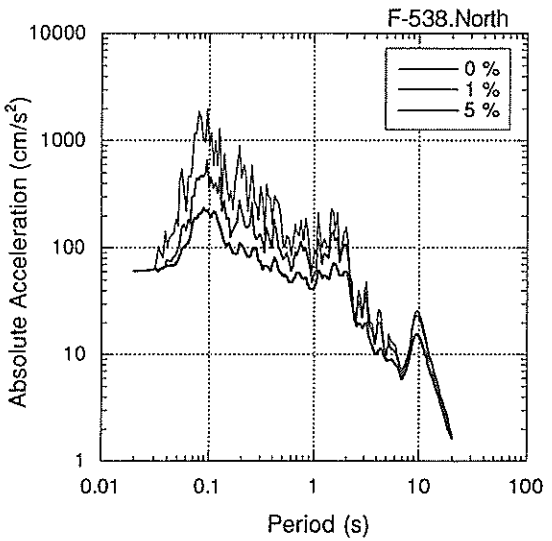

North - Fixed Filter
F-538 Otaru-G
East - Fixed Filter
F-538 Otaru-G
Up - Fixed Filter
F-538 Otaru-G
Displacement (cm)
Time (s)
North - Fixed Filter
F-538 Otaru-G
East - Fixed Filter
F-538 Otaru-G
Up - Fixed Filter
F-538 Otaru-G
Displacement (cm)
Time (s)

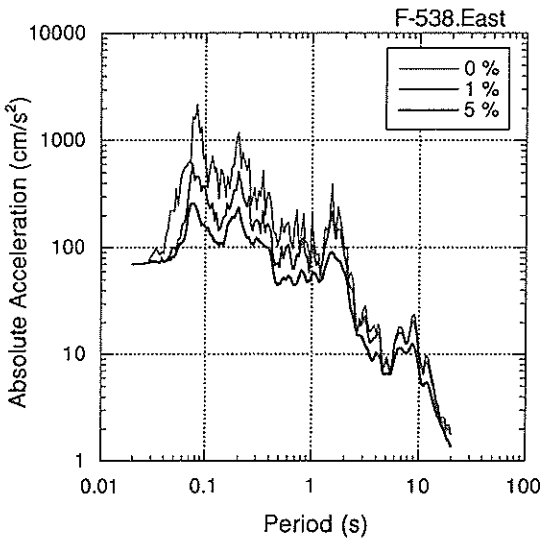

North - Variable Filter
F-538 Otaru-G
East - Variable Filter
F-538 Otaru-G
Up - Variable Filter
F-538 Otaru-G
Displacement (cm)
Time (s)
North - Variable Filter
F-538 Otaru-G
East - Variable Filter
F-538 Otaru-G
Up - Variable Filter
F-538 Otaru-G
Displacement (cm)
Time (s)

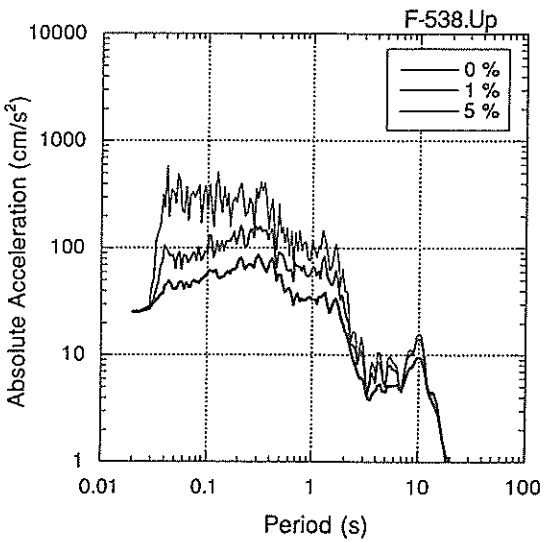

F-538.North
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

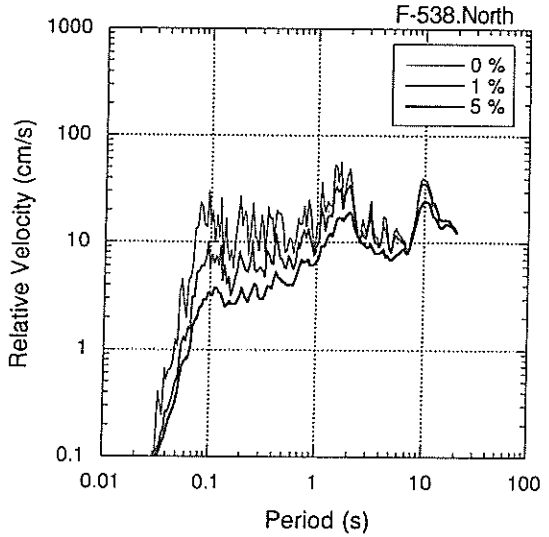

F-538.East
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

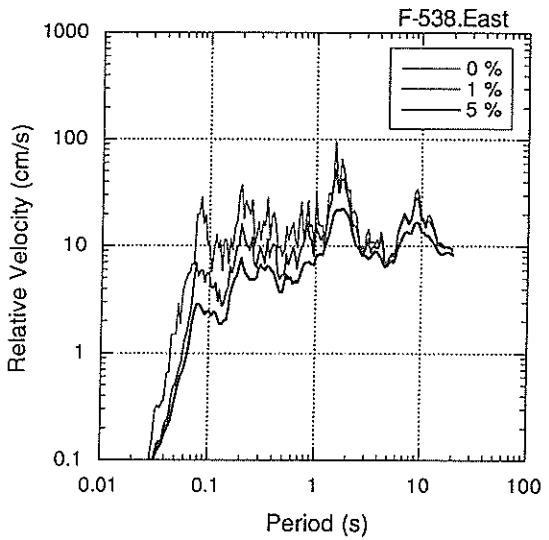

F-538.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

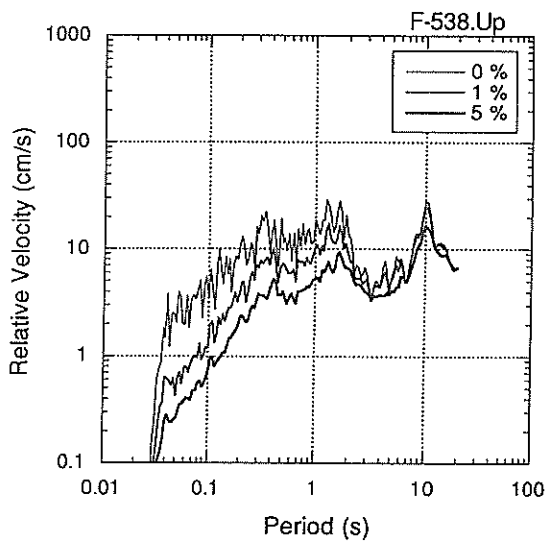

F-538.North
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

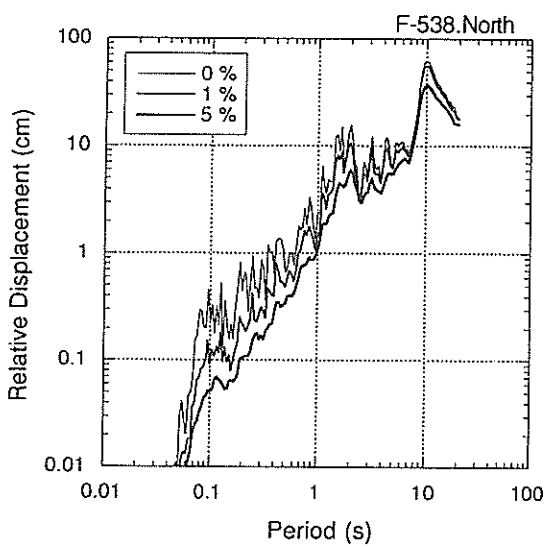

F-538.East
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

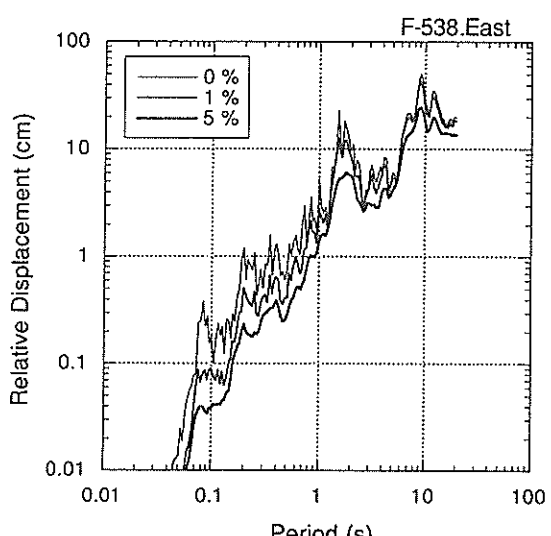

F-538.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

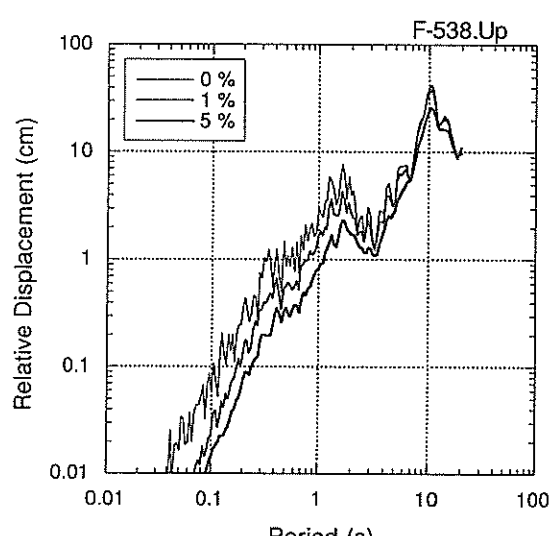

F-538.North
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

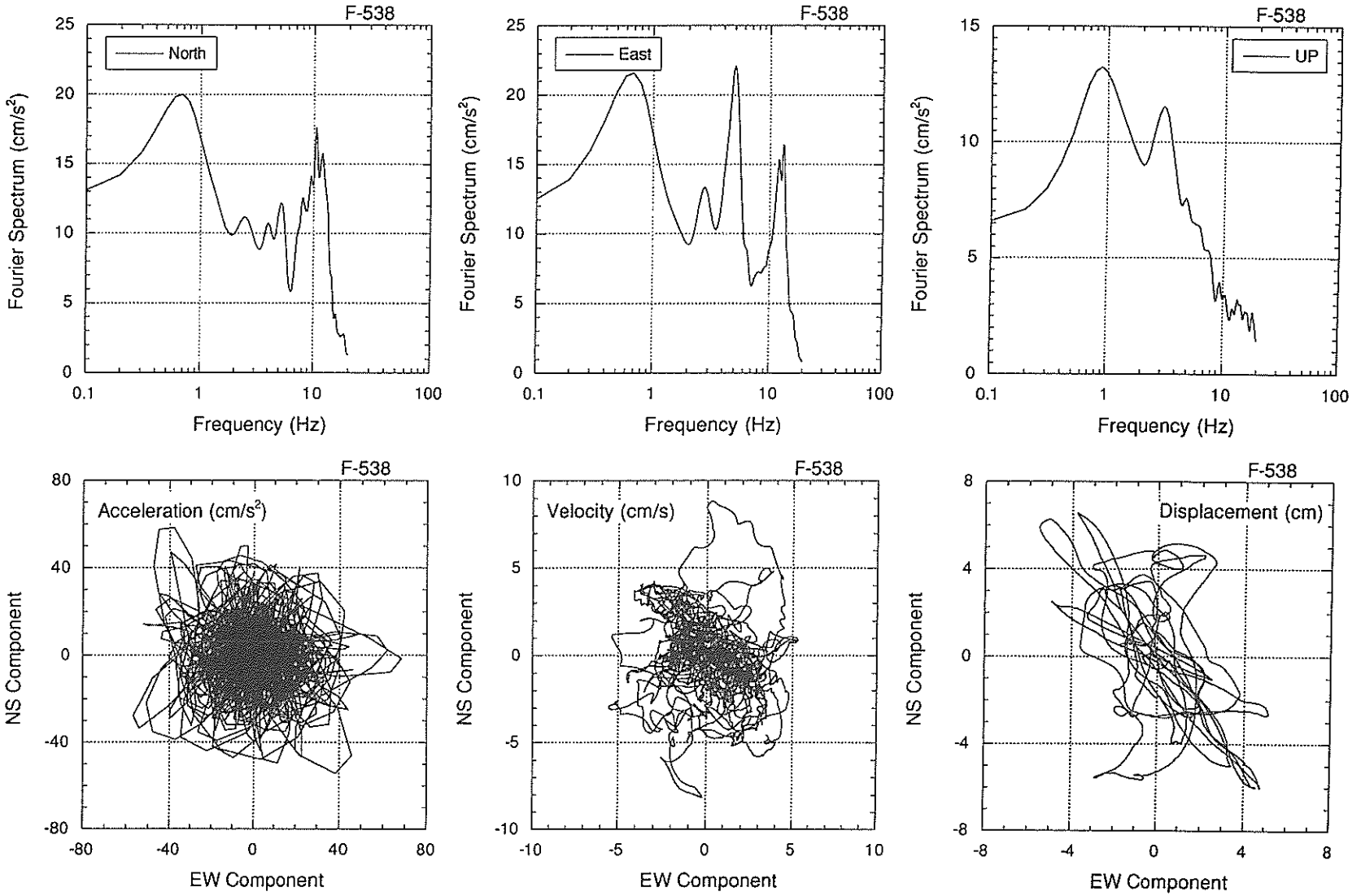

F-538.East
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100


F-538.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100


F-538.North
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100


F-538.East
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100


F-538.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100


F-538
North
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-538
East
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-538
UP
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-538
Acceleration (cm/s²)
NS Component
EW Component
F-538
Velocity (cm/s)
NS Component
EW Component
F-538
Displacement (cm)
NS Component
EW Component

RECORD NUMBER : F-541

STATION : HAKODATE-FB

EARTHQUAKE DATA

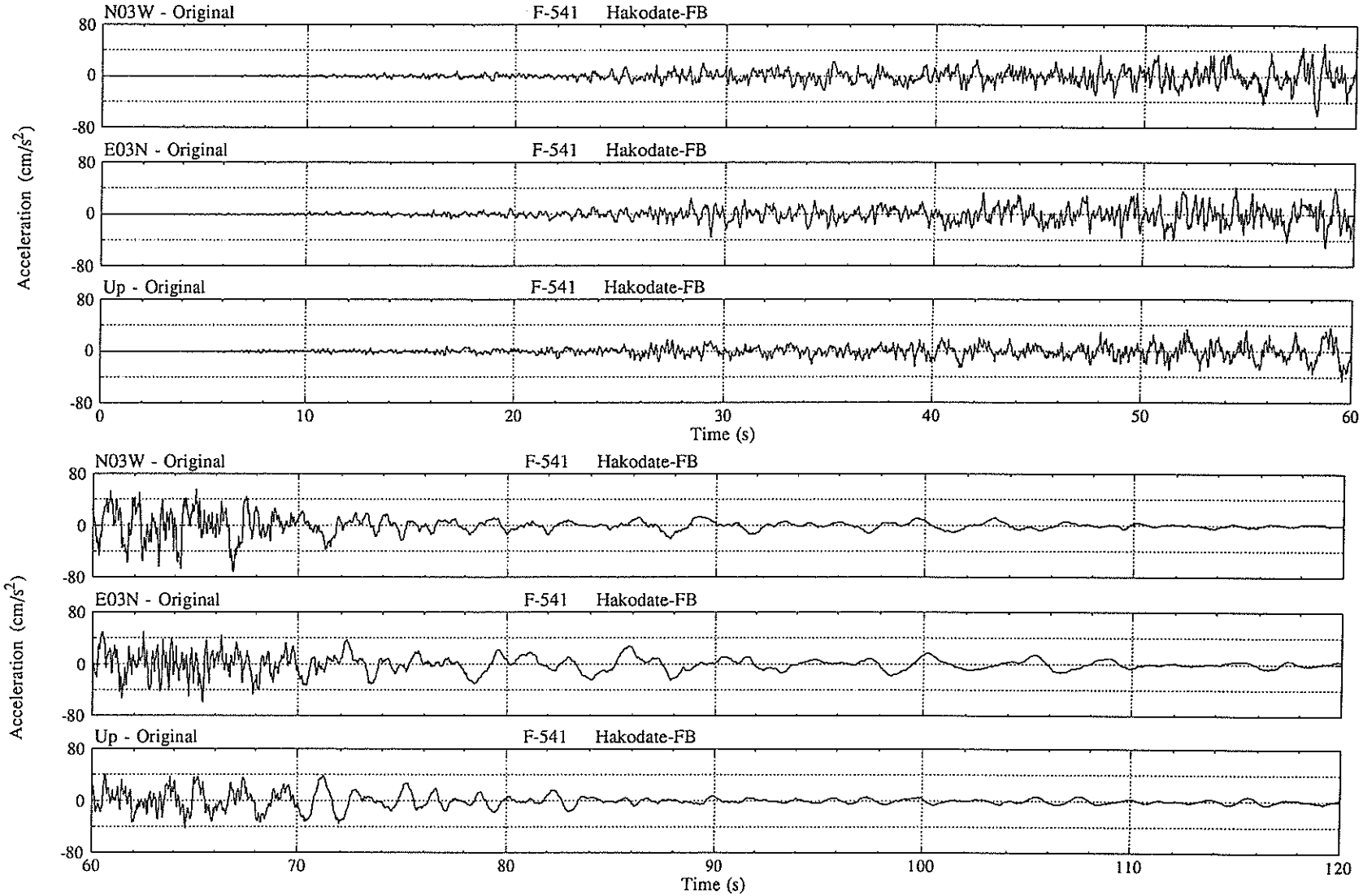
****

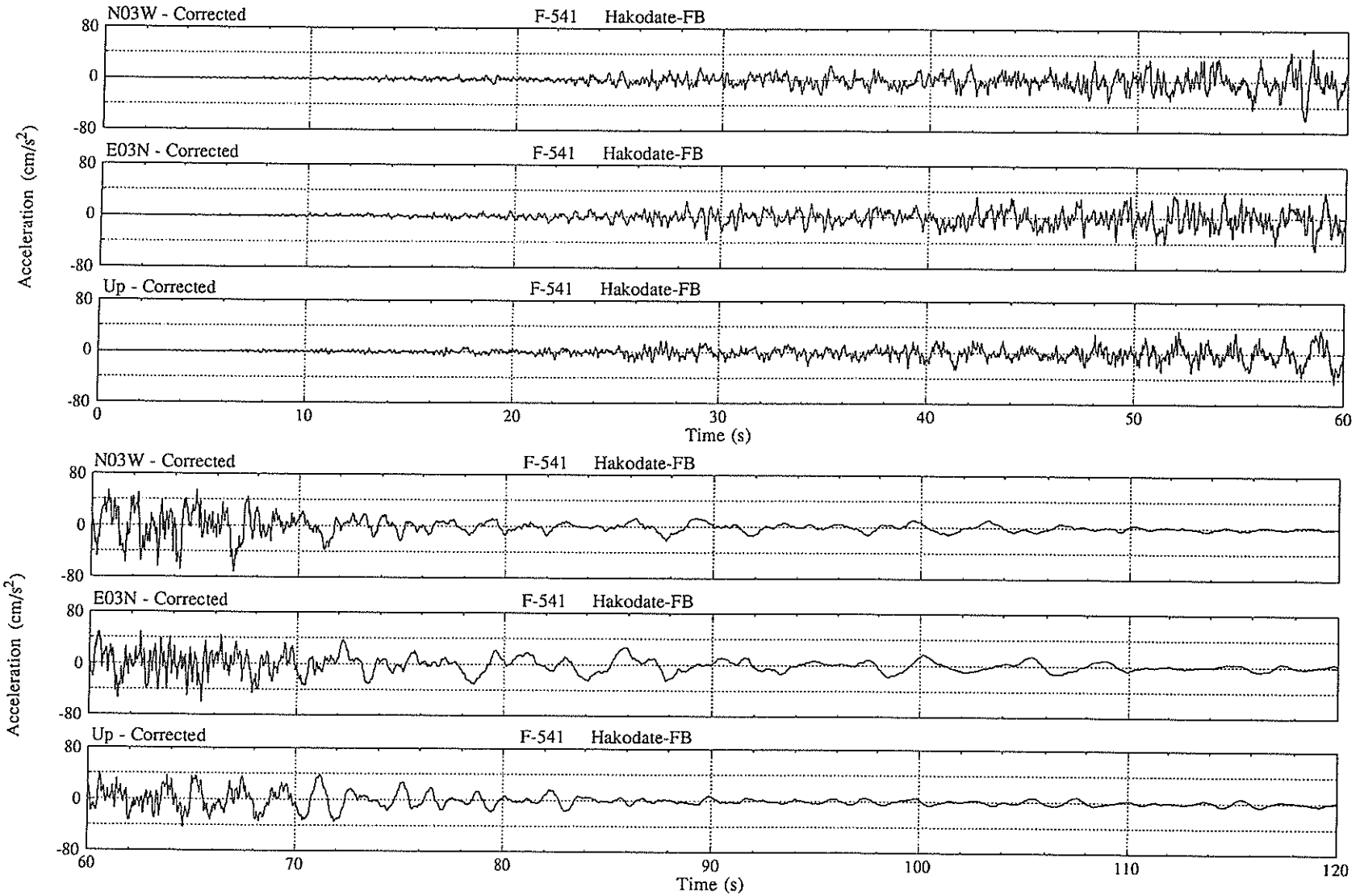
DATE AND TIME	22:17 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°46.8' N
LONGITUDE	139°11.0' E
DEPTH	35.1KM
JMA MAGNITUDE	7.8

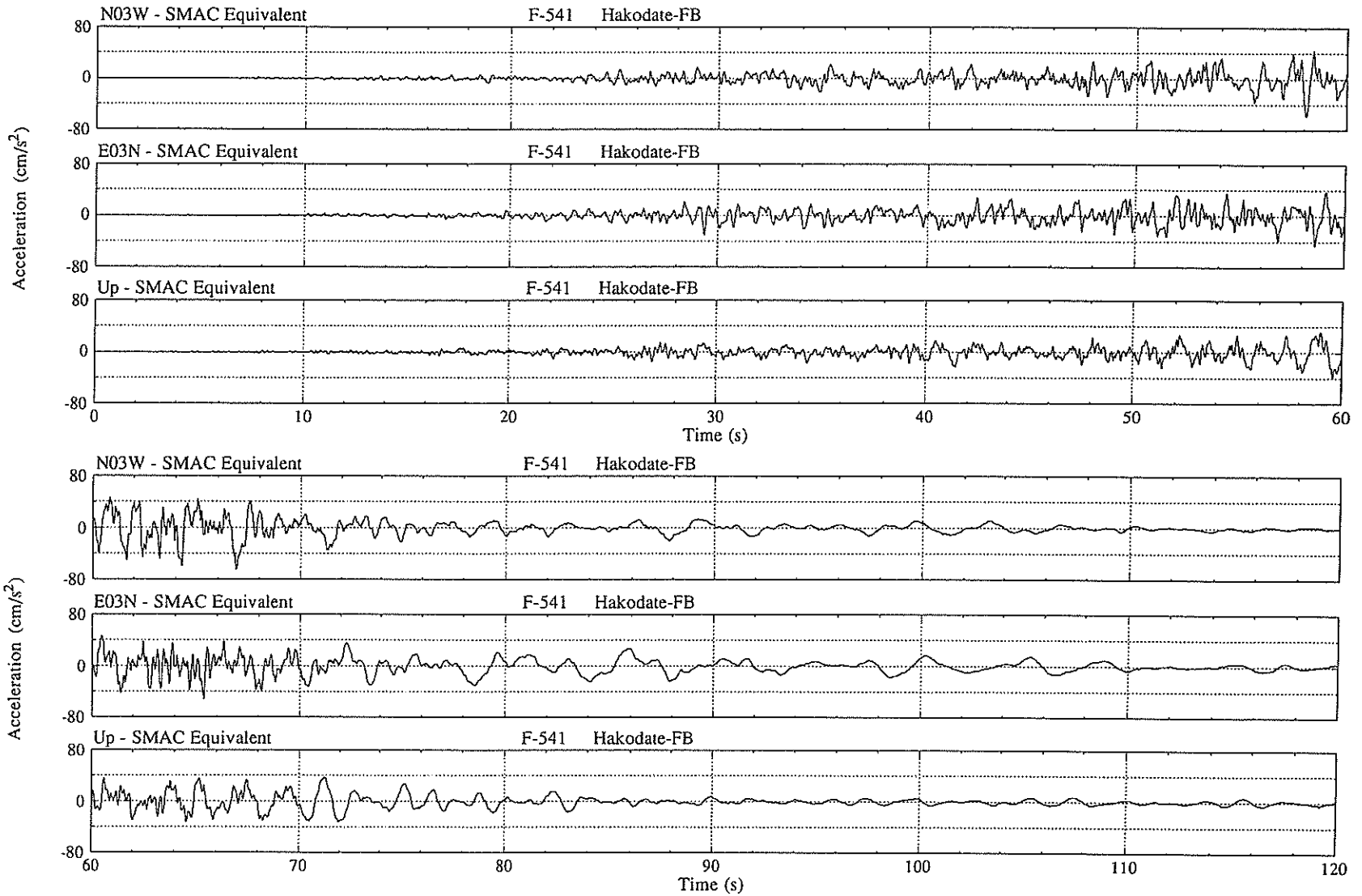
****

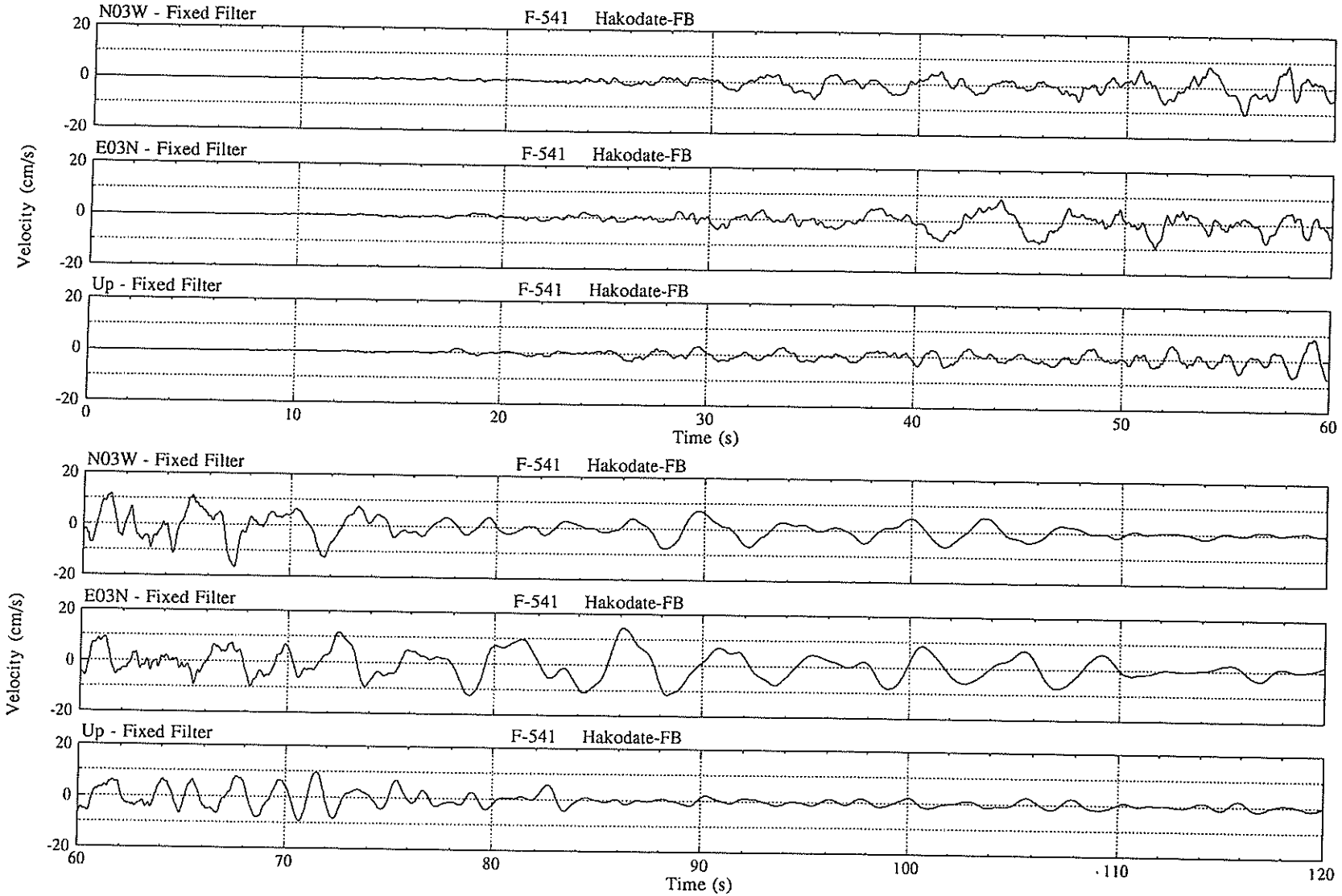
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.033	0.043	0.046	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	64.6	51.5	39.4	64.7
ORIGINAL	71.0	59.3	46.1	71.1
CORRECTED	71.0	59.8	45.9	71.0
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	16.52	14.76	9.82	17.99
VARIABLE FILTER	14.11	16.43	9.99	16.47
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	5.97	10.15	3.13	10.15
VARIABLE FILTER	9.89	12.26	5.52	12.29

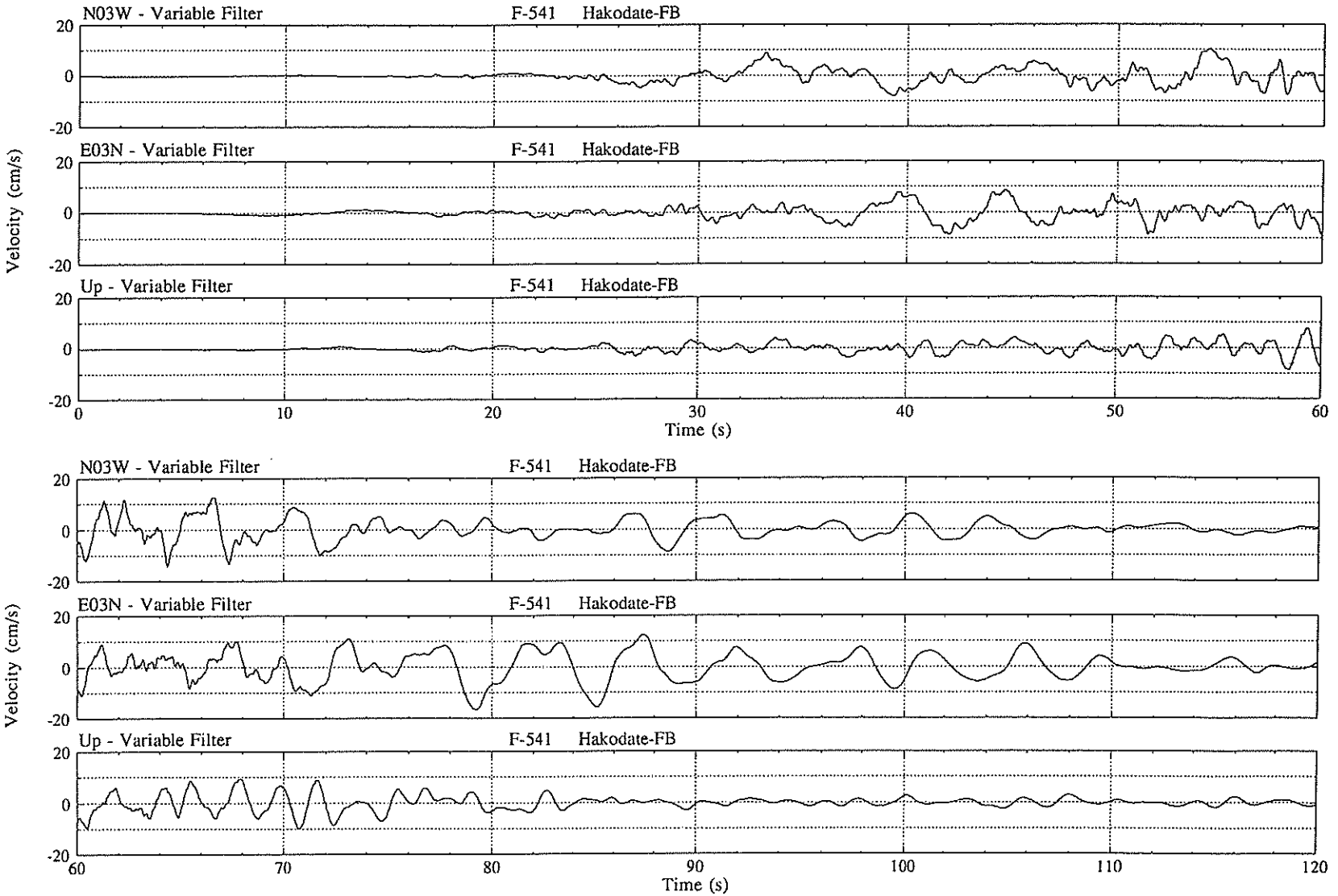
* RESULTANT OF HORIZONTAL COMPONENTS

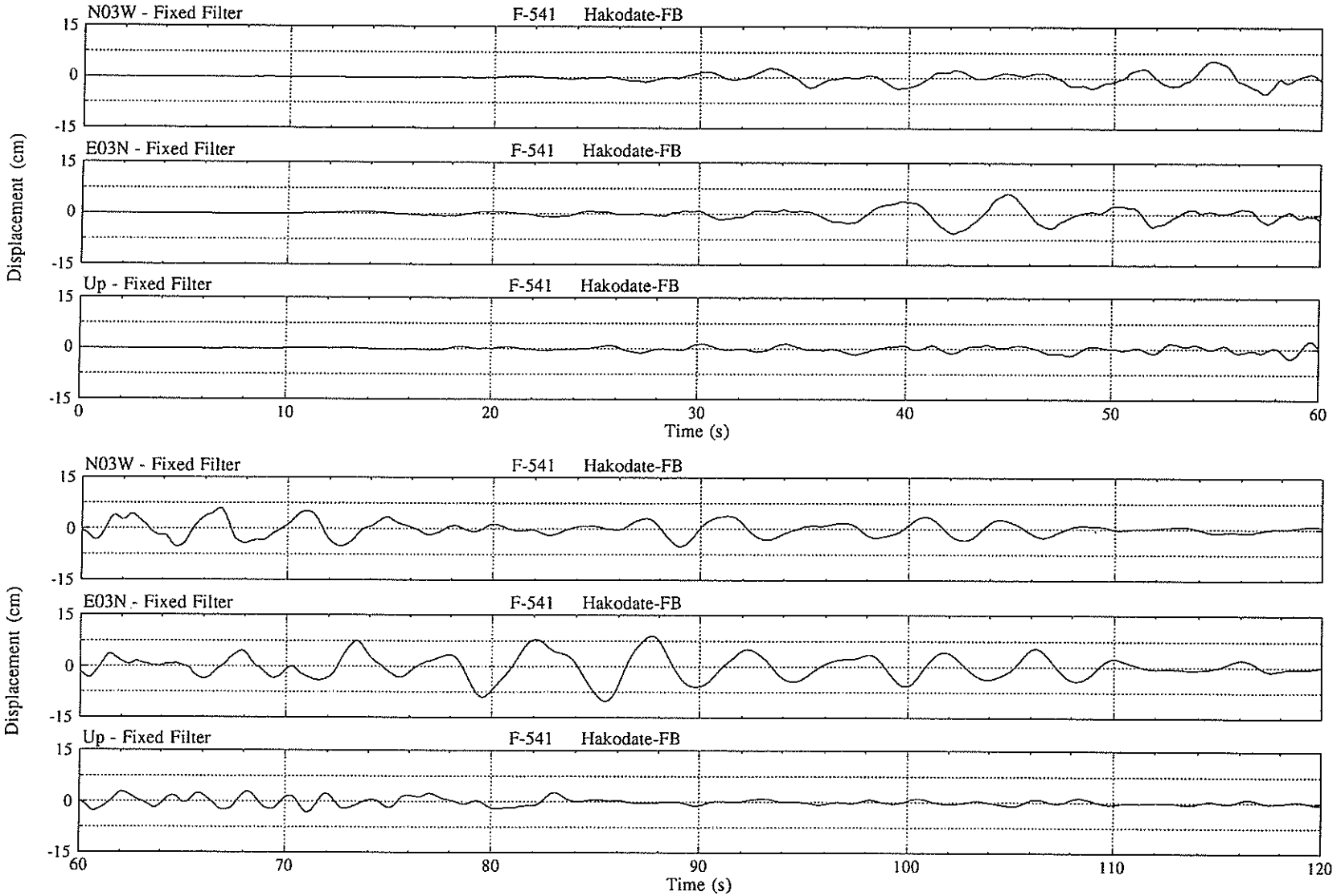

N03W - Original
F-541 Hakodate-FB
E03N - Original
F-541 Hakodate-FB
Up - Original
F-541 Hakodate-FB
Acceleration (cm/s²)
80
0
-80
0
10
20
30
40
50
60
Time (s)
N03W - Original
F-541 Hakodate-FB
E03N - Original
F-541 Hakodate-FB
Up - Original
F-541 Hakodate-FB
Acceleration (cm/s²)
80
0
-80
60
70
80
90
100
110
120
Time (s)

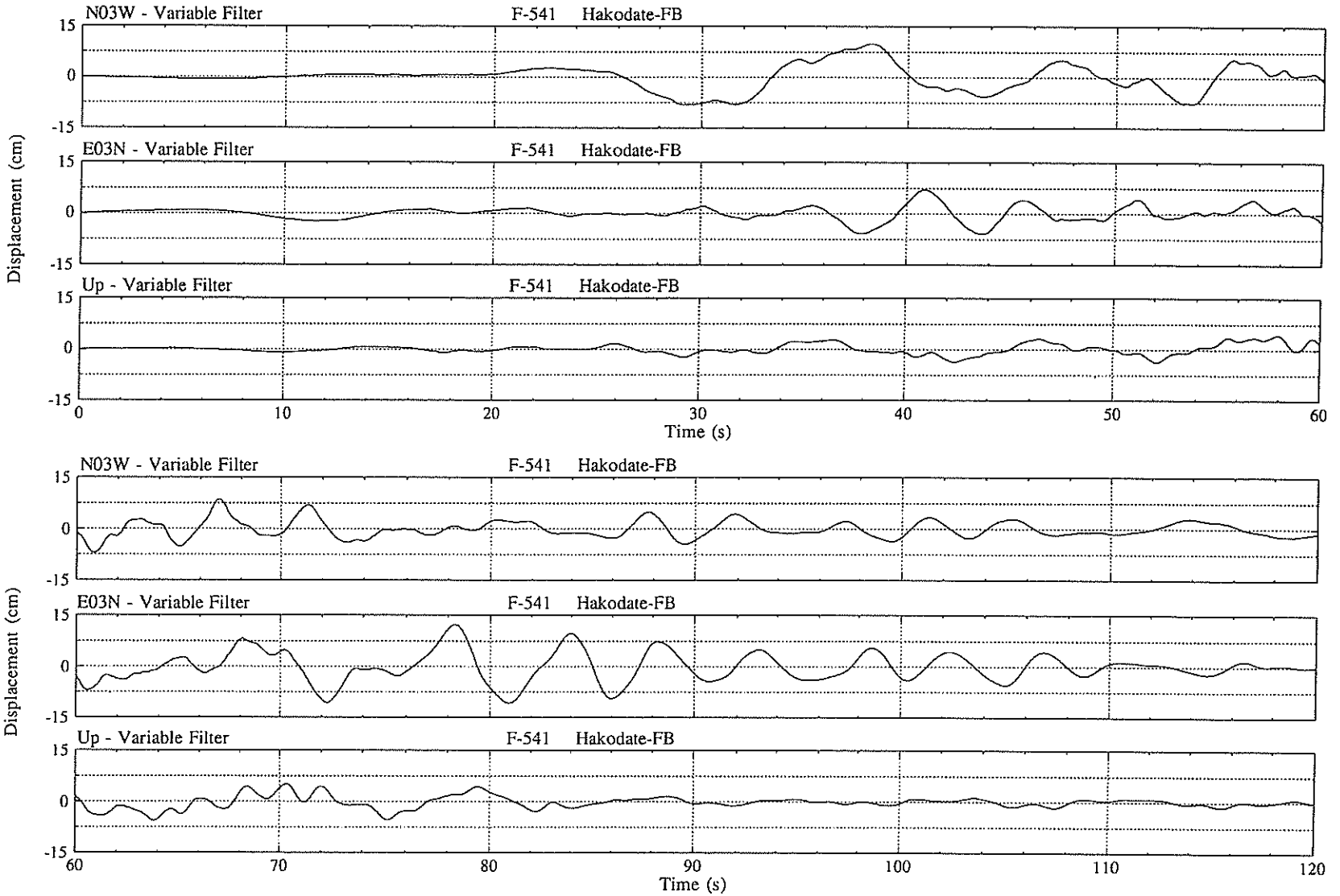

N03W - Corrected
F-541 Hakodate-FB
E03N - Corrected
F-541 Hakodate-FB
Up - Corrected
F-541 Hakodate-FB
Acceleration (cm/s²)
80
0
-80
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-541 Hakodate-FB
E03N - Corrected
F-541 Hakodate-FB
Up - Corrected
F-541 Hakodate-FB
Acceleration (cm/s²)
80
0
-80
60
70
80
90
100
110
120
Time (s)

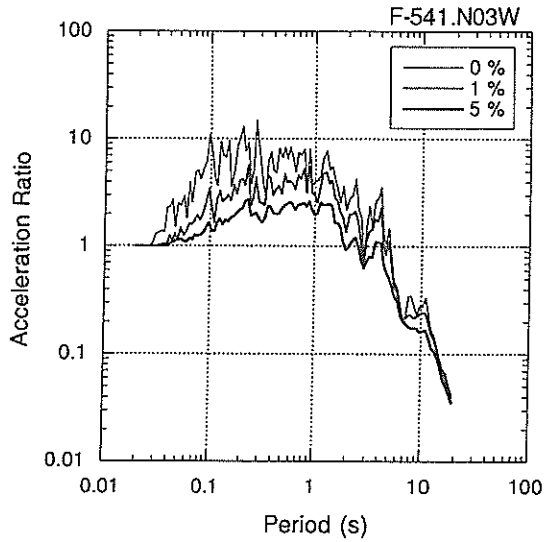

N03W - SMAC Equivalent
F-541 Hakodate-FB
E03N - SMAC Equivalent
F-541 Hakodate-FB
Up - SMAC Equivalent
F-541 Hakodate-FB
Acceleration (cm/s²)
80
0
-80
0
10
20
30
40
50
60
Time (s)
N03W - SMAC Equivalent
F-541 Hakodate-FB
E03N - SMAC Equivalent
F-541 Hakodate-FB
Up - SMAC Equivalent
F-541 Hakodate-FB
Acceleration (cm/s²)
80
0
-80
60
70
80
90
100
110
120
Time (s)

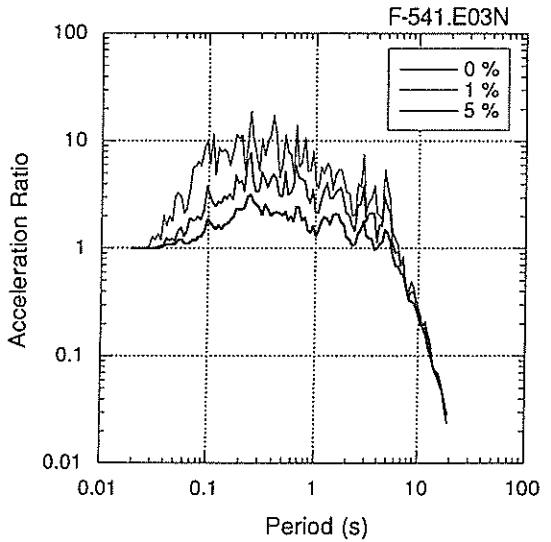

N03W - Fixed Filter
F-541 Hakodate-FB
E03N - Fixed Filter
F-541 Hakodate-FB
Up - Fixed Filter
F-541 Hakodate-FB
Velocity (cm/s)
20
0
-20
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-541 Hakodate-FB
E03N - Fixed Filter
F-541 Hakodate-FB
Up - Fixed Filter
F-541 Hakodate-FB
Velocity (cm/s)
20
0
-20
60
70
80
90
100
110
120
Time (s)

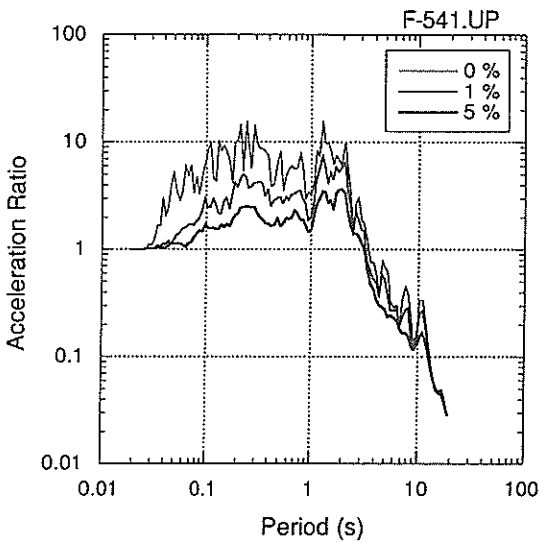

N03W - Variable Filter
F-541 Hakodate-FB
E03N - Variable Filter
F-541 Hakodate-FB
Up - Variable Filter
F-541 Hakodate-FB
Velocity (cm/s)
20
0
-20
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-541 Hakodate-FB
E03N - Variable Filter
F-541 Hakodate-FB
Up - Variable Filter
F-541 Hakodate-FB
Velocity (cm/s)
20
0
-20
60
70
80
90
100
110
120
Time (s)

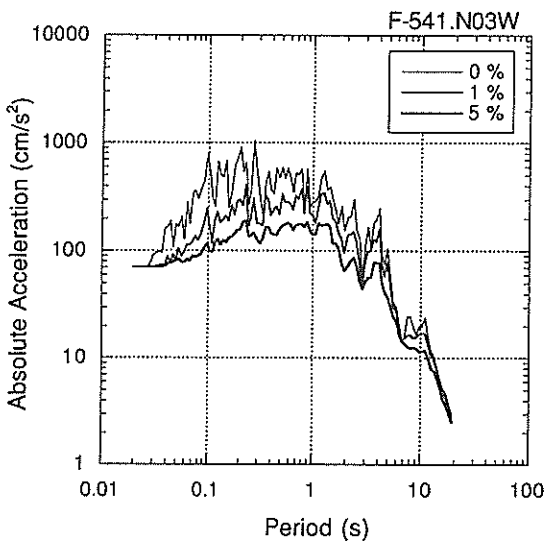

N03W - Fixed Filter
F-541 Hakodate-FB
E03N - Fixed Filter
F-541 Hakodate-FB
Up - Fixed Filter
F-541 Hakodate-FB
Displacement (cm)
15
0
-15
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-541 Hakodate-FB
E03N - Fixed Filter
F-541 Hakodate-FB
Up - Fixed Filter
F-541 Hakodate-FB
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

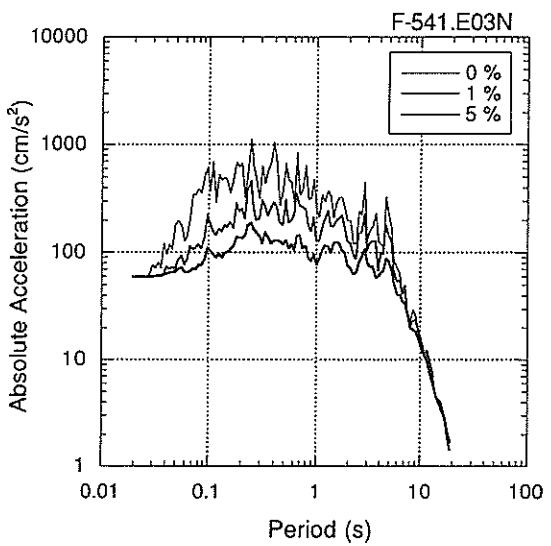

N03W - Variable Filter
F-541 Hakodate-FB
E03N - Variable Filter
F-541 Hakodate-FB
Up - Variable Filter
F-541 Hakodate-FB
Displacement (cm)
15
0
-15
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-541 Hakodate-FB
E03N - Variable Filter
F-541 Hakodate-FB
Up - Variable Filter
F-541 Hakodate-FB
Displacement (cm)
15
0
-15
60
70
80
90
100
110
120
Time (s)

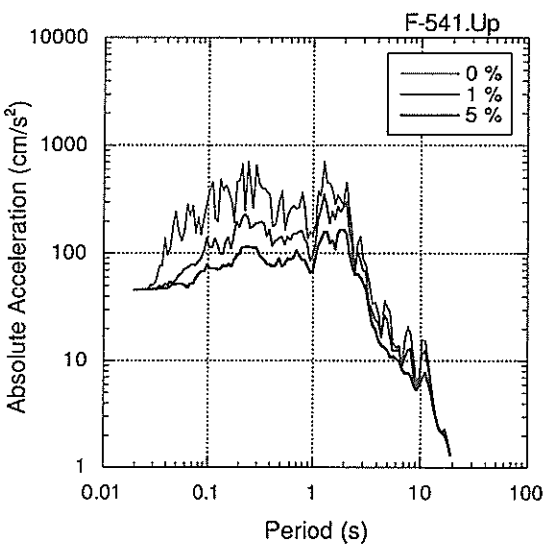

F-541.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

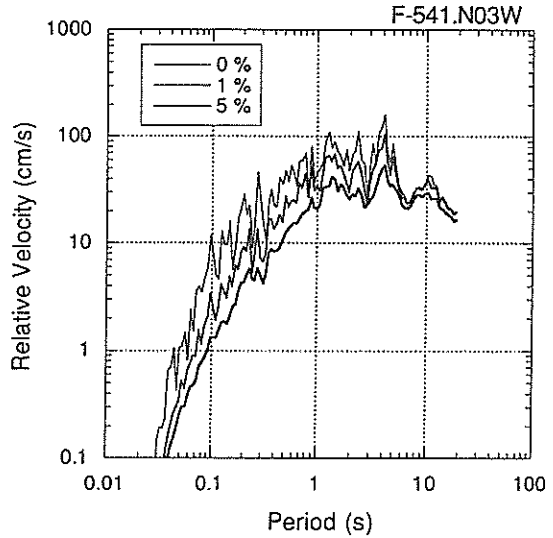

F-541.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

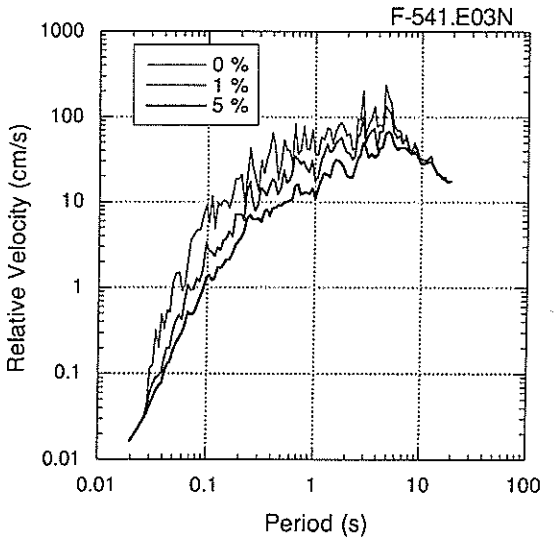

F-541.UP
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

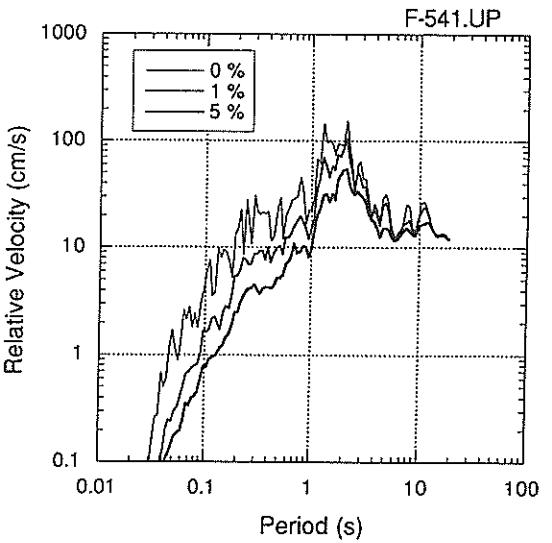

F-541.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

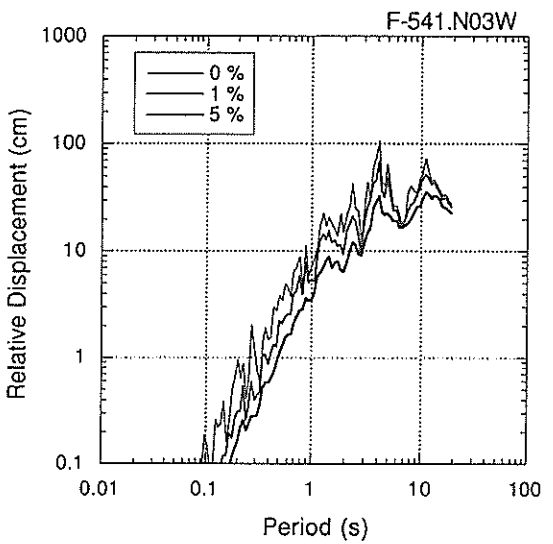

F-541.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

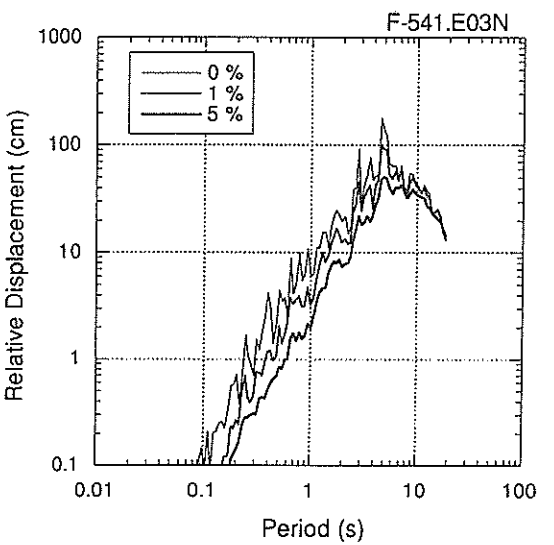

F-541.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

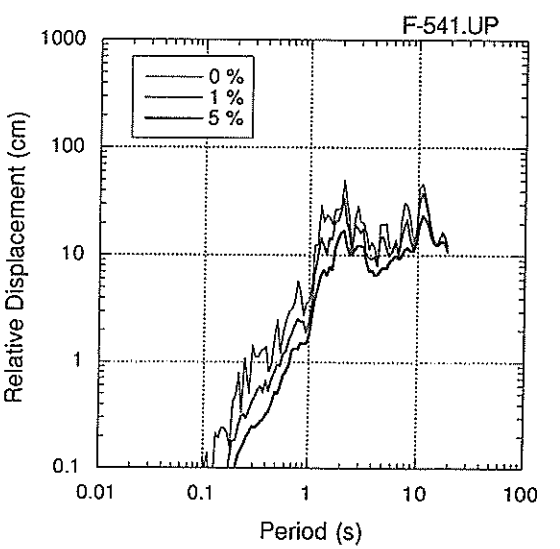

F-541.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

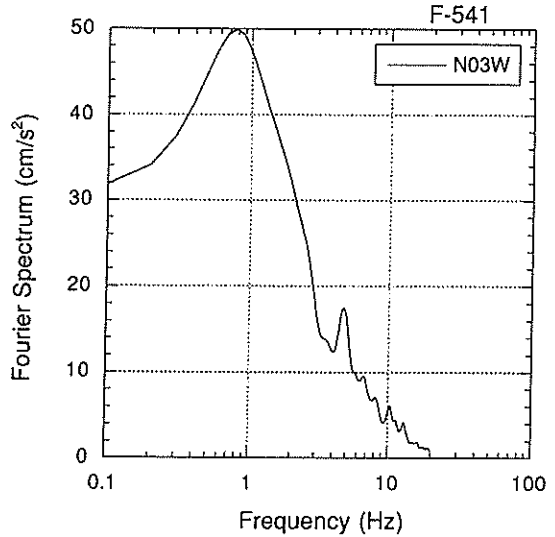

F-541.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

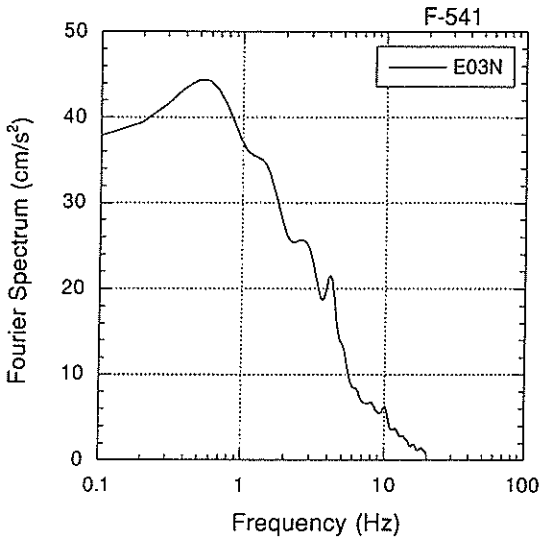

F-541.UP
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

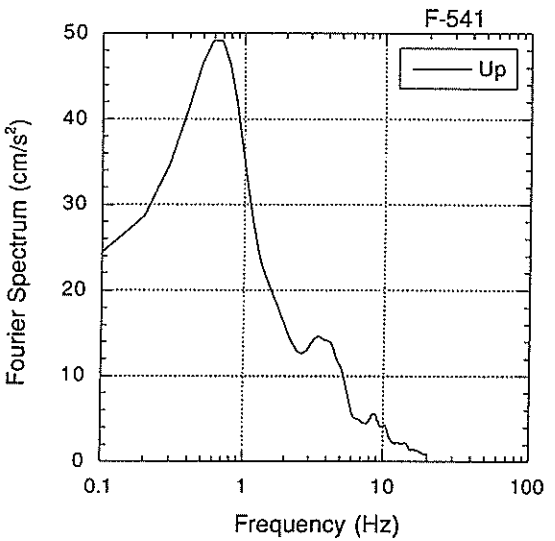

F-541.N03W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

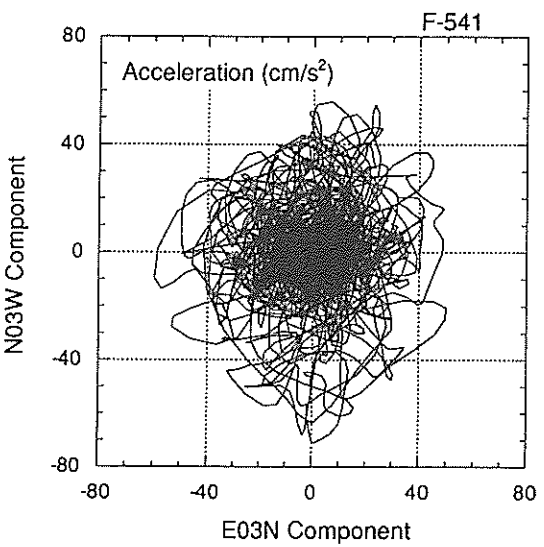

F-541.E03N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

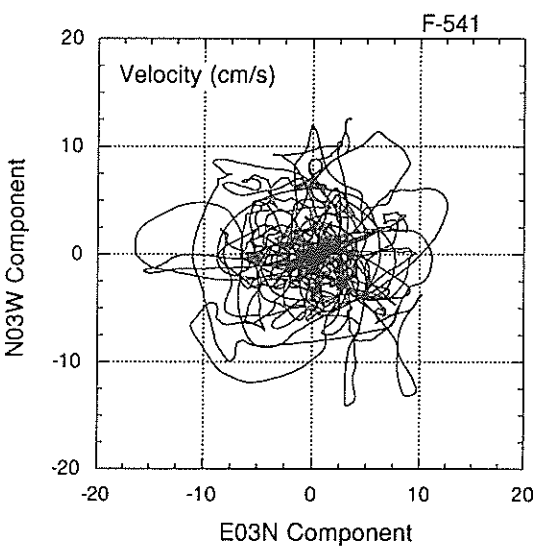

F-541.UP
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

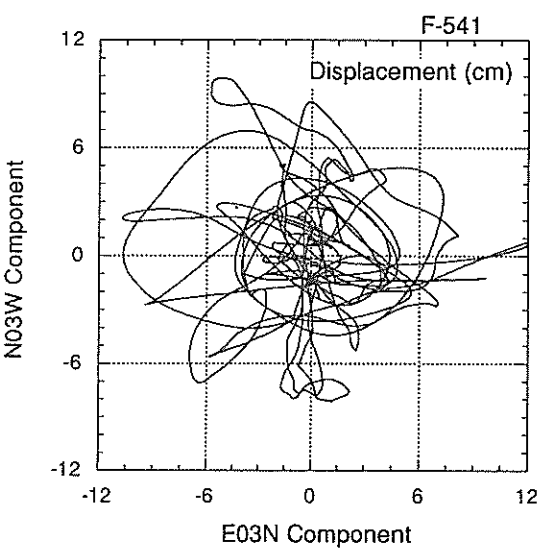

F-541
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-541
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-541
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-541
Acceleration (cm/s²)
N03W Component
E03N Component


F-541
Velocity (cm/s)
N03W Component
E03N Component


F-541
Displacement (cm)
N03W Component
E03N Component

RECORD NUMBER : F-545

STATION : HAKODATE-F

EARTHQUAKE DATA

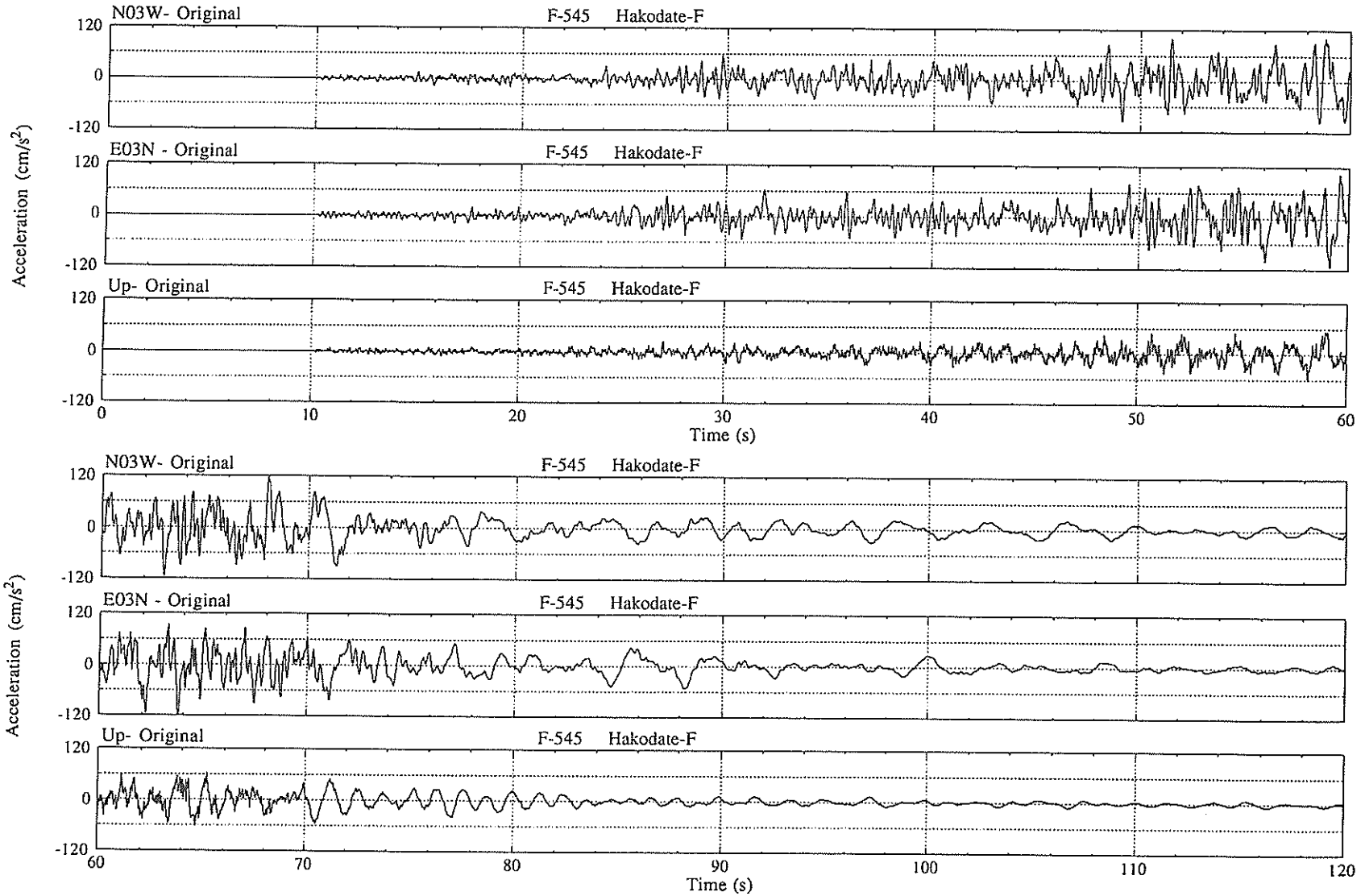
****

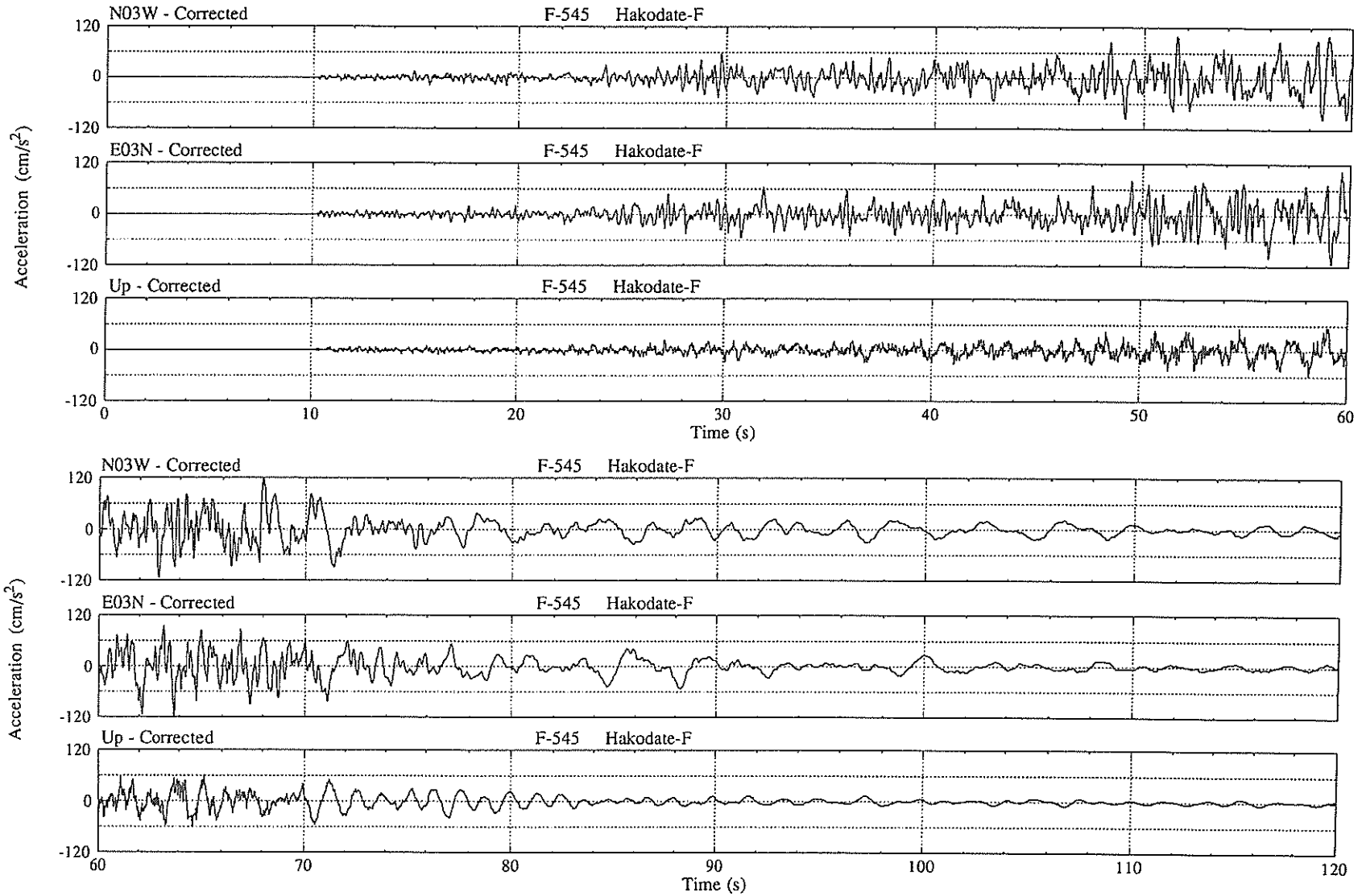
DATE AND TIME	22:17 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°46.8' N
LONGITUDE	139°11.0' E
DEPTH	35.1KM
JMA MAGNITUDE	7.8

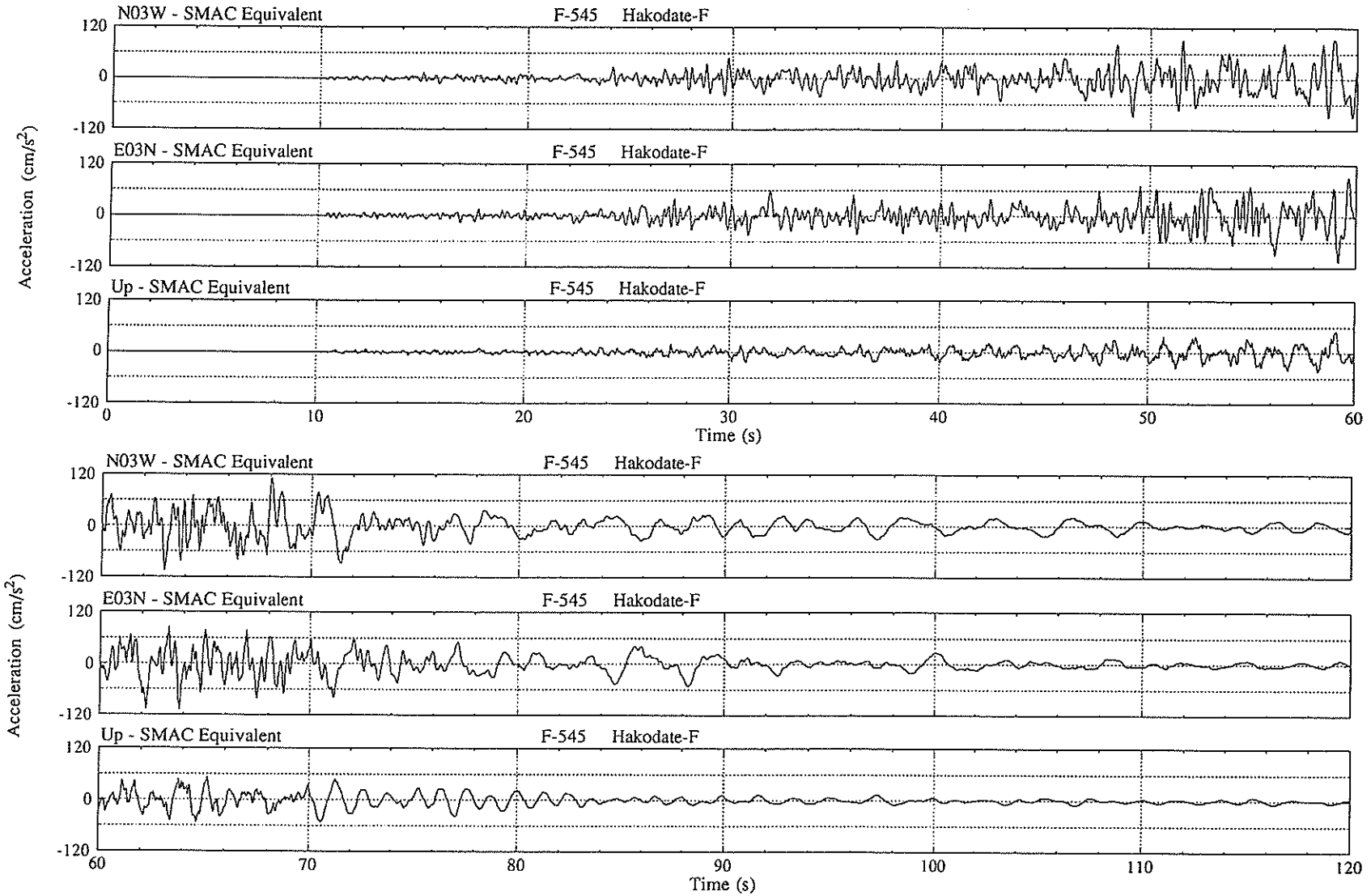
****

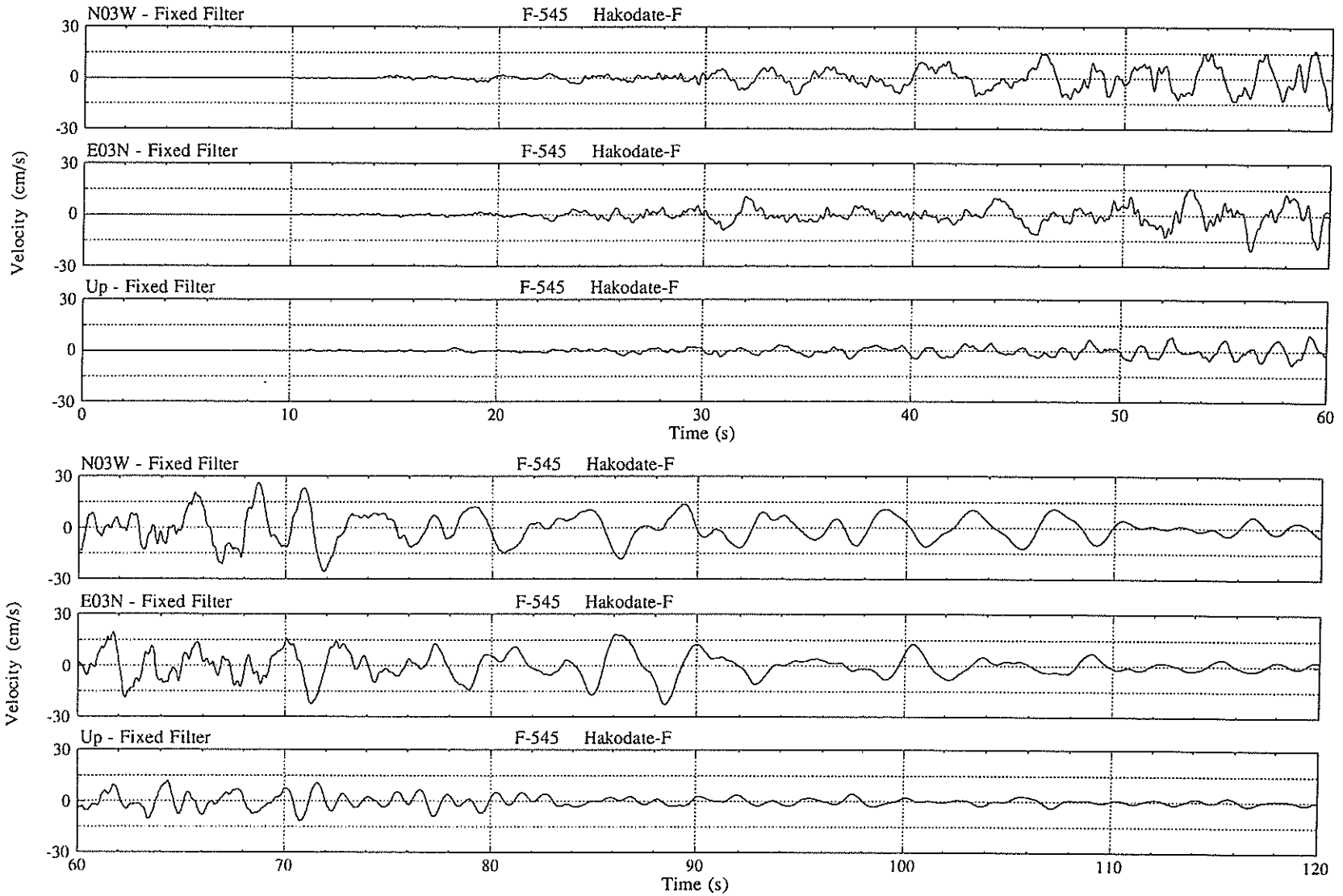
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.052	0.052	0.064	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	110.9	106.8	51.6	133.8
ORIGINAL	119.4	115.9	63.8	145.2
CORRECTED	118.3	115.1	61.5	144.9
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	26.41	22.80	11.81	27.01
VARIABLE FILTER	32.48	24.74	12.44	33.95
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	12.49	11.65	3.92	16.08
VARIABLE FILTER	15.48	12.59	5.20	15.78

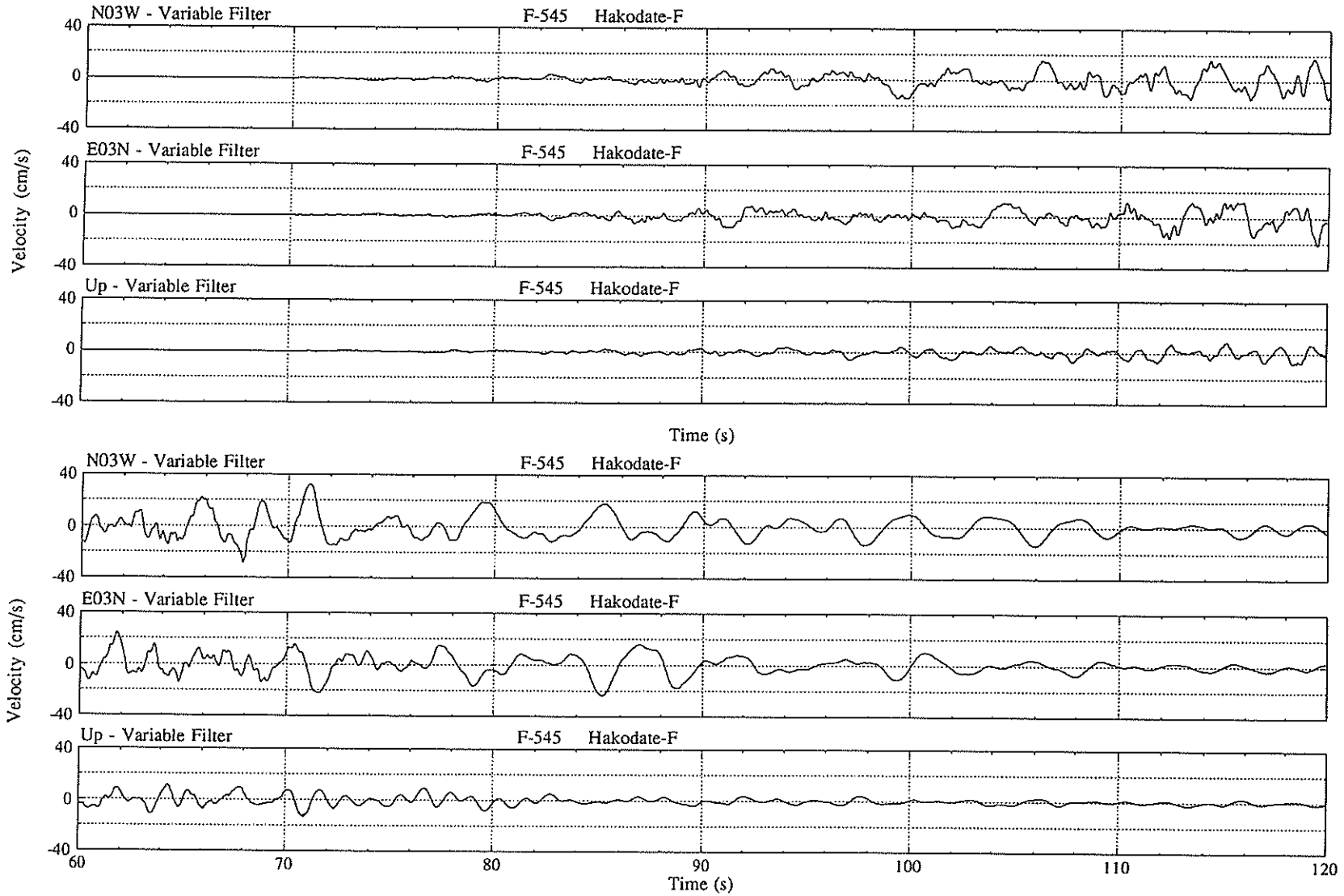
* RESULTANT OF HORIZONTAL COMPONENTS

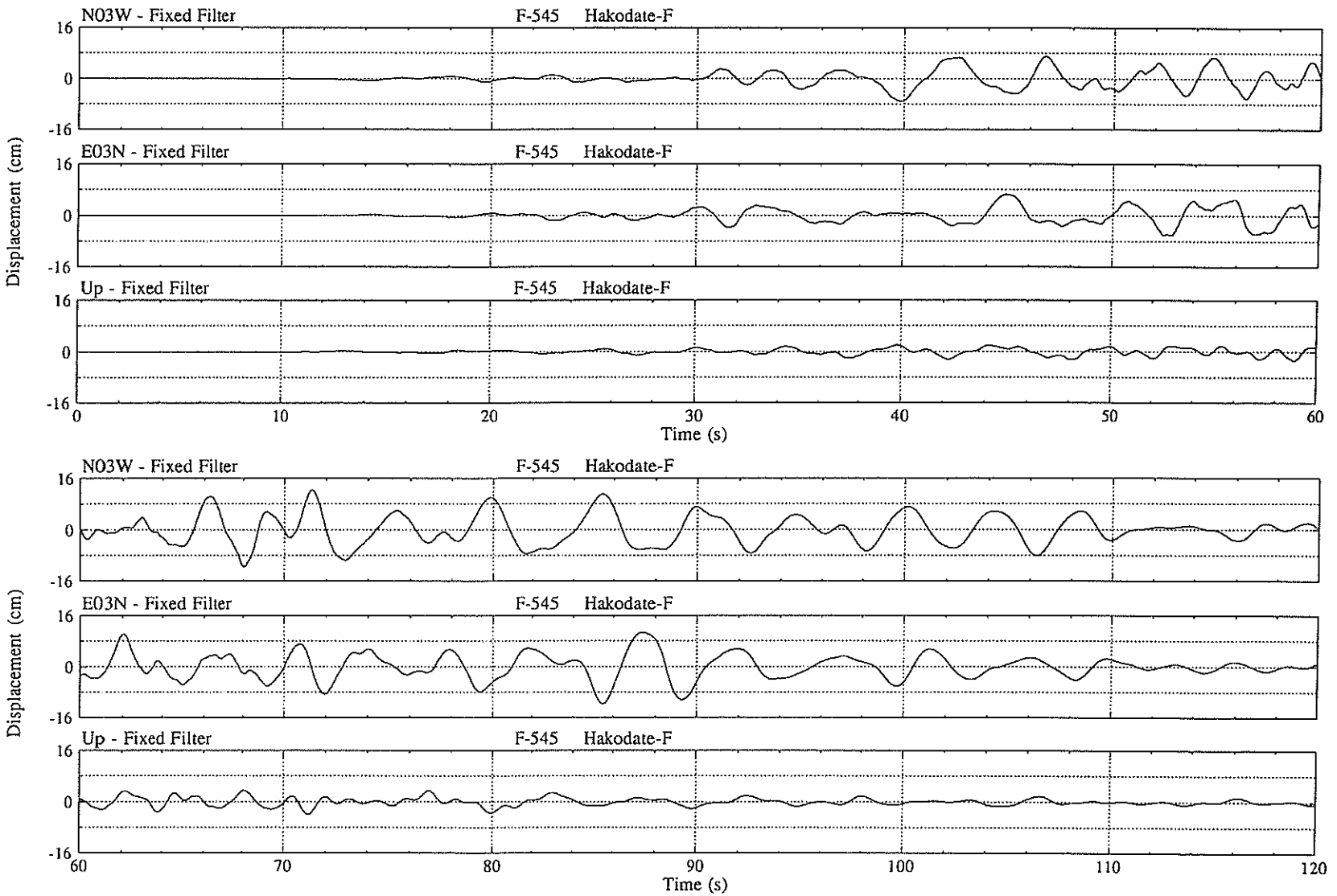

N03W- Original
F-545 Hakodate-F
E03N - Original
F-545 Hakodate-F
Up- Original
F-545 Hakodate-F
120
0
-120
Acceleration (cm/s²)
0
10
20
30
40
50
60
Time (s)
N03W- Original
F-545 Hakodate-F
E03N - Original
F-545 Hakodate-F
Up- Original
F-545 Hakodate-F
120
0
-120
Acceleration (cm/s²)
60
70
80
90
100
110
120
Time (s)

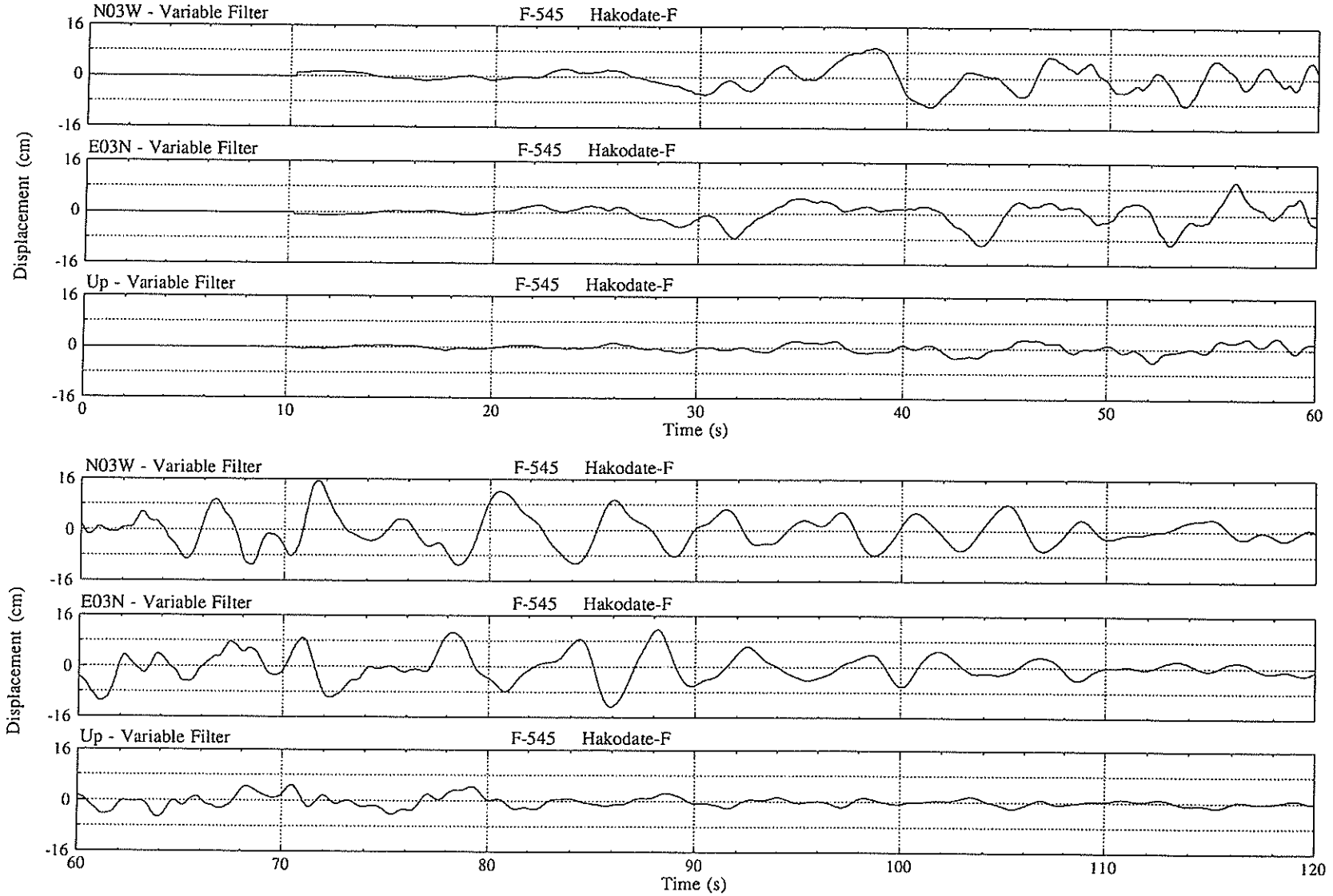

N03W - Corrected
F-545 Hakodate-F
E03N - Corrected
F-545 Hakodate-F
Up - Corrected
F-545 Hakodate-F
120
0
-120
Acceleration (cm/s²)
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-545 Hakodate-F
E03N - Corrected
F-545 Hakodate-F
Up - Corrected
F-545 Hakodate-F
120
0
-120
Acceleration (cm/s²)
60
70
80
90
100
110
120
Time (s)

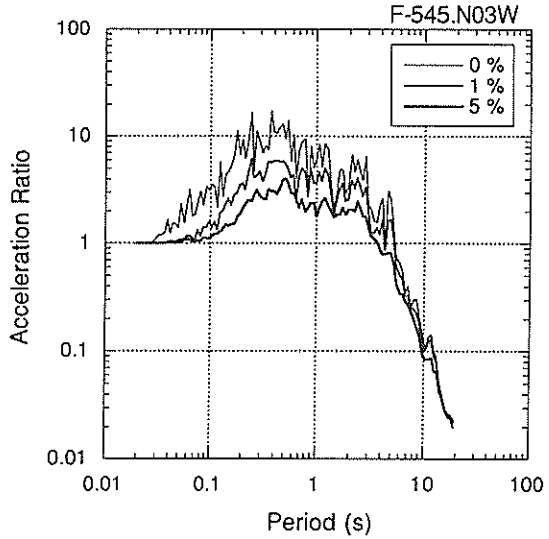

N03W - SMAC Equivalent
F-545 Hakodate-F
E03N - SMAC Equivalent
F-545 Hakodate-F
Up - SMAC Equivalent
F-545 Hakodate-F
Acceleration (cm/s²)
120
0
-120
0
10
20
30
40
50
60
Time (s)
70
80
90
100
110
120

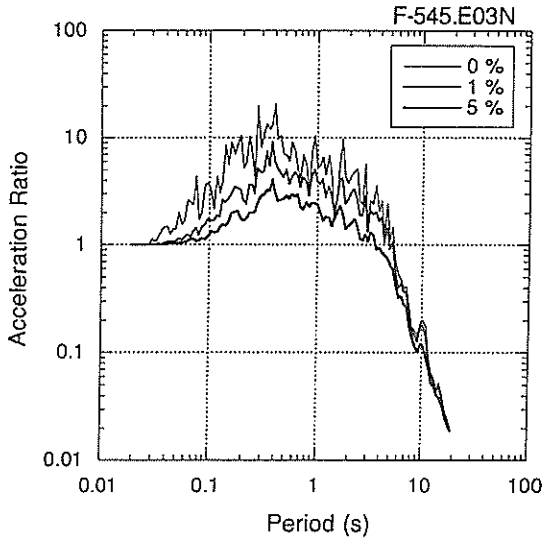

N03W - Fixed Filter
F-545 Hakodate-F
E03N - Fixed Filter
F-545 Hakodate-F
Up - Fixed Filter
F-545 Hakodate-F
Velocity (cm/s)
30
0
-30
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-545 Hakodate-F
E03N - Fixed Filter
F-545 Hakodate-F
Up - Fixed Filter
F-545 Hakodate-F
Velocity (cm/s)
30
0
-30
60
70
80
90
100
110
120
Time (s)

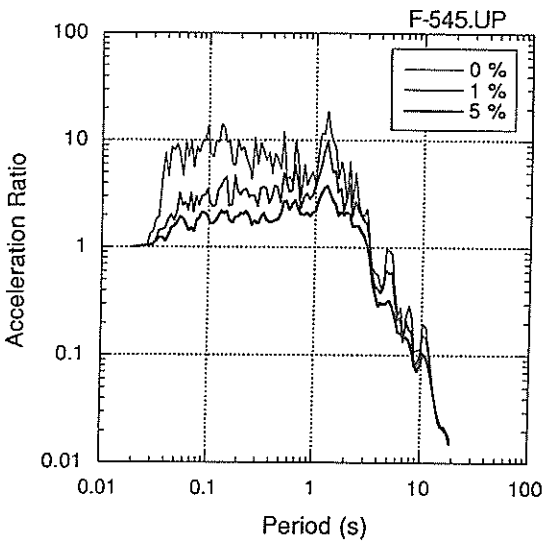

N03W - Variable Filter
F-545 Hakodate-F
E03N - Variable Filter
F-545 Hakodate-F
Up - Variable Filter
F-545 Hakodate-F
Velocity (cm/s)
40
0
-40
Time (s)
60
70
80
90
100
110
120

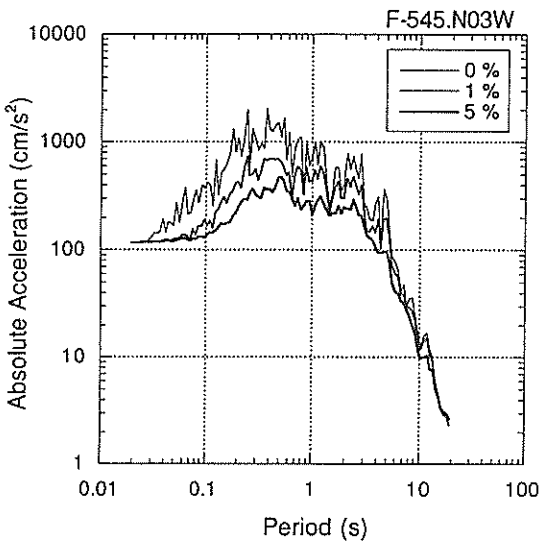

N03W - Fixed Filter
F-545 Hakodate-F
E03N - Fixed Filter
F-545 Hakodate-F
Up - Fixed Filter
F-545 Hakodate-F
Displacement (cm)
16
0
-16
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-545 Hakodate-F
E03N - Fixed Filter
F-545 Hakodate-F
Up - Fixed Filter
F-545 Hakodate-F
Displacement (cm)
16
0
-16
60
70
80
90
100
110
120
Time (s)

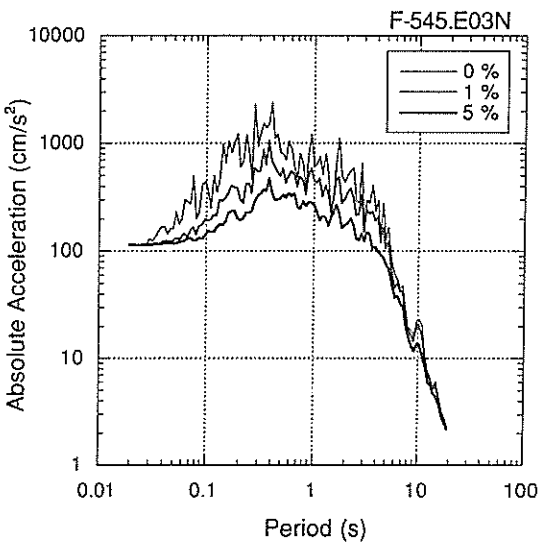

N03W - Variable Filter
F-545 Hakodate-F
E03N - Variable Filter
F-545 Hakodate-F
Up - Variable Filter
F-545 Hakodate-F
Displacement (cm)
16
0
-16
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-545 Hakodate-F
E03N - Variable Filter
F-545 Hakodate-F
Up - Variable Filter
F-545 Hakodate-F
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

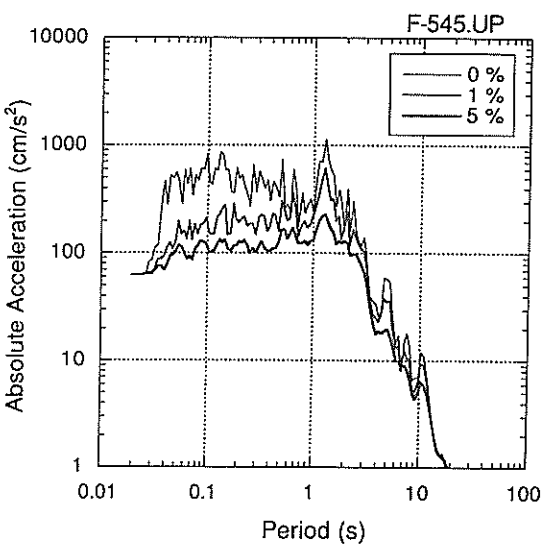

F-545.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

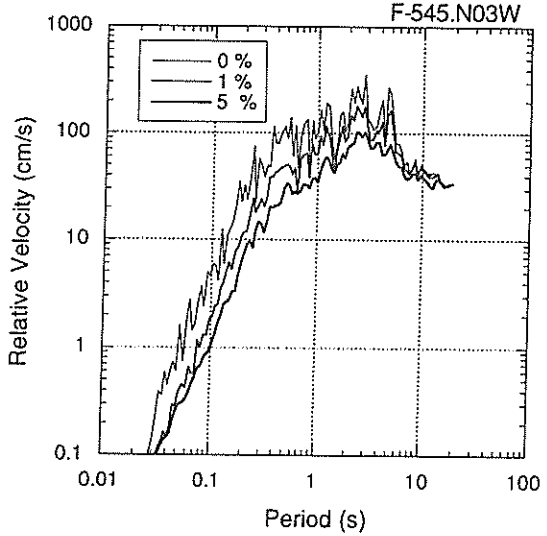

F-545.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

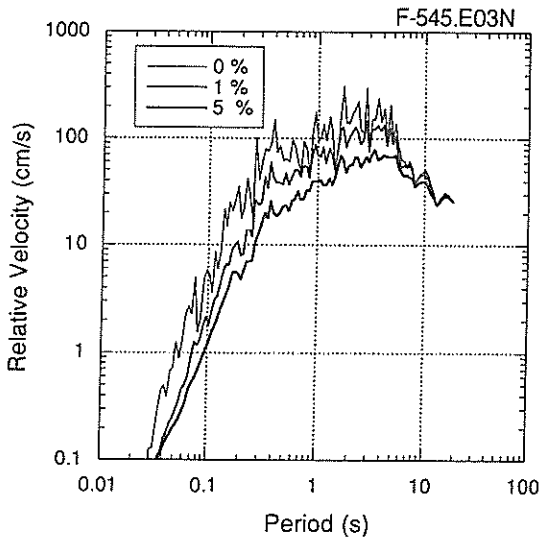

F-545.UP
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

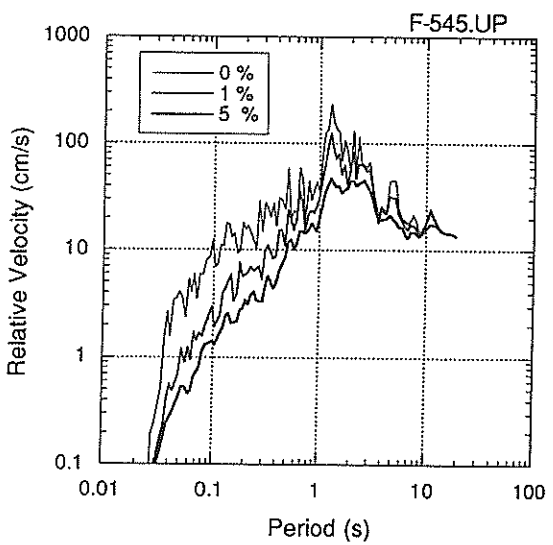

F-545.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

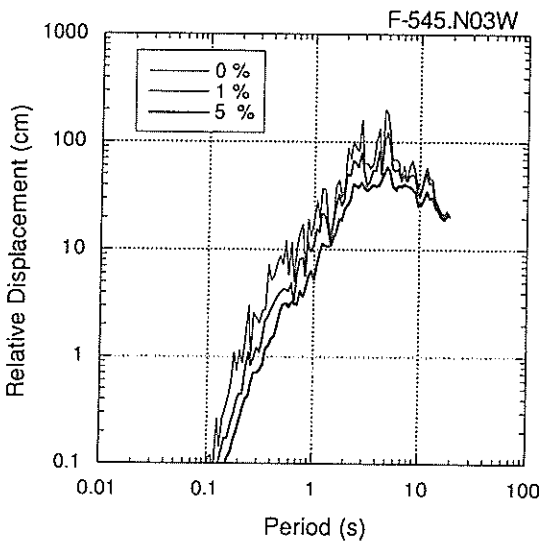

F-545.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

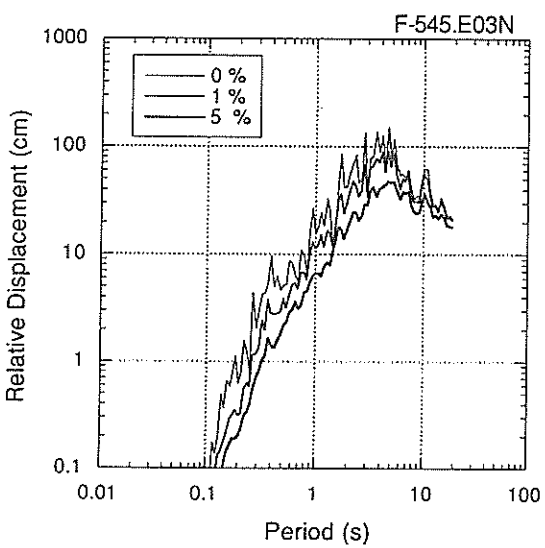

F-545.UP
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
10000
1000
100
10
1
0.01
0.1
1
10
100

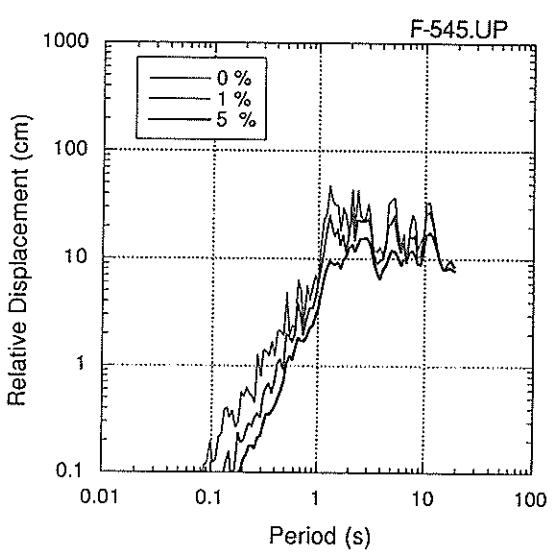

F-545.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

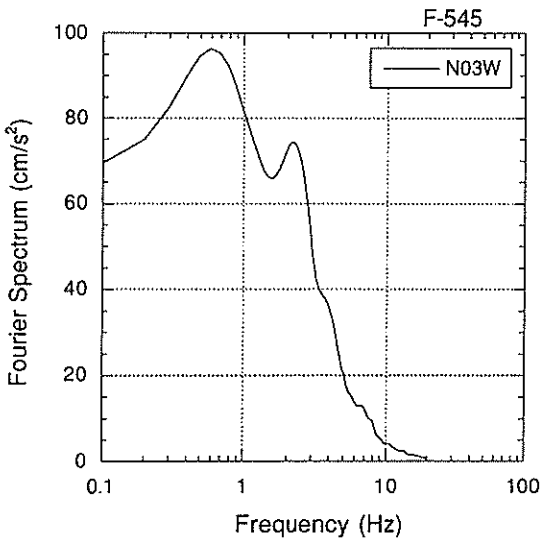

F-545.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

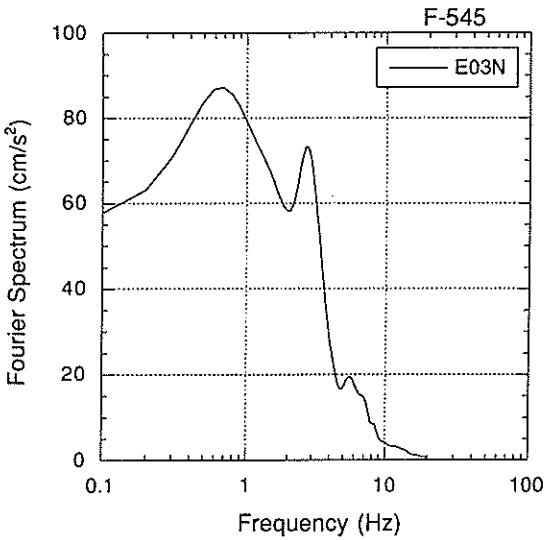

F-545.UP
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

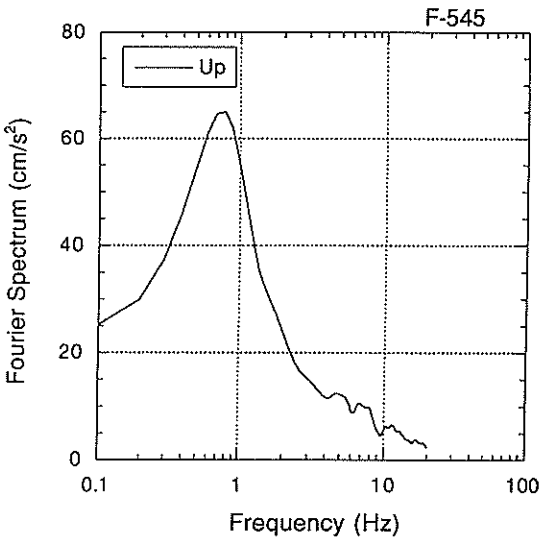

F-545.N03W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

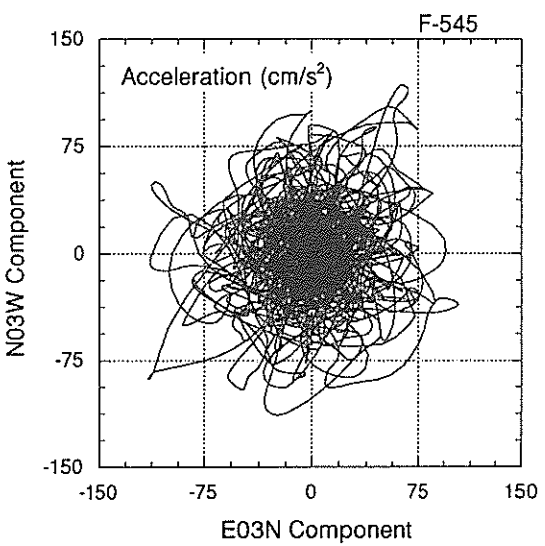

F-545.E03N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

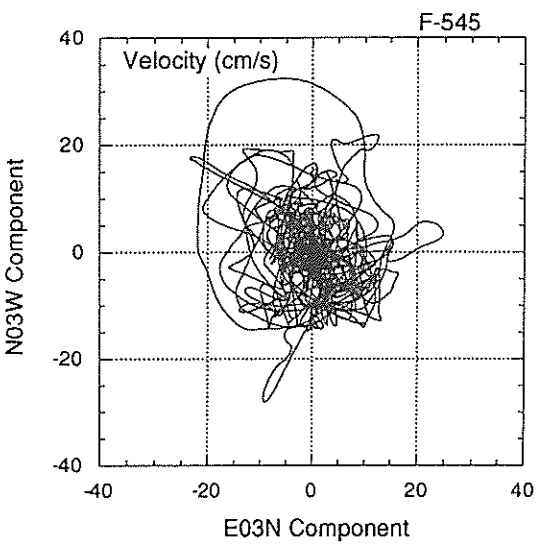

F-545.UP
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

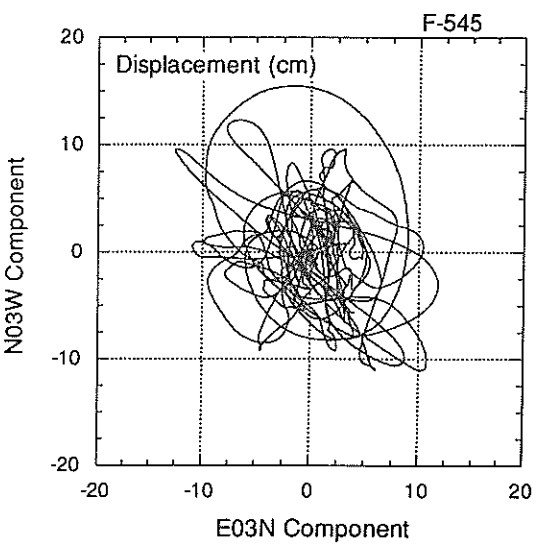

F-545
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-545
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-545
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-545
Acceleration (cm/s²)
N03W Component
E03N Component


F-545
Velocity (cm/s)
N03W Component
E03N Component


F-545
Displacement (cm)
N03W Component
E03N Component

RECORD NUMBER : F-549

STATION : HAKODATE-FR

EARTHQUAKE DATA

****

DATE AND TIME 22:17 JULY12, 1993

LOCATION OF HYPOCENTER

EPICENTRAL REGION SW OFF HOKKAIDO

LATITUDE 42°46.8' N

LONGITUDE 139°11.0' E

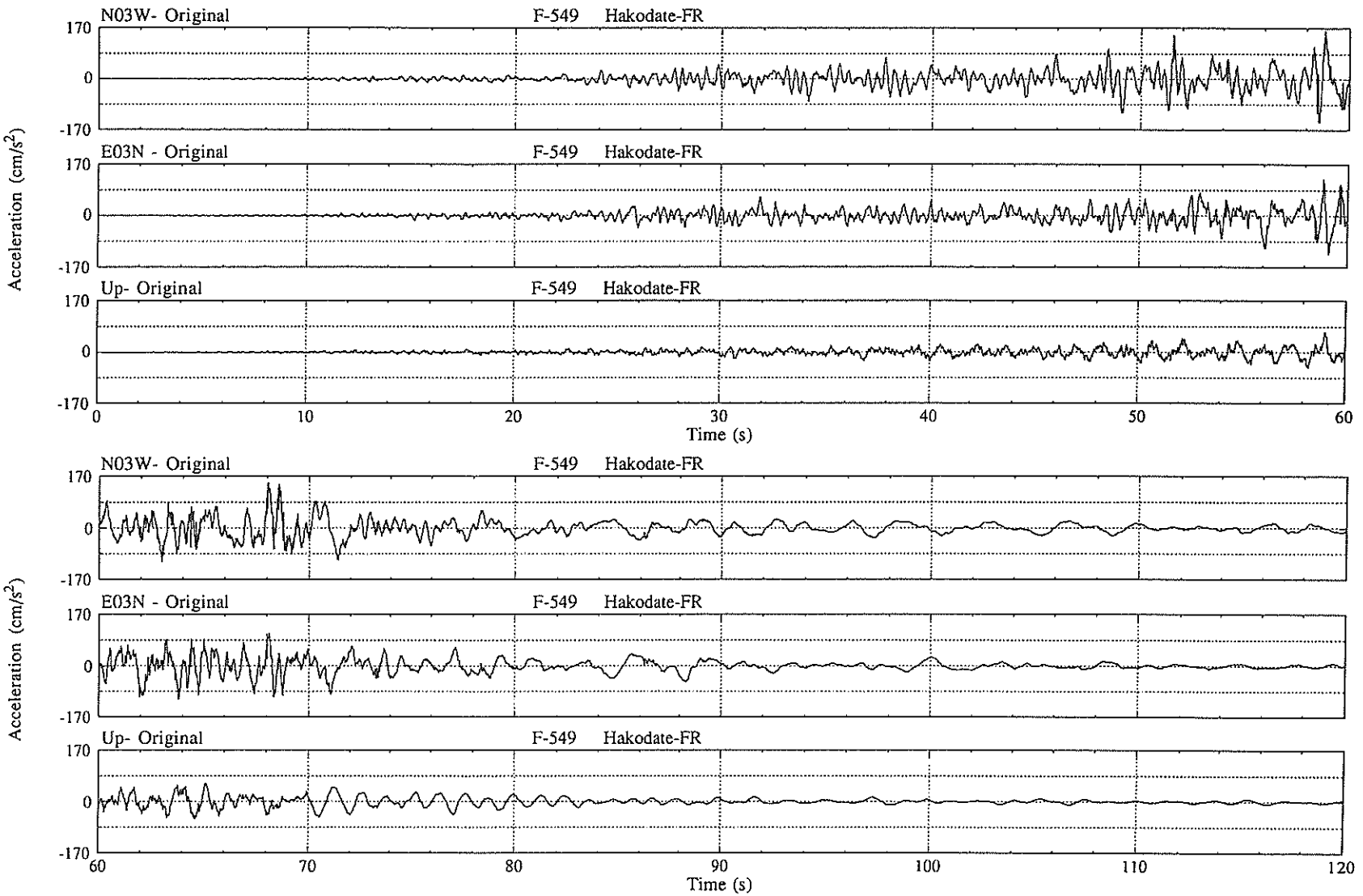
DEPTH 35.1KM

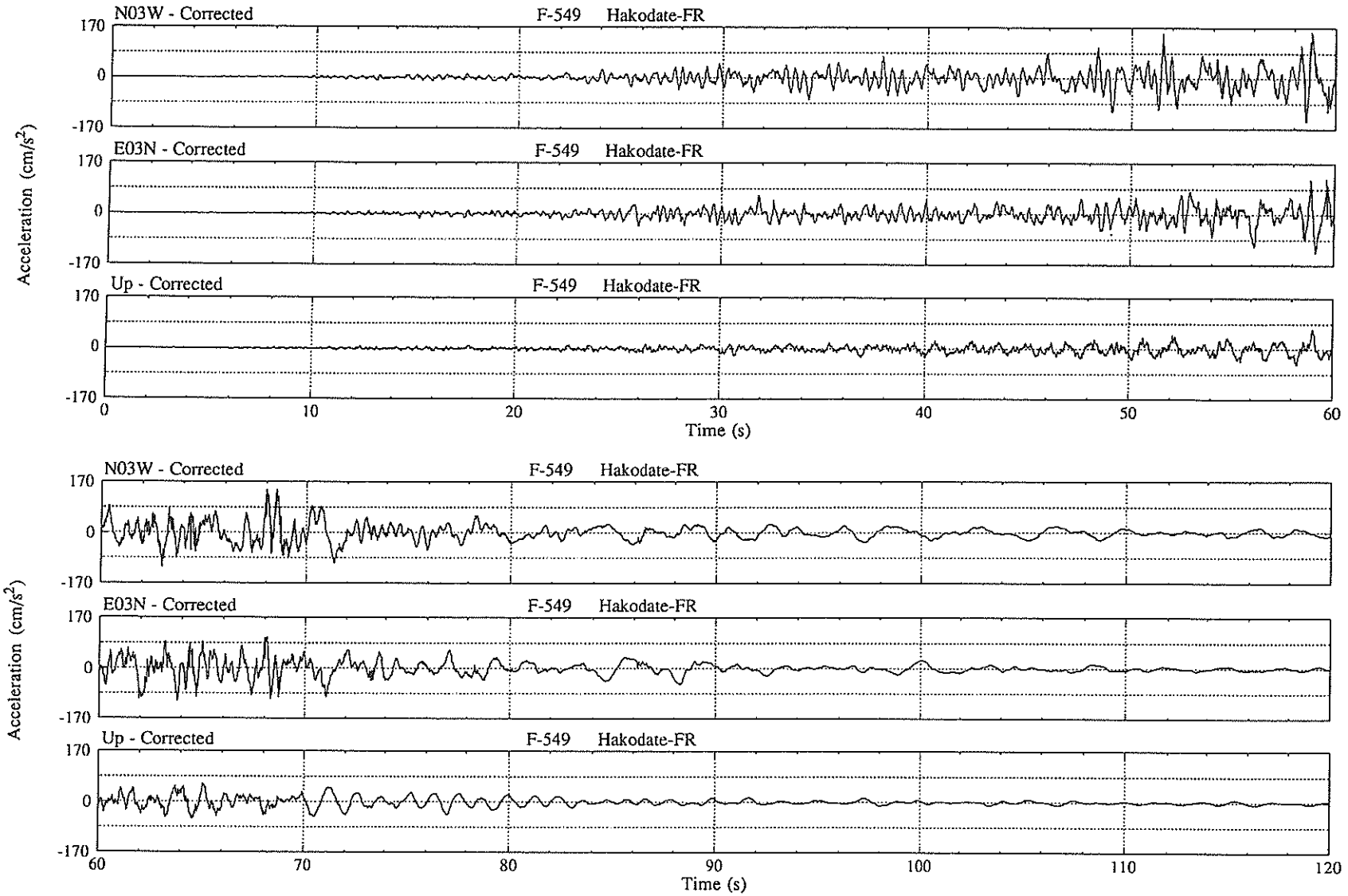
JMA MAGNITUDE 7.8

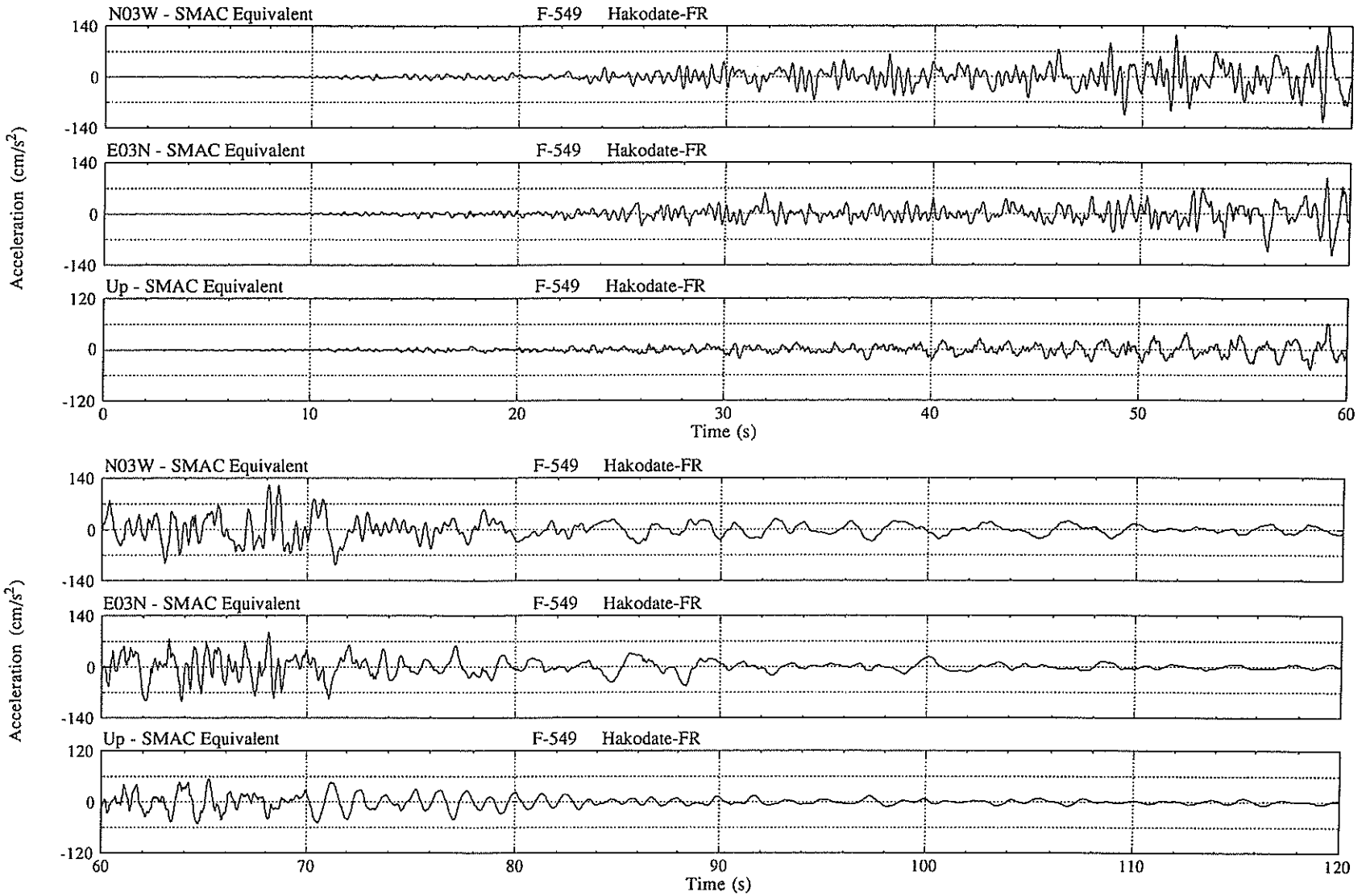
****

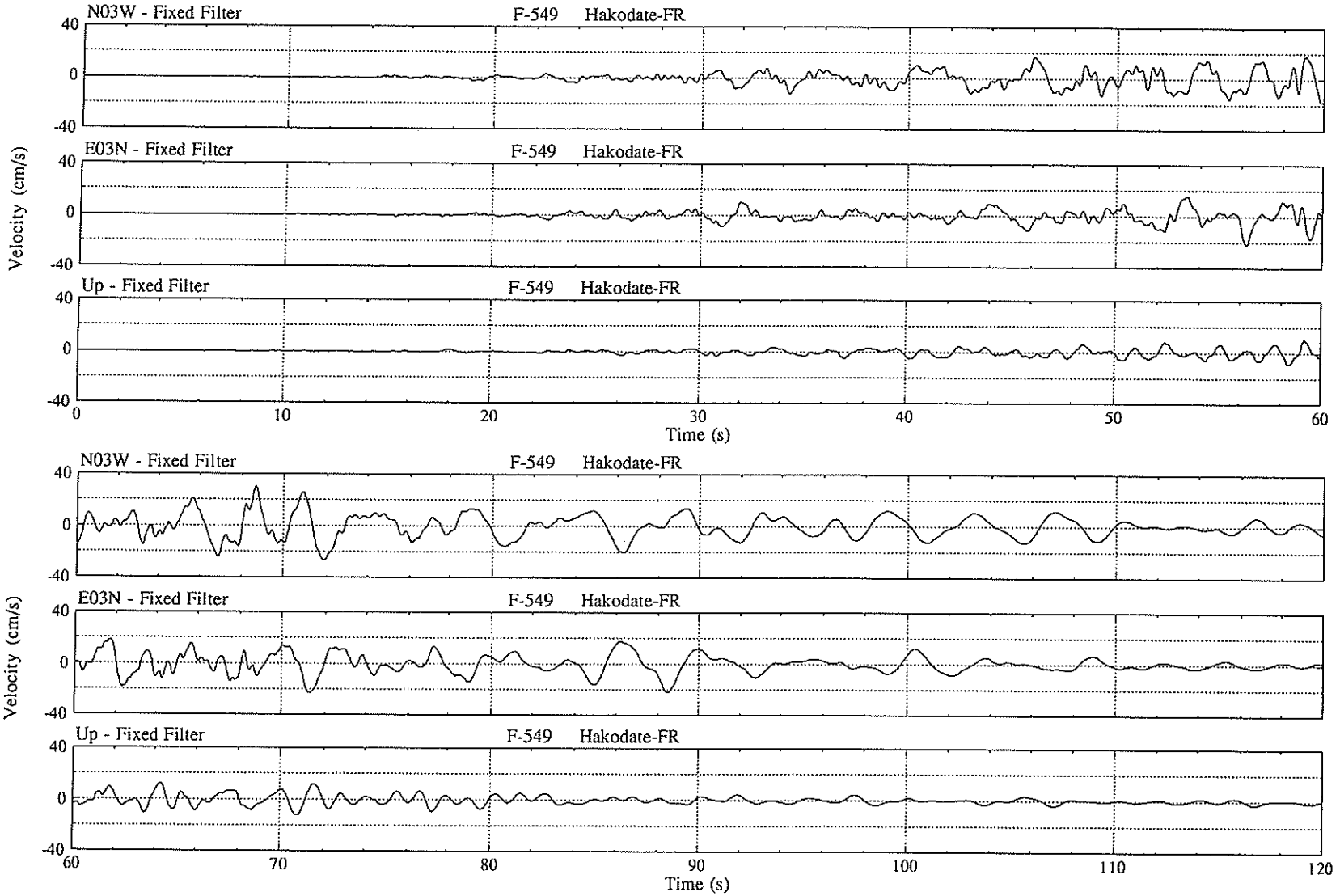
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.064	0.067	0.079	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	136.4	113.3	62.2	169.1
ORIGINAL	161.5	126.7	67.3	203.0
CORRECTED	157.2	127.6	67.9	196.9
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	30.88	22.83	12.30	31.18
VARIABLE FILTER	34.85	24.36	13.47	34.91
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	13.16	10.75	4.27	16.31
VARIABLE FILTER	15.98	11.78	4.54	16.07

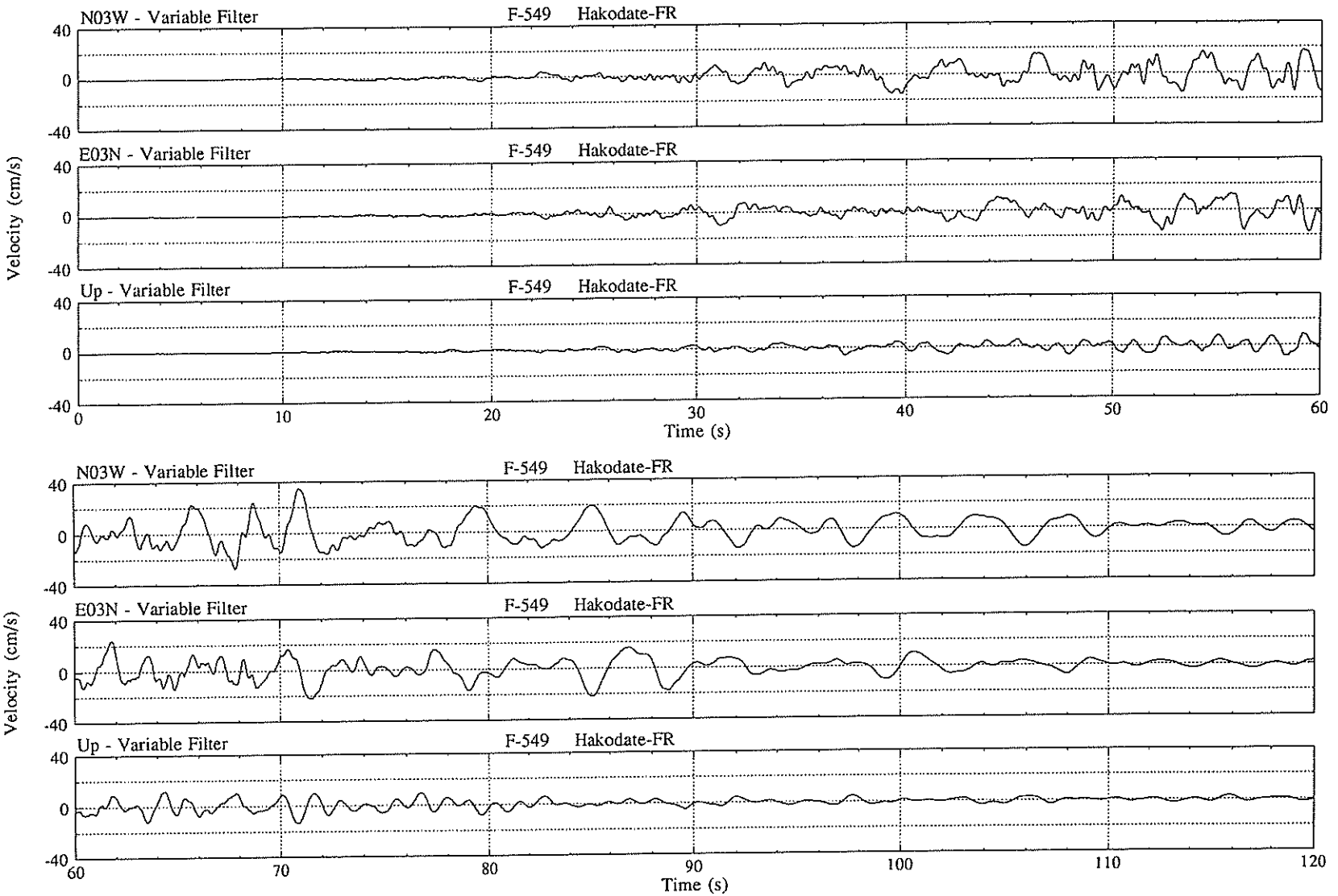
* RESULTANT OF HORIZONTAL COMPONENTS

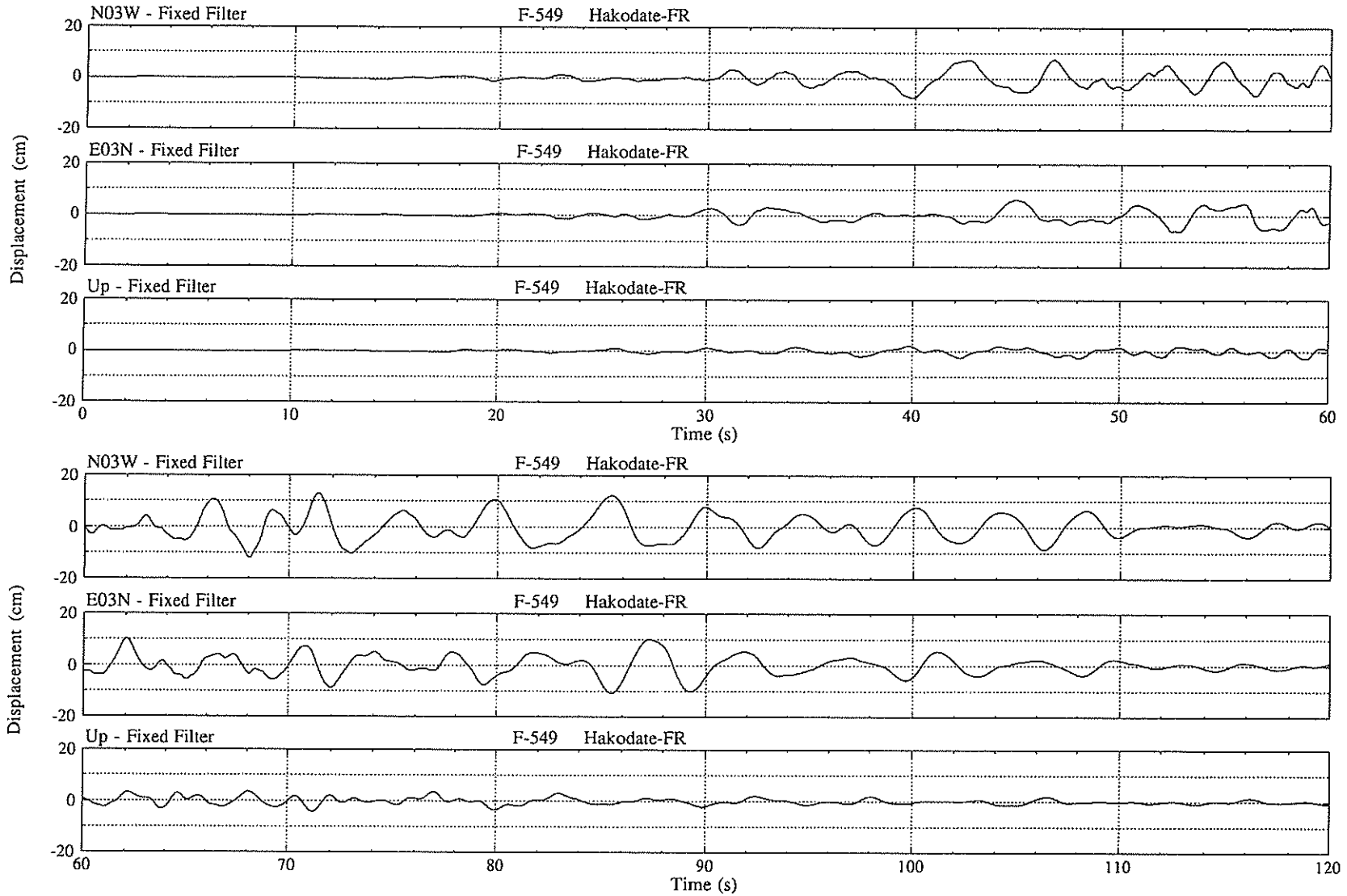

N03W- Original
F-549 Hakodate-FR
E03N - Original
F-549 Hakodate-FR
Up- Original
F-549 Hakodate-FR
Acceleration (cm/s²)
170
0
-170
0
10
20
30
40
50
60
Time (s)
N03W- Original
F-549 Hakodate-FR
E03N - Original
F-549 Hakodate-FR
Up- Original
F-549 Hakodate-FR
Acceleration (cm/s²)
170
0
-170
60
70
80
90
100
110
120
Time (s)

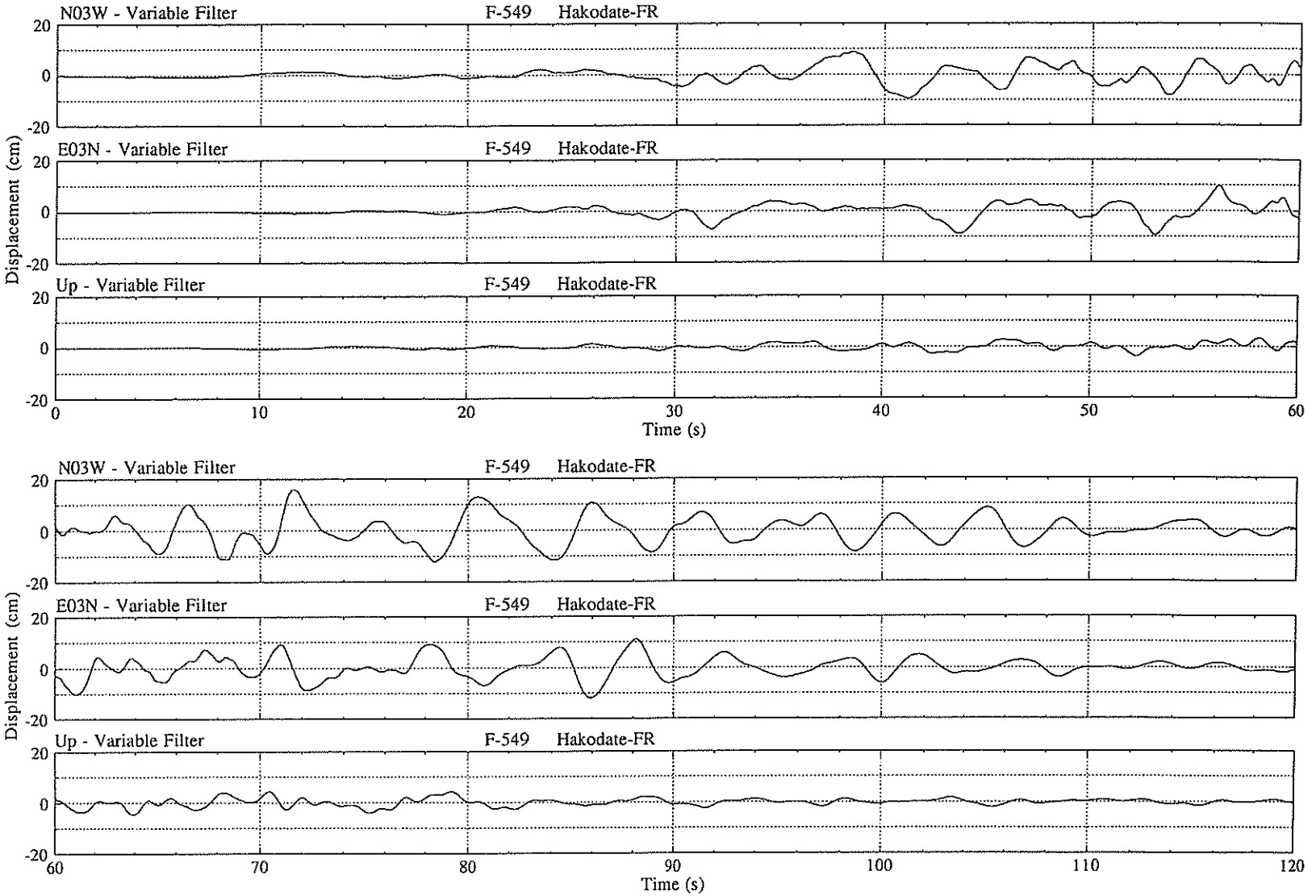

N03W - Corrected
F-549 Hakodate-FR
E03N - Corrected
F-549 Hakodate-FR
Up - Corrected
F-549 Hakodate-FR
Acceleration (cm/s²)
170
0
-170
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-549 Hakodate-FR
E03N - Corrected
F-549 Hakodate-FR
Up - Corrected
F-549 Hakodate-FR
Acceleration (cm/s²)
170
0
-170
60
70
80
90
100
110
120
Time (s)

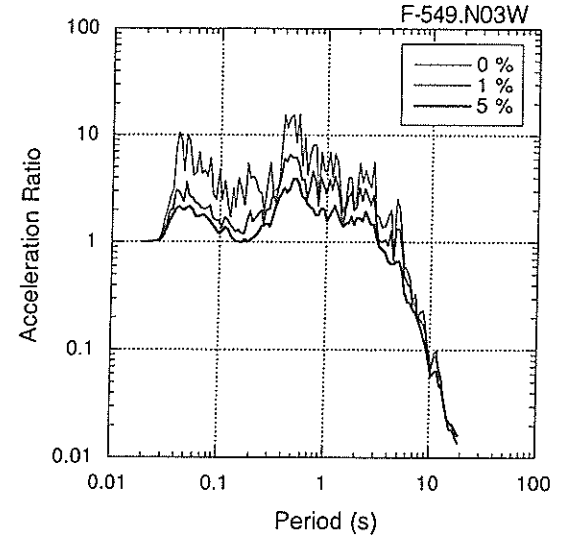

N03W - SMAC Equivalent
F-549 Hakodate-FR
E03N - SMAC Equivalent
F-549 Hakodate-FR
Up - SMAC Equivalent
F-549 Hakodate-FR
Acceleration (cm/s²)
140
0
-140
120
-120
0
10
20
30
40
50
60
Time (s)
N03W - SMAC Equivalent
F-549 Hakodate-FR
E03N - SMAC Equivalent
F-549 Hakodate-FR
Up - SMAC Equivalent
F-549 Hakodate-FR
Acceleration (cm/s²)
140
0
-140
120
-120
60
70
80
90
100
110
120
Time (s)

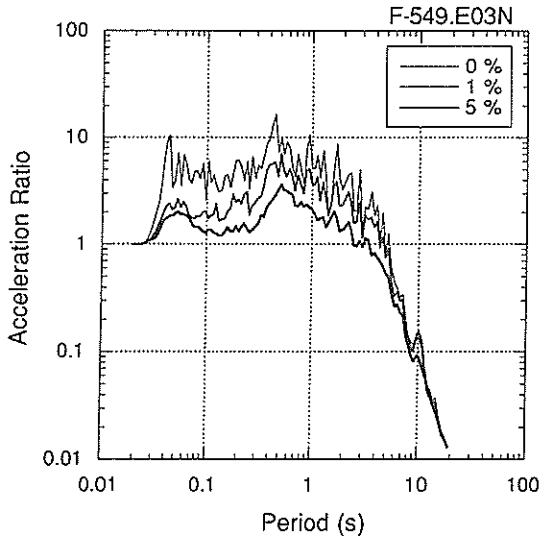

N03W - Fixed Filter
F-549 Hakodate-FR
E03N - Fixed Filter
F-549 Hakodate-FR
Up - Fixed Filter
F-549 Hakodate-FR
Velocity (cm/s)
40
0
-40
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-549 Hakodate-FR
E03N - Fixed Filter
F-549 Hakodate-FR
Up - Fixed Filter
F-549 Hakodate-FR
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

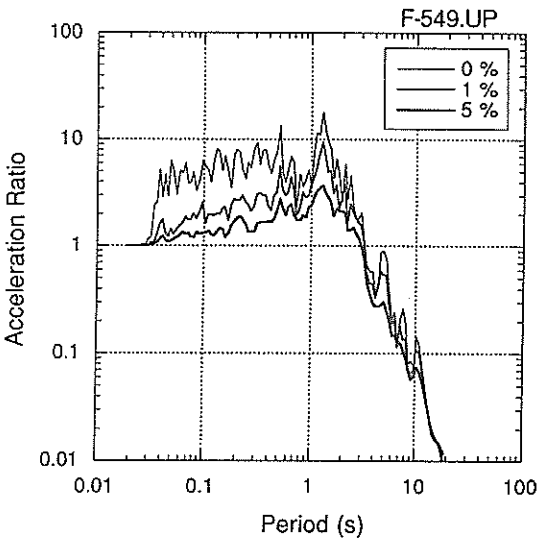

N03W - Variable Filter
F-549 Hakodate-FR
E03N - Variable Filter
F-549 Hakodate-FR
Up - Variable Filter
F-549 Hakodate-FR
Velocity (cm/s)
40
0
-40
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-549 Hakodate-FR
E03N - Variable Filter
F-549 Hakodate-FR
Up - Variable Filter
F-549 Hakodate-FR
Velocity (cm/s)
40
0
-40
60
70
80
90
100
110
120
Time (s)

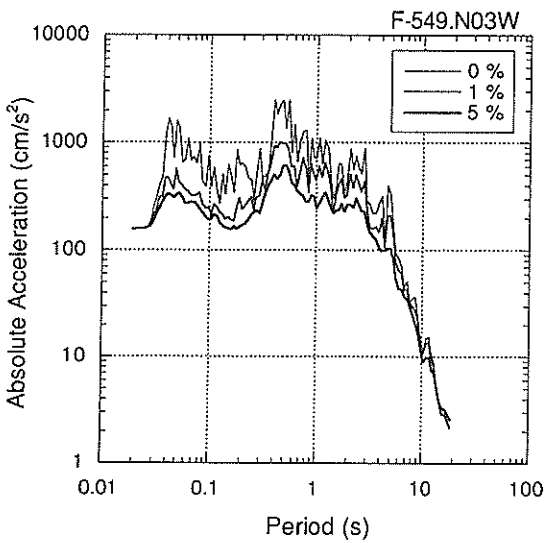

N03W - Fixed Filter
F-549 Hakodate-FR
E03N - Fixed Filter
F-549 Hakodate-FR
Up - Fixed Filter
F-549 Hakodate-FR
Displacement (cm)
20
0
-20
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-549 Hakodate-FR
E03N - Fixed Filter
F-549 Hakodate-FR
Up - Fixed Filter
F-549 Hakodate-FR
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

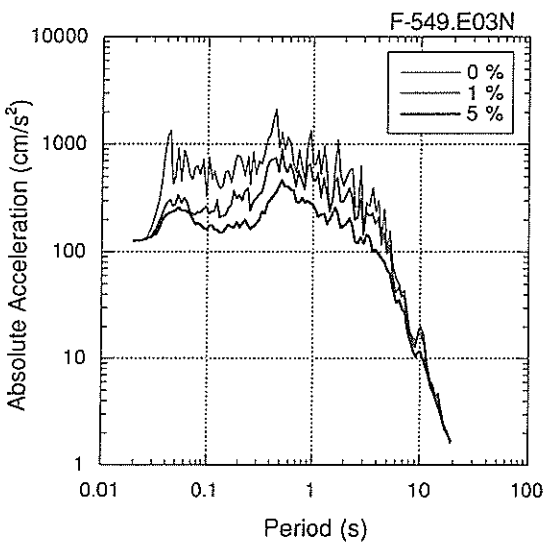

N03W - Variable Filter
F-549 Hakodate-FR
E03N - Variable Filter
F-549 Hakodate-FR
Up - Variable Filter
F-549 Hakodate-FR
Displacement (cm)
20
0
-20
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-549 Hakodate-FR
E03N - Variable Filter
F-549 Hakodate-FR
Up - Variable Filter
F-549 Hakodate-FR
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

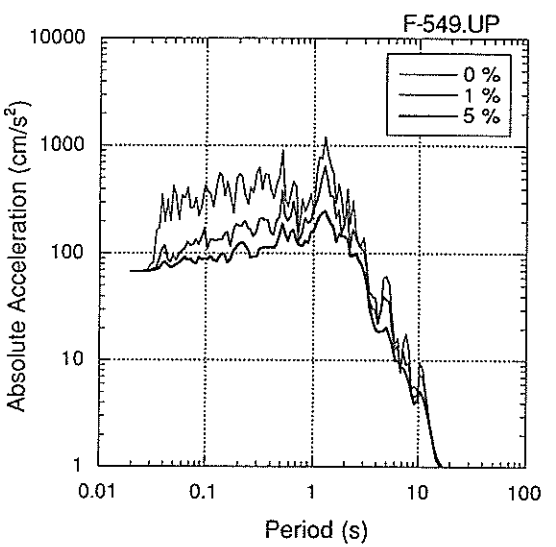

F-549.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)

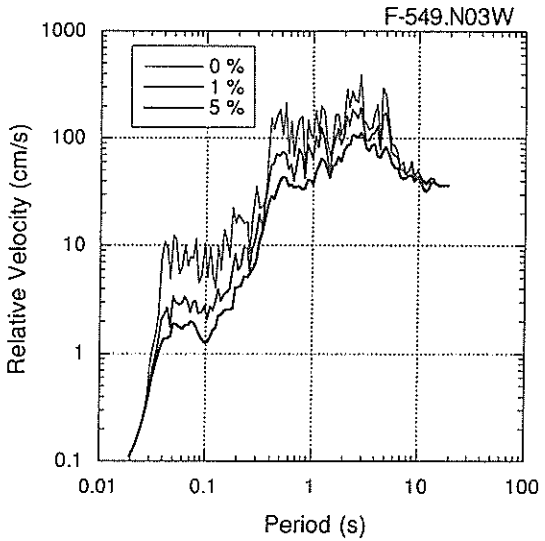

F-549.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)

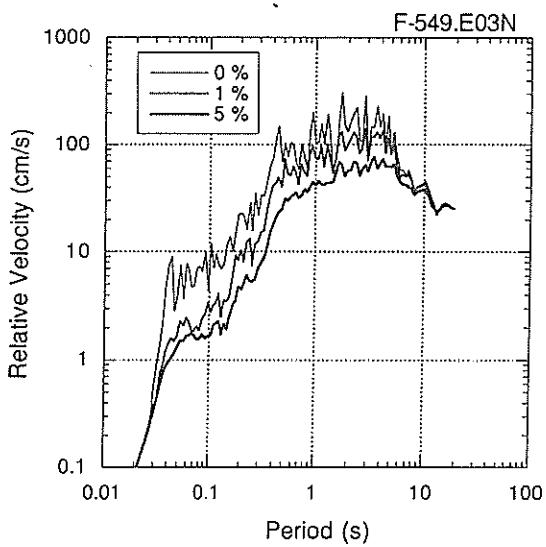

F-549.UP
0 %
1 %
5 %
Acceleration Ratio
Period (s)

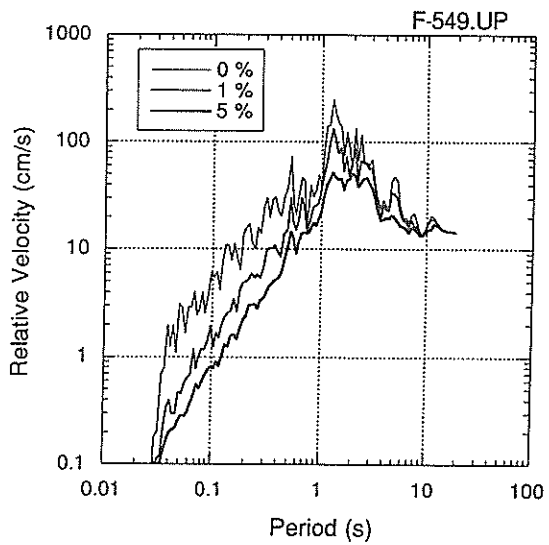

F-549.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

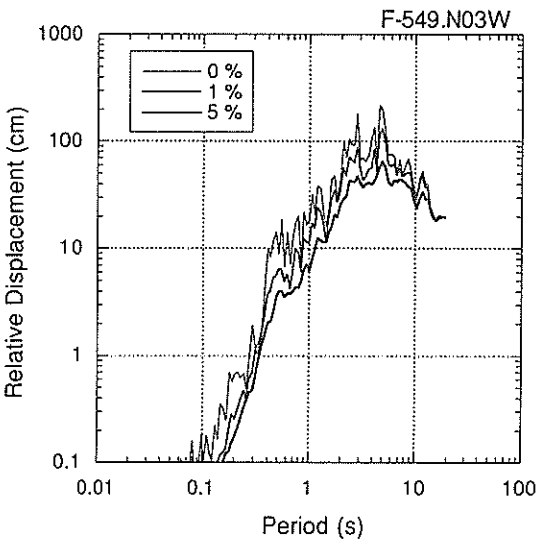

F-549.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

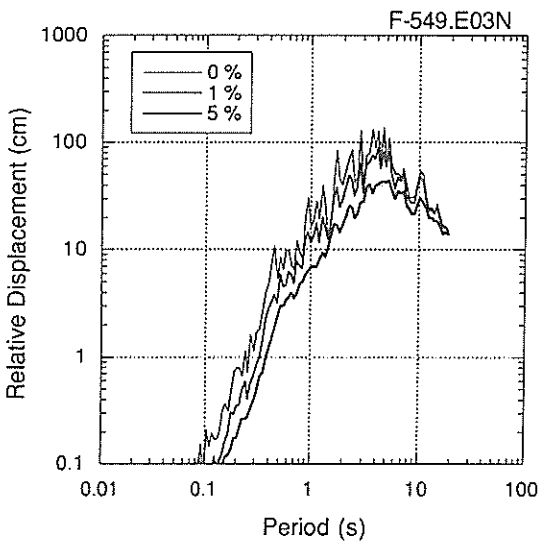

F-549.UP
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

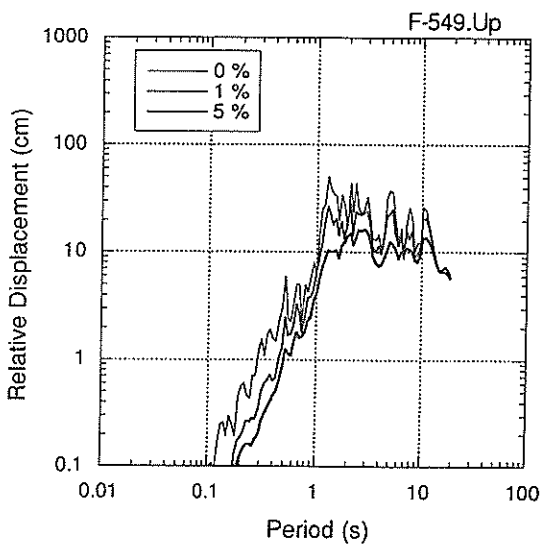

F-549.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

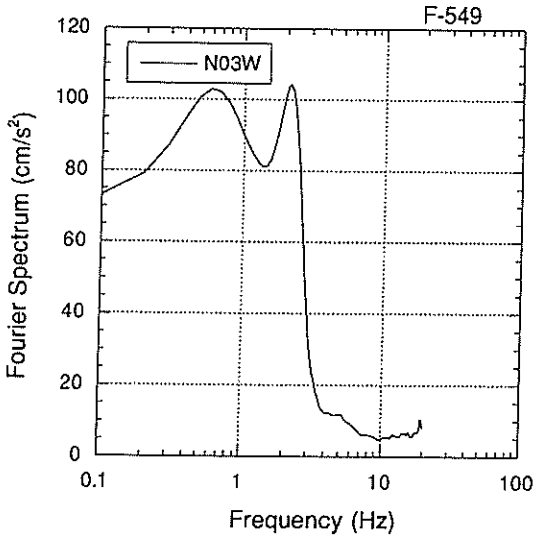

F-549.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

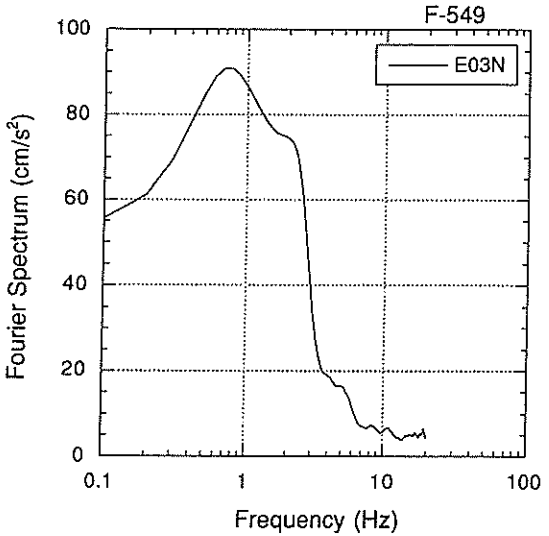

F-549.UP
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

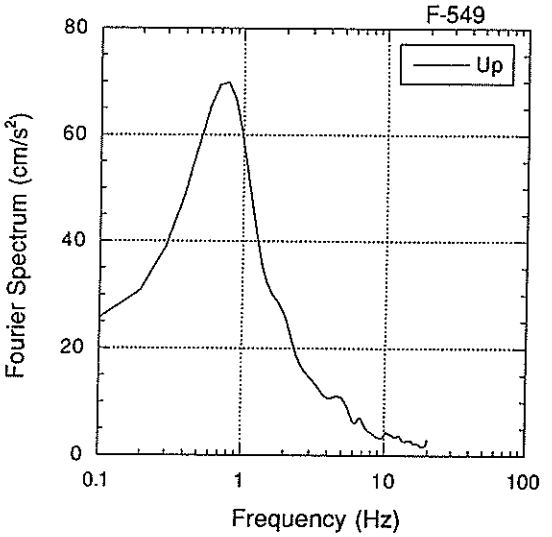

F-549.N03W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

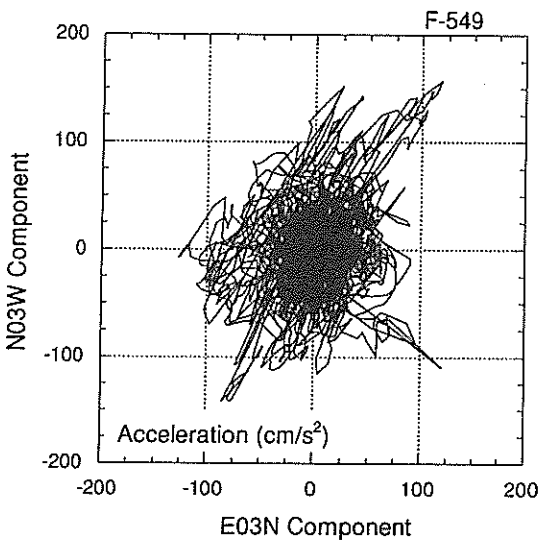

F-549.E03N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

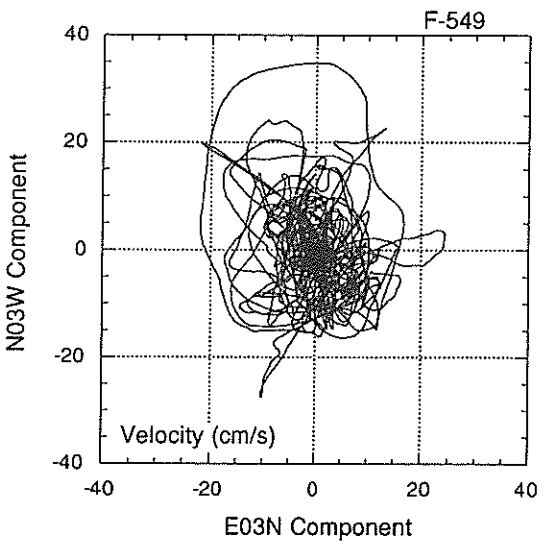

F-549.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

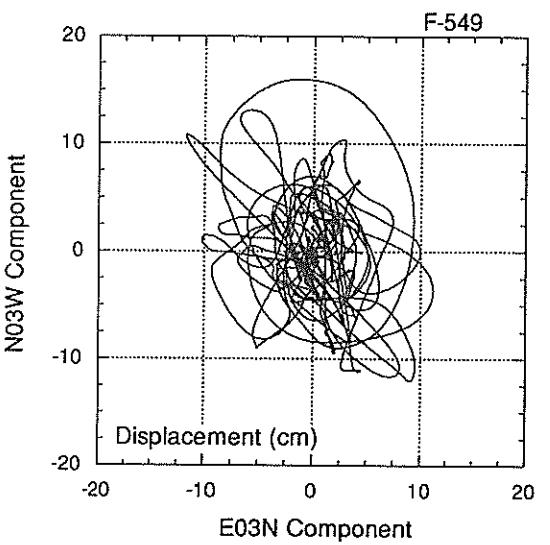

F-549
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-549
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-549
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-549
N03W Component
Acceleration (cm/s²)
E03N Component


F-549
N03W Component
Velocity (cm/s)
E03N Component


F-549
N03W Component
Displacement (cm)
E03N Component

RECORD NUMBER : F-554

STATION : MURORAN-G

EARTHQUAKE DATA

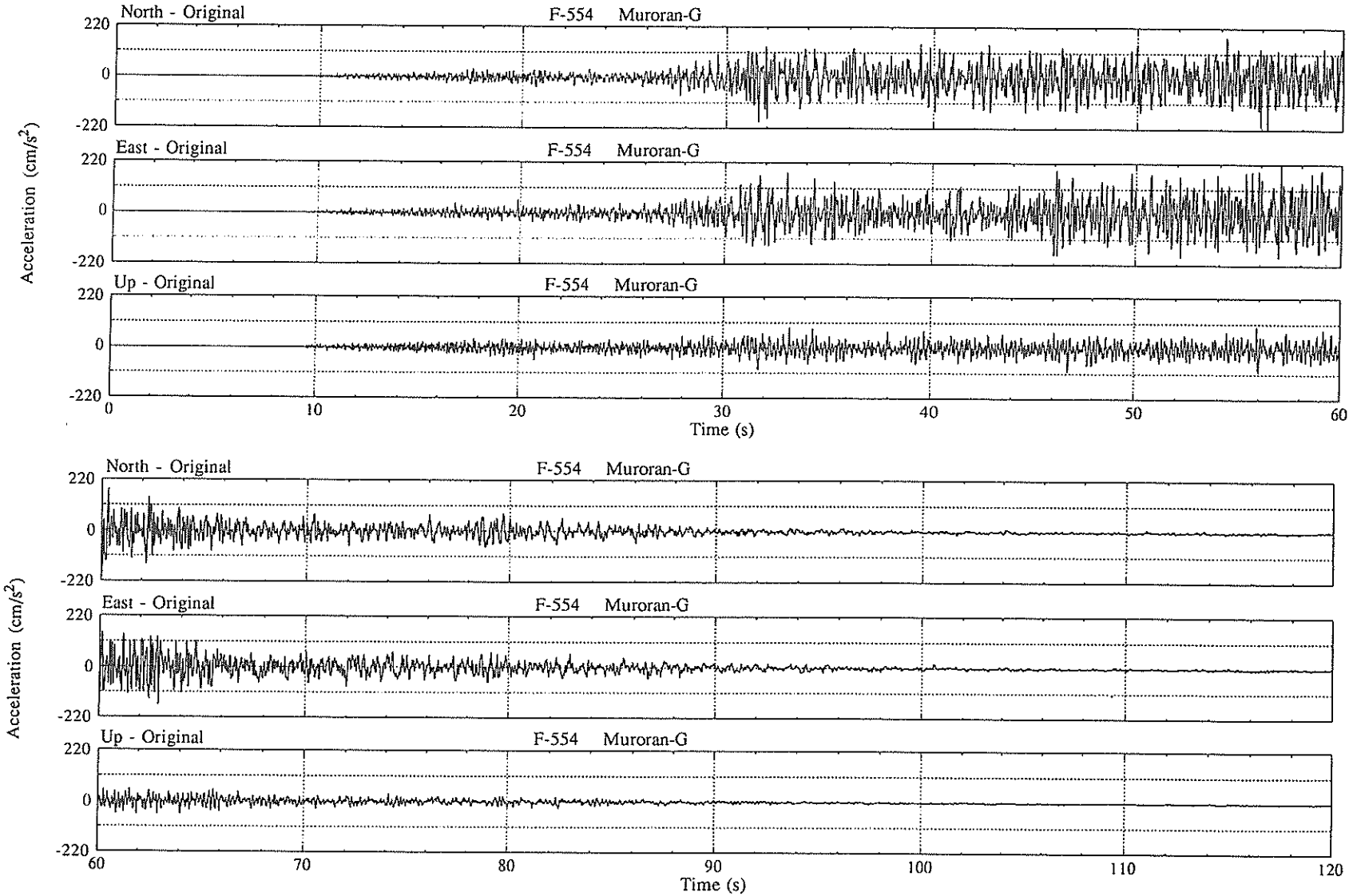
****

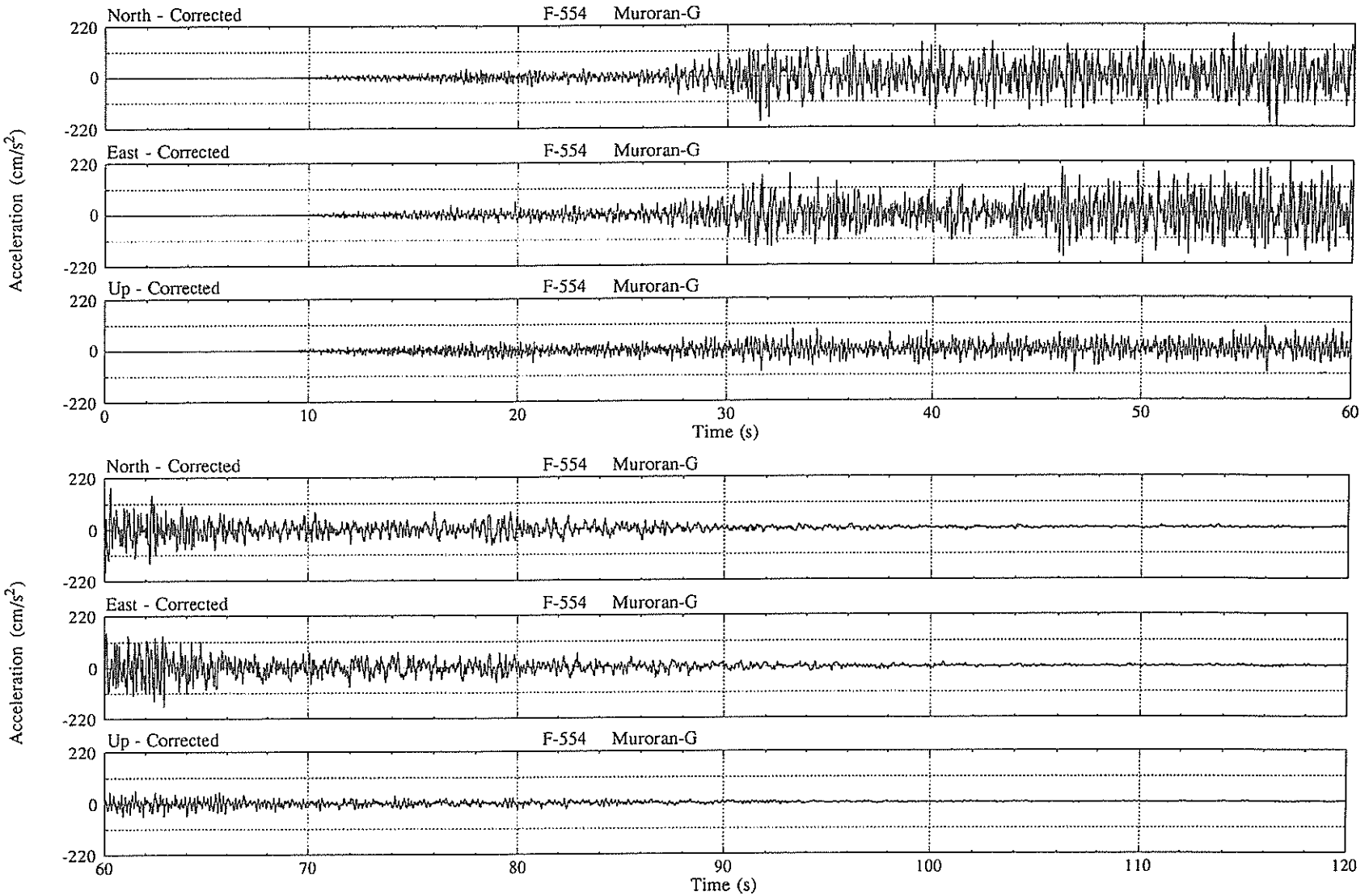
DATE AND TIME	22:17 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°46.8' N
LONGITUDE	139°11.0' E
DEPTH	35.1KM
JMA MAGNITUDE	7.8

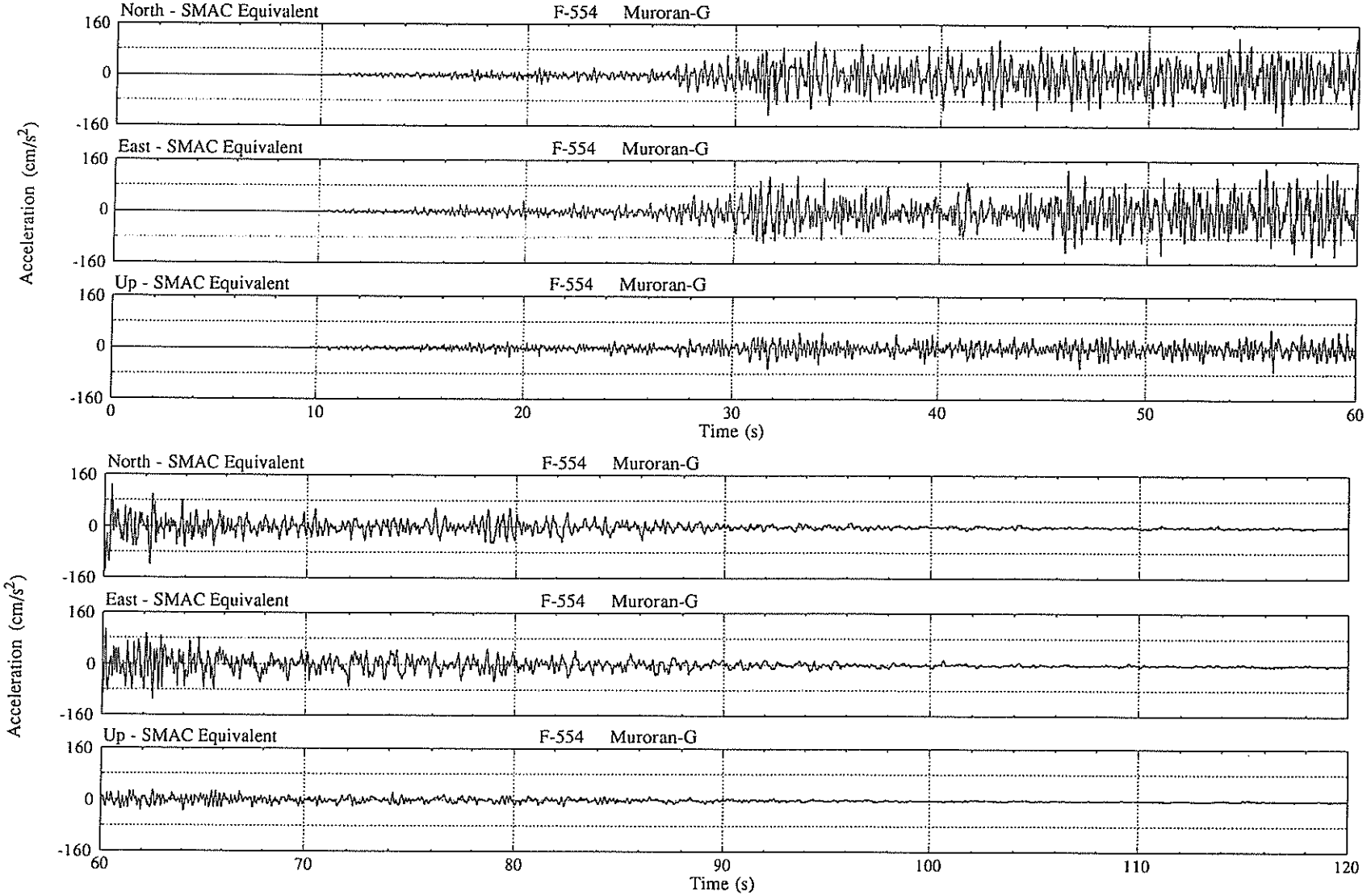
****

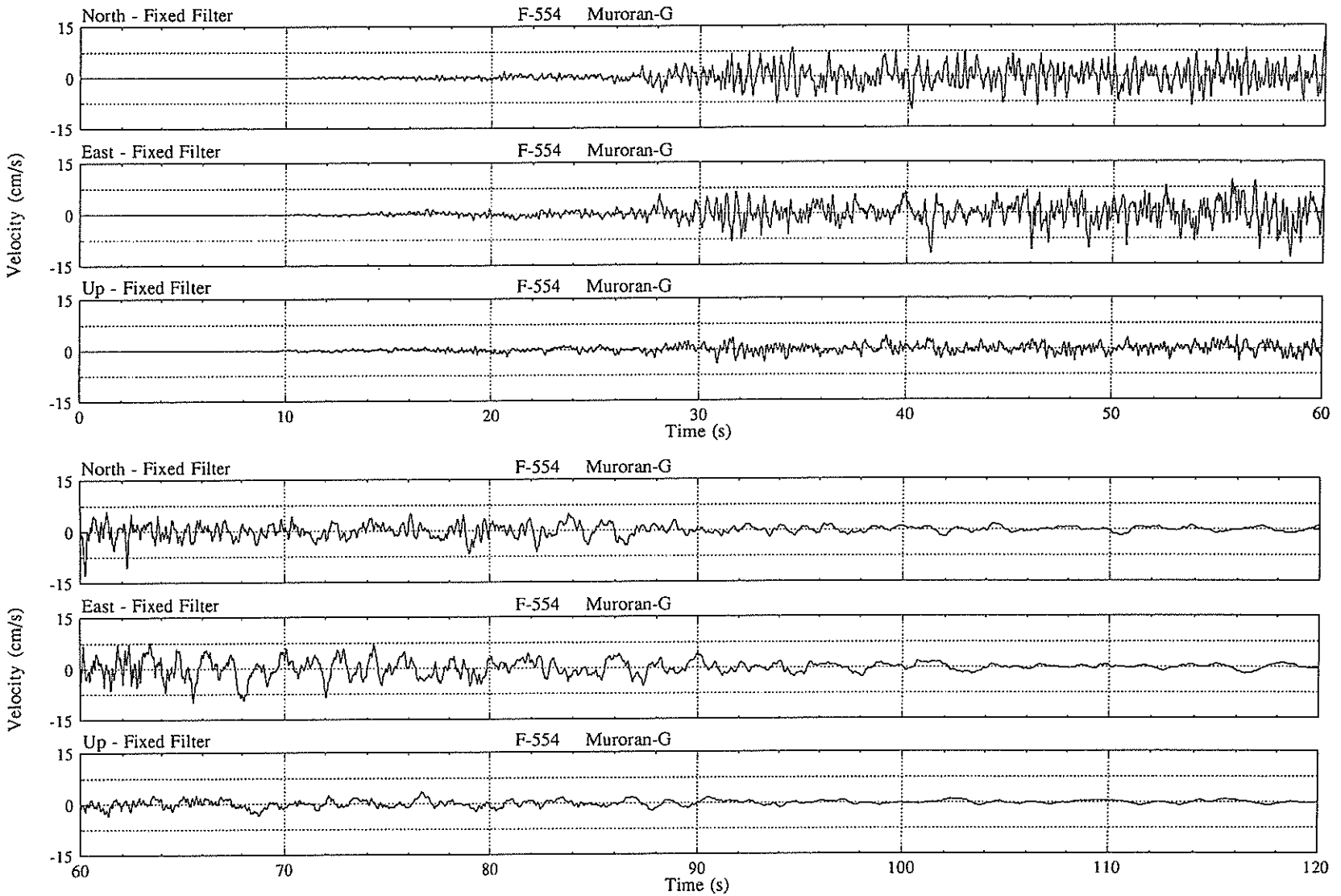
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.045	0.051	0.051	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	151.9	141.0	70.8	157.7
ORIGINAL	217.3	215.2	100.2	242.1
CORRECTED	217.6	214.2	100.0	241.8
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	12.87	12.95	4.20	13.01
VARIABLE FILTER	12.85	13.50	5.53	13.93
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	1.84	3.11	2.08	3.14
VARIABLE FILTER	6.30	6.58	5.08	6.72

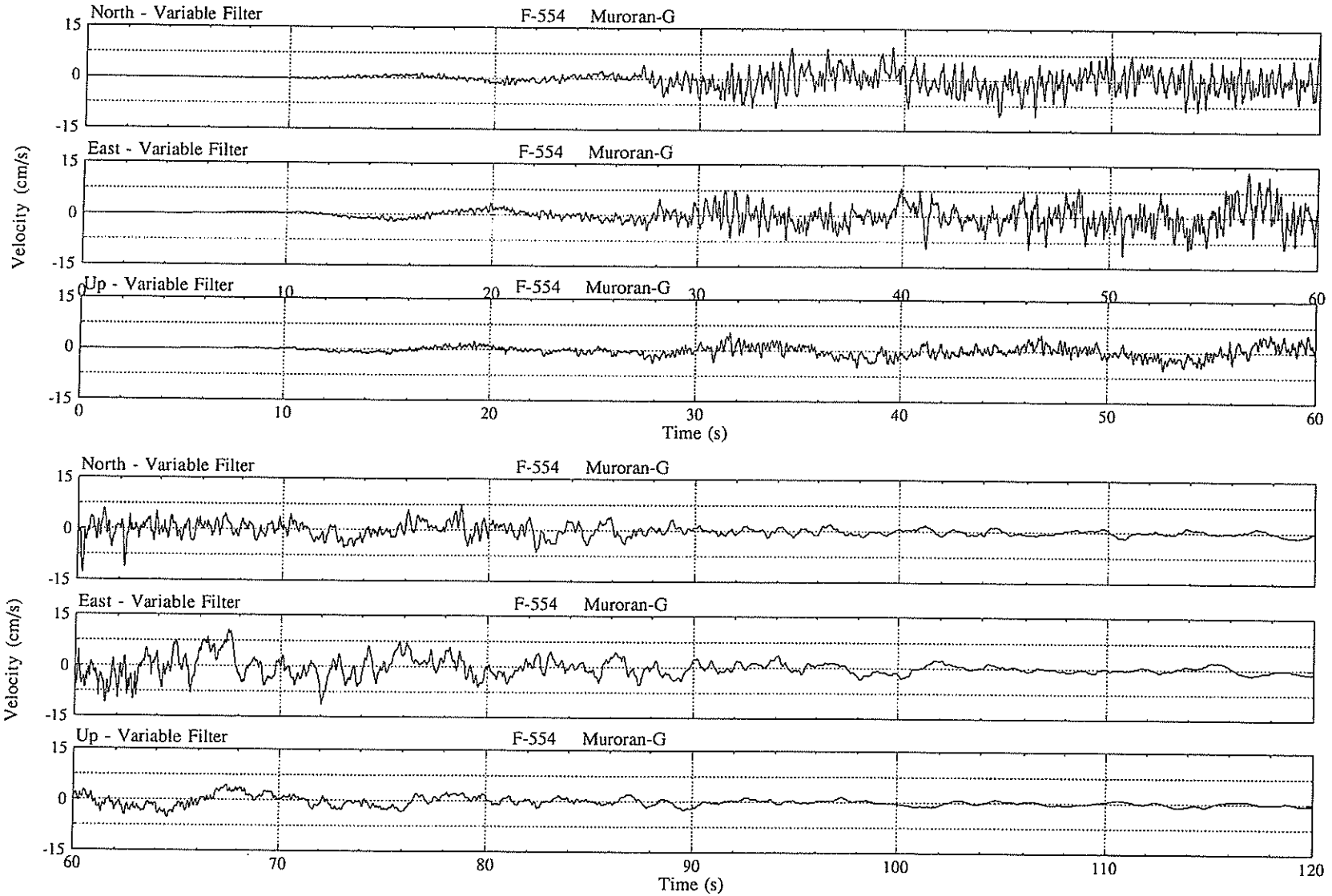
* RESULTANT OF HORIZONTAL COMPONENTS

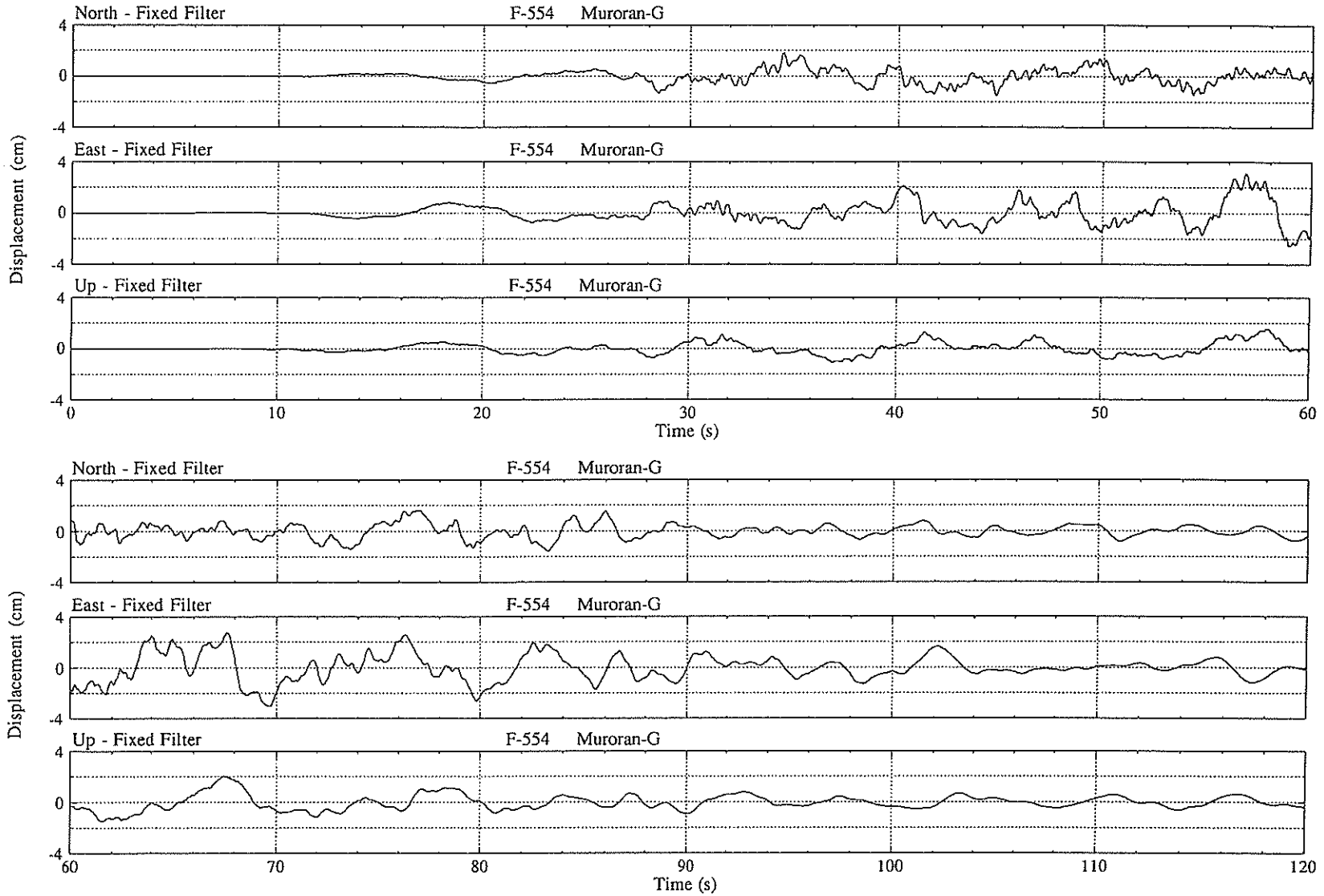

North - Original
F-554 Muroran-G
East - Original
F-554 Muroran-G
Up - Original
F-554 Muroran-G
220
0
-220
Acceleration (cm/s²)
0
10
20
30
40
50
60
Time (s)
North - Original
F-554 Muroran-G
East - Original
F-554 Muroran-G
Up - Original
F-554 Muroran-G
220
0
-220
Acceleration (cm/s²)
60
70
80
90
100
110
120
Time (s)

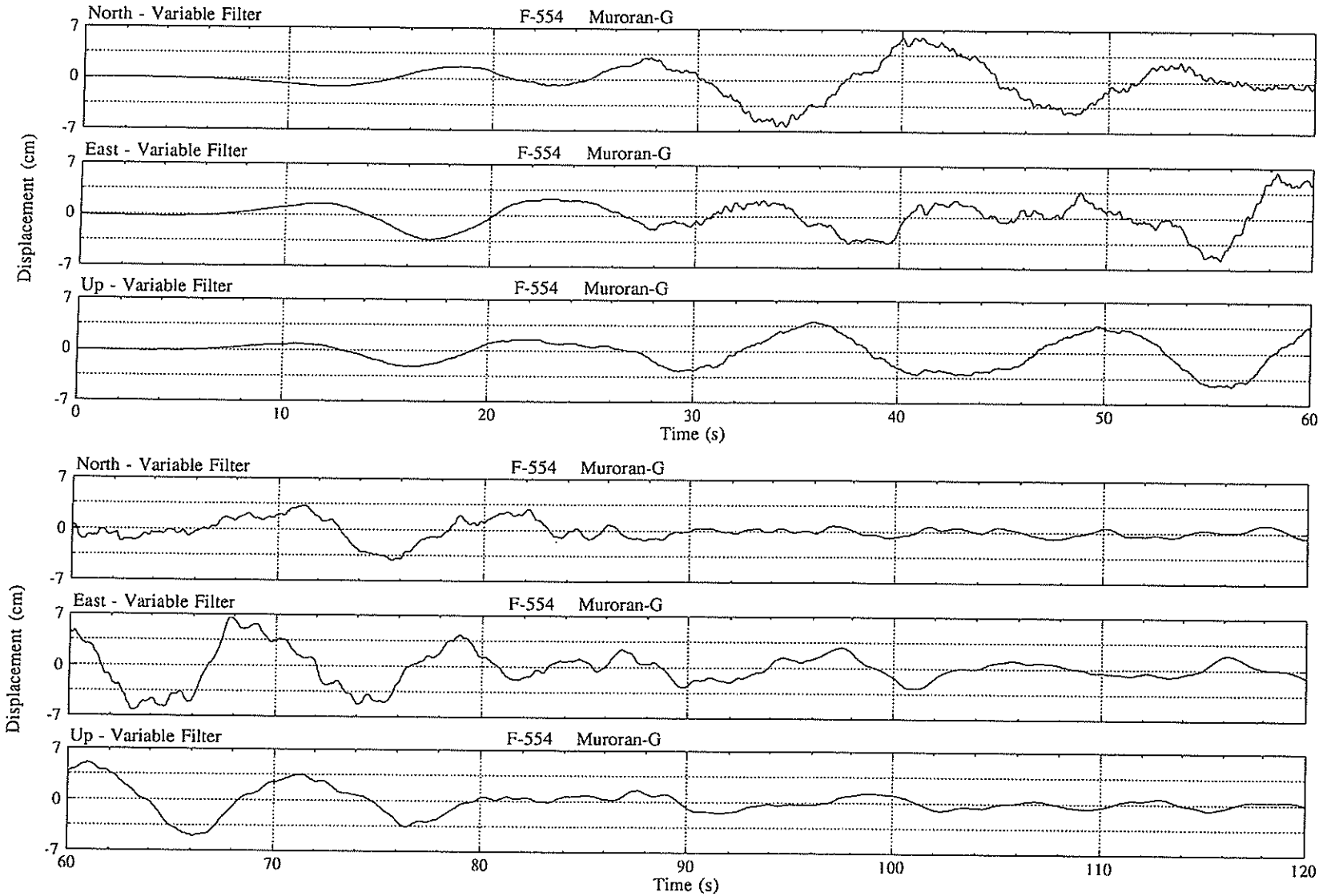

North - Corrected
F-554 Muroran-G
East - Corrected
F-554 Muroran-G
Up - Corrected
F-554 Muroran-G
220
0
-220
Acceleration (cm/s²)
0
10
20
30
40
50
60
Time (s)
North - Corrected
F-554 Muroran-G
East - Corrected
F-554 Muroran-G
Up - Corrected
F-554 Muroran-G
220
0
-220
Acceleration (cm/s²)
60
70
80
90
100
110
120
Time (s)

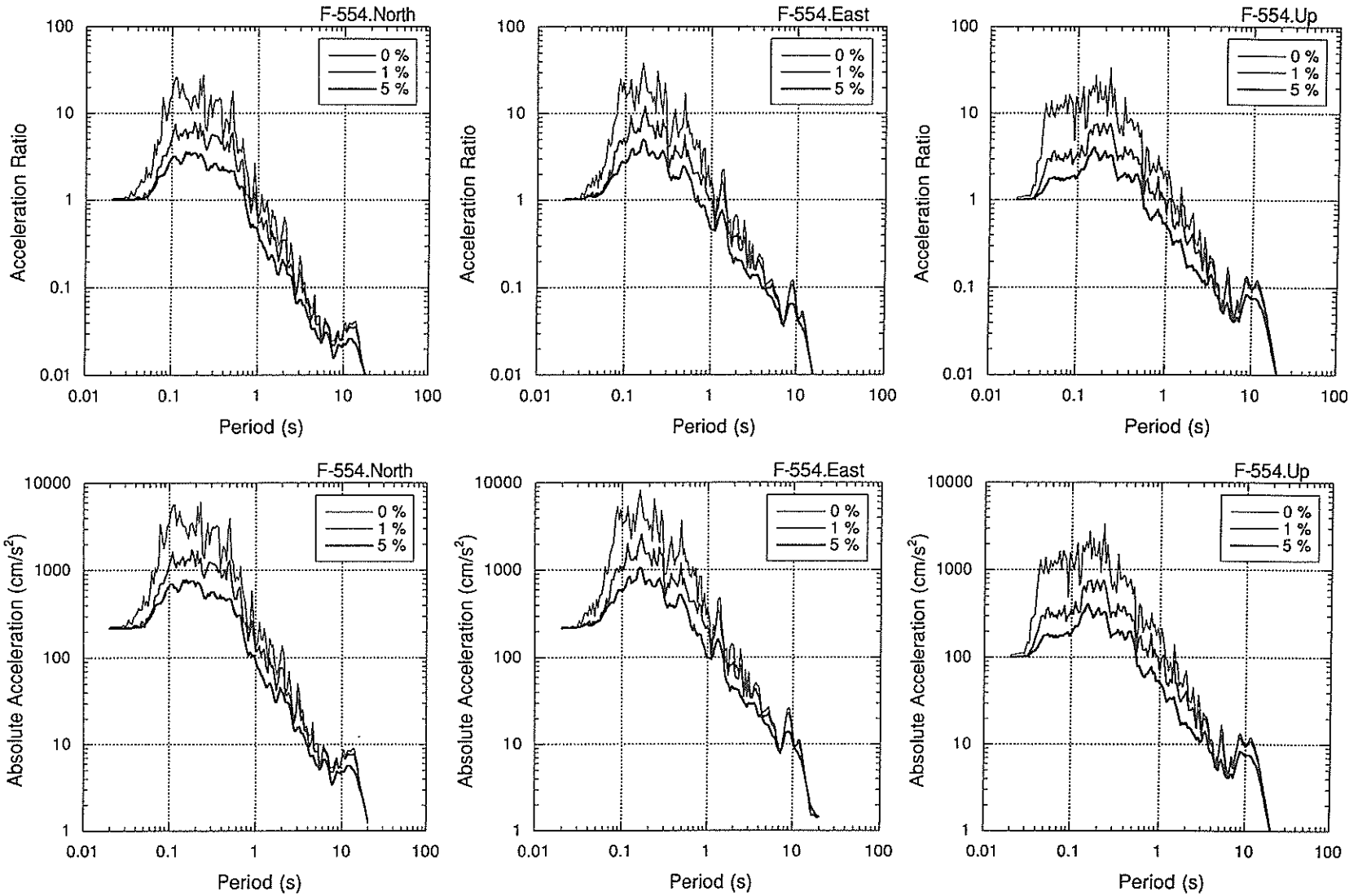

North - SMAC Equivalent
F-554 Muroran-G
East - SMAC Equivalent
F-554 Muroran-G
Up - SMAC Equivalent
F-554 Muroran-G
Acceleration (cm/s²)
160
0
-160
0
10
20
30
40
50
60
Time (s)
North - SMAC Equivalent
F-554 Muroran-G
East - SMAC Equivalent
F-554 Muroran-G
Up - SMAC Equivalent
F-554 Muroran-G
Acceleration (cm/s²)
160
0
-160
60
70
80
90
100
110
120
Time (s)

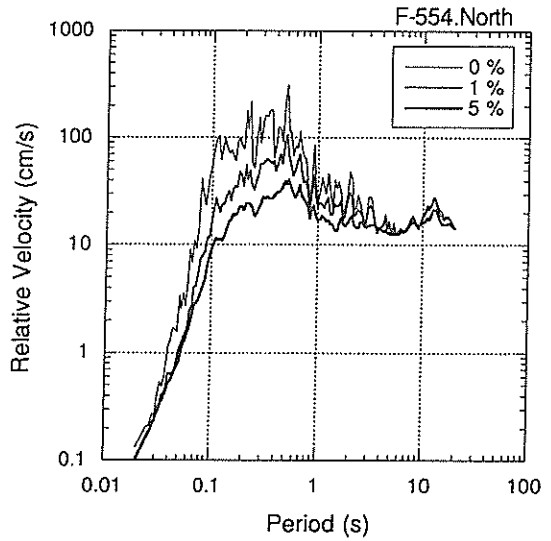

North - Fixed Filter
F-554 Muroran-G
East - Fixed Filter
F-554 Muroran-G
Up - Fixed Filter
F-554 Muroran-G
Velocity (cm/s)
15
0
-15
0
10
20
30
40
50
60
Time (s)
North - Fixed Filter
F-554 Muroran-G
East - Fixed Filter
F-554 Muroran-G
Up - Fixed Filter
F-554 Muroran-G
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

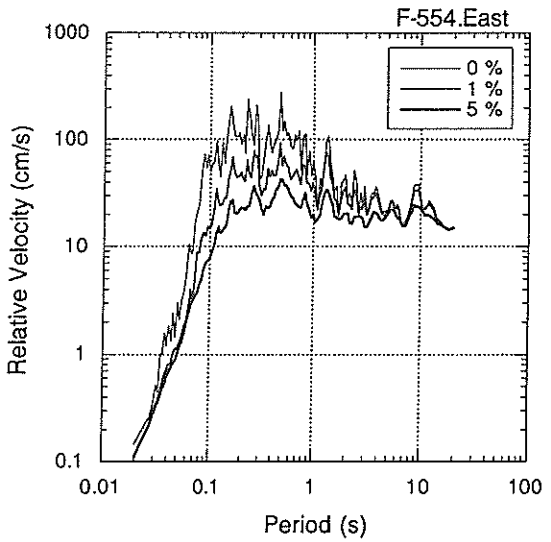

North - Variable Filter
F-554 Muroran-G
East - Variable Filter
F-554 Muroran-G
Up - Variable Filter
F-554 Muroran-G
Velocity (cm/s)
15
0
-15
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-554 Muroran-G
East - Variable Filter
F-554 Muroran-G
Up - Variable Filter
F-554 Muroran-G
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

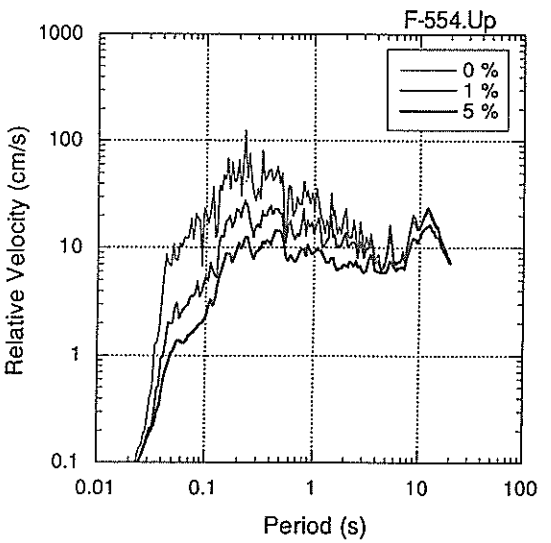

North - Fixed Filter
F-554 Muroran-G
East - Fixed Filter
F-554 Muroran-G
Up - Fixed Filter
F-554 Muroran-G
Displacement (cm)
Time (s)
North - Fixed Filter
F-554 Muroran-G
East - Fixed Filter
F-554 Muroran-G
Up - Fixed Filter
F-554 Muroran-G
Displacement (cm)
Time (s)

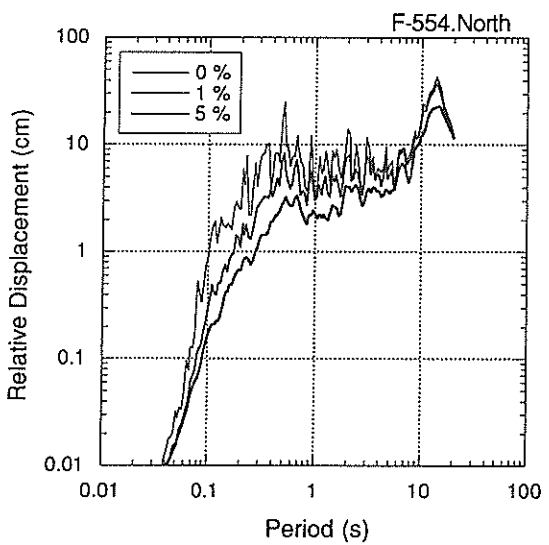

North - Variable Filter
F-554 Muroran-G
East - Variable Filter
F-554 Muroran-G
Up - Variable Filter
F-554 Muroran-G
Displacement (cm)
7
0
-7
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-554 Muroran-G
East - Variable Filter
F-554 Muroran-G
Up - Variable Filter
F-554 Muroran-G
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

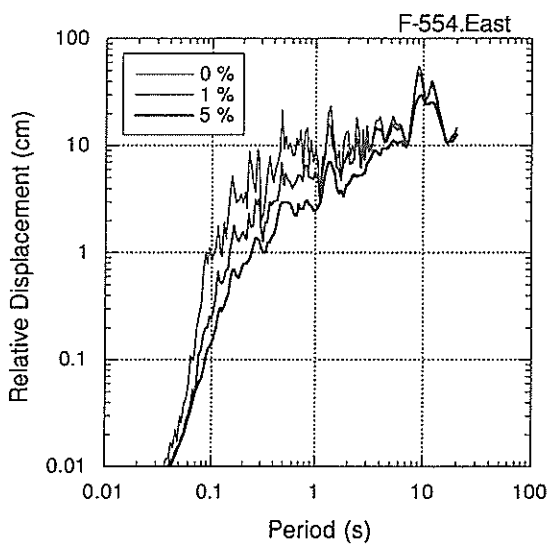

F-554.North
F-554.East
F-554.Up
0 %
1 %
5 %
Acceleration Ratio
Absolute Acceleration (cm/s²)
Period (s)
0.01
0.1
1
10
100
1000
10000

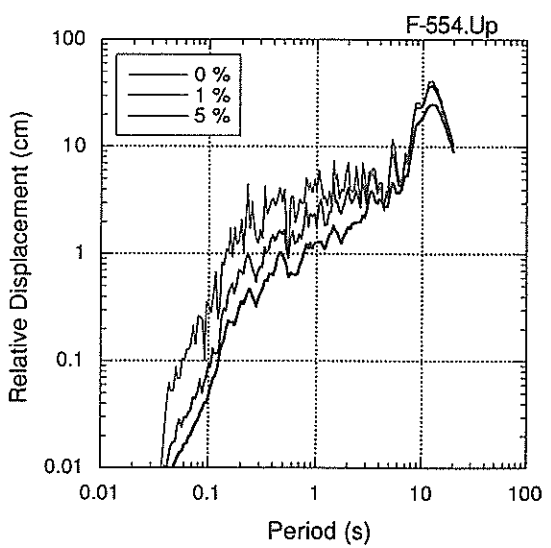

F-554.North
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

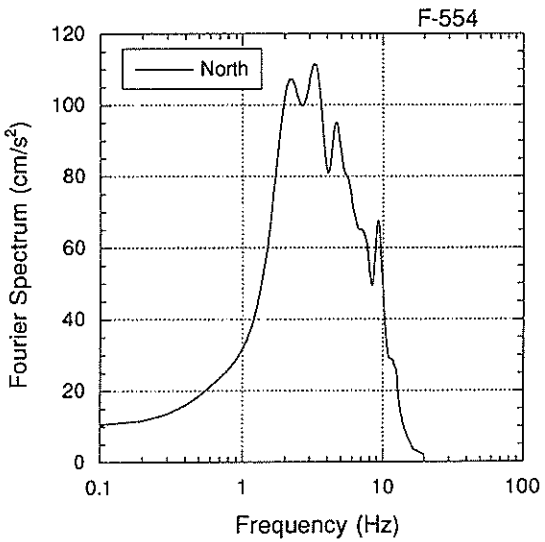

F-554.East
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

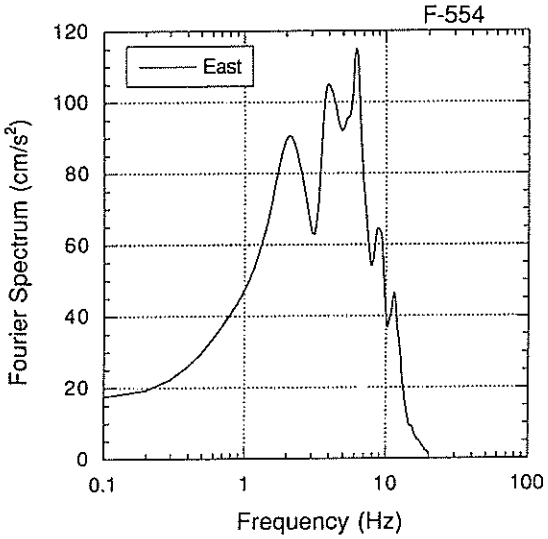

F-554.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

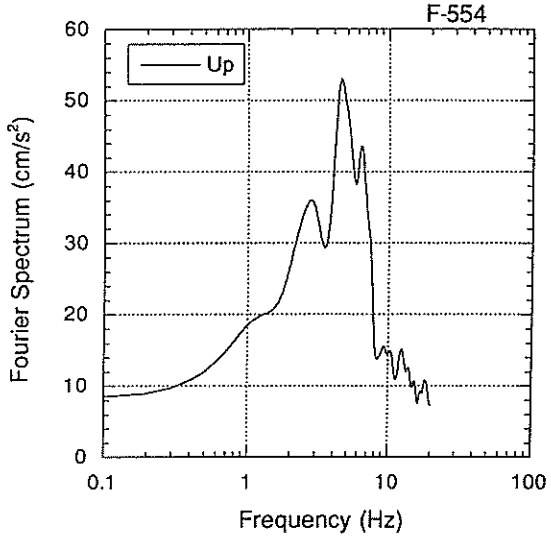

F-554.North
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

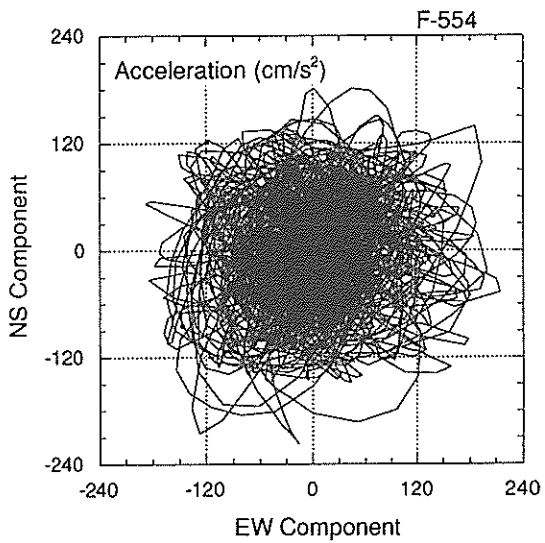

F-554.East
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

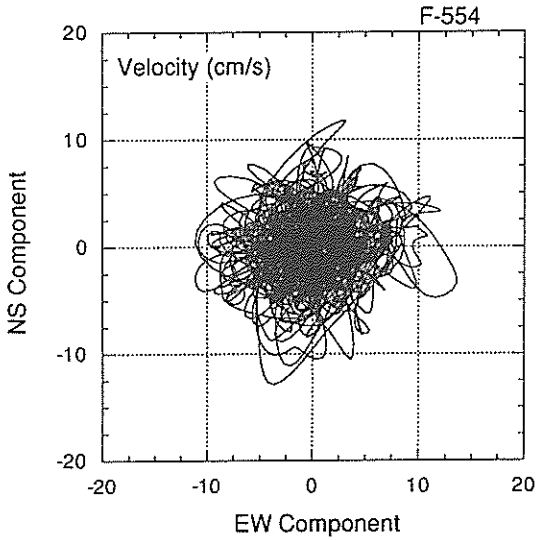

F-554.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

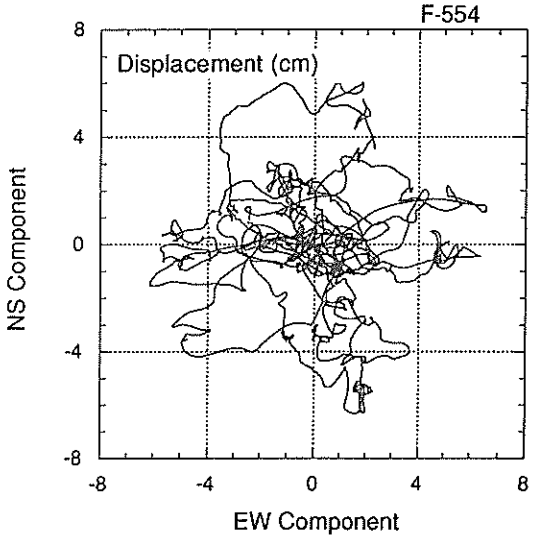

F-554
North
Fourier Spectrum (cm/s²)
Frequency (Hz)
120
100
80
60
40
20
0
0.1
1
10
100


F-554
East
Fourier Spectrum (cm/s²)
Frequency (Hz)
120
100
80
60
40
20
0
0.1
1
10
100


F-554
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)
60
50
40
30
20
10
0
0.1
1
10
100


F-554
Acceleration (cm/s²)
NS Component
EW Component
240
120
0
-120
-240


F-554
Velocity (cm/s)
NS Component
EW Component
20
10
0
-10
-20


F-554
Displacement (cm)
NS Component
EW Component
8
4
0
-4
-8

RECORD NUMBER : F-587

STATION : MIYAKO-G

EARTHQUAKE DATA

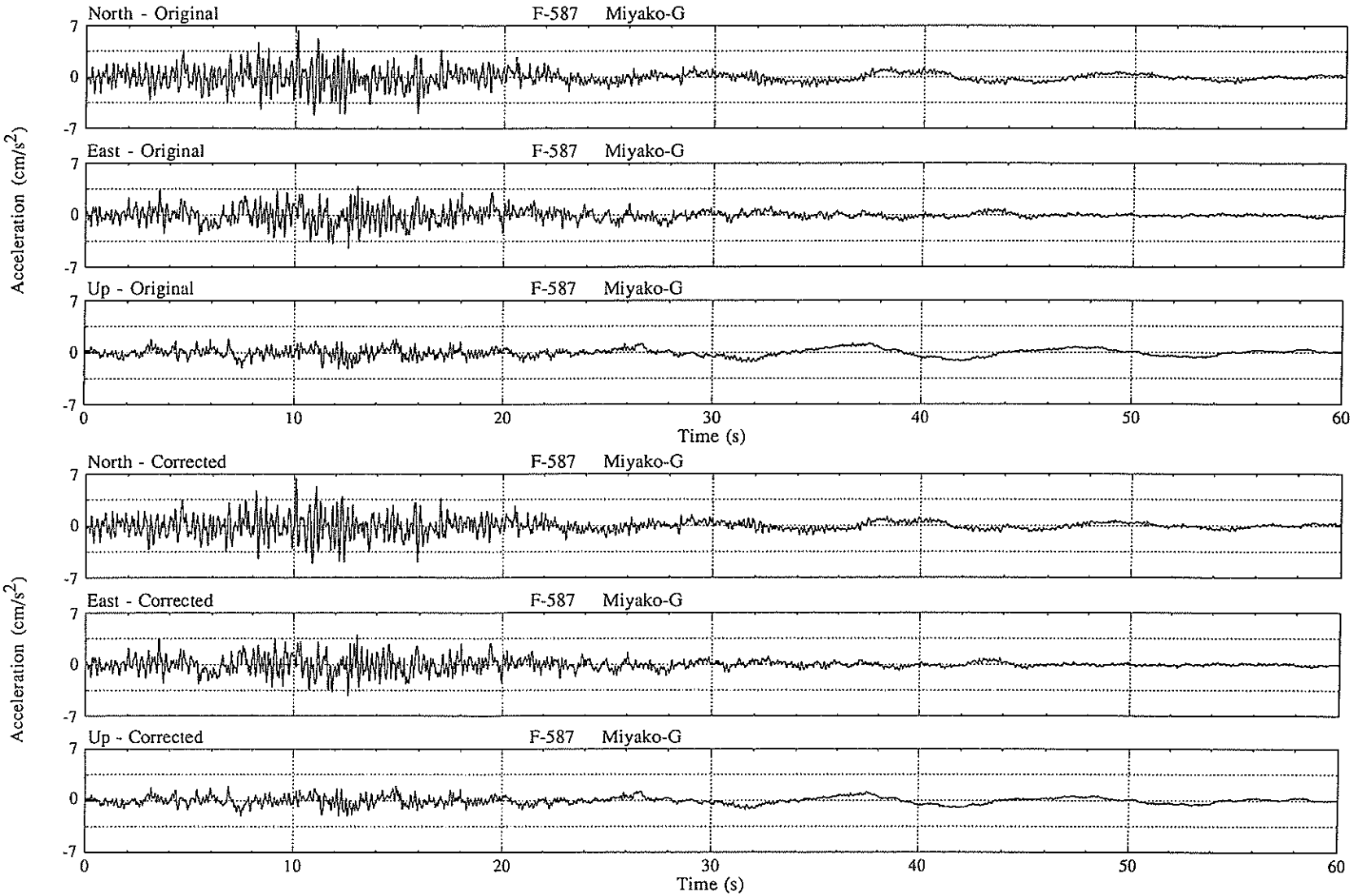
****

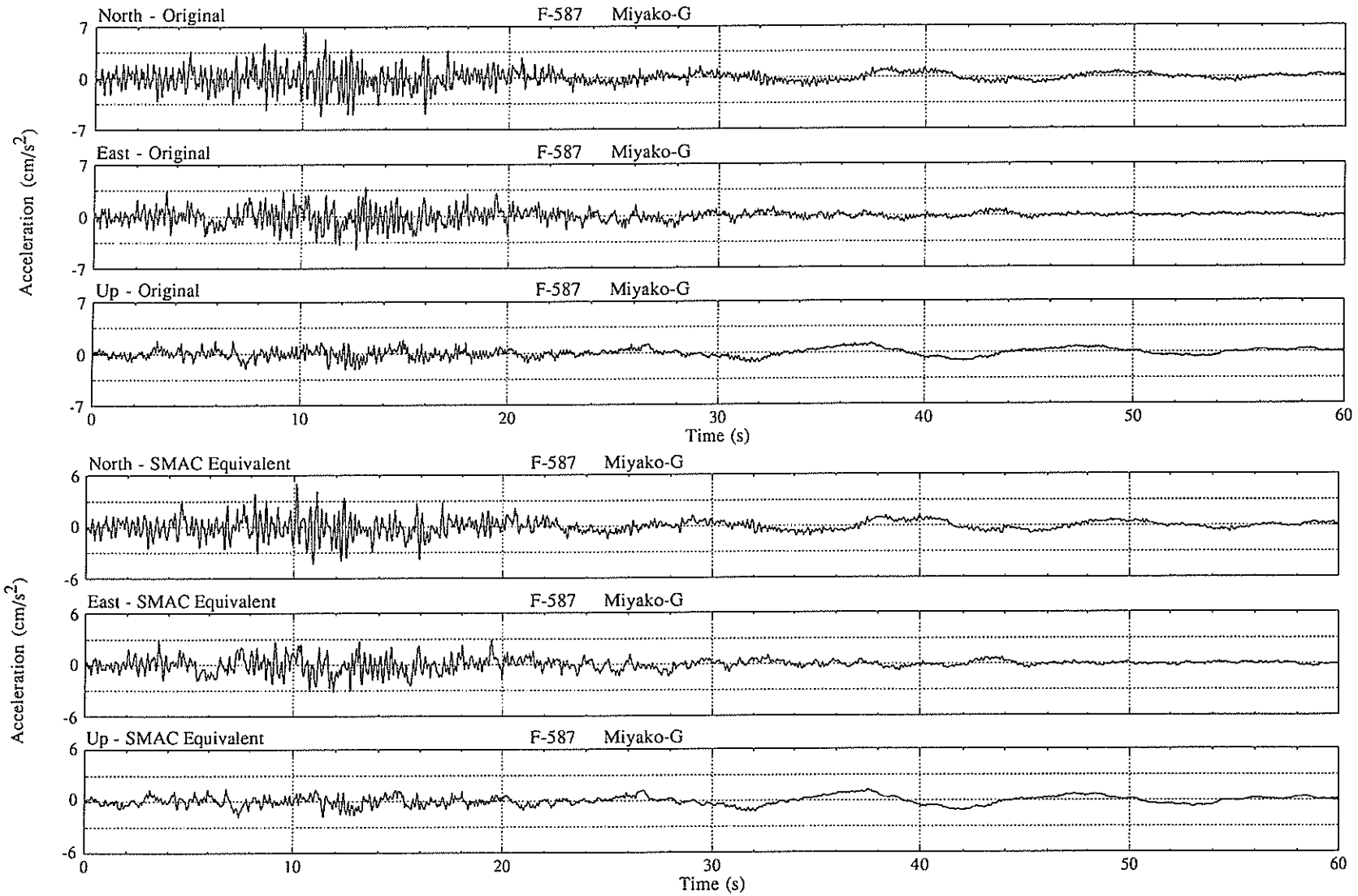
DATE AND TIME	22:17 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°46.8' N
LONGITUDE	139°11.0' E
DEPTH	35.1KM
JMA MAGNITUDE	7.8

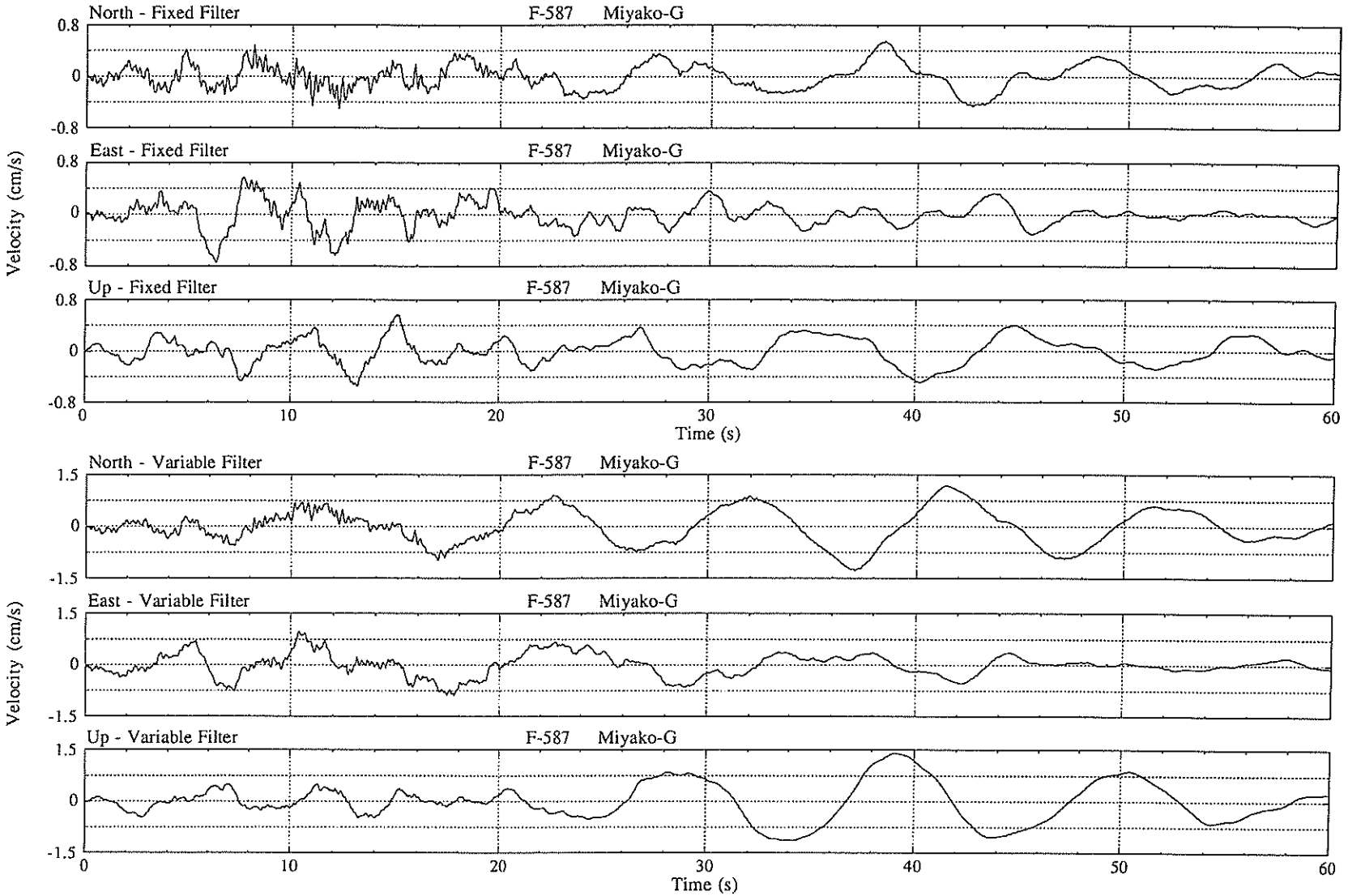
****

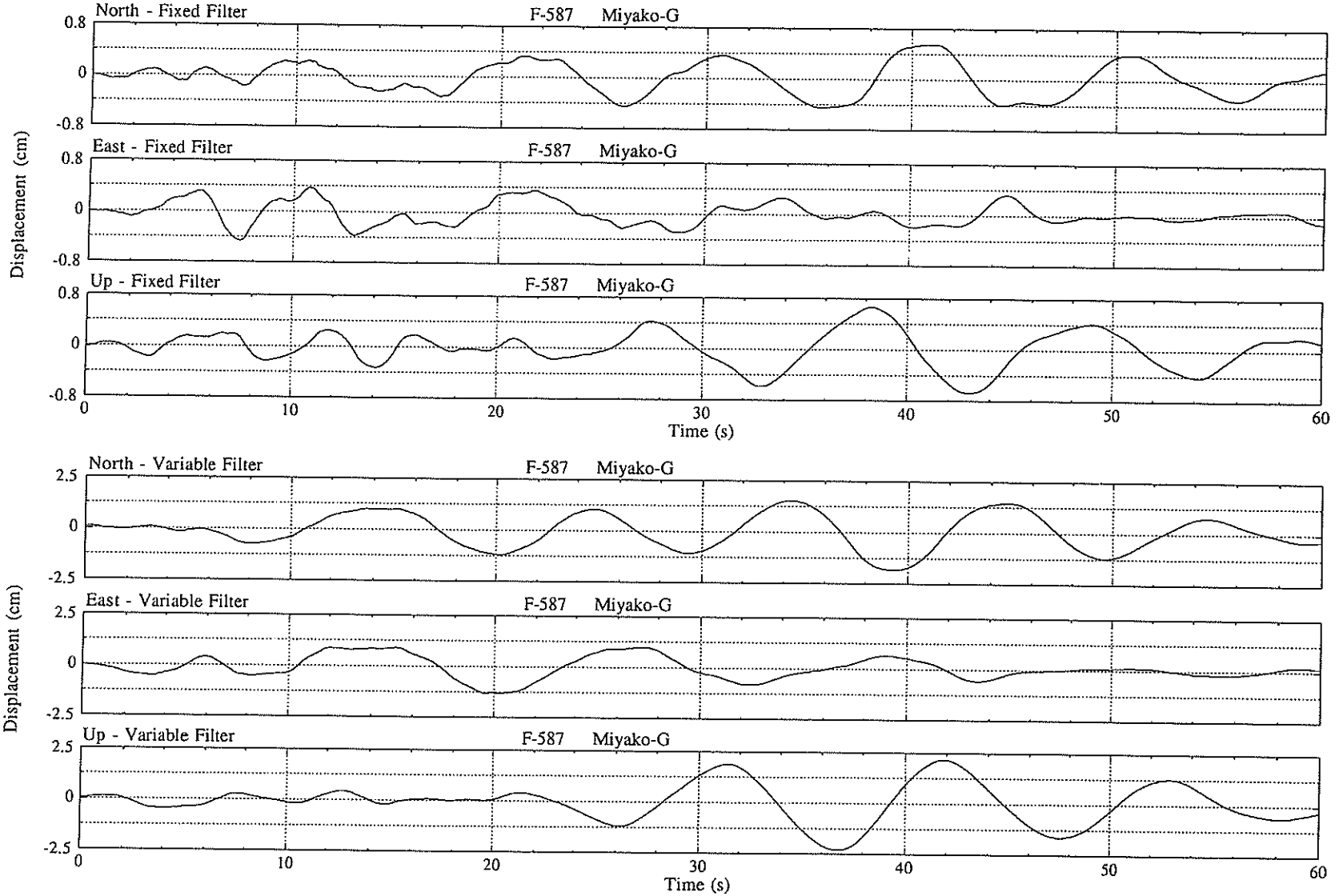
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.060	0.060	0.060	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	5.1	3.1	1.7	5.1
ORIGINAL	6.4	4.4	2.1	6.4
CORRECTED	6.4	4.2	2.1	6.4
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	0.56	0.74	0.58	0.77
VARIABLE FILTER	1.27	0.99	1.41	1.28
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.56	0.46	0.67	0.58
VARIABLE FILTER	1.82	1.30	2.29	1.93

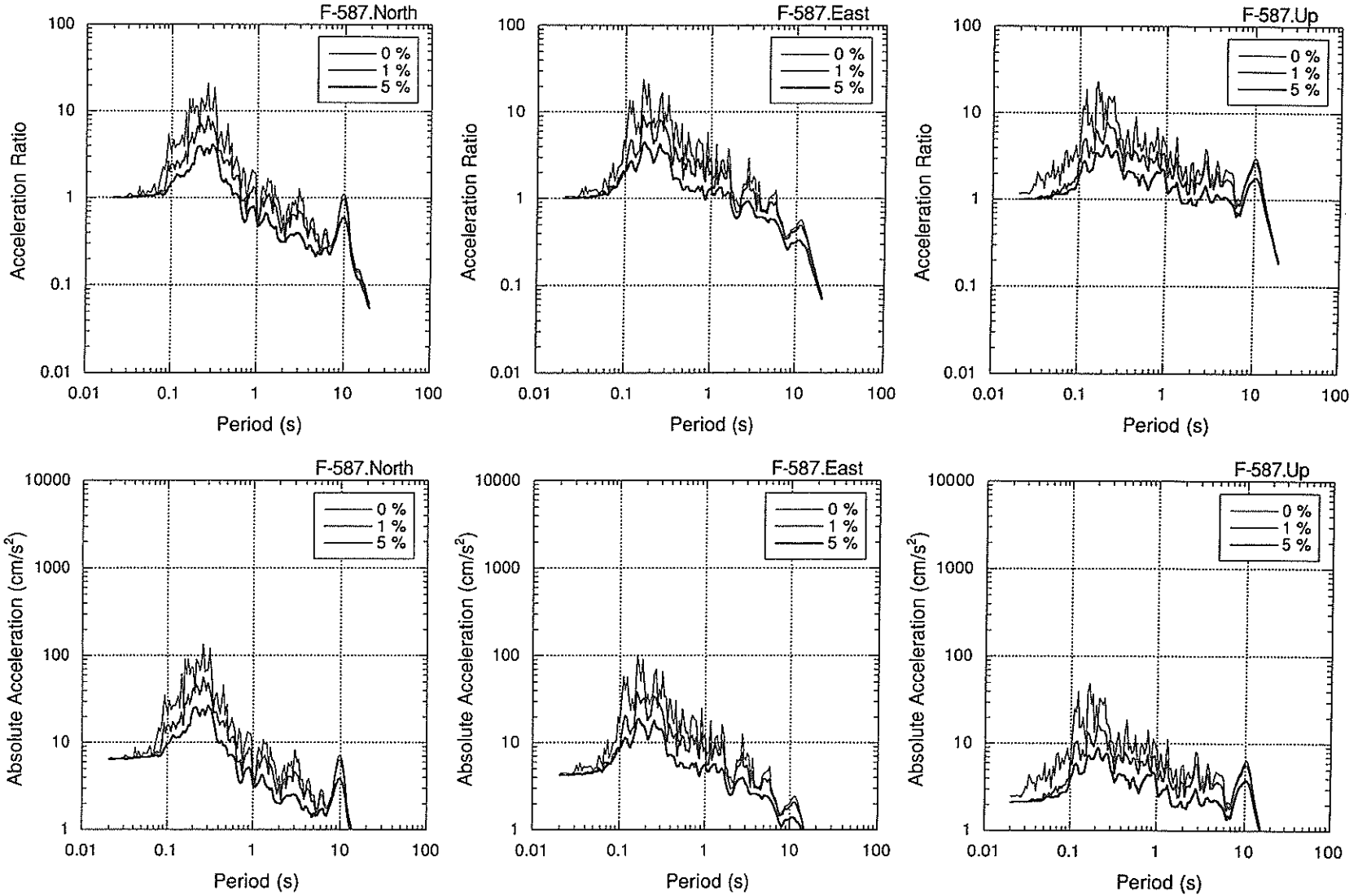
* RESULTANT OF HORIZONTAL COMPONENTS

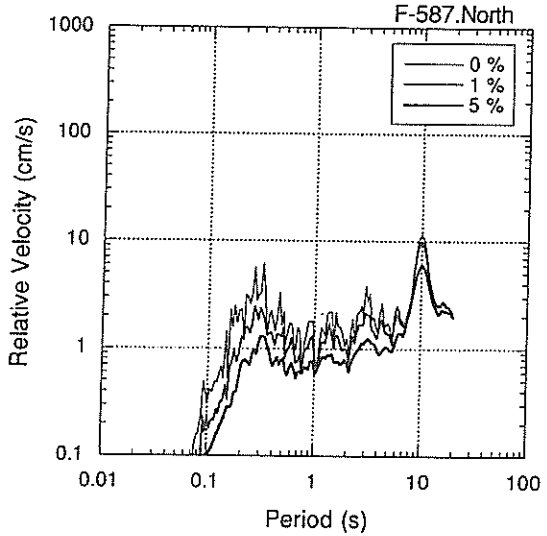

North - Original
F-587 Miyako-G
East - Original
F-587 Miyako-G
Up - Original
F-587 Miyako-G
Acceleration (cm/s^2)
7
0
-7
0
10
20
30
40
50
60
Time (s)
North - Corrected
F-587 Miyako-G
East - Corrected
F-587 Miyako-G
Up - Corrected
F-587 Miyako-G
Acceleration (cm/s^2)
Time (s)

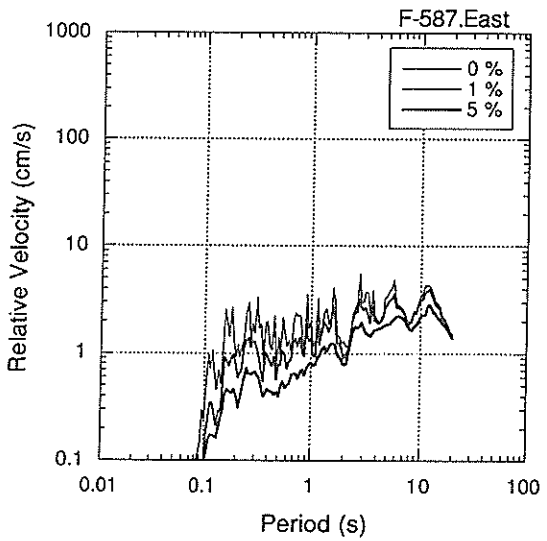

North - Original
F-587 Miyako-G
East - Original
F-587 Miyako-G
Up - Original
F-587 Miyako-G
Acceleration (cm/s^2)
7
0
-7
0
10
20
30
40
50
60
Time (s)
North - SMAC Equivalent
F-587 Miyako-G
East - SMAC Equivalent
F-587 Miyako-G
Up - SMAC Equivalent
F-587 Miyako-G
Acceleration (cm/s^2)
6
0
-6
0
10
20
30
40
50
60
Time (s)

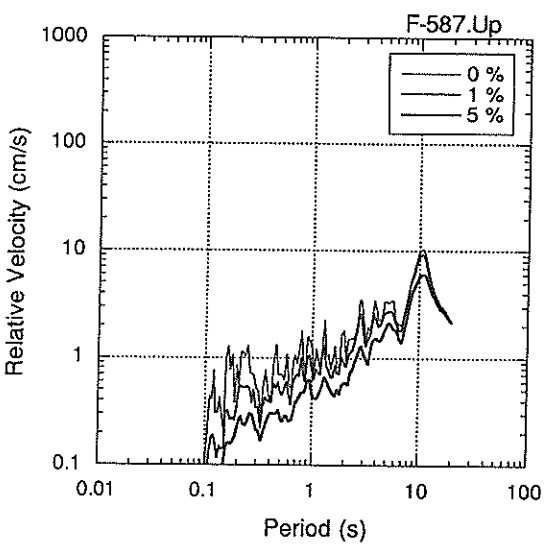

North - Fixed Filter
F-587 Miyako-G
East - Fixed Filter
F-587 Miyako-G
Up - Fixed Filter
F-587 Miyako-G
Velocity (cm/s)
0.8
0
-0.8
Time (s)
0
10
20
30
40
50
60
North - Variable Filter
F-587 Miyako-G
East - Variable Filter
F-587 Miyako-G
Up - Variable Filter
F-587 Miyako-G
1.5
-1.5

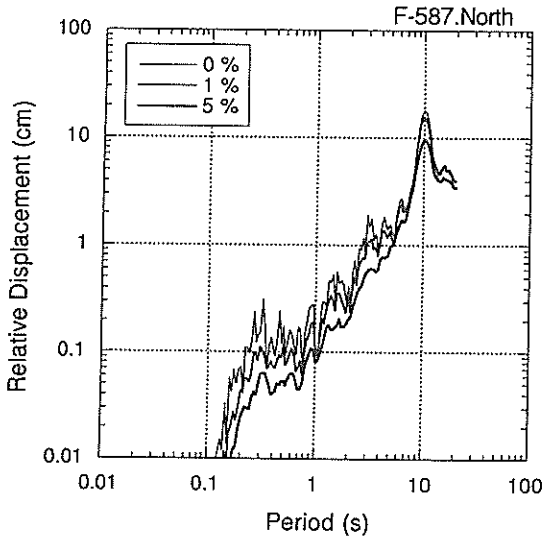

North - Fixed Filter
F-587 Miyako-G
East - Fixed Filter
F-587 Miyako-G
Up - Fixed Filter
F-587 Miyako-G
Displacement (cm)
0.8
0
-0.8
Time (s)
0
10
20
30
40
50
60
North - Variable Filter
F-587 Miyako-G
East - Variable Filter
F-587 Miyako-G
Up - Variable Filter
F-587 Miyako-G
Displacement (cm)
2.5
0
-2.5
Time (s)

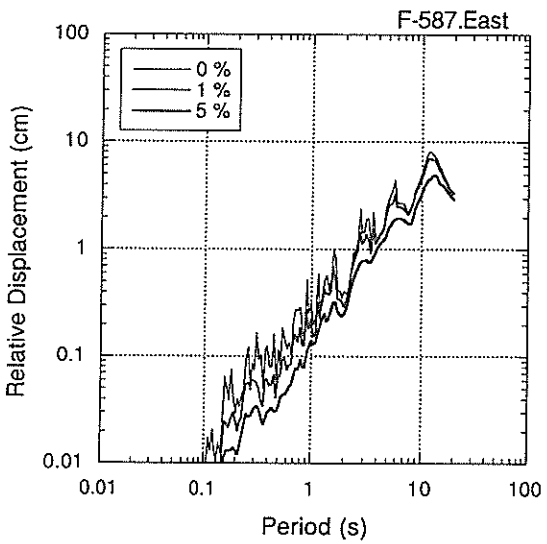

F-587.North
F-587.East
F-587.Up
0 %
1 %
5 %
Acceleration Ratio
Absolute Acceleration (cm/s²)
Period (s)
0.01
0.1
1
10
100
1000
10000

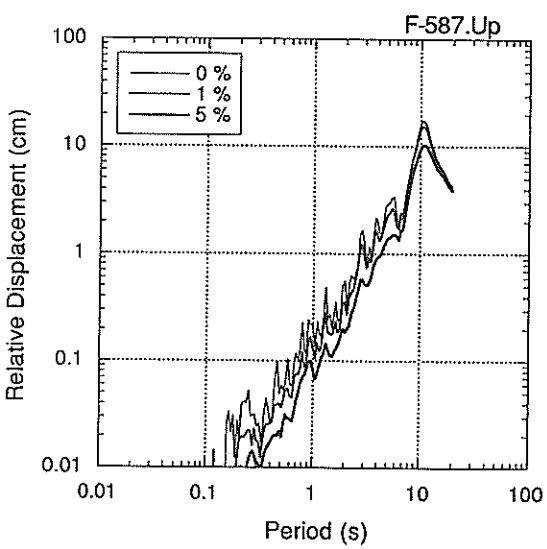

F-587.North
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

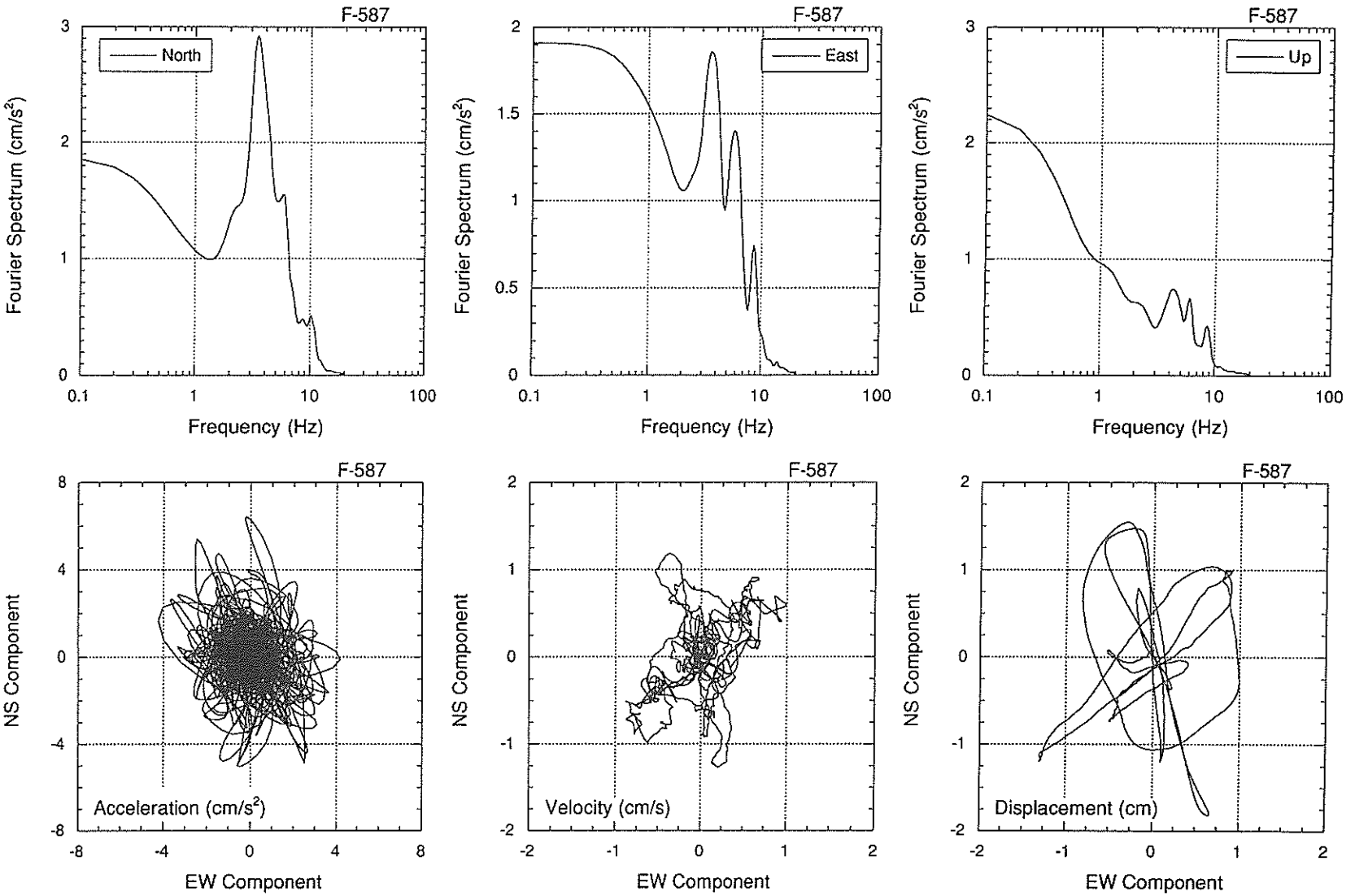

F-587.East
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100


F-587.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100


F-587.North
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100


F-587.East
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100


F-587.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100


F-587
North
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-587
East
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-587
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-587
NS Component
Acceleration (cm/s²)
EW Component
F-587
NS Component
Velocity (cm/s)
EW Component
F-587
NS Component
Displacement (cm)
EW Component

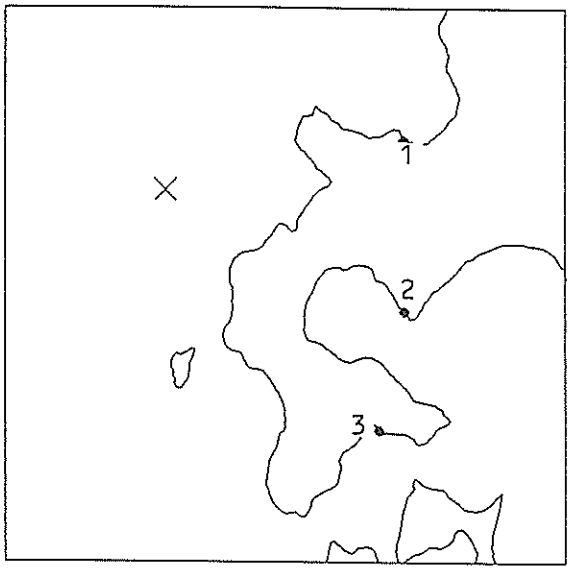
Strong-Motion Earthquake Observation Results of the After Shock at 23:04:24, July 12, 1993

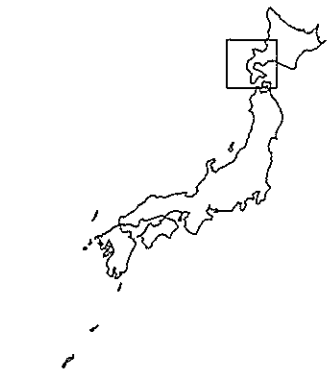
STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:04 JULY 12,1993
NW OFF SHAKOTAN PEN
EPICENTER : 43°1.2 'N 139°27.6'E
DEPTH : 34.5KM MAGNITUDE : 5.4

JMA INTENSITIES

Ⅲ : OTARU,HAKODATE
Ⅱ : ESASHI
Ⅰ : TOMAKOMAI,AOMORI,
MURORAN,FUKAURA





	STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS)	(EW)	(UD)	DIST. (KM)
1	OTARU-G	ON GROUND	F- 539	11	15	3	129
2	MURORAN-G	ON GROUND	F- 560	8	13	6	143
3	HAKODATE-FR	ON STRUC.	F- 550	17	11	4	172
3	HAKODATE-F	ON GROUND	F- 546	12	16	5	172
3	HAKODATE-FB	IN GROUND	F- 542	6	6	4	172
3	HAKODATE-M	ON GROUND	M-1473	17	15	6	172

Results of Preliminary Analyses of the After Shock at 23:04:24, July 12, 1993

RECORD NUMBER : M-1473

STATION : HAKODATE-M

EARTHQUAKE DATA

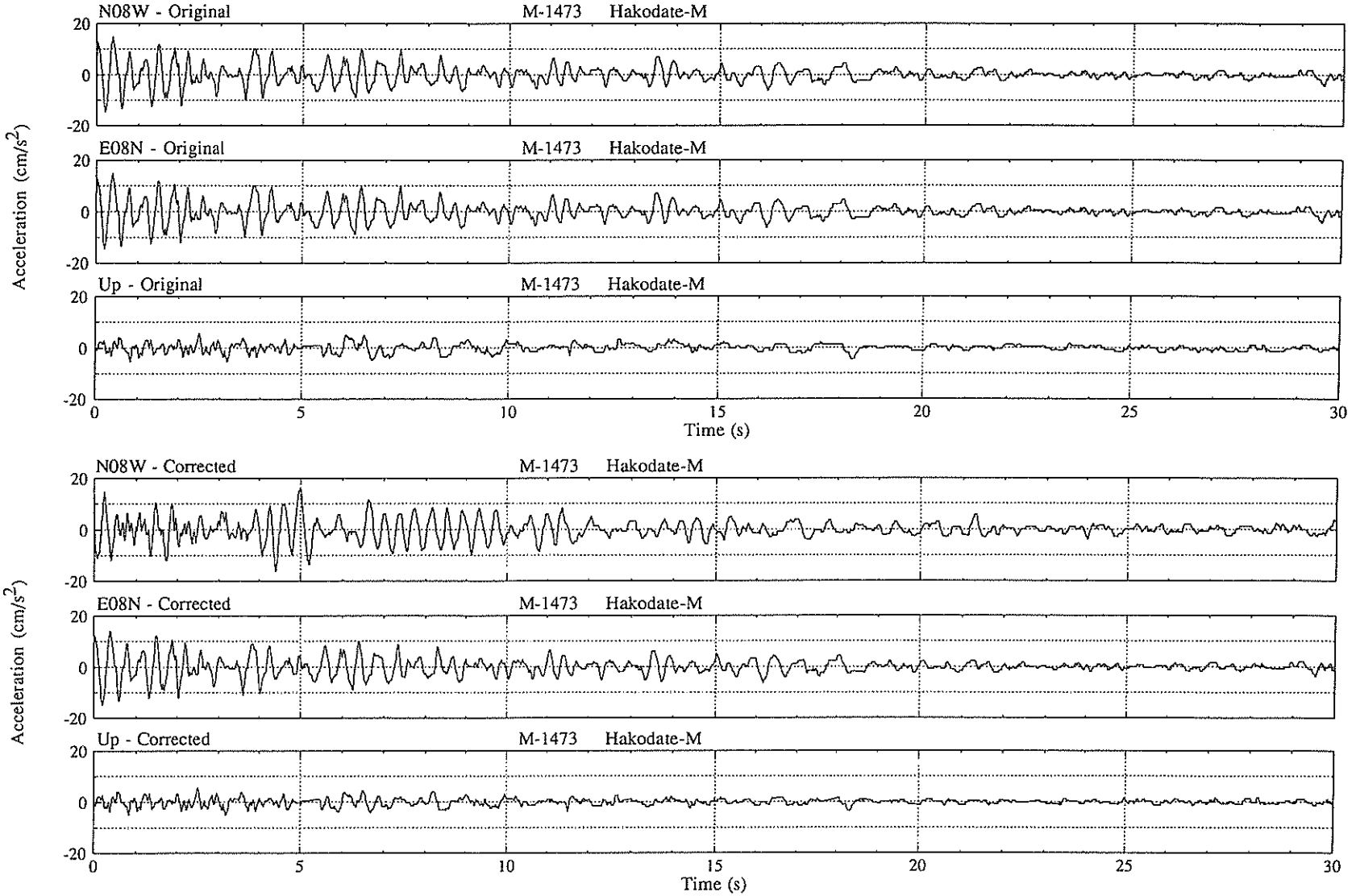
****

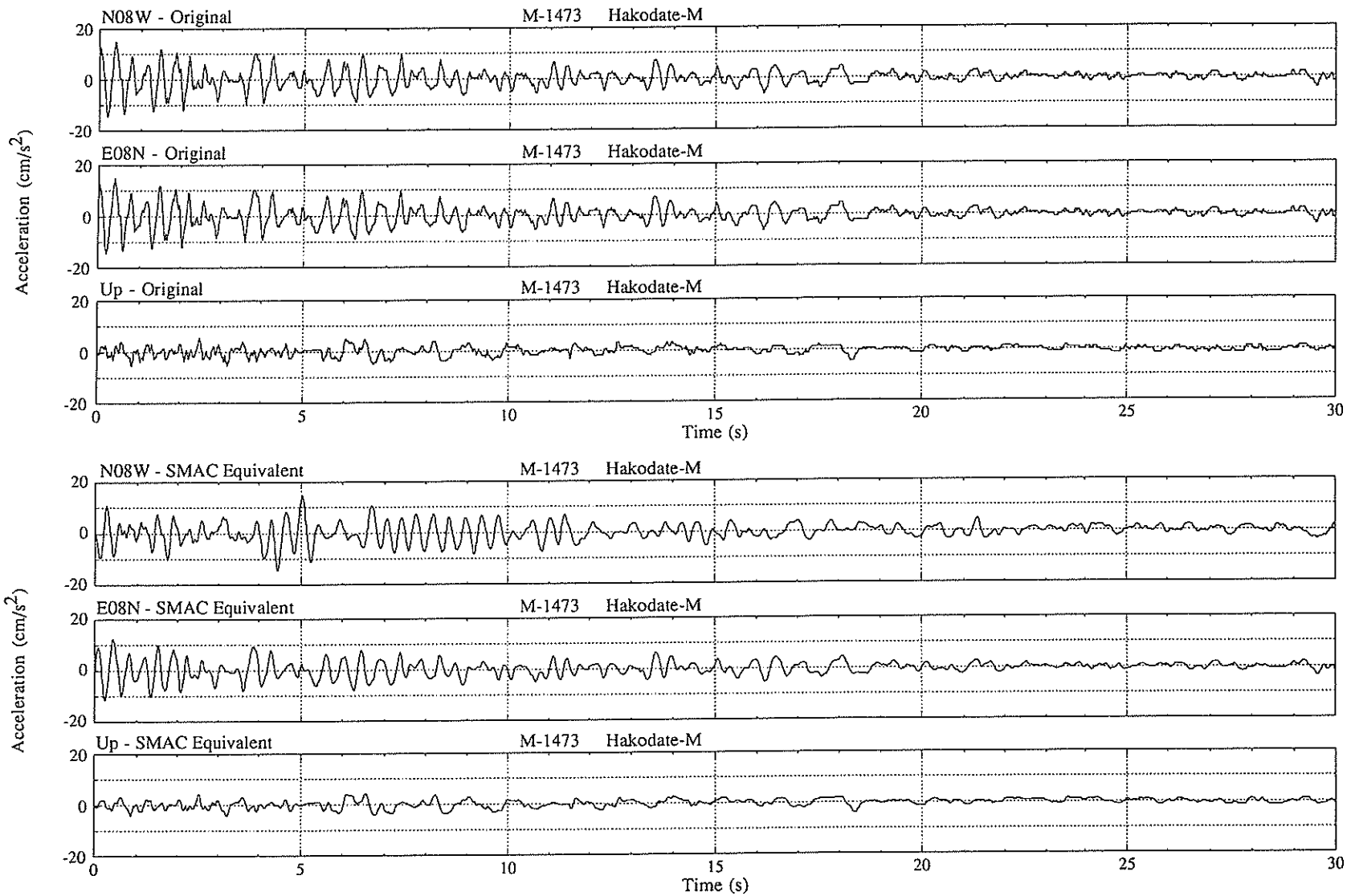
DATE AND TIME	23: 4 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	NW OFF SHAKOTAN PEN
LATITUDE	43° 1.2' N
LONGITUDE	139°27.6' E
DEPTH	34.5KM
JMA MAGNITUDE	5.4

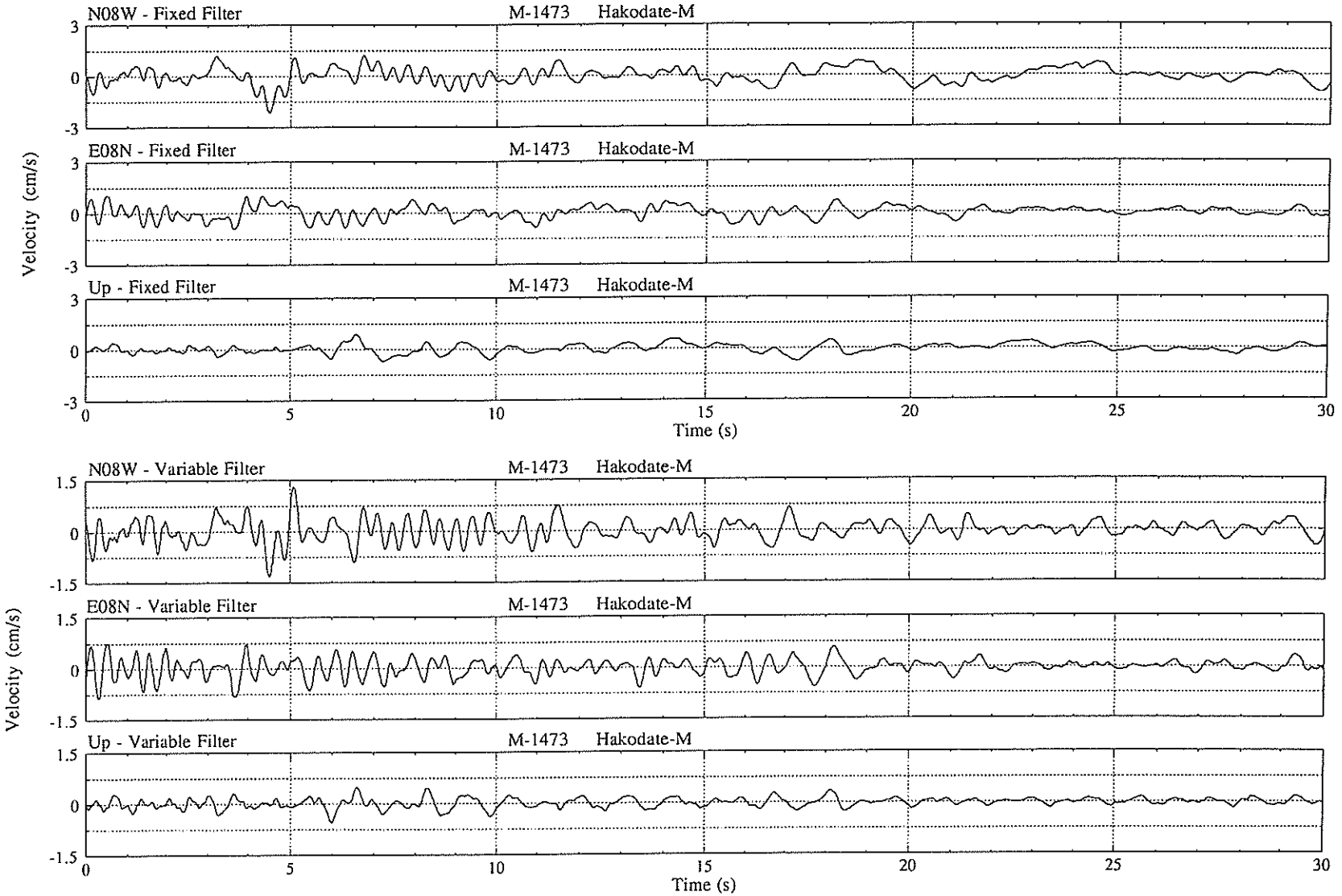
****

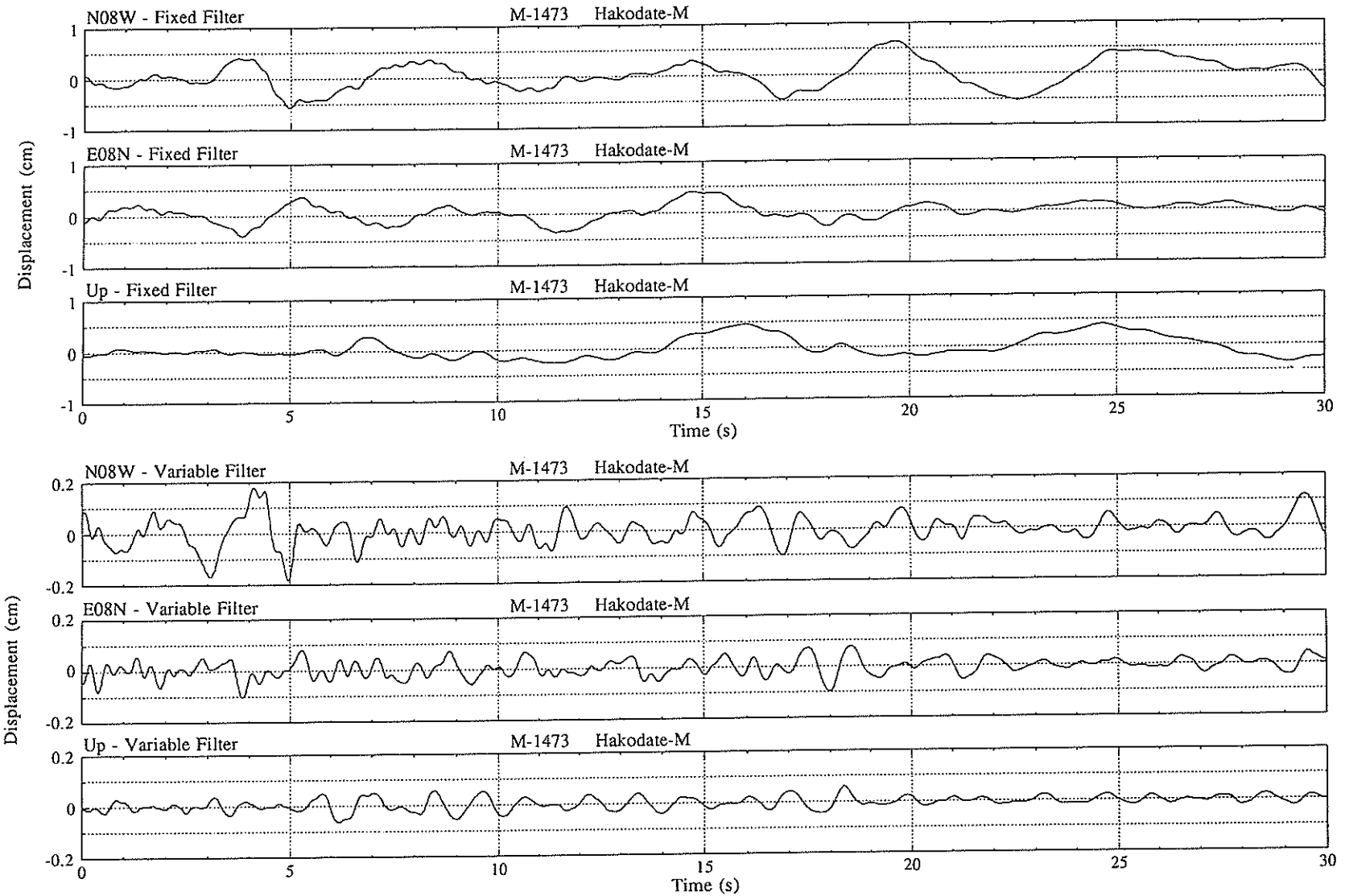
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.414	0.536	0.658	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	14.7	12.5	4.4	15.1
ORIGINAL	16.9	15.0	5.8	18.2
CORRECTED	16.4	14.9	5.6	18.5
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	2.12	1.06	0.90	2.18
VARIABLE FILTER	1.31	0.86	0.55	1.34
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.64	0.41	0.47	0.64
VARIABLE FILTER	0.18	0.10	0.06	0.18

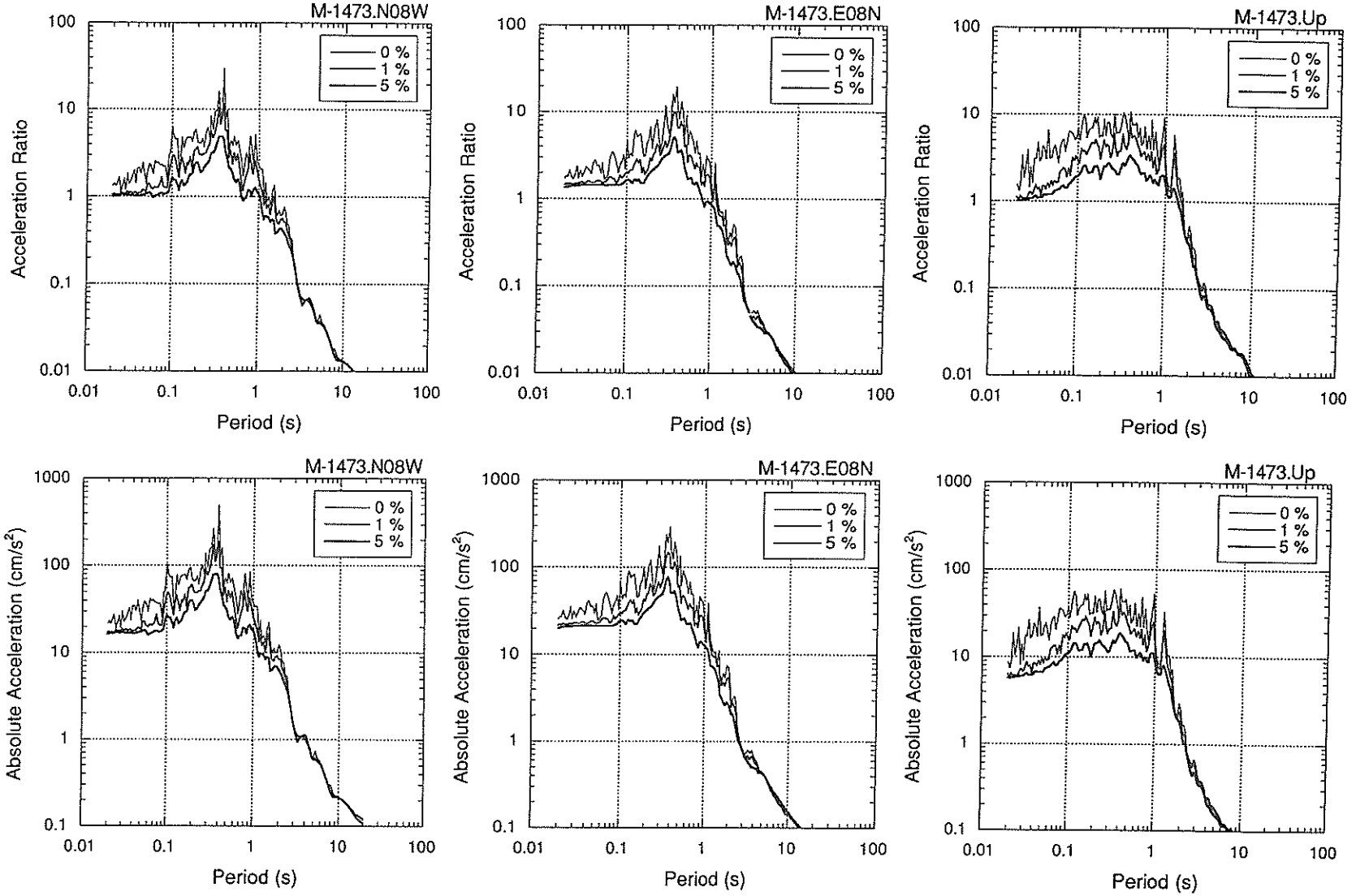
* RESULTANT OF HORIZONTAL COMPONENTS

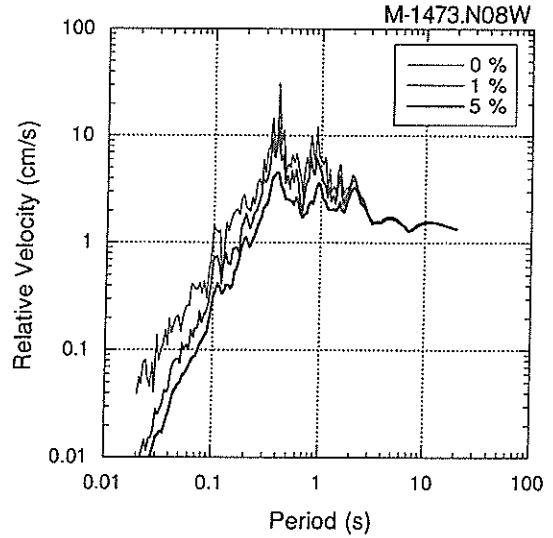

N08W - Original
M-1473 Hakodate-M
E08N - Original
M-1473 Hakodate-M
Up - Original
M-1473 Hakodate-M
Acceleration (cm/s^2)
Time (s)
N08W - Corrected
M-1473 Hakodate-M
E08N - Corrected
M-1473 Hakodate-M
Up - Corrected
M-1473 Hakodate-M
Acceleration (cm/s^2)
Time (s)

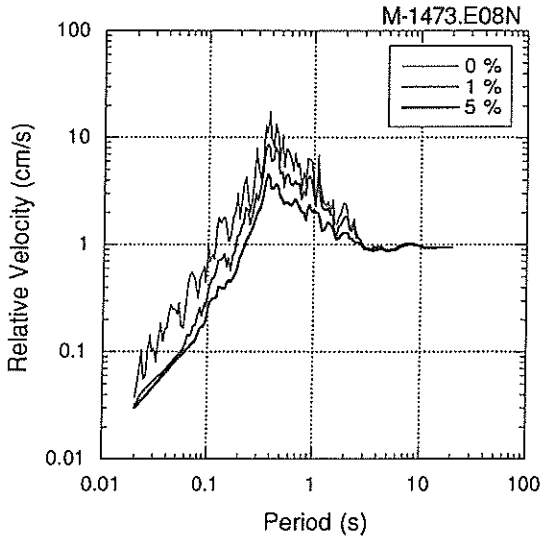

N08W - Original
M-1473 Hakodate-M
E08N - Original
M-1473 Hakodate-M
Up - Original
M-1473 Hakodate-M
Acceleration (cm/s2)
Time (s)
N08W - SMAC Equivalent
M-1473 Hakodate-M
E08N - SMAC Equivalent
M-1473 Hakodate-M
Up - SMAC Equivalent
M-1473 Hakodate-M
Acceleration (cm/s2)
Time (s)

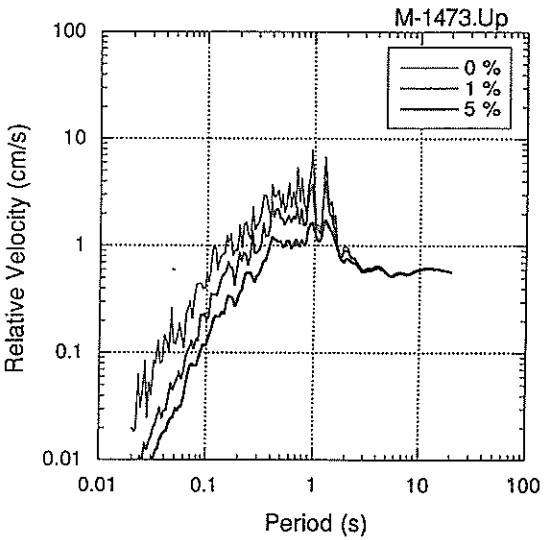

N08W - Fixed Filter
M-1473 Hakodate-M
E08N - Fixed Filter
M-1473 Hakodate-M
Up - Fixed Filter
M-1473 Hakodate-M
Velocity (cm/s)
3
0
-3
0
5
10
15
20
25
30
Time (s)
N08W - Variable Filter
M-1473 Hakodate-M
E08N - Variable Filter
M-1473 Hakodate-M
Up - Variable Filter
M-1473 Hakodate-M
Velocity (cm/s)
1.5
0
-1.5
0
5
10
15
20
25
30
Time (s)

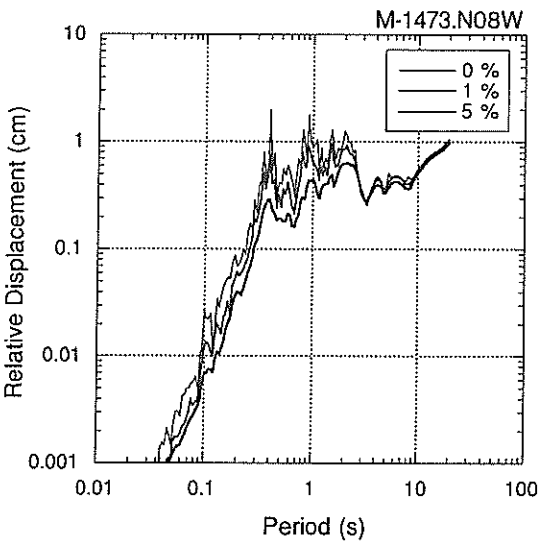

N08W - Fixed Filter
M-1473 Hakodate-M
E08N - Fixed Filter
M-1473 Hakodate-M
Up - Fixed Filter
M-1473 Hakodate-M
Displacement (cm)
Time (s)
N08W - Variable Filter
M-1473 Hakodate-M
E08N - Variable Filter
M-1473 Hakodate-M
Up - Variable Filter
M-1473 Hakodate-M
Displacement (cm)
Time (s)

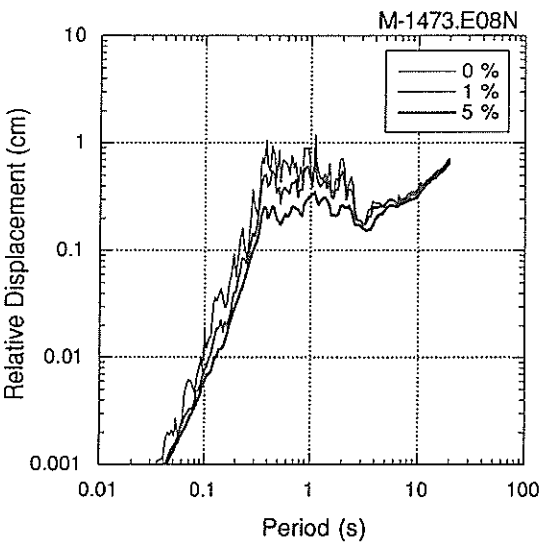

M-1473.N08W
M-1473.E08N
M-1473.Up
0 %
1 %
5 %
Acceleration Ratio
Absolute Acceleration (cm/s²)
Period (s)
0.01
0.1
1
10
100
1000

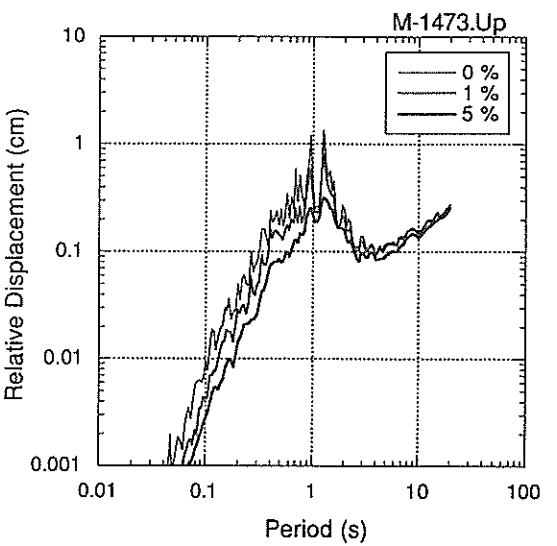

M-1473.N08W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

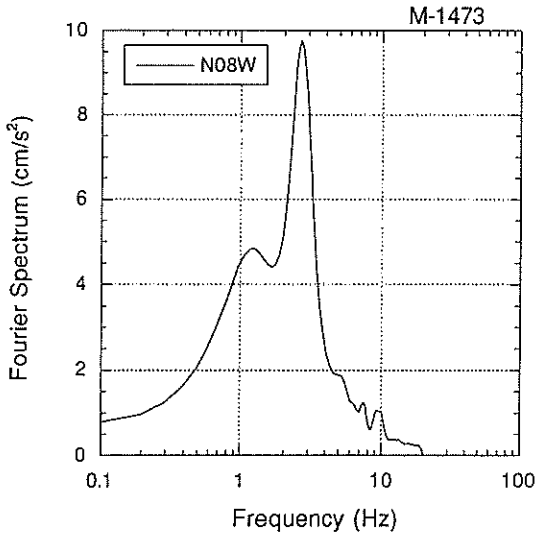

M-1473.E08N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

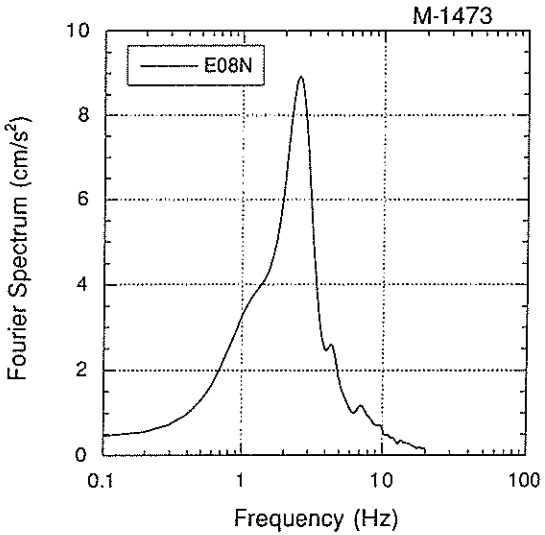

M-1473.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

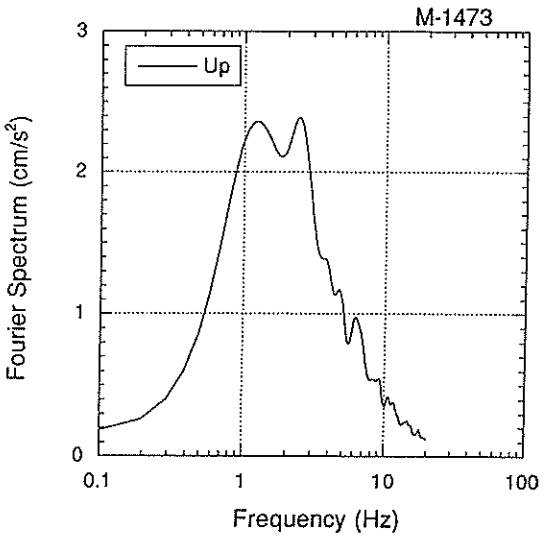

M-1473.N08W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

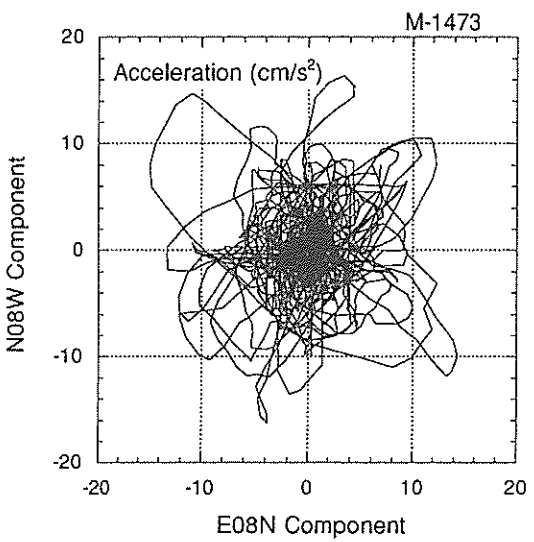

M-1473.E08N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

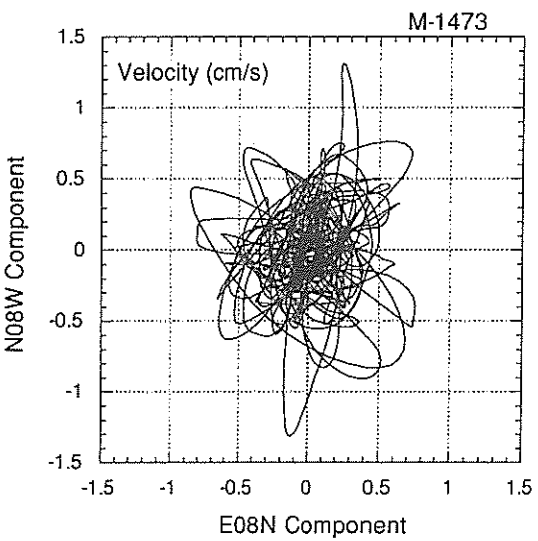

M-1473.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

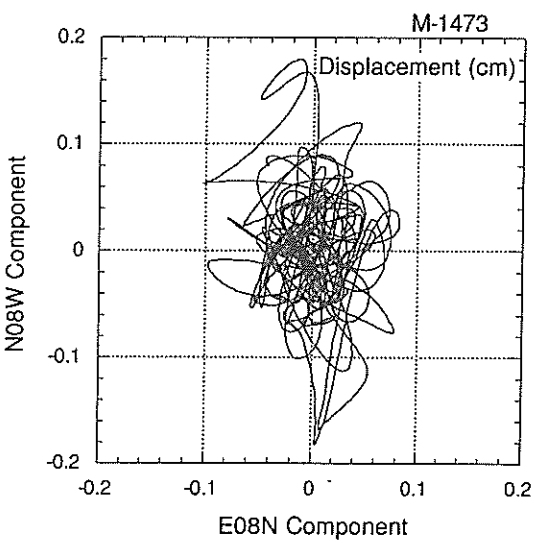

M-1473
N08W
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1473
E08N
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1473
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1473
Acceleration (cm/s²)
N08W Component
E08N Component


M-1473
Velocity (cm/s)
N08W Component
E08N Component


M-1473
Displacement (cm)
N08W Component
E08N Component

RECORD NUMBER : F-539

STATION : OTARU-G

EARTHQUAKE DATA

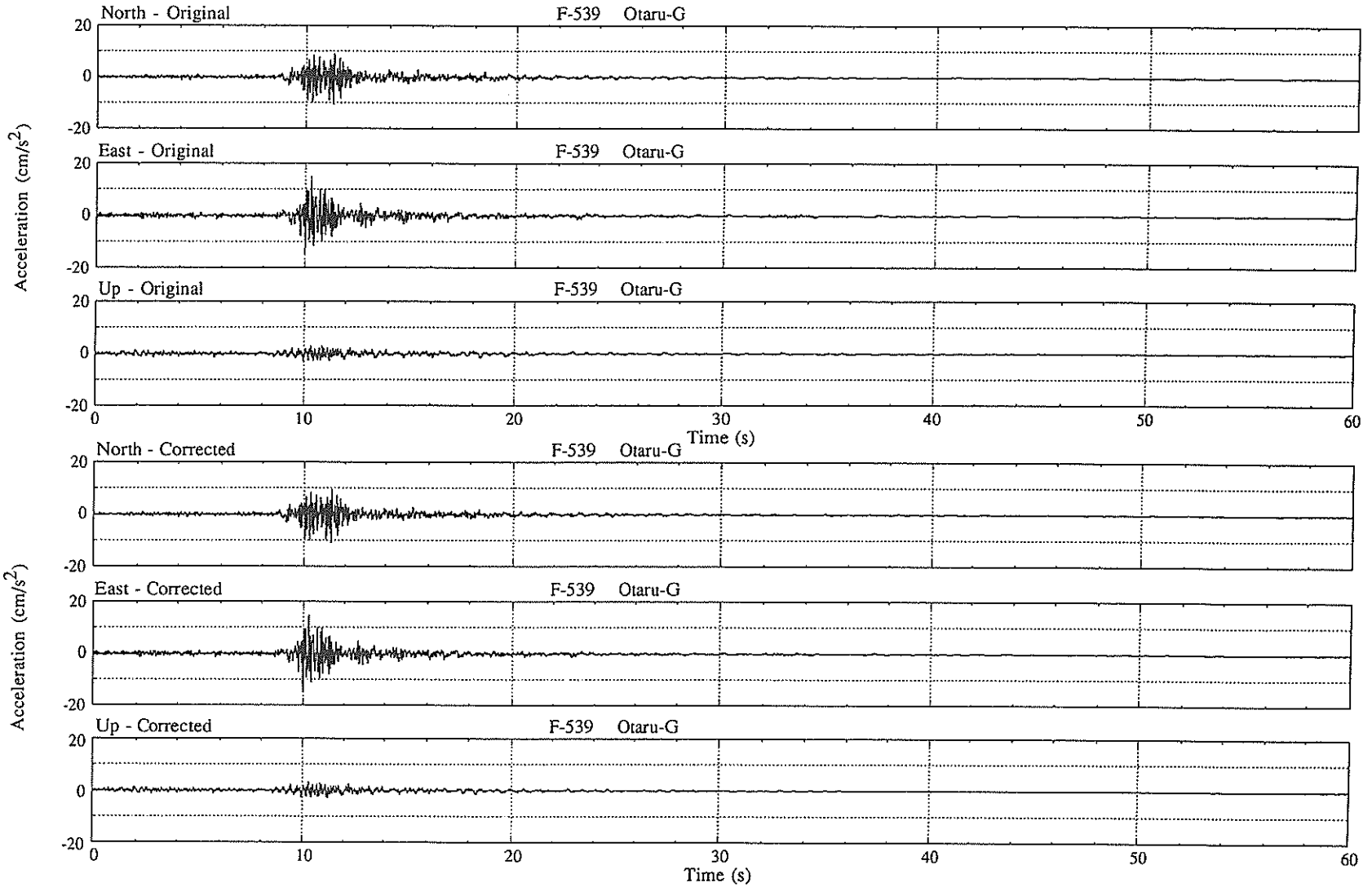
****

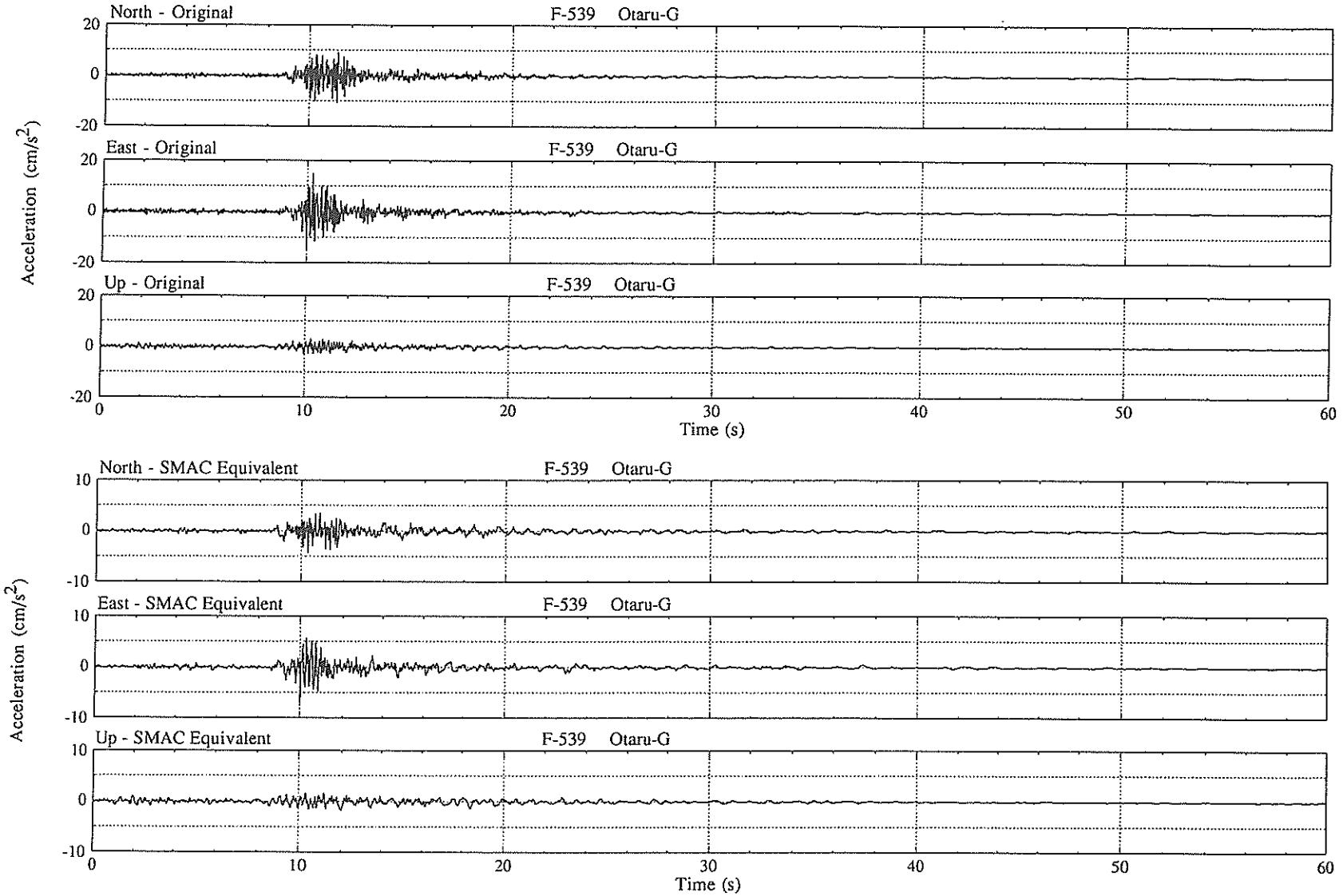
DATE AND TIME	23: 4 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	NW OFF SHAKOTAN PEN
LATITUDE	43° 1.2' N
LONGITUDE	139°27.6' E
DEPTH	34.5KM
JMA MAGNITUDE	5.4

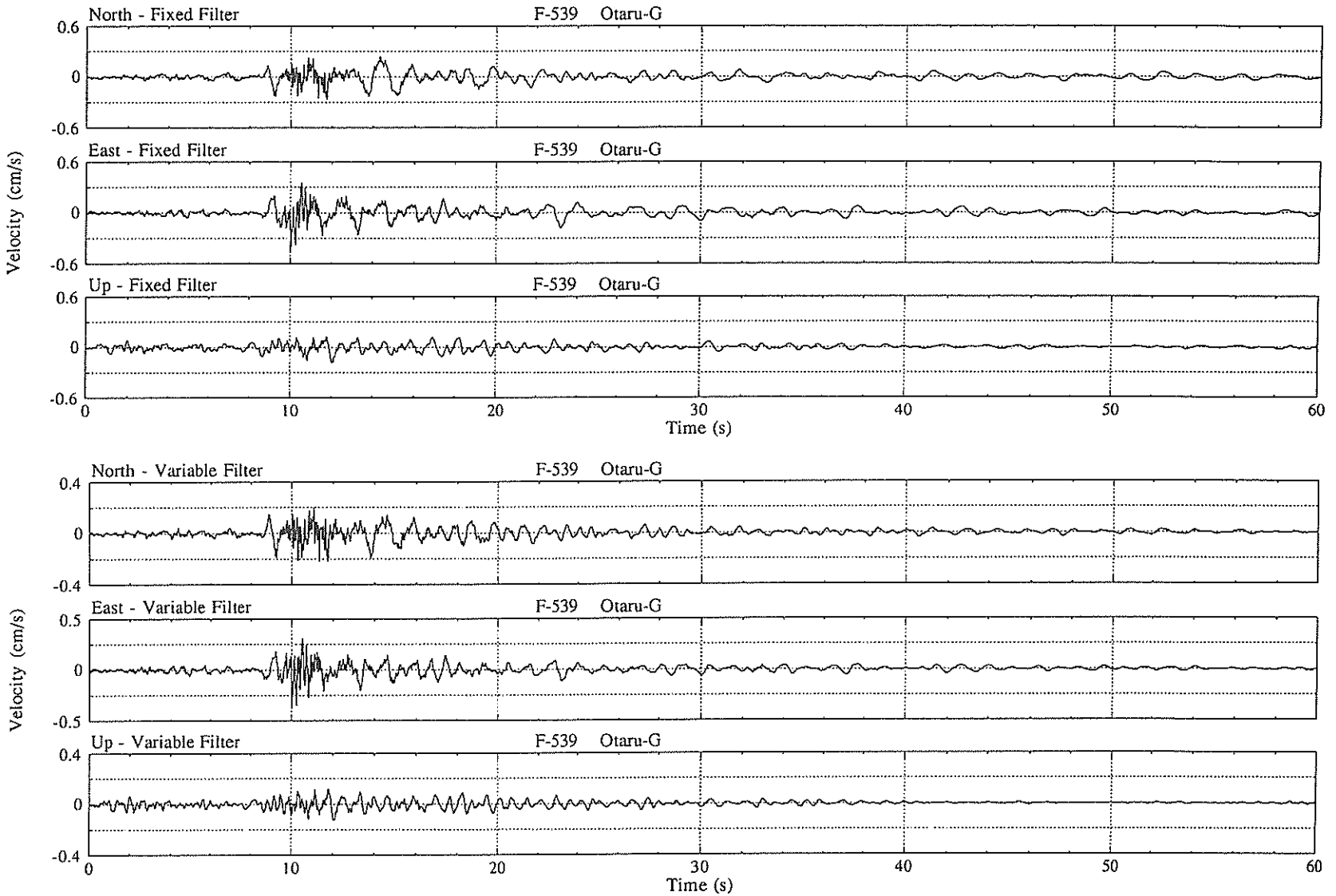
****

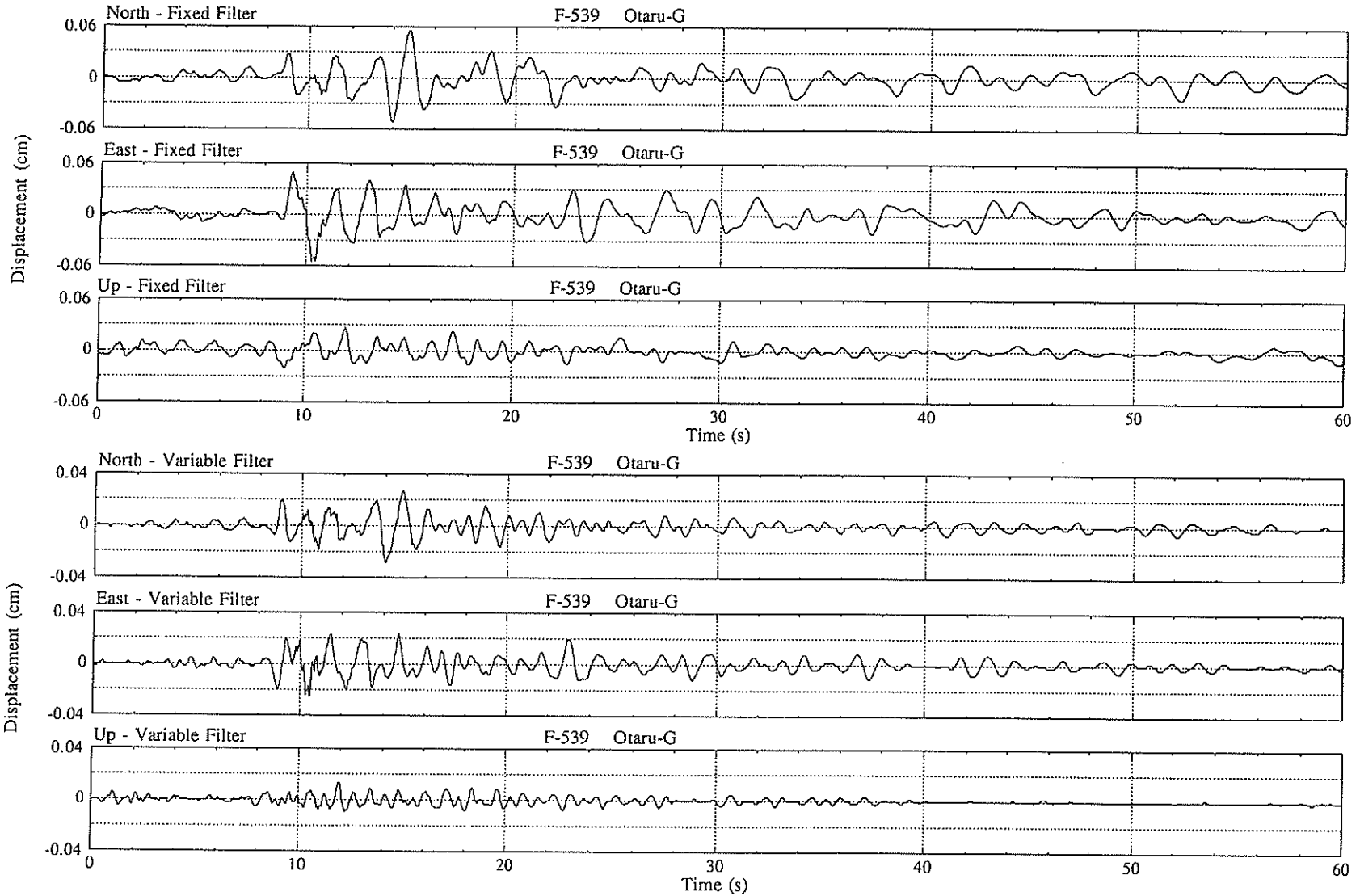
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.579	0.561	0.842	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	4.3	7.0	1.7	7.1
ORIGINAL	10.7	15.1	3.2	16.8
CORRECTED	10.9	15.0	3.4	16.9
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	0.26	0.47	0.18	0.49
VARIABLE FILTER	0.22	0.38	0.12	0.40
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.06	0.05	0.03	0.06
VARIABLE FILTER	0.03	0.02	0.01	0.03

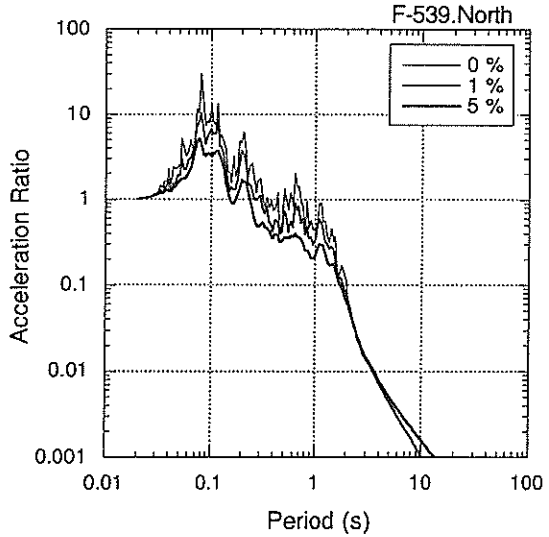
* RESULTANT OF HORIZONTAL COMPONENTS

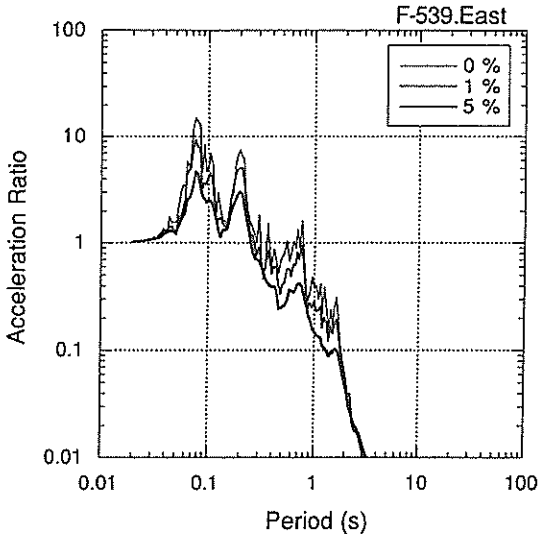

North - Original
F-539 Otaru-G
East - Original
F-539 Otaru-G
Up - Original
F-539 Otaru-G
North - Corrected
F-539 Otaru-G
East - Corrected
F-539 Otaru-G
Up - Corrected
F-539 Otaru-G
Acceleration (cm/s2)
Time (s)
20
0
-20
10
30
40
50
60

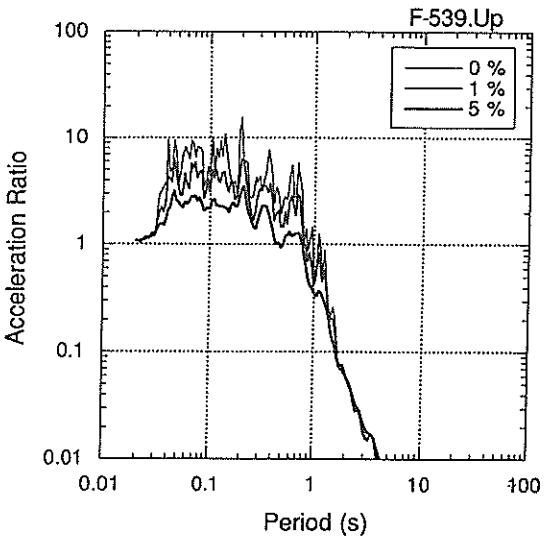

North - Original
F-539 Otaru-G
East - Original
F-539 Otaru-G
Up - Original
F-539 Otaru-G
Acceleration (cm/s^2)
Time (s)
North - SMAC Equivalent
F-539 Otaru-G
East - SMAC Equivalent
F-539 Otaru-G
Up - SMAC Equivalent
F-539 Otaru-G
Acceleration (cm/s^2)
Time (s)

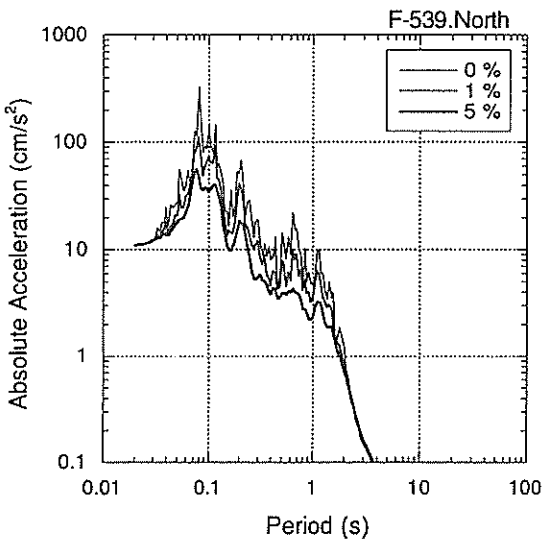

North - Fixed Filter
F-539 Otaru-G
East - Fixed Filter
F-539 Otaru-G
Up - Fixed Filter
F-539 Otaru-G
Velocity (cm/s)
0.6
0
-0.6
Time (s)
0
10
20
30
40
50
60
North - Variable Filter
F-539 Otaru-G
East - Variable Filter
F-539 Otaru-G
Up - Variable Filter
F-539 Otaru-G
0.4
-0.4
0.5
-0.5

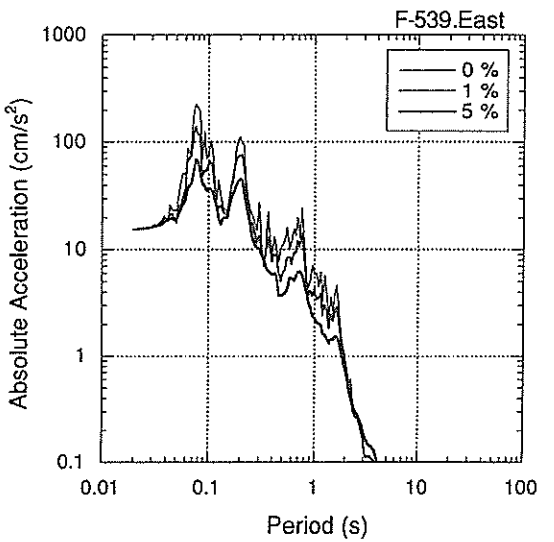

North - Fixed Filter
F-539 Otaru-G
East - Fixed Filter
F-539 Otaru-G
Up - Fixed Filter
F-539 Otaru-G
Displacement (cm)
0.06
0
-0.06
Time (s)
North - Variable Filter
F-539 Otaru-G
East - Variable Filter
F-539 Otaru-G
Up - Variable Filter
F-539 Otaru-G
0.04
-0.04
0
10
20
30
40
50
60

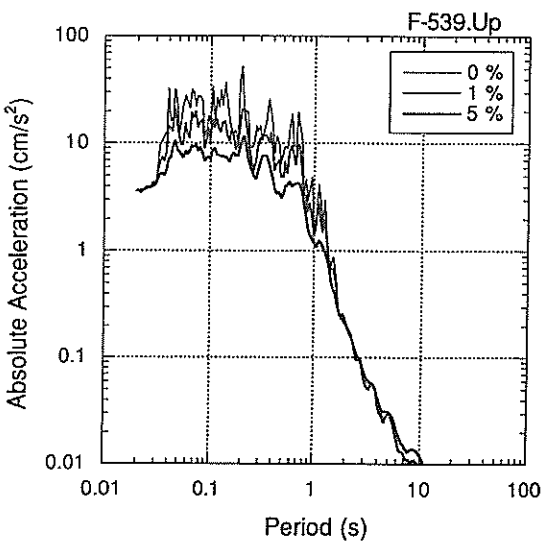

F-539.North
0 %
1 %
5 %
Acceleration Ratio
Period (s)

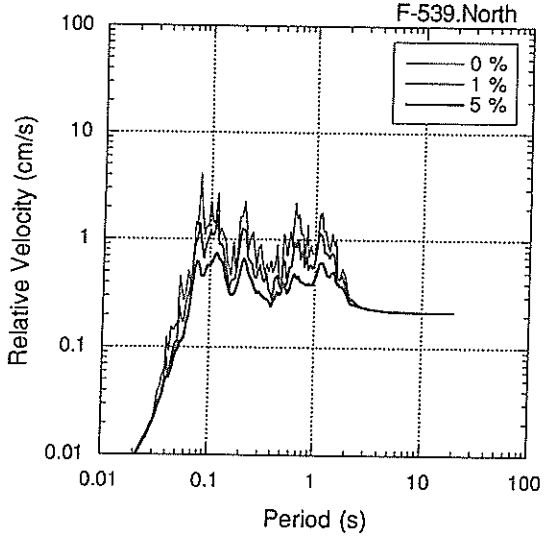

F-539.East
0 %
1 %
5 %
Acceleration Ratio
Period (s)

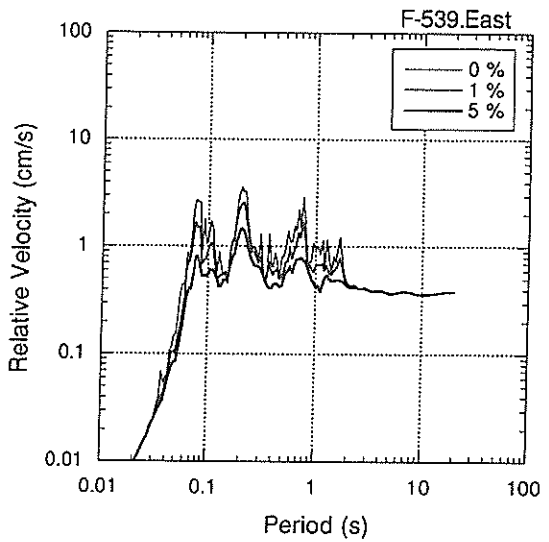

F-539.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)

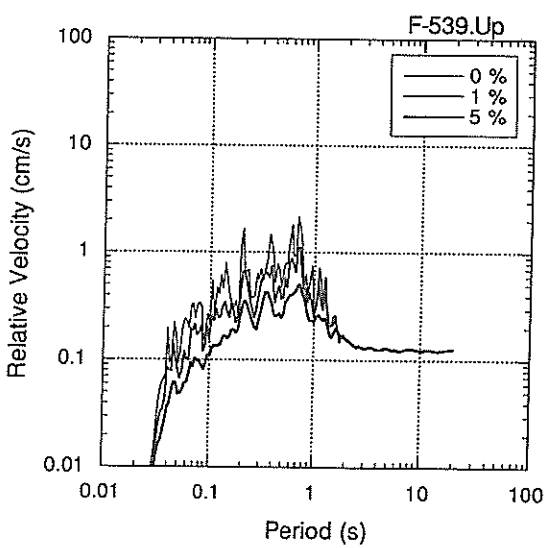

F-539.North
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

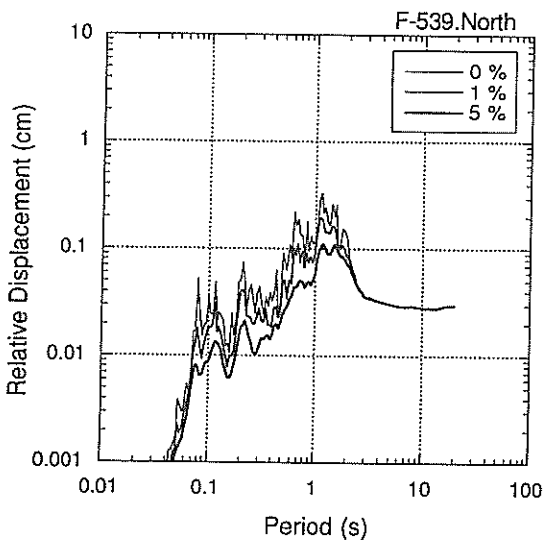

F-539.East
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

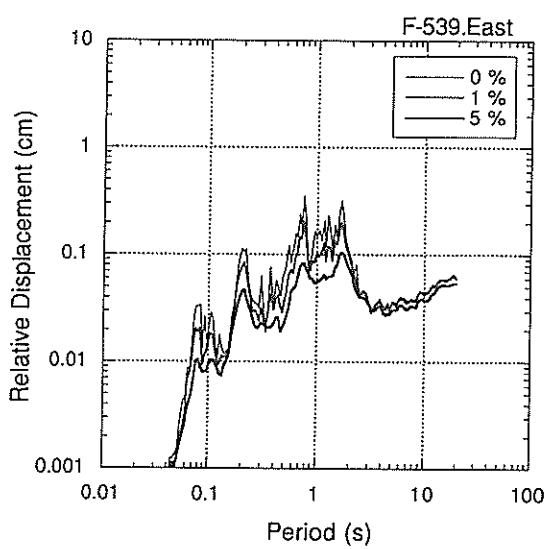

F-539.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

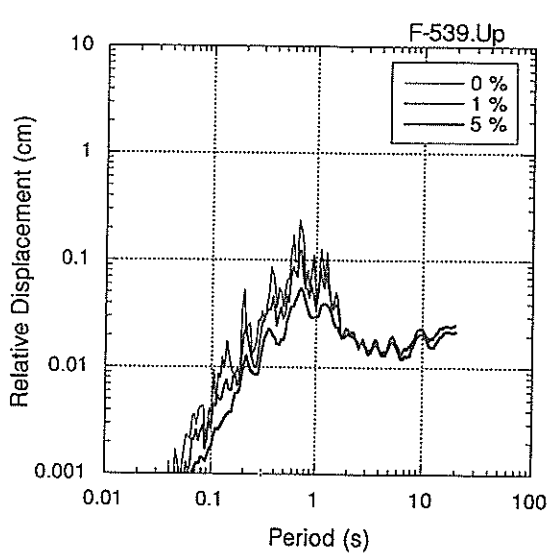

F-539.North
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

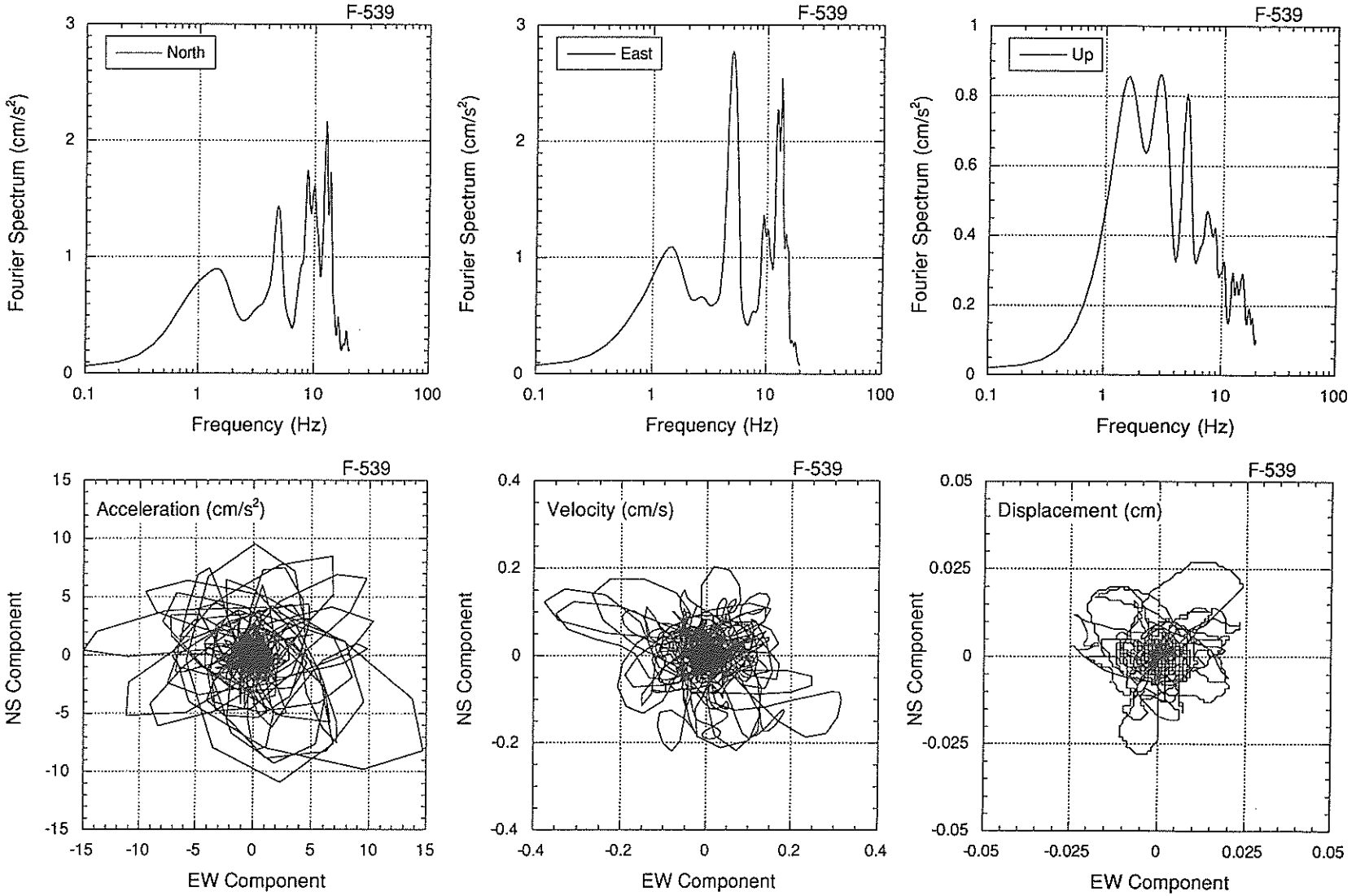

F-539.East
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100


F-539.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100


F-539.North
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100


F-539.East
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100


F-539.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100


F-539
North
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-539
East
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-539
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-539
Acceleration (cm/s²)
NS Component
EW Component
F-539
Velocity (cm/s)
NS Component
EW Component
F-539
Displacement (cm)
NS Component
EW Component

RECORD NUMBER : F-542

STATION : HAKODATE-FB

EARTHQUAKE DATA

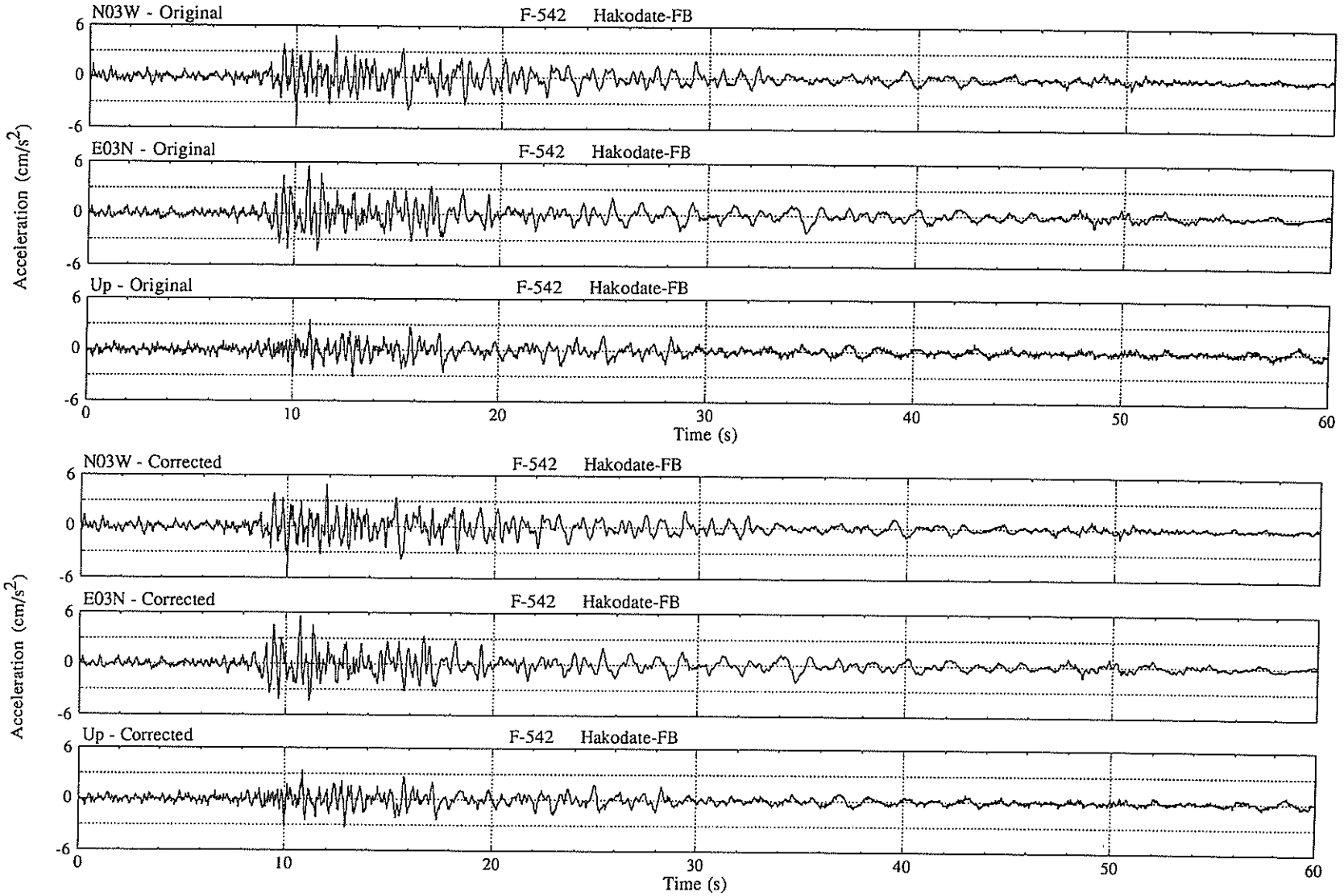
****

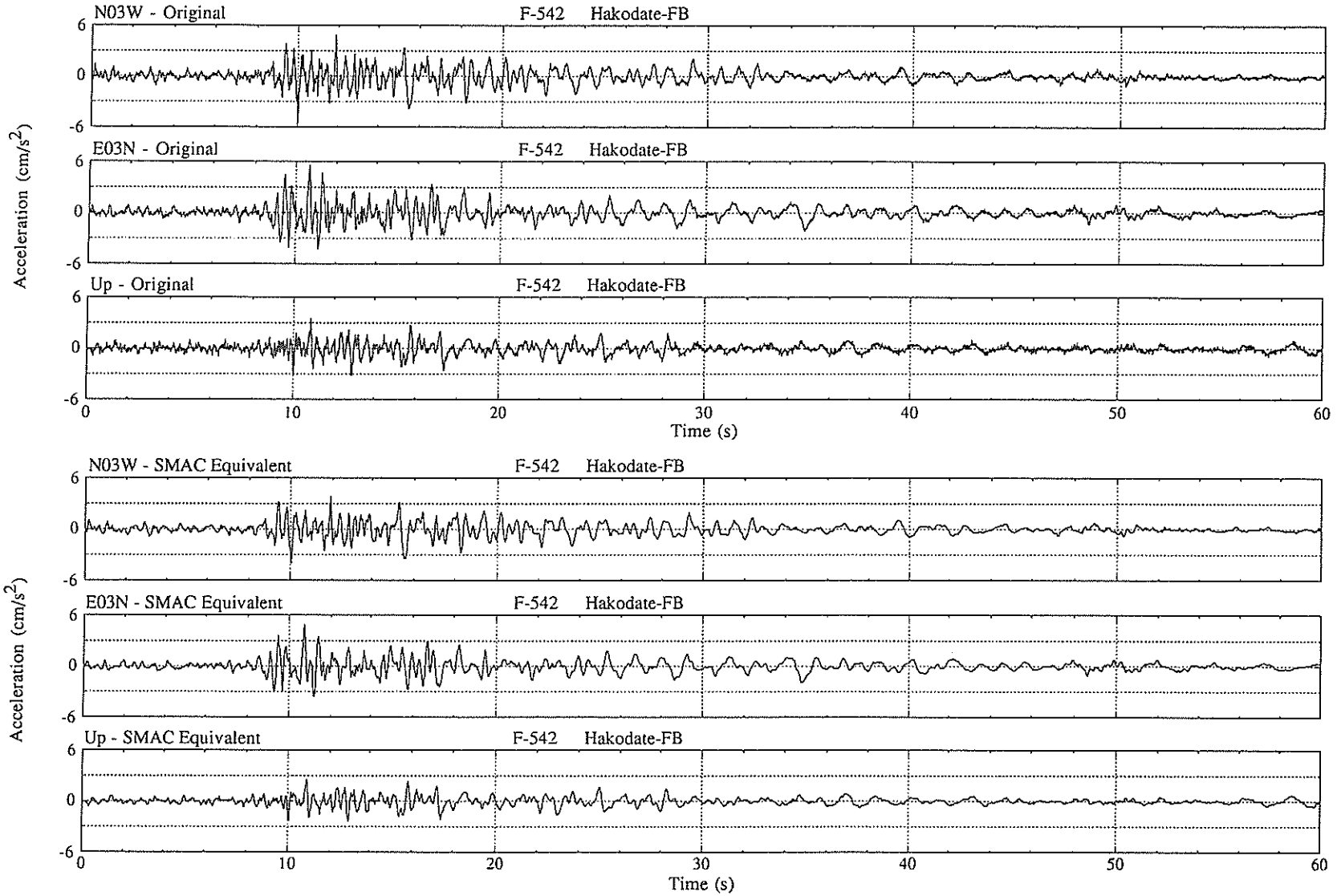
DATE AND TIME	23: 4 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	NW OFF SHAKOTAN PEN
LATITUDE	43° 1.2' N
LONGITUDE	139°27.6' E
DEPTH	34.5KM
JMA MAGNITUDE	5.4

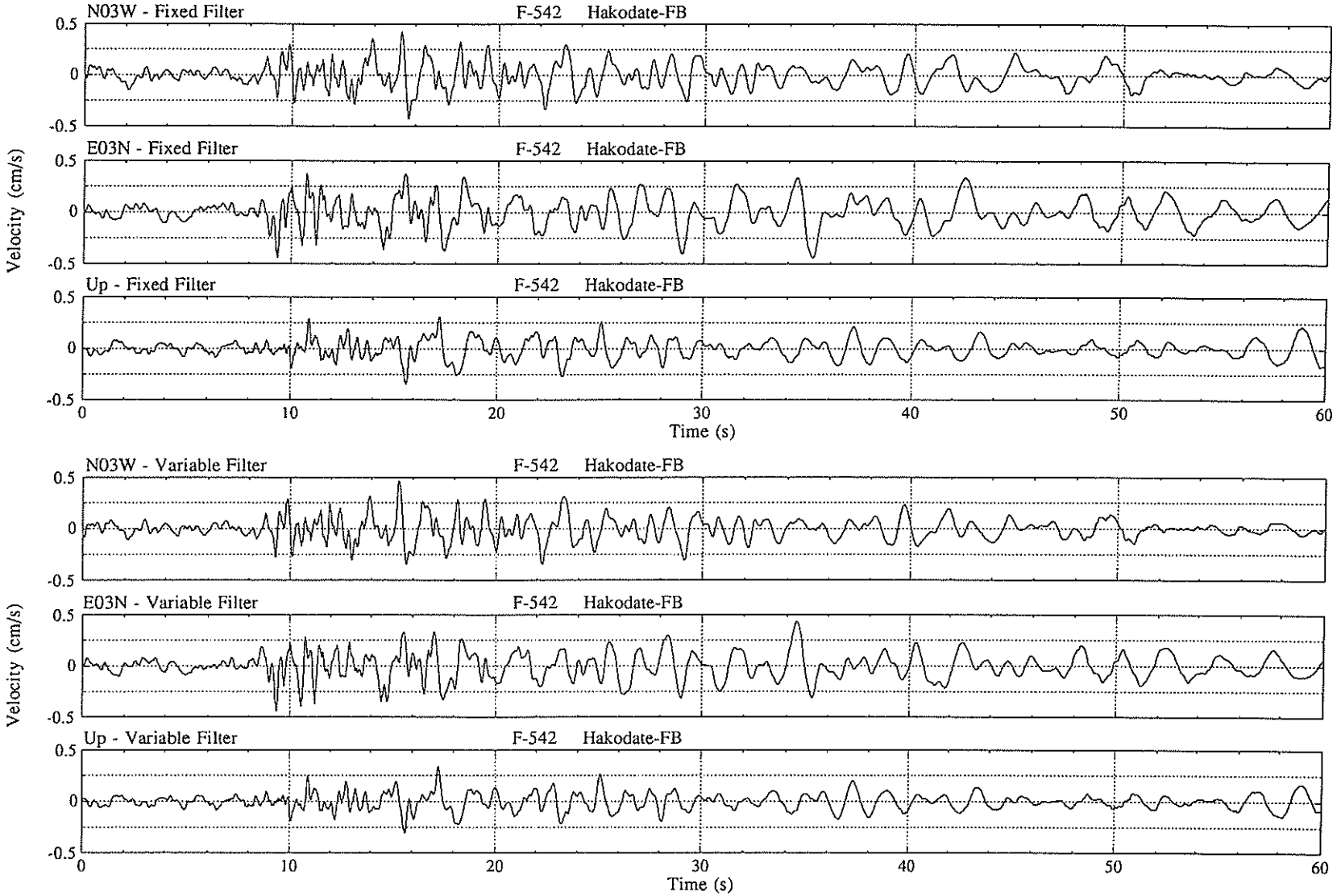
****

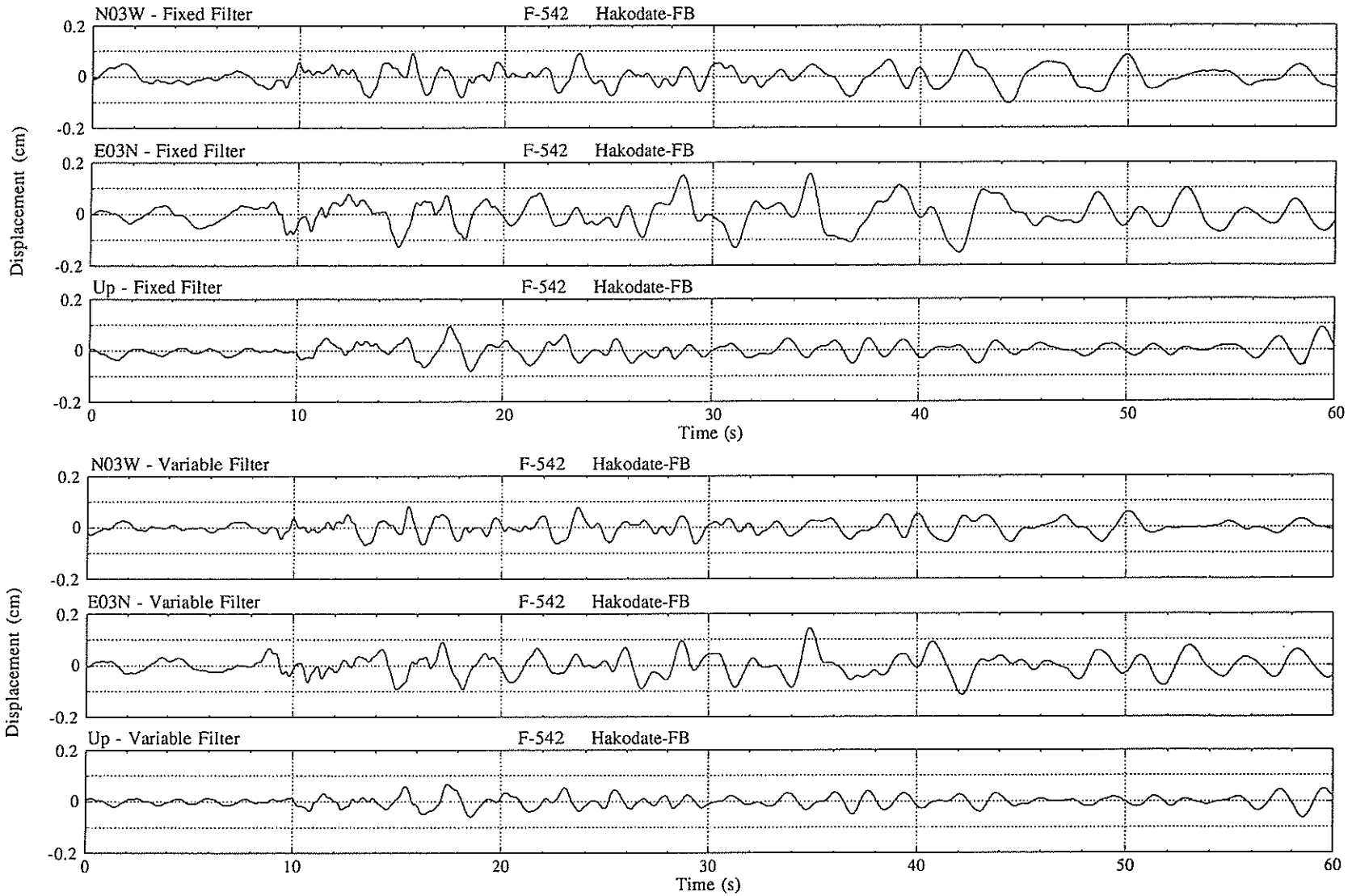
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.225	0.182	0.280	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	3.9	4.9	2.6	5.3
ORIGINAL	5.5	5.6	3.6	6.2
CORRECTED	5.3	5.6	3.4	6.1
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	0.43	0.44	0.34	0.50
VARIABLE FILTER	0.47	0.44	0.34	0.47
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.11	0.16	0.10	0.17
VARIABLE FILTER	0.08	0.15	0.07	0.15

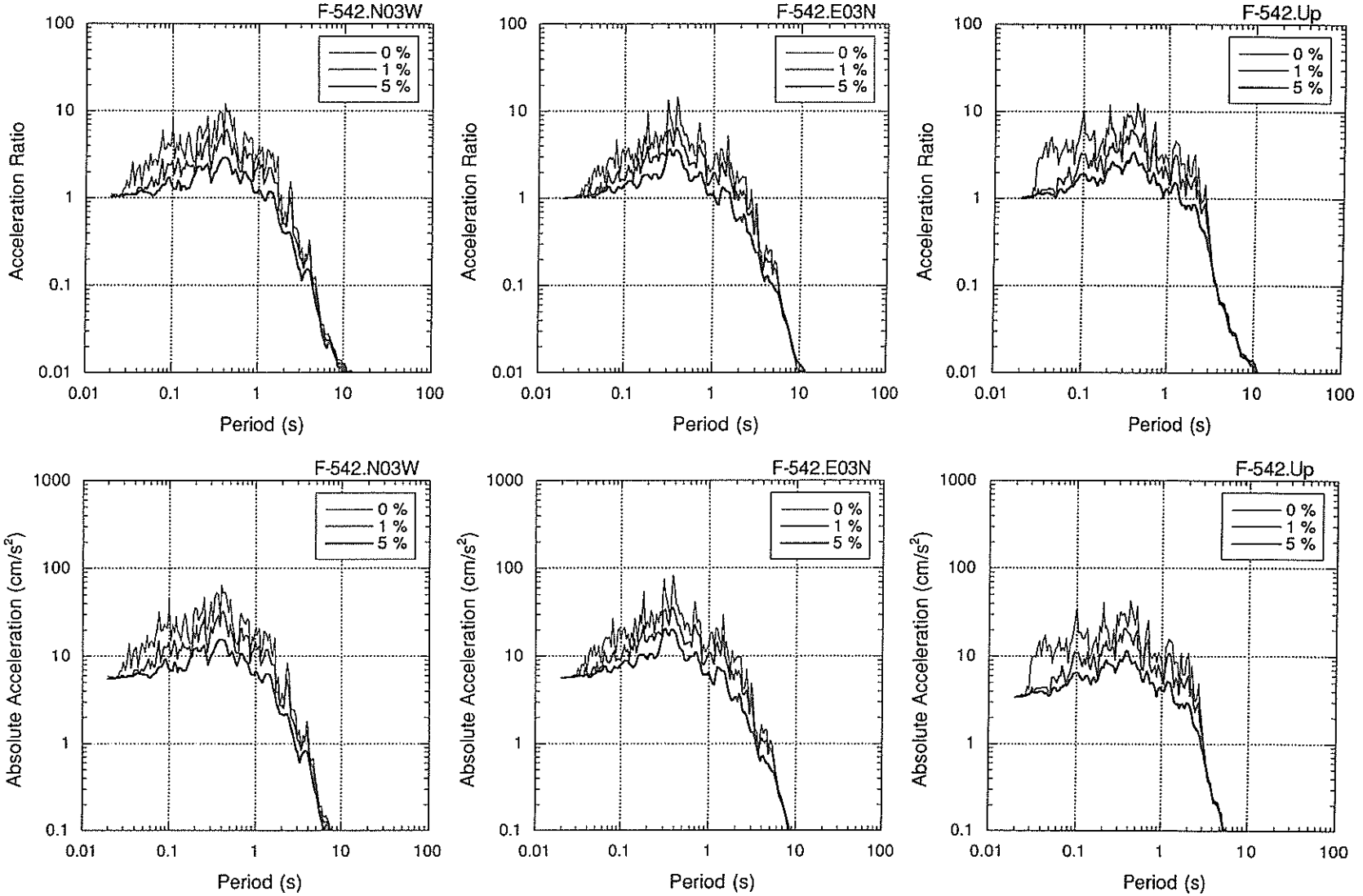
* RESULTANT OF HORIZONTAL COMPONENTS

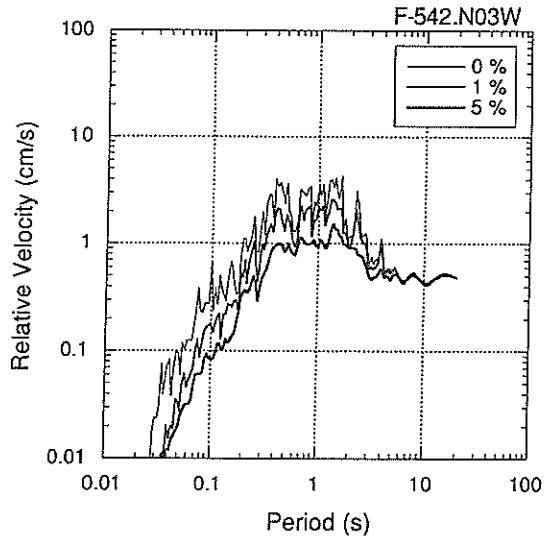

N03W - Original
F-542 Hakodate-FB
E03N - Original
F-542 Hakodate-FB
Up - Original
F-542 Hakodate-FB
Acceleration (cm/s2)
6
0
-6
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-542 Hakodate-FB
E03N - Corrected
F-542 Hakodate-FB
Up - Corrected
F-542 Hakodate-FB
Acceleration (cm/s2)
Time (s)

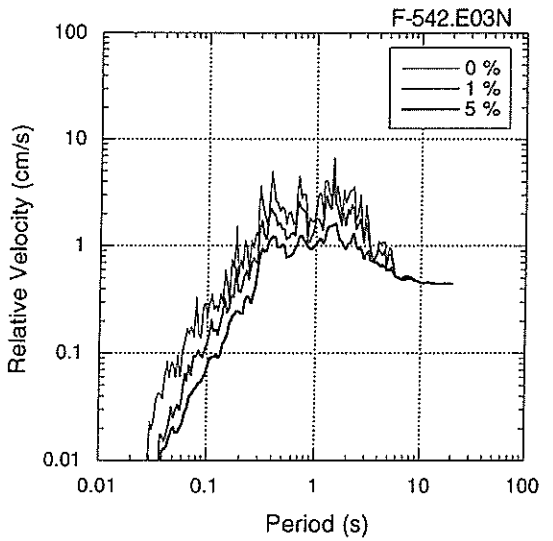

N03W - Original
F-542 Hakodate-FB
E03N - Original
F-542 Hakodate-FB
Up - Original
F-542 Hakodate-FB
Acceleration (cm/s2)
Time (s)
N03W - SMAC Equivalent
F-542 Hakodate-FB
E03N - SMAC Equivalent
F-542 Hakodate-FB
Up - SMAC Equivalent
F-542 Hakodate-FB
Acceleration (cm/s2)
Time (s)

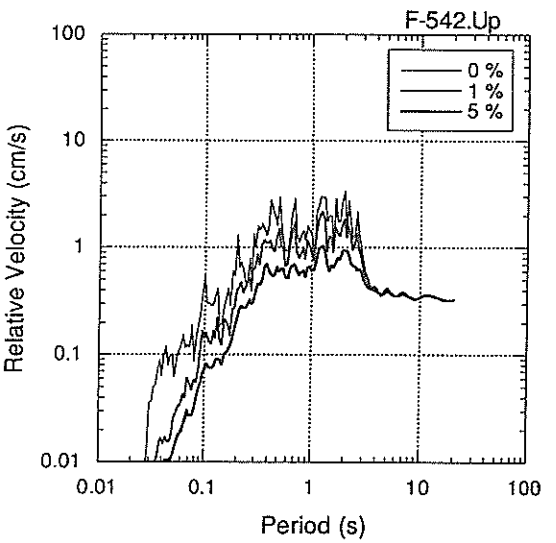

N03W - Fixed Filter
F-542 Hakodate-FB
E03N - Fixed Filter
F-542 Hakodate-FB
Up - Fixed Filter
F-542 Hakodate-FB
Velocity (cm/s)
0.5
0
-0.5
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-542 Hakodate-FB
E03N - Variable Filter
F-542 Hakodate-FB
Up - Variable Filter
F-542 Hakodate-FB
Velocity (cm/s)
Time (s)

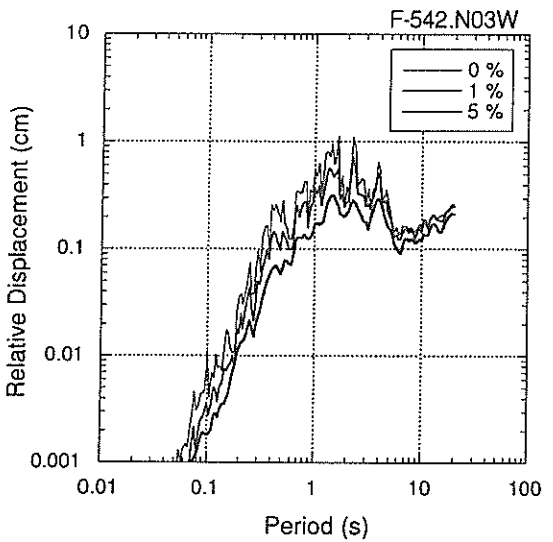

N03W - Fixed Filter
F-542 Hakodate-FB
E03N - Fixed Filter
F-542 Hakodate-FB
Up - Fixed Filter
F-542 Hakodate-FB
Displacement (cm)
0.2
0
-0.2
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-542 Hakodate-FB
E03N - Variable Filter
F-542 Hakodate-FB
Up - Variable Filter
F-542 Hakodate-FB
Displacement (cm)
Time (s)

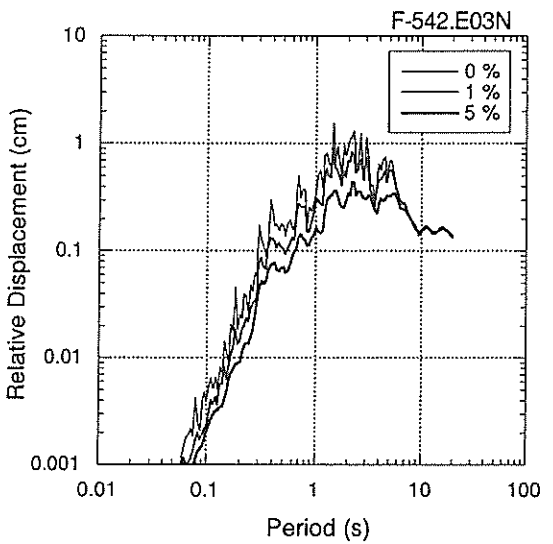

F-542.N03W
F-542.E03N
F-542.Up
0 %
1 %
5 %
Acceleration Ratio
Absolute Acceleration (cm/s²)
Period (s)
0.01
0.1
1
10
100
1000

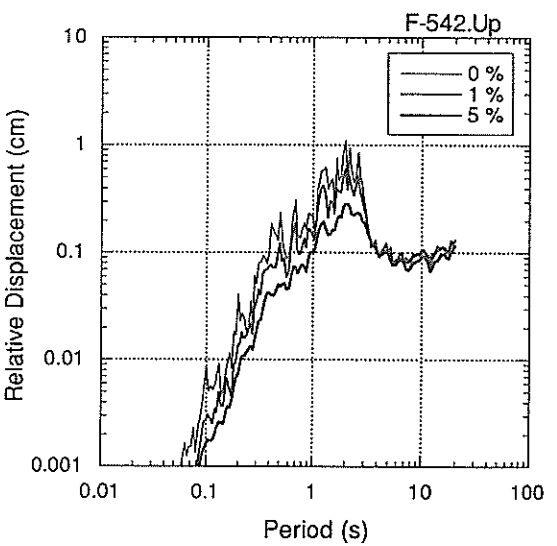

F-542.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)

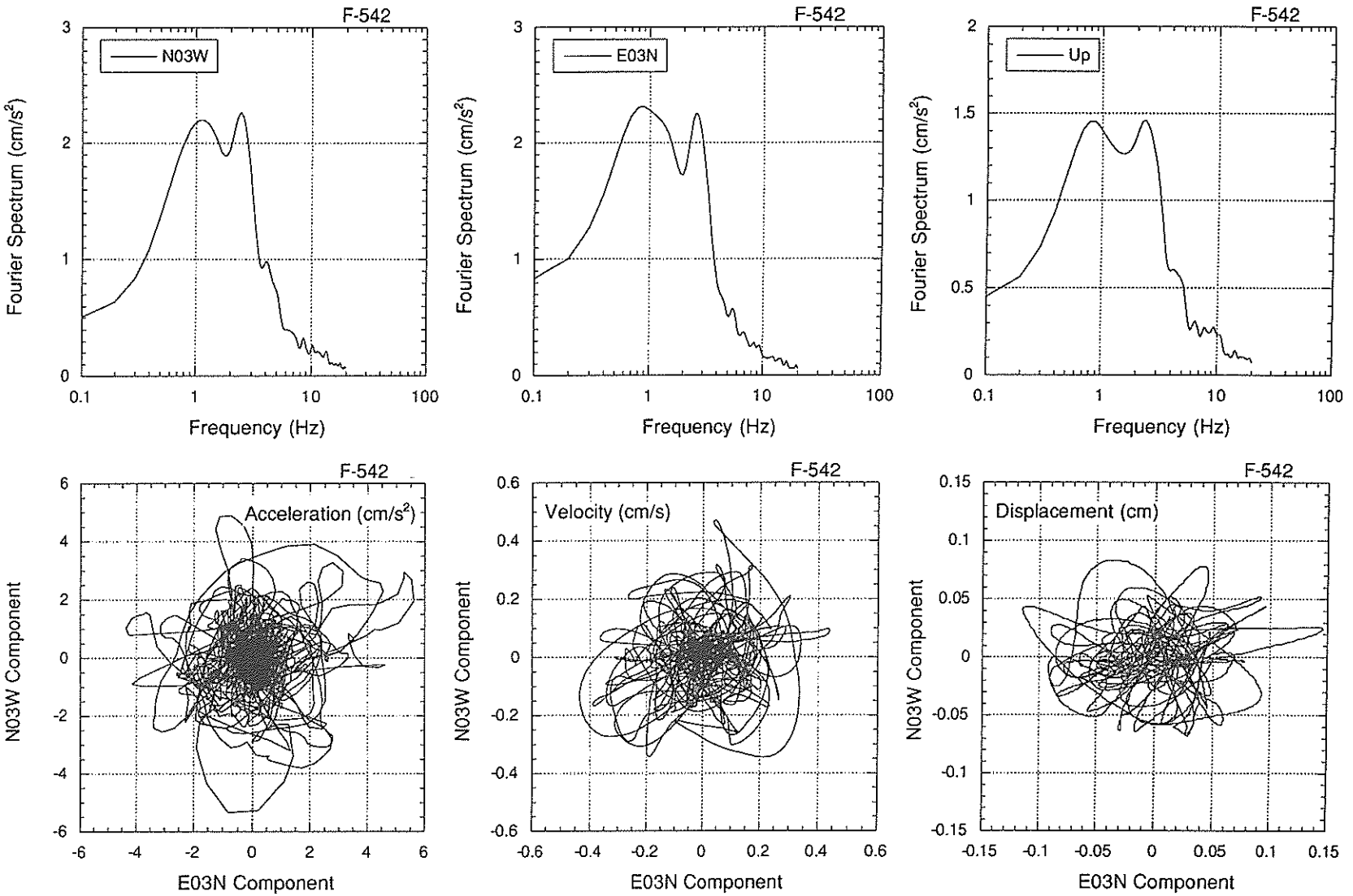

F-542.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)


F-542.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)


F-542.N03W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)


F-542.E03N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)


F-542.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)


F-542
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-542
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-542
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)
F-542
Acceleration (cm/s²)
N03W Component
E03N Component
F-542
Velocity (cm/s)
N03W Component
E03N Component
F-542
Displacement (cm)
N03W Component
E03N Component

RECORD NUMBER : F-546

STATION : HAKODATE-F

EARTHQUAKE DATA

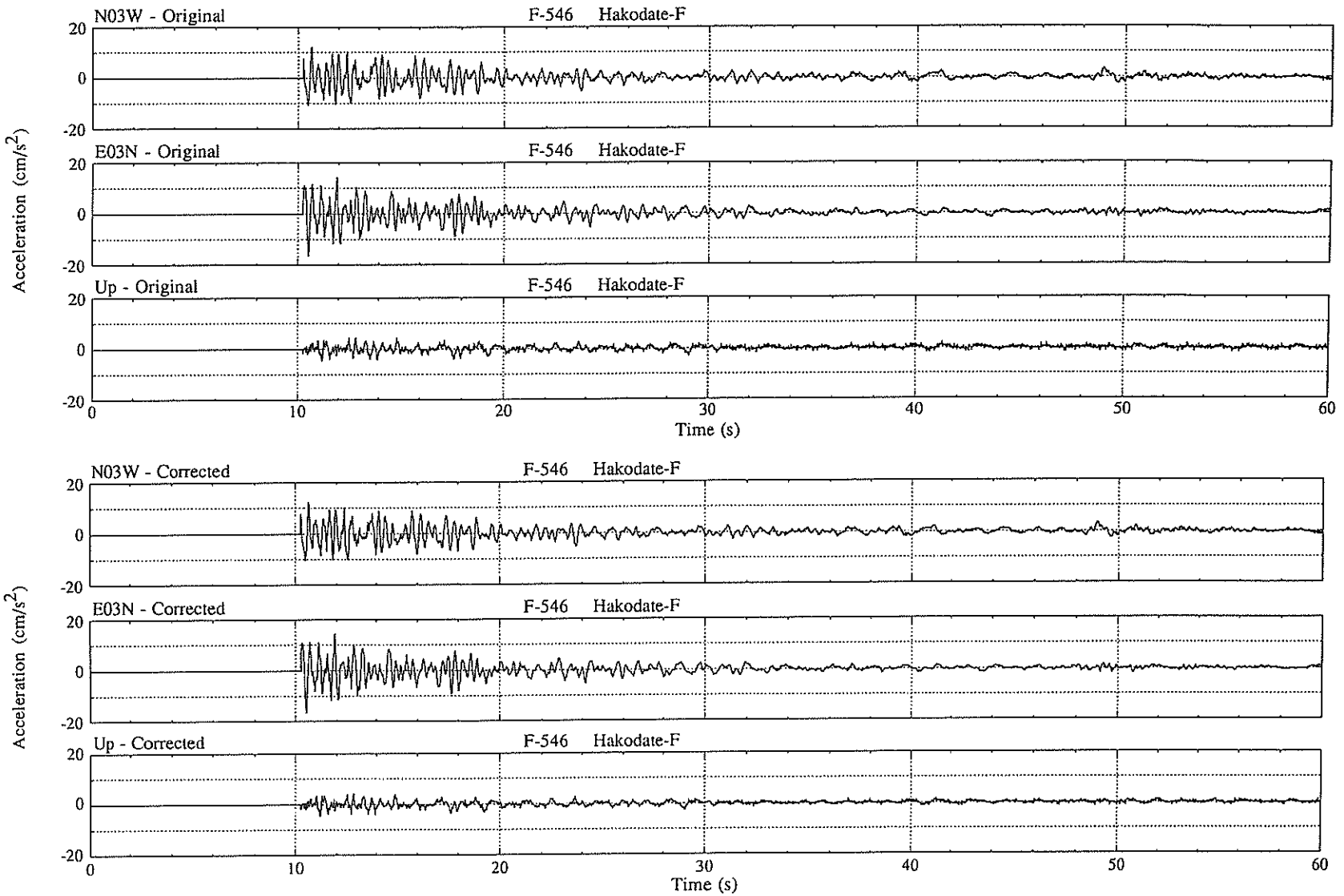
****

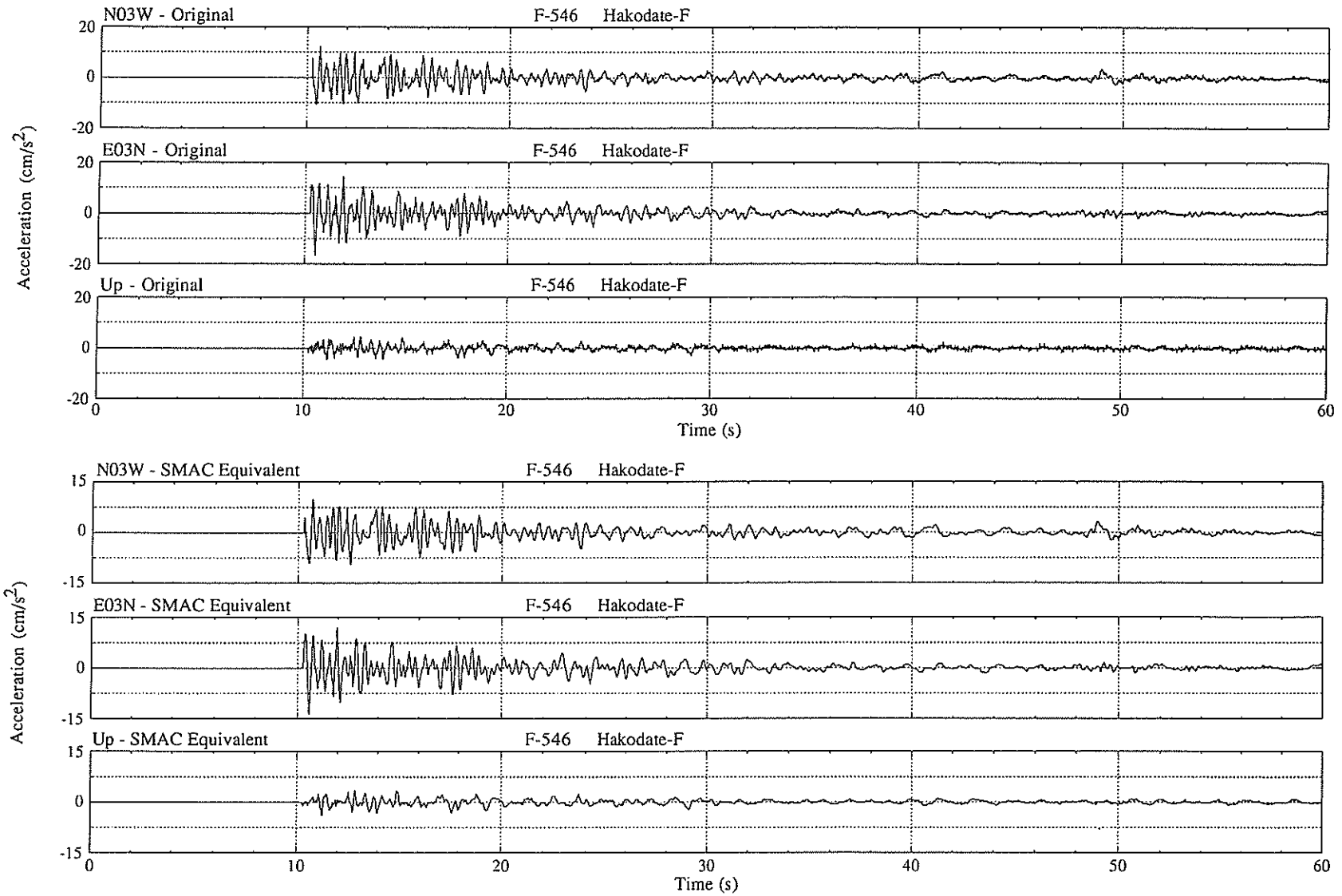
DATE AND TIME	23: 4 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	NW OFF SHAKOTAN PEN
LATITUDE	43° 1.2' N
LONGITUDE	139°27.6' E
DEPTH	34.5KM
JMA MAGNITUDE	5.4

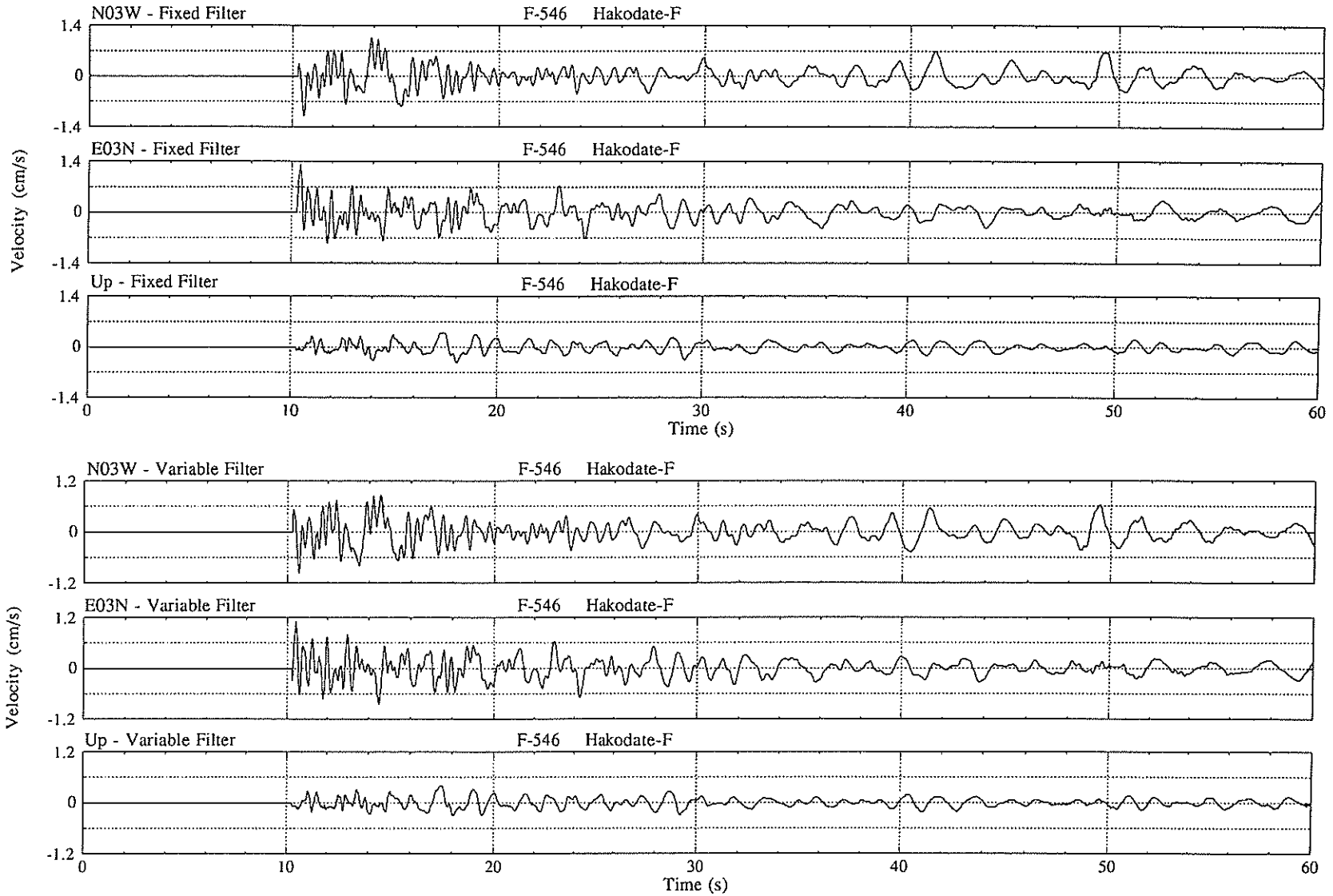
****

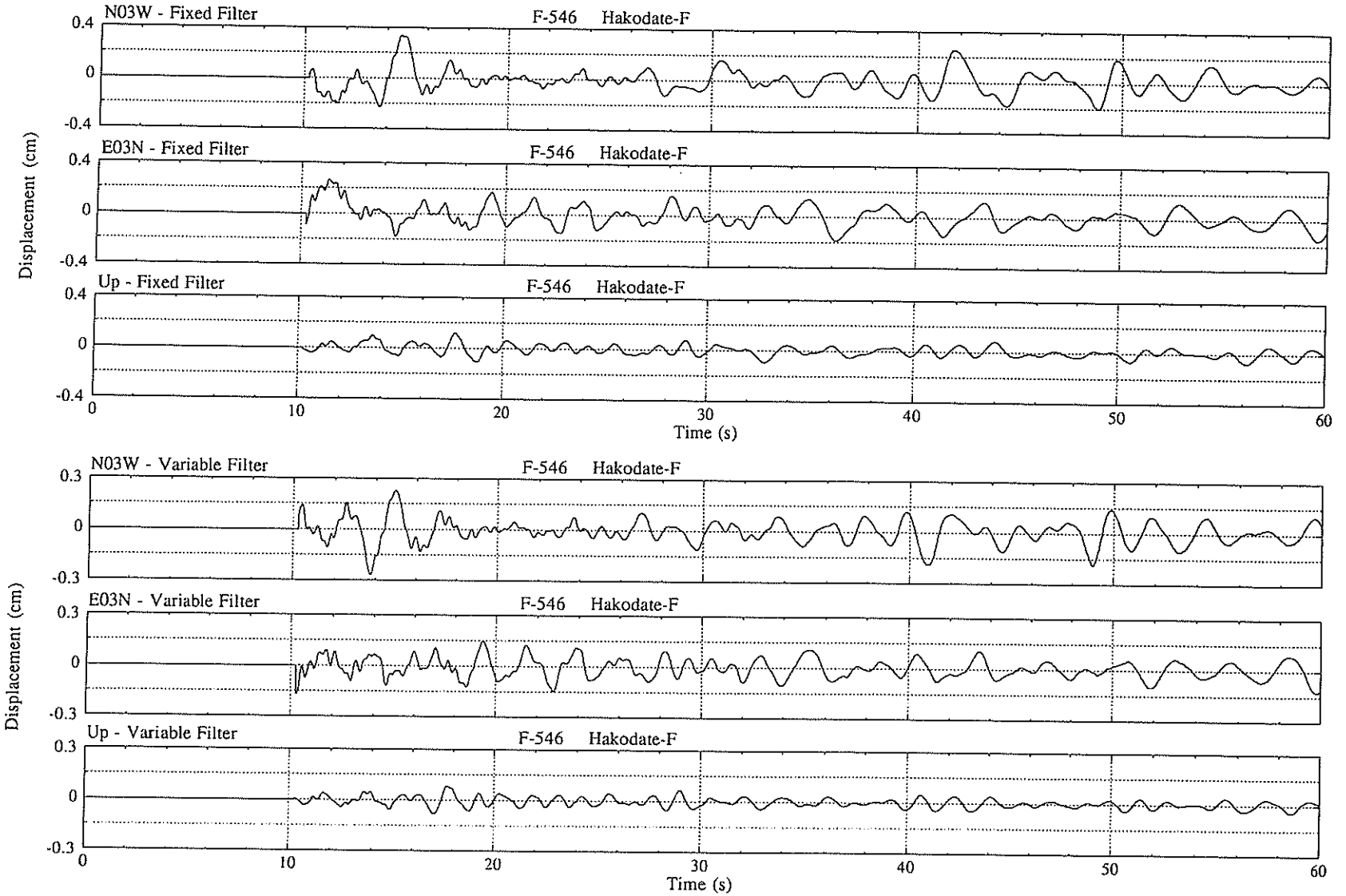
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.225	0.237	0.359	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	9.9	13.5	3.8	15.3
ORIGINAL	12.4	16.4	4.6	18.1
CORRECTED	12.5	16.5	4.5	18.1
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	1.09	1.31	0.42	1.33
VARIABLE FILTER	0.96	1.10	0.41	1.17
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.34	0.27	0.12	0.38
VARIABLE FILTER	0.27	0.17	0.08	0.27

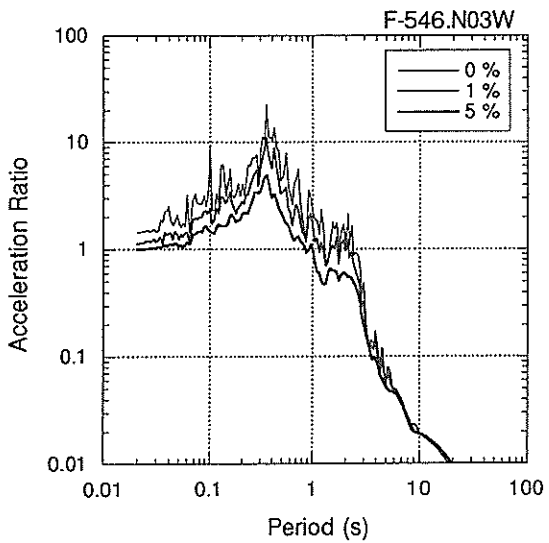
* RESULTANT OF HORIZONTAL COMPONENTS

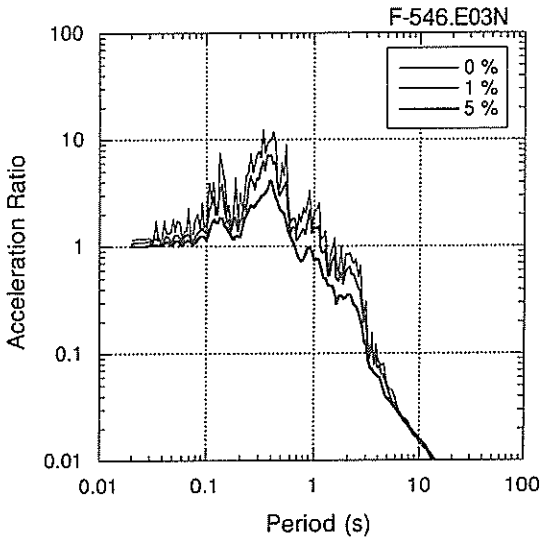

N03W - Original
F-546 Hakodate-F
E03N - Original
F-546 Hakodate-F
Up - Original
F-546 Hakodate-F
Acceleration (cm/s2)
Time (s)
N03W - Corrected
F-546 Hakodate-F
E03N - Corrected
F-546 Hakodate-F
Up - Corrected
F-546 Hakodate-F
Acceleration (cm/s2)
Time (s)

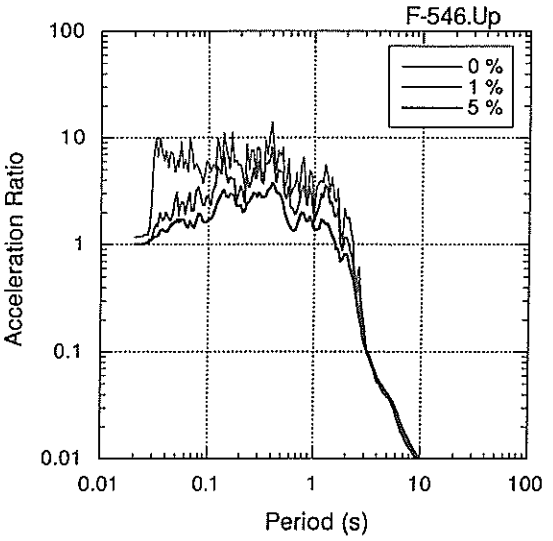

N03W - Original
F-546 Hakodate-F
E03N - Original
F-546 Hakodate-F
Up - Original
F-546 Hakodate-F
Acceleration (cm/s2)
20
0
-20
0
10
20
30
40
50
60
Time (s)
N03W - SMAC Equivalent
F-546 Hakodate-F
E03N - SMAC Equivalent
F-546 Hakodate-F
Up - SMAC Equivalent
F-546 Hakodate-F
Acceleration (cm/s2)
15
0
-15
0
10
20
30
40
50
60
Time (s)

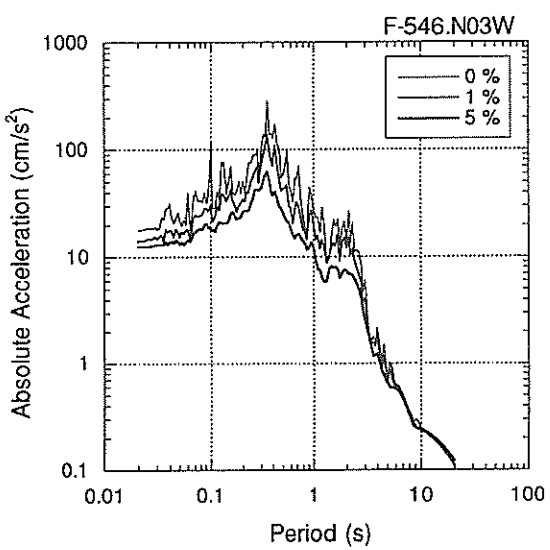

N03W - Fixed Filter
F-546 Hakodate-F
E03N - Fixed Filter
F-546 Hakodate-F
Up - Fixed Filter
F-546 Hakodate-F
Velocity (cm/s)
1.4
0
-1.4
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-546 Hakodate-F
E03N - Variable Filter
F-546 Hakodate-F
Up - Variable Filter
F-546 Hakodate-F
Velocity (cm/s)
1.2
0
-1.2
Time (s)

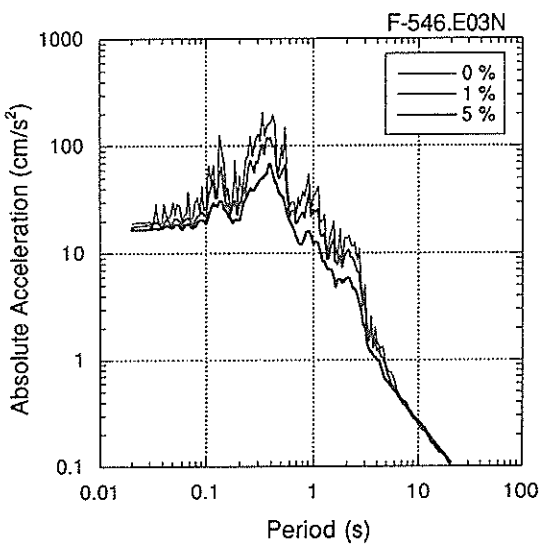

N03W - Fixed Filter
F-546 Hakodate-F
E03N - Fixed Filter
F-546 Hakodate-F
Up - Fixed Filter
F-546 Hakodate-F
Displacement (cm)
0.4
0
-0.4
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-546 Hakodate-F
E03N - Variable Filter
F-546 Hakodate-F
Up - Variable Filter
F-546 Hakodate-F
Displacement (cm)
0.3
0
-0.3
0
10
20
30
40
50
60
Time (s)

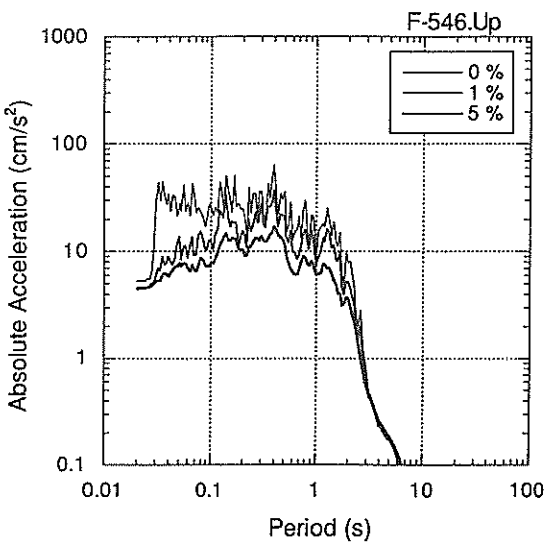

F-546.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)

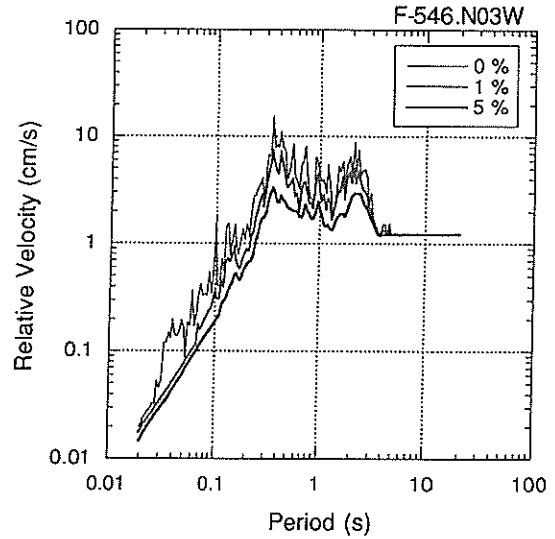

F-546.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)

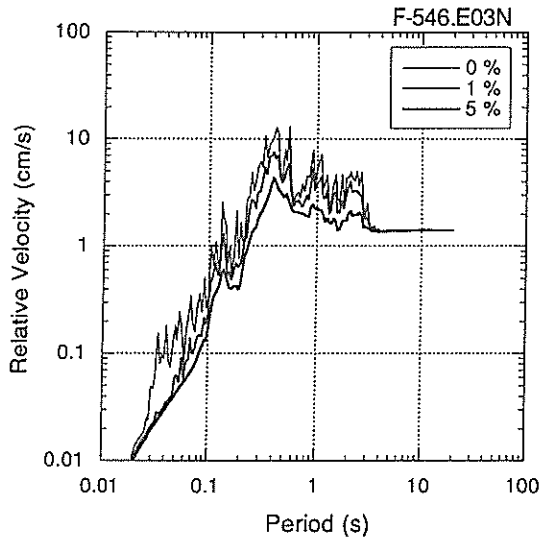

F-546.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)

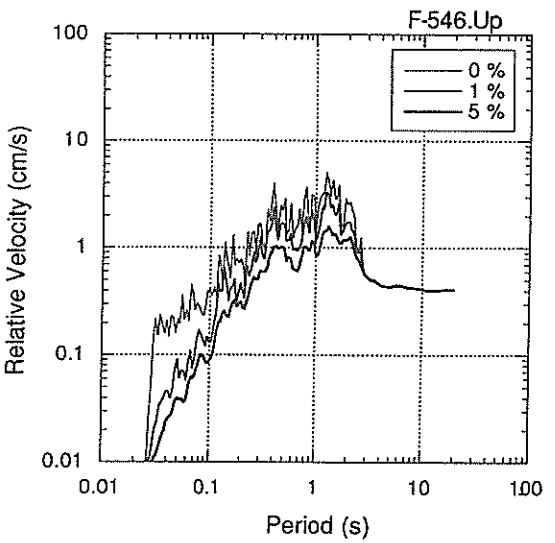

F-546.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

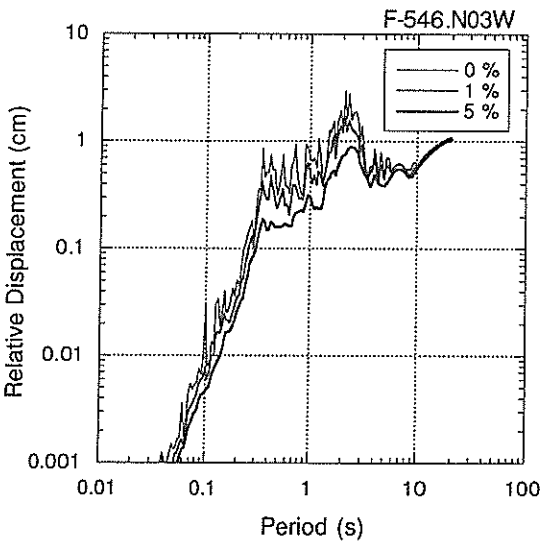

F-546.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

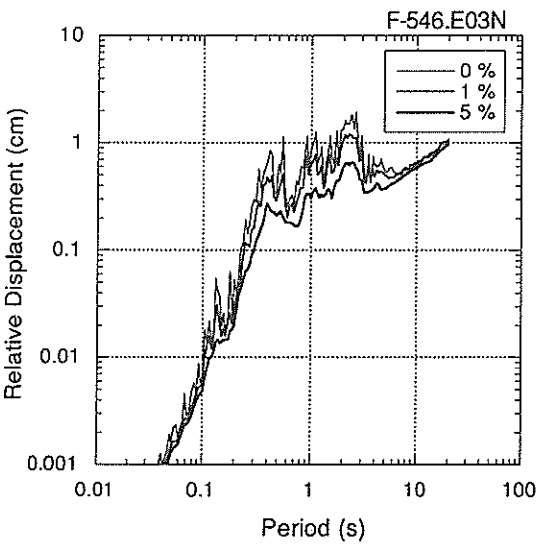

F-546.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

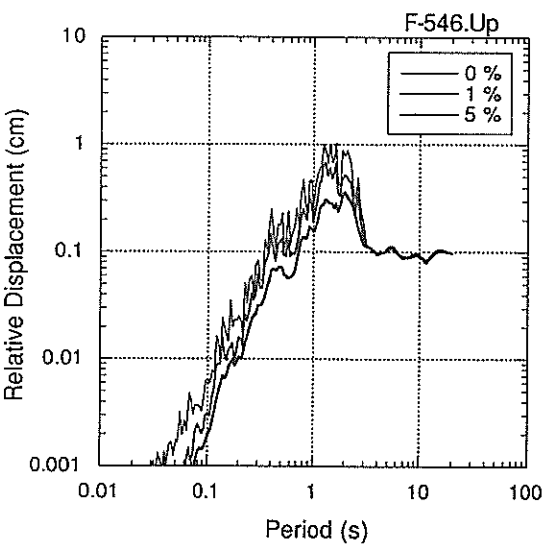

F-546.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)

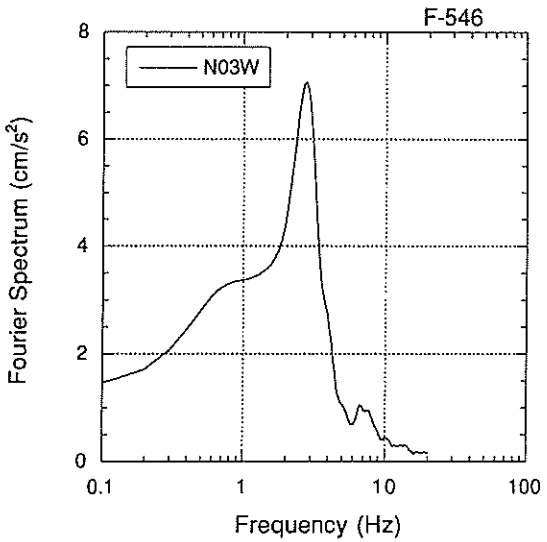

F-546.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)

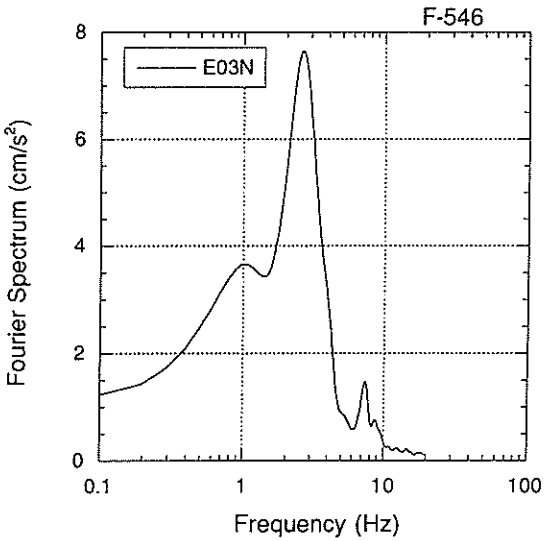

F-546.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)

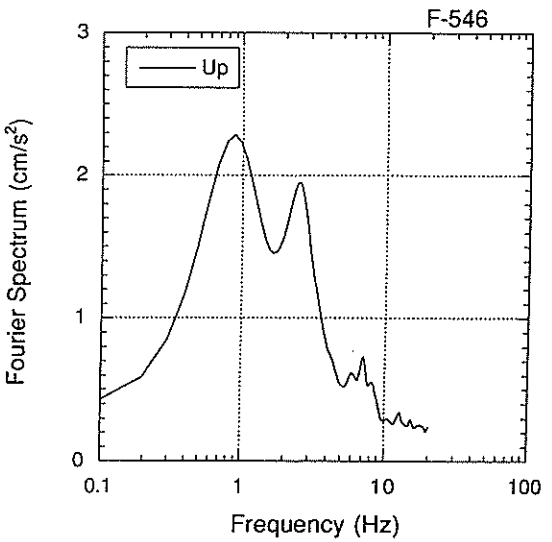

F-546.N03W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)

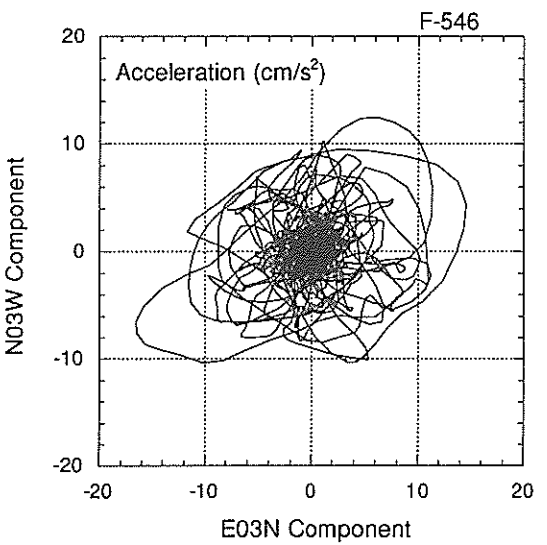

F-546.E03N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)

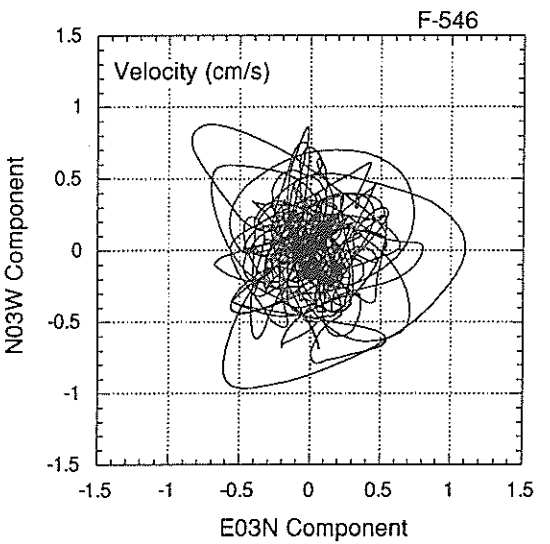

F-546.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)

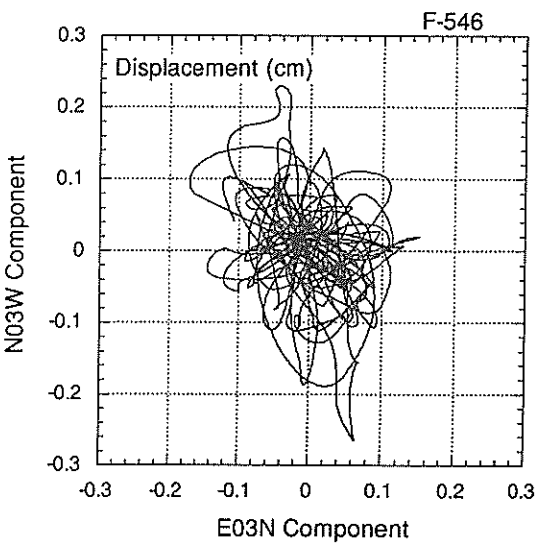

F-546
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-546
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-546
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-546
Acceleration (cm/s²)
N03W Component
E03N Component


F-546
Velocity (cm/s)
N03W Component
E03N Component


F-546
Displacement (cm)
N03W Component
E03N Component

RECORD NUMBER : F-550

STATION : HAKODATE-FR

EARTHQUAKE DATA

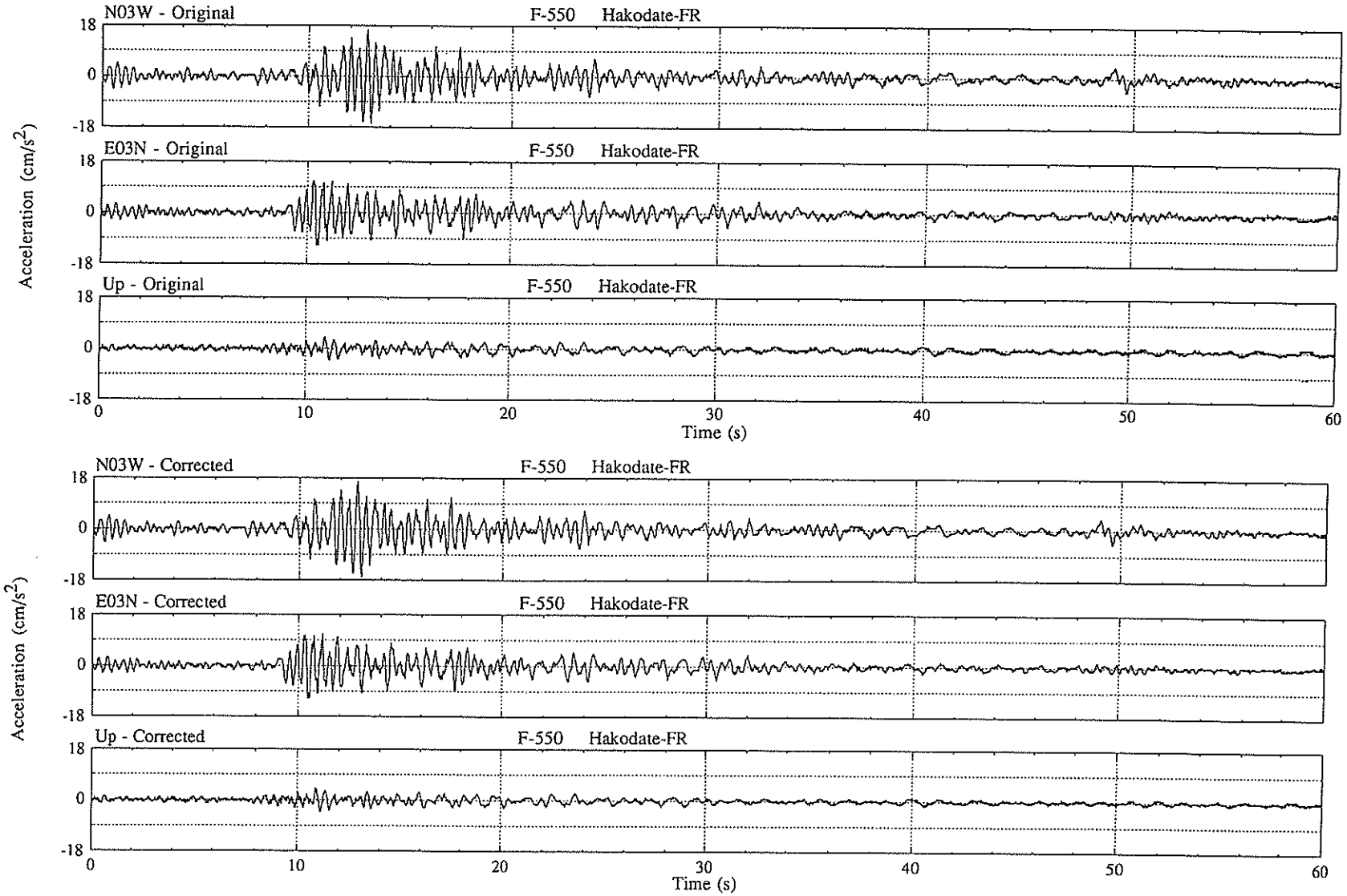
****

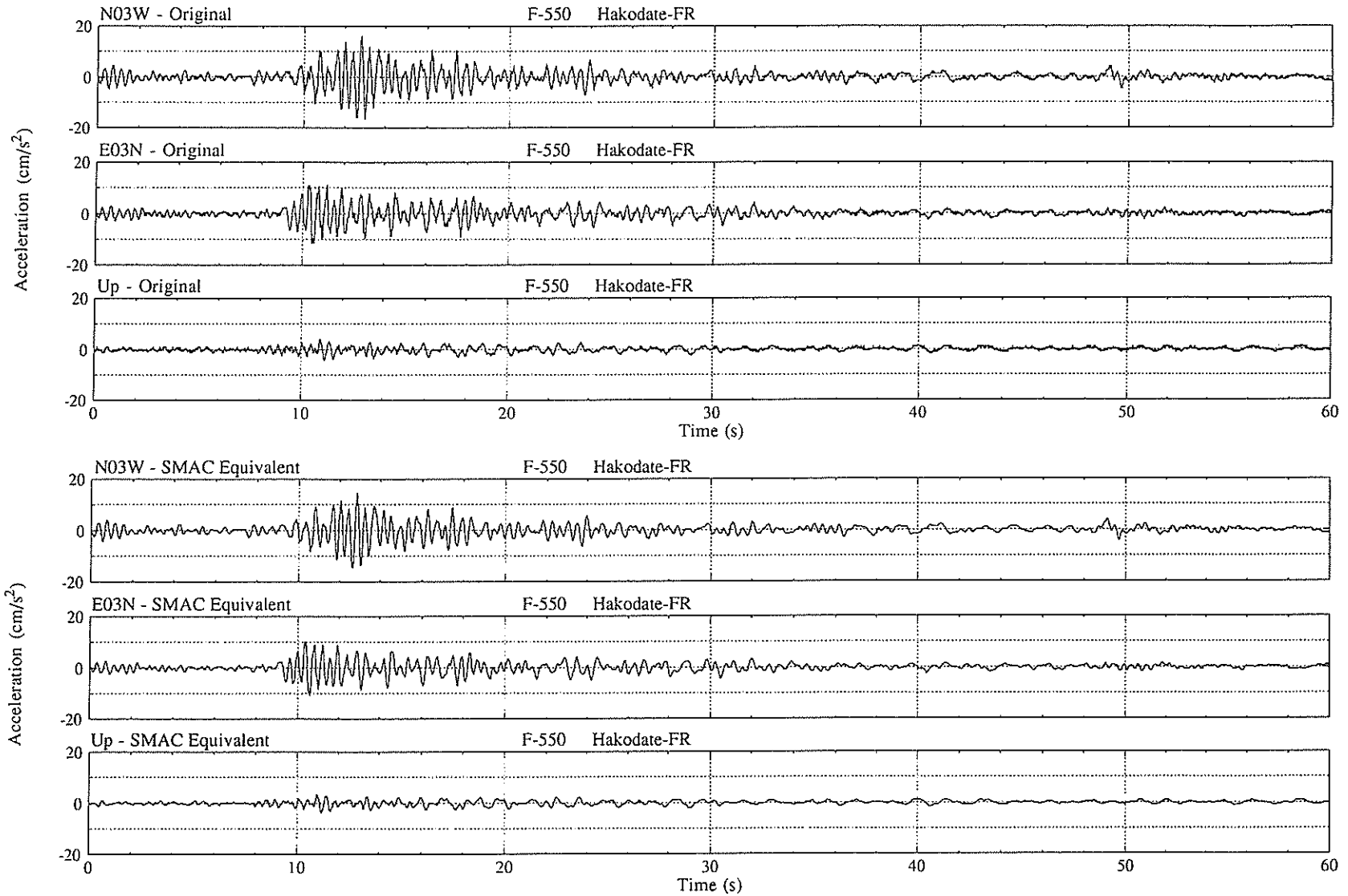
DATE AND TIME	23: 4 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	NW OFF SHAKOTAN PEN
LATITUDE	43° 1.2' N
LONGITUDE	139°27.6' E
DEPTH	34.5KM
JMA MAGNITUDE	5.4

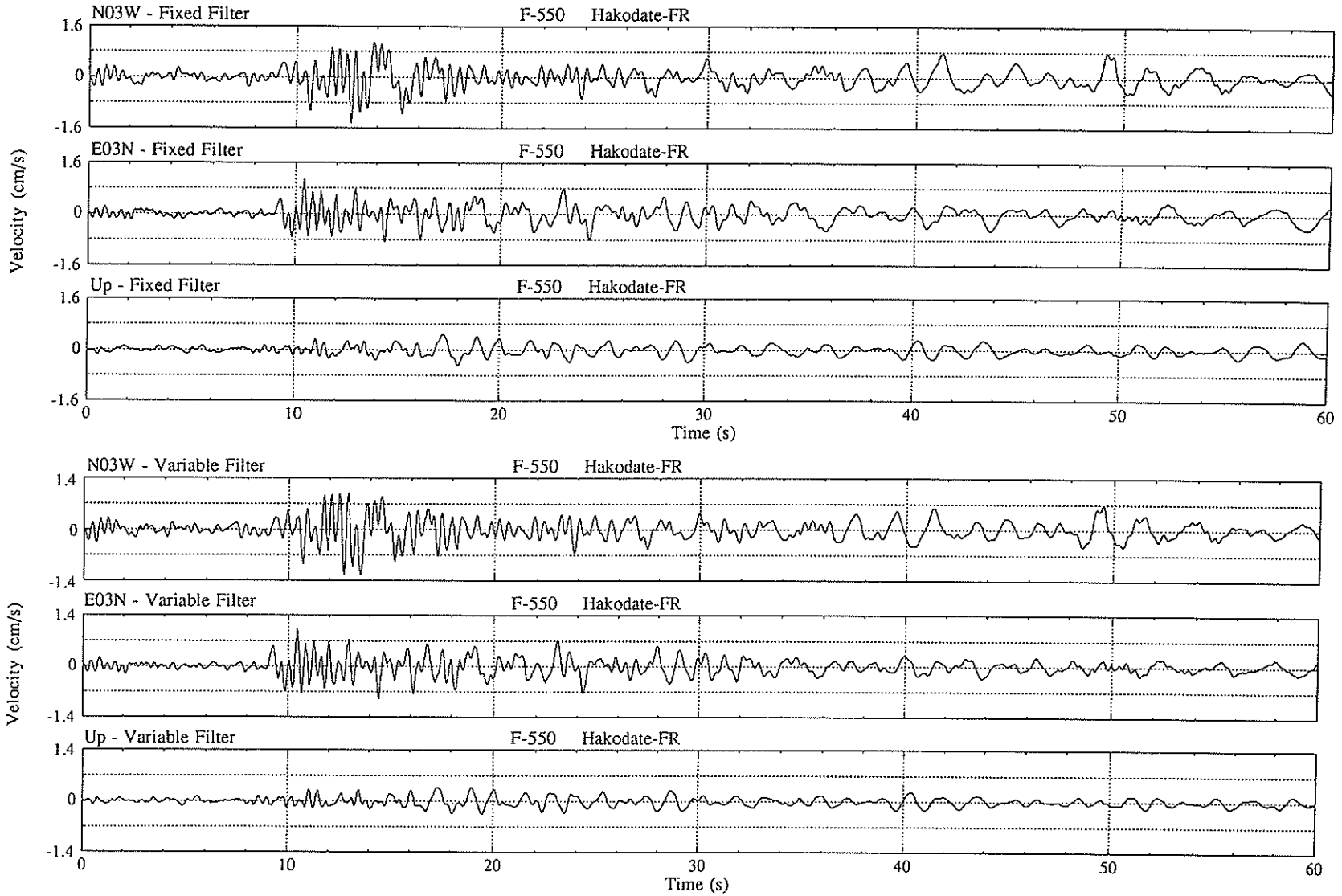
****

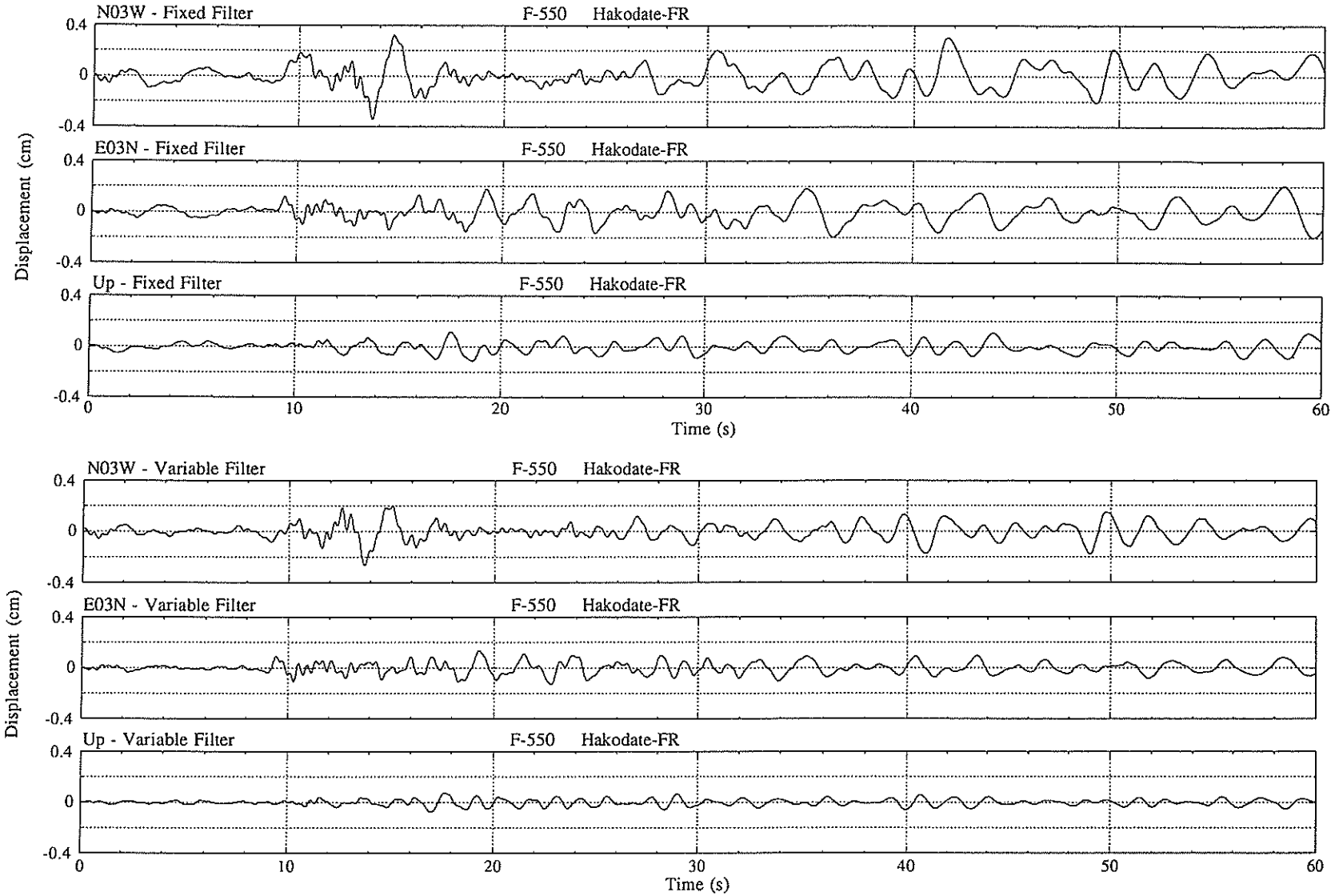
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.280	0.317	0.427	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	14.7	10.7	3.5	16.0
ORIGINAL	16.6	11.3	4.1	18.1
CORRECTED	16.8	11.5	4.2	18.2
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	1.44	1.07	0.49	1.47
VARIABLE FILTER	1.24	1.02	0.39	1.30
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.34	0.21	0.12	0.34
VARIABLE FILTER	0.26	0.14	0.08	0.27

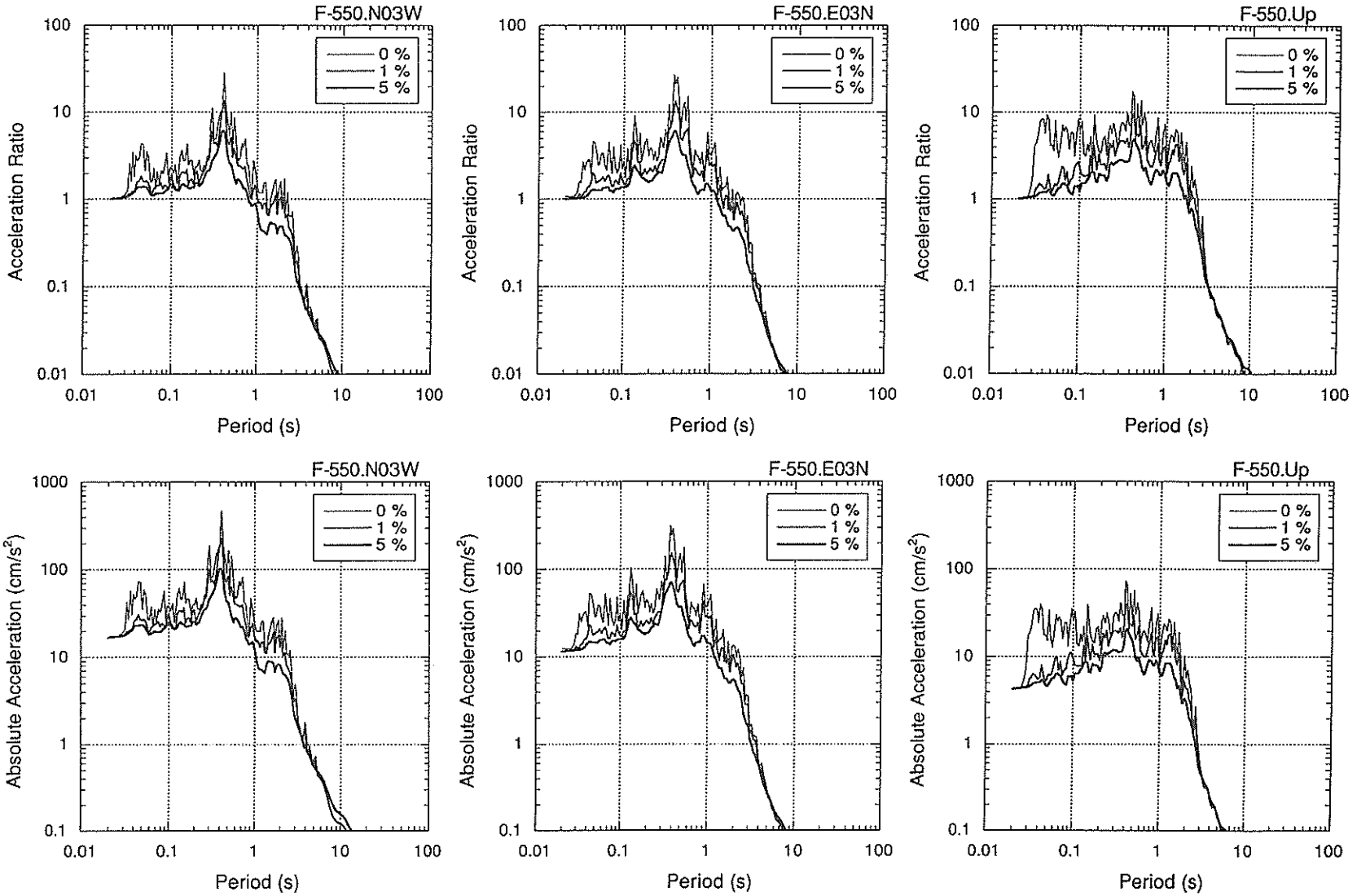
* RESULTANT OF HORIZONTAL COMPONENTS

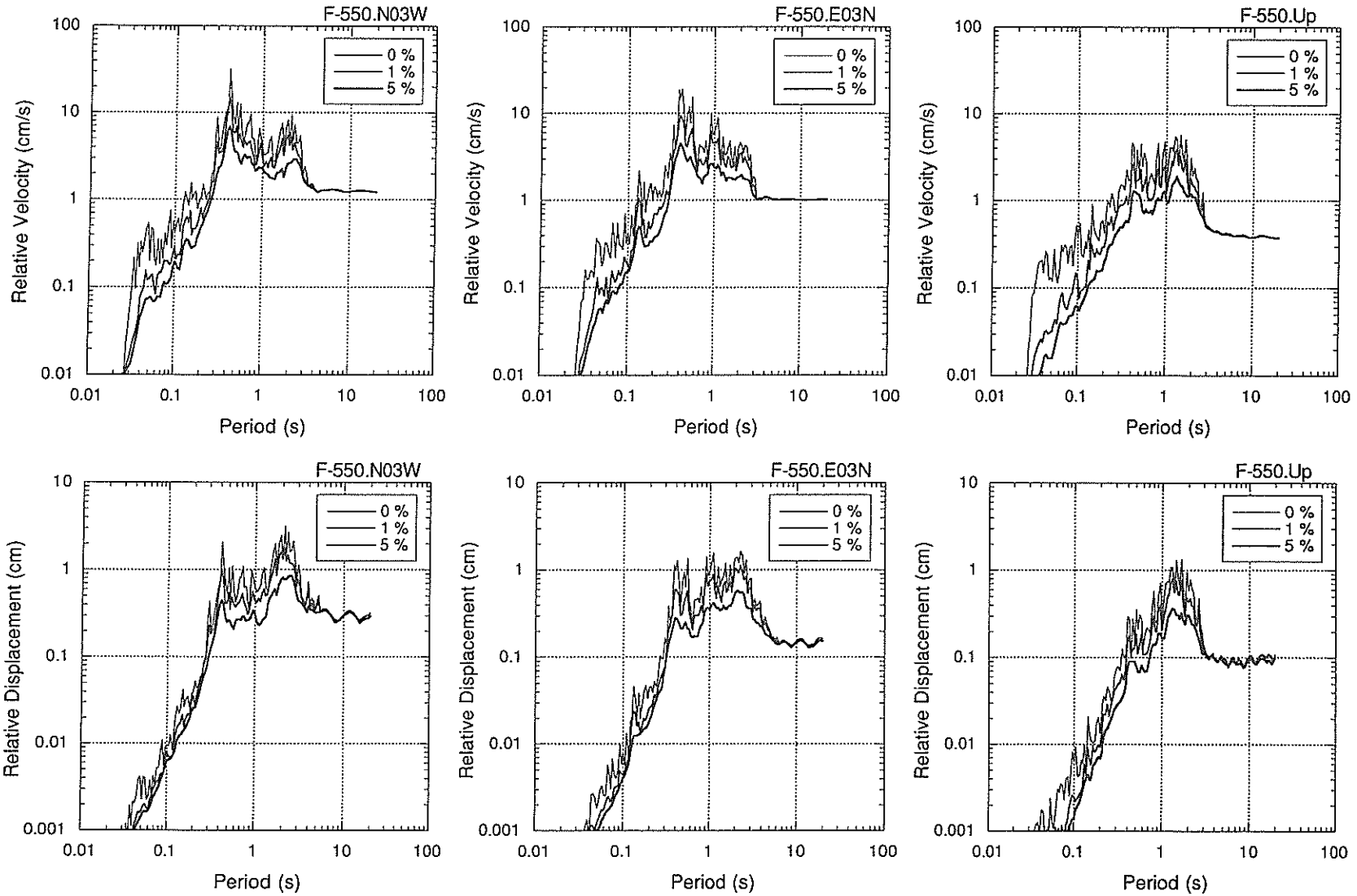

N03W - Original
F-550 Hakodate-FR
E03N - Original
F-550 Hakodate-FR
Up - Original
F-550 Hakodate-FR
Acceleration (cm/s^2)
18
0
-18
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-550 Hakodate-FR
E03N - Corrected
F-550 Hakodate-FR
Up - Corrected
F-550 Hakodate-FR
Acceleration (cm/s^2)
Time (s)

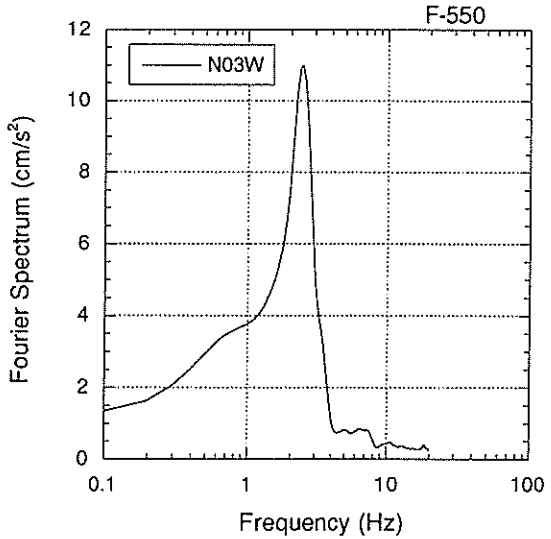

N03W - Original
F-550 Hakodate-FR
E03N - Original
F-550 Hakodate-FR
Up - Original
F-550 Hakodate-FR
Acceleration (cm/s²)
20
0
-20
0
10
20
30
40
50
60
Time (s)
N03W - SMAC Equivalent
F-550 Hakodate-FR
E03N - SMAC Equivalent
F-550 Hakodate-FR
Up - SMAC Equivalent
F-550 Hakodate-FR
Acceleration (cm/s²)
Time (s)

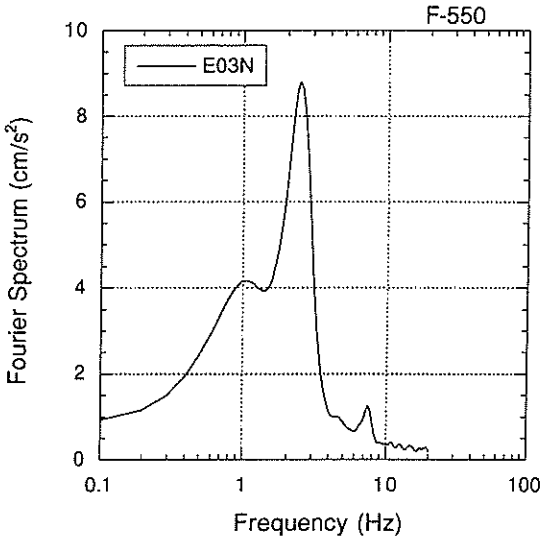

N03W - Fixed Filter
F-550 Hakodate-FR
E03N - Fixed Filter
F-550 Hakodate-FR
Up - Fixed Filter
F-550 Hakodate-FR
Velocity (cm/s)
1.6
0
-1.6
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-550 Hakodate-FR
E03N - Variable Filter
F-550 Hakodate-FR
Up - Variable Filter
F-550 Hakodate-FR
Velocity (cm/s)
1.4
0
-1.4
0
10
20
30
40
50
60
Time (s)

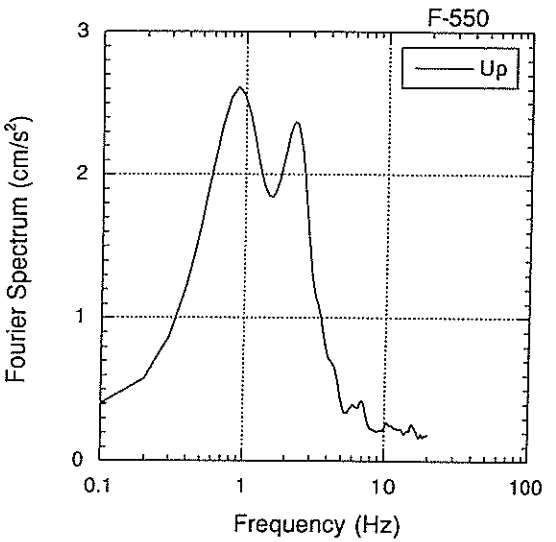

N03W - Fixed Filter
F-550 Hakodate-FR
E03N - Fixed Filter
F-550 Hakodate-FR
Up - Fixed Filter
F-550 Hakodate-FR
Displacement (cm)
0.4
0
-0.4
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-550 Hakodate-FR
E03N - Variable Filter
F-550 Hakodate-FR
Up - Variable Filter
F-550 Hakodate-FR
Displacement (cm)
Time (s)

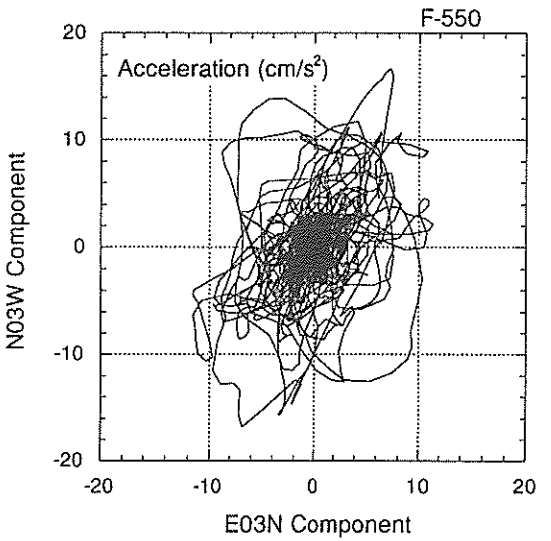

F-550.N03W
F-550.E03N
F-550.Up
0 %
1 %
5 %
Acceleration Ratio
Absolute Acceleration (cm/s²)
Period (s)
0.01
0.1
1
10
100
1000

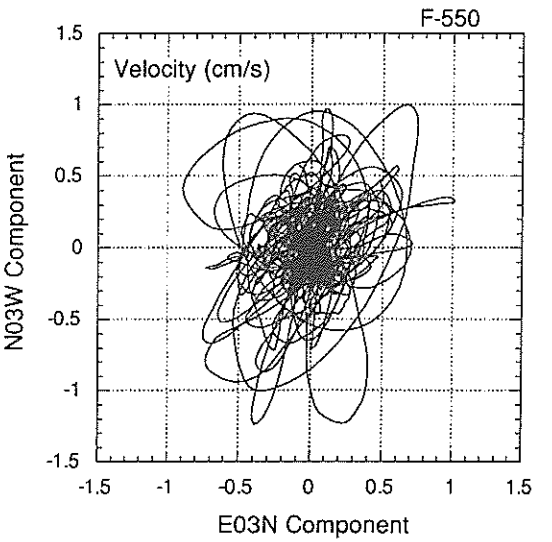

F-550.N03W
F-550.E03N
F-550.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

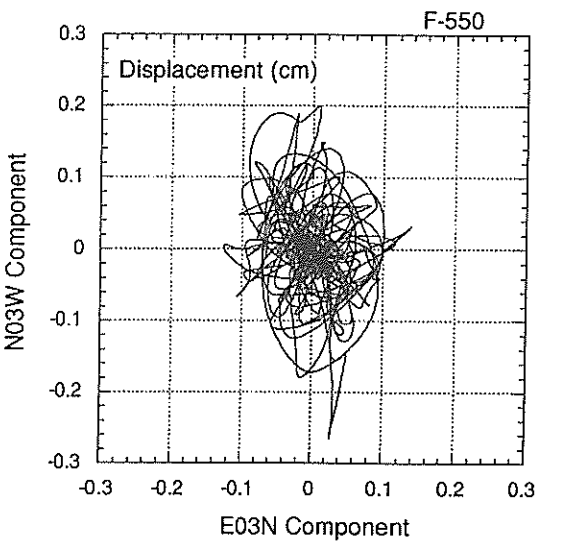

F-550
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-550
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-550
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-550
Acceleration (cm/s²)
N03W Component
E03N Component


F-550
Velocity (cm/s)
N03W Component
E03N Component


F-550
Displacement (cm)
N03W Component
E03N Component

RECORD NUMBER : F-560

STATION : MURORAN-G

EARTHQUAKE DATA

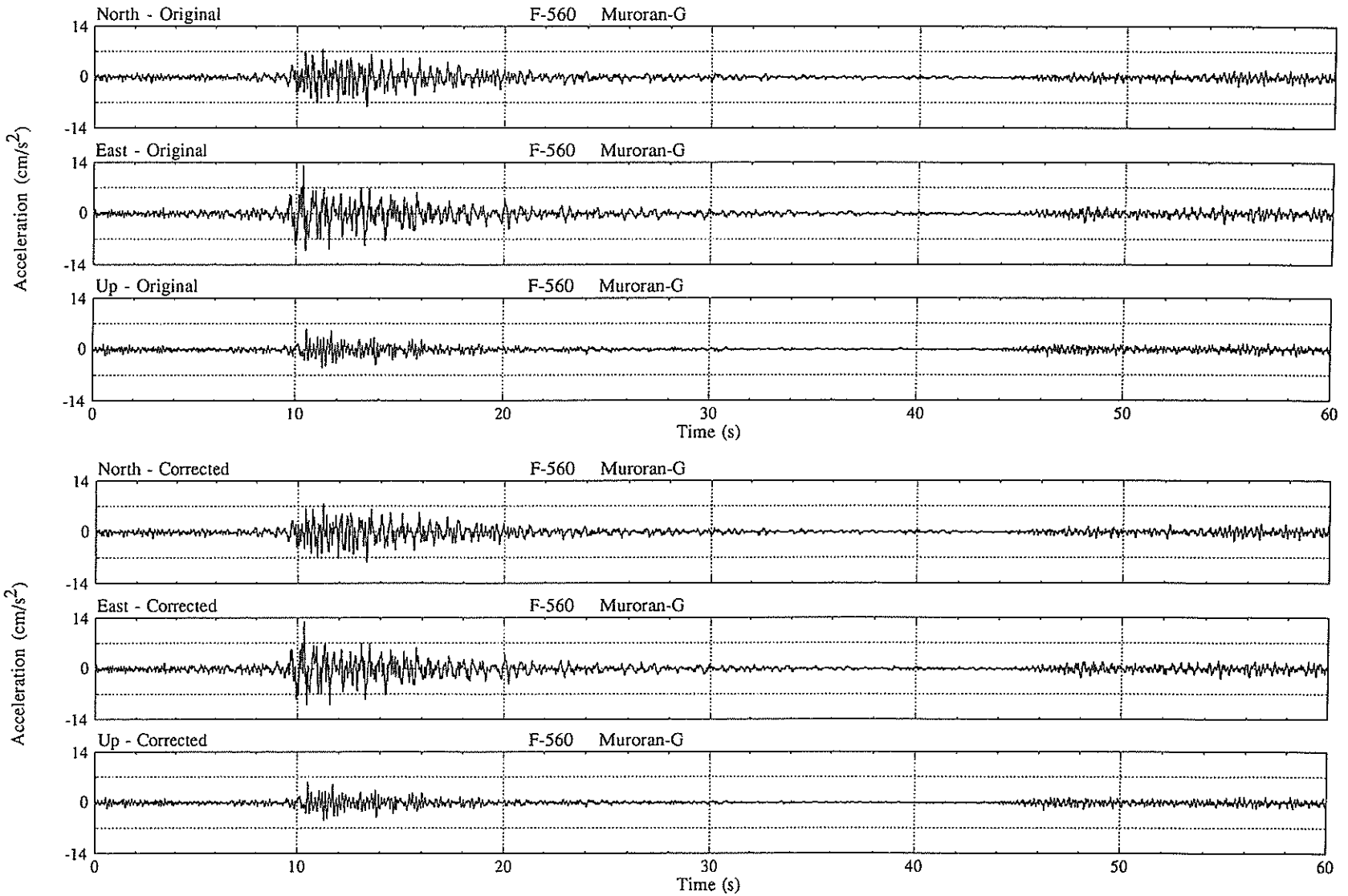
****

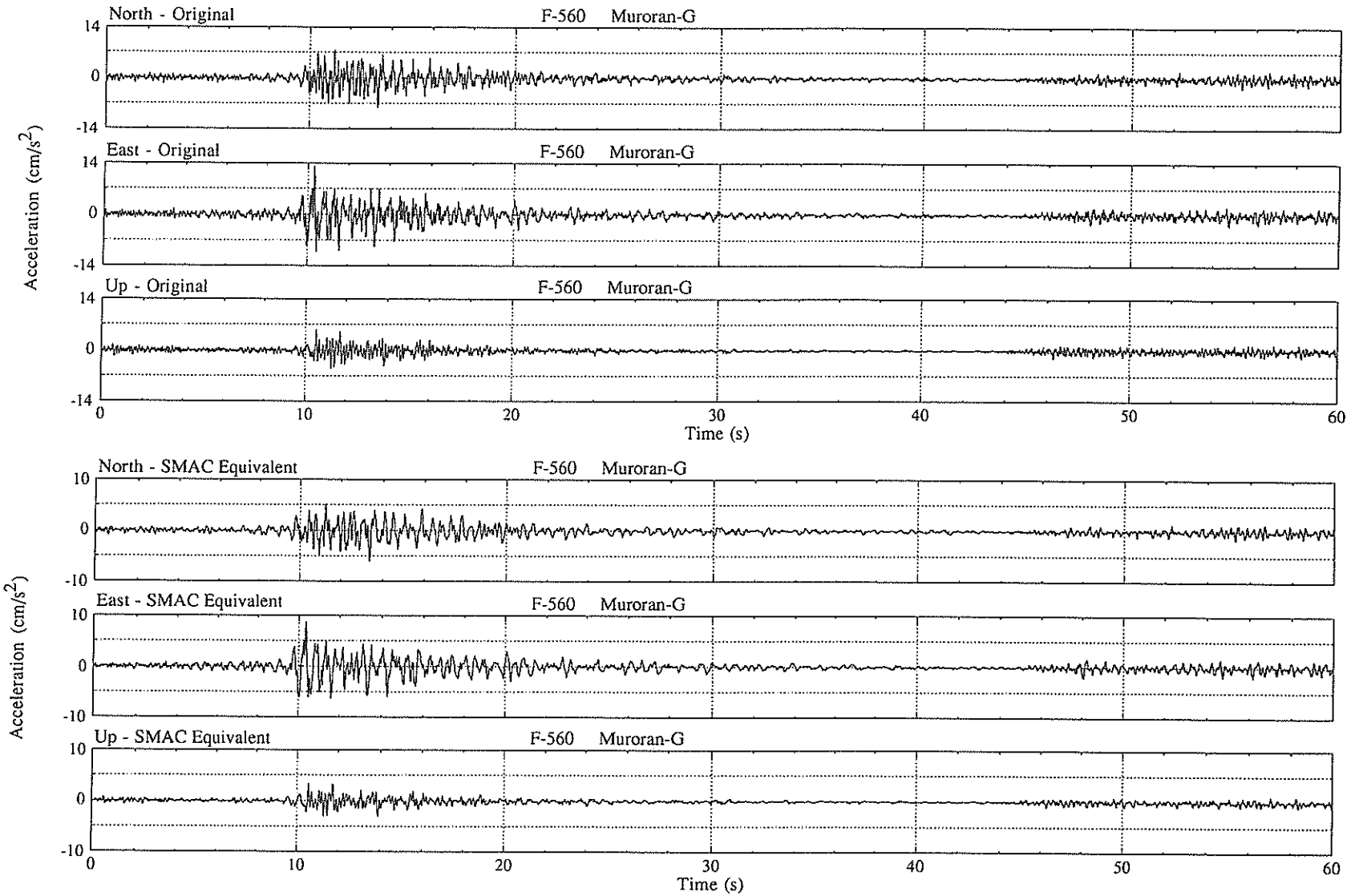
DATE AND TIME	23: 4 JULY12, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	NW OFF SHAKOTAN PEN
LATITUDE	43° 1.2' N
LONGITUDE	139°27.6' E
DEPTH	34.5KM
JMA MAGNITUDE	5.4

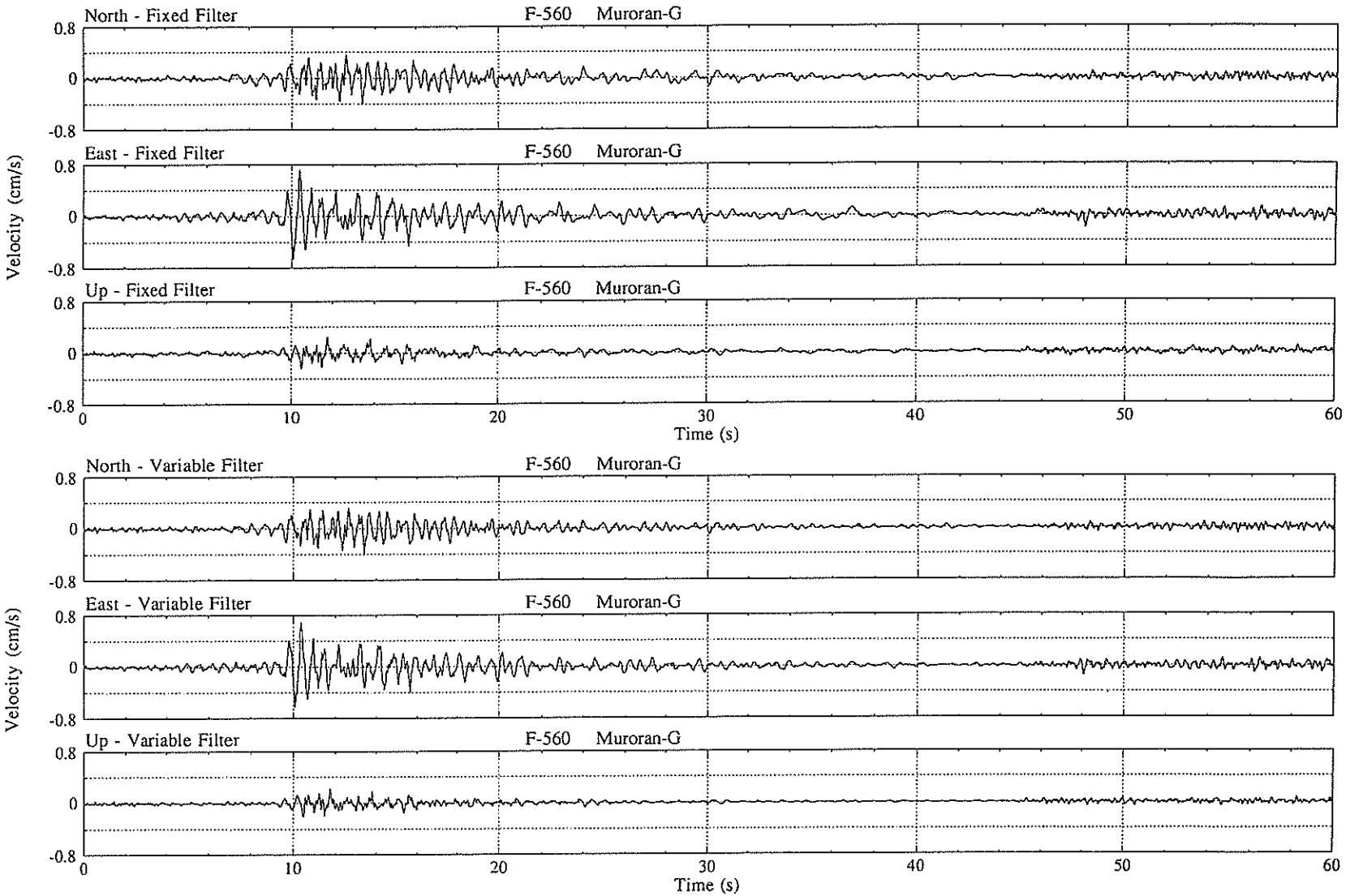
****

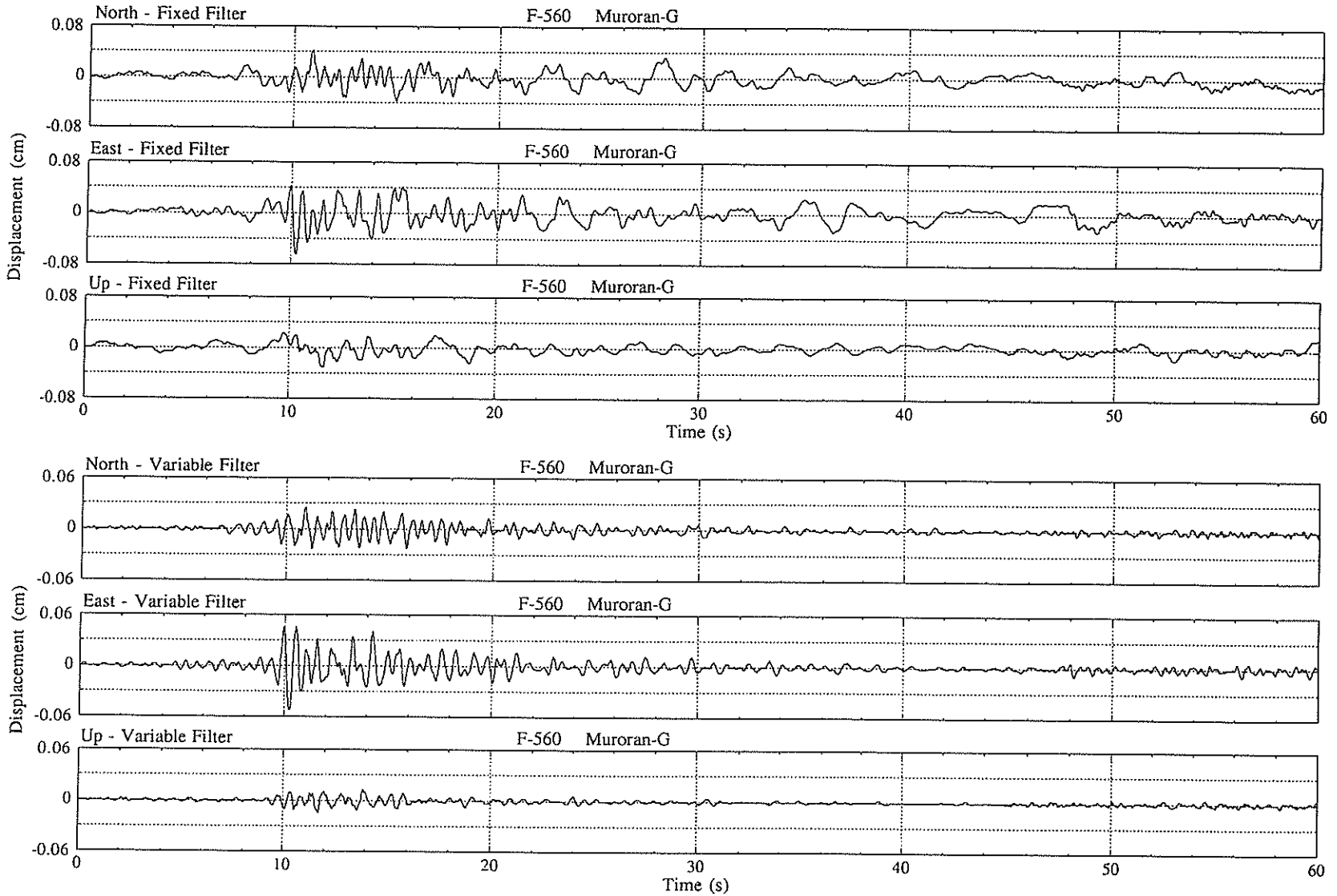
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.799	0.713	0.927	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	6.0	8.8	3.4	9.1
ORIGINAL	8.2	13.1	5.7	13.7
CORRECTED	8.2	12.9	5.6	13.6
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	0.39	0.72	0.26	0.75
VARIABLE FILTER	0.37	0.70	0.22	0.74
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.04	0.06	0.03	0.06
VARIABLE FILTER	0.03	0.05	0.01	0.05

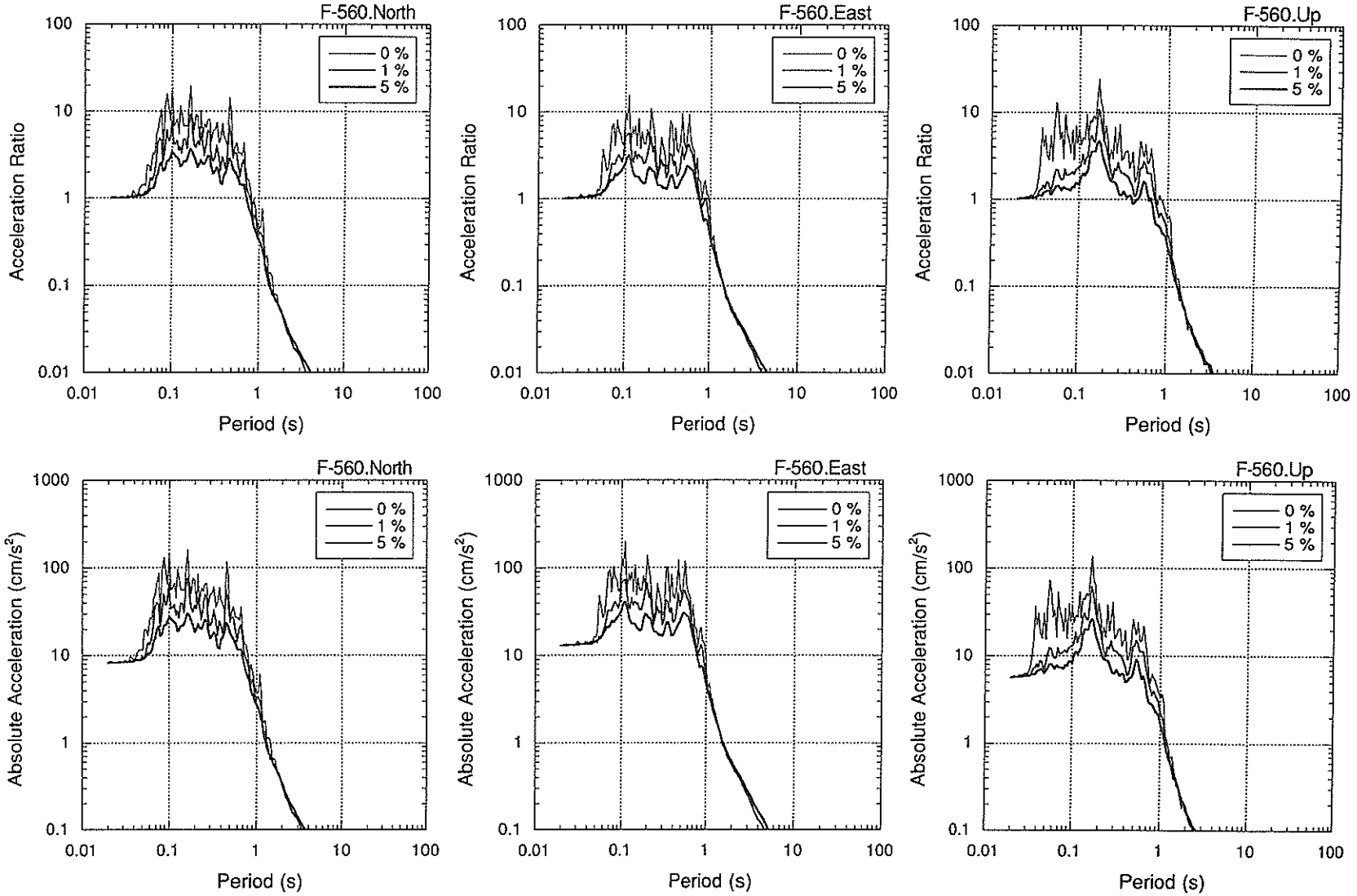
* RESULTANT OF HORIZONTAL COMPONENTS

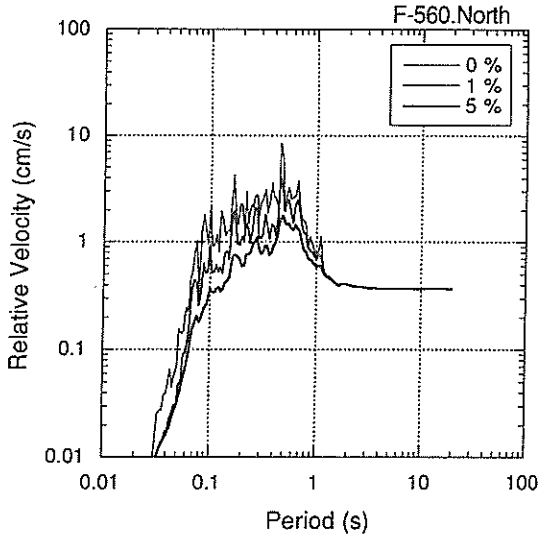

North - Original
F-560 Muroran-G
East - Original
F-560 Muroran-G
Up - Original
F-560 Muroran-G
Acceleration (cm/s2)
14
0
-14
0
10
20
30
40
50
60
Time (s)
North - Corrected
F-560 Muroran-G
East - Corrected
F-560 Muroran-G
Up - Corrected
F-560 Muroran-G
Acceleration (cm/s2)
Time (s)

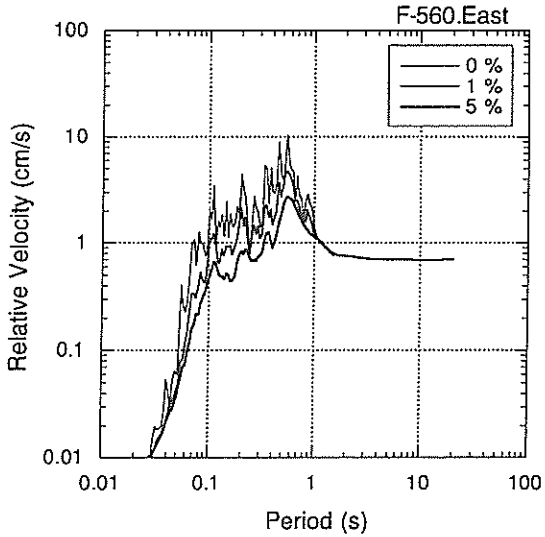

North - Original
F-560 Muroran-G
East - Original
F-560 Muroran-G
Up - Original
F-560 Muroran-G
Acceleration (cm/s^2)
14
0
-14
0
10
20
30
40
50
60
Time (s)
North - SMAC Equivalent
F-560 Muroran-G
East - SMAC Equivalent
F-560 Muroran-G
Up - SMAC Equivalent
F-560 Muroran-G
Acceleration (cm/s^2)
10
0
-10
0
10
20
30
40
50
60
Time (s)

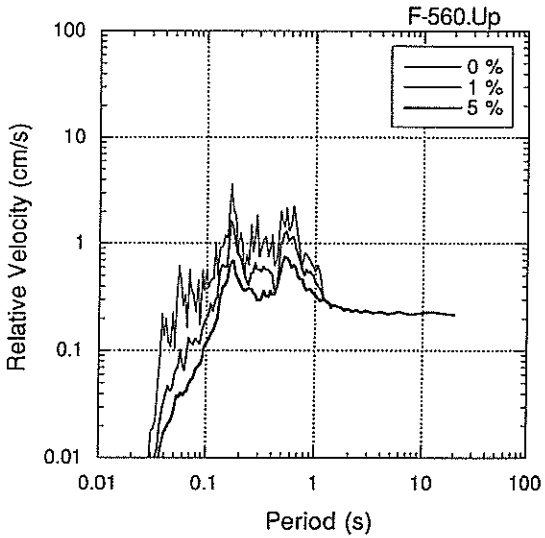

North - Fixed Filter
F-560 Muroran-G
East - Fixed Filter
F-560 Muroran-G
Up - Fixed Filter
F-560 Muroran-G
Velocity (cm/s)
0.8
0
-0.8
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-560 Muroran-G
East - Variable Filter
F-560 Muroran-G
Up - Variable Filter
F-560 Muroran-G
Velocity (cm/s)
Time (s)

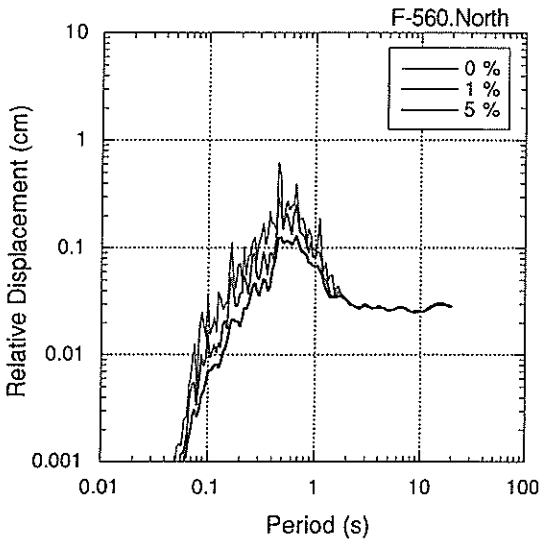

North - Fixed Filter
F-560 Muroran-G
East - Fixed Filter
F-560 Muroran-G
Up - Fixed Filter
F-560 Muroran-G
Displacement (cm)
0.08
0
-0.08
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-560 Muroran-G
East - Variable Filter
F-560 Muroran-G
Up - Variable Filter
F-560 Muroran-G
Displacement (cm)
0.06
0
-0.06
0
10
20
30
40
50
60
Time (s)

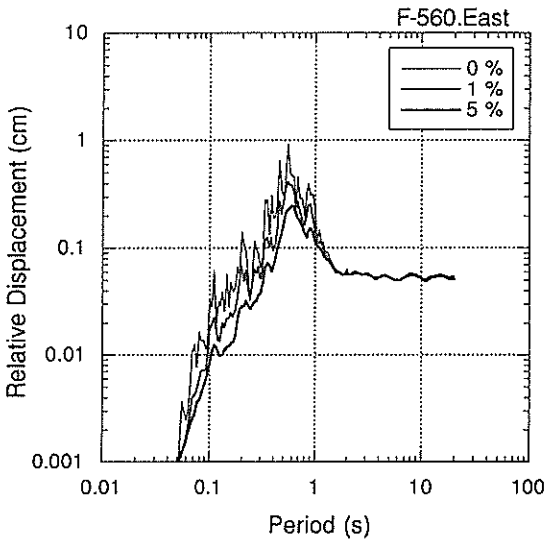

F-560.North
F-560.East
F-560.Up
0 %
1 %
5 %
Acceleration Ratio
Absolute Acceleration (cm/s²)
Period (s)
0.01
0.1
1
10
100
1000

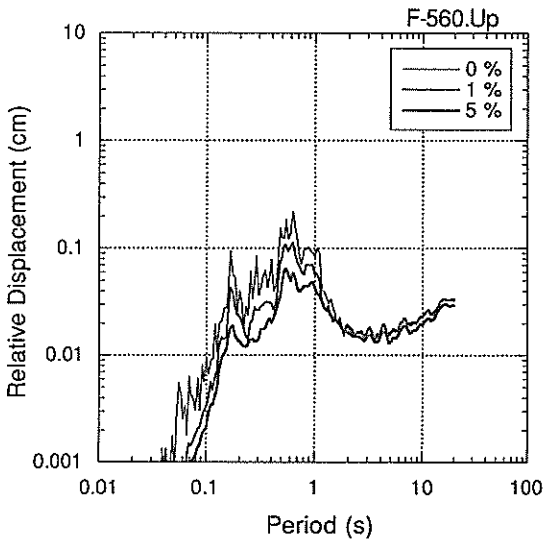

F-560.North
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

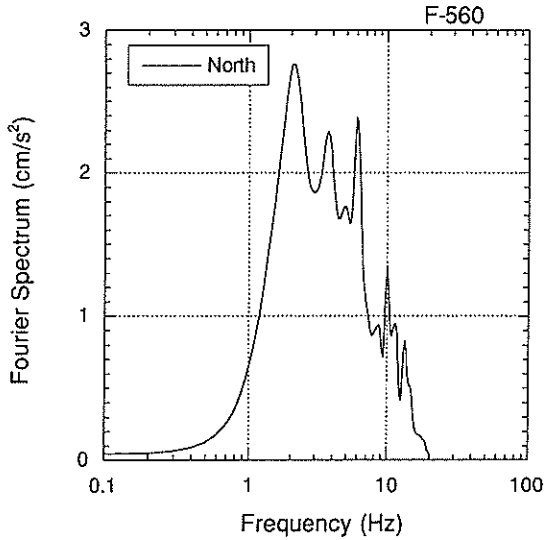

F-560.East
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

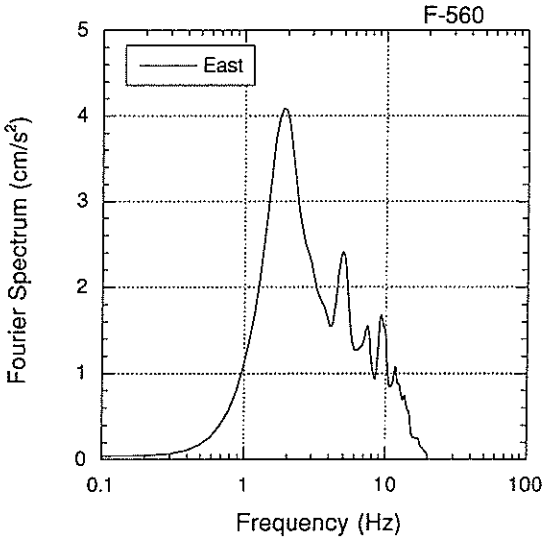

F-560.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

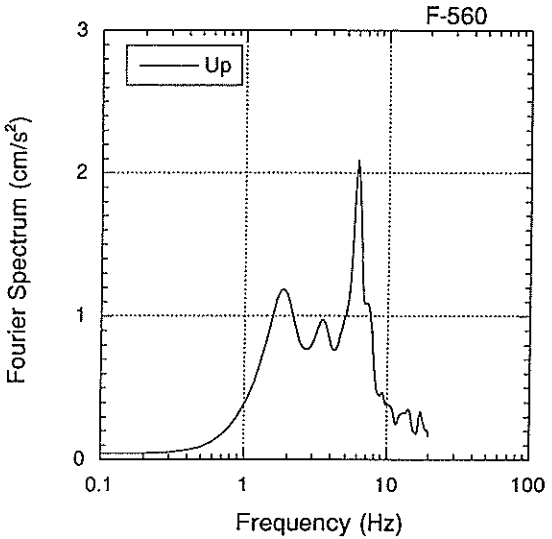

F-560.North
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

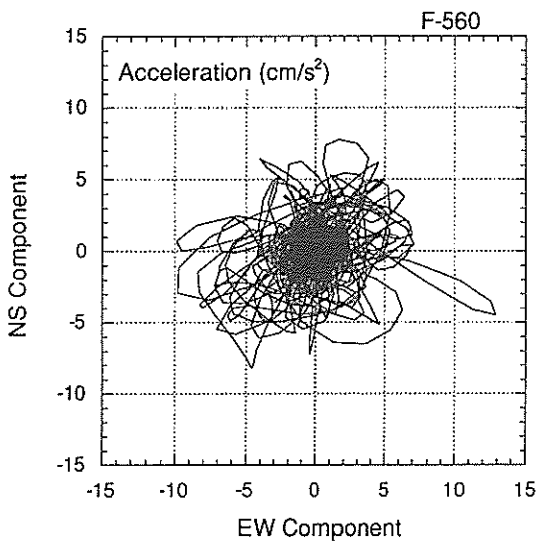

F-560.East
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

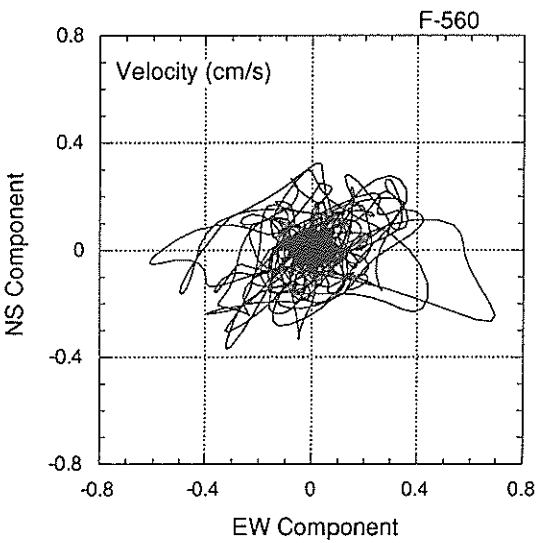

F-560.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

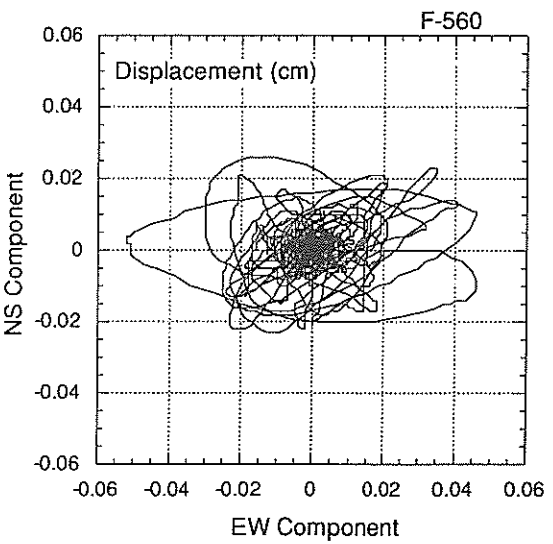

F-560
North
Fourier Spectrum (cm/s²)
Frequency (Hz)
0.1
1
10
100
0
1
2
3


F-560
East
Fourier Spectrum (cm/s²)
Frequency (Hz)
0.1
1
10
100
0
1
2
3
4
5


F-560
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)
0.1
1
10
100
0
1
2
3


F-560
Acceleration (cm/s²)
NS Component
EW Component
-15
-10
-5
0
5
10
15


F-560
Velocity (cm/s)
NS Component
EW Component
-0.8
-0.4
0
0.4
0.8


F-560
Displacement (cm)
NS Component
EW Component
-0.06
-0.04
-0.02
0
0.02
0.04
0.06

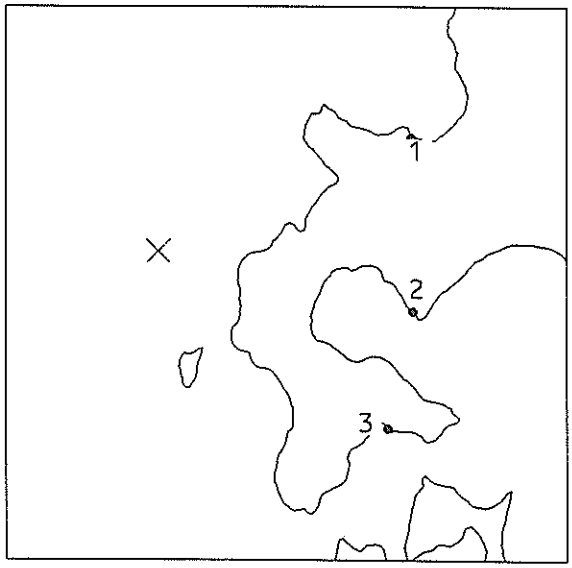
Strong-Motion Earthquake Observation Results of the After Shock at 01:01:05, July 13, 1993

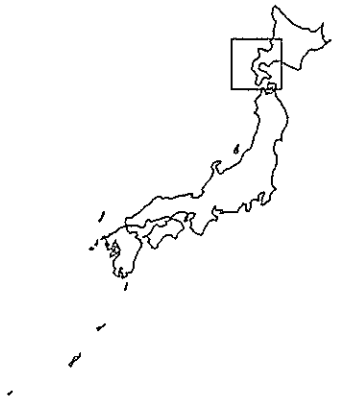
STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

01:01 JULY 13,1993
SW OFF HOKKAIDO
EPICENTER : 42°43.3'N 139°19.9'E
DEPTH : 28.6KM MAGNITUDE : 6.0

JMA INTENSITIES

Ⅲ : MURORAN,OTARU,ESASHI
Ⅱ : HAKODATE,TOMAKOMAI





	STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS)	(EW)	(UD)	DIST. (KM)
1	OTARU-G	ON GROUND	F- 540	8	9	3	147
2	MURORAN-G	ON GROUND	F- 568	29	38	16	139
3	HAKODATE-FR	ON STRUC.	F- 552	9	6	3	155
3	HAKODATE-F	ON GROUND	F- 548	8	7	4	155
3	HAKODATE-FB	IN GROUND	F- 544	3	3	3	155

Results of Preliminary Analyses of the After Shock at 01:01:05, July 13, 1993

RECORD NUMBER : F-540

STATION : OTARU-G

EARTHQUAKE DATA

****

DATE AND TIME 1: 1 JULY13, 1993

LOCATION OF HYPOCENTER

EPICENTRAL REGION SW OFF HOKKAIDO

LATITUDE 42°43.3' N

LONGITUDE 139°19.9' E

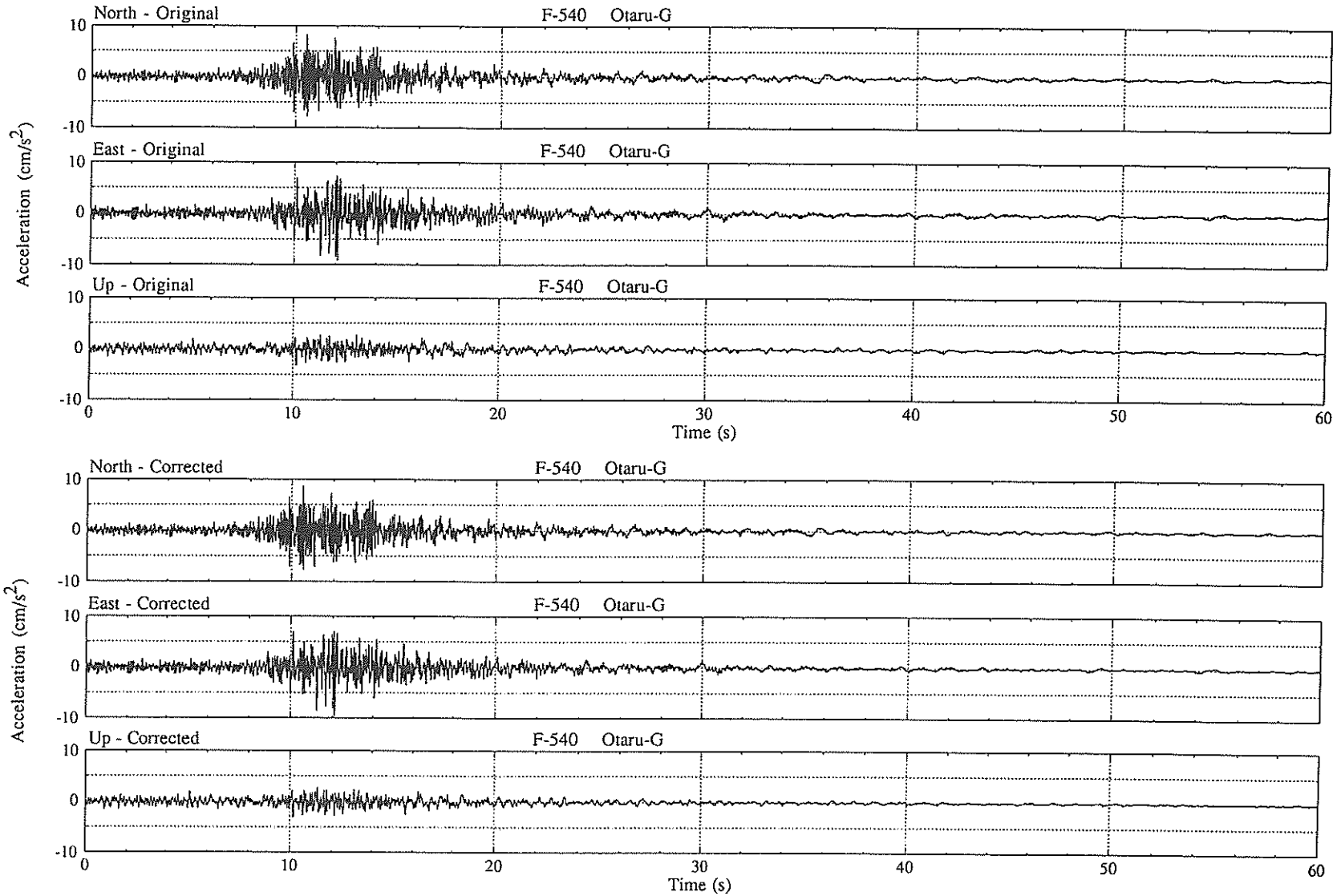
DEPTH 28.6KM

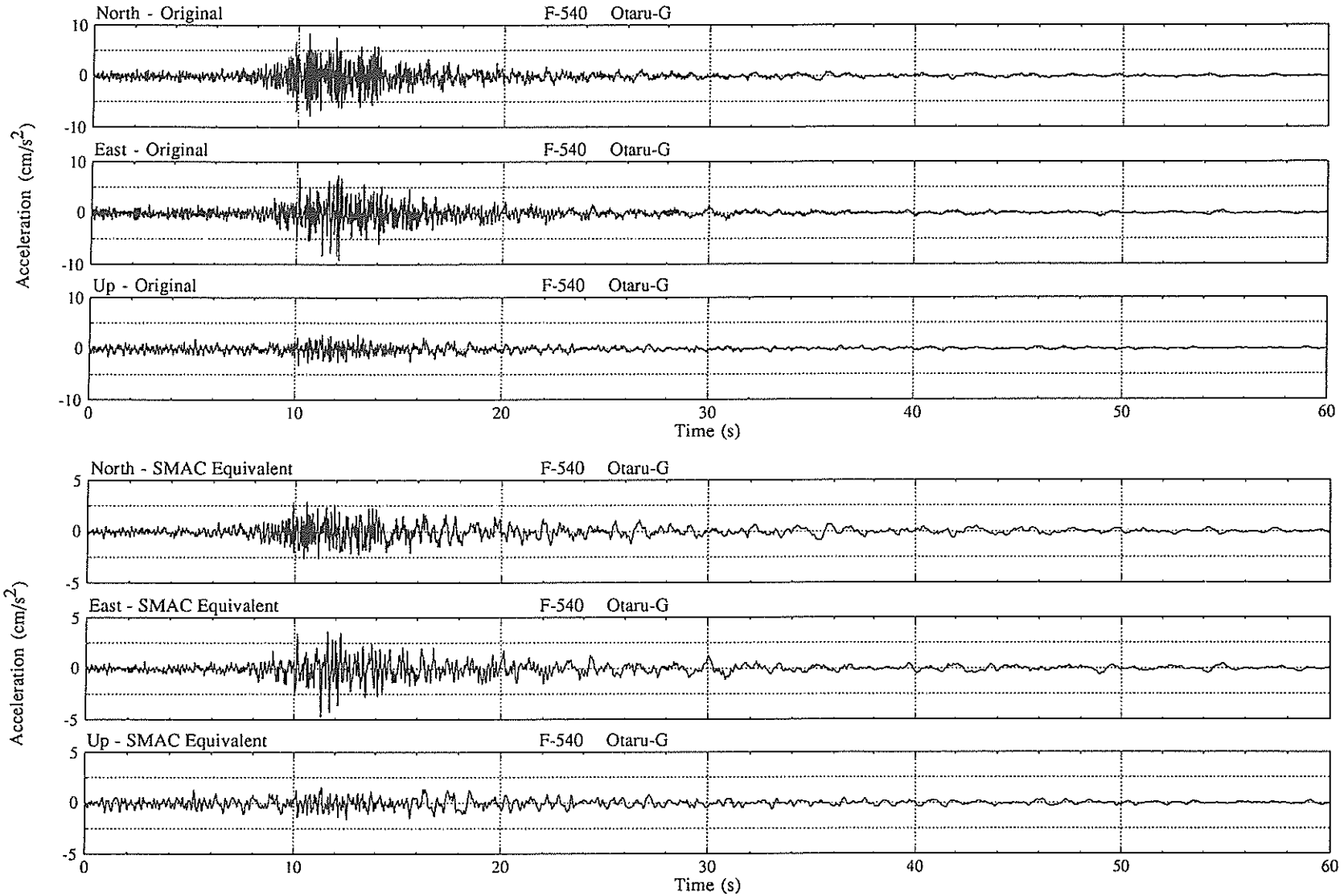
JMA MAGNITUDE 6.0

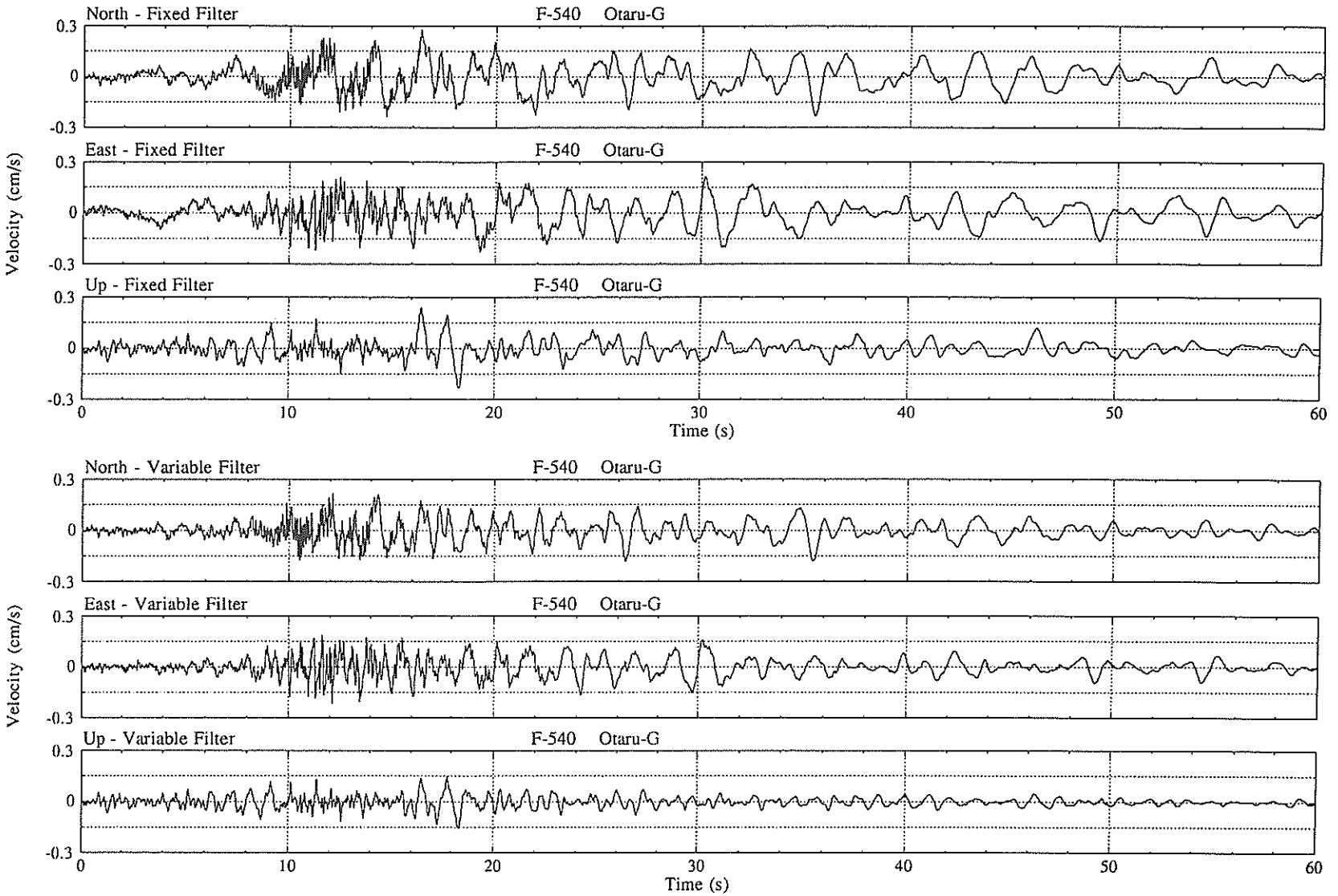
****

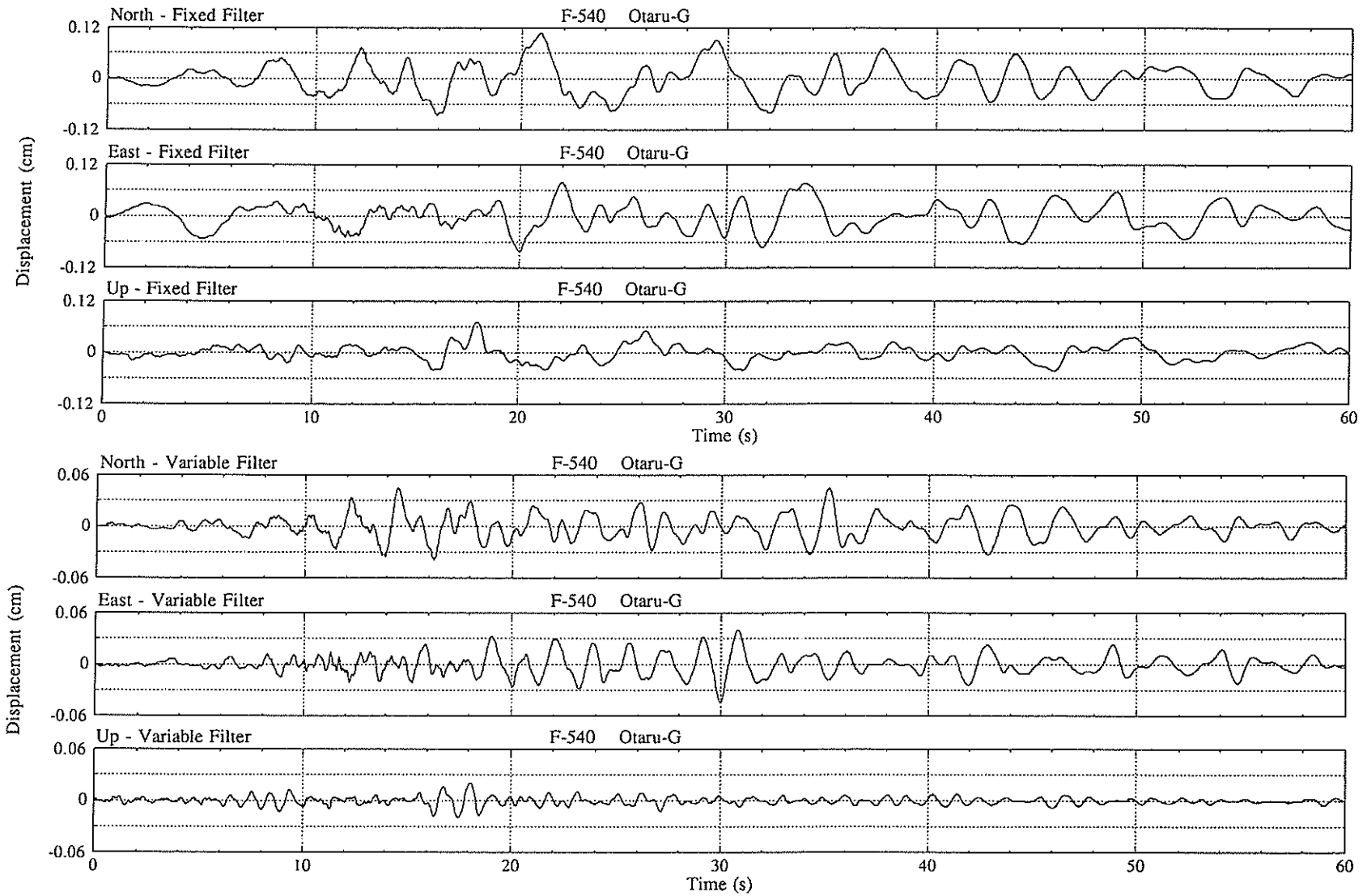
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.347	0.390	0.634	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	2.9	4.7	1.6	4.7
ORIGINAL	8.4	9.1	3.1	10.4
CORRECTED	8.6	9.6	3.1	10.8
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	0.28	0.23	0.24	0.30
VARIABLE FILTER	0.22	0.22	0.15	0.31
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.11	0.08	0.07	0.11
VARIABLE FILTER	0.05	0.04	0.02	0.05

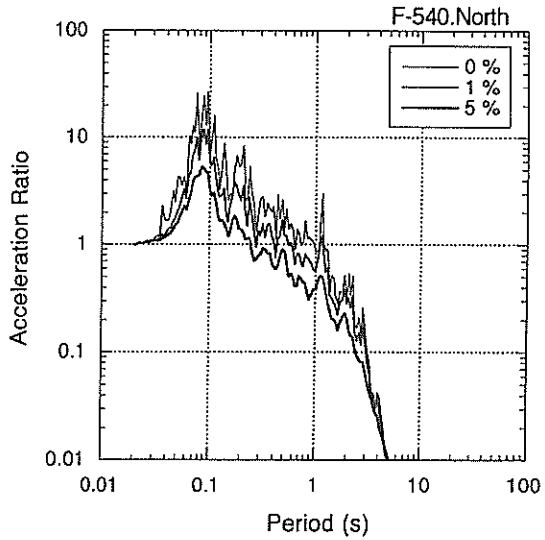
* RESULTANT OF HORIZONTAL COMPONENTS

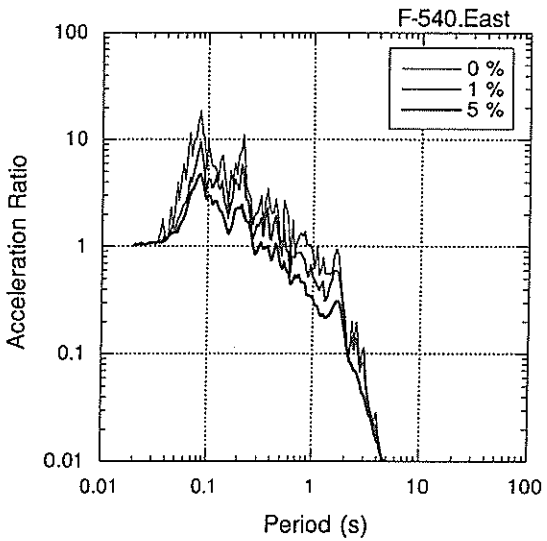

North - Original
F-540 Otaru-G
East - Original
F-540 Otaru-G
Up - Original
F-540 Otaru-G
Acceleration (cm/s2)
Time (s)
North - Corrected
F-540 Otaru-G
East - Corrected
F-540 Otaru-G
Up - Corrected
F-540 Otaru-G
Acceleration (cm/s2)
Time (s)

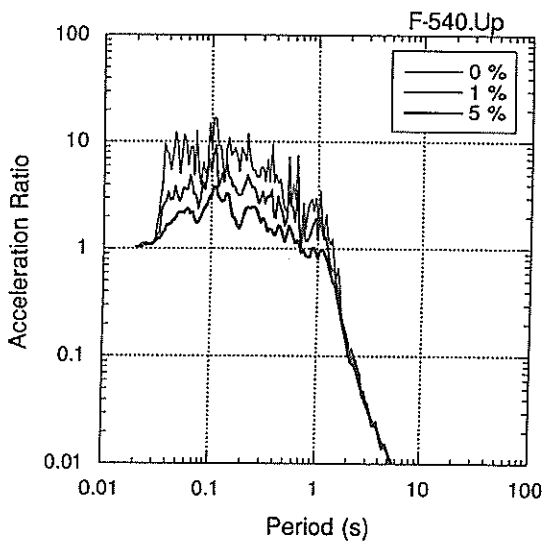

North - Original
F-540 Otaru-G
East - Original
F-540 Otaru-G
Up - Original
F-540 Otaru-G
Acceleration (cm/s^2)
10
0
-10
0
10
20
30
40
50
60
Time (s)
North - SMAC Equivalent
F-540 Otaru-G
East - SMAC Equivalent
F-540 Otaru-G
Up - SMAC Equivalent
F-540 Otaru-G
Acceleration (cm/s^2)
5
0
-5
0
10
20
30
40
50
60
Time (s)

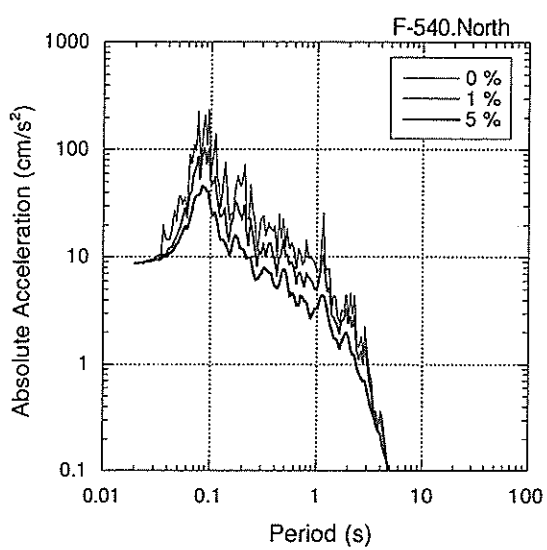

North - Fixed Filter
F-540 Otaru-G
East - Fixed Filter
F-540 Otaru-G
Up - Fixed Filter
F-540 Otaru-G
Velocity (cm/s)
0.3
0
-0.3
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-540 Otaru-G
East - Variable Filter
F-540 Otaru-G
Up - Variable Filter
F-540 Otaru-G
Velocity (cm/s)
Time (s)

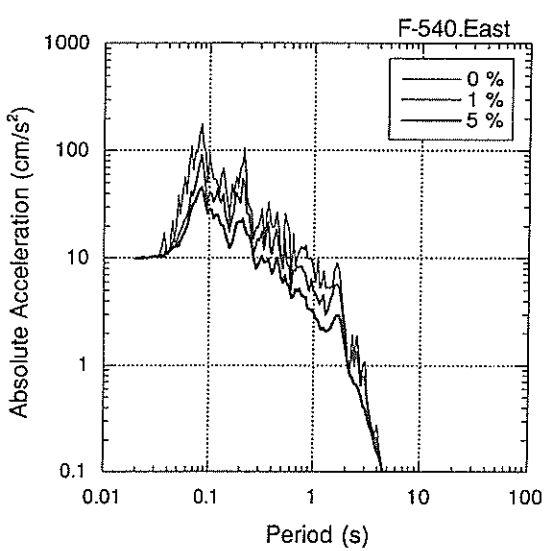

North - Fixed Filter
F-540 Otaru-G
East - Fixed Filter
F-540 Otaru-G
Up - Fixed Filter
F-540 Otaru-G
Displacement (cm)
0.12
0
-0.12
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-540 Otaru-G
East - Variable Filter
F-540 Otaru-G
Up - Variable Filter
F-540 Otaru-G
Displacement (cm)
0.06
0
-0.06
Time (s)

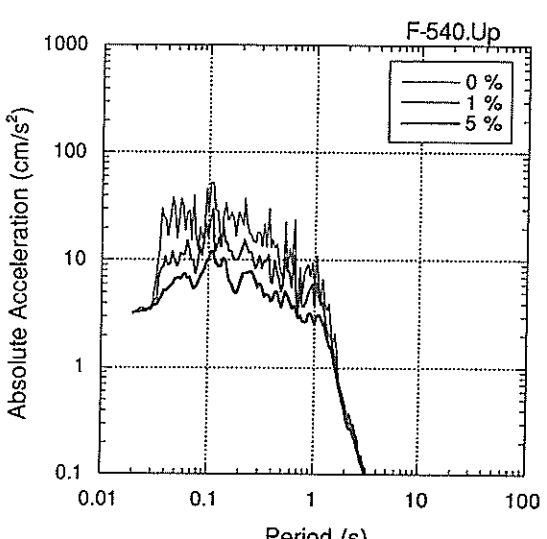

F-540.North
0 %
1 %
5 %
Acceleration Ratio
Period (s)

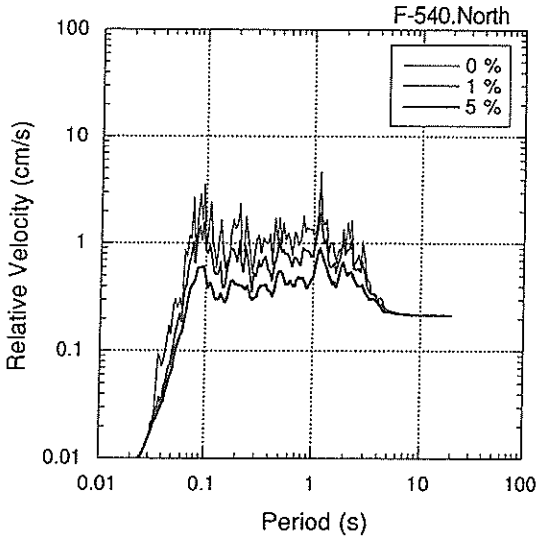

F-540.East
0 %
1 %
5 %
Acceleration Ratio
Period (s)

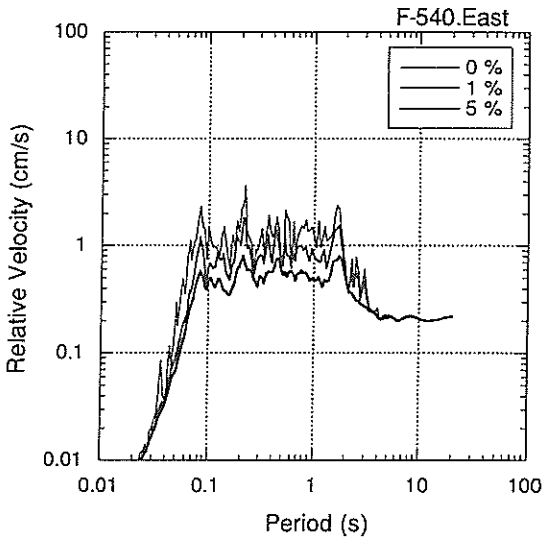

F-540.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)

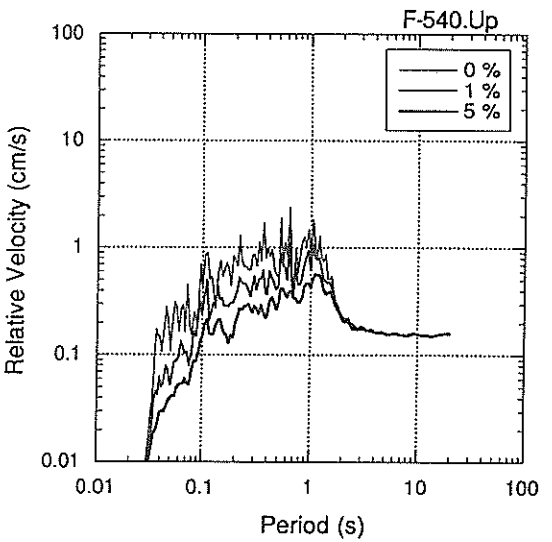

F-540.North
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

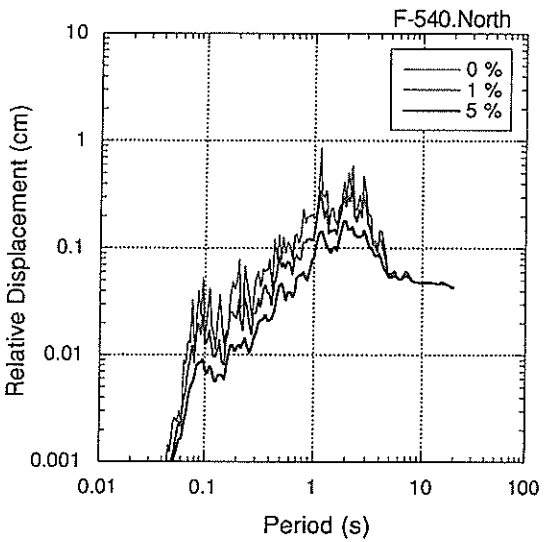

F-540.East
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

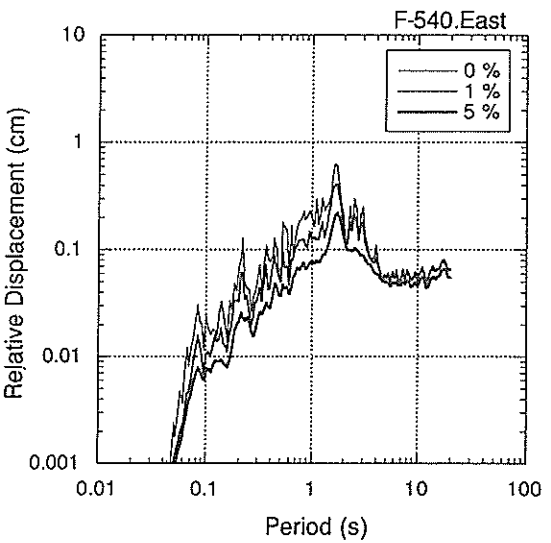

F-540.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

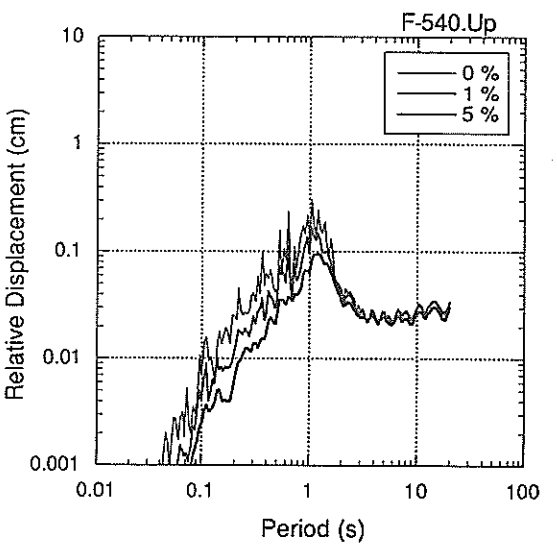

F-540.North
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

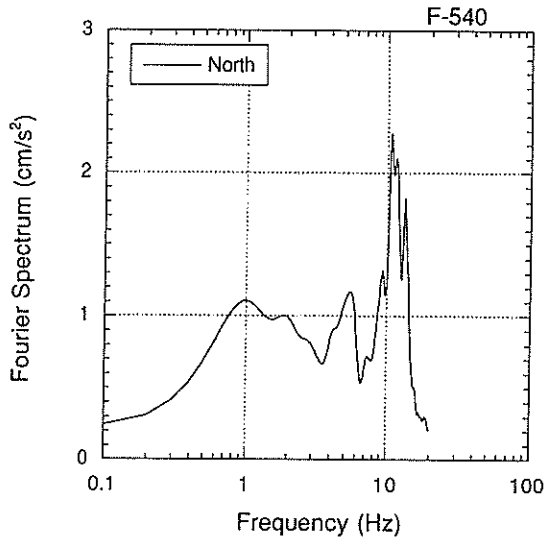

F-540.East
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

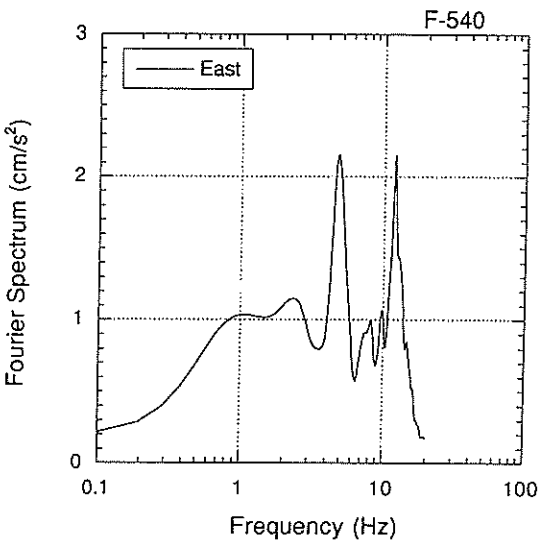

F-540.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

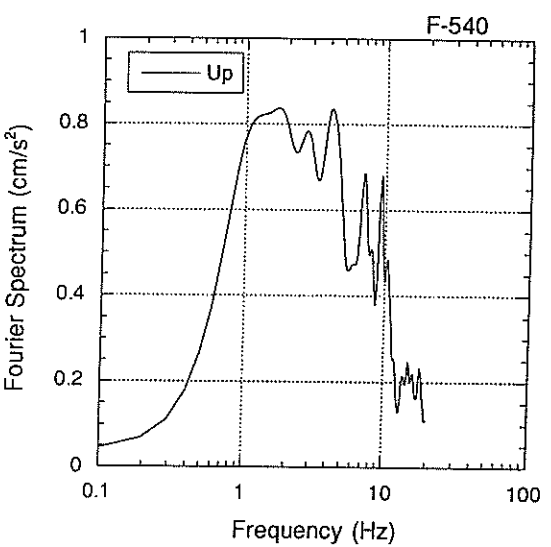

F-540.North
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

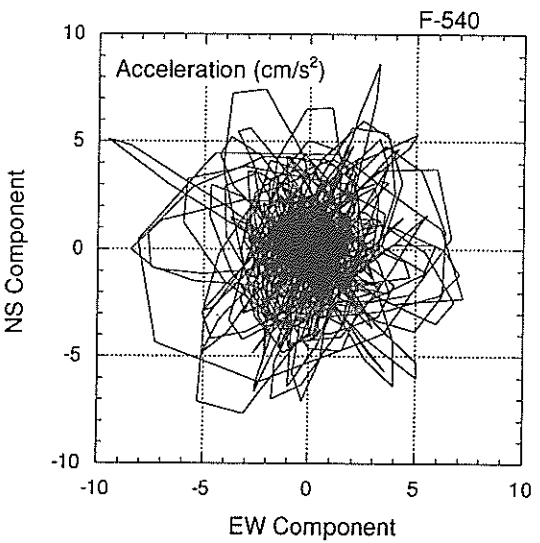

F-540.East
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

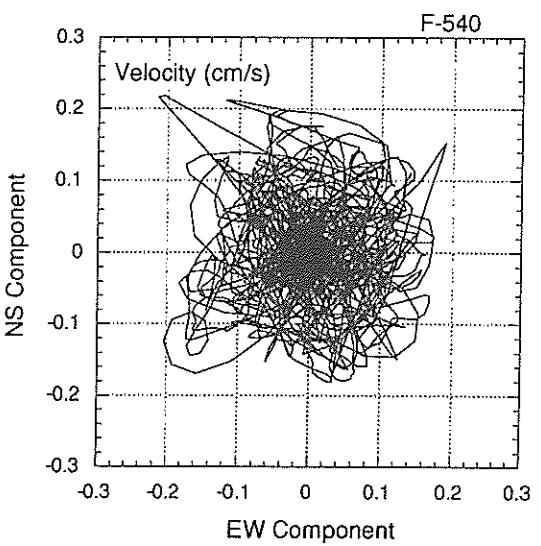

F-540.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

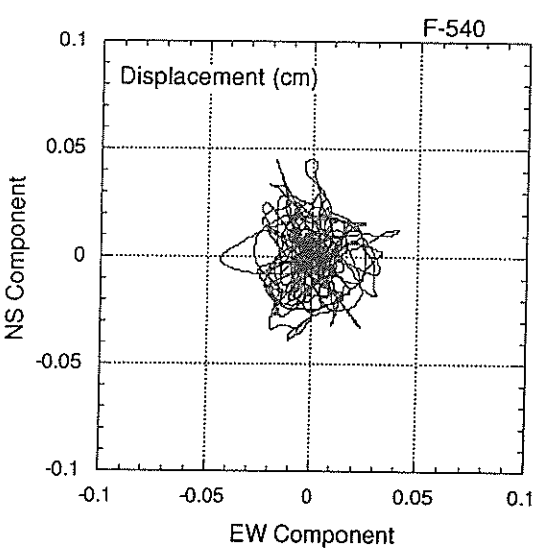

F-540
North
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-540
East
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-540
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-540
Acceleration (cm/s²)
NS Component
EW Component


F-540
Velocity (cm/s)
NS Component
EW Component


F-540
Displacement (cm)
NS Component
EW Component

RECORD NUMBER : F-544

STATION : HAKODATE-FB

EARTHQUAKE DATA

****

DATE AND TIME 1: 1 JULY13, 1993

LOCATION OF HYPOCENTER

EPICENTRAL REGION SW OFF HOKKAIDO

LATITUDE 42°43.3' N

LONGITUDE 139°19.9' E

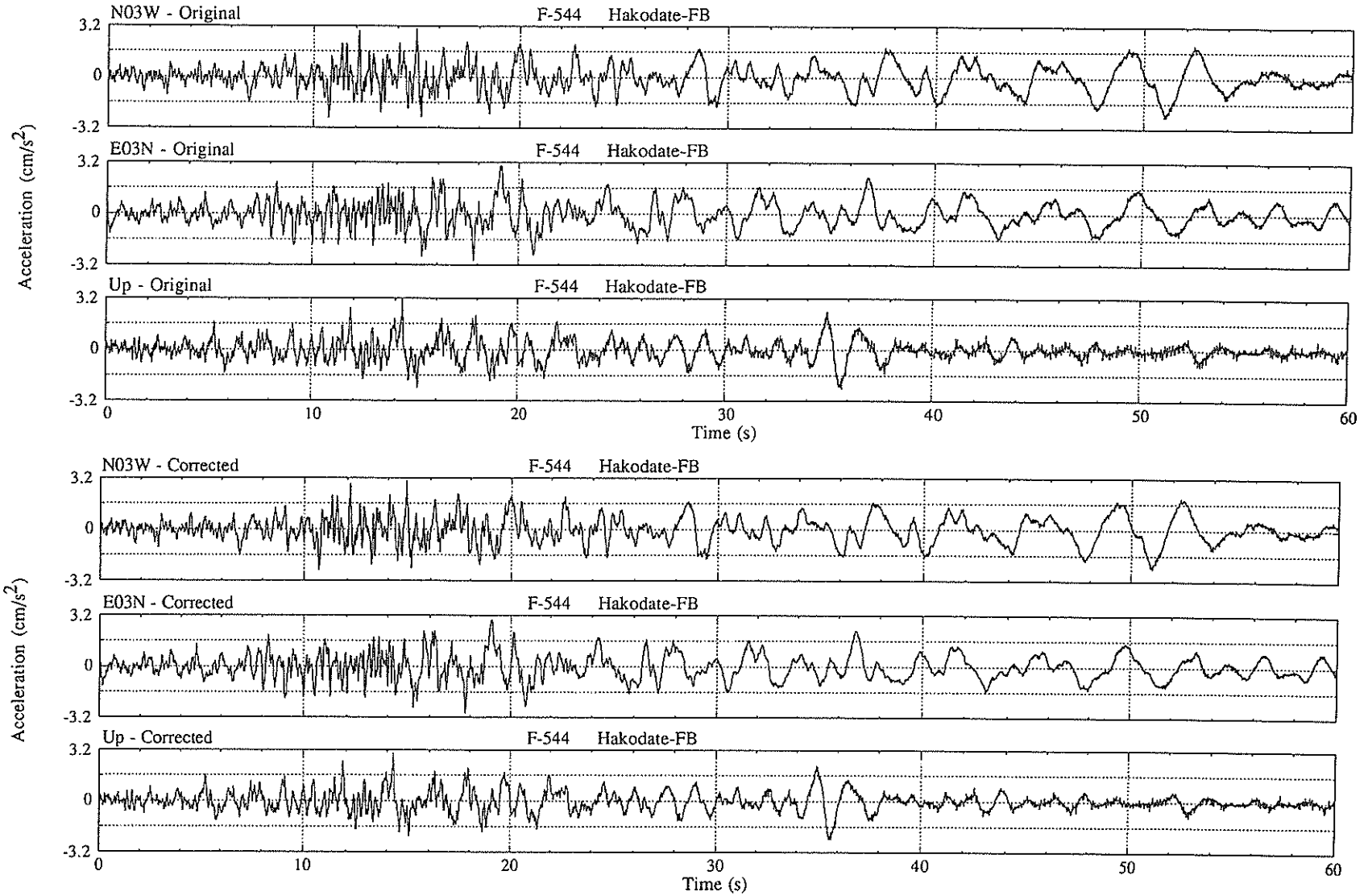
DEPTH 28.6KM

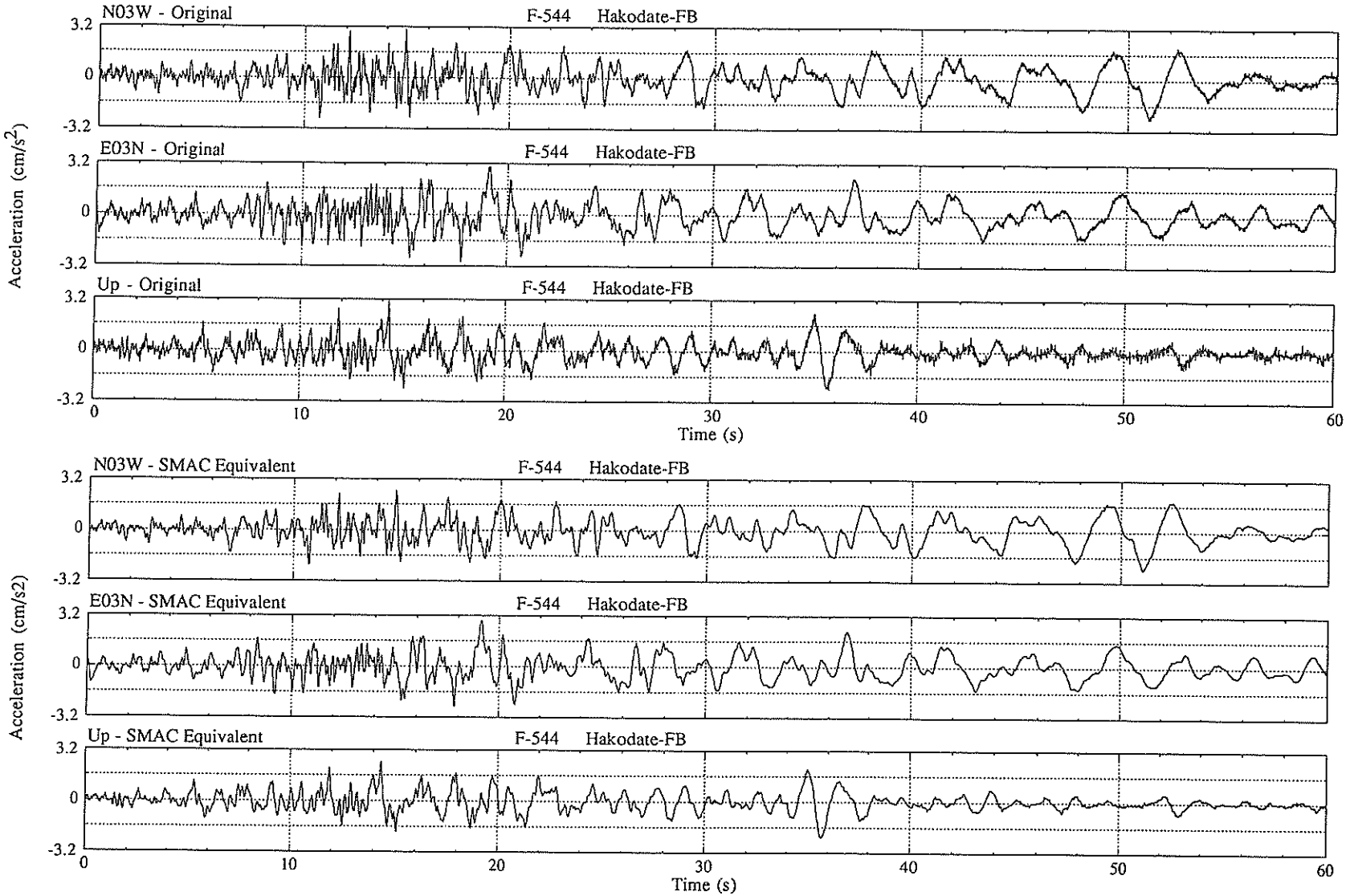
JMA MAGNITUDE 6.0

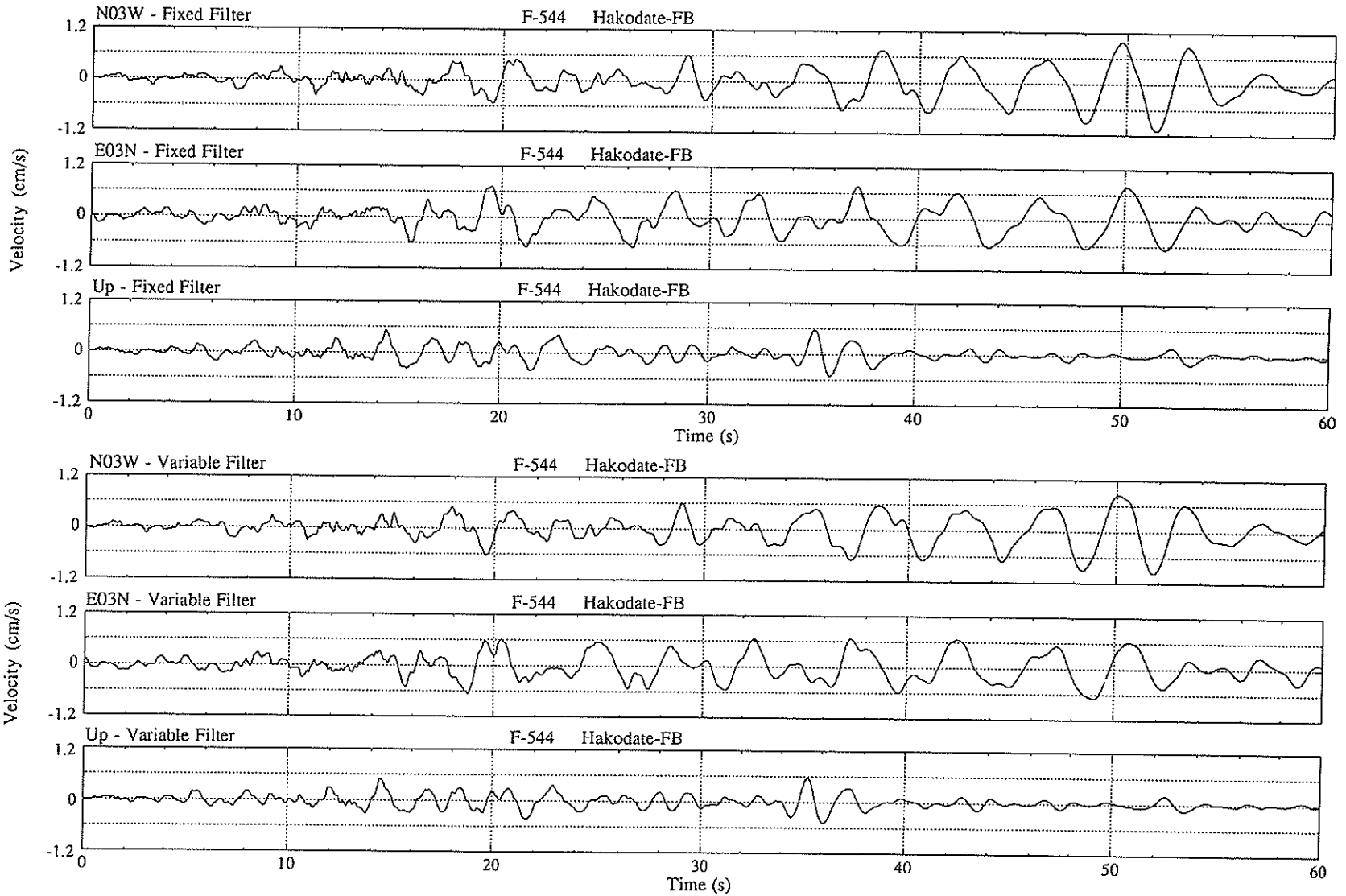
****

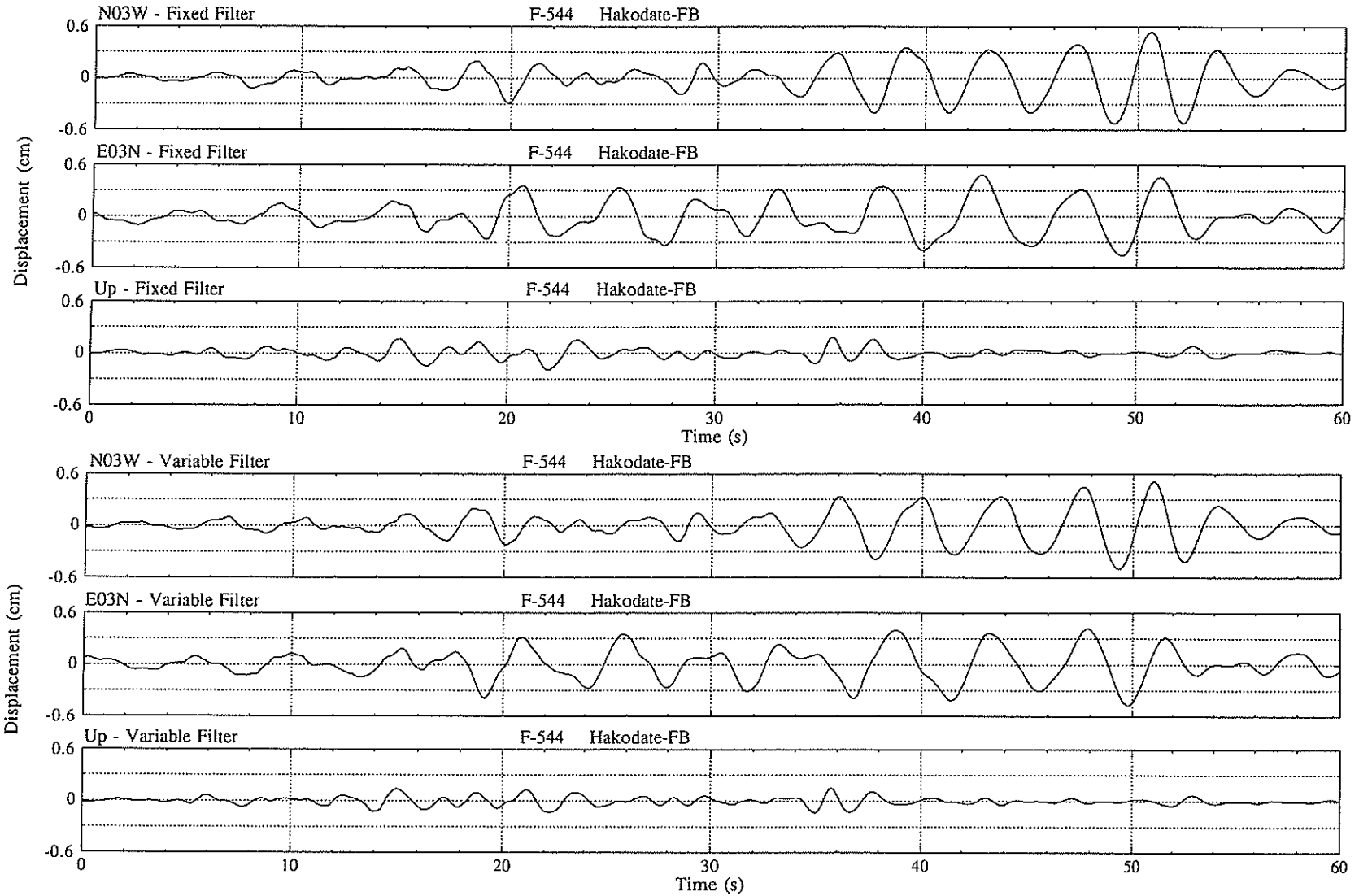
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.146	0.121	0.207	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	2.5	2.9	2.5	3.1
ORIGINAL	3.0	3.0	3.1	3.2
CORRECTED	3.0	2.9	3.0	3.2
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	1.09	0.80	0.58	1.19
VARIABLE FILTER	0.97	0.69	0.58	1.05
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.54	0.48	0.19	0.65
VARIABLE FILTER	0.51	0.47	0.15	0.63

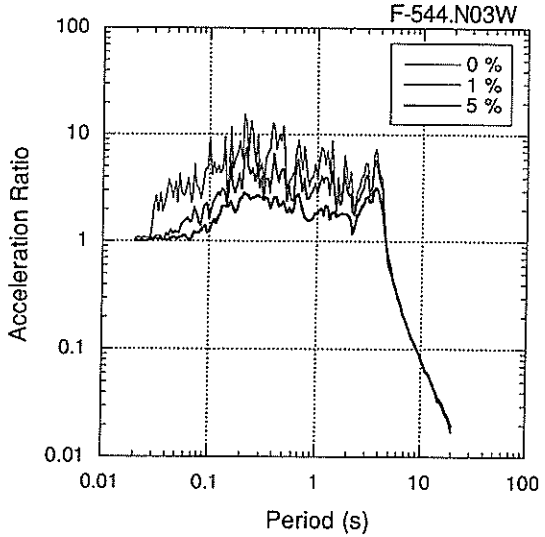
* RESULTANT OF HORIZONTAL COMPONENTS

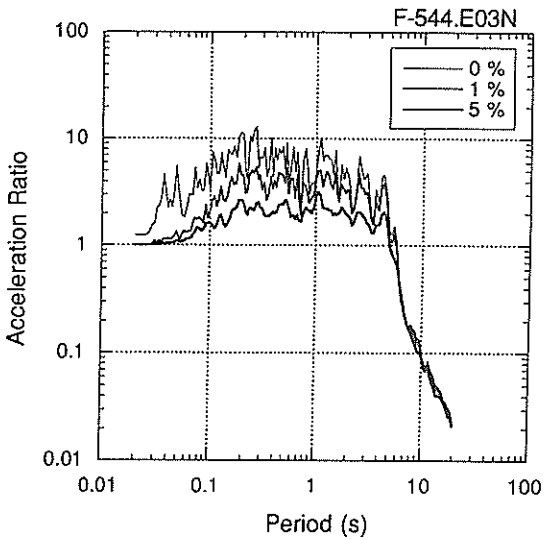

N03W - Original
F-544 Hakodate-FB
E03N - Original
F-544 Hakodate-FB
Up - Original
F-544 Hakodate-FB
Acceleration (cm/s²)
3.2
0
-3.2
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-544 Hakodate-FB
E03N - Corrected
F-544 Hakodate-FB
Up - Corrected
F-544 Hakodate-FB
Acceleration (cm/s²)
Time (s)

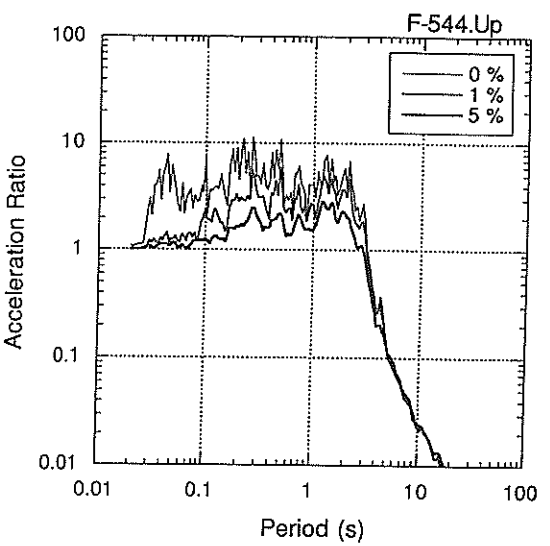

N03W - Original
F-544 Hakodate-FB
E03N - Original
F-544 Hakodate-FB
Up - Original
F-544 Hakodate-FB
Acceleration (cm/s2)
3.2
0
-3.2
0
10
20
30
40
50
60
Time (s)
N03W - SMAC Equivalent
F-544 Hakodate-FB
E03N - SMAC Equivalent
F-544 Hakodate-FB
Up - SMAC Equivalent
F-544 Hakodate-FB
Acceleration (cm/s2)
Time (s)

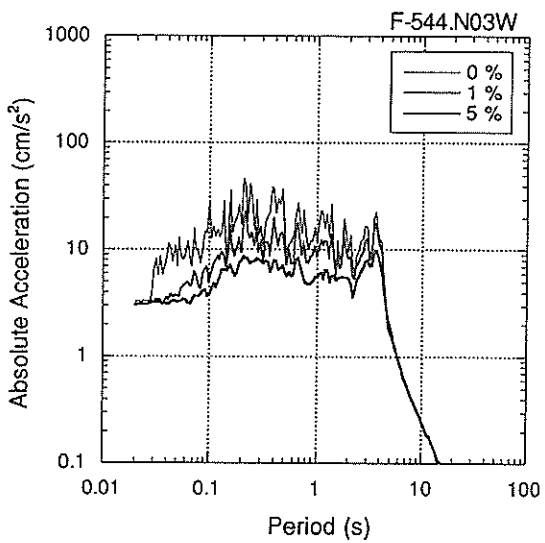

N03W - Fixed Filter
F-544 Hakodate-FB
E03N - Fixed Filter
F-544 Hakodate-FB
Up - Fixed Filter
F-544 Hakodate-FB
Velocity (cm/s)
1.2
0
-1.2
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-544 Hakodate-FB
E03N - Variable Filter
F-544 Hakodate-FB
Up - Variable Filter
F-544 Hakodate-FB
Velocity (cm/s)
Time (s)

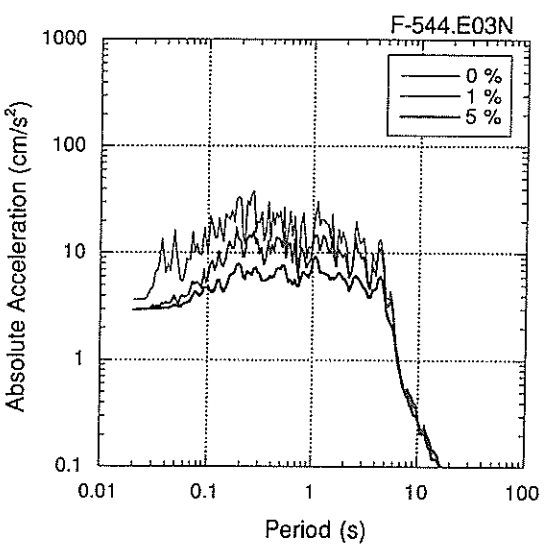

N03W - Fixed Filter
F-544 Hakodate-FB
E03N - Fixed Filter
F-544 Hakodate-FB
Up - Fixed Filter
F-544 Hakodate-FB
Displacement (cm)
0.6
0
-0.6
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-544 Hakodate-FB
E03N - Variable Filter
F-544 Hakodate-FB
Up - Variable Filter
F-544 Hakodate-FB
Displacement (cm)
Time (s)

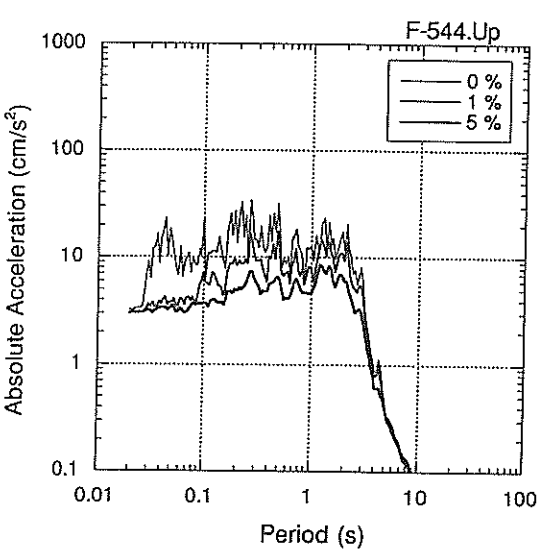

F-544.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)

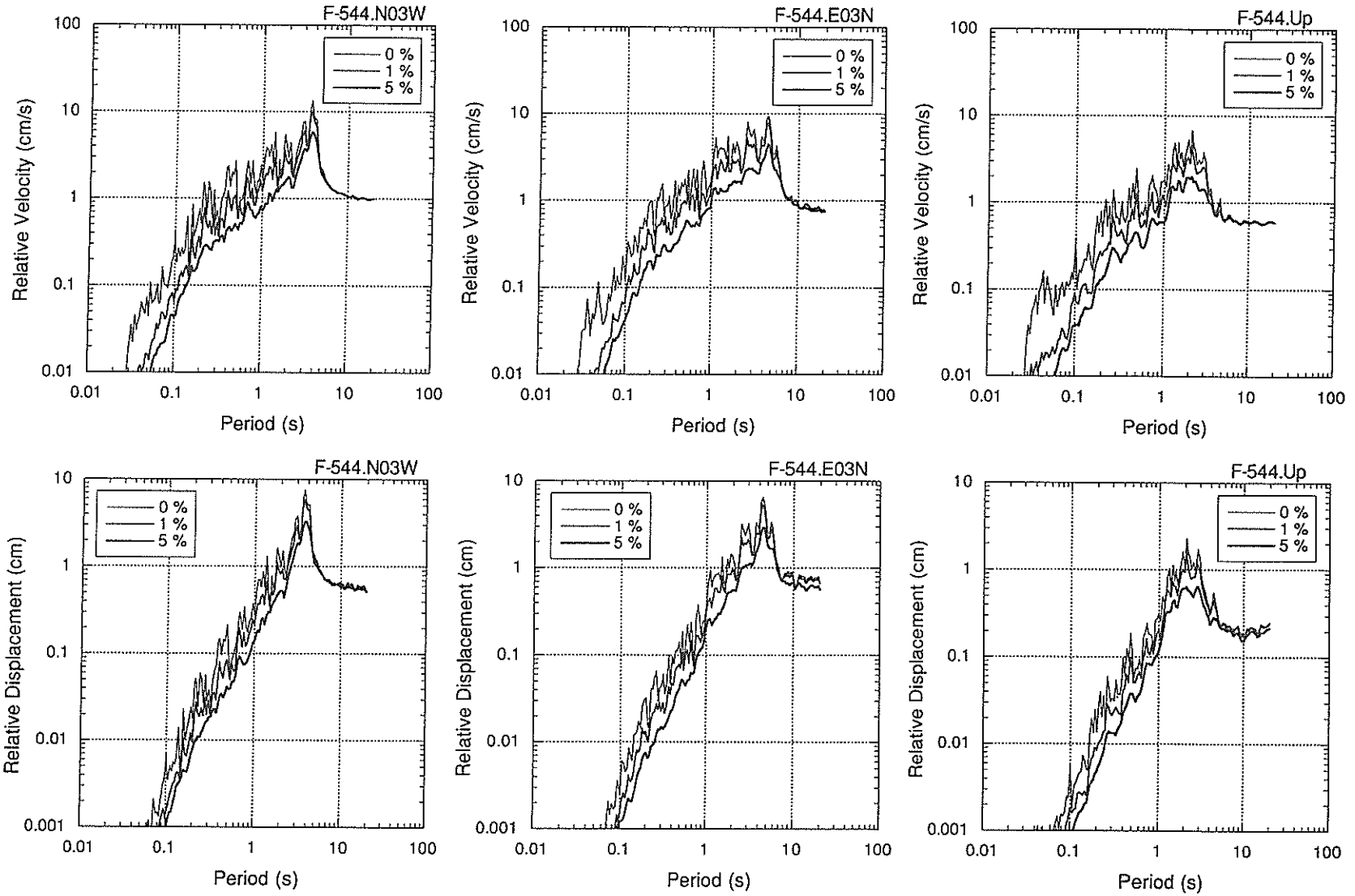

F-544.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)

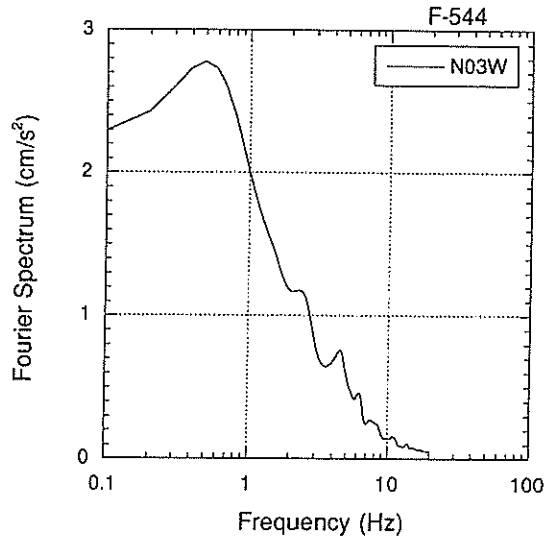

F-544.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)

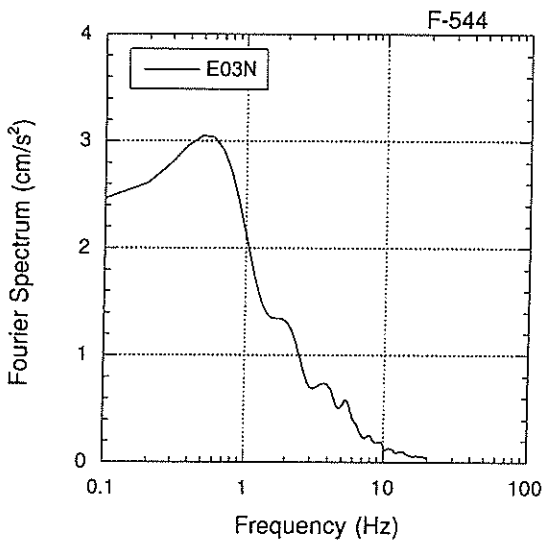

F-544.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

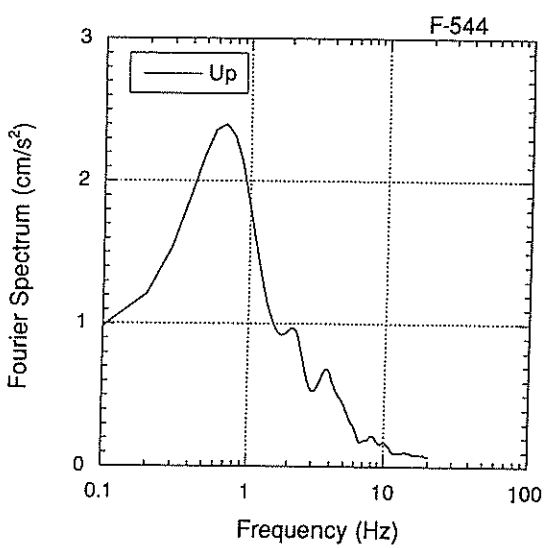

F-544.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

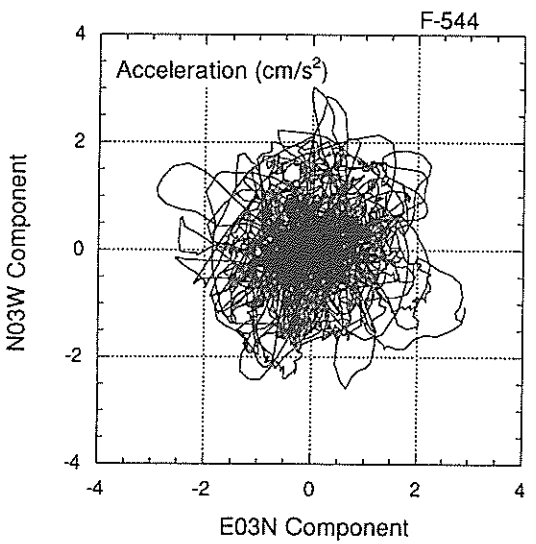

F-544.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

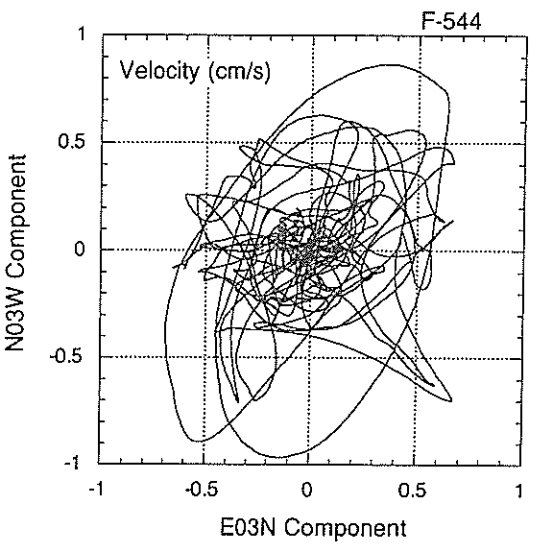

F-544.N03W
F-544.E03N
F-544.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

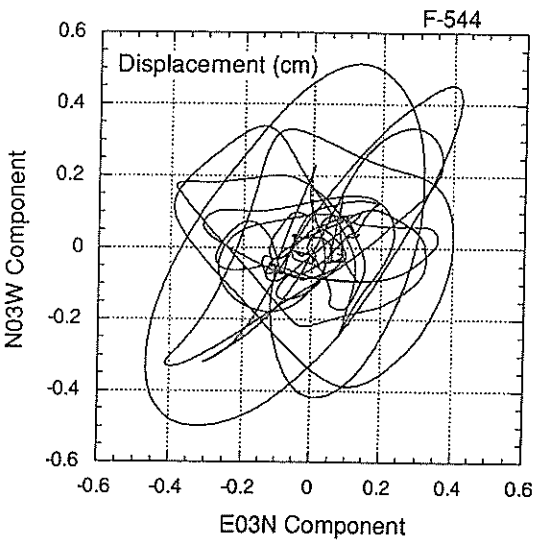

F-544
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-544
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-544
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-544
Acceleration (cm/s²)
N03W Component
E03N Component


F-544
Velocity (cm/s)
N03W Component
E03N Component


F-544
Displacement (cm)
N03W Component
E03N Component

RECORD NUMBER : F-548

STATION : HAKODATE-F

EARTHQUAKE DATA

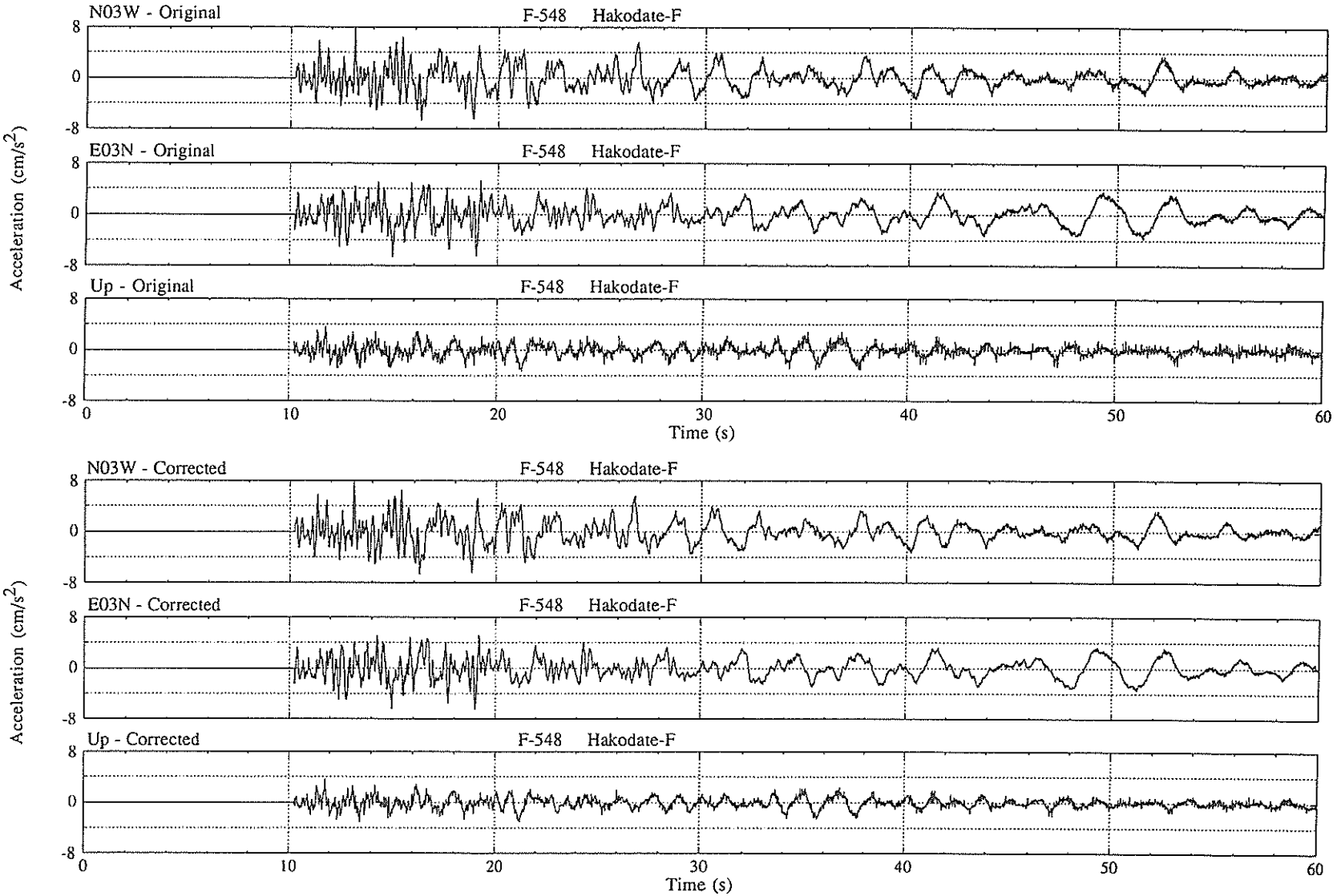
****

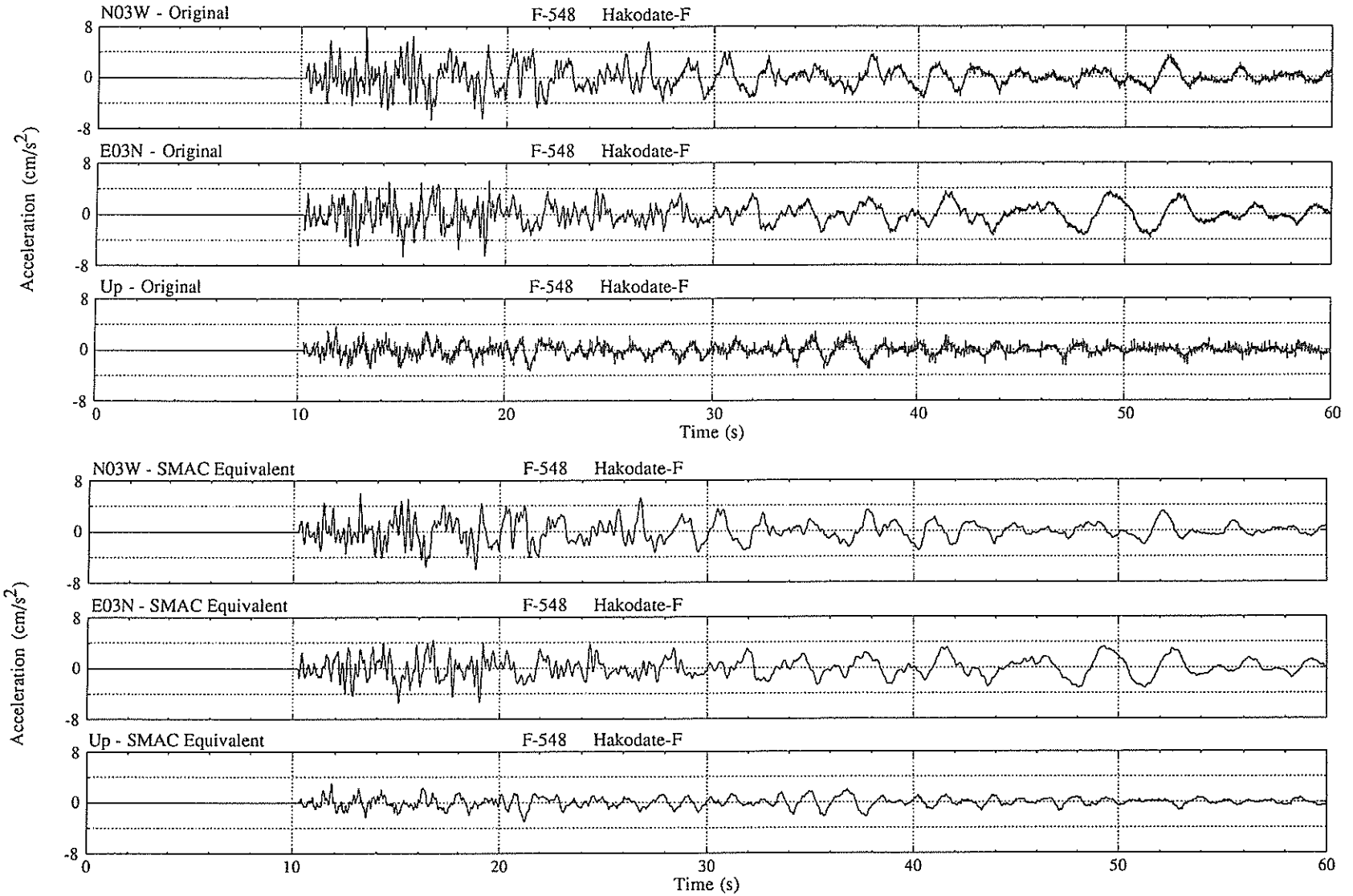
DATE AND TIME	1: 1 JULY13, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°43.9' N
LONGITUDE	139°19.9' E
DEPTH	28.6KM
JMA MAGNITUDE	6.0

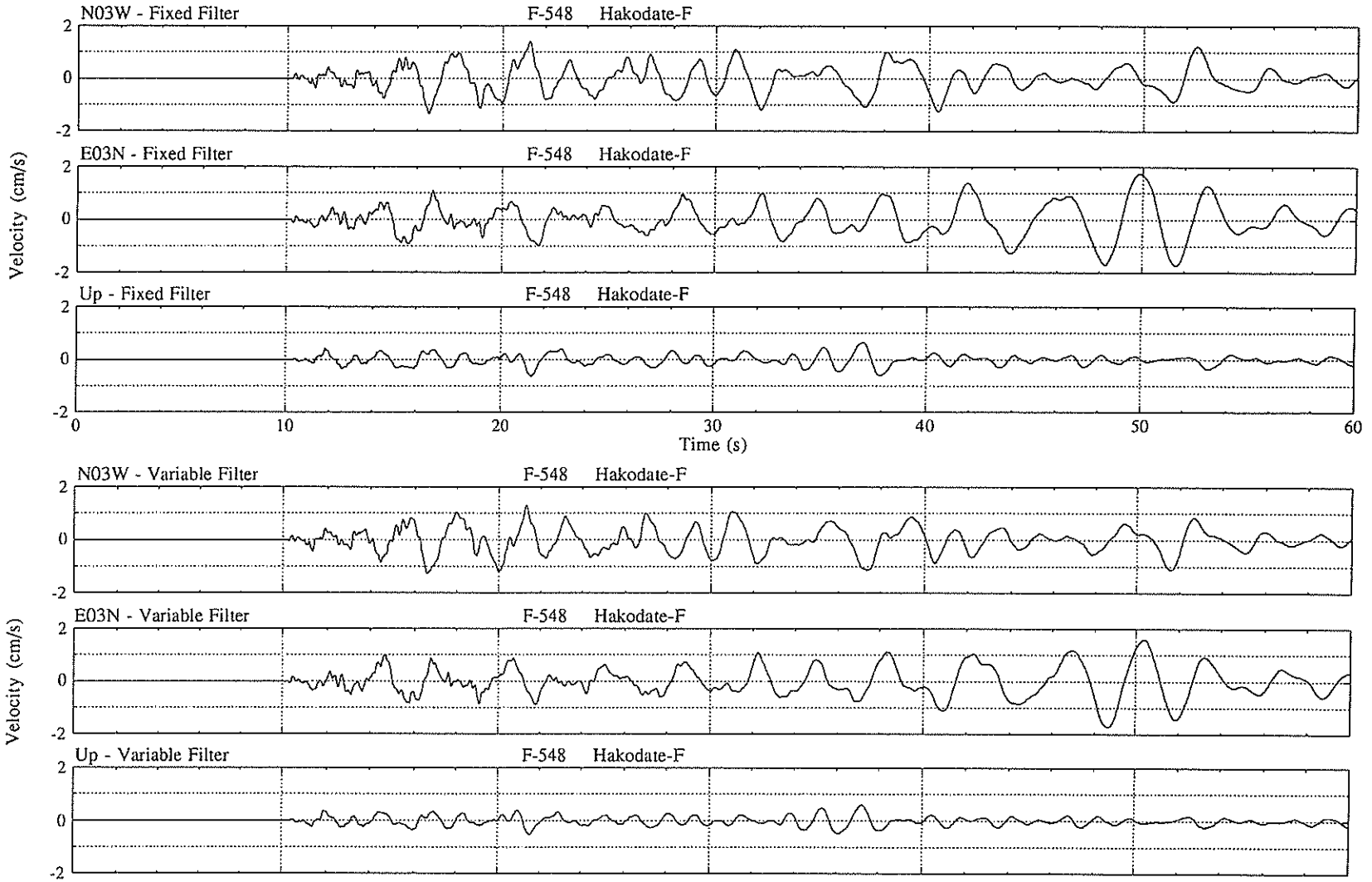
****

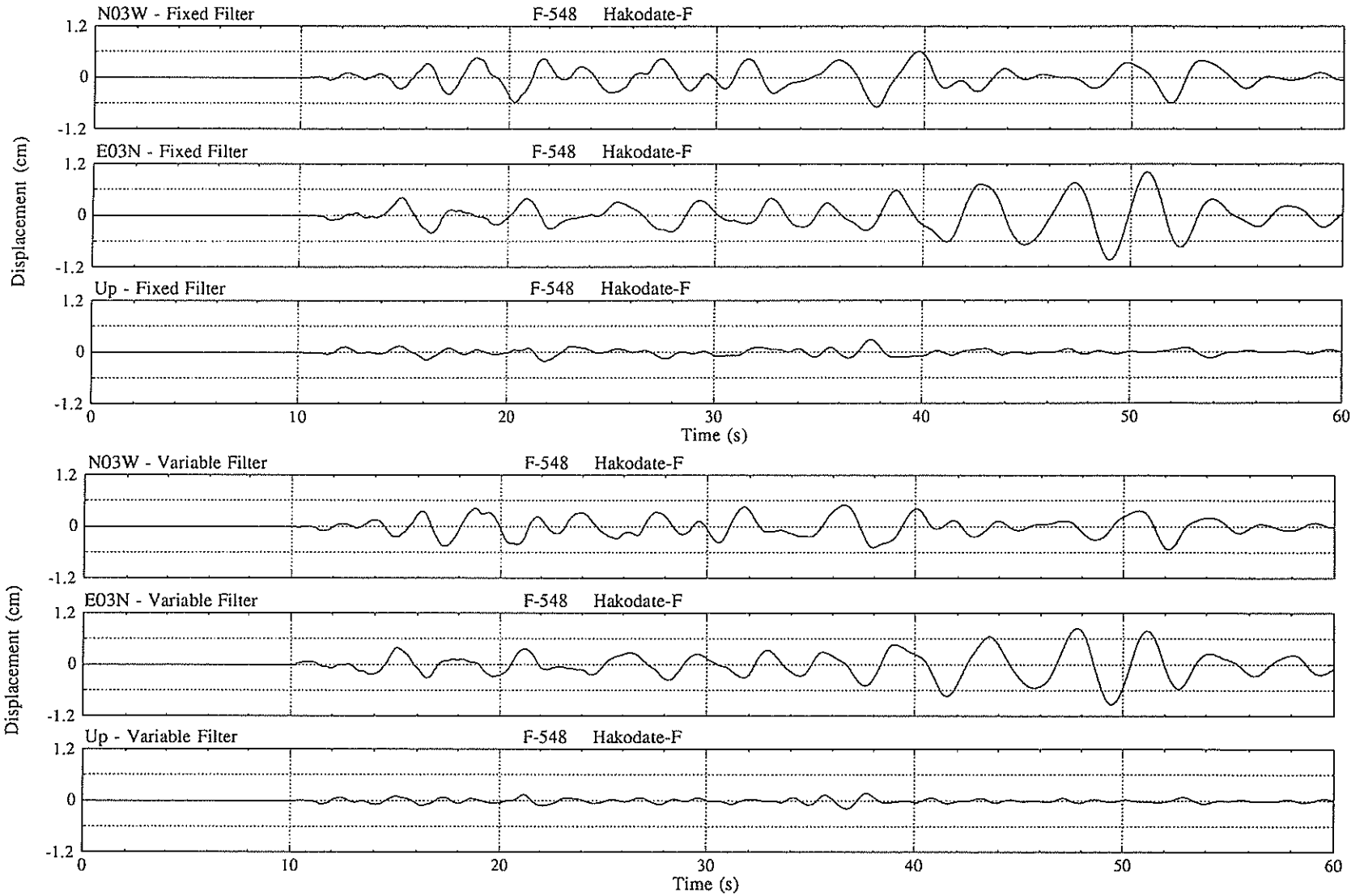
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.152	0.146	0.262	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	6.1	5.4	3.0	6.4
ORIGINAL	7.8	6.6	3.7	8.2
CORRECTED	7.9	6.5	3.7	8.0
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	1.41	1.76	0.67	1.88
VARIABLE FILTER	1.31	1.71	0.62	1.71
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.69	1.04	0.30	1.04
VARIABLE FILTER	0.53	0.92	0.18	0.92

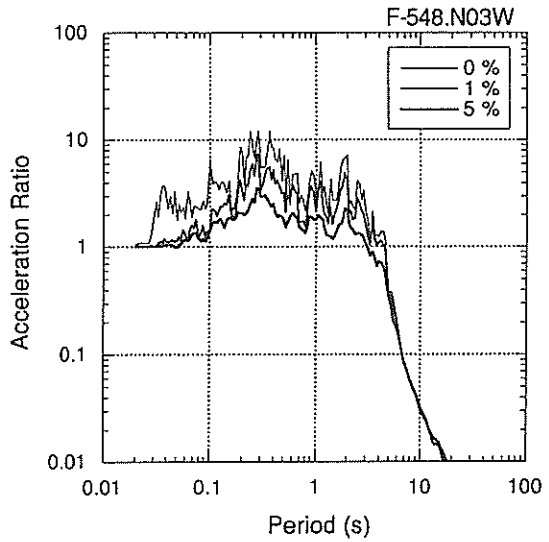
* RESULTANT OF HORIZONTAL COMPONENTS

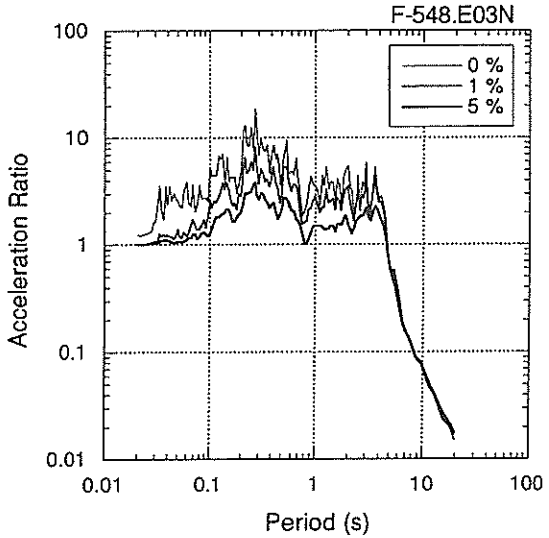

N03W - Original
F-548 Hakodate-F
E03N - Original
F-548 Hakodate-F
Up - Original
F-548 Hakodate-F
Acceleration (cm/s2)
8
0
-8
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-548 Hakodate-F
E03N - Corrected
F-548 Hakodate-F
Up - Corrected
F-548 Hakodate-F
Acceleration (cm/s2)
Time (s)

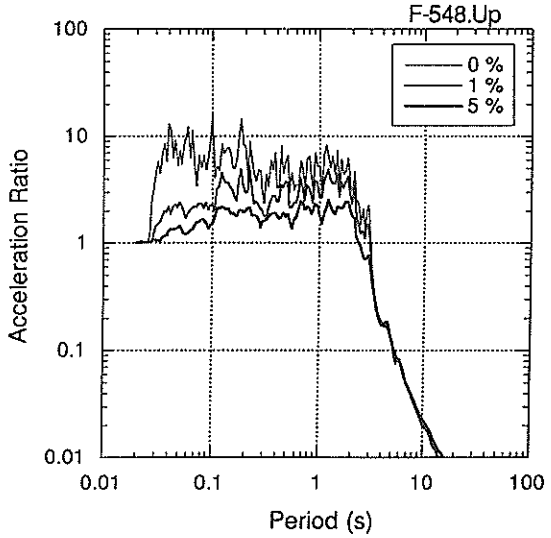

N03W - Original
F-548 Hakodate-F
E03N - Original
F-548 Hakodate-F
Up - Original
F-548 Hakodate-F
Acceleration (cm/s2)
8
0
-8
0
10
20
30
40
50
60
Time (s)
N03W - SMAC Equivalent
F-548 Hakodate-F
E03N - SMAC Equivalent
F-548 Hakodate-F
Up - SMAC Equivalent
F-548 Hakodate-F
Acceleration (cm/s2)
Time (s)

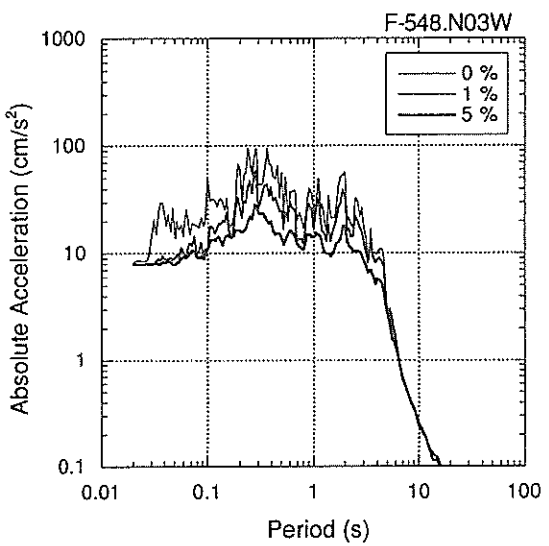

N03W - Fixed Filter
F-548 Hakodate-F
E03N - Fixed Filter
F-548 Hakodate-F
Up - Fixed Filter
F-548 Hakodate-F
Velocity (cm/s)
2
0
-2
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-548 Hakodate-F
E03N - Variable Filter
F-548 Hakodate-F
Up - Variable Filter
F-548 Hakodate-F
Velocity (cm/s)

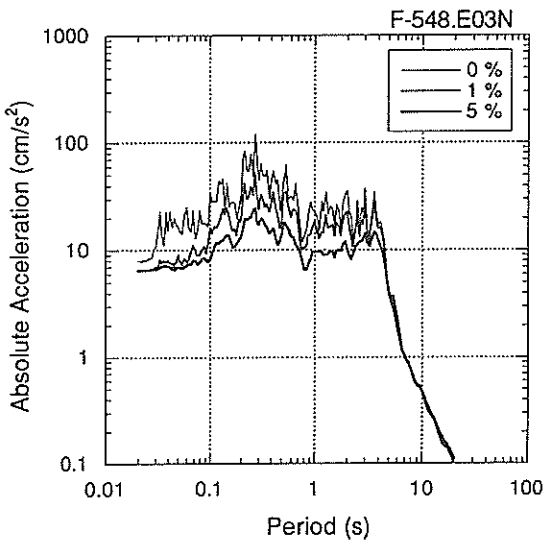

N03W - Fixed Filter
F-548 Hakodate-F
E03N - Fixed Filter
F-548 Hakodate-F
Up - Fixed Filter
F-548 Hakodate-F
Displacement (cm)
1.2
0
-1.2
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-548 Hakodate-F
E03N - Variable Filter
F-548 Hakodate-F
Up - Variable Filter
F-548 Hakodate-F
Displacement (cm)
Time (s)

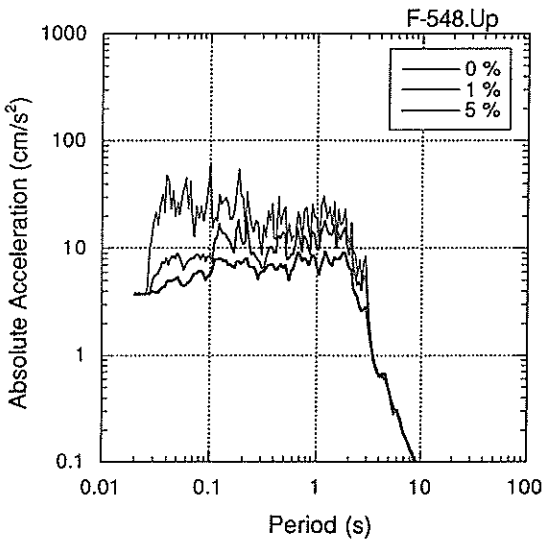

F-548.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)

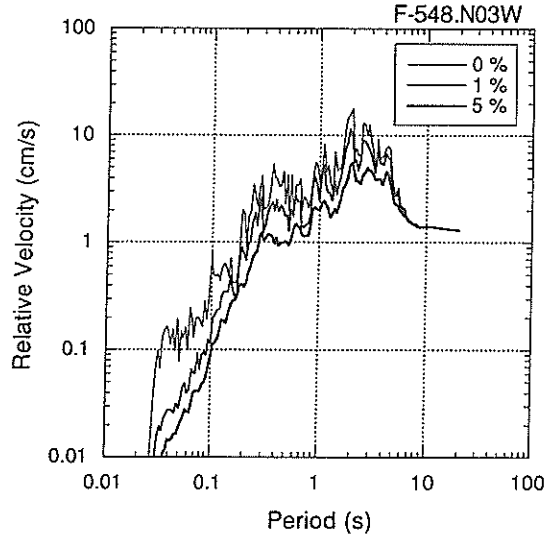

F-548.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)

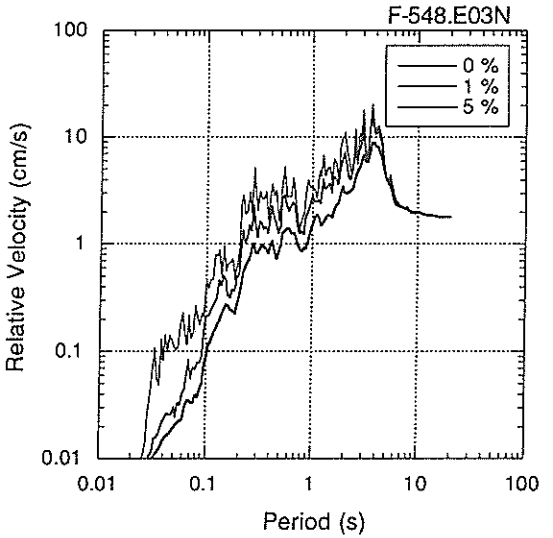

F-548.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)

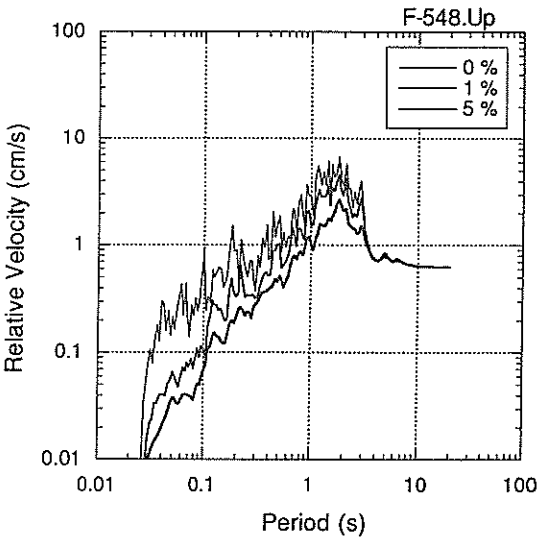

F-548.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

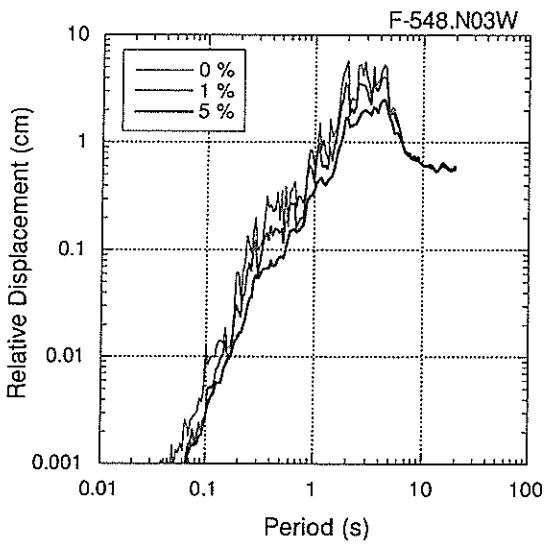

F-548.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

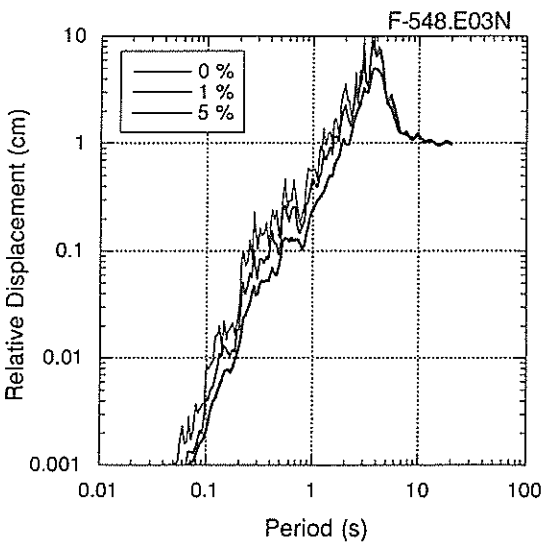

F-548.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

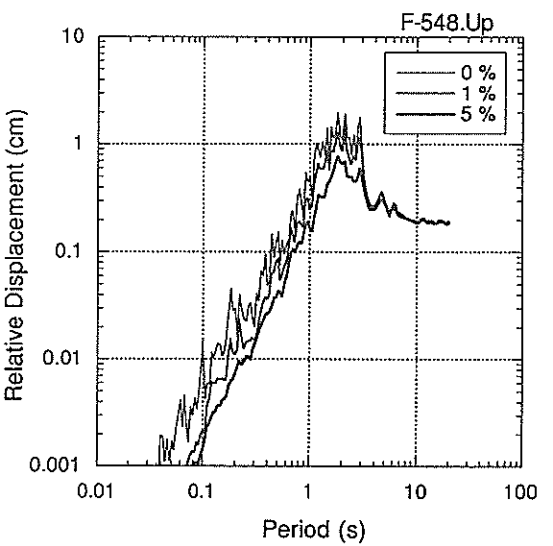

F-548.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

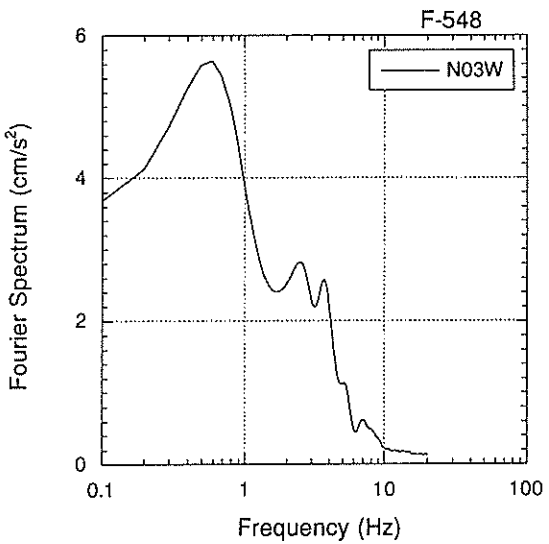

F-548.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

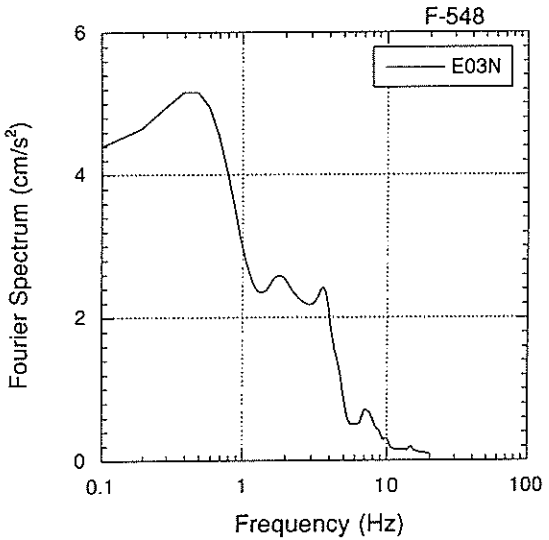

F-548.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

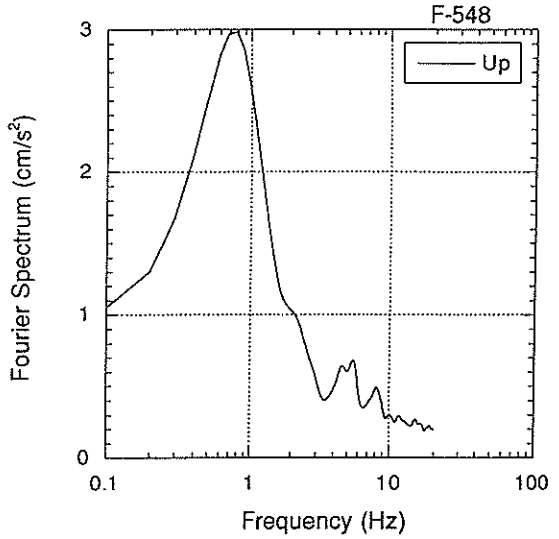

F-548.N03W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

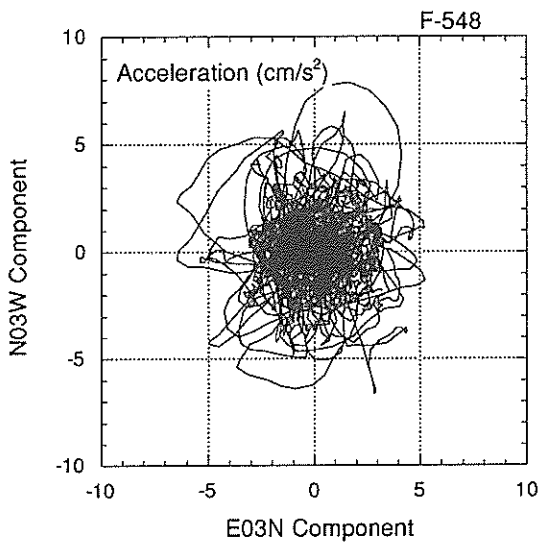

F-548.E03N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

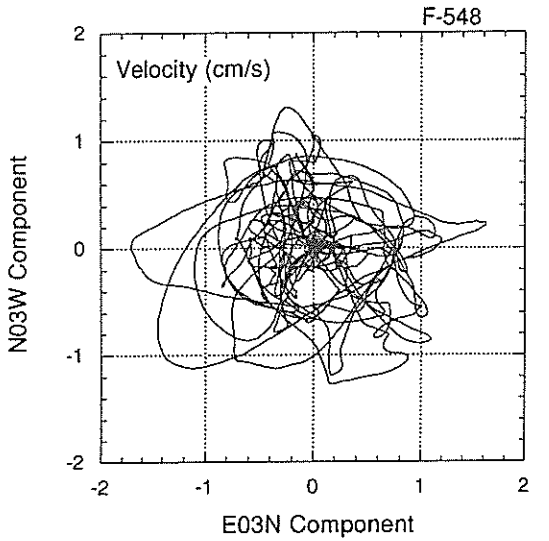

F-548.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

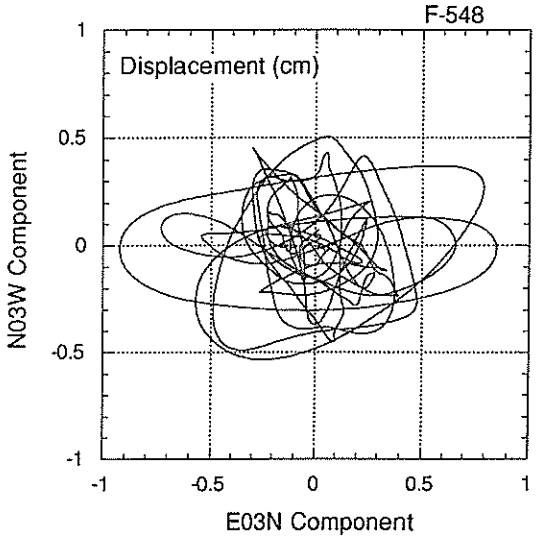

F-548
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)
0
2
4
6
0.1
1
10
100


F-548
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)
0
2
4
6
0.1
1
10
100


F-548
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)
0
1
2
3
0.1
1
10
100


F-548
Acceleration (cm/s²)
N03W Component
E03N Component
-10
-5
0
5
10


F-548
Velocity (cm/s)
N03W Component
E03N Component
-2
-1
0
1
2


F-548
Displacement (cm)
N03W Component
E03N Component
-1
-0.5
0
0.5
1

RECORD NUMBER : F-552

STATION : HAKODATE-FR

EARTHQUAKE DATA

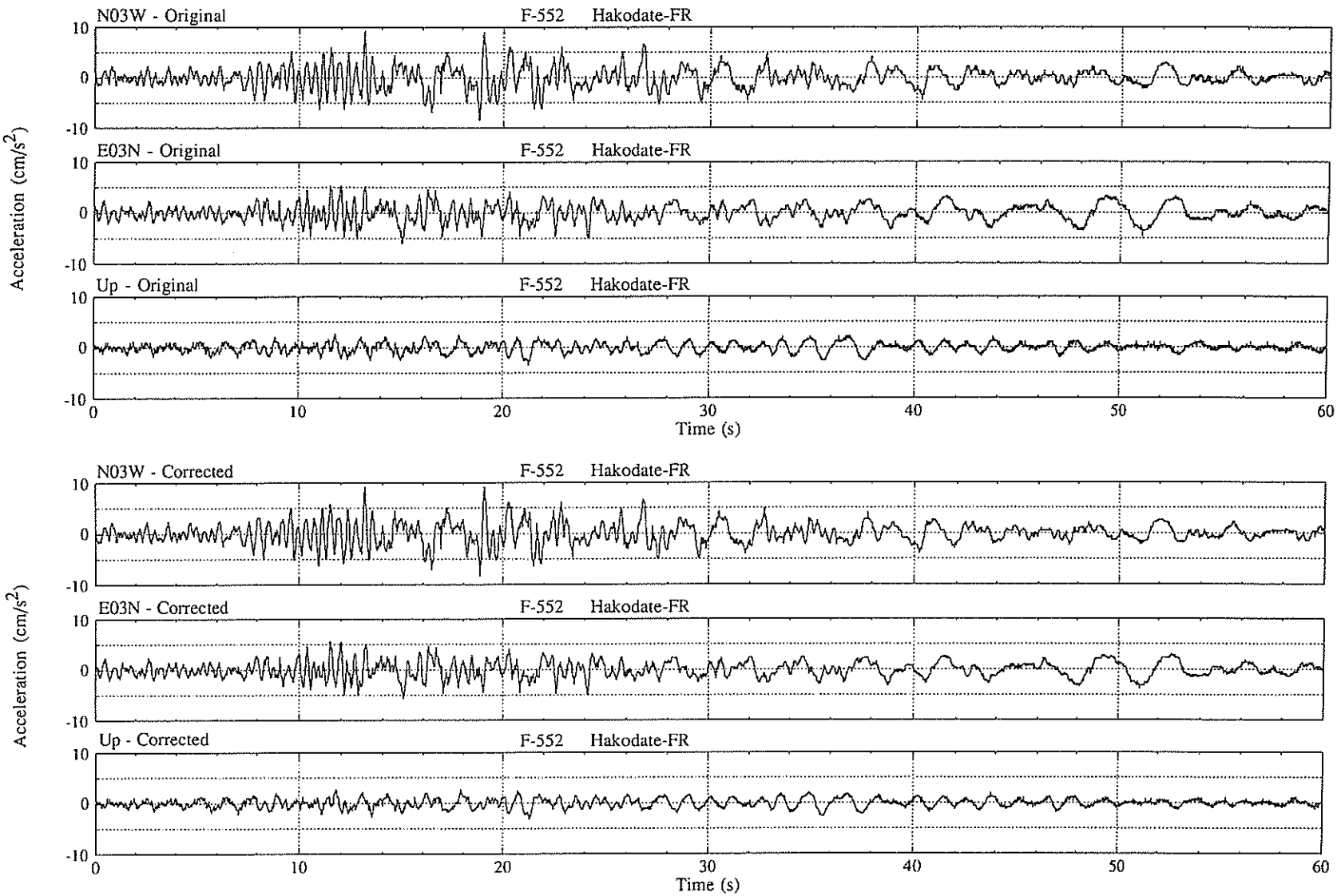
****

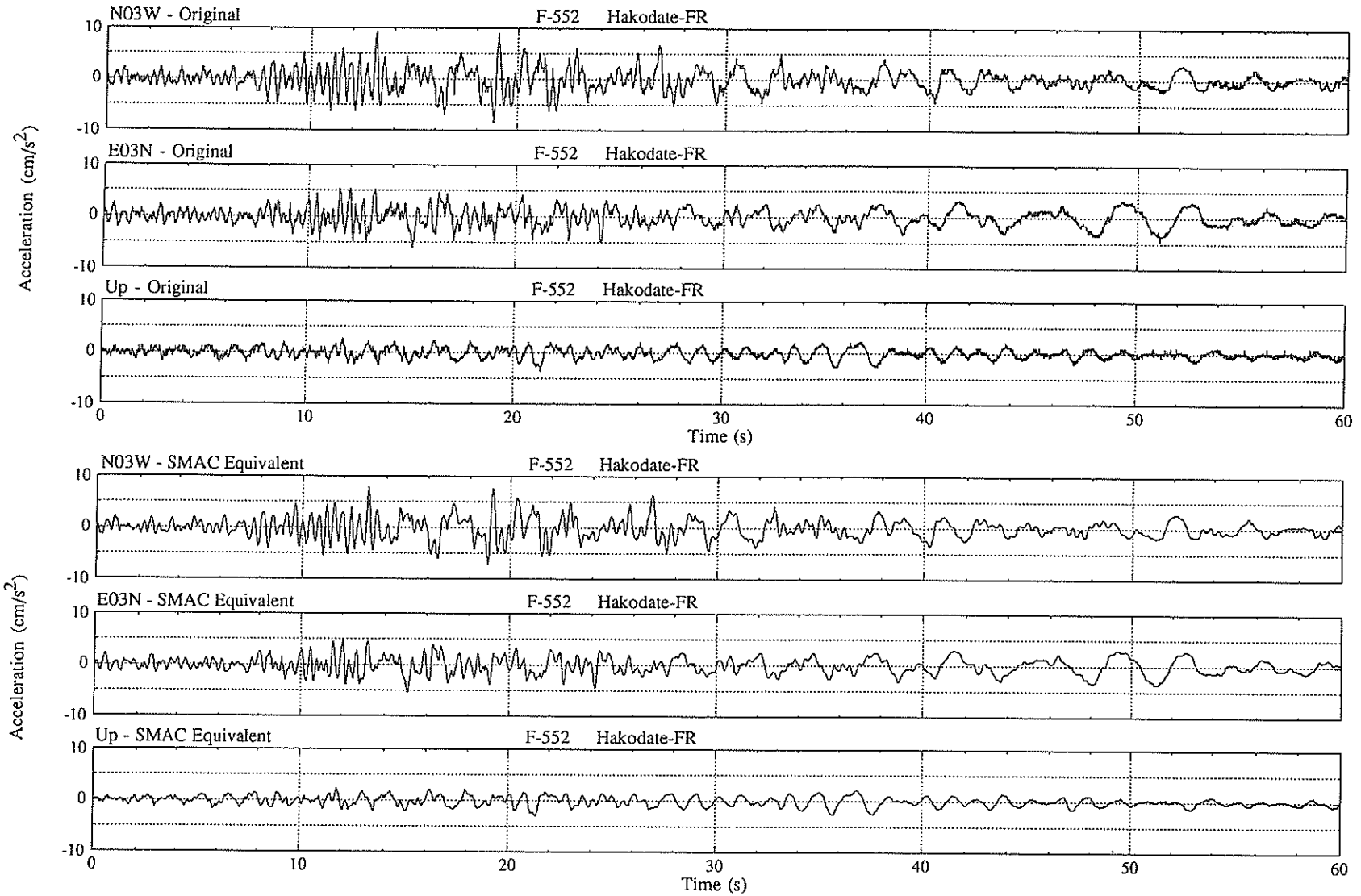
DATE AND TIME	1: 1 JULY13, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°43.9' N
LONGITUDE	139°19.9' E
DEPTH	28.6KM
JMA MAGNITUDE	6.0

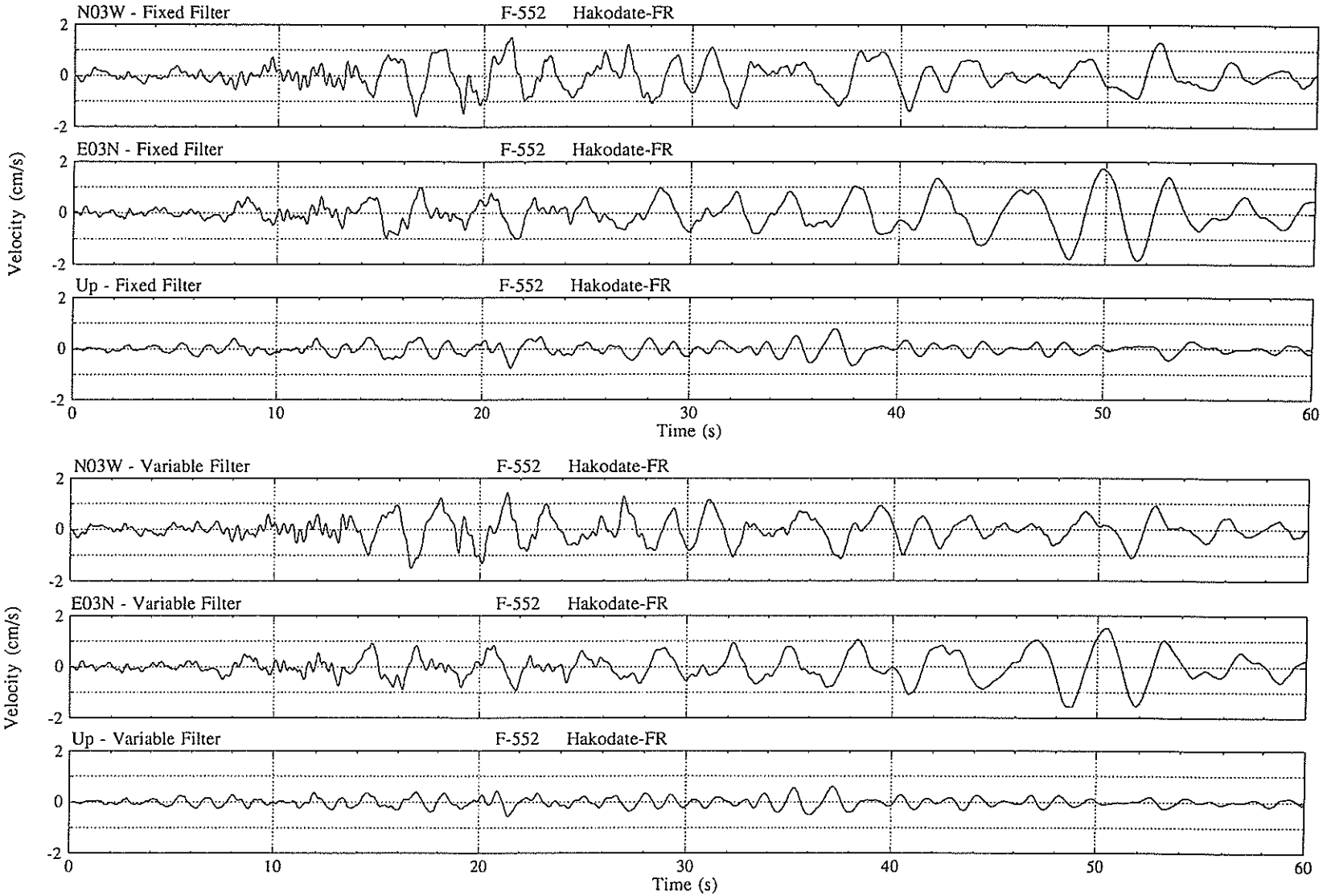
****

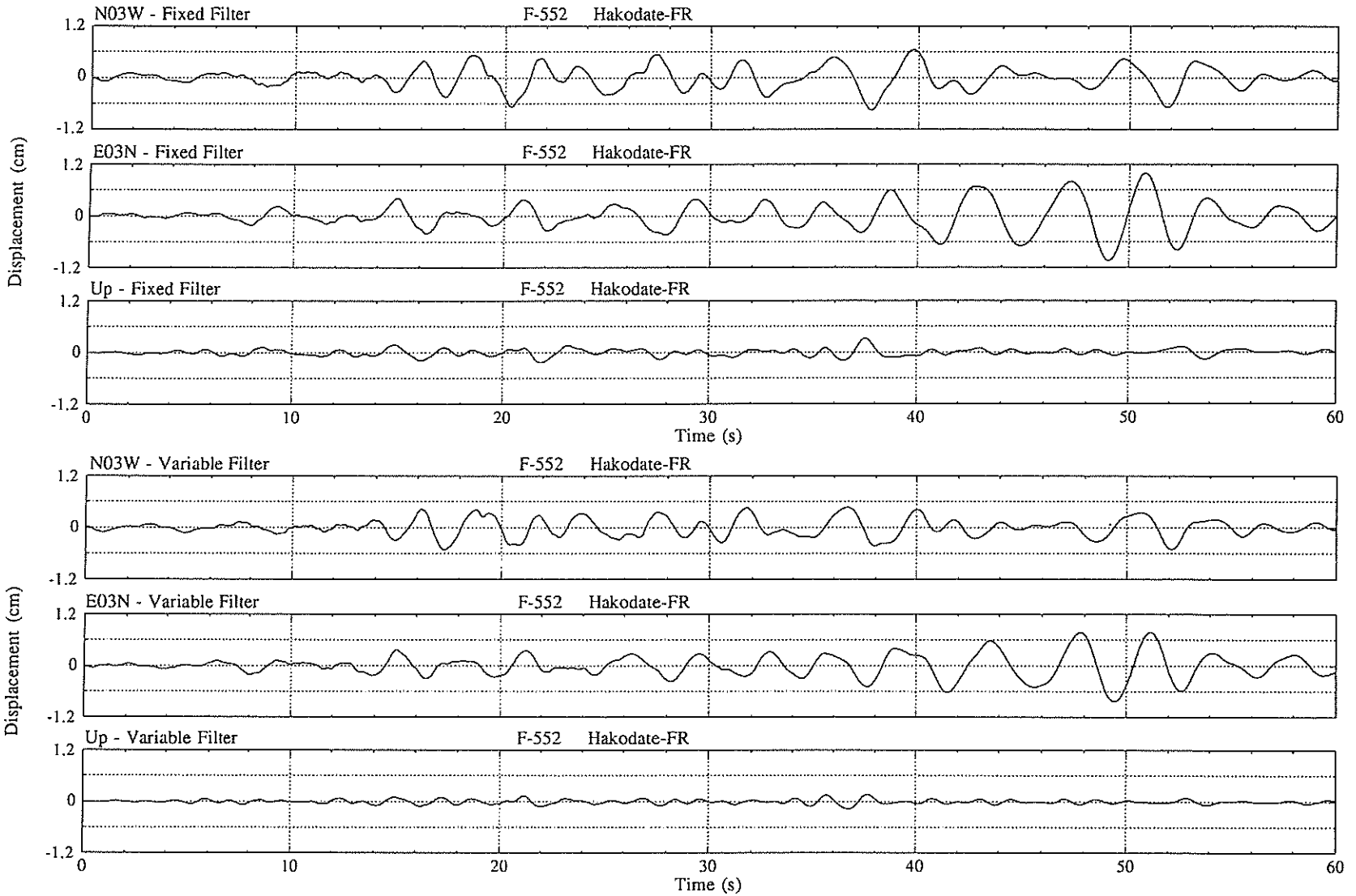
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.176	0.170	0.317	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	7.9	5.3	2.9	8.9
ORIGINAL	9.3	6.1	3.4	10.3
CORRECTED	9.2	5.8	3.1	10.2
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	1.58	1.85	0.79	2.00
VARIABLE FILTER	1.51	1.57	0.62	1.74
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.75	1.04	0.32	1.05
VARIABLE FILTER	0.51	0.83	0.17	0.83

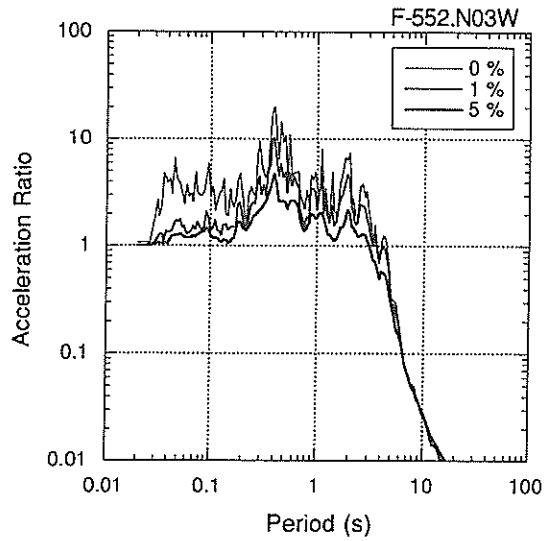
* RESULTANT OF HORIZONTAL COMPONENTS

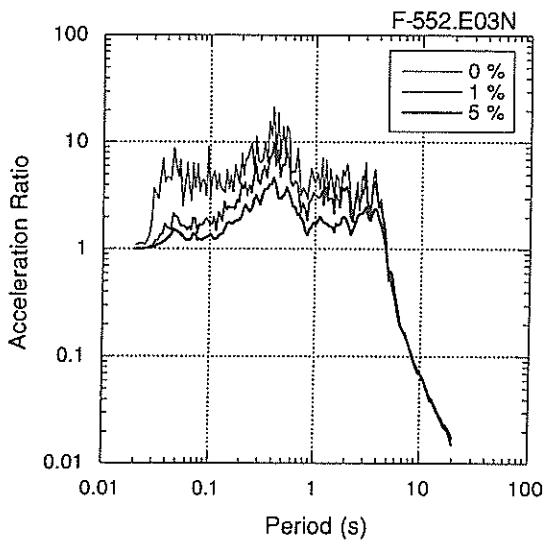

N03W - Original
F-552 Hakodate-FR
E03N - Original
F-552 Hakodate-FR
Up - Original
F-552 Hakodate-FR
Acceleration (cm/s2)
10
0
-10
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-552 Hakodate-FR
E03N - Corrected
F-552 Hakodate-FR
Up - Corrected
F-552 Hakodate-FR
Acceleration (cm/s2)
Time (s)

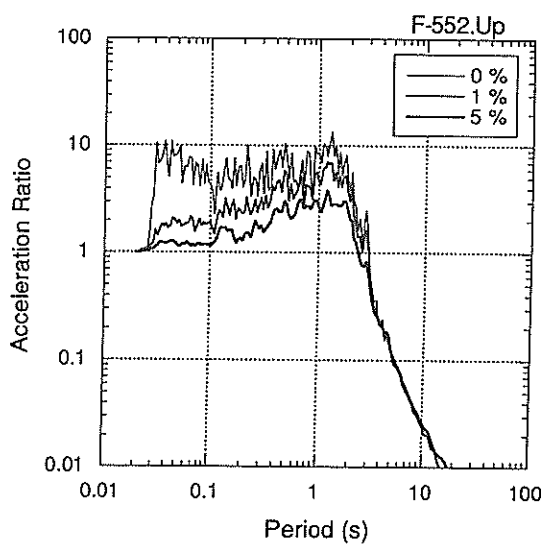

N03W - Original
F-552 Hakodate-FR
E03N - Original
F-552 Hakodate-FR
Up - Original
F-552 Hakodate-FR
Acceleration (cm/s²)
Time (s)
N03W - SMAC Equivalent
F-552 Hakodate-FR
E03N - SMAC Equivalent
F-552 Hakodate-FR
Up - SMAC Equivalent
F-552 Hakodate-FR
Acceleration (cm/s²)
Time (s)

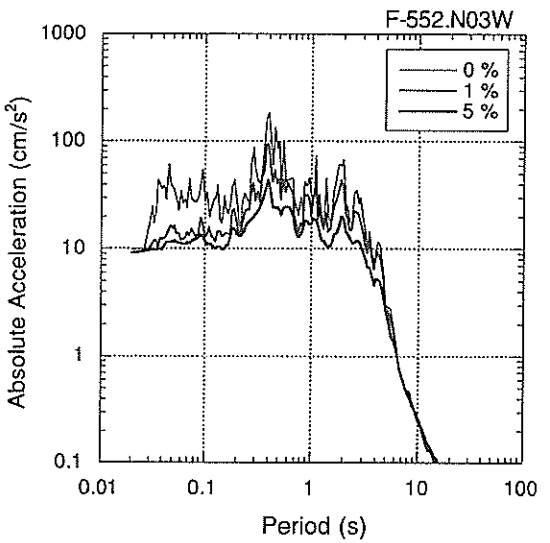

N03W - Fixed Filter
F-552 Hakodate-FR
E03N - Fixed Filter
F-552 Hakodate-FR
Up - Fixed Filter
F-552 Hakodate-FR
Velocity (cm/s)
Time (s)
N03W - Variable Filter
F-552 Hakodate-FR
E03N - Variable Filter
F-552 Hakodate-FR
Up - Variable Filter
F-552 Hakodate-FR
Velocity (cm/s)
Time (s)

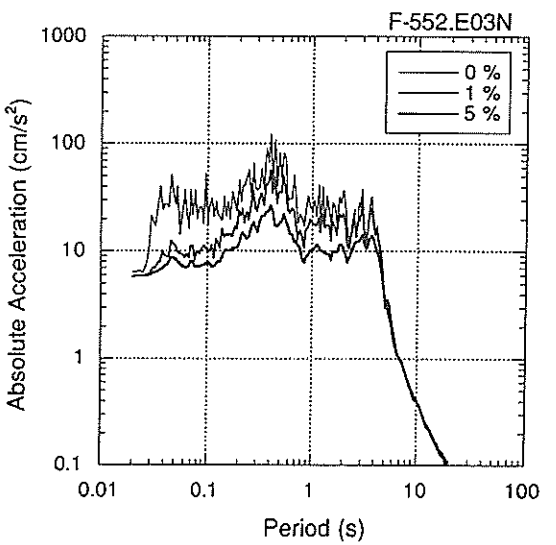

N03W - Fixed Filter
F-552 Hakodate-FR
E03N - Fixed Filter
F-552 Hakodate-FR
Up - Fixed Filter
F-552 Hakodate-FR
Displacement (cm)
1.2
0
-1.2
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-552 Hakodate-FR
E03N - Variable Filter
F-552 Hakodate-FR
Up - Variable Filter
F-552 Hakodate-FR
Displacement (cm)
Time (s)

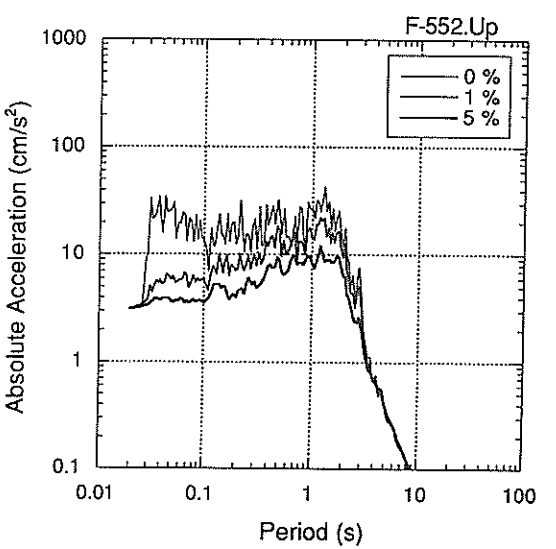

F-552.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

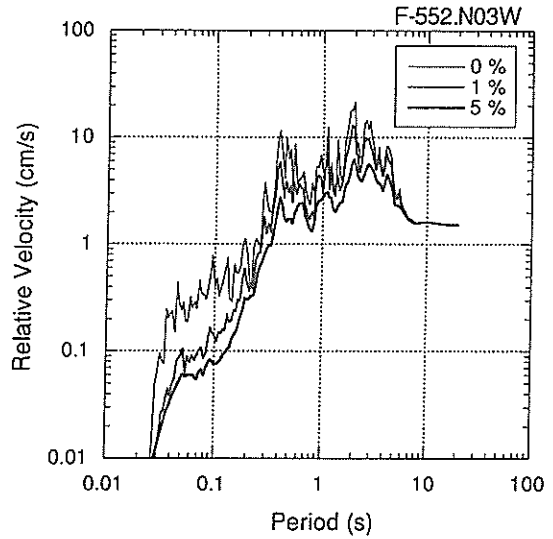

F-552.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

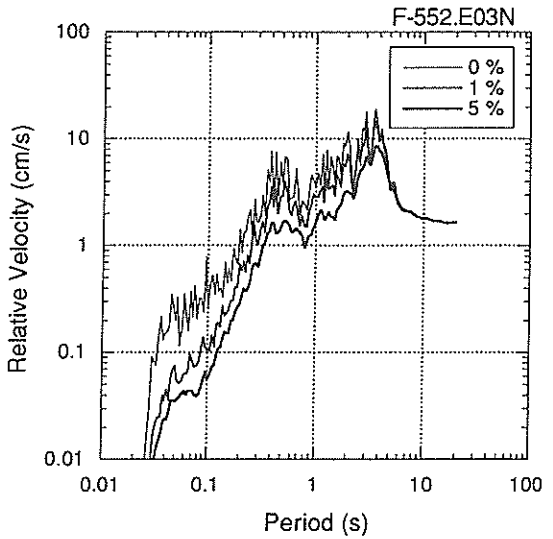

F-552.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

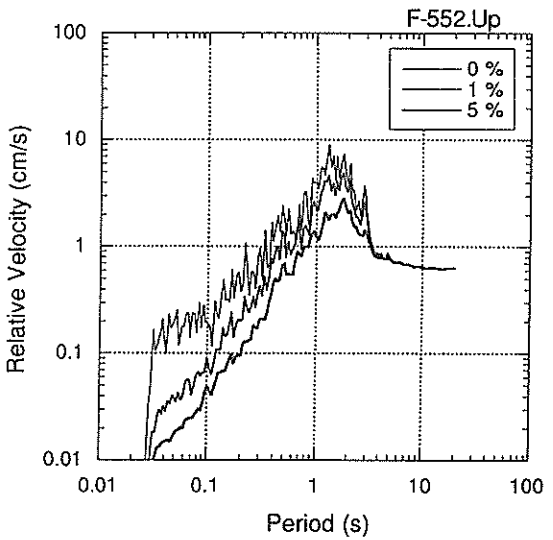

F-552.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

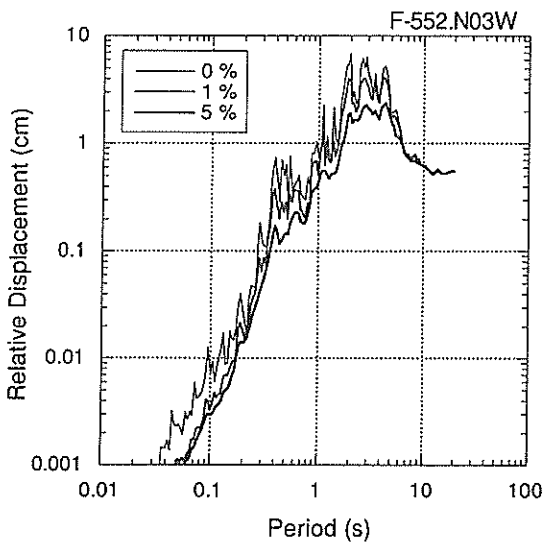

F-552.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

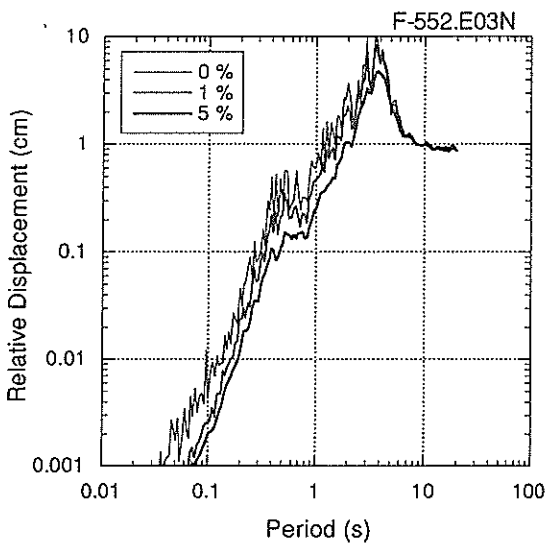

F-552.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

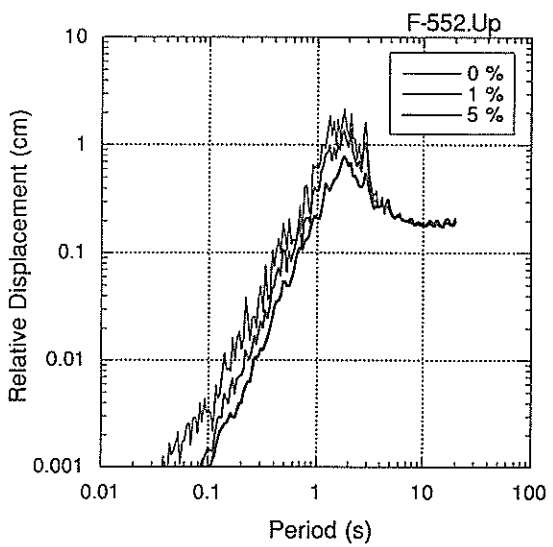

F-552.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

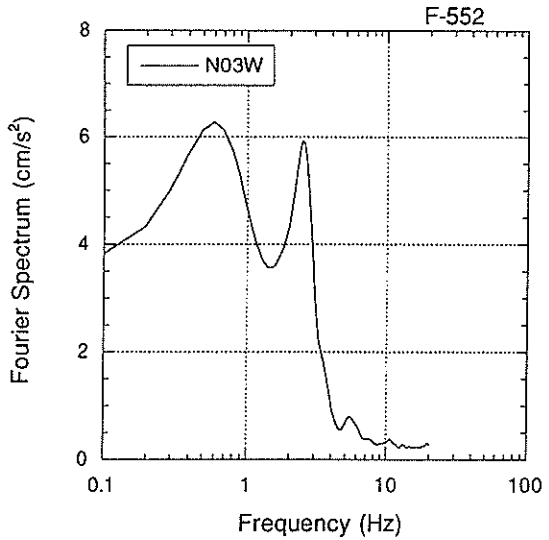

F-552.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

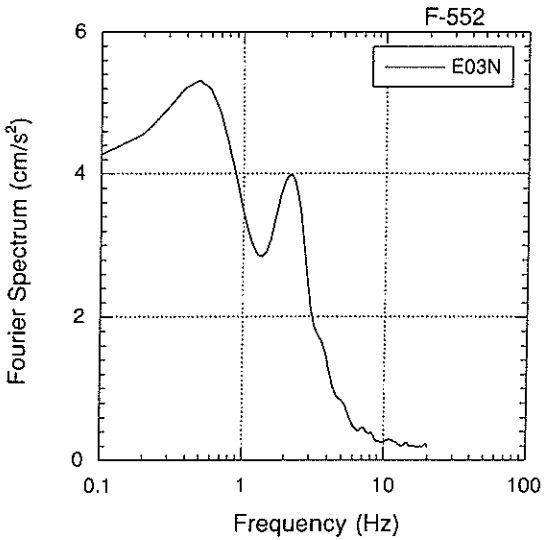

F-552.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

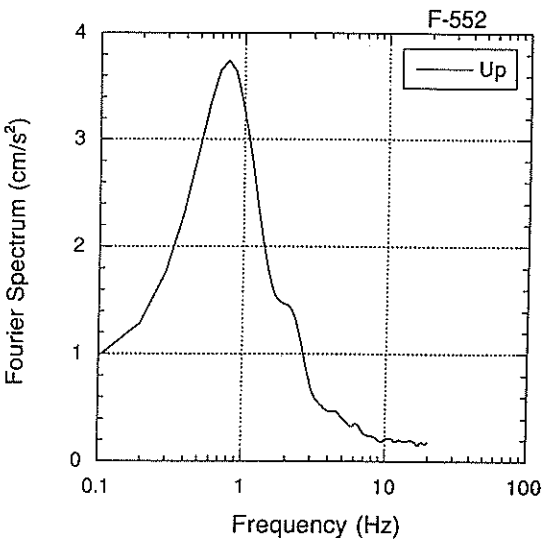

F-552.N03W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

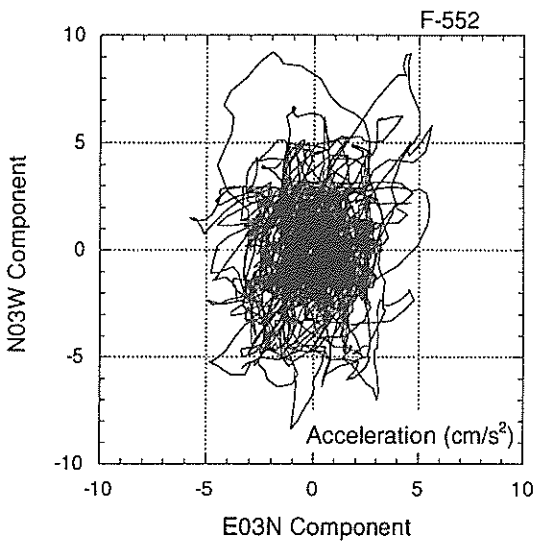

F-552.E03N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

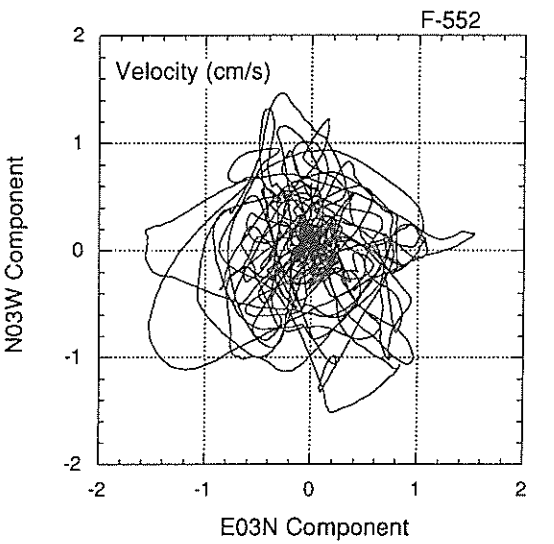

F-552.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

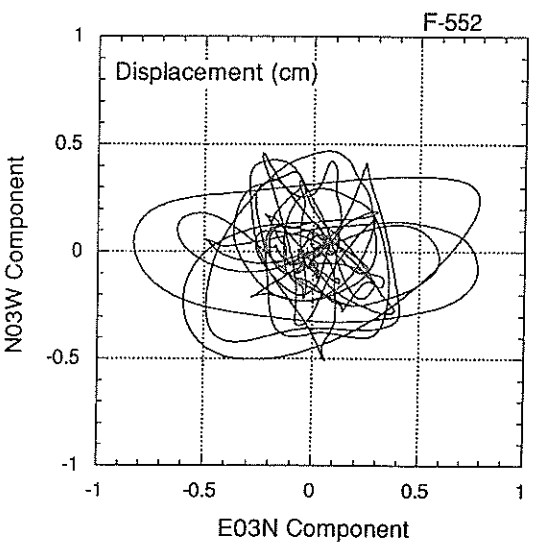

F-552
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-552
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-552
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-552
Acceleration (cm/s²)
N03W Component
E03N Component


F-552
Velocity (cm/s)
N03W Component
E03N Component


F-552
Displacement (cm)
N03W Component
E03N Component

RECORD NUMBER : F-568

STATION : MURORAN-G

EARTHQUAKE DATA

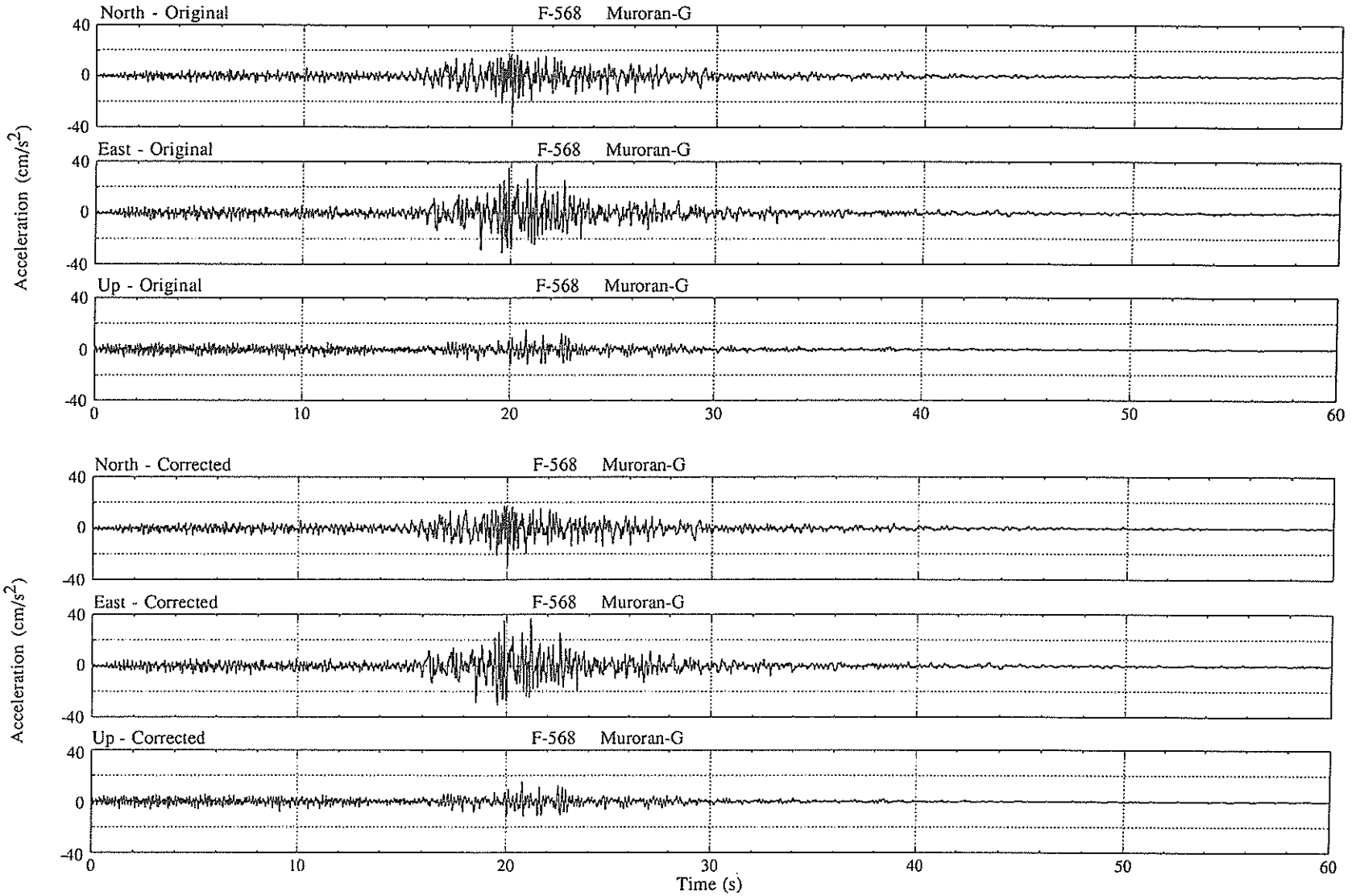
****

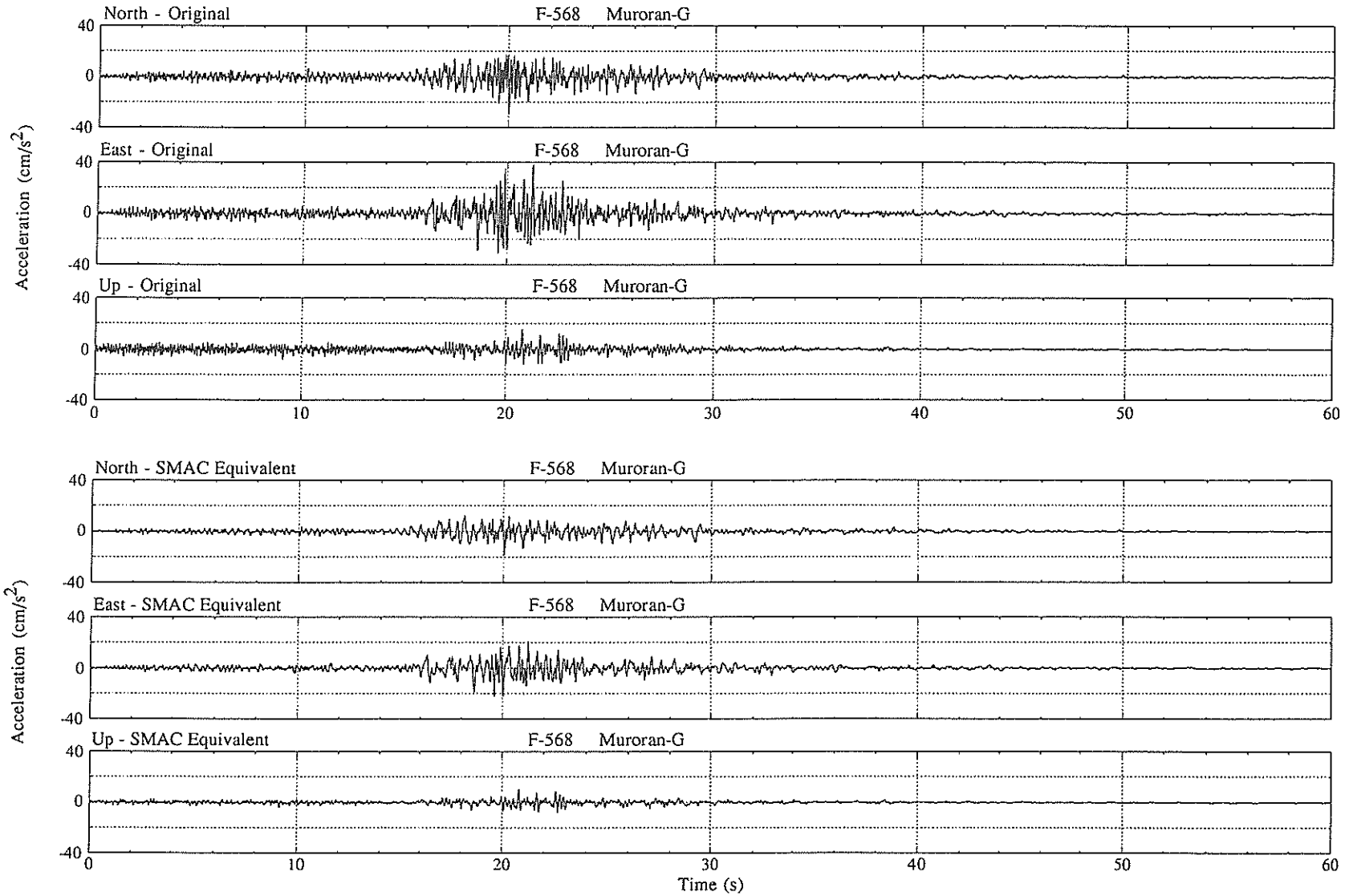
DATE AND TIME	1: 1 JULY13, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	42°43.3' N
LONGITUDE	139°19.9' E
DEPTH	28.6KM
JMA MAGNITUDE	6.0

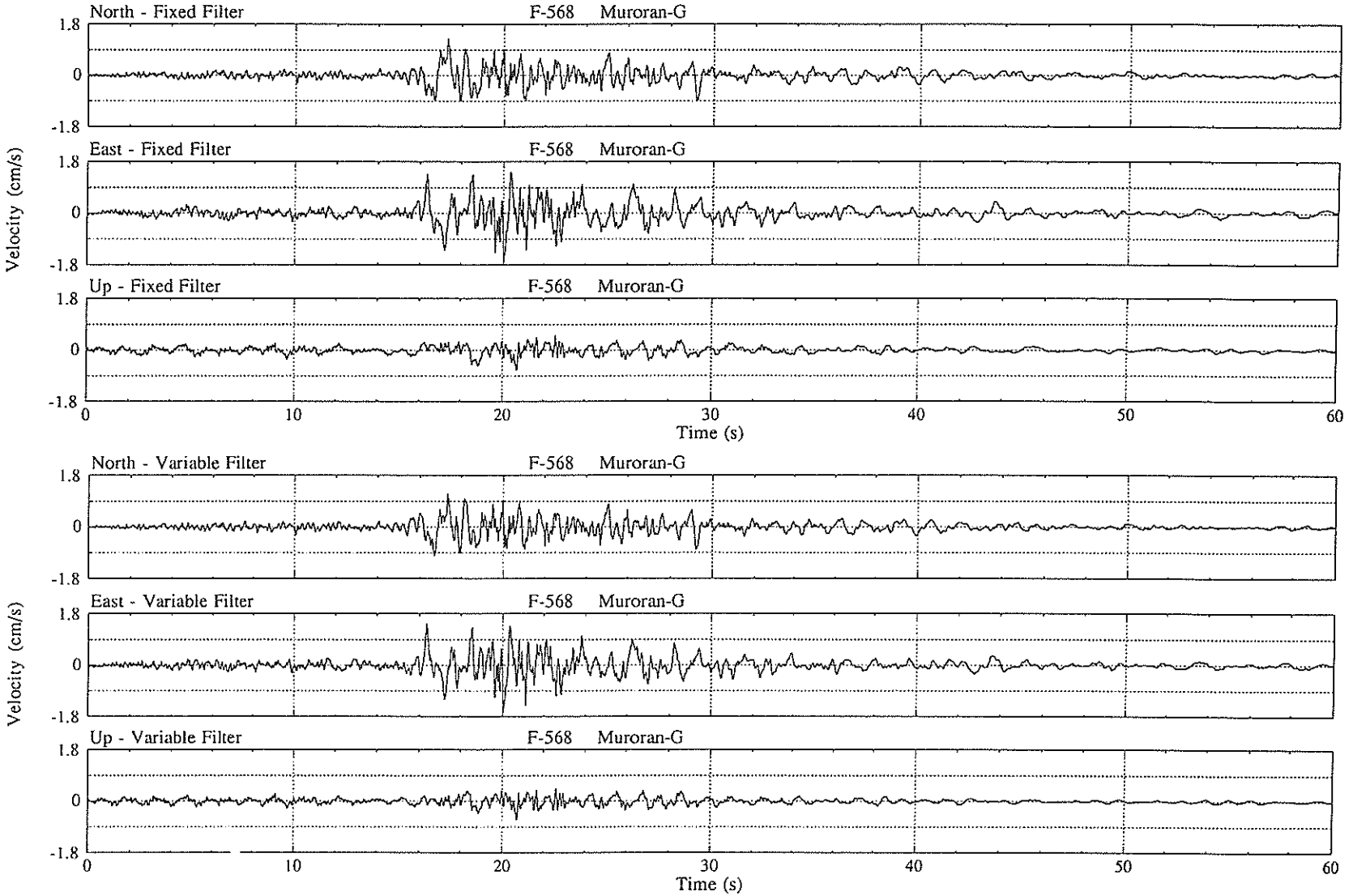
****

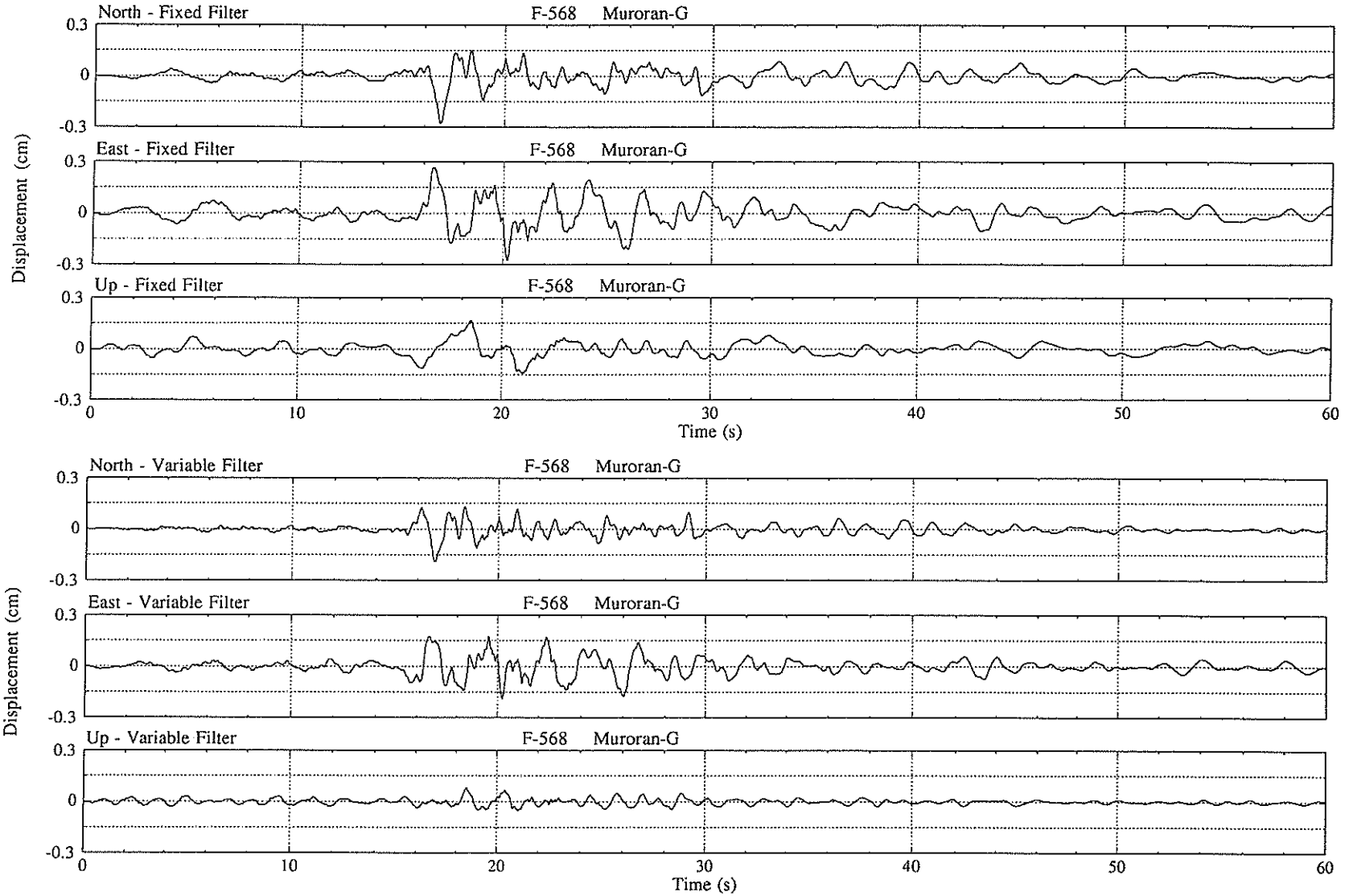
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.329	0.268	0.384	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	18.3	21.9	10.5	27.0
ORIGINAL	29.4	37.9	15.9	39.2
CORRECTED	29.2	37.0	15.6	39.5
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	1.30	1.69	0.69	1.80
VARIABLE FILTER	1.18	1.62	0.64	1.73
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.28	0.27	0.17	0.33
VARIABLE FILTER	0.19	0.19	0.08	0.24

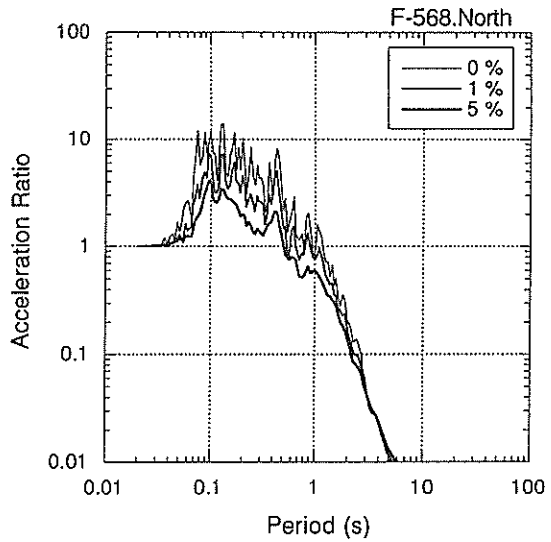
* RESULTANT OF HORIZONTAL COMPONENTS

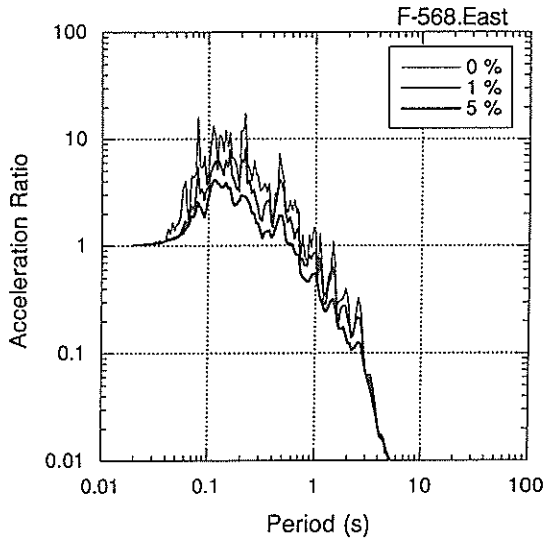

North - Original
F-568 Muroran-G
East - Original
F-568 Muroran-G
Up - Original
F-568 Muroran-G
North - Corrected
F-568 Muroran-G
East - Corrected
F-568 Muroran-G
Up - Corrected
F-568 Muroran-G
Acceleration (cm/s2)
Acceleration (cm/s2)
40
0
-40
0
10
20
30
40
50
60
Time (s)

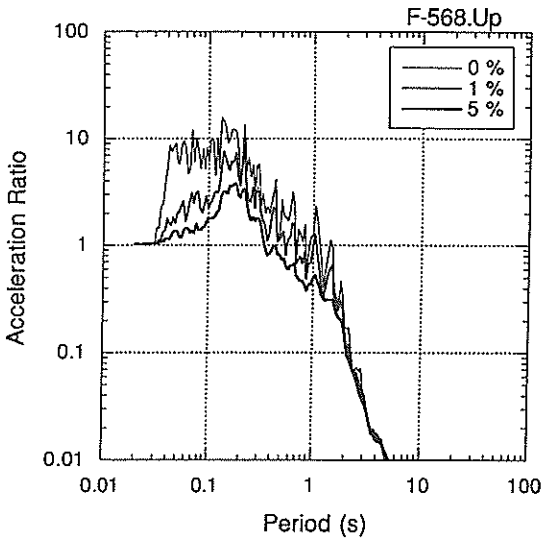

North - Original
F-568 Muroran-G
East - Original
F-568 Muroran-G
Up - Original
F-568 Muroran-G
North - SMAC Equivalent
F-568 Muroran-G
East - SMAC Equivalent
F-568 Muroran-G
Up - SMAC Equivalent
F-568 Muroran-G
Acceleration (cm/s2)
Acceleration (cm/s2)
40
0
-40
0
10
20
30
40
50
60
Time (s)

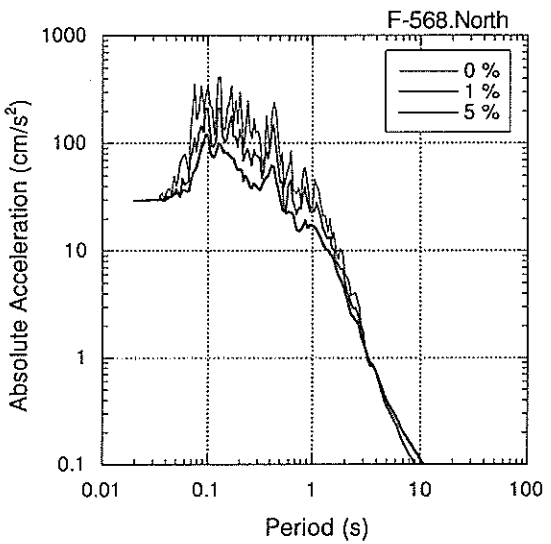

North - Fixed Filter
F-568 Muroran-G
East - Fixed Filter
F-568 Muroran-G
Up - Fixed Filter
F-568 Muroran-G
Velocity (cm/s)
1.8
0
-1.8
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-568 Muroran-G
East - Variable Filter
F-568 Muroran-G
Up - Variable Filter
F-568 Muroran-G
Velocity (cm/s)
Time (s)

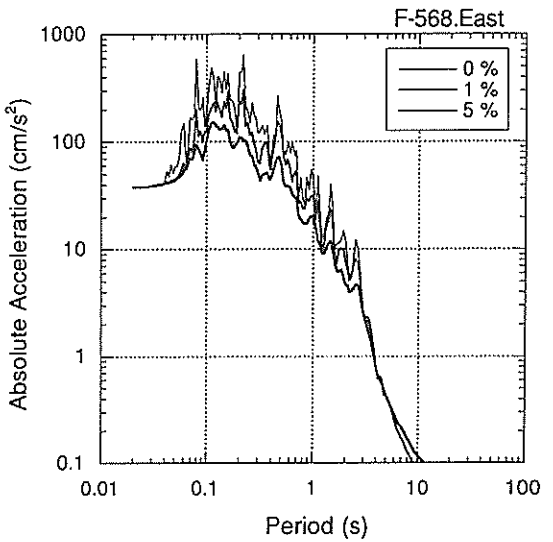

North - Fixed Filter
F-568 Muroran-G
East - Fixed Filter
F-568 Muroran-G
Up - Fixed Filter
F-568 Muroran-G
Displacement (cm)
0.3
0
-0.3
0
10
20
30
40
50
60
Time (s)
North - Variable Filter
F-568 Muroran-G
East - Variable Filter
F-568 Muroran-G
Up - Variable Filter
F-568 Muroran-G
Displacement (cm)
Time (s)

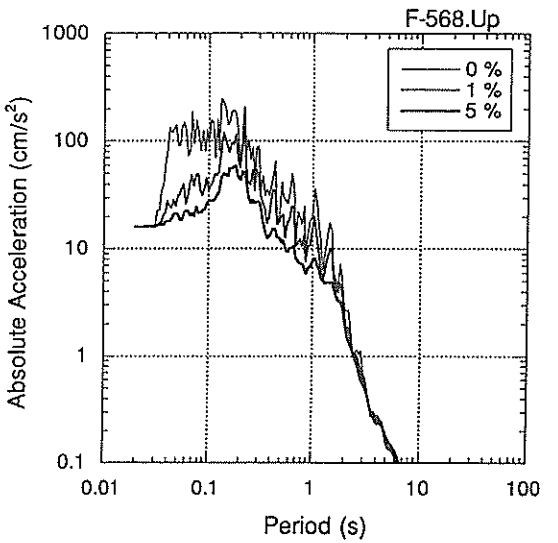

F-568.North
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

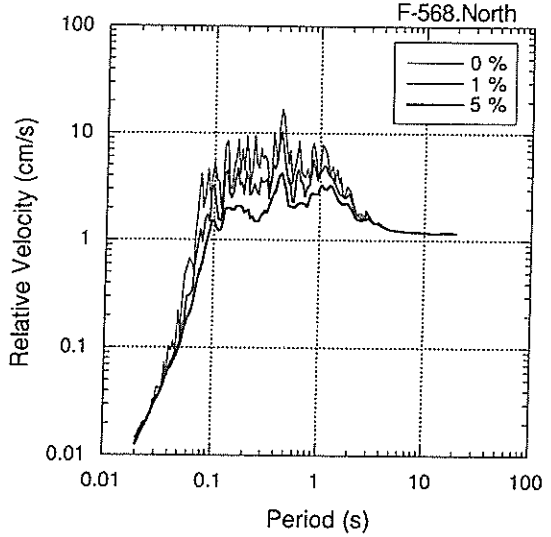

F-568.East
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

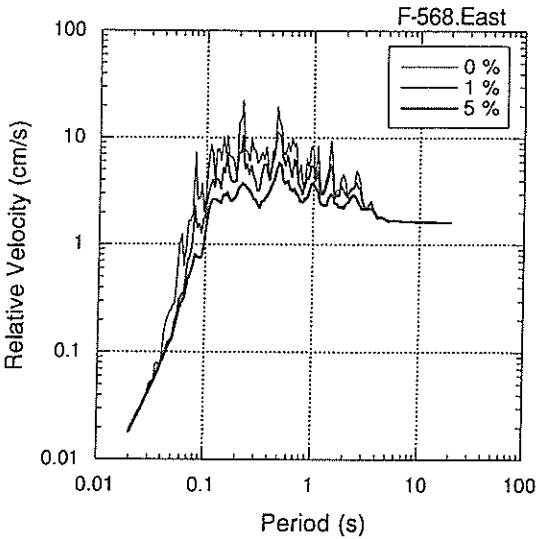

F-568.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

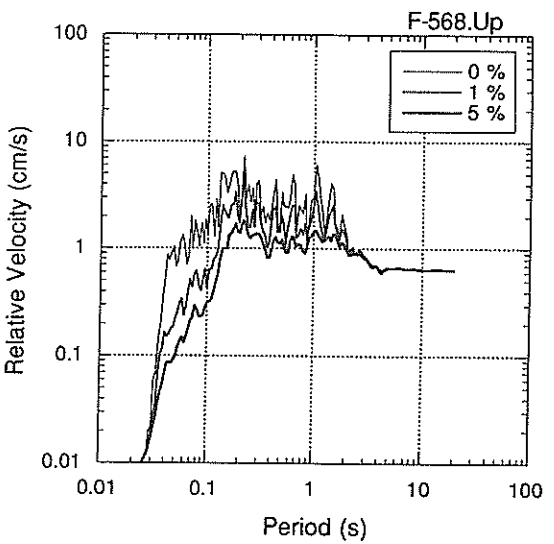

F-568.North
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

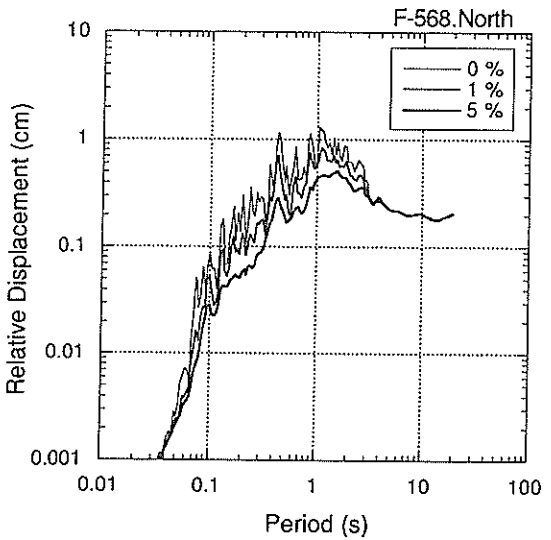

F-568.East
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

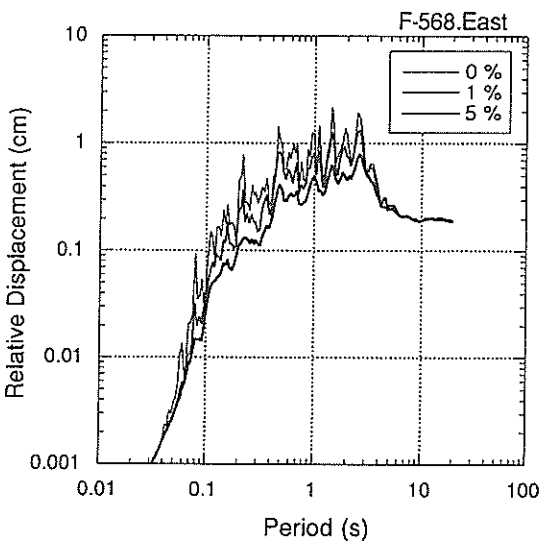

F-568.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

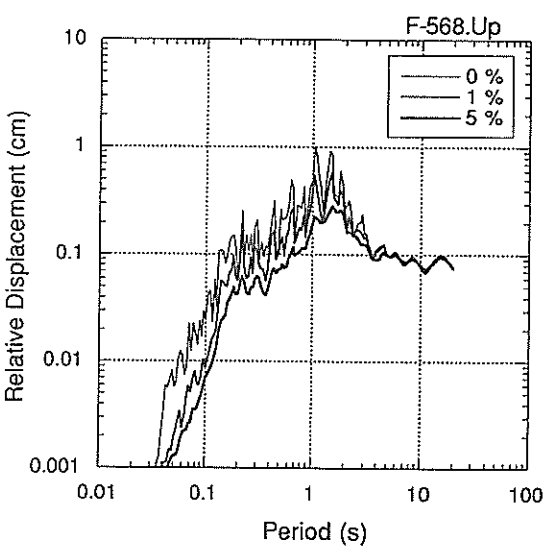

F-568.North
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

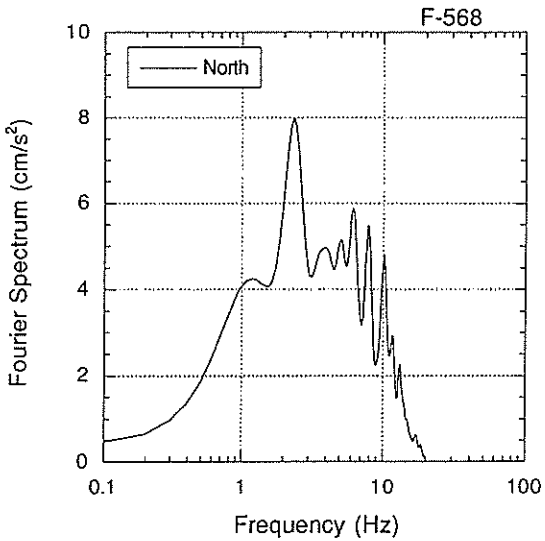

F-568.East
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

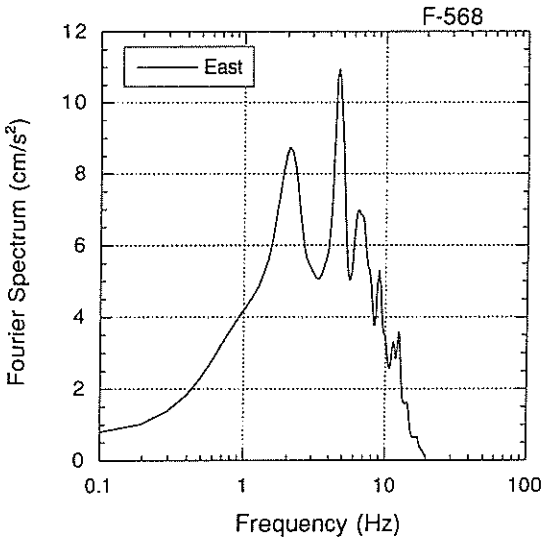

F-568.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

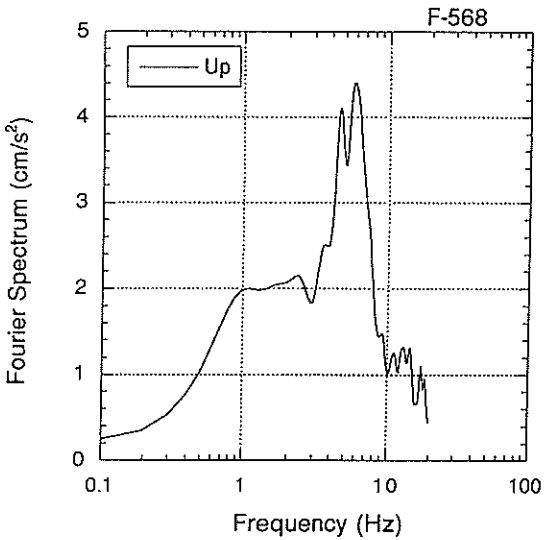

F-568.North
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

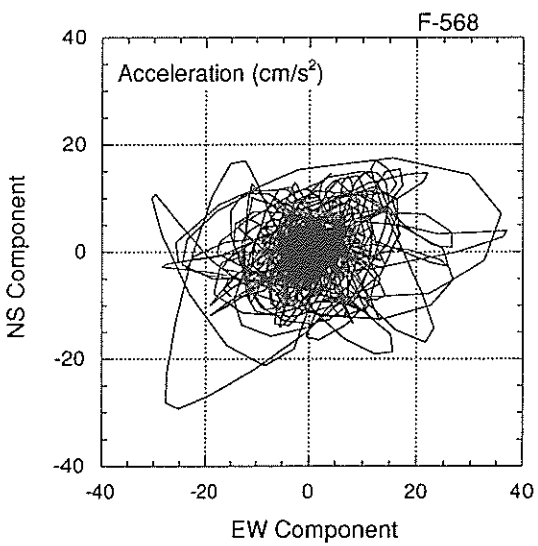

F-568.East
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

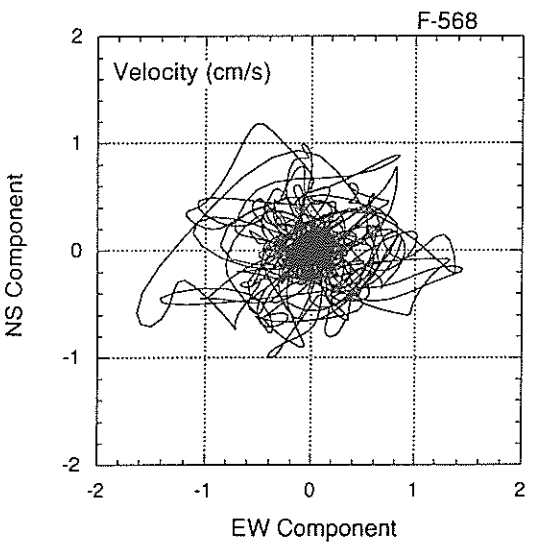

F-568.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
10
1
0.1
0.01
0.001
0.01
0.1
1
10
100

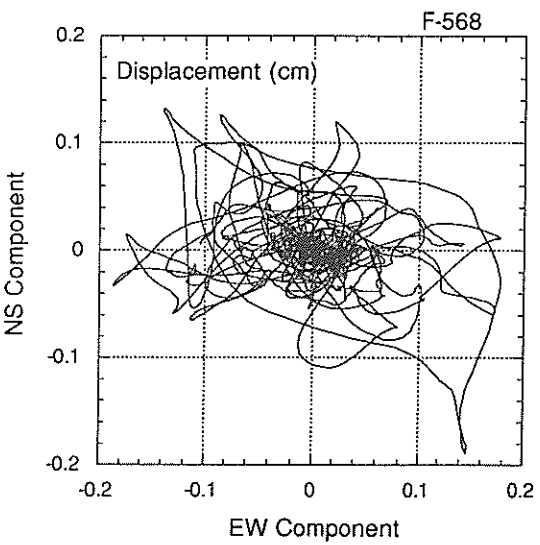

F-568
North
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-568
East
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-568
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-568
Acceleration (cm/s²)
NS Component
EW Component


F-568
Velocity (cm/s)
NS Component
EW Component


F-568
Displacement (cm)
NS Component
EW Component

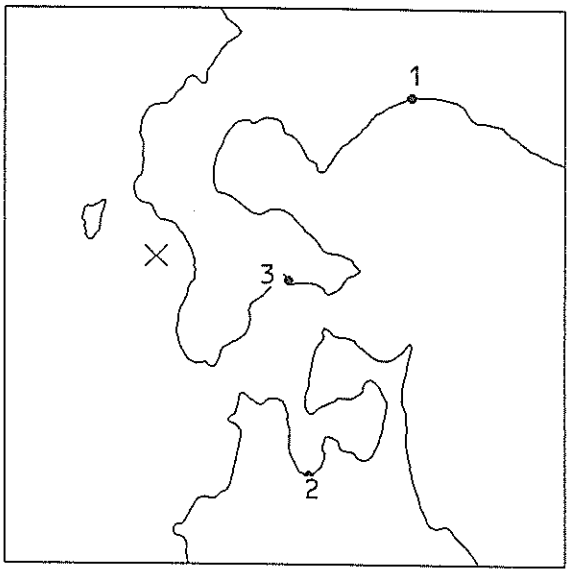
Strong-Motion Earthquake Observation Results of the After Shock at 04:42:44, August 8, 1993

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

04:42 AUG. 8 ,1993
SW OFF HOKKAIDO
EPICENTER : 41°57.3'N 139°53.3'E
DEPTH : 23.2KM MAGNITUDE : 6.3

JMA INTENSITIES

Ⅳ : ESASHI,HAKODATE
Ⅲ : MURORAN,TOMAKOMAI,OTARU
Ⅱ : HACHINOHE



	STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS)	(EW)	(UD)	DIST. (KM)
1	TOMAKOMAI-S	ON GROUND	S-2531	7	13	5	160
2	AOMORI-S	ON GROUND	S-2530	21	16	9	144
3	HAKODATE-FR	ON STRUC.	F- 604	49	46	16	72
3	HAKODATE-F	ON GROUND	F- 603	47	50	21	72
3	HAKODATE-M	ON GROUND	M-1476	52	56	31	72

Results of Preliminary Analyses of the After Shock at 04:42:44, August 8, 1993

RECORD NUMBER : S-2530

STATION : AOMORI-S

EARTHQUAKE DATA

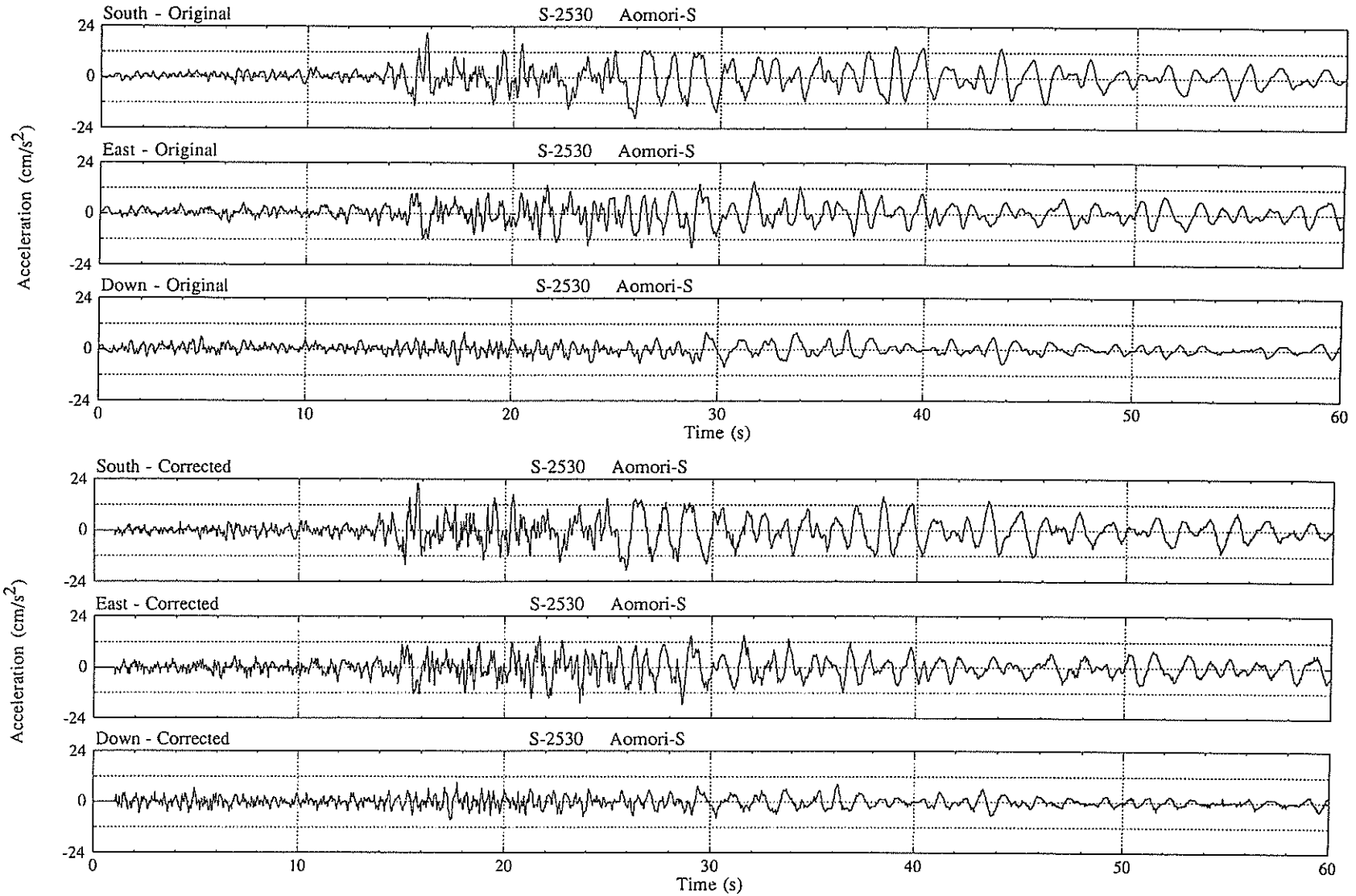
****

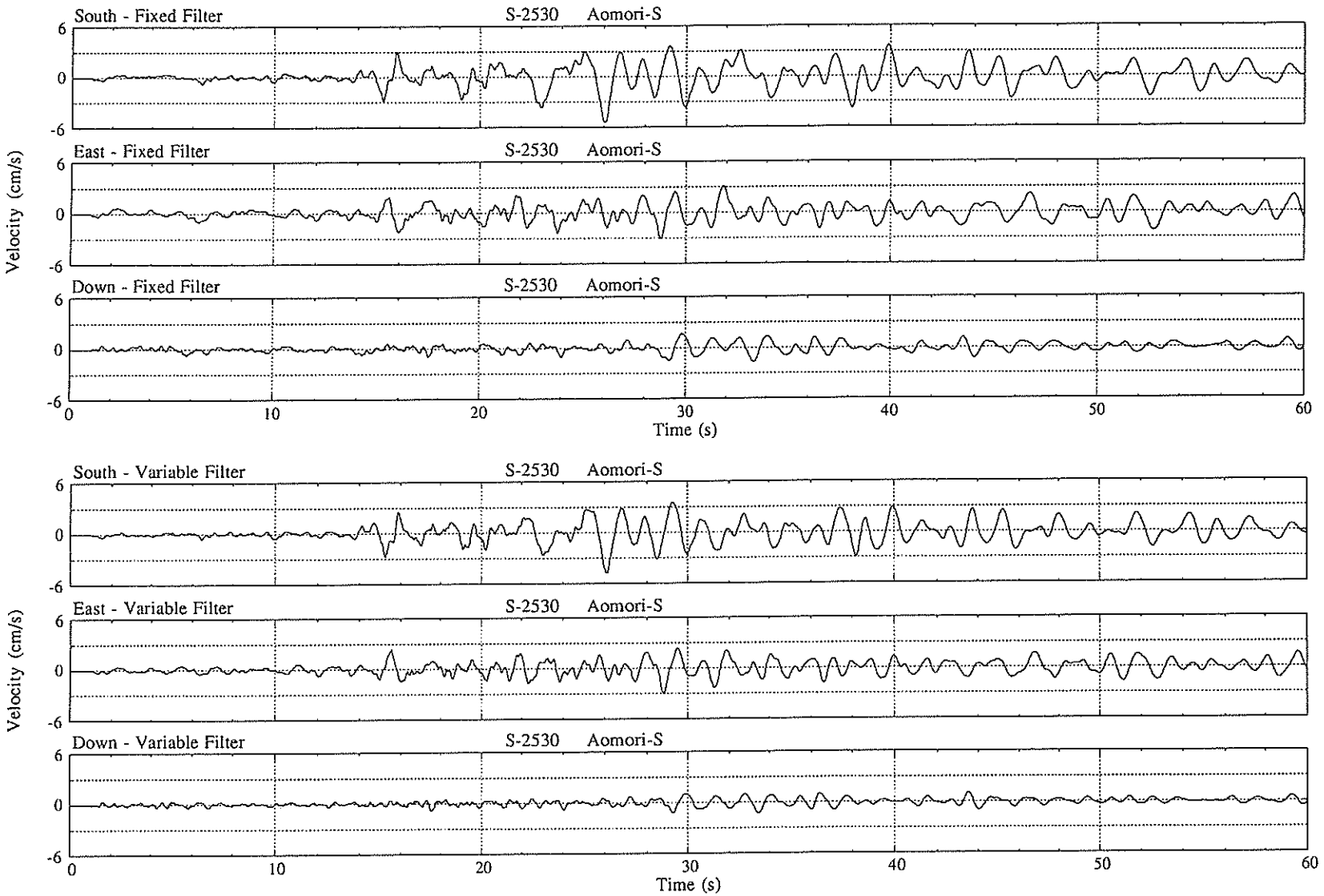
DATE AND TIME	4:42 AUG. 8, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	41°57.3' N
LONGITUDE	139°53.3' E
DEPTH	23.2KM
JMA MAGNITUDE	6.3

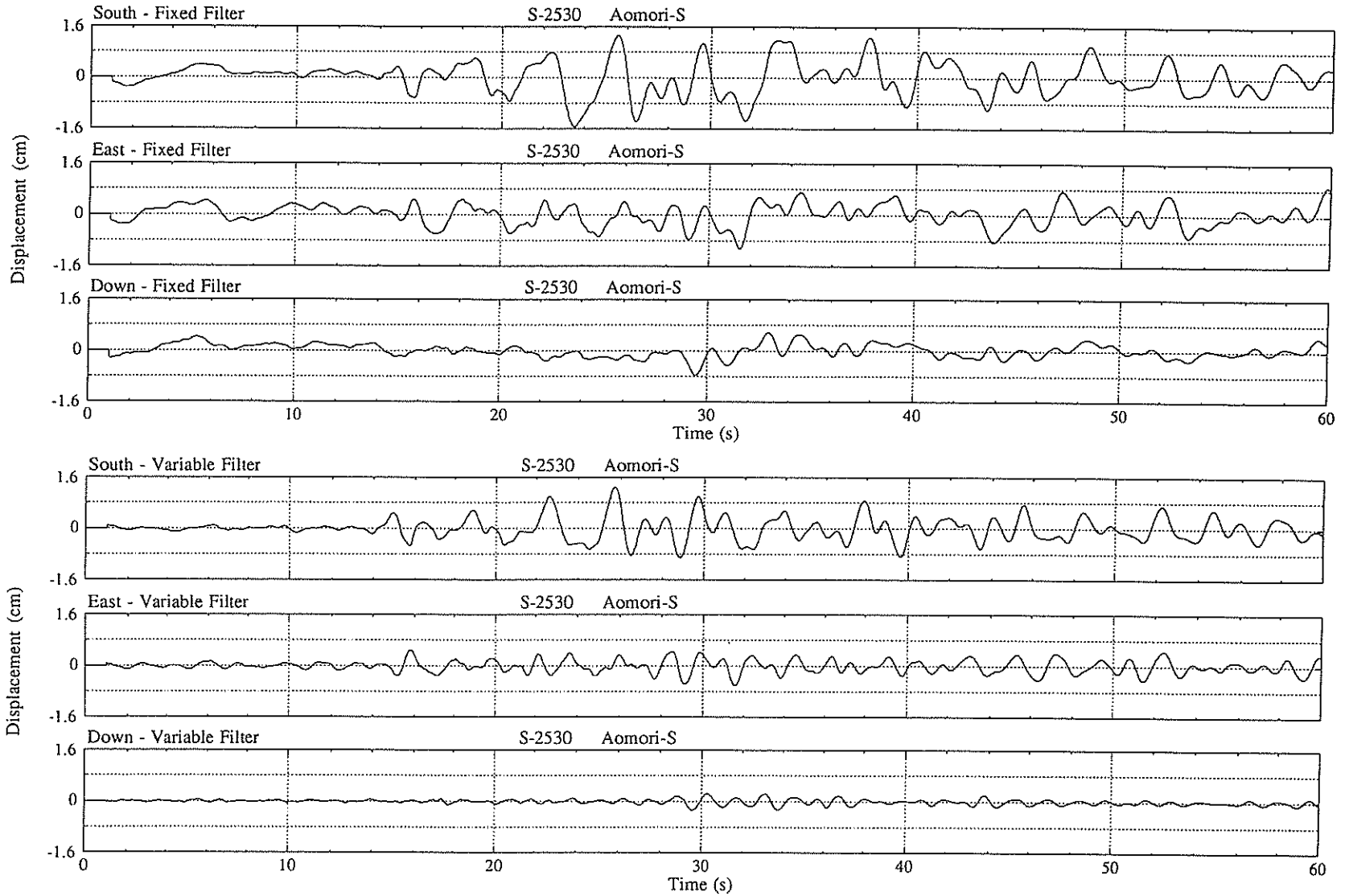
****

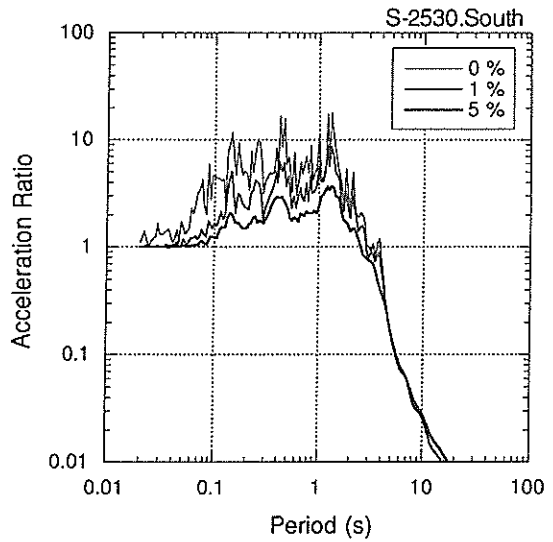
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.230	0.316	0.475	
MAXIMUM ACCELERATION (GAL)				
ORIGINAL	20.9	15.8	9.2	22.1
CORRECTED	22.2	17.3	9.1	23.0
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	5.39	3.12	1.68	5.51
VARIABLE FILTER	4.76	3.00	1.28	4.88
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	1.54	1.04	0.76	1.62
VARIABLE FILTER	1.30	0.61	0.26	1.30

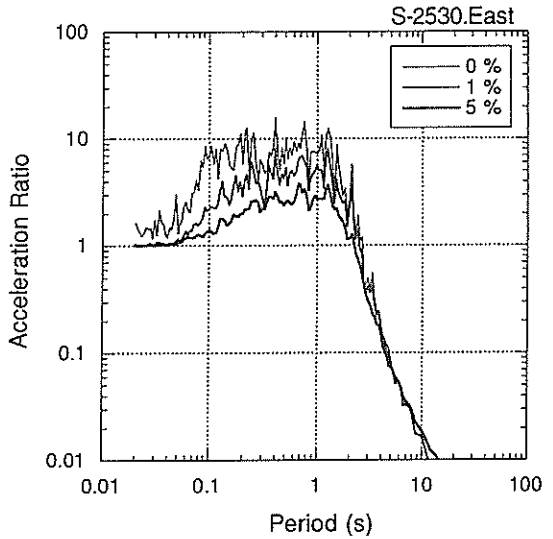
* RESULTANT OF HORIZONTAL COMPONENTS

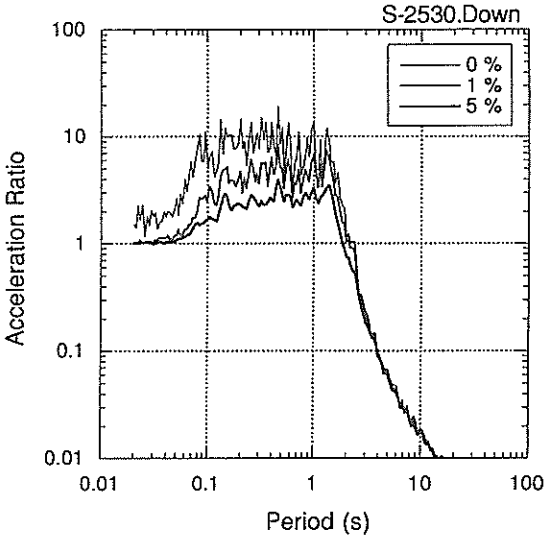

South - Original
S-2530 Aomori-S
East - Original
S-2530 Aomori-S
Down - Original
S-2530 Aomori-S
Acceleration (cm/s2)
24
0
-24
0
10
20
30
40
50
60
Time (s)
South - Corrected
S-2530 Aomori-S
East - Corrected
S-2530 Aomori-S
Down - Corrected
S-2530 Aomori-S
Acceleration (cm/s2)
Time (s)

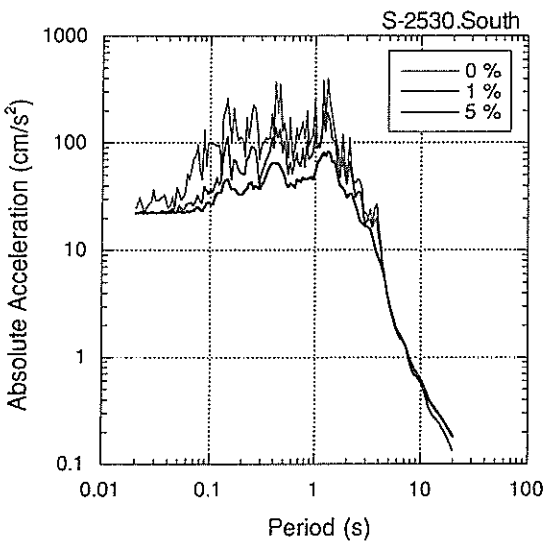

South - Fixed Filter
S-2530 Aomori-S
East - Fixed Filter
S-2530 Aomori-S
Down - Fixed Filter
S-2530 Aomori-S
Velocity (cm/s)
6
0
-6
0
10
20
30
40
50
60
Time (s)
South - Variable Filter
S-2530 Aomori-S
East - Variable Filter
S-2530 Aomori-S
Down - Variable Filter
S-2530 Aomori-S
Velocity (cm/s)
Time (s)

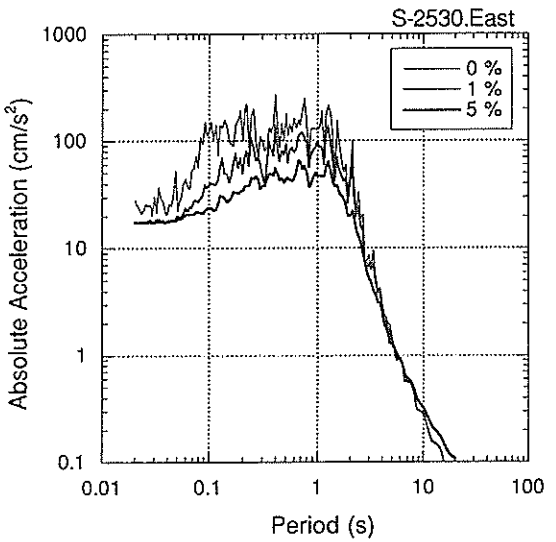

South - Fixed Filter
S-2530 Aomori-S
East - Fixed Filter
S-2530 Aomori-S
Down - Fixed Filter
S-2530 Aomori-S
Displacement (cm)
1.6
0
-1.6
0
10
20
30
40
50
60
Time (s)
South - Variable Filter
S-2530 Aomori-S
East - Variable Filter
S-2530 Aomori-S
Down - Variable Filter
S-2530 Aomori-S
Displacement (cm)
Time (s)

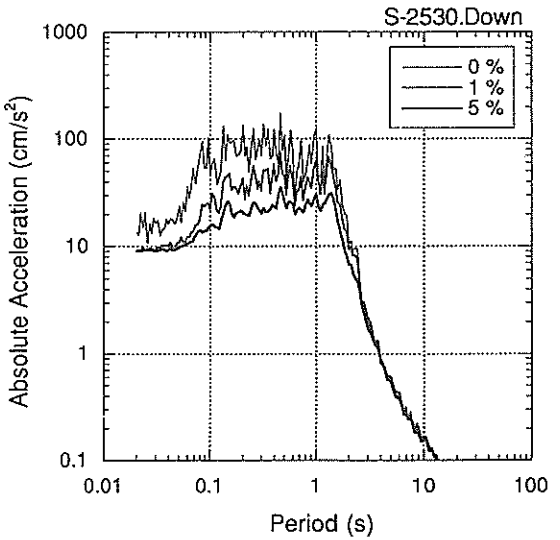

S-2530.South
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

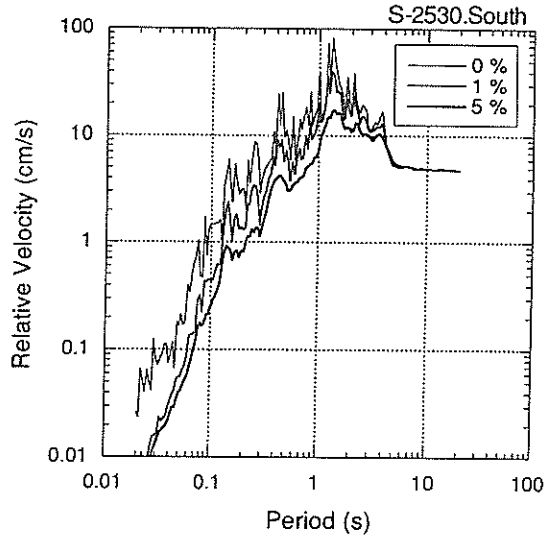

S-2530.East
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

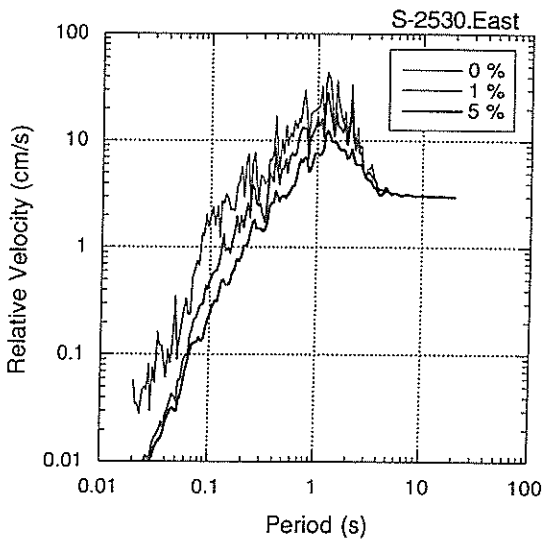

S-2530.Down
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

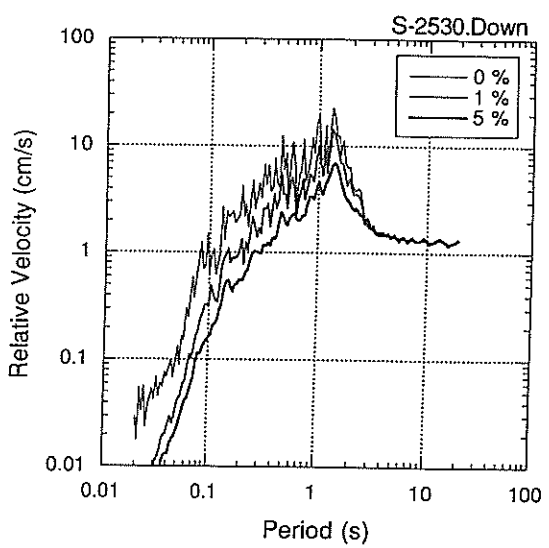

S-2530.South
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

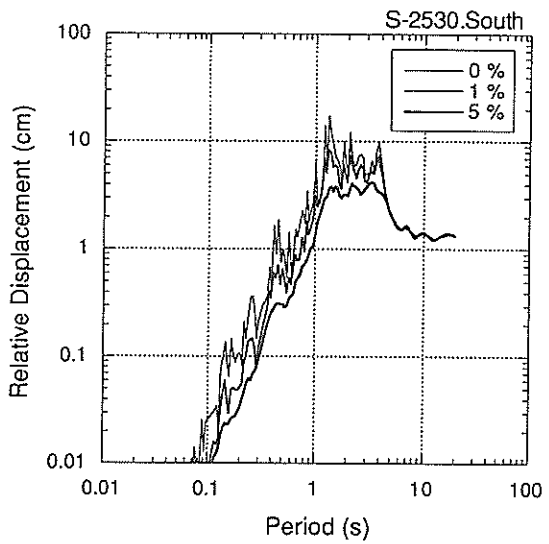

S-2530.East
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

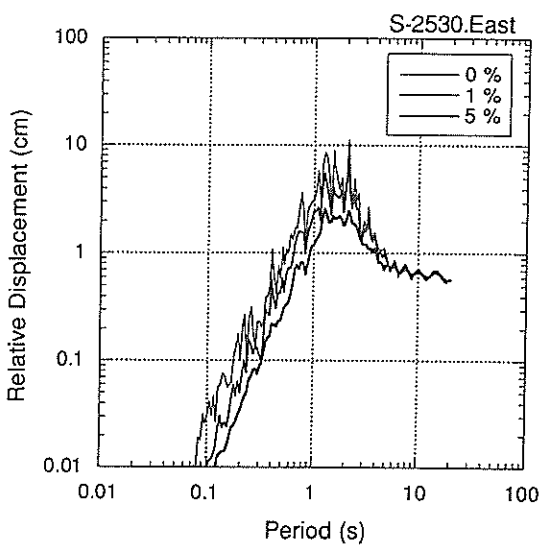

S-2530.Down
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

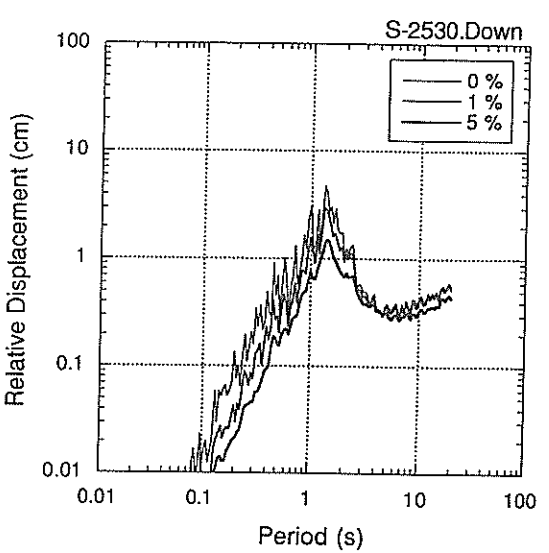

S-2530.South
Relative Velocity (cm/s)
Period (s)
0 %
1 %
5 %
100
10
1
0.1
0.01
0.01
0.1
1
10
100

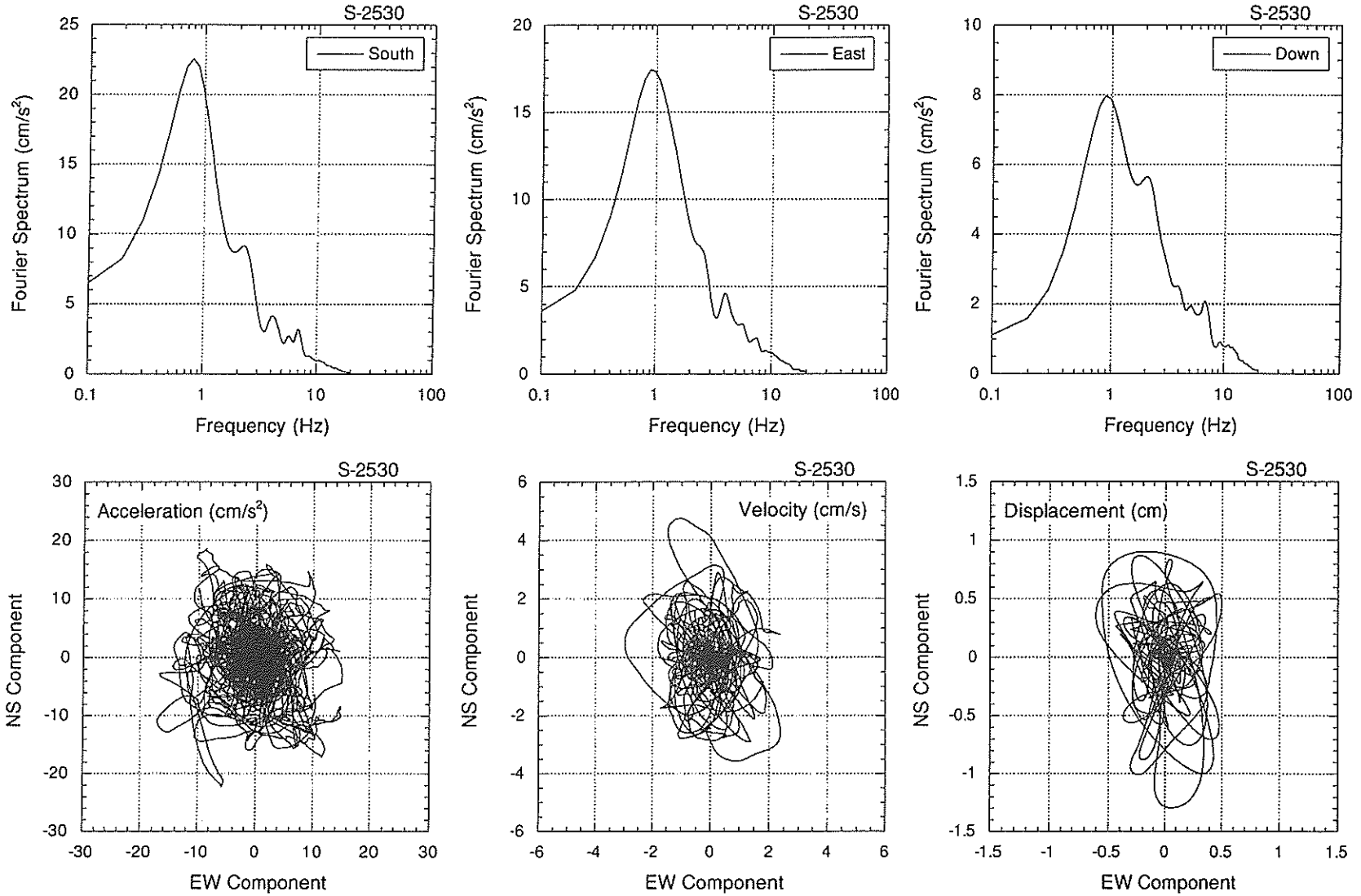

S-2530.East
Relative Velocity (cm/s)
Period (s)
0 %
1 %
5 %
100
10
1
0.1
0.01
0.01
0.1
1
10
100


S-2530.Down
Relative Velocity (cm/s)
Period (s)
0 %
1 %
5 %
100
10
1
0.1
0.01
0.01
0.1
1
10
100


S-2530.South
Relative Displacement (cm)
Period (s)
0 %
1 %
5 %
100
10
1
0.1
0.01
0.01
0.1
1
10
100


S-2530.East
Relative Displacement (cm)
Period (s)
0 %
1 %
5 %
100
10
1
0.1
0.01
0.01
0.1
1
10
100


S-2530.Down
Relative Displacement (cm)
Period (s)
0 %
1 %
5 %
100
10
1
0.1
0.01
0.01
0.1
1
10
100


S-2530
South
Fourier Spectrum (cm/s²)
Frequency (Hz)
S-2530
East
Fourier Spectrum (cm/s²)
Frequency (Hz)
S-2530
Down
Fourier Spectrum (cm/s²)
Frequency (Hz)
S-2530
Acceleration (cm/s²)
NS Component
EW Component
S-2530
Velocity (cm/s)
NS Component
EW Component
S-2530
Displacement (cm)
NS Component
EW Component

RECORD NUMBER : S-2531

STATION : TOMAKOMAI-S

EARTHQUAKE DATA

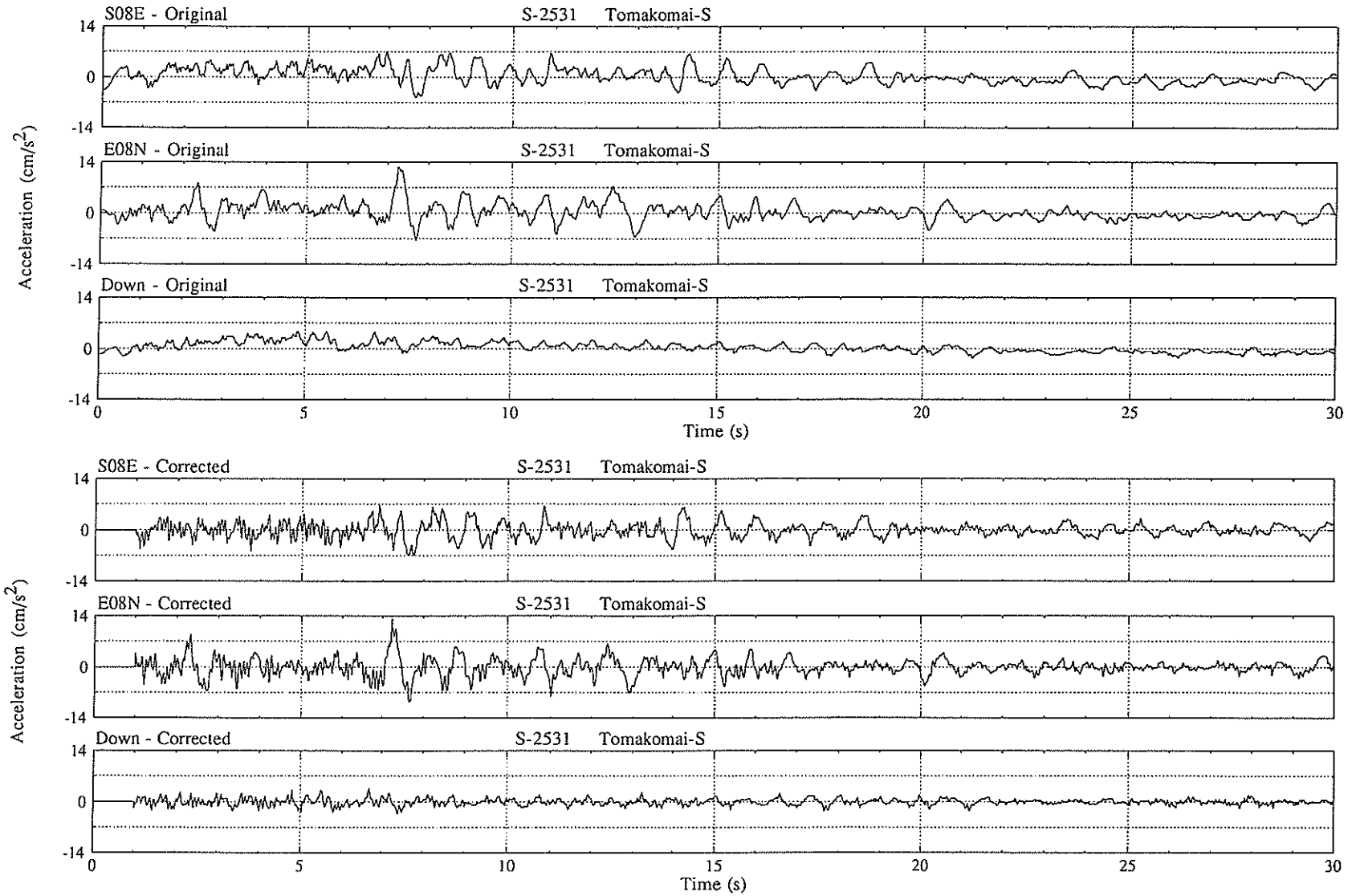
****

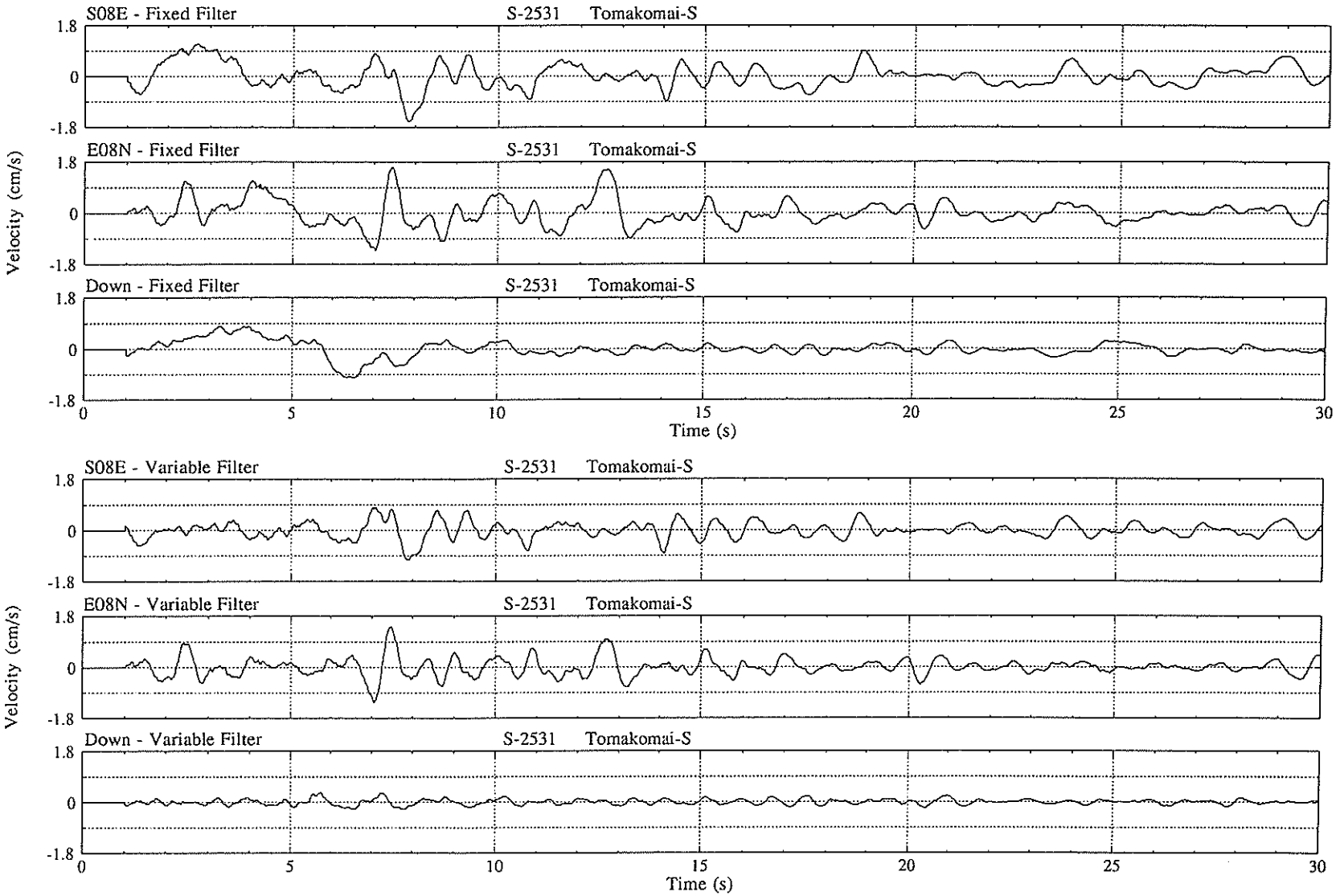
DATE AND TIME	4:42 AUG. 8, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	41°57.3' N
LONGITUDE	139°53.3' E
DEPTH	23.2KM
JMA MAGNITUDE	6.3

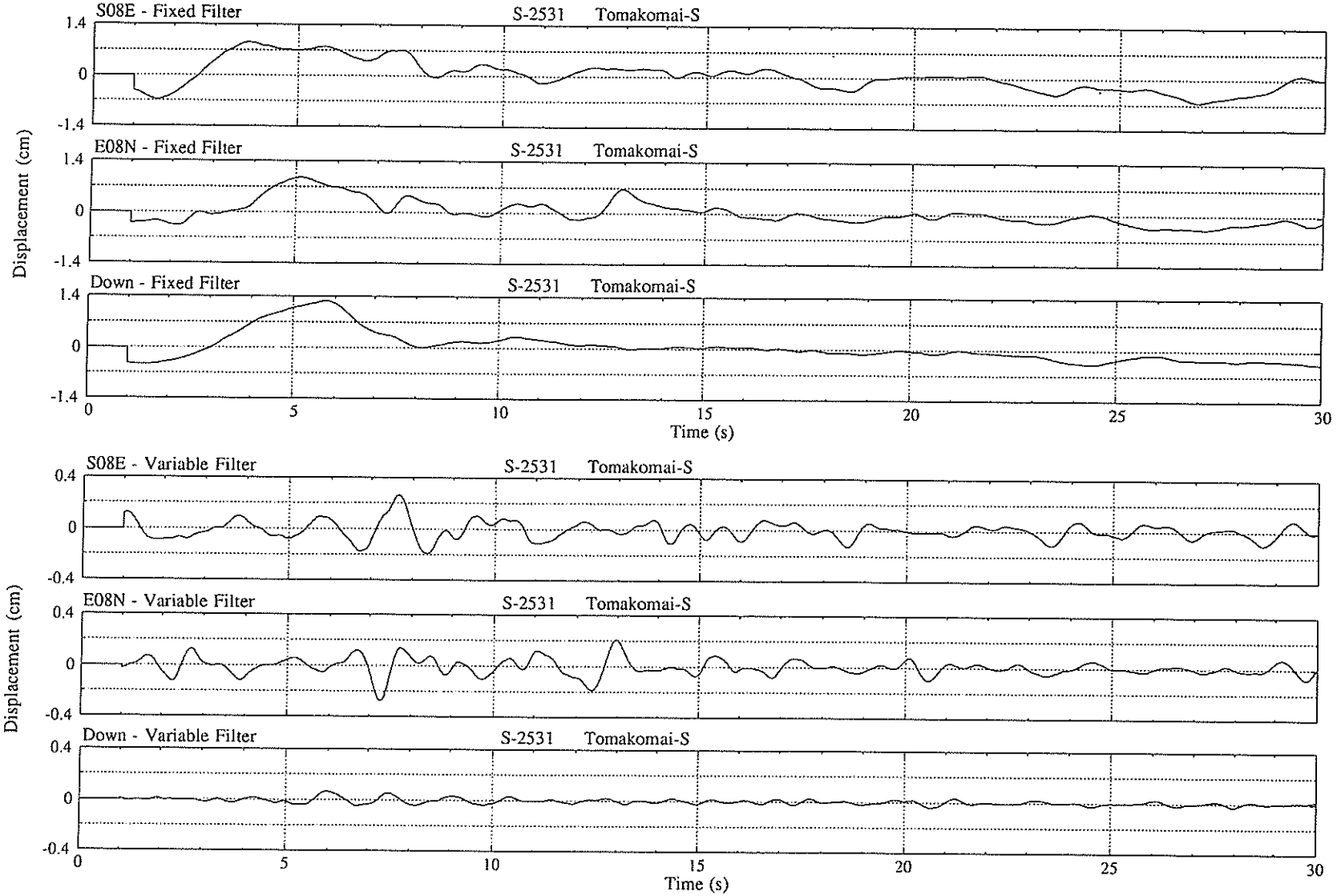
****

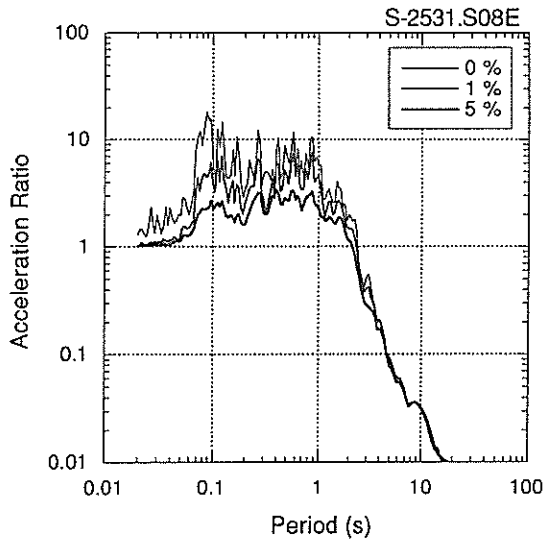
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.352	0.425	0.523	
MAXIMUM ACCELERATION (GAL)				
ORIGINAL	7.1	12.7	4.8	12.8
CORRECTED	6.9	13.3	3.7	14.2
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	1.58	1.61	1.00	1.63
VARIABLE FILTER	1.04	1.44	0.34	1.62
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	0.92	0.95	1.28	1.19
VARIABLE FILTER	0.27	0.28	0.07	0.29

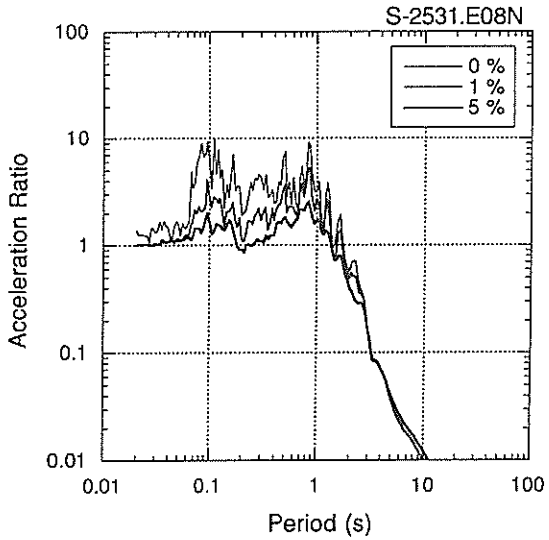
* RESULTANT OF HORIZONTAL COMPONENTS

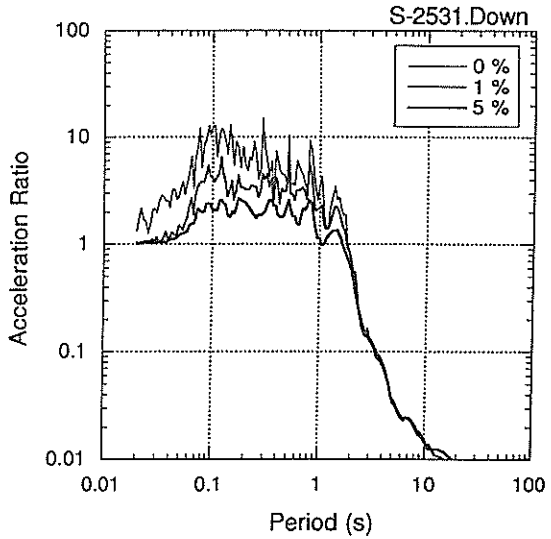

S08E - Original
S-2531 Tomakomai-S
E08N - Original
S-2531 Tomakomai-S
Down - Original
S-2531 Tomakomai-S
Acceleration (cm/s2)
14
0
-14
0
5
10
15
20
25
30
Time (s)
S08E - Corrected
S-2531 Tomakomai-S
E08N - Corrected
S-2531 Tomakomai-S
Down - Corrected
S-2531 Tomakomai-S
Acceleration (cm/s2)
Time (s)

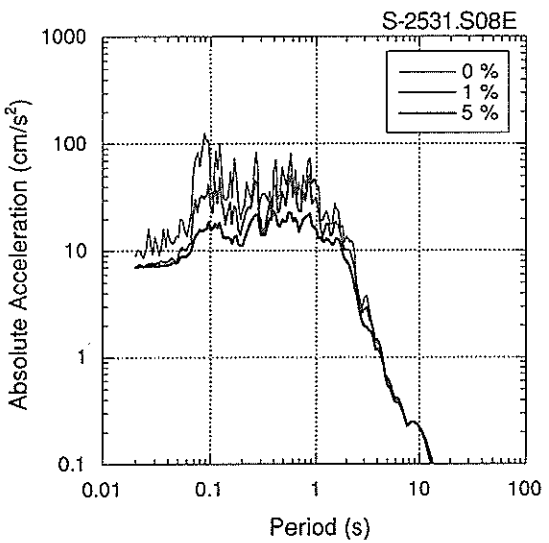

S08E - Fixed Filter
S-2531 Tomakomai-S
E08N - Fixed Filter
S-2531 Tomakomai-S
Down - Fixed Filter
S-2531 Tomakomai-S
Velocity (cm/s)
1.8
0
-1.8
0
5
10
15
20
25
30
Time (s)
S08E - Variable Filter
S-2531 Tomakomai-S
E08N - Variable Filter
S-2531 Tomakomai-S
Down - Variable Filter
S-2531 Tomakomai-S
Velocity (cm/s)
Time (s)

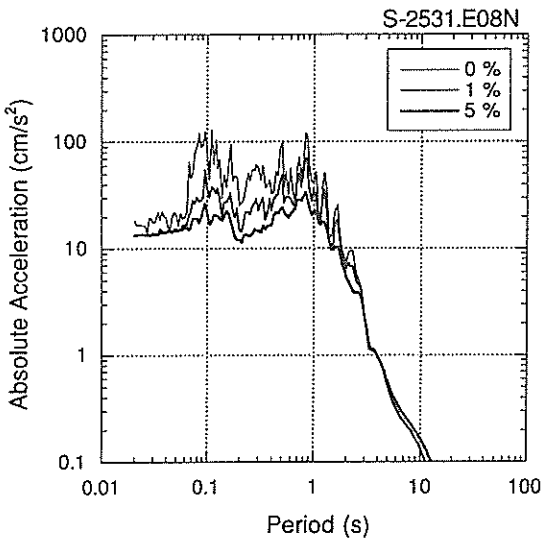

S08E - Fixed Filter
S-2531 Tomakomai-S
E08N - Fixed Filter
S-2531 Tomakomai-S
Down - Fixed Filter
S-2531 Tomakomai-S
Displacement (cm)
1.4
0
-1.4
0
5
10
15
20
25
30
Time (s)
S08E - Variable Filter
S-2531 Tomakomai-S
E08N - Variable Filter
S-2531 Tomakomai-S
Down - Variable Filter
S-2531 Tomakomai-S
Displacement (cm)
0.4
0
-0.4
Time (s)

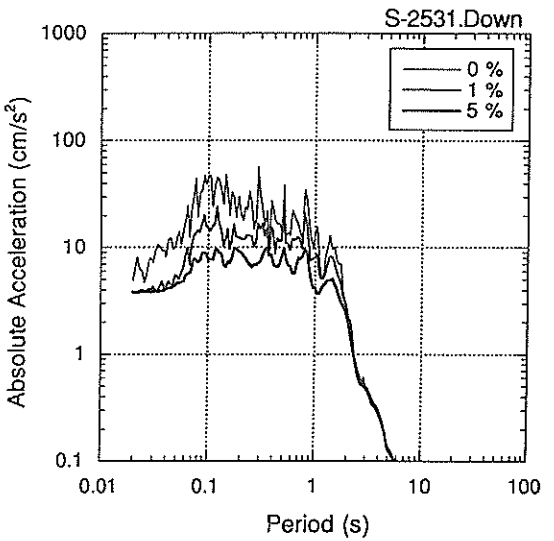

S-2531.S08E
0 %
1 %
5 %
Acceleration Ratio
Period (s)

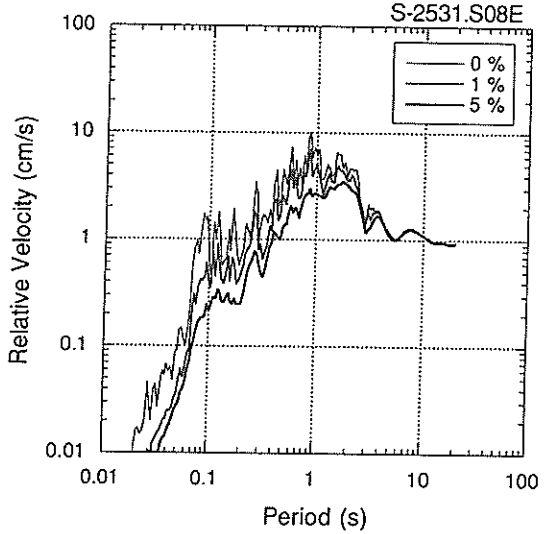

S-2531.E08N
0 %
1 %
5 %
Acceleration Ratio
Period (s)

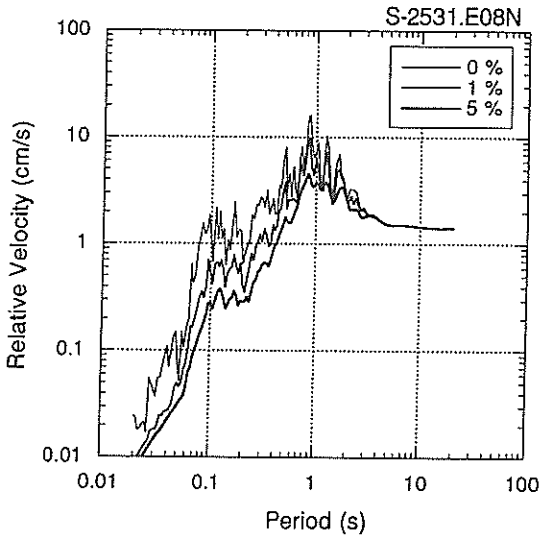

S-2531.Down
0 %
1 %
5 %
Acceleration Ratio
Period (s)

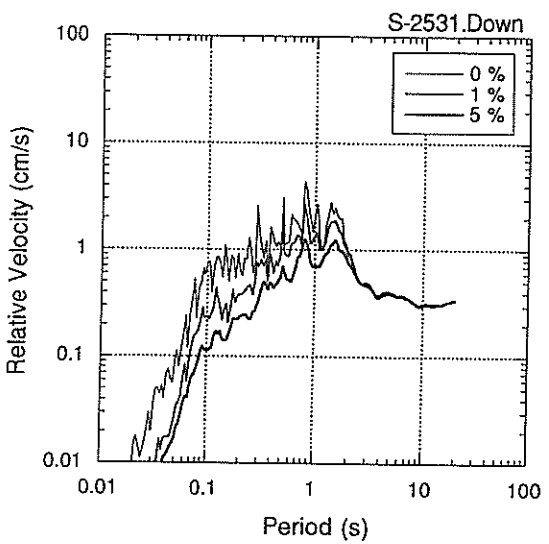

S-2531.S08E
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

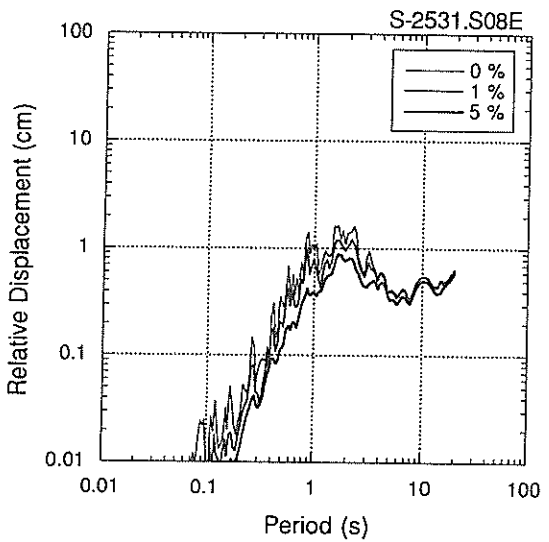

S-2531.E08N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

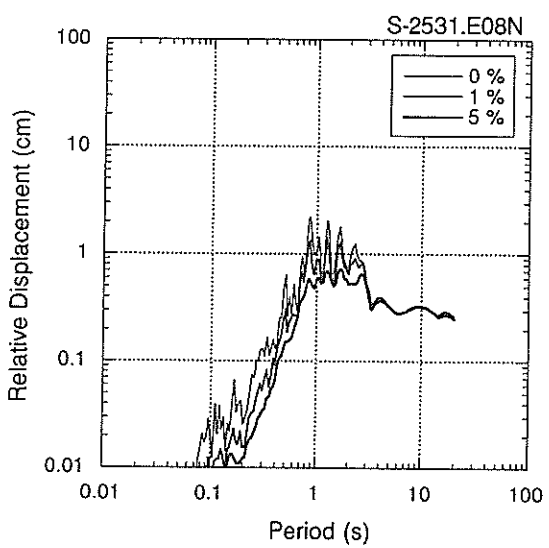

S-2531.Down
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)

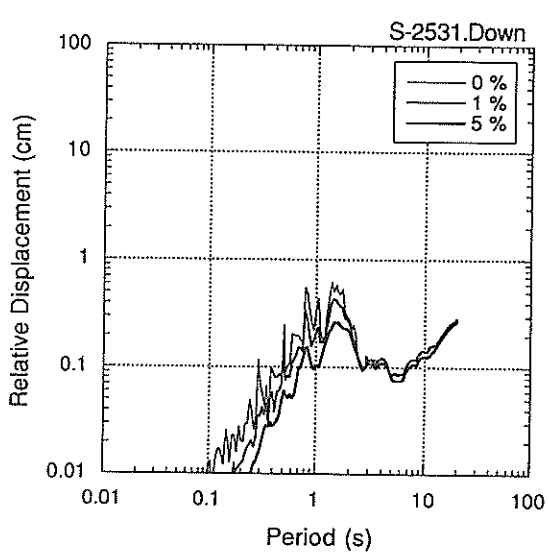

S-2531.S08E
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
0.01
0.1
1
10
100

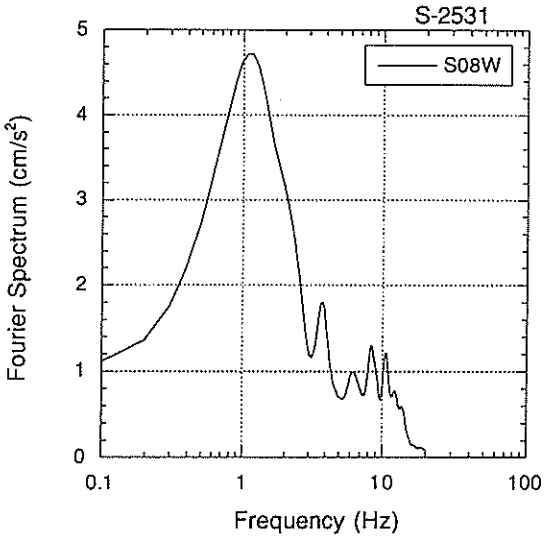

S-2531.E08N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
0.01
0.1
1
10
100

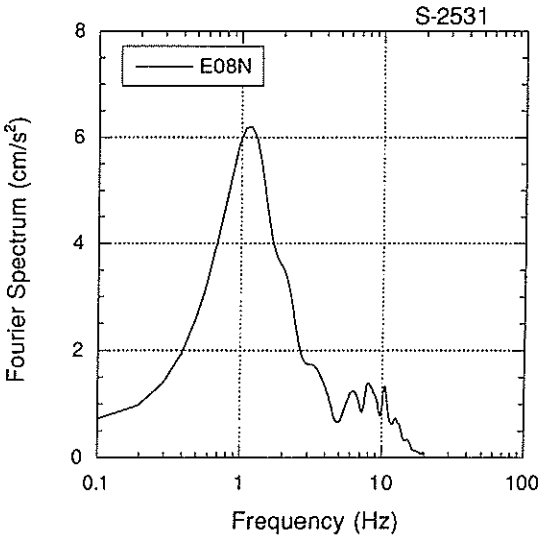

S-2531.Down
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
0.01
0.1
1
10
100

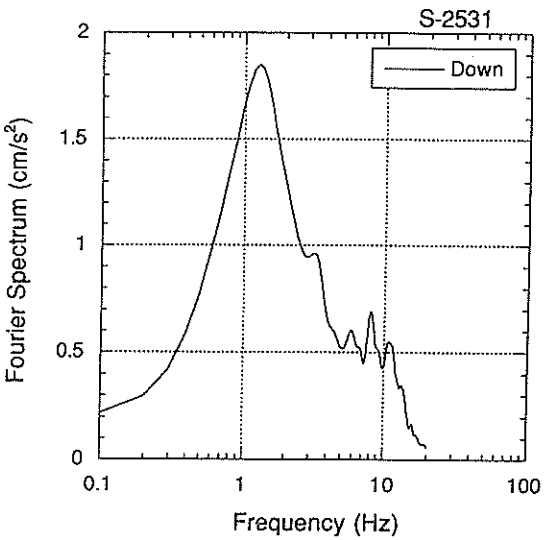

S-2531.S08E
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
0.01
0.1
1
10
100

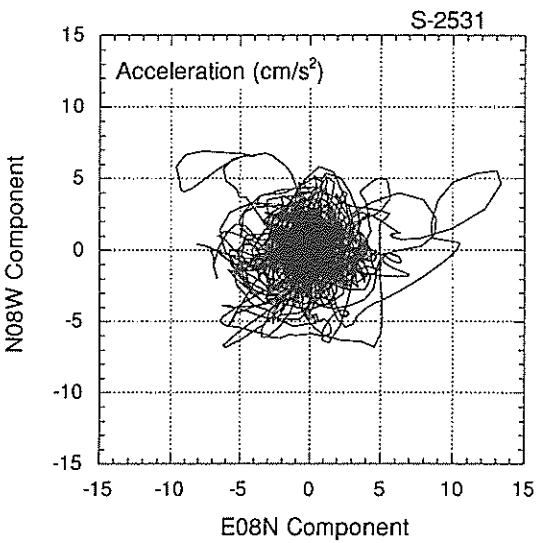

S-2531.E08N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
0.01
0.1
1
10
100

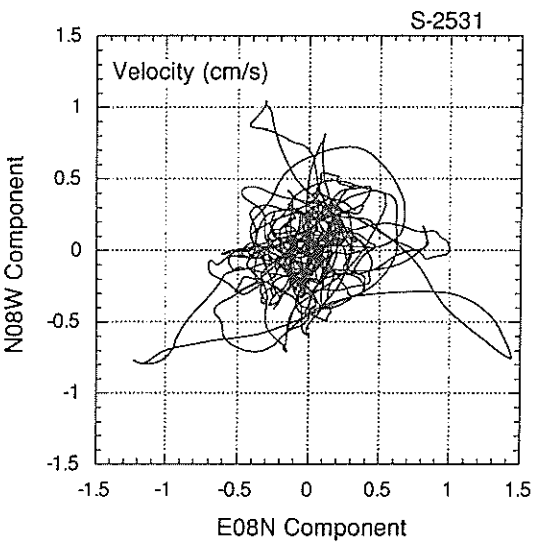

S-2531.Down
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
0.01
0.1
1
10
100

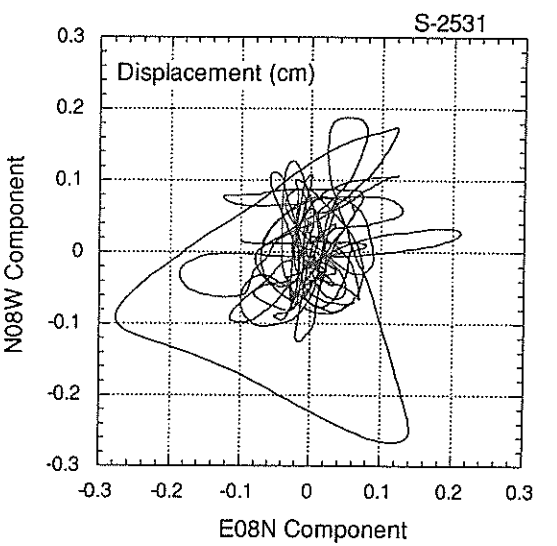

S-2531
S08W
Fourier Spectrum (cm/s²)
Frequency (Hz)


S-2531
E08N
Fourier Spectrum (cm/s²)
Frequency (Hz)


S-2531
Down
Fourier Spectrum (cm/s²)
Frequency (Hz)


S-2531
Acceleration (cm/s²)
N08W Component
E08N Component


S-2531
Velocity (cm/s)
N08W Component
E08N Component


S-2531
Displacement (cm)
N08W Component
E08N Component

RECORD NUMBER : M-1476

STATION : HAKODATE-M

EARTHQUAKE DATA

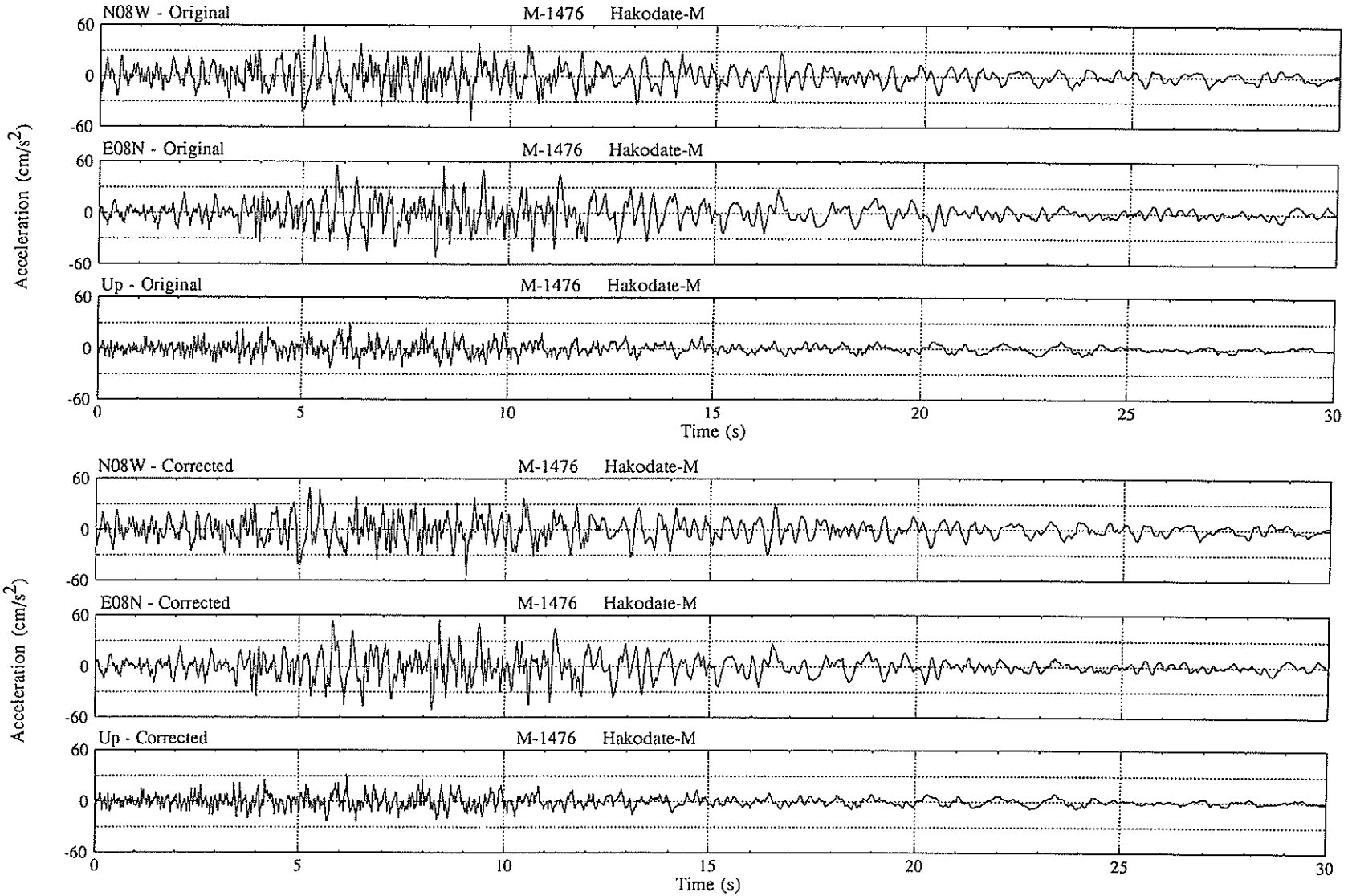
****

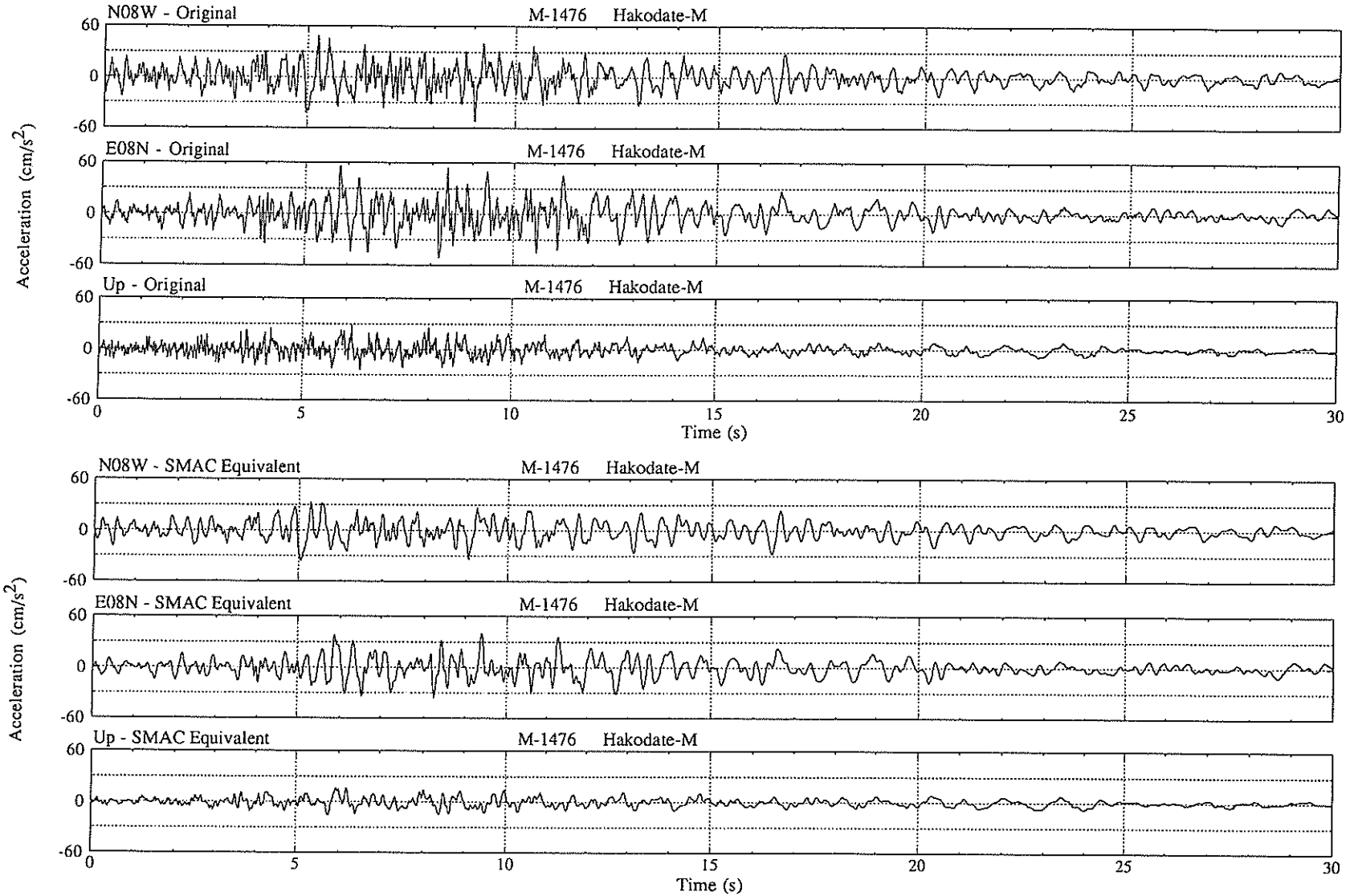
DATE AND TIME	4:42 AUG. 8,1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	41°57.3' N
LONGITUDE	139°53.3' E
DEPTH	23.2KM
JMA MAGNITUDE	6.3

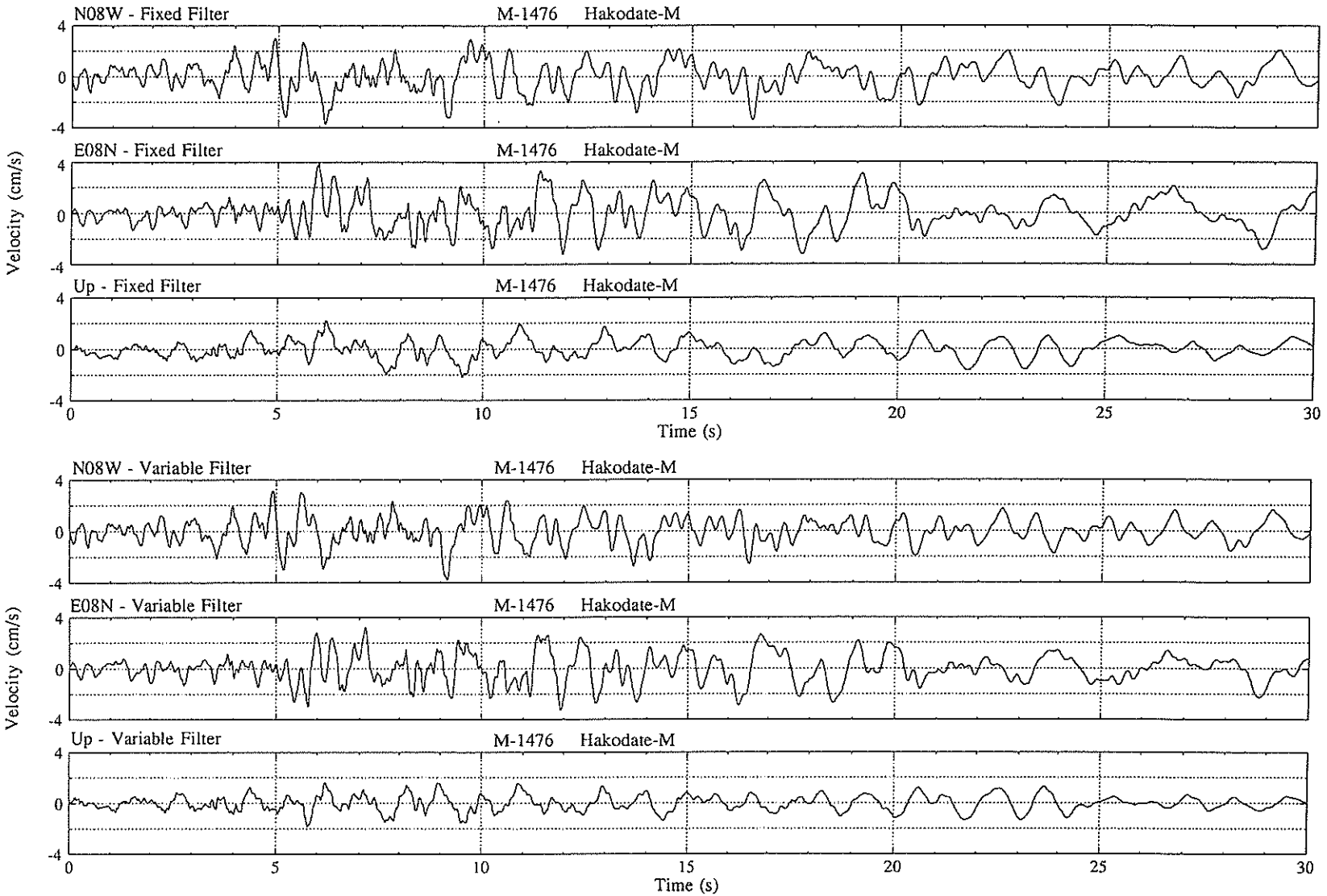
****

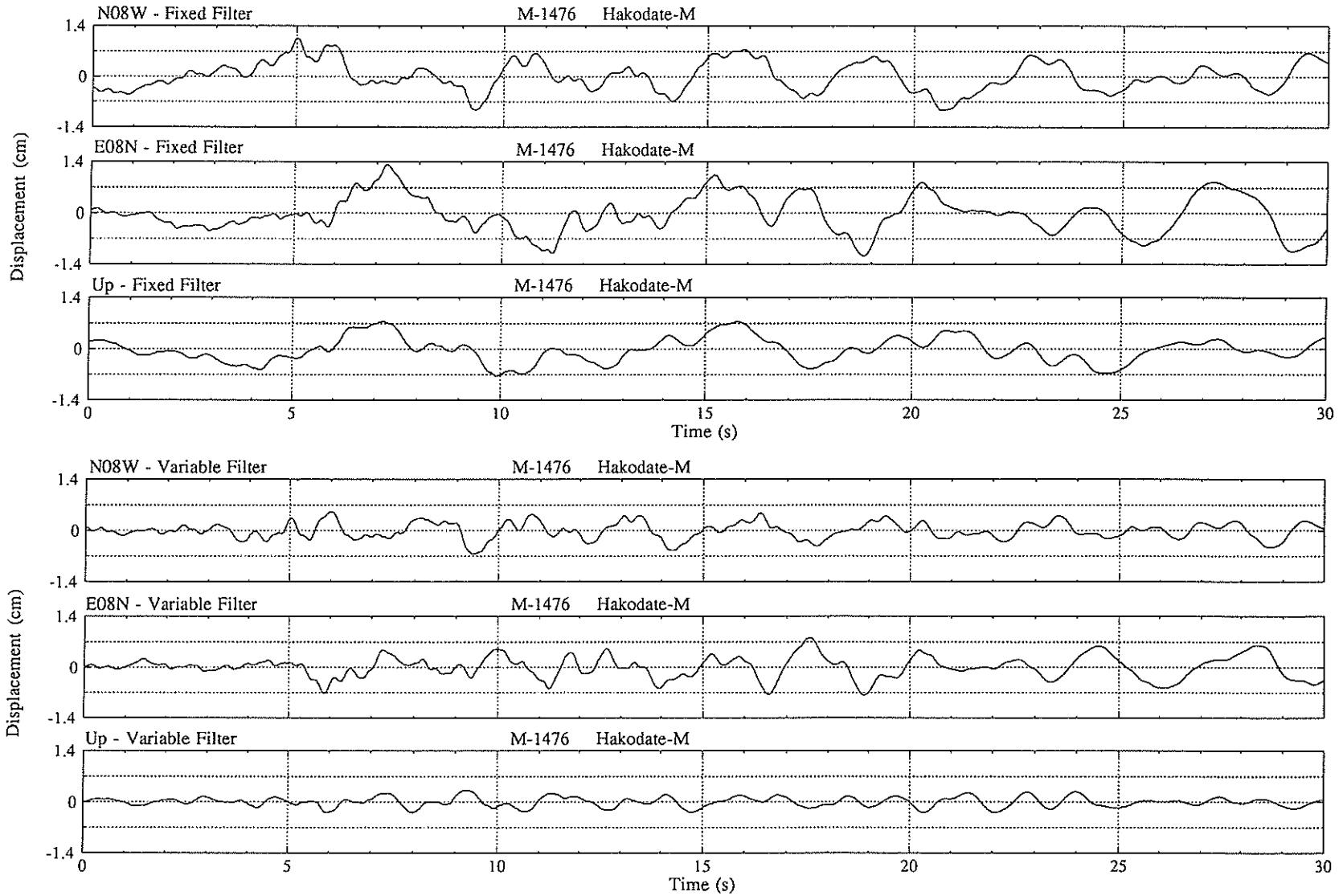
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.267	0.218	0.316	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	35.3	40.2	16.3	42.4
ORIGINAL	51.8	56.1	30.6	56.3
CORRECTED	52.7	55.0	32.3	55.4
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	3.71	3.85	2.26	3.95
VARIABLE FILTER	3.78	3.28	1.83	3.92
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	1.07	1.33	0.76	1.34
VARIABLE FILTER	0.64	0.82	0.32	0.89

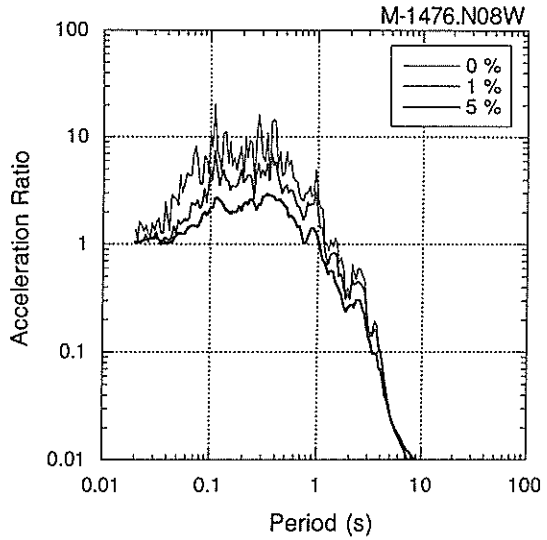
* RESULTANT OF HORIZONTAL COMPONENTS

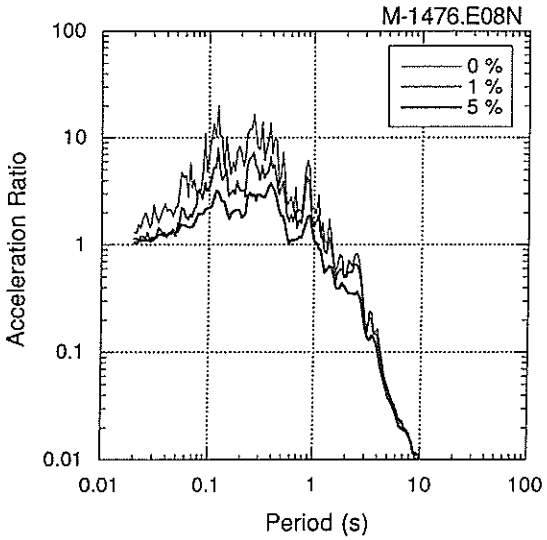

N08W - Original
M-1476 Hakodate-M
E08N - Original
M-1476 Hakodate-M
Up - Original
M-1476 Hakodate-M
Acceleration (cm/s2)
60
0
-60
0
5
10
15
20
25
30
Time (s)
N08W - Corrected
M-1476 Hakodate-M
E08N - Corrected
M-1476 Hakodate-M
Up - Corrected
M-1476 Hakodate-M
Acceleration (cm/s2)
Time (s)

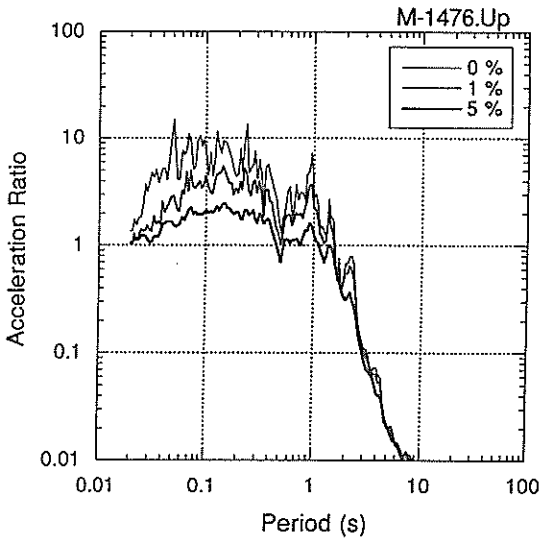

N08W - Original
M-1476 Hakodate-M
E08N - Original
M-1476 Hakodate-M
Up - Original
M-1476 Hakodate-M
Acceleration (cm/s2)
60
0
-60
0
5
10
15
20
25
30
Time (s)
N08W - SMAC Equivalent
M-1476 Hakodate-M
E08N - SMAC Equivalent
M-1476 Hakodate-M
Up - SMAC Equivalent
M-1476 Hakodate-M
Acceleration (cm/s2)
Time (s)

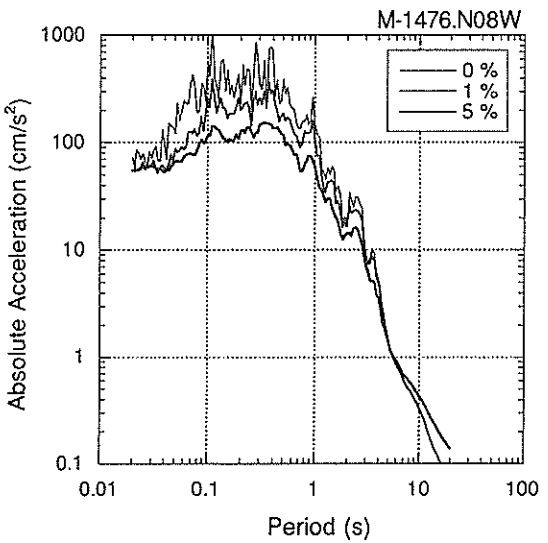

N08W - Fixed Filter
M-1476 Hakodate-M
E08N - Fixed Filter
M-1476 Hakodate-M
Up - Fixed Filter
M-1476 Hakodate-M
Velocity (cm/s)
Time (s)
N08W - Variable Filter
M-1476 Hakodate-M
E08N - Variable Filter
M-1476 Hakodate-M
Up - Variable Filter
M-1476 Hakodate-M
Velocity (cm/s)
Time (s)

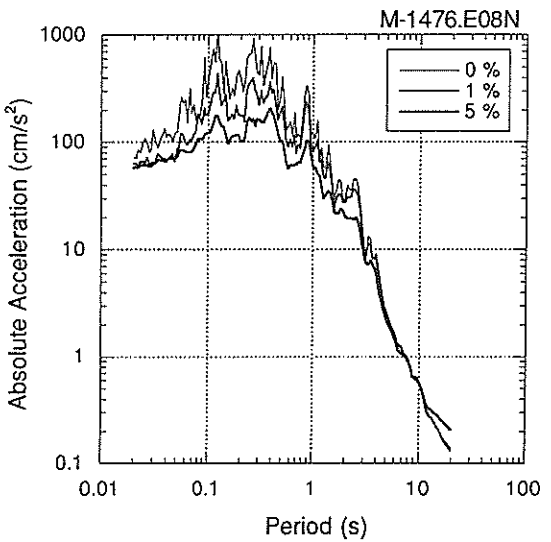

N08W - Fixed Filter
M-1476 Hakodate-M
E08N - Fixed Filter
M-1476 Hakodate-M
Up - Fixed Filter
M-1476 Hakodate-M
Displacement (cm)
1.4
0
-1.4
0
5
10
15
20
25
30
Time (s)
N08W - Variable Filter
M-1476 Hakodate-M
E08N - Variable Filter
M-1476 Hakodate-M
Up - Variable Filter
M-1476 Hakodate-M
Displacement (cm)
Time (s)

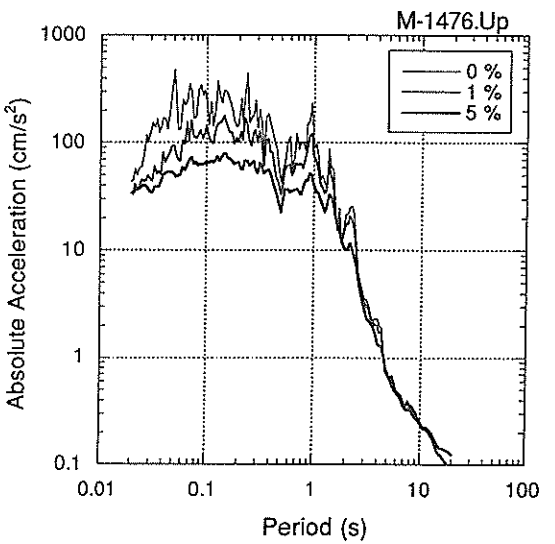

M-1476.N08W
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

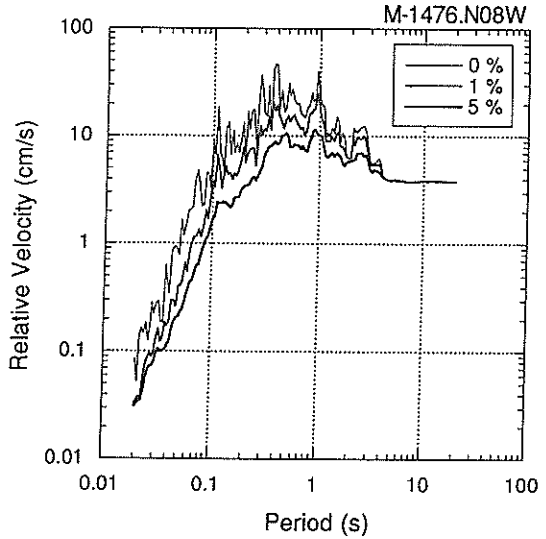

M-1476.E08N
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

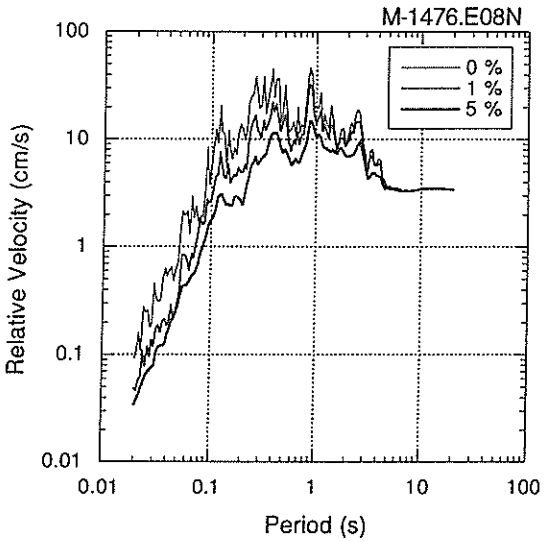

M-1476.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

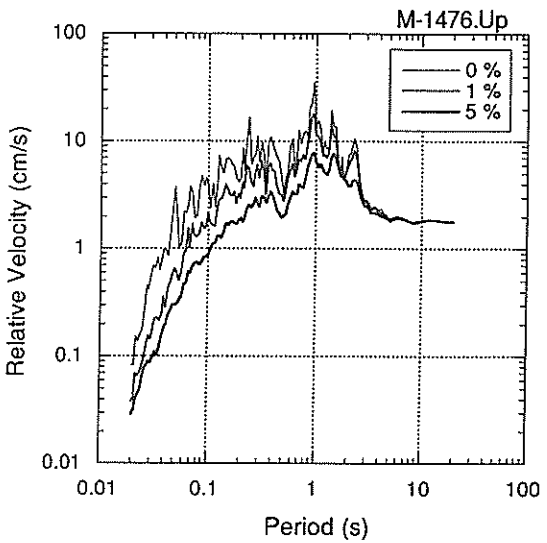

M-1476.N08W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

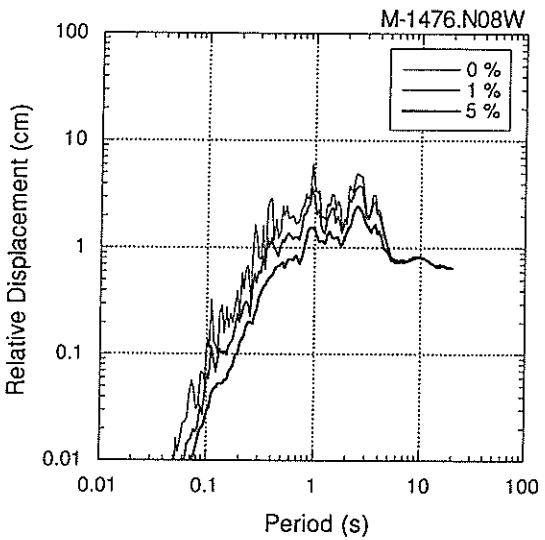

M-1476.E08N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

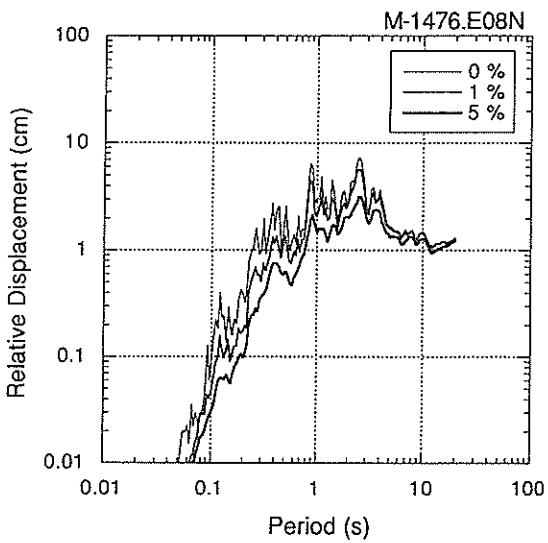

M-1476.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

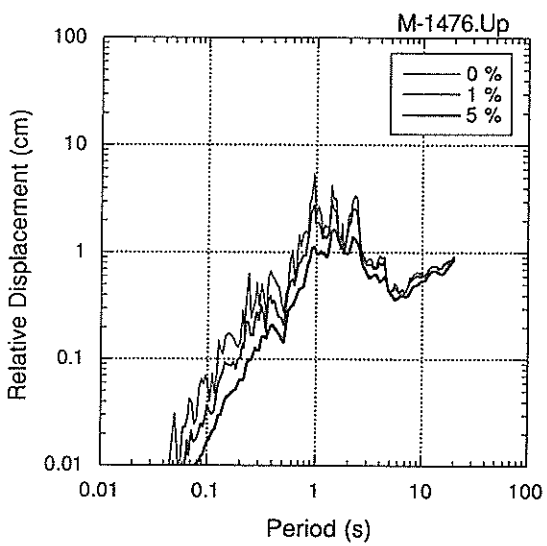

M-1476.N08W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

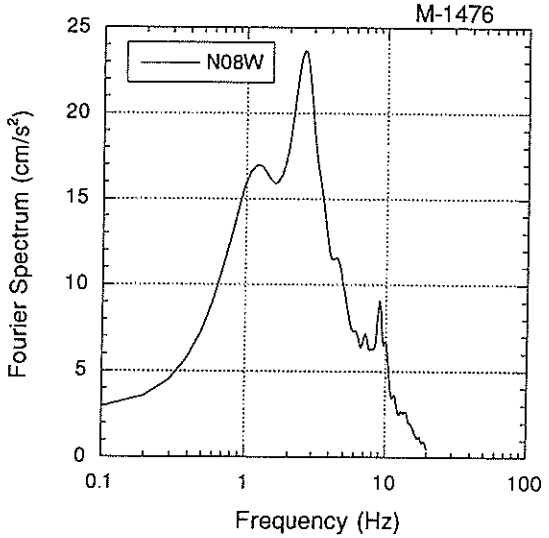

M-1476.E08N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

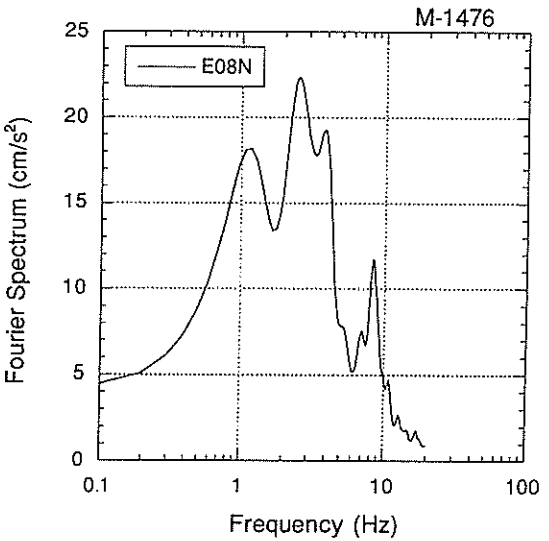

M-1476.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

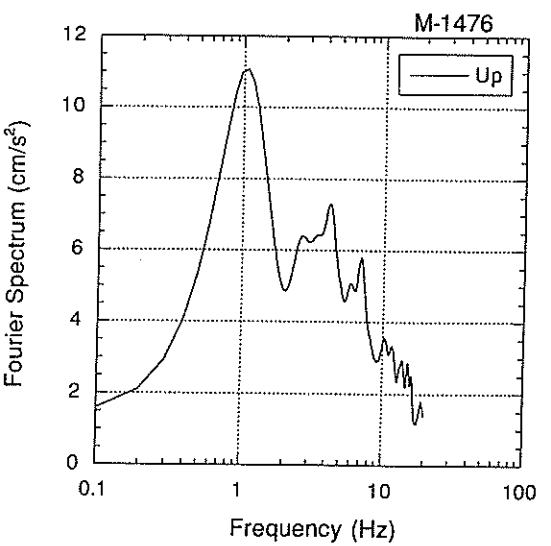

M-1476.N08W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

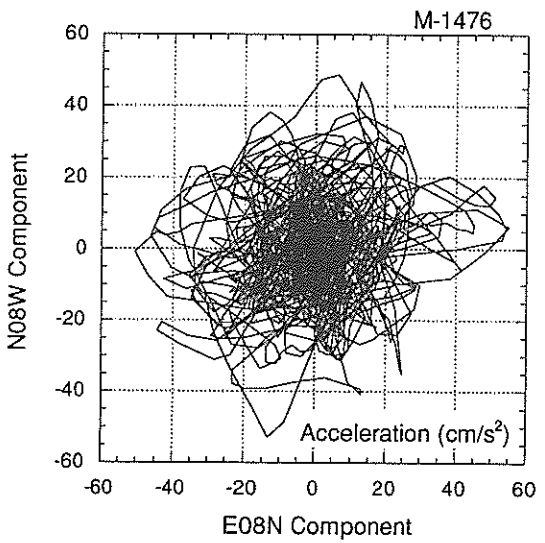

M-1476.E08N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

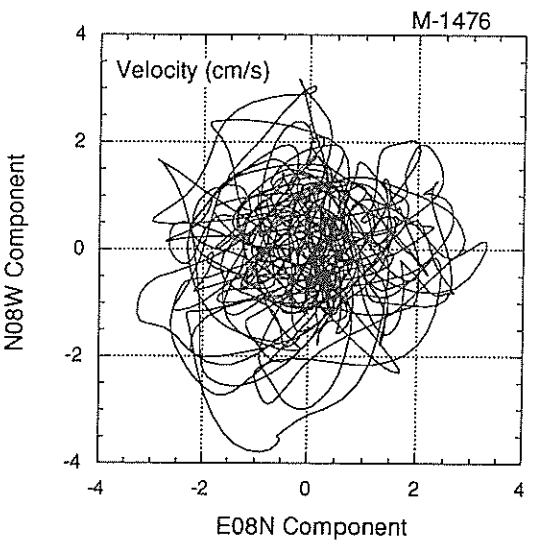

M-1476.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

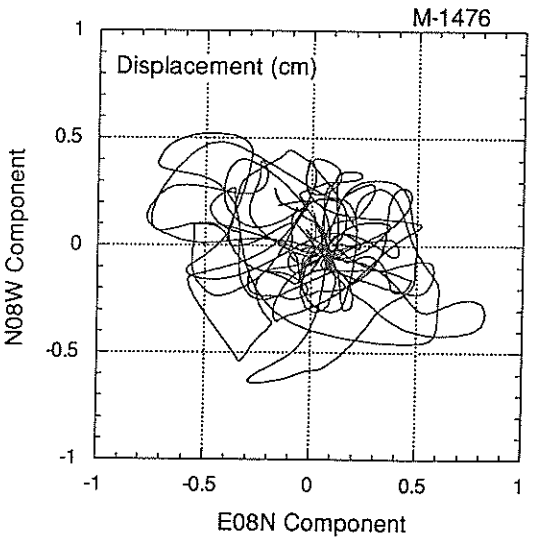

M-1476
N08W
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1476
E08N
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1476
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


M-1476
Acceleration (cm/s²)
N08W Component
E08N Component


M-1476
Velocity (cm/s)
N08W Component
E08N Component


M-1476
Displacement (cm)
N08W Component
E08N Component

RECORD NUMBER : F-603

STATION : HAKODATE-F

EARTHQUAKE DATA

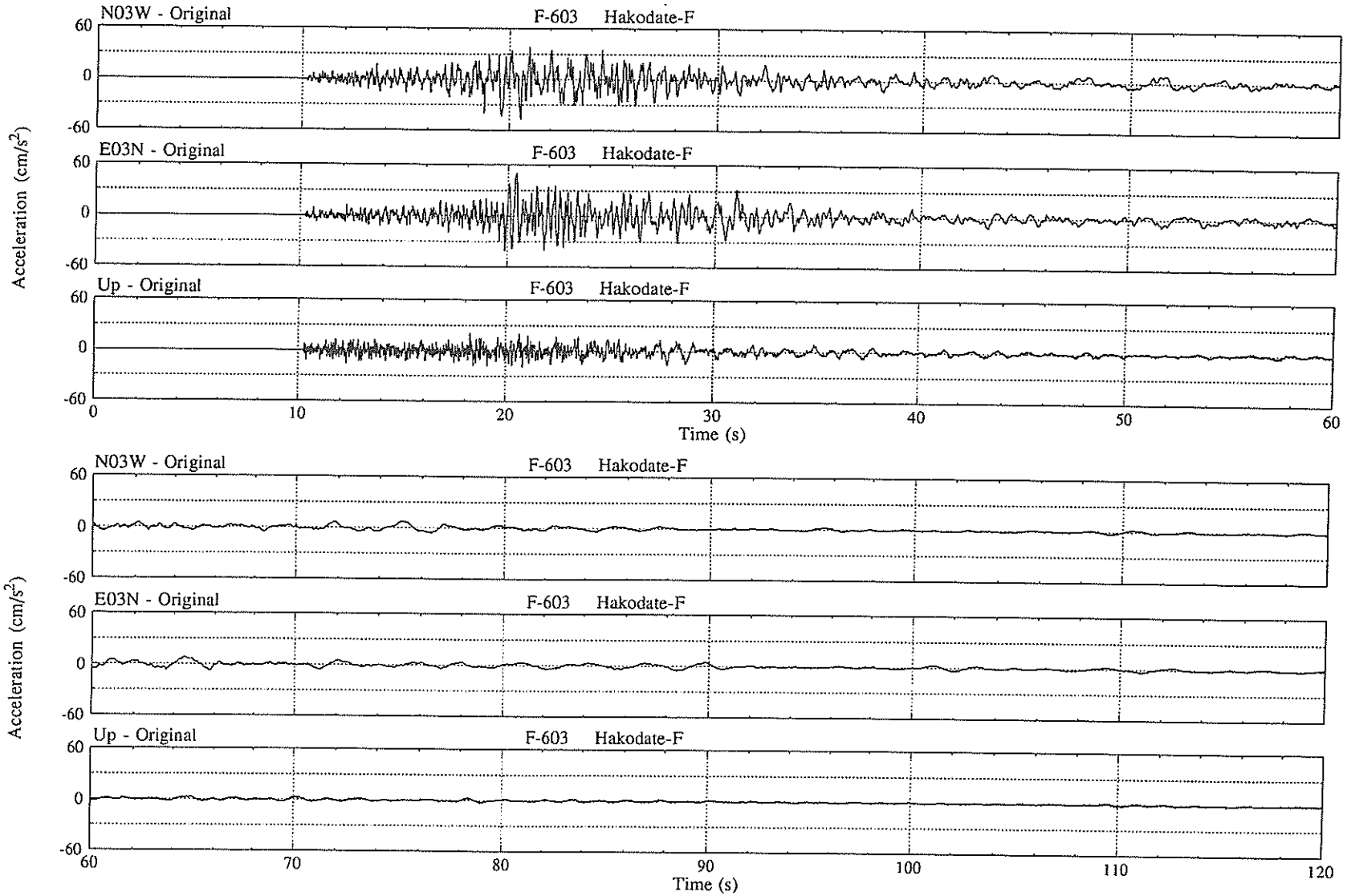
****

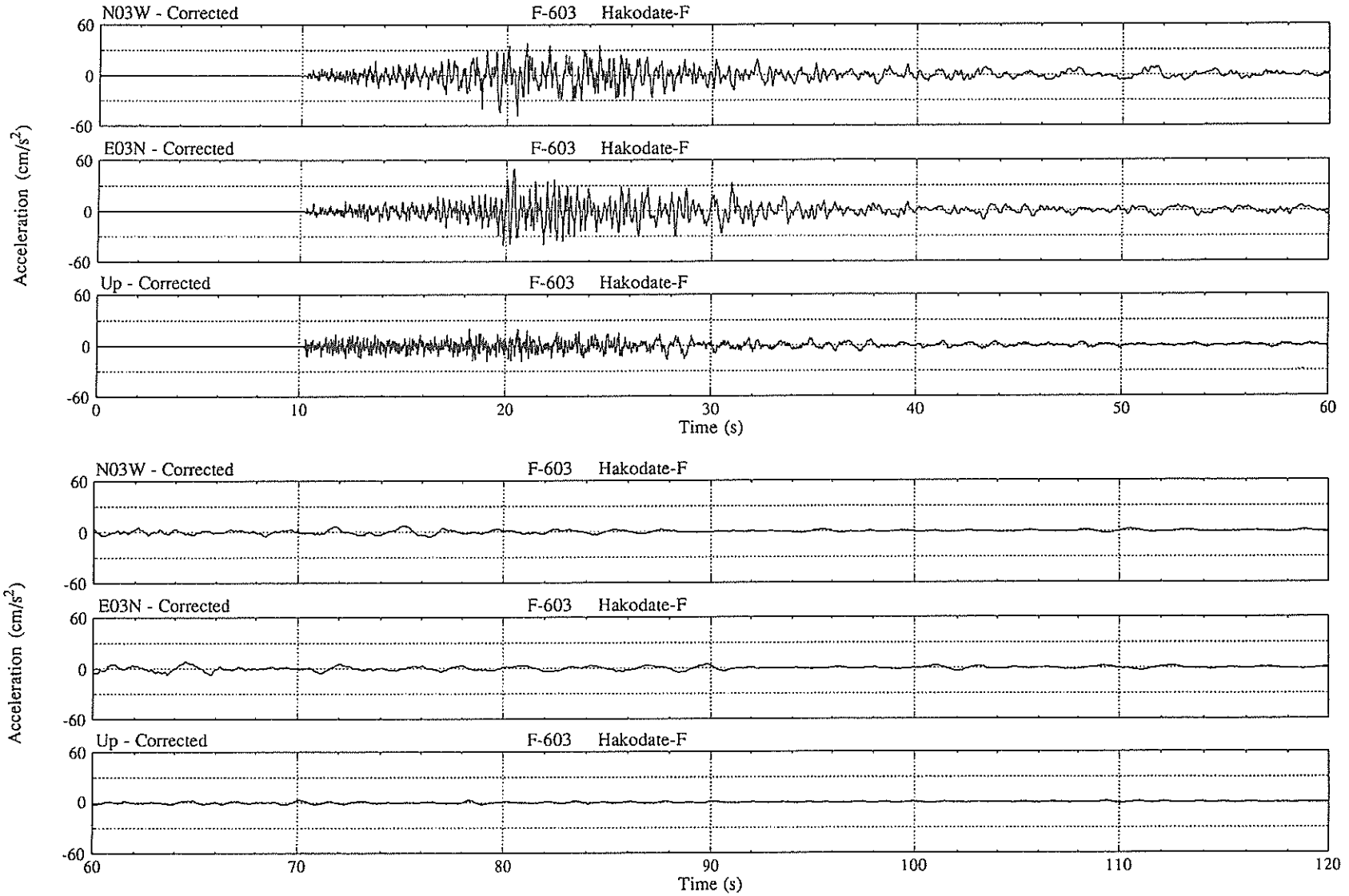
DATE AND TIME	4:42 AUG. 8, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	41°57.3' N
LONGITUDE	139°53.3' E
DEPTH	23.2KM
JMA MAGNITUDE	6.3

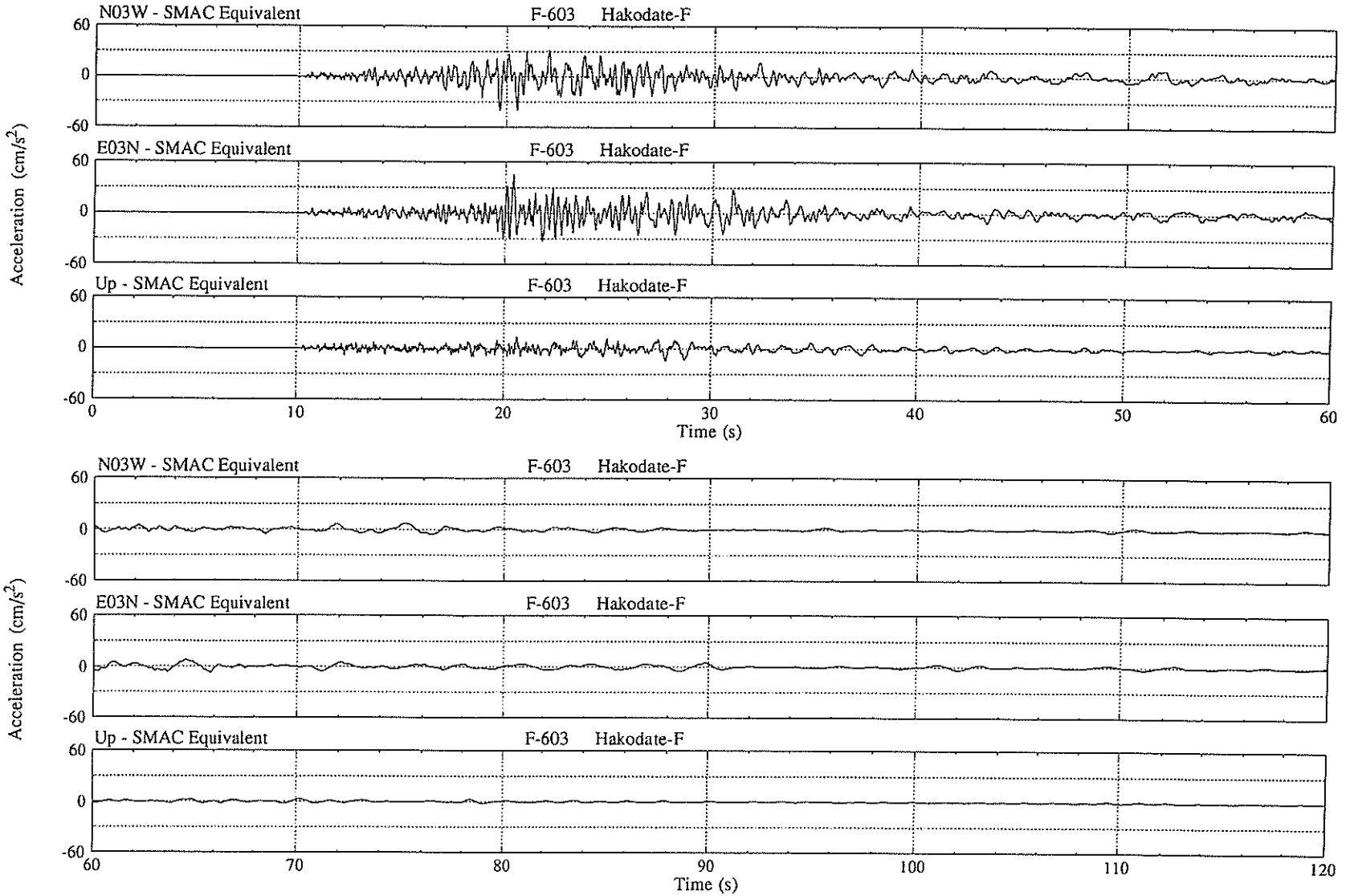
****

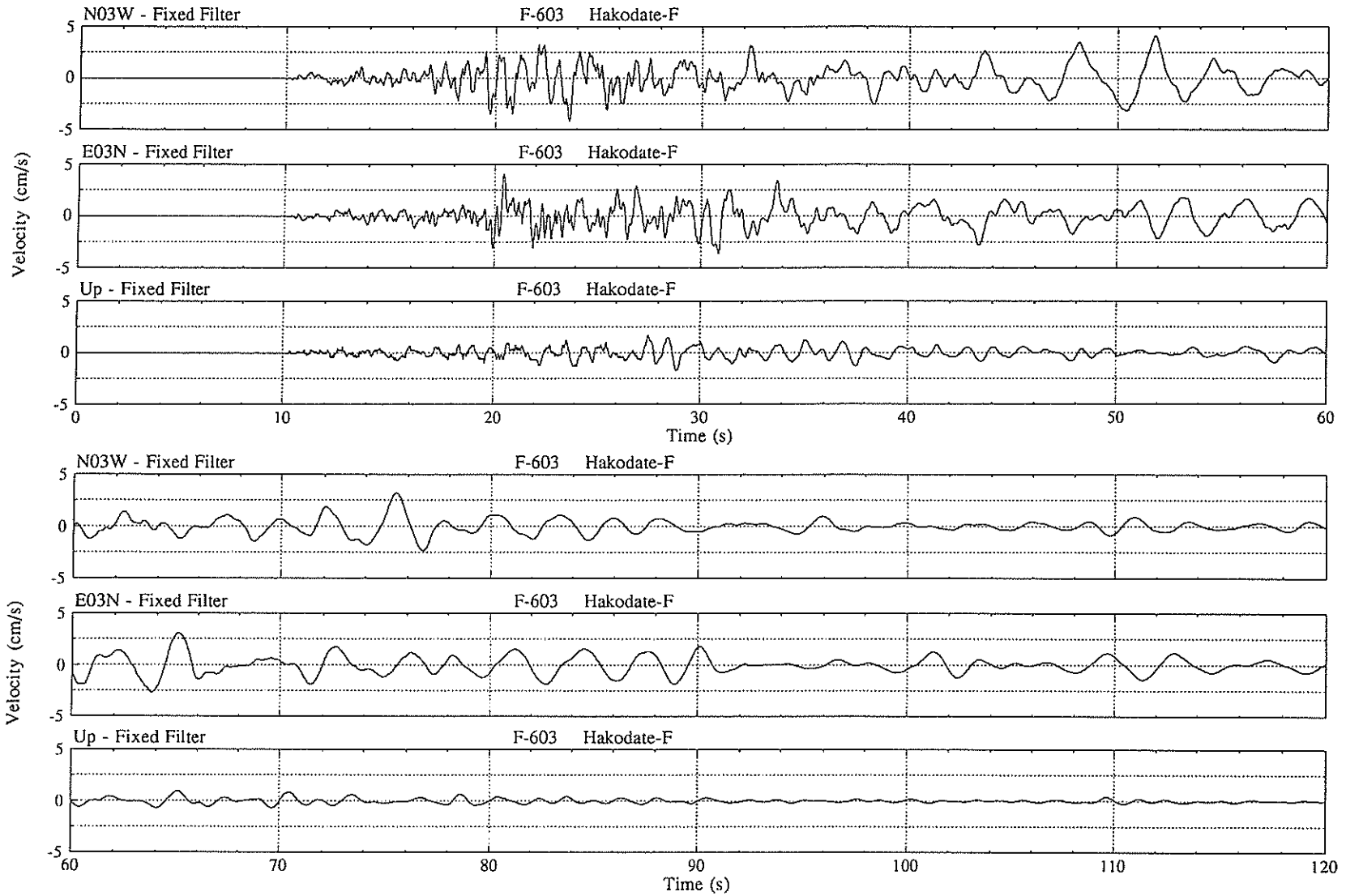
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.122	0.122	0.201	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	39.9	45.8	14.1	45.9
ORIGINAL	47.1	50.4	20.5	54.4
CORRECTED	47.2	50.2	20.3	54.8
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	4.21	4.10	1.73	4.51
VARIABLE FILTER	4.61	3.73	1.75	4.64
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	1.85	1.52	0.41	1.88
VARIABLE FILTER	1.80	1.42	0.31	1.90

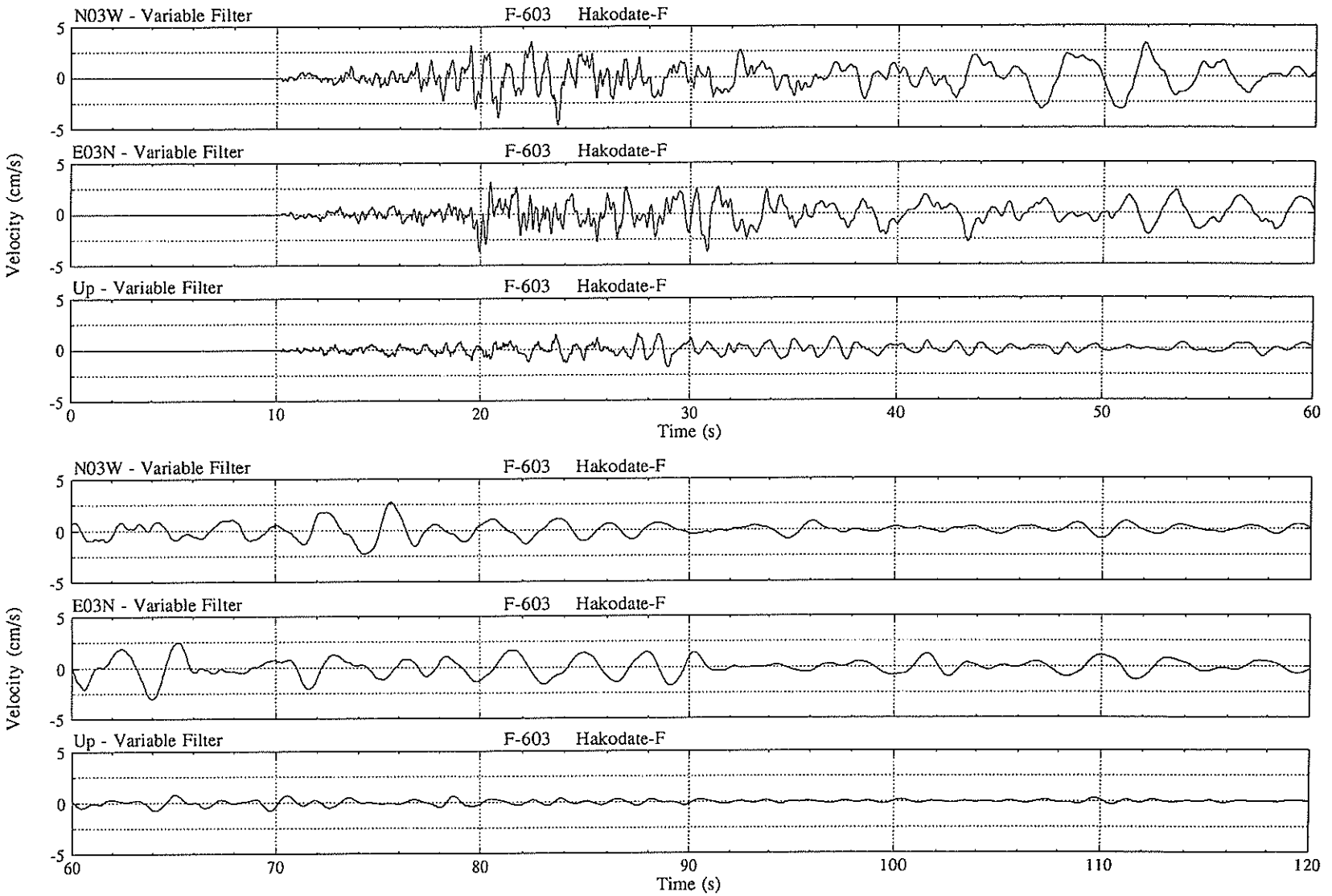
* RESULTANT OF HORIZONTAL COMPONENTS

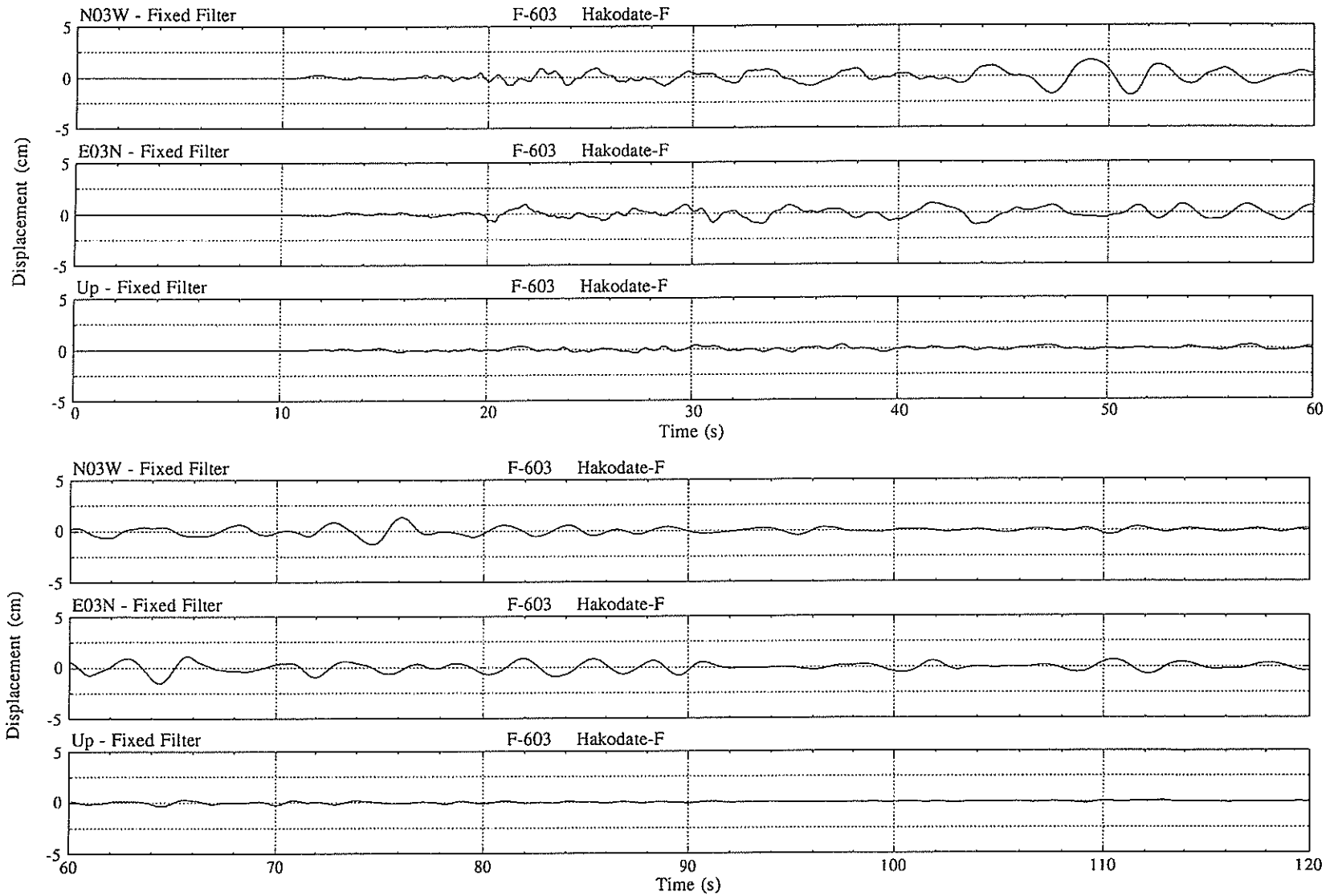

N03W - Original
F-603 Hakodate-F
E03N - Original
F-603 Hakodate-F
Up - Original
F-603 Hakodate-F
Acceleration (cm/s²)
60
0
-60
0
10
20
30
40
50
60
Time (s)
N03W - Original
F-603 Hakodate-F
E03N - Original
F-603 Hakodate-F
Up - Original
F-603 Hakodate-F
Acceleration (cm/s²)
60
70
80
90
100
110
120
Time (s)

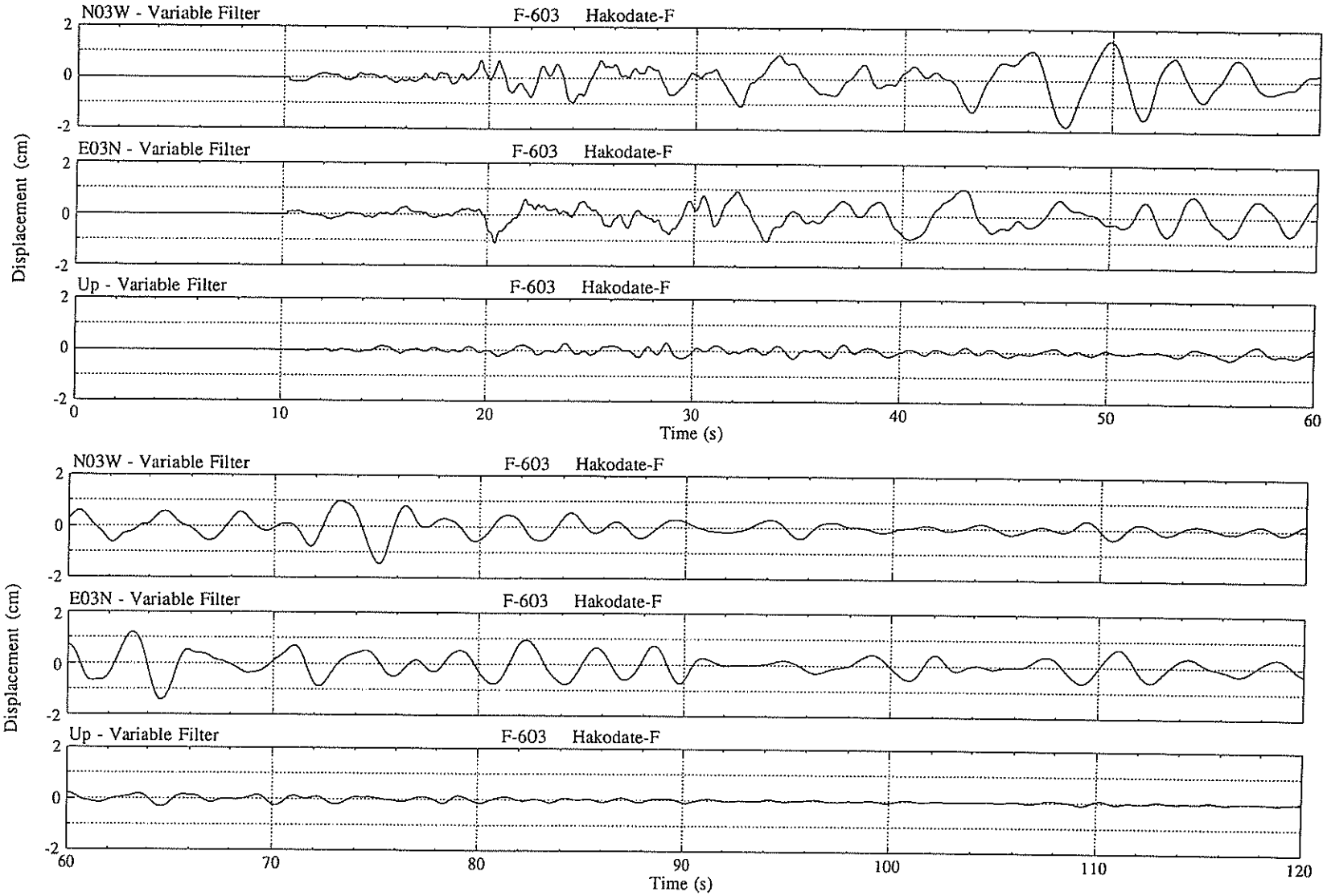

N03W - Corrected
F-603 Hakodate-F
E03N - Corrected
F-603 Hakodate-F
Up - Corrected
F-603 Hakodate-F
Acceleration (cm/s²)
60
0
-60
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-603 Hakodate-F
E03N - Corrected
F-603 Hakodate-F
Up - Corrected
F-603 Hakodate-F
Acceleration (cm/s²)
60
70
80
90
100
110
120
Time (s)

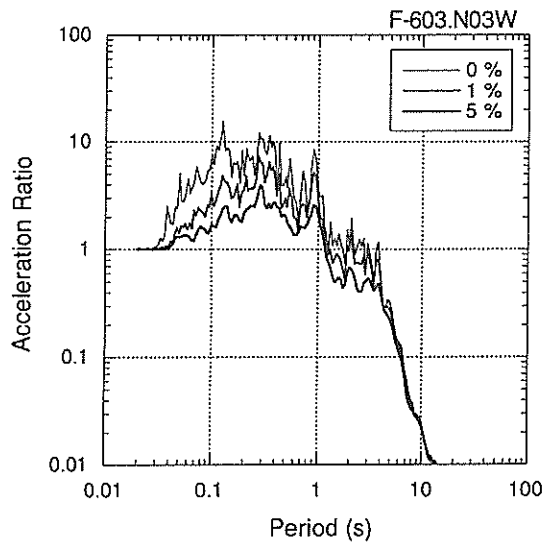

N03W - SMAC Equivalent
F-603 Hakodate-F
E03N - SMAC Equivalent
F-603 Hakodate-F
Up - SMAC Equivalent
F-603 Hakodate-F
Acceleration (cm/s²)
60
0
-60
0
10
20
30
40
50
60
Time (s)
N03W - SMAC Equivalent
F-603 Hakodate-F
E03N - SMAC Equivalent
F-603 Hakodate-F
Up - SMAC Equivalent
F-603 Hakodate-F
Acceleration (cm/s²)
60
70
80
90
100
110
120
Time (s)

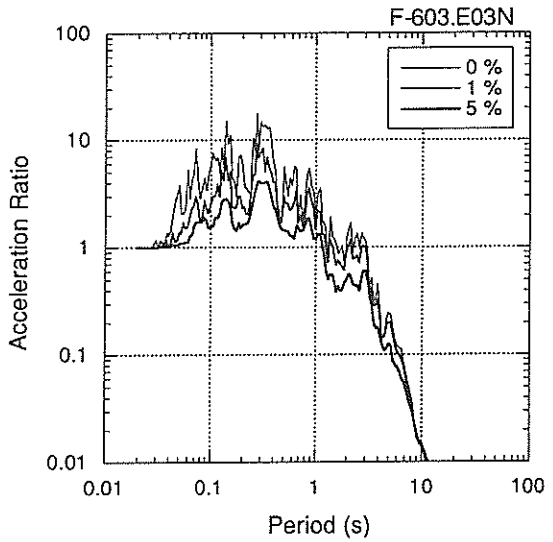

N03W - Fixed Filter
F-603 Hakodate-F
E03N - Fixed Filter
F-603 Hakodate-F
Up - Fixed Filter
F-603 Hakodate-F
Velocity (cm/s)
Time (s)
N03W - Fixed Filter
F-603 Hakodate-F
E03N - Fixed Filter
F-603 Hakodate-F
Up - Fixed Filter
F-603 Hakodate-F
Velocity (cm/s)
Time (s)

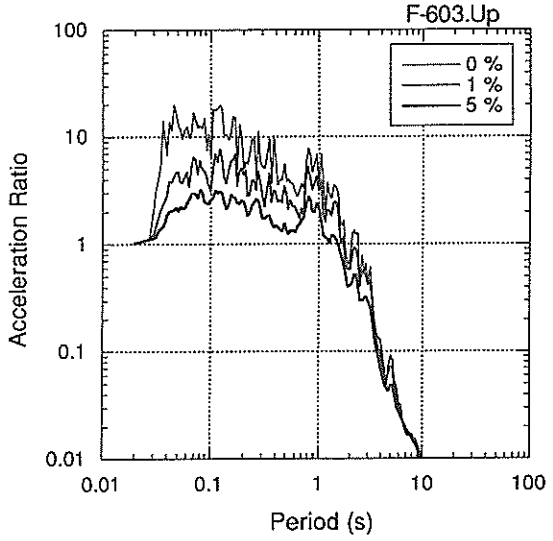

N03W - Variable Filter
F-603 Hakodate-F
E03N - Variable Filter
F-603 Hakodate-F
Up - Variable Filter
F-603 Hakodate-F
Velocity (cm/s)
5
0
-5
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-603 Hakodate-F
E03N - Variable Filter
F-603 Hakodate-F
Up - Variable Filter
F-603 Hakodate-F
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

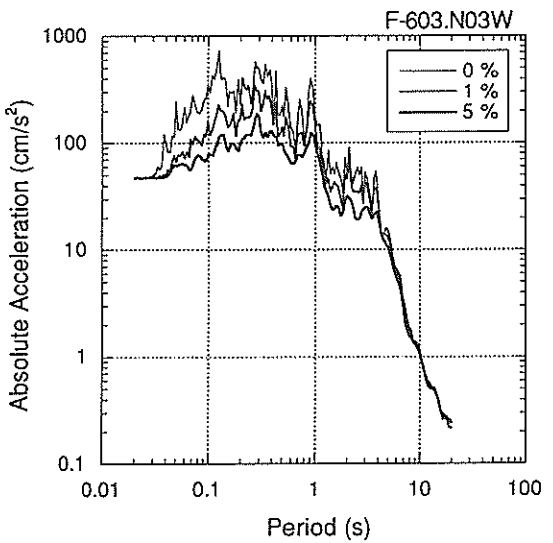

N03W - Fixed Filter
F-603 Hakodate-F
E03N - Fixed Filter
F-603 Hakodate-F
Up - Fixed Filter
F-603 Hakodate-F
Displacement (cm)
5
0
-5
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-603 Hakodate-F
E03N - Fixed Filter
F-603 Hakodate-F
Up - Fixed Filter
F-603 Hakodate-F
Displacement (cm)
5
0
-5
60
70
80
90
100
110
120
Time (s)

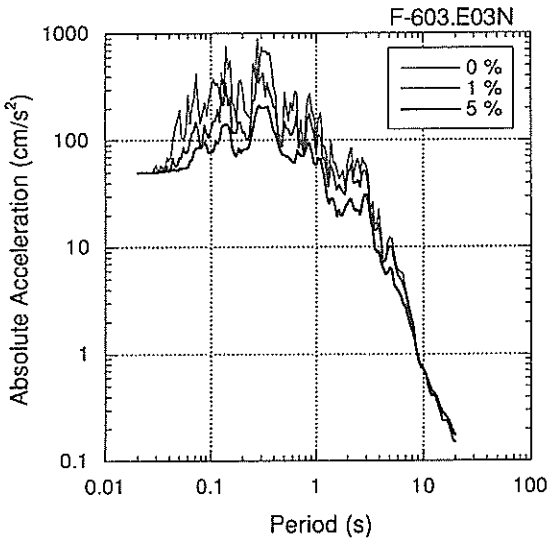

N03W - Variable Filter
F-603 Hakodate-F
E03N - Variable Filter
F-603 Hakodate-F
Up - Variable Filter
F-603 Hakodate-F
Displacement (cm)
Time (s)
N03W - Variable Filter
F-603 Hakodate-F
E03N - Variable Filter
F-603 Hakodate-F
Up - Variable Filter
F-603 Hakodate-F
Displacement (cm)
Time (s)

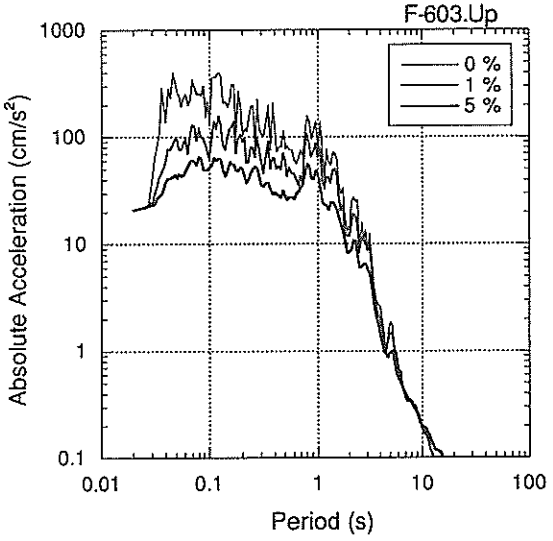

F-603.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

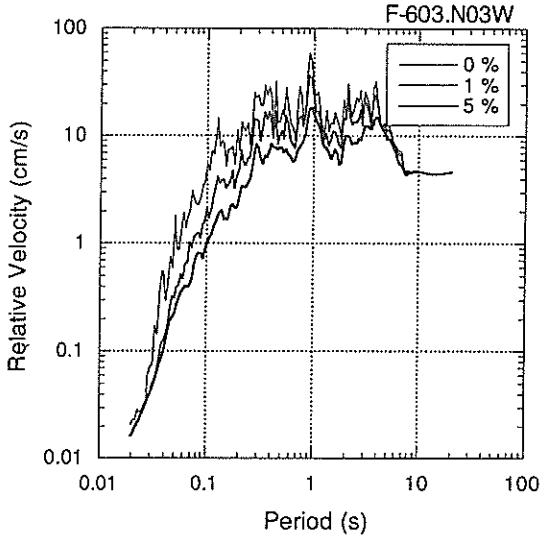

F-603.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

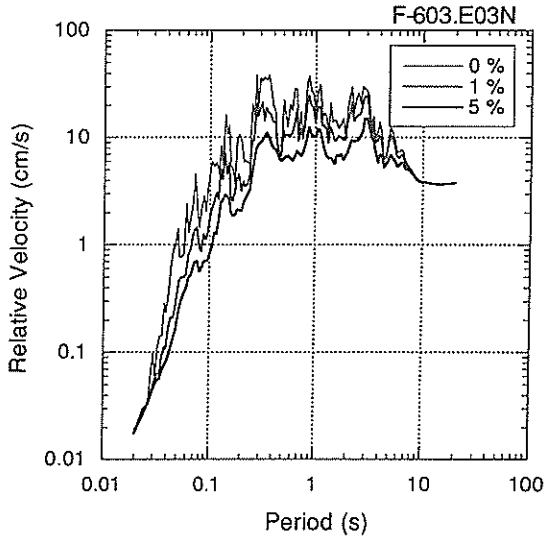

F-603.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

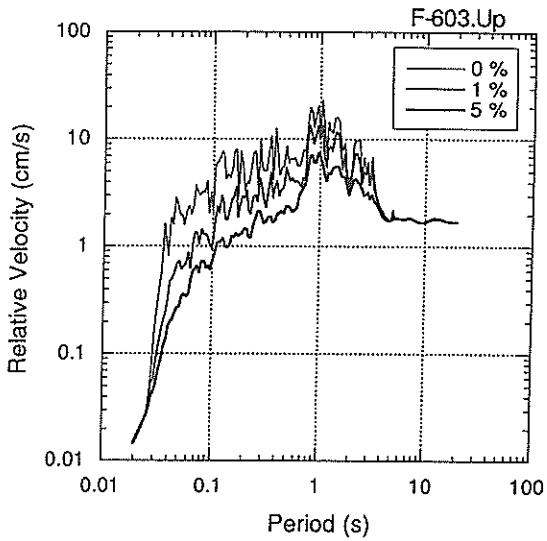

F-603.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

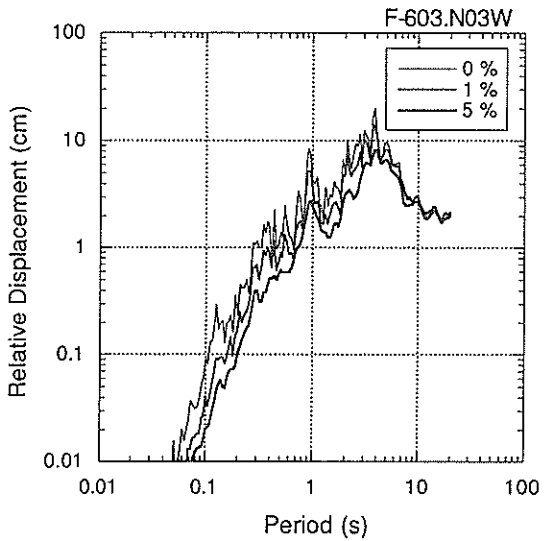

F-603.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

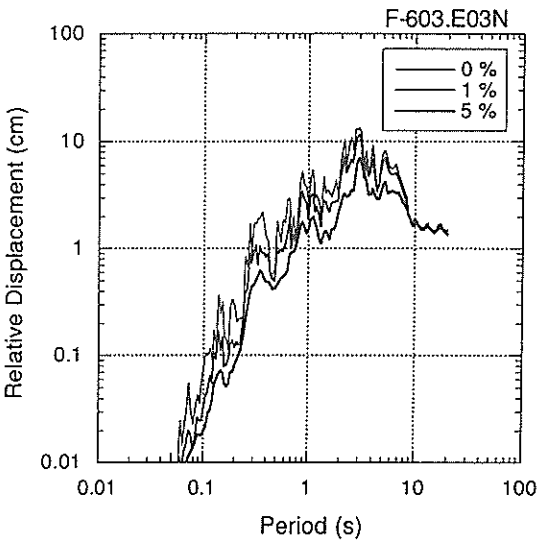

F-603.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

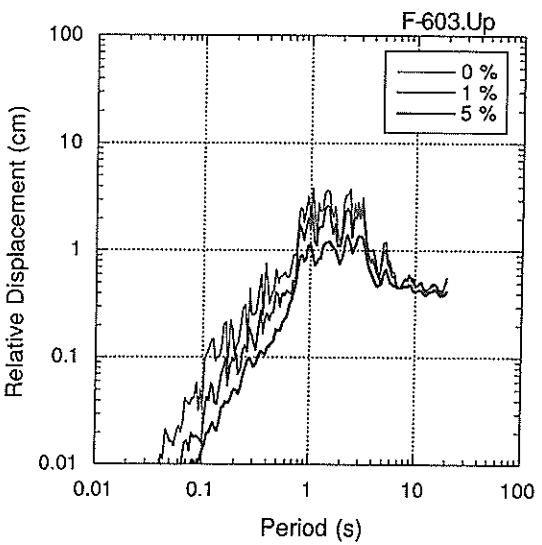

F-603.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

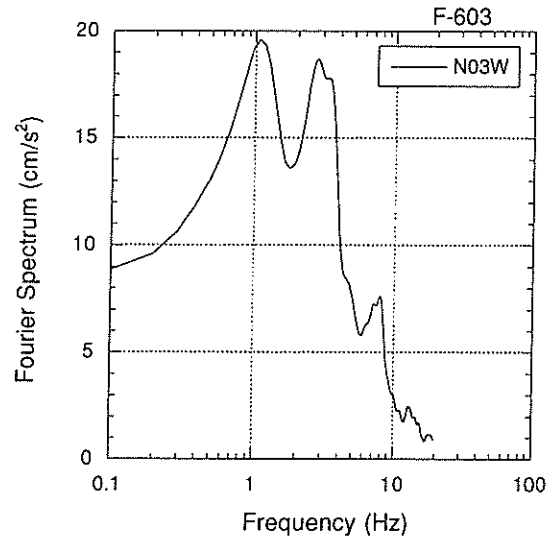

F-603.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

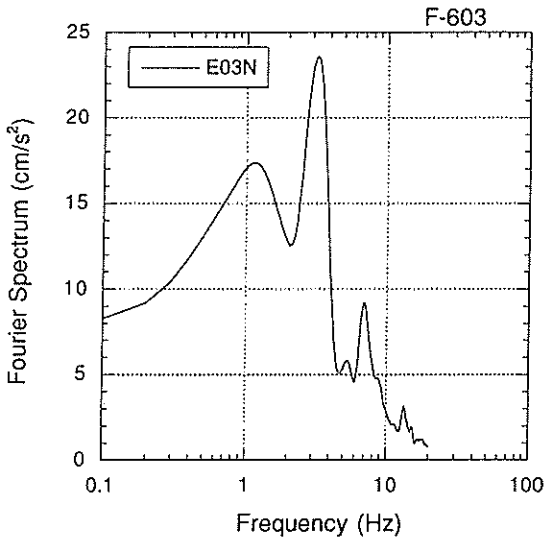

F-603.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

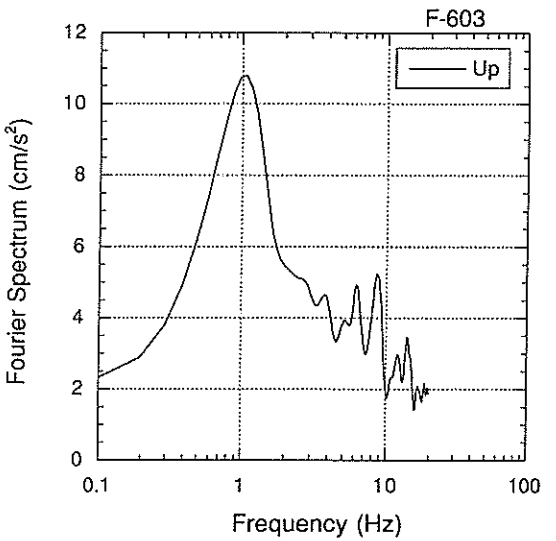

F-603.N03W
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

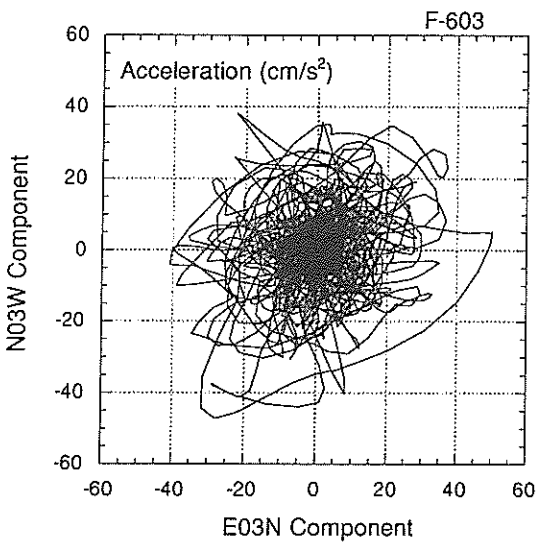

F-603.E03N
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

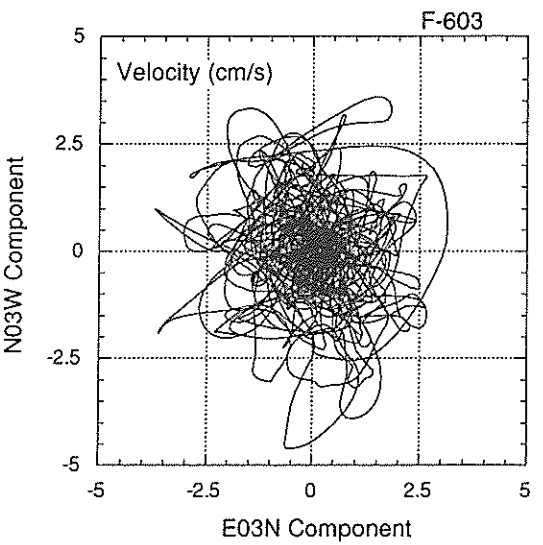

F-603.Up
0 %
1 %
5 %
Relative Displacement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

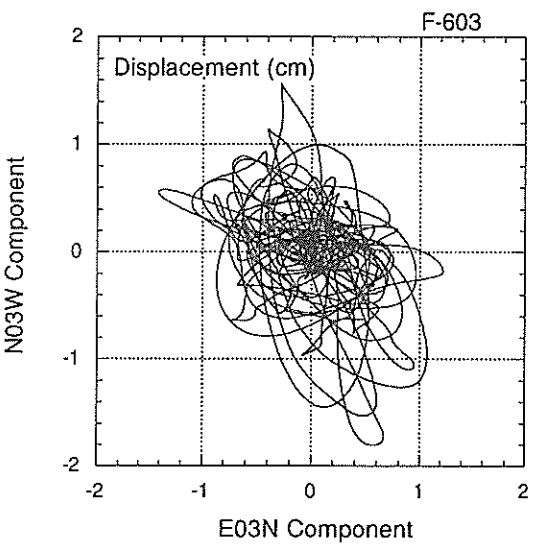

F-603
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-603
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-603
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-603
Acceleration (cm/s²)
N03W Component
E03N Component


F-603
Velocity (cm/s)
N03W Component
E03N Component


F-603
Displacement (cm)
N03W Component
E03N Component

RECORD NUMBER : F-604

STATION : HAKODATE-FR

EARTHQUAKE DATA

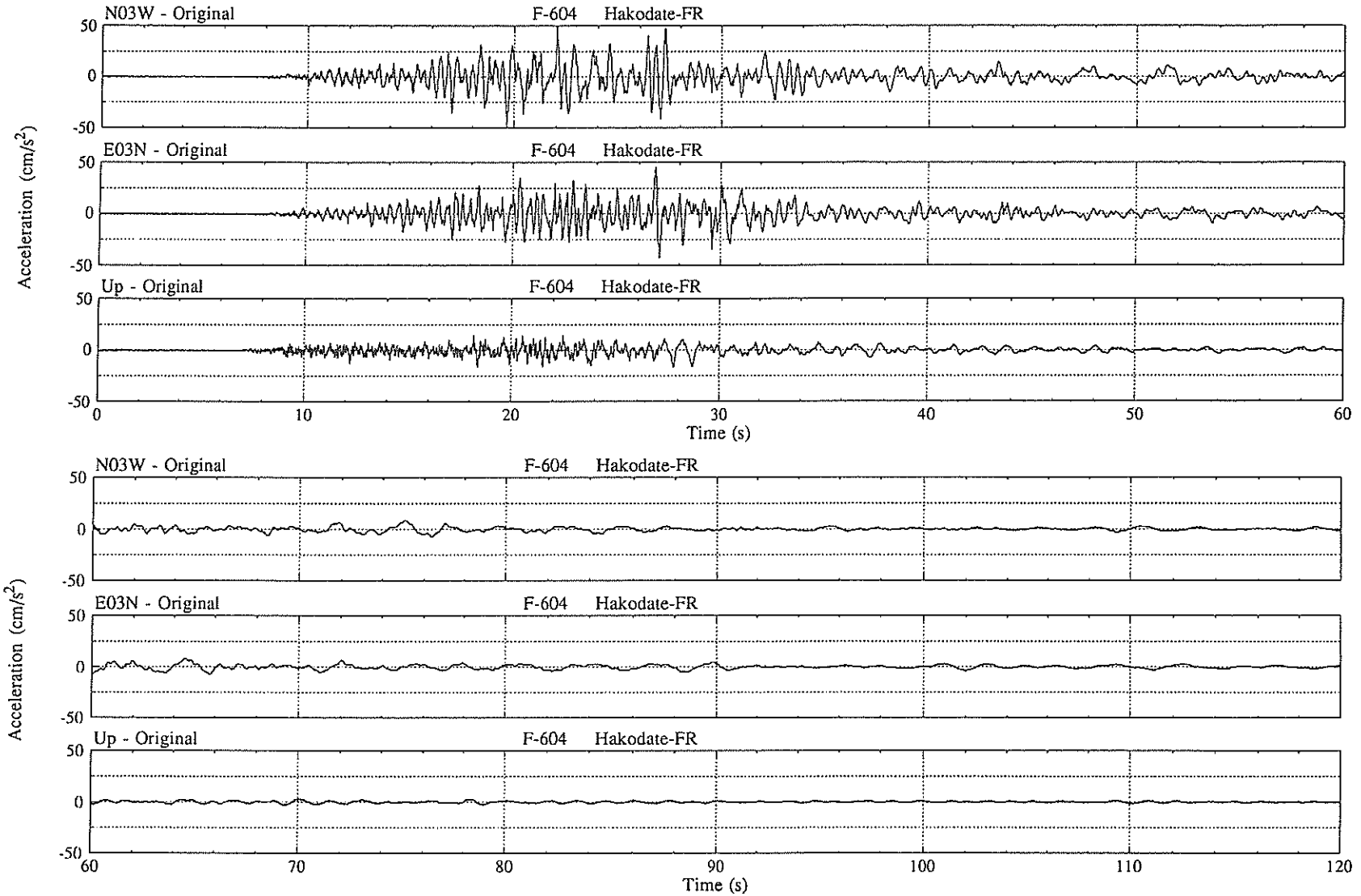
****

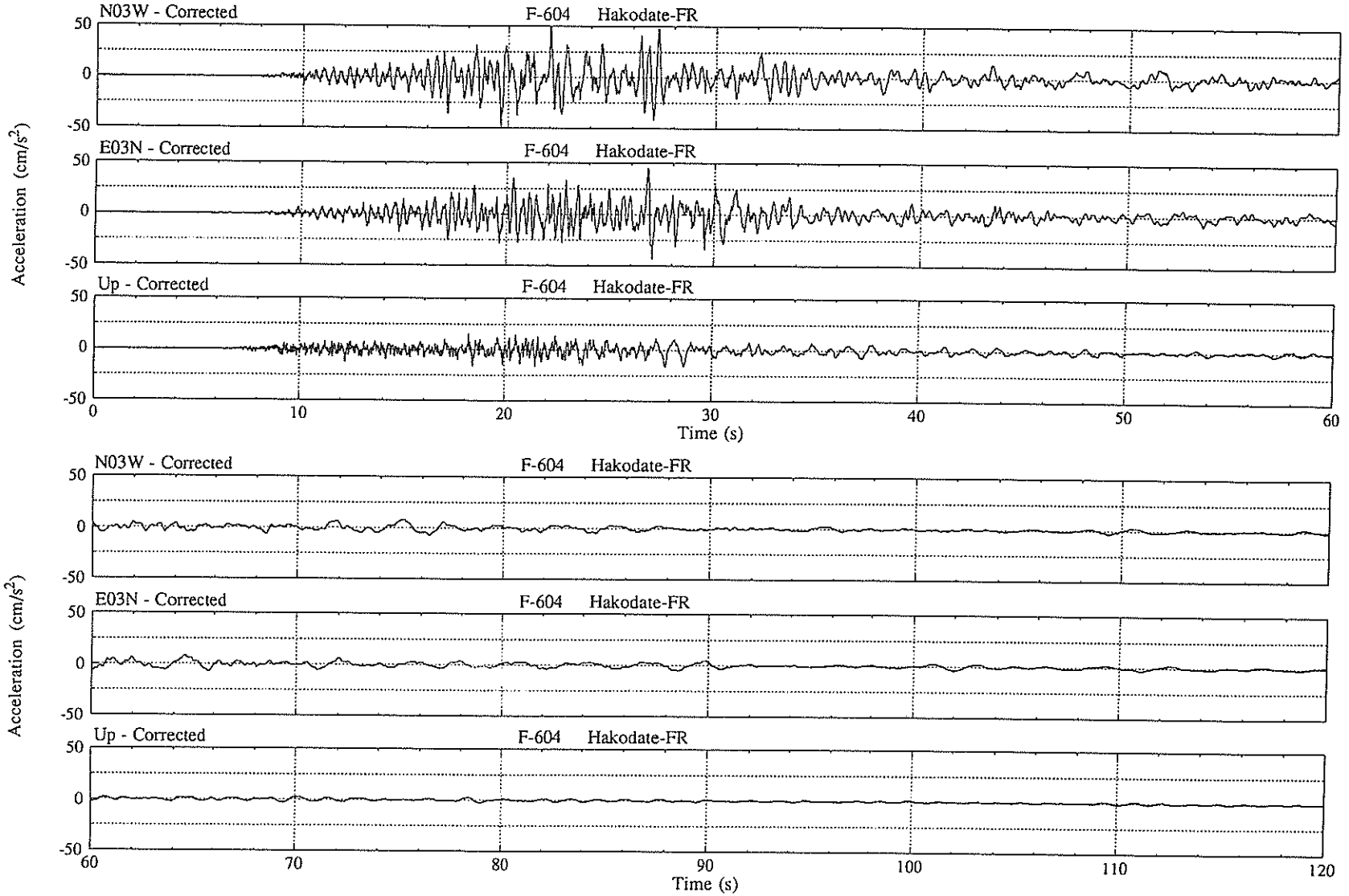
DATE AND TIME	4:42 AUG. 8, 1993
LOCATION OF HYPOCENTER	
EPICENTRAL REGION	SW OFF HOKKAIDO
LATITUDE	41°57.3' N
LONGITUDE	139°53.3' E
DEPTH	23.2KM
JMA MAGNITUDE	6.3

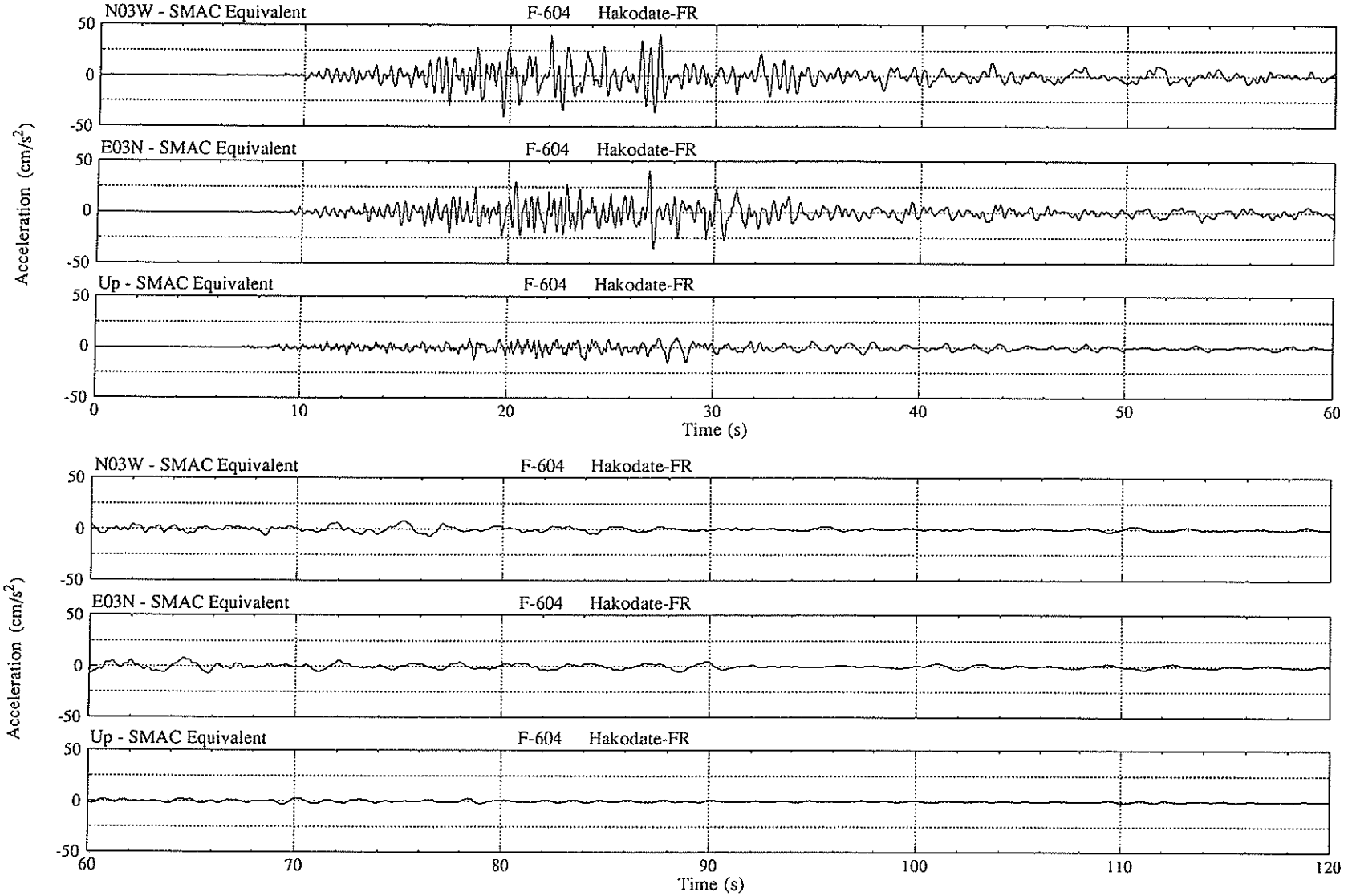
****

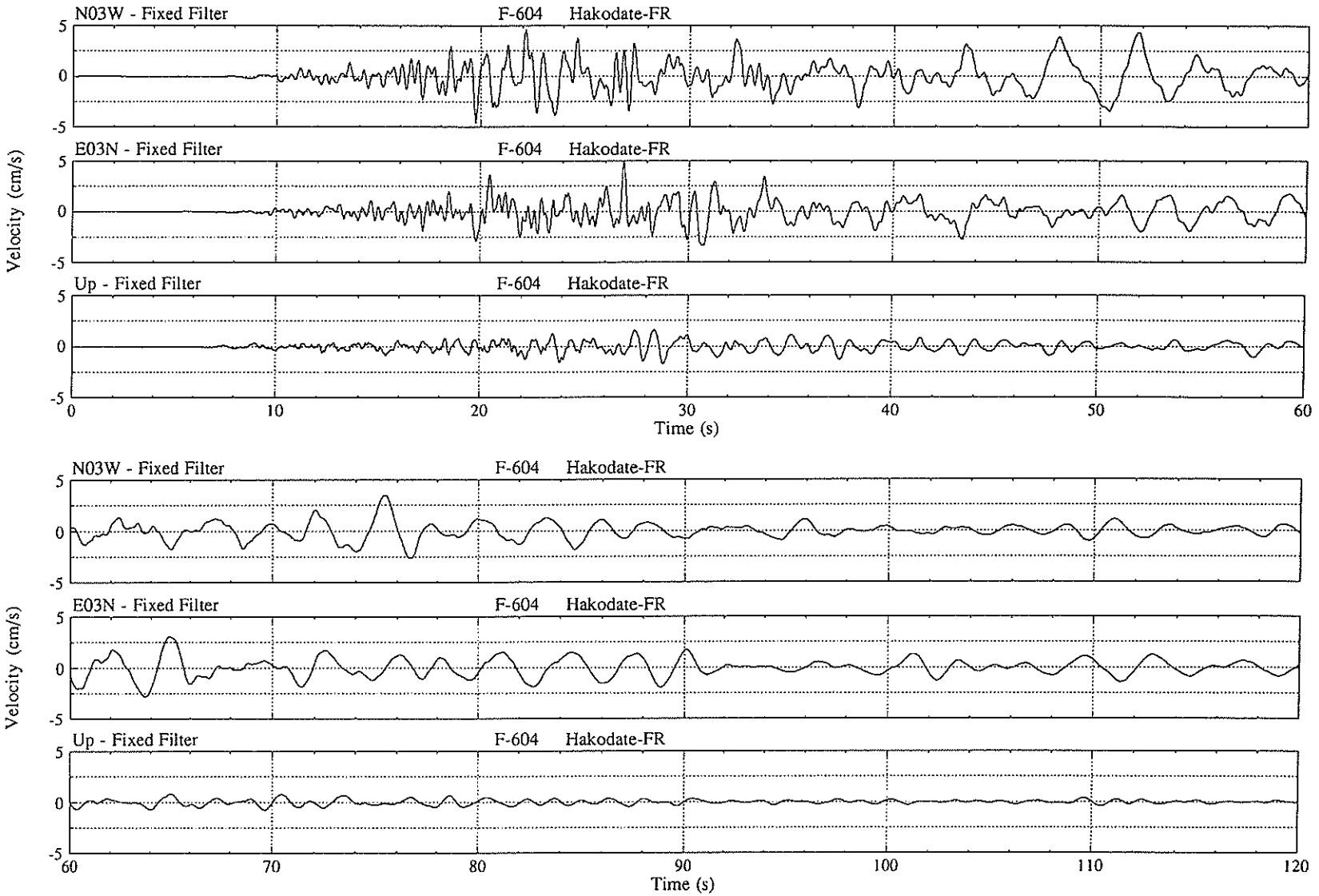
	PEAK VALUES OF COMPONENTS			
	N S	E W	U D	HORIZONTAL*
PARAMETER OF THE VARIABLE FILTER				
FC (HZ)	0.140	0.152	0.274	
MAXIMUM ACCELERATION (GAL)				
SMAC-B2 EQUIVALENT	40.5	41.4	14.9	49.7
ORIGINAL	49.4	45.6	16.0	56.8
CORRECTED	49.4	45.4	16.3	56.3
MAXIMUM VELOCITY (CM/SEC)				
FIXED FILTER	4.62	4.97	1.70	5.53
VARIABLE FILTER	4.24	4.85	1.67	5.48
MAXIMUM DISPLACEMENT (CM)				
FIXED FILTER	1.94	1.55	0.44	1.95
VARIABLE FILTER	1.84	1.35	0.36	1.87

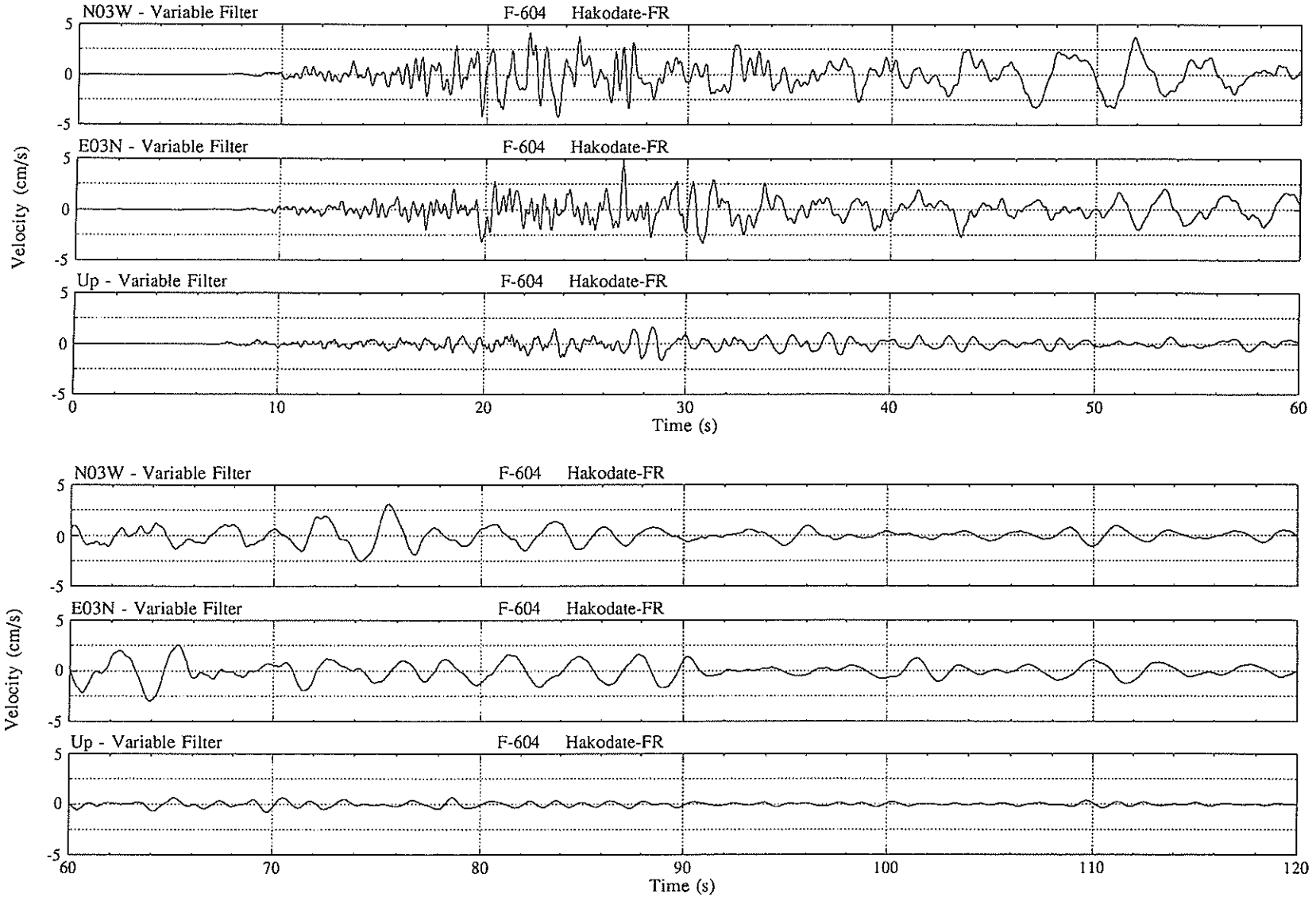
* RESULTANT OF HORIZONTAL COMPONENTS

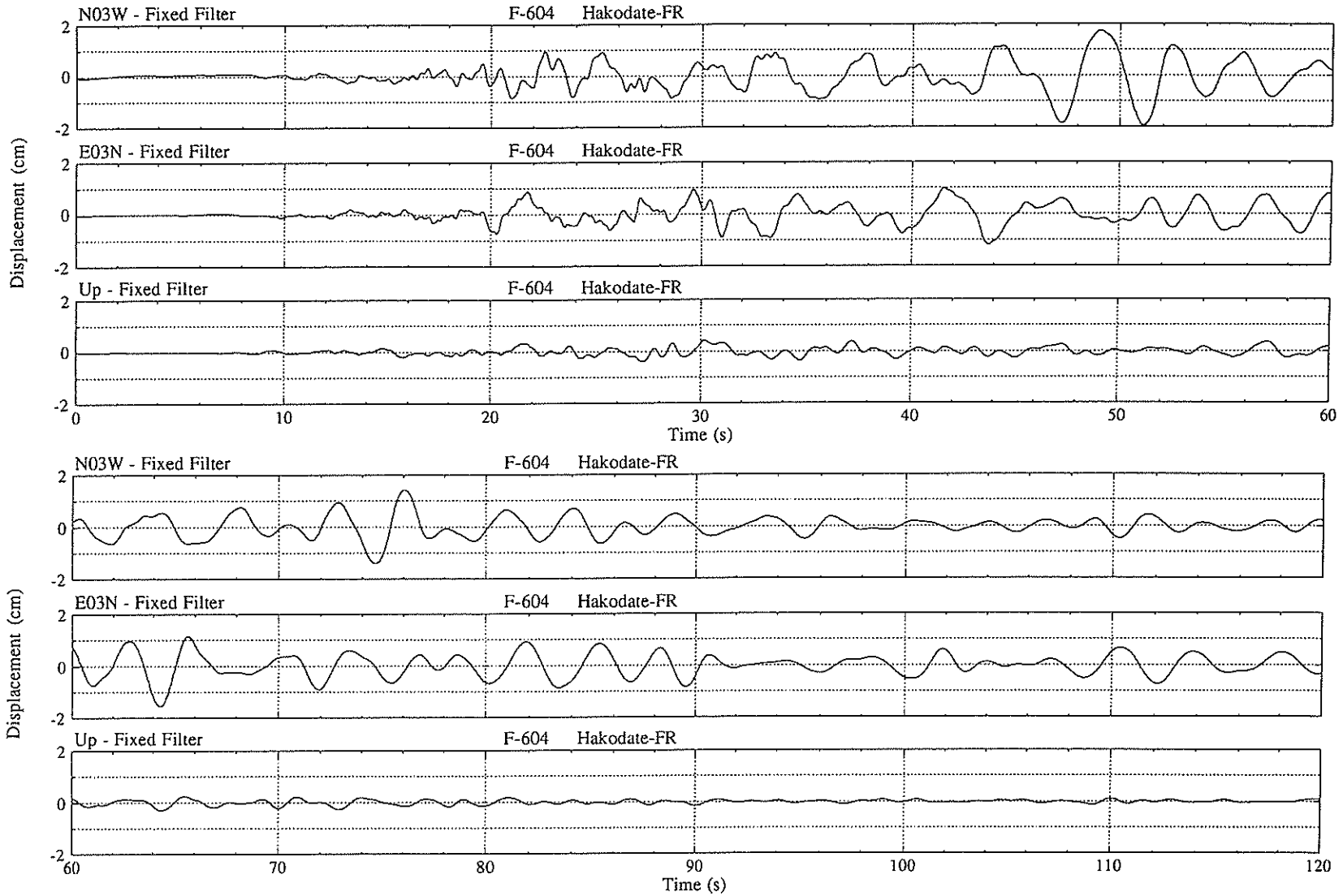

N03W - Original
F-604 Hakodate-FR
E03N - Original
F-604 Hakodate-FR
Up - Original
F-604 Hakodate-FR
Acceleration (cm/s²)
50
0
-50
0
10
20
30
40
50
60
Time (s)
N03W - Original
F-604 Hakodate-FR
E03N - Original
F-604 Hakodate-FR
Up - Original
F-604 Hakodate-FR
Acceleration (cm/s²)
50
0
-50
60
70
80
90
100
110
120
Time (s)

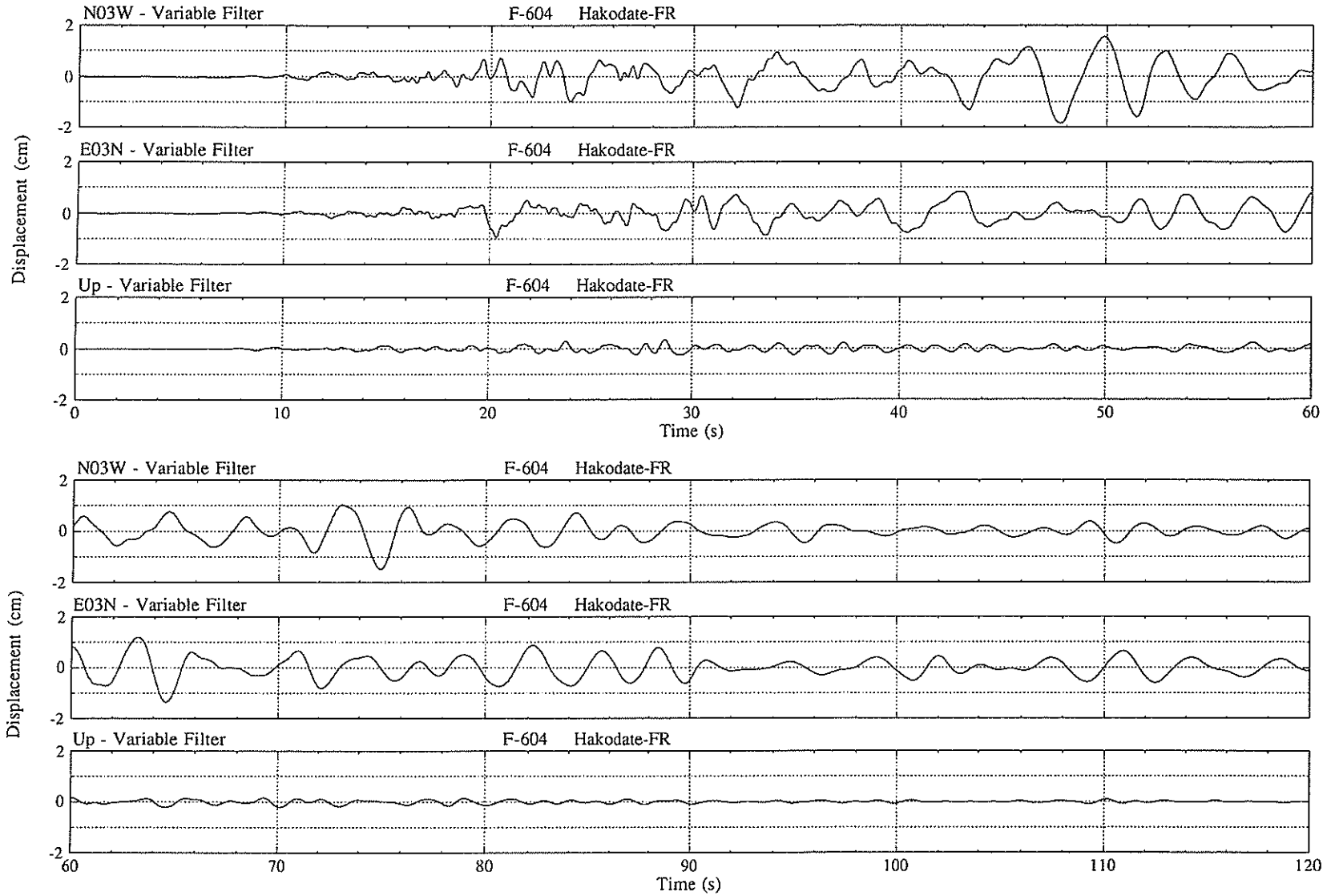

N03W - Corrected
F-604 Hakodate-FR
E03N - Corrected
F-604 Hakodate-FR
Up - Corrected
F-604 Hakodate-FR
Acceleration (cm/s²)
50
0
-50
0
10
20
30
40
50
60
Time (s)
N03W - Corrected
F-604 Hakodate-FR
E03N - Corrected
F-604 Hakodate-FR
Up - Corrected
F-604 Hakodate-FR
Acceleration (cm/s²)
50
0
-50
60
70
80
90
100
110
120
Time (s)

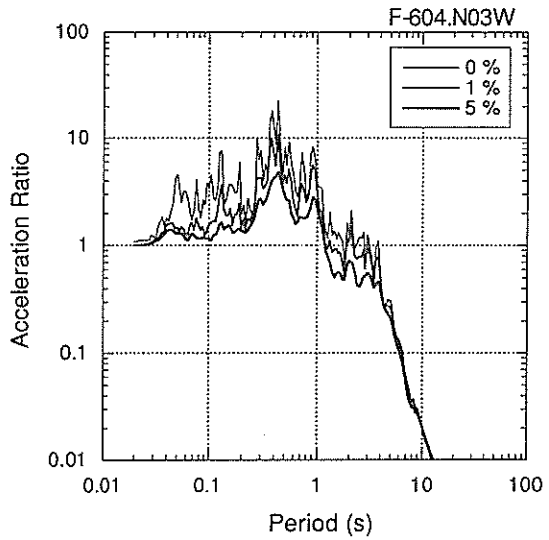

N03W - SMAC Equivalent
F-604 Hakodate-FR
E03N - SMAC Equivalent
F-604 Hakodate-FR
Up - SMAC Equivalent
F-604 Hakodate-FR
Acceleration (cm/s²)
50
0
-50
0
10
20
30
40
50
60
Time (s)
N03W - SMAC Equivalent
F-604 Hakodate-FR
E03N - SMAC Equivalent
F-604 Hakodate-FR
Up - SMAC Equivalent
F-604 Hakodate-FR
Acceleration (cm/s²)
50
0
-50
60
70
80
90
100
110
120
Time (s)

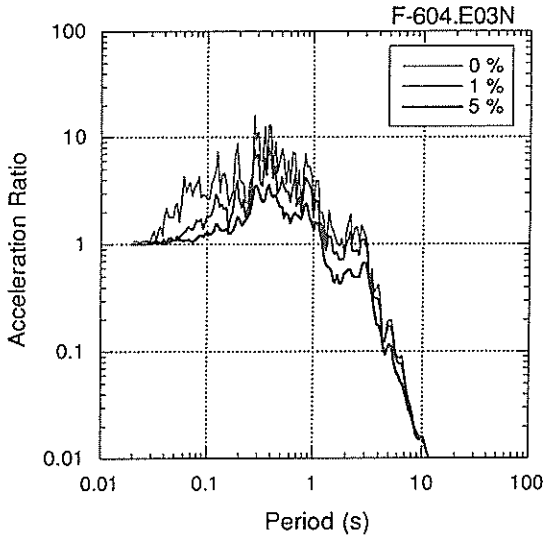

N03W - Fixed Filter
F-604 Hakodate-FR
E03N - Fixed Filter
F-604 Hakodate-FR
Up - Fixed Filter
F-604 Hakodate-FR
Velocity (cm/s)
5
0
-5
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-604 Hakodate-FR
E03N - Fixed Filter
F-604 Hakodate-FR
Up - Fixed Filter
F-604 Hakodate-FR
Velocity (cm/s)
60
70
80
90
100
110
120
Time (s)

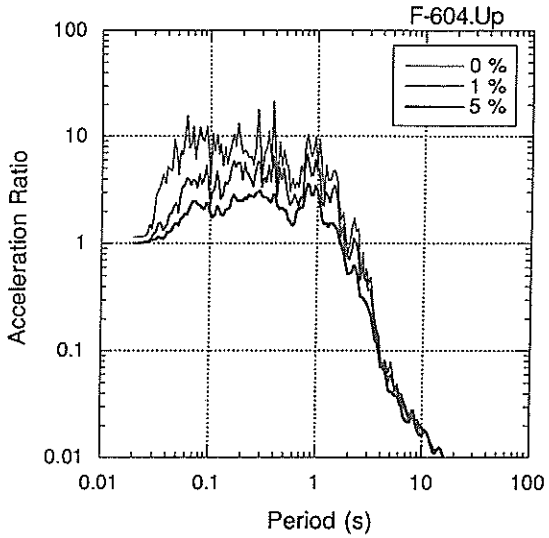

N03W - Variable Filter
F-604 Hakodate-FR
E03N - Variable Filter
F-604 Hakodate-FR
Up - Variable Filter
F-604 Hakodate-FR
Velocity (cm/s)
5
0
-5
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-604 Hakodate-FR
E03N - Variable Filter
F-604 Hakodate-FR
Up - Variable Filter
F-604 Hakodate-FR
Velocity (cm/s)
5
0
-5
60
70
80
90
100
110
120
Time (s)

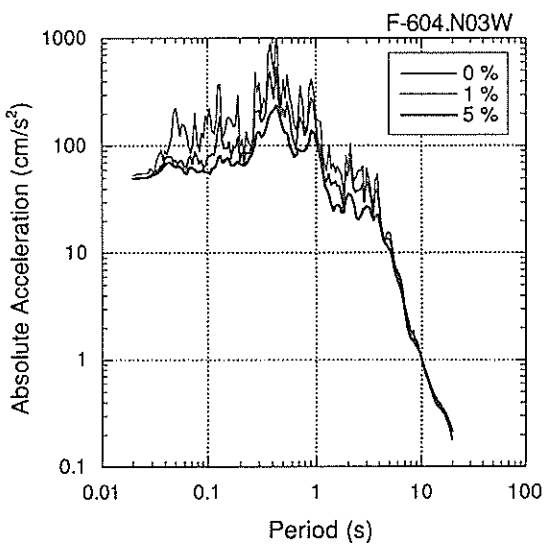

N03W - Fixed Filter
F-604 Hakodate-FR
E03N - Fixed Filter
F-604 Hakodate-FR
Up - Fixed Filter
F-604 Hakodate-FR
Displacement (cm)
2
0
-2
0
10
20
30
40
50
60
Time (s)
N03W - Fixed Filter
F-604 Hakodate-FR
E03N - Fixed Filter
F-604 Hakodate-FR
Up - Fixed Filter
F-604 Hakodate-FR
Displacement (cm)
60
70
80
90
100
110
120
Time (s)

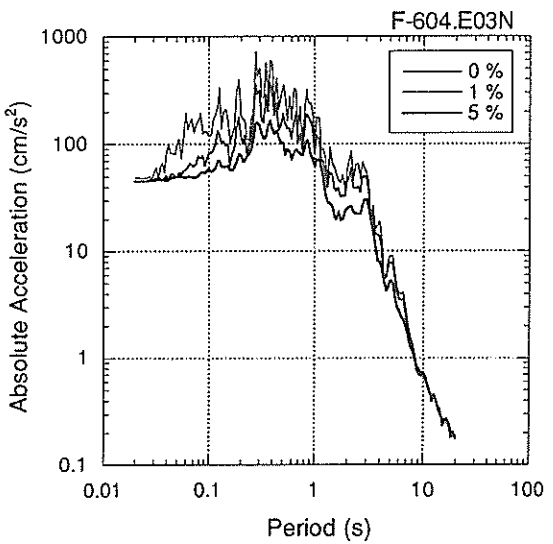

N03W - Variable Filter
F-604 Hakodate-FR
E03N - Variable Filter
F-604 Hakodate-FR
Up - Variable Filter
F-604 Hakodate-FR
Displacement (cm)
2
0
-2
0
10
20
30
40
50
60
Time (s)
N03W - Variable Filter
F-604 Hakodate-FR
E03N - Variable Filter
F-604 Hakodate-FR
Up - Variable Filter
F-604 Hakodate-FR
Displacement (cm)
2
0
-2
60
70
80
90
100
110
120
Time (s)

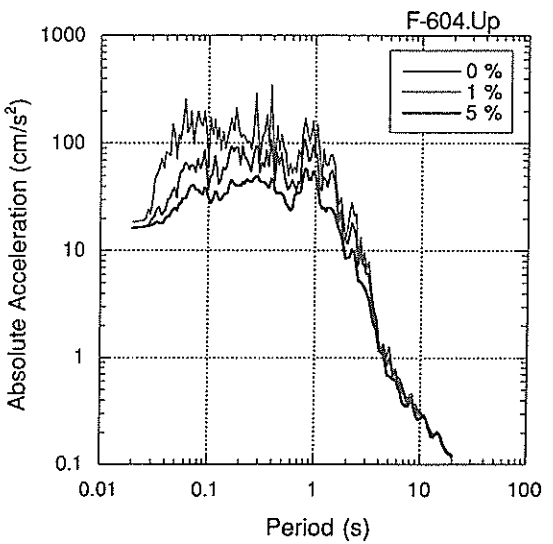

F-604.N03W
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

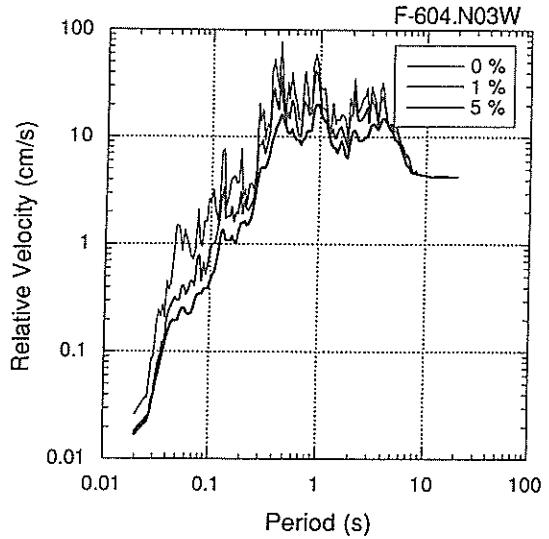

F-604.E03N
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

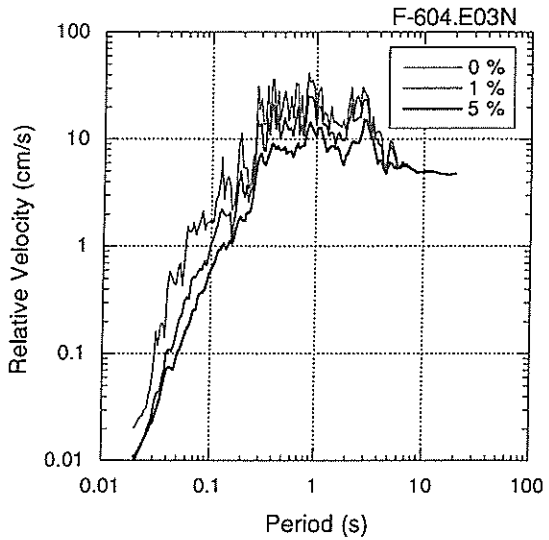

F-604.Up
0 %
1 %
5 %
Acceleration Ratio
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

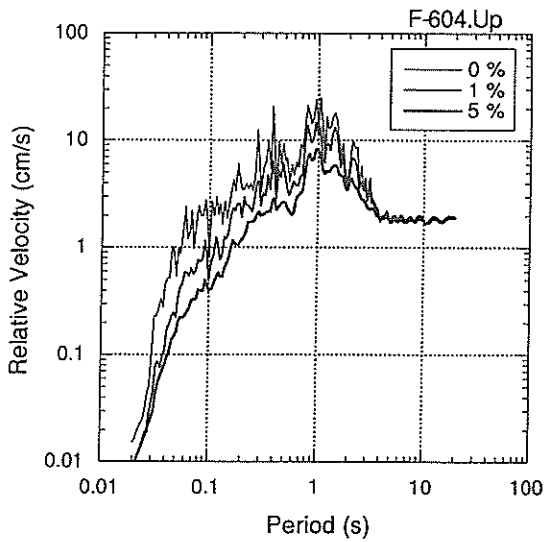

F-604.N03W
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

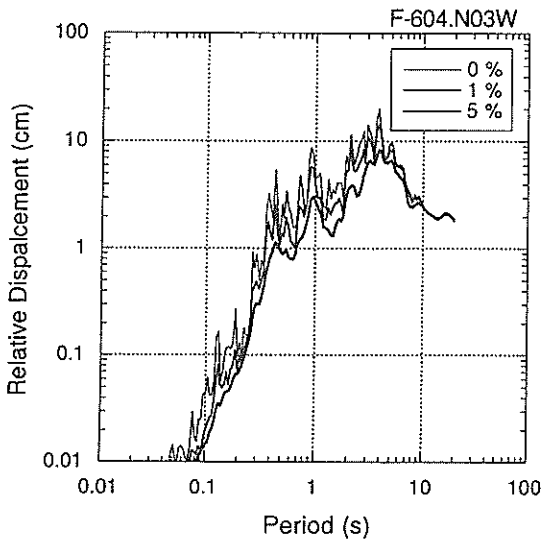

F-604.E03N
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

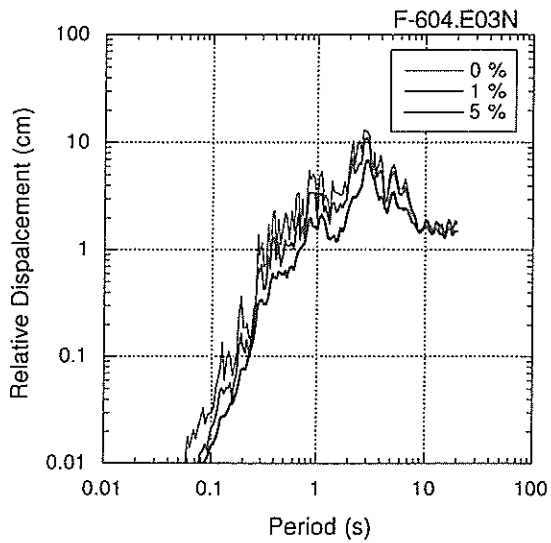

F-604.Up
0 %
1 %
5 %
Absolute Acceleration (cm/s²)
Period (s)
1000
100
10
1
0.1
0.01
0.1
1
10
100

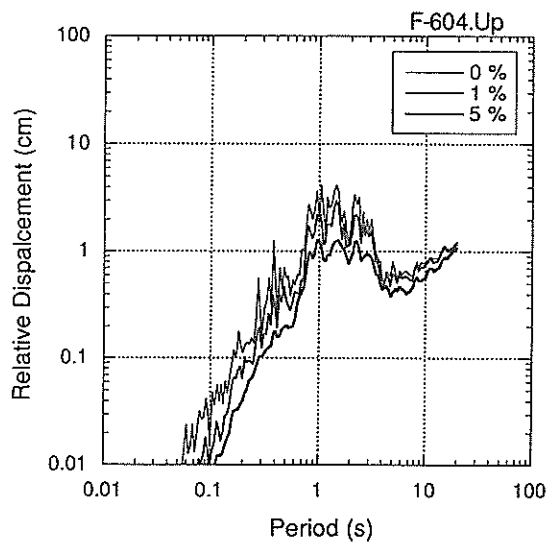

F-604.N03W
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

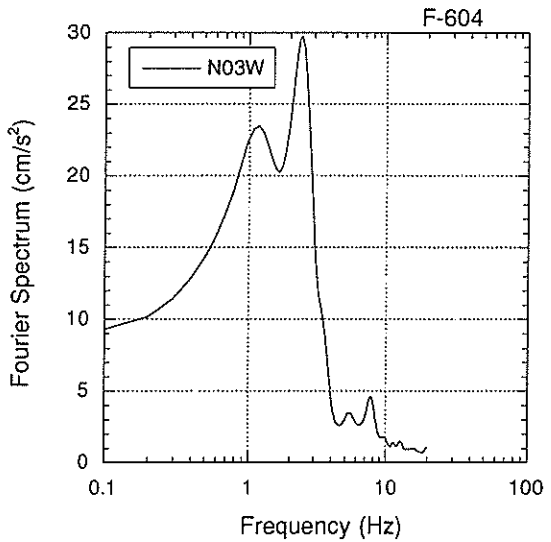

F-604.E03N
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

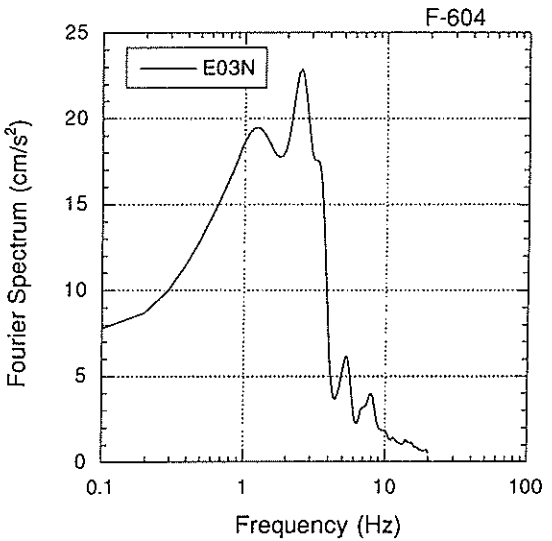

F-604.Up
0 %
1 %
5 %
Relative Velocity (cm/s)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

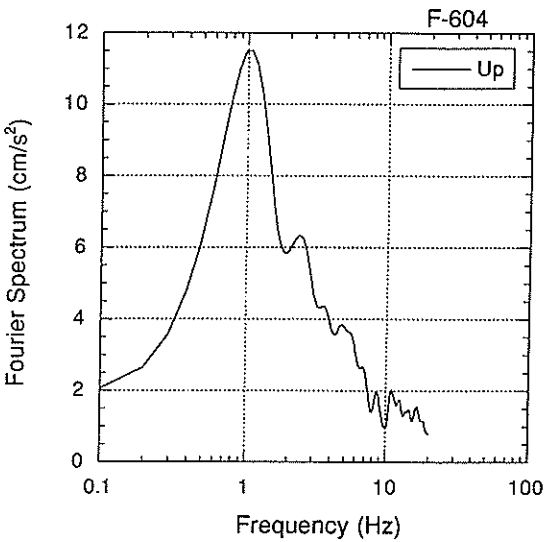

F-604.N03W
0 %
1 %
5 %
Relative Dispalcement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

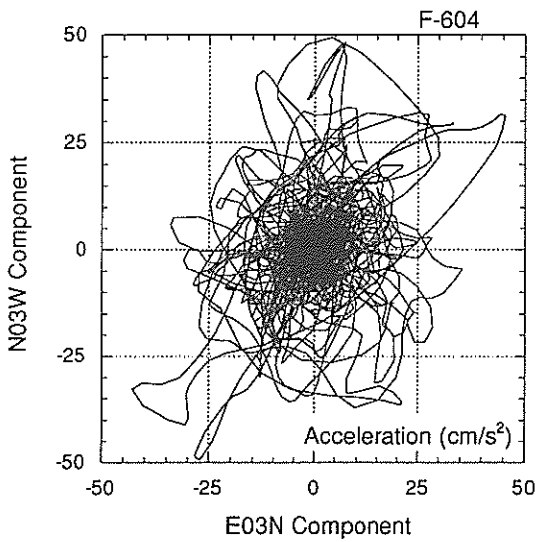

F-604.E03N
0 %
1 %
5 %
Relative Dispalcement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

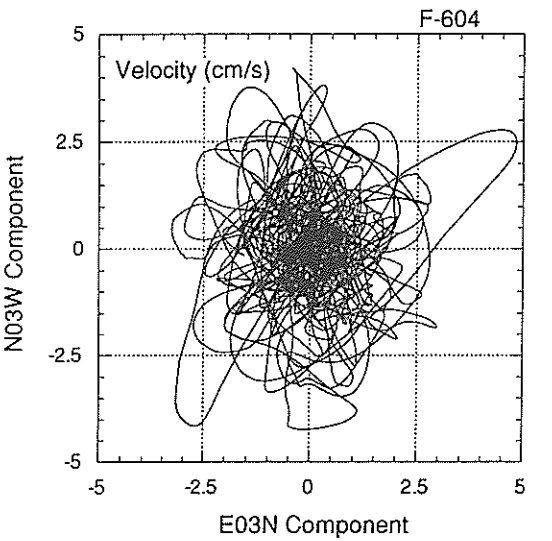

F-604.Up
0 %
1 %
5 %
Relative Dispalcement (cm)
Period (s)
100
10
1
0.1
0.01
0.01
0.1
1
10
100

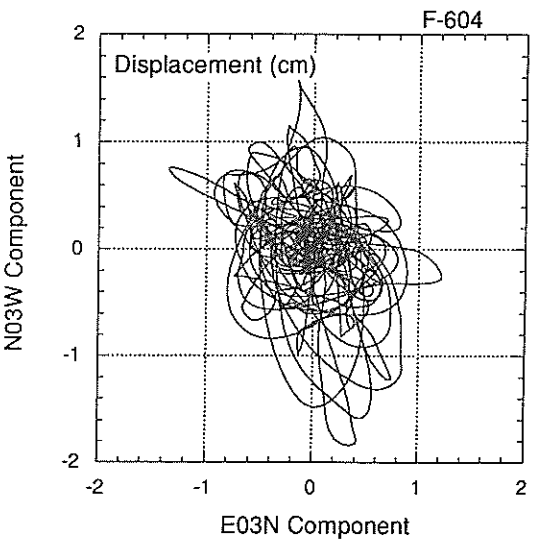

F-604
N03W
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-604
E03N
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-604
Up
Fourier Spectrum (cm/s²)
Frequency (Hz)


F-604
Acceleration (cm/s²)
N03W Component
E03N Component


F-604
Velocity (cm/s)
N03W Component
E03N Component


F-604
Displacement (cm)
N03W Component
E03N Component

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