

港湾技研資料

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MINISTRY OF TRANSPORT, JAPAN

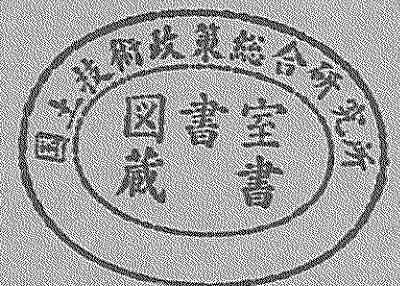
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ANNUAL REPORT ON STRONG-MOTION EARTHQUAKE RECORDS
IN JAPANESE PORTS (1995 & 1996)

港湾地域強震観測年報 (1995&1996)

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ANNUAL REPORT ON STRONG-MOTION EARTHQUAKE RECORDS IN JAPANESE PORTS (1995 & 1996)

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Strong-Motion Earthquake Observation Results (1995)

Results of Preliminary Analyses (1995)

1)	F -	732	Miyako-G	January, 1	(AR)
2)	F -	719	Wakayama-G	January, 3	(AR)
3)	F -	721	Miyako-G	January, 7	(AR)
4)	S -	2626	Shinagawa-S	January, 7	(AR)
5)	F -	756	Hitachinaka-F	January, 7	(AR,IR,RS,FS,LO)
6)	F -	816	Shinagawa-G	January, 7	(AR)
7)	S -	2613	Kashima-zokan-S	January, 10	(AR)
8)	F -	880	Hitachinaka-F	January, 10	(AR)
9)	S -	2614	Urakawa-S	January, 11	(AR)
10)	M -	1551	Tokachi-M	January, 11	(AR)
11)	F -	770	Hanasaki-F	January, 21	(AR)
12)	F -	846	Naha-G	January, 26	(AR)
13)	F -	935	Wakayama-G	February, 2	(AR)
14)	F -	882	Hitachinaka-F	March, 3	(AR)
15)	F -	938	Wakayama-G	March, 10	(AR)
16)	F -	883	Hitachinaka-F	March, 23	(AR)
17)	F -	870	Oita-G	March, 27	(AR)
18)	F -	827	Niigata-G	April, 1	(AR,IR,RS,FS,LO)
19)	F -	834	Niigata-G	April, 2	(AR)
20)	F -	842	Niigata-G	April, 5	(AR)
21)	F -	825	Onahama-ji-G	April, 12	(AR)
22)	F -	885	Hitachinaka-F	April, 12	(AR,IR,RS,FS,LO)
23)	F -	922	Niigata-G	April, 15	(AR)
24)	S -	2633	Tagonoura-S	April, 18	(AR)
25)	F -	868	Miyako-G	May, 7	(AR)
26)	F -	859	Matsuyama-G	May, 10	(AR)
27)	F -	940	Wakayama-G	May, 16	(AR)
28)	F -	955	Hitachinaka-F	May, 29	(AR)
29)	F -	942	Wakayama-G	June, 6	(AR)
30)	F -	943	Wakayama-G	June, 7	(AR,IR,RS,FS,LO)
31)	F -	944	Wakayama-G	June, 7	(AR,IR,RS,FS,LO)
32)	F -	915	Onahama-ji-G	June, 11	(AR)
33)	F -	956	Hitachinaka-F	June, 14	(AR)
34)	F -	957	Hitachinaka-F	June, 20	(AR)
35)	F -	958	Hitachinaka-F	June, 23	(AR)
36)	F -	878	Yamashita-F	July, 3	(AR,IR,RS,FS,LO)
37)	F -	1046	Shinagawa-G	July, 3	(AR,IR,RS,FS,LO)
38)	S -	2639	Kashima-zokan-S	July, 30	(AR,IR,RS,FS,LO)
39)	F -	959	Hitachinaka-F	July, 30	(AR)
40)	F -	897	Komatsujima-G	September, 9	(AR)
41)	F -	946	Wakayama-G	September, 9	(AR)
42)	F -	961	Hitachinaka-F	September,12	(AR)
43)	M -	1563	Tokachi-M	September,16	(AR)

44)	F -	911	Kushiro-G	September,16	(AR)
45)	M-	1564	Tokachi-M	September,26	(AR,IR,RS,FS,LO)
46)	F -	962	Hitachinaka-F	October, 1	(AR)
47)	S -	2645	Kobe-ji-S	October, 14	(AR)
48)	F -	924	Hirara-G	November, 11	(AR)
49)	F -	903	Tomakomai-G	November, 26	(AR)
50)	F -	917	Onahama-ji-G	December, 1	(AR)
51)	F -	948	Wakayama-G	December, 22	(AR,IR,RS,FS,LO)
52)	F -	949	Wakayama-G	December, 23	(AR)
53)	F -	950	Wakayama-G	December, 23	(AR,IR,RS,FS,LO)
54)	F -	951	Wakayama-G	December, 30	(AR)

Strong-Motion Earthquake Observation Results (1996)

Results of Preliminary Analyses (1996)

1)	S -	2649	Ofunato-bo-S	February, 17	(AR)
2)	S -	2651	Kashima-zokan-S	February, 17	(AR)
3)	M -	1568	Kamaishi-M	February, 17	(AR)
4)	M -	1583	Ofunato-mound-M	February, 17	(AR)
5)	S -	2656	Soma-S	February, 17	(AR,IR,RS,FS,LO)
6)	S -	2653	Tagonoura-S	March, 6	(AR,IR,RS,FS,LO)
7)	S -	2662	Shimizu-kojyo-S	March, 6	(AR)
8)	F -	1032	Yamashita-F	March, 6	(AR)
9)	F -	1029	Wakayama-G	March, 9	(AR,IR,RS,FS,LO)
10)	F -	1030	Wakayama-G	April, 5	(AR,IR,RS,FS,LO)
11)	M -	1584	Ofunato-mound-M	April, 23	(AR)
12)	M -	1585	Kamaishi-M	April, 23	(AR)
13)	S -	2667	Kashima-zokan-S	September,11	(AR,IR,RS,FS,LO)
14)	F -	1062	Hitachinaka-F	September,11	(AR)
15)	S -	2666	Chiba-S	September,11	(AR)
16)	F -	1063	Hitachinaka-F	October, 7	(AR,IR,RS,FS,LO)
17)	F -	1051	Miyazaki-GB	October, 19	(AR)
18)	F -	1052	Miyazaki-G	October, 19	(AR,IR,RS,FS,LO)
19)	F -	1055	Shibushi-G	October, 19	(AR)
20)	F -	1115	Oita-G	October, 19	(AR,IR,RS,FS,LO)
21)	F -	1067	Miyazaki-GB	December, 3	(AR,IR,RS,FS,LO)
22)	F -	1068	Miyazaki-G	December, 3	(AR,IR,RS,FS,LO)
23)	F -	1116	Oita-G	December, 3	(AR)
24)	F -	1071	Wakayama-G	December, 11	(AR,IR,RS,FS,LO)
25)	F -	1111	Onahama-ji-G	December, 21	(AR)

Abbreviations used above:

AR : Analog Records of Reproduced Accelerograms

IR : Integrated Velocities and displacements

RS : Response Spectra

FS : Fourier Spectra

LO : Loci of Accelerations, Velocities and displacements

港湾地域強震観測年報 (1995&1996)

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要 旨

1962年より実施されている港湾地域強震観測網においては、1996年12月31日現在、5223個の強震記録が蓄積されるに至っている。この内、1995年中には262個、1996年中には121個の強震記録が得られている。強震計の台数としては、1996年12月31日現在、94台の強震計が59港に設置されており、設置状況としては、67台が地盤上に、20台が地中に、7台が構造物上となっている。本強震観測網では、機械式アナログ記録方式のSMAC-B2型強震計、電気式アナログ記録方式のERS-B、-C、-D型強震計および電気式デジタル記録方式のERS-F、-G型強震計の6種類の強震計が使用されている。ただし、SMAC-B2型強震計については、数地点の例外を除いて最新型のERS-G型強震計に数年の内に更新される予定となっている。

本報告は、1995年および1996年に港湾地域強震観測網で得られた記録について報告するものである。本観測網で得られた記録は、地震毎に分類され、地震諸元、観測地点、記録番号、最大加速度等とともに、本報告に掲載されている強震観測表(Strong-Motion Earthquake Observation Results)にまとめられている。強震観測表の地震諸元は、気象庁地震津波監視課発行の「地震月報」および「地震火山概況」に基づいている。また、強震記録の記録番号は、各観測地点から記録が送られてきた順番に付けられており、記録の分類として、頭文字「S」で始まる記録はSMAC-B2型強震計で得られた記録、「M」はERS-B、-C、-D型強震計で得られた記録、「F」はERS-F、-G型強震計で得られた記録をそれぞれ示している。強震観測表にまとめられている記録の中で、最大加速度が20Galを越える記録については、観測結果として再生した加速度記録波形を示している。また、最大加速度が50Galを越える比較的大きな記録については、さらに、補正加速度記録波形、速度波形、変位波形、応答スペクトル、フーリエスペクトル、水平面内の加速度・速度・変位の軌跡も併せて示している。

1995年中には、1月17日に兵庫県南部地震(M=7.2)が発生し、本震及び余震において港湾地域強震観測網においても多くの記録を観測された。これらの記録は甚大な被害を受けた神戸港の港湾施設の復旧において非常に重要な情報を提供するものであった。これらの記録については、別報の「1995年兵庫県南部地震の港湾地域における強震記録」にて既に詳細に報告されている。また、1994年に生じた三陸はるか沖地震(M=7.5)の余震がいくつか1995年中に観測されたが、これら余震記録については別報の「1994年三陸はるか沖地震の港湾地域における強震記録」にて報告されている。

1995年および1996年における港湾地域強震観測は、以下に示す諸機関の協力の下に実施された。

運輸省港湾局
東京都港湾局

運輸省港湾建設局
静岡県港湾課

北海道開発局港湾部
宮城県港湾課

沖縄開発庁沖縄総合事務局
大阪市港湾局

また、本年報の作成には、各観測地点での強震観測担当者の努力に負うところが非常に大きい。担当者各位に敬意と謝意を表すとともに、各観測地点で実際に強震計の点検ならびに記録の取扱いに携わった方々の氏名を次頁以降に掲載する。

キーワード： 地震、 港湾強震観測、 数値化加速度記録、 応答スペクトル

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強震観測担当者 (1995年1月~12月)

第一港湾建設局

秋田	港湾工事事務所	玉内 克一	遠藤 源	伴 孝宏
酒田	〃	川村 浩	小野寺悌介	
新潟	〃	橋本 正夫		
伏木富山	〃	佐々木豊喜	川見 健二	森田 満幸
金沢	〃	竹田 信一	辻 浩幸	森永 真朗
敦賀	〃	寺崎 賢治	渡辺 淳一	高野 政広

第二港湾建設局

青森	港湾工事事務所	多田 和正	小林 雅幸	猪股 勉	
八戸	〃	原田 久志	伊勢 博	上原 正光	山廻邊伸充
釜石	〃 宮古工場	黒澤 忠男	吉田 静夫		
釜石	〃	斗沢 照夫	似内 敏行	及川 勝朋	高橋 三吉
塩釜	〃	田村 勇	中野渡秀一	加賀谷康司	
小名浜	〃	菅原 豊明	山之内 尚	川村 柳茂	石岡 英樹
小名浜	〃 相馬工場	木田 幸一	佐藤 匡	紺野 茂	
鹿島	〃	渡辺 祐治	福川 順	鈴木 夏雄	前田 直久
鹿島	〃 常陸那珂工場	鳥畑 孝志	平野 孝雄		
千葉	〃	三浦 匠	前田 敏幸	滝口 和美	相川 覚
京浜	〃	西谷 和人	川住 武之	仙田 孝一	岡本 敦史
		今野 頼夫			

第三港湾建設局

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境	〃	福永 幹雄	辻村 幸弘		
広島	〃	中平 浩之	高木 悌二	重光 孝美	石田 博
松山	〃	松崎 忠彦	堺 健作	中西 勝利	
小松島	〃	久本 忠則	山本 幹夫	木村 稔	国方 康史
高知	〃	渡部 隆雄	小銭貴一郎	桑名 公一	

第四港湾建設局

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宮崎	〃	坂本 隆一	吉田 豊成	島田 繁実	
志布志	〃	横手 敏弘	樋口 晃	大瀬 信一	永島田 剛
鹿児島	〃	上谷 修	木村 長正	下野 隆司	内田 雅士

第五港湾建設局

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清水	〃 御前崎工場	村松	佳春	桜井	日出伸	浅倉	弘敏		
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名古屋	〃	中山	努	中津川	哲司				
四日市	〃	秋田	真幸	比嘉	静秀				

北海道開発局

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浦河	〃	東館	雅樹	石井	克英	京野	勇一		
苫小牧	〃	神谷	昌文	若山	義樹				
室蘭	〃	高際	一男	桜井	博	福士	昌哉	長山	和彦
		楠山	哲弘						
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函館	〃	権藤	宗高	田中	和彦	清水	孝紀		

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那覇	港湾工事事務所	栗田	一昭	尾崎	幸男				
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平良	〃	内間	和秀	新垣	英隆				
石垣	〃	古山	治	石垣	里彦	新崎	栄作		

都道府県

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強震観測担当者 (1996年 1月～12月)

第一港湾建設局

秋 田	港湾工事事務所	玉内 克一	伴 孝宏	末永 清和	沓沢 文之
酒 田	〃	川村 浩	小野寺悌介		
新 潟	〃	橋本 正夫			
伏木富山	〃	岡本 博	小西 努		
金 沢	〃	竹田 信一	森永 真朗	安野 浩正	
敦 賀	〃	渡辺 淳一	高野 政広	高野 剛光	

第二港湾建設局

青 森	港湾工事事務所	小林 雅幸	猪股 勉	地本 敏雄	
八 戸	〃	上原 正光	山廻邊伸充	外久保裕一	尾方 拓也
		及川 勝朋	山田 真二		
釜 石	〃 宮古工場	黒澤 忠男	吉田 静夫		
釜 石	〃	及川 勝朋	高橋 三吉	佐藤 和敏	
塩 釜	〃	田村 勇	中野渡秀一	加賀谷康司	
小 名 浜	〃	川村 柳茂	石岡 英樹	一戸 秀久	
小 名 浜	〃 相馬工場	佐藤 匡	紺野 茂	佐々木英秋	西村 隆人
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鹿 島	〃 常陸那珂工場	鳥畑 孝志	平野 孝雄	千葉 仁	
千 葉	〃	滝口 和美	相川 覚	笹森秀一郎	山中 一成
京 浜	〃	西谷 和人	有路 隆一	北川 俊治	

第三港湾建設局

和 歌 山	港湾工事事務所	田村 節雄	竹地晃一郎	佐々木高雄	
神 戸	〃	山本 正男			
神 戸	〃 尼崎工場	山下 仁	高橋 敏文		
境	〃	福永 幹雄	辻村 幸弘	永田 良和	
広 島	〃	重光 孝美	石田 博		
松 山	〃	松崎 忠彦	中西 勝俊	島崎 正寛	
小 松 島	〃	木村 稔	国方 康史		
高 知	〃	小銭貴一郎	桑名 公一	清水 一	

第四港湾建設局

別 府	港湾工事事務所	佐方 良二	定野 修三	山口 誠	
宮 崎	〃	坂本 隆一	畠田 繁実	早田 秀人	後藤 清
志 布 志	〃	大瀬 信一	永島田 剛	松岡 英雄	
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第五港湾建設局

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ANNUAL REPORT ON STRONG-MOTION EARTHQUAKE RECORDS IN JAPANESE PORTS (1995 & 1996)

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Synopsis

Since 1962, strong-motion earthquakes and earthquake responses of structures have been observed in the major ports in Japan. By the end of December 1996, 5223 accelerograms had been accumulated and analyzed at the Geotechnical Earthquake Engineering Laboratory of the Port and Harbour Research Institute.

The strong-motion earthquake observation network in port areas in Japan consists of 94 strong-motion accelerographs installed at 59 ports as of December 1996. 67 accelerographs out of 94 are installed at ground surface, 20 accelerographs are in ground by using bore-hole and the rest 7 are on structures such as quay walls. In the network, two types of accelerographs have been used; one is the SMAC-B2 accelerograph and the other is the ERS accelerograph. The SMAC-B2 accelerograph is of a mechanical type and the ERS accelerograph is of an electrical type equipped with either analogue or digital recorder.

This report presents results of observation and preliminary analysis of records obtained in 1995&1996, which are listed in the tables of Strong-Motion Earthquake Observation Results with their maximum accelerations, being classified in accordance with earthquakes. For the records of ground motions with maximum accelerations exceeding 20 Gals ($=\text{cm}/\text{sec}^2$), computer plots of reproduced acceleration are presented. For the records of ground motions with maximum acceleration exceeding 50 Gals, computer plots of corrected acceleration, integrated velocity and displacement, response spectra, Fourier spectra, and loci of accelerations, velocities and displacements in horizontal plane are presented.

In 1995, great earthquake occurred in Hanshin area of Japan; the name of the earthquake is the 1995 Hyogo-ken nanbu Earthquake on January 17 and many aftershocks were followed. Many records were observed by these earthquakes in the network. The records obtained by these earthquakes are compiled into report entitled 'Strong-Motion Earthquake Records on the 1995 Hyogo-ken nanbu Earthquake in Port Areas' besides this annual report. In 1994, another great earthquake occurred in Sanriku area of Japan; the name of the earthquake is the 1994 Sanriku-Haruka-Oki Earthquake. Many after shocks were followed and some of them occurred in 1995. The records obtained by these aftershocks are compiled into report entitled 'Strong-Motion Earthquake Records on the 1994 Sanriku-Haruka-Oki Earthquake in Port Areas'.

Key Word: Earthquake, Port, Strong-Motion Earthquake Observation, Digitized Acceleration Records, Response Spectra

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1. Introduction

The observation of the strong-motion earthquake in major ports in Japan was started in 1962 by the Geotechnical Earthquake Engineering Laboratory of the Port and Harbour Research Institute. The observation network was expanded year by year and 94 accelerographs had been installed in 59 ports as of December 1996. 5223 accelerograms had been obtained in the network by the end of 1996. The number of accelerograms obtained in 1995 and 1996 were 262 and 121 respectively. Two types of accelerographs have been used in the network, namely the SMAC-B2 accelerograph and the ERS accelerograph. As of December 1996, 2642 accelerograms out of 5223 had been obtained by the SMAC-B2 accelerograph and 2581 accelerograms by the ERS accelerograph.

The records had been published as annual reports after preliminary processing and analyses which will be explained later. The records from 1963 to 1975 had been published in the preceding annual reports which had similar format to the present one¹⁾⁻¹¹⁾. Because digitized data of vertical components of the records from 1963 to 1975 were not included in those reports, the data were reported separately¹²⁾. After the annual report for the records of 1976 and 1977, a new data processing procedure was introduced, and accelerations with instrument correction, integrated velocities and displacements, Fourier spectra and response spectra had been reported in the annual reports¹³⁾⁻²⁸⁾. When disastrous earthquakes occurred, special reports had been published for the earthquake records besides annual reports²⁹⁾⁻⁴⁰⁾.

In 1968, there occurred an earthquake of JMA Magnitude 7.9 in south-east off Hokkaido island. This earthquake was named the 1968 Tokachi-Oki Earthquake, and large number of after shocks followed. Many damage took place to buildings, roads, port facilities and many other types of structures, and many accelerograms were obtained in the network. In particular, an accelerogram with the maximum acceleration of 259 Gals ($=\text{cm}/\text{sec}^2$) was recorded at Hachinohe Port in northern part of Honshu island. Because of the large magnitude of the earthquake and the damage to structures, the records were of great interest and importance, and a special report was published for the records²⁹⁾. In 1978, Japan was hit by two great earthquakes which were the 1978 Izu-Oshima-Kinkai Earthquake of JMA Magnitude 7.0 in south-central off Honshu island and the 1978 Miyagi-Ken-Oki Earthquake of JMA Magnitude 7.4 in north-east off Honshu island. Records of these earthquakes were compiled into two special reports^{30),31)}. In 1982, port structures were damaged by the 1982 Urakawa-Oki Earthquake of JMA Magnitude 7.1 in south-east off Hokkaido island, and records of the earthquake were also compiled into a special report³²⁾. In 1983, serious damage was brought about in the Japan Sea side of north-west off Honshu island by the 1983 Nipponkai-Chubu Earthquake of JMA Magnitude 7.7, and records of the earthquake were compiled into a special report³³⁾. In 1984, an earthquake of JMA Magnitude 7.1 occurred off east coast of Kyushu island in Hyuga-nada, and brought slight damage to port facilities. Records of the earthquake were compiled into a special report³⁴⁾. In 1987, an earthquake of JMA Magnitude 6.7 hit the metropolitan area. The earthquake caused some damages to structures and reclaimed lands area also liquefied slightly by this earthquake. Records of the earthquake are compiled into a special report³⁵⁾. In 1993, two great earthquakes occurred in Hokkaido island, which were the 1993 Kushiro-Oki Earthquake of JMA Magnitude 7.8 in east off Hokkaido on January 15 and the 1993 Hokkaido-Nansei-Oki Earthquake of JMA Magnitude 7.8 in south-west off Hokkaido on July 12. Serious damage was brought about in Hokkaido and many accelerograms were recorded in the network. The records obtained by these two big earthquakes were compiled into special reports^{36),37)}. In 1994, two great earthquakes occurred, which were the 1994 Hokkaido-Toho-Oki Earthquake of JMA Magnitude 8.1 in east off Hokkaido island on October 4 and the 1994 Sanriku-Haruka-Oki Earthquake of JMA Magnitude 7.5 in east off Honshu island on December 28. Many accelerograms were recorded in the network. These records are also compiled into special reports^{38),39)}.

In 1995, one of the most disastrous earthquake in the world hit Hanshin area of Japan. The earthquake was named as 1995 Hyogo-ken nanbu earthquake of JMA Magnitude 7.2. Most of structures in Kobe port were severely damaged by this earthquake. The records obtained during this earthquake and aftershocks are compiled into a special report⁴⁰⁾.

This report presents the strong-motion earthquake records observed in 1995 and 1996. Except the records of the main shock and after shocks of 1995 Hyogo-ken nanbu earthquake and after shocks of 1994 Sanriku-haruka-oki earthquake, which are compiled into the special reports^{39),40)}. The records obtained in the network in 1995 and 1996 are listed in tables of Strong-

Motion Earthquake Observation Results with their maximum accelerations, being classified by earthquakes. For the acceleration records obtained in ground or on ground with maximum accelerations exceeding 20 Gals, computer plots of reproduced accelerograms are prepared. For the records obtained in ground or on ground with maximum acceleration exceeding 50 Gals, computer plots of reproduced accelerograms, integrated velocities and displacements, response spectra, Fourier spectra and loci of accelerations, velocities and displacements in horizontal plane are prepared. Digitized data table of accelerograms and calculated data table of response spectra had been listed in the proceeded annual reports in old days, but those data are not included in this report because those printed digital data tables are not often used any more.

Following organizations cooperated with the Port and Harbour Research Institute in the strong-motion earthquake observation in port area;

- (a) The Bureau for Ports and Harbours of the Ministry of Transport
- (b) The Regional Bureaus for Port Construction of the Ministry of Transport
- (c) The Port and Harbour Division, Hokkaido Development Bureau of the Hokkaido Development Agency
- (d) The Okinawa General Office of the Okinawa Development Agency
- (e) The Harbour Bureaus of Tokyo Metropolitan Governments
- (f) The Harbour Bureaus of Osaka Municipal Governments
- (g) The Harbour Sections of Shizuoka Prefectural Governments
- (h) The Harbour Sections of Miyazaki Prefectural Governments

2. Network and Instruments

(1) Network

The network of the Port and Harbour Research Institute covered the whole coast line of Japan with 94 strong-motion accelerographs in 59 ports at the end of 1996. The locations of ports where accelerographs were installed as of December 1996 are shown in **Figure 1**. The numbers attached to the ports in **Figure 1** correspond to the numbers of ports in **Table 1**.

The stations in the network are listed in **Table 1** with the type of accelerograph and the installation condition, being classified by ports. The detailed information of the stations is described in the reports on the site characteristics⁽⁴¹⁾⁻⁴⁵⁾. At the end of 1996, the accelerographs at 11 stations out of 94 stations were the SMAC-B2 accelerographs and the rest 83 were the ERS accelerographs.

(2) Servicing

Installation and servicing of the accelerographs have been made by the port construction offices of the previously described organizations under the guidance of the Geotechnical Earthquake Engineering Laboratory. It is directed that accelerographs should be checked at least once a month and after an earthquake larger than the JMA seismic intensity scale II shown in **Table 2** and **Table 3**. JMA seismic intensity scale has slightly changed at February 1996 and both former scale and new scale are summarized in **Table 2** and **Table 3** respectively. Immediately after earthquakes, the accelerograms are sent to the Laboratory by mail without any treatment or reading to avoid possible damage to the records.

(3) Station

There are three kinds of stations in the network. The first is to record accelerations at ground surface, the second is in ground by using bore-hole and the third is to record earthquake response of structures. The station which records earthquake response of structures is always accompanied with another station which records ground acceleration in its vicinity.

In the stations which record the ground acceleration, one of the horizontal components of the accelerograph is directed to the due north except a few accelerographs. Some of the accelerographs are installed in parallel with the structures because most of port facilities such as quay walls or piers have two-dimensional-structure and it is desirable to record the components

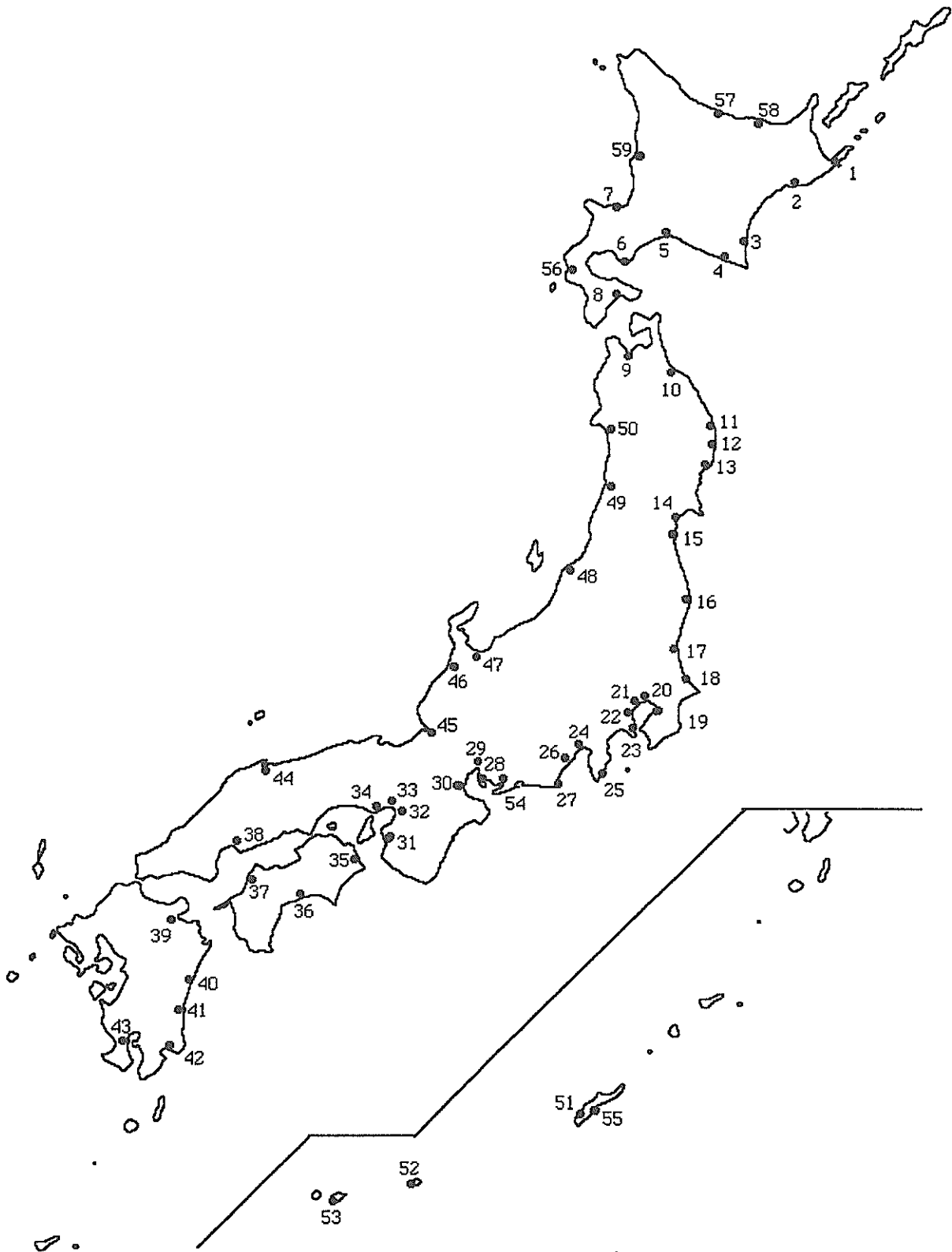


Figure 1 Location of ports where accelerographs are installed as of December 1996

Table 1 List of Strong-Motion Earthquake Stations of the Port and Harbour Research Institute

(December 1996)					
No. of port*	Name of port	Name of station	Type of accelerograph	Installation condition	Ref. No.**
1	Hanasaki	1 Hanasaki-F	ERS-F	on ground	
2	Kushiro	2 Kushiro-G	ERS-G	on ground	34
		3 Kushiro-GB	ERS-G	in ground	
3	Tokachi	4 Tokachi-G	ERS-G	on ground	298
4	Urakawa	5 Urakawa-S	SMAC-B2	on ground	
5	Tomakomai	6 Tomakomai-G	ERS-G	on ground	107
6	Muroran	7 Muroran-G	ERS-G	on ground	34,107
7	Otaru	8 Otaru-G	ERS-G	on ground	107
8	Hakodate	9 Hakodate-M	ERS-C	on ground	298
		10 Hakodate-FB	ERS-F	in ground	
		11 Hakodate-F	ERS-F	on ground	
		12 Hakodate-FR	ERS-F	on structure	
9	Aomori	13 Aomori-G	ERS-G	on ground	107,298,156
10	Hachinohe	14 Hachinohe-G	ERS-G	on ground	34,107
		15 Hachinohe-GB	ERS-G	in ground	
11	Miyako	16 Miyako-G	ERS-G	on ground	34,107
12	Kamaishi	17 Kamaishi-M	ERS-C	on ground	351
		18 Kamaishi-MB	ERS-D	in ground	351
13	Ofunato	19 Ofunato-bochi-S	SMAC-B2	on ground	34,107
		20 Ofunato-bo-S	SMAC-B2	on structure	34,107
		21 Ofunato-mound-M	ERS-C	on structure	
	Shiogama***	Shiogama-kojyo-S	SMAC-B2	on ground	34,107,156
14	Sendai	22 Sendai-M	ERS-C	on ground	351
		23 Sendai-MB	ERS-D	in ground	351
15	Soma	24 Soma-S	SMAC-B2	on ground	
16	Onahama	25 Onahama-ji-G	ERS-G	on ground	34,351
		26 Onahama-ji-GB	ERS-G	in ground	
17	Hitachinaka	27 Hitachinaka-F	ERS-F	on ground	
18	Kashima	28 Kashima-zokan-S	SMAC-B2	on ground	34,156,298
19	Chiba	29 Chiba-S	SMAC-B2	on ground	107
20	Tokyo	30 Shinagawa-G	ERS-G	on ground	
		31 Shinagawa-GB	ERS-G	in ground	
21	Kawasaki	32 Kawasaki-FB	ERS-F	in ground	
		33 Kawasaki-F	ERS-F	on ground	
		34 Kawasaki-FR	ERS-F	on structure	
22	Yokohama	35 Yamashita-FB	ERS-F	in ground	
		36 Yamashita-F	ERS-F	on ground	
		37 Yamashita-FR	ERS-F	on structure	
23	Yokosuka	38 Koken-G	ERS-G	on ground	
		39 Koken-S	SMAC-B2	on ground	34
24	Tagonoura	40 Tagonoura-S	SMAC-B2	on ground	107
25	Shimoda	41 Shimoda-F	ERS-F	on ground	
26	Shimizu	42 Shimizu-G	ERS-G	on ground	
		43 Shimizu-GB	ERS-G	in ground	
27	Omaezaki	44 Omaezaki-M	ERS-C	on ground	351
28	Kinuura	45 Kinuura-ji-S	SMAC-B2	on ground	107,298
29	Nagoya	46 Nagoya-sorami-G	ERS-G	on ground	
		47 Nagoya-sorami-GB	ERS-G	in ground	
		48 Nagoya-inae-G	ERS-G	on ground	34
30	Yokkaichi	49 Yokka-chitose-S	SMAC-B2	on ground	34,107
		50 Yokka-sekitan-M	ERS-B	on structure	34
		51 Yokka-dai2-M	ERS-B	on structure	34
31	Wakayama	52 Wakayama-G	ERS-G	on ground	34,298
32	Osaka	53 Osaka-ji-G	ERS-G	on ground	34
		54 Osaka-minami-G	ERS-G	on ground	34

(to be continued)

(Table 1 Continued)

No. of port*	Name of port	Name of station	Type of accelerograph	Installation condition	Ref. No.**
33	Amagasaki	55 Amagasaki-G	ERS-G	on ground	156
34	Kobe	56 Kobe-ji-S	SMAC-B2	on ground	34
		57 Kobe-ji-GB80	ERS-G	in ground	
		58 Kobe-ji-GB40	ERS-G	in ground	
		59 Kobe-ji-G	ERS-G	on ground	
		60 Kobe-dai8-G	ERS-G	on structure	34
		61 Kobe-maya-G	ERS-G	in ground	298
		62 Rokko-GB80	ERS-G	in ground	
		63 Rokko-GB40	ERS-G	in ground	
		64 Rokko-G	ERS-G	on ground	
35	Komatsujima	65 Komatsujima-G	ERS-G	on ground	107
36	Kochi	66 Kochi-G	ERS-G	on ground	34,298
37	Matsuyama	67 Matsuyama-G	ERS-G	on ground	156
38	Hiroshima	68 Hiroshima-G	ERS-G	on ground	34
39	Oita	69 Oita-G	ERS-G	on ground	156
40	Hososhima	70 Hososhima-F	ERS-F	on ground	34,298
41	Miyazaki	71 Miyazaki-G	ERS-G	on ground	298
		72 Miyazaki-GB	ERS-G	in ground	
42	Shibushi	73 Shibushi-G	ERS-G	on ground	
43	Kagoshima	74 Kagoshima-G	ERS-G	on ground	34,298
44	Sakaiminato	75 Sakaiminato-G	ERS-G	on ground	34,298
45	Tsuruga	76 Tsuruga-G	ERS-G	on ground	34
46	Kanazawa	77 Kanazawa-G	ERS-G	on ground	107
47	Toyama	78 Toyama-G	ERS-G	on ground	34
		79 Toyama-GB	ERS-G	in ground	
48	Niigata	80 Niigata-G	ERS-G	on ground	34,298
49	Sakata	81 Sakata-G	ERS-G	on ground	34
50	Akita	82 Akita-G	ERS-G	on ground	34,351
		83 Akita-GB	ERS-G	in ground	
51	Naha	84 Naha-G	ERS-G	on ground	298
		85 Naha-GB	ERS-G	in ground	
52	Hirara	86 Hirara-G	ERS-G	on ground	298
53	Ishigaki	87 Ishigaki-G	ERS-G	on ground	298
54	Mikawa	88 Mikawa-G	ERS-G	on ground	
		89 Mikawa-GB	ERS-G	in ground	
55	Nakagusuku	90 Nakagusuku-G	ERS-G	on ground	
56	Setana	91 Setana-G	ERS-G	on ground	
57	Monbetsu	92 Monbetsu-G	ERS-G	on ground	
58	Abashiri	93 Abashiri-G	ERS-G	on ground	
59	Rumoi	94 Rumoi-G	ERS-G	on ground	

*The numbers correspond to those in Figure 1.

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

These references include the site where initially SMAC-B2 accelerograph and it was already replaced with ERS type.

*** Observation at Shiogama port was stopped since March, 1996.

Table 2 JMA Seismic Intensity Scale

0 : NO FEELING	Shocks too weak to cause human feelings and registered only by a seismograph.
I : SLIGHT	Extremely feeble shocks only felt by persons at rest or by those who are observant to an earthquake.
II : WEAK	Shocks felt by most persons, slight shaking of doors and Japanese latticed sliding doors(shoji).
III : RATHER STRONG	Slight shaking of houses and buildings, rattling of doors and Japanese latticed sliding doors (shoji), swinging of hanging objects like electric lamps, moving of liquids in vessels.
IV : STRONG	Strong shaking of houses and buildings, overturning of unstable objects, spilling of liquids out of vessels.
V : VERY STRONG	Cracks in the walls, overturning of gravestones, stone lanterns, etc., damage to chimneys and mud-and-plaster warehouses.
VI : DISASTROUS	Demolition of houses by less than 30% in total number, landslips, fissures in the ground, etc.
VII : VERY DISASTROUS	Demolition of houses by more than 30%, intense landslips, large fissures in the ground, faults.

of the ground acceleration parallel and perpendicular to the principal axes of the structure. In the stations which record structural response and the accompanying stations which record the ground acceleration in its vicinity, accelerographs are installed parallel to the structure in which earthquake response is needed.

Two horizontal components of the accelerograph are usually corresponding to North-South (NS) and East-West (EW) direction, respectively. However, if the direction of the component of the accelerograph is different from the geometric direction, the deviation angle in degree is used to represent components direction. For example, N10E component means that the direction deviates 10 degrees eastward from the due north.

Each station in the network has its own abbreviated name listed in **Table 1**. The name consists of the location, the type of the accelerograph and the installation condition. For instance, the stations in Kushiro port in Hokkaido island are named Kushiro-G and Kushiro-GB, respectively. 'Kushiro' means the location of the station. In some sites where the accelerograph installed at the port construction office, the suffix 'ji' is attached as 'Kobe-ji'. The suffix 'G' represents type of acceleration and means that the ERS-G type accelerograph is installed at Kushiro port. If the SMAC-B2 accelerograph is installed, this suffix becomes 'S', if the ERS-B, -C and -D type accelerograph, 'M', and if the ERS-F type accelerograph, 'F'. The suffix 'B' after 'G' in Kushiro-GB represents installation condition and means that the accelerograph is installed in ground using bore-hole. If there is no suffix representing installation condition such as Kushiro-G, that means the accelerograph is being installed at ground surface. If the suffix representing installation condition becomes 'R', that means the accelerograph is being installed on the structure. In the Kobe-ji site and Rokko site, two accelerograph are installed at different depth of in ground. The suffix of number like '40' after 'B' represents the depth of in ground accelerograph.

Table 3 JMA Seismic Intensity Scale (February 1996)

0 : NO FEELING	Imperceptible to people.
I : SLIGHT	Felt by only some people in the building.
II : WEAK	Felt by most people in the building. Some people awake. Hanging objects such as lamps swing slightly.
III : RATHER STRONG	Felt by most people in the building. Dishes in a cupboard rattle occasionally. Electric wires swing slightly.
IV : STRONG	Many people are frightened. Most sleeping people awake. Hanging objects swing considerably and dishes in a cupboard rattle. Unstable ornaments fall occasionally. Electric wires swing considerably.
V(Lower) : VERY STRONG(Lower)	Some people find it difficult to move. Hanging objects swing violently. Most unstable ornaments fall. People notice electric-light poles swing. Occasionally, less earthquake-resistant houses suffer damage to walls and pillars.
V(Upper) : VERY STRONG(Upper)	Many people are considerably frightened and find it difficult to move. Most dishes in a cupboard and most books on a bookshelf fall. In many cases, unreinforced concrete-block walls collapse and tombstones overturn. Many automobiles stop because it becomes difficult to drive. Occasionally, less earthquake-resistant houses suffer heavy damage to walls and pillars and lean.
VI(Lower) : DISASTROUS(Lower)	Difficult to keep standing, A lot of heavy and unfixed furniture moves and falls. In some buildings, wall tiles and windowpanes are damaged and fall. Occasionally, less earthquake-resistant houses collapse.
VI(Upper) : DISASTROUS(Upper)	Impossible to keep standing and to move without crawling. Most heavy and unfixed furniture moves and falls. In many buildings, wall tiles and windowpanes are damaged and fall. Most unreinforced concrete-block walls collapse. Many, less earthquake-resistant houses collapse.
VII : VERY DISASTROUS	Thrown by the shaking and impossible to move at will. Most furniture moves to a large extent and some jumps up. In most buildings, wall tiles and windowpanes are damaged and fall. Occasionally, even highly earthquake-resistant buildings are severely damaged and lean.

(4) Accelerograph

(a) SMAC-B2 accelerograph

The SMAC-B2 accelerograph was developed by the Committee for the Standard Strong Motion Accelerograph. It is a three component mechanical type accelerograph which scratches records on a rolled waxed paper. The specifications of the SMAC-B2 accelerograph are shown in **Table 4**. Inside view and theoretical frequency characteristics are also shown in **Figure 2** and **Figure 3**, respectively.

The SMAC-B2 accelerograph has been one of the standard accelerographs in the network of the Port and Harbour Research Institute. At the earlier stage of the strong-motion observation, the SMAC-B2 accelerograph was one of the standard models and suitable for the observation condition in port areas. After the SMAC-B2 accelerograph, several types of accelerograph were developed by the Committee. In the network, however, the SMAC-B2 accelerograph has only been used as a mechanical type accelerograph because it was inconvenient to use many types of accelerographs from the view point of instrument correction procedure and maintenance. As of December 1996, total number of SMAC-B2 accelerograph being used is 11.

5 Gals ($=\text{cm/sec}^2$) is adopted as a triggering level of the accelerograph in places where ground noise is small, and 8 Gals in places where ground noise is relatively large because of heavy motor trucks for construction work or cargo transportation. A few number of the accelerographs located beside roads carrying very heavy traffic are triggered at 11 Gals.

At present, an action program is going on to replace the SMAC-B2 accelerographs with digital type accelerographs.

(b) ERS accelerograph

The SMAC-B2 accelerograph has been very widely used in the network. However, there exist some places where the SMAC-B2 accelerograph can not be installed, such as on structures or in ground. For that reason, the ERS accelerograph was developed by the Geotechnical Earthquake Engineering Laboratory to observe earthquake motions in a specific condition. Transducers and a recorder of the ERS accelerograph are separately installed for the observation.

Table 4 Specifications of the SMAC-B2 accelerograph

Component	2 horizontal and 1 vertical
Natural period	0.14 sec.
Sensitivity	12.5 Gal/mm
Damping	Critical
Damping mechanism	Air piston
Maximum recording acceleration	500 Gal
Recording speed	10 mm/sec.
Recording medium	Waxed paper
Driving mechanism for recorder	Hand-wound spring motor
Recording duration	3 min.
Recording capacity	5 earthquakes/roll
Starter	Electric contact made by vertical motion
Period of starter pendulum	0.3 sec.
Starter threshold	5 Gal
Auxiliary starter	Mechanical, works at 100 gal
Time marking	1 sec.
Power supply	4 dry cells
Size	54 × 54 × 37 in cm
Net weight	100 kg

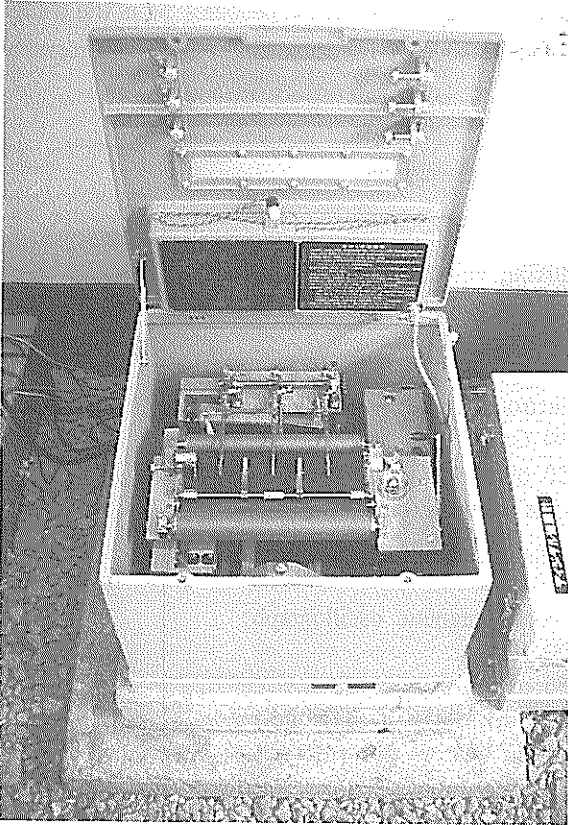
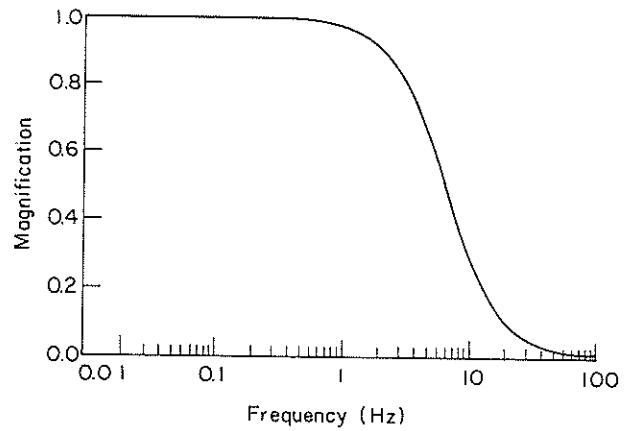
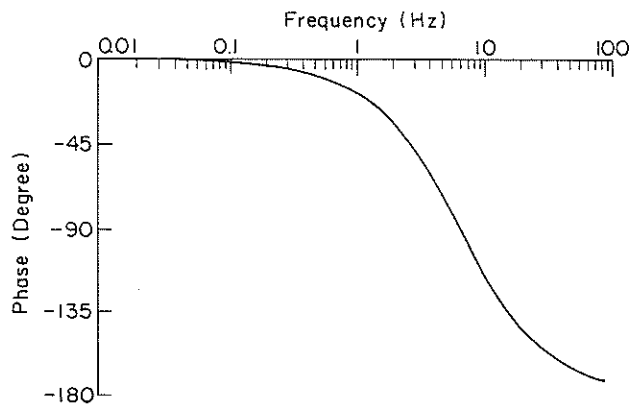


Figure 2 Inside view of the SMAC-B2 accelerograph



(a) amplitude



(b) phase

Figure 3 Frequency characteristics of the SMAC-B2 accelerograph

First, the accelerograph with magnetic tape data recorders was developed. This accelerograph was called the ERS-A accelerograph. After some period of operation, the magnetic tape data recorders were replaced by an oscillograph. The model with an oscillograph was named as the ERS-B accelerograph. The ERS-A and -B accelerograph records only two horizontal components of acceleration. The specifications of the ERS-B accelerograph are shown in **Table 5** and the transducer of the ERS-A and -B are shown in **Figure 4**. The ERS-B accelerographs are used at 2 stations at present as shown in **Table 1**.

After that, the ERS-C accelerograph was developed and installed. While the ERS-B accelerograph records accelerations in two horizontal components, the ERS-C accelerograph records acceleration of vertical component as well as two horizontal ones. The transducer of the ERS-C accelerograph is shown in **Figure 5**. The ERS-C accelerographs are working at 5 stations at present as shown in **Table 1**.

The ERS-D accelerograph was also developed for recording acceleration in ground. Accelerographs of this type had been installed at 2 stations in the network as shown in **Table 1**. The transducers of the ERS-D accelerograph are installed in bore-hole and they have the same specifications as those of the ERS-C accelerograph. The specifications of the ERS-C and -D accelerographs are shown in **Table 6**. The transducers of the ERS-D accelerograph are shown in **Figure 6**.

In the ERS-B, -C and -D accelerographs, the transducers are almost directly connected with galvanometers in the oscillograph. There exist only resistor circuits to adjust sensitivity and impedance matching between them. No electronic amplifier is used to attain maximum reliability of the instrument. The overall sensitivity is more than 10 mm per Gals ($=\text{cm}/\text{sec}^2$) and it is easily adjusted by changing resistors of the circuit. Therefore, the ERS-B, -C and -D accelerograph have

advantage to start the observation in its maximum sensitivity and to readjust the sensitivity into the appropriate one for the strong-motion after obtaining some records. The frequency characteristics of these accelerographs are shown in **Figure 7**. The triggering levels of these ERS accelerographs are similar to those of the SMAC-B2 accelerographs. If the ERS-B, -C and -D accelerographs are installed at the station, the suffix which represents type of accelerograph becomes 'M' in the name of the station. For instance, the name of the station at Hakodate port becomes Hakodate-M because the ERS-C accelerograph is installed.

Table 5 Specifications of the ERS-B accelerograph

Transducer	
Type	Moving coil type
Component	2 horizontal
Natural period	0.5 sec.
Damping factor	17
Damping mechanism	Electro-magnetic
Capacity	250 Gal
Coil impedance	320 ohm
Sensitivity	about 2mv/Gal(circuit open)
Water tightness	over 200 kg/cm ²
Recorder	
Type	Electro magnetic oscillograph
Natural frequency of galvanometer	100 Hz
Sensitivity	166 mm/mA
Recording paper	92 mm(width) × 30 m(length) (visible without processing)
Paper speed	2 cm/sec.
Time mark	0.1 sec.
Power supply ... Rechargeable battery, Charged automatically when it is necessary.	

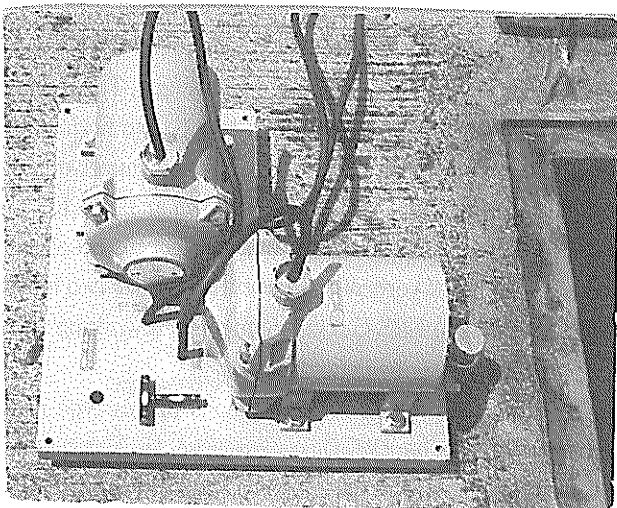


Figure 4 Transducers of the ERS-A and-B accelerograph

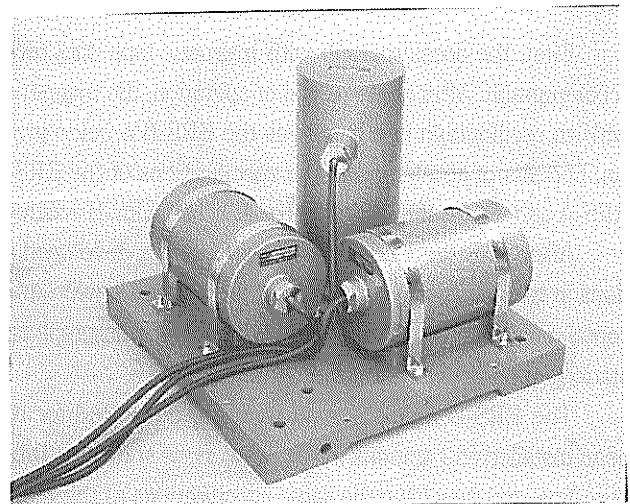


Figure 5 Transducers of the ERS-C accelerograph

Table 6 Specifications of the ERS-C(D) accelerograph

Transducer	
Type	Moving coil type
Component	2 horizontal and 1 vertical
Natural frequency	3 Hz(5 Hz)
Damping factor	17(10)
Damping mechanism	Electro-magnetic
Capacity	500 Gal
Water tightness	over 20 kg/cm ²
Recorder	
Type	Electro magnetic oscillograph
Natural frequency of galvanometer	270 Hz
Recording paper	198 mm(width)×30m(length) (visible without processing)
Paper speed	4 cm/sec.
Time mark	0.1 sec.
Sensitivity (overall)	2 Gal/mm, or 10 Gal/mm
Power supply ... Rechargeable battery, Charged automatically when it is necessary.	

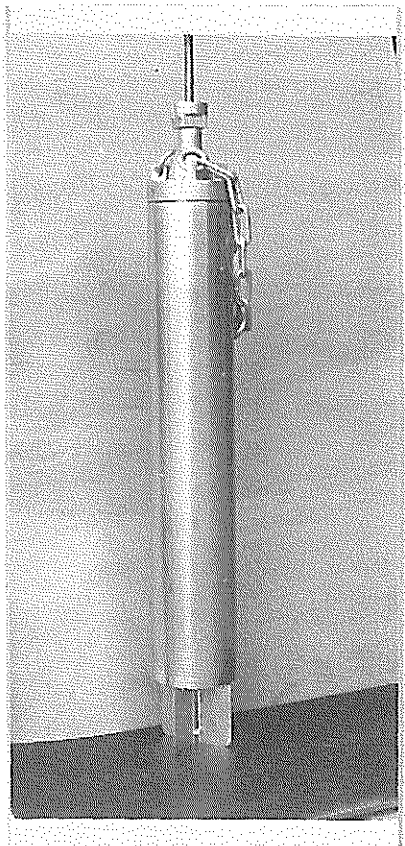
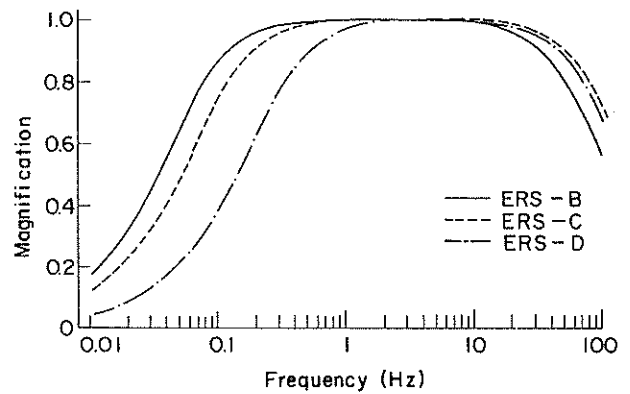
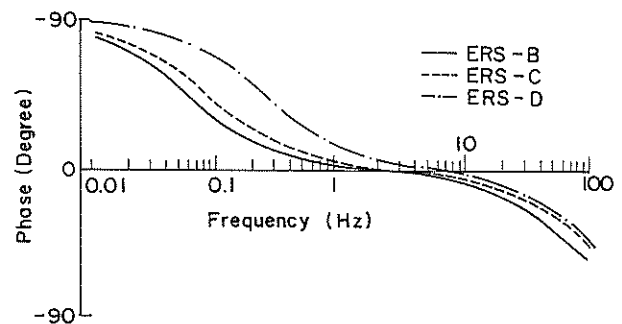


Figure 6 Transducers of the ERS-D accelerograph



(a) amplitude



(b) phase

Figure 7 Frequency characteristics of the RES-B,-C and -D accelerograph

(c) ERS-F accelerograph

The ERS-F accelerograph is a digital type strong-motion accelerograph equipped with non-volatile, solid state magnetic bubble memories. The main unit of the recording system, shown in **Figure 8**, consists of four non-volatile, solid-state magnetic bubble memories of the total memory size of 1 Mbytes and the controlling parts, of which dimensions are 240×240×35 mm, weighing about 1 kg. Double units can be installed in a recording system, but single unit is installed for the recording system at Hakodate Port and Hitachinaka Port. Time signal is recorded by using one channel in this system and the recording time of three components of acceleration and one time signal is about 40 minutes in double bubble memories.

There are several types of the ERS-F accelerographs. The standard type shown in **Figure 9** is a self-contained box type which contains transducers and a recorder with magnetic bubble memories all in one. The other is a separated type in which transducers and a recorder are separated with each other. **Figure 10** shows the transducers which is to be installed in ground by using bore-hole and to observe earthquake motions at base or in ground. The transducers shown in **Figure 11** is to be attached to structures. The front view of the recording system of the ERS-F accelerograph including the magnetic bubble memories is shown in **Figure 12**. Total number of the ERS-F accelerograph is 13 at present as shown in **Table 1**.

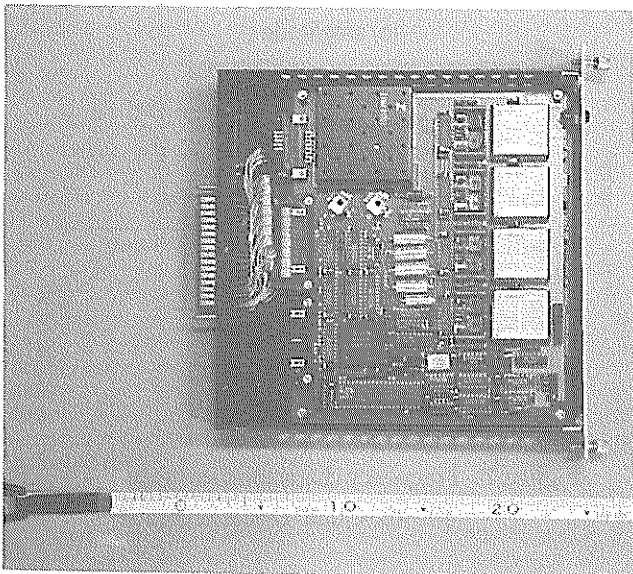


Figure 8 Inside view of the memory of the ERS-F accelerograph

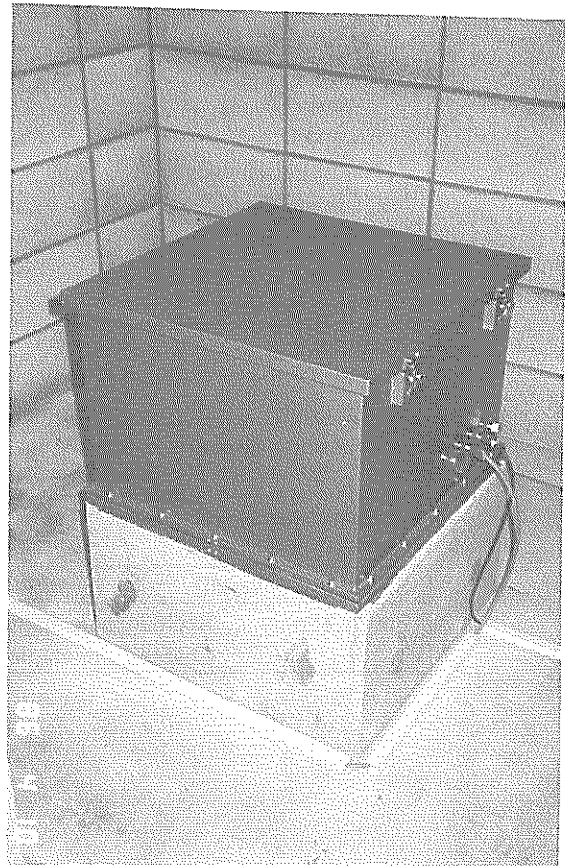


Figure 9 Standard type of the ERS-F accelerograph

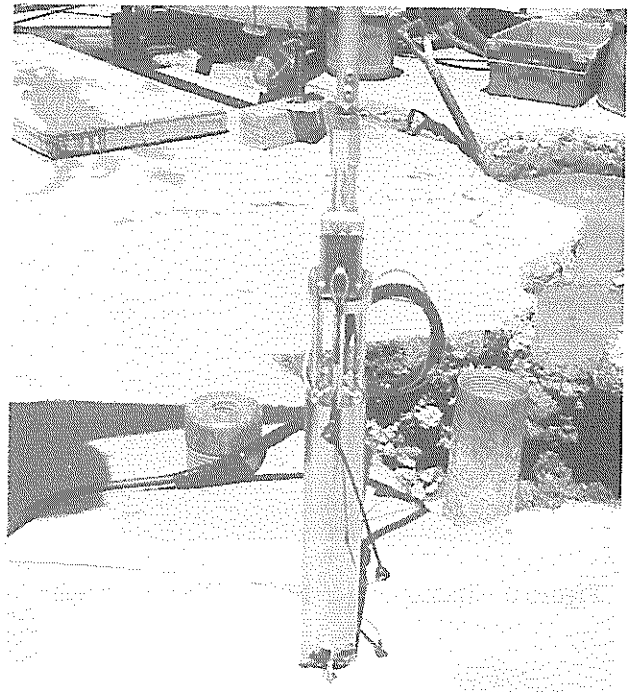


Figure 10 Transducers of the ERS-F and -G accelerograph installed in ground

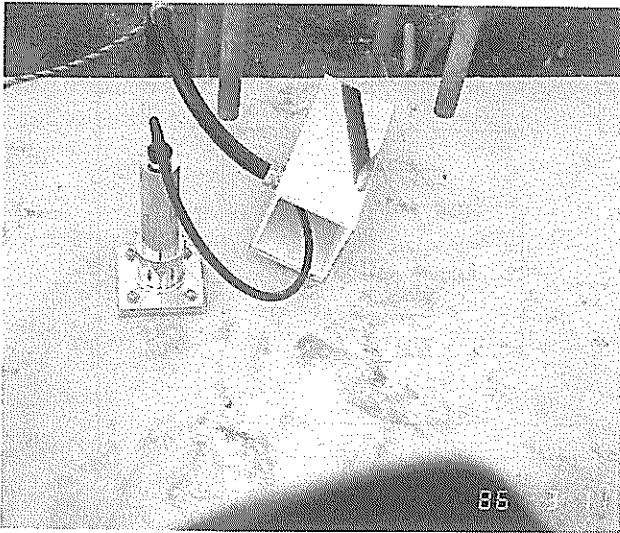


Figure 11 Transducers of the ERS-F and -G accelerograph attached in structures

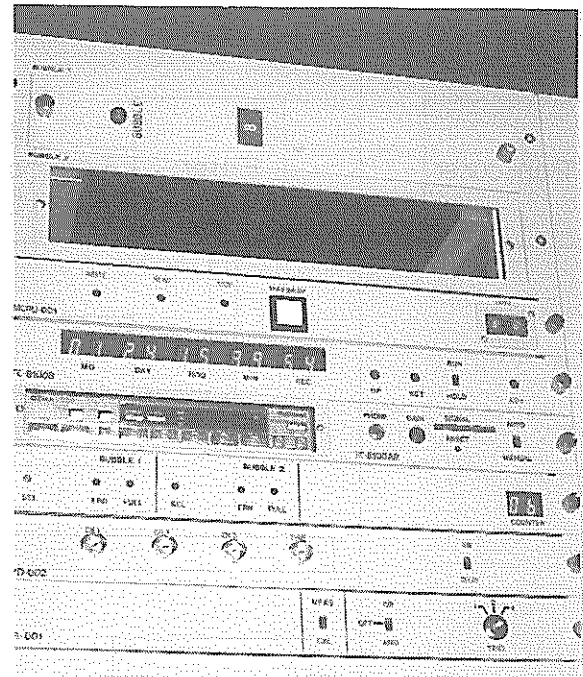


Figure 12 Front view of the recording system of the ERS-F accelerograph

The ERS-F accelerograph has a system shown by a block-diagram in **Figure 13**, and satisfies the specification shown in **Table 7**. The frequency characteristics of the transducers are shown in **Figure 14**. Recording duration of an earthquake motions is one minute at minimum, and the duration can be extended up to 10 minute at a step of one minute by monitoring the level of the acceleration. The recording duration is extended if the level of the monitored acceleration after each 40 seconds from the trigger or extension is higher than the trigger level of the acceleration. The main unit of the recording system can record ten earthquake motions by 60 seconds of three components at the maximum. If earthquakes occur successively and the earthquake motion data should over flow the recording system, records of the greatest maximum accelerations are retained. As exception to this, however, records of 180 seconds are stored in the first-come first-serve basis.

(d) ERS-G accelerograph

The ERS-G accelerograph is an improved version over the ERS-F accelerograph. Transducers of the accelerographs are almost the same to those of the ERS-F accelerograph. In the ERS-G accelerograph, IC-CARD memory as shown in **Figure 15** is used for the recording system and some improvements are done for the controlling system. The memory size of the IC-CARD is 2 Mbytes. The recording time of three components of acceleration is about 52 minutes in one card. The triggering level of acceleration can be set at several steps. The capacity of accelerograph is 2G, and the level of maximum acceleration (sensitivity) can be set at appropriate value from 0.008G to 2G. Total number of the ERS-G accelerograph is 61 at present.

The specification of the ERS-G acceleration is shown in **Table 6** with the specifications of the ERS-F accelerograph and frequency characteristics of the transducers which are the same as the transducers of ERS-F accelerograph are shown in **Figure 14**. Standard type of the ERS-G accelerograph is shown in **Figure 16** in which transducers and recording system with IC-CARD are contained all in one. The type of the transducer of the ERS-F and -G accelerograph installed at ground surface is usually force-balance type. However, the velocity-balance type is recently adopted for the transducers installed in ground because of the safety against lightning.

After recording earthquakes, the main unit (memory) of the recording system is pulled out from the recording system of the ERS-F and -G accelerograph and replaced by another memory ready for recording the coming earthquakes. The pulled out unit, bubble memory with a static eliminator on the connector to the unit of the ERS-F accelerograph and IC-CARD of the

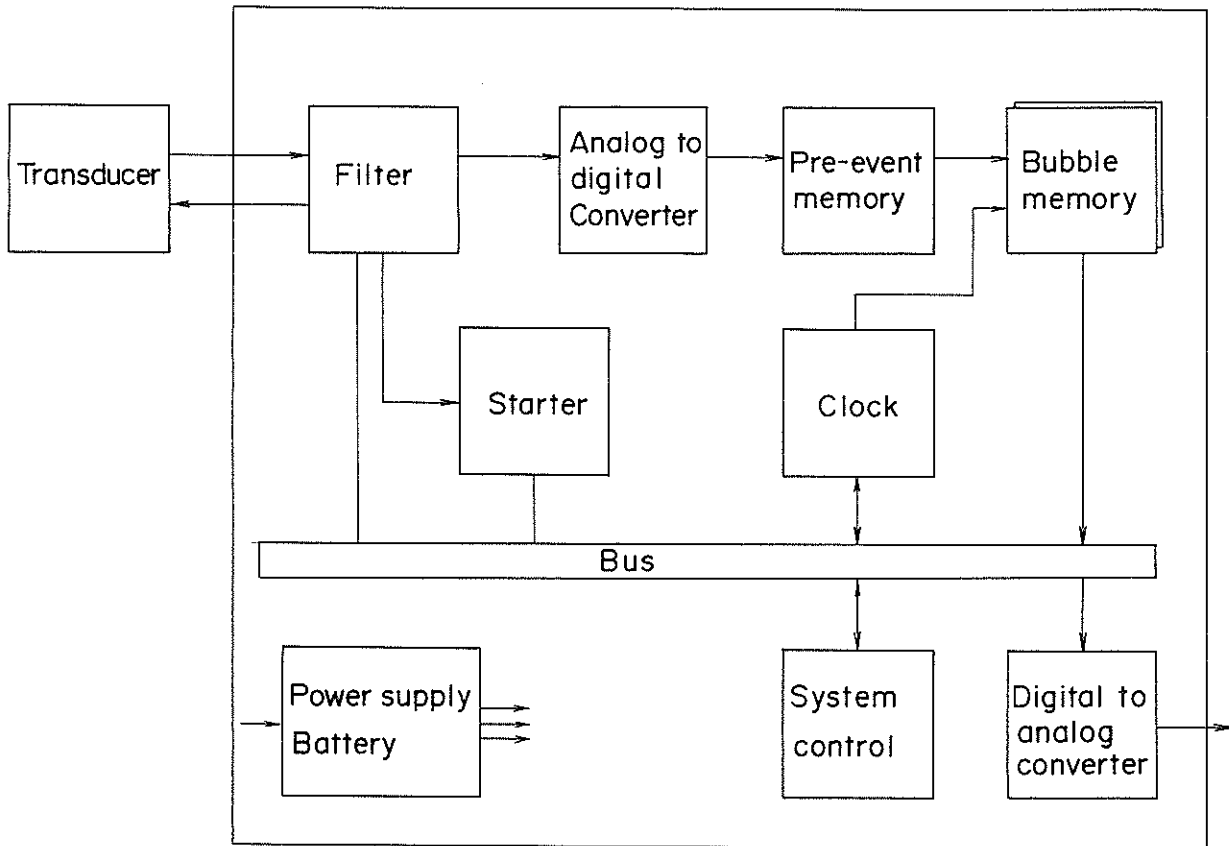


Figure 13 Block-diagram of the ERS-F accelerograph

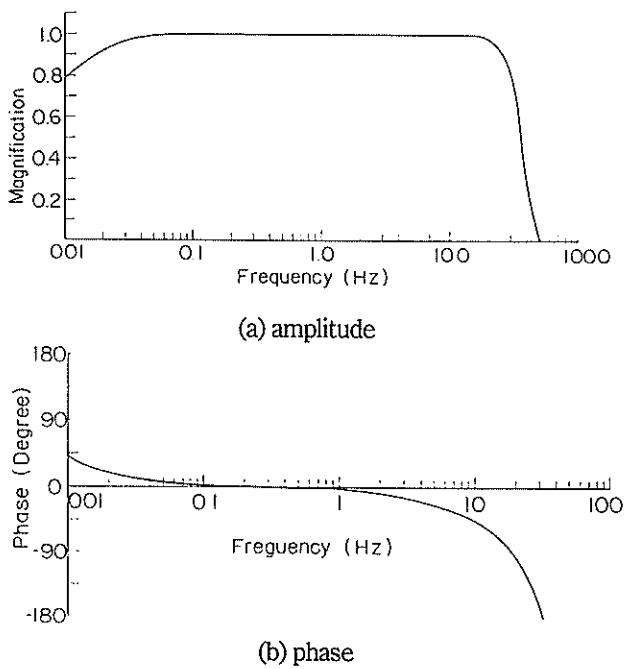


Figure 14 Frequency characteristics of the ERS-F and -G accelerograph

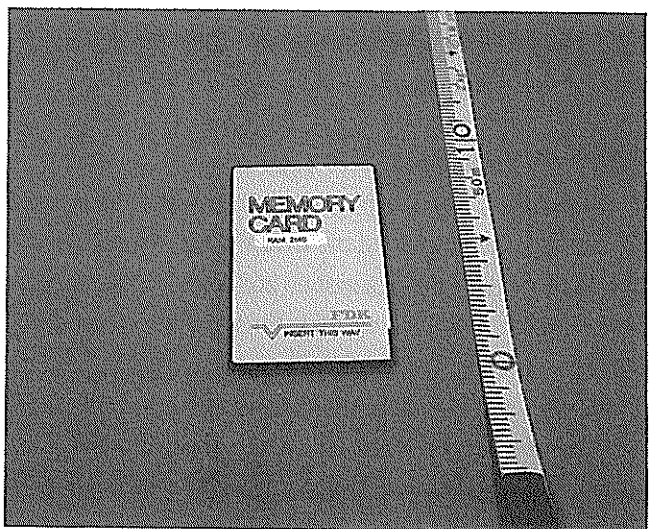


Figure 15 Memory (IC-CARD) of the ERS-G accelerograph

Table 7 Specifications of the ERS-F and-G accelerograph

Overall Capabilities	Maximum acceleration capacity (-F) 2G (-G) 0.008G~2G, variable Frequency characteristics 0.01Hz~35Hz Dynamic range 86 dB over
Transducer	Accelerometer Component 2 horizontal, 1 vertical Maximum capacity (-F) 2G (-G) 0.008G~2G, variable Sensitivity 10^{-5} Type Force-ballance servo or Velocity-ballance servo
Filter	High pass 0.007 Hz -6 dB/octave Low pass 35 Hz -18 dB/octave
A/D conversion	Resolution 16 bits Conversion rate 100 Hz
Pre-Event Memory	10 seconds.
Clock	Accuracy of internal clock 1/100 seconds corrected every an hour by NHK time signal
Starter	Trigger levels : 0.5, 1, 2% of maximum acceleration
Recorder	No. of channel (-F) 4~10 channel (1 time signal) (-G) 3~12 channel Memory size (-F) Bubble Memory : 1 Mbytes \times 2 (-G) IC-CARD Memory: 2 Mbytes Record length 1 ~ 10 minutes/record Maximum Recording Length (-F) 40 minutes/4ch. (-G) 52 minutes/3ch. Record of greatest maximum acceleration secured
Related Informations	Observation station, Number of records, Start time of each data, Maximum accelerations of each component
Calibration	Overall calibration are possible
Backup Power Supply	2 hour after power storage
Container	Alluminum box, Water-Proof, Size (-F) : 54(L),54(W),38(H)cm (-G) : 54(L),54(W),33(H)cm

ERS-G accelerograph, is packed in a case and sent to the Laboratory. The unit is set on the reproducer which is connected to a computer and digital time histories of earthquake motions are reproduced in the Laboratory. Absolute time at the trigger of the record is also obtained from the record of the internal clock of the accelerograph. As shown in **Table 7**, these recording system have digital delay memory for 10 seconds. If the recording started before the first motion of the earthquake, some of the portion of the record preceding the first motion is omitted.

(5) Foundation and House

As most of the harbour structures have shallow foundations and do not rest on bed rock, spread foundations for the accelerographs are being used. All the SMAC-B2 accelerographs in the network are installed on simple spread foundations which are made of reinforced concrete shown in **Figure 17**. The hollow space under the foundation is allocated to make the bulk density of the foundation equal to that of the soil, so that the disturbance to the records due to the foundation can be minimized. The foundations are also used for the ERS-F and -G accelerographs which were installed after the SMAC-B2 accelerograph for replacement.

The standard foundation for the ERS-B and -C accelerograph has not been established. Shape and size of a foundation for transducers of the ERS-C accelerograph are illustrated in **Figure 18**.

Usually, no pile is used to support the accelerograph and its foundation, but in the stations on very soft soil or very loose sand, concrete piles or wooden piles are used. For example, the foundation at the Niigata-G station is supported by piles. All the foundations are isolated from houses covering the accelerographs.

Most of the accelerographs are covered with houses which were built for the accelerographs. Some of the accelerographs are installed in houses which were built for other purposes. The houses built for covering accelerographs are made of reinforced concrete or concrete blocks, and some are prefabricated houses. The house of the Onahama-ji-G,GB station is shown in **Figure 19** as an example.

3. Preliminary Processing

All the accelerograms collected at the Geotechnical Earthquake Engineering Laboratory of the Port and Harbour Research Institute are listed in the tables on Strong-Motion Earthquake Observation Results, which are classified by earthquakes and listed in the later part of this report. They undergo the following preliminary processing.

At first, each accelerogram is given a record number according to the order of its arrival at the Laboratory. The record number for the accelerogram by the SMAC-B2 accelerograph begins with the capital letter 'S', that by the ERS-B, -C and -D accelerograph, with the capital letter 'M' and that by the ERS-F and ERS-G, with the capital letter 'F'.

Then, an earthquake which corresponds to each accelerogram is confirmed or determined. There is no time information in the accelerograms obtained by the SMAC-B2 accelerograph and the ERS-B, -C and -D accelerograph because those accelerographs are not equipped with an internal clock. Therefore, most of the accelerograms are sent to the Laboratory with the earthquake information from the stations. However, there are a few of the accelerograms without such information because the accelerograms were found in the regular servicing and it was difficult to find the corresponding earthquake at the station. For such accelerograms without time information, the earthquake is determined by considering both the possible period of the recording and the earthquake occurred in that area at that period.

The determination or the confirmation of the corresponding earthquake is based on the Seismological Bulletin by the Japan Meteorological Agency (JMA)^{46),47)}. If the Seismological Bulletins on the earthquakes are not available because of time lag of the publication after earthquakes, the preliminary reports on earthquakes by the JMA are used to determine the earthquakes^{48),49)}. Some of the accelerograms, however, remain without matching earthquakes. In this case, those earthquakes are treated as earthquake unknown. The accelerogram whose earthquake is unknown is not listed in the tables if both of its maximum horizontal accelerations are smaller than 20 Gals. It will be noted that the reliability of the earthquake determination based on such procedure for accelerograms with small acceleration is limited in the case that accelerograms do not have accurate time information.



Figure 16 Inside view of the ERS-G accelerograph

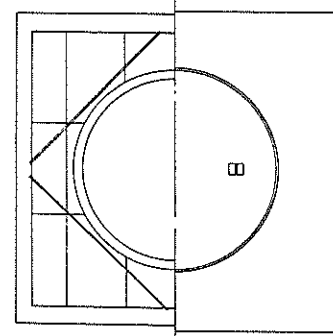
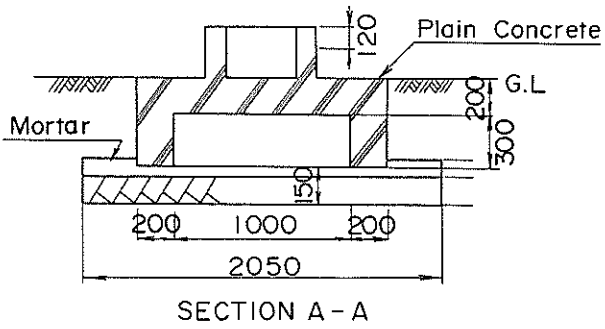
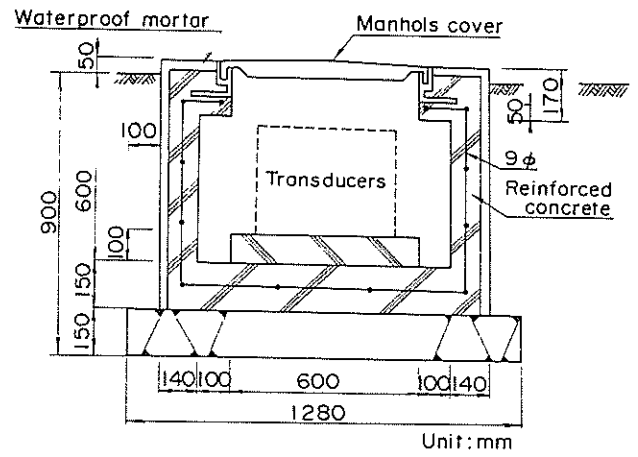
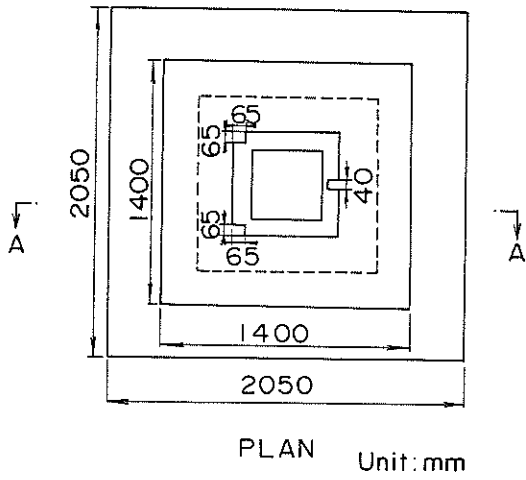


Figure 17 Foundation for the SMAC-B2 accelerograph

Figure 18 Foundation for the ERS-C accelerograph

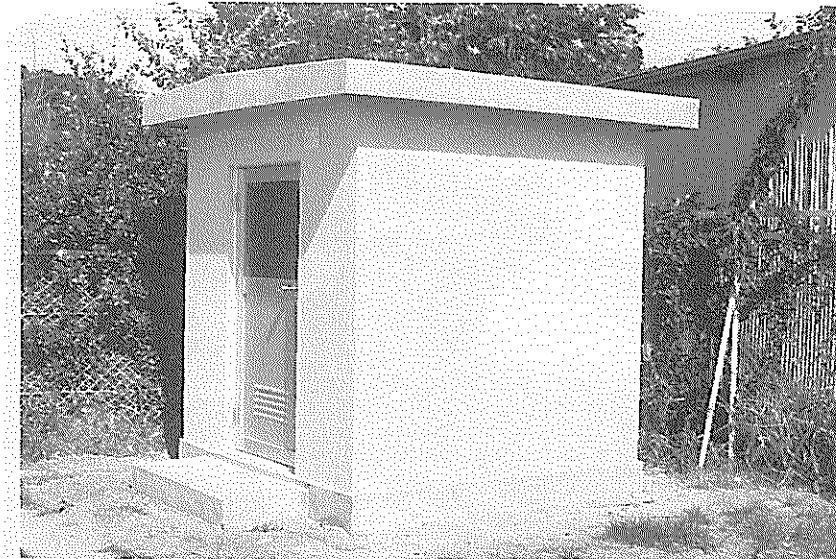


Figure 19 House of the Station (Onahama-ji-G,GB Station)

Accelerograms by the SMAC-B2 accelerograph are recorded on a rolled waxed paper which has dark red background. The recording by scratching the waxed paper with a stylus leaves the semi-translucent trace on the waxed paper. Because the waxed paper is not stable against scratching and is not appropriate to be used for the digitization, the photographic contact print of the original accelerogram is made on a special photographic sheet. This sheet is made of mylar film and stable against temperature change, humidity, and mechanical distortion. The sizes of the sheet are 55 cm in length and 30 cm in width. If the significant portion of the record is longer than 30 to 45 cm, the copy will be made on two sheets or more and the portion of about 10 cm at the end of each sheet is overlapped with each other for confirming data continuity in the successive sheets. After this processing, the record becomes black traces and semi-translucent background in the copy sheet and they are in good contrast for the digitization. The record by the ERS-B, -C and -D accelerograph is only chemically stabilized by sensitization before being used for digitization.

From the photographic copy or the stabilized original record, the maximum acceleration of each component is read by using a magnifying glass. In this reading, the base-line setting is not so accurate as that made in digitizing the accelerogram and these maximum accelerations are not so accurate and different from those processed through digitization, standard data processing and preliminary analyses which will be explained later. The maximum accelerations, which are listed in the tables of Strong-Motion Earthquake Observation Results and are not processed through preliminary analyses, are those determined by this preliminary processing. For the records by the ERS-F and -G accelerograph, acceleration data are directly read by a computer and the time information is included in the record. Therefore, the maximum acceleration and the time of triggering are obtained accurately, and the corresponding earthquakes of records are easily determined.

In the tables of Strong-Motion Earthquake Observation Results, the time in the earthquake data refers to the Japan Standard Time which is earlier than GMT by 9 hours, the magnitude is the JMA Magnitude which is determined by the JMA and the seismic intensity of the shock is estimated by the JMA according to the scale shown in **Table 2** and **3**.

4. Digitization

(1) Digitizer

Two types of digitizers are used in the Laboratory. One is for digitization of records by the SMAC-B2 accelerograph and the other is for digitization of records by the ERS-B, -C and -D accelerograph.

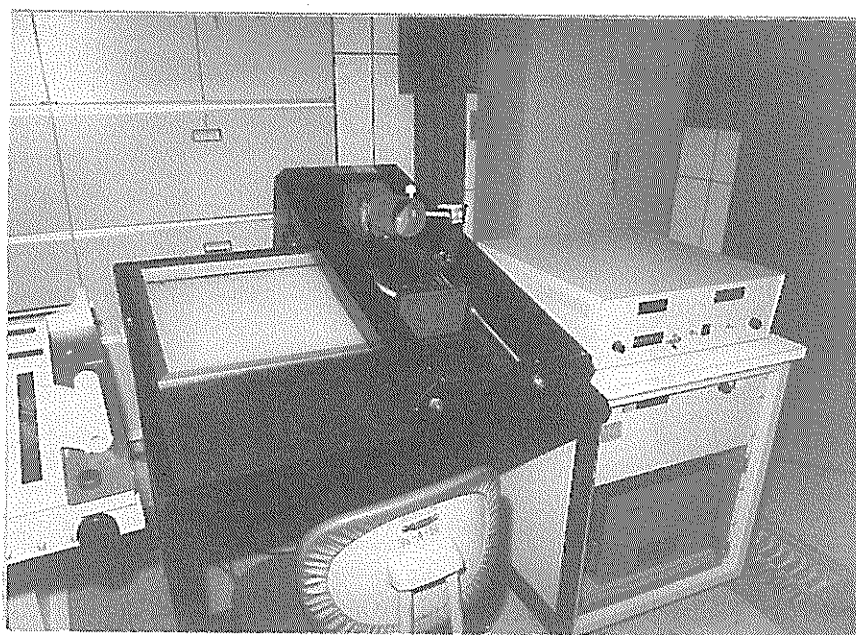


Figure 20 Digitizer for records by the SMAC-B2 accelerograph

Table 8 Specifications of digitizer for records by the SMAC-B" accelerograph

Digitizer Table	
Size of table	750 mm(X) × 660 mm(Y)
Effective area	430 mm(X) × 300 mm(Y)
Magnifying glass	5x, with a cross hair and illumination
Translation of magnifying glass	
Y-axis (vertical)	manual by rotating a wheel
X-axis (horizontal)	automatic, at intervals of 0.1 mm
Analog to Digital Converter and Control	
Resolution(overall)	1000 counts per a millimeter
Indication	
Y-axis (vertical)	sign and 4 digits
X-axis (horizontal)	4 digits

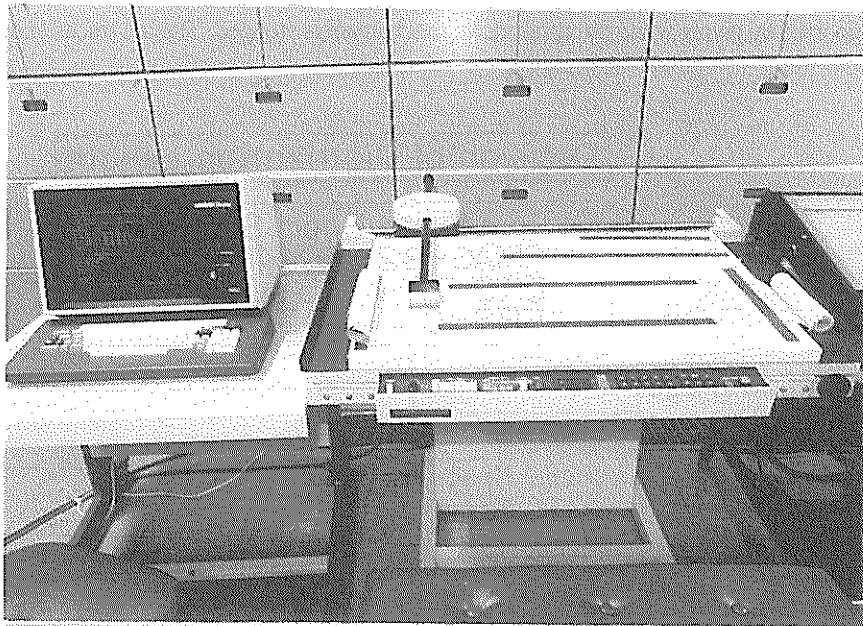


Figure 21 Digitizer for records by the ERS-B,-C and -D accelerograph

The digitizer for the accelerograms obtained by the SMAC-B2 accelerograph is a semi-automatic instrument. The view and the specifications of the digitizer are shown in **Figure 20** and **Table 8**, respectively. The digitizer works in the following way.

On the digitizer table, there is a magnifying glass which can be moved along the transverse (vertical) axis by rotating a small wheel near the glass. A magnescale is connected to the wheel, and the electric digital output corresponding to the position of the magnifying glass is produced from the magnescale. The magnifying glass has a cross-hair and a lamp to illuminate the accelerogram within its range. The operator places the cross-hair on the trace of an acceleration record and pushes a button, then the digital output from the magnescale is displayed on the panel and is stored in the memories of the computer. After this step, the magnifying glass is automatically shifted along the longitudinal (horizontal) axis by 0.1 mm.

The records obtained by the ERS-B, -C and -D accelerographs are processed with an on-line oscillogram digitizer connected to a computer which is shown in **Figure 21**. A record is placed on the digitizer table and an operator traces earthquake wave forms with a cursor of the digitizer. The travels of the cursor along horizontal and vertical axis are digitally counted and the coordinates of the cursor are transferred into memories of the computer at a step of 0.1 mm along the horizontal axis.

After the necessary portions of the record are digitized, digitized values in the memories are processed by computer programs. According to the directions given to the computer through the keyboard, printed list, magnetic tape and analog reproduction etc. are obtained as outputs of the digitized records in the memories.

(2) Digitization

The digitization procedure, which is shown in **Figure 22** and described here, has been applied for records obtained since 1976.

(a) SMAC-B2 accelerograph

The records by the SMAC-B2 accelerograph consist of acceleration records, fixed traces, timing marks, arc traces and free vibration traces for calibration of the characteristic periods and damping factors of the accelerograph. Among them, traces to be digitized are the recorded accelerations, the fixed traces and the arc traces. Digitized fixed traces and digitized arc traces are used for the standard data processing described later.

The fixed traces are recorded by the pens fixed to the accelerograph frame. The arc traces are recorded manually with the recording pens supported by pivots while the paper drive mechanism is stopped. The arc traces show offset of the pens

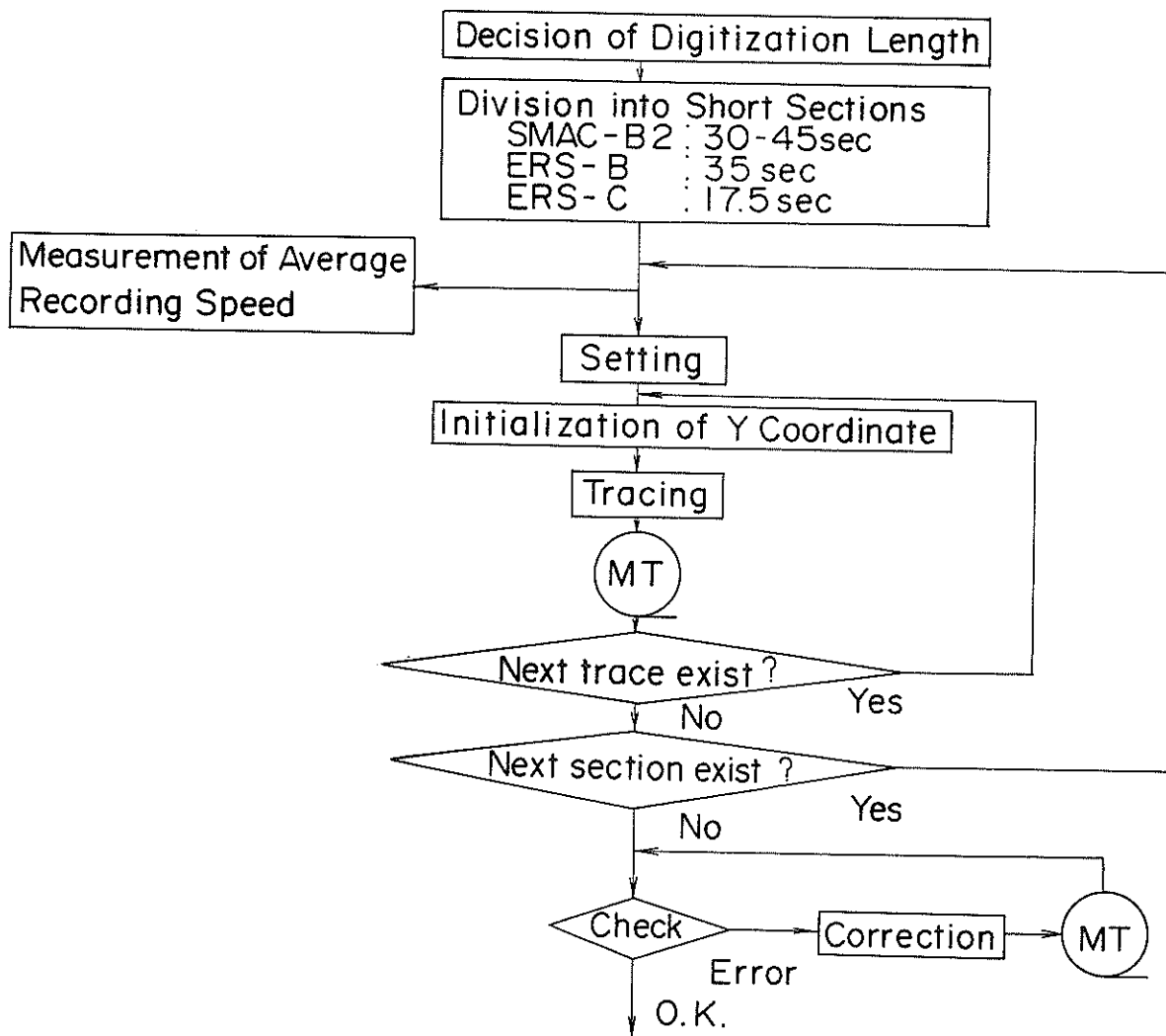


Figure 22 Digitization procedure

from the normal position where the pens are parallel to the direction of paper driving. The timing marks are pulses at intervals of one second. The timing marks are used only to obtain the average recording speed because fluctuation of the timing marks are estimated as small as the digital unit of the digitizer (0.1 mm) according to the results of the tests of the SMAC-B2 accelerographs⁵⁰. The average error in the time marking is expected to be less than 1 % and the fluctuation is less than 0.5 % according to the results of the tests of the SMAC-B2 accelerographs. In order to obtain the average paper speed, intervals of 30 pulses is measured by the digitizer for a record by the ERS-B, -C and -D accelerographs.

A record is digitized from the starting point of recording. Portion of the record to be digitized is determined so as to include discernible acceleration on the paper. This determination is done by observation of a record to be digitized. The portion of the record to be digitized is divided into some sections because of the limitation of the digitizer table. Length of each section is about 30 to 45 cm which is almost equivalent to 30 to 45 seconds. Digitization unit in the amplitude is 0.008 mm which is equivalent to 0.1 Gal. Contact prints are made for each section as described previously. Digitization procedure is summarized as follows;

- Setting of the copy

A photographic copy of a record to be digitized is fixed on the table of the digitizer with tape. The table is rotated by an adjusting screw so that the fixed trace on the copy is parallel to horizontal axis of the digitizer. Two points on the fixed trace located on both ends of section are used for this adjustment and vertical coordinate value of the two points are made to coincide with each other.

- Initialization of transverse coordinate

The origin of vertical coordinate of each sheet is tentatively set in the digitization procedure because Sectional Base-Line Location described later is to be applied in the standard data processing. Transverse coordinate of a first point to be digitized is usually set to zero.

- Tracing

The traces are digitized by an operator in the way described in the preceding section. Three components of accelerations, two fixed traces, and three arc traces are digitized at the intervals of 0.1 mm along horizontal axis. The intervals are almost equivalent to 0.001 second. Because accelerations are recorded in a cylindrical coordinate system, the digitized amplitude values do not correspond to equal time intervals.

- Recording of Digitized Data

Digitized data in the memory of the computer are recorded in the magnetic disk with such data as record number, component, station, date and time of the earthquake, time intervals, etc.

(b) ERS-B, -C and -D accelerograph

The records by the ERS-B, -C and -D accelerograph consist of recorded accelerations, fixed traces and timing marks. The fixed traces are recorded by light beams reflected from fixed mirrors attached to the oscillograph frame. They are parallel lines at intervals of 2 mm drawn in the whole breadth of the recording paper. The recorded accelerations and one of the fixed traces located in the center of the oscillogram are digitized. The record to be digitized is divided into some sections because of the limitation of the digitizer table. Length of each section is about 70 cm, which corresponds to about 35 seconds on a record by the ERS-B accelerograph and about 17.5 seconds on a record by the ERS-C and -D accelerograph.

Procedure of setting of a record by the ERS-B, -C and -D accelerograph and the initialization of transverse (vertical) coordinate is similar to that for a record by the SMAC-B2 accelerograph. The record is digitized by an operator in the way described in the preceding section. The accelerations are digitized at intervals of 0.1 mm, which corresponds to 0.005 second on a record by the ERS-B accelerograph and about 0.0025 second on a record by the ERS-C and D accelerograph. The fixed

trace is digitized at intervals of about 5 cm, which corresponds to 2.5 seconds on a record by the ERS-B accelerograph and 1.25 seconds on a record by the ERS-C and -D accelerograph. Then the digitized data of the fixed trace are obtained by linear interpolation at intervals of 0.1 mm. The digital unit in the amplitude is 0.1 mm, which corresponds to about 0.1 Gal (=cm/sec²) on a record by the ERS-B accelerograph and about 0.2 Gal or about 1.0 Gal on a record by the ERS-C and -D accelerograph. In the case of the ERS-C and -D accelerographs, sensitivities of the galvanometers are calibrated for each recording with a calibration signal before resetting paper drive.

Timing marks of the records by the ERS-C and -D accelerograph, which are pulses at intervals of 0.1 second generated by a crystal timer, are used only to measure the average recording speed because fluctuation of the timing marks is expected as small as that of the digital unit of the digitizer (0.1 mm) according to the results of the tests of the ERS-C and -D accelerographs⁵⁰. In the case of a record by the ERS-B accelerograph, timing marks are not used because accuracy of the timer depends on that of the frequency of the power supply which consists of batteries and a DC-AC inverter.

5. Standard Data Processing

The procedure for the standard data processing, which is shown in **Figure 23** and described here, has been applied for records obtained since 1976, although the correction for start up of recording paper drive of the SMAC-B2 accelerograph was slightly modified for the improvement of the accelerograph⁵⁰. The acceleration processed through the standard data processing will be called '**Original Acceleration**' hereafter.

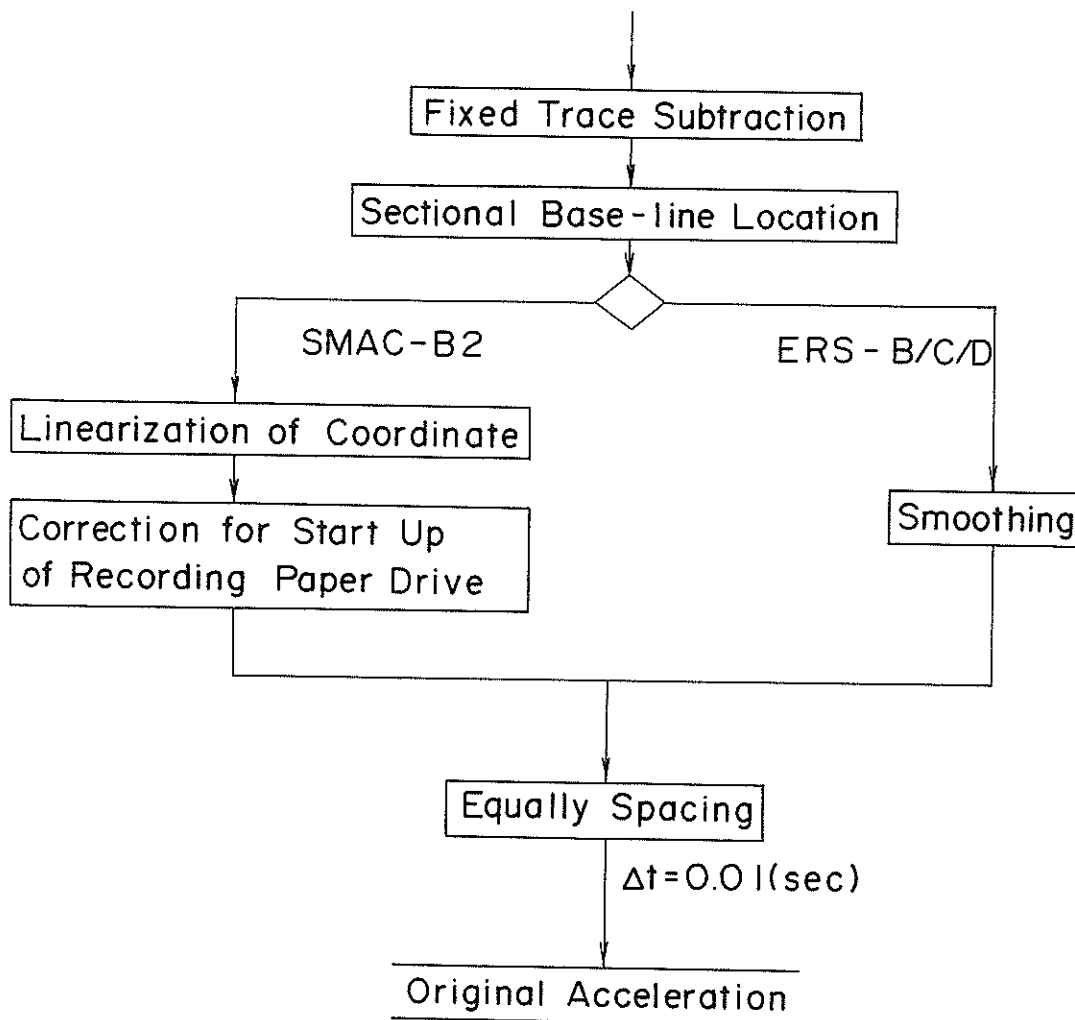


Figure 23 Procedure of standard data processing

Standard data processing for a record by the SMAC-B2 accelerograph is performed under following procedures;

- (1) Fixed Trace Subtraction
- (2) Sectional Base-line Location
- (3) Linearization of Coordinate
- (4) Correction for Start up of Recording Paper Drive
- (6) Equal Spacing

Standard data processing for a record by the ERS-B, -C and -D accelerograph is performed under following procedures;

- (1) Fixed Trace Subtraction
- (2) Sectional Base-line Location
- (5) Smoothing
- (6) Equal Spacing

Standard data processing for the records by the ERS-F and -G accelerograph are described in item (7). Each correction procedure is described briefly as follows.

(1) Fixed Trace Subtraction

This correction is applied in order to eliminate the following errors.

- i) errors caused by the transverse motion of recording paper in the drive mechanism of the accelerograph
- ii) systematic errors caused by an imperfect transverse moving mechanism of the digitizer cross-hair system
- iii) errors of sectional rotation of the record on the digitizer table at the setting

The systematic errors of the digitizer cross-hair system were found to be negligible according to the tests with a straight line made of a stretched steel wire and a stretched gut.

Digitized fixed traces are smoothed by a weighted running average scheme before subtracted from the accelerogram. The weight function is defined as follows;

$$\omega(t) = \begin{cases} \sqrt{\alpha/\pi} \exp(-\alpha t^2) & \text{if } |t| \leq t_0 \\ 0 & \text{otherwise} \end{cases} \quad \text{-----} \quad (1)$$

where $\alpha = (\pi/2)^2$ and $t_0 = \sqrt{\alpha/5} = 0.7 (s)$

At both ends of a section for digitization, α and t_0 in Eq.(1) are redefined by $\alpha = 5/S^2$ and $t_0 = S$, where S(s) is the distance from the end of a section. This weighted running average corresponds to low pass filter of the cut off frequency of about 0.5 Hz. The smoothed fixed traces are subtracted from the accelerogram. In the case of a record by the SMAC-B2 accelerographs, subtraction is made as follows;

- An upper trace is corrected by an upper fixed trace,
- A lower trace is corrected by a lower fixed trace and
- A center trace is corrected by an average of an upper and a lower fixed traces.

In the case of records by the ERS-B, -C and D accelerograph, one fixed trace is subtracted from all the components of an accelerogram.

(2) Sectional Base-line Location

As described previously, base-line is arbitrarily inserted for each section by the initialization of transverse coordinate. Sectional translation brings mainly low frequency errors into the accelerogram and produces an natural response of a low cut filter for integration around a point of junction of digitized sections. Base-line is located so as to make an ideal average of acceleration over almost infinite length zero. On the sectional base-line location, the authors assume that low frequency components up to about $1/T$, where T is the minimum length of sections, are almost none if calculation of spectrum is done over the infinite length for the accelerogram which have been corrected by the fixed trace subtraction and which have an ideal true base-line for each section. Based on the detailed study of the base-line location in the frequency space, the base-line is located sectionally so as to make a weighted average of each sectional acceleration zero. The weight function is defined by

$$u(t) = \Delta t \sqrt{\beta/\pi} \exp(-\beta t^2) \quad \text{-----} \quad (2)$$

where Δt is time interval, $\beta = 20/T^2$ and $T(s)$ is length of each section

The expected error of the location is almost proportional to the quantities of low frequency components up to about $1/T(\text{Hz})$. Because the authors do not have enough space to describe the detailed study, the authors introduce an example calculation to illustrate the difference between the proposed base-line location and the base-line location of least square fit scheme for each section. A sine wave generated by a computer of 100 Gal, 5 Hz and 5000 data with time intervals of 0.01 second is divided into two sections; one section is the first 2510 data and the other is the last 2490 data, which are looked upon as a sectionally digitized accelerogram. Sectional base-lines are located by the two method. Displacements are calculated from the two accelerations by the fixed filter method described later and a portion of the results including the junction of two sections are shown in **Figure 24** and **Figure 25**, respectively. The time of 10.1 seconds is the junction in these figures. These figures indicate that the proposed base-line location is much better in this case because true displacement is a sine wave.

(3) Linearization of Coordinate

This correction is applied to a record by the SMAC-B2 accelerograph to obtain a corrected longitudinal (**X**) coordinate of each datum. Transverse (**Y**) coordinate of the pivot of the recording pen is calculated from the digitized arc trace as shown in **Figure 26**. Let $r(\text{mm})$ denotes the radius of the arc which is the length of the arm of the recording pen, $y(\text{mm})$ denotes **Y** coordinate of a point whose **X** coordinate is to be corrected, $a(\text{mm})$ denotes **Y** coordinate of the center of the arc which is the pivot of the pen and e denotes error of **X** coordinate of the point to be corrected, then we have the following equation.

$$e = r - \sqrt{r^2 - (y - a)^2} \quad \text{-----} \quad (3)$$

Although the arc trace is digitized with arbitrarily determined base-line, the linearization of coordinate is uniformly performed because $(y-a)$ in the equation remains constant for any base-line. $a(\text{mm})$ in the equation will be set to zero if arc traces are accidentally not drawn or length of the arc trace is short which means the case the maximum difference of **X** coordinates of the arc trace is less than 0.5 mm.

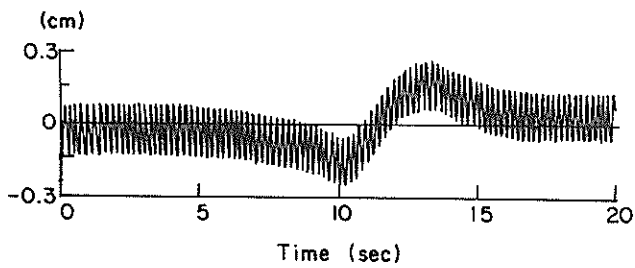


Figure 24 Integrated displacement from the acceleration record with sectionally base-line by a least square fit scheme

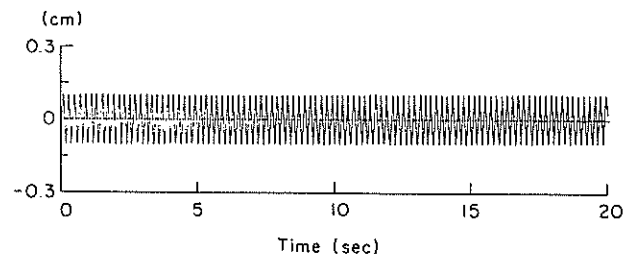


Figure 25 Integrated displacement from the acceleration record with sectionally located base-lines by the proposed method

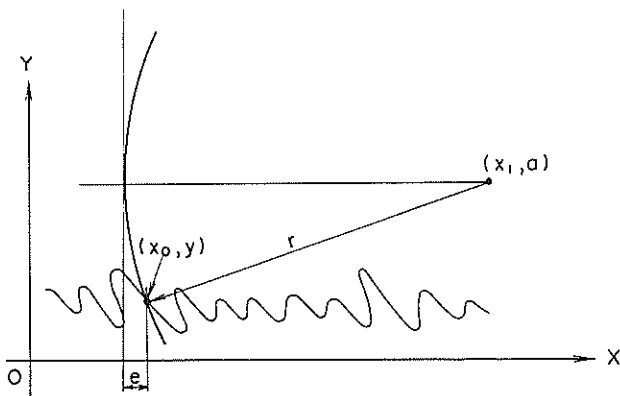


Figure 26 Linearization of coordinate

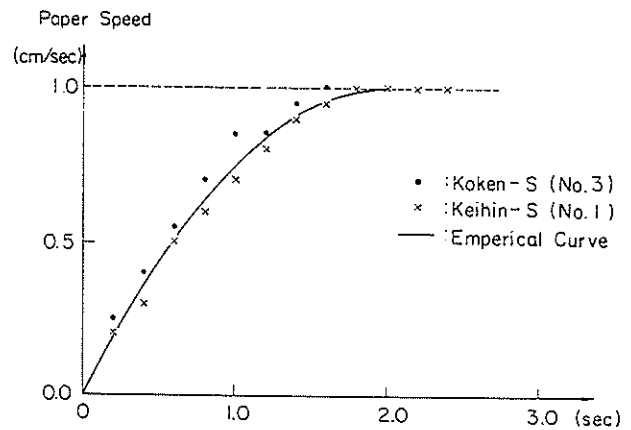


Figure 27 Variable recording speed on start up of recording paper drive

(4) Correction for start up of recording paper drive

The variation of recording paper speed of the SMAC-B2 accelerograph is represented by the following equation which is based on the tests conducted at the Laboratory shown in Figure 27.

$$v = \begin{cases} [1 - 1/b^2(t - t_0)^2] v_a & \text{if } 0 \leq t \leq t_0 \\ v_a & \text{if } t_0 < t \end{cases} \quad (4)$$

where v : paper speed at time t (cm/s)

v_a : paper speed after reaching constant speed (cm/s)

t : time after triggering (s)

t_0 : constant (s)

b : constant (s)

If t_0 and b are given, the correction for the start up of recording paper drive is simple problem. For the correction of the digitized records in the preceding annual report, $t_0 = 2.0$ (s) and $b = 2.0$ (s) were used. After the annual report had been published, it was found that more appropriate correction would be possible with a slight modification of t_0 value. For the correction of the most of the digitized records in this report, $t_0 = 1.9$ (s) is used.

(5) Smoothing

Smoothing is applied to a record by the ERS-B, -C and -D accelerograph. A record by the ERS-B, -C and -D accelerograph is digitized at intervals of 0.1 mm which correspond to about 0.005 second on a record by the ERS-B accelerograph and corresponds to about 0.0025 second on a record by the ERS-C and -D accelerograph. Frequency components higher than about 50 Hz are eliminated because there are almost no significant components of seismic acceleration over 50 Hz for the most of the record obtained by the ERS-B, -C and -D accelerograph so far.

The weight function is defined by

$$g(t) = \begin{cases} f_0 + f_1 & \text{if } t = 0 \\ \frac{2}{f_1 - f_0} \frac{\cos(2\pi f_0 t) - \cos(2\pi f_1 t)}{(2\pi t)^2} & \text{if } 0 < |t| \leq 1.0 \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

where $f_0 = 45 \text{ (Hz)}$ and $f_1 = 55 \text{ (Hz)}$

The filter corresponding to this weighted running average, which is shown in **Figure 28**, is approximately expressed as follows. Errors of the approximation are less than 0.3 %.

$$G(f) = \begin{cases} 1 & \text{if } |f| \leq f_0 \\ \frac{f_1 - |f|}{f_1 - f_0} & \text{if } f_0 \leq |f| \leq f_1 \\ 0 & \text{if } f_1 < |f| \end{cases} \quad (6)$$

where $f_0 = 45 \text{ (Hz)}$ and $f_1 = 55 \text{ (Hz)}$

(6) Equal Spacing

Data are equally spaced at intervals of 0.01 second by means of linear interpolation. A record by the SMAC-B2 accelerograph is digitized at intervals of 0.1 mm and is processed through the linearization of coordinate. The data processed through the linearization of coordinate are unequally spaced data, whose interval of data are longer than 0.01 second on portions of accelerogram where absolute value of acceleration decreases and intervals of data are shorter than 0.01 second elsewhere.

A record by the ERS-B, -C and -D accelerograph is digitized at intervals of 0.1 mm, which corresponds to about 0.005 second on a record by the ERS-B accelerograph and about 0.0025 second on a record by the ERS-C and -D accelerograph. There is no possibility of aliasing by the equal spacing at the interval of 0.01 seconds because their high frequency components over 50 Hz are eliminated by the smoothing. High density of sampling at digitization enables us to separate high frequency components which are possibly contaminated by digitization errors and assures us much accuracy of the interpolation.

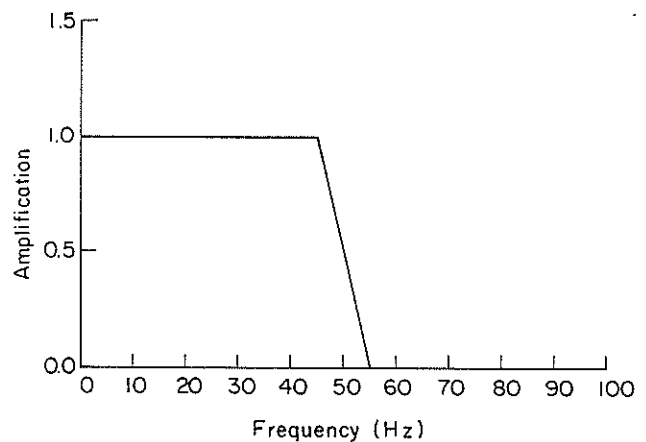


Figure 28 Filter for the smoothing

(7) Processing for the records by the ERS-F and -G accelerograph

Standard data processing and preliminary analyses described later for the records by the ERS-F and -G accelerograph are almost the same as those by ERS-B, -C and -D accelerograph. The differences are as follows;

- Overall base-line correction is applied for the data at the standard data processing.
- No smoothing is applied for the data at the standard data processing.
- As an instrument correction at the preliminary analyses, correction for the phase is applied but no correction is applied for the amplitude at the preliminary analyses.
- Low pass filter with cut-off frequency of 25 Hz and roll-off frequency of 40 Hz are applied by using a digital filter of cosine shape in frequency domain at the preliminary analyses.
- As the high pass filtering at the preliminary analyses, parameter E for the Variable Filter in Eq.(19), which is to be described later, is determined by the following equation;

$$E = (p \cdot 0.001) \cdot 0.02236 \text{-----} (7)$$

in which $p (=1000 \text{ Gal/2}^{16})$ is the sensitivity of the ERS-F and -G accelerograph.

The factors in Eq.(7) was obtained by the study on the noise level obtained by the power spectra of the noise under the conditions with connectors of signal conditioner in short circuit.

6. Preliminary Analyses

The Standard procedures of the preliminary analyses described here have been applied for records obtained since 1976^(50,51). The standard procedures of preliminary analyses consist of filtering for instrument correction, filtering for correction of low or high frequency components, integration, calculation of response spectra and Fourier spectra. The flow of the preliminary analyses is shown in **Figure 29**.

(1) Methods of Correction and Integration

Instrument correction, filtering, integration are applied in frequency domain. FFT is applied for the accelerogram which is extended with a section of zero outside the digitized portion in order to avoid link effect. The length of section of zero L (s) is determined so as to meet the following condition.

$$L > \max [2/3T, 10.0] \quad \text{-----} \quad (8)$$

where T (s) is the minimum length of sections made by the division of an accelerogram for the digitization. This condition is based on the examination of impulse responses of the high pass filters for integration to be described later. Length of the section of zero L is decided so as to make calculation time of FFT short as much as possible in the given memory size of the computer.

(2) Filters for Instrument Correction and Supplementary Filter

(a) Filters for a record by the SMAC-B2 accelerograph

The filter for instrument correction $A_S(f)$ is defined by the inverse of the frequency characteristics of the transducer of the SMAC-B2 accelerograph as follows.

$$A_S(f) = 1 - \left(\frac{f}{f_s}\right)^2 + 2h_s \left(\frac{f}{f_s}\right) i \quad \text{-----} \quad (9)$$

where $f_s = 1/0.14 = 7.1(\text{Hz})$ and $h_s = 1.0$

The supplementary filter $B_S(f)$ is defined by

$$B_S(f) = \begin{cases} 1 & \text{if } |f| \leq f_o \\ \left[1 + (|A_S(f)| - 1) \exp\left\{-\frac{(|f| - f_o)^2}{20}\right\} \right] \frac{1}{|A_S(f)|} & \text{otherwise} \end{cases} \quad \text{-----} \quad (10)$$

where $f_o = 10(\text{Hz})$

The supplementary filter is designed to suppress high frequency digitization noise and at the same time preserve high frequency components of an accelerogram in order to lessen an abnormal response of the filter to discontinuities at both ends of digitized portion of the accelerogram. The filter for instrument correction $A_S(f)$ and the supplementary filter $B_S(f)$ are shown in **Figure 30** and **Figure 31**, respectively. Combined filter by $A_S(f)$ and $B_S(f)$, which is shown in **Figure 32**, is applied for overall instrument correction for records by the SMAC-B2 accelerograph.

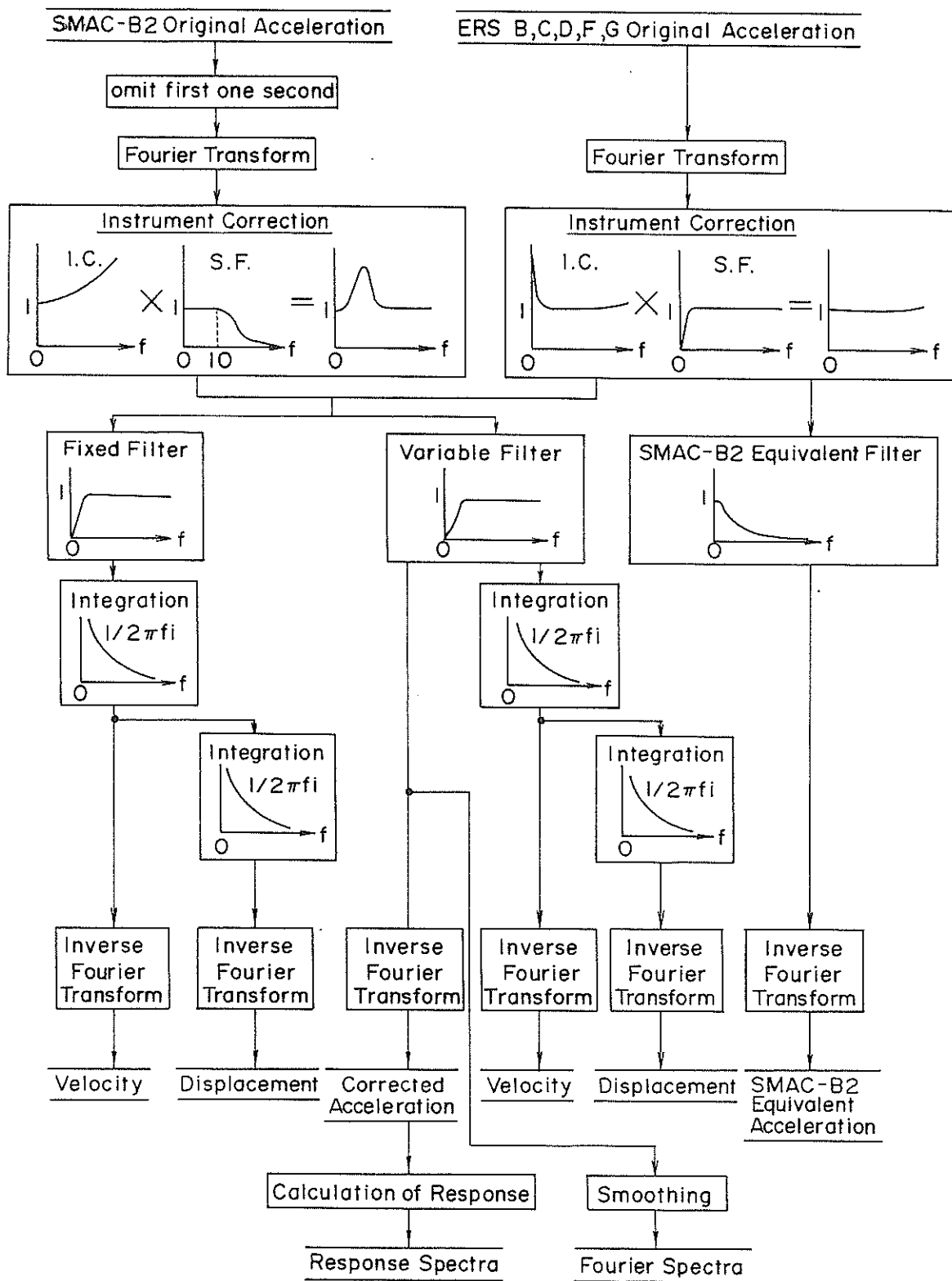


Figure 29 Procedure of preliminary analyses

(b) Filters for a record by the ERS-B, -C and -D accelerograph

The filter for the instrument correction $A_E(f)$ is defined by following equations;

$$A_E(f) = A_p(f) \cdot A_g(f) \quad \text{-----} \quad (11)$$

$$A_p(f) = 1 + \frac{i}{2h_p} \left(\frac{f}{f_p} - \frac{f_p}{f} \right) \quad \text{-----} \quad (12)$$

$$A_g(f) = 1 - \left(\frac{f}{f_g} \right)^2 - 2h_g \left(\frac{f}{f_g} \right) i \quad \text{-----} \quad (13)$$

where for a record by the ERS-B accelerograph

$$f_p = 2.0(\text{Hz}), h_p = 17, f_g = 100(\text{Hz}) \text{ and } h_g = 0.7$$

for a record by The ERS-C accelerograph

$$f_p = 3.0(\text{Hz}), h_p = 17, f_g = 250(\text{Hz}) \text{ and } h_g = 0.7$$

for a record by The ERS-D accelerograph

$$f_p = 5.0(\text{Hz}), h_p = 10, f_g = 100(\text{Hz}) \text{ and } h_g = 0.7$$

In the above equations, $1/A_p(f)$ means frequency characteristics of the pick up of the accelerograph and $1/A_g(f)$ means those of the galvanometer. Filters for instrument correction $A_E(f)$ are shown in **Figure 33** for 3 types of accelerograph.

The supplementary filter $B_E(f)$ is defined by

$$B_E(f) = \begin{cases} 1/|A_p(f)| & \text{if } |f| \leq f_p \\ 1 & \text{otherwise} \end{cases} \quad \text{-----} \quad (14)$$

where $A_p(f)$: Filter for the instrument correction of the pick up

f_p : Characteristic frequency of the pick up of each accelerograph

The supplementary filter is designed to suppress low frequency digitization errors. The supplementary filters $B_E(f)$ are shown in **Figure 34**. For overall instrument correction of records obtained by ERS-B, -C and -D accelerograph, combined filters by $A_E(f)$ and $B_E(f)$, which is shown in **Figure 35**, are applied.

(c) Filters for a record by the ERS-F and -G accelerograph

As mentioned earlier, correction for the frequency characteristics of phase, shown in **Figure 14 (b)**, is only applied for the data as a instrument correction and no correction is applied for the amplitude. As for the amplitude, however, components in high frequency range is cut off by the following equations because there is no significant information found in high frequency range so far.

$$A_f(f) = \begin{cases} 1 & \text{if } |f| \leq f_1 \\ \frac{1}{2} \left[\cos \left(p \frac{f - f_1}{f_2 - f_1} \right) + 1 \right] & \text{if } f_1 < |f| \leq f_2 \\ 0 & \text{if } |f| > f_2 \end{cases} \quad \text{-----} \quad (15)$$

where $f_1 = 25(\text{Hz})$ and $f_2 = 40(\text{Hz})$

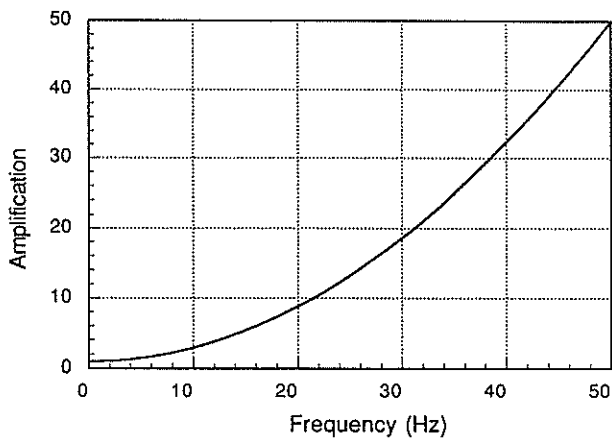


Figure 30 The filter for instrument correction for records by the SMAC-B2 accelerograph

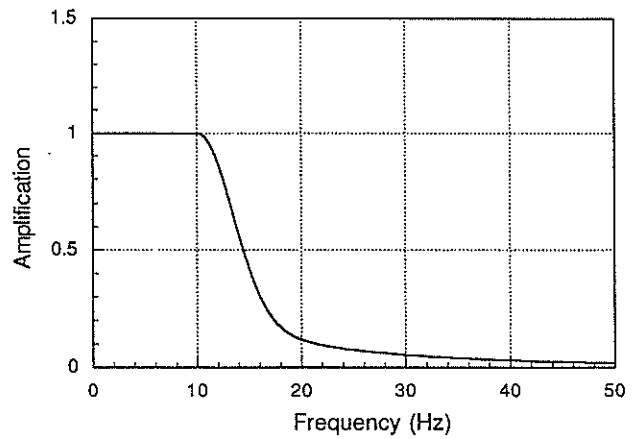


Figure 31 The supplementary filter for records by the SMAC-B2 accelerograph

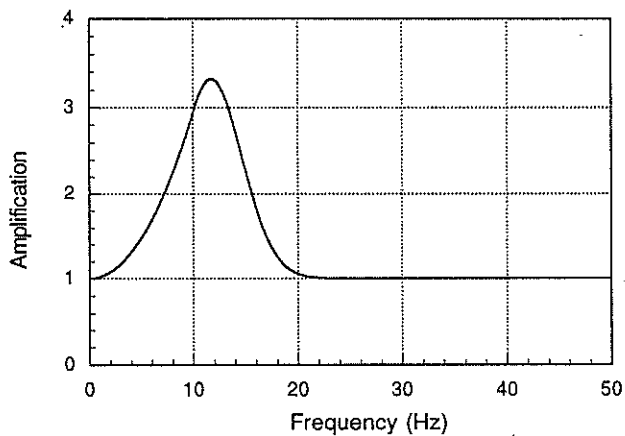


Figure 32 The combined filter for records by the SMAC-B2 accelerograph

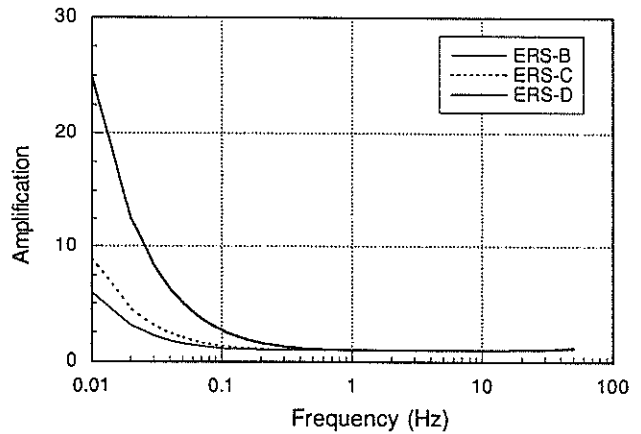


Figure 33 The filter instrument correction for records by the ERS-B, -C and -D accelerograph

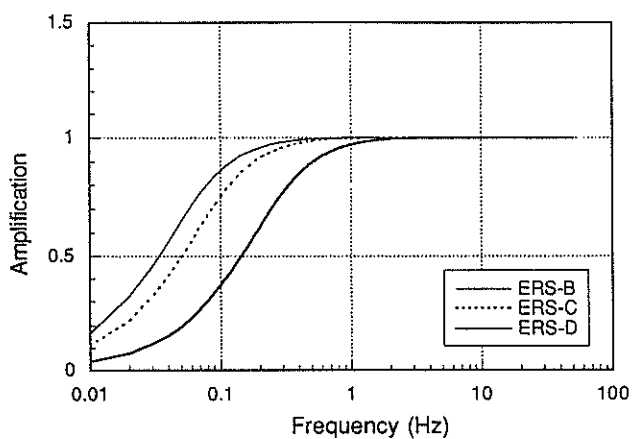


Figure 34 The supplementary filter for records by the ERS-B, -C and -D accelerograph

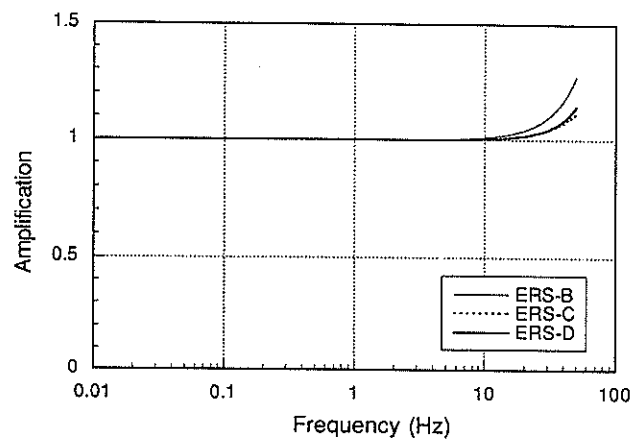


Figure 35 The combined filter for records by the ERS-B, -C and -D accelerograph

(3) SMAC-B2 Equivalent Filter

Frequency characteristics of SMAC-B2 accelerograph are different from those of ERS type accelerograph. In order to make it easy to compare the accelerograms by these different types of accelerographs, a filter defined in the following equation is applied for records by the ERS type accelerograph.

$$S(f) = \frac{1}{1 - \left(\frac{f}{f_s}\right)^2 + 2h_s \left(\frac{f}{f_s}\right)i} \quad (16)$$

where $f_s = 1/0.14 = 7.1(\text{Hz})$ and $h_s = 1.0$

This filter is shown in **Figure 36** and has the same frequency characteristics as that of the SMAC-B2 accelerograph. The filter is applied for the acceleration records by the ERS type accelerograph processed through the filter for instrument correction and the supplementary filter. Acceleration processed through this filter will be called '**SMAC-B2 Equivalent Acceleration**' in this report. This acceleration can be compared with the '**Original Acceleration**' by the SMAC-B2 accelerograph. Although acceleration processed by this filter can not represent accurate acceleration and its maximum acceleration will be smaller than that of a record through instrument correction especially in high frequency range, all the accelerograms by this procedure can be directly compared with each other.

(4) High pass filters for integration

Processed through the preliminary correction procedure, a digitized accelerogram is expected to have only such errors as random digitization errors and errors of sectional base-line location. Errors of sectional base-line location affect mainly to frequency components lower than about $1/T$, where T is the length of a section of an accelerogram divided for digitization.

As a result of the examination of random digitization errors, frequency characteristics of Signal-to-Noise (SN) ratio calculated for each frequency are found to be similar to those of digitized acceleration. In other words, ratio of digitized acceleration to digitization errors calculated for each frequency is large if the corresponding frequency components of the digitized acceleration is large. For the frequency components higher than about $1/T$, the result of the examination of digitization errors may remain valid. The result implies that SN ratio of a frequency component varies with the frequency characteristics of accelerogram to be digitized.

The cut-off frequency of a high pass filter for integration of a digitized accelerogram should be varied in accordance with frequency characteristics of an accelerogram from such a point of view that SN ratio should be kept higher than some constant level for every frequency component and at the same time the physically real signals should be preserved as much as possible. On the other hand, cut-off frequency of the filter should be kept constant for any accelerograms from such a point of view that the preserved real seismic signals should be filtered out by the same filter for the purpose of comparison between two or more velocities or displacements even if integrated errors are more or less included in them.

In order to satisfy a wide range of applications of the strong-motion records from the various view points, the authors proposed two methods of correction of an accelerogram to obtain integrated velocities and displacements. One is a method with a fixed filter and the other is a method with a variable filter.

(a) Fixed filter

This filter is defined by the following equation.

$$H_1(f) = \frac{1}{1 - \left(\frac{f_0}{f}\right)^2 + 2h\left(\frac{f_0}{f}\right)i} \cdot \frac{1}{\sqrt{1 + \left(\frac{f_1}{f}\right)^2}} \quad (17)$$

where $f_0 = 1/6(\text{Hz})$, $h = 0.552$ and $f_1 = 0.1(\text{Hz})$

This filter is designed to make it easy to compare the integrated displacement with records obtained by the one magnification strong-motion seismometer ($T=6$ seconds and $h=0.552$) deployed by the Japan Meteorological Agency (JMA). Cut-off frequency (3 dB down) of this filter is 0.154 Hz. This filter is shown in Figure 37.

(b) Variable filter

This filter is defined by the following equation;

$$H_2(f) = \left[1 - \exp\left\{-\left(\frac{f}{f_c}\right)^2\right\} \right]^2 \quad (18)$$

The parameter f_c in the equation varies so as to make σ equal to E , where σ is defined by

$$\sigma^2 = \frac{1}{M} \int_{-\infty}^{\infty} |x(f)|^2 \cdot \left[1 - \exp\left\{-(fT)^2\right\} \right]^4 \cdot [1 - H_2(f)]^2 df \quad (19)$$

where M is the length of whole digitized portion,

T is the minimum length of a section of accelerogram,

$X(f)$ is Fourier Transform of the original acceleration,

E is the value listed below;

for a record by the SMAC-B2 accelerograph

$$E = 0.5 (\text{Gal})$$

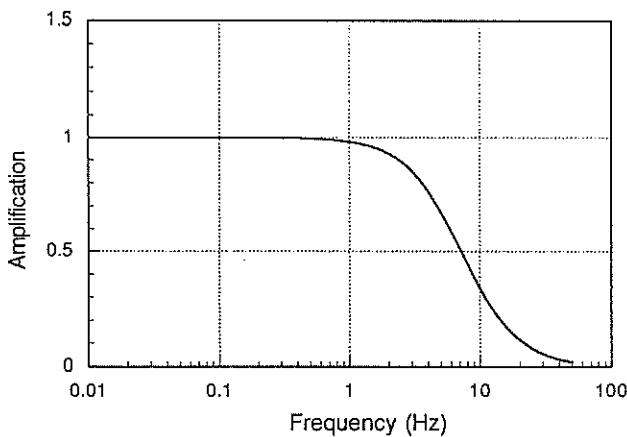


Figure 36 The SMAC-B2 equivalent filter

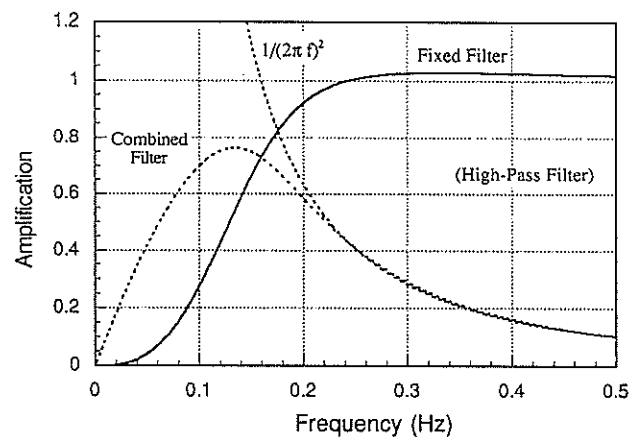


Figure 37 The fixed filter and the combined filter for double integral

for a record by the ERS-B, -C and -D accelerograph

$$E = 0.05p \text{ (Gal)}$$

where p (Gal/mm) is the sensitivity of the ERS-B, -C and -D accelerograph

for a record by the ERS-F and -G accelerograph

$$E = (p \cdot 0.001) \cdot 0.02236 \text{ (Gal)}$$

where p (1000 Gal/2¹⁶) is the sensitivity of the ERS-F and -G accelerograph

Cut-off frequency (3 dB down) of this filter is $1.36f_c$. This filter is shown in **Figure 38** and **Figure 39**.

Decision procedure of f_c is illustrated in **Figure 40**. f_c is fundamentally determined so as to filter out some constant amount of low frequency components of an accelerogram higher than about $1/T$. The greater low frequency components of an accelerogram are, the lower f_c should be. Because the greater low frequency components of an accelerogram are, the higher SN ratio of these components are. Low frequency components lower than about $1/T$ are eliminated for the decision procedure of f_c because they are possible to be contaminated by the errors at sectional base-line location and the relation between the SN ratio and the quantity of a frequency component of an accelerogram is afraid no longer remaining valid.

This decision procedure of f_c is, however, a compromise between such a view point as to keep SN ratio over some constant level for every frequency component and keep f_c to be a constant. The reason why such a compromised method is proposed is that the compromise makes decision procedure of f_c more stable against possible fluctuation of the relation between quantity of a frequency component of an accelerogram and the SN ratio. The relation may, to some extent, depend on frequency characteristics of an accelerogram to be digitized, digitized length of an accelerogram, non-stationarity of an accelerogram, etc. and the relation itself is valid only in a stochastic sense.

The reason why a fixed low pass supplementary filter is proposed instead of a variable one for a record by the SMAC-B2 accelerograph is that the possible fluctuation of the relation is expected to be greater for high frequency components. Slope of both of the high pass filters proposed here are designed to be mild in order to lessen an artificial predominant frequency component around the cut-off frequency.

(5) Outputs of Preliminary Analyses

(a) Acceleration, Velocity and Displacement

A portion of first one second of the original acceleration of the SMAC-B2 accelerograph is omitted for the instrument correction and the integration because even a slight difference of start up of recording paper drive between SMAC-B2 accelerographs and even a small difference of selection of starting point of digitization may sensitively affect accuracy of the portion of first short section processed through the correction of start up of the recording paper drive. In the case of the original acceleration of the ERS type accelerograph, no data is omitted. These accelerations are processed by the methods of correction and integration described previously. The calculated results are shown in figures and tables as results of preliminary analyses shown in the later part of this report.

In this report, '**Corrected Acceleration**' denotes acceleration with instrument correction processed through the variable filter and '**SMAC-B2 Equivalent Acceleration**' denotes acceleration obtained by the SMAC-B2 equivalent filter as shown in **Figure 29**. Integrated velocities and displacements are calculated with both the fixed filter and the variable filter. The parameter f_c for cut-off frequency of the variable filter is shown in the tables on the results of preliminary analyses.

The corrected acceleration of the different types of accelerographs can not necessarily be compared with each other because the difference of the supplementary filters produces difference mainly on the high frequency components over 10 Hz of the filtered accelerations. Instead of comparison of the corrected accelerations, SMAC-B2 equivalent acceleration can be freely compared with the original acceleration of the SMAC-B2 accelerograph except for the low frequency components lower than about 0.1 Hz.

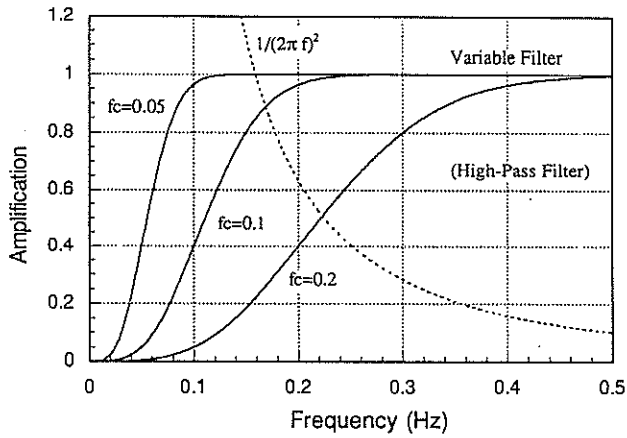


Figure 38 The variable filter and double integral

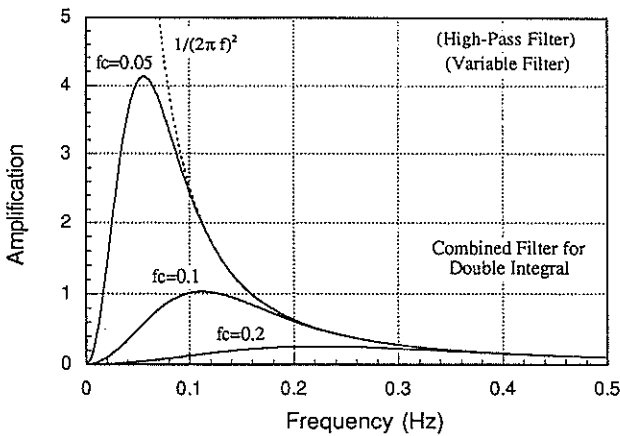
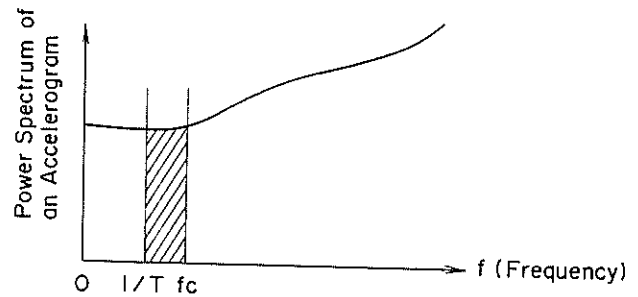


Figure 39 The combined filter of the variable filter for double integral

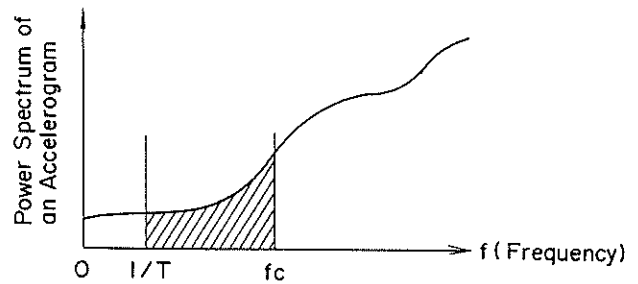


Figure 40 Simplified illustration of decision procedure of f_c

(b) Response Spectra

Response spectra are calculated from the corrected acceleration, which is an acceleration with instrument correction processed through the variable filter as described previously. The response spectra in the previous annual reports before 1968 were calculated from the digitized records by a digital computer using Runge-Kuta-Gill method to integrate numerically the equation of motion of the oscillator. The response spectra in the present report are calculated with a step by step calculation of the exact solution to the governing differential equation⁵². No significant difference was seen in the results calculated by the both methods, according to the trial calculations.

The time interval of each step of the calculation is 0.01 second for the oscillators of natural periods longer than 0.2 second. For the oscillators of shorter periods, the small time intervals are selected to that one cycle of the undamped free oscillation of the oscillator is covered at least by 20 steps of the numerical calculation to maintain the necessary accuracy. In these calculation, the digitized records at smaller time intervals are made by means of the interpolation in the computer.

To calculate response spectra, entire length of the record is not necessary and the last part of the record after the maximum response have appeared is in effect meaningless in the calculation. Besides, the shorter record is more preferable from view point of the calculation time. On some long records, their beginning parts of small acceleration are not used in the calculation so far as it is thought that the neglected parts do not affect the results of the calculation. In this report, the whole record length is adopted as length of calculating response spectra for the records less than 60 seconds. For the records of which time duration is more than 60 seconds, the length of 60 seconds which includes portions of main strong-motion is adopted as length of calculation. Acceleration ratio, absolute acceleration response, relative velocity response and relative displacement response are presented in this report as results of response spectra of 0%, 1% and 5% damping.

As response spectra of the period longer than about $1/f_c$ are influenced by the high pass filter ($1.36/f_c$ is the period of 3 dB down of the filter); i.e., calculated response spectra is true if real seismic signals do not exist in the period longer than about $1/f_c$ and calculated response spectra are smaller than the true value if real seismic signals do exist. In the case of the corrected acceleration by the SMAC-B2 accelerograph, response spectra of the period shorter than about 0.1 sec is also influenced by the low pass filter. Users of the response spectra should be careful about these characteristics of the response spectra calculated for the corrected acceleration and difference between the response spectra for the corrected acceleration and those for the uncorrected acceleration which had been calculated so far.

(c) Fourier Spectrum

The Fourier spectra are calculated by the FFT from the corrected acceleration. The time length for calculation is identical with the time length for calculating response spectra. The spectra in this report, however, are multiplied by the length of the record for calculation and then smoothed with the Parzen window of 1 Hz band width.

(d) Loci

The loci of accelerations, velocities and displacements in horizontal plane are included in this report. The records used for plotting loci are corrected accelerations, integrated velocities and displacements processed through the variable filter.

7. Summary of Observation

Strong-motion earthquakes and earthquake responses of structures have been observed in the major ports in Japan since 1962. 5223 accelerograms have been obtained by the end of 1996 in the network of the Port and Harbour Research Institute. As of December 1996, 94 strong-motion accelerographs have been installed in 59 ports in Japan. 67 accelerographs out of 94 are installed at ground surface, 20 accelerographs are in ground by using bore-hole and the rest 7 are on structures such as quay walls.

This report presents all the records obtained in 1995 and 1996, except the records of the main shock and after shocks of 1995 Hyogo-ken nanbu earthquake and after shocks of 1994 Sanriku-haruka-oki earthquake, which are compiled into the special reports^{39),40)}. The records obtained in 1995 and 1996 are listed in the tables of Strong-Motion Earthquake Observation Results with their maximum accelerations, being classified in accordance with earthquakes. For the records of ground motions with maximum accelerations exceeding 20 Gals ($=\text{cm}/\text{sec}^2$), computer plots of reproduced acceleration are presented. For the records of ground motions with maximum accelerations exceeding 50 Gals, computer plots of reproduced accelerograms, integrated velocities and displacements, response spectra, Fourier spectra and loci of accelerations, velocities and displacements in horizontal plane are presented.

In **Table 9**, a statistical summary (total number of records) of the strong-motion observation in the network is given at the end of 1996. In **Table 10**, record numbers of accelerograms of which digitized records and spectra have been published by the end of 1996 are shown. The number in the parentheses behind each record number shows the number of the Technical Note of the Port and Harbour Research Institute in which the record is presented.

(Received on June 30, 1998)

Table 9 Statistical Summary of Records

(December 1996)

Name of Station	Total Number of Records	Number of Records ($20 \leq \text{Max. Accel.} < 50\text{Gals}$)	Number of Records ($\text{Max. Accel.} \geq 50\text{Gals}$)
ABASHIRI-G	0	0	0
AKITA-GB	3	0	0
AKITA-G	3	0	0
AKITA-S*	33	7	2
AMAGASAKI-G	25	9	2
AMAGASAKI-S*	9	2	0
AOMORI-G	7	3	1
AOMORI-S*	48	17	6
CHIBA-S	97	19	4
HACHINOHE-GB	0	0	0
HACHINOHE-G	0	0	0
HACHINOHE-JI-S*	24	11	8
HACHINOHE-S*	111	16	5
HAKODATE-FB	17	3	1
HAKODATE-F	17	3	2
HAKODATE-FR	18	5	2
HAKODATE-M	50	17	6
HANASAKI-F	44	8	3
HANASAKI-M*	36	21	7
HIRARA-G	4	1	0
HIRARA-S*	5	1	0
HIROSHIMA-G	8	1	0
HIROSHIMA-S*	9	5	4
HIROSHIMA-JI-S*	5	0	0
HITACHINAKA-F	206	104	30
HOSOSHIMA-F	12	1	0
HOSOSHIMA-S*	54	19	7
ISHIGAKI-G	7	1	0
ISHIGAKI-S*	5	1	0
INAE-S*	23	7	0
INAE-SANBASHI-M*	20	10	1
INAE-YAITA-M*	30	13	3
KAGOSHIMA-G	2	1	0
KAGOSHIMA-S*	26	4	0
KAMAISHI-M	43	20	1
KAMAISHI-MB	43	4	1
KANAZAWA-G	1	1	0
KANAZAWA-S*	9	3	1
KASHIMA-S*	32	9	3
KASHIMA-JI-S*	30	6	3
KASHIMA-ZOKAN-S	136	33	12
KAWASAKI-FB	46	5	3
KAWASAKI-F	46	10	4
KAWASAKI-FR	46	17	5
KAWASAKI-CHI-M*	187	22	2
KAWASAKI-KO-M*	107	28	6
KEIHIN-JI-S*	133	19	2
KINUURA-JI-S	24	5	0
KINUURA-S*	8	4	2
KOBE-DAI6-S*	13	3	0
KOBE-DAI8-G	1	0	1
KOBE-DAI8-S*	18	2	1

(to be continued)

(Table 9 Continued)

(December 1996)

Name of Station	Total Number of Records	Number of Records ($20 \leq \text{Max. Accel.} < 50\text{Gals}$)	Number of Records ($\text{Max. Accel.} \geq 50\text{Gals}$)
KOBE-JI-GB80	0	0	0
KOBE-JI-GB40	0	0	0
KOBE-JI-G	0	0	0
KOBE-JI-S	18	6	1
KOBE-MAYA-DAI1-M*	16	7	2
KOBE-MAYA-DAI2-M*	21	7	1
KOBE-MAYA-G	0	0	0
KOBE-MAYA-M*	22	4	1
KOCHI-G	3	1	0
KOCHI-S*	21	3	1
KOCHI-JI-S*	13	3	0
KOKEN-G	1	1	1
KOKEN-M*	60	5	0
KOKEN-S	34	6	2
KOMATSUJIMA-G	3	2	2
KOMATSUJIMA-S*	17	2	0
KUSHIRO-GB	18	2	2
KUSHIRO-G	18	6	2
KUSHIRO-S*	49	16	6
KUSHIRO-JI-S*	14	7	3
MATSUYAMA-G	9	4	0
MATSUYAMA-S*	25	4	2
MIKAWA-GB	3	0	0
MIKAWA-G	3	0	0
MINAMATA-M*	3	0	0
MIYAKO-G	30	14	6
MIYAKO-S*	49	28	12
MIYAZAKI-GB	8	2	1
MIYAZAKI-G	8	2	3
MIYAZAKI-M*	50	10	4
MONBETSU-G	0	0	0
MURORAN-G	40	10	4
MURORAN-S*	69	14	6
NAGOYA-INA-E-G	0	0	0
NAGOYA-SORAMI-GB	0	0	0
NAGOYA-SORAMI-G	0	0	0
NAGOYA-ZOKAN-S*	26	5	2
NAHA-GB	12	0	0
NAHA-G	12	1	0
NAHA-S*	1	0	0
NAHA-ZOKAN-S*	2	1	0
NAKAGUSUKU-G	2	0	0
NIIGATA-G	26	4	1
NIIGATA-S*	12	1	0
NIIGATA-JI-S*	5	1	0
OFUNATO-S*	21	3	2
OFUNATO-BOCHI-S	73	16	5
OFUNATO-BO-S	118	41	23
OFUNATO-MOUND-M	80	26	8
OITA-G	4	2	1
OITA-S*	13	7	4
OKITSU-S*	28	4	0

(to be continued)

(Table 9 Continued)

(December 1996)

Name of Station	Total Number of Records	Number of Records ($20 \leq \text{Max. Accel.} < 50\text{Gals}$)	Number of Records ($\text{Max. Accel.} \geq 50\text{Gals}$)
OMAEZAKI-M	36	2	0
ONAHAMA-JI-GB	4	0	0
ONAHAMA-JI-G	4	4	0
ONAHAMA-JI-S*	37	25	8
ONAHAMA-S*	67	13	4
OSAKA-CHUO-S*	8	1	0
OSAKA-JI-G	4	2	1
OSAKA-JI-S*	12	1	1
OSAKA-MINAMI-G	4	2	0
OSAKA-MINAMI-S*	0	0	0
OTARU-G	8	2	1
OTARU-S*	13	0	0
ROKKO-GB80	0	0	0
ROKKO-GB40	0	0	0
ROKKO-G	0	0	0
RUMOI-G	0	0	0
SAKAIMINATO-G	2	1	0
SAKAIMINATO-S*	0	0	0
SAKAIMINATO-JI-S*	13	6	3
SAKATA-G	0	0	0
SAKATA-S*	61	6	0
SENDAI-M	89	19	3
SENDAI-MB	89	2	0
SETANA-G	0	0	0
SHIBUSHI-G	6	1	0
SHIBUSHI-S*	15	0	0
SHIMIZU-GB	1	0	0
SHIMIZU-G	1	0	0
SHIMIZU-KOJYO-S*	25	7	4
SHIMIZU-MIHO-S*	26	4	2
SHIMI.-SEKITAN-M*	23	11	5
SHIMI.-SEKITAN-S*	10	5	2
SHINAGAWA-GB	1	0	0
SHINAGAWA-G	2	1	1
SHINAGAWA-M*	1	1	1
SHINAGAWA-MB*	91	2	0
SHINAGAWA-S*	128	31	8
SHIOGAMA-KOJYO-S*	96	20	6
SHIOGAMA-S*	19	1	0
SHIMODA-F	9	1	0
SOMA-S	62	14	7
TAGONOURA-S	61	9	1
TOKACHI-G	0	0	0
TOKACHI-M*	111	61	23
TOMAKOMAI-G	5	1	0
TOMAKOMAI-S*	35	10	7
TOYAMA-GB	1	0	0
TOYAMA-G	1	0	0
TOYAMA-S*	8	3	2
TSURUGA-G	2	0	1
TSURUGA-S*	33	3	1
URAKAWA-S	152	19	6

(to be continued)

(Table 9 Continued)

(December 1996)

Name of Station	Total Number of Records	Number of Records ($20 \leq \text{Max. Accel.} < 50\text{Gals}$)	Number of Records ($\text{Max. Accel.} \geq 50\text{Gals}$)
WAKA,-GANPEKI-S*	7	2	0
WAKAYAMA-G	47	19	14
WAKAYAMA-S*	41	19	3
WAKAYAMA-JI-S*	12	5	4
WAKA.-SUMIKEN-S*	0	0	0
YAMASHITA-FB	68	2	0
YAMASHITA-F	68	14	4
YAMASHITA-FR	68	28	12
YAMASHI,-DAI7-M*	81	6	1
YAMASHI,-DAI6-S*	102	31	11
YAMASHITA-HEN-M*	199	19	6
YAMASHITA-HEN-S*	119	24	8
YOKKA.-CHITOSE-S	15	6	2
YOKKA.-DAI2-M	20	4	2
YOKKA.-SEKITAN-M	54	12	4
YOKKAICHI-JI-S*	5	2	0
TOTAL	5223	1263	418
ERS	2581	635	199
SMAC	2642	628	219

* Strong-motion observation of the stations had already been stopped.

Table 10 Summary of Analyzed Record Numbers

(December 1996)

Name of Station	Record Numbers which had been digitized and analyzed (Ref. No.**)				
AKITA-GB	F-708(892)	F-904(892)			
AKITA-G	F-709(892)	F-905(892)			
AKITA-S*	S-655(160)	S-1567(458)	S-1585(458)	S-1586(458)	
AMAGASAKI-G	F-765(907)	F-803(907)	F-804(907)	F-805(907)	F-808(907)
	F-809(907)	F-810(907)	F-811(907)	F-812(907)	F-813(907)
	F-817(907)	F-818(907)	F-819(907)	F-820(907)	F-821(907)
	F-849(907)	F-850(907)	F-932(907)	F-933(907)	F-934(907)
AOMORI-G	F-680(853)	F-692(892)	F-713(892)		
AOMORI-S*	S-235(80)	S-264(80)	S-670(160)	S-1573(458)	S-1592(458)
	S-2488(777)	S-2523(778)	S-2530(778)		
CHIBA-S	S-1378(374)	S-1545(487)	S-1884(547)	S-2107(619)	
HACHINOHE-S*	S-252(80)	S-669(160)	S-857(202)	S-1202(319)	S-1453(426)
	S-1575(458)				
HACHINOHE-JI-S*	S-1968(618)	S-1984(618)	S-2261(676)	S-2486(777)	S-2582(853)
	S-2597(892)	S-2598(892)	S-2606(892)		
HAKODATE-FB	F-508(777)	F-541(778)	F-542(776)	F-544(778)	F-667(853)
	F-687(892)	F-888(892)			
HAKODATE-F	F-545(778)	F-546(776)	F-548(778)	F-603(778)	F-668(853)
	F-689(892)	F-891(892)			
HAKODATE-FR	F-509(777)	F-549(778)	F-550(776)	F-552(778)	F-604(778)
HAKODATE-M	M-357(374)	M-523(442)	M-630(458)	M-639(458)	M-1444(777)
	M-1472(778)	M-1473(776)	M-1476(778)	M-1520(853)	
HANASAKI-F	F-478(776)	F-510(777)	F-681(853)	F-773(853)	F-777(853)
HANASAKI-M*	M-106(287)	M-262(338)	M-496(426)	M-887(547)	M-1014(588)
	M-1017(588)	M-1296(676)			
HIROSHIMA-G	F-790(907)				
HIROSHIMA-S*	S-364(98)	S-1306(338)	S-1623(487)		
HITACHINAKA-F	F-12(588)	F-15(588)	F-19(588)	F-34(618)	F-36(618)
	F-43(618)	F-46(618)	F-107(649)	F-174(649)	F-358(705)
	F-384(705)	F-423(727)	F-456(727)	F-483(776)	F-525(777)
HOSOSHIMA-S*	S-213(98)	S-453(100)	S-544(116)	S-545(116)	S-1231(338)
	S-1625(487)	S-1729(503)	S-2022(618)		
INAE-YAITA-M*	M-1553(907)				
KAMAISHI-M	M-1494(776)	M-1447(777)	M-1523(853)	M-1537(892)	
KAMAISHI-MB	M-1075(618)	M-1448(777)	M-1524(853)		
KANAZAWA-G	F-800(907)				
KANAZAWA-S*	S-2506(776)				
KASHIMA-S*	S-196(64)	S-612(136)	S-647(136)		

(to be continued)

(Table 10 Continued)

(December 1996)

Name of Station	Record Numbers which had been digitized and analyzed (Ref. No.**)				
KASHIMA-JI-S*	S-770(181)	S-813(202)	S-845(202)	S-882(202)	
KASHIMA-ZOKAN-S	S-1206(319)	S-1506(446)	S-1678(519)	S-1867(547)	S-1910(588)
	S-1957(588)	S-2110(619)	S-2196(676)	S-2206(676)	S-2492(777)
KAWASAKI-FB	F-461(776)				
KAWASAKI-F	F-98(619)	F-123(649)	F-462(776)	F-516(776)	F-739(892)
	F-985(892)	F-991(907)			
KAWASAKI-FR	F-463(776)	F-517(776)			
KAWASAKI-CHI-M*	M-186(317)	M-220(319)	M-406(374)	F-619(487)	
KEIHIN-JI-S*	S-1188(319)	S-1390(374)	S-2112(619)		
KINUURA-JI-S	S-2621(907)				
KINUURA-S*	S-480(100)	S-585(136)			
KOBE-DAI8-G	F-764(907)				
KOBE-JI-S	S-2615(907)	S-2623(907)			
KOBE-MAYA-M*	M-704(487)				
KOCHI-G	F-791(907)				
KOCHI-S*	S-211(98)				
KOCHI-JI-S*	S-1730(503)				
KOKEN-S	S-1046(338)	S-2106(619)	S-2417(776)		
KOKEN-M*	M-170(317)				
KOMATSUJIMA-G	F-794(907)	F-652(840)			
KUSHIRO-GB	F-506(777)	F-527(777)	F-670(853)	F-672(853)	F-674(853)
	F-695(853)	F-697(892)			
KUSHIRO-G	F-507(777)	F-528(777)	F-671(853)	F-673(853)	F-675(853)
	F-696(853)	F-698(892)			
KUSHIRO-S*	S-98(62)	S-369(98)	S-634(136)	S-674(160)	S-733(181)
	S-741(181)				
KUSHIRO-JI-S*	S-1976(618)	S-2171(649)	S-2390(727)		
MATSUYAMA-G	F-792(907)				
MATSUYAMA-S*	S-1303(338)	S-1731(503)	S-1624(487)		
MIYAKO-G	F-582(776)	F-584(776)	F-514(777)	F-587(778)	F-726(892)
	F-730(892)	F-734(892)	F-727(840)		
MIYAKO-S*	S-236(80)	S-271(80)	S-312(80)	S-273(98)	S-420(98)
	S-537(116)	S-1204(319)	S-1104(338)	S-1317(338)	S-1972(618)
	S-2255(676)				
MIYAZAKI-M*	M-228(338)	M-795(503)	M-877(547)	M-1107(618)	
MURORAN-G	F-505(777)	F-554(778)	F-560(778)	F-568(778)	F-679(853)
	F-700(892)	F-701(892)			
MURORAN-S*	S-234(80)	S-241(80)	S-399(80)	S-1425(426)	S-1474(442)
	S-1571(458)	S-1599(458)	S-1979(618)		

(to be continued)

(Table 10 Continued)

(December 1996)

Name of Station	Record Numbers which had been digitized and analyzed (Ref. No.**)				
NAGOYA-INA-E-S*	S-2616(907)				
NAGOYA-ZOKAN-S*	S-578(136)	S-1966(588)			
NIIGATA-G	F-705(892)				
NIIGATA-S*	S-107(62)				
NIIGATA-JI-S*	S-1203(319)				
OFUNATO-S*	S-140(64)	S-282(98)	S-361(98)		
OFUNATO-BO-S	S-2547(778)				
OFUNATO-BOCHI-S	S-554(116)	S-786(181)	S-1022(287)	S-1210(319)	S-1120(338)
OFUNATO-MOUND-M	M-1493(778)	M-1450(777)			
OITA-G	F-869(907)				
OITA-S*	S-924(236)	S-1629(487)	S-1734(503)	S-2021(618)	
OKITSU-S*	S-1071(317)				
ONAHAMA-S*	S-111(62)	S-1043(287)	S-1191(319)	S-1330(338)	
ONAHAMA-JI-S*	S-1330(338)	S-1505(446)	S-1602(487)	S-1633(487)	S-1946(588)
OSAKA-JI-G	F-854(907)	F-855(907)	F-856(907)	F-1041(907)	
OSAKA-JI-S*	S-2618(907)				
OSAKA-MINAMI-G	F-851(907)	F-852(907)	F-853(907)	F-1040(907)	
OTARU-G	F-536(777)	F-538(778)	F-539(778)	F-540(780)	F-676(853)
	F-694(892)				
SAKAIMINATO-G	F-793(907)				
SAKAIMINATO-JI-S*	S-2248(676)	S-2251(676)	S-2383(727)		
SAKATA-S*	S-1568(458)	S-2604(892)			
SENDAI-M	M-572(446)	M-1127(618)	M-1498(776)	M-1445(777)	M-1536(892)
SENDAI-MB	M-1446(777)	M-1547(892)			
SHIMIZU-KOJYO-S*	S-74(62)	S-1063(317)	S-1064(317)		
SHIMIZU-MIHO-S*	S-1066(317)	S-1069(317)			
SHINAGAWA-S*	S-340(98)	S-441(98)	S-1394(374)	S-1787(519)	S-1885(547)
	S-2111(619)	S-2130(649)	S-2395(727)	S-2419(778)	
SHIOGAMA-KOJYO-S*	S-782(181)	S-1118(338)	S-1201(319)	S-2006(618)	S-2029(618)
	S-2551(776)	S-2602(892)	S-2612(892)		
SHIOGAMA-S*	S-138(64)				
SOMA-S	S-1872(547)	S-2001(618)	S-2031(618)	S-2051(618)	S-2096(618)
	S-2220(676)	S-2487(777)	S-2584(853)	S-2610(892)	
TAGONOURA-S	S-1055(317)				
TOKACHI-M*	M-125(287)	M-145(287)	M-247(338)	M-260(338)	M-340(338)
	M-341(374)	M-439(426)	M-521(442)	M-522(442)	M-540(446)
	M-636(487)	M-703(487)	M-911(547)	M-972(547)	M-1078(618)
	M-1200(649)	M-1242(649)	M-1383(727)	M-1416(776)	M-1459(776)
	M-1443(777)	M-1519(853)	M-1534(892)	M-1511(840)	

(to be continued)

(Table 10 Continued)

(December 1996)

Name of Station	Record Numbers which had been digitized and analyzed (Ref. No.**)				
TOMAKOMAI-S*	S-877(202)	S-1418(426)	S-1472(442)	S-1977(618)	S-2491(777)
	S-2528(778)	S-2531(778)	S-2581(853)	S-2600(892)	
TOYAMA-GB	F-787(907)				
TOYAMA-G	F-788(907)				
TOYAMA-S*	S-1892(547)	S-2502(776)			
TSURUGA-G	F-789(907)				
TSURUGA-S*	S-1549(487)				
URAKAWA-S	S-1978(618)	S-2186(676)	S-2401(727)	S-2458(776)	S-2490(777)
	S-2580(853)	S-2599(892)	S-2608(892)		
WAKAYAMA-G	F-497(776)	F-503(776)	F-660(840)	F-715(840)	F718(840)
	F-795(907)	F-937(907)			
WAKAYAMA-S*	S-945(236)	S-1028(287)	S-1031(287)		
WAKAYAMA-JI-S*	S-265(98)	S-266(98)	S-788(181)		
YAMASHITA-FB	F-753(853)				
YAMASHITA-F	F-95(619)	F-168(649)	F-325(676)		
YAMASHITA-HEN-S*	S-412(98)	S-658(160)	S-1058(317)	S-1189(319)	S-1362(374)
	S-1386(374)	S-1614(487)	S-2113(619)	S-2155(649)	
YAMASHITA-HEN-M*	M-217(319)	M-403(374)	M-1022(588)	M-1056(588)	M-1183(619)
	M-1195(649)	M-1226(649)			
YOKKA.-CHITOSE-S	S-577(136)	S-2619(907)			
YOKKA.-SEKITAN-M	M-1555(907)				

* Strong-motion observation of the stations had already been stopped.

** The numbers correspond to those of the Technical Note of the Port and Harbour Research Institute, in which results of preliminary analysis are presented.

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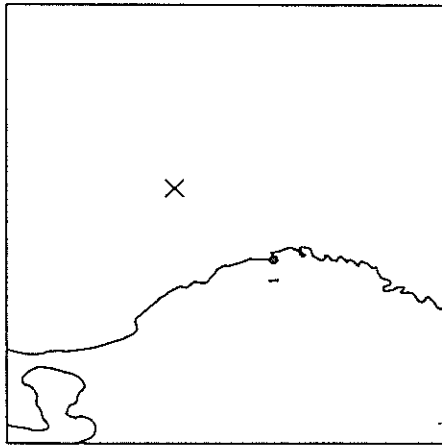
Strong-Motion Earthquake Observation Results (1995)

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

02:17 JAN. 1 .1995
 NE OFF IWATE PREF
 EPICENTER : 40 12.3'N 142 38.0'E
 DEPTH : 22.8KM MAGNITUDE : 4.6

JMA INTENSITIES

I : AOMORI, MORIOKA, OFUNATO,
 HACHINOME, MIYAKO



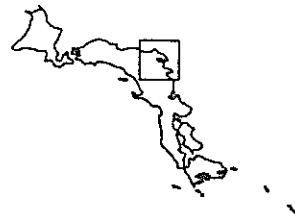
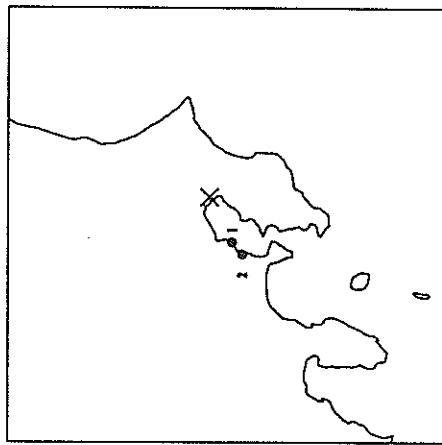
STATION	CONDITION	RECORD NUMBER	MAX.ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MIYAKO-G	ON GROUND	F- 732	23 15 4	83

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:52 JAN. 1 .1995
 CENTRAL CHIBA PREF
 EPICENTER : 35 37.5'N 140 6.5'E
 DEPTH : 77.3KM MAGNITUDE : 4.8

JMA INTENSITIES

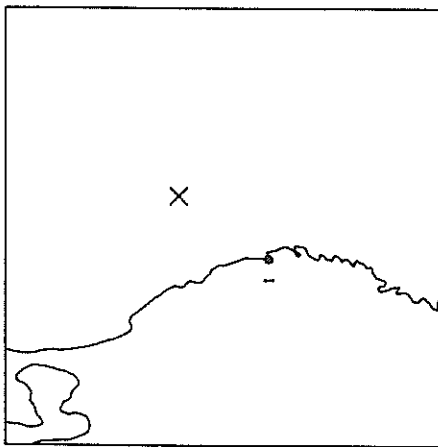
III : CHIBA, AJIRO
 II : TOKYO, YOKOHAMA, KATSUURA,
 KAKIOKA, TATEYAMA, OSHIMA,
 KAWAUCHIKO, MIKKO



STATION	CONDITION	RECORD NUMBER	MAX.ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KAWASAKI-FR	ON STRUC.	F- 743	9 9 4	34
1 KAWASAKI-F	ON GROUND	F- 742	9 8 4	34
1 KAWASAKI-FB	IN GROUND	F- 741	4 4 2	34
2 YAMASHITA-FR	ON STRUC.	F- 749	20 13 5	44
2 YAMASHITA-F	ON GROUND	F- 748	8 9 6	44
2 YAMASHITA-FB	IN GROUND	F- 747	3 3 3	44

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

01:42 JAN. 3 .1995
 NE OFF IWATE PREF
 EPICENTER : 40 9.3 'N 142 32.5 'E
 DEPTH : 33.9KM MAGNITUDE : 4.4
 JMA INTENSITIES
 II : MORIOKA
 I : HACHINOHE, MIYAKO,
 OFUNATO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MIYAKO-G	ON GROUND	F- 733	12 11 4	74

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:09 JAN. 3 .1995
 NW WAKAYAMA PREF
 EPICENTER : 34 5.5 'N 135 11.6 'E
 DEPTH : 13.2KM MAGNITUDE : 3.8
 * JISHIN KAZAN GAIKYO *



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 719	18 24 7	14

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

07:37 JAN. 7, 1995

HE OFF IWATE PREF

EPICENTER : 40 13.2'N 142 18.5'E

DEPTH : 47.8KM MAGNITUDE : 7.2

JMA INTENSITIES

V : HACHINOHE, MORIOKA

IV : OFUNATO, MIYAKO, MUTSU,

AOMORI

III : SENDAI, ISHINOMAKI, AKITA,

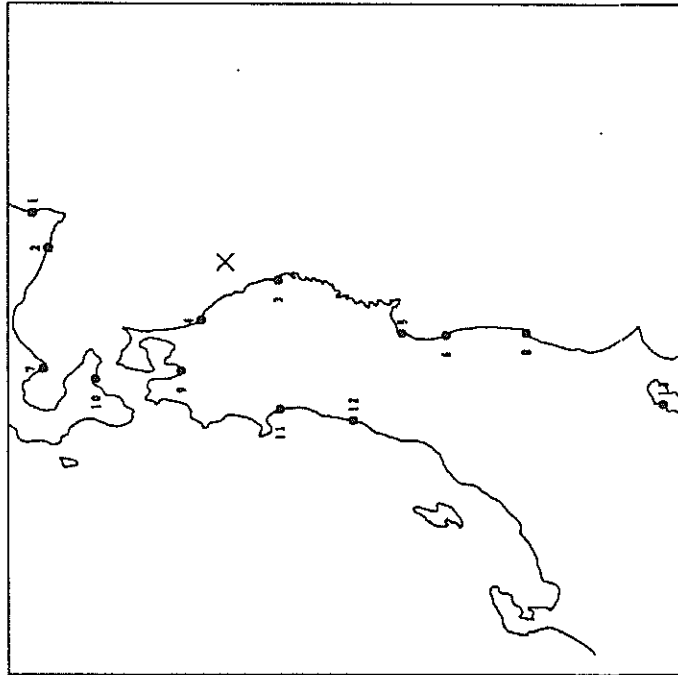
SHINJO, SAKATA, FUKUSHIMA,

URAKAWA, HIROO, HAKODATE,

TOMAKOMAI, OBIHIRO,

KUSHIRO, OTARU, KAKIOXA,

ONAHAMA

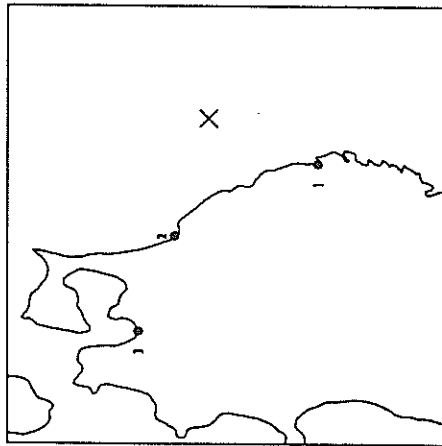


	STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (NS)	MAX. ACC. (EW) (EW)	MAX. ACC. (UD) (UD)	DIST. (KM)
1	TOYACHI-M	ON GROUND	M-1549	13	12	6	245
2	URAKAWA-S	ON GROUND	S-2608	11	12	6	219
3	MIYAKO-G	ON GROUND	F-734	212	192	60	70
4	HACHINOHE-JI-S	ON GROUND	S-2606	243	281	76	78
5	SHIOGAMA-KOJYO-S	ON GROUND	S-2612	31	24	14	238
5	SENDAI-WB	IN GROUND	M-1550	5	7	4	242
6	SOHA-S	ON GROUND	S-2610	11	12	5	290
7	MURORAN-G	ON GROUND	F-701	25	31	9	261
8	ONAHAMA-JI-S	ON GROUND	S-2605	4	8	3	383
9	AOMORI-G	ON GROUND	F-713	42	35	27	147
10	HAKODATE-M	ON GROUND	M-1562	19	24	9	218
10	HAKODATE-FR	ON STRUC.	F-894	23	20	7	218
10	HAKODATE-F	ON GROUND	F-891	15	18	8	218
10	HAKODATE-FB	IN GROUND	F-888	9	9	6	218
11	AKITA-G	ON GROUND	F-905	12	8	3	197
11	AKITA-GB	IN GROUND	F-904	9	8	3	197
12	SAKATA-S	ON GROUND	S-2609	6	6	2	256
13	KAWASAKI-FR	ON STRUC.	F-986	7	1	2	569
13	KAWASAKI-F	ON GROUND	F-985	6	8	2	569
13	KAWASAKI-FB	IN GROUND	F-984	2		1	569

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

11:36 JAN. 7, 1995
 NE OFF IWATE PREF
 EPICENTER : 40 16.6'N 142 25.5'E
 DEPTH : 38.1KM MAGNITUDE : 6.2

JMA INTENSITIES
 III : MORIOKA, AOMORI,
 HACHINOHE
 II : URAKAWA, ISHINOMAKI,
 OFUNATO, MUTSU, MIYAKO,
 HAKODATE, TOMAKOMAI,
 OBIHIRO, KUSHIRO

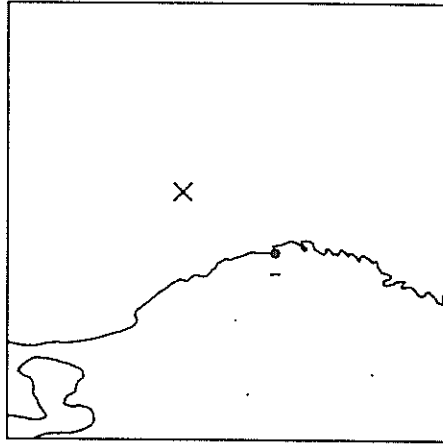


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 MIYAKO-G	ON GROUND	F-721	30 24 12	80
2 HACHINOHE-JI-S	ON GROUND	S-2607	9 14 4	84
3 AOMORI-G	ON GROUND	F-714	11 9 5	153

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

16:14 JAN. 7, 1995
 NE OFF IWATE PREF
 EPICENTER : 40 9.8'N 142 31.9'E
 DEPTH : 29.2KM MAGNITUDE : 4.9

JMA INTENSITIES
 II : AOMORI, MORIOKA,
 HACHINOHE
 I : URAKAWA, OFUNATO, MUTSU,
 MIYAKO



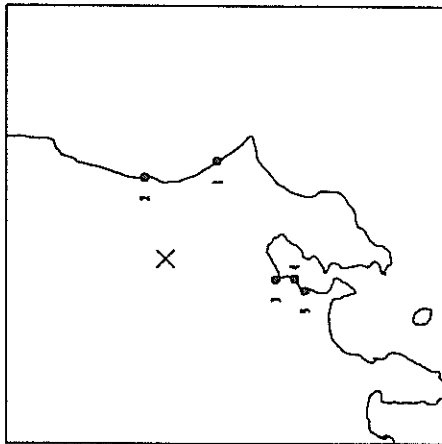
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 MIYAKO-G	ON GROUND	F-720	12 12 5	74

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:34 JAN. 7, 1995
 SW IBARAKI PREF
 EPICENTER : 36 17.9'N 139 58.8'E
 DEPTH : 71.5KM MAGNITUDE : 5.4

JMA INTENSITIES

IV : KAKIOKA, MITO, NIKKO
 III : UTSUNOMIYA, KUMAGAYA,
 TOKYO, CHIBA, SHIRAKAWA,
 CHICHIBU, YOKOHAMA, AJIRO



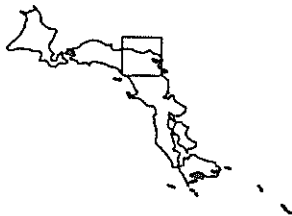
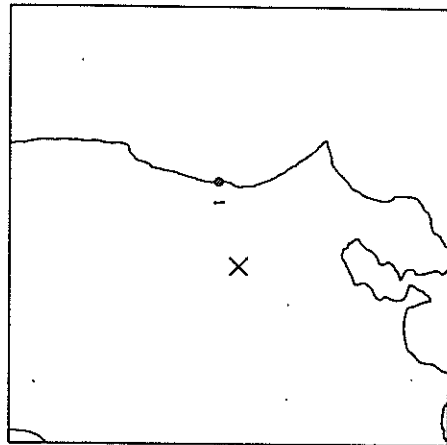
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (GAL) (EW) (UD)	DIST. (KM)
1 KASHIMA-ZOKAN-S	ON GROUND	S-2611	16 13 4	4	76
2 HITACHINAKA-F	ON GROUND	F-756	51 67 16	16	57
3 SHIRAGAWA-G	ON GROUND	F-816	28 42 35	35	77
3 SHINAGAWA-S	ON GROUND	S-2626	24	11	77
4 KAWASAKI-FR	ON STRUC.	F-989	23 1	5	90
4 KAWASAKI-F	ON GROUND	F-988	17 18 7	7	90
4 KAWASAKI-FB	IN GROUND	F-987	6	3	90
5 YAMASHITA-FR	ON STRUC.	F-873	43 23 4	4	98
5 YAMASHITA-F	ON GROUND	F-872	19 12 5	5	98
5 YAMASHITA-FB	IN GROUND	F-871	5 5 3	3	98

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

04:28 JAN. 8, 1995
 SW IBARAKI PREF
 EPICENTER : 36 18.5'N 139 57.7'E
 DEPTH : 70.8KM MAGNITUDE : 4.5

JMA INTENSITIES

II : KAKIOKA, UTSUNOMIYA, MITO,
 TOKYO, CHICHIBU, AJIRO
 I : KUMAGAYA, NIKKO, CHIBA,
 YOKOHAMA, KAWAGUCHI, KOFU



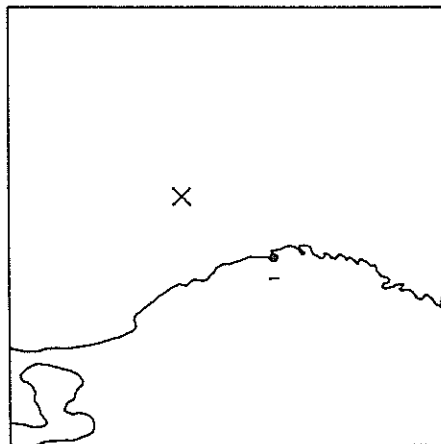
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (GAL) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-757	8 8 4	4	59

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

18:37 JAN. 8, 1995
 NE OFF IWATE PREF
 EPICENTER : 40 9.5 'N 142 32.3 'E
 DEPTH : 31.4KM MAGNITUDE : 4.7

JMA INTENSITIES

II : HACHINOHE, MORIOKA
 I : AOHORI, OFUNATO, MUTSU,
 MIYAKO



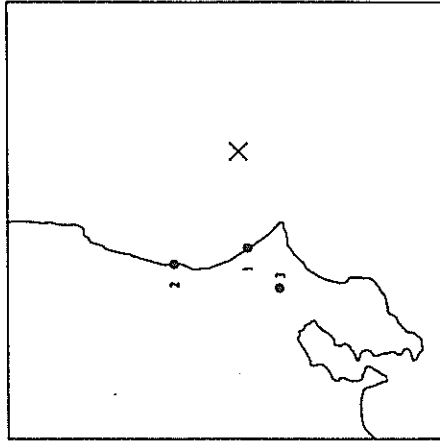
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS)	MAX. ACC. (GAL) (EW)	MAX. ACC. (GAL) (UD)	DIST. (KM)
1 MIYAKO-G	ON GROUND	F- 723	14	16	8	74

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

03:00 JAN. 10, 1995
 FAR E OFF IBARAKI PREF
 EPICENTER : 35 56.0 'N 141 25.9 'E
 DEPTH : 43.3KM MAGNITUDE : 6.1

JMA INTENSITIES

III : CHOSHI, MITO, KAKIOKA,
 NIKKO
 II : CHIBA, SENDAI, FUKUSHIMA,
 ONAHAWA, SHIRAKAWA, TOKYO,
 YOKOHAMA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS)	MAX. ACC. (GAL) (EW)	MAX. ACC. (GAL) (UD)	DIST. (KM)
1 KASHIMA-ZOKAN-S	ON GROUND	S-2613	23	21	6	66
2 HITACHINAKA-F	ON GROUND	F- 880	23	21	10	88

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

16:48 JAN. 11, 1995

S OFF URAKAWA

EPICENTER : 41 50.6'N 142 35.7'E

DEPTH : 56.1KM MAGNITUDE : 5.1

JMA INTENSITIES

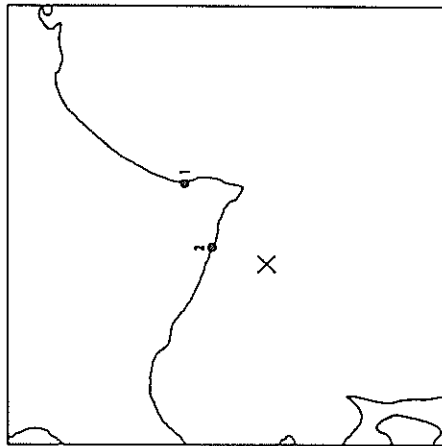
III : URAKAWA, HIROO

II : TOMAKOMAI, OBIHIRO,

KUSHIRO

I : IWANIZAWA, MORI, OTARU,

MORIOKA, HACHINOHE, MUTSU



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 TOKACHI-W	ON GROUND	M-1551	27 32 11	77
2 URAKAWA-S	ON GROUND	S-2614	21 17 5	38

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:26 JAN. 12, 1995

E OFF HOKKAIDO

EPICENTER : 43 44.0'N 147 20.1'E

DEPTH : 37.0KM MAGNITUDE : 6.0

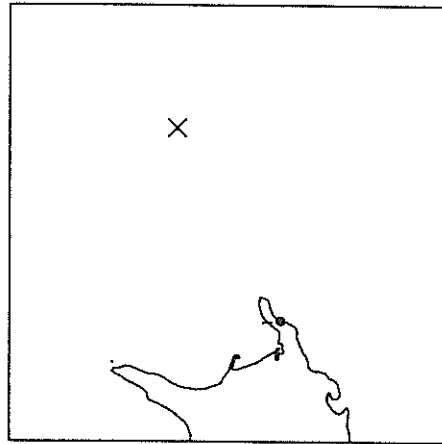
JMA INTENSITIES

III : NEMURO, KUSHIRO

II : OBIHIRO, URAKAWA

I : AJIRO, HIROO, TOMAKOMAI,

HACHINOHE, MUTSU, MORIOKA

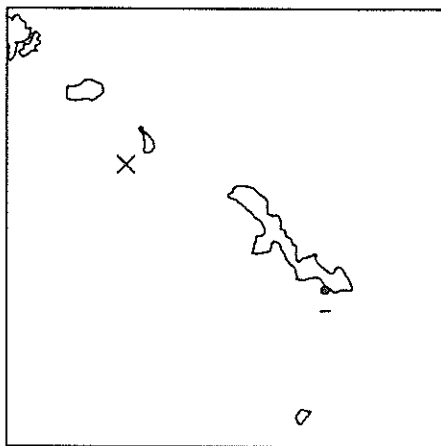


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HAKASAKI-F	ON GROUND	F-769	9 10 6	149

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

11:40 JAN. 15, 1995
 NEAR OKINAWAJIMA ISLAND
 EPICENTER : 27 30.5'N 128 27.8'E
 DEPTH : 46.0KM MAGNITUDE : 4.9

JMA INTENSITIES
 IV : OKINAWAJIMA
 III : NAGO
 I : NAHA, NAGO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (OAL)	DIST. (KM)
I NAHA-C	ON GROUND	F- 865	2 2 1	2 1	160
I NAHA-CB	IN GROUND	F- 864	1 2 1	2 1	160

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:46 JAN. 17, 1995

AWAJISHIMA ISLAND REGION

JMA INTENSITIES

VI : KOBE, SUMOTO

V : TOYOOKA, HIKONE, KYOTO

IV : NARA, TSU, TSURUGA, FUKUI,

UENO, YOKKAICHI, OIFU,

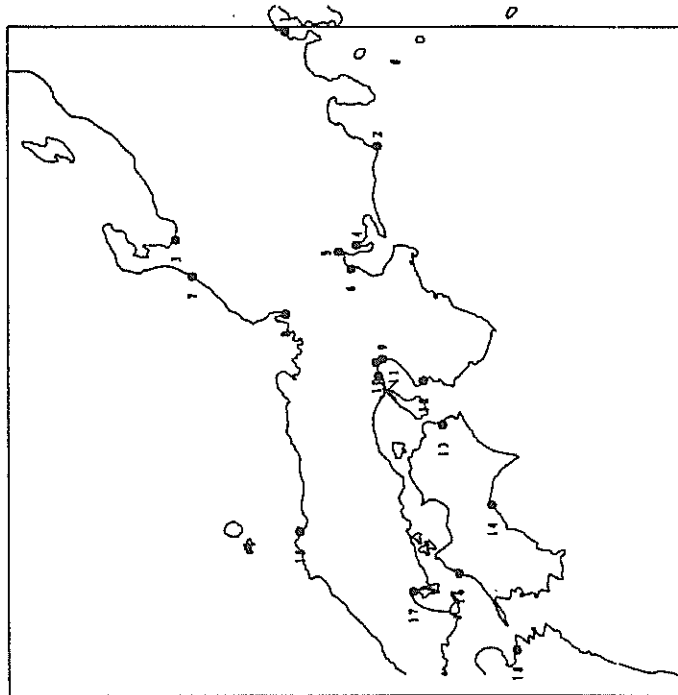
SAKAI, KOCHI, FUKUYAMA,

TOTTORI, TADOTSU, TSUYAMA,

TOKUSHIMA, OKAYAMA,

TAKAMATSU, OSAKA, MAIZURU,

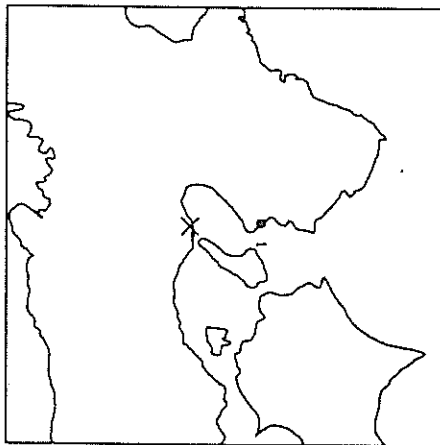
HIMEJI, WAKAYAMA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	DIST. (KM)
1 KAWASAKI-FR	ON STRUC.	F-992	5 1	441
1 KAWASAKI-F	ON GROUND	F-991	5 9 2	441
1 KAWASAKI-FB	IN GROUND	F-990	3 1	441
2 OMAEZAKI-M	ON GROUND	M-1552	2 2 2	291
3 TOYAMA-G	ON GROUND	F-788	20 13 4	306
3 TOYAMA-GB	IN GROUND	F-787	7 8 4	306
4 KINURU-JI-S	ON GROUND	S-2621	27 25 9	177
5 NAGOYA-INAES	ON STRUC.	S-2616	30 32 12	175
5 INAE-YAITA-M	ON STRUC.	M-1553	4 90	175
6 YOKKA.-CHITOSE-S	ON GROUND	S-2619	54 41 11	151
6 YOKKA.-SEKITAN-M	ON STRUC.	M-1555	5 93	151
7 KANAZAWA-G	ON GROUND	F-800	27 30 6	265
8 TSURUGA-G	ON GROUND	F-789	56 51 20	150
9 OSAKA-JI-S	ON GROUND	S-2618	178 125 103	37
10 AWASAKI-G	ON GROUND	F-765	321 472 311	36
11 KOBE-MAYA-DAI2-M	ON STRUC.	M-1554	4 480	20
11 KOBE-DAI8-G	ON STRUC.	F-764	683 394 334	19
11 KOBE-JI-S	ON GROUND	S-2615	206 531 285	18
12 WAKAYAMA-G	ON GROUND	F-795	157 109 67	43
13 KOMATSUJIMA-G	ON GROUND	F-794	89 96 32	76
14 KOCHI-G	ON GROUND	F-791	28 26 10	181
15 SAKAIMINATO-G	ON GROUND	F-793	44 33 16	193
16 MATSUYAMA-G	ON GROUND	F-792	40 35 10	228
17 HIROSHIMA-G	ON GROUND	F-790	20 12 7	236
18 OITA-G	ON GROUND	F-869	10 8 4	340

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

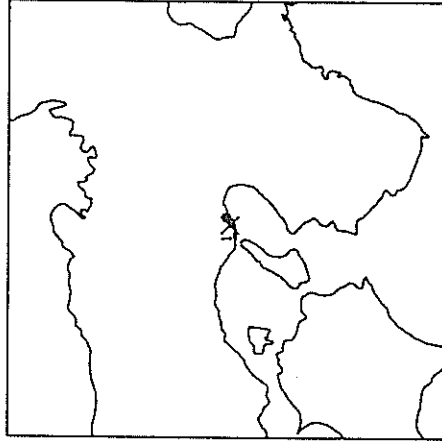
05:50 JAN. 17, 1995
 SE HYOGO PREF
 EPICENTER : 34 39.1'N 135 7.9 'E
 DEPTH : 13.2KM MAGNITUDE : 5.2
 * JISHIN KAZAN GAIKYO *



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-796	9 9 4	48

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

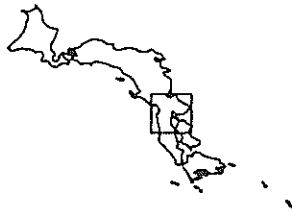
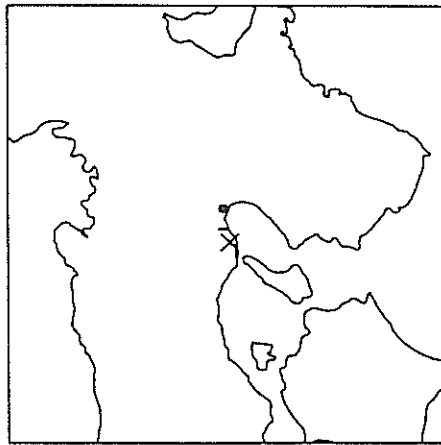
05:52 JAN. 17, 1995
 SE HYOGO PREF
 EPICENTER : 34 39.9'N 135 8.9 'E
 DEPTH : 15.1KM MAGNITUDE : 4.4
 JMA INTENSITIES
 III : KOBE
 II : HIMEJI
 I : OSAKA, TOYOOKA, OKAYAMA, KYOTO, WAKAYAMA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KOBE-JI-S	ON GROUND	S-2623	19 31 36	5

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

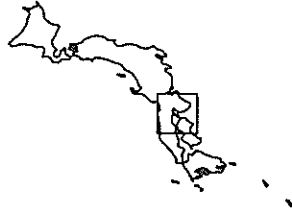
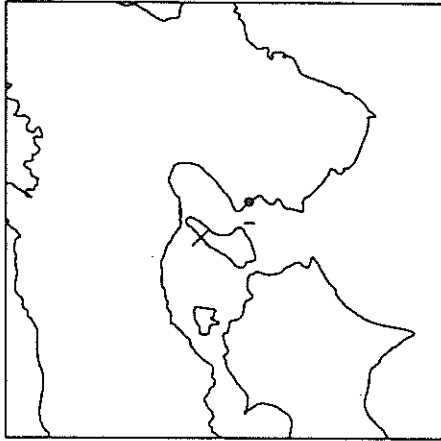
06:05 JAN. 17, 1995
 SE HYOGO PREF
 JMA INTENSITIES
 II : KOBE
 I : TOYOOKA, OKAYAMA
 EPICENTER : 34 40.5'N 135 8.7 'E
 DEPTH : 16.9KM MAGNITUDE : 3.9



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (OAL) (UD)	DIST. (KM)
1 AWAGASAKI-G	ON GROUND	F- 802	8 7 8	8	24

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

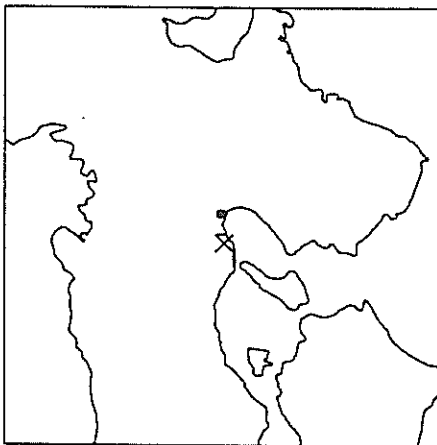
06:14 JAN. 17, 1995
 AWAJISHIMA ISLAND REGION
 JMA INTENSITIES
 I : KOBE, NARA
 EPICENTER : 34 30.6'N 134 53.5'E
 DEPTH : 11.5KM MAGNITUDE : 3.8



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (OAL) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 797	14 12 4	4	40

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

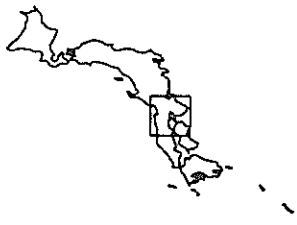
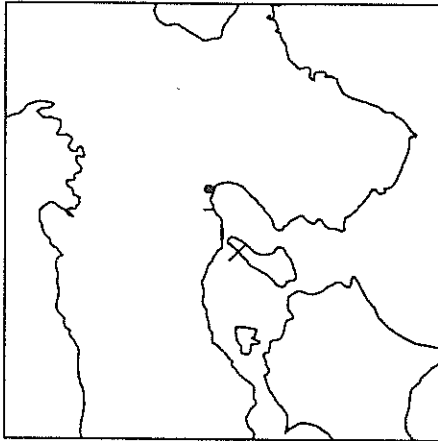
06:40 JAN. 17, 1995
 SE HYOGO PREF
 JWA INTENSITIES
 II : KOBE
 I : NARA, KYOTO
 EPICENTER : 34 41.6'N 135 10.8'E
 DEPTH : 13.8KM MAGNITUDE : 3.9



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AMAGASAKI-G	ON GROUND	F-803	13 10 13	20

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

06:42 JAN. 17, 1995
 AWAJISHIMA ISLAND REGION
 JWA INTENSITIES
 II : KOBE, OSAKA, NARA, HIMEJI,
 TOTTORI
 EPICENTER : 34 32.3'N 134 55.7'E
 DEPTH : 12.3KM MAGNITUDE : 4.5

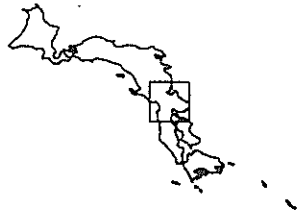
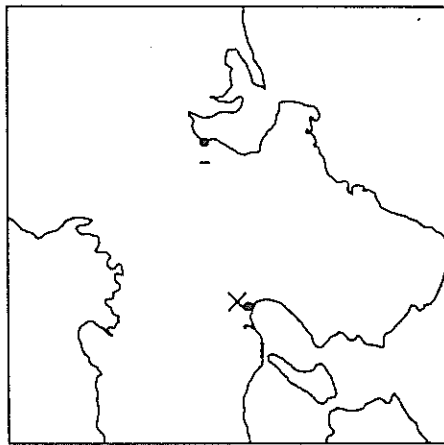


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AMAGASAKI-G	ON GROUND	F-804	18 13 23	47

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

07:38 JAN. 17, 1995
 SE HYOGO PREF
 EPICENTER : 34 46.9'N 135 26.3'E
 DEPTH : 11.7KM MAGNITUDE : 5.4

JWA INTENSITIES
 IV : NARA
 III : KOBE, OSAKA, KYOTO, HIKONE,
 MAIZURU, TOYOOKA, TSU,
 UENO

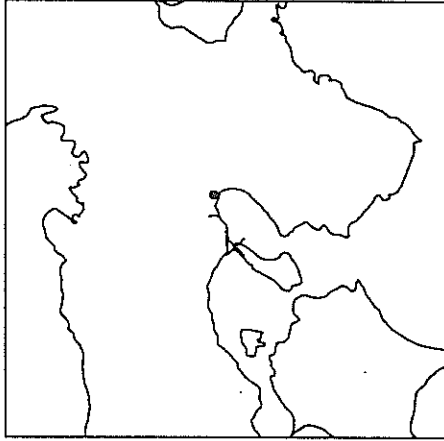


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (MS)	MAX. ACC. (EW) (UD)	MAX. ACC. (GAL)	DIST. (KM)
1 YOKKA.-CHITOSE-S	ON GROUND	S-2620	5	4	1	111
2 AWAGASAKI-G	ON GROUND	F-805	41	25	42	8

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

08:58 JAN. 17, 1995
 AWAJISHIMA ISLAND REGION
 EPICENTER : 34 35.0'N 135 0.5'E
 DEPTH : 18.9KM MAGNITUDE : 4.5

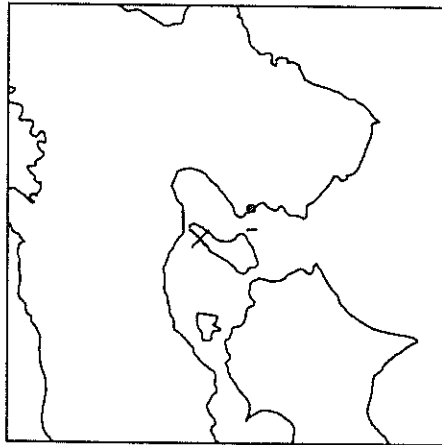
JWA INTENSITIES
 IV : KOBE
 II : SUOTO, HIMEJI, WAKAYAMA,
 KYOTO, TOYOOKA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (MS)	MAX. ACC. (EW) (UD)	MAX. ACC. (GAL)	DIST. (KM)
1 AWAGASAKI-G	ON GROUND	F-806	10	9	10	38

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

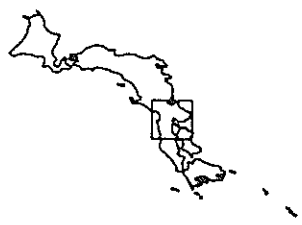
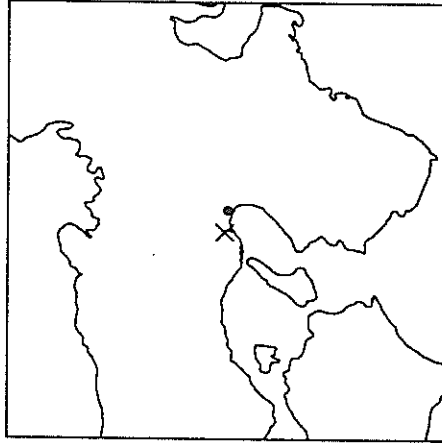
09:00 JAN. 17, 1995
 AWAJISHIMA ISLAND REGION
 EPICENTER : 34 31.8'N 134 55.8'E
 DEPTH : 9.9KM MAGNITUDE : 3.2



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-798	8 7 4	40

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

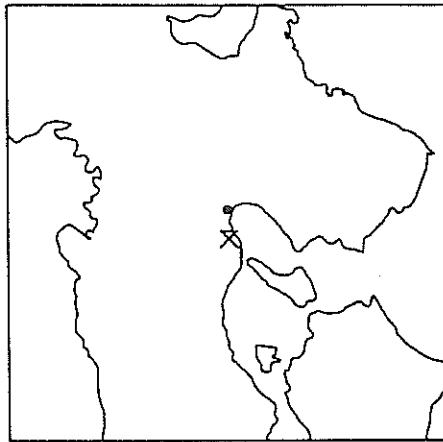
09:20 JAN. 17, 1995
 SE HYOGO PREF
 EPICENTER : 34 44.1'N 135 14.2'E
 DEPTH : 15.2KM MAGNITUDE : 3.2



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AWAGASAKI-G	ON GROUND	P-807	6 7 9	15

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

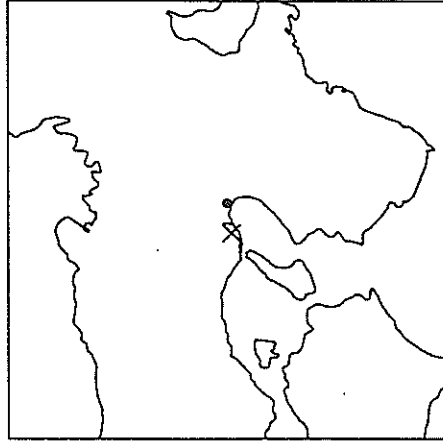
12:32 JAN. 17, 1995
 SE HYOGO PREF
 EPICENTER : 34 42.4'N 135 11.3'E
 DEPTH : 17.7KM MAGNITUDE : 4.1



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AMAGASAKI-G	ON GROUND	F-808	10 14 14	19

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:05 JAN. 17, 1995
 SE HYOGO PREF
 EPICENTER : 34 41.3'N 135 10.4'E
 DEPTH : 14.5KM MAGNITUDE : 4.7



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AMAGASAKI-G	ON GROUND	F-809	34 20 38	21

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

00:51 JAN. 18, 1995

SE HYOGO PREF

EPICENTER : 34 40.8'N 135 10.7'E

DEPTH : 15.7KM MAGNITUDE : 4.3

JWA INTENSITIES

III : KOBE

II : SUMOTO

I : TABOTSU, TAKANATSU,

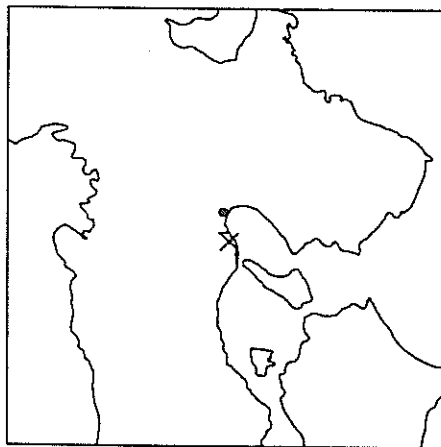
TAKAMATSU, OKAYAMA,

TOTTORI, HIKONE, TOYOOKA,

MAIZURU, HIMEJI, NARA,

KYOTO, WAKAYAMA, OSAKA,

UENO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AMACASAKI-G	ON GROUND	F- 810	28 11 22	20

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:25 JAN. 18, 1995

SE HYOGO PREF

EPICENTER : 34 41.6'N 135 11.1'E

DEPTH : 15.3KM MAGNITUDE : 4.3

JWA INTENSITIES

III : KOBE

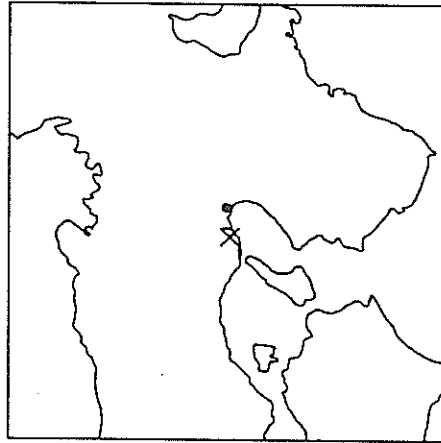
II : KYOTO

I : SUMOTO, NARA, OSAKA,

WAKAYAMA, TOYOOKA, HIKONE,

TOKUSHIMA, OKAYAMA,

TOTTORI, UENO, TSURUGA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AMACASAKI-G	ON GROUND	P- 811	14 6 11	20

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

06:50 JAN. 18, 1995

SE HYOGO PREF

EPICENTER : 34 41.0'N 135 10.2'E

DEPTH : 12.9KM MAGNITUDE : 4.3

JMA INTENSITIES

III : KOBE

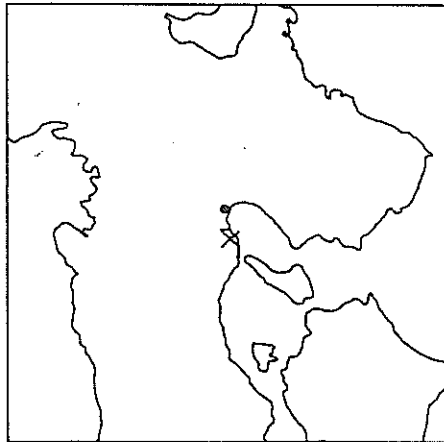
II : OKAYAMA, TOYOOKA

I : SUMOTO, NARA, OSAKA,

WAKAYAMA, HINEJI, KYOTO,

MAIZURU, TOTTORI,

TAKAMATSU, TADOTSU



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AMAGASAKI-G	ON GROUND	F-812	11 17 12	21

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

01:00 JAN. 19, 1995

SE HYOGO PREF

EPICENTER : 34 47.6'N 135 19.8'E

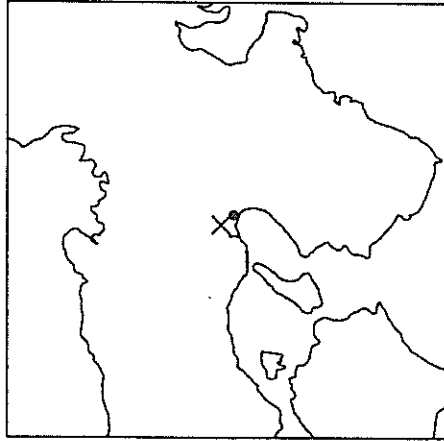
DEPTH : 13.1KM MAGNITUDE : 4.0

JMA INTENSITIES

II : KOBE

I : OSAKA, KYOTO, NARA, HIKONE,

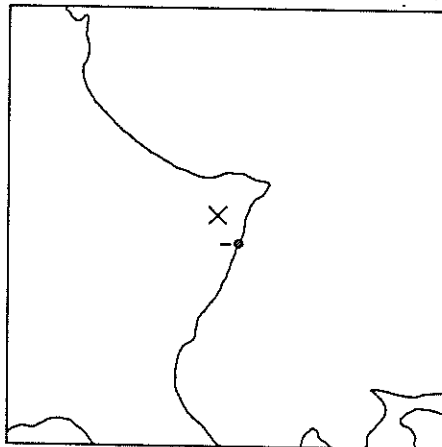
TOYOOKA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AMAGASAKI-G	ON GROUND	F-813	18 26 35	11

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

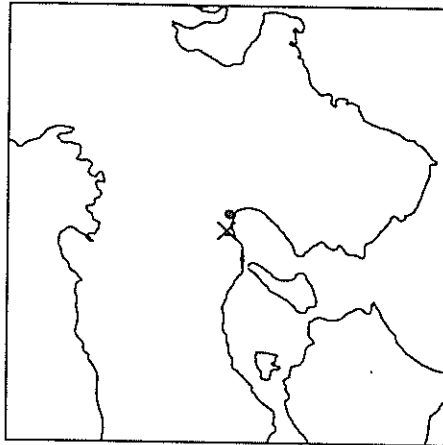
07:54 JAN. 19, 1995
 HIDAKA MOUNTAINS REGION
 JMA INTENSITIES
 II : URAKAWA, HIROO
 I : HIROO, OBIHIRO
 EPICENTER : 42 16.4'N 143 1.6 'E
 DEPTH : 65.3KM MAGNITUDE : 4.2



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2622	1 2 1	24

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

10:36 JAN. 19, 1995
 SE HYOGO PREF
 JMA INTENSITIES
 III : KOBE
 I : NARA, OSAKA
 EPICENTER : 34 43.9'N 135 16.9'E
 DEPTH : 10.5KM MAGNITUDE : 4.1



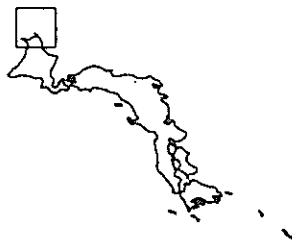
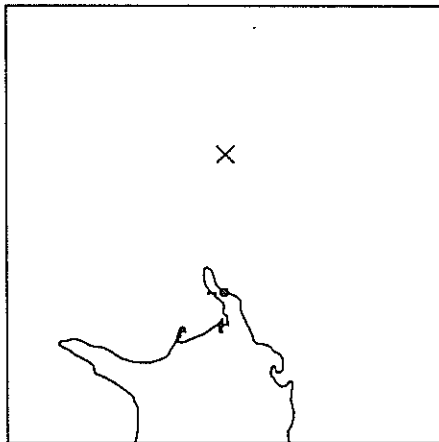
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 AMAGASAKI-G	ON GROUND	F-814	8 8 9	11

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

17:47 JAN. 21, 1995
 OFF NEMURO PENINSULA
 EPICENTER : 43 9.1 'N 146 44.1 'E
 DEPTH : 60.0KM MAGNITUDE : 6.1

JMA INTENSITIES

IV : KUSHIRO
 III : NEMURO
 II : HIROO, URAKAWA
 I : AJIRO, OBIHIRO, TOMAKOMAI,
 ISHINOWAKI, OFUNATO,
 MORIOKA, AOMORI, MIYAKO,
 HACHINOHE, NUTSU



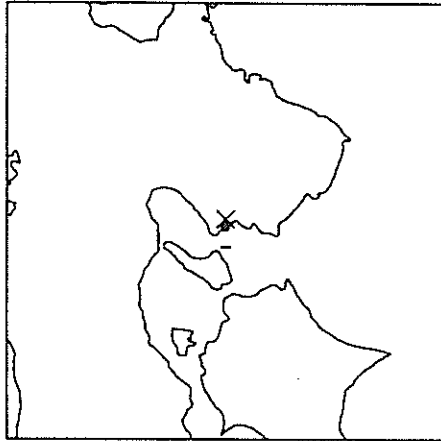
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (OAL) (UD)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F- 770	30 26 18	18 93	93

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

02:43 JAN. 23, 1995
 NW WAKAYAMA PREF
 EPICENTER : 34 12.5 'N 135 12.3 'E
 DEPTH : 10.4KM MAGNITUDE : 2.9

JMA INTENSITIES

II : WAKAYAMA

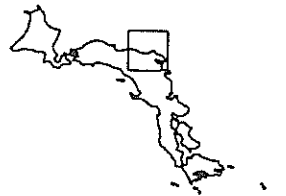
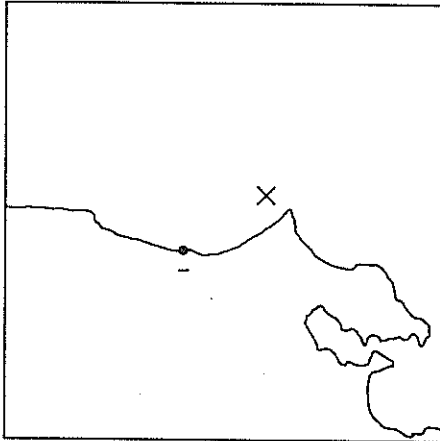
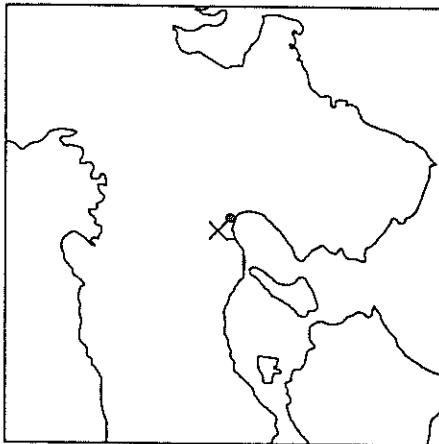


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (OAL) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 799	12 12 20	20 5	5

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:44 JAN. 23, 1995
 SE HYOGO PREF
 JMA INTENSITIES
 III : KOBE
 I : OSAKA, TAKAHATSU, TOTTORI,
 TOYOOKA, NARA, KYOTO,
 OKAYAMA, SUMOTO

07:56 JAN. 25, 1995
 NEAR CHOSHI CITY
 JMA INTENSITIES
 III : CHOSHI
 II : KAKIOKA
 I : MITO, CHIBA



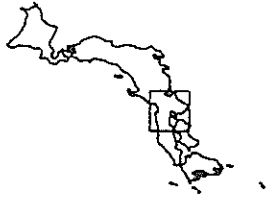
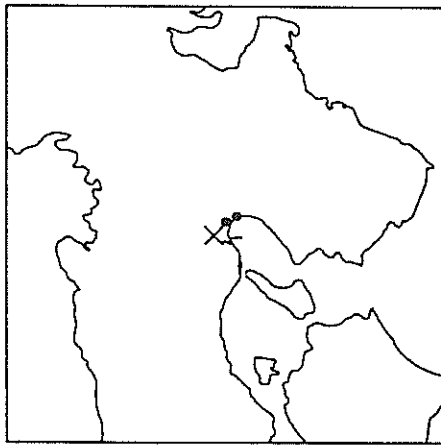
STATION
 I AWAGASAKI-G ON GROUND
 RECORD NUMBER F- 817
 MAX. ACC. (GAL) (NS) (EW) (UD) 16 35 14
 DIST. (KM) 12

STATION
 1 HITACHINAKA-F ON GROUND
 RECORD NUMBER F- 881
 MAX. ACC. (GAL) (NS) (EW) (UD) 6 6 2
 DIST. (KM) 68

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:15 JAN. 25, 1995
 SE HYOGO PREF
 EPICENTER : 34 47.4'N 135 18.4'E
 DEPTH : 14.8KM MAGNITUDE : 5.1

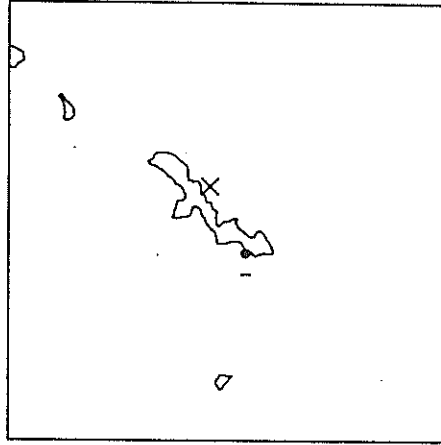
JMA INTENSITIES
 IV : KOBE
 III : OSAKA, KYOTO
 II : SUMOTO, NARA, HIKONE,
 MAIZURU, TOTTORI, TOYOOKA,
 UENO, TSURUGA, TSU



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 OSAKA-JI-G	ON GROUND	F- 856	16 52 18	20
2 AMAGASAKI-G	ON GROUND	F- 818	27 73 29	12

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

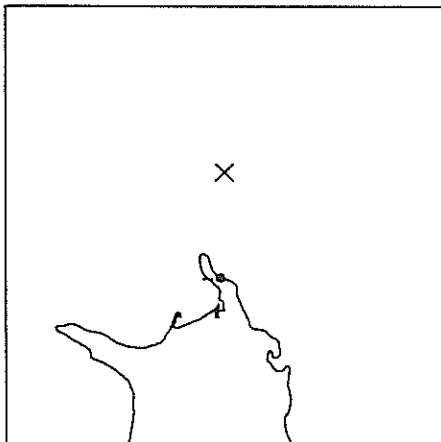
12:20 JAN. 26, 1995
 NEAR OKINAWAJIMA ISLAND
 EPICENTER : 26 29.1'N 128 7.9'E
 DEPTH : 49.3KM MAGNITUDE : 2.5



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 NAHA-G	ON GROUND	F- 846	14 20 29	52
1 NAHA-GB	IN GROUND	F- 845	4 14 13	52

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

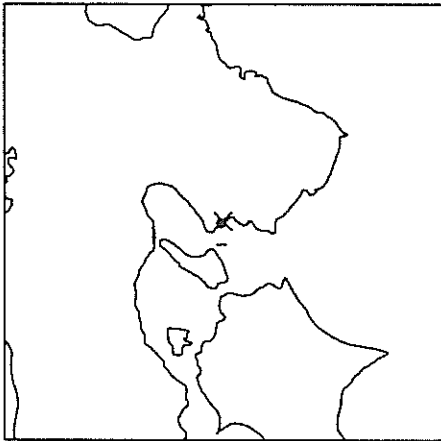
20:05 JAN. 27, 1995
 OFF NENURO PENINSULA
 EPICENTER : 43 9.9 'N 146 28.8 'E
 DEPTH : 50.6KM MAGNITUDE : 4.8



STATION	CONDITION	RECORD NUMBER	MAX-ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F- 771	19 16 5	73

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:36 FEB. 2, 1995
 NW WAKAYAMA PREF
 EPICENTER : 34 12.2 'N 135 9.9 'E
 DEPTH : 9.1KM MAGNITUDE : 2.6



STATION	CONDITION	RECORD NUMBER	MAX-ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 935	22 36 47	1

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

16:19 FEB. 2, 1995

JMA INTENSITIES

SE HYOGO PREF

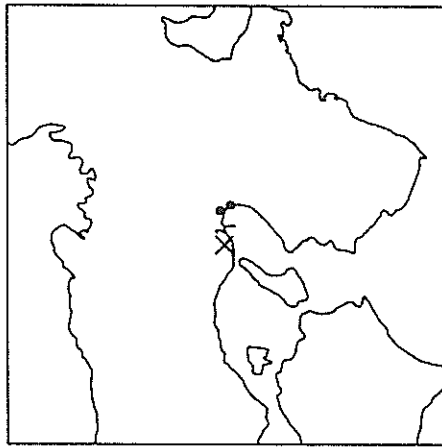
III : KOBE

EPICENTER : 34 41.4' N 135 8.6 ' E

I : OSAKA, HIKONE, TOYOOKA,

DEPTH : 18.1KM MAGNITUDE : 4.1

MAIZURU, KYOTO, WAKAYAMA,
NARA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 OSAKA-JI-G	ON GROUND	F- 854	22 21 23	27
1 OSAKA-MINAMI-G	ON GROUND	F- 851	22 36 14	27
2 AWAGASAKI-G	ON GROUND	F- 819	20 16 24	23

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:00 FEB. 6, 1995

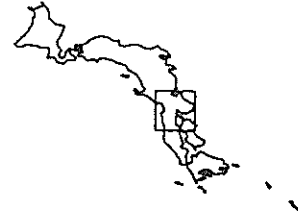
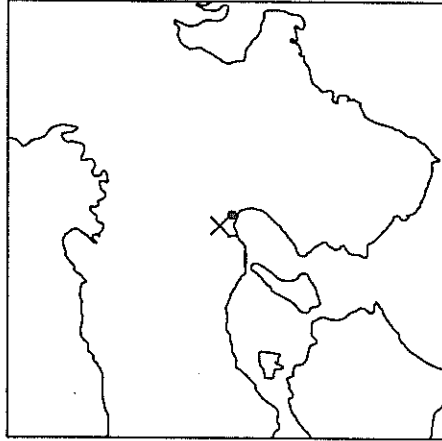
JMA INTENSITIES

SE HYOGO PREF

I : KOBE

EPICENTER : 34 47.5' N 135 19.5 ' E

DEPTH : 13.2KM MAGNITUDE : 3.6

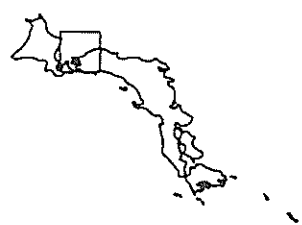
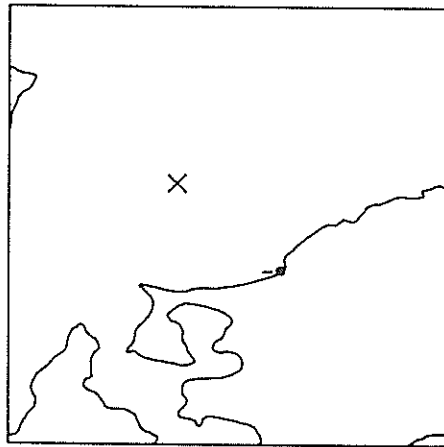


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 AWAGASAKI-G	ON GROUND	F- 820	5 11 6	11

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

22:51 FEB. 6, 1995
 E OFF AOMORI PREF
 EPICENTER : 41 8.2 'N 142 16.3 'E
 DEPTH : 56.0KM MAGNITUDE : 5.5

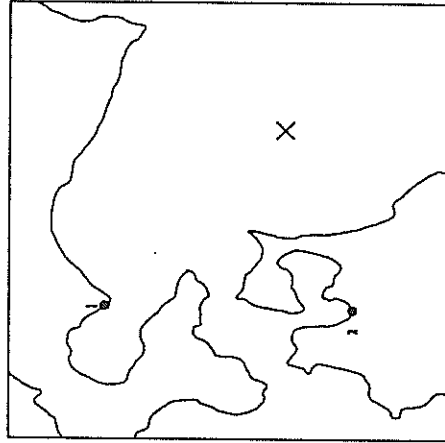
JMA INTENSITIES
 III : TOKAKOMAI, MUTSU,
 HACHINOHE, AOMORI
 II : KUSHIRO, HIROO, URAKAWA,
 MORIOKA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HACHINOHE-JI-S	ON GROUND	S-2627	6 4 5	92

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:53 FEB. 6, 1995
 E OFF AOMORI PREF
 EPICENTER : 41 8.8 'N 142 16.8 'E
 DEPTH : 60.2KM MAGNITUDE : 4.4



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MURORAN-G	ON GROUND	F-1021	5 7 4	172
2 AOMORI-G	ON GROUND	F-920	11 7 4	132

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

07:12 FEB. 14, 1995
 NW WAKAYAMA PREF
 EPICENTER : 34 5.6 'N 135 7.9 'E
 DEPTH : 10.9KM MAGNITUDE : 3.9

JMA INTENSITIES
 II : WAKAYAMA
 I : SUMOTO

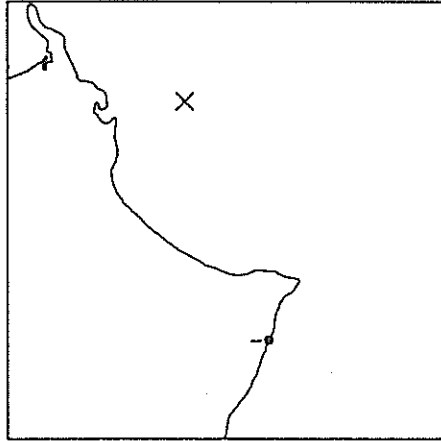


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 936	13 15 9	13

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

08:55 FEB. 15, 1995
 SE OFF TOKACHI
 EPICENTER : 42 30.3'N 144 50.7'E
 DEPTH : 45.3KM MAGNITUDE : 4.7

JMA INTENSITIES
 IV : KUSHIRO
 I : HIROO



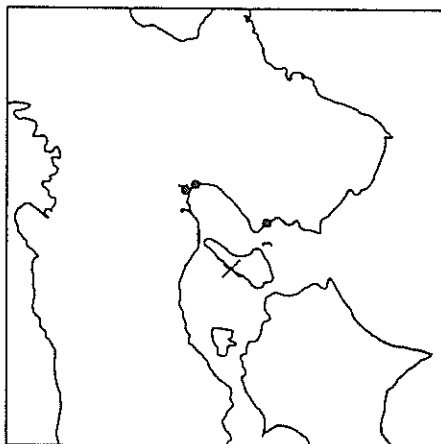
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2628	2 3 1	174

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:37 FEB. 18, 1995
 AWAJISHIMA ISLAND REGION
 EPICENTER : 34 26.2'N 134 49.0'E
 DEPTH : 15.9KM MAGNITUDE : 4.8

JWA INTENSITIES

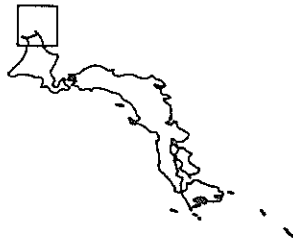
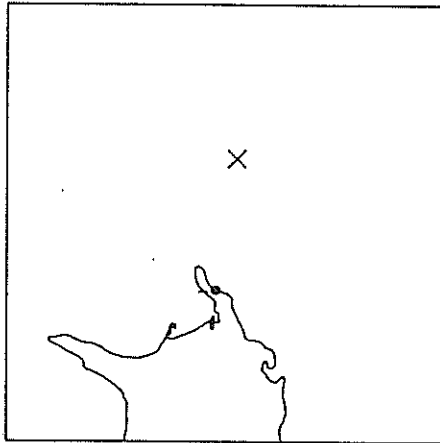
IV : SUNOTO
 III : WAKAYAMA, KOBE
 II : SAKAI, TOTTORI, NARA,
 TOYOOKA, KYOTO, TADOTSU,
 TSUYAMA, TAKAMATSU,
 OKAYAMA, TOKUSHIMA,
 HIMEJI



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 OSAKA-MINAMI-G	ON GROUND	F- 852	13 8 9	62
2 AWASAKI-G	ON GROUND	F- 821	8 4 5	61
3 WAKAYAMA-G	ON GROUND	F- 937	45 23 10	39

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:45 FEB. 19, 1995
 OFF HENRO PENINSULA
 EPICENTER : 43 2.5 'N 146 40.6'E
 DEPTH : 49.5KM MAGNITUDE : 5.4

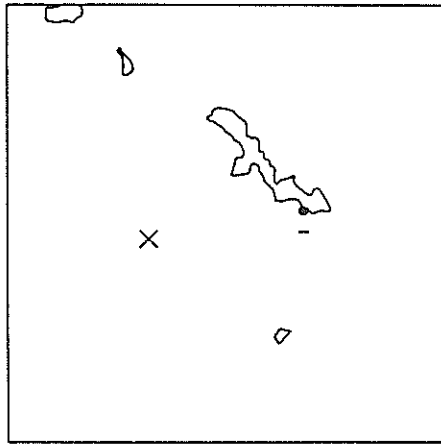


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F-1190	13 11 5	92

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:09 FEB. 25, 1995
 NW OFF OKINAWAJIMA IS
 EPICENTER : 27 12.1'N 127 25.5'E
 DEPTH : 96.0KM MAGNITUDE :

JMA INTENSITIES
 II : MAHA, KUWEJIMA
 I : MAGO, OKINOERABUJIMA

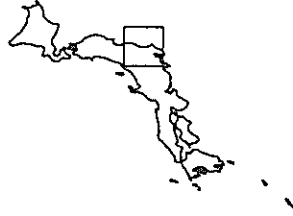
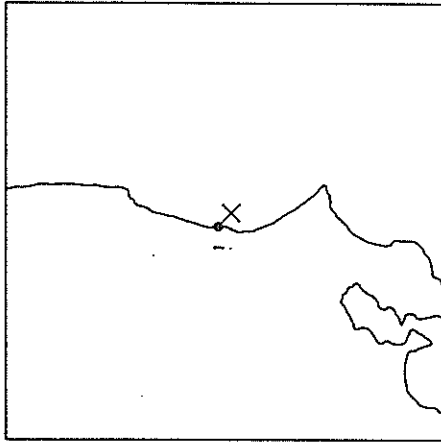


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MAHA-G	ON GROUND	F- 848	11 9 2	108
1 MAHA-GB	IN GROUND	F- 847	8 5 2	108

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

12:08 MAR. 3, 1995
 E OFF IBARAKI PREF
 EPICENTER : 36 18.1'N 140 42.8'E
 DEPTH : 97.4KM MAGNITUDE : 4.5

JMA INTENSITIES
 II : MITO
 I : KAKIOKA, UTSUNOMIYA,
 TOKYO, NIKKO, AJIRO,
 ONAHAMA

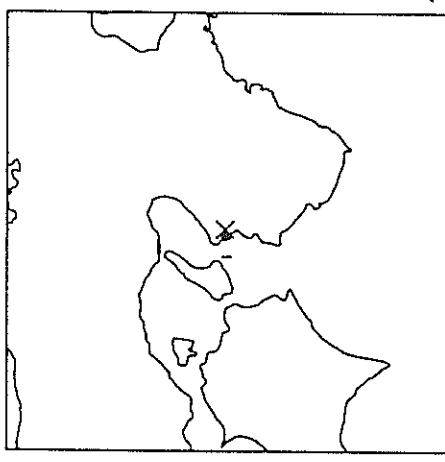


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F- 882	17 17 27	12

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

20:23 MAR. 10.1995
 NW WAKAYAMA PREF
 EPICENTER : 34 13.2'N 135 11.9'E
 DEPTH : 10.0KM MAGNITUDE : 2.9

JMA INTENSITIES
 III : WAKAYAMA

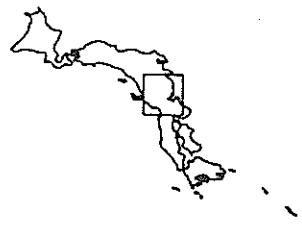
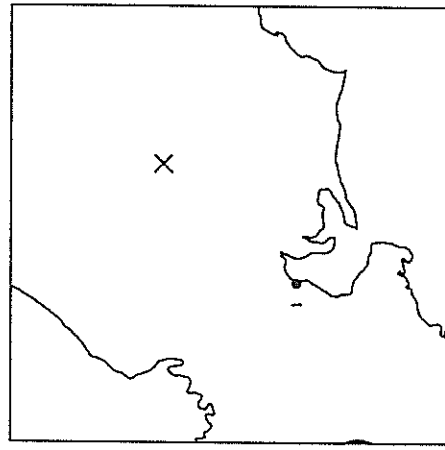


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-938	40 12 34	4

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

00:08 MAR. 17.1995
 WESTERN NAGANO PREF
 EPICENTER : 35 44.6'N 137 34.1'E
 DEPTH : 10.4KM MAGNITUDE : 5.3

JMA INTENSITIES
 III : IIDA,SUWA,HIXONE
 II : TAKAYAMA,KAWAGUCHIKO,
 YOKKAICHI,KOFU,TSURUGA,
 FUKUI,UENO,NARA,KYOTO,
 KOBE,GIFU,TOYAMA,NAGOYA,
 TSU

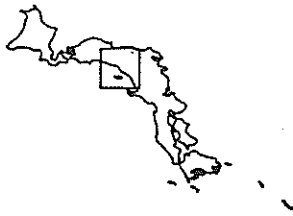
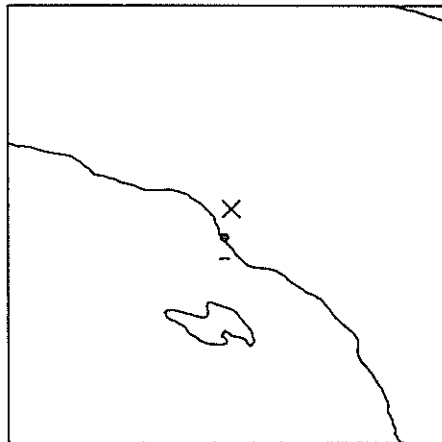


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 YOKKA.-CHITOSE-S ON GROUND		S-2630	4 5 3	121
1 YOKKA.-SEKITAN-M ON STRUC.		M-1560	4 33	122

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

06:56 MAR. 23, 1995
 NE NIIGATA PREF
 EPICENTER : 37 53.0°N 139 17.1°E
 DEPTH : 14.6KM MAGNITUDE : 3.7

JMA INTENSITIES
 I : NIIGATA

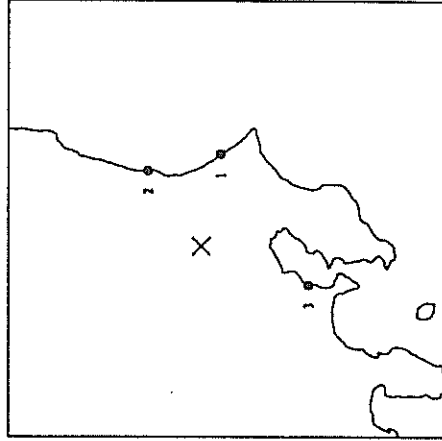


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 826	9 7 3	20

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

07:24 MAR. 23, 1995
 SW IBARAKI PREF
 EPICENTER : 36 5.7°N 140 1.0°E
 DEPTH : 56.2KM MAGNITUDE : 4.9

JMA INTENSITIES
 IV : KUMAGAYA, KAKIOKA
 III : MITO, TOKYO, UTSUNOMIYA, NIKKO
 II : SHIRAKAWA, ONAHAWA, CHIBA, KAWAGUCHIKO, TATEYAMA, CHICHIBU, OSHIMA, AJIRO, YOKOHAWA

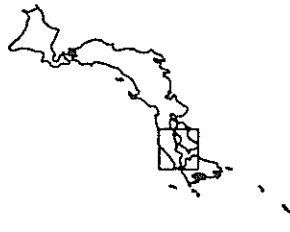
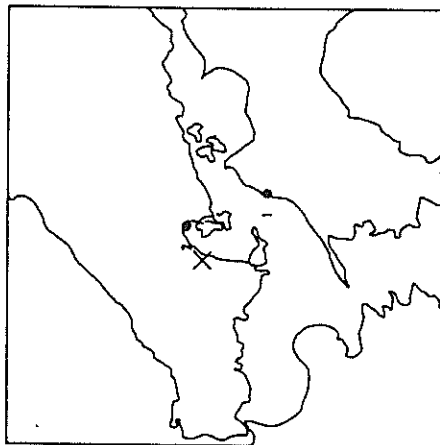


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KASHIMA-ZOKAN-S	ON GROUND	S-2629	5 5 3	63
2 HITACHINAKA-F	ON GROUND	F- 883	30 47 15	62
3 YAMASHITA-FR	ON STRUC.	F- 876	18 13 3	78
3 YAMASHITA-F	ON GROUND	F- 875	8 9 5	78
3 YAMASHITA-FB	IN GROUND	F- 874	3 3 1	78

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

22:58 MAR. 25, 1995
 WESTERN HIROSHIMA PREF
 EPICENTER : 34 15.1'N 132 13.2'E
 DEPTH : 15.2KM MAGNITUDE : 4.1

JMA INTENSITIES
 II : HIROSHIMA
 I : MATSUYAMA

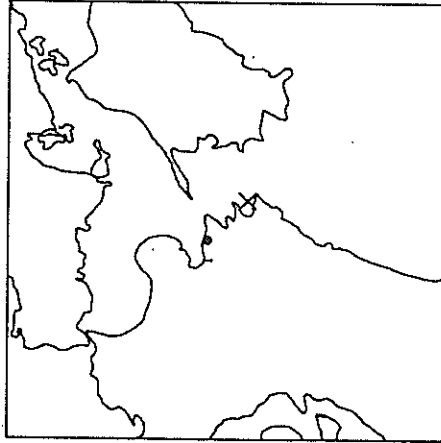


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MATSUYAMA-G	ON GROUND	F- 844	7 8 3	63
2 HIROSHIMA-G	ON GROUND	F- 857	19 20 15	25

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

15:09 MAR. 27, 1995
 BUNGO CHANNEL
 EPICENTER : 32 59.7'N 132 1.2'E
 DEPTH : 53.8KM MAGNITUDE : 4.0

JMA INTENSITIES
 I : UWAJIMA, OITA

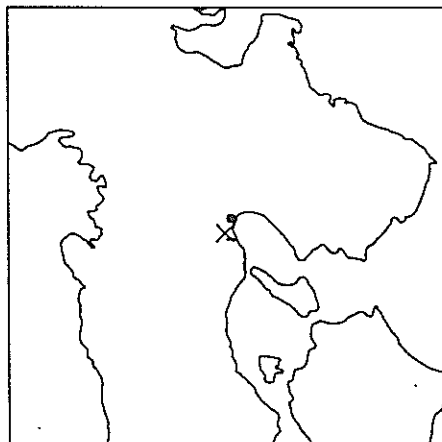


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 OITA-G	ON GROUND	F- 870	27 28 17	38

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

14:24 MAR. 30, 1995
 SE HYOGO PREP
 EPICENTER : 34 45.2' N 135 17.8' E
 DEPTH : 12.6 KM MAGNITUDE : 3.6

JMA INTENSITIES
 I : KOBE

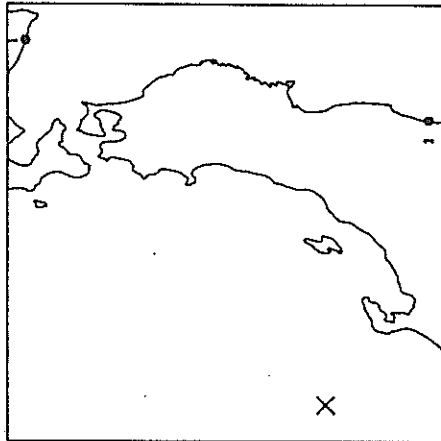


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 AHAGASAKI-G	ON GROUND	F-849	10 17 8	10

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:01 MAR. 31, 1995
 SEA OF JAPAN
 EPICENTER : 38 6.5' N 135 23.8' E
 DEPTH : 390.1 KM MAGNITUDE : 6.4

JMA INTENSITIES
 II : OKAHAMA, OFUNATO, URAKAWA,
 OBIHIRO, KUSHIRO
 I : WAJIMA, TOKYO, KAKIOKA,
 YOKOHAMA, MITO, CHIBA,
 TATEYAMA, KATSUURA,
 ISHIROMAKI, MORIOKA,
 MUTSU, HACHINOHE,
 TOMAKOMAI, HIROO, MIYAKO

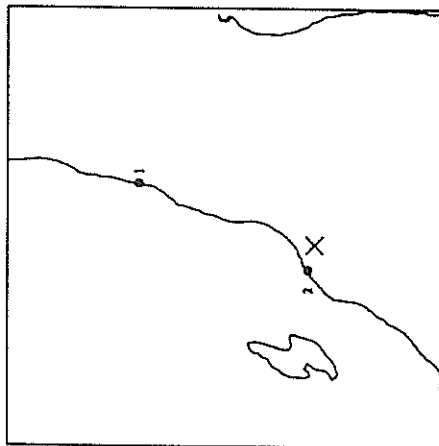


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2632	1 1 1	771
2 HITACHINAKA-F	ON GROUND	F-884	8 8 5	500

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

12:49 APR. 1 .1995
 NE NIIGATA PREF
 EPICENTER : 37 53.3'N 139 15.1'E
 DEPTH : 16.2KM MAGNITUDE : 5.5

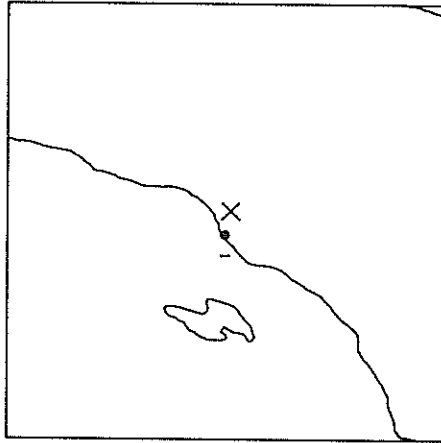
JMA INTENSITIES
 IV : NIIGATA, AIKAWA
 III : SHIRAKAWA, SAKATA, TAKADA
 II : WAKAMATSU, SHINJO,
 ONAHANA, WAJIMA, SUWA,
 NAGANO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 SAKATA-S	ON GROUND	S-2631	3 3 1	126
2 NIIGATA-G	ON GROUND	F-827	116 80 31	17

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

12:53 APR. 1 .1995
 NE NIIGATA PREF
 EPICENTER : 37 53.6'N 139 14.8'E
 DEPTH : 9.1KM MAGNITUDE : 3.7

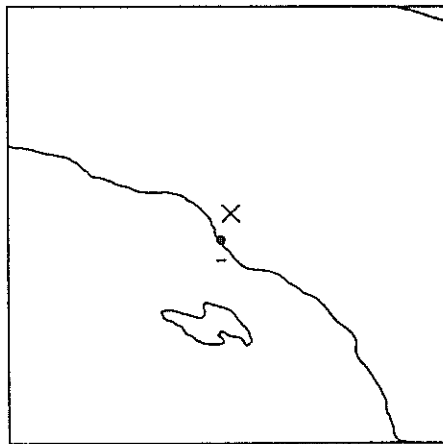


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F-828	17 12 4	16

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:43 APR. 1, 1995
 NE NIIGATA PREF
 EPICENTER : 37 52.0'N 139 16.0'E
 DEPTH : 14.7KM MAGNITUDE : 3.9

JMA INTENSITIES
 I : NIIGATA, SHIRAKAWA

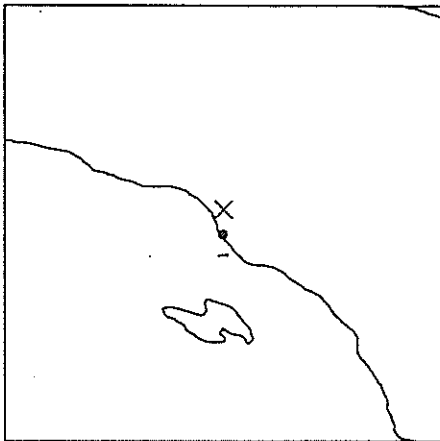


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 829	8 8	19

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

14:52 APR. 1, 1995
 NE NIIGATA PREF
 EPICENTER : 37 55.4'N 139 15.4'E
 DEPTH : 14.9KM MAGNITUDE : 4.1

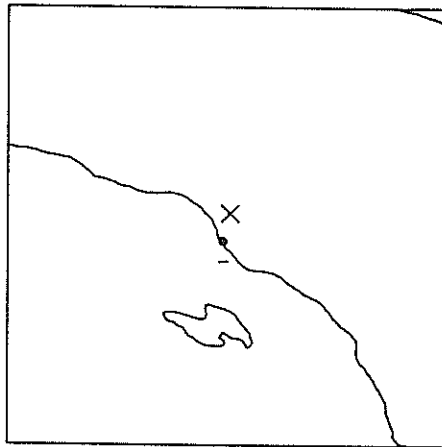
JMA INTENSITIES
 I : NIIGATA, AIKAWA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 830	13 12 5	16

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

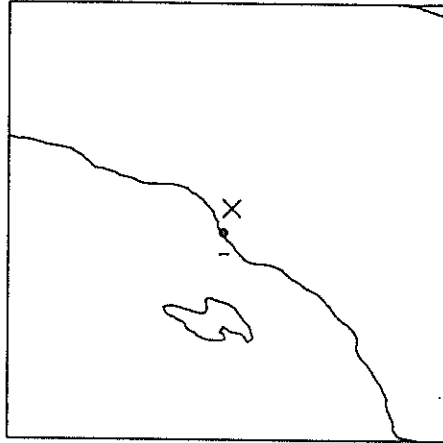
15:27 APR. 1, 1995
 NE NIIGATA PREF
 EPICENTER : 37 53.0'N 139 16.6'E
 DEPTH : 13.6KM MAGNITUDE : 3.4



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 831	8 4 2	19

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:52 APR. 1, 1995
 NE NIIGATA PREF
 EPICENTER : 37 52.9'N 139 15.0'E
 DEPTH : 16.8KM MAGNITUDE : 4.1

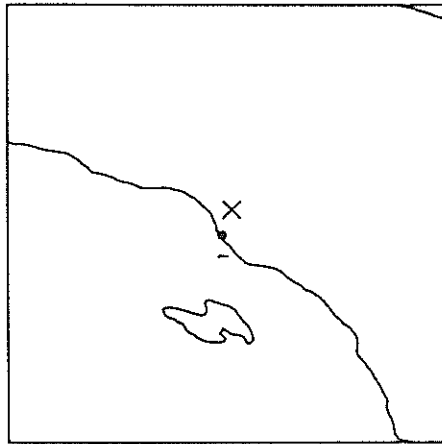


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 832	18 8 6	17

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

20:44 APR. 1 .1995
 NE NIIGATA PREF
 EPICENTER : 37 52.3'N 139 15.7'E
 DEPTH : 14.1KM MAGNITUDE : 4.0

JMA INTENSITIES
 II : NIIGATA
 I : SHIRAKAWA

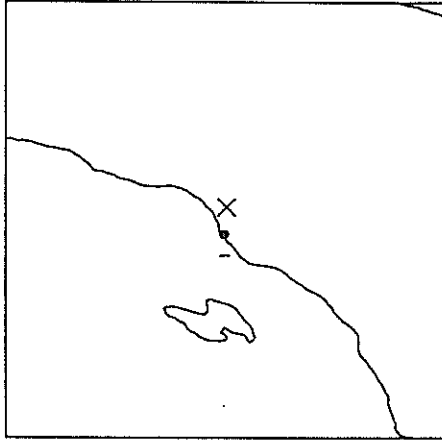


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 833	14 8 5	18

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

10:29 APR. 2 .1995
 NE NIIGATA PREF
 EPICENTER : 37 54.9'N 139 16.5'E
 DEPTH : 11.9KM MAGNITUDE : 4.3

JMA INTENSITIES
 III : NIIGATA, AIKAWA
 II : SHIRAKAWA
 I : TAKADA, SAKATA, WAKAWATSU, NAGANO

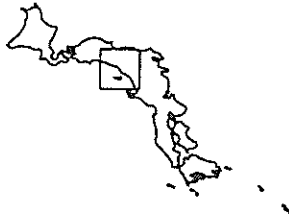
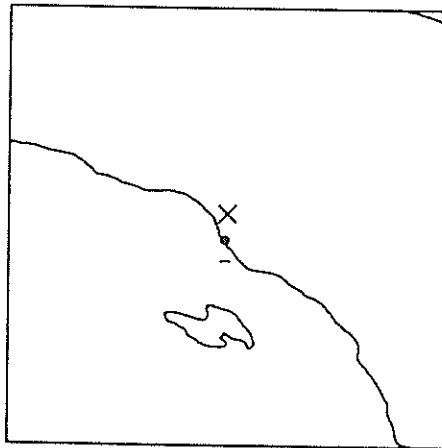


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 834	21 18 8	18

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

18:10 APR. 2, 1995
 NE NIIGATA PREF
 EPICENTER : 37 54.9'N 139 15.7'E
 DEPTH : 12.4KM MAGNITUDE : 4.0

JMA INTENSITIES
 II : NIIGATA

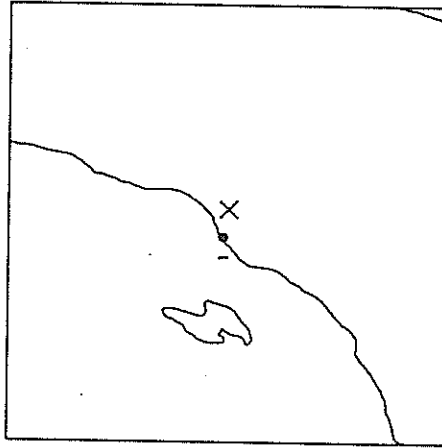


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL)	DIST.(KM)
1 NIIGATA-G	ON GROUND	F-835	9 10 4	17

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:52 APR. 2, 1995
 NE NIIGATA PREF
 EPICENTER : 37 53.5'N 139 16.8'E
 DEPTH : 12.1KM MAGNITUDE : 4.0

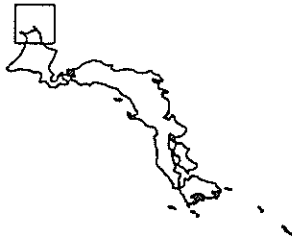
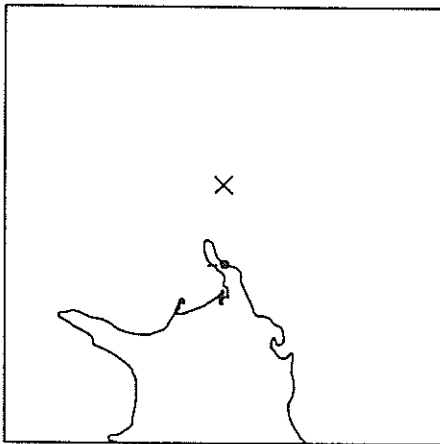
JMA INTENSITIES
 II : NIIGATA
 I : SHIRAKAWA, TAKADA



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL)	DIST.(KM)
1 NIIGATA-G	ON GROUND	F-836	9 6 3	19

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

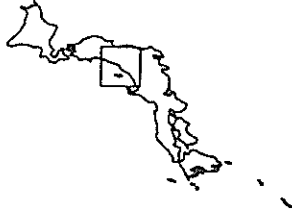
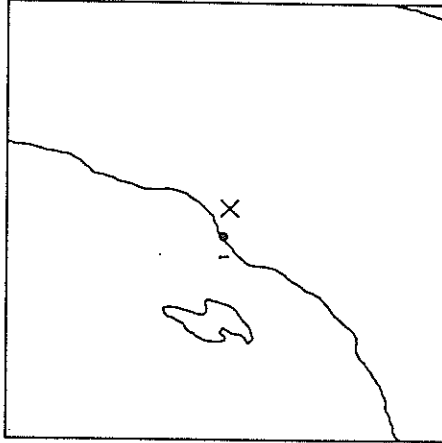
09:25 APR. 3, 1995
 OFF NEMURO PENINSULA
 EPICENTER : 43 13.6'N 146 14.7'E
 DEPTH : 81.4KM MAGNITUDE : 4.4



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F-1192	7 7 3	53

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

12:21 APR. 3, 1995
 NE NIIGATA PREP
 EPICENTER : 37 53.4'N 139 17.2'E
 DEPTH : 10.5KM MAGNITUDE : 3.6

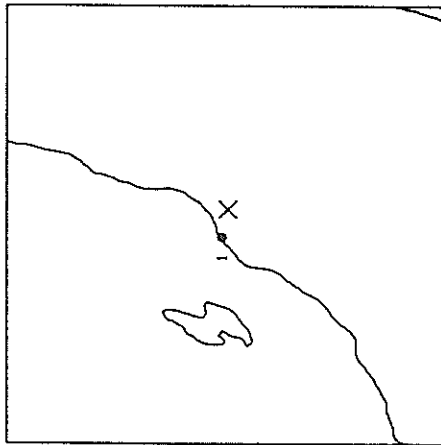


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	P-837	8 5 2	20

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

12:50 APR. 3, 1995
 NE NIIGATA PREF
 EPICENTER : 37 53.5'N 139 16.7'E
 DEPTH : 10.4KM MAGNITUDE : 3.5

JMA INTENSITIES
 I : NIIGATA

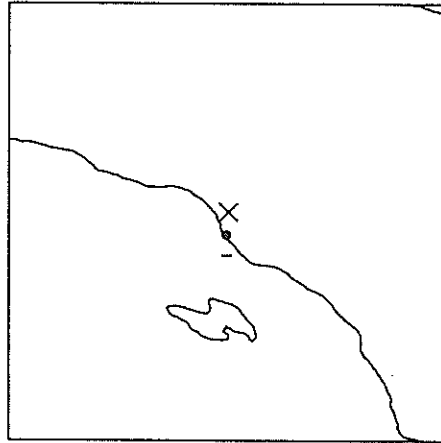


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(OAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 838	7 4 2	19

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

18:26 APR. 3, 1995
 NE NIIGATA PREF
 EPICENTER : 37 55.2'N 139 14.5'E
 DEPTH : 12.7KM MAGNITUDE : 3.8

JMA INTENSITIES
 II : NIIGATA

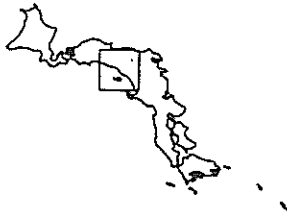
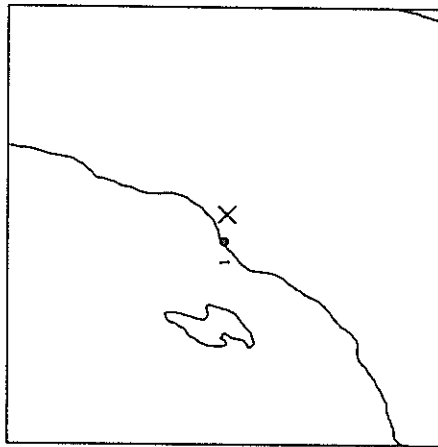


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(OAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	P- 839	7 6 3	15

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:07 APR. 4, 1995
 NE NIIGATA PREF
 EPICENTER : 37 54.7'N 139 16.6'E
 DEPTH : 5.7KM MAGNITUDE : 3.9

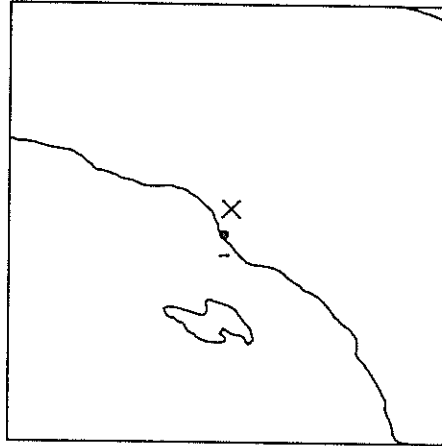
JMA INTENSITIES
 I : NIIGATA



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F-840	9 4 2	18

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:29 APR. 4, 1995
 NE NIIGATA PREF
 EPICENTER : 37 53.2'N 139 15.5'E
 DEPTH : 13.5KM MAGNITUDE : 3.3

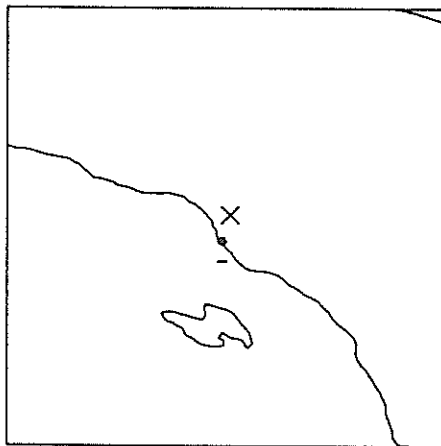


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F-841	6 4 1	17

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:25 APR. 5, 1995
 NE NIIGATA PREF
 EPICENTER : 37 52.8'N 139 16.0'E
 DEPTH : 18.3KM MAGNITUDE : 3.9

JMA INTENSITIES
 II : NIIGATA, SHIRAKAWA,
 AIKAWA, TAKADA
 I : WAKAYATSU, WAJIMA

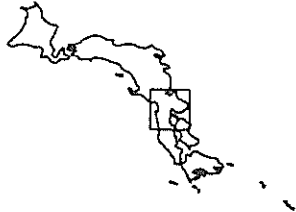
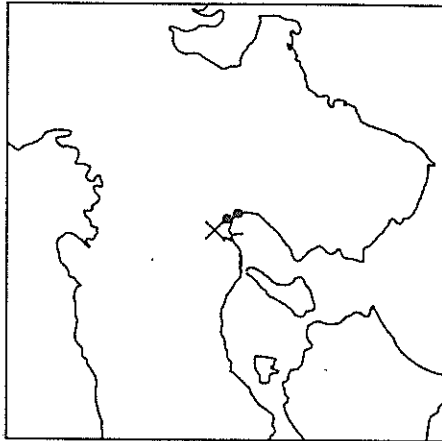


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 842	26 14 6	18

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

10:50 APR. 6, 1995
 SE HYOGO PREF
 EPICENTER : 34 47.5'N 135 19.3'E
 DEPTH : 11.8KM MAGNITUDE : 4.0

JMA INTENSITIES
 II : KOBE
 I : KYOTO, NARA, OSAKA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 OSAKA-JI-G	ON GROUND	F- 855	5 11 5	19
1 OSAKA-WINAMI-G	ON GROUND	F- 853	8 17 6	19
2 ANAGASAKI-G	ON GROUND	F- 850	11 28 17	11

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

16:20 APR. 7, 1995
 NE NIIGATA PREF
 EPICENTER : 37 53.6'N 139 16.4'E
 DEPTH : 14.1KM MAGNITUDE : 3.7

JMA INTENSITIES
 I : NIIGATA

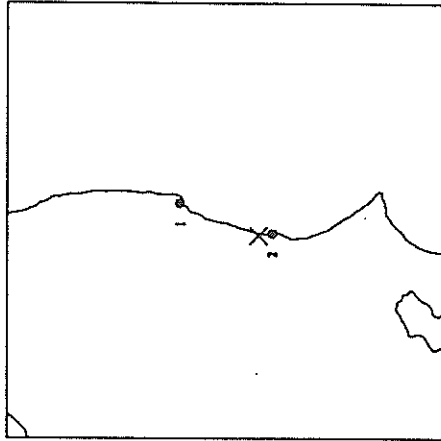


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F-843	8 6 3	18

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

14:23 APR. 12, 1995
 NORTHERN IBARAKI PREF
 EPICENTER : 36 28.2'N 140 36.5'E
 DEPTH : 52.8KM MAGNITUDE : 4.6

JMA INTENSITIES
 IV : MITO
 III : ONAHAMA
 II : SHIRAKAWA, NIKKO
 I : FUKUSHIMA, KUWAGAYA,
 UTSUNOMIYA, TOKYO, CHOSHI,
 CHICHIBU, MAEBASHI

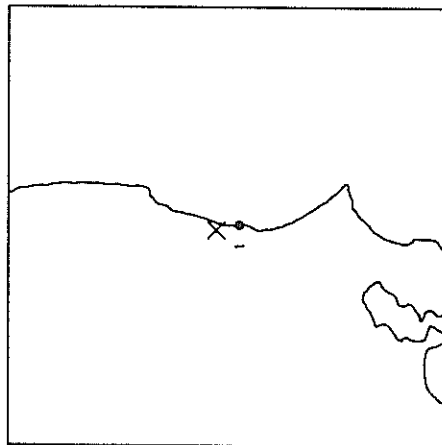


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 ONAHAMA-JI-CB	IN GROUND	F-824	9 5 3	58
1 ONAHAMA-JI-G	ON GROUND	F-825	24 21 14	58
2 HITACHINAKA-F	ON GROUND	F-885	43 71 21	9

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

06:11 APR. 13, 1995
 NORTHERN IBARAKI PREF
 EPICENTER : 36 31.9'N 140 35.4'E
 DEPTH : 57.3KM MAGNITUDE : 3.9

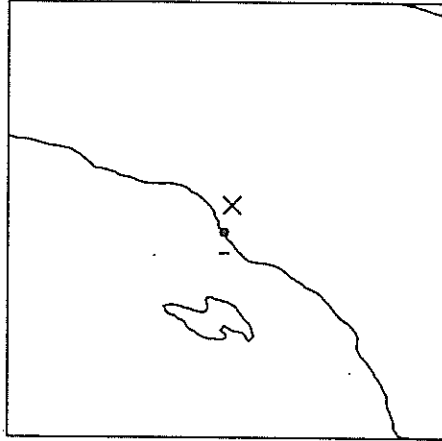
JMA INTENSITIES
 II : MITO



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(OAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F- 886	15 19 14	16

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

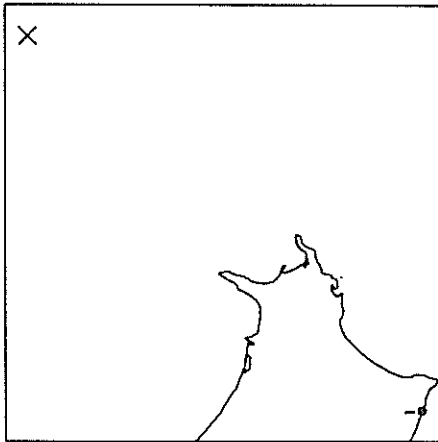
10:13 APR. 15, 1995
 NE NIIGATA PREF
 EPICENTER : 37 52.8'N 139 16.0'E
 DEPTH : 8.7KM MAGNITUDE : 4.0



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(OAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F- 922	21 16 6	18

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

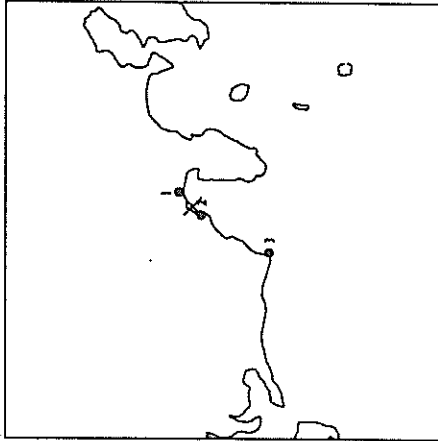
08:28 APR. 18,1995
 KURILE ISLANDS REGION
 EPICENTER : 46 7.9 'N 151 50.3'E
 DEPTH : 59.0KM MAGNITUDE : 6.9



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2635	5 4 3	846

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

20:26 APR. 18,1995
 NORTHERN SURUGA BAY REG
 EPICENTER : 35 3.7 'N 138 35.3'E
 DEPTH : 24.1KM MAGNITUDE : 4.5



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 TAGONOURA-S	ON GROUND	S-2633	43 41 16	13
2 SHIMIZU-MIHO-S	ON GROUND	S-2634	38 66 25	8
3 OMAEZAKI-M	ON GROUND	M-1561	13 10 5	60

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:59 APR. 27, 1995

NW WAKAYAMA PREF

EPICENTER : 34 8.8 'N 135 8.2 'E

DEPTH : 11.7KM MAGNITUDE : 3.5

JWA INTENSITIES

I : WAKAYAMA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-939	9 9 8	7

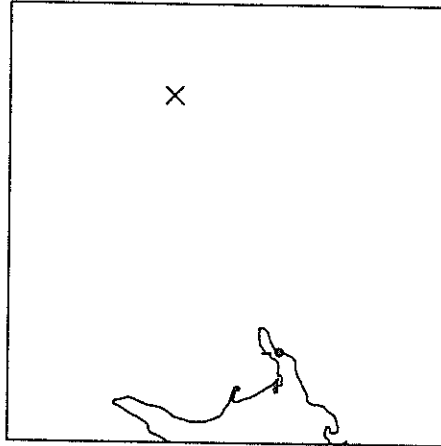
STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

01:30 APR. 29, 1995

E OFF HOKKAIDO

EPICENTER : 43 42.5 'N 147 53.2 'E

DEPTH : 3.0KM MAGNITUDE : 6.5



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F-1195	10 9 4	191

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

09:46 APR. 30, 1995

NE NIIGATA PREF

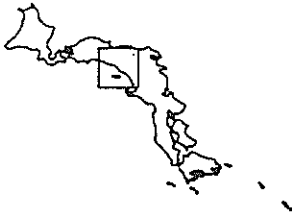
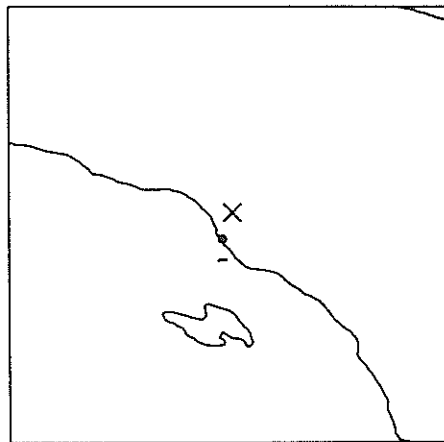
EPICENTER : 37 51.9'N 139 15.7'E

DEPTH : 10.1KM MAGNITUDE : 4.1

JMA INTENSITIES

II : NIIGATA

I : SHIRAKAWA, WAKAMATSU, AIKAWA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
I NIIGATA-G	ON GROUND	F-923	9 5 4	19

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

14:15 MAY 7, 1995

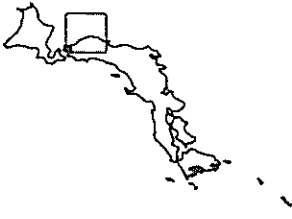
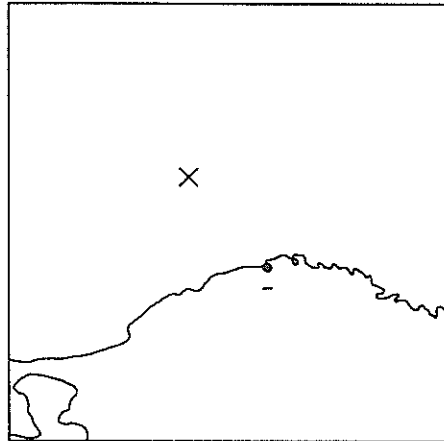
NE OFF IWATE PREF

EPICENTER : 40 3.6 'N 142 46.3'E

DEPTH : 27.6KM MAGNITUDE : 4.3

JMA INTENSITIES

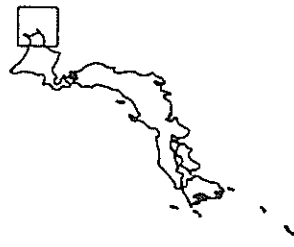
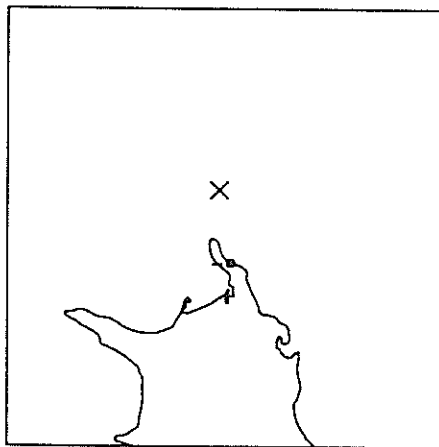
I : MIYAKO, MORIOKA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
I MIYAKO-G	ON GROUND	F-868	36 26 2	82

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:39 MAY 9, 1995
 OFF NEMURO PENINSULA
 EPICENTER : 43 17.3'N 146 13.3'E
 DEPTH : 83.5KM MAGNITUDE :

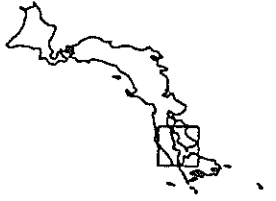
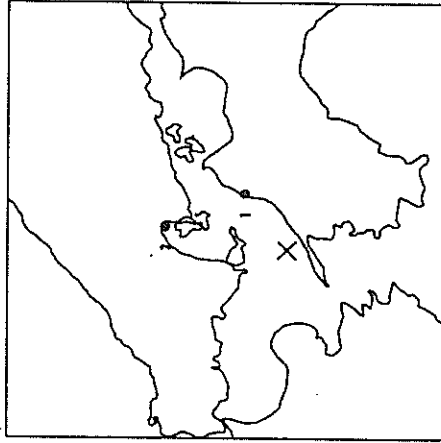


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F-1198	6 10 5	51

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:39 MAY 10, 1995
 IYONADA SETONAIKAI
 EPICENTER : 33 35.8'N 132 17.9'E
 DEPTH : 57.4KM MAGNITUDE : 4.4

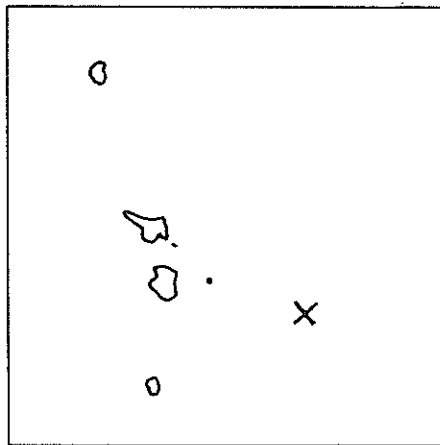
JMA INTENSITIES
 II : HIROSHIMA, MATSUYAMA, YAMAGUCHI
 I : FUKUYAMA, HAGI, TADOTSU, UWAJIMA, KOCHI, SHIMONOSEKI



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MATSUYAMA-G	ON GROUND	F-859	17 22 10	48
2 HIROSHIMA-G	ON GROUND	F-866	10 9 4	85

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

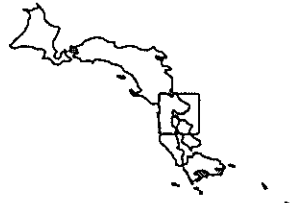
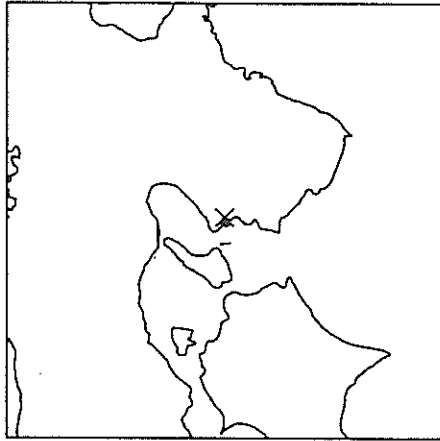
17:21 MAY 16, 1995 JMA INTENSITIES
 NEAR ISHIGAKIJIMA ISLAND
 II : IRIOHOTEJIMA
 I : ISHIGAKIJIMA
 EPICENTER : 23 53.1'N 123 20.7'E
 DEPTH : 35.7KM MAGNITUDE : 5.2



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 ISHIGAKI-G	ON GROUND	F- 858	4 6 2	96

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

18:29 MAY 16, 1995 JMA INTENSITIES
 NW WAKAYAMA PREF
 II : WAKAYAMA
 EPICENTER : 34 13.1'N 135 11.3'E
 DEPTH : 7.9KM MAGNITUDE : 2.9

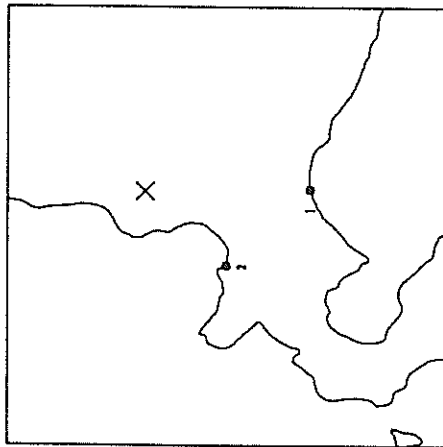


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 940	30 22 33	3

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:01 MAY 23, 1995
 KAMIKAWA-SORACHI REGION
 EPICENTER : 43 38.4'N 141 43.2'E
 DEPTH : 15.7KM MAGNITUDE : 5.7

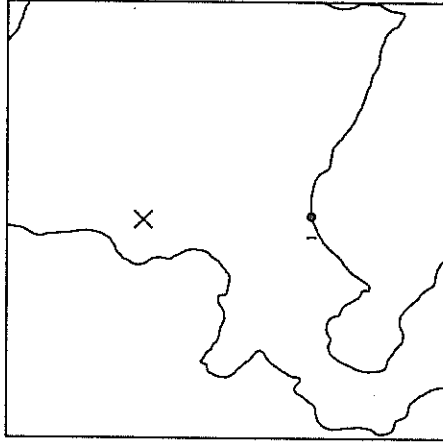
JMA INTENSITIES
 IV : RUMOI
 III : OTARU, KUTCHAN, IWAMIZAWA,
 TOMAKOMAI
 II : SAPPORO, ASAHIKAWA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 TOMAKOMAI-G	ON GROUND	F- 862	(NS) 10 (EW) 7 (UD) 3	112
2 OTARU-G	ON GROUND	F- 861	(NS) 11 (EW) 12 (UD) 5	75

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:03 MAY 23, 1995
 KAMIKAWA-SORACHI REGION
 EPICENTER : 43 39.5'N 141 42.6'E
 DEPTH : 11.0KM MAGNITUDE :

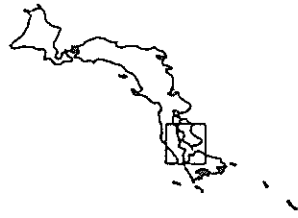
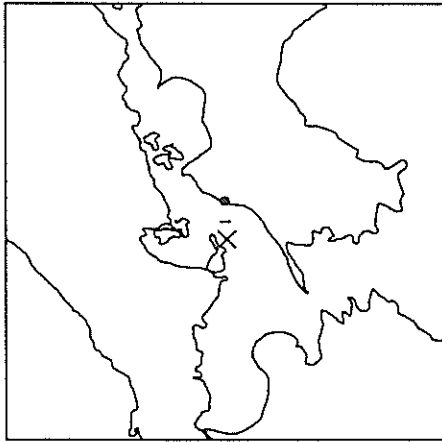


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 TOMAKOMAI-G	ON GROUND	F- 863	(NS) 10 (EW) 7 (UD) 3	114

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:38 MAY 24, 1995
 AKIHADA SETOHAIKAI
 EPICENTER : 33 50.5'N 132 25.9'E
 DEPTH : 55.6KM MAGNITUDE : 3.7

JMA INTENSITIES
 I : MATSUYAMA

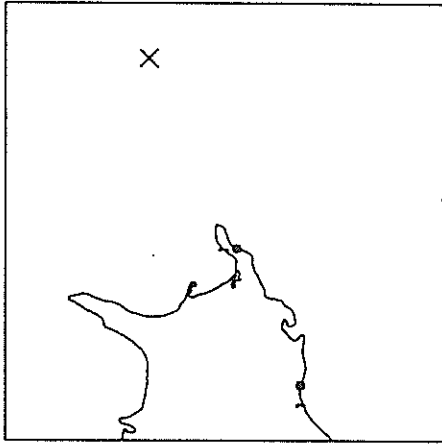


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (GAL)	DIST. (KM)
1 MATSUYAMA-G	ON GROUND	F-860	11 13 5		26

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:59 MAY 25, 1995
 E OFF HOKKAIDO
 EPICENTER : 43 38.5'N 147 16.9'E
 DEPTH : 30.0KM MAGNITUDE : 5.7

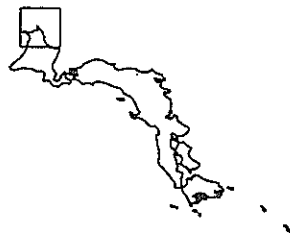
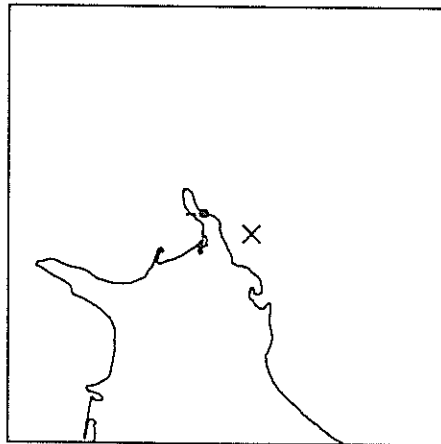
JMA INTENSITIES
 III : KUSHIRO
 II : URAKAWA, NEMURO
 I : TOMAKOMAI, OBIHIRO, HIROO, HACHINOHE, MORIOKA, MUTSU



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (GAL)	DIST. (KM)
1 HAKASAKI-F	ON GROUND	F-1199	8 6 4		142
2 KUSHIRO-G	ON GROUND	F-909	7 10 3		247
2 KUSHIRO-GB	IN GROUND	F-908	3 4 1		247

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

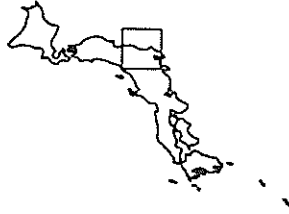
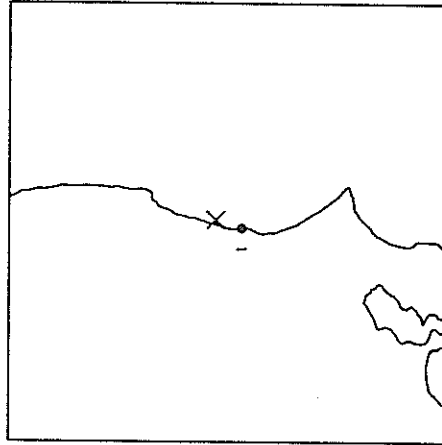
23:04 MAY 27, 1995
 OFF NEMURO PENINSULA
 EPICENTER : 43 0.3 'N 145 22.0 'E
 DEPTH : 45.6KM MAGNITUDE : 3.8



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F-1200	7 14 3	35

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

22:33 MAY 29, 1995
 NORTHERN IBARAKI PREF
 EPICENTER : 36 32.5 'N 140 41.9 'E
 DEPTH : 52.2KM MAGNITUDE : 3.8

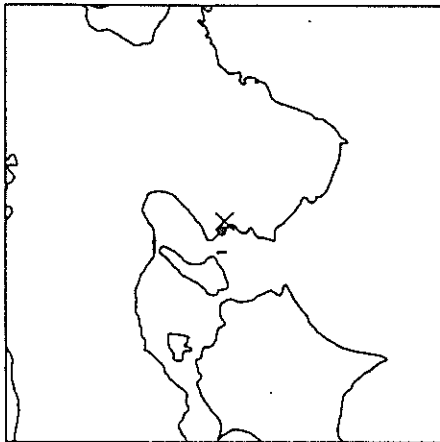


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-955	26 25 13	18

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

17:35 JUNE 6 ,1995
 NW WAKAYAMA PREF
 EPICENTER : 34 11.6'N 135 13.1'E
 DEPTH : 10.1KM MAGNITUDE : 3.1

JMA INTENSITIES
 II : WAKAYAMA

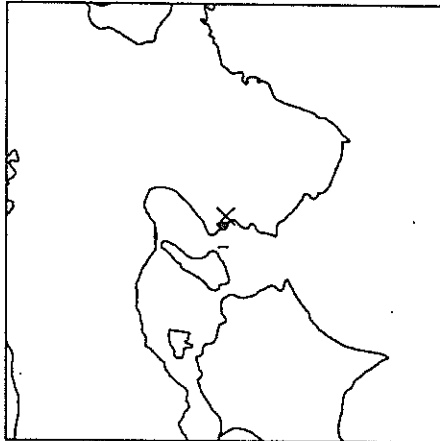


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(OAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-941	6 12 16	6

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

18:08 JUNE 6 ,1995
 NW WAKAYAMA PREF
 EPICENTER : 34 11.7'N 135 13.4'E
 DEPTH : 5.5KM MAGNITUDE : 3.3

JMA INTENSITIES
 III : WAKAYAMA

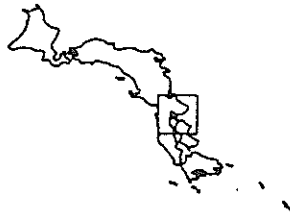


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(OAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-942	9 24 17	7

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

00:52 JUNE 7 ,1995
 HW WAKAYAMA PREF
 EPICENTER : 34 11.6'N 135 12.7'E
 DEPTH : 4.2KM MAGNITUDE : 3.8

JWA INTENSITIES
 IV : WAKAYAMA

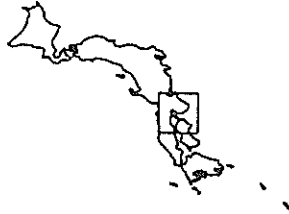
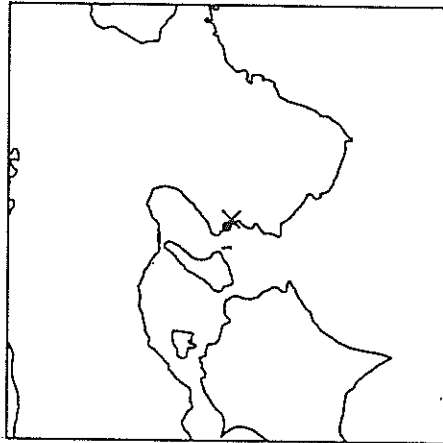


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 943	35 55 83	6

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

02:12 JUNE 7 ,1995
 HW WAKAYAMA PREF
 EPICENTER : 34 11.1'N 135 12.0'E
 DEPTH : 9.8KM MAGNITUDE : 3.6

JWA INTENSITIES
 III : WAKAYAMA

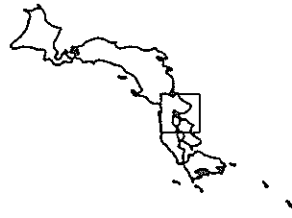


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 944	43 49 98	5

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

02:19 JUNE 7, 1995
 NW WAKAYAMA PREF
 EPICENTER : 34 11.6°N 135 12.7°E
 DEPTH : 9.0KM MAGNITUDE : 2.9

JMA INTENSITIES
 II : WAKAYAMA

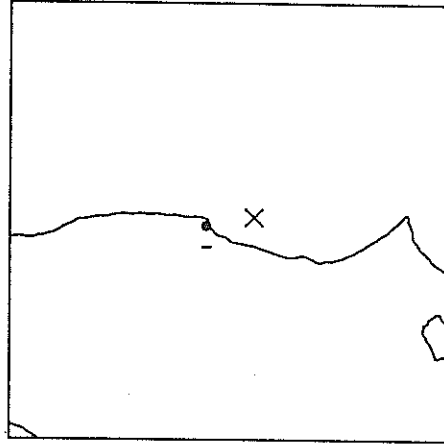


STATION	CONDITION	RECORD NUMBER	MAX-ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 945	10 9 15	6

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:41 JUNE 11, 1995
 E OFF IBARAKI PREF
 EPICENTER : 36 38.6°N 140 56.3°E
 DEPTH : 47.6KM MAGNITUDE : 4.0

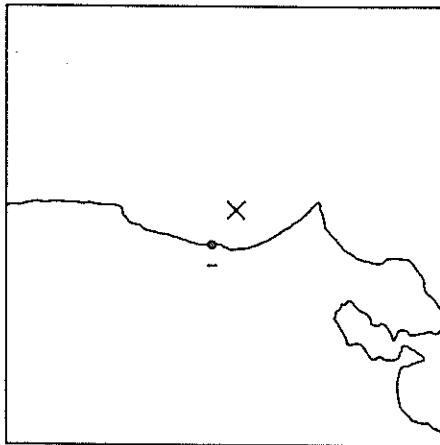
JMA INTENSITIES
 II : ONAHAMA, MITO
 I : SHIRAKAWA



STATION	CONDITION	RECORD NUMBER	MAX-ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 ONAHAMA-JJ-G	ON GROUND	F- 915	19 24 12	33
1 ONAHAMA-JJ-GB	IN GROUND	F- 914	7 6 3	33

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

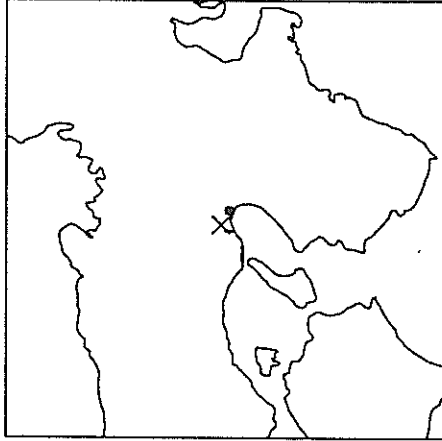
20:24 JUNE 14, 1995
 E OFF IBARAKI PREF
 III : MITO
 EPICENTER : 36 13.2'N 140-51.7'E
 DEPTH : 39.1KM MAGNITUDE : 3.8



STATION	CONDITION	RECORD NUMBER	MAX-ACC. (GAL)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-956	37 31 8	28

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

07:55 JUNE 16, 1995
 SE HYOGO PREF
 EPICENTER : 34 45.8'N 135 17.6'E
 DEPTH : 12.5KM MAGNITUDE : 3.8



STATION	CONDITION	RECORD NUMBER	MAX-ACC. (GAL)	DIST. (KM)
1 AWAGASAKI-G	ON GROUND	F-932	13 30 18	11

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:31 JUNE 17, 1995
 HYUGANADA REGION
 EPICENTER : 32 12.3'N 131 37.5'E
 DEPTH : 49.2KM MAGNITUDE : 4.2

JMA INTENSITIES
 II : MIYAZAKI
 I : KUMAMOTO, HITOYOSHI, OITA,
 NOBEOKA, MIYAKOROJO

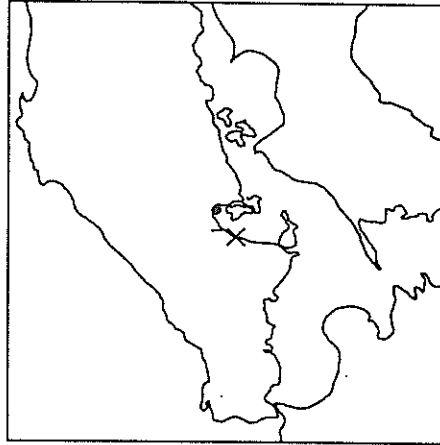


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MIYAZAKI-G	ON GROUND	F-901	13 7 4	37
1 MIYAZAKI-GB	IN GROUND	F-900	4 3 3	37

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

03:15 JUNE 19, 1995
 AKINADA SETOHAIKAI
 EPICENTER : 34 13.7'N 132 15.7'E
 DEPTH : 12.4KM MAGNITUDE : 3.8

JMA INTENSITIES
 II : HIROSHIMA



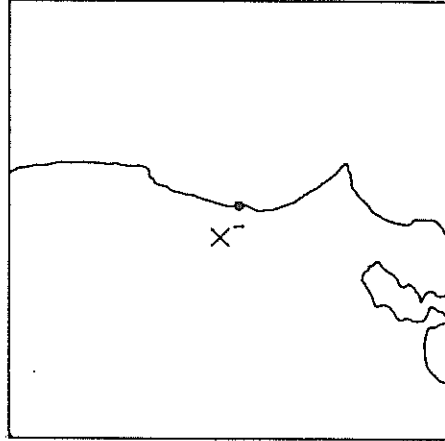
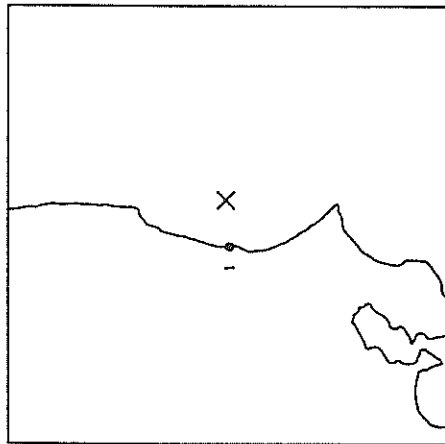
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HIROSHIMA-G	ON GROUND	F-867	19 12 5	23

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

16:54 JUNE 20, 1995
 E OFF IBARAKI PREF
 EPICENTER : 36 23.1' N 140 58.3' E
 DEPTH : 38.2KM MAGNITUDE : 4.3

03:03 JUNE 23, 1995
 NORTHERN IBARAKI PREF
 EPICENTER : 36 30.9' N 140 22.9' E
 DEPTH : 107.2KM MAGNITUDE : 4.3

JMA INTENSITIES
 I : FUKUSHIMA, SHIRAKAWA,
 ONAHAWA, MITO, NIKKO,
 UTSUNOMIYA
 II : ONAHAWA, MITO
 I : SHIRAKAWA, NIKKO



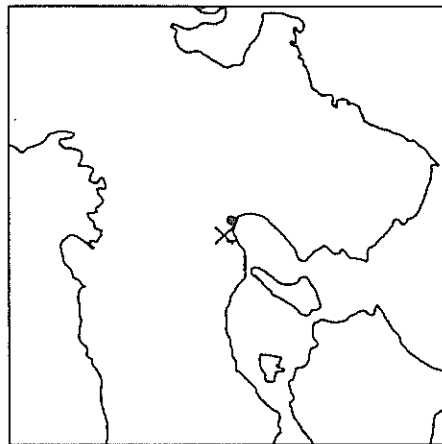
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1	HITACHINAKA-F ON GROUND	F-957	19 22 47	31

STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1	HITACHINAKA-F ON GROUND	P-958	28 29 13	25

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

22:19 JUNE 23, 1995
 SE HYOGO PREF
 EPICENTER : 34 45.5'N 135 17.4'E
 DEPTH : 13.2KM MAGNITUDE : 3.7

JMA INTENSITIES
 I : KOBE

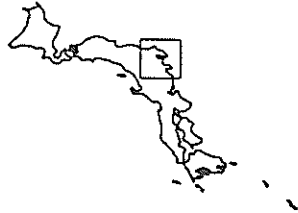
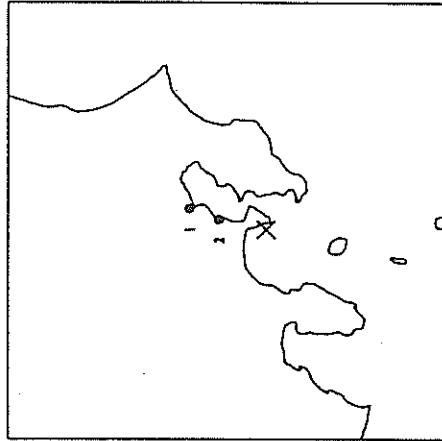


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 AWAGASAKI-G	ON GROUND	F-933	8 12 12	11

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

08:53 JULY 3, 1995
 SAGAMI BAY REGION
 EPICENTER : 35 9.8 'N 139 34.1'E
 DEPTH : 122.1KM MAGNITUDE : 5.2

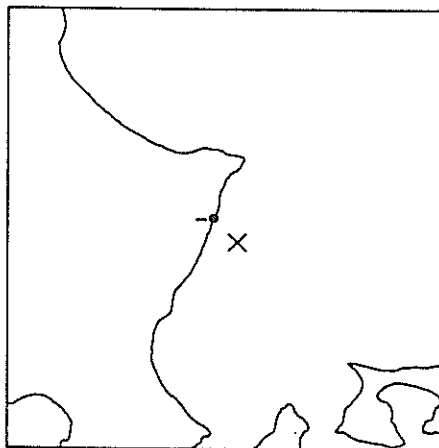
JMA INTENSITIES
 IV : TATEYAMA, YOKOHAMA, AJIRO
 III : CHIBA, KATSURU, TOKYO, KOFU, NISHINA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 SHINAGAWA-G	ON GROUND	F-1046	54 44 22	53
1 SHINAGAWA-GB	IN GROUND	F-1045	17 10 6	53
2 YAMASHITA-FR	ON STRUC.	F-879	71 141 23	32
2 YAMASHITA-F	ON GROUND	F-878	40 62 21	32
2 YAMASHITA-FB	IN GROUND	F-877	9 12 5	32

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

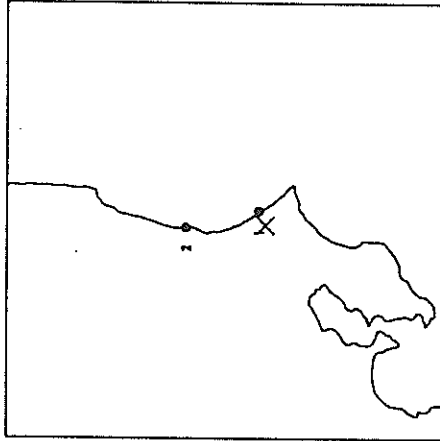
18:32 JULY 7, 1995
 S OFF URAKAWA
 EPICENTER : 42 2.1 'N 142 33.2 'E
 DEPTH : 63.2KM MAGNITUDE :



STATION	CONDITION	RECORD NUMBER	MAX-ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2638	2 3 1	23

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

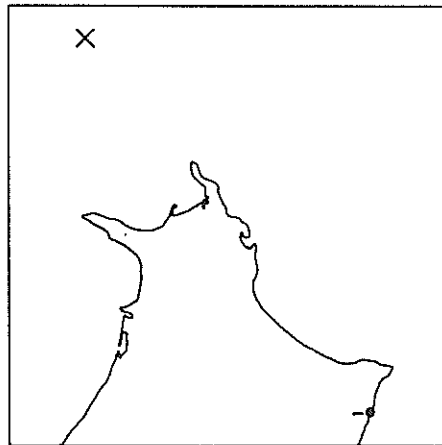
03:24 JULY 30, 1995
 JMA INTENSITIES
 SOUTHERN IBARAKI PREF
 EPICENTER : 35 54.0 'N 140 35.3 'E
 DEPTH : 42.6KM MAGNITUDE : 5.1
 III : MITO, CHOSHI, CHIBA
 II : ONAHANA, UTSUNOMIYA,
 NIKKO, TATEYAMA, TOKYO,
 KATSUURA, YOKOHAMA



STATION	CONDITION	RECORD NUMBER	MAX-ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 KASHIMA-ZOKAN-S	ON GROUND	S-2639	91 38 13	10
2 HITACHINAKA-F	ON GROUND	F-959	36 27 14	54

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

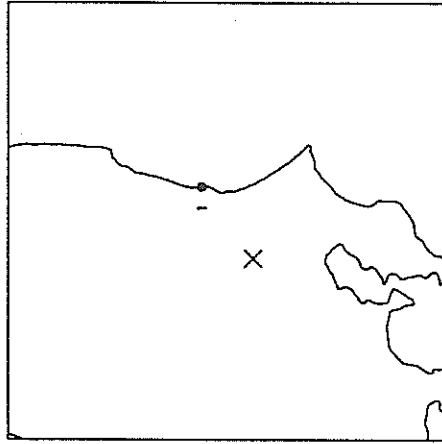
20:59 AUG. 6, 1995
 E OFF HOKKAIDO
 EPICENTER : 44 6.0 'N 147 23.6 'E
 DEPTH : 77.0KM MAGNITUDE : 5.6



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2640	1 1 1	432

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

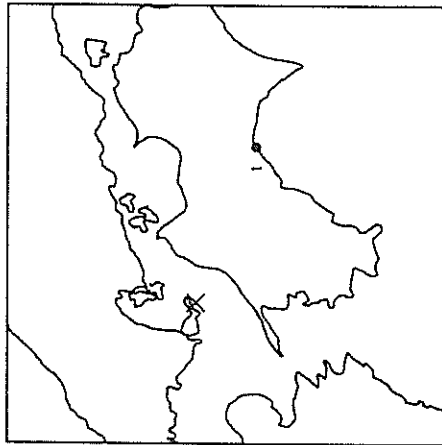
14:32 AUG. 27, 1995
 SW IBARAKI PREF
 EPICENTER : 36 6.2 'N 140 2.7 'E
 DEPTH : 69.4KM MAGNITUDE : 4.5



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-960	14 18 6	60

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

02:42 SEP. 2 .1995
 AKIHADA SETONAIKAI
 EPICENTER : 33 52.6'N 132 25.6'E
 DEPTH : 55.8KM MAGNITUDE : 3.9

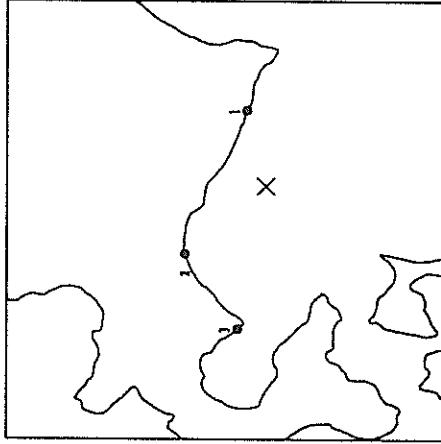


STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 KOCHI-G	ON GROUND	F-926	5 12 3	113

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

09:42 SEP. 4 .1995
 S OFF URAKAWA
 EPICENTER : 42 5.8 'N 142 7.6 'E
 DEPTH : 76.0KM MAGNITUDE : 4.3

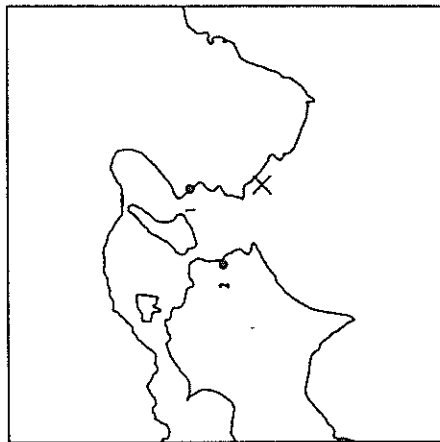
JMA INTENSITIES
 II : TOMAKONAI,URAKAWA
 I : OTARU,IWAMIZAWA,MURORAN,
 OBIHIRO,HIROO



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2641	1 1 1	54
2 TOMAKONAI-G	ON GROUND	F-902	13 14 3	72
3 MURORAN-G	ON GROUND	P-1022	10 9 4	100

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

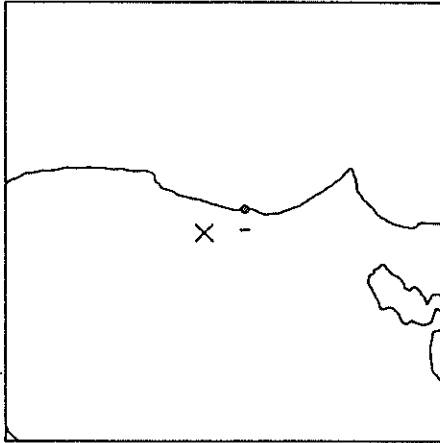
00:39 SEP. 9, 1995 JMA INTENSITIES
 S PART OF KII CHANNEL III : KOBE, WAKAYAMA, TOKUSHIMA
 EPICENTER : 33 46.0'N 135 9.9 'E II : SUMOTO, TAKAHATSU,
 DEPTH : 54.3KM MAGNITUDE : 4.6 TADOTSU



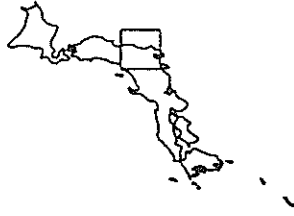
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 946	11 25 7	49
2 KOWATSUJIMA-C	ON GROUND	F- 897	15 32 14	60

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

08:17 SEP. 12, 1995 JMA INTENSITIES
 NORTHERN IBARAKI PREF II : MITO
 EPICENTER : 36 38.8'N 140 27.4 'E I : ONAHAMA, NIKKO
 DEPTH : 69.6KM MAGNITUDE : 3.2



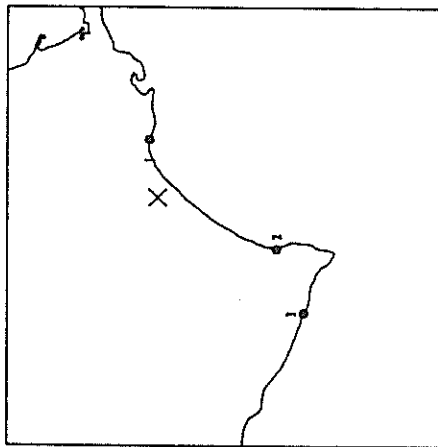
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F- 961	19 21 9	32



STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

08:52 SEP. 16, 1995
 KUSHIRO REGION
 EPICENTER : 42 59.5'N 143 51.4'E
 DEPTH : 112.4KM MAGNITUDE : 5.2

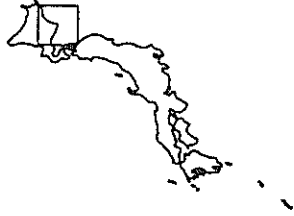
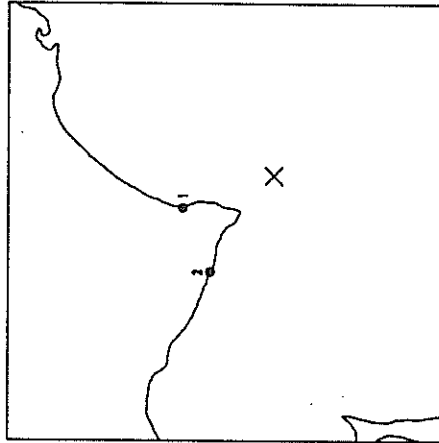
JMA INTENSITIES
 III : OBIHIRO, HIROO, KUSHIRO
 II : TOMAKOMAI, URAKAWA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 KUSHIRO-G	ON GROUND	F-911	29 24 6	40
1 KUSHIRO-GB	IN GROUND	F-910	12 8 2	40
2 TOKACHI-M	ON GROUND	M-1563	17 24 8	89
3 URAKAWA-S	ON GROUND	S-2642	3 3 1	127

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

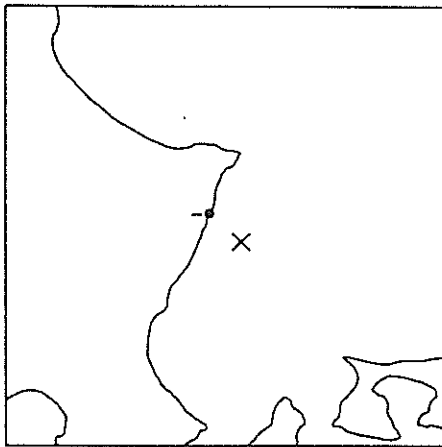
16:14 SEP. 26, 1995
 SE OFF ERIMOMISAKI
 EPICENTER : 41 42.3'N 143 30.3'E
 DEPTH : 39.4KM MAGNITUDE : 5.8



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 TOKACHI-M	ON GROUND	M-1584	49 48 12	66
2 URAKAWA-S	ON GROUND	S-2643	6 9 3	78

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

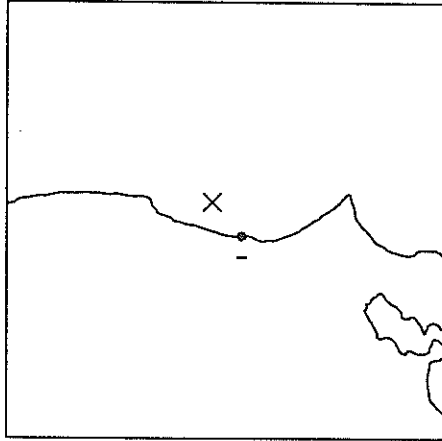
08:43 SEP. 27, 1995
 S OFF URAKAWA
 EPICENTER : 41 59.3'N 142 30.6'E
 DEPTH : 59.8KM MAGNITUDE : 4.4



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2644	5 4 2	29

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

07:27 OCT. 1, 1995
 E OFF IBARAKI PREF
 EPICENTER : 36 32.9'N 140 53.4'E
 DEPTH : 49.3KM MAGNITUDE : 4.1

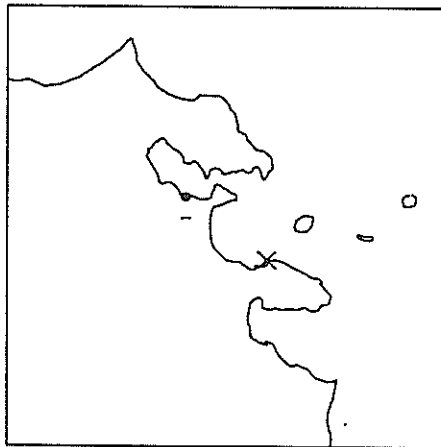


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-962	20 32 15	30

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

11:42 OCT. 1 .1995
 E OFF IZU PENINSULA
 EPICENTER : 34 58.3'N 139 9.2 'E
 DEPTH : 4.8KM MAGNITUDE : 4.5

JMA INTENSITIES
 IV : AJIRO, OSHIMA
 III : OSHIMA, MESHIMA
 II : TATEYAMA, YOKOHAMA,
 IROZAKI

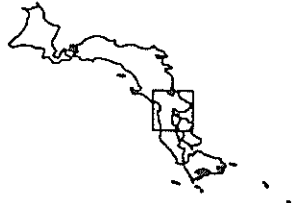
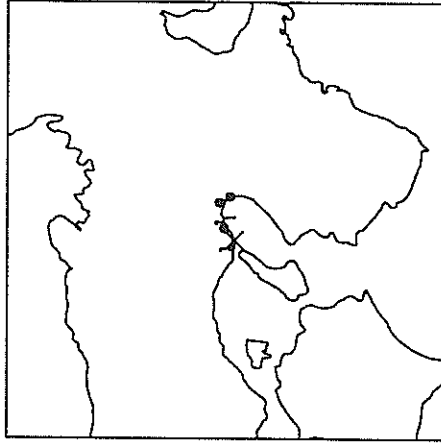


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 YAMASHITA-FR	ON STRUC.	F- 980	9 5 1	70
1 YAMASHITA-F	ON GROUND	F- 979	7 6 2	70
1 YAMASHITA-FB	IN GROUND	F- 978	2 2 1	70

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

02:04 OCT. 14.1995
 OSAKA BAY REGION
 EPICENTER : 34 37.6'N 135 6.9 'E
 DEPTH : 15.3KM MAGNITUDE : 4.5

JMA INTENSITIES
 IV : KOBE
 II : TSU, HIKOHE, OSAKA,
 TOYOOKA, SUMOTO, NARA,
 WAKAYAMA, HIMEJI, TOTTORI,
 OKAYAMA, TOKUSHIMA



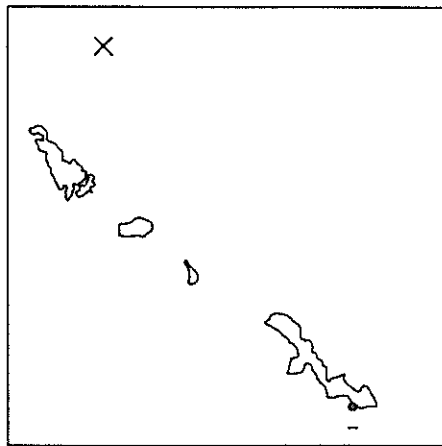
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 OSAKA-JI-G	ON GROUND	P-1041	28 12 19	30
1 OSAKA-MINAMI-G	ON GROUND	F-1040	37 23 20	30
2 AWAGASAKI-G	ON GROUND	P- 934	14 11 11	28
3 KOBE-JI-S	ON GROUND	S-2645	33 25 7	10

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:37 OCT. 18, 1995
 NEAR AWAMI-OSHIMA ISLAND
 EPICENTER : 28 1.8 'N 130 23.0 'E
 DEPTH : 38.5KM MAGNITUDE : 6.6

JMA INTENSITIES

IV : NAZE
 II : MIYAZAKI, MIYAKONOJO,
 KAGOSHIMA, KUNEJIMA



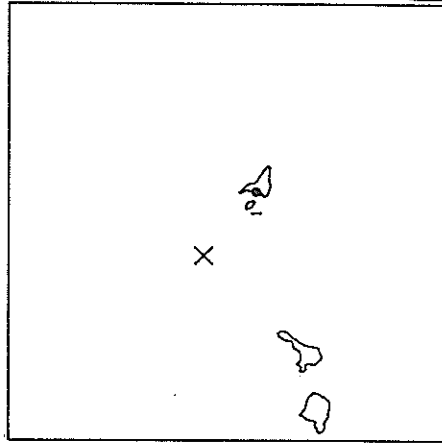
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MAHA-G	ON GROUND	F- 899	5 4 2	333
1 MAHA-GB	IN GROUND	F- 898	3 3 2	333

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

15:37 NOV. 11, 1995
 NEAR MIYAKOJIMA ISLAND
 EPICENTER : 25 5.9 'N 124 49.7 'E
 DEPTH : 77.0KM MAGNITUDE : 4.6

JMA INTENSITIES

III : MIYAKOJIMA
 II : IRIOMOTEJIMA
 I : ISHIGAKIJIMA

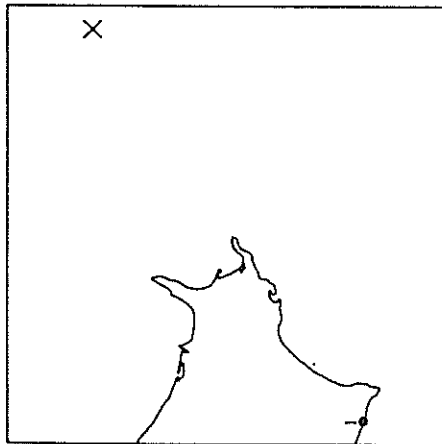


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HIRARA-G	ON GROUND	F- 924	18 22 20	56

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

02:24 NOV. 25, 1995
 SE OFF ETOROFU
 EPICENTER : 44 33.9'N 149 21.8'E
 DEPTH : 59.0KM MAGNITUDE : 6.5

JMA INTENSITIES
 III : URAKAWA
 II : KUSHIRO
 I : KUTCHAN, TOMAKOMAI,
 OBIHIRO, HIROO, NEWURO,
 AOMORI, MUTSU, MORIOKA

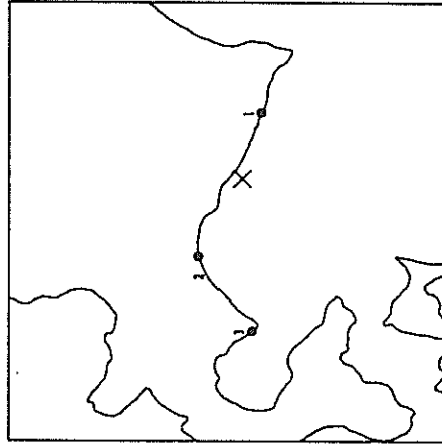


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (GAL)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2646	3 1 1	1 1 1	595

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

04:36 NOV. 26, 1995
 S OFF URAKAWA
 EPICENTER : 42 19.4'N 142 14.3'E
 DEPTH : 103.8KM MAGNITUDE : 4.2

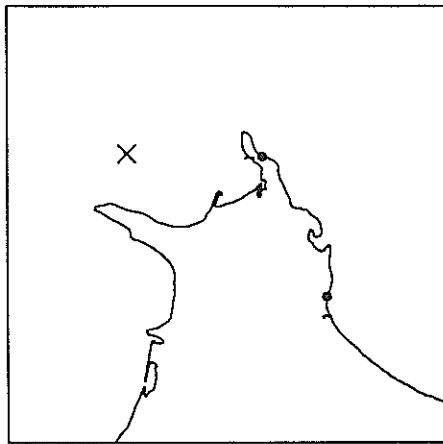
JMA INTENSITIES
 III : URAKAWA
 II : TOMAKOMAI
 I : SAPPORO, OTARU, IWAMIZAWA,
 OBIHIRO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (EW) (UD)	MAX. ACC. (GAL)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2647	8 6 4	4 4 4	47
2 TOMAKOMAI-G	ON GROUND	F-903	23 12 5	5 5 5	61
3 MURORAN-G	ON GROUND	P-1023	8 10 4	4 4 4	105

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

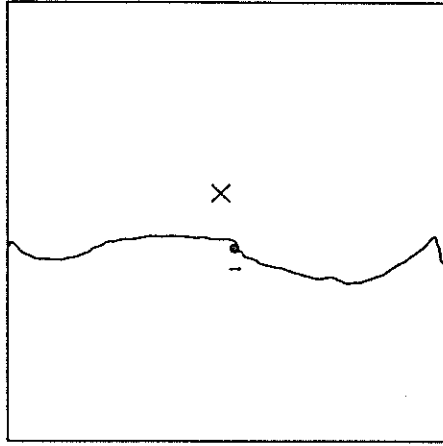
00:09 DEC. 1, 1995 JVA INTENSITIES
 NEAR KUNASHIRI ISLAND
 III : KUSHIRO
 II : TOMAKOMAI, URAKAWA,
 NEMURO
 EPICENTER : 44 6.2 'N 145 46.3 'E
 DEPTH : 151.4KM MAGNITUDE : 6.0



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HAKASAKI-F	ON GROUND	F-1204	10 11 6	92
2 KUSHIRO-G	ON GROUND	F-913	11 12 4	167
2 KUSHIRO-GB	IN GROUND	F-912	3 4 2	167

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:46 DEC. 1, 1995 JVA INTENSITIES
 E OFF FUKUSHIMA PREF
 III : SHIRAKAWA
 II : FUKUSHIMA, ONAHAMA, NIKKO
 EPICENTER : 36 59.7 'N 141 20.4 'E
 DEPTH : 77.9KM MAGNITUDE : 4.7

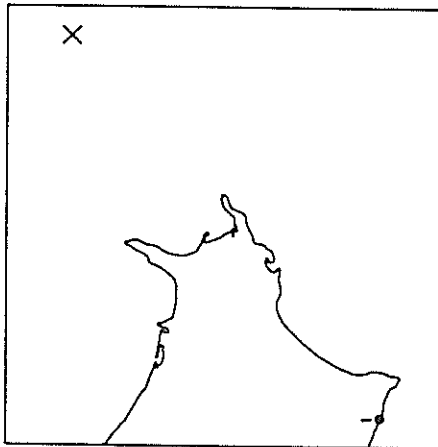


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 ONAHAMA-JI-G	ON GROUND	F-917	23 13 13	39
1 ONAHAMA-JI-GB	IN GROUND	F-916	5 4 8	39

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

03:01 DEC. 4, 1995
 SE OFF ETOROFU
 EPICENTER : 44 33.4'N 150 8.1' E
 DEPTH : 57.0KM MAGNITUDE : 7.2

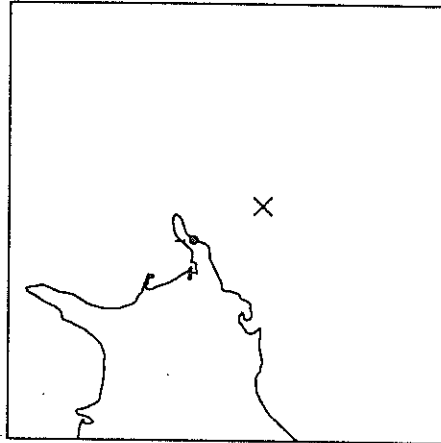
JMA INTENSITIES
 II : URAKAWA, KUSHIRO, MUTSU



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2648	4 3 1	651

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

18:08 DEC. 20, 1995
 OFF NEMURO PENINSULA
 EPICENTER : 42 49.8'N 145 47.3' E
 DEPTH : 62.6KM MAGNITUDE : 4.8

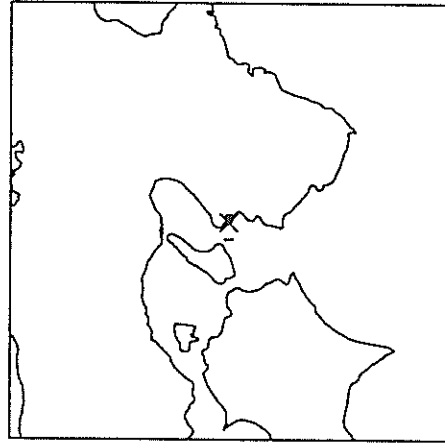


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HANASAKI-F	ON GROUND	P-1205	12 11 6	52

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:41 DEC. 22, 1995
 NW WAKAYAMA PREF
 EPICENTER : 34 12.4'N 135 6.8 'E
 DEPTH : 9.5KM MAGNITUDE : 4.1

04:53 DEC. 23, 1995
 NW WAKAYAMA PREF
 EPICENTER : 34 12.8'N 135 6.9 'E
 DEPTH : 9.6KM MAGNITUDE : 3.0



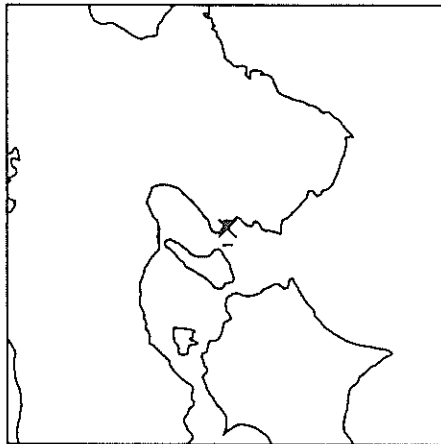
STATION	CONDITION	RECORD NUMBER	MAX-ACC. (GAL)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 948	269 379 265	3

STATION	CONDITION	RECORD NUMBER	MAX-ACC. (GAL)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	P- 949	24 36 22	3

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:36 DEC. 23, 1995
 NW WAKAYAMA PREF
 EPICENTER : 34 12.7'N 135 6.9 'E
 DEPTH : 9.2KM MAGNITUDE : 3.5

JMA INTENSITIES
 II : WAKAYAMA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 950	79 103 73	3

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:47 DEC. 30, 1995
 NW WAKAYAMA PREF
 EPICENTER : 34 12.6'N 135 7.0 'E
 DEPTH : 11.8KM MAGNITUDE : 2.8

JMA INTENSITIES
 I : WAKAYAMA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F- 951	27 41 31	2

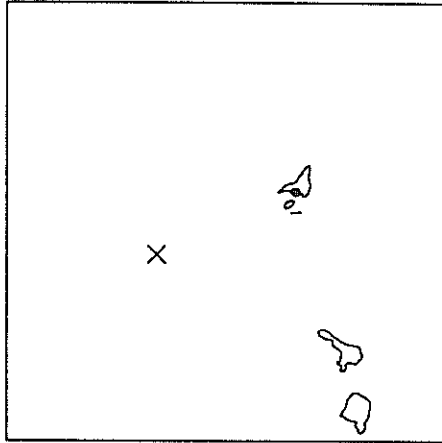
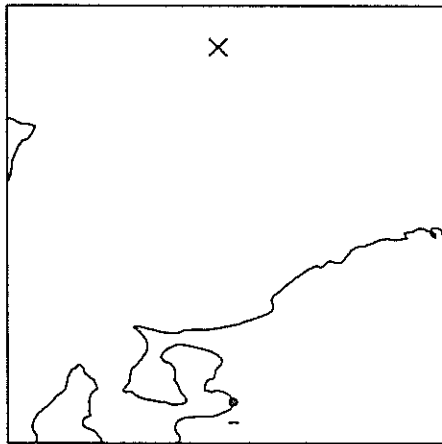
STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:11 DEC. 30,1995
 FAR E OFF SANRIKU
 EPICENTER : 40 41.9'N 143 45.4'E
 DEPTH : 0.0KM MAGNITUDE : 6.4

21:23 DEC. 30,1995
 NW OFF MIYAKOJIMA ISLAND
 EPICENTER : 25 37.5'N 124 46.9'E
 DEPTH : 8.0KM MAGNITUDE : 5.8

JMA INTENSITIES
 II : MIYAKOJIMA

JMA INTENSITIES
 II : HAKODATE,TOMAKOMAI,
 URAKAWA,AOMORI,
 HACHINOHE,MUTSU,MORIOKA



STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (HS) (EW) (UD)	DIST. (KM)
1 AOMORI-G	ON GROUND	F- 921	6 6 3	253

STATION	CONDITION	RECORD NUMBER	MAX.ACC.(GAL) (HS) (EW) (UD)	DIST. (KM)
1 HIRARA-G	ON GROUND	F- 925	8 8 4	104

Results of Preliminary Analyses (1995)

RECORD NUMBER : F-732

STATION : MIYAKO-G

EARTHQUAKE DATA

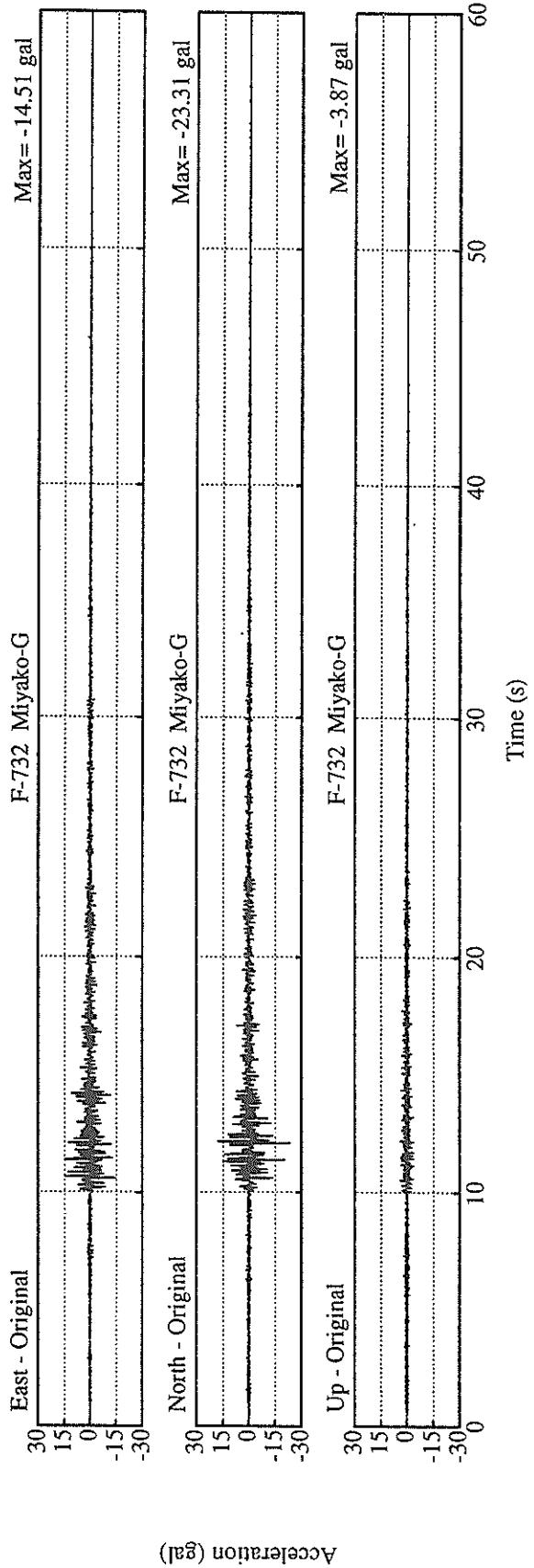
 DATE AND TIME 2:17 JAN. 1, 1995
 LOCATION OF HYPOCENTER NE OFF IWATE PREF
 EPICENTRAL REGION 40° 12.3' N
 LATITUDE 142° 38.0' E
 LONGITUDE 22.8KM
 DEPTH 4.6
 JMA MAGNITUDE

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
23.3	14.5	3.9	25.4

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-719

STATION : WAKAYAMA-G

EARTHQUAKE DATA

DATE AND TIME 13: 9 JAN. 3, 1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION NW WAKAYAMA PREF

LATITUDE 34° 5.6' N

LONGITUDE 135° 11.6' E

DEPTH 12.7KM

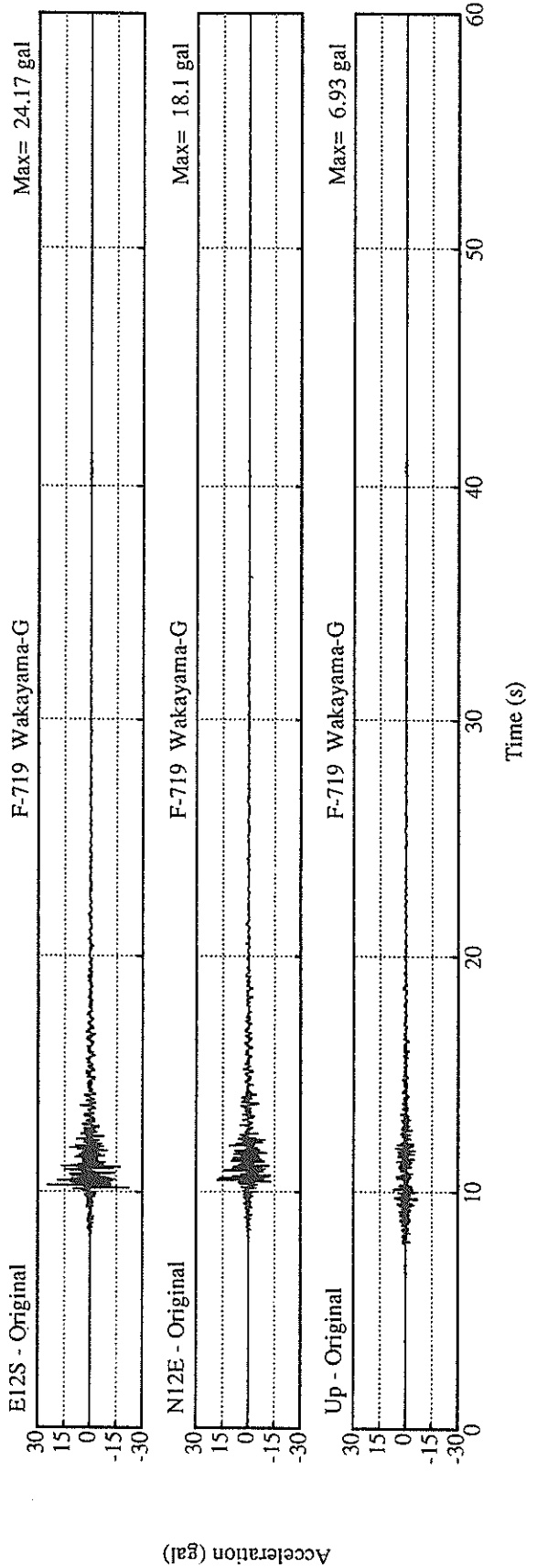
JMA MAGNITUDE 3.8

PEAK VALUES OF COMPONENTS

HORIZONTAL*		VERTICAL	
N S	E W	U D	HORIZONTAL*
18.1	24.2	6.9	24.3

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-721

STATION : MIYAKO-G

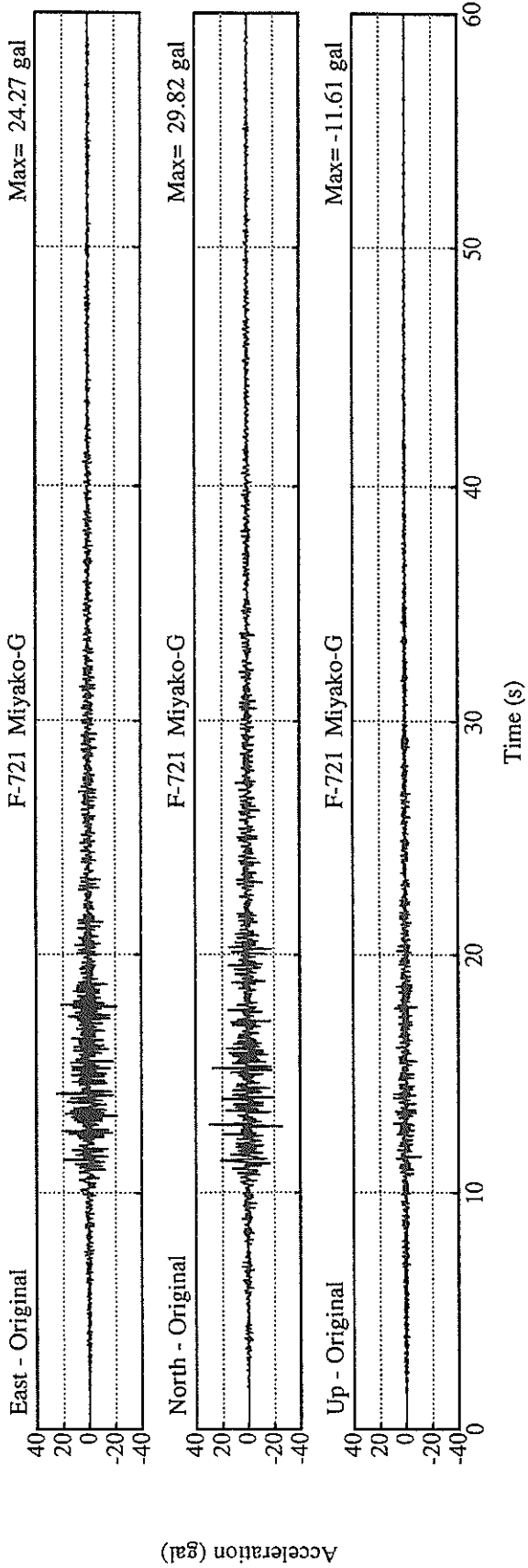
EARTHQUAKE DATA

 DATE AND TIME 11:36 JAN. 7, 1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NE OFF IWATE PREF
 LATITUDE 40° 16.6' N
 LONGITUDE 142° 25.5' E
 DEPTH 38.1KM
 JMA MAGNITUDE 6.2

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	29.8	24.3	11.6	31.7

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : S-2626

STATION : SHINAGAWA-S

EARTHQUAKE DATA

 DATE AND TIME 21:34 JAN. 7, 1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION SW IBARAKI PREF
 LATITUDE 36° 17.9' N
 LONGITUDE 139° 58.8' E
 DEPTH 71.5KM
 JMA MAGNITUDE 5.4

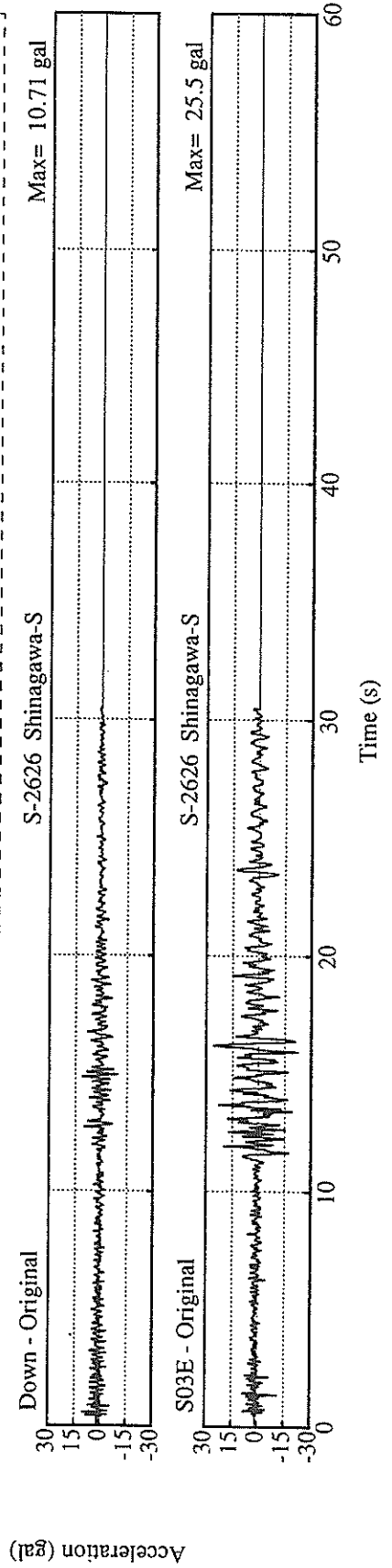
PEAK VALUES OF COMPONENTS

 N S E W U D HORIZONTAL*

 ORIGINAL ACCELERATION (GAL) 25.5 10.7

* RESULTANT OF HORIZONTAL COMPONENTS

E03N component shows abnormal response.



RECORD NUMBER : F-756

STATION : HITACHINAKA-F

EARTHQUAKE DATA

DATE AND TIME : 21:34 JAN. 7, 1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION

LATITUDE

LONGITUDE

DEPTH

JMA MAGNITUDE

SW IBARAKI PREF

36° 17.9' N

139° 58.8' E

71.5KM

5.4

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.604	0.543	0.720	

PARAMETER OF THE VARIABLE FILTER

FC (HZ)

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT

ORIGINAL

CORRECTED

21.9	22.5	6.6	26.4
51.3	67.4	15.5	73.4
51.3	65.4	14.9	74.5

MAXIMUM VELOCITY (CM/SEC)

FIXED FILTER

VARIABLE FILTER

1.10	1.21	0.42	1.28
1.14	1.26	0.44	1.37

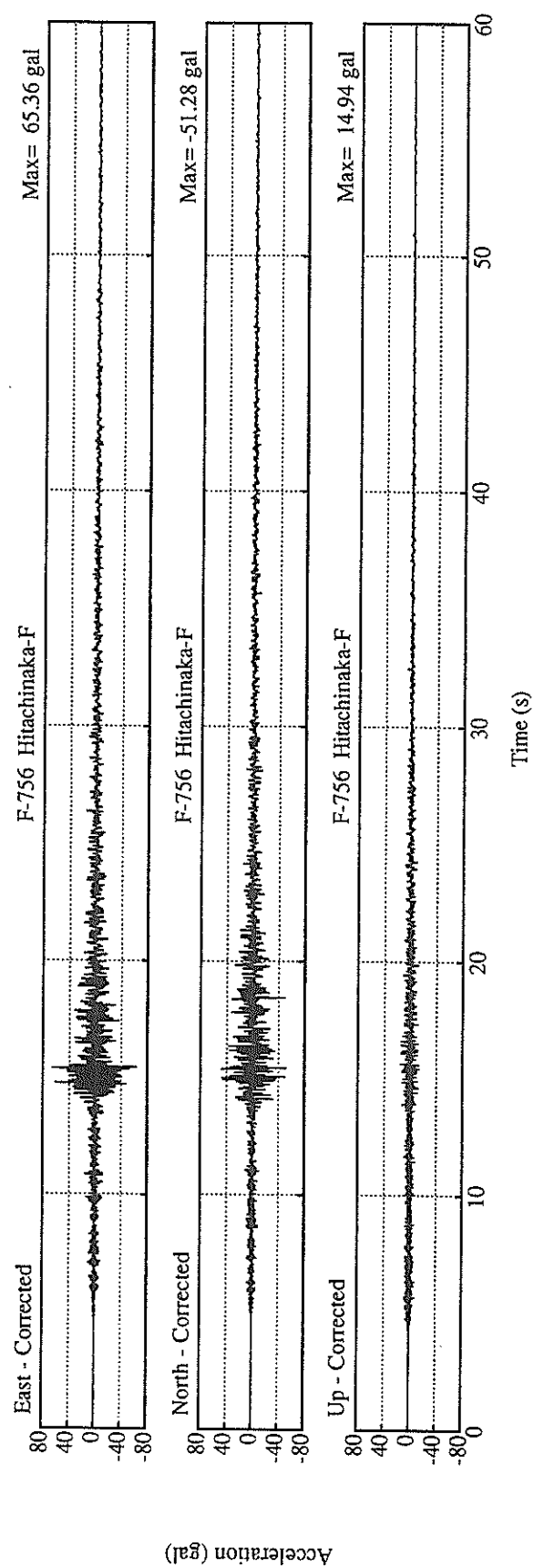
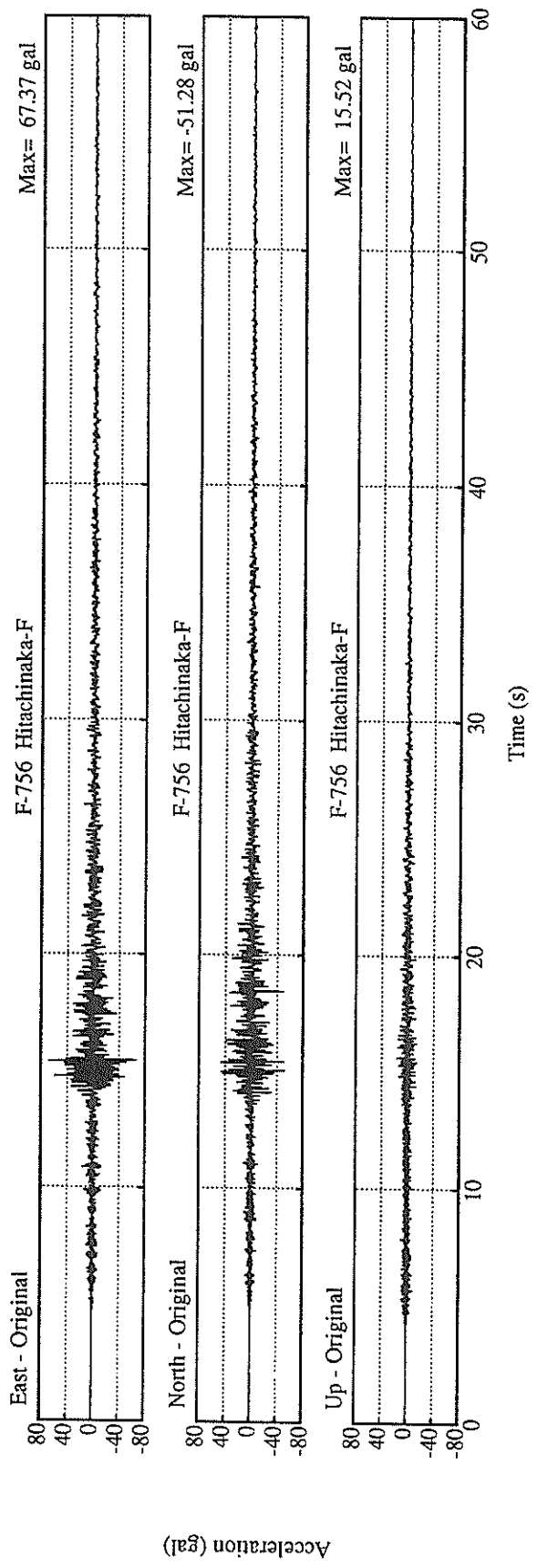
MAXIMUM DISPLACEMENT (CM)

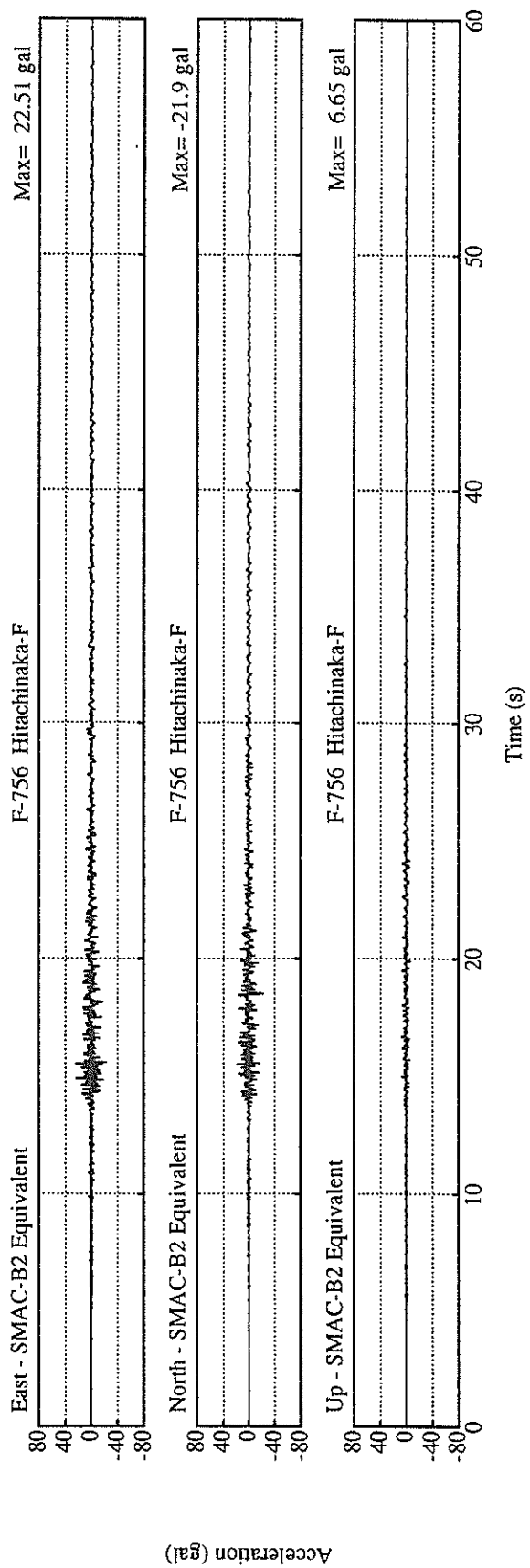
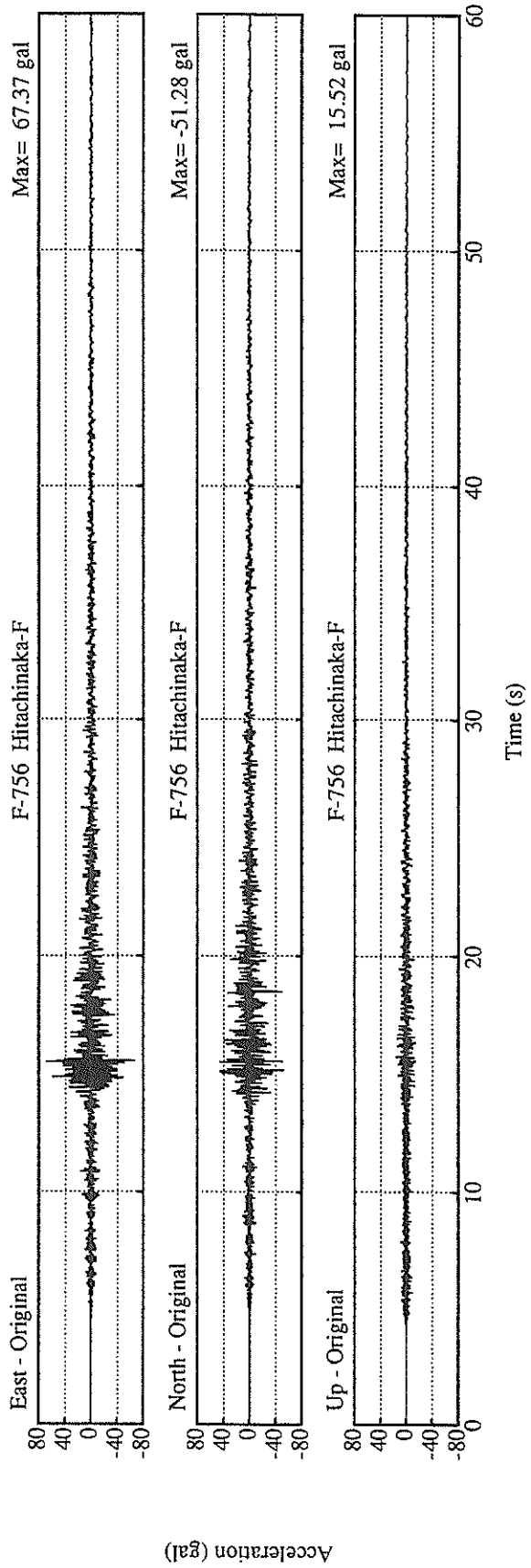
FIXED FILTER

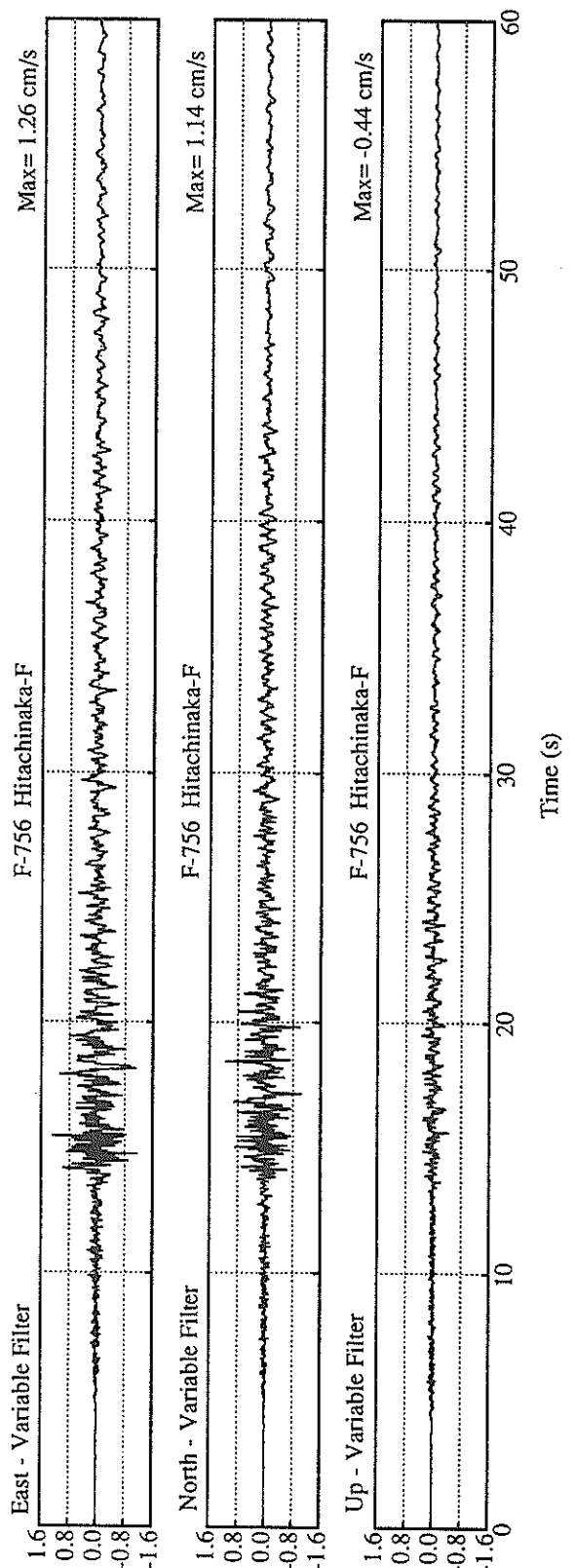
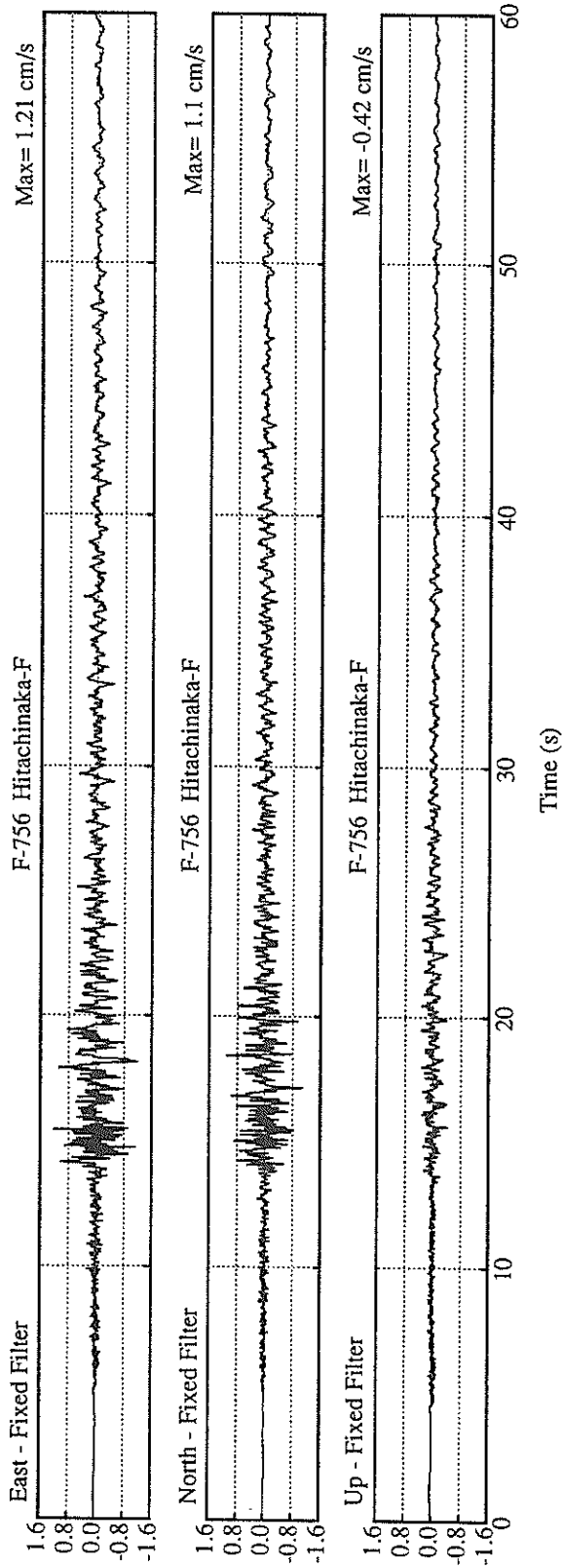
VARIABLE FILTER

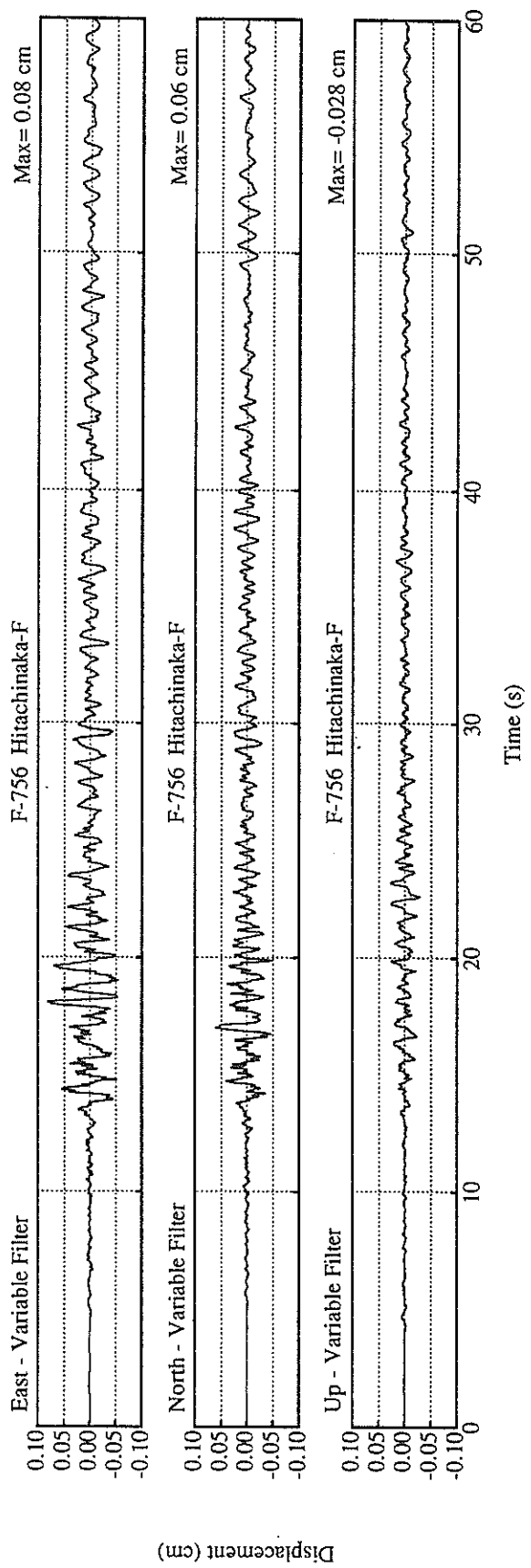
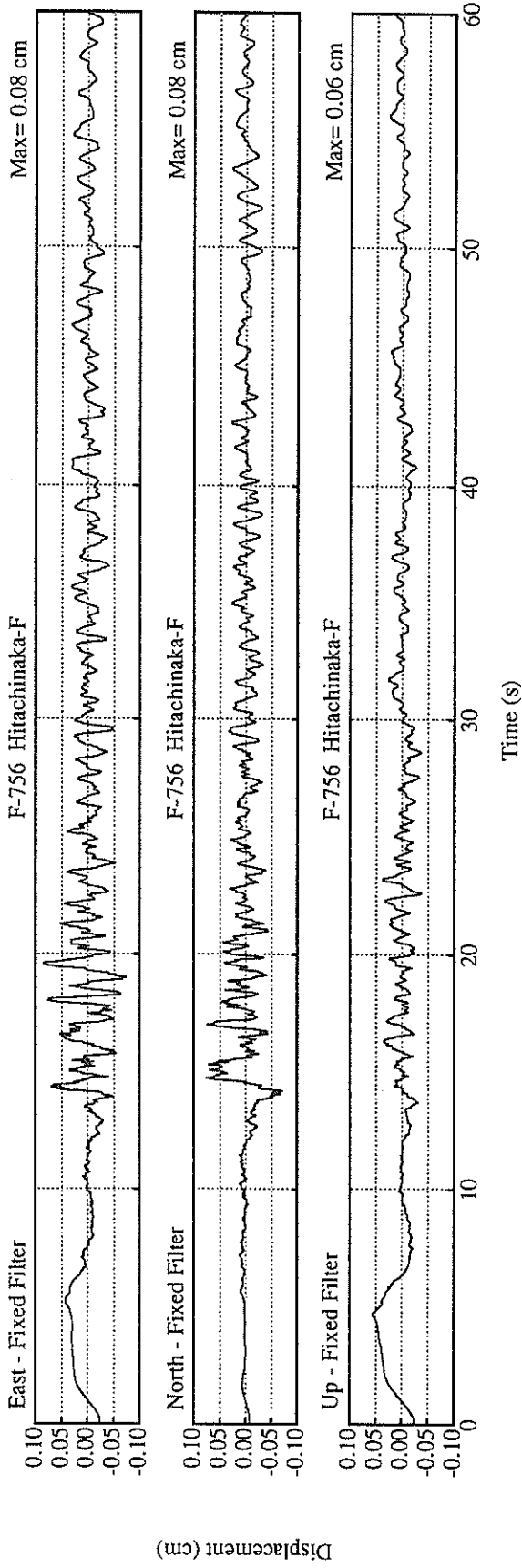
0.08	0.08	0.06	0.09
0.06	0.08	0.03	0.08

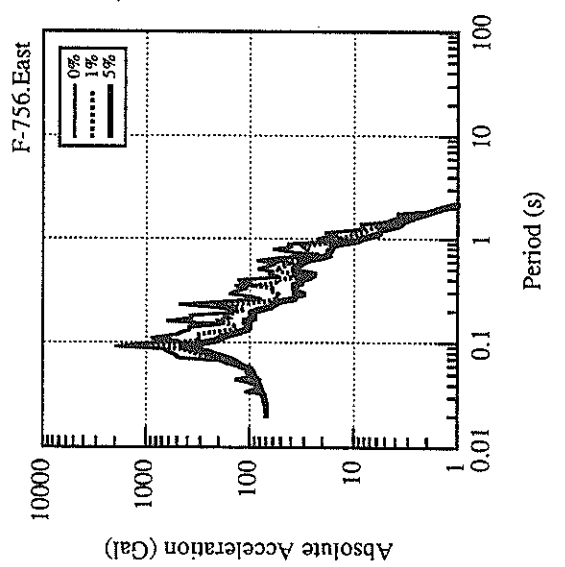
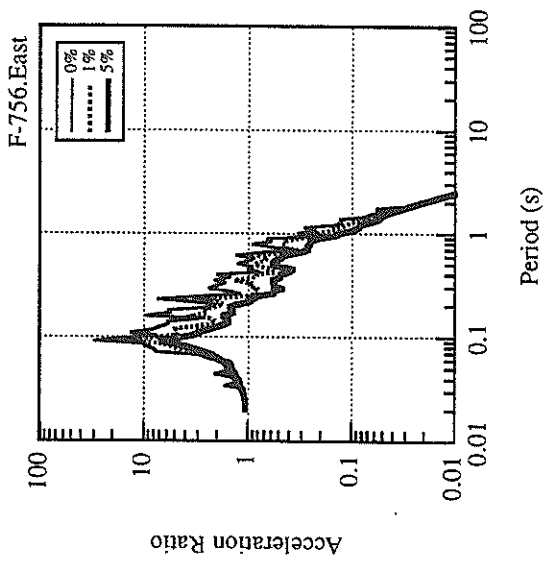
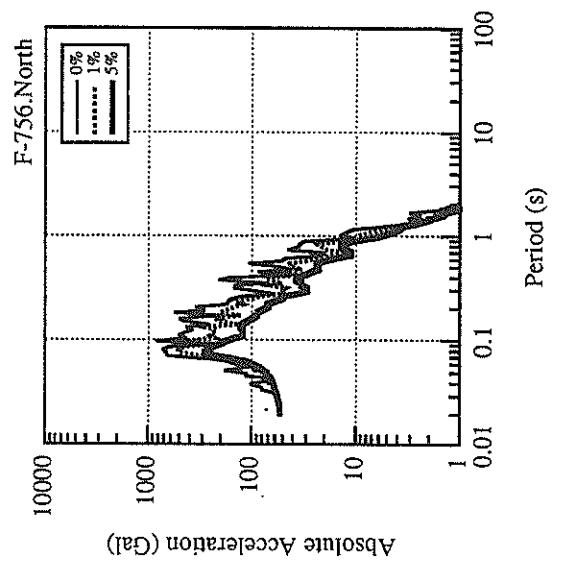
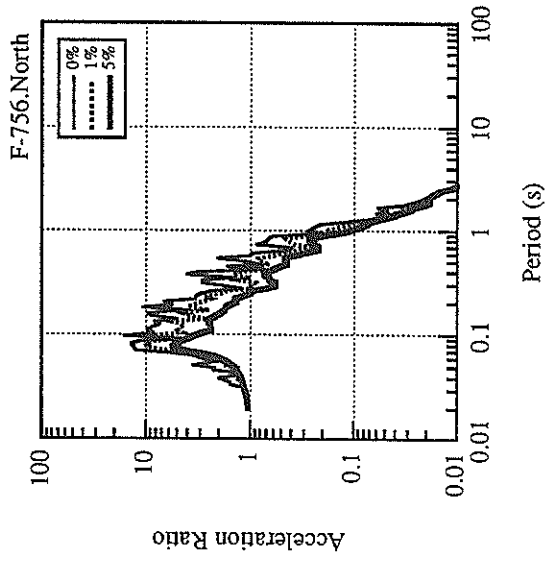
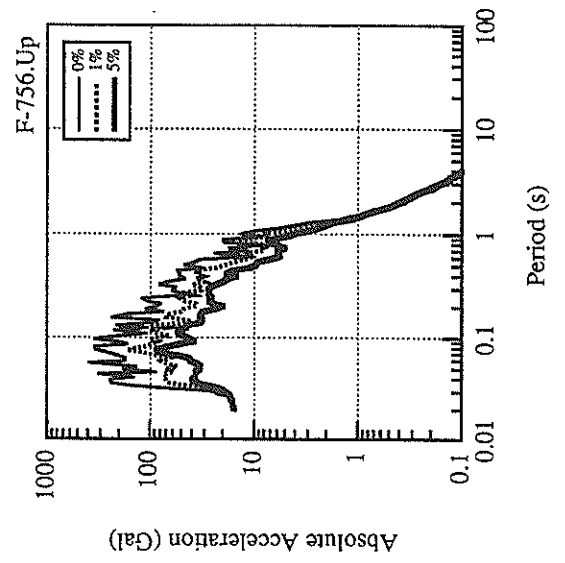
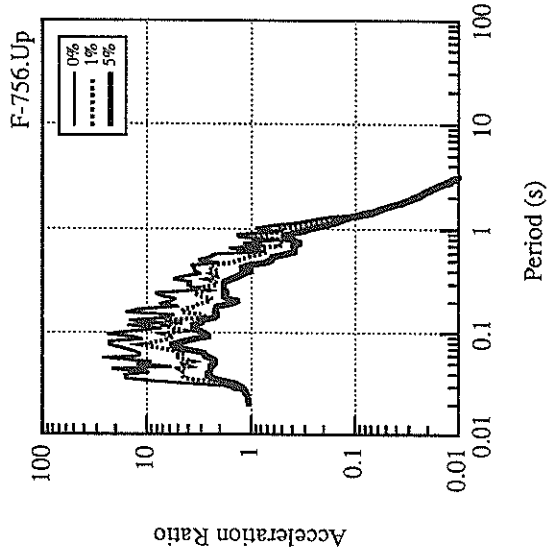
* RESULTANT OF HORIZONTAL COMPONENTS

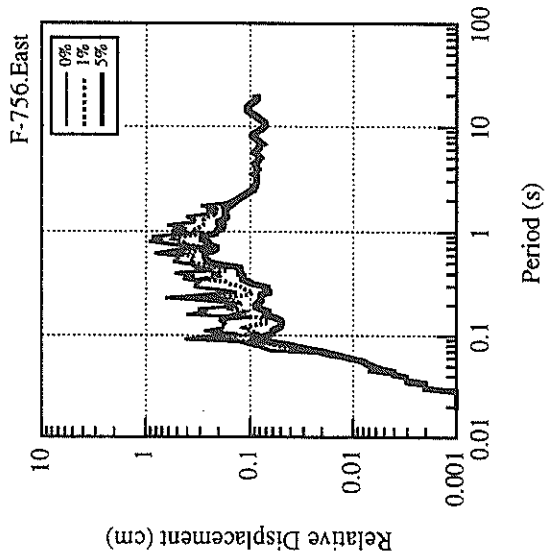
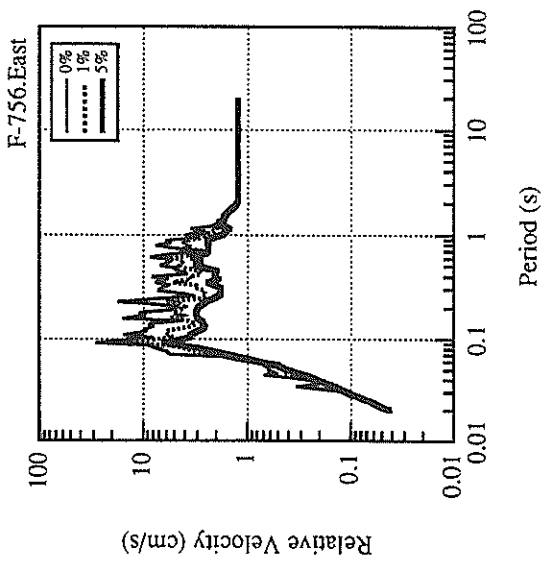
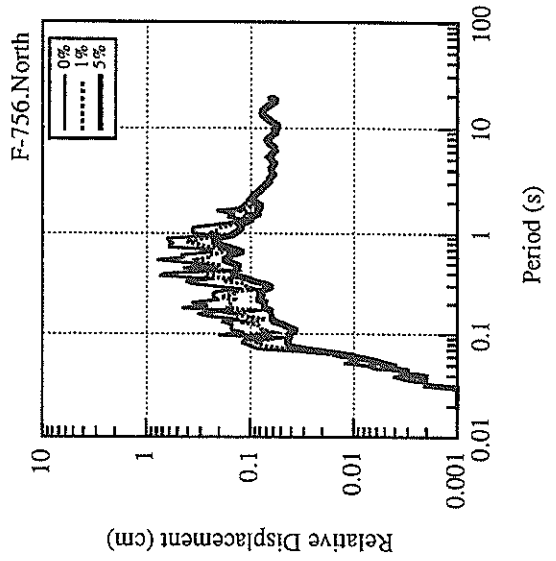
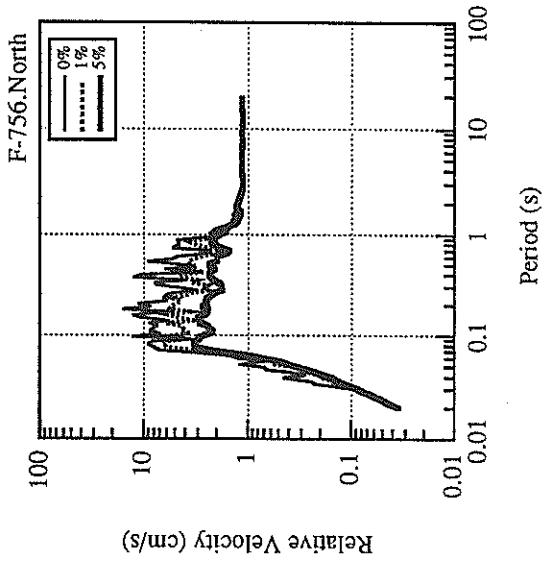
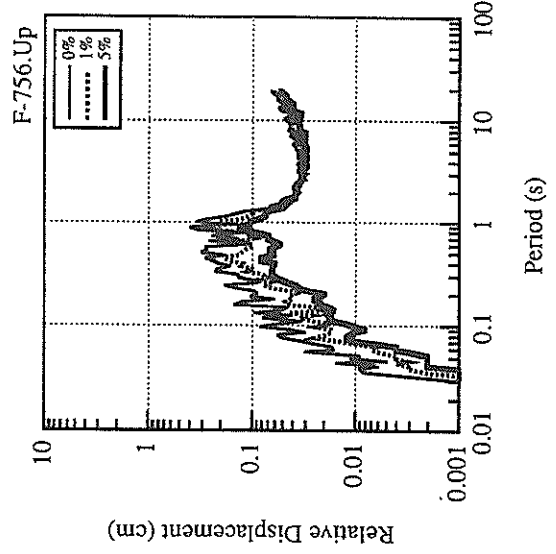
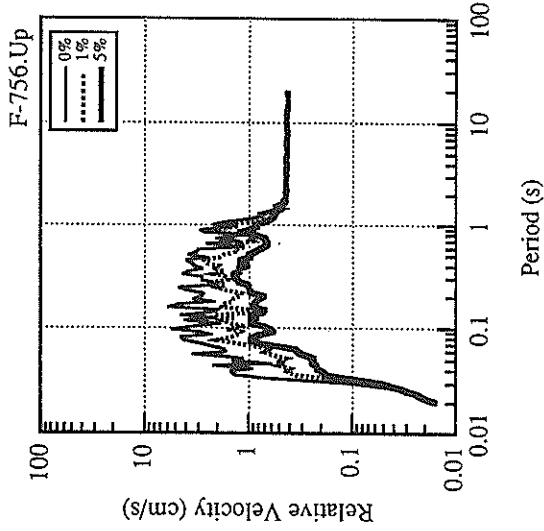


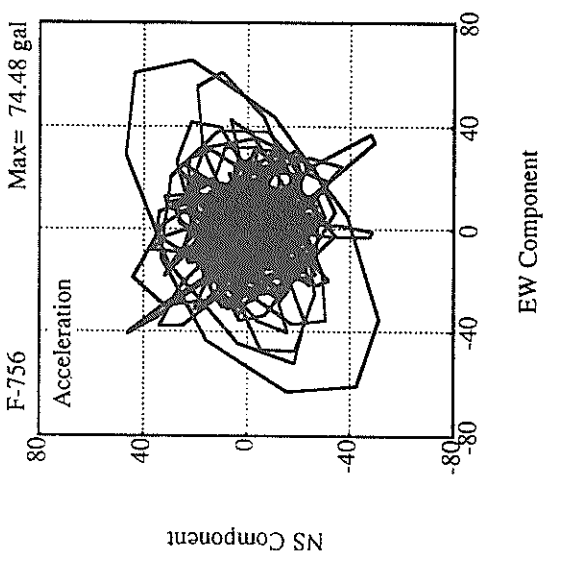
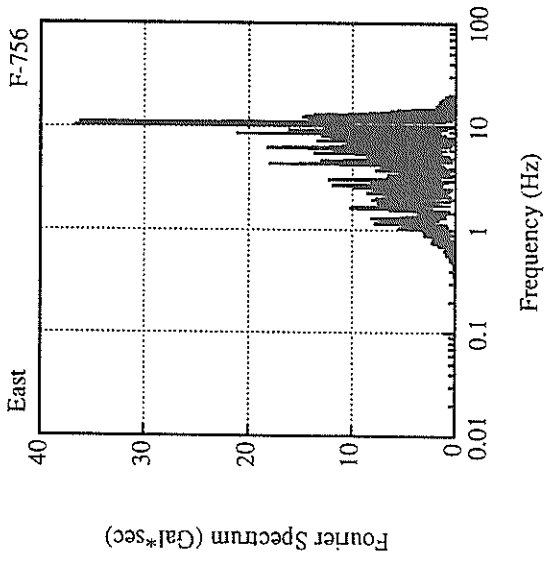
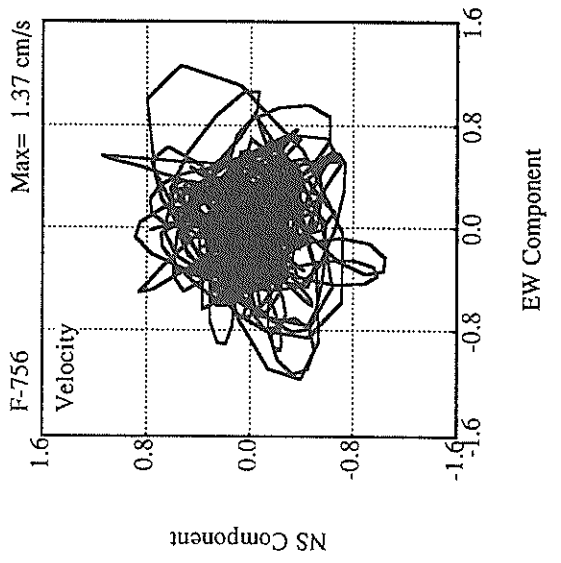
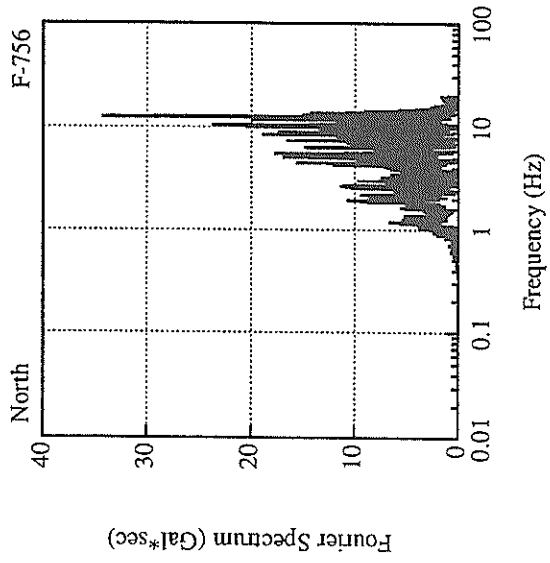
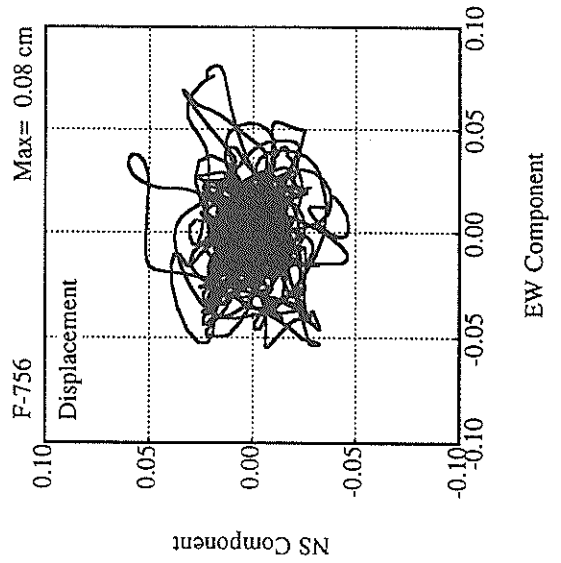
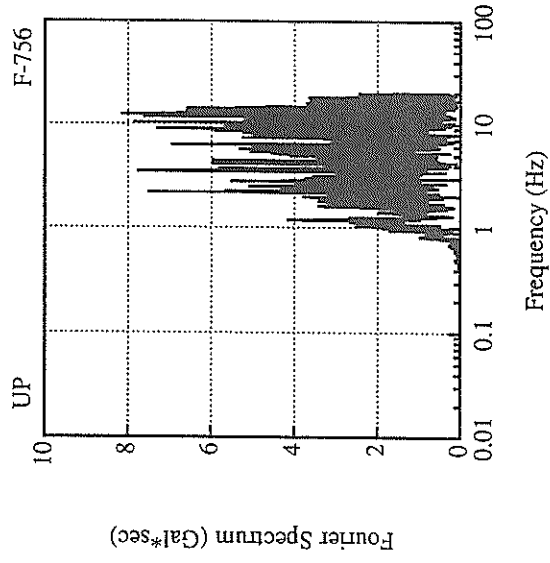












RECORD NUMBER : F-816

STATION : SHINAGAWA-G

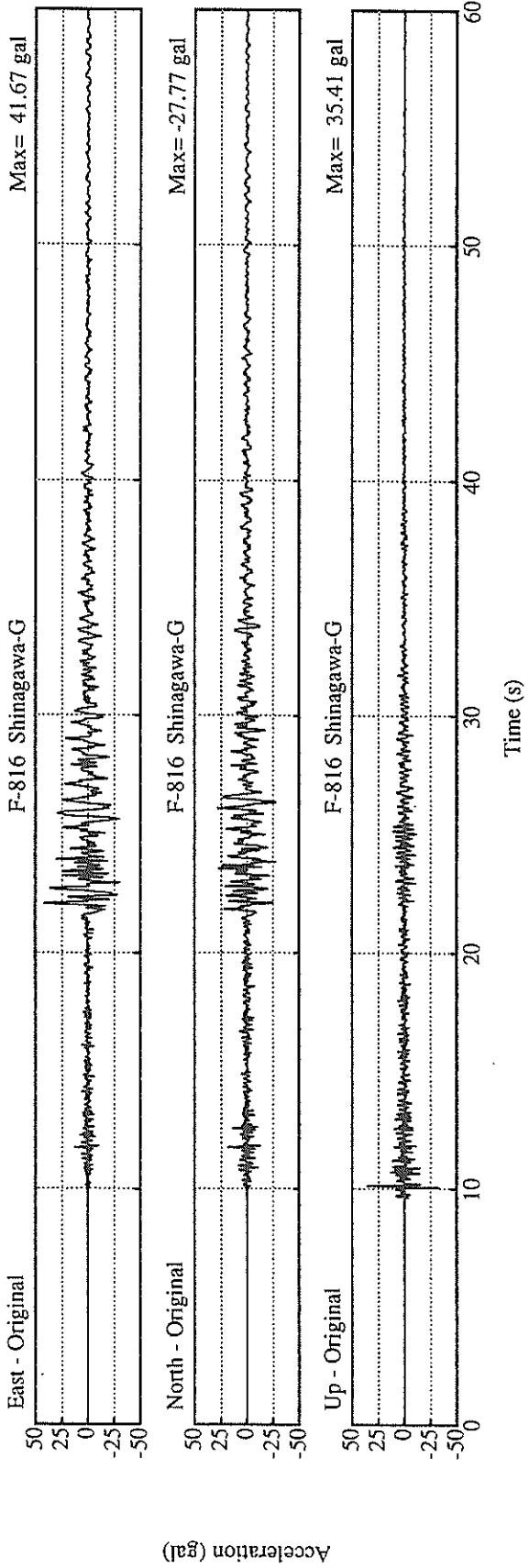
EARTHQUAKE DATA

 DATE AND TIME 21:34 JAN. 7, 1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION SW IBARAKI PREF
 LATITUDE 36° 17.9' N
 LONGITUDE 139° 58.8' E
 DEPTH 71.5KM
 JMA MAGNITUDE 5.4

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	27.8	41.7	35.4	47.1

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : S-2613

STATION : KASHIMA-ZOKAN-S

EARTHQUAKE DATA

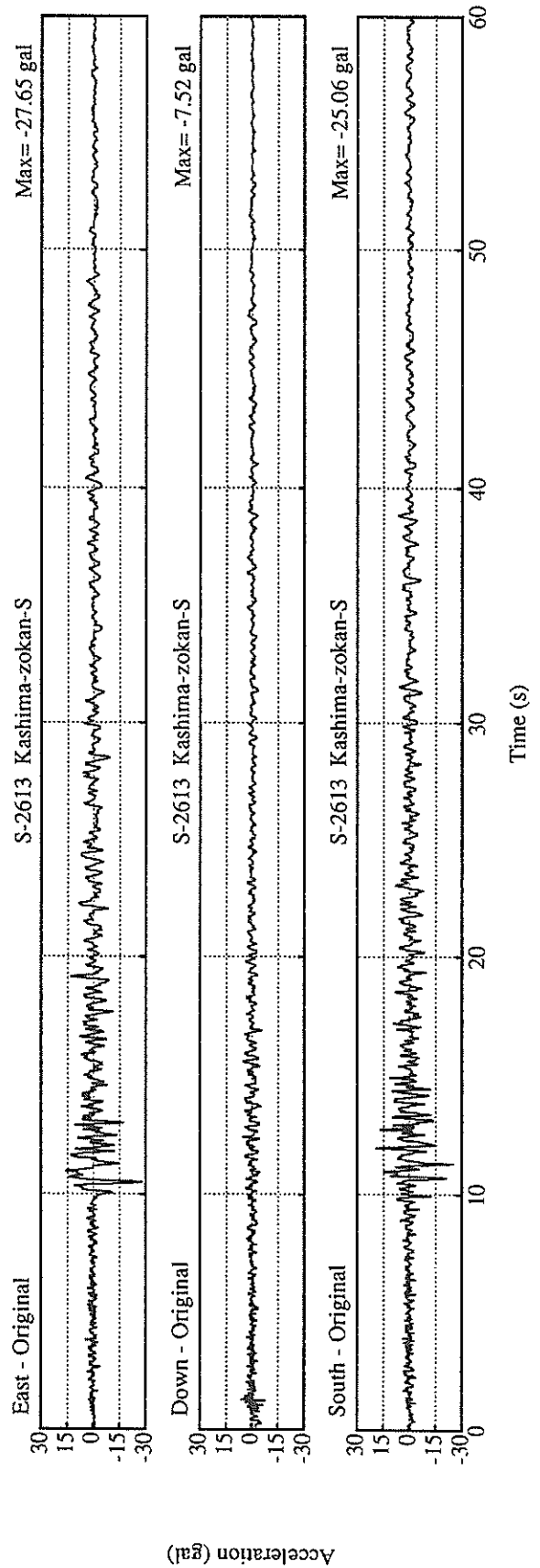
DATE AND TIME 3: 0 JAN.10,1995
LOCATION OF HYPOCENTER
EPICENTRAL REGION FAR. E OFF IBARAKI PREF
LATITUDE 35° 56.0' N
LONGITUDE 141° 25.9' E
DEPTH 43.3KM
JMA MAGNITUDE 6.1

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
25.1	27.6	7.5	28.9

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-880

STATION : HITACHINAKA-F

EARTHQUAKE DATA

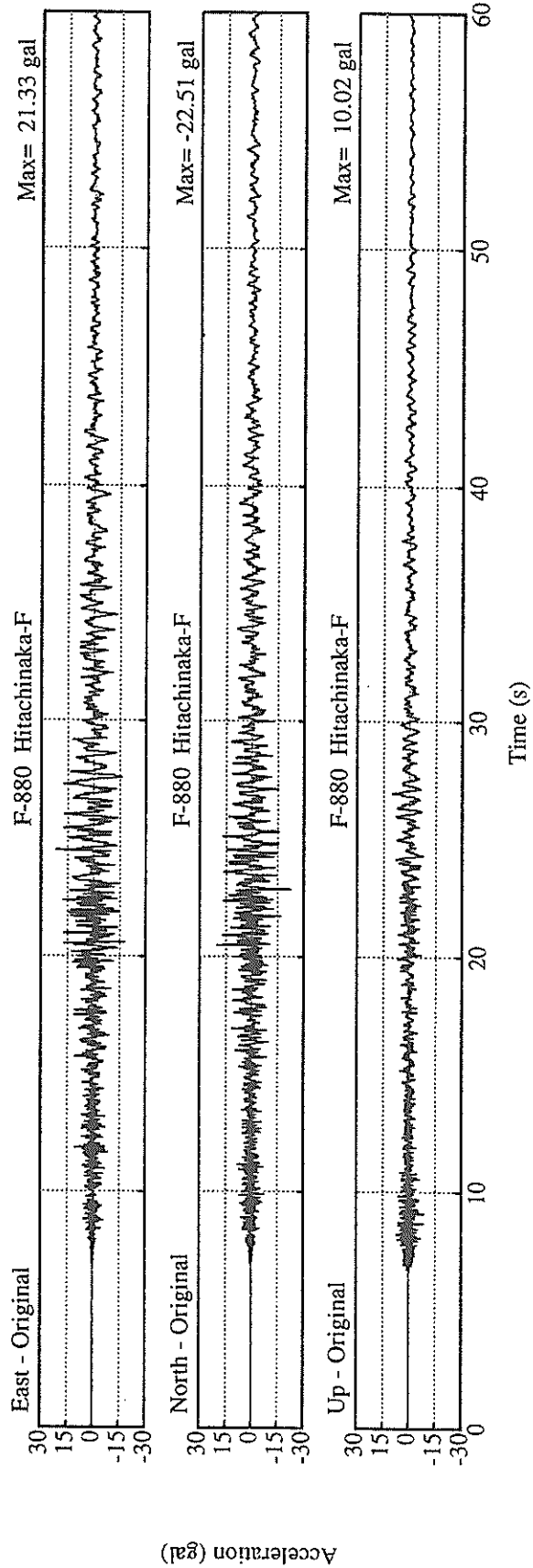
 DATE AND TIME 3: 0 JAN.10,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION FAR E OFF IBARAKI PREF
 LATITUDE 35°56.0' N
 LONGITUDE 141°25.9' E
 DEPTH 43.3KM
 JMA MAGNITUDE 6.1

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
22.5	21.3	10.0	23.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : S-2614

STATION : URAKAWA-S

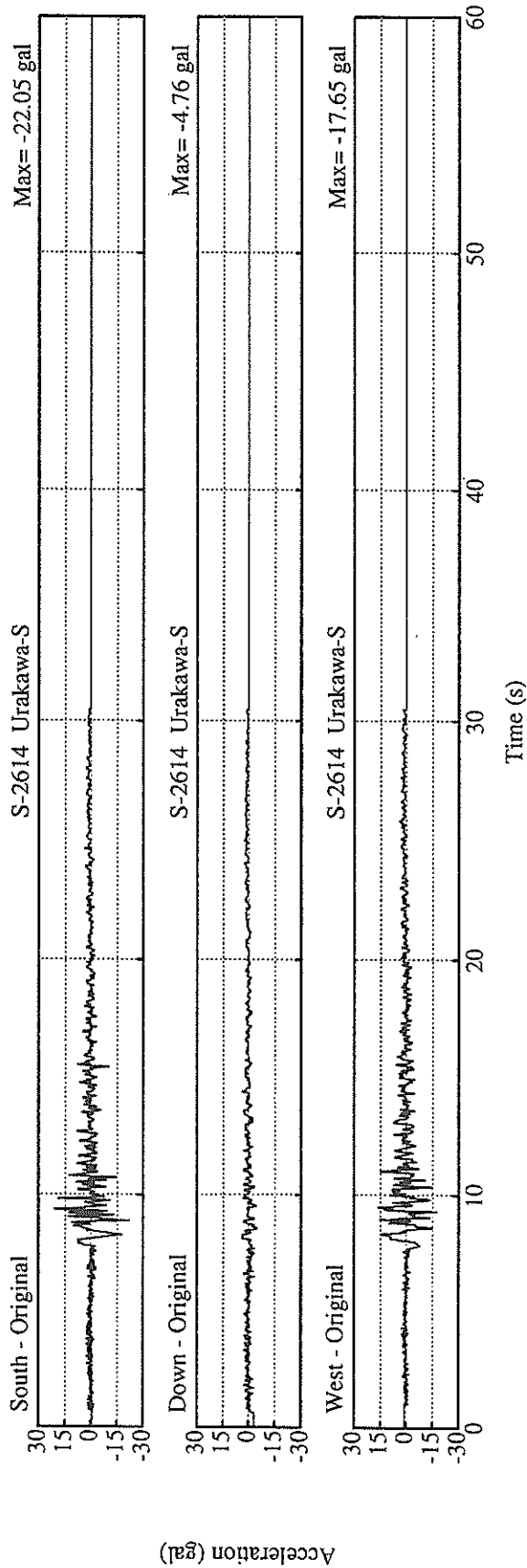
EARTHQUAKE DATA

 DATE AND TIME 16:48 JAN.11,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION S OFF URAKAWA
 LATITUDE 41° 50.6' N
 LONGITUDE 142° 35.7' E
 DEPTH 56.1KM
 JMA MAGNITUDE 5.1

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	22.0	17.7	4.8	24.5

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : M-1551

STATION : TOKACHI-M

EARTHQUAKE DATA

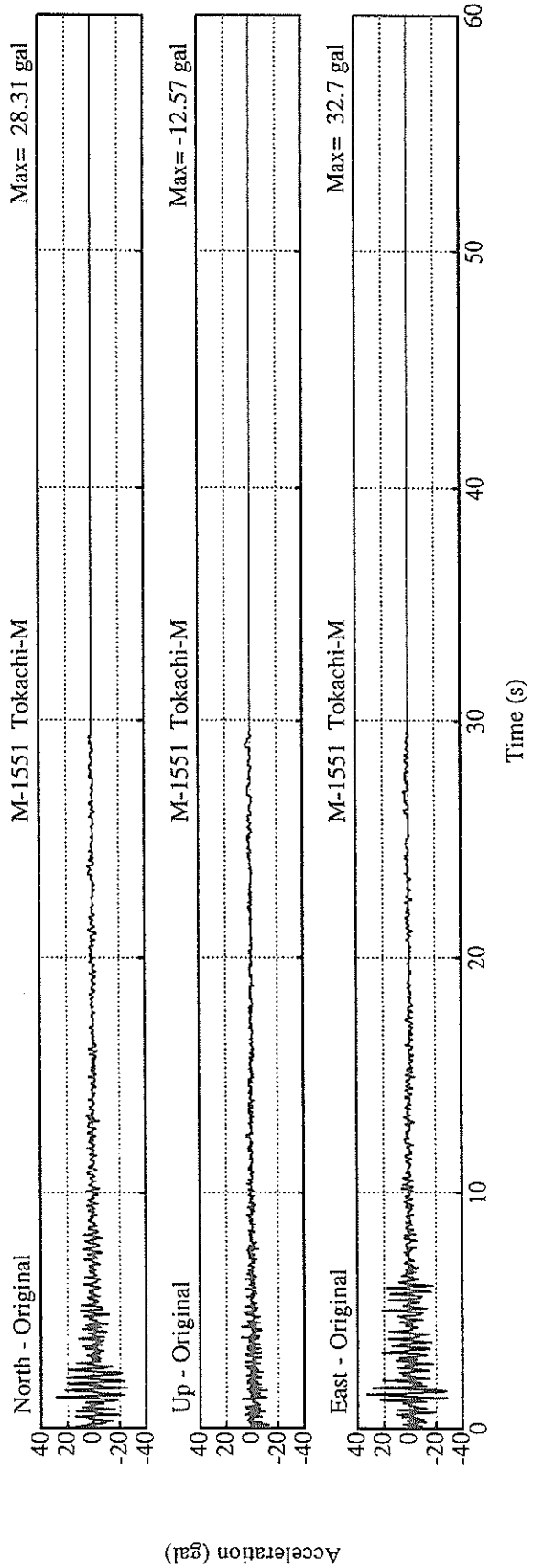
 DATE AND TIME 16:48 JAN.11,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION S OFF URAKAWA
 LATITUDE 41° 50.6' N
 LONGITUDE 142° 35.7' E
 DEPTH 56.1KM
 JMA MAGNITUDE 5.1

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
28.3	32.7	12.6	39.7

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-770

STATION : HANASAKI-F

EARTHQUAKE DATA

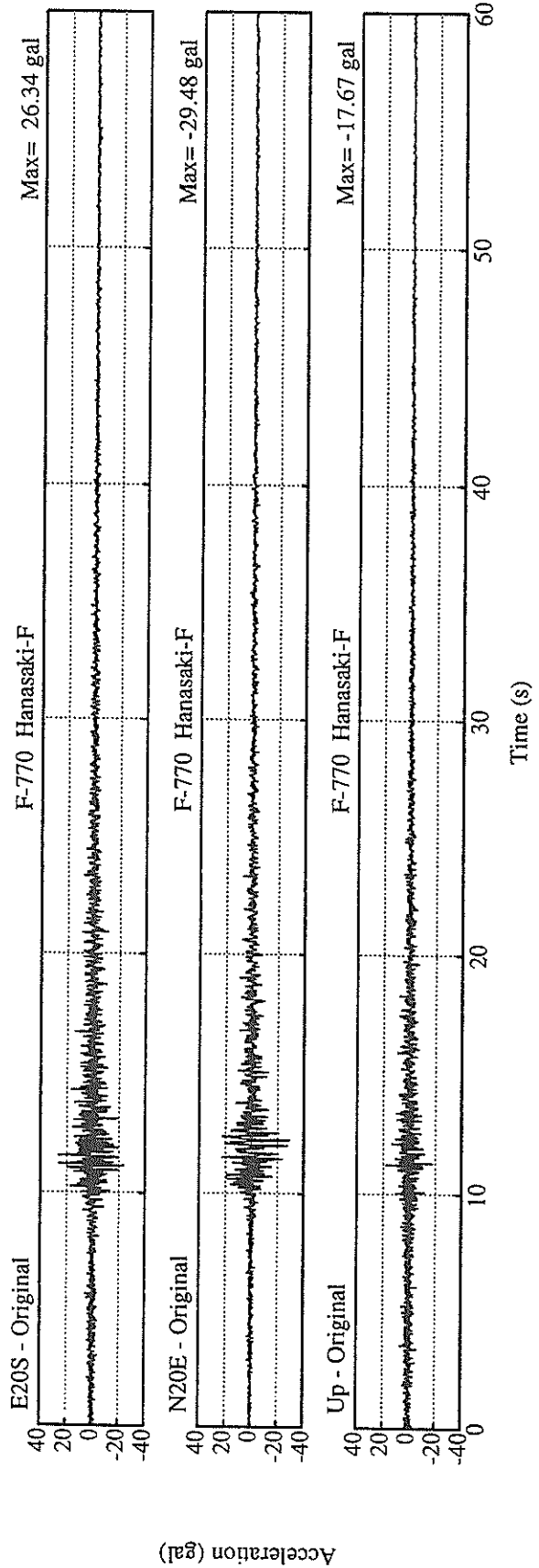
 DATE AND TIME 17:47 JAN.21,1995
 LOCATION OF HYPOCENTER OFF NEMURO PENINSULA
 EPICENTRAL REGION 43° 9.1' N
 LATITUDE 146° 44.1' E
 LONGITUDE 60.0KM
 DEPTH 6.1
 JMA MAGNITUDE 6.1

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
29.5	26.3	17.7	32.9

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-846

STATION : NAHA-G

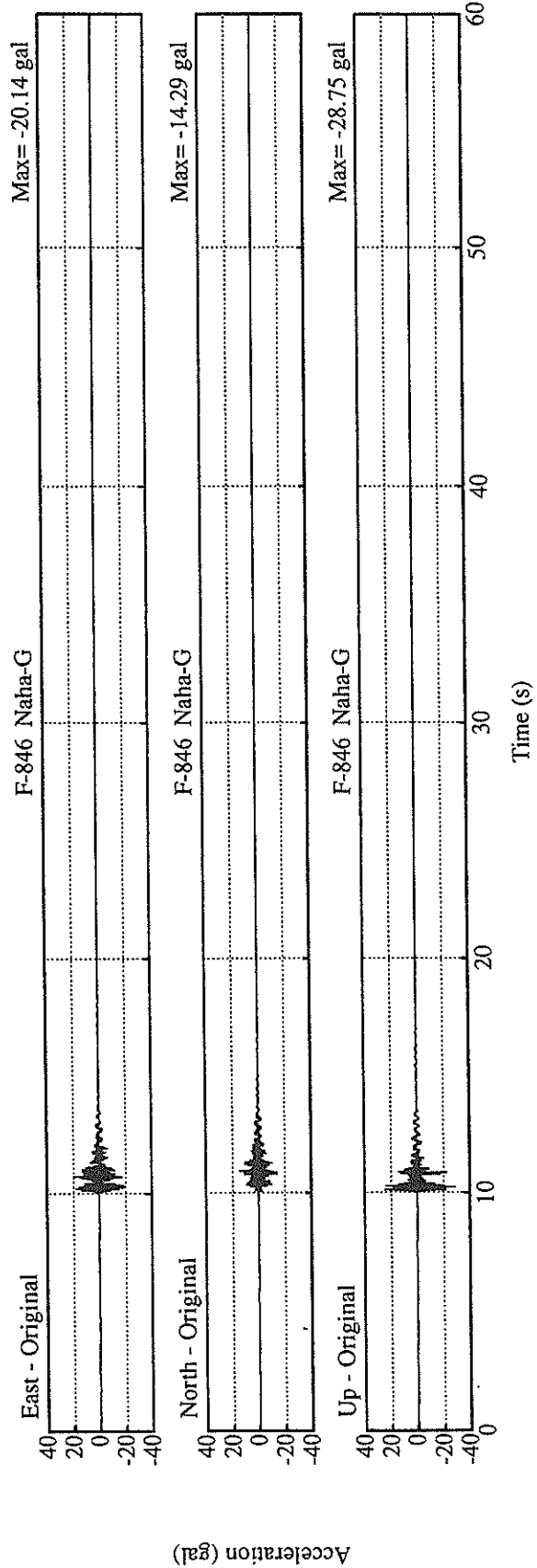
EARTHQUAKE DATA

 DATE AND TIME 12:20 JAN.26,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NEAR OKINAWAJIMA ISLAND
 LATITUDE 26°29.1' N
 LONGITUDE 128° 7.9' E
 DEPTH 49.3KM
 JMA MAGNITUDE 2.5

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	14.3	20.1	28.7	21.1

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-935

STATION : WAKAYAMA-G

EARTHQUAKE DATA

DATE AND TIME

5:36 FEB. 2, 1995

LOCATION OF HYPOCENTER

NW WAKAYAMA PREF

EPICENTRAL REGION

34° 12.2' N

LATITUDE

135° 9.9' E

LONGITUDE

9.1KM

DEPTH

2.6

JMA MAGNITUDE

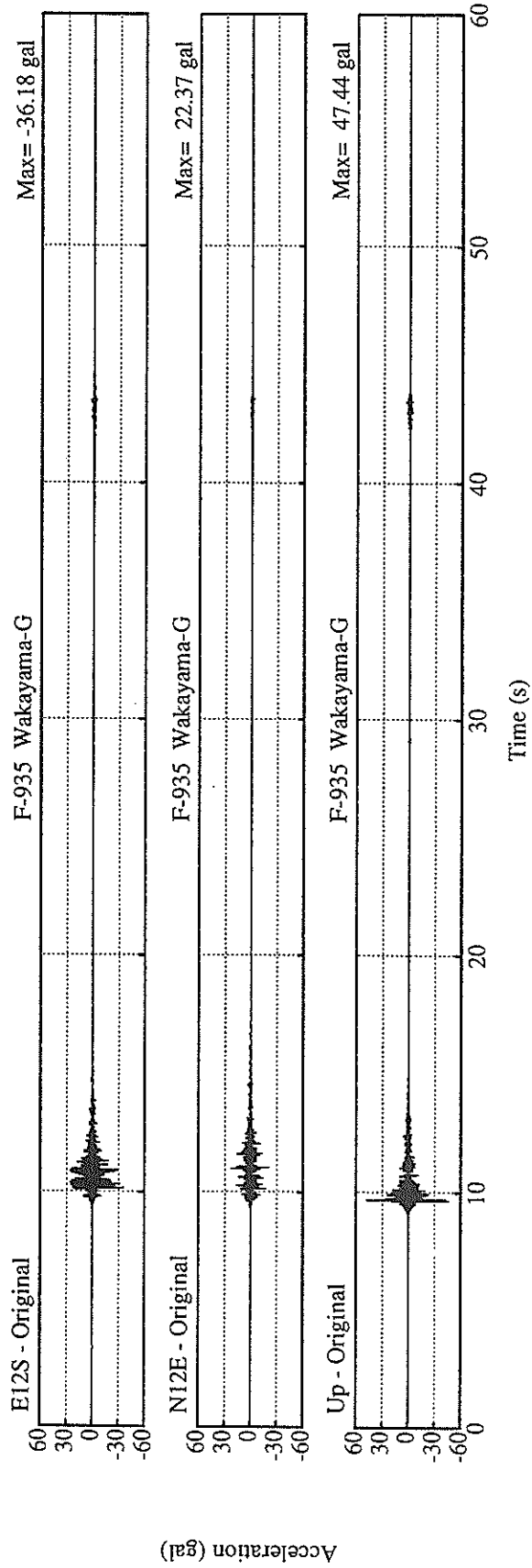
2.6

PEAK VALUES OF COMPONENTS

N S E W U D HORIZONTAL*

ORIGINAL ACCELERATION (GAL) 22.4 36.2 47.4 36.2

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-882

STATION : HITACHINAKA-F

EARTHQUAKE DATA

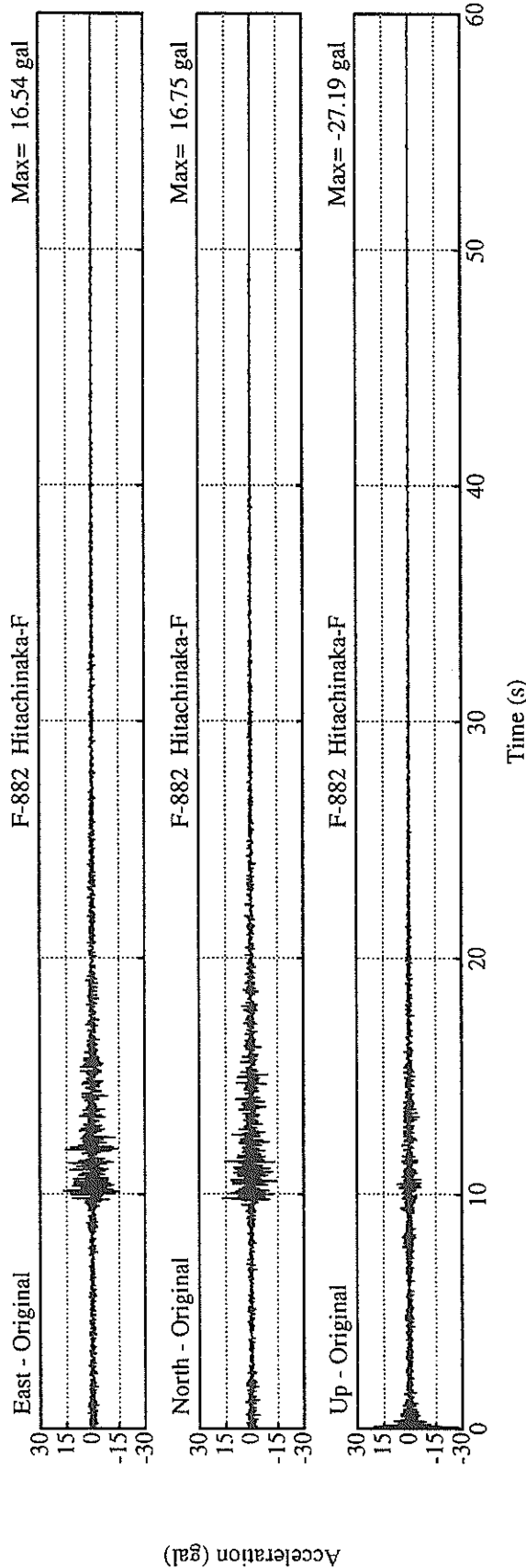
 DATE AND TIME 12: 8 MAR. 3, 1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF IBARAKI PREF
 LATITUDE 36° 18.1' N
 LONGITUDE 140° 42.8' E
 DEPTH 97.4KM
 JMA MAGNITUDE 4.5

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
16.8	16.5	27.2	19.5

* RESULTANT OF HORIZONTAL COMPONENTS

ORIGINAL ACCELERATION (GAL)



RECORD NUMBER : F-938

STATION : WAKAYAMA-G

EARTHQUAKE DATA

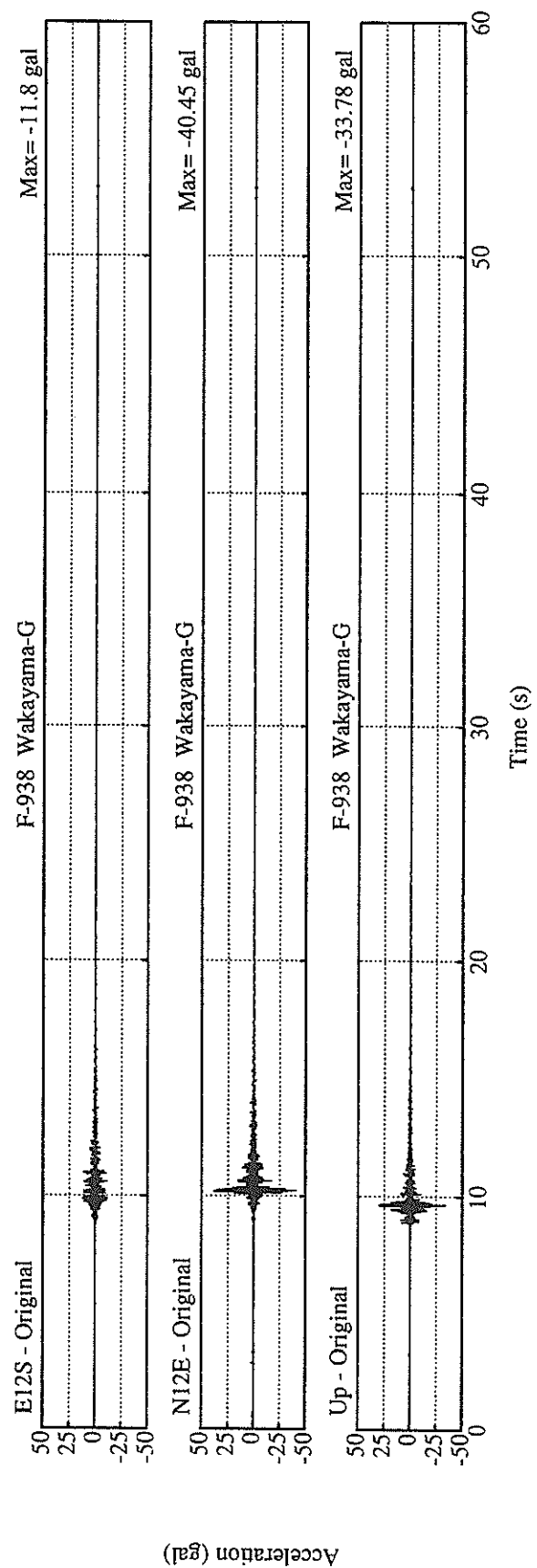
 DATE AND TIME 20:23 MAR.10,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34°13.2' N
 LONGITUDE 135°11.9' E
 DEPTH 10.0KM
 JMA MAGNITUDE 2.9

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
40.4	11.8	33.8	40.9

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-883

STATION : HITACHINAKA-F

EARTHQUAKE DATA

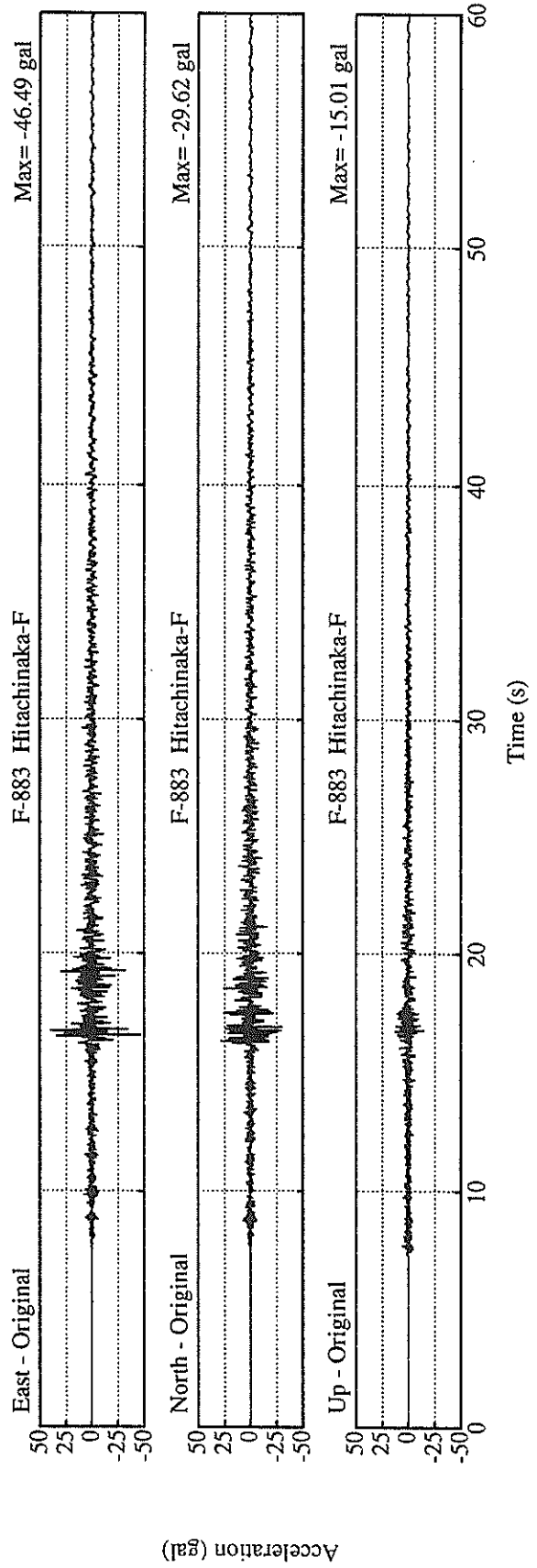
 DATE AND TIME : 7:24 MAR.23,1995
 LOCATION OF HYPOCENTER : SW IBARAKI PREF
 EPICENTRAL REGION : 36° 5.7' N
 LATITUDE : 140° 1.0' E
 LONGITUDE : 56.2KM
 DEPTH : 4.9
 JMA MAGNITUDE : 4.9

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
29.6	46.5	15.0	47.0

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-870

STATION : OITA-G

EARTHQUAKE DATA

DATE AND TIME : 15: 9 MAR.27,1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION : BUNGO CHANNEL

LATITUDE : 32° 59.7' N

LONGITUDE : 132° 1.2' E

DEPTH : 53.8KM

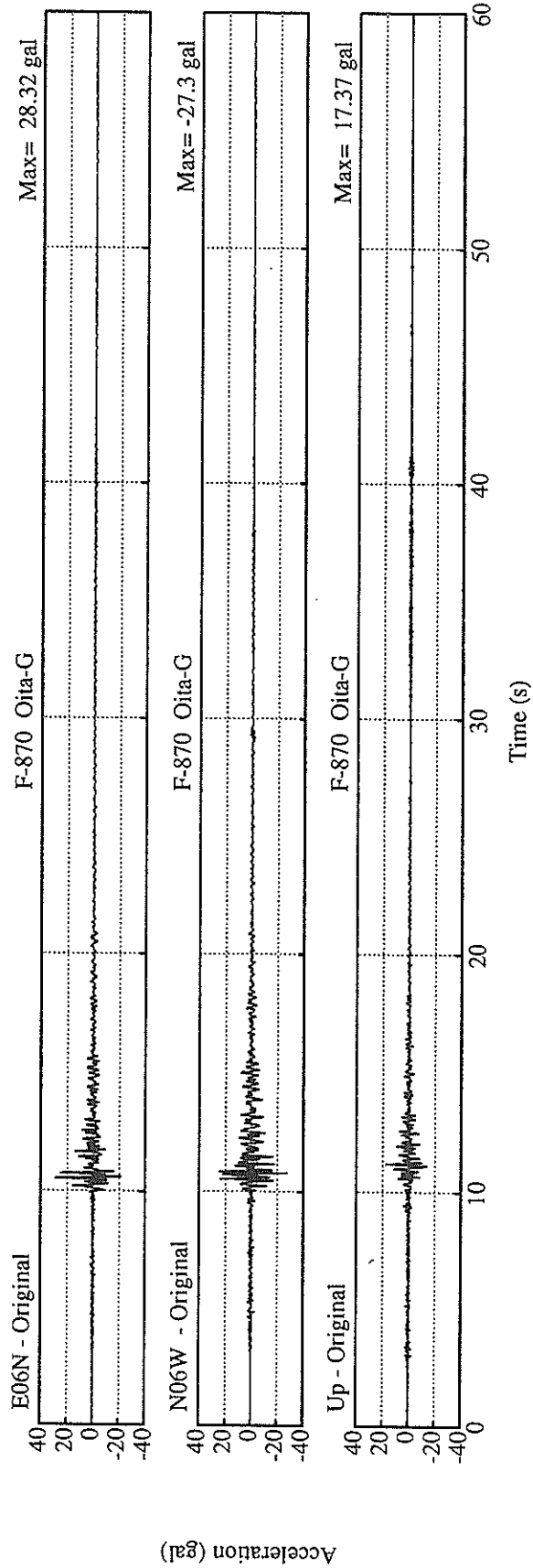
JMA MAGNITUDE : 4.0

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
27.3	28.3	17.4	35.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-827

STATION : NIIGATA-G

EARTHQUAKE DATA

 DATE AND TIME 12:49 APR 1, 1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NE NIIGATA PREF
 LATITUDE 37° 53.3' N
 LONGITUDE 139° 15.1' E
 DEPTH 16.2KM
 JMA MAGNITUDE 5.5

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.127	0.097	0.121	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.127 0.097 0.121

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	57.1	55.4	19.7	65.5
ORIGINAL	115.7	79.5	30.6	117.6
CORRECTED	115.5	79.6	30.6	117.5

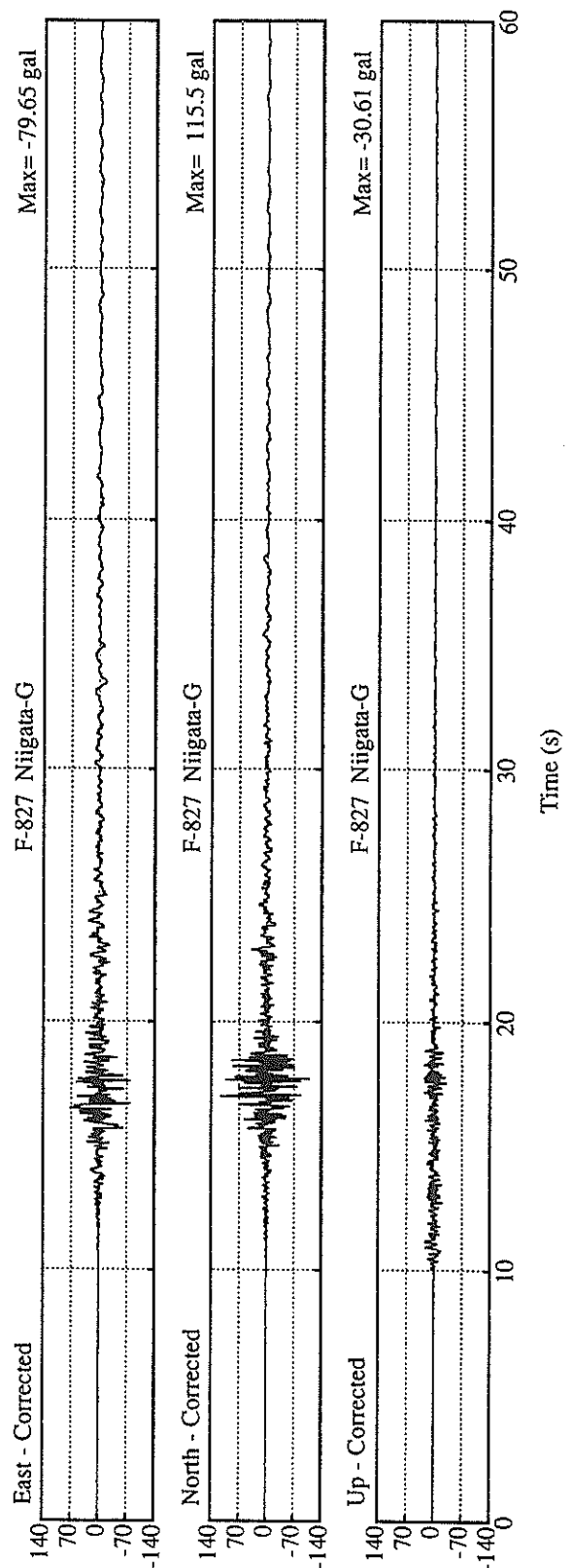
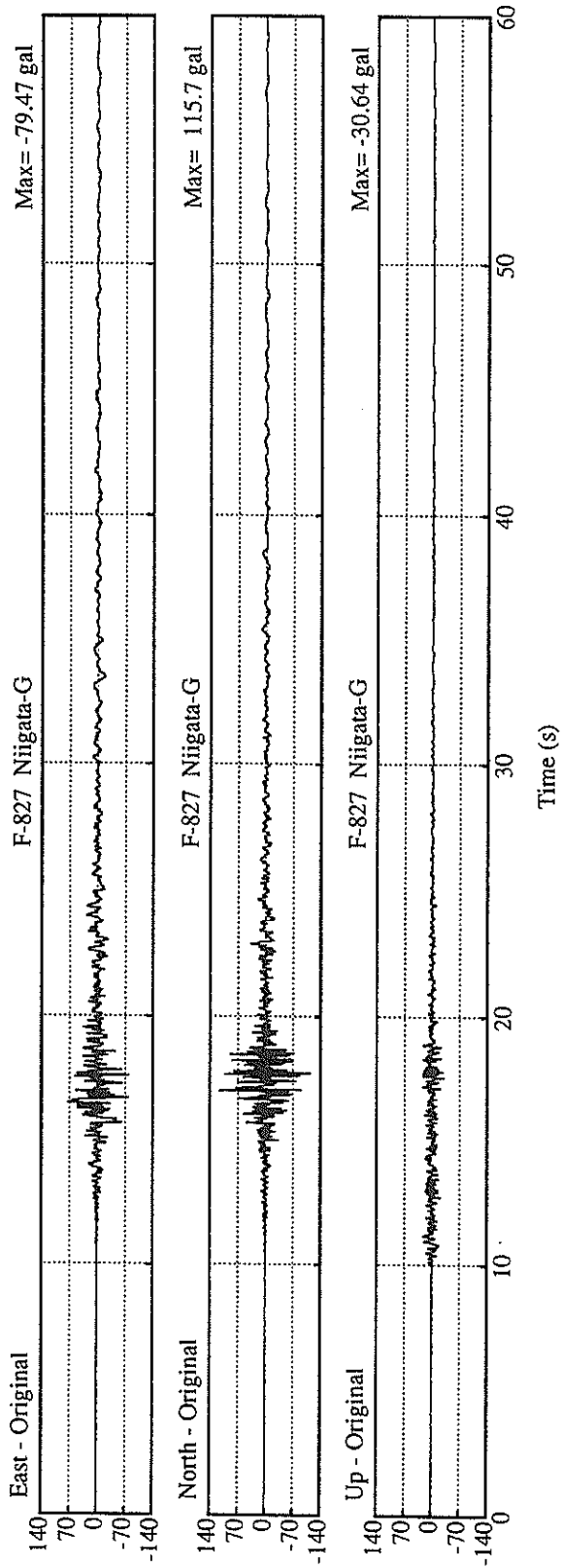
MAXIMUM VELOCITY (CM/SEC)

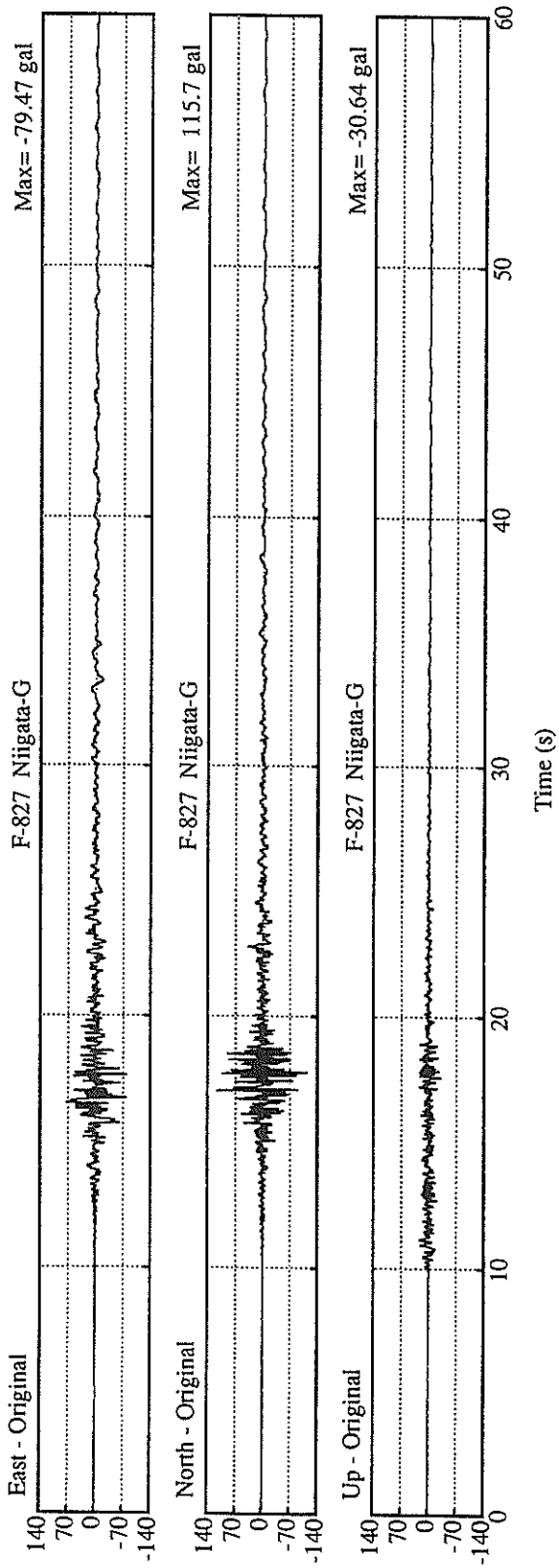
FIXED FILTER	5.12	8.76	1.99	9.22
VARIABLE FILTER	4.71	7.34	2.21	7.63

MAXIMUM DISPLACEMENT (CM)

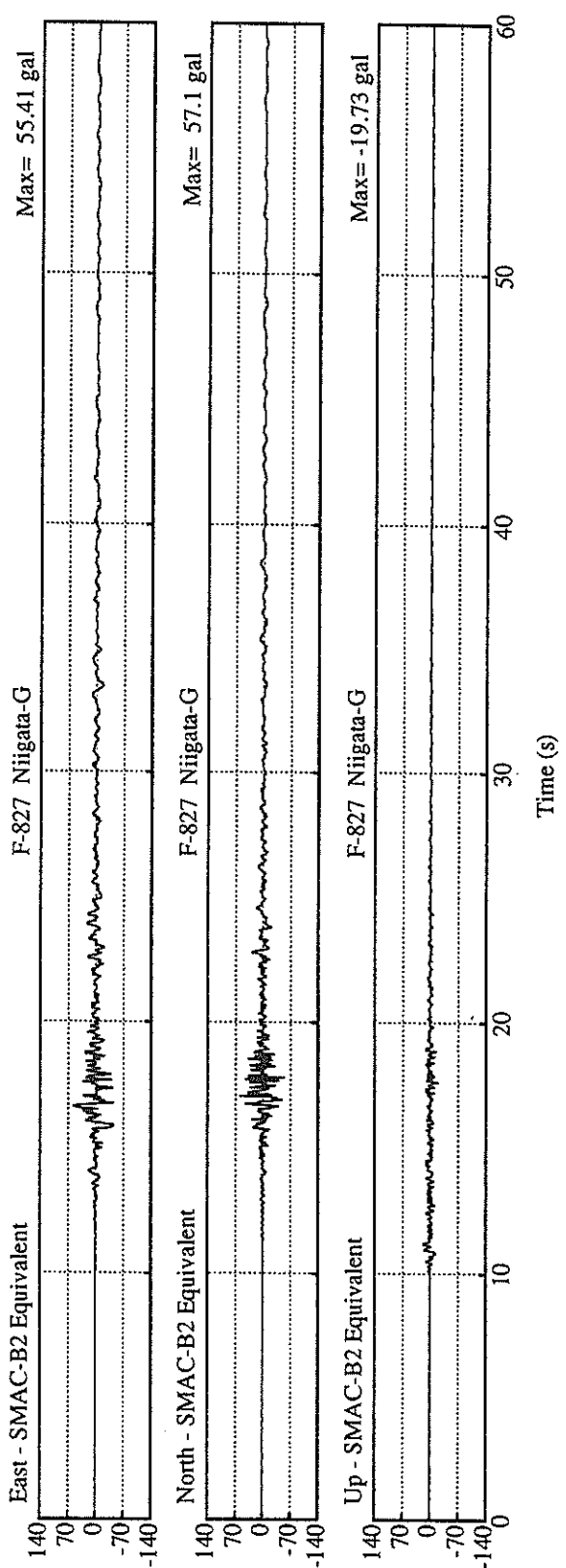
FIXED FILTER	1.09	2.23	0.39	2.31
VARIABLE FILTER	1.09	2.19	0.52	2.42

* RESULTANT OF HORIZONTAL COMPONENTS

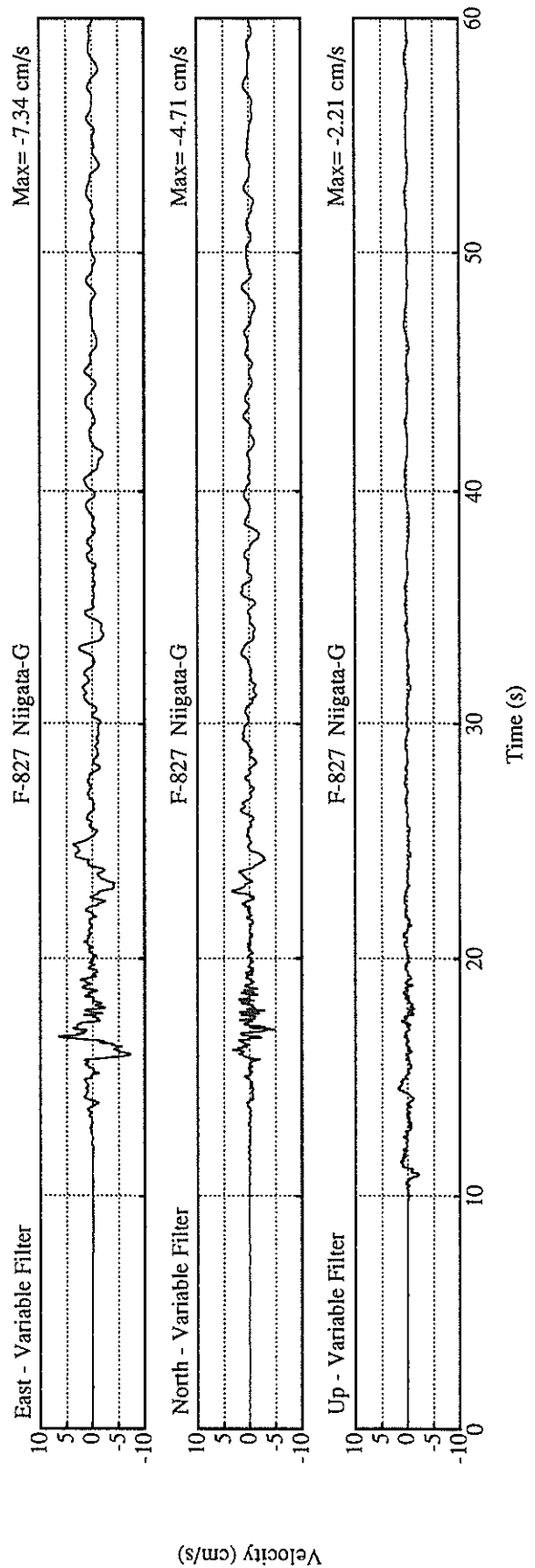
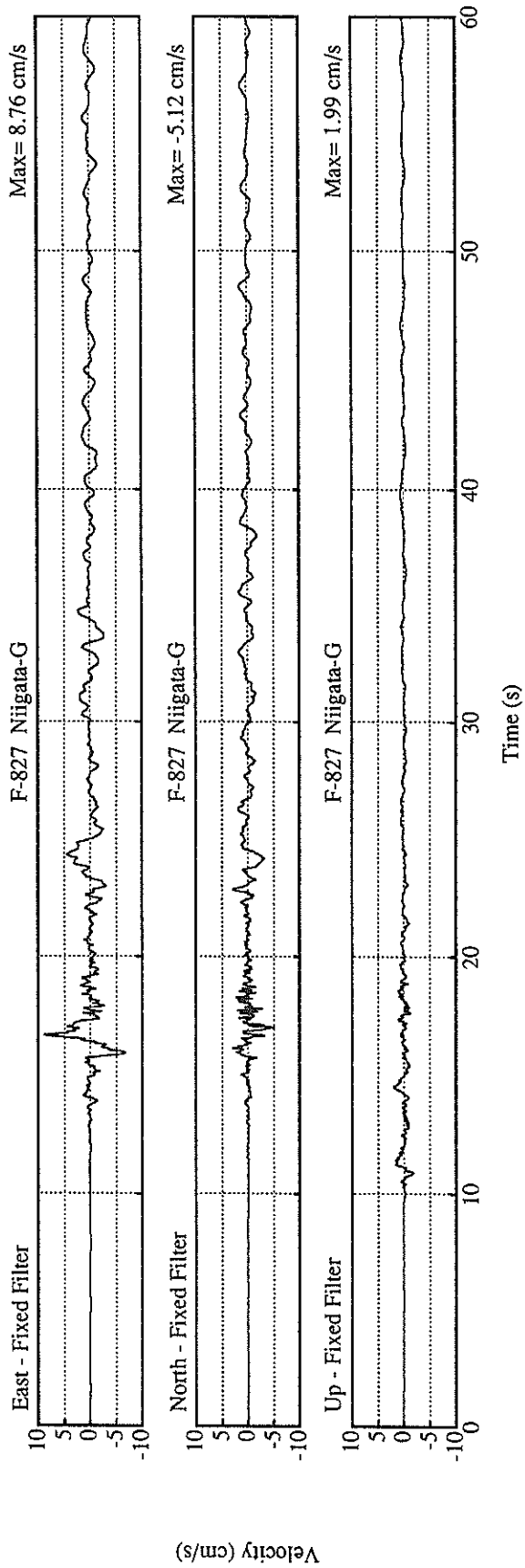


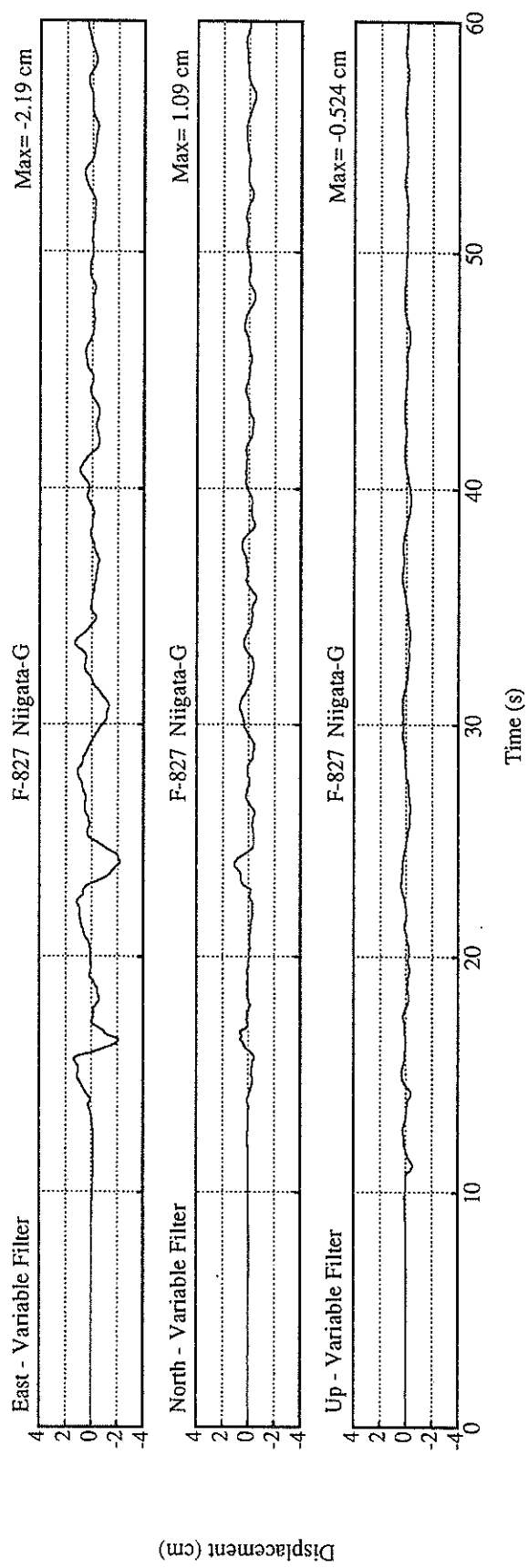
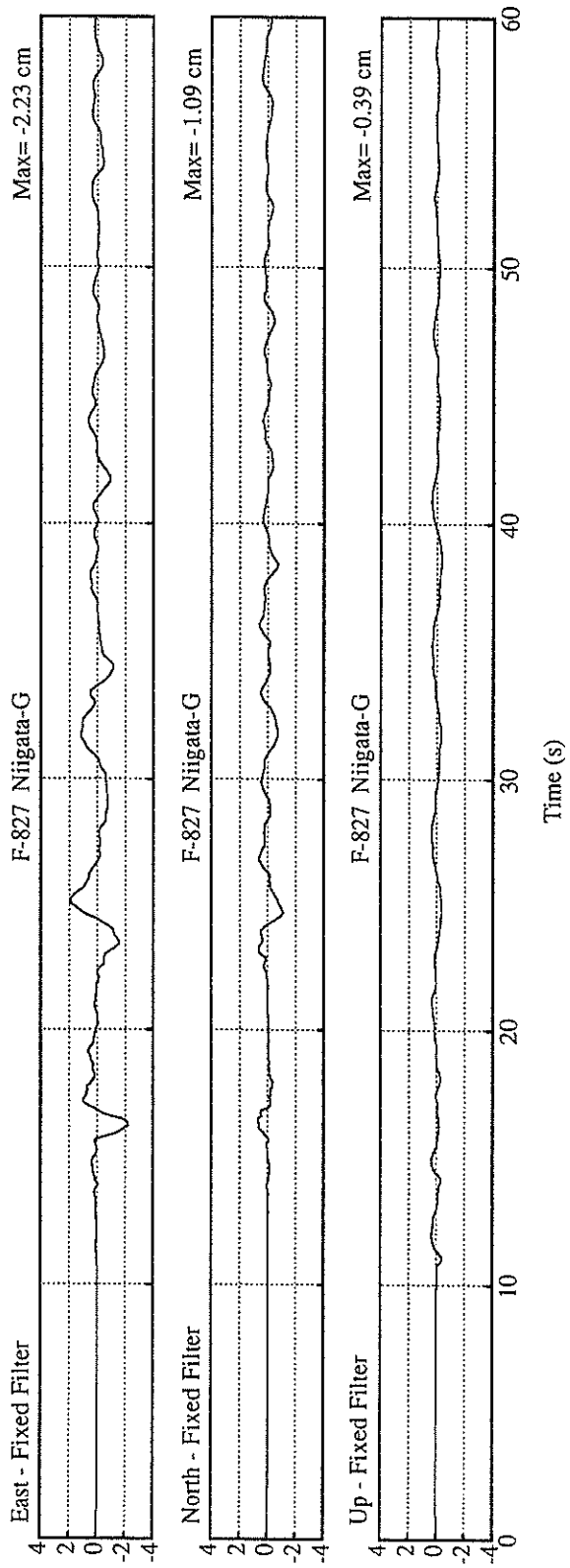


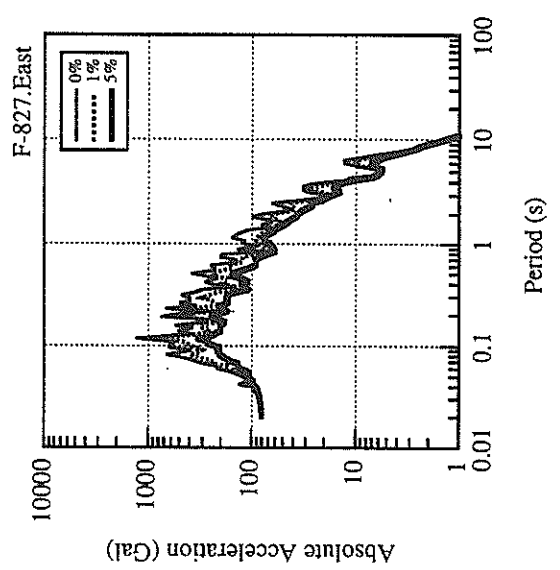
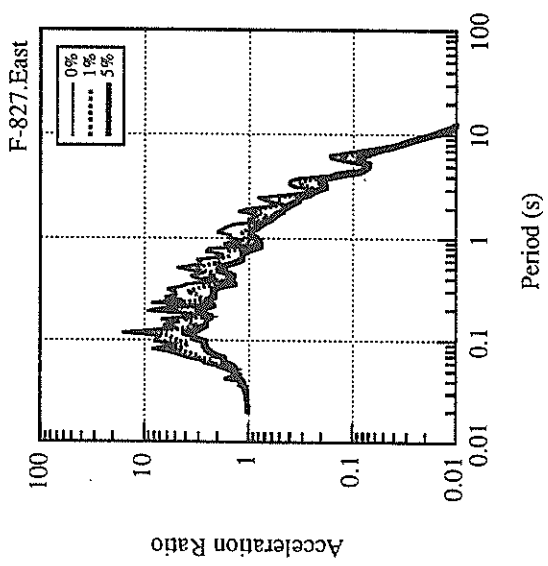
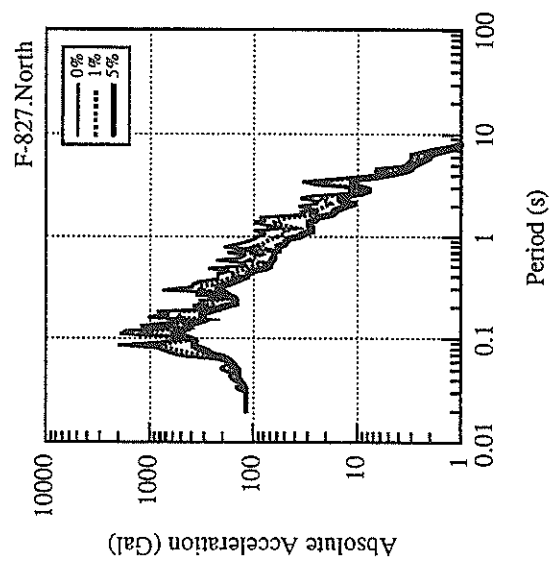
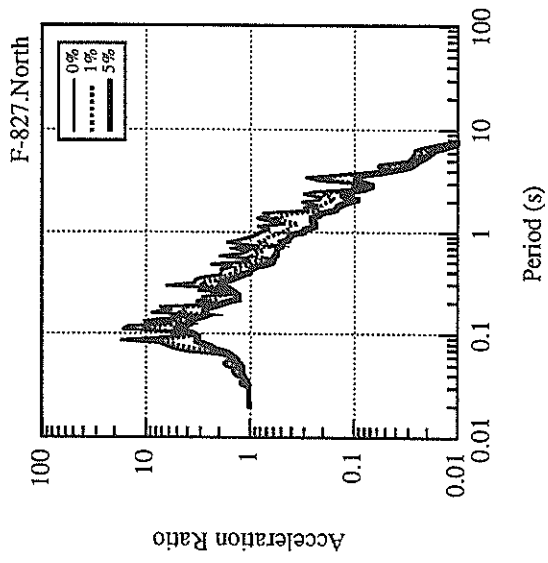
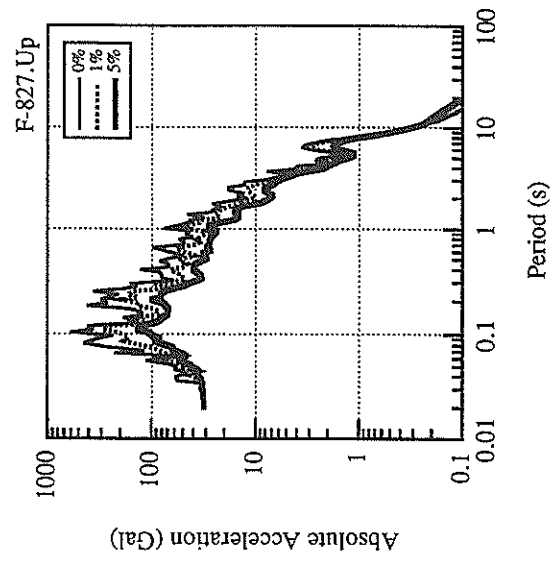
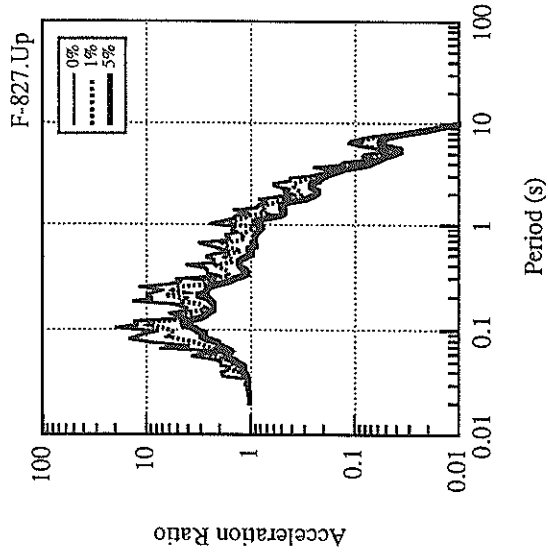
Acceleration (gal)

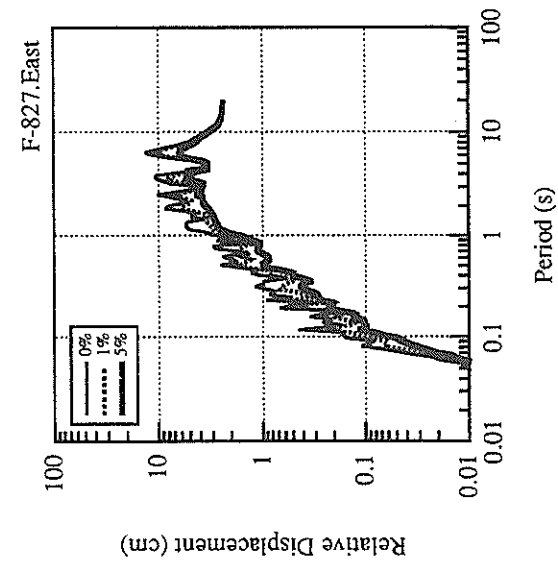
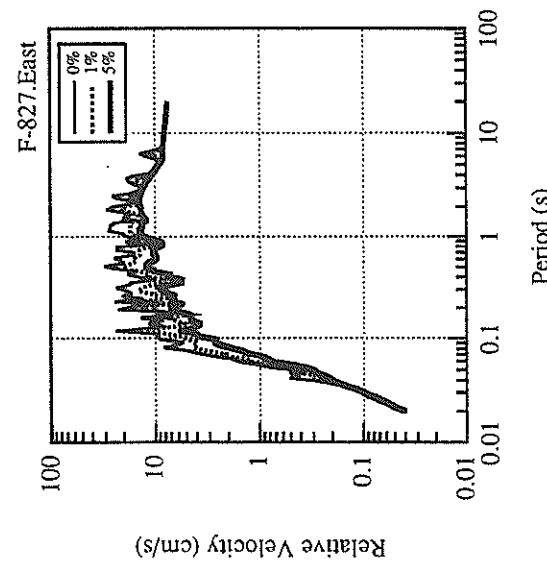
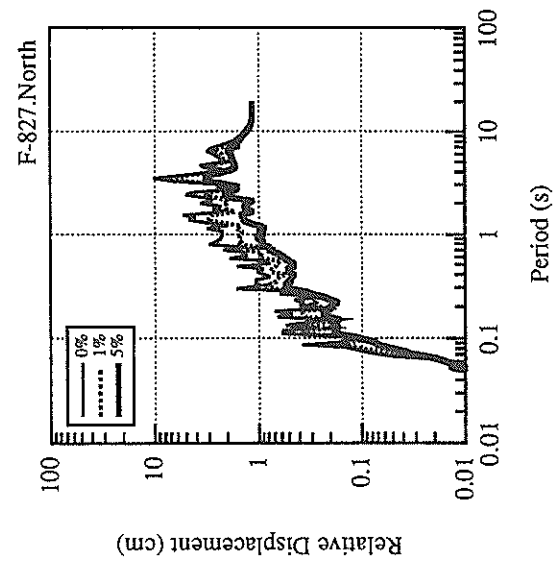
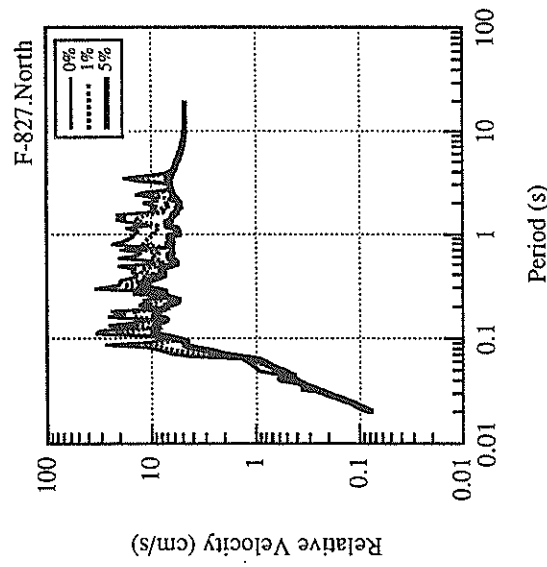
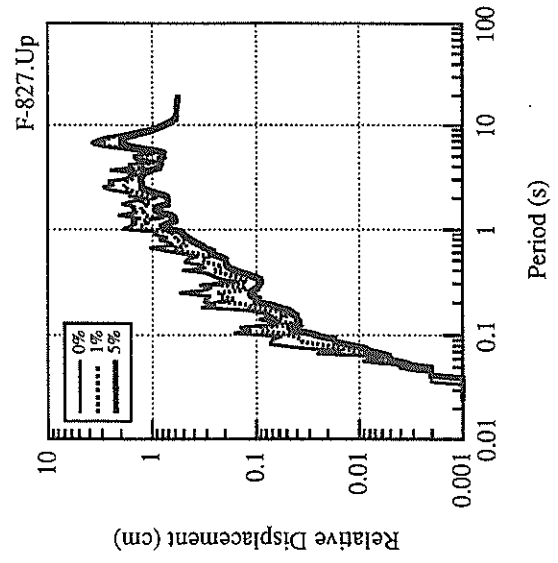
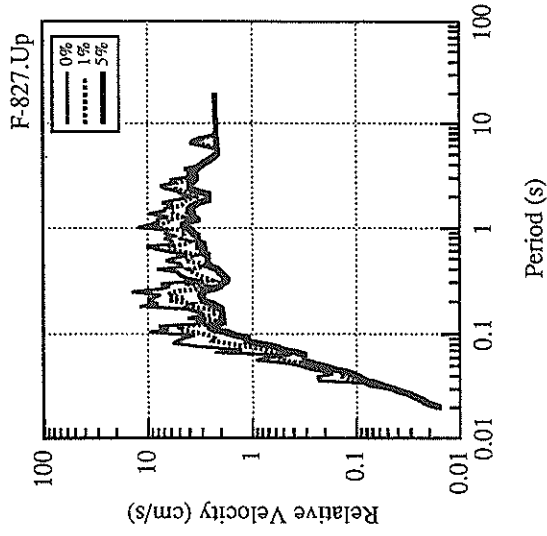


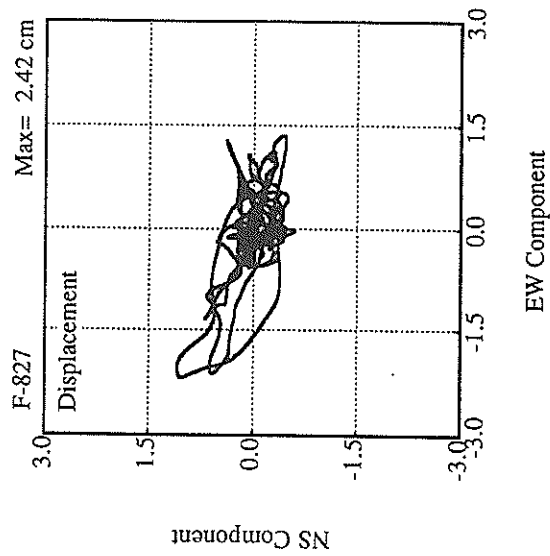
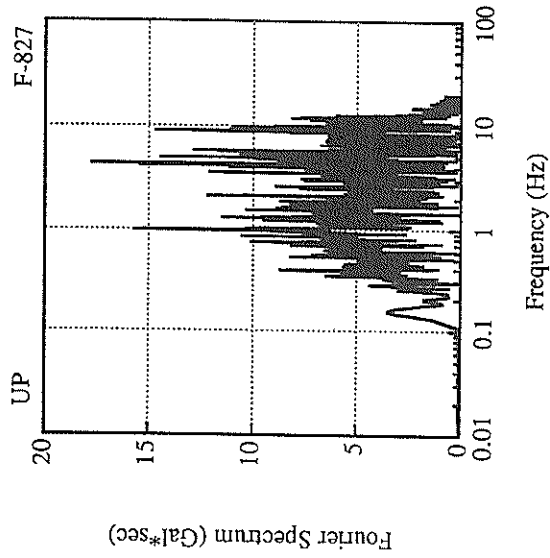
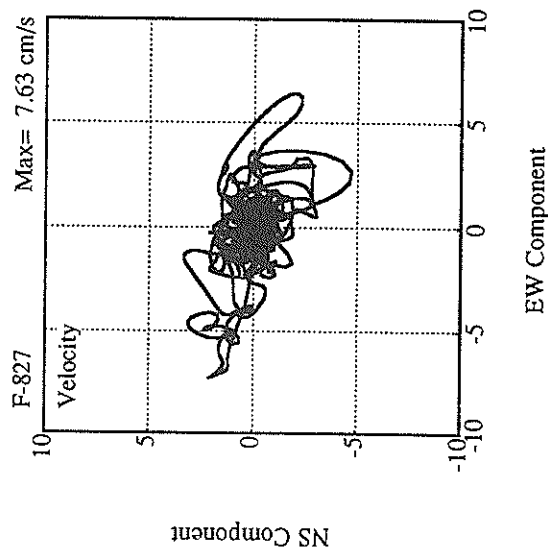
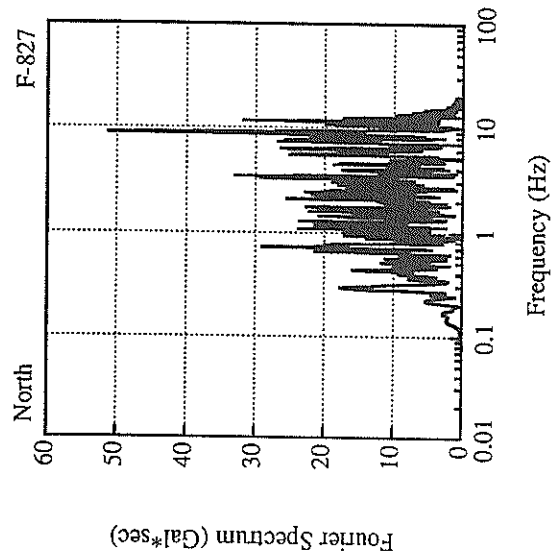
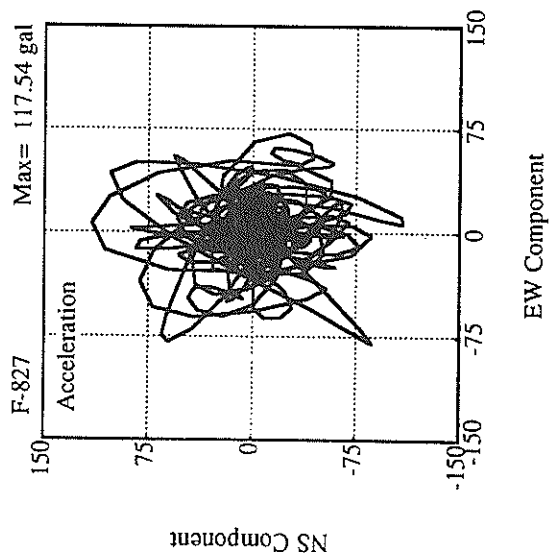
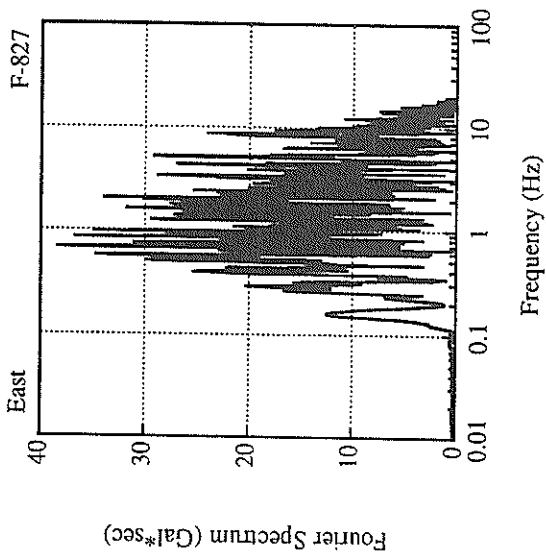
Acceleration (gal)











RECORD NUMBER : F-834

STATION : NIIGATA-G

EARTHQUAKE DATA

DATE AND TIME : 10:29 APR 2, 1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION : NE NIIGATA PREF

LATITUDE : 37° 54.9' N

LONGITUDE : 139° 16.5' E

DEPTH : 11.9KM

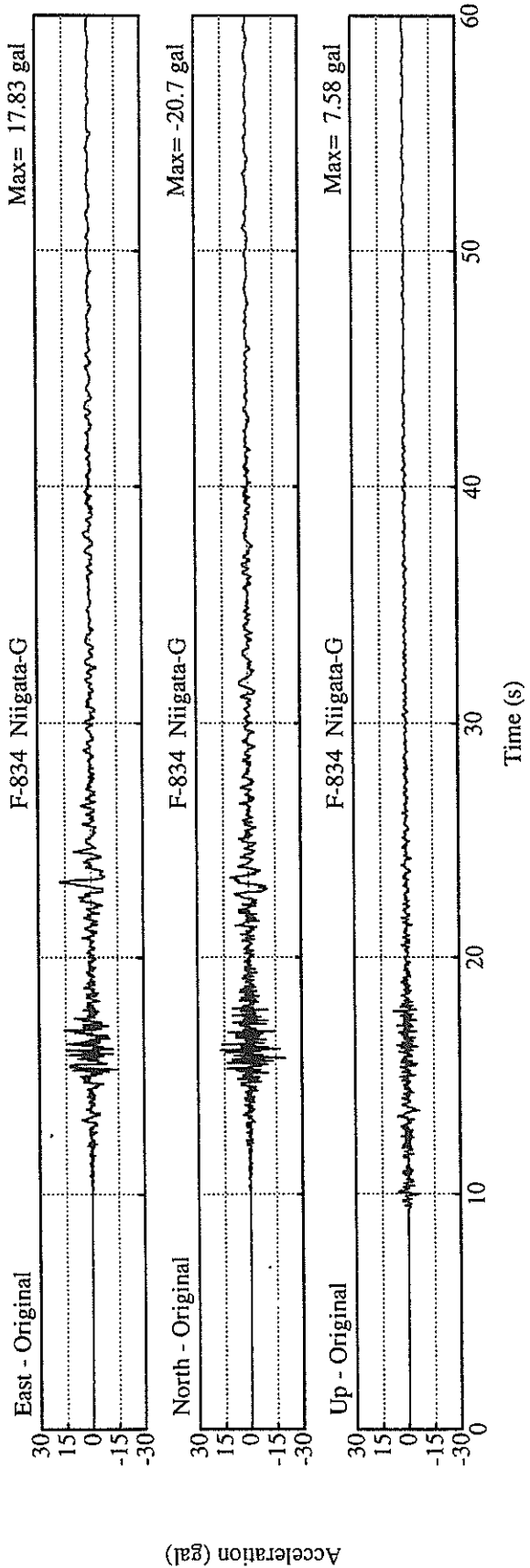
JMA MAGNITUDE : 4.3

PEAK VALUES OF COMPONENTS

N	S	E	W	U	D	HORIZONTAL*
20.7	17.8	7.6	22.3			

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-842

STATION : NIIGATA-G

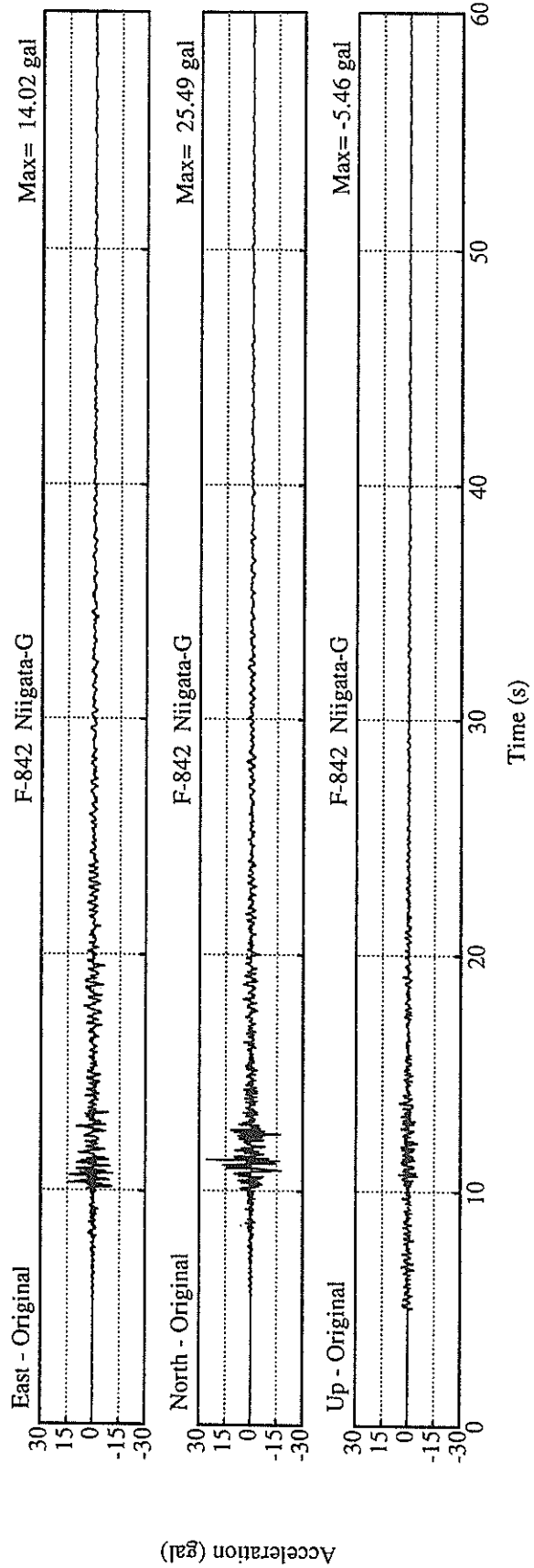
EARTHQUAKE DATA

 DATE AND TIME 13:25 APR 5,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NE NIIGATA PREF
 LATITUDE 37° 52.8' N
 LONGITUDE 139° 16.0' E
 DEPTH 18.3KM
 JMA MAGNITUDE 3.9

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	25.5	14.0	5.5	25.8

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-825

STATION : ONAHAMA-JI-G

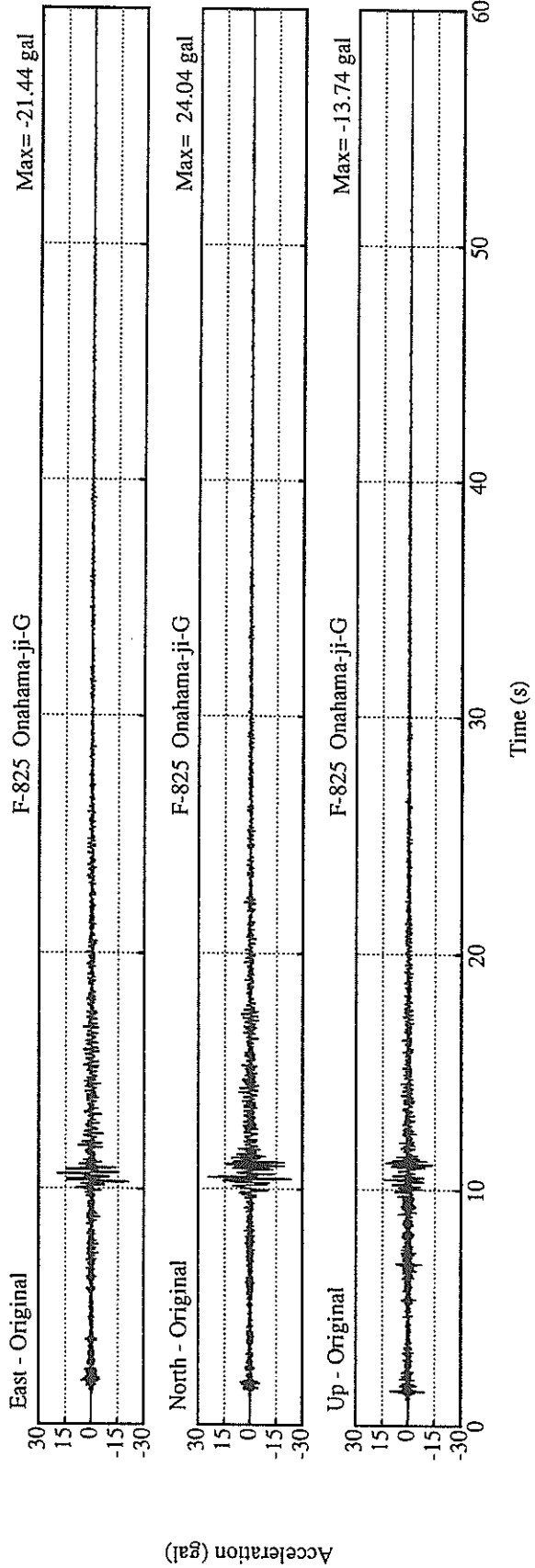
EARTHQUAKE DATA

 DATE AND TIME 14:23 APR 12,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NORTHERN IBARAKI PREF
 LATITUDE 36°28.2' N
 LONGITUDE 140°36.5' E
 DEPTH 52.8KM
 JMA MAGNITUDE 4.6

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	24.0	21.4	13.7	26.1

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-885

STATION : HITACHINAKA-F

EARTHQUAKE DATA

DATE AND TIME 14:23 APR 12, 1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION NORTHERN IBARAKI PREF

LATITUDE 36°28.2' N

LONGITUDE 140°36.5' E

DEPTH 52.8KM

JMA MAGNITUDE 4.6

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.707	0.616	0.823	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.707 0.616 0.823

MAXIMUM ACCELERATION (GAL)

	N S	E W	U D	HORIZONTAL*
SMAC-B2 EQUIVALENT	16.0	24.7	7.8	27.4
ORIGINAL	42.6	70.7	20.8	76.1
CORRECTED	40.9	71.9	21.5	77.4

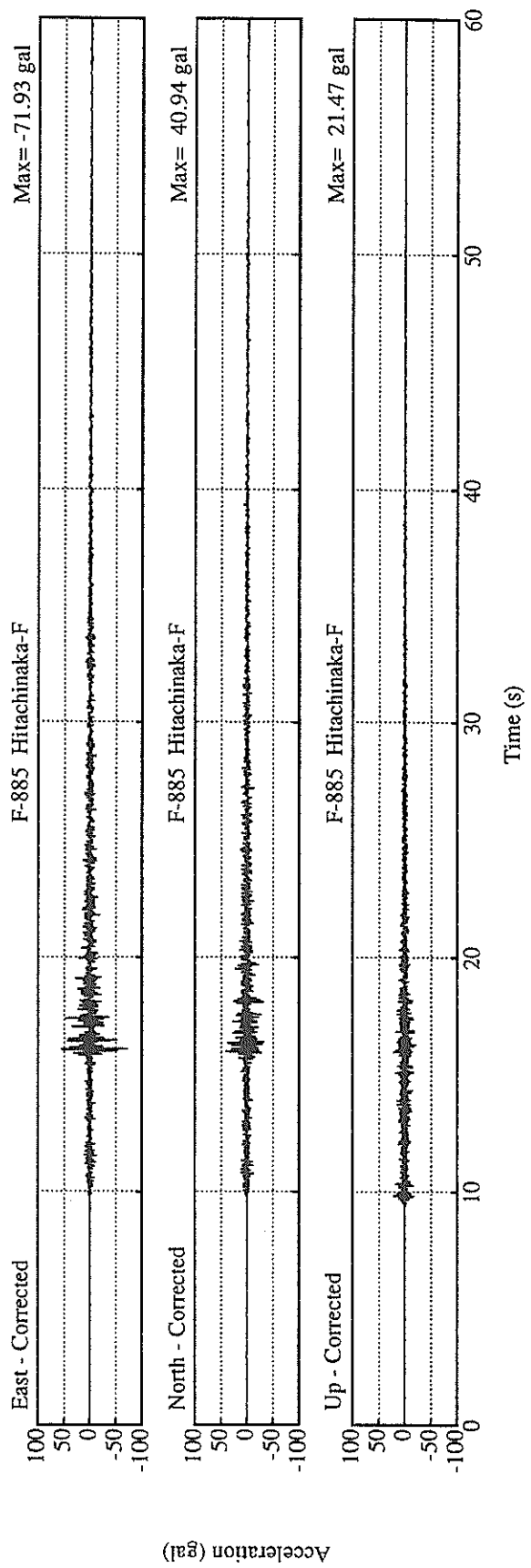
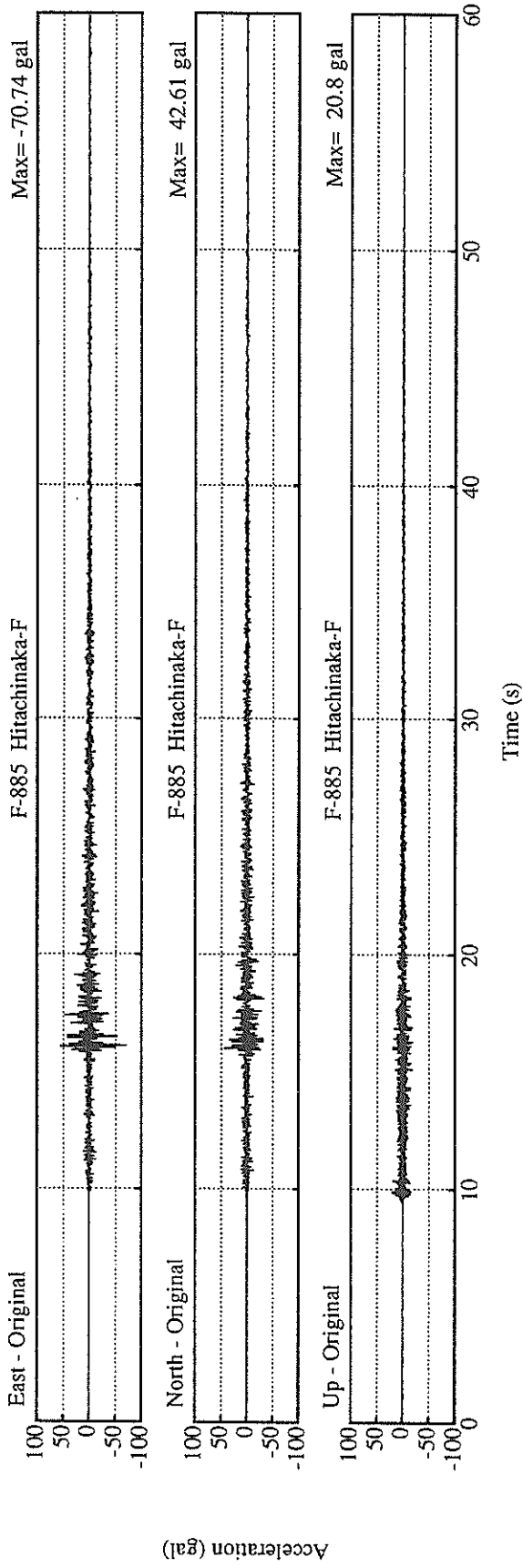
MAXIMUM VELOCITY (CM/SEC)

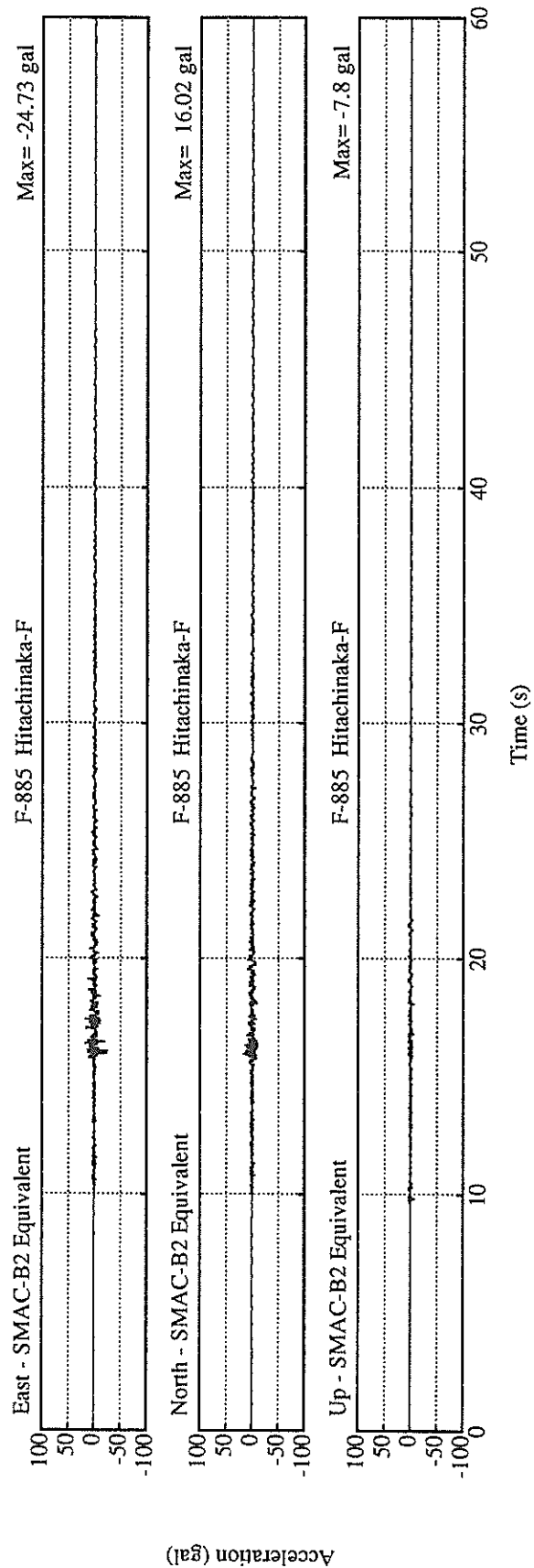
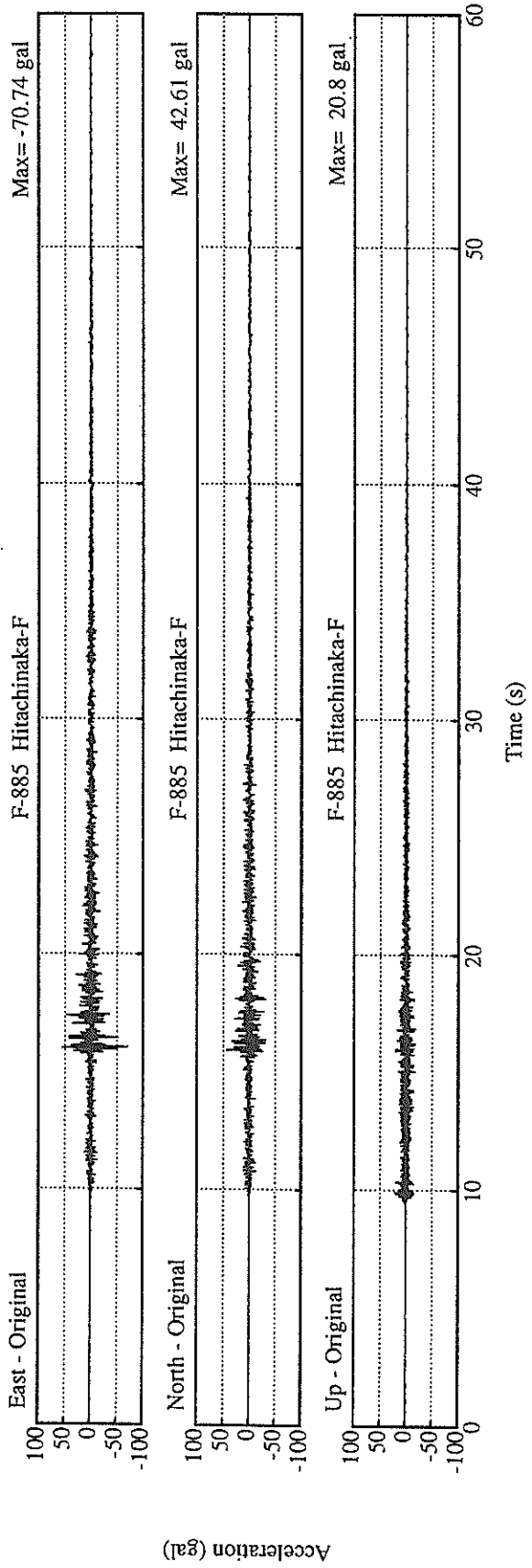
	N S	E W	U D	HORIZONTAL*
FIXED FILTER	0.79	1.63	0.45	1.79
VARIABLE FILTER	0.79	1.47	0.41	1.63

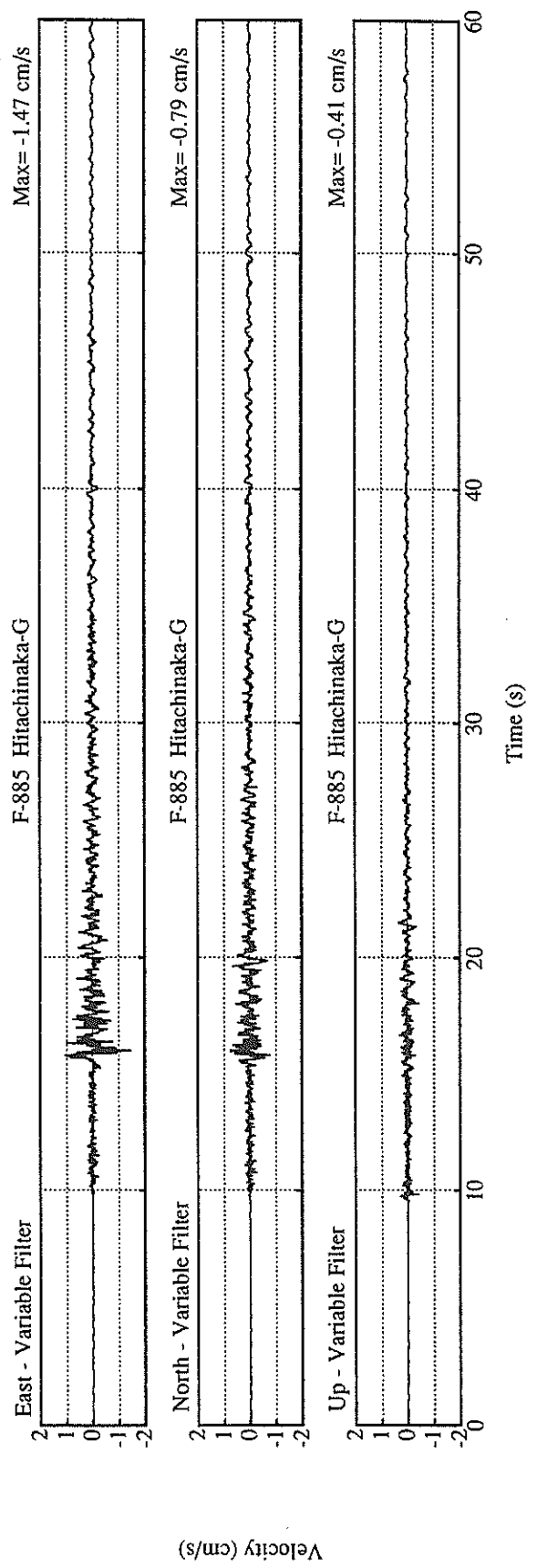
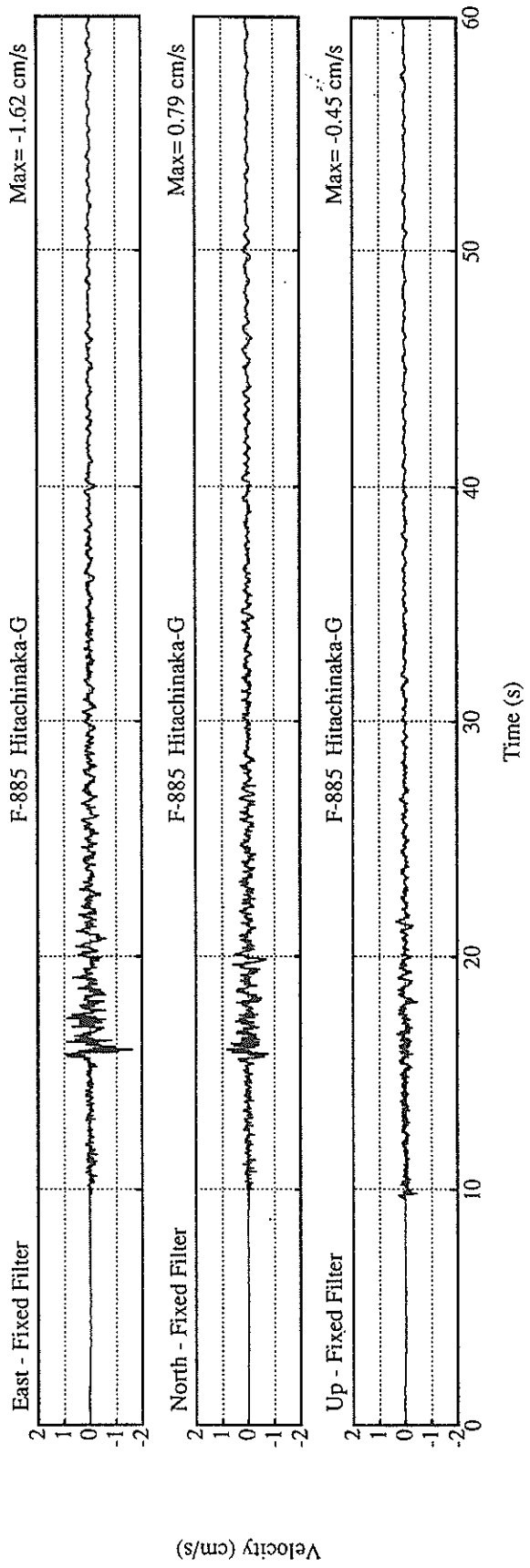
MAXIMUM DISPLACEMENT (CM)

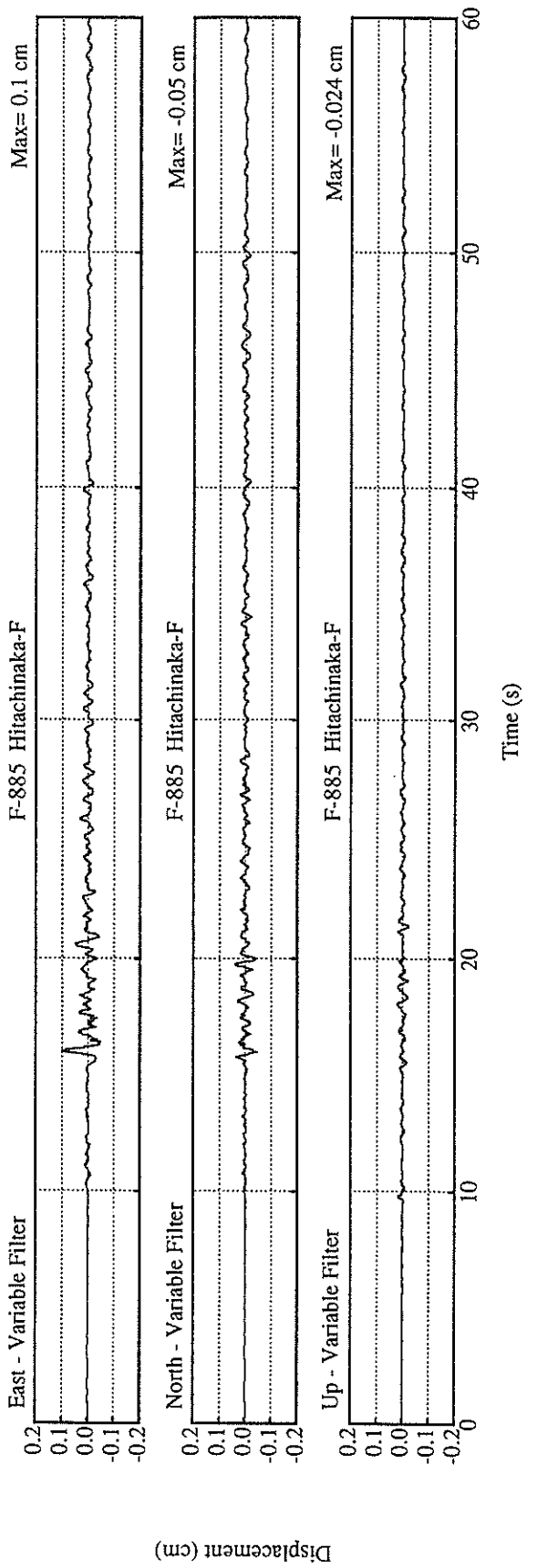
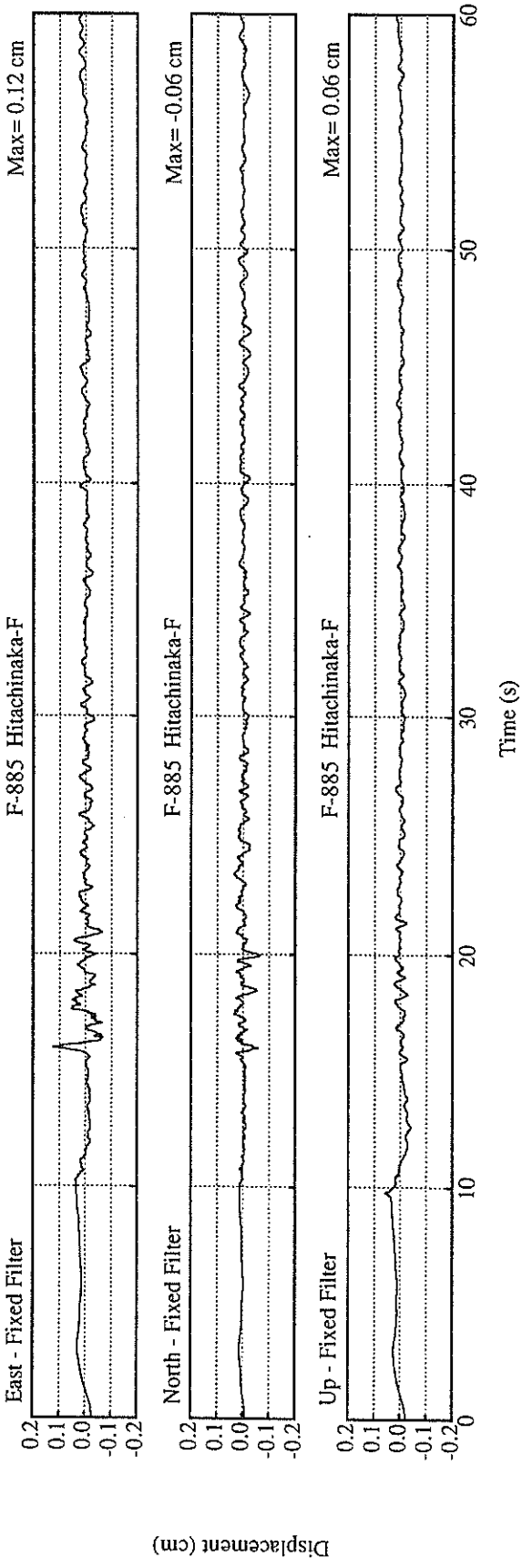
	N S	E W	U D	HORIZONTAL*
FIXED FILTER	0.06	0.12	0.06	0.14
VARIABLE FILTER	0.05	0.10	0.02	0.11

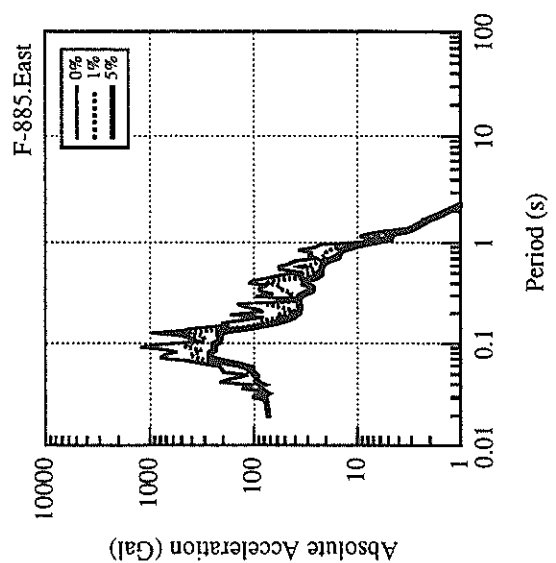
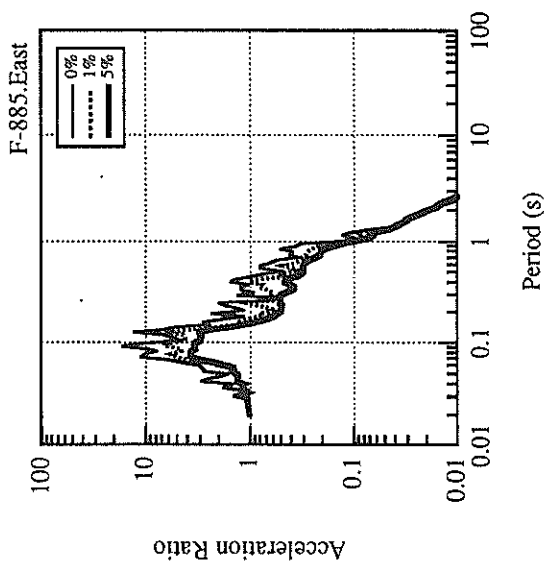
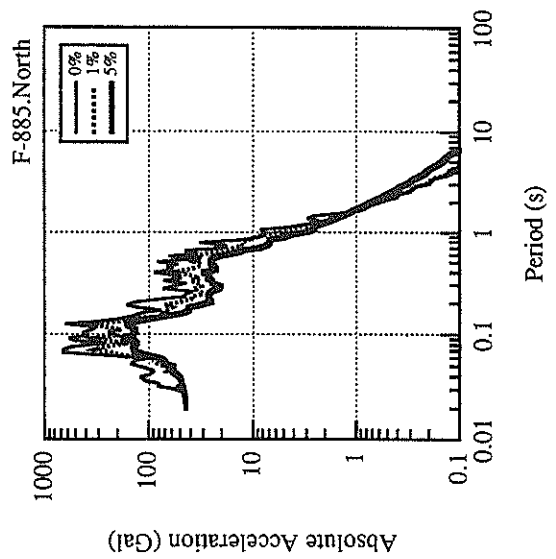
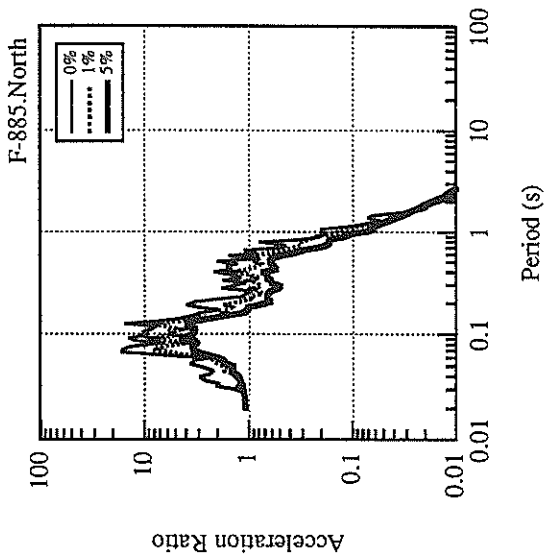
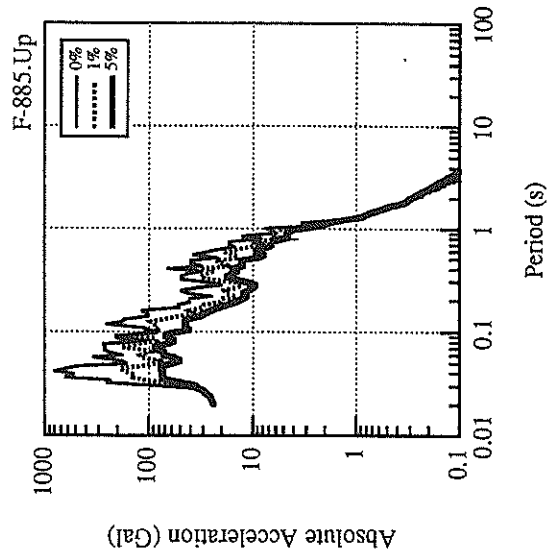
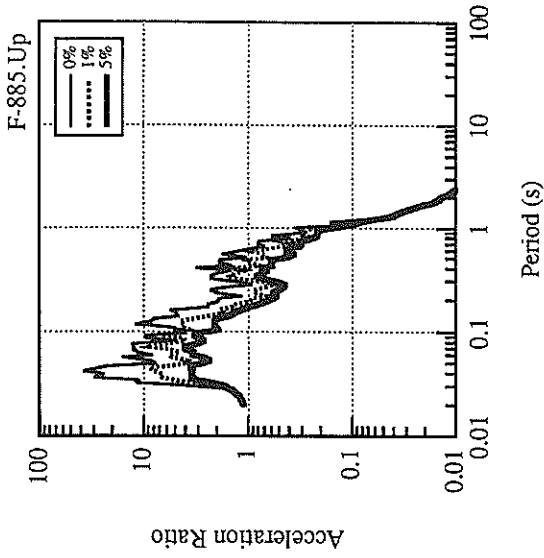
* RESULTANT OF HORIZONTAL COMPONENTS

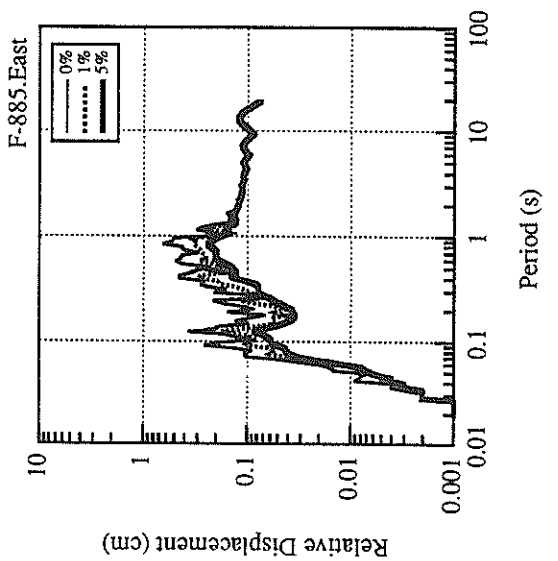
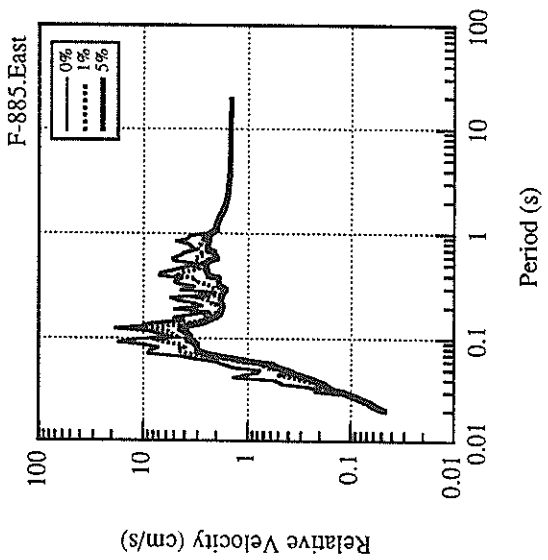
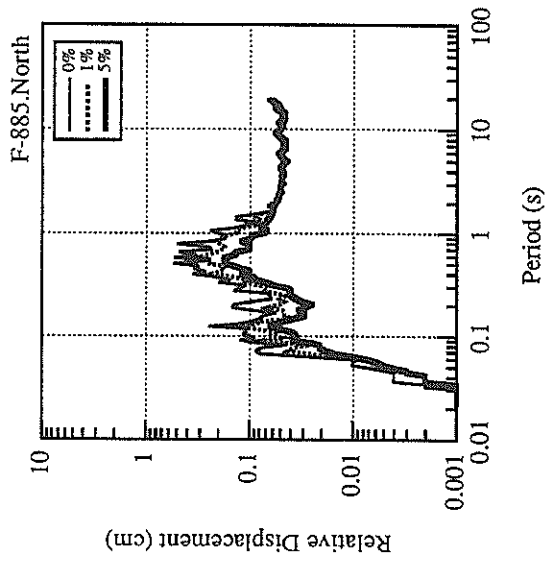
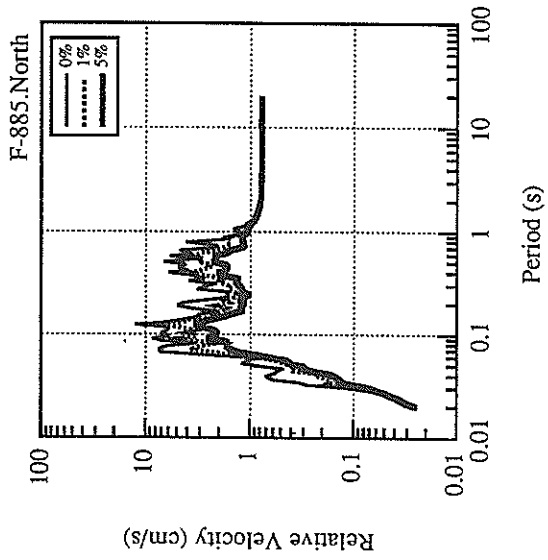
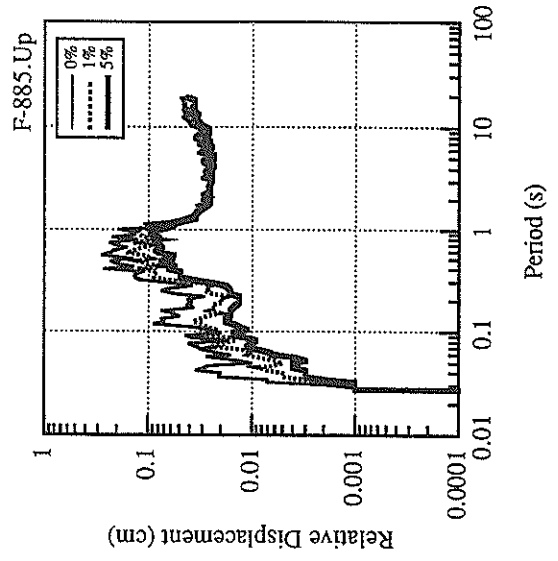
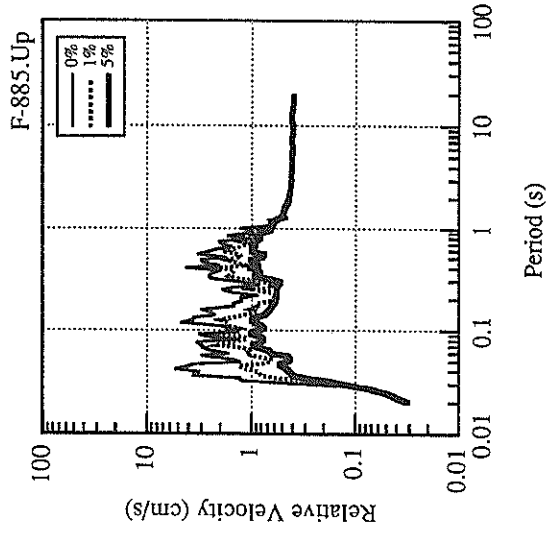


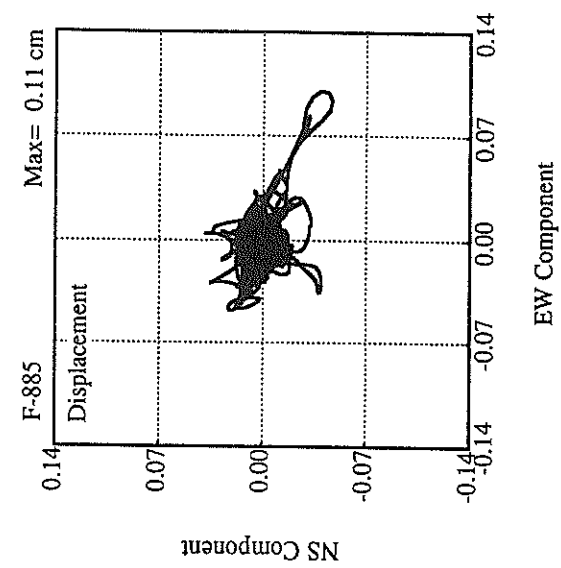
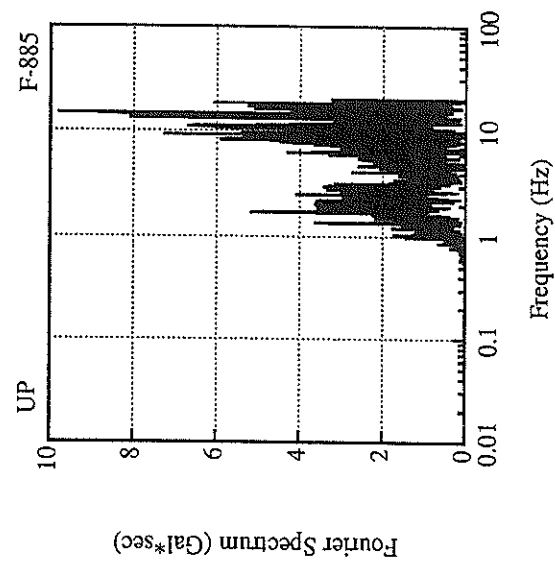
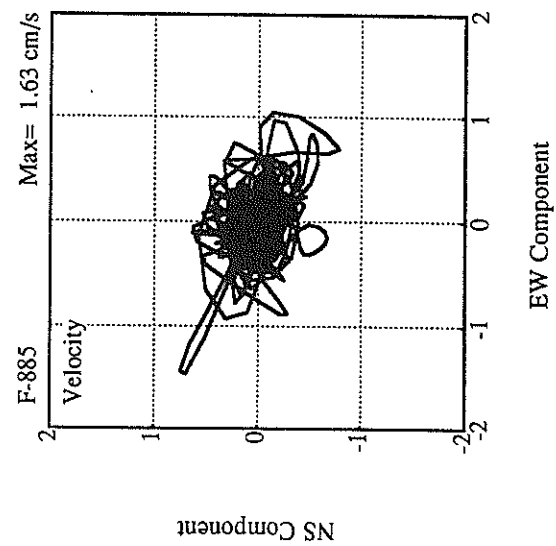
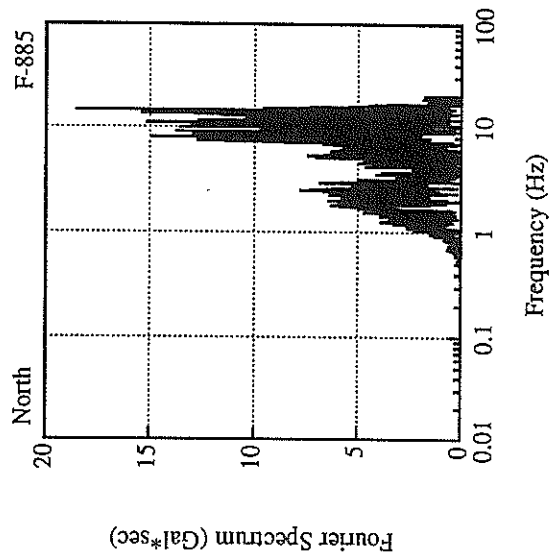
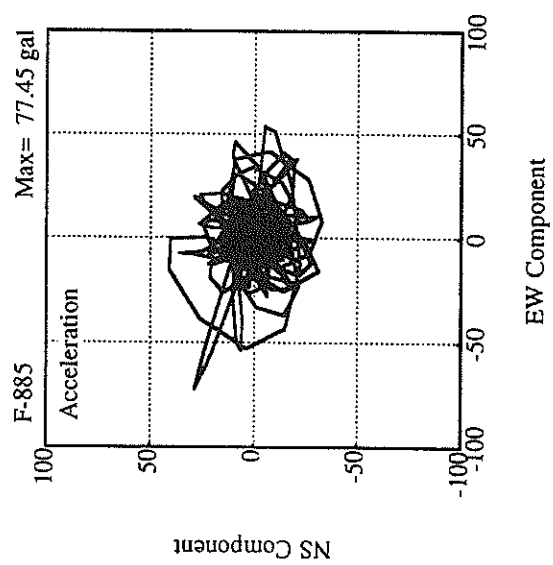
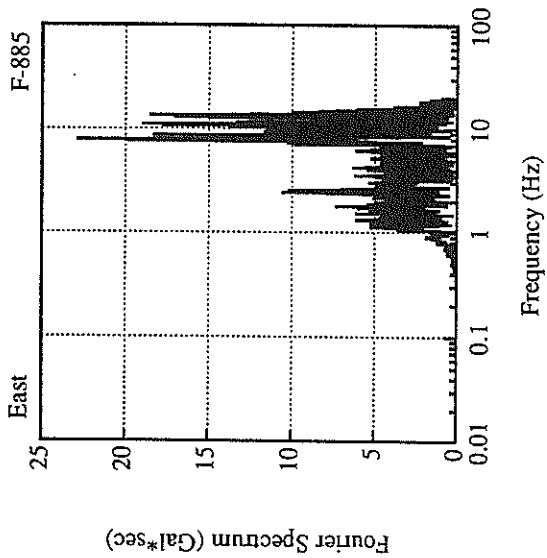












RECORD NUMBER : F-922

STATION : NIIGATA-G

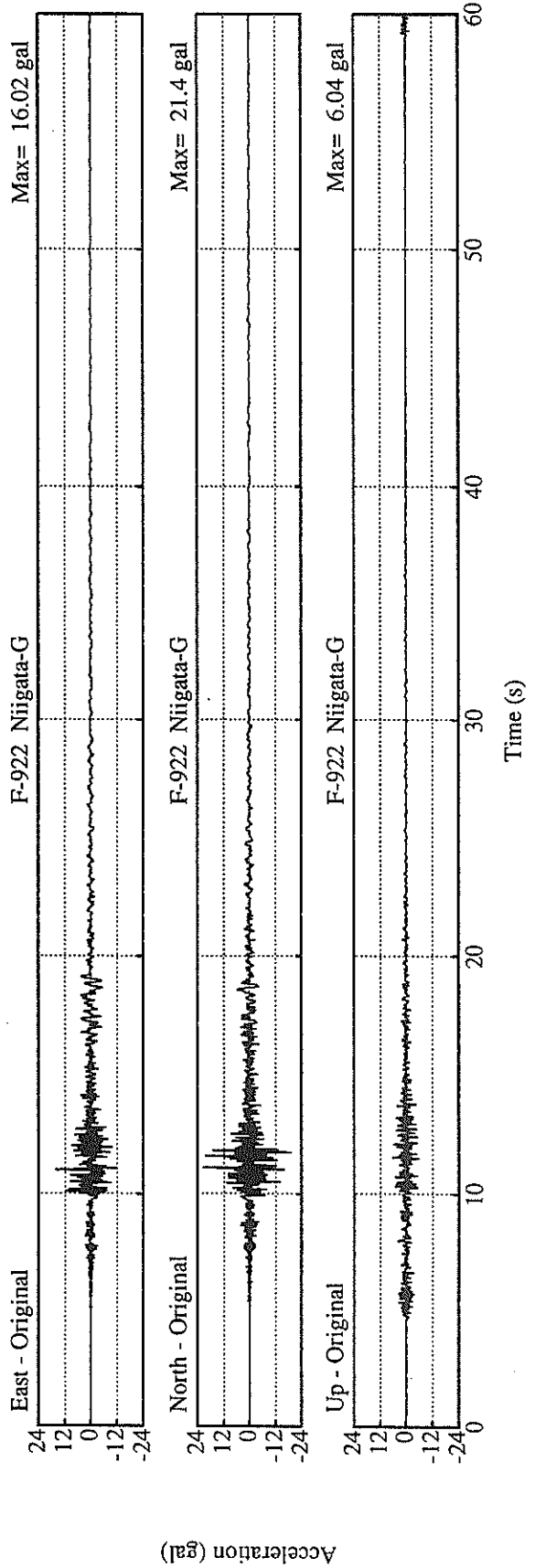
EARTHQUAKE DATA

DATE AND TIME 10:14 APR 15, 1995
LOCATION OF HYPOCENTER
EPICENTRAL REGION NE NIIGATA PREF
LATITUDE 37° 52.5' N
LONGITUDE 139° 15.7' E
DEPTH 8.4KM
JMA MAGNITUDE 4.2

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	21.4	16.0	6.0	21.7

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : S-2633

STATION : TAGONOURA-S

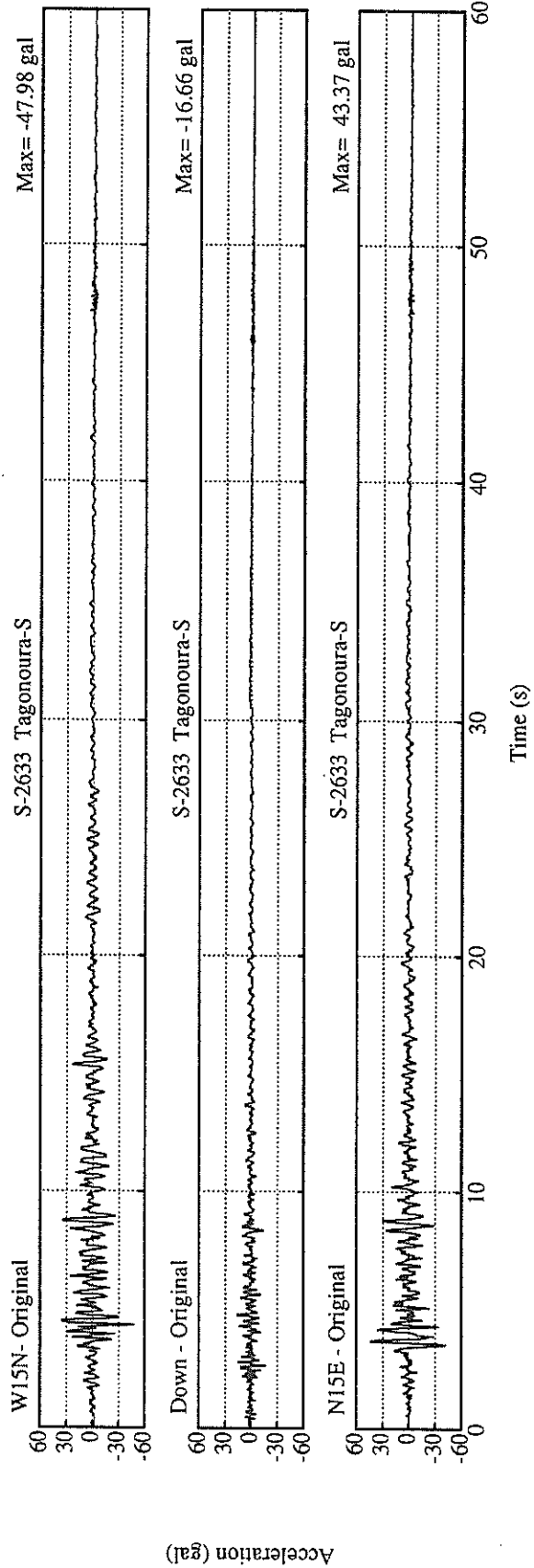
EARTHQUAKE DATA

 DATE AND TIME : 20:26 APR 18, 1995
 LOCATION OF HYPOCENTER : NORTHERN SURUGA BAY REG
 EPICENTRAL REGION : 35° 3.7' N
 LATITUDE : 138° 35.3' E
 LONGITUDE : 24.1KM
 DEPTH : 4.5
 JMA MAGNITUDE : 4.5

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	43.4	48.0	16.7	54.4

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-868

STATION : MIYAKO-G

EARTHQUAKE DATA

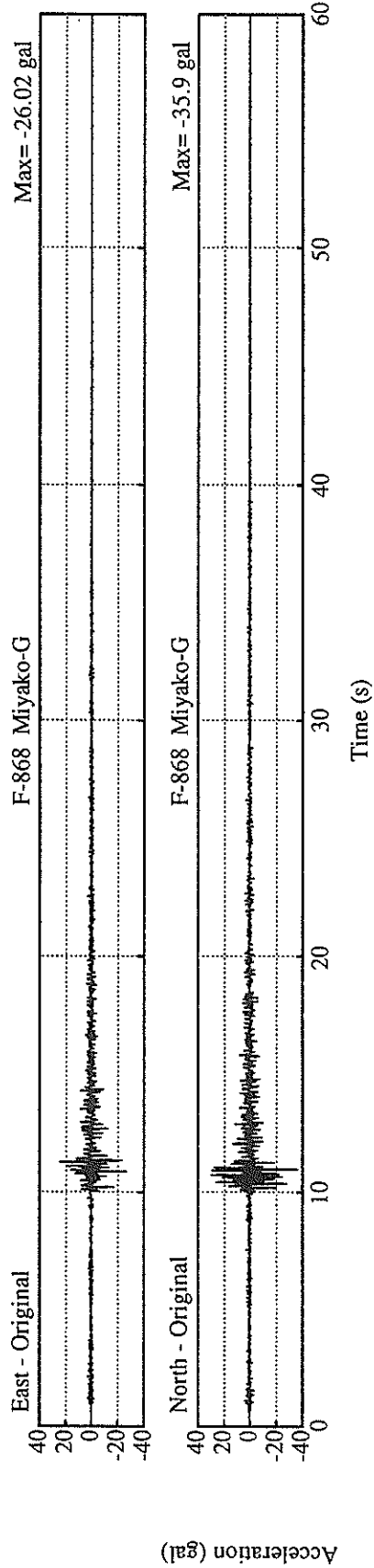
 DATE AND TIME 14:15 MAY 7,1995
 LOCATION OF HYPOCENTER NE OFF IWATE PREF
 EPICENTRAL REGION 40° 3.6' N
 LATITUDE 142° 46.3' E
 LONGITUDE 27.6KM
 DEPTH 4.3
 JMA MAGNITUDE 4.3

PEAK VALUES OF COMPONENTS

N	S	E	W	U	D	HORIZONTAL*
35.9	26.0	36.0				

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-859

STATION : MATSUYAMA-G

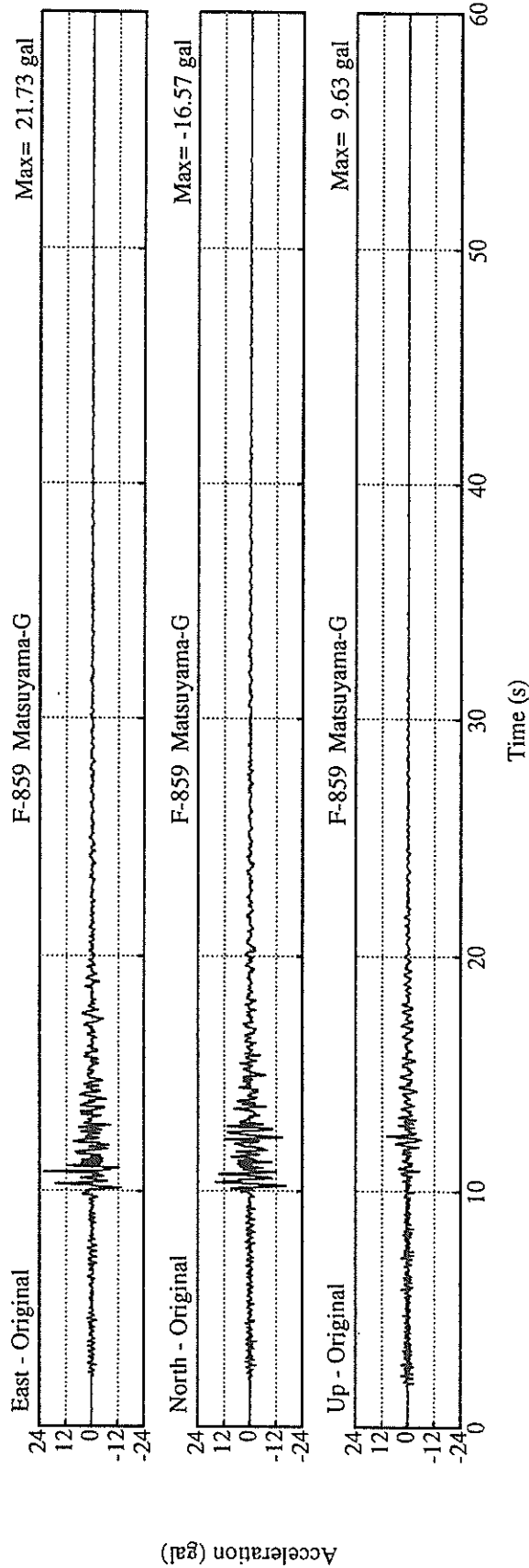
EARTHQUAKE DATA

 DATE AND TIME 5:39 MAY 10, 1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION IYONADA SEIONAIKAI
 LATITUDE 33° 35.8' N
 LONGITUDE 132° 17.9' E
 DEPTH 57.4KM
 JMA MAGNITUDE 4.4

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	16.6	21.7	9.6	24.7

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-940

STATION : WAKAYAMA-G

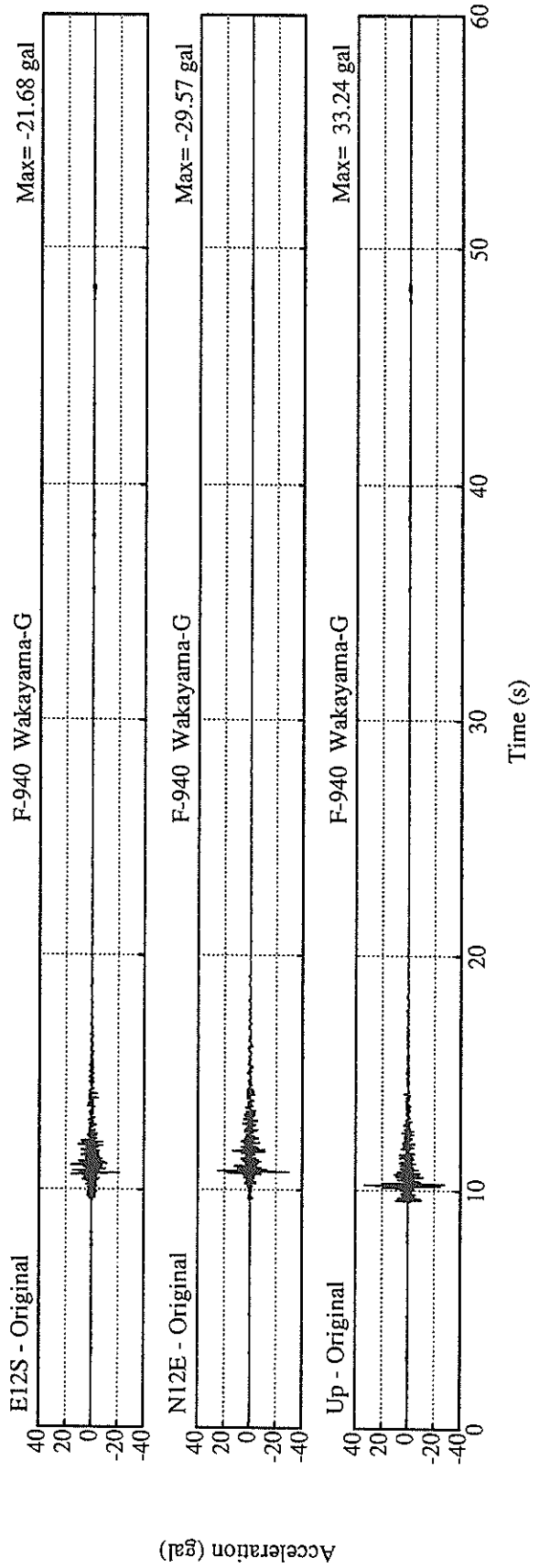
EARTHQUAKE DATA

 DATE AND TIME 18:29 MAY 16, 1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34° 13.1' N
 LONGITUDE 135° 11.3' E
 DEPTH 7.9KM
 JMA MAGNITUDE 2.9

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	29.6	21.7	33.2	30.1

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-955

STATION : HITACHINAKA-F

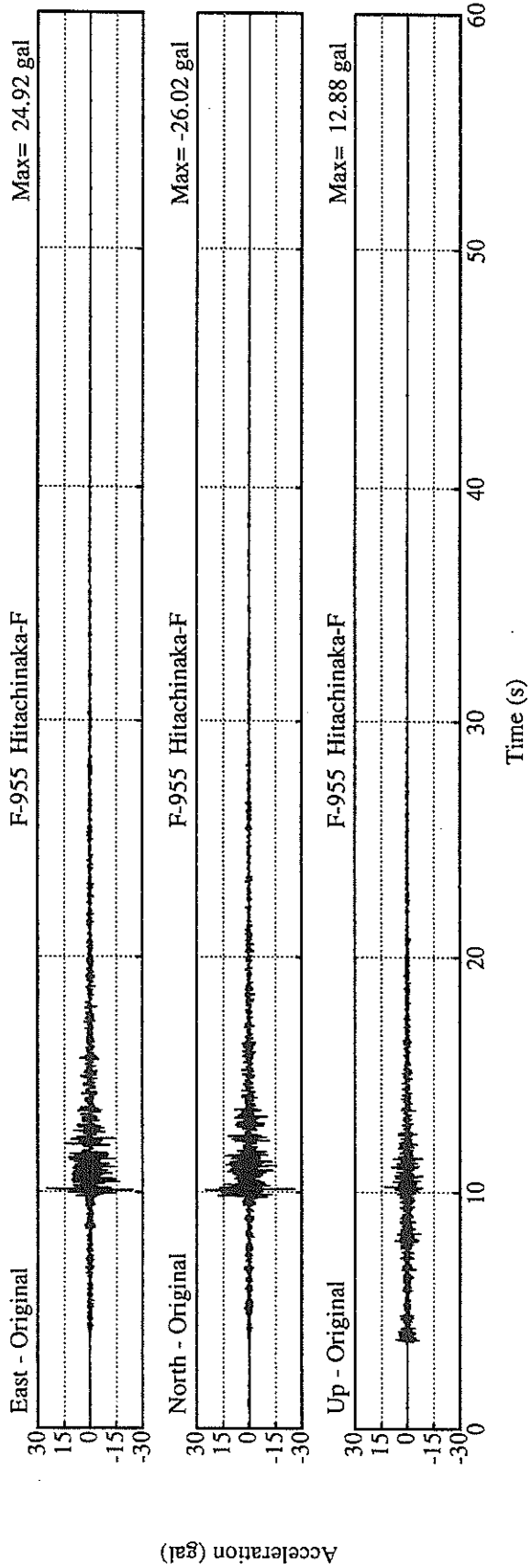
EARTHQUAKE DATA

 DATE AND TIME : 22:33 MAY 29, 1995
 LOCATION OF HYPOCENTER : NORTHERN IBARAKI PREF
 EPICENTRAL REGION : 36° 32.5' N
 LATITUDE : 140° 41.9' E
 LONGITUDE : 52.2KM
 DEPTH : 3.8
 JMA MAGNITUDE : 3.8

PEAK VALUES OF COMPONENTS

	N	S	E	W	U	D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	26.0	24.9	24.9	12.9	36.0		

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-942

STATION : WAKAYAMA-G

EARTHQUAKE DATA

 DATE AND TIME 18: 8 JUNE 6,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34° 11.7' N
 LONGITUDE 135° 13.4' E
 DEPTH 5.5KM
 JMA MAGNITUDE 3.3

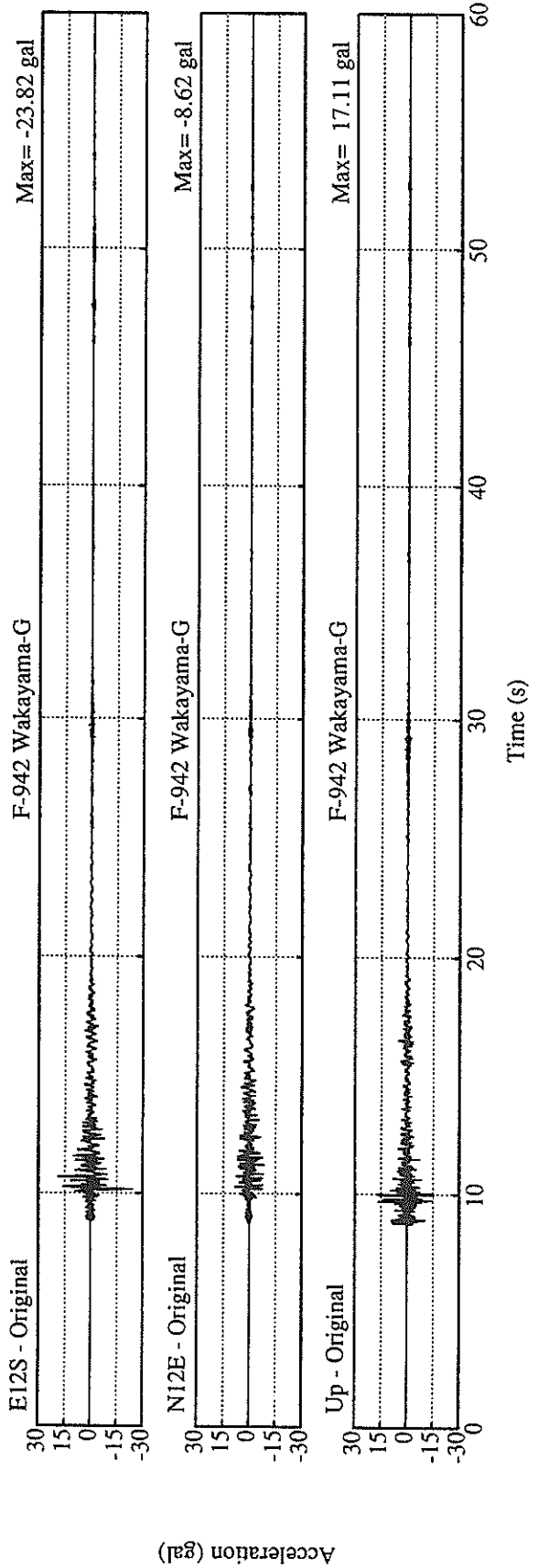
PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*

8.6	23.8	17.1	24.0

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-943

STATION : WAKAYAMA-G

EARTHQUAKE DATA

DATE AND TIME : 0:52 JUNE 7, 1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION : NW WAKAYAMA PREF

LATITUDE : 34° 11.6' N

LONGITUDE : 135° 12.7' E

DEPTH : 4.2KM

JMA MAGNITUDE : 3.8

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.646	0.695	0.835	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) : 0.646 0.695 0.835

MAXIMUM ACCELERATION (GAL)

	N S	E W	U D	HORIZONTAL*
SMAC-B2 EQUIVALENT	15.2	27.1	28.4	28.3
ORIGINAL	34.8	55.3	82.9	55.5
CORRECTED	32.7	51.9	79.9	52.2

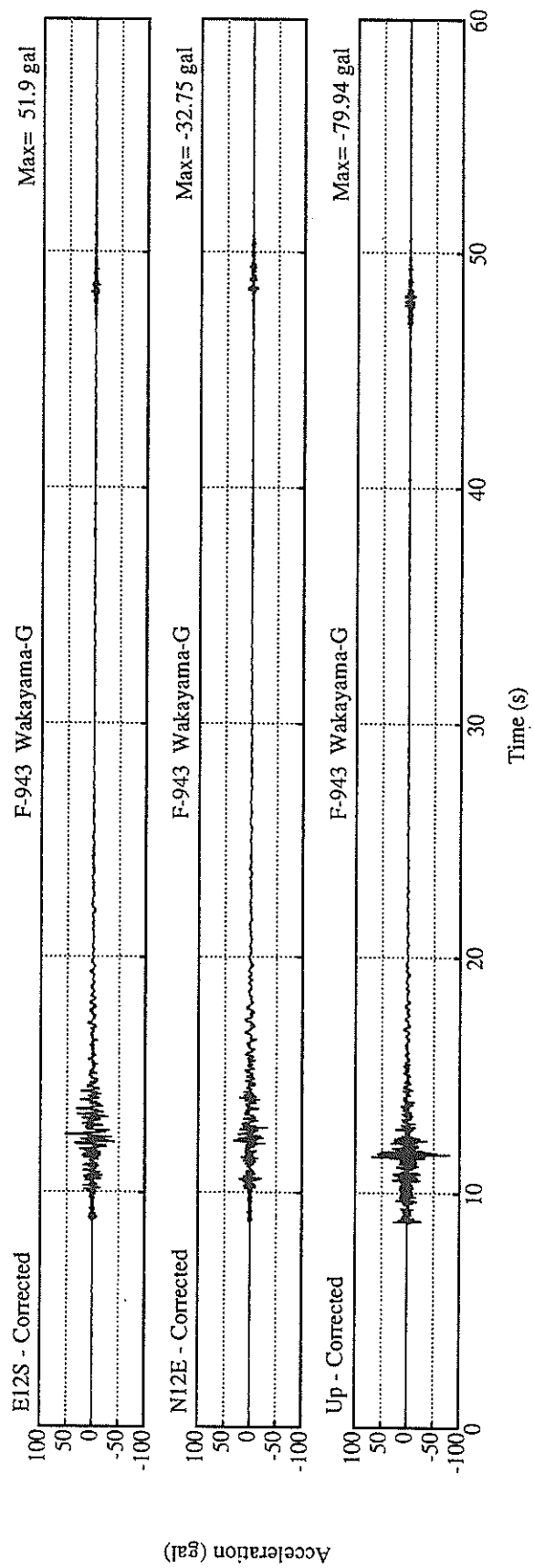
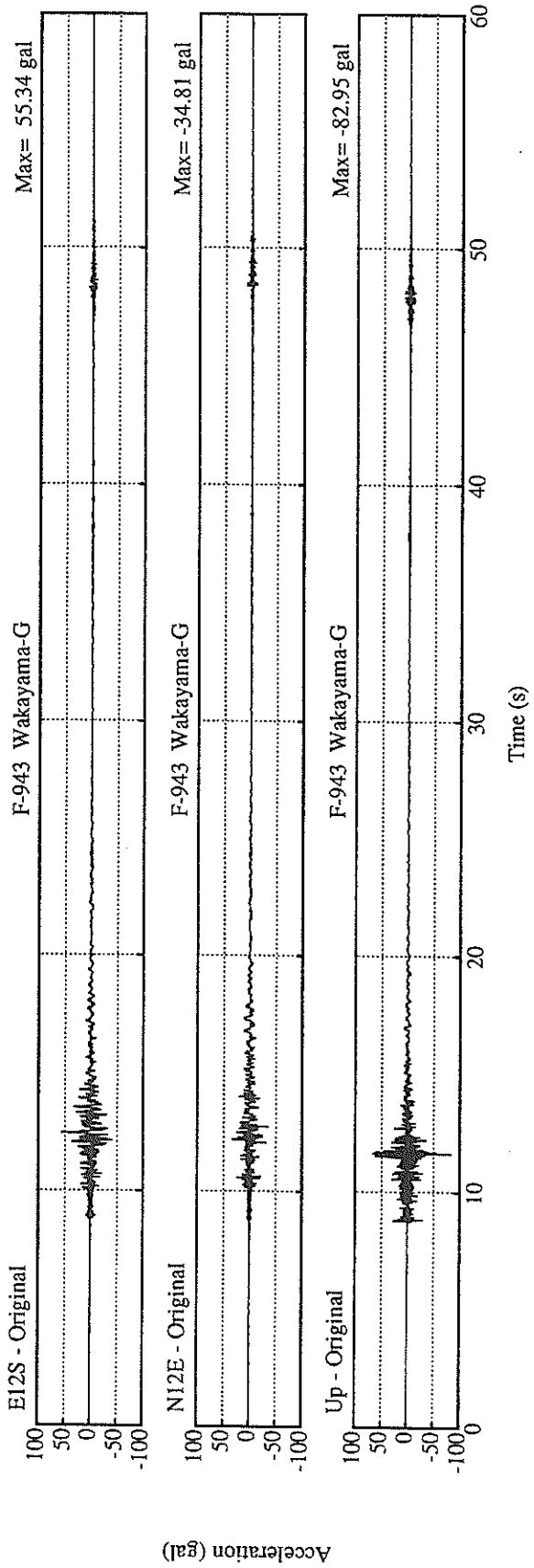
MAXIMUM VELOCITY (CM/SEC)

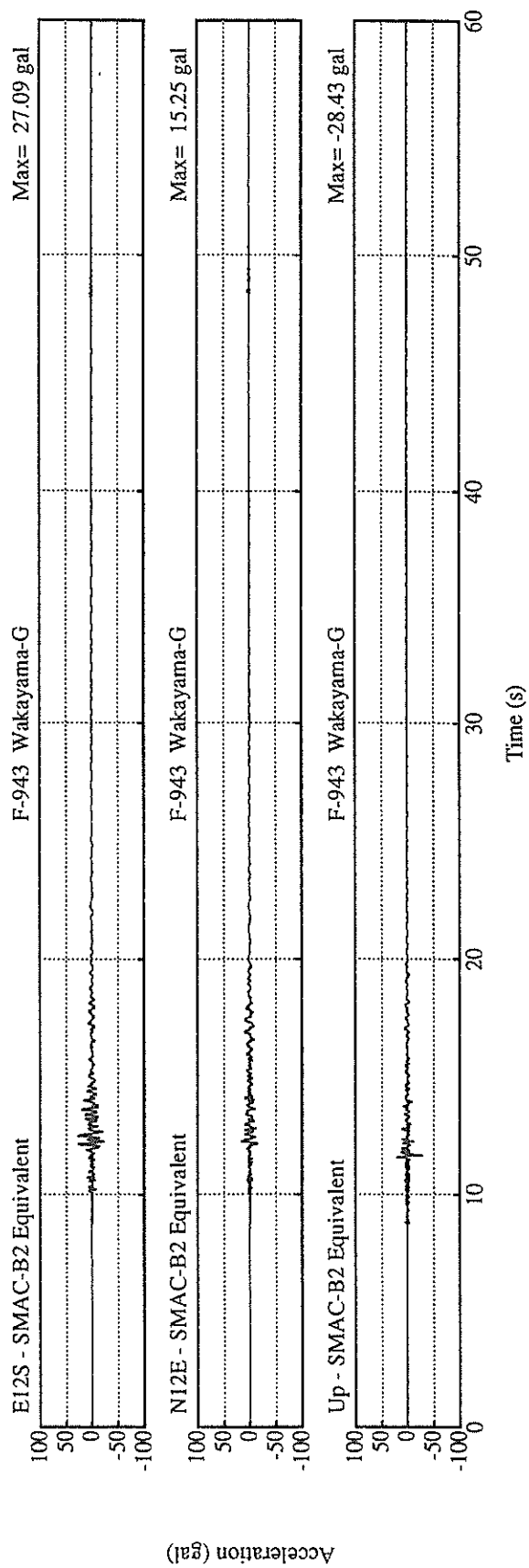
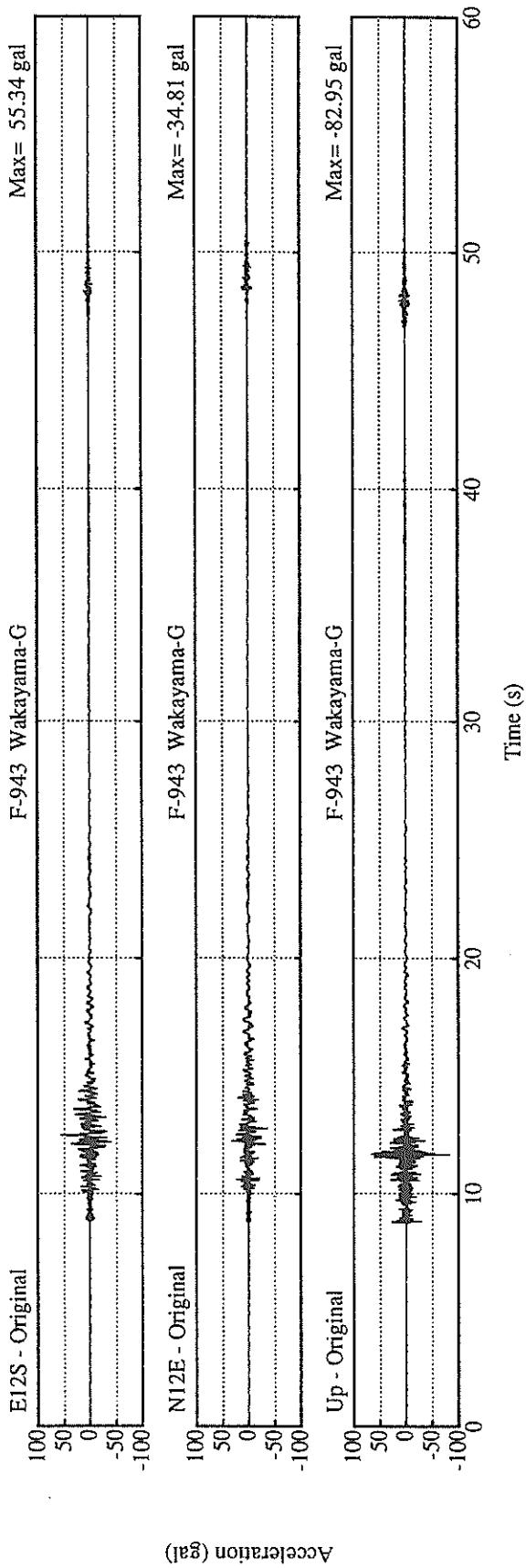
	N S	E W	U D	HORIZONTAL*
FIXED FILTER	0.99	1.57	1.22	1.60
VARIABLE FILTER	0.98	1.52	1.22	1.63

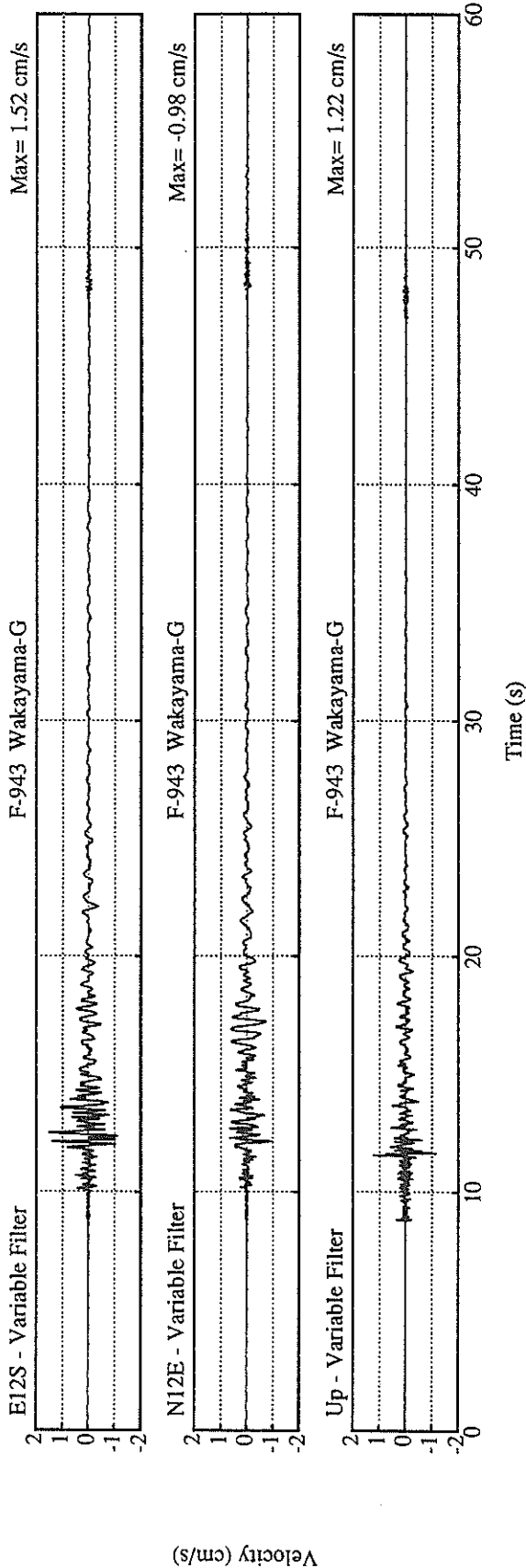
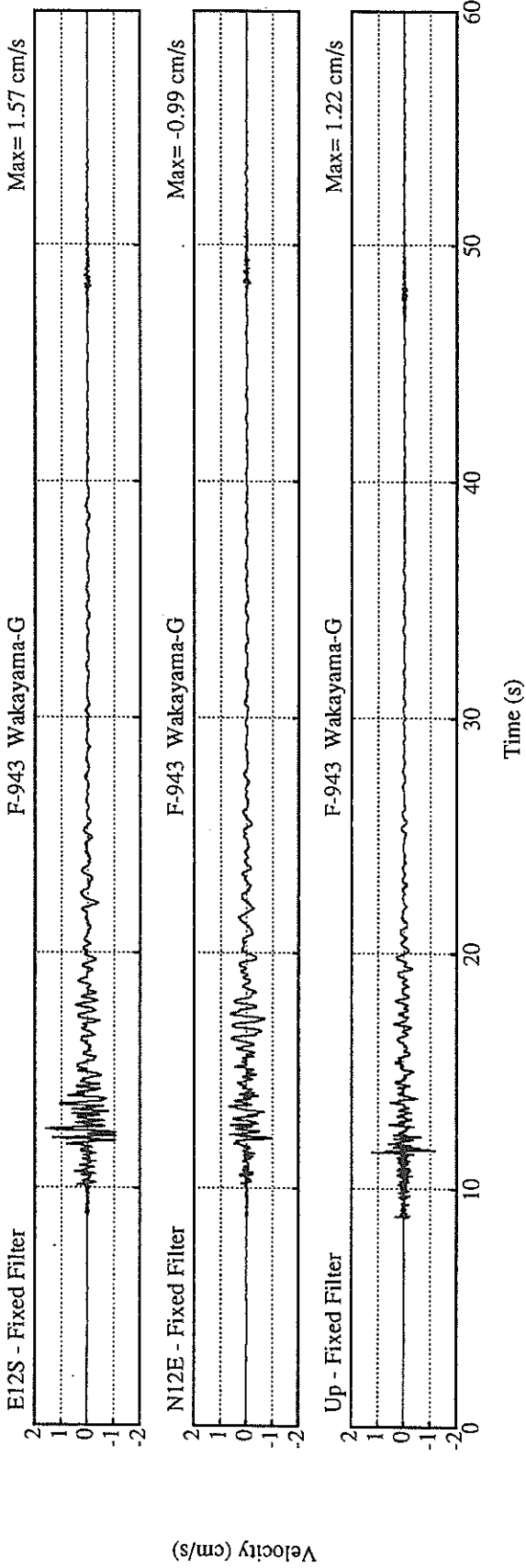
MAXIMUM DISPLACEMENT (CM)

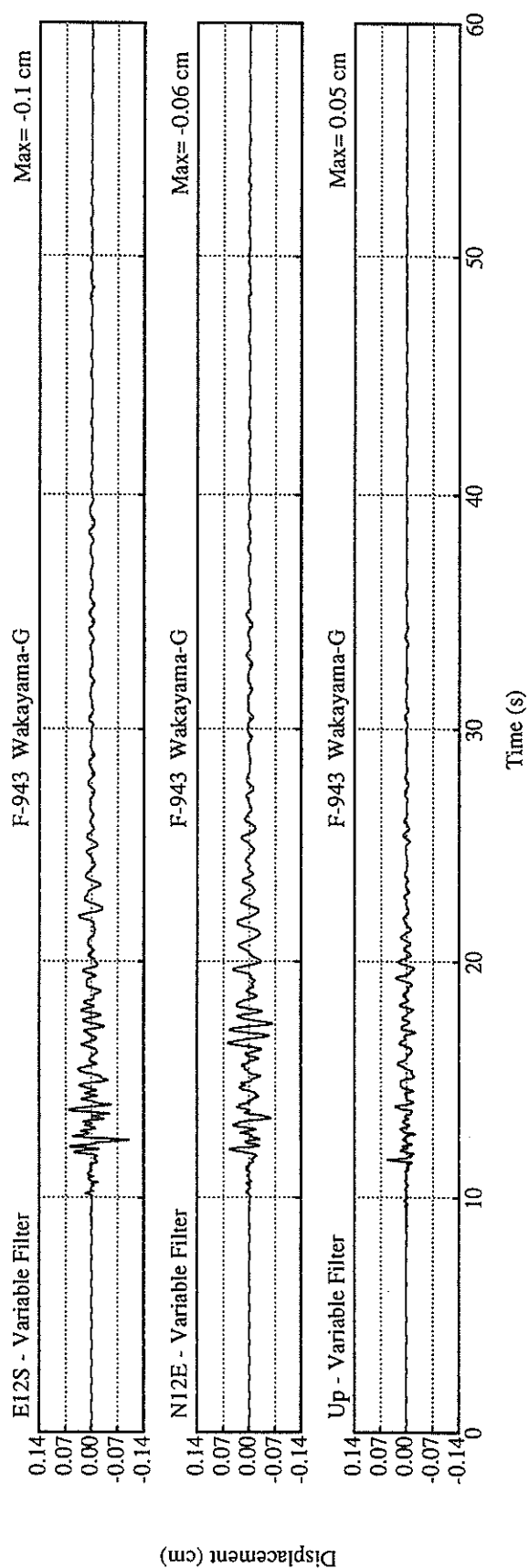
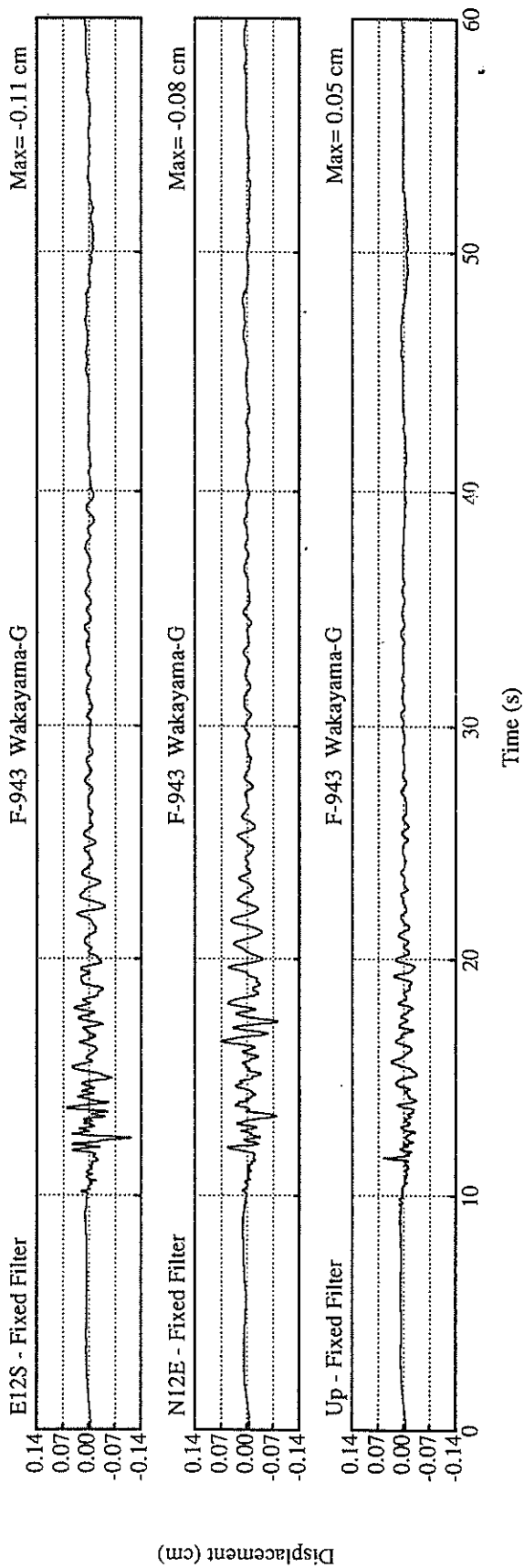
	N S	E W	U D	HORIZONTAL*
FIXED FILTER	0.08	0.11	0.05	0.11
VARIABLE FILTER	0.06	0.10	0.05	0.10

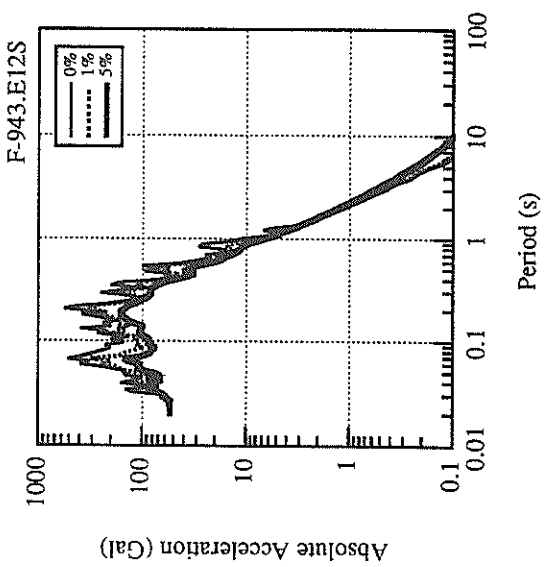
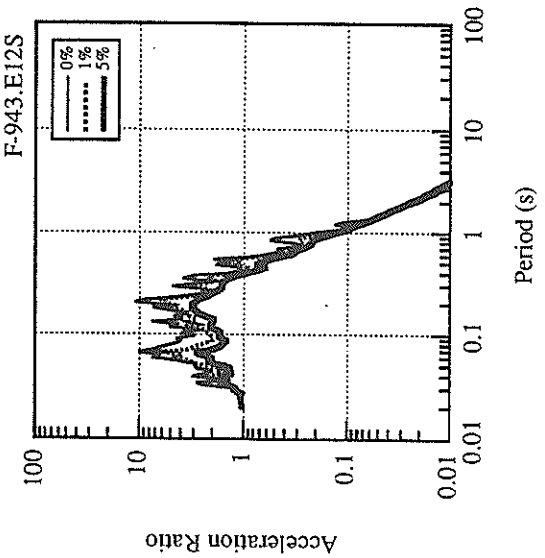
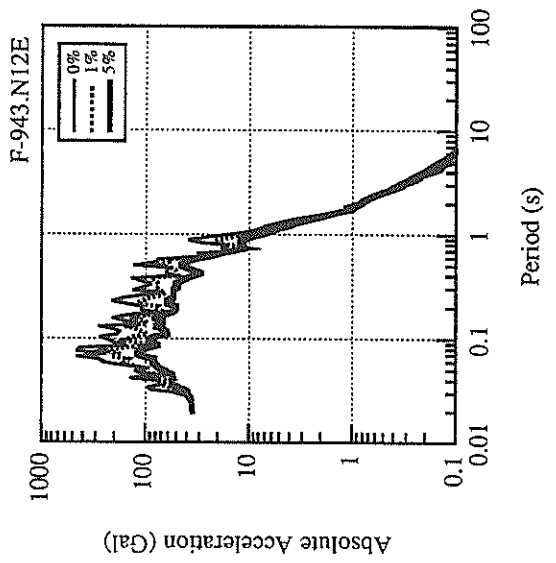
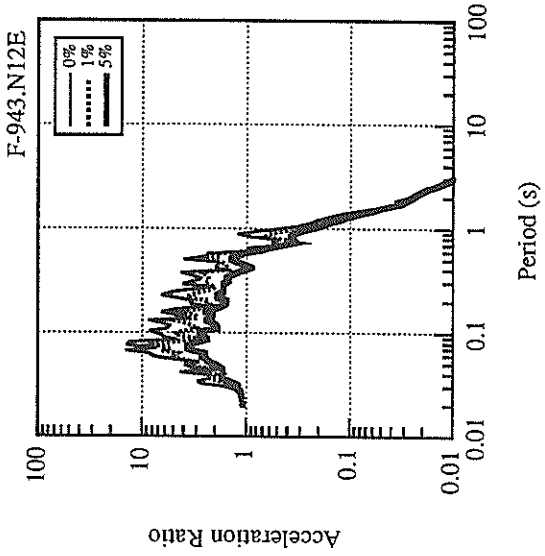
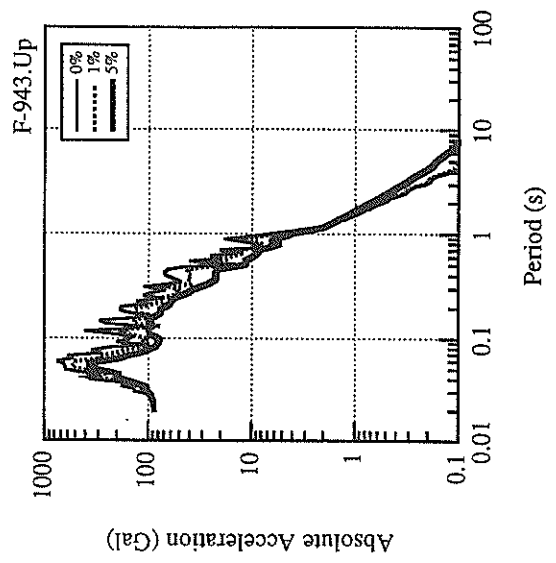
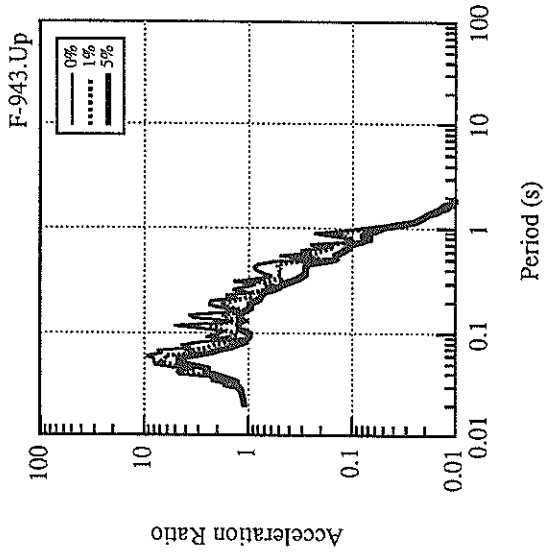
* RESULTANT OF HORIZONTAL COMPONENTS

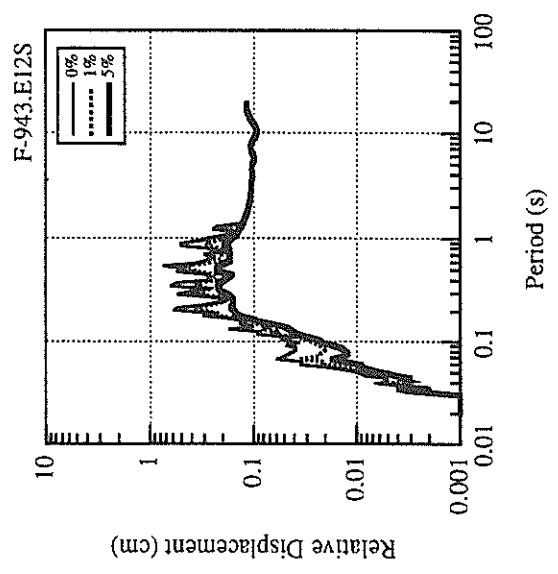
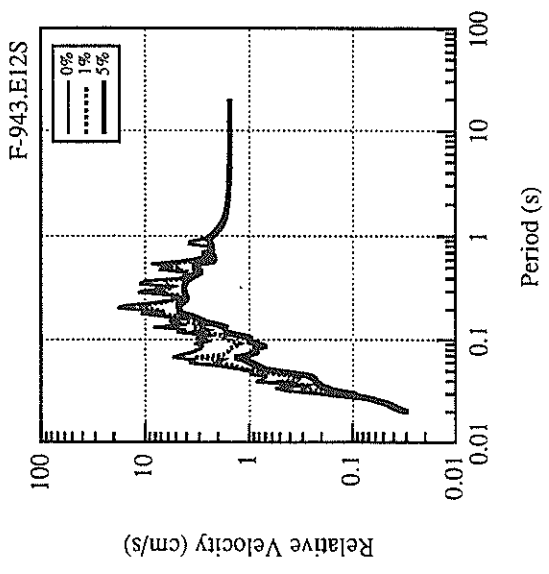
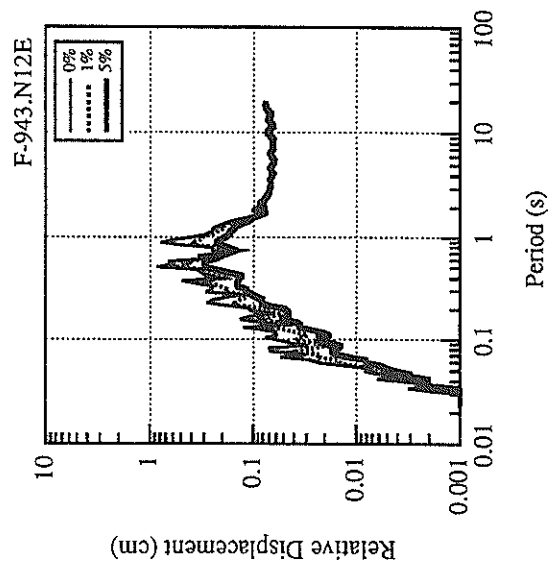
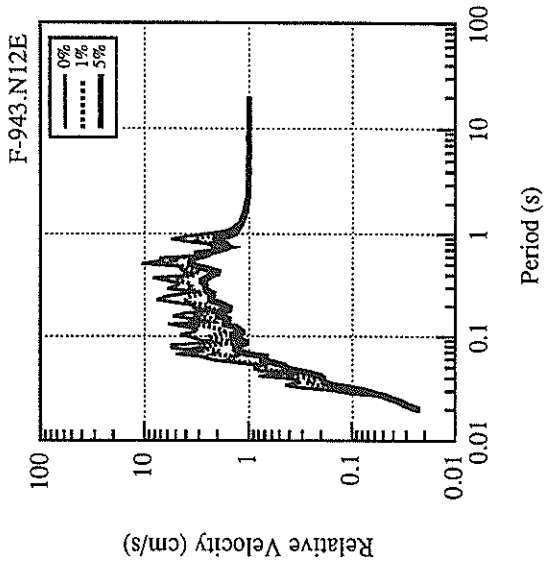
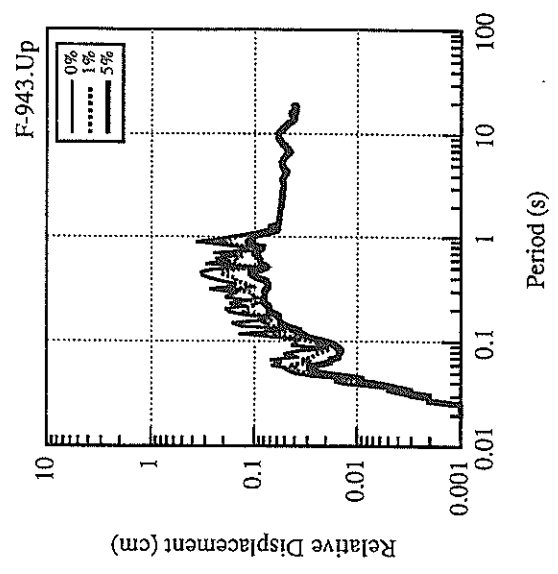
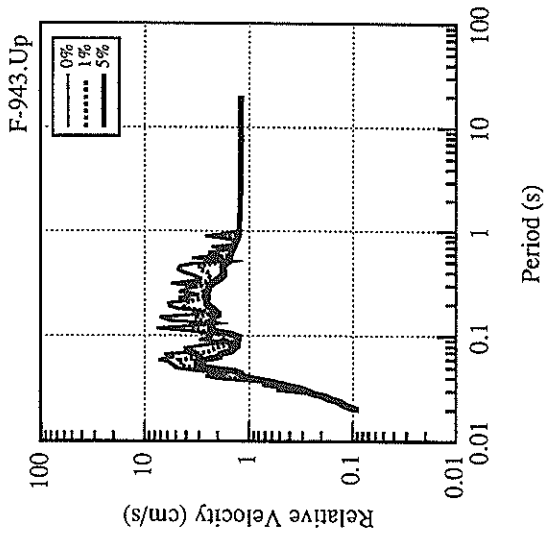


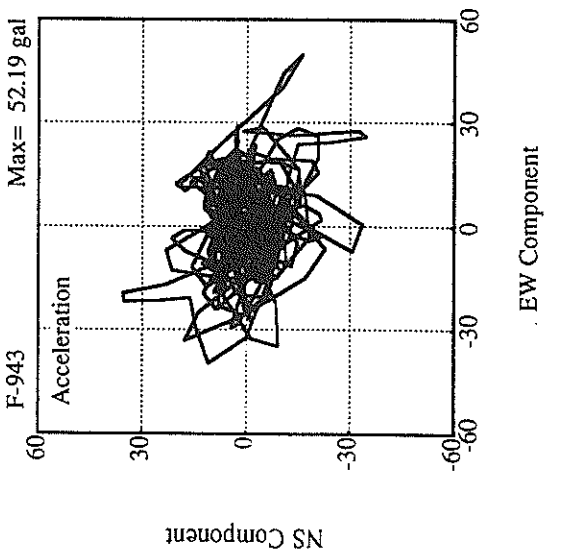
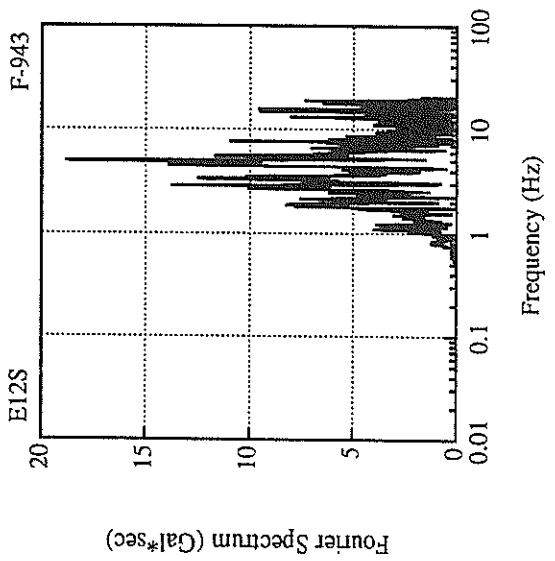
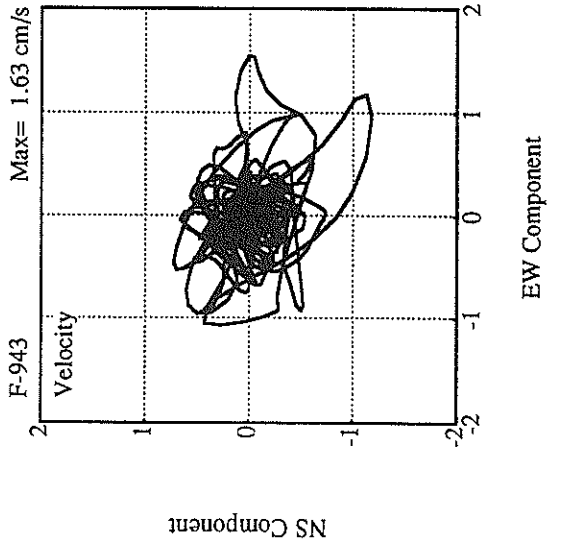
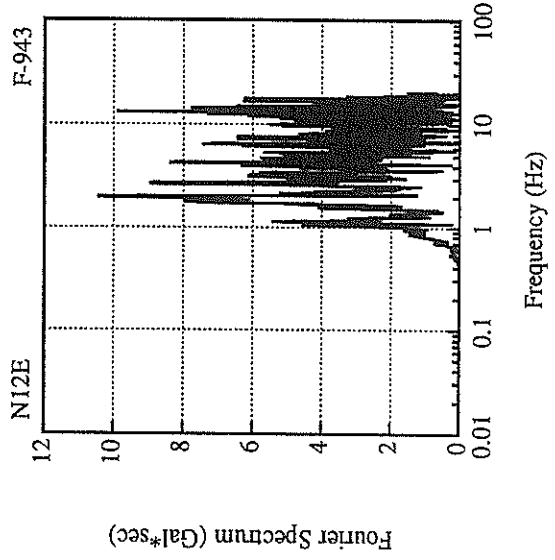
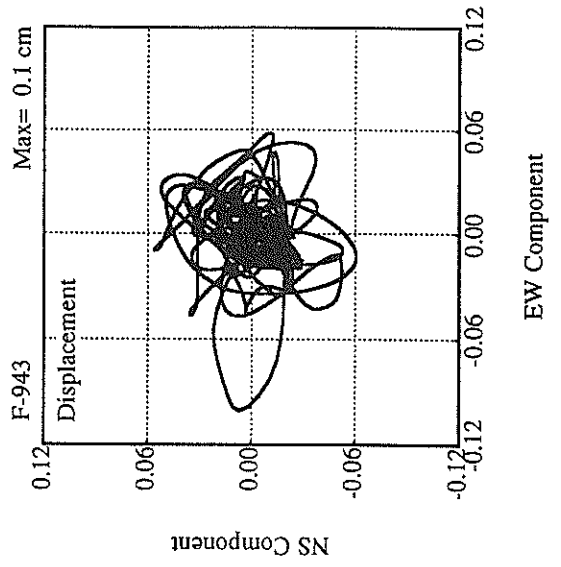
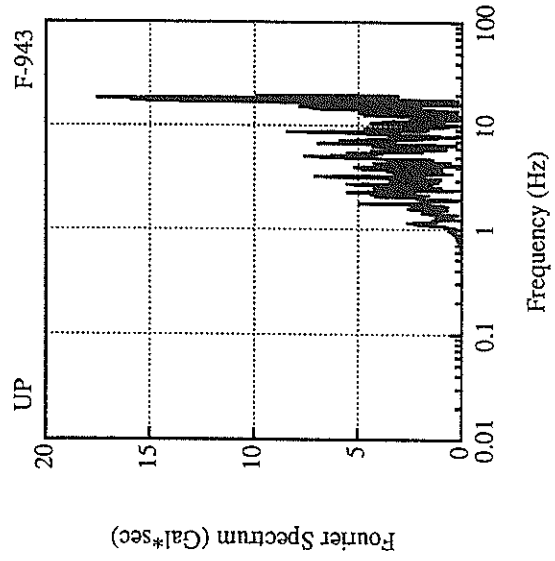












RECORD NUMBER : F-944

STATION : WAKAYAMA-G

EARTHQUAKE DATA

 DATE AND TIME 2:12 JUNE 7,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34° 11.1' N
 LONGITUDE 135° 12.0' E
 DEPTH 9.8KM
 JMA MAGNITUDE 3.6

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.799	0.842	1.092	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.799 0.842 1.092

MAXIMUM ACCELERATION (GAL)

	21.7	20.6	24.1	25.5
SMAC-B2 EQUIVALENT ORIGINAL	43.0	49.2	97.6	51.9
CORRECTED	42.0	48.5	95.4	53.0

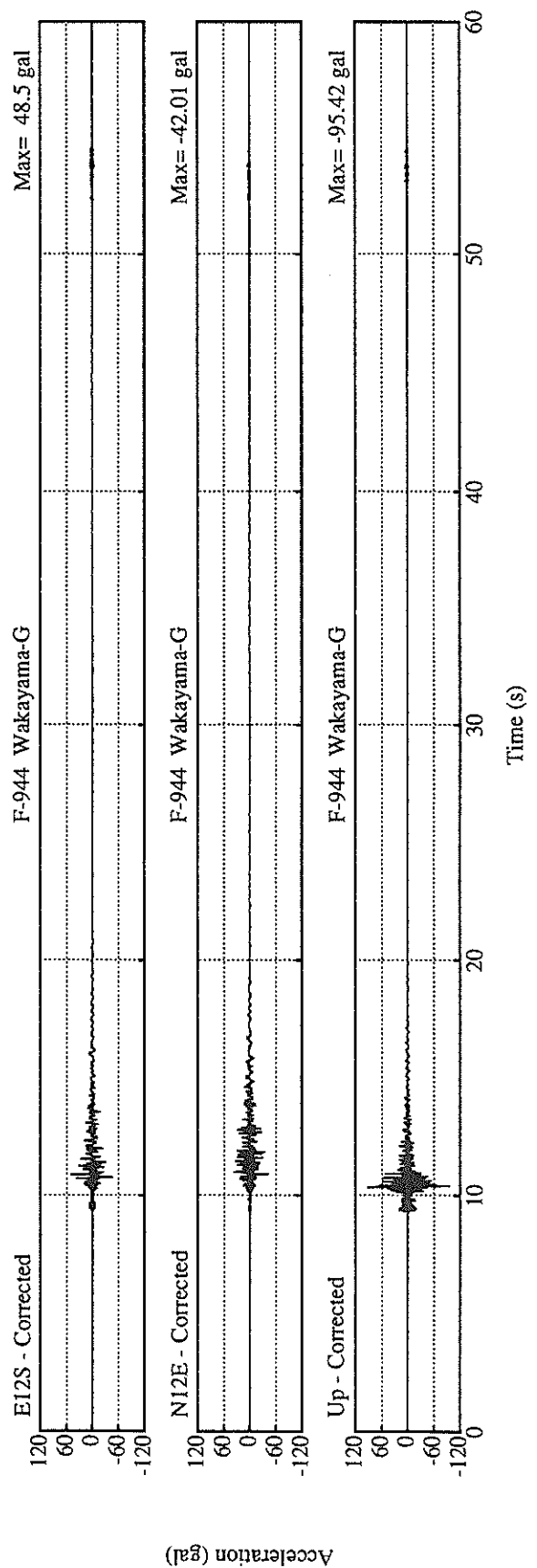
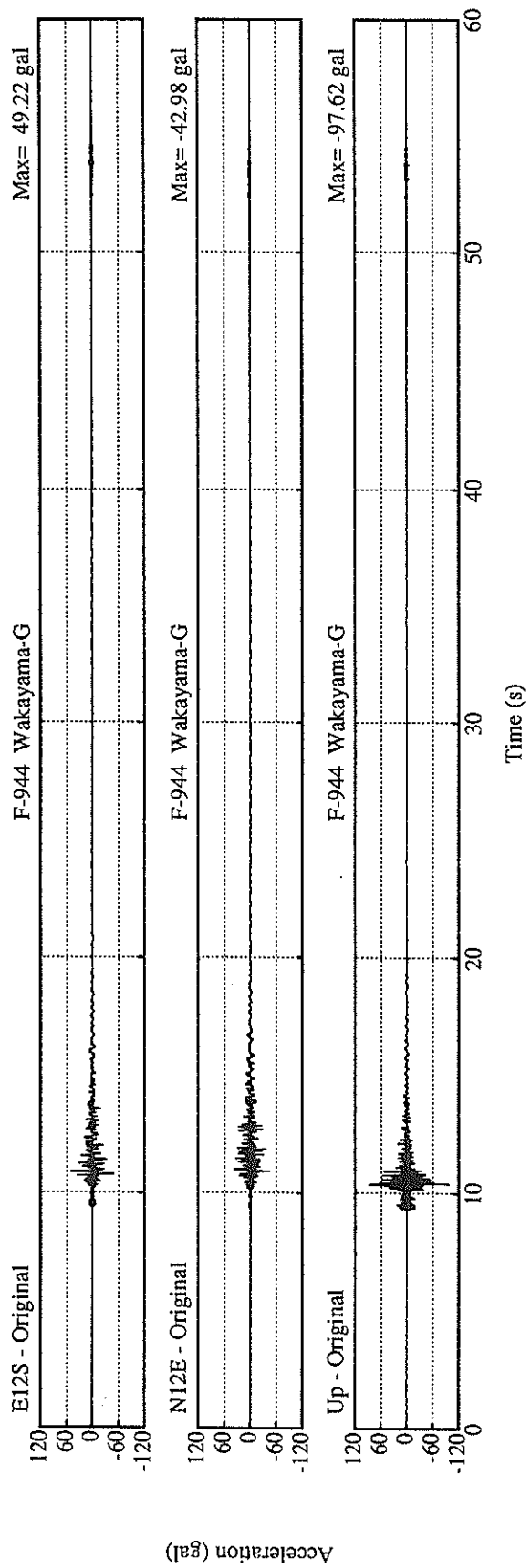
MAXIMUM VELOCITY (CM/SEC)

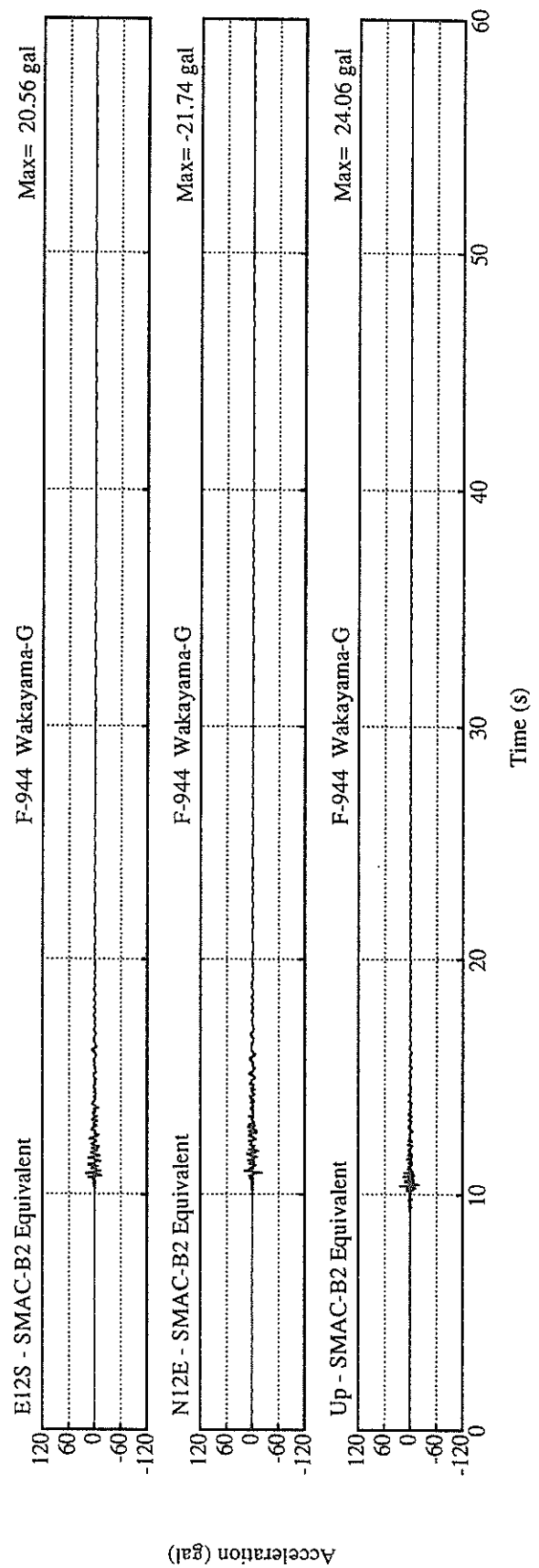
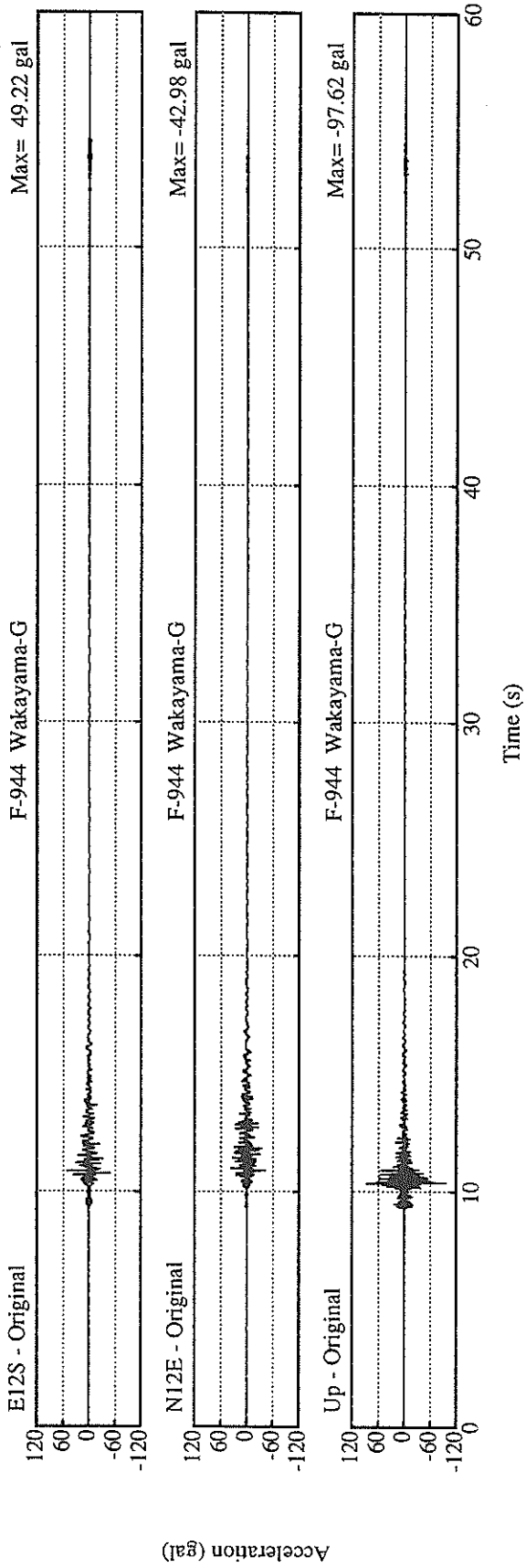
FIXED FILTER	1.19	1.02	1.54	1.24
VARIABLE FILTER	1.14	1.03	1.54	1.21

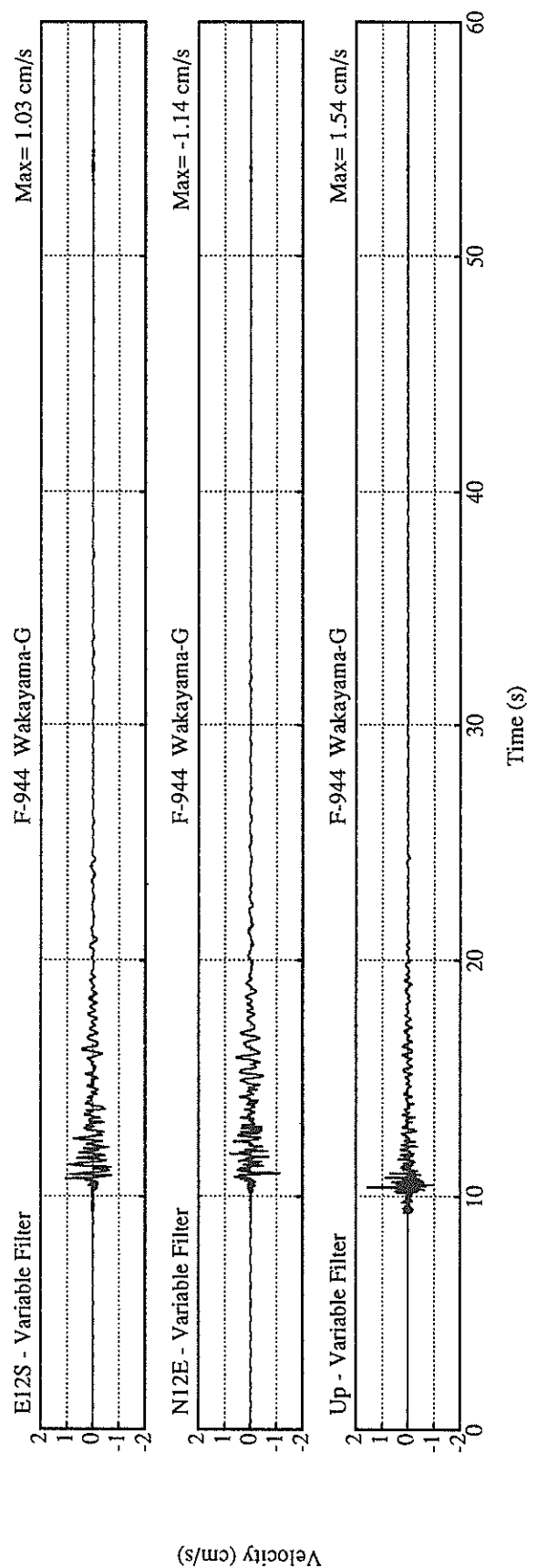
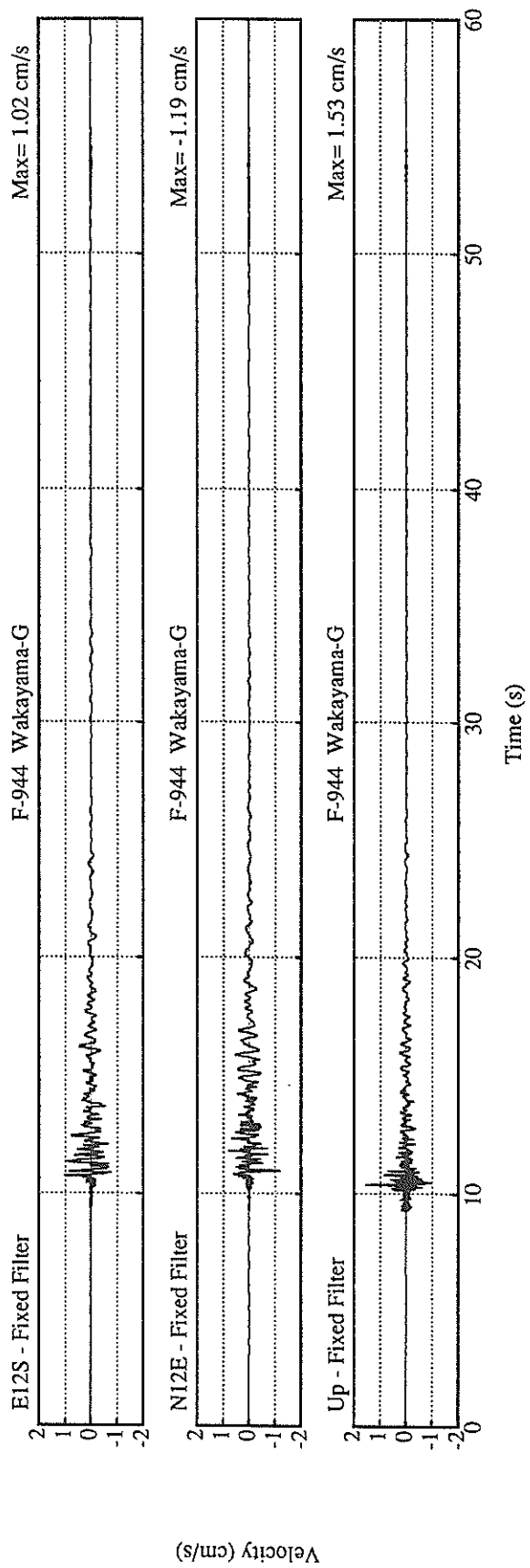
MAXIMUM DISPLACEMENT (CM)

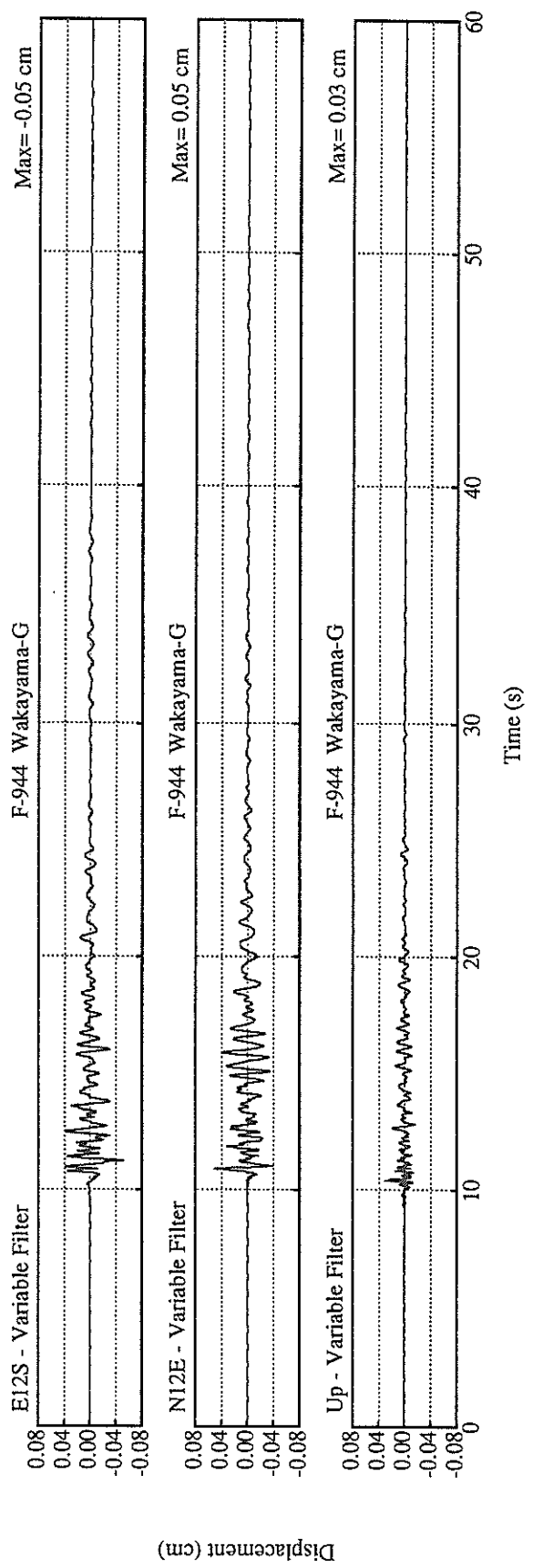
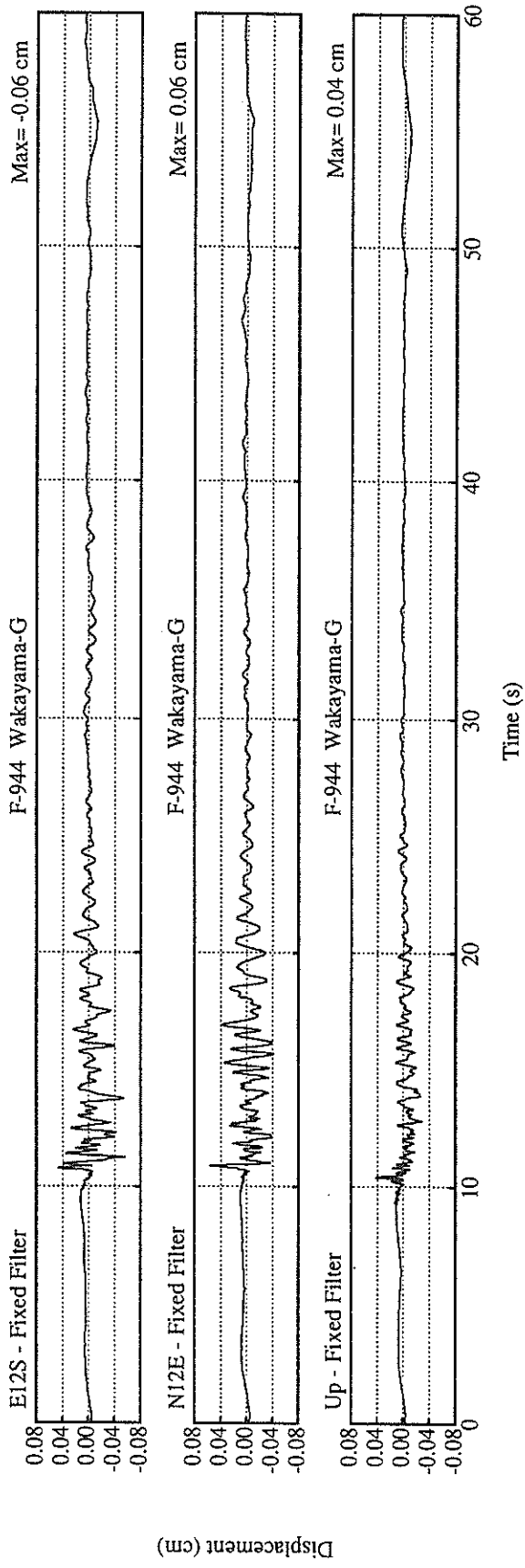
FIXED FILTER	0.06	0.06	0.04	0.06
VARIABLE FILTER	0.05	0.05	0.03	0.05

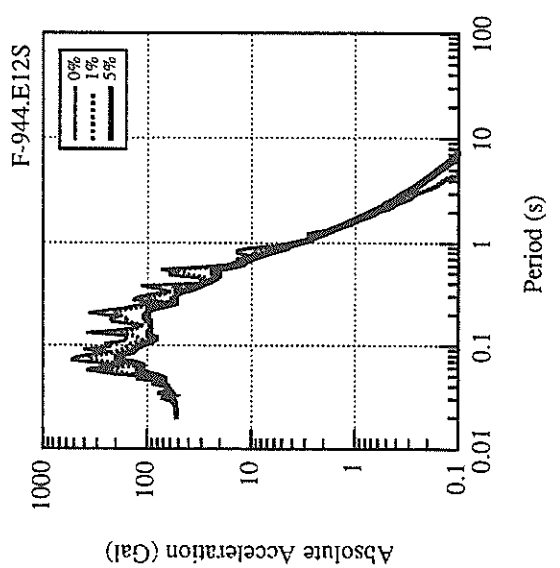
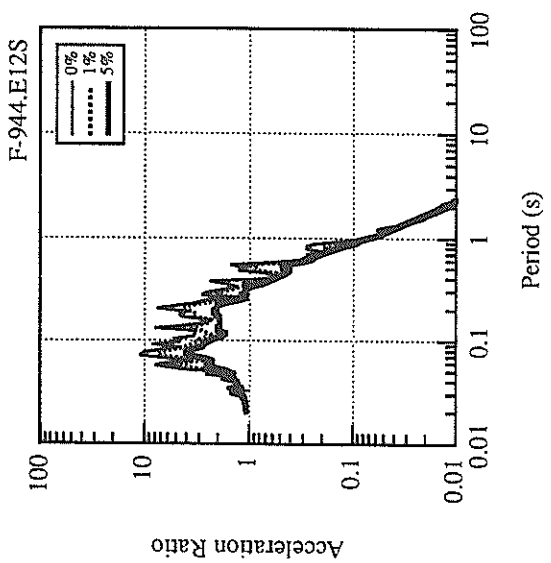
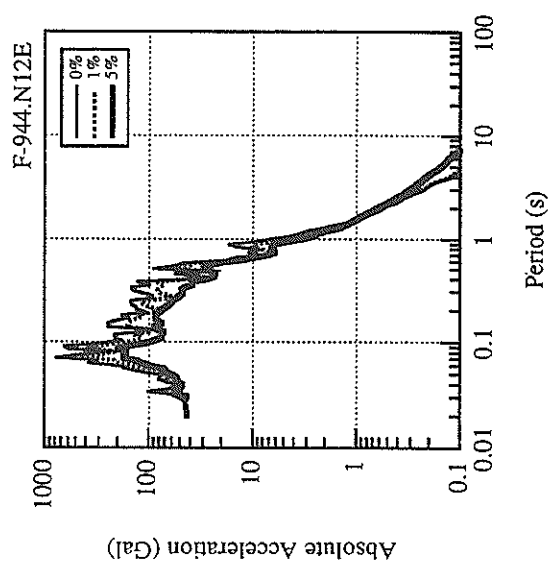
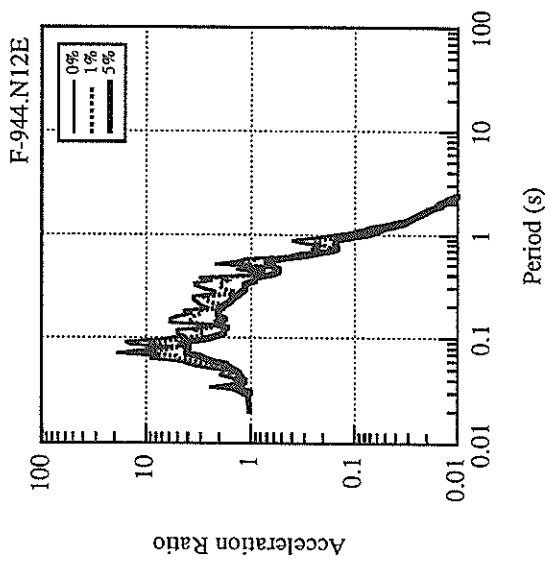
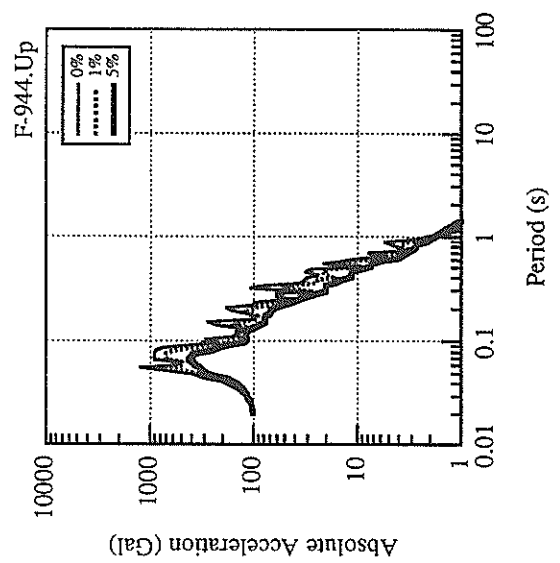
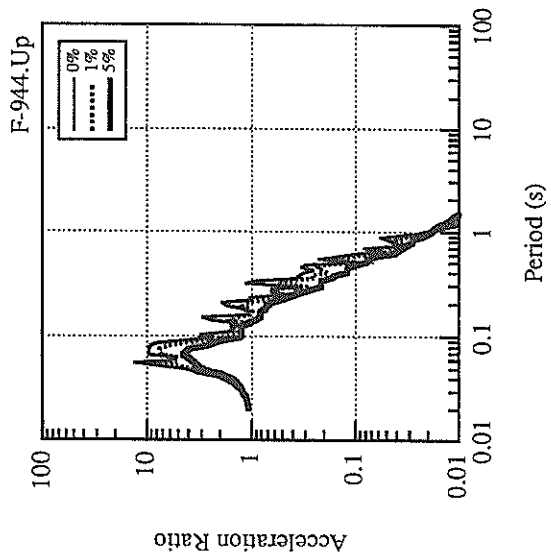
* RESULTANT OF HORIZONTAL COMPONENTS

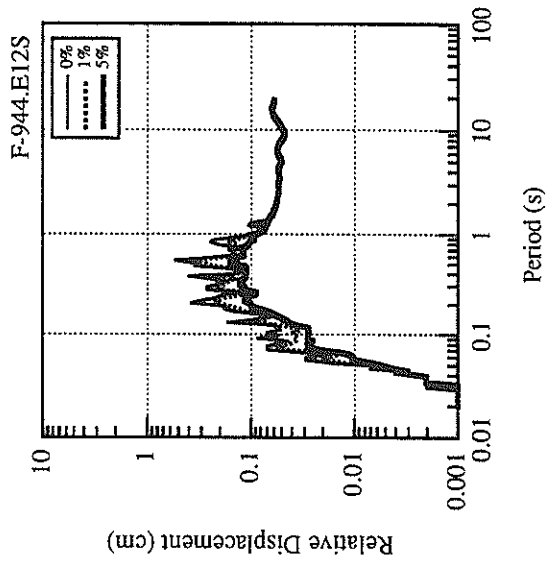
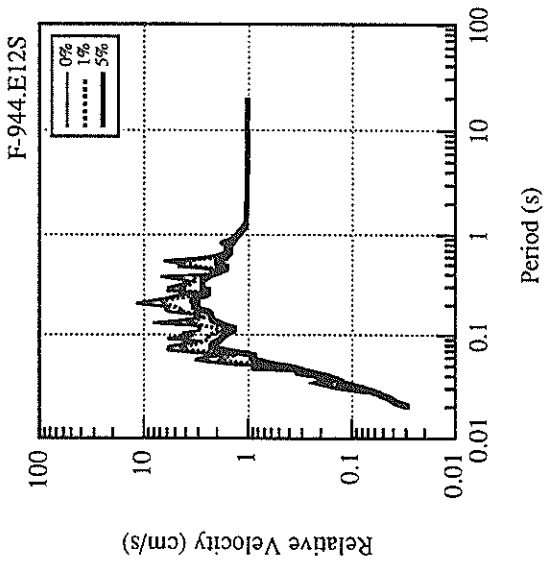
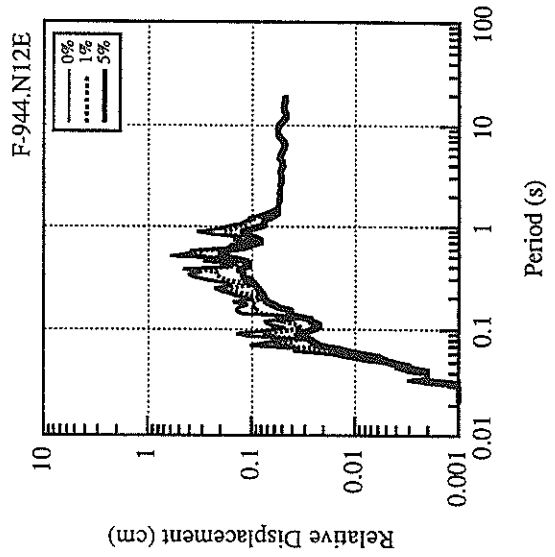
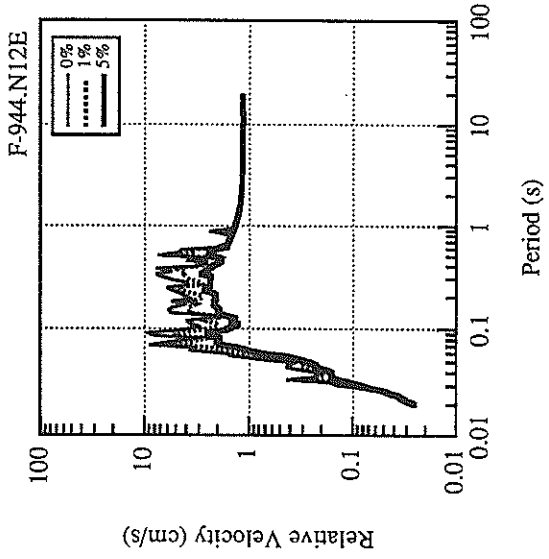
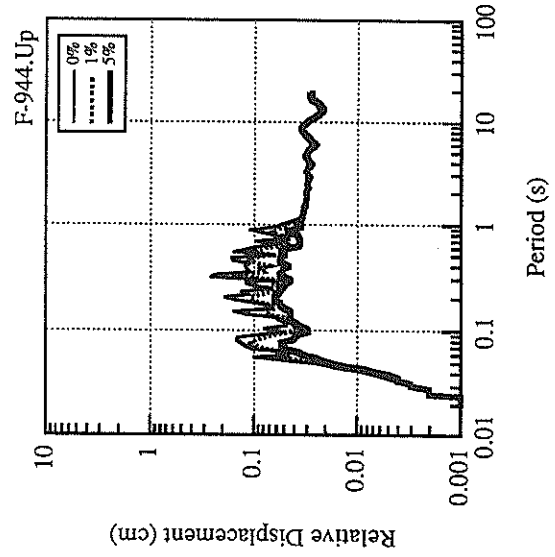
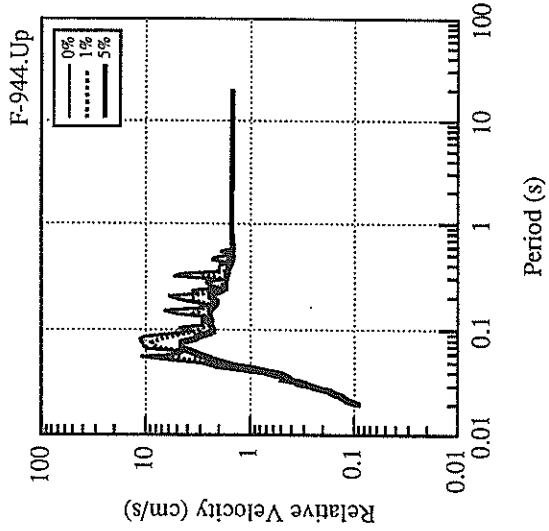


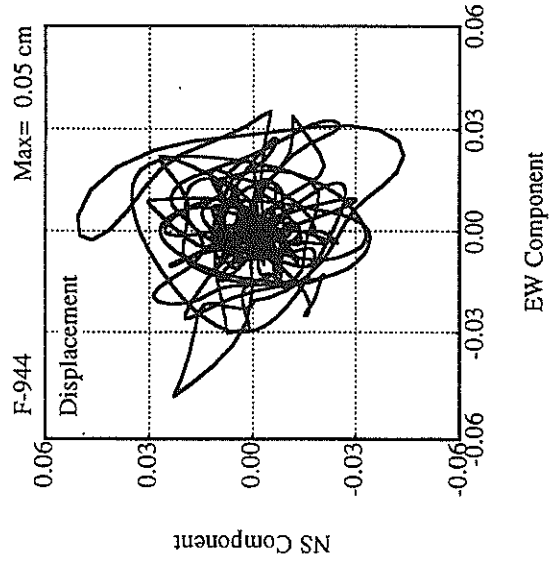
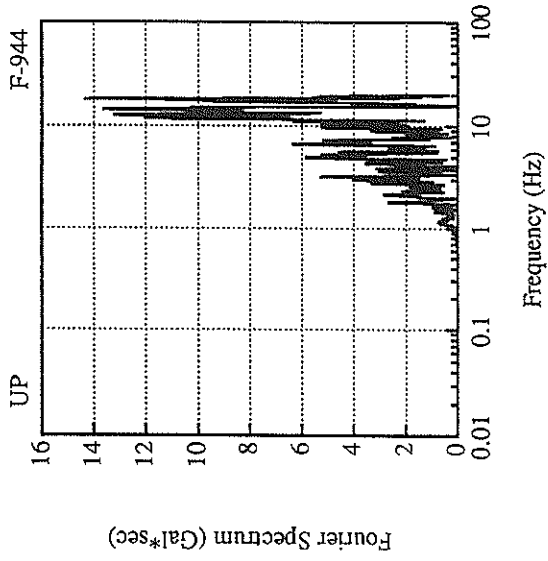
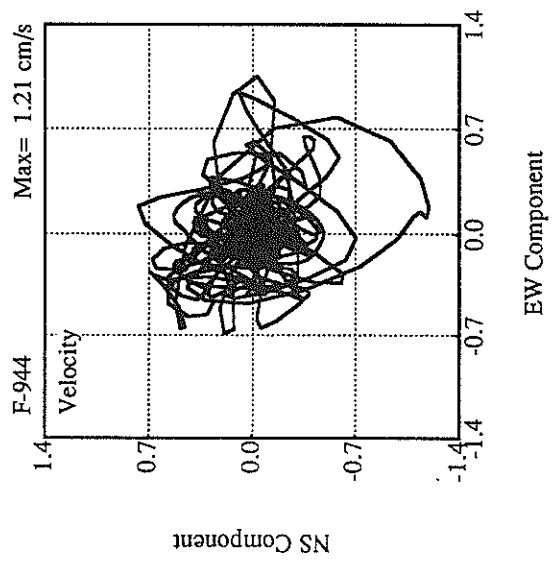
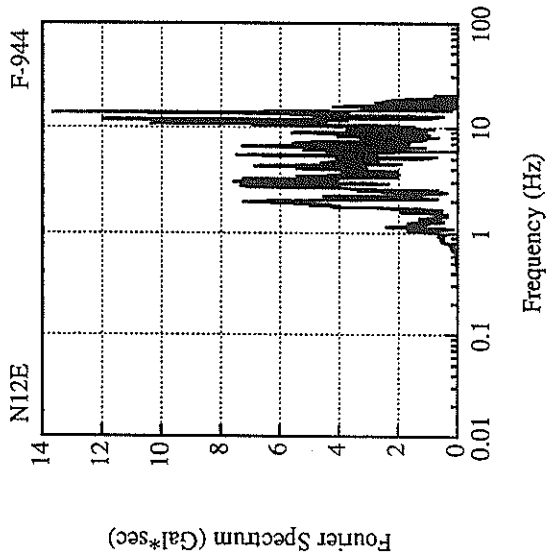
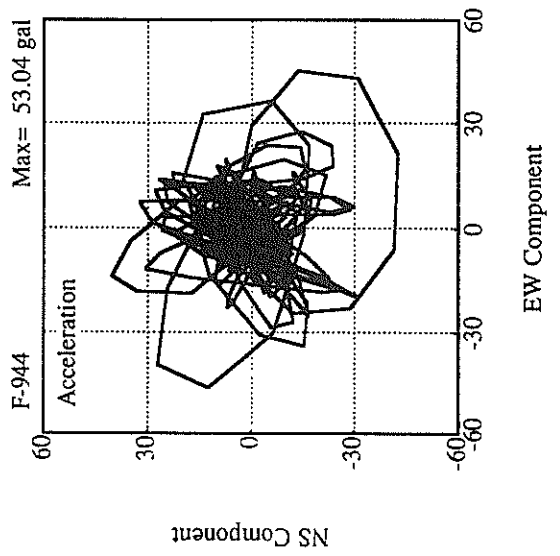
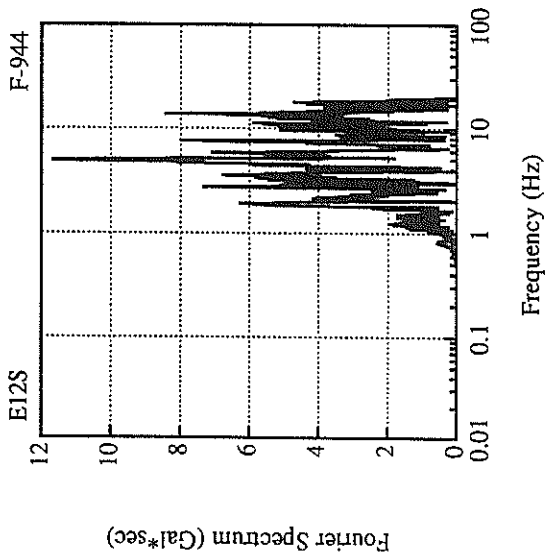












RECORD NUMBER : F-915

STATION : ONAHAMA-JI-G

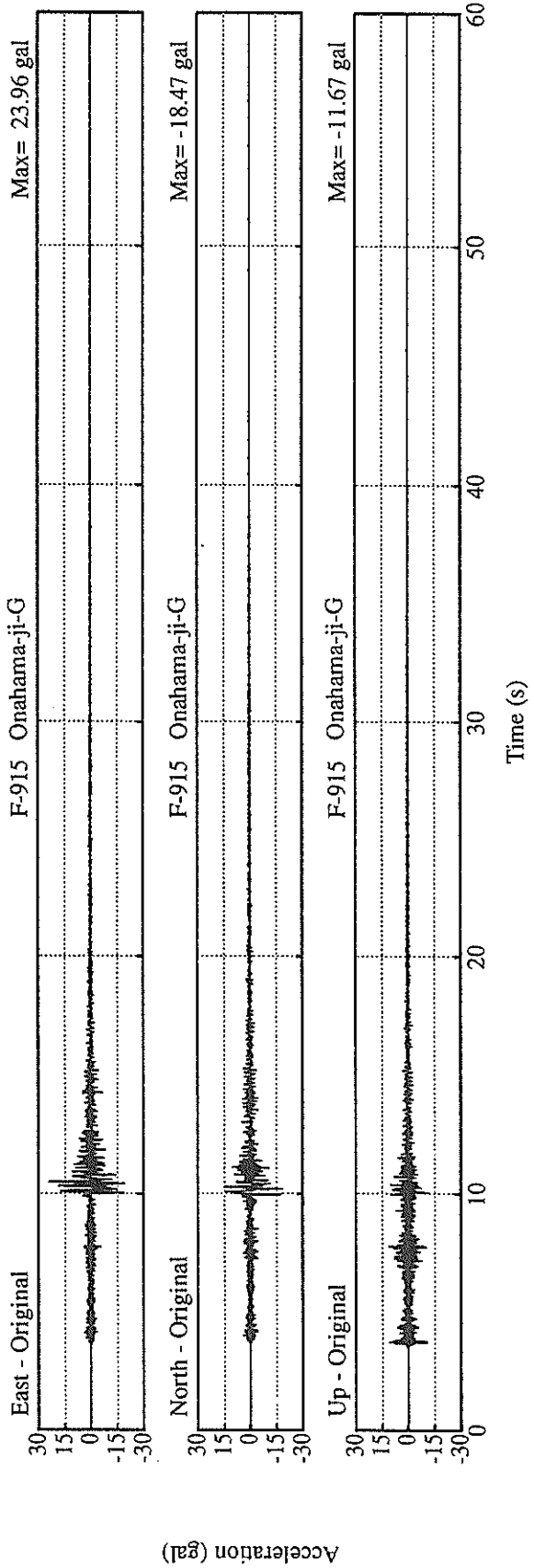
EARTHQUAKE DATA

 DATE AND TIME 19:41 JUNE11,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF IBARAKI PREF
 LATITUDE 36°38.6' N
 LONGITUDE 140°56.3' E
 DEPTH 47.6KM
 JMA MAGNITUDE 4.0

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	18.5	24.0	11.7	24.8

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-956

STATION : HITACHINAKA-F

EARTHQUAKE DATA

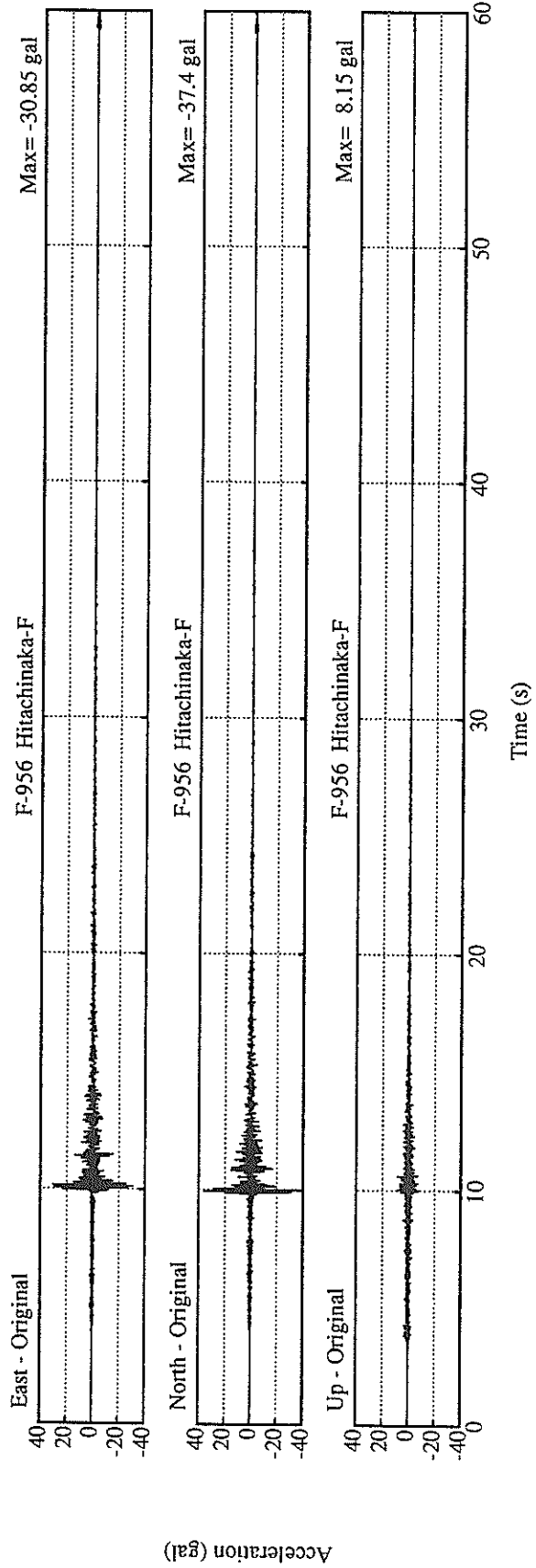
 DATE AND TIME 20:24 JUNE14,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF IBARAKI PREF
 LATITUDE 36°13.2' N
 LONGITUDE 140°51.7' E
 DEPTH 39.1KM
 JMA MAGNITUDE 3.8

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
37.4	30.9	8.1	43.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-957

STATION : HITACHINAKA-F

EARTHQUAKE DATA

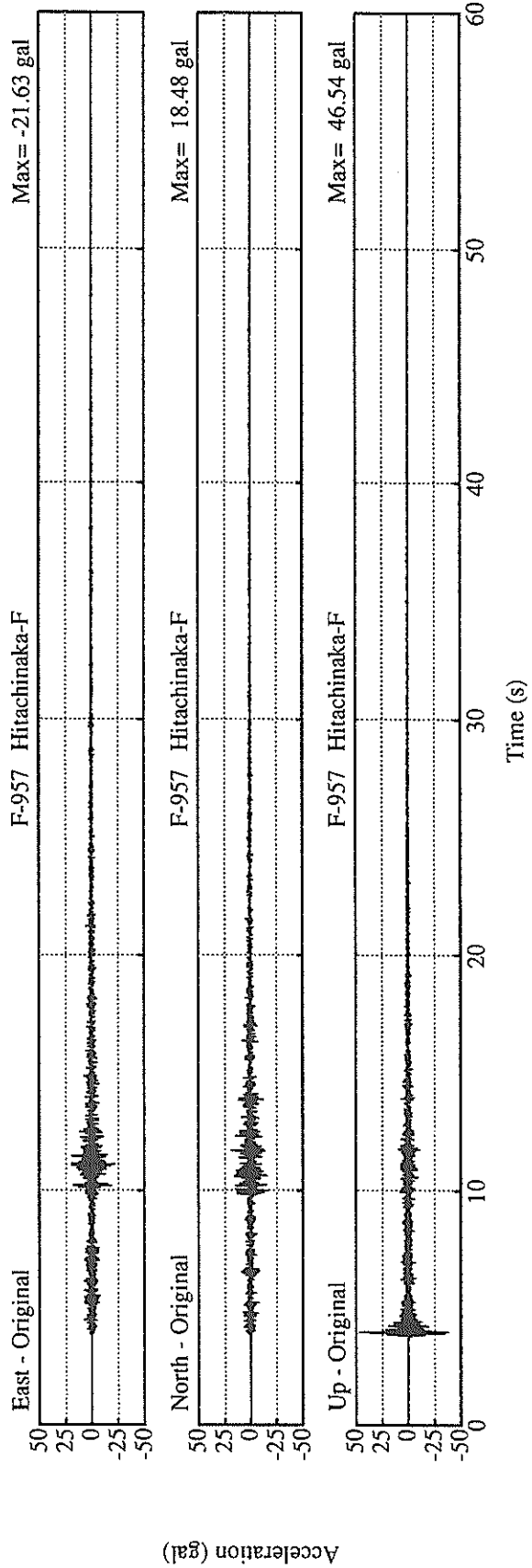
 DATE AND TIME : 16:54 JUNE20,1995
 LOCATION OF HYPOCENTER :
 EPICENTRAL REGION : E OFF IBARAKI PREF
 LATITUDE : 36°23.1' N
 LONGITUDE : 140°58.3' E
 DEPTH : 38.2KM
 JMA MAGNITUDE : 4.3

PEAK VALUES OF COMPONENTS

HORIZONTAL*		U	D	HORIZONTAL*	
N S	E W	U D	E W	N S	HORIZONTAL*
18.5	21.6	46.5	46.5	24.0	24.0

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-958

STATION : HITACHINAKA-F

EARTHQUAKE DATA

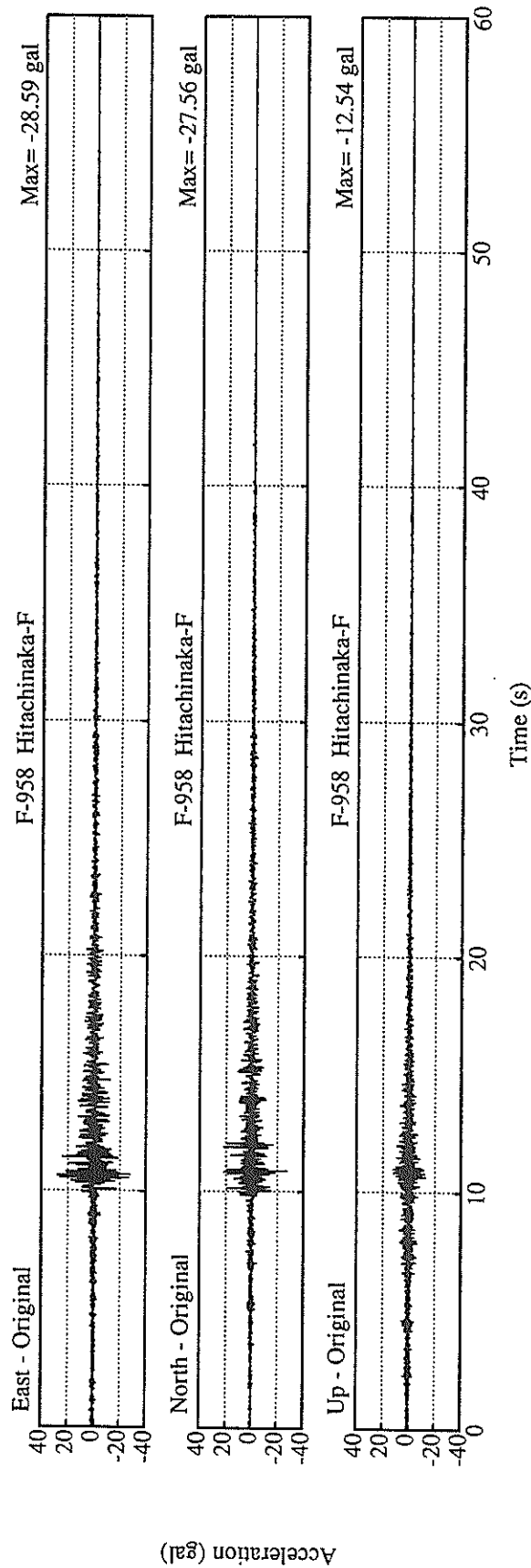
 DATE AND TIME : 3: 3 JUNE23,1995
 LOCATION OF HYPOCENTER : NORTHERN IBARAKI PREF
 EPICENTRAL REGION : 36° 30.9' N
 LATITUDE : 140° 22.9' E
 LONGITUDE : 107.2KM
 DEPTH : 4.3
 JMA MAGNITUDE : 4.3

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
27.6	28.6	12.5	30.3

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-878

STATION : YAMASHITA-F

EARTHQUAKE DATA

 DATE AND TIME 8:53 JULY 3,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION SAGAMI BAY REGION
 LATITUDE 35° 9.8' N
 LONGITUDE 139° 34.1' E
 DEPTH 122.1KM
 JMA MAGNITUDE 5.2

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.549	0.585	0.744	

PARAMETER OF THE VARIABLE FILTER

FC (HZ)	0.549	0.585	0.744
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MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	30.6	51.7	12.3	52.0
ORIGINAL	40.1	62.1	20.5	62.4
CORRECTED	40.4	61.6	20.8	61.8

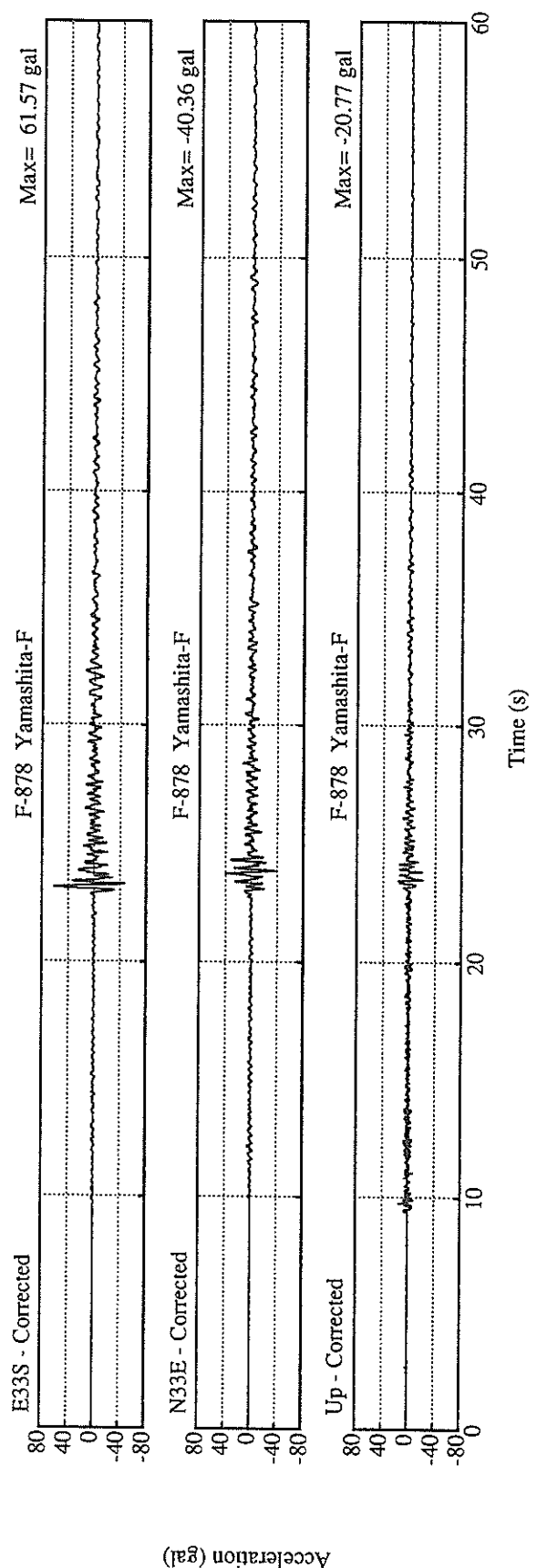
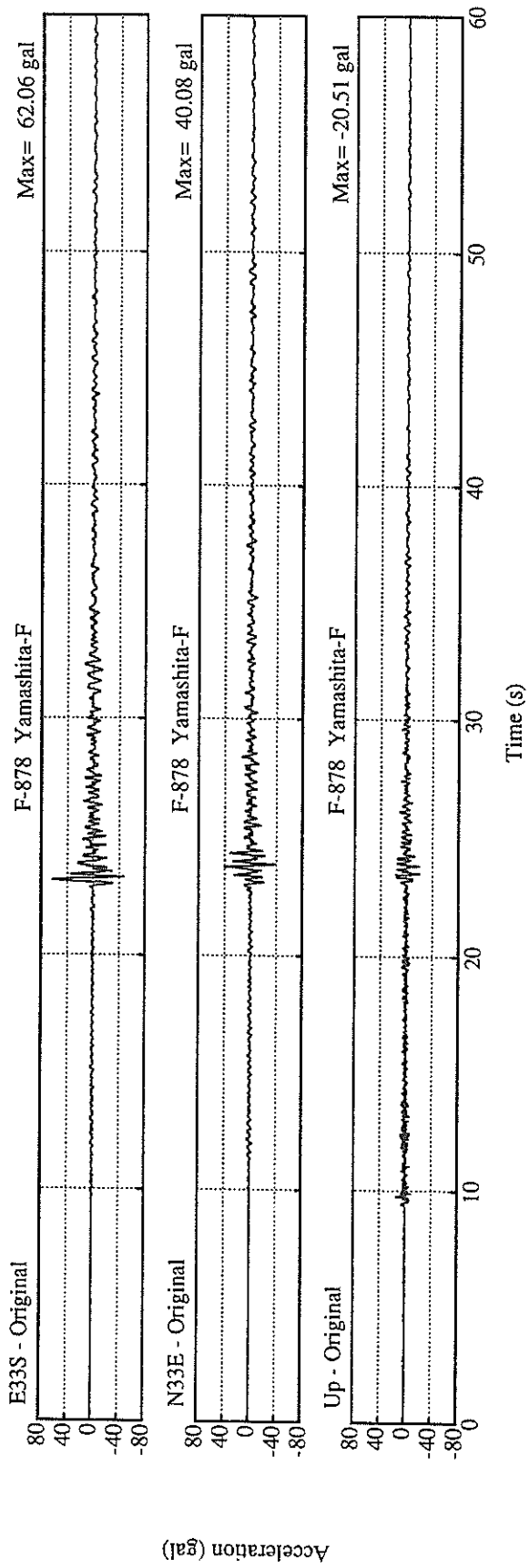
MAXIMUM VELOCITY (CM/SEC)

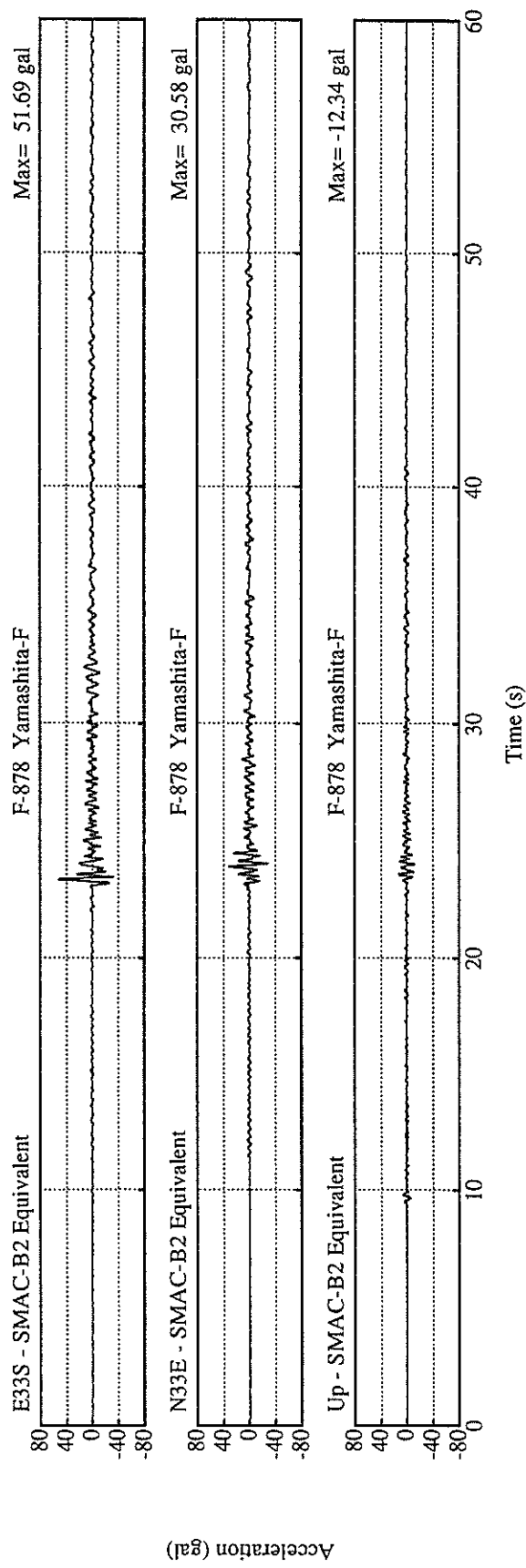
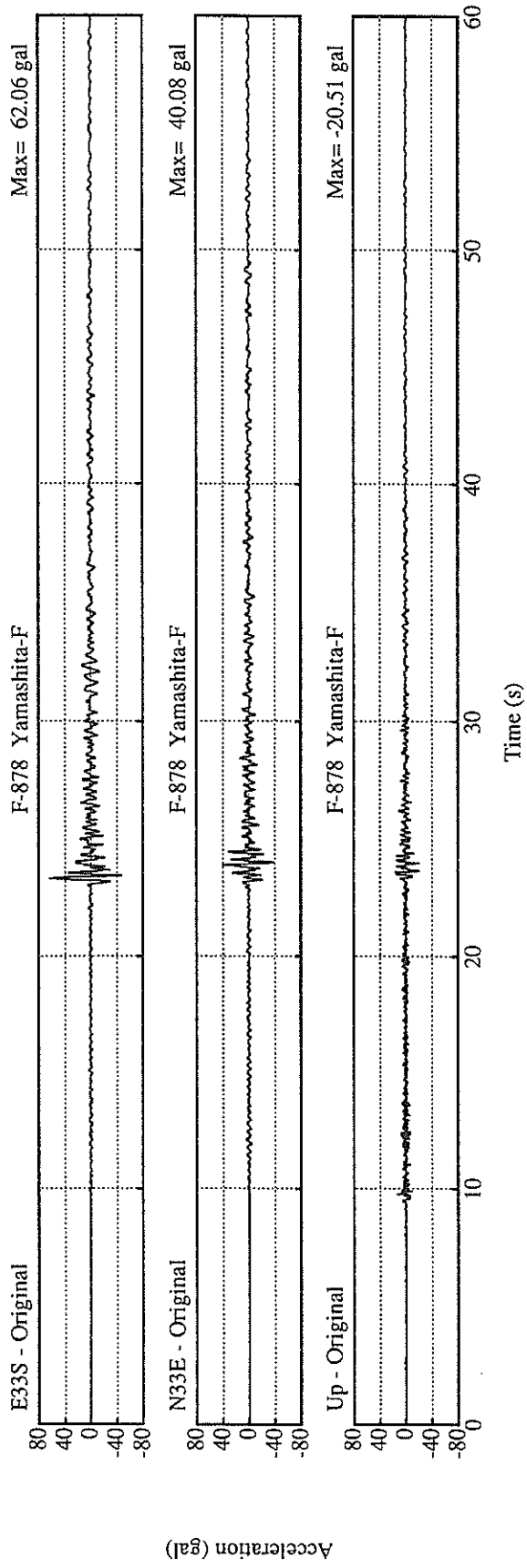
FIXED FILTER	2.18	3.14	0.86	3.15
VARIABLE FILTER	2.13	2.98	0.84	3.09

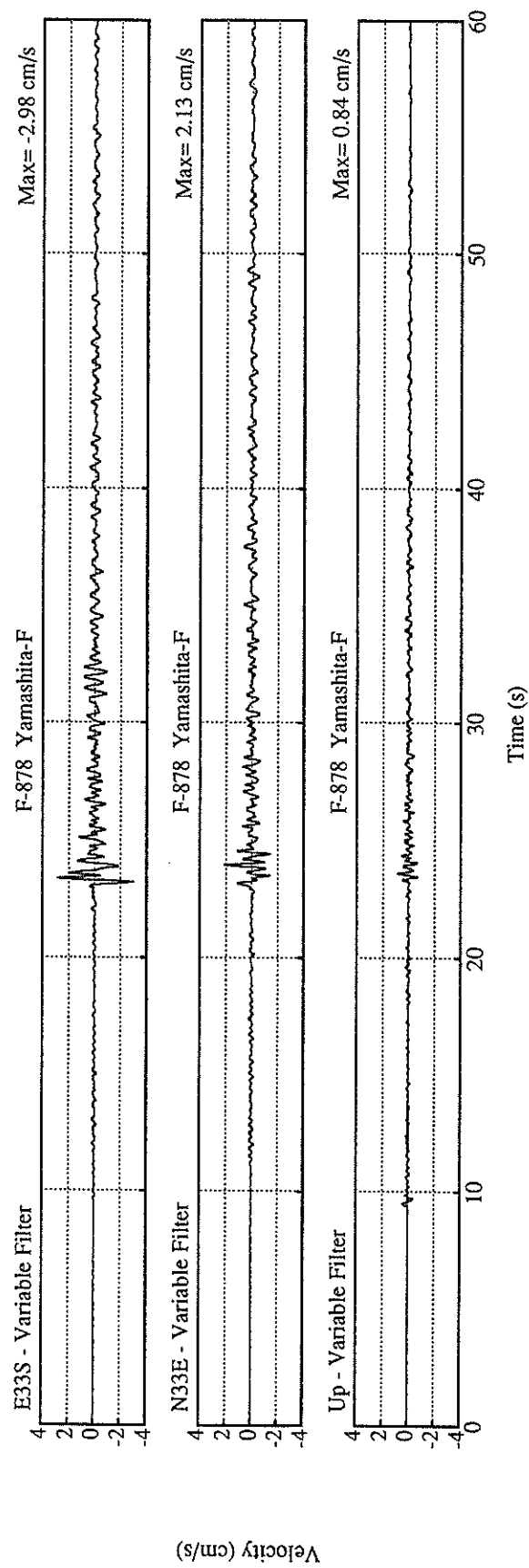
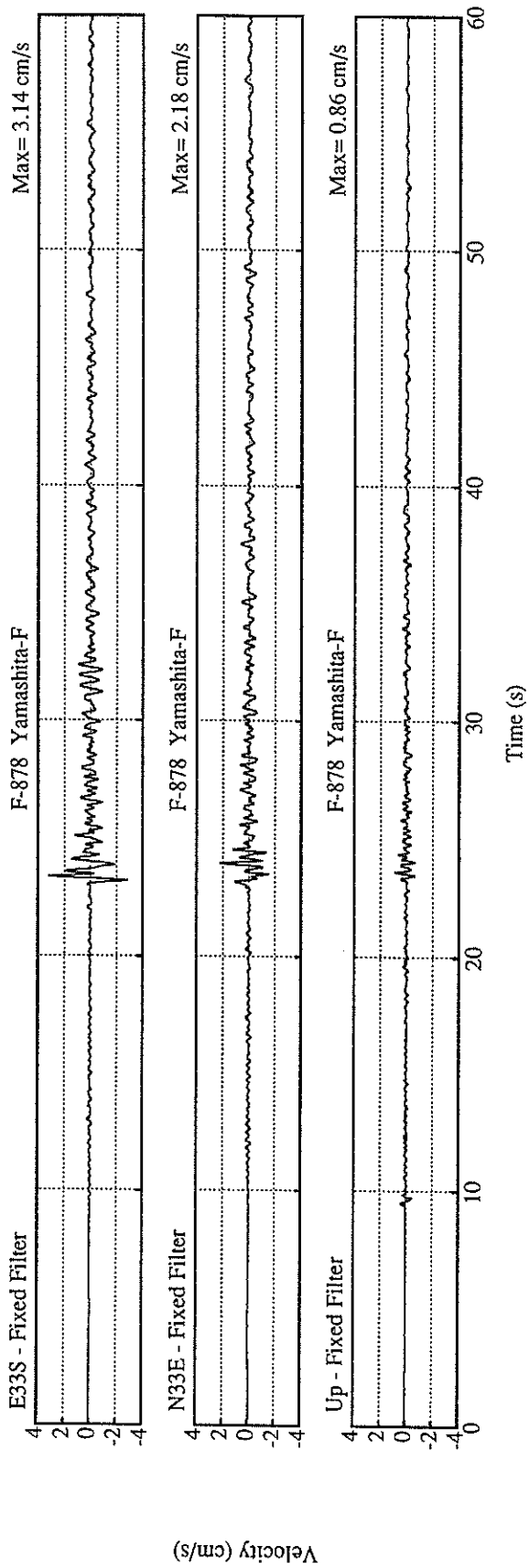
MAXIMUM DISPLACEMENT (CM)

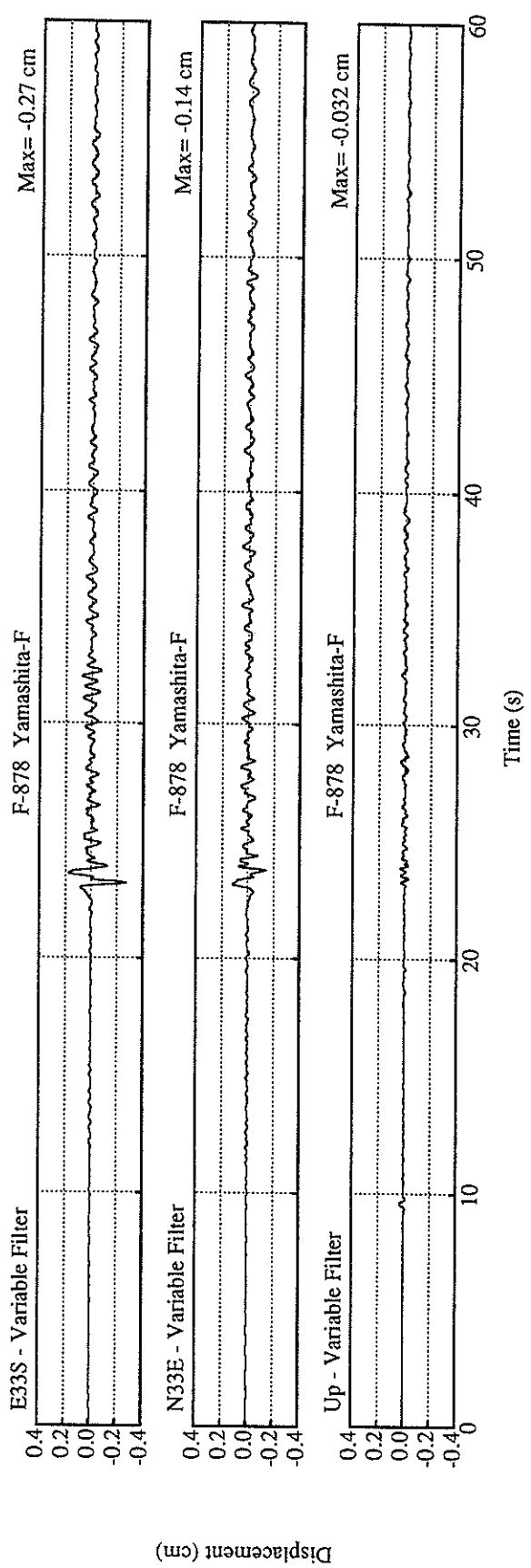
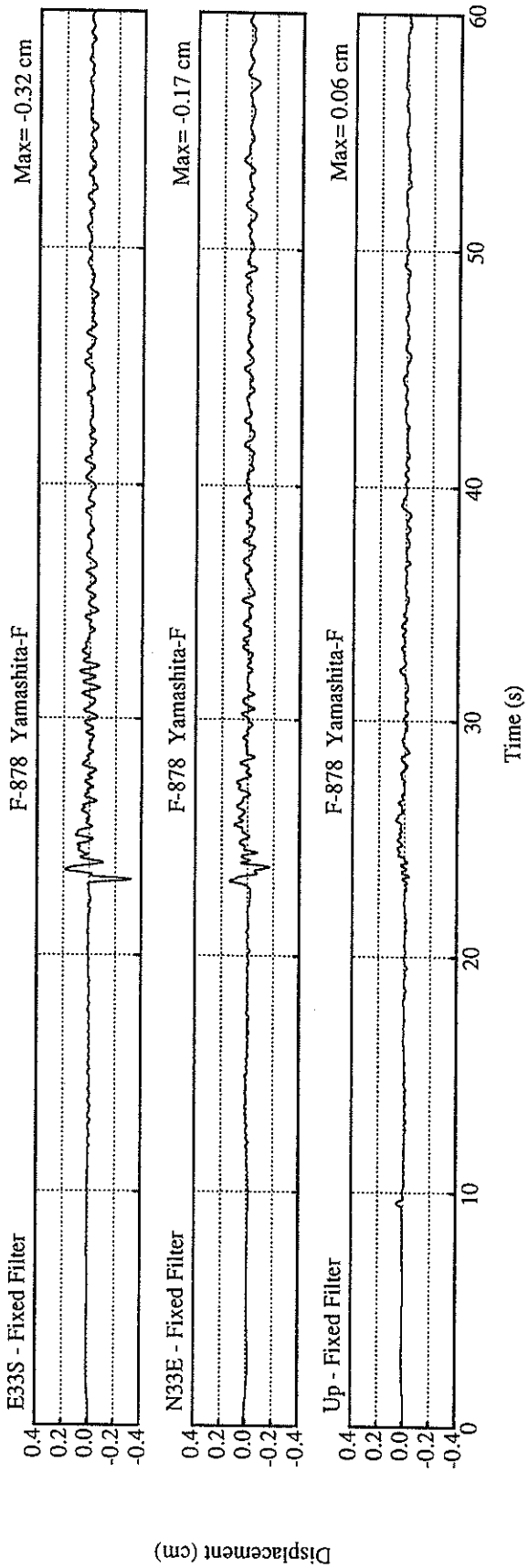
FIXED FILTER	0.17	0.32	0.06	0.34
VARIABLE FILTER	0.14	0.27	0.03	0.29

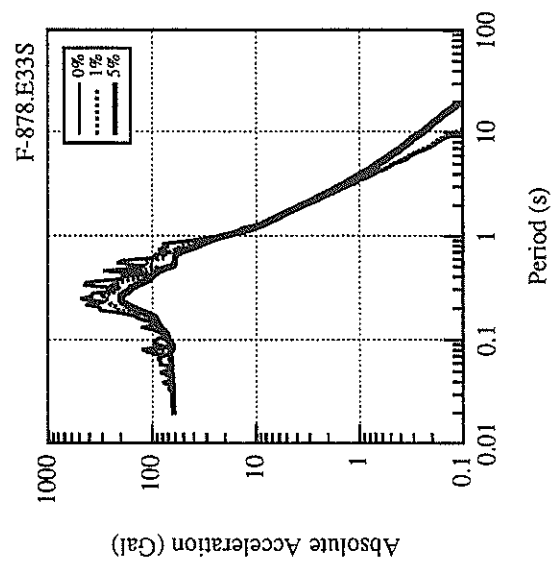
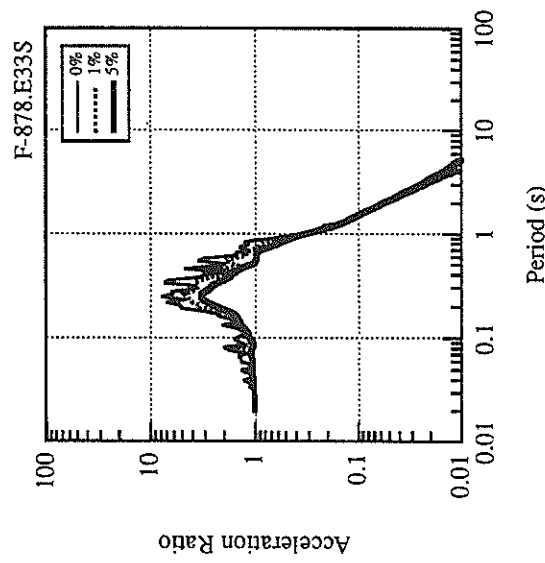
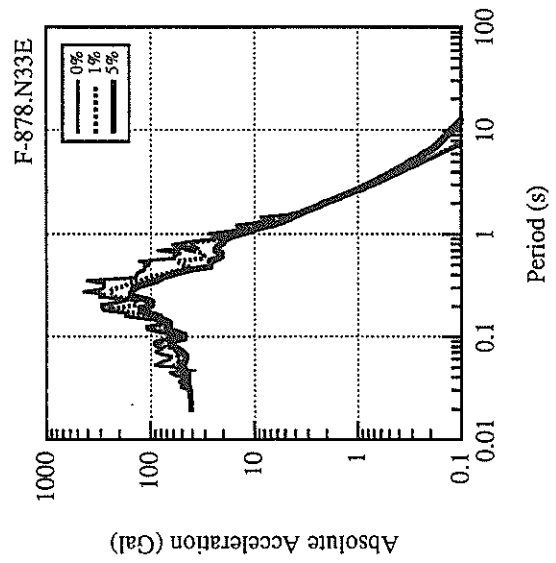
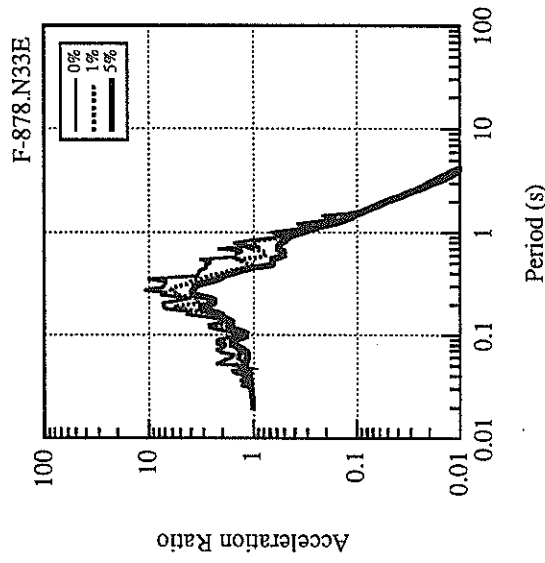
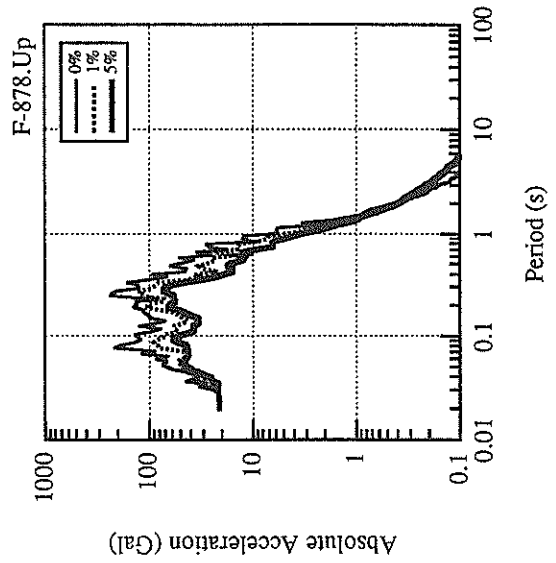
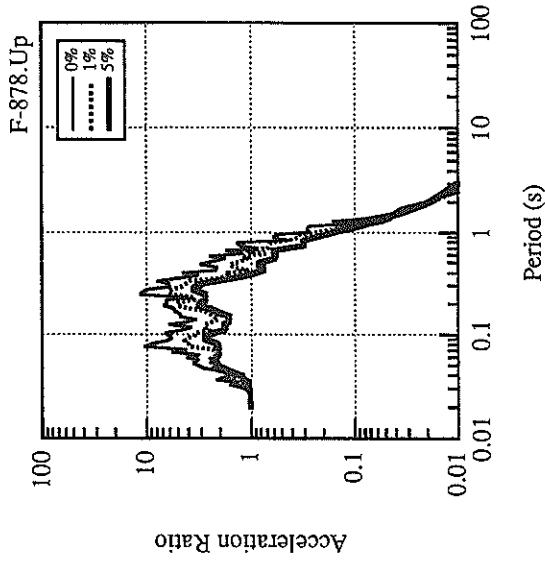
* RESULTANT OF HORIZONTAL COMPONENTS

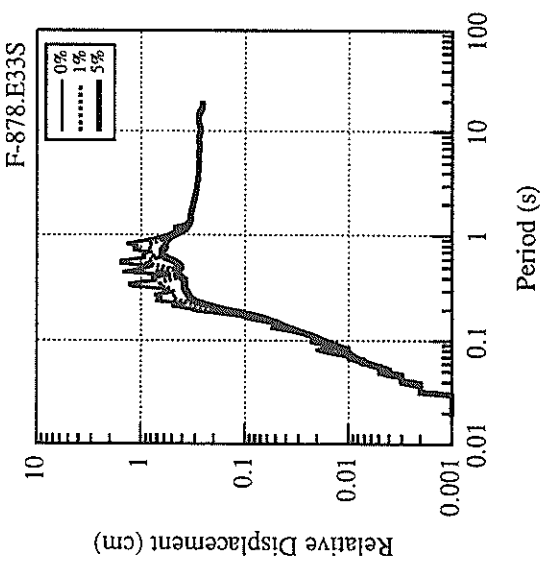
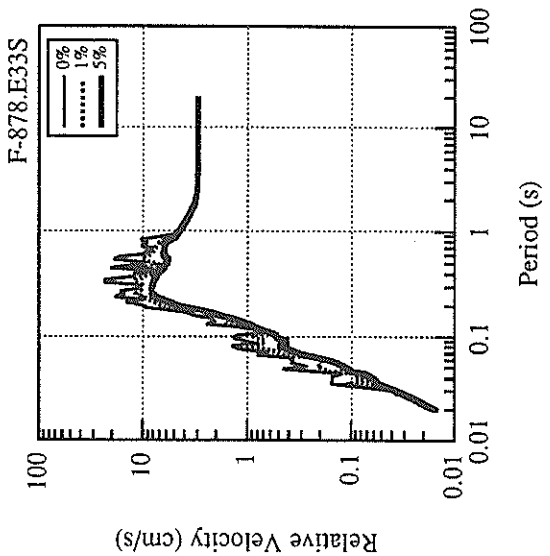
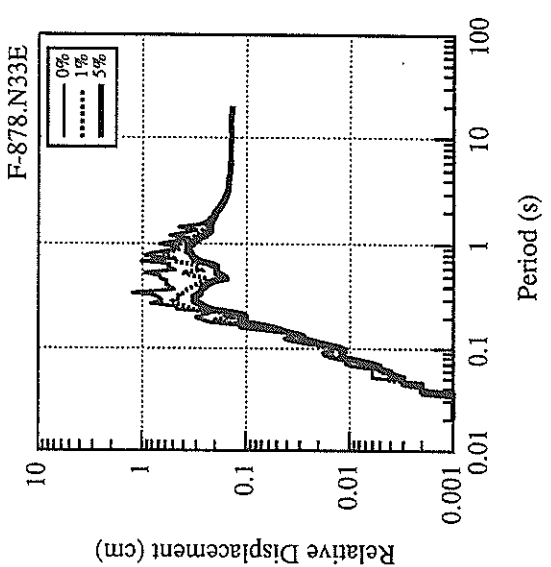
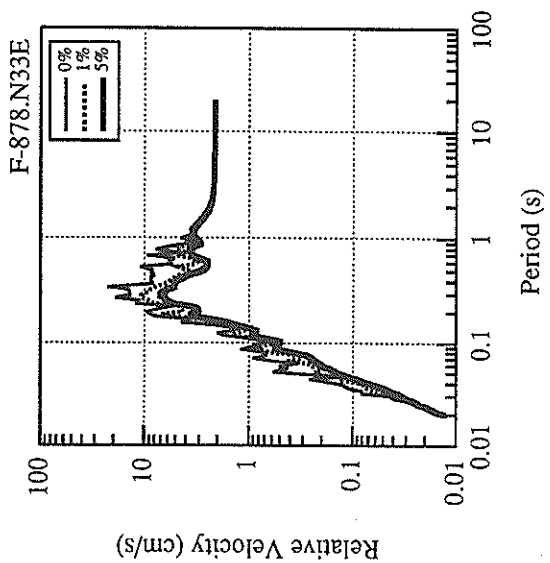
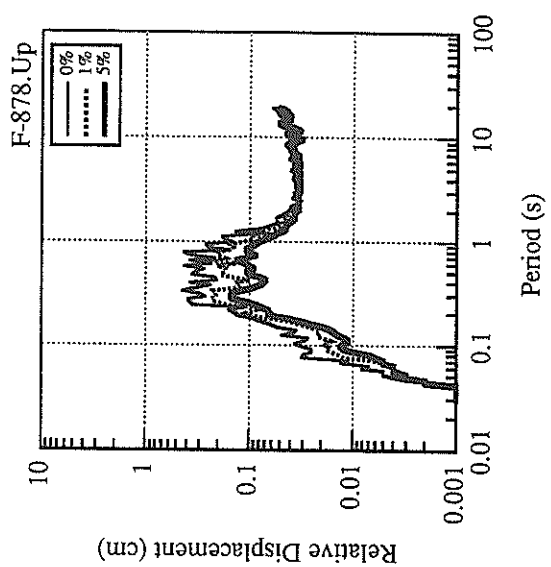
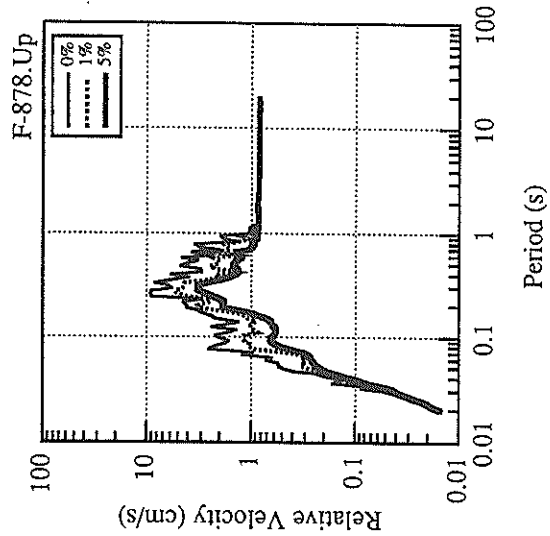


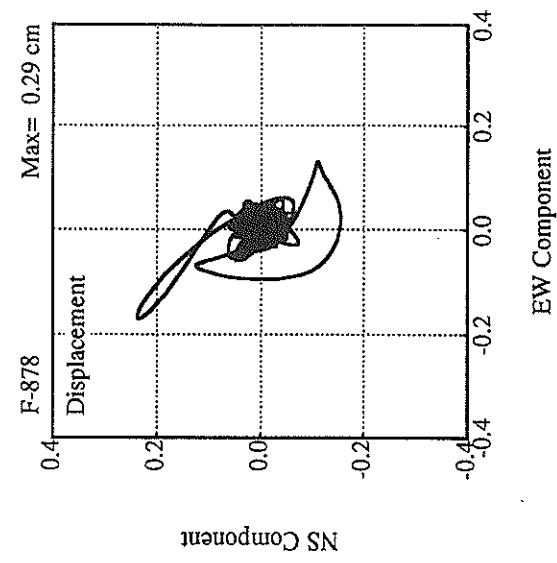
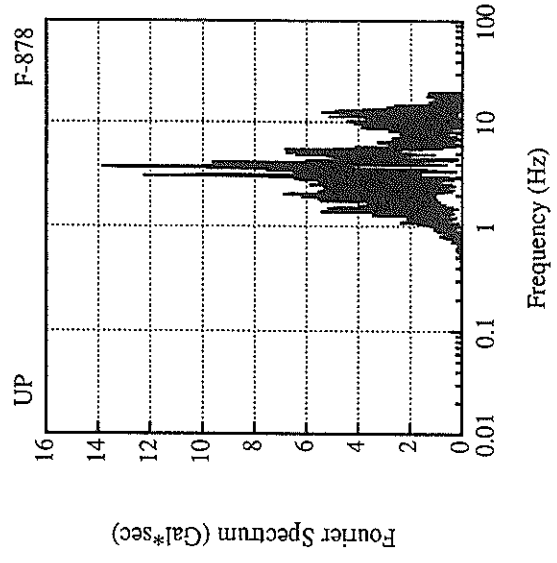
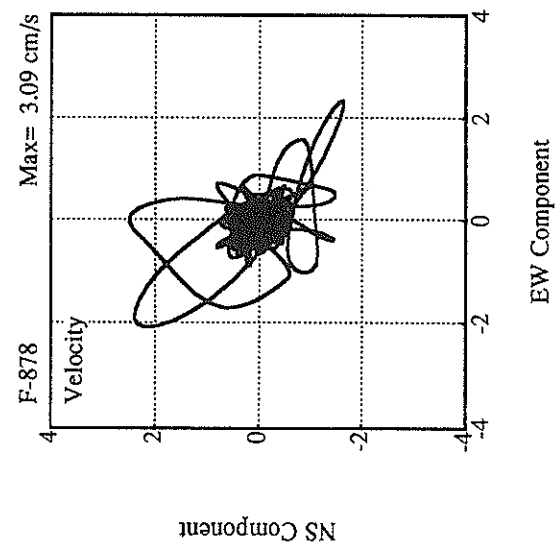
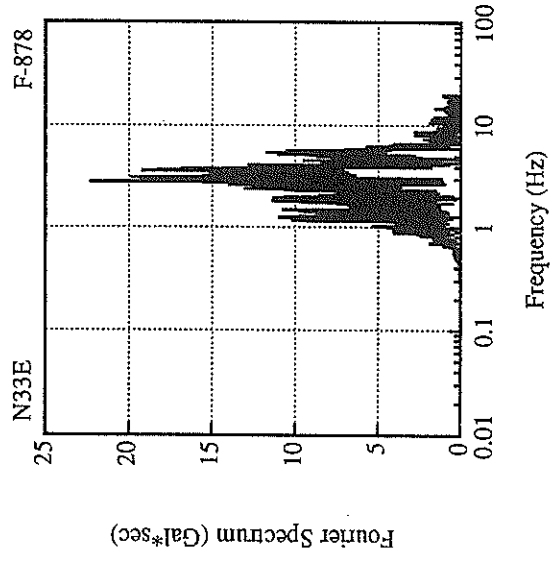
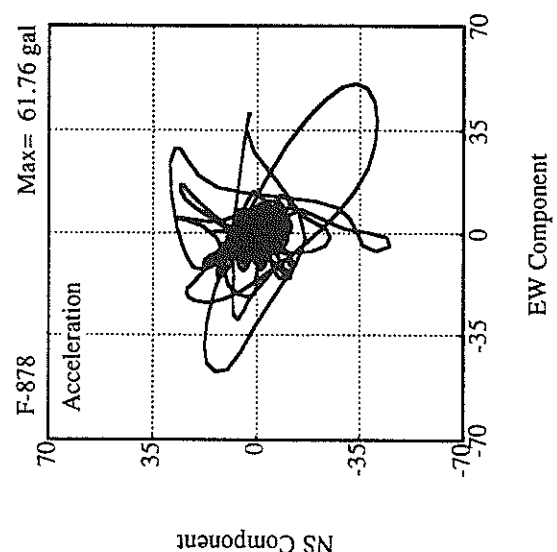
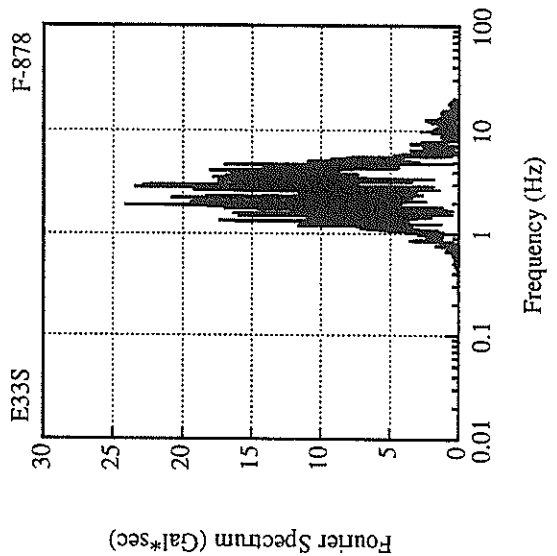












RECORD NUMBER : F-1046

STATION : SHINAGAWA-G

EARTHQUAKE DATA

DATE AND TIME : 8:53 JULY 3,1995
LOCATION OF HYPOCENTER : SAGAMI BAY REGION
EPICENTRAL REGION : 35° 9.8' N
LATITUDE : 139° 34.1' E
LONGITUDE : 122.1KM
DEPTH : 5.2
JMA MAGNITUDE : 5.2

PEAK VALUES OF COMPONENTS

N S E W U D HORIZONTAL*

PARAMETER OF THE VARIABLE FILTER

FC (HZ) : 0.524 0.671 0.976

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT : 38.4 33.3 10.0 39.4
ORIGINAL : 54.3 43.8 21.5 56.8
CORRECTED : 55.5 43.8 21.6 58.0

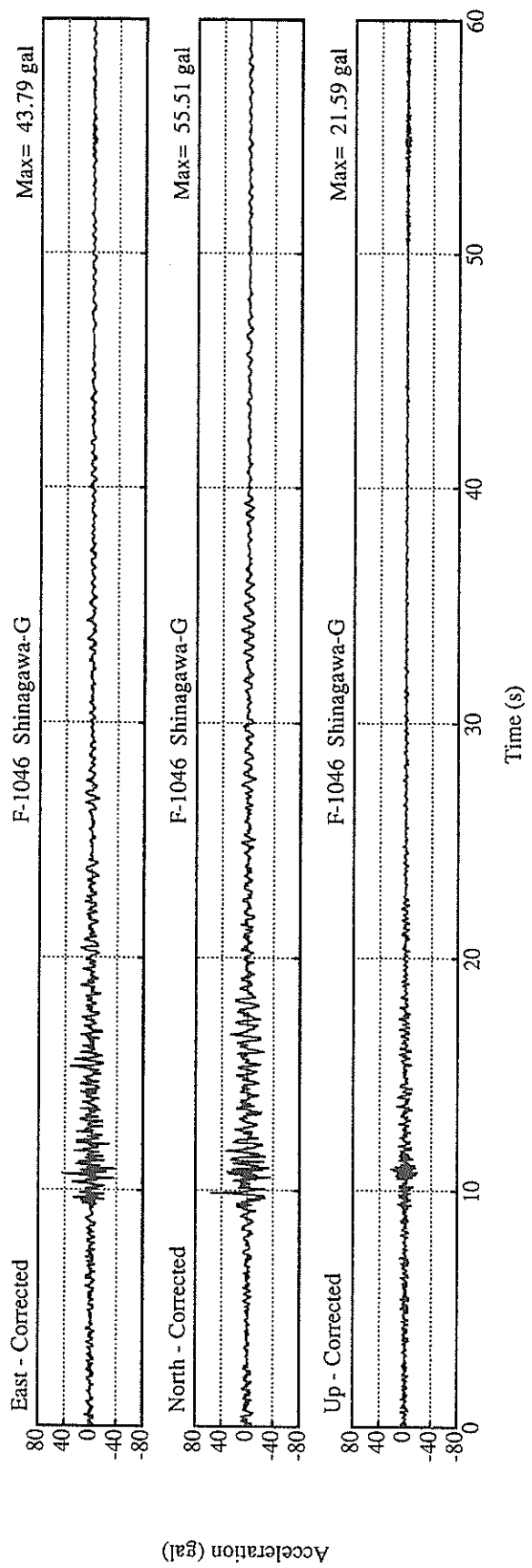
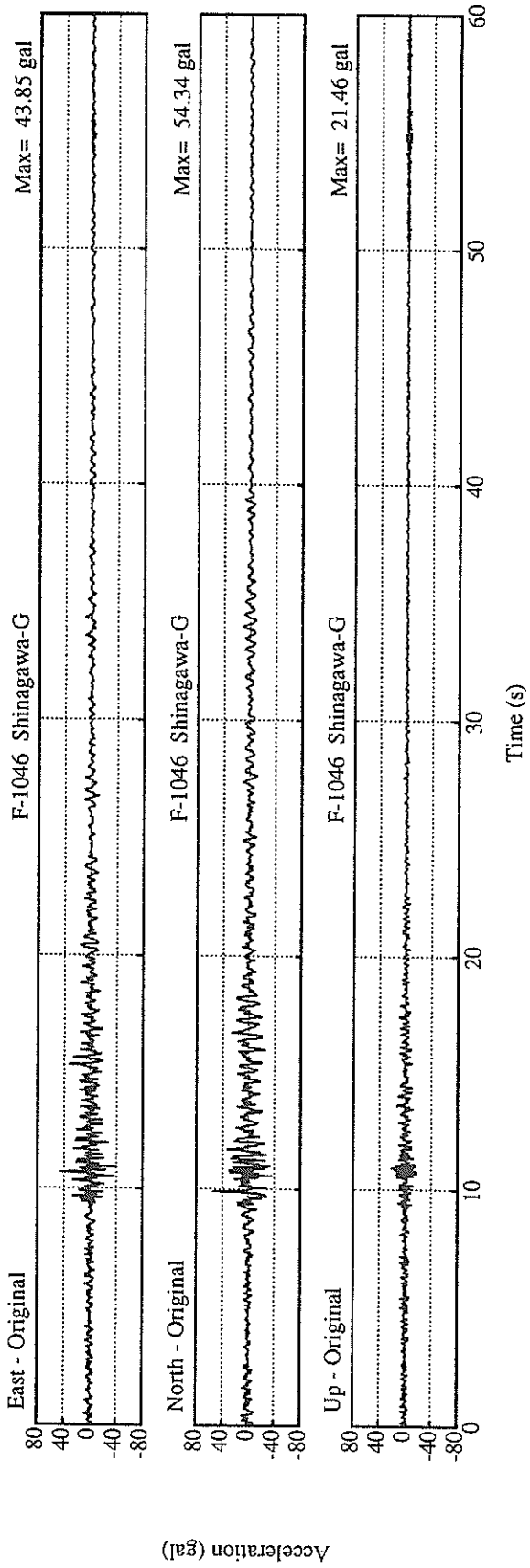
MAXIMUM VELOCITY (CM/SEC)

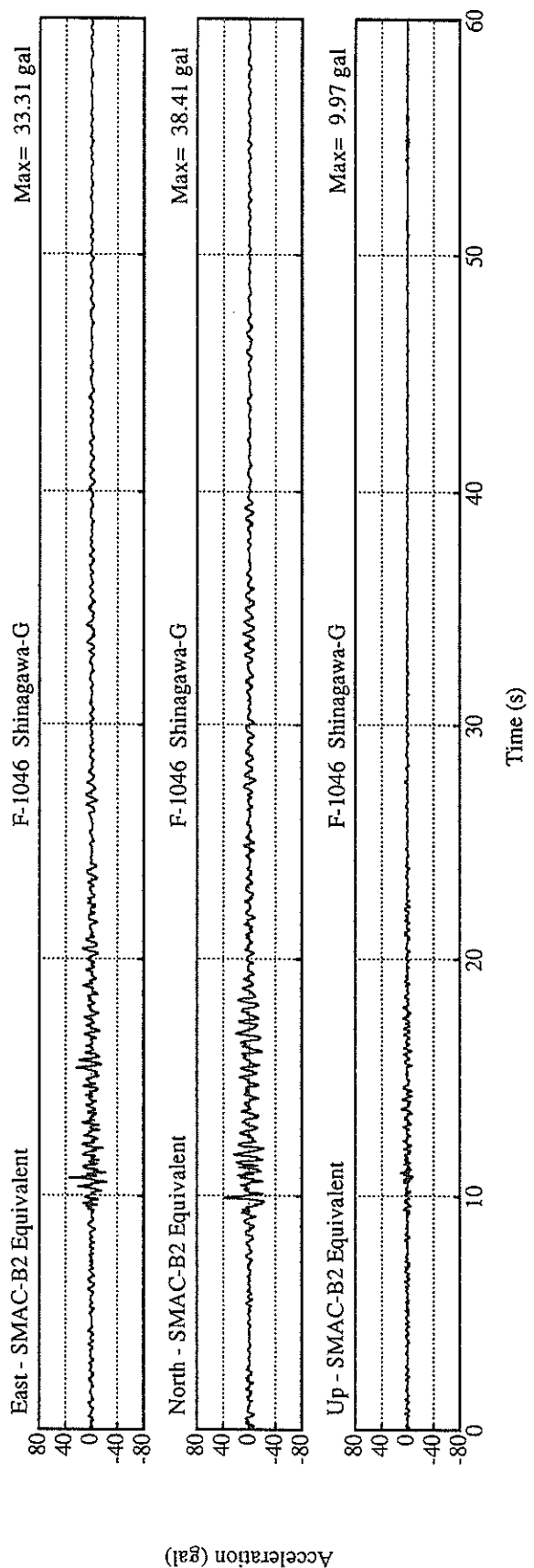
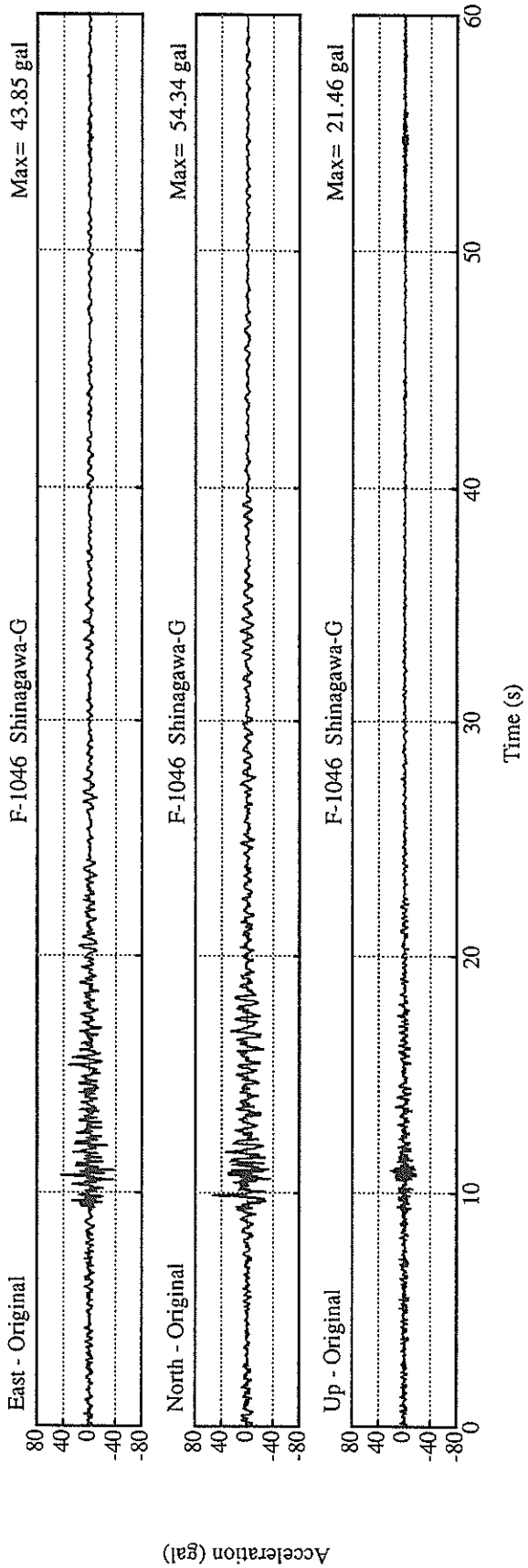
FIXED FILTER : 3.09 1.72 0.54 3.12
VARIABLE FILTER : 2.75 1.64 0.52 2.76

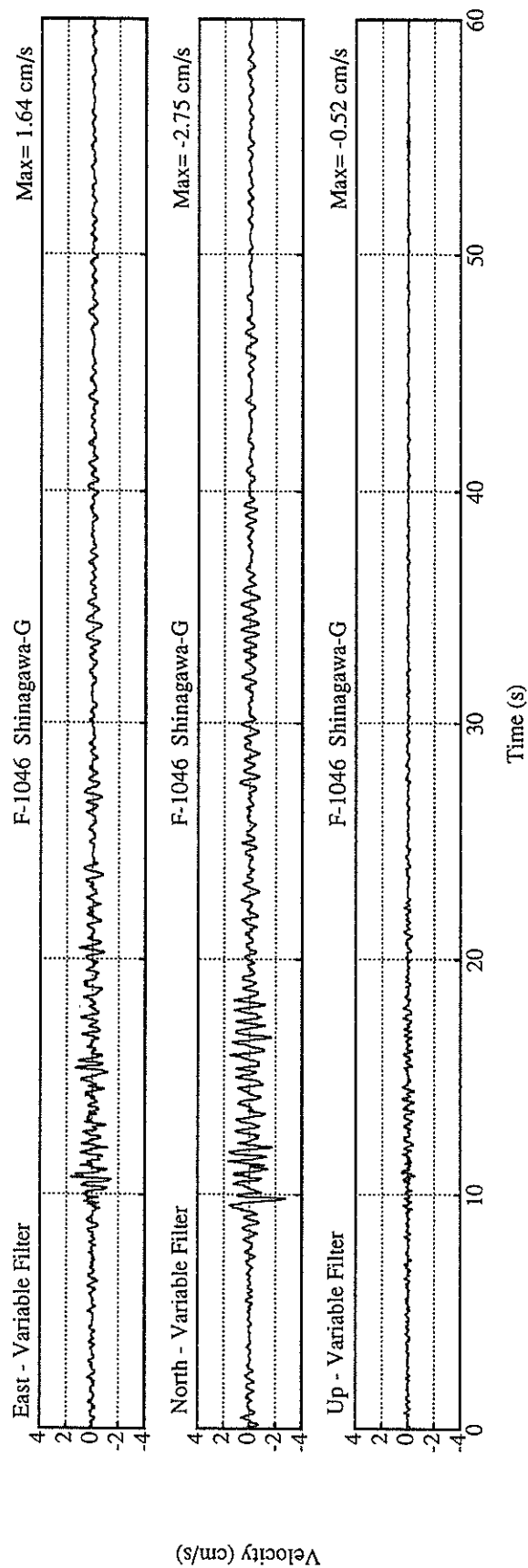
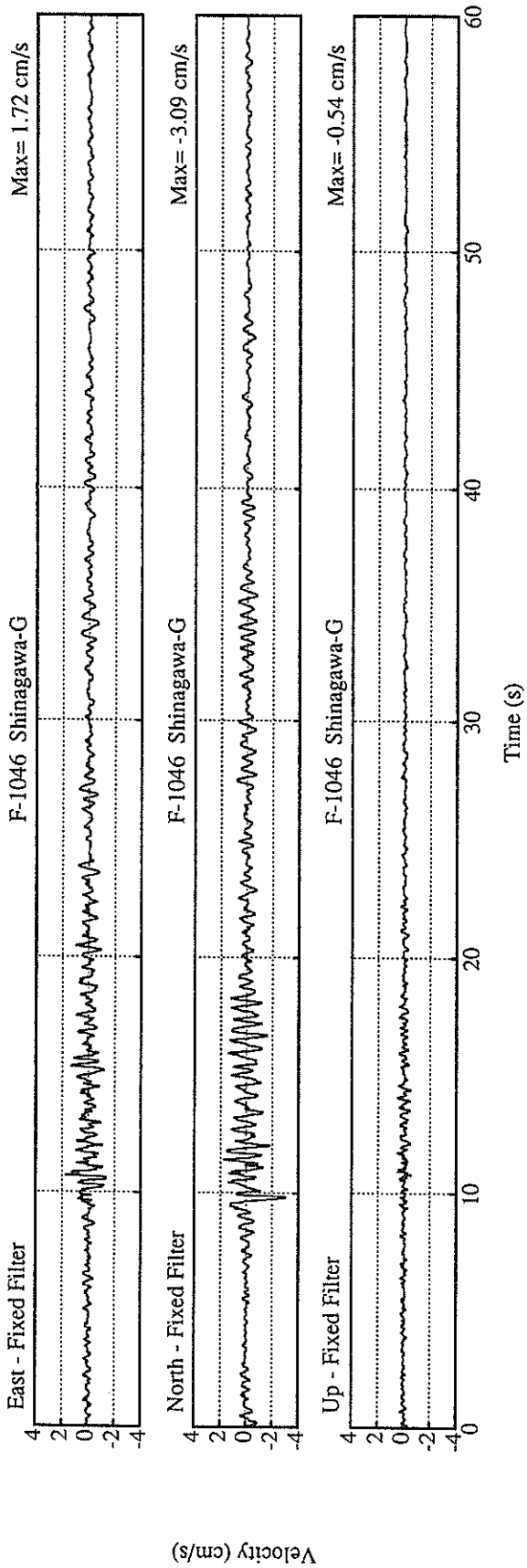
MAXIMUM DISPLACEMENT (CM)

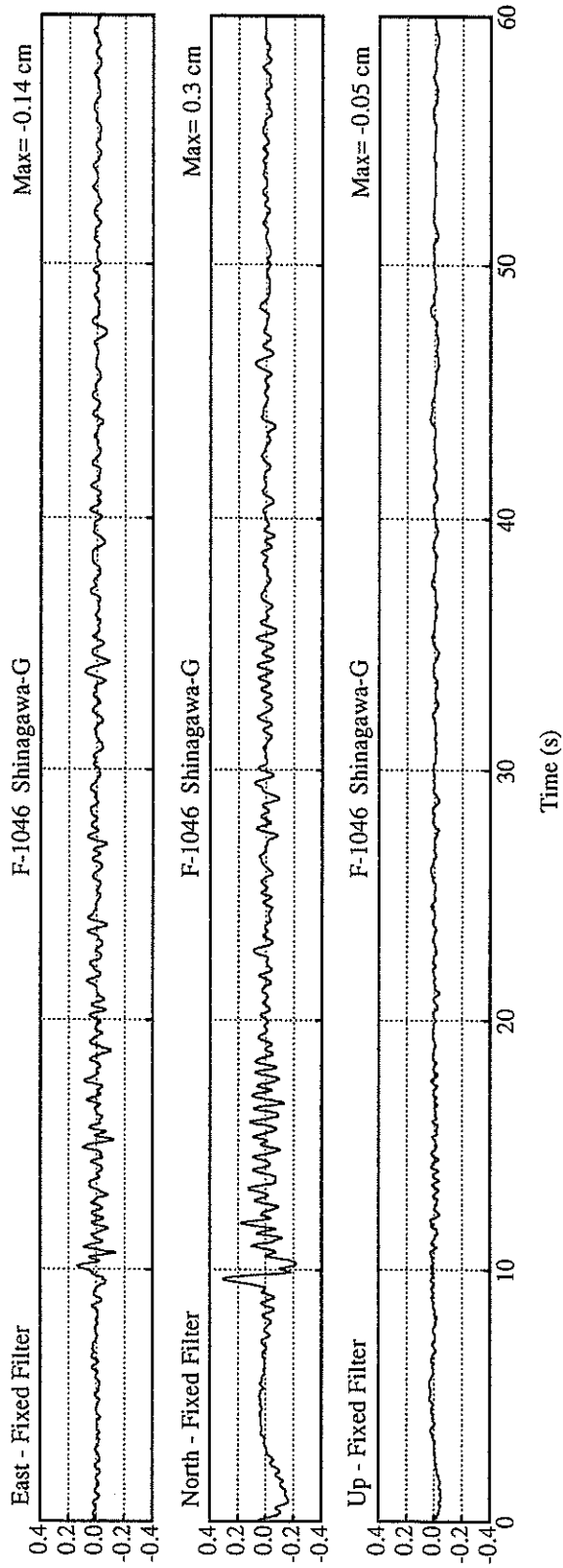
FIXED FILTER : 0.30 0.14 0.05 0.31
VARIABLE FILTER : 0.26 0.13 0.03 0.26

* RESULTANT OF HORIZONTAL COMPONENTS

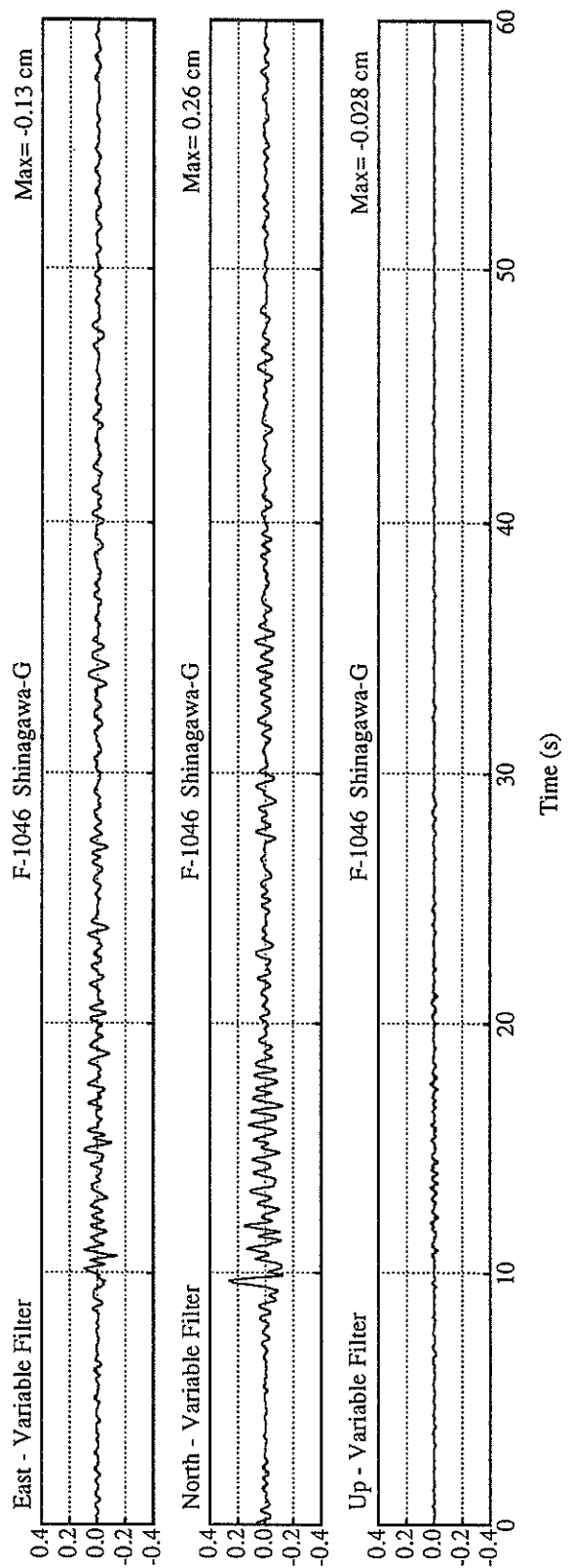




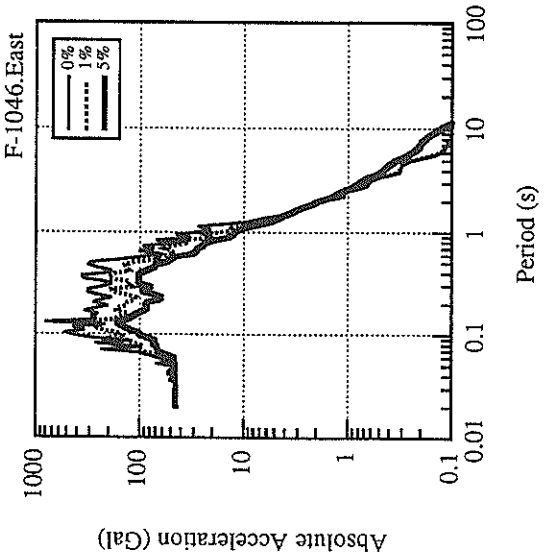
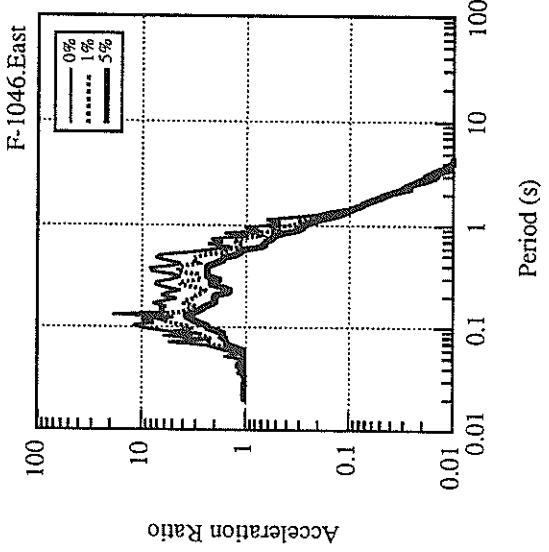
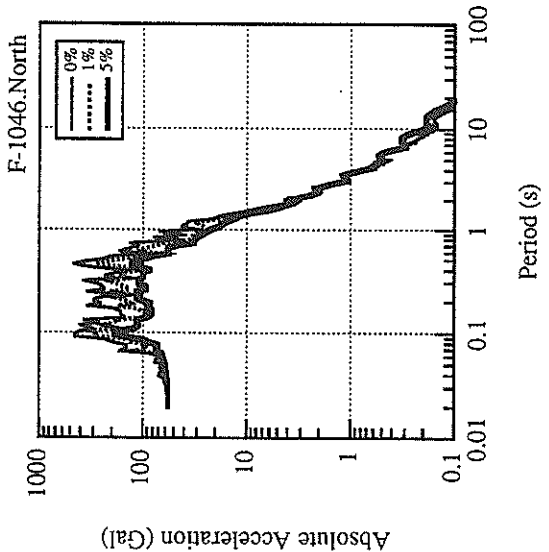
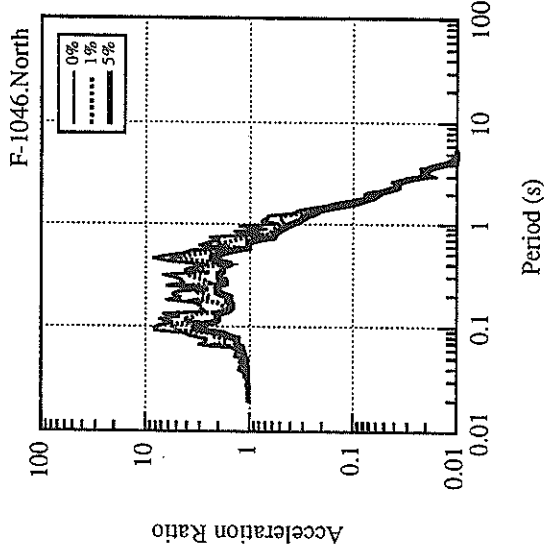
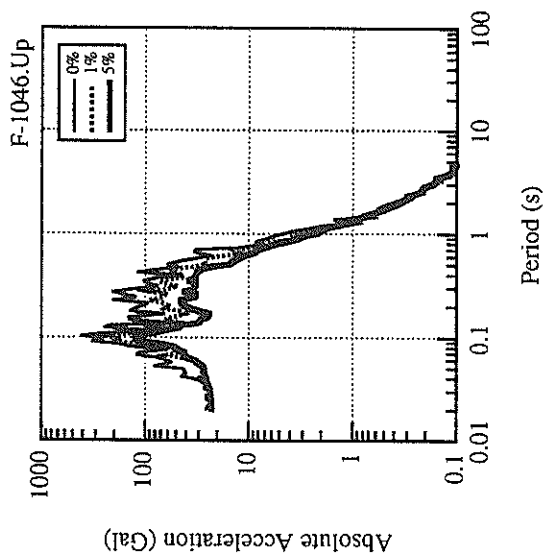
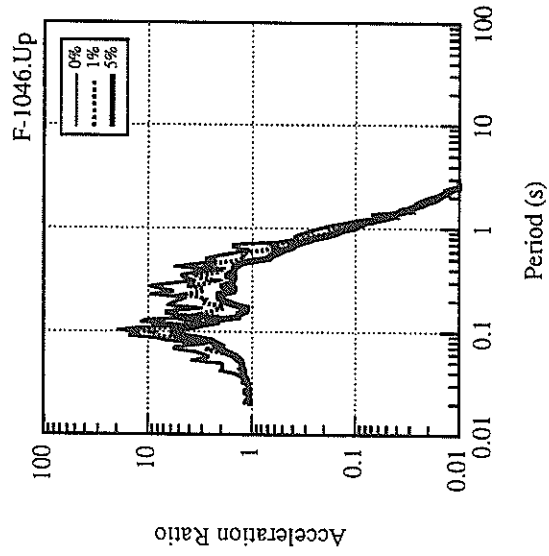


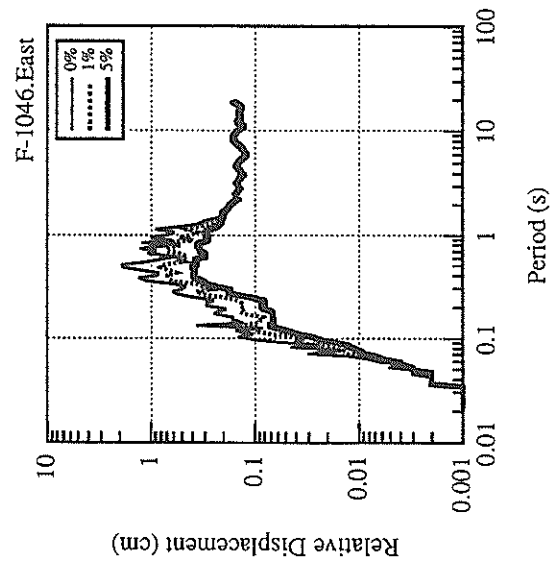
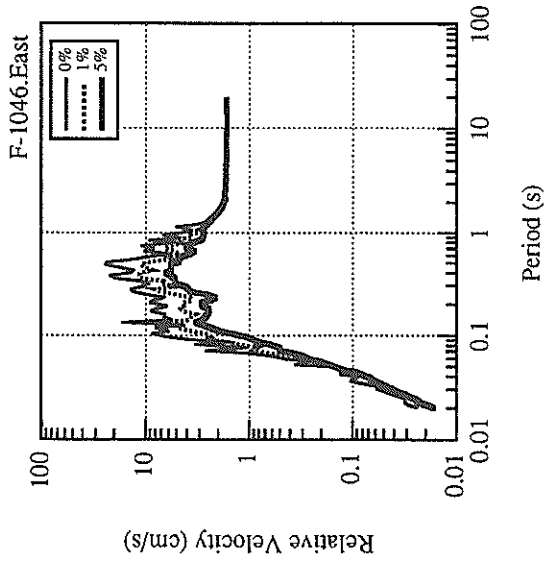
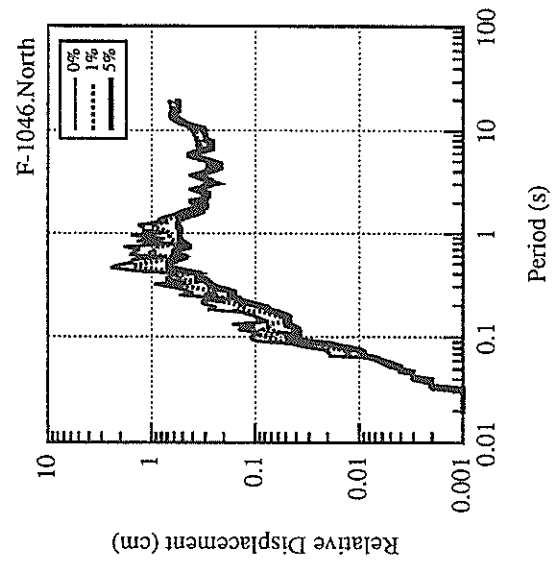
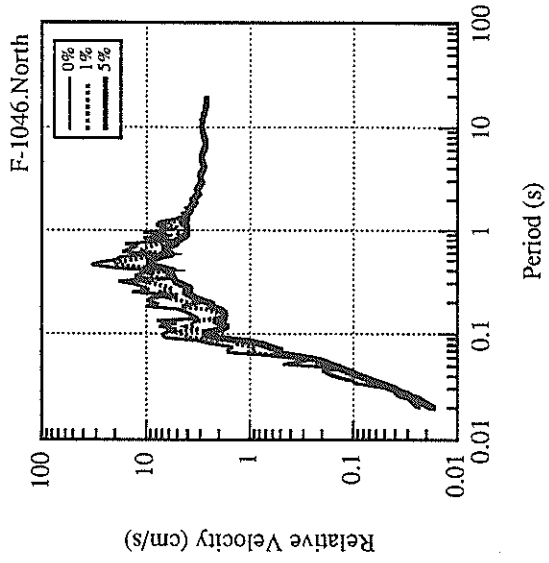
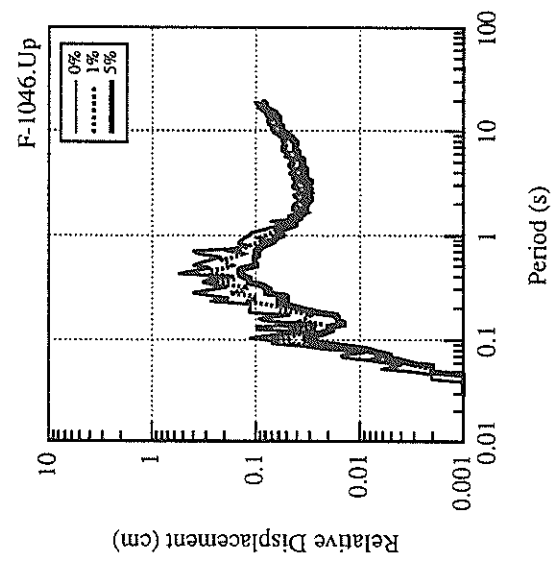
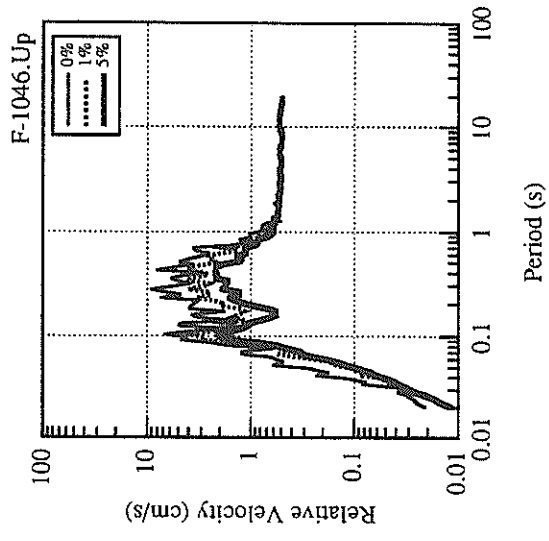


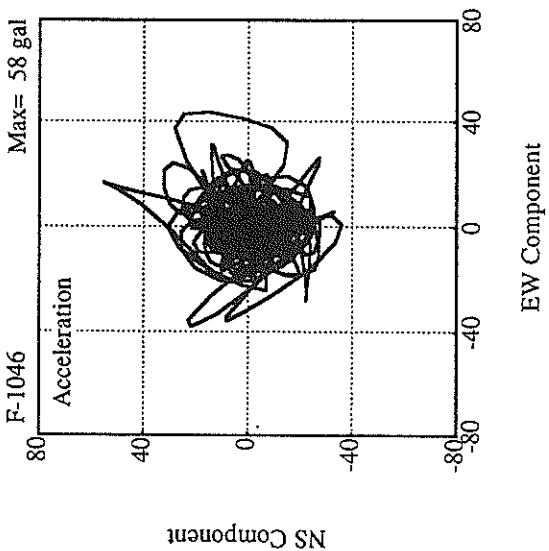
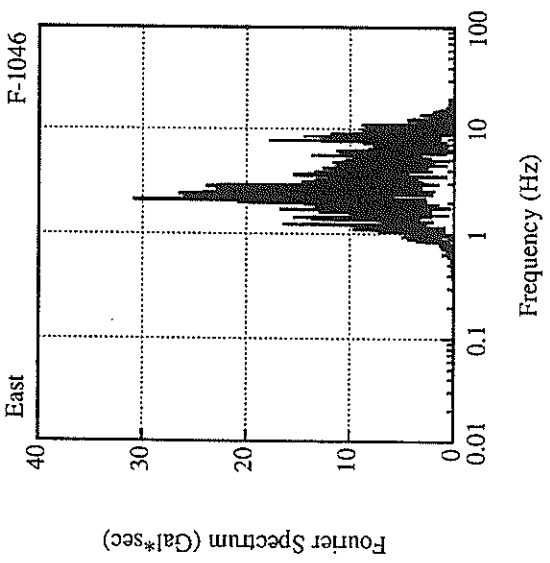
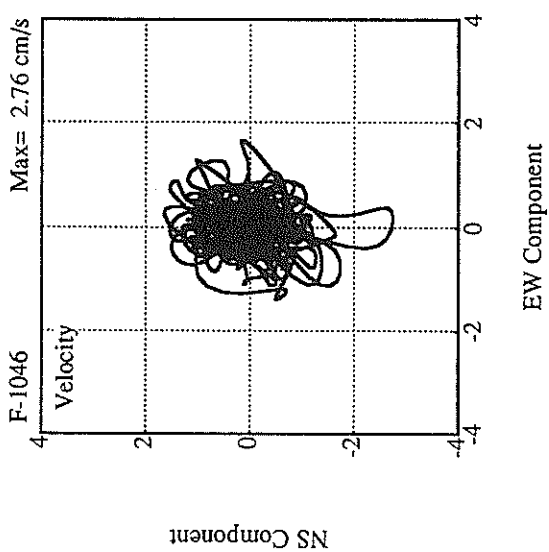
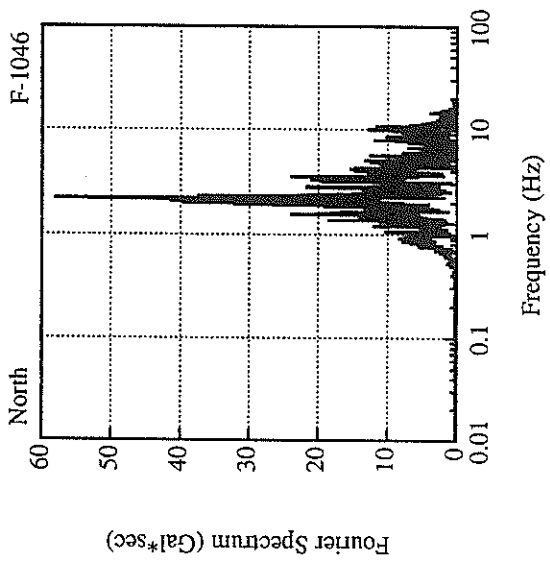
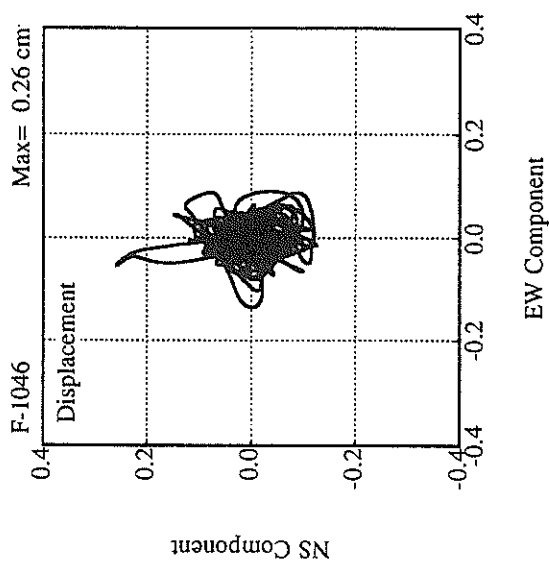
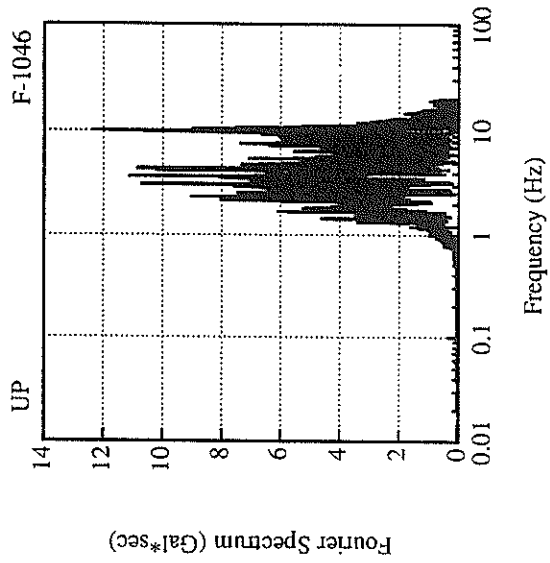
Displacement (cm)



Displacement (cm)







RECORD NUMBER : S-2639

STATION : KASHIMA-ZOKAN-S

EARTHQUAKE DATA

DATE AND TIME 3:24 JULY30,1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION SOUTHERN IBARAKI PREF

LATITUDE 35°54.0' N

LONGITUDE 140°35.3' E

DEPTH 42.6KM

JMA MAGNITUDE 5.1

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.255	0.450	0.353	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.255 0.450 0.353

MAXIMUM ACCELERATION (GAL)

ORIGINAL	114.5	44.3	13.0	116.4
CORRECTED	163.2	73.0	23.1	165.4

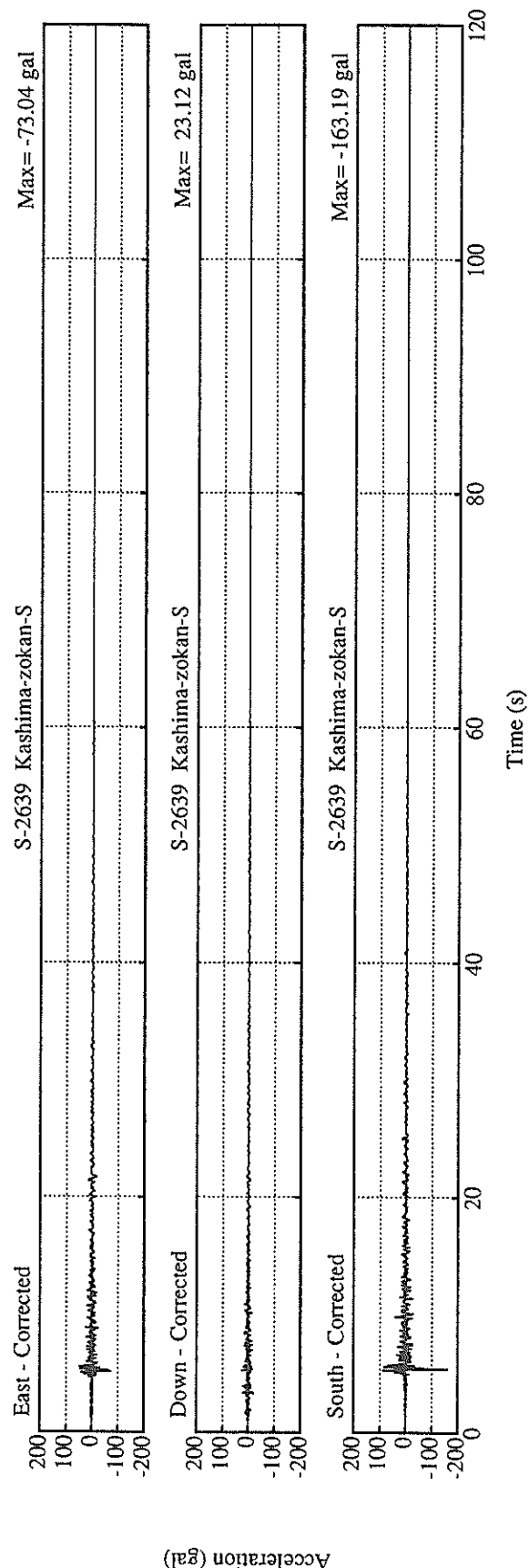
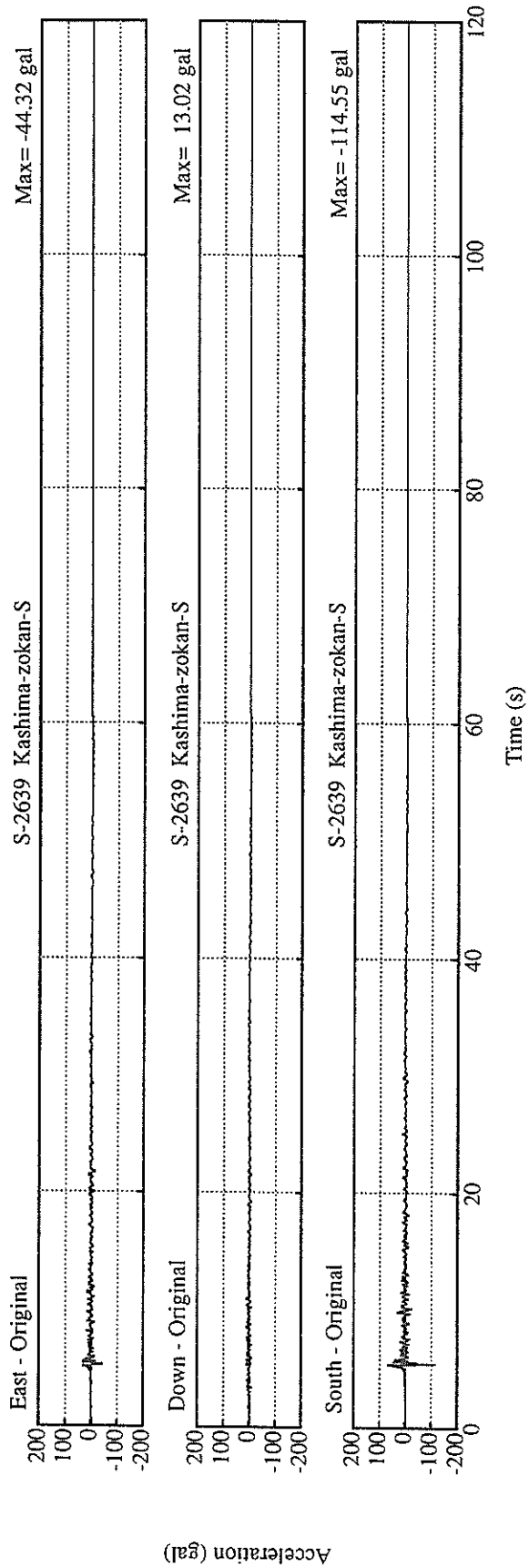
MAXIMUM VELOCITY (CM/SEC)

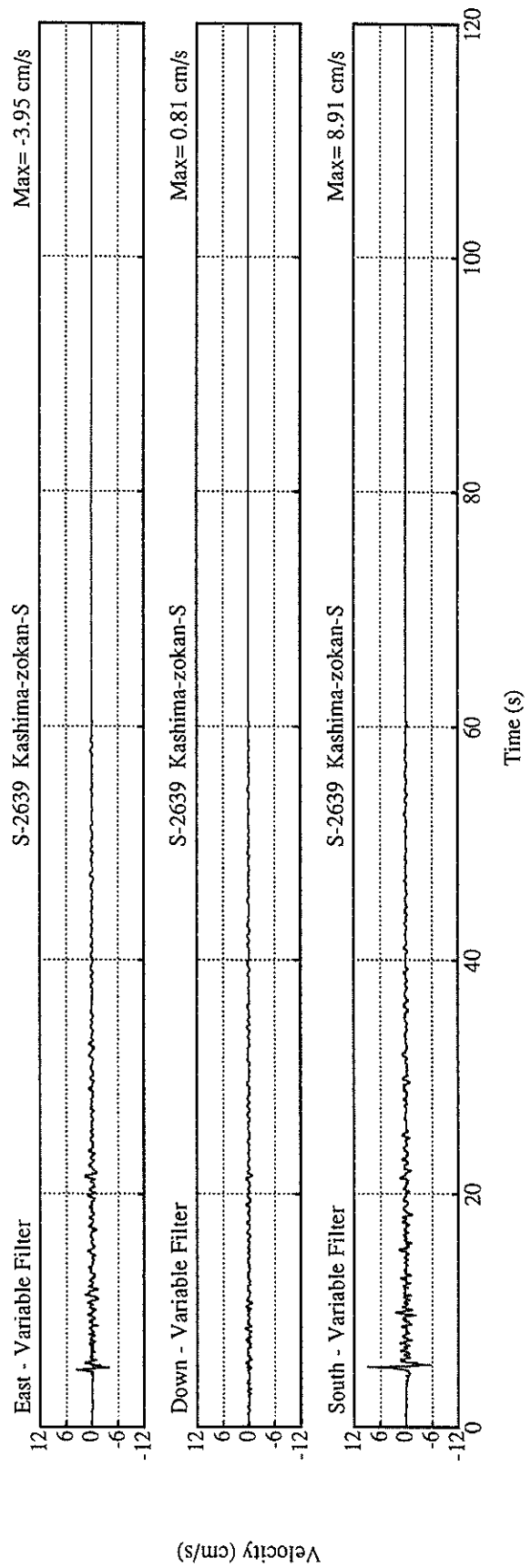
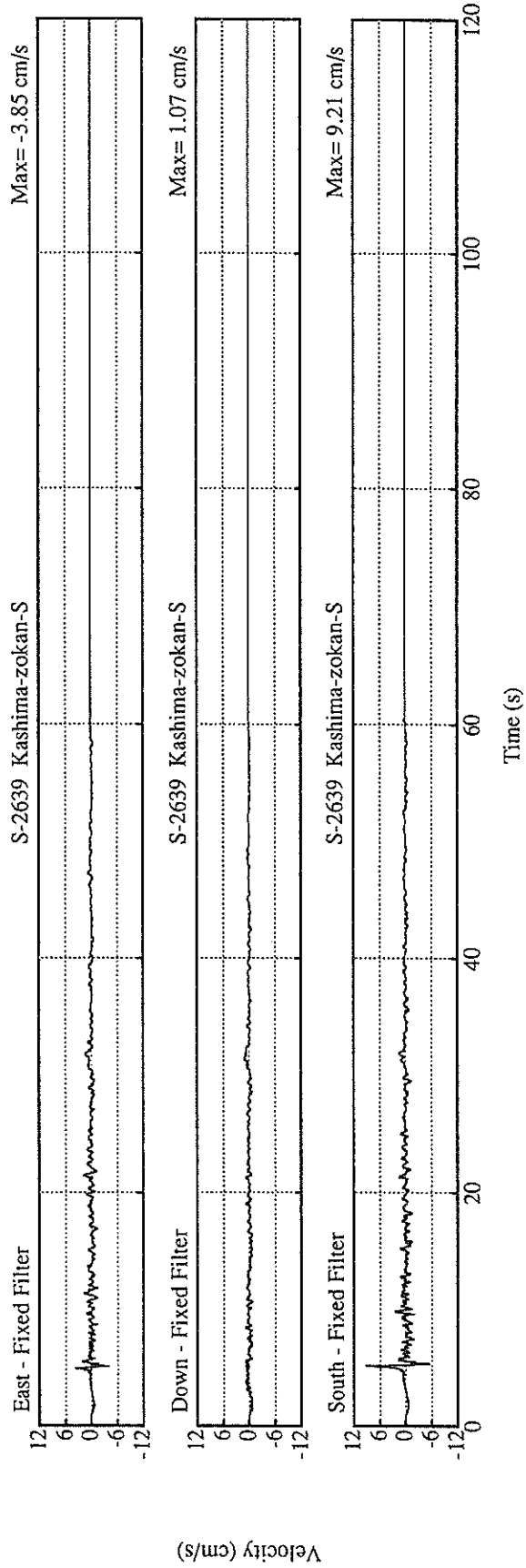
FIXED FILTER	9.21	3.85	1.07	9.53
VARIABLE FILTER	8.91	3.95	0.81	9.31

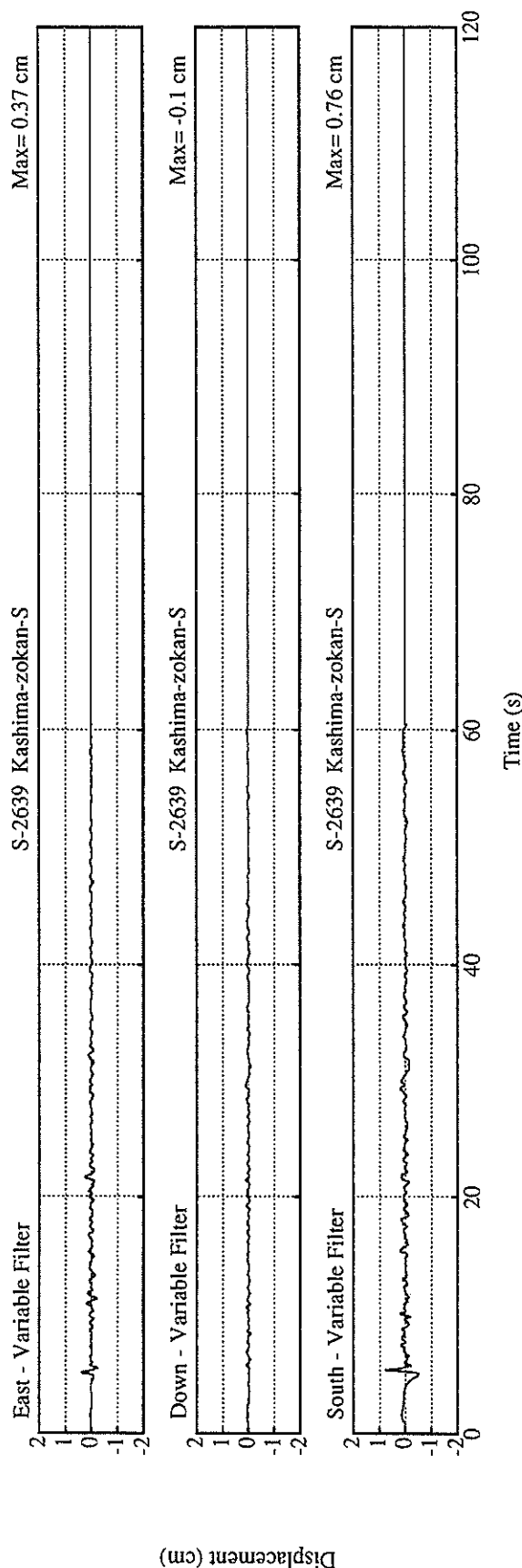
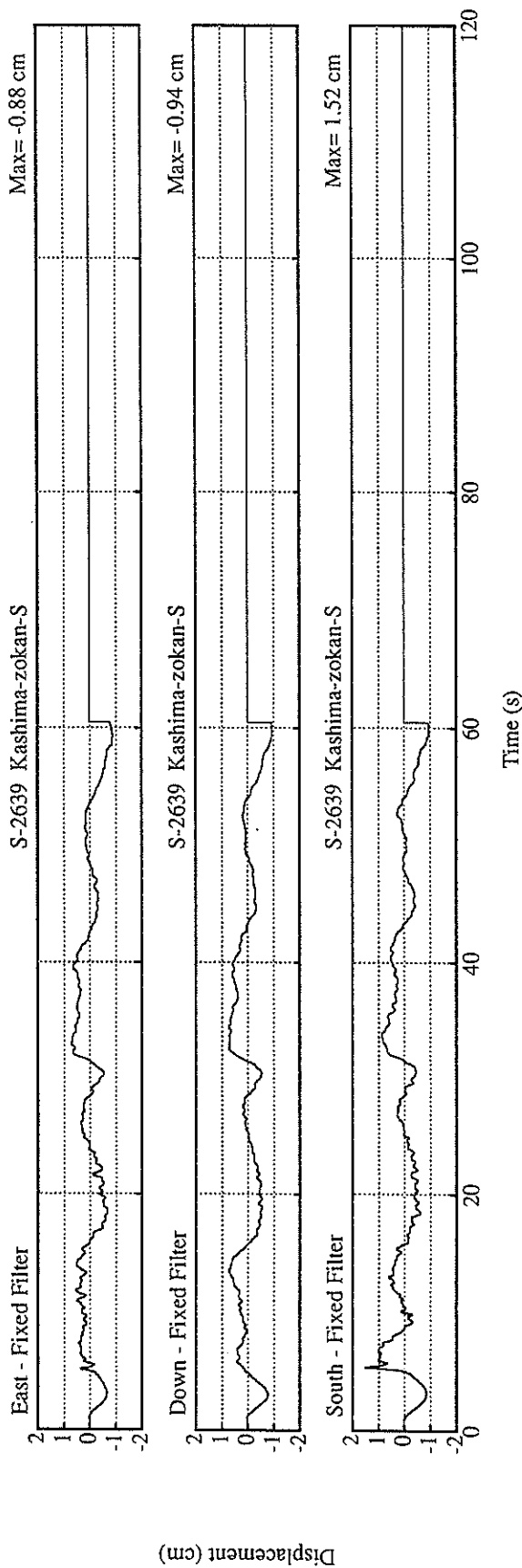
MAXIMUM DISPLACEMENT (CM)

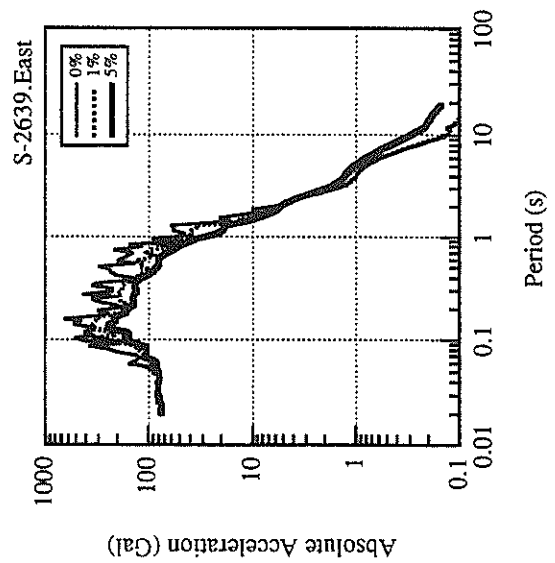
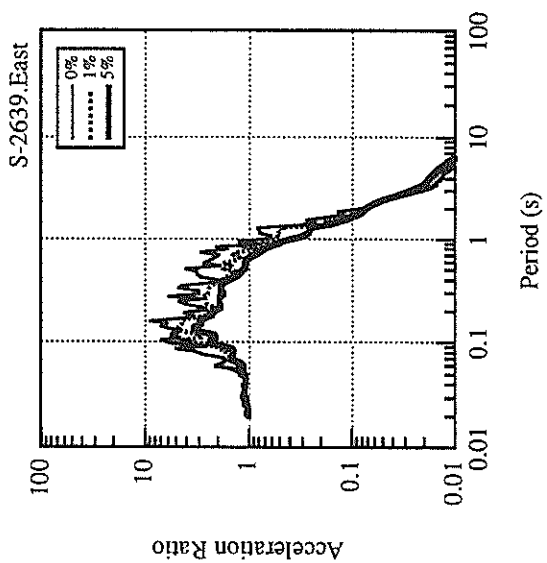
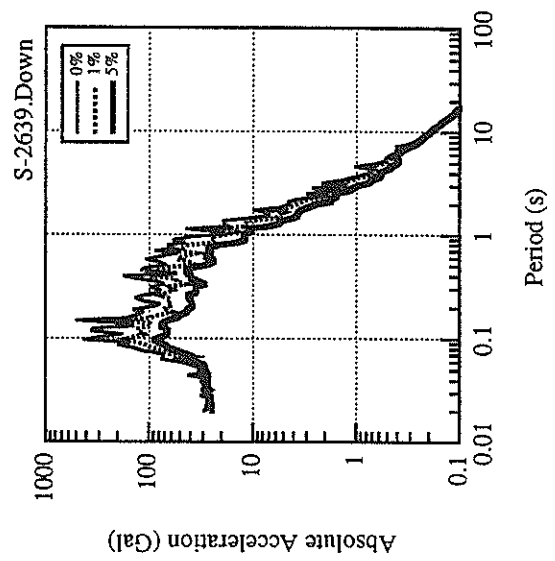
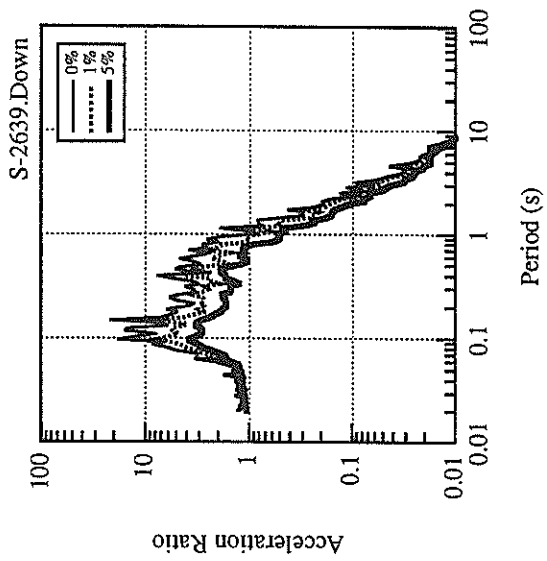
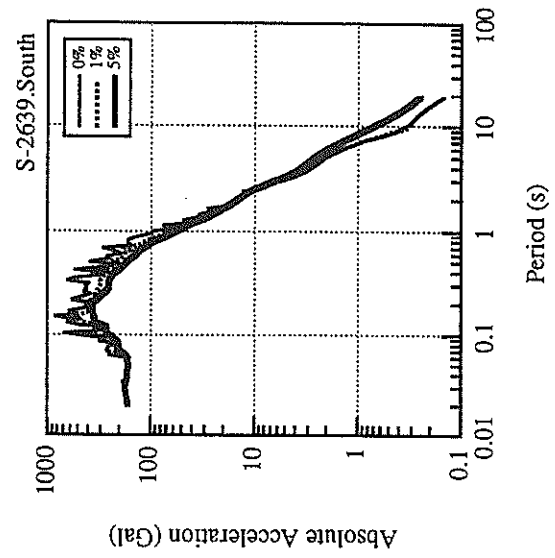
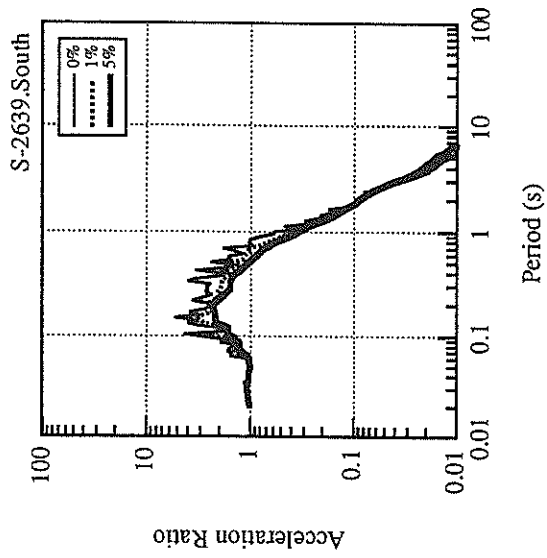
FIXED FILTER	1.52	0.88	0.94	1.52
VARIABLE FILTER	0.76	0.37	0.10	0.76

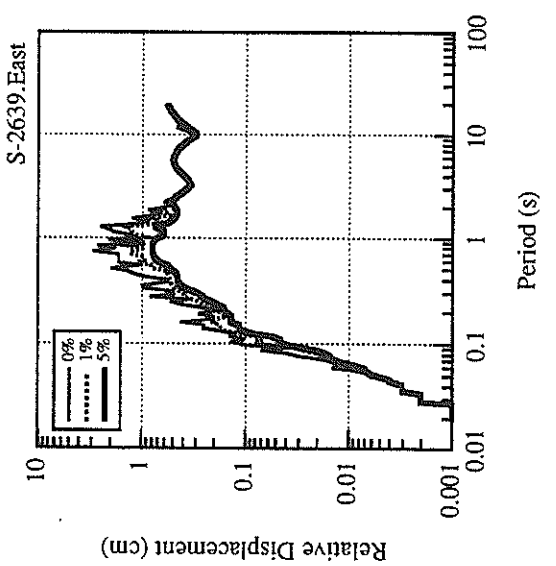
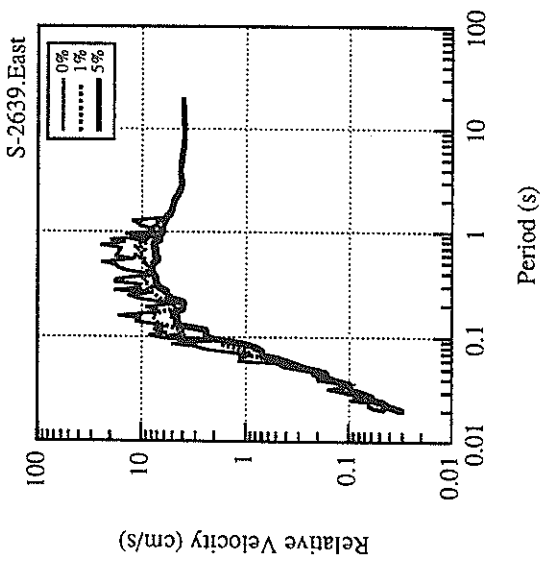
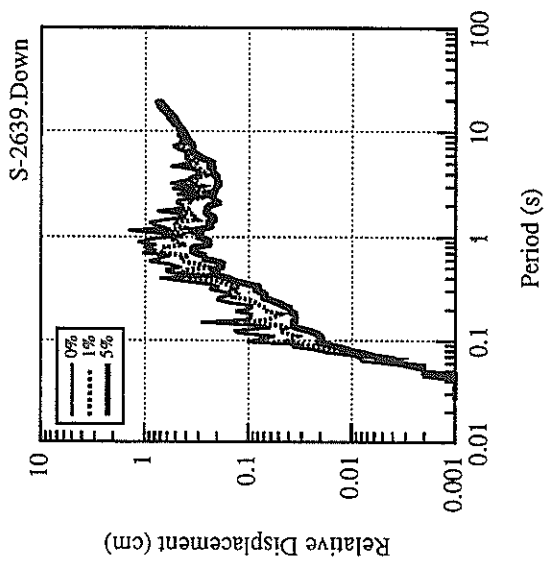
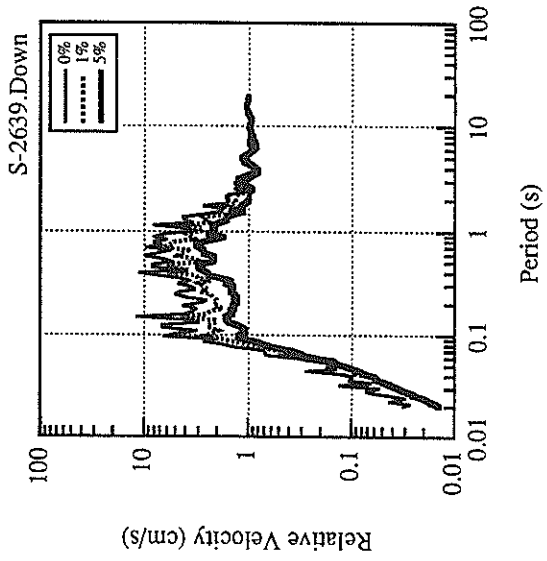
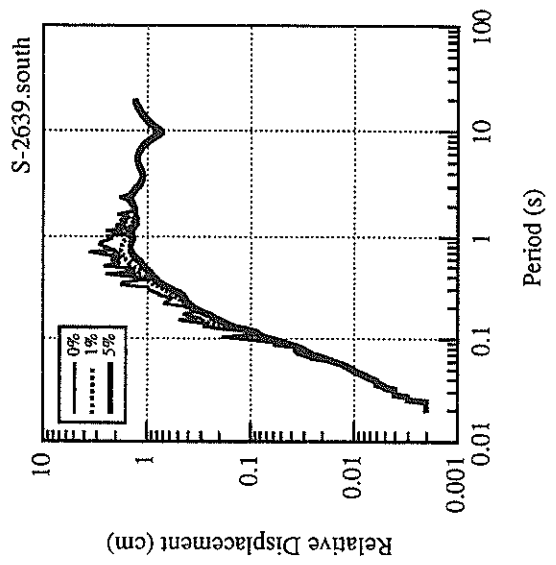
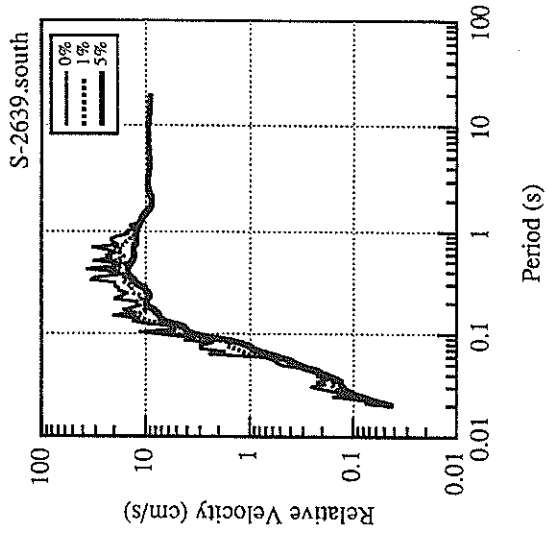
* RESULTANT OF HORIZONTAL COMPONENTS

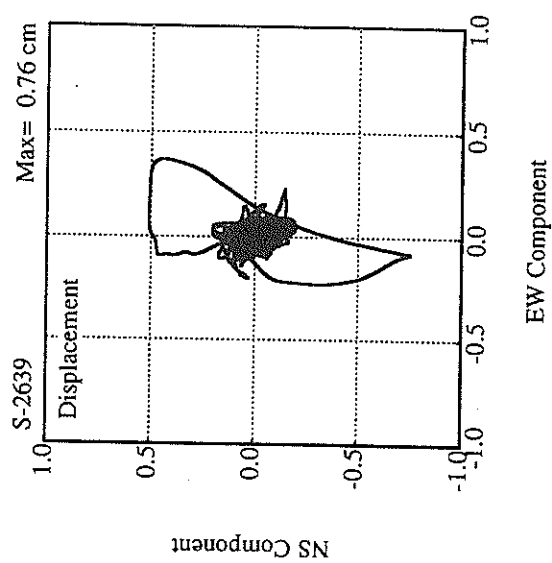
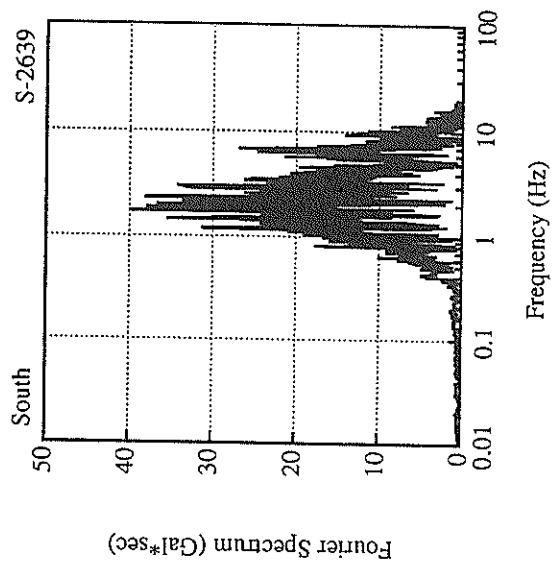
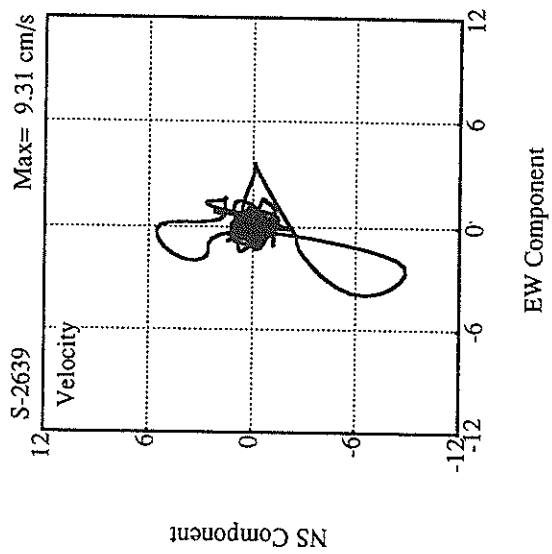
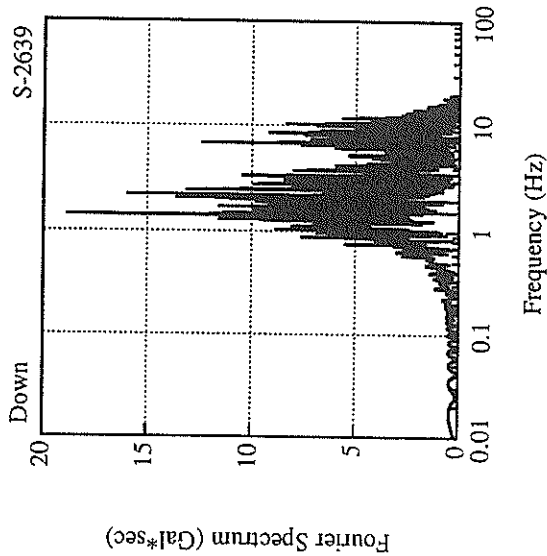
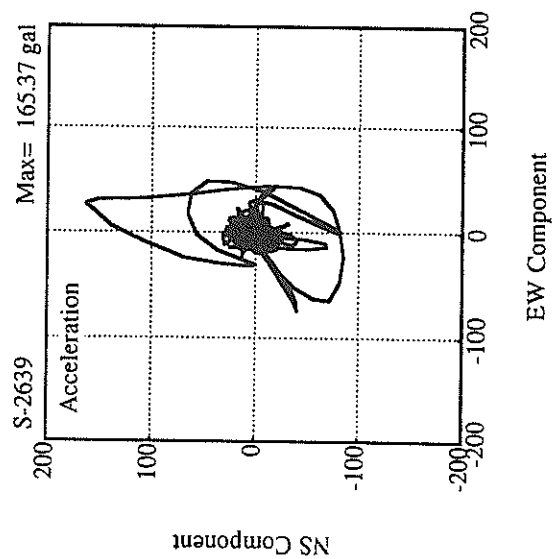
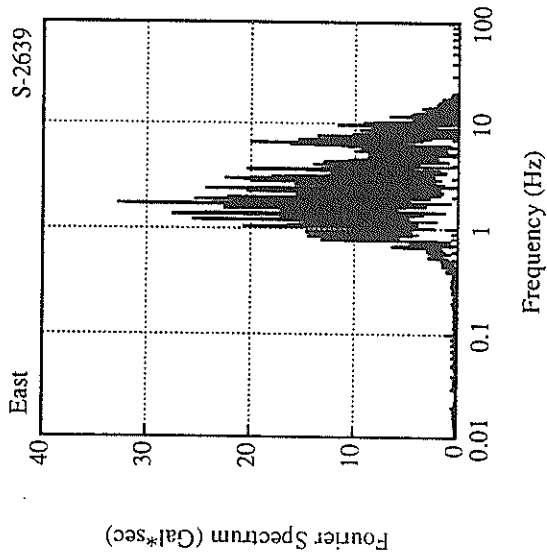












RECORD NUMBER : F-959

STATION : HITACHINAKA-F

EARTHQUAKE DATA

DATE AND TIME

3:24 JULY30,1995

LOCATION OF HYPOCENTER

SOUTHERN IBARAKI PREF

EPICENTRAL REGION

35°54.0' N

LATITUDE

140°35.3' E

LONGITUDE

42.6KM

DEPTH

5.1

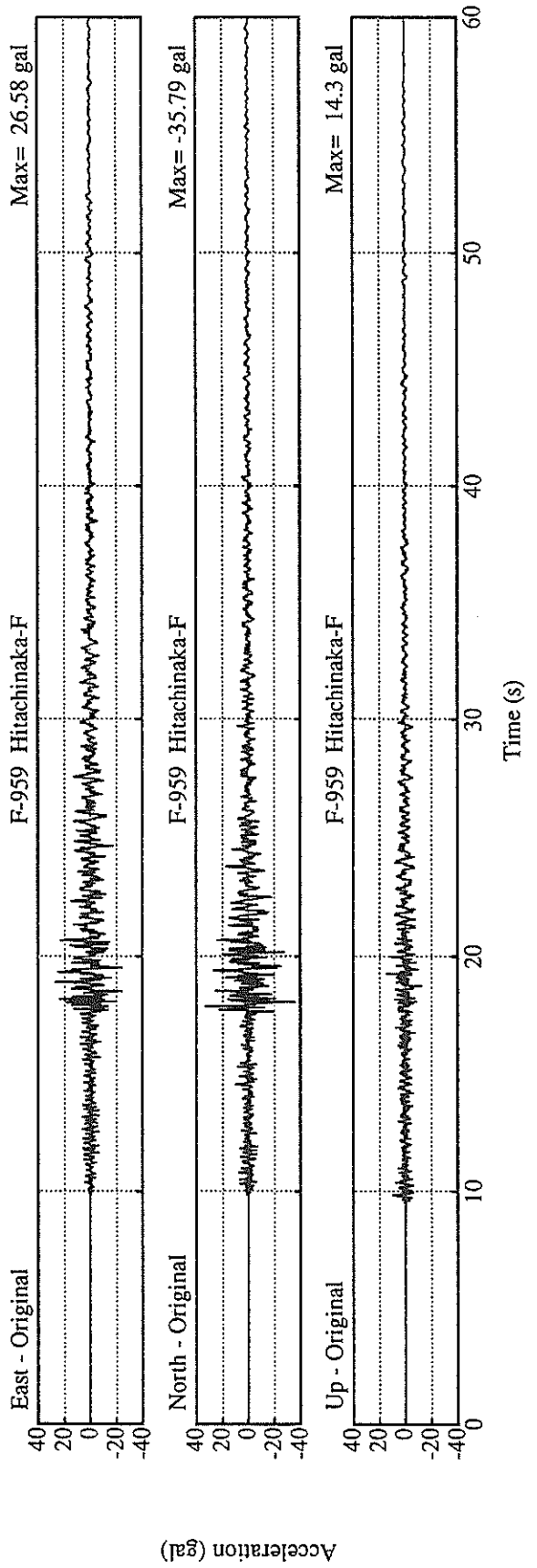
JMA MAGNITUDE

PEAK VALUES OF COMPONENTS

N	S	E	W	U	D	HORIZONTAL*
35.8	35.8	26.6	26.6	14.3	14.3	35.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-897

STATION : KOMATSUJIMA-G

EARTHQUAKE DATA

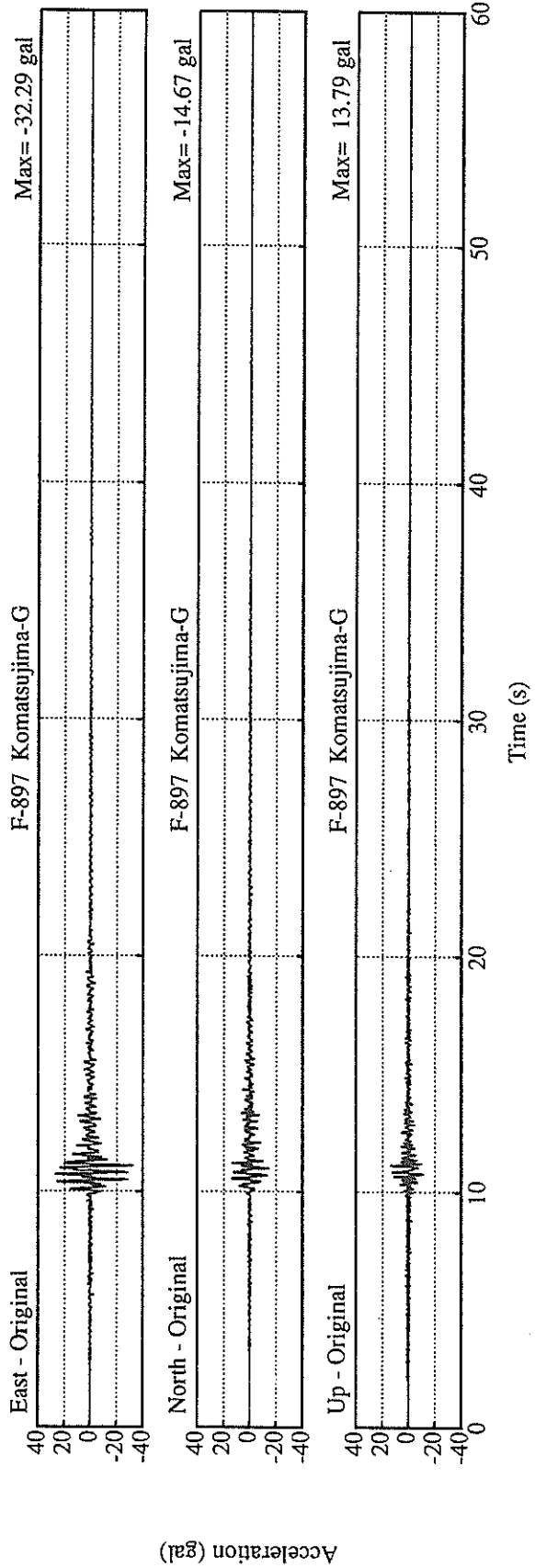
 DATE AND TIME 0:39 SEP. 9,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION S PART OF KII CHANNEL
 LATITUDE 33°46.0' N
 LONGITUDE 135° 9.9' E
 DEPTH 54.3KM
 JMA MAGNITUDE 4.6

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
14.7	32.3	13.8	32.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-946

STATION : WAKAYAMA-G

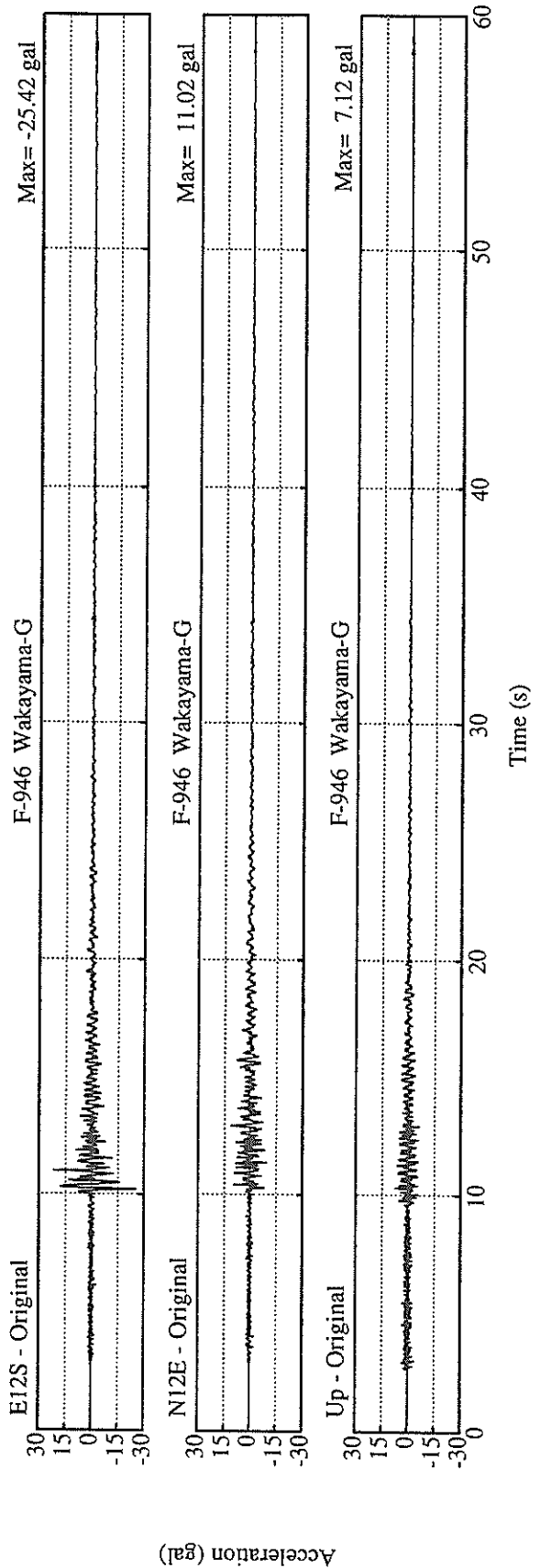
EARTHQUAKE DATA

 DATE AND TIME 0:39 SEP. 9,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION S PART OF KII CHANNEL
 LATITUDE 33° 46.0' N
 LONGITUDE 135° 9.9' E
 DEPTH 54.3KM
 JMA MAGNITUDE 4.6

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	11.0	25.4	7.1	25.4

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-961

STATION : HITACHINAKA-F

EARTHQUAKE DATA

 DATE AND TIME : 8:17 SEP.12,1995
 LOCATION OF HYPOCENTER : NORTHERN IBARAKI PREF
 EPICENTRAL REGION : 36°38.8' N
 LATITUDE : 140°27.4' E
 LONGITUDE : 69.6KM
 DEPTH : 3.2
 JMA MAGNITUDE : 3.2

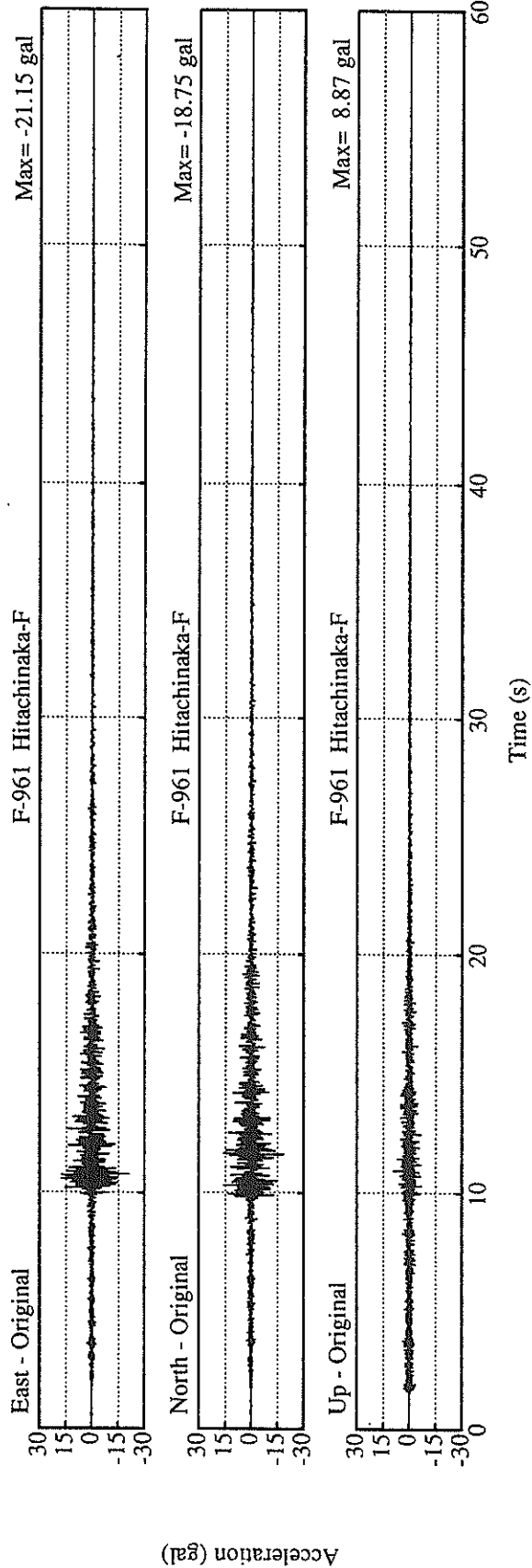
PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*

18.7	21.1	8.9	21.2

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : M-1563

STATION : TOKACHI-M

EARTHQUAKE DATA

DATE AND TIME 8:52 SEP.16,1995

LOCATION OF HYPOCENTER

KUSHIRO REGION

42°59.5' N

143°51.4' E

112.4KM

5.2

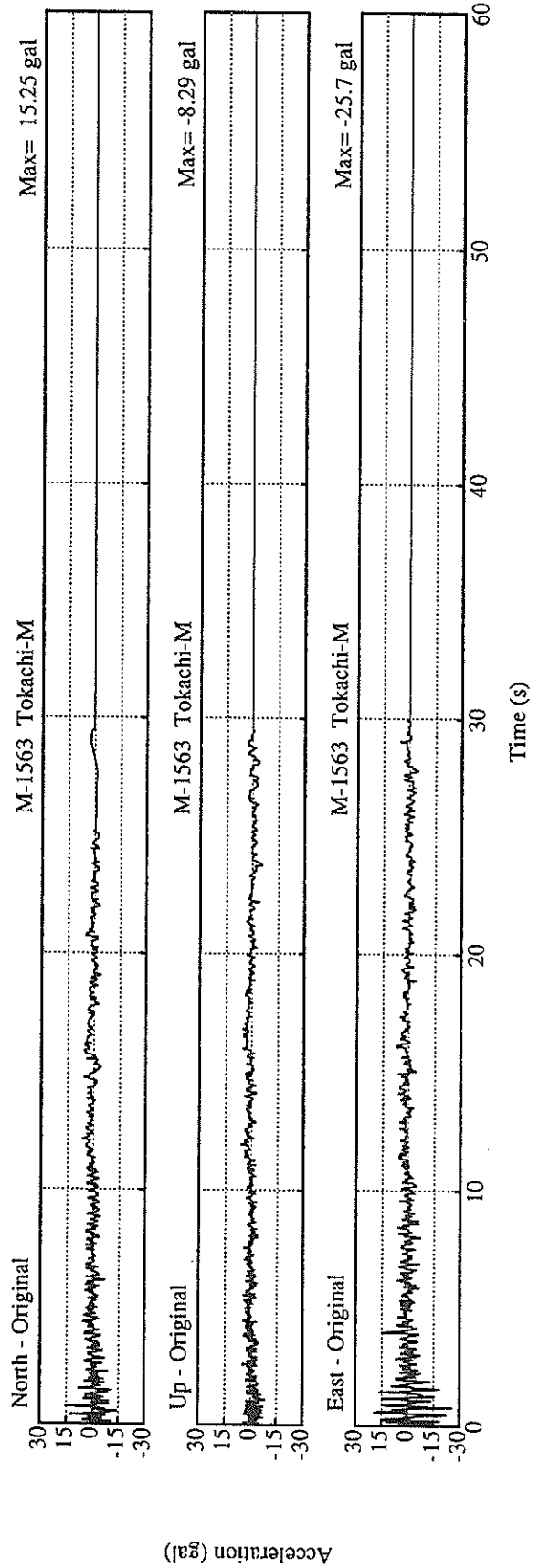
JMA MAGNITUDE

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
15.2	25.7	8.3	25.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-911

STATION : KUSHIRO-G

EARTHQUAKE DATA

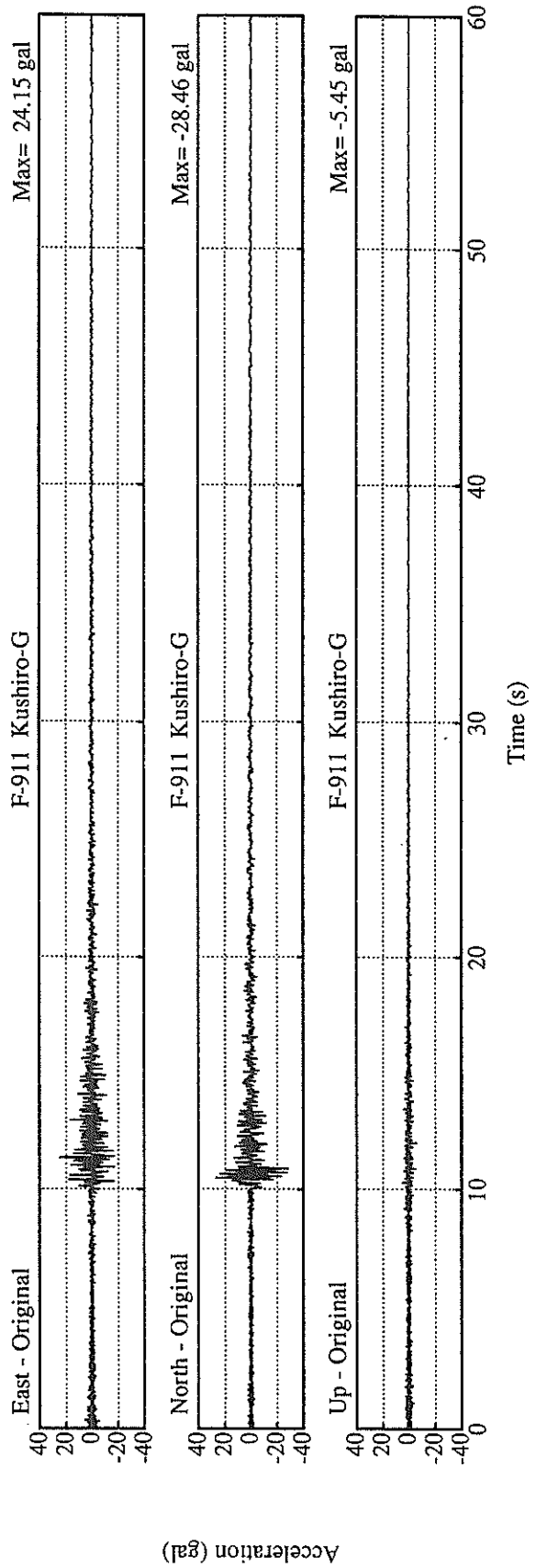
 DATE AND TIME 8:52 SEP.16,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION KUSHIRO REGION
 LATITUDE 42°59.5' N
 LONGITUDE 143°51.4' E
 DEPTH 112.4KM
 JMA MAGNITUDE 5.2

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
28.5	24.1	5.5	28.6

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : M-1564

STATION : TOKACHI-M

EARTHQUAKE DATA

 DATE AND TIME 16:14 SEP.26.1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION SE OFF ERIMOMISAKI
 LATITUDE 41°42.3' N
 LONGITUDE 143°30.3' E
 DEPTH 39.4KM
 JMA MAGNITUDE 5.8

PEAK VALUES OF COMPONENTS

	N	S	E	W	U	D	HORIZONTAL*
FC (HZ)	0.269	0.293	0.293	0.293			

PARAMETER OF THE VARIABLE FILTER

FC (HZ)	0.269	0.293	0.293
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MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	39.4	40.0	8.3	51.2
ORIGINAL	50.3	49.1	13.6	63.6
CORRECTED	49.8	48.7	12.6	62.8

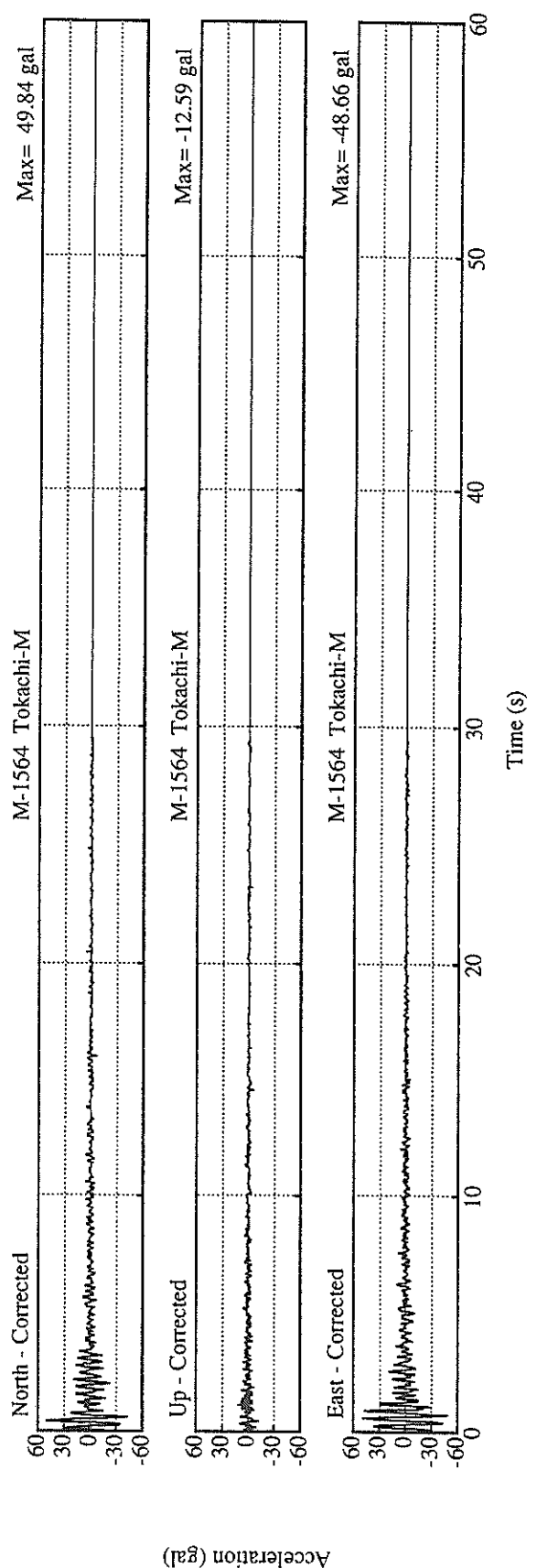
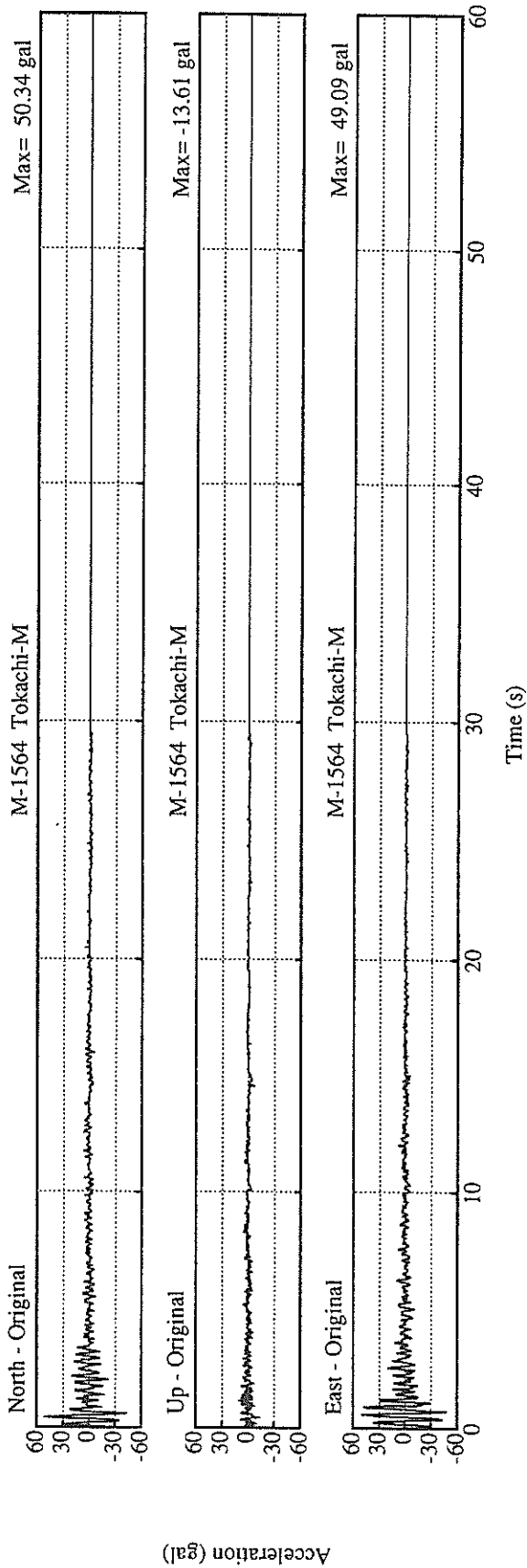
MAXIMUM VELOCITY (CM/SEC)

FIXED FILTER	2.59	3.79	1.31	4.20
VARIABLE FILTER	2.58	3.33	0.64	3.88

MAXIMUM DISPLACEMENT (CM)

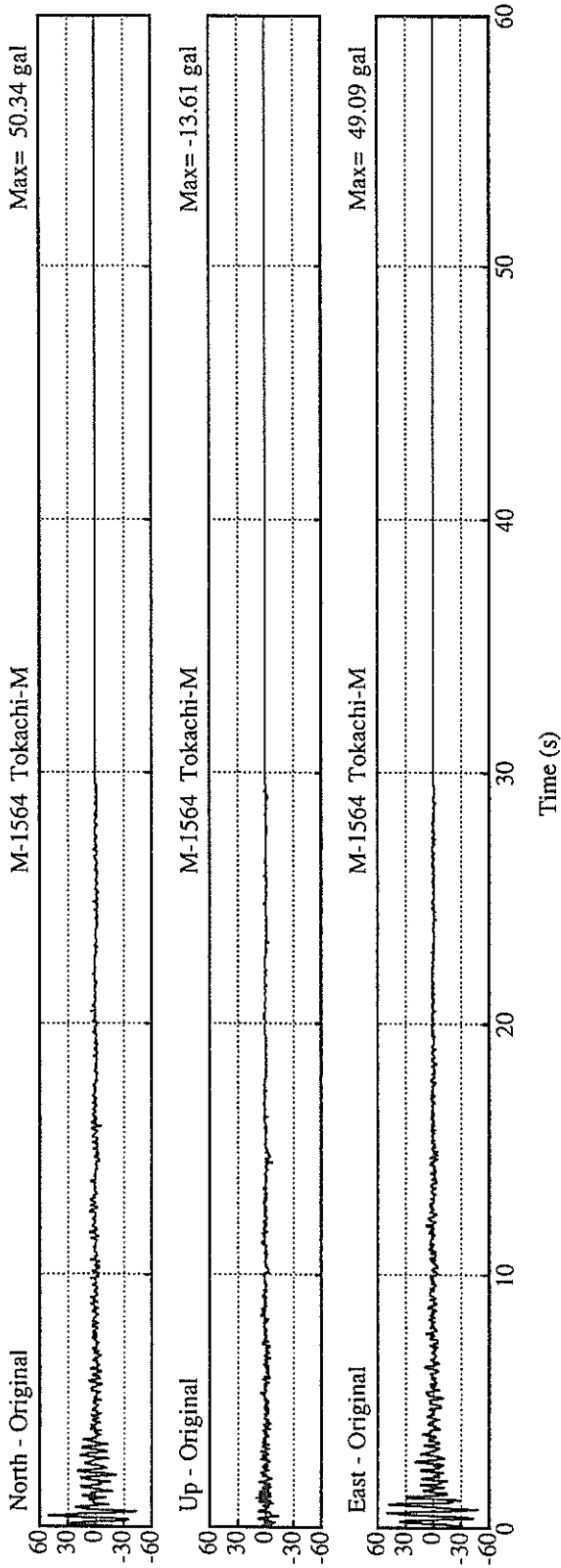
FIXED FILTER	0.90	0.88	0.85	1.04
VARIABLE FILTER	0.24	0.44	0.23	0.44

* RESULTANT OF HORIZONTAL COMPONENTS

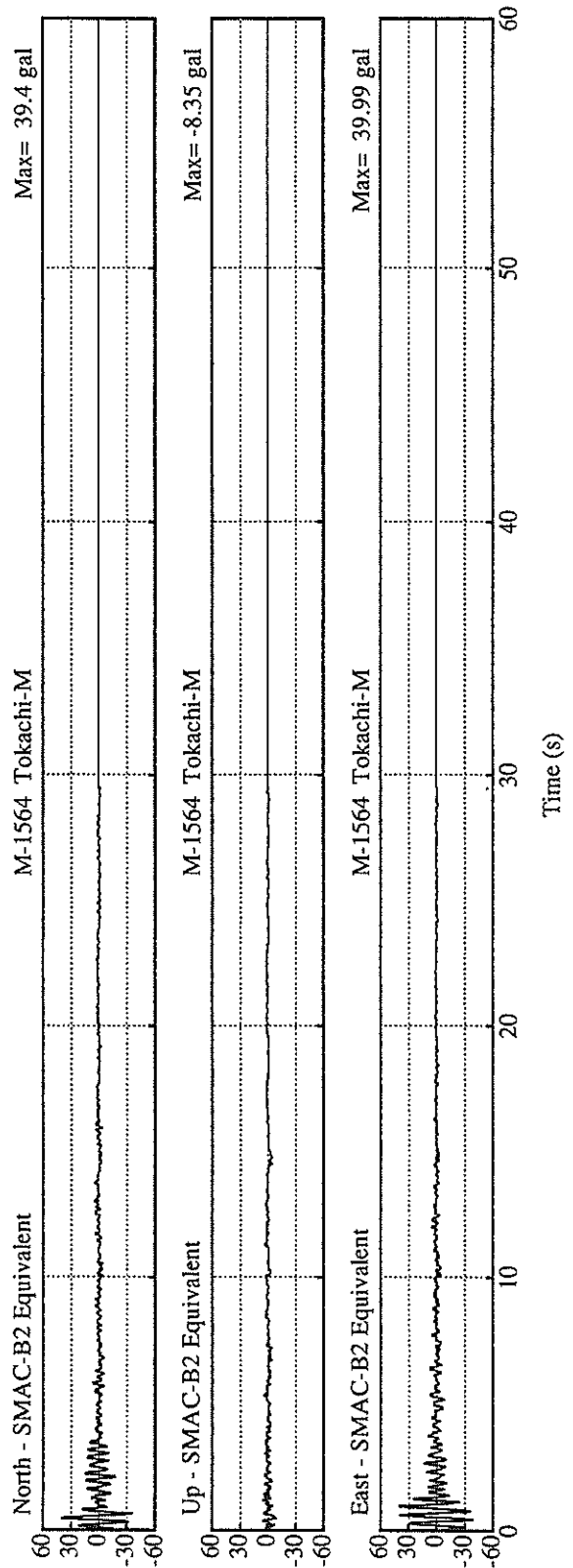


Acceleration (gal)

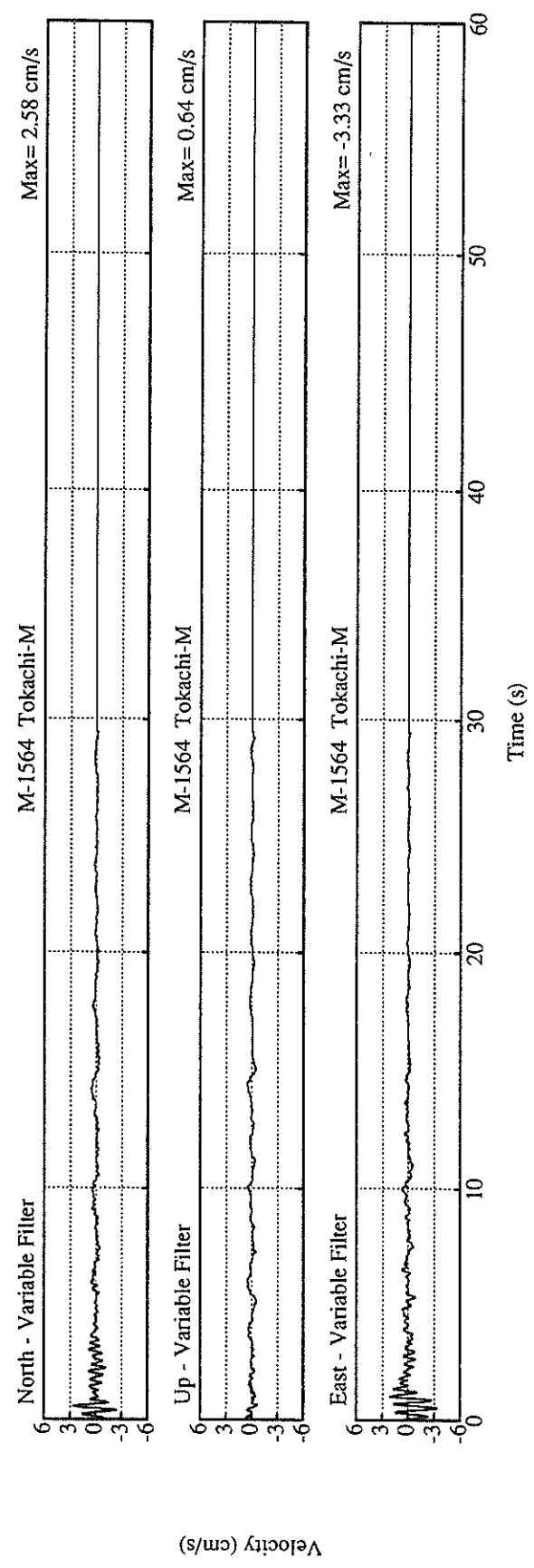
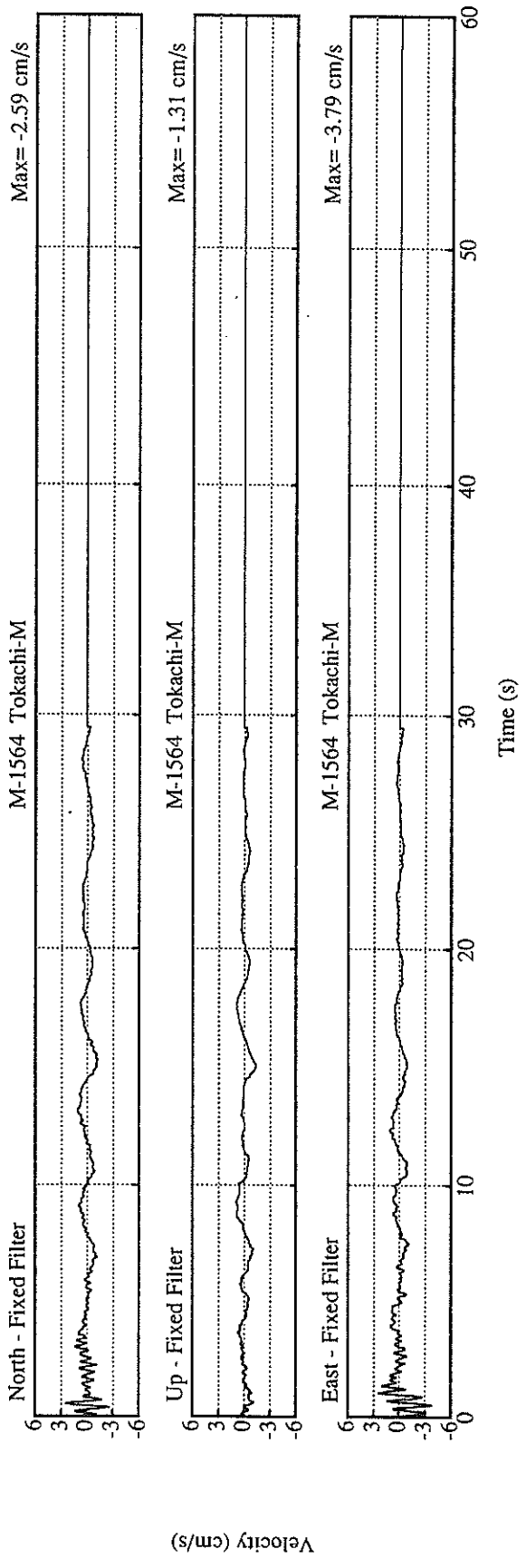
Acceleration (gal)

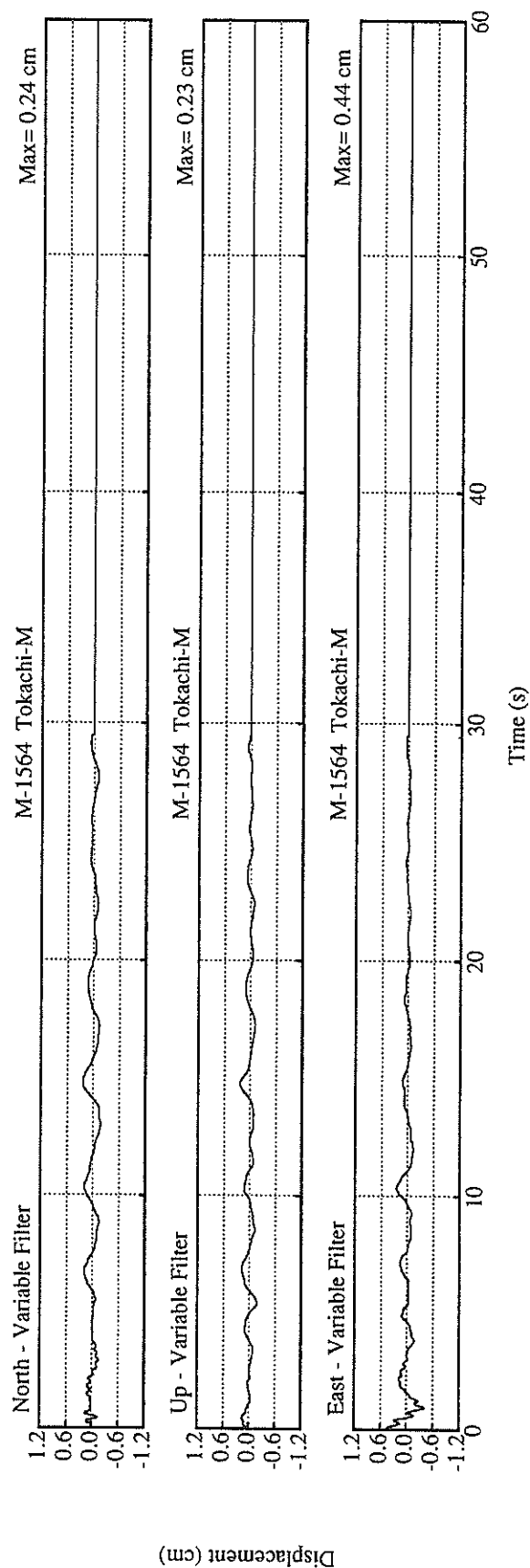
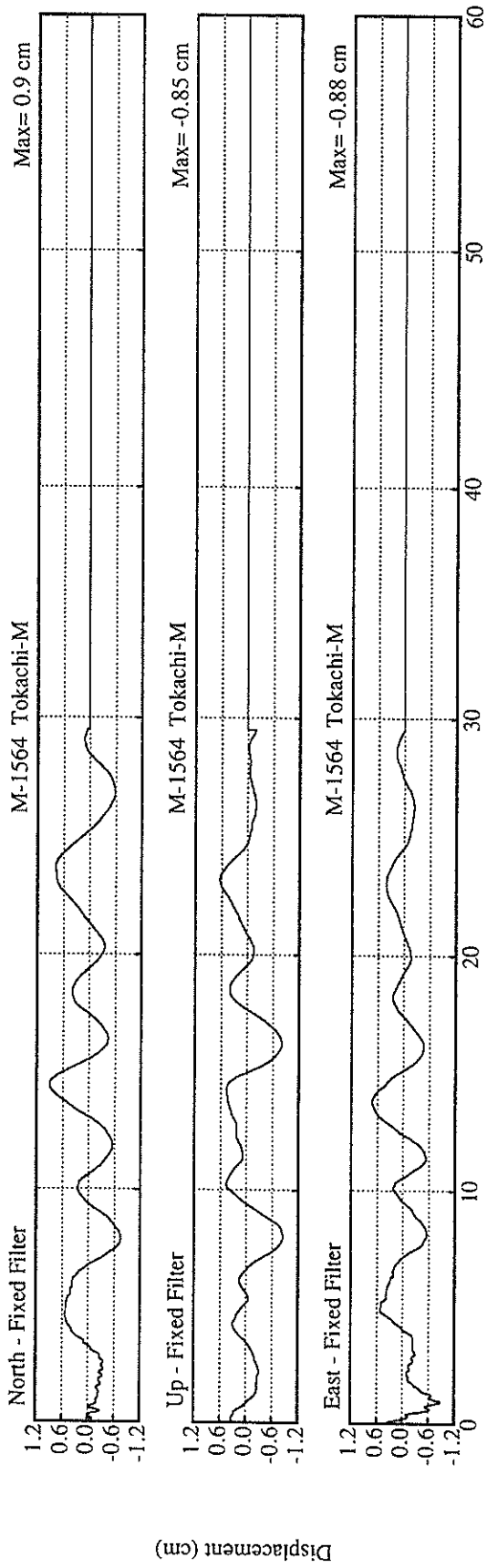


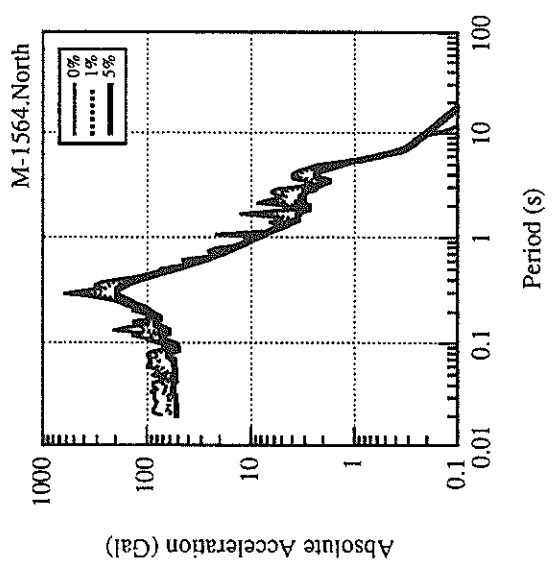
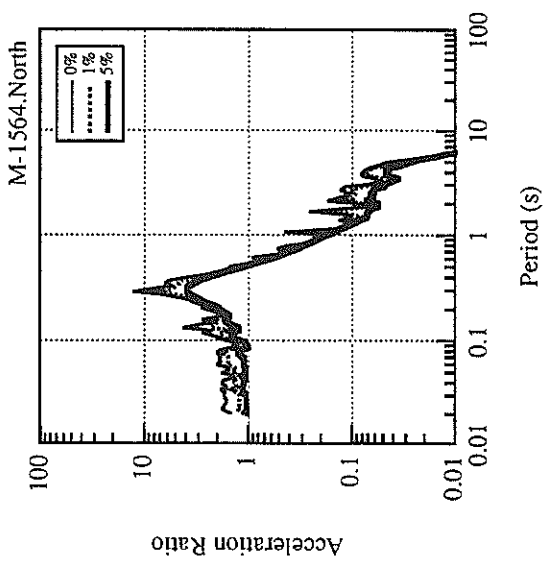
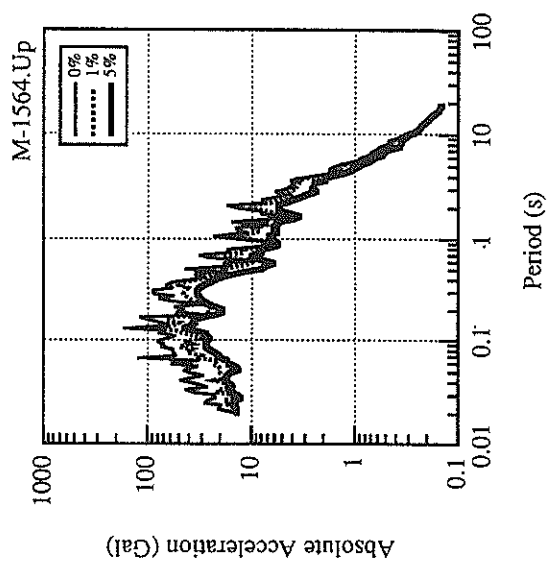
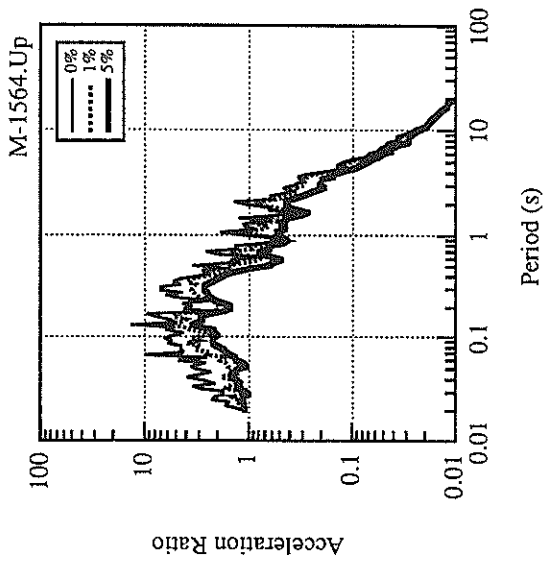
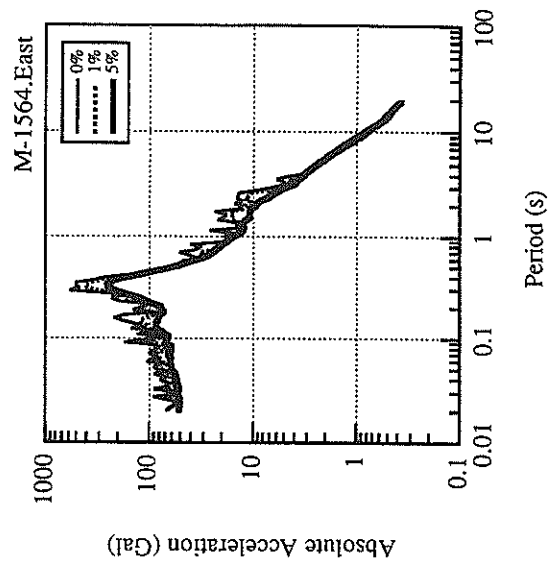
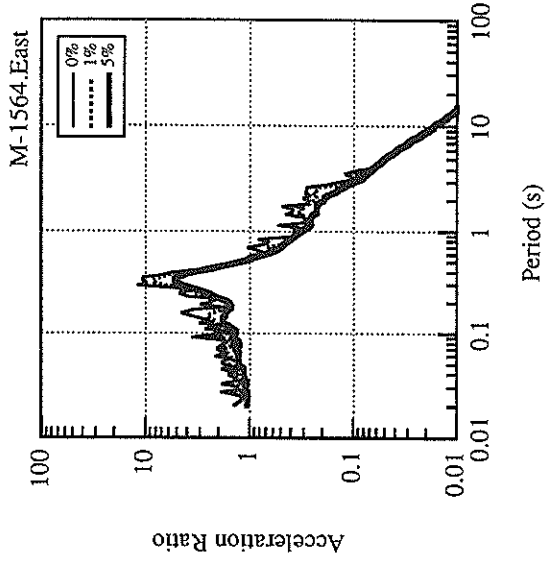
Acceleration (gal)

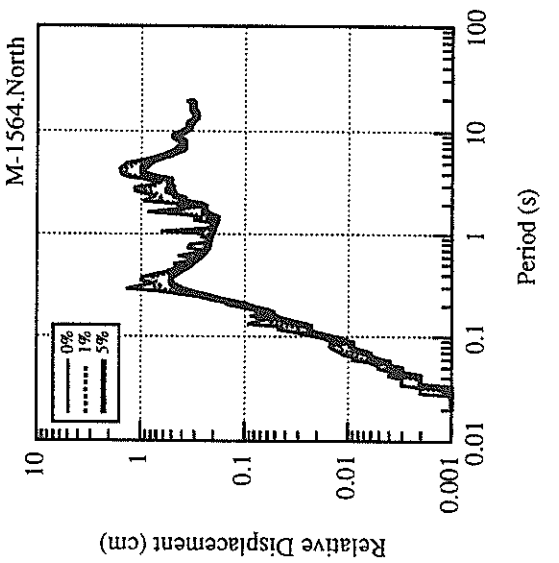
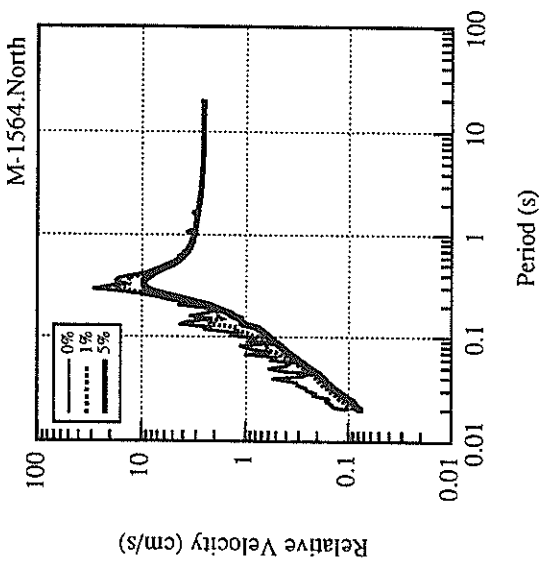
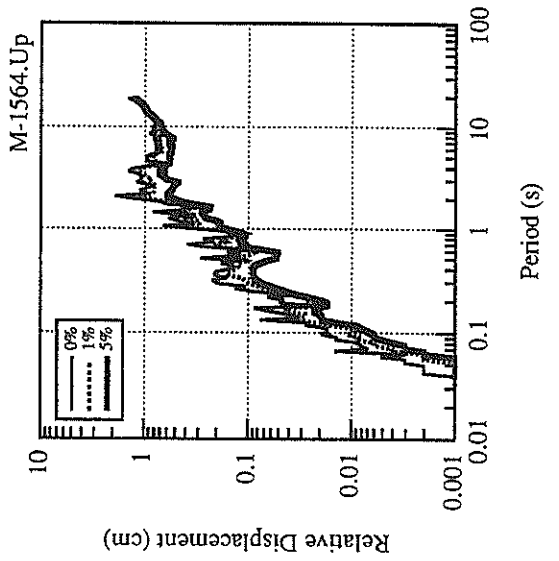
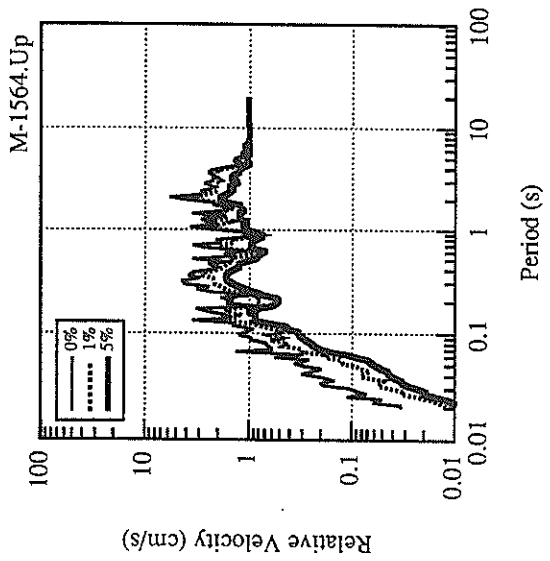
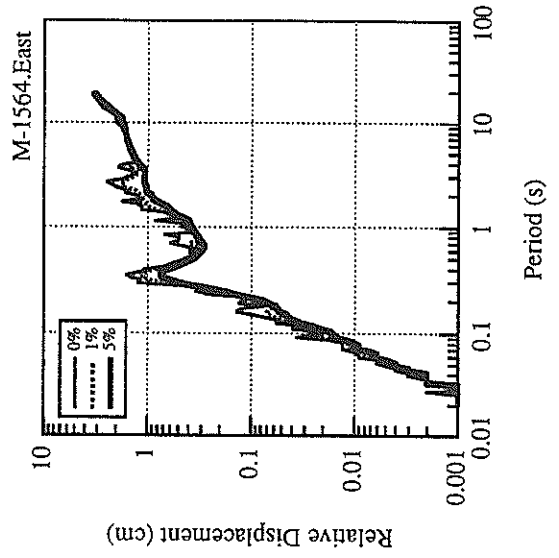
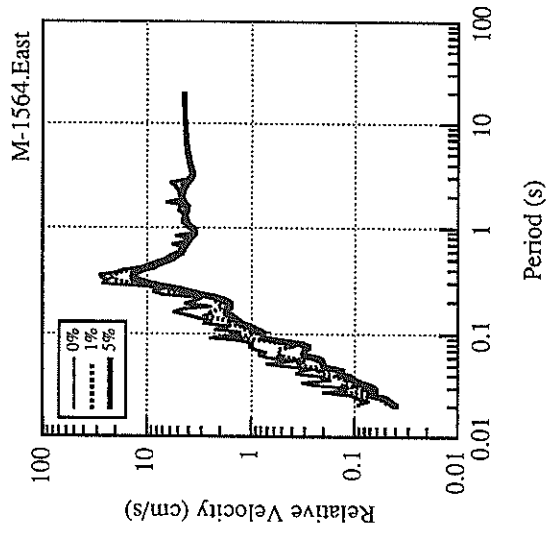


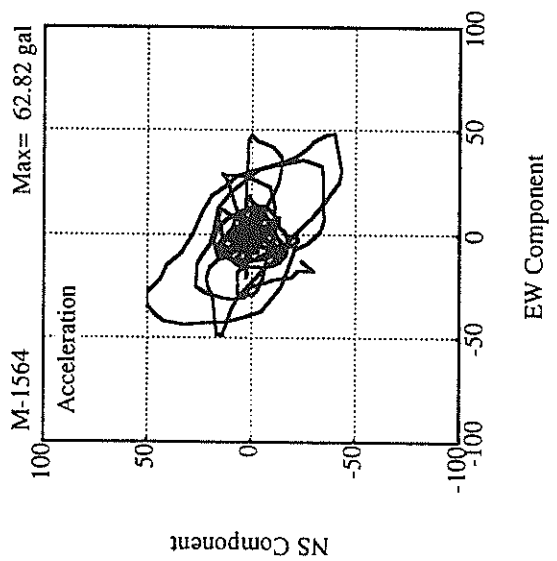
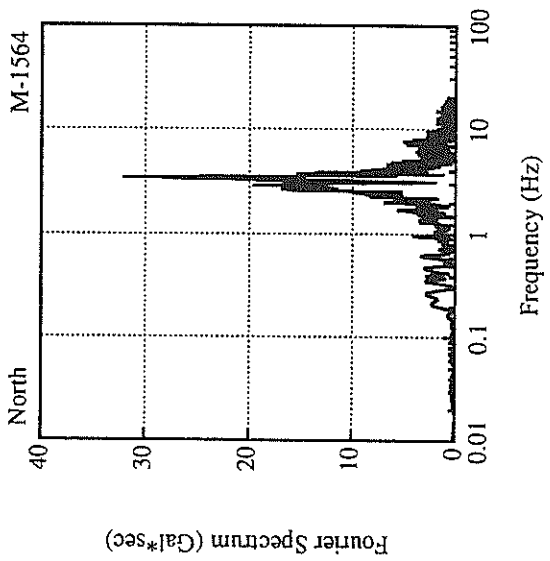
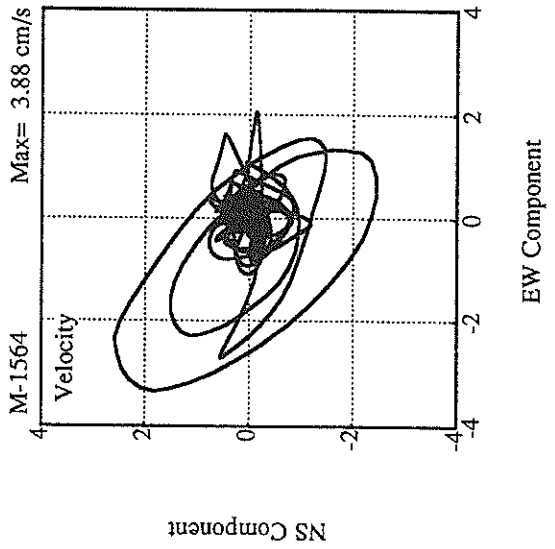
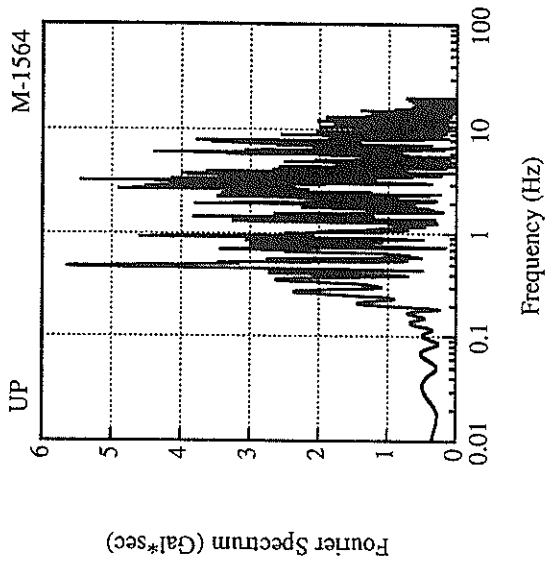
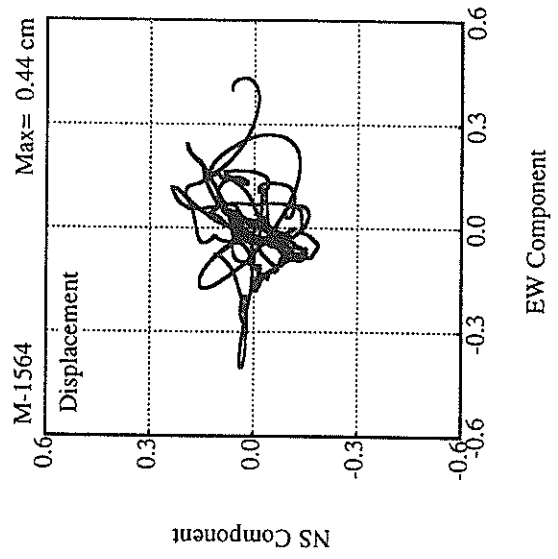
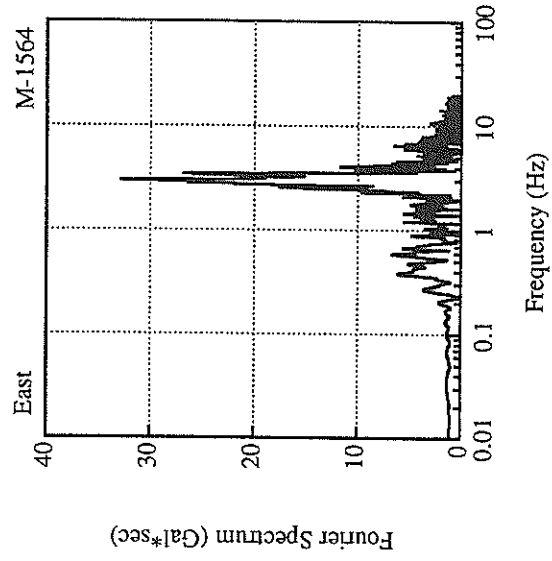
Acceleration (gal)











RECORD NUMBER : F-962

STATION : HITACHINAKA-F

EARTHQUAKE DATA

DATE AND TIME 7:27 OCT. 1,1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION E OFF IBARAKI PREF

LATITUDE 36° 32.9' N

LONGITUDE 140° 53.4' E

DEPTH 49.3KM

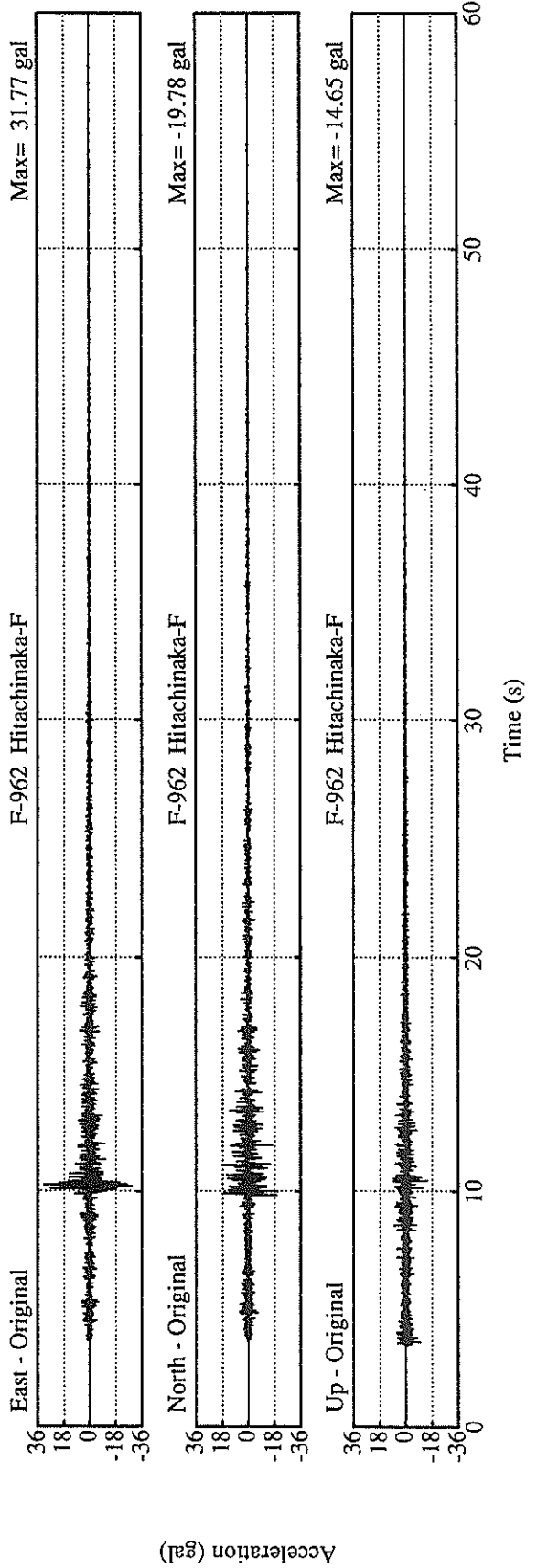
JMA MAGNITUDE 4.1

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
19.8	31.8	14.7	31.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : S-2645

STATION : KOBE-JI-S

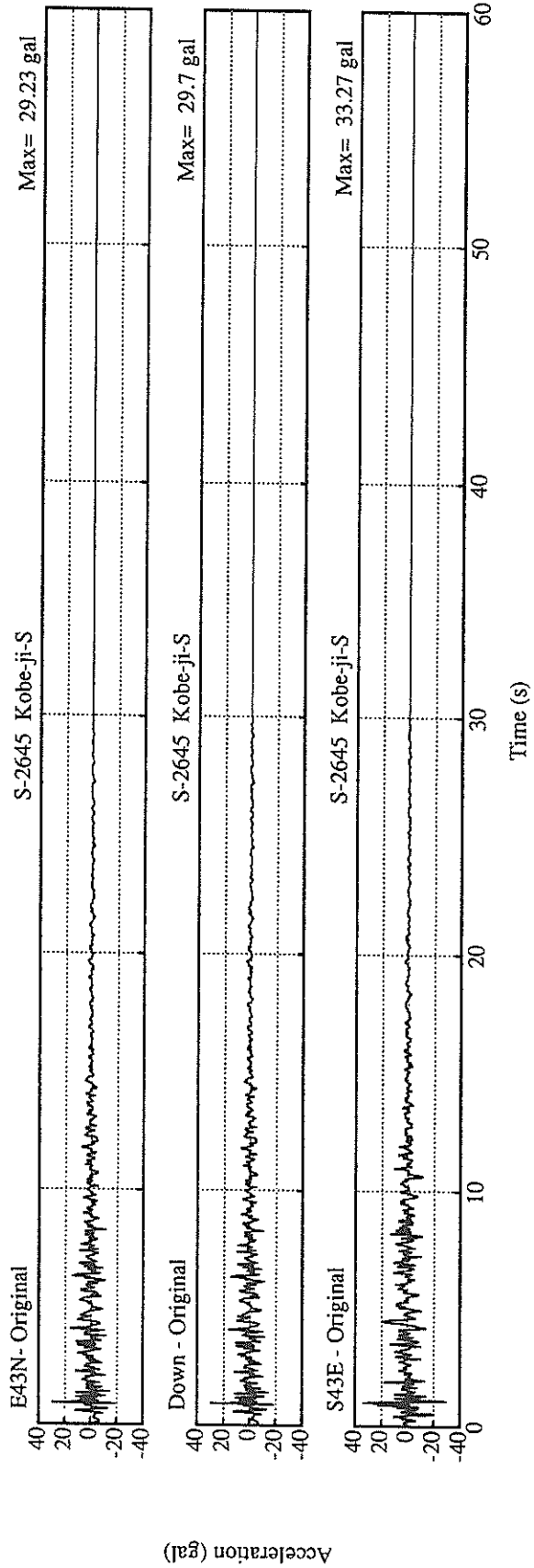
EARTHQUAKE DATA

 DATE AND TIME : 2: 4 OCT.14,1995
 LOCATION OF HYPOCENTER : OSAKA BAY REGION
 EPICENTRAL REGION : 34° 37.6' N
 LATITUDE : 135° 6.9' E
 LONGITUDE : 15.3KM
 DEPTH : 4.5
 JMA MAGNITUDE : 4.5

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	33.3	29.2	29.7	33.6

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-924

STATION : HIRARA-G

EARTHQUAKE DATA

 DATE AND TIME 15:37 NOV.11,1995
 LOCATION OF HYPOCENTER NEAR MIYAKOJIMA ISLAND
 EPICENTRAL REGION 25° 5.9' N
 LATITUDE 124° 49.7' E
 LONGITUDE 77.0KM
 DEPTH 4.6
 JMA MAGNITUDE 4.6

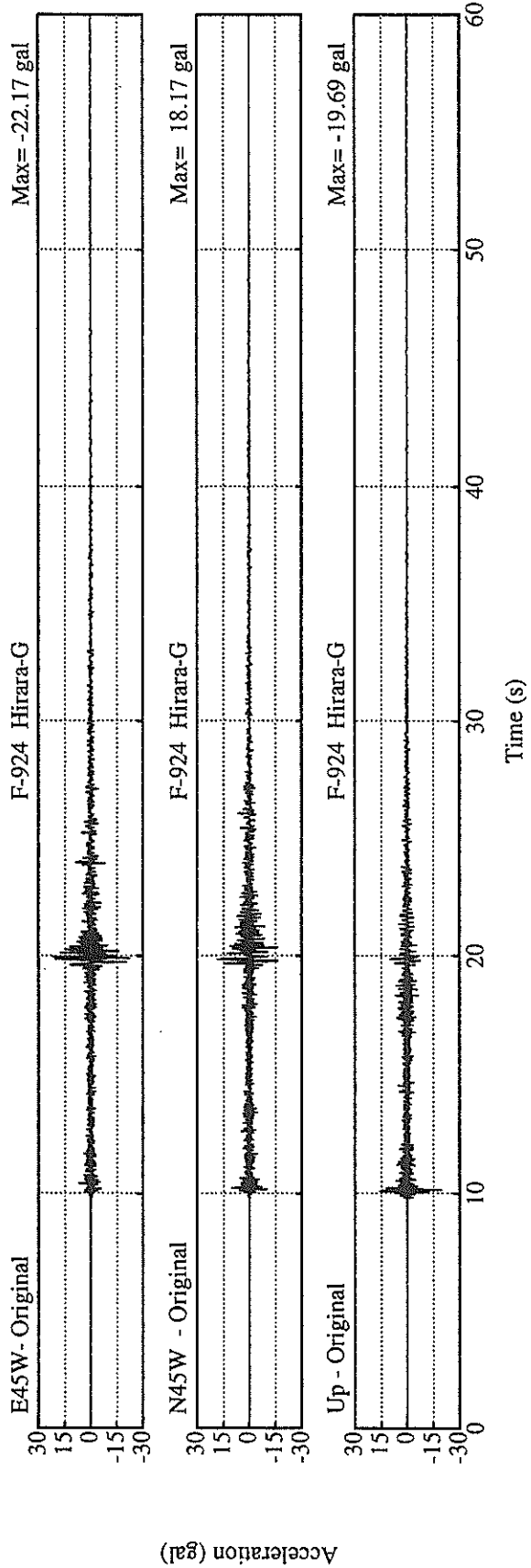
PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*

18.2	22.2	19.7	26.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-903

STATION : TOMAKOMAI-G

EARTHQUAKE DATA

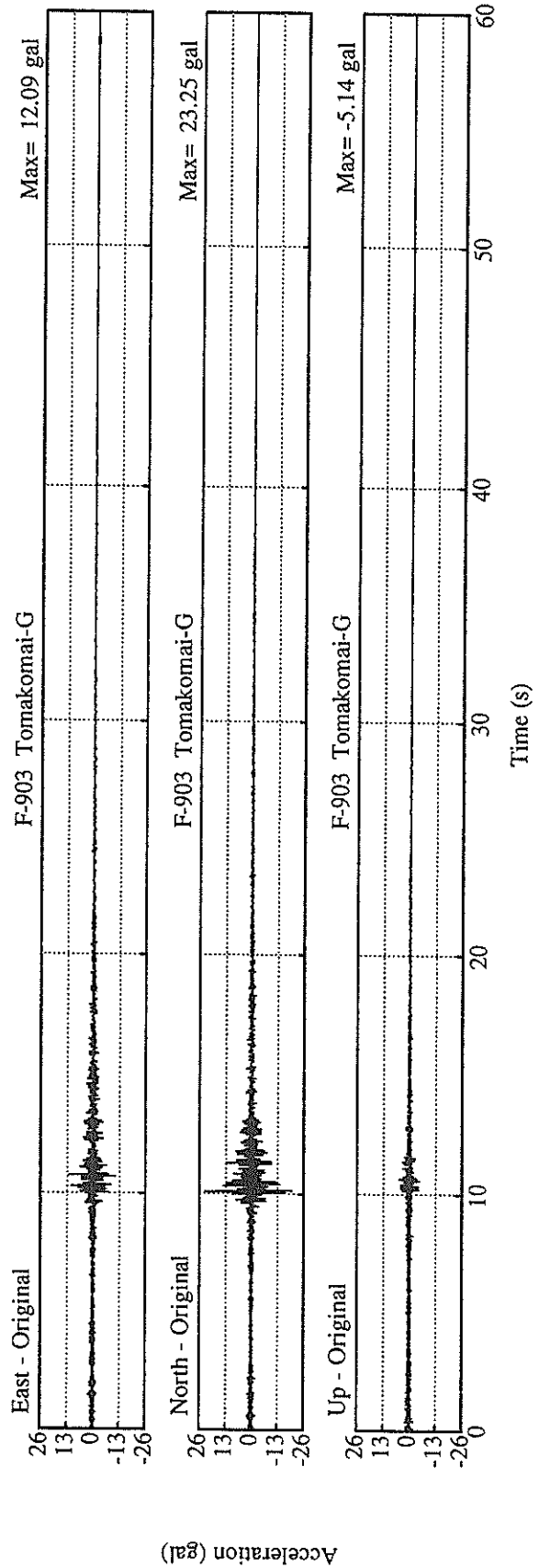
 DATE AND TIME 4:36 NOV.26,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION S OFF URAKAWA
 LATITUDE 42°19.4' N
 LONGITUDE 142°14.3' E
 DEPTH 103.8KM
 JMA MAGNITUDE 4.2

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
23.3	12.1	5.1	23.8

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-917

STATION : ONAHAMA-JI-G

EARTHQUAKE DATA

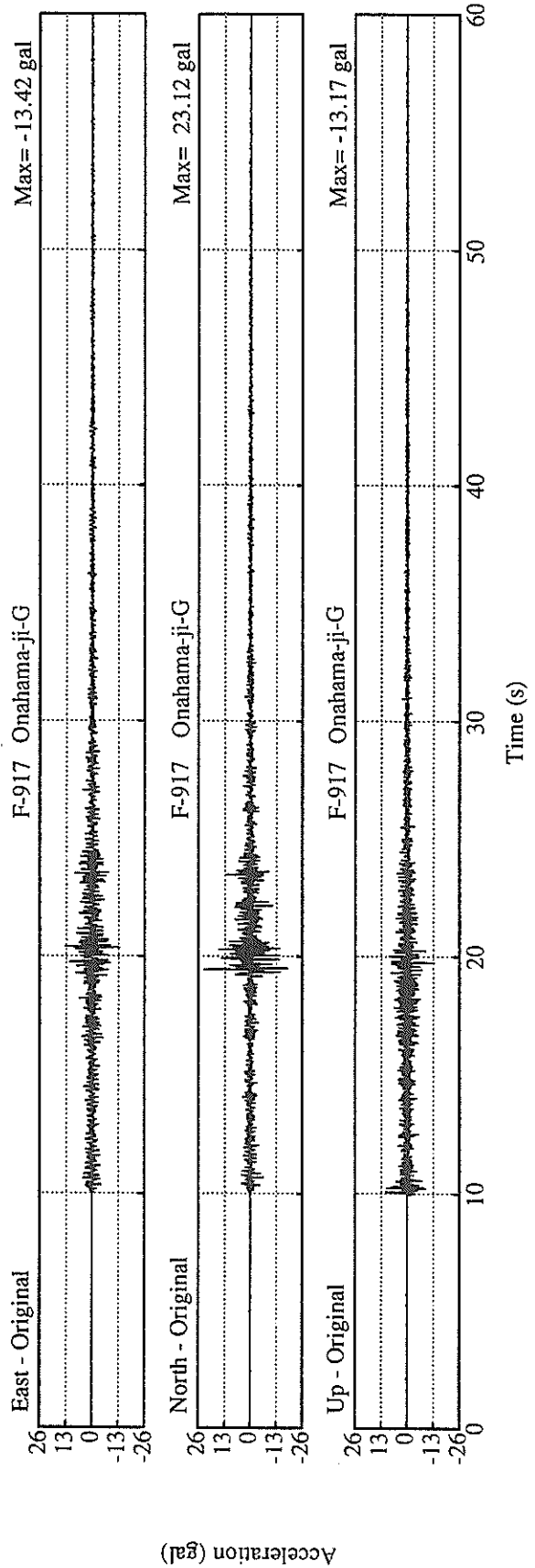
 DATE AND TIME 13:46 DEC. 1, 1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF FUKUSHIMA PREF
 LATITUDE 36° 59.7' N
 LONGITUDE 141° 20.4' E
 DEPTH 77.9KM
 JMA MAGNITUDE 4.7

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
23.1	13.4	13.2	23.3

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-948

STATION : WAKAYAMA-G

EARTHQUAKE DATA

DATE AND TIME : 21:41 DEC.22,1995

LOCATION OF HYPOCENTER

EPICENTRAL REGION : NW WAKAYAMA PREF

LATITUDE : 34° 12.4' N

LONGITUDE : 135° 6.8' E

DEPTH : 9.5KM

JMA MAGNITUDE : 4.1

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.414	0.378	0.585	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) : 0.414 0.378 0.585

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	129.5	216.7	106.0	216.7
ORIGINAL	269.2	379.4	264.5	410.4
CORRECTED	258.0	377.6	264.2	409.2

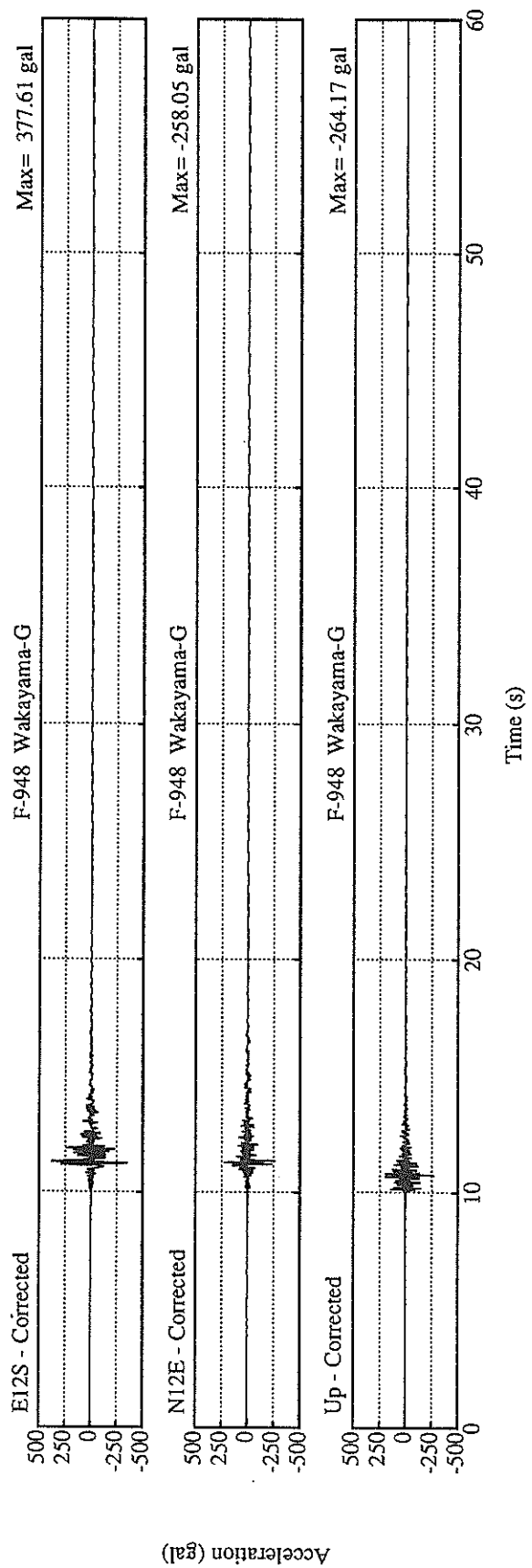
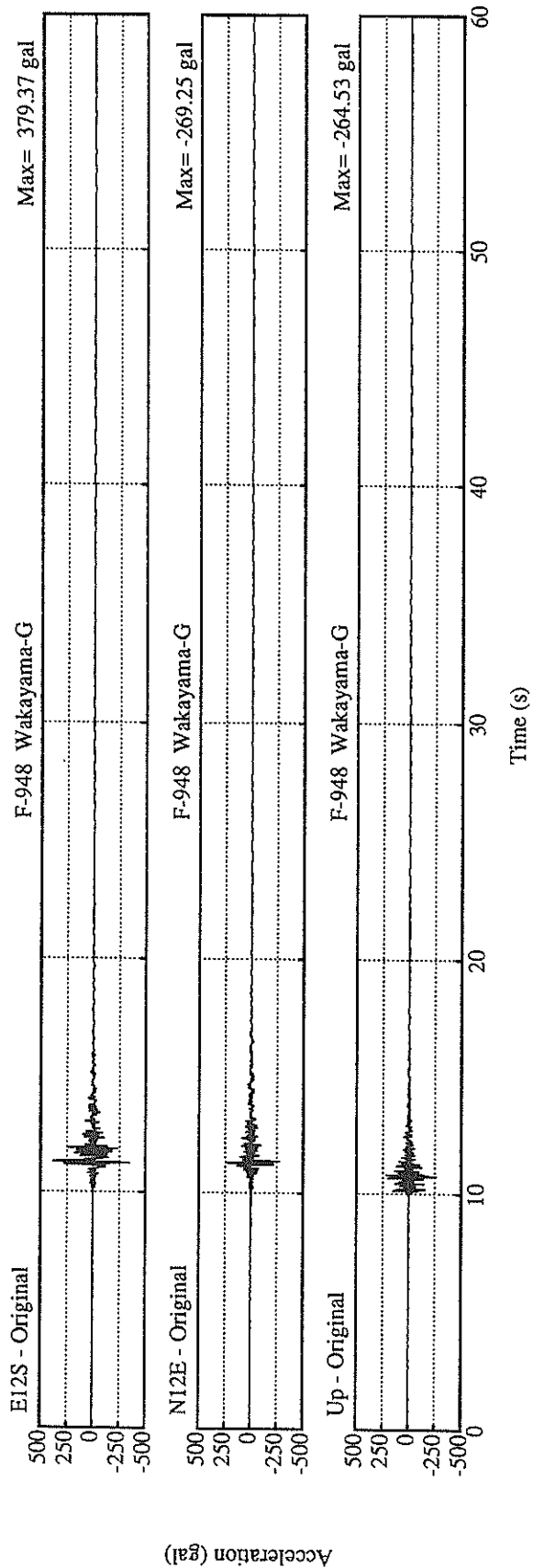
MAXIMUM VELOCITY (CM/SEC)

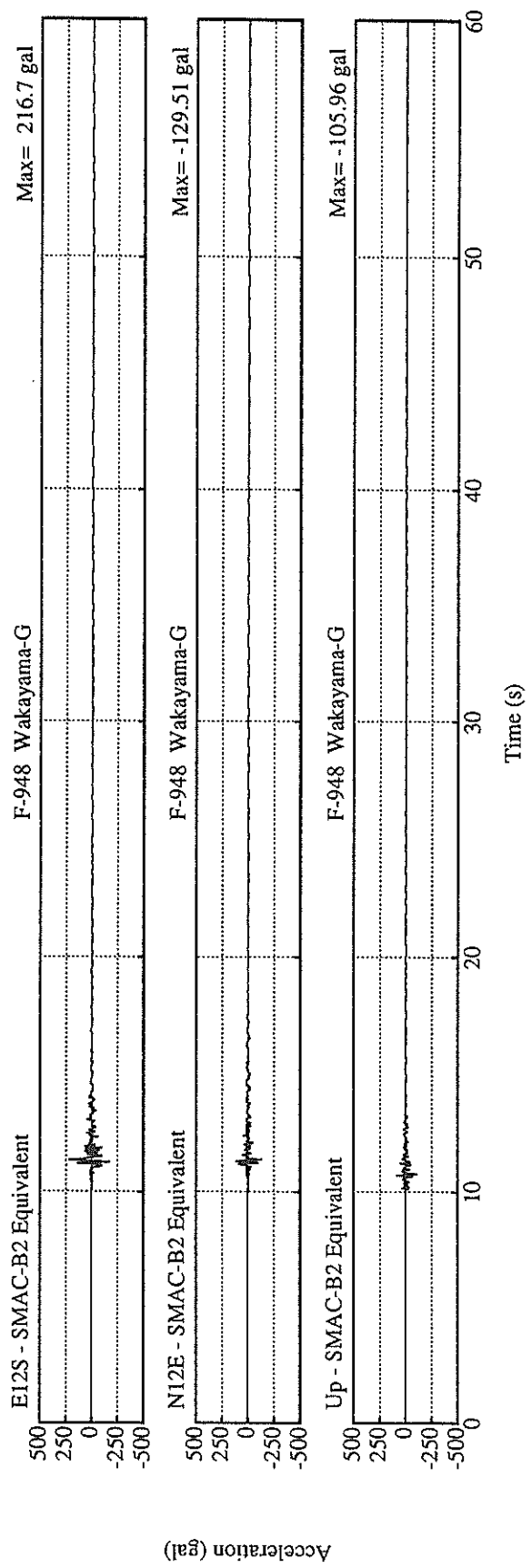
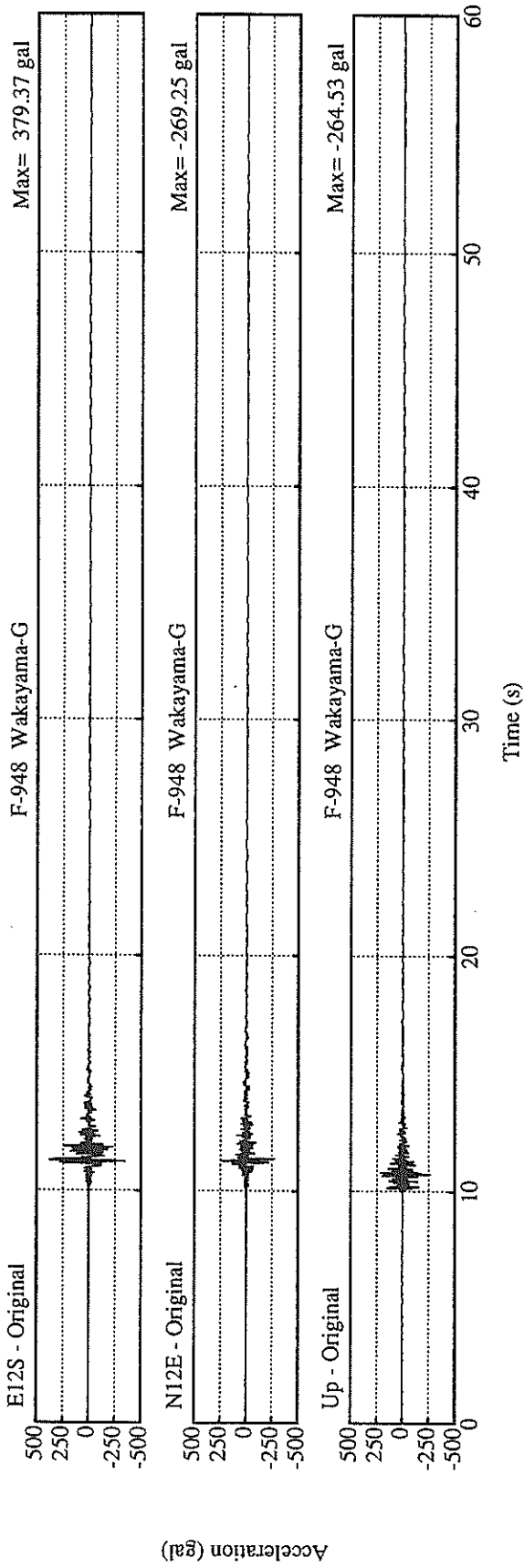
FIXED FILTER	6.52	12.07	4.35	12.10
VARIABLE FILTER	6.75	12.72	4.46	12.74

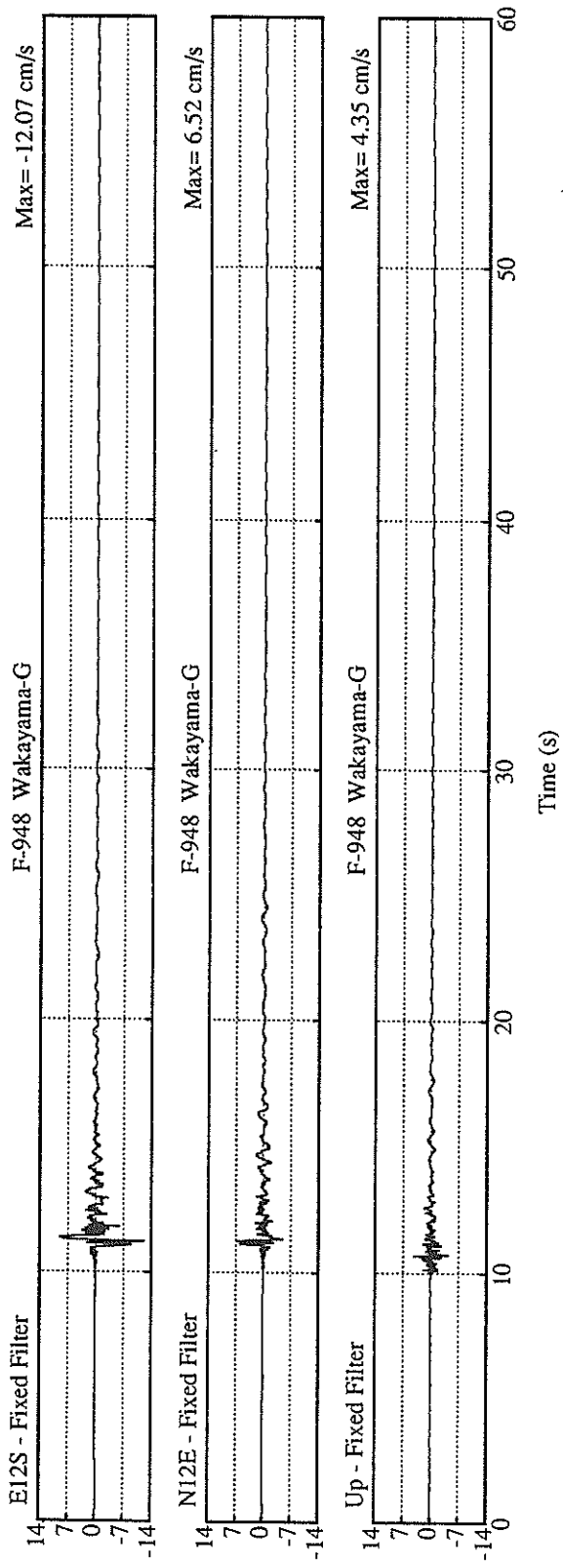
MAXIMUM DISPLACEMENT (CM)

FIXED FILTER	0.44	1.06	0.21	1.10
VARIABLE FILTER	0.40	0.96	0.18	0.99

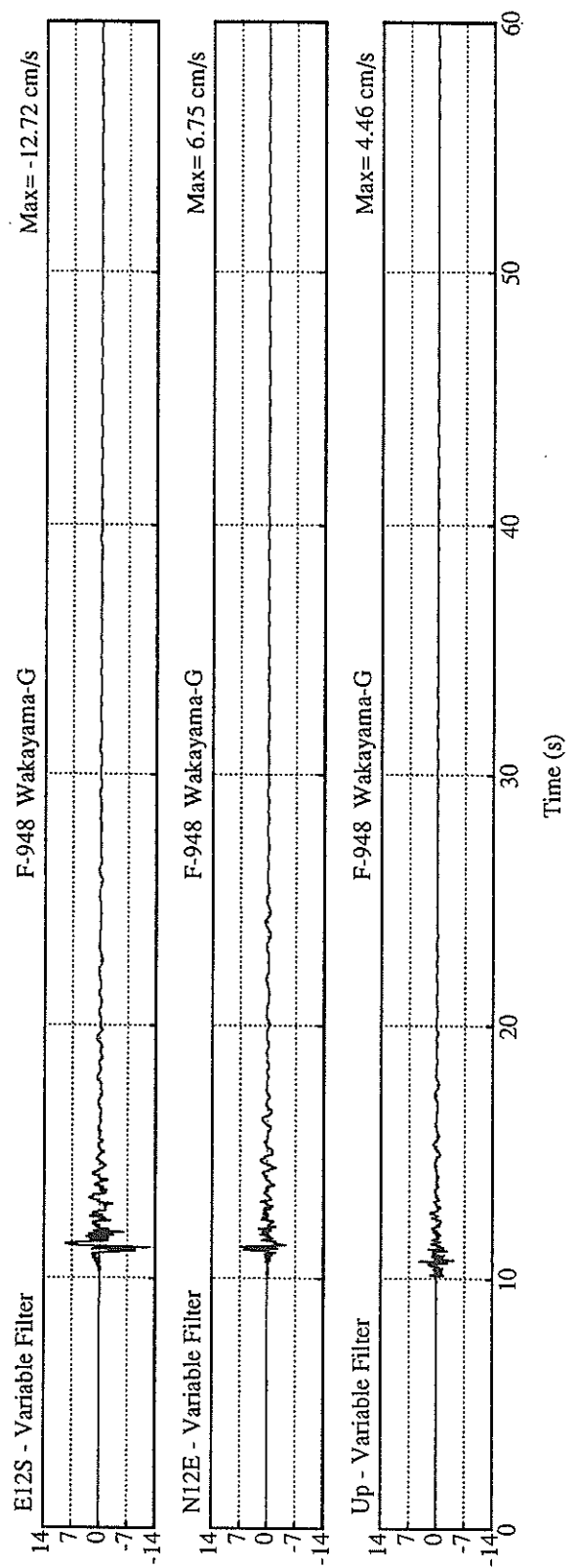
* RESULTANT OF HORIZONTAL COMPONENTS



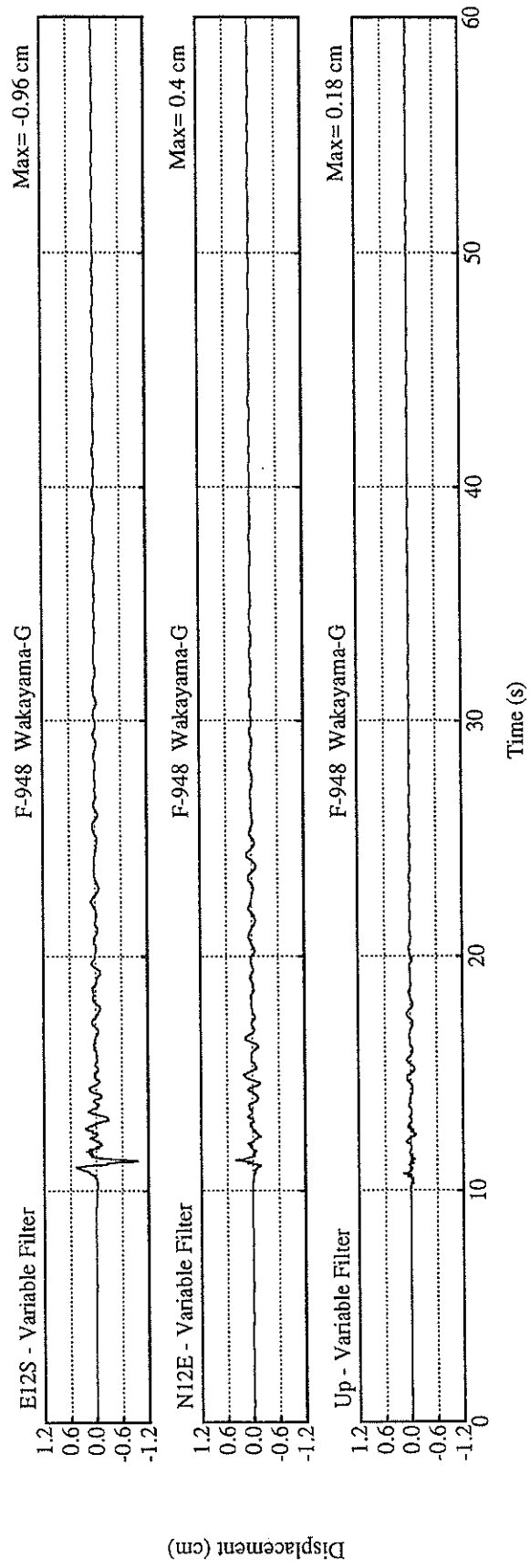
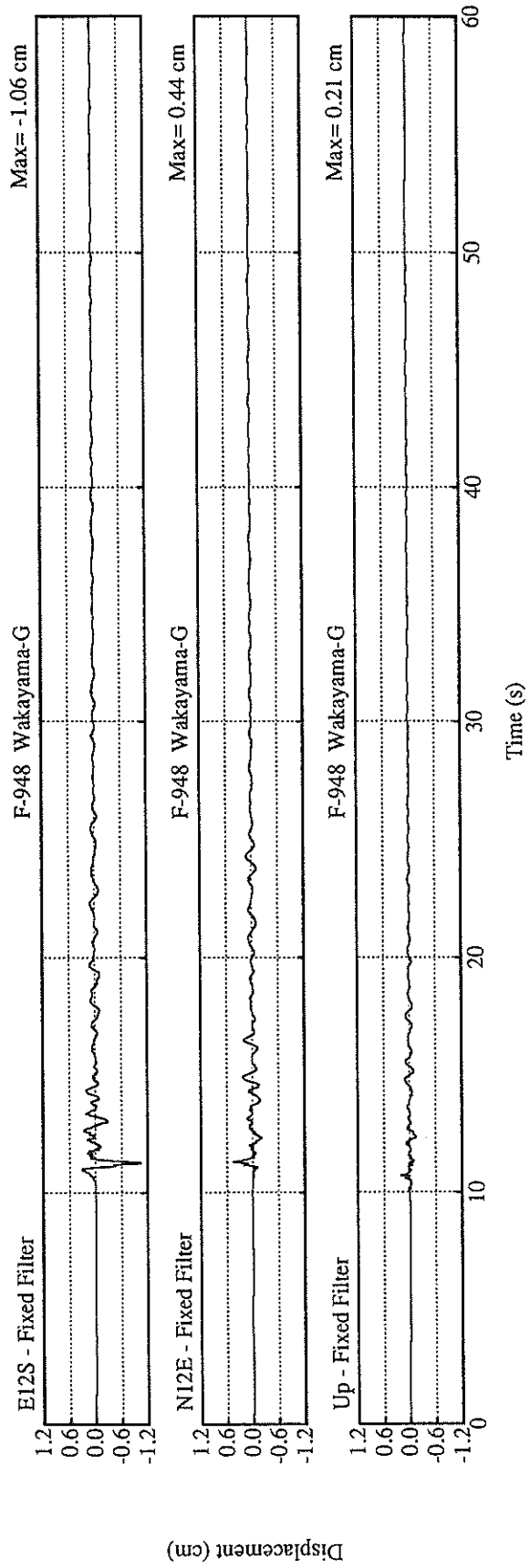


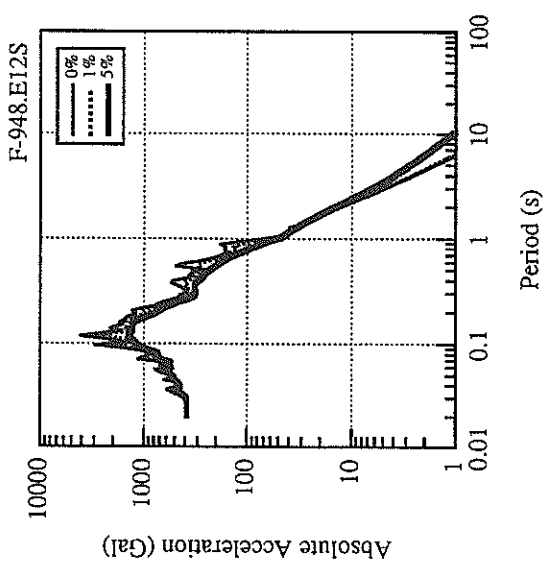
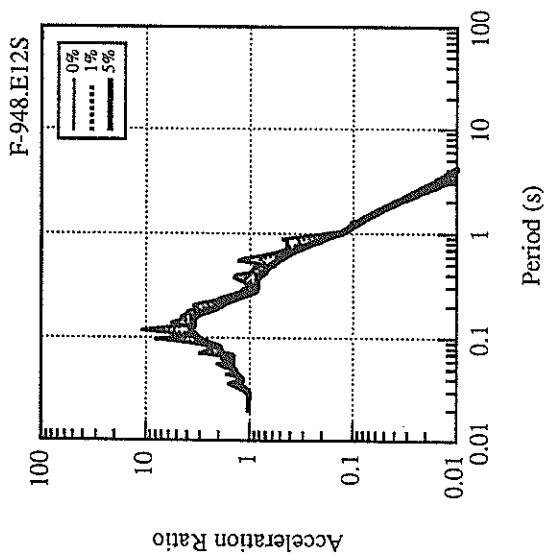
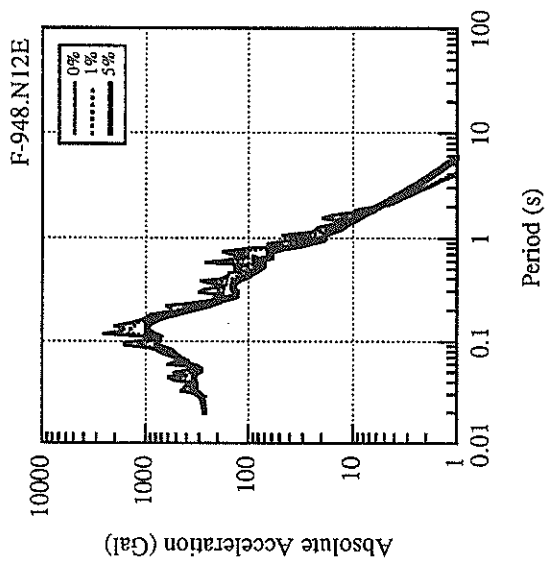
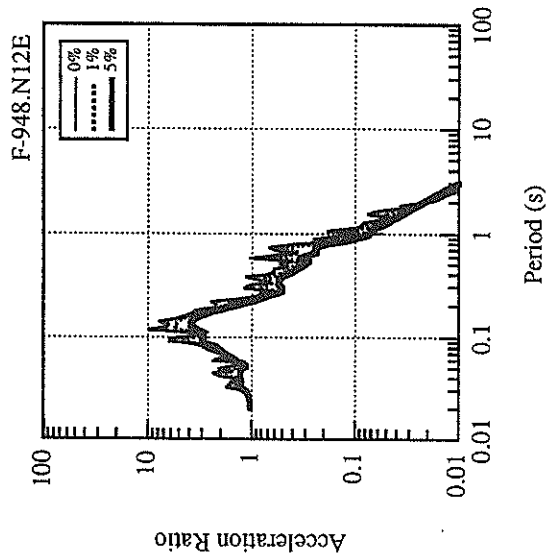
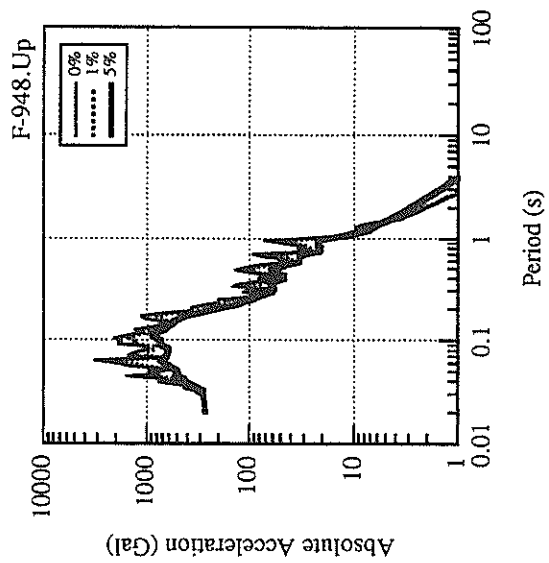
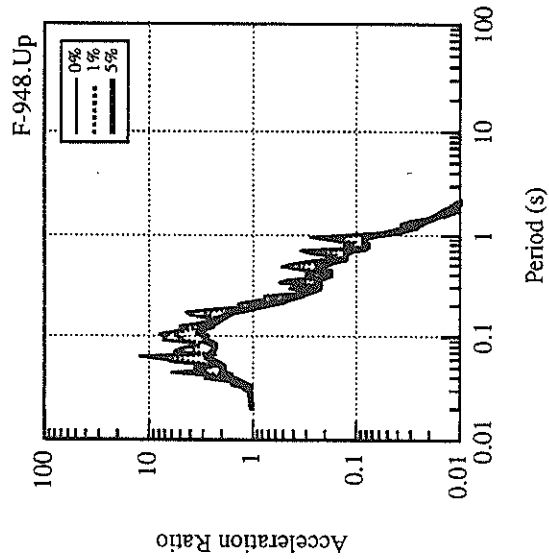


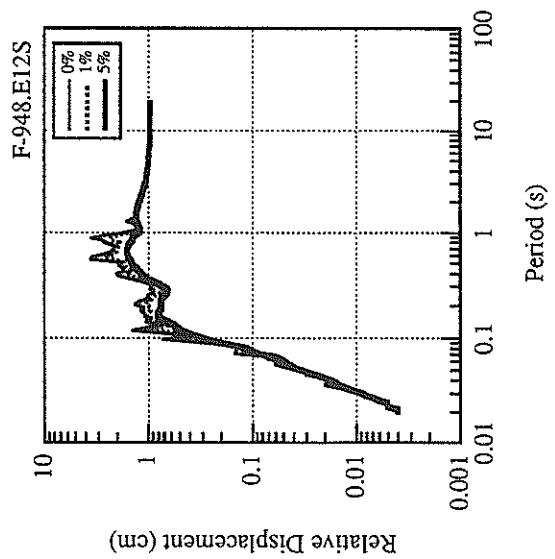
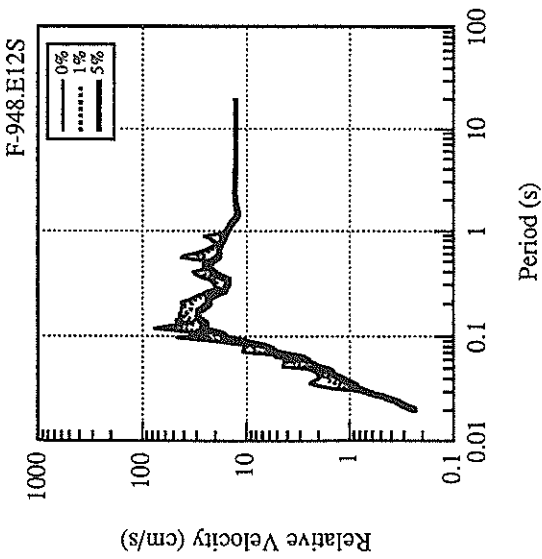
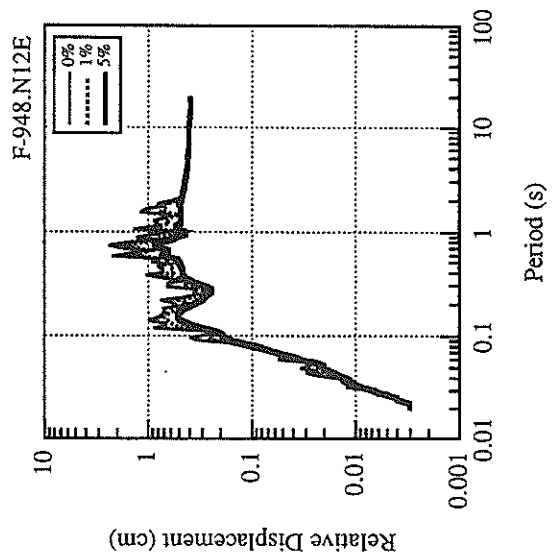
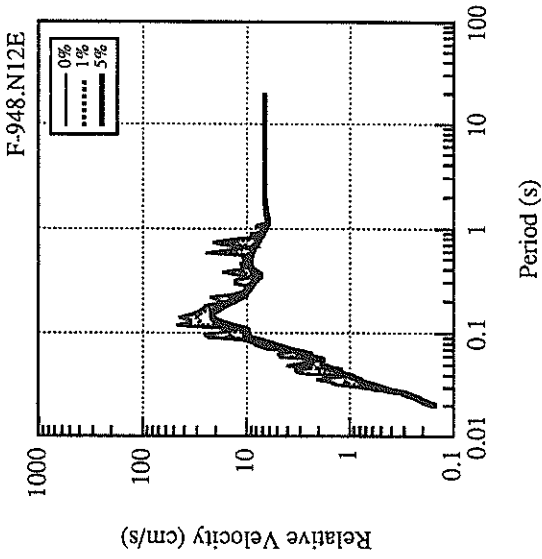
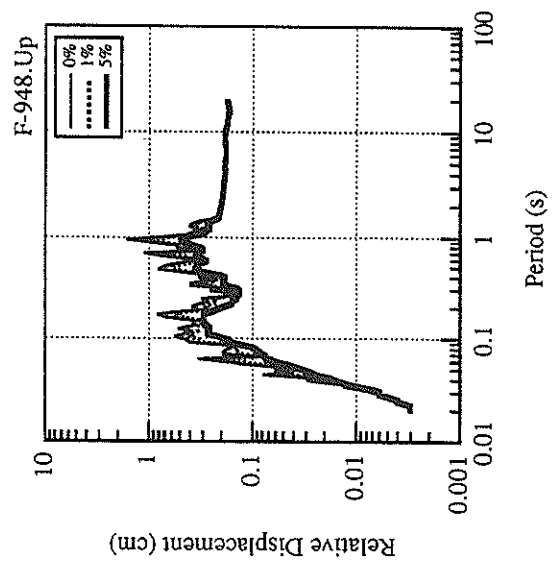
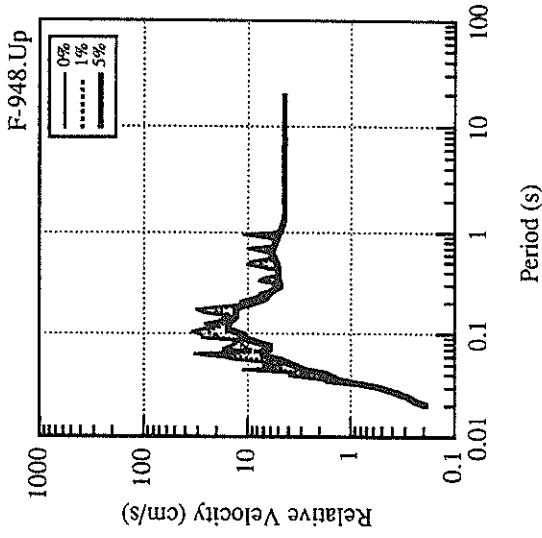
Velocity (cm/s)

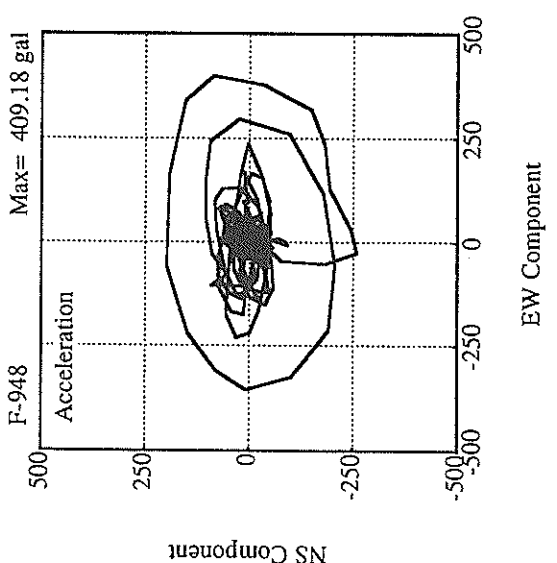
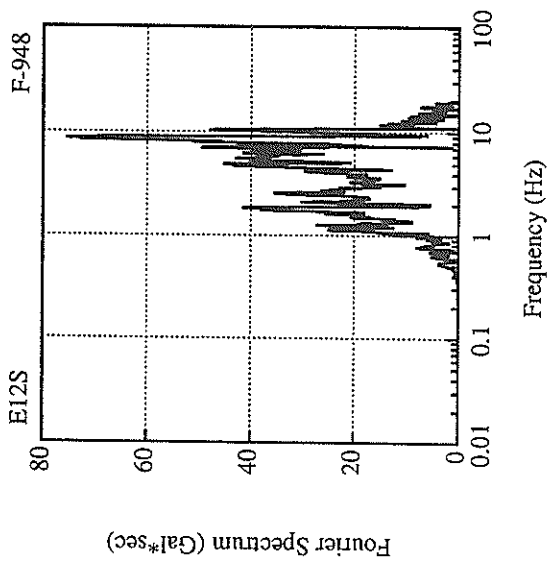
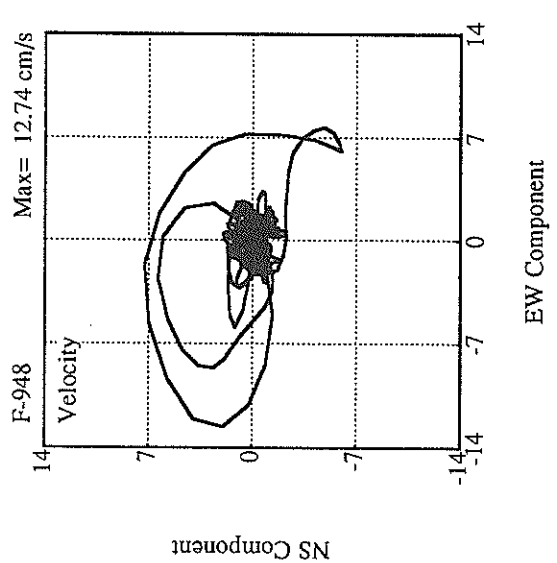
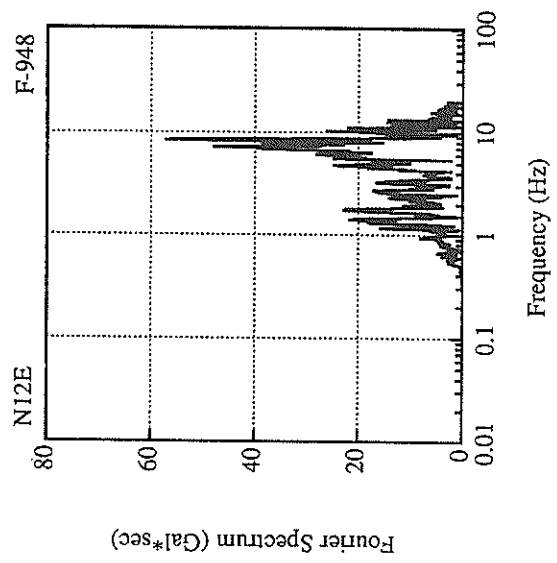
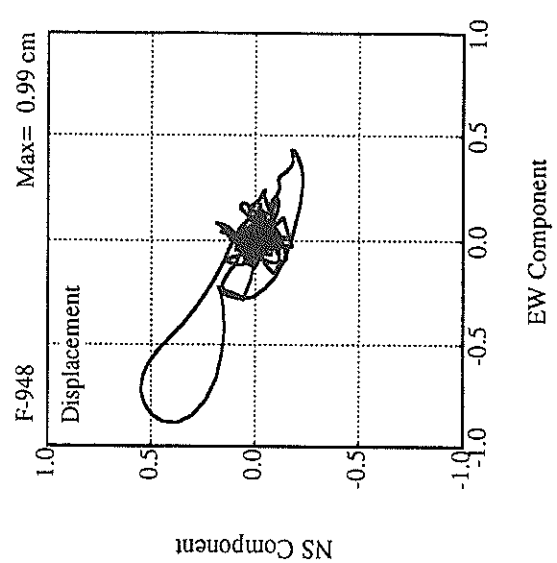
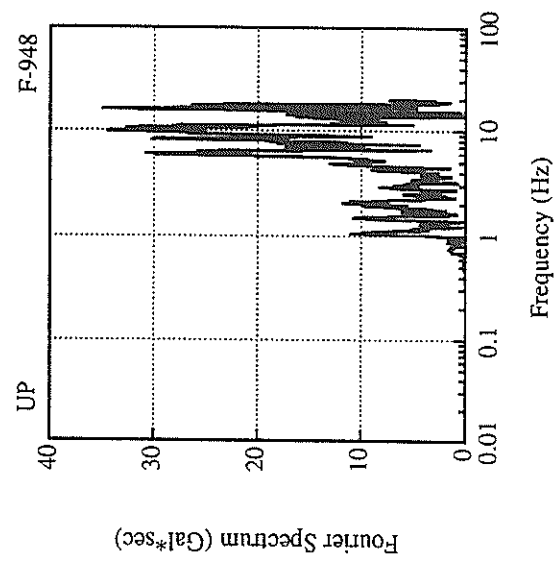


Velocity (cm/s)









RECORD NUMBER : F-949

STATION : WAKAYAMA-G

EARTHQUAKE DATA

 DATE AND TIME 4:53 DEC.23,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34°12.8' N
 LONGITUDE 135° 6.9' E
 DEPTH 9.6KM
 JMA MAGNITUDE 3.0

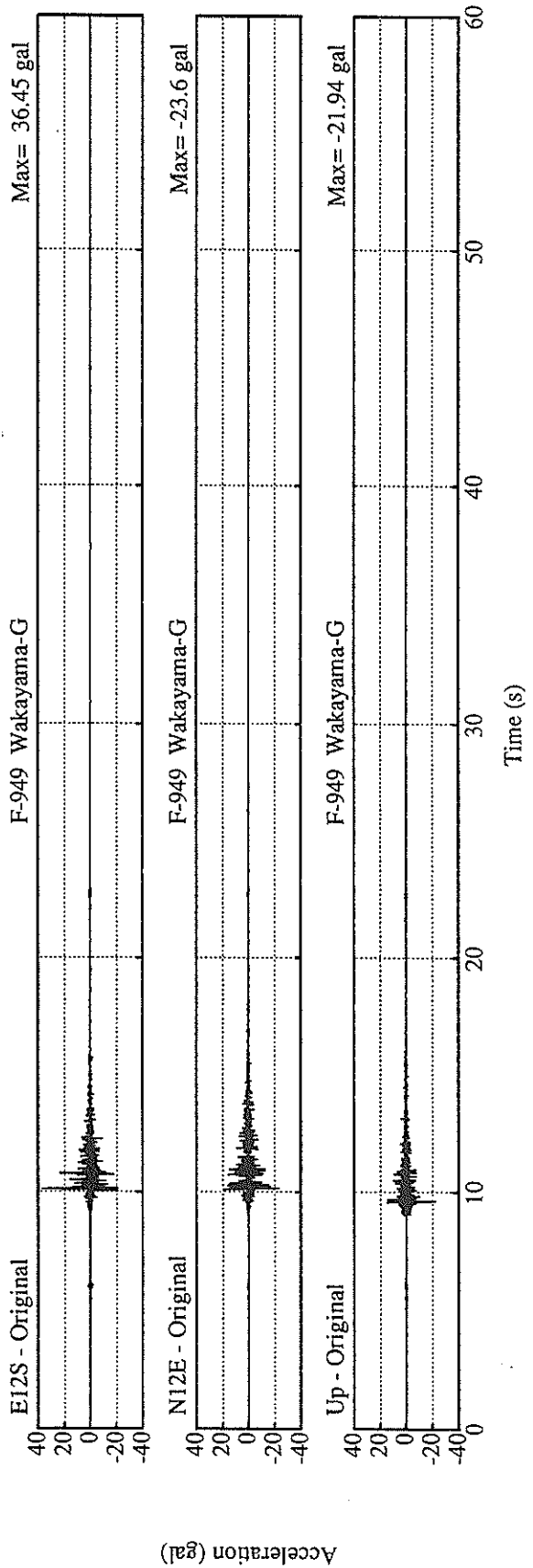
PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*

23.6	36.4	21.9	38.4

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-950

STATION : WAKAYAMA-G

EARTHQUAKE DATA

 DATE AND TIME 21:36 DEC.23,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34°12.7' N
 LONGITUDE 135° 6.9' E
 DEPTH 9.2KM
 JMA MAGNITUDE 3.5

PEAK VALUES OF COMPONENTS

 N S E W U D HORIZONTAL*

PARAMETER OF THE VARIABLE FILTER

 .FC (HZ) 1.165 1.067 1.647

MAXIMUM ACCELERATION (GAL)

 SMAC-B2 EQUIVALENT
 ORIGINAL 32.4 48.3 19.6 48.9
 CORRECTED 79.1 103.0 72.6 109.6
 77.4 106.0 73.7 111.4

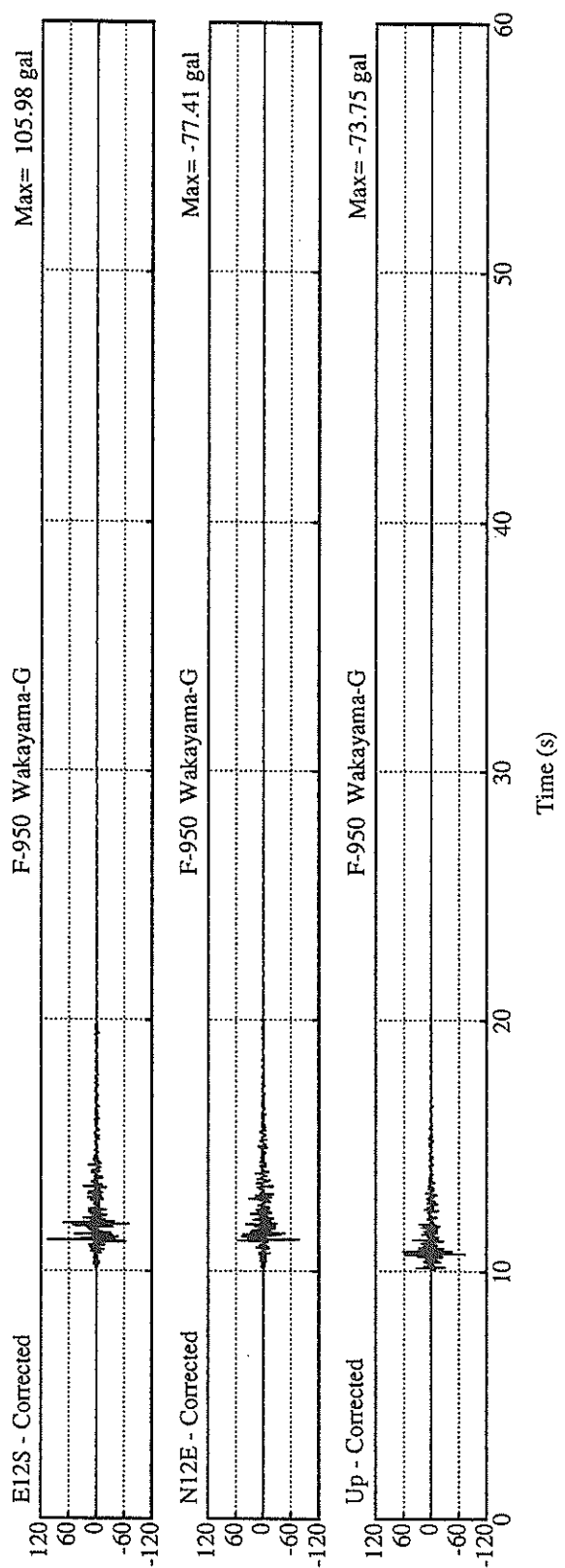
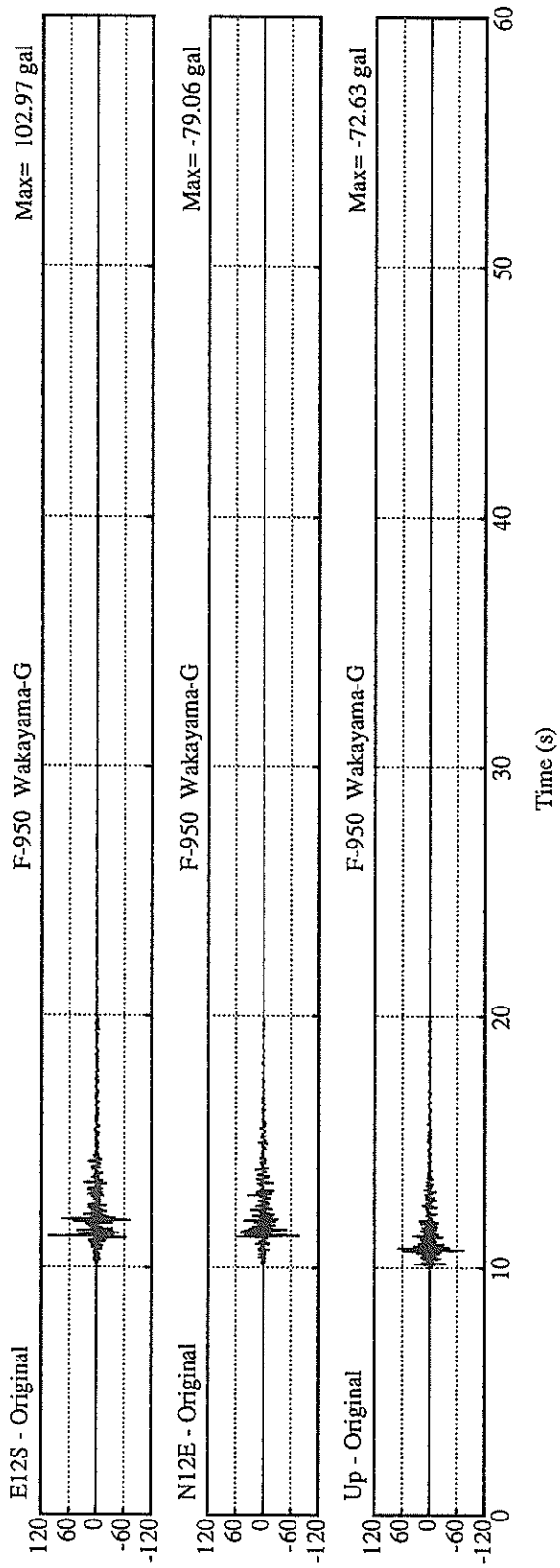
MAXIMUM VELOCITY (CM/SEC)

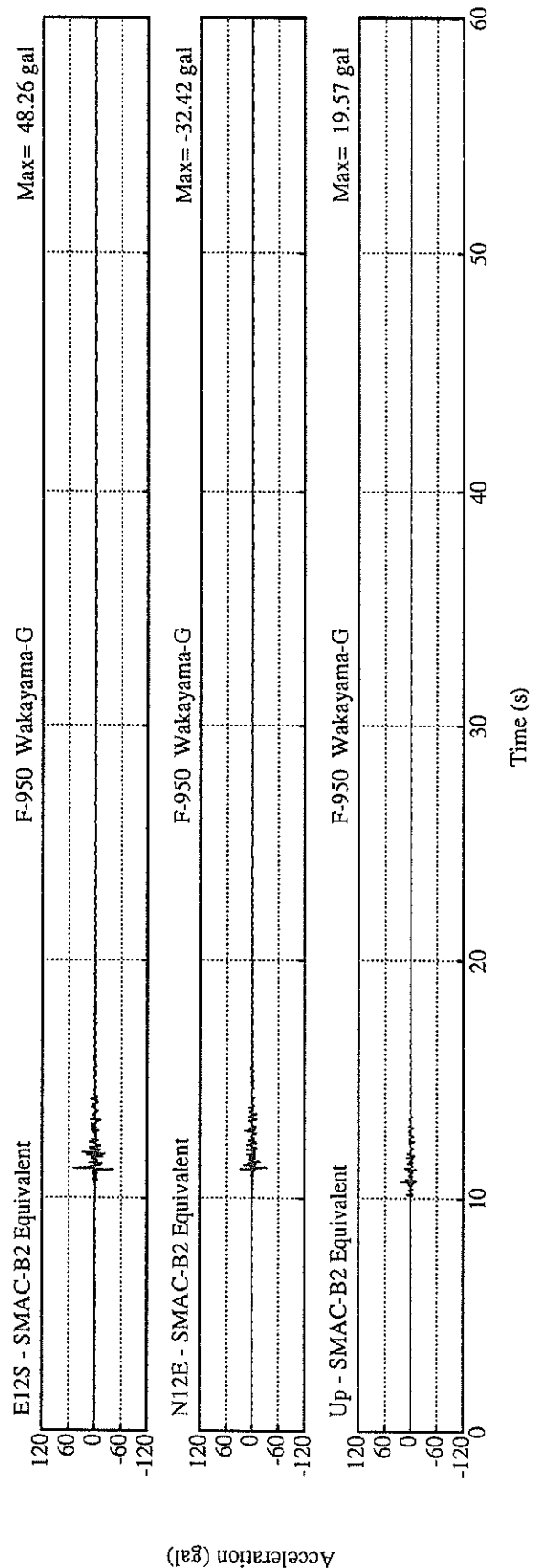
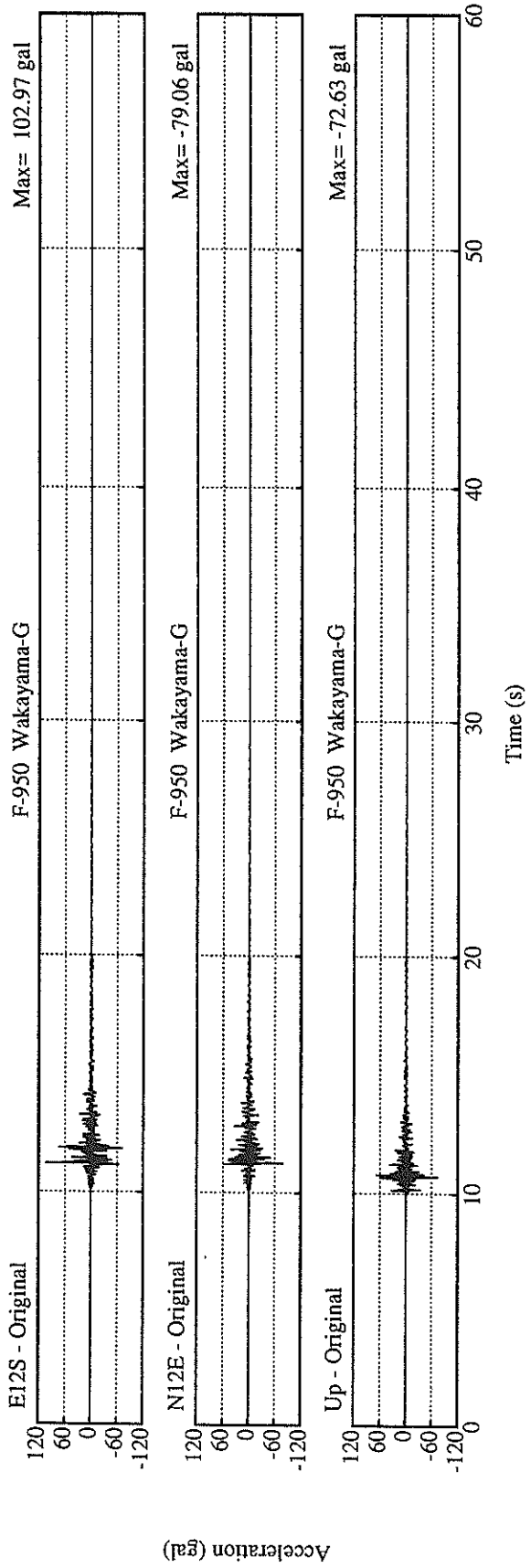
 FIXED FILTER 1.52 2.71 1.13 2.73
 VARIABLE FILTER 1.52 2.71 1.11 2.71

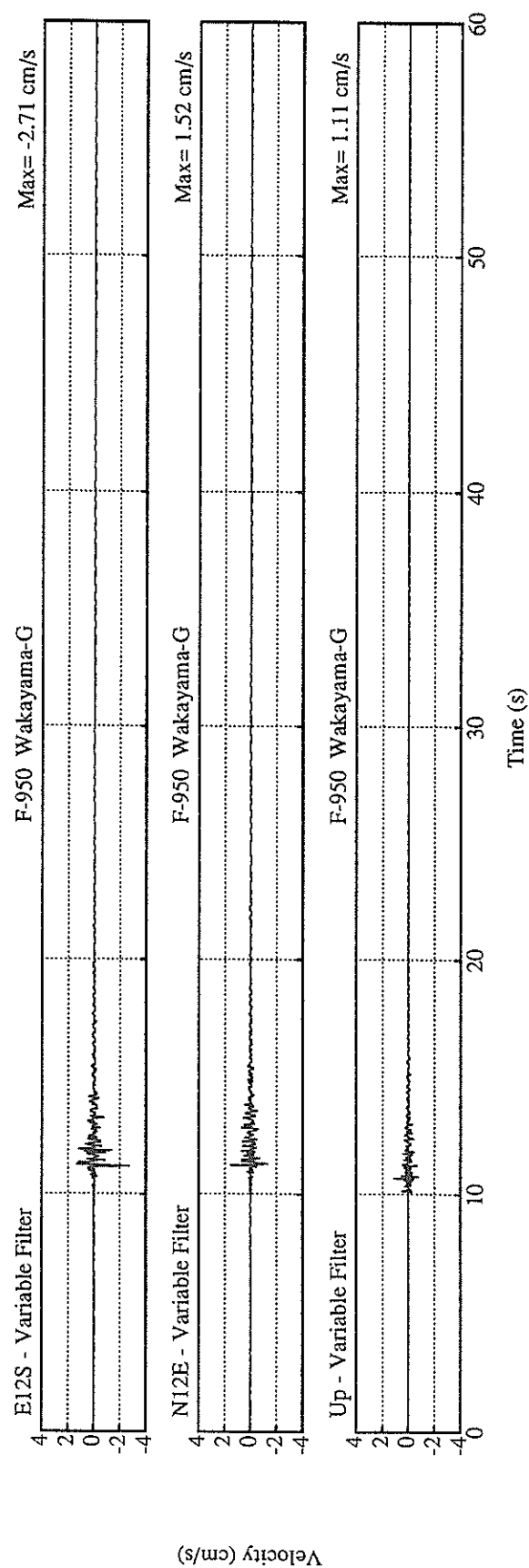
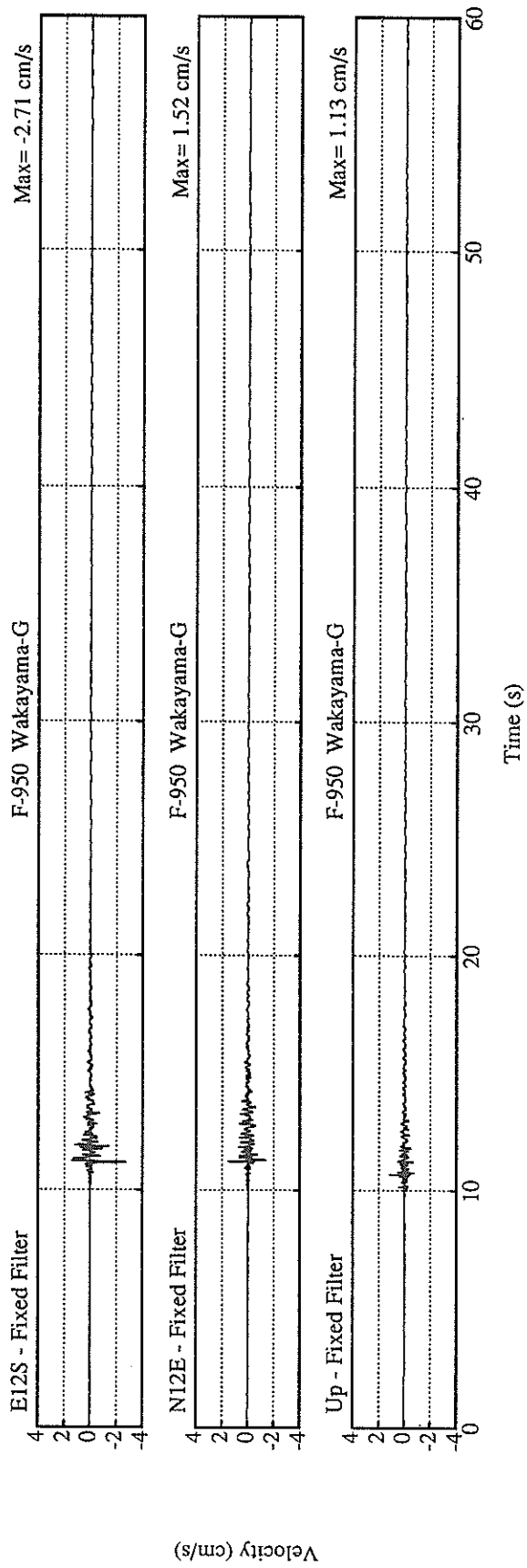
MAXIMUM DISPLACEMENT (CM)

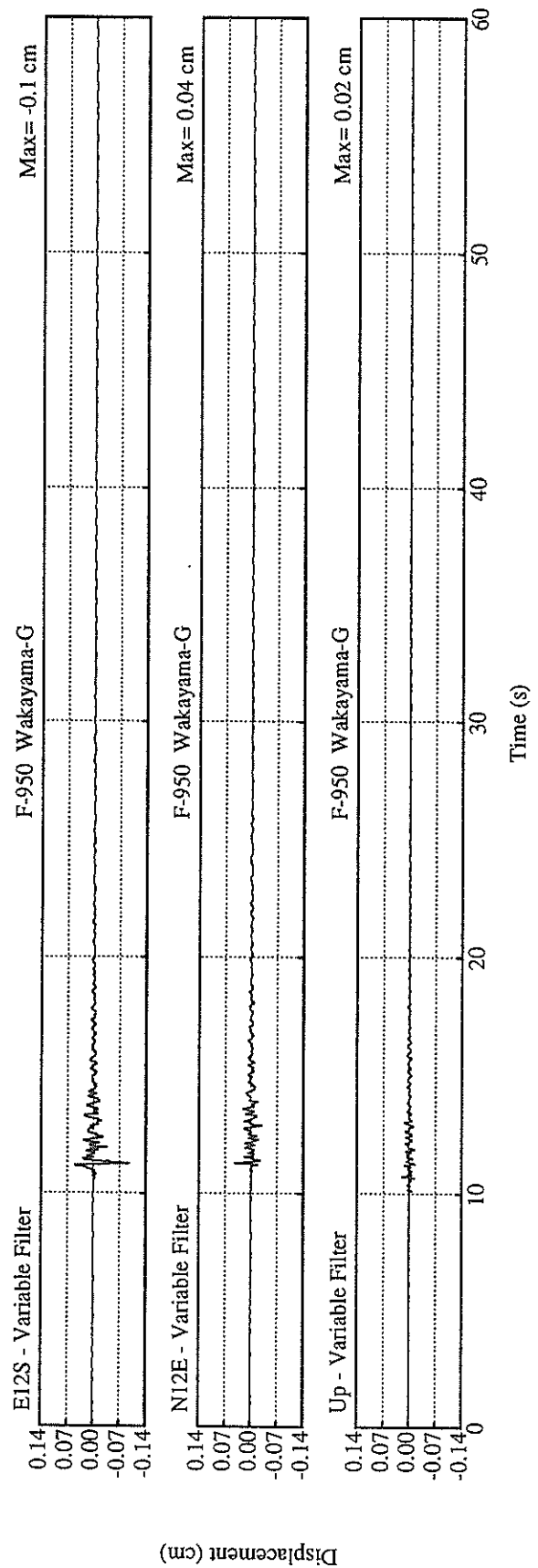
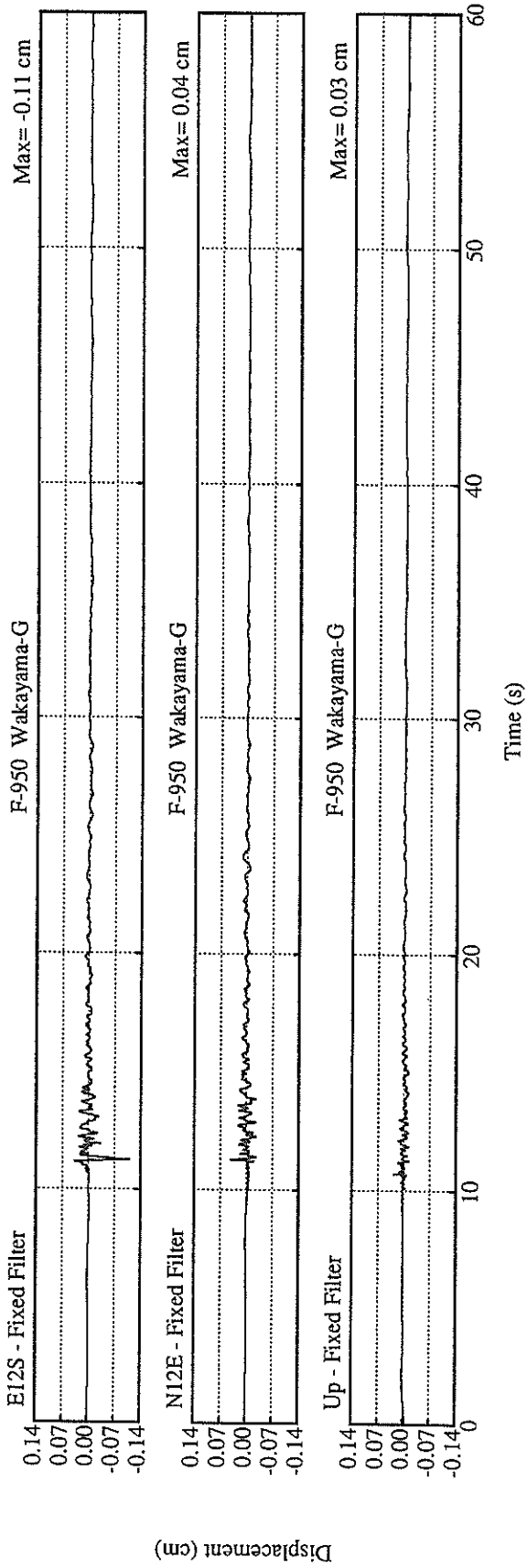
 FIXED FILTER 0.04 0.11 0.03 0.11
 VARIABLE FILTER 0.04 0.10 0.02 0.10

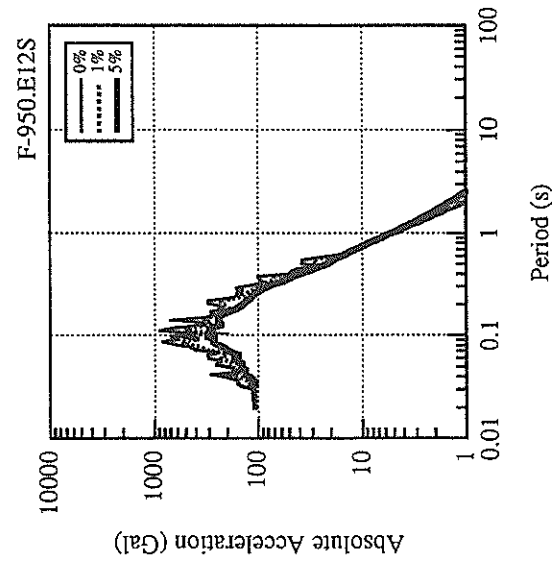
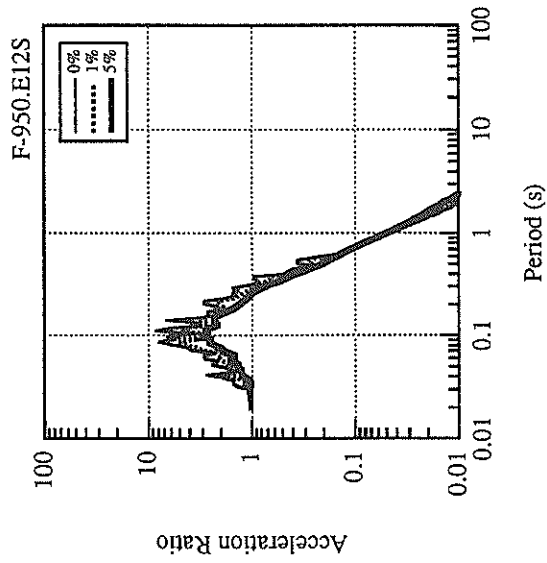
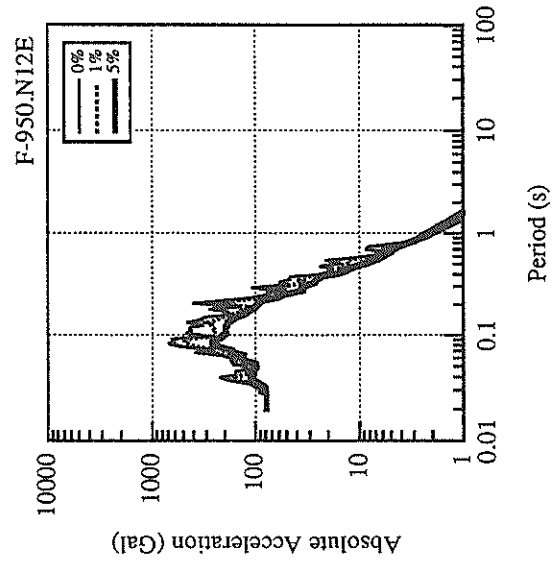
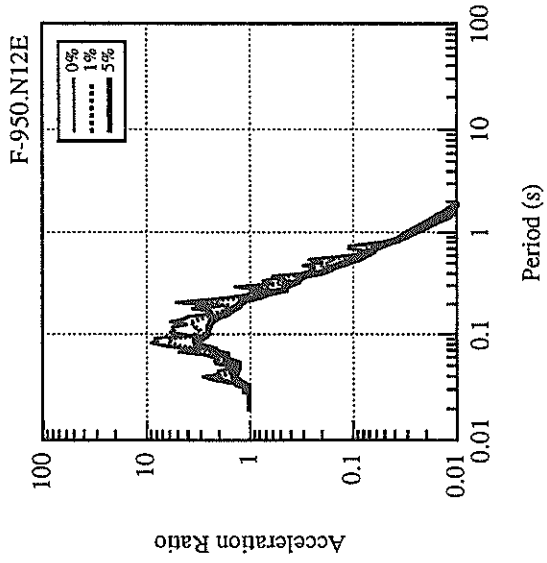
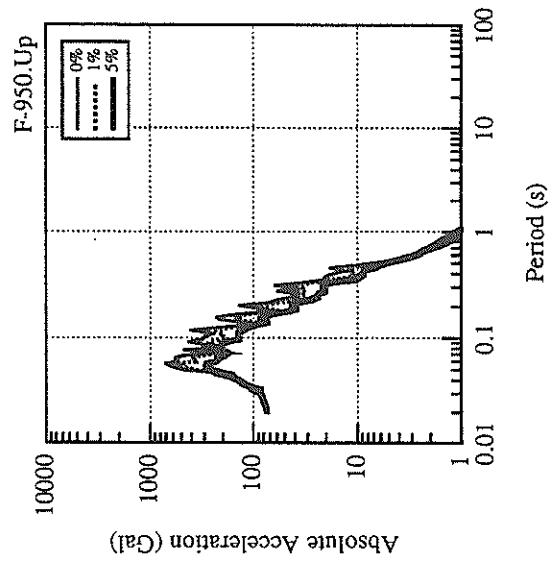
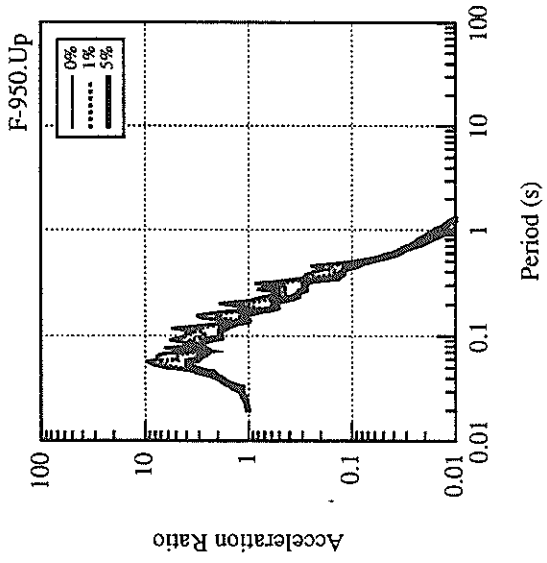
* RESULTANT OF HORIZONTAL COMPONENTS

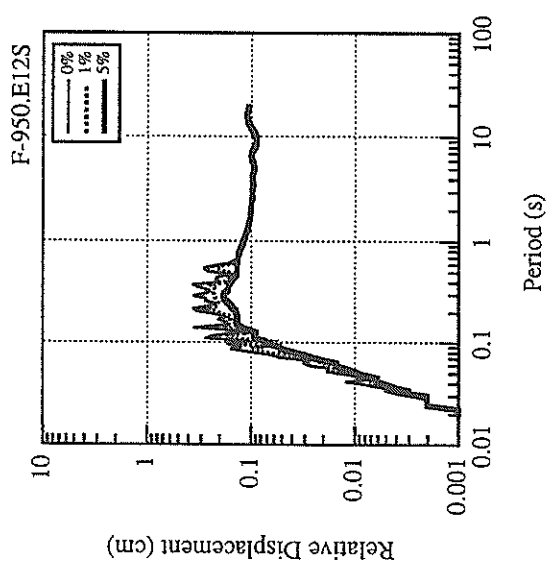
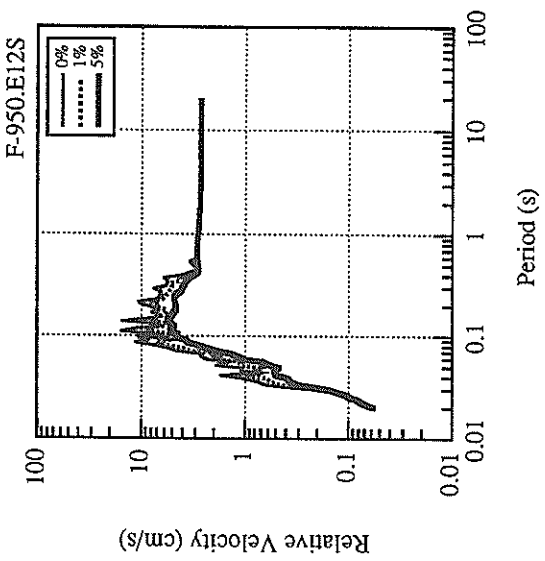
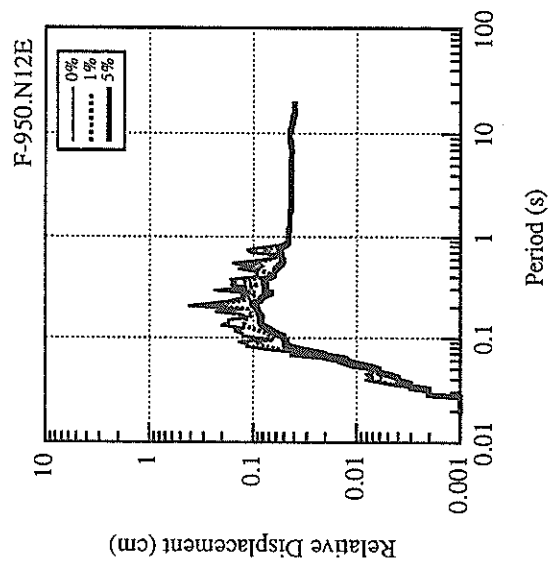
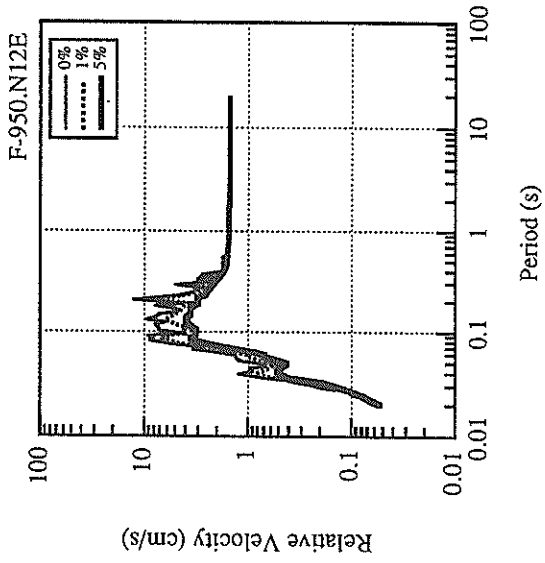
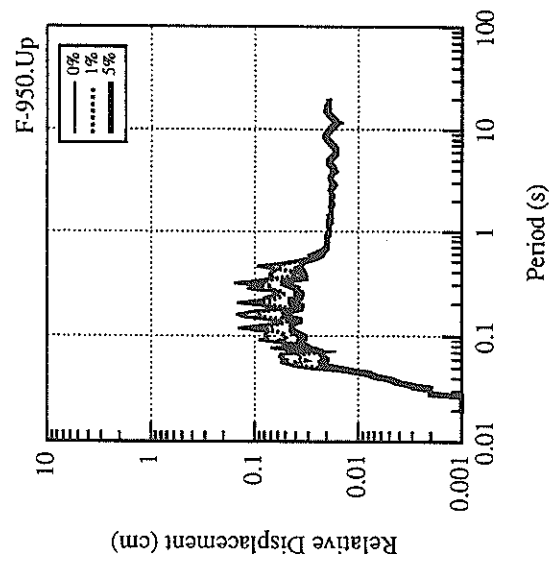
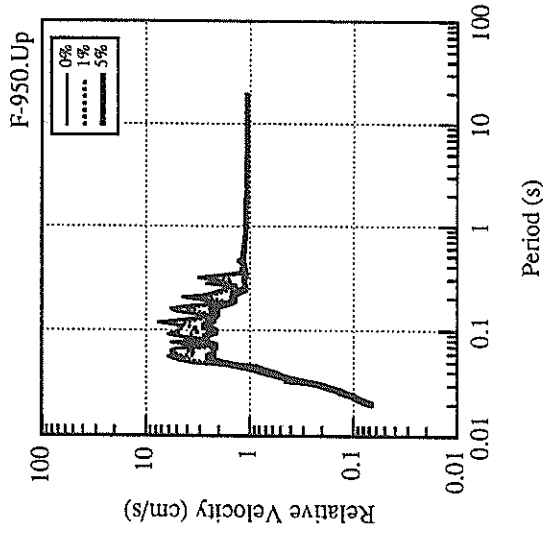


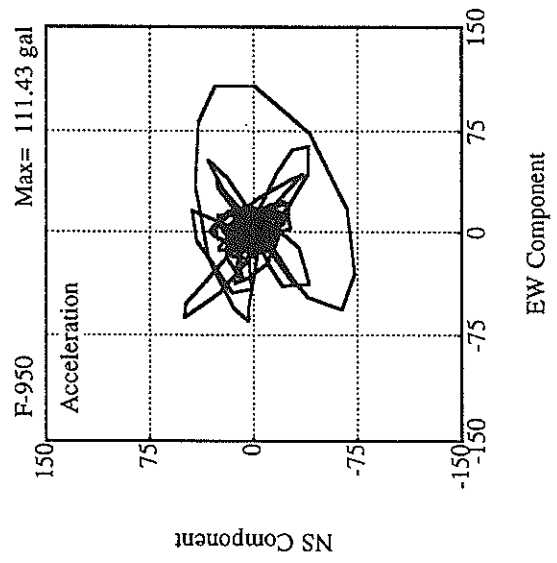
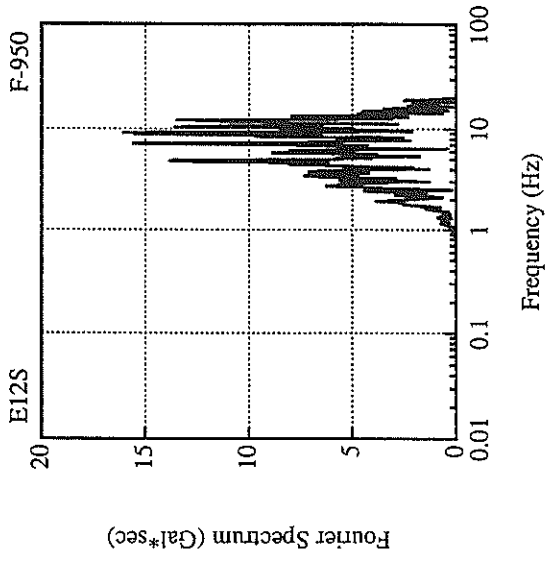
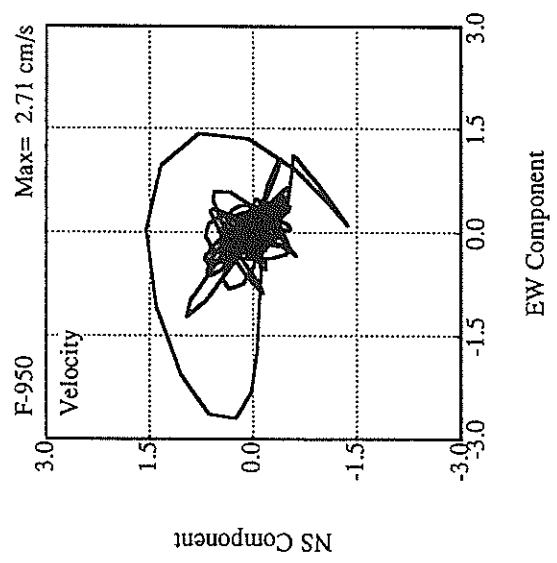
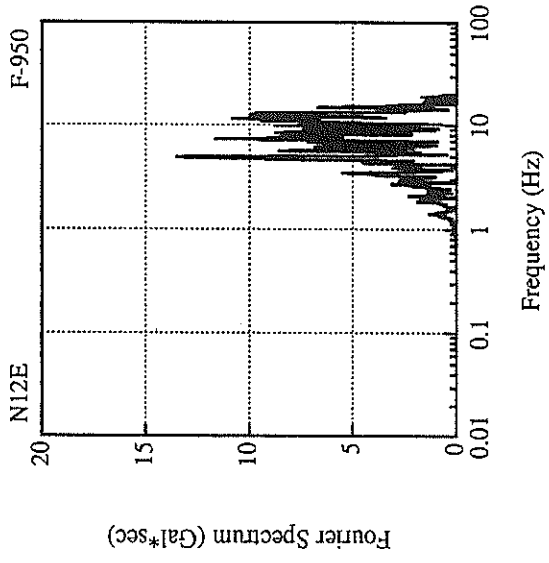
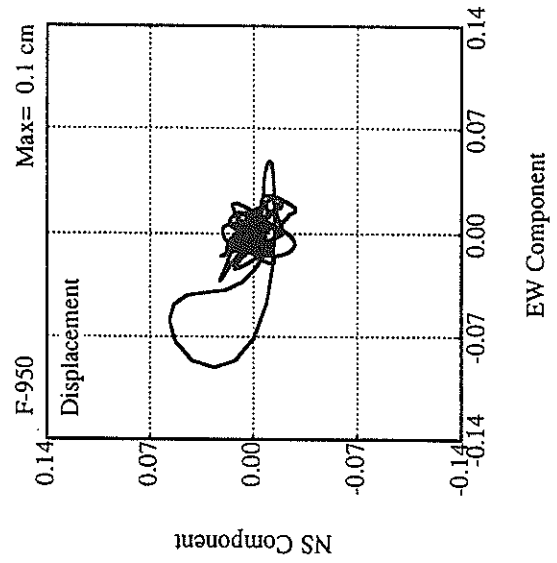
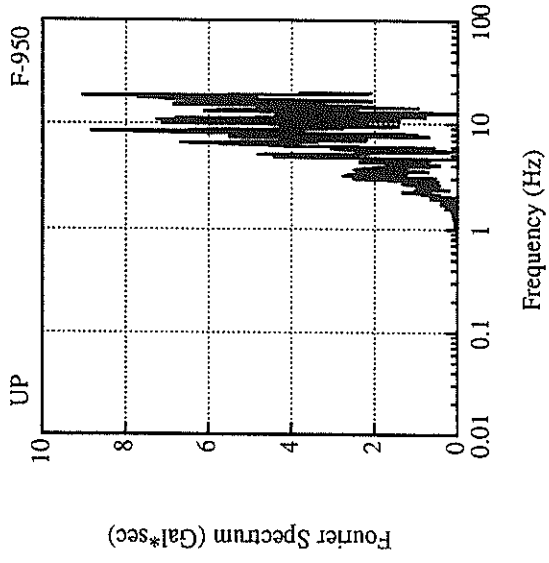












RECORD NUMBER : F-951

STATION : WAKAYAMA-G

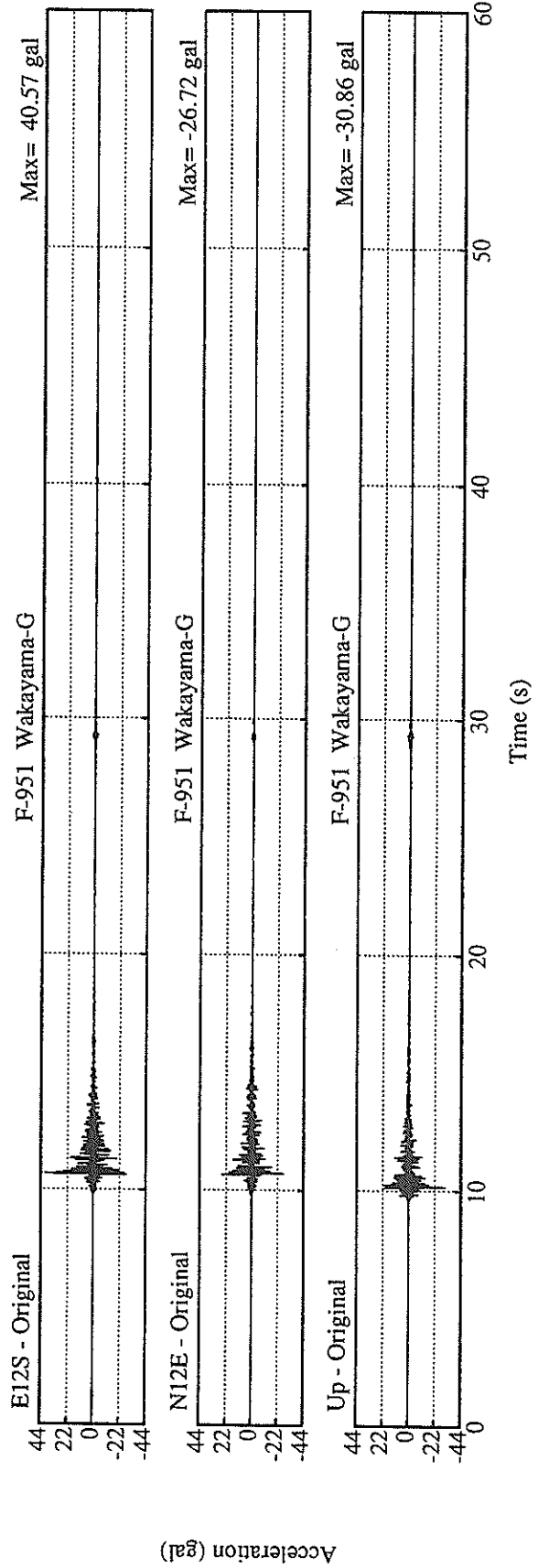
EARTHQUAKE DATA

 DATE AND TIME 5:47 DEC.30,1995
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34° 12.6' N
 LONGITUDE 135° 7.0' E
 DEPTH 11.8KM
 JMA MAGNITUDE 2.8

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	26.7	40.6	30.9	43.4

* RESULTANT OF HORIZONTAL COMPONENTS

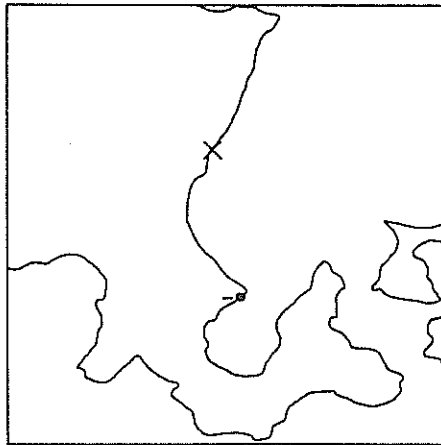


Strong-Motion Earthquake Observation Results (1996)

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:55 JAN. 2, 1996
 HIDAKA REGION
 EPICENTER : 42 26.0'N 142 11.5'E
 DEPTH : 92.7KM MAGNITUDE : 4.7

JMA INTENSITIES
 II : TOMAKOMAI, URAKAWA,
 OBIHIRO
 I : HAKODATE, MORI, OTARU,
 MUTSU, HIROO, KUSHIRO,
 HACHINOHE, IWAMIZAWA

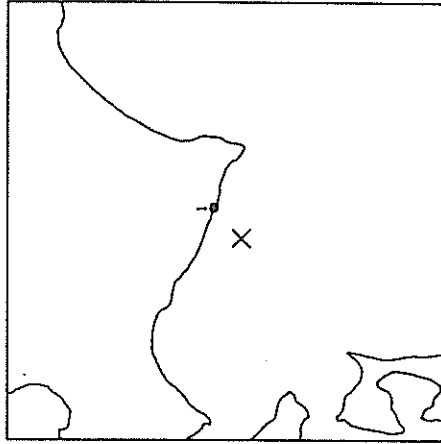


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 MURORAN-G	ON GROUND	F-1024	6 8 2	102

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:12 JAN. 5, 1996
 S OFF URAKAWA
 EPICENTER : 42 0.9 'N 142 30.3'E
 DEPTH : 60.9KM MAGNITUDE : 4.5

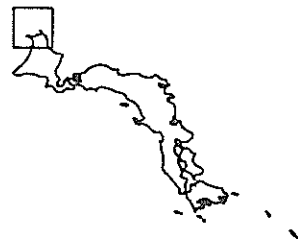
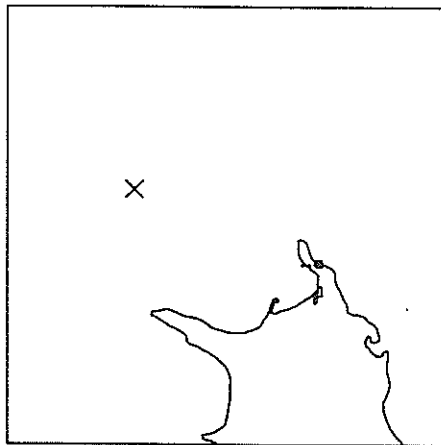
JMA INTENSITIES
 III : URAKAWA
 I : HIROO, TOMAKOMAI, OBIHIRO,
 MUTSU



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2650	6 6 1	27

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

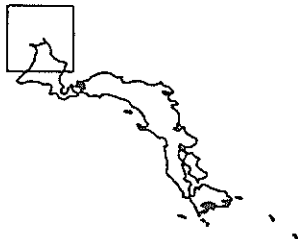
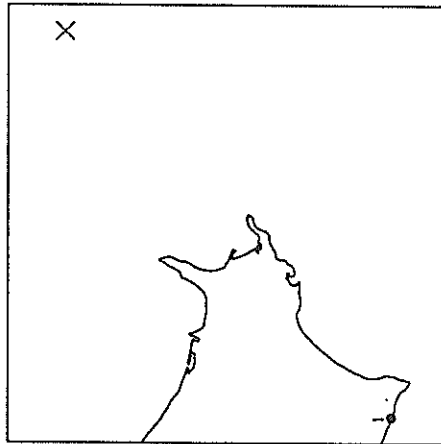
16:18 FEB. 1, 1996
 NEAR KAWASHIRI ISLAND
 EPICENTER : 44 20.6'N 146 25.7'E
 DEPTH : 198.4KM MAGNITUDE : 6.3
 JWA INTENSITIES
 III : KUSHIRO
 II : URAKAWA, HIROO, NEMURO,
 HACHINOHE, MUTSU



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HAKASAKI-F	ON GROUND	F-1189	7 9 4	135

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

06:36 FEB. 8, 1996
 KURILE ISLANDS REGION
 EPICENTER : 44 56.8'N 150 51.3'E
 DEPTH : 58.0KM MAGNITUDE : 6.6
 JWA INTENSITIES
 III : KUSHIRO
 II : URAKAWA, OBIHIRO, HIROO,
 NEMURO
 I : TOMAKOMAI, MORIOKA,
 AOMORI, HACHINOHE, MUTSU

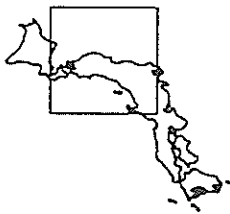
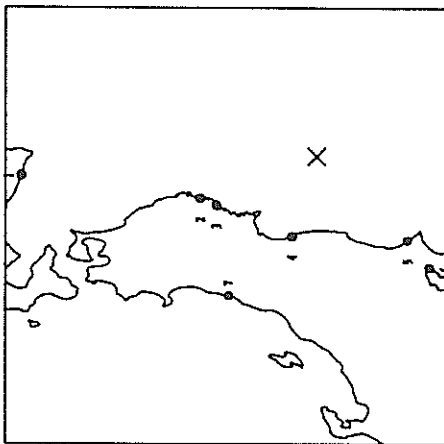


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2658	5 3 1	720

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

00:22 FEB. 17, 1996
 E OFF FUKUSHIMA PREF
 EPICENTER : 37 18.4'N 142 33.1'E
 DEPTH : 58.0KM MAGNITUDE : 6.5

JMA INTENSITIES
 IV : OFUNATO, MORIOKA,
 ISHINOWAKI, SENDAI,
 FUKUSHIMA, SHIRAKAWA,
 MITO

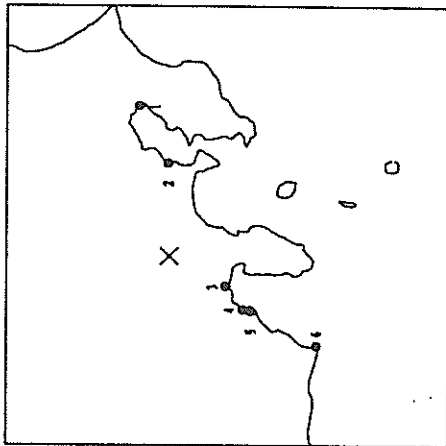


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2659	2 3 1	540
2 KAWAISHI-M	ON GROUND	M-1568	14 21 17	225
2 KAWAISHI-MB	IN GROUND	M-1567	7 14 7	225
3 OFUNATO-MOUND-M	ON STRUC.	M-1583	43 30 9	202
3 OFUNATO-BO-S	ON STRUC.	S-2649	39 10 202	202
3 OFUNATO-BOCHI-S	ON GROUND	S-2657	9 8 3	202
4 SOMA-S	ON GROUND	S-2656	51 69 28	151
5 KASHIMA-ZOKAN-S	ON GROUND	S-2651	31 26 7	225
6 CHIBA-S	ON GROUND	S-2654	1 6 6	289
7 SAKATA-S	ON GROUND	S-2655	11 8 6	299

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:35 MAR. 6, 1996
 EASTERN YAMANASHI PREF
 EPICENTER : 35 28.4'N 138 57.0'E
 DEPTH : 19.6KM MAGNITUDE : 5.3

JMA INTENSITIES
 V : KAWAGUCHIKO
 IV : MISHIMA
 III : CHICHIBU, TATEYAMA,
 OSHIMA, YOKOHAMA, KOFU,
 SUWA, AJIRO, IROZAKI,
 SHIZUOKA

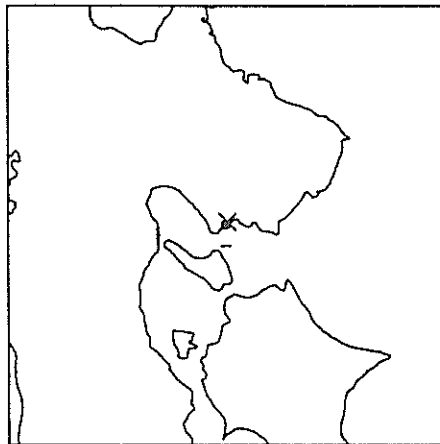


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 CHIBA-S	ON GROUND	S-2663	6 4 2	105
2 YAMASHITA-FR	ON STRUC.	F-1033	91 53 14	64
2 YAMASHITA-F	ON GROUND	F-1032	23 20 15	64
2 YAMASHITA-FB	IN GROUND	F-1031	7 5 4	64
3 TAGOHOURA-S	ON GROUND	S-2653	63 113 3	43
4 OKITSU-S	ON GROUND	S-2661	13 14 6	61
5 SHIMIZU-KOJYO-S	ON GROUND	S-2662	188 188 64	67
6 OMAEZAKI-M	ON GROUND	M-1565	7 5 3	117

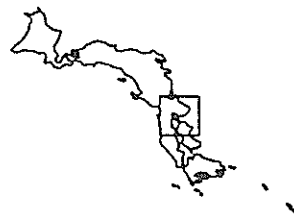
STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

08:18 MAR. 9, 1996
 NW WAKAYAMA PREF
 EPICENTER : 34 12.2'N 135 10.2'E
 DEPTH : 10.3KM MAGNITUDE : 3.4

JMA INTENSITIES
 II : WAKAYAMA



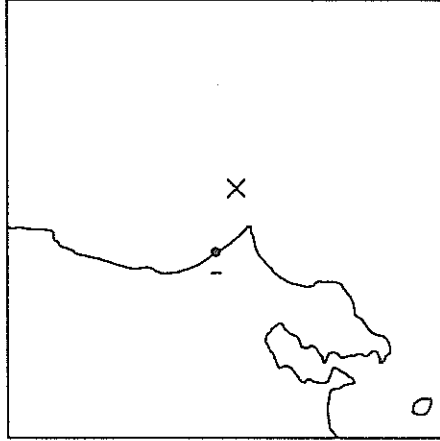
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-1029	38 109 64	2



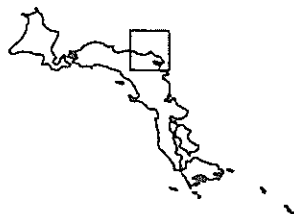
STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

11:06 MAR. 18, 1996
 NEAR CHOSHI CITY
 EPICENTER : 35 46.2'N 141 9.9'E
 DEPTH : 52.8KM MAGNITUDE : 4.8

JMA INTENSITIES
 III : CHOSHI
 I : OAHAWA, MITO, CHIBA,
 TATEYAMA, KATSUURA,
 YOKOHAMA



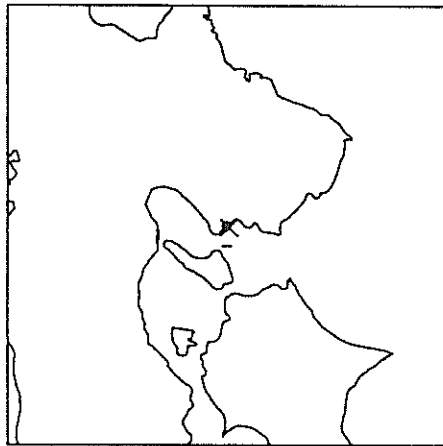
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KASHIMA-ZOKAN-S	ON GROUND	S-2652	9 8 2	45



STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

20:02 APR. 5 .1996
 HW WAKAYAMA PREF
 EPICENTER : 34 11.8'N 135 7.9 'E
 DEPTH : 9.1KM MAGNITUDE : 3.8

JMA INTENSITIES
 III : WAKAYAMA

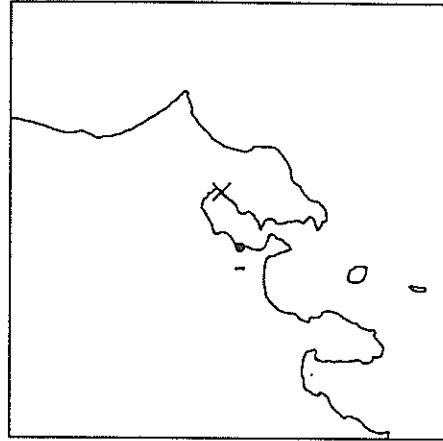


STATION	CONDITION	RECORD NUMBER	MAX-ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-1030	48 116 45	2

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:12 APR. 6 .1996
 CENTRAL CHIBA PREF
 EPICENTER : 35 32.2'N 140 5.2 'E
 DEPTH : 78.1KM MAGNITUDE : 4.0

JMA INTENSITIES
 II : YOKOHAMA, AJIRO
 I : NIKKO, OSHIMA, CHIBA,
 TATEYAMA, TOKYO



STATION	CONDITION	RECORD NUMBER	MAX-ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 YAMASHITA-FR	ON STRUC.	F-1036	10 8 3	39
1 YAMASHITA-F	ON GROUND	F-1035	5 6 3	39
1 YAMASHITA-FB	IN GROUND	F-1034	2 2 1	39

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

06:44 APR. 15, 1996

S OFF URAKAWA

EPICENTER : 42 2.3 'N 142 29.6 'E

DEPTH : 66.8KM MAGNITUDE : 4.7

JMA INTENSITIES

III : URAKAWA

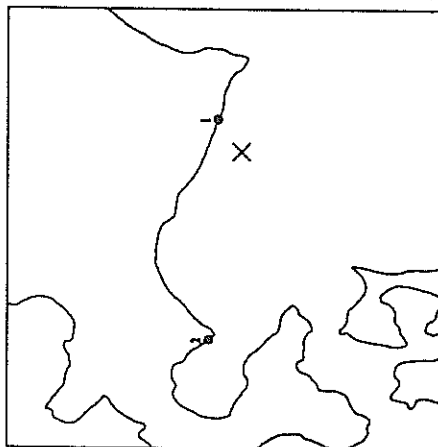
II : TOMAKOWAI, OBIHIRO, HIROO

I : SAPPORO, HAKODATE, MORI,

OTARU, IWAMIZAWA, MURORAN,

KUSHIRO, AOMORI,

HACHINOHE, MUTSU



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 URAKAWA-S	ON GROUND	S-2660	12 14 3	27
2 MURORAN-G	ON GROUND	F-1025	17 14 6	131

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

13:08 APR. 23, 1996

SOUTHERN IWATE PREF

EPICENTER : 39 12.6 'N 141 30.1 'E

DEPTH : 76.1KM MAGNITUDE : 5.2

JMA INTENSITIES

III : MIYAKO, OFUNATO, NORIOKA,

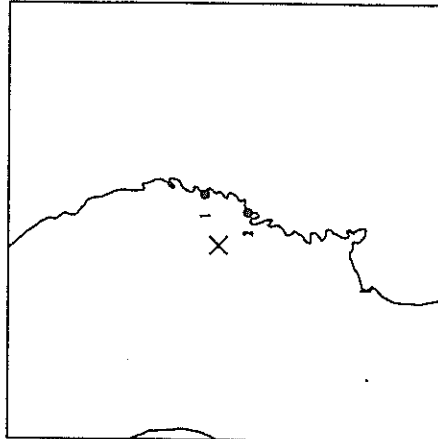
ISHINOMAKI, SENDAI

II : FUKUSHIMA

I : HACHINOHE, MUTSU, AKITA,

SAKATA, SHINJO, YAMAGATA,

SHIRAKAWA, ONAHAWA, MITO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KAWAISHI-MB	IH GROUND	M-1586	10 14 6	35
1 KAWAISHI-M	OH GROUND	M-1585	19 28 18	35
2 OFUNATO-MOUND-M	OH STRUC.	M-1584	21 14 14	29

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

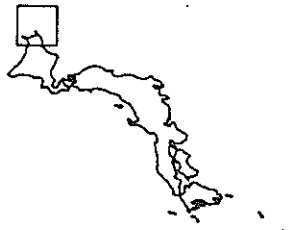
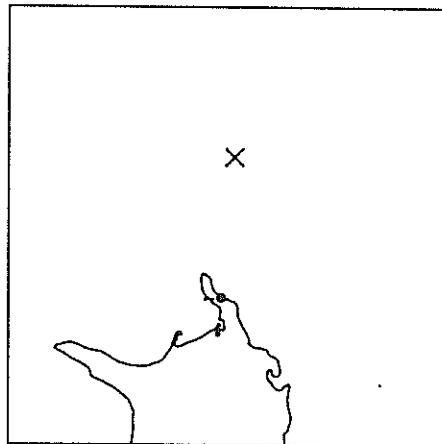
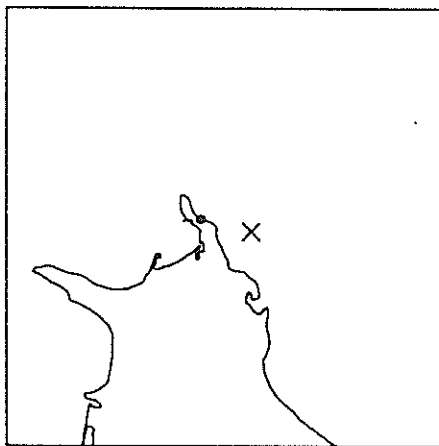
10:57 APR. 25, 1996
 OFF NEMURO PENINSULA
 EPICENTER : 42 58.8'N 145 25.6'E
 DEPTH : 47.9KM MAGNITUDE : 4.2

03:39 MAY 4, 1996
 OFF NEMURO PENINSULA
 EPICENTER : 43 4.7'N 146 44.8'E
 DEPTH : 51.9KM MAGNITUDE : 5.0

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

JWA INTENSITIES
 I : NEMURO, KUSHIRO

JWA INTENSITIES
 I : NEMURO, KUSHIRO



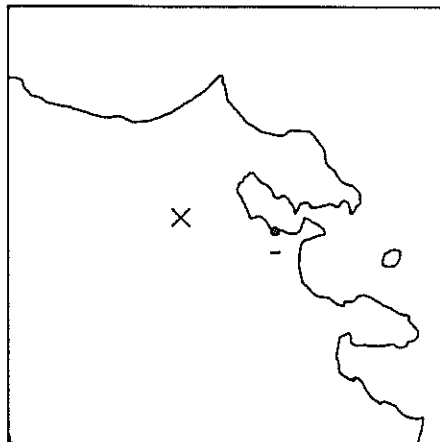
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F-1193	16 14 4	35

STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
1 HANASAKI-F	ON GROUND	F-1196	7 11 4	96

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:26 MAY 7, 1996
 SW IBARAKI PREF
 EPICENTER : 36 1.4 'N 139 48.8 'E
 DEPTH : 84.6KM MAGNITUDE : 4.0

JMA INTENSITIES
 II : TOKYO
 I : MITO, NIKKO, UTSUNOMIYA,
 KUMAGAYA, OSHIMA,
 YOKOHAMA, CHICHIBU

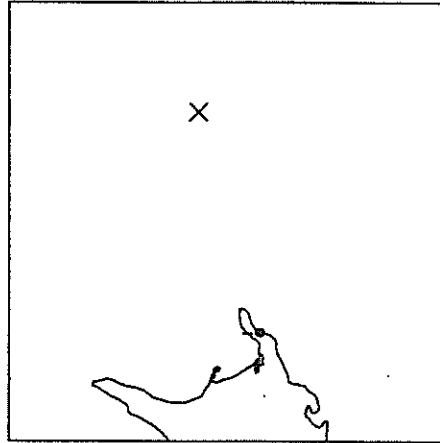


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 YAMASHITA-FR	OK STRUC.	F-1039	12 7 3	65
1 YAMASHITA-F	OK GROUND	F-1038	8 6 4	65
1 YAMASHITA-FB	IX GROUND	F-1037	3 3 1	65

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

08:20 MAY 8, 1996
 E OFF HOKKAIDO
 EPICENTER : 43 27.5 'N 147 31.9 'E
 DEPTH : 44.0KM MAGNITUDE : 6.0

JMA INTENSITIES
 II : KUSHIRO, NEHURO, MORIOKA
 I : ABASHIRI, TOMAKOMAI,
 URAKAWA, OBIHIRO, HIROO,
 AOMORI, HACHINOHE, MUTSU,
 MIYAKO, OFUNATO

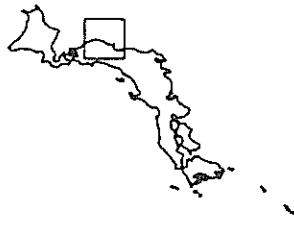
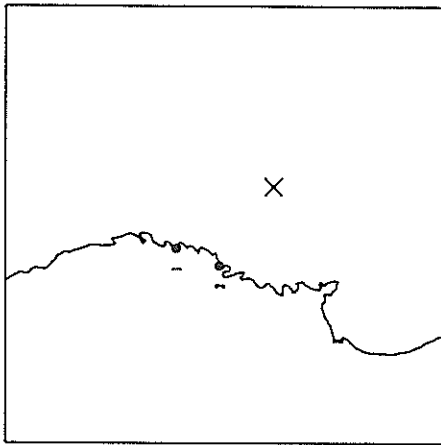


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 HAWASAKI-F	OK GROUND	F-1197	10 9 6	158

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

18:36 MAY 23, 1996
 E OFF MIYAGI PREF
 EPICENTER : 38 38.7'N 142 19.0'E
 DEPTH : 38.2KM MAGNITUDE : 4.8

JMA INTENSITIES
 III : OFUNATO, MORIOKA,
 ISHINOWAKI
 II : MIYAKO, SENDAI
 I : HACHINOHE, AKITA, SAKATA,
 SHINJO, FUKUSHIMA

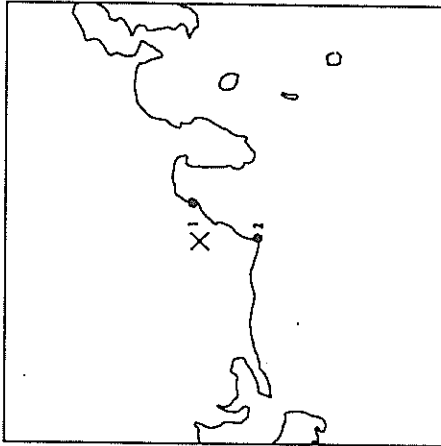


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KAMAIISHI-RB	IN GROUND	M-1588	8 7 5	78
2 OFUNATO-MOUND-M	ON STRUC.	M-1589	18	18
2 OFUNATO-BO-S	ON STRUC.	S-2665	6 19 2	65
2 OFUNATO-BOCHI-S	ON GROUND	S-2664	6 11 3	64

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:38 MAY 27, 1996
 CENTRAL SHIZUOKA PREF
 EPICENTER : 34 57.7'N 138 12.6'E
 DEPTH : 27.9KM MAGNITUDE : 4.2

JMA INTENSITIES
 III : SHIZUOKA
 II : OMAEZAKI
 I : AJIRO, HAMAMATSU, IRAKO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 SHIMIZU-G	ON GROUND	P-1028	5 3 3	26
1 SHIMIZU-GB	IN GROUND	F-1027	3 2 2	26
2 OMAEZAKI-M	ON GROUND	M-1566	8 8 2	39

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

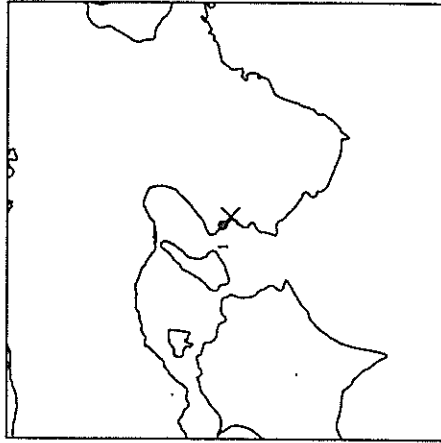
18:41 JUNE 2, 1996
 NEAR OKINAWAJIMA ISLAND
 EPICENTER : 27 32.1'N 128 29.5'E
 DEPTH : 39.5KM MAGNITUDE : 4.5



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KAKAGUSUKU-G	ON GROUND	F-1026	7 11 4	148

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

00:26 JUNE 22, 1996
 NW WAKAYAMA PREF
 EPICENTER : 34 10.0'N 135 12.8'E
 DEPTH : 10.6KM MAGNITUDE : 3.3

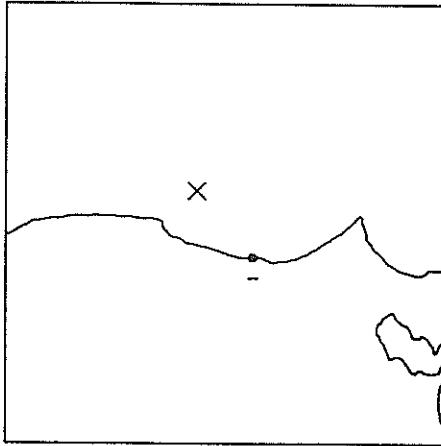


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-1042	7 10 9	8

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:11 JUNE 29, 1996
 E OFF IBARAKI PREF
 EPICENTER : 36 41.8'N 141 10.1'E
 DEPTH : 40.2KM MAGNITUDE : 4.0

JMA INTENSITIES
 I : FUKUSHIMA, SHIRAKAWA,
 ONAHARA, MITO

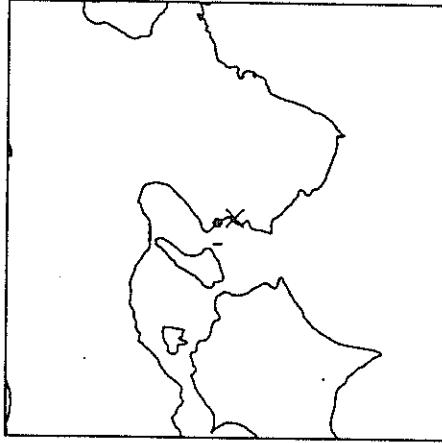


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (HS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-1058	10 12 7	60

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:36 JULY 6, 1996
 NW WAKAYAMA PREF
 EPICENTER : 34 6.4 'N 135 10.8'E
 DEPTH : 10.8KM MAGNITUDE : 3.8

JMA INTENSITIES
 II : WAKAYAMA



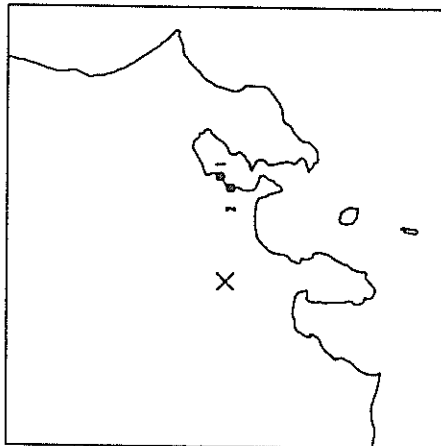
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (HS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-1043	14 11 10	12

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

03:16 AUG. 9 .1996
 EASTERN YAMAGASHI PREF
 EPICENTER : 35 30.5'N 138 58.3'E
 DEPTH : 20.8KM MAGNITUDE : 4.4

JMA INTENSITIES

- III : KAWAGUCHIKO, MISHIMA
- II : TOKYO, YOKOHAMA, AJIRO, KOFU, TOKYO, YOKOHAMA, AJIRO, KOFU
- I : NIKKO, CHICHIBU, CHIBA, TATEYAMA, OSHIMA, NAGANO, KARUIZAWA, SUWA, IIDA, IROZAKI, SHIZUOKA, KUMAGAYA



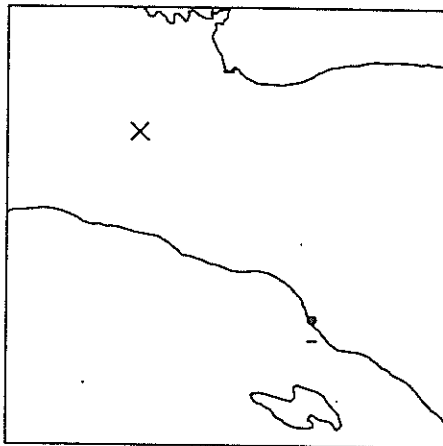
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 KAWASAKI-FR	ON STRUC.	F-1097	5 6 2	71
1 KAWASAKI-F	ON GROUND	F-1096	5 6 2	71
1 KAWASAKI-FB	IN GROUND	F-1095	14 15 4	71
2 YAMASHITA-FR	ON STRUC.	F-1075	8 9 4	63
2 YAMASHITA-F	ON GROUND	F-1074	8 9 4	63
2 YAMASHITA-FB	IN GROUND	F-1073	2 2 1	63

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

03:12 AUG. 11, 1996
 SOUTHERN AKITA PREF
 EPICENTER : 38 54.3'N 140 38.2'E
 DEPTH : 8.6KM MAGNITUDE : 5.9

JMA INTENSITIES

- IV : SHINJO
- III : SAKATA
- II : OFUNATO, MORIOKA, ISHINOMAKI, SENDAI, AKITA, YAMAGATA, FUKUSHIMA, ONAHAMA, WAKAMATSU, NIIGATA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 NIIGATA-G	ON GROUND	F-1044	10 13 3	174

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

01:03 AUG. 16, 1996

SW IBARAKI PREF

EPICENTER : 36 7.8 'N 139 51.0' E

DEPTH : 56.7KM MAGNITUDE : 4.3

JMA INTENSITIES

III : NIKKO

II : MITO, UTSUNOMIYA,

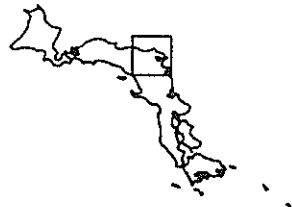
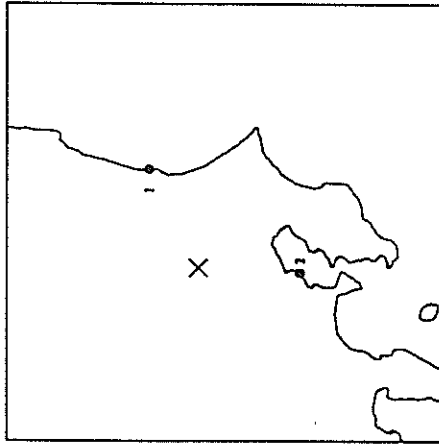
KUNAGAYA, CHICHIBU, TOKYO,

YOKOHAMA

I : SHIRAKAWA, ORAHAMA,

MAEBASHI, CHIBA, TATEYAMA,

KOFU, SUWA, AJIRO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-1059	12 11 6	74
2 KAWASAKI-FR	ON STRUC.	F-1100		69
2 KAWASAKI-F	ON GROUND	F-1099	5 6 2	69
2 KAWASAKI-FB	IN GROUND	F-1098		69

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

15:02 AUG. 19, 1996

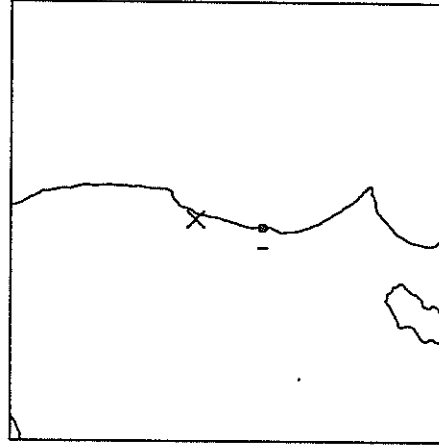
NORTHERN IBARAKI PREF

EPICENTER : 36 47.5'N 140 43.2' E

DEPTH : 71.2KM MAGNITUDE : 3.4

JMA INTENSITIES

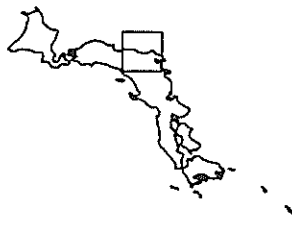
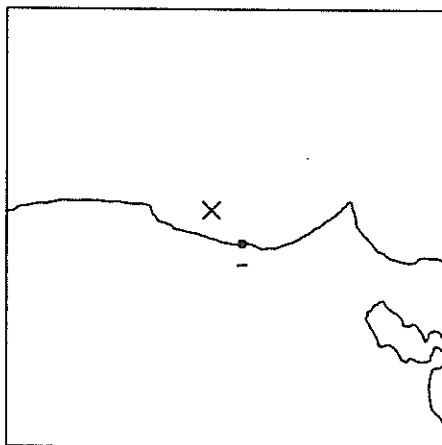
I : MITO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-1060	19 14 7	45

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

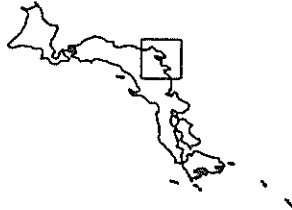
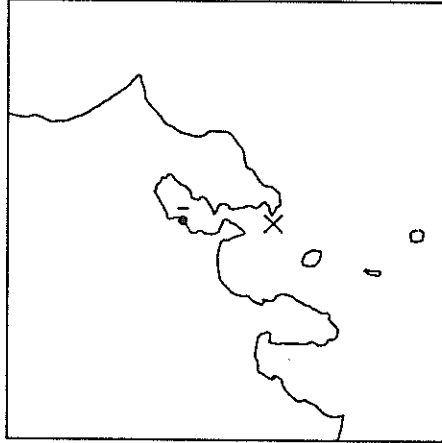
08:47 SEP. 2, 1996
 E OFF IBARAKI PREF
 JMA INTENSITIES I : MITO, SHIRAKAWA
 EPICENTER : 36 33.4'N 140 53.2'E
 DEPTH : 49.6KM MAGNITUDE : 3.9



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-1061	13 15 11	30

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

02:11 SEP. 5, 1996
 SAGAMIWADA
 JMA INTENSITIES III : TATEYAMA
 II : TOKYO, YOKOHAMA, AJIRO
 I : KATSUURA, OSHIMA
 EPICENTER : 34 57.3'N 139 41.6'E
 DEPTH : 48.0KM MAGNITUDE : 4.1

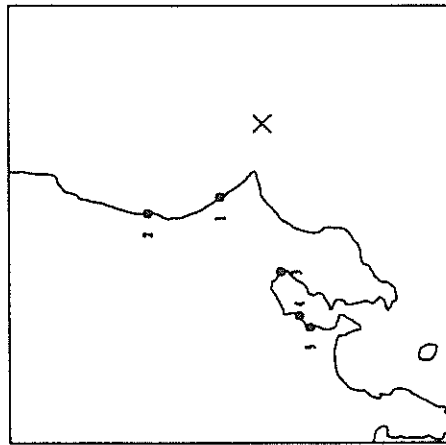


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KAWASAKI-FR	ON STRUC.	F-1103	9 6 3	61
1 KAWASAKI-F	ON GROUND	F-1102		61
1 KAWASAKI-FB	IN GROUND	F-1101		61

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

11:37 SEP. 11, 1996
 NEAR CHOSHI CITY
 EPICENTER : 35 38.1'N 141 13.2'E
 DEPTH : 52.0KM MAGNITUDE : 6.4

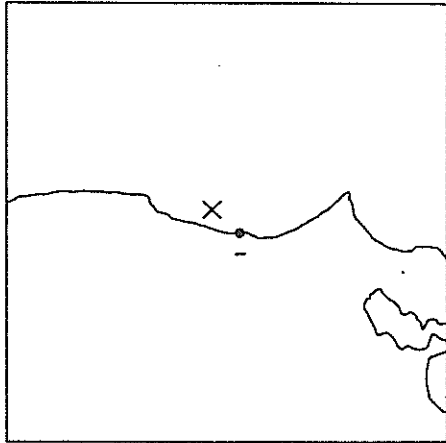
JMA INTENSITIES
 IV : CHIBA, CHOSHI
 III : FUKUSHIMA, SHIRAKAWA,
 ONAHAMA, MITO, TATEYAMA,
 KATSUURA, TOKYO, YOKOHAMA,
 SUWA, AJIRO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (NS)	MAX. ACC. (EW) (EW)	MAX. ACC. (OAL) (OAL)	DIST. (KM)
1 KASHIMA-ZOKAN-S	ON GROUND	S-2667	84	44	28	57
2 HITACHINAKA-F	ON GROUND	F-1062	45	46	22	99
3 CHIBA-S	ON GROUND	S-2666	22	24	6	100
4 KAWASAKI-FR	ON STRUC.	F-1106				132
4 KAWASAKI-P	ON GROUND	F-1105	15	15	6	132
4 KAWASAKI-FB	IN GROUND	F-1104				132
5 YAMASHITA-FR	ON STRUC.	F-1078	22	20	6	142
5 YAMASHITA-F	ON GROUND	F-1077	15	14	6	142
5 YAMASHITA-FB	IN GROUND	F-1076	5	5	3	142

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

05:53 SEP. 29, 1996
 E OFF IBARAKI PREF
 EPICENTER : 36 32.5'N 140 48.8'E
 DEPTH : 49.9KM MAGNITUDE : 3.7

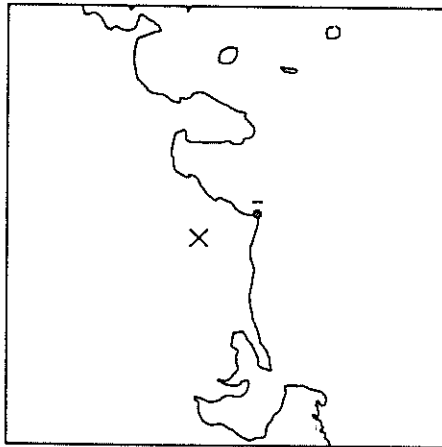


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (NS) (NS)	MAX. ACC. (EW) (EW)	MAX. ACC. (OAL) (OAL)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-1065	9	8	3	24

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

09:51 OCT. 5, 1996
 CENTRAL SHIZUOKA PREF
 EPICENTER : 34 58.3'N 138 3.1 'E
 DEPTH : 27.6KM MAGNITUDE : 4.3

JMA INTENSITIES
 II : OMAEZAKI, SHIZUOKA,
 HAMAMATSU
 I : TATEYAMA, OSHIMA, TSURUGA,
 KOFU, SUWA, IIDA, GIFU,
 AJIRO, IROZAKI, HAGOYA,
 YOKKAICHI, TSU, HIKONE

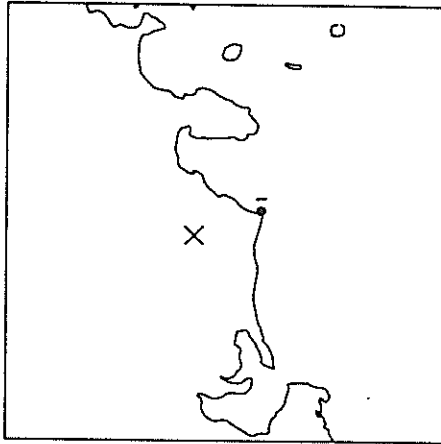


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 OMAEZAKI-M	ON GROUND	M-1591	8 6 3	43

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

21:56 OCT. 6, 1996
 CENTRAL SHIZUOKA PREF
 EPICENTER : 35 1.4 'N 138 3.5 'E
 DEPTH : 29.5KM MAGNITUDE : 3.8

JMA INTENSITIES
 I : IIDA, SHIZUOKA, OMAEZAKI



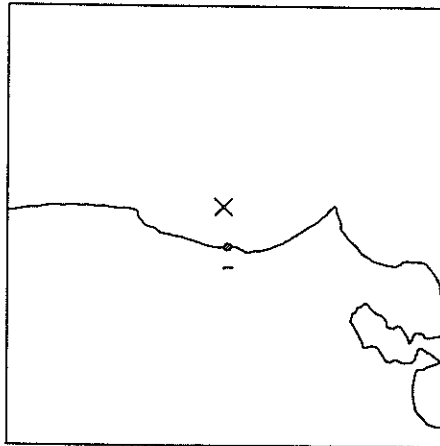
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (OAL) (NS) (EW) (UD)	DIST. (KM)
1 OMAEZAKI-M	ON GROUND	M-1590	3 3 2	48

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

06:03 OCT. 7, 1996
 E OFF IBARAKI PREF
 EPICENTER : 36 23.5'N 140 55.8'E
 DEPTH : 35.0KM MAGNITUDE : 4.3

JMA INTENSITIES

III : MITO
 II : SHIRAKAWA, ONAHAMA, NIKKO
 I : FUKUSHIMA, UTSUNOMIYA,
 CHOSHI, TOKYO



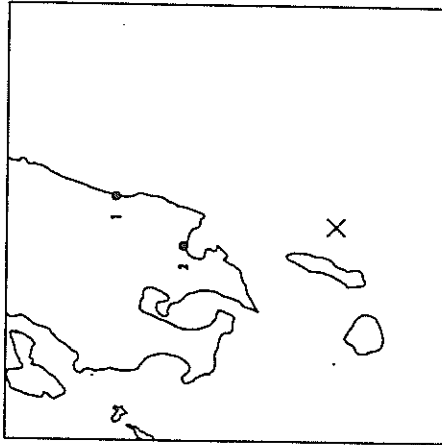
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-1063	41 55 19	28

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

19:50 OCT. 18, 1996
 NEAR TANEGASHIMA ISLAND
 EPICENTER : 30 32.0'N 131 16.1'E
 DEPTH : 39.8KM MAGNITUDE : 6.2

JMA INTENSITIES

III : MIYAZAKI, MIYAKOHOJO,
 KAGOSHIMA, IRIOMOTEJIMA
 II : KUMAMOTO, FUKUOKA, OITA,
 KAGOSHIMA, MAKURAZAKI
 I : SAGA, NOBEOKA, NAZE



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MIYAZAKI-G	ON GROUND	F-1048	10 10 4	152
1 MIYAZAKI-GB	IN GROUND	F-1047	6 6 3	152
2 SHIBUSHI-G	ON GROUND	F-1054	17 13 7	105

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:01 OCT. 19, 1996
 HYUGANADA REGION
 EPICENTER : 31 50.3'N 131 58.5'E
 DEPTH : 42.0KM MAGNITUDE : 5.1

JMA INTENSITIES

- III : HITOYOSHI, MIYAZAKI
- II : FUKUOKA, KUMAMOTO, OITA, NOBEOKA, MIYAKONOJO, KAGOSHIMA
- I : HIROSHIMA, HAGI, NAGASAKI, KUMAMOTO, KAGOSHIMA, MAKURAZAKI



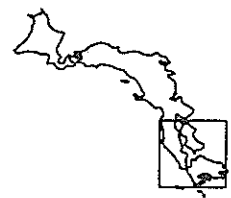
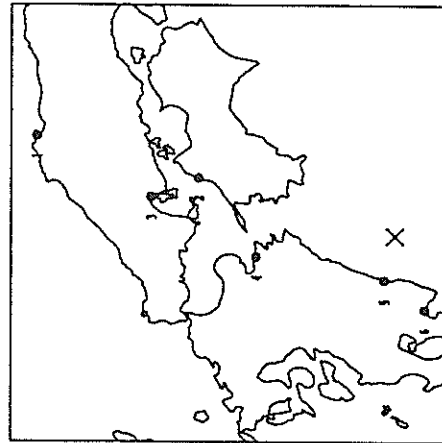
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 MIYAZAKI-G	ON GROUND	F-1050	13 16 9	49
1 MIYAZAKI-GB	IN GROUND	F-1049	5 8 4	49

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:44 OCT. 19, 1996
 HYUGANADA REGION
 EPICENTER : 31 47.7'N 131 59.5'E
 DEPTH : 41.2KM MAGNITUDE : 6.6

JMA INTENSITIES

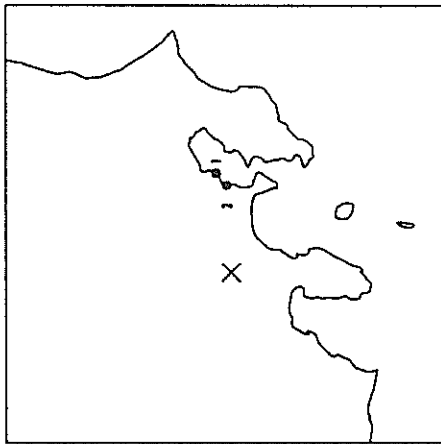
- V : MIYAZAKI
- IV : KUMAMOTO, OITA, NOBEOKA, MIYAKONOJO, KAGOSHIMA
- III : KURE, HIROSHIMA, HAGI, FUKUOKA, SAGA, NAGASAKI, KUMAMOTO, OITA, KAGOSHIMA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 SAKAIMINATO-G	ON GROUND	P-1056	12 8 3	432
2 MATSUYAMA-G	ON GROUND	F-1057	20 14 3	238
3 HIROSHIMA-G	ON GROUND	P-1053	9 15 2	287
4 OITA-G	ON GROUND	F-1115	64 50 34	162
5 MIYAZAKI-G	ON GROUND	P-1052	105 96 94	51
5 MIYAZAKI-GB	IN GROUND	P-1051	40 40 24	51
6 SHIBUSHI-G	ON GROUND	F-1055	28 33 13	90

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

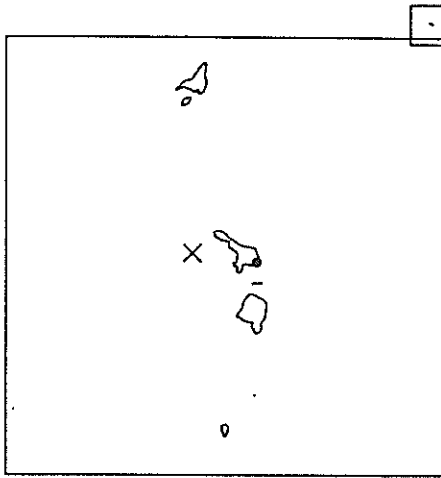
12:25 OCT. 25, 1996 JMA INTENSITIES
 EASTERN YAMASHI PREF III : OSHIMA, YOKOHAMA,
 EPICENTER : 35 27.1'N 139 0.3 'E KAWAGUCHIKO
 DEPTH : 22.7KM MAGNITUDE : 4.5 II : TOKYO, OSHIMA, KOFU, AJIRO,
 MISHIMA
 I : NIKKO, KUVAGAYA, SUWA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 KAWASAKI-FR	ON STRUC.	F-1109		68
1 KAWASAKI-F	ON GROUND	F-1108	7 7 3	68
1 KAWASAKI-FB	IN GROUND	F-1107		68
2 YAMASHITA-FR	ON STRUC.	F-1081	30 10 5	59
2 YAMASHITA-F	ON GROUND	F-1080	13 9 4	59
2 YAMASHITA-FB	IN GROUND	F-1079	4 2 1	59

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

23:41 OCT. 28, 1996 JMA INTENSITIES
 NEAR ISHIGAKIJIMA ISLAND II : ISHIGAKIJIMA,
 EPICENTER : 24 44.0'N 124 11.1'E IRIOMOTEJIMA
 DEPTH : 79.0KM MAGNITUDE : 4.2



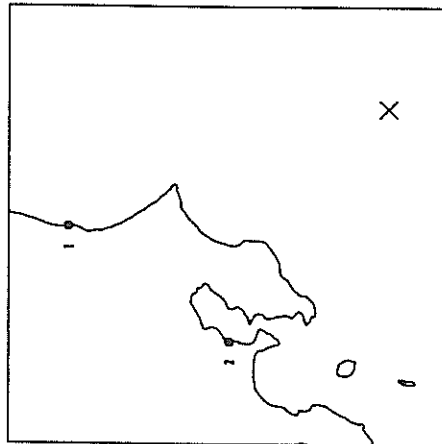
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 ISHIGAKI-G	ON GROUND	F-1114	15 17 4	44

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

11:27 NOV. 20, 1996
 FAR SE OFF BOSO PEN
 EPICENTER : 34 21.5'N 141 18.8'E
 DEPTH : 57.0KM MAGNITUDE : 6.0

JWA INTENSITIES

III : MIYAKEJIMA, HACHIJOJIMA
 II : CHIBA, TATEYAMA, TOKYO,
 OSHIMA, NIJIMA, YOKOHAMA,
 SUWA, AJIRO
 I : OFUNATO, ISHINOMAKI,
 SENDAI, FUKUSHIMA,
 SHIRAKAWA, MITO, CHOSHI,
 CHICHIBU, KAWAGUCHIKO



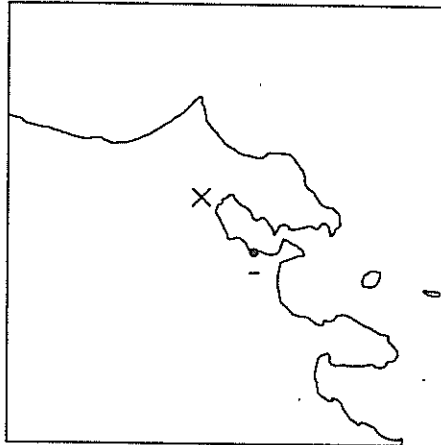
STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 HITACHINAKA-F	ON GROUND	F-1064	9 8 4	234
2 YAMASHITA-FR	ON STRUC.	F-1084	9 6 2	192
2 YAMASHITA-F	ON GROUND	F-1083	4 5 3	192
2 YAMASHITA-FB	IN GROUND	F-1082	2 2 1	192

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

07:39 NOV. 24, 1996
 NORTHERN CHIBA PREF
 EPICENTER : 35 45.0'N 140 6.5'E
 DEPTH : 77.3KM MAGNITUDE : 4.4

JWA INTENSITIES

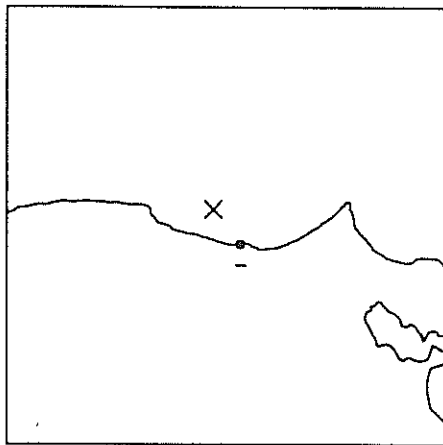
II : NIKKO, CHIBA, TOKYO,
 YOKOHAMA, AJIRO
 I : SHIRAKAWA, MITO,
 UTSUNOMIYA, CHICHIBU,
 CHIBA, OSHIMA,
 KAWAGUCHIKO, KOFU,
 MISHIMA



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 YAMASHITA-FR	ON STRUC.	P-1087	33 17 4	52
1 YAMASHITA-F	ON GROUND	F-1086	17 9 5	52
1 YAMASHITA-FB	IN GROUND	F-1085	4 4 1	52

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

11:45 NOV. 24, 1996
 E OFF IBARAKI PREF
 EPICENTER : 36 32.3'N 140 53.8'E
 DEPTH : 41.1KM MAGNITUDE : 3.5

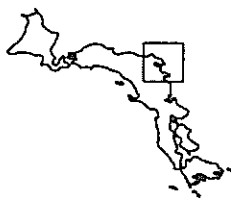
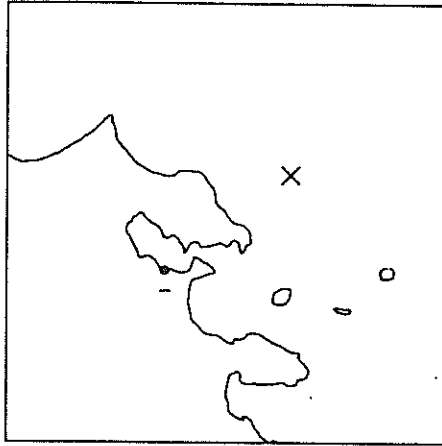


STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1	HITACHINAKA-F	F-1066	8 10 6	30

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

16:40 NOV. 28, 1996
 SE OFF BOSO PENINSULA
 EPICENTER : 34 37.9'N 140 19.8'E
 DEPTH : 68.6KM MAGNITUDE : 5.4

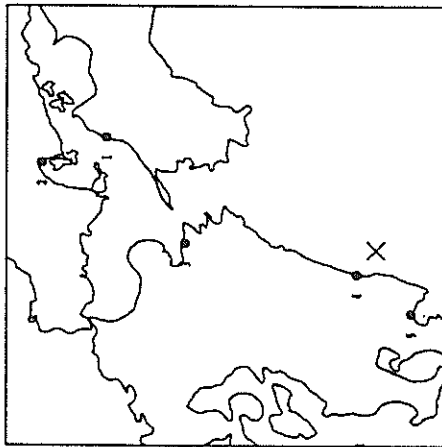
JMA INTENSITIES
 IV : TATEYAMA
 III : CHIBA, TOKYO, OSHIMA, NIJIMA, MIYAKEJIMA, HACHIJUJIMA
 I : NITO



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1	YAMASHITA-FR	F-1090	19 15 3	108
1	YAMASHITA-F	F-1089	11 12 3	108
1	YAMASHITA-FB	F-1088	3 2 2	108

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

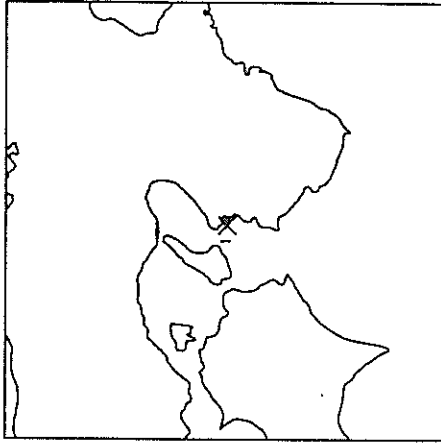
07:17 DEC. 3, 1996
 HYUGANADA REGION
 EPICENTER : 31 45.3'N 131 40.7'E
 DEPTH : 42.6KM MAGNITUDE : 6.6



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WATSUYAKA-G	ON GROUND	F-1072	16 14 2	252
2 HIROSHIMA-G	ON GROUND	F-1069	10 9 2	297
3 OITA-G	ON GROUND	F-1116	42 29 21	165
4 MIYAZAKI-G	ON GROUND	F-1068	115 140 55	26
4 MIYAZAKI-GB	IN GROUND	F-1067	47 56 26	26
5 SHIBUSHI-G	ON GROUND	F-1070	15 15 7	62

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

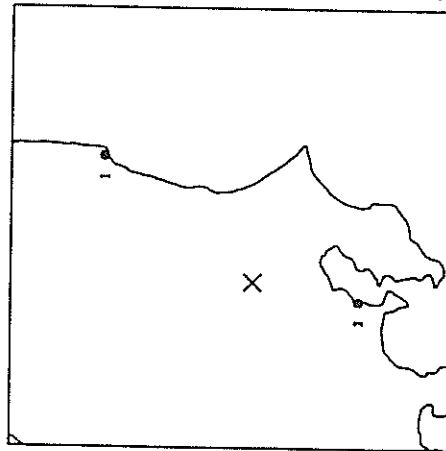
08:30 DEC. 11, 1996
 NW WAKAYAMA PREF
 EPICENTER : 34 12.1'N 135 6.4'E
 DEPTH : 8.8KM MAGNITUDE : 3.5



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL) (NS) (EW) (UD)	DIST. (KM)
1 WAKAYAMA-G	ON GROUND	F-1071	33 69 29	4

STRONG-MOTION EARTHQUAKE OBSERVATION RESULTS

10:28 DEC. 21, 1996
 SW IBARAKI PREF
 EPICENTER : 36 5.6 'N 139 51.8 'E
 DEPTH : 53.1KM MAGNITUDE : 5.4



STATION	CONDITION	RECORD NUMBER	MAX. ACC. (GAL)	DIST. (KM)
			(NS) (EW) (UD)	
1 OKAHAMA-JI-G	ON GROUND	F-1111	42 36 16	132
1 OKAHAMA-JI-GB	IN GROUND	F-1110	7 9 4	132
2 YAMASHITA-FR	ON STRUC.	F-1093	20 16 4	74
2 YAMASHITA-F	ON GROUND	F-1092	13 13 5	74
2 YAMASHITA-FB	IN GROUND	F-1091	5 5 2	74

Results of Preliminary Analyses (1996)

RECORD NUMBER : S-2649

STATION : OFUNATO-BO-S

EARTHQUAKE DATA

 DATE AND TIME 0:22 FEB.17,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF FUKUSHIMA PREF
 LATITUDE 37°18.4' N
 LONGITUDE 142°33.1' E
 DEPTH 58.0KM
 JMA MAGNITUDE 6.5

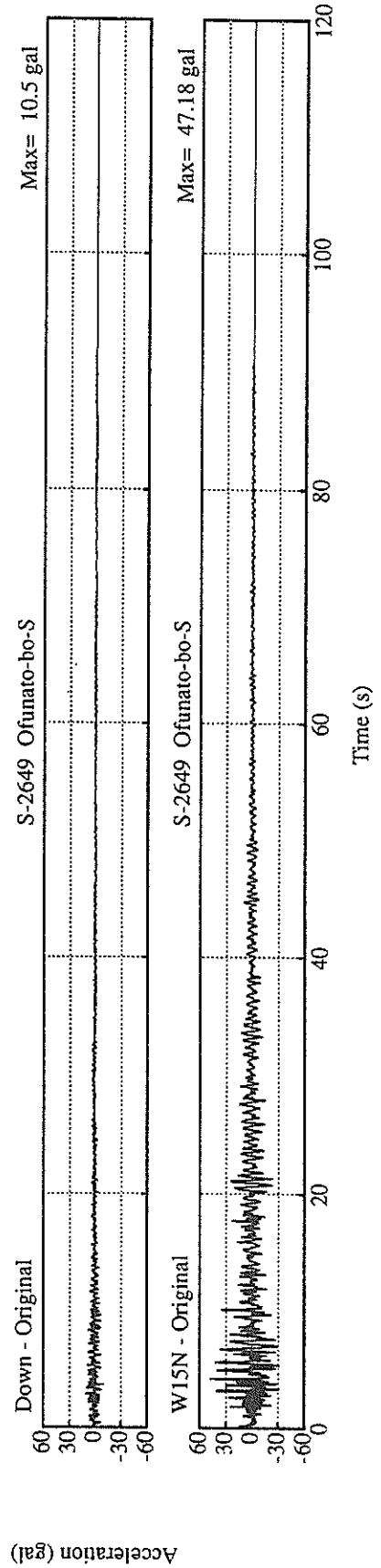
PEAK VALUES OF COMPONENTS

N	S	E	W	U	D	HORIZONTAL*

ORIGINAL ACCELERATION (GAL) 47.2 10.5

* RESULTANT OF HORIZONTAL COMPONENTS

S15W component shows abnormal response.



RECORD NUMBER : S-2651

STATION : KASHIMA-ZOKAN-S

EARTHQUAKE DATA

DATE AND TIME

0:22 FEB.17,1996

LOCATION OF HYPOCENTER

E OFF FUKUSHIMA PREF

EPICENTRAL REGION

37°18.4' N

LATITUDE

142°33.1' E

LONGITUDE

58.0KM

DEPTH

6.5

JMA MAGNITUDE

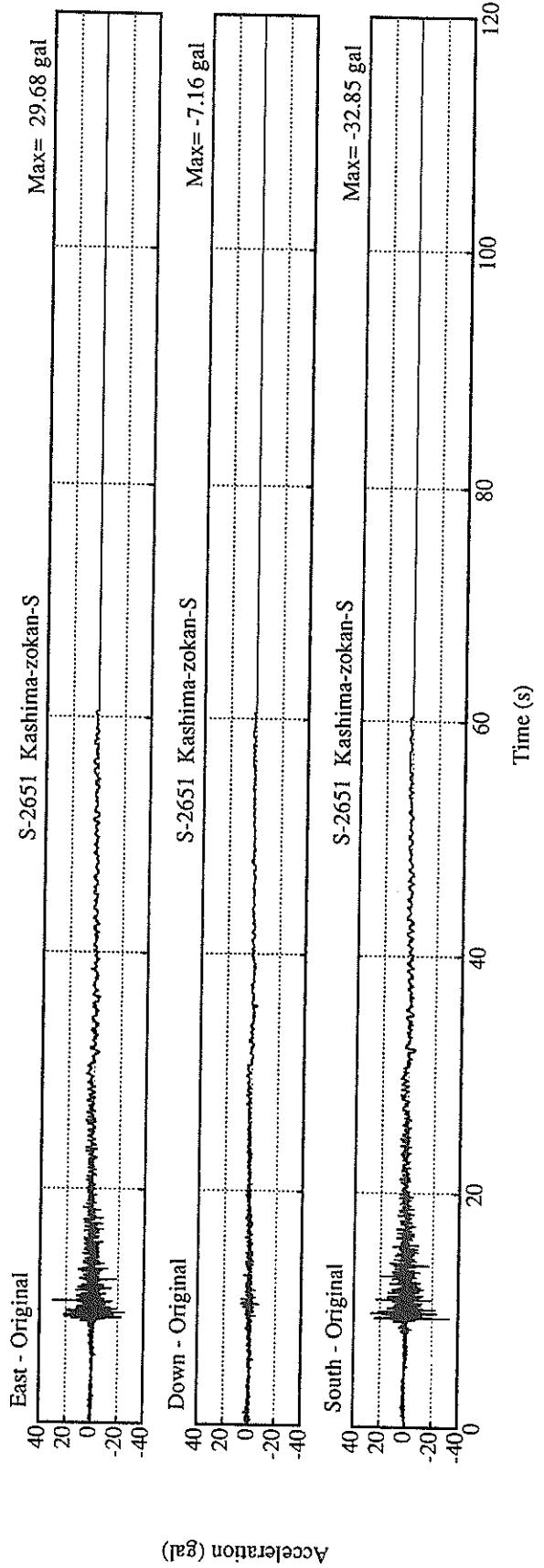
6.5

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
32.8	29.7	7.2	35.0

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : M-1568

STATION : KAMAISHI-M

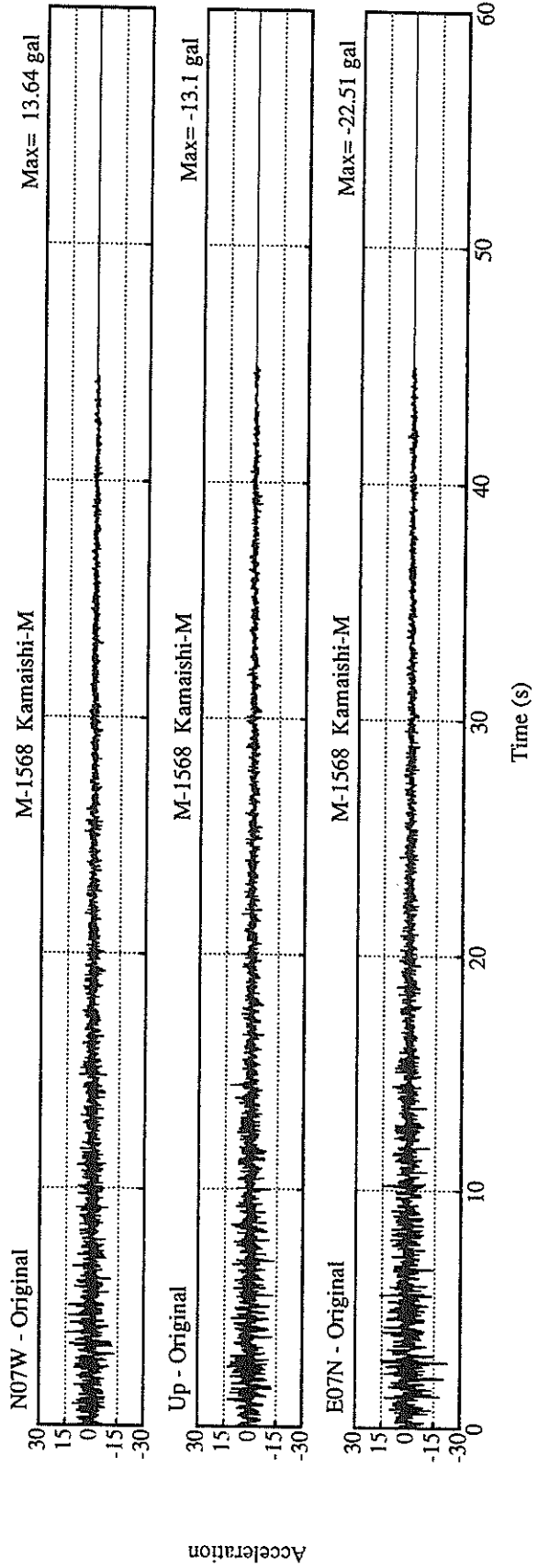
EARTHQUAKE DATA

 DATE AND TIME 0:22 FEB.17,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF FUKUSHIMA PREF
 LATITUDE 37° 18.4' N
 LONGITUDE 142° 33.1' E
 DEPTH 58.0KM
 JMA MAGNITUDE 6.5

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	13.6	22.5	13.1	24.1

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : M-1583

STATION : OFUNATO-MOUND-M

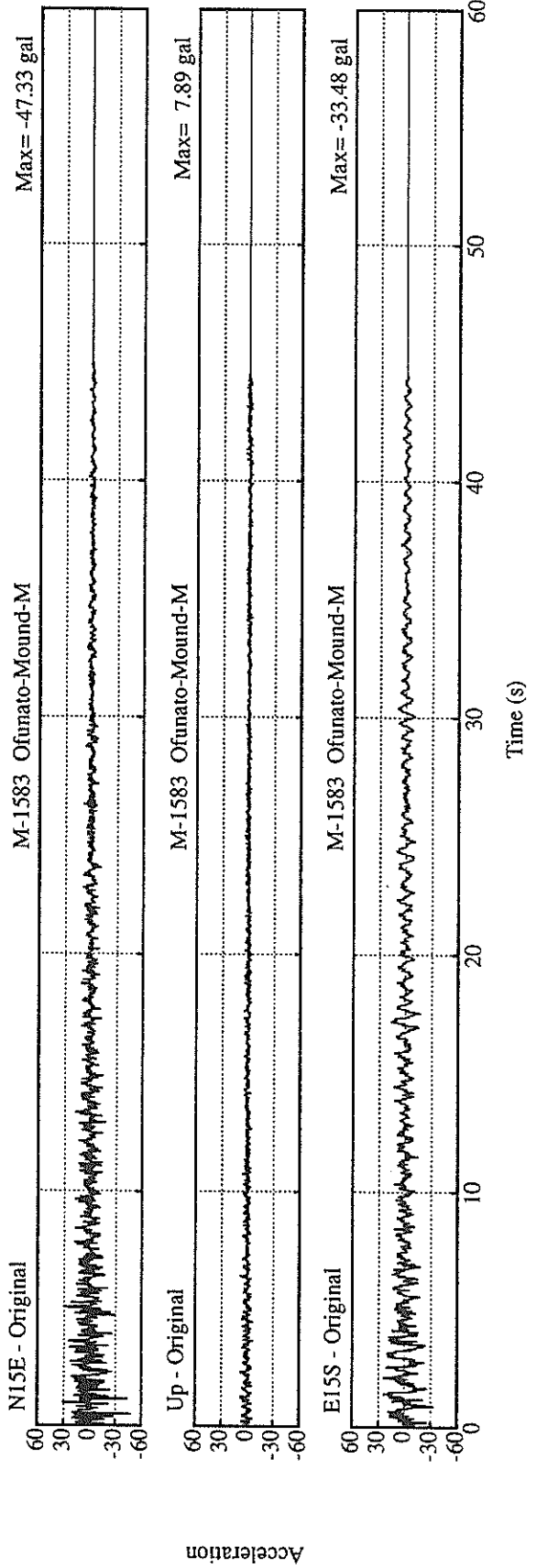
EARTHQUAKE DATA

 DATE AND TIME 0:22 FEB.17,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF FUKUSHIMA PREF
 LATITUDE 37.18.4' N
 LONGITUDE 142.33.1' E
 DEPTH 58.0KM
 JMA MAGNITUDE 6.5

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	47.3	33.5	7.9	47.7

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : S-2656
 STATION : SOMA-S

EARTHQUAKE DATA

 DATE AND TIME 0:22 FEB.17,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF FUKUSHIMA PREF
 LATITUDE 37°18.4' N
 LONGITUDE 142°33.1' E
 DEPTH 58.0KM
 JMA MAGNITUDE 6.5

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
0.536	0.402	0.793	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.536 0.402 0.793

MAXIMUM ACCELERATION (GAL)

ORIGINAL	55.3	70.6	27.9	72.9
CORRECTED	133.2	152.7	50.2	159.7

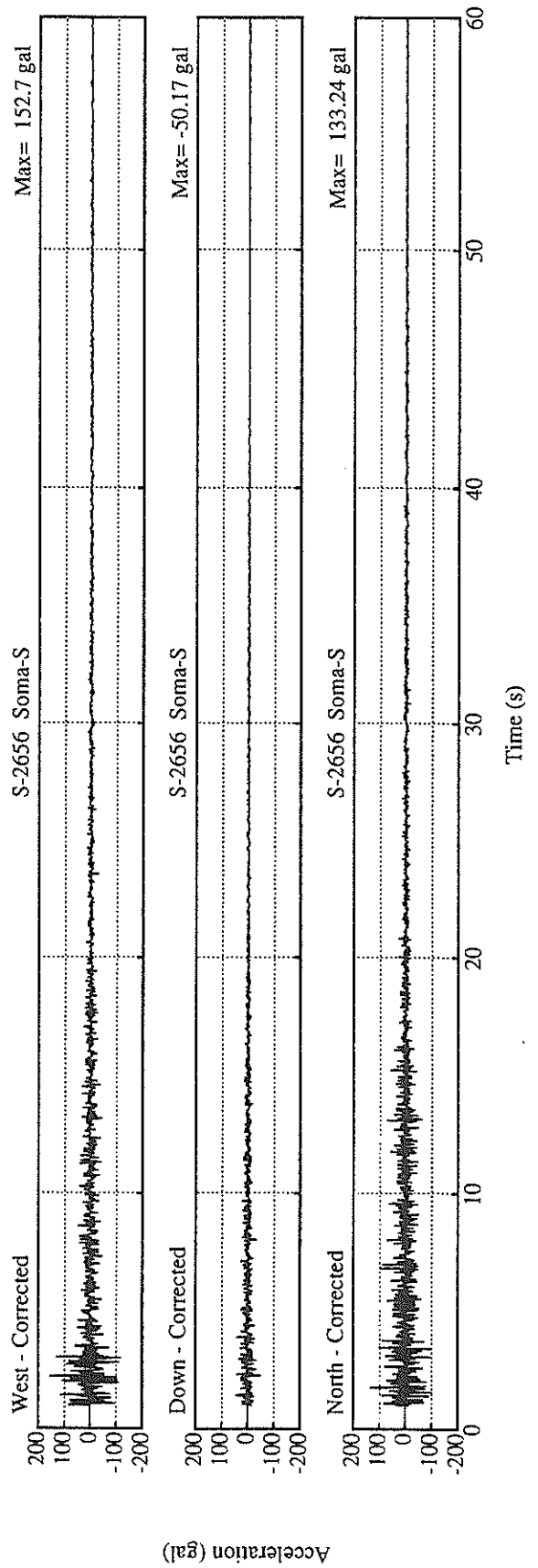
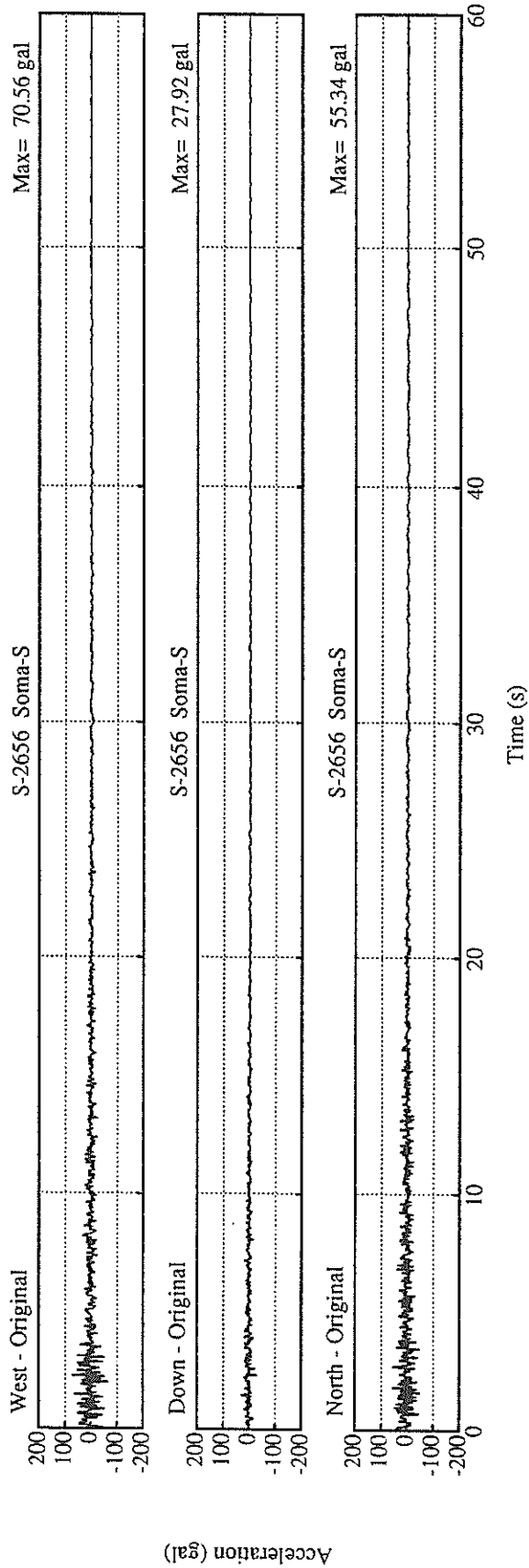
MAXIMUM VELOCITY (CM/SEC)

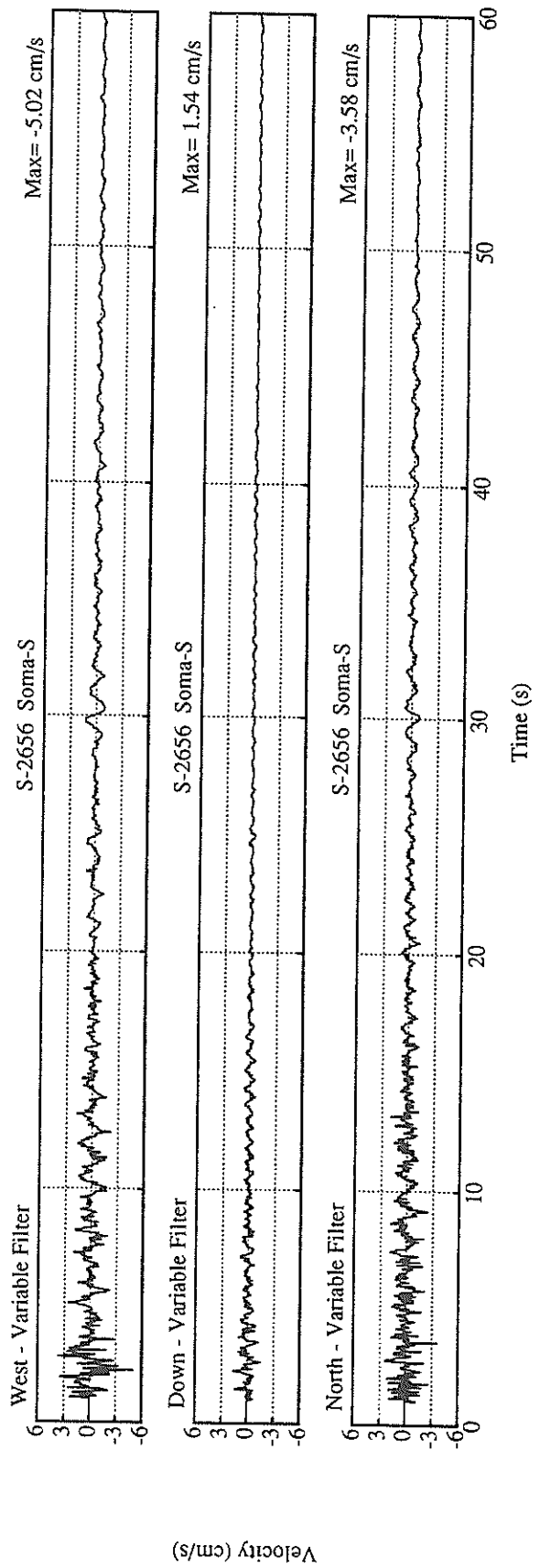
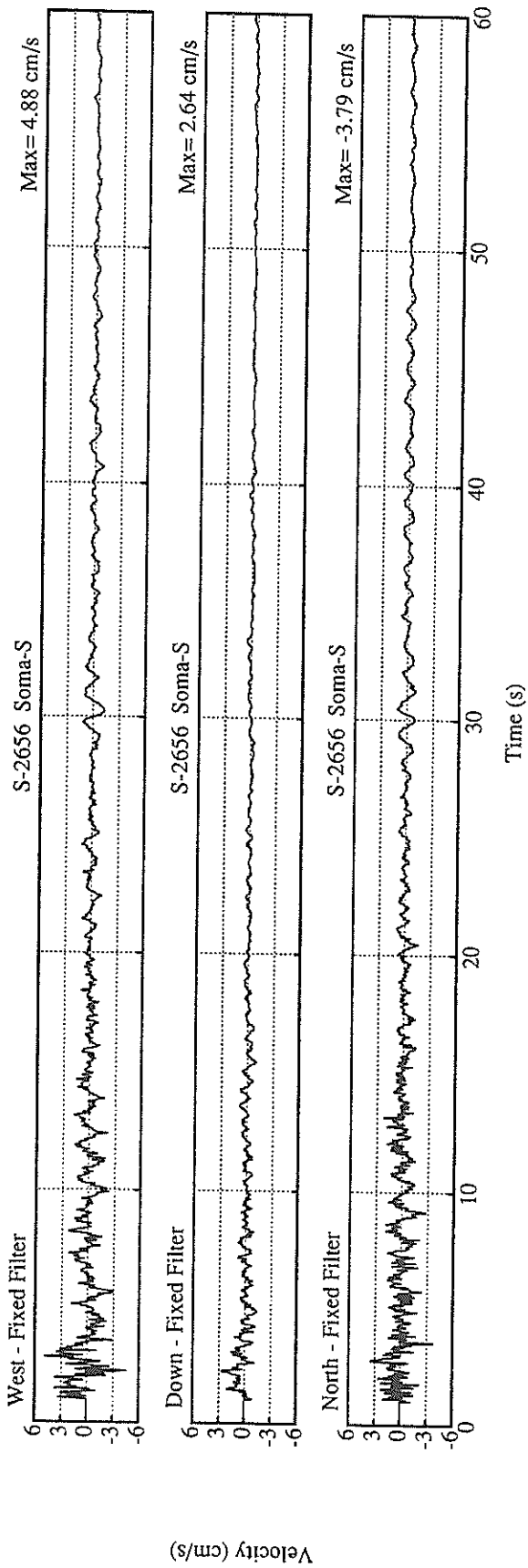
FIXED FILTER	3.79	4.88	2.64	5.63
VARIABLE FILTER	3.58	5.02	1.54	5.02

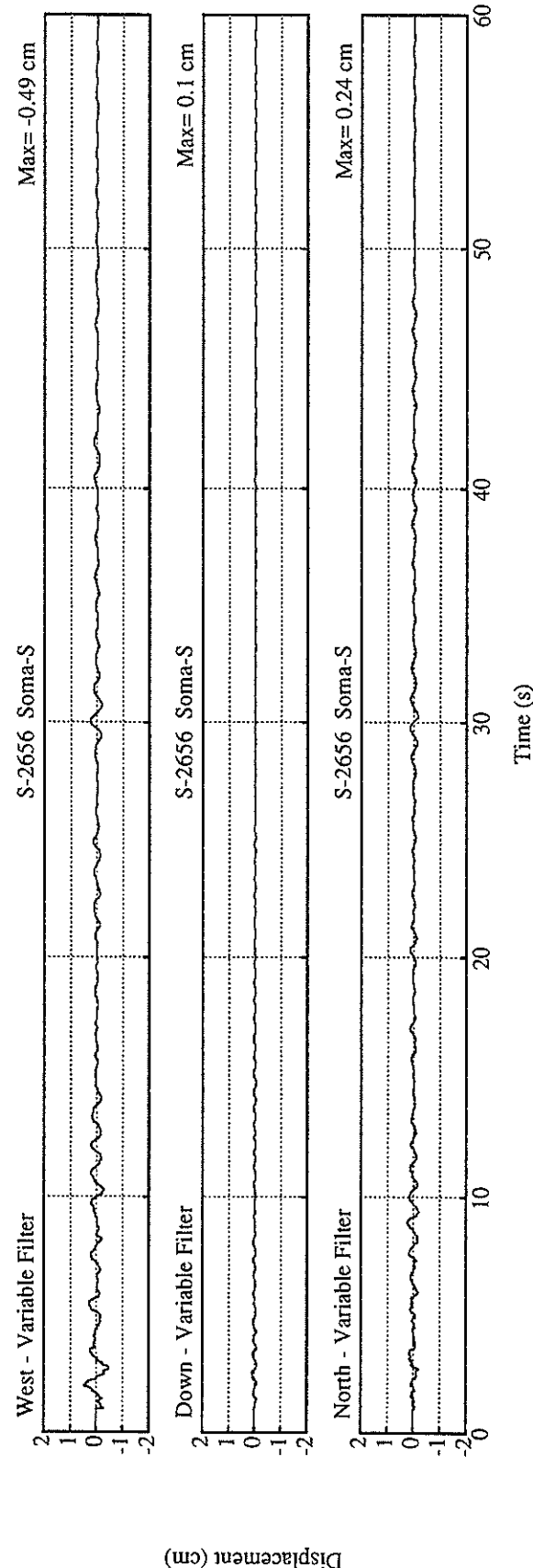
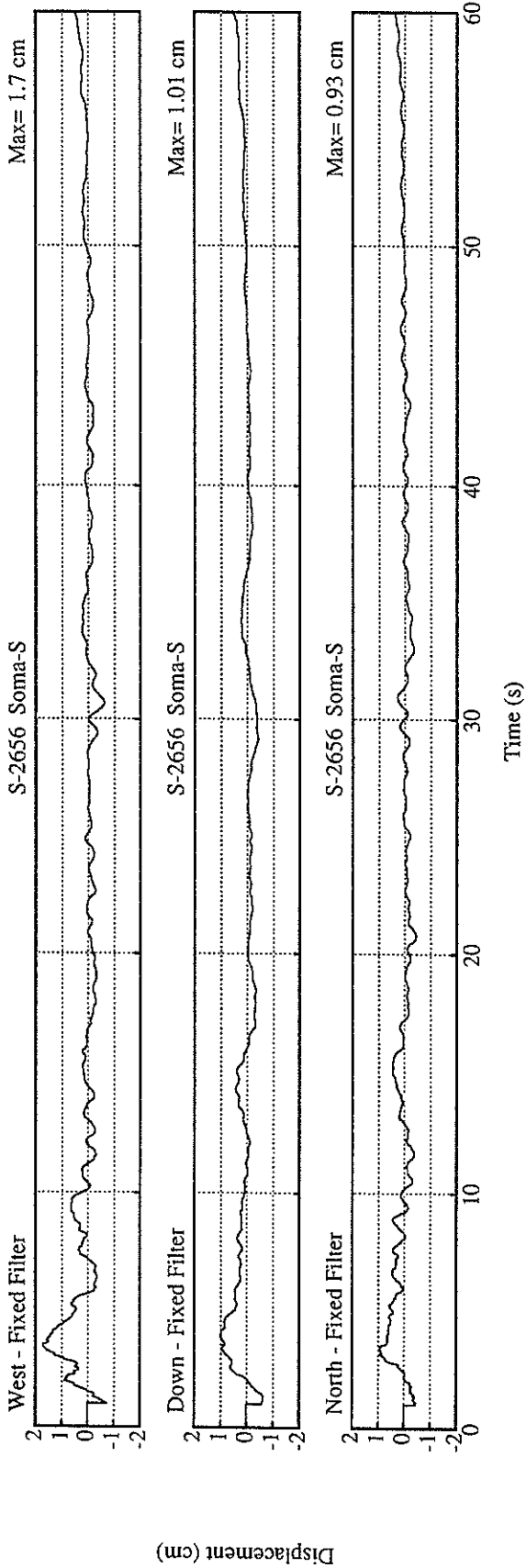
MAXIMUM DISPLACEMENT (CM)

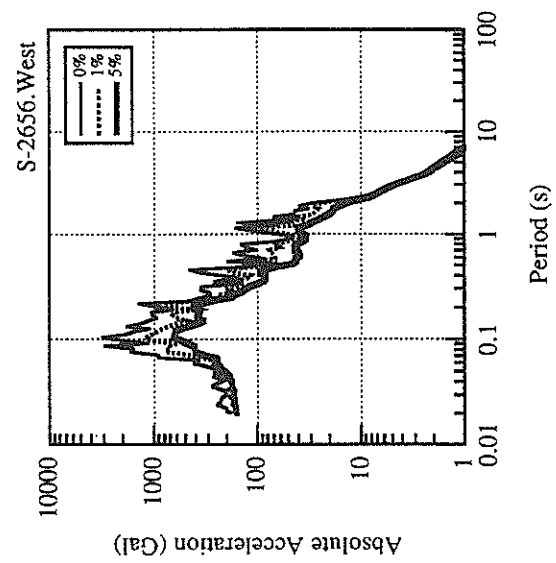
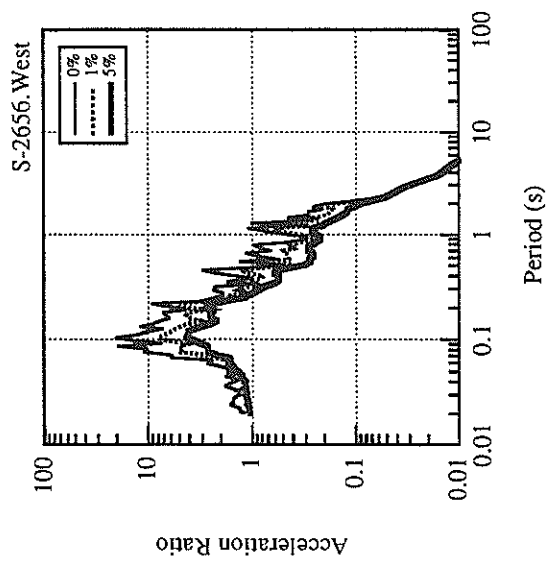
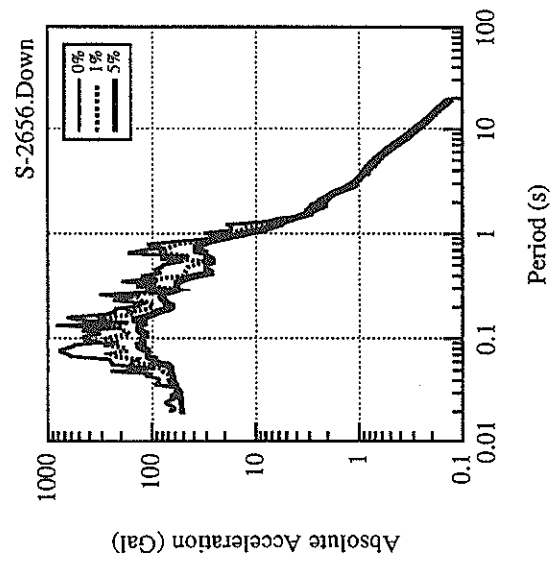
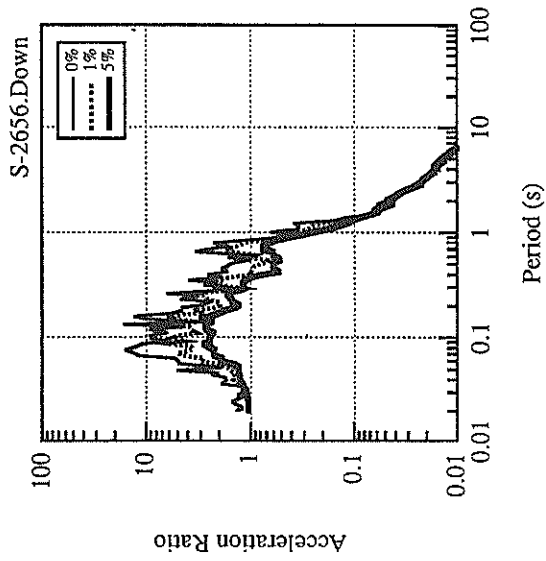
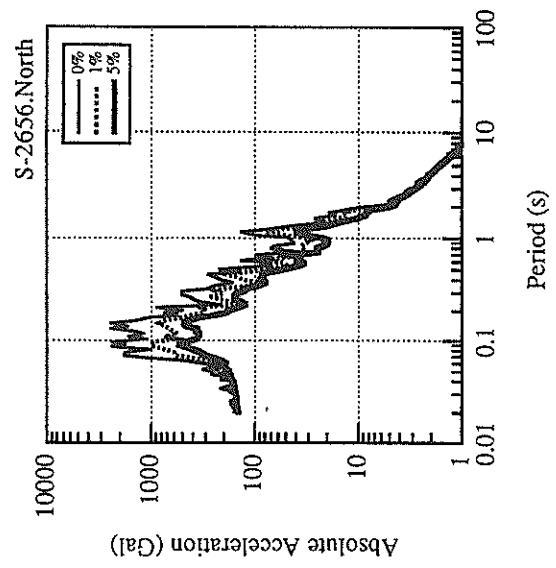
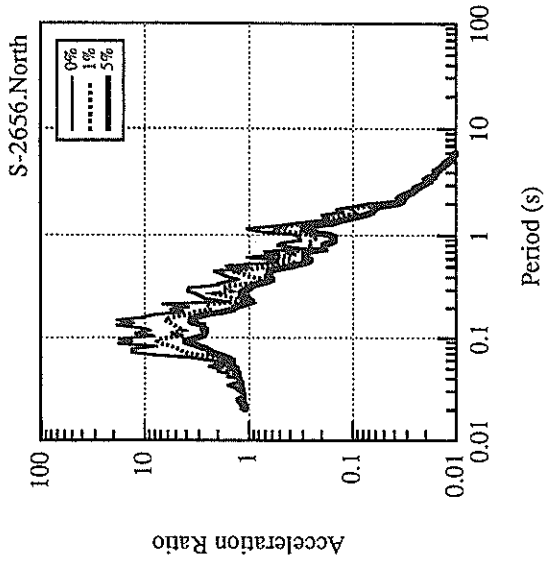
FIXED FILTER	0.93	1.70	1.01	1.94
VARIABLE FILTER	0.24	0.49	0.10	0.53

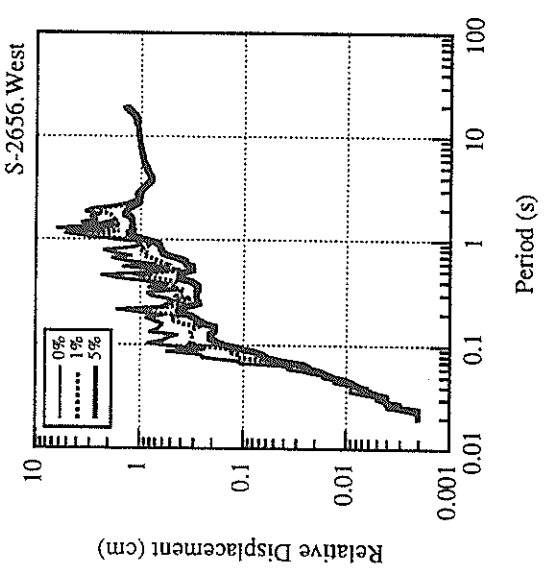
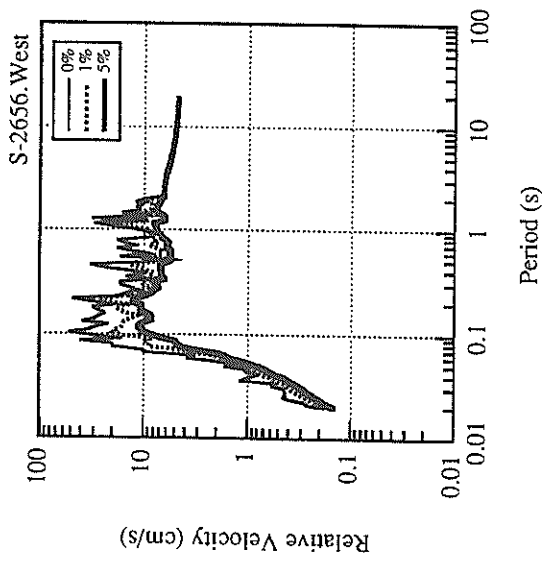
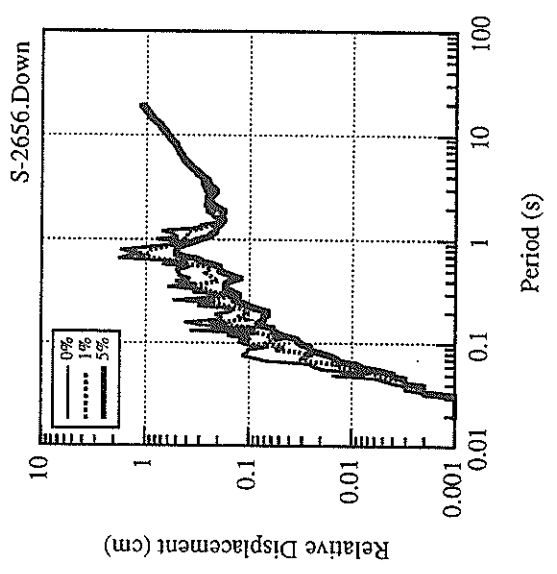
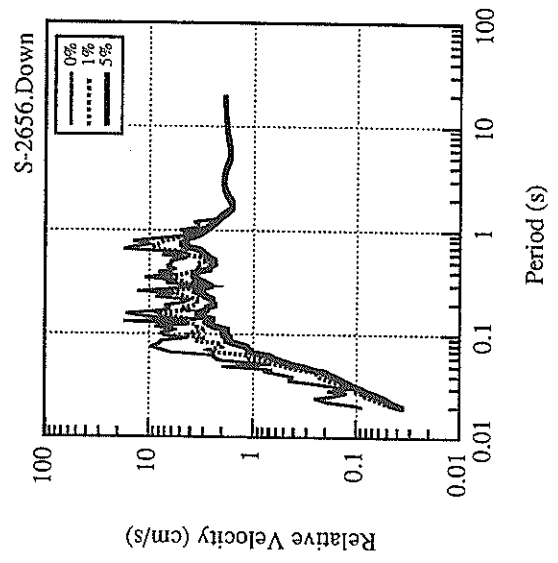
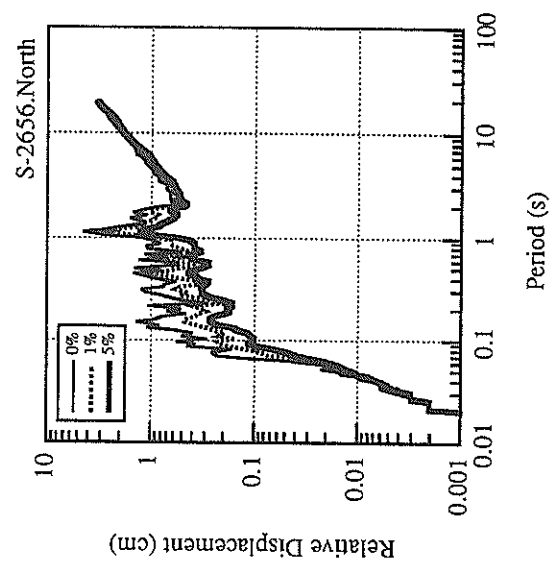
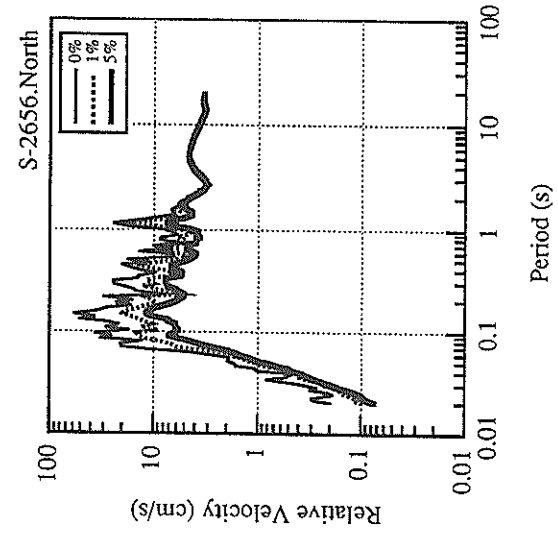
* RESULTANT OF HORIZONTAL COMPONENTS

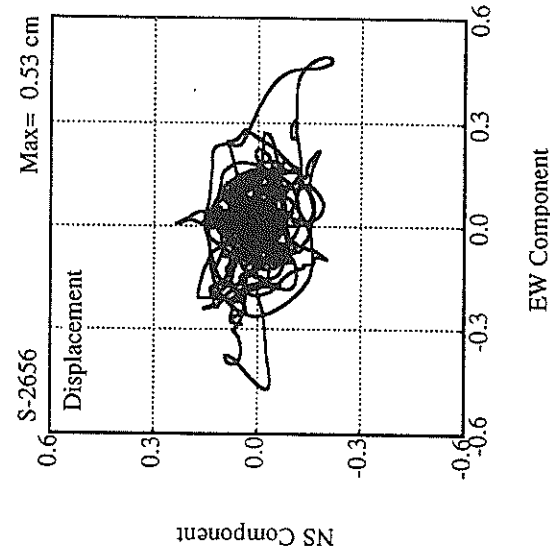
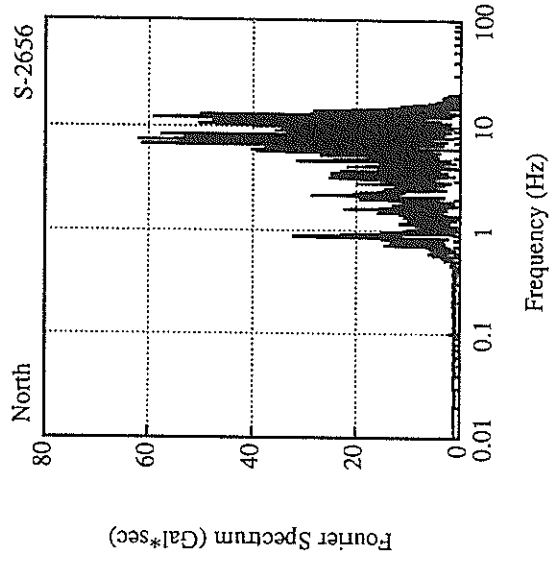
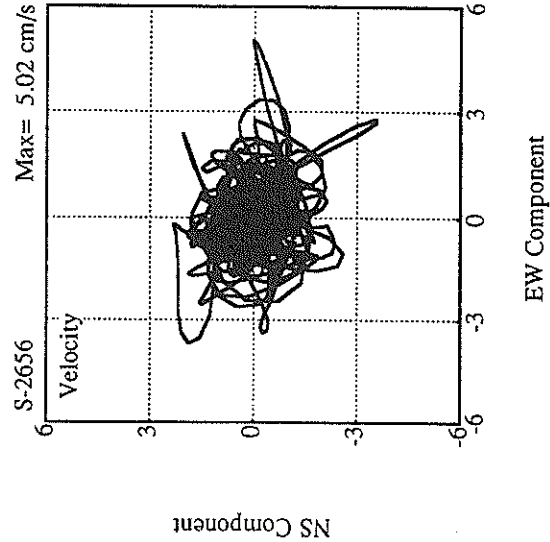
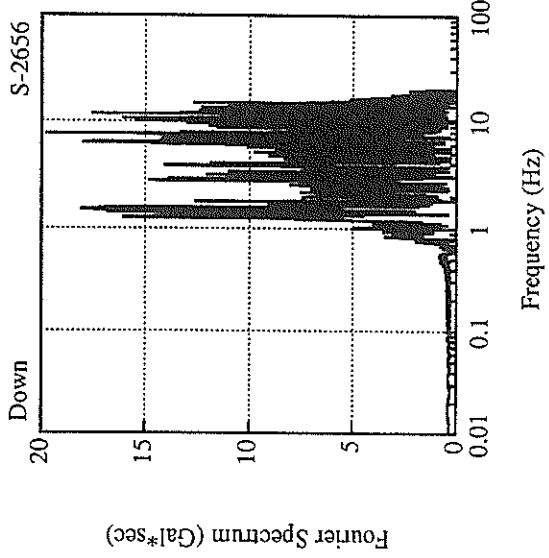
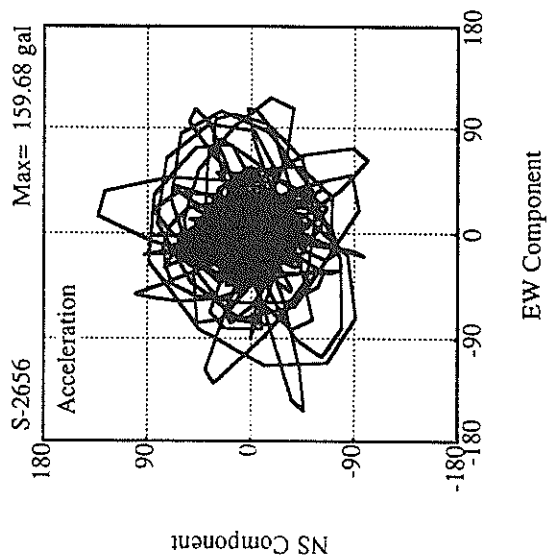
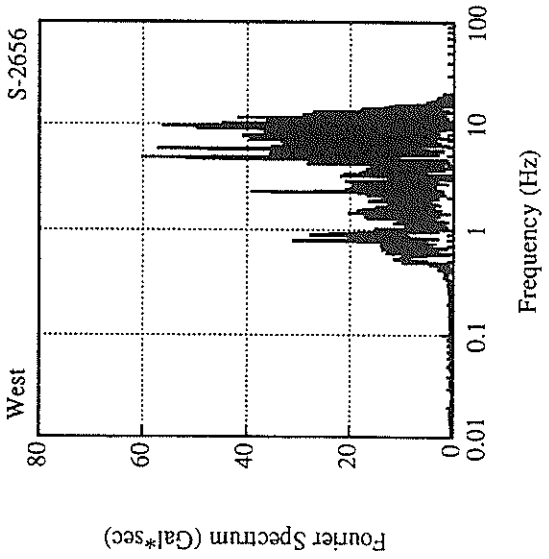












RECORD NUMBER : S-2653

STATION : TAGONOURA-S

EARTHQUAKE DATA

DATE AND TIME 23:35 MAR. 6, 1996
LOCATION OF HYPOCENTER
EPICENTRAL REGION EASTERN YAMANASHI PREF
LATITUDE 35° 28.4' N
LONGITUDE 138° 57.0' E
DEPTH 19.6KM
JMA MAGNITUDE 5.3

PEAK VALUES OF COMPONENTS

N S E W U D HORIZONTAL*

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.244 0.293

MAXIMUM ACCELERATION (GAL)

ORIGINAL 82.0 113.9 114.4
CORRECTED 113.7 144.8 145.8

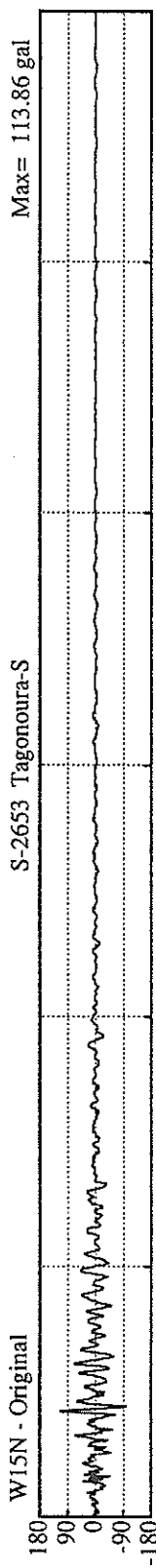
MAXIMUM VELOCITY (CM/SEC)

FIXED FILTER 7.96 7.30 8.87
VARIABLE FILTER 5.74 8.10 9.39

MAXIMUM DISPLACEMENT (CM)

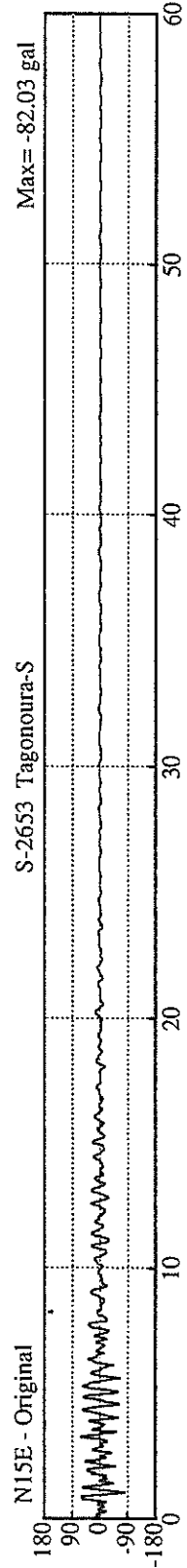
FIXED FILTER 2.943 2.207 3.455
VARIABLE FILTER 1.523 0.928 1.665

* RESULTANT OF HORIZONTAL COMPONENTS

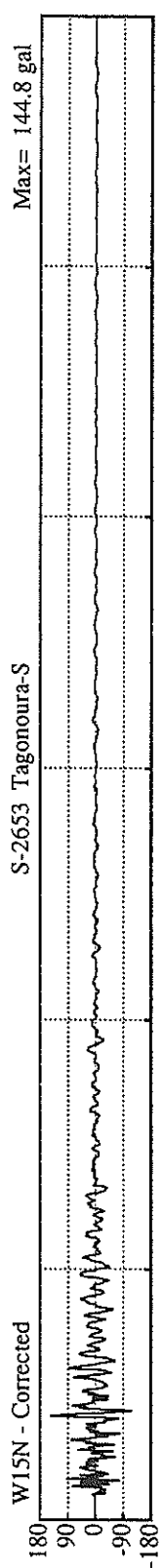


Acceleration (gal)

UP-DOWN component shows abnormal response.

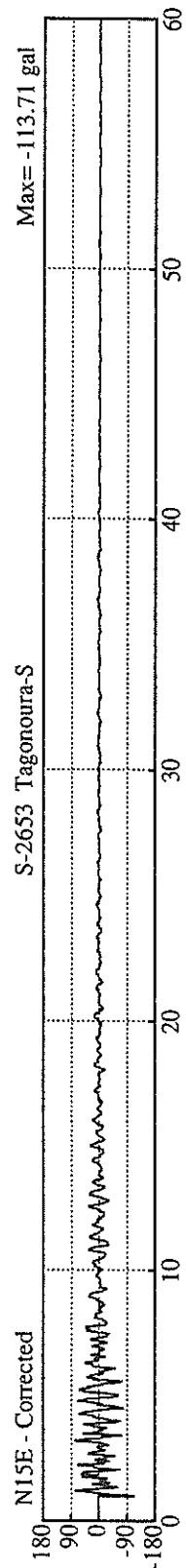


Time (s)

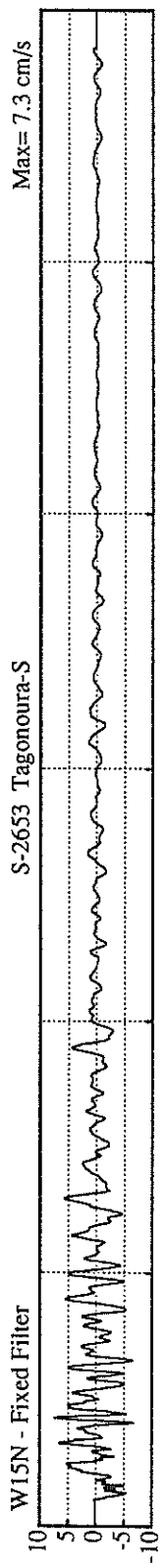


Acceleration (gal)

UP-DOWN component shows abnormal response.

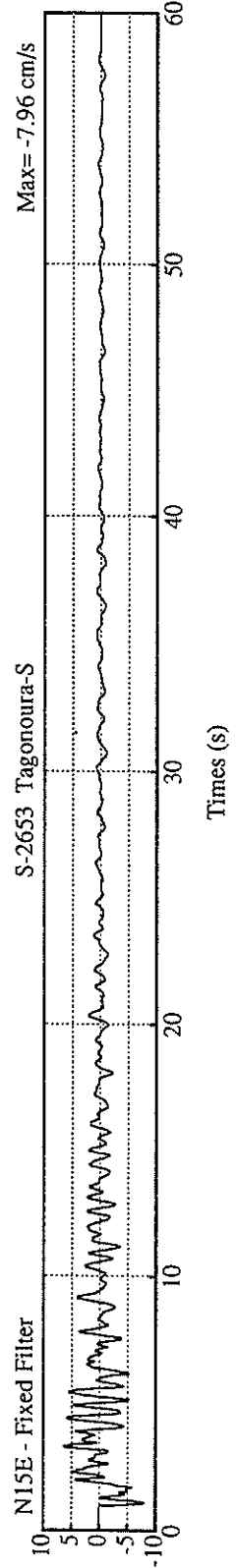


Time (s)

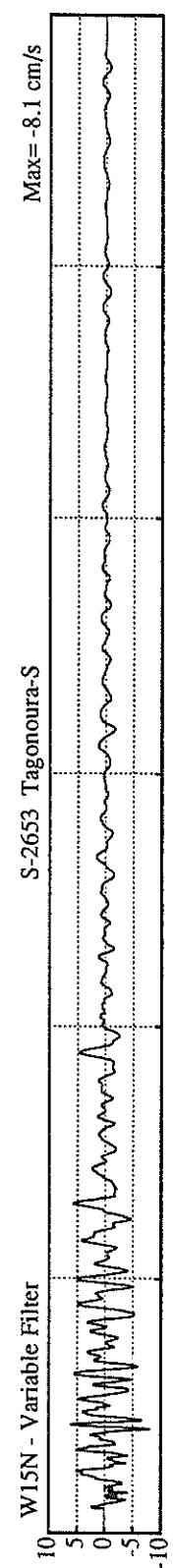


Velocity (cm/s)

UP-DOWN component shows abnormal response.

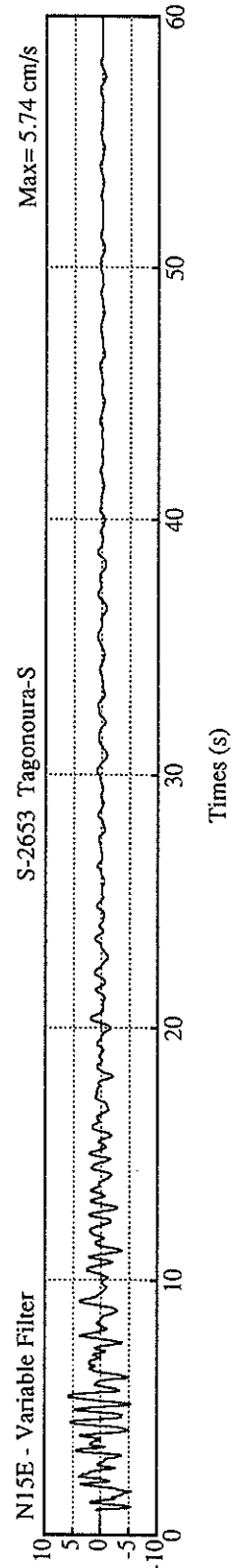


Times (s)

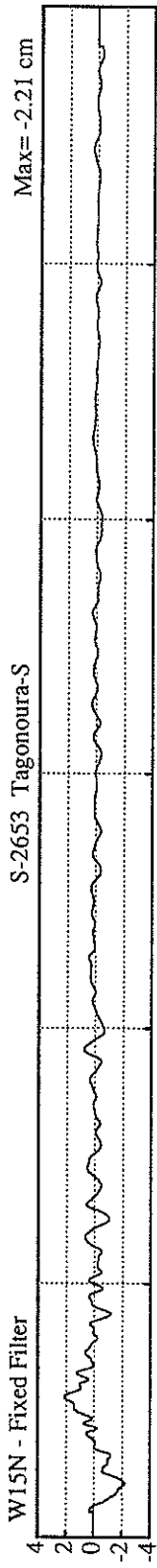


Velocity (cm/s)

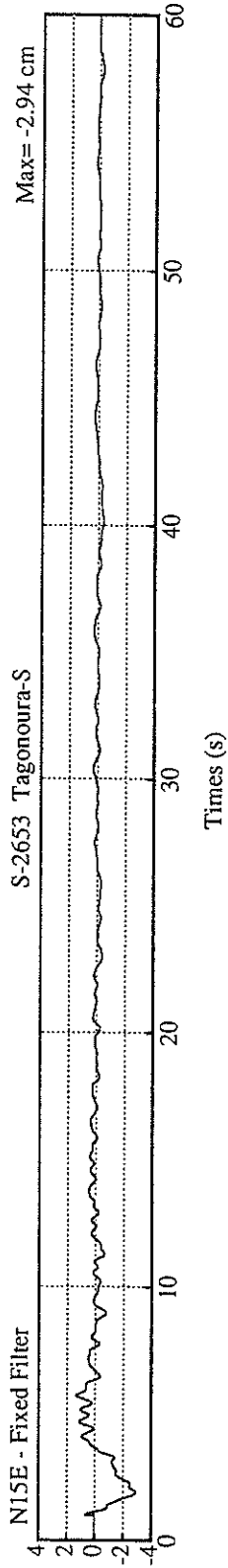
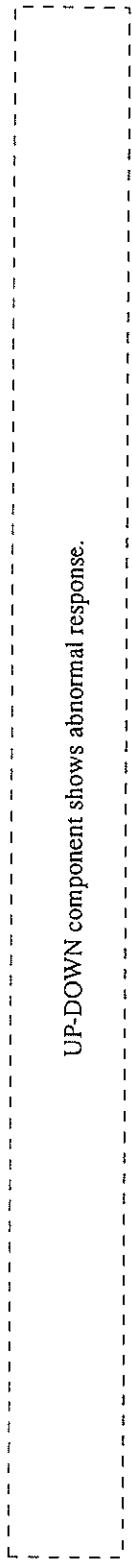
UP-DOWN component shows abnormal response.



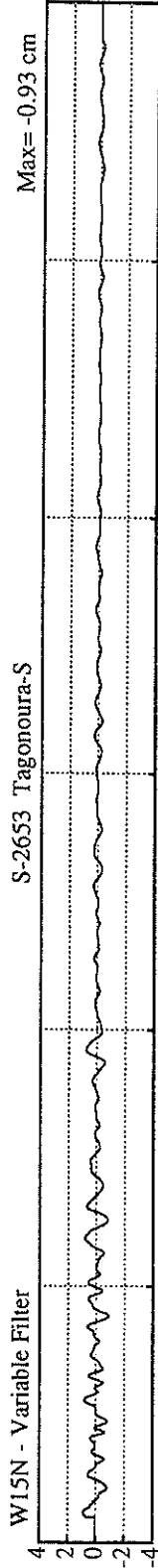
Times (s)



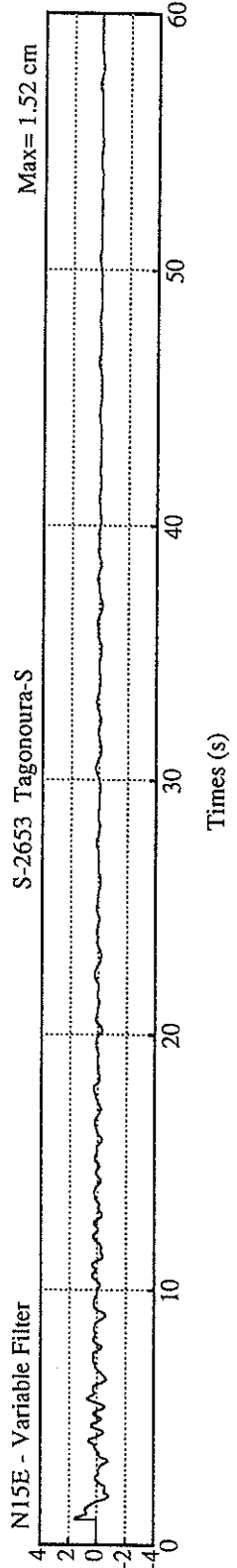
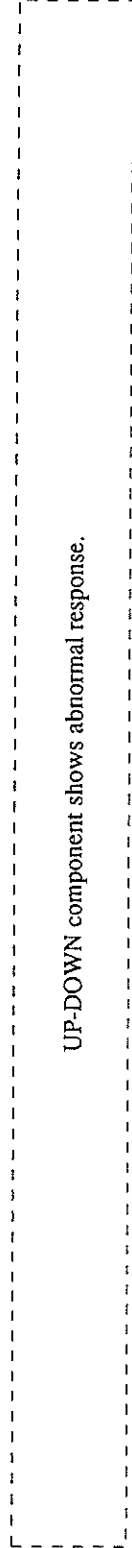
Displacement (cm)



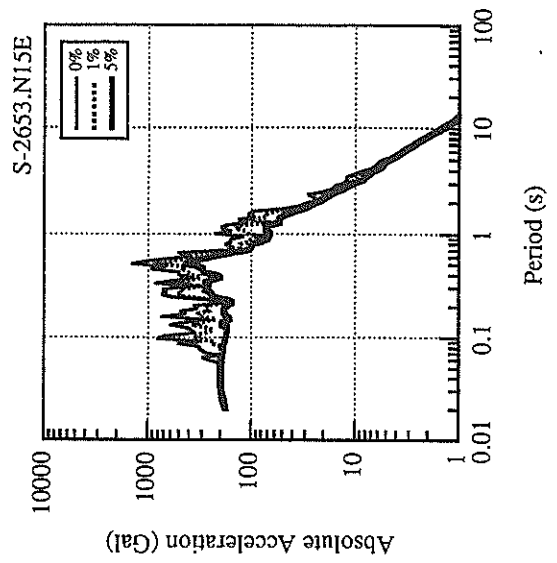
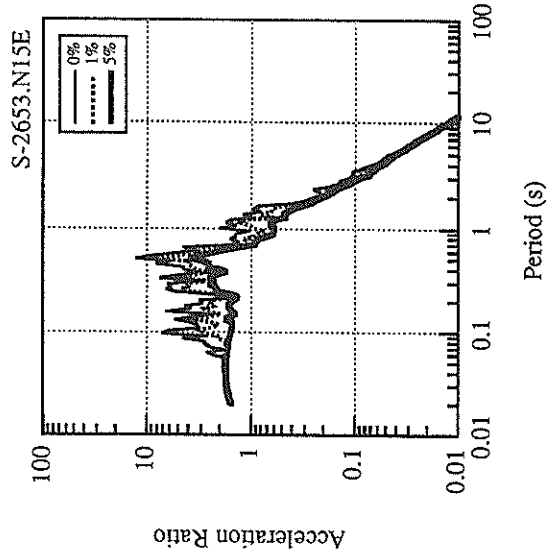
Times (s)



Displacement (cm)

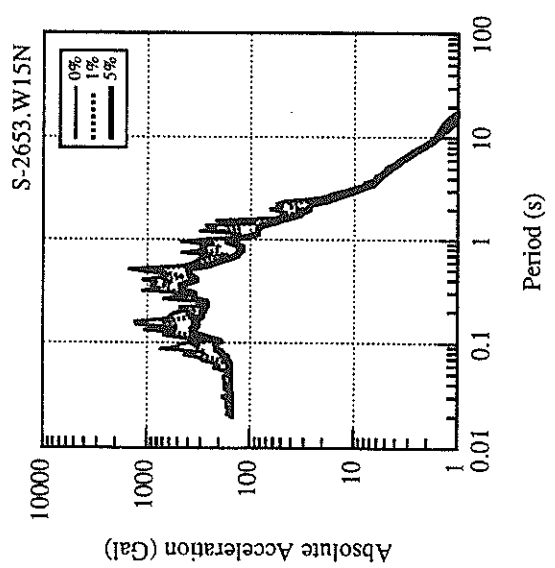
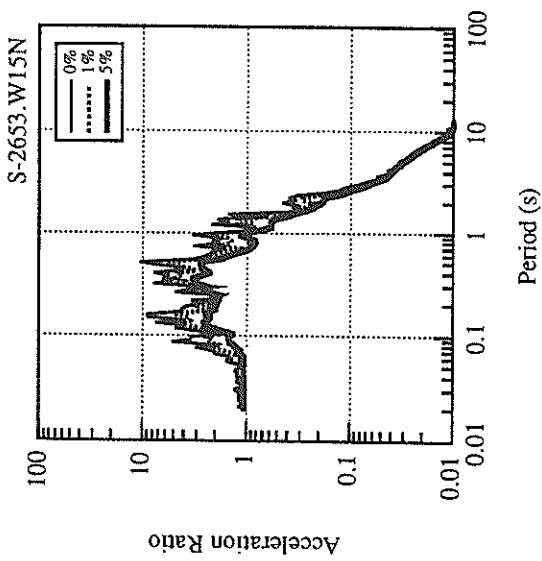


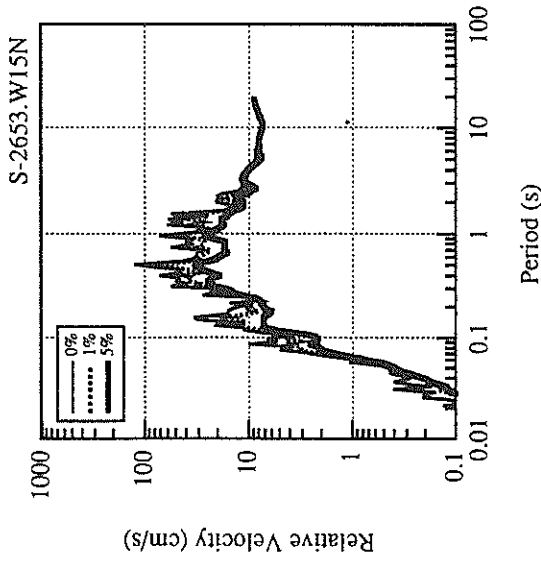
Times (s)



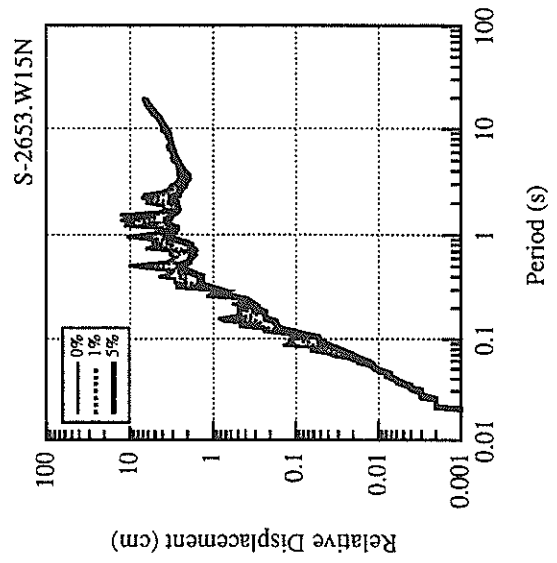
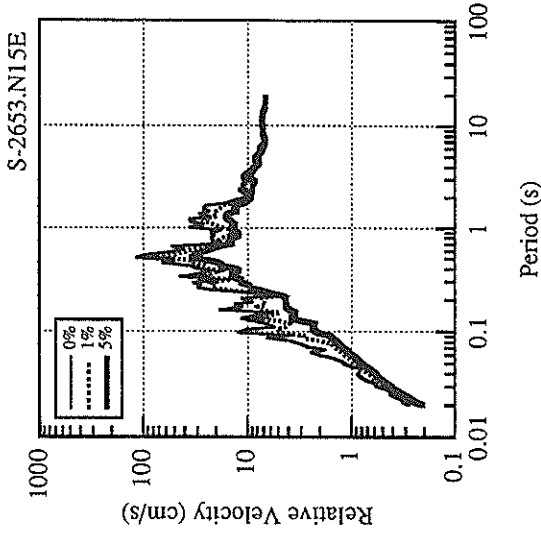
UP-DOWN component shows
abnormal response.

UP-DOWN component shows
abnormal response.

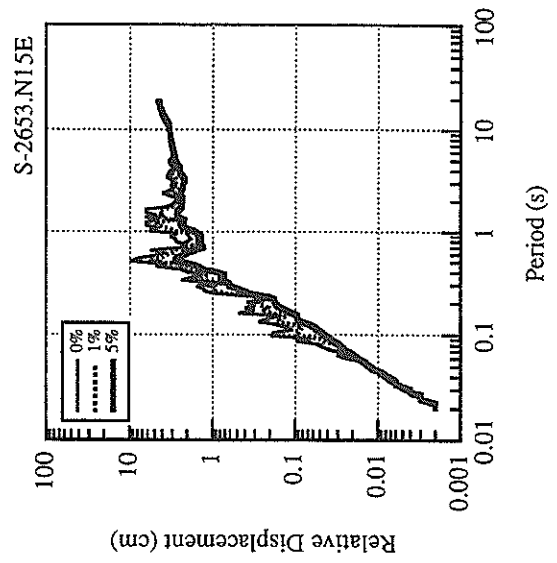


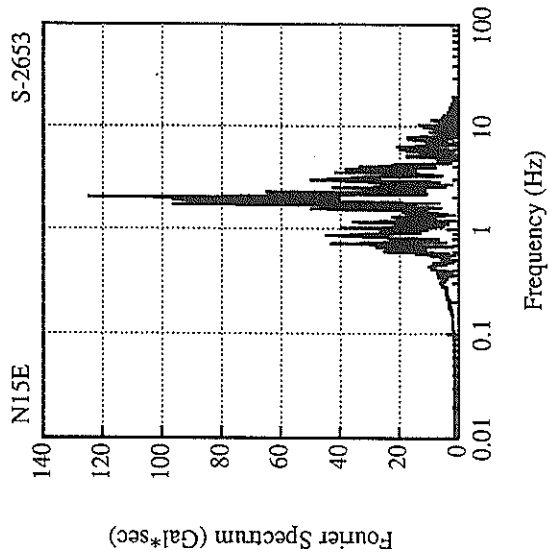
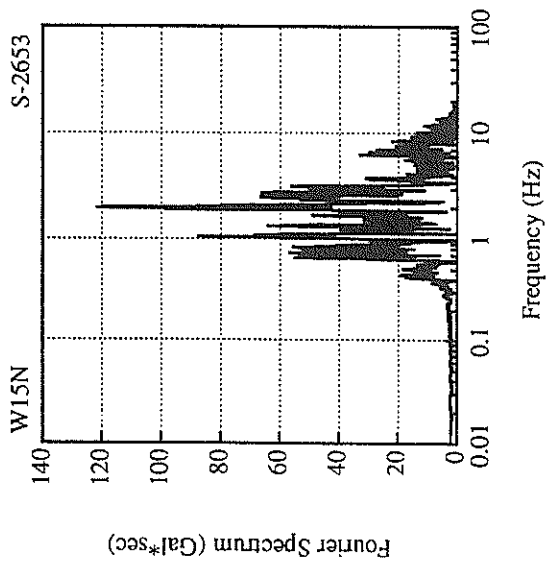


UP-DOWN component shows
abnormal response.

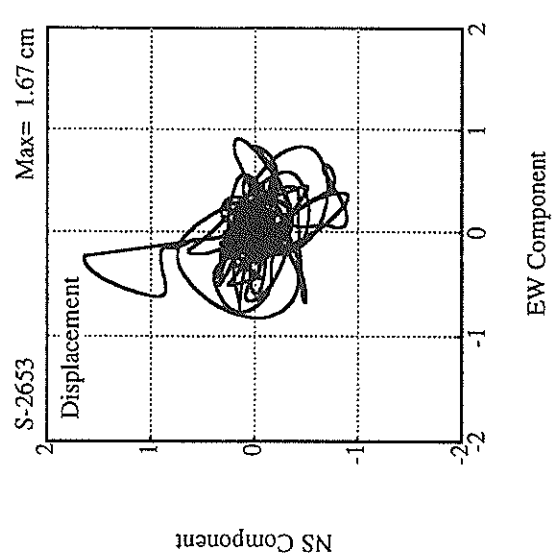
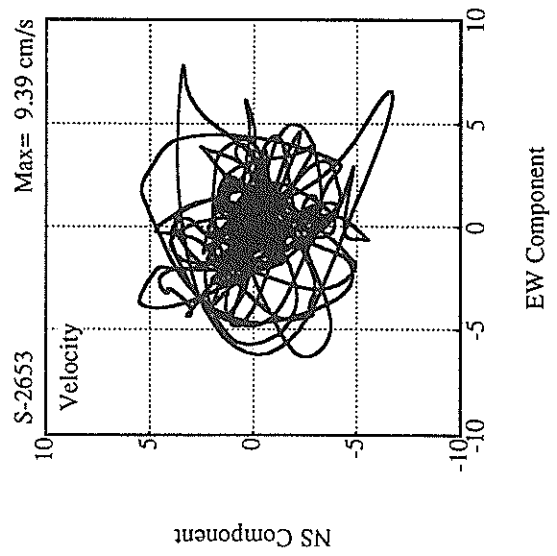
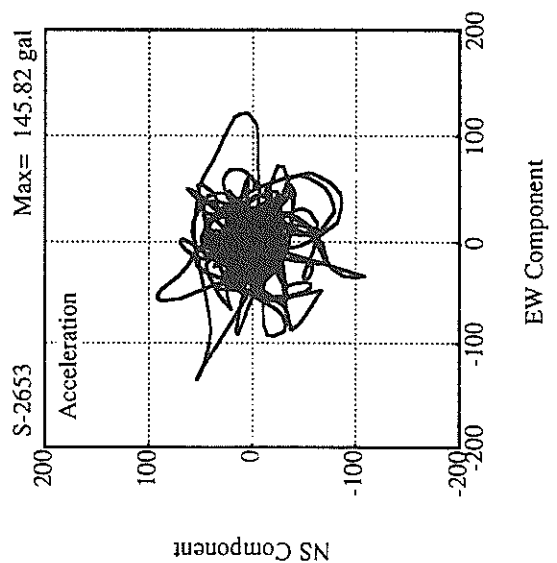


UP-DOWN component shows
abnormal response.





UP-DOWN component shows abnormal response.



RECORD NUMBER : S-2662

STATION : SHIMIZU-KOJYO-S

EARTHQUAKE DATA

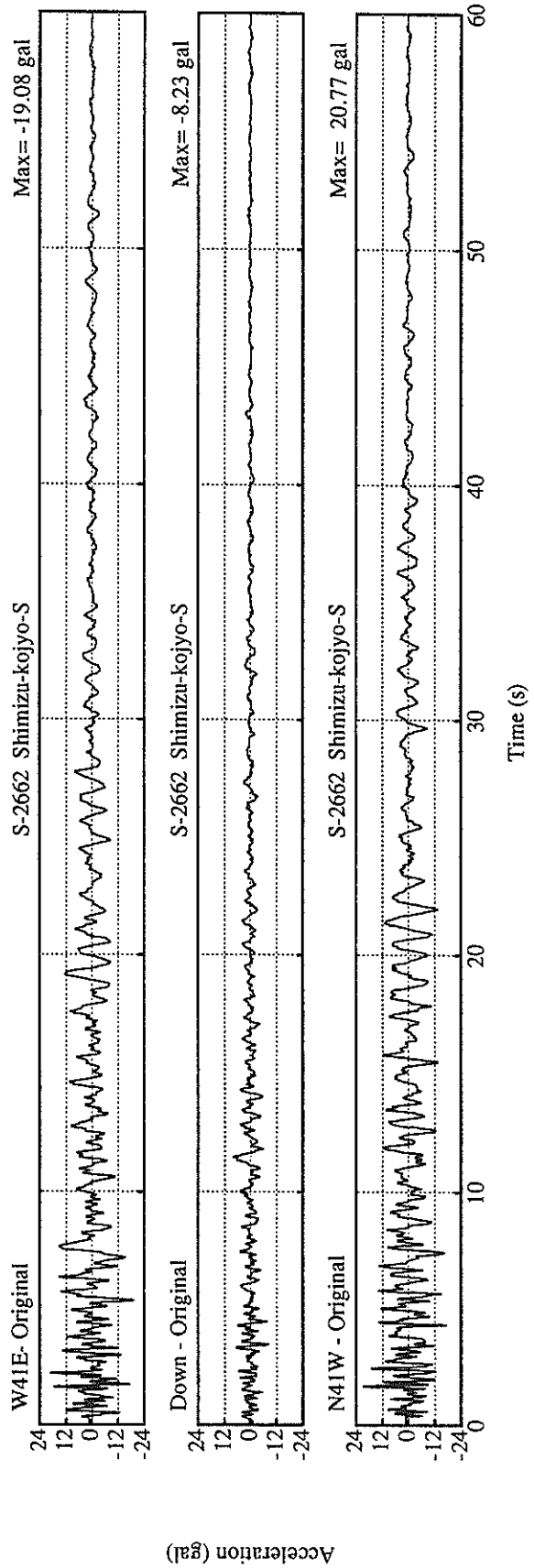
 DATE AND TIME 23:35 MAR. 6, 1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION EASTERN YAMANASHI PREF
 LATITUDE 35° 28.4' N
 LONGITUDE 138° 57.0' E
 DEPTH 19.6KM
 JMA MAGNITUDE 5.3

PEAK VALUES OF COMPONENTS

 N S E W U D HORIZONTAL*

 ORIGINAL ACCELERATION (GAL) 20.8 19.1 8.2 24.3

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-1032

STATION : YAMASHITA-F

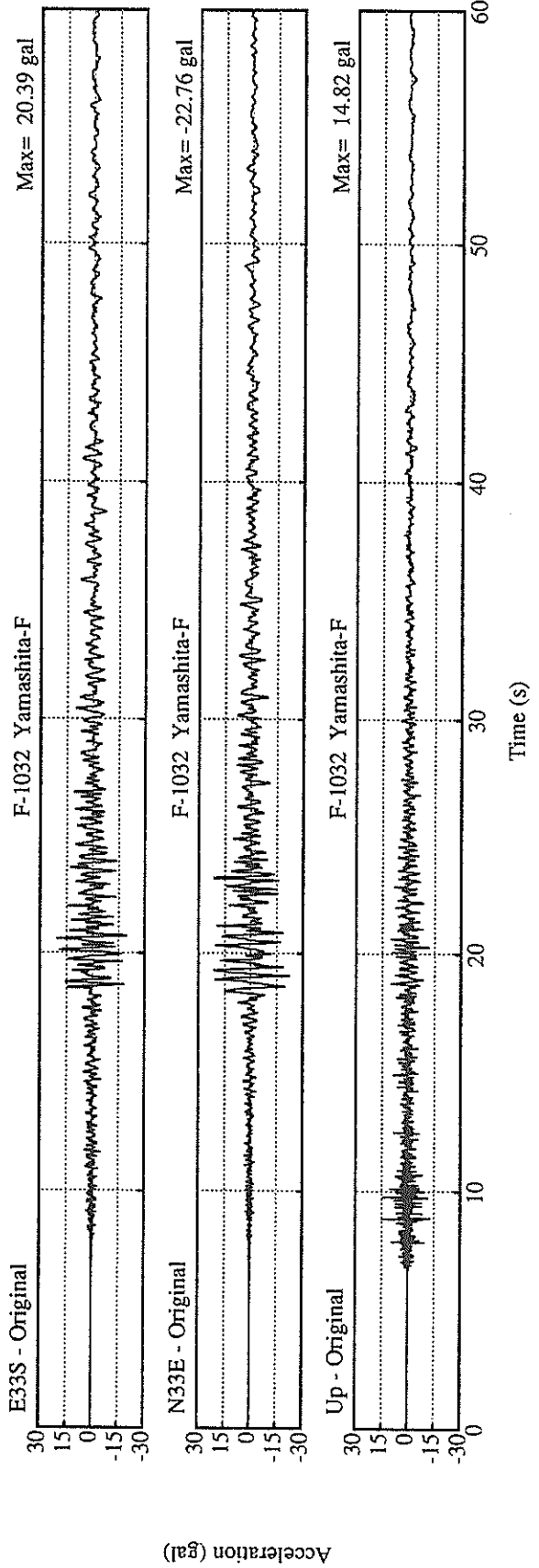
EARTHQUAKE DATA

 DATE AND TIME 23:35 MAR. 6,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION EASTERN YAMANASHI PREF
 LATITUDE 35°28.4' N
 LONGITUDE 138°57.0' E
 DEPTH 19.6KM
 JMA MAGNITUDE 5.3

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	22.8	20.4	14.8	24.5

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-1029

STATION : WAKAYAMA-G

EARTHQUAKE DATA

 DATE AND TIME 8:18 MAR. 9,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34°12.2' N
 LONGITUDE 135°10.2' E
 DEPTH 10.3KM
 JMA MAGNITUDE 3.4

 PEAK VALUES OF COMPONENTS

 N S E W U D HORIZONTAL*

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.933 0.897 1.147

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	15.6	51.7	23.8	52.1
ORIGINAL	38.2	108.8	64.0	109.8
CORRECTED	38.7	102.3	62.8	104.3

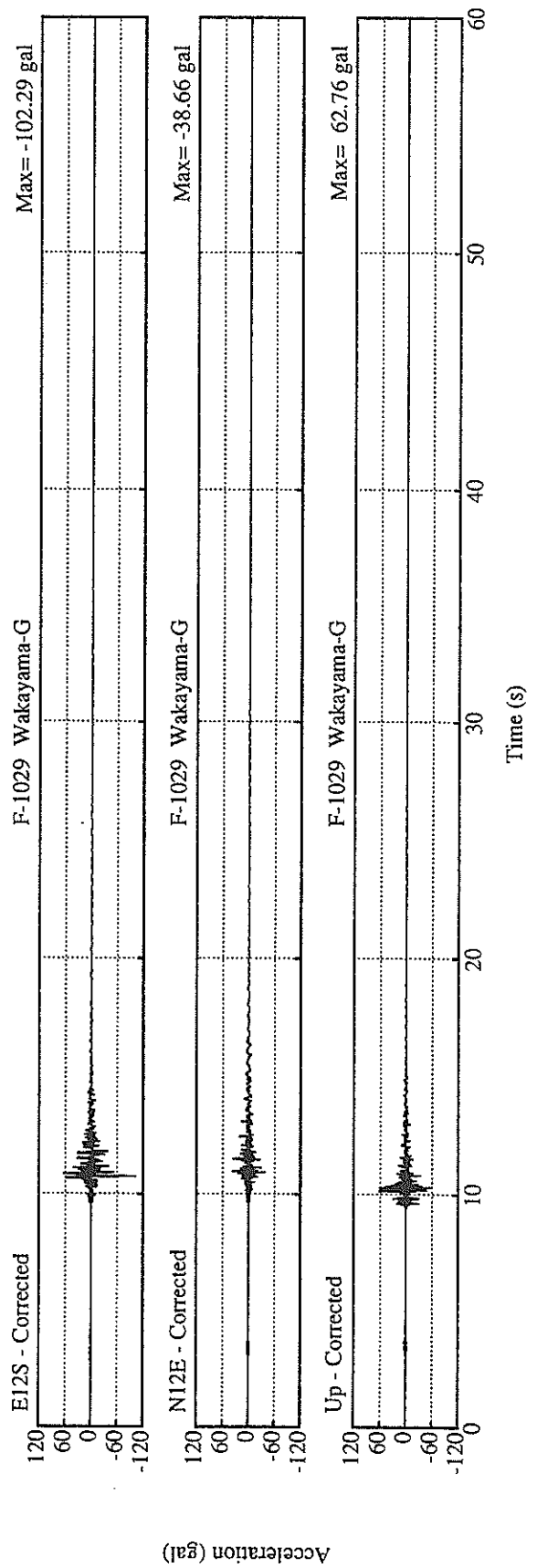
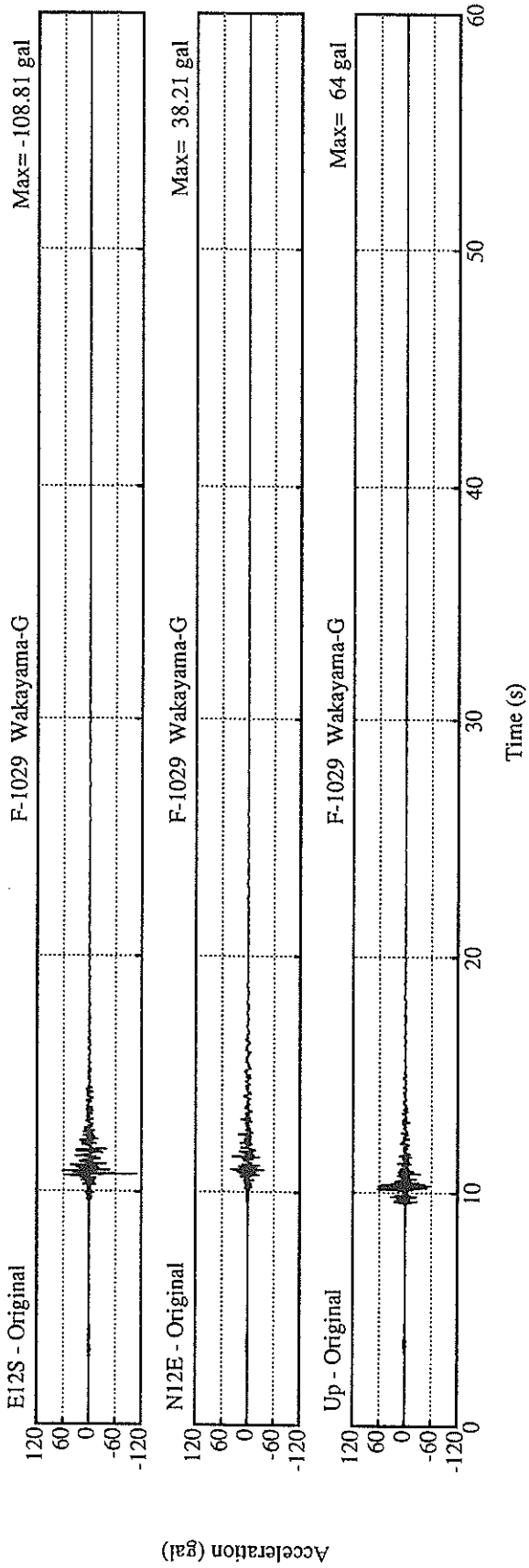
MAXIMUM VELOCITY (CM/SEC)

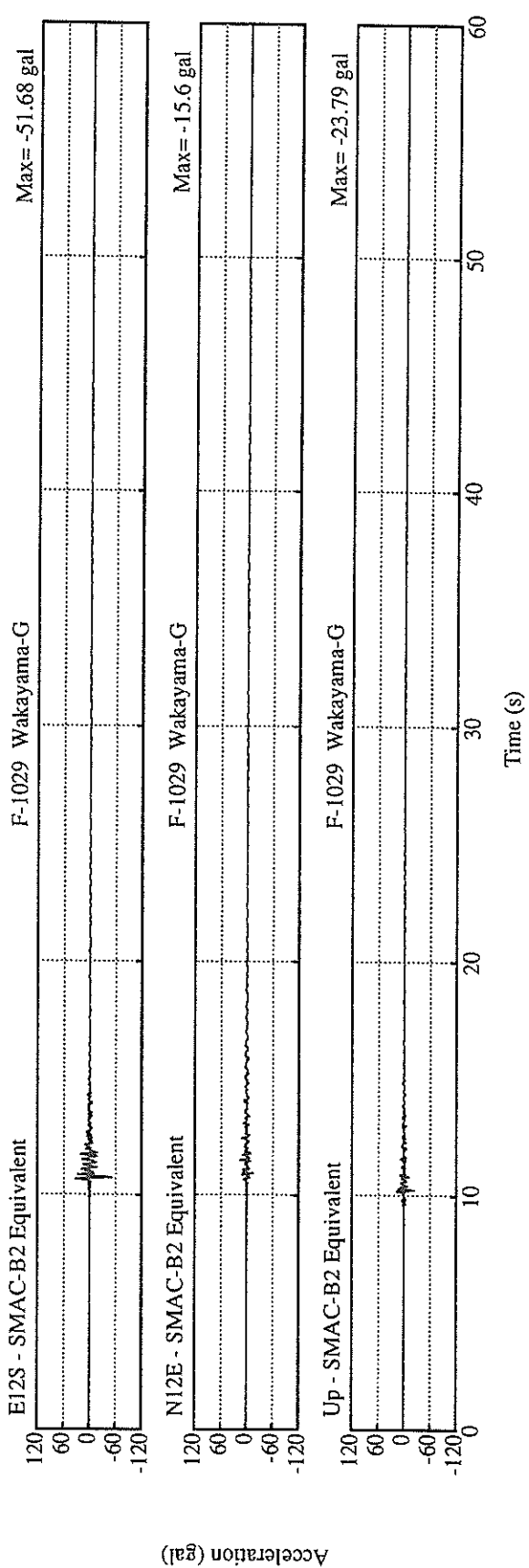
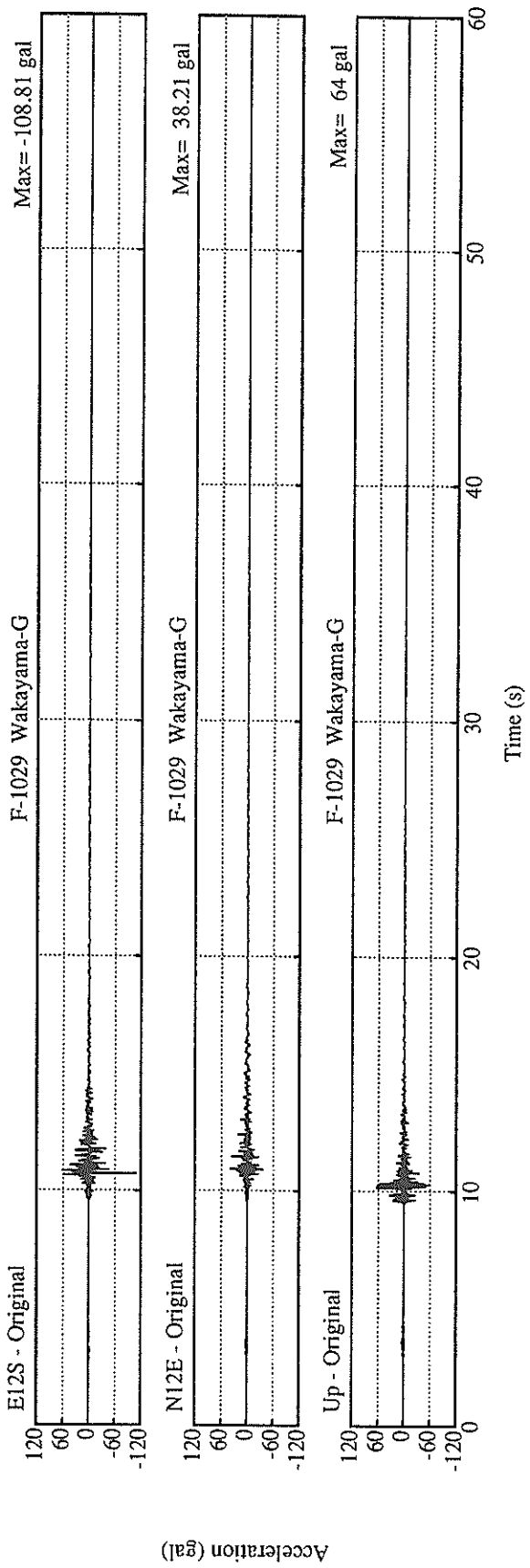
FIXED FILTER	0.76	2.45	1.17	2.48
VARIABLE FILTER	0.76	2.46	1.15	2.49

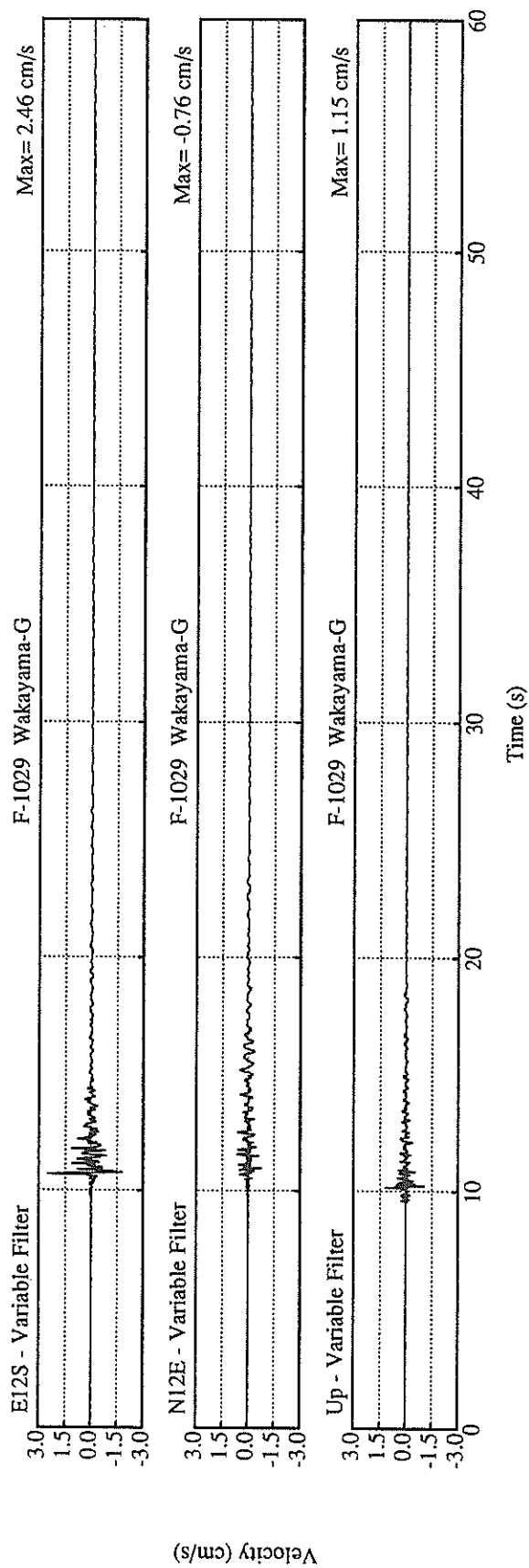
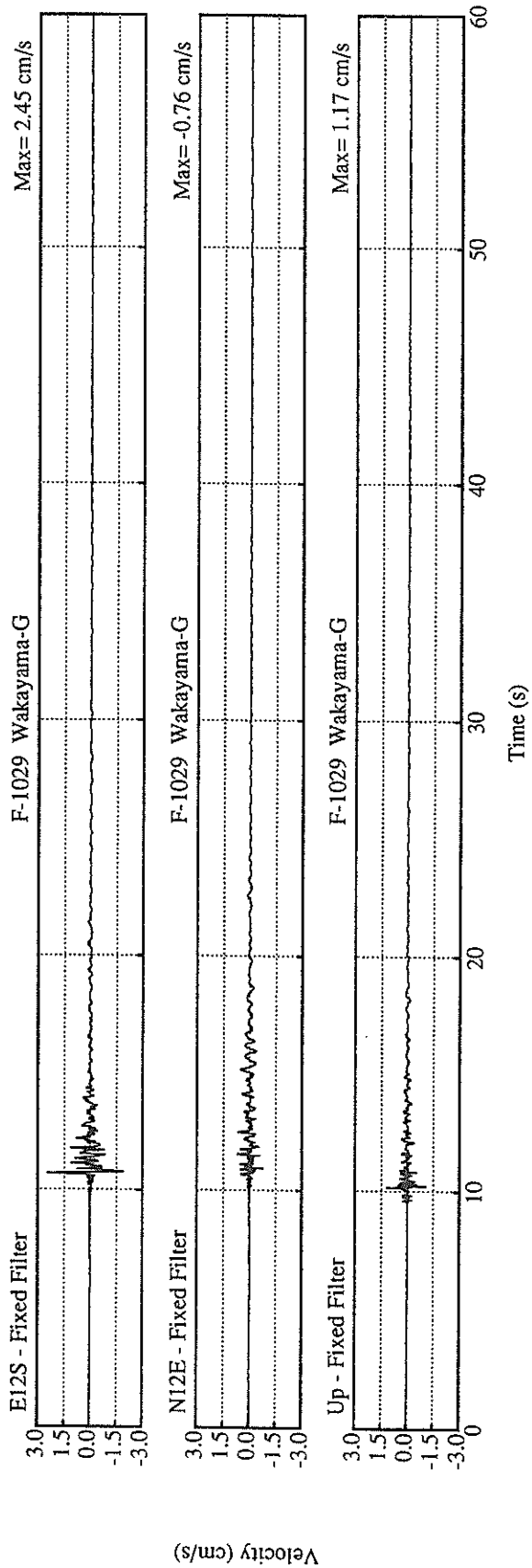
MAXIMUM DISPLACEMENT (CM)

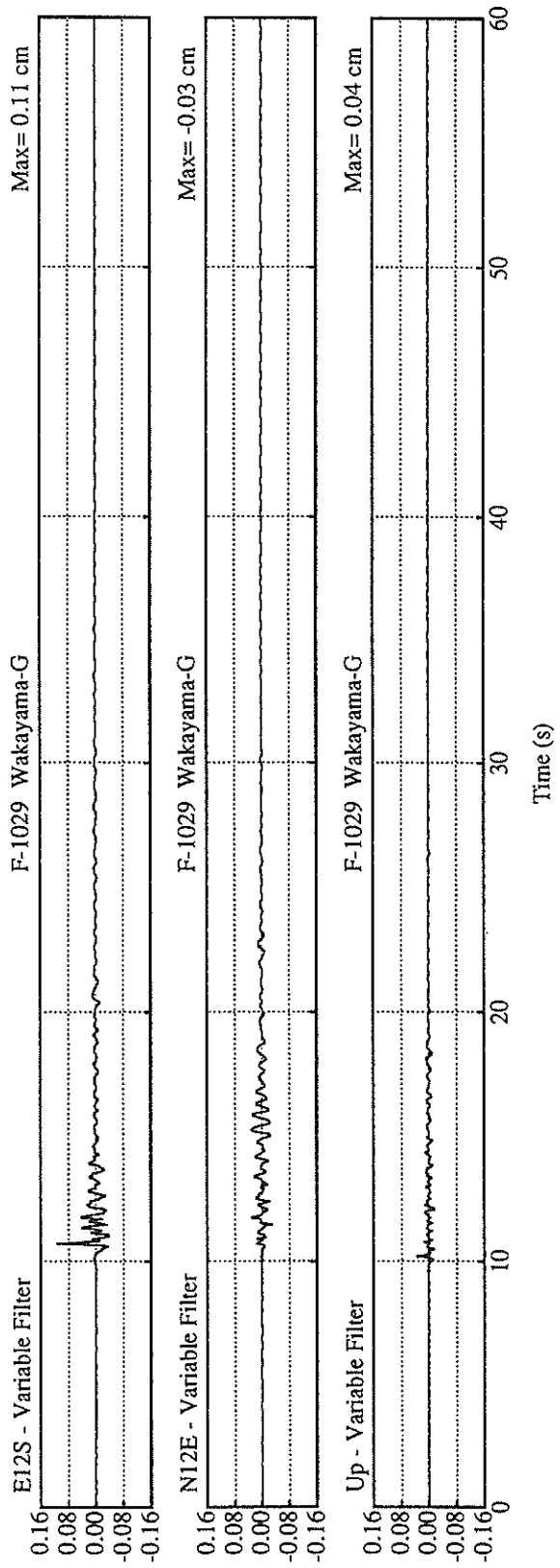
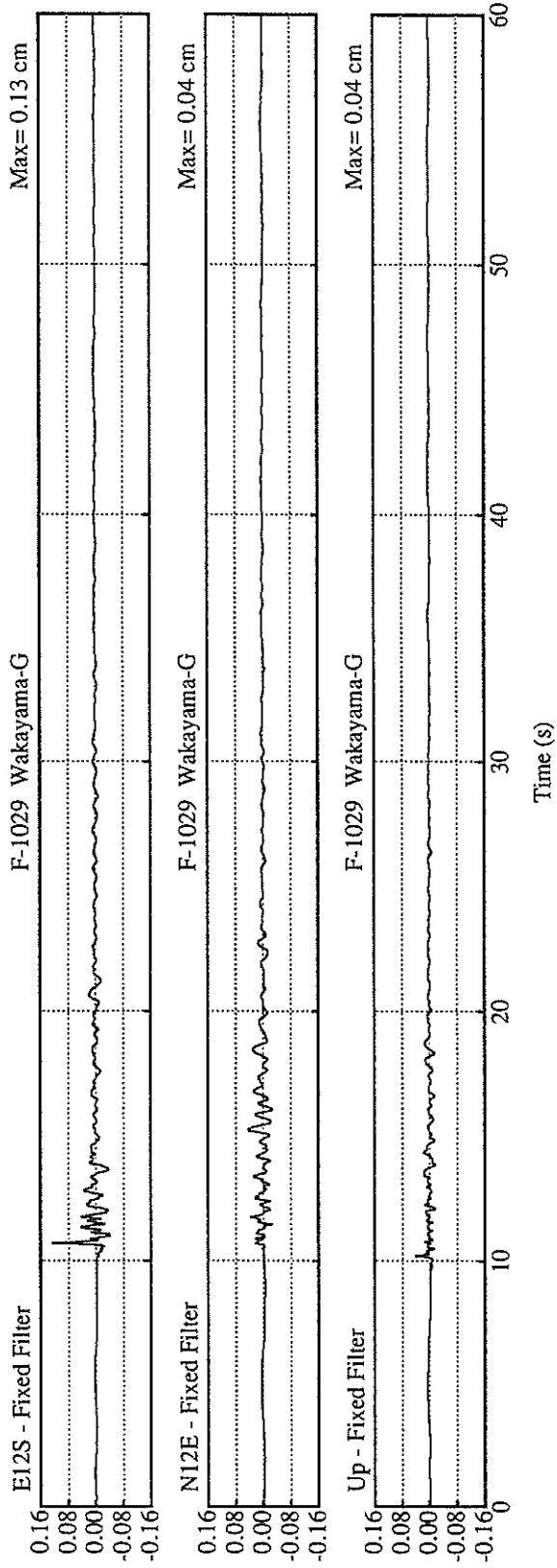
FIXED FILTER	0.04	0.13	0.04	0.13
VARIABLE FILTER	0.03	0.11	0.04	0.11

* RESULTANT OF HORIZONTAL COMPONENTS



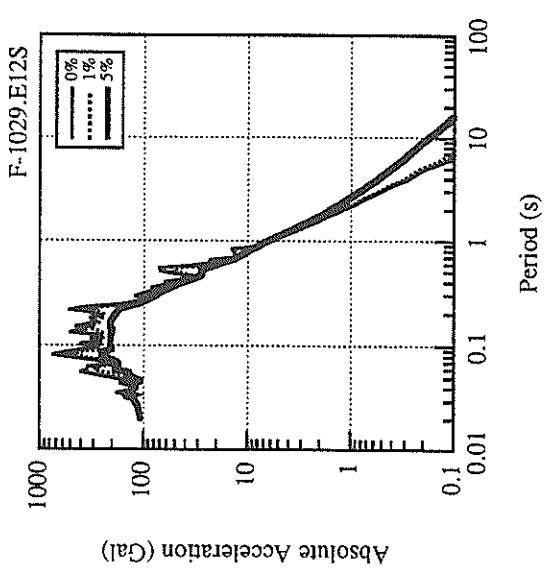
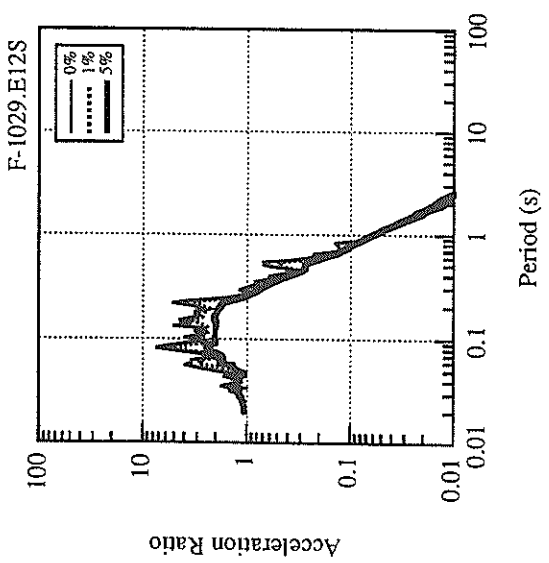
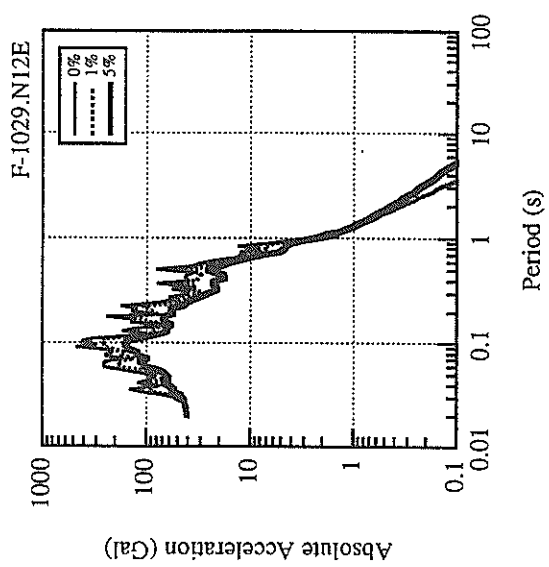
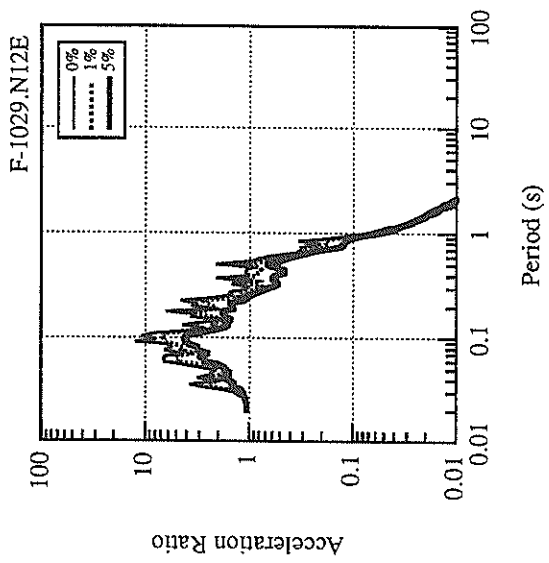
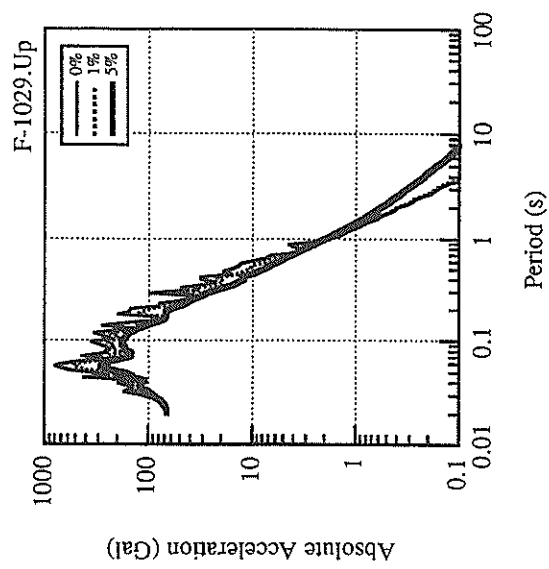
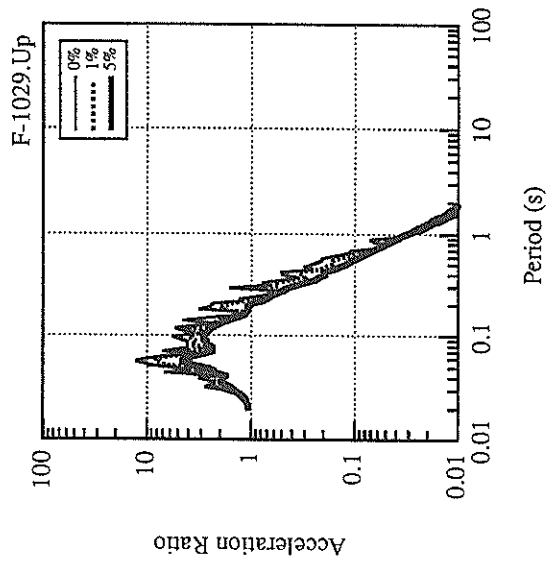


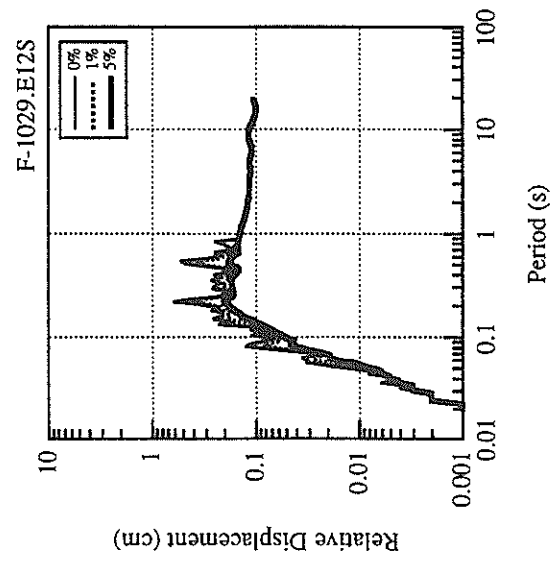
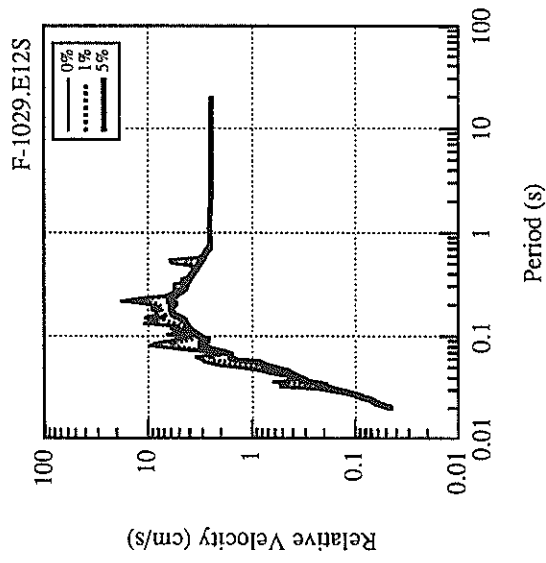
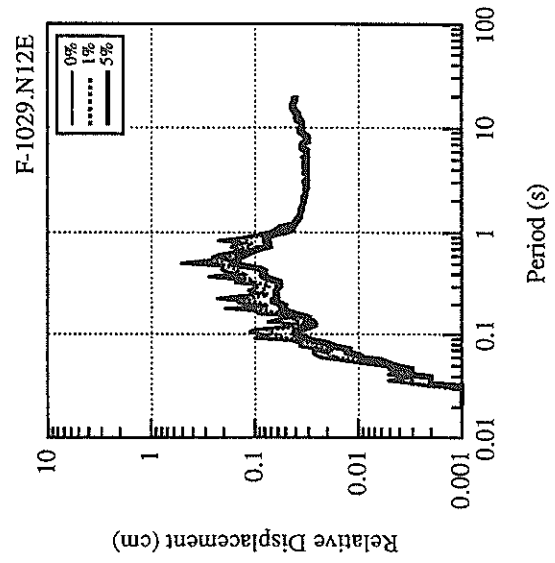
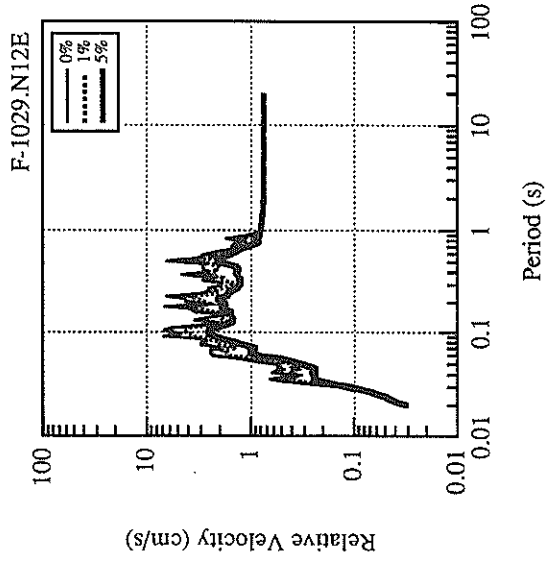
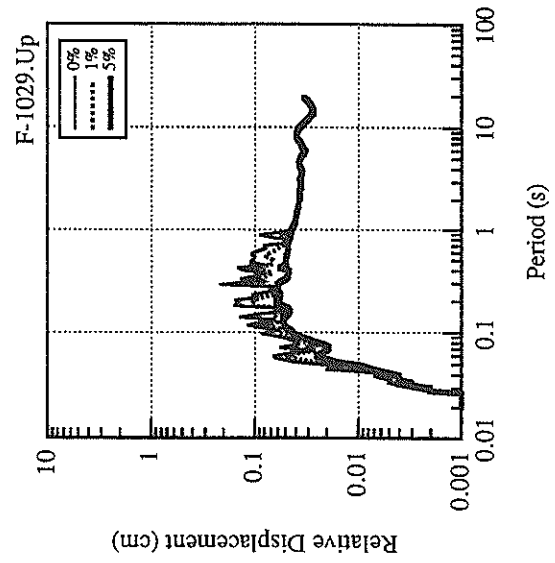
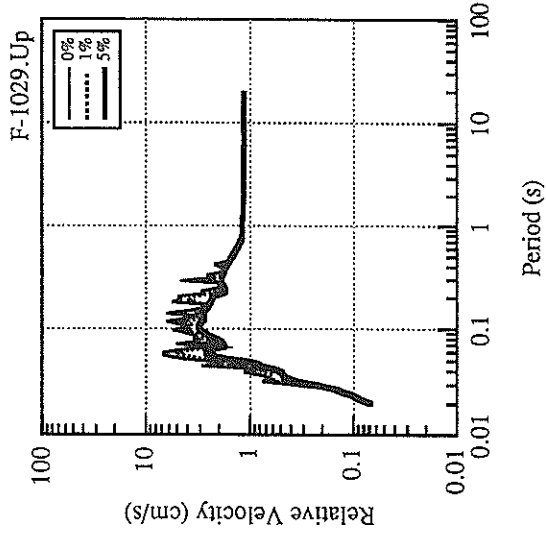


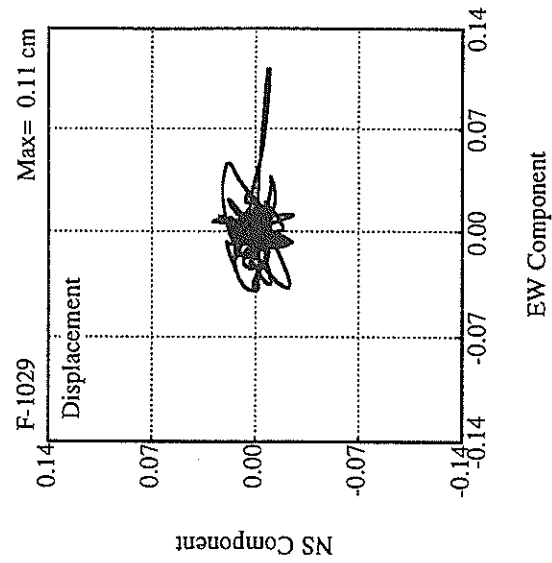
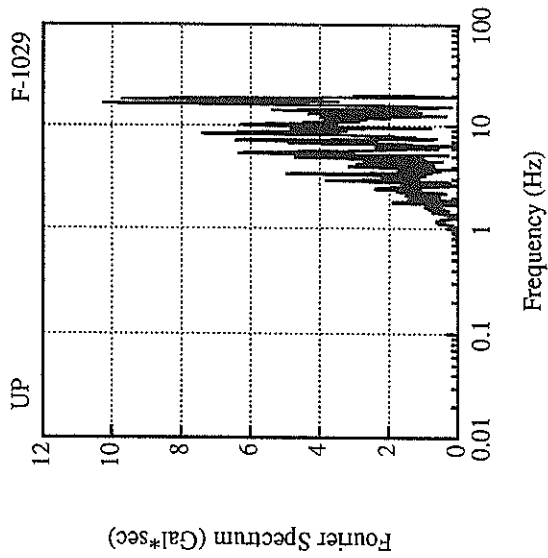
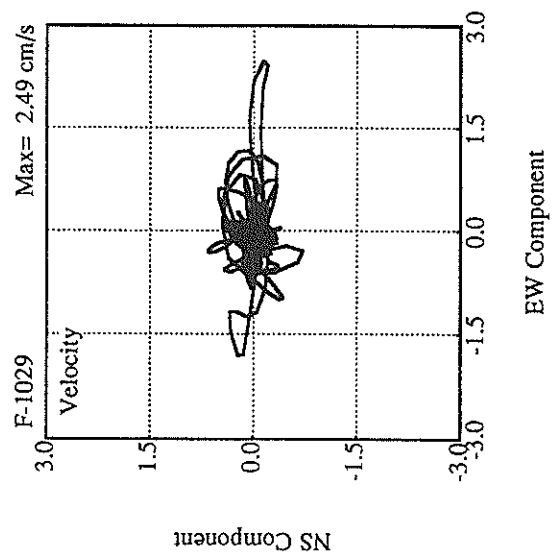
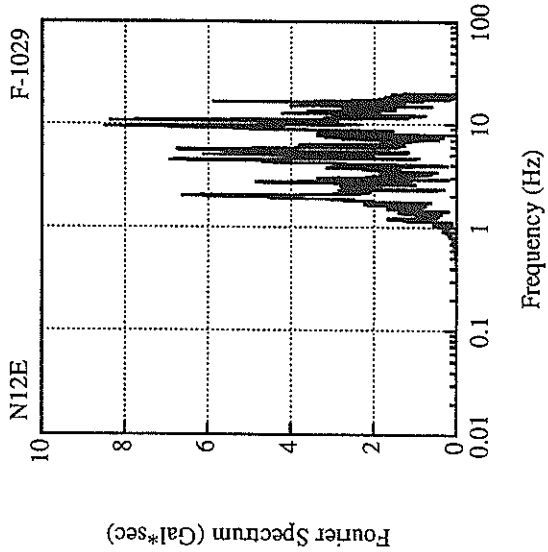
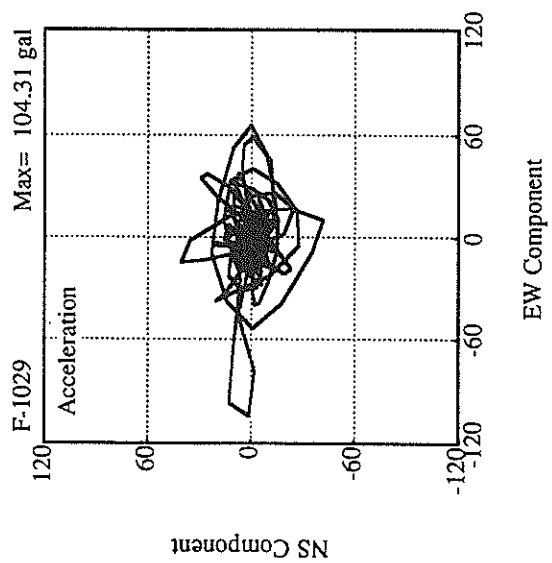
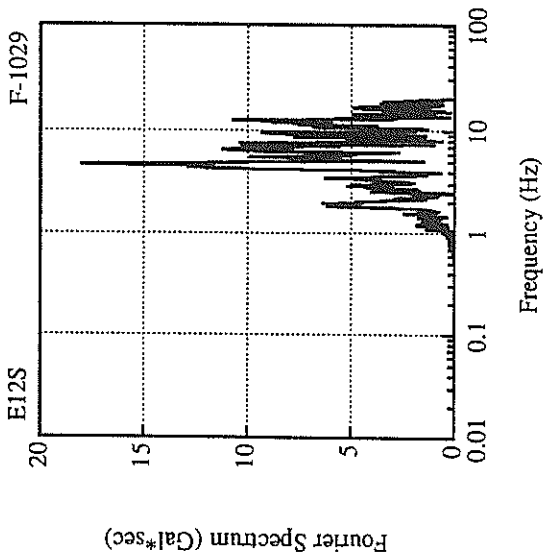


Displacement (cm)

Displacement (cm)







RECORD NUMBER : F-1030

STATION : WAKAYAMA-G

EARTHQUAKE DATA

 DATE AND TIME 20: 2 APR 5, 1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NW WAKAYAMA PREF
 LATITUDE 34° 11.8' N
 LONGITUDE 135° 7.9' E
 DEPTH 9.1KM
 JMA MAGNITUDE 3.8

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.585	0.530	0.829	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.585 0.530 0.829

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	21.7	52.1	16.3	53.3
ORIGINAL	47.5	116.0	44.8	116.6
CORRECTED	49.6	114.2	42.1	114.2

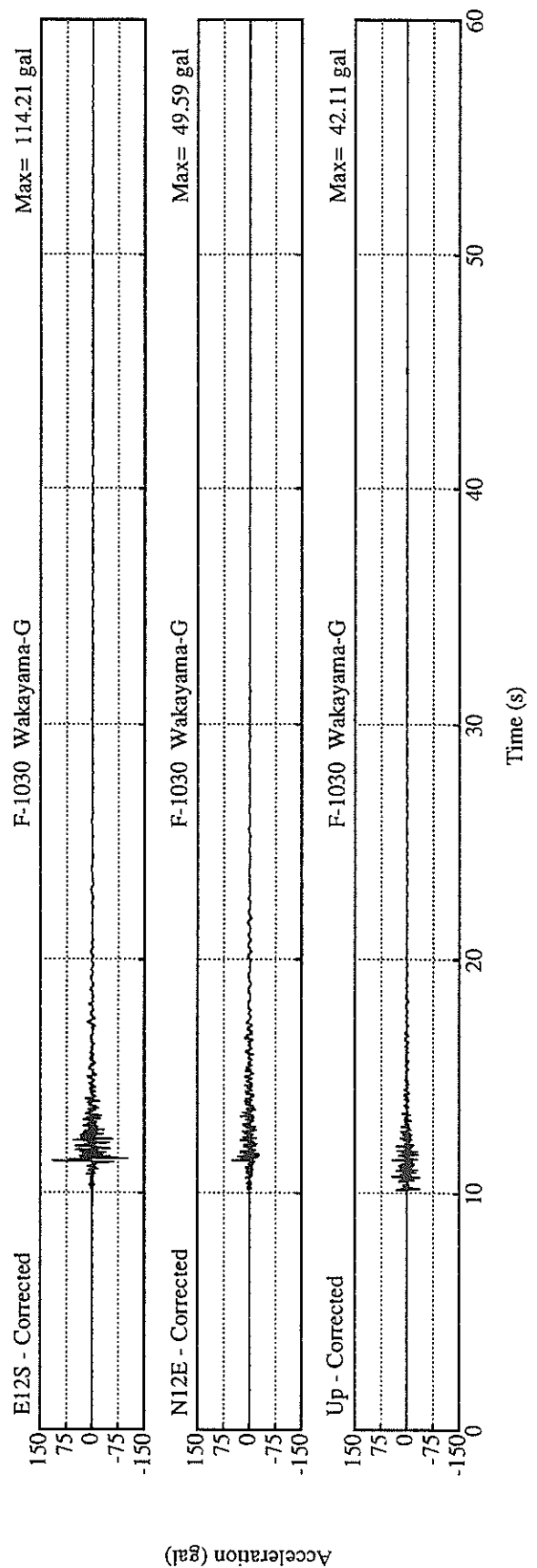
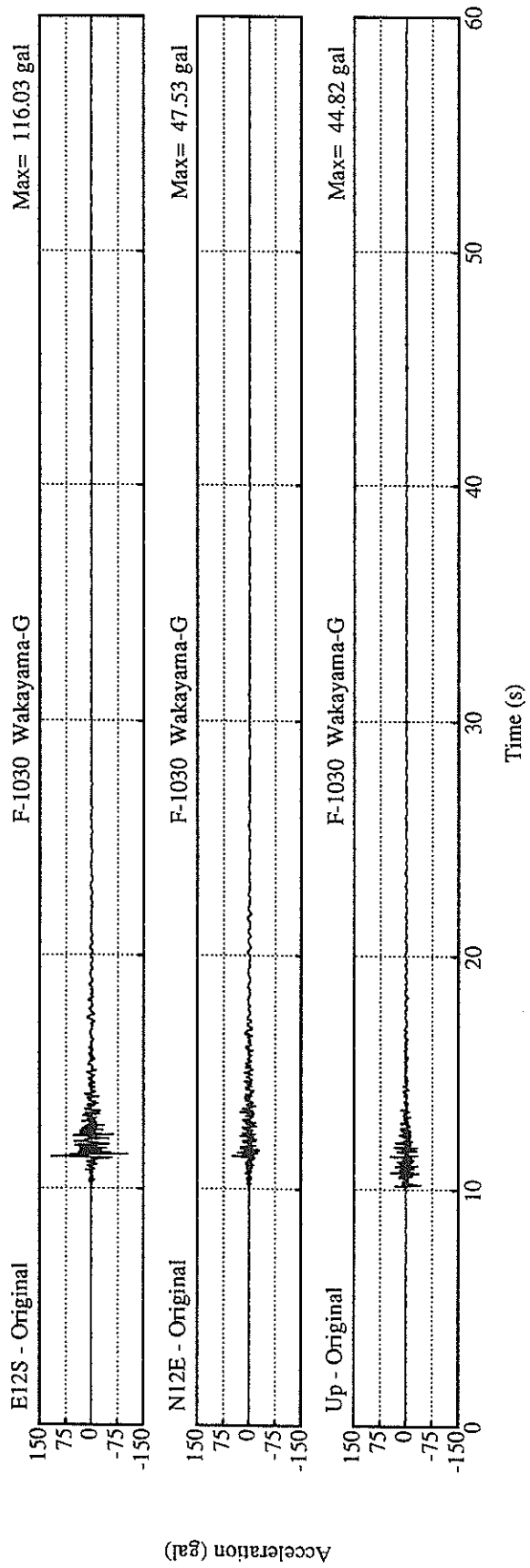
MAXIMUM VELOCITY (CM/SEC)

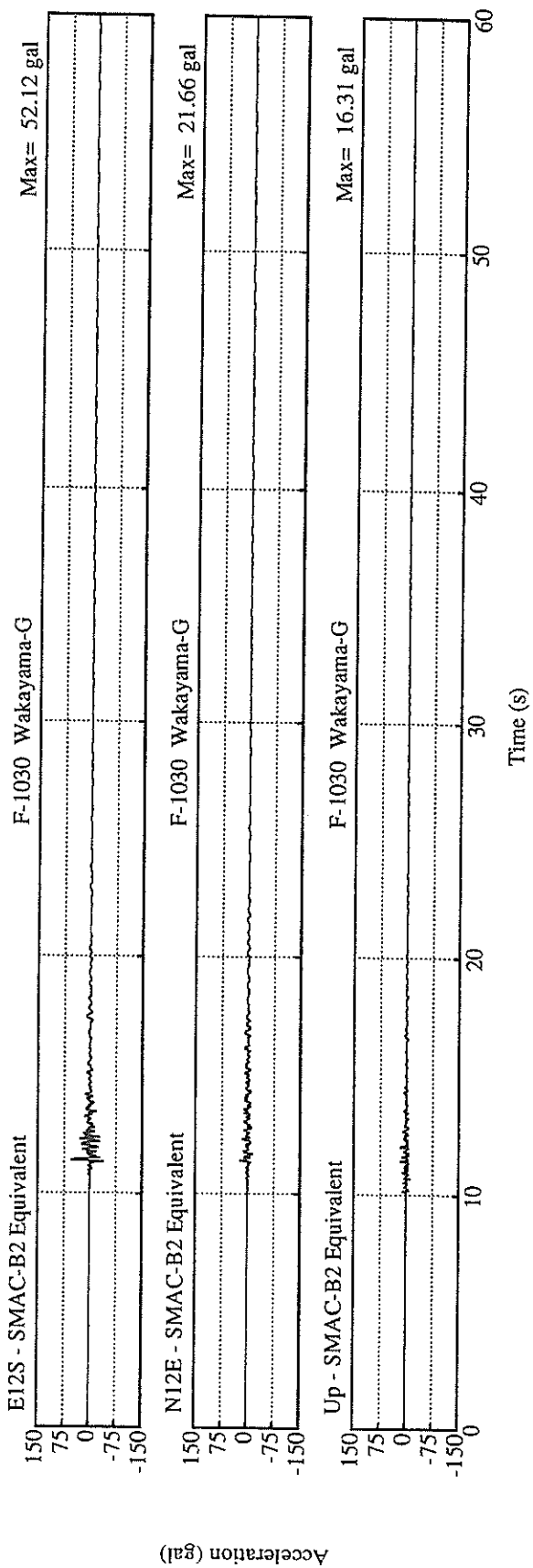
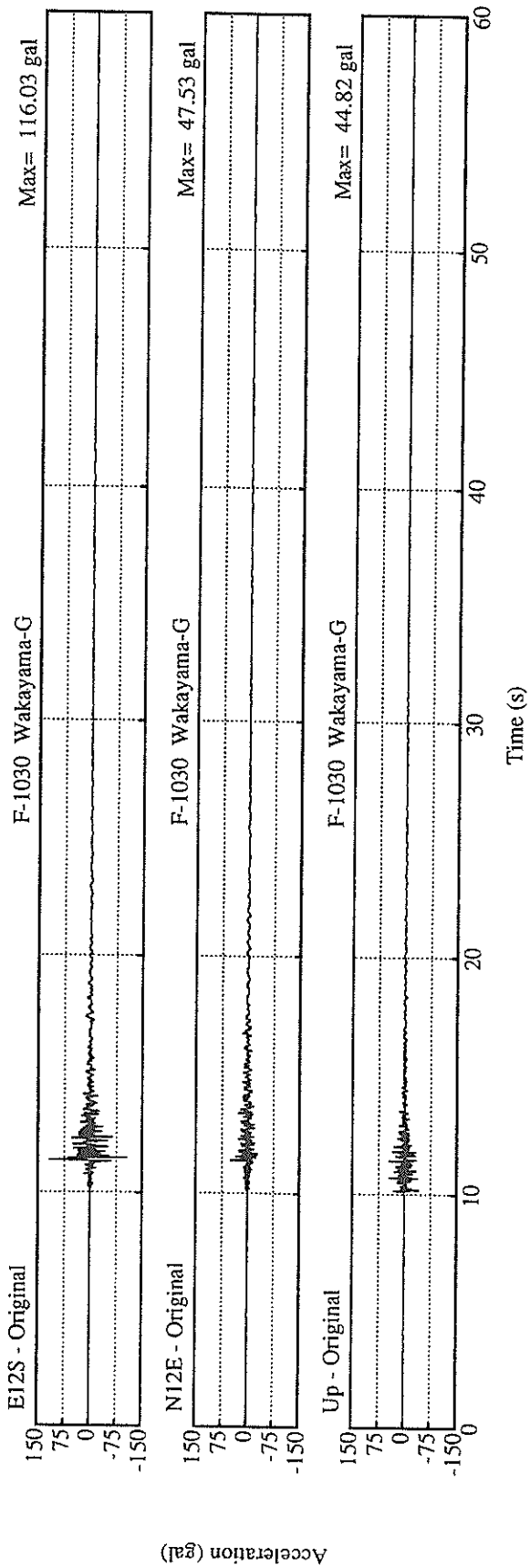
FIXED FILTER	1.16	3.19	0.78	3.33
VARIABLE FILTER	1.12	3.33	0.79	3.47

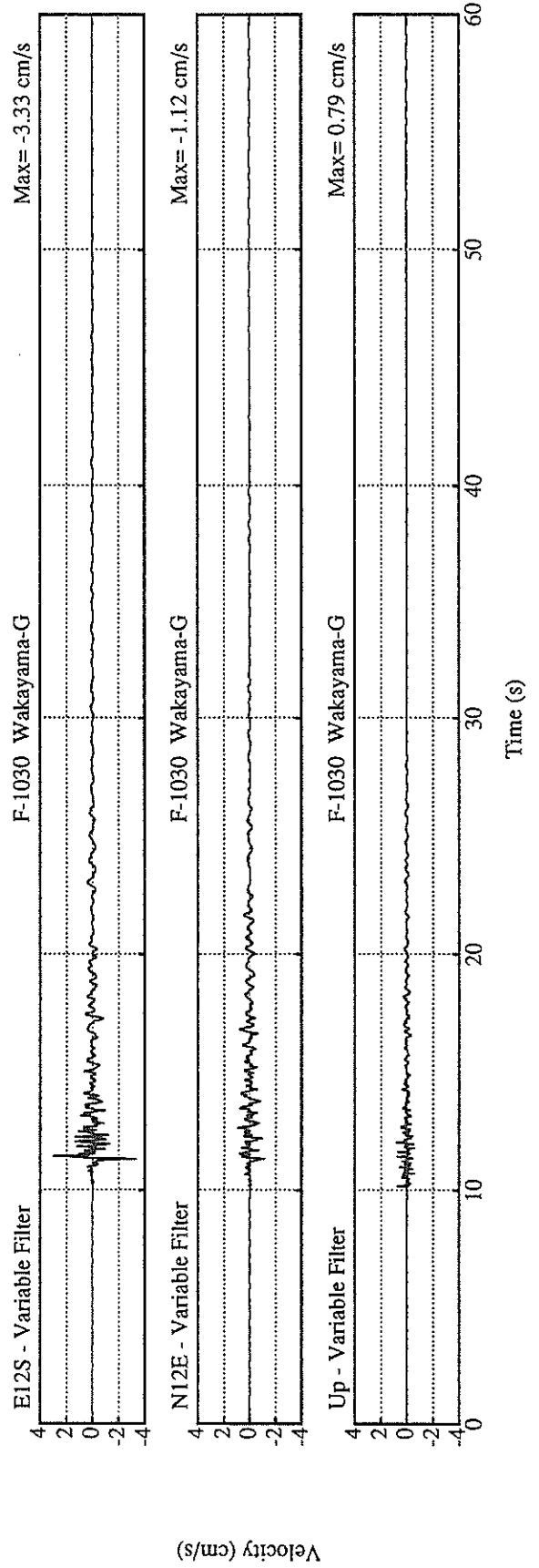
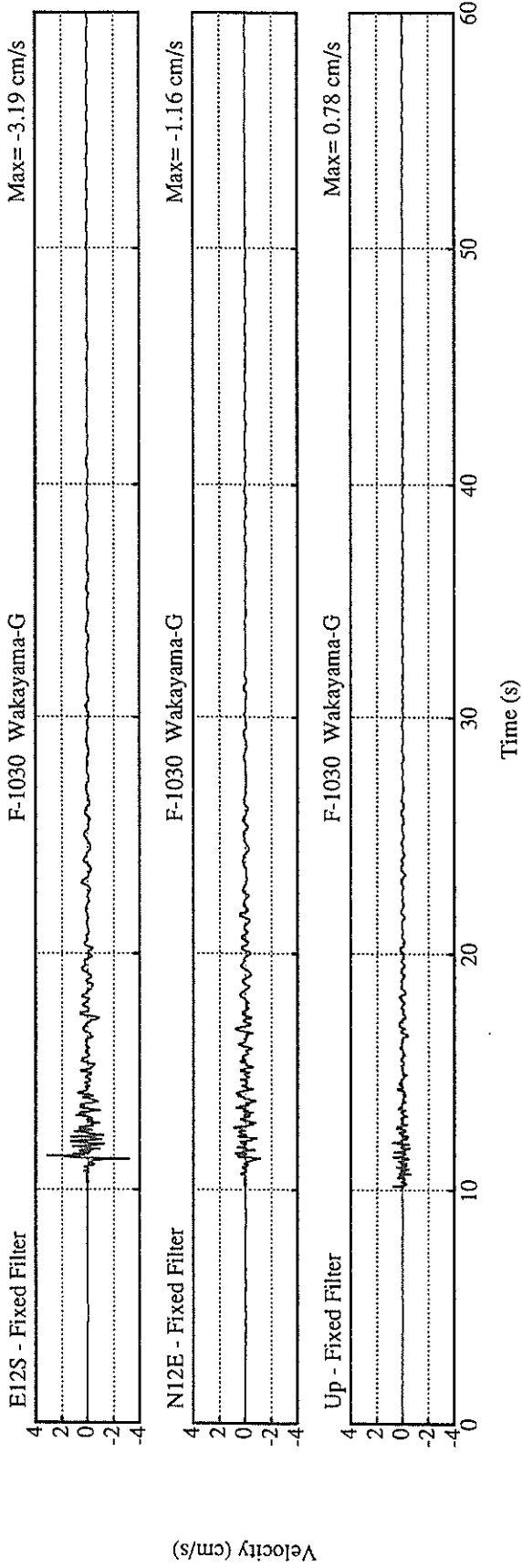
MAXIMUM DISPLACEMENT (CM)

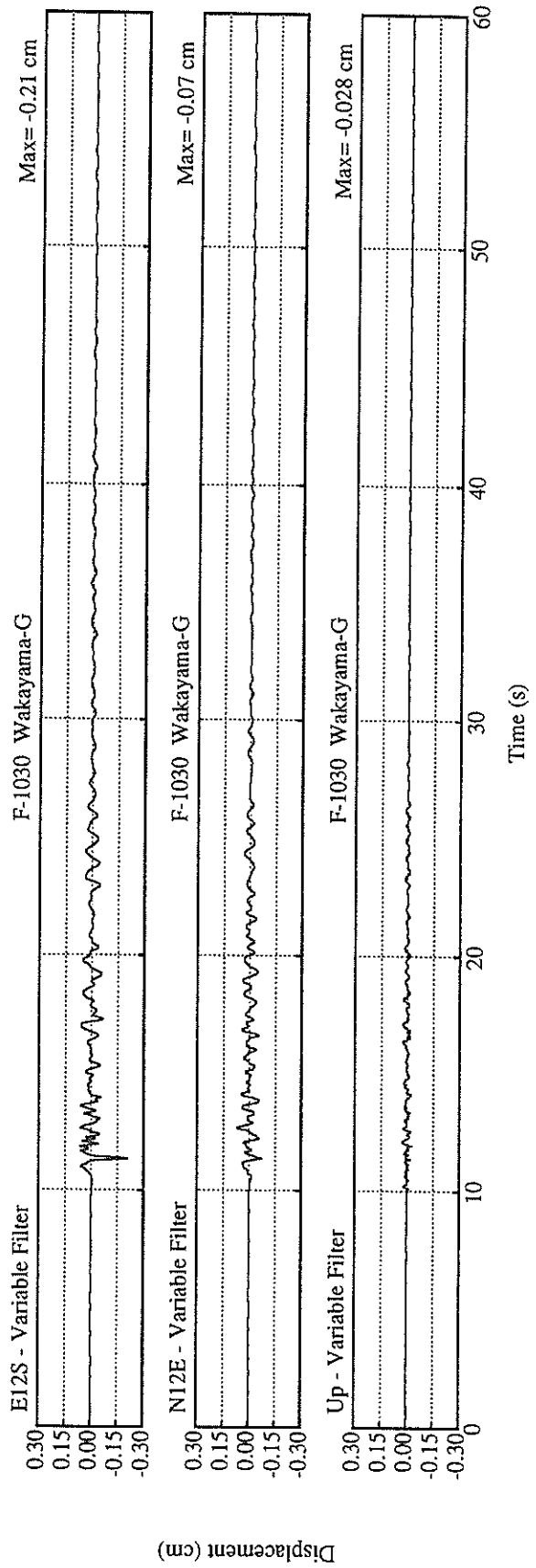
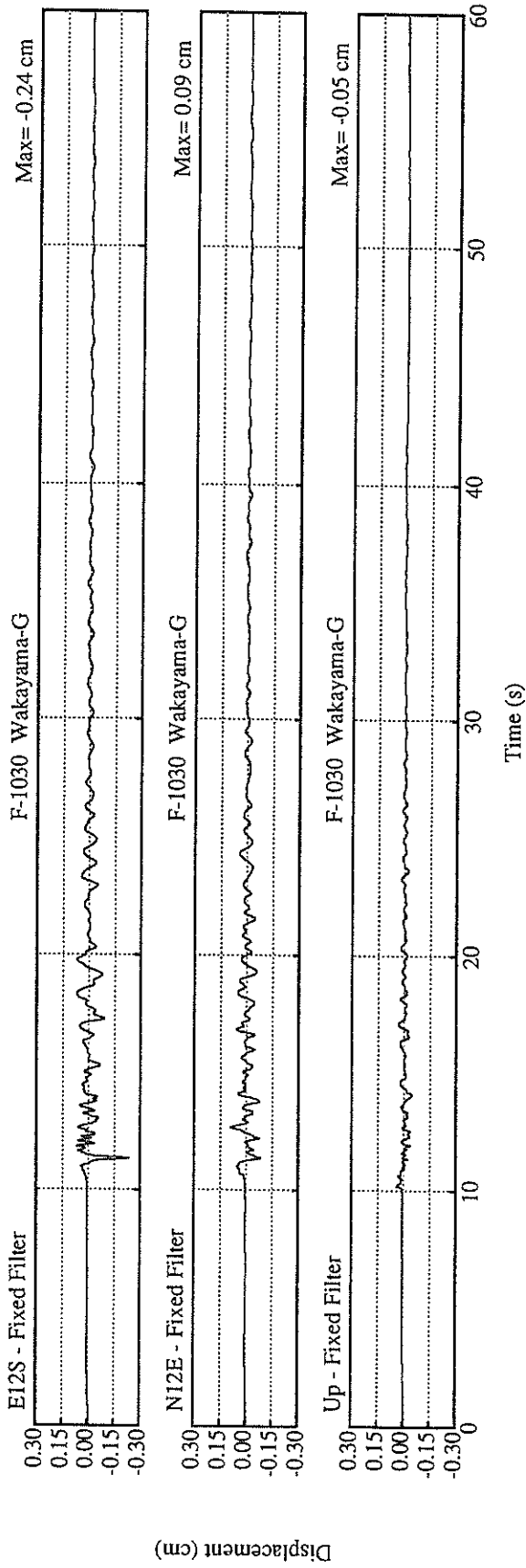
FIXED FILTER	0.09	0.24	0.05	0.25
VARIABLE FILTER	0.07	0.21	0.03	0.22

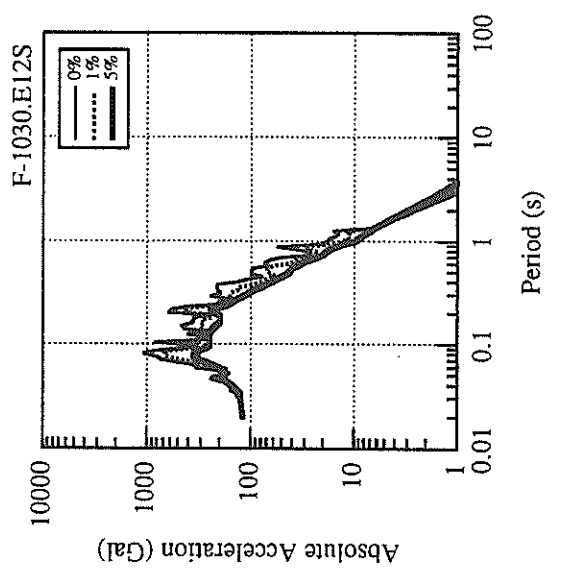
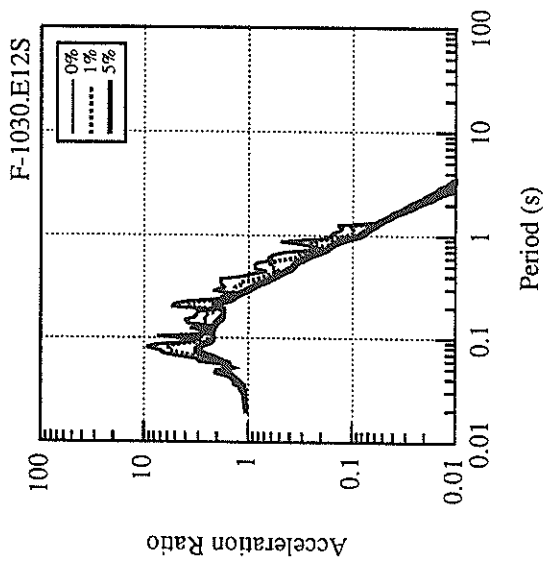
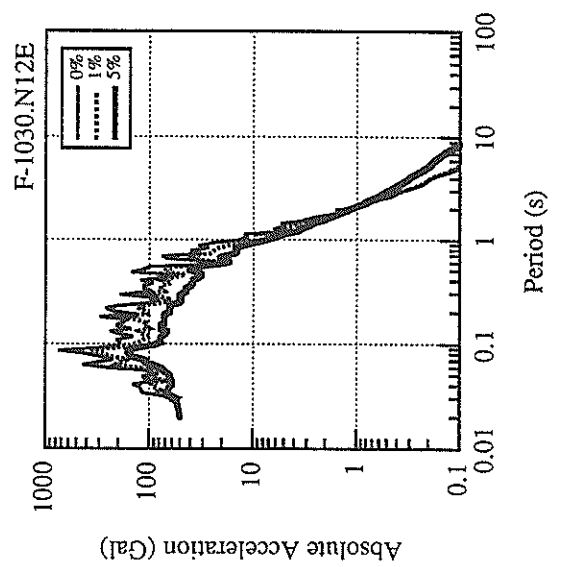
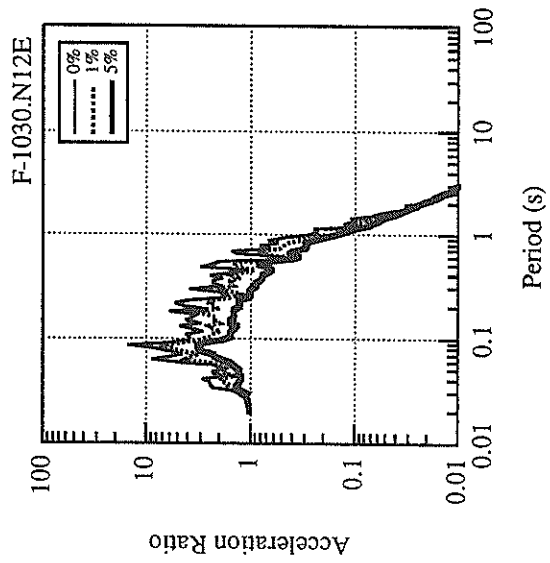
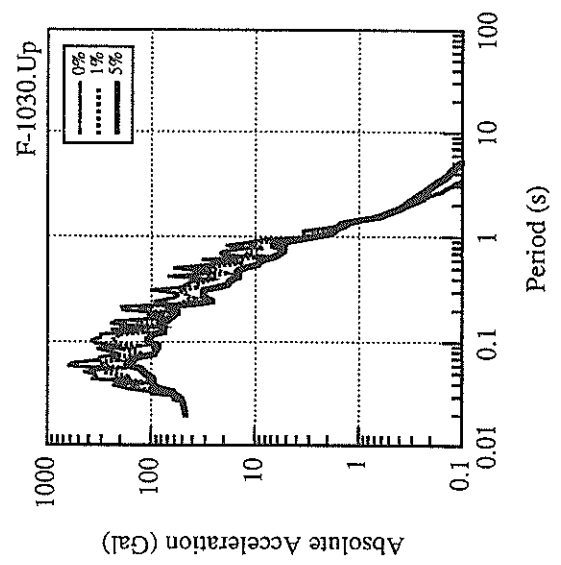
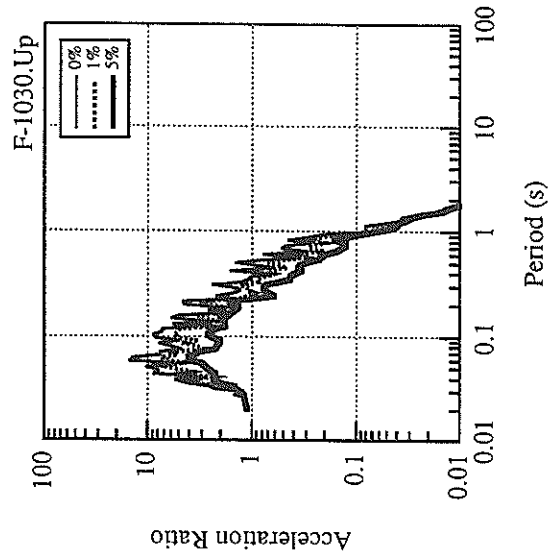
* RESULTANT OF HORIZONTAL COMPONENTS

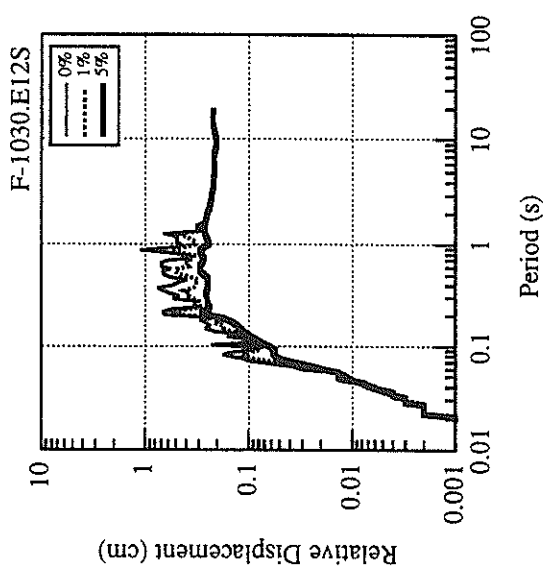
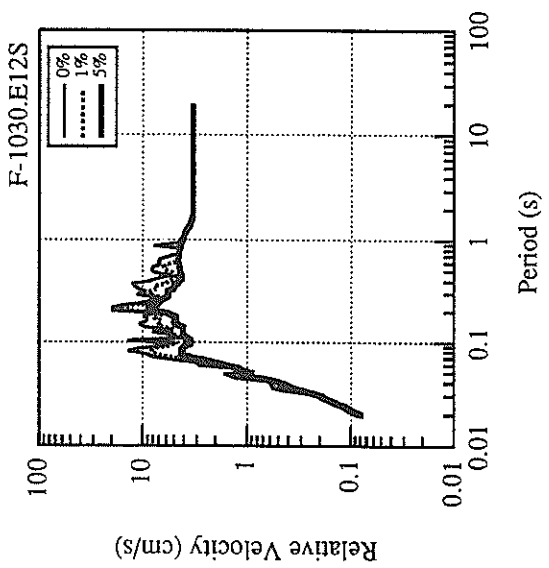
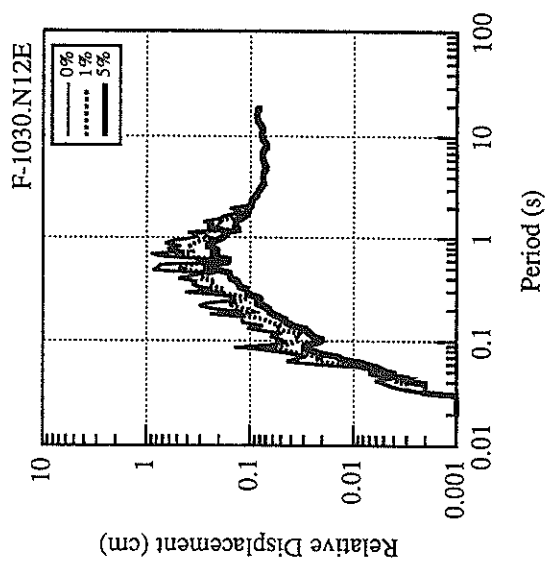
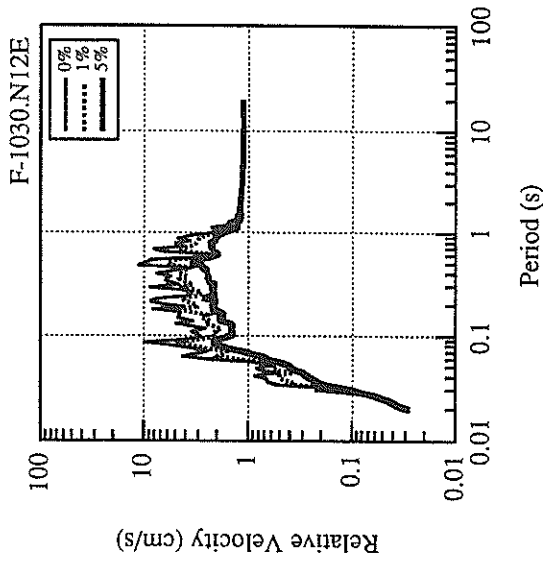
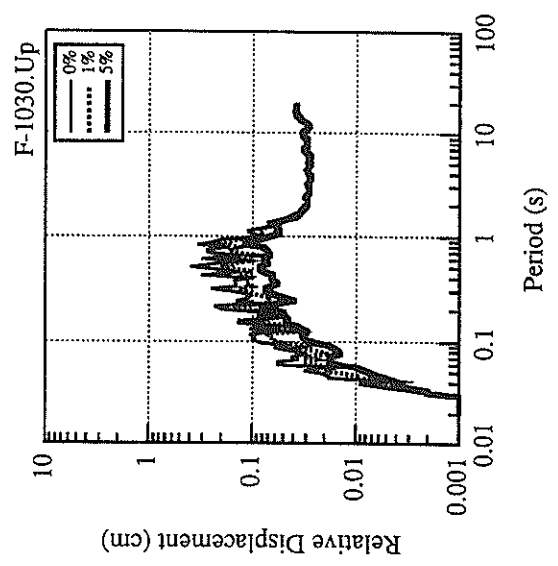
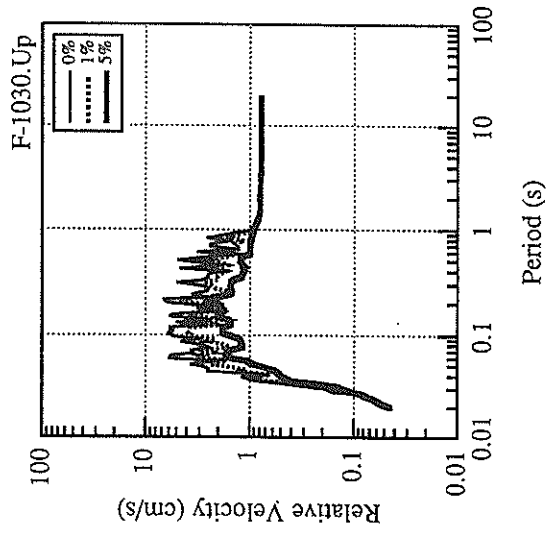


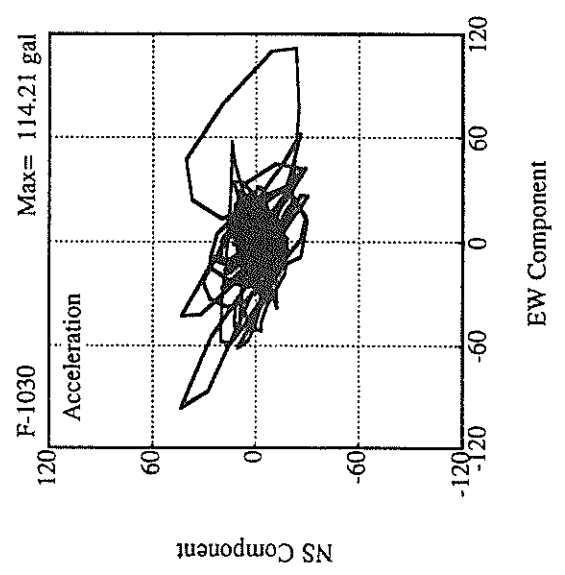
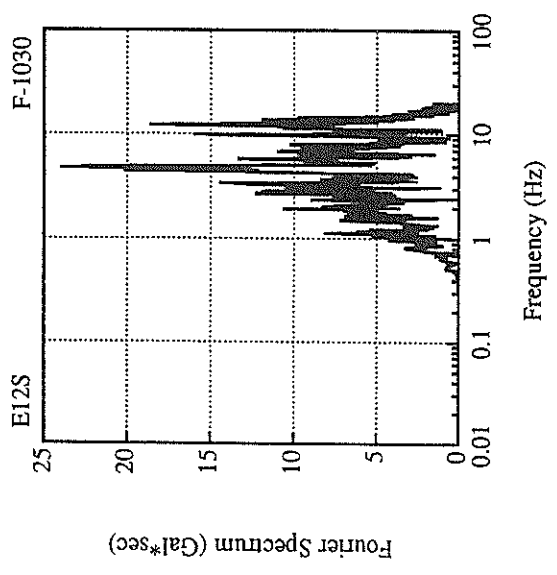
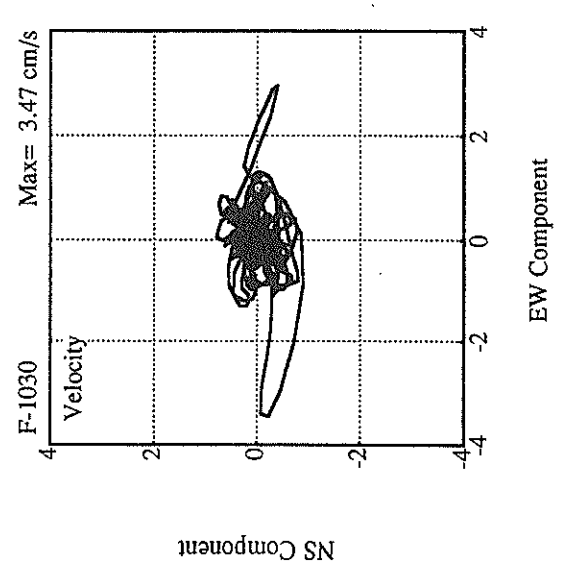
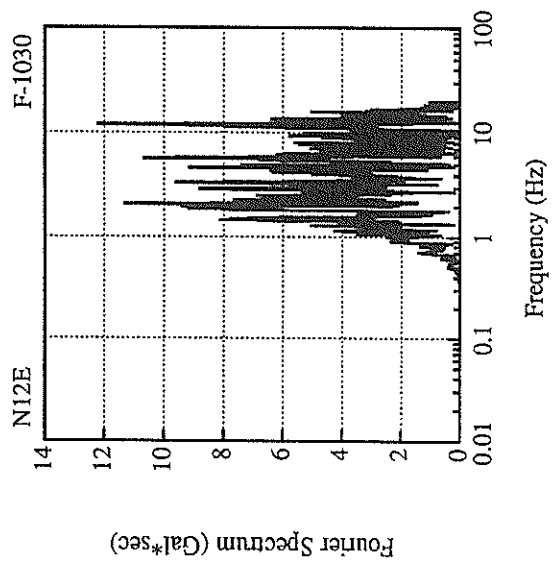
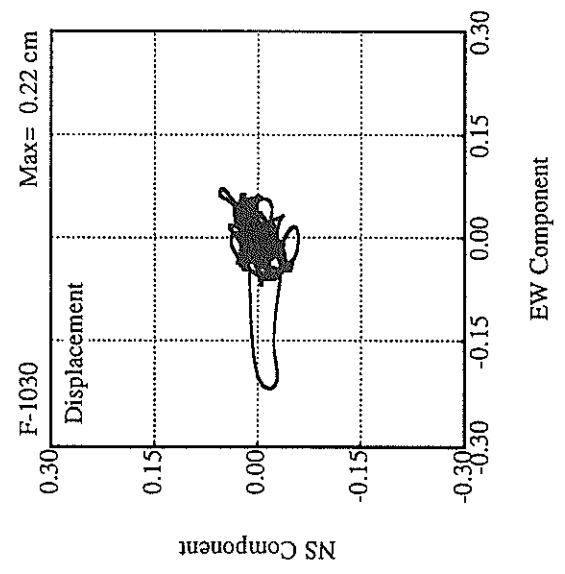
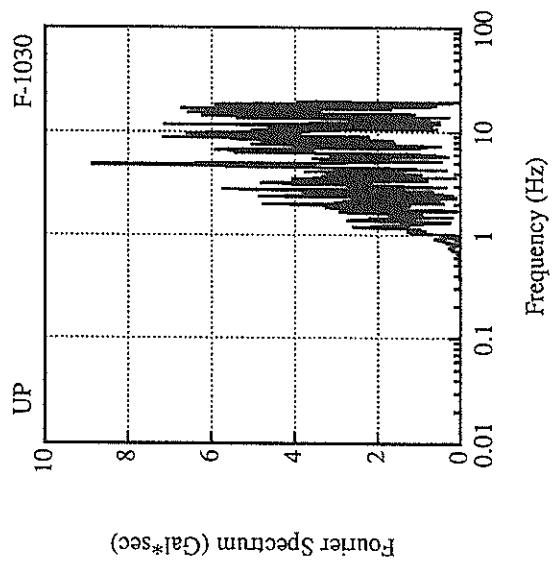












RECORD NUMBER : M-1584

STATION : OFUNATO-MOUND-M

EARTHQUAKE DATA

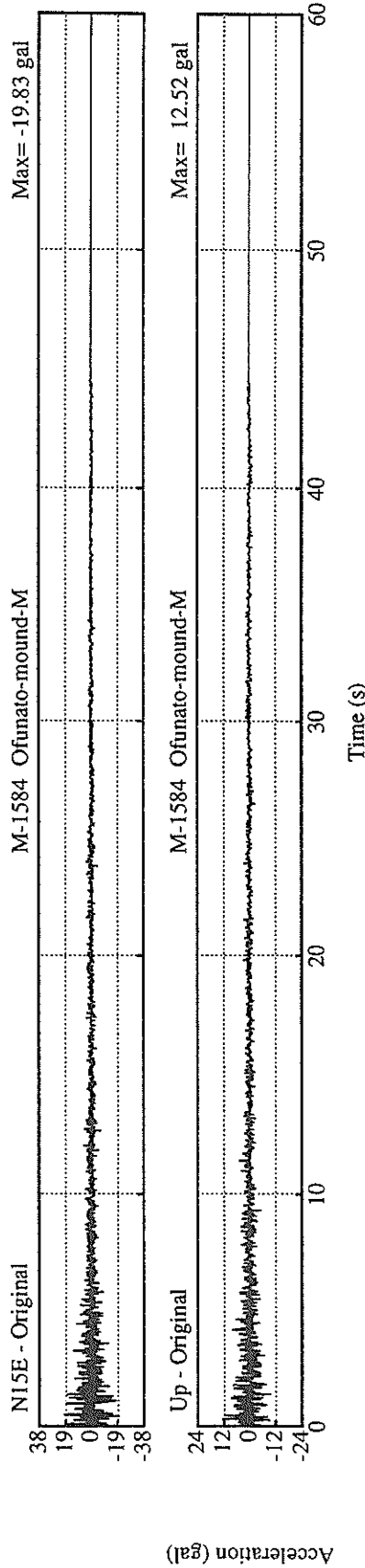
 DATE AND TIME 13: 8 APR 23,1996
 LOCATION OF HYPOCENTER SOUTHERN IWATE PREF
 EPICENTRAL REGION 39° 12.6' N
 LATITUDE 141° 30.1' E
 LONGITUDE 76.1KM
 DEPTH 5.2
 JMA MAGNITUDE *****

PEAK VALUES OF COMPONENTS

 N S E W U D HORIZONTAL*

 ORIGINAL ACCELERATION (GAL) 19.8 12.5

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : M-1585

STATION : KAMAISHI-M

EARTHQUAKE DATA

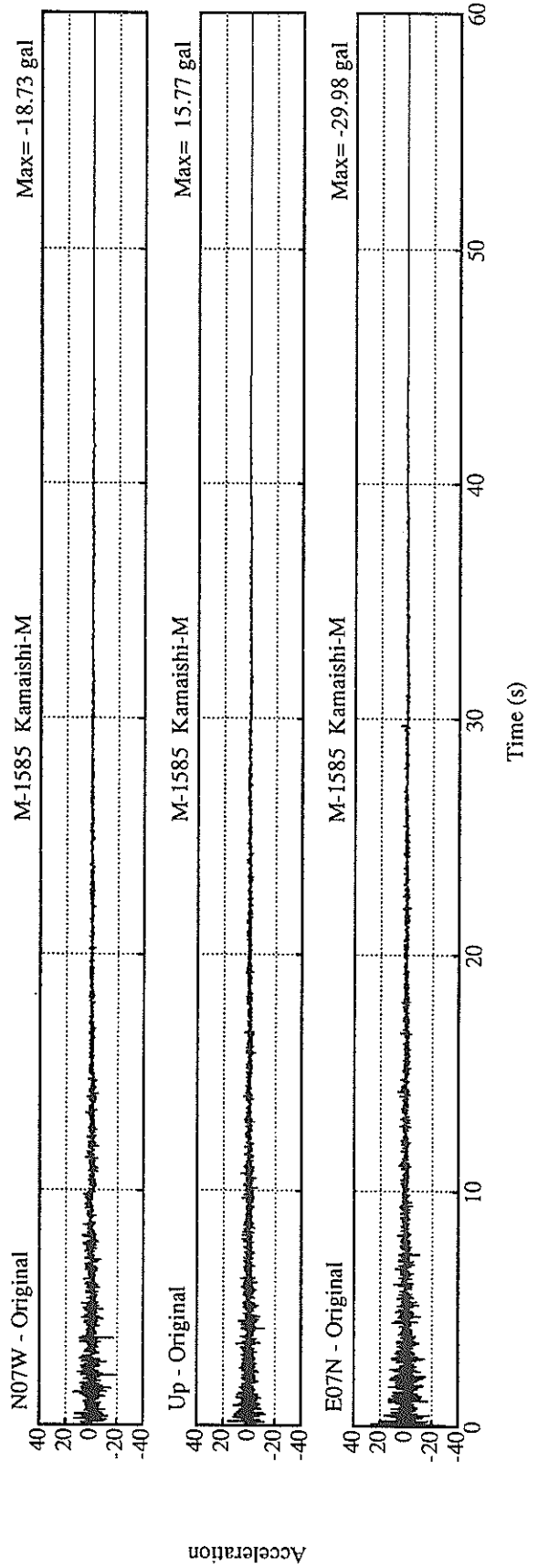
 DATE AND TIME : 13: 8 APR 23,1996
 LOCATION OF HYPOCENTER : SOUTHERN IWATE PREF
 EPICENTRAL REGION : 39° 12.6' N
 LATITUDE : 141° 30.1' E
 LONGITUDE : 76.1KM
 DEPTH : 5.2
 JMA MAGNITUDE : 5.2

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
18.7	30.0	15.8	30.0

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : S-2667

STATION : KASHIMA-ZOKAN-S

EARTHQUAKE DATA

 DATE AND TIME 11:37 SEP.11,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NEAR CHOSHI CITY
 LATITUDE 35°38.1' N
 LONGITUDE 141°13.2' E
 DEPTH 52.0KM
 JMA MAGNITUDE 6.4

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.096	0.291	0.304	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.096 0.291 0.304

MAXIMUM ACCELERATION (GAL)

ORIGINAL	83.0	53.3	30.1	86.6
CORRECTED	205.0	87.9	81.0	206.2

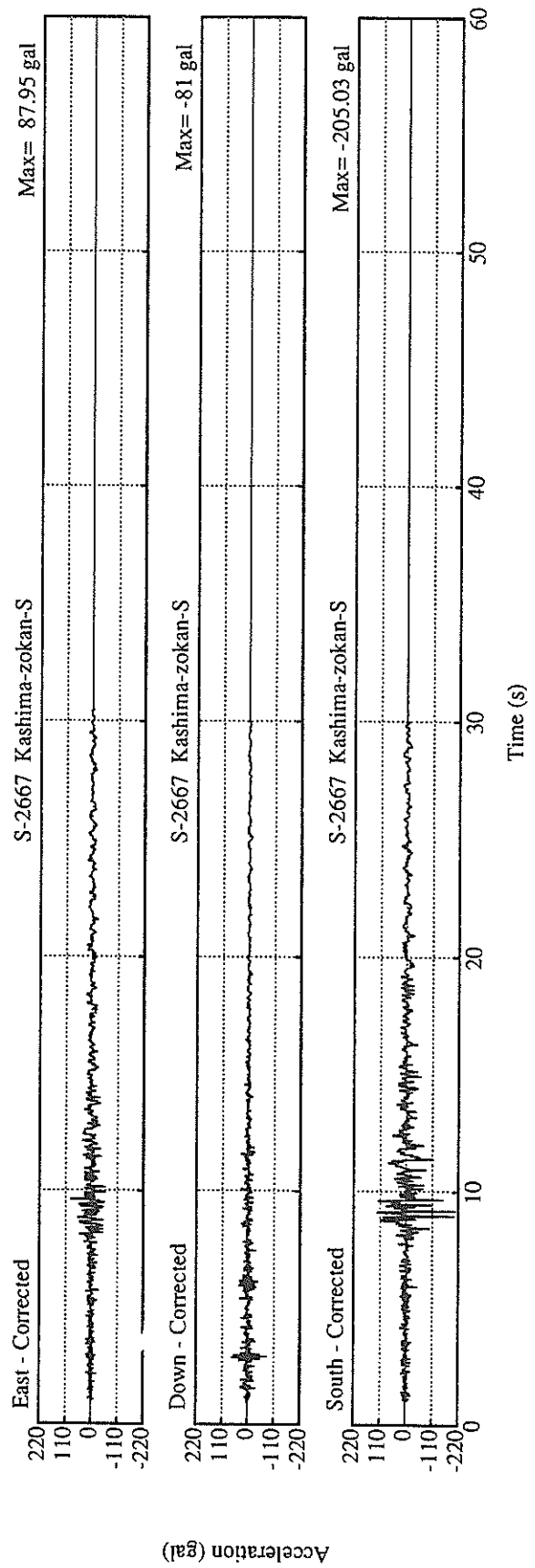
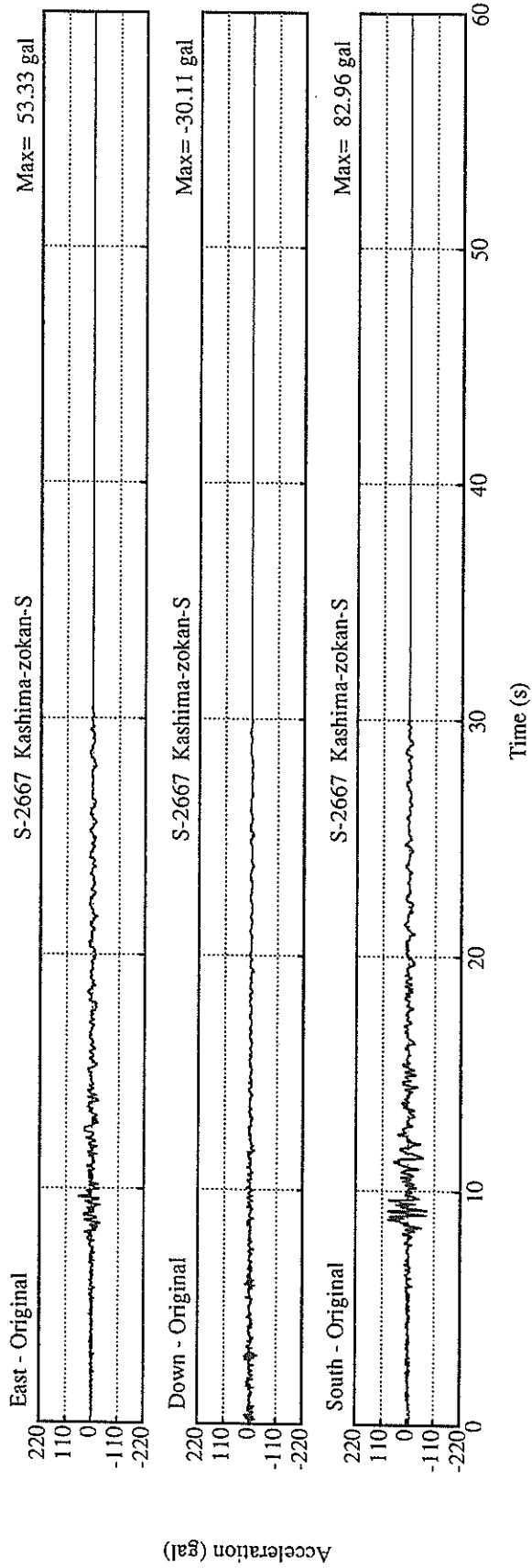
MAXIMUM VELOCITY (CM/SEC)

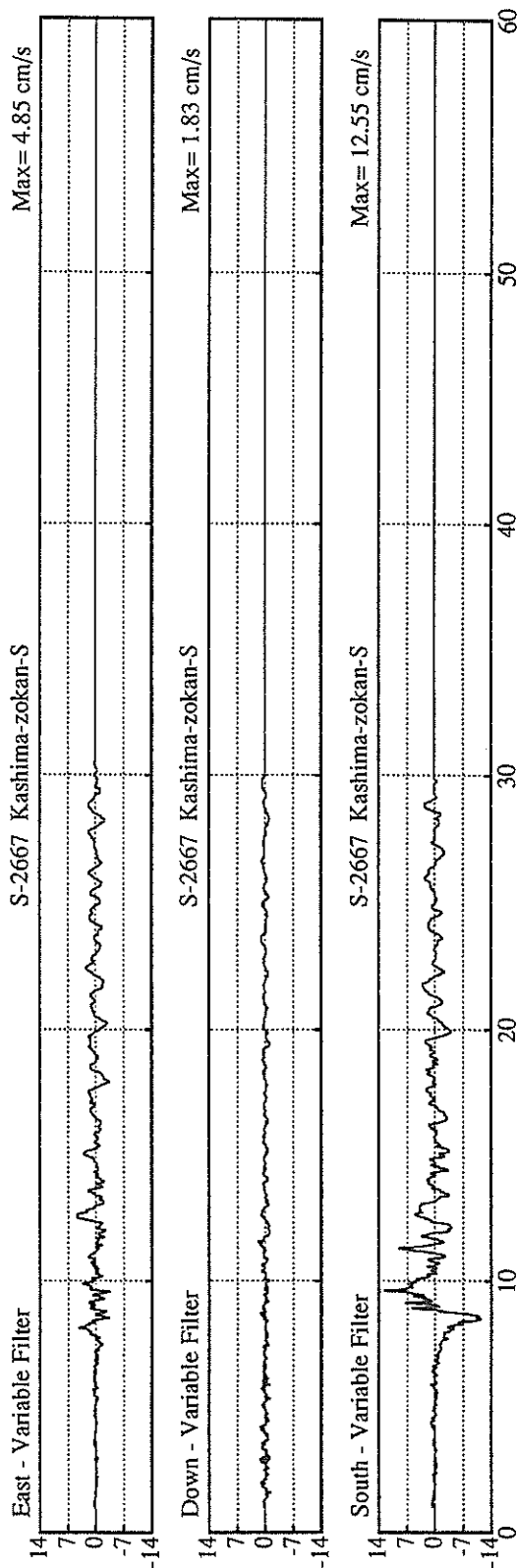
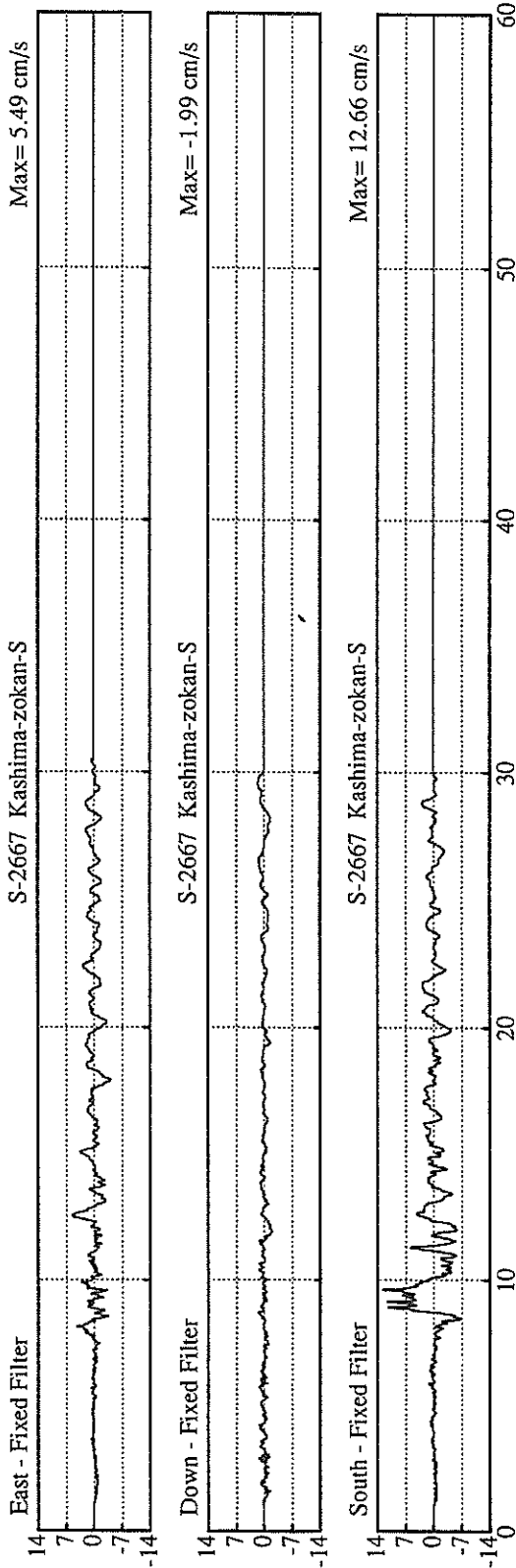
FIXED FILTER	12.66	5.49	1.99	12.67
VARIABLE FILTER	12.55	4.85	1.83	12.58

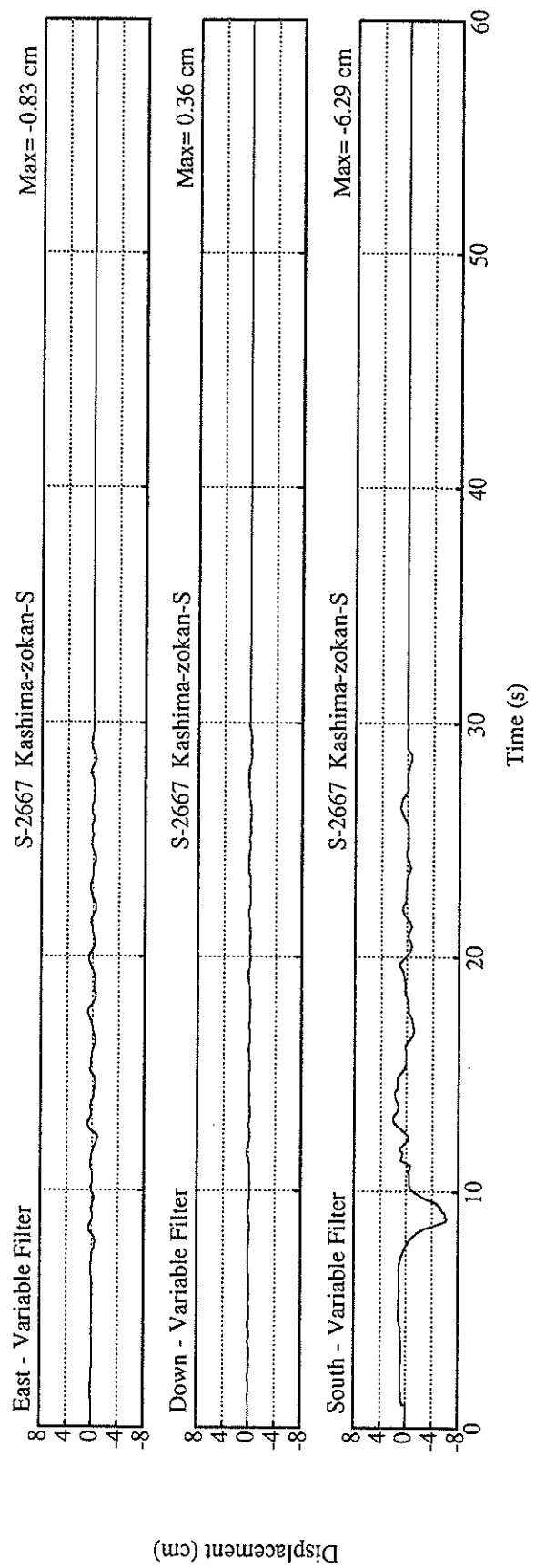
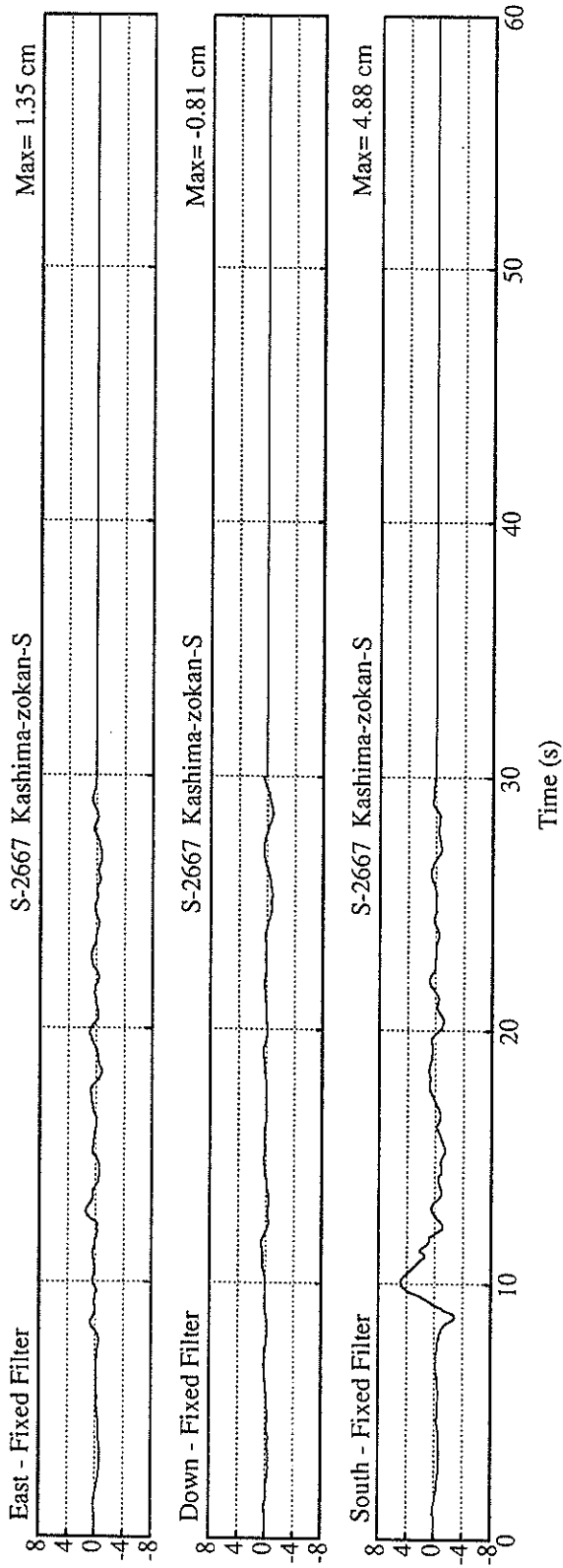
MAXIMUM DISPLACEMENT (CM)

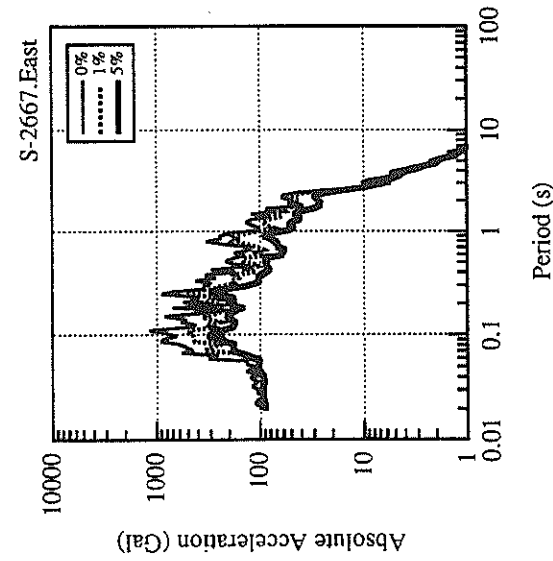
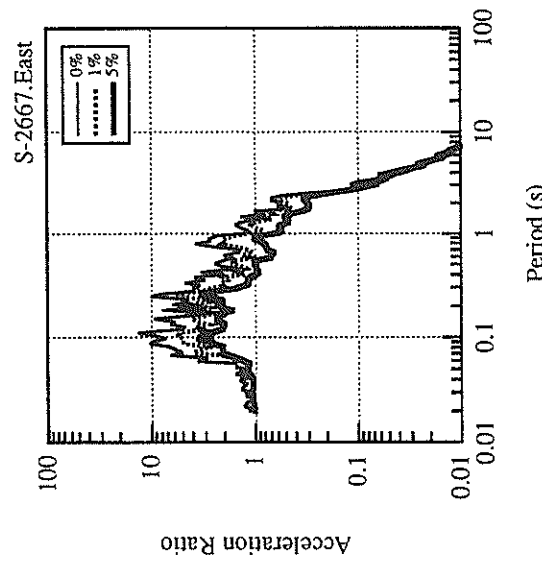
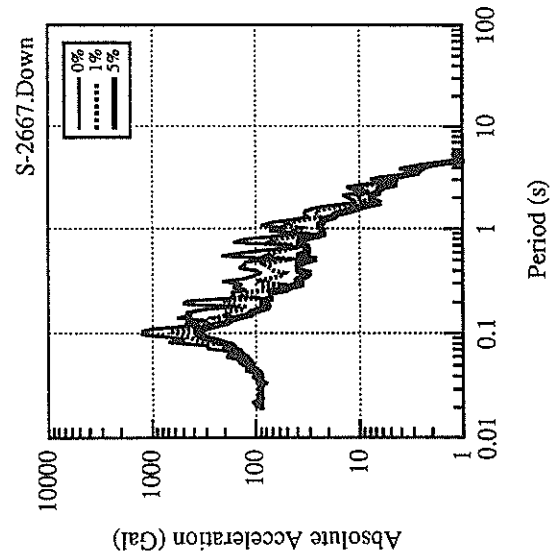
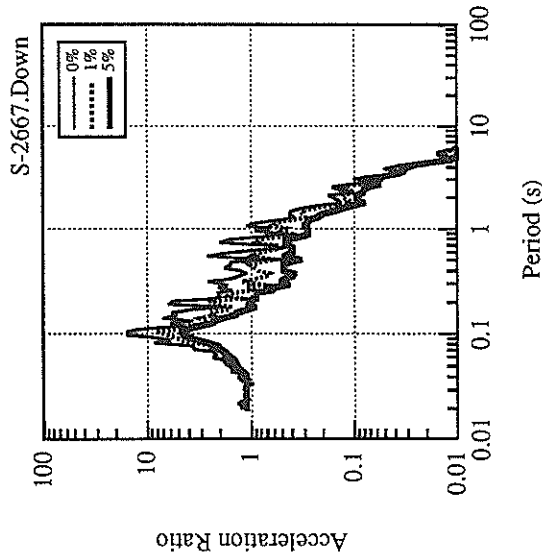
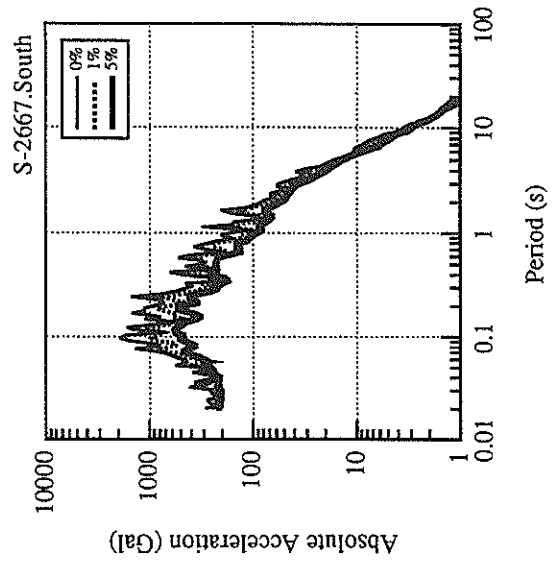
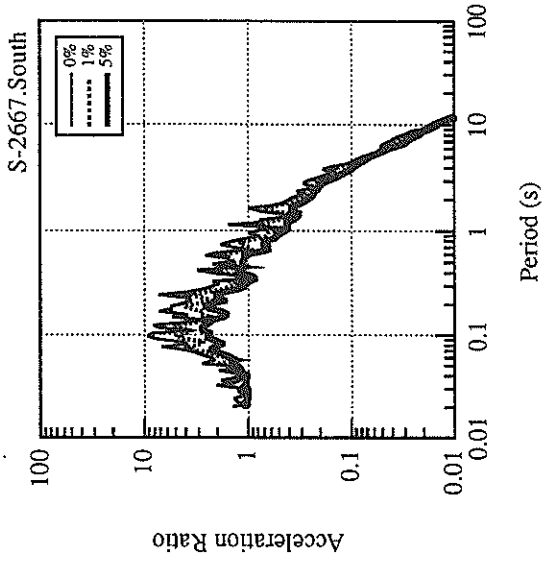
FIXED FILTER	4.88	1.35	0.81	4.90
VARIABLE FILTER	6.29	0.83	0.36	6.29

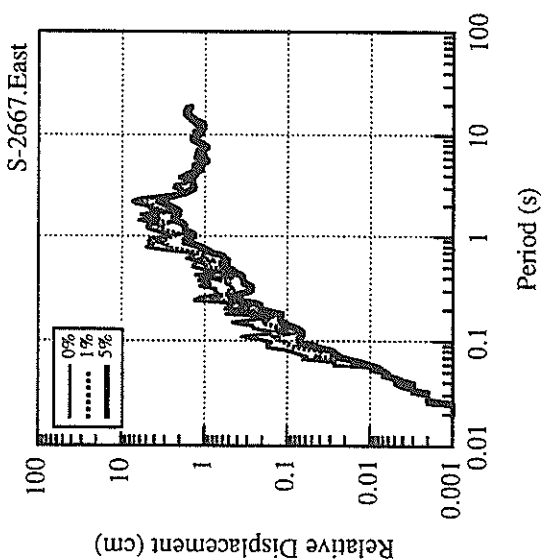
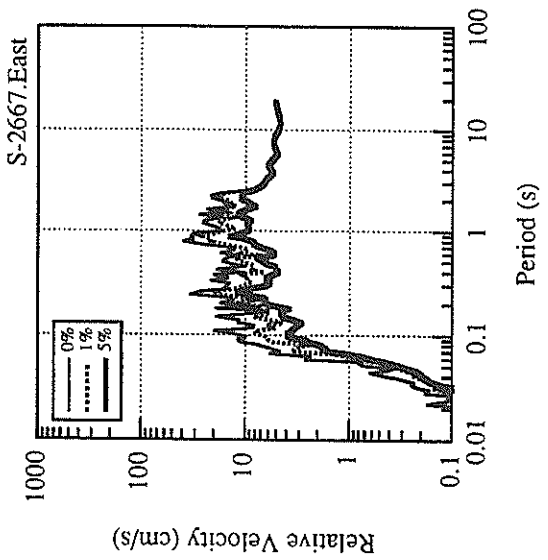
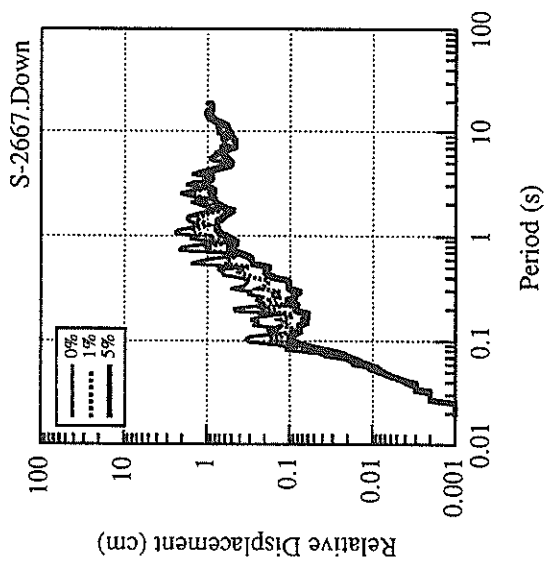
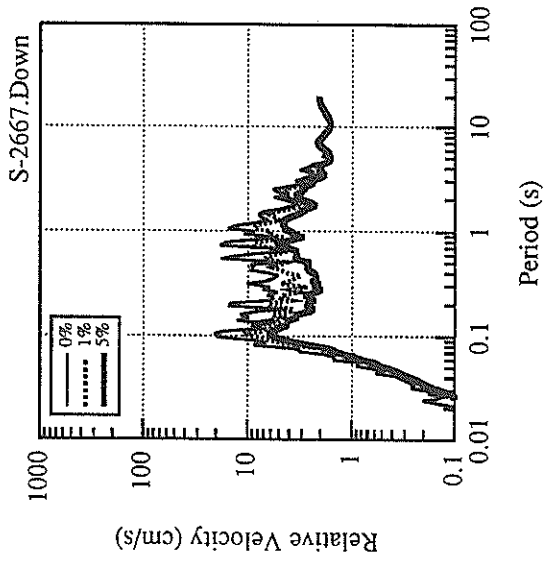
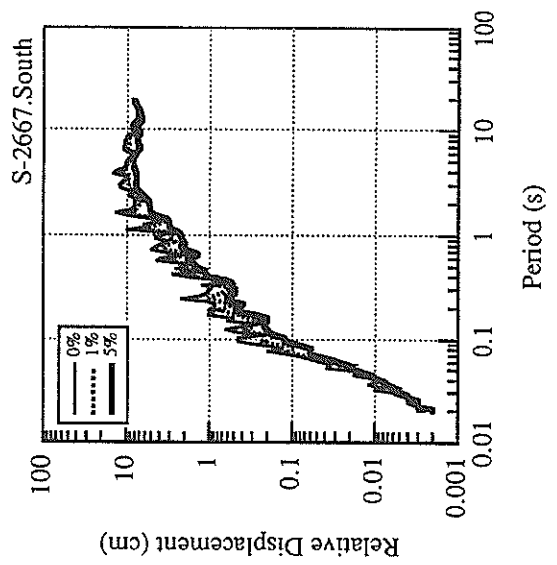
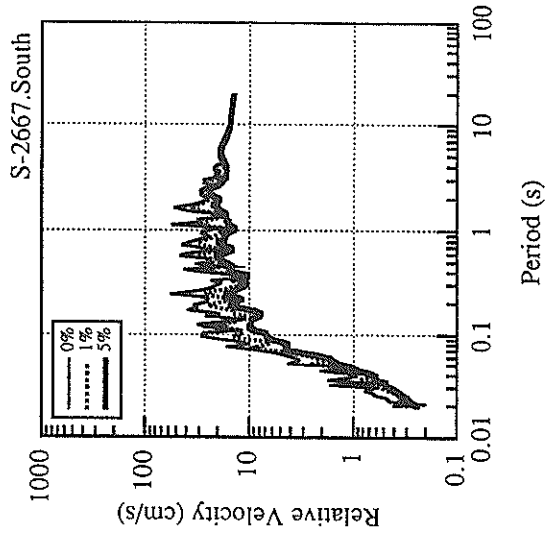
* RESULTANT OF HORIZONTAL COMPONENTS

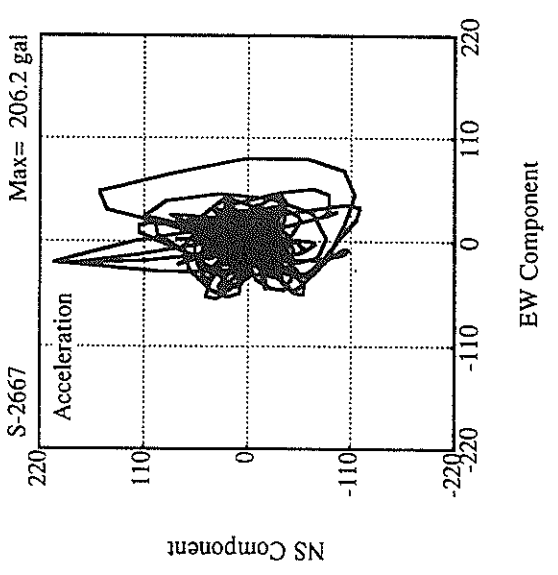
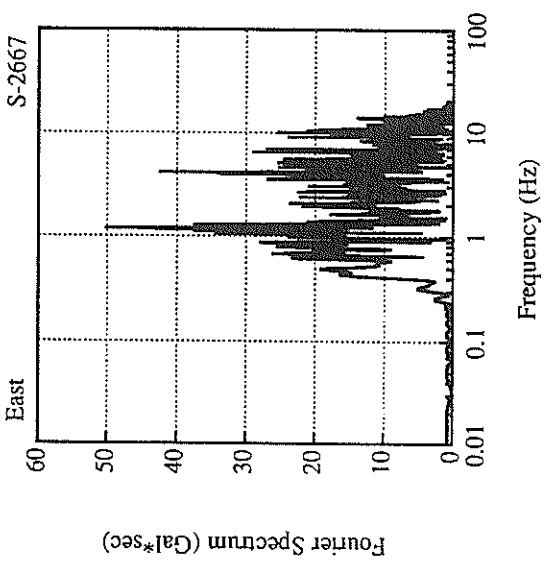
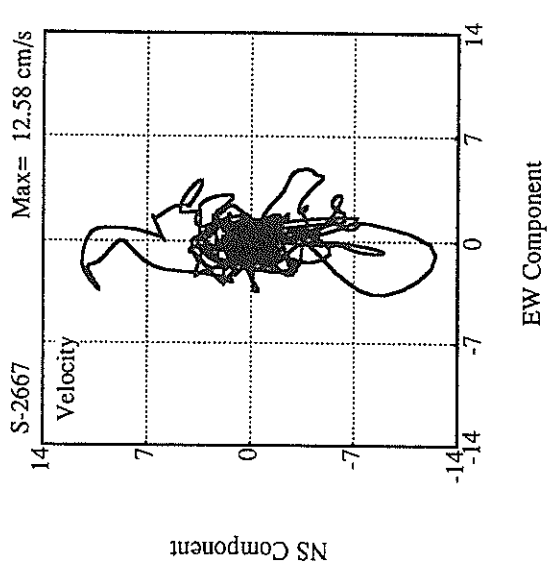
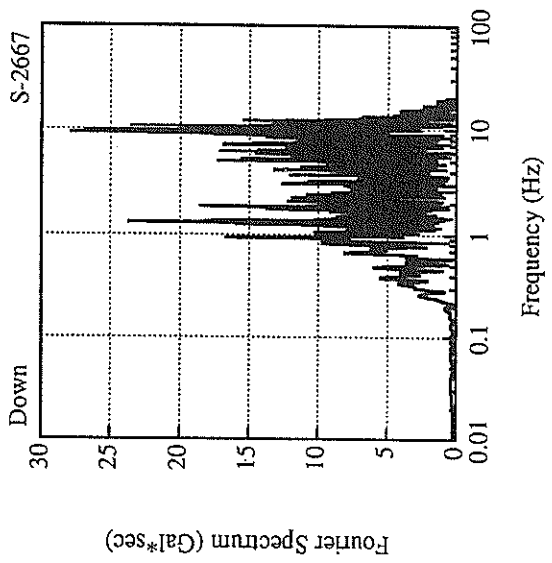
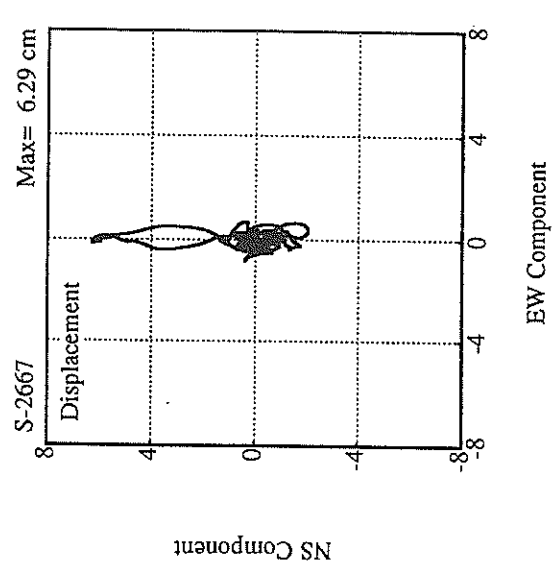
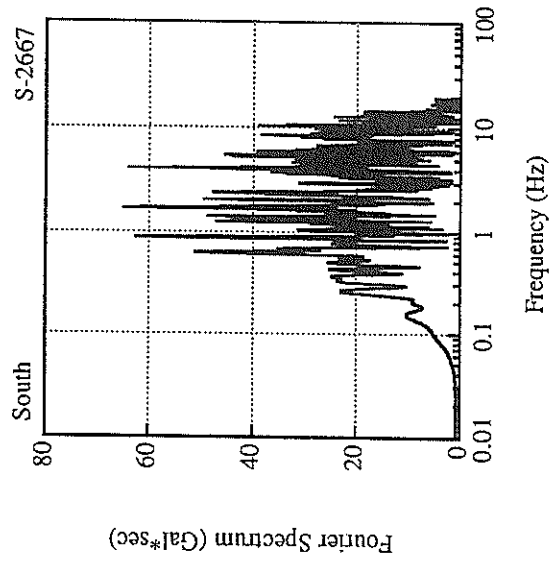












RECORD NUMBER : F-1062

STATION : HITACHINAKA-F

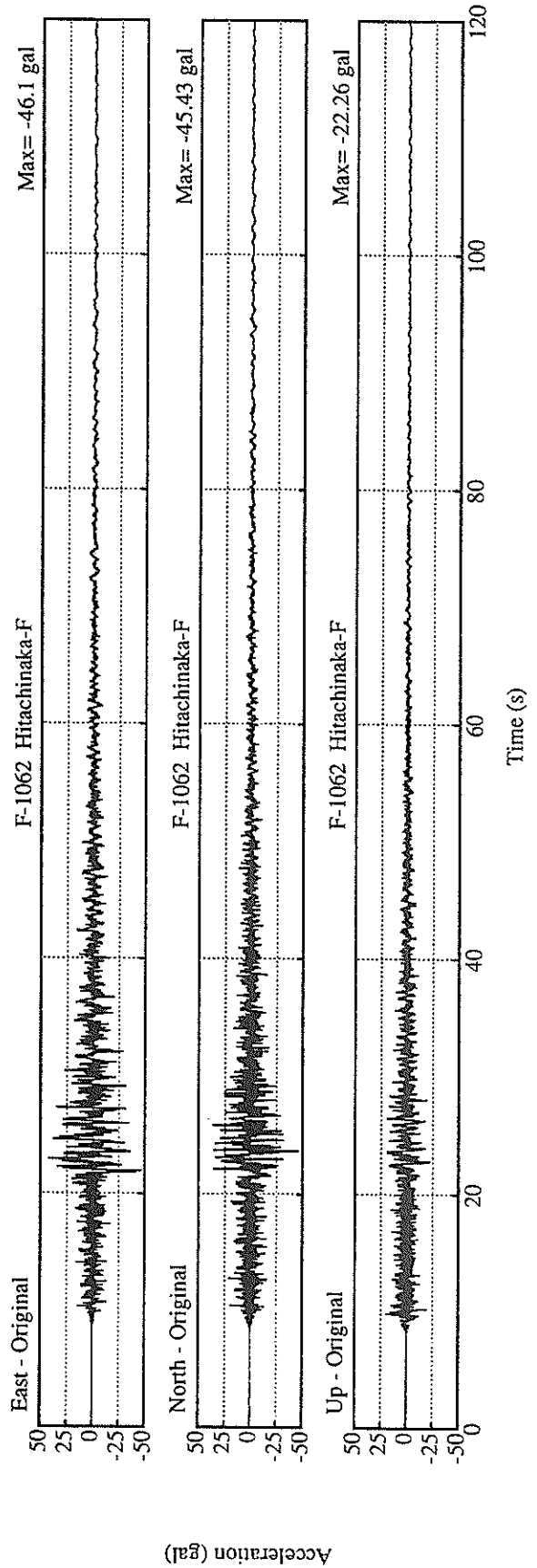
EARTHQUAKE DATA

 DATE AND TIME 11:37 SEP.11,1996
 LOCATION OF HYPOCENTER NEAR CHOSHI CITY
 EPICENTRAL REGION 35° 38.1' N
 LATITUDE 141° 13.2' E
 LONGITUDE 52.0KM
 DEPTH 6.4
 JMA MAGNITUDE 6.4

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	45.4	46.1	22.3	53.4

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : S-2666

STATION : CHIBA-S

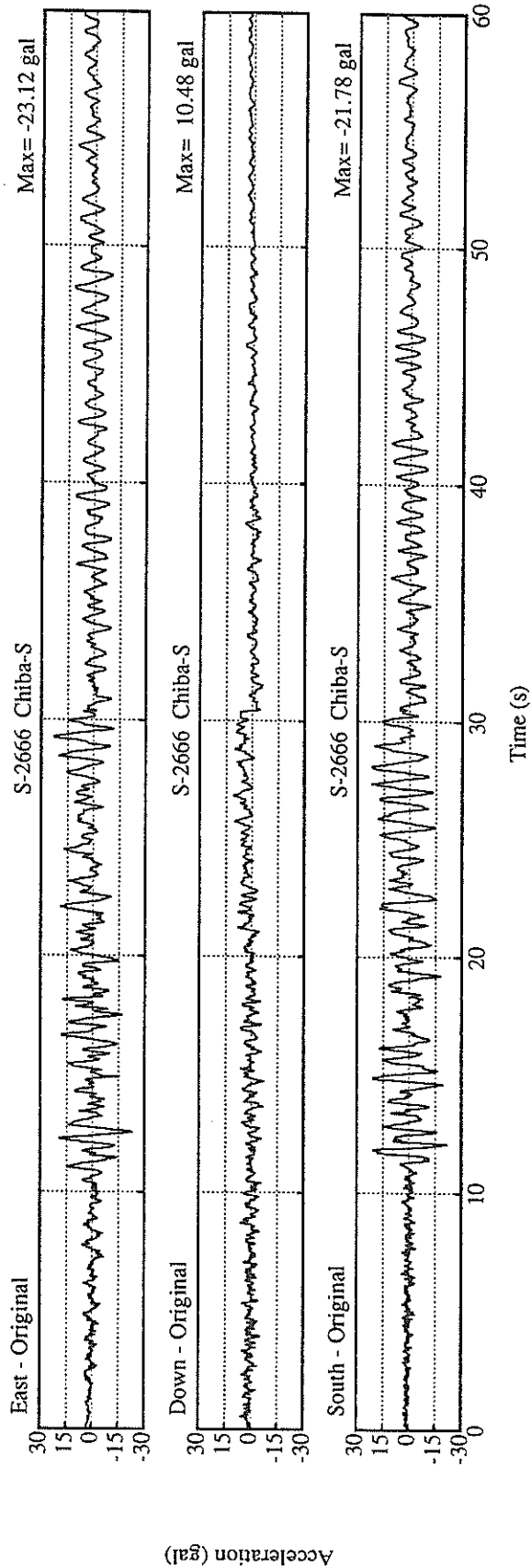
EARTHQUAKE DATA

 DATE AND TIME 11:37 SEP.11,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION NEAR CHOSHI CITY
 LATITUDE 35°38.1' N
 LONGITUDE 141°13.2' E
 DEPTH 52.0KM
 JMA MAGNITUDE 6.4

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	21.8	23.1	10.5	26.8

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-1063

STATION : HITACHINAKA-F

EARTHQUAKE DATA

 DATE AND TIME 6: 3 OCT. 7, 1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION E OFF IBARAKI PREF
 LATITUDE 36° 23.5' N
 LONGITUDE 140° 55.8' E
 DEPTH 35.0KM
 JMA MAGNITUDE 4.3

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	1.116	1.080	1.489	

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 1.116 1.080 1.489

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	17.7	18.7	5.1	19.5
ORIGINAL	41.1	54.9	18.7	55.8
CORRECTED	40.8	54.3	18.3	56.2

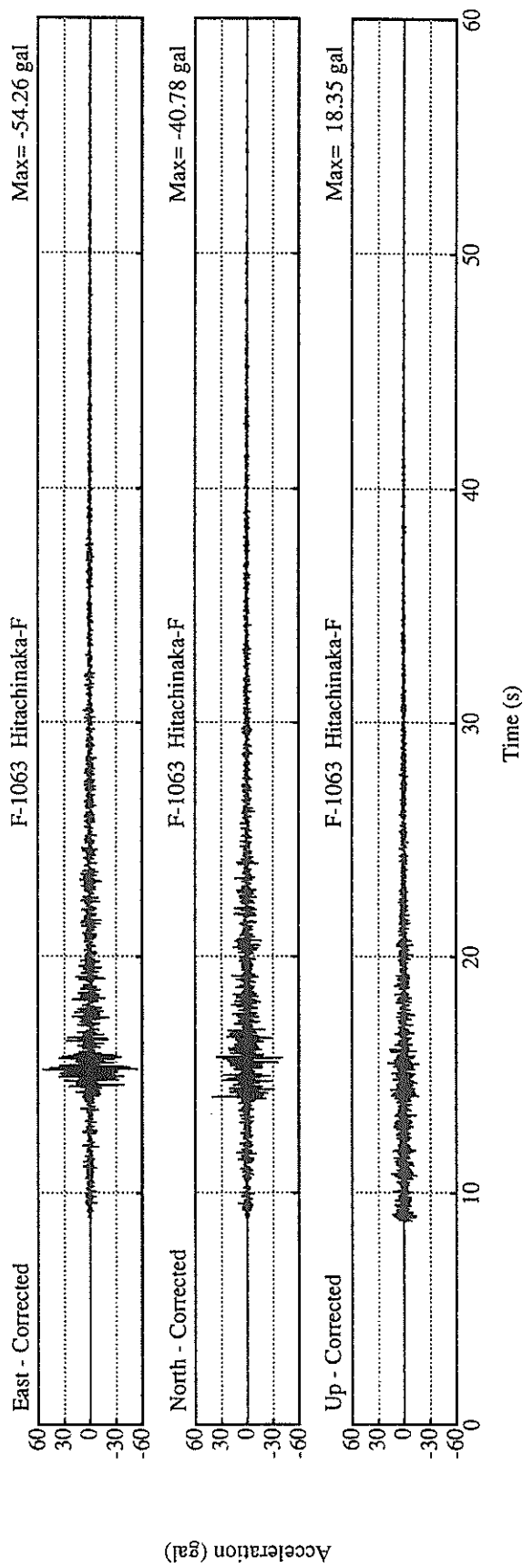
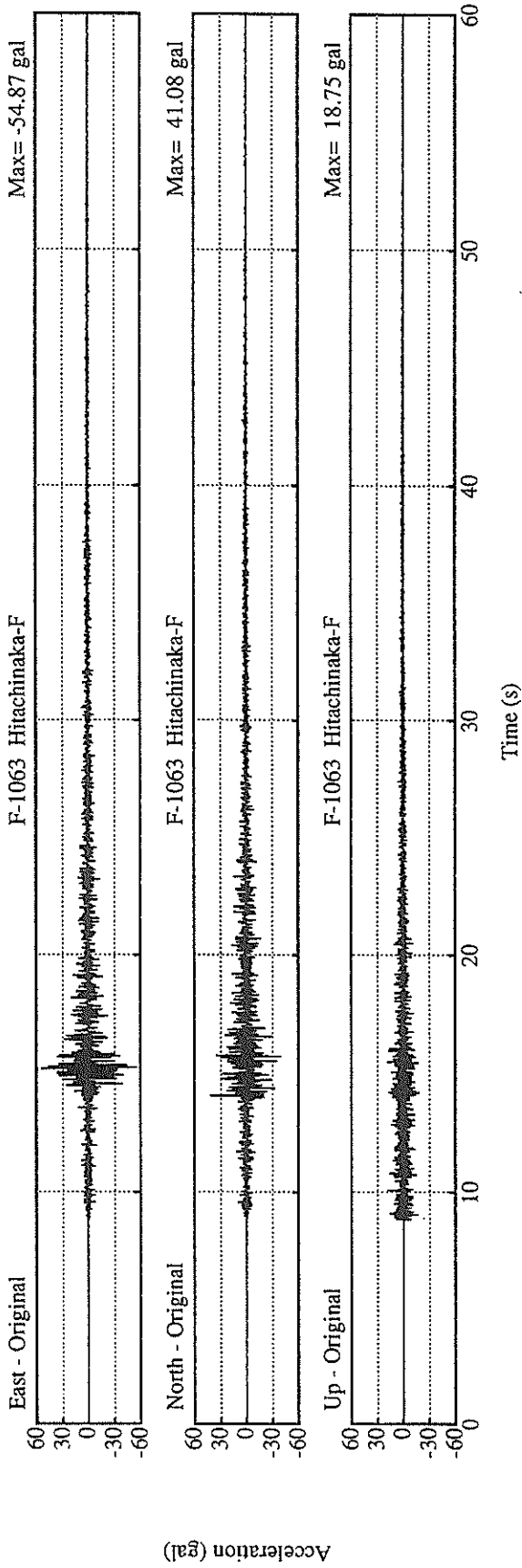
MAXIMUM VELOCITY (CM/SEC)

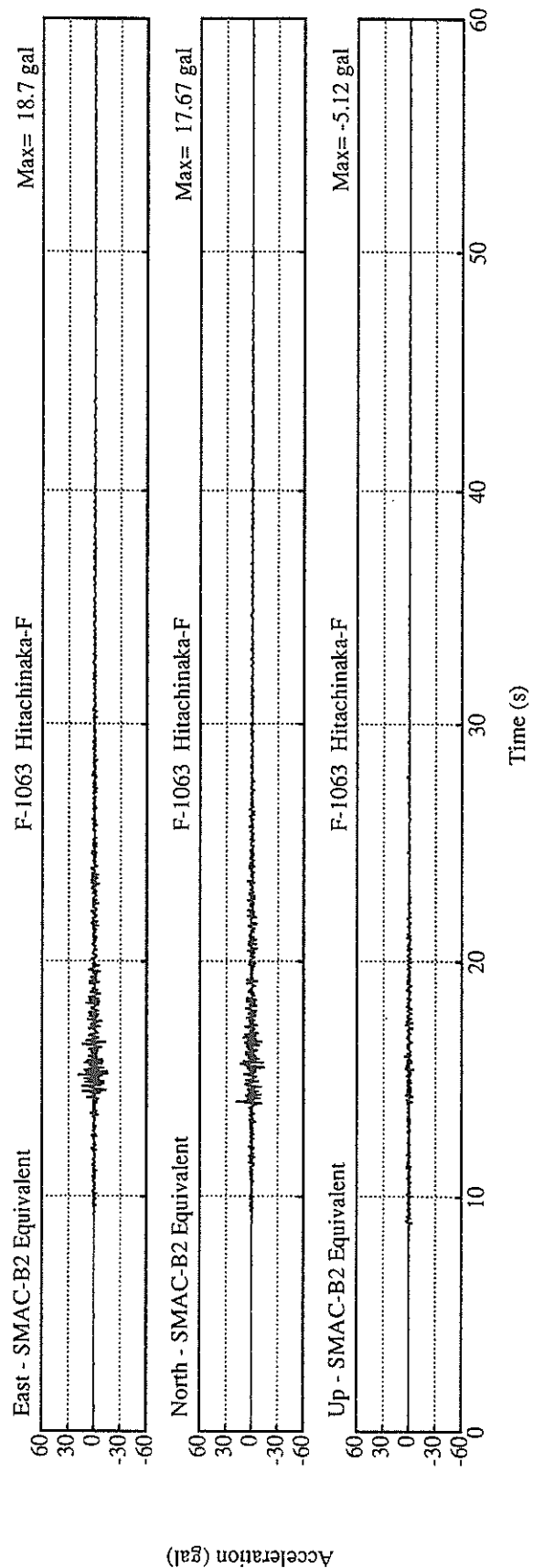
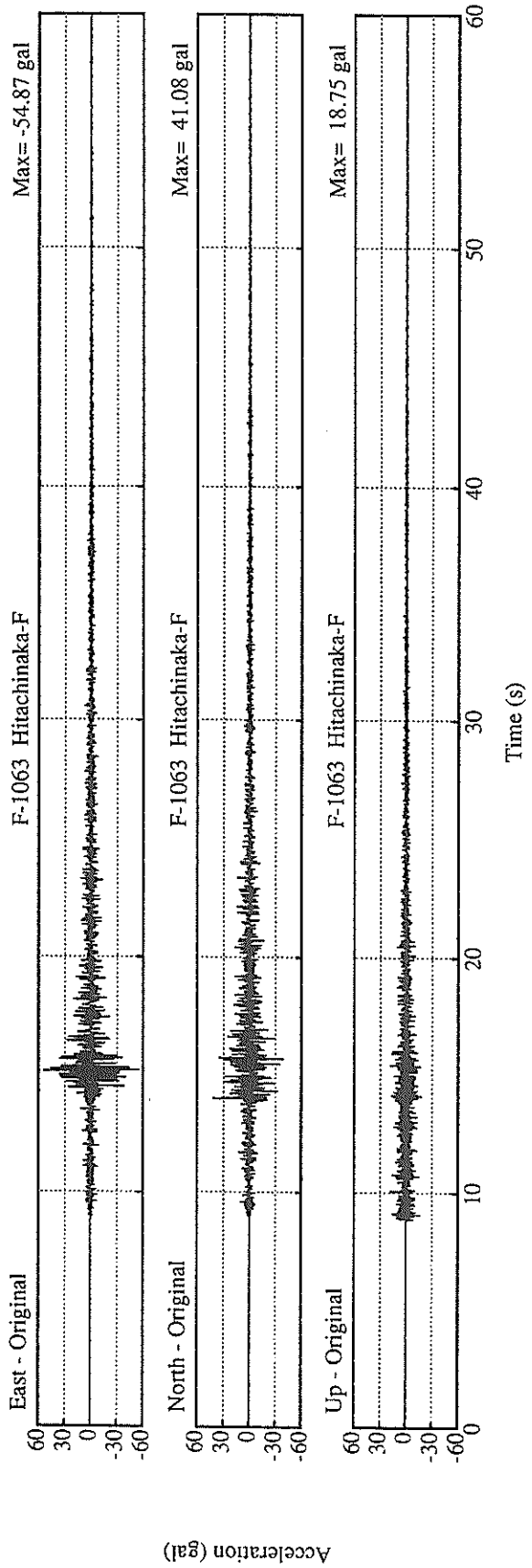
FIXED FILTER	0.86	1.07	0.33	1.07
VARIABLE FILTER	0.86	1.03	0.33	1.03

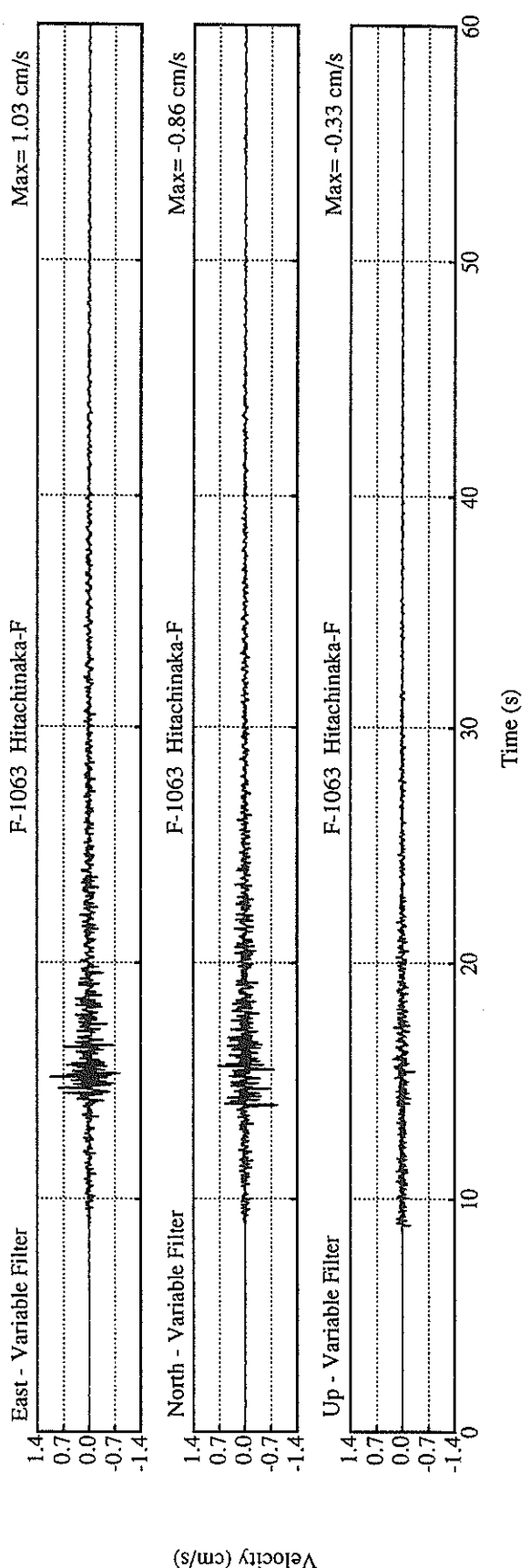
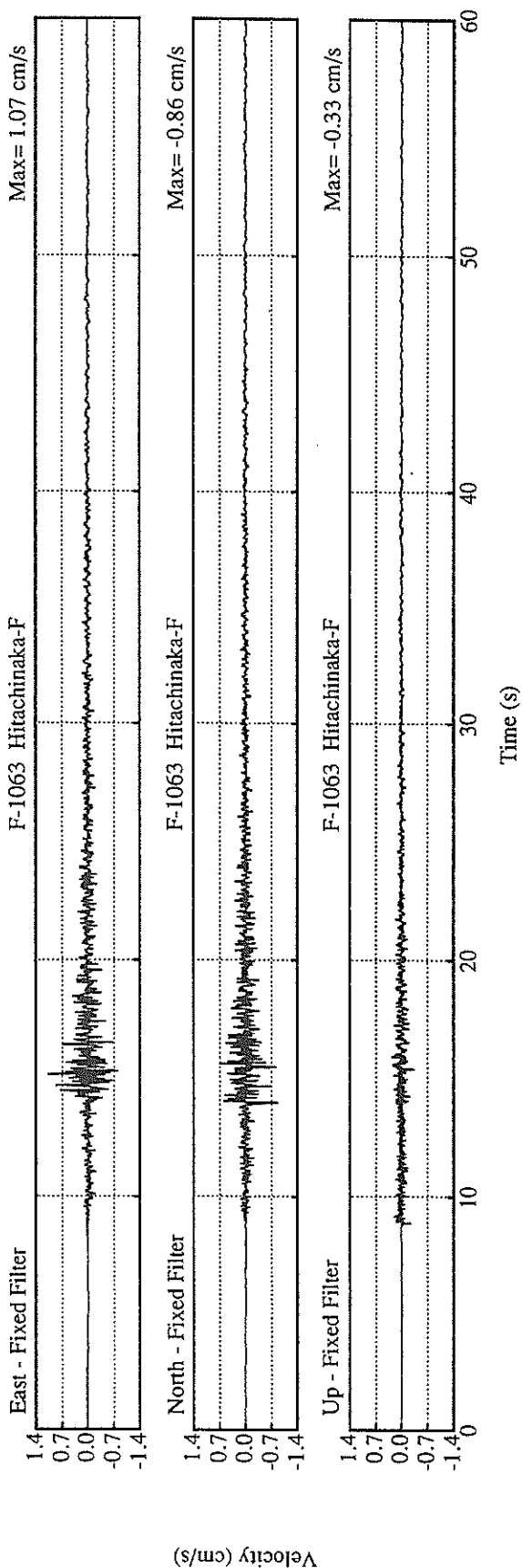
MAXIMUM DISPLACEMENT (CM)

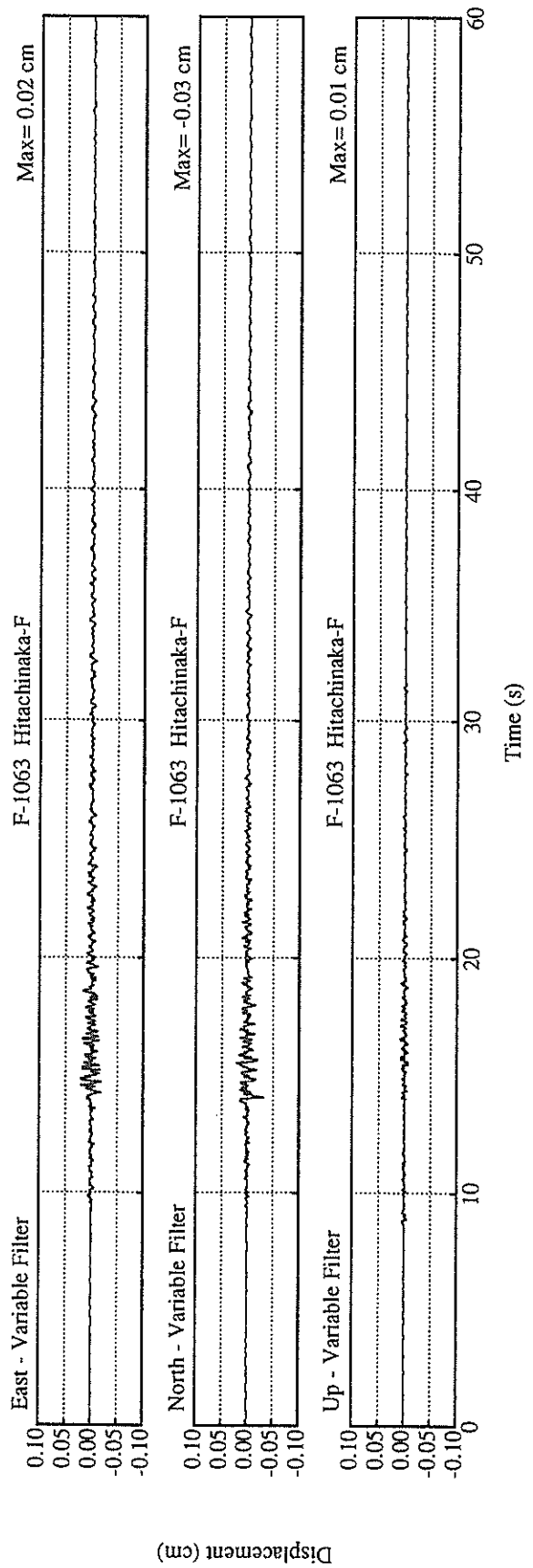
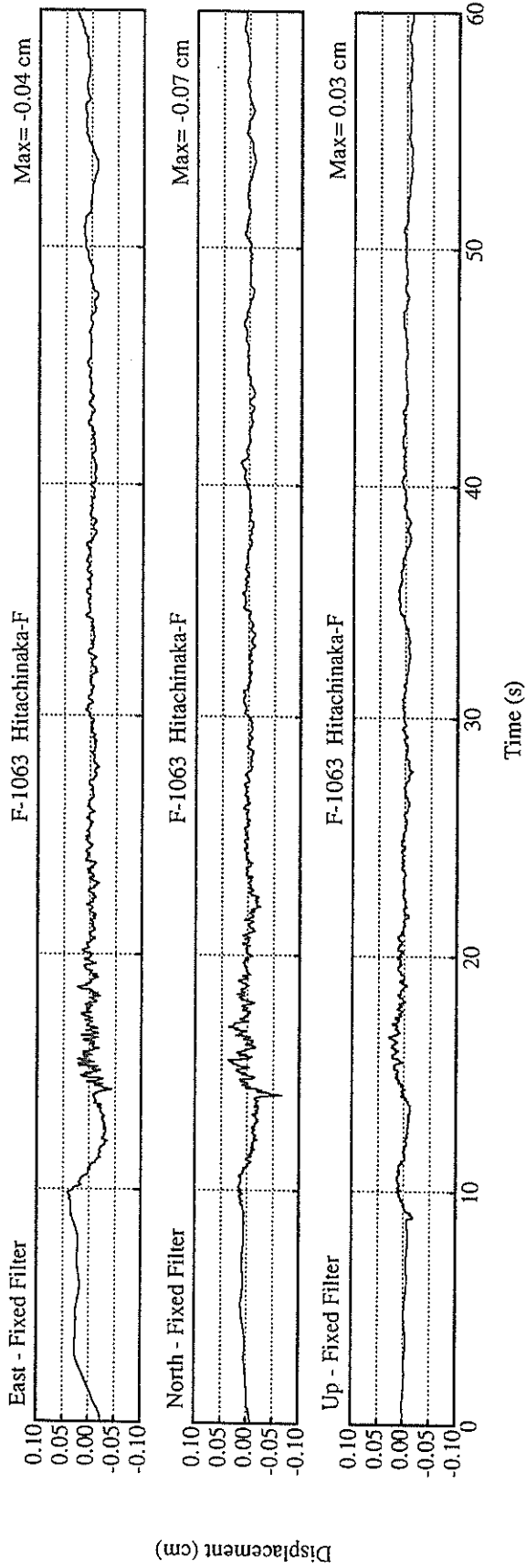
FIXED FILTER	0.07	0.04	0.03	0.07
VARIABLE FILTER	0.03	0.02	0.01	0.03

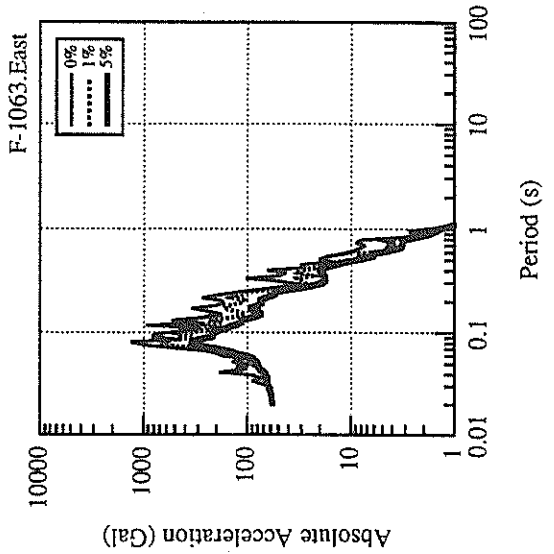
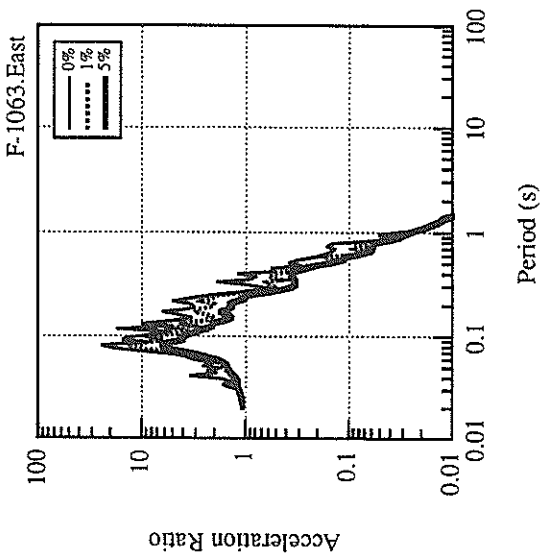
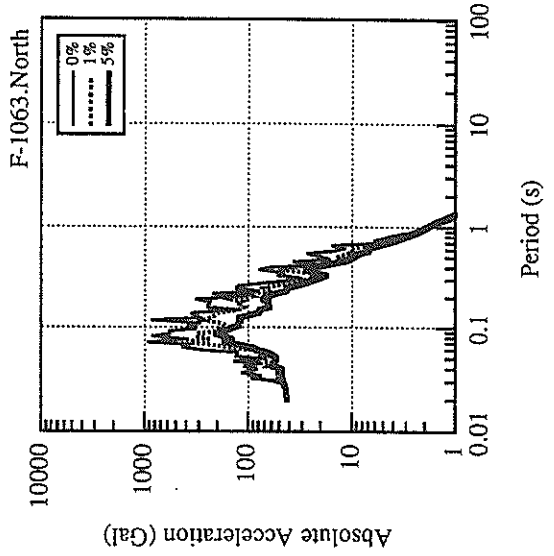
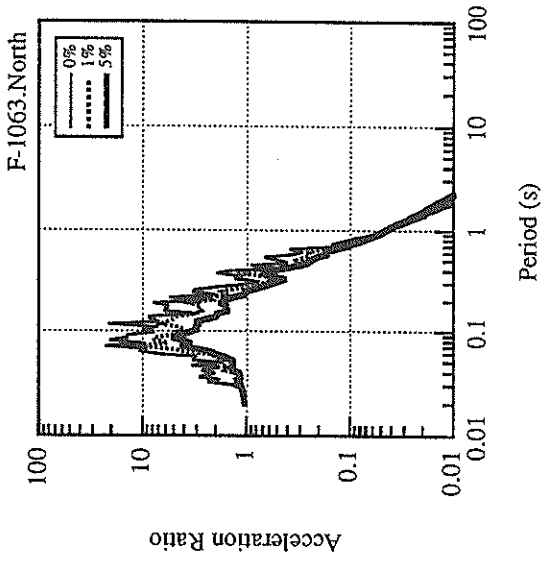
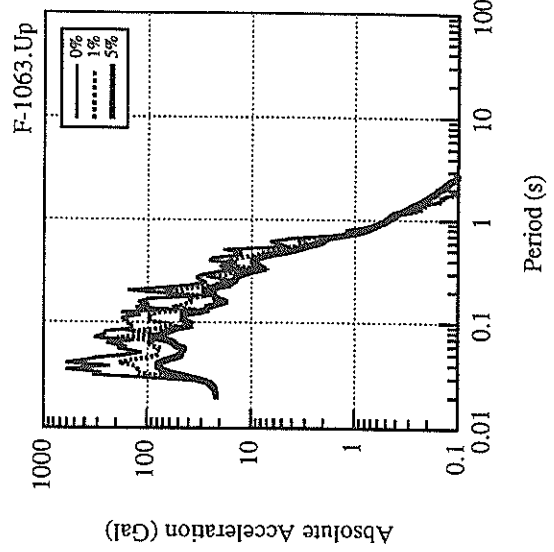
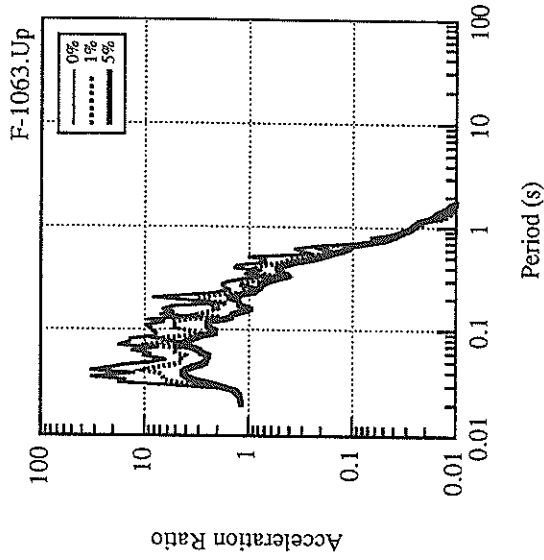
* RESULTANT OF HORIZONTAL COMPONENTS

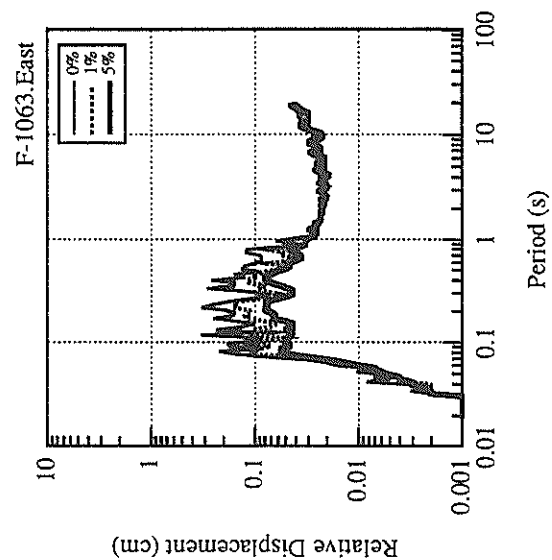
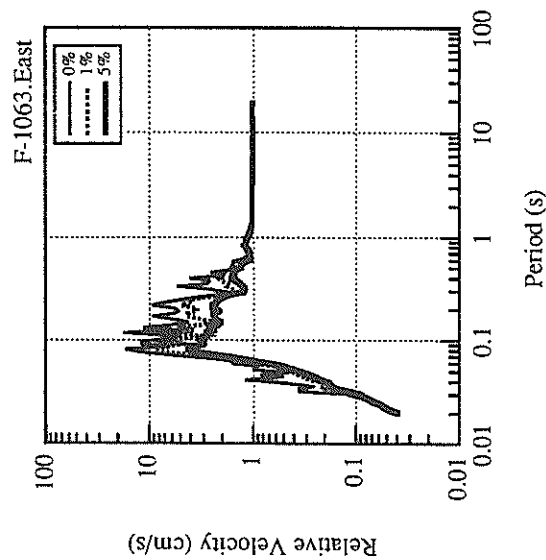
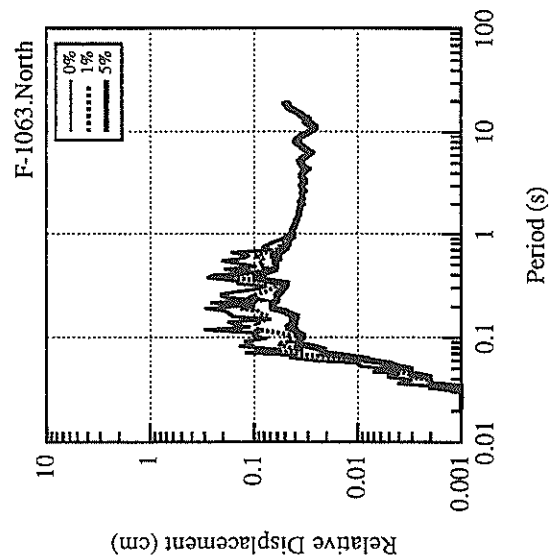
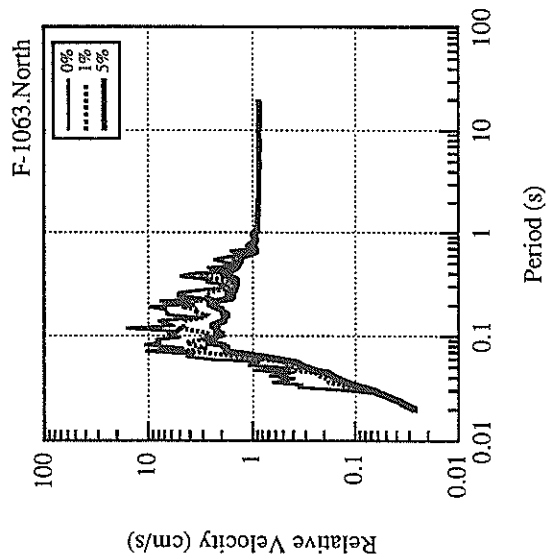
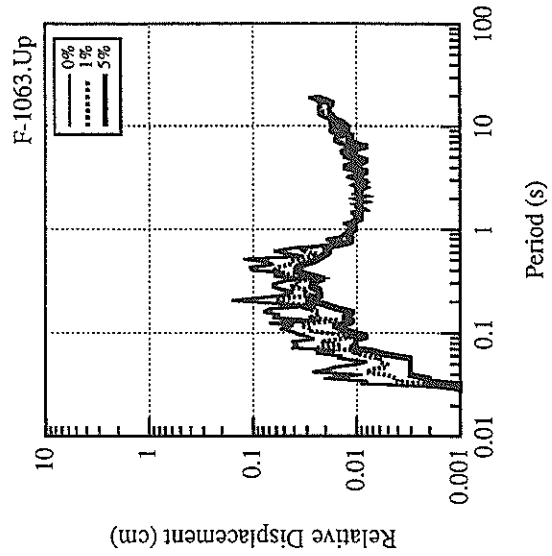
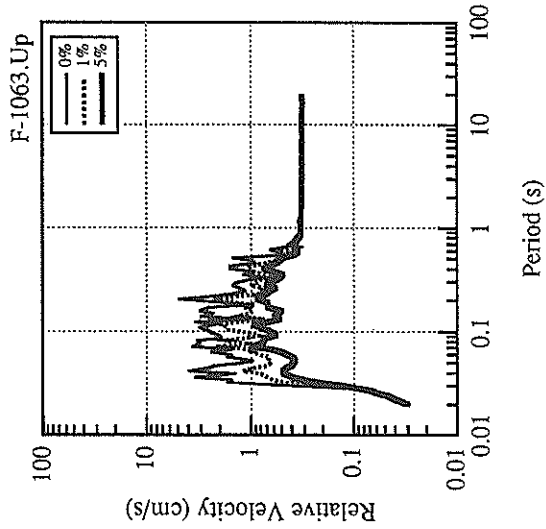


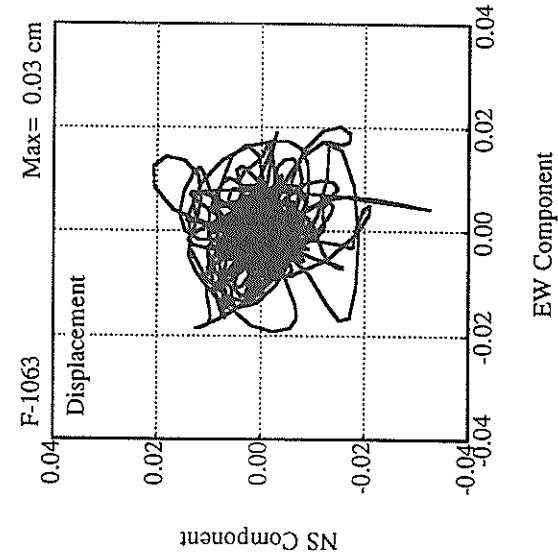
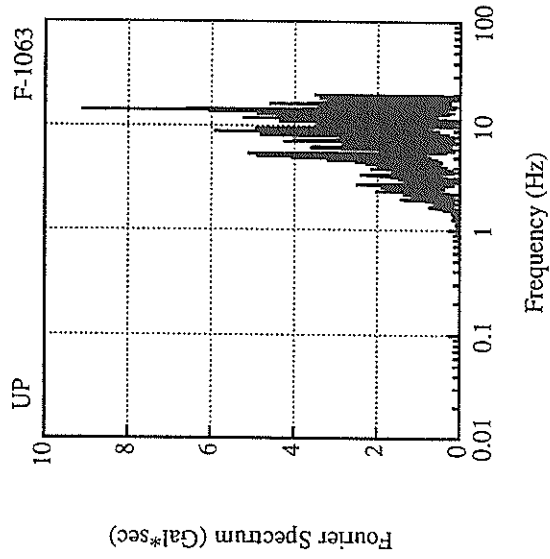
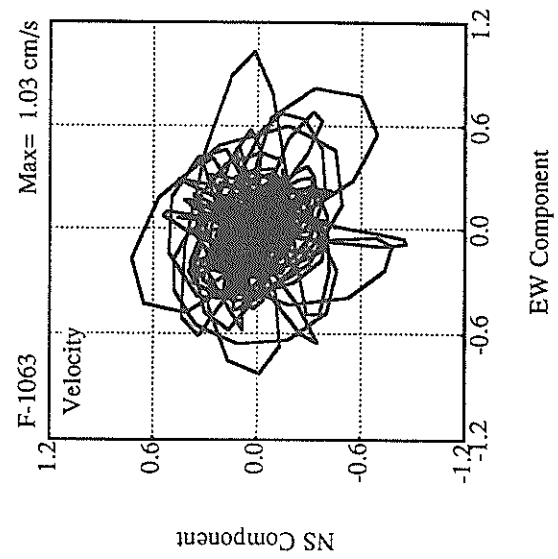
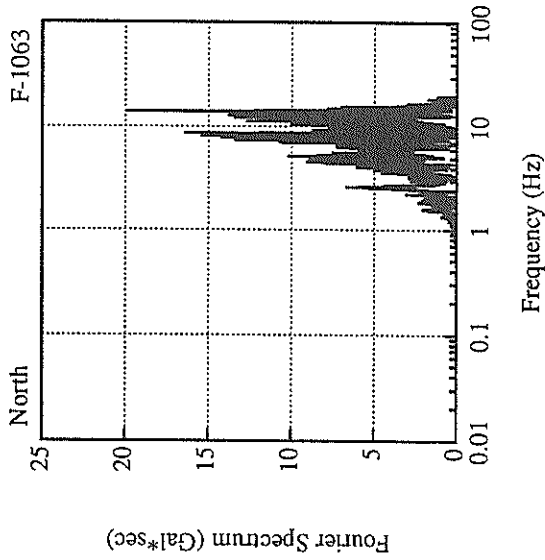
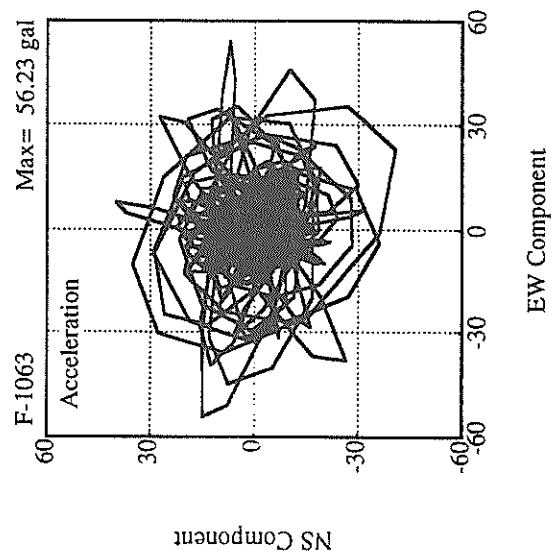
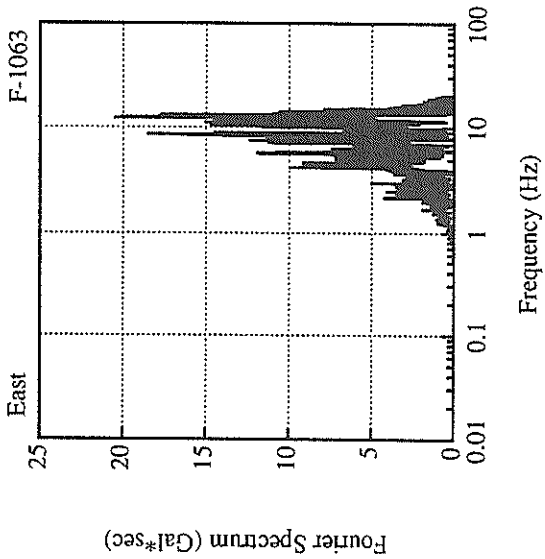












RECORD NUMBER : F-1051

STATION : MIYAZAKI-GB

EARTHQUAKE DATA

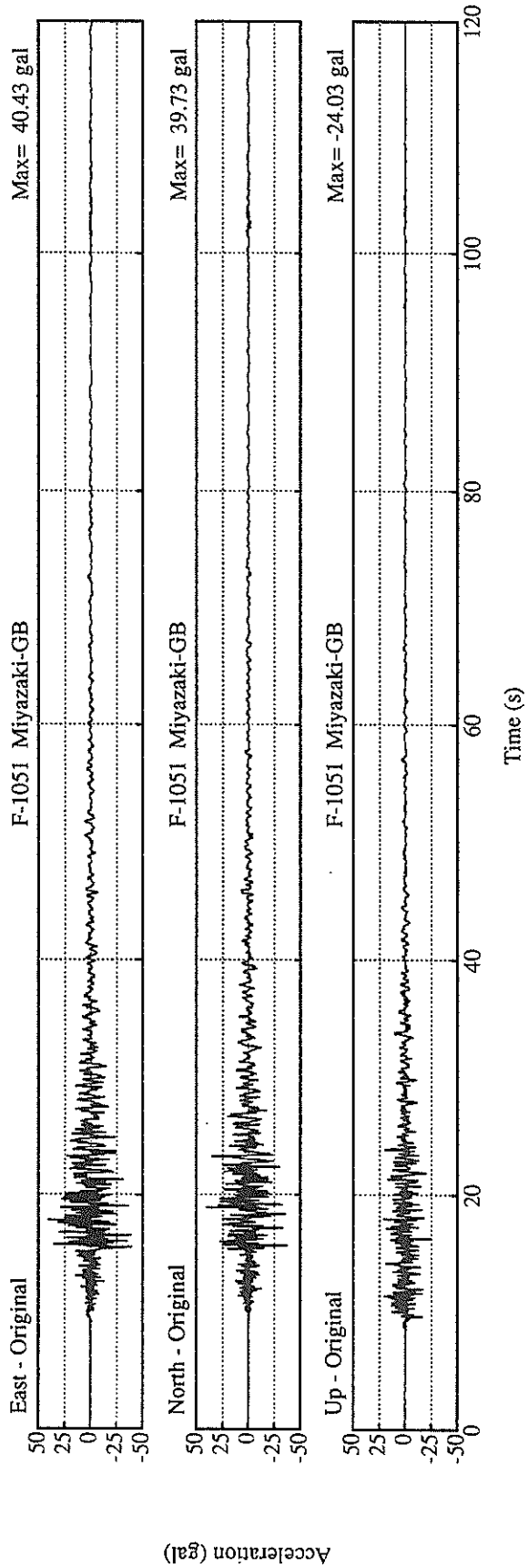
 DATE AND TIME : 23:44 OCT.19,1996
 LOCATION OF HYPOCENTER : HYUGANADA REGION
 EPICENTRAL REGION : 31°47.7' N
 LATITUDE : 131°59.5' E
 LONGITUDE : 41.2KM
 DEPTH : 6.6
 JMA MAGNITUDE : 6.6

PEAK VALUES OF COMPONENTS

N	S	E	W	U	D	HORIZONTAL*
39.7	40.4	24.0	48.7			

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-1052

STATION : MIYAZAKI-G

EARTHQUAKE DATA

 DATE AND TIME 23:44 OCT.19,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION HYUGANADA REGION
 LATITUDE 31°47.7' N
 LONGITUDE 131°59.5' E
 DEPTH 41.2KM
 JMA MAGNITUDE 6.6

PEAK VALUES OF COMPONENTS

 N S E W U D HORIZONTAL*

PARAMETER OF THE VARIABLE FILTER

 FC (HZ) 0.189 0.085 0.140

MAXIMUM ACCELERATION (GAL)

 SMAC-B2 EQUIVALENT 77.2 74.7 52.9 79.5
 ORIGINAL 104.5 95.8 94.1 105.4
 CORRECTED 104.4 96.6 94.7 105.6

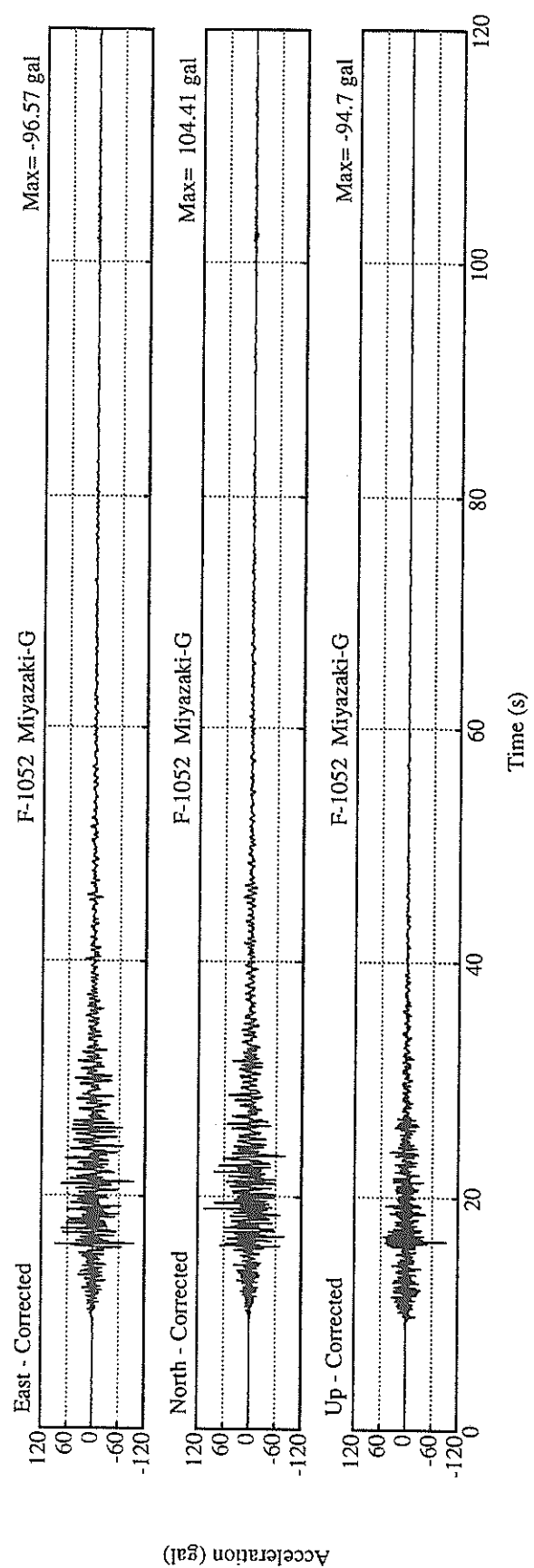
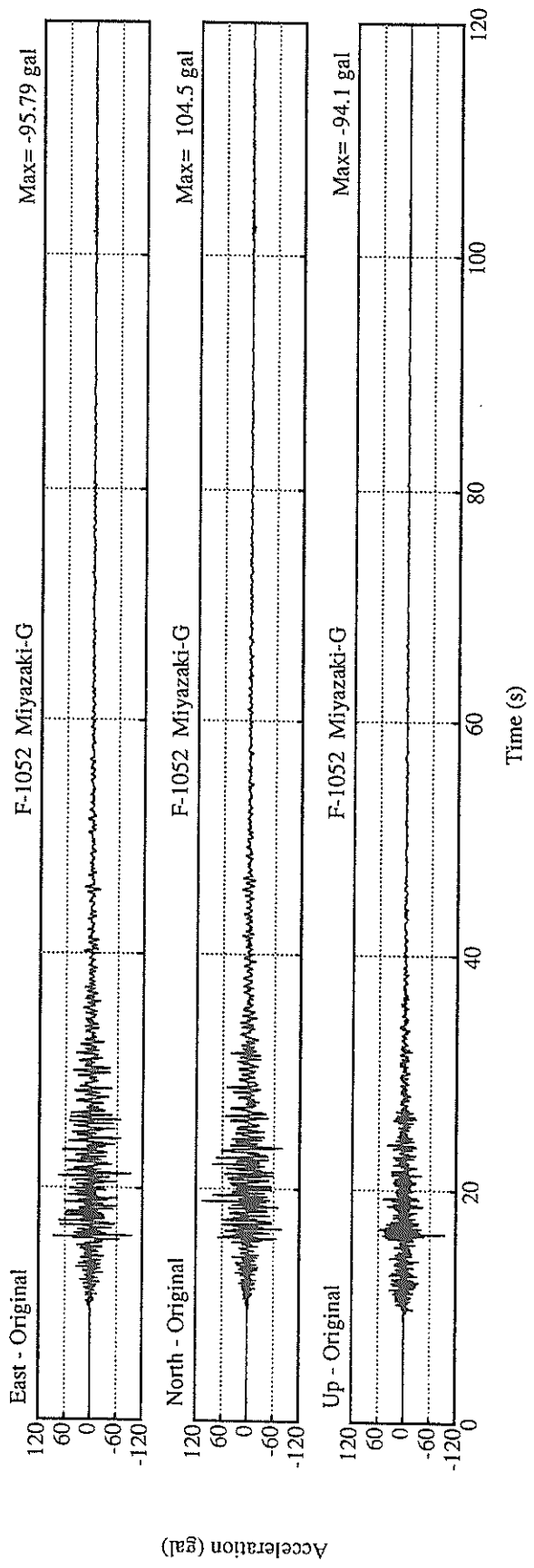
MAXIMUM VELOCITY (CM/SEC)

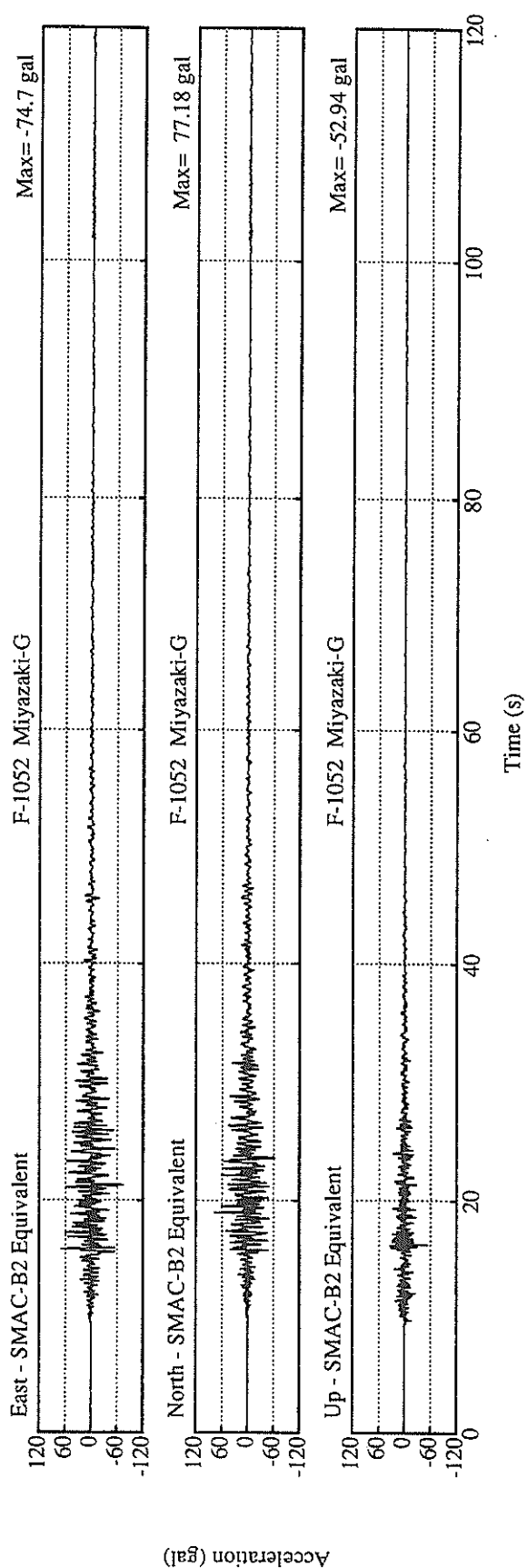
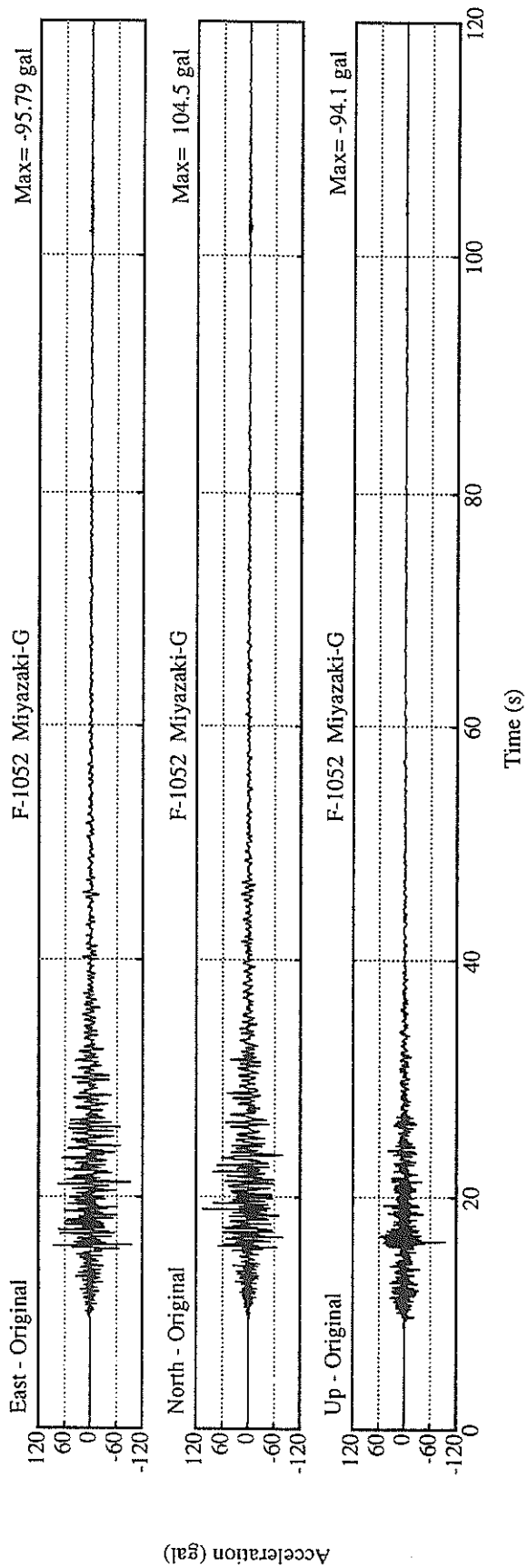
 FIXED FILTER 6.04 7.60 2.91 7.69
 VARIABLE FILTER 6.18 6.84 3.32 7.11

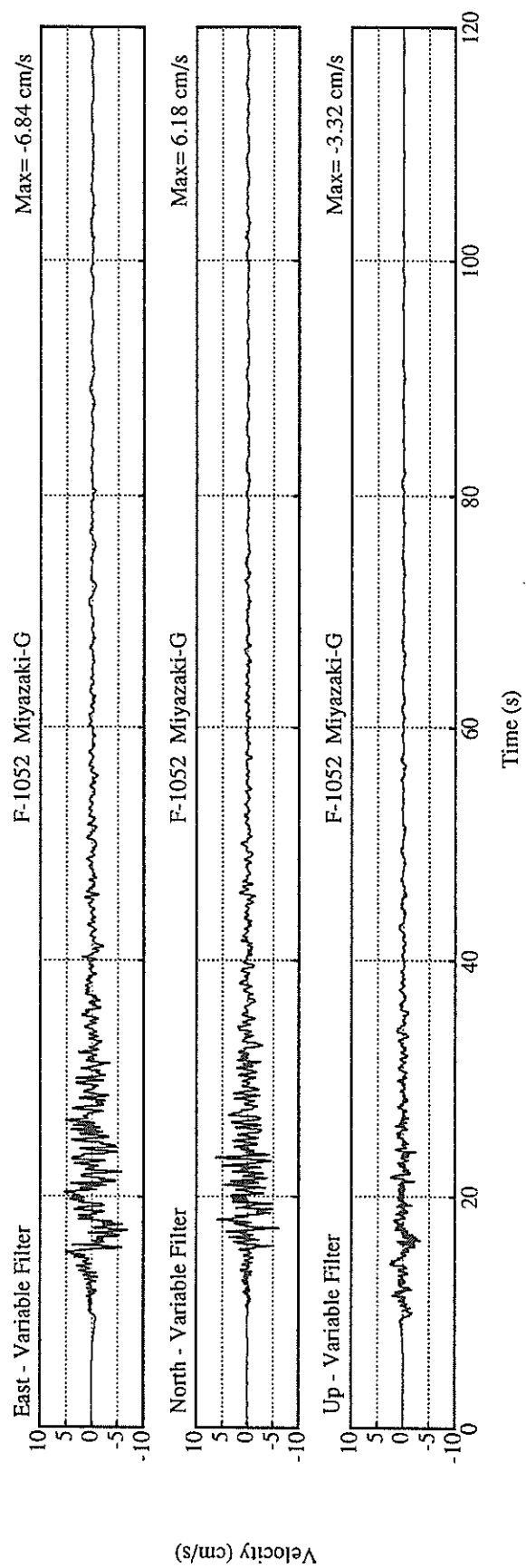
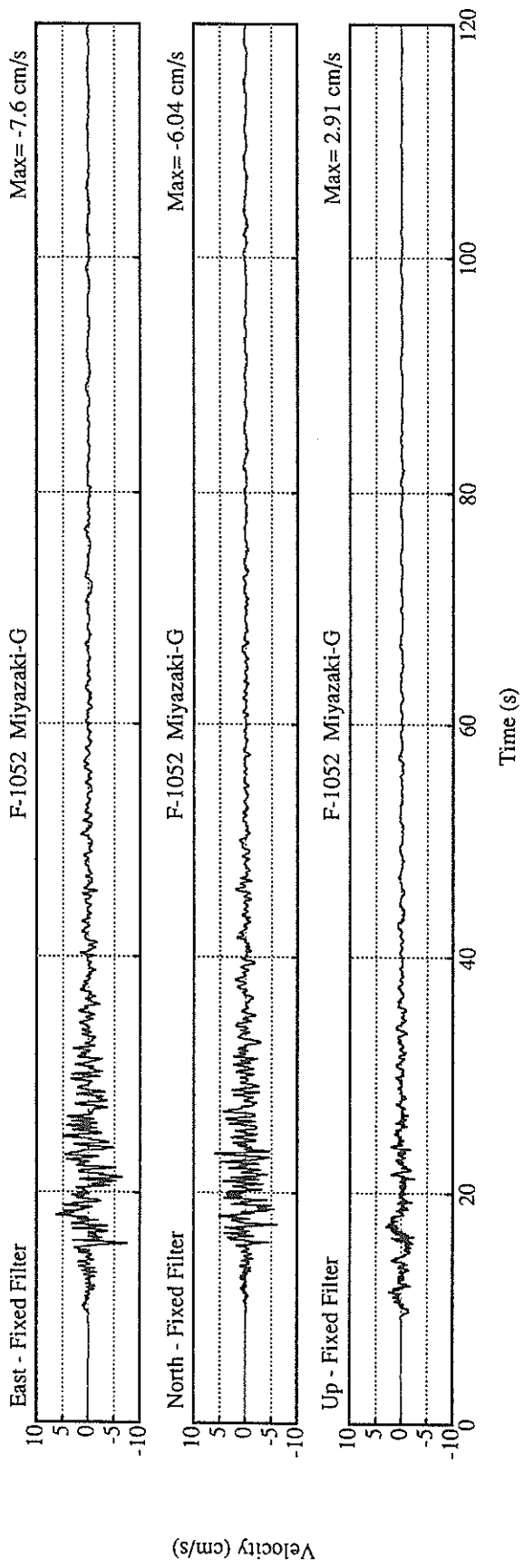
MAXIMUM DISPLACEMENT (CM)

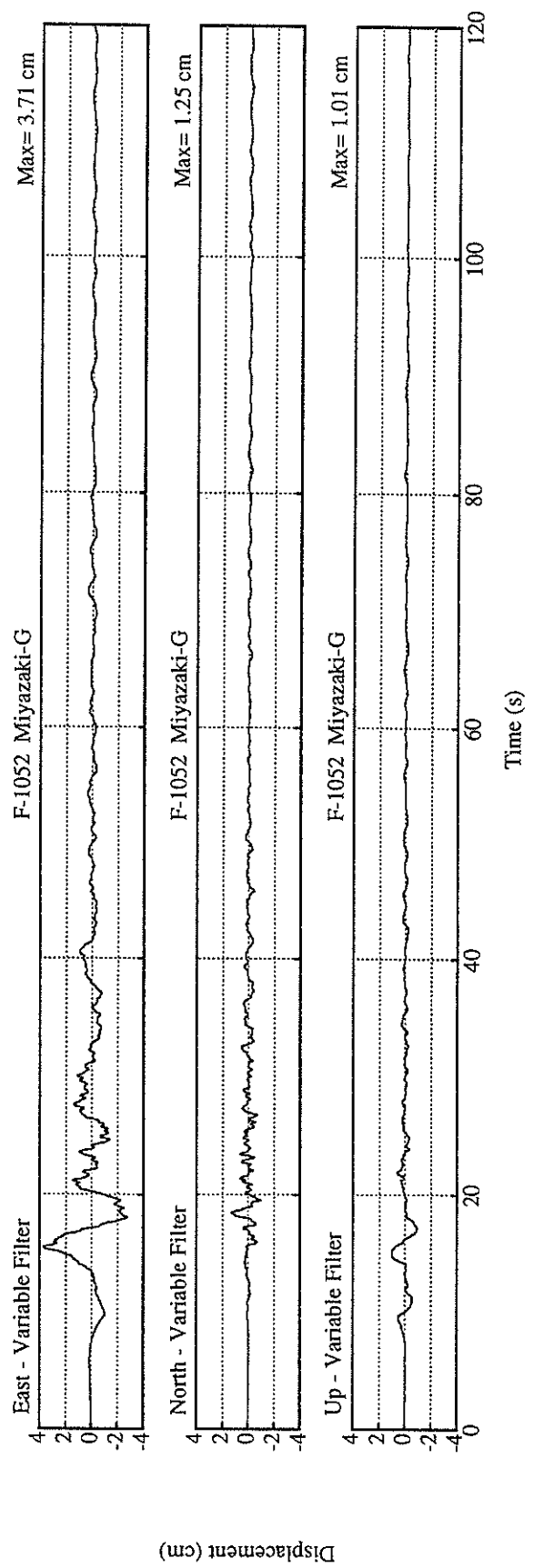
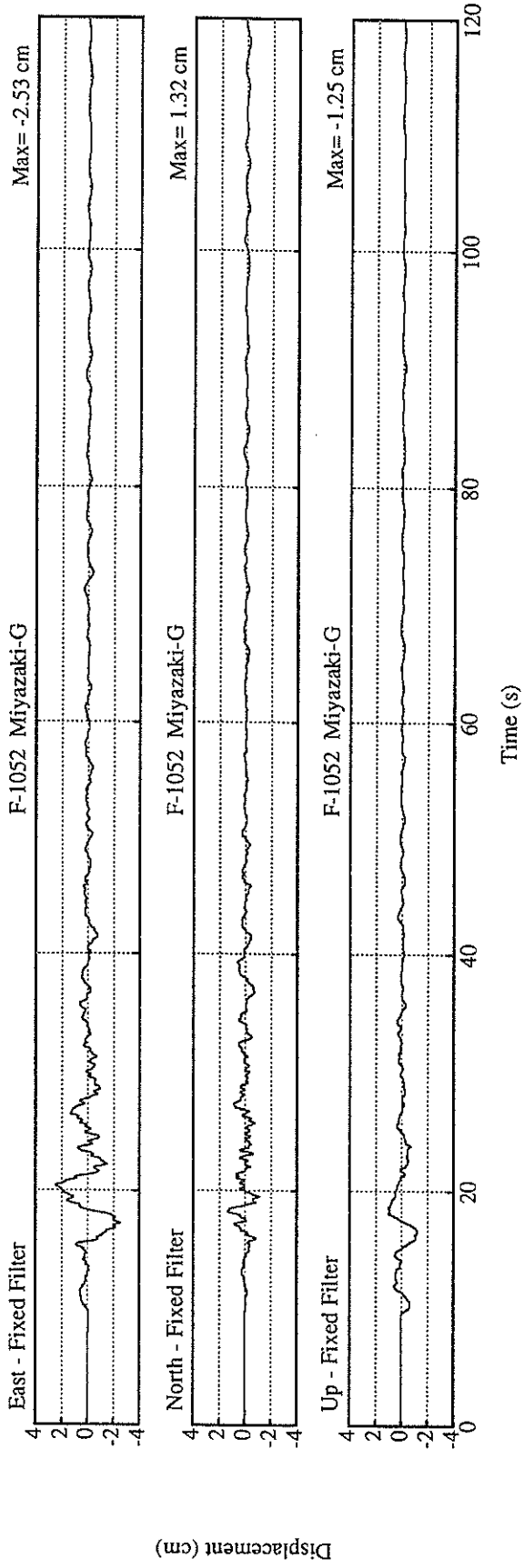
 FIXED FILTER 1.32 2.53 1.25 2.64
 VARIABLE FILTER 1.25 3.71 1.01 3.71

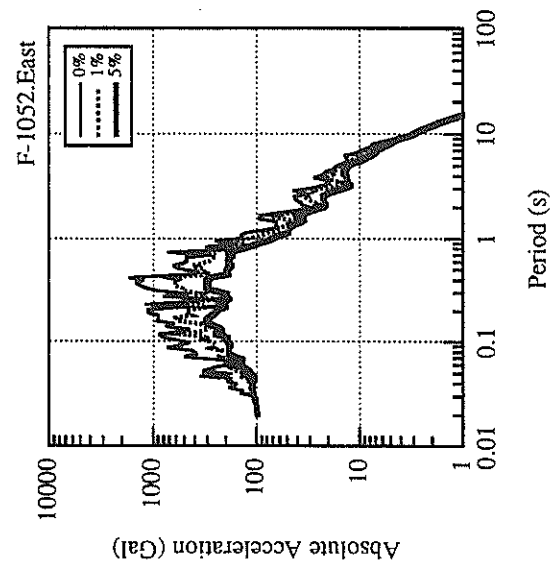
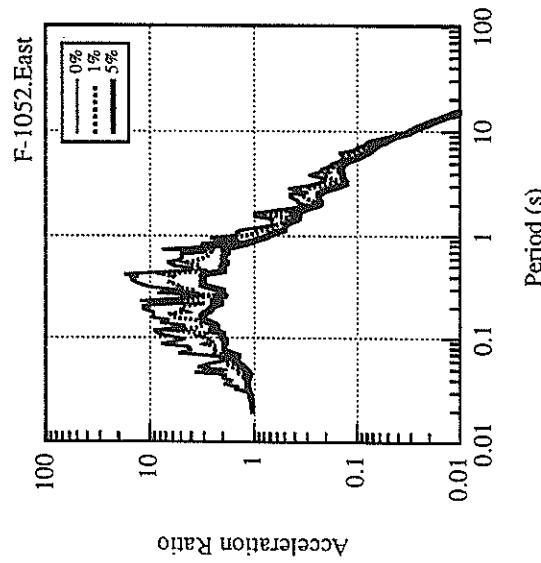
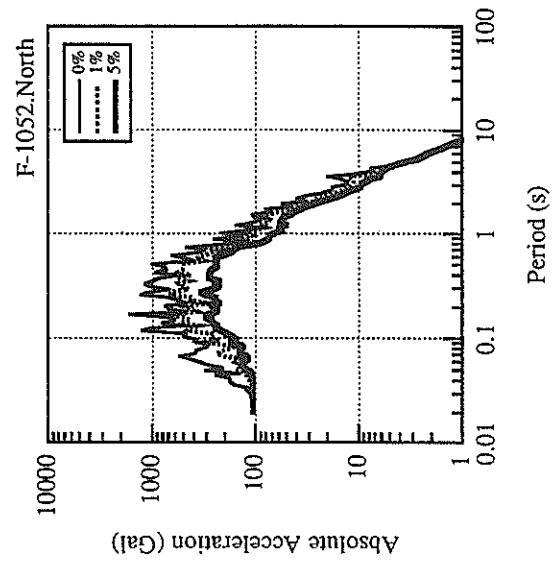
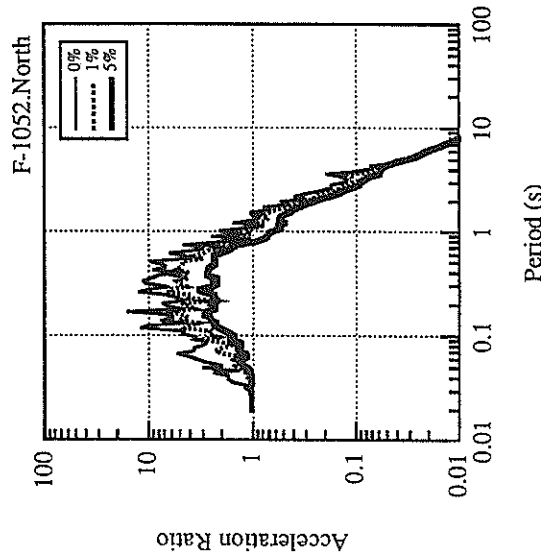
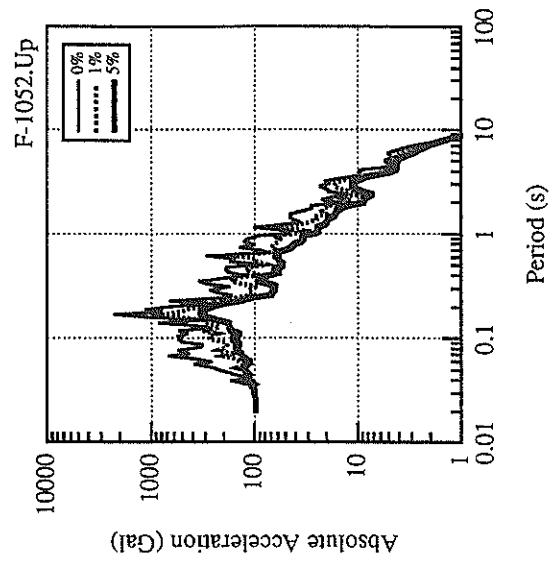
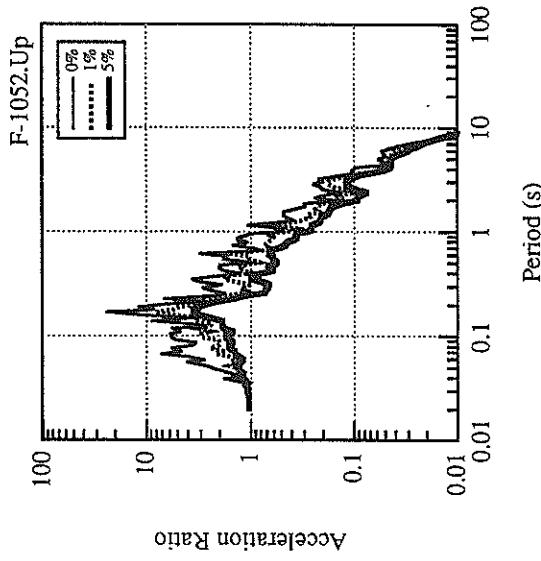
* RESULTANT OF HORIZONTAL COMPONENTS

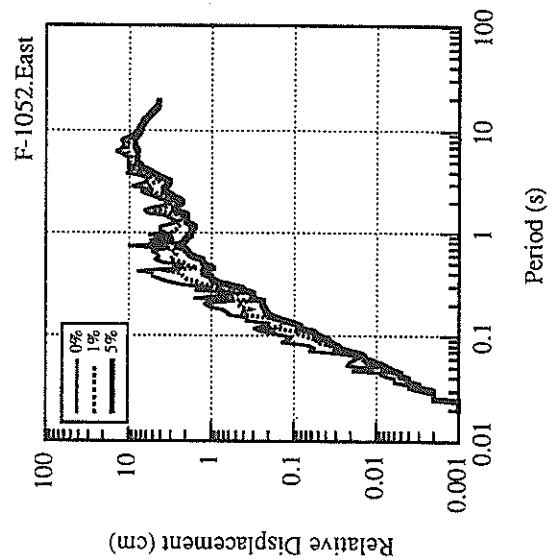
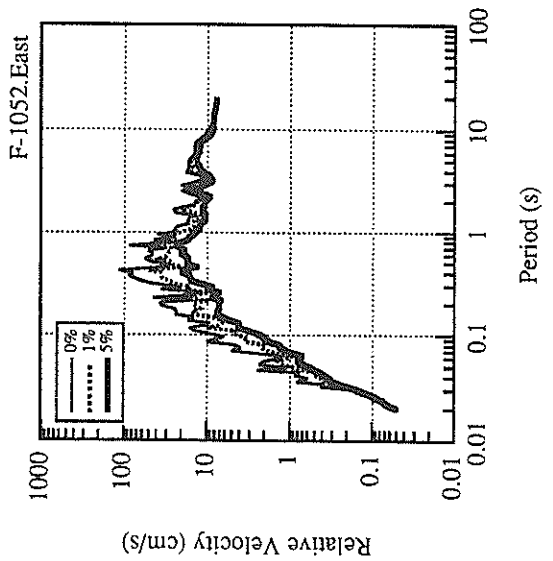
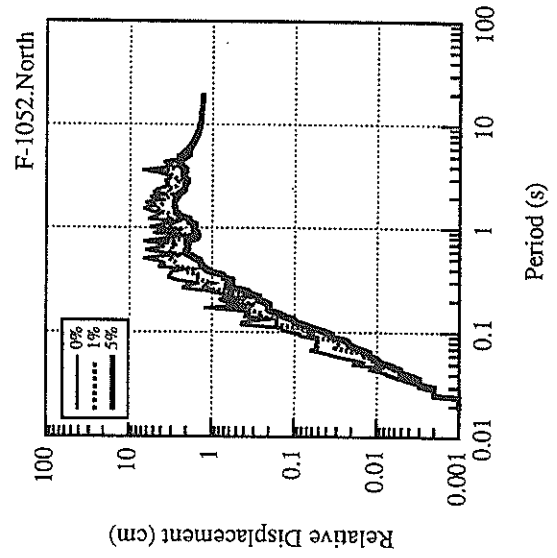
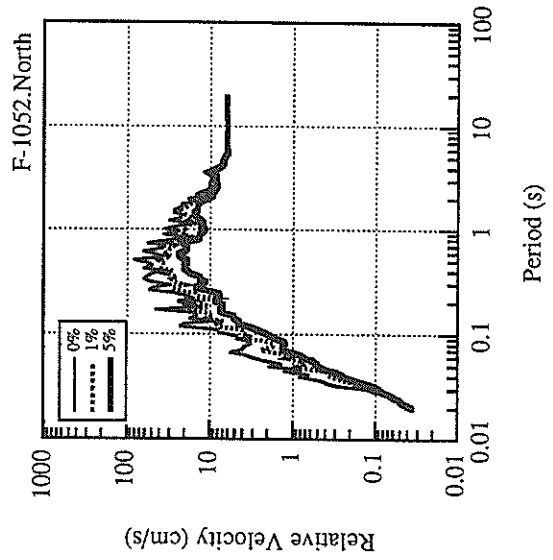
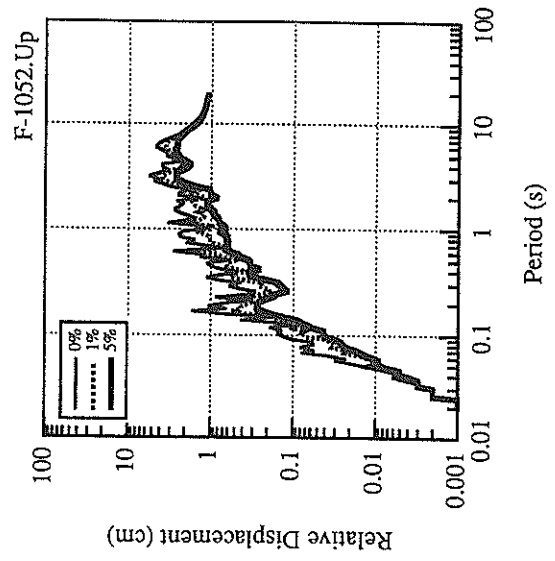
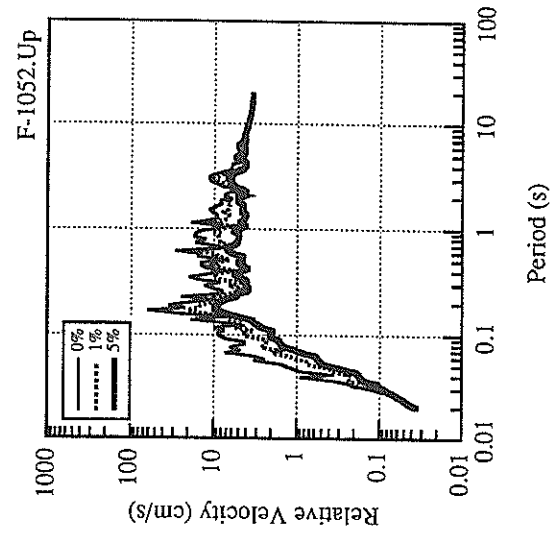


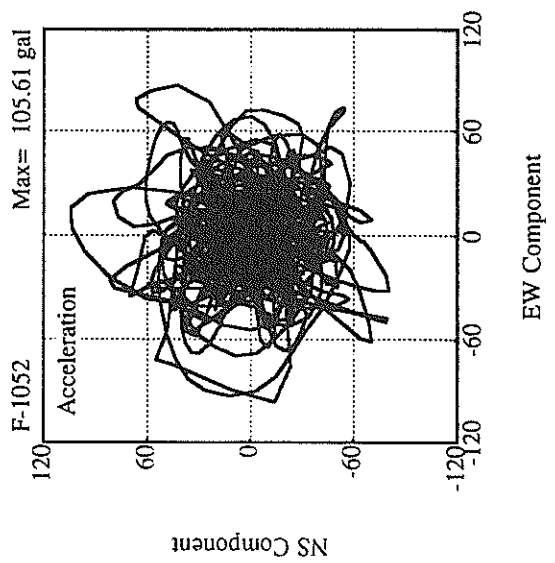
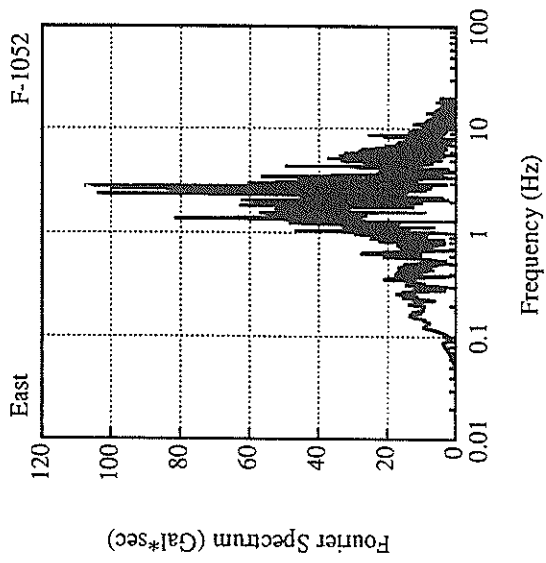
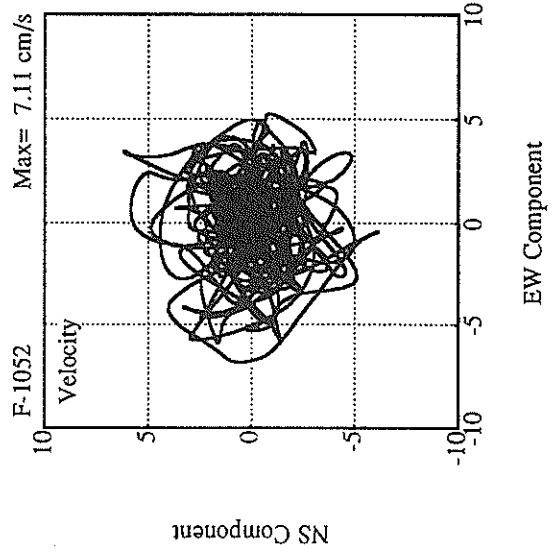
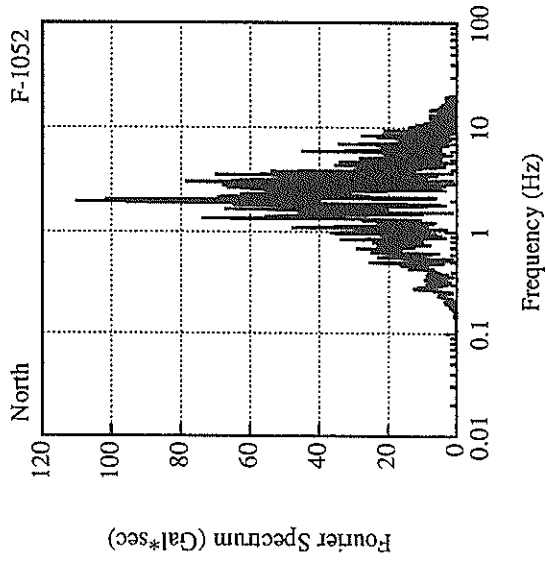
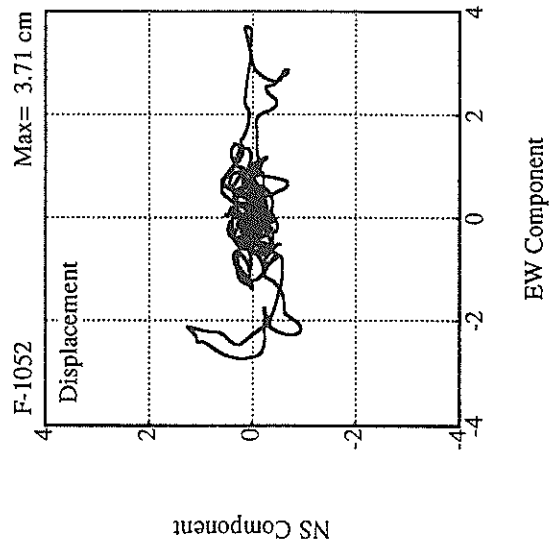
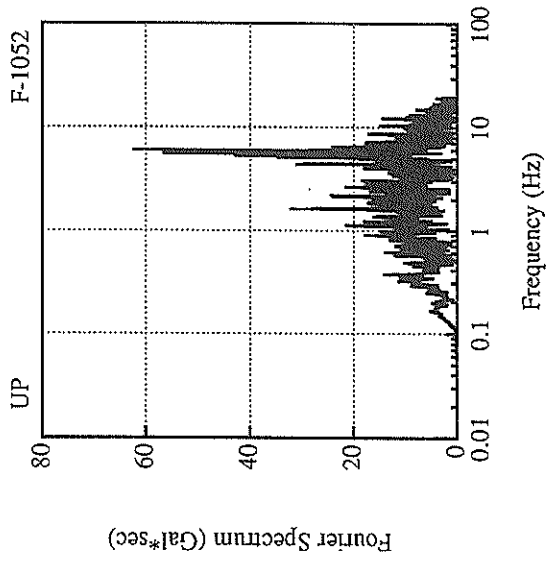












RECORD NUMBER : F-1055

STATION : SHIBUSHI-G

EARTHQUAKE DATA

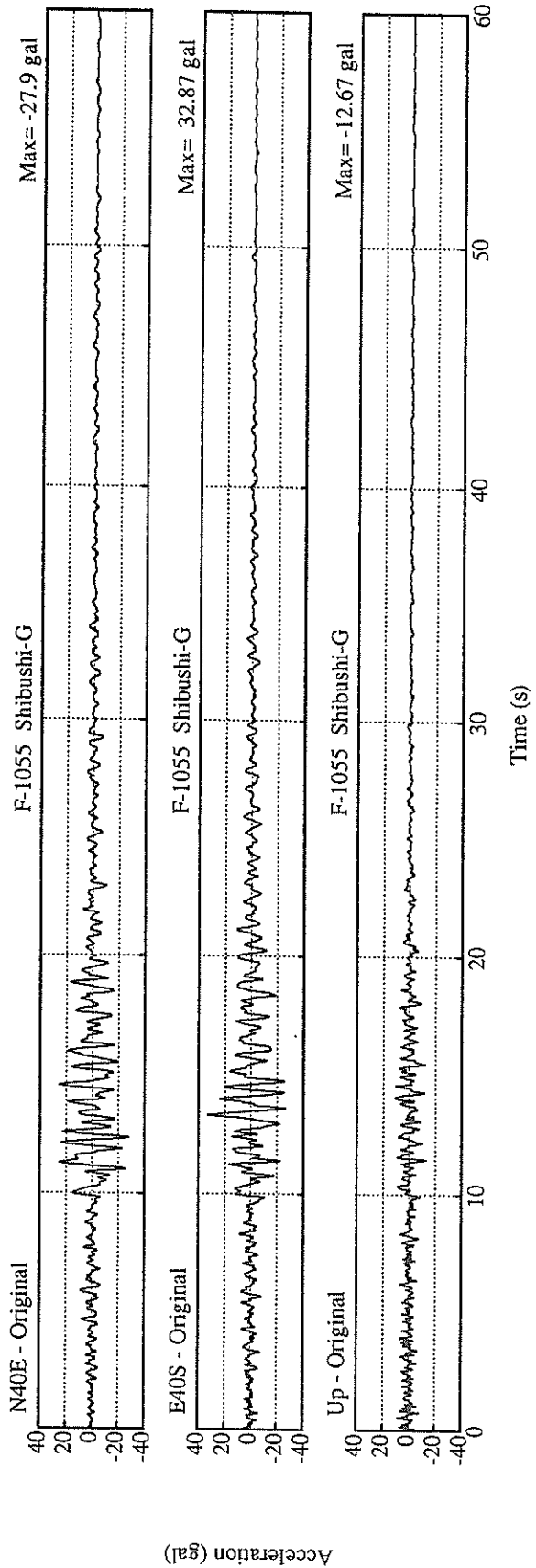
 DATE AND TIME 23:44 OCT.19,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION HYUGANADA REGION
 LATITUDE 31°47.7' N
 LONGITUDE 131°59.5' E
 DEPTH 41.2KM
 JMA MAGNITUDE 6.6

PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*
27.9	32.9	12.7	34.2

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-1115

STATION : OITA-G

EARTHQUAKE DATA

DATE AND TIME 23:44 OCT.19,1996

LOCATION OF HYPOCENTER

EPICENTRAL REGION

LATITUDE

LONGITUDE

DEPTH

JMA MAGNITUDE

HYUGANADA REGION

31° 47.7' N

131° 59.5' E

41.2KM

6.6

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.189	0.176	0.243	

PARAMETER OF THE VARIABLE FILTER

FC (HZ)

0.189

0.176

0.243

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT

ORIGINAL

CORRECTED

58.7

63.8

63.7

47.7	30.9	64.6
50.2	33.7	70.0
50.3	33.5	70.0

MAXIMUM VELOCITY (CM/SEC)

FIXED FILTER

VARIABLE FILTER

7.26

7.23

7.81

8.08

MAXIMUM DISPLACEMENT (CM)

FIXED FILTER

VARIABLE FILTER

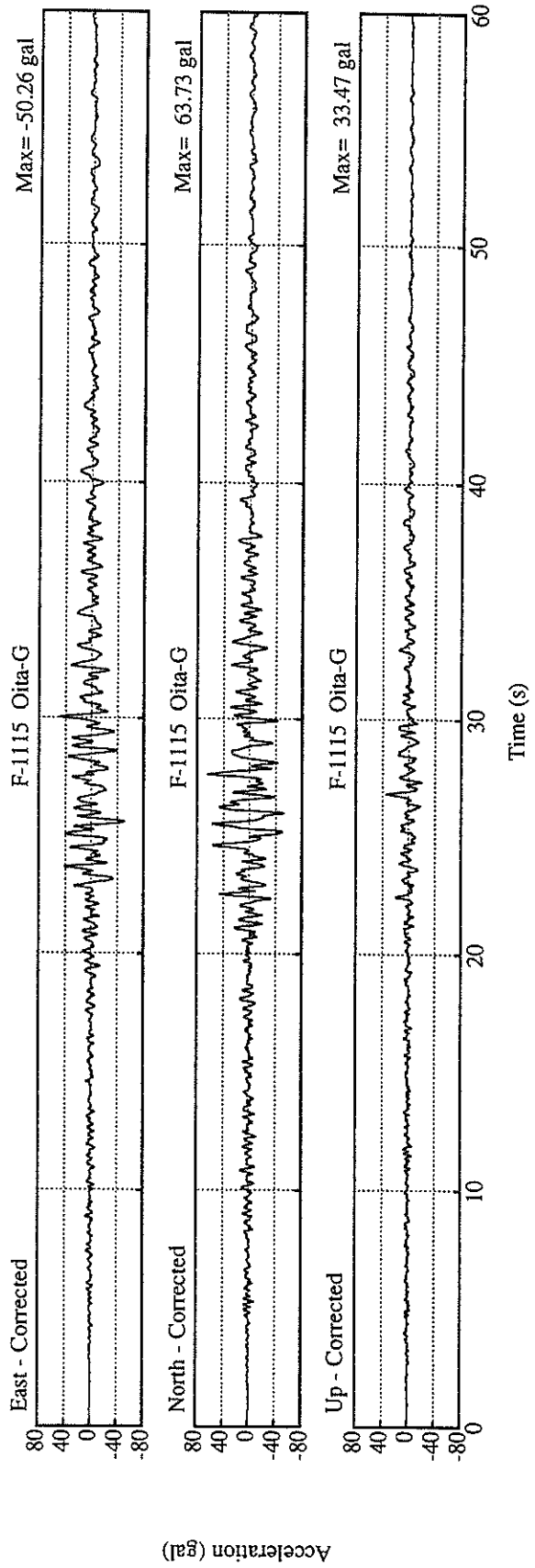
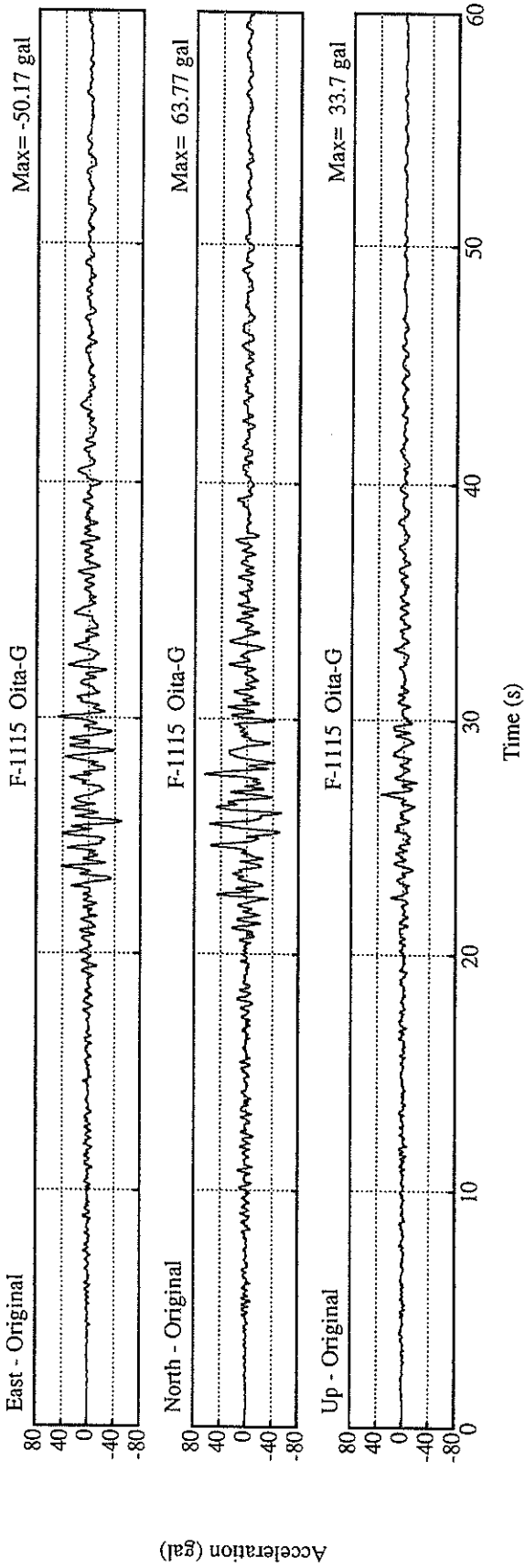
1.58

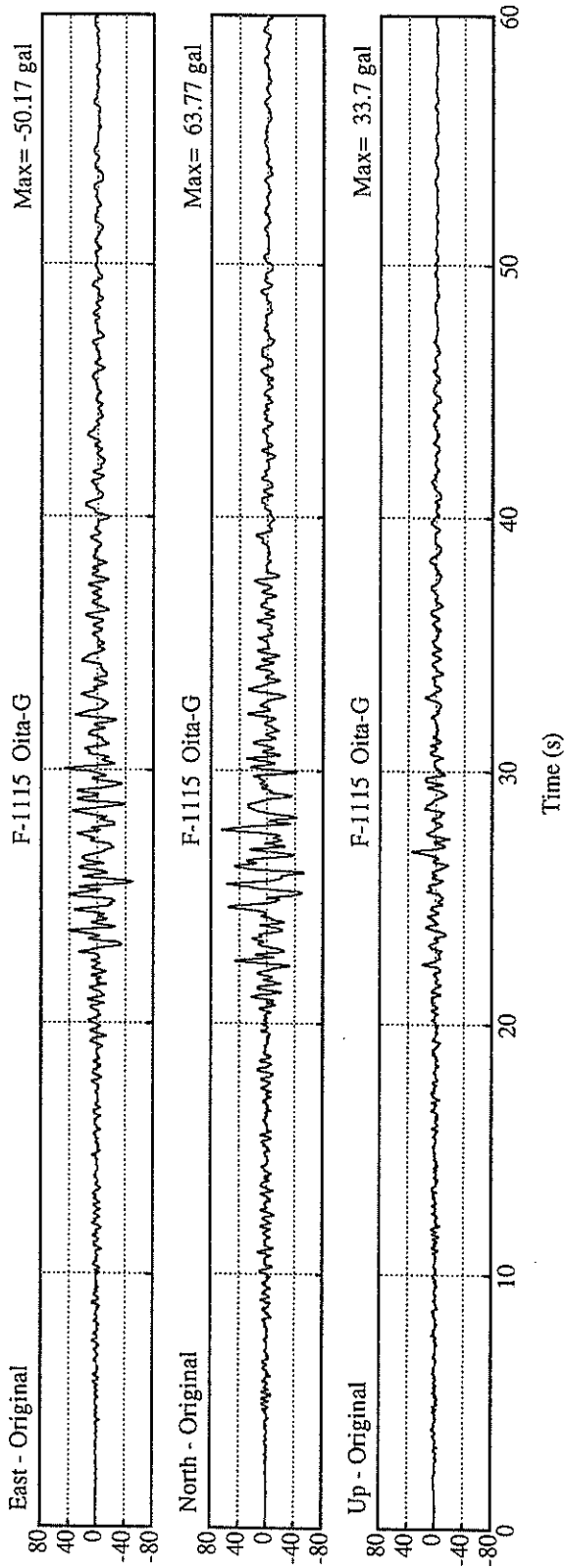
1.30

1.69

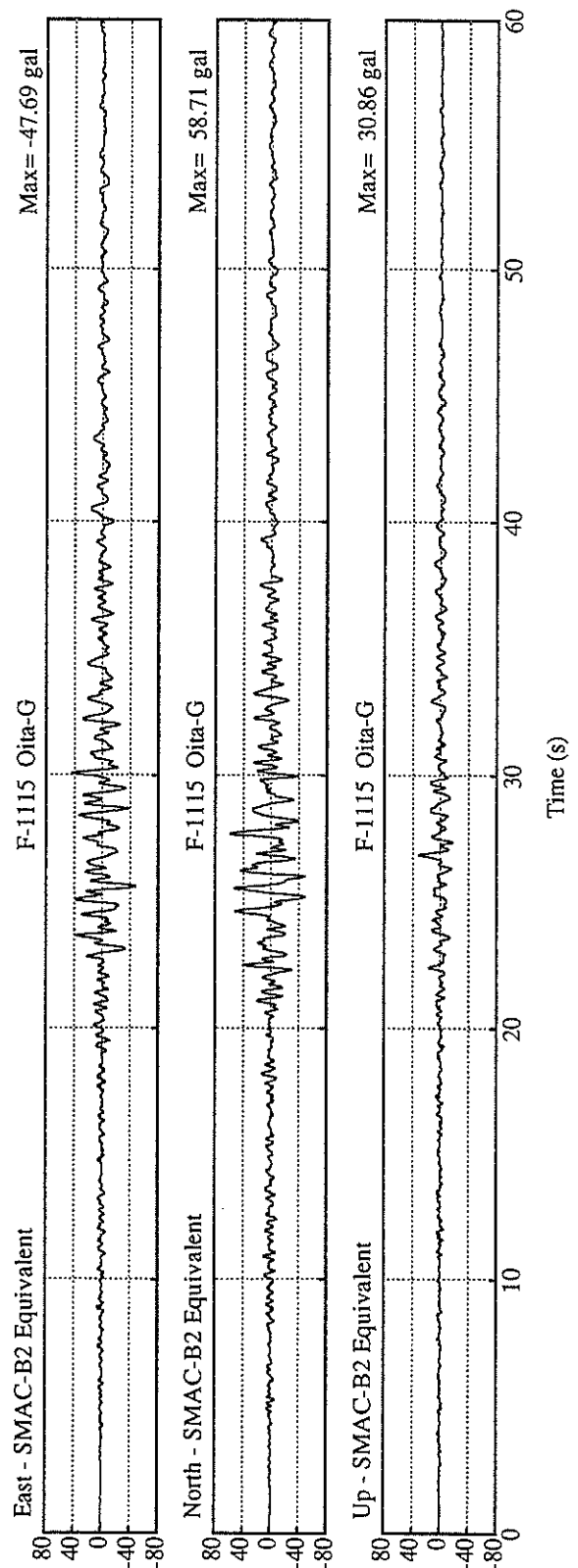
1.30

* RESULTANT OF HORIZONTAL COMPONENTS

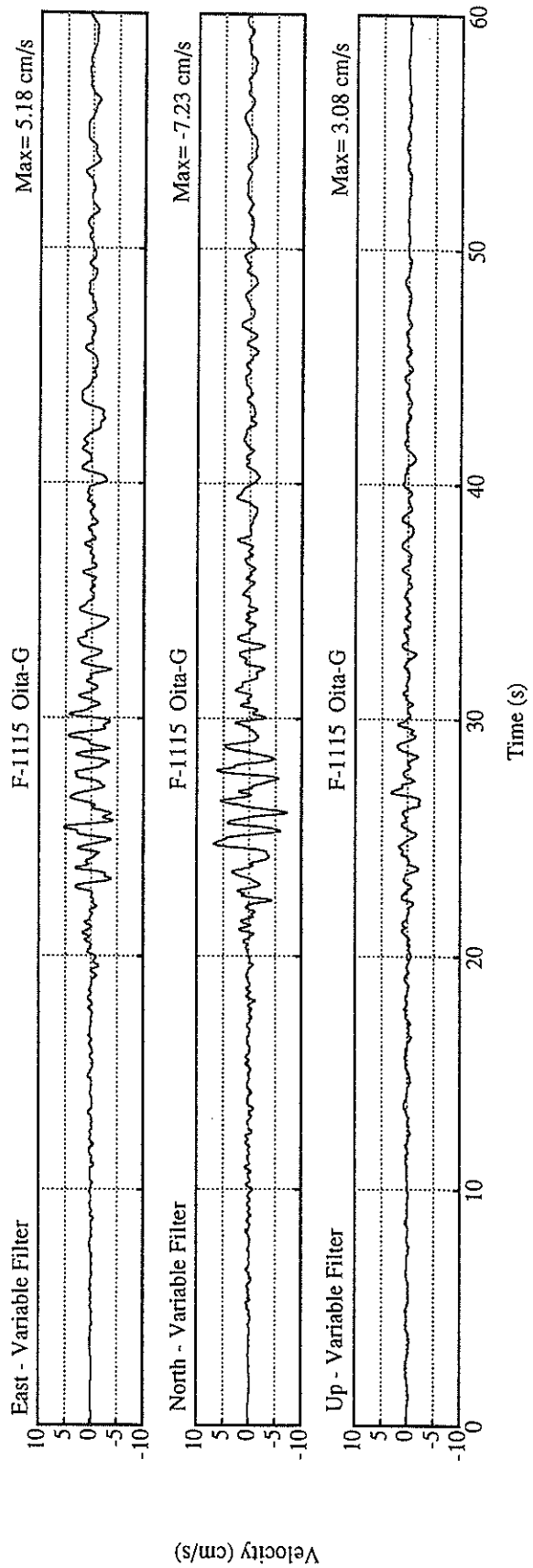
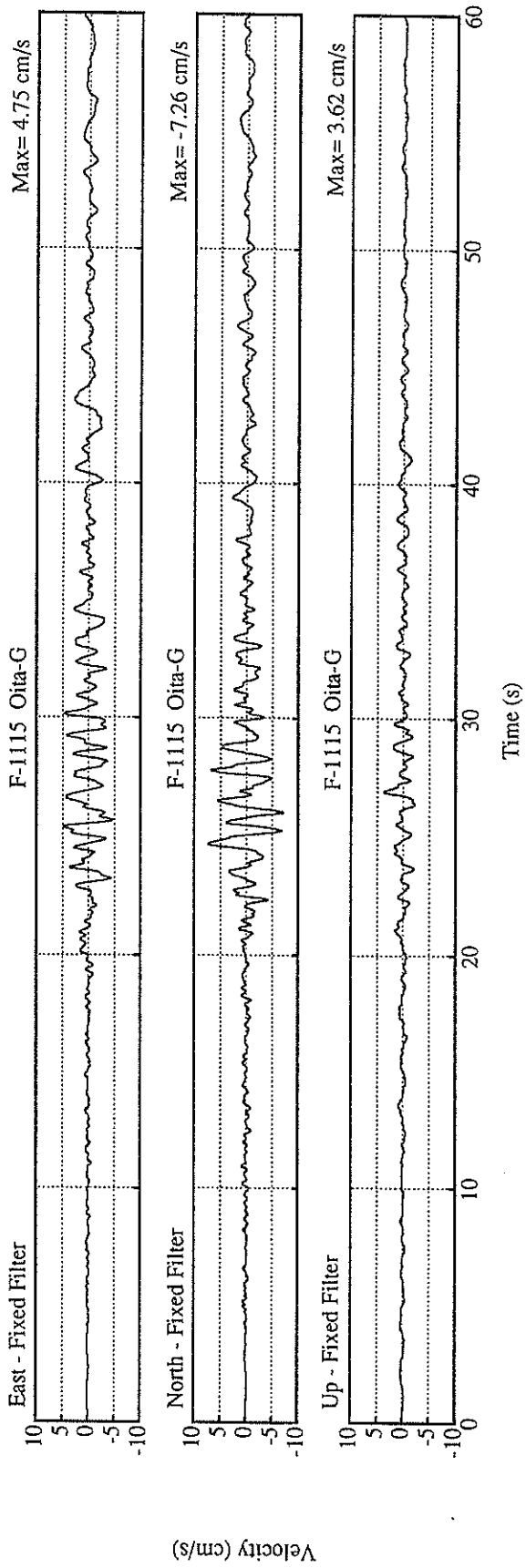


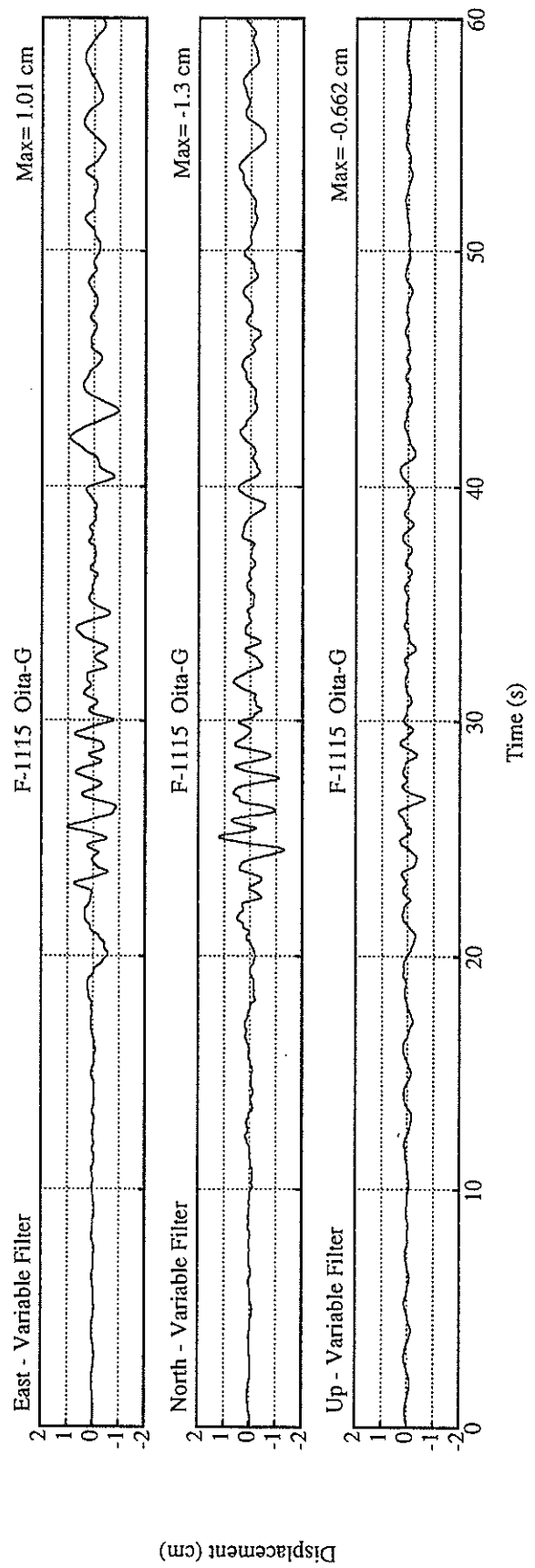
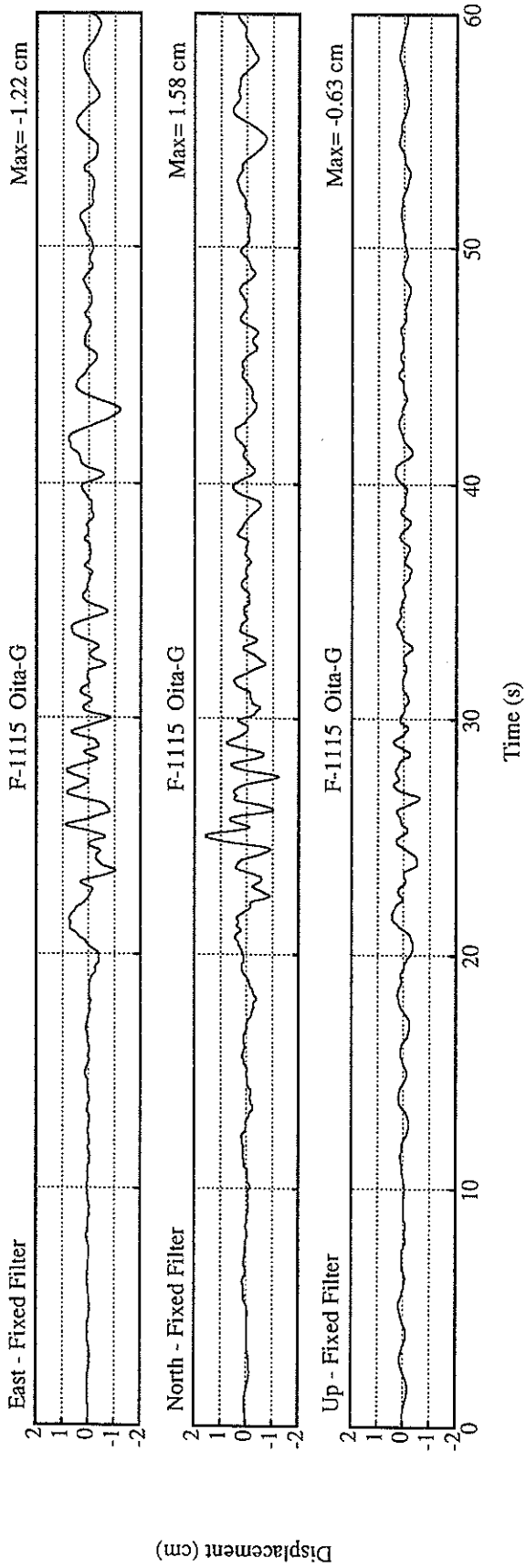


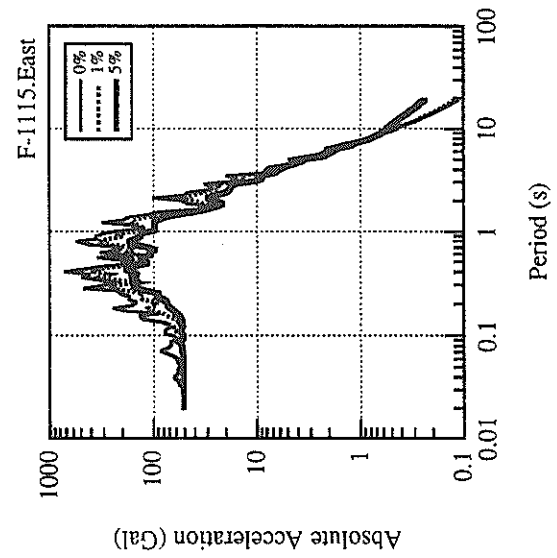
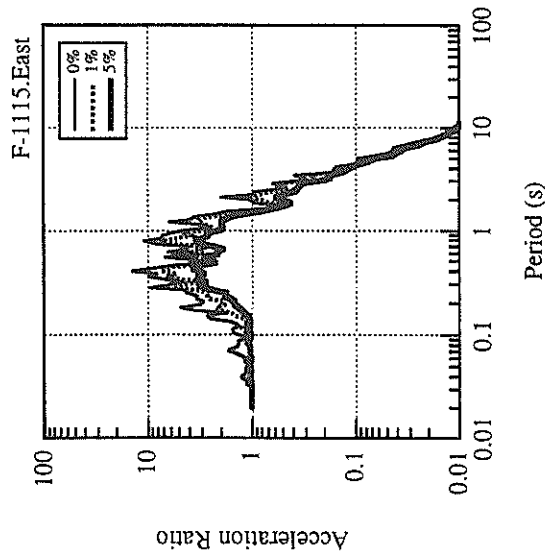
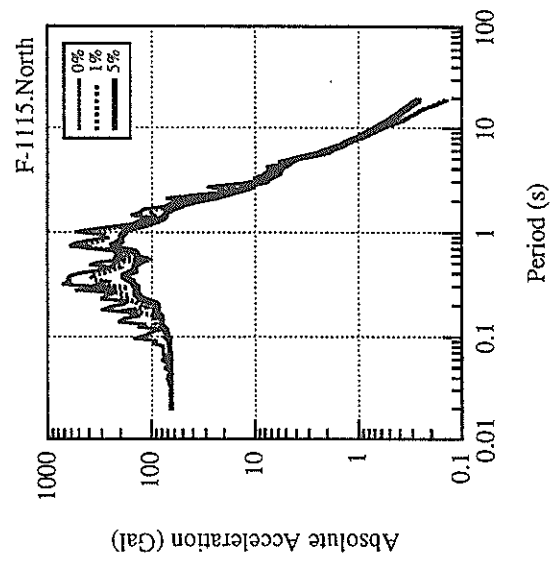
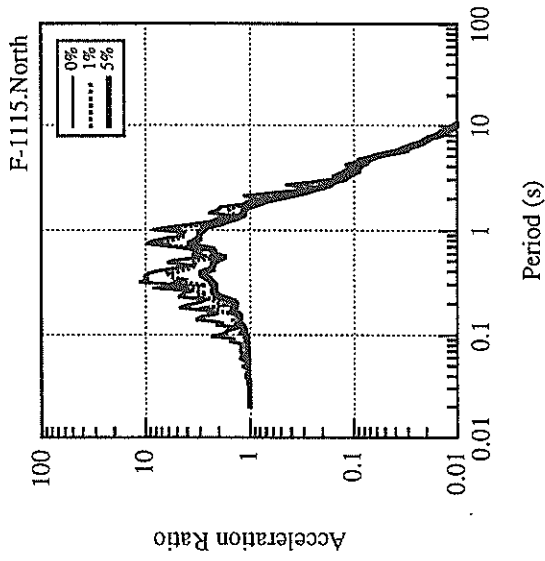
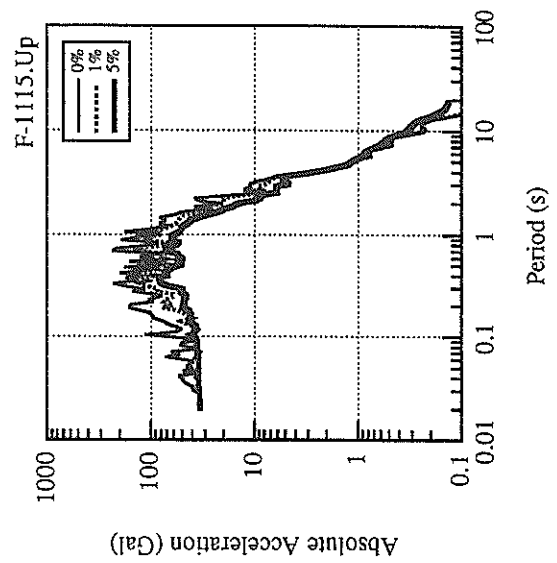
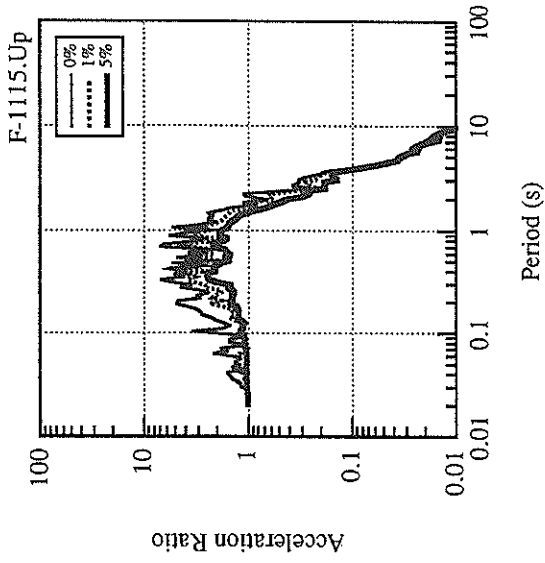
Acceleration (gal)

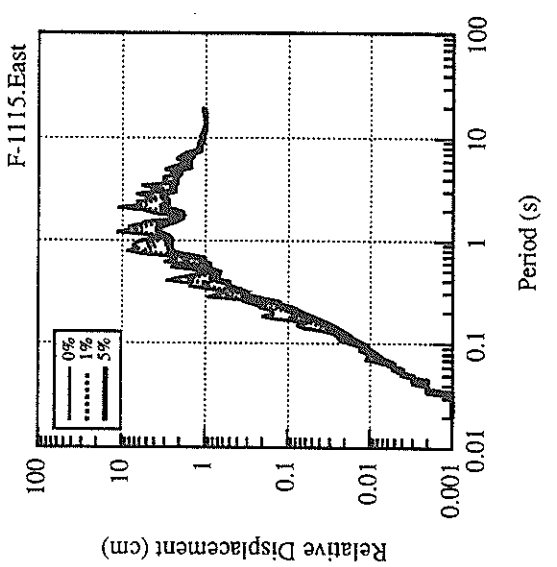
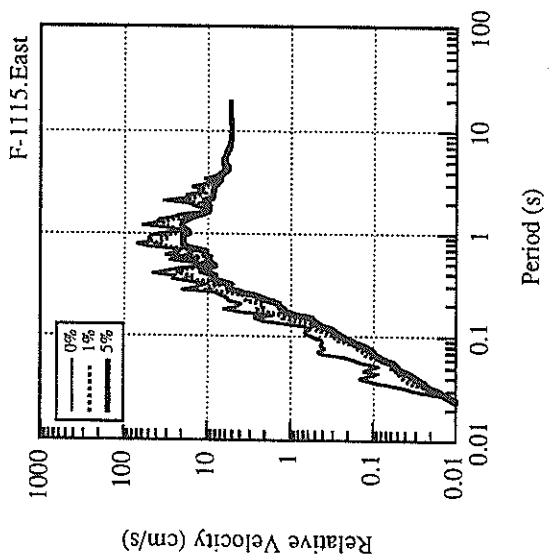
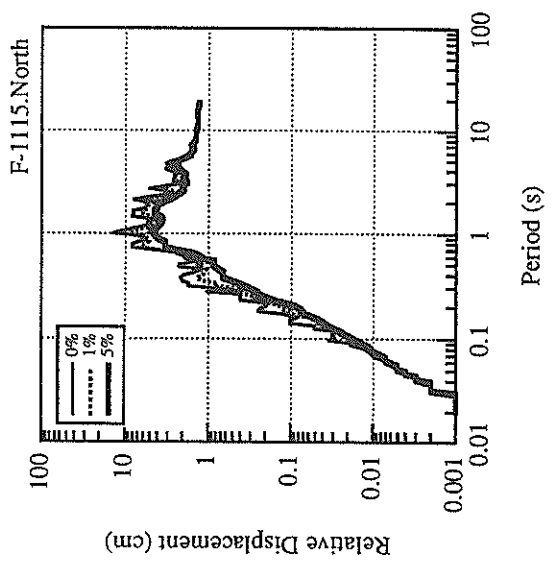
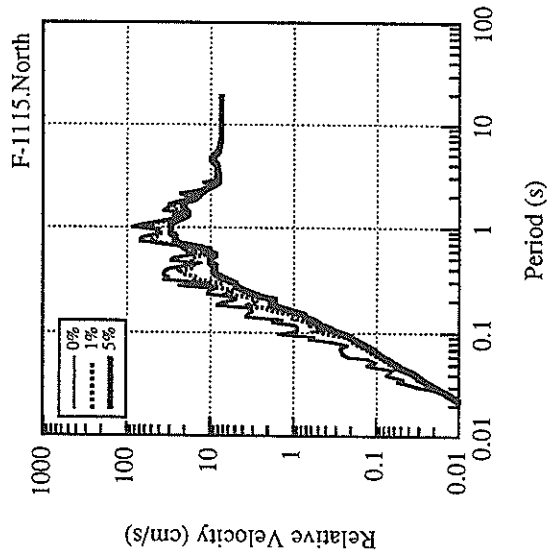
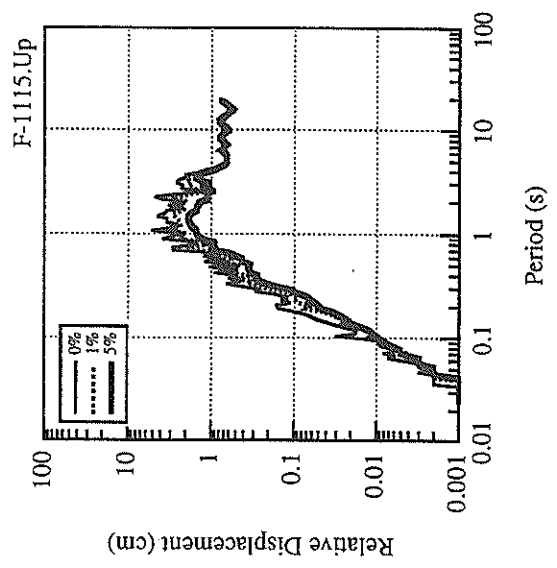
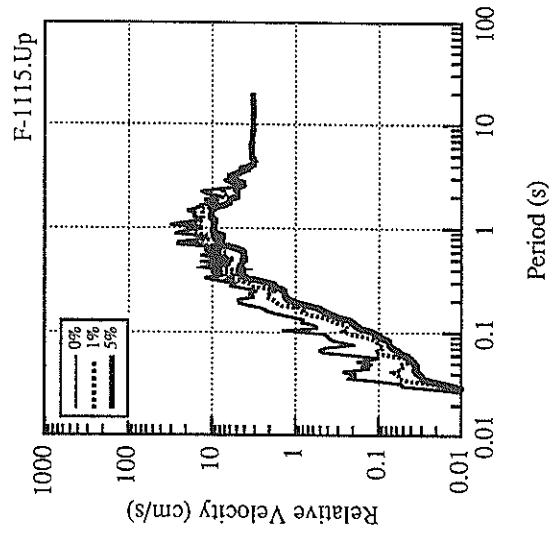


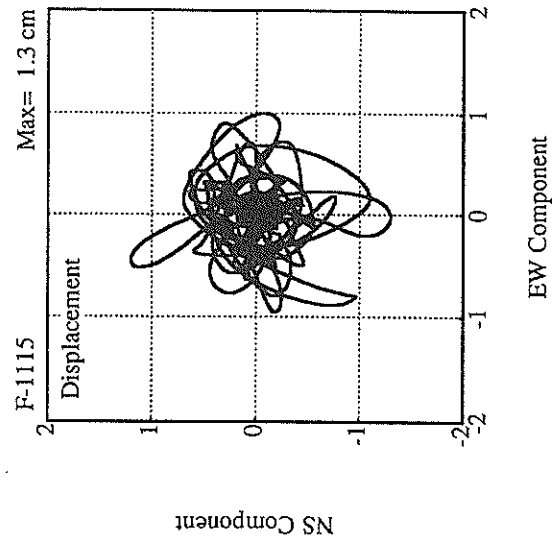
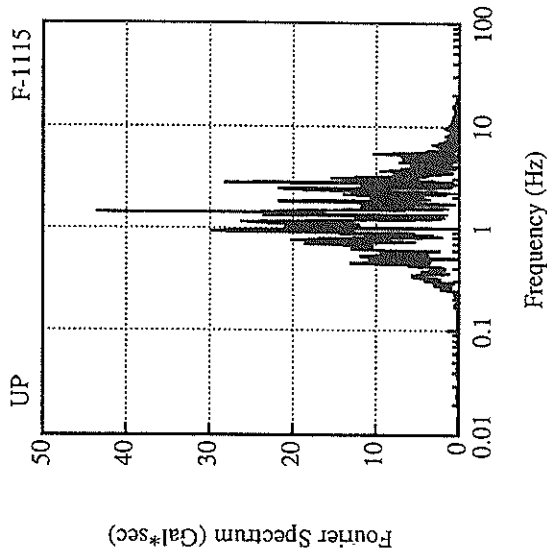
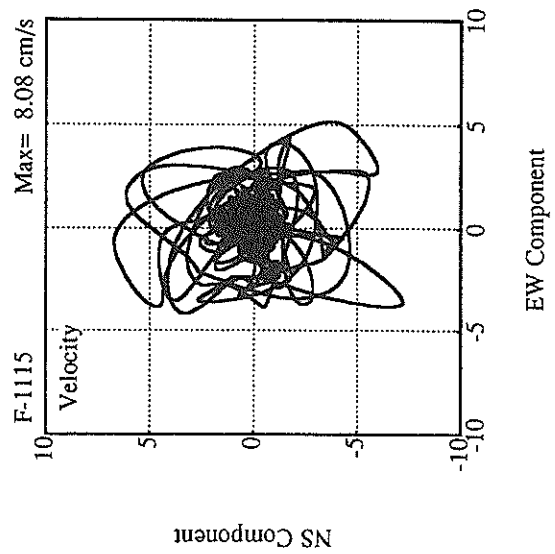
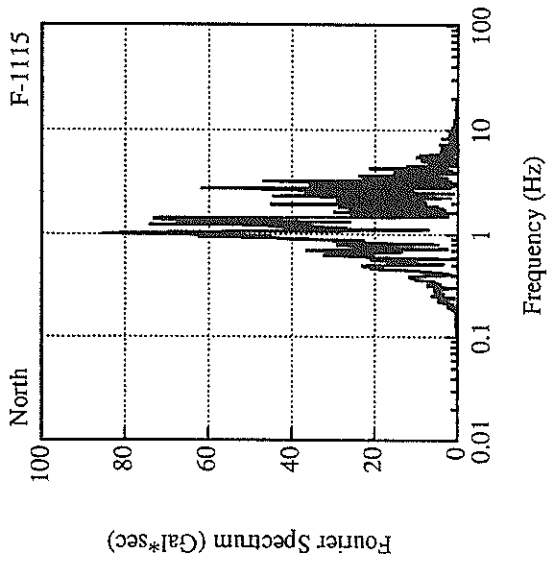
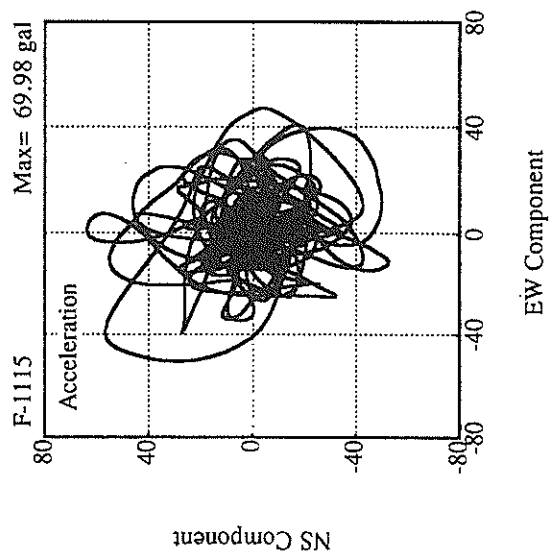
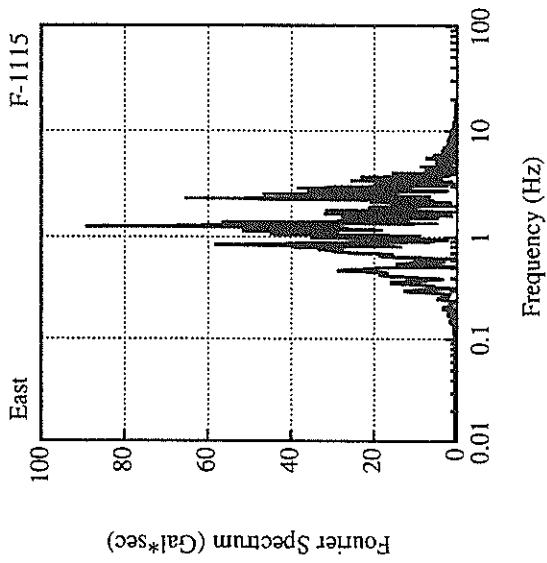
Acceleration (gal)











RECORD NUMBER : F-1067

STATION : MIYAZAKI-GB

EARTHQUAKE DATA

 DATE AND TIME 7:17 DEC. 3, 1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION HYUGANADA REGION
 LATITUDE 31°45.3' N
 LONGITUDE 131°40.7' E
 DEPTH 42.6KM
 JMA MAGNITUDE 6.6

PEAK VALUES OF COMPONENTS

 N S E W U D HORIZONTAL*

PARAMETER OF THE VARIABLE FILTER

FC (HZ) 0.128 0.091 0.128

MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT 41.4 42.3 20.1 43.3
 ORIGINAL 46.8 55.8 25.6 58.4
 CORRECTED 46.8 56.6 25.3 58.8

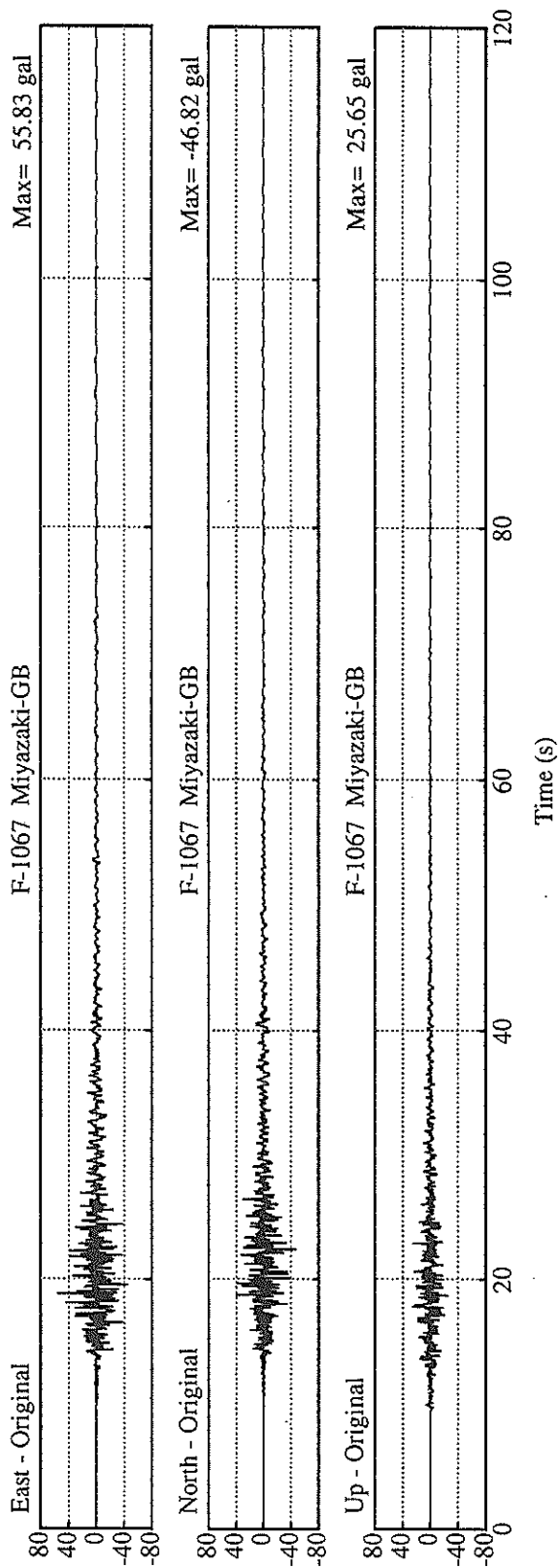
MAXIMUM VELOCITY (CM/SEC)

FIXED FILTER 4.43 3.97 2.55 5.17
 VARIABLE FILTER 3.89 3.36 2.63 4.30

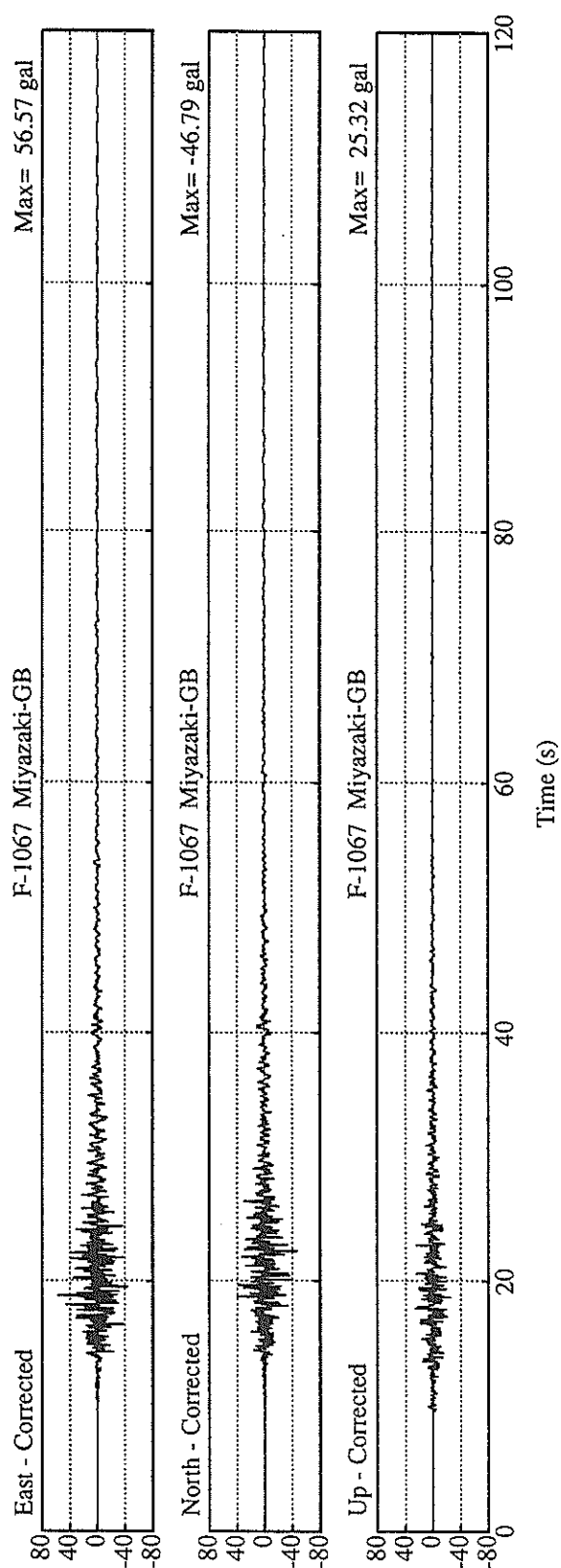
MAXIMUM DISPLACEMENT (CM)

FIXED FILTER 1.16 1.04 0.81 1.50
 VARIABLE FILTER 1.19 1.70 0.55 2.07

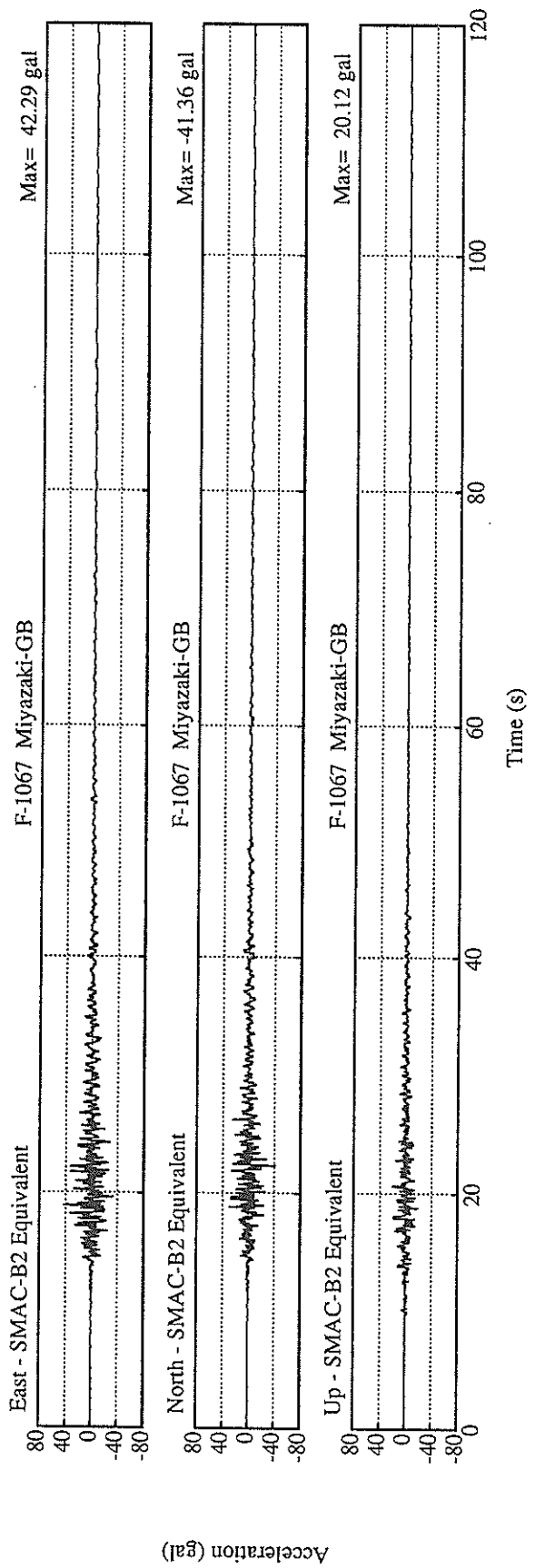
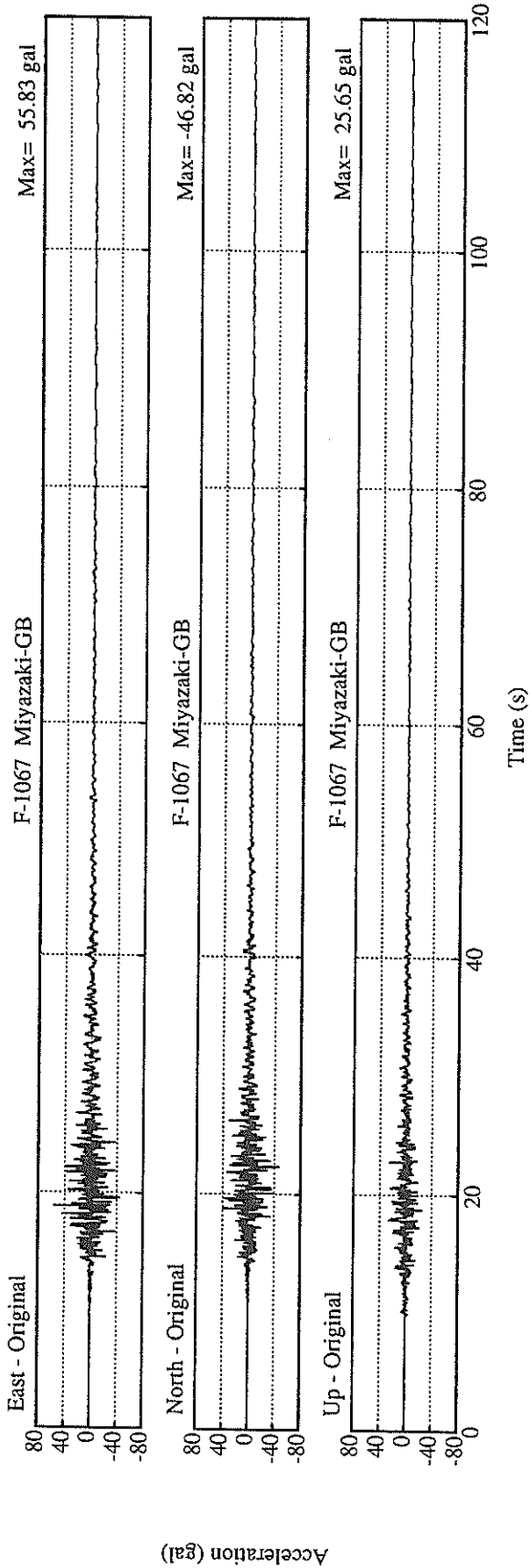
* RESULTANT OF HORIZONTAL COMPONENTS

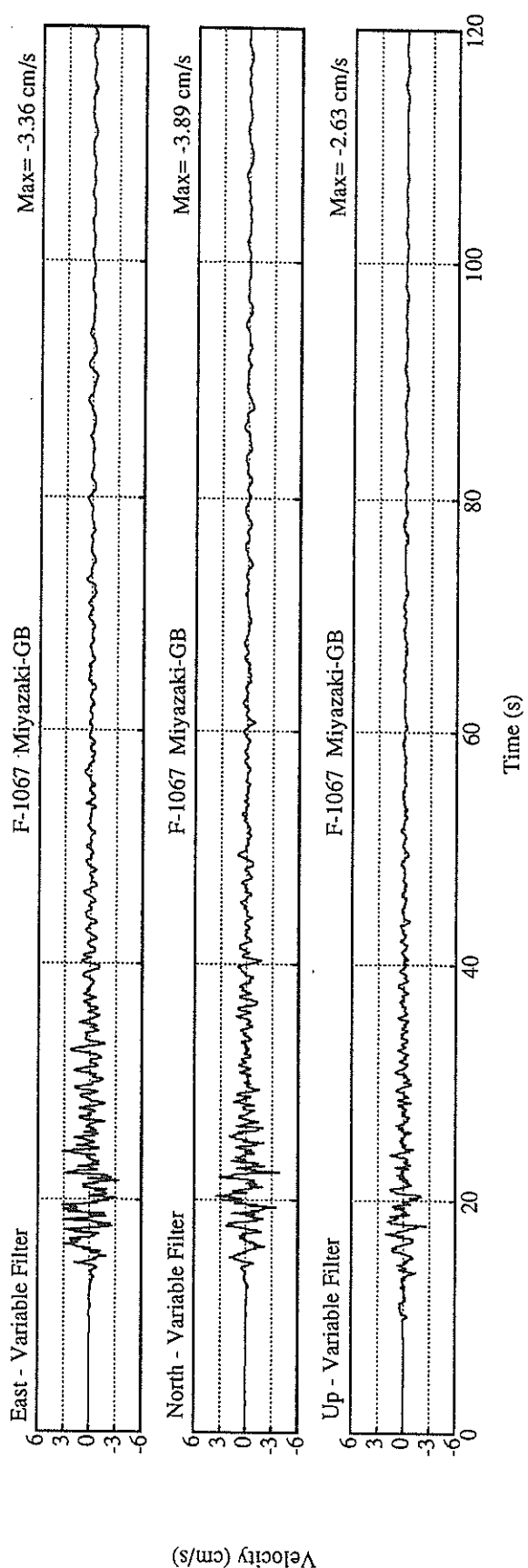
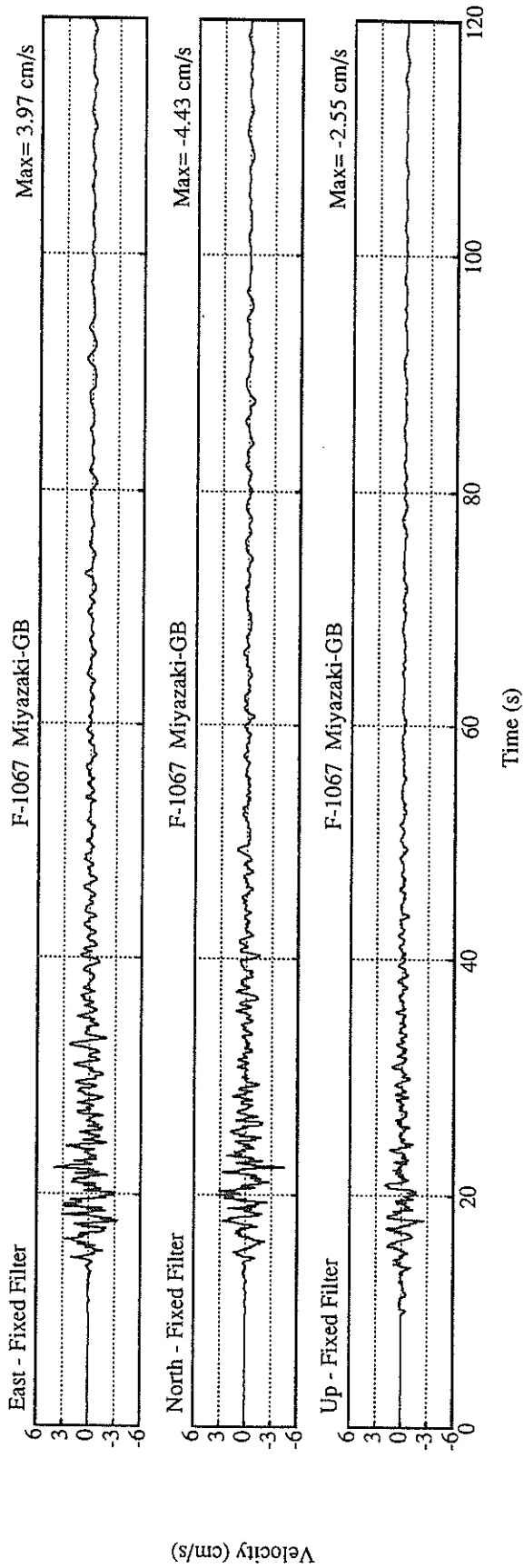


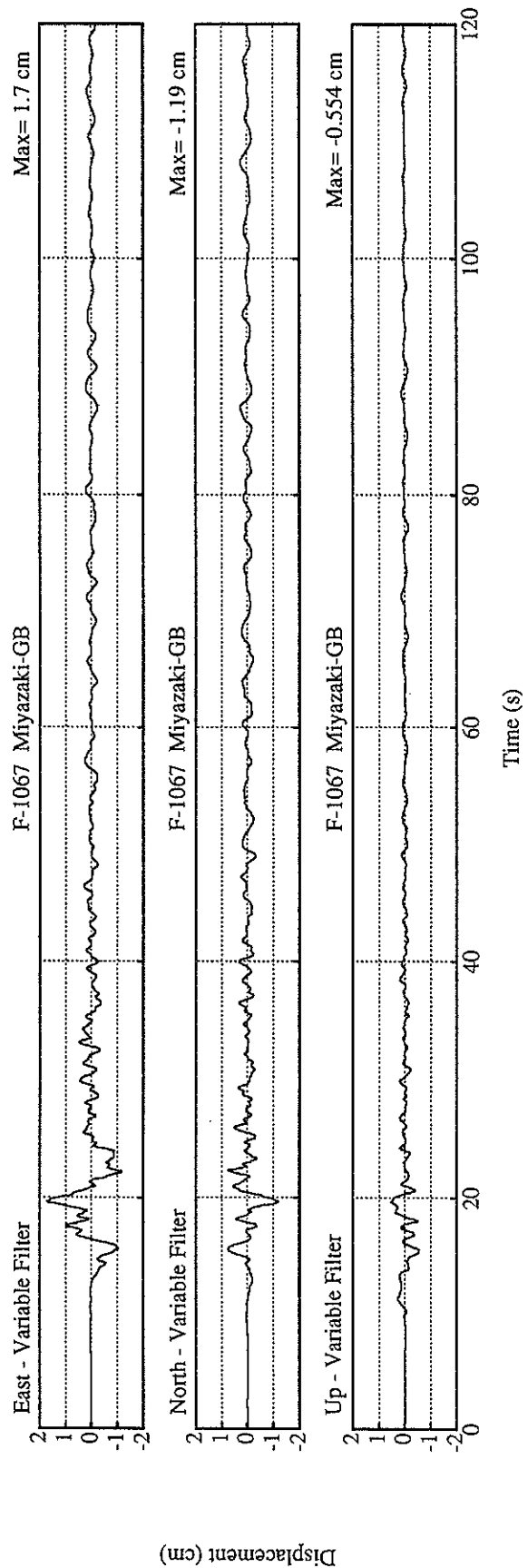
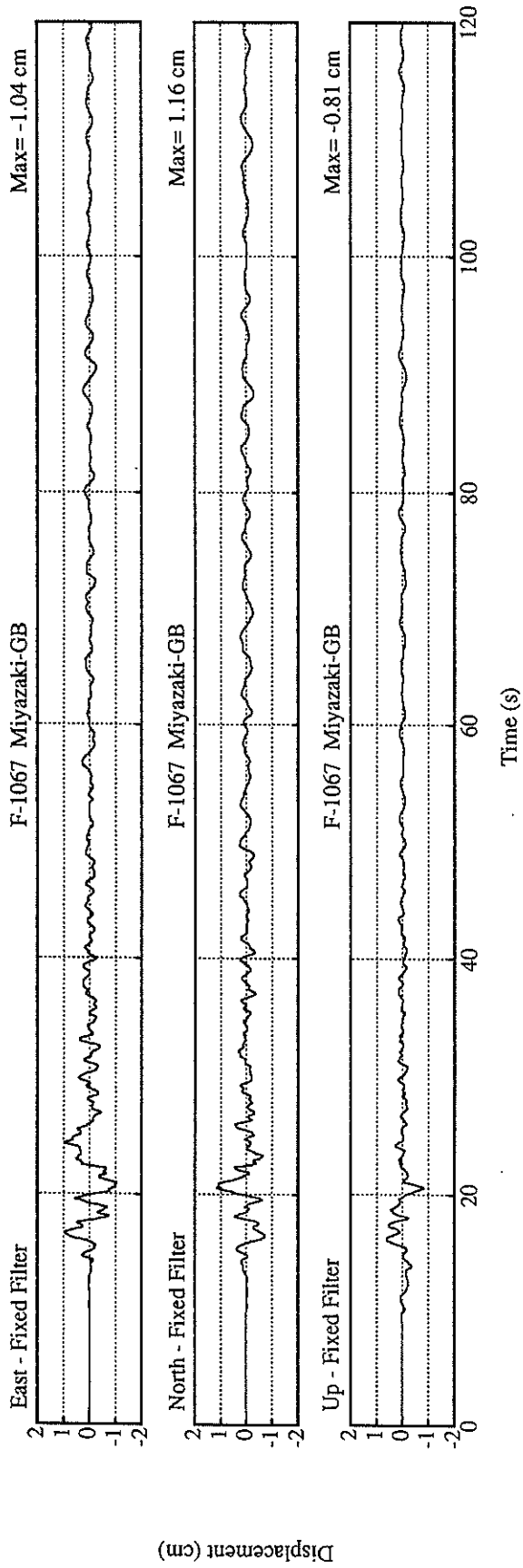
Acceleration (gal)

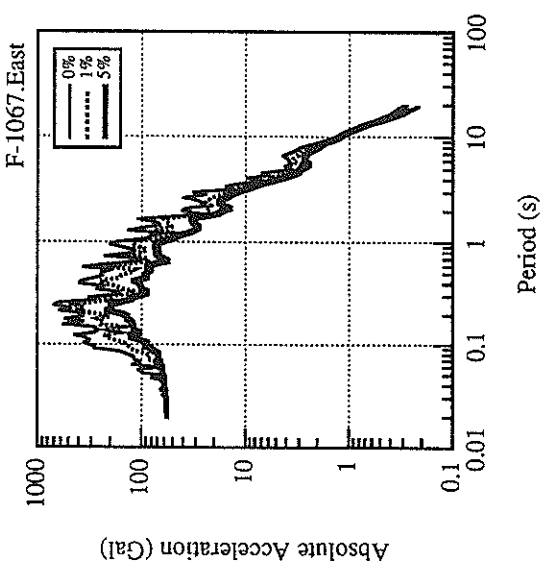
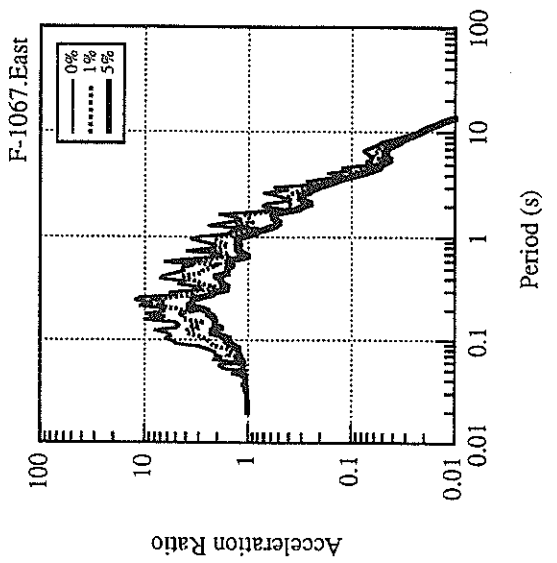
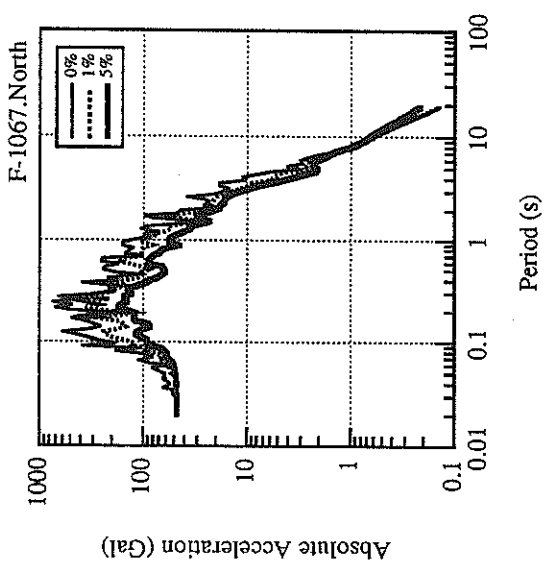
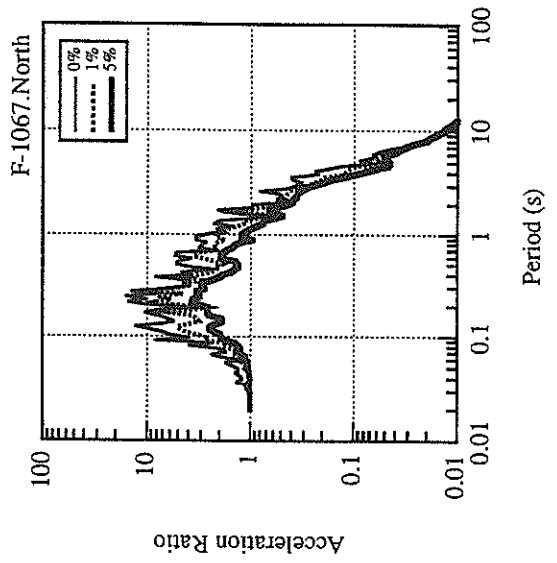
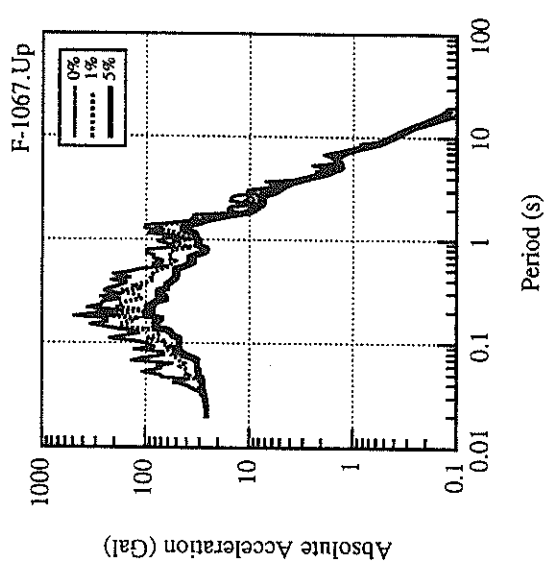
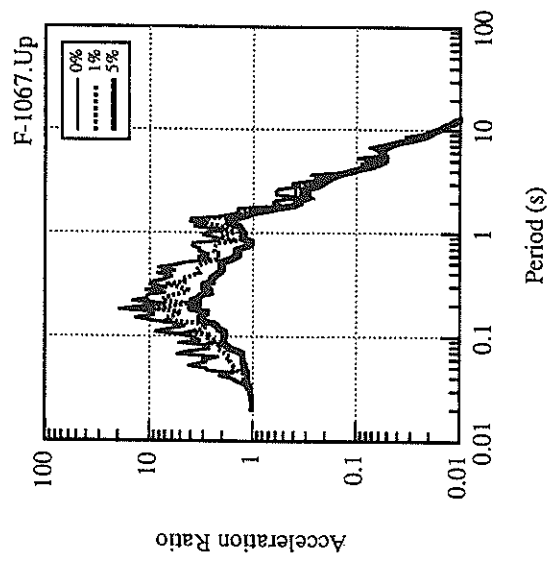


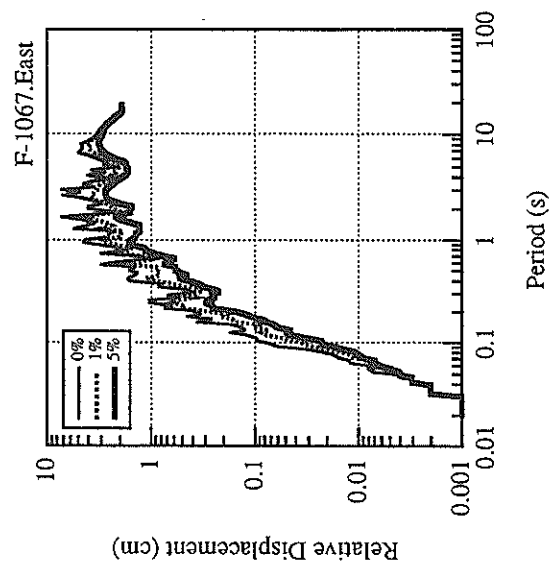
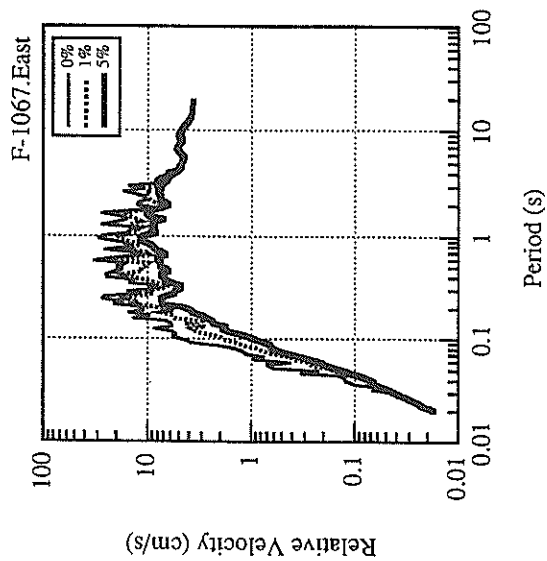
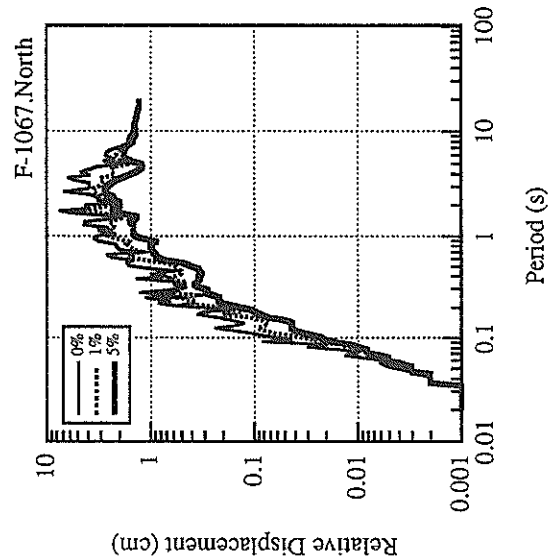
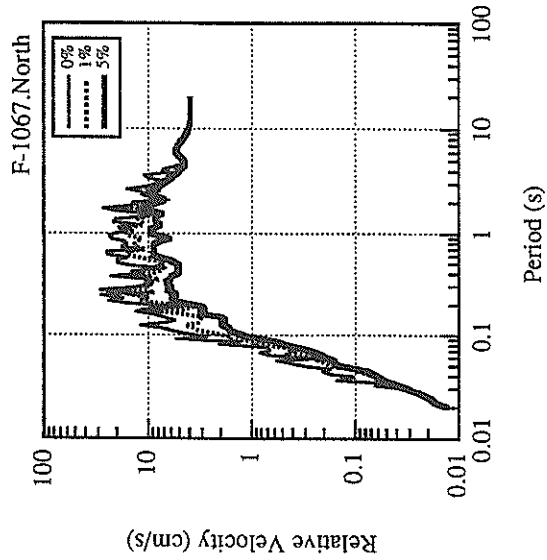
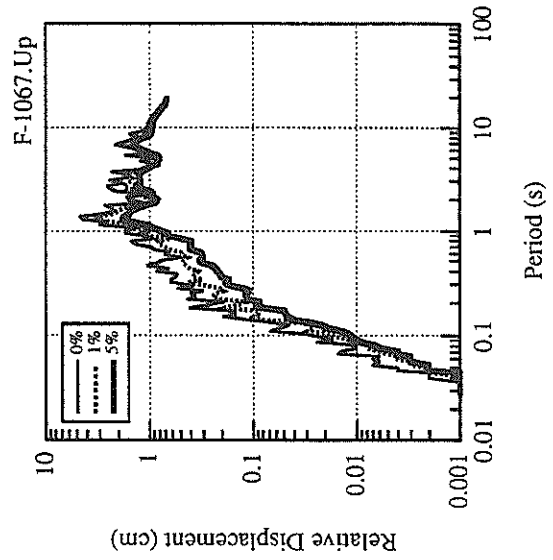
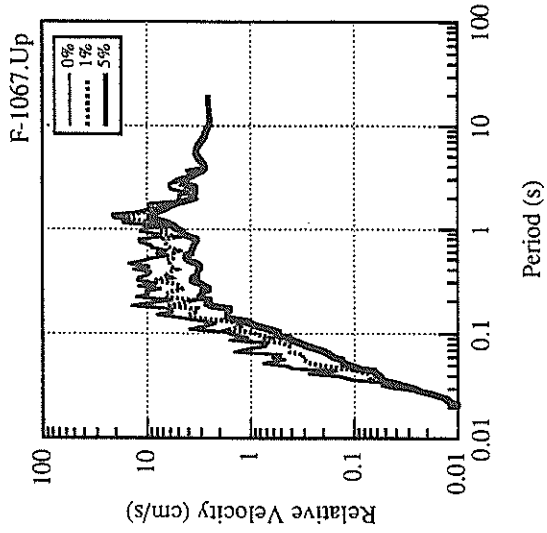
Acceleration (gal)

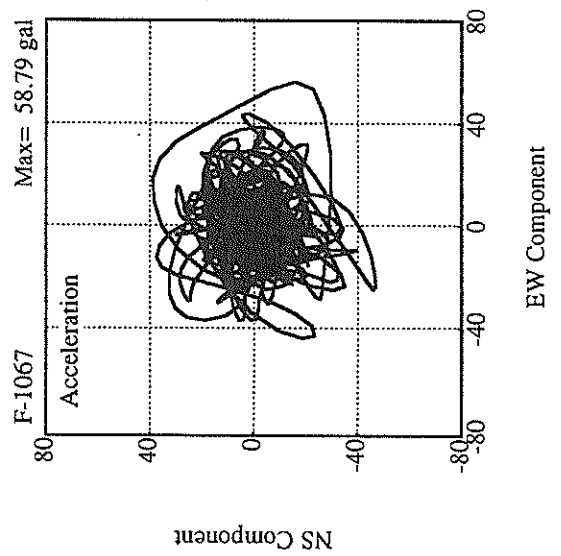
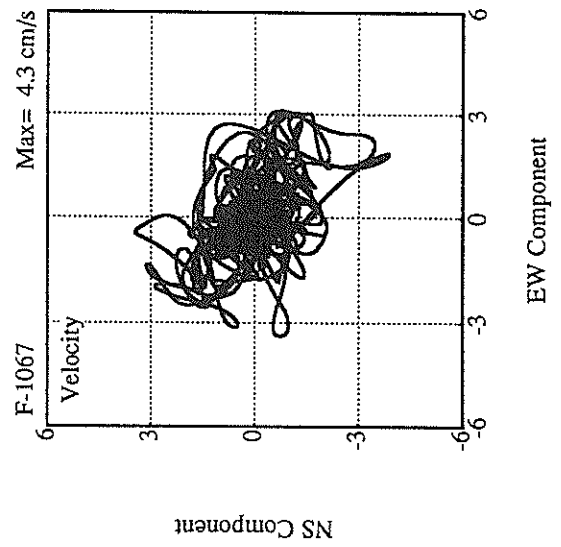
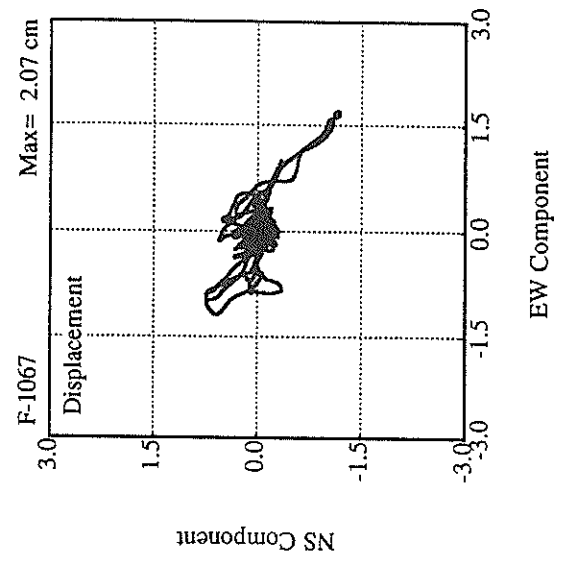
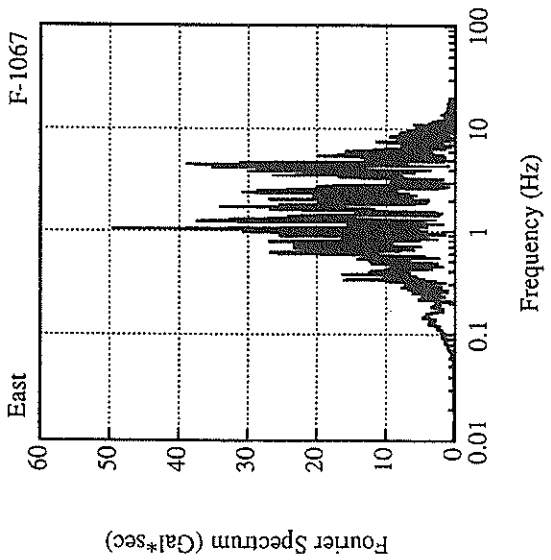
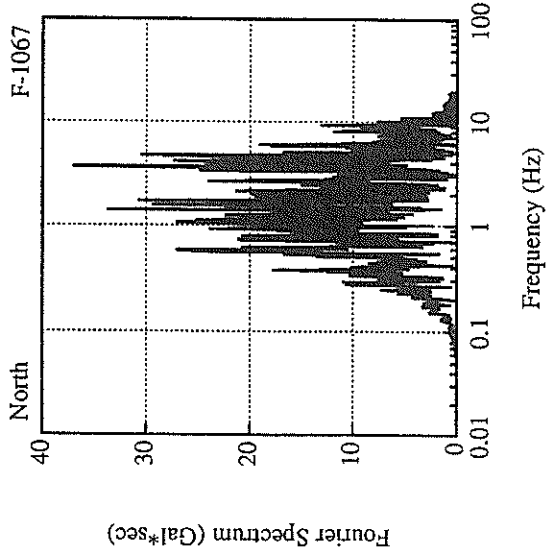
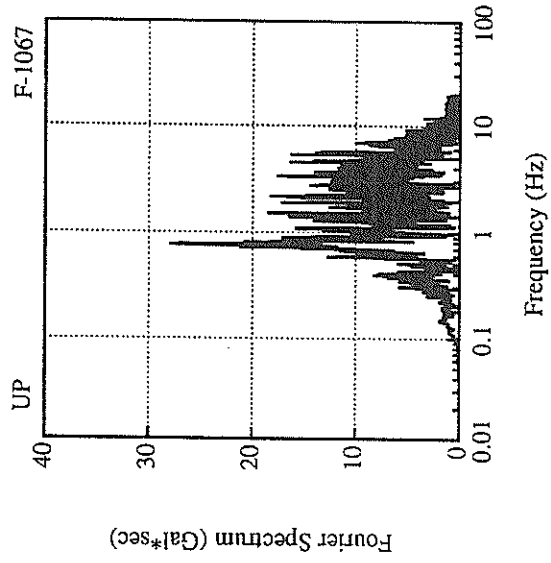












RECORD NUMBER : F-1068

STATION : MIYAZAKI-G

EARTHQUAKE DATA

 DATE AND TIME 7:17 DEC. 3,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION HYUGANADA REGION
 LATITUDE 31° 45.3' N
 LONGITUDE 131° 40.7' E
 DEPTH 42.6KM
 JMA MAGNITUDE 6.6

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	0.213	0.164	0.311	

PARAMETER OF THE VARIABLE FILTER

FC (HZ)	0.213	0.164	0.311
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MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	91.0	106.3	32.2	109.6
ORIGINAL	115.2	140.3	54.5	146.4
CORRECTED	115.0	141.0	55.3	146.3

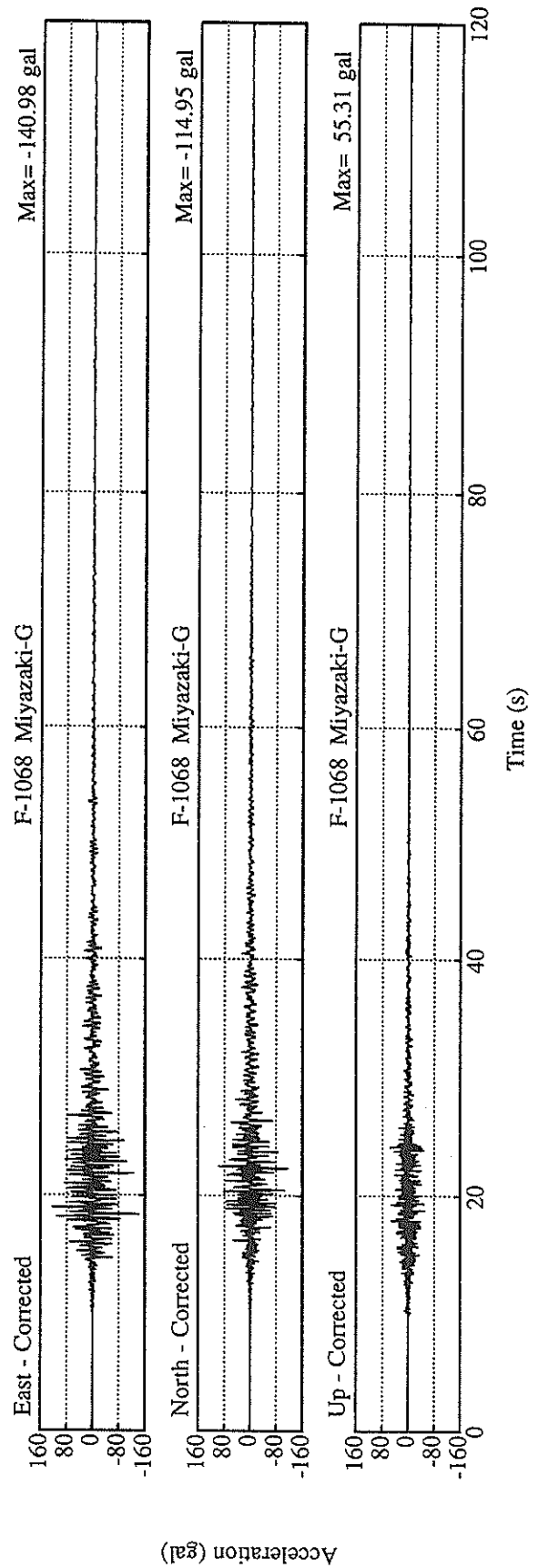
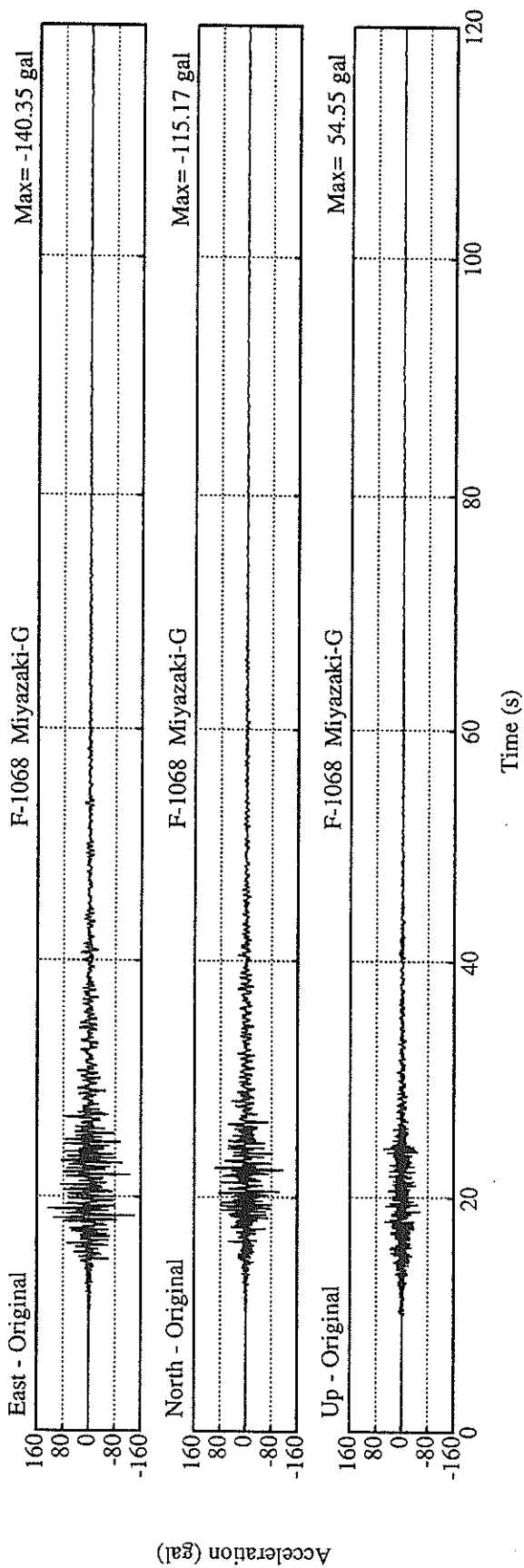
MAXIMUM VELOCITY (CM/SEC)

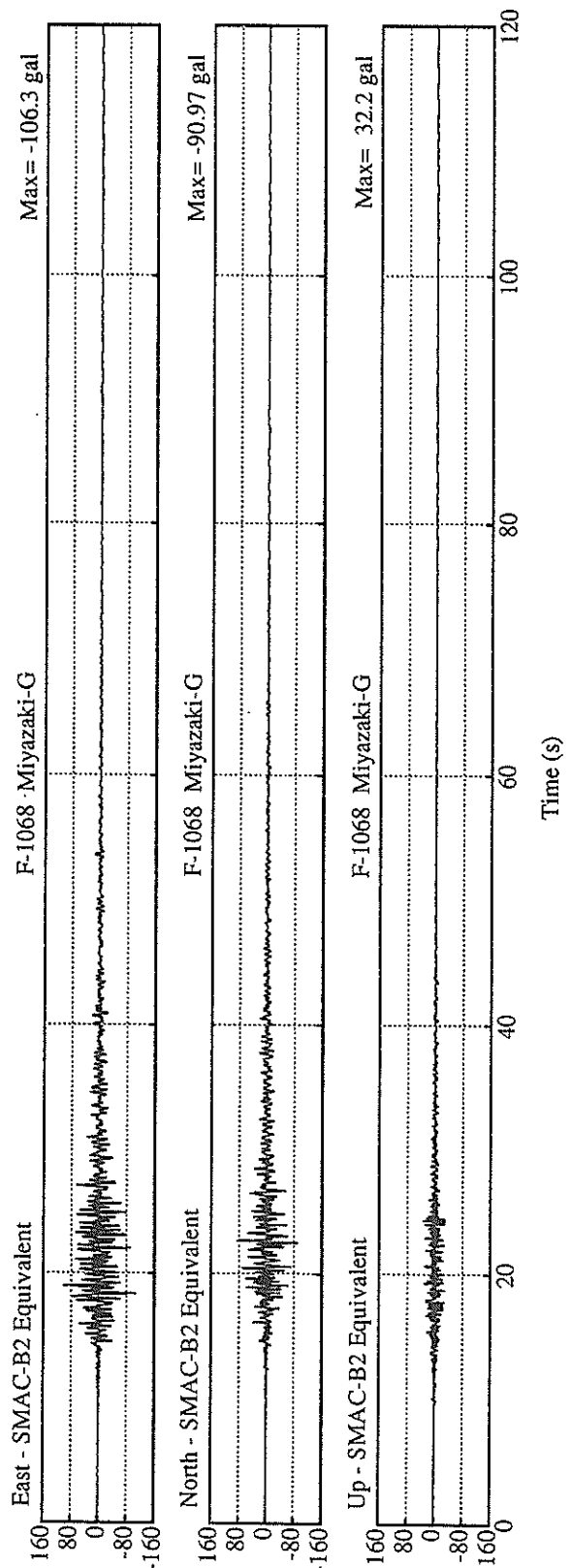
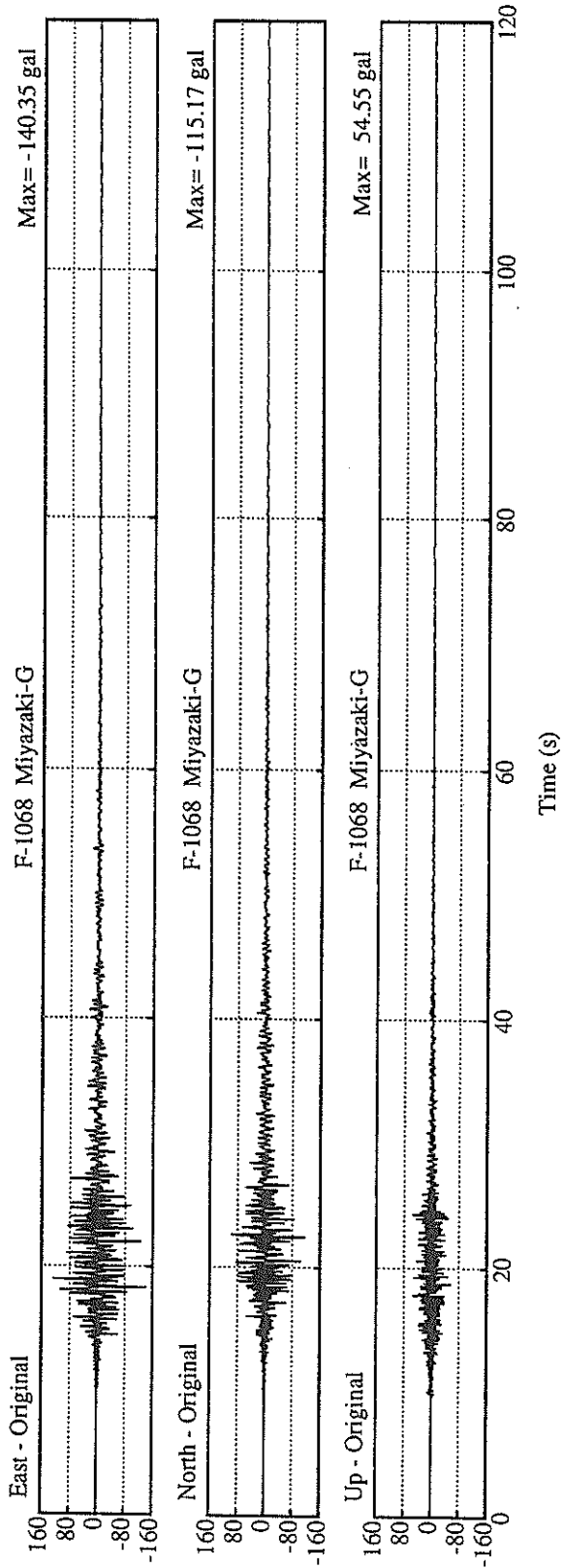
FIXED FILTER	8.32	7.58	3.23	8.70
VARIABLE FILTER	7.90	7.35	3.46	8.24

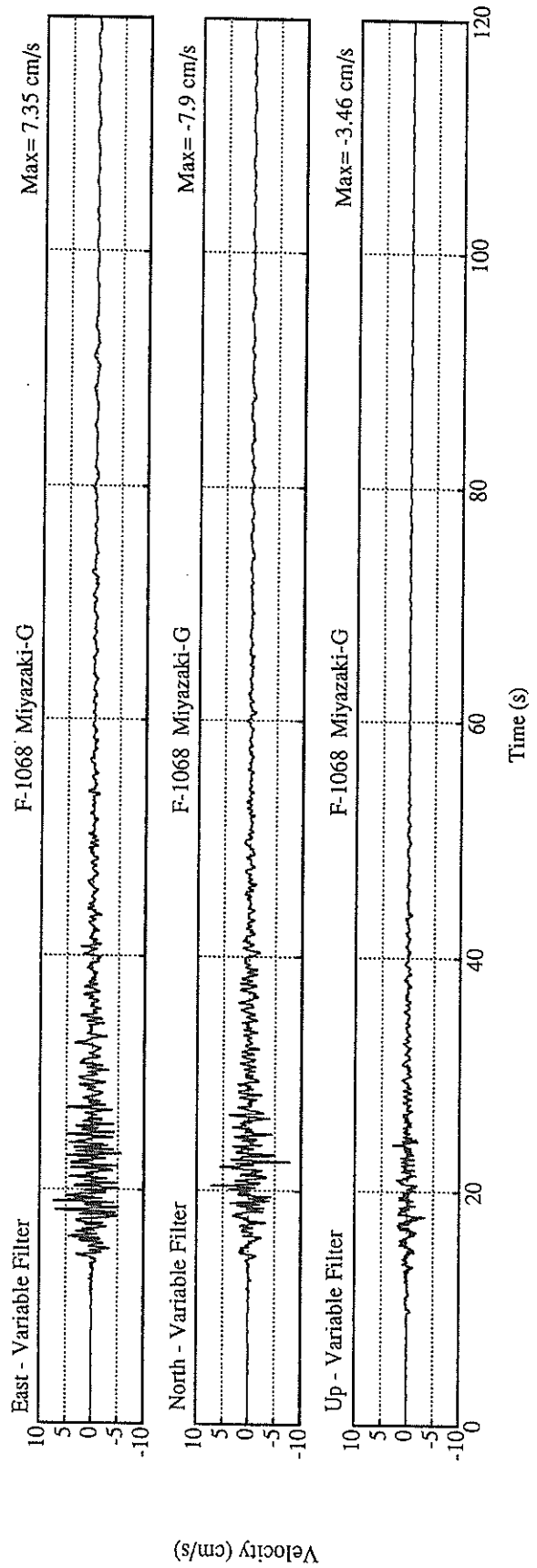
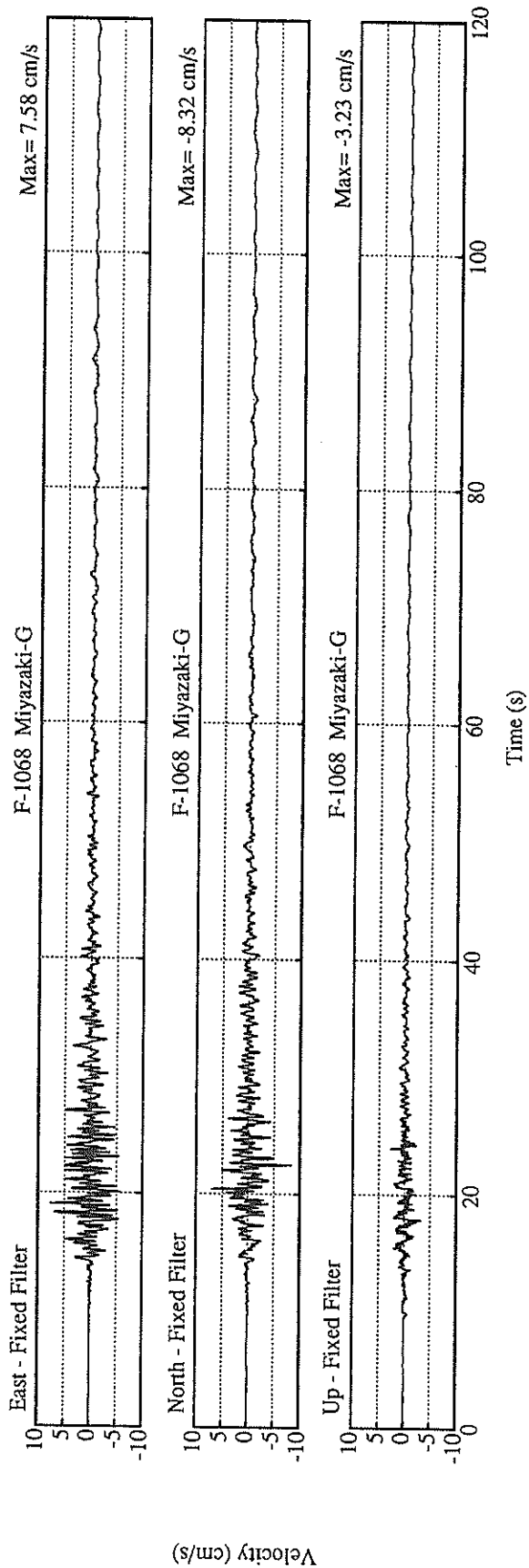
MAXIMUM DISPLACEMENT (CM)

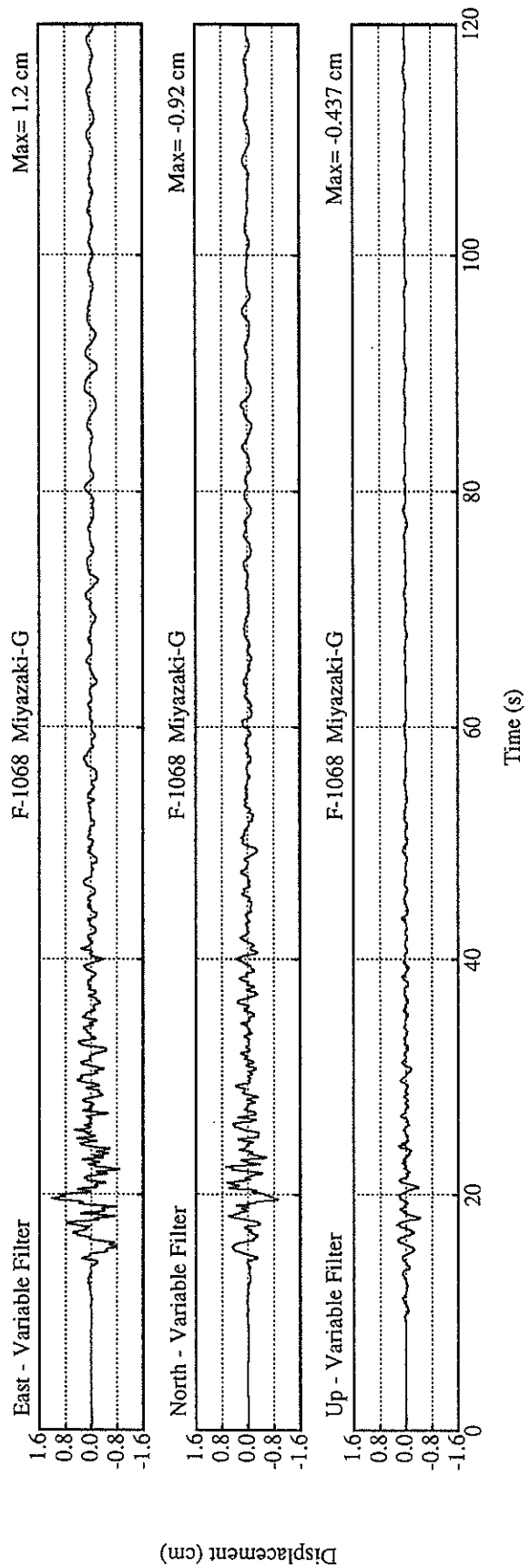
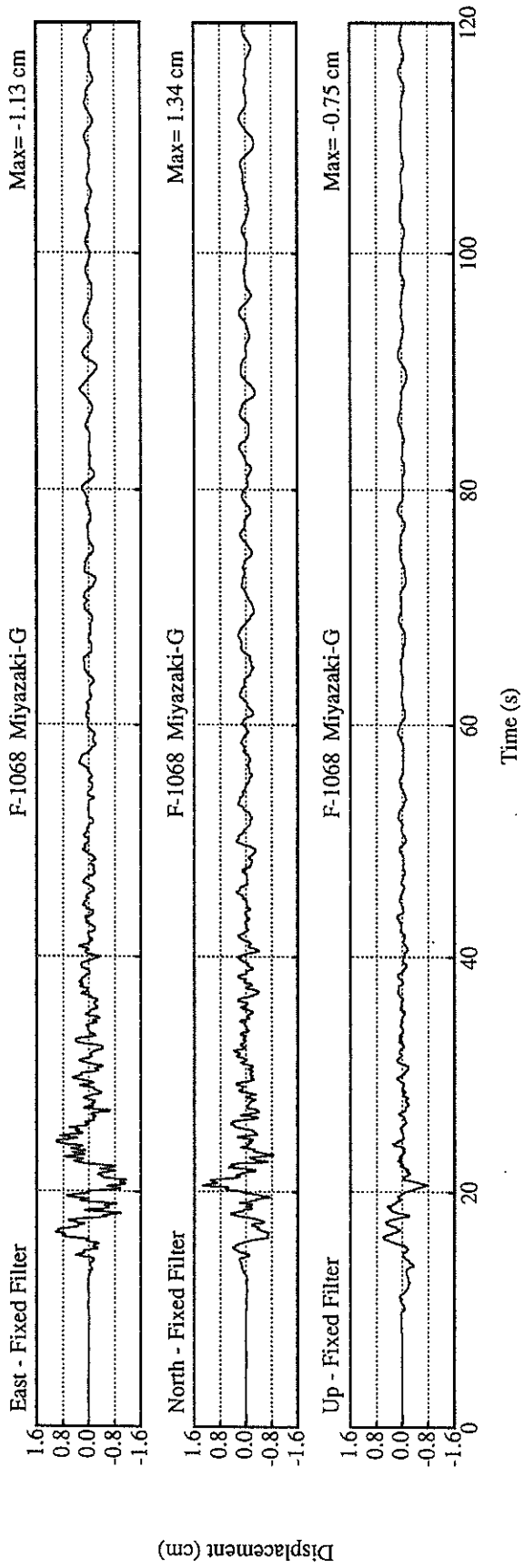
FIXED FILTER	1.34	1.13	0.75	1.63
VARIABLE FILTER	0.92	1.20	0.44	1.46

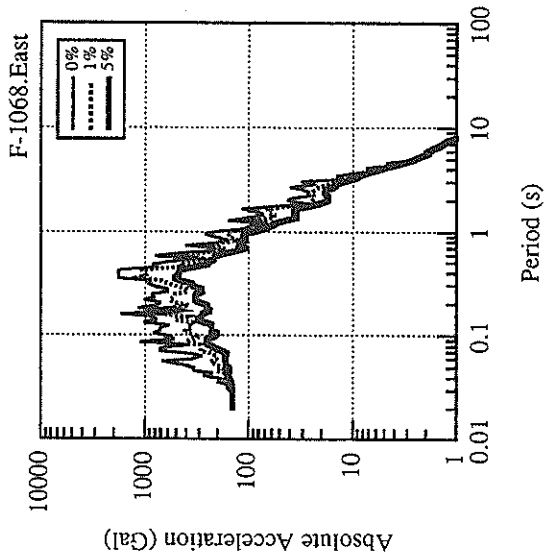
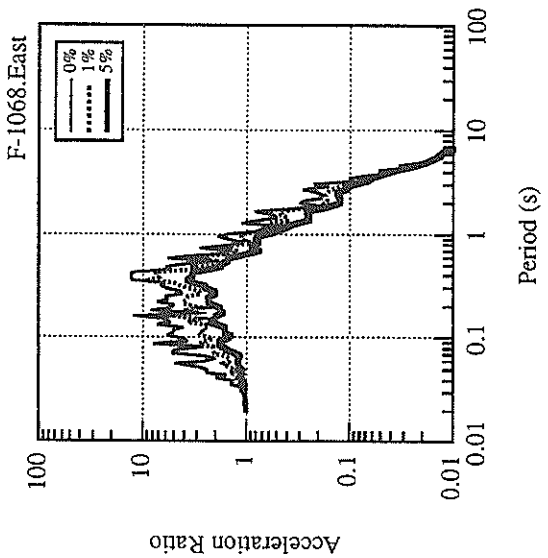
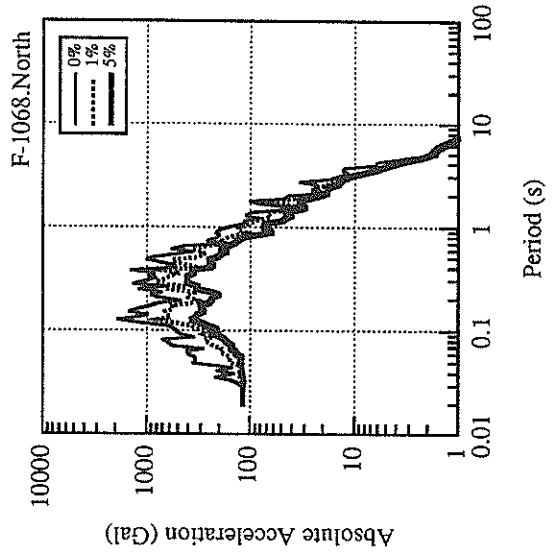
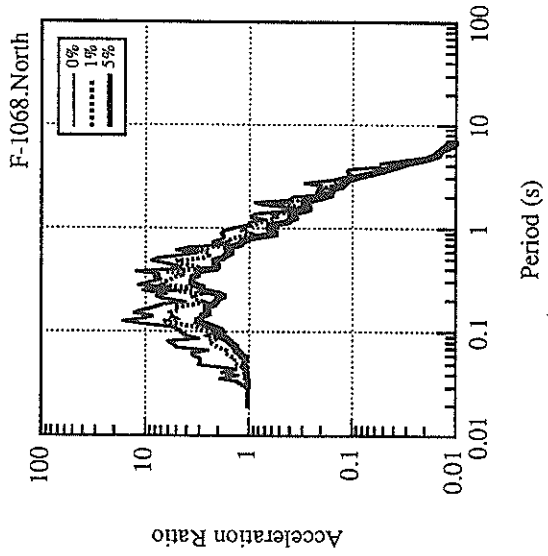
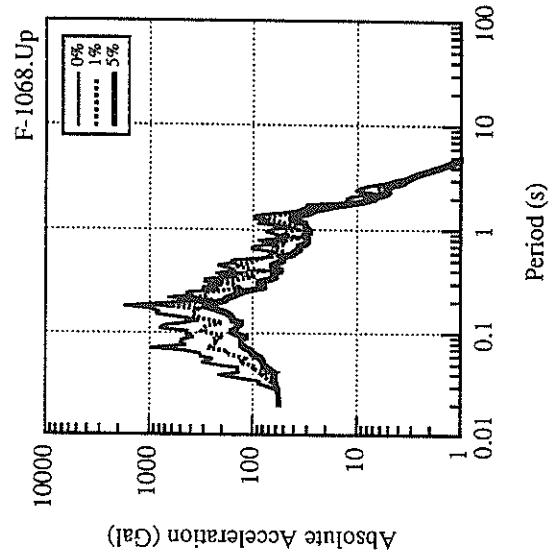
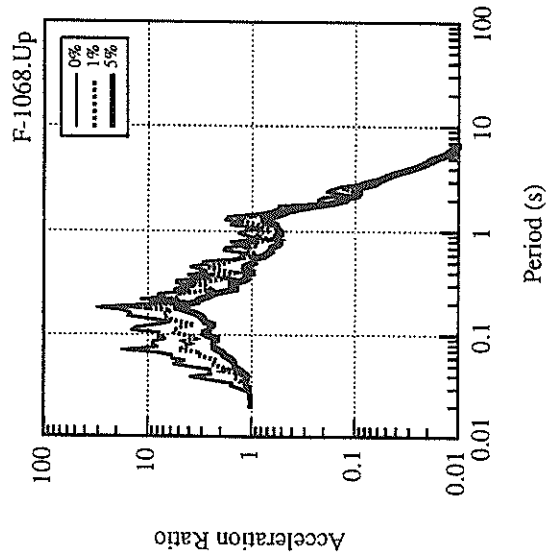
* RESULTANT OF HORIZONTAL COMPONENTS

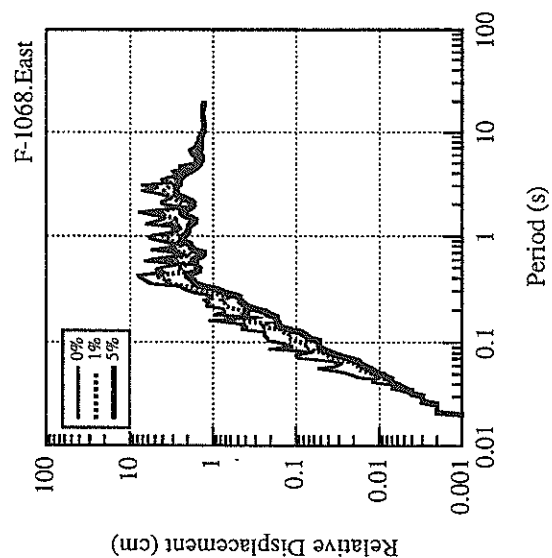
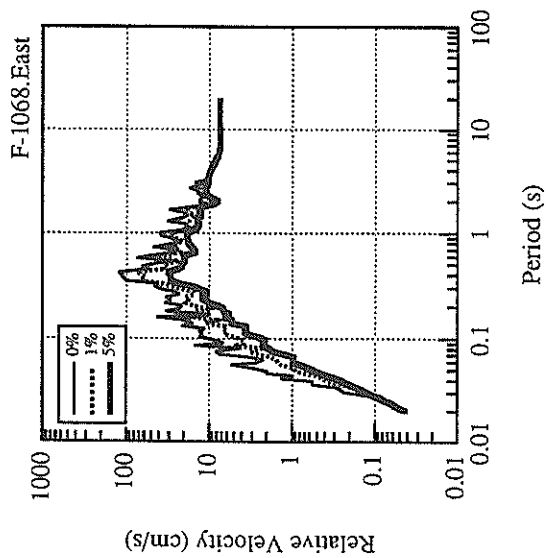
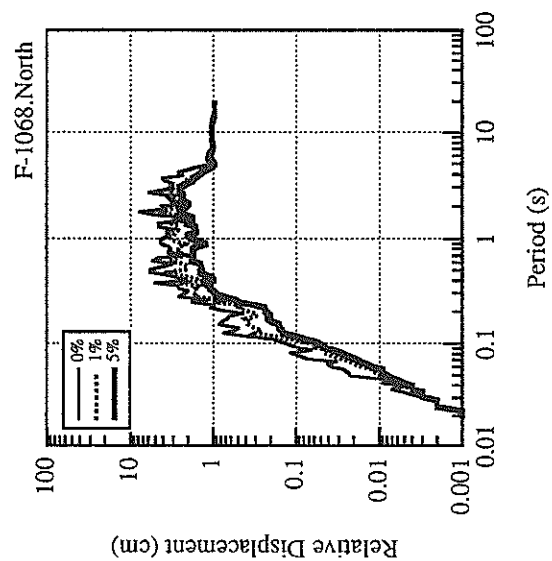
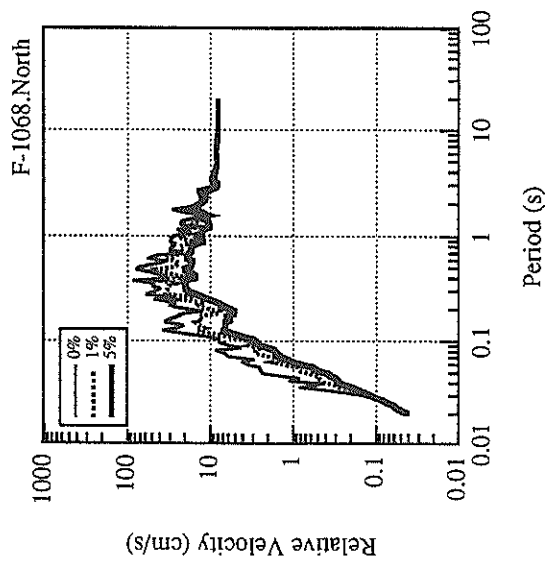
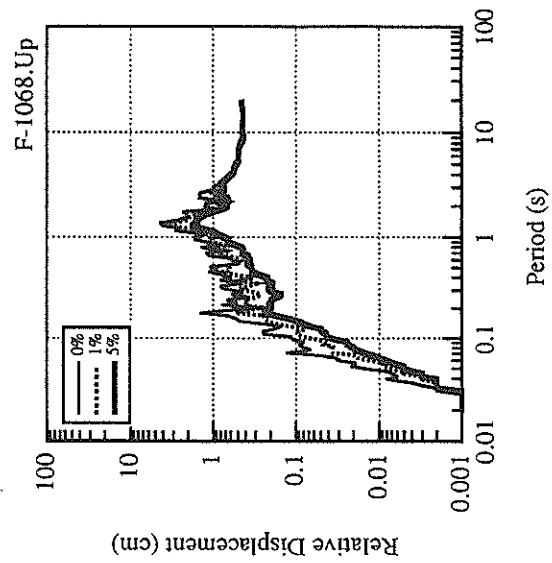
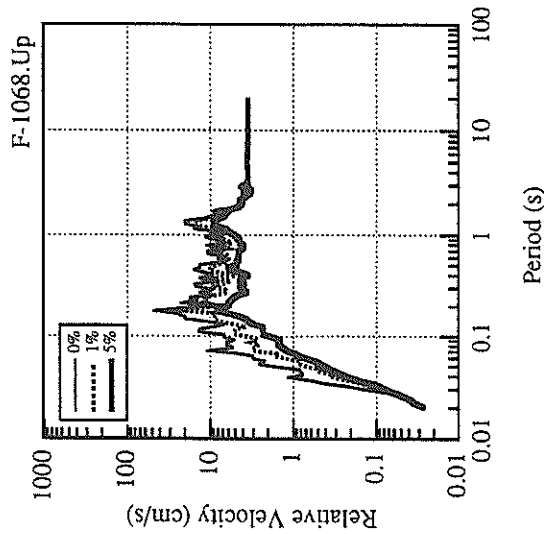


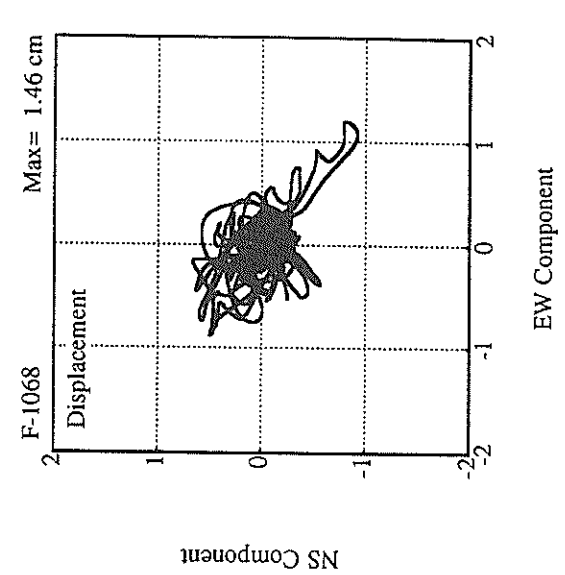
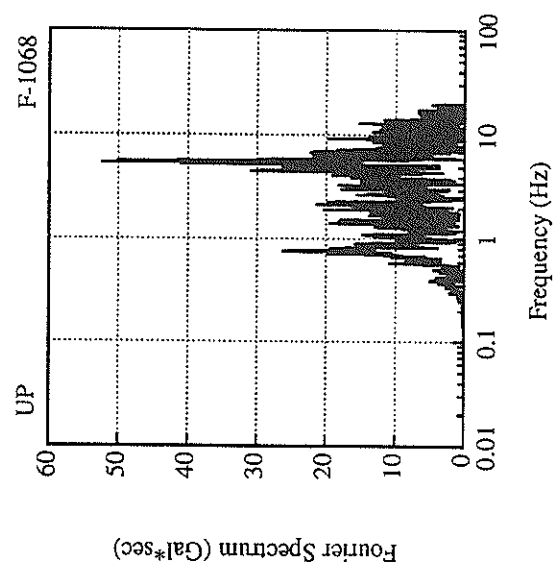
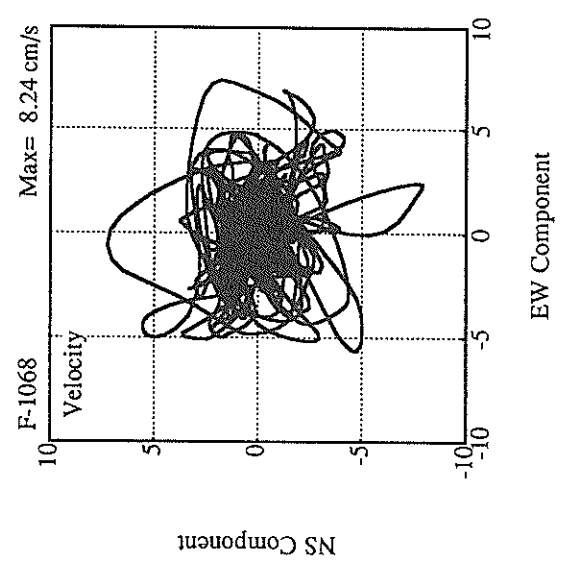
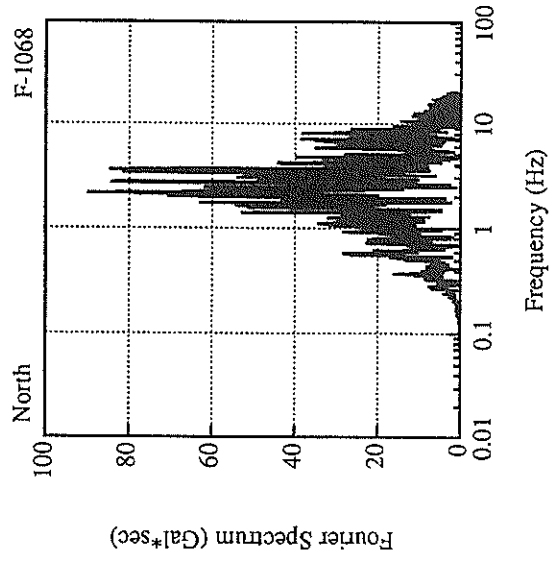
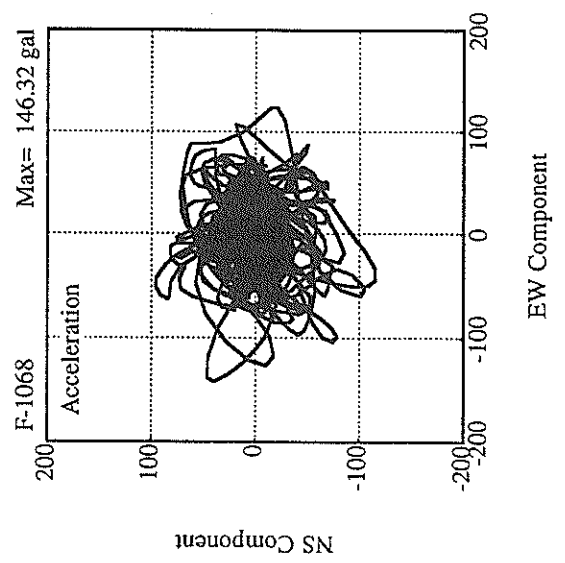
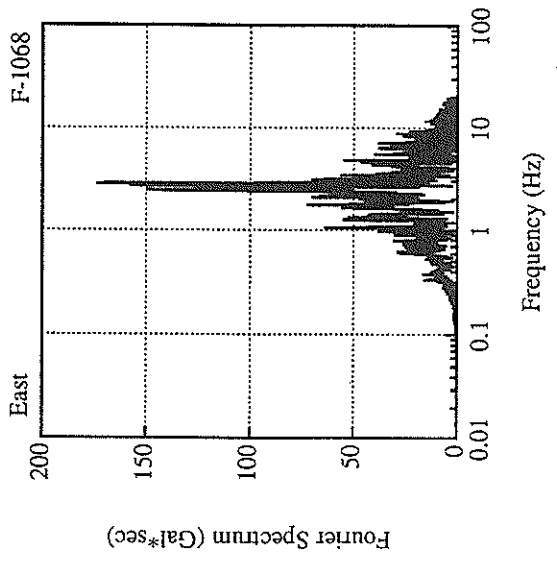












RECORD NUMBER : F-1116

STATION : OITA-G

EARTHQUAKE DATA

 DATE AND TIME 7:17 DEC. 3, 1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION HYUGANADA REGION
 LATITUDE 31° 45.3' N
 LONGITUDE 131° 40.7' E
 DEPTH 42.6KM
 JMA MAGNITUDE 6.6

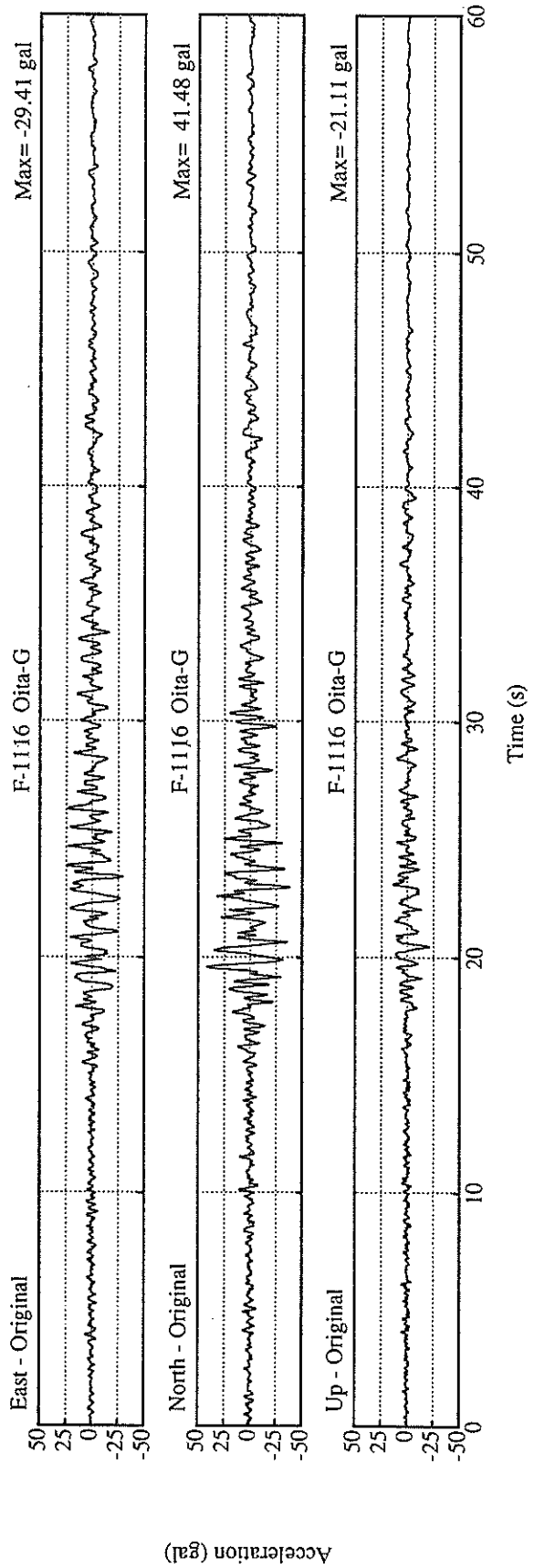
PEAK VALUES OF COMPONENTS

N S	E W	U D	HORIZONTAL*

41.5	29.4	21.1	41.5

ORIGINAL ACCELERATION (GAL)

* RESULTANT OF HORIZONTAL COMPONENTS



RECORD NUMBER : F-1071

STATION : WAKAYAMA-G

EARTHQUAKE DATA

 DATE AND TIME : 8:30 DEC.11,1996
 LOCATION OF HYPOCENTER :
 EPICENTRAL REGION : NW WAKAYAMA PREF
 LATITUDE : 34°12.1' N
 LONGITUDE : 135° 6.4' E
 DEPTH : 8.8KM
 JMA MAGNITUDE : 3.5

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
FC (HZ)	1.415	1.202	2.050	

PARAMETER OF THE VARIABLE FILTER

FC (HZ)	1.415	1.202	2.050
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MAXIMUM ACCELERATION (GAL)

SMAC-B2 EQUIVALENT	13.9	35.2	8.4	35.8
ORIGINAL	32.6	69.2	28.7	69.2
CORRECTED	32.8	68.9	30.8	69.2

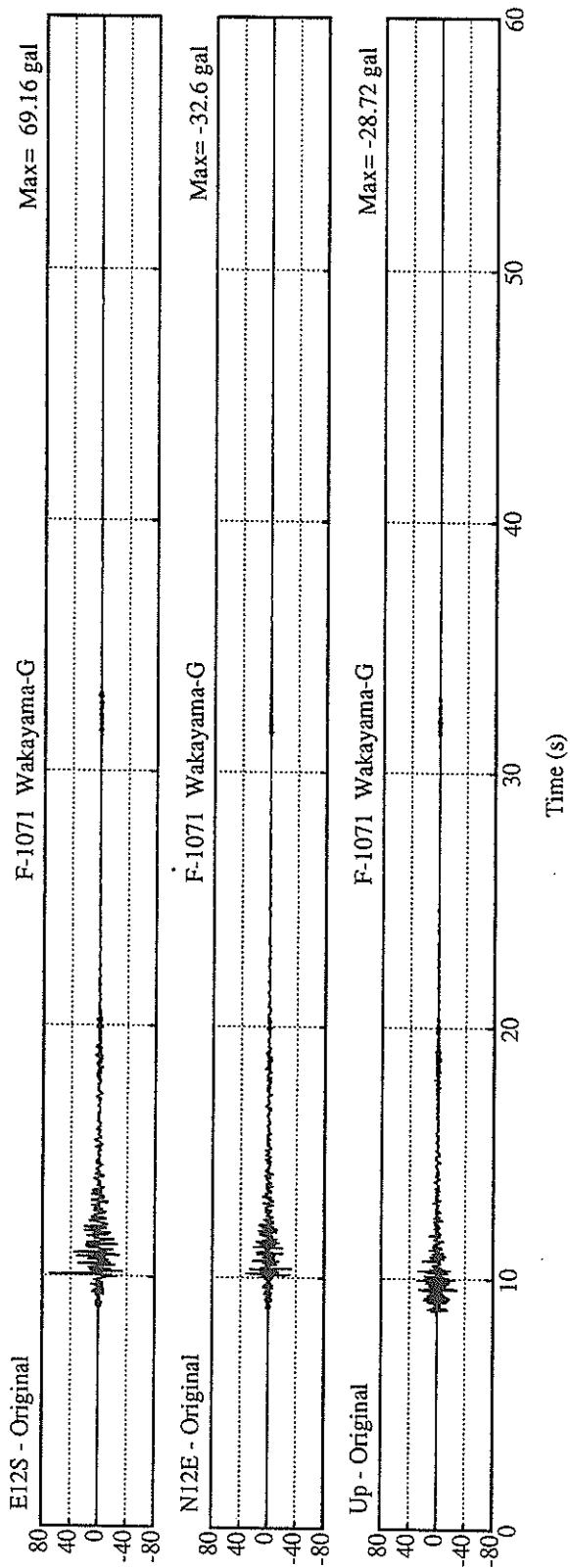
MAXIMUM VELOCITY (CM/SEC)

FIXED FILTER	0.75	1.51	0.39	1.51
VARIABLE FILTER	0.71	1.53	0.37	1.54

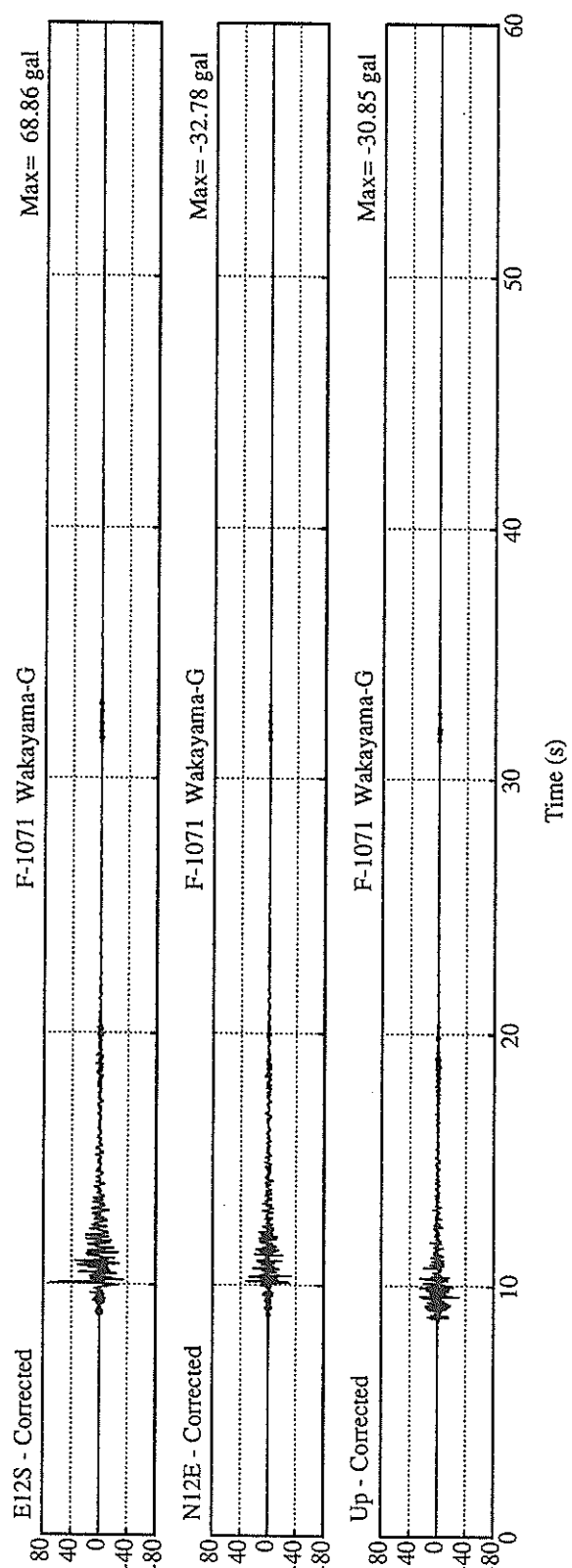
MAXIMUM DISPLACEMENT (CM)

FIXED FILTER	0.03	0.11	0.02	0.11
VARIABLE FILTER	0.02	0.08	0.01	0.09

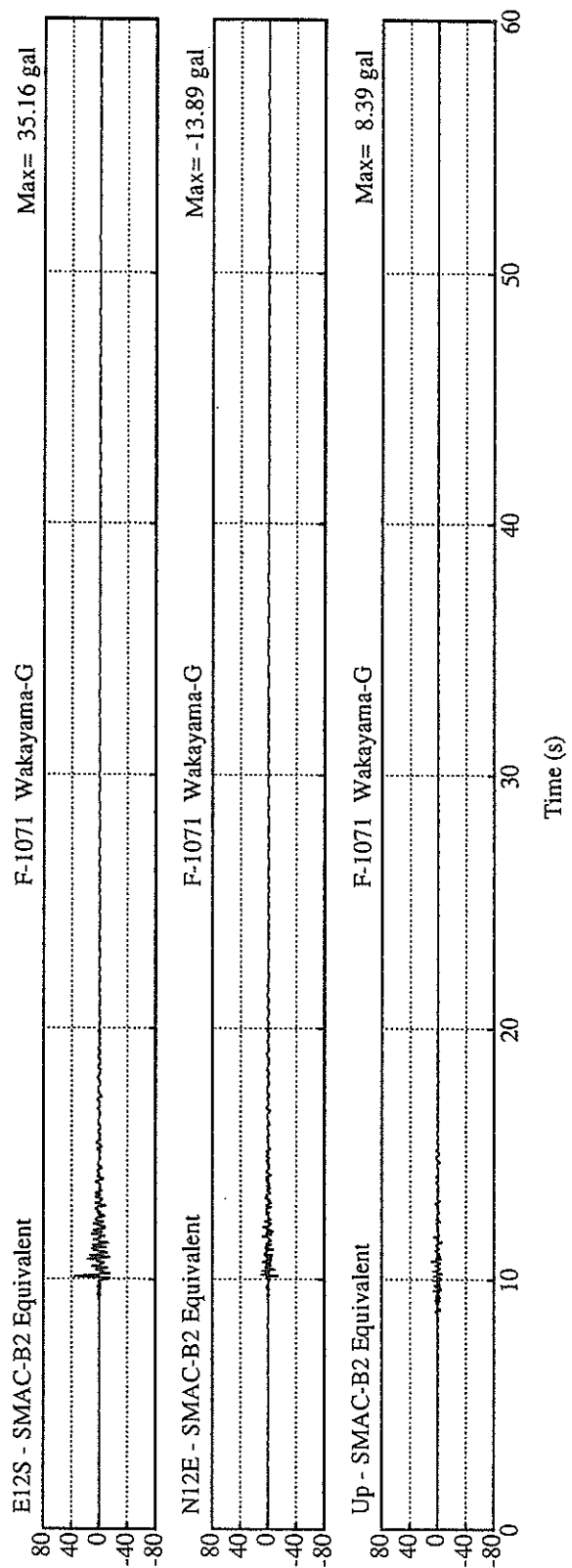
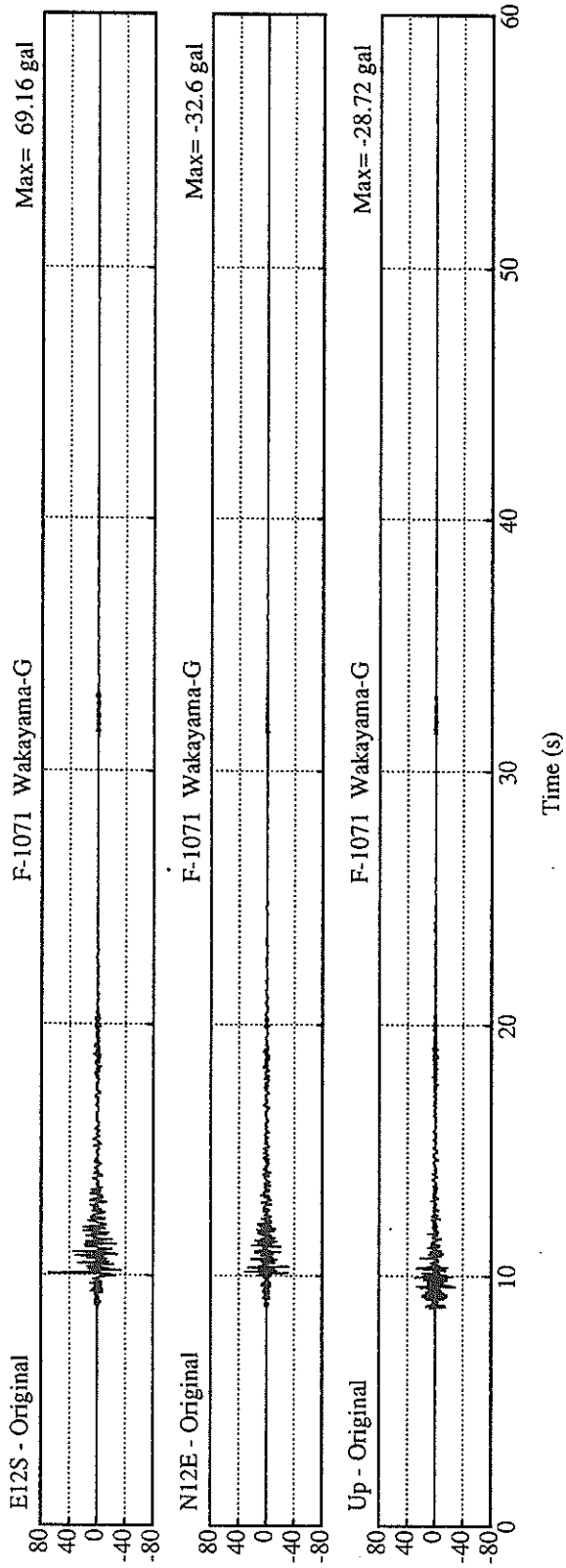
* RESULTANT OF HORIZONTAL COMPONENTS

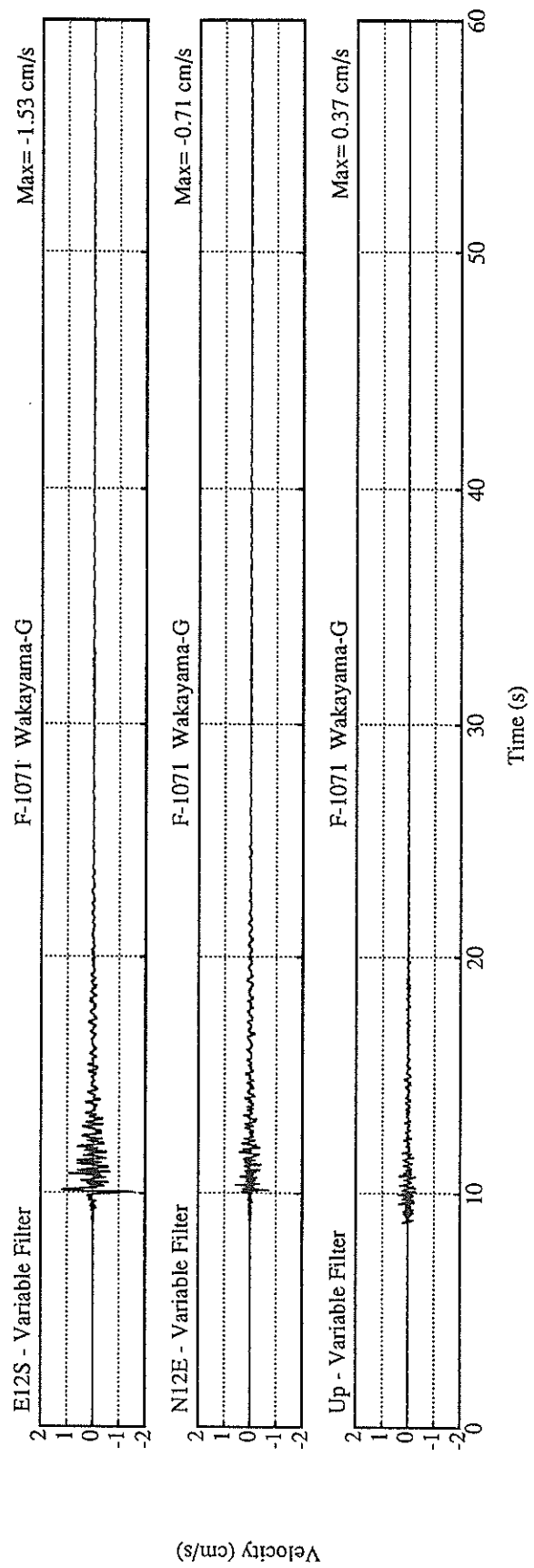
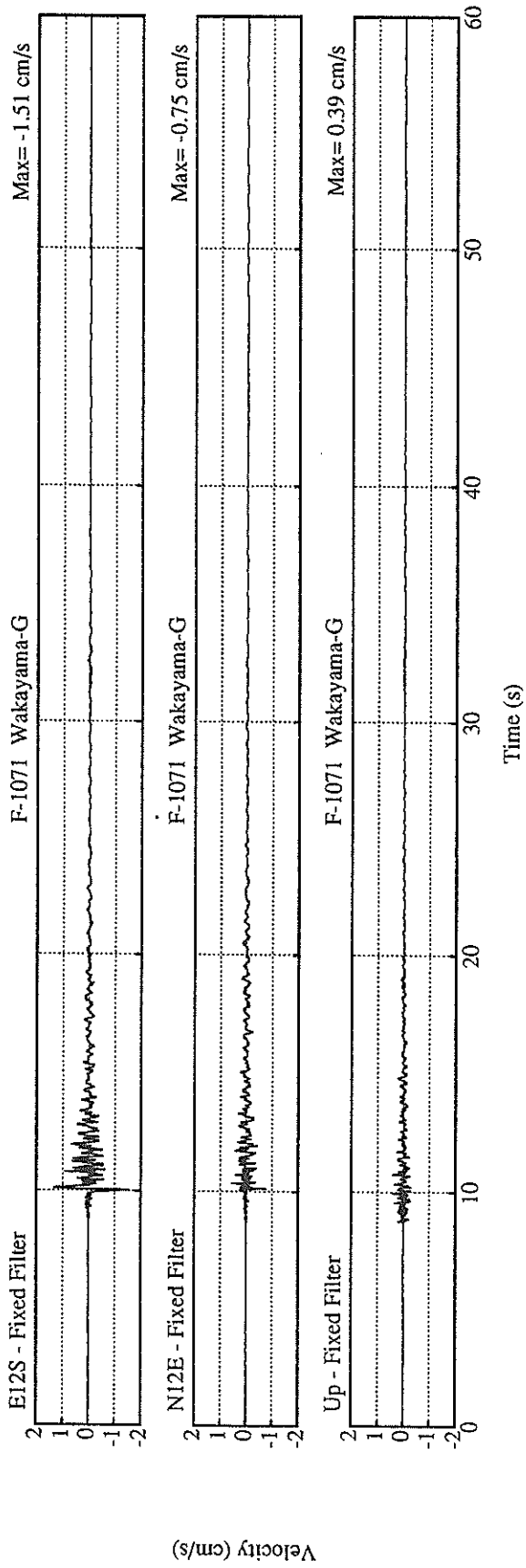


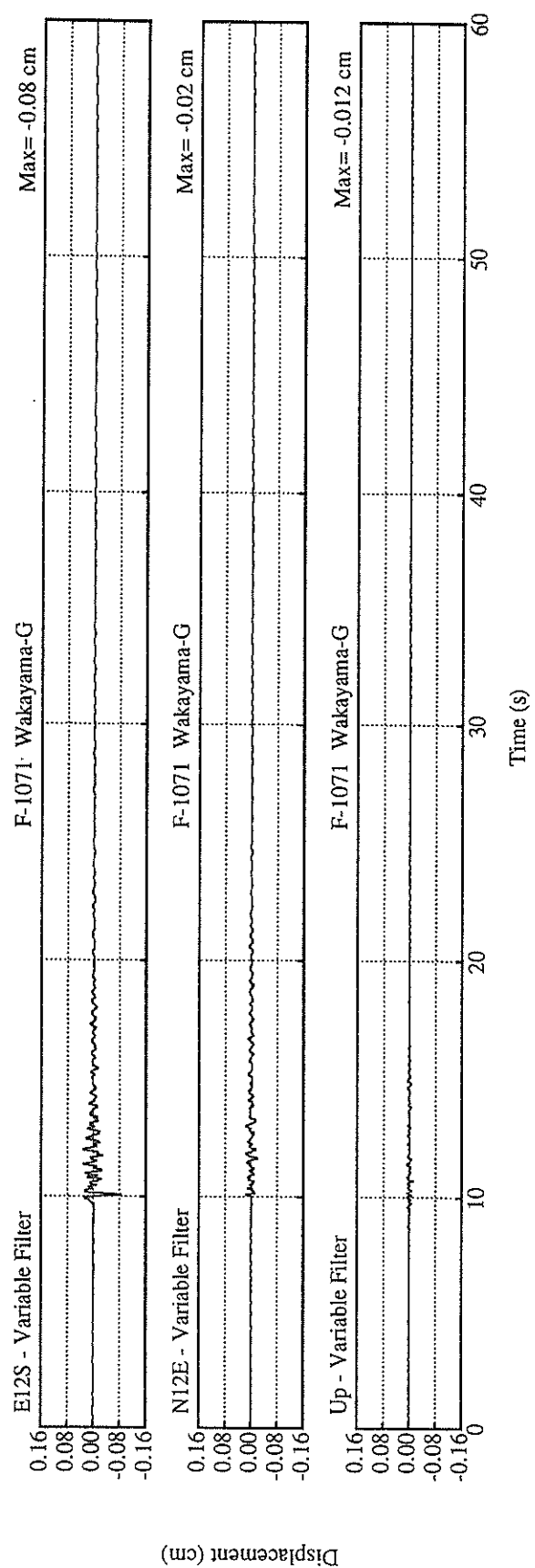
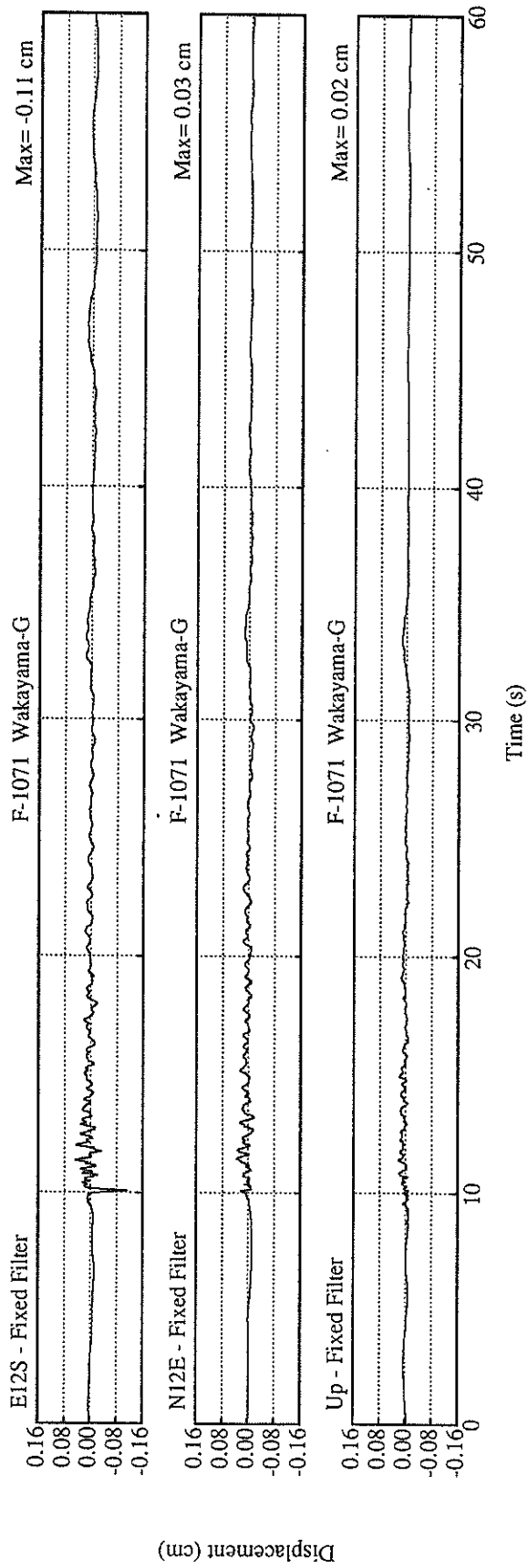
Acceleration (gal)

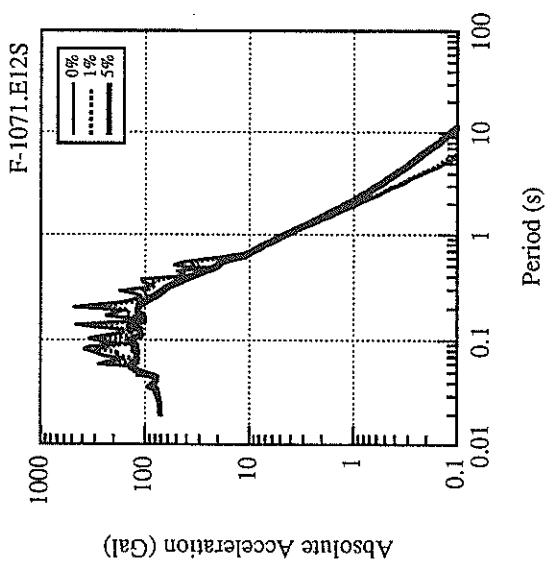
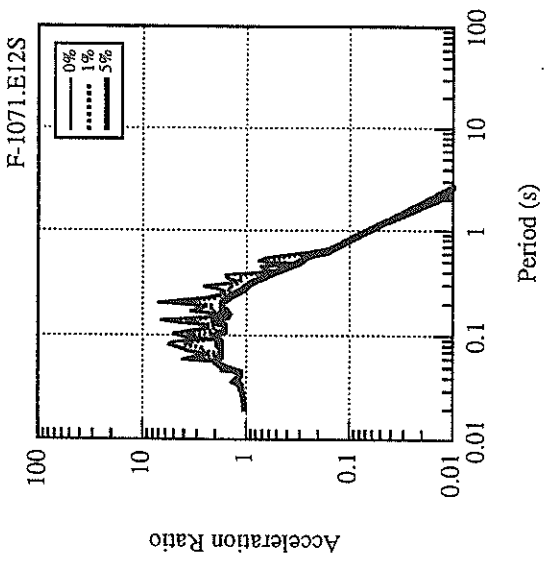
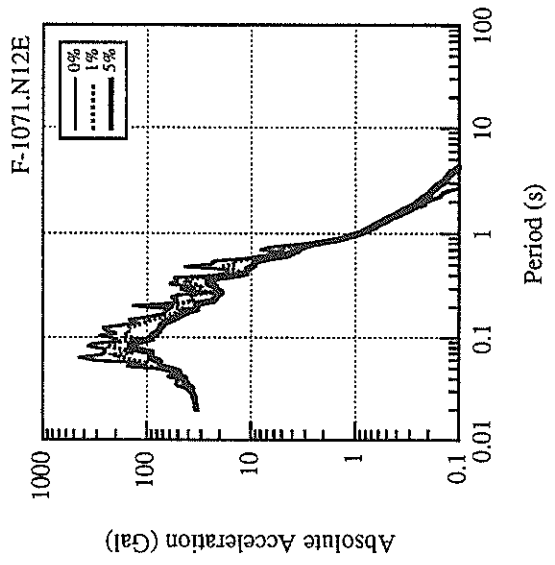
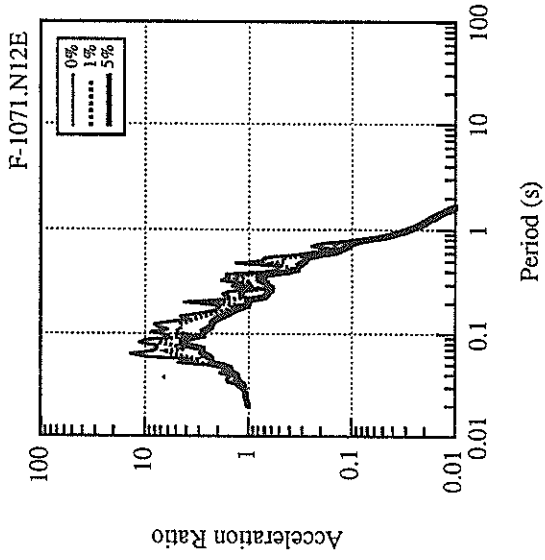
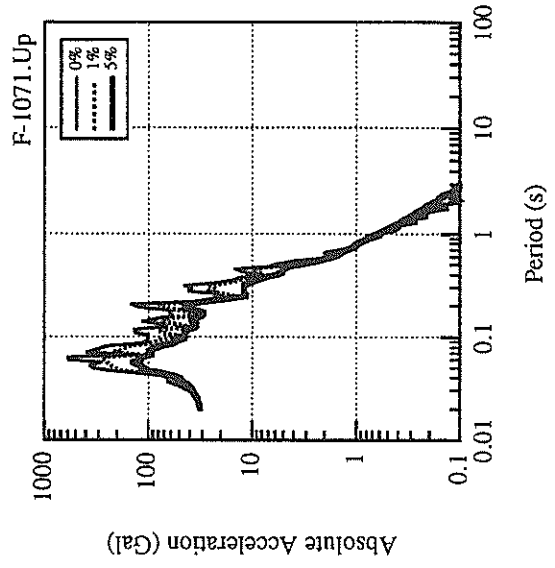
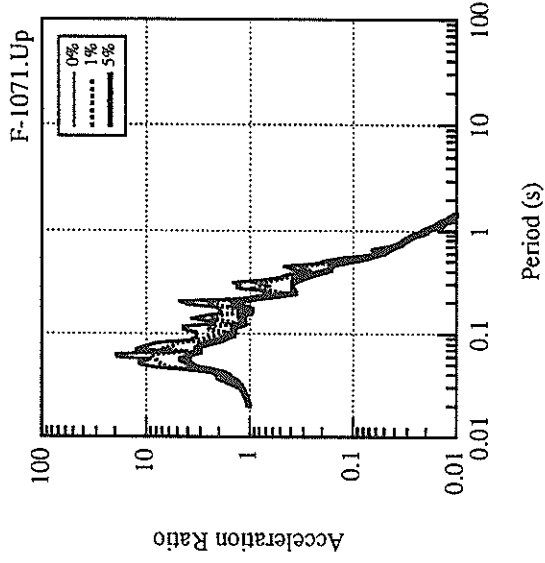


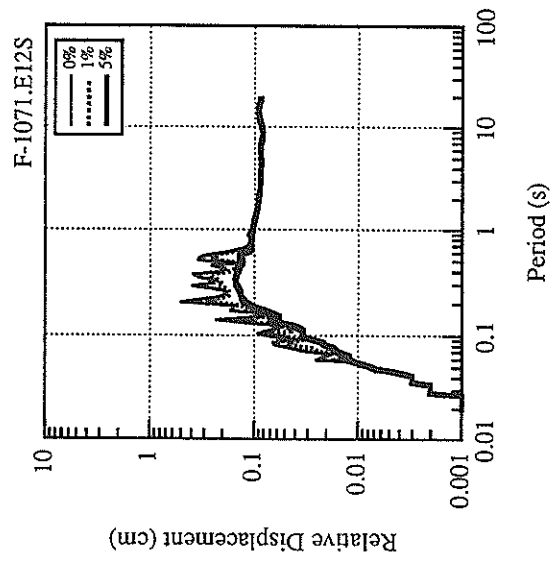
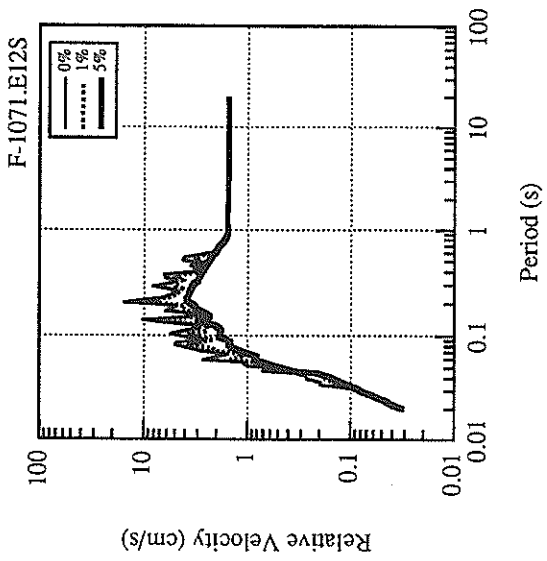
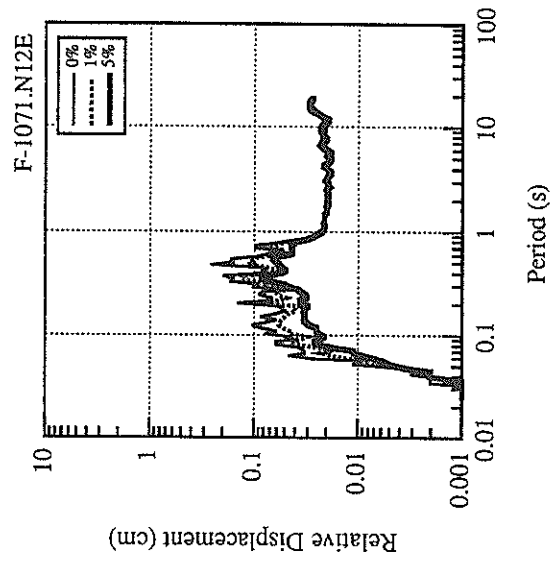
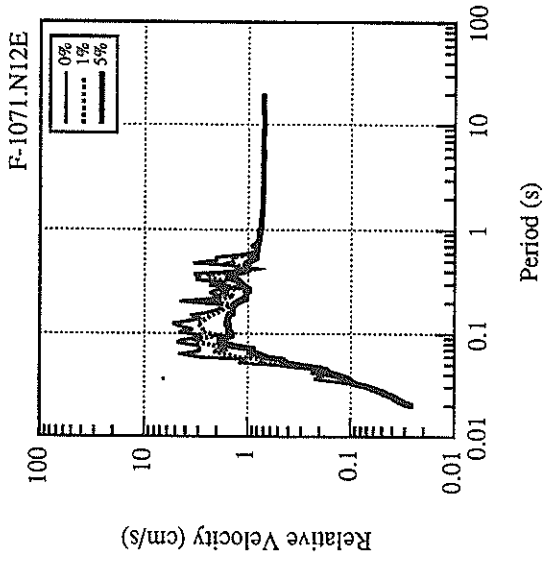
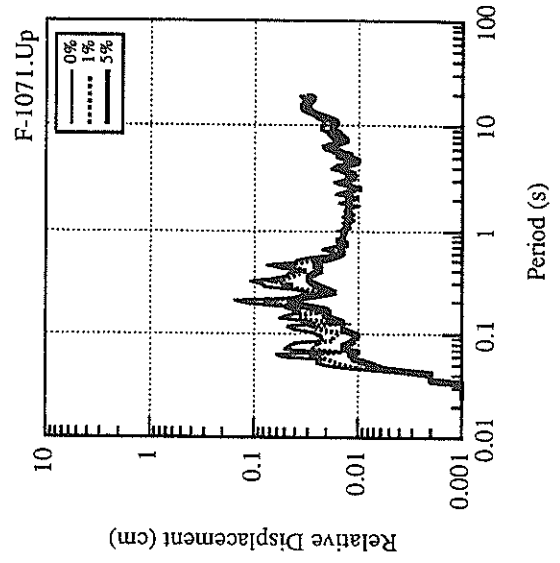
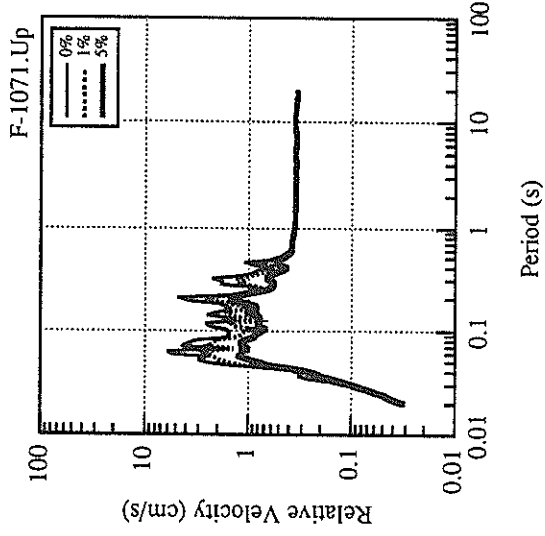
Acceleration (gal)

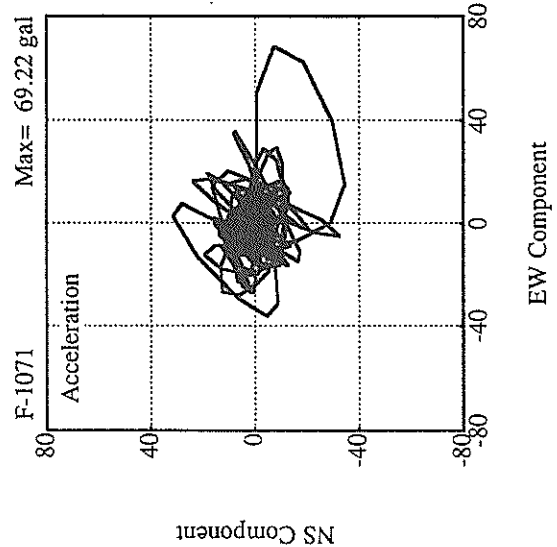
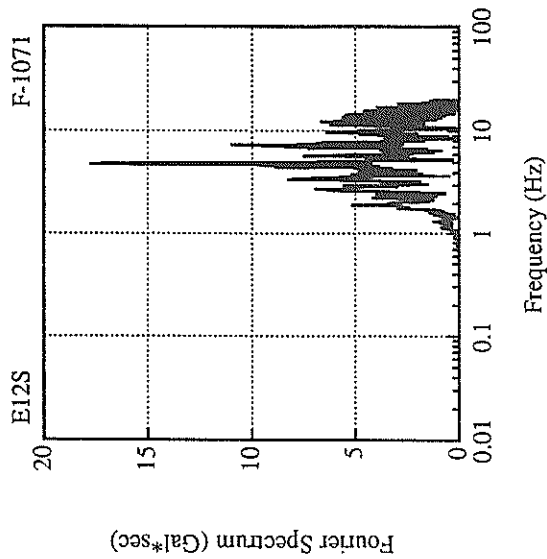
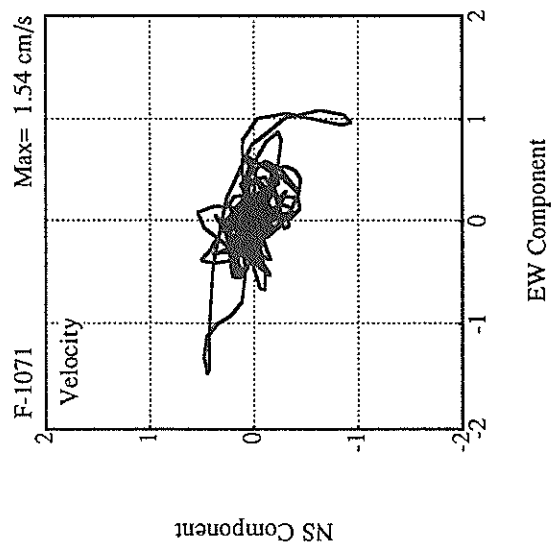
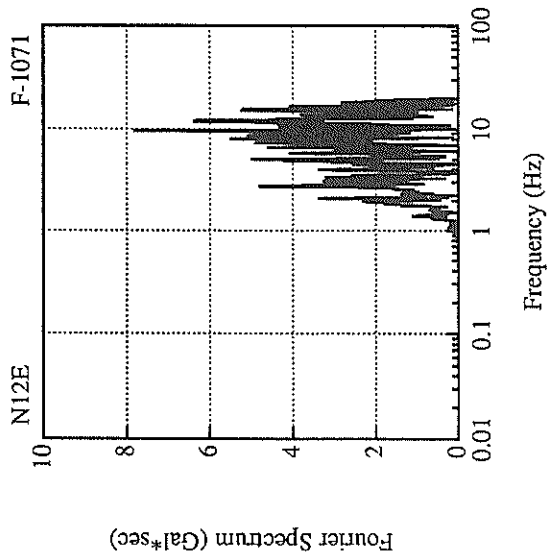
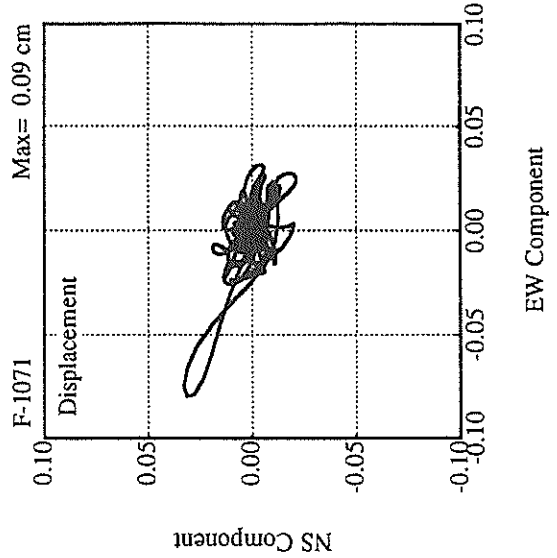
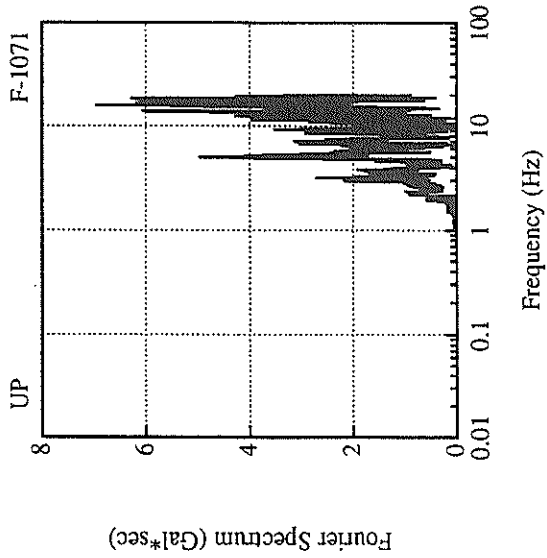












RECORD NUMBER : F-1111

STATION : ONAHAMA-JI-G

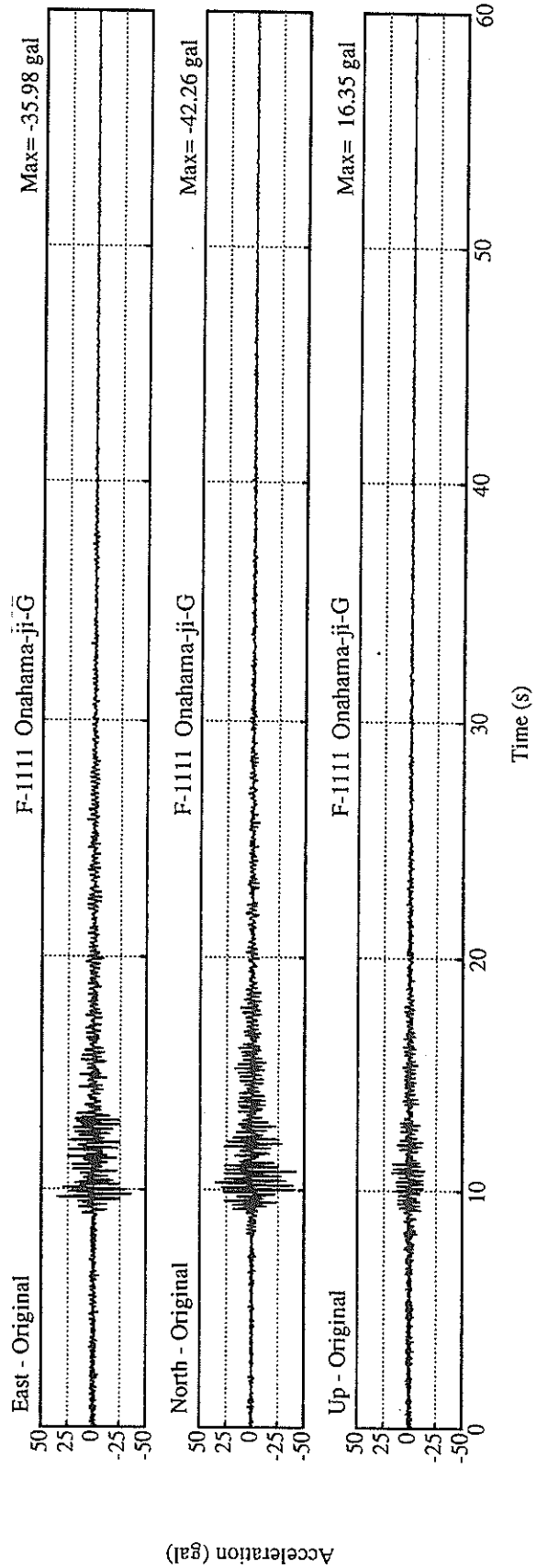
EARTHQUAKE DATA

 DATE AND TIME 10:28 DEC.21,1996
 LOCATION OF HYPOCENTER
 EPICENTRAL REGION SW IBARAKI PREF
 LATITUDE 36° 5.6' N
 LONGITUDE 139° 51.8' E
 DEPTH 53.1KM
 JMA MAGNITUDE 5.4

PEAK VALUES OF COMPONENTS

	N S	E W	U D	HORIZONTAL*
ORIGINAL ACCELERATION (GAL)	42.3	36.0	16.4	51.8

* RESULTANT OF HORIZONTAL COMPONENTS



港湾技研資料 No.909

1998.9

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