



Boğaziçi University
Kandilli Observatory and Earthquake Research Institute
Department of Earthquake Engineering



**PRELIMINARY ANALYSIS OF DATA
FROM THE AFTERSHOCK DEPLOYMENT
IN VAN AND ERCİŞ , TURKEY**

AFTERSHOCKS WITH $M \geq 4.0$

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SUMMARY

Following the destructive $M=7.2$ Van Earthquake of 23 October 2011 in Eastern Turkey, we have deployed eight strong motion monitoring equipment to the region to record aftershocks.

Four of the stations were installed in the city of Van, and the remaining four in the city of Erciș, which suffered the most damage and loss of life. The stations in each city are arranged such that one of the stations is located on a stiff soil or a rock site to be used as the reference station, and the remaining three in the flat urban area forming a triangle.

The eight-station network has recorded a large number of aftershocks, including the destructive one with $M=5.6$ on 9 November 2011 epicentered near the town of Edremit south of Van. Figure 1 shows the deployment regions. The locations of the eight stations in Van and Erciș can be seen Figures 2 and 3 respectively. Descriptive information on the stations is summarized in Table 1.

This document reports on the records from earthquakes with $M \geq 4.0$ that were obtained until 3 November 2011 and on the events with $M \geq 4.9$ in the period of 03-21 November 2011. All together ten events are considered in this report. The events before 9 November are essentially the aftershocks of the 23 October 2011, $M_w 7.2$ earthquake. All of the reported earthquakes were recorded by the stations in Erciș, whereas in Van only three earthquakes were recorded by two of the four stations. The records can be downloaded through links in Table 2 and Table 3. Table 2 covers events with $M \geq 4.0$ in the period of 1-3 November 2011. Table 3 are for the $M \geq 4.9$ events between 3 and 21 November 2011. The epicentral properties of all events can be found in Table 4.

Six earthquakes are selected for analysis among the presented ten. The first one is the $M4.7$ earthquake of 02.11.2011. The second earthquake is the Şahgeldi event, which took place on the same date with the first one, was however recorded by five stations. Processed records from the Akçift event ($M4.7$) can be seen in pages 11-20. The records of the Şahgeldi event ($M4.4$) are presented in pages 21-34. The records from the $M4.9$ Çolpan event are given in pages 35-44, $M5.5$ Vangölü in pages 45-62, Mollakasım in 63-80 and finally Bodurağaç records are given in pages 81-90.

At link

http://www.koeri.boun.edu.tr/Haberler/23%20October%202011,%20Mw=7.2%20Van,%20Turkey%20Eq.6_205.depmuh, information on the 23 October 2011 earthquake can be found.



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For the background information on the 9 November 2011, M5.6 earthquake please see the link http://www.koeri.boun.edu.tr/Haberler/THE%20NOVEMBER%202009,%202011%20EDREMIT-VAN,%20TURKEY%20EARTHQUAKE_6_207.depmuh.

Analysis of records from the 9 November 2011, M5.6 earthquake is covered in a separate report at link http://www.koeri.boun.edu.tr/depremmuh/deprem-raporlari/Van_Eq_aftershocks1.pdf.

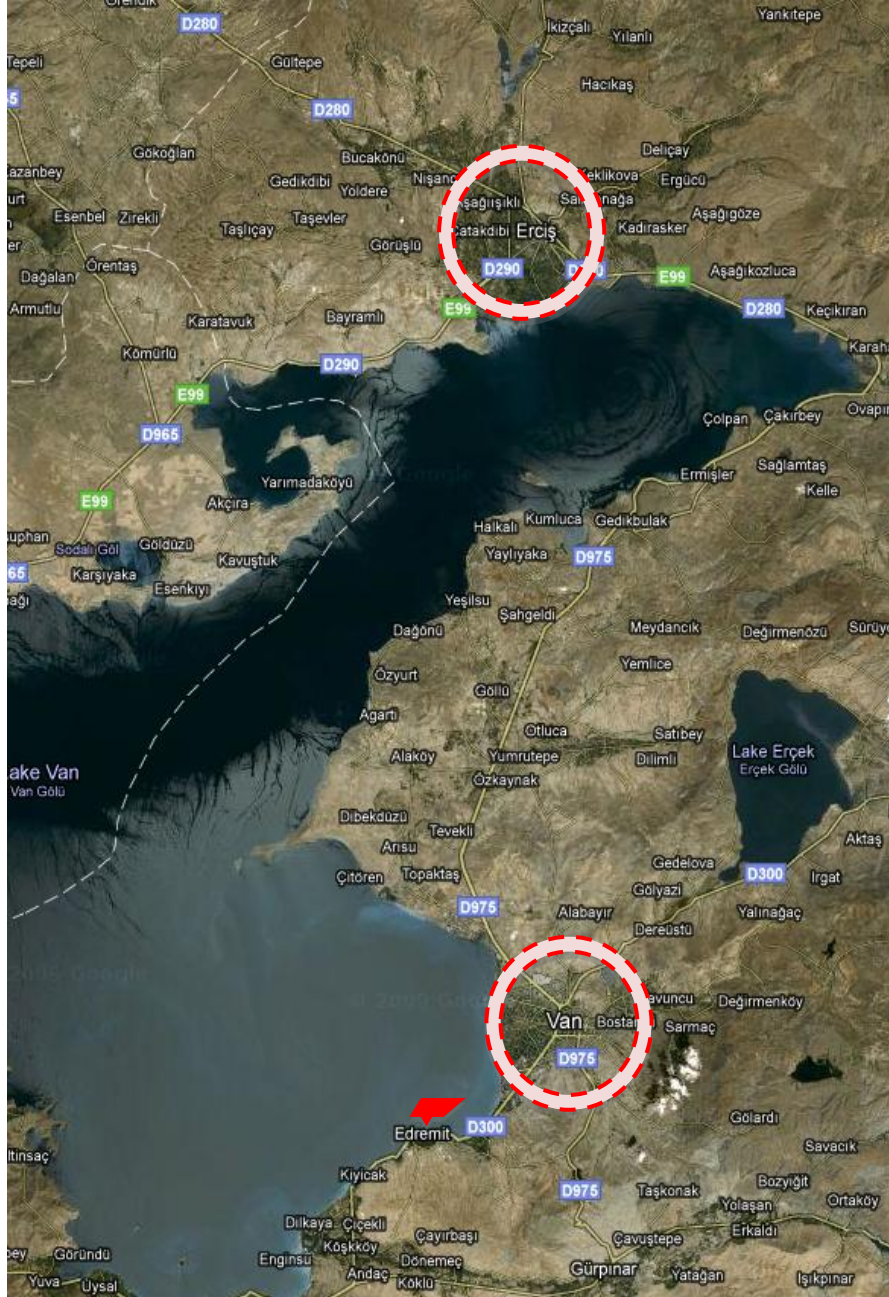


Figure 1. Locations of aftershock monitoring cities, Van and Erciş



Figure 2. Locations of aftershock monitoring stations in Van

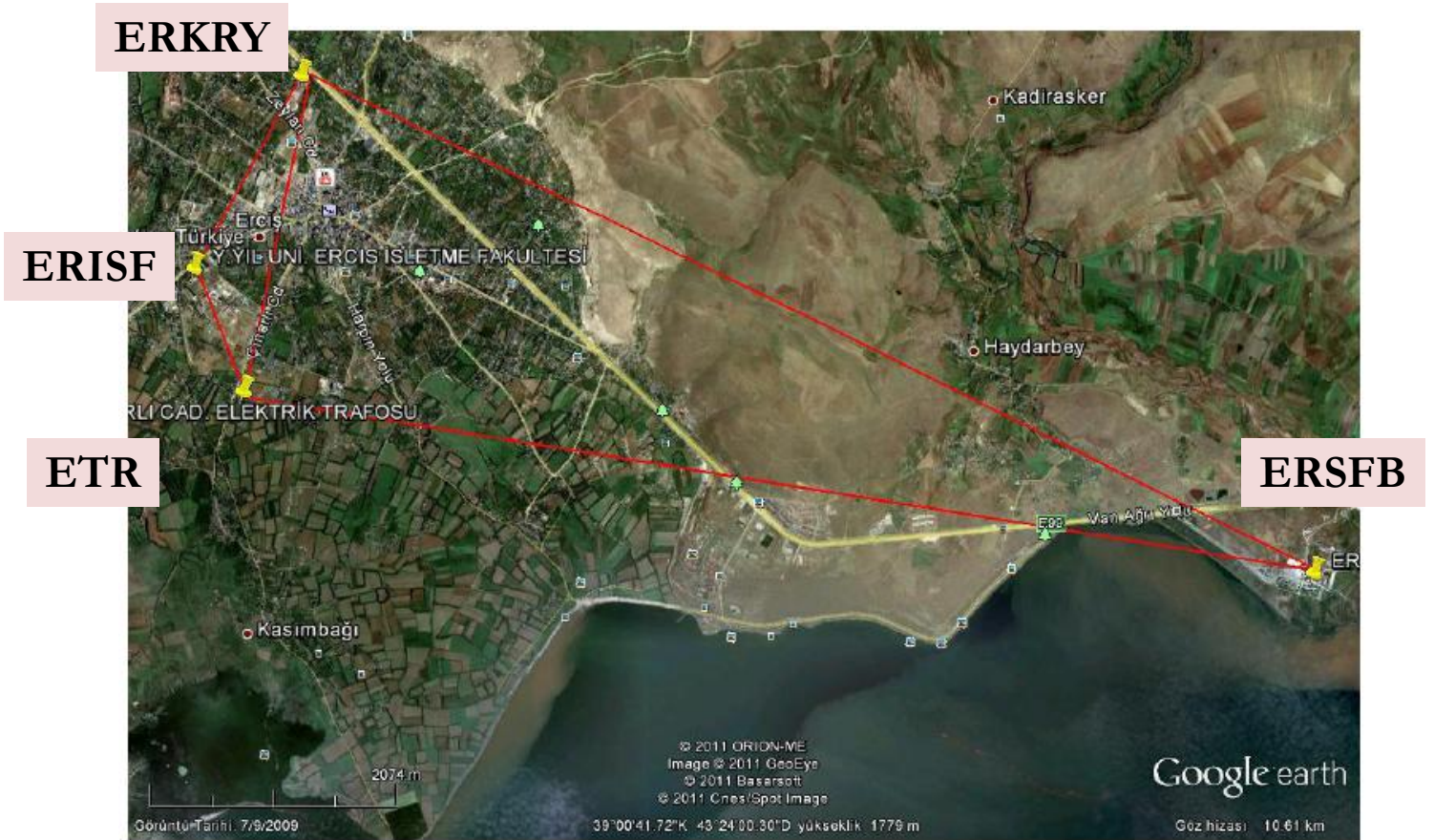


Figure 3. Locations of aftershock monitoring stations in Erciş

Table 1. Station information for the Van and Erciş deployments.

VAN

STATION CODE	STATION COORDINATES	STATION LOCATION
VNS (rock site)	38.33455N 43.19533E	Şemsibey İlkokulu
VNKIO (soil site)	38.33455N 43.19533E	Koç İlköğretim Okulu
VNTGM (soil site)	38.33455N 43.19533E	TEDAŞ Genel Müdürlüğü (Havaalanı kavsığı)
VNKEA (soil site)	38.33455N 43.19533E	TEDAŞ Köy Elektrik Arıza (Valilik yanı, Santral Sok.)

ERCİŞ

STATION CODE	STATION COORDINATES	STATION LOCATION
ERSFB (stiff soil site)	38.59996N 43.27304E	Erciş Şeker Fabrikası
ETR (soil site)	39.00880N 43.21097E	TEDAŞ Trafo Binası (Çınarlı Caddesi sonu)
ERKRY(soil site)	39.02264N 43.21426E	Erciş Karayolları 115. Şube Müdürlüğü
ERISF(soil site)	39.01398N 43.20798E	Yüzüncü Yıl Üniversitesi Erciş İşletme Fakültesi

Table 2. Aftershock records (01.11.2011-03.11.2011, $M \geq 4.0$)

STATIONS AND AFTERSHOCKS		Sağlamtaş M=4.3 01/11/2011 23:10:44	Çakırbey M=4.8, 02/11/2011 06:34:20	Akçift M=4.7 02/11/2011 15:24:02	Şahgeldi M=4.4 02/11/2011 22:48:21	Çolpan M=4.1 02/11/2011 23:44:15	Unseli- Muradiye M=4.0 03/11/2011 03:05:46
VAN	VNS 38.33445N – 43.19533E Şemsibey İlkokulu						
	VNKIO 38.30957N – 43.20473E Koç İlköğretimokulu				X		
	VNTGM 38.28571N – 43.21571E TEDAŞ Genel Müdürlüğü				X		
	VNKEA 38.30070N – 43.23898E TEDAŞ Köy Elektrik Arıza						
ERCIŞ	ERSFB 38.59996N – 43.27304E Erciş Şeker Fabrikası	X	X	X		X	X
	ETR 39.00880N – 43.21097E TEDAŞ Trafo			X	X	X	X
	ERKRY 39.02264N – 43.21426E Karayolları 115. Şube Müd.	X	X	X	X	X	X
	ERISF 39.01398N – 43.20798E 100. Yıl Üni. İşletme Fak.	X	X	X	X	X	X



Table 3. Aftershock records (03.11.2011-21.11.2011, $M \geq 4.9$)

STATIONS AND AFTERSHOCKS		Çolpan M=4.9 06/11/2011 02:43:12	Van Gölü M=5.5 08/11/2011 22:05:15	Mollakasım M=5.2 14/11/2011 22:08:15	Bodurağaç M=4.9 18/11/2011 17:39:40
VAN	VNS 38.33445N – 43.19533E Şemsibey İlkokulu		X	X	
	VNKIO 38.30957N – 43.20473E Koç İlköğretimokulu	X			
	VNTGM 38.28571N – 43.21571E TEDAŞ Genel Müdürlüğü				
	VNKEA 38.30070N – 43.23898E TEDAŞ Köy Elektrik Arıza		X	X	X
ERCİŞ	ERSFB 38.59996N – 43.27304E Erciş Şeker Fabrikası	X	X	X	X
	ETR 39.00880N – 43.21097E TEDAŞ Trafo	X	X	X	X
	ERKRY 39.02264N – 43.21426E Karayolları 115. Şube Müd.	X	X	X	X
	ERISF 39.01398N – 43.20798E 100. Yıl Üni. İşletme Fak.	X	X	X	X

Table 4. Epicentral properties (Source: UDIM-KOERI)

Date	Latitude	Longitude	Depth	Magnitude	
01.11.2011 23:10:44	38.881N	43.581E	5.0	4.3	Sağlamtaş (Van)
02.11.2011 06:34:20	38.873N	43.569E	5.0	4.8	Çakırbey (Van)
02.11.2011 15:24:02	38.856N	43.578E	5.0	4.7	Akçift (Van)
02.11.2011 22:48:21	38.761N	43.321E	5.0	4.4	Şahgeldi (Van)
02.11.2011 23:44:15	38.939N	43.553E	5.0	4.1	Çolpan (Van)
03.11.2011 03:05:46	38.958N	43.588E	5.0	4.0	Unseli- Muradiye (Van)
06.11.2011 02:43:12	38.924N	43.565E	5.0	4.9	Çolpan (Van)
08.11.2011 22:05:51	38.724N	43.087E	4.3	5.5	Van Gölü (Van)
14.11.2011 22:08:15	38.678N	43.182E	3.1	5.2	Mollakasım (Van)
18.11.2011 17:39:40	38.837N	43.870E	5.0	4.9	Bodurağaç (Van)



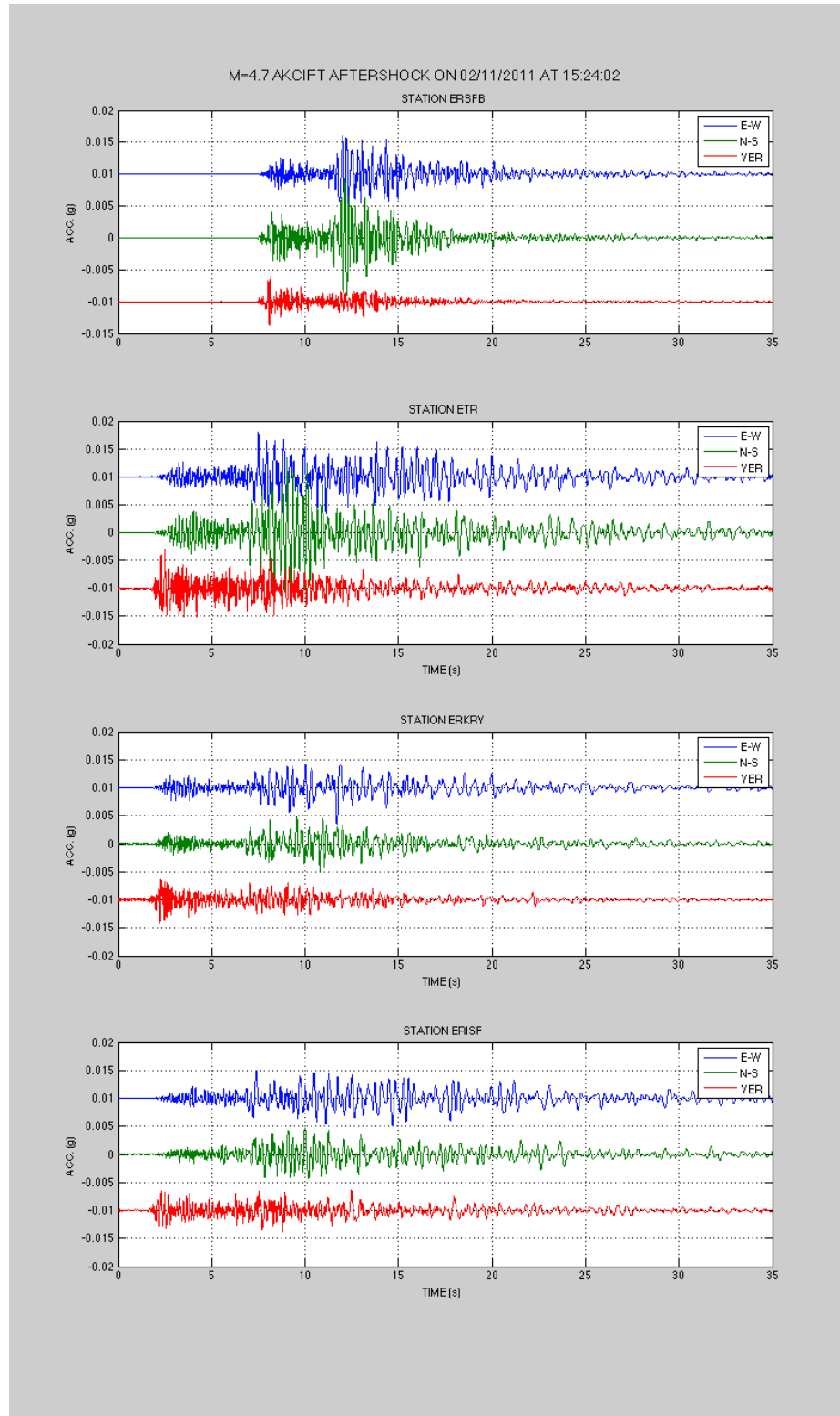
Akçift/Van Aftershock

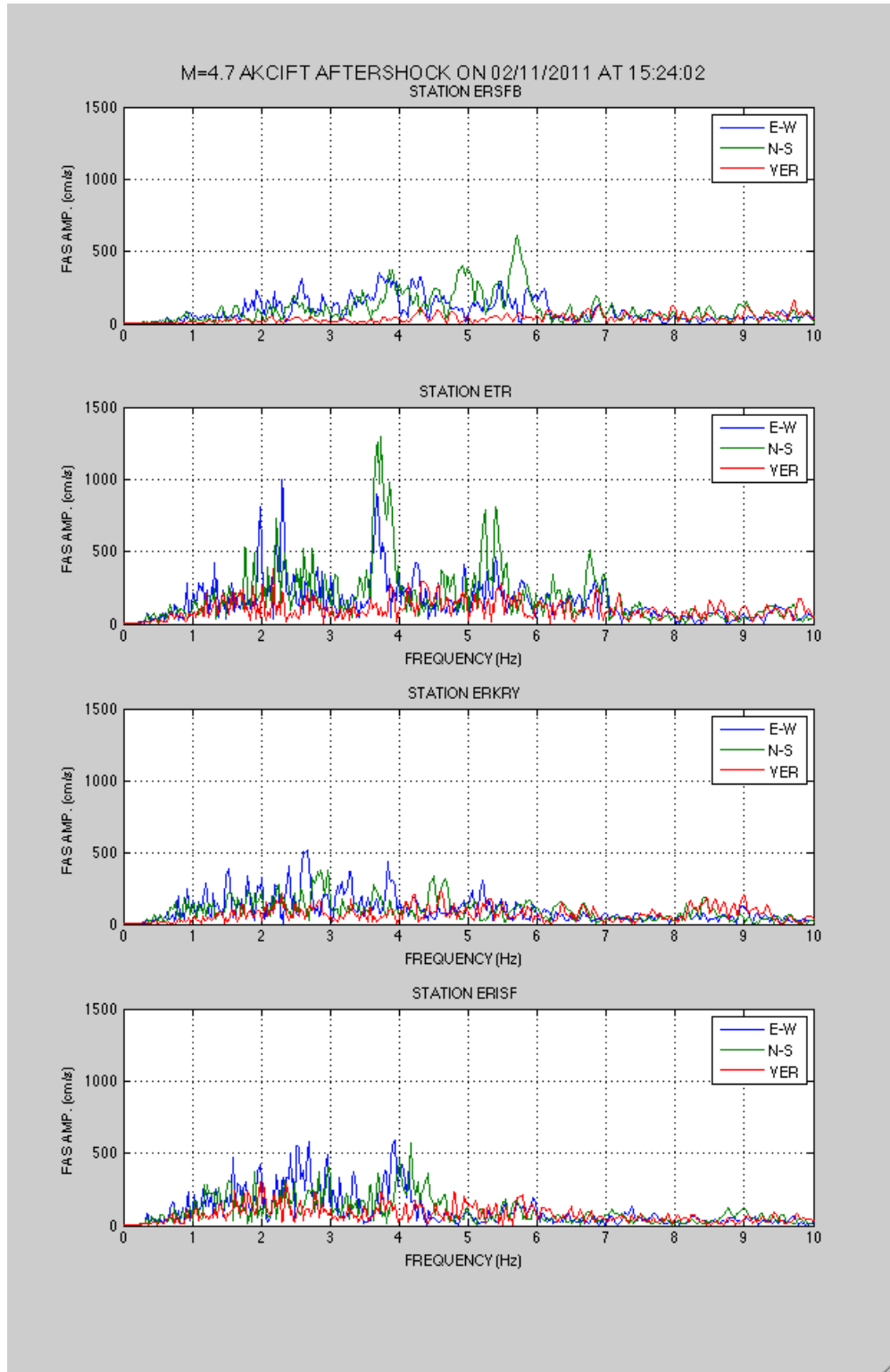
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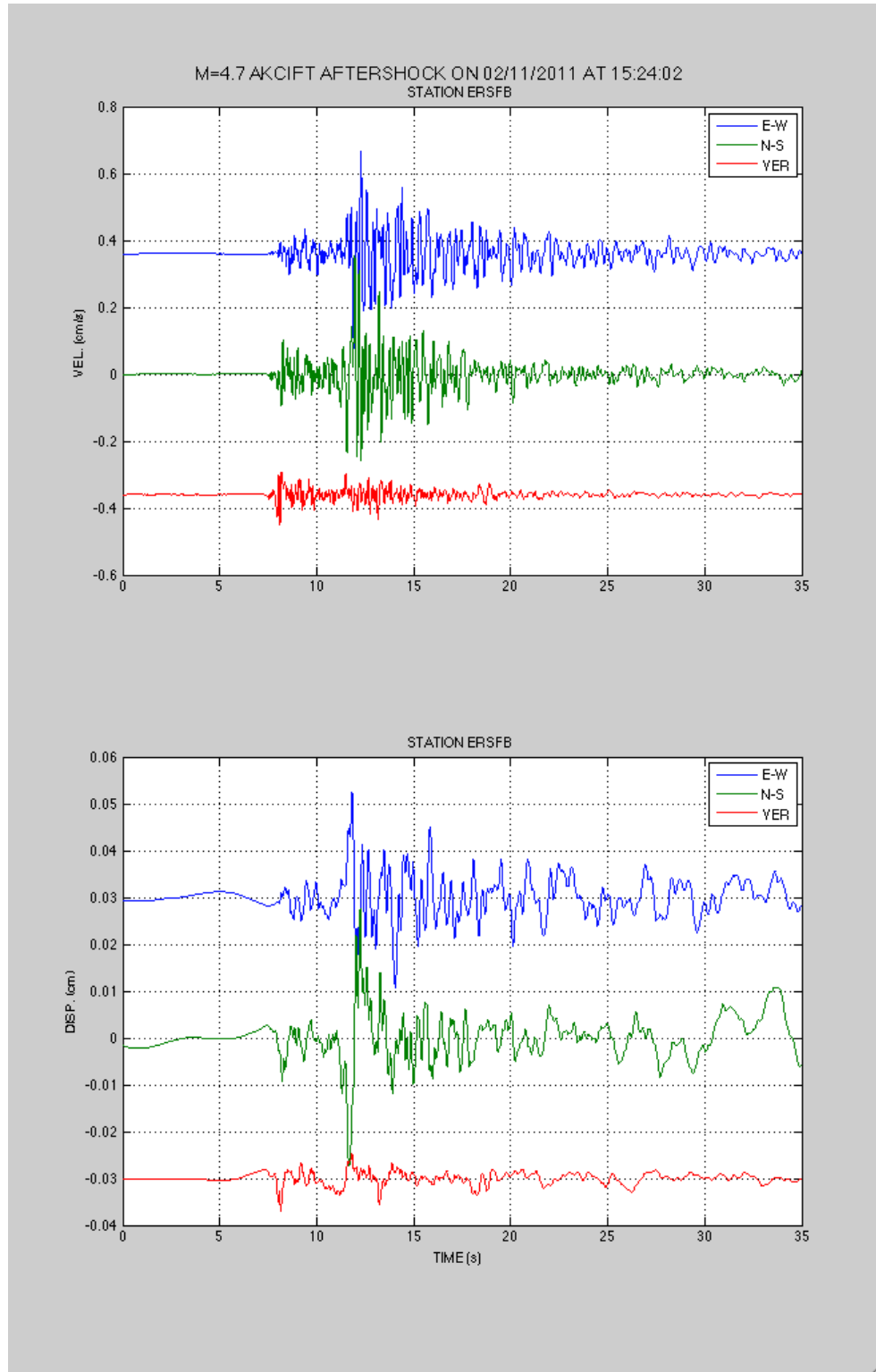
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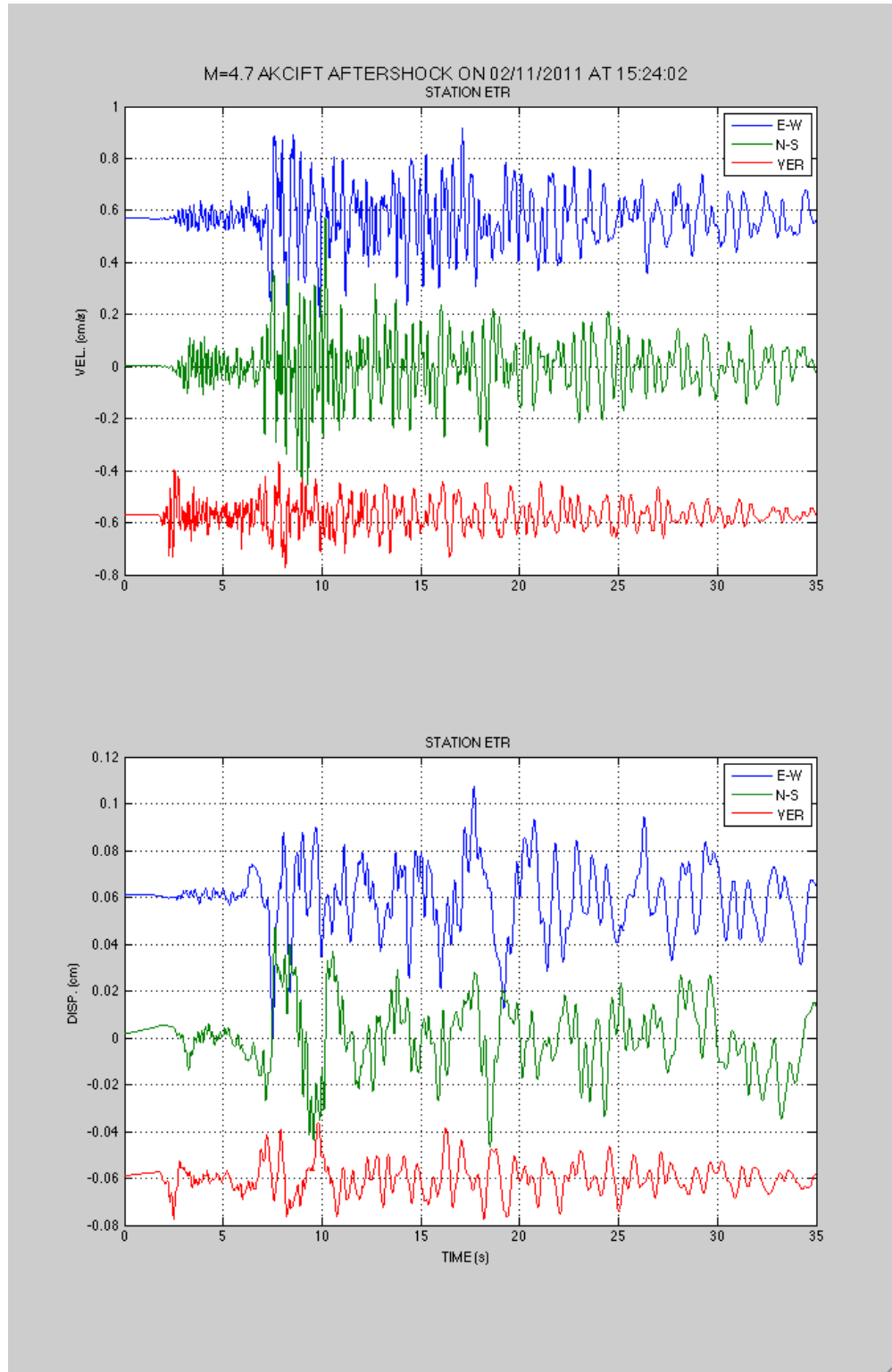
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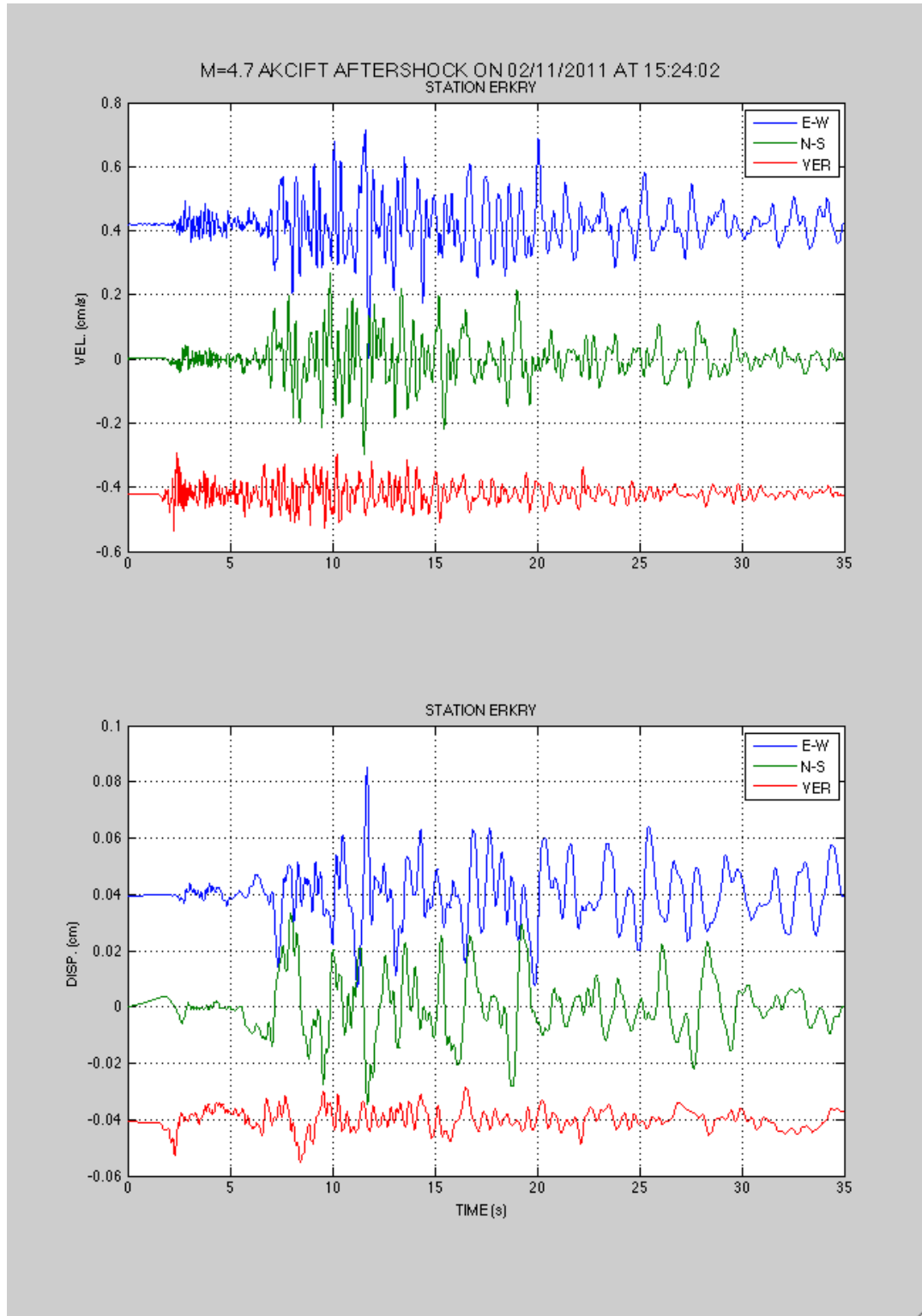
ERCİŞ RECORDS

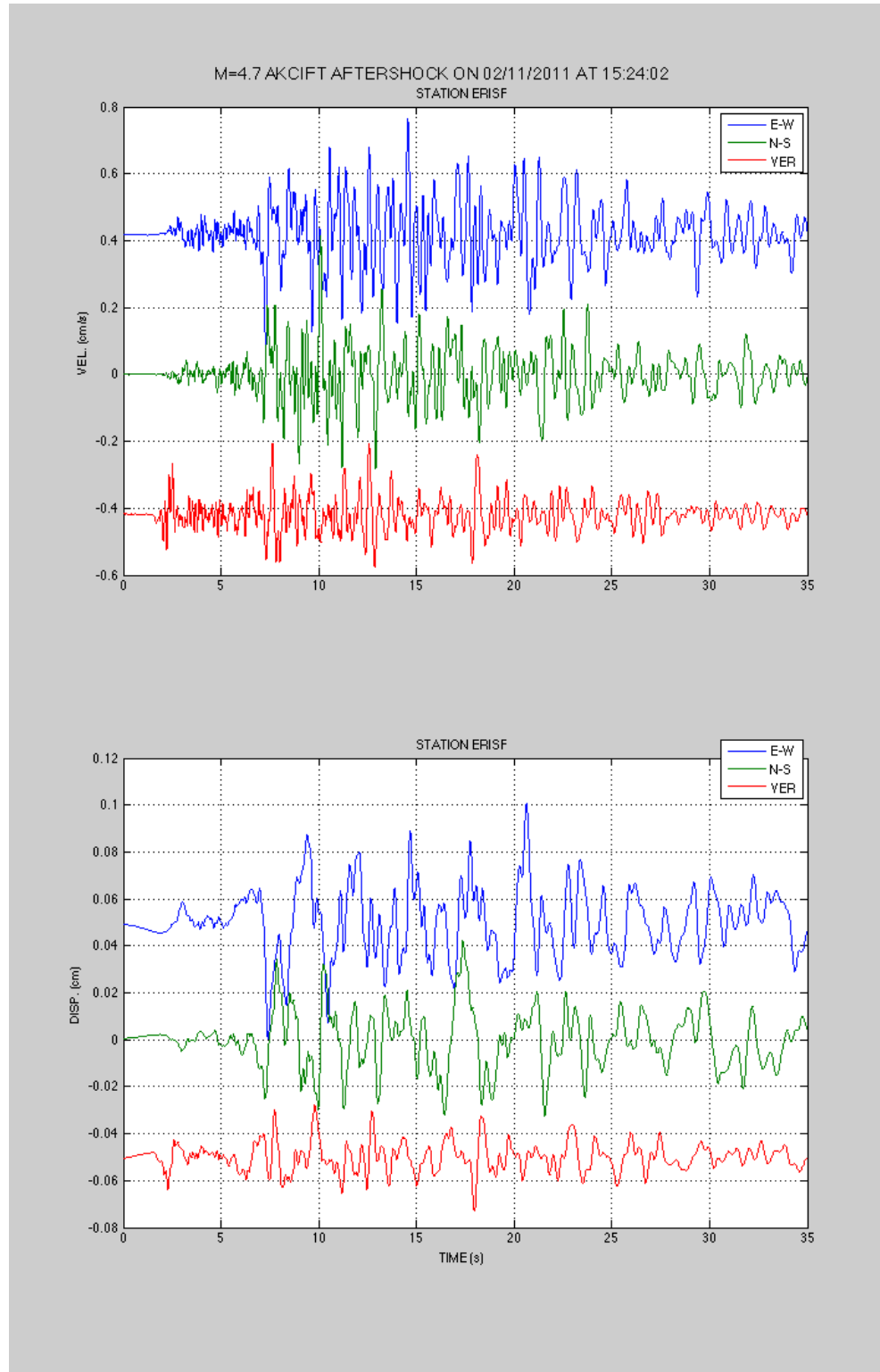


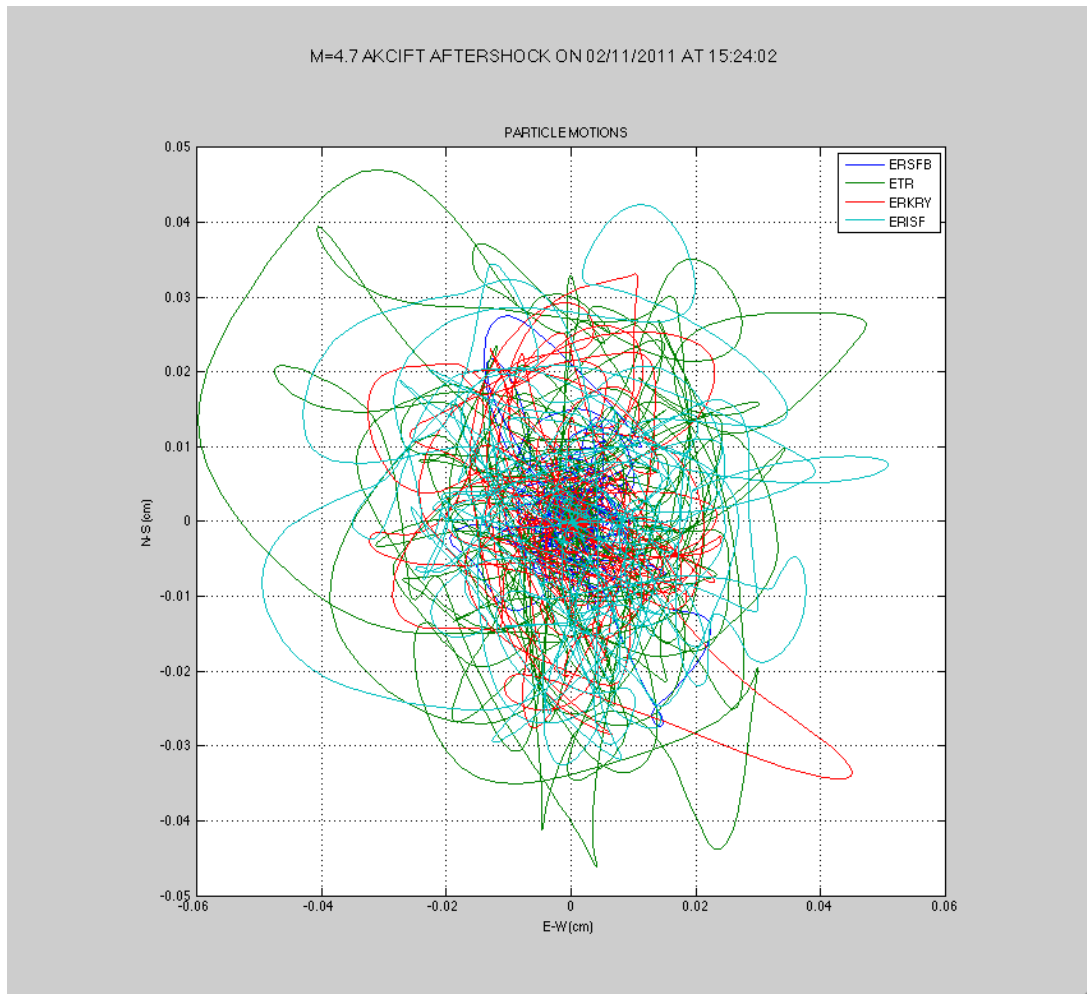


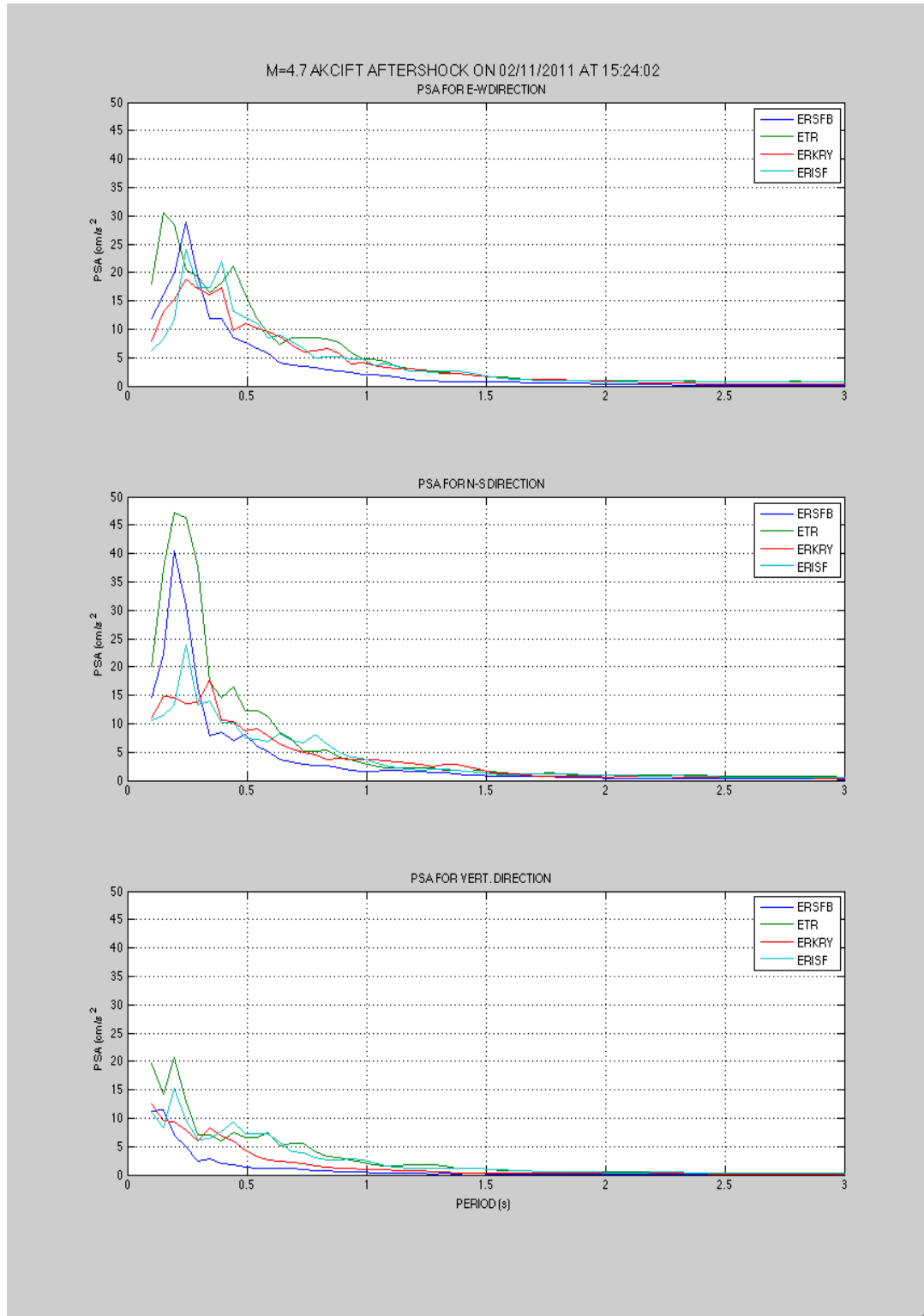


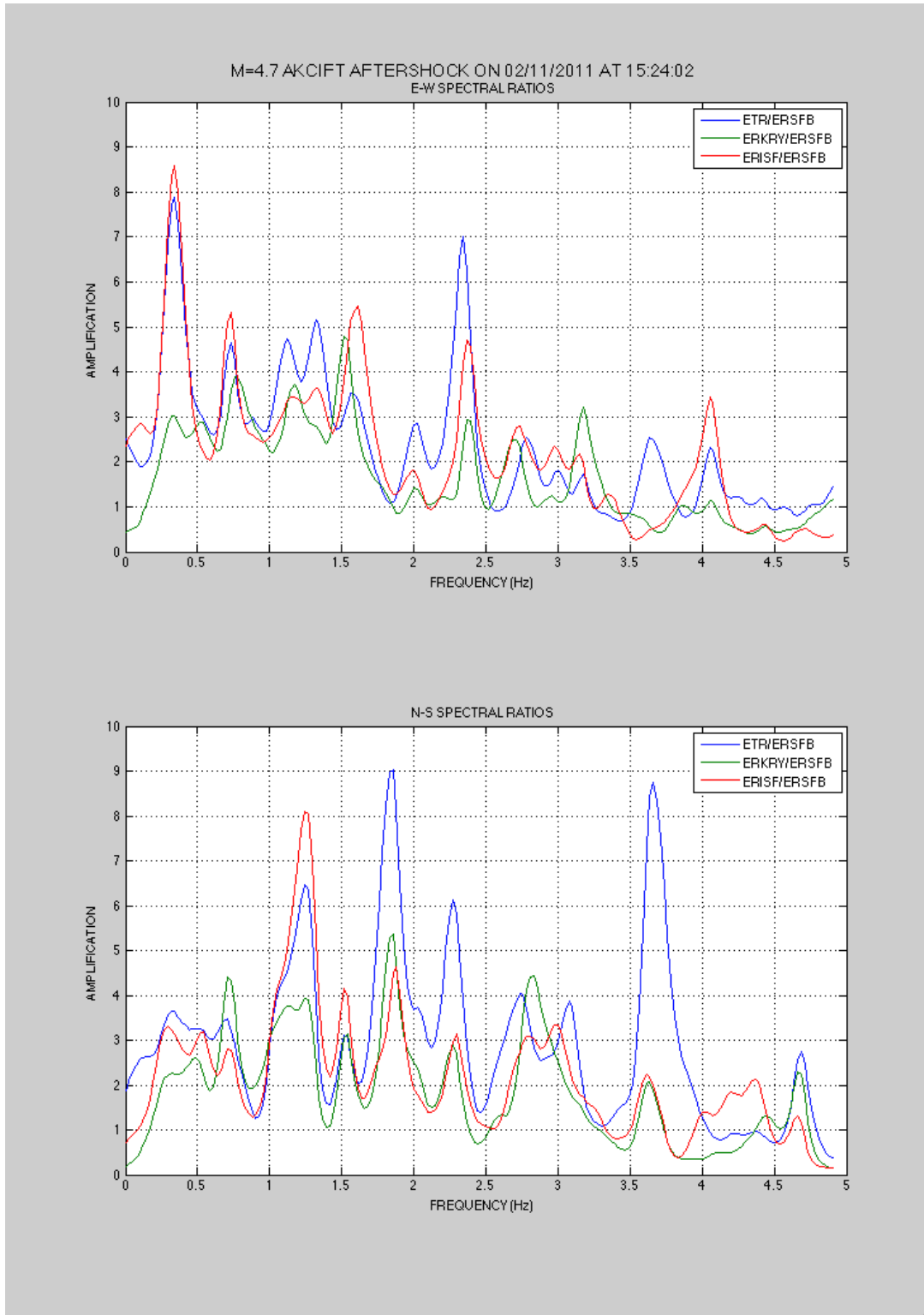














Şahgeldi/Van Aftershock

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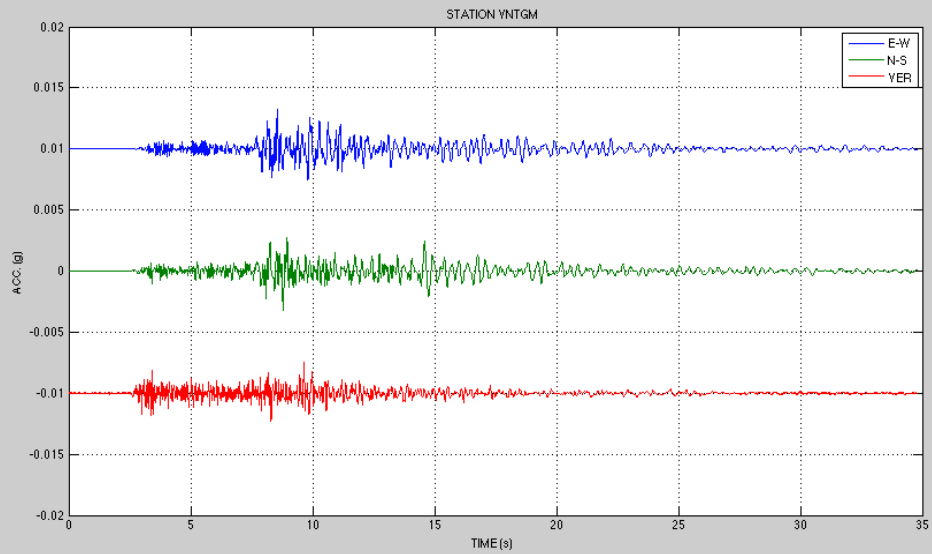
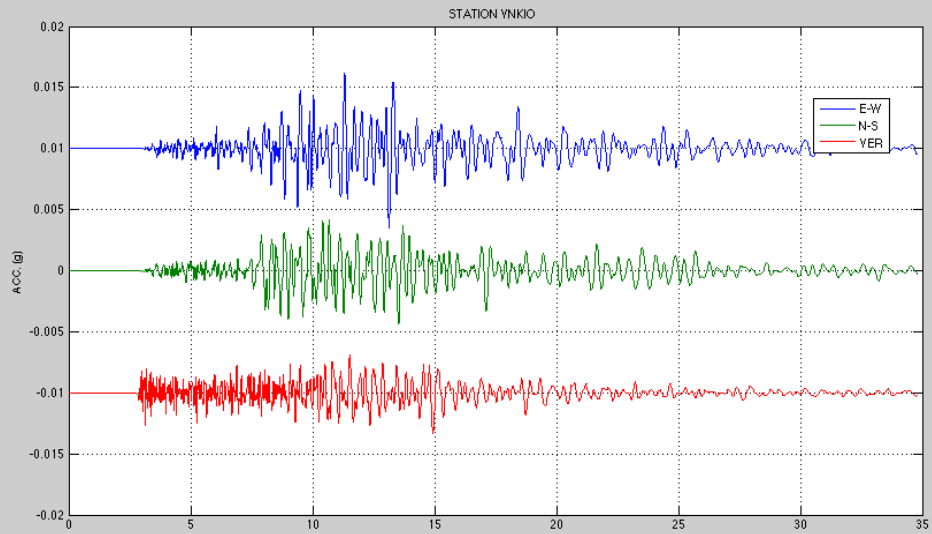
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22:48:21

VAN RECORDS

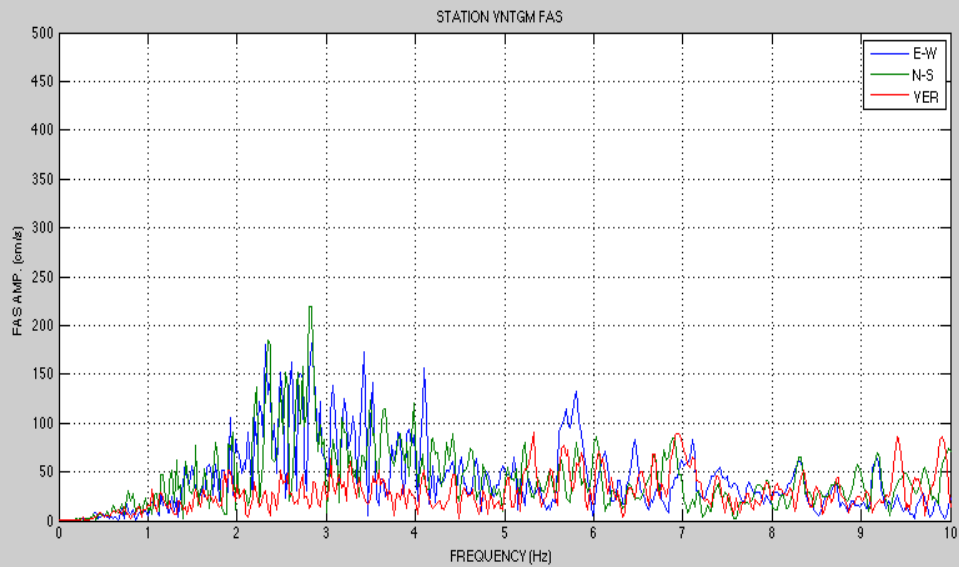
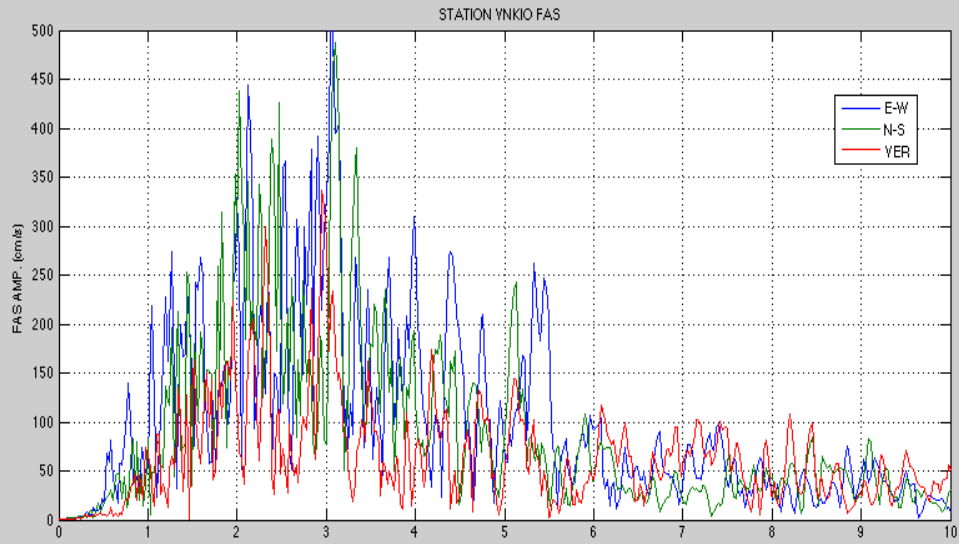


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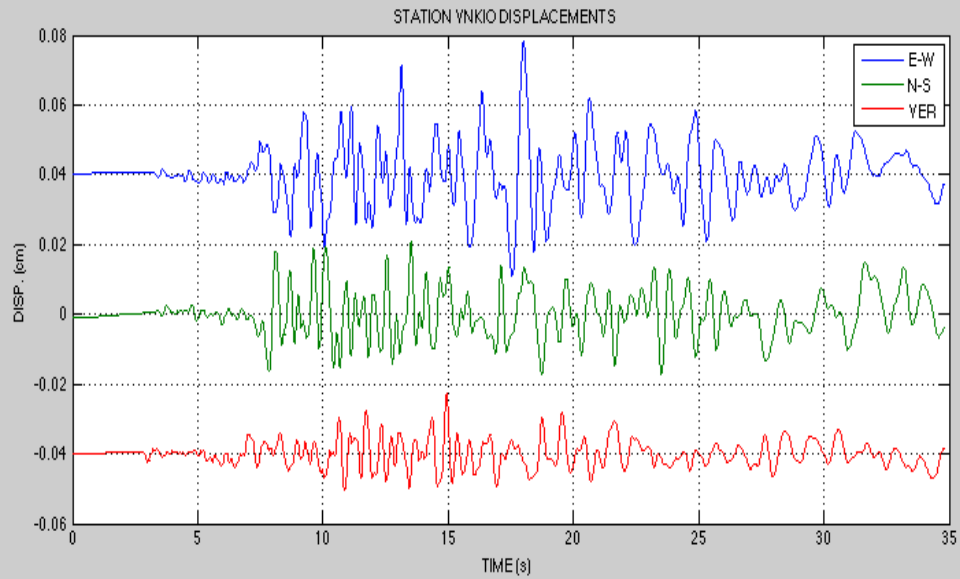
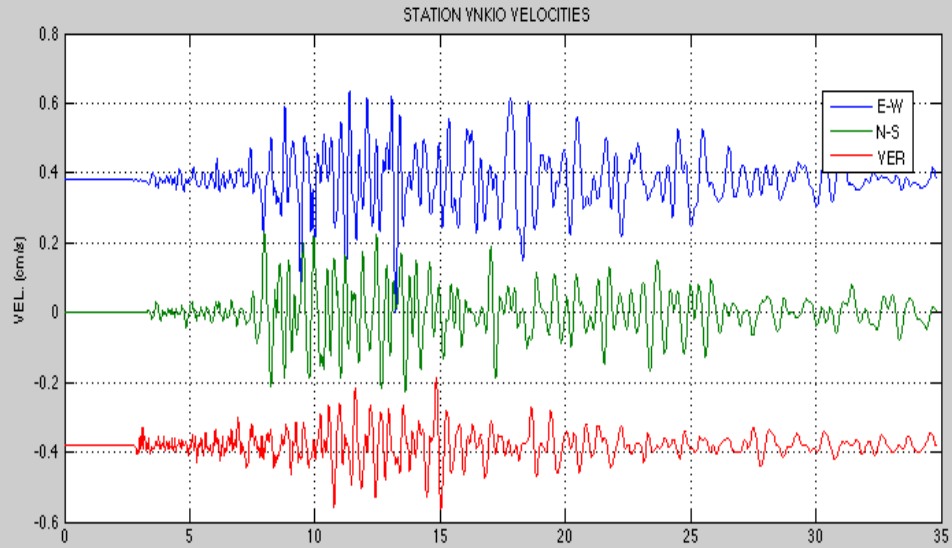


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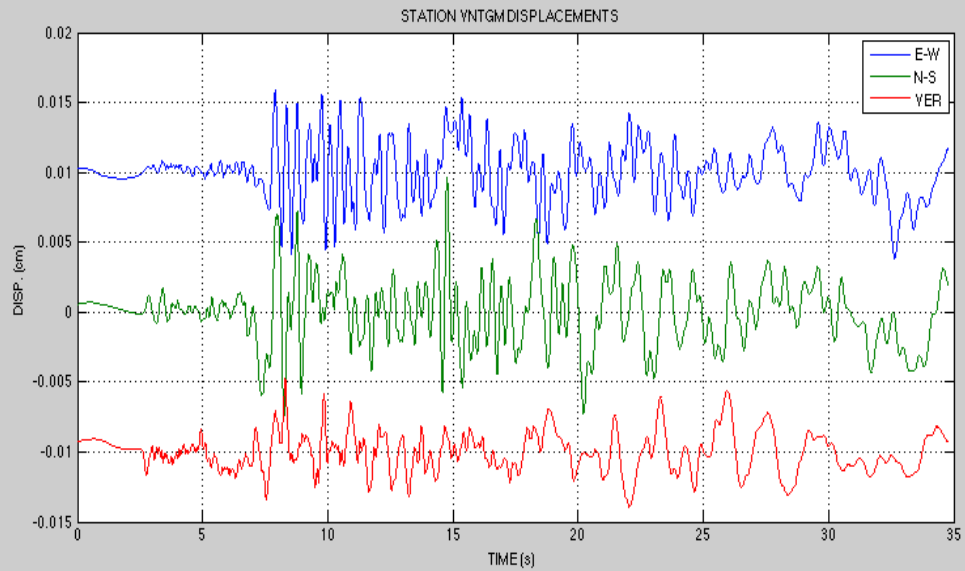
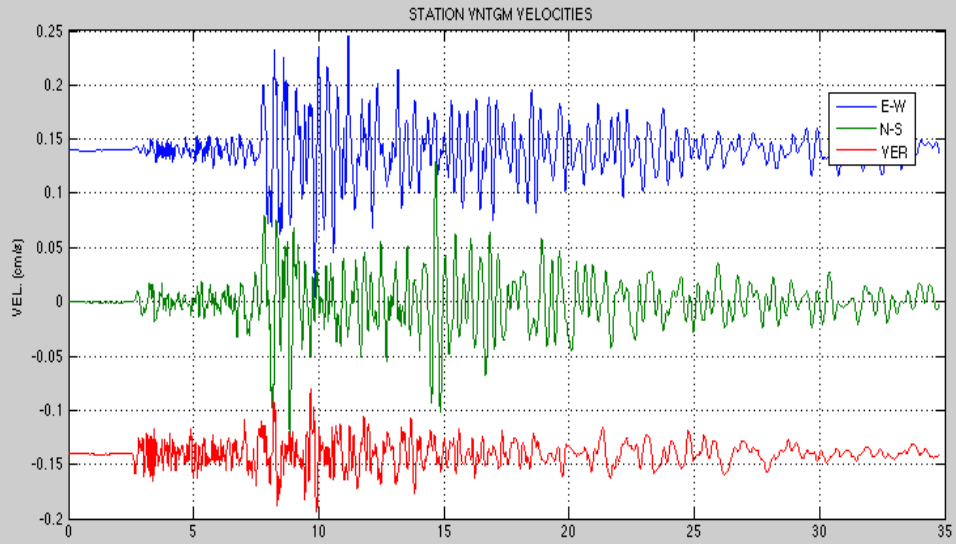


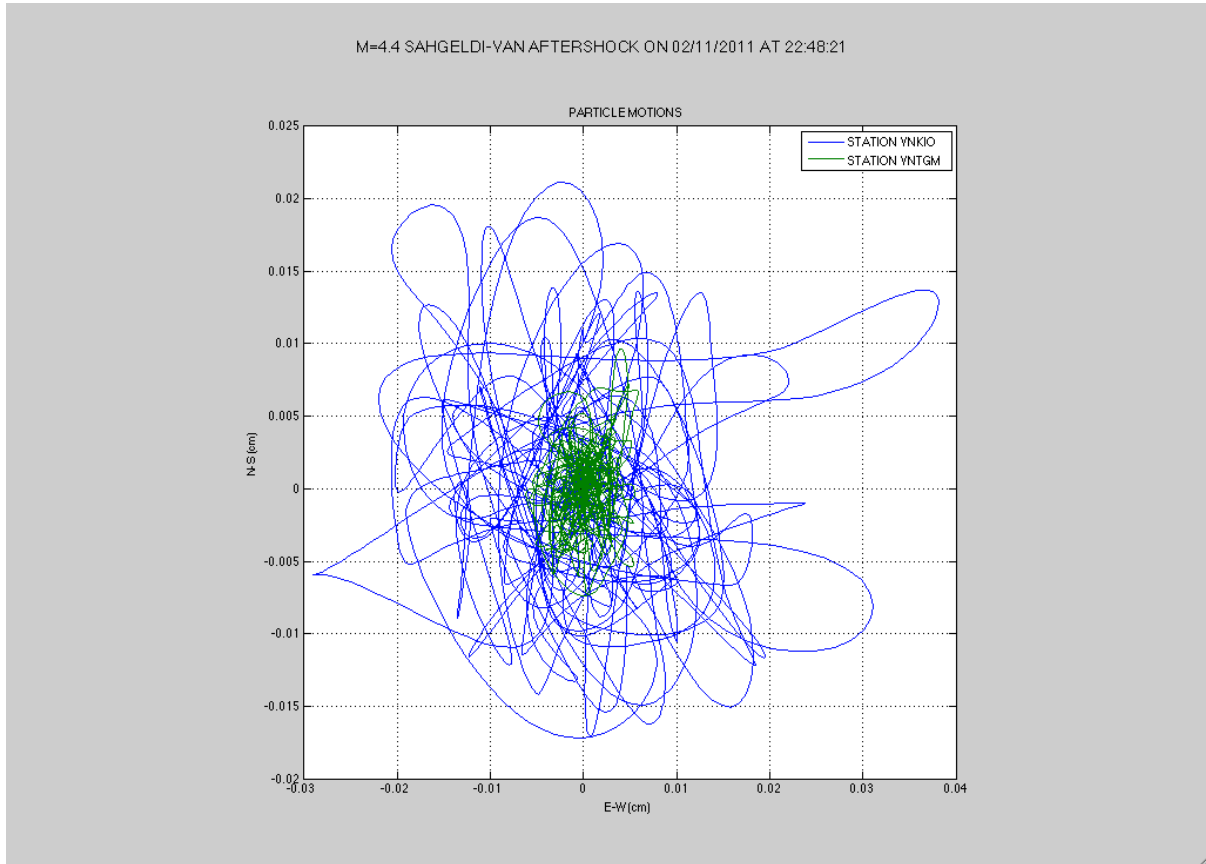
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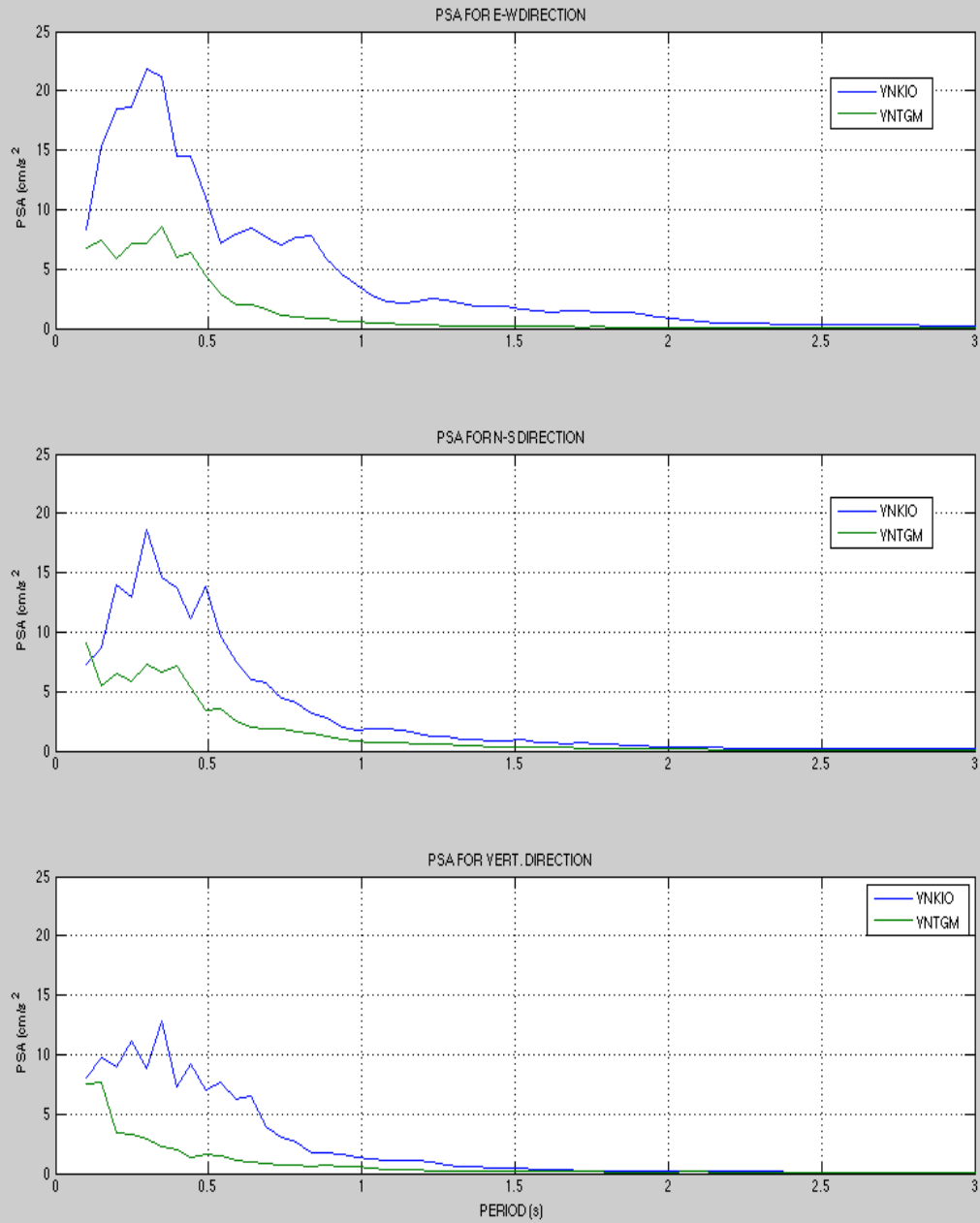
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M=4.4 SAHGELDI-VAN AFTERSHOCK ON 02/11/2011 AT 22:48:21





Şahgeldi/Van Aftershock

M=4.4

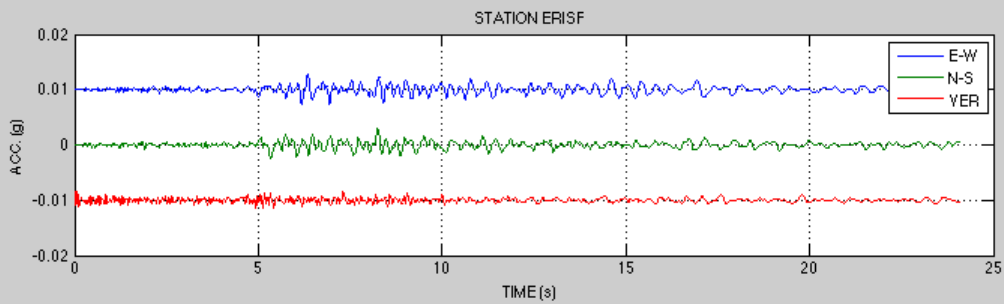
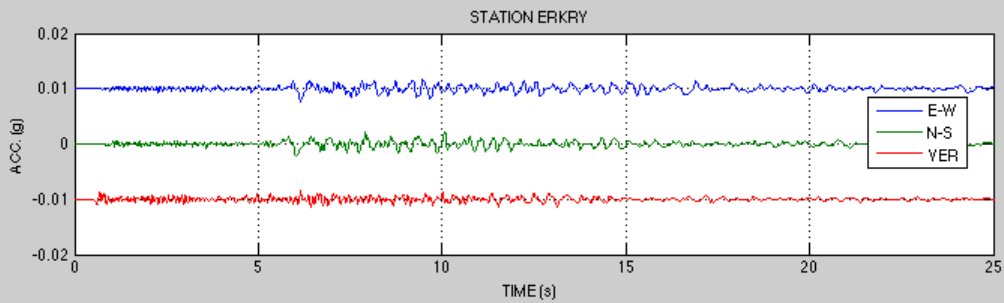
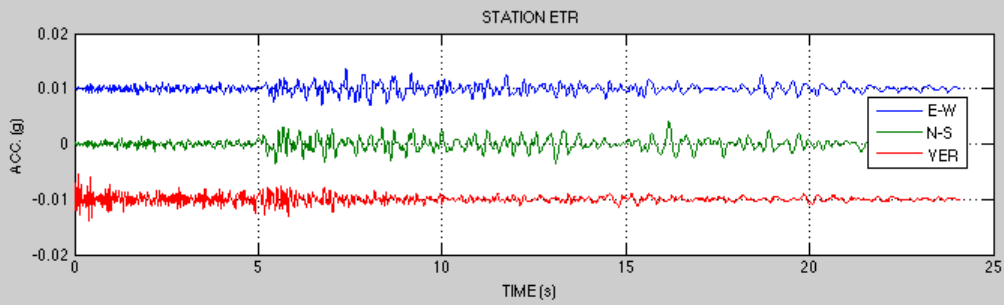
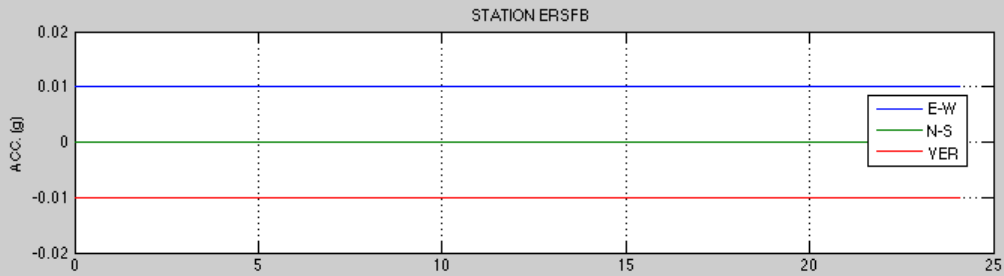
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ERCİŞ RECORDS

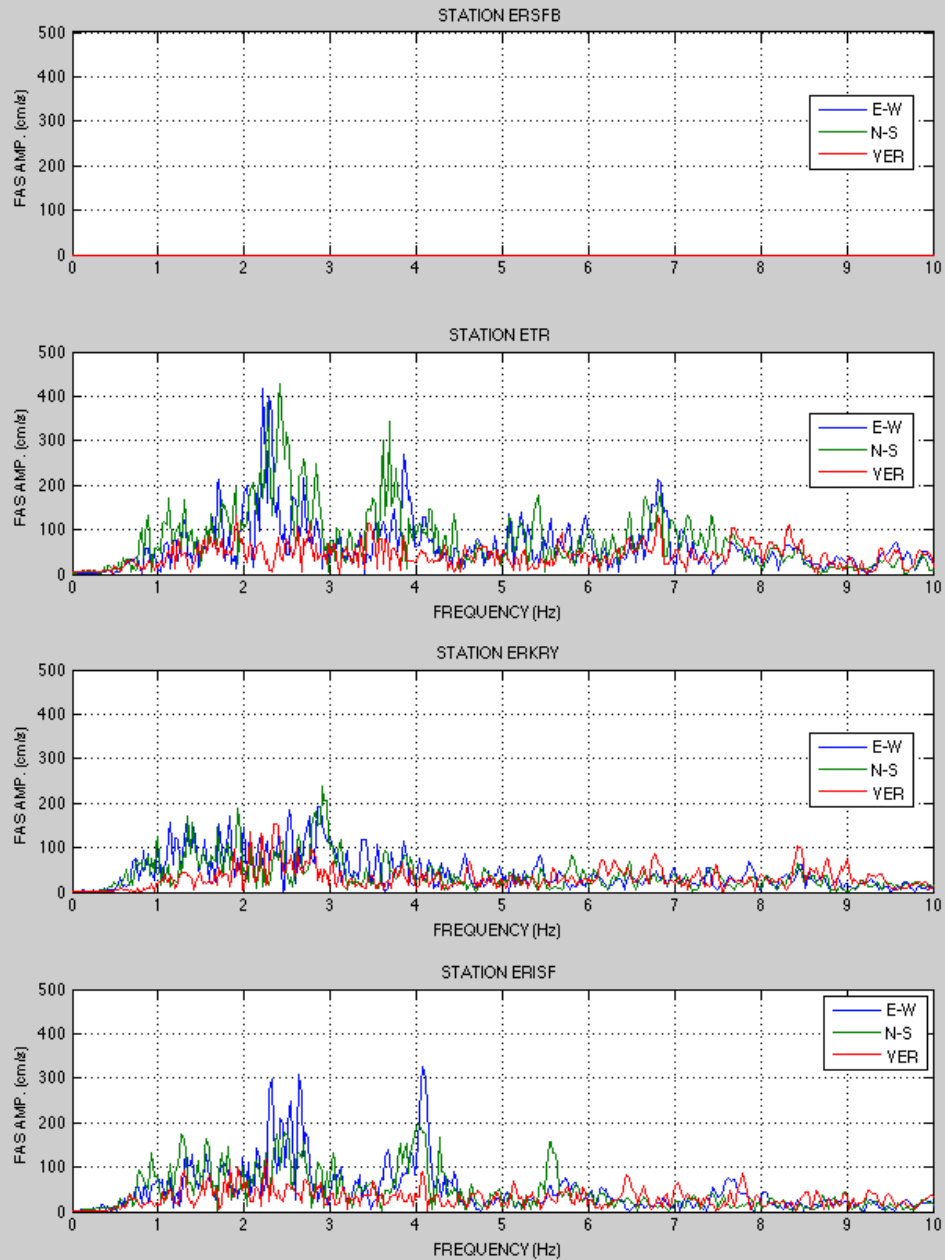


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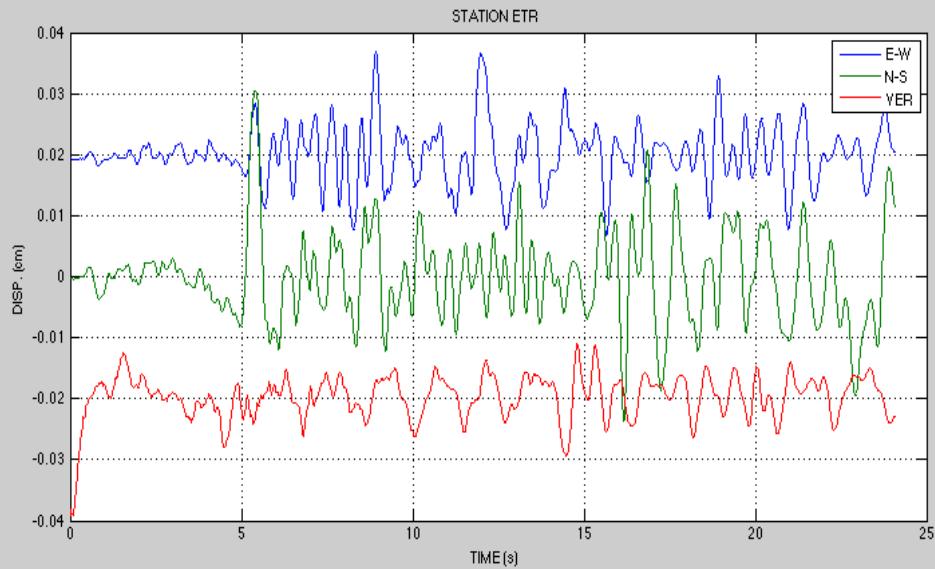
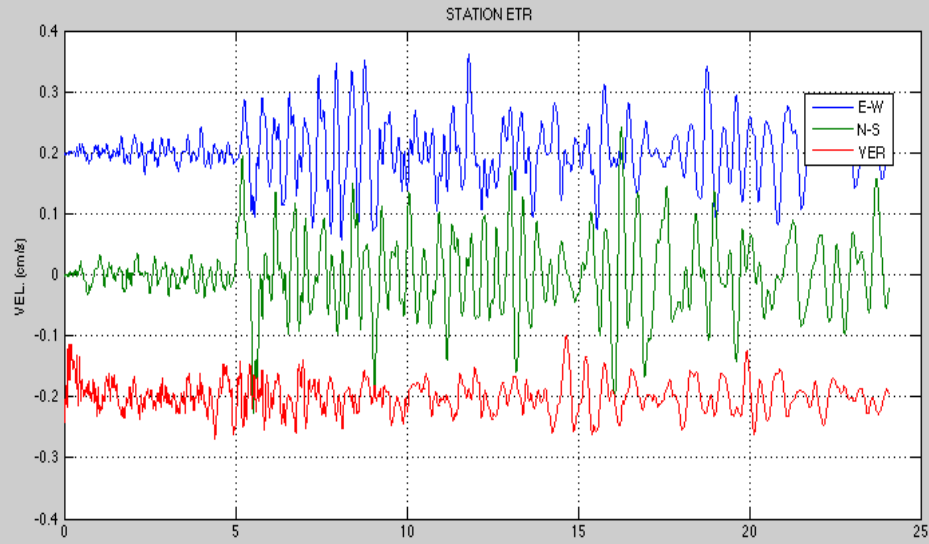


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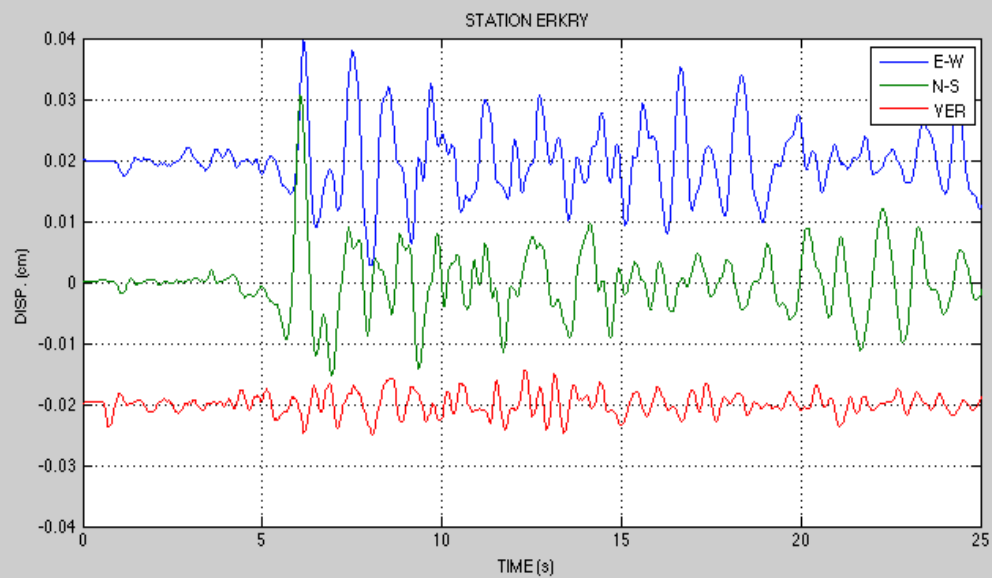
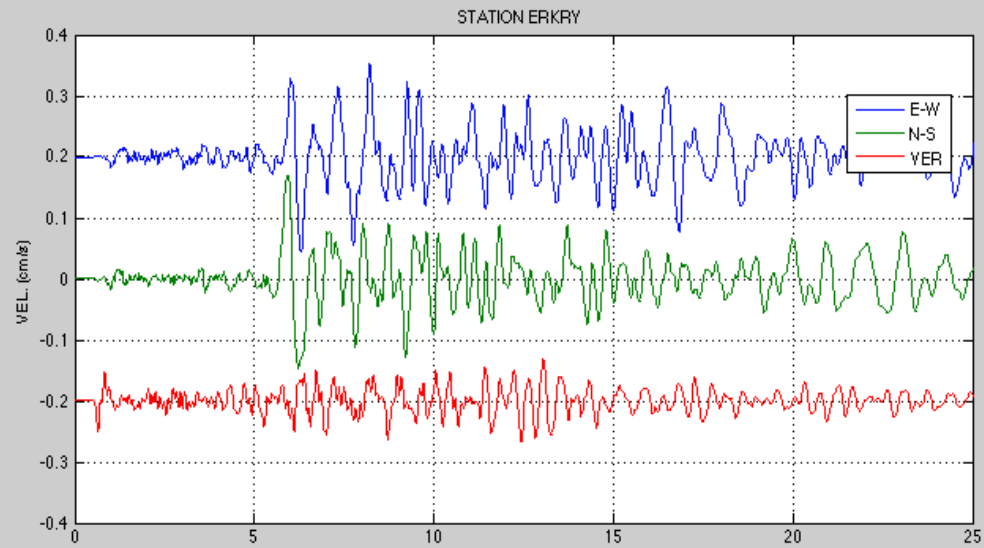


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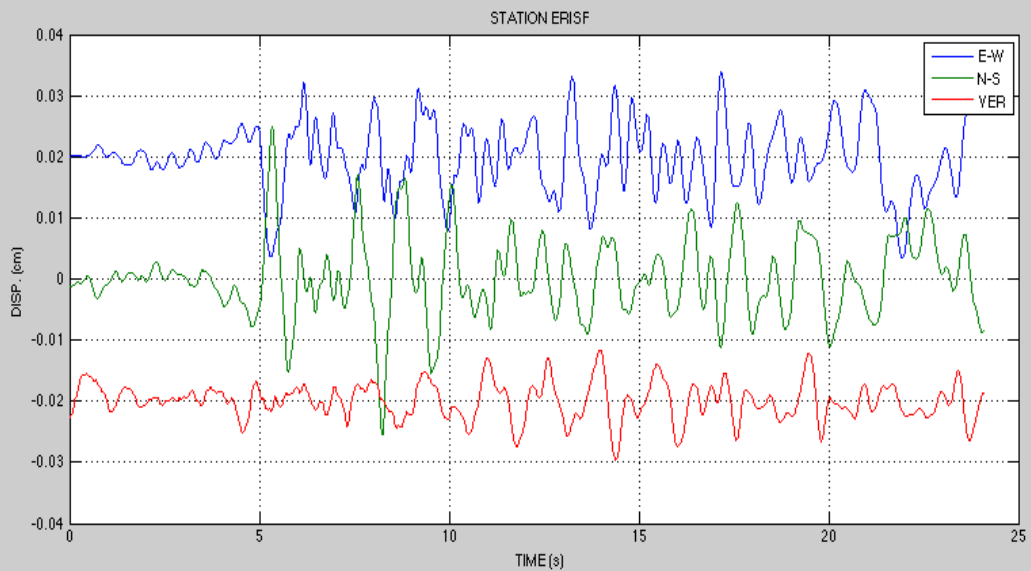
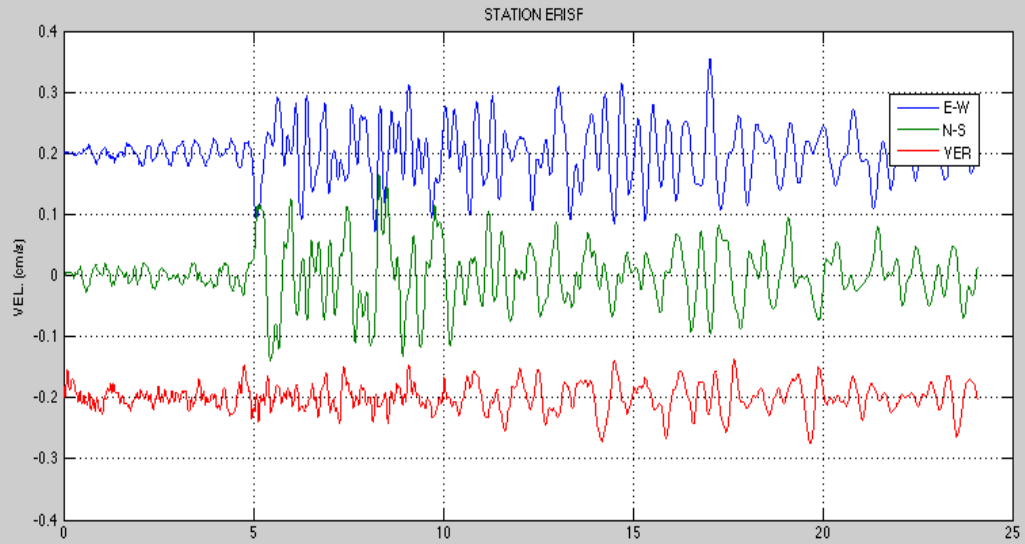


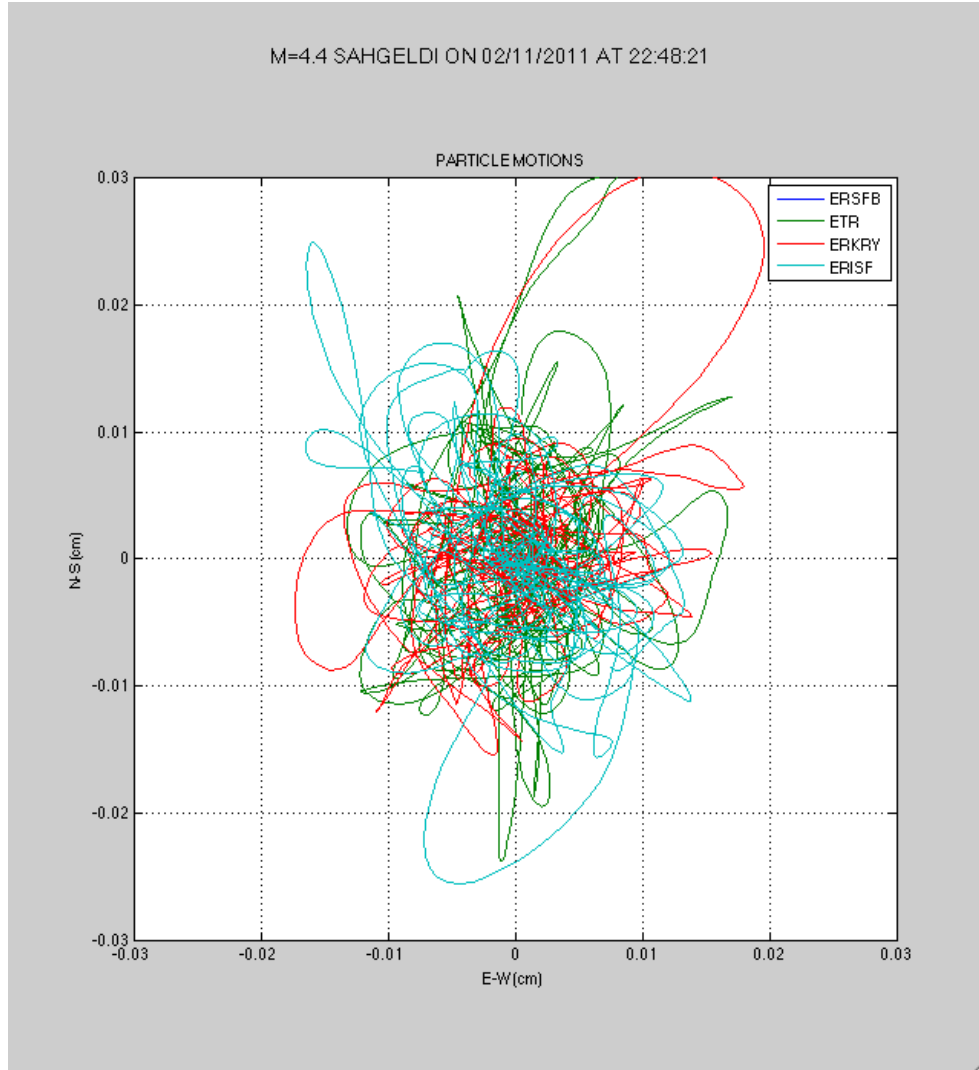
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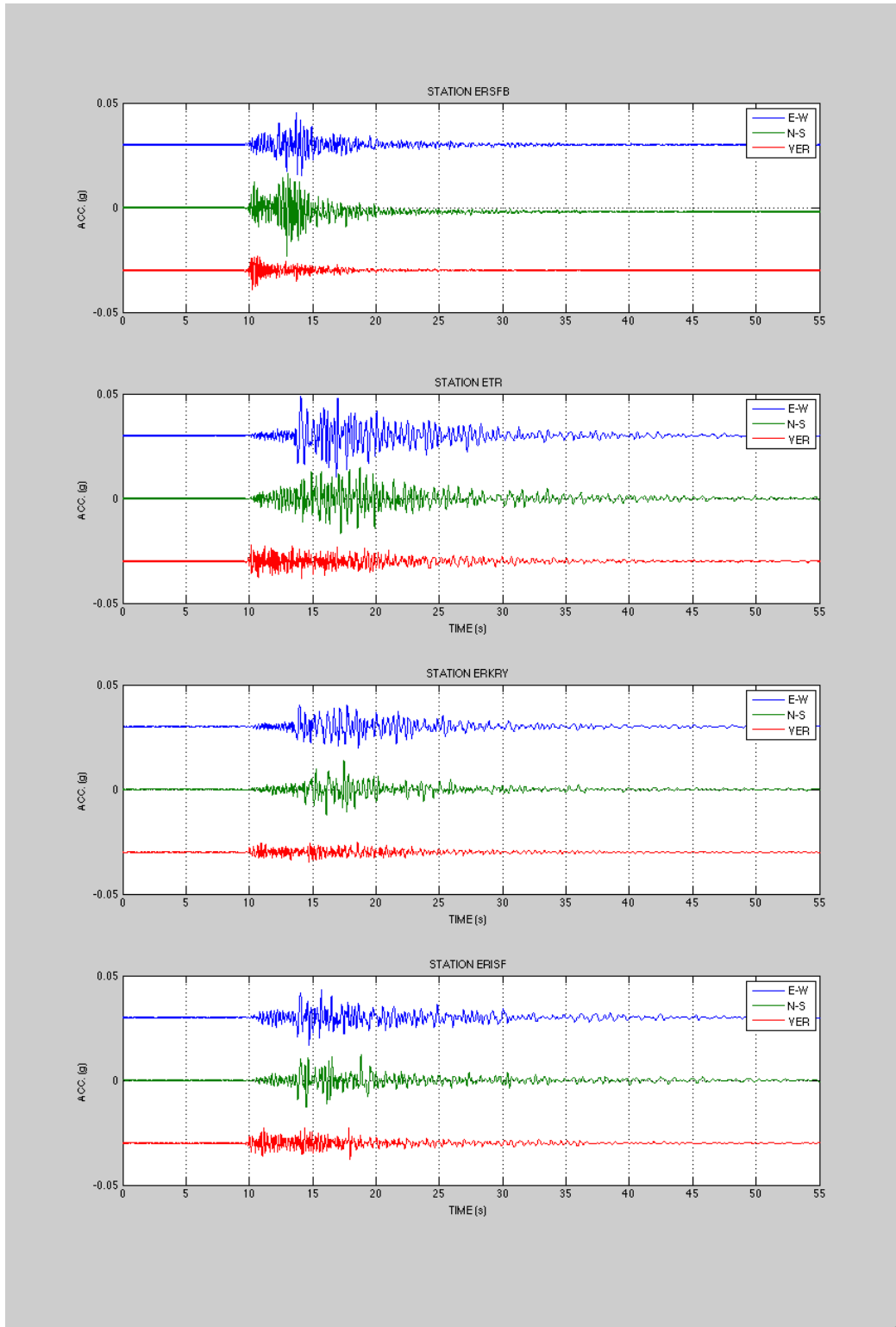
Çolpan/Van Aftershock

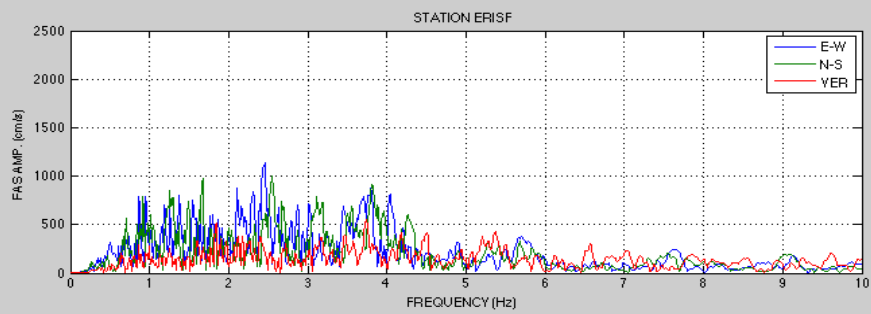
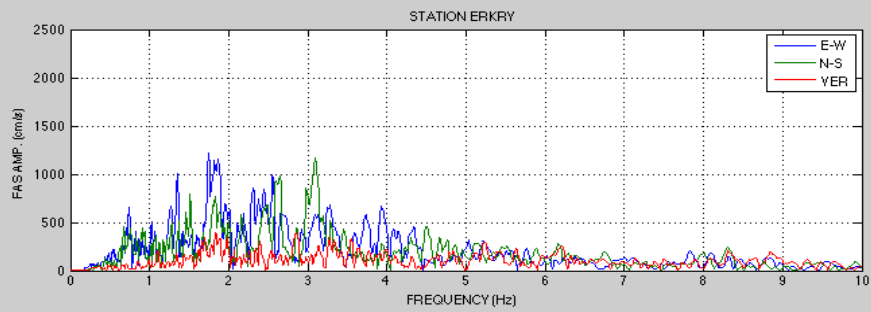
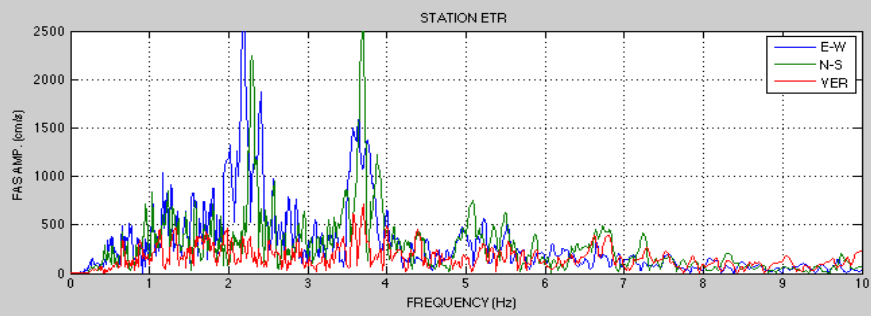
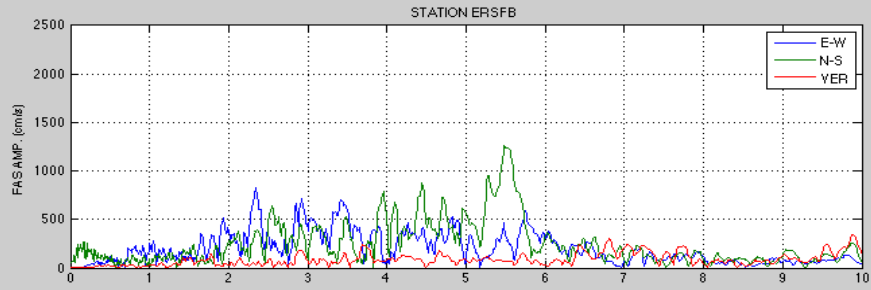
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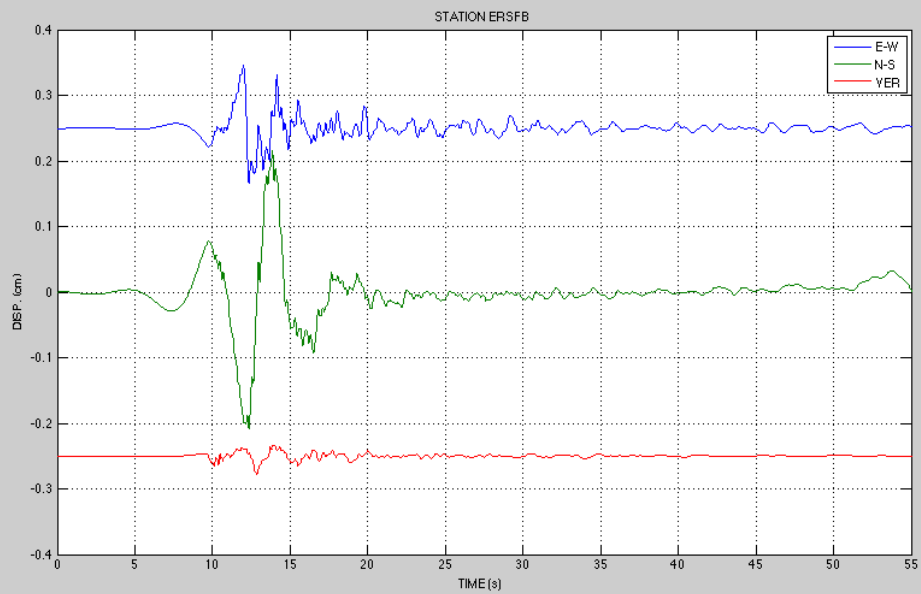
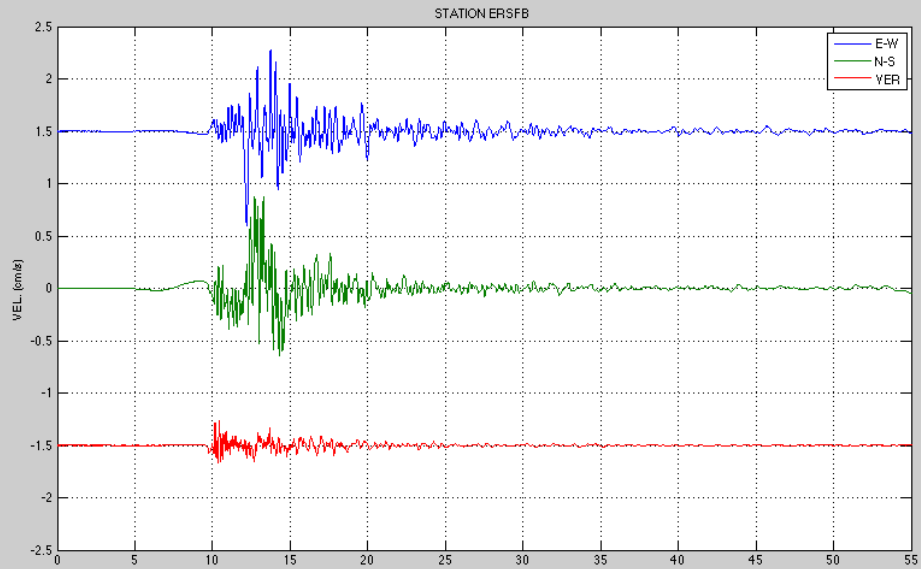
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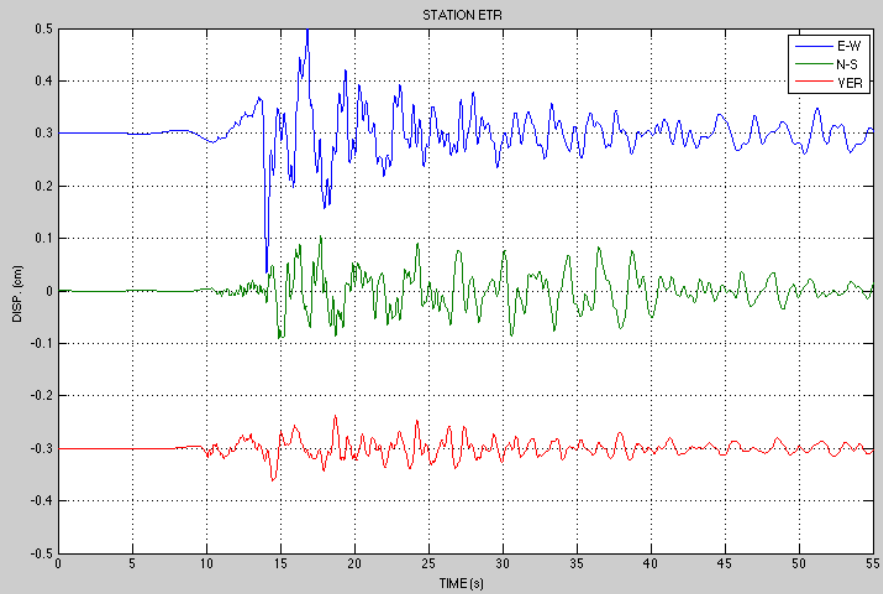
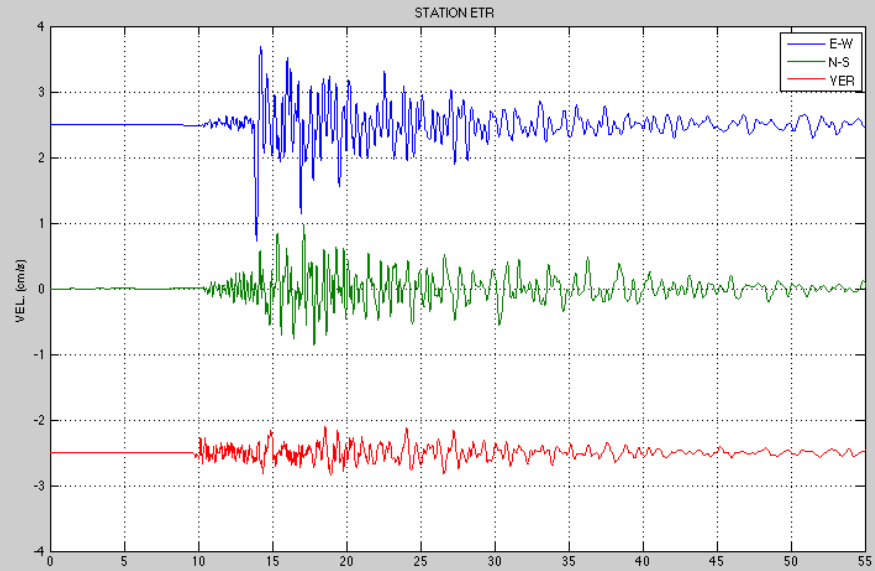
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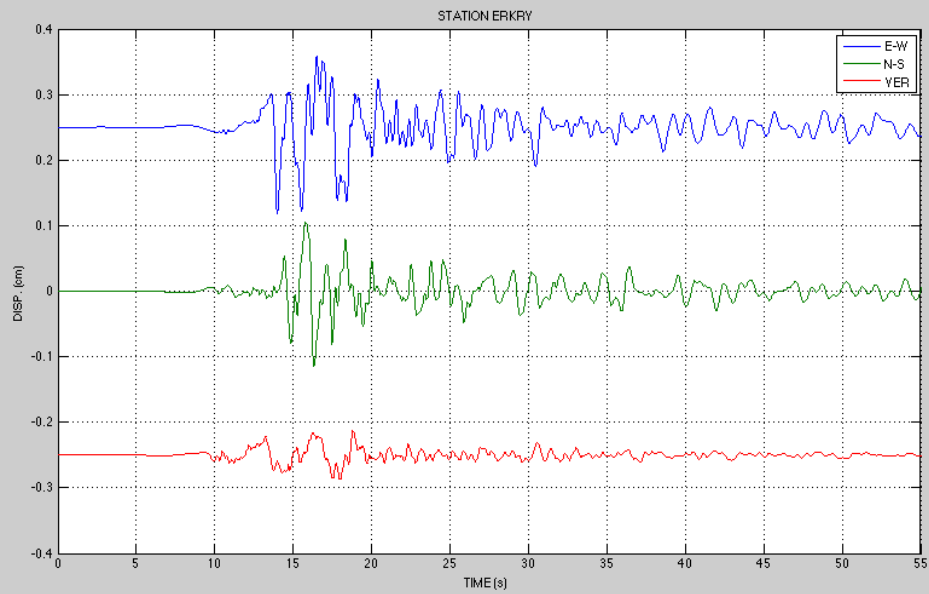
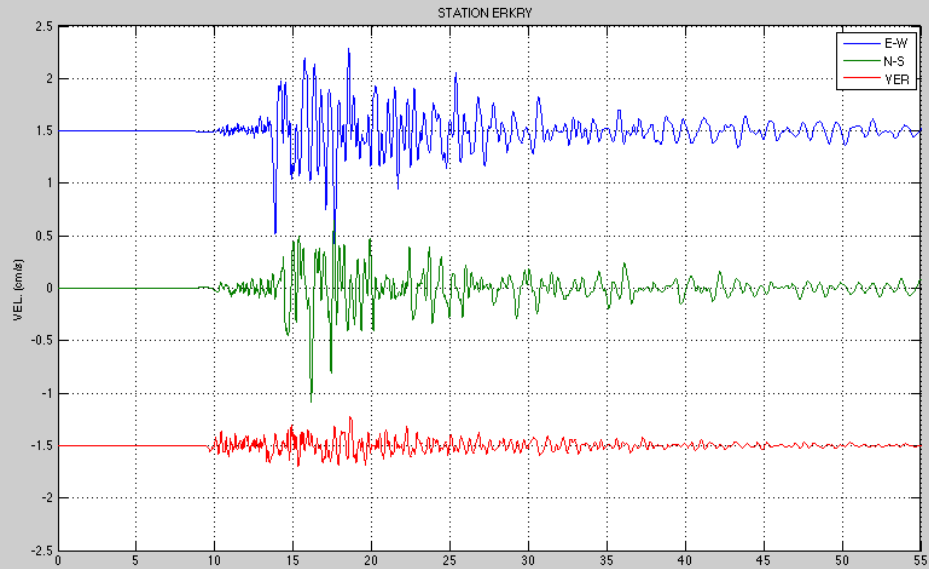
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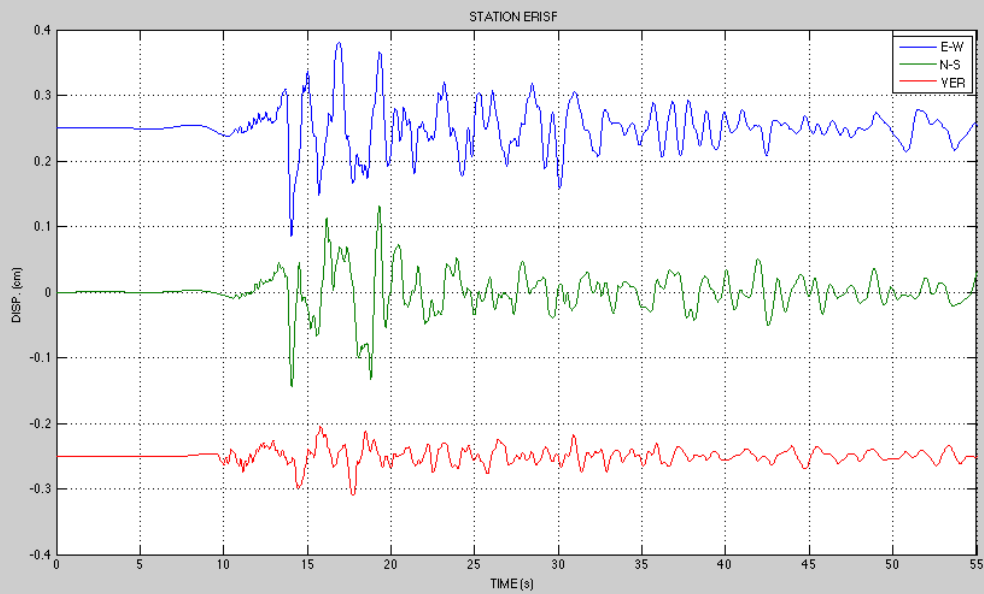
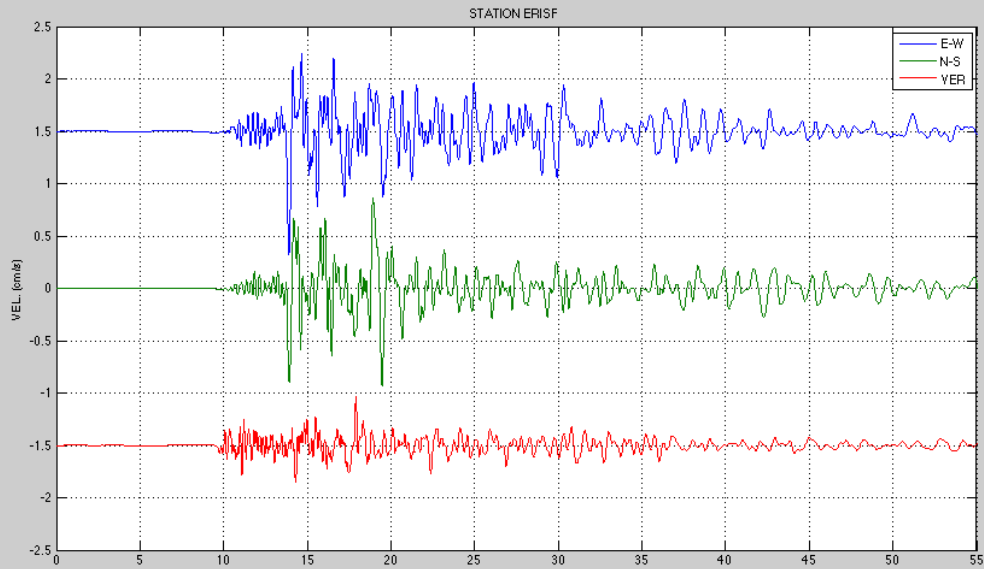


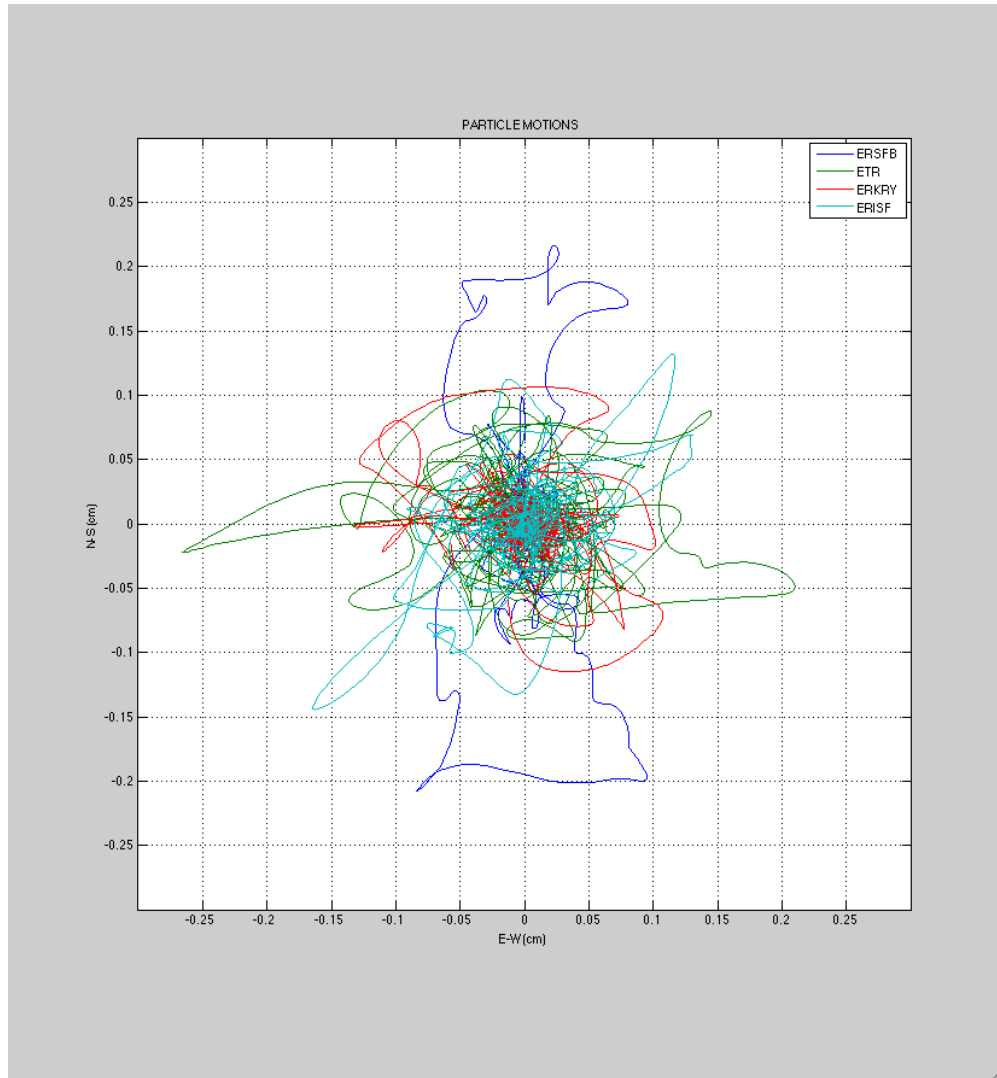


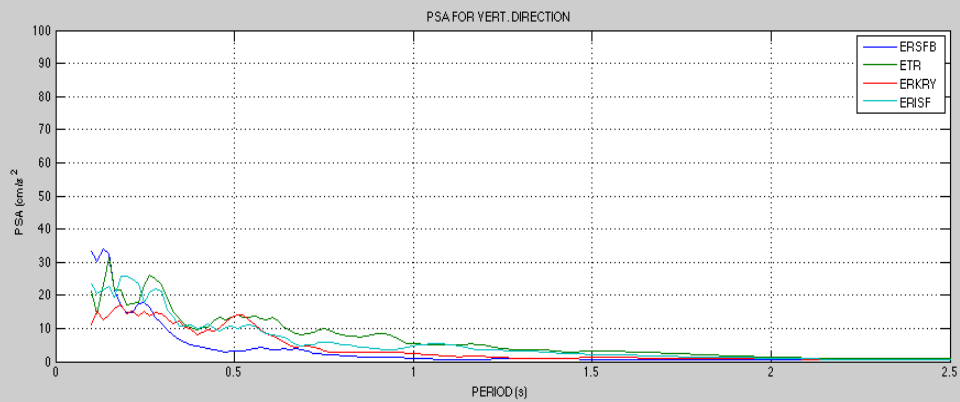
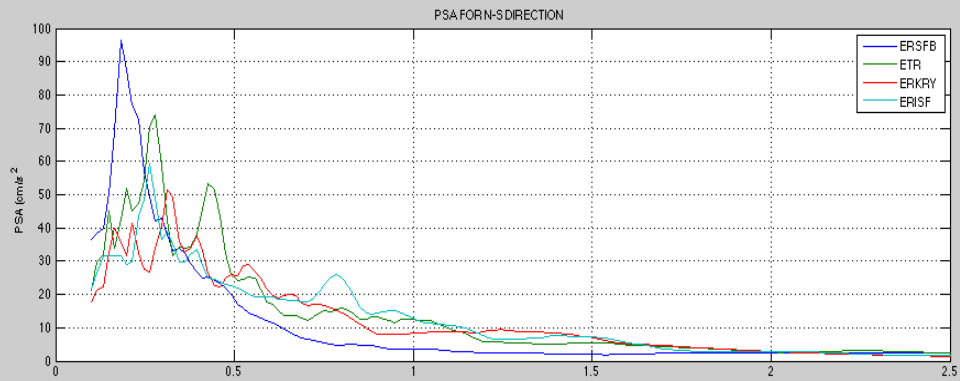
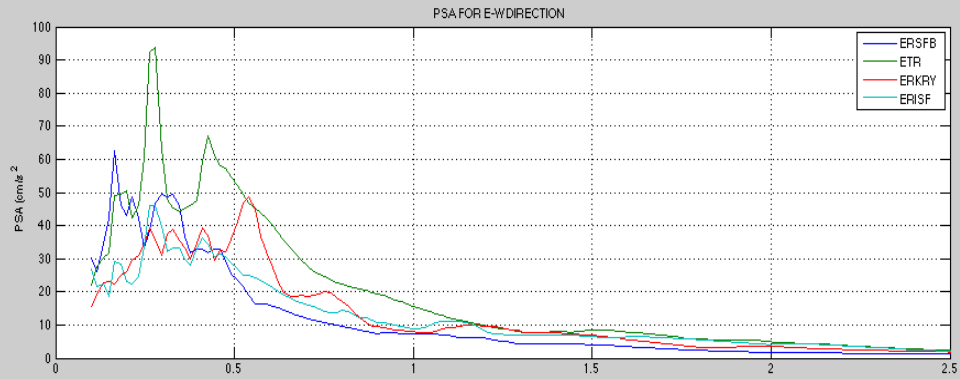


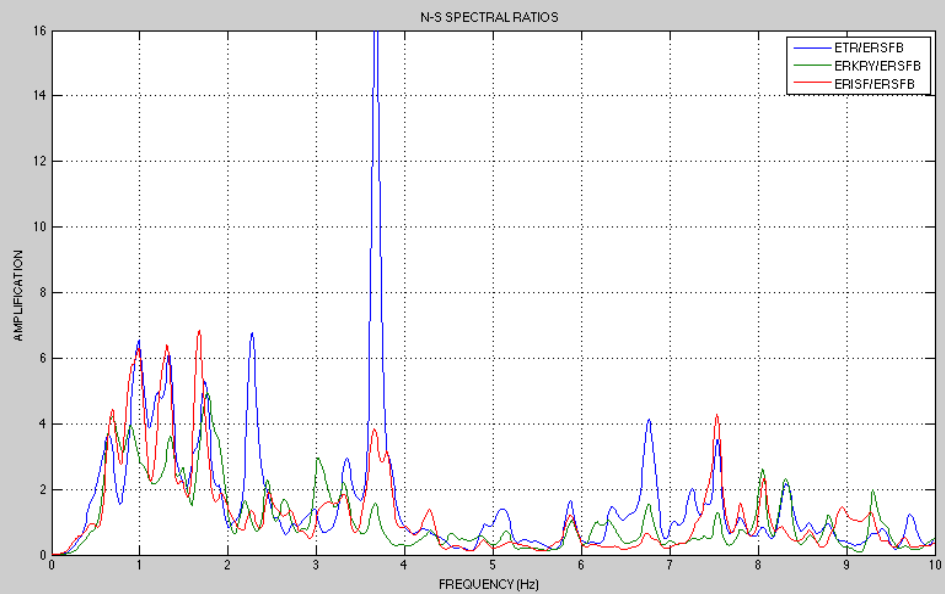
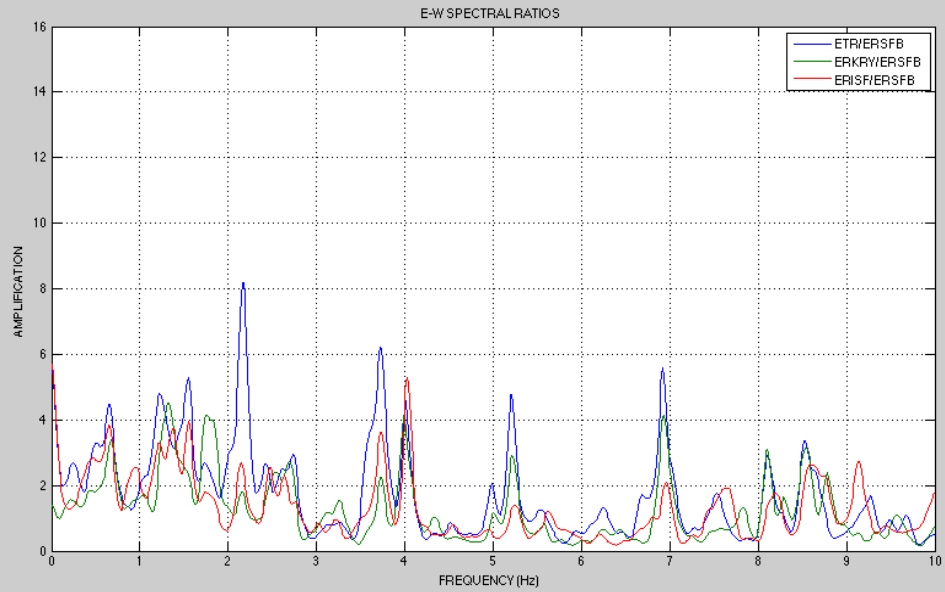














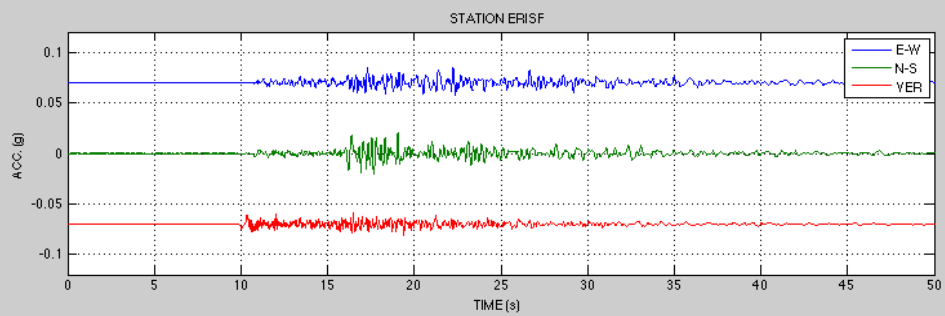
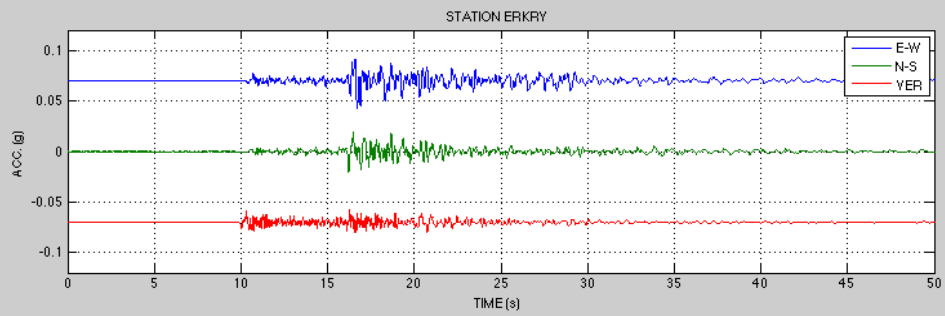
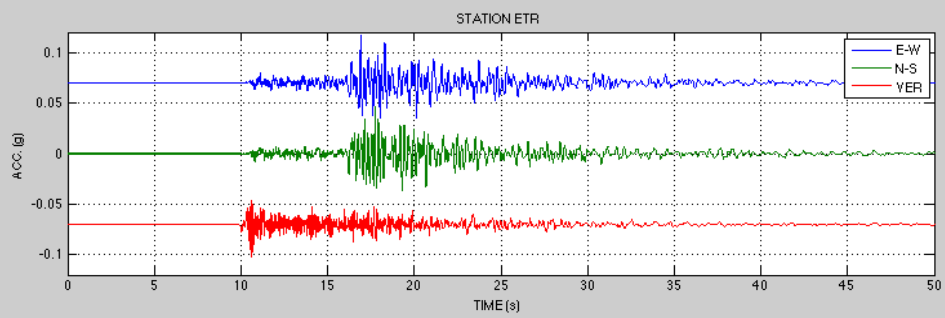
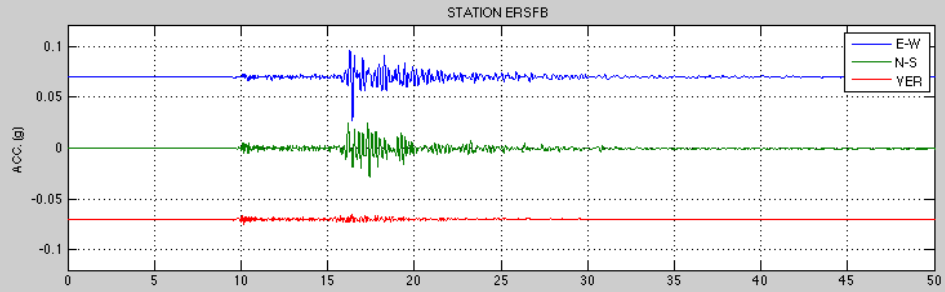
Van Gölü/Van Aftershock

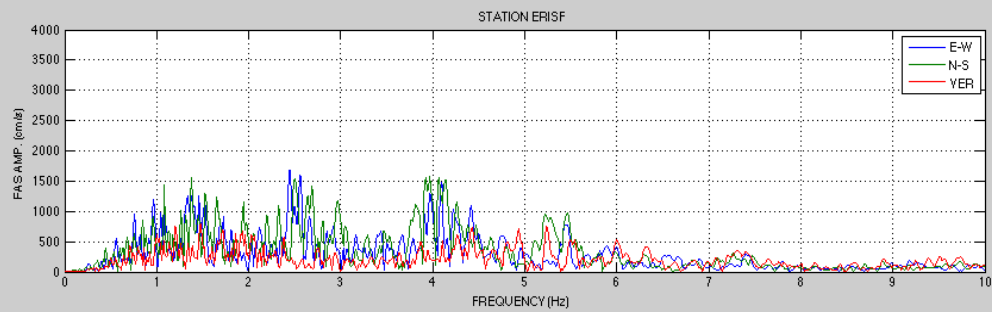
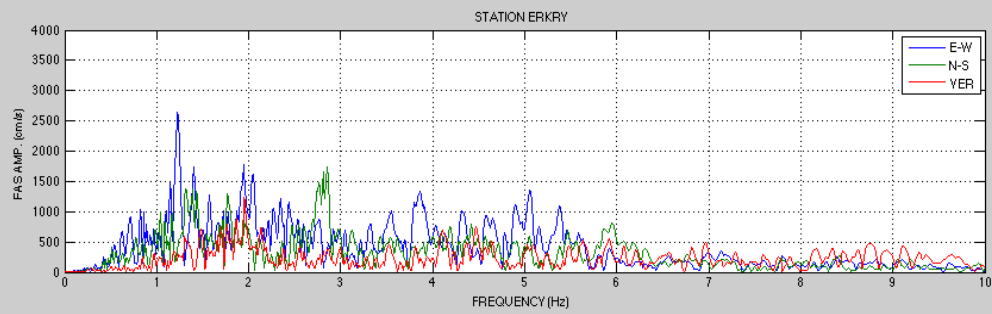
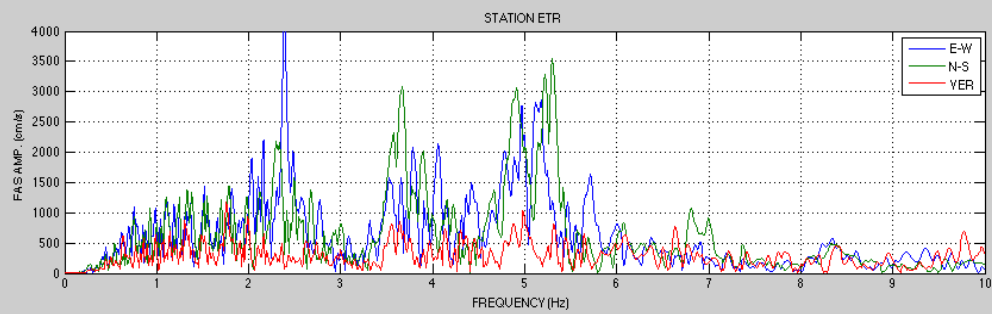
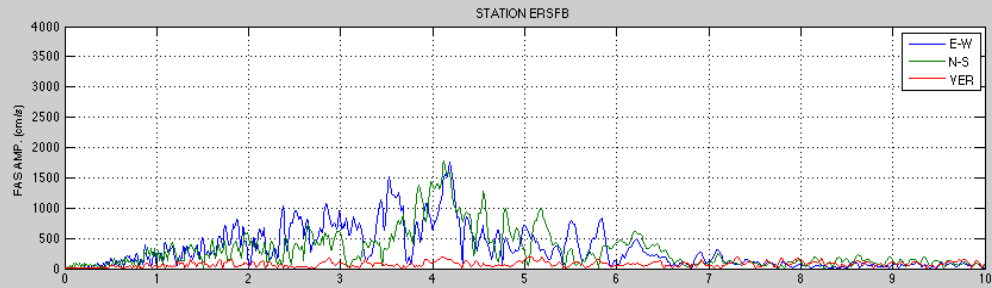
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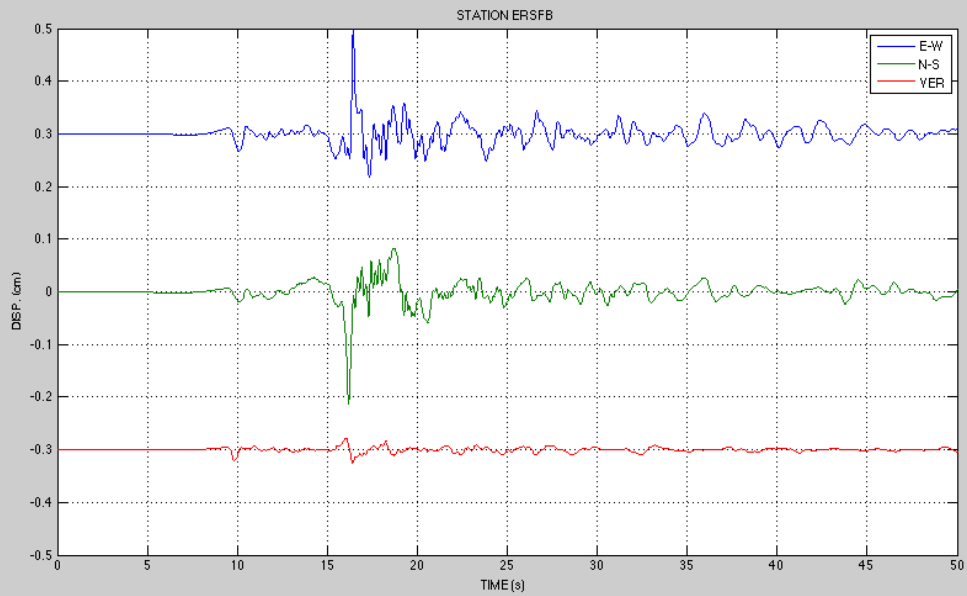
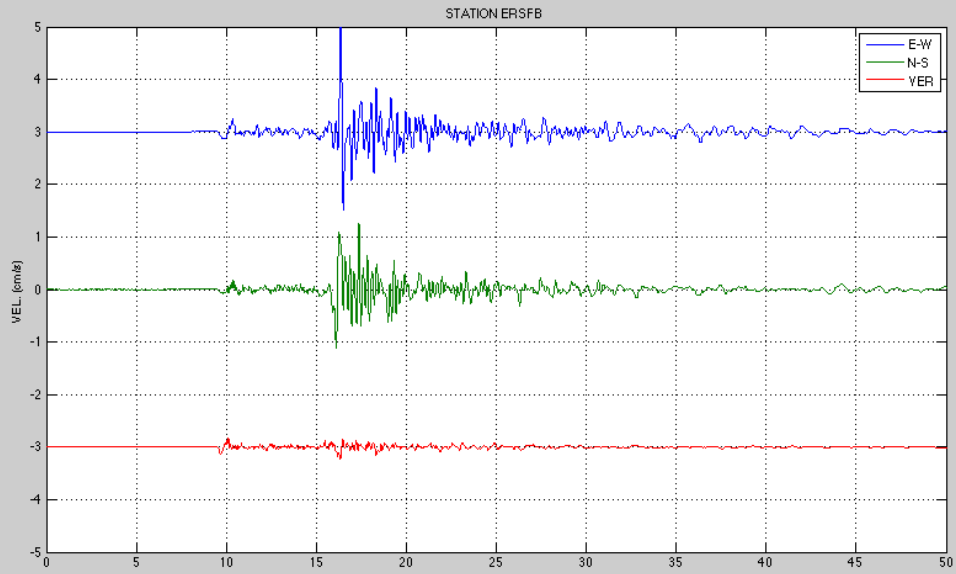
08/11/2011

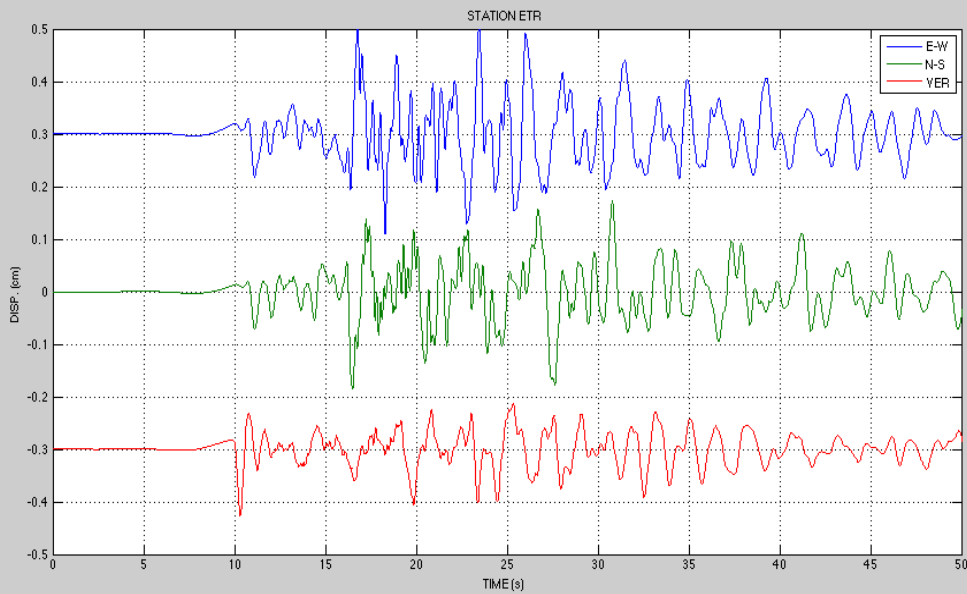
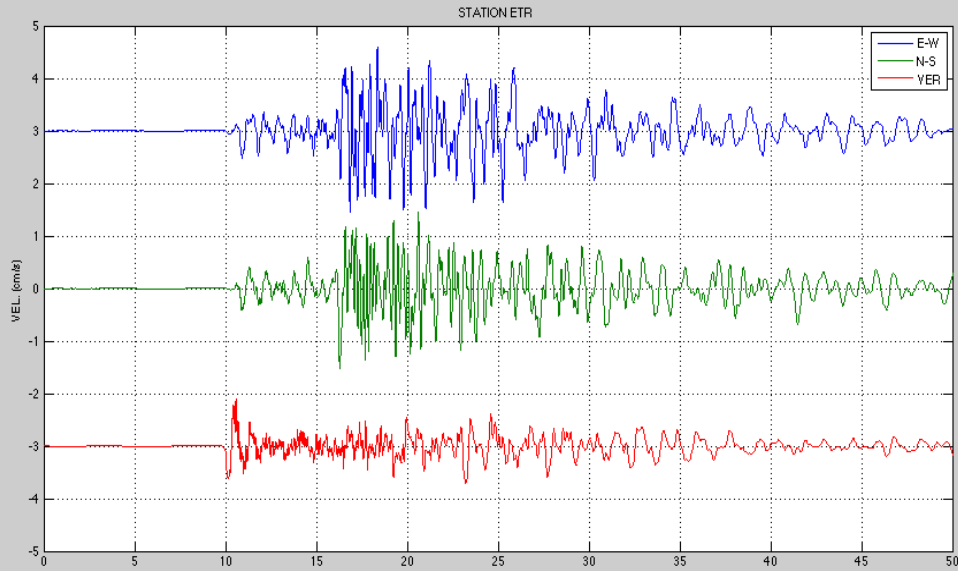
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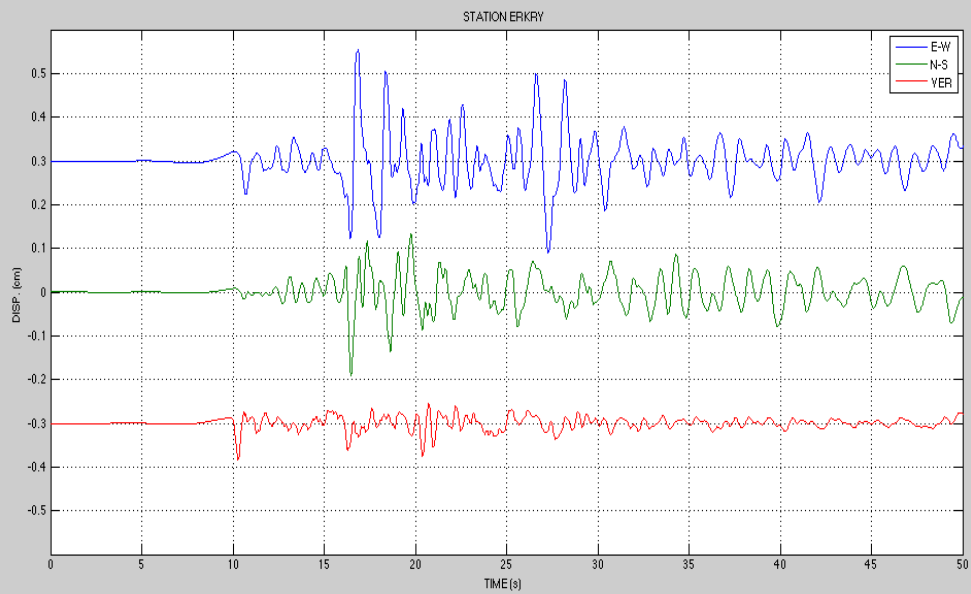
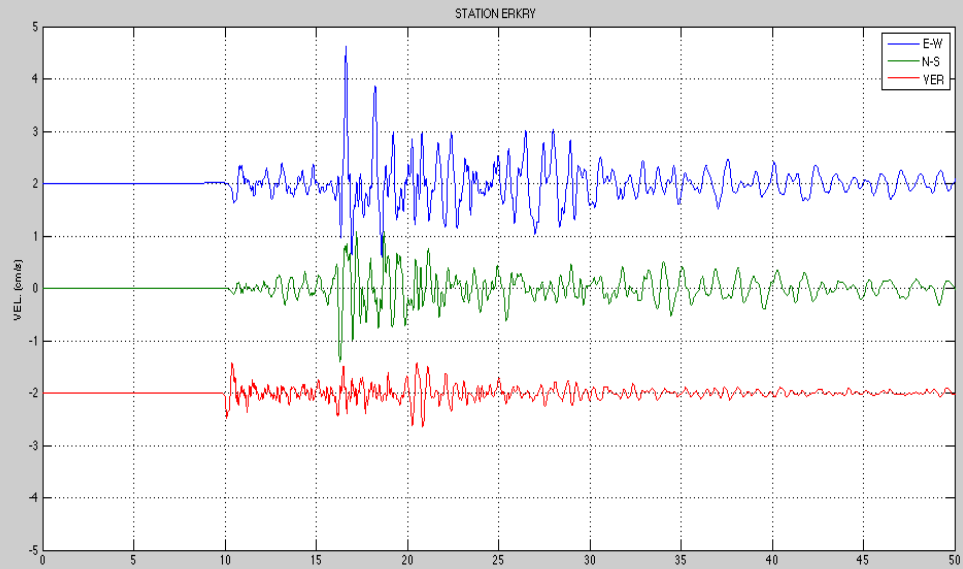
ERCIŞ RECORDS

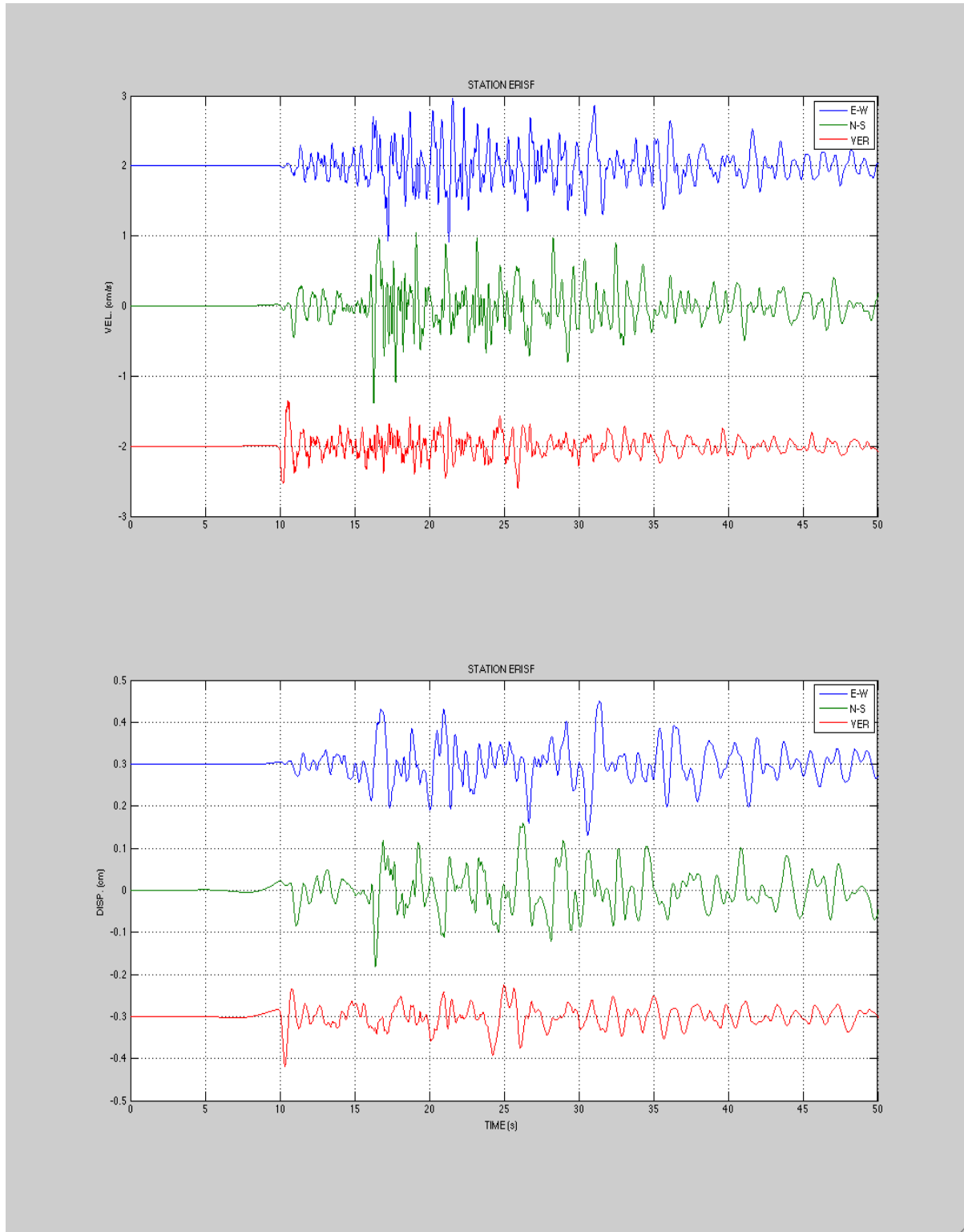


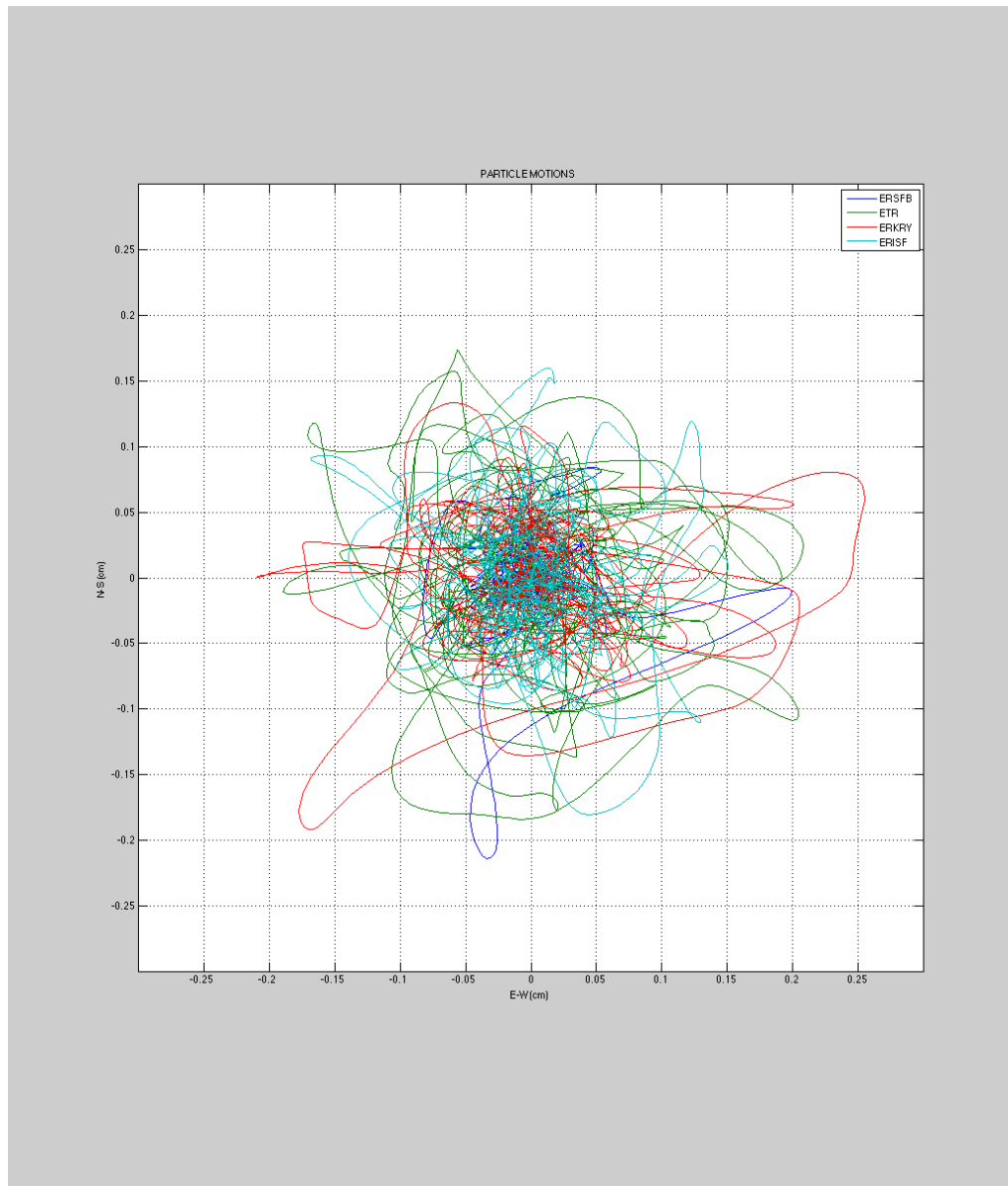


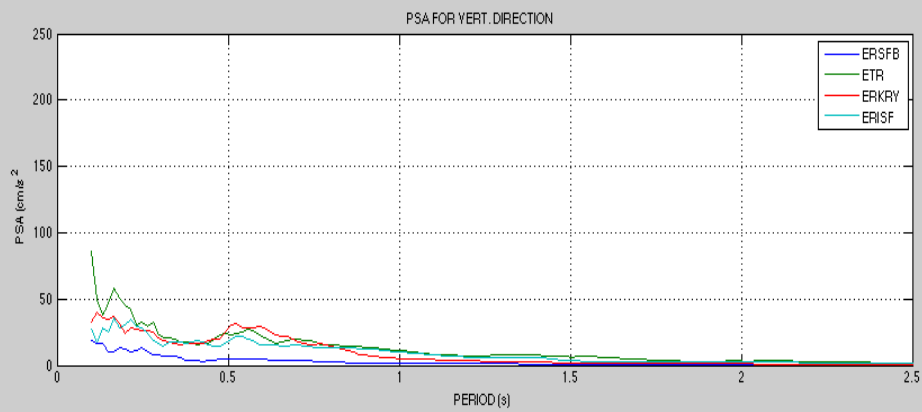
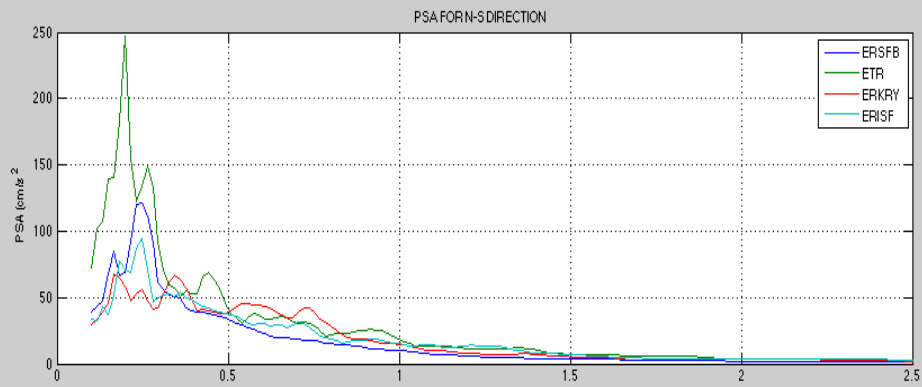
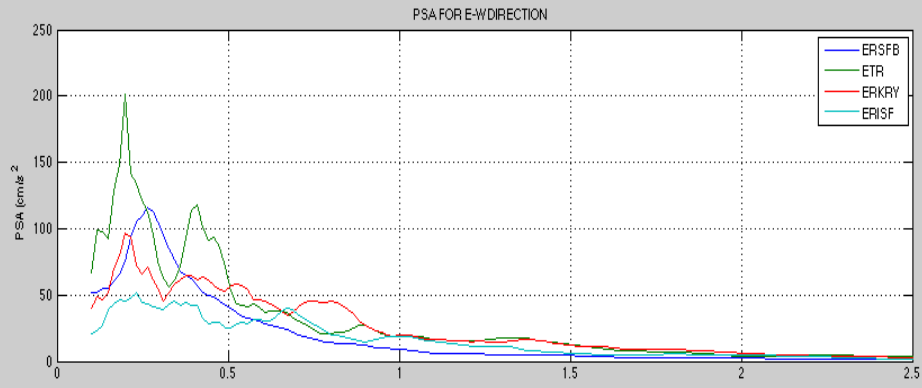


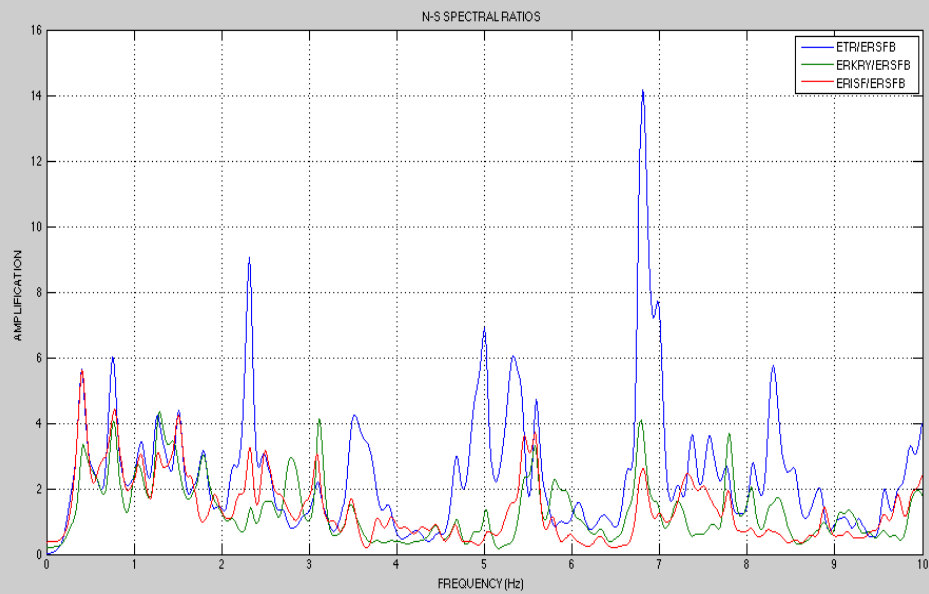
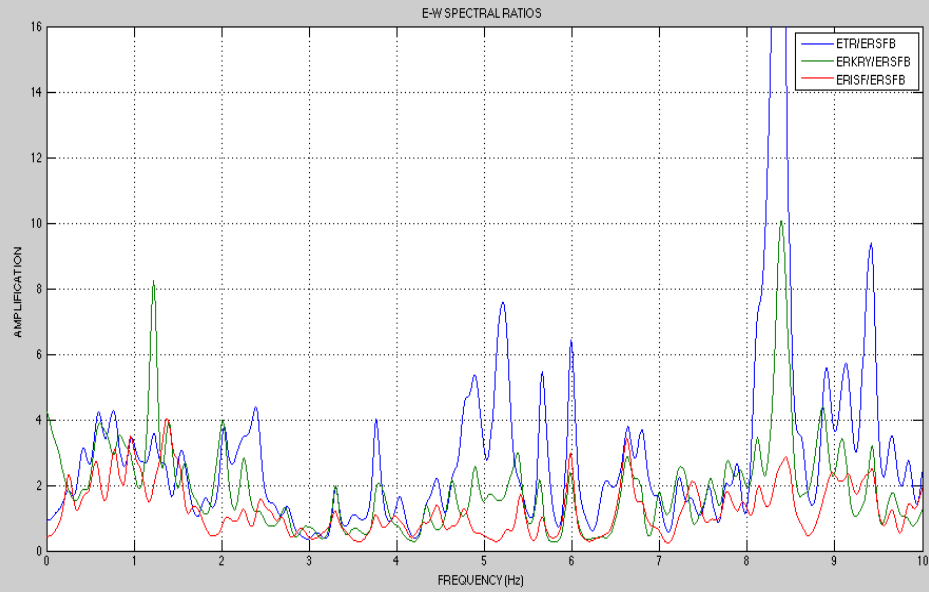














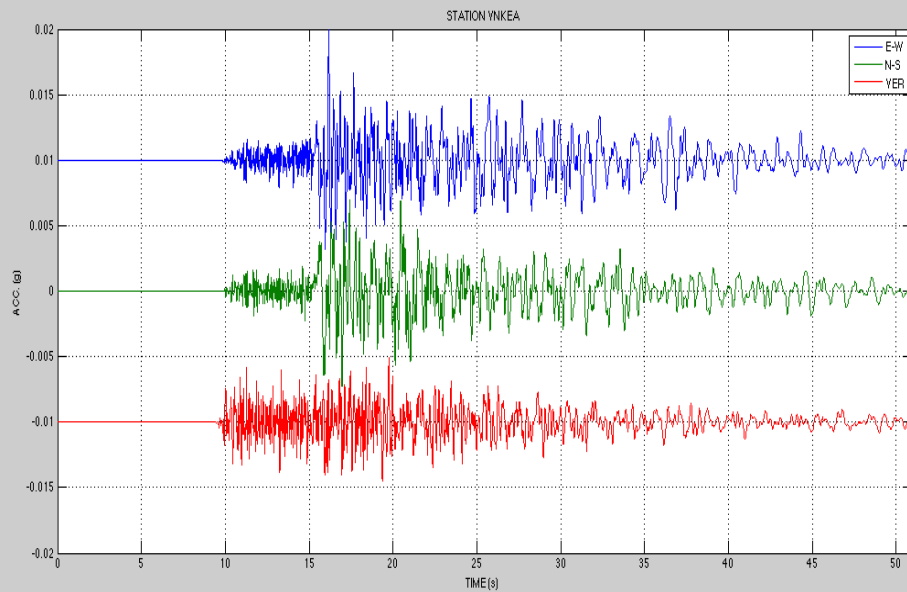
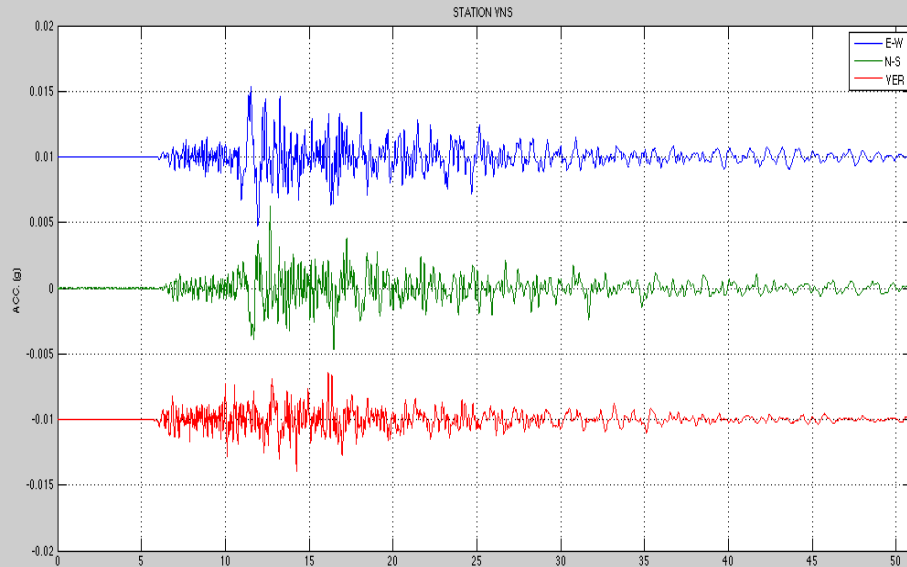
Van Gölü/Van Aftershock

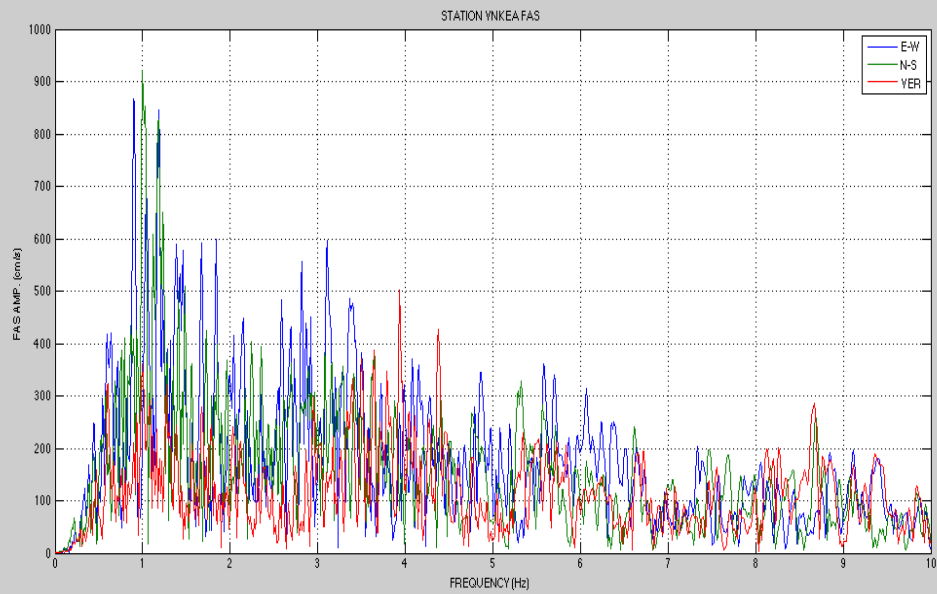
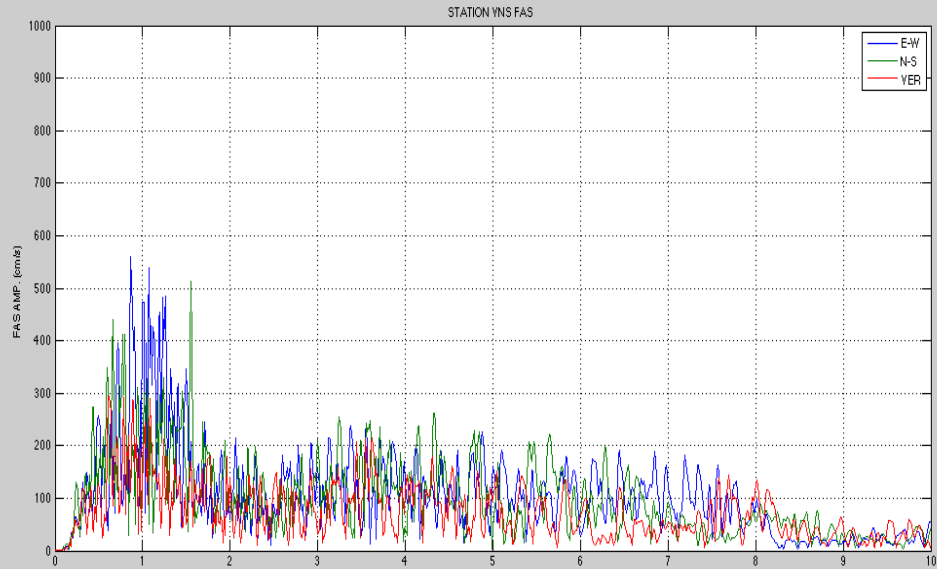
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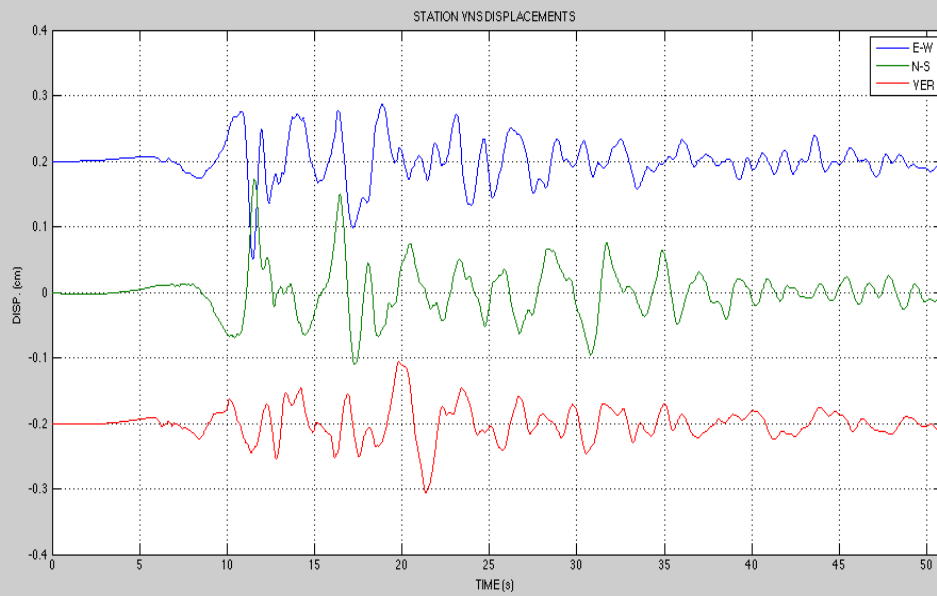
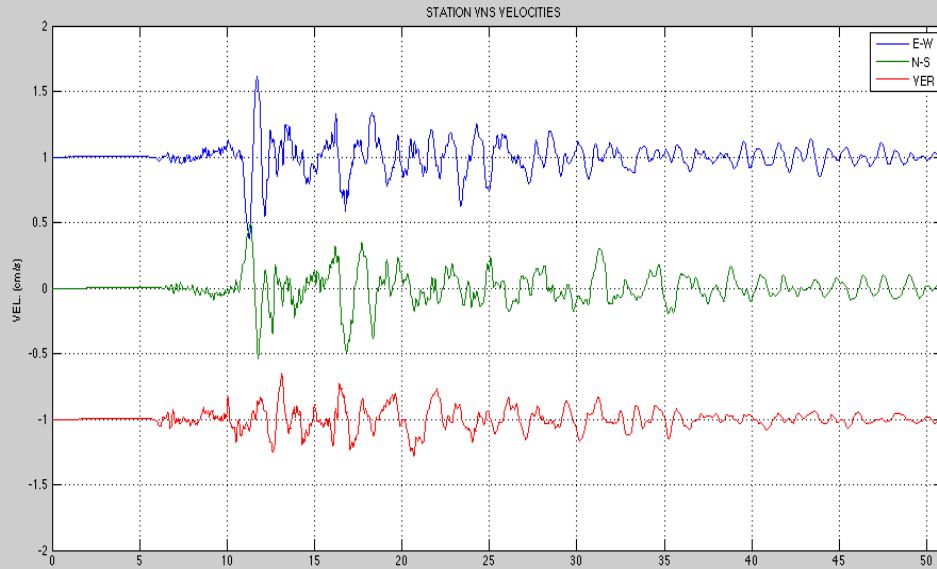
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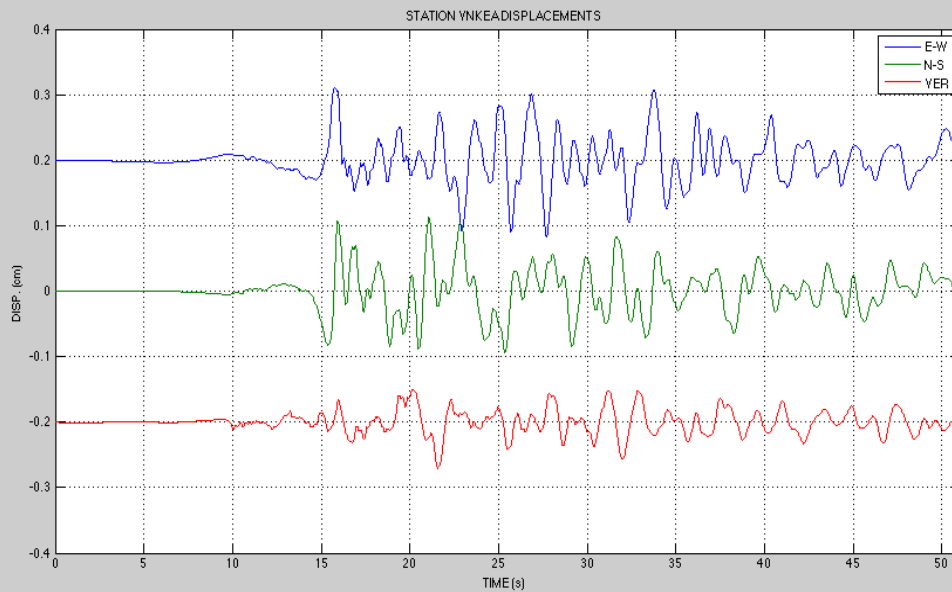
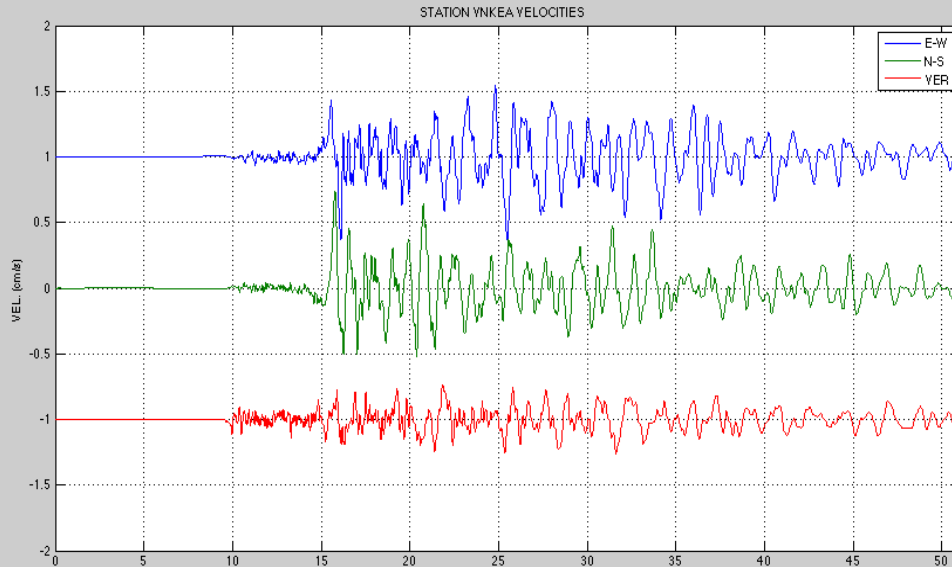
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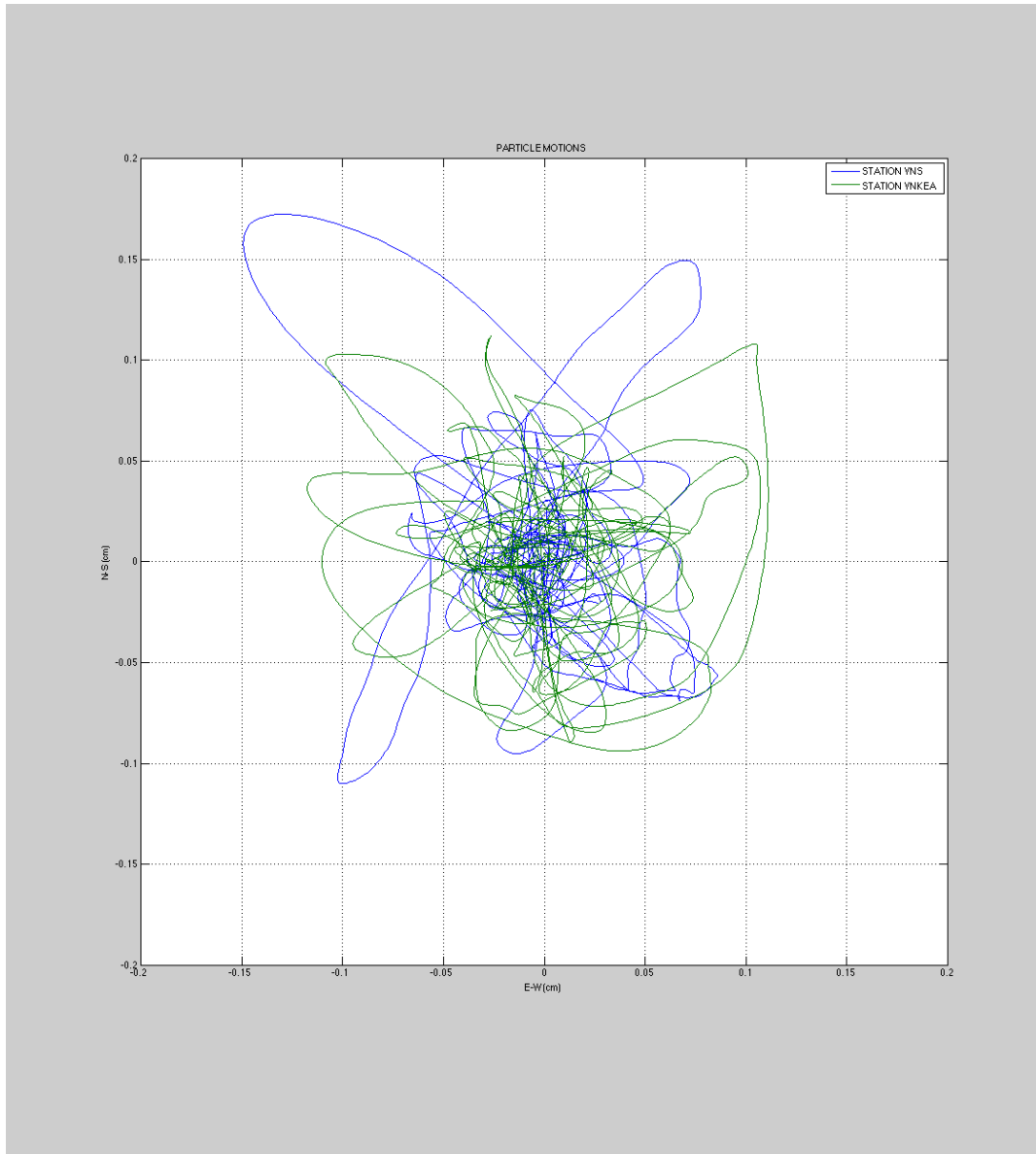
VAN RECORDS

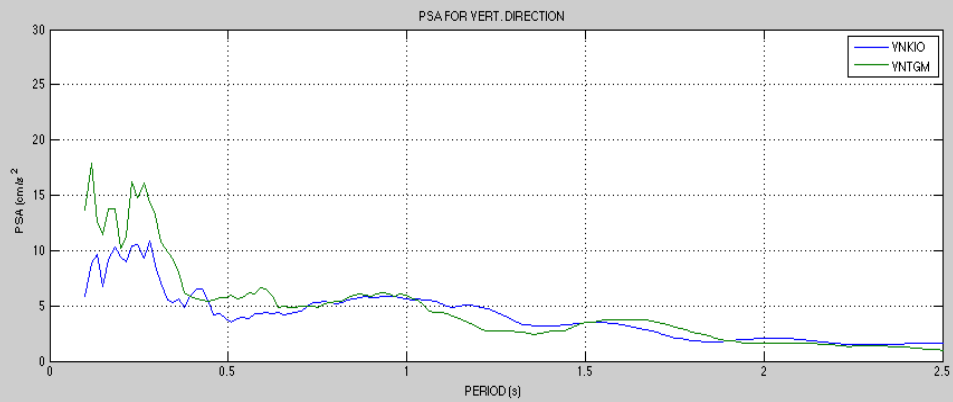
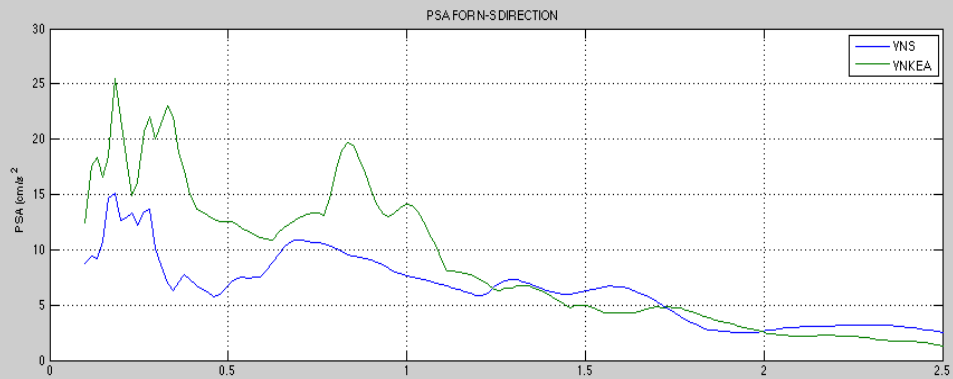
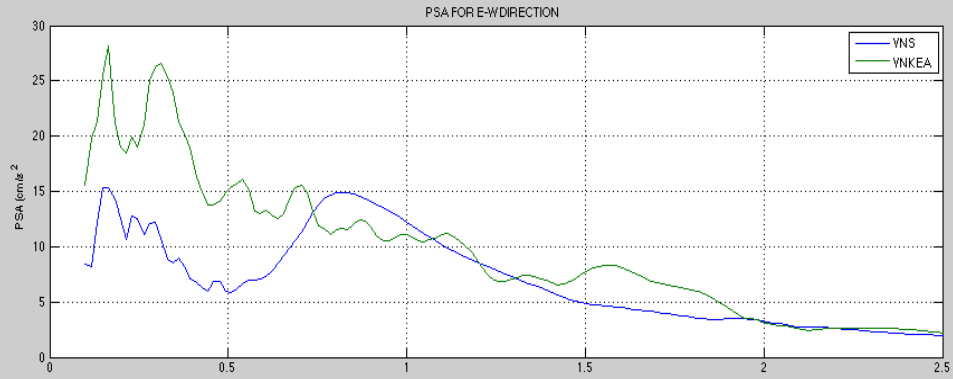


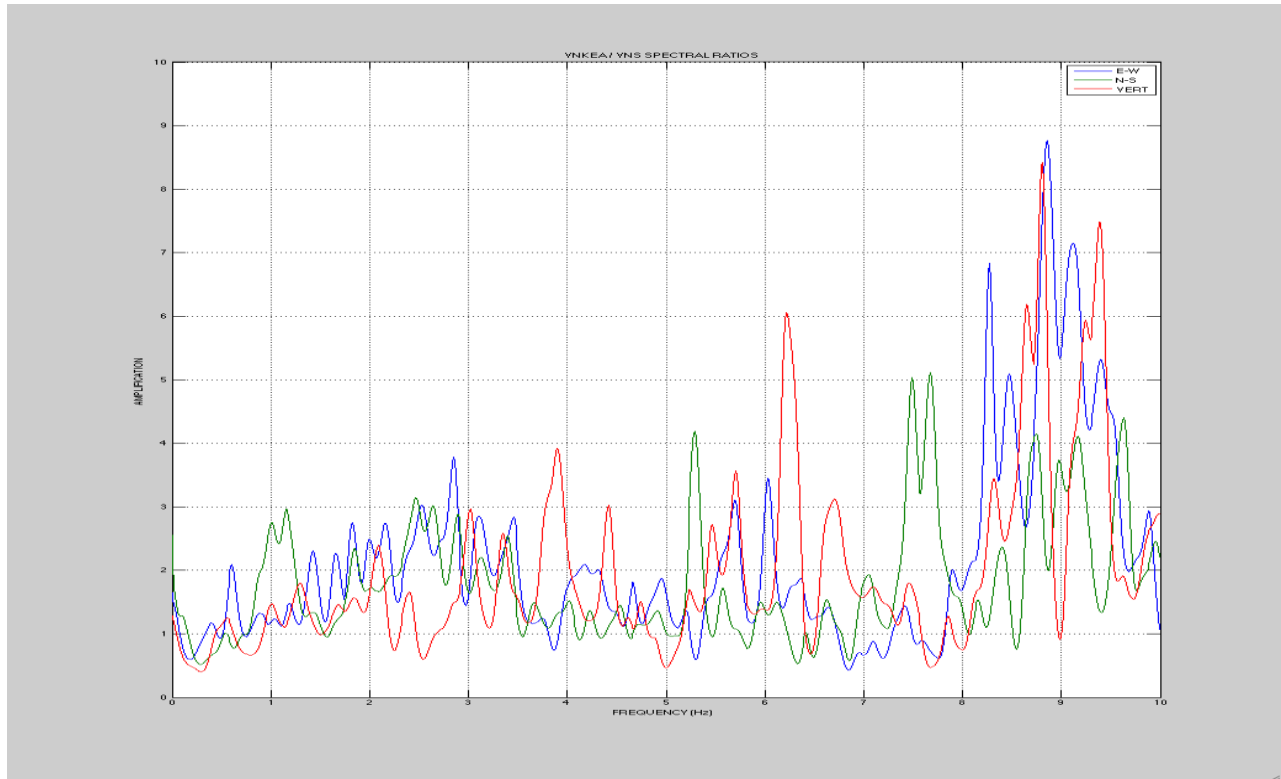














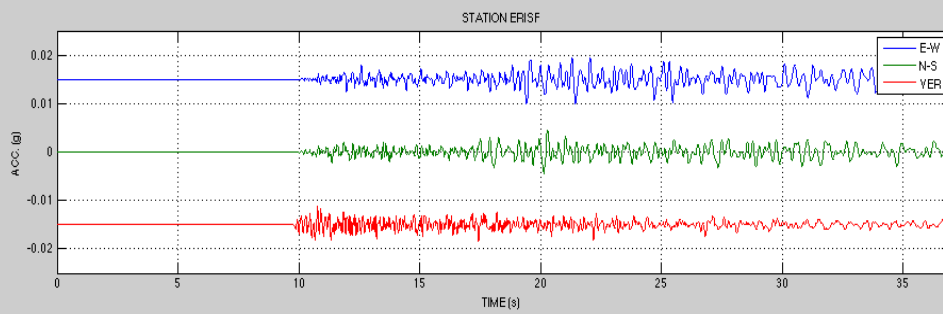
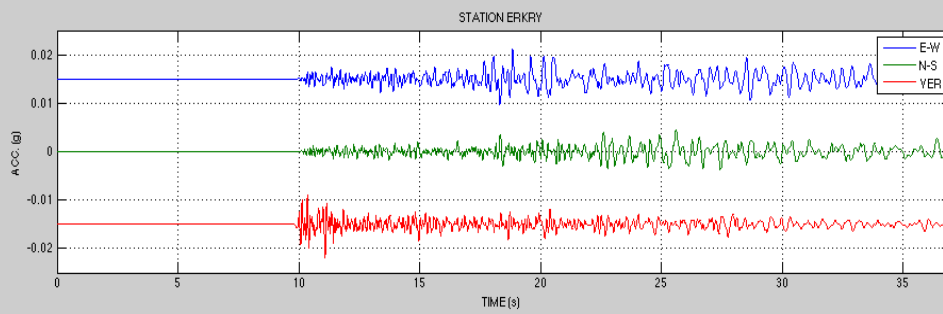
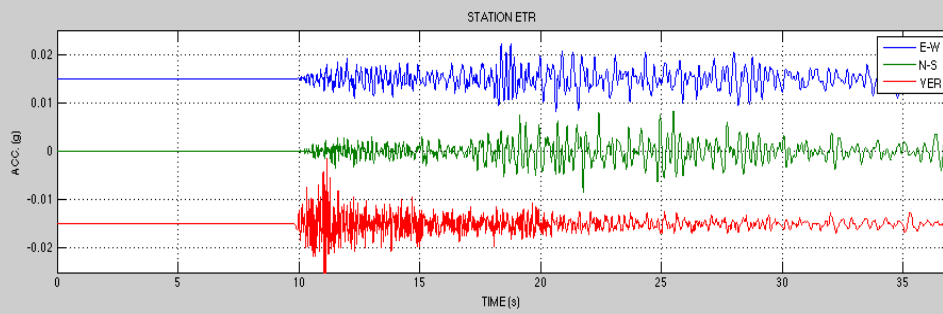
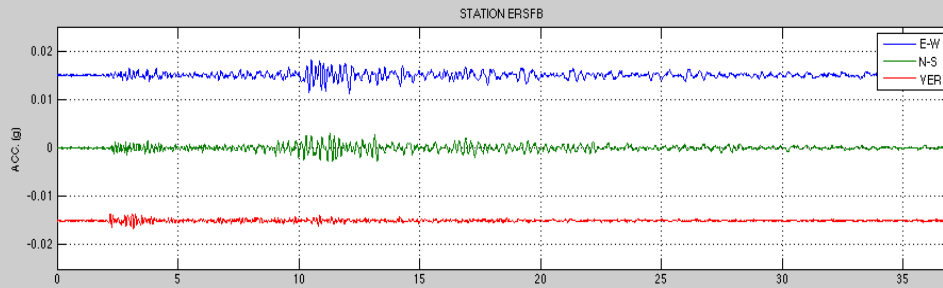
Mollakasım/Van Aftershock

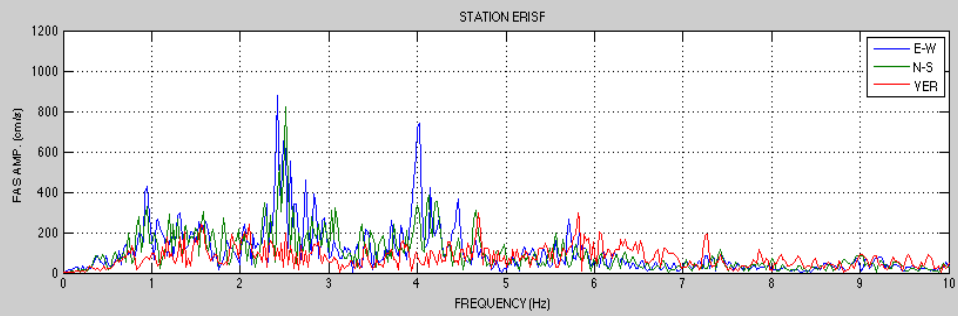
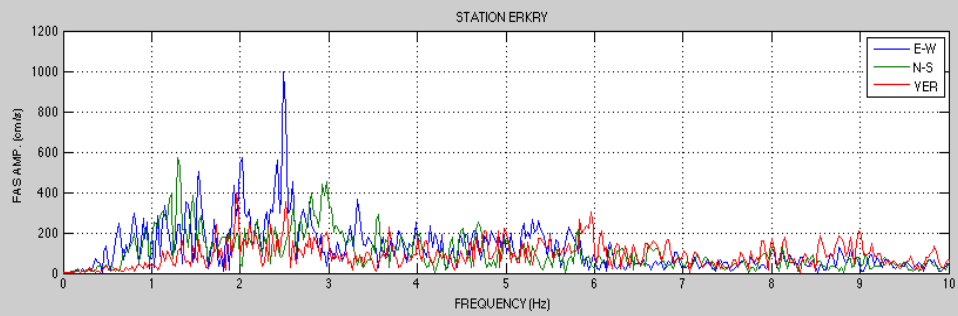
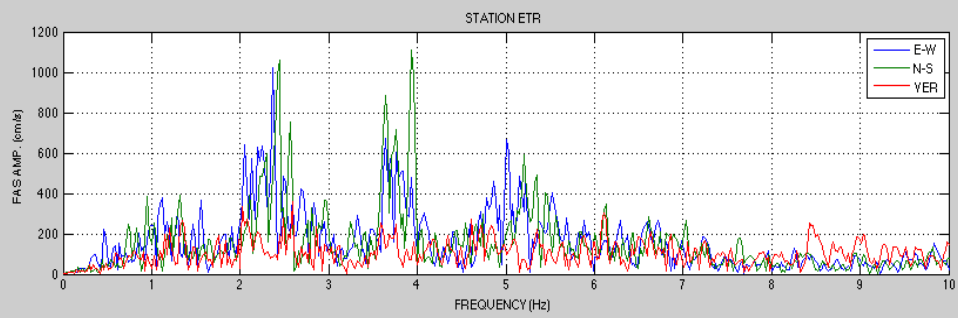
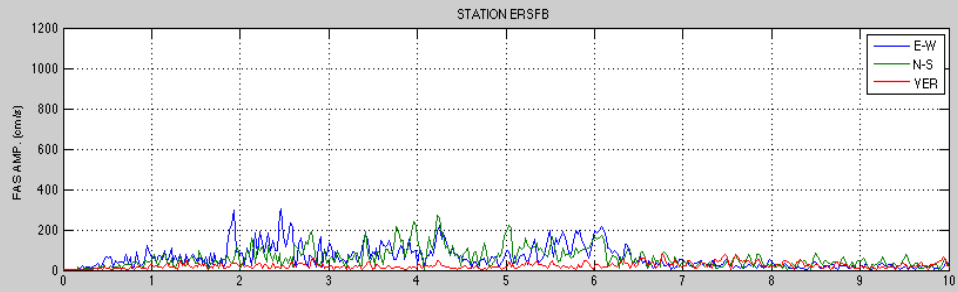
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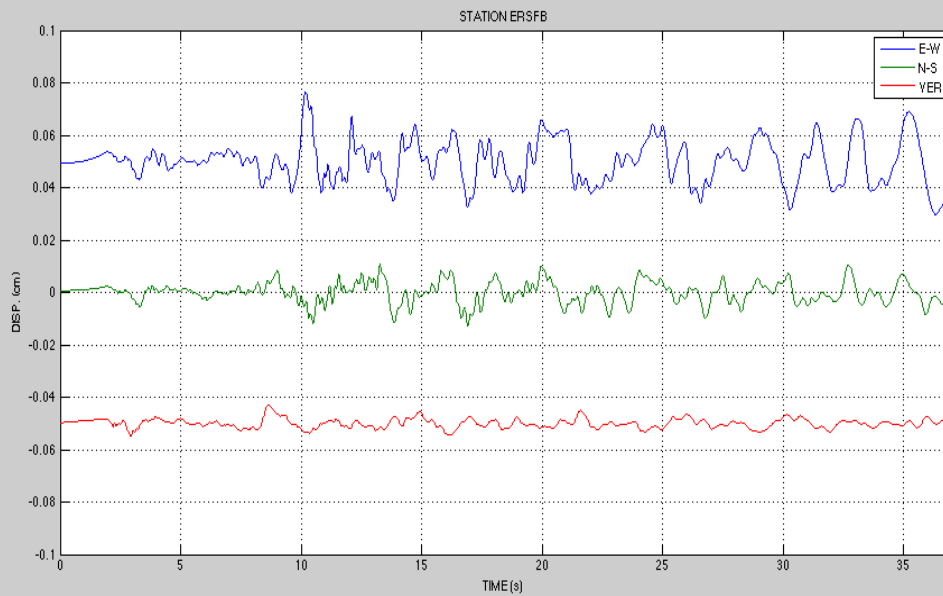
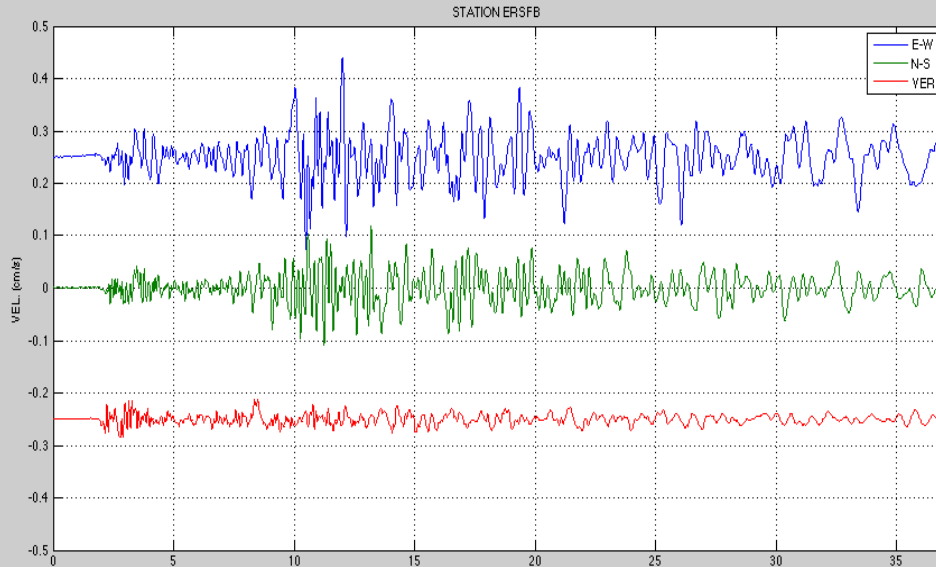
14/11/2011

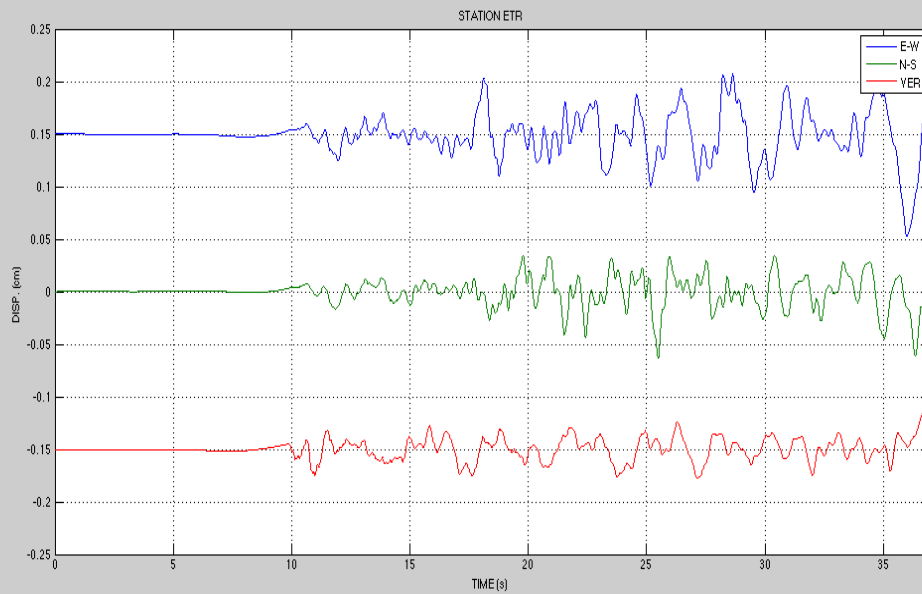
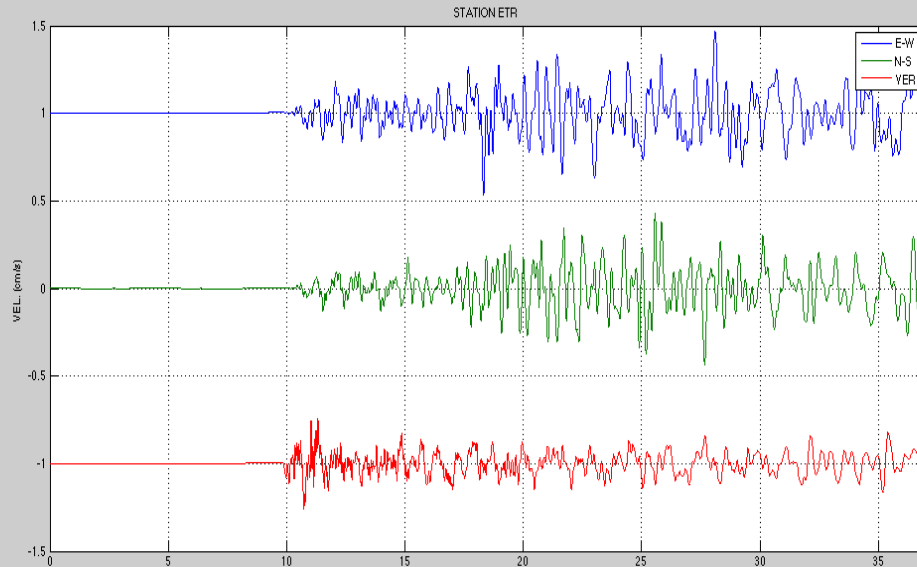
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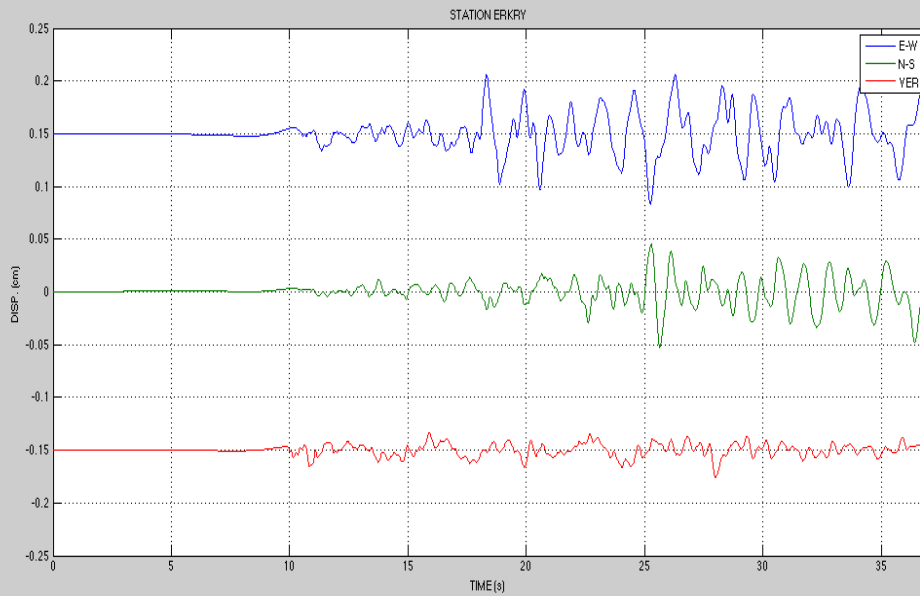
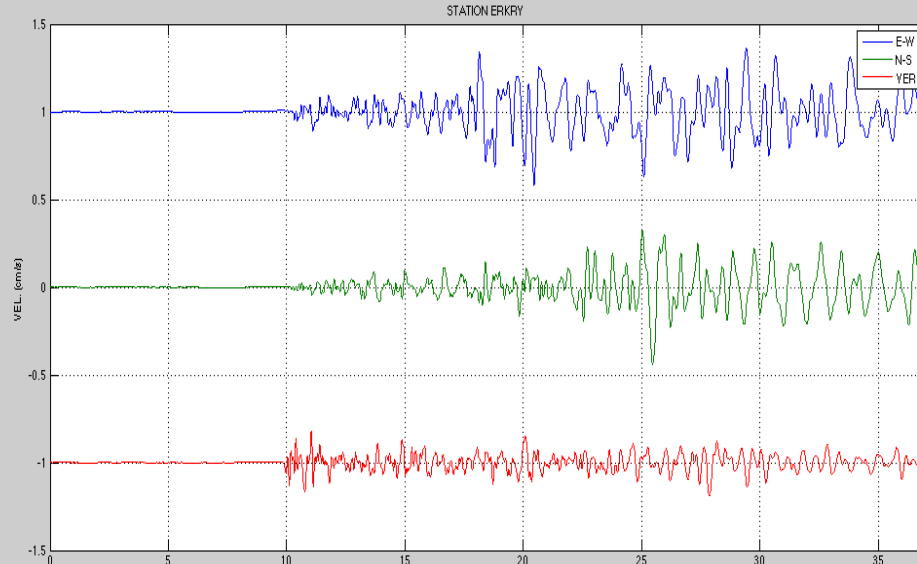
ERCİŞ RECORDS

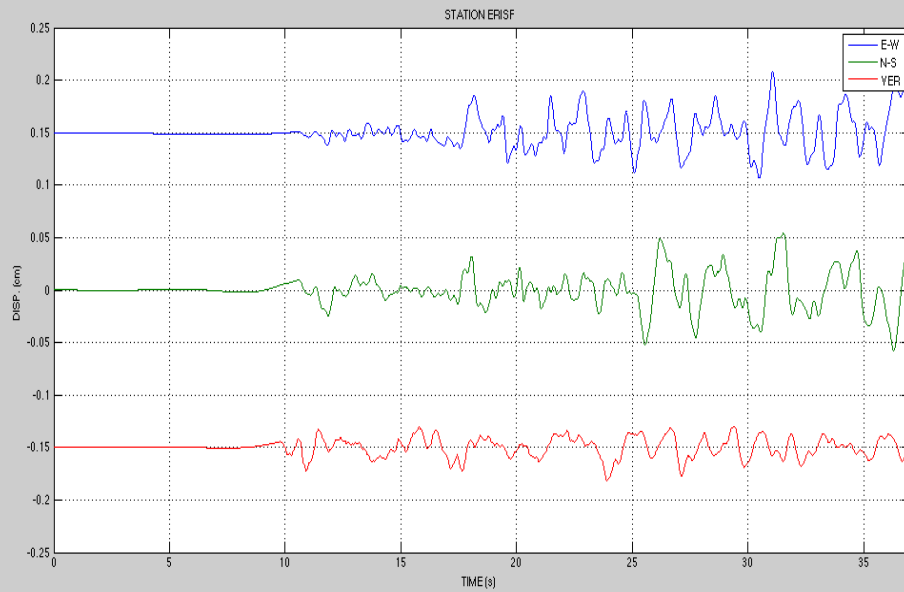
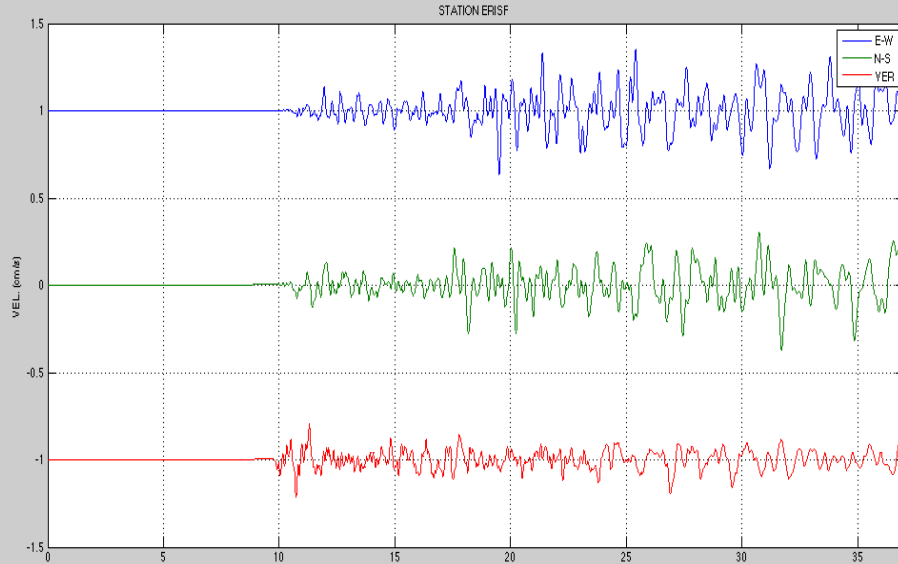


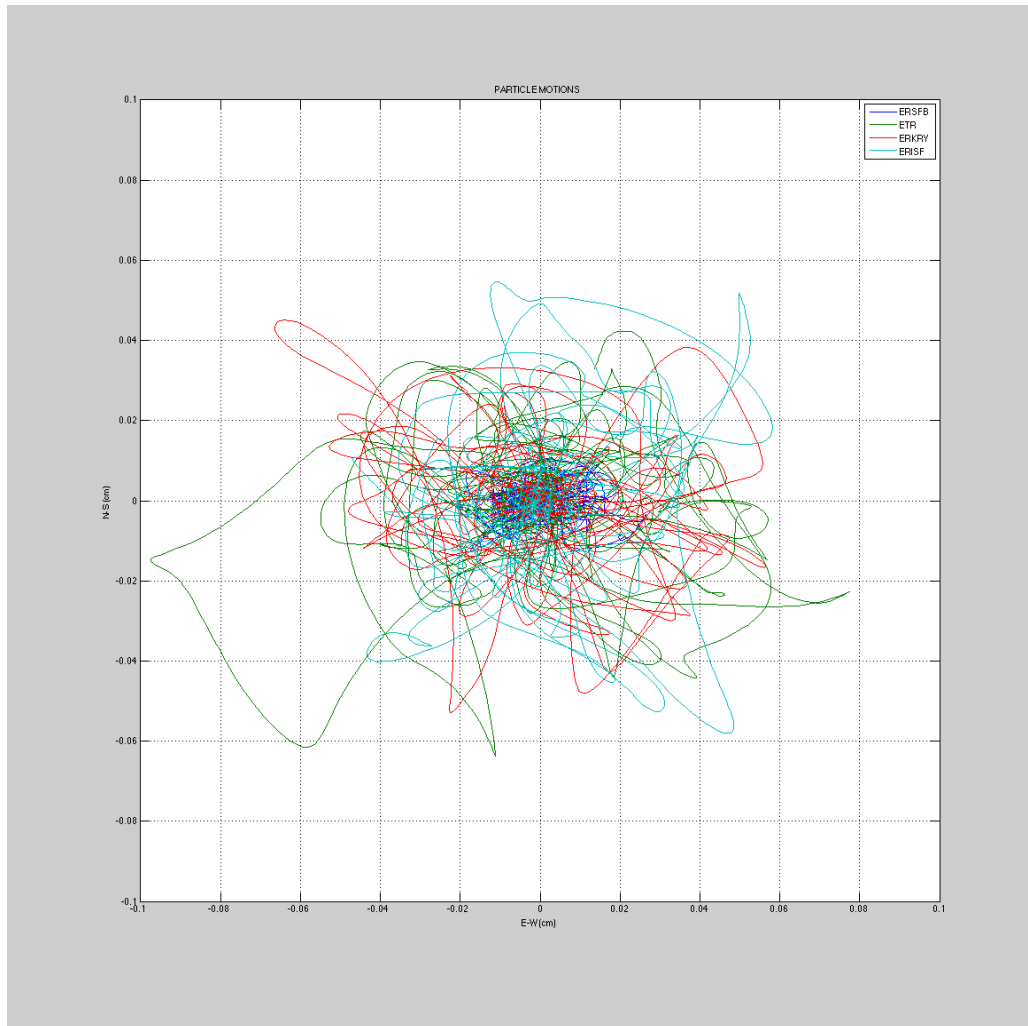


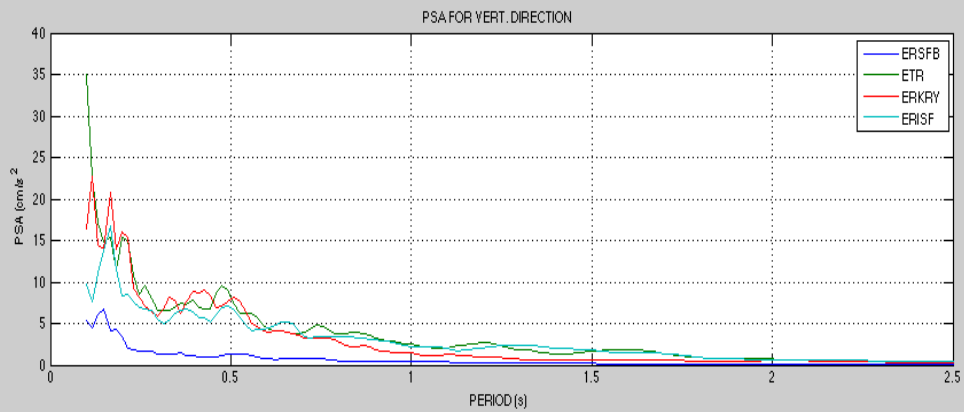
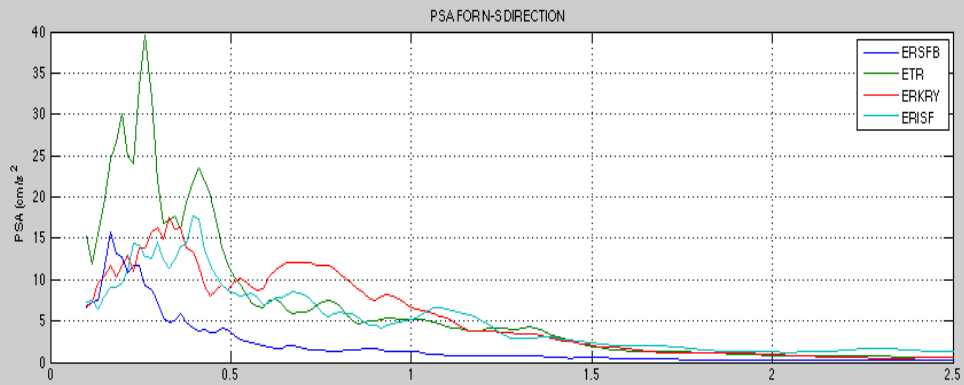
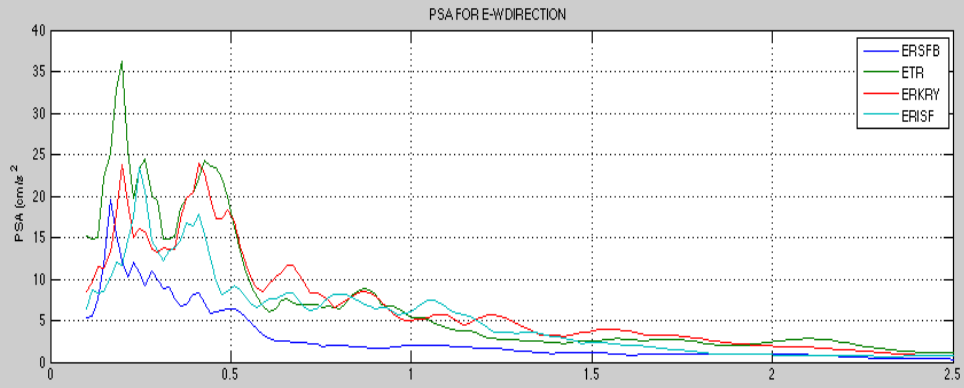


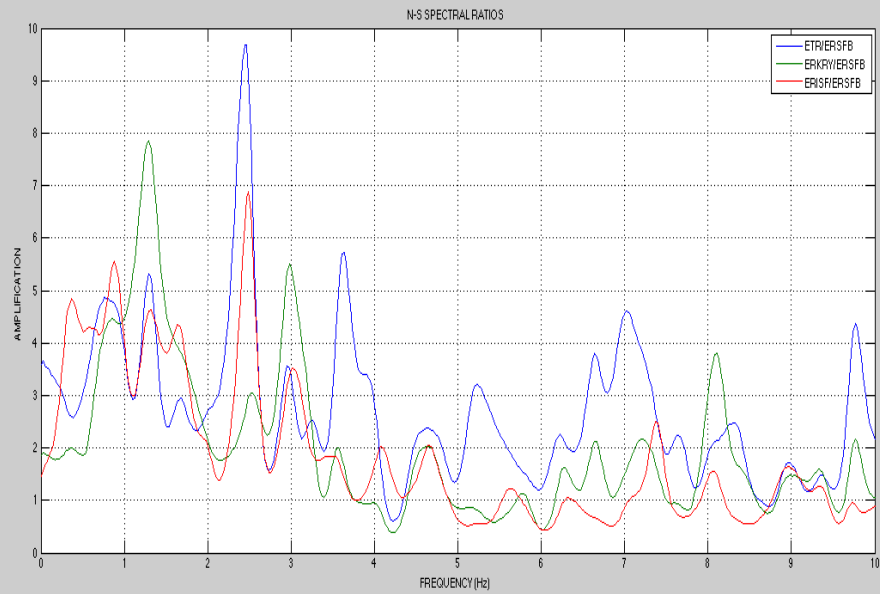
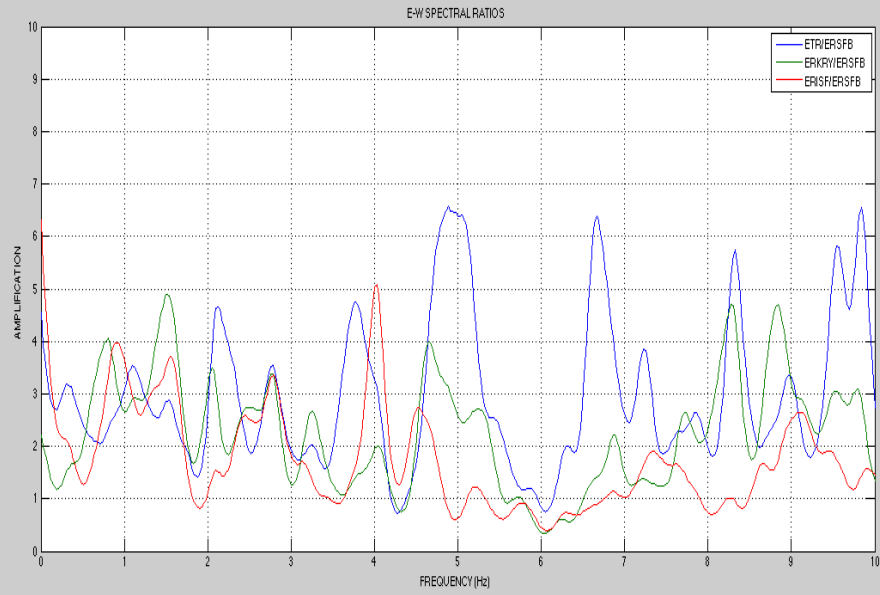














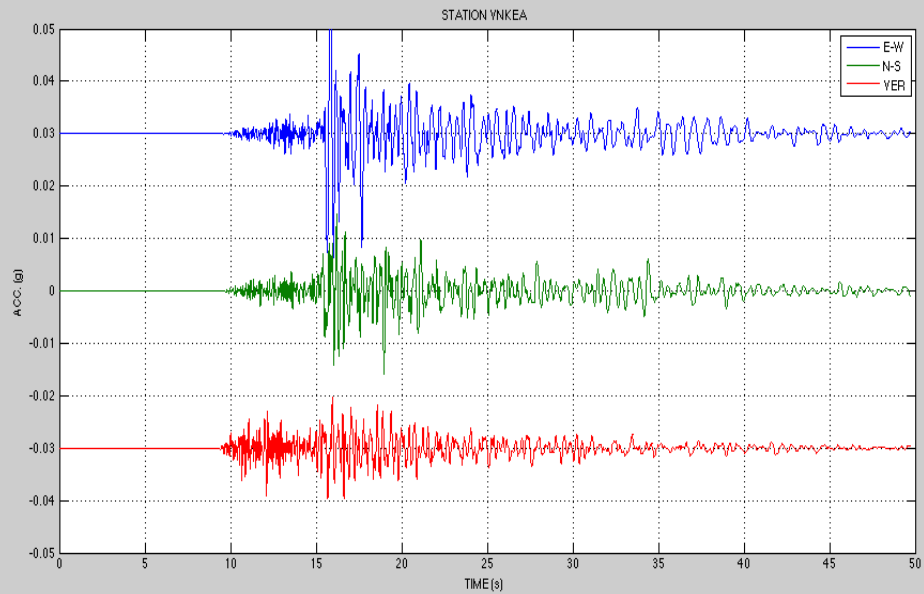
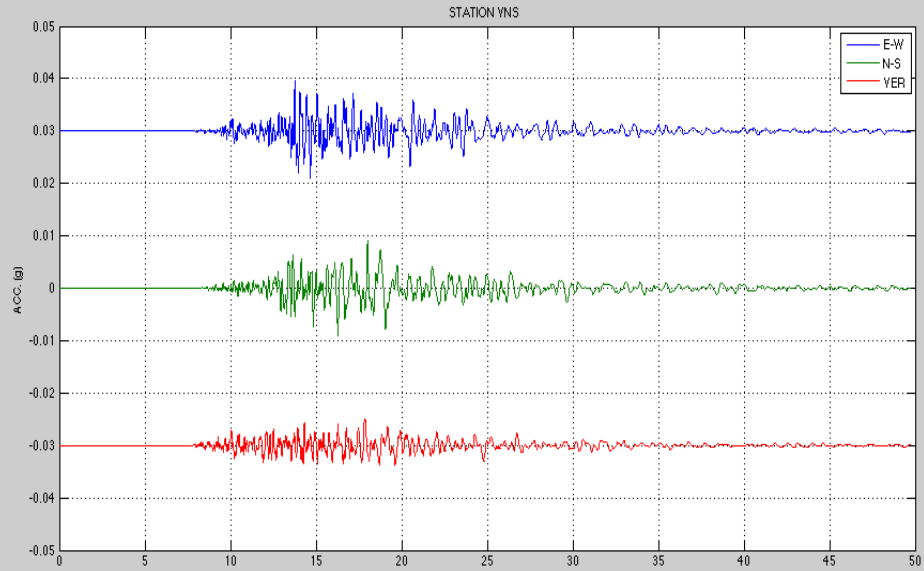
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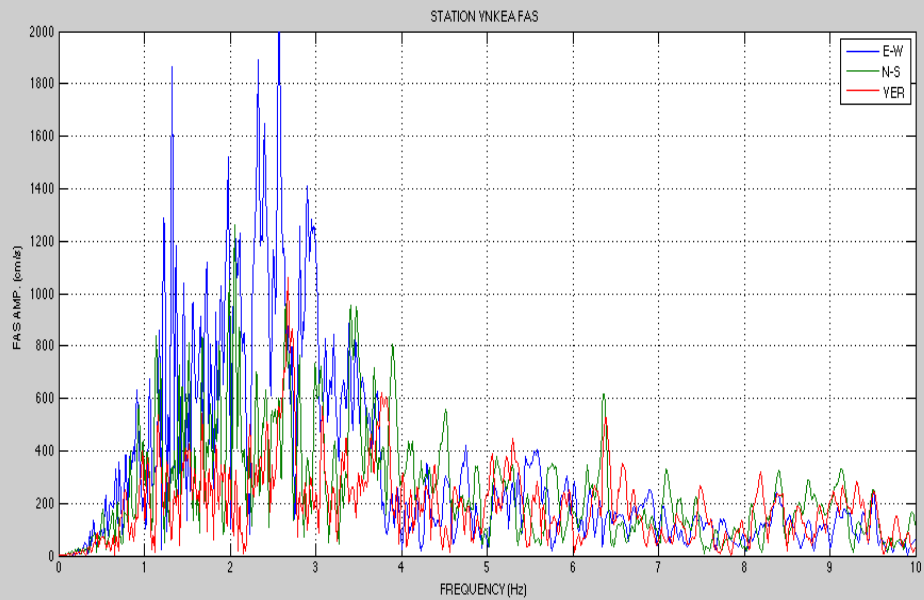
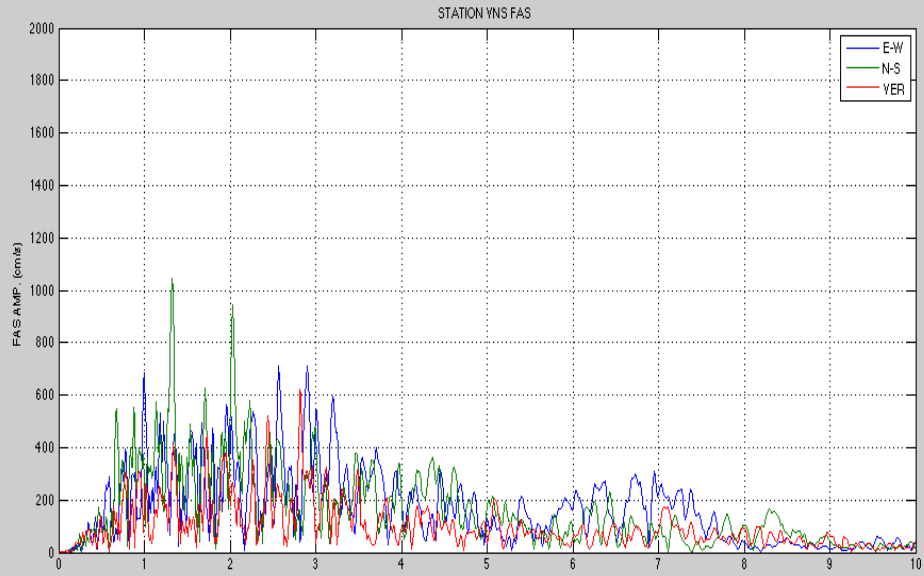
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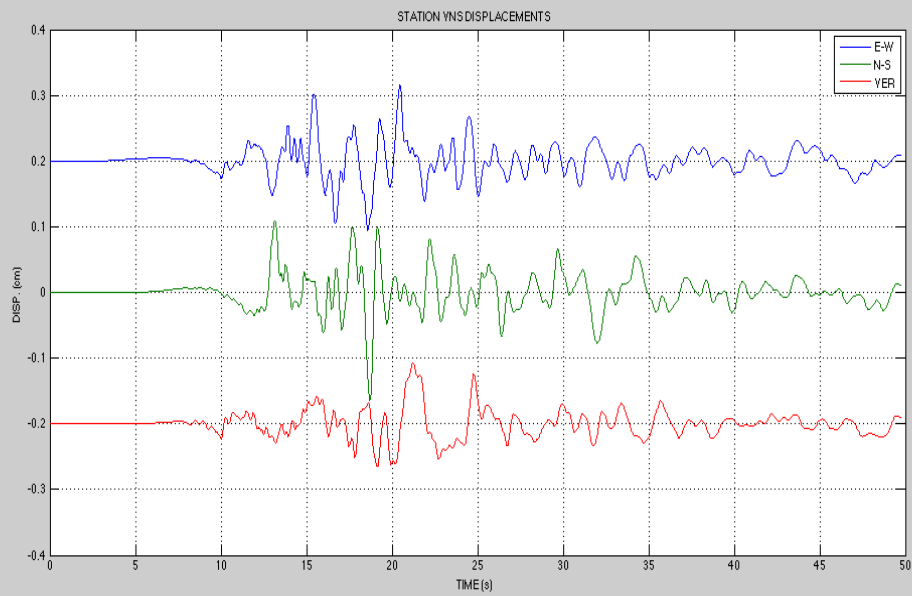
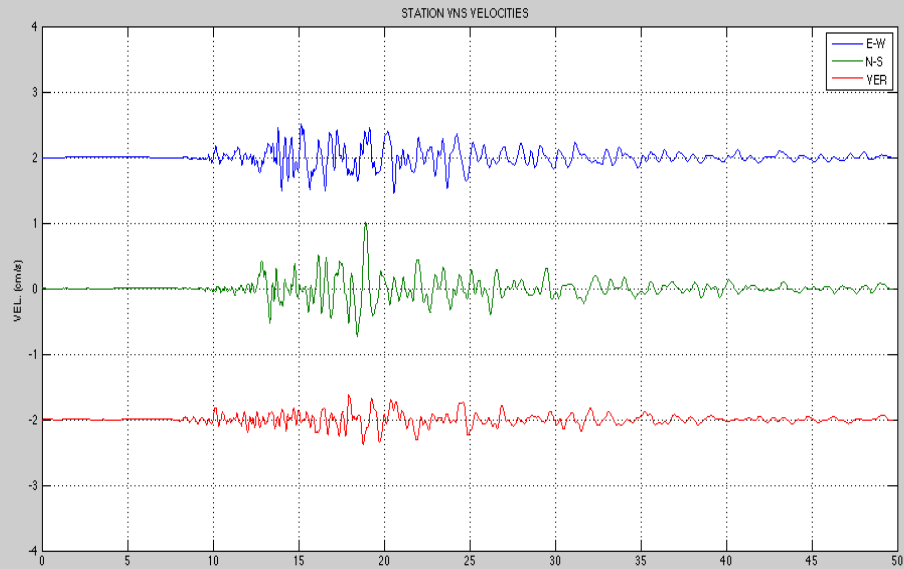
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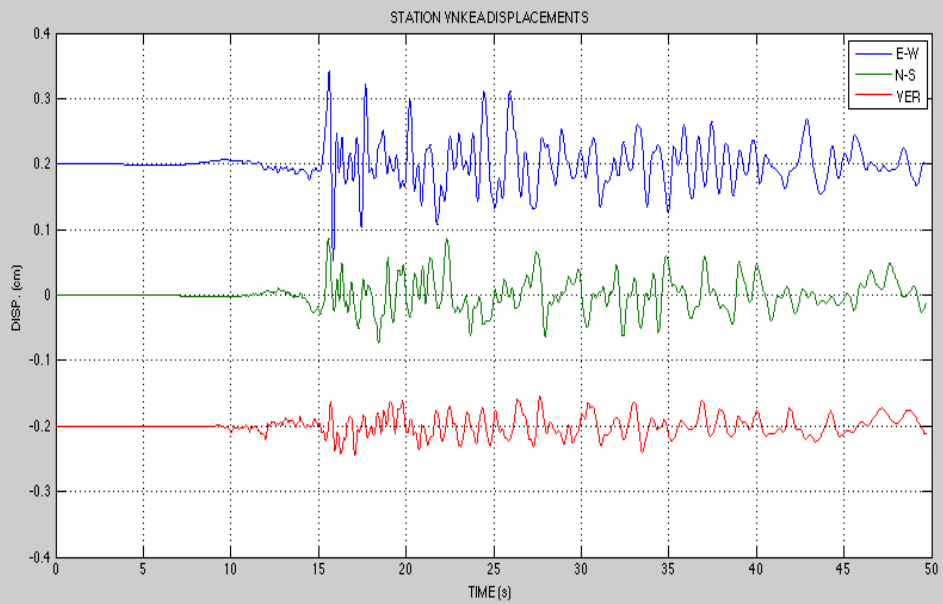
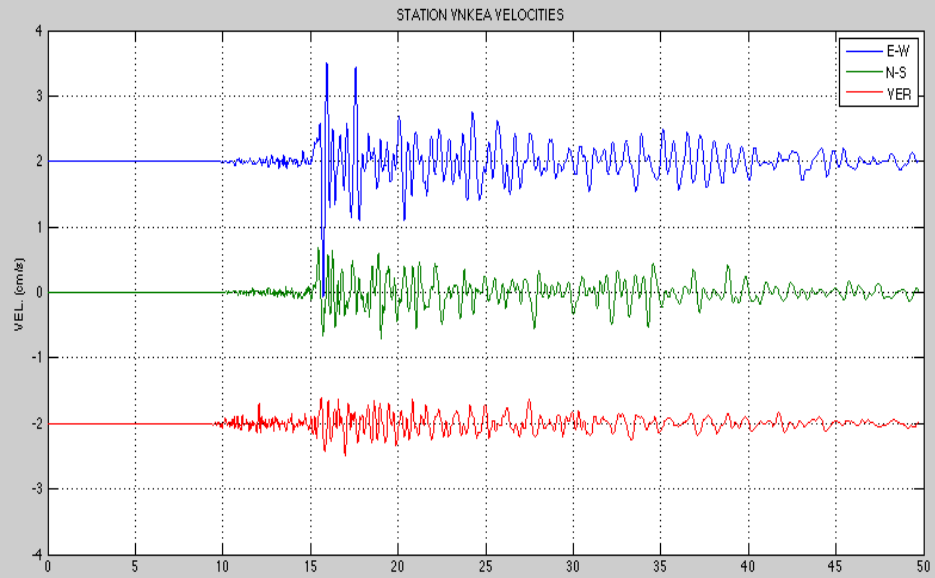
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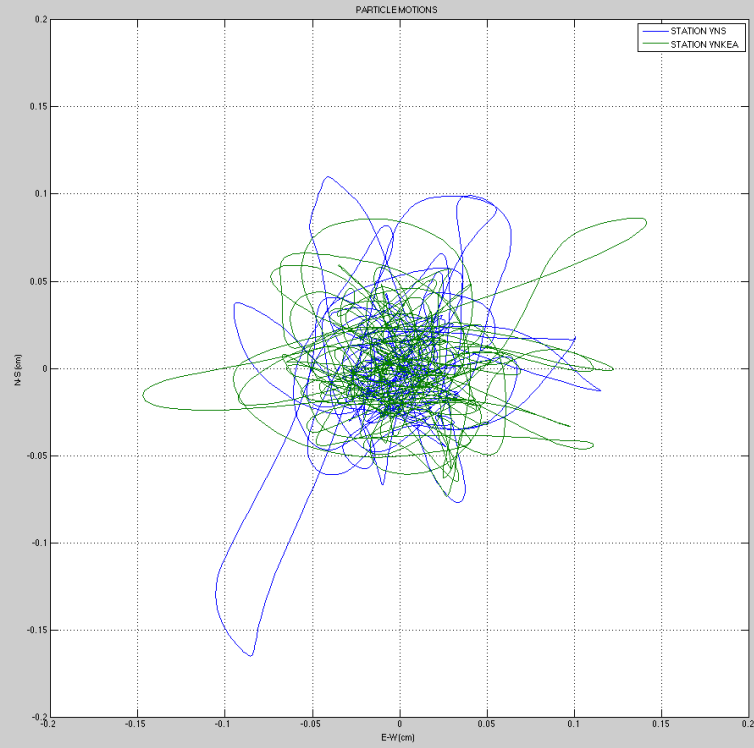
VAN RECORDS

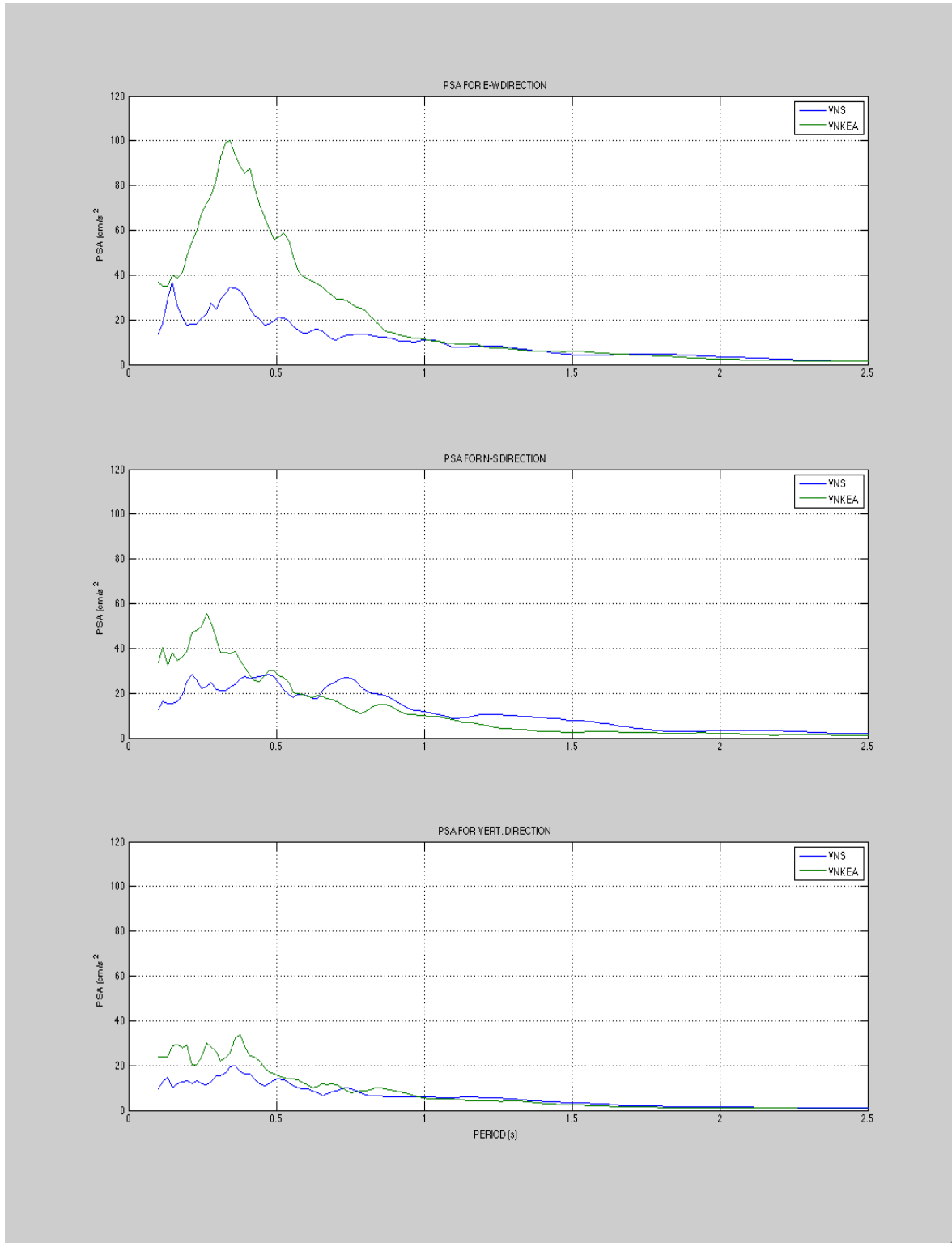


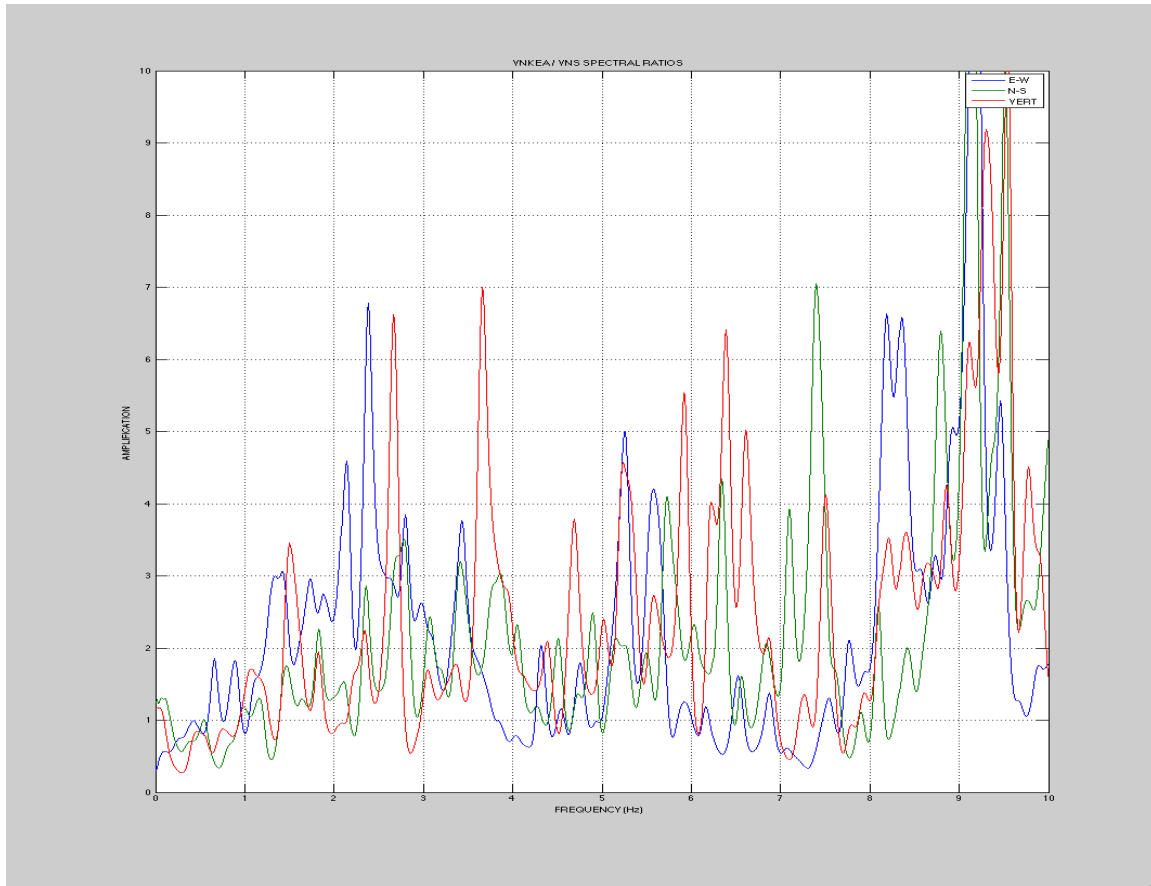














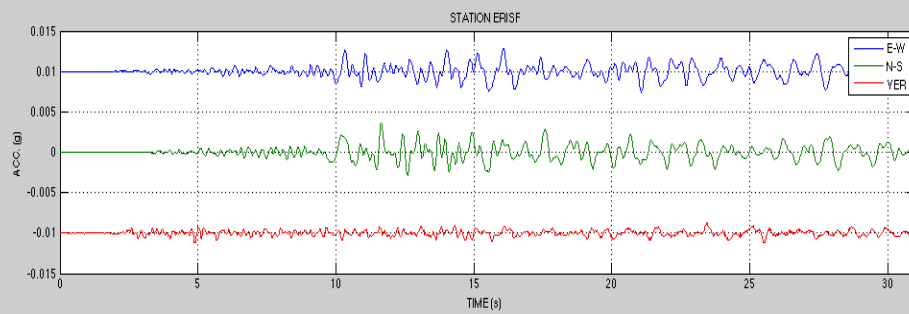
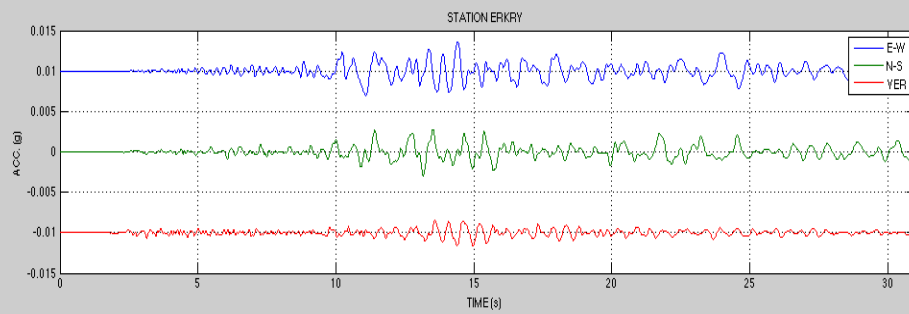
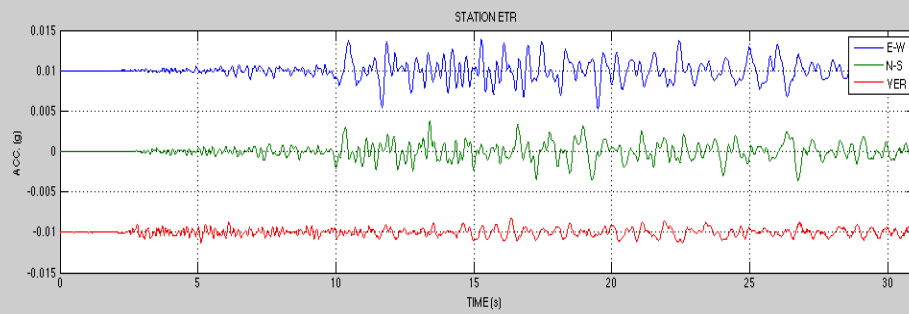
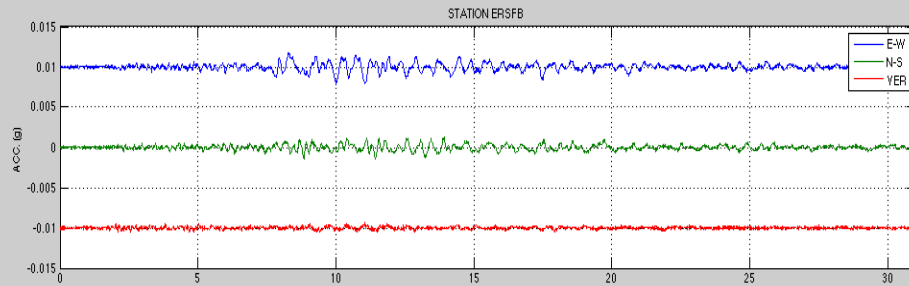
Bodurağaç/Van Aftershock

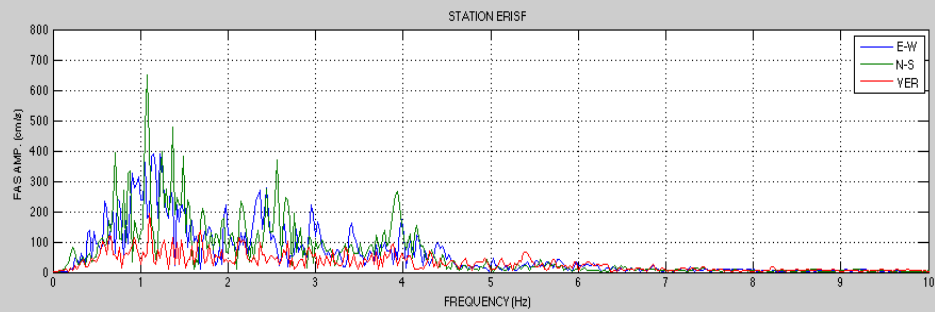
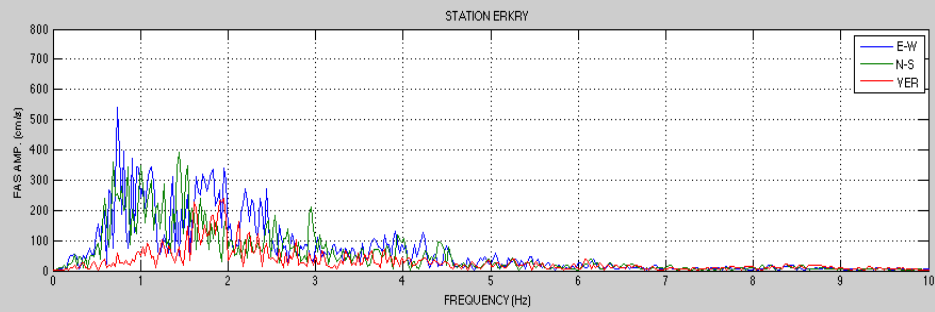
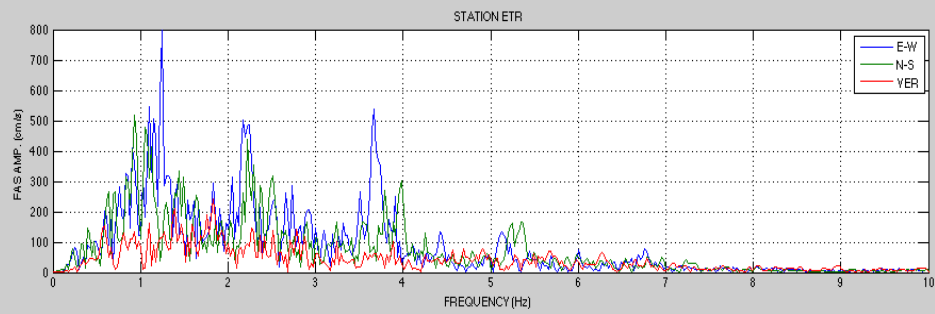
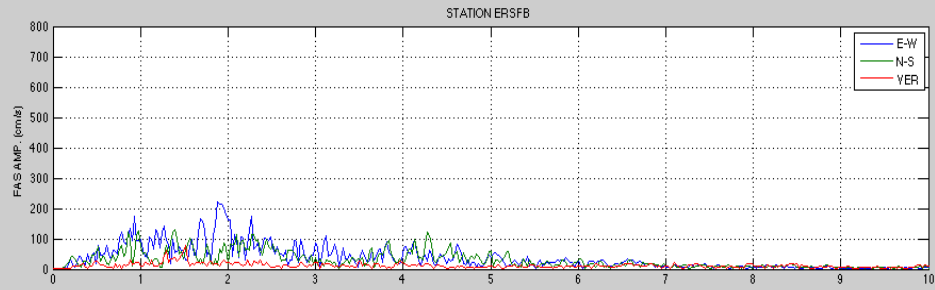
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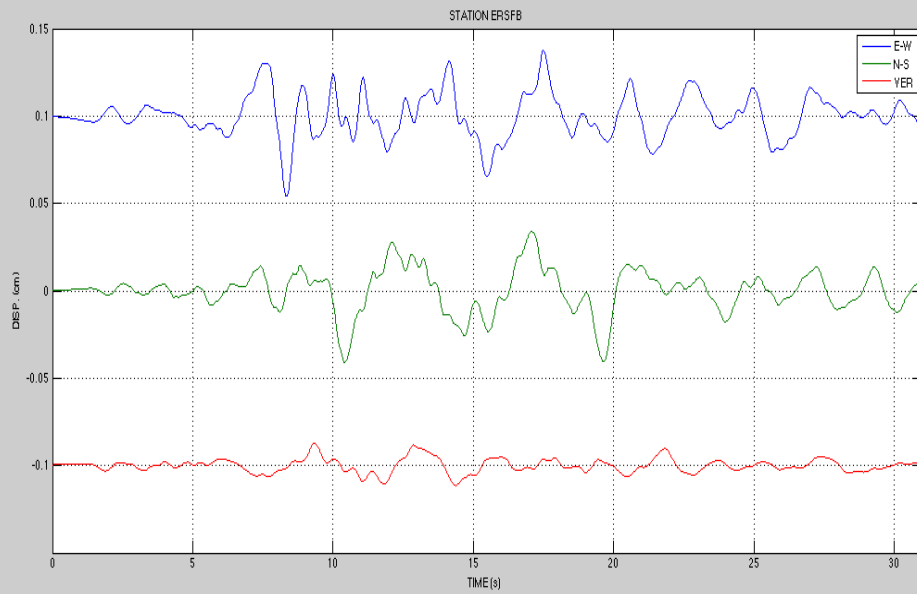
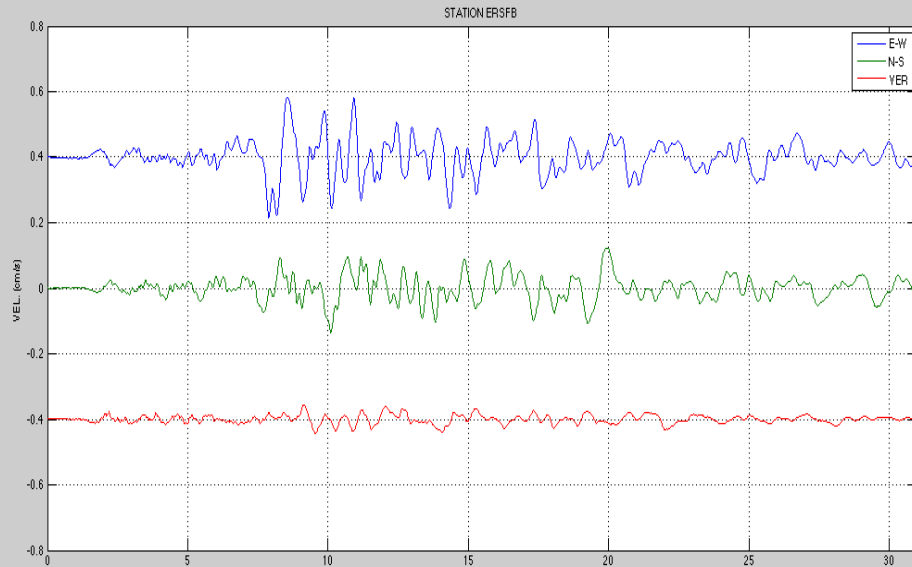
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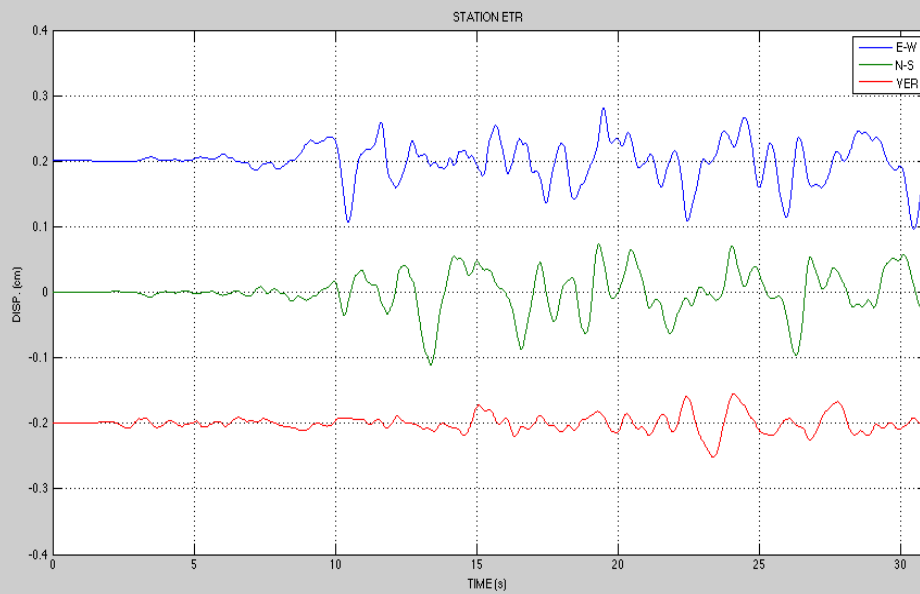
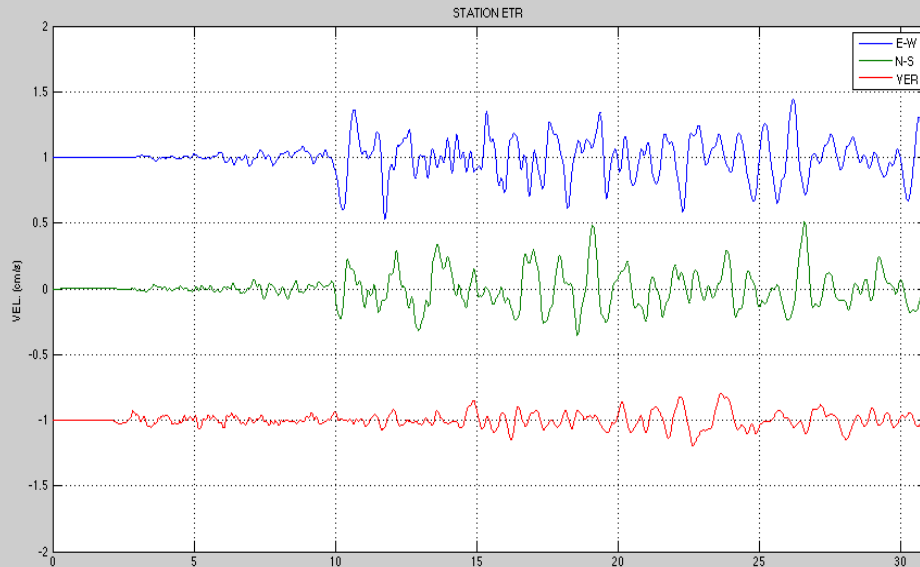
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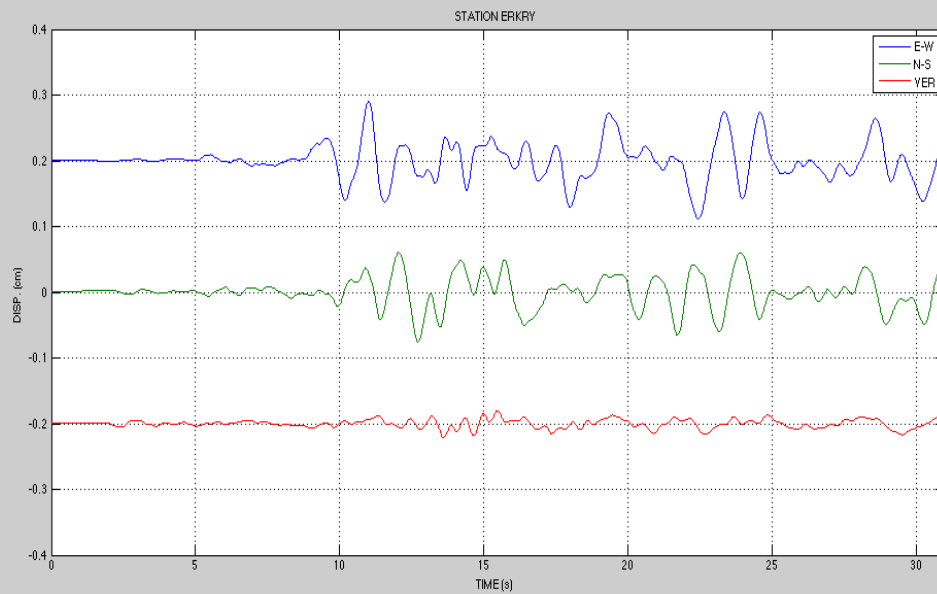
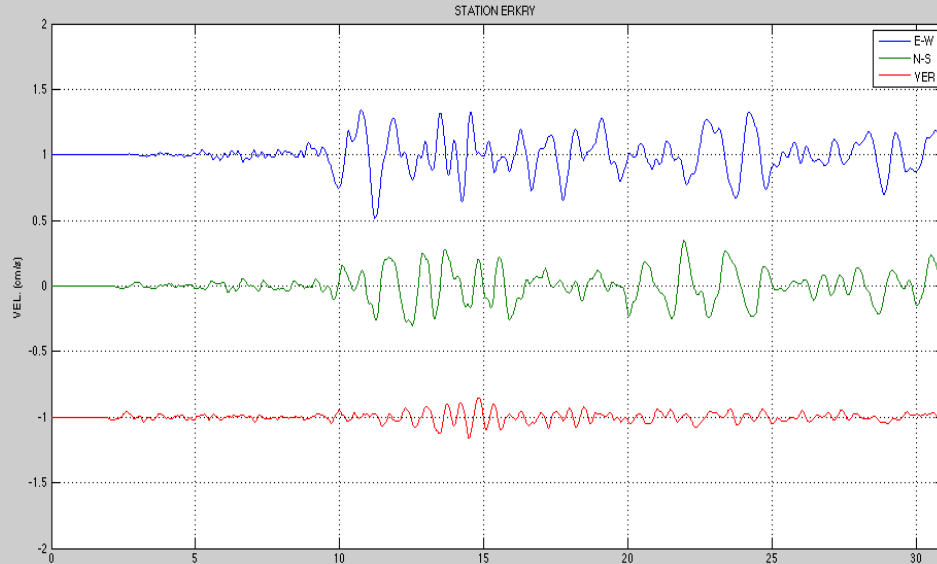
ERCİŞ RECORDS

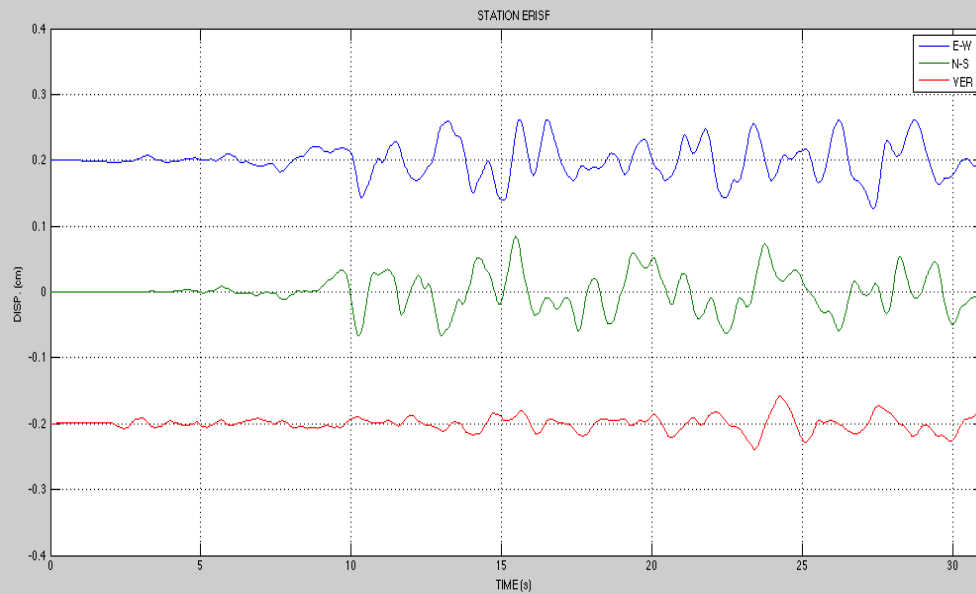
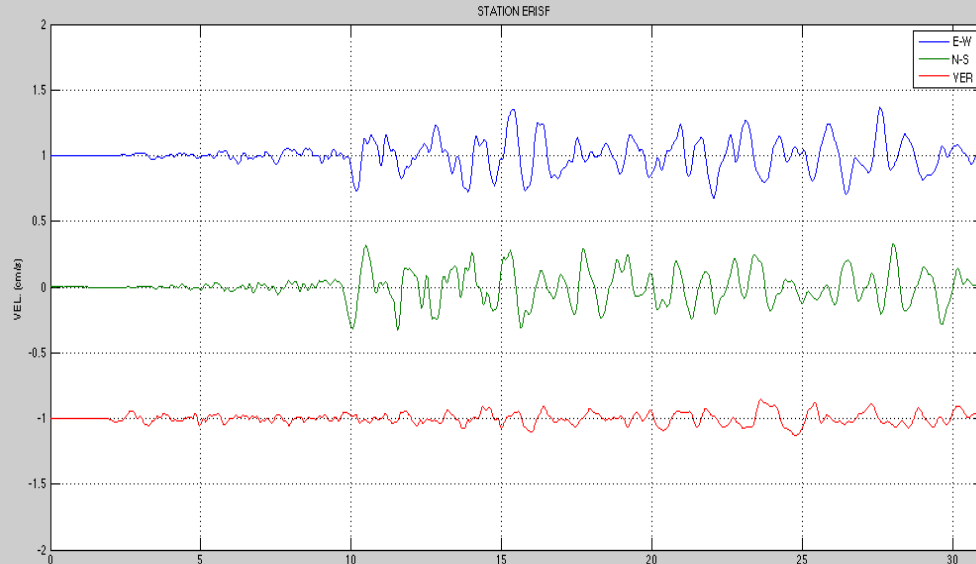


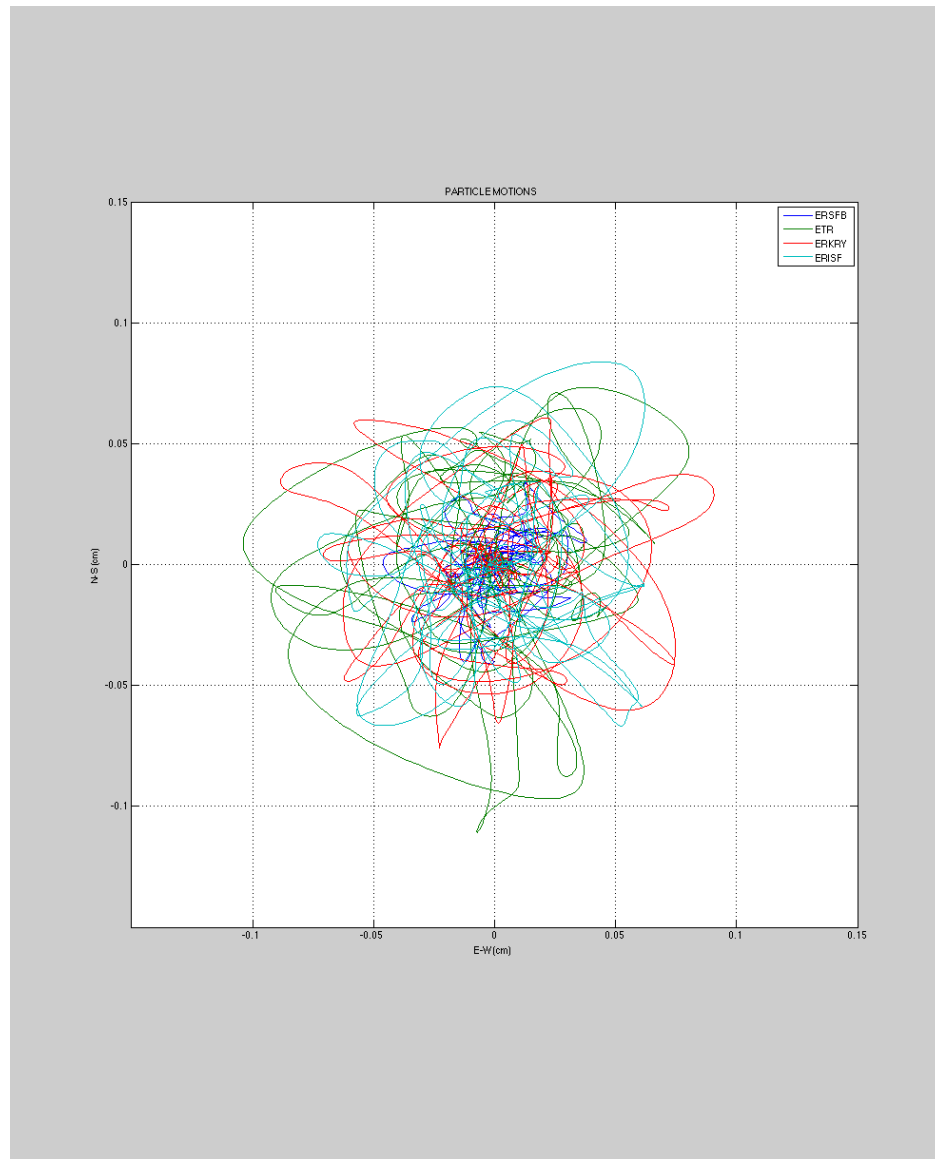


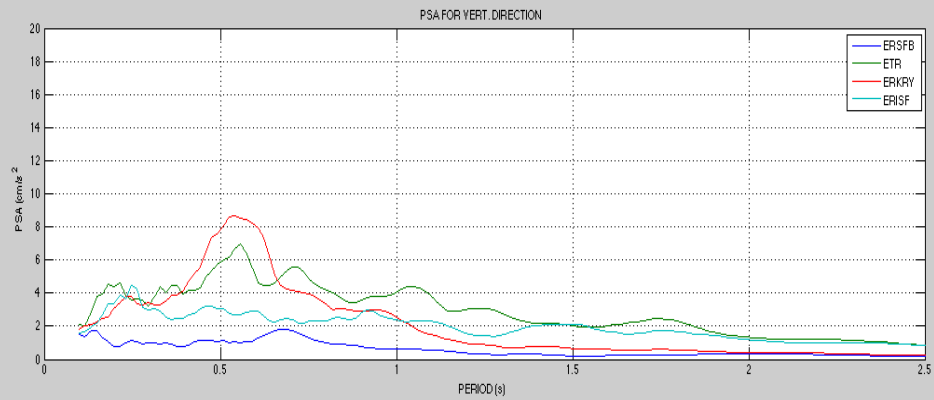
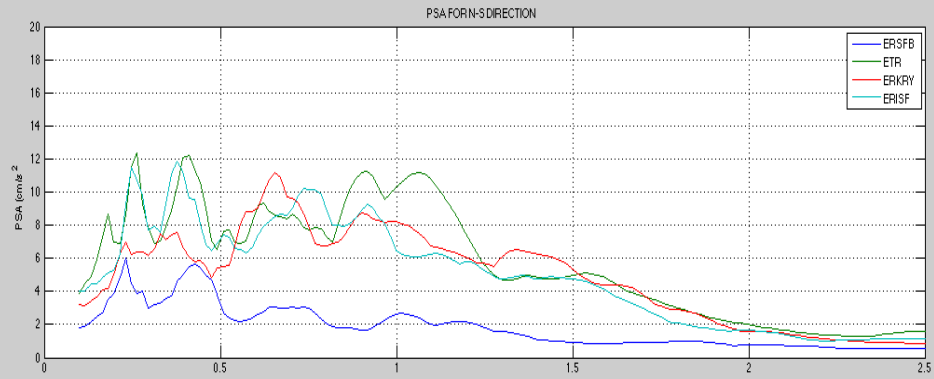
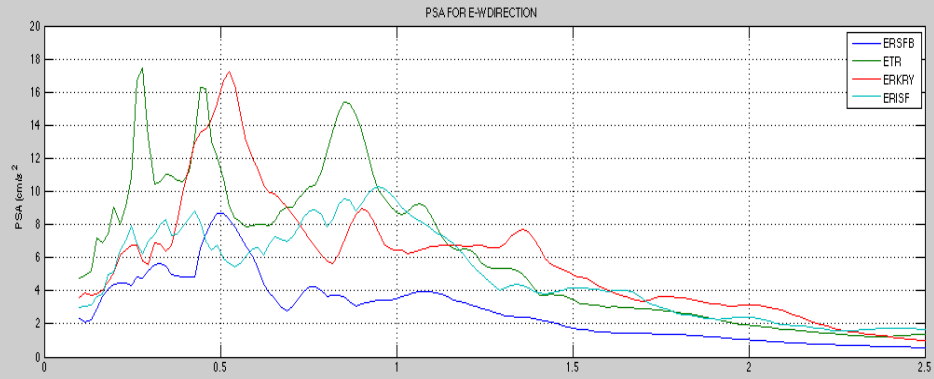


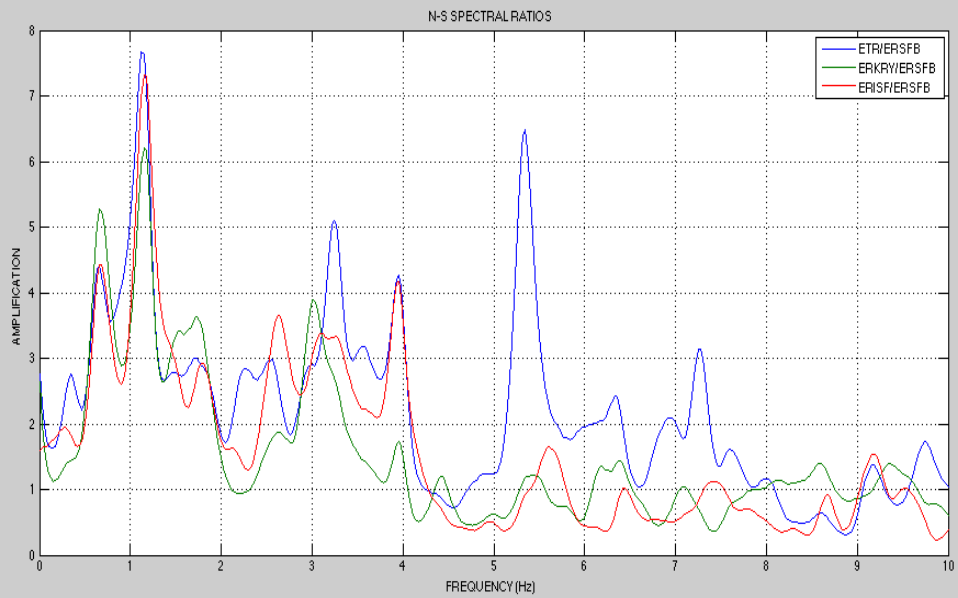
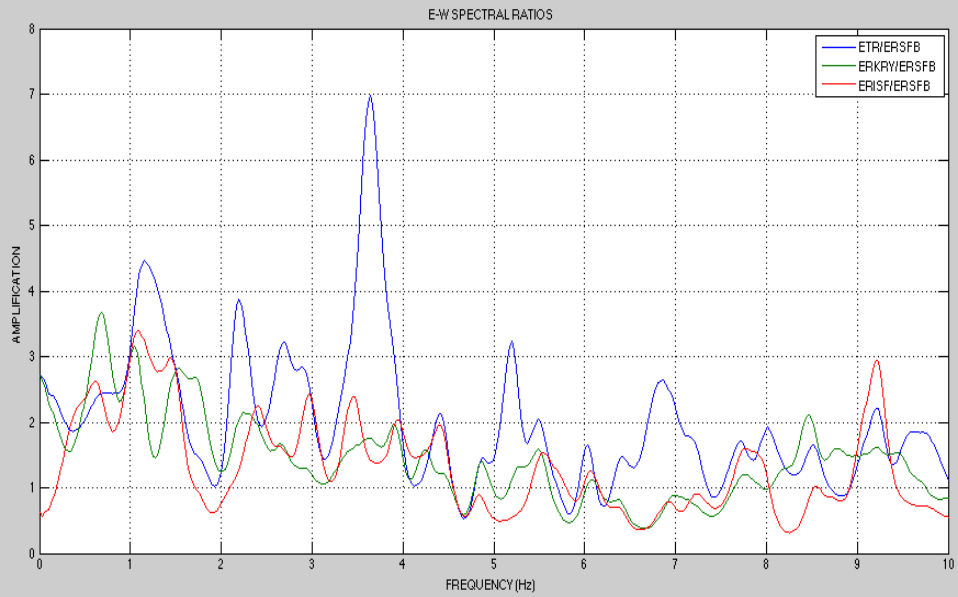












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