

Technical Note

STRONG MOTION RECORD THAN JANUARY TO JUNE 2007

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Abstract

Iran Strong Motion Network started its activities in 1973 and running by Building and Housing Research Center since 1981. At the date of this study ISMN consisted of more than 1103 digital (SSA-2) and 15 analog (SMA-1) accelerographs. The accelerograms of different earthquake, are downloaded, controlled, processed, and then added to the comprehensive data bank, which is very useful for scientists and engineers in the field of engineering seismology and earthquake engineering.

Here, the most important earthquakes are briefly described. More information is presented in Appendix I and also available on <http://www.bhrc.ac.ir>.

Keyword: Accelerogram, accelerograph, earthquake, record, strong ground motion, Iran strong motion

1. Introduction

The Iranian plateau is one of the most seismically active areas of the world and frequently suffers destructive and catastrophic earthquakes that cause heavy life loss and widespread damages.

The Alpine-Himalayan earthquake belt, where Iran is located, extends from west Portugal eastward along southern Europe, including Iran and southern East Asia, and then encircling the Pacific Ocean. Major geological structures of Iran are the Alborz Mountains in the North, the Zagros belt in the west and south, the Kopet-dagh range in the northeast, the depression of the Great Kavir in the center, Dasht-e Lut in the east and the Caspian Sea in the north.

For better understanding of earthquake occurrence in the country we need to complete our knowledge about these natural phenomena. One of the most advanced methods in this process is direct recording and measurement of the strong ground motions during earthquakes. Knowledge of the ground motion is essential to an understanding of the earthquake and the behavior of Structures. For this purpose, a network of strong motion accelerographs is maintained by the Building and Housing Research Center.

2. Iran Strong Motion Network

The accelerographic Network of Iran started its activities in 1973 at the Planning and Budget Organization. In 1981 the Network was transferred to Building and Housing Research Center and a new stage of its activities was born. The network was consisted of 274 accelerographs until 1992. At the date of this study, the network was consisted of 1095 accelerographic stations (Figures 1 and 2) that are equipped with digital SSA-2 or analog SMA-1 accelerographs. The trigger level of all the instruments were set at 0.01g and more than 5500 accelelograms have been recorded from January 1973 to December 2005.

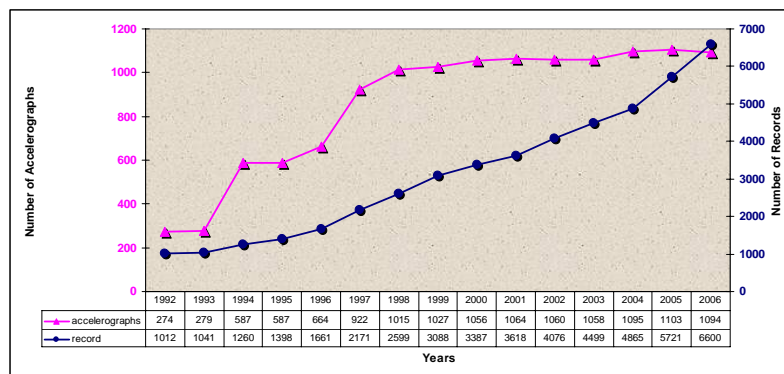


Figure 1. Number of Accelerographs in operation

3. The Catalog of Accelerograms, Recorded By ISMN

In the first half of the year 2007, 207 accelerograms (with PGA greater than the trigger level of 0.01g) were recorded by 126 accelerographs, which were triggered by 86 different earthquakes (Figure 2). The maximum PGA of about 0.43g was occurred in Qadrooni Dam station (Kerman Province) due to the Qadrooni Dam earthquake of April 8th, 2007, even if it was not the greatest earthquake of this year. The strong motion and the seismological data of the major earthquakes are presented in Appendix I and the most important events are briefly described at the following.

3.1 Damavand Earthquake of February 26th, 2007

On February 26th, 2007 at 19:43:06 (UTC), an earthquake with the magnitude of M3.0 (IGUT) occurred in Damavand region in Tehran Province. The earthquake was recorded by 3 sets of SSA-2 accelerographs (Figure 3) of Iran strong motion network. The peak ground acceleration of about 0.027g occurred in Damavand station. The Epicenter of this earthquake has been located at 35.748N, 52.117E (IGUT).

3.2 Dorood Earthquake of March 6th, 2007

On March 6th, 2007 at 22:32:05 (UTC), an earthquake having the magnitude of M4.7 (IGUT) occurred in Dorood region in Lorestan Province. This earthquake was recorded by 3 sets of

SSA-2 accelerographs (Figure 4) of Iran strong motion network. The maximum peak ground acceleration was recorded in Dorood station with the size of 0.059 g. The Epicenter of this event has been located at 33.504N, 48.918E (IGUT).

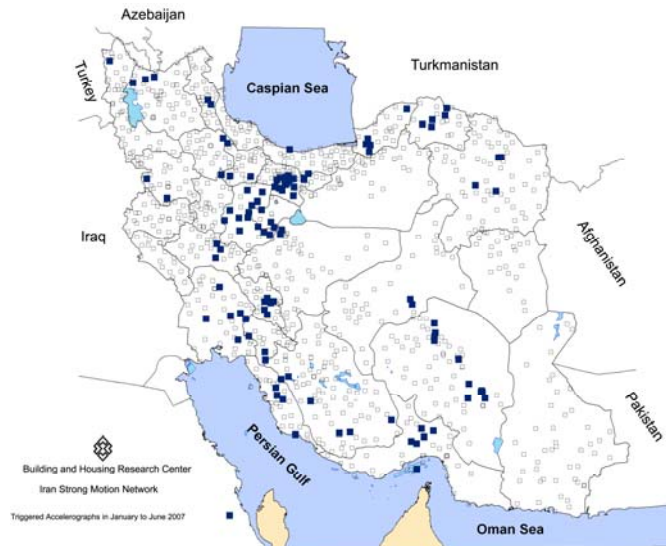


Figure 2. Iran Strong Motion Network (ISMN) and triggered stations in January to June 2007

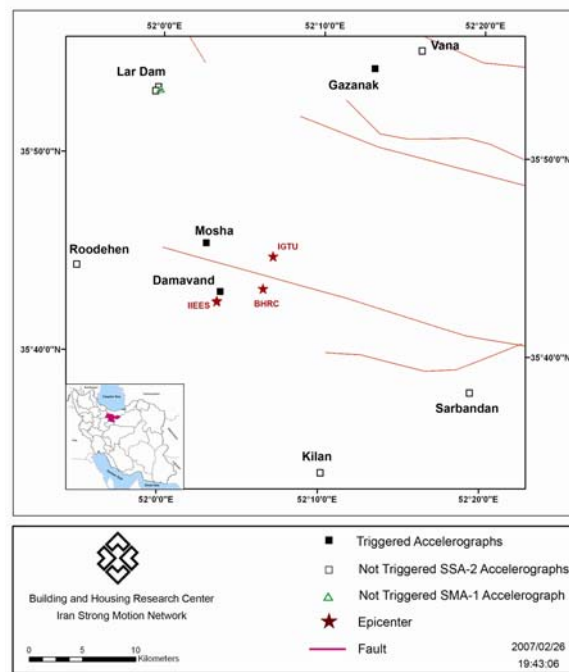


Figure 3. The location map of Damavand Earthquake of February 26th, 2007 and triggered accelerographs

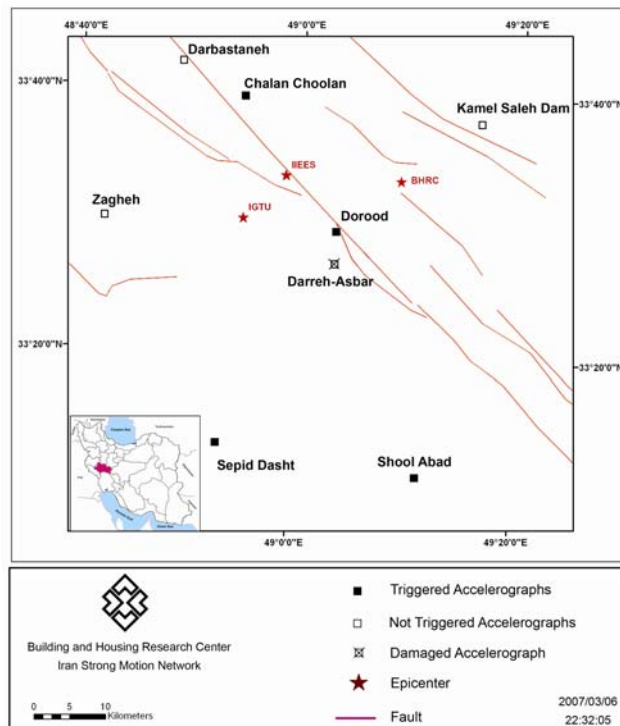


Figure 4. The location map of Dorood Earthquake of March 6th, 2007 and triggered accelerographs

3.3 Baravat earthquake of March 26th, 2007

On March 26th, 2007 at 06:36:53(UTC), an earthquake having the magnitude of M15.5 (BHRC), M5.1 (IGUT), M15.0 (IIEES) occurred near Baravat in Kerman Province (Figure 5). The Earthquake was recorded by 6 SSA-2 accelerographs in Baravat, Posht Rood, Bam, Qotbabad, Abaragh and Mohammad Abad Maskoon stations of Iran strong motion network. The maximum peak ground acceleration of about 0.18g occurred in Baravat station. The epicenter of this event has been located at 29.20N, 58.40E (BHRC), 29.273N, 58.326E (IGUT) and 29.17N, 58.46E (IIEES).

3.4 Qadrooni Dam earthquake of April 8th, 2007

On April 8th, 2007 at 11:22:24(UTC), an earthquake having magnitude M14.3 (IIEES), M4.6 (IGUT) occurred in Kerman Province (Figure 6).The Earthquake was recorded by 3 station accelerographs installed in Qadrooni Dam, Ravar, and Hotkan. The peak ground acceleration belongs to the Qadrooni Dam station (0.434g). The epicenter of this earthquake had been located at 31.024N, 56.829E (IGUT) and 30.94N, 56.82E (IIEES).

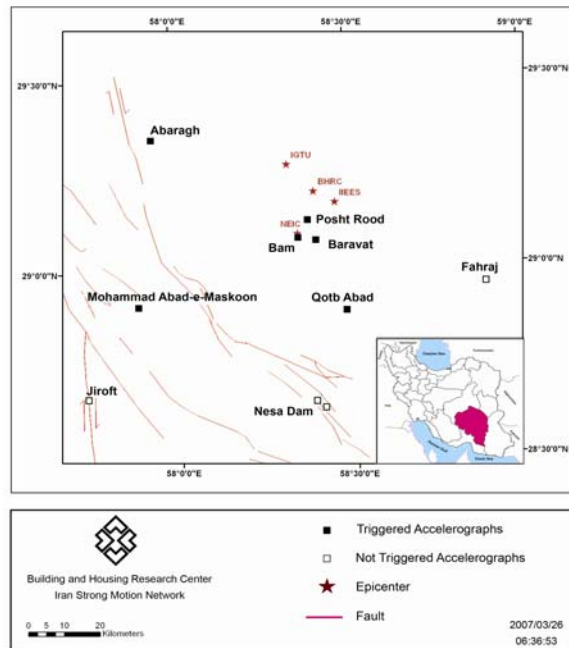


Figure 5. The location map of Baravat Earthquake of March 26th, 2007 and triggered accelerographs

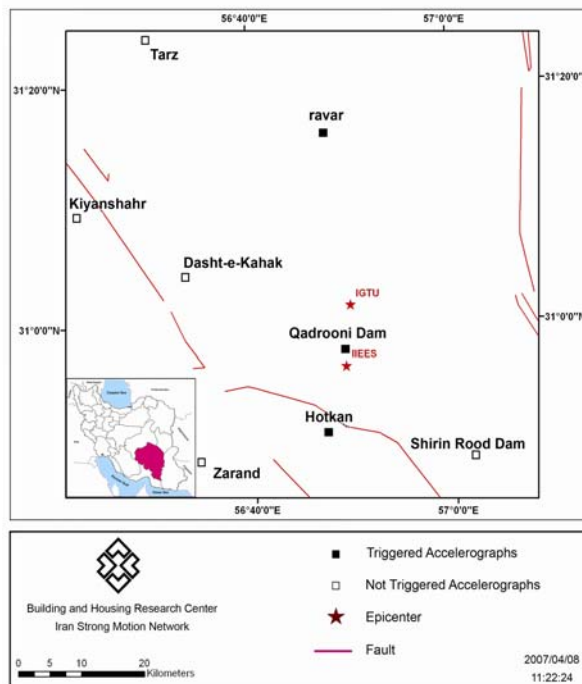


Figure 6. The location map of Qadrooni Dam Earthquake of April 8th, 2007 and triggered accelerographs

3.5 Fareghan Earthquake of April 25th, 2007

On April 25, 2007 at 05:19:02 (UTC), an earthquake with M5.0 (IGTU), M4.7 (IIEES) Occurred in Fareghan (Hormozgan province) in South of Iran. This event was recorded by 3 sets of digital accelerograph (Fareghan, Sargaz Ahmadi and Siyahoo) of Iran Strong Ground Motion Network (Figure 7). The maximum peak acceleration as much as 50 cm/s/s was recorded in Sargaz Ahmadi station. The epicenter of this event has been located at 28.045N, 56.312E (IGUT), 28.19N, 56.22E (IIEES).

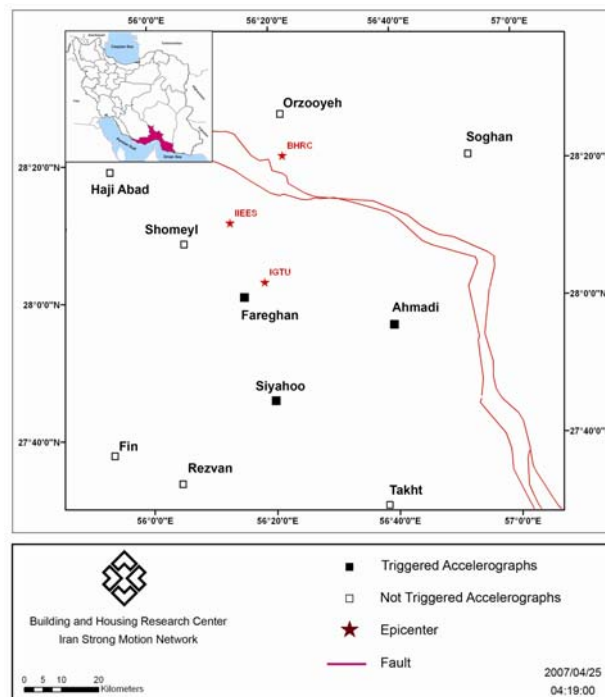


Figure 7. The location map of Fareghan earthquake of April 25th, 2007 and triggered accelerographs

3.6 Avargan Earthquake of May 17th, 2007

On May 17th, 2007 at 09:16:31(UTC), an earthquake having the magnitude M4.0 (IIEES), M4.1 (IGUT) occurred near Avargan in Chaharmahal & Bakhtiyari Province. The Earthquake was recorded by 5 sets of SSA-2 accelerographs installed in Avargan, Boldaji, Naqan and Shalamzar stations (Figure 8). The Maximum peak ground acceleration belongs to the Avargan station (36 cm/s/s). The epicenter of this earthquake had been located at 31.857N, 50.907E (IGUT) and 31.81N, 50.96E (IIEES).

3.7 Kahak (Qom Province) earthquake of June 18th, 2007

On Monday afternoon of June 18th, 2007, at 14:29:50 (UTC), an earthquake having magnitude of M5.7 (BHRC), M5.5 (IGUT) and M5.6 (IIEES) shock Kahak region in Qom Province. Even if, it was a moderate earthquake, it was strongly felt at distances of about 200 Kilometers and more caused common fear in Tehran city. This earthquake is

downloaded from 49 stations (Figure 9). The greatest peak ground acceleration belongs to Kahak station (101 cm/s/s). The epicenter of this earthquake is located at 34.54N, 50.91E (BHRC), 50.834E-34.405N (IGUT) and 50.86E-34.52N (IIEES).

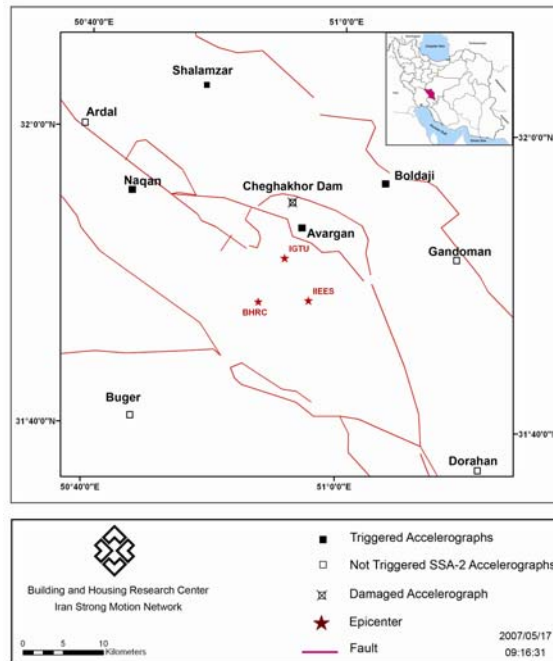


Figure 8. The location map of Avargan earthquake of May 17th, 2007 and triggered accelerographs

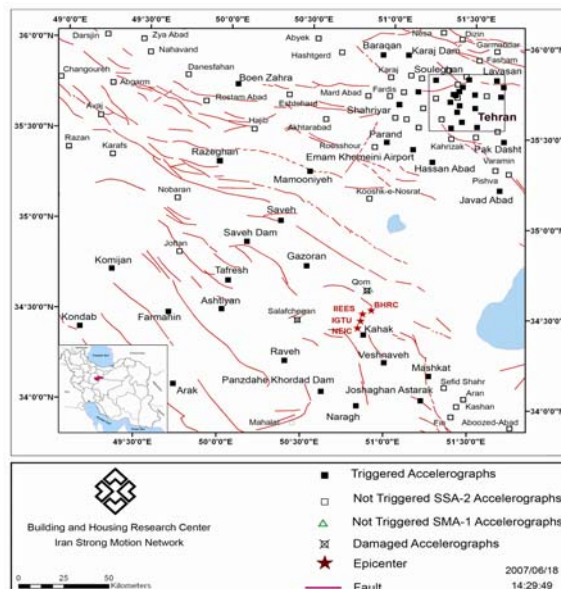


Figure 9. The location of Kahak (Qom Province) Earthquake of June 18th, 2007 and triggered accelerographs

3. Conclusion

Iran Strong Motion Network had 1076 SSA-2 and 15 SMA-1 accelerographs in operation in 2007. In the period of January to June 2007, there are 111 events with different magnitude, have been triggered 126 stations of Iran Strong Motion Network and has been recorded 207 accelerograms. The greatest and the most important earthquake in this period was Kahak (Qom Province) earthquake of June 18th, 2007, which was recorded in 56 accelerograph stations. But the maximum peak ground acceleration (0.434g) was recorded in Ghadrone Dam due to the earthquake of April 8th, 2007

The seismological parameters including magnitude and epicentral coordinates of the causal earthquakes were estimated using the recorded accelerograms. The outcomes are compared with those reported by national and international organizations and presented for the comparison. Since the accelerograms are occurred in the maximum distances of few tenths of kilometers, which in many cases are less than the accuracy of earthquake reported location. Therefore the computed parameters can be used in more assurance.

The comparison of seismological and strong motion data also helps to find the gaps in the ISMN and enables for more documented development and instruments setups.

References

1. Berberian M. Contribution to the Seismotectonics of Iran, GSI, Report No. 39, 1976.
2. BHRC: Building and Housing Research Center
3. ISMN: Iran Strong Motion Network.
4. IGTU: Institute of Geophysics of Tehran University.
5. IIEES: International Institute of Earthquake Engineering and Seismology.
6. NEIC: National Earthquake Information Center.

Appendix I

Strong Motion Data (BHRC)						Seismological Data					
No.	Stations	Number Record	Coordinate		U.P.G.A (cm/s ²)	Origin Time		Epicenter		Magnitude	Ref
			N	E		Y-M-D	h:m:s	N	E		
1	Borazjan	4264/01	29.258	51.216	59	2007/01/02	23:17:13	29.085 29.47	51.061 51.4	M3.8 ML4.0	IGTU IIEES
2	Kharvanagh	4249/02	38.688	46.166	22	2007/01/04	13:52:48	38.683 39.17	45.915 46.1	M3.7 ML3.8	IGTU IIEES
3	Zenooz	4288	38.585	45.834	13	2007/01/04	13:52:48	38.683 39.17	45.915 46.1	M3.7 ML3.8	IGTU IIEES
4	Haftgel	4248	31.442	49.529	26	2007/01/11	7:15:54	31.33 31.428 30.98	49.63 49.505 49.27	mb4.4 M3.7 ML3.4	NEIC IGTU IIEES

5	Kooreh	4272	27.921	53.797	29	2007/01/14	7:14:07	28.19	53.89	ML3.1	IIEES
6	Borazjan	4264/02	29.258	51.216	41	2007/01/18	2:01:36	29.05 28.992	50.94 51.217	ML3.1 M3.2	IIEES IGTU
7	Bagh-Malek	4247/01	31.54	49.871	46	2007/01/19	10:11:59	31.473 31.45 31.45	49.652 49.6 49.6	M4.4 ML4.4 mb4.8	IGTU IIEES NEIC
8	Bagh-Malek	4247/02	31.54	49.871	27	2007/01/19	10:14:06	31.444 31.33	49.754 49.87	M4.0 ML3.9	IGTU IIEES
9	Bagh-Malek	4247/03	31.54	49.871	15	2007/01/19	15:17:52	31.4 31.483	49.57 49.618	ML3.6 M3.8	IIEES IGTU
10	Torqabe	4274	36.309	59.381	12	2007/01/21	13:53:28	36.252	59.179	M3.5	IGTU
11	Mashhad5	4327	36.308	59.47	41	2007/01/21	13:53:28	36.252 36.27	59.179 59.09	M3.5 ML3.4	IGTU KHSN
12	Chahar Bagh	4332	36.604	54.502	15	2007/02/02	9:26:56				
13	Gifan	4262	37.893	57.487	20	2007/02/02	14:47:19				
14	Kowsar Dam	4271/01	36.811	54.546	38	2007/02/03	8:30:08	36.765	54.624	M4.2	IGTU
15	Hotkan	4302/06	30.848	56.788	22	2007/02/05	12:03:05	31.322	56.765	M3.6	IGTU
16	Posht Rood	4305/01	29.123	58.381	47	2007/02/07	8:19:01	29.374	59.137	M3.5	IGTU
17	Kowsar Dam	4271/02	36.811	54.546	24	2007/02/09	0:14:34	36.772	54.479	M3.9	IGTU
18	Agh Ghala	4267	37.01	54.452	15	2007/02/09	0:14:38	36.772	54.479	M3.9	IGTU
19	Gorgan	4269	36.839	54.385	21	2007/02/09	0:14:38	36.772	54.479	M3.9	IGTU
20	Chalan Choolan	4285/01	33.659	48.913	15	2007/02/14	12:48:50	33.67	48.831	M3.2	IGTU
21	Konar Takhteh	4270	29.531	51.395	29	2007/02/16	16:44:27	29.53	51.238	M3.4	IGTU
22	Hotkan	4302/07	30.848	56.788	15	2007/02/19	2:45:58	31.13	56.77	mb4.6	NEIC
	Qadrooni Dam	4306/01	30.962	56.819	16			31.129 30.31	56.769 56.48	M4.5 MW4.5	IGTU KHSN
23	Siyahoo	4277	27.759	56.335	14	2007/02/20	9:23:19	27.428 27.64	56.389 56.65	M4.9 mb5.0	IGTU NEIC
24	Changoureh	4345/02	35.777	48.963	37	2007/02/21	22:17:01	35.631 35.8	49.043 48.94	M2.7 ML2.6	IGTU IIEES
25	Bugar	4278	31.676	50.729	47	2007/02/22	2:09:07	31.51	50.94	ML4.4	IIEES
26	Lordegan	4280	31.515	50.835	14	2007/02/22	2:09:07	31.738	50.893	M4.6	IGTU
27	Kavaneh	4323	34.973	46.983	18	2007/02/22	5:25:32	34.839 34.86	46.998 47.24	M3.5 ML3.3	IGTU IIEES
28	Rivash	4296	35.478	58.465	16	2007/02/22	17:29:00	35.544	58.695	M3.3	IGTU
29	Damavand	4283	35.717	52.063	27	2007/02/26	19:43:06	35.71	52.06	ML3.4	IIEES
	Gazanak	4308	35.903	52.218	22			35.748	52.117	M3.6	IGTU
	Mosha	4284	35.758	52.048	19						
30	Fork	4268/01	28.284	55.221	75	2007/02/27	22:28:12	28.15 28.096	54.87 55.083	mb4.8 M4.6	IIEES IGTU
31	Fork	4268/02	28.284	55.221	26	2007/02/27	22:49:24	28.05	55.145	M3.9	IGTU
32	Bandar-e-Dayyer	4290	27.834	51.927	68	2007/03/04	8:27:51				
33	Dorood	4286	33.491	49.059	59	2007/03/06	22:32:05	33.504	48.918	M4.7	IGTU
	Chalan Choolan	4285/02	33.659	48.913	35			33.56	48.98	ML4.7	IIEES
	Sepid Dasht	4287	33.218	48.891	23						

34	Joshan	4292	30.124	57.61	17	2007/03/07	10:38:45				
35	Ahvaz	4276	31.32	48.664	16	2007/03/11	13:48:38	31.226 31.67	48.866 49.31	M3.9 ML4.0	IGTU IIEES
36	Faryab	4291	28.903	51.462	33	2007/03/16	7:58:46				
37	Fork	4297	28.284	55.221	46	2007/03/18	20:41:04	28.187	55.131	M3.4	IGTU
38	Helabad Qoorichay Dam2	4326	37.936	48.425	24	2007/03/22	23:16:35	38.208	48.412	M3.4	IGTU
		4343	38.074	48.296	28			38.06	48.38	ML3.4	IIEES
39	Khanook	4293	30.717	56.776	12	2007/03/23	15:10:37	30.74 30.864	56.74 56.714	ML2.8 M3.2	IIEES IGTU
40	Barvat	4298/01	29.071	58.402	180	2007/03/26	6:36:53	29.09	58.35	mb4.9	NEIC
	Posht Rood	4305/02	29.123	58.381	76			29.17	58.46	ML5.0	IIEES
	Bam	4289	29.079	58.353	69			29.273	58.326	M5.1	IGTU
	Qotb Abad	4294	28.883	58.483	43						
	Abaragh Mohammad Abad-e- Maskoon	4299 4300	29.347 28.908	57.94 57.888	36 19			29.2	58.4	ML5.5	BHRC
41	Barvat Posht Rood	4298/02	29.071	58.402	35	2007/03/26	6:38:35				
		4305/03	29.123	58.381	17						
42	Naqan Shalamzar	4309	31.929	50.724	134	2007/03/26	6:55:34	32.131	50.836	M3.3	IGTU
		4310	32.049	50.818	15			32	50.7	ML3.1	IIEES
43	Ravar	4295	31.263	56.791	44	2007/03/26	21:19:08	31.21 31.25	56.84 56.828	ML3.3 M3.7	IIEES IGTU
44	Hotkan Qadrooni Dam	4302/08	30.848	56.788	21	2007/04/01	19:51:26	30.79	56.74	ML4.2	IIEES
		4306/02	30.962	56.819	19			30.753 30.76	56.82 56.82	M4.2 mb4.2	IGTU NEIC
45	Chalan Choolan	4415	33.659	48.913	91	2007/04/04	12:41:30	33.061	48.608	M3.7	IGTU
46	Changoureh	4345/03	35.777	48.963	28	2007/04/06	11:37:36	35.415 35.68	49.026 48.91	M3.1 ML3.0	IGTU IIEES
47	Qadrooni Dam	4306/03	30.962	56.819	434	2007/04/08	11:22:24	30.94	56.82	ML4.3	IIEES
	Ravar	4301	31.263	56.791	11			31.45	56.48	MW4.5	KHSN
	Hotkan	4302/09	30.848	56.788	14			31.024	56.829	M4.6	IGTU
48	Siah-Cheshmeh	4307	39.066	44.386	25	2007/04/09	21:26:46	38.99 39.049	44.47 44.439	ML4.2 M4.1	IIEES IGTU
49	Qadrooni Dam	4306/04	30.962	56.819	14	2007/04/10	3:45:59	31.288	56.823	M2.6	IGTU
50	Showgan	4320	37.341	56.884	35	2007/04/10	18:42:49	37.32	57.037	M3.2	IGTU
51	Qadrooni Dam	4306/05	30.962	56.819	30	2007/04/11	5:11:23	31.13	56.875	M2.6	IGTU
52	Molea Esmaeel	4314	32.037	55.952	12	2007/04/12	12:59:41	32.22	55.87	ML3.6	IIEES
								32.104	56.017	M3.9	IGTU
53	Lali	4402	32.335	49.091	14	2007/04/15	3:56:21	32.15 32.166	49.43 49.441	mb4.5 M4.4	NEIC IGTU
54	Tashan	4407	30.829	50.201	15	2007/04/18	0:14:48	30.959 30.88	50.339 50.27	M4.5 mb4.6	IGTU NEIC
55	Rezvan	4404	27.56	56.078	34	2007/04/18	15:45:39				
56	Changoureh	4345/04	35.777	48.963	22	2007/04/18	23:43:11	35.72	48.89	ML3.0	IIEES
								35.811	49.197	M3.0	IGTU
57	Ashkhaneh	4316	37.559	56.919	11	2007/04/20	8:04:41	37.649	56.706	M4.3	IGTU

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	Chaman Bid	4329	37.429	56.546	12			37.31	56.51	ML4.6	IIEES
58	Maraveh Tappeh	4319/01	37.904	55.955	73	2007/04/24	13:09:17	38.061	55.879	M3.4	IGTU
59	Fareghan	4313	28.008	56.256	15	2007/04/25	5:19:00	28.045	56.312	M5.0	IGTU
	Siyahoo	4311	27.759	56.335	16			28.19	56.22	ML4.7	IIEES
	Ahmadi	4312	27.938	56.665	50						
60	Ahmadi	4315	27.938	56.665	15	2007/04/26	4:03:31	28.23	56.24	mb4.6	NEIC
								28.017	56.36	M4.4	IGTU
								28.23	56.24	ML4.0	IIEES
61	Baygan	4318	28.865	52.428	30	2007/04/29	22:05:55	28.856	52.33	M2.6	IGTU
62	Suza	4321	26.782	56.07	12	2007/05/01	7:51:30	26.926	55.882	M4.2	IGTU
								27.01	55.78	ML3.9	IIEES
63	Maraveh Tappeh	4319/02	37.904	55.955	33	2007/05/05	4:52:09	37.98	56.34	ML3.7	IIEES
								37.895	55.325	M3.8	IGTU
64	Naveh	4331	37.674	57.421	50	2007/05/06	17:47:41	37.572	57.582	M2.6	IGTU
65	Bahabad	4317	31.872	56.015	39	2007/05/08	3:28:25	31.795	56.202	M4.5	IGTU
								31.87	56.12	ML4.3	IIEES
66	Zanjireh	4328	38.456	45.366	33	2007/05/09	4:32:48	38.309	45.34	M3.7	IGTU
								38.58	45.46	ML3.6	IIEES
67	Ab-bar Gilvan	4337	36.925	48.954	28	2007/05/11	14:50:09	36.99	49.3	ML4.1	IIEES
		4341	36.781	49.132	12			36.847	49.287	M4.3	IGTU
68	Marivan	4411	35.521	46.182	39	2007/05/12	15:58:18	35.418	46.437	ML3.0	IGTU
69	Haftgel	4399	31.442	49.529	55	2007/05/15	18:15:37	31.524	50.531	M2.7	IGTU
70	Siyahoo	4336/01	27.759	56.335	18	2007/05/16	0:19:09	28.12	56.05	ML4.1	IIEES
								27.896	56.017	M4.1	IGTU
71	Fareghan Siyahoo	4334	28.008	56.256	17	2007/05/16	0:27:33	28.23	56.05	ML4.2	IIEES
		4336/02	27.759	56.335	27			27.884	56.051	M4.2	IGTU
72	Avargan Boldaji Naqan Shalamzar	4338	31.891	50.949	36	2007/05/17	9:16:31	31.857	50.927	M4.1	IGTU
		4339	31.943	51.057	31						
		4342	31.929	50.724	15			31.81	50.96	ML4.0	IIEES
		4344	32.049	50.818	16						
73	Khonj Kooreh	4335/01	27.889	53.431	72	2007/05/18	23:03:35	27.73	53.16	ML4.7	IIEES
		4400	27.921	53.797	31			27.642	53.285	M4.6	IGTU
74	Khonj	4335/02	27.889	53.431	25	2007/05/18	23:25:01	27.916	53.202	M3.6	IGTU
								27.59	53.14	ML3.6	IIEES
75	Khonj	4335/03	27.889	53.431	40	2007/05/18	23:47:10	27.69	53.19	ML3.7	IIEES
								27.548	53.379	M3.8	IGTU
76	Abgarm	4333	35.756	49.284	31	2007/05/22	11:53:10	35.7	49.42	ML3.6	IIEES
								35.672	49.32	M4.1	IGTU
77	Fin	4410/01	27.63	55.895	21	2007/05/24	0:51:56				
78	Siah-Cheshmeh	4405	39.066	44.386	11	2007/05/26	9:08:21	39.226	44.459	M3.9	IGTU
79	Baba Kalan Dogonbadan	4408	30.111	50.82	15	2007/05/30	10:50:23	30.281	50.747	ML4.0	IGTU
		4409	30.354	50.791	35			30.28	50.75	M4.4	NEIC
80	Abad	4398	29.022	51.256	15	2007/05/31	10:28:36	29.044	51.31	ML4.3	IGTU
81	Noshahr	4403	36.654	51.494	20	2007/06/07	2:34:32	36.489	51.583	M3.4	IGTU

82	Aghajari	4414	30.7	49.829	19	2007/06/15	2:18:55	31.014	50.124	M2.4	IGTU
83	Kahak	4348	34.402	50.866	101	2007/06/18	14:29:49	34.54	50.91	ML5.7	BHRC
	Panzdahe khordad Dam2	4379	34.083	50.622	87						
	Gazoran	4350	34.776	50.509	79						
	Panzdahe khordad Dam1	4378	34.083	50.622	42						
	Hassan Abad	4369	35.367	51.253	40						
	Mamooniyeh	4357	35.299	50.51	39						
	Veshnaveh	4368	34.251	50.995	39						
	Saveh Dam1	4388	34.901	50.142	37						
	TEHRAN 36	4360	35.762	51.407	37						
	TEHRAN 32	4359	35.762	51.407	31						
	TEHRAN 4	4361	35.762	51.407	30						
	Raveh	4387	34.249	50.395	30						
	Arak	4356	34.101	49.731	26			34.405	50.834	M5.5	IGTU
	Naragh	4385	34.009	50.836	25						
	Farmahin	4382	34.498	49.684	24						
	Javad Abad	4372	35.215	51.668	22						
	Boeen Zahra	4394	35.77	50.051	22						
	Parand	4377	35.471	50.971	20						
	TEHRAN 13	4354	35.647	51.397	17						
	Tafresh	4390	34.684	50.037	16						
	Razeghan	4358	35.341	49.957	16						
	TEHRAN 11	4392	35.761	51.407	16						
	Shahriyar	4376	35.681	51.042	15						
	Saveh	4389	35.022	50.343	15						
	TEHRAN 29	4386	35.683	51.411	15			34.48	50.85	M5.9	NEIC
	Mashkat	4349	34.181	51.266	15						
	Komijan	4384	34.725	49.329	15						
	Pak Dasht	4373	35.485	51.687	15						
	Tehran63	4366	35.786	51.428	14						
	Panzdahe khordad Dam3	4380	34.083	50.622	14						
	TEHRAN 1	4353	35.592	51.427	13						
	Emam khomainsi Airport	4351	35.434	51.133	13						
	Joshaghan Astarak	4347	34.045	51.222	12						
	Khondab	4383	34.401	49.154	12						
	Ashtiyan	4381	34.523	50.005	12						
	TEHRAN 26	4396	35.701	51.353	11						
	TEHRAN 10	4367	35.762	51.407	10			34.52	50.86	ML5.6	IIEES
	Tehran62	4365	35.786	51.428	10						
	TEHRAN 22	4395	35.739	51.385	10						
	TEHRAN 17	4355	35.669	51.506	9						
	Tehran58	4352	35.558	51.362	9						
	TEHRAN 12	4397	35.827	51.466	8						
	TEHRAN 27	4371	35.735	51.663	6						
	TEHRAN 24	4375	35.754	51.155	6						

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	TEHRAN 9	4391	35.745	51.372	6						
	Tehran60	4364	35.786	51.428	6						
	Tehran 54	4370	35.744	51.503	6						
	Tehran59	4362	35.786	51.428	4						
	Tehran61	4363	35.786	51.428	4						
84	Kahak	4393	34.402	50.866	20	2007/06/19	15:04:19	34.54 34.5	50.87 50.875	ML4.3 M4.4	IIEES IGTU
85	Seiydoon	4413	31.366	50.075	32	2007/06/20	9:22:31	31.322	50.091	M3.9	BHRC
86	Torbate Heiydaryeh	4406	35.274	59.221	60	2007/06/24	23:02:41	35.22 35.209	59.32 59.184	ML3.8 M3.8	KHSN IGTU
87	Kazeroon	4401/01	29.625	51.639	30	2007/06/26	0:07:48	35.305	52.431	M1.8	IGTU
88	Kazeroon	4401/02	29.625	51.639	32	2007/06/27	21:16:08				
89	Fin	4410/02	27.63	55.895	14	2007/06/29	12:52:04	27.825	56.323	M3.3	IGTU