



## Active Tectonics of Tehran Area, Iran

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### ABSTRACT

Tehran area (with 2398.5 km<sup>2</sup> area) extended from the east of Damavand volcano to the west of Karaj city. This area is a major part of Tehran province and according to geologic division is a minor part of Alborz zone. This area is under compressive stress and shortening that caused by Arabia – Eurasia Convergence. This situation has confirmed by dominant existence of folded structures and thrust fault system. We have investigated geologic hazards of Tehran area, because this area is the most strategic part of Iran. The major faults have been investigated and have not been found any evidences to existence of north and south Rey faults. In the other hand, active tectonic of this area has been investigated and Mosha fault has been introduced as the most active fault. The high seismic potential has been distinguished by integration of structural geology and active tectonic studies. The evaluation of movement potential of the main faults in the current tectonic regime shows the North Tehran fault has % 90 potential to movement. In addition the hazard potentials of landslides, settlements, volcanism and dams have been introduced. Finally, geologic hazard map has been prepared and has been divided to 10 zones with one to four ranking of risk.

**KEYWORDS:** seismogenic faults, landslides, Damavand volcano, dams, hazards.

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### INTRODUCTION

The Tehran studied area is located between central Alborz in north and central Iran plain in south. This area bounded by several active faults (Tchalenko et al., 1974). Also there are some important seismic evidences (Ambraseys and Melville, 1982). Among main seismogenic faults, Mosha fault, is a reverse fault with component of left lateral in younger movements with slip rate 2 mm/yr (Solaymani et al., 2002). The slip rate of 7mm/yr in a 5my period for Pliocene-quaternary has been suggested (Vernant et al., 2004). North Tehran fault is another main fault that is presented as a thrust fault (Reiben, 1955; Tchalenko et al., 1974).

Studied area has been divided to 5 seismic zones on the basis of seismic studies (Zare and Majde Jabari, 2004). Seismic micro zoning of Tehran area on the basis of geotechnical and Seismology studies, engineering factors and according to previous studies on the faults has presented 4 models of faults for earthquake scenario (Oyo office, 2000). Also Seismic micro zoning of north and south of Tehran city has been concluded on the basis of Geotechnical studies, seismography and prepared geology map (Jafari, 2002).

For the first time by using all data and studying geological evidences in the area ,active tectonic of Tehran area and relative assessment geology hazards of this area have been considered .This area is strategically important, so this study seems to be necessary. For this aim, by consideration and introducing main seismogenic faults, measurement of active tectonic indexes, classification of relative active tectonic, consideration of seismic background, assessment of movement potential of quaternary seismogenic faults of the area, consideration and introducing of landslide and settlement potential, consideration of probability of reactivation Damavand volcano, and comparison of dams hazards (tectonic position); geological hazard map of the area has been prepared and has been divided to 10 zones , then relative hazards of these zones have been assessed.

#### 1- MAIN SEISMOGENIC FAULTS

Faults are the main and most significant structural features of studied area. After primitive considering on previous studies ( Dresch, 1961; Dellenbach, 1964; Assereto, 1966; Allenbach, 1966; Tchalenko et al., 1974; Berberian, 1976, 1981, 1983, 1992; Demartini et al., 1998; Solaymani et al., 2001; Nazary, 2005,2006)and analysis GIS on available maps (Berberian et al.,1983; Haghipour et al., 1986; Nazary,2005) of the area and integration of data layers of these three maps , have been introduced nine main and Quaternary faults with high seismic potential and hazardous for big Tehran city and around cities. Then after structural studies, hydrology studies of some faults (North and South Rey faults), seismic and active tectonic studies seven main faults with high seismogenic have been introduced ( fig. 1 and 2).

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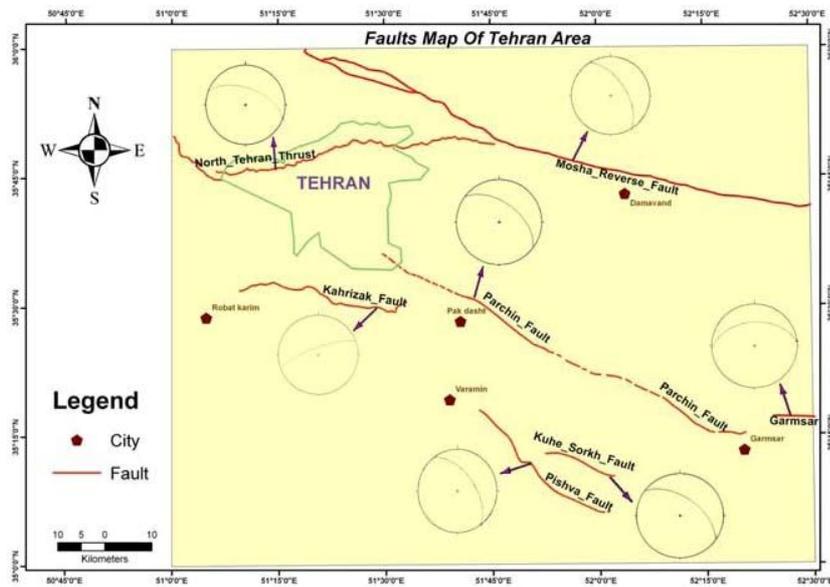


Fig. 1: Map of main and seismogenic faults of the Tehran area (this map has been Prepared from three maps(Berberian et al., 1983; Haghypour et al., 1986; Nazari, 2005) and analyzed in ARCGIS soft ware in Scale 1:250000, these stereogram images have been made in Tectonics FP software).

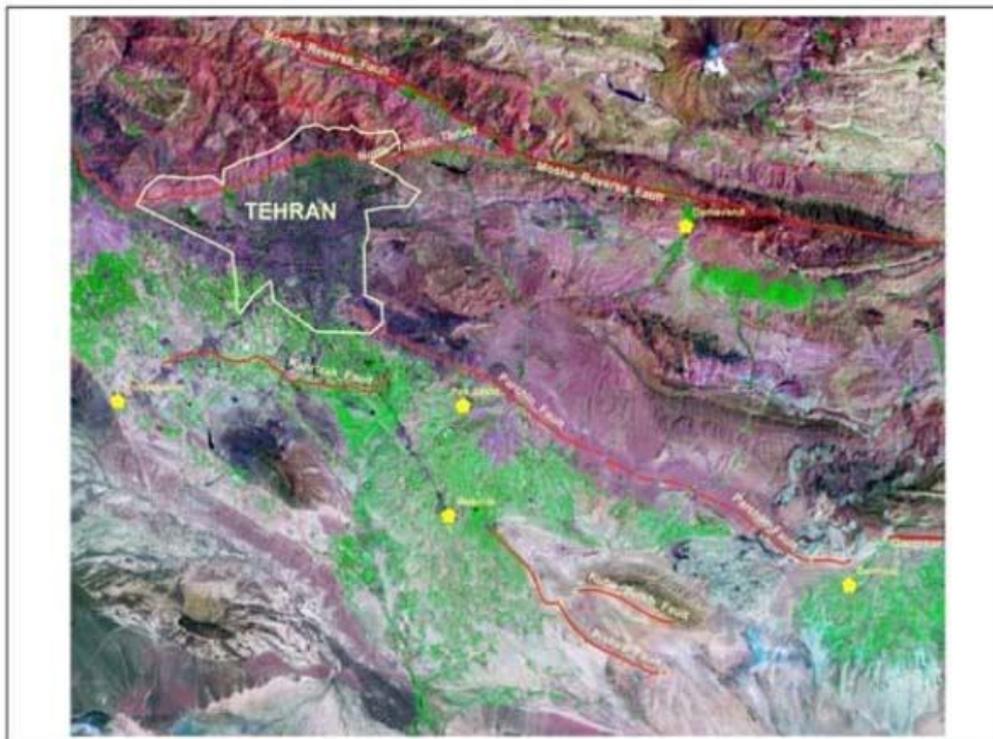


Fig. 2: Position of main and seismogenic faults on the Satellite image (seismogenic faults on this image in ARC GIS software in scale 1:250000, red lines show the faults and yellow points show the cities).

1-Mosha fault, is extended from north east of Amin Abad village to 45 km east of Qazvin which is about 200 km and strike N110-153 and dip to north direction (35-70) ( Fig.1) .this fault is a reverse fault with a left lateral strike slip component in younger movements ( fig. 3 and 4).

2- North Tehran fault, is extended from east of Lashgarak valley (Deh-Sabo) in north east of Tehran to Kazem Abad village (2km east of Kalak and north of Tehran – Karaj highway) and continue to Karaj city. The length of this fault is more than 75 km with strike N115E and dip 30-80 to north direction ( fig.1). This is a thrust fault ( fig.5) with a left lateral strike slip component (Nazari, 2006).

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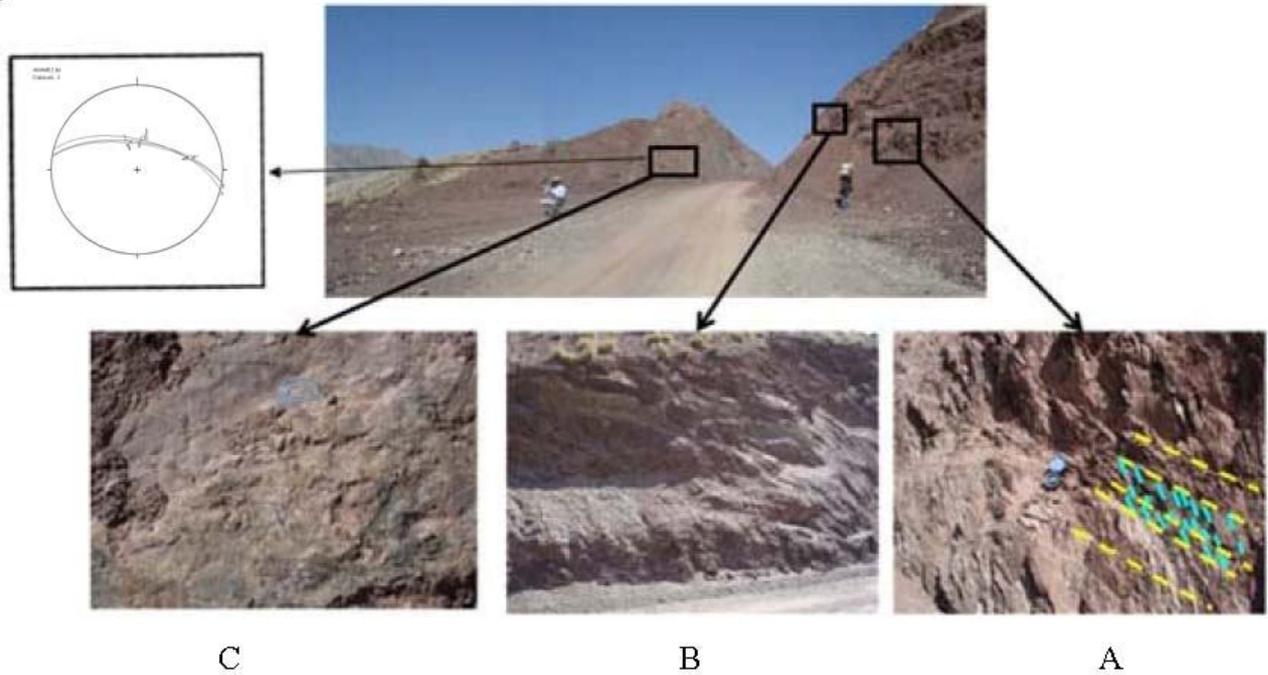


Fig. 3: Mosha fault zone in Amame (view to North West); A) C and S Planes (in Karaj formation) B) shear band C) slicklines on the upper red formation D) fault plane and slicklines on the fault in Amame region.



Fig. 4: A view of fault scarp caused by Mosha fault and uplift of Quaternary sediment in direction of fault (view to north east).



Fig. 5: Section of North Tehran fault in Hesarak region (view to south east).

3- Kahrizak fault, with more than 90 km has been located in 10km south of Rey city (20 km south of Tehran). Strike of this fault is N70- 80W with dip 70-80 to north direction (fig.1). It is a thrust fault with a right lateral strike slip component (Demartini,et al 1998).

4- Parchin Fault, with length of 70km, begins from North West and continues to North West of Garmsar. The strike of this fault is N307 with dip 19-53 to north east direction (fig.1). It is a reverse fault (Berberian, 1981).

5- Pishva fault, with length of 37 km has been extended from south east Varamin to south east Kuhe- Gach Anticline. The strike is N324 and dip is 50-58 to north east direction (fig. 1). It is a reverse fault (Berberian, 1981).

6- Kuh Sorkh fault, with length of 22 km begins from North West Kuhe Sorkh anticline and continues to Takhte Rostam Mountains. The strike is N306 with dip 30-40 to north direction (fig. 1). It is a thrust fault with a left lateral component.

7- Garmsar fault, with length about 56 km long (we have a small part of this fault in the area) begins from south west Lasegerd. East path of this fault doesn't continue to salt diapir of Garmsar and also west part doesn't continue to Parchin fault. The strike of this fault is N226 with dip 40-45 to north direction (fig. 1).it is a thrust fault (Berberian, 1981).

According To the following reasons has not been found any evidence to existence of north and south Rey faults.

- 1- Lack of observing of fault plane (in field works).
- 2- Lake of observing to existence of faults in paleoseismology studies (Nazary et al., 2005, 2006).
- 3- Do not lake of stable geomorphic evidences (Against Berberian et al., 1992).
- 4- Lack of observation of unusual changes in pisometric surface in Rey region (Against Berberian et al., 1992) (fig. 6).
- 5- Lack of observing fault in trench excavation of Tehran subway from Tehran Bazar region to south (Tehran Plane).

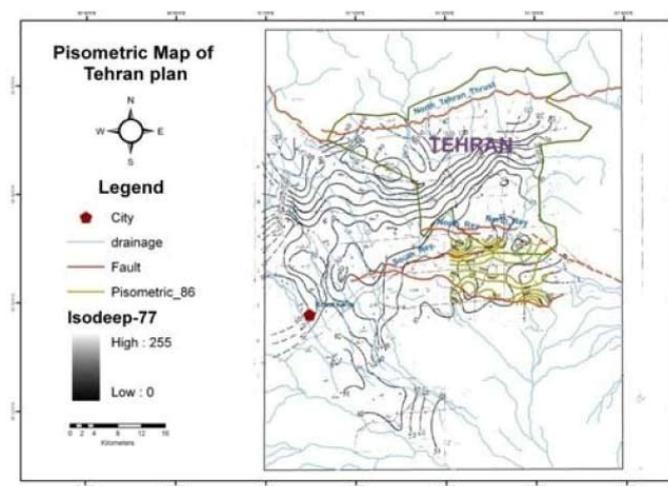


Fig. 6: The position of north and south Rey faults on the pisometric map of the Tehran plane (this map has been Prepared from isodeep map of Tehran plain (Mardani, 1998) and analyzed in ARC GIS software in scale 1:100.000.

## 2- RELATIVE TECTONIC ACTIVITY OF THE AREA

With quantitative measurements evaluation of landform could be. For this reason, different parameters must be calculated. By this method final evaluation of the level of relative tectonic activity could be. Some of the geomorphic indexes can be the primary method for identifying of area with rapid tectonic deformations. This method can rapidly consider for vast area (Keller and Pinter, 1996). All data for this kind of measurements have been extracted from topography maps of Tehran area in scale of 1:50000 and 1:250000. In the following you can find the most applied geomorphic indexes for active tectonic studies. So, these indexes have been calculated (fig. 7 and 8; table. 1, 2 and 3).

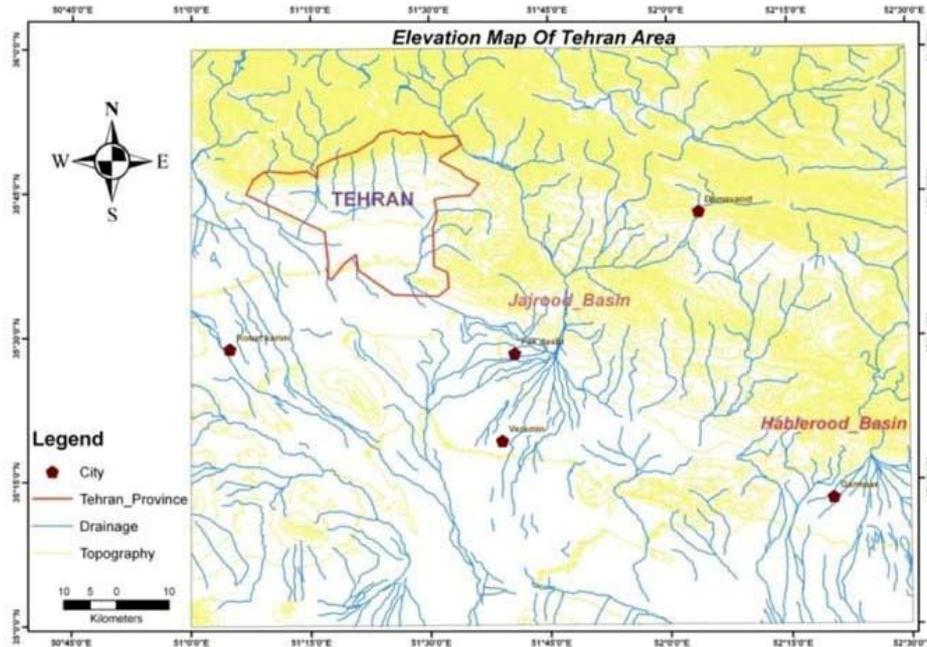


Fig. 7: Elevation map of studied area (this map has been prepared from topography map of Tehran) and has been analyzed in ARC GIS software in scale 1:250000.

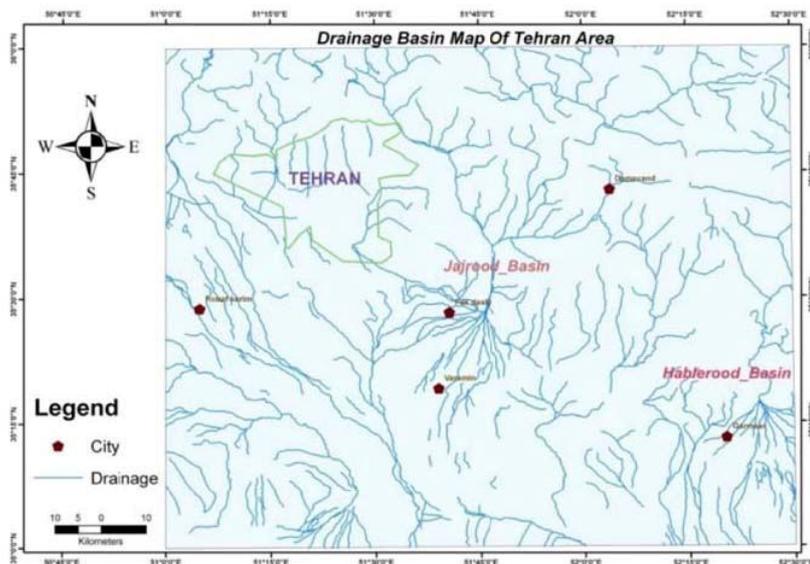


Fig. 8: Drainage Basin map of studied area (this map has been prepared from topography map of Tehran) and has been analyzed in ARC GIS soft ware in scale 1:250,000.

Table 1: Hypsometric integral and Topography type of main drainage basins of studied area; in this table, data <0.45 show old topography, between 0.45-0.55 is adult, >0.55 show young Topography.

NO	Basin	Topography map	Min relief (m)	max relief (m)	Medium relief (m)	Hypsometric integral	topography
1	Jajrod river	Tehran	1300	5500	3372	0.49	Adult
2	Hable rood river	Aradan	866	2567	1745.82	0.517	Adult

Table 2: Asymmetric basins factor of studied area.

River	Direction	Total area of basin(m2)	Area of right side basin (m2)	Asymmetry factor	Tilted part to down
Jajrod	From north to south	540.75	173.75	32.1	eastern
Hable rood	From north to south	260	216	60	eastern

Table 3: Frontal Mountain index of faults.

No	Fault	LMF(KM)	LS ( KM)	SMF
1	Mosha fault	118.85	116	1.02
2	North Tehran fault	65	61.21	1.06
3	Garmsar fault	62.44	55.25	1.13
4	Kuhe Sorkh fault	22.19	21.23	1.04
5	Pishva fault	34.61	30.88	1.12
6	Parchin fault	83.41	68.18	1.22
7	Kahrizak fault	54.75	38.51	1.4

Meanwhile calculating  $V_f$  index (the relation between width bottom of valley and high) has been observed that  $V_f$  index of Mosha fault has been decreased from Hezardasht to Meygoun. Also this index for North Tehran fault has been increased from Gandom - Mageh to Hesarak. It shows that relative active of Mosha fault from Hezardasht to Meygoun has been increased, but North Tehran fault active from Gandom- Mageh to Hesarak has been decreased (fig. 9 and table 4).

Classification of Frontal Mountain based on relative tectonic activities is a new relative method and we must know results of this method in only relative distinction in one area. This area which has been located in border of south Alborz with central Iran, basically has high tectonic activities as you see in table (table 5), studied area has two levels of relative Tectonic activities.  $V_f$  index of Kahrizak fault could not be evaluate even on topographic map in scale of 1:25000, therefore we have marked it with question mark. Anyhow in this research in comparison of others, Mosha and Kuhe-Sorkh faults according to have the most level of relative tectonic activity and Pishva fault has the least level (table 5).

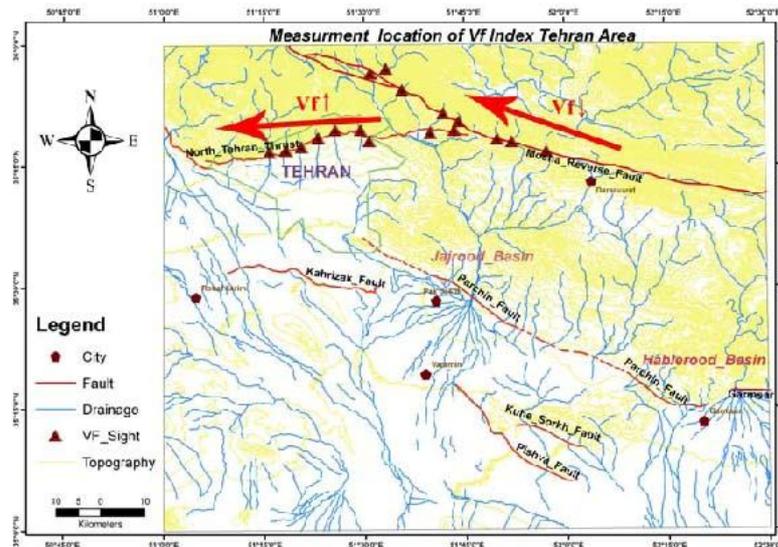


Fig. 9: location of  $V_f$  index data on two main faults (Mosha and North Tehran faults) (this map has been Prepared from topography map of Tehran) and has been analyzed in ARC GIS soft ware in scale 1:250.000.

Table 4: VF Data of faults.

No	Front mountain	No. Map	Esc(m)	Eid(m)	Erd(m)	V <sub>fw</sub> (m)	V <sub>f</sub>	Vf.Avg	
1	North Tehran Fault	Tajrish	1550	1590	1600	200	2.22	1.36	
2	North Tehran Fault	Tajrish	1600	1700	1680	200	2		
3	North Tehran Fault	Tajrish	1770	2040	2200	200	0.57		
4	North Tehran Fault	Tajrish	1800	2020	1900	200	1.3		
5	North Tehran Fault	Tajrish	1870	1940	2200	300	1.5		
6	North Tehran Fault	Tajrish	1750	1940	2080	200	0.7		
7	North Tehran Fault	Lashgarak	1810	1820	1880	100	2.5		
8	North Tehran Fault	Lashgarak	1760	1780	1940	100	0.8		
9	North Tehran Fault	Lashgarak	1850	1980	1920	70	0.7		
10	Mosha Fault	Lavasan	2275	2400	2400	250	1	0.72	
11	Mosha Fault	Lavasan	2150	2250	2325	100	0.72		
12	Mosha Fault	Lavasan	2525	50262	2625	150	0.75		
13	Mosha Fault	Lashgarak	2240	2340	2360	100	0.9		
14	Mosha Fault	Lashgarak	2400	2460	2600	100	0.7		
15	Mosha Fault	Lashgarak	2030	2060	2400	100	0.6		
16	Mosha Fault	Lashgarak	2050	2220	2300	100	0.4		
17	Parchin Fault	Aradan	1050	1265	1150	150	1.95	1.1	
18	Parchin Fault	Aradan	990	1230	1192	250	1.13		
19	Parchin Fault	Aradan	1070	1150	1160	100	1.17		
20	Parchin Fault	Ayvanaki	1050	1160	1496	250	0.89		
21	Parchin Fault	Ayvanaki	1030	1316	1499	300	0.79		
22	Parchin Fault	Ayvanaki	1110	1499	1245	250	0.95		
23	Parchin Fault	Sharif Abad	1110	1220	1279	150	1.07		
24	Parchin Fault	Sharif Abad	1110	1279	1225	200	1.40		
25	Parchin Fault	Sharif Abad	1090	1210	1195	125	1.11		
26	Pishva Fault	Pishva	850	891	887	65	1.66	1.26	
27	Pishva Fault	Kuh Sorkh	870	939	929	50	0.78		
28	Kuhe Sorkh Fault	Kuh Sorkh	1270	1285	1365	35	0.63		0.55
29	Kuhe Sorkh Fault	Kuh Sorkh	990	1144	1291	45	0.19		
30	Kuhe Sorkh Fault	Kuh Sorkh	850	910	950	50	0.62		
31	Kuhe Sorkh Fault	Kuh Sorkh	890	1010	910	50	0.71		
32	Kuhe Sorkh Fault	Kuh Sorkh	910	1030	950	50	0.62		
33	Garmsar Trust	Garmsar	990	1127	1050	100	1.01	1.29	
34	Garmsar Trust	Garmsar	1010	1025	1128	175	2.63		
35	Garmsar Trust	Garmsar	1050	1125	1110	100	1.48		
36	Garmsar Trust	Garmsar	970	1140	1105	100	0.65		
37	Garmsar Trust	Garmsar	950	1063	1063	50	0.44		
38	Garmsar Trust	Garmsar	950	1023	1015	100	1.44		
39	Garmsar Trust	Garmsar	950	1032	1034	175	1.80		
40	Garmsar Trust	Garmsar	970	1114	1110	125	0.88		

Table 5: Classification of relative active tectonic of studied area.

No	Front Name	Front Type	Orientation of front	Front Length(km)	Max Relief	SMF	VF Ave.	Relative Tectonic Activity Classifications
1	Mosha	Fault	NW-SW	118.58	2500	1.02	0.65	1
2	North Tehran	Fault- trust	NE-SW	65	2000	1.06	1.36	2
3	Garmsar	Fault- trust	W-E	62.44	1565	1.13	1.29	1
4	Kuh e Sorkh	Fault- trust	W-E	22.19	1365	1.04	0.55	1
5	Pishva	Fault	NE-SE	32.61	1142	1.12	1.26	1
6	Parchin	Fault	NW-SE	83.41	1499	1.22	1.1	1-2
7	Kahrizak	Fault- trust	NW-SE	38.51	1380	1.4	?	?

### 3- SEISMOLOGY STUDIES

In this part seismologic background of area has been studied (fig. 10 and 11) and movement potential of main seismogenic of faults has been calculated.

According to main directions of studied faults in the area, two main directions of NW- SE and E-W in the area have been recognized. Parchin, Pishva, Kuh-e Sorkh and Mosha faults have 300-324 direction with medium and high dip. E - W group of faults is consisting of Kahrizak fault and two main thrust (Garmsar and North Tehran faults). At first, on the basis of fault plane position and direction of area tectonic stress, the range of  $\theta$  angle for each fault has been calculated then by using of movement potential equivalence (Lee et al., 1997), movement potential (FMP) for each fault has been calculated ( table 6).

Accompanied with distinguishing high potential of seismicity on the basis of ancient , historical and instrumental earthquakes and introducing the main seismic sources (seven main and seismogenic faults) and high seismic background of Mousha fault and limited region between two Parchin and Garmsar faults and low seismic background of Rey faults region particularly earthquakes with magnitude >3 degree in Richter scale , movement potential of faults have been calculated ( table 6), resulted in North Tehran fault has the highest potential (90%) and Parchin fault has the least movement potential (10%).

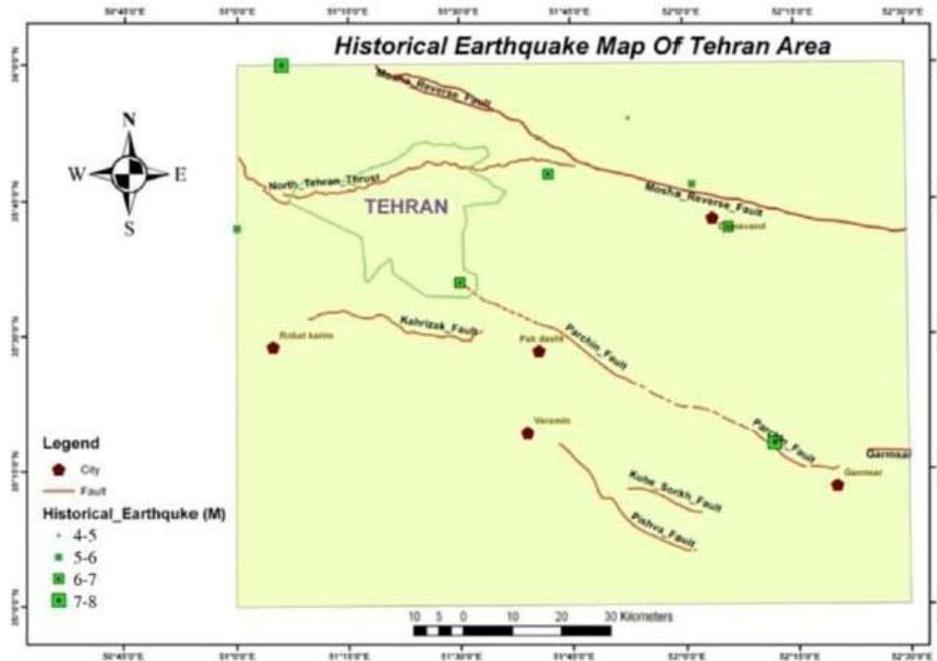


Fig. 10: main historical earthquakes positions of the Tehran area (the main historical earthquakes positions have been taken Moinfar et al., 1994 and have analyzed in ARC GIS software in scale 1 :250000.

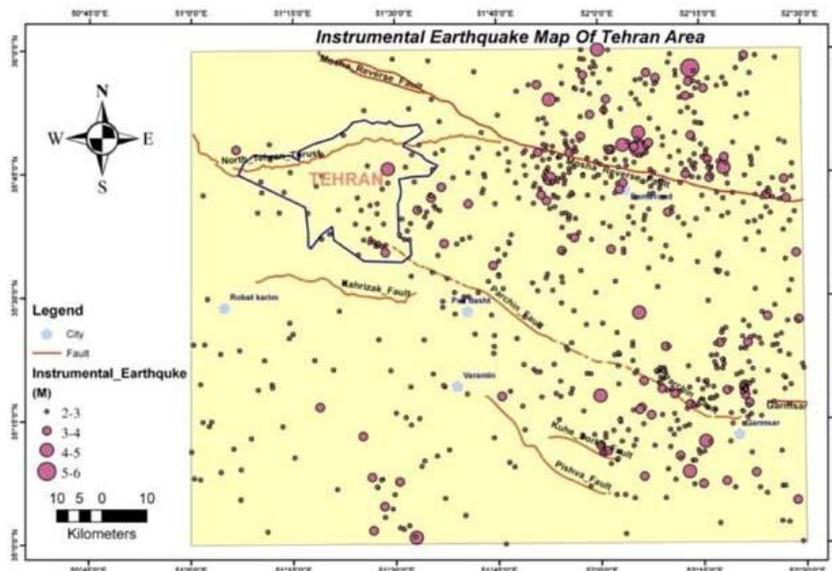


Fig. 11: Epicenter of instrumental earthquakes of the Tehran area (the epicenters of these earthquakes have been taken from geophysics institute site of Tehran university from 1930-2006 and have been analyzed in ARC GIS soft ware in scale 1 :250000.

Table 6: Calculated results of fault movement potentials

NO	Fault Name	Fault Position	Fault polar Position	θ Angle	FMP
1	Fault Mosha	143-153,35-70	143-153,56-22	36-51	0.2-0.7
2	North Tehran fault	57-89,10-80	148-182,12-82	57-72	0.9-0.4
3	Kahrizak fault	70,70-80	12-22,162	43-44	0.4
4	Parchin fault	307,49-55	35-41,217	28-33	0.1
5	Pishva fault	324,50-58	32-40,237	36-40	0.2-0.3
6	Kuh e Sorkh fault	306,30-40	50-60,216	40-51	0.3-0.7
7	Garmsar fault	266,40-45	45-50,176	43-48	0.4-0.6

4- LANDSLIDES

By considering of recent landslides in Tehran area (fig.12), have been concluded that high potential which cause violent landslide in some part of Farahzad valley , Karaj - Chalous road, Oshan - Fasham, Fasham- Maygoun, around of Latyan Dam and Tehran - Amol road (specially from Abali to Abe-Ask) (fig. 13, 14, 15, 16 and 17).

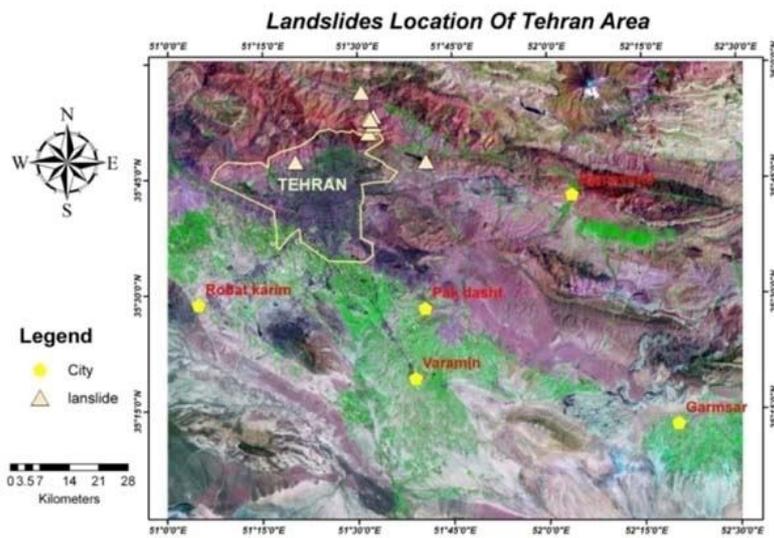


Fig. 12: situations of Tehran area landslides on satellite image.



Fig. 13: Rotational slide in debris Haji Abad -Oshan Road (one km to Oshan), the instigation of susceptible mass (raining and previous landslide)With road construction activity (view to north east).



Fig. 14: Landslide in rocks and debris on unstable slope in Abali – Amol road (View to north).



Fig. 15: A view of rotational slide in debris in Shahrak Majles region (view to north east) .



Fig. 16: Housing and non housing constructions beside of the river that have been damaged by Oshan landslide (view to North West).



Fig. 17: landslides of road around of Latyan Dam (in right hand falling)  
(View to north east).

In future Because these areas have been located in position with active tectonic (south border of central Alborz) and near to two main seismogenic faults that finally have been caused invariable conditions (as primary factor) that under factors such as road constructions (such as Tehran - Amol, Karaj - Chalous and Oshan-Meygoun), city constructions like housing and non housing constructions, inside and outside of cities in the area with high potential of landslide (such as unstable slopes and all areas which landslide have been happened) and also Strong raining (according to topography and weather condition) as second factors, this phenomenon has been occurred or intensified. North of Tehran city because of main seismogenic fault (North Tehran fault) and passing this fault

through these regions such as Darband, Darakeh, Velenjack, Farahzad, Hesarak and Kan (Tchalenko et al.,1974), have been located in frontal mountain and has active tectonic and potential of landslide.

### 5- SETTLEMENTS

By studding of recent settlements of Tehran area has been recognized that south part of Tehran city has highest potential of settlement (fig.18). Main factor of this phenomenon is irregular withdrawal of groundwater. Also tectonic activity, building and kind of soil caused this phenomenon would happen or intensify.

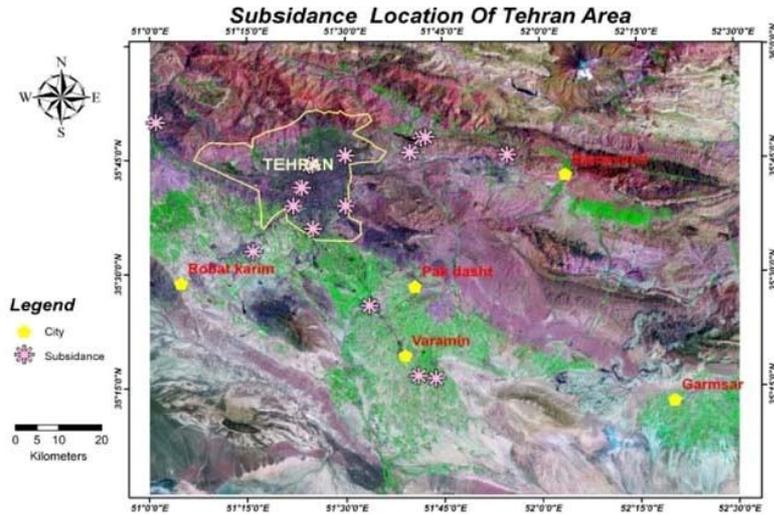


Fig. 18: Tehran area settlements situations on satellite image (Pink stars show settlement position).

### 6- DAMAVAND VOLCANO

Damavand volcano with conical structure has been located in north of Iran and 50 km north of Tehran with high 5670 ( fig. 19).

Different scientists have studied on the Damavand volcano (Gansser and Hubber, 1962; Jung et al, 1976; Emami, 1989; Davidson et al., 2000, 2004; Hassanzadeh, 2001; Darvishzadeh, 2001). Based on total considerations, Damavand volcano can be one of the conical volcanoes has been located in collection of pyroclastic rocks of Karaj formation in Iran and has been extended to north west in lesser Caucasus (Alavi, 1991), and because of delay volcanism (structurally in the suitable regions) in a retrogressive back arc basin has been come to surface. The same back arc basin has been developed because of Neotethyan subduction (with fast dip) in border of east south part of black sea to south border of Caspian sea (central Alborz) .Therefore, it could be acknowledged that the ability of Damavand volcano (lava and solid particles) will decrease from now, but small pick of activity is expected.

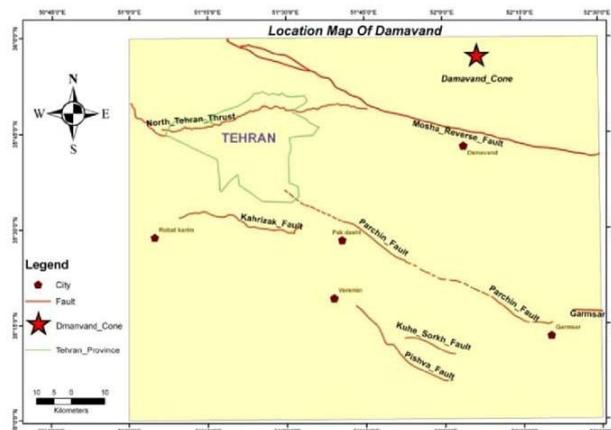


Fig. 19: The locating of Damavand volcano and main faults of the Tehran area (this location has been taken from topography map of Tehran), and has been prepared in ARC GIS soft ware in scale of 1:250,000.

7- DAMS

According to researches and studies on tree main dams of Tehran area and estimating probability hazards in future, Latyan Dam from tectonic situation has been located in nearing region of two main seismogenic faults (fig. 20).

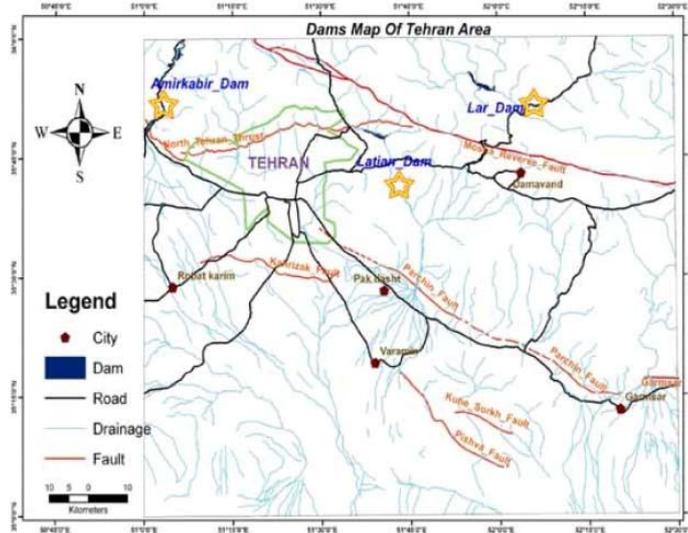


Fig. 20: Position of tree main Dams of the Tehran area (this map has been prepared from topography map of the Tehran) and has been analyzed in ARC GIS soft ware in scale of 1:250000, stars show the cities).

Therefore it is an area with assembly of strain and according to background of dam (consist of two minor fault in right side fulcrum of dam that its activity can cause damaging and more influence water to bottom Latyan dam and accelerate to weathering of rocks), this dam from tectonic position is more active than other two dams, therefore it has highest hazard from damage and failure in future. If probably failure makes problems in roads particularly Sadr highway, also destroy buildings (Darvazeh city). In next stage of hazard is Lar dam, because this dam has been located in nearness of Mosha fault (fig. 20). Studies of structural, morphotectonics and seismology show dam region is active and also according to the kind of dam (Earth dam) is unstable against to earthquake (Vafaiian, 1995). Damages of Lar dam consist of destroying Polour city and next stage Abe-Ask city and also close the road Tehran-Amol. At last there is Karaj dam because of locating in south part of central Alborz with active tectonics.

8- RELATIVE ESTIMATE OF GEOLOGY HAZARDS OF TEHRAN AREA

Total data and investigations have been presented in previous parts, digit of geology maps, field studies, consideration of measurements and analysis final data layers in Arc GIS Software; relative geology hazards of Tehran area have been considered. In fact geologic hazard map of Tehran area based on the number of geology evidences and their hazards in 1:250/000 scales have been prepared (fig. 21).

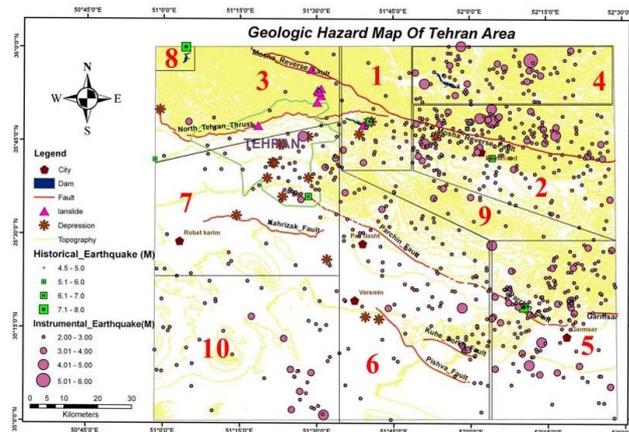


Fig. 21: Geologic hazard map of the Tehran area (this map has been prepared in ARC GIS software from total data and considerations in scale of 1:250000).

Finally, Tehran area has been divided to 10 zones with different intensify and degree of Hazard (1 to 4). In following about every zone have been explained.

Zone 1: this zone has been located in nearing region of two main seismogenic faults (Mosha and North Tehran faults) and has high assembly strain (Talwani1999). So it is an active region. In addition to (map 10) other geology evidences such as landslide, settlement and also a historical earthquake (6.1-7) have been observed. Latyan dam is one of the tree dams of Tehran area which has been located in this zone. Finally according to hazards of these evidences, first degree to this zone has been given.

Zone 2: to this zone according to existence of Mosha fault, many epicenters of earthquakes with magnitude more than 5 degree in Richter scale, Historical earthquake and settlement evidence, second degree have been given.

Zone 3: this zone because of position of Mosha fault, North Tehran fault and also landslides have been given third degree.

Zone 4: this zone according to many epicenter earthquakes particular epicenters with magnitude >4 degree in Richter scale, Lar dam and Damavand cone has been located in third degree.

Zone5: This zone is consist of nearing region of two Parchin and Garmsar faults, earthquakes epicenter with magnitude >4 degree in Richter scale and also a Historical earthquake with magnitude 7.1, so it has been located in second degree.

Zone 6: This zone is consist of two main faults (Pishva and Kuh-e Sorkh), many of earthquakes epicenter and settlement evidence in west of Pishva fault. So third degree has been given to this zone.

Zone7: this zone is consisting of Tehran city limited (Except northeast parts) and apart of south region of outside of Tehran city. In fact this zone strategically is very important but according to many locations of settlements, existence Kahrizak fault and a historical earthquake with magnitude 6.1, second degree to this zone have been given.

Zone 8: to this zone according to position of Karaj dam and a historical earthquake >7, third degree have been given.

Zone 9: this zone is consisting of south part of central Alborz in east of Tehran area and few epicenter of earthquakes with small to medium magnitude, fourth degree to this zone have been given.

Zone 10: this zone is consist of south west part of Tehran area and like to zone 9 is containing earthquakes epicenter with small to medium magnitude, have been given fourth degree to this zone.

## CONCLUSION

In this investigation have been distinguished that studied area include seven main seismogenic faults and have not been found any evidence to existence of North and South Rey faults. With calculation of geomorphic indexes, Mosha fault as the most of level of relative active tectonic has been known. Also North Tehran fault has the highest of movement potential (90%) and Pishva fault has the lowest movement potential (10%) in current tectonic regime. Karaj- Tehran, Oshan- Fasham, Fasham-Meygon, Amol-Tehran, a part of Farahzad valley, the road around of Latyan dam and also north of Tehran city from Darband to Hesarak which have been located on north Tehran fault have high potential of landslide that the first factor is nearness to main seismogenic faults and Earthquakes with magnitude more than 6 degree in Richter scale. Also south part of Tehran area has been introduced with high settlement potential, that the first factor is irregular withdraw from under ground waters that influence of second factor (tectonic evidence, building, kind of soil) this phenomenon has been happened or intensified. With total studies on the Damavand volcano have been acknowledged ability of volcano (lava and solid particles) will decrease from now. In study on hazard potential of dams have been recognized Latyan dam has been located in first degree and Lar and Karaj dams according to have been situated in next degrees. Finally with total investigations, geologic Hazard map (1:250/000) has been prepared and relative Hazards of Tehran area have been evaluated; so this area has been divided to 10 zones from one to four ranking of risk.

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