

**JSCE** International Roundtable Meeting Part I & II  
5, 6 September 2012; Nagoya University

## The Aftermath of 23.10.2011 & 09.11.2011 VAN-TURKEY EARTHQUAKES





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### TURKEY and MAJOR NATURAL DISASTER RISKS

- Geographically, Turkey has **7 regions**. This is due to climate, topography and neighborhood; however not to official governmental administration.
- We have **81 provinces**, each having independent governorships and municipalities. Each province has various numbers of districts, each having smaller municipalities and governorship offices.
- Please NOTE THAT: Mayors are elected by central voting of the public, while governors are appointed by the republic !

### TURKEY and MAJOR NATURAL DISASTER RISKS



EQs, floods, hurricane

North shores suffers serious floods and landslides; south suffer NAF !

HIGHLANDS: EQs; landslide due to snow

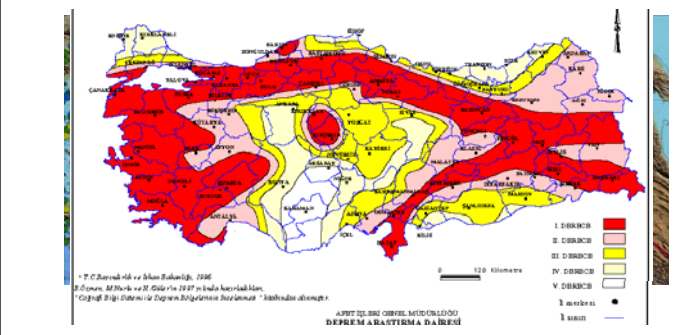
EQs; hurricane and floods

EQs; Draught

EQs; hurricane and somehow tornadoes

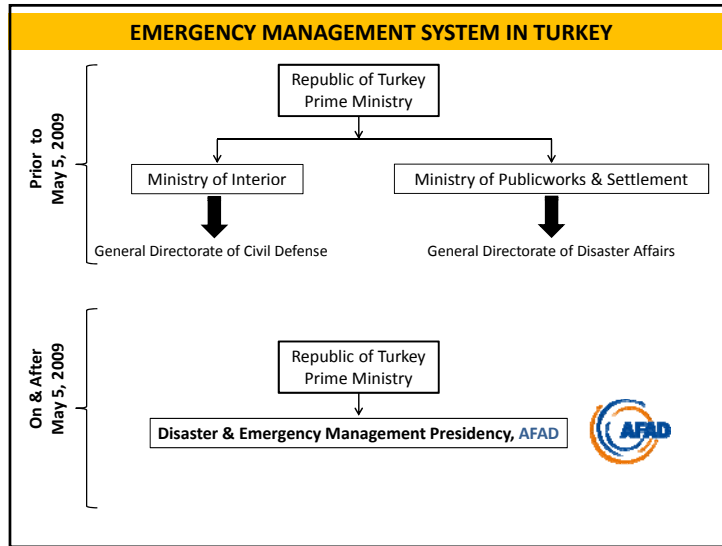
Hurricane & Draught slightly. THAT'S WHY THE NATIONS CAPITAL ANKARA IS SETTLED IN

### TURKEY and MAJOR NATURAL DISASTER RISKS



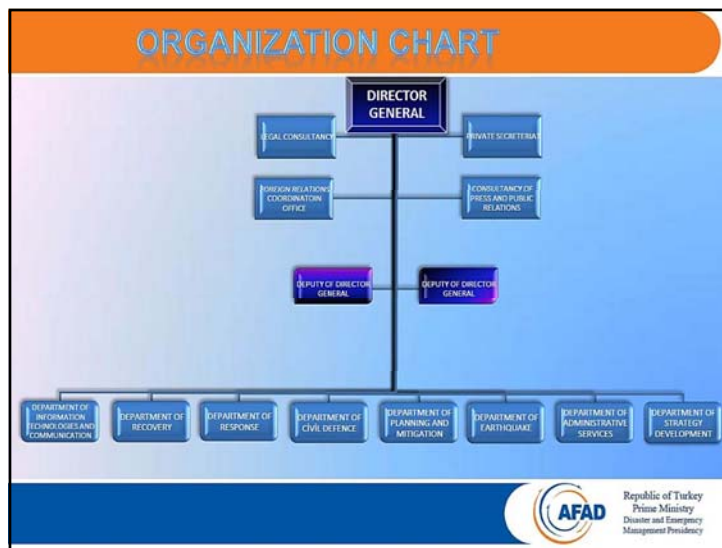
Epicentral Distribution of Turkish Earthquakes: 1900-2002

**M ≥ 5.0**



### EMERGENCY MANAGEMENT SYSTEM IN TURKEY

- Turkey's Disaster Management System mainly focused on post-disaster period and there were no incentives or legislations to encourage risk-analysis or risk-reduction approaches before a disaster event
- The 2 major earthquakes of **M7.4 August 17, 1999 Kocaeli** and **M7.2 November 11, 1999 Düzce** became the **'turning point'** in disaster management system of Turkey.
- In order to take necessary measures for an effective emergency management and civil protection issues nationwide, AFAD conducts:
  - Pre-incident works (preparedness; mitigation; risk management)
  - On-incident works (response)
  - Post-incident works (recovery; reconstruction)
  - Collaboration and cooperation between governmental-NGO-private institutions as well as public universities
  - Handles and operates the official strong motion network



### EMERGENCY MANAGEMENT SYSTEM IN TURKEY

- Directly dependent to General Director, there is the **EARTHQUAKE ADVISORY COMMITTEE** with members from government, academy and Turkish Red-Crescent. They were the leading committee to propose the **Earthquake Strategy Plan-2023**.
- Istanbul Metropolitan Municipality realized the research project called **'Istanbul Earthquake Master Plan'** by the collaboration of 4 major universities of Turkey.
- **Microzonation** for seismically prone zones of big cities are almost completed within the recent 13 years after 1999 EQs.

### EMERGENCY MANAGEMENT SYSTEM IN TURKEY

**In the academic point of view:**

- **Kandilli Observatory and Earthquake Engineering Research Institute (KOERI)** of Bosphorus University is also providing: EQ strong motions; weather forecast; geotechnical problems due to natural hazards.
- **Istanbul Technical University (ITU) & Federal Emergency Management Agency (FEMA)** initiated the collaborative project **ACHIEVE** in 2000.
  - We established our **'Center of Excellence for Disaster Management'** in ITU in early 2001.
  - We trained many 'trainers' from public institutions: Governor's departments, municipal departments; fire fighters; search & rescue teams; etc.
  - We initiated the first **'Emergency Management Master's Program'** in Turkey.
- Collaboration with **JICA** for many years led us to establish our own EQ Eng. research labs; training; furthermore we were the key institution for the **'THIRD COUNTRY TRAINING'**.
- **JICA** also collaborated with Governmental Agencies and Municipalities.
- Today many universities have EQ Eng. Research Institutes offering MSc and PhD programs.

### 2011 VAN EARTHQUAKES of TURKEY

Settled in the eastern Turkey, Van has 1<sup>st</sup> and 2<sup>nd</sup> degrees of seismic zones.

VAN FAULT is recently discovered !

### 2011 VAN EARTHQUAKES of TURKEY

22 Stations nearby recorded the shakes, however the closest station in downtown Van City Center lost its power...

This station was settled in a governmental building and the battery was dead !!!

Station No.	R <sub>epi</sub> (km)	MS	PGA	EW
1	42.29	178.30	588.30	
2	56.51	44.50	58.00	
3	113.32	28.86	16.00	
4	118.63	48.80	432.24	
5	119.58	8.00	5.17	
6	170.06	63.31	8.80	
7	211.71	4.58	4.20	
8	227.73	8.00	8.59	
9	228.96	1.53	11.28	
10	268.32	3.07	1.81	
11	388.09	1.20	1.19	
12	261.42	4.51	34.41	
13	327.21	2.12	1.74	
14	217.21	4.48	1.81	
15	242.71	1.48	1.13	
16	268.38	1.94	1.32	
17	216.66	1.68	1.10	
18	361.20	1.00	1.00	
19	428.57	1.89	2.71	
20	440.75	1.50	1.00	
21	511.09	1.12	0.54	
22	561.00	1.74	1.11	

### 2011 VAN EARTHQUAKES of TURKEY

Source	Coordinates		Magnitude	Depth (km)
	N	E		
AFAD <sup>1</sup>	38.6890	43.4657	6.7 (M <sub>L</sub> ), 7.0 (M <sub>w</sub> )	19.02
KOERI <sup>2</sup>	38.7518	43.3400	6.6 (M <sub>L</sub> ), 7.2 (M <sub>w</sub> )	5.00
USGS <sup>3</sup>	38.6911	43.4977	7.1 (M <sub>w</sub> )	16.00
EMSC <sup>4</sup>	38.78	43.40	7.2 (M <sub>w</sub> )	10.00

Recorded PGA= 178.5 gal  
Epicentral distance R=43 km  
Estimated PGA= 250.0 gal

Source	Coordinates		Magnitude	Depth (km)
	N	E		
AFAD	38.4472	43.2638	5.6 (M <sub>L</sub> )	6.09
KOERI	38.429	43.234	5.6 (M <sub>L</sub> )	5.00
USGS	38.349	43.403	5.7 (M <sub>w</sub> )	4.00
EMSC	38.42	43.29	5.7 (M <sub>w</sub> )	6.00

Recorded PGA= 245.9 gal  
Epicentral distance R=17 km


### 2011 VAN EARTHQUAKES of TURKEY

**23.10.2012 Tabanlı-VAN EQ**


- Severe damage in Ercis district: 52 of 18,424 buildings totally collapsed
- 6 totally collapsed in central Van
- 5 villages almost wiped-off the map
- 604 casualties
- 222 rescued under the ruins
- More than 2000 injured
- Thousands of farm animals and hundreds of barns are lost

**09.11.2012 Edremit-VAN EQ**

- Severe damage in Van City: 25 buildings totally collapsed including 2 Hotels in service.
- 40 casualties
- 30 rescued under the ruins
- UNFORTUNATELY**, the 2 hotels were hosting search & rescue teams, journalists, volunteers from national and international NGOs.




Bayram Hotel before 09.11.2011




Bayram Hotel at 10.11.2011 morning

### 2011 VAN EARTHQUAKES of TURKEY



**Atsushi MIYAZAKI (MD)**  
rip: 10.11.2011



**Miyuki KONNAI**  
Rescued under ruins after 5.5 hours

Japan Association for Aid and Relief (AAR) Volunteers

### RESPONSE STAGE





Led by the Governorship of Van Province and local AFAD:

- Initiated right after the first EQ within half an hour.
- First rescue operations were carried out by people...
- Official Search & Rescue Teams started their operations immediately, both in Ercis District and central Van.
- Arrival of official S&R Teams from other provinces and S&R Teams of NGOs started at the end of the day.
- TOTALLY 222 people from the first EQ and 30 people from the second are rescued under the ruins of collapsed buildings all ALIVE...









Mucize haber 102. saatte geldi

### RESPONSE STAGE

Donations from all over the country started to be gathered all around the nation next day. However, Van Airport was slightly damaged which delayed the landing of planes for half of the day. The damage was quickly repaired...



...however, the donations arrived to Van by air traffic were too much to stock, henceforth the landing area were full of containers.

**RESPONSE STAGE**

Initial Damage Assessment started 2 days after the main-shock, while there were hundreds of after-shocks and still ongoing S&R operations...

Istanbul Technical University was the first to arrive the site on the 26th of October for giving a hand and scientific research as well.



In collaboration with Governor of Van and AFAD officials, our team assessed structural damages in public buildings, governmental buildings and some schools in Van city center; Ercis district; and 7 villages between 26-29 October 2011. Furthermore, research teams from other public and private universities arrived the region for similar purposes.

**RESPONSE STAGE**



Preliminary assessment results indicated landslides and liquefaction around Ercis district and typical construction failures due to poor quality of materials, detailing, workmanship, etc. to cause the damages.


**RESPONSE-to-RECOVERY STAGE**

- Since the region was populated almost one million with more than 400,000 buildings; AFAD was not able to realize damage assessment alone in a short while. Universities and civil engineers and architects were invited for help via Chamber of Civil Engineers and Chamber of Architects. Japanese Research Groups arrived the region twice.
- Many people left the city especially after the second earthquake. People were terrorized with horror...
- School children are transferred to other provinces all around the country. Ministry of Education cooperated with Governorship of Van immediately.
- Many homeless were hosted by 5 star hotels, holiday villages, governmental facilities in the Aegean and Mediterranean Regions of Turkey, where the weather was warm enough. Ministry of Tourism and Culture cooperated with Governorship of Van.
- Public universities were invited by Ministry of Education for damage assessment of school buildings. ITU alone surveyed 135 buildings.
- Still detailed investigation of moderately damaged buildings and strengthening work is going on.

**RECOVERY STAGE**

During the response stage of emergency management, S&R; first-aid and health teams from 48 provinces and 39 private organizations arrived the region.

In 14 different sheltering locations temporary housing was provided by 71,500 tents. Turkish Red-Crescent was holding around 60,000 tents. Foreign countries donated tents and other needful things immediately:



**European-Union Countries: 4,575 tents**

UK: 1144	Ireland: 624
Germany: 500	France: 490
Belgium: 400	Luxemburg: 360
Spain: 329	Estonia: 329
Sweden: 155	Denmark: 100
Romania: 100	Austria: 32
Slovakia: 10	Slovenia: 2

**Other Countries' Donations:**  
 Japan (via JICA): 30 million JPY; tents; first-aid kits; LETTERS !  
 Azerbaijan: 1000 tents; 40 generators; 40 kitchens; 2000 blankets  
 Iran: 700 tents  
 Israel: 100 (prefabricated-housing)  
 Saudi Arabia: 5,000,000 USD  
 Macedonia: 100,000 USD  
 Northern Iraq: 1,000,000 USD  
 Greece; Bosnia-Herzegovina; Russia.... We are very grateful...

**RECOVERY STAGE**







At the end of February, tents are replaced with container-cities. Within 34 temporary housing location, 28,500 containers and prefabricated houses are settled housing 180,000 people.









**RECOVERY STAGE**

Meanwhile, Turkish Prime-Ministry, **Housing Development Administration of Turkey (TOKI)** initiated 136 different projects having 202,750 independent units for those homeless people.

Currently 10,100 people are working in the construction sites and concrete capacity is 15,000m<sup>3</sup> per day in 5088 hectares of new settlement area. Tunnel formwork system is preferred for its speed.



**FINAL WORDS**

It is announced by Turkish Government that the cost of Van EQs to Republic of Turkey will be

**5,500,000,000 TRL  $\cong$  3,030,700,000 USD  $\cong$  238,222,500,000 JPY**

⇓

*more and even more TAXes...*

The best action taken by the government was enforcing the **New Law** on 31.05.2012 called:

**'The Law on the Renewal of Urban Settlement Areas Subjected to Disaster Risk'**

We believe that with this law, mitigation and risk-reduction before a future disaster event will be realized, so that we will have less loss of human lives, buildings and money...

**THANK YOU VERY MUCH FOR LISTENING**